



Avaya Solution & Interoperability Test Lab

Application Notes for Teleopti Pro with Avaya AuraTM Communication Manager – Issue 1.0

Abstract

These Application Notes describe the compliance testing of Teleopti Pro with Avaya AuraTM Communication Manager. Teleopti Pro is a call accounting program which processes Call Detail Records generated by Avaya AuraTM Communication Manager.

Information in these Application Notes has been obtained through DevConnect compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.

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1. Introduction

The Teleopti Pro Server processes Call Detail Records which it receives from Avaya Aura™ Communication Manager. It can produce call usage reports on incoming and outgoing calls involving internal, external, and network parties.

Teleopti Pro calculates calling charges for outgoing calls based on the destination called and the call duration. Thus, Teleopti Pro does not use charging information which may be returned from the network.

1.1. Interoperability Compliance Testing

The following tests steps were performed during compliance testing:

- Verify the ability of Teleopti Pro to process CDR records for intra-switch calls.
- Verify the ability of Teleopti Pro to process CDR records for inter-switch calls.
- Verify the ability of Teleopti Pro to process CDR records for calls to domestic external (PSTN) telephones.
- Verify the ability of Teleopti Pro to process CDR records for calls to international external (PSTN) telephones.
- Verify the ability of Teleopti Pro to process CDR records for incoming calls.
- Verify the ability of Teleopti Pro to process CDR records for held calls.
- Verify the ability of Teleopti Pro to process CDR records for transferred calls.
- Verify the ability of Teleopti Pro to process CDR records for conference calls.
- Verify the ability of Teleopti Pro to process CDR records for calls made from bridged appearances.
- Verify the ability of Teleopti Pro to process CDR records for calls answered from bridged appearances.
- Verify the ability of Teleopti Pro to process CDR records for calls made to hunt groups.
- Verify the ability of the Teleopti Pro server to recover from interface and power interruptions.

1.2. Support

Teleopti offers customer support at:

Web: support@teleopti.com

Phone: +46 8 568 95 010.

2. Reference Configuration

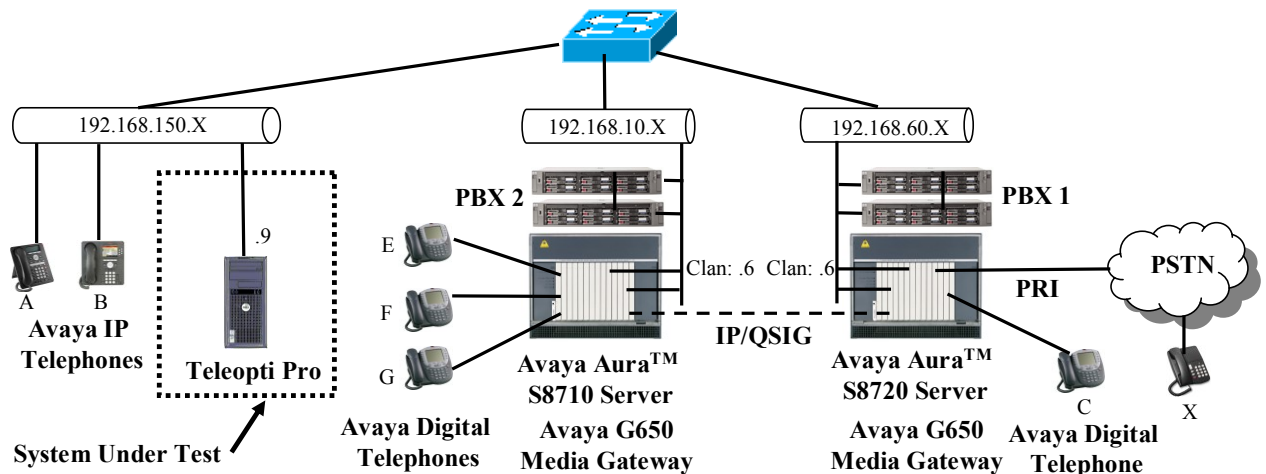


Figure 1: Reference Configuration

The presence of PBX 2 in the above configuration is solely for the purpose of making calls via a trunk to another PBX, and is otherwise not essential for usage of Teleopti Pro. The PBX 2 system is not configured to generate CDR records. The IP/QSIG trunk between the PBX 1 and the PBX 2 could be replaced with any other type of trunk supported by both systems, i.e. PRI, SIP, etc. The function of each of the components in **Figure 1** is as follows:

