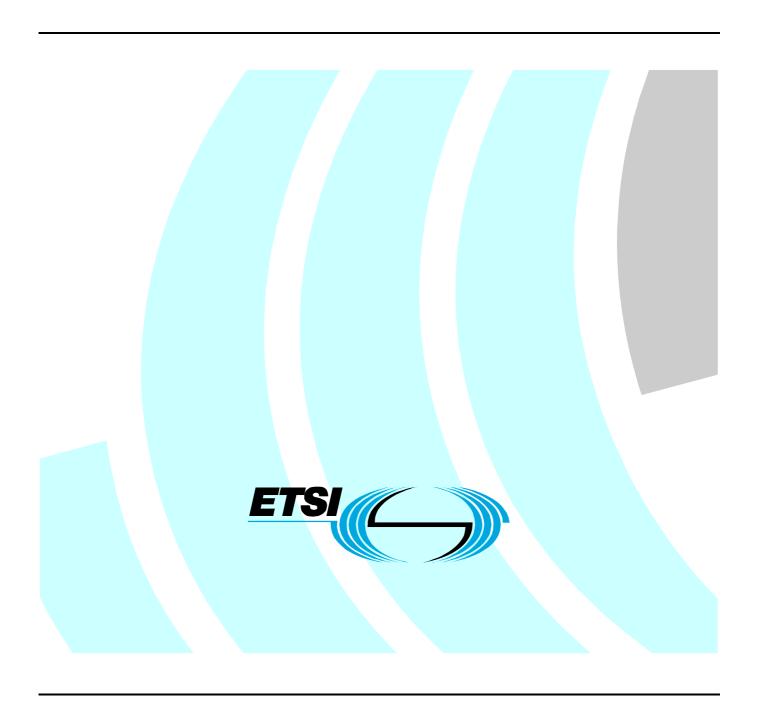
ETSITS 186 011-2 V1.0.0 (2008-04)

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 DTS/TISPAN-06027-2-NGN

Keywords

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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 interworking for the IP Multimedia Call Control Protocol based on Stage 3 Session Initiation Protocol (SIP) and Session Description Protocol (SDP) standard, TS 124 229 [1]. TDs have been specified on the basis of the test purposes (TPs) and test suite structure (TSS) presented in [2]. TP fragments presented in the present document as part of TDs are defined using the TPLan notation (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.

The scope of these test descriptions is not to cover all requirements specified in TS 124 229 [1]. It has been reduced to cover only requirements which relate to basic IMS call functionality for a minimal interworking IMS CN configuration, i.e. based on a P-CSCF, S-CSCF, I-CSCF, and HSS. Therefore, assessment of, e.g. IMS roaming, topology hiding, etc. at the NNI are not addressed in this test purpose specification. TDs have been only specified for requirements that are observable at the interface between two separate minimal IMS CN implementations, i.e. IMS NNI.

NOTE: Requirements which can only be observed at the interface between UE and IMS CN, i.e. home P-CSCF, 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.
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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 (V6.13.0): "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 124 229 version 6.13.0 Release 6)".

| [2] | ETSI TS 186 011-1: "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 (V6.0.0): "Universal Mobile Telecommunications System (UMTS); Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Part 2: Implementation Conformance Statement (ICS) specification (3GPP TS 34.229-2 version 6.0.0 Release 6)".
- [7] ETSI TS 123 228 (V6.15.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS); Stage 2 (3GPP TS 23.228 version 6.15.0 Release 6)".
- [8] ETSI TS 133 203 (V6.10.0): "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)".
- [9] Void.
- [10] Void.
- [11] ETSI TS 123 060 (V6.15.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); General Packet Radio Service (GPRS); Service description; Stage 2 (3GPP TS 23.060 version 6.15.0 Release 6)".
- [12] ETSI TS 127 060 (V6.0.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Packet domain; Mobile Station (MS) supporting Packet Switched services (3GPP TS 27.060 version 6.0.0 Release 6)".

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.

- [13] ETSI TR 133 978 (V6.6.0): "Universal Mobile Telecommunications System (UMTS); Security aspects of early IP Multimedia Subsystem (IMS) (3GPP TR 33.978 version 6.6.0 Release 6)".
- [14] ETSI TR 123 981 (V6.4.0): "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:

3GPP 3rd Generation Partnership Project AS (IMS) Application Server

CF (Test) ConFiguration

CFW Call FloW CN Core Network

CSCF Call Session Control Function

DHCP Dynamic Host Configuration Protocol

DNS Domain Name System
HSS Home Subscriber Server
I-CSCF Interrogating CSCF
IMS IP Multimedia Subsystem
IOI Inter Operator Identifier
IP Internet Protocol

NNI Network-to-Network Interface PCO Point of Control and Observation

P-CSCF Proxy CSCF PO POstamble PR PReamble

PSTN Public Switched Telephone Network

RQ ReQuirement S-CSCF Serving CSCF

SIP Session Initiation Protocol SDP Session Description Protocol

SUT System Under Test

TISPAN Telecommunications and Internet converged Services and Protocols for Advanced Networking

TB Test Body
TD Test Description
TP Test Purpose
TPLan Test purpose Not

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 [1].

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 [14].

4.2.2 IP bearer establishment

4.2.2.1 3GPP

3GPP bearer establishment procedures imply the creation of a PDP context over GPRS [11] and [12].

4.2.3 Authentication and security

4.2.3.1 3GPP

The current test specification supports standard 3GPP security, namely full IMS [8], early IMS [13] and optionally allows SIP Digest authentication without key agreement and null authentication.

4.2.4 Registration and subscription

4.2.4.1 SIP call flow

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

Depending on the security and authentication method used, the registration steps are:

- 1. All: The UE establishes an IP bearer as required by its specific access network.
- 2. All: Optional P-CSCF address discovery using the DHCP procedure.
- 3. All: The UE initiates IMS registration. IMS waits for the UE to send an initial REGISTER request.
- 4. *Full IMS, SIP Digest:* The IMS responds to the initial REGISTER request with a valid 401 unauthorized response.
- 5. Full IMS: The IMS and UE set up a temporary set of security associations.
- 6. Full IMS, SIP Digest: UE sends another REGISTER request (over the security associations for Full IMS).
- 7. *All:* The IMS responds to the REGISTER request with valid 200 OK responses (sent over the same temporary set of security associations that the UE used for sending the REGISTER request for Full IMS).
- 8. *All:* The IMS waits for the UE to send a SUBSCRIBE request (over the newly established security association for Full IMS).
- 9. All: The IMS responds to the SUBSCRIBE request with a valid 200 OK response.
- 10. All: The IMS sends a valid NOTIFY request for the subscribed registration event package.
- 11. All: The IMS waits for the UE to respond to the NOTIFY with a 200 OK response.

Expected sequence:

| Step | Direc | tion | Message | Comment | | |
|------|---------------|---------------|------------------|--|--------|---|
| - | UE | IMS | 1 | | | |
| 2 | + | \rightarrow | | Optional P-CSCF address discovery using DHCP | | |
| | | | | procedures for IPv4. | | |
| 3 | - | > | REGISTER | The UE sends initial registration for IMS services. | | |
| 4 | + | - | 401 Unauthorized | Full IMS, SIP Digest: The IMS responds with a valid | | |
| | | | | authentication challenge and security mechanisms | | |
| | | | | supported by the network. | | |
| 5 | \rightarrow | | REGISTER | Full IMS, SIP Digest: The UE completes the | | |
| | | | | security negotiation procedures (sets up a | | |
| | | | | temporary set of security associations for Full IMS) | | |
| | | | | and sends another REGISTER with authentication | | |
| | | | | credentials. | | |
| 6 | + | - | 200 OK | The IMS responds with 200 OK. | | |
| 7 | - |) | SUBSCRIBE | The UE subscribes to its registration event | | |
| | | | | package. | | |
| 8 | - | - | 200 OK | The IMS responds with 200 OK. | | |
| 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 | - | > | 200 OK | The UE responds with 200 OK. | | |

4.2.5 Supported options

4.2.5.1 Security

"Early IMS" is the default security configuration in all test descriptions. Optional support for sec-agree when full IMS security is used. Tests may be executed with full IMS security if all required IMS nodes support it.

4.2.5.2 Signalling compression

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

4.2.5.3 Preconditions

"No precondition" is the default SDP configuration in all test descriptions. Tests may be executed with SDP preconditions if the required nodes support it.

4.2.5.4 Reliable provisional responses

Reliable provisional responses (100rel) are the default signalling configuration in all test descriptions.

4.2.5.5 Forking

Not applicable in the current test specification. However, support for forking is a requirement of the IMS specification.

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 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, and HSS are considered to be within a "black box" for testing purposes. We refer to this System Under Test (SUT) as "the minimal IMS". Interfaces within the IMS are considered internal and not observable for testing purposes. The use cases and test descriptions described below may be run with IMS roaming without modifications. However, no test descriptions are available that validate the operation of the Mw interface between the P-CSCF and S-CSCF as an NNI interface.

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. Although considered as internal and not explicitly involved in current NNI test configurations which exclude IMS roaming, it is recommended that the Mw interface between the P-CSCF and S-CSCF be exposed/available for troubleshooting purposes.

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. The Mw interface between the S-CSCF and either I- or S-CSCF in another domain is used as a point of observation against which NNI interoperability tests are validated. The Mw interfaces between I- and S-CSCFs within the same network are considered as internal IMS interfaces. Although considered as internal and not explicitly involved in current NNI test configurations which exclude IMS roaming, it is recommended that the Mw interface between the P-CSCF and S-CSCF be 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 HSS

4.3.1.3.1 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.

4.3.1.3.2 Node configuration

The HSS should be configured within the IMS to interact with CSCFs as required using DIAMETER Cx interfaces. For the purpose of this test specification, "ims_a.net" refers to the domain served by "IMS_A" and "ims_b.net" refers to the domain served by "IMS_B". Users should be provisioned to match the sample profiles listed in table 1. All public identities belong to the same implicitly registered set.

Table 1: HSS sample user profiles

| IMS Domain | Private Identity | Public Identity 1 | Public Identity 2 | Default Public Identity | Filter criteria |
|---------------|----------------------------|-------------------------------|----------------------|-------------------------------|---|
| ims_a.net | user_a1_priv@ims_a. net | sip:user_a1_pub@ims_ a.net | na | 1 | na |
| ims_a.net | user_a2_priv@ims_a. net | sip:user_a2_pub@ims_ a.net | tel:+336333482 73 | 1 | na |
| ims_a.net | user_a3_priv@ims_a. net | sip:user_a3_pub@ims_ a.net | tel:+336333482 74 | 2 | na |
| ims_a.net | user_a4_priv@ims_a. net | sip:user_a4_pub@ims_ a.net | na | 1 | terminating_unregistered/INVIT E/ SESSION_TERMINATED/ as_a1.ims_a.net |
| ims_a.net | user_a5_priv@ims_a. net | sip:user_a5_pub@ims_ a.net | na | 1 | |
| ims_b.net | user_b1_priv@ims_a. net | sip:user_b1_pub@ims_ a.net | na | 1 | |
| ims_b.net | user_b2_priv@ims_a. net | sip:user_b2_pub@ims_ a.net | tel:+447444593 84 | 1 | |
| ims_b.net | user_b3_priv@ims_a. net | sip:user_b3_pub@ims_ a.net | tel:+447444593 85 | 2 | |
| ims_b.net | user_b4_priv@ims_a. net | sip:user_b4_pub@ims_ a.net | na | 1 | terminating_unregistered/INVIT E/ SESSION_TERMINATED/ as_b1.ims_b.net |
| ims_b.net | user_b5_priv@ims_a. net | sip:user_b5_pub@ims_ a.net | na | 1 | |

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.

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.

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.

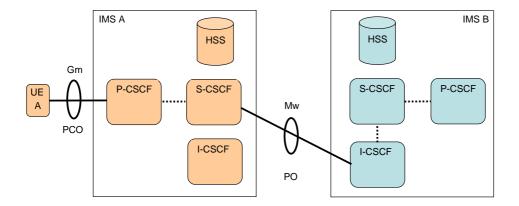
4.3.4 Test configurations

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).

The following guidelines are used to describe the test configurations:

- Named based convention defined in TS 123 228 [7] clause 5.5.1.
- Reuse the following abbreviations:
 - SS1: Different network operators performing origination and termination.
 - MO2: Mobile origination, home. The "Originating Network" of S-S#1 is therefore the home network.
 - ASO: Application Server origination. The" Originating Network" of S-S#1 is the home network.
 - MT2: Mobile termination, located in home service area. The "Terminating Network" of S-S#1 is the home network.
 - AST4: Termination at Application Server based on service logic.
- Exclude PSTN, non-IMS endpoints and IMS roaming since these are out of scope.
- Further differentiate IMS NNI observation points based on:
 - IN: initial request/response for a dialog.
 - SU: subsequent requests/responses in a dialog.
 - ST: standalone requests/response.

- and indicate:
 - observable interfaces as a solid line.
 - non-observable interfaces as dashed lines.



Precondition:

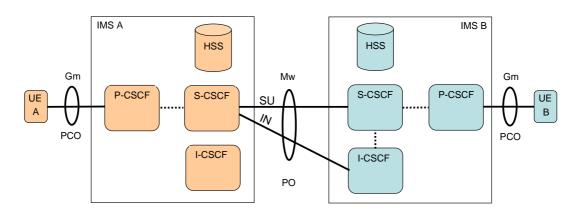
Different network operators performing origination and termination (SS1), UE_A in Home network A (MO2), UE_A registered, neither AS nor THIG nor IMS-ALG involved

Test configuration for:

Unsuccessful initial requests and responses from UE_A Example:

Initial INVITE in IMS VoIP voice call from UE_A to non-existing user

Figure 1: CF_MO2-SS1



Precondition:

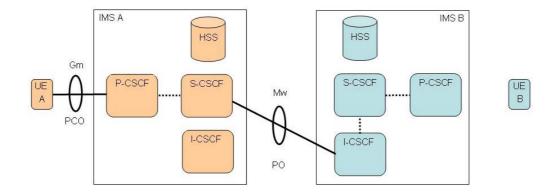
Different network operators performing origination and termination (SS1), UE_A in Home network A (MO2), UE_B in Home network B (MT2), both UEs registered, neither AS nor THIG nor IMS-ALG involved, in SU case dialog initiated between UE_A and UE_B

Test configuration for:

Initial (IN) and Subsequent (SU) requests and responses between UE_A and UE_B Example:

IN: Initial INVITE in IMS VoIP voice call from UE_A to UE_B SU: BYE request, UE_B terminates IMS VoIP call towards UE_B

Figure 2: CF_MO2-SS1-MT2



Precondition:

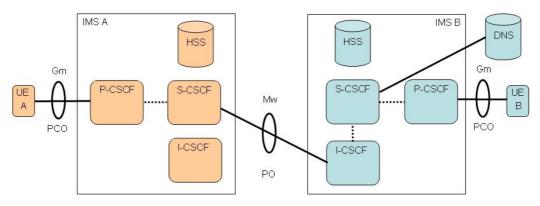
Different network operators performing origination and termination (SS1), UE_A in Home network A (MO2), UE_B in Home network B (MT2), only UE_A registered, neither AS nor THIG nor IMS-ALG involved, in SU case dialog initiated between UE_A and UE_B

Test configuration for:
Unsuccessful initial requests and responses from UE_A

Example:

Initial INVITE in IMS VoIP voice call from UE_A

Figure 3: CF_MO2-SS1-MT2b

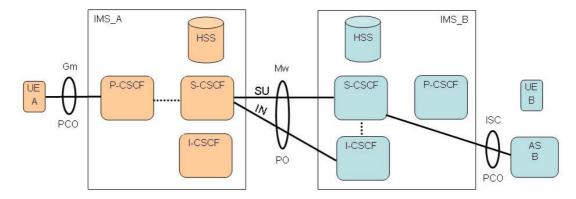


Different network operators performing origination and termination (SS1), UE_A in Home network A (MO2), UE_B in Home network B (MT2), both UEs registered, DNS server involved in network B, neither AS nor THIG nor IMS-ALG involved, in SU case dialog initiated between UE_A and UE_B Test configuration for:

Initial requests and responses between UE_A and UE_B

Initial INVITE in IMS VoIP voice call from UE_A

Figure 4: CF_MO2-SS1-MT2c



Precondition:

Different network operators performing origination and termination (SS1), UE_A in Home network A (MO#2), UE_B in Home network B (MT#2), AS_B discovered based on service logic in Home network B (AST#4), only UE_A registered, in SU case dialog initiated between UE_A and AS_B, neither THIG nor IMS-ALG involved

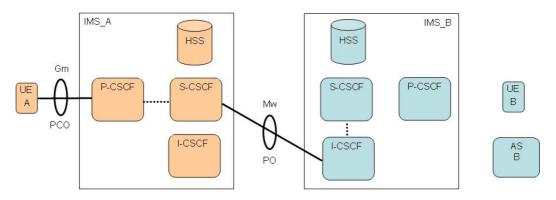
Test configuration for:

Initial (IN) and Subsequent (SU) requests and responses between UE_A and AS_B Example:

IN: Initial INVITE, IMS VoIP voice call from UE_A forwarded to AS_B as a result of filter criteria. ASB acts as routing AS

SU: BYE request, UE_A terminates IMS VoIP voice call towards AS_B

Figure 5: CF_MO2-SS1-MT2-AST4



Precondition:

Different network operators performing origination and termination (SS1), UE_A in Home network A (MO#2), UE_B in Home network B (MT#2), AS_B discovered based on service logic in Home network B (AST#4), only UE_A registered, AS_B not responding, neither THIG nor IMS-ALG involved Test configuration for:

Initial (IN) and Subsequent (SU) requests and responses between UE_A and AS_B xample:

IN: Unsuccessful initial INVITE, IMS VoIP voice call from UE_A forwarded to AS_B as a result of filter criteria but no response.

Figure 6: CF_MO2-SS1-MT2-AST4b

4.4 Test descriptions

Test descriptions (TDs) are provided below. For each TD, one generic use case forms the basis of the test sequence which presented in clause 4.5.2 of the present document. Each test sequence step includes also a reference to a specific step within the SIP call flow steps of the generic use case. Whereas test preamble (PR) and postamble (PO) call flow steps are only referenced in test descriptions, the call flow steps for the test body (TB) are repeated after each TD and include any modifications necessary to the generic use case call flow. In test body call flows steps that are associated with user interactions are shown shaded and steps which have pass criteria are associated with are shown in bold.

4.4.1 General capabilities

4.4.1.1 IMS CN components shall support SIP messages greater than 1 500 bytes

| | | Test description | | | |
|----------------|---|--------------------------------------|--|--|--|
| Identifier: | TD_IMS_0001 | | | | |
| Summary: | IMS CN components shall support SIP messages greater than 1 500 bytes | | | | |
| Configuration: | CF_MO2 | 2-SS1-MT2 | | | |
| References | Test purpose Specification reference | | | | |
| | TP_IMS | _4002_01 | TS 124 229 [1] clause 4.2A paragraph 1 | | |
| Use case: | UC_05 | | | | |
| Pre-test | • S | tatic configuration as per clause 4. | 3 | | |
| conditions: | • U | IE_A, UE_B support 100rel, no SDI | P preconditions | | |
| | • U | IE_A, UE_B have no filter criteria d | efined in HSS | | |
| | • U | IE_A, UE_B IP bearers established | l as per clause 4.2.1 | | |
| | • U | IE_A, UE_B registered as per claus | se 4.2.3 | | |
| | • U | IE_A, UE_B registered public ident | ities are SIP URIs only | | |
| Test sequence: | Step | | | | |
| | 1 PR | UE_A is requested to send a MES | SSAGE with 2 000 byte file to UE_B (prior to | | |
| | | CFW step 1) | | | |
| | 2 TB | | attempted over TCP (CFW step 2) | | |
| | 3 TB | _ | SAGE with 2 000 byte file (prior to CFW | | |
| | | step 4) | | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_4002_01 in CFW step 2 | (MESSAGE): | | |
| | | ensure that { | | | |
| | | when { UE_A sends MESSAGE | <u> </u> | | |
| | containing a Message_Body bigger than 1 500 bytes } | | | | |
| | then { IMS_B receives the MESSAGE | | | | |
| | containing a Message_Body bigger than 1 500 bytes | | | | |
| | | and | | | |
| | | UE_B receives MESSAGE | | | |
| | | ' | | | |
| 1 | | J | | | |

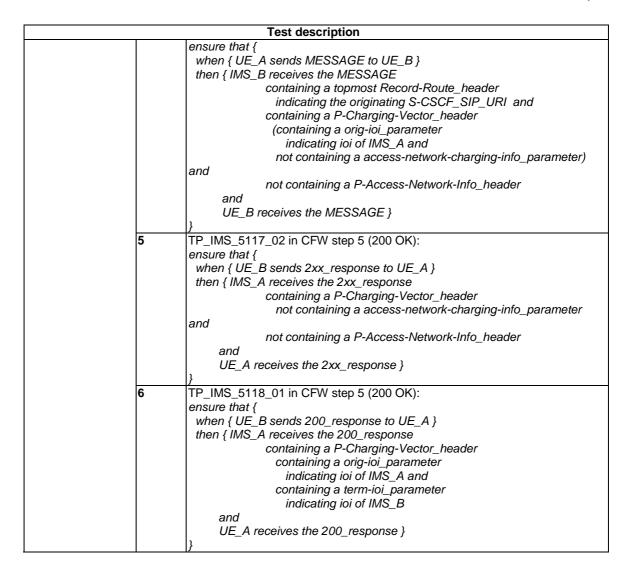
| Step | | Direc | ctio | า | Message | Comment |
|------|---|---------------|---------------|---|---------|------------------------------|
| | U | I | I | U | | |
| | Е | M | M | Е | | |
| | Α | S | S | В | | |
| | | Α | В | | | |
| 1 | | \rightarrow | | | MESSAGE | UE_A sends MESSAGE to IMS_A |
| 2 | | - | > | | MESSAGE | IMS_A sends MESSAGE to IMS_B |
| 3 | | | \rightarrow | • | MESSAGE | IMS_A sends MESSAGE to UE_B |
| 4 | | | + | • | 200 OK | UE_B sends 200 OK to IMS_B |
| 5 | | • | \leftarrow | | 200 OK | IMS_B sends 200 OK to IMS_A |
| 6 | | ← | | | 200 OK | IMS_A sends 200 OK to UE_A |

