ETSI IMS Plugtest 2
November 10-14 2008, Bled, Slovenia
Final Test Report

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1 Summary

This report presents the results of ETSI IMS interoperability event 2 held in Bled, Slovenia from November 10th to 14th 2008 at Hotel Golf. The Plugtests assessed the interoperability as well as conformance of IMS core networks (composed of P/I/S-CSCF, IBCF, AS, DNS and HSS) which are implemented on the basis of ETSI ES 283 003 (V1.8.0) [3GPP TS 24.229 Release 7 (Version 7.2.0), modified]. The tests executed at the event were related to basic IMS call functionality, messaging and roaming and were taken from the ETSI IMS NNI interoperability test specification ETSI TS 186 011-2 Version 2.1.8[1].

It is important to remember that the main goal of this IMS plugtest has been to *assess the base specification* of IMS core networks, i.e., not the quality of IMS core network implementations. Therefore, the results are presented in this report purely from a test specification point of view, i.e., they are not related to the participating IMS vendors.

Six IMS core network vendors participated at this event. During the event 410 of 1110 potential tests were executed. Overall results show a very high level of interoperability (82%) of IMS core networks but a lower level of overall conformance to the 3GPP base standard (51 %) in the tests executed. Also note that 29% of all potential tests could not be executed due to issues outside of the IMS core networks, e.g., issues with remote connections and clarity of event configuration information, as well as lack of the support for a feature by a participating IMS core network.

The main interoperability issues encountered were related to call hold/resume functionality, roaming scenarios for basic call and the use of AS in roaming scenarios. Most issues encountered in conformance assessment where related to handling of header tokenization for topology hiding, handling of roaming scenarios (with and without AS involvement), as well as use of P-Charging-Vector and P-Asserted-Identity headers in various SIP requests and responses.

For more detailed results the reader should check the remainder of this document.

2 Event Organization

In the event participating vendors had their IMS network either locally installed in a private room in Bled, i.e., with access restricted to the IMS network vendor only, or remotely connected via a VPN connection. One vendor provided a simulated IMS

[1] Note that the initial basis for the tests was the version 2.0.0 of this document. Before and during the event a number of errors were found and corrected in the document leading to versions up to 2.1.8. Version 2.1.8 was used as the basis for conformance analysis. Note that this version will be submitted to ETSI INT for approval and eventual publishing. In addition, the revision of the published version may differ from the current working version.

network, i.e. a “black box” that represented emulations of all IMS components to the connected peer IMS networks.

DNS equipment was provided by vendors and also located with the IMS network installation. User equipment selected to drive core network interoperability tests was the TISPAN OpenIC client by Fraunhofer Focus. Commercial clients by RADVISION and Smith Micro Software participated at the event in ad-hoc testing sessions. Application servers were provided by most vendors, either locally or remotely.

Tests, i.e., the test sequence part of Test Descriptions specified in the test specification, were executed in match sessions from the public room, i.e., with presence of match session chairs appointed by ETSI, IMS network vendors and operators. For each test executed, a member of the IMS network vendor team operated user equipment connected to their IMS network based on instructions from a test session chair. During each test, IMS network traffic at Gm and Mw, ISC and Ic interfaces was captured and saved by the test session chair. Due to limitations by the event test network it was not possible to capture remote Mw/IC interfaces and local Gm interfaces at the same time. Also remote ISC interfaces could not be traced.

During the first 1.5 h each test session 37 tests were attempted to be executed from one IMS network vendor playing the role of IMS_A to the another IMS network vendor playing the role of IMS_B. In the next 1.5h the roles were reversed and all 37 tests were again attempted to be executed. Note that during the first 3 hours of the test session no conformance analysis was performed. Only interoperability results were recorded in a Test Session Report based on mutual agreement of all involved parties. Two Test Session Reports were filled in during each test session.

After 3 hours into the test session all test execution was stopped and a selected number of tests (as many as possible) were reviewed for conformance for one hour during test session wrap-up. Conformance verdicts were assigned for each reviewed test. The remaining tests (which could not be analyzed due to time limitations) were reviewed and assigned verdicts by ETSI representatives. The final Test Session Reports with all interoperability results and conformance verdicts were handed out to IMS vendors a first review and approved at the end of the event. Note that at this point there has not been any final agreement by IMS network vendors to the final results.

Since the test specification only assessed SIP messaging it was agreed to not check bi-directional voice as part of interoperability test results. Also 6 tests from the test specification ETSI TS 186 011-2 were not taken into account since they either required functionality not part of the event test configuration, i.e. forced loss of connectivity of a UE, or were not supported by the user equipment used in the event, i.e. call hold and resume using the UPDATE method.

3 Overall Results

Table 1, Figure 1, and Figure 2 summarize interoperability as well as conformance results collected over all test sessions performed during this event.

For interoperability results there are four possible observations: “OK”, “not OK”, “Not Applicable” or “Out Of Time”. Whereas the first two results are self-explanatory, the “Not Applicable” result has been given in case the test could not be performed due to limitations of the event setup or by one of the IMS core networks participating in a test, e.g., missing support for registration of a roaming user. The “Out Of Time” result was given for all tests not executed due to lack of time in each three hour test session.

