

Avaya Solution & Interoperability Test Lab

Application Notes for Twisted Pair Solutions WAVE with Avaya Communication Manager using H.323 IP Trunks – Issue 1.1

Abstract

These Application Notes describe the configuration procedures required to allow Twisted Pair Solutions Wide Area Voice Environment (WAVE) communicate across a H.323 IP trunk to endpoints controlled by Avaya Communication Manager. Twisted Pair Solutions WAVE is a software application suite that enables group communication and interoperation between diverse endpoints and networks. Internally, WAVE creates communication "channels" where endpoints communicate via a shared multicast IP address. These channels are "always on" and endpoints can tune into the channels at any time. Because of this, WAVE is particularly suited for addressing the needs of communication environments that require this type of "always on" communication. Examples include:

- 1. Hoot and Holler networks for financial markets.
- 2. Land Mobile Radio (LMR) networks for first responders and defense markets requiring radio interoperability.

The compliance testing focused on verifying that endpoints and trunk calls controlled by Avaya Communication Manager could connect to the communication channels hosted by WAVE, interoperate with WAVE endpoints and participate with acceptable voice quality. Basic serviceability and performance testing was also conducted to assess the reliability of the solution. Information in these Application Notes has been obtained through compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

1. Introduction

These Application Notes describe a compliance-tested group communication solution comprised of Avaya Communication Manager and Twisted Pair Solutions Wide Area Voice Environment (WAVE). Twisted Pair Solutions WAVE is a software application suite that enables group communication and interoperation between diverse endpoints and networks. Internally, WAVE creates communication "channels" where endpoints communicate via a shared multicast IP address. These channels are "always on" and endpoints can tune into the channels at any time. Because of this, WAVE is particularly suited for addressing the needs of communication environments that require this type of "always on" communication. Examples include:

- 1. Hoot and Holler networks for financial markets
- 2. Land Mobile Radio (LMR) networks for first responders and defense markets requiring radio interoperability.

Any endpoint that can directly connect to the multicast IP address that carries the WAVE channel is generically referred to as a WAVE endpoint. Examples include the WAVE Desktop Communicator PC application and land mobile radios even though the radios use an access router to gain access to the IP network.

Non-WAVE endpoints require a "session" to connect to a WAVE channel. Endpoints that are controlled by Avaya Communication Manager fall in this category. A session is a logical component internal to WAVE that serves as an entry point to a specific channel or bridges between channels. In the case of the compliance test, a session was created that was accessible via a dial-in number. Endpoints that were controlled by Avaya Communication Manager would dial this number to access the associated channel.

WAVE communicates to Avaya Communication Manager via a H.323 IP trunk. For the compliance test, a set of extensions on Avaya Communication Manager were reserved for use by WAVE. Each of these extensions represented a different WAVE session that was connected to a different WAVE channel. Avaya Communication Manager routed calls to these extensions across the H.323 IP trunk associated with WAVE. The appropriate WAVE session would answer the call at the other end and prompt the caller for a PIN number if required. After the PIN was entered by the caller, the caller was then connected to the associated WAVE channel and could now communicate with all other users of the channel.

The general test approach focused on verifying that endpoints and trunk calls controlled by Avaya Communication Manager could connect to communication channels hosted by WAVE, interoperate with WAVE endpoints and participate with acceptable voice quality. In addition, serviceability and performance testing were also conducted to assess the reliability of the solution.

WAVE was tested with Avaya Communication Manager in both a Hoot and Holler network application and a LMR network application. The configuration of Avaya Communication

Manager and the WAVE Media Server is the same for both of these applications. However, the configuration of WAVE channels and sessions will be different. These Application Notes show the WAVE channel and session configuration of the Hoot and Holler application which is the simpler of the two. For details on configuring WAVE channels and sessions for a LMR application, please refer to reference [3].

The components of WAVE used in the compliance test are listed below. These Application Notes will describe the configuration of each component. In addition, the WAVE Media Server configuration will include a description of creating channels and sessions. The components include:

- 1. *WAVE Management Server* The WAVE Management Server is the software application for configuring a WAVE system.
- 2. *WAVE Media Server* The WAVE Media Server is the software application that provides all the media processing for WAVE.
- 3. *WAVE Desktop Communicator* The WAVE Desktop Communicator is the software application that provides a user interface that allows a PC to become a communication device that can access a WAVE communication channel.

Figure 1 illustrates the sample configuration that was used for the compliance test. It is comprised of two sites each with an Avaya Media Server running Avaya Communication Manager. There is a Twisted Pair Solutions WAVE Media Server located at site 2. The WAVE Media Server communicates to Avaya Communication Manager at each site via a H.323 IP trunk established between itself and each of the Avaya Media Servers. There are no trunks directly between the two Avaya Media Servers. Thus, the only way that endpoints controlled by one Avaya Communication Manager can communicate to endpoints controlled by the other Avaya Communication Manager is through the WAVE Media Server.

Located at site 1 is an Avaya S8500 Media Server running Avaya Communication Manager with an Avaya G650 Media Gateway. Avaya 6400D Series Digital Telephones, Avaya 6200 Series Analog Telephones and an analog trunk are connected to the Media Gateway. Avaya 4600 Series IP Telephones and an Avaya IP Softphone are registered to the Avaya S8500 Media Server.

Located at site 2 is an Avaya S8300 Media Server running Avaya Communication Manager with an Avaya G700 Media Gateway. Avaya 6400D Series Digital Telephones, Avaya 6200 Series Analog Telephones, and a PRI trunk are connected to the Media Gateway. Avaya 4600 Series IP Telephones and an Avaya IP Softphone are registered to the Media Server. Additional endpoints at site 2 include a Twisted Pair Solutions WAVE Desktop Communicator and land mobile radios (LMRs) connected through a Ritron RadioNexus LMR Base Station to a Cisco 3725 Multiservice Access Router which acts as gateway to the IP network for the radios.

The IP network connecting the two sites is an Avaya C363T-PWR Converged Stackable Switch and Extreme Networks Alpine 3804 switch.



Figure 1: Test Configuration for Twisted Pair Solutions WAVE Compliance Test

2. Equipment and Software Validated

The following equipment and software/firmware were used for the test configuration provided.

Equipment	Software/Firmware
Avaya S8300 Media Server	Communication Manager 3.0.1
	(R013x.00.1.346.0)
Avaya G700 Media Gateway (Media Gateway	24.21.1
Processor)	
Avaya S8500 Media Server	Communication Manager 3.0.1
	(R013x.00.1.346.0)
Avaya G650 Media Gateway	-
TN2312BP IP Server Interface (IPSI)	HW03 FW22
TN799DP C-LAN Interface (C-LAN)	HW01 FW15
TN2302AP IP Media Processor (MEDPRO)	HW20 FW105

Equipment	Software/Firmware		
Avaya 4600 Series IP Telephones	2.3 (4610SW H.323)		
	2.3 (4620SW H.323)		
	2.5 (4625SW H.323)		
Avaya IP Softphones	5.2		
Avaya C363T-PWR Converged Stackable Switch	4.5.14		
Extreme Networks Alpine 3804	7.2.0 Build 25		
Twisted Pair Solutions WAVE Media Server Software	2.03 (SP1) running on		
	Windows 2003 Server SP1		
Twisted Pair Solutions WAVE Management Server	2.03 (SP1) running on		
Software	Windows 2003 Server SP1		
Twisted Pair Solutions WAVE Desktop	2.03 (SP1) running on		
Communicator	Windows XP Professional		
Cisco 3725 Multiservice Access Router with	IOS 12.4.1A		
Advanced Enterprise Options			
Ritron RadioNexus LMR Base Station	-		
Land Mobile Radio	_		

3. Configure Avaya Communication Manager

This section describes the procedure for configuring a H.323 IP trunk on Avaya Communication Manager. These steps are performed through the System Access Terminal (SAT). These steps describe the procedure used for the Avaya S8300 Media Server. All steps are the same for the other Media Servers unless otherwise noted.

ep	Description							
1.	Use the change node-names ip command to associate a Name with the IP Address of							
	the host that will termin	the host that will terminate the far-end of the H 323 trunk. For the compliance test						
	WAVE was chosen as t	the node name and the host running the WAVE Media Server						
	WAVE was chosen as the node name and the host running the WAVE Media							
	an IP address of 192.16	58.1.71.						
	The near and of the II 222 trunk is terminated by the Astoric S2200 Media Ser							
	The near-end of the H 3	323 trunk is terminated by the Ayaya \$8300 Media Server T						
	The near-end of the H.3	323 trunk is terminated by the Avaya S8300 Media Server. T						
	The near-end of the H.3 Avaya S8300 Media Se	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name						
	The near-end of the H.3 Avaya S8300 Media Se shown in the example b	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name is below as having IP Address of 192.168.1.201. This informat						
	The near-end of the H.3 Avaya S8300 Media Se shown in the example b will be used in subseque	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name is below as having IP Address of 192.168.1.201. This informat						
	The near-end of the H.3 Avaya S8300 Media Se shown in the example b will be used in subseque	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name is below as having IP Address of 192.168.1.201. This information that steps.						
	The near-end of the H.3 Avaya S8300 Media Se shown in the example b will be used in subseque	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name is below as having IP Address of 192.168.1.201. This information tent steps.						
	The near-end of the H.3 Avaya S8300 Media Se shown in the example b will be used in subseque change node-names in	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name is below as having IP Address of 192.168.1.201. This information tent steps.						
	The near-end of the H.3 Avaya S8300 Media Se shown in the example b will be used in subseque change node-names in Name	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name below as having IP Address of 192.168.1.201. This informat int steps. Page 1 of 1 Page 1 of 1 IP NODE NAMES IP Address Name IP Address						
	The near-end of the H.3 Avaya S8300 Media Se shown in the example b will be used in subseque change node-names ip Name Wireless-S8500	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name is below as having IP Address of 192.168.1.201. This information tent steps. Page 1 of 1 IP NODE NAMES IP Address Name IP Address 10 .11 .11 .7						
	The near-end of the H.3 Avaya S8300 Media Se shown in the example b will be used in subseque change node-names in Name Wireless-S8500 default	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name below as having IP Address of 192.168.1.201. This information tent steps. Page 1 of 1 Page 1 of 1 Page 1 of 1 IP NODE NAMES IP Address Name IP Address 10 .11 .11 .7 0 .0 .0 .0						
	The near-end of the H.3 Avaya S8300 Media Se shown in the example b will be used in subseque change node-names in Name Wireless-S8500 default procr	323 trunk is terminated by the Avaya S8300 Media Server. T erver has a pre-defined node name of procr. This node name below as having IP Address of 192.168.1.201. This information tent steps. Page 1 of 1 Page 1 of 1 Page 1 of 1 IP NODE NAMES IP Address Name IP Address 10 .11 .11 .7 0 .0 .0 .0 192.168.1 .201						