4.4.2 Initial dialog or standalone request procedures

4.4.2.1 Standalone request procedures

4.4.2.1.1 Standalone MESSAGE request procedure

| Test description | | | | | |
|------------------|---|-----------------------------------|--|--|--|
| Identifier: | TD_IMS | | | | |
| Summary: | | ne MESSAGE request procedu | res | | |
| Configuration: | _ | 2-SS1-MT2 | | | |
| References | Test pur | | Specification reference | | |
| | | _5050_03 | | | |
| | | _5061_02 | TS 124 229 [1] clause 5.2.6.4 paragraph 89 | | |
| | | _5097_06 | TS 124 229 [1] clause 5.4.3.2 paragraph 1 | | |
| | TP_IMS_5117_02 TS 124 229 [1] clause 5.4.3.3 paragraph 4 | | | | |
| | TP_IMS_5118_01 TS 124 229 [1] clause 5.4.3.3 paragraph 54 | | | | |
| Use case | UC_05 | | | | |
| reference: | | | | | |
| Pre-test | Static configuration as per clause 4.3 | | | | |
| conditions: | Static configuration as per clause 4.3 UE_A, UE_B support 100rel, no SDP preconditions | | | | |
| | • U | E_A, UE_B have no filter criteria | a defined in HSS | | |
| | • U | E_A, UE_B IP bearers establish | ned as per clause 4.2.1 | | |
| | • U | E_A, UE_B registered as per cl | ause 4.2.3 | | |
| | • U | E_A, UE_B registered public ide | entities are SIP URIs only | | |
| Test sequence: | Step | | | | |
| | 1 PR | UE_A is requested to send a M | IESSAGE from UE_A to UE_B (prior to CFW | | |
| | | step 1) | | | |
| | 2 TB | Verify that UE_B gets the ME | SSAGE (prior to CFW step 4) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5050_03 in CFW step | 2 (MESSAGE): | | |
| | | ensure that { | | | |
| | | when { UE_A sends MESSA(| | | |
| | | then { IMS_B receives MESS. | | | |
| | | | eferred-Identity_header and | | |
| | | containing P-Asserte | | | |
| | | containing an addr | ess of UE_A | | |
| | | and | | | |
| | | _ | arging-Vector_header | | |
| | | containing icid_par | ameter | | |
| | | and | | | |
| | | UE_B receives MESSAG | 'E | | |
| | | } | | | |
| | 2 | TP_IMS_5061_02 in CFW step | 5 (200 OK): | | |
| | _ | ensure that { | 3 (200 OK). | | |
| | | when { UE_B sends a 2xx_re | snonse from LIF A l | | |
| | | then { IMS_A receives the 2xx | | | |
| | | | eferred-Identity_header and | | |
| | | containing P-Assen | | | |
| | | | Iress 'sent in P-Called_Party-ID header of the | | |
| | | standalone request' | | | |
| | | and | | | |
| | | UE_A receives the 2xx_r | esponse | | |
| | · | | | | |
| | | } | | | |
| | 3 | TP_IMS_5097_06 in CFW step | 2 (MESSAGE): | | |
| | | ensure that { | | | |
| | | when { UE_A sends a MESS | | | |
| | | then { IMS_B receives the M | | | |
| | | | Charging-Vector_header | | |
| | | containing a ic | nd_parameter | | |
| | | and | 04053 | | |
| | | UE_B receives the MES | SAGE } | | |
| | | } TD_UNG_5007_07: 07: | 0 (145004.05) | | |
| | 4 | TP_IMS_5097_07 in CFW step |) 2 (MESSAGE): | | |



| Step | | Direc | ctio | n | Message | Comment |
|------|---|----------|--------------|---|---------|------------------------------|
| | U | I | Ι | U | | |
| | Ε | M | M | E | | |
| | Α | S | S | В | | |
| | | Α | В | | | |
| 1 | | → | | | MESSAGE | UE_A sends MESSAGE to IMS_A |
| 2 | | - |) | | MESSAGE | IMS_A sends MESSAGE to IMS_B |
| 3 | | | - | > | MESSAGE | IMS_A sends MESSAGE to UE_B |
| 4 | | | (| - | 200 OK | UE_B sends 200 OK to IMS_B |
| 5 | | • | (| | 200 OK | IMS_B sends 200 OK to IMS_A |
| 6 | | ← | | | 200 OK | IMS_A sends 200 OK to UE_A |

4.4.2.1.2 Standalone MESSAGE request procedure with implicit Tel URI

| | | Test description | | | |
|-----------------|---|--|---|--|--|
| Identifier: | TD_IMS | | | | |
| Summary: | Standalo | ne MESSAGE request procedur | es with implicit Tel URI | | |
| Configuration: | CF_MO2-SS1-MT2 | | | | |
| References | Test pur | | Specification reference | | |
| | TS 124 229 [1] clause 5.4.3.2 paragraph 1 | | | | |
| | TP_IMS_5117_04 TS 124 229 [1] clause 5.4.3.3 paragraph 49 | | | | |
| Use case ref.: | UC_05 | | | | |
| Pre-test | | tatic configuration as per clause 4 | | | |
| conditions: | | E_A, UE_B support 100rel, no SI | • | | |
| | | E_A, UE_B have no filter criteria | | | |
| | | E_A, UE_B IP bearers establishe | • | | |
| | | E_A, UE_B registered as per cla | | | |
| | | | public identities include SIP and Tel URIs | | |
| Toot commons | | E_A, UE_B default public identity | / IS a SIP_URI | | |
| Test sequence: | Step 1 PR | LIE A is requested to send a ME | ESSAGE from UE_A to UE_B (prior to CFW | | |
| | IPK | step 1) | ESSAGE HOITI DE_A TO DE_B (PHOI TO CFW | | |
| | 2 TB | Verify that UE_B gets the MES | SSAGE (prior to CFW step 4) | | |
| Pass criteria: | Check | Verny that OE_B gets the MEe | por oc (prior to or w step 4) | | |
| l acc criteria. | 1 | TP_IMS_5097_08 in CFW step : | 2 (MESSAGE): | | |
| | | ensure that { | | | |
| | | when { UE_A sends MESSAGE | E to UE_B | | |
| | | | not containing a P-Preferred-Identity_header or | | |
| | | • | eferred-Identity_header | | |
| | | not indicating a | | | |
| | | then { IMS_B receives the MES | | | |
| | | | serted-Identity_header efault_registered_public_identity and | | |
| | | | serted-Identity_header | | |
| | | indicating a Tel_ | | | |
| | | and | | | |
| | | UE_B receives the MESSA | 4G <i>E</i> } | | |
| | | } | • | | |
| | | TP_IMS_5117_04 in CFW step | 5 (200 OK): | | |
| | | ensure that { | | | |
| | | when { UE_B sends 2xx_response | | | |
| | | | P-Preferred-Identity_header or | | |
| | | _ | eferred-Identity_header | | |
| | | not indicating a then { IMS_A receives the 2xx_ | _ , | | |
| | | | serted-Identity_header | | |
| | | | efault_registered_public_identity and | | |
| | | | serted-Identity_header | | |
| | | indicating a Tel_ | | | |
| | | and | | | |
| | | UE_A receives the 2xx_re | sponse } | | |
| | | <i>}</i> | | | |

| Step | Direction | | n | Message | Comment | |
|------|-----------|---------------|----------|---------|---------|------------------------------|
| | U | I | I | U | | |
| | Ε | M | М | Е | | |
| | Α | S | S | В | | |
| | | Α | В | | | |
| 1 | | \rightarrow | | | MESSAGE | UE_A sends MESSAGE to IMS_A |
| 2 | | - | → | | MESSAGE | IMS_A sends MESSAGE to IMS_B |
| 3 | | | .1. | > | MESSAGE | IMS_A sends MESSAGE to UE_B |
| 4 | | | + | - | 200 OK | UE_B sends 200 OK to IMS_B |
| 5 | | • | 1. | | 200 OK | IMS_B sends 200 OK to IMS_A |
| 6 | | + | | | 200 OK | IMS_A sends 200 OK to UE_A |

4.4.2.1.3 Standalone MESSAGE request procedure with implicit SIP URI

| | | Test description | on | | |
|--|--------------------------------------|----------------------------------|--|--|--|
| Identifier: | TD_IMS | | | | |
| Summary: | Standalo | ne MESSAGE request proced | res with implicit SIP URI | | |
| Configuration: | | 2-SS1-MT2 | • | | |
| References | Test purpose Specification reference | | | | |
| TP_IMS_5097_09 TS 124 229 [1] clause 5.4.3.2 | | | | | |
| | | _5117_06 | TS 124 229 [1] clause 5.4.3.3 paragraph 49 | | |
| Use case | UC_05 | | | | |
| reference: | | | | | |
| Pre-test | | tatic configuration as per claus | | | |
| conditions: | • U | E_A, UE_B support 100rel, no | SDP preconditions | | |
| | • U | E_A, UE_B have no filter criter | ia defined in HSS | | |
| | • U | E_A, UE_B IP bearers establis | hed as per clause 4.2.1 | | |
| | • U | E_A, UE_B registered as per of | lause 4.2.3 | | |
| | | | I public identities include SIP and Tel URIs | | |
| | • U | E_A, UE_B default public ident | ity is a Tel_URI | | |
| Test sequence: | Step | | | | |
| | 1 PR | UE_A is requested to send a l | MESSAGE from UE_A to UE_B (prior to CFW | | |
| | | step 1) | | | |
| | 2 TB | Verify that UE_B gets the M | ESSAGE (prior to CFW step 4) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5097_09 in CFW ste | p 2 (MESSAGE): | | |
| | | ensure that { | | | |
| | | when { UE_A sends MESSA | | | |
| | | • | P-Preferred-Identity_header or | | |
| | | | Preferred-Identity_header | | |
| | | indicating a T | | | |
| | | then { IMS_B receives the M | | | |
| | | | Asserted-Identity_header | | |
| | | | default_registered_public_identity and | | |
| | | • | Asserted-Identity_header | | |
| | | _ | el_derived_SIP_URI | | |
| | | and | CACE | | |
| | | UE_B receives the MES | SAGE } | | |
| | | TP_IMS_5117_06 in CFW ste | n 5 (200 OK): | | |
| | | ensure that { | ρο (200 Οιν). | | |
| | | when { UE_B sends 2xx_res | ponse to UF_A | | |
| | | | n P-Preferred-Identity_header or | | |
| | | | Preferred-Identity_header | | |
| | | indicating a T | | | |
| | | then { IMS_A receives the 23 | | | |
| | | | Asserted-Identity_header | | |
| | | | default_registered_public_identity and | | |
| | | | Asserted-Identity_header | | |
| | | indicating a T | el_derived_SIP_URI | | |
| | | and | | | |
| | | UE_A receives the 2xx_ | response } | | |
| | | } | | | |
| | | | | | |

| Step | Direction | | n | Message | Comment | |
|------|-----------|---------------|--------------|---------|---------|------------------------------|
| | U | ı | I | U | | |
| | Е | М | M | E | | |
| | Α | S | S | В | | |
| | | Α | В | | | |
| 1 | | \rightarrow | | | MESSAGE | UE_A sends MESSAGE to IMS_A |
| 2 | | - | → | | MESSAGE | IMS_A sends MESSAGE to IMS_B |
| 3 | | | 7 | > | MESSAGE | IMS_A sends MESSAGE to UE_B |
| 4 | | | + | - | 200 OK | UE_B sends 200 OK to IMS_B |
| 5 | | • | \leftarrow | | 200 OK | IMS_B sends 200 OK to IMS_A |
| 6 | | \leftarrow | | | 200 OK | IMS_A sends 200 OK to UE_A |

4.4.2.1.4 Standalone MESSAGE request with DNS/ENUM lookup procedures

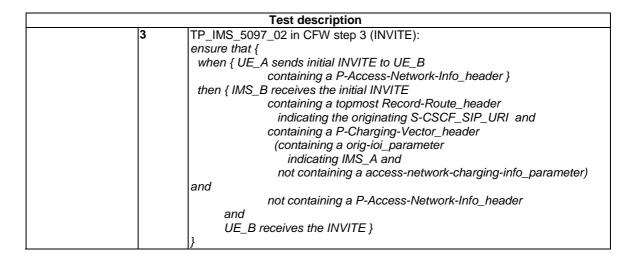
| | | Test description | | | |
|----------------|--|-------------------------------------|---|--|--|
| Identifier: | TD_IMS | _0005 | | | |
| Summary: | Standalone MESSAGE request with DNS/ENUM lookup procedures | | | | |
| Configuration: | CF_MO2-SS1-MT2c | | | | |
| References | Test pui | Specification reference | | | |
| | TP_IMS | _5097_10 | TS 124 229 [1] clause 5.4.3.2 paragraph 1 | | |
| Use case | UC_05 | | | | |
| reference.: | | | | | |
| Pre-test | • S | tatic configuration as per clause 4 | 3 | | |
| conditions: | • U | E_A, UE_B support 100rel, no SD | P preconditions | | |
| | • U | E_A, UE_B have no filter criteria o | lefined in HSS | | |
| | • U | E_A, UE_B IP bearers established | l as per clause 4.2.1 | | |
| | | E_A, UE_B registered as per clau | · | | |
| | | E_A, UE_B registered public iden | | | |
| | | | NUM entry mapping UE_B's E.164 number | | |
| | | its SIP URI public identity | 3 - 2 - 3 - 2 - 3 - 3 - 3 - 3 - 3 - 3 - | | |
| Test sequence: | Step | | | | |
| - | 1 PR | UE_A is requested to send a ME | SSAGE from UE_A to UE_B (prior to CFW | | |
| | | step 1) | ·. | | |
| | 2 TB | Verify that UE_B gets the MESS | SAGE (prior to CFW step 4) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5097_10 in CFW step 2 | (MESSAGE): | | |
| | | ensure that { | | | |
| | | when { UE_A sends MESSAGE | to UE_B | | |
| | | containing a Requ | | | |
| | | indicating a Tel_ | | | |
| | | then { IMS_A sends a DNS_Qu | | | |
| | | | URI_E.164_Number } | | |
| | | when { IMS_A receives DNS_R | | | |
| | | | R_Resource_Record | | |
| | | indicating the SII | | | |
| | | then { IMS_A sends the MESSA | | | |
| | | containing a Requi | | | |
| | | indicating a SIP_ | UKI | | |
| | | and | GE 1 | | |
| | | UE_B receives the MESSA | GE } | | |
| 1 | | } | | | |

| Step | Direction | | n | Message | Comment | |
|------|-----------|---------------|-----------------|---------|---------|------------------------------|
| | U | I | I | U | | |
| | Ē | | M | E | | |
| | А | S | S B | В | | |
| 1 | | \rightarrow | | | MESSAGE | UE_A sends MESSAGE to IMS_A |
| 2 | | - | > | | MESSAGE | IMS_A sends MESSAGE to IMS_B |
| 3 | | | 1 | • | MESSAGE | IMS_A sends MESSAGE to UE_B |
| 4 | | | + | - | 200 OK | UE_B sends 200 OK to IMS_B |
| 5 | | • | \ | | 200 OK | IMS_B sends 200 OK to IMS_A |
| 6 | | ← | | | 200 OK | IMS_A sends 200 OK to UE_A |

4.4.2.2 Initial INVITE dialog procedures

4.4.2.2.1 Initial INVITE request procedure

| | | Test description | | | |
|----------------|--|---------------------------------------|---|--|--|
| Identifier: | TD_IMS_ | _0006 | | | |
| Summary: | Initial IN | VITE request procedures | | | |
| Configuration: | | 2-SS1-MT2 | | | |
| References | Test pur | pose | Specification reference | | |
| | | | TS 124 229 [1] clause 5.2.6.3 paragraph 4 | | |
| | | _5097_01 | TS 124 229 [1] clause 5.4.3.2 paragraph 1 | | |
| | TP_IMS_ | _5097_02 | TS 124 229 [1] clause 5.4.3.2 paragraph 1 | | |
| Use case | UC_01 | | | | |
| reference.: | | | | | |
| Pre-test | • S | tatic configuration as per clause 4.3 | 3 | | |
| conditions: | • U | E_A, UE_B support 100rel, no SDF | P preconditions | | |
| | UE_A, UE_B support 100rel, no SDP preconditions UE_A, UE_B have no filter criteria defined in HSS | | | | |
| | • U | E_A, UE_B IP bearers established | as per clause 4.2.1 | | |
| | • U | E_A, UE_B registered as per claus | e 4.2.3 | | |
| | • U | E_A, UE_B registered public identif | ties are SIP URIs only | | |
| Test sequence: | Step | | | | |
| | 1 TB | | A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | | | |
| | 2 PO | Verify that UE_B rings (prior to CF | | | |
| | 3 PO | Verify that ringback is present at U | | | |
| | 4 PO | Answer the call at UE_B (prior to 0 | | | |
| | 5 PO | | d in both directions (prior to CFW step 22) | | |
| | 6 PO | Release call at UE_A (prior to CFV | | | |
| | 7 PO | Verify that call is released at UE_E | 3 (prior to CFW step 25) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5046_01 in CFW step 3 (| (INVITE): | | |
| | | ensure that { | - D. | | |
| | | when { UE_A sends INVITE to U | | | |
| | | then { IMS_B receives the INVITE | | | |
| | | containing an additional | | | |
| | | containing (P-CSCF_ (P-CSCF-FQD | | | |
| | | | ddress)) of IMS_A and | | |
| | | | I topmost Record-Route_header | | |
| | | | port_number 'where it awaits subsequent | | |
| | | 3, | requests from the called party' and | | |
| | | (P-CSCF-FQD | | | |
| | | | ddress)) of IMS_A and | | |
| | | | red-Identity_header and | | |
| | | containing P-Asserted-I | = | | |
| | | containing an address | | | |
| | | containing P-Charging- | | | |
| | | containing icid_parame | eter eter | | |
| | | and UE_B receives INVITE | | | |
| | | OL_Bieceives inviil | | | |
| | | 3 | | | |
| | 2 | TP_IMS_5097_01 in CFW step 3 (| INVITE)· | | |
| | | ensure that { | <i>.</i> | | |
| | | when { UE_A sends an initial IN | VITE to UE_B } | | |
| | | then { IMS_B receives the initial | | | |
| | | | rging-Vector_header | | |
| | | containing a icid_j | parameter | | |
| | | and | | | |
| | | UE_B receives the INVITE } | | | |
| | | <u> }</u> | | | |



| Step | | Dire | ctic | n | Message | Comment | |
|------|-------------|------------------|------------------|--------------|------------|--|--|
| | U E A | I M S A | I M S B | U E B | | | |
| 1 | | → | | | INVITE | UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports | |
| 2 | | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying provisional response | |
| 3 | | - |) | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF | |
| 4 | | • | + | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying provisional response | |
| 5 | | | - |) | INVITE | IMS_B P-CSCF forwards INVITE to UE_B | |
| 6 | | | • | 1. | 100 Trying | UE_B responds with a 100 Trying provisional response | |

4.4.2.2.2 1xx provisional response to initial INVITE request procedures

| | | Test description | |
|----------------|--|---|---|
| Identifier: | TD_IMS | | |
| | | _0007 isional response to initial INVITE | roquest procedure |
| Summary: | | | request procedure |
| Configuration: | | 2-SS1-MT2 | Charification reference |
| References | Test pu | | Specification reference |
| | | _5055_01 | TS 124 229 [1] clause 5.2.6.4 paragraph 15 |
| | | _5115_01 | TS 124 229 [1] clause 5.4.3.3 paragraph 44 |
| | | _5131_01 | TS 124 229 [1] clause 5.3.2.1 paragraph 44 |
| Use case | UC_01 | | |
| reference.: | | | |
| Pre-test | • S | tatic configuration as per clause 4 | 1.3 |
| conditions: | • L | E_A, UE_B support 100rel, no SI | OP preconditions |
| | UE_A, UE_B support Tourer, no SDP preconditions UE_A, UE_B have no filter criteria defined in HSS | | |
| | | E_A, UE_B IP bearers establishe | |
| | | E_A, UE_B registered as per clau | |
| | | E_A, UE_B registered public ider | |
| Test sequence: | Step | L_71, GL_B registered public laci | iddes are on ords only |
| rest sequence. | | Initiate on IMC VaID call on LIE | A, addressed to UE_B's SIP URI (prior to |
| | 1 PR | CFW step 1) | n, addressed to DE_D's SIF UKI (PHOLIO |
| | 0.00 | | NOW ston 7) |
| | 2 PR | Verify that UE_B rings (prior to C | |
| | 3 TB | | at UE_A (prior to CFW step 10) |
| | 4 PO | Answer the call at UE_B (prior to | |
| | 5 PO | | ged in both directions (prior to CFW step 22) |
| | 6 PO | Release call at UE_A (prior to Cl | FW step 22) |
| | 7 PO | Verify that call is released at UE | _B (prior to CFW step 25) |
| Pass criteria: | Check | | |
| | 1 | TP_IMS_5055_01 in CFW step 8 | 3 (180 Ringing): |
| | | ensure that { | · • • • • • • • • • • • • • • • • • • • |
| | | when { UE_B sends a 1xx_resp | oonse to UE_A } |
| | | then { IMS_A receives 1xx_res | |
| | | containing Record-Ro | |
| | | | CF_port_number of IMS_B 'where it expects |
| | | | subsequent requests' and |
| | | not containing comp | |
| | | | erred-Identity_header and |
| | | containing P-Asserted | |
| | | | ss 'sent in P-Called_Party-ID header |
| | | gg | of the initial request' |
| | | and | |
| | | UE_A receives 1xx_respor | nse. |
| | | } | |
| | | 13 | |
| | 2 | TP_IMS_5115_01 in CFW step 8 | 8 (180 Ringing): |
| | [- | ensure that { | 5 (100 Milging). |
| | | when { UE_B sends 1xx_respo | nse to LIF A } |
| | | then { IMS_A receives the 1xx_ | |
| | | | response larging-Vector_header |
| | | • | • • |
| | | containing a original indicating IMS | |
| | | | m-ioi_parameter |
| | | | |
| | | indicating IMS | _ <i>D</i> |
| | | and | ononoo l |
| | | UE_A receives the 1xx_res | spunse } |
| | 2 | TD IMO 5404 04 5 0544 5 6 | 2 (400 Diaging): |
| | 3 | TP_IMS_5131_01 in CFW step 8 | s (180 Kinging): |
| | | ensure that { | (- 1/5 / 1) |
| | | when { UE_B sends 1xx_respo | |
| | | then { IMS_A receives the 1xx_ | |
| | | _ | P-Charging-Function-Addresses_header |
| | | and | |
| | | UE_A receives the 1xx_res | sponse } |
| | | } | |
| | | | |