For conformance results there are three possible verdicts: “Pass”, “Fail”, “Inconclusive”. Here, the “Pass” verdict has been given in cases that the analysis of the test execution trace show that both the IMS core networks participating in a test fulfilled all of the verdict criteria specified in the test specification for that test. The “Fail” verdict has been given in cases that the analysis of the test execution trace show that one of the IMS core networks participating in a test violated one or more of the verdict criteria specified in the test specification for that test. The “Inconclusive” verdict was assigned in cases were some non-conformant condition had been observed which was either not part of the verdict criteria, e.g., the test never got to through its preamble, or could not be contributed to the participating IMS core networks, e.g., the user equipment failed to send a large message to the originating network although it had been asked to do so. So in both latter cases the verdict criteria can not be checked – therefore the test is assigned an “Inconclusive” verdict.

Table 1. Overall interoperability and conformance event results

Specification under test	**ETSI ES 283 003 (V1.8.0), [3GPP TS 24.229 Release 7 (Version 7.2.0), modified]**
Test Specification used	**ETSI 186 011-2 2.1.8**[2]
Number of potential Test Descriptions in the Plugtest	**37 of 43 (TDs not tested were TD_IMS_0019, TD_IMS_0020, TD_IMS_0026, TD_IMS_0027 (UPDATE), TD_IMS_0021, TD_IMS_0023 (Loss of connectivity))**
Number of participating IMS core network vendors	**6**
Number of test sessions	**30**
Number of tests executed	**410 of 1110**
Average number of tests executed per session	**14 of 37**

[2] See footnote 1

Interoperability testing	
Overall percentage of IOP OK	**81.5%**
Overall percentage of IOP not OK	**18.5%**
Overall percentage of IOP Not Applicable (over total possible)	**28.8%**
Overall percentage of IOP Out Of Time (over total possible)	**34.2%**
Conformance testing	
Overall percentage of Pass Verdicts	**51.2%**
Overall percentage of Fail Verdicts	**36.6%**
Overall percentage of Inconclusive Verdicts	**12.2%**

Note that the numbers for overall interoperability in Table 1 exclude tests with "Not OK" results for which the verdict was found to be inconclusive, i.e., failed due to reasons beyond the IMS core networks. Also percentages for "OK" and "not OK" or "Pass", "Fail" and "Inconclusive" are computed based on the total *executed* tests, whereas the percentage of "Not Applicable" and "Out Of Time" are based on the total of all *potential* tests. Where the number of "Out Of Time" seems to appear relatively high, it has to be noted, that the test scenarios in this second IMS Plugtest were of significantly higher complexity than during the earlier event in 2007. Therefore execution and interoperability analysis of the individual test scenarios were more time consuming.

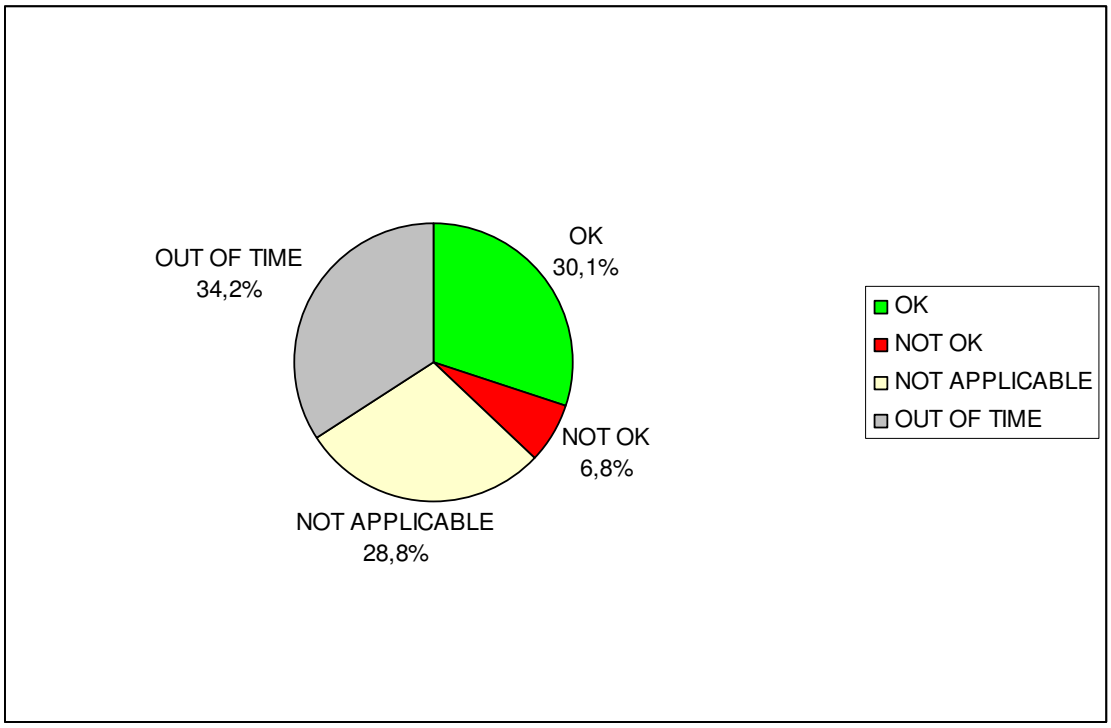

Figure 1. Pie chart of overall interoperability figures

Note that in Figure 2 “Pass”, “Fail”, and “Inconclusive” percentages are based on the number of all executed tests.

