Avaya Solution & Interoperability Test Lab

Configuring Avaya IP Telephones with Avaya IP Office Using D-Link DWL-810+ AirPlus Wireless Bridges in "Ad-hoc" Mode – Issue 1.0

Abstract

These Application Notes provide the steps required to deploy an Avaya 4600 Series IP Telephones operating remotely from an Avaya IP Office IP403 Server via D-Link Wireless Bridges.

This configuration does not prioritize voice packet access to the bandwidth of the wireless portion of the network. As shown, voice and data can coexist over the same wireless network and channel, but in an extreme situation voice quality for that phone could be compromised. Also, while the wireless devices used here are configured for WEP encryption, some situations may require models with additional security features.

1. Introduction

In some circumstances, Avaya 4600 series IP Telephones may be preferred over wireless telephones, but running wire to the phone's location may not be timely or cost effective. **Figure 1** shows two alternative configurations where a pair of D-Link DWL 810+ AirPlus Wireless Bridges was used in "Ad-hoc" mode (communication without a separate Access Point) to establish up to 22 Mb/second of wireless bandwidth between the phone and the IP Office Server. The Avaya 4620SW IP Telephone is locally powered.

Two alternative configurations are covered. The "Voice/Data" alternative supports a collocated remote PC on a separate data Virtual LAN. The "Voice-only" alternative is simpler, supporting a remote IP Telephone on a single VLAN.

