Alcatel-Lucent Application Partner Program Inter-Working Report

Partner: Sennheiser
Application type: Headsets for terminals

The product and version listed have been tested with the Alcatel-Lucent Communication Server and the version specified hereinafter. The tests concern only the inter-working between the Application Partner product and the Alcatel-Lucent Communication platforms. The inter-working report is valid until the Application Partner issues a new version of such product (incorporating new features or functionality), or until Alcatel-Lucent issues a new version of such Alcatel-Lucent product (incorporating new features or functionality), whichever first occurs.

Tests identification

Date of the tests	December 2011

Alcatel-Lucent's representative	Florian Residori
Partner's representative	Lars Rasmussen

Alcatel-Lucent Communication Platform (OmniPCX 4400/Enterprise, OmniTouch, OmniPCX Office, ...)	OmniPCX Enterprise OmniPCX Office
Alcatel-Lucent compatibility release	Not applicable
Partner's application version	Not relevant

Environment (if it has a sense)	☑ ACD ☑ Business

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History:

1. Edition 1 – October 2010: Creation of the document
2. Edition 2 – December 2011: Tests of Circle series (SC230/SC260)

Test results

Headset Name	Sennheiser Part No.	Test Result	Comment
SC230	504401	OK	Wired monaural Contact Centre & Office (CC&O) headset.
SC260	504402	OK	Wired binaural Contact Centre & Office (CC&O) headset.
SH330	005354	OK	Wired monaural office headset. Listening tests is pending.
SH350	005356	OK	Wired binaural office headset. Listening tests is pending.
CC515	500215	OK	Wired monaural call centre headset. Listening tests is pending.
CC550	005361	OK	Wired binaural call centre headset. Listening tests is pending.
DW Office / DW10	504300	OK	Wireless 2in1 (ear hook/headband) office headset.
DW Pro1 / DW20	504304	OK	Wireless monaural office headset.
DW Pro2 / DW30	504308	OK	Wireless binaural office headset.

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1 Introduction

The goal of these tests is to qualify an external application as an Alliance & Application Partner Program solution for the Alcatel-Lucent Communication Platform.

The scope of the tests is the interoperability of the application with the Alcatel-Lucent Communication Platform. It covers a basic or complex inter-working to ensure that services requested by the application and provided by the Communication Platform (and/or conversely) are properly completed.
These tests do not verify the functional achievement of the application as well as they do not cover load capacity checks, race conditions and generally speaking any real customer's site conditions.

A number of acoustical test have been made to evaluate the performance of the headset compared to the handset of the telephone.
As a reference, a handset from the Alcatel IPTOUCH 4038 has been used.

Handset and headset are measured on a B&K HATS with a Listen Sound Check system.

For the receiver the frequency response, distortion, impedance, sensitivity and maximum Sound Pressure Level (SPL) are measured. For the transmitter the frequency response and sensitivity have been measured.

All tests are done with the standard cable CSTD01.

Detailed information about the measurement setup, measurement conditions, actual measurements and special functionality can be found in appendix F.

In addition to the acoustical tests, a full functional verification of the compatibility and interoperability between the Alcatel-Lucent 8-series and 9-series phones and the Sennheiser headsets has been performed.)

2 Application information

Application type: Corded and Wireless headsets

Application commercial names:

- SC230,
- SC260,
- SH330,
- SH350,
- CC515,
- CC550,
- DW Office,
- DW Pro1,
- DW Pro2.

Application version: N/A

Interface type: Wired through the handset/headset port. Wireless system uses DECT for wireless transport layer.

Interface version (if relevant): Not Relevant

Brief application description:

This document is the detailed test plan and report for validating Alcatel-Lucent product(s) with the following Sennheiser Communications A/S product(s):

1. Sennheiser DW Office wireless headset
2. Sennheiser DW Pro 1 wireless headset
3. Sennheiser DW Pro 2 wireless headset
4. SH and CC-series corded products
5. Circle Series (SC230/SC260) wired products

The purpose of this test plan is to certify compatibility and Interoperability between Sennheiser Communications headset and Alcatel-Lucent telephony systems.

On the DW Series wireless products the main aim is to validate Electronic Hook Switch (EHS) functionality.

On the Circle, SH and CC-series products the main aim is to validate audio through.

Test Environment Architecture (Wireless - DW Series)

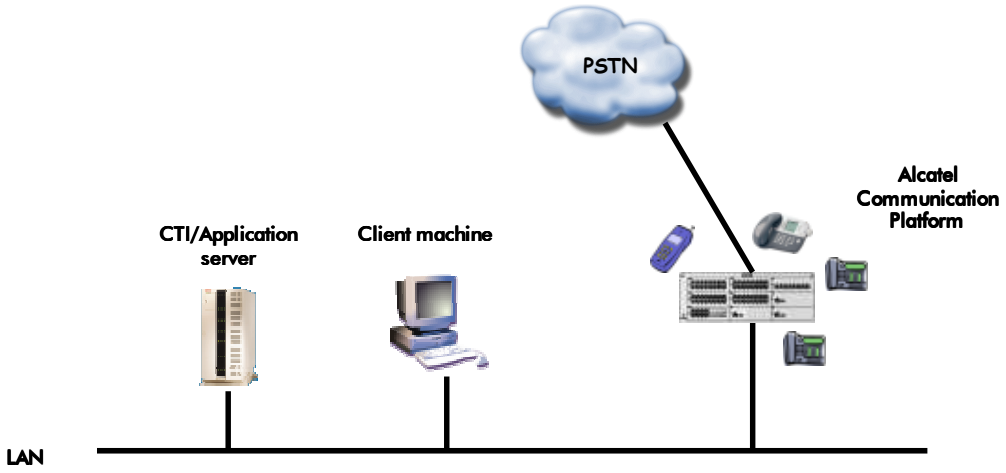
Test Environmement Architecture (Wired - Circle, SH and CC Series)

3 Tests environment

3.1 General architecture

The tests are performed on the Alcatel-Lucent TSS Applications International platform in the following environment:

Figure 1 **Tests environment**



3.2 Hardware configuration

- **Alcatel Communication Platform**: CallServer; UA and Z interfaces, LAN MX16, IBS borne
  - Alcatel IPTOUCH 4068 (IP) (Bluetooth connection)
  - Alcatel IPTOUCH 4038-4028-4018-4008
  - Alcatel DECT MR300/400

3.3 Software configuration

- **Alcatel Communication Platform**:
  OmniPCX Enterprise R10 J1.410.40c

4 Test Scenarios

4.1 Test Method

The qualification test is divided in three steps:

4.1.1 Handset / Headset Measurements

Handsets from the Alcatel telephone terminals are investigated in the Sennheiser Communications acoustic lab. The performance is recorded and the signal parameters are compared with the Sennheiser Communications Headset equivalent.

