Avaya Solution & Interoperability Test Lab

Application Notes for the Vocera Communications System with Avaya IP Office using E1 interface - Issue 1.0

Abstract

These Application Notes describe the configuration steps required to integrate Vocera Communications System – Vocera Server, Telephony Server and badges, with Avaya IP 403 Office, Avaya Wireless AP-7 and AP-8.

Emphasis of the testing was placed on verifying reliable integration between the Vocera Telephony Server and Avaya IP Office, using the E1 interface.

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 configuration comprised of the wireless communication features of a Vocera Communications System with Avaya IP Office and Avaya Wireless AP-7 and AP-8.

Vocera Communications System is comprised of three main components:

- Vocera Badges
- Vocera Server
- Vocera Telephony Server

The Vocera Badges are wireless 802.11b devices that serve as communicators in a wireless environment. By pressing the call button on a badge, a user can interface with the Vocera Server to start the call process.

The Vocera Server acts as a communication server to place calls between the badges. The Vocera Server stores the user and Badge information, and has the speech access interface that allows the users to place and receive calls.

The Vocera Telephony Server is an optional interface that provides connectivity to a PBX system. The Vocera Telephony Server was utilized for the test to setup an IP trunk between the Vocera Telephony Server and Avaya IP Office. The interface used between the Vocera Telephony Server and PBX was E1. The Vocera Telephony Server allows the Vocera Server to connect Badges to PBX users, as well as route calls to the public network through the PBX.

The two server applications, the Vocera Server and Vocera Telephony Server, can reside in the same physical server platform.

For additional information on Vocera Communication System, please refer to Vocera documentation [3] and [4].

Figure 1 illustrates the network configuration used to verify the Vocera Communications solution. The configuration details provided in these Application Notes focus on the PBX interfaces between Avaya IP Office and the Vocera Telephony Server as well as the wireless configuration between the Vocera Badges and Avaya Wireless AP-7 and AP-8. Extreme Networks Alpine 3804 and Summit 300-48 Ethernet Switches provided the infrastructure for interconnecting between Avaya IP Office and Vocera Communications System.