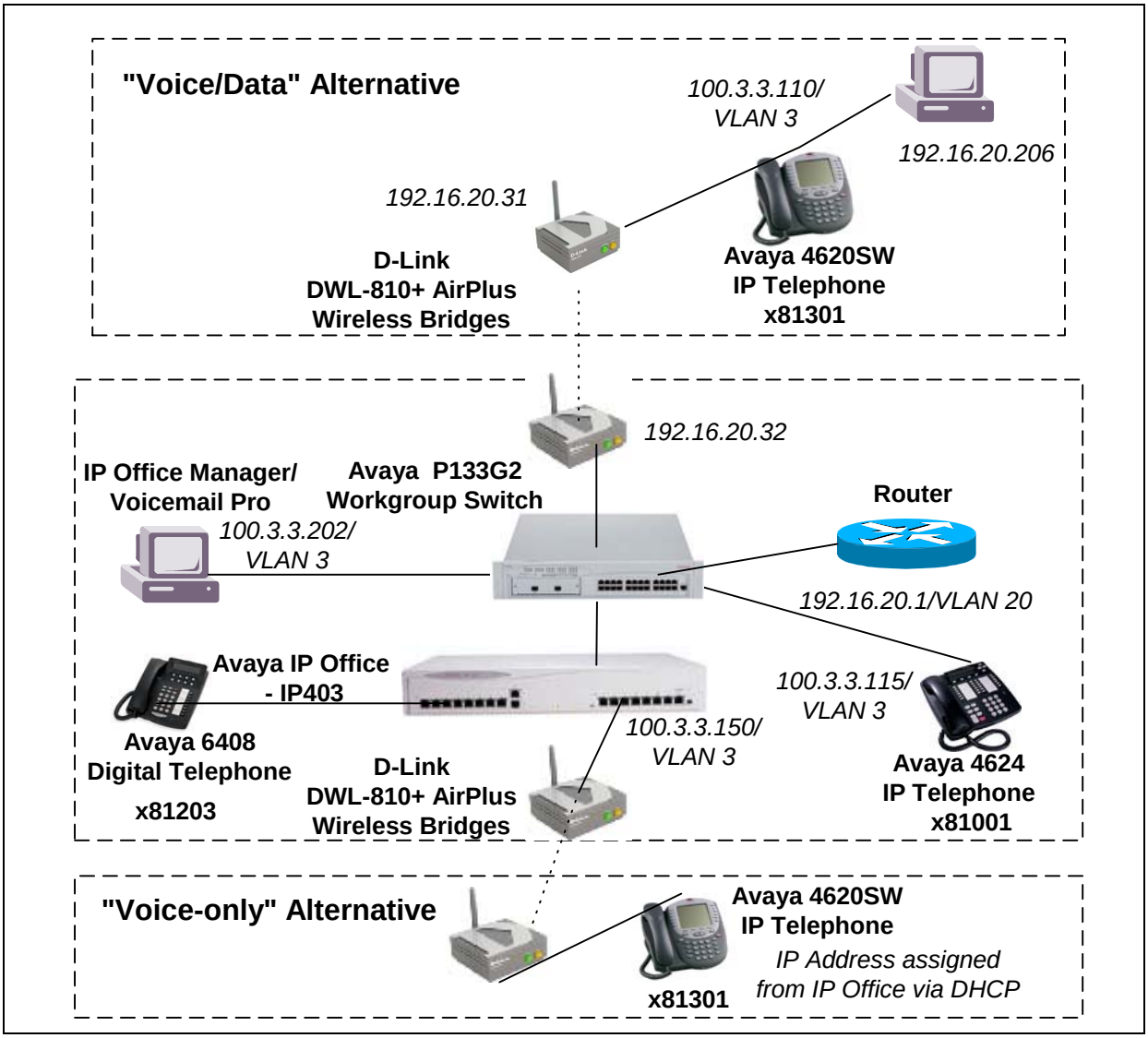

Figure 1: Tested Configurations

2. Equipment and Software Validated

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

Equipment	Software
Avaya IP Office – Small Office Edition	R2.1(15)
Avaya 4620SW IP Telephone	R2.0
Avaya 4624 IP Telephone	R1.8
Avaya P133G2 WorkGroup Switch	R2.53
D-Link DWL-810+	v2.0
Avaya 6408 Digital Telephone	N/A

3. Configure the D-Link Wireless Bridges

This section describes the steps to configure the D-Link wireless bridges for a Voice/Data or Voice-only configuration. It is assumed that the reader can connect a PC with a browser to the D-Link Bridge that is being configured.

Note that the bridges have a reset button to return to factory default settings, including defaults for the IP address, user and password.

Step 1: Configure a PC with an address on the subnet of the D-Link wireless bridge and open a browser to the D-Link Bridge IP address (default: 192.168.0.30). (Generally, the browser should be set to NOT use a proxy to reach this local address). After the user name and password has been entered, the "Home" menu will appear.

