

Avaya Solution & Interoperability Test Lab

# Application Notes for Empirix Hammer IP with Avaya Aura® Communication Manager using H.323 Endpoint Emulation – Issue 1.0

## Abstract

These Application Notes describe the configuration steps required to integrate Empirix Hammer IP test solution with Avaya Aura® Communication Manager using H.323 endpoint emulation. Hammer IP validates IP-based systems by testing the actual network under anticipated traffic conditions to provide a complete understanding of expected performance. Hammer IP can be used to assess and monitor network performance, reliability and quality of VoIP services in an Avaya IP telephony network. In this configuration, the Hammer IP emulates H.323 endpoints that originate and terminate calls through Avaya Aura® Communication Manager. While the call is active, Hammer IP can send DTMF tones and voice media, and provide voice quality metrics. Call progress can also be monitored, and at the completion of the test, test reports can be generated. Hammer IP provides a collection of applications used to configure the system; create, schedule, and monitor tests; and create reports.

Readers should pay attention to Section 2, in particular the scope of testing as outlined in Section 2.1 as well as the observations noted in Section 2.2, to ensure that their own use cases are adequately covered by this scope and results.

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.

# 1 Introduction

These Application Notes describe the configuration steps required to integrate Empirix Hammer IP test system with Avaya Aura® Communication Manager using H.323 endpoint emulation. Hammer IP validates IP-based systems by testing the actual network under anticipated traffic conditions to provide a complete understanding of expected performance. Hammer IP can be used to assess and monitor network performance, reliability and quality of VoIP services in an Avaya IP telephony network. In this configuration, the Hammer IP emulates H.323 endpoints that originate and terminate calls through Avaya Aura® Communication Manager. While the call is active, Hammer IP can send DTMF tones and voice media, and provide voice quality metrics. Call progress can also be monitored, and at the completion of the test, test reports can be generated. Hammer IP provides a collection of applications used to configure the system; create, schedule, and monitor tests; and create reports.

The following set of Hammer IP applications were used during the compliance testing:

- Hammer Configurator used to configure and manage the system.
- Hammer TestBuilder used to create and run test scripts.
- Hammer System Monitor used to monitor H.323 registration status and call progress.
- Hammer Call Summary Monitor used to monitor call completion.

Below is a list of related Application Notes.

- Application Notes for Empirix Hammer IP with Avaya Aura® Communication Manager using H.323 Trunk Emulation [2]
- Application Notes for Empirix Hammer IP with Avaya Aura® Communication Manager and Avaya Aura® Session Manager using SIP Endpoint Emulation [3]
- Application Notes for Empirix Hammer IP with Avaya Aura® Communication Manager and Avaya Aura® Session Manager using SIP Trunk Emulation [4]

# 2 General Test Approach

Interoperability compliance testing covered feature and serviceability testing. The feature testing was conducted by originating and terminating calls using H.323 endpoint channels on Hammer IP and establishing the calls through Communication Manager. The compliance test also covered monitoring various reports on Hammer IP during and after the test runs, and checking the status of various H.323 resources on Communication Manager. The serviceability testing focused on verifying the ability of Hammer IP to recover from adverse conditions, such as disconnecting the Ethernet cable and rebooting the server.

DevConnect Compliance Testing is conducted jointly by Avaya and DevConnect members. The jointly-defined test plan focuses on exercising APIs and/or standards-based interfaces pertinent to the interoperability of the tested products and their functionalities. DevConnect Compliance Testing is not intended to substitute full product performance or feature testing performed by DevConnect members, nor is it to be construed as an endorsement by Avaya of the suitability or completeness of a DevConnect member's solution.

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## 2.1 Interoperability Compliance Testing

The interoperability compliance testing focused on verifying that the Hammer IP can register with Avaya Aura® Communication Manager as H.323 endpoints, establish calls, send voice media, and provide voice quality metrics. The following features and functionality were covered:

- H.323 endpoint registration with Avaya Aura® Communication Manager.
- Originating and terminating calls through Avaya Aura® Communication Manager.
- Support of G.711mu-law and G.729 codecs.
- Support of direct IP-to-IP media (also known as "Shuffling" which allows IP endpoints to send audio RTP packets directly to each other without using media resources on the Avaya Media Gateway). Calls with Shuffling and IP Audio Hairpinning disabled were also verified.
- Generating voice quality metrics with Shuffling disabled.
- DTMF support.
- Support for H.323 agent login to allow calls directly to a hunt group to be routed to an available agent, which is a Hammer IP H.323 endpoint.
- Support for Avaya H.323 Time-to-Service (TTS).
- SRTP with clear text H.323 signaling from H.323 endpoints to H.323 endpoints and H.323/SIP trunks.
- Originating calls from H.323 endpoints and terminating calls on H.323 endpoints, H.323 trunks, SIP endpoints, and SIP trunks.

**Note:** Performance and load testing was not the focus of the compliance test.

### 2.2 Test Results

All test cases passed. Empirix Hammer IP was successful in originating calls using H.323 endpoint emulation and terminating calls on channels emulating H.323 endpoints, H.323 trunks, SIP endpoints, and SIP trunks. It was observed that after reconnecting the Ethernet cable or reestablishing network connectivity, while a test script was running, required the channels to be unregistered and the configuration to be re-applied.

**Important Note:** The purpose of this compliance test was to verify interoperability between Empirix Hammer IP and Avaya Aura® Communication Manager using H.323 endpoint emulation. That is, the goal was to verify that Hammer IP can register with Communication Manager and establish calls. This was successfully verified. If a Hammer test encounters failed calls, there are various items to consider, including:

• The **Guard Time** and **Stagger** parameters may be set too aggressively (e.g., Hammer IP may be initiating too many calls too quickly) and the configuration under test may not be able to handle the load generated by Hammer IP. These parameters should be considered carefully for each test. It may be necessary to slow down the test to a rate that can be reasonably handled by the test configuration.

Resources may be getting exhausted in the Avaya media gateway. These resources may
include media processing resources, touch-tone receivers (TTRs), network trunks, and
TDM bus resources.

Generally speaking, call failures encountered in Hammer IP are usually a result of one of the issues mentioned above.

**Note:** Communication Manager does not shuffle calls between a SIP trunk and H.323 trunk. This is per design. If the originating endpoint on Hammer is a SIP endpoint, note that the call arrives on Communication Manager via a SIP trunk. Therefore, a call from a SIP endpoint to an H.323 trunk is essentially a call from a SIP trunk to an H.323 trunk and the call is not shuffled.

## 2.3 Support

Technical support on the Empirix Hammer IP can be obtained via phone, website, or email.

- **Phone:** (978) 313-7002
- Web: <u>http://www.empirix.com/support/maintenance.aspx</u>
- Email: <u>supportcontract@empirix.com</u>

# 3 Reference Configuration

The network diagram below illustrates the test configuration. In this configuration, Communication Manager receives calls from Hammer IP, which emulates H.323 endpoints. The call is then routed back to Hammer IP. The call can be terminated to another H.323 endpoint, H.323 trunk, SIP endpoint<sup>1</sup>, or SIP trunk. While the call is established, Hammer IP can send DTMF and/or voice media (i.e., RTP traffic) using an audio recording. A voice quality test allows voice quality metrics to be provided at the end of each call. The Hammer IP applications running on the Hammer IP server were used to configure the system, create and monitor the tests, and view the test reports.

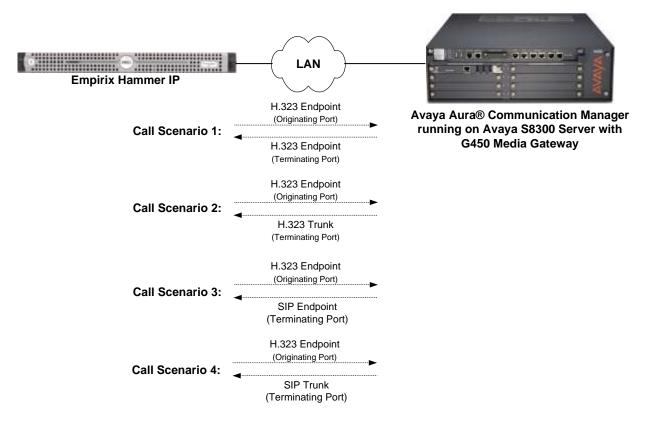


Figure 1: Empirix Hammer IP with Avaya Aura® Communication Manager

<sup>&</sup>lt;sup>1</sup> To terminate the call to a SIP endpoint or SIP trunk, Avaya Aura® Session Manager is required, but is not shown in the configuration diagram.