- The Teleopti Pro server processes CDR records which it receives from the PBX 1.
- The PBX 1 sends CDR records to the Teleopti Pro server as call events occur.
- The PBX 2 has an IP/QSIG trunk interface to the PBX 1. The PBX 2 generates call activity over its PRI trunk, but does not generate CDR records itself.
- The PBX 1 has a PRI trunk interface to the Public Switched Telephone Network (PSTN) over which it can make and receive external calls.
- The Avaya IP Telephones with the designation “A”-“B” are registered with the PBX 1.
- The Avaya Digital telephones with the designation “E”-“G” are attached to the PBX 2.
- Telephone “X” is attached to the Public Switched Telephone Network (PSTN).

The following table contains additional information about each of the telephones contained in the above diagram.

Endpoint	Ext	PSTN Number	Endpoint
A	60071	+49 69 xxxx9887 60071	Avaya 1616
B	60093	+49 69 xxxx9887 60093	Avaya 9640G
C	60007	+49 69 xxxx9887 60007	Avaya 2410
E	10007		Avaya 2410
F	10008		Avaya 2410
G	10009		Avaya 2410
HG (A & B)	61000		
X		+49 69 xxxx 6174	ISDN

Table 1: Extensions Used for Testing

3. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

Platform	Software Component	Version
PBX	Avaya Aura Communication Manager	5.2.1 R015x.02.1.016.4 Patch: 17774
Media Gateway	Avaya TN2312BP IP SERVER INTFC	HW15/FW046
	Avaya TN799DP CONTROL-LAN	HW01/FW032
	Avaya TN2302AP IP MEDIA PROCESSOR	HW20/FW120
Telephones	Avaya 1608 IP Telephone	2110
	Avaya 1616 IP Telephone	2110
	Avaya 9640G IP Telephone	3.1
Server	Teleopti Pro	7
	MS XP Professional	SP3
	MS SQL Server	2008
Client	MS XP Professional	SP3
	MS Internet Explorer	7.0

Table 2: Version Numbers of Equipment and Software

4. Configuration

4.1. Configure Avaya Aura™ Communication Manager

All of the configuration descriptions included in this section are for PBX1. The configuration of PBX2 beyond the scope of these Application Notes, as it is only included in the reference configuration as a means to test the ability of Teleopti Pro to correctly compute calling charges for calls which include a networked PBX.

The configuration and verification operations illustrated in this section were all performed using the Avaya Aura™ Communication Manager SAT terminal via SSH port 5022.

The information provided in this section describes the configuration of Avaya Aura™ Communication Manager for this solution. For all other provisioning information such as installation and configuration, please refer to the product documentation in reference [1].

The configuration operations describe in this section can be summarized as follows:

- Verify that the licenses allocated to the system are sufficient to support the required configuration.
- Configure the IP node name to be used by Teleopti Pro.
- Configure the telephone stations that are to be used for testing.
- Configure the CDR IP service which sends the CDR records to Teleopti Pro.
- Configure the format of the CDR records which are sent to Teleopti Pro.
- Designate the list of stations for which intra-switch CDR records are to be generated.

The configuration of the PRI trunks which attach to the PSTN and the PBX 1 is outside the scope of these Application Notes.

4.1.1. Verify system-parameters customer-options

Use the **display system-parameters customer-options** command to verify that Avaya Aura™ Communication Manager is licensed to meet the minimum requirements to interoperate with the Teleopti Pro server. Those items shown in bold indicate required values or minimum capacity requirements. If these are not met in the configuration, please contact an Avaya representative for further assistance.

On page 2, the value configured for “Maximum Concurrently Registered IP Stations” must be sufficient to support the total number of IP stations used.

display system-parameters customer-options		Page 2 of 10
OPTIONAL FEATURES		
IP PORT CAPACITIES		USED
Maximum Administered H.323 Trunks:	30	5
Maximum Concurrently Registered IP Stations:	10	3
Maximum Administered Remote Office Trunks:	0	0
Maximum Concurrently Registered Remote Office Stations:	0	0
Maximum Concurrently Registered IP eCons:	0	0
Max Concur Registered Unauthenticated H.323 Stations:	0	0
Maximum Video Capable H.323 Stations:	0	0
Maximum Video Capable IP Softphones:	0	0
Maximum Administered SIP Trunks:	10	3
Maximum Number of DS1 Boards with Echo Cancellation:	0	0
Maximum TN2501 VAL Boards:	0	0
Maximum Media Gateway VAL Sources:	0	0
Maximum TN2602 Boards with 80 VoIP Channels:	0	0
Maximum TN2602 Boards with 320 VoIP Channels:	0	0
Maximum Number of Expanded Meet-me Conference Ports:	0	0