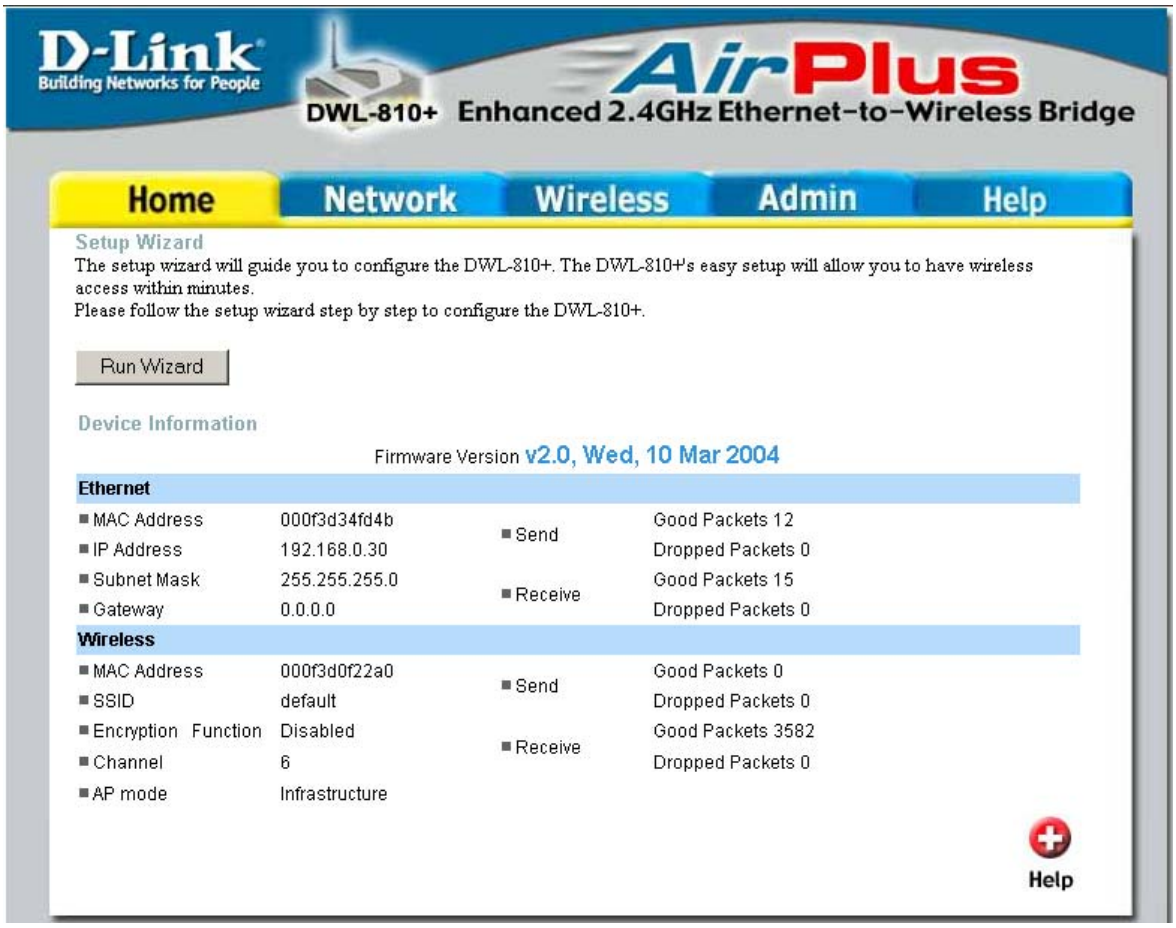

Figure 2: Home Page

Step 2: Perform this step if you want the D-Link Bridge to be reachable for management via IP on a specific subnet. Generally, static IP addressing is easier to use than DHCP for managed devices, but alternatively the Bridges can be assigned IP addresses via DHCP if the **Dynamic IP address** option is selected from the Network tab. This step assumes static IP address assignment.

Click the **Network** tab and ensure the *LAN IP* radio button is set to **Static IP Address**. Set the *IP Address* to a free IP address on the chosen subnet and set the *Subnet Mask* for that subnet. Set the *Gateway* to the subnet router.

Click **Apply.**

The D-Link Bridge will restart. Reconfigure your PC to be on the same subnet as the D-Link Bridge's new management IP address and open a browser connection to the new D-Link Bridge address.

Repeat this step for the second D-Link Bridge, assigning it a unique IP Address.