# 4 Equipment and Software Validated

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

Equipment/Software	Release/Version
Avaya Aura® Communication Manager running on S8300 Server	6.3.9 SP 9.1 (R016x.03.0.124.0 with Patch 22098)
Avaya G450 Media Gateway	Gateway FW 36.12.0
Avaya Aura® Session Manager running on an S8800 Server	6.3.11.0.631103
Empirix Hammer IP running on Microsoft Windows Server 2008 R2 with Dual 2.40 GHz Intel Xeon CPU and 12.0 GB of RAM	6.0.0.85

# 5 Configure Avaya Aura® Communication Manager

This section provides the procedures for configuring Communication Manager. The configuration was performed using the System Access Terminal (SAT). The procedures include the following areas:

- Administer IP Codec Set
- Administer IP Network Region
- Administer H.323 Stations

### 5.1 Administer IP Codec Set

In the **IP Codec Set** form, specify the audio codec(s) required by the test that will be run on the Hammer IP. The form is accessed via the **change ip-codec-set 1** command. Note the codec set number since it will be used in the IP Network Region covered in the next section. For the compliance test, G.711mu-law, G.729AB, and G.729A codecs were used. In the IP codec set form, specify the appropriate codec being used by the Hammer test. Below is the IP codec set configured for **G.711mu-law**.

```
change ip-codec-set 1
                      IP CODEC SET
   Codec Set: 1
  Audio
Codec
             Silence Frames Packet
             Suppression Per Pkt Size(ms)
1: G.711MU
              n 2
                                 20
2:
3:
4:
5:
6:
7:
   Media Encryption
1: none
2:
3:
```

If SRTP is required for the test, set **Media Encryption** to *1-srtp-aescm128-hmac80*. This is the media encryption supported by Hammer IP.

```
Media Encryption
1: 1-srtp-aescm128-hmac80
2:
3:
```

1 of

Page

2

### 5.2 Administer IP Network Region

In the **IP Network Region** form, specify the codec set to be used for Hammer calls and specify whether **IP-IP Direct Audio** (Shuffling) is required for the test. Shuffling allows audio traffic to be sent directly between IP endpoints without using media resources in the Avaya G450 Media Gateway. Note that if Shuffling is enabled, audio traffic does not egress the Hammer IP since the calls would be shuffled. In the following example, Shuffling is disabled.

```
Page 1 of 20
change ip-network-region 1
                             IP NETWORK REGION
 Region: 1
Location: 1 Authoritative Domain: devcon.com
Name: Stub Network Region: n
MEDIA PARAMETERS
                              Intra-region IP-IP Direct Audio: no
     Codec Set: 1
                             Inter-region IP-IP Direct Audio: no
  UDP Port Min: 2048
                                        IP Audio Hairpinning? n
  UDP Port Max: 65535
DIFFSERV/TOS PARAMETERS
Call Control PHB Value: 46
       Audio PHB Value: 46
       Video PHB Value: 26
802.1P/Q PARAMETERS
Call Control 802.1p Priority: 6
       Audio 802.1p Priority: 6
       Video 802.1p Priority: 5
                                 AUDIO RESOURCE RESERVATION PARAMETERS
H.323 IP ENDPOINTS
                                                    RSVP Enabled? n
 H.323 Link Bounce Recovery? y
Idle Traffic Interval (sec): 20
  Keep-Alive Interval (sec): 5
          Keep-Alive Count: 5
```

On **Page 3**, set the **Near End Establishes TCP Signaling Socket** field to *y* if Communication Manager should initiate setting up the TCP signaling socket. Setting this field to *n* will allow Hammer IP to initiate setting up the socket.

```
Page 3 of 20
change ip-network-region 1
                               IP NETWORK REGION
INTER-GATEWAY ALTERNATE ROUTING / DIAL PLAN TRANSPARENCY
Incoming LDN Extension:
Conversion To Full Public Number - Delete:
                                              Insert:
Maximum Number of Trunks to Use for IGAR:
Dial Plan Transparency in Survivable Mode? n
BACKUP SERVERS (IN PRIORITY ORDER)
                                     H.323 SECURITY PROFILES
1
                                     1
                                        challenge
2
                                     2
3
                                     3
4
                                     4
 5
 6
                                     Allow SIP URI Conversion? y
TCP SIGNALING LINK ESTABLISHMENT FOR AVAYA H.323 ENDPOINTS
  Near End Establishes TCP Signaling Socket? y
                      Near End TCP Port Min: 61440
                       Near End TCP Port Max: 61444
```

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### 5.3 Administer H.323 Stations

Configure a H.323 station for each H.323 channel on the Hammer IP. Set the **Type** field to *9620* or *9630*. Set the **Port** field to *IP* and configure a descriptive **Name**. Lastly, configure the **Security Code** that will be used by the Hammer IP to register with Communication Manager. For the compliance test, 20 H.323 stations were used with extensions ranging from 41011 to 41030. The first group of 10 channels (extensions 41011 to 41020) was used to originate calls. The calls were then terminated on the remaining 10 channels (extensions 41021 to 41030). Repeat this procedure for each channel required by the Hammer test.

add station 41011	Page	1 of 5
	STATION	
Extension: 41011	Lock Messages? n	BCC: 0
Туре: 9620	Security Code: 1234	TN: 1
Port: IP	Coverage Path 1:	COR: 1
Name: Hammer	Coverage Path 2:	COS: 1
	Hunt-to Station:	Tests? y
STATION OPTIONS		_
	Time of Day Lock Table:	
Loss Group: 19	Personalized Ringing Pattern:	1
	Message Lamp Ext:	41011
Speakerphone: 2-wa	Ay Mute Button Enabled?	V
Display Language: eng	lish	_
Survivable GK Node Name:		
Survivable COR: inte	ernal Media Complex Ext:	
Survivable Trunk Dest? y	IP SoftPhone?	n
-		
	IP Video?	n
	Short/Prefixed Registration Allowed:	default
	Customizable Labels?	У

**Page 2** of the station form allows Shuffling to be enabled or disabled at the station level. Shuffling can also be disabled at the IP Network Region level.

add station 41011	Page 2 of 5
	STATION
FEATURE OPTIONS	
LWC Reception: spe	Auto Select Any Idle Appearance? n
LWC Activation? y	Coverage Msg Retrieval? y
LWC Log External Calls? n	Auto Answer: none
CDR Privacy? n	Data Restriction? n
Redirect Notification? y	Idle Appearance Preference? n
Per Button Ring Control? n	Bridged Idle Line Preference? n
Bridged Call Alerting? n	Restrict Last Appearance? y
Active Station Ringing: single	
	EMU Login Allowed? n
	Per Station CPN - Send Calling Number?
Service Link Mode: as-needed	EC500 State: enabled
Multimedia Mode: enhanced	Audible Message Waiting? n
MWI Served User Type:	Display Client Redirection? n
AUDIX Name:	Select Last Used Appearance? n
	Coverage After Forwarding? s
	Multimedia Early Answer? n
	Direct IP-IP Audio Connections? y
Emergency Location Ext: 41011	Always Use? n IP Audio Hairpinning? n
Precedence Call Waiting? y	

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# 6 Configure Empirix Hammer IP

This section provides the procedures for configuring the Empirix Hammer IP. The procedures fall into the following areas:

- Assign unique IP addresses to each Hammer IP channel.
- Configure the system, including the originating and terminating channels and the PhoneBook, using the **Hammer Configurator**.
- Save and apply the Hammer configuration and start the Hammer server.
- Create and run the test script using the **Hammer TestBuilder**.