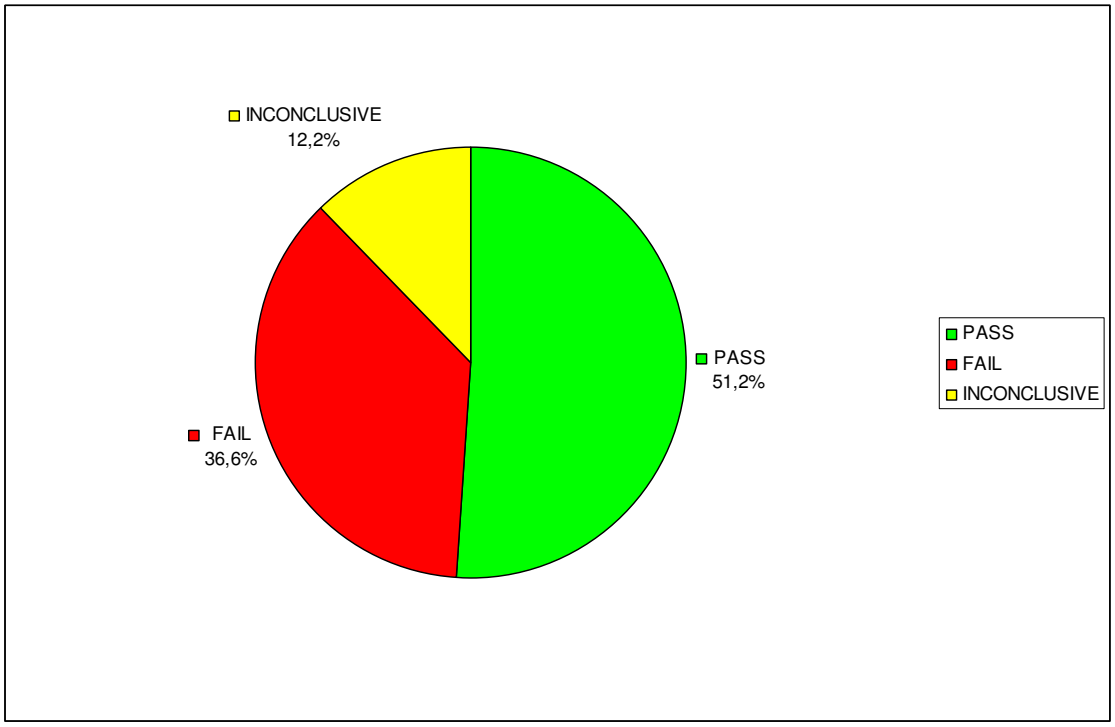

Figure 2. Pie chart of conformance figures

3 More Detailed Interoperability Results

This section presents the overall interoperability results based on the executed Test Description identifier from ETSI TS 186 011-2. The column "Runs" refers to the total number of executions during the entire event. Table 2 shows interoperability results in percentages and Table 3 in number of test execution runs. Note again that the percentages in Table 2 for "OK" and "not OK" are computed based on the total *executed* tests, whereas the percentage of "Not Applicable" and "Out Of Time" are based on the total of all *potential* tests.

Tables 4 and 5 show the same figures summarized for each test group to enable a faster understanding on to where the most issues still occur.

A first analysis shows that the tests for ISC based supplementary services Call Hold and OIP/OIR (TD_IMS_0037, TD_IMS_0041) have had the most interoperability issues. It should be noted that tests related to topology hiding (TD_IMS_0003H, TD_IMS_0008, TD_IMS_0028, TD_IMS_0029, TD_IMS_0030, TD_IMS_0004H) have not been executed often and therefore cannot be considered to give a realistic picture on the status of topology hiding.

Table 2. Interoperability Results per Test Description in percent

Test Id	Summary	Runs	OK	NOT	NA	OoT
TD_IMS_0002	First time registration in a visited IMS network	20	85,0%	15,0%	26,7%	6,7%
TD_IMS_0004	IMS network sends 403 response from a different trust domain without topology hiding	16	100,0%	0,0%	26,7%	20,0%
TD_IMS_0006	IMS network can initiate user de-registration	17	70,6%	29,4%	26,7%	16,7%
TD_IMS_0003	IMS network chooses a second entry point without topology hiding.	10	80,0%	20,0%	40,0%	26,7%
TD_IMS_0005	IMS network supports network initiated re-registration	7	85,7%	14,3%	33,3%	43,3%
TD_IMS_0007	IMS network can initiate user re-authentication	0	0,0%	0,0%	43,3%	56,7%
TD_IMS_0034	IMS network handles messaging while roaming	14	57,1%	42,9%	26,7%	26,7%
TD_IMS_0031	IMS network handles messaging with SIP identity without topology hiding	25	80,0%	20,0%	3,3%	13,3%
TD_IMS_0035	IMS network handles messaging when receiving user is not registered	20	95,0%	5,0%	13,3%	20,0%
TD_IMS_0036	IMS network handles messaging when receiving user has been barred	16	100,0%	0,0%	30,0%	16,7%
TD_IMS_0001	IMS network shall support SIP messages greater than 1500 bytes	6	83,3%	16,7%	20,0%	60,0%
TD_IMS_0011	IMS network does not establish call to barred user	16	100,0%	0,0%	26,7%	20,0%
TD_IMS_0012	IMS network rejects call to non existing user	21	90,5%	9,5%	6,7%	23,3%
TD_IMS_0013	IMS network does not establish a call for unavailable user	19	100,0%	0,0%	10,0%	26,7%
TD_IMS_0014	IMS network can handle call to non-registered user and unreachable AS	15	100,0%	0,0%	23,3%	26,7%
TD_IMS_0022	IMS network handles calling user canceling call before its establishment	23	87,0%	13,0%	3,3%	20,0%
TD_IMS_0024	IMS network ends call in case calling UE is forcefully de-registered in IMS network	19	84,2%	15,8%	10,0%	26,7%
TD_IMS_0015	IMS network handles call while UE_B is roaming without topology hiding	13	46,2%	53,8%	36,7%	20,0%
TD_IMS_0017	IMS network handles routing information received from the UE before forwarding them	13	69,2%	30,8%	36,7%	20,0%
TD_IMS_0009	IMS network can establish dialogs for users with default SIP URIs and resolve Tel URI E.164 numbers	18	83,3%	16,7%	16,7%	23,3%
TD_IMS_0010	IMS network can handle establishment of dialogs for users with default TEL URIs	8	100,0%	0,0%	50,0%	23,3%
TD_IMS_0032	IMS network handles messaging with TEL URI identities	7	100,0%	0,0%	50,0%	26,7%
TD_IMS_0033	IMS network handles messaging with DNS/ENUM lookup	11	100,0%	0,0%	40,0%	23,3%
TD_IMS_0037	IMS network supports ISC based on HOLD	9	33,3%	66,7%	36,7%	33,3%