The expected test body call flow sequence is:

| Step | Direction | | | Message | Comment | | |
|------|-------------|------------------|--------------|----------|-------------|-------------|---|
| - | U E A | I M S A | I N S | 3 | U E B | _ | |
| 7 | | | | ← | | 180 Ringing | UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting |
| 8 | | | (| | | 180 Ringing | IMS_B S-CSCF forwards 180 Ringing response to IMS_A S-CSCF |
| 9 | | + | | | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response to UE_A |
| 10 | | \rightarrow | | | | PRACK | UE_A acknowledges the receipt of 180 response by sending PRACK |

4.4.2.2.3 2xx final response and ACK for initial INVITE request procedures

| | | Test descript | on | |
|----------------|----------|--|---|--|
| Identifier: | TD_IMS | | | |
| Summary: | 2xx fina | I response and ACK for initial II | NVITE request procedures | |
| Configuration: | | 2-SS1-MT2 | • | |
| References | Test pu | irpose | Specification reference | |
| | TP_IMS | 5_5055_02 | TS 124 229 [1] clause 5.2.6.4 paragraph 15 | |
| | | 5_5115_02 | TS 124 229 [1] clause 5.4.3.3 paragraph 44 | |
| | TP_IMS | 5_5131_02 | TS 124 229 [1] clause 5.3.2.1 paragraph 44 | |
| | TP_IMS | 5_5107_03 | TS 124 229 [1] clause 5.4.3.2 paragraph 49 | |
| Use case | UC_01 | | | |
| reference.: | | | | |
| Pre-test | • 5 | Static configuration as per claus | se 4.3 | |
| conditions: | | JE_A, UE_B support 100rel, no | | |
| | • (| JE_A, UE_B have no filter crite | ria defined in HSS | |
| | • (| JE_A, UE_B IP bearers establi | shed as per clause 4.2.1 | |
| | • (| JE_A, UE_B registered as per | clause 4.2.3 | |
| | | JE_A, UE_B registered public i | | |
| Test sequence: | Step | | | |
| • | 1 PR | Initiate an IMS VoIP call on U | E_A, addressed to UE_B's SIP URI (prior to | |
| | | CFW step 1) | | |
| | 2 PR | Verify that UE_B rings (prior | o CFW step 7) | |
| | 3 PR | | t at UE_A (prior to CFW step 10) | |
| | 4 TB | Answer the call at UE_B (prior to CFW step 16) | | |
| | 5 PO | Verify that voice can be exchange | anged in both directions (prior to CFW step 22) | |
| | 6 PO | Release call at UE_A (prior to | | |
| | 7 PO | Verify that call is released at | JE_B (prior to CFW step 25) | |
| Pass criteria: | Check | | | |
| | 1 | TP_IMS_5055_02 in CFW sto | ep 17 (200 Ok): | |
| | | ensure that { | | |
| | | when { UE_B sends a 2xx_i | | |
| | | then { IMS_A receives 2xx_ | | |
| | | containing Record | | |
| | | | CSCF_port_number of IMS_B 'where it expects | |
| | | subsequent requests' and | | |
| | | | mp_parameter and | |
| | | | referred-Identity_header and | |
| | | | rted-Identity_header | |
| | | | lress 'sent in P-Called_Party-ID header of the | |
| | | initial request' | | |
| | | and | | |
| | | UE_B receives 2xx_res | ponse | |
| | | } | | |
| | | <i>}</i> | | |

| Test description | | | | |
|------------------|----------|---|--|--|
| | 2 | TP_IMS_5115_02 in CFW step 17 (200 Ok): | | |
| | | ensure that { | | |
| | | when { UE_B sends 2xx_response to UE_A } | | |
| | | then { IMS_A receives the 2xx_response | | |
| | | containing a P-Charging-Vector_header | | |
| | | containing an orig-ioi_parameter | | |
| | | indicating IMS_A and | | |
| | | containing a term-ioi_parameter | | |
| | | indicating IMS_B | | |
| | | and | | |
| | | UE_A receives the 2xx_response } | | |
| | | } | | |
| | 3 | TP_IMS_5131_02 in CFW step 17 (200 Ok): | | |
| | | ensure that { | | |
| | | when { UE_B sends 2xx_response to UE_A } | | |
| | | then { IMS_A receives the 2xx_response | | |
| | | not containing a P-Charging-Function-Addresses_header | | |
| | | and | | |
| | | UE_A receives the 2xx_response } | | |
| | | } | | |
| | 4 | TP_IMS_5107_03 in CFW step 20 (ACK): | | |
| | | ensure that { | | |
| | | when { (UÈ_A sends ACK to UE_B) | | |
| | | containing a P-Access-Network-Info_header } | | |
| | | then { IMS B receives the ACK | | |
| | | (containing a P-Charging-Vector_header | | |
| | | not containing a access-network-charging-info_parameter | | |
| | | or | | |
| | | not containing a P-Charging-Vector_header) | | |
| | | and | | |
| | | not containing a P-Access-Network-Info_header | | |
| | | and | | |
| | | UE_B receives the ACK } | | |
| | | } | | |
| | <u> </u> | 1/ | | |

| Step | Direction | | 1 | Message | Comment | |
|------|-------------|------------------|------------------|-------------|---------|--|
| | U E A | I M S A | I M S B | U E B | | |
| 16 | | | + | | 200 OK | UE_B responds INVITE with 200 OK to indicate that the call has been answered |
| 17 | | • | + | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 18 | | ← | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |
| 19 | | \rightarrow | | | ACK | UE_A acknowledges the receipt of 200 OK for INVITE |
| 20 | | 1- | > | | ACK | IMS_A S-CSCF forwards ACK to IMS_B S-CSCF |
| 21 | | | \rightarrow | | ACK | IMS_B P-CSCF forwards ACK to UE_B |

4.4.2.2.4 Initial INVITE request procedure with implicit Tel URI

| | | Test description | | | |
|----------------|--|---------------------------------------|---|--|--|
| Identifier: | TD_IMS_0009 | | | | |
| Summary: | Initial INVITE request procedure with implicit Tel URI | | | | |
| Configuration: | CF_MO2-SS1-MT2 | | | | |
| References | Test pur | | Specification reference | | |
| | | _5097_03 | TS 124 229 [1] clause 5.4.3.2 paragraph 1 | | |
| Use case | UC_01 | | | | |
| reference.: | | | | | |
| Pre-test | | tatic configuration as per clause 4.3 | | | |
| conditions: | • U | E_A, UE_B support 100rel, no SDF | P preconditions | | |
| | • U | E_A, UE_B have no filter criteria de | efined in HSS | | |
| | • U | E_A, UE_B IP bearers established | as per clause 4.2.1 | | |
| | • U | E_A, UE_B registered as per clause | e 4.2.3 | | |
| | • U | E_A, UE_B implicitly registered pub | olic identities include SIP and Tel URIs | | |
| | • U | E_A, UE_B default public identity is | a SIP_URI | | |
| Test sequence: | Step | | | | |
| | 1 TB | Initiate an IMS VoIP call on UE_A | A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | | | |
| | 2 PO | Verify that UE_B rings (prior to CF | | | |
| | 3 PO | Verify that ringback is present at U | | | |
| | 4 PO | Answer the call at UE_B (prior to 0 | | | |
| | 5 PO | | d in both directions (prior to CFW step 22) | | |
| | 6 PO | Release call at UE_A (prior to CFV | | | |
| | 7 PO | Verify that call is released at UE_E | 3 (prior to CFW step 25) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5097_03 in CFW step 3 (| (INVITE): | | |
| | | ensure that { | - , , , , , , | | |
| | | when { UE_A sends initial INVITE | | | |
| | | | Preferred-Identity_header or | | |
| | | not indicating a P-Preis | erred-Identity_header | | |
| | | then { IMS_B receives the initial I | | | |
| | | | erted-Identity_header | | |
| | | | nult_registered_public_identity and | | |
| | | | erted-Identity_header | | |
| | | indicating a Tel_U | | | |
| | | and | | | |
| | | UE_B receives the INVITE } | | | |
| | | } | | | |

| Step | | Direc | ctio | n | Message | Comment |
|------|-------------|------------------|------------------|-------------|------------|--|
| | U E A | I M S A | I M S B | U E B | | |
| 1 | | → | | | INVITE | UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports |
| 2 | | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying provisional response |
| 3 | | - | > | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I- CSCF |
| 4 | | • | 1 | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying provisional response |
| 5 | | | .1. | > | INVITE | IMS_B P-CSCF forwards INVITE to UE_B |
| 6 | | | + | _ | 100 Trying | UE_B responds with a 100 Trying provisional response |

4.4.2.2.5 1xx provisional response to initial INVITE request procedures with implicit Tel URI

| | | Test description | | | |
|----------------|---|--|--|--|--|
| Identifier: | TD_IMS_0010 | | | | |
| Summary: | 1xx provisional response to initial INVITE request procedures with implicit Tel URI | | | | |
| Configuration: | CF_MO2-SS1-MT2 | | | | |
| References | Test pur | pose Specification reference | | | |
| | TP_IMS_ | _5115_03 TS 124 229 [1] clause 5.4.3.3 paragraph 44 | | | |
| Use case | UC_01 | | | | |
| reference.: | | | | | |
| Pre-test | • St | tatic configuration as per clause 4.3 | | | |
| conditions: | • U | E_A, UE_B support 100rel, no SDP preconditions | | | |
| | • U | E_A, UE_B have no filter criteria defined in HSS | | | |
| | • U | E_A, UE_B IP bearers established as per clause 4.2.1 | | | |
| | • U | E_A, UE_B registered as per clause 4.2.3 | | | |
| | | E_A, UE_B implicitly registered public identities include SIP and Tel URIs | | | |
| | • U | E_A, UE_B default public identity is a SIP_URI | | | |
| Test sequence: | Step | | | | |
| | 1 PR | Initiate an IMS VoIP call on UE_A, addressed to UE_B's SIP URI (prior to | | | |
| | | CFW step 1) | | | |
| | 2 PR | Verify that UE_B rings (prior to CFW step 7) | | | |
| | 3 TB | Verify that ringback is present at UE_A (prior to CFW step 10) | | | |
| | 4 PO | Answer the call at UE_B (prior to CFW step 16) | | | |
| | 5 PO | Verify that voice can be exchanged in both directions (prior to CFW step 22) | | | |
| | 6 PO | Release call at UE_A (prior to CFW step 22) | | | |
| | 7 PO | Verify that call is released at UE_B (prior to CFW step 25) | | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5115_03 in CFW step 8 (180 Ringing): | | | |
| | | ensure that { | | | |
| | | when { UE_B sends 1xx_response to UE_A | | | |
| | | not containing a P-Preferred-Identity_header or containing a P-Preferred-Identity_header | | | |
| | | indicating a SIP_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_URI | | | |
| | 1 | and | | | |
| | | UE_A receives the 1xx_response } | | | |
| |] | } | | | |

| Step | | Dire | cti | on | | Message | Comment |
|------|---|---------------|-----|--------------|---|-------------|---|
| | U | I | П | | U | | |
| | Ε | M | N | 1 | Ε | | |
| | Α | S | S | ; | В | | |
| | | Α | В | 1 | | | |
| 7 | | | | \leftarrow | | 180 Ringing | UE_B responds to initial INVITE with 180 Ringing to |
| | | | | | | | indicate that it has started alerting |
| 8 | | | ← | | | 180 Ringing | IMS_B S-CSCF forwards 180 Ringing response |
| | | | | | | | to IMS_A S-CSCF |
| 9 | | + | | | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response |
| | | | | | | | to UE_A |
| 10 | | \rightarrow | | | | PRACK | UE_A acknowledges the receipt of 180 response by |
| | | | | | | | sending PRACK |

4.4.2.2.6 2xx final response to initial INVITE request procedures with implicit Tel URI

| | | Test description | | | |
|----------------|---|--------------------------------------|--|--|--|
| Identifier: | TD_IMS | | | | |
| Summary: | 2xx final response to initial INVITE request procedures with implicit Tel URI | | | | |
| Configuration: | | 2-SS1-MT2 | · | | |
| References | Test purpose Specification reference | | | | |
| | TP_IMS | _5115_04 | TS 124 229 [1] clause 5.4.3.3 paragraph 44 | | |
| Use case | UC_01 | | | | |
| reference.: | | | | | |
| Pre-test | • S | tatic configuration as per clause 4 | .3 | | |
| conditions: | • U | E_A, UE_B support 100rel, no SE | P preconditions | | |
| | | E_A, UE_B have no filter criteria of | | | |
| | | E_A, UE_B IP bearers established | | | |
| | • U | E_A, UE_B registered as per clau | se 4.2.3 | | |
| | | | ublic identities include SIP and Tel URIs | | |
| | | E_A, UE_B default public identity | | | |
| Test sequence: | Step | | | | |
| • | 1 PR | Initiate an IMS VoIP call on UE | A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | , – u | | |
| | 2 PR | Verify that UE_B rings (prior to C | FW step 7) | | |
| | 3 PR | Verify that ringback is present at | UE_A (prior to CFW step 10) | | |
| | 4 TB | Answer the call at UE_B (prior | | | |
| | 5 PO | Verify that voice can be exchang | ed in both directions (prior to CFW step 22) | | |
| | 6 PO | Release call at UE_A (prior to CF | W step 22) | | |
| | 7 PO | Verify that call is released at UE_ | B (prior to CFW step 25) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5115_04 in CFW step 1 | 7 (200 Ok): | | |
| | | ensure that { | | | |
| | | when { UE_B sends 2xx_respon | | | |
| | | | -Preferred-Identity_header or | | |
| | | | eferred-Identity_header | | |
| | | not indicating a | | | |
| | | then { IMS_A receives the 2xx_ | | | |
| | | | serted-Identity_header | | |
| | | | fault_registered_public_identity and | | |
| | | | serted-Identity_header | | |
| | | indicating a Tel_ and | UKI | | |
| | | ***** | enonco l | | |
| | | UE_A receives the 2xx_res | purse ; | | |
| <u> </u> | 1 | J . | | | |

| Step | |)ired | tio | n | Message | Comment |
|------|-------------|------------------|------------------|-----|---------|--|
| | U E A | I M S A | I M S B | UEB | | |
| 16 | | | + | - | 200 OK | UE_B responds INVITE with 200 OK to indicate that the call has been answered |
| 17 | | • | | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 18 | | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |
| 19 | | \rightarrow | | | ACK | UE_A acknowledges the receipt of 200 OK for INVITE |
| 20 | | | > | | ACK | IMS_A S-CSCF forwards ACK to IMS_B S-CSCF |
| 21 | | | 1 | • | ACK | IMS_B P-CSCF forwards ACK to UE_B |
| 22 | | \rightarrow | | | BYE | UE_A releases the call with BYE |

4.4.2.2.7 Initial INVITE request procedure with implicit SIP URI

| | | Test description | | | |
|----------------|--|--|---|--|--|
| Identifier: | TD_IMS_0012 | | | | |
| Summary: | Initial INVITE request procedure with implicit SIP URI | | | | |
| Configuration: | CF_MO2-SS1-MT2 | | | | |
| References | Test purpose Specification reference | | | | |
| | | _5097_04 | TS 124 229 [1] clause 5.4.3.2 paragraph 1 | | |
| Use case | UC_01 | | | | |
| reference.: | | | | | |
| Pre-test | | tatic configuration as per clause 4.3 | | | |
| conditions: | | E_A, UE_B support 100rel, no SDF | | | |
| | • U | E_A, UE_B have no filter criteria de | efined in HSS | | |
| | • U | E_A, UE_B IP bearers established | as per clause 4.2.1 | | |
| | • U | E_A, UE_B registered as per clause | e 4.2.3 | | |
| | • U | E_A, UE_B implicitly registered pub | olic identities include SIP and Tel URIs | | |
| | • U | E_A, UE_B default public identity is | a Tel_URI | | |
| Test sequence: | Step | | | | |
| | 1 TB | Initiate an IMS VoIP call on UE_A | A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | | | |
| | 2 PO | Verify that UE_B rings (prior to CF | | | |
| | 3 PO | Verify that ringback is present at U | | | |
| | 4 PO | Answer the call at UE_B (prior to CFW step 16) | | | |
| | 5 PO | | d in both directions (prior to CFW step 22) | | |
| | 6 PO | Release call at UE_A (prior to CFV | | | |
| | 7 PO | Verify that call is released at UE_E | 3 (prior to CFW step 25) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5097_04 in CFW step 3 (| (INVITE): | | |
| | | ensure that { | | | |
| | | when { UE_A sends initial INVITE | | | |
| | | | Preferred-Identity_header or | | |
| | | indicating a Tel_U | erred-Identity_header | | |
| | | then { IMS_B receives the initial I | | | |
| | | | erted-Identity_header | | |
| | | | nult_registered_public_identity and | | |
| | | | erted-Identity_header | | |
| | | indicating a Tel_d | | | |
| | | and | | | |
| | | UE_B receives the INVITE } | | | |
| | | } | | | |

| Step | | Direc | tio | n | Message | Comment |
|------|-------------|------------------|------------------|-------------|------------|--|
| | U E A | I M S A | I M S B | U E B | | |
| 1 | | \rightarrow | | | INVITE | UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports |
| 2 | | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying provisional response |
| 3 | | - | > | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF |
| 4 | | + | 1. | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying provisional response |
| 5 | | | 1 | > | INVITE | IMS_B P-CSCF forwards INVITE to UE_B |
| 6 | | | + | | 100 Trying | UE_B responds with a 100 Trying provisional response |

4.4.2.2.8 1xx provisional response to initial INVITE request procedures with implicit SIP URI

| | | Test description | | | | |
|----------------|---|-------------------------------------|---|--|--|--|
| Identifier: | TD_IMS_0013 | | | | | |
| Summary: | 1xx provisional response to initial INVITE request procedures with implicit SIP URI | | | | | |
| Configuration: | CF_MO2-SS1-MT2 | | | | | |
| References | Test pur | pose | Specification reference | | | |
| | TP_IMS_ | _5115_05 | TS 124 229 [1] clause 5.4.3.3 paragraph 44 | | | |
| Use case | UC_01 | | | | | |
| reference.: | | | | | | |
| Pre-test | • S | tatic configuration as per clause 4 | l.3 | | | |
| conditions: | • U | E_A, UE_B support 100rel, no SI | OP preconditions | | | |
| | • U | E_A, UE_B have no filter criteria | defined in HSS | | | |
| | • U | E_A, UE_B IP bearers establishe | d as per clause 4.2.1 | | | |
| | • U | E_A, UE_B registered as per clau | use 4.2.3 | | | |
| | • U | E_A, UE_B implicitly registered p | ublic identities include SIP and Tel URIs | | | |
| | • U | E_A, UE_B default public identity | is a Tel_URI | | | |
| Test sequence: | Step | | | | | |
| | 1 PR | | | | | |
| | | CFW step 1) | | | | |
| | 2 PR | Verify that UE_B rings (prior to C | | | | |
| | 3 TB | | at UE_A (prior to CFW step 10) | | | |
| | 4 PO | Answer the call at UE_B (prior to | CFW step 16) | | | |
| | 5 PO | | ed in both directions (prior to CFW step 22) | | | |
| | 6 PO | Release call at UE_A (prior to CI | | | | |
| | 7 PO | Verify that call is released at UE | _B (prior to CFW step 25) | | | |
| Pass criteria: | Check | | | | | |
| | 1 | TP_IMS_5115_05 in CFW step 8 | 3 (180 Ringing): | | | |
| | | ensure that { | | | | |
| | | when { UE_B sends 1xx_respo | | | | |
| | | | P-Preferred-Identity_header or | | | |
| | | | eferred-Identity_header | | | |
| | | indicating a Tel_ | | | | |
| | | then { IMS_A receives the 1xx_ | | | | |
| | | | serted-Identity_header efault_registered_public_identity and | | | |
| | | | serted-Identity_header | | | |
| | | | _derived_SIP_URI | | | |
| | | and | _donvou_on _ond | | | |
| | | UE_A receives the 1xx_res | sponse } | | | |
| | |]} | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | | |
| L | <u> </u> | | | | | |

| Step | | Dire | ctic | n | Message | Comment |
|------|---|---------------|--------------|--------------|-------------|---|
| | U | I | I | U | 1 | |
| | Ε | М | М | Ε | | |
| | Α | S | S | В | | |
| | | Α | В | | | |
| 7 | | | • | (| 180 Ringing | UE_B responds to initial INVITE with 180 Ringing to |
| | | | | | | indicate that it has started alerting |
| 8 | | • | \leftarrow | | 180 Ringing | IMS_B S-CSCF forwards 180 Ringing response |
| | | | | | | to IMS_A S-CSCF |
| 9 | | - | | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response |
| | | | | | | to UE_A |
| 10 | | \rightarrow | | | PRACK | UE_A acknowledges the receipt of 180 response by |
| | | | | | | sending PRACK |