### 6.1 Configure IP Addresses on Hammer IP Server

The Hammer IP server needs to be configured with IP addresses for each channel. During the compliance test, 20 H.323 endpoint channels were used. 10 channels were used to originate calls and 10 channels were used to terminate calls. This requires a block of 20 unique IP addresses, which must be contiguous. The 20 IP addresses used were from 192.168.100.171 to 192.168.100.190. These IP addresses are configured in the **Advanced TCP/IP Settings** under Network Connections in Windows Server 2008.

Advanced TCP/IP Set	tings		<u>? ×</u>
IP Settings DNS V	VINS		
IP add <u>r</u> esses			
IP address		Subnet mask	▲
192.168.100.172	2	255.255.255.0	
192.168.100.173	}	255.255.255.0	
	<u>A</u> dd	<u>E</u> dit	Remo <u>v</u> e
De <u>f</u> ault gateways:			
Gateway		Metric	
192.168.100.1		Automatic	
	A <u>d</u> d	Edi <u>t</u>	Remove
Automatic metric	c		
Interface metric:		-	
		ОК	Cancel

## 6.2 Configure System

This section covers the configuration of originating and terminating channels and the PhoneBook on Hammer IP. In this configuration, the originating channels emulate H.323 endpoints (described in **Section 6.2.1**). The terminating channels can emulate H.323 endpoints, H.323 trunks, SIP endpoints, or SIP trunks. These Application Notes will explicitly describe the configuration for terminating calls to H.323 endpoints in **Section 6.2.2.1**. In addition, it will provide references to other Application Notes for configuring terminating channels as H.323 trunks, SIP endpoints, and SIP trunks in **Sections 6.2.2.2**, **6.2.2.3**, and **6.2.2.4**, respectively. Only one of those sections needs to be followed depending on the configuration desired.

#### 6.2.1 Configure Originating Channels – H.323 Endpoints

Empirix Hammer IP is configured through the **Hammer Configurator**, a graphical user interface, residing on the Hammer IP server. From the Hammer IP server, run the **Hammer Configurator**. The following screen is displayed.

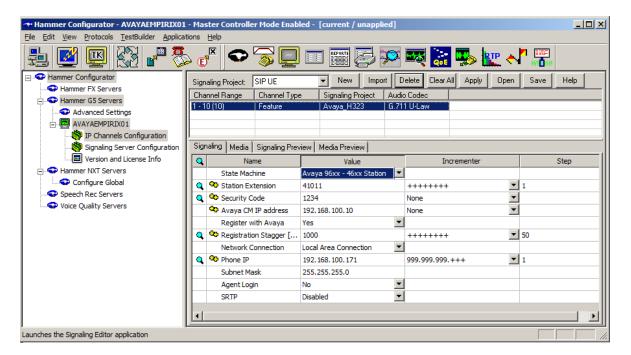
**Note:** It is assumed that Hammer IP is already in **Master Controller Mode**. To verify, check that the title bar of the **Hammer Configurator** indicates *Master Controller Mode Enabled* as shown below. It is also assumed that a system was already added to the configuration. In this configuration, the system name is *AVAYAEMPIRIX01*, which corresponds to the server name.

In the **Hammer Configurator**, the server name will appear in the left pane of the **Hammer Configurator**. Expand the server name (e.g., *AVAYAEMPIRIX01*) in the left pane and click on **IP Channels Configuration**. The following window will be displayed. Select *Avaya H.323* for the **Signaling Project** and then click **New**.

Hammer Configurator - AVAYAEMPIRIX01	- Master Controller	Mode Enable	d - [current / unapplied	i]		
<u>File Edit View Protocols TestBuilder Applica</u>	tions <u>H</u> elp					
📑 🖉 🖻 🐯 🗗 🎖		📃		ब्द 😹	🌄 🕎	< <b>₽</b> 📲
🖃 🗢 Hammer Configurator	Signaling Project:	SIPUE	New Import	Delete Clear /	All Apply Op	en Save Help
Hammer FX Servers		Avaya H323	▲ gnaling Project /	Audio Codec		
🖃 😎 Hammer G5 Servers	4	\vaya_SIP				
Advanced Settings		3ICC Cisco Skinny				
AVAYAEMPIRIX01		Clear Channel	▼			
IP Channels Configuration						
Signaling Server Configuration						
Version and License Info						
Hammer NXT Servers						
Configure Global						
Speech Rec Servers						
Voice Quality Servers	Signaling Media	Signaling Previe	w Media Preview			
	Q Nam	e	Value	Increi	menter	Step
Ready						

The first line in the grid that is highlighted in the figure below corresponds to the 10 originating channels. To set the number of channels in the group, click on the **Channel Range** cell in the grid and enter the number *10*. Set the **Channel Type** cell to *Feature*. The following fields in the **Signaling** tab should then be set as follows:

- State Machine should be set to Avaya 96xx 46xx Station.
- Station Extension should be set to the first extension in the group (e.g., 41011) and the Incrementer and Step fields should be set as shown so that the extension of the subsequent channels are incremented by one. This covers extensions from 41011 to 41020.
- Security Code should match the one configured in the corresponding Station form on Communication Manager.
- Avaya CM IP Address should be set to the S8300 Server IP address (e.g., 192.168.100.10). Use the C-LAN IP address if a C-LAN card is being used in a G650 Media Gateway.
- **Register with Avaya** should be set to *Yes*.
- **Network Connection** should be set to the appropriate network interface.
- Phone IP should be set to the IP address of the first channel in the group and the Incrementer and Step fields should be set as shown so that the last octet of the IP address is incremented by one. Note that this requires a block of contiguous IP addresses. This covers IP addresses from 192.168.100.171 to 192.168.100.180.
- Subnet Mask should be set to the network mask (e.g., 255.255.255.0).
- Agent Login should be set to *No* for the originating channels. However, for the terminating channels, Agent Login may be set to *Yes* if the terminating H.323 endpoints will act as agents in a contact center environment (i.e., agents logged into a hunt group/split). Otherwise, set this field to *No*.
- **SRTP** should be set to *Disabled* unless enabled in **Section 5.1**.



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- Audio Codec should be set to the appropriate codec for the test. G711 U-Law, G729AB, and G.729A were used during the compliance testing.
- **Frequency [ms]** should be set to the appropriate value for the specified codec. It should match the Packet Size [ms] field in the **IP Codec Set** form on Communication Manager for the specified codec.
- **Network Connection** should specify the appropriate network interface.
- Source IP Address should be set to the IP address of the first channel in the group. The **Incrementer** and **Step** fields should be set as shown so that the last octet of the IP address is incremented for the subsequent channels. Note that the IP addresses for the channels must be contiguous.
- Media Profile should be set to one that specifies the codec configured in the Audio Codec field. See Appendix A for instructions on configuring a Media Profile.
- The default values for the remaining fields may be used as shown.

