

ETSI TS 186 011-2 V5.1.1 (2013-10)



**Core Network and Interoperability Testing (INT);
IMS NNI Interoperability Test Specifications
(3GPP Release 10);
Part 2: Test descriptions for IMS NNI Interoperability**

Reference

RTS/INT-00085-2

Keywords

IMS, interoperability, interworking, NNI, testing

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2013.
All rights reserved.

DECT™, PLUGTESTS™, UMTS™ and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and LTE™ are Trade Marks of ETSI registered for the benefit of its Members and
of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	7
Foreword.....	7
Introduction	7
1 Scope	8
2 References	8
2.1 Normative references	8
2.2 Informative references.....	9
3 Abbreviations	10
4 IMS NNI Interoperability Test Specification	12
4.1 Introduction	12
4.2 Test Prerequisites	12
4.2.1 IP Version	12
4.2.2 Authentication and Security.....	12
4.2.3 Registration and Subscription	12
4.2.3.1 SIP Call Flow	12
4.2.3.1.1 Early IMS Registration and Subscription Call Flow	12
4.2.3.1.2 Full IMS Registration and Subscription Call Flow	13
4.2.3.1.3 SIP Digest Registration and Subscription Call Flow	14
4.2.4 Supported Options	14
4.2.4.1 Security	14
4.2.4.2 Signalling Compression	14
4.2.5 Number Resolution	14
4.2.6 QoS aspects.....	14
4.3 Test Infrastructure	15
4.3.1 Core IMS Nodes	15
4.3.1.1 P-CSCF	15
4.3.1.1.1 Relevant Interfaces	15
4.3.1.1.2 Node Configuration	15
4.3.1.2 S-CSCF	15
4.3.1.2.1 Relevant Interfaces	15
4.3.1.2.2 Node Configuration	15
4.3.1.3 I-CSCF	16
4.3.1.3.1 Relevant Interfaces	16
4.3.1.3.2 Node Configuration	16
4.3.1.4 IBCF.....	16
4.3.1.4.1 Relevant Interfaces	16
4.3.1.4.2 Node Configuration	16
4.3.1.5 HSS	16
4.3.1.5.1 Relevant Interfaces	16
4.3.1.5.2 Node Configuration	16
4.3.1.6 MRFC	17
4.3.1.6.1 Relevant Interfaces	17
4.3.1.6.2 Node Configuration	17
4.3.1.7 MRFP	17
4.3.1.7.1 Relevant Interfaces	17
4.3.1.7.2 Node Configuration	17
4.3.1.8 MGCF	17
4.3.1.8.1 Relevant Interfaces	17
4.3.1.8.2 Node Configuration	18
4.3.1.9 MGF.....	18
4.3.1.9.1 Relevant Interfaces	18
4.3.1.9.2 Node Configuration	18
4.3.1.10 SGF	18

4.3.1.10.1	Relevant Interfaces	18
4.3.1.10.2	Node Configuration	18
4.3.2	External IMS core Nodes	18
4.3.2.1	UE	18
4.3.2.1.1	Relevant Interfaces	18
4.3.2.1.2	Node Configuration	18
4.3.2.2	AS	18
4.3.2.2.1	Relevant Interfaces	18
4.3.2.2.2	Node Configuration	19
4.3.3	Supporting IMS Nodes	19
4.3.3.1	DNS	19
4.3.3.1.1	Relevant Interfaces	19
4.3.3.1.2	Node Configuration	19
4.3.3.2	ENUM	19
4.3.3.2.1	Local ENUM Solution	19
4.3.3.2.2	Common ENUM Solution	19
4.3.3.2.3	Node Configuration	19
4.3.4	Test Configurations	20
4.4	Use Cases	24
4.4.1	IMS Registration in a Visited Network	24
4.4.1.1	Description	24
4.4.1.2	UC_01_R: SIP message flow for IMS registration with CF ROAM ROAM	25
4.4.2	User-initiated VoIP call setup and release	26
4.4.2.1	Normal Call	26
4.4.2.1.1	Description	26
4.4.2.1.2	UC_02_I: SIP Call Flow "Normal Call" with CF_INT_CALL	26
4.4.2.1.3	UC_02_R: SIP Call Flow "Normal Call" with CF_ROAM_CALL	29
4.4.3	User-initiated call hold and resume	36
4.4.3.1	User-initiated call hold and resume using reINVITE	36
4.4.3.1.1	Description	36
4.4.3.1.2	UC_03_I: SIP Call Flow "call hold and resume" using reINVITE with CF_INT_CALL	37
4.4.3.1.3	UC_03_R: SIP Call Flow "call hold and resume" using reINVITE with CF_ROAM_CALL	41
4.4.3.2	User-initiated call hold and resume using UPDATE	49
4.4.3.2.1	Description	49
4.4.3.2.2	UC_04_I: SIP Call Flow "call hold and resume" using UPDATE with CF_INT_CALL	49
4.4.3.2.3	UC_04_R: SIP Call Flow "call hold and resume" using UPDATE with CF_ROAM_CALL	53
4.4.4	IMS message exchange between UEs in different networks	59
4.4.4.1	Description	59
4.4.4.2	UC_05_I: SIP Call flow for IMS Message Exchange with CF_INT_CALL	59
4.4.4.3	UC_05_R: SIP Call Flow for IMS Message Exchange with CF_ROAM_CALL	60
4.4.5	Supplementary Service Anonymous Communication Rejection (ACR)	61
4.4.5.1	Description	61
4.4.5.2	UC_06_I: SIP message flow for SS ACR with CF_INT_AS	61
4.4.5.3	UC_06_R: SIP message flow for SS ACR with CF_ROAM_AS	63
4.4.6	Supplementary Service Outgoing Communication Barring (OCB)	64
4.4.6.1	Description	64
4.4.6.2	UC_07_I: SIP message flow for SS OCB with CF_INT_AS	65
4.4.6.3	UC_07_R: SIP message flow for SS OCB with CF_ROAM_AS	65
4.4.7	Supplementary Service Originating Identification Presentation (OIP)	66
4.4.7.1	Description	66
4.4.7.2	UC_08_I: SIP message flow for SS OIP with CF_INT_AS	67
4.4.7.3	UC_08_R: SIP message flow for SS OIP with CF_ROAM_AS	69
4.4.8	Supplementary Service Originating Identification Restriction (OIR)	72
4.4.8.1	Description	72
4.4.8.2	UC_09_I: SIP message flow for SS OIR with CF_INT_AS	73
4.4.8.3	UC_09_R: SIP message flow for SS OIR with CF_ROAM_AS	76
4.4.9	Supplementary Service HOLD	79
4.4.9.1	Description	79
4.4.9.1.1	UC_10_I: SIP Call Flow "call hold and resume with AS tone" using reINVITE with CF_INT_AS	80
4.4.9.1.2	UC_10_R: SIP Call Flow "call hold and resume with AS tone" using reINVITE with CF_ROAM_AS	84