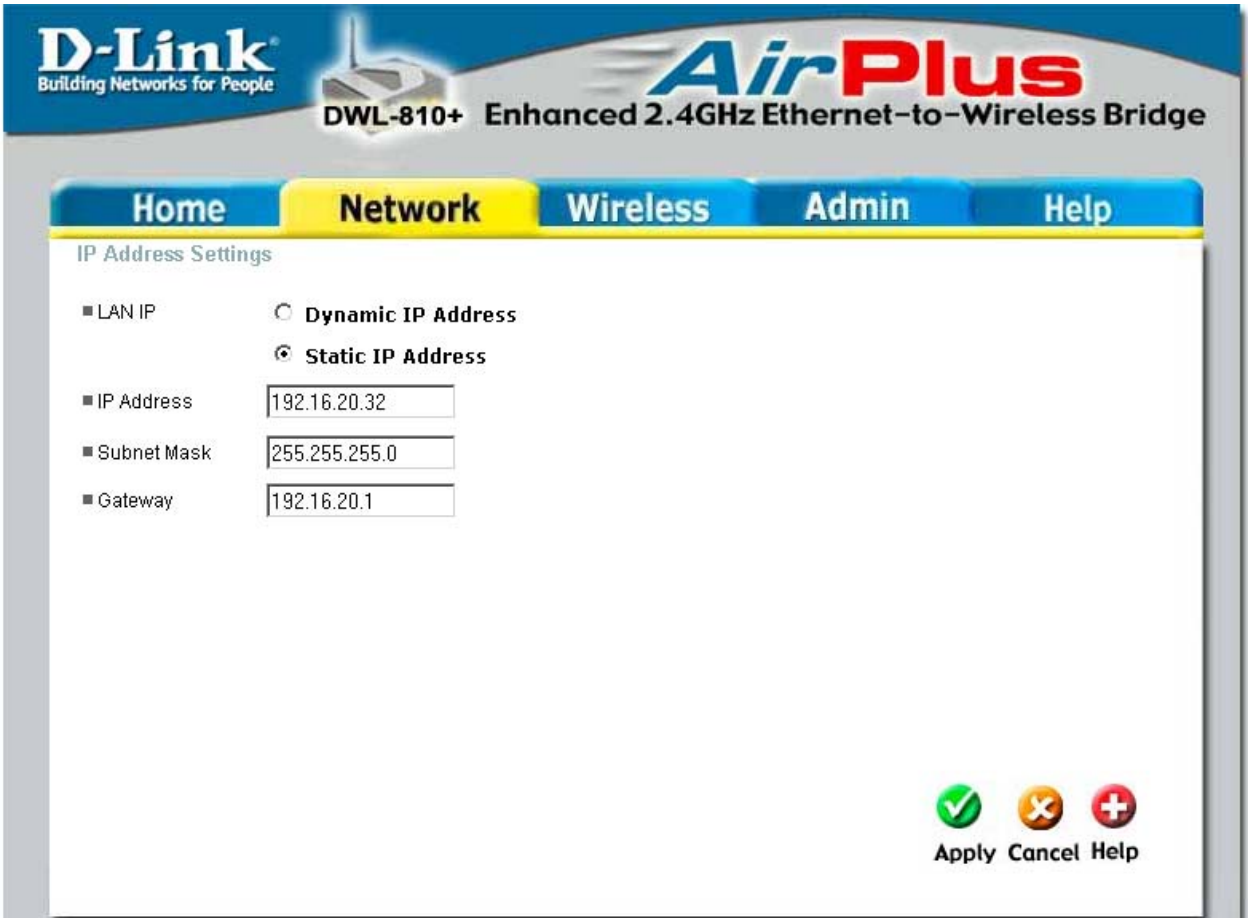

Figure 3: Network Tab

Step 3: Click the **Wireless** tab. Set the *Operating Mode* to **Ad-hoc**. Set the *AP Name* to a value that will be unique among communicating bridges (e.g., **DWL-810+station1** for the station side and **DWL-810+office** for the IP Office side). Set the *SSID* to the value that will be used among all the communicating bridges in this configuration (e.g., **voip1**). *Channel* selection is ideally based on performance planning considerations (e.g., what channel is least loaded with the least interference). If encryption is desired, click the **Enabled** radio button and set *WEP encryption* to the desired setting (e.g., **128Bit**). Set the *WEP Mode* to **ASCII** to enter a key in **ASCII** mode. Set the key to use (e.g., **key1**) on each side to the same string (e.g., **a secret code**). If conditions allow, leave the *TX Rate* at the highest setting.

Both D-Link bridges should be configured with the same wireless parameters, except each AP Name should be unique.

Click **Apply**. Click **Continue** and allow the unit to restart.