The following parameters are compared:

RX	Frequency Response
	Sensitivity
	Impedance
	Distortion
	Max. output
TX	Frequency Response
	Sensitivity

All measurements are performed using a Brüel and Kjær Head And Torso Simulator (HATS) and Sound Check.

Detailed information about these tests can be found under appendix G.

4.1.2 Listening Test

Sennheiser Communications headset products are installed on the Alcatel terminal equipment.
Through listening tests, the quality is evaluated.
Both transmit and receive audio path are evaluated.

The following parameters are in focus:

Listening Test Parameter	
Sound level	After setup, the signal level in the headset is comfortable.
Speech Quality	The speech must be clear and undistorted.

A listening test is subjective by nature. To ensure a thorough evaluation, participants from both Alcatel and Sennheiser Communications must be involved in the listening test.
The list of headset products is given in appendix A.

4.1.3 Available features

A table summarizing available features of each headset is completed.

Circle Series (SC230/SC260) wired headset

- Best-in-class Comfort – Circleflex™ patent-pending dual-hinge ear cups that adapt seamlessly to your ears, for instant perfect fit and relaxed all-day wearing
- Noise-canceling microphone – filters out ambient noise for optimum speech clarity
- Unique Robust Construction – crafted with look and feel in mind
- Dual-sided wearing style – numbered headband grooves for step-by-step adjust-ment ensures perfect binaural sound reproduction in noisy environments
- Durability – metal reinforced headband designed for years of wearing pleasure
- Sennheiser HD Voice Clarity – wideband sound for a more natural experience
- Bendable Boom Arm – easy to adjust to the optimal microphone position
- Pivotable Boom – rotates through 350 degrees for precision microphone placement and wearing flexibility on right or left side
- Name Tag Personalization – easy user ID helps to avoid wearing a neighbor's headset
- ActiveGard™ –technology protects you from acoustic shock and sudden sound surges

DW Series wireless

- Unique Premium Design – Crafted for comfort
- High Comfort Wearing Styles – Choose between ear hook and headband wearing style
- Intuitive user interface – Mute microphone and adjust volume up or down
- Sennheiser HD Voice Clarity – Wideband sound for a more natural experience
- Full workday Talk Time – 8 hours in wideband sound mode and 12 hours in narrowband sound mode
- Intelligent fast charging – 50% in 20 minutes gives you 4 hours talk time
- Long Distance Wireless Range – In typical office building: Up to 55 m and in line of sight: Up to 180 m.
- Protected hearing – ActiveGard™ technology protects against acoustic shock and sudden sound surges
- Boosted productivity – Noise-canceling microphone filters out unwanted background noise
- Desk phone & soft phone – Switch from one communication channel to the other. One touch on the base station to select the channel you wish to call from

SH and CC Series corded

- Unique Premium Design – Crafted for comfort
- High comfort headband wearing style
- Both single- and double sided versions available
- Optimum clarity – A noise-cancelling microphone filters out ambient sounds for clearer speech.
- HD voice clarity – The SH and CC Series are available both in narrowband (200Hz-3.5khz) and wideband (200Hz-6.8khz) versions. The wideband versions delivers natural high-definition sound for superior voice clarity, accented speaker recognition, and reduced echo.
- Protected hearing - ActiveGard™ technology protects against acoustic shock and sudden sound surges.

4.1.4 Conclusion

The result of the two above mentioned tests are combined into a single recommendation for each headset product qualifying it on the Alcatel equipment. Qualified headset product is fully functional with the Alcatel terminals nd PBX system.

4.2 Test results

Listening tests

Both transmit and receive audio path quality are evaluated according to appendix C.

Listening Test Result			
Headset Name	**Sennheiser Part Number**	**Test Result**	**Comment**
IP Touch 4068			
SC230	504401	✓	
SC260	504402	✓	
SH330	005354	✓	
SH350	005356	✓	
CC515	500215	✓	
CC550	005361	✓	
DW Office / DW10	504300	✓	
DW Pro1 / DW20	504304	✓	
DW Pro2 / DW30	504308	✓	
IP Touch 4038/4028/4018/4008			
SC230	504401	✓	
SC260	504402	✓	
SH330	005354	✓	
SH350	005356	✓	
CC515	500215	✓	
CC550	005361	✓	
DW Office / DW10	504300	✓	
DW Pro1 / DW20	504304	✓	
DW Pro2 / DW30	504308	✓	
MR 400, Omnitouch 8118/8128			
SC230	504401	✓	**This test have been made by Alcatel-Lucent**
SC260	504402	✓	"
SH330	005354	✓	"
SH350	005356	✓	"
CC515	500215	✓	"
CC550	005361	✓	"
DW Office / DW10	504300	✓	"
DW Pro1 / DW20	504304	✓	"
DW Pro2 / DW30	504308	✓	"

Listening tests are done on the available test system at Sennheiser Communication

4.2.1 Handset / Headset Measurements

Test results for IP Touch Handset: Transmit

The transmit sensitivity of the handset and headset at 1 kHz are to be within 3dB of each other.

Product	Sensitivity at 1 kHz dB V/Pa	Difference dB	Limit dB
Handset IP Touch	**-39.5 dBV**	-	+/-3dB
SH330	-42,0 dBV	-2,5 dB	✓
SH350	-40,0 dBV	-0,5 dB	✓
CC515	-40,0 dBV	-0,5 dB	✓
CC550	-38,5 dBV	+1,0 dB	✓
DW Office / DW10	-37,2 dBV	+2,3 dB	✓
DW Pro1 / DW20	-37,9 dBV	+1,6 dB	✓
DW Pro2 / DW30	-37,8 dBV	+1,7 dB	✓

Note: The DW series is equipped with a microphone level adjustment. The value is obtained when putting the microphone level adjustment to position “6”. This setting can be adjusted in step of 3 dB.