Step	Description						
2.	Create a signaling group for the H.323 trunk by using the add signaling-group <i>x</i>						
	command where x is the number of an available signaling group. Set the Group Type						
	field to h.323. The Near-end Node Name field is set to procr which is the node name of the Avaya S8300 Media Server. In the case of the Avaya S8500 or other Media Server, the Near-end Nede Name field would be set to the node name of the resident C						
	I AN The For and Node Name field is	sot to WAVE which is the node name created					
	LAN. The Fai-end Node Name field is	Set to WAVE which is the node hame created					
	in the previous step for the wAVE Medi	a Server. The Near-end Listen Port and Far-					
	end Listen Port fields must be set to 1/2	20. This is the port number that WAVE uses					
	for H.323 signalling. The Far-end Netw	vork Region field is set to 1. Set the DTMF					
	over IP field to out-of-band. This field s	should not be set to in-band even if G.711					
	encoding is used exclusively. The Trun	k Group for Channel Selection field will be					
	added later after the trunk group is create	ed.					
	add signaling-group 4	Page 1 of 5					
	SIGN	ALING GROUP					
	Group Number: 4 Group	Type: h.323					
	Remote Of	fice? n Max number of NCA TSC: 0					
	IP V	SBS? n Max number of CA TSC: 0 Tideo? n Trunk Group for NCA TSC:					
	Trunk Group for Channel Selec	tion:					
	Supplementary Service Protocol: a						
	T303 Timer(sec): IU					
	Near-end Node Name: procr	Far-end Node Name: WAVE					
	Near-end Listen Port: 1720	Far-end Listen Port: 1720					
	LRO Required? n	Calls Share IP Signaling Connection? n					
	RRQ Required? n						
		Bypass If IP Threshold Exceeded? n					
	DTME over IP: out-of-band	H.235 Annex H Required? n Direct IP-IP Audio Connections? v					
		IP Audio Hairpinning? y					
		Interworking Message: PROGress					
		DCP/Analog Bearer Capability: 3.1kHz					

Id trunk-group x command the Group Type field to isdn. In the TAC field, enter a trunk e Dial Access field to y. Set the Page 1 of 20 m CDR Reports: y TN: 1 TAC: 104 Carrier Medium: IP Night Service: TestCall ITC: rest
Page 1 of 20 n CDR Reports: y TN: 1 TAC: 104 Carrier Medium: IP Night Service: TestCall ITC: rest Send National IEs: 6
n CDR Reports: y TN: 1 TAC: 104 Carrier Medium: IP Night Service: TestCall ITC: rest
Send National IEs: 6
rice: none ling (in/out): enbloc/enbloc Digital Loss Group: 18 Format: on: async Duplex: full
field for each member to be t the Sig Grp field to the number his case 4.
Page 4 of 20 Members (min/max): 0/0 inistered Members: 0
Sig Grp 4 4 4 4 4 4 4 4 4

	Desci	ripuon
Re	eturn to the signaling group form of the sig	gnaling group created earlier by using the
ch	ange signaling-group 4 command. Set t	he Trunk Group for Channel Selecti o
fie	eld to 4 to associate trunk group 4 to this s	ignaling group.
	add signaling-group 4	Page 1 of
	SIGNALI	NG GROUP
	Group Number: 4 Group Typ	e: h.323
	Remote Offic	e? n Max number of NCA TSC: 0
	IP Vide	o? n Trunk Group for NCA TSC:
	Trunk Group for Channel Selectio	n: 4
	T303 Timer(sec): 10
	Near-end Node Name: procr Near-end Listen Port: 1720	Far-end Node Name: WAVE Far-end Listen Port: 1720
		Far-end Network Region: 1
	LRQ Required? n RRO Required? n	Calls Share IP Signaling Connection?
		Bypass If IP Threshold Exceeded?
	DTME over ID: out-of-hand	H.235 Annex H Required?
	DIME OVEL IF: Out-of-band	IP Audio Hairpinning?
		Interworking Message: PROGres
		DCP/Analog Bearer Capability: 3.1kHz
Cr ro Na	reate a route pattern to use the H.323 trunk ute-pattern x command where x represer ame field enter any descriptive name. In	the Grp No field enter the number of the
Cr ro Na tru	reate a route pattern to use the H.323 trunk ute-pattern x command where x represer ame field, enter any descriptive name. In unk group created in the Step 3. Set the F	k. To accomplish this, use the change that an unused route pattern. In the Patte the Grp No field enter the number of the RL field to 0.
Cr ro Na tru	The reate a route pattern to use the H.323 trunk ute-pattern x command where x represent ame field, enter any descriptive name. In unk group created in the Step 3 . Set the F change route-pattern 65 Pattern Number: 65	the Grp No field enter the number of the RL field to 0.
Cr ro Na tru	The eater a route pattern to use the H.323 trunk ute-pattern x command where x represent the field, enter any descriptive name. In this group created in the Step 3 . Set the Function of the function	A DCP/Analog Bearer Capability: 3.1kHz A. To accomplish this, use the change its an unused route pattern. In the Pattern the Grp No field enter the number of the RL field to 0. Page 1 of 3 Pattern Name: WAVE Secure SIP? n
Cr rov Na tru	reate a route pattern to use the H.323 trunk ute-pattern <i>x</i> command where <i>x</i> represer ame field, enter any descriptive name. In unk group created in the Step 3 . Set the F change route-pattern 65 Pattern Number: 65 Grp FRL NPA Pfx Hop Toll No. Insert No. Mrk Imt List Del Digit	DCP/Analog Bearer Capability: 3.1kHz k. To accomplish this, use the change its an unused route pattern. In the Patte the Grp No field enter the number of the RL field to 0. Page 1 of 3 Pattern Name: WAVE Secure SIP? n ted DCS/ IXC
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Cr ro Na tru	reate a route pattern to use the H.323 trunk ute-pattern <i>x</i> command where <i>x</i> represer ame field, enter any descriptive name. In the group created in the Step 3 . Set the F change route-pattern 65 Pattern Number: 65 Grp FRL NPA Pfx Hop Toll No. Insert No Mrk Lmt List Del Digits Dgts 1: 4 0	DCP/Analog Bearer Capability: 3.1kHz c. To accomplish this, use the change its an unused route pattern. In the Patter the Grp No field enter the number of the RL field to 0. Page 1 of 3 Pattern Name: WAVE Secure SIP? n ted S DCS/ IXC QSIG Intw n use
Cr ro Na tru	change route-pattern 65 Grp FRL NPA Pfx Hop Toll No. Insert No Mrk Lmt List Del Digits 1: 4 0 2: 3:	DCP/Analog Bearer Capability: 3.1kHz A. To accomplish this, use the change its an unused route pattern. In the Patter the Grp No field enter the number of the RL field to 0. Page 1 of 3 Pattern Name: WAVE Secure SIP? n ted DCS/ IXC QSIG Intw n use n use n use n use
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Cr rov Na tru	reate a route pattern to use the H.323 trunk ute-pattern <i>x</i> command where <i>x</i> represer ame field, enter any descriptive name. In Ink group created in the Step 3. Set the F change route-pattern 65 Pattern Number: 65 Grp FRL NPA Pfx Hop Toll No. Insert No Mrk Lmt List Del Digits Dgts 1: 4 0 2: 3: 4: 5: 6: BCC VALUE TSC CA-TSC ITC BCIE S 0 1 2 3 4 W Request	DCP/Analog Bearer Capability: 3.1kHz A. To accomplish this, use the change its an unused route pattern. In the Patter the Grp No field enter the number of the RL field to 0. Page 1 of 3 Pattern Name: WAVE Secure SIP? n ted DCS/ IXC QSIG Intw n use n use n use n use Service/Feature PARM No. Numbering LAR Dgts Format Subaddress
Cr roi Na tru	reate a route pattern to use the H.323 trunk ute-pattern <i>x</i> command where <i>x</i> represer ame field, enter any descriptive name. In Ink group created in the Step 3 . Set the F change route-pattern 65 Pattern Number: 65 Grp FRL NPA Pfx Hop Toll No. Insert No Mrk Lmt List Del Digits Dgts 1: 4 0 2: 3: 4: 5: 6: BCC VALUE TSC CA-TSC ITC BCIE S 0 1 2 3 4 W Request 1: y y y y n n rest	DCP/Analog Bearer Capability: 3.1kHz A. To accomplish this, use the change its an unused route pattern. In the Patter the Grp No field enter the number of the RL field to 0. Page 1 of 3 Pattern Name: WAVE Secure SIP? n ted DCS/ IXC QSIG Intw n use n use n use n use Service/Feature PARM No. Numbering LAR Dgts Format Subaddress none
Cr ron Na tru	reate a route pattern to use the H.323 trunk ute-pattern <i>x</i> command where <i>x</i> represer ame field, enter any descriptive name. In mk group created in the Step 3 . Set the F change route-pattern 65 Pattern Number: 65 Grp FRL NPA Pfx Hop Toll No. Insert No Mrk Lmt List Del Digits Dgts 1: 4 0 2: 3: 4: 5: 6: BCC VALUE TSC CA-TSC ITC BCIE S 0 1 2 3 4 W Request 1: y y y y y n n rest 2: y y y y y n n rest 3: w y y y n n rest 2: y y y y n n rest	A DCP/Analog Bearer Capability: 3.1kHz A. To accomplish this, use the change its an unused route pattern. In the Patter the Grp No field enter the number of the RL field to 0. Page 1 of 3 Pattern Name: WAVE Secure SIP? n ted DCS/ IXC QSIG Intw n use n use n use n use Service/Feature PARM No. Numbering LAR Dgts Format Subaddress none
Cr rov Na tru	reate a route pattern to use the H.323 trunk ute-pattern x command where x represer ame field, enter any descriptive name. In the group created in the Step 3. Set the F change route-pattern 65 Pattern Number: 65 Grp FRL NPA Pfx Hop Toll No. Insert No Mrk Lmt List Del Digits Dgts 1: 4 0 2: 3: 4: 5: 6: ECC VALUE TSC CA-TSC ITC BCIE S 0 1 2 3 4 W Request 1: y y y y y n n rest 2: y y y y y n n rest 3: y y y y n n rest 4: y y y y n n rest 4: y y y y n n rest 3: y y y y n n rest 4: y y y y y n n rest 4: y y y y y n n rest 4: y y y y y n n rest	DCP/Analog Bearer Capability: 3.1kHz A. To accomplish this, use the change its an unused route pattern. In the Patter the Grp No field enter the number of the RL field to 0. Page 1 of 3 Pattern Name: WAVE Secure SIP? n ted DCS/ IXC QSIG Intw n use n use n use n use Service/Feature PARM No. Numbering LAR Dgts Format Subaddress none none
Cr ro Na tru	eate a route pattern to use the H.323 trunk ute-pattern x command where x represer ame field, enter any descriptive name. In ink group created in the Step 3. Set the F change route-pattern 65 Pattern Number: 65 Grp FRL NPA Pfx Hop Toll No. Insert No Mrk Lmt List Del Digits Dgts 1: 4 0 2: 3: 4: 5: 6: BCC VALUE TSC CA-TSC ITC BCIE S 0 1 2 3 4 W Request 1: y y y y y n n rest 2: y y y y y n n rest 3: y y y y y n n rest 4: y y y y n n rest 5: y y y y n n rest	DCP/Analog Bearer Capability: 3.1kHz A. To accomplish this, use the change its an unused route pattern. In the Patter the Grp No field enter the number of the RL field to 0. Page 1 of 3 Pattern Name: WAVE Secure SIP? n ted DCS/ IXC QSIG Intw n use n use n use n use Service/Feature PARM No. Numbering LAR Dgts Format Subaddress none none

