Avaya Solution & Interoperability Test Lab

Application Notes for Configuring the Linksys WRT55AG Dual-band A+G Wireless Router to Support Avaya Communication Manager, Avaya IP Wireless Telephones and Avaya IP Softphone - Issue 1.0

Abstract

These Application Notes describe the procedure for configuring the Linksys WRT55AG Dual-band A+G Wireless Router to support Avaya Communication Manager, Avaya IP Wireless Telephones and Avaya IP Softphone. Features and functionality were validated.

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1. Introduction

These Application Notes describe the steps to configure Linksys WRT55AG Dual-band A+G Wireless Router to support Avaya Communication Manager, Avaya IP Wireless Telephones and Avaya IP Softphone. The Linksys WRT55AG Wireless Router supports WEP encryption, but not 802.1x authentications. These Application Notes cover the following areas:

- System IP and Wireless 802.11a and 802.11g radio configuration.
- Wired Equivalent Privacy (WEP) encryption configuration
- Windows XP Wireless Client configuration

These Application Notes do not cover the configuration for Avaya IP Wireless Telephones and Avaya IP Softphone. For detailed configuration of these devices, refer to the Application Notes listed in the Section 8.

The version of Linksys firmware validated in these Application Notes does not support Spectralink Voice Priority (SVP), which is a requirement for guaranteeing over the air Quality of Service (QoS). The lack of support for this feature limits deployment options for this solution.

Figure 1 shows the network configuration used for verification.

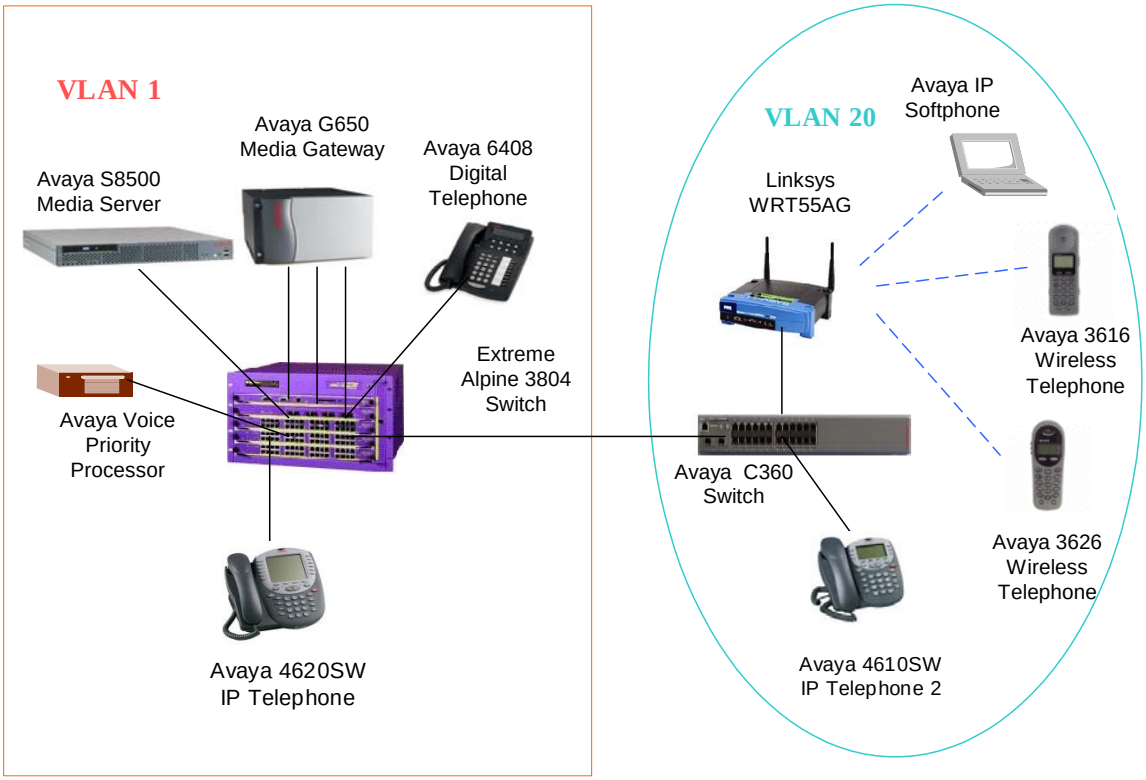

Figure 1: Network Configuration

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Table 1 lists the IP addresses and subnet masks for the tested devices.

