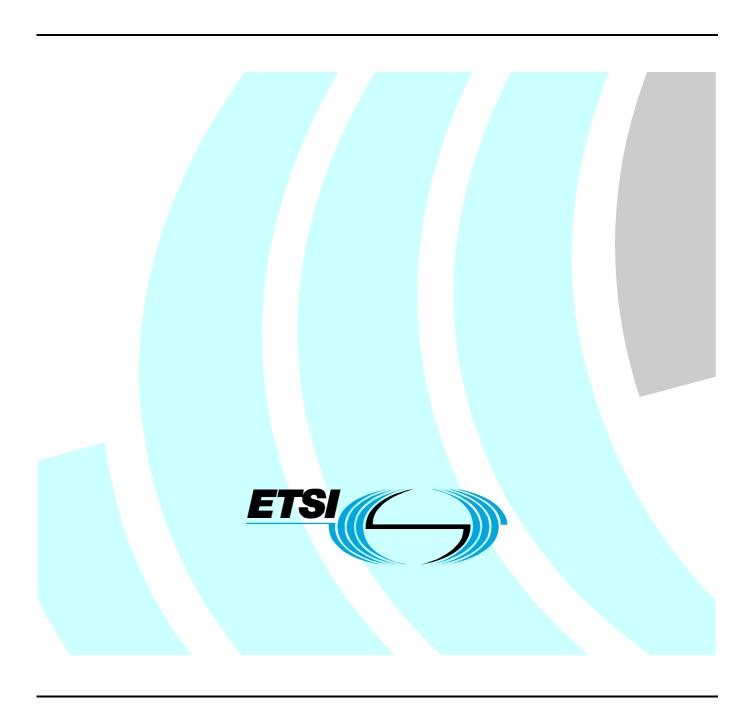
# ETSITS 186 011-2 V2.1.1 (2009-02)

Technical Specification

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN);
IMS NNI Interworking Test Specifications;
Part 2: Test Descriptions for IMS NNI Interworking



## Reference RTS/TISPAN-06033-2-NGN-R1

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## **Foreword**

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

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

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

Part 2: "Test Descriptions for IMS NNI Interworking".

# 1 Scope

The present document specifies interoperability Test Descriptions (TDs) for IMS 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 Release 7 [1]. TDs have been specified on the basis of the Test Purposes (TPs) and Test Suite Structure (TSS) presented in TS 124 229 [1]. 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 (TS 124 410 [10]), CDIV (TS 124 404 [11]), ACR-CB (TS 124 411 [12]) and OIP/OIR (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 [6].

# 2 References

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

- For a specific reference, subsequent revisions do not apply.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

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## 2.1 Normative references

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

- [1] ETSI TS 124 229:" Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229 version 7.2.0 Release 7)".
- [2] ETSI TS 186 011-1 (V2.1.1): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS NNI Interworking Test Specifications; Part 1: Test Purposes for IMS NNI Interworking".

- [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: "Universal Mobile Telecommunications System (UMTS); 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 version 7.0.0 Release 7)".
- [7] ETSI TS 133 203: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); 3G security; Access security for IP-based services (3GPP TS 33.203 version 6.10.0 Release 6)".
- [8] IETF RFC 2617: "HTTP Authentication: Basic and Digest Access Authentication".
- [9] IETF RFC 2806: "URLs for Telephone Calls".
- [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 version 7.0.0 Release 7)".
- [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 version 7.0.0 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 version 7.0.0 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 version 7.0.0 Release 7)".

## 2.2 Informative references

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

- [i.1] ETSI TR 133 978: "Universal Mobile Telecommunications System (UMTS); Security aspects of early IP Multimedia Subsystem (IMS) (3GPP TR 33.978 version 6.6.0 Release 6)".
- [i.2] ETSI TR 123 981: "Universal Mobile Telecommunications System (UMTS); Interworking aspects and migration scenarios for IPv4-based IP Multimedia Subsystem (IMS) implementations (3GPP TR 23.981 version 6.4.0 Release 6)".

# 3 Abbreviations

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

3GPP3rd Generation Partnership ProjectACRAnonymous Communication RejectionAKAAuthentication and Key Agreement

AS (IMS) Application Server

CB Call Barring
CDIV Call DIVersion
CF (Test) Configuration

CFW Call Flow CN Core Network

CSCF Call Session Control Function

DHCP Dynamic Host Configuration Protocol

DNS Domain Name System
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 ISC IMS Service Control

NNI Network-to-Network Interface
OIP Originating Identification Presentation
OIR Originating Identification Restriction

OIR Originating Identification Restriction
PCO Point of Control and Observation

P-CSCF Proxy CSCF
PO Point of Observation

PSTN Public Switched Telephone Network

SA Security Association S-CSCF Serving CSCF

SDP Session Description Protocol SIP Session Initiation Protocol SUT System Under Test

TCP Transmission Control Protocol

TD Test Description

TISPAN Telecommunications and Internet converged Services and Protocols for Advanced Networking

TP Test Purpose

TPLan Test Purpose Notation TSS Test Suite Structure

UC Use Case

UE User Equipment

URI Uniform Record Identifier
VoIP Voice over Internet Protocol
XML 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].

## 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:

Step	Direction		Message	Comment		
	UE	IMS				
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>	•	200 OK	The IMS responds with 200 OK.		
5	$\rightarrow$	•	SUBSCRIBE	The UE subscribes to its registration event package.	ţe	
6	<b>+</b>	•	200 OK	The IMS responds with 200 OK.	ξĘ	
7	+	•	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.	Unprotected	
8	<b>→</b>	·	200 OK	The UE responds with 200 OK.		

# 4.2.3.1.2 Full IMS Registration and Subscription Call Flow

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

Step	Direction	Message	Comment	
	UE IMS			
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).	ļ.,
3	$\rightarrow$	REGISTER	The UE sends initial registration for IMS services.	0
4	<b>←</b>	401 Unauthorized	The IMS responds with a valid Digest AKA	Unprotected
			authentication challenge and a list of integrity and	Ě
			encryption algorithms supported by the network as	pro
			defined in the IMS AKA procedure of	٦ ا
			TS 133 203 [7].	
5			Upon receipt of 401 Unauthorized, the UE selects	
			the first integrity and encryption algorithm	
			combination on the list received from the P-CSCF in	
			401 Unauthorized which is also supported by the	
			UE. If the P-CSCF did not include any	
			confidentiality algorithm in 401 Unauthorized then the UE shall select the NULL encryption algorithm.	
			The UE then proceeds to establish two new pairs of	
			IPSEC security associations (SA1 and SA2).	
6	$\rightarrow$	REGISTER	The UE sends another REGISTER with	$\vdash$
		REGIOTER	authentication credentials over IPSEC security	ed L
			association SA1.	SA
7	+	200 OK	The IMS responds with 200 OK over the same	Protected bv SA1
'	-		IPSEC security association SA1.	₾ _
8	$\rightarrow$	SUBSCRIBE	The UE subscribes to its registration event package	
			over the IPSEC security association SA2.	
9	<b>←</b>	200 OK	The IMS responds with 200 OK over the IPSEC	72
			security association SA2.	Ś
10	+	NOTIFY	The IMS sends initial NOTIFY for registration event	Protected by SA2
			package, containing full registration state	eq
			information for the registered public user identity in	ect
			the XML body, over the IPSEC security association	ğ
			SA2.	<u>-</u>
11	$\rightarrow$	200 OK	The UE responds with 200 OK over the IPSEC	
			security association SA2.	

## 4.2.3.1.3 SIP Digest Registration and Subscription Call Flow

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

Step	Direction UE IMS	Message	Comment		
1			The UE establishes an IP bearer as required by its specific access network (optional).		
2	←→		P-CSCF address discovery using DHCP procedures for IPv4 (optional).		
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	<b>→</b>	REGISTER	The UE sends another REGISTER with authentication credentials.	ρé	
6	+	200 OK	The IMS responds with 200 OK.	헗	
7	<b>→</b>	SUBSCRIBE	The UE subscribes to its registration event package.	Unprotected	
8	+	200 OK	The IMS responds with 200 OK.	ゔ	
9	+	NOTIFY	The IMS sends initial NOTIFY for registration event package, containing full registration state information for the registered public user identity in the XML body.		
10	$\rightarrow$	200 OK	The UE responds with 200 OK.		

# 4.2.4 Supported Options

## 4.2.4.1 Security

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

## 4.2.4.2 Signalling Compression

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

## 4.3 Test Infrastructure

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

## 4.3.1 Core IMS Nodes

Because the current testing scope excludes IMS roaming and 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 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 where no topology hiding is applied the Mw interface 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 topology hiding is applied, the Mw interface 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.

## 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 topology hiding is applied, the Mw interface 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.

#### 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

The IBCF is the core IMS node providing topology hiding. When topology hiding is applied, the Ic interface 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. The Mw interfaces between IBCF and I- or 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 interfaces are exposed for troubleshooting purposes.

#### 4.3.1.4.1 Node Configuration

The IBCF should be configured to support the pre-requisites outlined in clause 4.2. The need to activate the IBCF as part of an IMS core network depends highly on the test description 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 is not activated.

#### 4.3.1.4.2 Relevant Interfaces

#### 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	Public Identity 2 (Tel URI)	Default Public Identity	Filter criteria
user_1_priv	user_1_pub	n.a.	1	na
user_2_priv	user_2_pub	e.g. tel:0633348273	1	na
user_3_priv	user_3_pub	e.g. tel:0633348274	2	na
user_4_priv	user_4_pub	n.a.	1	terminating_unregistered/INVITE/ SESSION_TERMINATED/ as-1.ims-a.net
user_5_priv	user_5_pub	n.a.	1	TODO
user_6_priv	user_6_pub	n.a.	1	TODO

Public user identity may take the form of SIP or TEL URIs (RFC 2806 [9]).

EXAMPLE 1: sip:user\_1\_pub@ims\_a.net

EXAMPLE 2: tel: 0633348273@ims\_a.net

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

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

## 4.3.2 External IMS 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 (TS 124 410 [10]), CDIV (TS 124 404 [11]), ACR-CB (TS 124 411 [12]) or (TS 124 407 OIP/OIR [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

The application server (AS) is considered to act as a stimulus node in this test specification. The ISC interface between the S-CSCF and the AS is used as a Point of Control and Observation (PCO) 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 at least one of the supplementary services HOLD (TS 124 410 [10]), CDIV (TS 124 404 [11]), ACR-CB (TS 124 411 [12]) or (TS 124 407 OIP/OIR [13]).

## 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.

## 4.3.3.1.2 Node Configuration

DNS should be configured for appropriate resource record handling as required to support proper resolution of all SIP URIs in Request URIs and Route headers. In addition, DNS must support ENUM functionality in order to resolve Tel URIs into SIP URIs. As an example, a DNS should have an entry to map E.164 number 0633348273 with user user\_2\_priv@ims\_a.net.

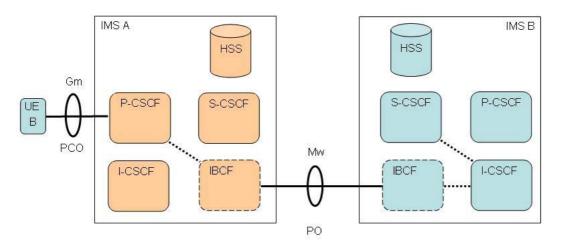
# 4.3.4 Test Configurations

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 SUT(s) connectivity and associated UE(s), AS(s) and DNS(s).

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

# Roaming Registration

# CF\_ROAM\_REG



#### Precondition:

Different network operators acting as home and visited IMS, UE\_B roaming in IMS\_A (ROAM), UE\_B not yet registered (REG), neither UE\_A nor AS involved, IBCF only if topology hiding required Test configuration for:

Registration requests and responses from UE\_B

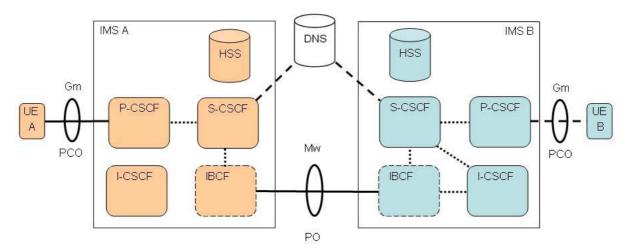
Example:

REGISTER prior to IMS VoIP voice call from UE\_B

Figure 1: CF\_ROAM\_REG

# Interworking Call

# CF\_INT\_CALL



#### Precondition:

Different network operators acting as originating and terminating IMS, both UEs or only UE A in home networks (INT), both UEs registered, no AS, DNS may be involved, IBCF only if topology hiding required
Test configuration for:

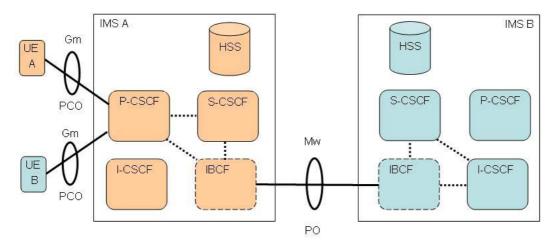
Requests and responses between UE\_A and UE\_B in call (CALL) and messaging scenarios Unsuccessful initial requests and responses from UE\_A (when UE\_B is not registered)

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

Figure 2: CF\_INT\_CALL

## Roaming Call

# CF\_ROAM\_CALL



#### Precondition:

Different network operators acting as home IMS for UE\_A and UE\_B, UE\_B roaming (ROAM) in network IMS\_A, UE\_A in home network, both UEs are registered, no AS, IBCF only if topology hiding required

Test configuration for:

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

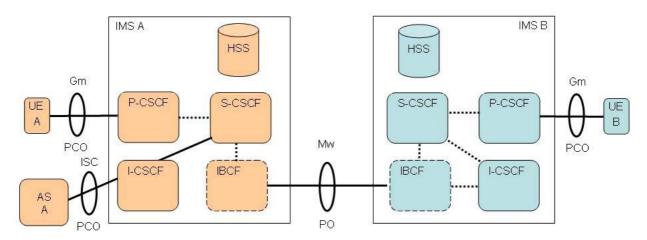
Example:

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

Figure 3: CF\_ROAM\_CALL

## Interworking Application Server

# CF\_INT\_AS



## Precondition:

Different network operators acting as originating and terminating IMS, UE\_A and UE\_B in home networks (INT), both UEs registered, only AS for UE\_A (AS), IBCF only if topology hiding required Test configuration for:

Requests and responses between AS\_A and UEs

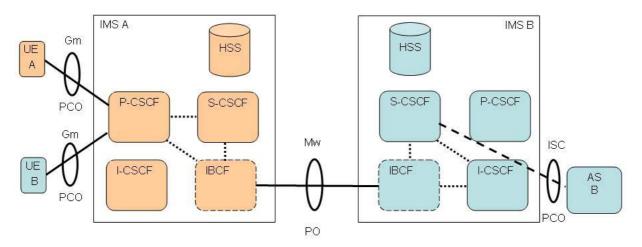
#### Example:

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

## CF\_ROAM\_AS



Precondition:

Different network operators acting as home IMS for UE\_A and UE\_B, UE\_B roaming (ROAM) in IMS\_A, UE\_A in home network, both UEs or registered, AS for UE B may be involved (AS), IBCF only if topology hiding required

Test configuration for:

Requests and responses between AS B and UEs

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

Example

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

Figure 5: CF\_ROAM\_AS

## 4.4 Use Cases

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

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

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

# 4.4.1 IMS Registration in a Visited Network

## 4.4.1.1 Description

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

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

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

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

The expected call flow sequence is:

Step	[	Directio	n		Message	Comment
		s	U I E M B S A	M S B		
1			<b>)</b>			User B triggers registration to IMS B
2			$\longrightarrow$		REGISTER	UE_B sends a REGISTER to IMS_A
3				$\longrightarrow$	REGISTER	IMS_A forwards the REGISTER to IMS_B
4			<b>←</b>		401 Unauthorized	IMS_B responds with 401 Unauthorized to IMS_A
5			$\leftarrow$		401 Unauthorized	IMS_A forwards the 401 Unauthorized to UE_B
6			$\longrightarrow$		REGISTER	UE_B sends the same REGISTER containing authentication challenge response to IMS_A
7				$\longrightarrow$	REGISTER	IMS_A forwards the REGISTER to IMS B
8			⊢ ←		200 OK	IMS_B responds with 200 OK
9			$\leftarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
10			<u> </u>	$\longrightarrow$	SUBSCRIBE	IMS_A sends a SUBSCRIBE to IMS_B
11					200 OK	IMS_B responds with a 200 OK
12			<b>├</b>		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing UE_B's registration status
13				$\longrightarrow$	200 OK	IMS_A responds to the NOTIFY with a 200 OK
14			$\longrightarrow$		SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event package) to IMS_A
15				$\longrightarrow$	SUBSCRIBE	IMS_A forwards the SUBSCRIBE request to IMS_B
16			<b>←</b>		200 OK	IMS_B responds to the SUBSCRIBE with a 200 OK
17			<b>—</b>		200 OK	IMS_A forwards the 200 OK response to UE_B
18			<b>←</b>		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing UE_B's registration status
19			<b>—</b>		NOTIFY	IMS_A forwards the NOTIFY to UE_B
20			$\longrightarrow$		200 OK	UE_B responds to the NOTIFY with a 200 OK
21				$\longrightarrow$	200 OK	IMS_A forwards the 200 OK to IMS_B
22		<b>K</b>	-			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).

Step	Action	CF_INT_CALL	CF_ROAM_CALL
1	User A calls User B	Step 1	Step 1
2	User B is informed of incoming call of User A	Step 8	Step 10
3	User A is informed that UE_B is ringing	Step 12	Step 15
4	User B answers call	Step 13	Step 16
5	User A is informed that call has been answered	Step 17	Step 21
6	User B is informed that the call is established	Step 21	Step 26
7A	User A ends call	Step 22A	Step 27A
7B	User B ends call	Step 22B	Step 27B
8A	User B is informed that call has ended	Step 26A	Step 32A
8B	User A is informed that call has ended	Step 26B	Step 32B
9A	User A is informed that call has ended	Step 30A	Step 37A
9B	User B is informed that call has ended	Step 30B	Step 37B

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

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

Step			Direc	ction			Message	Comment
	U	U	_	I	U	U		
	s	E	M	M	E	S		
	e	Α	S	S B	В	e		
	r A		A	В		r B		
1		$\rightarrow$					IND UTE	User A calls User B
2							INVITE	UE_A sends INVITE with the first SDP offer
			$\overline{}$					indicating all desired medias and codecs that UE_A supports
3	,						100 Trying	IMS_A responds with a 100 Trying provisional
		$\leftarrow$					100 Trying	response
4	•			$\longrightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
5	·						100 Trying	IMS_B responds with a 100 Trying provisional
								response
6					$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
7				<b>—</b>			100 Trying	UE_B optionally responds with a 100 Trying
-				-				provisional response
8							180 Ringing	User B is informed of incoming call of User A UE_B responds to initial INVITE with 180
9				$\leftarrow$			100 Kinging	Ringing to indicate that it has started alerting
10	·						180 Ringing	IMS_B forwards 180 Ringing response to
			$\leftarrow$					IMS_A
11	•						180 Ringing	IMS_A forwards the 180 Ringing response to
								UE_A
12	←							User A is informed that UE_B is ringing
13					$\leftarrow$		200 014	User B answers call
14				←			200 OK	UE_B responds to INVITE with 200 OK to indicate that the call has been answered
15			,				200 OK	IMS_B forwards 200 OK response to IMS_A
16	•	_	`				200 OK	IMS_A forwards the 200 OK response to UE_A
17	<b>←</b>						200 011	User A is informed that call has been answered
18							ACK	UE_A acknowledges the receipt of 200 OK for
			$\longrightarrow$					INVITE
19				$\longrightarrow$			ACK	IMS_A forwards ACK to IMS_B
20					$\rightarrow$		ACK	IMS_B forwards ACK to UE_B
21						$\rightarrow$		User B is informed that the call is established
22A		$\rightarrow$						User A ends call
23A	.		$\longrightarrow$				BYE	UE_A releases the call with BYE
24A 25A	.			$\rightarrow$			BYE BYE	IMS_A forwards BYE to IMS_B
26A							DIE	IMS_B forwards BYE to UE_B User B is informed that call has ended
27A				_			200 OK	UE_B sends 200 OK for BYE
28A	·		<u></u>				200 OK	IMS_B forwards 200 OK response to IMS_A
29A	·	$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
30A	<u>k</u>							User A is informed that call has ended
22B					$\leftarrow$			User B ends call
23B				$\leftarrow$			BYE	UE_B releases the call with BYE
24B			←				BYE	IMS_B forwards BYE to IMS_A
25B		←	=				BYE	IMS_A forwards BYE to UE_A
26B	. <b>├</b>							User A is informed that call has ended
27B	.   _		$\longrightarrow$				200 OK	UE_A sends 200 OK for BYE
28B	.			$\rightarrow$			200 OK	IMS_A forwards 200 OK response to IMS_B
29B					$\rightarrow$		200 OK	IMS_B forwards the 200 OK response to UE_B
30B								User B is informed that call has ended

# 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			D	irection	on			Message	Comment
•	U	U		J	U	ı	I		
	S	E		5	E	M	M		
	e r	Α		e r	В	S A	S		
	À			3		^			
1		$\rightarrow$							User A calls User B
2								INVITE	UE_A sends INVITE with the first SDP offer
		-				$\rightarrow$			indicating all desired media and codecs that
									UE_A supports
3		•	<del>(</del>					100 Trying	IMS_A responds with a 100 Trying provisional response
4								INVITE	IMS_A forwards INVITE to IMS_B
5								100 Trying	IMS_B responds with a 100 Trying provisional
									response
6 7						$\leftarrow$		INVITE	IMS_B forwards the INVITE to IMS_A
′						_	$\longrightarrow$	100 Trying	IMS_A responds with a 100 Trying provisional response
8					←			INVITE	IMS_A forwards the INVITE to UE_B
9						_		100 Trying	UE_B optionally responds with a 100 Trying
40									provisional response
10				(				180 Ringing	User B is informed of incoming call of User A UE_B responds to initial INVITE with 180
''						$\rightarrow$		Too Kinging	Ringing to indicate that it has started alerting
12								180 Ringing	IMS_A forwards 180 Ringing response to
							1	122.71	IMS_B
13						$\leftarrow$		180 Ringing	IMS_B forwards the 180 Ringing response to IMS_A
14								180 Ringing	IMS_A forwards the 180 Ringing response to
		•						100 1	UE_A
15	←				ŀ				User A is informed that UE_B is ringing
16 17					→			200 OK	User B answers call
17						$\rightarrow$		200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
18							$\longrightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
19						$\leftarrow$		200 OK	IMS_B forwards the 200 OK response to IMS_A
20	,	•	<del>(</del>					200 OK	IMS_A forwards the 200 OK response to UE_A
21								ACK	User A is informed that call has been answered UE_A acknowledges the receipt of 200 OK for
22		ŀ				$\rightarrow$		AOR	INVITE
23						_	$\longrightarrow$	ACK	IMS_A forwards ACK to IMS_B
24						$\leftarrow$		ACK	IMS_B forwards ACK to IMS_A
25				,	$\leftarrow$			ACK	IMS_A forwards ACK to UE_B
26		$\overline{}$							User B is informed that the call is established
27A 28A		7				_		BYE	User A ends call UE_A releases the call with BYE
29A						1	$\longrightarrow$	BYE	IMS_A forwards BYE to IMS_B
30A						$\leftarrow$		BYE	IMS_B forwards BYE to IMS_A
31A					←			BYE	IMS_A forwards BYE to UE_B
32A 33A				<b>(</b>				200 OK	User B is informed that call has ended UE B sends 200 OK for BYE
34A						$\neg oxed{oxed}$		200 OK 200 OK	IMS_A forwards 200 OK response to IMS_B
35A						$\leftarrow$		200 OK	IMS_B forwards the 200 OK response to IMS_A
36A		•			+	_		200 OK	IMS_A forwards the 200 OK response to UE_A
37A	$\leftarrow$								User A is informed that call has ended
27B					$\rightarrow$			DVE	User B ends call
28B 29B						$\rightarrow$		BYE BYE	UE_B releases the call with BYE IMS_A forwards BYE to IMS_B
30B						<b>—</b>		BYE	IMS_B forwards BYE to IMS_A
31B		•	(	<u> </u>	+	┩`		BYE	IMS_A forwards BYE to UE_A
32B	$\leftarrow$	$\dashv$							User A is informed that call has ended
33B					+	$\rightarrow$		200 OK	UE_A sends 200 OK for BYE
34B 35B						_		200 OK 200 OK	IMS_A forwards 200 OK response to IMS_B IMS_B forwards the 200 OK response to IMS_A
36B					<u></u>			200 OK	IMS_A forwards the 200 OK response to IWS_A
	,			•	1.	1	ı	L	

Step			Direc	ction			Message	Comment
	U	U	U	U	ı	ı		
	s	E	s	E	M	M		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
37B			$\leftarrow$					User B is informed that call has ended

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

Step			Direc	tion			Message	Comment
	U	U	C	U	ı	ı		
	S	Ε	S	Е	М	М		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
1			_	$\rightarrow$				User B calls User A
2							INVITE	UE_B sends INVITE with the first SDP offer
					$\longrightarrow$			indicating all desired media and codecs that
								UE_B supports
3				_			100 Trying	IMS_A responds with a 100 Trying provisional
				(				response
4						$\rightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
5					$\leftarrow$		100 Trying	IMS_B responds with a 100 Trying provisional
6					,		INVITE	response IMS_B forwards the INVITE to IMS_A
6 7	.						100 Trying	IMS_A responds with a 100 Trying provisional
'					<u> </u>	$\rightarrow$	100 Hyllig	response
8	}	_					INVITE	IMS_A forwards the INVITE to UE_A
9							100 Trying	UE_A optionally responds with a 100 Trying
					$\longrightarrow$			provisional response
10	$\leftarrow$							User A is informed of incoming call of User B
11							180 Ringing	UE_A responds to initial INVITE with 180
								Ringing to indicate that it has started alerting
12							180 Ringing	IMS_A forwards 180 Ringing response to
	,					1		IMS_B
13					←		180 Ringing	IMS_B forwards the 180 Ringing response to
	,						100 D: :	IMS_A
14				$\leftarrow$			180 Ringing	IMS_A forwards the 180 Ringing response to UE_B
15			,					User B is informed that UE_A is ringing
16		_						User A answers call
17		1					200 OK	UE_A responds INVITE with 200 OK to indicate
''					$\longrightarrow$		200 011	that the call has been answered
18	1					$\rightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
19					$\leftarrow$		200 OK	IMS_B forwards the 200 OK response to IMS_A
20				$\leftarrow$			200 OK	IMS_A forwards the 200 OK response to UE_B
21			←					User B is informed that call has been answered
22							ACK	UE_B acknowledges the receipt of 200 OK for
	.				1		1016	INVITE
23	.					$\rightarrow$	ACK	IMS_A forwards ACK to IMS_B
24	,				←		ACK	IMS_B forwards ACK to IMS_A
25		$\leftarrow$					ACK	IMS_A forwards ACK to UE_A
26	<u> </u>							User A is informed that the call is established
27A		$\rightarrow$					5)/5	User A ends call
28A	.				$\longrightarrow$		BYE	UE_A releases the call with BYE
29A						$\rightarrow$	BYE	IMS_A forwards BYE to IMS_B
30A 31A							BYE BYE	IMS_B forwards BYE to IMS_A IMS_A forwards BYE to UE_B
31A 32A							DIE	User B is informed that call has ended
33A							200 OK	UE_B sends 200 OK for BYE
34A	.						200 OK 200 OK	IMS_A forwards 200 OK response to IMS_B
35A					_		200 OK 200 OK	IMS_B forwards the 200 OK response to IMS_A
36A	·	_					200 OK	IMS_A forwards the 200 OK response to UE_A
JUA	ı	_			1	ı	200 011	INVIO_7 LIOI WAI AS THE ZOO OIL TESPONSE TO UL_A

Step			Direc	ction			Message	Comment
	C	U	U	U	ı	ı		
	S	E	S	E	M	M		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Ą		В					
37A	$\leftarrow$							User A is informed that call has ended
27B				$\rightarrow$				User B ends call
28B				_	$\longrightarrow$		BYE	UE_B releases the call with BYE
29B						$\longrightarrow$	BYE	IMS_A forwards BYE to IMS_B
30B					$\leftarrow$		BYE	IMS_B forwards BYE to IMS_A
31B		$\leftarrow$					BYE	IMS_A forwards BYE to UE_A
32B	←							User A is informed that call has ended
33B		-			$\longrightarrow$		200 OK	UE_A sends 200 OK for BYE
34B						$\longrightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
35B					$\leftarrow$		200 OK	IMS_B forwards the 200 OK response to IMS_A
36B				←			200 OK	IMS_A forwards the 200 OK response to UE_B
37B			$\leftarrow$					User B is informed that call has ended