Step	Description
7.	Use the change dialplan analysis command to create a range of dialed digits that will be routed by Automatic Alternate Routing (AAR) to the WAVE Media Server. For the compliance test, all 5-digit extensions beginning with 65 were reserved for use by WAVE. Thus in the example below, an entry was added with the Dialed String field set to 65, the Total Length field set to 5 and the Call Type field set to aar. This entry results in all dialed strings beginning with 65 and 5 digits in length being routed by AAR.
	change dialplan analysis DIAL PLAN ANALYSIS TABLE Percent Full: 1
	Dialed Total Call Dialed Total Call Dialed Total Call String Length Type String Length Type String Length Type 0 1 attd 1 3 dac 2 3 fac 3 4 ext 33 4 aar 6 5 aar 64 5 ext 65 5 aar 8 1 fac 9 1 fac
8.	Use the change aar analysis <i>x</i> command, where <i>x</i> is the digit string of interest, to define which route pattern will be chosen when the digit string is dialed. For the compliance test, all 5-digit extensions beginning with 65 were routed to the WAVE Media Server. Route pattern 65 is the route pattern created in Step 6 that uses the trunk group associated with the H.323 trunk terminated at the WAVE Media Server. Thus, an entry was added to the AAR DIGIT ANALYSIS TABLE with the Dialed String field set to 65, Total Min field set to 5, the Total Max field set to 5, Route Pattern set to 65 and Call Type set to aar.
	change aar analysis 65 Page 1 of 2 AAR DIGIT ANALYSIS TABLE Percent Full: 1
	Dialed StringTotalRouteCallNodeANIStringMinMaxPatternTypeNumReqd65565aarn777254aarn8552aarn977254aarn

Step	Description				
9.	Define the codecs supported on the H.323 trunk by configuring the ip-codec-set. Use the change ip-codec-set x command to define the list of codecs, where x is the number of the ip-codec-set associated with the H.323 trunk.				
	The ip-codec-set associated with the trunk is based on which ip-network-region the near-end node of the trunk resides. Use the list ip-interface all command to view the ip-network-region associated with the near-end node. Use the display ip-network-region command for that region to view the ip-codec-set used by the trunk.				
	the H.323 trunk. The lecs when these codecs were be codec list, G.729 had to be				
	listed first as shown below. Otherwise, the connection result	ted in no audio.			
	change ip-codec-set 1	Page 1 of 2			
	IP Codec Set				
	Codec Set: 1				
	AudioSilenceFramesPacketCodecSuppressionPer PktSize(ms)1:G.729n2202:G.711MUn220				

4. Configure Twisted Pair Solutions WAVE

This section describes the configuration of Twisted Pair Solutions WAVE. It is comprised of three components. Each component is installed and configured separately.

4.1. Configure WAVE Management Server

This section describes the configuration of the Twisted Pair Solutions WAVE Management Server. The WAVE Management Server must be installed first before the other components. The other components can then be downloaded and installed from the WAVE Management Server.



Step	Description					
3.	Enter a valid User ID and Password . The example below shows a system that has a User ID of bfedus administered.					
	Select Login to continue.					
	🚰 Login - Microsoft Internet Explorer					
	Eile Edit View Favorites Iools Help					
	$\begin{array}{c c c c c c c c c c c c c c c c c c c $					
	Address 🕘 http://192.168.1.71/wave/login.asp					
	Not logged in Log in					
	Login					
	Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:36:40 PM					
	Menu ready for use					

Step	Description			
4.	A list of profiles are displayed that can be used for login. An individual user may have access to multiple profiles. To perform the configuration procedures outlined in subsequent steps, select a profile that has full administrative permissions.			
	subsequent steps, select a prome that has full administrative permissions.			
	On an initial installation, using the default User ID of Administrator, the Profiles window does not appear. Instead, the System Settings window appears as shown in Step 6 . For more details on creating user IDs and profiles see reference [3].			
	The example below shows the profiles created for the User ID bfedus. Select the Full User Access (Admin) profile. This profile has administrative permissions.			
	Select Login to continue.			
	¹ Profiles - Microsoft Internet Explorer Elle Edit View Favorites Lools Help ¹ Back + → + ② ③ ① Notes Notes			
	Address Address http://192.168.1.71/wave/profiles.asp			
	Bryan Fedus * No Profiles * No Profiles			
	Please select a profile to login to:			
	Login Full User Access (Admin) UHF User Access			
	VHF User Access			
	Login			
	Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:37:04 PM			
	Menu ready for use			



,	Description					
5.	Select the Browse button next to the Upload License File field to locate the license file The license file will have the name of <i>serial_number</i> .wle where <i>serial_number</i> is the value shown in the Serial Number field. It should be located in the directory where th WAVE Management Server was installed. Once the file has been located and selected					
	the Upload License File will be populated.					
	Next, select the use its Internet an activation with the newlet	he Obtain Activ et connection to code. Once this by obtained code	ivation Code button. The WAVE Management Server will to contact a central server to authenticate its license and obta is is complete, the Activation Code field will be populated le.	l ıin		
	The example demo license license was a required) are	shown below is did not require lready authentic not shown.	as from the compliance test which used a demo license. The e an activation code. The screenshot was captured after the cated. In this case, the license file and activation code (if	3		
	🖉 System Settings - Micro	osoft Internet Explorer		<u>B</u> ×		
	<u>File Edit View Favorite</u>	is <u>T</u> ools <u>H</u> elp		11		
	← Back ← ⇒ → 🙆 🕼	🖓 🛛 🥨 Search 💿 Favorites 🖇	행/Media 33 타고· 슬 阳 · 브 11.			
	Address 😂 http://192.168.1	.71/wave/system_settings_form.asp	sp 🖉 🖉 🖉 🖉 🖉	nks »		
	Address @ http://192.168.1	.71/wave/system_settings_form.asp	sp 💆 🧭 Go Un	nks »		
	Address & http://192.168.1	.71/wave/system_settings_form.asp	sp 🗹 🖉 Go Un	nks »		
	Address http://192.166.1	.71/wave/system_settings_form.asp	sp v r r r r r r r r r r r r r r r r r r	nks »		
	Address http://192.166.1	.71/wave/system_settings_form.asp	sp v r r r r r r r r r r r r r r r r r r	nks »		
	Address in http://192.166.1	.71/wave/system_settings_form.asp stem Settings Component Versions WAVE System: Database Version: License Management:	sp ✓ ✓ ↔ un Save 2.0.3.31 (SP1) 35 URL Access: 1.2.27.0 22.65.0 Web Client Version: 2.0.23 Web Client OCX Version: 2.0.0.66	nks »		
	Address in http://192.166.1	.71/wave/system_settings_form.asp stem Settings Component Versions WAVE System: Database Version: License Management:	sp ✓ ✓ ↔ un Save Save 2.0.3.31 (SP1) 35 URL Access: 1.2.27.0 Desktop Client Version: 2.0.23 Web Client OCX Version: 2.0.0.66	nks »		
	Address in http://192.166.1	.71/wave/system_settings_form.asp stem Settings Component Versions WAVE System: Database Version: License Management: Licensing Serial Number:	sp ✓ ✓ ↔ un Save 2.0.3.31 (SP1) 35 URL Access: 1.1.23.0 35 URL Access: 1.2.27.0 Desktop Client Version: 2.0.23 Web Client OCX Version: 2.0.23 Web Client OCX Version: 2.0.0.66	nks »		
	Address in http://192.166.1	.71/wave/system_settings_form.asp stem Settings Component Versions WAVE System: Database Version: License Management: Licensing Serial Number:	sp ✓ ✓ ∞ Co Lin Save 2.0.3.31 (SP1) Utility Functions: 1.1.23.0 35 URL Access: 1.2.27.0 2.2.65.0 Desktop Client Version: 2.0.23 Web Client OCX Version: 2.0.0.66	nks »		
	Address in http://192.166.1	71/wave/system_settings_form.asp stem Settings Component Versions WAVE System: Database Version: License Management: Licensing Serial Number: Upload License File:	sp ✓ ♂ Go Unit Save Save Save Save 2.0.3.31 (SP1) Utility Functions: 1.1.23.0 35 URL Access: 1.2.27.0 2.2.65.0 Desktop Client Version: 2.0.23 Web Client OCX Version: 2.0.0.66	A A A A A A A A A A A A A A A A A A A		
	Address i http://192.166.1	71/wave/system_settings_form.asp stem Settings WAVE System: Database Version: License Management: Licensing Serial Number: Upload License File: System ID:	sp	nks »		
	Ageress in http://192.166.1	71/wave/system_settings_form.asp stem Settings Component Versions WAVE System: Database Version: License Management: Licensing Serial Number: Upload License File: System ID: Activation Code:	sp	nks »		
	Ageress in http://192.166.1	71/wave/system_settings_form.asp stem Settings WAVE System: Database Version: License Management: Licensing Serial Number: Upload License File: System ID: Activation Code:	sp C C un Save Save Save	nks »		
	Ageress in http://192.168.1	71/wave/system_settings_form.asp stem Settings Component Versions WAVE System: Database Version: License Management: Licensing Serial Number: Upload License File: System ID: Activation Code: Licensee Information:	sp Constant of the serial number you are using does not require activation Cuterrese: Cu	nks »		
	Ageress in http://192.168.1	.71/wave/system_settings_form.asp stem Settings stem Settings WAVE System: Database Version: License Management: Licensing Serial Number: Upload License File: System ID: Activation Code: Licensee Information: Licenses: Database In Imp	sp Consulting Systems Engineer Organizational Sub Unit: Consulting Systems Engineer Organizational Sub Unit: WAVE 2.0 Demo License WAVE 2.0 Demo License	nks >>		
	Ageress in http://192.168.1	71/wave/system_settings_form.asp stem Settings WAVE System: Database Version: License Management: Licensing Serial Number: Upload License File: System ID: Activation Code: Licensee Information: Licenses: Reset In Use	sp Consulting Systems Engineer Organizational Sub Unit: WAVE 2.0 Demo License Variational Sub Unit: WAVE 2.0 Demo License	nks »		