Product	Sensitivity at 1 kHz dB V/Pa	Difference dB	Limit dB
Handset IP Touch	**-49.0 dBV**	-	+/-3dB
SC230	-48,5 dBV	+0,5 dB	✓
SC260	-48,3 dBV	+0,3 dB	✓

Note: The sensitivity of the handset microphone is measured with a distance of 50mm away from the mouth, as this is seen as a more natural position for the user. Position the handset close to the mouth (e.g. 20 mm) will result in a lot of “puff” noise.

Test results for IP Touch Handset: Receive

The receive sensitivity is to be within ±6.25 dB of the handset. This allows for different headset styles and the 12.5 dB of user adjustable volume control.

Product	Sensitivity at 1 kHz dB Pa/V First test campaign	Difference dB	Sensitivity at 1 kHz dB Pa/V Second test campaign	Difference dB	Limit dB
Handset IP Touch	**18,25**	-	**19,3**	-	±6.25 dB
SC230			**11,5**	-7,8	-
SC260			**9,0/8,0**	-10,3/-11,3	-
SH330	**23,53**	+5,28			✓
SH350	**20,94/21,90**	+2,69/+3,69			✓
CC515	**22,14**	+3,89			✓
CC550	**20,65/19,30**	+2,40/1,05			✓
DW Office / DW10	**13,81**	-4,44			✓
DW Pro1 / DW20	**21,13**	+2,88			✓
DW Pro2 / DW30	**14,13/14,06**	-4,12/-4,19			✓

Measured with 0Ω in series with speaker.

Product	Sensitivity at 1 kHz dB Pa/V	Difference dB	Limit dB
Handset IP Touch	**1,8**	-	±6.25 dB
SC230	1,7	-0,1	✓
SC260	-1,6/-0,6	-3,4/-2,4	✓

Measured according to specification in appendix B. (with 400Ω in series with speaker)

DW series are measured at maximum volume control. Please note that signal will be higher as the signal in this volume position is compressed.

The binaural headset does not deliver the same sound pressure level as the monaural headset and the handset speaker. Normally this is fully accepted as the perceived sound pressure level is on a binaural headset is 6 to 10 dB higher when compared to a monaural headset. Refer to ETSI EG 202 518 V1.1.1 (2006-09), annex B and ITU-T P.310 (06/2009) paragraph 6.2.1.

Note that this measurement has been made in two different ways for. In the first measurement, the speaker serial resistance is 400Ω as specified in the measurement setup in appendix B. In the second measurement the serial resistance is 0Ω. This latter measurement is often used to characterize the speaker itself.

The THD+N measurement of the headset is to be less than 3 % across the 300 Hz up to 3400 Hz frequency band.

Product	Maximum THD+N (300 Hz to 3400 Hz) % First test campaign	Maximum THD+N (300 Hz to 3400 Hz) % Second test campaign	Limit %
Handset IP Touch	**1,1%**	**0,8%**	**<3%**
SC230		0,8%	✓
SC260		0,6%/0,7%	✓
SH330	0,35%		✓
SH350	0,35%/0,35%		✓
CC515	0,25%		✓
CC550	0,25%/0,25%		✓
DW Office / DW10	2,9%		✓
DW Pro1 / DW20	1,8%		✓
DW Pro2 / DW30	1,7%/1,8%		✓

Note: The THD is measured at maximum volume setting on the DW Pro1 and DW Pro2. See measurements and addition explanation in the measurements overview.

Receive Impedance.

Product	S/N	Impedance at 1kHz	DC resistance Ω
Handset IP Touch	**-**	**55,9**	**54,8**
SC230	0251000090	-	179
SC260	0251000054	-	187
SH330	030 023 1372	308,4	296,4
SH350	019 013 3897	296,6	284,8
CC515	030 000 7331	302,7	291,1
CC550	033 005 1539	299,8	291,3
DW Office / DW10	230 001 865	750	880
DW Pro1 / DW20	300 000 002	750	880
DW Pro2 / DW30	260 000 624	750	880

Note : The impedance is measured both at DC and AC except for Circle Series. The AC impedance is quite close to the DC impedance.
The impedance for the DW series is only measured once as this is defined by the base station.

Receiver maximum sound pressure level.

Product	Maximum SPL at 1 kHz dB SPL	Difference dB
Handset IP Touch	110,0 dB	-
SC230	100,3 dB	-9,7 dB
SC260	95,0/98,1 dB	-15,0/-11,9 dB
SH330	111,4 dB	+1,4 dB
SH350	110,8/109,8 dB	+0,8/-0,2 dB
CC515	111,1 dB	+1,1 dB
CC550	108,3/107,9 dB	-1,7/-2,1 dB
DW Office / DW10	86,2 dB	-23,8 dB
DW Pro1 / DW20	93,5 dB	-16,5 dB
DW Pro2 / DW30	86,4/86,5 dB	-23,6/-23,5 dB

Note. The wired headsets are equipped with an ActiveGard™ protection system. This system limits the maximum sound pressure. If this system detects very high supply levels it will limits the sound pressure even further. The maximum sound pressure will be achieved with a receiver supply of approx -6dBV, where the sound pressure will be less than 90 dB SPL with a receiver supply of e.g. +6dBV or higher.
The DW series are equipped with a “Dynamic Volume Control” and a digital version of the ActiveGard™ that actively reduces the sound pressure level.