TD_IMS_0038	IMS network supports ISC based on OIP	8	75,0%	25,0%	36,7%	36,7%
TD_IMS_0039	IMS network supports ISC based on OIR/ACR	7	57,1%	42,9%	50,0%	26,7%
TD_IMS_0040	IMS network supports ISC based on CFU	8	62,5%	37,5%	43,3%	30,0%
TD_IMS_0041	IMS network supports ISC based on OIP/OIR	6	33,3%	66,7%	53,3%	26,7%
TD_IMS_0025	IMS network handles user initiated call hold when home caller puts another home user on hold and resumes call	15	73,3%	26,7%	0,0%	50,0%
TD_IMS_0016	IMS network handles user initiated call hold when home caller puts roaming user on hold and resumes call	7	71,4%	28,6%	23,3%	53,3%
TD_IMS_0018	IMS network handles user initiated call hold when roaming caller puts a home user on hold and resumes call	7	57,1%	42,9%	23,3%	53,3%
TD_IMS_0003H	IMS network chooses a second entry point with topology hiding.	1	100,0%	0,0%	46,7%	50,0%
TD_IMS_0008	First time registration via a visited IMS network with topology hiding	2	100,0%	0,0%	43,3%	50,0%
TD_IMS_0028	IMS network handles basic call with topology hiding correctly	3	33,3%	66,7%	20,0%	70,0%
TD_IMS_0029	IMS network handles calling user canceling call correctly before its establishment with topology hiding	1	100,0%	0,0%	23,3%	73,3%
TD_IMS_0030	IMS network handles user initiated call hold when a home caller puts a roaming user on hold and resumes call with	1	100,0%	0,0%	23,3%	73,3%
TD_IMS_0004H	IMS network sends 403 response from a different trust domain with topology hiding	1	0,0%	100,0%	43,3%	53,3%

Table 3. Interoperability Results per Test Description in number of test executions

Test Id	Summary	Runs	OK	NOT	NA	OoT
TD_IMS_0002	First time registration in a visited IMS network	20	17	3	8	2
TD_IMS_0004	IMS network sends 403 response from a different trust domain without topology hiding	16	16	0	8	6
TD_IMS_0006	IMS network can initiate user de-registration	17	12	5	8	5
TD_IMS_0003	IMS network chooses a second entry point without topology hiding.	10	8	2	12	8
TD_IMS_0005	IMS network supports network initiated re-registration	7	6	1	10	13
TD_IMS_0007	IMS network can initiate user re-authentication	0	0	0	13	17
TD_IMS_0034	IMS network handles messaging while roaming	14	8	6	8	8
TD_IMS_0031	IMS network handles messaging with SIP identity without topology hiding	25	20	5	1	4
TD_IMS_0035	IMS network handles messaging when receiving user is not registered	20	19	1	4	6
TD_IMS_0036	IMS network handles messaging when receiving user has been barred	16	16	0	9	5
TD_IMS_0001	IMS network shall support SIP messages greater than 1500 bytes	6	5	1	6	18
TD_IMS_0011	IMS network does not establish call to barred user	16	16	0	8	6
TD_IMS_0012	IMS network rejects call to non existing user	21	19	2	2	7
TD_IMS_0013	IMS network does not establish a call for unavailable user	19	19	0	3	8
TD_IMS_0014	IMS network can handle call to non-registered user and unreachable AS	15	15	0	7	8
TD_IMS_0022	IMS network handles calling user canceling call before its establishment	23	20	3	1	6
TD_IMS_0024	IMS network ends call in case calling UE is forcefully de-registered in IMS network	19	16	3	3	8
TD_IMS_0015	IMS network handles call while UE_B is roaming without topology hiding	13	6	7	11	6
TD_IMS_0017	IMS network handles routing information received from the UE before forwarding them	13	9	4	11	6
TD_IMS_0009	IMS network can establish dialogs for users with default SIP URIs and resolve Tel URI E.164 numbers	18	15	3	5	7
TD_IMS_0010	IMS network can handle establishment of dialogs for users with default TEL URIs	8	8	0	15	7
TD_IMS_0032	IMS network handles messaging with TEL URI identities	7	7	0	15	8
TD_IMS_0033	IMS network handles messaging with DNS/ENUM lookup	11	11	0	12	7
TD_IMS_0037	IMS network supports ISC based on HOLD	9	3	6	11	10
TD_IMS_0038	IMS network supports ISC based on OIP	8	6	2	11	11
TD_IMS_0039	IMS network supports ISC based on OIR/ACR	7	4	3	15	8
TD_IMS_0040	IMS network supports ISC based on CFU	8	5	3	13	9
TD_IMS_0041	IMS network supports ISC based on OIP/OIR	6	2	4	16	8

TD_IMS_0025	IMS network handles user initiated call hold when home caller puts another home user on hold and resumes call	15	11	4		0	15
TD_IMS_0016	IMS network handles user initiated call hold when home caller puts roaming user on hold and resumes call	7	5	2		7	16
TD_IMS_0018	IMS network handles user initiated call hold when roaming caller puts a home user on hold and resumes call	7	4	3		7	16
TD_IMS_0003H	IMS network chooses a second entry point with topology hiding.	1	1	0		14	15
TD_IMS_0008	First time registration via a visited IMS network with topology hiding	2	2	0		13	15
TD_IMS_0028	IMS network handles basic call with topology hiding correctly	3	1	2		6	21
TD_IMS_0029	IMS network handles calling user canceling call correctly before its establishment with topology hiding	1	1	0		7	22
TD_IMS_0030	IMS network handles user initiated call hold when a home caller puts a roaming user on hold and resumes call with topology hiding	1	1	0		7	22
TD_IMS_0004H	IMS network sends 403 response from a different trust domain with topology hiding	1	0	1		13	16

Table 4. Interoperability Results per Test Group in percent

Test Group Id	Runs	OK	NOT OK		NA	OoT
Roaming Registration	70	84,3%	15,7%		32,8%	28,3%
Messaging	81	84,0%	16,0%		18,7%	27,3%
Interworking Basic Call	126	88,1%	11,9%		16,7%	23,3%
Roaming Basic Call	26	57,7%	42,3%		36,7%	20,0%
Interworking Tel URI & ENUM	44	93,2%	6,8%		39,2%	24,2%
Application Server with roaming	38	52,6%	47,4%		44,0%	30,7%
User Hold & Resume	29	69,0%	31,0%		15,6%	52,2%
Roaming Registration with TH (IMS_A)	3	100,0%	0,0%		45,0%	50,0%
Interworking Basic Call with TH	4	50,0%	50,0%		21,7%	71,7%
Roaming User Hold & Resume with TH	1	100,0%	0,0%		23,3%	73,3%
Roaming Registration with TH (IMS_B)	1	0,0%	100,0%		43,3%	53,3%

Table 5. Interoperability Results per Test Group in number of test executions

Test Group Id	Runs	OK	NOT OK		NA	OoT
Roaming Registration	70	59	11		59	51
Messaging	81	68	13		28	41
Interworking Basic Call	126	111	15		35	49
Roaming Basic Call	26	15	11		22	12
Interworking Tel URI & ENUM	44	41	3		47	29
Application Server with roaming	38	20	18		66	46
User Hold & Resume	29	20	9		14	47
Roaming Registration with TH (IMS_A)	3	3	0		27	30
Interworking Basic Call with TH	4	2	2		13	43
Roaming User Hold & Resume with TH	1	1	0		7	22
Roaming Registration with TH (IMS_B)	1	0	1		13	16

4 More Detailed Conformance Results

This section presents the overall conformance verdicts based on the executed Test Description identifier from ETSI TS 186 011-2. The column “Runs” refers to the total number of executions during the entire event. Table 6 shows conformance results in percentages and Table 7 in number of test execution runs. Note again that the percentages in Table 4 for “PASS”, “FAIL”, and “INCONC(LUSIVE)” are computed based on the total *executed* tests. Tables 8 and 9 summarize the conformance results per test group.

A first analysis shows that the tests for basic call and hold/resume for roaming users (TD_IMS_0015, TD_IMS_0018) and roaming user registration test (TD_IMS_0002) have had the most conformance issues. In general, we see that also a number of messaging tests (TD_IMS_0031, TD_IMS_00034) have conformance issues. A good result to see is the relatively low amount of “Inconclusive” verdicts. The exception here are the tests on Application Server with roaming (TD_IMS_0037, TD_IMS_0038, TD_IMS_0039, TD_IMS_0040, TD_IMS_0041) where the common issue has been either the user equipment used in the tests or the unavailability of traces from the (remote) AS.

Table 6. Conformance Verdicts per Test Description in percent

Test Id	Summary	Runs	PASS	FAIL	INCONC
TD_IMS_0002	First time registration in a visited IMS network	20	25,0%	65,0%	10,0%
TD_IMS_0004	IMS network sends 403 response from a different trust domain without topology hiding	16	81,3%	18,8%	0,0%
TD_IMS_0006	IMS network can initiate user de-registration	17	17,6%	76,5%	5,9%
TD_IMS_0003	IMS network chooses a second entry point without topology hiding.	10	80,0%	10,0%	10,0%
TD_IMS_0005	IMS network supports network initiated re-registration	7	28,6%	42,9%	28,6%
TD_IMS_0007	IMS network can initiate user re-authentication	0	0,0%	0,0%	0,0%
TD_IMS_0034	IMS network handles messaging while roaming	14	21,4%	64,3%	14,3%
TD_IMS_0031	IMS network handles messaging with SIP identity without topology hiding	25	36,0%	64,0%	0,0%
TD_IMS_0035	IMS network handles messaging when receiving user is not registered	20	90,0%	5,0%	5,0%
TD_IMS_0036	IMS network handles messaging when receiving user has been barred	16	93,8%	0,0%	6,3%
TD_IMS_0001	IMS network shall support SIP messages greater than 1500 bytes	6	83,3%	16,7%	0,0%
TD_IMS_0011	IMS network does not establish call to barred user	16	100,0%	0,0%	0,0%
TD_IMS_0012	IMS network rejects call to non existing user	21	85,7%	14,3%	0,0%
TD_IMS_0013	IMS network does not establish a call for unavailable user	19	89,5%	5,3%	5,3%
TD_IMS_0014	IMS network can handle call to non-registered user and unreachable AS	15	100,0%	0,0%	0,0%
TD_IMS_0022	IMS network handles calling user canceling call before its establishment	23	87,0%	13,0%	0,0%
TD_IMS_0024	IMS network ends call in case calling UE is forcefully de-registered in IMS network	19	52,6%	36,8%	10,5%
TD_IMS_0015	IMS network handles call while UE_B is roaming without topology hiding	13	0,0%	76,9%	23,1%
TD_IMS_0017	IMS network handles routing information received from the UE before forwarding them	13	46,2%	38,5%	15,4%
TD_IMS_0009	IMS network can establish dialogs for users with default SIP URIs and resolve Tel URI E.164 numbers	18	27,8%	55,6%	16,7%
TD_IMS_0010	IMS network can handle establishment of dialogs for users with default TEL URIs	8	37,5%	62,5%	0,0%
TD_IMS_0032	IMS network handles messaging with TEL URI identities	7	42,9%	57,1%	0,0%
TD_IMS_0033	IMS network handles messaging with DNS/ENUM lookup	11	45,5%	45,5%	9,1%
TD_IMS_0037	IMS network supports ISC based on HOLD	9	0,0%	11,1%	88,9%
TD_IMS_0038	IMS network supports ISC based on OIP	8	12,5%	25,0%	62,5%

TD_IMS_0039	IMS network supports ISC based on OIR/ACR	7	0,0%	57,1%	42,9%
TD_IMS_0040	IMS network supports ISC based on CFU	8	12,5%	50,0%	37,5%
TD_IMS_0041	IMS network supports ISC based on OIP/OIR	6	0,0%	50,0%	50,0%
TD_IMS_0025	IMS network handles user initiated call hold when home caller puts another home user on hold and resumes call	15	26,7%	46,7%	26,7%
TD_IMS_0016	IMS network handles user initiated call hold when home caller puts roaming user on hold and resumes call	7	28,6%	42,9%	28,6%
TD_IMS_0018	IMS network handles user initiated call hold when roaming caller puts a home user on hold and resumes call	7	28,6%	71,4%	0,0%
TD_IMS_0003H	IMS network chooses a second entry point with topology hiding.	1	100,0%	0,0%	0,0%
TD_IMS_0008	First time registration via a visited IMS network with topology hiding	2	0,0%	100,0%	0,0%
TD_IMS_0028	IMS network handles basic call with topology hiding correctly	3	0,0%	100,0%	0,0%
TD_IMS_0029	IMS network handles calling user canceling call correctly before its establishment with topology hiding	1	0,0%	100,0%	0,0%
TD_IMS_0030	IMS network handles user initiated call hold when a home caller puts a roaming user on hold and resumes call with topology hiding	1	0,0%	100,0%	0,0%
TD_IMS_0004H	IMS network sends 403 response from a different trust domain with topology hiding	1	0,0%	100,0%	0,0%

Table 7. Conformance Verdicts per Test Description in number of test executions

Test Id	Summary	Runs	PASS	FAIL	INCONC
TD_IMS_0002	First time registration in a visited IMS network	20	5	13	2
TD_IMS_0004	IMS network sends 403 response from a different trust domain without topology hiding	16	13	3	0
TD_IMS_0006	IMS network can initiate user de-registration	17	3	13	1
TD_IMS_0003	IMS network chooses a second entry point without topology hiding.	10	8	1	1
TD_IMS_0005	IMS network supports network initiated re-registration	7	2	3	2
TD_IMS_0007	IMS network can initiate user re-authentication	0	0	0	0
TD_IMS_0034	IMS network handles messaging while roaming	14	3	9	2
TD_IMS_0031	IMS network handles messaging with SIP identity without topology hiding	25	9	16	0
TD_IMS_0035	IMS network handles messaging when receiving user is not registered	20	18	1	1
TD_IMS_0036	IMS network handles messaging when receiving user has been barred	16	15	0	1
TD_IMS_0001	IMS network shall support SIP messages greater than 1500 bytes	6	5	1	0
TD_IMS_0011	IMS network does not establish call to barred user	16	16	0	0
TD_IMS_0012	IMS network rejects call to non existing user	21	18	3	0
TD_IMS_0013	IMS network does not establish a call for unavailable user	19	17	1	1
TD_IMS_0014	IMS network can handle call to non-registered user and unreachable AS	15	15	0	0
TD_IMS_0022	IMS network handles calling user canceling call before its establishment	23	20	3	0
TD_IMS_0024	IMS network ends call in case calling UE is forcefully de-registered in IMS network	19	10	7	2
TD_IMS_0015	IMS network handles call while UE_B is roaming without topology hiding	13	0	10	3
TD_IMS_0017	IMS network handles routing information received from the UE before forwarding them	13	6	5	2
TD_IMS_0009	IMS network can establish dialogs for users with default SIP URIs and resolve Tel URI E.164 numbers	18	5	10	3
TD_IMS_0010	IMS network can handle establishment of dialogs for users with default TEL URIs	8	3	5	0
TD_IMS_0032	IMS network handles messaging with TEL URI identities	7	3	4	0