## 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.

## 4.4.3.1 User-initiated call hold and resume using reINVITE

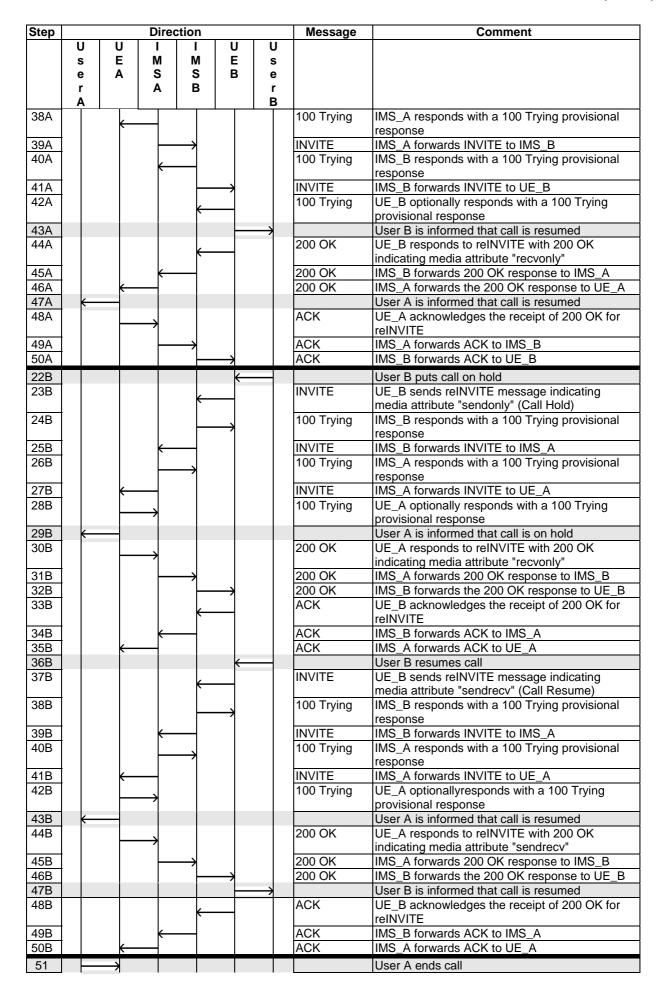
## 4.4.3.1.1 Description

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	8	10
3	User A is informed that UE_B is ringing	12	15
4	User B answers call	13	16
5	User A is informed that call has been answered	17	21
6	User B is presented that call is established	27	26
7A	User A puts call on hold	22A	27A
7B	User B puts call on hold	22B	27B
8A	User B is informed that call on hold	29A	36A
8B	User A is informed that call on hold	29B	36B
9A	User A resumes call	36A	45A
9B	User B resumes call	36B	45B
10A	User B is informed that call is resumed	43A	54A
10B	User A is informed that call is resumed	43B	54A
11A	User A is informed that call is resumed	47A	59A
11B	User B is informed that call is resumed	47B	59B
12	User A ends call	51	64
13	User B is informed that call has ended	55	69
14	User A is informed that call has ended	59	73

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

Step		D	irection			Message	Comment
	U	U	I I	_	U		
	s e		M M S S		s e		
	r		A B		r		
	A				В		
1		<del>-</del>					User A calls User B
2						INVITE	UE_A sends INVITE with the first SDP offer
		$ \rangle$					indicating all desired media and codecs that
3						100 Trying	UE_A supports IMS_A responds with a 100 Trying provisional
3		←	1			100 Trying	response
4			$\longrightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
5						100 Trying	IMS_B responds with a 100 Trying provisional
-	.					INVITE	response IMS_B forwards INVITE to UE_B
6 7						100 Trying	UE_B optionally responds with a 100 Trying
'						1.00 Trying	provisional response
8					>		User B is informed of incoming call of User A
9						180 Ringing	UE_B responds to initial INVITE with 180
10						190 Dinging	Ringing to indicate that it has started alerting
10			<del></del>			180 Ringing	IMS_B forwards 180 Ringing response to IMS_A
11						180 Ringing	IMS_A forwards the 180 Ringing response to
							UE_A
12 13	<b>—</b>						User A is informed that UE_B is ringing User B answers call
14						200 OK	UE_B responds to INVITE with 200 OK to
'			<b>←</b>			200 010	indicate that the call has been answered
15			<del></del>			200 OK	IMS_B forwards 200 OK response to IMS_A
16		<b>K</b>	-			200 OK	IMS_A forwards the 200 OK response to UE_A
17 18	<b>—</b>					ACK	User A is informed that call has been answered UE_A acknowledges the receipt of 200 OK for
10		<b>├</b> ───				ACK	INVITE
19			$\longrightarrow$			ACK	IMS_A forwards ACK to IMS_B
20			<u> </u>	$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
21							User B is presented that call is in progress
22A		7				INDUITE	User A puts call on hold
23A		<b>├</b>				INVITE	UE_A sends reINVITE message indicating media attribute "sendonly" (Call Hold)
24A						100 Trying	IMS_A responds with a 100 Trying provisional
	.						response
25A	.		$\longrightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
26A			<b></b>			100 Trying	IMS_B responds with a 100 Trying provisional response
27A						INVITE	IMS_B forwards INVITE to UE_B
28A						100 Trying	UE_B optionally responds with a 100 Trying
							provisional response
29A					>	200 01	User B is informed that call is on hold
30A			<del> </del>			200 OK	UE_B responds to reINVITE with 200 OK indicating media attribute "recvonly"
31A			<b>—</b>			200 OK	IMS_B forwards 200 OK response to IMS_A
32A		<b>K</b>	-			200 OK	IMS_A forwards the 200 OK response to UE_A
33A		$\longmapsto$	<b>,</b>			ACK	UE_A acknowledges the receipt of 200 OK for
34A						ACK	INVITE IMS_A forwards ACK to IMS_B
35A	-					ACK	IMS_B forwards ACK to UE_B
36A		<b>→</b>					User A resumes call
37A						INVITE	UE_A sends reINVITE message indicating
		<del></del>	] [	ļ			media attribute "sendrecv" (Call Resume)



Step			Direc	ction			Message	Comment
	U	U	ı	ı	U	U		
	s	Е	M	M	E	s		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
52			$\rightarrow$				BYE	UE_A releases the call with BYE
53				$\longrightarrow$			BYE	IMS_A forwards BYE to IMS_B
54					$\longrightarrow$		BYE	IMS_B forwards BYE to UE_B
55						$\longrightarrow$		User B is informed that call has ended
56				$\leftarrow$			200 OK	UE_B sends 200 OK for BYE
57			←				200 OK	IMS_B forwards 200 OK response to IMS_A
58		⊬					200 OK	IMS_A forwards the 200 OK response to UE_A
59	←							User A is informed that call has ended

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

Step			Direc	ction			Message	Comment
op	U	U	U	U		ı	ccaage	- Commons
	S	Ē	s	Ē	M	M		
	e	Ā	e	В	S	S		
	r		r		Α	В		
	Α		В					
1		$\rightarrow$						User A calls User B
2							INVITE	UE A sends INVITE with the first SDP offer
					$\rightarrow$			indicating all desired media and codecs that
								UE_A supports
3	,	,					100 Trying	IMS_A responds with a 100 Trying provisional
								response
4						$\longrightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
5					,		100 Trying	IMS_B responds with a 100 Trying provisional
								response
6					$\leftarrow$	_	INVITE	IMS_B forwards INVITE to IMS_A
7							100 Trying	IMS_A responds with a 100 Trying provisional
						1		response
8				$\leftarrow$			INVITE	IMS_A forwards INVITE to UE_B
9							100 Trying	UE_B optionally responds with a 100 Trying
								provisional response
10			$\leftarrow$				100 D: :	User B is informed of incoming call of User A
11					$\longrightarrow$		180 Ringing	UE_B responds to initial INVITE with 180
12							100 Dinging	Ringing to indicate that it has started alerting
12						$\rightarrow$	180 Ringing	IMS_A forwards 180 Ringing response to IMS_B
13	,						180 Ringing	IMS_B forwards the 180 Ringing response to
					$\leftarrow$			IMS_A
14	,						180 Ringing	IMS_A forwards the 180 Ringing response to
								UE_A
15	←	_						User A is informed that UE_B is ringing
16				$\rightarrow$				User B answers call
17							200 OK	UE_B responds to INVITE with 200 OK to
					1			indicate that the call has been answered
18						$\rightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
19	. [				$\leftarrow$	<del></del> [	200 OK	IMS_B forwards 200 OK response to IMS_A
20		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
21	<b>←</b>							User A is informed that call has been answered
22					$\longrightarrow$		ACK	UE_A acknowledges the receipt of 200 OK for
	.							INVITE
23	. [					$\longrightarrow$	ACK	IMS_A forwards ACK to IMS_B
24	.				$\leftarrow$	$\neg$	ACK	IMS_B forwards ACK to IMS_A
25				$\leftarrow$			ACK	IMS_A forwards ACK to UE_B
26			⊬					User B is presented that call is established

Step			D	irectio	n			Message	Comment
	U	U	Ų		U	ı	ı		
	s	E	5		E	М	M		
	е	Α	•		В	S	S		
	r A		ľ			Α	В		
074	<del>-</del>			)					Harry Augusta and any harlal
27A 28A								INVITE	User A puts call on hold UE_A sends reINVITE message indicating
20A						$\rightarrow$		IINVIIE	media attribute "sendonly" (Call Hold)
29A								100 Trying	IMS_A responds with a 100 Trying provisional
		F						1.00,	response
30A							$\rightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
31A						_		100 Trying	IMS_B responds with a 100 Trying provisional
									response
32A						$\leftarrow$		INVITE	IMS_B forwards INVITE to IMS_A
33A							$\rightarrow$	100 Trying	IMS_A responds with a 100 Trying provisional response
34A								INVITE	IMS_A forwards INVITE to UE_B
35A					`			100 Trying	UE_B optionally responds with a 100 Trying
00/1						$\rightarrow$			provisional response
36A				<del></del>					User B is informed that call is on hold
37A						_		200 OK	UE_B responds to reINVITE with 200 OK
0.0.7						1		222 211	indicating media attribute "recvonly"
38A							$\rightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
39A 40A								200 OK 200 OK	IMS_B forwards 200 OK response to IMS_A IMS_A forwards the 200 OK response to UE_A
41A								ACK	UE_A acknowledges the receipt of 200 OK for
71/1						$\rightarrow$		7.01	reINVITE
42A							$\rightarrow$	ACK	IMS_A forwards ACK to IMS_B
43A						$\leftarrow$		ACK	IMS_B forwards ACK to IMS_A
44A					$\leftarrow$			ACK	IMS_A forwards ACK to UE_B
45A	-	$\longrightarrow$							User A resumes call
46A		-				$\rightarrow$		INVITE	UE_A sends reINVITE message indicating
47A								100 Trying	media attribute "sendrecv" (Call Resume) IMS_A responds with a 100 Trying provisional
1773		K						100 Hymig	response
48A							$\rightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
49A						_		100 Trying	IMS_B responds with a 100 Trying provisional
									response
50A 51A						$\leftarrow$		INVITE	IMS_B forwards INVITE to IMS_A
SIA							$\rightarrow$	100 Trying	IMS_A responds with a 100 Trying provisional response
52A					$\leftarrow$			INVITE	IMS_A forwards INVITE to UE_B
53A								100 Trying	UE_B optionally responds with a 100 Trying
						7		, 0	provisional response
54A				$\leftarrow$					User B is informed that call is resumed
55A						$\rightarrow$		200 OK	UE_B responds to reINVITE with 200 OK
56A								200 OK	indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B
57A								200 OK 200 OK	IMS_B forwards 200 OK response to IMS_B
58A		k						200 OK	IMS_A forwards the 200 OK response to UE_A
59A	<b>←</b>								User A is informed that call is resumed
60A								ACK	UE_A acknowledges the receipt of 200 OK for
									reINVITE
61A							$\rightarrow$	ACK	IMS_A forwards ACK to IMS_B
62A 63A	-	+			_	_	=	ACK ACK	IMS_B forwards ACK to IMS_A IMS_A forwards ACK to UE_B
								AUN	
27B 28B								INVITE	User B puts call on hold UE_B sends reINVITE message indicating
200						$\rightarrow$		IIN VITE	media attribute "sendonly" (Call Hold)
290								100 Trying	IMS_A responds with a 100 Trying provisional
В								, ,	response
30B							$\rightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
31B						$\leftarrow$		100 Trying	IMS_B responds with a 100 Trying provisional
32B								INVITE	response IMS_B forwards INVITE to IMS_A
JZD	J	1		l	l			HNVIIE	INVID_D IDIWATUS HAVITE TO HAIS_A

Step			Direc	tion			Message	Comment
_	U	U	U	U	I	I		
	s	E	S	Ε	M	M		
	е	Α	е	В	S	S		
	r A		r B		Α	В		
33B			<u> </u>				100 Trying	IMS_A responds with a 100 Trying provisional
33B						$\longrightarrow$	100 Hyllig	response
34B		←					INVITE	IMS_A forwards INVITE to UE_A
35B							100 Trying	UE_A optionally responds with a 100 Trying
					$\longrightarrow$			provisional response
36B	←	_						User A is informed that call is on hold
37B							200 OK	UE_A responds to reINVITE with 200 OK
					1			indicating media attribute "recvonly"
38B						$\longrightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
39B					$\leftarrow$		200 OK	IMS_B forwards 200 OK response to IMS_A
40B				$\leftarrow$			200 OK	IMS_A forwards the 200 OK response to UE_B
41B				<u> </u>	$\longrightarrow$		ACK	UE_B acknowledges the receipt of 200 OK for reINVITE
42B							ACK	IMS_A forwards ACK to IMS_B
43B					_		ACK	IMS_B forwards ACK to IMS_B
44B		<u></u>					ACK	IMS_A forwards ACK to UE_A
45B		ì		$\rightarrow$				User B resumes call
46B							INVITE	UE_B sends reINVITE message indicating
					$\longrightarrow$			media attribute "sendrecv" (Call Resume)
47B				_			100 Trying	IMS_A responds with a 100 Trying provisional
								response
48B						$\longrightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
49B					←		100 Trying	IMS_B responds with a 100 Trying provisional
50B							INVITE	response IMS_B forwards INVITE to IMS_A
51B							100 Trying	IMS_A responds with a 100 Trying provisional
310						$\longrightarrow$	100 Trying	response
52B		←					INVITE	IMS_A forwards INVITE to UE_A
53B		ľ					100 Trying	UE_A optionally responds with a 100 Trying
					$\longrightarrow$		, 3	provisional response
54B	←	_						User A is informed that call is resumed
55B							200 OK	UE_A responds to reINVITE with 200 OK
					1			indicating media attribute "sendrecv"
56B					_	$\longrightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
57B				,	$\leftarrow$		200 OK	IMS_B forwards 200 OK response to IMS_A
58B 59B			,				200 OK	IMS_A forwards the 200 OK response to UE_B User B is informed that call is resumed
60B							ACK	UE_B acknowledges the receipt of 200 OK for
GOD					$\longrightarrow$		/ COIX	reINVITE
61B						$\longrightarrow$	ACK	IMS_A forwards ACK to IMS_B
62B					k-		ACK	IMS_B forwards ACK to IMS_A
63B		←	_				ACK	IMS_A forwards ACK to UE_A
64		$\rightarrow$						User A ends call
65					$\longrightarrow$		BYE	UE_A releases the call with BYE
66					<u> </u>	$\longrightarrow$	BYE	IMS_A forwards BYE to IMS_B
67					$\leftarrow$		BYE	IMS_B forwards BYE to IMS_B
68				←			BYE	IMS_B forwards BYE to UE_B
69			$\leftarrow$					User B is informed that call has ended
70					$\longrightarrow$		200 OK	UE_B sends 200 OK for BYE
71						$\longrightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
72					$\leftarrow$		200 OK	IMS_B forwards 200 OK response to IMS_A
73 74		<b>—</b>					200 OK	IMS_A forwards the 200 OK response to UE_A
74	<u> </u>							User A is informed that call has ended

# 4.4.3.2 User-initiated call hold and resume using UPDATE

## 4.4.3.2.1 Description

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

Step	Action	CF_INT_CALL	CF_ROAM_CALL
1	User A calls User B	1	1
2	User B is informed of incoming call of User A	8	10
3	User A is informed that UE_B is ringing	12	15
4	User B answers call	13	16
5	User A is informed that call has been answered	17	21
6	User B is informed that call is established	21	26
7A	User A puts call on hold	22A	27A
7B	User B puts call on hold	22B	27B
8A	User B is informed that call on hold	26A	32A
8B	User A is informed that call on hold	26B	32B
9A	User A resumes call	30A	37A
9B	User B resumes call	30B	37B
10A	User B is informed that call is resumed	34A	42A
10B	User A is informed that call is resumed	34B	42B
11A	User A is informed that call is resumed	38A	47A
11	User A is informed that call is resumed	38B	47B
12	User A ends call	39	48
13	User B is informed that call has ended	43	53
14	User A is informed that call has ended	47	58

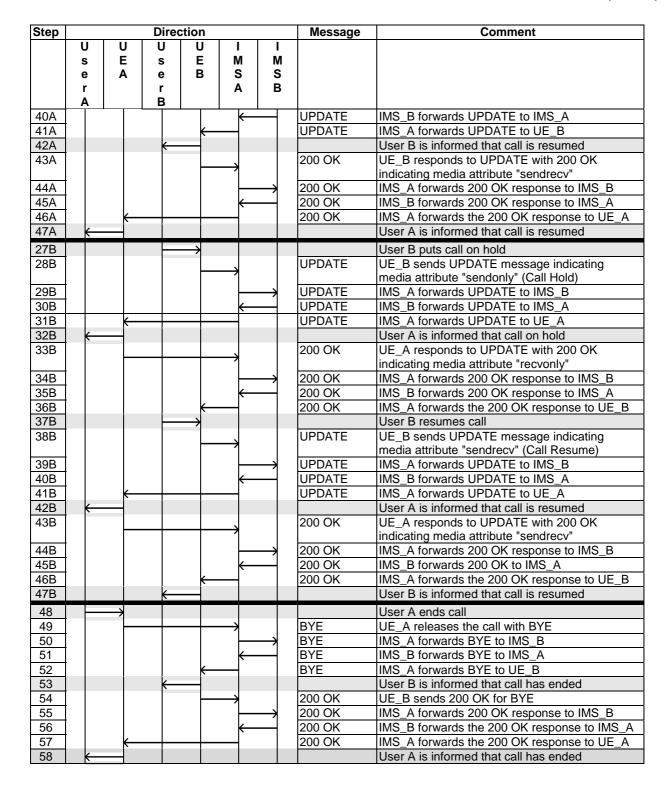
# 4.4.3.2.2 UC\_04\_I: SIP Call Flow "call hold and resume" using UPDATE with CF\_INT\_CALL

Step			Direc	tion			Message	Comment
Стор	U	U	1	I	U	U	Moodage	Common
	S	Ē	M	М	Ē	S		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
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
								UE_A supports
3		_					100 Trying	IMS_AW responds with a 100 Trying provisional
								response
4				$\longrightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
5			_				100 Trying	IMS_B responds with a 100 Trying provisional
			`					response
6					$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
7				_			100 Trying	UE_B optionally responds with a 100 Trying
								provisional response
8						$\rightarrow$		User B is informed of incoming call of User A
9				<u>_</u>			180 Ringing	UE_B responds to initial INVITE with 180
	,			(				Ringing to indicate that it has started alerting
10			<b>←</b>				180 Ringing	IMS_B forwards 180 Ringing response to IMS_A
11		<b>←</b>					180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
12	<b>←</b>							User A is informed that UE_B is ringing
13	ì				←			User B answers call
14					,		200 OK	UE_B responds to INVITE with 200 OK to
' '				$\leftarrow$				indicate that the call has been answered
15			$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IMS_A

Step			Di	rectio	n			Message	Comment
	U	U				U	U		
	s	Ε	M		/	Ε	s		
	е	Α	S		3	В	е		
	r		Α	. E	3		r		
10	A	- 1.					В	000 014	1000 01/
16		$\vdash$						200 OK	IMS_A forwards the 200 OK response to UE_A
17	$\vdash$							4016	User A is informed that call has been answered
18			$\longrightarrow$					ACK	UE_A acknowledges the receipt of 200 OK for INVITE
19				,				ACK	IMS_A forwards ACK to IMS_B
20			ſ	,		_		ACK	IMS_B forwards ACK to UE_B
21						1_	_	AOR	User B is informed that call is established
22A			-						
22A 23A		7						UPDATE	User A puts call on hold UE_A sends UPDATE message indicating
23A			$\longrightarrow$					UPDATE	media attribute "sendonly" (Call Hold)
24A			L					UPDATE	IMS_A forwards UPDATE to IMS_B
25A				•		_		UPDATE	IMS B forwards UPDATE to UE B
26A						<u> </u>	$\rightarrow$	OI BATTE	User B is informed that call is on hold
27A					,			200 OK	UE_B responds to UPDATE with 200 OK
					$\overline{}$				indicating media attribute "recvonly"
28A			ŧ	<del>(                                    </del>	1			200 OK	IMS_B forwards 200 OK response to IMS_A
29A		$\leftarrow$						200 OK	IMS_A forwards the 200 OK response to UE_A
30A		$\rightarrow$							User A resumes call
31A								UPDATE	UE_A sends UPDATE message indicating
			1						media attribute "sendrecv" (Call Resume)
32A			-	$\longrightarrow$	1			UPDATE	IMS_A forwards UPDATE to IMS_B
33A						$\rightarrow$		UPDATE	IMS_B forwards UPDATE to UE_B
34A							$\rightarrow$	202 014	User B is informed that call is resumed
35A					$\leftarrow$			200 OK	UE_B responds to UPDATE with 200 OK
36A				,				200 OK	indicating media attribute "sendrecv"  IMS_B forwards 200 OK response to IMS_A
37A			1						
								וייט ממכו	IMS A forwards the 200 OK response to LIE A
								200 OK	IMS_A forwards the 200 OK response to UE_A User A is informed that call is resumed
38A	←							200 OK	User A is informed that call is resumed
38A 22B	<del>(</del>					<b>←</b>			User A is informed that call is resumed User B puts call on hold
38A	<b>—</b>				<b>—</b>	<del>-</del>		UPDATE	User A is informed that call is resumed User B puts call on hold UE_B sends UPDATE message indicating
38A 22B 23B	€			<u>,                                      </u>	<b>—</b>	<b>K</b>		UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)
38A 22B	<del></del>		*	<u> </u>	<b>←</b>	<b>←</b>			User A is informed that call is resumed User B puts call on hold UE_B sends UPDATE message indicating
38A 22B 23B 24B	<b>←</b>	<u> </u>	*	<u> </u>		<b>*</b>		UPDATE UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A
38A 22B 23B 24B 25B	<b>←</b>			<u> </u>	<b>(</b>	<del>(</del>		UPDATE UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A
38A 22B 23B 24B 25B 26B	<b>←</b>			<u>(</u>	<b>←</b>	<del>-</del>		UPDATE UPDATE UPDATE 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"
22B 23B 24B 25B 26B 27B	<b>←</b>			<i>*************************************</i>	<b>*</b>	<b>(</b>		UPDATE UPDATE UPDATE 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B
22B 23B 24B 25B 26B 27B 28B 29B	<del></del>			· · · ·	<b>←</b>	<del></del>		UPDATE UPDATE UPDATE 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B
22B 23B 24B 25B 26B 27B 28B 29B 30B	<b>←</b>			· · · · · · · · · · · · · · · · · · ·	<b>&lt;</b>	<del></del>		UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call
22B 23B 24B 25B 26B 27B 28B 29B	<b>←</b>			· · · ·		·		UPDATE UPDATE UPDATE 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B	<b>←</b>			· · · ·	<	<del>-</del>		UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B	<b>←</b>			· · · · · · · · · · · · · · · · · · ·		<del>-</del>		UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B	-			· · · · · · · · · · · · · · · · · · ·		<del>-</del>		UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B	<b>←</b>			· · · · · · · · · · · · · · · · · · ·	<del>-</del>	<del>-</del>		UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B	<b>—</b>		→ -	· · · · · · · · · · · · · · · · · · ·		-		UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B	<b>←</b>		→ .	· · · · · · · · · · · · · · · · · · ·				UPDATE UPDATE UPDATE 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B	<b>←</b>		→ -	· · · · · · · · · · · · · · · · · · ·		<b>*</b>		UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE UPDATE	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B	<b>—</b>		→ - - -	· · · · · · · · · · · · · · · · · · ·		<b>—</b>		UPDATE UPDATE UPDATE 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE UPDATE 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B	<b>-</b>			· · · · · · · · · · · · · · · · · · ·	<b>+</b>	<b>*</b>	<b>-</b>	UPDATE UPDATE UPDATE 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE UPDATE 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards 200 OK response to IMS_B
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B 36B 37B 38B	<b>-</b>			· · · · · · · · · · · · · · · · · · ·		<b>+</b>		UPDATE UPDATE UPDATE 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE UPDATE 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B is informed that call is resumed
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B 36B 37B 38B	<b>(</b>	<		· · · · · · · · · · · · · · · · · · ·		<b>+</b>		UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B 36B 37B 38B 39 40 41 42	<b>—</b>		→ - - -	· · · · · · · · · · · · · · · · · · ·		<b>*</b>		UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call  UE_A releases the call with BYE
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B 36B 37B 38B 39 40 41 42 43	<b>←</b>		→ - - -	· · · · · · · · · · · · · · · · · · ·		-	<del>-&gt;</del>	UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call  UE_A releases the call with BYE  IMS_B forwards BYE to IMS_B  IMS_B forwards BYE to UE_B  User B is informed that call has ended
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B 36B 37B 38B 39 40 41 42 43 44	<b>—</b>			· · · · · · · · · · · · · · · · · · ·		<b>-</b>	<b>—</b>	UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK 200 OK 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call  UE_A releases the call with BYE  IMS_A forwards BYE to IMS_B  IMS_B forwards BYE to UE_B  User B is informed that call has ended  UE_B sends 200 OK for BYE
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B 36B 37B 38B 39 40 41 42 43 44 45	<b>—</b>		→	· · · · · · · · · · · · · · · · · · ·			<b></b>	UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call  UE_A releases the call with BYE  IMS_B forwards BYE to IMS_B  IMS_B forwards BYE to UE_B  User B is informed that call has ended  UE_B sends 200 OK response to IMS_A  IMS_B forwards BYE to UE_B  User B is informed that call has ended  UE_B sends 200 OK response to IMS_A
22B 23B 24B 25B 26B 27B 28B 29B 30B 31B 32B 33B 34B 35B 36B 37B 38B 39 40 41 42 43 44	<b>—</b>		→ - - - -	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		<b>*</b>	<b></b>	UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK UPDATE UPDATE UPDATE UPDATE 200 OK 200 OK 200 OK 200 OK 200 OK 200 OK	User A is informed that call is resumed  User B puts call on hold  UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call on hold  UE_A responds to UPDATE with 200 OK indicating media attribute "recvonly"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B resumes call  UE_B sends UPDATE message indicating media attribute "sendrecv" (Call Resume)  IMS_B forwards UPDATE to IMS_A  IMS_A forwards UPDATE to UE_A  User A is informed that call is resumed  UE_A responds to UPDATE with 200 OK indicating media attribute "sendrecv"  IMS_A forwards 200 OK response to IMS_B  IMS_B forwards the 200 OK response to UE_B  User B is informed that call is resumed  User A ends call  UE_A releases the call with BYE  IMS_A forwards BYE to IMS_B  IMS_B forwards BYE to UE_B  User B is informed that call has ended  UE_B sends 200 OK for BYE

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

Step			Di	rectio	n			Message	Comment
_	U	U	U	-	J	l l		_	
	s	E	S	_		M N			
	e	Α	е	6		S S A B			
	r A		r B		'	A B	•		
2		$\rightarrow$						IND/ITE	User A calls User B
2								INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and codecs that
					·	1			UE_A supports
3								100 Trying	IMS_A responds with a 100 Trying provisional
		<b>—</b>							response
4						$\longrightarrow$		INVITE	IMS_A forwards INVITE to IMS_B
5						<b></b>		100 Trying	IMS_B responds with a 100 Trying provisional
						)		IND ATE	response
6 7								INVITE 100 Trying	IMS_B forwards the INVITE to IMS_A IMS_A responds with a 100 Trying provisional
'						$\longrightarrow$		100 Trying	response
8					<del></del>	1		INVITE	IMS_A forwards the INVITE to UE_B
9					ľ,			100 Trying	UE_B optionally responds with a 100 Trying
					,			, ,	provisional response
10			K						User B is informed of incoming call of User A
11					;	,		180 Ringing	UE_B responds to initial INVITE with 180
40								100 Dinging	Ringing to indicate that it has started alerting
12						$\longrightarrow$		180 Ringing	IMS_A forwards 180 Ringing response to IMS_B
13								180 Ringing	IMS_B forwards the 180 Ringing response to
						$\leftarrow$			IMS_A
14		,						180 Ringing	IMS_A forwards the 180 Ringing response to
									UE_A
15	⊬								User A is informed that UE_B is ringing
16 17				$\longrightarrow$				200 OK	User B answers call UE_B responds INVITE with 200 OK to indicate
''					<del>                                     </del>	•		200 OK	that the call has been answered
18								200 OK	IMS_A forwards 200 OK response to IMS_B
19						<u> </u>		200 OK	IMS_B forwards the 200 OK response to IMS_A
20		<b>←</b>						200 OK	IMS_A forwards the 200 OK response to UE_A
21	←	_							User A is informed that call has been answered
22		_			,			ACK	UE_A acknowledges the receipt of 200 OK for
22					<b>'</b>			ACK	INVITE
23 24								ACK ACK	IMS_A forwards ACK to IMS_B IMS_B forwards ACK to IMS_A
25								ACK	IMS_A forwards ACK to UE_B
26			K					71011	User B is informed that the call is established
27A		$\rightarrow$							User A puts call on hold
28A								UPDATE	UE_A sends UPDATE message indicating
					,	1			media attribute "sendonly" (Call Hold)
29A						$\longrightarrow$		UPDATE	IMS_A forwards UPDATE to IMS_B
30A						$\leftarrow$		UPDATE	IMS_B forwards UPDATE to IMS_A
31A				,	K			UPDATE	IMS_A forwards UPDATE to UE_B
32A 33A			K					200 OK	User B is informed that call is on hold UE_B responds to UPDATE with 200 OK
SSA					<del>                                     </del>			200 OK	indicating media attribute "recvonly"
34A								200 OK	IMS_A forwards 200 OK response to IMS_B
35A						$\leftarrow$		200 OK	IMS_B forwards 200 OK response to IMS_A
36A		←				-		200 OK	IMS_A forwards the 200 OK response to UE_A
37A		$\rightarrow$							User A resumes call
38A					ļ.,			UPDATE	UE_A sends UPDATE message indicating
20.4					<b> </b>			LIDDATE	media attribute "sendrecv" (Call Resume)
39A			I		]	$\longmapsto$		UPDATE	IMS_A forwards UPDATE to IMS_B



# 4.4.4 IMS message exchange between UEs in different networks

## 4.4.4.1 Description

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

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

Step	Action	CF_INT_CALL	CF_ROAM_CALL
1	User A sends an instant message	Step 1	Step 1
2	User B is informed about the instant message	Step 5	Step 6
3	Optional: User A is presented a delivery report	Step 9	Step 11

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

The expected call flow sequence is:

Step	Direction						Message	Comment
	U	U	I	I	U	U		
	S	Е	M	M	E	s		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
1		$\rightarrow$						User A sends an instant message to user B
2		_	$\rightarrow$				MESSAGE	UE_A sends MESSAGE to IMS_A
3							MESSAGE	IMS_A sends MESSAGE to IMS_B
4							MESSAGE	IMS_B sends MESSAGE to UE_B
5						$\longrightarrow$		User B is informed about the instant message
6		<del></del>					200 OK	UE_B sends 200 OK to IMS_B
7							200 OK	IMS_B sends 200 OK to IMS_A
8							200 OK	IMS_A sends 200 OK to UE_A
9	←							Optional: User A is presented a delivery report

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

The expected call flow sequence is:

Step			Direc	tion			Message	Comment
	C	U	U	U	_	ı		
	S	Е	s	Ε	M	M		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
1		_						User A sends an instant message to user B
2		1_			$\rightarrow$		MESSAGE	UE A sends MESSAGE to IMS A
3					<u> </u>	$\rightarrow$	MESSAGE	IMS_A forwards MESSAGE to IMS_B
4							MESSAGE	IMS_B forwards MESSAGE to IMSA
5							MESSAGE	IMS_A forwards MESSAGE to UE_B
6								User B is informed about the instant message
7					$\longrightarrow$		200 OK	UE_B responds with 200 OK to IMS_A
8						$\rightarrow$	200 OK	IMS_A forwards 200 OK to IMS_B
9					$\leftarrow$		200 OK	IMS_B forwards 200 OK to IMS_A
10		$\leftarrow$					200 OK	IMS_A forwards 200 OK to UE_A
11	←							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 while UE\_B is roaming in IMS A. 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\_ROAM\_AS.