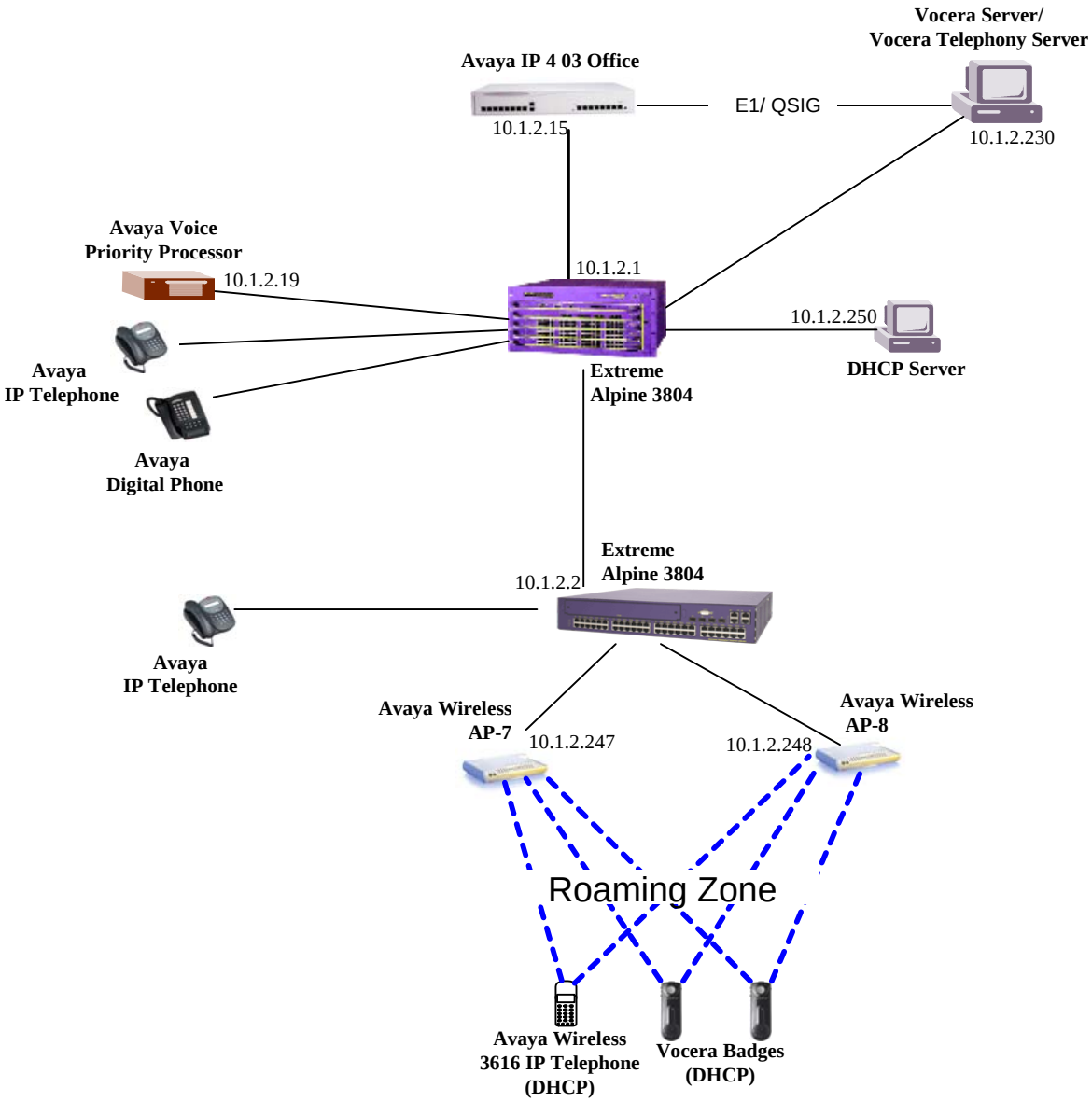


Figure 1: Test Configuration of Vocera with Avaya IP 403 Office

2. Equipment and Software Validated

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

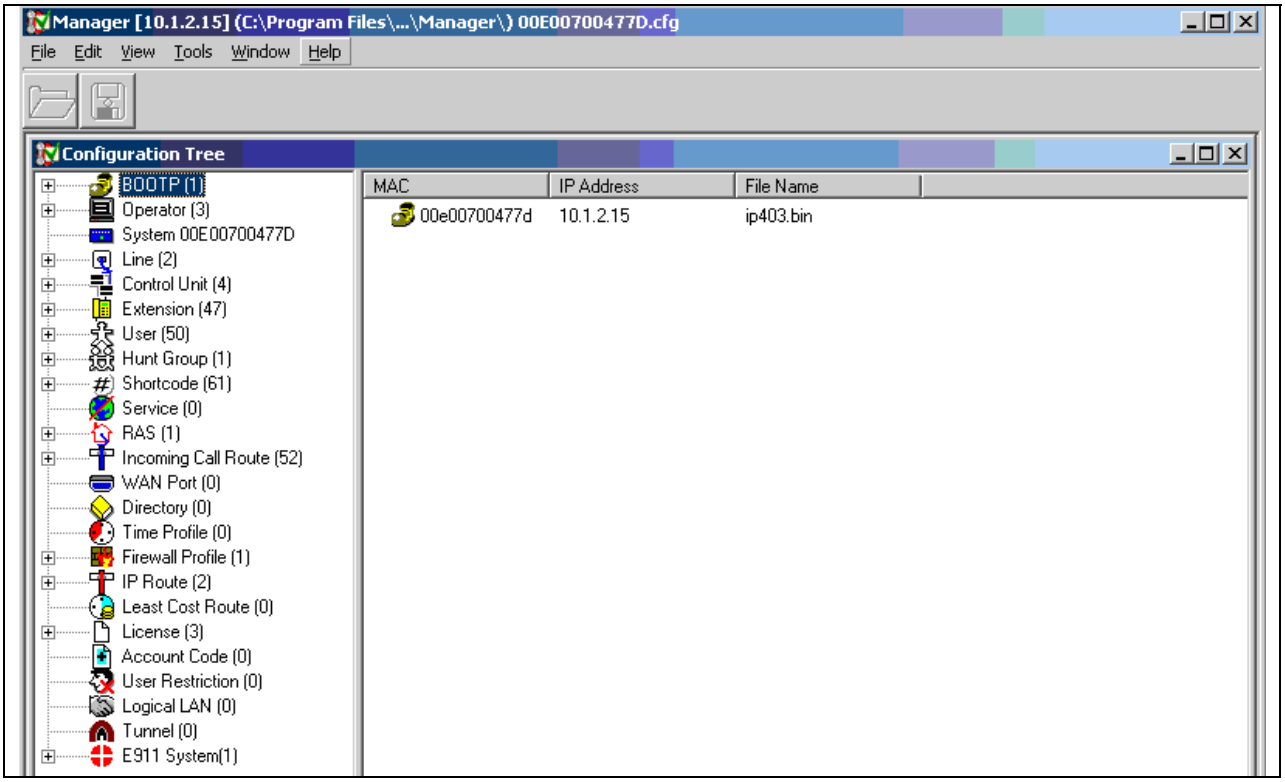
Equipment	Software
Avaya IP 403 Office	3.1 (29)
Avaya Wireless AP-7	V2.6.0 (914)
Avaya Wireless AP-8	V2.5.2 (894)
Avaya 4620SW IP Telephones	2.3
Avaya Digital Telephone	
Avaya 3616 IP Wireless Telephones	96.040
Extreme Networks Alpine 3804 Ethernet Switch	7.2.0 Build 25
Extreme Networks Summit 300-48 Ethernet Switch	7.4e.1.5
Vocera Server and Telephony Server	3.1 build 1060
Vocera Badges	3.1 build 1060

3. Configure the Avaya IP Office

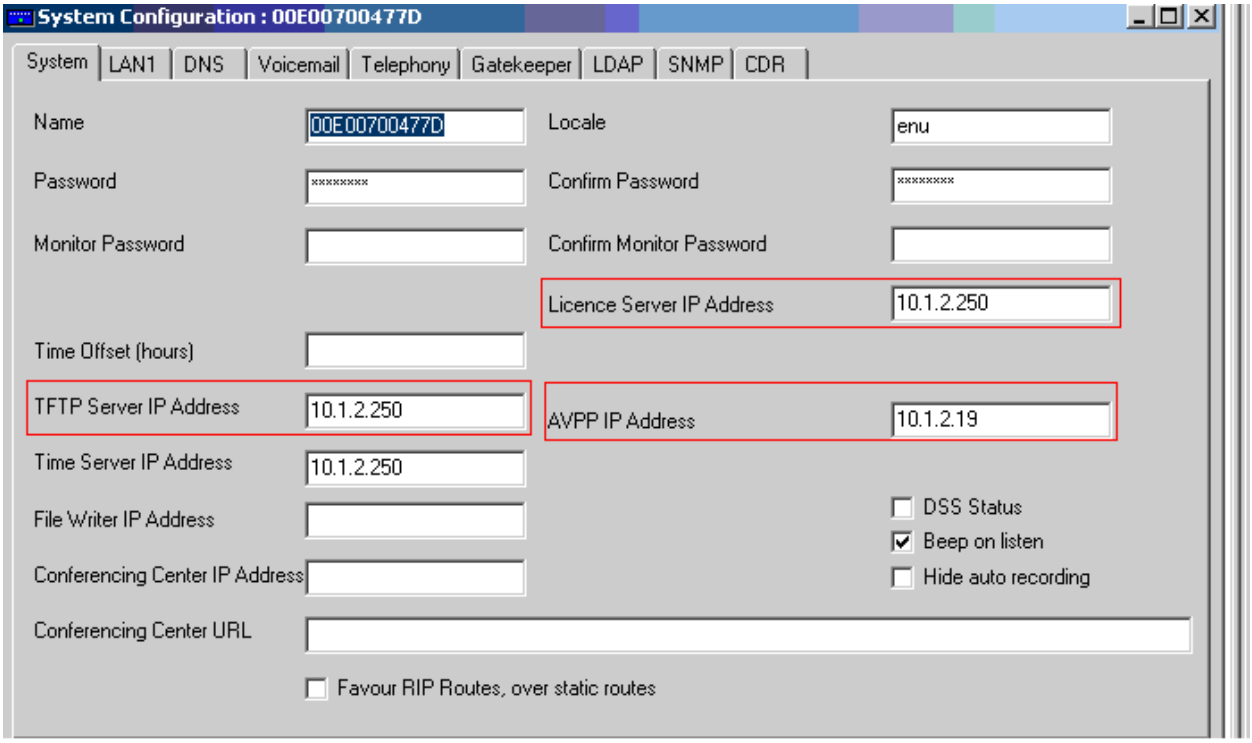
Connectivity between Avaya IP Office and the Vocera Telephony Server was done using E1 interface. The following section shows the relevant configuration screens for the interface. Avaya IP Office configurations are executed using the IP Office Manager. After each configuration is completed it is recommended to save the configuration and initiate an immediate reboot, if appropriate, so that the configuration is applied to the Avaya IP Office switch.