Device	VLAN	IP Address/Mask	Gateway
Avaya S8500 Media Server	VLAN 1	50.1.1.5 /24	50.1.1.1
Avaya G650 Media Gateway • IPSI • C-LAN • MEDPRO	VLAN 1	 50.1.1.6/24 50.1.1.7/24 50.1.1.8/24	 50.1.1.1 50.1.1.1 50.1.1.1
Avaya Voice Priority Processor	VLAN 1	50.1.1.9/24	50.1.1.1
Avaya C360 Switch	VLAN20	20.1.1.2/24	20.1.1.1
Linksys Dual-band A+G Wireless Router	VLAN 20	20.1.1.11/24	20.1.1.1
Extreme Alpine 3804 Switch	VLAN1 VLAN20	50.1.1.1/24 20.1.1.1/24	N/A N/A
Avaya 3626 Wireless Telephone	VLAN20	20.1.1.100	20.1.1.1
Avaya 3616 Wireless Telephone	VLAN20	20.1.1.101	20.1.1.1
Avaya IP Softphone installed on Windows XP Laptop	VLAN20	20.1.1.122	20.1.1.1

Table 1: Devices IP Address and Gateway

2. Equipment and Software Validated

Table 2 lists the equipment and software version used for the configuration.

Equipment	Software
Avaya S8500 Media Server/G650 Media Gateway with	Communication Manager 2.2 (R012x.02.0.111.4)
Avaya IP Softphone	V5.0.1.2
Avaya 4620SW/4610SW IP telephones	R2.01
Avaya 3616/3626Wireless IP Phone	96.024
Avaya Voice Priority Processor	R32/21
Avaya C360 Stackable Switch	R4.3.12
Linksys Dual-band A+G Wireless Router WRT55AG	V1.04
Extreme Alpine 3804 Switch	V7.2.0b25
Dell Latitude D800 Laptop with ▪ Windows XP Professional with Service Pack 1	 Version 2002

Table 2: Equipment and Software Validated

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3. Configure the Linksys Dual-band A+G Wireless Router

The configuration can be done using a web-based interface. Assume that the IP address 20.1.1.11 has been pre-configured on the WRT55AG Router. The following sessions display the related configuration using web-based interface.

3.1. Basic System and Wired Equivalent Privacy (WEP) Configuration

This section presents the steps necessary for basic system and WEP configuration. The WRT55AG has both 802.11a and 802.11g radio interfaces. In these Application Notes, the "g" radio is configured to accept both 802.11b and 802.11g clients in order to support the Avaya IP 3616 and 3626 IP Wireless Telephones. Note that the Avaya 3626 and 3616 series Wireless Telephones currently only operate in b mode. WEP encryption is only enabled on the 802.11g radio interface since the configuration for the 802.11a radio interface is the same.

Step	Description
1.	• Launch a web browser with the URL http://20.1.1.11. Log into the Access Point with proper user name and password as shown below.
2.	• After login, click the **Setup** tab. • Verify that the IP address **20.1.1.11** and Subnet mask **255.255.255.0** are in the corresponding fields. • Select **Enable** mode for 802.11a radio and enter **linksysa** as its **SSID**. • Leave **WEP** disabled, the default setting. • Select **Mixed** mode for 802.11g radio. (Note that the Mixed mode allows "802.11g" radio to accept both 802.11b and 802.11g clients). • Enter **linksysb** as its **SSID** and select **Enable** for **SSID Broadcast**. • Click **Enable** for **WEP** and click **Edit WEP Settings** button as shown below.