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_ROAM_AS
1	User A calls User B	Step 1
2	User A is informed that call is declined	Step 11

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

The expected call flow sequence is:

Step			Di	irectio	n			Message	Comment
	U s e r A	U E A	U s e r B	U E B	M S A	I M S B	A S B		
									IMS A configured to use OIR AS
1		$\rightarrow$							User A calls User B
2								INVITE	UE_A sends INVITE with the first SDP offer
					$\longrightarrow$				indicating all desired media and codecs that UE_A supports
3								100 Trying	IMS_A responds with a 100 Trying provisional
									response
									INVITE triggers the OIR IFC in IMS_A
4						$\rightarrow$		INVITE	IMS_A forwards INVITE to IMS_B
5					_			100 Trying	IMS_B responds with a 100 Trying provisional
									response
									INVITE triggers the ACR IFC in IMS_B
6							$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
7						_		100 Trying	AS optionally responds with a 100 Trying
						`			provisional response
8						$\leftarrow$		603 Decline	IMS_B AS responds with 603 Decline to IMS_B
9					$\leftarrow$			603 Decline	IMS_B forwards the 603 Decline to IMS_A
10		←						603 Decline	IMS_A forwards the 603 Decline to UE_A
11	←								User A is informed of a declined call
12					$\longrightarrow$			ACK	UE_A sends ACK to IMS_A
13						$\longrightarrow$		ACK	IMS_A forwards ACK to IMS_B
14							$\rightarrow$	ACK	IMS_B forwards ACK to IMS_B AS

## 4.4.6 Supplementary Service Outgoing Communication Barring (OCB)

#### 4.4.6.1 Description

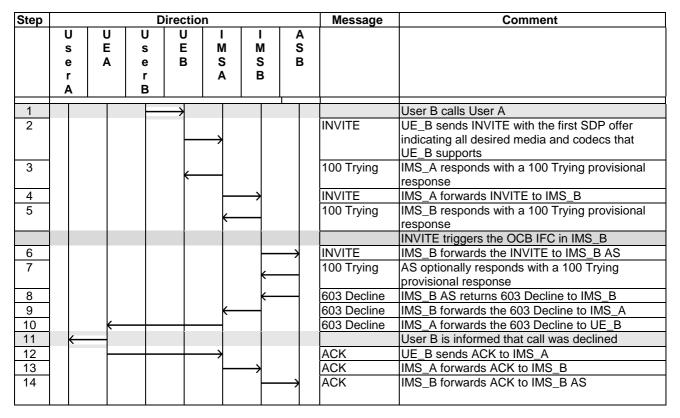
While roaming in IMS A network, UE\_B places an IMS VoIP call to UE\_A. UE\_B is subscribed to OCB service and based on the UE\_B identity the OCB service is invoked. The call flow path and node configuration for this use case corresponds to CF\_ ROAM\_AS.

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

Step	Action	CF_ROAM_AS
1	User B calls User A	Step 1
2	User B is informed that call was declined	Step 11

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

The expected call flow sequence is:



### 4.4.7 Supplementary Service Originating Identification Presentation (OIP)

#### 4.4.7.1 Description

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

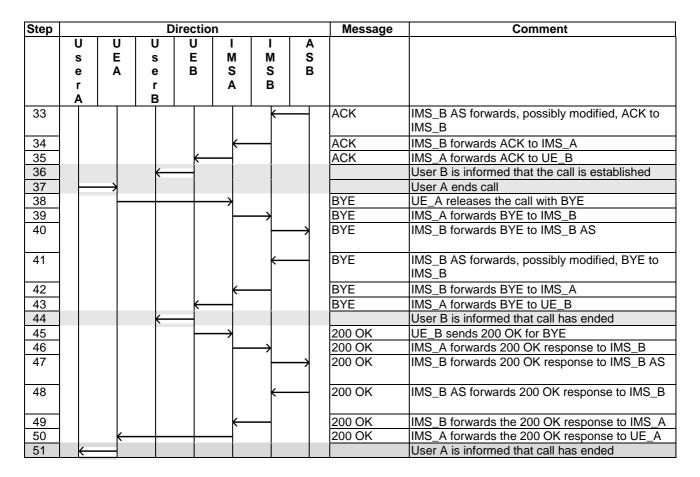
The test sequence typically associated with this use case when is as follows (CFW step numbers refer the call flow step numbering).

Step	Action	CF_ROAM_AS
1	User A calls User B	Step 1
2	User B is informed of incoming call of User A, user A's identity is displayed	Step 14
3	User A is informed that UE_B is ringing	Step 21
4	User B answers call	Step 22
5	User A is informed that call has been answered	Step 29
6	User B is informed that the call is established	Step 36
7	User A ends call	Step 37
8	User B is informed that call has ended	Step 44
9	User A is informed that call has ended	Step 51

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

The expected call flow sequence is:

Step			D	irection	1			Message	Comment
	U	U	U	U	I		Α		
	S	E	s	E	M	M	S		
	е	Α	е	В	S	S	В		
	r		r B		Α	В			
	Α		D				<u> </u>		
1		<del>)</del>							User A calls User B
2								INVITE	UE_A sends INVITE with the first SDP offer
					$\rightarrow$				indicating all desired media and codecs that
3								100 Truing	UE_A supports IMS A responds with a 100 Trying provisional
3		$\leftarrow$						100 Trying	response
4						$\rightarrow$		INVITE	IMS_A forwards INVITE to IMS_B
5						1		100 Trying	IMS_B responds with a 100 Trying provisional
					$\leftarrow$				response
									INVITE triggers the OIP IFC in IMS_B
6							$\longrightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS
7						_		100 Trying	AS optionally responds with a 100 Trying
						l`			provisional response
8						$\leftarrow$		INVITE	IMS_B AS returns, possibly modified, INVITE to
9								100 Trying	IMS_B
9						$\vdash$	$\longrightarrow$	100 Hying	IMS_B responds with a 100 Trying provisional response
10					<u></u>			INVITE	IMS_B forwards the INVITE to IMS_A
11					(			100 Trying	IMS_A responds with a 100 Trying provisional
						$\rightarrow$			response
12				←				INVITE	IMS_A forwards the INVITE to UE_B
13								100 Trying	UE_B optionally responds with a 100 Trying
					1				provisional response
14			<b>—</b>						User B is informed of incoming call of User A,
4.5								400 Din sin s	User A's identity is displayed
15					$\longrightarrow$			180 Ringing	UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting
16								180 Ringing	IMS_A forwards 180 Ringing response to
'						$\longrightarrow$		100 Kinging	IMS_B
17							$\longrightarrow$	180 Ringing	IMS_B forwards 180 Ringing response to
									IMS_B AS
18						←		180 Ringing	IMS_B AS forwards 180 Ringing response to
									IMS_B
19								180 Ringing	IMS_B forwards the 180 Ringing response to
					ì				IMS_A
20		$\leftarrow$						180 Ringing	IMS_A forwards the 180 Ringing response to
21	_								UE_A User A is informed that UE_B is ringing
21									User B answers call
23								200 OK	UE_B responds INVITE with 200 OK to indicate
20					$\rightarrow$				that the call has been answered
24					<u> </u>	$\rightarrow$		200 OK	IMS_A forwards 200 OK response to IMS_B
25						<u> </u>	$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to IMS_B AS
									*
26						$\leftarrow$		200 OK	IMS_B AS forwards 200 OK response to IMS_B
27					$\leftarrow$			200 OK	IMS_B forwards the 200 OK response to IMS_A
28		$\leftarrow$						200 OK	IMS_A forwards the 200 OK response to UE_A
29	(							ACK	User A is informed that call has been answered
30					$\rightarrow$			ACK	UE_A acknowledges the receipt of 200 OK for INVITE
31								ACK	IMS_A forwards ACK to IMS_B
32								ACK	IMS_B forwards ACK to IMS_B AS
02							1		I
								<u> </u>	



## 4.4.8 Supplementary Service Originating Identification Restriction (OIR)

#### 4.4.8.1 Description

While roaming in IMS A network, 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\_ROAM\_AS.

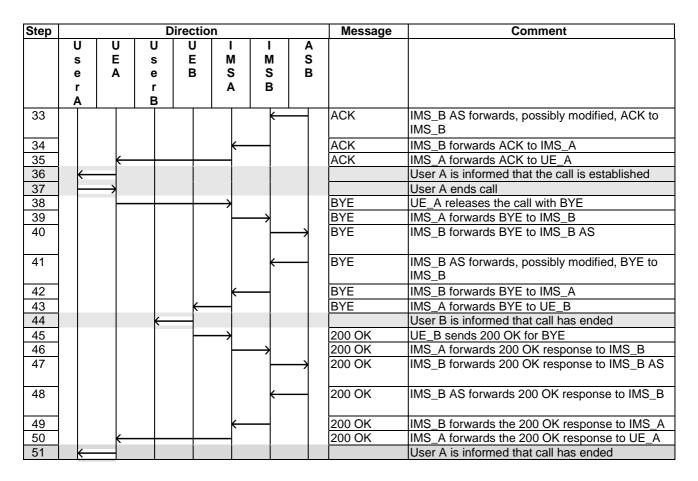
The test sequence typically associated with this use case is as follows (CFW step numbers refer the call flow step numbering).

Step	Action	CF_ROAM_AS
1	User B calls User A	Step 1
2	User A is informed of incoming call of User B, user B's identity is not displayed	Step 14
3	User B is informed that UE_A is ringing	Step 21
4	User A answers call	Step 22
5	User B is informed that call has been answered	Step 29
6	User A is informed that the call is established	Step 36
7	User A ends call	Step 37
8	User B is informed that call has ended	Step 44
9	User A is informed that call has ended	Step 51

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

The expected call flow sequence is:

Step			Direction	1			Message	Comment	
	U		U	I	ı	Α			
	s E		E	M	M	S			
	e A	-   -	В	S	S	В			
	r	r B		Α	В				
	Α	D			<u> </u>	<u> </u>			
1		_	$\longrightarrow$					User B calls User A	
2							INVITE	UE_B sends INVITE with the first SDP offer	
				$\rightarrow$				indicating all desired media and codecs that	
3							100 Truing	UE_B supports IMS_A responds with a 100 Trying provisional	
3			$\leftarrow$				100 Trying	response	
4							INVITE	IMS_A forwards INVITE to IMS_B	
5					1		100 Trying	IMS_B responds with a 100 Trying provisional	
				$\leftarrow$			l cc,g	response	
								INVITE triggers the OIR IFC in IMS_B	
6						$\rightarrow$	INVITE	IMS_B forwards the INVITE to IMS_B AS	
7					,		100 Trying	AS optionally responds with a 100 Trying	
								provisional response	
8					←		INVITE	IMS_B AS returns, possibly modified, INVITE to	
					ľ			IMS_B	
9						$\longrightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional	
10							INVITE	response IMS_B forwards the INVITE to IMS_A	
10							100 Trying	IMS_A responds with a 100 Trying provisional	
' '					$\longrightarrow$		100 Trying	response	
12							INVITE	IMS_A forwards the INVITE to UE_A	
13		•					100 Trying	UE_A optionally responds with a 100 Trying	
				<b>-</b>				provisional response	
14								User A is informed of incoming call of User B,	
								user B's identity is not displayed	
15				$\rightarrow$			180 Ringing	UE_A responds to initial INVITE with 180	
10							400 Din sin s	Ringing to indicate that it has started alerting	
16					$\longrightarrow$		180 Ringing	IMS_A forwards 180 Ringing response to IMS_B	
17							180 Ringing	IMS_B forwards 180 Ringing response to	
''						1	100 runging	IMS_B AS	
18					$\leftarrow$		180 Ringing	IMS_B AS forwards 180 Ringing response to	
					ľ			IMS_B	
19							180 Ringing	IMS_B forwards the 180 Ringing response to	
								IMS_A	
20							180 Ringing	IMS_A forwards the 180 Ringing response to	
								UE_B	
21		<del>(</del>						User B is informed that UE_A is ringing	
22	$\rightarrow$						222 011	User A answers call	
23				$\rightarrow$			200 OK	UE_A responds INVITE with 200 OK to indicate	
24							200 OK	that the call has been answered IMS_A forwards 200 OK response to IMS_B	
25					$\frown$		200 OK 200 OK	IMS_B forwards 200 OK response to IMS_B AS	
25						1	200 OK	INIO_B TOT WAI US 200 OT TESPONSE TO TIMO_B AO	
26					<u></u>		200 OK	IMS_B AS forwards 200 OK response to IMS_B	
-5					`				
27				$\leftarrow$			200 OK	IMS_B forwards the 200 OK response to IMS_A	
28			$\leftarrow$				200 OK	IMS_A forwards the 200 OK response to UE_B	
29		<b>←</b>						User B is informed that call has been answered	
30							ACK	UE_B acknowledges the receipt of 200 OK for	
								INVITE	
31					$\longrightarrow$		ACK	IMS_A forwards ACK to IMS_B	
32						$\longrightarrow$	ACK	IMS_B forwards ACK to IMS_B AS	



### 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 with voice message. 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_ROAM_AS
1	User A calls User B	1
2	User B is informed of incoming call of User A	10
3	User A is informed that UE_B is ringing	15
4	User B answers call	16
5	User A is informed that call has been answered	21
6	User B is informed that call is established	26
7	User B puts call on hold	27
8	User A is informed that call on hold with AS tone and/or	40
	announcement	
9	User B is informed that call on hold	47
10	User B resumes call	54
11	User A is informed that call is resumed	67
12	User B is informed that call is resumed	81
13	User A ends call	82
14	User B is informed that call has ended	86
15	User A is informed that call has ended	91

4.4.9.1.1 UC\_10\_R: SIP Call Flow "call hold and resume with AS tones and/or announcements" using reINVITE with CF\_ROAM\_AS

The expected call flow sequence is:

Step			[	Directi	on			Message	Comment	
	U	U	U	U	I	ı	Α			
	S	E	s	E	M	M	S			
	е	Α	е	В	S	S	В			
	r A		r B		Α	В				
	^									
1		$\rightarrow$							User A calls User B	
								INVITE	UE_A sends INVITE with the first SDP offer	
2					$\longrightarrow$				indicating all desired media and codecs that UE_A supports	
								100 Trying	IMS_A responds with a 100 Trying provisional	
3		$\leftarrow$	_					100 Trying	response	
4						$\rightarrow$		INVITE	IMS_A forwards INVITE to IMS_B	
								100 Trying	IMS_B responds with a 100 Trying provisional	
5								, ,	response	
6					←			INVITE	IMS_B forwards INVITE to IMS_A	
								100 Trying	IMS_A responds with a 100 Trying provisional	
7								IND //TE	response	
8				←				INVITE	IMS_A forwards INVITE to UE_B	
9				$\vdash$	$\longrightarrow$			100 Trying	UE_B optionally responds with a 100 Trying provisional response	
10			_						User B is informed of incoming call of User A	
10								180 Ringing	UE_B responds to initial INVITE with 180	
11					$\longrightarrow$			100 1	Ringing to indicate that it has started alerting	
								180 Ringing	IMS_A forwards 180 Ringing response to	
12									IMS_B	
					_			180 Ringing	IMS_B forwards the 180 Ringing response to	
13					ľ			100 51	IMS_A	
14		$\leftarrow$						180 Ringing	IMS_A P- forwards the 180 Ringing response to UE_A	
14 15	/								User A is informed that UE_B is ringing	
16				$\rightarrow$					User B answers call	
10								200 OK	UE_B responds to INVITE with 200 OK to	
17					$\longrightarrow$				indicate that the call has been answered	
18						$\rightarrow$		200 OK	IMS_A forwards 200 OK response to IMS_B	
19					←			200 OK	IMS_B forwards 200 OK response to IMS_A	
20		$\leftarrow$						200 OK	IMS_A forwards the 200 OK response to UE_A	
21	$\leftarrow$	_						1011	User A is informed that call has been answered	
00		_			$\longrightarrow$			ACK	UE_A acknowledges the receipt of 200 OK for	
22								ACK	INVITE IMS_A forwards ACK to IMS_B	
24								ACK	IMS_B forwards ACK to IMS_A	
25				_	`			ACK	IMS_A forwards ACK to UE_B	
26			←	`				71011	User B is informed that call is established	
28			È	$\longrightarrow$	·				User B puts call on hold	
								INVITE	UE_B sends reINVITE message indicating	
28					7				media attribute "sendonly" (Call Hold)	
				<u>_</u>				100 Trying	IMS_A responds with a 100 Trying provisional	
29				`				IND UTE	response	
30						$\rightarrow$		INVITE	IMS_A forwards INVITE to IMS_B	
31					⇤			100 Trying	IMS_B responds with a 100 Trying provisional response	
32								INVITE	IMS_B sends reINVITE to AS_B	
02							1	100 Trying	AS_B optionally responds with a 100 Trying	
33						←			provisional response	
35						$\leftarrow$	_	INVITE	AS_B sends reINVITE to IMS_B	
								100 Trying	IMS_B responds with a 100 Trying provisional	
35									response	
36					←			INVITE	IMS_B forwards reINVITE to IMS_A	
0.7						$\longrightarrow$		100 Trying	IMS_A responds with a 100 Trying provisional	
37		1					I		response	

Step				Directio	on			Message	Comment
0.00	U	U	U	U		1	Α	eeea.ge	- Commons
	s	Ē	s	E	М	M	S		
	e	A	e	В	S	S	В		
	r		r		Α	В			
	Ą		В						
38		$\leftarrow$						INVITE	IMS_A forwards reINVITE to UE_A
								100 Trying	UE _A optionally responds with a 100 Trying
39					1				provisional response
	_								User A is informed that call is on hold (with tone
40									and/or announcement)
								200 OK	UE_A responds to reINVITE with 200 OK
41					1				indicating media attribute "recvonly"
42						$\rightarrow$		200 OK	IMS_A forwards 200 OK response to IMS_B
43							$\longrightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
44						$\leftarrow$		200 OK	AS_B forwards 200 OK response to IMS_B
45					←			200 OK	IMS_B forwards 200 OK response to IMS_A
46				$\leftarrow$				200 OK	IMS_A forward the 200 OK to UE_B
47			←						User B is informed that the call is on hold
					<b>→</b>			ACK	UE_B acknowledges the receipt of 200 OK for
48								1016	reINVITE
49						$\rightarrow$		ACK	IMS_A forwards ACK to IMS_B
50							$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
51						$\leftarrow$		ACK	AS_B forwards ACK to IMS_B
52					←			ACK	IMS_B forwards ACK to IMS_A
53				$\leftarrow$				ACK	IMS_A forwards ACK to UE_B
54				$\longrightarrow$					User B resumes call
								INVITE	UE_B sends second reINVITE message
					$\longrightarrow$				indicating media attribute "sendrecv" (Call
55								400 T :	Resume)
F.C.				$\leftarrow$				100 Trying	IMS_A responds with a 100 Trying provisional
56								INVITE	response
57						7			IMS_A sends reINVITE to IMS_B
50					←			100 Trying	IMS_B responds with a 100 Trying provisional
58 59								INVITE	response IMS_B sends reINVITE to AS_B
59							7	100 Trying	AS_B optionally responds with a 100 Trying
60						$\leftarrow$		100 Trying	provisional response
61						,		INVITE	AS_B forwards INVITE to IMS_B
01								100 Trying	IMS_B responds with a 100 Trying provisional
62							$\longrightarrow$	100 Trying	response
63								INVITE	IMS_B sends reINVITE to IMS_A
00								100 Trying	IMS_A responds with a 100 Trying provisional
64						$\rightarrow$		100 Trying	response
65		<u> </u>						INVITE	IMS_A forwards reINVITE to UE_A
- 00								100 Trying	UE_A optionally responds with a 100 Trying
66					$\longrightarrow$			100 1171119	provisional response
67	<b>K</b>								User A is informed that call is resumed
								200 OK	UE_A sends the 200 OK indicating media
68					$\longrightarrow$				attribute "sendrecv" to IMS_A
69						$\rightarrow$		200 OK	IMS_A forwards 200 OK response to IMS_B
70							$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
71						$\leftarrow$		200 OK	AS_B forwards the 200 OK for INVITE
72					←			200 OK	IMS_B forwards 200 OK to IMS_A
73				←				200 OK	IMS_A forwards 200 OK to UE_B
74			<b>←</b>						User B is informed that call is resumed
75					$\longrightarrow$			ACK	UE_B sends ACK to IMS_A
76						$\rightarrow$		ACK	IMS_A forwards ACK to IMS_B
77						-	$\rightarrow$	ACK	IMS_B forwards ACK to AS_B
78						$\leftarrow$		ACK	AS_B forwards ACK to IMS_B
79					<del></del>			ACK	IMS_B forwards ACK to IMS_A
80		$\leftarrow$						ACK	IMS_A forwards ACK to UE_A
81	←							ACK	User A is informed that call resumed
82		$\rightarrow$							User A ends call
83					$\longrightarrow$			BYE	UE_A releases the call with BYE
84					-	$\longrightarrow$		BYE	IMS_A forwards BYE to IMS_B

Step		Direction						Message	Comment
	U	U	U	U	ı	ı	Α		
	s	E	s	E	M	M	S		
	е	Α	е	В	S	S	В		
	r		r		Α	В			
	Α		В						
85				$\leftarrow$				BYE	IMS_B forwards BYE to UE_B
86			⊬						User B is informed that call has ended
87					$\longrightarrow$			200 OK	UE_B sends 200 OK for BYE
88						$\longrightarrow$		200 OK	IMS_A forwards 200 OK response to IMS_B
89					←			200 OK	IMS_B forwards 200 OK response to IMS_A
90		$\leftarrow$						200 OK	IMS_A forwards the 200 OK response to UE_A
91	←								User A is informed that call has ended

#### 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_ROAM_AS
1	User A calls User B	1
2	User A may be informed of call diversion	11
3	User B2 answers call	19
4	User A is informed that call has been answered	26
6	User B2 is informed that call is established	32
7	User A ends call	33
8	User B is informed that call has ended	37
9	User A is informed that call has ended	42

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

The expected call flow sequence is:

Step		Direction							Comment
	U s e r A	U E A	U s e r B2	U E B2	I M S A	I M S B	A S B		
1		$\rightarrow$							User A calls User B
2					$\rightarrow$			INVITE	UE_A sends INVITE with the first SDP offer indicating all desired media and codecs that UE_A supports
3		$\leftarrow$						100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\rightarrow$		INVITE	IMS_A forwards INVITE to IMS_B
5					<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
								15 15 (1775	INVITE triggers the CFU IFC in IMS_B
7						<b>←</b>		INVITE 100 Trying	IMS_B forwards the INVITE to AS_B AS_B optionally responds with the 100 Trying to IMS_B
									AS_B applies the CDIV CFU procedure
8								181 Call is	AS_B indicates optionally to IMS_B that
						$\leftarrow$		being	call has been forwarded
								forwarded	
9								181 Call is being	IMS_B indicates to IMS_A that call has been forwarded
								forwarded	been folwarded
10								181 Call is	IMS_A indicates that call to UE_B has
		$\leftarrow$	_					being	been forwarded
- 4.4								forwarded	
11	$\leftarrow$							INVITE	User A may be informed of call diversion AS_B returns, possibly modified, INVITE
						$\leftarrow$			to IMS_B
13							$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
14					←			INVITE	IMS_B forwards the INVITE to IMS_A
15						$\rightarrow$		100 Trying	IMS_A responds with a 100 Trying provisional response
16				$\leftarrow$				INVITE	IMS_A forwards the INVITE to UE_B2
17					$\rightarrow$			100 Trying	UE_B2 optionally responds with a 100 Trying provisional response
18			$\leftarrow$						User B2 is informed of incoming call of User A
19				$\rightarrow$					User B2 answers call
20					$\rightarrow$			200 OK	UE_B2 responds to INVITE with 200 OK to indicate that the call has been answered
21						$\rightarrow$		200 OK	IMS_A forwards 200 OK response to IMS_B
22							$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
23						<b>←</b>	$\blacksquare$	200 OK	AS_B returns, possibly modified, 200 OK to IMS_B
24					<b>(</b>	$\dashv$		200 OK	IMS_B forwards 200 OK response to IMS_A
25		<b>—</b>						200 OK	IMS_A forwards 200 OK response to UE_A
26	<del>(</del>								User A is informed that call has been answered
27					$\rightarrow$			ACK	UE_A acknowledges the receipt of 200 OK for INVITE

Step				Directio	n			Message	Comment
	U s e r A	U E A	U s e r B2	U E B2	I M S A	I M S B	A S B		
28						$\rightarrow$		ACK	IMS_A forwards ACK to IMS_B
29							$\longrightarrow$	ACK	IMS_B forwards ACK to AS_B
30						<b>←</b>		ACK	AS_B returns, possibly modified, ACK to IMS_B
31			←					ACK	IMS_B forwards ACK to UE_B2
32			<b>K</b>						User B2 is informed that call is established
33		$\longrightarrow$							User A ends call
34					$\rightarrow$			BYE	UE_A releases the call with BYE
35						$\longrightarrow$		BYE	IMS_A forwards BYE to IMS_B
36				←				BYE	IMS_B forwards BYE to UE_B
37			⊬						User B is informed that call has ended
38				_	$\longrightarrow$			200 OK	UE_B sends 200 OK for BYE
39						$\rightarrow$		200 OK	IMS_A forwards 200 OK response to IMS_B
40					←			200 OK	IMS_B forwards 200 OK response to IMS_A
41		<b>←</b>						200 OK	IMS_A forwards the 200 OK response to UE_A
42	$\downarrow$								User A is informed that call has ended