Step	Description						
7.	. On this same page, scroll down to the Global System Settings and Defaults section						
	Select the proper time zone from the pull down menu next to the Server TimeZone field					FimeZone field.	
	The default settings can be used for all other fields						
	The default sounds can be abed for an other noids.						
	Scroll back to the top of the page and select the Save button to continue.						
	Scron back to the top of the page and select the Save button to continue.						
	🚰 System Settings - Microsoft Internet Explorer						
	File Edit View Favorites Tools Help						
	← Back ← ⇒ → 🙆 😰 🚮	😡 Search 🙀 Favorites 🔇	Media 🎯 🕹 🥩				
	Address C http://192.168.1.71/0	wave/system_settings_form.asp				▼ (2°Go Links "	
		Global System Settings	and Defaults				
		Server TimeZone:		(GMT-05) Eastern Time (US & Ca	anada) 🗾		
		Global Filter method:		Allow users to select the filter met	hod	•	
		Default Max Participant	s:	10			
		Duration to keep audio	recordings:	30 days 💌			
	Duration to keep CDR records:						
	Enable Media Server failover support:						
		Enable Active Directory Active Directory Domain					
		Group Name Prefix:		wave *			
				Please review the documentation to authenticate users against the	n on how to configure your Web Se e Active Directory	erver	
		System Control Chann	el Settings				
		System Default Tx Rate	: 57,600 bps	•			
		System Presence Ch	annel (SPC)				
		Multicast Address:	234.5.6.7	Port: 9999	Sub Channel:	100	
		Support Items					
		Administrative contact:	your system administr	ator			
		Support URL:	http://www.twist	pair.com/support/default.a	asp?TYPE=user&PRODUCT	=WAVE	
						V	
		Bug report URL:	http://www.twist	pair.com/support/bug_repor	t.asp?TYPE=user&PROD	UCT=WAVE	
	Menu ready for use						
	Start 3 (Start 2)	C:\WINNT\syste	/stem Setting 🕅 Cor	trol Panel 🛛 🗑 WAVE Screensho		🕅 🔂 🕮 🗒 📲 4:42 PM	

4.2. Configure WAVE Media Server

This section describes the configuration of the Twisted Pair Solutions WAVE Media Server. The WAVE Media Server does not have its own user interface. All configuration of the WAVE Media Server is done from the WAVE Management Server.

Step	Description	
1.	Follow the installation procedures for the WAVE Media Server outlined in the Version 2.0 Service Pack 1 Administration Guide [3] by selecting System → Software from the main menu on the left of the window. In the case of the c test, the WAVE Media Server was installed on the same host as the WAVE Management Server with IP address of 192.168.1.71.	e WAVE Install ompliance
	WAVE home - Microsoft Internet Explorer File Edit View Favorites Tools Help	Crimer WAVE Systems
	System System Settings uire Logout System log caps Applications Caps Install Software Recordings Audio Files Audio Files Audio Files Ons, Inc Seles@twistoer.com Copyright © 20 Scripts ons, Inc Seles@twistoer.com Current server time is 11/30/2005 4:37:22 PM	ア Internet 通野乳乳 4:43 PM

Step			Ι	Description
2.	Double-c	lick on WAVE M	edia Server a	and follow the prompts to complete the
	installatio	on.		
	Install Software File Edit View	e - Microsoft Internet Explorer		<u>_</u> X
	← Back + → -	Search Favorites	@™Media 🎯 🖏 - 🧉	
	Address 🙆 http://1	192.168.1.71/wave/software.asp		▼ @Go Links ≫
	WAVE			<u>ام</u>
	Bryan Fedus Full User	Install Software		
	Access	Item	Platform	Description
	<u>()</u>	🔀 WAVE Media Server	🧚 Microsoft Windows	This is a server component that provides centralized mixing and conferencing facilities.
	Personal >			When prompted, you should enter "http://192.168.1.71:80/wave/_interface/get_media_server_config.asp?NAME=%s" or the configuration LIP:
	Channels Sessions	🕮 WAVE Desktop Communicator	Microsoft Windows	Installing this component on your computer allows you to access WAVE without using a web prowser.
	Media Servers			
	Interop			
	LMR CallManager			
	Users >			
	Management System			
	Logout			
	Copyright © 2003	8-2005 <u>Twisted Pair Solutions, Inc.</u> - sa	ales@twistpair.com Curre	nt server time is 11/30/2005 4:42:27 PM
	Annu ready for us	se		Thernet
	Start 1	🞐 🧐 🔘 🔟 🏧 C:\WINNT\syste 🎼]Install Softwar 🔍 🔾	ontrol Panel 👜 WAVE Screensho 👼 🕀 🕅 🖓 🕵 🔩 4:44 PM

Step	Description
3.	After the WAVE Media Server has been successfully installed, configure the media server by navigating to Media Servers \rightarrow Media Servers from the main menu on the left-hand side of the window. The example below shows this being done from the
	WAVE Management Server Home Page but this can be done from any window where
	the main menu appears.
	🗿 WAVE home - Microsoft Internet Explorer
	File Edit View Favorites Tools Help
	Address Abtri/192168121/wave/default asn
	WAVE
	Bryan Fedus Full User Home
	Access Access The WAVE User Guide Thelps you get the most out of the web dition of the Desktop Communicator. PDAs Telephones & Cell Phones UP Phones Other WAVE Systems Other WAVE Systems
	Channels > The WAVE Admin Guide documents WAVE's Media Servers > The WAVE Admin Guide documents WAVE's Media Servers Media Servers Media Servers
	Interfaces Interfaces Interop Interop LMR Interfaces CallManager Users Users Image: Specific and Solutions
	Management P Remember that your user name and password are case-sensitive. If you're Logout Land Mobile Pacilos Pecordings Logout Asving trouble logging in, check to make sure Caps Lock is off. Case sensitive sure Caps Case sensitive sure Caps
	Copyright @ 2003-2005 Twisted Par Solutions, Inc sales@twistpar.com Current server time is 11/30/2005 4:37:22 PM
	V
	🔮 server_mgt.asp?FLTR_ACT=RESET 🧶 Internet

Step	Description
4.	A list of available WAVE Media Servers appears in the window below. In the case of
	the compliance test, only one media server was installed so there is only one entry in the
	list. The newly installed media server appears with a default name and description.
	Double-click on the Name of the media server to configure it.
	č
	⁴ Media Servers - Microsoft Internet Explorer
	File Edit View Favorites Tools Help
	Address Athr:/(192.168.1.71/wave/server_mot_acn/2FITR_ACT=RFSFT
	WAVE
	Bryan Fedus Media Servers
	Access
	Show servers where Name 🔽 contains 🔽 Find Reset
	Home NOTE: This page automatically updates every 60 seconds.
	Channels Add Media Server Delete Selected Reconfig Selected Commit Changes
	Sessions
	Media Servers 3
	Interop
	LMR P
	Users b 0 out of 100 Dialpeer Participant licenses in use.
	Management D
	Logout
	Convright @ 2003-2005 Twisted Pair Solutions, Inc sales@twistnair.com - Current server time is 11/30/2005 5:37:33 PM
	Menu ready for use
	🕅 Start 🔟 🧶 🗊 🍘 🕮 C:\WINNT\syste 🏟 Media Servers 🔔 Control Panel - 🖉 WAVE Screensho 📴 🔆 🕅 🔂 🕮 🦣 💈 5:39 PM

Step		D	Description	
5.	Click the Active box in the Name and De Address and Audio to 150.	at the top of the pa scription fields. Er Binding IP Addre	ge. Enter any descriptive name anter the IP address of the host PC ss fields. The Maximum Partic	and description in the Host ipants was set
	Click the check box any H.323 call, such Communication Mar configured by the W Communication Mar WAVE chooses the codec is supported b result in no audio. S supported codecs, re	next to Enable H.3 as the calls that will nager. The signalin AVE administrator nager must be confi- codec automatically by WAVE. If the co supported codecs ind- fer to WAVE produ	23 Signaling . This enables WAV I be routed to WAVE from Avay g port and codec used for the H.3. The signaling port is always 17 gured to use this port in Section 3 to match the codec used by the dec is not supported by WAVE, clude G.711u and G.729. For a c act documentation.	VE to answer ya 323 call is not V20. Avaya 3 Step 2 . far-end, if the the call will complete list of
	The configuration of Modify Media Server - Microsoft Interr File Edit View Favorites Tools Help	f this window contin	nues in the next step.	
	Address (a) http://192.168.1.71/wave/server	form.asp?ACTION=EDITFORM&ID={7605847	8-9136-4014-82E5-8623E70A5F05}	▼ (c ² Go Links »
	Access			
	(?)		Save	
	Home Personal	Server Information		
	Channels	Name		
	Sessions >	Name:	DC Media Server	
	Media Servers	Host Name:		
	Interaces > Interop > LMR > CallManager > Users > Management >		 WARNING It is not recommended that you manually modify the server's host name as this is the name that is used to identify the server for communication and autor registration. If you incorrectly specify the host name, there is a possibility that duplicate server entries will be created. Check this box	
	System	Host Address:	192.168.1.71 *	
	100001	Audio Binding IP Address:	192.168.1.71 *	
		Protocol Port:	31325 *	
		Maximum Participants:	150 - High-end server	
		📕 Enable Failover		
		Server Rank: Failover Media Server peer:	1 (highest) 💌 (none) 💌	
		Enable H.323 Signaling		
			There are 10 Dialpeer Participant	-
	🕘 Menu ready for use			V Internet
	🏽 🚮 Start 🗍 🚮 🥭 🏐 🔘 🕅 🖾 C:\WIN	NT\syste Modify Media 5 🔍 Cor	ntrol Panel WAVE Screensho	🗑 🔂 🕮 💐 💐 4:47 PM 👘

Step	Description	
6.	Scroll down to the bottom of the page. In order to support any calls, the Maximum calls field must be increased from the default of 0 to some value up to the maximum number allowed by the available license. The demo license used for the compliance test supported 100 calls. If the user has multiple servers, this number must be statically allocated between the servers. It is not a dynamic pool that is shared between the servers. In the case of the compliance test, which used only one server, the value was set to 90. The Maximum Cisco paging devices was also set to 90. Default values wer used for all other fields.	st
	Scroll back to the top of the page and select the Save button to complete the configuration.	
	Note: The following screenshot was captured after channels had been assigned to this server as per the next step. Thus, the status at the bottom of the screen shows 34 channels assigned to this server. Modify Media Server - Microsoft Internet Explorer	X
	File Edit View Favorites Tools Help	
	Address @ http://192.168.1.71/wave/server_form.asp?ACTION=EDITFORM&ID={76058478-9136-4014-82E5-8623E70A5F05}	5 »
	Pailover Media Server (none) ●	
	Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:45:46 PM	•
	😸 Menu ready for use 👘 Internet	1