4.4.2.2.9 2xx final response to initial INVITE request procedures with implicit SIP URI

| | | Test description | | | |
|----------------|---|-------------------------------------|---|--|--|
| Identifier: | TD_IMS_0014 | | | | |
| Summary: | 2xx final response to initial INVITE request procedures with implicit SIP URI | | | | |
| Configuration: | CF_MO2-SS1-MT2 | | | | |
| References | Test pur | pose | Specification reference | | |
| | TP_IMS_ | 5115_06 | TS 124 229 [1] clause 5.4.3.3 paragraph 44 | | |
| Use case | UC_01 | | | | |
| reference.: | | | | | |
| Pre-test | • St | tatic configuration as per clause 4 | .3 | | |
| conditions: | • U | E_A, UE_B support 100rel, no SD | P preconditions | | |
| | • U | E_A, UE_B have no filter criteria | defined in HSS | | |
| | • U | E_A, UE_B IP bearers establishe | d as per clause 4.2.1 | | |
| | • U | E_A, UE_B registered as per clau | se 4.2.3 | | |
| | | | ublic identities include SIP and Tel URIs | | |
| | | E_A, UE_B default public identity | | | |
| Test sequence: | Step | | _ | | |
| - | 1 PR | Initiate an IMS VoIP call on UE_A | A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | - " | | |
| | 2 PR | Verify that UE_B rings (prior to C | FW step 7) | | |
| | 3 PR | Verify that ringback is present at | UE_A (prior to CFW step 10) | | |
| | 4 TB | Answer the call at UE_B (prior | to CFW step 16) | | |
| | 5 PO | Verify that voice can be exchang | ed in both directions (prior to CFW step 22) | | |
| | 6 PO | Release call at UE_A (prior to CF | | | |
| | 7 PO | Verify that call is released at UE_ | _B (prior to CFW step 25) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5115_06 in CFW step 1 | 7 (200 Ok): | | |
| | | ensure that { | | | |
| | | when { UE_B sends 2xx_respon | | | |
| | | | -Preferred-Identity_header or | | |
| | | | eferred-Identity_header | | |
| | | indicating a Tel_ | | | |
| | | then { IMS_A receives the 2xx_ | • | | |
| | | | serted-Identity_header | | |
| | | | fault_registered_public_identity and serted-Identity_header | | |
| | | | derived_SIP_URI | | |
| | | indicating a rei_ and | uenveu_on _ora | | |
| | | UE_A receives the 2xx_res | enonse } | | |
| | | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | | |
| L | | V . | | | |

| Step | | Dire | ctic | n | Message | Comment |
|------|---|---------------|--------------|-----------------|---------|--|
| | U | I | I | U | | |
| | E | M | M | 1 - | | |
| | Α | S | S B | В | | |
| 16 | | | • | ` | 200 OK | UE_B responds INVITE with 200 OK to indicate that the call has been answered |
| 17 | | , | + | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 18 | | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |
| 19 | | \rightarrow | | | ACK | UE_A acknowledges the receipt of 200 OK for INVITE |
| 20 | | • |) | | ACK | IMS_A S-CSCF forwards ACK to IMS_B S-CSCF |
| 21 | | |]- | > | ACK | IMS_B P-CSCF forwards ACK to UE_B |

4.4.2.2.10 Initial INVITE request with DNS/ENUM lookup procedures

| | | Test descrip | tion | | | |
|----------------|--|---------------------------------------|--|--|--|--|
| Identifier: | TD_IMS_0015 | | | | | |
| Summary: | Initial INVITE request with DNS/ENUM lookup procedures | | | | | |
| Configuration: | CF_MO2-SS1-MT2c | | | | | |
| References | Test purpose Specification reference | | | | | |
| | TP_IMS_5097_05 TS 124 229 [1] clause 5.4.3.2 paragraph 1 | | | | | |
| Use case | UC_01 | | | | | |
| reference.: | | | | | | |
| Pre-test | | tatic configuration as per clau | | | | |
| conditions: | • U | E_A, UE_B support 100rel, n | o SDP preconditions | | | |
| | • U | E_A, UE_B have no filter crite | eria defined in HSS | | | |
| | • U | E_A, UE_B IP bearers estable | lished as per clause 4.2.1 | | | |
| | | E_A, UE_B registered as per | | | | |
| | • U | E_A, UE_B registered public | identities are SIP URIs only | | | |
| | | | NS/ENUM entry mapping UE_B's E.164 number | | | |
| | | its SIP URI public identity | | | | |
| Test sequence: | Step | | | | | |
| | 1 TB | | UE_A, addressed to UE_B's SIP URI (prior to | | | |
| | | CFW step 1) | | | | |
| | 2 TB Verify that UE_B rings (prior to CFW step 7) | | | | | |
| | 3 PO | | nt at UE_A (prior to CFW step 10) | | | |
| | 4 PO | Answer the call at UE_B (pri | | | | |
| | 5 PO | | nanged in both directions (prior to CFW step 22) | | | |
| | 6 PO | Release call at UE_A (prior | • / | | | |
| | 7 PO | Verify that call is released at | : UE_B (prior to CFW step 25) | | | |
| Pass criteria: | Check | | | | | |
| | 1 | TP_IMS_5097_05 in CFW s | tep 3 (INVITE): | | | |
| | | ensure that { | ADVITE () UE D | | | |
| | | when { UE_A sends initial I | _ | | | |
| | | containing a F | | | | |
| | | indicating a then { IMS_A sends a DNS | | | | |
| | | | Tel_URI_E.164_Number } | | | |
| | | when { IMS_A receives DN | | | | |
| | | | NAPTR_Resource_Record | | | |
| | | | ne SIP_URI of UE_B } | | | |
| | | then { IMS_A sends the init | | | | |
| | | containing a F | | | | |
| | | indicating a | | | | |
| | | and | | | | |
| | | UE_B receives the IN\ | /ITE } | | | |
| | | } | • | | | |
| • | • | • | | | | |

| Step | | Dire | cti | on | Message | Comment |
|------|---|---------------|---------------|---------------|-------------|---|
| | U | I | I | Ι | | |
| | Ā | S | S | - 1 - | | |
| | | Α | В | 3 | | |
| 1 | | \rightarrow | | | INVITE | UE_A sends INVITE with the first SDP offer indicating |
| | | | | | | all desired medias and codecs that UE_A supports |
| 2 | | \leftarrow | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying |
| | | | | | | provisional response |
| 3 | | | | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF |
| 4 | | | \rightarrow | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying |
| | | | | | | provisional response |
| 5 | | | | \rightarrow | INVITE | IMS_B P-CSCF forwards INVITE to UE_B |
| 6 | | | | ← | 100 Trying | UE_B responds with a 100 Trying provisional |
| | | | | | | response |
| 7 | | | | ← | 180 Ringing | UE_B responds to initial INVITE with 180 Ringing to |
| | | | | | | indicate that it has started alerting |

4.4.2.3 Special case of initial INVITE dialog procedures

4.4.2.3.1 P-CSCF initiated session release, session establishment cancelled

| Test description | | | | | |
|------------------|--|-------------------------------------|---|--|--|
| Identifier: | TD_IMS_0016 | | | | |
| Summary: | P-CSCF-initiated session release, session establishment cancelled, resources no | | | | |
| | longer available | | | | |
| Configuration: | CF_MO2-SS1-MT2 | | | | |
| References | Test pur | pose | Specification reference | | |
| | TP_IMS_5072_01 | | TS 124 229 [1] clause 5.2.8.1.1 paragraph 1 | | |
| Use case | UC_04 (CFW for Cancelled) | | | | |
| reference.: | | | | | |
| Pre-test | Static configuration as per clause 4.3 | | | | |
| conditions: | UE_A, UE_B support 100rel, no SDP preconditions | | | | |
| | • U | E_A, UE_B have no filter criteria o | defined in HSS | | |
| | UE_A, UE_B IP bearers established as per clause 4.2.1 | | | | |
| | UE_A, UE_B registered as per clause 4.2.3 UE_A, UE_B registered public identities are SIP URIs only | | | | |
| | | | | | |
| | P-CSCF can receive notifications of UE_A network access failures | | | | |
| Test sequence: | Step | | | | |
| | 1 PR | Initiate an IMS VoIP call on UE_A | A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | | | |
| | 2 PR | Verify that UE_B rings (prior to C | | | |
| | 3 PR | Verify that ringback is present at | | | |
| | 4 TB | Remove cable, antenna or batt | ery from UE_A (prior to CFW step 16) | | |
| | 5 TB | Verify that call is ended at UE_ | B (prior to CFW step 20) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5072_01 in CFW step 1 | 7 (CANCEL): | | |
| | | ensure that { | | | |
| | | | cation that UE_A is no longer available' } | | |
| | | then { IMS_A sends a CANCEL | - | | |
| | | UE_B receives the CANCE | =L | | |
| | | , <i>}</i> | | | |
| | | <u> }</u> | | | |

The expected test body call flow is:

| Step | Direction | | n | Message | Comment | |
|------|-----------|--------|----------|---------|---------|--|
| | U | I | _ | U | | |
| | E | M S | M S | В | | |
| | Α | A | В | В | | |
| 16 | | | | | | PDF or SPDF sends a message that resources are |
| | | | | | | missing for UE_A |
| 17 | | - | → | | CANCEL | IMS_A sends CANCEL to IMS_B |
| 18 | | + | - | | 200 OK | IMS_B S-CSCF responds with a 200 OK |
| 19 | | | 1 | • | CANCEL | IMS_B sends CANCEL to UE_B |
| 20 | | | + | - | 200 OK | UE_B responds with 200 OK |

4.4.2.3.2 P-CSCF initiated session release, session released from originating network

| | | Test description | | |
|----------------|---|--|---|--|
| Identifier: | TD_IMS_0017 | | | |
| Summary: | P-CSCF-initiated session release, session released from originating network | | | |
| Configuration: | CF_MO2-SS1-MT2 | | | |
| References | Test purpose Specification reference | | | |
| | | 5073_01 | TS 124 229 [1] clause 5.2.8.1.2 paragraph 1 | |
| Use case | UC_04 (CFW for originating network) | | | |
| reference.: | | | | |
| Pre-test | | tatic configuration as per clause 4 | | |
| conditions: | UE_A, UE_B support 100rel, no SDP preconditions | | | |
| | UE_A, UE_B have no filter criteria defined in HSS | | | |
| | • U | E_A, UE_B IP bearers establishe | d as per clause 4.2.1 | |
| | | E_A, UE_B registered as per clau | | |
| | | E_A, UE_B registered public ider | | |
| | • P- | CSCF can receive notifications of | f UE_A network access failures | |
| Test sequence: | Step | | | |
| | 1 PR | PR Initiate an IMS VoIP call on UE_A, addressed to UE_B's SIP URI (prior to CFW step 1) | | |
| | 2 PR | Verify that UE_B rings (prior to CFW step 7) | | |
| | 3 PR | Verify that ob_B migs (prior to Gr W step 7) Verify that ringback is present at UE_A (prior to CFW step 10) | | |
| | 4 PR | Answer the call at UE_B (prior to | | |
| | 5 PR Verify that voice can be exchanged in both directions (prior to CFW s | | | |
| | 6 TB | | tery from UE_A (prior to CFW step 22) | |
| | 7 TB | Verify that call is released at U | E_B (prior to CFW step 25) | |
| Pass criteria: | Check | | | |
| | 1 | TP_IMS_5073_01 in CFW step 2 | 23 (BYE): | |
| | | ensure that { | | |
| | | when { UE_A is no_longer_ava | | |
| | | then { IMS_B receives BYE from | | |
| | containing Request_URI | | | |
| | indicating the Contact_header_value of UE_B and | | | |
| | | containing To_header | | |
| | | containing From_head | 200_OK_To_header_value from UE_B | |
| | | <u> </u> | INVITE_From_header_value from UE_A | |
| | | and | IIIVVITE_FTOIN_Neader_value froin 6E_A | |
| | | containing Call-ID_he | ader | |
| | | | INVITE_Call_Id_header_value from UE_A | |
| | | and | | |
| | | containing CSeq_hea | der | |
| | | indicating an increm | nented Sequence_Number and | |
| | | containing Route_hea | | |
| | | | ecific routing information for UE_B' and d on local policy or call release reason' | |
| | | and | | |
| | | UE_B receives BYE | | |
| | | } | | |
| | | <u> </u> } | | |

The expected test body call flow is:

| Step | Direction | | n | Message | Comment | |
|------|-------------|------------------|------------------|-------------|---------|---|
| | U E A | I M S A | I M S B | U E B | | |
| 22 | | | | | | PDF or SPDF sends a message that resources are missing for UE_A |
| 23 | | - | → | | BYE | IMS_A P-CSCF sends BYE to IMS_B S-CSCF |
| 24 | | | 7 | > | BYE | IMS_B P-CSCF forwards BYE to UE_B |
| 25 | | | (| - [| 200 OK | UE_B sends 200 OK for BYE |

4.4.2.3.3 P-CSCF initiated session release, session released from terminating network

| | | Test description | on | | |
|----------------|---|--|--|--|--|
| Identifier: | TD_IMS_ | | | | |
| Summary: | P-CSCF- | initiated session release, sessi- | on released from terminating network | | |
| Configuration: | CF_MO2 | 2-SS1-MT2 | | | |
| References | Test purpose Specification reference | | | | |
| | TP_IMS_5074_01 TS 124 229 [1] clause 5.2.8.1.2 paragraph 10 | | | | |
| Use case | UC_04 (CFW for terminating network) | | | | |
| reference.: | , , | | | | |
| Pre-test | Static configuration as per clause 4.3 U.S. A. U.S. B. | | | | |
| conditions: | UE_A, UE_B support 100rel, no SDP preconditions | | | | |
| | UE_A, UE_B have no filter criteria defined in HSS | | | | |
| | • U | E_A, UE_B IP bearers establish | ned as per clause 4.2.1 | | |
| | | E_A, UE_B registered as per cl | | | |
| | | E_A, UE_B registered public id | | | |
| | • P | CSCF can receive notifications | of UE_B network access failures | | |
| Test sequence: | Step | | | | |
| | 1 PR | Initiate an IMS VoIP call on UE CFW step 1) | E_A, addressed to UE_B's SIP URI (prior to | | |
| | 2 PR | Verify that UE_B rings (prior to | CFW step 7) | | |
| | 3 PR | | at UE_A (prior to CFW step 10) | | |
| | 4 PR | Answer the call at UE_B (prior | | | |
| | 5 PR | | nged in both directions (prior to CFW step 22) | | |
| | 6 TB | | attery from UE_B (prior to CFW step 22) | | |
| | 7 TB | | UE_A (prior to CFW step 25) | | |
| Pass criteria: | Check | | = 11 7 | | |
| | 1 | TP_IMS_5074_01 in CFW step | 23 (BYE): | | |
| | | ensure that { | , | | |
| | | when { UE_B is no_longer_a | | | |
| | | then { IMS_A receives BYE fi | | | |
| | | containing Request | | | |
| | | • | ntact_header_value of UE_A and | | |
| | | containing To_head | | | |
| | | containing From he | al INVITE_To_header_value from UE_A | | |
| | | 9 = | al 200_OK_From_header_value from UE_B | | |
| | | and | ar 200_ON_I Tom_neader_value from OL_B | | |
| | | containing Call-ID_l | neader | | |
| | | | al INVITE_Call_Id_header_value from UE_A | | |
| | | and | | | |
| | | containing CSeq_he | eader | | |
| | | indicating an incre | mented Sequence_Number and | | |
| | | containing Route_h | | | |
| | | | specific routing information for UE_A' and sed on local policy or call release reason' | | |
| | | and | | | |
| | | UE_A receives BYE | | | |
| | | } | | | |
| | | } | | | |

The expected test body call flow sequence is:

| Step | Direction | | n | Message | Comment | |
|------|-----------|---------------|--------|---------|---------|---|
| | U | I M | I M | U | | |
| | Ā | S | S | В | | |
| 22 | | | | | LOSS | PDF or SPDF(in IMS_B) sends a message that resources are missing for UE_B |
| 23 | | • | + | | ВҮЕ | IMS_A P-CSCF sends BYE to IMS_B S-CSCF |
| 24 | | ← | | | BYE | IMS_B P-CSCF forwards BYE to UE_B |
| 25 | | \rightarrow | | | 200 OK | UE_B sends 200 OK for BYE |

4.4.2.3.4 Initial request to non-existent user procedures

| | | Test description | | |
|----------------|--|-------------------------------------|--|--|
| Identifier: | TD_IMS_0019 | | | |
| Summary: | Initial INVITE request to non-existent user procedures | | | |
| Configuration: | CF_MO2 | 2-SS1 | | |
| References | Test pur | | Specification reference | |
| | TP_IMS_ | _5132_01 | TS 124 229 [1] clause 5.3.2.1 paragraph 32 | |
| Use case | UC_01 | | | |
| reference.: | | | | |
| Pre-test | | tatic configuration as per clause 4 | | |
| conditions: | • U | E_A support 100rel, no SDP pred | onditions | |
| | • U | E_A have no filter criteria defined | in HSS | |
| | • U | E_A IP bearers established as pe | r clause 4.2.1 | |
| | • U | E_A registered as per clause 4.2. | 3 | |
| | • U | E_A registered public identities a | re SIP URIs only | |
| Test sequence: | Step | | | |
| | 1 PR | Initiate an IMS VoIP call on UE_ | A, addressed to | |
| | | sip:non_existent_user@ims_b.n- | et (prior to CFW step 1) | |
| | 2 TB | Verify that an error is received | and call is aborted at UE_A (after CFW | |
| | | step 6) | | |
| Pass criteria: | Check | | | |
| | 1 | TP_IMS_5132_01 in CFW step s | 5 (404 or 604 Response): | |
| | | ensure that { | | |
| | | when { UE_A sends INVITE | | |
| | | containing a Request_ | | |
| | | indicating a non_exis | | |
| | | then { IMS_B receives the INVI | 1E | |
| | | and | response or a 604 response) | |
| | | and | _response or a 604_response) | |
| | | UE A receives the respons | Se 1 | |
| | | OL_A receives the respons | , j | |
| <u>l</u> | | IJ | | |

The expected test body call flow sequence is:

| Step | |)irec | ection | | Message | Comment |
|------|-------------|------------------|------------------|-------------|--|--|
| | U E A | I M S A | I M S B | U E B | | |
| 1 | | → | | | INVITE | UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports |
| 2 | | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying provisional response |
| 3 | | - |) | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF |
| 4 | | * | .L | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying provisional response |
| 5 | | • | 1, | | 404 Not Found or | IMS_B I-CSCF generates error message |
| | | | | | 604 Does not exist anywhere | indicating non-existent user |
| 6 | | ← | | | 404 Not Found or 604 Does not exist anywhere | IMS_A P-CSCF forwards error response to UE_A |

4.4.2.3.5 Initial request to non-registered user with no filter criterion

| | | Test description | | |
|----------------------|---|--|--|--|
| Identifier: | TD_IMS_0020 | | | |
| Summary: | Initial request to non-registered user with no filter criterion | | | |
| Configuration: | CF_MO2 | 2-SS1-MT2b | | |
| References | Test purpose Specification reference | | | |
| | TP_IMS_ | _5133_01 | TS 124 229 [1] clause 5.3.2.1 paragraph 33 | |
| Use case reference.: | UC_01 | | | |
| Pre-test | • S | tatic configuration as per clause 4 | .3 | |
| conditions: | • U | E_A, UE_B support 100rel, no SE | P preconditions | |
| | • U | E_A, UE_B have no filter criteria | defined in HSS | |
| | • U | E_A, UE_B IP bearers establishe | d as per clause 4.2.1 | |
| | • U | E_A registered as per clause 4.2. | 3 | |
| | • U | E_B not registered | | |
| | • U | E_A registered public identities ar | e SIP URIs only | |
| Test sequence: | Step | | | |
| | 1 TB | Initiate an IMS VoIP call on UE CFW step 1) | _A, addressed to UE_B's SIP URI (prior to | |
| | 2 TB | Verify that error is received and call is aborted at UE_A (after CFW step 6) | | |
| Pass criteria: | Check | | | |
| | 1 | TP_IMS_5133_01 in CFW step 5 | 5 (480 Response): | |
| | | ensure that { | | |
| | | when { UE_A sends INVITE to | | |
| | | then { IMS_B receives the INVI | | |
| | | sends a 480_response to IMS_A | | |
| | | and | , | |
| | | UE_A receives the 480_res } | sponse } | |

The expected test body call flow sequence is:

| Step | | Direc | ctio | 1 | Message | Comment |
|------|-------------|------------------|------------------|-------------|-----------------------------|--|
| | U E A | I M S A | I M S B | U E B | - | |
| 1 | | \rightarrow | | | INVITE | UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports |
| 2 | | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying provisional response |
| 3 | | - | > | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF |
| 4 | | • | + | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying provisional response |
| 5 | | • | + | | 480 Temporarily unavailable | IMS_B I-CSCF generates error message indicating unavailable user |
| 6 | | + | | | 480 Temporarily unavailable | IMS_A P-CSCF forwards error response to UE_A |