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Step	Description

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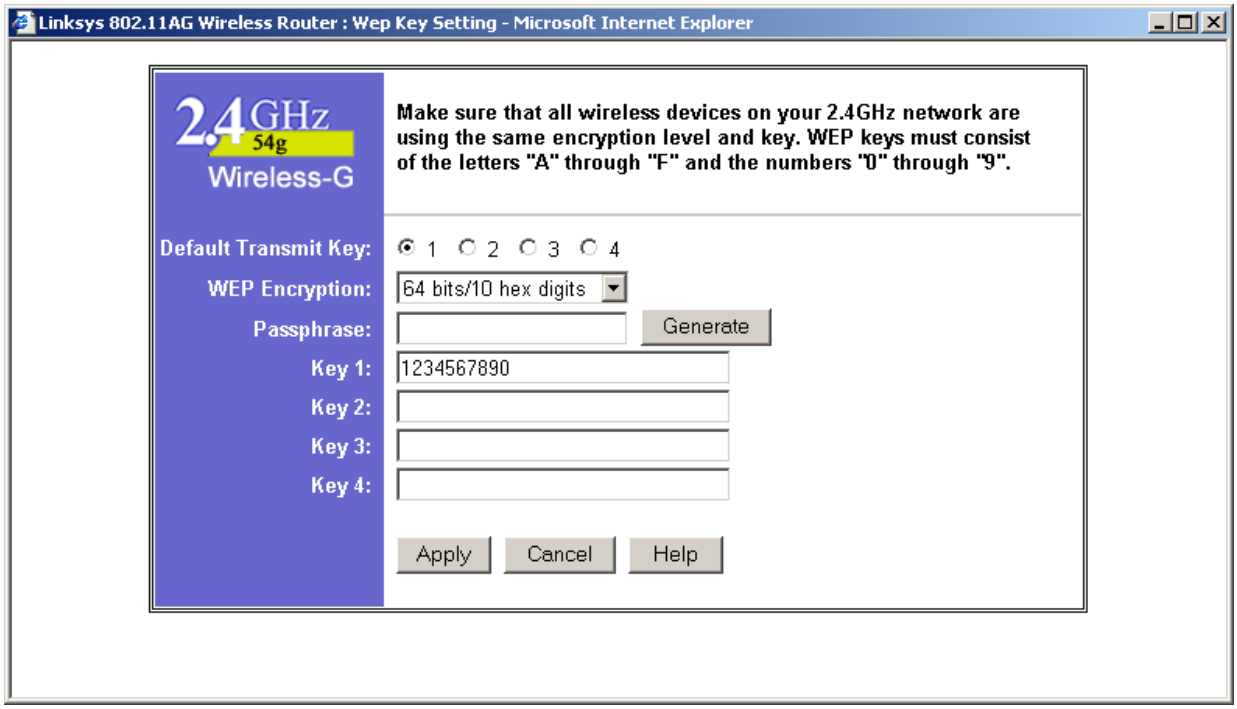
Step	Description
	• Click **1** for the **Default Transmit Key.** • Select 64 bits/10 hex digits as **WEP Encryption** key. • Enter the key in the **Key 1** field. In this configuration, the key **1234567890** is used. • Click **Apply**.



- Click the **Continue** button to go back to the configuration menu.

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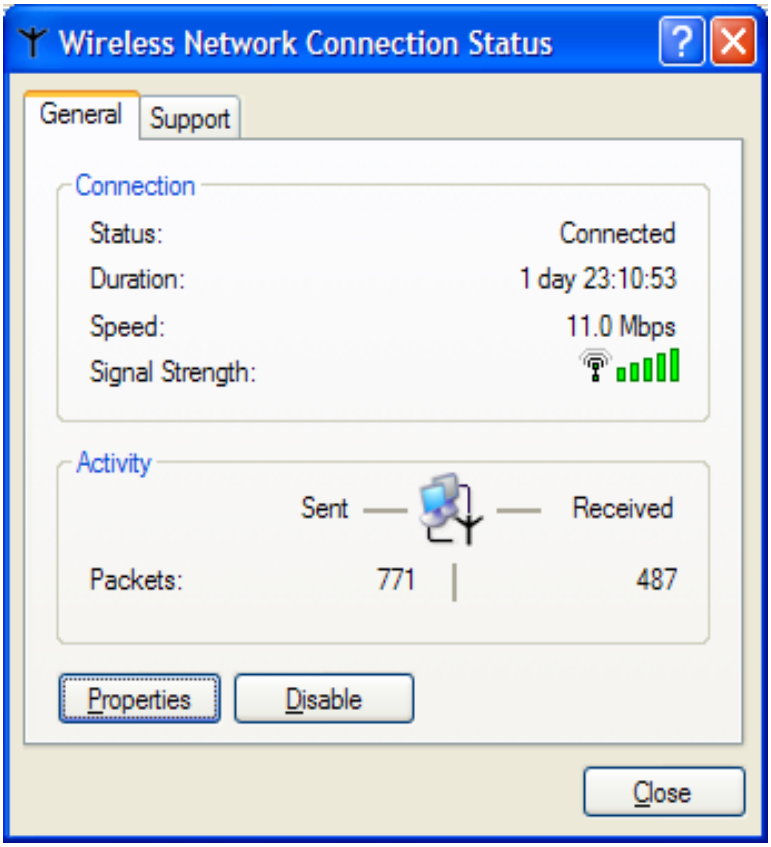
3.2. