
	Document:	Innovaphone PBX based on Innovaphone VoIP Gateways and IPVA - Validation Report
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Innovaphone IP-PBX based on Innovaphone VoIP Gateways and IPVA

Validation Report


Business Trunking and Wireless Office Extended

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1.2 Version History

Version	Date	Author	Status	Notes
V1	01/07/2015	Hans Mens	First version	Innovaphone PBX based on Innovaphone VoIP Gateways and IPVA - Validation Report for Business Trunking and Wireless Office Extended on the Proximus IMS VoIP network


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2. Scope of the Document

The goal of this document is to provide information regarding to the test status upon the interworking between the Innovaphone IP-PBX platform within a NNI configuration setup (non-registration based) and the Proximus IMS VoIP network for both the Business Trunking and the Wireless Office Extended solution as offered by this IMS network.


For every issue discovered during the validation procedure, a problem description, an analysis and a responsibility classification will be provided.

Once the IP-PBX is in service, no tickets are allowed for issues classified as type B, C or D (see the appendix).

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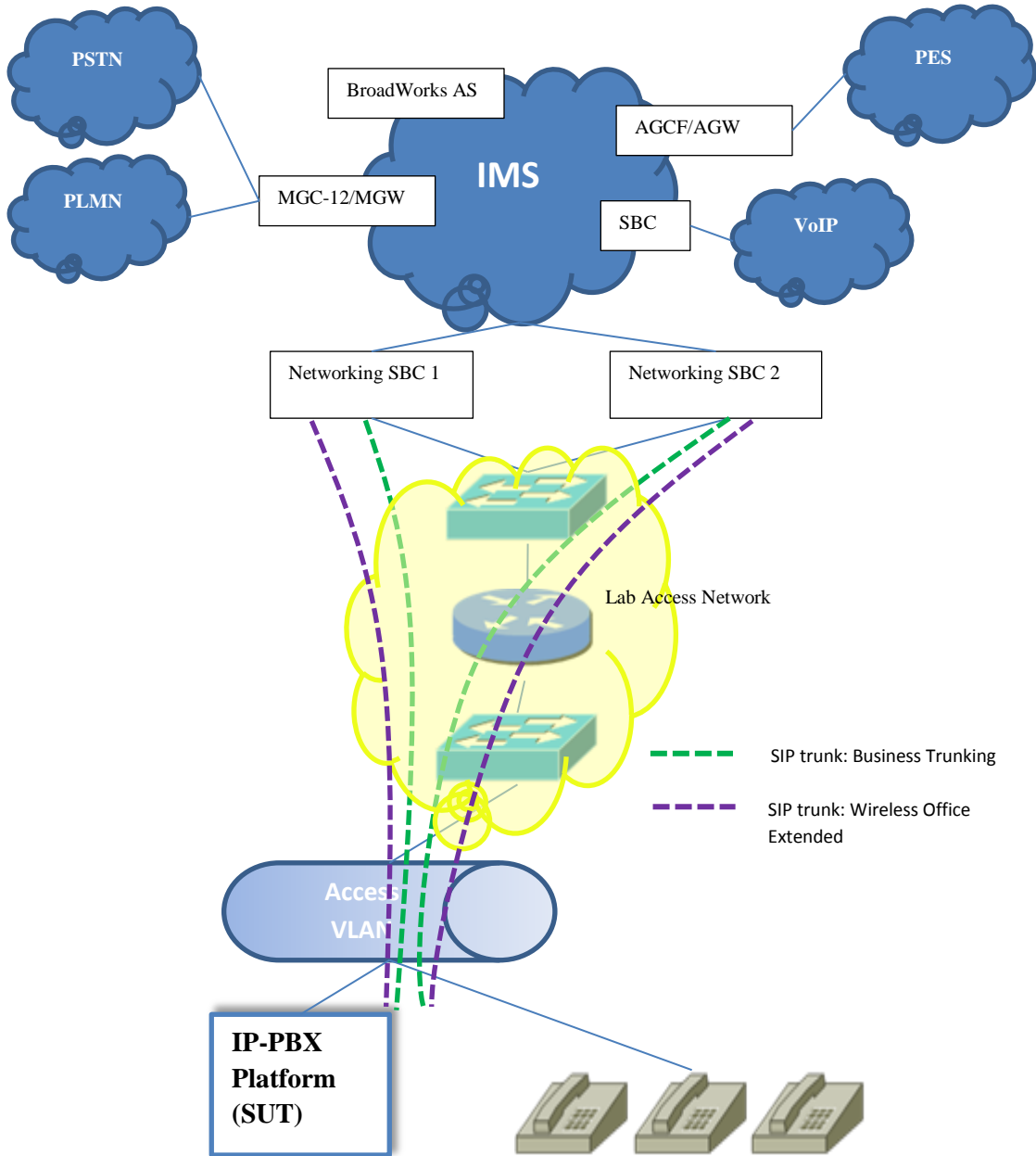
3. IMS and IP-PBX Software Versions