TD_IMS_0033	IMS network handles messaging with DNS/ENUM lookup	11	5	5	1
TD_IMS_0037	IMS network supports ISC based on HOLD	9	0	1	8
TD_IMS_0038	IMS network supports ISC based on OIP	8	1	2	5
TD_IMS_0039	IMS network supports ISC based on OIR/ACR	7	0	4	3
TD_IMS_0040	IMS network supports ISC based on CFU	8	1	4	3
TD_IMS_0041	IMS network supports ISC based on OIP/OIR	6	0	3	3
TD_IMS_0025	IMS network handles user initiated call hold when home caller puts another home user on hold and	15	4	7	4
TD_IMS_0016	IMS network handles user initiated call hold when home caller puts roaming user on hold and resumes call	7	2	3	2
TD_IMS_0018	IMS network handles user initiated call hold when roaming caller puts a home user on hold and resumes call	7	2	5	0
TD_IMS_0003H	IMS network chooses a second entry point with topology hiding.	1	1	0	0
TD_IMS_0008	First time registration via a visited IMS network with topology hiding	2	0	2	0
TD_IMS_0028	IMS network handles basic call with topology hiding correctly	3	0	3	0
TD_IMS_0029	IMS network handles calling user canceling call correctly before its establishment with topology hiding	1	0	1	0
TD_IMS_0030	IMS network handles user initiated call hold when a home caller puts a roaming user on hold and resumes call	1	0	1	0
TD_IMS_0004H	IMS network sends 403 response from a different trust domain with topology hiding	1	0	1	0

Table 8. Conformance Verdicts per Test Group in percent

Test Group Id	Runs	PASS	FAIL	INCONC
Roaming Registration	70	44,3%	47,1%	8,6%
Messaging	81	61,7%	33,3%	4,9%
Interworking Basic Call	126	76,2%	19,0%	4,8%
Roaming Basic Call	26	23,1%	57,7%	19,2%
Interworking Tel URI & ENUM	44	36,4%	54,5%	9,1%
Application Server with roaming	38	5,3%	36,8%	57,9%
User Hold & Resume	29	27,6%	51,7%	20,7%
Roaming Registration with TH (IMS_A)	3	33,3%	66,7%	0,0%
Interworking Basic Call with TH	4	0,0%	100,0%	0,0%
Roaming User Hold & Resume with TH	1	0,0%	100,0%	0,0%
Roaming Registration with TH (IMS_B)	1	0,0%	100,0%	0,0%

Table 9. Conformance Verdicts per Test Group in number of test executions

Test Group Id	Runs	PASS	FAIL	INCONC
Roaming Registration	70	31	33	6
Messaging	81	50	27	4
Interworking Basic Call	126	96	24	6
Roaming Basic Call	26	6	15	5
Interworking Tel URI & ENUM	44	16	24	4
Application Server with roaming	38	2	14	22
User Hold & Resume	29	8	15	6
Roaming Registration with TH (IMS_A)	3	1	2	0
Interworking Basic Call with TH	4	0	4	0
Roaming User Hold & Resume with TH	1	0	1	0
Roaming Registration with TH (IMS_B)	1	0	1	0

5 Collected Comments

In order to understand the results shown in previous sections better, this section presents some of the comments specified in cases of conformance "Fail" and "Inconclusive" verdicts. These comments have been extracted from relevant Test Session Reports.

Test Description	Verdict	Comment
TD_IMS_0002	F	No path header is contained in 200OK from IMS_B
	I	401 not received
	F	P-charging-vector header is missing
	F	Path header missing in 200 OK from IMS_B
	F	Path header from IMS_A does not contain SIP-URI of P-CSCF
	F	No P-Charging-Vector header in SUBSCRIBE
	F	No response value in Authorization header of "protected" REGISTER from IMS_A
	F	IMS_B rejects protected REGISTER with 482
TD_IMS_0004	F	IMS_B does not send 403 Forbidden to IMS_A
	F	IMS_B sends a 404 instead of 403 response
TD_IMS_0006	F	Incorrect XML from IMS_B
	F	NOTIFY with Request-URI indicating UE_B not received from IMS_B
	F	NOTIFY with Request line indicating P-CSCF not received from IMS_B
	F	No Route header in NOTIFY from IMS_B
TD_IMS_0005	F	Incorrect request URI
	F	NOTIFY from IMS_B without Route header
TD_IMS_0034	F	IMS_B does not send the MESSAGE to UE_B
	F	No Route and no P-Charging-Vector header in MESSAGE from IMS_A
	F	IMS_B rejects MESSAGE with 400
	F	No P-Charging-Vector header in 200 OK from IMS_B
	F	P-Charging-Vector header contains ioi parameter.