4.4.10	Supplementary Service Call Forward Unconditional (CFU)	90
4.4.10.1	Description	90
4.4.10.1.1	UC_11_I: SIP Call Flow "Communication Forwarding unconditional" with CF_INT_AS	90
4.4.10.1.2	UC_11_R: SIP Call Flow "Communication Forwarding unconditional" with CF_ROAM_AS	92
4.4.10.1.3	UC_12: SIP Call Flow "Normal Call" with 2 UEs registered to same public identity	95
4.4.11	Addition of media stream	98
4.4.11.1	Description	98
4.4.11.1.1	UC_13: SIP Call Flow "Addition of media stream using reINVITE"	99
4.4.12	Removal of media stream	103
4.4.12.1	Description	103
4.4.12.1.1	UC_14: SIP Call Flow "Removal of media streams using UPDATE"	103
4.4.12.1.2	UC_15: SIP Call Flow "Removal of media streams using reINVITE"	105
4.4.13	Ad-hoc Conferencing service	107
4.4.13.1	Description	107
4.4.13.2	UC_16: SIP Call Flow "Ad-hoc Conference call"	107
4.4.14	Presence service	111
4.4.15	IPTV service	111
4.4.15.1	Broadcast (BC) Session	111
4.4.15.1.1	Description	111
4.4.15.1.2	UC_19: BC session	111
4.4.15.2	Content on Demand (CoD) Session	112
4.4.15.2.1	Description	112
4.4.15.2.2	UC_20: CoD session establishing content control channel and content delivery channels separately (RTSP Method 1)	113
4.4.15.2.3	UC_21: CoD session establishing content control channel and content delivery channels separately using RTSP Method 2	115
4.4.15.3	Request for Network PVR offline capture	115
4.4.15.3.1	Description	115
4.4.15.3.2	UC_22: Request for Network PVR offline capture	116
4.4.16	IMS-PSTN Interoperability	116
4.4.16.1	IMS-to-PSTN call	116
4.4.16.1.1	Description	116
4.4.16.1.2	UC_23: IMS-to-PSTN call	116
4.4.16.2	PSTN-to-IMS call	118
4.4.16.2.1	Description	118
4.4.16.2.2	UC_24: PSTN-to-IMS call	119
4.5	Test Descriptions	121
4.5.1	General Capabilities	121
4.5.1.1	SIP messages longer than 1 500 bytes	121
4.5.1.2	ENUM Query - Functionality test	122
4.5.2	Registration and De-registration	124
4.5.2.1	First time registration in a visited IMS network	124
4.5.2.2	No response from first entry point on REGISTER without topology hiding	131
4.5.2.3	403 response to REGISTER from an un-trusted domain without topology hiding	134
4.5.2.4	Network initiated deregistration by the S-CSCF	135
4.5.2.5	Network initiated re-authentication by the S-CSCF	136
4.5.3	Initial Dialog or Subsequent Procedures	140
4.5.3.1	Initial INVITE Dialog Procedures	140
4.5.3.1.1	Initial INVITE Request Procedures - Originating	140
4.5.3.1.2	Dialogue Procedures with Roaming	158
4.5.3.1.3	Subsequent Request Procedures - Originating Network	176
4.5.3.1.4	Dialogue Procedures - Topology Hiding	203
4.5.4	Messaging	213
4.5.4.1	Messaging with ENUM lookup procedure	213
4.5.4.2	Messaging with SIP URI public identities	215
4.5.4.3	Messaging with TEL URI identities	217
4.5.4.4	Messaging when roaming	219
4.5.4.5	Messaging with receiving user not registered	221
4.5.4.6	Messaging with receiving user barred	222
4.5.5	Supplementary Services	223
4.5.5.1	Supplementary Service HOLD with AS	223
4.5.5.2	Supplementary Service HOLD with AS in roaming	227