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

| | Test description | | | | | |
|----------------|---|---|--|--|--|--|
| Identifier: | TD_IMS_0021 | | | | | |
| Summary: | Initial request to non-registered user with terminating unregistered filter criterion | | | | | |
| Configuration: | CF_MO2 | 2-SS1-MT2-AST4b | | | | |
| References | Test pur | Specification reference | | | | |
| | TP_IMS_ | 5133_01 | TS 124 229 [1] clause 5.3.2.1 paragraph 33 | | | |
| Use case | UC_01 | | | | | |
| reference.: | | | | | | |
| Pre-test | • St | tatic configuration as per clause 4 | 3 | | | |
| conditions: | • U | E_A, UE_B support 100rel, no SE | OP preconditions | | | |
| | • U | E_A has no filter criteria defined in | n HSS | | | |
| | • IN | IS_B has terminating unregistered | d criterion for UE_B on INVITE indicating | | | |
| | S | ESSION_TERMINATED option | _ | | | |
| | • Ta | arget AS in IMS_B is unreachable | • | | | |
| | • U | E_A, UE_B IP bearers establishe | d as per clause 4.2.1 | | | |
| | • U | E_A registered as per clause 4.2. | 3 | | | |
| | • U | E_B not registered | | | | |
| | • U | E_A registered public identities ar | re SIP URIs only | | | |
| Test sequence: | Step | | | | | |
| | 1 PR | Initiate an IMS VoIP call on UE_/ | A, addressed to UE_B's SIP URI (prior to | | | |
| | | CFW step 1) | | | | |
| | 2 TB | Verify that error is received an | d call is aborted at UE_A (prior to CFW | | | |
| | | step 6) | | | | |
| Pass criteria: | Check | | | | | |
| | 1 | TP_IMS_5109_01 in CFW step 5 | 5 (Error Response): | | | |
| | | ensure that { | | | | |
| | | when { UE_A sends INVITE to | | | | |
| | then { IMS_B receives the INVITE and | | | | | |
| | | , | e or a 5xx_response) to IMS_A | | | |
| | | and | , | | | |
| | | UE_A receives the respons | se } | | | |
| | | <i>}</i> | | | | |

| Step | | irec | tior | 1 | Message | Comment |
|------|---|----------|--------|----|-------------------------------------|--|
| | U | I M | М | UE | | |
| | A | S | S B | В | | |
| 1 | | → | | | INVITE | UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports |
| 2 | | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying provisional response |
| 3 | | - | > | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF |
| 4 | | + | | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying provisional response |
| 5 | | • | 1 | | 408 Request Timeout or 5xx Response | IMS_B I-CSCF forwards S-CSCF error message indicating unreachable AS |
| 6 | | + | | | 408 Request Timeout or 5xx Response | IMS_A P-CSCF forwards error response to UE_A |

4.4.2.3.7 S-CSCF initiated session release from originating network

| Test description | | | | | |
|------------------|---|-----------------------------------|--|--|--|
| Identifier: | TD_IMS_0022 | | | | |
| Summary: | S-CSCF-initiated release of established session from originating network | | | | |
| Configuration: | CF_MO2 | 2-SS1-MT2 | - | | |
| References | Test purpose Specification reference | | | | |
| | TP_IMS_ | _5139_01 | TS 124 229 [1] clause 5.4.5.1.2 paragraph 1 | | |
| Use case | UC_03 (| CFW for originating network) | | | |
| reference.: | • | | | | |
| Pre-test | • S | tatic configuration as per clause | e 4.3 | | |
| conditions: | • U | E_A, UE_B support 100rel, no | SDP preconditions | | |
| | • U | E_A, UE_B have no filter criteri | a defined in HSS | | |
| | • U | E_A, UE_B IP bearers establis | hed as per clause 4.2.1 | | |
| | • U | E_A registered as per clause 4 | .2.3 | | |
| | • U | E_A registered public identities | are SIP URIs only | | |
| Test sequence: | Step | | | | |
| | 1 PR | Initiate an IMS VoIP call on UE | _A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | | | |
| | 2 PR | Verify that UE_B rings (prior to | CFW step 7) | | |
| | 3 PR | Verify that ringback is present | at UE_A (prior to CFW step 10) | | |
| | 4 PR | Answer the call at UE_B (prior | | | |
| | 5 PR | Verify that voice can be excha | nged in both directions (prior to CFW step 22) | | |
| | 6 TB Set UE_A registration status to de-registered in IMS_A HSS (prior to | | | | |
| | | CFW step 22) | | | |
| | 7 TB | Verify that call is ended at U | | | |
| | 8 PO | Verify that call is ended at UE_ | | | |
| | 9 PO | Verify that UE_A is deregistered | ed | | |

| | Test description | | | | | |
|-------------------|------------------|--|--|--|--|--|
| Pass criteria: | Check | | | | | |
| | 1 | TP_IMS_5139_01 in CFW step 22 (BYE): | | | | |
| | | ensure that { | | | | |
| | | when { IMS_A receives 'an indication that UE_A is to be de-registered' } | | | | |
| | | then { IMS_A sends a BYE to IMS_B | | | | |
| | | containing Request_URI | | | | |
| | | indicating the Contact_header_value of UE_B and | | | | |
| | | containing To_header | | | | |
| | | indicating the initial 200_OK_To_value from UE_B | | | | |
| | | containing From_header | | | | |
| | | indicating the initial INVITE_From_value from UE_A and | | | | |
| | | containing Call-ID_header | | | | |
| | | indicating the initial INVITE_Call_Id_value from UE_A and | | | | |
| | | containing CSeq_header | | | | |
| | | indicating an incremented Sequence_Number and | | | | |
| | | containing Route_header | | | | |
| | | indicating 'dialog specific routing information for UE_B' and | | | | |
| | | 'further headers based on local policy or call release reason' | | | | |
| | | and | | | | |
| UE_B receives BYE | | | | | | |
| | | } | | | | |
| | | } | | | | |

The expected TB call flow is:

| Step | | Dire | cti | on | | Message | Comment |
|------|---|---------------|--------------|---------------|---|---------|--|
| | U | I | I | | U | | |
| | E | M | M | - 1 | E | | |
| | Α | S | S | | В | | |
| 22 | | | <u> </u> | | | BYE | IMS_A S-CSCF releases the call towards the |
| | | | | | | | called user with BYE |
| 23 | | | | \rightarrow | | BYE | IMS_B P-CSCF forwards BYE to UE_B |
| 24 | | | | \uparrow | | 200 OK | UE_B sends 200 OK for BYE |
| 25 | | • | \leftarrow | | | 200 OK | IMS_B S-CSCF forwards 200 OK response to |
| | | | | | | | IMS_A S-CSCF |
| 26 | | \leftarrow | | | | BYE | IMS_A S-CSCF releases the call towards the calling |
| | | | | | | | user with BYE |
| 27 | | \rightarrow | | | | 200 OK | UE_A sends 200 OK for BYE |

4.4.2.3.8 S-CSCF initiated session release from terminating network

| | | Test description | | | |
|----------------|--|--|---|--|--|
| Identifier: | TD_IMS_ | | | | |
| Summary: | | initiated release of established se | ession from terminating network | | |
| Configuration: | | 2-SS1-MT2 | | | |
| References | Test pur | | Specification reference | | |
| | | _5139_02 | TS 124 229 [1] clause 5.4.5.1.2 paragraph 1 | | |
| Use case | UC_03 (CFW for terminating network) | | | | |
| reference.: | | | | | |
| Pre-test | | tatic configuration as per clause 4 | | | |
| conditions: | | E_A, UE_B support 100rel, no SE | | | |
| | | E_A, UE_B have no filter criteria | | | |
| | | E_A, UE_B IP bearers establishe | • | | |
| | | E_A registered as per clause 4.2. | | | |
| Took common co | | E_A registered public identities a | re SIP URIS ONly | | |
| Test sequence: | Step | Initiate on IMC ValD cell on LIE | A, addressed to UE_B's SIP URI (prior to | | |
| | 1 PR | CFW step 1) | A, addressed to UE_B's SIP URI (prior to | | |
| | 2 PR | Verify that UE_B rings (prior to C | YEW stop 7) | | |
| | 3 PR | Verify that ob_B fings (phor to be verify that ringback is present at | | | |
| | 4 PR | Answer the call at UE_B (prior to | | | |
| | 5 PR | Verify that voice can be exchanged in both directions (prior to CFW step 21) | | | |
| | 6 TB | | o de-registered in IMS_A HSS (prior to | | |
| | CFW step 22) | | | | |
| | 7 TB | Verify that call is ended at UE | A (prior to CFW step 24) | | |
| | 8 PO | Verify that call is ended at UE_B | | | |
| | 9 PO | Verify that UE_A is deregistered | | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5139_02 in CFW step 2 | 22 (BYE): | | |
| | | ensure that { | | | |
| | | 1 | cation that UE_B is no_longer_available' } | | |
| | | then { IMS_B sends a BYE to II | | | |
| | | containing Request_U | | | |
| | | | ct_header_value of UE_A and | | |
| | | containing To_header | INVITE_To_value from UE_A | | |
| | | containing From head | | | |
| | | _ | 200_OK_From_value from UE_B and | | |
| | | containing Call-ID_he | | | |
| | | | INVITE_Call_Id_value from UE_A and | | |
| | | containing CSeq_hea | | | |
| | | | ented Sequence_Number and | | |
| | | containing Route_hea | | | |
| | | | ecific routing information for UE_A' and | | |
| | | | d on local policy or call release reason' | | |
| | | and | | | |
| | | UE_A receives BYE | | | |
| | | } | | | |
| | | l <i>I</i> | | | |

The expected TB call flow is:

| Step | | Direc | ctio | n | Message | Comment |
|------|-------------|------------------|---------------|-------------|---------|--|
| | U E A | I M S A | I M S B | U E B | | |
| 22 | | • | | | ВУЕ | IMS_B S-CSCF releases the call towards the calling user with BYE |
| 23 | | ← | | | BYE | IMS_A P-CSCF forwards BYE to UE_B |
| 24 | | \rightarrow | | | 200 OK | UE_A sends 200 OK for BYE |
| 25 | | | > | | 200 OK | IMS_A S-CSCF forwards 200 OK response to IMS_B S-CSCF |
| 26 | | | - | > | ВУЕ | IMS_B S-CSCF releases the call towards the called user with BYE |
| 27 | | | (| - | 200 OK | UE_B sends 200 OK for BYE |

4.4.3 Subsequent requests within dialog procedures

4.4.3.1 Subsequent UPDATE target refresh request procedures

| | | Test description | | |
|----------------|--|---------------------------------------|--|--|
| Identifier: | TD_IMS_ | _0024 | | |
| Summary: | Subsequent UPDATE target refresh requests and 200 OK response procedures | | | |
| Configuration: | CF_MO2 | 2-SS1-MT2 | · | |
| References | Test purpose Specification reference | | | |
| | TP_IMS_ | | TS 124 229 [1] clause 5.2.6.3 paragraph 26 | |
| | TP_IMS_ | _5058_02 | TS 124 229 [1] clause 5.2.6.4 paragraph 67 | |
| | | | TS 124 229 [1] clause 5.4.3.2 paragraph 42 | |
| Use case | UC_02 (| CFW for UPDATE) | | |
| reference.: | | | | |
| Pre-test | | tatic configuration as per clause 4.3 | | |
| conditions: | • U | E_A, UE_B support 100rel, no SDI | P preconditions | |
| | • U | E_A, UE_B have no filter criteria de | efined in HSS | |
| | • U | E_A, UE_B IP bearers established | as per clause 4.2.1 | |
| | | E_A, UE_B registered as per claus | | |
| | • U | E_A, UE_B registered public identi | ities are SIP URIs only | |
| | • U | E_A, UE_B support UPDATE meth | nod for call hold/resume | |
| Test sequence: | Step | | | |
| | 1 PR | Initiate an IMS VoIP call on UE_A | ., addressed to UE_B's SIP URI (prior to | |
| | | CFW step 1) | | |
| | 2 PR | Verify that UE_B rings (prior to CF | | |
| | 3 PR | Verify that ringback is present at L | | |
| | 4 PR | Answer the call at UE_B (prior to | | |
| | 5 PR | | ed in both directions (prior to CFW step 22) | |
| | 6 TB | Place call on hold at UE_A (price | | |
| | 7 TB | | be exchanged in both directions (prior to | |
| | | CFW step 25) | | |
| | 8 TB | Resume call at UE_A (prior to C | | |
| | 9 TB | | ged in both directions (prior to CFW step | |
| | | 31) | | |
| | 10 PO | Release call at UE_A (prior to CF) | | |
| | 11 PO | Verify that call is released at UE_I | B (prior to CFW step 37) | |

| | | Test description |
|----------------|-------|---|
| Pass criteria: | Check | |
| | 1 | TP_IMS_5048_02 in CFW step 23 and 29 (UPDATE): |
| | | ensure that { |
| | | when { UE_A sends UPDATE to UE_B } |
| | | then { IMS_B receives the UPDATE |
| | | containing an additional Via_header |
| | | containing (P-CSCF_port_number 'where it awaits the responses to arrive' and |
| | | (P-CSCF-FQDN_address or |
| | | P-CSCF-IP_address)) of IMS_A and |
| | | containing an additional topmost Record-Route_header |
| | | containing (P-CSCF_port_number 'where it awaits subsequent |
| | | requests from the called party' and |
| | | (P-CSCF-FQDN_address or |
| | | P-CSCF-IP_address)) of IMS_A |
| | | and |
| | | UE_B receives UPDATE |
| | | } |
| | |] |
| | | TP_IMS_5058_02 in CFW step 26 and 32 (200 Ok): |
| | | ensure that { |
| | | when { UE_B sends a 2xx_response to UE_A } |
| | | then { IMS_A receives 2xx_response |
| | | containing Record-Route_header containing the same P-CSCF_port_number of IMS_B 'as in the |
| | | response to the previous initial request' and |
| | | not containing a comp_parameter |
| | | and |
| | | UE_A receives 2xx_response |
| | | } |
| | | } |
| | | TP_IMS_5106_02 in CFW step 23 and 29 (UPDATE): |
| | | ensure that { |
| | | when { UE_A sends subsequent UPDATE to UE_B } |
| | | then { IMS_B receives the subsequent UPDATE |
| | | containing a topmost Record-Route_header |
| | | containing 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 |
| | | and UE Procedures the UPDATE) |
| | | UE_B receives the UPDATE } |
| | | l) |

| Step | | Direction | | 1 | Message | Comment | |
|------|-------------|------------------|----------|---------------|-------------|----------|--|
| | U E A | I M S A | 5 | N | U E B | 3 | |
| 22 | | \rightarrow | | | | UPDATE | UE_A sends UPDATE message indicating media stream inactive (Call Hold) |
| 23 | | | ^ | | | UPDATE | IMS_A S-CSCF forwards UPDATE to IMS_B S-CSCF |
| 24 | | | | \rightarrow | | UPDATE | IMS_B P-CSCF forwards UPDATE to UE_B |
| 25 | | | | + | | 200 OK | UE_B responds to UPDATE with 200 OK indicating media stream inactive |
| 26 | | | + | | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 27 | | + | | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |
| 28 | | \rightarrow | | | | UPDATE | UE_A sends UPDATE message indicating media stream active (Call Resume) |
| 29 | | | → | | | UPDATE | IMS_A S-CSCF forwards UPDATE to IMS_B S-CSCF |
| 30 | | | | \rightarrow | | UPDATE | IMS_B P-CSCF forwards UPDATE to UE_B |
| 31 | | | | + | | 200 OK | UE_B responds to UPDATE with 200 OK indicating media stream active |
| 32 | | | ← | | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 33 | | + | | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |

4.4.3.2 Subsequent PRACK request procedures

| | | Test description | | | |
|----------------|--|-------------------------------------|--|--|--|
| Identifier: | TD_IMS_ | | | | |
| Summary: | Subsequent PRACK requests and 200 OK response procedures CF_MO2-SS1-MT2 | | | | |
| Configuration: | | | | | |
| References | Test pur | | Specification reference | | |
| | TP_IMS_ | _5107_01 | TS 124 229 [1] clause 5.4.3.2 paragraph 49 | | |
| Use case | UC_01 | | | | |
| reference.: | | | | | |
| Pre-test | Static configuration as per clause 4.3 | | | | |
| conditions: | UE_A, UE_B support 100rel, no SDP preconditions | | | | |
| | UE_A, UE_B support 100rel, no SDP preconditions UE_A, UE_B have no filter criteria defined in HSS | | | | |
| | • U | E_A, UE_B IP bearers established | d as per clause 4.2.1 | | |
| | • U | E_A, UE_B registered as per clau | se 4.2.3 | | |
| | • U | E_A, UE_B registered public iden | tities are SIP URIs only | | |
| Test sequence: | Step | | | | |
| | 1 PR | Initiate an IMS VoIP call on UE_A | A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | | | |
| | 2 PR | Verify that UE_B rings (prior to C | FW step 7) | | |
| | 3 PR | Verify that ringback is present at | | | |
| | 4 TB | Answer the call at UE_B (prior | to CFW step 16) | | |
| | 5 PO | | ed in both directions (prior to CFW step 22) | | |
| | 6 PO | Release call at UE_A (prior to CF | | | |
| | 7 PO | Verify that call is released at UE_ | _B (prior to CFW step 25) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5107_01 in CFW step 1 | 1 (PRACK): | | |
| | | ensure that { | | | |
| | | when { (UE_A sends PRACK to | | | |
| | | containing a P-Acc | cess-Network-Info_header } | | |
| | | then { IMS_B receives the PRACK | | | |
| | | | arging-Vector_header | | |
| | | | access-network-charging-info_parameter | | |
| | | or | Charging Vactor bander | | |
| | | not containing a P- | Charging-Vector_header) | | |
| | | | Access-Network-Info header | | |
| | | and | Access-Network-Info_header | | |
| | | UE_B receives the PRACK | 1 | | |
| | | 3 | | | |
| | 2 | TP_IMS_5121_02 in CFW step 1 | 4 (200 OK)· | | |
| | | ensure that { | . (255 51.4). | | |
| | | when { UE_B sends 2xx_respon | nse to UE A } | | |
| | | then { IMS_A receives the 2xx_ | - | | |
| | | | arging-Vector_header | | |
| | | | access-network-charging-info_parameter | | |
| | | and | - - · | | |
| | | not containing a P | -Access-Network-Info_header | | |
| | | and | | | |
| | | UE_A receives the 2xx_res | sponse } | | |
| | |]} | | | |

| Step | Direction | | n | Message | Comment | |
|------|-------------|------------------|-------------|-------------|---------|--|
| | U E A | I M S A | M S B | U E B | | |
| 10 | | → | | | PRACK | UE_A acknowledges the receipt of 180 response by sending PRACK |
| 11 | | - | → | | PRACK | IMS_A S-CSCF forwards PRACK to IMS_B S-CSCF |
| 12 | | | 1. | > | PRACK | IMS_B P-CSCF forwards PRACK to UE_B |
| 13 | | | + | - | 200 OK | UE_B responds PRACK with 200 OK |
| 14 | | • | ₩ | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 15 | | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |

4.4.3.3 Subsequent BYE request procedures

| | I | Test description | | | |
|----------------|--|--|--|--|--|
| Identifier: | TD_IMS_0026 Subsequent BVE requests and 200 OK response precedures | | | | |
| Summary: | Subsequent BYE requests and 200 OK response procedures | | | | |
| Configuration: | | 2-SS1-MT2 | | | |
| References | Test pur | | Specification reference | | |
| | | _5107_01 | TS 124 229 [1] clause 5.4.3.2 paragraph 49 | | |
| | | _5121_02 | TS 124 229 [1] clause 5.4.3.3 paragraph 60 | | |
| Use case | UC_01 | | | | |
| reference.: | | | | | |
| Pre-test | | tatic configuration as per clause 4 | | | |
| conditions: | | E_A, UE_B support 100rel, no SE | | | |
| | | E_A, UE_B have no filter criteria | | | |
| | | E_A, UE_B IP bearers establishe | | | |
| | • U | E_A, UE_B registered as per clau | ise 4.2.3 | | |
| | | E_A, UE_B registered public identities are SIP URIs only | | | |
| Test sequence: | Step | | | | |
| | 1 PR | Initiate an IMS VoIP call on UE_ | A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | | | |
| | 2 PR | Verify that UE_B rings (prior to C | | | |
| | 3 PR | Verify that ringback is present at | | | |
| | 4 PR | Answer the call at UE_B (prior to | CFW step 16) | | |
| | 5 PR | | ed in both directions (prior to CFW step 22) | | |
| | 6 TB | Release call at UE_A (prior to | | | |
| | 7 TB | Verify that call is released at U | E_B (prior to CFW step 25) | | |
| Pass criteria: | Check | | | | |
| | 1 | TP_IMS_5107_02 in CFW step 2 | 23 (BYE): | | |
| | | ensure that { | | | |
| | | when { (UE_A sends BYE_to U | | | |
| | | | cess-Network-Info_header } | | |
| | | then { IMS_B receives the BYE | | | |
| | | | arging-Vector_header | | |
| | | | access-network-charging-info_parameter | | |
| | | or | Observing Martin basedon) | | |
| | | _ | Charging-Vector_header) | | |
| | | and | Access Notwork Info header | | |
| | | not containing a P- | Access-Network-Info_header | | |
| | | UE_B receives the BYE } | | | |
| | | OL_Dieceives life Dil } | | | |
| <u> </u> | 1 | IJ. | | | |

| Test description | | | | | |
|------------------|---|--|--|--|--|
| 2 | TP_IMS_5121_02 in CFW step 26 (200 OK): | | | | |
| | ensure that { | | | | |
| | when { UE_B sends 2xx_response to UE_A } | | | | |
| | then { IMS_A receives the 2xx_response | | | | |
| | containing a P-Charging-Vector_header | | | | |
| | not containing a access-network-charging-info_parameter | | | | |
| | and | | | | |
| | not containing a P-Access-Network-Info_header | | | | |
| | and | | | | |
| | UE_A receives the 2xx_response } | | | | |
| | } | | | | |

| Step | Direction | | | Message | Comment | | |
|------|-----------|---------------|---------------|--------------|---------|--------|--|
| | U | I | I | | U | _ | |
| | E | M | N | - 1 | E | | |
| | Α | S | 5 | - | В | | |
| 00 | | ΙA | E | 5 | | DVE | LIE A valance the nell with DVE |
| 22 | | \rightarrow | | | | BYE | UE_A releases the call with BYE |
| 23 | | | \rightarrow | | | BYE | IMS_A S-CSCF forwards BYE to IMS_B |
| | | | | | | | S-CSCF |
| 24 | | | | \uparrow | | BYE | IMS_B P-CSCF forwards BYE to UE_B |
| 25 | | | | \downarrow | | 200 OK | UE_B sends 200 OK for BYE |
| 26 | | | \ | | | 200 OK | IMS_B S-CSCF forwards 200 OK response to |
| | | | | | | | IMS_A S-CSCF |
| 27 | | \leftarrow | | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to |
| | | | | | | | UE_A |