Test Description	Verdict	Comment
TD_IMS_0031	F	200OK is not sent by IMS_B
	F	IMS_A MESSAGE missing P-Charging-Vector and P-Asserted-ID header
	F	IMS_B 200 OK missing P-Charging-Vector
	F	IMS_B rejects MESSAGE with 400
	F	IMS_B rejects MESSAGE with 482
	F	MESSAGE from IMS_A: tel URI is not present in P-Asserted-Identity header
	F	MESSAGE does not contain Record header
TD_IMS_0035	F	IMS_B sends 183 instead of 4xx response
TD_IMS_0001	F	IMS_B does not receive any message
TD_IMS_0022	F	INVITE from IMS_A P-CSCF is rejected by IMS_B I-CSCF with 480
	F	CANCEL from IMS_A is rejected by IMS_B with 405
TD_IMS_0024	F	No Route header present and Cseq with invalid value in BYE from IMS_A
	F	Request URI does not contain value of UE_B and Route header is not present
TD_IMS_0015	F	No INVITE from IMS_A to IMS_B
	F	orig-IOI parameter in INVITE from IMS_B
	F	INVITE from IMS_B without Record-Route header and with ioi-parameter in P-Charging-Vector header
	I	BYE from UE_A is not forwarded by IMS_A
	F	INVITE: Service-Route header is not present P-Asserted-ID contain UE_B value instead of UE_A Via header does not contain P-CSCF values
	F	ACK from UE_B is not forwarded by IMS_A
	F	IMS_A rejects INVITE from UE_B with 403
	F	No Record-Route header in BYE/180 from IMS_A
TD_IMS_0017	F	No INVITE from IMS_A to IMS_B
	F	ACK from UE_B is not forwarded by IMS_A
	I	orig-IOI parameter in INVITE from IMS_B
	I	BYE from IMS_A contains no Record-Route header and contains Route-header indicating its own P-CSCF

Test Description	Verdict	Comment
TD_IMS_0009	F	";" missing between orig-ioi and term-ioi from IMS_B
	F	INVITE should not contain P-Access-Network-Info
	F	Only one identity in P-Asserted-Identity header in INVITE from IMS_A
	F	Bye contains P-Access-Network-Info header
	F	Only one identity in P-Asserted-Identity header in180/200 from IMS_B
	F	IMS_A sends no ACK
	F	INVITE does not contain Route header, P-Charging-Vector and Record-Route header is IBCF addres instead of SCSCF
TD_IMS_0010	F	";" missing between orig-ioi and term-ioi from IMS_B
	F	INVITE should not contain P-Access-Network-Info
	F	Only one identity in P-Asserted-Identity header in INVITE from IMS_A
	F	Bye contains P-Access-Network-Info header
	F	Only one identity in P-Asserted-Identity header in180/200 from IMS_B
TD_IMS_0032	F	No P-Charging-Vector in 200 OK from IMS_B and no P-Asserted-Identity in 200 OK from IMS_B
TD_IMS_0033	F	No P-Asserted-Identity header in 200 OK from IMS_B
TD_IMS_0037	F	P-Charging-Vector header missing in the INVITE
	F	P-Charging-Vector header missing in the 200 OK
TD_IMS_0038	F	no Tel URI of UE_A in INVITE Check 2- no Tel derive SIP URI in INVITE
TD_IMS_0039	F	IMS_A does not send 433 to UE
	F	IMS_B receives a 403 response instead of 433
TD_IMS_0040	F	INVITE does not contain access-network-charging-info parameter in the p-charging vector header
	F	Via header does not contain P-CSCF via port number
	F	Record route header does not contain p-cscf port number
	F	IMS_A rejects call with 480
	F	No P-Charging-Vector header in INVITE
	F	no invite is sent to IMS_B
TD_IMS_0041	F	IMS_A rejects call with 503
	F	P-Charging-Vector does not contain orig-ioi and term-ioi parameters

Test Description	Verdict	Comment
TD_IMS_0025	**F**	**No P-Charging-Vector in 200 from IMS_B**
	F	**Re-NVITE from IMS_A without Record-Route and P-Charging-Vector**
TD_IMS_0016	**F**	**Initial INVITE is rejected by IMS_A P-CSCF with 483**
	F	**No P-Charging-Vector header in 200 OK from IMS_B**
TD_IMS_0018	**F**	**Initial INVITE is rejected by IMS_A P-CSCF with 483**
	F	**Record-Route and P-Charging-Vector header missing in Re-INVITE from IMS_A**
	F	**Record-Route and P-Charging-Vector header missing in Re-INVITE from IMS_A**
TD_IMS_0008	**F**	**All messages without tokenized-by parameters!**
TD_IMS_0028	**F**	**All messages without tokenized-by parameters!**
TD_IMS_0029	**F**	**All messages without tokenized-by parameters!**
TD_IMS_0030	**F**	**All messages without tokenized-by parameters!**
TD_IMS_0004H	**F**	**403 from IMS_B not received**

Version History

V1.0.0	November 2008	First version
V1.0.1	November 2008	Minor improvements