Ch	naling Project Innel Bange 10110	SIP UE Channel Typ		- New	Import	100000	125105500	Incode which the	dama ta a series and			
		Channel Typ			in the second	Delete	Clear All	Apply	Open	Save	Help	
			00	Signaling P	ciect /	Audio Code	10	Learning of			anormal.	
		Feature		Avaya H3		5,211 U L	10					
1014	salar Media	Simulae Bu		Inda Dana								
-			Value			Incrementer				Step		
P		dec	G.711	ULaw		1					P.	
	Frequen	cy [ms]	20 [ms]		1							
	Network Connection		Local Area Connection									
	Co Source B	P Address	192.168,100.171		999.999.999.+++			* 1	1			
9	C Audo Po	rt	10000		+++++	+++		* 2				
	DTMP Ty	pe	In Ben	d	1							
			Audio									
L					8				_			
						-						
ļ		ofie										
			-		-							
	q	Audio Co Prequen Network     Source B     Audio Po DTMP Ty Silence T Atter Bu Subnet N Media Pr RTCP	Name     Audio Codec     Prequency [ris]     Network Connection     Source IP Address     Source IP Address     Serve Type     Siterce Type     Siterce Type     Siters Buffer     Subnet Mask     Media Profile     RTCP	Name           Audio Codec         6,711           Prequency [ris]         20 [ris           Network Connection         Local A           Source IP Address         192,11           Sterse Type         10000           DTM* Type         1n Ban           Sterse Type         Audio           Jitter Buffer         8 x Fri           Subnet Mask         235,22           Media Profile         G711	Name         Value           Audo Codec         G./11UH46W           Prequency [ris]         20 [ris]           Network Connection         Local Area Connect           Source IP Address         192.168.100.171           Connection         Local Area Connect           Audo Port         10000           DTMF Type         In Band           Silence Type         Audio           Atter Buffer         8 x frequency [ris]           Subnet Mask         25.255.255.0           Media Profile         G711U.sdp           RTCP         Enabled	Audo Codec         G.711UA.sw           Prequency [ns]         20 [ms]           Network Connection         Local Area Connection           Co Source IP Address         192.168,100.171           Co Audo Port         10000           DTMP Type         In Band           Silence Type         Audio           Jtter Buffer         8 x Frequency [ms]           Subnet Mask         253,255.255.0           Media Profile         G7110.sdp           RTCP         Enabled	Name         Value           Audio Codec         G7711ULow//         *           Prequency (rts)         20 (rts)         *           Network Connection         Local Area Connection         *           Source IP Address         192, 168, 120, 171         999, 999           Audio Port         10000         +++++           DTMP Type         In Band         *           Stence Type         Audio         *           Stence Type         Stence Type         Stence Type           Subnet Mask         255, 255, 255, 0         *           Media Profile         G7112Lodp         *           RTCP         Enabled         *	Name         Value         Increme           Audio Codec         Gr/11U3.6w// *         *           Prequency [ris]         20 [ris]         *           Network Connection         Local Area Connection         *           Source IP Address         192,168,100,171         999,999,999,+++           C Audio Port         10000         +++++++           DTMP Type         In Band         *           Silence Type         Audio         *           Jtter Buffer         8 x Frequency [ris]         *           Subnet Mask         255,255.0         Media Profile           RTCP         Enabled         *	Name         Value         Incrementer           Audio Codec         Gr711 U-Low         •           Prequency [rts]         20 [rts]         •           Network Connection         Local Area Connection         •           Source IP Address         192, 168, 200, 171         999, 999, 999, 999, +++           •         •         Audio Port         10000           DTMP Type         In Band         •           Silence Type         Audio         •           Subnet Mask         255, 255, 255, 0         •           Media Profile         G7110, sdp         •           RTCP         Enabled         •	Name         Value         Incrementer           Audio Codec         G.711 U-Low            Prequency [rts]         20 [rts]            Network Connection         Local Area Connection            Source IP Address         192,168,200.171         999,999,999,999,+++         1           Connection         10000         +++++++         2           DTMP Type         In Band            Silence Type         Audio            Subnet Mask         205,255.255.0            Media Profile         G7110.sdp            RTCP         Enabled	Name         Value         Incrementer         Ste           Audio Codec         GX711ULtow         Incrementer         Ste           Prequency [ms]         20 [ms]         Image: Comparison of the state of th	

#### 6.2.2 Configure Terminating Channels

During the compliance test, the originating channels emulated H.323 endpoints with the calls terminating on H.323 endpoints, H.323 trunks, SIP endpoints, or SIP trunks. Select one of the following subsections depending on the configuration desired.

- Section 6.2.2.1 for terminating calls on H.323 endpoints.
- Section 6.2.2.2 for terminating calls on H.323 trunks.
- Section 6.2.2.3 for terminating calls on SIP endpoints.
- Section 6.2.2.4 for terminating calls on SIP trunks.

**Note:** Ensure that the originating and terminating channels are assigned unique IP addresses and extensions.

#### 6.2.2.1 Configure Terminating Channels – H.323 Endpoints

The second line in the grid that is highlighted in the figure below corresponds to the second group of channels that will terminate calls. Set the **Channel Range** cell to the number of channels in this group. Set the **Channel Type** cell to *Feature*. The configuration of the **Signaling** tab is similar to the one for the group of originating channels in **Section 6.2.1** with the exception that the **Station Extension** and **Phone IP** fields will be different. This group of channels will be assigned extensions *41021* to *41030* and IP addresses from *192.168.100.181* to *192.168.100.190*. Again, the IP addresses for this group of channels must be contiguous. Also, note that **Agent Login** may be enabled for the terminating channels as mentioned above. To enable agent login, see **Appendix B**.

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Hammer Configurator Hammer FX Servers		aling Project	SIP UE		New	Import	Delete	Dear All	Apply	Ope	n Save	Heb
Hammer FX Servers	Chi	nnel Range	Channel Ty	pe 1	ignaling P	oject A	udio Code	c.				i
Advanced Settings		0 (10)	Feature		kvava H32		711 U La					
AVAYAEMPIRIX01     SP Channels Configuration     Sgnaing Server Configuration     Version and License Info		20 (10)	Feature		lvaya_H3	3 4	711013	w				
O Hammer NXT Servers     Configure Global     Speech Rec Servers												
Voice Quality Servers	Sig	haling Media	Signaling Pr	eview M	edia Previe		-					
	Q	Nan	ne		Value			Increm	inter .		SI	tep
	-	State Mad	hine	Avaya 9	ixx - 46xx	Station						
	9	Station Ex	tension	41021			+++++	****			1	
	9	Security C	ode	1234 192.168.100.10			None 2		-			
		🕸 Avaya OM	IP address							•		
		Register w	ith Avaya	Yes			1			- 1		
		Con manufacture all		1000			+++++	***		٠	50	
	.9	Registration	n Stagger	2000			-					
	٩	Network C		a second designed on	a Cornect	en 🧕						
		and the second second second		Local Are	a Connect 100.181	on 🚊	-	.999.+++	6		1	
		Network C	Connection	Local Are	100.181	on _	-	2.999.+++	6	*	1	
		Network C	onnection nk	Local Are 192.168	100.181	on 2	999.99	2.999.+++	R.	*	1	

Solution & Interoperability Test Lab Application Notes ©2015 Avaya Inc. All Rights Reserved. The **Media** tab for the group of terminating channels is shown below. The configuration is similar to the one for the group of originating channels except for the **Source IP Address** field.

u 📑 🛄 🖏 📲	20	18	0	30			37		QuE	<b>1</b> 5	<u>e</u> 🔊	r 🖓											
Hammer Configurator      Hammer FX Servers      Advanced Settings      Advanced Settings      Advanced Settings      Advanced Settings      Advanced Settings      AvarxAbitPUBIX01      Signaling Server Configuration      Version and License Info      Hammer NXT Servers      Configure Global      Speech Rec Servers      Voice Quality Servers	Sig	nair	Project	SIP UE	-	- New	Import	Delete	Clear Al	Apply [	Open)	Save	Help										
	Ch	ann	el Flange	Charmel Typ	90	Signaling P	icieci /	Audio Code	C	ATTENDED AND A													
	1		10) (10)	Feature		Avaya H3 Avaya H3		3.711 U-La 3.711 U-La															
	1			Signaling Pre	view   1	fedie Preve	-	1	Increment	1000													
	9	1	Name Audio Codec		G.711U-Law *		1	ncener	loer		38	ep											
		+	and the second second	and the second sec		Prequency [ms] Network Connection	1017 C	1077.c	1077.0		22.0				20 [m	The second s	-						
		Network Connection	and the second se	work Connection	-		Area Come	tion	1														
		Q	Source S	Address	192.1	68, 200, 181		999.999	999.+++		- 1												
		¢	Audio Per	rt	10000		+++++	+++		* 2													
			DTMF Typ	pe	In Ber	ed -	1	1															
			Silence T		Audio		-	1															
			3tter But			equency [m	0 2	1															
			Subnet M			55.255.0	1				_												
		1	Media Pro	ine .		U.sdp																	
					Enable	and the																	

### 6.2.2.2 Configure Terminating Channels – H.323 Trunks

To terminate the calls to H.323 trunks follow the instructions described in [2], specifically:

- Section 5 describes how to configure H.323 trunks and call routing on Communication Manager.
- Section 6.2.2.1 describes how to configure terminating H.323 trunks on Hammer IP.
- Section 6.4 describes how to specify the dialed digits when running a test script.