4.4.3.4 Subsequent INVITE target refresh request procedures

| | | Test description | | |
|----------------|--|-------------------------------------|--|--|
| Identifier: | TD_IMS | 0027 | | |
| Summary: | Subsequent INVITE target refresh requests and 200 OK response procedures | | | |
| Configuration: | | -SS1-MT2 | | |
| References | Test pur | pose | Specification reference | |
| | TP_IMS_ | 5048_01 | TS 124 229 [1] clause 5.2.6.3 paragraph 26 | |
| | TP_IMS_ | 5058_02 | TS 124 229 [1] clause 5.2.6.4 paragraph 67 | |
| | TP_IMS_ | 5106_01 | TS 124 229 [1] clause 5.4.3.2 paragraph 42 | |
| Use case | UC_02 (0 | CFW for reINVITE) | | |
| reference.: | | | | |
| Pre-test | • St | tatic configuration as per clause 4 | .3 | |
| conditions: | • U | E_A, UE_B support 100rel, no SE | P preconditions | |
| | • U | E_A, UE_B have no filter criteria | defined in HSS | |
| | • U | E_A, UE_B IP bearers establishe | d as per clause 4.2.1 | |
| | • U | E_A, UE_B registered as per clau | ise 4.2.3 | |
| | • U | E_A, UE_B registered public iden | tities are SIP URIs only | |
| | • U | E_A, UE_B support reINVITE me | thod for call hold/resume | |
| Test sequence: | Step | | | |
| | 1 PR | Initiate an IMS VoIP call on UE_/ | A, addressed to UE_B's SIP URI (prior to | |
| | | CFW step 1) | | |
| | 2 PR | Verify that UE_B rings (prior to C | | |
| | 3 PR | Verify that ringback is present at | | |
| | 4 PR | Answer the call at UE_B (prior to | | |
| | 5 PR | | ed in both directions (prior to CFW step 22) | |
| | 6 TB | Place call on hold at UE_A (pri | | |
| | 7 TB | | be exchanged in both directions (prior to | |
| | | CFW step 28) | | |
| | 8 TB | Resume call at UE_A (prior to | | |
| | 9 TB | Verify that voice can be excharged | nged in both directions (prior to CFW step | |
| | 10 PO | Release call at UE_A (prior to CI | FW step 46) | |

| | | Test description |
|----------------|-------|--|
| | 11 PO | Verify that call is released at UE_B (prior to CFW step 49) |
| Pass criteria: | Check | |
| | 1 | TP_IMS_5048_01 in CFW step 24 and 36 (INVITE): |
| | | ensure that { |
| | | when { UE_A sends a subsequent INVITE to UE_B } |
| | | then { IMS_B receives the subsequent INVITE |
| | | containing an additional Via_header |
| | | containing (P-CSCF_port_number 'where it awaits the responses |
| | | to arrive' and |
| | | (P-CSCF-FQDN_address or |
| | | P-CSCF-IP_address)) of IMS_A and |
| | | containing an additional topmost Record-Route_header |
| | | containing (P-CSCF_port_number 'where it awaits subsequent |
| | | requests from the called party' and |
| | | (P-CSCF-FQDN_address or |
| | | P-CSCF-IP_address)) of IMS_A |
| | | and |
| | | UE_B receives INVITE |
| | | } |
| | | } |
| | | TP_IMS_5058_02 in CFW step 29 and 41 (200 Ok): |
| | | ensure that { |
| | | when { UE_B sends a 2xx_response to UE_A } |
| | | then { IMS_A receives 2xx_response |
| | | containing Record-Route_header |
| | | containing the same P-CSCF_port_number of IMS_B 'as in the |
| | | response to the previous initial request' and |
| | | not containing a comp_parameter |
| | | and |
| | | UE_A receives 2xx_response |
| | | } |
| | | } |
| | | TP_IMS_5106_01 in CFW step 24 and 36 (INVITE): |
| | | ensure that { |
| | | when { UE_A sends subsequent INVITE to UE_B } |
| | | then { IMS_B receives the subsequent INVITE |
| | | containing a topmost Record-Route_header |
| | | containing the S-CSCF_SIP_URI of IMS_A and |
| | 1 | containing a P-Charging-Vector_header |
| | | not containing a access-network-charging-info_parameter |
| | | land |
| | | not containing a P-Access-Network-Info_header |
| | 1 | and |
| | | UE_B receives the INVITE } |
| | |]} |
| | | и |

| Step | | Direction | | | Message | Comment | | | |
|--------------|----------|---------------|---------------|---------------|---------|------------|--|--|--|
| | U | | | I | 1 1 | | | | |
| | E | M | N S | | E B | | | | |
| | A | S | В | | 5 | | | | |
| 22 | | \rightarrow | Ĭ | | | INVITE | UE_A sends reINVITE message indicating media | | |
| | | - | | | | <u>-</u> | stream inactive (Call Hold) | | |
| 23 | | ← | | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying | | |
| | | | | | | | provisional response | | |
| 24 | | | \rightarrow | | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B | | |
| | | | | | | | S-CSCF | | |
| 25 | | | \leftarrow | | | 100 Trying | IMS_B S-CSCF responds with a 100 Trying | | |
| 20 | | | | → | | INIVITE | provisional response | | |
| 26 27 | | | | <u>フ</u> | | INVITE | IMS_B P-CSCF forwards INVITE to UE_B UE_B responds with a 100 Trying provisional | | |
| 21 | | | | | | 100 Trying | response | | |
| 28 | | | | ← | | 200 OK | UE_B responds to UPDATE with 200 OK indicating | | |
| 20 | | | | ` | | 200 OK | media stream inactive | | |
| 29 | | | ← | | | 200 OK | IMS_B S-CSCF forwards 200 OK response to | | |
| | | | | | | | IMS_A S-CSCF | | |
| 30 | | \leftarrow | | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to | | |
| | | | | | | | UE_A | | |
| 31 | | \rightarrow | | | | ACK | UE_A acknowledges the receipt of 200 OK for | | |
| | | | _ | | | 101/ | INVITE | | |
| 32 | | | \rightarrow | | | ACK | IMS_A S-CSCF forwards ACK to IMS_B S-CSCF | | |
| 33 | | | | \rightarrow | | ACK | IMS_B P-CSCF forwards ACK to UE_B | | |
| 34 | | \rightarrow | | \dashv | | INVITE | UE_A sends reINVITE message indicating media | | |
| J 54 | | | | | | 1144112 | stream active (Call Resume) | | |
| 35 | | ← | | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying | | |
| | | | | | | | provisional response | | |
| 36 | | | \rightarrow | | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B | | |
| | | | | | | | S-CSCF | | |
| 37 | | | \leftarrow | | | 100 Trying | IMS_B S-CSCF responds with a 100 Trying | | |
| | | | | \downarrow | | | provisional response | | |
| 38 | \vdash | | |) | | INVITE | IMS_B P-CSCF forwards INVITE to UE_B | | |
| 39 | | | | ← | | 100 Trying | UE_B responds with a 100 Trying provisional | | |
| 40 | | | | (| | 200 OK | response UE_B responds to UPDATE with 200 OK indicating | | |
| 40 | | | | ` | | 200 OIX | media stream active | | |
| 41 | | | (| | | 200 OK | IMS_B S-CSCF forwards 200 OK response to | | |
| | | | | | | | IMS_A S-CSCF | | |
| 42 | | ← | | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to | | |
| | | | | | | | UE_A | | |
| 43 | | \rightarrow | | T | | ACK | UE_A acknowledges the receipt of 200 OK for | | |
| | | | Ų | _ | | | INVITE | | |
| 44 | | | \rightarrow | | | ACK | IMS_A S-CSCF forwards ACK to IMS_B | | |
| 45 | + | | | \dashv | | ACK | S-CSCF | | |
| 45 | | | | \rightarrow | | ACK | IMS_B P-CSCF forwards ACK to UE_B | | |

4.4.3.5 Subsequent CANCEL request procedures

| | | Test description | | | |
|----------------|---|--|---|--|--|
| Identifier: | TD_IMS | _0028 | | | |
| Summary: | TD_IMS_0028 Subsequent CANCEL request procedures | | | | |
| Configuration: | CF_MO2-SS1-MT2 | | | | |
| References | Test pur | Specification reference | | | |
| | TP_IMS_ | _5107_04 | TS 124 229 [1] clause 5.4.3.2 paragraph 49 | | |
| | TP_IMS_5107_04 TS 124 229 [1] clause 5.4.3.2 paragraph 49 TP_IMS_5121_02 TS 124 229 [1] clause 5.4.3.3 paragraph 60 | | | | |
| Use case | TP_IMS_5121_02 TS 124 229 [1] clause 5.4.3.3 paragraph 60 UC_01 | | | | |
| reference.: | | | | | |
| Pre-test | Static configuration as per clause 4.3 | | | | |
| conditions: | • U | E_A support 100rel, no SDP prece | onditions | | |
| | • U | E_A have no filter criteria defined | in HSS | | |
| | • U | E_A IP bearers established as per | r clause 4.2.1 | | |
| | • U | E_A registered as per clause 4.2.3 | 3 | | |
| | • U | E_A registered public identities ar | e SIP URIs only | | |
| Test sequence: | Step | | · | | |
| | 1 PR | Initiate an IMS VoIP call on UE_A | A, addressed to UE_B's SIP URI (prior to | | |
| | | CFW step 1) | | | |
| | 2 PR | Verify that UE_B rings (prior to C | | | |
| | 3 PR | Verify that ringback is present at | | | |
| | 4 TB | End call at UE_A (prior to CFW | | | |
| | 5 PO | Verify that call is ended at UE_B | (prior to CFW step 21) | | |
| Pass criteria: | Check | | | | |
| rass criteria. | CHECK | | | | |
| Pass Criteria. | 1 | TP_IMS_5107_04 in CFW step 1 | 8 (CANCEL): | | |
| rass criteria. | 1 | ensure that { | , | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to | UE_B} | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN | O UE_B } | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN (containing a P-Ch | O UE_B } CEL arging-Vector_header | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN (containing a P-Ch not containing a | OUE_B } CEL larging-Vector_header access-network-charging-info_parameter or | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN((containing a P-Ch) not containing a F not containing a F | O UE_B } CEL Parging-Vector_header access-network-charging-info_parameter or -Charging-Vector_header) and | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN((containing a P-Ch) not containing a P-Ch) not containing a P-Ch | OUE_B } CEL larging-Vector_header access-network-charging-info_parameter or | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN(containing a P-Chnot containing a not containing a Potential formula for the containing a Potential formula fo | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN((containing a P-Ch) not containing a P-Ch) not containing a P-Ch | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN(containing a P-Chnot containing a not containing a Polytocontaining a Poly | O UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } | | |
| rass cineria. | 2 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN(containing a P-Chnot containing a not containing a Post and UE_B receives the CANCE } TP_IMS_5121_02 in CFW step 1 | O UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN(containing a P-Chnot containing a not containing a P-not containing a P-no | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } 8 (200 OK): | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN(containing a P-Chnot containing a not containing a Post and UE_B receives the CANCE } TP_IMS_5121_02 in CFW step 1 | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } 8 (200 OK): | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CANC (containing a P-Chenot containing a Post not containing a | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } 8 (200 OK): | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CANC (containing a P-Che not containing a P-Che not CANCE } TP_IMS_5121_02 in CFW step 1 ensure that { when { UE_B sends 2xx_resport then { IMS_A receives the 2xx_receives t | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } 8 (200 OK): Pase to UE_A } Presponse Pataining a P-Charging-Vector_header Paccess-network-charging-info_parameter or | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CANC (containing a P-Che not containing a P-Che not CANCE } TP_IMS_5121_02 in CFW step 1 ensure that { when { UE_B sends 2xx_resport then { IMS_A receives the 2xx_receives the 2xx | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } 8 (200 OK): Pase to UE_A } Presponse Pataining a P-Charging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN(containing a P-Ch not containing a P | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } 8 (200 OK): Pase to UE_A } Presponse Pataining a P-Charging-Vector_header Paccess-network-charging-info_parameter or | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CANC (containing a P-Chenot containing a Post not CANCE } TP_IMS_5121_02 in CFW step 1 ensure that { when { UE_B sends 2xx_resport then { IMS_A receives the 2xx_containing a post containing a Post not containing a | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } 8 (200 OK): Pase to UE_A } Presponse Pataining a P-Charging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header P-Charging-Vector_header P-Charging-Vector_header | | |
| rass cineria. | 1 | ensure that { when { UE_A sends CANCEL to then { IMS_B receives the CAN(containing a P-Ch not containing a P | o UE_B } CEL Parging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header) and P-Access-Network-Info_header L } 8 (200 OK): Pase to UE_A } Presponse Pataining a P-Charging-Vector_header Paccess-network-charging-info_parameter or P-Charging-Vector_header P-Charging-Vector_header P-Charging-Vector_header | | |

| Step | Direction | | | Message | Comment | | |
|------|-------------|------------------|---------------|---------------|-------------|------------------------|---|
| | U E A | I M S A | N S E | 1 I | J E B | _ | |
| 16 | | \rightarrow | | | | CANCEL | UE_A sends CANCEL to abort call |
| 17 | | \downarrow | | | | 200 OK | IMS_A P-CSCF responds with a 200 OK response |
| 18 | | | → | | | CANCEL | IMS_A S-CSCF sends CANCEL to IMS_B S-CSCF |
| 19 | | | ← | | | 200 OK | IMS_B S-CSCF responds with a 200 OK |
| | | | | | | | response |
| 20 | | | | \rightarrow | | CANCEL | IMS_B P-CSCF sends CANCEL to UE_B |
| 21 | | | | \ | | 200 OK | UE_B responds with a 200 OK response |
| 22 | | | | + | | 487 Request Terminated | UE_B confirms cancellation of the INVITE request with a 487 Request Terminated error response |
| 23 | | | | \rightarrow | | ACK | IMS_B P-CSCF responds with an ACK to UE_B |
| 24 | | | ← | | | 487 Request Terminated | IMS_B S-CSCF sends a 487 Request Terminated error response to IMS_A S-CSCF |
| 25 | | | \rightarrow | | | ACK | IMS_A S-CSCF responds with an ACK |
| 26 | | + | | | | 487 Request Terminated | IMS_B P-CSCF sends a 487 Request Terminated error response to UE_A |
| 27 | | \rightarrow | | | | ACK | UE_A responds with an ACK |

4.5 Use cases

All test descriptions are based on an underlying use case, i.e. user interactions with an external IMS entity, which serves as the basis for stimulating the generation of SIP messages at the IMS NNI. Test procedures include the execution of the use case, validation of the call flow and validation of generic headers. Test requirements validate specific messages and headers observed over NNI. These are related to test purposes and underlying specification requirements. Use case descriptions, associated test sequences and call flows referenced by TDs are presented below. Call flow steps corresponding to specific test sequence steps are displayed with shading.

4.5.1 UC_01: User-initiated VoIP call setup and release

4.5.1.1 Description

UE_A places an IMS VoIP call to UE_B. Once the media path is established, the originating user releases the call. We assume support for reliable provisional responses (100rel) and no SDP preconditions. The call flow path and node configuration for this use case corresponds to CF_MO2-SS1-MT2.

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

| 1 | Initiate an IMS VoIP call on UE_A, addressed to UE_B's SIP URI (prior to CFW step 1) |
|---|--|
| 2 | Verify that UE_B rings (prior to CFW step 7) |
| 3 | Verify that ringback is present at UE_A (prior to CFW step 10) |
| 4 | Answer the call at UE_B (prior to CFW step 16) |
| 5 | Verify that voice can be exchanged in both directions (prior to CFW step 22) |
| 6 | Release call at UE_A (prior to CFW step 22) |
| 7 | Verify that call is released at UE_B (prior to CFW step 25) |

4.5.1.2 SIP Call Flow

For a call with reliable provisional responses (100rel) and no SDP preconditions, the expected sequence is:

| Step Direction | 01 | Direction | | | | | | | |
|---|------|-----------|---------------|---------------|---------------|---|---------------|--|--|
| A S A B B 1 → INVITE UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports 2 ← 100 Trying IMS_A P-CSCF responds with a 100 Trying provisional response 3 → INVITE IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF 4 ← 100 Trying IMS_B I-CSCF responds with a 100 Trying provisional response 5 IMS_B I-CSCF forwards INVITE to UE_B IMS_B I-CSCF forwards INVITE to UE_B 6 IMS_B I-CSCF forwards INVITE to UE_B IMS_B I-CSCF forwards INVITE to UE_B 7 IMS_B I-CSCF forwards INVITE to UE_B IMS_B I-CSCF forwards INVITE to UE_B 8 IMS_B INSIGH in INVITE to UE_B IMS_B INSIGH INVITE INVITE TO UE_B 9 IMS_B INSIGH INVITE INVITE INVITE INVITE TO UE_B IMS_B INSIGH INVITE INVITE TO UE_B 10 IMS_B INSIGH INVITE INV | Step | | | | | | Message | Comment | |
| A S B B | | _ | | | _ | | | | |
| A B INVITE UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports INVITE IMS_A P-CSCF responds with a 100 Trying provisional response IMS_A P-CSCF forwards INVITE to IMS_B I-CSCF | | | | | | | | | |
| 1 | | Α | | | | B | | | |
| Indicating all desired medias and codecs that UE_A supports | 1 | | | 45 | , | | INIVITE | I I A sends INIVITE with the first SDD offer | |
| Supports IMS. A P-CSCF responds with a 100 Trying IMS. A P-CSCF responds with a 100 Trying provisional response IMS. A S-CSCF forwards INVITE to IMS_B I-CSCF IMS. B I-CSCF responds with a 100 Trying IMS. B I-CSCF responds with a 100 Trying IMS. B I-CSCF responds with a 100 Trying IMS. B I-CSCF forwards INVITE to UE. B IMS. B P-CSCF forwards INVITE to UE. B UE_B responds with a 100 Trying provisional response IMS. B P-CSCF forwards INVITE to UE. B UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting IMS. B S-CSCF forwards 180 Ringing response to IMS. A S-CSCF forwards 180 Ringing response to IMS. A S-CSCF forwards 180 Ringing response to UE_A UE_A acknowledges the receipt of 180 response by sending PRACK IMS. A S-CSCF forwards PRACK to IMS_B S-CSCF forwards PRACK to IMS_B S-CSCF forwards PRACK to UE_B IMS. A S-CSCF forwards PRACK to UE_B IMS_B S-CSCF forwards 200 OK response to IMS_B S-CSCF forwards ACK to IMS_B S-CSCF forwards BYE to IMS_B S-CSCF forward | | | 7 | | _ | | INVIIE | | |
| 2 | | | | | | | | | |
| 1 | 2 | | 4 | | | | 100 Trying | | |
| 3 | | | ` | | | | 100 Trying | | |
| 4 | 3 | | | <u> </u> | | | INIVITE | | |
| 5 | | | | | | | | | |
| 5 → INVITE IMS_B P-CSCF forwards INVITE to UE_B 6 ← 100 Trying UE_B responds with a 100 Trying provisional response 7 ← 180 Ringing UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting 8 ← 180 Ringing IMS_B S-CSCF forwards 180 Ringing response to IMS_A P-CSCF forwards the 180 Ringing response to UE_A 10 → PRACK UE_A acknowledges the receipt of 180 response by sending PRACK 11 → PRACK IMS_A S-CSCF forwards PRACK to IMS_B S-CSCF 12 → PRACK IMS_B S-CSCF forwards PRACK to UE_B 13 ← 200 OK UE_B responds PRACK with 200 OK 14 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 15 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to UE_A 16 ← 200 OK UE_B responds INVITE with 200 OK to indicate that the call has been answered 17 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 18 ← 200 OK IMS_B S-CSCF forwards ACK to IMS_B S-CSCF | 4 | | | ` | | | 100 Trying | | |
| 6 | 5 | | | | \rightarrow | | INIVITE | IMS_B P-CSCE forwards INIVITE to LIE_B | |
| Tesponse | | | | | | | | IJE B responds with a 100 Trying provisional | |
| For the color of the color o | | | | | ` | | 100 Trying | response | |
| | 7 | | | | 4 | | 180 Ringing | I.E. B responds to initial INIVITE with 180 Ringing to | |
| 8 | , | | | | ` | | 100 Talliging | | |
| MIS_A S-CSCF | 8 | | | _ | | | 180 Ringing | | |
| 9 ← 180 Ringing | | | | ` | | | 100 Kinging | | |
| to UE_A 10 | a | | ← | | | | 180 Ringing | | |
| 10 | | | ` | | | | 100 Kinging | | |
| Sending PRACK IMS_A S-CSCF forwards PRACK to IMS_B S-CSCF | 10 | | \rightarrow | | | | PRACK | | |
| 11 | 10 | | | | | | 110.010 | | |
| S-CSCF 12 | 11 | | | \rightarrow | | | PRACK | IMS A S-CSCE forwards PRACK to IMS B | |
| 12 | '' | | | | | | 110.010 | | |
| 13 | 12 | | | | \rightarrow | | PRACK | | |
| 14 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 15 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to UE_A 16 ← 200 OK UE_B responds INVITE with 200 OK to indicate that the call has been answered 17 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 18 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to UE_A acknowledges the receipt of 200 OK for INVITE 19 → ACK UE_A acknowledges the receipt of 200 OK for INVITE 20 → ACK IMS_A S-CSCF forwards ACK to IMS_B S-CSCF 21 → ACK IMS_B P-CSCF forwards ACK to UE_B 22 → BYE UE_A releases the call with BYE 23 → BYE IMS_A S-CSCF forwards BYE to IMS_B S-CSCF 24 → BYE IMS_B P-CSCF forwards BYE to UE_B 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF forwards the 200 OK response to IMS_A S-CSCF forwards the 200 OK response to IMS_A S-CSCF forwards the 200 OK response to IMS_A S-CSCF forwards | | | | | | | | | |
| IMS_A S-CSCF IMS_A P-CSCF forwards the 200 OK response to UE_A | | | | ← | • | | | | |
| 15 | '' | | | ` | | | 200 010 | | |
| UE_A | 15 | | ← | | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to | |
| 16 | 10 | | | | | | 200 010 | | |
| the call has been answered 17 | 16 | | | | \leftarrow | | 200 OK | | |
| 17 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 18 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to UE_A 19 → ACK UE_A acknowledges the receipt of 200 OK for INVITE 20 → ACK IMS_A S-CSCF forwards ACK to IMS_B S-CSCF 21 → ACK IMS_B P-CSCF forwards ACK to UE_B 22 → BYE UE_A releases the call with BYE 23 → BYE IMS_A S-CSCF forwards BYE to IMS_B S-CSCF 24 → BYE IMS_B P-CSCF forwards BYE to UE_B 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | | | | | = | | | | |
| 18 ← 200 OK IMS_A S-CSCF 19 → ACK UE_A acknowledges the receipt of 200 OK for INVITE 20 → ACK IMS_A S-CSCF forwards ACK to IMS_B S-CSCF 21 → ACK IMS_B P-CSCF forwards ACK to UE_B 22 → BYE UE_A releases the call with BYE 23 → BYE IMS_A S-CSCF forwards BYE to IMS_B S-CSCF 24 → BYE IMS_B P-CSCF forwards BYE to UE_B 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | 17 | | | \leftarrow | | | 200 OK | IMS_B S-CSCF forwards 200 OK response to | |
| 18 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to UE_A 19 → ACK UE_A acknowledges the receipt of 200 OK for INVITE 20 → ACK IMS_A S-CSCF forwards ACK to IMS_B S-CSCF 21 → ACK IMS_B P-CSCF forwards ACK to UE_B 22 → BYE UE_A releases the call with BYE 23 → BYE IMS_A S-CSCF forwards BYE to IMS_B S-CSCF 24 → BYE IMS_B P-CSCF forwards BYE to UE_B 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to IMS_A S-CSCF | | | | | | | · | IMS A S-CSCF | |
| 19 → ACK UE_A acknowledges the receipt of 200 OK for INVITE 20 → ACK IMS_A S-CSCF forwards ACK to IMS_B S-CSCF 21 → ACK IMS_B P-CSCF forwards ACK to UE_B 22 → BYE UE_A releases the call with BYE 23 → BYE IMS_A S-CSCF forwards BYE to IMS_B S-CSCF 24 → BYE IMS_B P-CSCF forwards BYE to UE_B 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | 18 | | - | | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to | |
| 19 → ACK UE_A acknowledges the receipt of 200 OK for INVITE 20 → ACK IMS_A S-CSCF forwards ACK to IMS_B S-CSCF 21 → ACK IMS_B P-CSCF forwards ACK to UE_B 22 → BYE UE_A releases the call with BYE IMS_A S-CSCF forwards BYE to IMS_B S-CSCF 24 → BYE IMS_B P-CSCF forwards BYE to UE_B UE_B sends 200 OK for BYE IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF | | | | | | | | | |
| INVITE | 19 | | \rightarrow | | | | ACK | | |
| 20 | 1 | | | | | | | | |
| S-CSCF | 20 | | | \rightarrow | | | ACK | | |
| 21 → ACK IMS_B P-CSCF forwards ACK to UE_B 22 → BYE UE_A releases the call with BYE 23 → BYE IMS_A S-CSCF forwards BYE to IMS_B 24 → BYE IMS_B P-CSCF forwards BYE to UE_B 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | | | | | | | | | |
| 22 → BYE UE_A releases the call with BYE 23 → BYE IMS_A S-CSCF forwards BYE to IMS_B S-CSCF 24 → BYE IMS_B P-CSCF forwards BYE to UE_B 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | 21 | | | | \rightarrow | | ACK | | |
| 23 → BYE IMS_A S-CSCF forwards BYE to IMS_B S-CSCF 24 → BYE IMS_B P-CSCF forwards BYE to UE_B 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | | | \rightarrow | | | | | | |
| S-CSCF | | | | \rightarrow | | | | | |
| 24 → BYE IMS_B P-CSCF forwards BYE to UE_B 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | | | | | | | | | |
| 25 ← 200 OK UE_B sends 200 OK for BYE 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | 24 | | | | \rightarrow | | BYE | | |
| 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | | | | | | | | | |
| IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | | | | | | | | | |
| 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to | | | | | | | | | |
| | 27 | | - | | | | 200 OK | | |
| | | | | | | | | | |