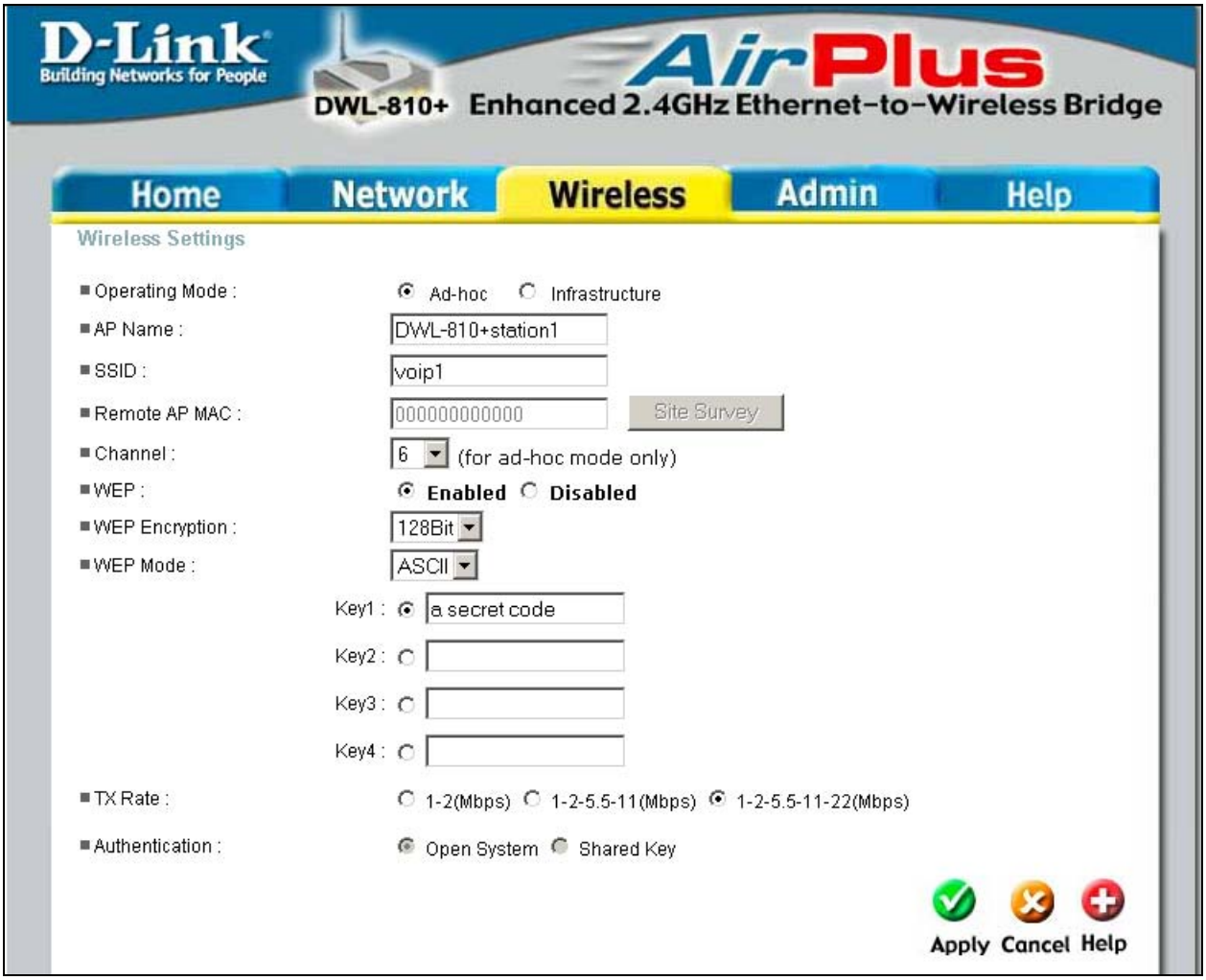

Figure 4: Wireless Tab

4. Configure the Avaya IP Office IP403 Server

This section describes the steps to configure the IP Office for support of the IP Phone, and is the same as any IP Phone configuration. It is assumed that the reader has the IP Office Manager application available and has logged in.