Available features

Test category	Tests	SC230	SC260	SH330	SH350	CC515	CC550	DW Office	DW Pro1	DW Pro2
Power supply										
	Battery replacement							X	X	X
Plugging / Pairing										
	Headset connection							X	X	X
	USB connection							X	X	X
	Bluetooth connection									
Voice functionalities										
	Voice emission							X	X	X
	Voice reception							X	X	X
Telephony										
Not in communication	Hang-up (from headset)							X	X	X
	On-hook (from headset)							X	X	X
In communication	Hang-up (from headset)							X	X	X
	On-hook (from headset)							X	X	X
	Mute							X	X	X
	Sound level modification (reception)							X	X	X
	Sound level modification (emission)							X	X	X

Here is the legend for the previous table :

: Functionality not available on this device
X : Functionality available and operational
-- : Functionality not operational or problems have been observed

4.3 Conclusion

The following table summarizes test results:

Headset Name	Sennheiser Part No.	Test Result	Comment
SC230	504401	OK	Wired monaural Contact Centre & Office (CC&O) headset.
SC260	504402	OK	Wired binaural Contact Centre & Office (CC&O) headset.
SH330	005354	OK	Wired monaural office headset.
SH350	005356	OK	Wired binaural office headset.
CC515	500215	OK	Wired monaural call centre headset.
CC550	005361	OK	Wired binaural call centre headset.
DW Office / DW10	504300	OK	Wireless 2in1 (ear hook/headband) office headset.
DW Pro1 / DW20	504304	OK	Wireless monaural office headset.
DW Pro2 / DW30	504308	OK	Wireless binaural office headset.

5 Test cases for DW series

Test Case No.	Purpose	Precondition	Test Steps	Verify

5.1 Incoming call handling:

TC_IC_MSH_DS_001	HS can accept and end an incoming call.	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone and answer the call on the HS b) end the active call on the HS Repeat this test case 5 times!	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_IC_MSH_DS_002	HS can accept and Base can end an incoming call.	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone and answer the call on the HS b) end the active call on the Base Repeat this test case 5 times!	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_IC_MSH_DS_003	Base can accept and HS can end an incoming call.	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone and answer the call on the Base b) end the active call on the HS	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly

TC_IC_MSH_DS_004	Base can accept and end an incoming call.	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone and answer the call on the Base b) end the active call on the Base	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_IC_MSH_DS_005	Accept incoming call by lifting HS out of Base - and end it by replacing HS back. (Deskphone)	Base is connected to a deskphone and a softphone. Base and HS is paired - HS is placed in Base craddle. Base is configured to answer on HS lift. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone and answer the call by lifting HS out of cradle b) end the call by replacing the HS on the Base craddle Repeat this test case 5 times!	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_IC_MSH_DS_006	The call is not answered by lifting HS out of craddle	Base is connected to a deskphone and a softphone. Base and HS is paired - HS is placed in Base craddle. Base is NOT configured to answer on HS lift. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone and try to answer the call by lifting HS out of cradle	a) verify that the call is not answered and that the phone is still ringing

TC_IC_MSH_DS_007	To power on the HS and answer and end an incoming call.	Base is connected to a deskphone and a softphone. HS is powered off. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone b) power on the HS and answer the call from the HS c) end the call from the HS	a) verify that the call can be answered from the HS after it is powered on
TC_IC_MSH_DS_008	To power on the HS and answer and verify auto-answer	Base is connected to a deskphone and a softphone. HS is powered off. Base IS configured to auto answer on HS lift. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone b) power on the HS and answer the call from the HS c) end the call from the HS	a) verify that the call can be answered from the HS after it is powered on
TC_IC_MSH_DS_009	To reject an incoming call from the HS	Base is connected to a deskphone and a softphone. Base IS configured to auto answer on HS lift. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone b) with correct action on the HS reject the incoming call	a) verify that the call can be rejected from the HS
TC_IC_MSH_DS_011	To power off the HS during the incoming call	Base is connected to a deskphone and a softphone. Base IS configured to auto answer on HS lift. Base is defaulted to PSTN interface.	a) make an incoming call from External Deskphone b) with corect action on HS - power it off during the incoming call	b) verify that the HS can be powered off during the incoming call

		Hook interface configured and installed is = MSH		
TC_IC_MSH_DS_012	To place the HS back in BS during an incoming call	Base is connected to a deskphone and a softphone. Base IS configured to auto answer on HS lift. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone b) place the HS back in the BS during the incoming call	b) verify that the HS and BS dont crash when HS inserted in the BS
TC_IC_MSH_DS_013	To abort an incoming call from the external deskphone	Base is connected to a deskphone and a softphone. Base IS configured to auto answer on HS lift. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone b) cancel the call from the external deskphone	b) verify that the HS and BS stops indicating incoming call

5.2 Outgoing call handling:

TC_OC_MSH_DS_001	HS can initiate and end an outgoing call.	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Base is NOT configured to answer on HS lift. Hook interface configured and installed is = MSH	a) Initiate an outgoing call from the HS and make a call to the external deskphone b) end the active call on the HS Repeat this test case 5 times!	a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
	BS can initiate and end an outgoing call.	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Base is NOT configured to answer on HS lift. Hook interface configured and installed is = MSH	a) Initiate an outgoing call from the BS and make a call to the external deskphone b) end the active call on the BS Repeat this test case 5 times!	a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_OC_MSH_DS_003	HS can initiate and BS end an outgoing call.	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Base is NOT configured to answer on HS lift. Hook interface configured and installed is = MSH	a) Initiate an outgoing call from the HS and make a call to the external deskphone b) end the active call on the BS Repeat this test case 5 times!	a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly

TC_OC_MSH_DS_004	BS can initiate and HS end an outgoing call.	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Base is NOT configured to answer on HS lift. Hook interface configured and installed is = MSH	a) Initiate an outgoing call from the HS and make a call to the external deskphone b) end the active call on the HS Repeat this test case 5 times!	a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_OC_MSH_DS_005	HS can initiate and BS end an outgoing call.	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Base IS configured to answer on HS lift. Hook interface configured and installed is = MSH	a) Initiate an outgoing call from the HS by lifting it out of the BS and make a call to the external deskphone b) end the active call on the BS Repeat this test case 5 times!	a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_OC_MSH_DS_006	HS can initiate and end an outgoing call by lifting hs out and back from BS	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Base IS configured to answer on HS lift. Hook interface configured and installed is = MSH	a) Initiate an outgoing call from the HS by lifting it out of the BS and make a call to the external deskphone b) end the active call by placing the HS back in BS cradle Repeat this test case 5 times!	a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly

TC_OC_MSH_DS_007	HS can initiate and end an outgoing call by lifting hs out and back from BS	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Base IS configured to answer on HS lift. Hook interface configured and installed is = MSH	a) Initiate an outgoing call from the HS by lifting it out of the BS and make a call to the external deskphone b) end the active call from the external deskphone Repeat this test case 5 times!	a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_OC_MSH_DS_008	HS can initiate and end an outgoing call (with auto link disabled)	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Base IS NOT configured to answer on HS lift. Hook interface configured and installed is = MSH	a) Initiate an outgoing call from the HS by lifting it out of the BS and make a call to the external deskphone b) end the active call from the HS Repeat this test case 5 times!	a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_OC_MSH_DS_009	To power on the HS and initiate an outgoing call	Base is connected to a deskphone and a softphone. HS is powered off. Base is defaulted to PSTN interface. Base IS NOT configured to answer on HS lift. Hook interface configured and installed is = MSH	a) Power on the HS b) Initiate an outgoing call from the HS b c) with correct action on the HS end the call	a) verify that the HS connects to the BS after power on b) a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly

TC_OC_MSH_DS_010	Stress Test : Open / close link from the HS	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Base is NOT configured to answer on HS lift. Hook interface configured and installed is = MSH	a) open link towards deksphone from the HS b) close the link from the HS immediately after Repeat this test case 50 times!	a) verify that call is initiated and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly

5.3 Toggling between phone interfaces:

TC_CTT_MSH_DS_004	Active call on USB interface - toggle to answer incoming PSTN call from the HS and end it from the BS	Base is connected to a deskphone and a softphone. Hook interface configured and installed is = MSH There is an active call on USB interface!	a) make an incoming call from External Deskphone and answer the call on the HS b) end the active call on the BS	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_CTT_MSH_DS_005	Active call on USB interface - toggle to answer incoming PSTN call from the BS and end it from the HS	Base is connected to a deskphone and a softphone. Hook interface configured and installed is = MSH There is an active call on USB interface!	a) make an incoming call from External Deskphone and answer the call on the BS b) end the active call on the HS	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly
TC_CTT_MSH_DS_009	Active call on USB interface (via HeadSetup) - toggle to answer incoming PSTN call from the HS and end it from the BS	Base is connected to a deskphone and a softphone (Skype) via HeadSetup running. Hook interface configured and installed is = MSH There is an active call on USB interface!	a) make an incoming call from External Deskphone and answer the call on the HS b) end the active call on the BS	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly

TC_CTT_MSH_DS_010	Active call on USB interface (via HeadSetup) - toggle to answer incoming PSTN call from the BS and end it from the HS	Base is connected to a deskphone and a softphone (Skype) via HeadSetup running. Hook interface configured and installed is = MSH There is an active call on USB interface!	a) make an incoming call from External Deskphone and answer the call on the BS b) end the active call on the HS	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is ended and hook interface is behaving correctly

5.4 Power Control:

TC_PC_DS_005	Removing / reinserting power cable on BS and answering incoming call	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base range setting is set to = low. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) Remove power cable from BS b) Reinsert the power cable to the BS c) Make incoming call from external deskphone d) Answer the call from the BS e) end the call from the HS **repeat test 10 times!**	a) verify correct behaviour after power cable is removed b) verify correct behaviour after power cable is reinserted d) verify correct behaviour when call is answerred e) verify that call is ended and hook interface is behaving correctly
TC_PC_DS_006	Removing / reinserting power cable on BS and initiating outgoing call	Base is connected to a deskphone and a softphone. Base and HS is paired - link is closed. Base range setting is set to = low. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) Remove power cable from BS b) Reinsert the power cable to the BS c) initiate outgoing call from the HS d) end the call from the BS **repeat test 10 times!**	a) verify correct behaviour after power cable is removed b) verify correct behaviour after power cable is reinserted c) verify correct behaviour when call is answerred d) verify that call is ended and hook interface is behaving correctly

5.5 Interface robustness validation:

TC_CD_DS_004	Connect the Ehook cable during an active call and transfer the audio to HS	Base is NOT connected to the deskphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone and answer the call on the deskphone b) connect the BS to the deskphone via the Ehook cable and transfer the call to the HS from the HS c) end the call by replacing hs in craddle Repeat this test case 10 times!	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is transferred to hs c) verify that call is ended and hook interface is behaving correctly
TC_CD_DS_005	Disconnect/ Reconnect Ehook cable during an active call	Base is connected to the deskphone and a softphone. Base and HS is paired - link is closed. Base is defaulted to PSTN interface. Hook interface configured and installed is = MSH	a) make an incoming call from External Deskphone and answer the call on tHS b) Disconnect the ehook cable from either BS or Deskphone c) wait 30 seconds and reconnect the ehook cable and transfer the audio to HS c) end the call by replacing hs in craddle Repeat this test case 10 times!	a) verify that call is answerred and hook interface is behaving correctly b) verify that call is transferred to deskphone c) verify correct behaviour on HS c) verify that call is ended and hook interface is behaving correctly

6 Appendix A : Products description

Ideal for offices and call centers where you need to talk on the phone and keep one ear on what's happening around you, our single-sided headsets deliver great sound to one ear, just like a traditional phone, while our double-sided headsets deliver your calls in quality sound, helping you to truly concentrate on your caller – but with your hands free. With a range of wearing styles and ear pads, you'll easily find a headset that you can comfortably wear all day.
All Sennheiser Communications telecom headsets are featuring the unique ActiveGard™ acoustical shock protection system. The patented system utilizes compression technologies to remove the energy from an excessive incoming signal transmitted through the telephone system and leaves the signal free of distortion.

Why headset from Sennheiser Communications

Design & comfort
We have designed our unique headsets to provide you with the most comfortable and visually-attractive solution, giving professional users a real choice of wearing style based on their needs.
Imagine making every call in comfort, and being able to focus on what's important: Dedicated and concentrated communication.

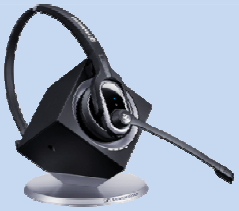
Sound quality
Our headsets come with all the advantages of Sennheiser HD voice clarity. By delivering a warm and more natural sound, wideband technology allows you to catch the emotional tone of your callers' voices, so you won't ever be in doubt or misunderstand a situation – even in the noisiest of environments.
Also, thanks to the Sennheiser legacy in audio, callers will sound as if they're right across from you – just like face-to-face communication.