The configuration verified for E1 trunk used the 4xxxx extension range for the Vocera Server and Badges. Short Strings were used to allow 5-digit dialing to reach Vocera Badges. When no digits are sent to the Vocera Server, the user is greeted by the voice interface, and prompted for a badge user to contact. If digits are sent over the trunk to the Vocera Server, then Vocera looks up the digits in a table to see if they match a Badge user, and sets up the connection to that user. If the digits are not in the user table, then the user hears an audio message indicating there is no such user and is prompted for a user to contact. The configuration shown here does not send digits to the Vocera server, so the caller always receives the initial greeting.

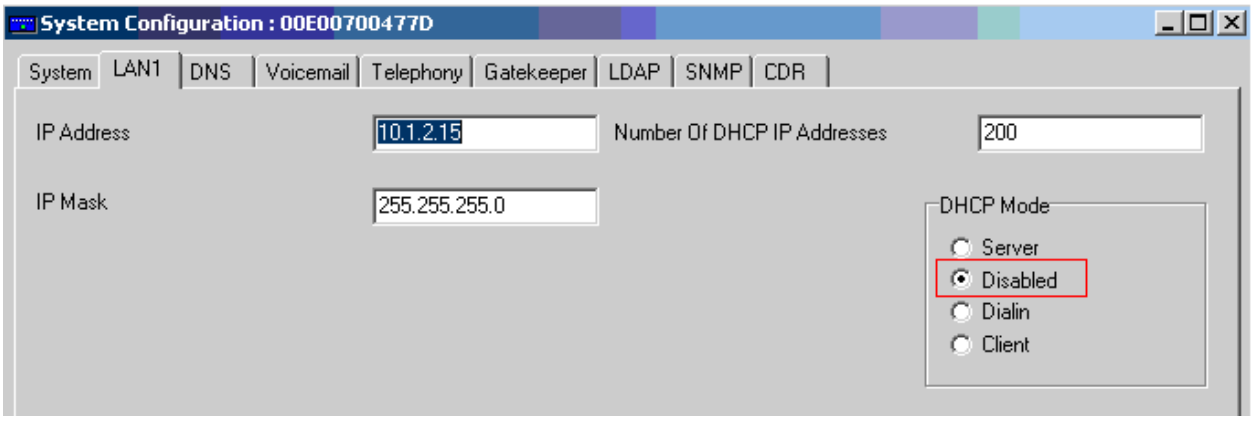
To configure Avaya IP Office login to the IP Office manager (**Start → Programs → IP Office → Manager)** using appropriate credentials. The main configuration window will appear.



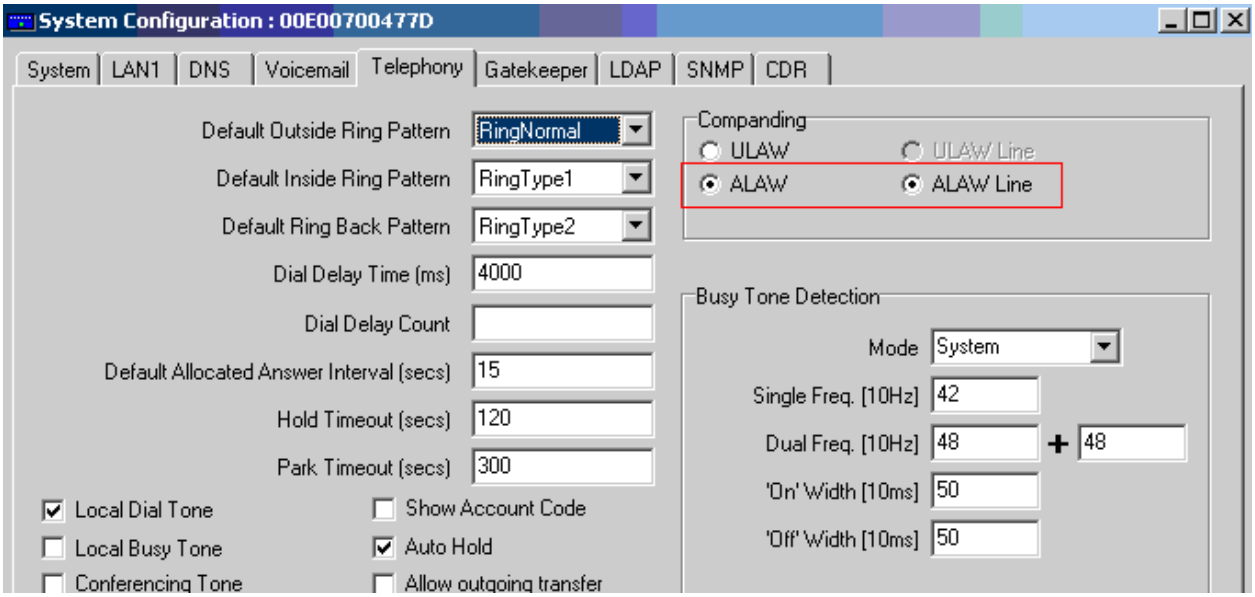
In the Configuration Tree, expand the System section. Double click on System Name and the System Configuration window appears. In this window the **TFTP Server**, **License Server**, and **AVPP** IP Addresses need to be specified.