<i>Equipment</i>	<i>Release</i>
IMS Solution	IMS Rel 10.1
ALU MGC-12	Release label BGCSX30 R10.0.0
ALU MGW	Rel 3.0 – B30
Application Server	Broadworks Release 18
ACME SBC	SD7.0.0_MR-12-Patch_9
IP-PBX	Innovaphone IP302 V11r2

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4. IP-PBX Test Setup for Validation Testing

Hereby a graphical overview upon the test setup as used for the validation testing of the IP-PBX platform in our IMS VoIP Labs.




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5. IP-PBX Configuration Documentation

Hereby the SIP trunk configuration document for the Innovaphone IP-PBX. It provides all the details upon the IP-PBX's configuration setup as used during the IMS validation testing.

Follow the links below for the configuration documentation regarding to Business Trunking and Wireless Office Extended:

- BT: http://wiki.innovaphone.com/index.php?title=Howto:Bussiness_Trunking_-_Proximus_-_SIP_Provider
- WoE: http://wiki.innovaphone.com/index.php?title=Howto:Belgium_-_Proximus_-_Wireless_Office_Extended_-_SIP_Provider%282015%29

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6. Validation Tests and Results

A complete overview of the executed testcases, together with their results can be found in the testbook (see embedded MS Excel Workbook below).

The testbook is organised as such so that all tests corresponding to one single IMS service are grouped on one single tab.

The testbook contains separate tabs for each of the following IMS services:


- Business Trunking Service
- Emergency Calling
- Network SBC Geo-Redundancy (high availability service)
- Fax over IP (FoIP)
- Wireless Office Extended Service



IP-PBX

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Traces which were taken throughout the validation test phase are available on request.

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7. IP-PBX Identity Card

The table below provides an overview upon how the IP-PBX has been configured / was behaving itself during the validation testing.

Area	Question	Answer	Remarks
Number Formatting			
Number format of the called party	Does the IP-PBX put the E.164 number format of the called party in its R-URI and To-header of an outgoing INVITE request	NO	Via configuration it's possible to put the called party number in E.164 format, however according to our BT UNI specification documentation this is not the recommended setting
Number format of the called party	Does the IP-PBX put the number of the called party "as it has been dialled (without the prefix)" in its R-URI and To-header of an outgoing INVITE request	YES	
Number format of the calling party	Does the IP-PBX put the E.164 number format of the calling party in its From-header of an outgoing INVITE request	YES	
Call Admission Control			
Contact-header format	Does the IP-PBX put its IP-address in the Contact-header of an outgoing INVITE request	YES	
Support for Reliability on Provisional Responses			
Support for reliability on provisional responses	Is the IP-PBX supporting the reliability of provisional responses (Support-header with 100rel value)	YES	
Media and RTP			
RTP proxy / RTP non-proxy mode	Does the IP-PBX remain in the RTP path after it has diverted or transferred a call to remote (external) party? (question only valid in case 302 / REFER is not used for call diversion / call transfer)	NO	
RTP to phone	Is the RTP flowing between the networking SBC and the PBX or between the networking SBC and the IP-phone	Between SBC and IP-phone	
RTP to phone	In case the RTP is flowing between the SBC and an IP-phone, is the IP-PBX using a SIP re-INVITE in order to signal this behaviour	NO	Instead it immediately puts the IP address of the phone as connection IP address in the SDP offer / answer
DTMF	Is the IP-PBX behaving correctly according to the RFC4733 when it is about outbound DTMF (DTMF tones sent from IP-PBX towards remote endpoint)	YES	
DTMF	Is the IP-PBX behaving correctly according to the RFC4733 when it is about inbound DTMF (DTMF tones sent from remote endpoint towards IP-PBX)	YES	
DTMF	Is the IP-PBX capable of fixing DTMF payload type to 101?	YES	