Perfect match
No matter whether you want the freedom to work at your desk, or roam around the office, Sennheiser Communications are able to deliver the perfect match:

- Wireless headset for maximum flexibility and mobility
- Corded headset when your desk is the primary workplace
- Dialogue with ergonomic perfection in wearing style
- Earhook and headband versions available
- Both single- and double-sided versions available

Safety
Because your comfort is our concern we have ensured that you get safe, high-quality headsets fitted with our patented ActiveGard™ system which protects you from acoustic shock.

Sennheiser Communications - DW Series (Wireless)

Type	Solution		
DECT Wireless	DW Office	DW Pro1	DW Pro2
			

- Unique Premium Design – Crafted for comfort
- High Comfort Wearing Styles – Choose between ear hook and headband wearing style
- Intuitive user interface – Mute microphone and adjust volume up or down
- Sennheiser HD Voice Clarity – Wideband sound for a more natural experience
- Full workday Talk Time – 8 hours in wideband sound mode and 12 hours in narrowband sound mode
- Intelligent fast charging – 50% in 20 minutes gives you 4 hours talk time
- Long Distance Wireless Range – In typical office building: Up to 55 m and in line of sight: Up to 180 m.
- Protected hearing – ActiveGard™ technology protects against acoustic shock and sudden sound surges
- Boosted productivity – Noise-canceling microphone filters out unwanted background noise
- Desk phone & softphone – Switch from one communication channel to the other. One touch on the base station to select the channel you wish to call from

Sennheiser Communications – Wired Circle Series (SC230/SC260)

Circle Series – SC230
- Sennheiser HD voice clarity
- Best-in-class Comfort
- Noise-cancelling microphone
- ActiveGard™ acoustic shock protection
- Monaural (single-sided)

Circle Series – SC260
- Sennheiser HD voice clarity
- Best-in-class Comfort
- Noise-cancelling microphone
- ActiveGard™ acoustic shock protection
- Binaural (dual-sided)

Sennheiser Communications – SH and CC Series (Corded)

Medium Line – SH3XX line
- Noise cancelling Microphone
- Comfort design – large speakers
- Open plan offices
- ActiveGard™ acoustic shock protection

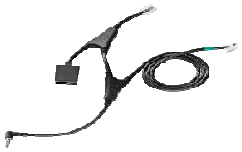
High-End line – CC5XX line
- Ultra noise cancelling Microphone
- Comfort design – Ext Large loudspeakers
- Call center / customer service
- ActiveGard™ acoustic shock protection

Alcatel-Lucent phones – 8 series IP touch

DW Office

DW Pro1

DW Pro2



CEHS-AL 01
Art. Nr. 504100

IP Touch 4008

IP Touch 4018

IP Touch 4028

IP Touch 4038

IP Touch 4068

CCEL 193-2
Art. Nr. 500366

SC230

SC260

SH 2xx series

SH 3xx series

CC 5xx series

Alcatel-Lucent phones – 9 series Digital phones

DW Office

DW Pro1

DW Pro2

CEHS-AL 01
Art. Nr. 504100

Digital phone 4019

Digital phone 4029

Digital phone 4039

CCEL-193-2
Art. Nr. 500366

SC230

SC260

SH 2xx series

SH 3xx series

CC 5xx series

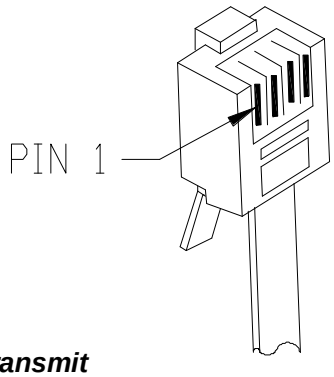
7 Appendix B: Electrical Measurements

Introduction

In order to ensure the suitability of the headset the following electrical tests are to be carried out.

Wiring.

The headset supplier is to ensure that the wiring of the headset confirms to that of the Alcatel handsets shown as following: -

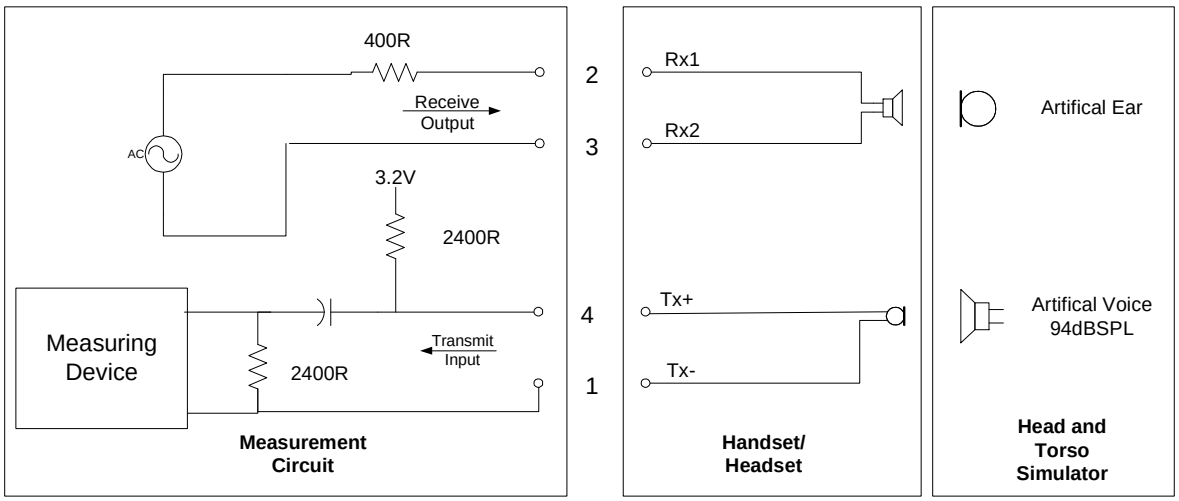


Pin 1 - TX -
Pin 2 - RX
Pin 3 - RX
Pin 4 – TX+

Transmit

The handset is to be unplugged and removed from the terminal. Using a handset positioner the handset is to be located onto the Head and Torso simulator (an example of which is the B&K 4128) in the standard wearing position.