Step	Description
7.	Next, channels are created to allow logical groups of endpoints to communicate through WAVE using an IP multicast address. No channels exist by default and must be created by the administrator. To create a channel, navigate to Channels \rightarrow Channels from the main menu on the left-hand side of the page. The example below shows this being done from the WAVE Management Server Home Page but this can be done from any window where the main menu appears.
	WAVE home - Microsoft Internet Explorer _₽.♥ File Edit View Favorites Tools Help ↓ Back * → · ② ② △ ③ ▷ ● ● Address ⓐ http://192.168.1.71/wave/default.asp ✓ ◇ ○ △ △
	WAVE Bryan Fedus Full User Access Home Value • The WAVE User Guide helps you get the most out of the web delion of the Desktop Communicator. • The WAVE User Guide helps you get the most out of the web delion of the Desktop Communicator. • The WAVE User Guide helps you get the most out of the web delion of the Desktop Communicator. • Picros • Picros • Other WAVE Systems Channel Groups • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions • Many WAVE "How-To" attices are available on the Twisted Pair Solutions <t< th=""></t<>
	Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Image: Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Image: Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Image: Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Image: Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003 Twisted Pair Solutions, Inc sales@twistpair.com Image: Current server time is 11/30/2005 4:51:45 PM Image: Copyright © 2003 Twisted Pair Solutions, Inc sales@twisted Pair Solu

Step				Ι	Descriptio	on			
8.	Select the	e Add	Chann	el button.					
	The chan network. networks Administ	nel cor Confi could tration	nfigura guratic be quit Guide	tion example sho on of channels for the different. Refe for complete deta	wn in Sto other en er to the V uils.	eps 9 - 11 is typical of wironments such as La WAVE Version 2.0 Set	a Hoot .nd Moł rvice Pa	and bile ack 2	Holler Radio 2
	🔗 Channels - Micr	rosoft Internet	: Explorer						_ 8 ×
	File Edit View	Favorites To	ools Help						
	\Leftrightarrow Back $\bullet \Rightarrow \bullet$	2 🖸 🖄	Search 👔]Favorites 🎯 Media 🎯 🗟 🖌 🖉) 🗹 - 🗏 🛍				
	Address 🙆 http://	192.168.1.71/w	ave/channel_mg	t.asp?FLTR_ACT=RESET				• (iriks ≫
	WAVE								<u>^</u>
	Bryan Fedus Full User	Chan	nels						
	Access	- Show char	nnels where	Name 💽 contains	•	Find Reset			
	Home (?)	Add Chanr	nel Dele	te Selected Commit Change	s				
	Personal >		000000	Name	Group	App Description Type Receiv		Transmit	Transmit
	Channels >				PC Clients (8)	Avaya			C 711 Jul 2
	Media Servers		<u></u>	<u>Avaya Hammer (65011)</u>	<u>PC Clients</u>	(none)Hammer Standard 234.13 (65011)	.13.13:28100	33	64k/2
	Interfaces Interop			<u>Avaya Hammer2 (65012)</u>	<u>PC Clients</u>	(none)Hammer2 Standard 234.14 (65012)	.14.14:28200	33	G.711 uLav 64k/2
	LMR > CallManager >	□ 🕺	.	<u>Avaya Hoot & Holler (65013)</u>	<u>PC Clients</u>	Avaya Hoot & (none)Holler Standard 234.12 (65013)	.12.12:29000	33	G.711 uLav 64k/2
	Users >	□ 🕺		<u>Avaya LMR (65010)</u>	PC Clients	(none) ^{Avaya} LMR Standard 237.10 (65010)	.10.10:27770	3	G.711 uLa\ 64k/2
	Management System		a	<u>Chat (8001)</u>	<u>PC Clients</u>	(none)PC Clients - Standard 234.1.: Chat	13.1:34050	¥	G.711 uLa\ 64k/2
	Logout	□ 🕺	2	- <u>Music (8007)</u>	<u>PC Clients</u>	PC Clients - (none)Network Standard 234.1.3 Music	3.6:34052	3	G.711 uLav 64k/2
		□ 🕺	4	<u>UHF Radio (8002)</u>	PC Clients	Desktop Communicator Clents for UHF System	3.7:34054	33	G.711 uLa\ 64k/2
		□ 🕺	a X	VHF Radio (8003)	PC Clients	Desktop (none)Communicator Clients for VHF System	3.8:34056	33	G.711 uLa\ 64k/2
		12 out of in use.	100 Standard C	hannel licenses 3 out of 100 True in use.	ink Channel licenses	0 out of 100 Cisco Paging Channel licenses in use.	1 out of 10 in use.	00 LMR In	terface licens
	•								• •
		• • • • III			(Internet	
	Start 3	• \$ © <u> </u>	C:\WINNT\s	/ste @ Channels - Micr 🔍 C	ontroi Panel	WAVE Screensho	₽ 4 E 🕅 🖸 💟 !	<u> </u>	4:54 PM

Step	Description
9.	Select the Channel Type to be created from the drop-down menu. The example below
	shows a Standard channel type being created.
	\mathcal{F}_{1}
	Select Next to continue
	🚰 Modify Channel - Microsoft Internet Explorer
	File Edit View Favorites Tools Help
	4-Back - → - ② ② ③ ④ ③ Gearch ⓐ Favorites ③ Media ③ □ - ④ □ · □ ≦.
	Address 🔮 http://192.168.1.71/wave/channel_form.asp
	WAVE
	Bryan Fedus Add Channel
	Full User
	Select the type of channel you would like to create:
	Home Channel Type: Standard
	Personal
	Sessions
	Media Servers 🕑
	CallManager >
	Users b Management b
	System
	Logout
	Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 4:53:24 PM
	×
	Menu ready for use
	調査 Carterl 「 通 @ つ じ (WINNTsyste 修 Modify Channel Q Control Panel 圏 WAVE Screensho 単 化 ひ () () () () () () () () () () () () ()

Step	Description
10.	Enter any descriptive name and description in the Name and Description fields. Enter an available valid IP multicast address in the IP address field. The Internet Assigned Numbers Authority (IANA) define globally scoped IP multicast addresses as being in the range of 224.0.1.0 to 238.255.255.255. However, many of these are reserved for specific purposes. See <u>http://www.iana.org/assignments/multicast-addresses</u> for a complete list. However, generally IP addresses in the range of 234.0.0.0 to 238.255.255.255 can be used in the IP Address field in the form below. The Port field must be set to an even number value greater than 1024 and less than 65,536. The configuration of this screen continues in the next step.
	Image: Second Secon
	Bryan Peus Add Channel - Standard Full User Save Access Channel Information Personal Channel Information Channels Avaya DevConnect Test Channel Sessions Description: Interfaces Interfaces Interfaces Group: LMR CallManager Users Remote Channel Access Settings
	Management System Logout Proxy Session: Audio Receive IP address: 237.10.10.12 IP address: 237.10.10.12 Port: 27772 Voice Activity Detection (VAD): Enable VAD Instant Replay: Iv Enable Instant Replay Keep the last 2 minutes of audio for replay Filter frequencies on this audio stream: Frequency Filter: (none)
	Audio Transmit Menu ready for use Modify Channel G_Control Panel MWAVE Screensho Medify Channel G_Control Panel MWAVE Screensho Medify Channel G_Control Panel MWAVE Screensho Medify Channel S:03 PM

tep	Description
11.	Scroll down to the page to the Audio Transmit section. In this example, for a channel
	used in a Hoot and Holler network, verify that the following options are checked:
	Allow audio transmission on this channel
	Allow the user to (lately the microphone
	• Anow the user to latch the incrophone
	Verify the following option is unchecked:
	Mute channel when transmitting
	The Codec field represents the codec for the WAVE multicast IP channel. Select a value from the pull-down menu that is appropriate for the bandwidth available on the IP network for this type of traffic. It is not necessary for this value to match the codec value configured on the Avaya Communication Manager in Section 3 Step 9 . If the
	values do not match, WAVE will translate the audio stream using the codec on the
	H.323 call from Avaya Communication Manager to the codec used by the WAVE IP
	multicast channel. For the compliance test, the value of G.711 uLaw 64K was selected
	for the WAVE IP multicast channel
	The default value was used for all other options
	The default value was used for an other options.
	Scroll back to the top of the page and select Save to continue.
	A Ma Rio Channel Minner & Johannet Fusionen
	File Edit View Favorites Tools Help
	⇔Back • ⇒ → Ø Ø Δ QSearch Terrorites @Media Ø B • ⊕ W • ⊟ 100
	Address 🕘 http://192.168.1.71/wave/channel_form.asp?ACTION=NEWFORM&TYPE=18WOPUSH=Y8DEFGRPID={A6E2719F-F25E-4B9F-BCB3-A94F5E704963}
	Audio Transmit
	Allow audio transmission on this channel
	Mute all other channels when transmitting
	□ Disable the Talk button when receiving audio (simplex)
	☑ Use the same IP address and port as 'Audio Receive'
	IP address: 237.10.10.12 Port: 27772
	Codec: G.711 uLaw 64k 🔽 * Scale: 2 🗹
	Voice Activity Detection (VAD): Enable VAD
	Play an announcement before transmitting: AutoAlert
	🖬 Enable Real-Time Media Channel (RTMC) control stream
	Max Tx Rate: System Default (57600 bps) 💌
	Cross Mute Group: (none)
	Channel Settings
	Quality of Service (QoS) enabled:
	Minimum jitter buffer length (milliseconds): 20 💌
	Maximum jitter buffer length (milliseconds): 100 💌
	Security
	Audio Stream Encryption
	Encryption Password: Internal 🔽 Generate a new password
	Menu ready for use
	📺 Stof PM

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Step	Description
12.	After the channel is configured, the following screen appears so the administrator can define which profiles can use this channel. To allow access to this channel by a given profile, select the check box next to the profile Name in the list of Available Profiles . The Available Profiles are displayed on the right side of the window. More than one can be selected. The example below shows two profiles being given access: the Full User Access profile and the Guest User Access profile. Select the Update Profile Privileges button to submit the data. The window below will be updated to show the selected profiles have been added to the Current Profiles list on the left side of the window.
	Idit profile membership for channel 'Avaya DevConnect Test Channel' - Microsoft Internet Explorer Imit State File Edit View Favorites Tools Help Imit Back Imit State Imit State Imit State Imit State Imit State Address Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State Imit State
	Full User Access Back Home Current Profiles Available Profiles Personal Current Profiles Available Profiles Channels Filter: Show all entries Filter: Media Servers Filter: Show all entries Filter: Media Servers Remove Selected Update Profile Privileges Add Selected Interfaces Name Access Level AD Profile LMR CallManager Users Users User System System User User User User Bystem Deport User Access User User Logout User Access User User User
	Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 5:04:00 PM