Figure 2: System-Parameters Customers-Options Form, Page 2

On page 4, the “IP Stations” parameter must be set to “y” so that IP stations can be configured.

display system-parameters customer-options		Page 4 of 10
OPTIONAL FEATURES		
Emergency Access to Attendant? y		IP Stations? y
Enable 'dadmin' Login? y		
Enhanced Conferencing? n		ISDN Feature Plus? n
Enhanced EC500? y		ISDN Network Call Redirection? n
Enterprise Survivable Server? n		ISDN-BRI Trunks? y
Enterprise Wide Licensing? n		ISDN-PRI? y
ESS Administration? n		Local Survivable Processor? n
Extended Cvg/Fwd Admin? n		Malicious Call Trace? n
External Device Alarm Admin? n		Media Encryption Over IP? n
Five Port Networks Max Per MCC? n		Mode Code for Centralized Voice Mail? n
Flexible Billing? n		
Forced Entry of Account Codes? n		Multifrequency Signaling? y
Global Call Classification? n		Multimedia Call Handling (Basic)? n
Hospitality (Basic)? y		Multimedia Call Handling (Enhanced)? n
Hospitality (G3V3 Enhancements)? n		
IP Trunks? y		
IP Attendant Consoles? n		

Figure 3: System-Parameters Customers-Options Form, Page 4

4.1.2. Configure Node Names

Use the **change node-names ip** command to configure the IP address of the Teleopti Pro server and the local Control LAN interface (CLAN).

change node-names ip		Page 1 of 2
IP NODE NAMES		
Name	IP Address	
PBX 2-CLAN	192.168.10.6	
clan	192.168.60.6	
teleopti	192.168.150.9	
default	0.0.0.0	
rdt-monitor	192.168.150.3	

Figure 4: Node-Names IP Form

4.1.3. Configure Telephone Stations

Use the **add station** command to configure the stations shown in **Table 1**.

Parameter	Usage
Type	Enter the type of station that is to be configured.
Security Code	Enter a numeric security code
Name	Enter a descriptive name for the user of the station.

Table 3: Station Parameters

add station 60093		Page 1 of 5
STATION		
Extension: 60093	Lock Messages? n	BCC: 0
Type: 9640	Security Code: 123456	TN: 1
Port: S00098	Coverage Path 1:	COR: 1
Name: extn 60093	Coverage Path 2:	COS: 1
	Hunt-to Station:	
STATION OPTIONS		
Time of Day Lock Table:		
Loss Group: 19	Personalized Ringing Pattern: 1	
	Message Lamp Ext: 60093	
Speakerphone: 2-way	Mute Button Enabled? y	
Display Language: english	Button Modules: 0	
Survivable GK Node Name:		
Survivable COR: internal	Media Complex Ext:	
Survivable Trunk Dest? y	IP SoftPhone? n	
Customizable Labels? y		

Figure 5: Add Station Form, Page 1

4.1.4. Configure IP Services

Use the **change ip-services** command to configure the IP service which sends CDR records to Teleopti Pro. Note that the CDR2 interface was used to attach a test program for verification purposes only: this need not be configured for normal operation.

Parameter	Usage
Service Type (p.1)	Enter “CDR1” to specify that the primary CDR interface is to be used to send CDR records to Teleopti Pro. This must correspond to the “Primary Output Endpoint” parameter which is shown in Figure 7 .
Local Node (p.1)	Enter “clan” to specify that the CLAN interface is to be used to send CDR records. This value must be configured in Figure 4 .
Remote Node (p.1)	Enter “Teleopti Pro” to specify that CDR records are to be sent to the Teleopti Pro server. This value must be configured in Figure 4 .
Remote Port (p.1)	Enter “9000” to specify that CDR records are to be sent to the Teleopti Pro port which is defined in Figure 4 .