The microphone circuit of the handset and headset is to be configured in a circuit typical to that of the Reflexes telephones, as shown below



Using the standard 1/12 octave steps the voice is to be swept across the 100Hz to 10kHz bandwidth. The output from the handset is to be recorded along with a THD+N measurement. The handset is to be replaced by the headset and the microphone adjusted to the correct wearing position in accordance with the manufactures instructions, and the test repeated.

Receive

For receive testing the handset is to be placed on the HATS in the normal wearing position as detailed above. The handset is to be driven from 400R (the typical output impedance for a Reflexes terminal) at –20dBV, as shown above.

The handset is to be replaced by the headset placed in the normal wearing position as defined by the manufacturer. The headset is to be fitted with the standard ear cushion that is supplied with the headset. Only the normal pressure applied by the headband or ear loop is to be used during this test.

It is accepted that different headset styles have different receive characteristics. The Reflexes range of telephones, which have a volume control; telephones are able to be adjusted by 12.5dB.

8 Appendix C: Subjective Measurements

As well as carrying out simple electrical measurements, subjective measurements on the headset are also required.

Subjective measurements are for want of a better word very subjective. In order to ensure some sort of standard and repeatability the following steps should be used during the subjective measurements.

1) For each headset tested a blind comparison should always be made against the handset. The remote party should be asked to comment on level and tonal quality of both the headset and handset.
2) For amplifier based products or products that require some setting up, the unit should be set to provide a transmit level that is similar to that of the handset. The exact setting should be recorded.
3) Both the headset wearer and remote part should listen out for distortion, noise or any unwanted artifacts. The headset is deemed not compatible if the noise or artifacts affect the overall audio quality.
4) The headset is deemed compatibility if the headset does not degrade the quality of the telephone, or introduce any unwanted artifacts.

9 Appendix D: Partner escalation process

Level:	Description:	Contact Person:	E-mail:	Phone:
1	Day-to-Day support	Erik Sonne	es@senncom.com	+45 56180059
2	Strategic importance	Lars Riis Rasmussen	lra@senncom.com	+45 56180015
3	Management	Jesper Kock	jek@senncom.com	+45 56180021

10 Appendix E: AAPP program

10.1 Alcatel-Lucent Application Partner Program (AAPP)

Complete e-business solutions at your disposal

The Application Partner Program is designed to support companies that develop communication applications for the enterprise market, based on Alcatel-Lucent's Omni product family. The program provides tools and support for developing, verifying and promoting compliant third-party applications that complement Alcatel-Lucent's Omni-based products. Alcatel-Lucent facilitates market access for compliant applications.

The Alcatel-Lucent Application Partner Program (AAPP) has two main objectives:

- **Provide easy interfacing for Alcatel-Lucent communication products**: Alcatel-Lucent's communication products for the enterprise market include infrastructure elements, platforms and software suites. To ensure easy integration, the AAPP provides a full array of standards-based application programming interfaces and fully-documented proprietary interfaces. Together, these enable third-party applications to benefit fully from the potential of Alcatel-Lucent products.

- **Test and verify a comprehensive range of third-party applications**: to ensure proper inter-working, Alcatel-Lucent tests and verifies selected third-party applications that complement its portfolio. Successful candidates, which are labelled Alcatel-Lucent Compliant Application, come from every area of voice and data communications.

The Alcatel-Lucent Application Partner Program covers a wide array of third-party applications/products designed for voice-centric and data-centric networks in the enterprise market, including terminals, communication applications, mobility, management, security, …

Web site

If registered Application Partner, you can access the AAPP website at this URL:
http://applicationpartner.alcatel-lucent.com

10.2 Alcatel-Lucent.com

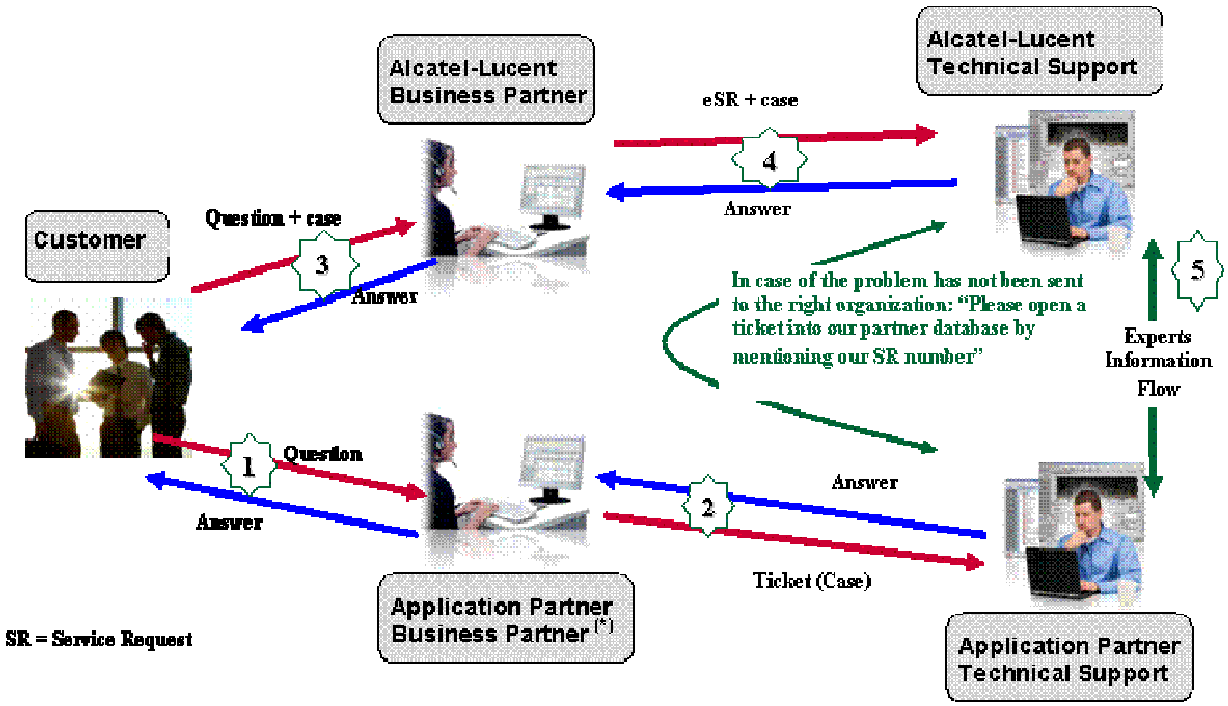
You can access the Alcatel-Lucent website at this URL: http://www.Alcatel-Lucent.com/