The configuration described in all the aforementioned sections of **[2]** must be completed for terminating calls to H.323 trunks.

### **6.2.2.3 Configure Terminating Channels – SIP Endpoints**

To terminate the calls to SIP endpoints follow the instructions described in [3], specifically:

- Section 5 describes how to configure SIP trunk to Session Manager, SIP stations, and call routing on Communication Manager.
- Section 6 describes how to configure Session Manager, including the SIP trunk to Communication Manager and SIP endpoints. This section needs to be configured in its entirety.
- Section 7.2.2.1 describes how to configure terminating SIP endpoints on Hammer IP.
- Section 7.2.3 describes how to configure the PhoneBook.
- Section 7.4 describes how to disable the **Do Connect Latency** option (required) and how to specify the dialed digits when running a test script.

The configuration described in all the aforementioned sections of **[3]** must be completed for terminating calls to H.323 trunks.

### 6.2.2.4 Configure Terminating Channels – SIP Trunks

To terminate the calls to SIP trunks follow the instructions described in [4], specifically:

- Section 5 describes how to configure call routing on Communication Manager.
- Section 6 describes how to configure SIP trunks to Hammer IP on Session Manager.
- Section 7.2.2.1 describes how to configure terminating SIP trunks on Hammer IP.
- Section 7.4 describes how to specify the dialed digits when running a test script.

The configuration described in all the aforementioned sections of **[4]** must be completed for terminating calls to SIP trunks.

#### 6.2.3 Configure the PhoneBook

The **PhoneBook** is used to specify which number each originating channel should dial when placing a call. This section specifies the **PhoneBook** configuration when calls are being terminated on H.323 endpoints. Click on the **PhoneBook** icon in the **Hammer Configurator**. The **PhoneBook** window is displayed below. The **Channel** column is automatically displayed with the appropriate channel groups. Right-mouse click on the first line corresponding to the group of originating channels (channels 1-10) and select the **Increment using a simple format** option as shown below.

🔜 Phonebook: New F	Phonebook			×
File Help				
	€ 🖬 🔸			
Phonebook Settings	Channel Map Settings Phone List Settings			1
Use Phone List	Channel	Phone #	Configured Phone #	Fie
	AVAYAEMPIRIX01 Channel Group0:1-10 AVAYAEMPIRIX01 Channel Group1:11-20	Expand/Collapse Channels Increment using a simple fo Increment using an advance		
		<u> </u>	Cancel	Help

In the **Simple Incrementer** window, specify the number that the first originating channel should dial in the **Start Value** field. In this example, the first channel will dial *41021*, which corresponds to channel 11. Set the **Increment By** field to *1*. This specifies that the subsequent channels should increment the dialed number by one. For example, channel 1 will dial 41021, channel 2 will dial 41022, and so on. The **Start Channel** field should be set to the first channel number and the **End Channel** field should be set to the last originating channel number, which is *10*. Click **OK**.

Simple Incrementer
Server: AVAYAEMPIBIX01
Column: Phone #
Destination Server:
Fill Type
Channel Fill C Group Fill
Tel.Numbers   IP Addresses   URLs   MAC Addresses
All numbers around non-numerics
(e.g. 9,,1,,888-555-*999# becomes 9,,1,,888-556-*000#)
xxx-yyy-zzzz xxx (e.g. 1 (888) 555-9999 becomes 1 (889) 555-9999)
O yyy (e.g. 1 888 555 9999 becomes 1 888 556 9999)
zzzz (e.g. 1-888-555-9999 becomes 1-888-555-0000)
Use H323 formatting, with prefix:
Start Value: 41021
Increment By: 1
Start Channel: 1
End Channel: 10
OK Cancel Apply Help

🔜 Phonebook: New Phoneboo	k			×
File Help				
New Open				
Save	<b></b>			
Save As	p Settings Phone List Settings			
Import Phone List				[
Import Channel Map	Channel	Phone #	Configured Phone #	Fie
1 H323_EPT_EPT_2.phn	IPIRIX01 Channel Group0:1-10	41021	46101	
2 H323_EPT_EPT.phn	/PIRIX01 Channel Group1:11-20		46111	
3 H323_TRK_SIP_EPT.phn				
4 H323_TRK_H323_EPT.phn				
Exit				
1	-			F
		ОК	Cancel	Help

Once the **PhoneBook** is configured, select **File→Save As** to save the PhoneBook.

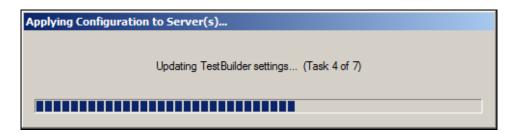
The PhoneBook is saved as *H323\_EPT\_EPT.phn* in the following window. This PhoneBook will be used when running the test.

🐡 Save As			×
COC LoadBla	ster 🕶 Config 👻 GlobalPhoneBooks 🛛 👻 🚱	Search GlobalPhoneBoo	oks 😥
Organize 👻 New folder			:= - 🕡
☆ Favorites	Name ^	Date modified	Type 🔺
🧫 Desktop	H323_EPT_EPT.phn	2/23/2015 11:48 AM	PHN File
Downloads	H323_EPT_EPT_2.phn	3/23/2015 10:45 AM	PHN File
Recent Places	H323_EPT_SIP_EPT.phn	2/23/2015 4:07 PM	PHN File
🤤 Libraries	H323_Phonebook.phn	2/13/2015 1:20 PM	PHN File
Documents	H323_TRK_H323_EPT.phn	2/23/2015 5:10 PM	PHN File
J Music	H323_TRK_SIP_EPT.phn	2/23/2015 5:16 PM	PHN File
Pictures	MGCP_NCS_Phonebook.phn	2/13/2015 1:20 PM	PHN File
Videos	SIP_EPT_EPT.phn	2/23/2015 11:19 AM	PHN File
🖳 Computer	SIP_EPT_H323_EPT.phn	2/23/2015 3:12 PM	PHN File
Local Disk (C:)	SIP_Phonebook.phn	2/13/2015 1:20 PM	PHN File
	SIP_TRK_EPT.phn	2/23/2015 2:49 PM	PHN File
📬 Network	SIP_TRK_H323_EPT.nhn	2/23/2015 1:18 PM	PHN File
	23_EPT_EPT.phn		<u> </u>
Save as type: Pho	neBook Text Files (*.phn)		<b></b>
Aide Folders		Save	Cancel

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### 6.3 Applying the Hammer IP Configuration

This completes the configuration of Hammer IP. This configuration should be saved by clicking the **Save** button on the **Hammer Configurator** window. The configuration needs to be applied to the server for the changes to take effect. Click on the **Apply** button in the **Hammer Configurator** window. The following window is displayed as the configuration is being applied to the server.



Check that the system has been started by clicking on the server name (e.g., AVAYAEMPIRIX01) in the left pane of the **Hammer Configurator**. If the current status is *System Is Stopped*, click the **Start system** button to start the system. When the system is started, it should appear as shown below and should also specify which configuration has been applied. The configuration performed above was saved as *H323\_20\_EPT\_EPT*. When the system is started, Hammer IP will register H.323 endpoints with Communication Manager.