Step	Description
13.	Next, sessions are created to allow other endpoints to access the channel which cannot access the channel directly. For the compliance test, a session was created to provide dial-in access to the channel. A separate session is created for each channel that needs to be accessed by Avaya Communication Manager endpoints. To create a session, navigate to Sessions \rightarrow Sessions from the main menu on the left-hand side of the page. The example below shows this being done from the WAVE Management Server Home Page but this can be done from any window where the main menu appears.
	WAVE home - Microsoft Internet Explorer Image: State
	Copyright @ 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 5:06:01 PM Image: Session_mgt.asp?FLTCLR=Y8FLTR_ACT=RESET Image: Session_mgt.asp?FLTCLR=Y8FLTR_ACT=RESET Image: Session_mgt.asp?FLTCLR=Y8FLTR_ACT=RESET Image: Session_mgt.asp?FLTCLR=Y8FLTR_ACT=RESET

tep						Description				
14.	Select A	dd S	Sess	sion.						
	The session configuration example shown in Steps 15 - 24 is typical of a dial-in sest for a Hoot and Holler channel. Configuration of sessions for other environments su Land Mobile Radio networks could be quite different. Refer to the WAVE Version Service Pack 2 Administration Guide for complete details.									
	🍘 Sessions - Micr	osoft In	iternet l	Explorer					_ 5	
	File Edit View	Favorit	tes To	ols Help						
	🗢 Back 🔹 🔿 👻	3	3 (Search 🛛 🙀 Favorite	es 🍘 Media 🎯 🛛	B- 3 🖬 - 🗉 📖				
	Address 🙆 http://	192.168	.1.71/wa	ve/session_mgt.asp?FLT	CLR=Y&FLTR_ACT=RI	ESET		-	_ (∂Go Lin	
	WAVE									
	VVAVE		_							
	Bryan Fedus Full User	S	essio	ns						
	Access	Sho	w sessio	ons where Name	 contains 	Find Reset				
	<u>/</u>									
	Home	Add	d Sessior	n Delete Selec	ted Commit	Changes	Туре	Parcion		
	Channels			Name	(all)	Description	(all)	ID / DN	Servers	
	Sessions 🕨		1	<u>Avaya H&H Dial-In</u>	Dial-In Access	Avaya H&H Dial-In	Advanced	65013	DC Media Server	
	Media Servers >		<u>.</u>	<u>Avaya Hammer - Dia</u> In	<u>II-</u> Dial-In Access	Avaya Hammer - Dial-In	Advanced	65011	DC Media Server	
	Interop		1	<u>Avaya Hammer2 Dia</u> In	I- Dial-In Access	Avaya Hammer2 Dial-In	Advanced	65012	DC Media Server	
	LMR >		1	Avaya Hoot Record	(Default)	Avaya Test	Advanced		DC Media Server	
	CallManager >		<u>.</u>	<u>Avaya LMR Dial In</u>	Dial-In Access	Avaya LMR Dial In	Advanced	65010	DC Media Server	
	Management >		1	Avaya Meet-Me Tes	t Dial-In Access	Avaya Meet-Me Test	Meet Me	65005	DC Media Server	
	System 🕨		1	<u>Avaya UHF Test</u>	Dial-In Access	Avaya UHF Test	Advanced	65002	DC Media Server	
	Logout		1	Avaya VHF Test	Dial-In Access	Avaya VHF Test	Advanced	65003	DC Media Server	
			1	Chat Channel Recording	Recording	Chat Channel Recording	Advanced		DC Media Server	
			I Ì	Chat Dial-In	Dial-In Access	Chat Dial-In	Channel Access	8001	DC Media Server	
			I Ì	<u>Chat to IP Phone</u> Bridge	Bridge	Chat Desktop Communicator Channel to Chat IP Phone Client Channel Bridge	Advanced		DC Media Server	
				Emergency All Call	Dial-In Access	Emergency All Call	Advanced	8050	DC Media Server	
			1		Conferences	Group Call	Group Call	8004	DC Media	
			1	Meet-Me Conference		Meet-Me Conference	Meet Me	8005	DC Media	
			1	Music Dial-In	Dial-In Access	Music Dial-In	Channel Access	8007	DC Media	
	, (#1)								1 ANIME	

Step	Description
15.	From the pull-down menu for the Session Type field, select Channel Access. This is
	the appropriate choice to create a dial-in session for the channel created earlier.
	Select Next to continue.
	출 Add Session - Mirrosoft Tatarnat Funlarar
	File Edit View Favorites Tools Help
	← Back - → - ③ ② △ QSearch Terrorites ③Media ③ St- ④ Terrorites
	Address 🙆 http://192.168.1.71/wave/session_form.asp
	WAVE
	Bryan Fedus Add Session
	Full User Access
	Select the type of session you would like to create:
	Home Session Type: Channel Access
	Channels
	Sessions
	Interfaces
	Interop >
	LMR CallManager
	Users
	Management System
	Logout
	Copyright © 2003-2005 Twisted Par Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 5:07:14 PM
	🖉 Menu ready for use
	🙀 Start 🛛 🗃 🈹 🎲 🕝 🗍 🔤 C:\WINNT\syste 🖗 Add Session 😧 Control Panel 🖉 WAVE Screensho

Step		Description
16.	Enter any descriptive the Description field information entered default value for the Select Save to contin	e name in the Name field. Optionally, a description can be added in d. If not, the Description field will be auto-populated with the same in the Name field. Check the check box next to Active . Use the remaining field.
	🖉 Add Session - Channel Access - Microso	oft Internet Explorer
	File Edit View Favorites Tools Help	International Activity of the second seco
	↔ Back • → • 🙆 🗗 🚮 🥘 Search	📷 Favorites 🞯 Media 🧭 🛃 - 🎒 🔝 - 📄 🚉
	Address 🙆 http://192.168.1.71/wave/session	_form.asp?ACTION=NEWFORM&TYPE=38NOPU5H=Y8DEFGRPID=
	WAVE	
	Bryan Fedus Add Session Full User	- Channel Access
	Access	Envo
	Personal	
	Channels >	Name: Avaya DevConnect Dial In *
	Sessions	Description:
	Interfaces	Broup Conference Confe
	Interop >	
		Save
	Users >	inducates a required meta
	Management >	
	System	
	Copyright © 2003-2005 Twisted Pair Solu	ttions, Inc <u>sales@twistpair.com</u> Current server time is 11/30/2005 5:10:57 PM
		-
	🕘 Menu ready for use	🗾 👔 Internet
	🏽 🕄 🥵 🎲 🕐 🛛 🖾 C:\WIN	NT\syste 🖗 Add Session - C 💁 Control Panel 🛛 WAVE Screensho

Step	Description
17.	The Modify Session window appears as shown below. The Name and Description fields are auto-populated from the information provided in the previous step. In the Conference ID / DN field, enter a valid extension on Avaya Communication Manager that will serve as the dial-in number. Verify that the check box is checked next to Treat as the Dial-In DN . Users can be required to enter a personal identification number when dialing in by entering a value in the Speaker PIN field. Use default values for all other fields.
	Image: Service State Service State Image: Service State Modify Session - Channel Access Image: Service State Modify Session - Channel Access
	Fill User Access Home Personal Channels Sessions Media Servers Interfaces Interfaces <
	Hosting Servers Add Servers Remove Selected Commit changes Image: Start Image: Start Image: Start Image: Star

Step	Description
18.	Scroll to the bottom of this same page to define which WAVE Media Server will host this session. Select the Add Servers button.
	Modify Session - Channel Access - Microsoft Internet Explorer Image: Second Image:
	Add Participant Remove Selected No participants have yet been added Image: Save save and Commit changes Indicates a required field Indicates a required field Indicates a nequired field Indicates a nequired field Indicates a nequired field Indicates a nequired field Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 5:12:13 PM Image: Start Medify Session Control Panel Medify Session Control Panel Medify Session Start Medify Session Control Panel M

Step		Description							
19.	A list of available WA	VE Media Servers will appe	ar. Check the box next to	the Name					
	of the server to host this session. In the case of the compliance test, there was only one								
	WAVE Media Server.								
	Select the Add Selecte	d Servers button to continue	e.						
	🖉 Adding Servers to a Session - Microsoft Inte	ernet Explorer							
	File Edit View Favorites Tools Help								
	Address Address http://192.168.1.71/wave/session_serv	er_select.asp?ACTION=SELSERVER&ID={5D8FB2C7-6862-4852-86	643-80CCF83D0887}&TYPE=3&SERVERTYPE=2&NOPUSH=Y	▼ 🖓 Go Links »					
	\approx			A					
	WAVE								
	Bryan Fedus Adding Servers	to a Session							
	Access Add Selected Servers	Cancel							
	Name	Description	Host Name	Type					
	Personal	DC Media Server	APCOPOD2	Meula					
	Channels 🕨								
	Sessions Media Servers								
	Interfaces >								
	LMR								
	CallManager 🕨								
	Users Management								
	System >								
	Logout								
	Copyright © 2003-2005 Twisted Pair Solutions	<u>, Inc sales@twistpair.com</u> Current server time is 11/30/2	2005 5:16:09 PM						
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	(C)			J Internet					
	🏽 🎆 Start 🔢 🚰 🏉 🎲 🖉 🗍 🚾 C:\WINNT\sy:	ste 🖉 Adding Servers 🔯 Control Panel 🖉 WAY	VE Screensho	💁 🕮 🔩 🔩 🛛 5:19 PM					

Step	Description
20.	After adding a server, the administrator is returned to the Modify Session window. Select the Add Participant button to define which channels will use this dial-in session.
	Modify Session - Channel Access - Microsoft Internet Explorer Image: Search i
	Management System Logout Add Servers Remove Selected Commit changes Image: Server Add Servers Remove Selected Participants Maximum callers per server: 10 * VAD: In On Add Participants * No participants have yet been added * * * * * * * * *
	愛 Menu ready for use