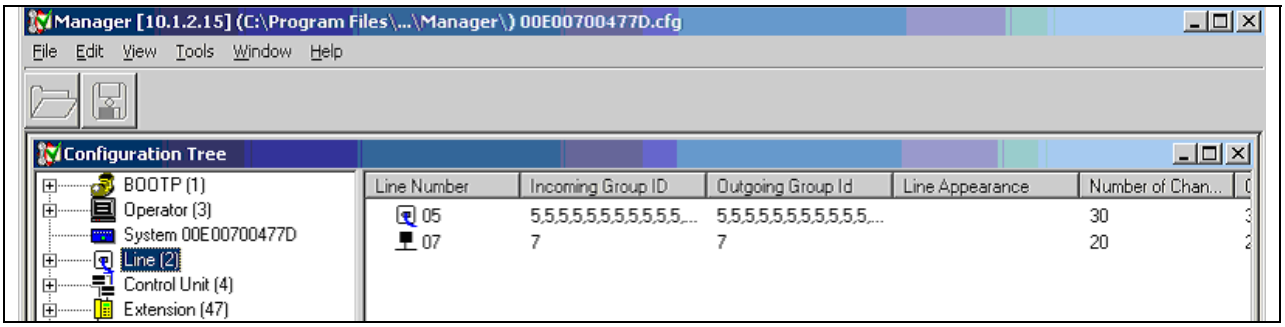
In the System Configuration window click the **LAN1** tab and **disable** the DHCP Mode. The DHCP functionality will be provide by a DHCP server in the same network.



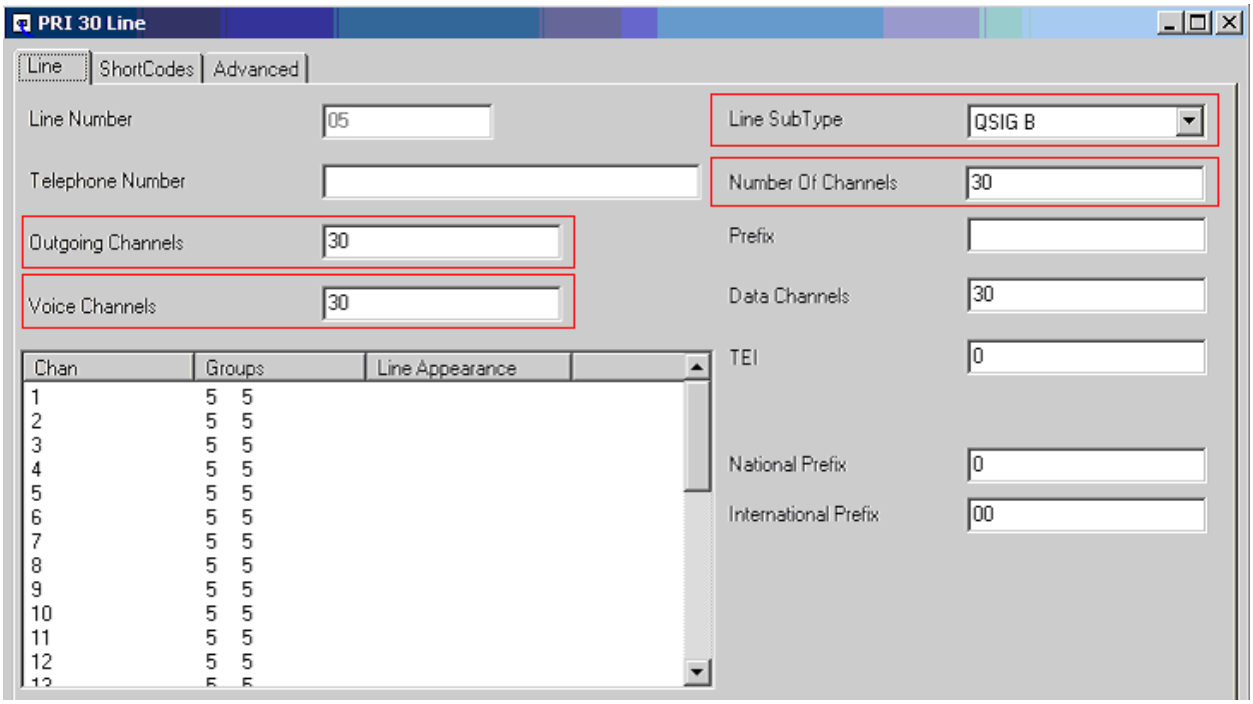
In the System Configuration window click the **Telephony** tab. The Companding field must be set to **ALAW** and **ALAW Line** to communicate with the Vocera Telephony Server through the E1 trunk.



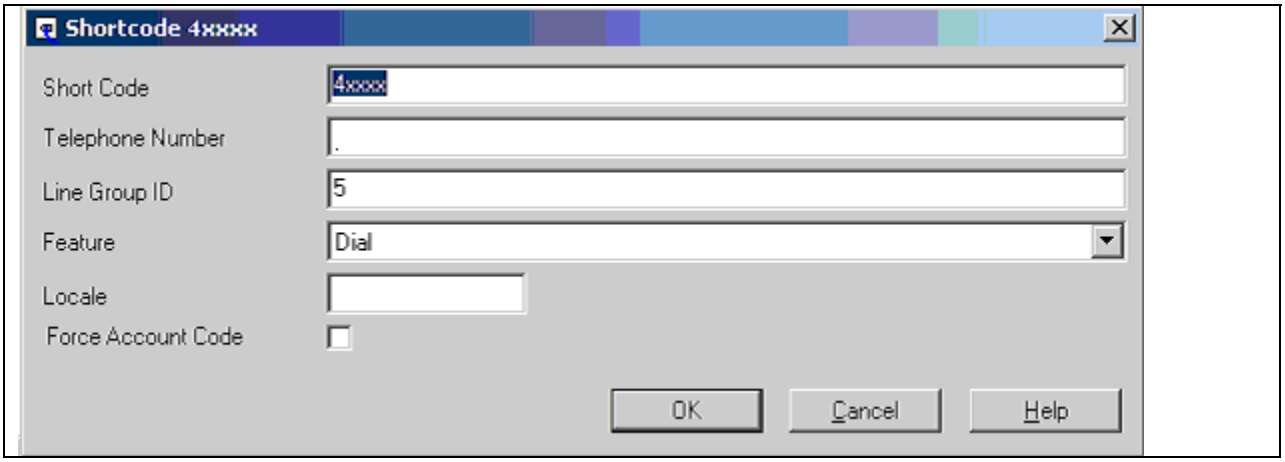
In the Configuration Tree, expand the **Line** section. In the sample configuration, the Line number 05 was configured to connect to the Vocera Server. Double click on **Line Number 05** and the following window appears.