4.5.2 UC_02: User-initiated call hold and resume

4.5.2.1 Description

UE_A places an IMS VoIP call to UE_B. Once the media path is established, the originating user puts the call on hold, stopping the media stream. The originating user then resumes the call. The call flow path and node configuration for this use case corresponds to CF_MO2-SS1-MT2. We assume reliable provisional responses (100rel) and no SDP preconditions.

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

| 1 | Initiate an IMS VoIP call on UE_A, addressed to UE_B's SIP URI (prior to CFW step 1) |
|----|--|
| 2 | Verify that UE_B rings (prior to CFW step 7) |
| 3 | Verify that ringback is present at UE_A (prior to CFW step 10) |
| 4 | Answer the call at UE_B (prior to CFW step 16) |
| 5 | Verify that voice can be exchanged in both directions (prior to CFW step 22) |
| 6 | Place call on hold at UE_A (prior to CFW step 22) |
| 7 | Verify that voice can no longer be exchanged in both directions (prior to CFW step 25) |
| 8 | Resume call at UE_A (prior to CFW step 28) |
| 9 | Verify that voice can be exchanged in both directions (prior to CFW step 31) |
| 10 | Release call at UE_A (prior to CFW step 34) |
| 11 | Verify that call is released at UE_B (prior to CFW step 37) |
| | |

4.5.2.2 SIP Call Flow with UPDATE

The expected sequence:

| The color of th | Step | Direction | | | on . | Message | Comment |
|---|------|-----------|-----------------|-----------------|-----------------|-------------|--|
| A S S B B NVITE UE A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports NVITE | Ciop | | | | moodago | Commone | |
| A B | | | | | | | |
| 1 | | Α | | | | | |
| Indicating all desired medias and codecs that UE_A Supports | 1 | | | P | | INVITE | IJE A sends INVITE with the first SDP offer |
| Supports | | | | | | | |
| | | | | | | | supports |
| 3 | 2 | | ← | | | 100 Trying | |
| 6 | | | | \downarrow | | INDUITE | |
| Drowisional response Drowisional response Drowisional response Drowing UE_B responds with a 100 Trying provisional response UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting IMS_B S-CSCF forwards 180 Ringing response to IMS_A S-CSCF IMS_A P-CSCF forwards the 180 Ringing response to UE_A UE_A acknowledges the receipt of 180 response by sending PRACK IMS_A S-CSCF forwards PRACK to IMS_B S-CSCF forwards PRACK to IMS_B S-CSCF forwards PRACK to IMS_B S-CSCF forwards PRACK to UE_B UE_B responds to INVITE with 200 OK UE_B responds to INVITE with 200 OK UE_B responds to INVITE with 200 OK response to UE_A UE_B responds to INVITE with 200 OK response to UE_A UE_B responds to INVITE with 200 OK response to UE_B UE_B responds to INVITE with 200 OK response to UE_B UE_B responds to INVITE with 200 OK response to UE_B UE_B responds to INVITE with 200 OK response to UE_B UE_B responds to INVITE with 200 OK response to UE_B UE_B responds to INVITE with 200 OK response to UE_B UE_B responds to INVITE with 200 OK response to UE_B UE_B RESPONSE TO INVITE UE_B RESPONSE TO INVI | | | | | | | |
| 5 | 4 | | | ` | | Too Trying | |
| Tesponse Fesponse Fesponds to initial INVITE with 180 Ringing to indicate that it has started alerting IMS_B_S-CSCF forwards 180 Ringing response to IMS_A_S-CSCF Forwards 180 Ringing response to IMS_A_S-CSCF Forwards 180 Ringing response to IMS_A_S-CSCF Forwards the 180 Ringing response to UE_A_A IMS_A_S-CSCF Forwards the 180 Ringing response to UE_A_A IMS_A_S-CSCF Forwards the 180 Ringing response by sending PRACK IMS_A_S-CSCF Forwards PRACK to IMS_B_S-CSCF IMS_A_S-CSCF Forwards PRACK to IMS_B_S-CSCF IMS_A_S-CSCF Forwards PRACK to UE_B_S-CSCF IMS_A_S-CSCF Forwards 200 OK IMS_B_S-CSCF Forwards 200 OK response to IMS_A_S-CSCF IMS | 5 | | | 1 | > | INVITE | IMS_B P-CSCF forwards INVITE to UE_B |
| Forward For | 6 | | | • | + | 100 Trying | |
| | _ | | | | | | response |
| 8 | / | | | | ← | 180 Ringing | |
| IMS_A S-CSCF IMS_A P-CSCF forwards the 180 Ringing response to UE_A | 8 | | — | _ | | 180 Ringing | IMS_R S-CSCF forwards 180 Ringing response to |
| 9 | | | | 1 | | | |
| 10 | 9 | 1 | + | 1 | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response |
| Sending PRACK IMS_A S-CSCF forwards PRACK to IMS_B S-CSCF | | | | | | | |
| 11 | 10 | | $ \rightarrow $ | | | PRACK | |
| S-CSCF IMS_B P-CSCF forwards PRACK to UE_B | 11 | | - | <u> </u> | | DBVCK | |
| 12 | '' | | | | | ITACK | |
| 14 | 12 | | | 1 |) | PRACK | |
| IMS_A S-CSCF IMS_A P-CSCF forwards the 200 OK response to UE_A | | | | _ | + | | |
| 15 | 14 | | ◆ | \leftarrow | | 200 OK | |
| UE_A | 45 | | | _ | | 222 014 | |
| 16 | 15 | | | | | 200 OK | |
| that the call has been answered 17 | 16 | | | - | ← | 200 OK | |
| IMS_A S-CSCF IMS_A P-CSCF forwards the 200 OK response to UE_A 19 → ACK UE_A acknowledges the receipt of 200 OK for INVITE 20 → ACK IMS_B S-CSCF forwards ACK to IMS_B S-CSCF 21 → ACK IMS_B P-CSCF forwards ACK to UE_B 22 → UPDATE UE_A sends UPDATE message indicating media stream inactive (Call Hold) 23 → UPDATE IMS_B P-CSCF forwards UPDATE to UE_B 24 → UPDATE IMS_B P-CSCF forwards UPDATE to UE_B 25 ← 200 OK UE_B responds to UPDATE with 200 OK indicating media stream inactive 26 ← 200 OK IMS_B S-CSCF 27 ← 200 OK IMS_B S-CSCF forwards UPDATE to UE_B IMS_A S-CSCF 28 → UPDATE UE_A sends UPDATE message indicating media stream active (Call Resume) 18 S-CSCF forwards UPDATE to UE_B IMS_B S-CSCF forwards UPDATE to UE_A sends UPDATE to UE_A sends UPDATE to UE_B IMS_A S-CSCF forwards UPDATE to UE_B IMS_A S-CSCF forwards UPDATE to UE_B IMS_A S-CSCF forwards UPDATE to IMS_B S-CSCF forwards UPDATE to UE_B IMS_A S-CSCF forwards UPDATE to UE_B IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active IMS_B S-CSCF forwards UPDATE with 200 OK IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active IMS_B S-CSCF forwards 200 OK response to IMS_B S-CSCF forward | | | | | | | that the call has been answered |
| 18 | 17 | | • | - | | 200 OK | |
| UE_A 19 → ACK UE_A acknowledges the receipt of 200 OK for INVITE 20 → ACK IMS_A S-CSCF forwards ACK to IMS_B S-CSCF 21 → ACK IMS_B P-CSCF forwards ACK to UE_B 22 → UPDATE UE_A sends UPDATE message indicating media stream inactive (Call Resume) 23 → UPDATE UPDATE UBS_B P-CSCF forwards UPDATE to IMS_B S-CSCF 24 → UPDATE IMS_B P-CSCF forwards UPDATE to UE_B 25 ← 200 OK UBS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to UBS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to UBS_A S-CSCF 28 → UPDATE UBS_A S-CSCF forwards UPDATE message indicating media stream active (Call Resume) UBS_A S-CSCF forwards UPDATE to IMS_B S-CSCF forwards UPDATE to UE_B 1MS_B P-CSCF forwards UPDATE to UE_B 1MS_B P-CSCF forwards UPDATE with 200 OK indicating media stream active (Call Resume) 1MS_B P-CSCF forwards UPDATE to UE_B 1MS_B P-CSCF forwards UPDATE with 200 OK indicating media stream active 1MS_B P-CSCF forwards 200 OK response to 1MS_B S-CSCF forwards 200 OK response to | 10 | | _ | _ | | 200 OK | IMS_A S-CSCF |
| 19 | 10 | | | | | 200 OK | |
| INVITE IMS_A S-CSCF forwards ACK to IMS_B S-CSCF S-CSCF IMS_B P-CSCF forwards ACK to UE_B UE_A sends UPDATE message indicating media stream inactive (Call Hold) IMS_A S-CSCF S-CSCF IMS_B P-CSCF forwards UPDATE to IMS_B S-CSCF IMS_B P-CSCF forwards UPDATE to UE_B IMS_B P-CSCF forwards UPDATE to UE_B UE_B responds to UPDATE with 200 OK indicating media stream inactive IMS_B S-CSCF IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF IMS_A S-CSCF forwards the 200 OK response to UE_A IMS_B S-CSCF forwards the 200 OK response to UE_A IMS_A S-CSCF forwards UPDATE message indicating media stream active (Call Resume) IMS_A S-CSCF forwards UPDATE to IMS_B S-CSCF IMS_A S-CSCF forwards UPDATE to IMS_B S-CSCF IMS_B S-CSCF forwards UPDATE to UE_B IMS_B S-CSCF forwards UPDATE to UE_B IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active UPDATE IMS_B S-CSCF forwards UPDATE to UE_B IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active IMS_B S-CSCF forwards UPDATE with 200 OK indicating media stream active IMS_B S-CSCF forwards 200 OK response to IMS_B S-CSCF forwards 200 OK res | 19 | | \rightarrow | | | ACK | |
| S-CSCF 21 | | | | | | | INVITE |
| 21 | 20 | | - |) | | ACK | |
| UPDATE UE_A sends UPDATE message indicating media stream inactive (Call Hold) | 21 | | | _ | | ACK | |
| stream inactive (Call Hold) 23 | | | \rightarrow | | 7 | | |
| 23 | | | | | | J. 5/112 | |
| 24 → UPDATE IMS_B P-CSCF forwards UPDATE to UE_B 25 ← 200 OK UE_B responds to UPDATE with 200 OK indicating media stream inactive 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to UE_A 28 → UPDATE UE_A sends UPDATE message indicating media stream active (Call Resume) 29 → UPDATE IMS_A S-CSCF forwards UPDATE to IMS_B S-CSCF 30 → UPDATE IMS_B P-CSCF forwards UPDATE to UE_B 31 ← 200 OK UE_B responds to UPDATE with 200 OK indicating media stream active 32 ← 200 OK IMS_B S-CSCF forwards 200 OK response to | 23 | | - | → | | UPDATE | IMS_A S-CSCF forwards UPDATE to IMS_B |
| 25 | | | | _ | | LUDDATE | |
| media stream inactive 26 ← 200 OK | | <u> </u> | | | | | |
| 26 ← 200 OK IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF 27 ← 200 OK IMS_A P-CSCF forwards the 200 OK response to UE_A 28 → UPDATE UE_A sends UPDATE message indicating media stream active (Call Resume) 29 → UPDATE IMS_A S-CSCF forwards UPDATE to IMS_B S-CSCF 30 → UPDATE IMS_B P-CSCF forwards UPDATE to UE_B 31 ← 200 OK UE_B responds to UPDATE with 200 OK indicating media stream active 32 ← 200 OK IMS_B S-CSCF forwards 200 OK response to | 25 | | | | | ZUU UK | |
| IMS_A S-CSCF 27 | 26 | 1 | | ┵ | + | 200 OK | |
| UE_A 28 → UPDATE UE_A sends UPDATE message indicating media stream active (Call Resume) 1MS_A S-CSCF forwards UPDATE to IMS_B S-CSCF 30 → UPDATE IMS_B P-CSCF forwards UPDATE to UE_B 31 ← 200 OK UE_B responds to UPDATE with 200 OK indicating media stream active 32 ← 200 OK IMS_B S-CSCF forwards 200 OK response to | | | | | | | IMS_A S-CSCF |
| 28 → UPDATE UE_A sends UPDATE message indicating media stream active (Call Resume) UPDATE IMS_A S-CSCF forwards UPDATE to IMS_B S-CSCF 30 → UPDATE IMS_B P-CSCF forwards UPDATE to UE_B IMS_B P-CSCF forwards UPDATE with 200 OK indicating media stream active 32 ← 200 OK IMS_B S-CSCF forwards 200 OK response to | 27 | | \leftarrow | | | 200 OK | |
| Stream active (Call Resume) 29 | 00 | | | - | | LIDDATE | |
| 29 | 28 | | 7 | | | UPDATE | |
| S-CSCF 30 → UPDATE IMS_B P-CSCF forwards UPDATE to UE_B 31 ← 200 OK UE_B responds to UPDATE with 200 OK indicating media stream active 32 ← 200 OK IMS_B S-CSCF forwards 200 OK response to | 29 | | | > | | UPDATE | |
| 31 | | 1 | | | | | |
| media stream active 32 ← 200 OK IMS_B S-CSCF forwards 200 OK response to | | | | _ | | | |
| 32 ← 200 OK IMS_B S-CSCF forwards 200 OK response to | 31 | | | • | + | 200 OK | |
| | 32 | | - | \leftarrow | | 200 OK | |
| | | | | | | | |

| Step | Direction | | on | Message | Comment | |
|------|-----------|--------------|---------------|--------------|---------|--|
| 33 | | \leftarrow | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to |
| | | | | | | UE_A |
| 34 | | \uparrow | | | BYE | UE_A releases the call with BYE |
| 35 | | | \rightarrow | | BYE | IMS_A S-CSCF forwards BYE to IMS_B |
| | | | | | | S-CSCF |
| 36 | | | | | BYE | IMS_B P-CSCF forwards BYE to UE_B |
| 37 | | | | \leftarrow | 200 OK | UE_B sends 200 OK for BYE |
| 38 | | | ← | | 200 OK | IMS_B S-CSCF forwards 200 OK response to |
| | | | | | | IMS_A S-CSCF |
| 39 | | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to |
| | | | | | | UE_A |

4.5.2.3 SIP Call Flow with reINVITE

The expected sequence:

| Step | Direction | | | ion Message | | Comment |
|----------|---------------|--|--------------|--------------|------------------|--|
| Cicp | U | | | U | ooduge | - Common |
| | E | | M | | | |
| | Α | S | S B | | | |
| 1 | | <u> </u> | H | | INVITE | UE A sends INVITE with the first SDP offer |
| | | | | | | indicating all desired medias and codecs that UE_A |
| | | | | | | supports |
| 2 | | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying |
| | | | | | | provisional response |
| 3 | | | → | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF |
| 4 | | • | (| | 100 Trying | IMS_B I-CSCF responds with a 100 Trying |
| | | | | | | provisional response |
| 5 | | | |) | INVITE | IMS_B P-CSCF forwards INVITE to UE_B |
| 6 | | | | + | 100 Trying | UE_B responds with a 100 Trying provisional |
| 7 | | | | (| 180 Ringing | response UE_B responds to initial INVITE with 180 Ringing to |
| ′ | | | • | ` | Too Kinging | indicate that it has started alerting |
| 8 | | - | - | | 180 Ringing | IMS_B S-CSCF forwards 180 Ringing response to |
| | | | ` | | | IMS_A S-CSCF |
| 9 | | ← | | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response |
| | | | | | | to UE_A |
| 10 | | \rightarrow | | | PRACK | UE_A acknowledges the receipt of 180 response by |
| | | | | | | sending PRACK |
| 11 | | - | > | | PRACK | IMS_A S-CSCF forwards PRACK to IMS_B |
| 4.0 | | | _ | | DD 4 OV | S-CSCF |
| 12 | | | |) | PRACK | IMS_B P-CSCF forwards PRACK to UE_B |
| 13 14 | | ٠, | <u>- </u> | (| 200 OK 200 OK | UE_B responds to PRACK with 200 OK |
| 14 | | 1 | _ | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 15 | | ← | - | - | 200 OK | IMS_A P-CSCF forwards the 200 OK response to |
| 10 | | ` | | | 200 010 | UE_A |
| 16 | | | • | (| 200 OK | UE_B responds to INVITE with 200 OK to indicate |
| | | | | | | that the call has been answered |
| 17 | | • | (| | 200 OK | IMS_B S-CSCF forwards 200 OK response to |
| | | | | | | IMS_A S-CSCF |
| 18 | | ← | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to |
| 4.0 | $\vdash \mid$ | \downarrow | | - | 1000 | UE_A |
| 19 | | \rightarrow | | | ACK | UE_A acknowledges the receipt of 200 OK for INVITE |
| 20 | \vdash | + |) | - | ACK | INVITE IMS_A S-CSCF forwards ACK to IMS_B |
| 20 | | | 7 | | ACK | S-CSCF forwards ACK to IMS_B |
| 21 | \vdash | + | + |) | ACK | IMS_B P-CSCF forwards ACK to UE_B |
| 22 | | → | | | INVITE | UE_A sends reINVITE message indicating media |
| | | | | | | stream inactive (Call Hold) |
| 23 | | - | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying |
| | | | | | | provisional response |

| Step | Direction | | on | Message | Comment |
|------|---------------|---------------|---------------|------------|--|
| 24 | | \rightarrow | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B S-CSCF |
| 25 | | ← | | 100 Trying | IMS_B S-CSCF responds with a 100 Trying |
| | | | | | provisional response |
| 26 | | | \rightarrow | INVITE | IMS_B P-CSCF forwards INVITE to UE_B |
| 27 | | | + | 100 Trying | UE_B responds with a 100 Trying provisional response |
| 28 | | | + | 200 OK | UE_B responds to UPDATE with 200 OK indicating media stream inactive |
| 29 | | + | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 30 | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |
| 31 | \rightarrow | | | ACK | UE_A acknowledges the receipt of 200 OK for INVITE |
| 32 | | \rightarrow | | ACK | IMS_A S-CSCF forwards ACK to IMS_B S-CSCF |
| 33 | | | \rightarrow | ACK | IMS_B P-CSCF forwards ACK to UE_B |
| 34 | \rightarrow | | | INVITE | UE_A sends reINVITE message indicating media stream active (Call Resume) |
| 35 | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying provisional response |
| 36 | | \rightarrow | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B S-CSCF |
| 37 | | + | | 100 Trying | IMS_B S-CSCF responds with a 100 Trying provisional response |
| 38 | | | \rightarrow | INVITE | IMS_B P-CSCF forwards INVITE to UE_B |
| 39 | | | + | 100 Trying | UE_B responds with a 100 Trying provisional response |
| 40 | | | + | 200 OK | UE_B responds to UPDATE with 200 OK indicating media stream active |
| 41 | | + | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 42 | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |
| 43 | \rightarrow | | | ACK | UE_A acknowledges the receipt of 200 OK for INVITE |
| 44 | | \rightarrow | | ACK | IMS_A S-CSCF forwards ACK to IMS_B S-CSCF |
| 45 | | | \rightarrow | ACK | IMS_B P-CSCF forwards ACK to UE_B |
| 46 | \rightarrow | | | BYE | UE_A releases the call with BYE |
| 47 | | \rightarrow | | BYE | IMS_A S-CSCF forwards BYE to IMS_B S-CSCF |
| 48 | | | \rightarrow | BYE | IMS_B P-CSCF forwards BYE to UE_B |
| 49 | | | ← | 200 OK | UE_B sends 200 OK for BYE |
| 50 | | + | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 51 | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |

4.5.3 UC_03: S-CSCF initiated session release

4.5.3.1 Description

UE_A places an IMS VoIP call to UE_B. Once the media path is established, the session is released by the originating network through a forced user de-registration at the HSS in IMS_A. The call flow path and node configuration for this use case corresponds to CF_MO2-SS1-MT2. We assume provisional responses (100rel) and no SDP preconditions.