Table 4: Station Parameters

change ip-services			Page 1 of 4		
IP SERVICES					
Service Type	Enabled	Local Node	Local Port	Remote Node	Remote Port
AESVCS	y	clan	8765		
CDR1		clan	0	teleopti	9000
CDR2		clan	0	rdt-monitor	9000

Figure 6: IP-Services Form, Page 1

4.1.5. Configure CDR Interface to Teleopti Pro

Use the **change system-parameters cdr** command to configure the PBX 1 to send CDR records using the format required by Teleopti Pro. Set the parameters on page 1 of this form as show in the following table. Note that the configuration values for the “Secondary Output” were included to cause CDR records to be written to a test tool, and are not required for normal operation.

Parameter	Usage
Primary Output Format	Set this field to “customized” so that CDR records can be generated using the format required by Teleopti Pro.
Primary Output Endpoint	Set this field to “CDR1” to use the CDR IP output device which was configured in section 4.1.4 .
Enable CDR Storage on Disk	Set this field to “y”.
Suppress CDR for Ineffective Call Attempts	Set this field to “y”.

Table 5: Values Used for System-Parameters CDR, Page 1

change system-parameters cdr		Page 1 of 2
CDR SYSTEM PARAMETERS		
Node Number (Local PBX ID):		
Primary Output Format: customized		Primary Output Endpoint: CDR1
Secondary Output Format: customized		Secondary Output Endpoint: CDR2
Use ISDN Layouts? n		Enable CDR Storage on Disk? y
Use Enhanced Formats? n		Condition Code 'T' For Redirected Calls? n
Use Legacy CDR Formats? y		Remove # From Called Number? y
Modified Circuit ID Display? n		Intra-switch CDR? y
Record Outgoing Calls Only? n		Outg Trk Call Splitting? y
Suppress CDR for Ineffective Call Attempts? y		Outg Attd Call Record? y
Disconnect Information in Place of FRL? n		Interworking Feat-flag? n
Force Entry of Acct Code for Calls Marked on Toll Analysis Form? n		Calls to Hunt Group - Record: group-ext
Record Called Vector Directory Number Instead of Group or Member? n		Record Agent ID on Incoming? n
Record Agent ID on Incoming? n		Record Agent ID on Outgoing? y
Inc Trk Call Splitting? n		Call Record Handling Option: warning
Record Non-Call-Assoc TSC? n		Digits to Record for Outgoing Calls: dialed
Record Call-Assoc TSC? n		CDR Account Code Length: 15
Privacy - Digits to Hide: 0		

Figure 7: System-Parameters CDR Form, Page 1

The parameters on page 2 of the **system-parameters cdr** form define the format of the CDR record which is sent to Teleopti Pro. Set the parameters on this form as shown in the following form. Additional information on this subject is contained in [2].

change system-parameters cdr		Page 2 of 2	
CDR SYSTEM PARAMETERS			
Data Item - Length	Data Item - Length	Data Item - Length	
1: date - 6	17: in-trk-code - 4	33: line-feed - 1	
2: space - 1	18: space - 1	34: -	
3: time - 4	19: auth-code - 7	35: -	
4: space - 1	20: space - 1	36: -	
5: sec-dur - 5	21: in-crt-id - 3	37: -	
6: space - 1	22: space - 1	38: -	
7: cond-code - 1	23: out-crt-id - 3	39: -	
8: space - 1	24: space - 1	40: -	
9: code-dial - 4	25: isdn-cc - 11	41: -	
10: space - 1	26: space - 1	42: -	
11: code-used - 4	27: ppm - 5	43: -	
12: space - 1	28: space - 1	44: -	
13: dialed-num - 18	29: acct-code - 15	45: -	
14: space - 1	30: space - 1	46: -	
15: calling-num - 10	31: attd-console - 2	47: -	
16: space - 1	32: return - 1	48: -	
Record length = 119			

Figure 8: System-Parameters CDR Form, Page 2

4.1.6. Configure Intra-Switch CDR Numbers

Use the **change intra-switch-cdr** command to specify that the CDR records are to be generated for locally-attached stations. Enter the local extensions “A” – “C” which are shown in **Table 1**. This step is required only if call records for calls amongst local telephones should be generated.

change intra-switch-cdr		Page 1 of 3	
INTRA-SWITCH CDR			
Extension	Assigned Members:	3	of 5000 administered
Extension	Extension	Extension	Extension
60071			
60093			
60007			

Figure 9: Intra-Switch CDR Form

After the configuration steps for Avaya Aura™ Communication Manager are complete, enter the command **save translation** to make these changes permanent.

4.2. Configure Teleopti Pro

It is assumed the Teleopti Pro application has been successfully installed prior to performing the configuration steps described in this section. A description of the installation of this product is beyond the scope of this document.