Step 1: From the IP Office Manager, click on the **System→System Configuration→LAN1** tab. Set the *IP address* and *IP Mask* consistently with the subnet address plan. Set *DHCP Mode* to **Server** if the IP Office is to configure any endpoints via DHCP, otherwise DHCP can be **Disabled**.

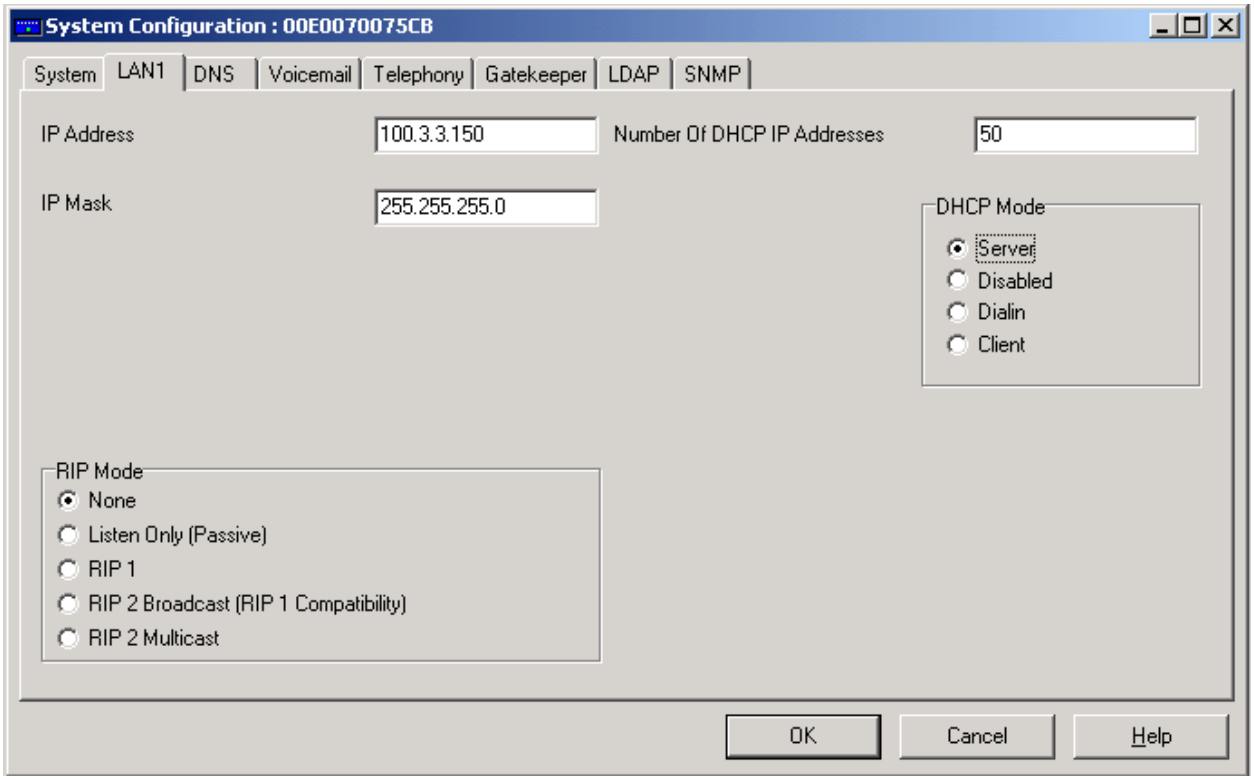

Figure 5: LAN1 Tab

Step 2: From the Configuration Tree **Users** pane, right click to add a **New** User for the IP phone and set all settings as normal, including assigning a unique *Name* and *Extension* on the User tab.