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

| 1 | Initiate an IMS VoIP call on UE_A, addressed to UE_B's SIP URI (prior to CFW step 1) |
|---|--|
| 2 | Verify that UE_B rings (prior to CFW step 7) |
| 3 | Verify that ringback is present at UE_A (prior to CFW step 10) |
| 4 | Answer the call at UE_B (prior to CFW step 16) |
| 5 | Verify that voice can be exchanged in both directions (prior to CFW step 22) |
| 6 | Forced de-registration by IMS_A (prior to CFW step 22) |
| 7 | Verify that call is released at UE_B (prior to CFW step 24) |

4.5.3.2 Call Flow

4.5.3.2.1 Session release from originating network

| Step | Direction | | on | Message | Comment | |
|------|-------------|------------------|---------------|---------------|-------------|--|
| | U E A | I M S A | | В | | |
| 1 | | \rightarrow | | | INVITE | UE_A sends INVITE with the first SDP offer indicating all desired medias and codecs that UE_A supports |
| 2 | | ← | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying provisional response |
| 3 | | | \rightarrow | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF |
| 4 | | | + | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying provisional response |
| 5 | | | | \rightarrow | INVITE | IMS_B P-CSCF forwards INVITE to UE_B |
| 6 | | | | + | 100 Trying | UE_B responds with a 100 Trying provisional response |
| 7 | | | | + | 180 Ringing | UE_B responds to initial INVITE with 180 Ringing to indicate that it has started alerting |
| 8 | | | + | | 180 Ringing | IMS_B S-CSCF forwards 180 Ringing response to IMS_A S-CSCF |
| 9 | | + | | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response to UE_A |
| 10 | | \rightarrow | | | PRACK | UE_A acknowledges the receipt of 180 response by sending PRACK |
| 11 | | | \rightarrow | | PRACK | IMS_A S-CSCF forwards PRACK to IMS_B S-CSCF |
| 12 | | | | \rightarrow | PRACK | IMS_B P-CSCF forwards PRACK to UE_B |
| 13 | | | | \leftarrow | 200 OK | UE_B responds PRACK with 200 OK |
| 14 | | | + | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 15 | | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |
| 16 | | | | + | 200 OK | UE_B responds INVITE with 200 OK to indicate that the call has been answered |
| 17 | | | + | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |
| 18 | | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A |
| 19 | | \rightarrow | | | ACK | UE_A acknowledges the receipt of 200 OK for INVITE |
| 20 | | | → | | ACK | IMS_A S-CSCF forwards ACK to IMS_B S-CSCF |
| 21 | 1 | | | \rightarrow | ACK | IMS_B P-CSCF forwards ACK to UE_B |
| 22 | | | \rightarrow | | BYE | IMS_A S-CSCF releases the call towards the called user with BYE |
| 23 | | | | \rightarrow | BYE | IMS_B P-CSCF forwards BYE to UE_B |
| 24 | | | | / | 200 OK | UE_B sends 200 OK for BYE |
| 25 | | | ← | | 200 OK | IMS_B S-CSCF forwards 200 OK response to IMS_A S-CSCF |

| Step | Direction | | n | Message | Comment | |
|------|-----------|---------------|---|---------|---------|--|
| | U | I | ı | U | | |
| | E | | М | E | | |
| | Α | S | S | В | | |
| | | Α | В | | | |
| 26 | | \leftarrow | | | BYE | IMS_A S-CSCF releases the call towards the calling |
| | | | | | | user with BYE |
| 27 | | \rightarrow | | | 200 OK | UE A sends 200 OK for BYE |

4.5.3.2.2 Session release from terminating network

| Step | [| Direction | | | Message | Comment | |
|------|----------|---------------|-----------------|---------------|------------|---|--|
| | U | | | I U | | | |
| | E | M S | N S | | E B | | |
| | A | A | В | | D | | |
| 1 | | \rightarrow | آ | | | INVITE | UE_A sends INVITE with the first SDP offer |
| - | | | | | | | indicating all desired medias and codecs that UE_A |
| | | | | | | | supports |
| 2 | | ← | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying | |
| | | | | | | | provisional response |
| 3 | | |) | | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF |
| 4 | | | ← | | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying |
| 5 | | | | → | | INVITE | provisional response IMS B P-CSCF forwards INVITE to UE B |
| 6 | | - | | フ ← | | 100 Trying | UE_B responds with a 100 Trying provisional |
| 0 | | | | ` | | Too Trying | response |
| 7 | | | | (| | 180 Ringing | UE_B responds to initial INVITE with 180 Ringing to |
| • | | | | | | 100 1 111 191 19 | indicate that it has started alerting |
| 8 | | — - | \leftarrow | | | 180 Ringing | IMS_B S-CSCF forwards 180 Ringing response to |
| | | | | | | 3 3 | IMS_A S-CSCF |
| 9 | | + | | | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response |
| | | | | | | | to UE_A |
| 10 | | → | | | | PRACK | UE_A acknowledges the receipt of 180 response by |
| | | | Ų | | | 77.401/ | sending PRACK |
| 11 | | | > | | | PRACK | IMS_A S-CSCF forwards PRACK to IMS_B |
| 12 | | | | → | | PRACK | S-CSCF IMS_B P-CSCF forwards PRACK to UE_B |
| 13 | | | | <i>→</i> | | 200 OK | UE_B responds PRACK with 200 OK |
| 14 | | - | ← | ` | | 200 OK | IMS_B S-CSCF forwards 200 OK response to |
| '- | | | ` | | | 200 OK | IMS_A S-CSCF |
| 15 | | + | | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to |
| | | | | | | | UE_A |
| 16 | | | | ← | | 200 OK | UE_B responds INVITE with 200 OK to indicate that |
| | | | | | | | the call has been answered |
| 17 | | ŀ | \leftarrow | | | 200 OK | IMS_B S-CSCF forwards 200 OK response to |
| | | | | | | | IMS_A S-CSCF |
| 18 | | + | | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to |
| 10 | | \rightarrow | | | | A C I/ | UE_A |
| 19 | | 7 | | | | ACK | UE_A acknowledges the receipt of 200 OK for INVITE |
| 20 | \vdash | ۲. | → | | | ACK | IMS_A S-CSCF forwards ACK to IMS_B |
| | | | | | | 7.01 | S-CSCF |
| 21 | | | | \rightarrow | | ACK | IMS_B P-CSCF forwards ACK to UE_B |
| 22 | | | (| | | BYE | IMS_B S-CSCF releases the call towards the calling |
| | | | | | | | user with BYE |
| 23 | | + | | | | BYE | IMS_A P-CSCF forwards BYE to UE_B |
| 24 | | \rightarrow | | | | 200 OK | UE_A sends 200 OK for BYE |
| 25 | | | \rightarrow | | | 200 OK | IMS_A S-CSCF forwards 200 OK response to |
| | | | | Ų | | DVE | IMS_B S-CSCF |
| 26 | | | | \rightarrow | | BYE | IMS_B S-CSCF releases the call towards the called |
| 07 | \vdash | | | , | | 200 01/ | user with BYE |
| 27 | | | | \leftarrow | | 200 OK | UE_B sends 200 OK for BYE |

4.5.4 UC_04: P-CSCF initiated session release

4.5.4.1 Description

An internal message reports to the P-CSCF the loss of resource (e.g. radio resources). If a dialog initiation is started, but not yet established, then the P-CSCF will CANCEL the requests. If a UE_A Originated dialog is established then the call will be released by the P-CSCF (in IMS_A). If a UE_B Originated dialog is established then the call will be released by the P-CSCF (in IMS_A). The call flow path and node configuration for this use case corresponds to CF_MO2-SS1-MT2.

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):

| 1 | Initiate an IMS VoIP call on UE_A, addressed to UE_B's SIP URI (prior to CFW step 1) |
|---|--|
| 2 | Verify that UE_B rings (prior to CFW step 7) |
| 3 | Verify that ringback is present at UE_A (prior to CFW step 10) |
| 4 | Remove cable, antenna or battery from UE_A (prior to CFW step 16/22) |
| 5 | Verify that the call is terminated at UE_B (prior to CFW step 20/25) |

4.5.4.2 Call flow

4.5.4.2.1 Session establishment cancelled

| Step | [| Dire | ctic | n | Message | Comment | |
|------|-----------------|---------------|---------------|-----------------|------------------------|--|--|
| | 1 - 1 - 1 - 1 - | | U | | | | |
| | E | M | M | | | | |
| | A | S | S B | | | | |
| 1 | | \rightarrow | Ī | | INVITE | UE_A sends INVITE with the first SDP offer | |
| | | | | | | indicating all desired medias and codecs that UE_A | |
| | | | | | | supports | |
| 2 | | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying | |
| | | | | | | provisional response | |
| 3 | | |) | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF | |
| 4 | | | ← | | 100 Trying | IMS_B I-CSCF responds with a 100 Trying | |
| | | | | | IND. (ITE | provisional response | |
| 5 | | | | → | INVITE | IMS_B P-CSCF forwards INVITE to UE_B | |
| 6 | | | 1 | _ | 100 Trying | UE_B responds with a 100 Trying provisional | |
| 7 | | | _ | (| 180 Ringing | response UE_B responds to initial INVITE with 180 Ringing to | |
| ′ | | | | | | indicate that it has started alerting | |
| 8 | | ٠, | \leftarrow | | 180 Ringing | IMS_B S-CSCF forwards 180 Ringing response to | |
| | | | ` | | Too Kinging | IMS_A S-CSCF | |
| 9 | | ← | | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response | |
| | | | | | | to UE_A | |
| 10 | | \rightarrow | | | PRACK | UE_A acknowledges the receipt of 180 response by | |
| | | | | | | sending PRACK | |
| 11 | | - | \rightarrow | | PRACK | IMS_A S-CSCF forwards PRACK to IMS_B | |
| | | | | | | S-CSCF | |
| 12 | | | |) | PRACK | IMS_B P-CSCF forwards PRACK to UE_B | |
| 13 | | | | - | 200 OK | UE_B responds PRACK with 200 OK | |
| 14 | | • | ← | | 200 OK | IMS_B S-CSCF forwards 200 OK response to | |
| 45 | | ← | | | 000 01/ | IMS_A S-CSCF | |
| 15 | | 7 | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to UE_A | |
| 16 | | | | | LOSS | Internal a message that resources for UE_A are not | |
| 10 | | | | | | available | |
| 17 | | - |) | | CANCEL | IMS A sends CANCEL to IMS B | |
| 18 | | | É | | 200 OK | IMS_B S-CSCF responds with a 200 OK | |
| 19 | | | | > | CANCEL | IMS_B sends CANCEL to UE_B | |
| 20 | | | | - | 200 OK | UE_B responds with 200 OK | |
| 21 | | | | - | 437 Request Terminated | UE_B S-CSCF sends 437 Request Terminated to | |
| | | | | | · | IMS_B | |
| 22 | | | |) | ACK | IMS_B responds with ACK | |
| 23 | | | \leftarrow | | 437 Request Terminated | IMS_B sends 437 Request Terminated to IMS_A | |
| 24 | | |) | | ACK | IMS_A responds with ACK | |

4.5.4.2.2 Session release from originating network

| Step | Direction | | | on | Message | Comment |
|------|-----------|---------------|---------------|--------------|-------------|---|
| | UI | | U | | | |
| | E | M | | | | |
| | A | S | S B | | | |
| 1 | | \rightarrow | J | | INVITE | UE_A sends INVITE with the first SDP offer |
| | | - | | | <u>-</u> | indicating all desired medias and codecs that UE_A |
| | | | | | | supports |
| 2 | | ← | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying |
| | | | | | | provisional response |
| 3 | | | \rightarrow | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF |
| 4 | | | (| | 100 Trying | IMS_B I-CSCF responds with a 100 Trying |
| 5 | | | | → | INVITE | provisional response IMS_B P-CSCF forwards INVITE to UE_B |
| 6 | | | | \leftarrow | 100 Trying | UE_B responds with a 100 Trying provisional |
| " | | | | ` | Too Trying | response |
| 7 | | | <u> </u> | \leftarrow | 180 Ringing | UE_B responds to initial INVITE with 180 Ringing to |
| | | | | | 100 1 km g | indicate that it has started alerting |
| 8 | | | \leftarrow | | 180 Ringing | IMS_B S-CSCF forwards 180 Ringing response to |
| | | | | | | IMS_A S-CSCF |
| 9 | | \leftarrow | | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response |
| | | | | | | to UE_A |
| 10 | | \rightarrow | | | PRACK | UE_A acknowledges the receipt of 180 response by |
| 11 | | | \rightarrow | | PRACK | sending PRACK IMS_A S-CSCF forwards PRACK to IMS_B |
| '' | | | 7 | | PRACK | S-CSCF forwards PRACK to IMS_B |
| 12 | | | | → | PRACK | IMS_B P-CSCF forwards PRACK to UE_B |
| 13 | | | | \leftarrow | 200 OK | UE_B responds PRACK with 200 OK |
| 14 | | | ← | | 200 OK | IMS_B S-CSCF forwards 200 OK response to |
| | | | | | | IMS_A S-CSCF |
| 15 | | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to |
| | | | | _ | | UE_A |
| 16 | | | ľ | ← | 200 OK | UE_B responds INVITE with 200 OK to indicate that |
| 17 | | | - | | 200 OK | the call has been answered IMS_B S-CSCF forwards 200 OK response to |
| '' | | | | | 200 OK | IMS_A S-CSCF forwards 200 OK response to |
| 18 | | ← | <u></u> | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to |
| '0 | | ` | | | 200 011 | UE_A |
| 19 | | \rightarrow | | | ACK | UE_A acknowledges the receipt of 200 OK for |
| | | | | | | INVITE |
| 20 | | | \rightarrow | | ACK | IMS_A S-CSCF forwards ACK to IMS_B |
| | | | _ | | | S-CSCF |
| 21 | | | _ | → | ACK | IMS_B P-CSCF forwards ACK to UE_B |
| 22 | | | | | LOSS | PDF or SPDF sends a message that resources are |
| 23 | | | \rightarrow | | BYE | missing for UE_A IMS_A P-CSCF sends BYE to IMS_B |
| 23 | | | 7 | | DIE | S-CSCF |
| 24 | H | | | → | BYE | IMS_B P-CSCF forwards BYE to UE_B |
| 25 | | | | É | 200 OK | UE_B sends 200 OK for BYE |
| 26 | | | \leftarrow | | 200 OK | IMS_B forwards 200 OK response to IMS_A |

4.5.4.2.3 Session release from terminating network

| Step | Direction | | | on | Message | Comment | | |
|------|-----------|---------------|---------------|--------------|------------------|---|--|--|
| | UI | | | | . <u>I</u> U | | | |
| | E | M | M | | | | | |
| | A | S | S B | | | | | |
| 1 | | \rightarrow | J | | INVITE | UE_A sends INVITE with the first SDP offer | | |
| • | | = | | | <u>-</u> | indicating all desired medias and codecs that UE_A | | |
| | | | | | | supports | | |
| 2 | | + | | | 100 Trying | IMS_A P-CSCF responds with a 100 Trying | | |
| | | | | | | provisional response | | |
| 3 | | | \rightarrow | | INVITE | IMS_A S-CSCF forwards INVITE to IMS_B I-CSCF | | |
| 4 | | | (| | 100 Trying | IMS_B I-CSCF responds with a 100 Trying | | |
| 5 | | | | → | INVITE | provisional response IMS_B P-CSCF forwards INVITE to UE_B | | |
| 6 | | | | \leftarrow | 100 Trying | UE_B responds with a 100 Trying provisional | | |
| U | | | | ` | Too Trying | response | | |
| 7 | | | <u> </u> | \leftarrow | 180 Ringing | UE_B responds to initial INVITE with 180 Ringing to | | |
| | | | | | | indicate that it has started alerting | | |
| 8 | | | \leftarrow | | 180 Ringing | IMS_B S-CSCF forwards 180 Ringing response to | | |
| | | | | | | IMS_A S-CSCF | | |
| 9 | | \leftarrow | | | 180 Ringing | IMS_A P-CSCF forwards the 180 Ringing response | | |
| | | | | | | to UE_A | | |
| 10 | | \rightarrow | | | PRACK | UE_A acknowledges the receipt of 180 response by | | |
| 11 | | | \rightarrow | | PRACK | sending PRACK IMS_A S-CSCF forwards PRACK to IMS_B | | |
| 11 | | | 7 | | PRACK | S-CSCF forwards PRACK to fivis_b | | |
| 12 | | | | → | PRACK | IMS_B P-CSCF forwards PRACK to UE_B | | |
| 13 | | | | \leftarrow | 200 OK | UE_B responds PRACK with 200 OK | | |
| 14 | | | ← | | 200 OK | IMS_B S-CSCF forwards 200 OK response to | | |
| | | | | | | IMS_A S-CSCF | | |
| 15 | | + | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to | | |
| | | | | _ | | UE_A | | |
| 16 | | | ľ | ← | 200 OK | UE_B responds INVITE with 200 OK to indicate that | | |
| 17 | | | ← | | 200 OK | the call has been answered IMS_B S-CSCF forwards 200 OK response to | | |
| 17 | | | | | 200 OK | IMS_A S-CSCF forwards 200 OK response to | | |
| 18 | | - | | | 200 OK | IMS_A P-CSCF forwards the 200 OK response to | | |
| .0 | | | | | 200 011 | UE_A | | |
| 19 | | \rightarrow | | | ACK | UE_A acknowledges the receipt of 200 OK for | | |
| | | | | | | INVITE | | |
| 20 | | | \rightarrow | | ACK | IMS_A S-CSCF forwards ACK to IMS_B | | |
| 0.4 | \vdash | | | + | 1014 | S-CSCF | | |
| 21 | | | ŀ |) | ACK | IMS_B P-CSCF forwards ACK to UE_B | | |
| 22 | | | | | LOSS | PDF or SPDF(in IMS_B) sends a message that resources are missing for UE_B | | |
| 23 | | | \leftarrow | | BYE | IMS_A P-CSCF sends BYE to IMS_B | | |
| 20 | | | ` | | | S-CSCF | | |
| 24 | | - | \dashv | | BYE | IMS_B P-CSCF forwards BYE to UE_B | | |
| 25 | | \rightarrow | | | 200 OK | UE_B sends 200 OK for BYE | | |
| 26 | | | \rightarrow | | 200 OK | IMS_B forwards 200 OK response to IMS_A | | |

4.5.5 UC_05: IMS message exchange between UEs in different networks

4.5.5.1 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):

| 1 | UE_A is requested to send a MESSAGE to UE_B (prior to CFW step 1) |
|---|---|
| 2 | Verify that UE_B gets the MESSAGE (prior to CFW step 4) |

4.5.5.2 Call flow

| Step | Direction | | | n | Message | Comment |
|------|-----------|---------------|-----------------|-------------|---------|------------------------------|
| | U | I | I | U | | |
| | E | | M | E | | |
| | Α | S | S B | В | | |
| 1 | | \rightarrow | Ť | | MESSAGE | UE_A sends MESSAGE to IMS_A |
| 2 | | - | > | | MESSAGE | IMS_A sends MESSAGE to IMS_B |
| 3 | | | 1 | > | MESSAGE | IMS_A sends MESSAGE to UE_B |
| 4 | | | + | - | 200 OK | UE_B sends 200 OK to IMS_B |
| 5 | | • | 1. | | 200 OK | IMS_B sends 200 OK to IMS_A |
| 6 | | \leftarrow | | | 200 OK | IMS_A sends 200 OK to UE_A |

History

| | Document history | | | | | | | |
|--------|------------------|-------------|--|--|--|--|--|--|
| V1.0.0 | April 2008 | Publication | | | | | | |
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