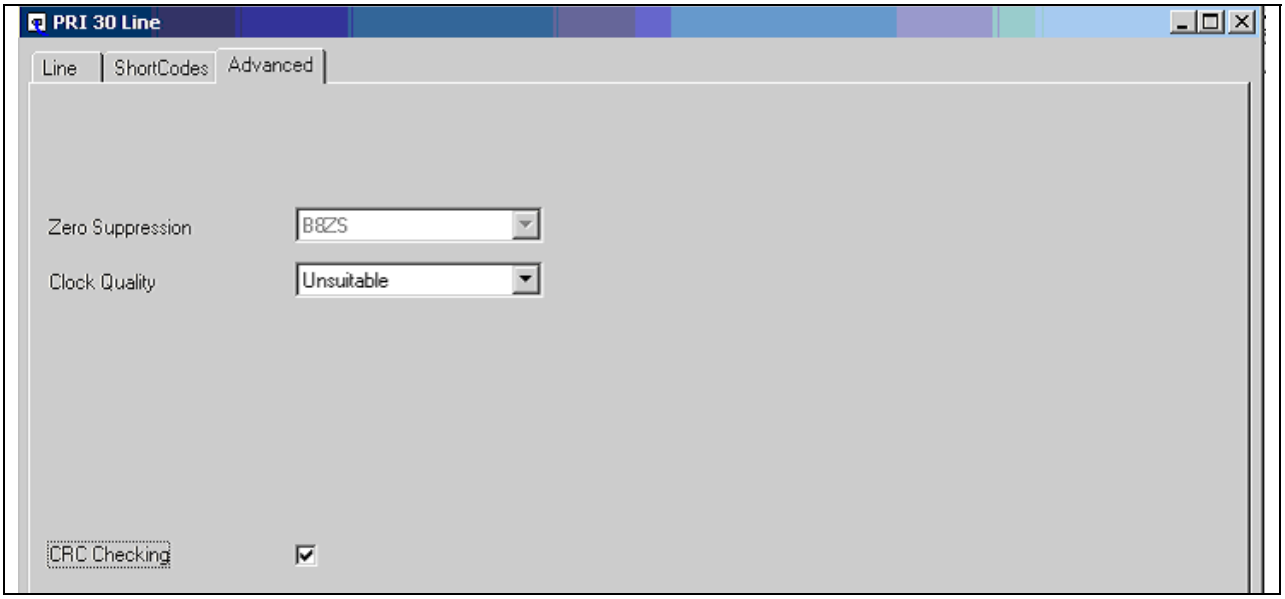
In the sample configuration, Avaya IP Office was set to the user side (**QSIG B**) of the E1 QSIG protocol, and the Vocera Telephony Server was set to the network side (**QSIG A**). The Line Sub Type field was set to **QSIG B**. The number of channels field was set to **30** channels, and those channels were Voice Channels.



Shortcodes are configured from the Shortcode entry in the Configuration Tree. Click on **Shortcode**, and then on the screen to the right, click with the right mouse button and select **new**. This will open a new Shortcode window. The screen below shows the Shortcode used in the sample configuration to route 4xxxx. The Line Group ID was set to **5**, which is the E1 trunk that connects to the Vocera Server.



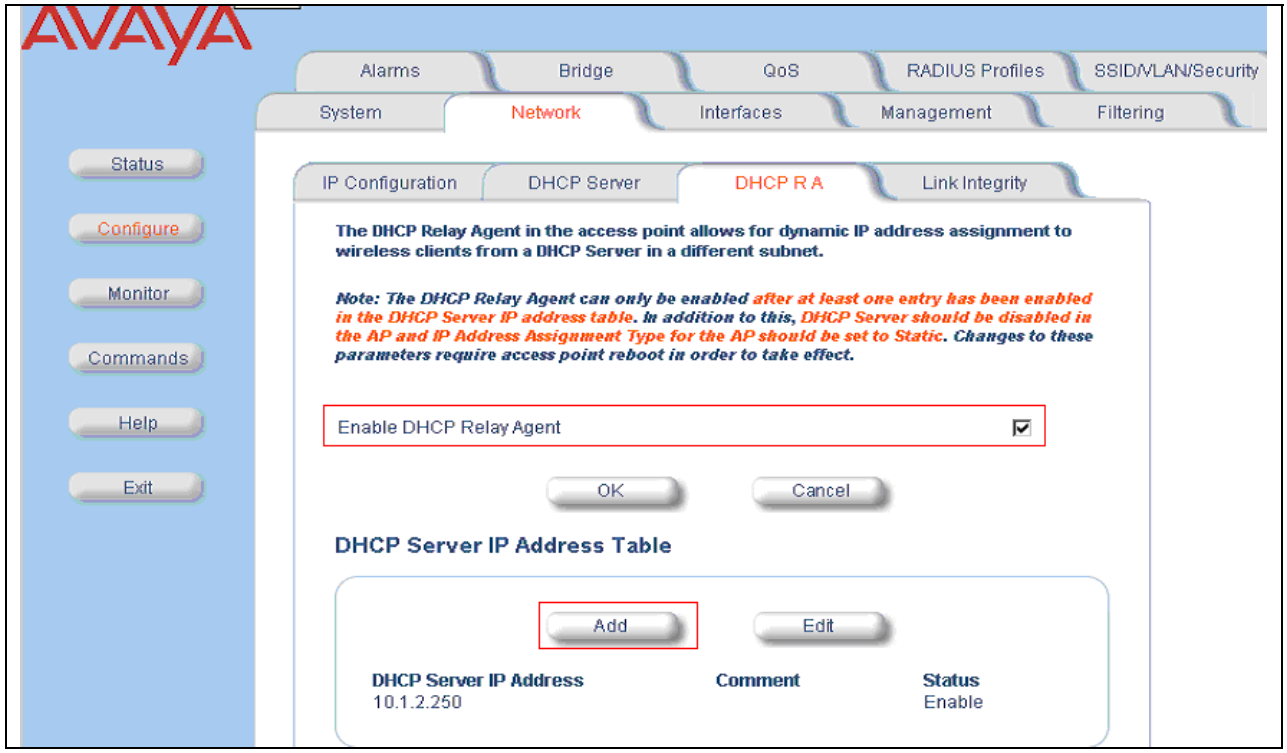
In the **Advanced** Tab, it is important to set the Clock Quality field to **Unsuitable** to prevent Avaya IP Office from attempting to synchronize its clock from the Vocera Server. The Vocera Server will synchronize its clock from Avaya IP Office.