Ele Edit View Protocols TestBuilder Applications Help     Image: Configurator     Hammer Configurator     Hammer Configurator     Advanced Settings     Image: Configuration     Signaling Server Configuration   Image: Signaling Serv	Hammer Configurator - AVAYAEMPIRIXO:		
Hammer Configurator Hammer FX Servers Advanced Settings Advanced Settings Advanced Settings IP Channels Configuration Signaling Server Configuration Version and License Info Version and License Info Speech Rec Servers Voice Quality Servers Voice Quality Servers Options Options Operations Start system Stop system	File Edit View Protocols TestBuilder Applica		
Image: Server Connguration       Image: Server Connguration         Image: Wersion and License Info       Image: Server Configuration         Image: Wersion and License Info       Image: Server Configuration         Image: Wersion and License Info       Image: Server Configuration         Image: Wersion Configuration       Image: Server Configuration	Hammer FX Servers      Hammer G5 Servers      Advanced Settings      AVAYAEMPIRIX01	Configure Hammer G5 system: AVAYAEMPIRIX01 Current status	
	Signaling Server Configuration  Version and License Info  Hammer NXT Servers  Configure Global  Speech Rec Servers	The configuration "H323_20_EPT_EPT" is loaded and ready to run.         Options         Auto start system on reboot         Stop system	

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## 6.4 Configure and Run the Test Script

For the compliance test, two default test scripts were used:

- a\_calls\_b\_dtmf.hld to verify DTMF
- Voice Quality Test.hld to verify voice quality

The sample test script, Voice Quality Test.hld, establishes a VoIP call between two H.323 endpoints on Hammer IP, followed by the originating side playing an audio prompt to the far-end so that voice quality metrics (e.g., PESQ score) can be obtained. The test script is configured with the **Hammer TestBuilder** application and can be displayed in a ladder diagram as shown below by double-clicking on the test script name.

**Note:** When changing from one Hammer configuration to another, where the previous configuration used H.323 endpoints, it may be required to unregister the H.323 endpoints before proceeding with the new Hammer test as shown in **Appendix C**.

					-	<u>r &lt;' '</u>
Hanner	a oan	A	N B	2	9	Main ] Pus ] Fax ] VoP ] Speech
CalProfileTests	Place Call					Start Phone
a_calis_b_video.htd	Voice Duality		-	Wait For Call		Play Prompt
Advanced Voice Quality Test.hid	Play			Voice Quality Colculate		🐝 Release Call
CF_Audio_T38Fax_Then_Audia.hld CF_Audio_Then_T38Fax.hld CF_T38Fax_Only.hld	Pause	•	•	Pause		Send Digit
ConfirmPath.Hid				Voice Quality Play		🌀 Place Call
DTMF Test.hid	Voice Duality Calculate	-				Stop Phone
NantainConnectionVoice.hid	Maintain Connection Stim	•	•	Maintain Connection		(The Send Tone
SgraingOnly.htd Visco Quality Test.htd	Pause	•		Paule		Send IPMediaModify
a_cala_b_ittnf_anakig.hid	Release Call					Pause
a cala b tone analog hid a cala b video hid a cala b video hid			•	Wat For Disconnect		Confirm Path Stimulus
a_cals_b_voice_analog.htd						
TrainingMode Ind					-	
Users TB [ <u>n</u> ] HVB	*			2	1 -	

In the sample test script configured above, the A-side (originating H.323 endpoint) places a call to the B-side (terminating H.323 endpoint) using the **Place Call** action. The **Place Call** properties can be configured by double-clicking on the action in the ladder diagram. The **Place Call Properties** is configured to use the **Phone book** as shown below.

Place Call Properties	X
Phone Number	ОК
C Use <u>D</u> ial String	Cancel
• Use Phone book	Help
O Use <u>C</u> hannel Map	
Timeout (ms):	
60000	
TDM Parameters	
ISDN SS7	
- IP Parameters	
H.323 Restrict Media	
Connect Latency Connect Latency Connect Latency	ency Params

Note: Disable the **Do Connect Latency** option in the **Place Call Properties** window.

To run the test, right-mouse click on the test script in the left pane of the **Hammer TestBuilder** window and navigate to **Schedule** $\rightarrow$ **Edit & Run**. To re-run the test, the user can simply select **Schedule** $\rightarrow$ **Run**, if no changes are required.

multisesson a calls jb tore.hid a calls jb tore.hid a calls jb tore.hid a calls jb tore.hid a calls jb tore.hid Advanced Voice Quality Test.hid Calbrate.hid C F_Autio_T38Fax_Then_Autio.hid C F_Autio_T38Fax_Then_Autio.hid C F_T38Fax_Only.hid C f_T38Fa	h ⊂ Place Cal i ⊂ Cal Voice Quality Plause Voice Quality Calculate Maintain Connection Sta Pause ESE & Suin Run			Wait For Call Voice Quality Calculate Pause Voice Quality Play Mainfain Connection Pause Wait For Disconnect		<ul> <li>Start Phone</li> <li>Validate Digits Stim</li> <li>Play Prompt</li> <li>Release Call</li> <li>Send Digit</li> <li>Place Call</li> <li>Stop Phone</li> <li>Stop Phone</li> <li>Send Tone</li> <li>Send IPMediaModity</li> <li>Pause</li> <li>Contirm Path Stimulus</li> </ul>
--	--	--	--	--	--	---

In the **Properties** window, click on the ellipses button (...) in the **Channels** section and assign channels to the **A-Side** and **B-Side**. Next, select the appropriate PhoneBook (e.g., *H323\_EPT\_EPT*). The H323\_EPT\_EPT PhoneBook was configured above. Set the **Loop Count** to the appropriate value to control the number of iterations the test should run. Setting this field to *-1* will allow the test to run forever. Setting this field to a specific number will run the test for the many iterations and then stop. The **Guard Time (ms)** field specifies how long to wait before the test is run again on the same channel. The minimum setting should be *3500*. The **Stagger** section allows the user to specify how long to wait before the test is run on the next channel. Click **OK**.

**Important Note:** The **Guard Time** and **Stagger** parameters should be carefully considered for every test. A test script could fail because the configuration under test cannot handle the load generated by the Hammer IP. These parameters can slow down the test to a rate that can be reasonably handled by the test configuration.

Properties	×
TB Scheduler Other	1
ary\Hammer\CallProfileTests\Voice Quality Test.hld         Start Time:       11:16:49 AM         4/17/2015	Action if a Channel is busy:
Channels A-Side: AVAYAEMPIRIX01[1-10] B-Side: AVAYAEMPIRIX01[11-20]	Max <u>A</u> ctive Connections: 0 (0 = Unlimited)
PhoneBook Select a PhoneBook: H323_EPT_EPT Stagger O Automatic - Est. CHT (s) 5	Max Test Time: Hours: 0 ▲ (0 = Forever) Minutes: 0 ▲
User Defined - (ms)	Loop Count: (-1 = Loop Forever) -1
© Random - Min (s) 1 Max (s) 5	Guard Time (ms):
C None	3500
	OK Cancel Apply Help

# 7 Verification Steps

This section provides the tests that can be performed to verify proper configuration of Avaya Aura® Communication Manager and Empirix Hammer IP.

## 7.1 Verify Avaya Aura® Communication Manager

To verify that the Hammer IP can register H.323 endpoints on Communication Manager, the **list registered-ip-stations** command may be used to verify that the endpoints have been successfully registered.

list register	ed-ip-stat	ions			Page	1
		REGIST	ERED	IP STATIONS		
Station Ext or Orig Port				Station IP Address/ Gatekeeper IP Address		_
41011	9620 1	IP_Phone 2.80	У	192.168.100.171 192.168.100.10		
41012	9620 1	IP_Phone 2.80	У	192.168.100.172 192.168.100.10		
41013	9620 1	IP_Phone 2.80	У	192.168.100.173 192.168.100.10		
41014	9620 1	IP_Phone 2.80	У	192.168.100.174 192.168.100.10		
41015	9620 1	IP_Phone 2.80	У	192.168.100.175 192.168.100.10		

When the Hammer IP is running a test script, the **status station** command may be used to view the active call status. The **Service State** should be set to *in-service*.