Step	Description							
21.	From the pull-down menu for the Participant Type field, select Standard Channels .							
	Select Next to continue.							
	Adding Session Participants - Microsoft Internet Explorer							
	File Edit View Favorites Tools Help → Rark + → - ② ② ③ ③ ③ A ③ Search CallEavorites ③ Mercia ③ ③ □ + → □ □ ④							
	Address 🙆 http://192.168.1.71/wave/session_part_select.asp?ACTION=SELPARTTYPE&ID={5D8FB2C7-6662-4852-8643-B0CCF83D0887}&TYPE=38MOPUSH=Y							
	WAVE							
	Bryan Fedus Full User Adding Session Participants							
	Access							
	Home							
	Personal							
	Channels							
	Media Servers >							
	Interfaces > Interop >							
	Users							
	Management							
	Logout							
	Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 5:19:03 PM							
	Menu ready for use							
	🔀 Start 🗹 🔗 😒 🎯 🔤 C:\WINNT\syste 🖗 Adding Session 🔯 Control Panel 🛛 🖉 WAVE Screensho							

)					Description				
22.	A list of a	available channe	els will a	ppear	r including the char	nel created ear	lier. Select the		
	radio button next to the channel to be added. In the case of the example below, the								
	Avaya DevConnect Test Channel was selected.								
	v								
	Choose th	he Select a Part	icinant	hutto	n to continue				
	Choose the Select a Farticipant button to continue.								
	💣 Selecting a Cha	nnel participant for the Session -	Microsoft Intern	et Explorer			_ 8 >		
	File Edit View	Favorites Tools Help					18		
	⇔Back • ⇒ •	🎯 😰 🖓 😡 Search 💽 Favo	orites 🍘 Media	3 B.	🗹 • 🖃 🛝				
	Address 🙋 http://:	192.168.1.71/wave/session_part_sele	ct.asp?ACTION=SE	LPART&ID={	5D8FB2C7-6862-4852-8643-B0CCF83D0887}	&TYPE=3&PARTTYPE=1&NOPUSH=Y	&FLTR_ACT=F <u>▼</u> 🖓 Go Links *		
	WAVE						-		
	Bryan Fedus	Selecting a Chann	nel particip	ant for	the Session				
	Full User					11			
	Access	- Show channels where Name	8 🗾	contains	<u> Find</u>	Reset			
	Home	Select a Participant Ca	incel						
	Personal 🕨	📕 Name	Group	App Code	Description	Type Receive	TransmitTransmit Codec		
	Channels Sessions	 Avaya DevConnect Test Channel 	PC Clients	(none)	Avaya DevConnect Test Channel	Standard 237.10.10.12:27772	G.711 uLaw 64k/2		
	Media Servers 🕨	C <u>Avaya Hammer (65011)</u>	PC Clients	(none)	Avaya Hammer (65011)	Standard 234.13.13.13:28100			
	Interfaces >	O <u>Avaya Hammer2 (65012</u>)) <u>PC Clients</u>	(none)	Avaya Hammer2 (65012)	Standard 234.14.14.14:28200			
	LMR	C <u>Avaya Hoot & Holler</u> (65013)	PC Clients	(none)	Avaya Hoot & Holler (65013)	Standard 234.12.12.12:29000			
	CallManager 🕨	O <u>Avaya LMR (65010)</u>	PC Clients	(none)	Avaya LMR (65010)	Standard 237.10.10.10:27770			
	Users Management	C Chat - IP Phone	<u>Cisco IP</u> Phones	Cisco79xx	IP Phones - Chat	Standard 234.1.3.1:26002			
	System	O <u>Chat (8001)</u>	PC Clients	(none)	PC Clients - Chat	Standard 234.1.13.1:34050			
	Logout	O <u>Music</u>	<u>Cisco IP</u> Phones	<u>Cisco79xx</u>	IP Phones - Music	Standard 234.1.3.2:26004			
		O <u>Music (8007)</u>	PC Clients	(none)	PC Clients - Network Music	Standard 234.1.3.6:34052			
		O UHF - IP Phone	<u>Cisco IP</u> Phones	<u>Cisco79xx</u>	IP Phone Clients for UHF System	Standard 234.1.3.3:26006			
		O UHF Radio (8002)	PC Clients	(none)	Desktop Communicator Clients for UHF System	Standard 234.1.3.7:34054			
		O VHF - IP Phone	<u>Cisco IP</u> Phones	<u>Cisco79xx</u>	IP Phone Clients for VHF System	Standard 234.1.3.4:26008			
		C VHF Radio (8003)	PC Clients	(none)	Desktop Communicator Clients for VHF System	Standard 234.1.3.8:34056	G.711 uLaw 64k/2 64		
						PM	-		
	Menu ready for u	se se	- colocimtwictnoi	r com (lir	rent cerver time is 11/31/20115-5:10:43		🔮 Internet		
	😹 Start 🛛 🚮 🔏	🎒 🧐 🖉 🗍 🚾 C:\WINNT\syste	Selecting a	Cha 🔍	Control Panel 🛛 🕅 WAVE Screensho	119 ():	🕅 🔂 🚅 💐 🚽 🛛 5:23 РМ		

Step	Description								
23.	After selecting a participant, the administrator is returned to the Modify Session								
	window. Scroll to the bottom of the page to view the participant just added. Select the Save and Commit changes button.								
	🖉 Modify Session - Channel Access - Microsoft Internet Explorer	×							
	File Edit View Favorites Tools Help								
	Address @ http://192.168.1.71/wave/session_form.aso?ACTION=EDITFORM&ID=(5D8FB2C7-6862-8652-8643-B0CCF83D0887/&TYPE=38NOPUSH=Y	s »							
	meura servers > Description.								
	Interfaces P Group (Default)								
	LMR > Conference ID / DN: 65014 * 🔽 Treat as the Dial-In DN								
	CallManager 👂 🛛 🖾 More Settings								
	Users Management Hosting Servers								
	System >								
	Logout Add Servers Remove Selected Commit changes all Host Name Host Address								
	DC Media Server APCOPOD2 192.168.1.71	1							
	Participants								
	Maximum callers per server: 10 * VAD: In On 💌 Out On 💌								
	Add Participant Remove Selected								
	Channels								
	Name Group App Code Type Rx Address IX IX Address Codec Static Tone Pattern Tone Ret Freq Filter								
	Avaya DevConnect Test Channel Clents (none) Standard 237.10.10.12:27772 3 ULaw (none) 1 Sec 🔽 Def (none)	Ē							
	Berord this session								
		1							
	* Indicates a required field * Indicates a NAT Address								
		- 1							
	Copyright © 2003-2005 Twisted Pair Solutions, Inc sales@twistpair.com Current server time is 11/30/2005 5:22:20 PM	Ţ							
	📴 Cart 🛄 🥮 🖓 🤍 🔤 C: (WUNNUT/Syste @ Modily Session 🖳 Control Panel WAYE Screensho Q: V 🕞 🕼 🕮 🤤 🙀 5:26 Pi	1							

Step				Description						
24.	After committing the changes, the administrator is returned to the Sessions window.									
	The sessions are listed alphabetically. The newly created session appears at the top of									
	the list.									
	Sessions - Microsoft Internel	t Explorer					_ 8 ×			
	File Edit View Favorites T	ools Help								
	4= Back • ⇒ • ③ ④ △	Q Search 📷 Favorites	Media 🎯 🛃 •							
	Address e http://192.168.1.71/w	ave/session_mgt.asp				<u> </u>	C∕GO Links ‴			
	WAVE									
	Bryan Fedus Sessi	ons								
	Full User Access	News		Find Paset						
	Show sess	sions where Name		Fillu Reset						
	Home Add Sessio	on 📃 Delete Selecte	ed Commit Chang	ges	_					
	Personal	Name	Group (all)	Description	(all)	Session	Servers			
	Sessions	<u>Avaya DevConnect</u> Dial In	(Default)	 Avaya DevConnect Dial In	Channel Access	65014	DC Media Server			
	Media Servers 🕨 🗖 🔒	Avaya H&H Dial-In	Dial-In Access	Avaya H&H Dial-In	Advanced	65013	DC Media Server			
	Interfaces	Avaya Hammer - Dial-	Dial-In Access	Avaya Hammer - Dial-In	Advanced	65011	DC Media Server			
		Avaya Hammer2 Dial- In	Dial-In Access	Avaya Hammer2 Dial-In	Advanced	65012	DC Media Server			
	CallManager 🕨 🔲 🔝	Avaya Hoot Record	(Default)	Avaya Test	Advanced		DC Media Server			
	Management	<u>Avaya LMR Dial In</u>	Dial-In Access	Avaya LMR Dial In	Advanced	65010	DC Media Server			
	System 🕨 🗖 📊	<u>Avaya Meet-Me Test</u>	<u>Dial-In Access</u>	Avaya Meet-Me Test	Meet Me	65005	DC Media Server			
	Logout 🗖 🖬	Avaya UHF Test	Dial-In Access	Avaya UHF Test	Advanced	65002	DC Media Server			
		<u>Avaya VHF Test</u>	Dial-In Access	Avaya VHF Test	Advanced	65003	DC Media Server			
	I 🖬 🖬	Chat Channel Recording	Recording	Chat Channel Recording	Advanced		DC Media Server			
		Chat Dial-In	Dial-In Access	Chat Dial-In	Channel Access	8001	DC Media Server			
		<u>Chat to IP Phone</u> Bridge	Bridge	Chat Desktop Communicator Channel to Chat IP Phone Client Channel Bridge	Advanced		DC Media Server			
		Emergency All Call	Dial-In Access	Emergency All Call	Advanced	8050	DC Media Server			
	E 🖬 🛙	Croup Call	Conferences	Group Call	Group Call	8004	DC Media Server			
		Meet-Me Conference	Conferences	Meet-Me Conference	Meet Me	8005				
	Menu ready for use		~			😮 Intern	et			
	📺 Start 🛛 🕜 🕭 🎾 🔘	C:\WINNT\syste	Sessions - Micr 🔍	Control Panel WAVE Screensho	₩₩ Q E (y dd (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	🖌 🗮 5:26 PM			

4.3. Configure WAVE Desktop Communicator

This section describes the configuration of the Twisted Pair Solutions WAVE Desktop Communicator. No manual configuration is required beyond the initial software installation. Each time a user logs into the WAVE Desktop Communicator with a specific profile, the configuration for that profile is automatically downloaded from the WAVE Management Server to the WAVE Desktop Communicator.