## 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	iption						
Identifier:	TD_IMS_0	0001							
Summary:	IMS CN components shall support SIP messages greater than 1 500 bytes								
Configuration:	CF_INT_CALL								
SUT	IMS_B								
References	Test Purp	ose	Spec. Ref.						
	TP_IMS_4	.002_1	clause 4.2A §1						
Use Case ref.:	UC_05_I								
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A and IMS_A configured to use TCP for transport</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is registered user of IMS_B using any user identity</li> </ul>								
Test Sequence:	Step								
•	1	User A sends message to User B	essage to User B with more than 1 500 characters						
	2	Verify that user B receives messa							
Conformance	Check								
Criteria:	1	then { IMS_B receives the MES	E to UE_B ody greater than 1 500 bytes }						

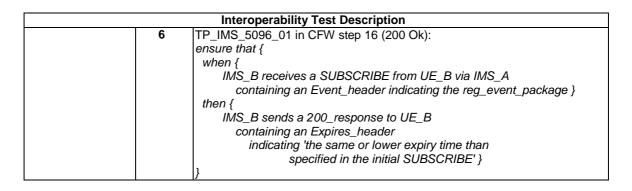
Step			Direc	tion			Message	Comment
	C	U	I	ı	C	U		
	S	E	M	M	E	s		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
1		_						User A sends an instant message to user B
2			_				MESSAGE	UE A sends MESSAGE to IMS A
3			1				MESSAGE	IMS A sends MESSAGE to IMS B with via
				$\rightarrow$			III COOKOL	header indicating TCP
4					$\longrightarrow$		MESSAGE	IMS_B sends MESSAGE to UE_B
5					_	$\rightarrow$		User B is informed about the instant message
6				$\leftarrow$	_		200 OK	UE_B sends 200 OK to IMS_B
7			←				200 OK	IMS_B sends 200 OK to IMS_A
8		←					200 OK	IMS_A sends 200 OK to UE_A
9	$\leftarrow$							Optional: User A is presented a delivery report

# 4.5.2 Registration and De-registration

## 4.5.2.1 First time registration in a visited IMS network

		Interoperability Test Des	cription						
Identifier:	TD_IMS_								
Summary:	First time	registration in a visited IMS netw	ork						
Configuration:	CF_ROAI	M_REG							
SUT	IMS_A an	d IMS_B							
References	Test Pur	oose	Spec. Ref.						
	TP_IMS_		clause 5.2.2 §2						
	TP_IMS		clause 5.2.2 §2						
	TP_IMS_		clause 5.2.3 §1						
	TP_IMS_		clause 5.4.1.2.1 §6						
	TP_IMS_		clause 5.4.1.2.2 §1						
	TP_IMS_		clause 5.4.2.1.1 §1						
Use Case ref.:	UC_01_R		Clause 5.4.2.1.1 § 1						
Ose Case Iel	_UC_U1_R								
Pre-test	- UC	CC of IMC D is configured assert	ling to toble 1						
conditions:		SS of IMS_B is configured accord							
conditions:		B IP bearers established to IMS	S_A as per clause 4.2.1						
		BB not registered in IMS_B							
	• IM	S_A within the trust domain of IM	IS_B						
Test Sequence:	Step								
	1	User B registers in IMS B using	any valid user identity						
	2	Verify that UE_B shows succes	sful registration						
Conformance	Check								
Criteria:	1	TP_IMS_5011_01 in CFW step	3 (REGISTER):						
		,							
		when { UE_B sends an unprot	ected REGISTER to IMS A						
		containing a Security-Client_header }							
		then { IMS_A sends the REGIS							
		containing a Path_head							
			SIP_URI of IMS_A and						
		containing a Require_h							
		containing a path_opt							
		containing a P-Charging							
		containing an icid_pa							
		containing a Authorizati							
			ry-protected_parameter						
		indicating no	ny protosta <u>-</u> parameter						
			ty-Verify that_header and						
		not containing a Securi							
		containing a P-Visited-I							
			network at the home network' }						
		l	notwork at the nome notwork j						
	2	TP_IMS_5011_02 in CFW step	7 (DECISTED):						
	_	ensure that {	T (REGIOTER).						
		when { UE_B sends a protected	ad REGISTER to IMS A						
		containing a Security-Cl							
		then { IMS_A sends the REGIS							
		containing a Path_head							
			SIP_URI of IMS_A and						
		containing a Require_h							
		containing a path_opt							
		containing a P-Charging							
		containing an icid_pa							
		containing a Authorizati							
			y-protected_parameter						
		indicating yes	to Novik that bearings						
			ty-Verify that_header and						
		not containing a Securi							
		containing a P-Visited-I							
		indicating 'the visited	network at the home network' }						
		<i>}</i>							

```
Interoperability Test Description
3
      TP IMS 5044 01 in CFW step 15 (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_parameter }
4
       TP_IMS_5089_01 in CFW step 4 (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
                 (not containing an integrity-protected_parameter or
                    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 }
5
      TP_IMS_5092_01 in CFW step 8 (200 Ok):
       ensure that {
        when { UE B sends a protected REGISTER to IMS B and
            IMS A sends the REGISTER to IMS B
              containing an Authorization_header
                containing an integrity-protected_parameter indicating yes }
       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 Contact_header
                  indicating 'all contact addresses'
                     for the default public user identity of UE B }
```



Step	D	irectio	n		Message	Comment
	U			I M		
	6	_	3 S	S		
	r		Α	В		
	E	3				
1		$\longrightarrow$				User B registers in IMS B
2			$\longrightarrow$		REGISTER	UE_B sends a REGISTER to IMS_A
3			_	$\longrightarrow$	REGISTER	IMS_A forwards the REGISTER to IMS_B
4						IMS_B responds with 401 Unauthorized to
			•			IMS_A
5			<del></del>		401 Unauthorized	IMS_A forwards the 401 Unauthorized to UE_B
6					REGISTER	UE_B sends the same REGISTER containing
			1			authentication challenge response to IMS_A
7				$\longrightarrow$	REGISTER	IMS_A forwards the REGISTER to IMS B
8			<b>⊢</b>			IMS_B responds with 200 OK
9			←		200 OK	IMS_A forwards the 200 OK response to UE_B
10			-	$\longrightarrow$	SUBSCRIBE	IMS_A sends a SUBSCRIBE to IMS_B
11			K		200 OK	IMS_B responds with a 200 OK
12			_		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing
						UE_B's registration status
13			-	$\longrightarrow$	200 OK	IMS_A responds to the NOTIFY with a 200 OK
14					SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event
			1			package) to IMS_A
15				$\longrightarrow$	SUBSCRIBE	IMS_A forwards the SUBSCRIBE request to IMS_B
16			<b>K</b>		200 OK	IMS_B responds with 200 OK
17			<b>—</b>		200 OK	IMS_A forwards the 200 OK response to UE_B
18					NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing
			<b>_</b>			UE_B's registration status
19			<del></del>		NOTIFY	IMS_A forwards the NOTIFY to UE_B
20			$\longrightarrow$		200 OK	UE_B responds to the NOTIFY with a 200 OK
21				$\longrightarrow$	200 OK	IMS_A forwards the 200 OK to IMS_B
22		<del>-</del>				User B is informed about successful registration

## 4.5.2.2 Multiple entry points, no response from first entry point on REGISTER

		Interoperability Test Desc	ription						
Identifier:	TD_IMS_	0003							
Summary:	Check that the IMS chooses a second entry point to the home network of a user that								
	requested registration, if the first entry point does not answer.								
Configuration:	CF_ROAI	M_REG							
SUT	IMS_A								
References	Test Purp		Spec. Ref.						
	TP_IMS_		clause 5.2.2 §26						
	TP_IMS_		clause 5.10.2.1 §1						
Use Case ref.:	UC_01_R								
Pre-test		SS of IMS_B is configured according							
conditions:		B IP bearers established to IMS							
	• IM	S_A configured with multiple entry	points for IMS_B						
	• Fir	st entry point determined by the IM	MS_A pointing to a non-existing component						
	in	IMS_B	-						
Test Sequence:	Step								
	1	User B registers in IMS B using a							
	2	Verify that UE_B shows success	successful registration						
Conformance	Check								
Criteria:	1	TP_IMS_5203_01 in CFW step 4	(REGISTER): [P-CSCF]						
		ensure that {							
		when { IMS_A receives no resp							
		then { IMS_A sends the REGIS	TER to another_entry_point of IMS_B }						
		}	(220022) (2202						
	2	TP_IMS_5402_01 in CFW step 4	(REGISTER): [IBCF]						
		ensure that {	ED (- IMO A						
		when { UE_B sends a REGISTI							
		IMS_B does not send a res							
			REGISTER to another_entry_point of						
	I	IMS_B }							
		1, - '							

Step	Direct	ion			Message	Comment
	U s e r B	U E B	I M S A	I M S B		
1		$\rightarrow$				User B activates the UE in the home network
2			$\rightarrow$		REGISTER	UE_B sends a REGISTER to IMS_A
3					REGISTER	IMS_A forwards the REGISTER to first entry
				$\longrightarrow$		point defined for IMS_B
						No response from IMS_B
4					REGISTER	IMS_A sends a REGISTER to another entry
				$\longrightarrow$		point defined for IMS_B
5			←		401 Unauthorized	IMS_B responds with 401 Unauthorized to IMS_A
6		←			401 Unauthorized	IMS_A forwards the 401 Unauthorized to UE_B
7					REGISTER	UE_B sends the same REGISTER containing
						authentication challenge response to IMS_A
8				$\longrightarrow$	REGISTER	IMS_A forwards the REGISTER to IMS B
9			$\leftarrow$		200 OK	IMS_B responds with 200 OK
10		←			200 OK	IMS_A forwards the 200 OK response to UE_B
11				$\longrightarrow$	SUBSCRIBE	IMS_A sends a SUBSCRIBE to IMS_B
12			$\leftarrow$	_	200 OK	IMS_B responds with a 200 OK
13			,		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing
						UE_B's registration status
14				$\longrightarrow$	200 OK	IMS_A responds to the NOTIFY with a 200 OK
15					SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event
			1			package) to IMS_A
16				$\longrightarrow$	SUBSCRIBE	IMS_A forwards the SUBSCRIBE request to IMS_B
17			←		200 OK	IMS_B responds to the SUBSCRIBE with a 200 OK
18		<b>—</b>			200 OK	IMS_A forwards the 200 OK response to UE_B
19		`			NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing
			⊬			UE_B's registration status
20		<b>—</b>			NOTIFY	IMS_A forwards the NOTIFY to UE_B*
21		-	$\rightarrow$		200 OK	UE_B responds to the NOTIFY with a 200 OK
22			-	$\longrightarrow$	200 OK	IMS_A forwards the 200 OK to IMS_B
23	$\leftarrow$	_				User B is informed about successful registration

## 4.5.2.3 403 response to REGISTER from an un-trusted domain

		Interoperability Test Des	scription							
Identifier:	TD_IMS_									
Summary:	403 respo	403 response is sent when attempting registration from a different trust domain								
Configuration:	CF_ROAM_REG									
SUT	IMS_B									
References	Test Pur	Spec. Ref.								
	TP_IMS_	5129_01	clause 5.3.1.2 §1							
	TP_IMS_	5411_01	clause 5.10.3.1 §1							
Use Case ref.:	UC_01_F	<u> </u>								
Pre-test	• HS	SS of IMS_B is configured accor	ding to table 1							
conditions:	• UI	E_B IP bearers established to IM	IS_A as per clause 4.2.1							
	• IM	S_A and IMS_B are in different	trust domains							
Test Sequence:	Step									
	1	User B registers in IMS B using	g any user identity							
	2	Verify that UE_B shows unsuc	cessful registration							
Conformance	Check									
Criteria:	1	TP_IMS_5129_01 in CFW step	3 (REGISTER) [I-CSCF]:							
		ensure that {								
		when { UE_B sends an initial	=							
		and IMS_B receives the	•							
		then { IMS_B sends a 403_re	sponse to IMS_A }							
		}								
	2	TP_IMS_5411_01 in CFW step	3 (REGISTER) [IBCF]:							
		ensure that {	TED ( 140 D )							
		when { UE_B sends a REGIS	<del>=</del>							
		IMS_B sends the REGIS	— <i>*</i>							
		then { IMS_B sends a 403_re	sponse to IMS_A }							
		}								

Step		Dire	ction			Message	Comment
		U	U	ı	ı		
		S	E	M	M		
		е	В	S	S		
		r		Α	В		
		В					
4							Hear Destinates the HE is a visited national.
1							User B activates the UE in a visited network
2				$\longrightarrow$		REGISTER	UE_B sends a REGISTER to IMS_A
3					$\longrightarrow$	REGISTER	IMS_A forwards the REGISTER to IMS_B
4						403 Forbidden	IMS_B responds with 403 Forbidden to
				$\leftarrow$			IMS_A
5			←			403 Forbidden	IMS_A forwards the 403 Forbidden to UE_B
6							User B is informed about the registration is
							rejected

# 4.5.2.4 Network initiated deregistration upon receipt of a new registration with new contact information

		Interoperability Test Description						
Identifier:	TD_IMS_0	0005						
Summary:	Network in information	nitiated deregistration upon receipt of a new registration with new contact						
Configuration:	CF ROAM	VI REG						
SUT	IMS_B							
References	Test Purpose Spec. Ref.							
	TP_IMS_5	5088_01 clause 5.4.1.2.1 §1						
Use Case ref.:	UC_01_R							
Pre-test	• HS	SS of IMS_B is configured according to table 1						
conditions:		E_B IP bearers established to IMS_A as per clause 4.2.1						
		 _B has been registered using any user identity in IMS_B via IMS_A but has						
		en physically unplugged, i.e. without de-registration						
Test Sequence:	Step							
-	1	UE_B connects to IMS_B						
	2	Verify that UE_B shows successful registration						
Conformance	Check							
Criteria:	1	TP_IMS_5088_01 in CFW step 2 (REGISTER) and 6 (NOTIFY):						
		ensure that {						
		when { UE_B sends an initial REGISTER to IMS_B						
		containing an Authorization_header						
		not containing an integrity-protected_parameter or						
		containing an integrity-protected_parameter indicating no }						
		then { IMS_B sends a NOTIFY to IMS_A						
		containing a Request_URI						
		indicating the P-CSCF_SIP_URI of IMS_A and						
		containing an Event_header						
		containing the reg_event_package and containing a P-Charging-Vector_header						
		containing a F-Charging-vector_neader  containing an icid_parameter and						
		containing an icid_parameter and containing a Route_header						
		indicating the original Route_header from SUBSCRIBE and						
		containing a Message_Body XML						
		containing of meddago_body						
		a registration_element						
		(containing an aor_attribute						
		indicating registered_public_identity of UE_B and						
		containing a state_attribute						
		indicating terminated and						
		containing a contact_subelement						
		(containing an event_attribute						
		indicating deactivated or rejected						
		containing a state_attribute indicating terminated and						
		containing a URI_subelement						
		indicating the contact_address of UE_B)						
		)}						
		<b> </b> }						

Step			Dire	ction			Message	Comment
			U	U	I	ı		
			s	E	M	М		
			е	В	S	S		
			r		Α	В		
			В					
1								User B connects UE B to IMS B
2				-		$\overline{}$	REGISTER	UE_B sends a REGISTER to IMS_B
3						1		
3				$\leftarrow$			401 Unauthorized	IMS_B responds with 401 Unauthorized to
								UE_B
4						$\longrightarrow$	REGISTER	UE_B sends a REGISTER to IMS_B
5				$\leftarrow$			200 OK	IMS_B responds with 200 OK to UE_B
6					$\leftarrow$		NOTIFY	IMS_B sends a NOTIFY to IMS_A
7						$\longrightarrow$	200 OK	IMS_A responds with a 200 OK IMS_B
8								User B is informed about the successful re-
								registration

# 4.5.2.5 Network initiated deregistration by the S-CSCF

	Interoperability Test Description
Identifier:	TD_IMS_0006
Summary:	Ensure that the network can initiate user de-registration, e.g., when a user runs out of credit
Configuration:	CF_ROAM_REG
SUT	IMS_B
References	Test Purpose Spec. Ref.
	TP_IMS_5093_01 clause 5.4.1.5 §6
Use Case ref.:	UC_01_R
Pre-test	HSS of IMS_B is configured according to table 1
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> </ul>
	UE_B registered in IMS_B using any user identity
	IMS_A within the trust domain of IMS_B
Test Sequence:	Step
	1 IMS_B is triggered manually to de-register user B
	Verify that UE_B shows successful de-registration
Conformance	Check
Criteria:	1 TP_IMS_5093_01 in CFW step 23
	ensure that {
	when { IMS_B receives an network_originated_deregistration_event }
	then { IMS_B sends a NOTIFY to IMS_A
	containing a Request_URI
	indicating UE_B and
	containing an Event_header
	indicating the reg_event_package and
	containing a P-Charging-Vector_header
	containing an icid_parameter and
	containing a Route_header
	indicating the original Route_header from SUBSCRIBE and
	containing a Message_Body XML containing for each registered_public_identity of UE_B
	a registration_element
	(containing an aor_attribute
	indicating registered_public_identity of UE_B and
	containing a state_attribute
	indicating terminated and
	containing a contact_subelement
	(containing an event_attribute indicating deactivated or rejected
	containing a state_attribute indicating terminated and
	containing an URI_subelement
	indicating the contact_address of UE_B) and
	IMS_B sends a NOTIFY to IMS_A
	containing a Request_URI
	indicating P-CSCF_SIP_URI of IMS_A and
	containing an Event_header indicating the reg_event_package and
	containing a P-Charging-Vector_header
	containing an icid_parameter and
	containing a Route_header
	indicating the original Route_header from SUBSCRIBE and
	containing a Message_Body XML
	containing for each registered_public_identity of UE_B
	a registration_element (containing an aor_attribute
	indicating registered_public_identity of UE_B and
	containing a state_attribute
	indicating terminated and
	containing a contact_subelement
	(containing an event_attribute
	indicating deactivated or rejected and

Interoperability Test Description					
	containing a state_attribute indicating terminated and				
	containing an URI_subelement				
	indicating the contact_address of UE_B) }				
	]}				

Step	Direction						Message	Comment
			U s e r B	U E B	I M S A	I M S B		
								IMS_B is triggered to de-register user B
23					<b>(</b>		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing UE_B's de-registration
24				←			NOTIFY	IMS_B sends a NOTIFY to UE_B, containing UE_B's de-registration
25			$\leftarrow$	_				User B is informed about de-registration

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

	Interoperability Test Description					
Identifier:	TD_IMS_0007					
Summary:	Ensure that the network can initiate user re-authentication					
Configuration:	CF_ROAM_REG					
SUT	IMS_B					
References	Test Purpose Spec. Ref.					
	TP_IMS_5094_01 clause 5.4.1.6 §2					
Use Case ref.:	UC_01_R					
Pre-test	HSS of IMS_B is configured according to table 1					
conditions:	UE_B IP bearers established to IMS_A as per clause 4.2.1					
	UE_B registered in IMS_B using any user identity					
	IMS_A within the trust domain of IMS_B					
	Event received in S-CSCF of IMS_B to re-authenticate UE_B					
Test Sequence:	Step					
	1 IMS_B network is triggered to re-authenticate user B					
	2 Verify that UE_B shows successful registration					
Conformance	Check					
Criteria:	1 TP_IMS_5094_01 in CFW step 23					
	ensure that {					
	when { IMS_B receives an network_originated_reauthentication_	_event }				
	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_package and					
	containing a P-Charging-Vector_header					
	containing an icid_parameter and					
	containing a Route_header					
	indicating the original Route_header from SUBSCRIBE	and				
	containing a Message_Body XML					
	containing for each registered_public_identity of UE_B					
	a registration_element					
	(containing an aor_attribute	ı				
	indicating a registered_public_identity of UE_B and containing a state_attribute	1				
	indicating active and					
	containing a contact_subelement					
	(containing an event_attribute					
	indicating shortened and					
	containing a state_attribute indicating active and					
	containing an URI_subelement					
	indicating the contact_address of UE_B and					
	containing an expiry_attribute) and IMS_B sends a NOTIFY to IMS_A P-CSCF					
	containing a Request_URI					
	indicating the P-CSCF_SIP_URI of IMS_A and					
	containing an Event_header					
	indicating the reg_event_package and					
	containing a P-Charging-Vector_header					
	containing an icid_parameter and					
	containing a Route_header	·I				
	indicating the original Route_header from SUBSCRIBE	ana				
	containing a Message_Body XML containing for each registered_public_identity of UE_B					
	a registration_element					
	(containing an aor_attribute					
	indicating a registered_public_identity of UE_B and	1				
	containing a state_attribute					
	indicating active and					
	containing a contact_subelement					
	(containing an event_attribute					
<del></del>						

Interoperability Test Description					
	indicating shortened and				
	containing a state_attribute indicating active and				
	containing an URI_subelement				
	indicating the contact_address of UE_B and				
	containing an expiry_attribute) }				
	}				

Step	D	irectior	1		Message	Comment
	U	J		ı		
	s			M		
	e	) B		S		
	<u>r</u>		Α	В		
	B	5				
						IMS_B is triggered to re-authenticate user B
23			,		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing
						UE_B's re-authentication
24			,		NOTIFY	IMS_B sends a NOTIFY to UE_B, containing
						UE_ re-authentication
25					REGISTER	UE_B sends REGISTER containing
			1			authentication challenge response to IMS_A
26				$\longrightarrow$	REGISTER	IMS_A forwards the REGISTER to IMS B
27			←		200 OK	IMS_B responds with 200 OK
28			$\longleftarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
29				$\rightarrow$	SUBSCRIBE	IMS_A sends a SUBSCRIBE to IMS_B
30			←		200 OK	IMS_B responds with a 200 OK
31					NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing
						UE_B's registration status
32				$\longrightarrow$	200 OK	IMS_A responds to the NOTIFY with a 200 OK
33					SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event
			1			package) to IMS_A
34				$\longrightarrow$	SUBSCRIBE	IMS_A forwards the SUBSCRIBE to IMS_B
35			_		200 OK	IMS_B responds to the SUBSCRIBE with a 200
						OK
36		•	$\leftarrow$		200 OK	IMS_A forwards the 200 OK response to UE_B
37			_		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing
			`			UE_B's registration status
38		•	$\leftarrow$		NOTIFY	IMS_A forwards the NOTIFY to UE_B*
39		•	$\longrightarrow$		200 OK	UE_B responds to the NOTIFY with a 200 OK
40				$\rightarrow$	200 OK	IMS_A forwards the 200 OK to IMS_B
41		$\leftarrow$				User B is informed about successful registration

## 4.5.2.7 First time registration in a visited IMS network requiring Topology Hiding

		Interoperability Test	Description				
Identifier:	TD_IMS_	_0008					
Summary:			network with topology hiding				
Configuration:	CF_ROA	.M_REG					
SUT	IMS_A						
References	Test Pur		Spec. Ref.				
		_513401	clause 5.10.4.1 §5				
		_540101	clause 5.10.2.1 §1				
	TP_IMS_	_540501	clause 5.10.2.2 §1				
Use Case ref.:	UC_01_I	२					
Pre-test	. Н	SS of IMS_B is configured a	searding to table 1				
conditions:		E_B IP bearers established t					
oonaniono.		E_B is not registered	J IIVIO_A as per clause 4.2.1				
		IS_A has topology hiding en	phlod				
	• 111	15_A has topology fliding en	ableu				
Test Sequence:	Step						
Tool ooquonooi	1	User B registers in IMS B (	ising any user identity				
	2	Verify that UE_B shows su	ccessful registration				
0	Observi						
Conformance	Check	TD 1140 5404 04 : 0514					
Criteria:	1	TP_IMS_5134_01 in CFW	step 3, 7 (REGISTER):				
		ensure that {	OIOTED (- IMO A )				
		when { UE_B sends a RE					
		then { IMS_A sends the F					
		containing an additional topmost Path_header					
	indicating the IBCF_SIP_URI of IMS_A }						
	2 TP_IMS_5401_01 in CFW step 3, 7 (REGISTER):						
	ensure that {						
		when { UE_B sends a RE	GISTER to IMS_A				
		eader}					
		REGISTER to IMS_B					
		containing a Pati					
			crypted_consecutive_header_entries and				
		tokeniz	red-by_parameter) }				
	3	TP IMS 5405 01 in CEW	step 10, 15 (SUBSCRIBE):				
		ensure that {	step 10, 10 (0000011102).				
		when { UE_B sends a SU	BSCRIBE to IMS_B }				
		then { IMS_A sends the S					
		containing a Via					
			crypted_consecutive_header_entries and				
			nized-by_parameter) and				
			ord-Route_header				
		containing (en	crypted_consecutive_header_entries and				
			nized-by_parameter) and				
		containing a Rou					
			crypted_consecutive_header_entries and				
			nized-by_parameter) and				
			P-Charging-Vector_header and				
		a P-Cl	parging-Function-Addresses_header) }				
		}					

Step	Direction	Message	Comment
	U U I I S E M M		
	S   E   M   M		
	B     1   -		
1			User B registers in IMS B
2		REGISTER	UE_B sends a REGISTER to IMS_A
3		REGISTER	IMS_A forwards the REGISTER to IMS_B
4		401 Unauthorized	IMS_B responds with 401 Unauthorized to
			IMS_A
5	<del>                                   </del>	401 Unauthorized	IMS_A forwards the 401 Unauthorized to UE_B
6		REGISTER	UE_B sends the same REGISTER containing
			authentication challenge response to IMS_A
7		REGISTER	IMS_A forwards the REGISTER to IMS B
8		200 OK	IMS_B responds with 200 OK
9	<del>                                   </del>	200 OK	IMS_A forwards the 200 OK response to UE_B
10		SUBSCRIBE	IMS_A sends a SUBSCRIBE to IMS_B
11	<del>   </del>	200 OK	IMS_B responds with a 200 OK
12		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing
			UE_B's registration status
13		200 OK	IMS_A responds to the NOTIFY with a 200 OK
14		SUBSCRIBE	UE_B sends a SUBSCRIBE (reg event
			package) to IMS_A
15		SUBSCRIBE	IMS_A forwards the SUBSCRIBE request to
			IMS_B
16		200 OK	IMS_B responds to the SUBSCRIBE with a 200
			OK
17	<del>                                   </del>	200 OK	IMS_A forwards the 200 OK response to UE_B
18		NOTIFY	IMS_B sends a NOTIFY to IMS_A, containing
			UE_B's registration status
19		NOTIFY	IMS_A forwards the NOTIFY to UE_B
20		200 OK	UE_B responds to the NOTIFY with a 200 OK
21		200 OK	IMS_A forwards the 200 OK to IMS_B
22			User B is informed about successful registration

# 4.5.3 Initial Dialog or Standalone 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

		Interoperability Tes	st Description
Identifier:	TD_IMS_		
Summary:			ndle establishment of dialogs for users with default
		and resolve Tel URI E.163	
Configuration:	CF_INT_		
SUT	IMS A aı	nd IMS_B	
References	Test Pur		Spec. Ref.
		5097_01	clause 5.4.3.2 §1
		_5097_02	clause 5.4.3.2 §1
		5097_02 5097_04	clause 5.4.3.2 §1
		_5107_02	clause 5.4.3.2 §49
		5107_01	clause 5.4.3.2 §49
		5115_01	clause 5.4.3.3 §39
		_5115_03	clause 5.4.3.3 §39
		_5115_02	clause 5.4.3.3 §39
		_511504	clause 5.4.3.3 §39
		_5131_01	clause 5.3.2.1 §37
	TP_IMS_	_5131_02	clause 5.3.2.1 §37
Use Case ref.:	UC_02_I		
Pre-test	• H	SS of IMS A and of IMS B	is configured according to table 1
conditions:			arers established to their respective IMS networks
		s per clause 4.2.1	
			as user2 according to table 1
			as user2 according to table 1
		IS_A within the trust domai	
			NUM entry for the Tel URI E.164 Number of user
		_priv of IMS_B	
the state of the s			
Test Sequence:	Step		
Test Sequence:	Step 1	User A calls user B's Tel	URI
Test Sequence:	1	User A calls user B's Tel	
Test Sequence:	1 2	Verify that user B is infor	med of incoming call of User A
Test Sequence:	1 2 3	Verify that user B is information Verify that user A is information.	med of incoming call of User A
Test Sequence:	1 2 3 4	Verify that user B is informal Verify that user A is informal User B answers the call	med of incoming call of User A med that UE_B is ringing
Test Sequence:	1 2 3 4 5	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user A is informal Verify that user B is informal Verify	med of incoming call of User A med that UE_B is ringing med that call has been answered
Test Sequence:	1 2 3 4 5 6	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user B is informal Verify	med of incoming call of User A med that UE_B is ringing
Test Sequence:	1 2 3 4 5 6 7	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user B is informal User A ends the call	med of incoming call of User A med that UE_B is ringing med that call has been answered med that the call is established
Test Sequence:	1 2 3 4 5 6 7 8	Verify that user B is information. Verify that user A is information. User B answers the call Verify that user A is information. Verify that user B is information. User A ends the call Verify with UE_B that call	med of incoming call of User A med that UE_B is ringing med that call has been answered med that the call is established has been released
Test Sequence:	1 2 3 4 5 6 7	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user B is informal User A ends the call	med of incoming call of User A med that UE_B is ringing med that call has been answered med that the call is established has been released
·	1 2 3 4 5 6 7 8	Verify that user B is information. Verify that user A is information. User B answers the call Verify that user A is information. Verify that user B is information. User A ends the call Verify with UE_B that call	med of incoming call of User A med that UE_B is ringing med that call has been answered med that the call is established has been released
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user B is informal User A ends the call Verify with UE_B that call Verify with UE_A that call	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released
·	1 2 3 4 5 6 7 8	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user B is informal User A ends the call Verify with UE_B that call Verify with UE_A that Call Verify With UE	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user B is informal User A ends the call Verify with UE_B that call Verify with UE_A that call Verify with UE	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released V step 4 (INVITE):
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user B is informal User A ends the call Verify with UE_B that call Verify with UE_A that call Verify with UE	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user B is informal User A ends the call Verify with UE_B that call Verify with UE_A that call Verify with UE	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user A is informal Verify that user B is informal User A ends the call Verify with UE_B that call Verify with UE_A that call Verify with UE	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  initial INVITE to UE_B } the initial INVITE
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is informal Verify that user A is informal User B answers the call Verify that user B is informal Verify that user B is informal User A ends the call Verify with UE_B that call Verify with UE_A sends an interest that {	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  initial INVITE to UE_B } the initial INVITE
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is inform Verify that user A is inform User B answers the call Verify that user A is inform Verify that user B is inform User A ends the call Verify with UE_B that call Verify with UE_A that cal Verify with UE_A that cal  TP_IMS_5097_01 in CFV ensure that { when { UE_A sends an interpretation of the containing a least indicating the Sends in information of the containing a least indicating the Sends in information of the containing a least indicating the Sends in information.	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  initial INVITE to UE_B } the initial INVITE  Route_header
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is inform Verify that user A is inform User B answers the call Verify that user A is inform Verify that user B is inform User A ends the call Verify with UE_B that call Verify with UE_A that cal Verify with UE_A that cal  TP_IMS_5097_01 in CFV ensure that { when { UE_A sends an interpretation of the containing a Findicating the Secontaining a P-CI	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  mitial INVITE to UE_B } the initial INVITE  Route_header -CSCF_SIP_URI of IMS_A marging-Vector_header
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is inform Verify that user A is inform User B answers the call Verify that user A is inform Verify that user B is inform User A ends the call Verify with UE_B that call Verify with UE_A that call Verify with UE_A that call TP_IMS_5097_01 in CFV ensure that { when { UE_A sends an interest that { when { IMS_B receives the indicating the Secontaining a P-CV (containing an interest that {	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  mitial INVITE to UE_B } he initial INVITE  Route_header -CSCF_SIP_URI of IMS_A harging-Vector_header id_parameter and
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is inform Verify that user A is inform User B answers the call Verify that user A is inform Verify that user B is inform User A ends the call Verify with UE_B that call Verify with UE_A that call Verify with UE_A that call TP_IMS_5097_01 in CFV ensure that { when { UE_A sends an interest that { when { IMS_B receives the indicating the Secontaining a P-CV (containing a interest incontaining a original intere	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  mitial INVITE to UE_B } he initial INVITE  Route_header -CSCF_SIP_URI of IMS_A harging-Vector_header id_parameter and g-ioi_parameter indicating IMS_A and
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is information. Verify that user A is information. User B answers the call verify that user B is information. Verify that user B is information. User A ends the call verify with UE_B that call verify with UE_A sends an interest that {  when { UE_A sends an interest then { IMS_B receives the indicating the Secontaining a P-Checontaining a original containing a	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  witial INVITE to UE_B } he initial INVITE Route_header -CSCF_SIP_URI of IMS_A harging-Vector_header id_parameter and g-ioi_parameter indicating IMS_A and term-ioi_parameter) and
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is information. Verify that user A is information. User B answers the call. Verify that user B is information. Verify that user B is information. User A ends the call. Verify with UE_B that call. Verify with UE_A sends an interest that {  when { UE_A sends an interest then { IMS_B receives the indicating the Secontaining a P-Clean (containing a properties of the indicating a properties of the ind	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  witial INVITE to UE_B } he initial INVITE Route_header -CSCF_SIP_URI of IMS_A harging-Vector_header id_parameter and g-ioi_parameter indicating IMS_A and term-ioi_parameter) and ord-Route_header
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is information. Verify that user A is information. User B answers the call. Verify that user B is information. Verify that user B is information. User A ends the call. Verify with UE_B that call. Verify with UE_A that call. Verify with	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  witial INVITE to UE_B } he initial INVITE Route_header -CSCF_SIP_URI of IMS_A harging-Vector_header id_parameter and g-ioi_parameter indicating IMS_A and term-ioi_parameter) and ord-Route_header iniginating S-CSCF_SIP_URI and
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is information. Verify that user A is information. User B answers the call. Verify that user B is information. Verify that user B is information. User A ends the call. Verify with UE_B that call. Verify with UE_A sends an interest that {  When { UE_A sends an interest then { IMS_B receives the indicating the Secontaining a P-Checontaining a recontaining a Receive indicating the ocentaining a P-Checontaining	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  witial INVITE to UE_B } he initial INVITE Route_header -CSCF_SIP_URI of IMS_A harging-Vector_header id_parameter and g-ioi_parameter indicating IMS_A and herd-Route_header iginating S-CSCF_SIP_URI and harging-Vector_header
Conformance	1 2 3 4 5 6 7 8 9	Verify that user B is information. Verify that user A is information. User B answers the call. Verify that user B is information. Verify that user B is information. User A ends the call. Verify with UE_B that call. Verify with UE_A that call. Verify with	med of incoming call of User A med that UE_B is ringing  med that call has been answered med that the call is established  has been released has been released  V step 4 (INVITE):  witial INVITE to UE_B } he initial INVITE Route_header -CSCF_SIP_URI of IMS_A harging-Vector_header id_parameter and g-ioi_parameter indicating IMS_A and term-ioi_parameter) and ord-Route_header iniginating S-CSCF_SIP_URI and

		Interoperability Test Description
	2	TP_IMS_5097_02 in CFW step 4 (INVITE):
	2	ensure that {
		when { UE_A sends an initial INVITE to UE_B
		not containing a P-Preferred-Identity_header or
		containing a P-Preferred-Identity_header
		not indicating a Tel_URI of UE_A}
		then { IMS_B receives the initial INVITE
		containing a P-Asserted-Identity_header
		indicating the default_registered_public_identity of UE_A
		and
		containing a P-Asserted-Identity_header
		indicating a Tel_URI of UE_A }
-	3	TD_IMC_5007_04 in_CDM_stan_4 (INIVITE):
	3	TP_IMS_5097_04 in CFW step 4 (INVITE):
		ensure that {
		when { UE_A sends an initial INVITE to UE_B containing a Request_URI
		indicating a Tel_URI}
		then { IMS_A sends a DNS_Query to DNS_B
		containing the Tel_URI_E.164_Number }
		when { IMS_A receives DNS_Response
		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 a access-network-charging-info_parameter }
		}
	4	TP_IMS_5107_02 in CFW step 19 (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 and
		containing a P-Charging-Vector_header
		not containing a access-network-charging-info_parameter and not containing a P-Access-Network-Info_header }
		Thot containing a F-Access-Network-Into_neader }
	5	TP_IMS_5107_01 in CFW step 24A (BYE):
	J	ensure that {
		when { UE_A sends BYE to UE_B }
		then { IMS_B receives the BYE
		containing no Route_header
		indicating the S-CSCF_SIP_URI of IMS_A and
		containing a P-Charging-Vector_header
		not containing a access-network-charging-info_parameter and
		not containing a P-Access-Network-Info_header }
		}
	6	TP_IMS_5115_01 in CFW step 10 (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 a orig-ioi_parameter
		indicating operator_identifier of IMS_A and
		containing a term-ioi_parameter
		indicating operator_identifier of IMS_B
		}

	Interoperability Test Description
7	TP_IMS_5115_03 in CFW step 10 (180 Ringing):
	ensure that {
	when { UE_B sends a 1xx_response to UE_A
	(not containing a P-Preferred-Identity_header or
	containing a P-Preferred-Identity_header
	indicating a SIP_URI of UE_B) }
	then { IMS_A receives the 1xx_response from IMS_B
	containing a P-Asserted-Identity_header
	indicating the default_registered_public_identity and
	containing a P-Asserted-Identity_header
	indicating a Tel_URI of UE_BI }
	TD_IMC_5115_00 in CDM stop 15 (2)vv\;
8	TP_IMS_5115_02 in CFW step 15 (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 15 (2xx):
	ensure that {
	when { UE_B sends a 2xx_response to UE_A
	(not containing a P-Preferred-Identity_header or
	containing a P-Preferred-Identity_header
	not indicating a Tel_URI of UE_B) }
	then { IMS_A receives the 2xx_response from IMS_B
	containing a P-Asserted-Identity_header
	indicating the default_registered_public_identity of UE_B and
	containing a P-Asserted-Identity_header
	indicating a Tel_URI of UE_B}
10	TD IMC 5131 01 in CEW aton 10 (100 Dinging):
10	TP_IMS_5131_01 in CFW step 10 (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 }
	}
11	TP_IMS_5131_01 in CFW step 15 (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
	}
	1,
	V

Step	Direction		Message	Comment
	U U I I	UU		
	S E M M e A S S	E s B e		
	e A S S r A B	B e r		
	Å     ^   B	ЬB		
1				User A calls User B
2			INVITE	UE A sends INVITE with the first SDP offer
_			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	indicating all desired medias and codecs that
				UE_A supports
3			100 Trying	IMS_A responds with a 100 Trying provisional
				response
4			INVITE	IMS_A forwards INVITE to IMS_B
5			100 Trying	IMS_B responds with a 100 Trying provisional
	.			response
6	.	<del> </del>	INVITE	IMS_B forwards INVITE to UE_B
7		<b>_</b>	100 Trying	UE_B optionally responds with a 100 Trying
0		,		provisional response
8			400 Dinging	User B is informed of incoming call of User A UE B responds to initial INVITE with 180
9		_	180 Ringing	Ringing to indicate that it has started alerting
10	·		180 Ringing	IMS_B forwards 180 Ringing response to
'0	<del>                                   </del>		100 Kinging	IMS_A
11			180 Ringing	IMS_A forwards the 180 Ringing response to
				UE_A
12				User A is informed that UE_B is ringing
13		<del></del>		User B answers call
14			200 OK	UE_B responds INVITE with 200 OK to indicate
45			202 01/	that the call has been answered
<b>15</b>			<b>200 OK</b> 200 OK	IMS_B forwards 200 OK response to IMS_A IMS_A forwards the 200 OK response to UE_A
17			200 OK	User A is informed that call has been answered
18			ACK	UE_A acknowledges the receipt of 200 OK for
10	<del>  →</del>		ACK	INVITE
19			ACK	IMS_A forwards ACK to IMS_
20	·	<b>→</b>	ACK	IMS B forwards ACK to UE B
21		<u> </u>		User B is informed that the call is established
22A	$\longrightarrow$			User A ends call
23A	$\longrightarrow$		BYE	UE_A releases the call with BYE
24A			BYE	IMS_A forwards BYE to IMS_B
25A		$\rightarrow$	BYE	IMS_B forwards BYE to UE_B
26A		$\longrightarrow$		User B is informed that call has ended
27A	.	$\dashv$	200 OK	UE_B sends 200 OK for BYE
28A	.     <del>     </del>		200 OK	IMS_B forwards 200 OK response to IMS_A
29A			200 OK	IMS_A forwards the 200 OK response to UE_A
30A		$\longrightarrow$		User B is informed that call has ended

#### 4.5.3.1.1.2 Default Tel URI

		Interoperability Test	Description				
Identifier:	TD_IMS_		•				
Summary:	Ensure that the IMS network can handle establishment of dialogs for users with default						
	TEL URI		<b>G</b>				
Configuration:	CF_INT_	CALL					
SUT		nd IMS_B					
References	Test Pur		Spec. Ref.				
			clause 5.4.3.2 §1				
			clause 5.4.3.2 §1				
			clause 5.4.3.2 §49				
			clause 5.4.3.2 §49				
			clause 5.4.3.3 §39				
		_5115_05	clause 5.4.3.3 §39				
		_5115_02	clause 5.4.3.3 §39				
		5115_06	clause 5.4.3.3 §39				
		_5131_01	clause 5.4.3.3 §37				
		_5131_02	clause 5.3.2.1 §37				
Use Case ref.:	UC_02_I		0.000 0.0.2.1 301				
000 0000 10111	00_02_1						
Pre-test	• н	SS of IMS A and of IMS B is	configured according to table 1				
conditions:			ers established to their respective IMS networks				
		s per clause 4.2.1	ers established to their respective hilo hetworks				
		•	sing user3 according to table 1				
			sing user3 according to table 1				
		IS_A within the trust domain					
	110	NS_A WITHIN THE TRUST GOMAIN	OF TIMO_B				
Test Sequence:	Step						
rest ocquerioc.	1	User A calls user B					
	2		ed of incoming call of User A				
	3	Verify that user A is inform					
	4	User B answers the call	ed that OL_D is hinging				
	5	I .	ed that call has been answered				
	6		ed that the call is established				
	0						
	7	Il loor A ando the coll	od triat trio dan io detablierioa				
	7	User A ends the call					
	8	Verify with UE_B that call h	nas been released				
			nas been released				
Conformance	8 9	Verify with UE_B that call h	nas been released				
Conformance	8 9 <b>Check</b>	Verify with UE_B that call he verify with UE_A that call he	nas been released nas been released				
Conformance Criteria:	8 9	Verify with UE_B that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW	nas been released nas been released				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h  TP_IMS_5097_01 in CFW ensure that {	nas been released nas been released step 4 (INVITE):				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init	nas been released nas been released step 4 (INVITE):				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init then { IMS_B receives the	nas been released nas been released step 4 (INVITE): tial INVITE to UE_B }				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init then { IMS_B receives the not containing a Ro	nas been released nas been released step 4 (INVITE): rial INVITE to UE_B } e initial INVITE oute_header				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init then { IMS_B receives the not containing a Ro indicating the S-C	nas been released nas been released step 4 (INVITE): tial INVITE to UE_B } e initial INVITE oute_header CSCF_SIP_URI of IMS_A				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init then { IMS_B receives the not containing a Ro indicating the S-C containing a P-Cha	nas been released nas been released step 4 (INVITE): tial INVITE to UE_B } e initial INVITE oute_header CSCF_SIP_URI of IMS_A arging-Vector_header				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init then { IMS_B receives the not containing a Ro indicating the S-C containing a p-Cha (containing an icid	nas been released nas been released step 4 (INVITE): tial INVITE to UE_B } e initial INVITE oute_header CSCF_SIP_URI of IMS_A arging-Vector_header d_parameter and				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init then { IMS_B receives the not containing a Ro indicating the S-C containing a P-Cha (containing an icid containing a orig-	nas been released nas been released step 4 (INVITE): tial INVITE to UE_B } e initial INVITE oute_header CSCF_SIP_URI of IMS_A arging-Vector_header				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init then { IMS_B receives the not containing a Ro indicating the S-C containing a P-Cha (containing an icid containing a orig-	nas been released nas been released step 4 (INVITE): fial INVITE to UE_B } e initial INVITE bute_header CSCF_SIP_URI of IMS_A lorging-Vector_header d_parameter and eioi_parameter indicating IMS_A and ferm-ioi_parameter) and				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init then { IMS_B receives the not containing a Ro indicating the S-C containing an icid containing a orig- not containing a t containing a Record	nas been released nas been released step 4 (INVITE): fial INVITE to UE_B } e initial INVITE bute_header CSCF_SIP_URI of IMS_A lorging-Vector_header d_parameter and eioi_parameter indicating IMS_A and ferm-ioi_parameter) and				
	8 9 <b>Check</b>	Verify with UE_B that call h Verify with UE_A that call h Verify with UE_A that call h TP_IMS_5097_01 in CFW ensure that { when { UE_A sends an init then { IMS_B receives the not containing a Ro indicating the S-C containing an icid containing a orig- not containing a t containing a Recon indicating the orig	nas been released nas been released step 4 (INVITE): fial INVITE to UE_B } e initial INVITE bute_header CSCF_SIP_URI of IMS_A targing-Vector_header d_parameter and eioi_parameter indicating IMS_A and fierm-ioi_parameter) and d-Route_header				
	8 9 <b>Check</b>	Verify with UE_B that call he Verify with UE_A that call he ensure that {  when { UE_A sends an initiation then { IMS_B receives the not containing a Recontaining a P-Cha (containing an icide containing a origination to containing a technique that containing a P-Cha not containing a recontaining a reconta	nas been released nas been released step 4 (INVITE): stal INVITE to UE_B } e initial INVITE oute_header CSCF_SIP_URI of IMS_A arging-Vector_header d_parameter and ioi_parameter indicating IMS_A and term-ioi_parameter) and d-Route_header ginating S-CSCF_SIP_URI and arging-Vector_header access-network-charging-info_parameter and				
	8 9 <b>Check</b>	Verify with UE_B that call he Verify with UE_A that call he ensure that {  when { UE_A sends an initiation then { IMS_B receives the not containing a Recontaining a P-Cha (containing an icide containing a origination to containing a technique that containing a P-Cha not containing a recontaining a reconta	nas been released nas been released step 4 (INVITE): stal INVITE to UE_B } e initial INVITE oute_header CSCF_SIP_URI of IMS_A arging-Vector_header d_parameter and ioi_parameter indicating IMS_A and term-ioi_parameter) and d-Route_header ginating S-CSCF_SIP_URI and arging-Vector_header				

		Interoperability Test Description
	2	TP_IMS_5097_03 in CFW step 4 (INVITE)
		ensure that { when { UE_A sends an initial INVITE to UE_B
		not containing a P-Preferred-Identity_header or
		containing a P-Preferred-Identity_header
		indicating a Tel_URI of UE_A }
		then { IMS_B receives the initial INVITE
		containing a P-Asserted-Identity_header
		indicating the default_registered_public_identity of UE_A
		and containing a P-Asserted-Identity_header
		indicating a Tel_derived_SIP_URI of UE_A}
		}
	3	TP_IMS_5107_02 in CFW step 19 (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 and
		containing a P-Charging-Vector_header
		not containing a access-network-charging-info_parameter and
		not containing a P-Access-Network-Info_header }
		}
	4	TP_IMS_5107_01 in CFW step 24A (BYE):
		ensure that {
		when { UE_A sends BYE to UE_B } then { IMS_B receives the BYE
		containing no Route_header
		indicating the S-CSCF_SIP_URI of IMS_A and
		containing a P-Charging-Vector_header
		not containing a access-network-charging-info_parameter and
		not containing a P-Access-Network-Info_header }
_		
	5	TP_IMS_5115_01 in CFW step 10 (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 a 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_05 in CFW step 10 (180 Ringing):
	•	ensure that {
		when { UE_B sends a 1xx_response to UE_A
		(not containing a P-Preferred-Identity_header or
		containing a P-Preferred-Identity_header
		indicating a Tel_URI) }
		then { IMS_A receives the 1xx_response
		containing a P-Asserted-Identity_header indicating the default_registered_public_identity and
		containing a P-Asserted-Identity_header
		indicating a Tel_derived_SIP_URI }
		<u> </u>
	7	TP_IMS_5115_02 in CFW step 15 (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
		}
·		

	Interoperability Test Description
8	TP IMS 5115 06 in CFW step 15 (2xx):
	ensure that {
	when { UE_B sends a 2xx_response to UE_A
	(not containing a P-Preferred-Identity header or
	containing a P-Preferred-Identity_header
	indicating a Tel_URI) }
	then { IMS A receives the 2xx response
	containing a P-Asserted-Identity_header
	indicating the default_registered_public_identity and
	containing a P-Asserted-Identity header
	indicating a Tel_derived_SIP_URI }
	}
9	TP_IMS_5131_01 in CFW step 10 (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_01 in CFW step 15 (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
	}
	}

Step	Direction						Message	Comment
	U	U	I	I	U	U		
	s	Ε	M	M	E	s		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
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
								UE_A supports
3		←					100 Trying	IMS_A responds with a 100 Trying provisional
		(						response
4				$\rightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
5			<b>k</b> —				100 Trying	IMS_B responds with a 100 Trying provisional
							INVITE	response
6 7							100 Trying	IMS_B forwards INVITE to UE_B UE_B optionally responds with a 100 Trying
'				$\leftarrow$			100 Trying	provisional response
8								User B is informed of incoming call of User A
9							180 Ringing	UE_B responds to initial INVITE with 180
				$\leftarrow$			Too ranging	Ringing to indicate that it has started alerting
10							180 Ringing	IMS B forwards 180 Ringing response to
			<b>—</b>					IMS_A
11							180 Ringing	IMS_A forwards the 180 Ringing response to
								UE_A
12	⊬							User A is informed that UE_B is ringing
13					←			User B answers call
14				_			200 OK	UE_B responds INVITE with 200 OK to indicate
				`				that the call has been answered
15			⊬				200 OK	IMS_B forwards 200 OK response to IMS_A
16		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
17	$\leftarrow$						A 017	User A is informed that call has been answered
18			$\rightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
19							ACK	IMS_A forwards ACK to IMS_B
20							ACK	IMS_B forwards ACK to UE_B
21					1_		ACK	User B is informed that the call is established
22A						1		User A ends call
23A		1					BYE	UE_A releases the call with BYE
24A			1	$\rightarrow$			BYE	IMS_A forwards BYE to IMS_B
25A				1	$\longrightarrow$		BYE	IMS_B forwards BYE to UE_B
26A						$\rightarrow$		User B is informed that call has ended
27A				<b>(</b>			200 OK	UE_B sends 200 OK for BYE
28A			<b>K</b> —				200 OK	IMS_B forwards 200 OK response to IMS_
29A		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
30A						$\rightarrow$		User B is informed that call has ended

#### 4.5.3.1.1.3 Rejection of call from barred user

		Interoperability Test Descr	iption						
Identifier:	TD_IMS_0011								
Summary:	Ensure that	at IMS does not establish call for b	arred user						
Configuration:	CF_INT_CALL								
SUT	IMS_B								
References	Test Purp	ose	Spec. Ref.						
	TP_IMS_5	097_11	clause 5.4.3.2 §1						
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 been barred in IMS_B</li> </ul>								
T 10	0.								
Test Sequence:	Step	User A calls user B							
	2	Verify that user A is informed that call cannot be established							
		verily that user A is informed that	call carmot be established						
Conformance	Check								
Criteria:	1	TP_IMS_5097_11 in CFW step 4 ensure that { when { UE_A sends an initial IN IMS_A sends the INVITE to containing a P-Asserted-le indicating a barred_use then { IMS_B sends 403_respond}	VITE to UE_B and IMS_B dentity_header or in IMS_B }						

Step			Direc	ction			Message	Comment
	U s e r A	U E A	M S A	I M S B	U E B	U s e r B		
1		$\rightarrow$						User A calls User B
2			$\rightarrow$				INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports
3		←					100 Trying	IMS_A responds with a 100 Trying provisional response
4				$\rightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
5			<b>←</b>				100 Trying	IMS_B responds with a 100 Trying provisional response
6			<del>(</del>				403 forbidden	IMS_B responds to the INVITE with 403 Forbidden
7		<del>(                                    </del>					403 Forbidden	IMS_B responds to the 403 Forbidden response to UE_A
8	$\leftarrow$							User A is informed that call has failed
9		_	$\longrightarrow$				ACK	UE_A acknowledges the response
10				$\rightarrow$			ACK	IMS_A forwards the ACK to IMS_B

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

		Intereperability Test Decer	intion								
		Interoperability Test Descr	iption								
Identifier:	TD_IMS_0012										
Summary:	Ensure th	Ensure that IMS rejects call to non existing user									
Configuration:	CF_INT_CALL										
SUT	IMS_B										
References	Test Pur	oose	Spec. Ref.								
	TP_IMS_	5132_01	clause 5.3.2.1 §28								
Use Case ref.:	UC_01_I										
Pre-test conditions:	• UE	<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:	Step										
	1	User A calls user B indicating a n	User A calls user B indicating a non existing identity within IMS_B domain								
	2	Verify that user A is informed that	call cannot be established								
Conformance	Check										
Criteria:	1	TP_IMS_5132_01 in CFW step 6 ensure that {   when { UE_A sends an initial IN	VITE  JRI  ing_user in IMS_B and  IMS_B }								

Step			Direc	ction			Message	Comment
	U s e r A	U E A	I M S A	I M S B	U E B	U s e r B		
1								User A calls User B
2			$\rightarrow$				INVITE	UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports
3		$\leftarrow$					100 Trying	IMS_A responds with a 100 Trying provisional response
4			_	$\longrightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
5			<b>←</b>				100 Trying	IMS_B responds with a 100 Trying provisional response
6	,		←				404 Not Found	IMS_B responds with 404 Not Found to IMS_A
7		<b>—</b>					404 Not Found	IMS_A forwards the 404 Not Found response to UE_A
8	<del></del>							User A is informed that called user does not exist
9			$\rightarrow$				ACK	UE_A acknowledges the receipt of a 404 final response
10				$\longrightarrow$			ACK	IMS_A forwards the ACK to IMS_B

#### 4.5.3.1.1.5 Rejection of call to unavailable user

		Interoperability Test Descr	iption						
Identifier:	TD_IMS_0013								
Summary:	Ensure that IMS does not establish a call for unavailable user								
Configuration:	CF_INT_CAL	LL							
SUT	IMS_B								
References	Test Purpos	se	Spec. Ref.						
	TP_IMS_513	33_01	clause 5.3.2.1 §29						
Use Case ref.:	UC_01I								
Pre-test conditions:	<ul> <li>HSS of IMS_A and IMS_B is configured according to table 1</li> <li>UE_A has IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A is registered in IMS_A using any user identity</li> <li>UE_B is not registered in IMS_B</li> </ul>								
Test Sequence:		ser A calls a valid user B identity erify that user A is informed that	y user B is not reachable or equivalent						
Conformance Criteria:	er	P_IMS_5133_01 in CFW step 6 nsure that { when { UE_A sends INVITE to L then { IMS_B sends a 4xx_respo	JE_B}						

Step			Direc	ction			Message	Comment
•	U s e r A	U E A	M S A	I M S B	U E B	U s e r B		
4								Lleer A celle Lleer D
2		_					INVITE	User A calls User B
							IIIVIIE	UE_A sends INVITE with the first SDP offer
			~					indicating all desired medias and codecs that
3							400 Truin a	UE_A supports
3		$\leftarrow$					100 Trying	IMS_A responds with a 100 Trying provisional
							D 0 475	response
4				$\longrightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
5			_				100 Trying	IMS_B responds with a 100 Trying provisional
			`					response
6			←				4xx	IMS_B responds with 4xx to IMS_A
7		$\leftarrow$					4xx	IMS_A forwards the 4xx response to UE_A
8	,							User A is informed that called user does not
	$\leftarrow$							exist
9							ACK	UE_A acknowledges the receipt of a 404 final
			$\longrightarrow$					response
10				$\longrightarrow$			ACK	IMS_A forwards the ACK to IMS_B

### 4.5.3.1.2 Dialogue Procedures with Roaming

#### 4.5.3.1.2.1 Normal call

		Interoperability Test Desc	ription
Identifier:	TD_IMS_0		
Summary:	Normal ca	II while UE_B is roaming without t	opology hiding
Configuration:	CF_ROAM	/LCALL	
SUT	IMS_A		
References	Test Purp	ose	Spec. Ref.
	TP_IMS_5	5046_01	clause 5.2.6.3 §4
	TP_IMS_5	5067_01	clause 5.2.7.2 §7
	TP_IMS_5	5070_01	clause 5.2.7.3 §6
	TP_IMS_5	5301_01	clause 5.4.3.3 §56
	TP_IMS_5		clause 5.2.6.4 §15
	TP_IMS_5		clause 5.2.6.4 §15
	TP_IMS_5		clause 5.4.3.3 §1
Use Case ref.:	UC_02_R		1
Pre-test	• HS	S of IMS_A and of IMS B is config	gured according to table 1
conditions:			tablished to IMS_B as per clause 4.2.1
		_A is registered in IMS_A using a	
		_A is registered in IMS_A using a _B is registered in IMS_B via IMS	
		_B is registered in livid_B via livid S_A within the trust domain of IMS	
		Service-Route header list exists fo	
	T A S	bei vice-Route fleader list exists to	I DE_B III F-C3CF
Test Sequence:	Stop		
rest sequence.	Step 1	User A calls User B	
			nooming call of Llaar A
	2	Verify that user B is informed of in	
	3	Verify that user A is informed that	t UE_B is ringing
	4	User B answers call	4
	5	Verify that User A is informed that	
	6	Verify that User B is informed that	it the call is established
	7	User A ends call	t II b d - d
	8	Verify that user B is informed tha	
	9	Verify that user A is informed tha	t call has ended
0 (	011		
Conformance	Check	TD 1140 5040 04 : 0514 4	
Criteria:	1	TP_IMS_5046_01 in CFW step 4	<del>!</del>
		ensure that {	LINDUTE form LIE D.)
		when { IMS_A receives an initia	
		then { IMS_A sends the INVITE containing an additional	
			via_neader F_via_port_number and
			r_via_port_number and QDN_address or
			_address)) of IMS_A and
			_address))
		indicating (the P-CSCF	
			subsequent requests' from UE_A and
		(the P-CSCF-FQ	
			_address)) of IMS_A and
	1		rvice Route header URIs
	1	from the regis	
		not containing P-Preferre	
	1	containing a P-Asserted-	
	1	containing an address of	
	1	containing a P-Charging-	
	1	containing an icid_para	
		containing an lora bara	

	Interoperability Test Description
2	TP_IMS_5067_01 in CFW step 4
	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
	containing a access-network-charging-info_parameter }
	}
3	TP_IMS_5070_01 in CFW step 7
	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_5301_01 in CFW step 29A
	ensure that {
	when { IMS_A receives a BYE from UE_A
	}
	then { IMS_A sends the BYE
	containing no Route_header indicating the S-CSCF_SIP_URI of IMS_A
	containing a topmost Record-Route_header
	indicating the S-CSCF_SIP_URI of IMS_A
	}
_	}  TD
5	TP_IMS_5055_01 in CFW step 12
	ensure that {    when { IMS_A receives a 180_response from UE_B }
	then { IMS_A sends a 180_response to IMS_B
	containing a Record-Route_header
	containing the 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 address 'sent in P-Called_Party-ID header
	sent in the initial request' }
	}
6	TP_IMS_5055_02 in CFW step 18
	ensure that {
	when { IMS_A receives a 200_response from UE_B } then { IMS_A sends the 200_response to IMS_B
	containing a Record-Route_header
	containing the 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 address 'sent in P-Called_Party-ID header
	sent in the initial request'
	}
	}
7	TP_IMS_5108_01 in CFW step 6 (INVITE):
	ensure that {
	when { UE_A sends an initial INVITE to UE_B
	IMS_A sends the INVITE to IMS_B containing a P-Charging-Vector_header
	containing a F-Charging-vector_neader  containing an icid_parameter }
	then { IMS_B sends the INVITE to IMS_A
	containing no Route_header
	indicating the S-CSCF_SIP_URI of IMS_B and
	containing a P-Charging-Vector_header
	containing the same icid_parameter and
	not containing ioi_parameters
	containing a Record-Route_header containing the S-CSCF_SIP_URI of IMS_B }
1	V.

Step			Direc	tion			Message	Comment
	U	U	C	C	_	ı		
	S	E	S	E	M	M		
	е	Α	e	В	S	S		
	r A		r B		Α	В		
_								H. B. II. II. A
2				$\rightarrow$			INIVITE	User B calls User A UE_B sends INVITE with the first SDP offer
2							INVITE	
								indicating all desired media and codecs that UE_B supports
3				$\leftarrow$			100 Trying	IMS_A responds with a 100 Trying provisional response
4						$\longrightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
5					<b>←</b>		100 Trying	IMS_B responds with a 100 Trying provisional response
6	•				<u></u>		INVITE	IMS_B forwards the INVITE to IMS_A
7					(		100 Trying	IMS_A responds with a 100 Trying
						$\rightarrow$	,	provisional response
8	•	$\leftarrow$					INVITE	IMS_A forwards the INVITE to UE_A
9	•						100 Trying	UE_A optionally responds with a 100 Trying
								provisional response
10	. ├─	_						User A is informed of incoming call of User B
11							180 Ringing	UE_A responds to initial INVITE with 180
					1			Ringing to indicate that it has started alerting
12						$\rightarrow$	180 Ringing	IMS_A forwards 180 Ringing response to IMS_B
13					$\leftarrow$		180 Ringing	IMS_B forwards the 180 Ringing response to IMS_A
14				<b>-</b>			180 Ringing	IMS_A forwards the 180 Ringing response to UE_B
15			$\leftarrow$					User B is informed that UE_A is ringing
16		$\rightarrow$	Ì					User A answers call
17		Ĺ			$\rightarrow$		200 OK	UE_A responds INVITE with 200 OK to indicate that the call has been answered
18						$\rightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
19							200 OK	IMS_B forwards the 200 OK response to IMS_A
20				_			200 OK 200 OK	IMS_A forwards the 200 OK response to IMS_A
21			_				200 010	User B is presented that call in process
22							ACK	UE_B acknowledges the receipt of 200 OK for
					$\rightarrow$			INVITE
23					-	$\rightarrow$	ACK	IMS_A forwards ACK to IMS_B
24					←		ACK	IMS_B forwards ACK to IMS_A
25		$\leftarrow$					ACK	IMS_A forwards ACK to UE_A
26	<del></del>							User A is informed that the call is in progress
27A		$\rightarrow$					5)/5	User A ends call
28A					$\longrightarrow$		BYE	UE_A releases the call with BYE
29A						$\rightarrow$	BYE	IMS_A forwards BYE to IMS_B
30A					$\leftarrow$		BYE	IMS_B forwards BYE to IMS_A
31A				$\leftarrow$			BYE	IMS_A forwards BYE to UE_B
32A			<b>←</b>					User B is informed that call has ended

#### 4.5.3.1.2.2 Normal call with hold/resume

		Interoperability Te	est Description					
Identifier:	TD_IMS_	_0015	•					
Summary:			re handled correctly In case of a user initiated call r puts roaming user on hold and resumes call					
Configuration:	CF_ROA	M_CALL						
SUT	IMS_A							
References	Test Purpose Spec. Ref.							
		5081_01	clause 5.2.9.2 §1					
		_5082_01	clause 5.2.9.2 §2					
		5120_01	clause 5.4.3.3 §48					
Use Case ref.:	UC_03 R							
Pre-test	• H:	SS of IMS A and of IMS F	3 is configured according to table 1					
conditions:	• Ul	E_A and UE_B have IP be s per clause 4.2.1 E_A configured to perform E_A is registered in IMS_/	earers established to their respective IMS networks nuser initiated hold/resume using INVITE	8				
	•		5					
Test Sequence:	Step							
	1	User A calls User B						
	2		rmed of incoming call of User A					
	3		rmed that UE_A is ringing					
	4	User B answers call						
	5		rmed that call has been answered					
	6		rmed that call is established					
	7	User A puts call on hold						
	8		rmed that call is on hold					
	9 10	Verify that user A is info User A resumes call	med that can is on hold					
	11		rmed that call is resumed					
	12		rmed that call is resumed					
	13	User A ends call	imed that call is resumed					
	14		rmed that call has ended					
	15		rmed that call has ended					
		The state of the s						
Conformance	Check							
Criteria:	1	TP_IMS_5081_01 in CF	W step 41A and 60A (100 Trying):					
		ensure that {						
			subsequent INVITE to UE_B and					
			ne INVITE from IMS_B }					
		then { IMS_A sends a	100_response to IMS_B }					
	•	} TD_IMC_5000_04 := C5	7M star 4CA and CEA (200 OK).					
	2	ensure that {	W step 46A and 65A (200 OK):					
			s a 200_response from UE_B }					
			e 200_response to IMS_B					
			-Charging-Vector_header					
		containing ar						
		_	ss-network-charging-info_parameter					
		}						
		}						
	3		W step 40A and 59A (INVITE):					
		ensure that {  when { I IF \( \Delta \) sends	a subsequent INVITE to UE_B }					
			es the INVITE from IMS_B					
			aining a topmost Route_header					
			ning the S-CSCF_SIP_URI					
			ng a Record-Route_header					
			ning the S-CSCF_SIP_URI }					
1		lı	•					

Step			Direc	ction			Message	Comment
	U	U	U	U	I	ı		
	s	E	S	E	M	M		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
34			K					User B is presented that call is in progress
35A		$\rightarrow$						User A puts call on hold
36A					,		INVITE	UE_A sends reINVITE message indicating
					$\longrightarrow$			media attribute "sendonly" (Call Hold)
37A							100 Trying	IMS_A responds with a 100 Trying provisional
								response
38A						$\longrightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
39A					/		100 Trying	IMS_B responds with a 100 Trying provisional
								response
40A					$\leftarrow$		INVITE	IMS_B forwards INVITE to IMS_A
41A							100 Trying	IMS_A responds with a 100 Trying
						1		provisional response
42A				$\leftarrow$			INVITE	IMS_A forwards INVITE to UE_B
43A					$\longrightarrow$		100 Trying	UE_B optionally responds with a 100 Trying
								provisional response
44A			$\leftarrow$				222 014	User B is informed that call is on hold
45A					$\longrightarrow$		200 OK	UE_B responds to INVITE with 200 OK
40.4							000 01/	indicating attribute "recvonly" inactive
46A					,	<b>→</b>	200 OK	IMS_A forwards 200 OK response to IMS_B
47A					$\leftarrow$		200 OK	IMS_B forwards 200 OK response to IMS_A
48A 49A		$\leftarrow$					200 OK ACK	IMS_A forwards the 200 OK response to UE_A
49A					$\longrightarrow$		ACK	UE_A acknowledges the receipt of 200 OK for INVITE
50A							ACK	IMS_A forwards ACK to IMS_B
51A					_		ACK	IMS_B forwards ACK to IMS_B
52A				_	`		ACK	IMS_A forwards ACK to UE_B
53A	_						TOR	User A is informed that call is on hold
54A	<u> </u>	_		ļ				User A resumes call
55A							INVITE	UE_A sends reINVITE message indicating
0071					$\longrightarrow$		"""	media attribute "sendrecv" (Call Resume)
56A							100 Trying	IMS_A responds with a 100 Trying provisional
		$\leftarrow$						response
57A						$\longrightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
58A							100 Trying	IMS_B responds with a 100 Trying provisional
								response
59A					$\leftarrow$		INVITE	IMS_B forwards INVITE to IMS_A
60A							100 Trying	IMS_A responds with a 100 Trying
						1		provisional response
61A				$\leftarrow$	$\overline{}$		INVITE	IMS_A forwards INVITE to UE_B
62A					$\longrightarrow$		100 Trying	UE_B optionally responds with a 100 Trying
00.1								provisional response
63A			$\leftarrow$				000 014	User B is informed that call is resumed
64A					$\longrightarrow$		200 OK	UE_B responds to INVITE with 200 OK
CE A							200 01/	indicating media attribute "sendrecv"
65A						$\rightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
66A							200 OK	IMS_B forwards the 200 OK response to IMS_A
67A							200 OK	IMS_A forwards the 200 OK response to UE_A
68A								User A is informed that call is resumed

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

		Interoperability Test Description							
Identifier:	TD_IMS_	0016							
Summary:		at the P-CSCF, after a dialogue has been established, modifies routing							
	information in subsequent requests (other than target refresh) received from the								
	before forwarding them to an IMS.								
Configuration:	CF_ROAI	M_CALL							
SUT	IMS_A	<u> </u>							
References	Test Purp								
	TP_IMS_								
Use Case ref.:	UC_02_R								
Pre-test	• HS	SS of IMS_A and of IMS B is configured according to table 1							
conditions:	• UE	B has IP bearers established to their respective IMS networks as per							
	cla	use 4.2.1							
	• UE	_A registered in IMS_A using any user identity							
		B is registered in IMS_B via IMS_A using any user identity							
Test Sequence:	Step								
-	1	User B calls user A							
	2	Verify that user A is informed of incoming call of User B							
	3	Verify that user B is informed that UE_A is ringing							
	4	User A answers call							
	5	Verify that user B is informed that call has been answered							
	6	Verify that user A is informed that call is established							
	7	User B ends call							
	8	Verify that user A is informed that call has ended							
	9	Verify that user B is informed that call has ended							
Conformance	Check								
Criteria:	1	TP_IMS_5052_01 in CFW step 29B (BYE):							
		ensure that {							
		when { IMS_A receives a BYE from UE_B }							
		then { IMS_A sends the BYE to IMS_B							
		not containing a Route_header							
		indicating the P-CSCF_SIP_URI of IMS_A and							
		containing the same Record-Route_header							
		as in the previous ACK							
		}							
		<u> </u>							

Step			Direc	ction			Message	Comment
	U	U	U	U	ı	ı		
	S	E	S	E	M	M		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
070								
27B				$\rightarrow$				User B ends call
28B				_	$\rightarrow$		BYE	UE_B releases the call with BYE
29B						$\longrightarrow$	BYE	IMS_A forwards BYE to IMS_B
30B					$\leftarrow$		BYE	IMS_B forwards BYE to IMS_A
31B		$\leftarrow$					BYE	IMS_A forwards BYE to UE_A
32B	$\leftarrow$	_						User A is informed that call has ended

### 4.5.3.1.2.4 Subsequent target refresh request (INVITE)

		Interoperability Test	Description						
Identifier:	TD_IMS_	0017	•						
Summary:	Check tha	at subsequent INVITEs are h	andled 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 Purp		Spec. Ref.						
	TP_IMS_		clause 5.2.6.3 §26						
	TP_IMS_		clause 5.2.9.1 §2						
Use Case ref.:	UC_03_R								
Pre-test			configured according to table 1						
conditions:			ers established to their respective IMS networks						
		per clause 4.2.1							
			er initiated hold/resume using INVITE						
		_A registered in IMS_A usin							
	• UE	_B is registered in IMS_B vi	a IMS_A using any user identity						
- 10	lo.								
Test Sequence:	Step	H							
	1	User B calls User A							
	2		d of incoming call of User B						
	3	Verify that user B is informed	d that UE_A is ringing						
	4	User A answers call	d that call has been arrays and						
	5		d that call has been answered						
	6	Verify that user A is informed	d that call is established						
	7	User B puts call on hold	d that call is an hold						
	8	Verify that user A is informed Verify that user B is informed to the control of t							
	10	User B resumes call	ed that call is on hold						
	11	Verify that user A is informed	d that call is resumed						
	12	Verify that user B is informed							
	13	User A ends call	d that can is resumed						
	14	Verify that user B is informed	d that call has ended						
	15	Verify that user A is informed							
	1.0	Troing that door 7 to mioning	a that can had chaca						
Conformance	Check								
Criteria:	1	TP IMS 5048 01 in CFW	step 38B and 57B (INVITE):						
		ensure that {	,						
		when { IMS_A receives a	subsequent INVITE from UE_B }						
		then { IMS_A sends the IN							
			ional topmost Record-Route_header						
		• .	P-CSCF_port_number 'where it awaits						
			ent requests' from UE_A and						
			CF-FQDN_address or						
			CF-IP_address)) of IMS_A and						
		containing an addit	·CSCF_via_port_number and						
			CSCF_via_poit_number and CF-FQDN_address or						
			CF-IP_address)) of IMS_A }						
		}	aaa						
	2	TP IMS 5080 01 in CFW	step 38B and 57B (INVITE):						
		ensure that {							
			bsequent INVITE from UE_B }						
		then { IMS_A sends the IN							
		containing a P-Chargi	ng-Vector_header						
		containing an upda	ted access-network-charging-info_parameter}						
		}							

Step			Direc	tion			Message	Comment
	U	U	U	U	I	I		
	S	E	S	E	M	M		
	e	Α	e	В	S	S B		
	r A		r B		A	В		
35B				_				User B puts call on hold
36B							INVITE	UE_B sends reINVITE message indicating
002					$\longrightarrow$			media attribute "sendonly" (Call Hold)
37B							100 Trying	IMS_A responds with a 100 Trying provisional
								response
38B						$\longrightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
39B					←		100 Trying	IMS_B responds with a 100 Trying provisional response
40B					$\leftarrow$		INVITE	IMS_B forwards INVITE to IMS_A
41B							100 Trying	IMS_A responds with a 100 Trying provisional
						1		response
42B		$\leftarrow$					INVITE	IMS_A forwards INVITE to UE_A
43B					$\longrightarrow$		100 Trying	UE_A optionally responds with a 100 Trying
44B								provisional response User A is informed that call is on hold
44B 45B							200 OK	UE_A responds to INVITE with 200 OK
436					$\longrightarrow$		200 OK	indicating attribute "recvonly"
46B							200 OK	IMS_A forwards 200 OK response to IMS_B
47B					<u> </u>		200 OK	IMS_B forwards 200 OK response to IMS_A
48B				←			200 OK	IMS_A forwards the 200 OK response to UE_B
49B					$\longrightarrow$		ACK	UE_B acknowledges the receipt of 200 OK for INVITE
50B						$\longrightarrow$	ACK	IMS_A forwards ACK to IMS_B
51B					←		ACK	IMS_B forwards ACK to IMS_B
52B		←					ACK	IMS_A forwards ACK to UE_A
53B			⊬	_				User B is informed that call is on hold
54B			_	$\rightarrow$				User B resumes call
55B							INVITE	UE_B sends reINVITE message indicating
=00					1		100 T :	media attribute "sendrecv" (Call Resume)
56B				←			100 Trying	IMS_A responds with a 100 Trying provisional
57D							INVITE	response IMS_A forwards INVITE to IMS_B
<b>57B</b> 58B						7	100 Trying	IMS_B responds with a 100 Trying provisional
SOD					$\leftarrow$		100 Hying	response
59B							INVITE	IMS_B forwards INVITE to IMS_A
60B					`		100 Trying	IMS_A responds with a 100 Trying provisional
						$\rightarrow$	,	response
61B		$\leftarrow$					INVITE	IMS_A forwards INVITE to UE_A
62B					$\rightarrow$		100 Trying	UE_A optionally responds with a 100 Trying provisional response
63B	←							User A is informed that call is resumed
UUD								Coo. 77 to informed that oall to resulted

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

		Interoperability Test Description						
Identifier:	TD_IMS_	TD_IMS_0018						
Summary:	Check th	at subsequent UPDATEs are handled 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 Pur	pose Spec. Ref.						
	TP_IMS_	_5080_02 clause 5.2.9.1 §2						
Use Case ref.:	UC_03_F	२						
Pre-test	• H	SS of IMS_A and of IMS B is configured according to table 1						
conditions:	• U	E_B has IP bearers established to their respective IMS networks as per						
	cl	ause 4.2.1						
	• U	E_A registered in IMS_A						
	• U	E_B configured to perform user initiated hold/resume using UPDATE						
	• U	E_B is registered in IMS_B via IMS_A						
Test Sequence:	Step							
	1	User B calls User A						
	2	Verify that user A is informed of incoming call of User A						
	3	Verify that user B is informed that UE_A is ringing						
	4	User A answers call						
	5	Verify that user A is informed that call has been answered						
	6	Verify that user B is informed that call is established						
	7	User B puts call on hold						
	8	Verify that user A is informed that call 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						
Conformance	Check							
Criteria:								
	1	TP_IMS_5080_02 in CFW step 37B and 47B (UPDATE):						
		ensure that {						
		when { IMS_A receives subsequent UPDATE from UE_B }						
		then { IMS_A sends the UPDATE to IMS_B						
		containing a P-Charging-Vector_header						
		containing an updated access-network-charging-info_parameter}						
l		}						

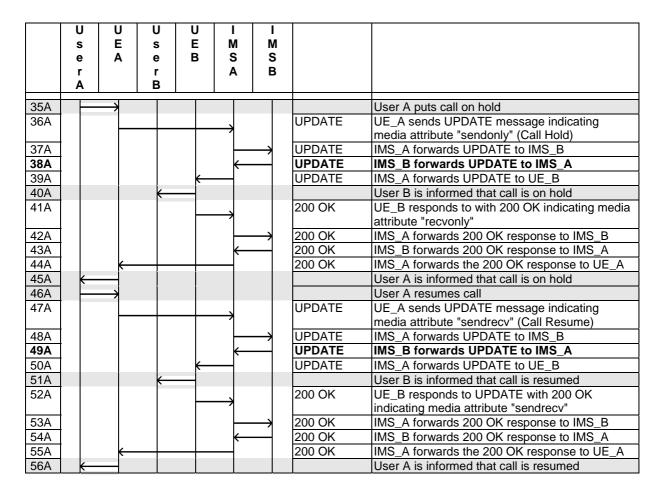
Step		Direction					Message	Comment
	U s e r A	UEA	U s e r B	U E B	I M S A	M S B		
35B				$\rightarrow$				User B puts call on hold
36B					$\rightarrow$		UPDATE	UE_B sends UPDATE message indicating media attribute "sendonly" (Call Hold)
37B						$\longrightarrow$	UPDATE	IMS_A forwards UPDATE to IMS_B
38B	1				$\leftarrow$		UPDATE	IMS_B forwards UPDATE to IMS_A
39B		←					UPDATE	IMS_A forwards UPDATE to UE_A
40B	$\leftarrow$							User A is informed that call on hold
41B							200 OK	UE_A responds to UPDATE with 200 OK
								indicating media attribute "recvonly"
42B						$\longrightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
43B					$\leftarrow$		200 OK	IMS_B forwards 200 OK response to IMS_A

Step			Direc	ction			Message	Comment
	C	U	U	U	ı	ı		
	S	Е	s	E	M	M		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
44B				$\leftarrow$			200 OK	IMS_A forwards the 200 OK response to UE_B
45B			$\vdash$	$\longrightarrow$				User B resumes call
46B							UPDATE	UE_B sends UPDATE message indicating
					7			media attribute "sendrecv" (Call Resume)
47B						$\longrightarrow$	UPDATE	IMS_A forwards UPDATE to IMS_B
48B					←		UPDATE	IMS_B forwards UPDATE to IMS_A
49B		←					UPDATE	IMS_A forwards UPDATE to UE_A
50B	$\downarrow$							User A is informed that call is resumed

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

		Interoperability Te	st Description				
Identifier:	TD_IMS_	0019					
Summary:	Check that subsequent UPDATEs are handled correctly In case of a user initiated of hold and resume when home caller puts a roaming user on hold and resumes call						
Configuration:	CF_ROA	M_CALL					
SUT	IMS_A						
References	Test Pur	oose	Spec. Ref.				
	TP_IMS_5120_02 clause 5.4.3.3 §48						
Use Case ref.:	UC_03_R	<u> </u>					
Pre-test	• HS	SS of IMS_A and of IMS B	is configured according to table 1				
conditions:			arers established to their respective IMS networks				
		per clause 4.2.1	·				
	• UE	_A configured to perform	user initiated hold/resume using UPDATE				
	• UE	E_A registered in IMS_A u	sing any user identity				
	• UE	E_B is registered in IMS_E	via IMS_A using any user identity				
Test Sequence:	Step						
	1	User A calls User B					
	2		er B is informed of incoming call of User A				
	3		med that UE_A is ringing				
	4	User B answers call					
	5		med that call has been answered				
	6		med that call is established				
	7	User A puts call on hold					
	8	Verify that user B is infor					
	9	Verify that user A is infor	med that call is on hold				
	10	User A resumes call					
	11		med that call is resumed				
	12		erify that user A is informed that call is resumed				
	13	User A ends call					
	14	Verify that user B is infor					
	15	Verify that user A is infor	med that call has ended				
0 (							
Conformance	Check	TD 1140 5400 00 : 05	A				
Criteria:	1		W step 38A and 49A (UPDATE):				
		ensure that {	an UPDATE to UE_B }				
			es the UPDATE from IMS_B				
			is the OFDATE ITOHT IINS_B I a topmost Route_header				
			the S-CSCF_SIP_URI				
			Record-Route_header				
			the S-CSCF_SIP_URI }				
		}	5 5501 _011 _0111 ;				
	1	<u> </u>					

Step	Direction	Message	Comment



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

		Interoperability Test Descr	ription						
Identifier:	TD_IMS_0	0020							
Summary:	IMS sends CANCEL to call originator in case terminating UE looses connectivity during								
		dialog initiation							
Configuration:	CF_ROAN	/I_CALL							
SUT	IMS_A								
References	Test Purp		Spec. Ref.						
	TP_IMS_5	_	clause 5.2.8.1.1 §1						
Use Case ref.:	UC_02_R								
Pre-test		S of IMS_A and of IMS B is config							
conditions:	• UE	_A and UE_B has IP bearers esta	blished to their respective IMS networks as						
		clause 4.2.1							
	- I	JE_A registered in IMS_A using any user identity							
	● UE	_B is registered in IMS_B via IMS	_A using any user identity						
_									
Test Sequence:	Step								
	1	Jser B calls User A							
	2		is informed of incoming call of User B						
	4		/erify that user B is informed that UE_A is ringing JE_B loses connectivity to IMS_A /erify that user A is informed that call has been cancelled						
	5								
	6	Verify that user A is informed that							
0 (	Observa								
Conformance Criteria:	Check								
	1	TP_IMS_5072_02 in CFW step 1	8 (CANCEL):						
		ensure that {							
			cation that UE_B is no longer available' }						
		then { IMS_A sends a CANCEL							
		containing a Reason_hea							
		containing a status_cod							
		indicating '503 Service	e unavaliable						
		}							
	1	IJ							

Step			Direc	ction			Message	Comment
	U	U	U	U	ı	ı		
	s	Е	s	E	M	M		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
10	$\leftarrow$							User A is informed of incoming call of User B
11							180 Ringing	UE_A responds to initial INVITE with 180
					7			Ringing to indicate that it has started alerting
12							180 Ringing	IMS_A forwards 180 Ringing response to
								IMS_B
13					_		180 Ringing	IMS_B forwards the 180 Ringing response to
					`			IMS_A
14				<b>←</b>			180 Ringing	IMS_A forwards the 180 Ringing response to
				,				UE_B
15			⊬					User B is informed that UE_A is ringing
16								UE_B looses connectivity
17								IMS_A is informed about UE_B loosing
								connectivity
18	,					$\rightarrow$	CANCEL	IMS_A sends CANCEL to IMS_B
19					$\leftarrow$		200 OK	IMS_B responds with 200 OK to IMS_A
20					$\leftarrow$		CANCEL	IMS_B forwards the CANCEL to IMS_A
21						$\longrightarrow$	200 OK	IMS_A responds with 200 OK to IMS_B
22		$\leftarrow$	-	_			CANCEL	IMS_A forwards the CANCEL to UE_A
23					$\longrightarrow$		200 OK	UE_A responds with 200 OK to IMS_A
24	$\leftarrow$							User A is informed that call has been cancelled
25							487 Request	UE_A sends 487 Request Terminated to IMS_A
					7		Terminated	

Step			Direc	ction			Message	Comment
	C	C	U	U	I	ı		
	S	E	s	E	M	M		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
26		←					ACK	IMS_A responds with ACK to UE_A
27							487 Request	IMS_A forwards the 487 Request Terminated to
							Terminated	IMS_B
28					$\leftarrow$		ACK	IMS_B responds with ACK to IMS_A

### 4.5.3.1.3 Subsequent Request Procedures - Originating Network

### 4.5.3.1.3.1 Call CANCEL by calling user

	Interoperability Test Description
Identifier:	TD_IMS_0021
Summary:	Calling user cancels call before its establishment
Configuration:	CF_INT_CALL
SUT	IMS_A
References	Test Purpose Spec. Ref.
	TP_IMS_5107_3 clause 5.4.3.2 §49
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
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
Conformance	Check
Criteria:	1 TP_IMS_5107_03 in CFW step 16 (CANCEL):
	ensure that {
	when { UE_A sends CANCEL to UE_B }
	then { IMS_B receives the CANCEL
	containing no Route_header
	indicating the S-CSCF_SIP_URI of IMS_B and
	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	tion			Message	Comment
	U	U	I		U	U		
	s	Е	M	M	E	s		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
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
								UE_A supports
3		_					100 Trying	IMS_A responds with a 100 Trying provisional
		`						response
4				$\longrightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
5			_				100 Trying	IMS_B responds with a 100 Trying provisional
			(					response
6					$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
7				$\leftarrow$			100 Trying	UE_B optionally responds with a 100 Trying
								provisional response
8						$\rightarrow$	400 D: :	User B is informed of incoming call of User A
9				←			180 Ringing	UE_B responds to initial INVITE with 180
10							180 Ringing	Ringing to indicate that it has started alerting IMS_B forwards 180 Ringing response to
10			$\leftarrow$				160 Kinging	IMS_A
11							180 Ringing	IMS_A forwards the 180 Ringing response to
' '		$\leftarrow$					100 Kinging	UE_A
12	<u> </u>							User A is informed that UE_B is ringing
13	<u> </u>	$\rightarrow$						User A cancels the call
14			$\rightarrow$				CANCEL	UE_A sends a CANCEL to IMS_A
15		$\leftarrow$					200 OK	IMS_A responds with a 200 OK to UE_A
16				$\rightarrow$			CANCEL	IMS_A forwards the CANCEL to IMS_B
17			←				200 OK	IMS_B responds with a 200 OK to IMS_A
18					$\longrightarrow$		CANCEL	IMS_B forwards the CANCEL to UE_B
19				$\leftarrow$			200 OK	UE_B responds with a 200 OK to IMS_B
20						$\rightarrow$		User B is informed that call has been cancelled
21							487 Request	UE_B sends 487 Request Terminated to IMS_B
							Terminated	
22				<u> </u>	$\longrightarrow$		ACK	IMS_B responds with ACK to UE_B
23			_				487 Request	IMS_B forwards the 487 Request Terminated to
				]			Terminated	IMS_A
24				$\longrightarrow$			ACK	IMS_A responds with ACK to IMS_B
25		<b>—</b>						IMS_A forwards the 487 Request Terminated to
		`					Terminated	UE_A
26			$\rightarrow$				ACK	UE_A responds with ACK to IMS_A
27	$\leftarrow$							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 Description					
Identifier:	TD_IMS_						
Summary:	IMS ends call in case calling UE looses connectivity during a call						
Configuration:	CF_INT_0	CALL					
SUT	IMS_B						
References	Test Purp	ose Spec. Re	ef.				
	TP_IMS_	5073_01 clause 5.	2.8.1.2 §1				
Use Case ref.:	UC_02_I						
Pre-test	• HS	S of IMS_A and of IMS B is configured acco	ording to table 1				
conditions:	• UE	_A and UE_B have IP bearers established t	to their respective IMS networks				
	as	per clause 4.2.1	·				
	• UE	_A is registered in IMS_A using any user ide	entity				
		_B is registered in IMS_B using any user ide					
Test Sequence:	Step						
	1	User B calls User A					
	2	Verify that user A is informed of incoming c	all of User B				
	3	Verify that user B is informed that UE_A is					
	4	User A answers call					
	5	Verify that user B is presented that call in p	rocess				
	6	Verify that user A is informed that the call is					
	7	UE_B looses connectivity					
	8	Verify that user A is informed that call has be	peen ended				
Conformance	Check						
Criteria:	1	TP_IMS_5073_01 in CFW step 23 (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_va	alue of UE_A and				
		containing To_header					
		indicating the initial 200_OK_To_	value from UE_A				
		containing From_header	, , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
		indicating the initial INVITE_Fron	n_value from UE_B and				
		containing Call-ID_header	ld value from LIE B and				
		indicating the initial INVITE_Call_	_id_value irom UE_B and				
		containing CSeq_header indicating an incremented Seque	ince Number and				
		containing Route_header	nice_ivaniber and				
		indicating 'dialog specific routing	information for LIE Δ' and				
		'further headers based on local pol	icv or call release reason'				
		}	io, or our roloudo roudon				
		} ′					
	1	<u>U</u>					