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Voice Codecs	Is the IP-PBX able to support both G711a AND G729 as audio codec with packetization time set to 20 ms	YES	
Call Hold / Call Resume			
SIP Signalling	Does the IP-PBX make use of SIP re-INVITE in order to put a call on hold / resume a call	YES	It sends a re-INVITE in order to put a call on hold in order to connect the IP-PBX Media Service in order to playback the MoH; it sends a re-INVITE in order to resume a call again in order to connect the IP-phone back into the voice path
SDP Media Direction Attribute Parameters	Does the IP-PBX make use of SDP media direction attribute parameters (sendonly/recvonly/inactive) in order to put a call on hold	NO	See also the remark made in chapter 8
CLIR			
Privacy header	Does the IP-PBX make use of the Privacy-header with value set to "header" or "id" in order to initiate a CLIR call	YES	
Calling Line Identification	Does the IP-PBX keeps the original called party number in the From-header of an outgoing INVITE request in case of a CLIR call (because of the fact that the PAI-header is overwritten by the SBC, the called party should be in the From-header)	NO	Instead the CLI is put in the PAI of the outgoing INVITE request and the From is set to anonymous; A HMR at our networking SBC's will copy the CLI from the PAI into the From based on the presence of the Privacy-header with value set to id; By this the CLIR service will be invoked properly
Emergency Calling			
Emergency calls originated from remote sites with its number manipulations	Does the IP-PBX support the required number manipulation in case that emergency calls are originated from remote sites: - R-URI/To-header = 1992<1AB><ZIP>; - From-header = EVN from remote site	YES	
Dynamic site information	Does the IP-PBX has a mechanism to detect dynamically upon from which site an emergency call is initiated at (e.g. by using IP subnet information)	YES	It detects the IP-phone's location during phone registration based on IP subnet information
Network Call Forwarding and Network Call Transfer			
Network call forwarding (cfr. partial re-routing in the ISDN world)	Is the IP-PBX capable of making use of a 302_MOVED_TEMP response on the public SIP trunk in order to initiate a network call forwarding (all according to the specifications described within our BT-UNI description document)	YES	



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Network call forwarding (cfr. partial re-routing in the ISDN world)	Can the use of a 302_MOVED_TEMP response be controlled by the IP-PBX as per trunk level (as it is not allowed to use this response on a mobile SIP trunk)	NO	As a consequence, network call forwarding cannot be activated for customers having the WoE service too (mobile SIP trunk)
Network call transfer	Is the IP-PBX capable of making use of SIP REFER request on the public SIP trunk in order to initiate a network call transfer (all according to the specifications as described within our BT-UNI description document)	NO	
Network call transfer	Can the use of a SIP REFER be controlled by the IP-PBX as per trunk level (as it is not allowed to use this request on a mobile SIP trunk)	NA	As SIP REFER is not supported by this IP-PBX
Fax over IP			
FoIP	Has the IP-PBX the necessary capabilities to deal with all the fallback scenario's in case a remote endpoint does not support T.38 (e.g. correct reaction on 488 or 415 error responses)	YES	
FoIP	Does the IP-PBX handle the SIP re-INVITE from MGC12, containing both the codecs T.38 and G.711a in different SDP media-lines, correctly?	UNKNOWN	The IP-PBX / ATA does not wait upon the re-INVITE from the MGC-12, instead it always triggers the switch to T.38 first
FoIP	Can T.38 be enabled at IP-PBX level?	YES	
SBC Geo-Redundancy			
SBC Redundancy & Load Balancing	Is the IP-PABX able to support the use of multiple SIP trunks between different networking SBC's both for outgoing and incoming calls (BT + WoE)	YES	
SBC Redundancy & Load Balancing	Does the IP-PABX support the use of SIP OPTIONS requests in order to actively monitor the availability of a certain SIP trunk	YES	
SBC Redundancy & Load Balancing	Is the IP-PBX able of handling / answering upon incoming SIP OPTIONS requests coming from our networking SBC's	YES	
SBC Redundancy & Load Balancing	Is the IP-PABX able to work in active/active mode	YES	
SBC Redundancy & Load Balancing	Is the IP-PABX able to work in active/standby mode	YES	

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8. Remarks concerning the Testing and the IP-PBX's Behaviour