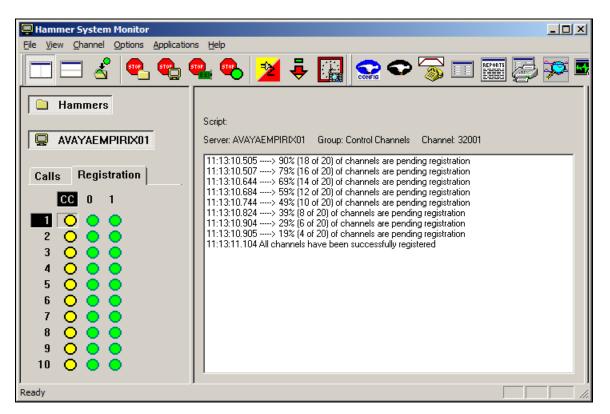
status station 41011		Page 1 of 9
	GENERAL STATUS	
Administered Type: 9620	Service State:	in-service/off-hook
Connected Type: N/A	TCP Signal Status:	connected
Extension: 41011	Network Region:	1
Port: S0002	0 Parameter Download:	complete
Call Parked? no	SAC Activated?	no
Ring Cut Off Act? no		
Active Coverage Option: 1	one-X Server Status:	N/A
EC500 Status: N/A	Off-PBX Service State:	N/A
Message Waiting:		
Connected Ports: S00031		
Limit Incoming Calls? no		
User Cntrl Restr: none	HOSPITALIT	Y STATUS
Group Cntrl Restr: none	Awaken at:	
	User DND: no	
	Group DND: no	
	Room Status: oc	cupied

Solution & Interoperability Test Lab Application Notes ©2015 Avaya Inc. All Rights Reserved. **Page 5** of the **status station** command indicates the codec being used for the call and whether the call is shuffled or not. If the call is shuffled, the **Audio Connection Type** field is set to *ip-direct*, if it isn't, the field is set to *ip-tdm*.

```
status station 41011
                                                                  Page
                                                                         5 of
                                                                                9
                          AUDIO CHANNEL Port: S00020
G.711MU
             Switch-End Audio Location: MG1
            IP Address
                                                      Port Node Name
                                                                             Rqn
Other-End: 192.168.100.15
                                                      2050
                                                                             1
  Set-End: 192.168.100.171
                                                      10000 HammerIP-Out
                                                                             1
Audio Connection Type: ip-tdm
```

## 7.2 Verify Empirix Hammer IP

To view the H.323 registration status on Hammer IP, make sure that the **Hammer System Monitor** is running before starting the system. Click on the yellow circle under the **CC** column and row **1**. Hammer IP will indicate when all of the channels have successfully registered.



Call progress may be monitored in the **Hammer System Monitor**. The call log for an originating channel may be logged to the left window and the call log for a terminating channel may be logged to the right window.



The **Hammer Call Summary Monitor** may be used to get a test status overview, including the number of call attempts, number of failed calls, PESQ scores, amongst other useful metrics.

Hammer Call Summary Monitor		
	- > 중 🛄 🧱 🚰 🗺 式 🐝 🗽 😽	
Call Attempts: 30	Calls per Hour: 30 CCS Last Hour: 173	
Successful Calls: 30	Calls per Second: 0 Erlang Last Hour: 4.81	
Failed: 0	DTMF Mismatch: 0 Avg. CCS per Hour: 173	
% Completed: 100.0000	Avg. Erlang per Hour: 4.81	
PAMS Quality 0.00 PAMS Effort 0.00 PESQ 4.39 Front End Clipping (ms) 0.00	0.00       0.00       0.00         0.00       0.00       0.00         4.36       4.39       4.39         0.00       0.00       0.00	T
Server: System Default	Currently Connected: 20 Graph Refresh Rate (s): 1	
Calls Connected 120 100 80 60 40 20		
	29 29 30 40 10 20 20 20 20 20 20 20 20 20 20 20 20 20	
) Ready	Time Since Last Reset: 000:01:00	

# 8 Conclusion

These Application Notes describe the configuration steps required to integrate Empirix Hammer IP with Avaya Aura® Communication Manager using H.323 endpoint emulation. Hammer IP H.323 channels were able to register with Avaya Aura® Communication Manager, successfully establish calls to H.323 and SIP endpoints/trunks, generate voice quality metrics, and monitor the calls. All feature and serviceability test cases were completed successfully. Refer to **Section 2.2** for test observations.

# 9 References

This section references the product documentation relevant to these Application Notes.

- [1] *Administering Avaya Aura*® *Communication Manager*, Release 6.3, Issue 10.0, June 2014, Document Number 03-300509, available at <u>http://support.avaya.com</u>.
- [2] Application Notes for Empirix Hammer IP with Avaya Aura® Communication Manager using H.323 Trunk Emulation, Issue 1.0, available at <a href="http://www.avaya.com">http://www.avaya.com</a>.
- [3] Application Notes for Empirix Hammer IP with Avaya Aura® Communication Manager and Avaya Aura® Session Manager using SIP Endpoint Emulation, Issue 1.0, available at <u>http://www.avaya.com</u>.
- [4] Application Notes for Empirix Hammer IP with Avaya Aura® Communication Manager and Avaya Aura® Session Manager using SIP Trunk Emulation, Issue 1.0, available at http://www.avaya.com.
- [5] Empirix Hammer IP Installation Guide, May 2015, available from Empirix.

#### **APPENDIX A: Configure Media Profile on Empirix Hammer IP**

The following windows show the configuration of the **Media Profile** used in the **Media** tab for the originating and terminating channel groups. To access this window, click on the ellipses button (...) by the **Media Profile** field in the **Media** tab. Click on the **Audio Description** button to view the codecs that will be advertised by the Hammer IP when placing a call.

	ion		
Include Field?	Field	Value	
	(o=) Owner:	Empirix_VQ_Agent	
	(s=) Session Name:	Empirix VQ Test Session	
	(i=) Session Information:		
	(u=) URI of Description:		
	(e=) Email Address:		
	(p=) Phone Number:		
	(b=) Bandwidth Information:		
r (a=) Attributes			
			Add
			Edit
			Delete
Media Descriptio	18		
-		: (T.38) Description 🛛 🗖 Video D	escription
		(T.38) Description Video D	escription
		(T.38) Description	escription
Media Descriptio			lescription

The following window shows the codecs selected for this profile. This **Media Profile** was already created and named *G711U.sdp*. It specifies G.711U and RFC 2833. When done, click **OK** to return to the previous window. Additional media profiles can be created and saved by selecting the desired codecs in this window and then clicking the **Save** button in the previous window.

Codec	Send 'rtpmap'?	Payload Type		<b>▲</b>	
🗹 G.711U	No	0			
🗖 G.711A	No	8			
🗖 G.723	No	4			
🗖 G.729A	No	18			
🗖 G.729AB	No	18			
🗖 G.726 40 kb/s	Yes	127			
🗖 G.726 32 kb/s	Yes	97			A
🗖 G.726 24 kb/s	Yes	98			•
🗖 G.726 16 kb/s	Yes	99			
🗹 RFC 2833	Yes	101			+
	Vee	100		<b>_</b>	
	1.1		Value		
nclude Field? Fie	and ) Media Information:				
[i=		n:			
[i=	) Media Information:	n:			
[i=	) Media Information:	n:			Add
[i=	) Media Information:	n:			Add

#### **APPENDIX B: Enable Agent Login**

This appendix describes how to configure Communication Manager and Hammer IP to allow H.323 endpoints to login as agents.

Note 1: This feature is applicable when the terminating channels are emulating H.323 endpoints.

**Note 2:** Verify that **Expert Agent Selection (EAS)** is enabled in the **system-parameters customer-options** form and the **system-parameters features** form.