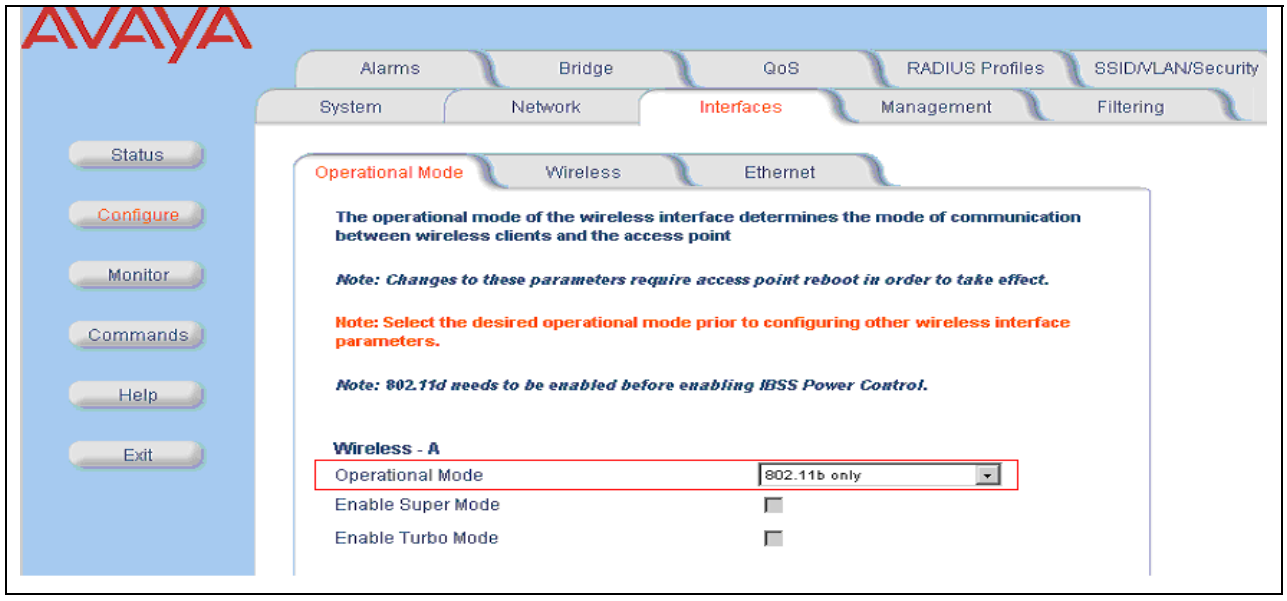
4. Configure Avaya Wireless AP-7 and AP-8

Two types of the Avaya wireless devices were used: Avaya Wireless AP-7 and AP-8. The initial configuration for the Avaya Wireless AP-7 and AP-8 are accomplished through the ScanTool software, which comes with the Access Wireless AP-7 or AP-8 software. After the initial configuration, the web interface was utilized to do the configuration modifications. The configuration screens included here show how to configure the **Network**, **Interfaces**, **Service Set identifier** (**SSID)**, and **Wired Equivalent Privacy (WEP) encryption**.

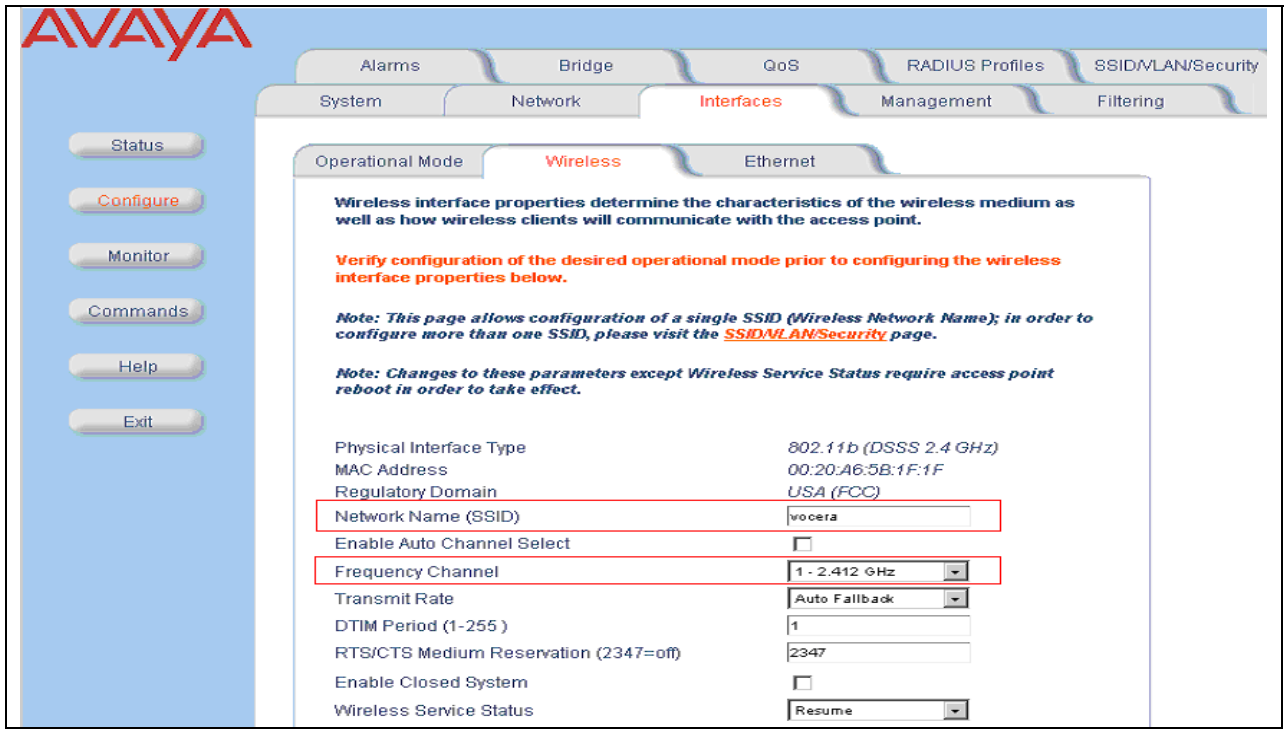
Use a web browser to access the Management IP address of the Avaya Wireless AP-7 and AP-8. Click on the **Configure** tab from the main menu on the left. Click the **Network** tab from the right menu and select **DHCP RA** (DHCP Relay Agent) tab from the submenu (**Configure → Network → DHCP RA**). The following screen appears. Enable the DHCP Relay Agent by checking the box. Add the DHCP server by clicking the **Add** button and provide the IP address of the DHCP server.