Step					Descri	ption			
1.	Follow the installation procedures for the WAVE Desktop Communicator outlined in the WAVE Version 2.0 Service Pack 1 Administration Guide [3] by selecting System →Install Software from the main menu on the left of the window. In the case of the compliance test, the WAVE Desktop Communicator was installed on a different host (IP address of 192.168.1.72) than the WAVE Management Server.								
	🖉 WAYE home - Microsoft Internet Explorer								
	File Edit View Favorites Tools Help								
	(→ Back • → • (2) (2) (2) (2) (2) Search (2) Favorites (2) Media (2) (2) • (2) (2) (2) (2) (2) (2) (2) (2) (2) (2)								
		Address (@ http://192.168.1./1/wave/default.asp							
	WAVE								
	Bryan Fedus Full User								
	Access The WAVE Us helps you ge of the web es Desktop Com		tuide most out o of the icator. PDAs IP Phones & Cell Phones IP Phones				ones	Other WAVE Systems	
	Channels Sessions Media Servers	The <u>WAVE Admin</u> documents WAVE administration screet	<u>suide</u> ; ens.			~	/		- Wieler
	Interop	Many WAVE "How articles are availat Twisted Pair Soluti <u>Support</u> web site.	To" le on the ons		66	WAY	VE C		
	Users 🕨			PCs					Public Address Systems
	Management >	Remember that you are and a	ur user are						
	Logout S	ystem Settings ystem log	hu're ng in,		Land Mobile Hadios			Hecordings	
	Aş In At	oplications stall Software ecordings udio Files	_Caps						
	A	udio Filter Definitions							
	Copyright © 20 <mark>8</mark>	cripts	ons, Inc	<u>.</u> - <u>sales@twistpair.c</u>	:om Current server tin	ne is 11/30/2005 4:37:2	2 PM		_
									V
	Software.asp			11		1 =	1		Internet
	Start 🛛 🚮 🍓) 🖾 🕲 🗍 🚾 C:/WIN	VT\syste	WAVE home -	🔯 Control Panel	WAVE Screensho.) 💽 🕮 💐 💐 4:43 PM

Step			Ι	Description			
2.	Double-click on WAVE Desktop Communicator and follow the prompts to complete the						
	installation.						
	🗳 Install Software - Microsoft Internet Explorer						
	File Edit View	Favorites Tools Help		(B)			
	↔ Back • → → ② ② △ ③ Search ⓐ Favorites ③ Media ③ □ □ → ④ 题 • ④ ■ ↓						
	Address 🕘 http://192.168.1.71/wave/software.asp						
	WAVE						
	Bryan Fedus Install Software						
	Access	Item	Platform	Description			
	1	🕮 WAVE Media Server	Microsoft Windows	This is a server component that provides centralized mixing and conferencing facilities.			
	Home			When prompted, you should enter			
	Channels			as the configuration URL.			
	Sessions 🕨	🕮 WAVE Desktop Communicator	🢐 Microsoft Windows	Installing this component on your computer allows you to access WAVE without using a web browser.			
	Media Servers 🕨						
	Interraces						
	LMR >						
	CallManager 🕨						
	Users <						
	Management 👂						
	System >						
	Logout						
	Copyright © 2003	3-2005 <u>Twisted Pair Solutions, Inc.</u> - <u>sa</u>	a <u>les@twistpair.com</u> Curre	nt server time is 11/30/2005 4:42:27 PM			
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	🔀 Start 🛛 🗹 💰	🗦 🧐 🔘 🔟 🔤 C:\WINNT\syste]Install Softwar 🛕 🔾	ontrol Panel 🛛 🕅 WAVE Screensho 🕮 🕀 🕅 🔂 🔮 🖳 4:44 PM			

5. Using WAVE Desktop Communicator

This section describes the most basic operation of the Twisted Pair Solutions WAVE Desktop Communicator. For a complete description of all icons and features please refer to the WAVE Version 2.0 Service Pack 1 Desktop Communicator User Guide. The WAVE Desktop Communicator is used by the end-user to access a WAVE channel from a PC.

Step	Description
1.	Launch the WAVE Desktop Communicator from the Windows Start menu by navigating
	to Start \rightarrow Programs \rightarrow Twisted Pair Solutions \rightarrow WAVE \rightarrow Desktop
	Communicator.

Step	Description							
2.	Select the IP address of the WAVE Media Server from the pull-down menu next to the							
	Server field. Enter a valid User Name and Password.							
	Select OK to continue.							
	WAVE Login							
	\approx							
	MANE							
	VVAVE							
	Server: 192.168.1.71							
	User Name: bfedus							
	Password:							
	Remember my password							
	Log me in automaticallu							
	Enable Remote Channel Access (VPN)							
	OK Cancel							
3.	From the list of profiles provided, highlight the one to be used for login.							
	Select OK to continue.							
	🕅 Select a Profile							
	Select the Profile you want to login							
	Full User Access							
	UHF User Access							
	VHP Osel Access							
	Full User Access Access Level: Administrator							
	UK Cancel							

Step	Description
4.	The main WAVE Desktop Communicator window will appear. In the example shown
	below, the user has access to eight separate channels including some Hoot and Holler
	type channels and LNR type channels. Each channel is represented as a separate panel in the window with a white background called the Client Channel Banel. The last panel
	in the window with the purple background is the Client Control Panel which contains
	controls which are not channel specific
	WAVE Desktop Communicator - Full User Access
	Eile Channels Tools Help
	Avaya DevConnect Test Channel
	📙 🖉 🗛 Avaya Hoot & Holler (65013)
	No sudio
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	Chat (8001)
	No sudio
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	\$3
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	05:30:29 PM
	Solution Stream

Description
The example below shows the Client Channel Panel for the Avaya DevConnect Test Channel . The channel is active, as indicated by the Channel Activity icon being yellow. The Channel Activity icon is oval-shaped and is located to the far left of the Client Channel Panel .
The channel name appears on the Channel State button. If the Channel State button is green, as shown below, the channel is not muted. If it is yellow, the channel is muted. Multiple channels can be active at one time and the conversation on all active channels will be heard on the user's PC speakers. Below the Channel State button is the text No audio . This indicates that no one is currently speaking on this channel even though it is active. If someone was speaking, a timestamp would appear in this area of the window.
The mute state of a channel can be toggled on or off by clicking the Channel State button. If the user wishes to be removed from a channel, the user would click on the Channel Activity icon and the icon would turn grey.
To talk on a channel, the user clicks the Talk button. If the Talk button is blue, then the microphone for that channel is latched. This means the user does not have to hold the Talk button down to be heard. The user clicks the Talk button again when the user is done speaking. If the Talk button is red, then the microphone for that channel is not latched. This means the user must hold down the Talk button to be heard and releases the Talk button when the user is done talking.
To exit the application, navigate to File \rightarrow Exit from the menu bar.
WAVE Desktop Communicator - Full User Access

6. Interoperability Compliance Testing

This section describes the compliance testing used to verify the interoperability of Twisted Pair Solutions WAVE and Avaya Communication Manager using a H.323 IP trunk.

6.1. General Test Approach

The general test approach focused on verifying that endpoints controlled by Avaya Communication Manager could connect to communication channels hosted by WAVE, interoperate with WAVE endpoints and participate with acceptable voice quality. The following functionality was exercised as part of the compliance test.

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SPOC 5/30/2006	©2006 Avaya Inc. All Rights Reserved.	Wave-ACM

- Calls to WAVE sessions involving only Avaya Communication Manager endpoints (H.323, digital, and analog).
- Calls to WAVE sessions involving Avaya Communication Manager endpoints (H.323, digital, and analog) and WAVE Desktop Communicator tuned to the corresponding WAVE channel. This simulated a Hoot and Holler network scenario.
- Calls to WAVE sessions involving Avaya Communication Manager endpoints (H.323, digital, and analog) and land mobile radios tied to the corresponding WAVE channel. This simulated a first responder radio network scenario.
- Calls using G.711 and G.729 codecs.
- Calls requiring transcoding internal to WAVE. If calls attempt to connect to a WAVE channel using a different codec than the channel itself, then WAVE will perform the transcoding and convert the audio from one codec to the other.
- DTMF transmission using out-of-band signaling.
- Interactions with hold, transfer and conference.
- Direct IP-to-IP media (also known as "shuffling" which allows H.323 endpoints to send audio (RTP) packets directly to each other without using media resources on the Avaya Media Gateway).

In addition, the solution's recovery behavior was tested with network failures and system restarts. Lastly, a bulk call generator was used to generate significant call volumes to three separate WAVE sessions simultaneously.

6.2. Test Results

All test cases passed. Endpoints controlled by Avaya Communication Manager were able to dial-in to WAVE sessions and be connected to existing WAVE channels. These endpoints were able to participate with acceptable voice quality with native WAVE endpoints connected to the channel.

The following observations were made during the compliance test and documented in the configuration steps where appropriate:

- 1. This solution does not support in-band transmission of DTMF tones.
- 2. If G.729 appears in the codec set on Avaya Communication Manager, this solution requires that it appears first in the preferred list.
- 3. Intermittently, endpoints registered to the Avaya S8500 Media Server or connected to the Avaya G650 Media Gateway at site 1 in **Figure 1** could not rejoin a WAVE session after placing the call on hold that connects to the WAVE session. In these instances, multiple attempts to take the call off hold were necessary to rejoin the session.

7. Verification Steps

The following steps may be used to verify the configuration:

1. Verify that the state of the H.323 IP trunk between the WAVE Media Server and the Avaya Media Server is in-service. To accomplish this, use the **status trunk-group** *x* command, where *x* is the trunk group number associated with this trunk.

- 2. Place a call to a dial-in WAVE session with an associated WAVE channel from an Avaya Communication Manager endpoint. Verify that the Avaya Communication Manager endpoint has a two-way talk path to a WAVE endpoint currently on the channel.
- 3. Place two calls to a dial-in WAVE session that requires a PIN. Originate the calls from two Avaya Communication Manager endpoints. Verify that a two-way talk path is established between the endpoints via the WAVE session thus verifying the PIN digits were correctly detected.

8. Support

Technical support for Twisted Pair Solutions WAVE can be obtained by contacting Twisted Pair Solutions via the support link at <u>http://www.twistpair.com</u>.

9. Conclusion

These Application Notes describe the procedures for configuring the group communication solution comprised of Avaya Communication Manager and Twisted Pair Solutions Wide Area Voice Environment (WAVE) using a H.323 IP trunk. This solution allows endpoints and trunk calls controlled by Avaya Communication Manager to connect to "always on" communication channels hosted by WAVE and interoperate with WAVE endpoints. Typical environments that currently use WAVE are Hoot and Holler networks for financial markets and Land Mobile Radio environments requiring radio interoperability with other frequencies or endpoints.

10. Additional References

The following Avaya product documentation can be found at http://support.avaya.com .

[1] Feature Description and Implementation For Avaya Communication Manager, Release 3.0, Issue 3.0, June 2005, Document Number 555-245-205

[2] Administrator Guide for Avaya Communication Manager, Release 3.0, Issue 1.0, June 2005, Document Number 03-300509

The following WAVE product documentation is available from Twisted Pair Solutions. Visit the website at <u>http://www.twistpair.com</u> for company and product information.

[3] WAVE Version 2.0 Service Pack 1 Administration Guide

[4] WAVE Version 2.0 Service Pack 1 Desktop Communicator User Guide

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