**Note 3:** See **Appendix C** to determine if H.323 endpoints need to be unregistered before proceeding.

First, create a hunt group/skill for the H.323 endpoints to log into. Configure the fields in **bold** as shown below. The Hammer test should then place calls to the **Group Extension**.

add hunt-group 70	HUNT	Pag GROUP	e	1 of	4	
Group Number: Group Name:	70 Empirix Hunt	ACD? Queue?	-			
Group Extension:		Vector?	У			
Group Type: TN:						
COR:	1	MM Early Answer?	n			
Security Code:		Local Agent Preference?	n			
ISDN/SIP Caller Display:						
Queue Limit:	unlimited					
Calls Warning Threshold:	Port:					
Time Warning Threshold:	Port:					

On **Page 2**, set the **Skill** field to *y*. Optionally, set the **Measured** field to *internal* to use the monitor BCMS commands to determine if agents are logged into a specific hunt group.

```
add hunt-group 70 Page 2 of 4

HUNT GROUP

Skill? y Expected Call Handling Time (sec): 180

AAS? n Service Level Target (% in sec): 80 in 20

Measured: internal

Supervisor Extension:

Controlling Adjunct: none

VuStats Objective:

Multiple Call Handling: none

Timed ACW Interval (sec): After Xfer or Held Call Drops? n
```

Next, add an **agent-loginID** for each agent required by the Hammer test and specify a **Password** as shown below.

add agent-loginID 42001		Page 1	of 2
	AGENT	LOGINID	
	~ 1		
Login ID: 420		AAS?	
Name: Age	nt 1	AUDIX?	n
TN: 1		LWC Reception:	spe
COR: 1		LWC Log External Calls?	n
Coverage Path:		AUDIX Name for Messaging:	
Security Code:			
-		LoginID for ISDN/SIP Display?	n
		Password:	1234
		Password (enter again):	1234
		Auto Answer:	station
		MIA Across Skills:	system
		ACW Agent Considered Idle:	system
		Aux Work Reason Code Type:	system
		Logout Reason Code Type:	system
Maximu	m time age	ent in ACW before logout (sec):	system
	-	Forced Agent Logout Time:	:
WARNING: Agent must log	in again	before changes take effect	

On **Page 2**, set the **SN** field to the hunt group number configured above and set the **SL** field to a valid value.

ſ	add agen	t-loginID ·	42001		Page 2 of 2
	-	-		AGENT LO	OGINID
	Di	rect Agent	Skill:		Service Objective? n
	Call Han	dling Pref	erence: s	kill-level	Local Call Preference? n
	SN	RL SL	SN	RL SL	
	1: <b>70</b>	1	16:		

Finally, assign feature access codes (FACs) for agent login features, including Login, Logout, and Auto-In, as shown below.

change feature-access-codes	Page	5 of	10
FEATURE ACCESS CODE (FAC)	2		
Call Center Features			
AGENT WORK MODES			
After Call Work Access Code:			
Assist Access Code:			
Auto-In Access Code: *19			
Aux Work Access Code:			
Login Access Code: *15			
Logout Access Code: *16			
Manual-in Access Code:			
SERVICE OBSERVING			
Service Observing Listen Only Access Code:			
Service Observing Listen/Talk Access Code:			
Service Observing No Talk Access Code:			
Service Observing Next Call Listen Only Access Code:			
Service Observing by Location Listen Only Access Code:			
Service Observing by Location Listen/Talk Access Code:			

JAO; Reviewed: SPOC 6/11/2015 Solution & Interoperability Test Lab Application Notes ©2015 Avaya Inc. All Rights Reserved. 33 of 38 HIP-H323-EPT This completes the configuration on the Communication Manager side. To enable agent login on Hammer IP, navigate to the terminating H.323 endpoints and enable **Agent Login** on the **Signaling** tab as shown below. Specify the **Agent Password** as configured in the agent-loginID and specify the FACs for agent login, logout, and auto-in feature.

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Hammer Configurator	Sign	angi	Project	SIPUE	-	* New	Import	Delete	Clear Al	Apply	Open	Save	Help	
Hammer FX Servers     Hammer GS Servers     Advanced Settings     Advanced Settings     Advanced Settings     Hove Advanced Settings     Decomplex Configuration		Channel Range C 1 • 10 (10) F		Channel T Feature Feature			Avaya H323 G.7		vudio Codeic 3.711 U-Law 3.711 U-Law 3.711 U-Law			Laurocecied		
Signaling Server Configuration     Signaling Server Configuration     Version and License Info     Hammer NXT Servers     Configure Global     Speech Rec Servers     Voice Quality Servers	510	naing	Meda	Signaling P	heview	Media Preview	1							
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				Connection	Local A	vea Connection	6 🗶							
	9	<b>30</b> F	hone IP		192.18	58, 100, 181		999.999	.999.+++	-	* 1			
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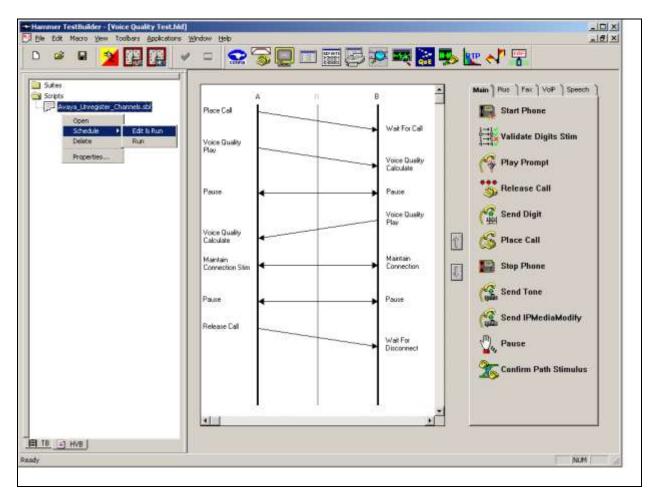
To verify if the H.323 endpoints are logged in as agents, use the **monitor bcms skill**  $\langle HG\# \rangle$  command, where  $\langle HG\# \rangle$  is the hunt group number.

monitor bcms skill 70       Page 1 of 2         BCMS SKILL (AGENT) STATUS         Skill: 70         Skill: 70         Skill: 70         Skill: 70         Skill: 70         Skill: 70         Skill Name: Empirix Hunt         Calls Waiting: 0         Oldest Call: 0:00         & Within Service Level: 20         Oldest Call: 0:00         ACCe EXT IN EXT OUT         Staffed: 10 Avail: 10 ACD: 0 ACW: 0 AUX: 0 Extn Calls: 0 Other: 0         ACD EXT IN EXT OUT         AGENT NAME         LOGIN ID         ACD EXT IN EXT OUT         Agent 1         A2001         Ayail 14:36         Agent 1         Agent 1         Agent 1         Agent 1         Agent 1         Agent 2         Agent 3         Agent 4         Agent 3         Agent 4         Agent 4 <td <="" colspan="2" th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></td>	<th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>										
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### **APPENDIX C: Unregister H.323 Endpoints**

If transitioning from one Hammer configuration, where H.323 endpoints were used, to another configuration that uses agent login or vice versa, it is necessary to unregister the H.323 endpoints prior to proceeding with the new Hammer test. To unregister the H.323 endpoints, go to the **Hammer TestBuilder** and select the **HVB** tab at the bottom left-hand corner of the window. Right-mouse click on the Avaya\_Unregister\_Channels.sbl script and choose **Schedule**  $\rightarrow$  **Edit & Run** as shown below.

**Note:** The Avaya\_Unregister\_Channels.sbl script is available by default with Hammer IP. However, the script needs to be imported and compiled (not shown) first.



In the Properties window, select all the channels associated and run this script once (i.e., **Loop Count** is set to 1). Click **OK**.

Properties	×
HVB Scheduler	
ivate\Hammer\scripts\Avaya_Unregister_Channels.sbl Start Time: 12:09:19 PM	Action if a Channel is busy: Wait
Channels AVAYAEMPIRIX01[1-20]	Max <u>A</u> ctive Connections: 0 (0 = Unlimited)
Stagger C Automatic - Est. CHT (s) 5	Max Test Time: Hours: 0 (0 = Forever) Minutes: 0
O User Defined - (ms) 50 Min (s) 1	Loop Count: (-1 = Loop Forever)
Max (s) 5	Guard Time (ms):
ОК	Cancel Apply Help

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