Navigate to the **Configure → Interface → Operational Mode** page. Select the **802.11 B only** for the Operational Mode field as shown in the following screen.



Navigate to the **Configure → Interface → Wireless** page. Configure the **SSID** and **Frequency Channel** fields and enter the value as shown below. For the roaming test, the Frequency Channel field for Avaya Wireless AP-7 was set to Channel **1**. The Avaya Wireless AP-8 device used the channel **11** for the Frequency Channel field.



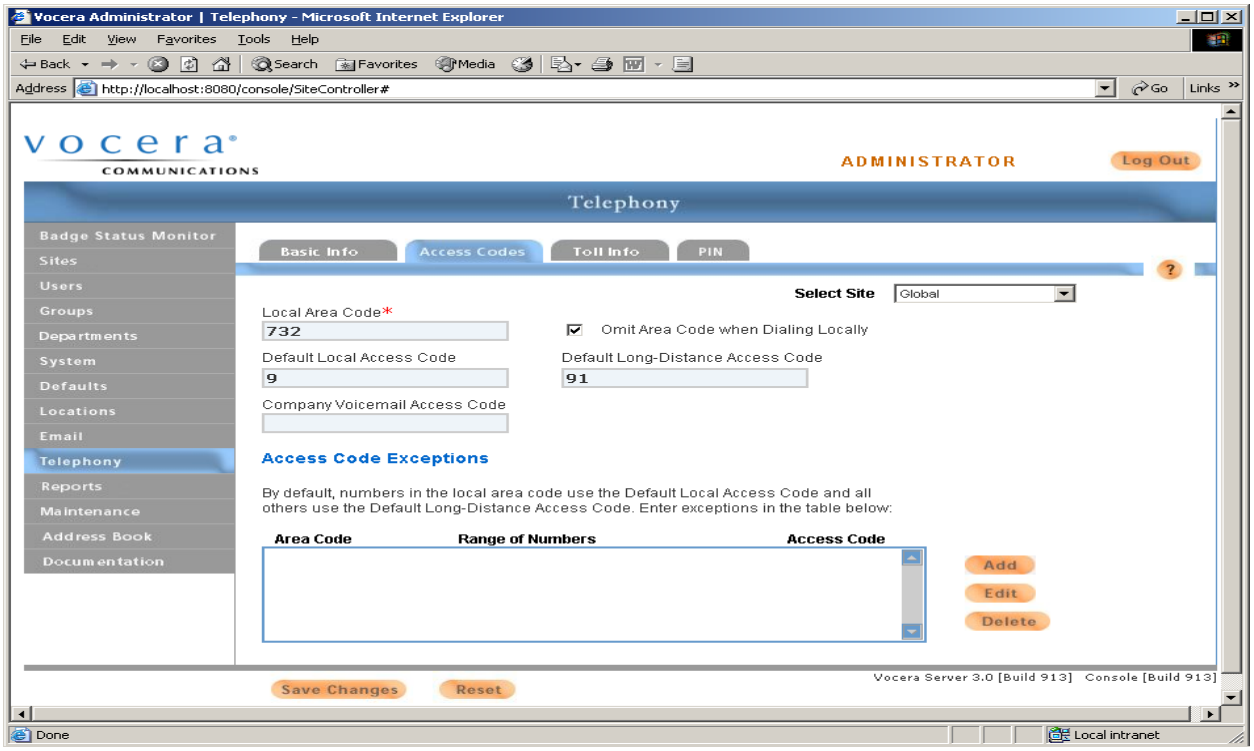
Navigate to the **Configure → SSID/VLAN/Security → Security Profile** page. The following screen appears. Enable the WEP encryption by clicking the **Edit** button.

To add or edit the WEP encryption, click on the **WEP Station** box, and enter 13 characters to be used for the WEP 128 encryption key on the Encryption Key 0 field.
Note that the same WEP encryption key needs to be used by all wireless devices to be able to communicate.

For the new configuration to take effect, the Avaya Wireless AP-7 and AP-8 must now be rebooted. Click the **Commands** tab from the main menu, and then select the **Reboot** tab to reboot.