Step			Direc	ction			Message	Comment
	U	U	I	I	U	U		
	S	E	M	M	E	s		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
13		$\rightarrow$						User A answers call
14							200 OK	UE_A responds INVITE with 200 OK to indicate
			$\rightarrow$					that the call has been answered
15				$\longrightarrow$			200 OK	IMS_A forwards 200 OK response to IMS_B
16					$\longrightarrow$		200 OK	IMS_B forwards the 200 OK response to UE_B
17						$\longrightarrow$		User B is presented that call in process
18							ACK	UE_B acknowledges the receipt of 200 OK for
								INVITE
19			←				ACK	IMS_B forwards ACK to IMS_A
20		←					ACK	IMS_A forwards ACK to UE_A
21	$\leftarrow$	_						User A is informed that the call is in progress
22								UE_B looses connectivity
23			$\leftarrow$				BYE	IMS_B forwards BYE to IMS_A
24		←					BYE	IMS_A forwards BYE to UE_A
25	←	_						User A is informed that call has ended
26			$\longrightarrow$				200 OK	UE_A sends 200 OK for BYE
27				$\rightarrow$			200 OK	IMS_A forwards 200 OK response to IMS_B

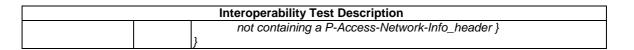
### 4.5.3.1.3.3 Call failure due to de-registration of calling user during call

		Interoperability Test Description					
Identifier:	TD_IMS_						
Summary:		call in case calling UE is forcefully de-registered in IMS during a call					
Configuration:	CF_INT_0	CALL					
SUT	IMS_A						
References	Test Purp						
	TP_IMS_	5139_01 clause 5.4.5.1.2 §1					
Use Case ref.:	UC_02_I						
	1						
Pre-test		SS of IMS_A and of IMS B is configured according to table 1					
conditions:		E_A and UE_B have IP bearers established to their respective IMS networks as					
		r clause 4.2.1					
		_A is registered in IMS_A using any user identity					
		E_B is registered in IMS_B using any user identity					
	There is an ongoing dialogue between UE_A and UE_B						
<b>-</b>	101						
Test Sequence:	Step						
	1	User A calls User B					
	2	Verify that user B is informed of incoming call of User A					
	3	Verify that user A is informed that UE_B is ringing					
	4	User B answers call					
	5	Verify that User A is informed that call has been answered					
	6	Verify that User B is informed that the call is established					
	7	UE_A is forced to be de-registered in IMS_A					
	8	Verify that user B is informed that call has been ended					
	<u> </u>						
Conformance	Check						
Criteria:	1	TP_IMS_5139_01 in CFW step 23 (BYE):					
		ensure that {					
		when { IMS_A receives a 'network internal indication that the lifetime					
		of the last public user identity has expired '					
		than (IMS A sands a BVE to IJE B					
		then { IMS_A sends a BYE to UE_B containing a Request_URI set to Contact_header_value of UE_B and					
		containing a Request_ORN set to Contact_header_value of OL_B and containing a To_header set to					
		the To_header of the 200_response to initial INVITE and					
		containing a From_header set to					
		the From_header of the initial INVITE and					
		containing a Call-ID_header set to					
		the Call-ID_header of the initial INVITE and					
		containing a CSeq_header set to					
		'CSeq_header from the calling user incremented by one' and					
	1	containing a Route_header set to					
		'routeing information towards the called user as stored					
		for the dialog' and					
1							
		containing 'further headers, based on local policy or the					
		containing 'further headers, based on local policy or the requested session release reason'					

Step			Direc	tion			Message	Comment
	U	U	I		U	U	_	
	s	Е	M	M	E	S		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
13					<b>←</b>			User B answers call
14				<b>←</b>	_		200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
15			$\leftarrow$				200 OK	IMS_B forwards 200 OK response to IMS_A
16		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
17	←							User A is informed that call has been answered
18			$\rightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
19				$\rightarrow$			ACK	IMS_A forwards ACK to IMS_B S-CSCF
20					$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
21					_	$\rightarrow$		User B is informed that the call is established
22			Ì					UE_A is forced to be de-registered in IMS_A
23				$\rightarrow$			BYE	IMS_A forwards BYE to IMS_B
24					$\longrightarrow$		BYE	IMS_B forwards BYE to UE_B
25						$\rightarrow$		User B is informed that call has ended
26				←	_		200 OK	UE_B sends 200 OK for BYE
27			←				200 OK	IMS_B forwards 200 OK response to IMS_A

### 4.5.3.1.3.4 Subsequent target refresh request (INVITE)

		Interoperability Test	Description							
Identifier:	TD_IMS_									
Summary:			andled correctly In case of a user initiated call							
	hold and	resume when home caller p	its another home user on hold and resumes call							
Configurations	OF INT	0.411								
Configuration:	CF_INT_ IMS_A	CALL								
References	Test Pur	nosa	Spec. Ref.							
References	TP_IMS_		clause 5.4.3.2 §42							
		5121_01	clause 5.4.3.3 §53							
			clause 5.4.3.3 §53							
Use Case ref.:	_	P_IMS_5121_02   clause 5.4.3.3 §53 C_03_I								
900 9u00 10iii	00_00_1									
Pre-test	• H	SS of IMS A and of IMS B is	configured according to table 1							
conditions:			ers established to their respective IMS networks							
	as	s per clause 4.2.1	·							
	• UI	E_A configured to perform us	er initiated hold/resume using INVITE							
		E_A is registered in IMS_A u								
	• UI	E_B is registered in IMS_B u	sing any user identity							
Test Sequence:	Step	11 4 " 11 =								
	1	User A calls User B	ad after a contrary and the A							
	2		ed of incoming call of User A							
	3	Verify that user A is inform User B answers call	ed that UE_A is ringing							
	<u>4</u> 5		ed that call has been answered							
	6	Verify that user B is inform								
	7	User A puts call on hold	ed that can is established							
		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		that user B is informed that call has ended							
	15	Verify that user A is inform	ed that call has ended							
	Ta									
Conformance	Check	TD 1140 5400 04 : 0514	4 054 (AN (IN) (ITE)							
Criteria:	1	ensure that {	step 25A and 40A (INVITE):							
		osequent INVITE to UE_B }								
		then { IMS_B receives the								
			Record-Route_header							
			the S-CSCF_SIP_URI of IMS_A and							
			ng Route_header							
			the S-CSCF_SIP_URI of IMS_A and							
			P-Charging-Vector_header							
			ning a access-network-charging-info_parameter							
		and	ng a P-Access-Network-Info_header }							
		110t cornairii	ig a 1 -Access-ivetwork-iiilo_neader }							
	2	TP IMS 5121 01 (IMS B	in CFW step 26A and 41A (100 Trying):							
		ensure that {								
		when { UE_B sends a 1x	c_response to UE_A }							
		then { IMS_A receives the								
			arging-Vector_header							
			access-network-charging-info_parameter and							
		not containing a P	Access-Network-Info_header }							
	3	TP IMS 5121 02 (IMS R	in CFW step 31A and 46A (200 OK):							
		ensure that {	in or w step orn and 40h (200 Oh).							
		when { UE_B sends a 2xx	response to UE_A }							
		then { IMS_A receives the								
		containing a P-Cha	arging-Vector_header							
			access-network-charging-info_parameter and							
	-	<u>.                                    </u>	- · · · · · · · · · · · · · · · · · · ·							



Step			Direc	tion			Message	Comment
	U	U	I	I	U	U		
	S	E	M	M	E	S		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
22A		$\rightarrow$						User A puts call on hold
23A							INVITE	UE_A sends reINVITE message indicating
			7					media attribute "sendonly" (Call Hold)
24A		_					100 Trying	IMS_A responds with a 100 Trying provisional
		(						response
25A				$\rightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
26A			←				100 Trying	IMS_B responds with a 100 Trying
074							IND UTE	provisional response
27A					$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B
28A				$\leftarrow$			100 Trying	UE_B optionally responds with a 100 Trying provisional response
29A								User B is informed that call is on hold
30A						7	200 OK	UE_B responds to INVITE with 200 OK
30A				$\leftarrow$			200 OK	indicating media attribute "recvonly"
31A			_				200 OK	IMS_B forwards 200 OK response to IMS_A
32A		_	`				200 OK	IMS_A forwards the 200 OK response to UE_A
33A	_						200 OK	User A is informed that call is on hold
34A							ACK	UE_A acknowledges the receipt of 200 OK for
34/1			$\rightarrow$				7.01	INVITE
35A	•			$\rightarrow$			ACK	IMS_A forwards ACK to IMS_B
36A					$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
37A		$\longrightarrow$						User A resumes call
38A							INVITE	UE_A sends reINVITE message indicating
			1					media attribute "sendrecv" (Call Resume)
39A		_					100 Trying	IMS_A responds with a 100 Trying provisional
		(						response
40A				$\rightarrow$			INVITE	IMS_A forwards INVITE to IMS_B
41A			<b>←</b>				100 Trying	IMS_B responds with a 100 Trying
40.4							IND UTE	provisional response
42A	.				$\longrightarrow$		INVITE	IMS_B forwards INVITE to UE_B
43A				$\leftarrow$			100 Trying	UE_B optionally responds with a 100 Trying
44A								provisional response
44A 45A						7	200 OK	User B is informed that call is resumed UE B responds to INVITE with 200 OK
45A				←			200 OK	indicating media attribute "sendrecv"
46A	.						200 OK	IMS_B forwards 200 OK response to IMS_A
46A 47A	.						200 OK 200 OK	IMS_A forwards the 200 OK response to UE_A
47A 48A	_						200 OK	User A is informed that call is resumed
+0A								USEL A IS ILLIOITHEU MAN CAIL IS LESUITIEU

### 4.5.3.1.3.5 Subsequent target refresh request UPDATE)

		Interoperability Tes	t Description							
Identifier:	TD_IMS_	0025	·							
Summary:	Check tha	at subsequent UPDATEs a	e handled correctly In case of a user initiated call							
	hold and resume when home caller puts another home user on hold and resumes call CF_INT_CALL									
Configuration:										
SUT	IMS_A, IMS_B									
References	Test Purp		Spec. Ref.							
	TP_IMS_		clause 5.4.3.2 §42							
	TP_IMS_	5121_02	clause 5.4.3.3 §53							
Use Case ref.:	UC_03_I									
Pre-test			s configured according to table 1							
conditions:	• UE	E_A and UE_B have IP bea	rers established to their respective IMS networks							
		per clause 4.2.1								
			user initiated hold/resume using UPDATE							
	• UE	E_A is registered in IMS_A	using any user identity							
	• UE	B is registered in IMS_B	using any user identity							
Test Sequence:	Step									
	1	User A calls User B								
	2		ned of incoming call of User A							
	3	Verify that user A is inforr	ned that UE_A is ringing							
	4	User B answers call								
	5		ned that call has been answered							
	6		ned that call is established							
	7	User A puts call on hold								
	8	Verify that user B is inforr								
	9	Verify that user A is inforr	ned that call is on hold							
	10	User A resumes call								
	11	Verify that user B is inforr								
	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							
0 (	01 1									
Conformance Criteria:	Check	TD IMO 5400 00 (IMO	\\ := OF\M =t== 04A === 100A (HDDATE):							
Criteria:	1	`	A) in CFW step 24A and 33A (UPDATE):							
		ensure that {    when { UE_A sends an	IDDATE to LIE DI							
		then { IMS_B receives the								
			a Record-Route_header							
			g the S-CSCF_SIP_URI of IMS_A and							
			ing Route_header							
			the S-CSCF_SIP_URI of IMS_A and							
			a P-Charging-Vector_header							
		not conta	ining a access-network-charging-info_parameter							
		and								
		not contai	ning a P-Access-Network-Info_header }							
		}								
	2		3) in CFW step 28A and 37A (200 OK):							
		ensure that {								
		when { UE_B sends a 2								
		then { IMS_A receives the series of the seri								
			narging-Vector_header							
			a access-network-charging-info_parameter and							
		noi containing a i	P-Access-Network-Info_header }							
		[f								

Step			Direc	ction			Message	Comment
	U	U	I	I	U	U		
	s	Ε	M	M	Е	S		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
22A		$\rightarrow$						User A puts call on hold
23A							UPDATE	UE_A sends UPDATE message indicating
			$\overline{}$					media attribute "sendonly" (Call Hold)
24A				$\longrightarrow$			UPDATE	IMS_A forwards UPDATE to IMS_B
25A					$\rightarrow$		UPDATE	IMS_B forwards UPDATE to UE_B
26A						$\longrightarrow$		User B is informed that call is on hold
27A							200 OK	UE_B responds to UPDATE with 200 OK
								indicating media attribute "recvonly"
28A			←				200 OK	IMS_B forwards 200 OK response to IMS_A
29A		,					200 OK	IMS_A P-CSCF forwards the 200 OK response
								to UE_A
30A	←							User A is informed that call is on hold
31A	_	$\rightarrow$						User A resumes call
32A							UPDATE	UE_A sends UPDATE message indicating
			1					media attribute "sendrecv" (Call Resume)
33A				$\longrightarrow$			UPDATE	IMS_A forwards UPDATE to IMS_B
34A					$\rightarrow$		UPDATE	IMS_B forwards UPDATE to UE_B
35A						$\longrightarrow$		User B is informed that call is resumed
36A							200 OK	UE_B responds to UPDATE with 200 OK
								indicating media attribute "sendrecv"
37A			←				200 OK	IMS_B forwards 200 OK response to IMS_A
38A		$\leftarrow$	=				200 OK	IMS_A forwards the 200 OK response to UE_A
39A	$\leftarrow$							User A is informed that call is resumed

# 4.5.3.1.4 Subsequent Request Procedures - Terminating Network

		Interoperability Test Description	
Identifier:	TD_IMS_0	026	
Summary:		call in case called UE looses connectivity during a call	
Configuration:	CF_INT_C	CALL	
SUT	IMS_B		
References	Test Purp		
	TP_IMS_5	5074_01 clause 5.2.8.1.2 §11	
Use Case ref.:	UC_02_I		
Pre-test conditions:	<ul><li>UE per</li><li>UE</li></ul>	S of IMS_A and of IMS B is configured according to table 1 :_A and UE_B has IP bearers established to their respective r clause 4.2.1 :_A is registered in IMS_A using any user identity :_B is registered in IMS_B using any user identity	IMS networks as
Test Sequence:	Step		
Conformance	1 2 3 4 5 6 7 8	User A calls User B Verify that user B is informed of incoming call of user A 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 Verify that User B is informed that the call is established UE_B looses connectivity Verify that user A is informed that call has been ended	
Criteria:	Cneck		
	1	TP_IMS_5074_01 in CFW step 23 (BYE): ensure that {   when { IMS_B receives 'an indication that UE_B is no_long 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 INVITE_To_value from UE_A containing From_header indicating the initial 200_OK_From_value from UE containing Call-ID_header indicating the initial INVITE_Call_Id_value from U containing CSeq_header indicating an incremented Sequence_Number and containing Route_header indicating 'dialog specific routing information for U 'further headers based on local policy or call release } }	E_B and E_A and d lE_A' and

Step			Direc	tion			Message	Comment
•	U s e	U E A	I M S	I M S	U E B	U s e		
	r A		Α	В		r B		
13					<b>←</b>			User B answers call
14				<b>←</b>			200 OK	UE_B responds INVITE with 200 OK to indicate that the call has been answered
15			←				200 OK	IMS_B forwards 200 OK response to IMS_A
16	<u>;</u>						200 OK	IMS_A forwards the 200 OK response to UE_A
17	←	_						User A is informed that call has been answered
18			$\longrightarrow$				ACK	UE_A acknowledges the receipt of 200 OK for INVITE
19				$\longrightarrow$			ACK	IMS_A forwards ACK to IMS_B
20				<u> </u>	$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
21					_	$\rightarrow$		User B is informed that the call is established
22								UE_B looses connectivity
23			$\leftarrow$				BYE	IMS_B sends a BYE to IMS_A
24		←					BYE	IMS_A forwards the BYE response to UE_A
25	←	-						UE_A is informed that call has ended
26			$\longrightarrow$				200 OK	UE_A responds to the BYE with 200 OK
27				$\longrightarrow$			200 OK	IMS_A forwards the 200 OK response to IMS_B

### 4.5.3.1.5 Dialogue Procedures - Topology Hiding

#### 4.5.3.1.5.1 Normal call

		Interoperability Test Descr	ription			
Identifier:	TD_IMS_0					
Summary:	Basic call	with topology hiding				
Configuration:	CF_INT_C	CALL				
SUT	IMS_A					
References	Test Purp	ose	Spec. Ref.			
	TP_IMS_5	5135_01	clause 5.10.4.1 §7			
	TP_IMS_5	5137_01	clause 5.10.4.2 §1			
	TP_IMS_5		clause 5.10.2.2 §1			
	TP_IMS_5		clause 5.10.2.3 §1			
	TP_IMS_5		clause 5.10.2.3 §1			
	TP_IMS_5		clause 5.10.3.2 §1			
	TP_IMS_5		clause 5.10.4.2 §1			
	TP_IMS_5		clause 5.10.4.2 §1			
Use Case ref.:	UC 02 I	<u>_</u> 00	J			
000 0000 10111	00_02					
Pre-test	• HS	S of IMS_A and of IMS B is config	sured according to table 1			
conditions:			tablished to their respective IMS networks			
		per clause 4.2.1	abilished to their respective two networks			
		_A is registered in IMS_A using a	ny user identity			
		_B is registered in IMS_B using a				
		_b is registered in IMS_b dsing all S_A is configured for topology hidi				
	• IIVIS	3_A is conligured for topology flidi	ng			
Test Sequence:	Step					
rest ocquerice.	1	User A calls user B				
	2	Verify that user B is informed of in	acoming call of User A			
	3					
	4	Verify that user A is informed that	LUE_B IS IIIIgIIIg			
		User B answers the call	t call bas been ensured			
		<ul> <li>Verify that user A is informed that call has been answered</li> <li>User B is informed that the call is established</li> </ul>				
	6		established			
	7					
	8	Verify with UE_B that call has be				
	9	Verify with UE_A that call has be	en released			
Conformon	Chaola					
Conformance Criteria:	Check	TD IMO 5405 04 in OFM stars 4	(INIVITE).			
Criteria:	1	TP_IMS_5135_01 in CFW step 4	(INVITE):			
		ensure that {	VITE to IMP A I			
		when { UE_B sends a initial INV then { IMS_A sends the initial IN				
			IVITE to IIVIS_B Il topmost Record-Route_header			
		indicating the IBCF_	SID TIPL of IMS A 1			
		Indicating the IBOI_	OII _OIN OI IIVIO_A J			
	2	TP_IMS_5137_01 in CFW step 4	(INI\/ITE\·			
	_	ensure that {	(IIIVIII).			
		when { UE_A sends an initial IN	VITE to LIE B3			
		then { IMS_A sends the INVITE				
		containing a Via_heade				
			d_consecutive_header_entries and			
			by_parameter) and			
		containing a Record-Ro				
			d_consecutive_header_entries and			
			by_parameter) and			
		containing a Route_hea				
			d_consecutive_header_entries and			
			 py_parameter) }			
		<b> </b> }	/ -			
	1	V				

TP_IMS_5404_01 in CFW step 4 (INVITE): ensure that {     when { UE_A sends an initial INVITE to UE_B	3	TD IMO 5404 04 :- OEM -4 4 /INV/ITE).
when { UE_A sends an initial INVITE to UE_B		· · ·
containing a P-Charging-Vector_header and containing a P-Charging-Function-Addresses_header } then { IMS_A sends the INVITE not containing (a P-Charging-Vector_header and a P-Charging-Function-Addresses_header) } }  4 TP_IMS_5408_01 in CFW step 19 (ACK): ensure that {		· ·
containing a P-Charging-Function-Addresses_header } then { IMS_A sends the INVITE not containing (a P-Charging-Vector_header and a P-Charging-Function-Addresses_header) } } TP_IMS_5408_01 in CFW step 19 (ACK): ensure that {		
then { IMS_A sends the INVITE not containing (a P-Charging-Vector_header and a P-Charging-Function-Addresses_header) } }  4 TP_IMS_5408_01 in CFW step 19 (ACK): ensure that {		
a P-Charging-Function-Addresses_header) }  4 TP_IMS_5408_01 in CFW step 19 (ACK): ensure that {		
TP_IMS_5408_01 in CFW step 19 (ACK):  ensure that {		
ensure that {		a P-Charging-Function-Addresses_header) }
ensure that {	4	TD_IMS_5409_04 in CEW stop 40 (ACK):
	4	
I When { UE A sends an ACK to UE B }		when { UE_A sends an ACK to UE_B }
then { IMS_A sends the ACK to IMS_B		
containing a Via_header		
containing (encrypted_consecutive_header_entries and		
a tokenized-by_parameter) and		
containing a Route_header		
containing (encrypted_consecutive_header_entries and a tokenized-by_parameter) }		
}		}
5 TP_IMS_5408_03 in CFW step 24A (BYE):	5	TP_IMS_5408_03 in CFW step 24A (BYE):
ensure that {		ensure that {
when { UE_A sends a BYE to UE_B }		
then { IMS_A sends the BYE to IMS_B		
containing a Via_header		
containing (encrypted_consecutive_header_entries and		<b>3</b> , <b>3</b> ,
a tokenized-by_parameter) and containing a Record-Route_header		
containing a record-reader  containing (encrypted_consecutive_header_entries and		· ·
a tokenized-by_parameter) and		
containing a Route_header		
containing (encrypted_consecutive_header_entries and		
a tokenized-by_parameter) }		a tokenized-by_parameter) }
6 TP_IMS_5414_01 in CFW step 5 (100 Trying):	6	TP IMS 5414 01 in CFW step 5 (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 }		then { IMS_B sends a 100_response to IMS_A }
7 TP_IMS_5137_02 in CFW step 10 (180 Ringing):	7	TP_IMS_5137_02 in CFW step 10 (180 Ringing):
ensure that {		
when { UE_B sends a 1xx_response to UE_A }		
then { IMS_B sends the 1xx_response to IMS_A		
containing Via_header		
containing (encrypted_consecutive_header_entries and		
a tokenized-by_parameter) and containing Record-Route_header		
containing Necord-Notice_neader  containing (encrypted_consecutive_header_entries and		
a tokenized-by_parameter) }		
}		}
8 TP_IMS_5137_03 in CFW step 15 and 28A (200 OK):	8	
ensure that {		
when { UE_B sends a 2xx_response to UE_A }		
then { IMS_B sends the 2xx_response to IMS_A containing a Via_header		
containing a via_neader  containing (encrypted_consecutive_header_entries and		
a tokenized-by_parameter) and		
containing a Record-Route_header		
containing (encrypted_consecutive_header_entries and		containing (encrypted_consecutive_header_entries and
a tokenized-by_parameter) }		a tokenized-by_parameter) }
}		

Step			Direc	ction			Message	Comment
	U	U	I	I	U	U		
	s	E	M	М	Е	s		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
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
							100 T	UE_A supports
3		$\leftarrow$					100 Trying	IMS_A responds with a 100 Trying provisional
4							INVITE	response IMS A forwards INVITE to IMS B
5							100 Trying	IMS_B responds with a 100 Trying
			←				100 Trying	provisional response
6					$\rightarrow$		INVITE	IMS_B forwards INVITE to UE_B
7							100 Trying	UE_B optionally responds with a 100 Trying
								provisional response
8						$\longrightarrow$		User B is informed of incoming call of User A
9				_			180 Ringing	UE_B responds to initial INVITE with 180
				(				Ringing to indicate that it has started alerting
10			←				180 Ringing	IMS_B forwards 180 Ringing response to IMS_A
11		$\leftarrow$					180 Ringing	IMS_A forwards the 180 Ringing response to UE_A
12	←							User A is informed that UE_B is ringing
13					←	_		User B answers call
14				<u></u>			200 OK	UE_B responds INVITE with 200 OK to indicate
				`				that the call has been answered
15			←				200 OK	IMS_B forwards 200 OK response to IMS_A
16		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
17 18	$\leftarrow$						ACK	User A is informed that call has been answered UE_A acknowledges the receipt of 200 OK for
10			$\longrightarrow$				ACK	INVITE
19							ACK	IMS_A forwards ACK to IMS_B
20				1_	$\longrightarrow$		ACK	IMS_B forwards ACK to UE_B
21						$\longrightarrow$		User B is informed that the call is established
22A		$\rightarrow$						User A ends call
23A			$\rightarrow$				BYE	UE_A releases the call with BYE
24A			-	$\longrightarrow$			BYE	IMS_A forwards BYE to IMS_B
25A				<u> </u>	$\rightarrow$		BYE	IMS_B forwards BYE to UE_B
26A						$\longrightarrow$		User B is informed that call has ended
27A				$\leftarrow$			200 OK	UE_B sends 200 OK for BYE
28A			⇤				200 OK	IMS_B forwards 200 OK response to IMS_A
29A		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
30A	<del>-</del>							User A is informed that call has ended

### 4.5.3.1.5.2 CANCEL call by calling user

		Interoperability Test De	escription							
Identifier:	TD_IMS_0028									
Configuration:	CF_INT_0	CALL								
SUT	IMS_A and IMS_B									
References	Test Purp	ose	Spec. Ref.							
	TP_IMS_	5408_02	clause 5.10.2.3 §1							
Use Case ref.:	UC_02_I									
Summary:	Calling us	er cancels call before its estab	lishment with topology hiding							
Pre-test	• HS	S of IMS_A and of IMS B is co	onfigured according to table 1							
conditions:			s established to their respective IMS networks							
		per clause 4.2.1								
	• UE	_A is registered in IMS_A usir	ng any user identity							
	• UE	_B is registered in IMS_B usir	ng any user identity							
	• IM:	S_A is configured for topology	hiding							
Test Sequence:	Step									
	1									
	2	7								
	3 Verify that user A is informed that UE_B is ringing									
	4	User A cancels call								
	5	Verify that user B is informed								
	6	Verify that user A is informed	that call is terminated							
Conformance	Check									
Criteria:	1	TP_IMS_5408_02 in CFW st	ep 16 (CANCEL):							
		ensure that {	251 ( 115 2)							
		when { UE_A sends a CAN								
		then { IMS_A sends the CAI								
		containing a Via_h								
			/pted_consecutive_header_entries and							
		containing a Recor	ed-by_parameter) and							
			/pted_consecutive_header_entries and							
			ed-by_parameter) and							
		containing a Route								
			rpted_consecutive_header_entries and							
			ed-by_parameter) }							
		]}								
<u> </u>	1	1/								

Step			Direc	tion			Message	Comment
	Ω	U	_	ı	U	U		
	S	E	M	M	E	S		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
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
							100 T :	UE_A supports
3		$\leftarrow$					100 Trying	IMS_A responds with a 100 Trying provisional
4							INVITE	response IMS_A forwards INVITE to IMS_B
<u>4</u> 5				$\rightarrow$				IMS_B responds with a 100 Trying provisional
5			$\leftarrow$				100 Trying	response
6							INVITE	IMS_B forwards INVITE to UE_B
7					1		100 Trying	UE_B optionally responds with a 100 Trying
,				←			100 Trying	provisional response
8						$\rightarrow$		User B is informed of incoming call of User A
9							180 Ringing	UE_B responds to initial INVITE with 180
				←				Ringing to indicate that it has started alerting
10							180 Ringing	IMS_B forwards 180 Ringing response to
			$\leftarrow$					IMS_A
11		,					180 Ringing	IMS_A forwards the 180 Ringing response to
		`						UE_A
12	←	$\rightarrow$						User A is informed that UE_B is ringing
13		$\rightarrow$						User A cancels the call
14			$\longrightarrow$				CANCEL	UE_A sends a CANCEL to IMS_A
15		$\leftarrow$					200 OK	IMS_A responds with 200 OK to UE_A
16				$\rightarrow$			CANCEL	IMS_A forwards the CANCEL to IMS_B
17			$\leftarrow$				200 OK	IMS_B responds with 200 OK to IMS_A
18					$\longrightarrow$		CANCEL	IMS_B forwards the CANCEL to UE_B
19				$\leftarrow$			200 OK	UE_B responds with 200 OK to IMS_B
20						$\rightarrow$	407 D 1	User B is informed that call has been cancelled
21				<b>K</b>			487 Request	UE_B sends 487 Request Terminated to IMS_B
22							Terminated ACK	IMC Proposed with ACK to LIC P
23		1			7		487 Request	IMS_B responds with ACK to UE_B IMS_B forwards the 487 Request Terminated to
23			$\leftarrow$				Terminated	IMS_A
24							ACK	IMS_A responds with ACK to IMS_B
25								IMS_A forwards the 487 Request Terminated to
25		⇤					Terminated	UE_A
26			$\longrightarrow$				ACK	UE_A responds with ACK to IMS_A
27							, (3)(	User A is informed that call is terminated
<b>Z</b> I								Osol /t is informed that can is terminated