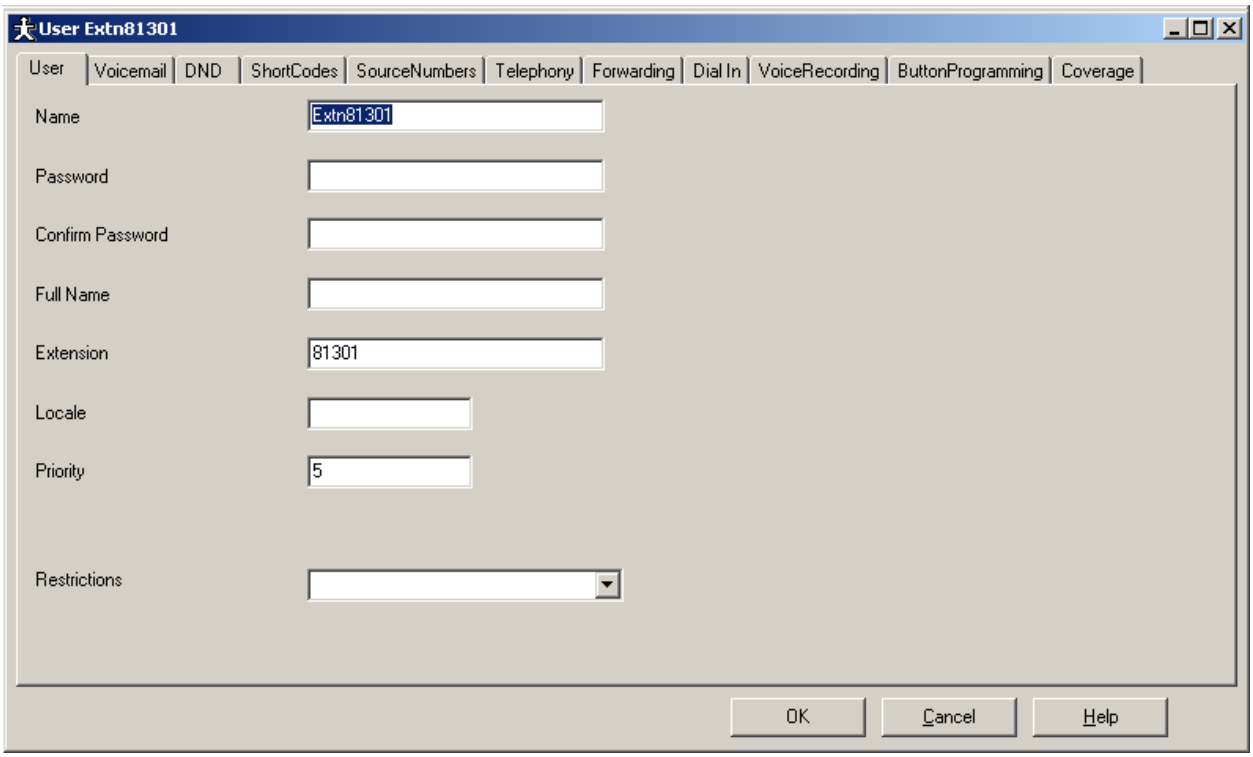

Figure 6: User tab

5. 4620SW IP Telephone Configuration

This section describes the 4620SW IP Telephone configuration, showing how to configure both the static option and the DHCP option. In **Figure 1**, static configuration was used for the "Voice/Data" configuration, while DHCP was used for the "Voice-only" configuration.

Step 1: From the IP Phone Keypad, press the sequence: **hold A D D R #.**
Alternatively, disconnect the phone's ethernet connection, while continuing to power it and press ***** at the prompt.

Step 2: The Phone should be configured with the Static Configuration column entries below, or the DHCP column entries.

Entry	**Static Configuration**	**DHCP Configuration**
Phone=	**100.3.3.110**	**0.0.0.0**
Call Server=	**100.3.3.150**	**0.0.0.0**
CallSvPort=	**1719**	**0**
Router=	**100.3.3.150**	**0.0.0.0**
Mask=	**255.255.255.0**	**0.0.0.0**
FileSv=	**100.3.3.202**	**0.0.0.0**
802.1Q=	**On**	**Off**
VLANID=	**3**	**N/A**
VLANTEST=	**3**	**N/A**

When using the static configuration, press "#" when prompted to "Save new values?".

Step 3: If the Phone display prompts for an extension (EXTN=) enter the extension and password from the User tab of the previous step. Otherwise, if the Extension must be changed, from the IP Phone Keypad, press the sequence: **hold LOGOFF #.** Enter the new extension and password when prompted.

Step 4: One mechanism to set the QOS parameters is to press the sequence: **hold Q O S #**. Set the L2audio and L2signaling parameters to **6** and set the L3 parameters consistently with your Layer 3 QOS plan. Alternatively, but not shown here, these settings can be populated by a TFTP server.

6. Avaya P133G2 WorkGroup Switch configuration

This section describes those steps required to configure the Avaya P133G2 Workgroup Switch. Only those steps specific to this configuration are highlighted.

Port Connecting to the D-Link Wireless Bridge for the "Voice/Data" Alternative

```
set port vlan-binding-mode 1/21 static

set port disable 1/21
set port negotiation 1/21 enable
set port flowcontrol all 1/21 off
set port level 1/21 0
set trunk 1/21 off
set port vlan 20 1/21
set port name 1/21 "NO NAME"
set port trap 1/21 disable
set port classification 1/21 regular
set port enable 1/21

set port static-vlan 1/21 3
```

Incoming Non-Tagged (Data) traffic will have Priority **0**.

Incoming Non-Tagged (Data) traffic is assigned to VLAN **20**.
VLAN **20** traffic will be sent on this port.

Voice VLAN (**3**) traffic will be sent on this port.
IP Phone packets, tagged VLAN 3, are accepted.

Port Connected to the IP Office

```
set port vlan-binding-mode 1/7 static

set port disable 1/7
!#port 1/7 does not support auto-negotiation-flowcontrol-advertisement
set port negotiation 1/7 enable
set port flowcontrol all 1/7 off
set port level 1/7 6
set trunk 1/7 off
set port vlan 3 1/7
set port name 1/7 "NO NAME"
set port trap 1/7 disable
set port classification 1/7 regular
set port enable 1/7
```

Incoming IP Office traffic will have Priority **6**.

Incoming traffic will be assigned to VLAN 3. VLAN 3 traffic will be sent on this port.

The port for any IP Phone that will not use 802.1Q VLAN tagging, as in the "Voice-only" configuration of **Figure 1**, should be configured similarly to the port connected to IP Office.

7. Verification Steps

- Verify successful pings over the wireless bridge.
- Place calls from the IP phone behind the D-Link bridges and verify that station operations are the same as without the bridge.
- For troubleshooting problems, consider the following:
  - Verify that the problem occurs only when the configuration involves the D-Link Bridge (e.g., try plugging the IP Phone directly into the IP Office LAN1 port).
  - Examine the *Wireless* tab settings carefully to insure that all settings, other than *Ap Name* are exactly the same.
  - If there are transmission issues that clear up when the bridges are close together, consider browsing to the home page of the bridge and check the packet statistics (e.g., dropped packets). Suggested checks from the D-Link Installation Guide include:
    - Number of walls and ceilings traversed, thickness and materials. Note that a wall is effectively thicker if the signal crosses at an angle other than 90 degrees.
    - Radio Frequency Interference
    - Antennae orientation
  - If the IP Phone or a PC has moved from one side of the wireless bridge to another, consider re-powering the bridges to ensure that the association between MAC address and port is cleared.

8. Conclusion

Following these Application Notes will result in a successful implementation of an Avaya IP telephone operating remotely from the IP Office via D-Link wireless bridges.

9. References

Additional Application Notes can be found at www.avaya.com

Provided with the D-Link DWL-810 Bridge:

“D-Link AirPlus DWL-810+ 2.4 Ghz Ethernet-to-Wireless Bridge”

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 Solution & Interoperability Test Lab at interoplabnotes@list.avaya.com