Start the Teleopti Log Server Settings application from the desktop by double clicking on its icon on the desktop.

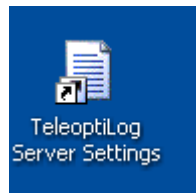


Figure 10: Teleopti Server Settings Icon

The Server Settings Tool will open. Click “New Setting”.

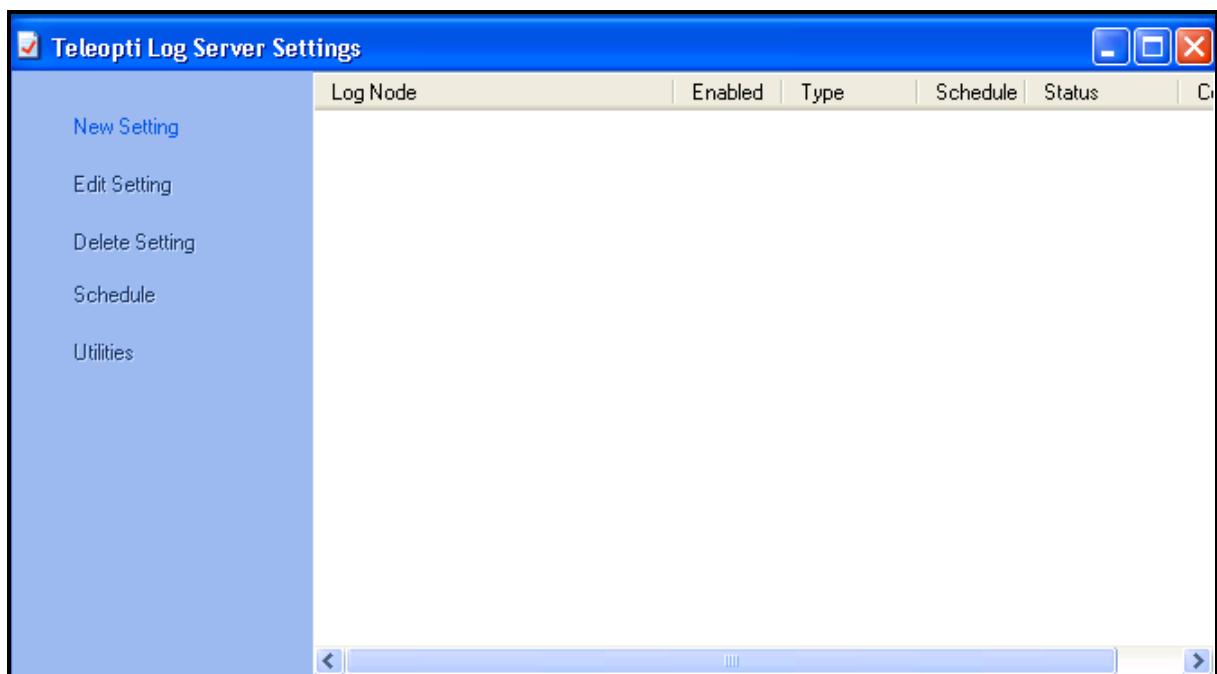
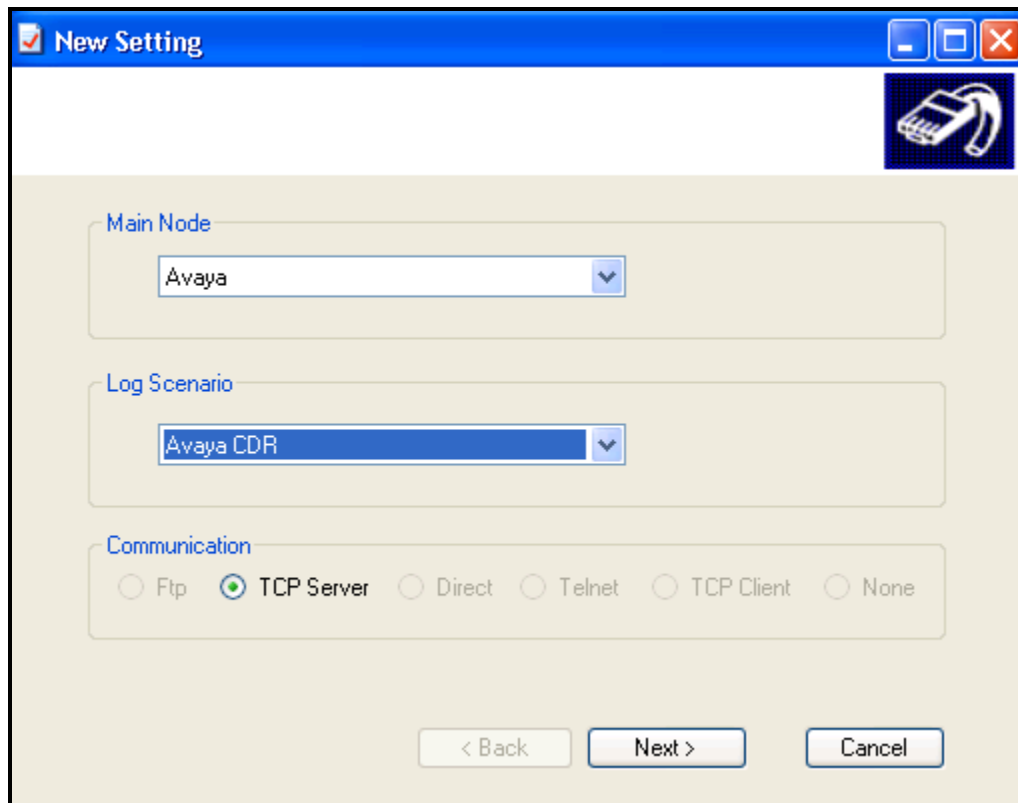