#### 4.5.3.1.5.3 Normal call with hold/resume

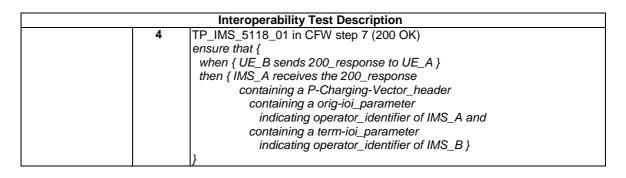
		Interoperability Test Description							
Identifier:	TD_IMS_0								
Summary:	User initia	ted call hold and resume when a home caller puts a roaming user on hold							
	and resumes call with topology hiding								
Configuration:	CF_ROAM_CALL								
SUT	IMS_A								
References	Test Purpose Spec. Ref.								
	TP_IMS_5								
Use Case ref.:	UC_03_R	·							
Pre-test	• HS	S 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 ne								
		per clause 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 via IMS A in IMS_B using any user identity							
		S_A is configured for topology hiding							
	11VIV	5_7 the configured for topology maing							
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							
	10	Verify that user A is informed that call has ended							
Conformance	Check								
Criteria:	1	TP_IMS_5408_04 in CFW step 38A and 57A (INVITE):							
o monai	-	ensure that {							
		when { UE_A sends a subsequent INVITE to UE_B }							
		then { IMS_A sends the INVITE to IMS_B							
		containing a Via_header							
		containing (encrypted_consecutive_header_entries and							
		a tokenized-by_parameter) and							
		containing a Record-Route_header							
		containing (encrypted_consecutive_header_entries and							
		a tokenized-by_parameter) and							
		containing a Route_header							
		containing (encrypted_consecutive_header_entries and							
		a tokenized-by_parameter) }							
		]}							

Step			Dire	ction			Message	Comment
•	U	U	U	U	ı	I		
	s	E	s	Е	M	М		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
34			<b>(</b>					User B is presented that call is in progress
35A		_	)					User A puts call on hold
36A							INVITE	UE_A sends reINVITE message indicating
00/1					$\longrightarrow$			media attribute "sendonly" (Call Hold)
37A							100 Trying	IMS_A responds with a 100 Trying provisional
		<b>—</b>						response
38A						$\longrightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
39A					,		100 Trying	IMS_B responds with a 100 Trying provisional
								response
40A					←		INVITE	IMS_B forwards INVITE to IMS_A
41A							100 Trying	IMS_A responds with a 100 Trying provisional
								response
42A				$\leftarrow$			INVITE	IMS_A forwards INVITE to UE_B
43A							100 Trying	UE_B optionally responds with a 100 Trying
					1			provisional response
44A			←					User B is informed that call is on hold
45A							200 OK	UE_B responds to INVITE with 200 OK
					1			indicating media attribute "recvonly"
46A						$\longrightarrow$	200 OK	IMS_A forwards 200 OK response to IMS_B
47A					←		200 OK	IMS_B forwards 200 OK response to IMS_A
48A		$\leftarrow$					200 OK	IMS_A forwards the 200 OK response to UE_A
49A							ACK	UE_A acknowledges the receipt of 200 OK for
					1			INVITE
50A						$\longrightarrow$	ACK	IMS_A forwards ACK to IMS_B
51A					←		ACK	IMS_B forwards ACK to IMS_A
52A				⊬			ACK	IMS_A forwards ACK to UE_B
53A	<b>—</b>							User A is informed that call is on hold
54A		$\rightarrow$						User A resumes call
55A							INVITE	UE_A sends reINVITE message indicating
					1			media attribute "sendrecv" (Call Resume)
56A		<b>—</b>					100 Trying	IMS_A responds with a 100 Trying provisional
<b></b> _								response
57A					<b>-</b>	$\longrightarrow$	INVITE	IMS_A forwards INVITE to IMS_B
58A					←		100 Trying	IMS_B responds with a 100 Trying provisional
							15 17 47 75	response
59A					⇤		INVITE	IMS_B forwards INVITE to IMS_A
60A						$\longrightarrow$	100 Trying	IMS_A responds with a 100 Trying provisional
						-	15 17 17 17 17 17 17 17 17 17 17 17 17 17	response
61A				⊬			INVITE	IMS_A forwards INVITE to UE_B
62A							100 Trying	UE_B optionally responds with a 100 Trying
								provisional response
63A			K					User B is informed that call is resumed

# 4.5.4 Messaging

### 4.5.4.1 Messaging with SIP URI public identities

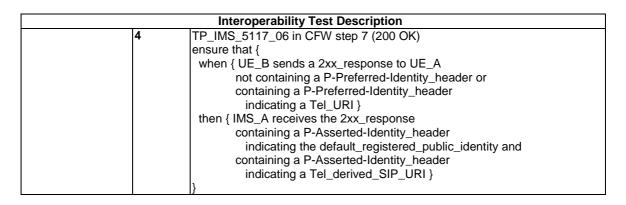
·											
	I	Interoperability Test Desc	ription								
Identifier:	TD_IMS_0		22 21 44 L LLP								
Summary:	_	at messaging works with SIP iden	tity without topology hiding								
Configuration:	CF_INT_C	JALL									
SUT	IMS_B Test Purpose Spec. Ref.										
References											
	TP_IMS_5097_05										
		IMS_5117_02     clause 5.4.3.3 §44       IMS_5118_01     clause 5.4.3.3 §45									
Han Conn rof .											
Ose Case ren.:	se Case ref.: UC_05_I										
Pre-test   HSS of IMS_A and of IMS B is configured according to table 1											
conditions:											
conditions.		UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1									
		ause 4.2.1 \ is registered in IMS_A using use	or2 according to table 1								
		B is registered in IMS_B using any									
	_	A is within the trust domain of IMS									
		\ and UE_B registered with SIP U A not configured for topology hidi									
	INIO_	A not configured for topology filal									
Test Sequence:	Step										
	1	User A sends message to user E									
	2	Verify that user B receives mess									
		, , , , , , , , , , , , , , , , , , , ,									
Conformance	Check										
Criteria:	1	TP_IMS_5097_05 in CFW step 3	3 (MESSAGE)								
		ensure that {									
		when { UE_A sends a MESSA(									
		then { IMS_B receives the MES									
		not containing a Route_h									
		indicating the S-CSCF_									
		containing a P-Charging-									
		(containing an icid_para									
			arameter indicating IMS_A and								
		not containing a term-io containing a Record-Rou									
			ng S-CSCF_SIP_URI and								
		containing a P-Charging-									
			s-network-charging-info_parameter and								
		not containing a P-Acces									
		}									
	2	TP_IMS_5097_06 in CFW step 3	3 (MESSAGE)								
		ensure that {									
		when { UE_A sends a MESSA									
		not containing a P-Prefe	rred-Identity_header or								
		containing a P-Preferred									
		not indicating a Tel_U	•								
		then { IMS_B receives the MES									
		containing a P-Asserted									
			registered_public_identity and								
		containing a P-Asserted	-identity_neader								
		indicating a Tel_URI }									
	3	TP_IMS_5117_02 in CFW step 7	7 (200 OK)								
		ensure that {	. (200 011)								
		when { UE_B sends a 2xx_resp	oonse to UE A }								
		then { IMS_A receives the 2xx_									
		containing a P-Charging									
			ss-network-charging-info_parameter and								
			ss-Network-Info_header }								
		]}	<u> </u>								
	•	•									



Step			Direc	ction			Message	Comment
	C	U	ı	ı	U	U		
	s	Е	M	M	E	s		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
								Hara Arrada an instant massage to war D
1		$\rightarrow$						User A sends an instant message to user B
2			$\longrightarrow$				MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\longrightarrow$			MESSAGE	IMS_A sends MESSAGE to IMS_B
4					$\longrightarrow$		MESSAGE	IMS_B sends MESSAGE to UE_B
5						$\longrightarrow$		User B is informed about the instant message
6				$\leftarrow$			200 OK	UE_B sends 200 OK to IMS_B
7			$\leftarrow$				200 OK	IMS_B sends 200 OK to IMS_A
8		←					200 OK	IMS_A sends 200 OK to UE_A
9	$\leftarrow$							Optional: User A is presented a delivery report

# 4.5.4.2 Messaging with TEL URI identities

		Interoperability Test Descr	iption								
Identifier:	TD_IMS_	0032									
Summary:		at messaging works with TEL URI	identities								
Configuration:	CF_INT_CALL IMS_B										
SUT											
References			Spec. Ref.								
	TP_IMS_		clause 5.4.3.2 §1								
	TP_IMS_		clause 5.4.3.3 §44								
	TP_IMS_	clause 5.4.3.3 §45									
	TP_IMS_5117_06 clause 5.4.3.3 §44										
Use Case ref.:	UC_05_I										
Pre-test		of IMS_A and of IMS B is configure									
conditions:			lished to their respective IMS networks as								
		lause 4.2.1									
		A is registered in IMS_A using user									
		B is registered in IMS_B using user									
	<ul><li>IMS_</li></ul>	A is within the trust domain of IMS	_B								
•	To:										
Test Sequence:	Step										
	1	User A sends message to User B									
	2	Verify that user B receives messa	ige from user A								
Conformance	Check										
Criteria:	Check										
Criteria.	1	TP_IMS_5097_07 in CFW step 3 (MESSAGE)									
	1	ensure that {									
		when { UE_A sends a MESSAG	E to LIE R								
		not containing a P-Prefer									
		containing a P-Preferred-									
		indicating a Tel_URI }	racinally_moduler								
		then { IMS_B receives the MES	SAGE								
		containing a P-Asserted-									
			egistered_public_identity and								
		containing a P-Asserted-									
		indicating a Tel_derived									
		}	•								
	2	TP_IMS_5117_02 in CFW step 7	(200 OK)								
		ensure that {									
		when { UE_B sends a 2xx_resp									
		then { IMS_A receives the 2xx_r									
		containing a P-Charging-									
		_	s-network-charging-info_parameter and								
		not containing a P-Acces	s-Network-Info_header								
		}									
	3	TP_IMS_5118_01 in CFW step 7	(200 OK)								
		ensure that {	(- 115 - 4.)								
		when { UE_B sends 200_respor									
		then { IMS_A receives the 200_i									
		containing a P-Charging									
		containing a orig-ioi_pa									
			dentifier of IMS_A and								
		containing a term-ioi_p indicating operator_io									
		indicating operator_it	dentines of livio_b ;								
	I	IJ									



Step			Direc	tion			Message	Comment
	C	U	I	ı	U	U		
	S	Е	M	M	E	S		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
1								User A sends an instant message to user B
I .		_						J
2		<u> </u>	$\longrightarrow$				MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\longrightarrow$			MESSAGE	IMS_A sends MESSAGE to IMS_B
4					$\longrightarrow$		MESSAGE	IMS_B sends MESSAGE to UE_B
5						$\longrightarrow$		User B is informed about the instant message
6							200 OK	UE_B sends 200 OK to IMS_B
7							200 OK	IMS_B sends 200 OK to IMS_A
8							200 OK	IMS_A sends 200 OK to UE_A
9	$\leftarrow$							Optional: User A is presented a delivery report

# 4.5.4.3 Messaging with DNS/ENUM lookup procedure

		Interoperability Test Desc	ription						
Identifier:	TD_IMS_0033								
Summary:	Ensure that me	essaging works with DNS/EN	IUM lookup procedure						
Configuration:	CF_INT_CALL	-							
SUT	IMS_A								
References	Test Purpose Spec. Ref.								
	TP_IMS_5097		clause 5.4.3.2 §1						
	TP_IMS_5117		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 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 user3 according to table 1</li> <li>IMS_A is within the trust domain of IMS_B</li> <li>DNS_B is configured with a DNS/ENUM entry mapping</li> </ul>								
Test Sequence:	Step								
	1 Use	er A sends message to user E	3's Tel URI						
	2 Ver	ify that user B receives mess	age from user A						
Conformance	Check								
Criteria:	the wt	IMS_5117_04 in CFW step sture that { then { UE_B sends a 2xx_respont containing a P-Prefered not indicating a Tel_Uien { IMS_A receives the 2xx_containing a P-Asserted	GE to UE_B IRI  Jury to DNS_B JE.164_Number } Response Pasource_Record If of UE_B } AGE to IMS_B IRI  J-Vector_header Pas-network-charging-info_parameter }  19 (200 OK)  Poonse to UE_A Parred-Identity_header Identity_header RI } Jresponse Id-Identity_header Jregistered_public_identity and Id-Identity_header Identity_header						

Step	Direction							Message	Comment
	U s e r A	U E A	M S A	D N S A	Г М S В	U E B	U s e r B		
1		$\rightarrow$							User A sends an instant message
2		_	$\rightarrow$					MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\rightarrow$				DNS QUERY	IMS_A sends DNS QUERY to DNS_A containing E.164 TEL URI
4								DNS	DNS_A sends DNS RESPONSE containing
								RESPONSE	NAPTR resource record to IMS_A
5					$\rightarrow$			MESSAGE	IMS_A sends MESSAGE to IMS_B containing Request URI which indicates a SIP URI
6								MESSAGE	IMS_B sends MESSAGE to UE_B
7						$\vdash$	$\rightarrow$		User B is informed about the instant message
8					$\leftarrow$	_		200 OK	UE_B sends 200 OK to IMS_B
9			$\leftarrow$		_			200 OK	IMS_B sends 200 OK to IMS_A
10		$\leftarrow$	-					200 OK	IMS_A sends 200 OK to UE_A
11	$\leftarrow$								Optional: User A is presented a delivery report

### 4.5.4.4 Messaging when roaming

		Interoperability Test Descr	iption							
Identifier:	TD_IMS_0	0034	-							
Summary:		at messaging works while roaming								
Configuration:	CF_ROAN									
SUT	IMS_A an	d IMS_B								
References	Test Purp		Spec. Ref.							
	TP_IMS_5108_02									
	TP_IMS_5050_01   clause 5.2.6.3 §46									
Use Case ref.:	UC_05_R		,							
	UC_U3_K									
Pre-test	• HSS	of IMS_A and of IMS B is configure	ed according to table 1							
conditions:			lished to their respective IMS networks as							
		ause 4.2.1	morrou to their respective into methorica de							
		is registered in IMS_A using any	user identity							
		is registered in IMS_B via IMS_A								
	U OL_D	is registered in two_b via two_re	doing any door identity							
Test Sequence:	Step									
	1	User A sends message to user B								
	2	Verify that user B receives messa	ige from user A							
		TV OTHY THAT GOOD D TECEIVES THESSA								
Conformance	Check									
Criteria:	1	TP_IMS_5108_02 in CFW step 4	(MESSAGE)							
	-	ensure that {	(							
		when { UE_A sends a MESSAG	E to UE B							
		IMS_A sends the MESSAG								
		containing a P-Charging-\								
		containing an icid_parar								
		then { IMS_B sends the MESSA								
		containing no Route_head								
		indicating the S-CSCF_								
		containing a P-Charging-\								
		containing the same icid								
		not containing ioi_paran								
		containing a Record-Rout								
		containing the S-CSCF_	SIP_URI of IMS_B }							
		}	·							
	2	TP_IMS_5118_01 in CFW step 9	CFW step 9 (200 OK)							
		ensure that {								
		when { UE_B sends 200_respor	nse to UE_A }							
		then { IMS_A receives the 200_i								
		containing a P-Charging	-Vector_header							
		containing a orig-ioi_pa								
			dentifier of IMS_A and							
		containing a term-ioi_p								
		indicating operator_id	dentifier of IMS_B }							
		}								
	3	TP_IMS_5050_01 in CFW step 3	(MESSAGE)							
		ensure that {								
		when { IMS_A receives a MESS								
		then { IMS_A sends the MESSA								
		containing a Route_head								
			rvice Route header URIs							
		from registration' and								
		not containing a P-Prefer								
		containing P-Asserted-Ide								
		containing an address o								
		containing the P-Chargin								
		containing an icid_parar	neter }							
		J <i>}</i>								

Step			Direc	ction			Message	Comment
	U	U	U	U	ı	ı		
	S	E	S	E	M	M		
	е	Α	е	В	S	S		
	r		r		Α	В		
	Α		В					
1								User A sends an instant message to user B
2		1					MESSAGE	UE A sends MESSAGE to IMS A
	,				7			
3						$\rightarrow$	MESSAGE	IMS_A sends MESSAGE to IMS_B
4					$\leftarrow$		MESSAGE	IMS_B sends MESSAGE to IMS_A
5				$\leftarrow$			MESSAGE	IMS_A sends MESSAGE to UE_B
6								User B is informed about the instant message
7					$\rightarrow$		200 OK	UE_B sends 200 OK to IMS_A
8						$\longrightarrow$	200 OK	IMS_A sends 200 OK to IMS_B
9					←		200 OK	IMS_B sends 200 OK to IMS_A
10		←					200 OK	IMS_A sends 200 OK to UE_A
11	$\leftarrow$							Optional: User A is presented a delivery report

### 4.5.4.5 Messaging with receiving user not registered

		Interoperability Test Desci	ription						
Identifier:	TD_IMS_0035								
Summary:	Standalone message procedure with receiving user not registered								
Configuration:	CF_INT_C	CALL							
SUT	IMS_B								
References	Test Purp	ose	Spec. Ref.						
	TP_IMS_5	5114_02	clause 5.4.3.3 §34						
Use Case ref.:	UC_05_I								
Pre-test	<ul> <li>HSS of</li> </ul>	of IMS_A and of IMS B is configur	ed according to table 1						
conditions:			olished to their respective IMS networks as						
	per cl	ause 4.2.1	·						
	<ul><li>UE_A</li></ul>	is registered in IMS_A using any	user identity						
	<ul> <li>UE_B</li> </ul>	is not registered in IMS_B	·						
	<ul> <li>IMS_I</li> </ul>	B is not configured with any filter o	criteria to contact 'any AS'						
Test Sequence:	Step								
	1	User A sends message to a valid	user B identity						
	2	Verify that user A is informed that	t user B could not be reached						
Conformance	Check								
Criteria:	1	TP_IMS_5114_02 in CFW step 5	(4xx Response)						
		ensure that {							
		when { UE_A sends a MESSAG							
		IMS_A sends the MESSAG							
		then { IMS_B sends a 4xx_resp	onse to IMS_A						
		}							
		]}							

Step			Direc	ction			Message	Comment
•	U s e r A	U E A	I M S A	M S B	U E B	U s e r B		
						Ь		
1	H	$\rightarrow$						User A sends an instant message to NON registered user B
2			$\longrightarrow$				MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\longrightarrow$			MESSAGE	IMS_A sends MESSAGE to IMS_B
4								IMS_B detects that user B is not registered
5			<b>←</b>				4xx Response	IMS_B sends 4xx Response to IMS_A
6		<b>←</b>					4xx Response	IMS_A sends 4xx Response to UE_A
7	$\leftarrow$							User A is informed that user B could not be reached

### 4.5.4.6 Messaging with receiving user barred

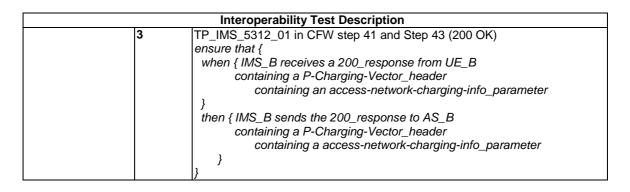
	Interoperability Test Description						
Identifier:	TD_IMS_0036						
Summary:	Ensure that messaging works when receiving user has been barred						
Configuration:	CF_INT_CALL						
SUT	IMS_B						
References	Test Purp			Spec. Ref.			
	TP_IMS_5	5097_12		clause 5.4.3.2 §1			
Use Case ref.:	UC_05_I						
Pre-test conditions:	<ul> <li>HSS of IMS_A and of IMS B is configured according to table 1</li> <li>UE_A and UE_B have IP bearers established to their respective IMS networks as per clause 4.2.1</li> <li>UE_A 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> </ul>						
Test Sequence:	Step		_				
root ooquonoo.	1 User A sends message to User B						
	2			user B could not be reached			
		voing that door 7 to it	nonnoa triat	addi B ddaid ffot bo foddiffod			
Conformance	Check						
Criteria:	1		a MESSAG e MESSAG P-Asserted-lo a barred_us	E to UE_B and E to IMS_B dentity_header ser in IMS_B }			

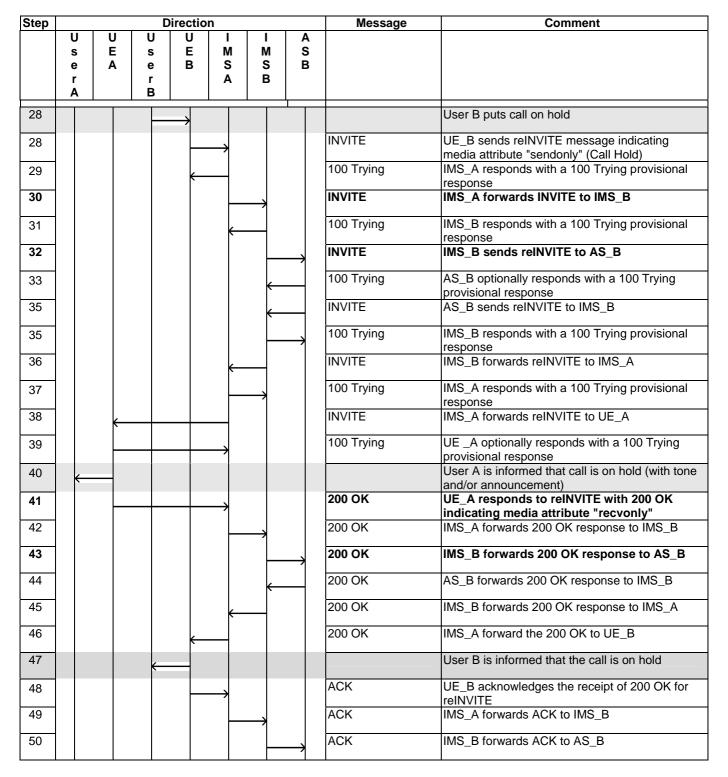
Step	Direction						Message	Comment
	U	U	I	I	U	U		
	s	Ε	M	M	E	s		
	е	Α	S	S	В	е		
	r		Α	В		r		
	Α					В		
-1								Hear A sende an instant massage to registered
'	_	$\longrightarrow$						User A sends an instant message to registered user B
							14500105	
2			$\longrightarrow$				MESSAGE	UE_A sends MESSAGE to IMS_A
3				$\longrightarrow$			MESSAGE	IMS_A sends MESSAGE to IMS_B
4								IMS_B detects that user B has been barred
5			,				403	IMS_B sends 403 Response to IMS_A
							Response	_
6							403	IMS_A sends 403 Response to UE_A
							Response	
7								Optional: User A is informed that user B could
								not be reached

# 4.5.5 Supplementary Services

### 4.5.5.1 Supplementary Service HOLD with AS

		Interoperability Tes	t Description				
Identifier:	TD_IMS_0030						
Summary:	Ensure that IMS supports properly application services based on the HOLD						
	suppleme	ntary service					
Configuration:	CF_ROAM_AS						
SUT	IMS_B						
References	Test Pur	oose	Spec. Ref.				
	TP_IMS_	5310 01	clause 5.4.6.1.2 §1				
	TP_IMS_		clause 5.4.3.3 §53				
	TP_IMS_		clause 5.4.6.1.3 §1				
Use Case ref.:	UC_10_R		jerosto or morring g				
Pre-test	• HS	SS of IMS A and of IMS Bi	s configured according to table 1				
conditions:			rers established to their respective IMS networks				
conditions.		per clause 4.2.1	reis established to their respective livio hetworks				
			rain ar american infantitiv				
		_A is registered in IMS_A					
			via IMS_A using any user identity				
	• AS	S_B is configured to contact	AS_B in case of HOLD activation				
<b>-</b>							
Test Sequence:	Step						
	1	User A calls User B					
	2		ned of incoming call of User A				
	3	Verify that user A is inform	ned that UE_B is ringing				
	4	User B answers call					
	5	Verify that user A is inform	ned that call has been answered				
	6	Verify that user B is inform	ned that call is established				
	7	User B puts call on hold					
	8		ned that call on hold with AS tone and/or				
		announcement					
	9	Verify that user B is inform	ned that call on hold				
	10	User B resumes call					
	11	Verify that user A is inform	ned that call is resumed				
	12	Verify that user B is inform					
	13	User A ends call	iod triat can io recarried				
	14	Verify that user B is inform	ned that call has ended				
	15	Verify that user A is inform					
	10	Verify that user 74 is inform	ica triat can rias criaca				
Conformance	Check						
Criteria:	1	TD IMS 5310 01 in CEV	step 30 and Step 32 (INVITE)				
Officia.	1.	ensure that {	step 30 and Step 32 (INVITE)				
			ubsequent INVITE to IMS_B				
			arging-Vector_header				
			cess-network-charging-info_parameter and				
			P-Access-Network-Info_header				
		t Containing a	1 -Access-NetWork-IIIIo_neader				
		then { IMS_B sends the	INIVITE to AS B				
			arging-Vector_header				
			cess-network-charging-info_parameter and				
			P-Access-Network-Info_header				
			F-Access-NetWork-IIIIO_Neader				
		}					
	2	TP IMS 5302 01 in CEV	step 41 and Step 43 (2XX)				
	-	ensure that {	STOP TI AND OTEP TO (ZAA)				
			a 2xx_response from UE_B				
		IS	1 ZAA_160POH06 HOHI OL_D				
		then { IMS_B sends the i	Dvv. response to AS R				
			Charging-Vector_header				
			an access-network-charging-info_parameter and				
			cess-Network-Info_header				
		}					
		<i>]</i>					





Step				Direction	on			Message	Comment
	U s	UE		U	I M	I M	AS		
	e	Ā		В	S	S	В		
	r A		r B		Α	В			
51	Î					$\leftarrow$		ACK	AS_B forwards ACK to IMS_B
52					←			ACK	IMS_B forwards ACK to IMS_A
53				<b>←</b>				ACK	IMS_A forwards ACK to UE_B
54									User B resumes call
55					$\longrightarrow$			INVITE	UE_B sends second reINVITE message indicating media attribute "sendrecv" (Call Resume)
56				<b>←</b>				100 Trying	IMS_A responds with a 100 Trying provisional response
57						$\rightarrow$		INVITE	IMS_A sends reINVITE to IMS_B
58					<b>←</b>			100 Trying	IMS_B responds with a 100 Trying provisional response
59							$\rightarrow$	INVITE	IMS_B sends reINVITE to AS_B
60						<b>←</b>		100 Trying	AS_B optionally responds with a 100 Trying provisional response
61						$\leftarrow$		INVITE	AS_B forwards INVITE to IMS_B
62							$\rightarrow$	100 Trying	IMS_B responds with a 100 Trying provisional response
63					←			INVITE	IMS_B sends reINVITE to IMS_A
64						$\rightarrow$		100 Trying	IMS_A responds with a 100 Trying provisional response
65								INVITE	IMS_A forwards reINVITE to UE_A
66					$\longrightarrow$			100 Trying	UE_A optionally responds with a 100 Trying provisional response
67	+								User A is informed that call is resumed
68		-			<b>→</b>			200 OK	UE_A sends the 200 OK indicating media attribute "sendrecv" to IMS_A
69						$\rightarrow$		200 OK	IMS_A forwards 200 OK response to IMS_B
70							$\rightarrow$	200 OK	IMS_B forwards 200 OK response to AS_B
71						$\leftarrow$		200 OK	AS_B forwards the 200 OK for INVITE
72					<b>K</b>			200 OK	IMS_B forwards 200 OK to IMS_A
73				<b>K</b>				200 OK	IMS_A forwards 200 OK to UE_B
74			€						User B is informed that call is resumed
75					$\longrightarrow$			ACK	UE_B sends ACK to IMS_A
76						$\rightarrow$		ACK	IMS_A forwards ACK to IMS_B
77							$\rightarrow$	ACK	IMS_B forwards ACK to AS_B
78						$\leftarrow$		ACK	AS_B forwards ACK to IMS_B
79					<b>K</b>			ACK	IMS_B forwards ACK to IMS_A
80								ACK	IMS_A forwards ACK to UE_A
81	<u> </u>							ACK	User A is informed that call resumed

# History

Document history					
V2.1.1	February 2009	Publication			