Below an overview upon the most important remarks which need to be made regarding to the IP-PBX's behaviour as observed during the validation testing phase:

Network Call Forwarding / Network Call Transfer

- The IP-PBX is able to initiate a network call forward by sending a 302_MOVED_TEMP response; However this is a system wide configuration setting (it cannot be set on individual SIP trunks); As a consequence this option cannot be activated for customer which have the WoE service too because for our mobile SIP trunks we've no application server capable of interpreting the 302 response correctly
- The IP-PBX does not support the use of SIP REFER requests in order to initiate a network call transfer

RTP Proxy / non-Proxy Mode


- For the validation testing of this IP-PBX we decided to disable the media-relay option at IP-PBX level. This means that:
 - For incoming / outgoing calls the RTP will flow directly between the IP-phones and the networking SBC's.
 - After a call forward / call transfer, the IP-PBX will ensure with appropriate call signalling that the RTP media will be relayed at the networking SBC's
- Via configuration, it's possible to enable the media-relay at the IP-PBX. This option will ensure that the PBX will always remain in the RTP media path. However, it has not been tested within our lab. Therefore we recommend keeping the media-relay option disabled.

Call Hold / Call Resume

- We decided to disable the option to use the media direction attribute "sendonly" in the SDP offers when placing a call on hold. Because, from the moment that we enable this option, the IP-PBX generates 2 re-INVITE requests in order to place a call on hold. Both requests contain an SDP offer with the media direction attribute "sendonly". Upon the first SDP offer, our BroadWorks AS generates an SDP answer with the media direction attribute "recvonly". But... on the second offer, the AS generates an SDP answer with the media direction attribute "inactive". This leads to an "inactive" RTP stream and the party which has been put on hold, won't hear anything anymore (e.g. no MoH) until the call is resumed again.


SDP Offer / Answer Model

- In case of outgoing calls, the IP-PBX sends an SDP offer in which the voice codecs are listed according to the priority in which they're configured at the IP-PBX
- In case of incoming calls, the SDP answer will always contain the preferred voice codec of the SDP offerer.

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Fax over IP (FoIP)

- All FoIP tests have been executed with analogue fax equipment connected to an Innovaphone IP22 ATA device

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9. Overview on Problems and Issues

9.1 Issue Overview

Within the table below, an overview upon the issues detected during the validation testing will be provided. It can serve as history information for later use.

Details upon the issues themselves can be read in subsequent paragraphs (as long as those issues remain in the OPEN status).

ID	Description	Severity	Resp	Solution	Status
#1	WoE and Blind Call Transfer: Missing RBT / no voice after a blind call transfer towards a mobile WoE user	MAJOR / BLOCKING	IP-PBX Supplier	New SW Build has been made available where it has been ensured that intermediated provisional SDP responses are relayed towards the remote VoIP party too	CLOSED

9.2 Issues found during IP-PBX Business Trunking Validation Testing

There are no remaining issues.

9.3 Issues found during IP-PBX Fax over IP Testing


There are no remaining issues.

9.4 Issues found during IP-PBX Interoperability Testing

No IP-PBX interoperability tests have been executed.

9.5 Issues found during IP-PBX Wireless Office Extended Validation Testing

There are no remaining issues.

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10. Responsibility Classification

Below an overview on the responsibility classification can be found. The meaning of the different classification codes can be found in the Appendix section at the end of this document.

10.1 Issues found during IP-PBX Business Trunking Validation Testing

As there are no remaining issues, this paragraph becomes obsolete.

10.2 Issues found during IP-PBX Fax over IP Testing


As there are no remaining issues, this paragraph becomes obsolete.

10.3 Issues found during IP-PBX Interoperability Testing

As no interoperability tests have been executed, this paragraph becomes obsolete.

10.4 Issues found during IP-PBX Wireless Office Extended Validation Testing

As there are no remaining issues, this paragraph becomes obsolete.

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11. Appendix – Classification Codes

Type A:

- Problem has been recognized as an internal (IMS) issue and will be solved by Alcatel – Lucent / Proximus.

Type B:

- Problem cannot be solved but Proximus agrees to leave the situation as it is now.

Type C:

- Problem is Change Request.

Type D:

- Problem has been recognized as IP-PBX vendor problem and will be solved by the IP-PBX vendor.

END OF DOCUMENT