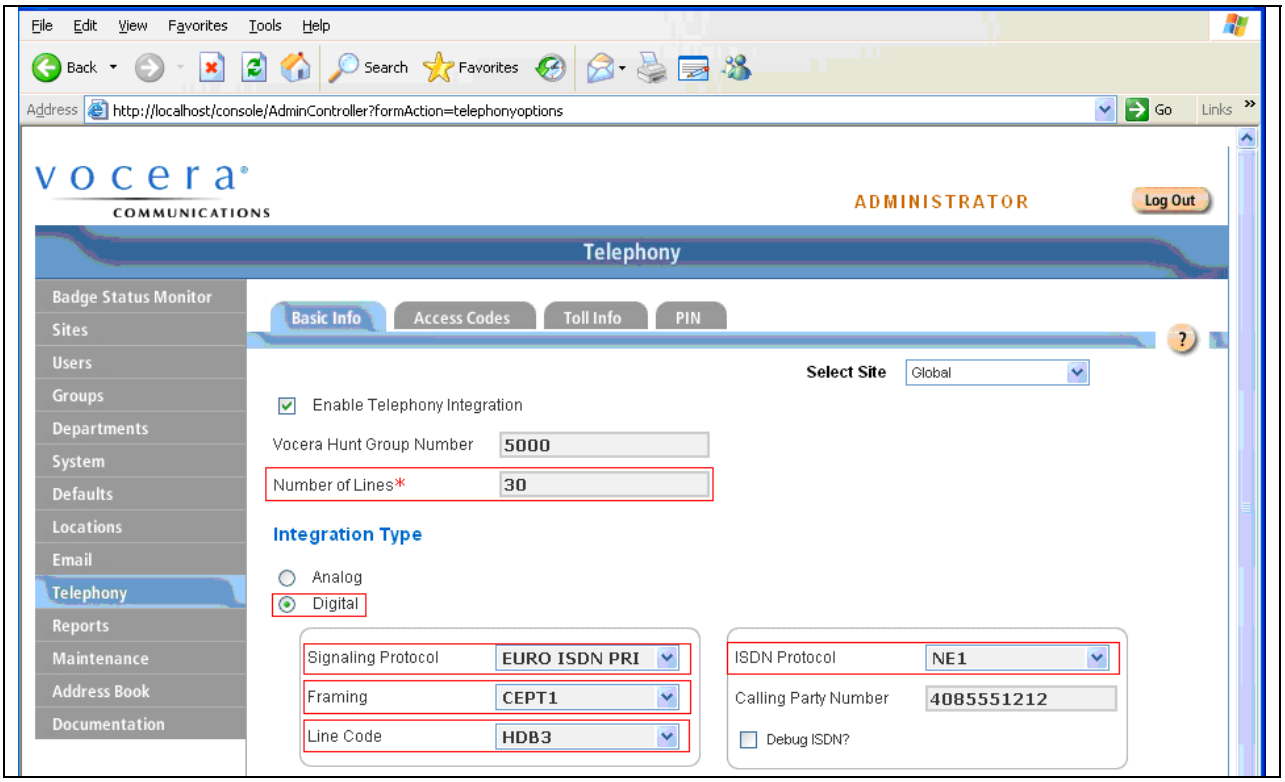
5. Configure the Vocera Communications System

Login to the Vocera Communications Systems web based console using a web browser and appropriate credentials. The following screen shows the telephony configuration used when the Vocera Telephony Server places outbound calls through the PBX. The Local Area Code should match the local PBX area code. The Default Local Access Code should match the appropriate dialout shortcode in Avaya IP Office. The Default Long-Distance Access Code is typically the same as the Local Access Code, followed by a **1**.



The following screen shows the configuration used when the Vocera Telephony Server was connected to Avaya IP Office using E1 trunk. The following configuration was set in the Vocera Telephony Server to setup an E1 trunk with Avaya IP Office.

- Number of Lines: **30** (For E1 trunk the 16th channel is reserved for signaling and 32nd channel is reserved for Controlling. That leaves 30 channels for voice)
- Integration Type: **Digital**
- Signaling Protocol: **EURO ISDN PRI**
- Framing: **CEPT1**
- Line Code: **HDB3**
- ISDN Protocol: **NE1** (Indicates that the Vocera Telephony Server was set to **peer-master**)



5.1. Configure the Vocera Badges

A Vocera provided script is used to easily download configuration information to the Vocera Badges. The following screen shows the applicable fields that were changed for the Vocera Badges to communicate with the Avaya Wireless AP-7 and AP-8.

```
AuthenticationType              Open
EncryptionType                  WEP128
SSID                            vocera
ServerIPAddr                    10.1.2.230
ShortPreamble                   FALSE
UpdaterIPAddr                   10.1.2.230
WEPKey1                         31323334353637383930313233
WEPKeySlot                      1
```

6. Interoperability Compliance Testing

Interoperability compliance testing covered connectivity, error recovery, and feature functionality. Feature tests verified the ability of the Vocera Server to communicate with Avaya IP Office to make and receive calls, transfer calls, and conference calls. Connectivity tests verified that the Vocera Server was able to connect to Avaya IP Office over the E1 trunk. It also verified that the Vocera Badges were able to connect to Avaya Wireless AP-7 and AP-8, and roam between access points. Error recovery testing verified that the Vocera Server was able to recover connectivity to Avaya IP Office under a link failure scenario.

6.1. General Test Approach

All test cases were performed manually. The following features and functionality were verified:

- E1 connectivity between Vocera Telephony Server and Avaya IP Office
- WEP128 encryption
- Layer 2 Roaming
- Transfers and Conference calls between Vocera badges and Avaya IP Telephones
- Link Failure scenario

6.2. Test Results

All test cases passed. The Vocera Communications System provided connectivity to Vocera Badge users over an Avaya wireless infrastructure, and connected to Avaya IP Office over the E1 interface.

7. Verification Steps

To verify that the solution is properly configured, the following steps can be utilized.

- Place calls between the Vocera Badges to verify proper connectivity through the wireless infrastructure. If the Vocera Badge is not able to reach the Vocera Server, verify that the proper WEP encryption key and SSID was configured for the badge and Avaya Wireless AP-7 and AP-8.
- Place calls in both directions between Vocera Telephony Server and Avaya IP Office. If the calls are not successful, verify the proper configuration for the trunk port between Avaya IP Office and the Vocera Telephony Server.

8. Support

For technical support on the Vocera Communication System, call Vocera Support at (800) 473-3971 or send email to Support@Vocera.com.

9. Conclusion

These Application Notes describe the configuration steps required for integrating the Vocera Communication System with Avaya IP Telephony infrastructure. The systems interoperated

successfully, providing a suitable solution for wireless access and connectivity between Vocera Badge users and Avaya IP Office users.

10. References

This section references the Avaya and Vocera Communications documentation that are relevant to these Application Notes.

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

[1] *Avaya Voice Priority Processor*, Issue 4, May 2004, Document Number 555-301-102.
[2] *IP Office 3.0 Manager*, Issue 16f, Feb 2005.

The following Vocera Communications product documentation is provided by Vocera Communications. For additional product and company information, visit http://www.vocera.com.

[3] *Vocera Administration Guide*, Version 3.0.
[4] *Vocera Installation Guide*, Version 3.0.

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya Developer*Connection* Program at devconnect@avaya.com.