11 Appendix F: AAPP Escalation process

11.1 Introduction

The purpose of this appendix is to define the split of responsibilities and the escalation process to be applied by the Alcatel-Lucent Business Partners when facing a problem with a solution involving an Alcatel-Lucent platform and a Third-Party application ***with or without a valid Alcatel-Lucent Inter-Working Report.***

If a problem occurs on an installation involving Alcatel-Lucent platforms and a certified product or application, both parties, Alcatel-Lucent and the Application Partner, are engaged as follows:



(*) The Application Partner Business Partner can be a Third-Party company or the Alcatel-Lucent Business Partner itself

11.2 Escalation in case of certified application/products

The Alcatel-Lucent support will be limited to applications with a valid Inter-Working Report (IWR). Known problems or remarks mentioned in the IWR will not be taken into account.

A valid IWR means an official IWR exists which is posted on the Alcatel-Lucent Enterprise Business Portal and mentions the same release/version of the software of both parties as those of the current customer installation (Or an official agreement between Alcatel-Lucent and the Third-Party exists to support the customer installation if the release/version doesn't match those mentioned in the latest IWR).

If there is an interworking issue, both parties, Alcatel-Lucent and the Application Partner, are engaged:

Case 1: the responsibility can be established 100% on Alcatel-Lucent side.
In that case, the problem must be escalated by the ALU Business Partner to the Alcatel-Lucent Support Center using the standard process: open a ticket (eService Request –eSR)

Case 2: the responsibility can be established 100% on Application Partner side.
In that case, the problem must be escalated directly to the Application Partner by opening a ticket through the Partner Hotline. In general, the process to be applied for the Application Partner is described in the IWR.

Case 3: the responsibility can not be established.
In that case the following process applies:

- The Application Partner shall be contacted first by the Business Partner (responsible for the application, see figure in previous page) for an analysis of the problem.

- The Alcatel-Lucent Business Partner will escalate the problem to the Alcatel-Lucent Support Center only if the Application Partner has demonstrated with traces a problem on the Alcatel-Lucent side or if the Application Partner (not the Business Partner) needs the involvement of Alcatel-Lucent.

In that case**,** the Alcatel-Lucent Business Partner must provide the reference of the Case Number on the Application Partner side. The Application Partner must provide to Alcatel-Lucent the results of its investigations, traces, etc, related to this Case Number.

Alcatel-Lucent reserves the right to close the case opened on his side if the investigations made on the Application Partner side are insufficient or do no exist.

IMPORTANT NOTE 1: The possibility to configure the Alcatel-Lucent PBX with ACTIS quotation tool in order to interwork with an external application is not a guarantee of the availability of the solution. Please check the availability of the Inter-Working Report on the AAPP (Url: https://private.applicationpartner.alcatel-lucent.com) or Enterprise Business Portal (Url: Enterprise Business Portal) web sites.

IMPORTANT NOTE 2: Involvement of the Alcatel-Lucent Business Partner is mandatory, the access to the Alcatel-Lucent platform (remote access, login/password) being the Business Partner responsibility.

11.3 Escalation in case of non-certified application/product

If an Alcatel-Lucent Business Partner escalates an issue where a 3rd party application is involved and the following conditions apply:

1. no IWR exist (not available on the Enterprise Business Portal for Business Partners or on the Alcatel-Lucent Application Partner web site) ,

2. Or the 3rd party company is referenced as AAPP participant but with no existing IWR,

3. Or the existing IWR is available but the release/version of the both parties (Alcatel-Lucent and 3rd-party) are not the same than those currently deployed at the customer site (see exception in Note 2).

In this case, the only responsibility of the Alcatel-Lucent Technical Support is to verify that the Alcatel-Lucent platform is correctly installed and configured for a standard use and that the Alcatel-Lucent equipments perform as expected. If that's the case, Alcatel-Lucent will be forced to close the case.

If the Alcatel-Lucent Business Partner, the customer or the 3rd party company need additional and specific involvement from Alcatel-Lucent, there are two options:

- Either request a quote for specific investigation and diagnosis (with no agreement to fix the issue),

- Or the AAPP program process is followed to officially certify the 3rd party application/product.

For both options, just send the request to the AAPP team (by opening an e-SR).

IMPORTANT NOTE 1: Even if the 3rd party company is able to demonstrate the issue is on the Alcatel-Lucent side, there is no obligation from Alcatel-Lucent to fix it (there is no official IWR established between the two parties).

IMPORTANT NOTE 2: For case 3, Alcatel-Lucent and the Third-Party company may decide to provide a document specifying the possible extension of the IWR by mentioning the list of releases/versions officially supported. (Another way is to update an existing IWR with new release/version compatibility).

11.4 Technical Support access

The Alcatel-Lucent **Support Center** is open 24 hours a day; 7 days a week:

- e-Support from the Application Partner Web site (if registered Alcatel-Lucent Application Partner): http://applicationpartner.alcatel-lucent.com
- e-Support from the Alcatel-Lucent Business Partners Web site (if registered Alcatel-Lucent Business Partners): https://businessportal.alcatel-lucent.com click under "Let us help you" the *eService Request* link
- e-mail: Ebg_Global_Supportcenter@alcatel-lucent.com
- Fax number: +33(0)3 69 20 85 85
- Telephone numbers:

Alcatel-Lucent Business Partners Support Center for countries:

Country	**Supported language**	**Toll free number**
France	French	+800-00200100
Belgium		
Luxembourg		
Germany	German	
Austria		
Switzerland		
United Kingdom	English	
Italy		
Australia		
Denmark		
Ireland		
Netherlands		
South Africa		
Norway		
Poland		
Sweden		
Czech Republic		
Estonia		
Finland		
Greece		
Slovakia		
Portugal		
Spain	Spanish	

For other countries:

English answer : + 1 650 385 2193
French answer : + 1 650 385 2196
German answer : + 1 650 385 2197
Spanish answer : + 1 650 385 2198

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