4.5.5.3	Supplementary Service OIP with AS	231
4.5.5.4	Supplementary Service OIP with AS in roaming	234
4.5.5.5	Supplementary Services OIR and ACR with AS	237
4.5.5.6	Supplementary Services OIR and ACR with AS in roaming	240
4.5.5.7	Supplementary Service CFU with AS	243
4.5.5.8	Supplementary Service CFU with AS in roaming	246
4.5.5.9	Supplementary Services OIP and OIR with AS	249
4.5.5.10	Supplementary Services OIP and OIR with AS in roaming	252
4.5.5.11	Ad-hoc Conference Call service	256
4.5.6	Presence	260
4.5.7	IPTV	260
4.5.7.1	IPTV registration and Service Attachment. Push mode	260
4.5.7.2	IPTV registration and Service Attachment. Pull mode.	262
4.5.7.3	BC session	263
4.5.7.4	CoD session. Establishing content control channel and content delivery channels using RTSP Method 1	265
4.5.7.5	CoD session. Establishing content control channel and content delivery channels using RTSP Method 2	267
4.5.7.6	Request for Network PVR offline capture in home network	269
4.5.8	IMS-PSTN Interoperability	270
4.5.8.1	IMS-to-PSTN call	270
4.5.8.1.1	ENUM Query - IMS-to-PSTN call	270
4.5.8.1.2	Normal Call, PSTN user clears call	271
4.5.8.1.3	Normal Call, IMS user clears call	274
4.5.8.1.4	Unsuccessful Call, PSTN user busy	276
4.5.8.1.5	IMS user holds/resumes call	278
4.5.8.1.6	PSTN user holds/resumes call	279
4.5.8.2	PSTN-to-IMS call	281
4.5.8.2.1	Normal Call, PSTN user clears call	281
4.5.8.2.2	Normal Call, IMS user clears call	284
4.5.8.2.3	Unsuccessful Call, IMS user busy	287
4.5.8.2.4	IMS user holds/resumes call	289
4.5.8.2.5	PSTN user holds/resumes call	290
History	293

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

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

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

- Part 1: "Test purposes for IMS NNI Interoperability";
- Part 2: "Test descriptions for IMS NNI Interoperability";**
- Part 3: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)".

Introduction

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

Test purposes defined in the present document have been developed based on the requirements stated in the 3GPP IMS Release 10 specification.

1 Scope

The present document specifies interoperability Test Descriptions (TDs) for Inter-IMS Network to Network Interface (II-NNI) interoperability testing for the IP Multimedia Call Control Protocol based on Stage 3 Session Initiation Protocol (SIP) and Session Description Protocol (SDP) standard, TS 124 229 [1]. Interconnection aspects between two different IM CN subsystems for end to end service interoperability are based on standard TS 129 165 [15]. *TDs have been specified on the basis of the Test Purposes (TPs) and Test Suite Structure (TSS) presented in TS 186 011-1 [2].* TP fragments presented in the present document as part of TDs are defined using the TPLan notation of ES 202 553 [5]. TDs have been written based on the test specification framework described in TS 102 351 [3] and the interoperability testing methodology defined in TS 102 237-1 [4], i.e. interoperability testing with a conformance relation.

For the assessment of IMS core network requirements related to the ISC interface parts of the supplementary services HOLD (see TS 124 410 [9]), CDIV (see TS 124 404 [10]), ACR-CB (see TS 124 411 [11]), and OIP/OIR (see TS 124 407 [12]) have been used.

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

NOTE: Requirements pertaining to a UE or an AS implementation or IMS core network requirements that can only be observed at the interface between UE and IMS CN are explicitly not within the scope of the present document.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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

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

2.1 Normative references

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

- [1] ETSI TS 124 229 (V10.10.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229 version 10.10.0 Release 10)".
- [2] ETSI TS 186 011-1 (V5.1.1): "Core Network and Interoperability Testing (INT); IMS NNI Interoperability Test Specifications (3GPP Release 10); Part 1: Test purposes for IMS NNI Interoperability".
- [3] ETSI TS 102 351: "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT); IPv6 Testing: Methodology and Framework".
- [4] ETSI TS 102 237-1: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 4; Interoperability test methods and approaches; Part 1: Generic approach to interoperability testing".
- [5] ETSI ES 202 553: "Methods for Testing and Specification (MTS); TPLan: A notation for expressing Test Purposes".