Figure 11: Teleopti Server Settings Program

Choose a “Main Node” setting of “Avaya”, a “Log Scenario” of “Avaya CDR”, and click “Next”.



The screenshot shows a Windows-style dialog box titled "New Setting". It contains three sections: "Main Node" with a dropdown menu set to "Avaya", "Log Scenario" with a dropdown menu set to "Avaya CDR", and "Communication" with radio buttons for "Ftp", "TCP Server" (which is selected), "Direct", "Telnet", "TCP Client", and "None". At the bottom are three buttons: "< Back", "Next >", and "Cancel".

Figure 12: Teleopti Server Settings for Avaya

Parameter	Usage
Port	Enter the value which was specified in Figure 6 .
File name	Enter a FileName where CDR records are to be stored.
Path	Enter the path where CDR files are to be stored.

Table 6: Avaya CDR Settings Parameters

Edit Setting

Settings: Avaya Avaya CDR

parameter	value
Port	9000
ShowDebug	False
TimerInterval	60
FileName	AvayaCDR
Path	C:\LogData\Avaya\CDR\

< Back Finish > Cancel

Figure 13: Teleopti Server CDR Settings Screen

5. General Test Approach and Test Results

The only problem which occurred during testing occurred when the Teleopti Pro server was disconnected from the LAN. Any call records which were sent by PBX 1 for approximately the first two minutes after the disconnection were not recorded. Records which were sent thereafter were recorded correctly after the Teleopti Pro server was reconnected to the LAN.

6. Verification Steps

The correct operation of the data link to Teleopti Pro can be verified from Avaya AuraTM Communication Manager by entering **status cdr-link** from the SAT console and verifying that the “primary” “Link State” is “up”.

status cdr-link	
CDR LINK STATUS	
Primary	Secondary
Link State: up	down
Number of Retries:	999
Date & Time: 2008/8 /7 3 :35:9	2008/8 /6 6 :35:19
Forward Seq. No: 42	0
Backward Seq. No: 0	0
CDR Buffer % Full: 0.00	0.07
Reason Code: OKchange ip-services	CDR connection is closed

Figure 14: Status cdr-link Screen

The correct recording of call records can be verified by making a call from one of the stations attached to PBX 1 (“A” – “C”) to an external party (“X”). If Avaya Aura™ Communication Manager has been configured to generate records for calls amongst local telephones (**Figure 9**), the correct recording of call records can be verified by making calls amongst local stations.

7. Conclusion

These Application Notes describe the compliance testing of the Teleopti Pro with Avaya Aura™ Communication Manager. The various features of the Teleopti Pro which involve interaction with telephony were tested. A detailed description of the configuration required for both the Avaya and the Teleopti equipment is documented within these Application Notes.

8. Additional References

- [1] *Administering Avaya Aura™ Communication Manager*, May 2009, Document Number 03-300509.
- [2] *Avaya Aura™ Communication Manager Feature Description and Implementation*, May 2009, Document Number 555-245-205.
- [3] Teleopti Product Description: Teleopti Pro product leaflet.pdf

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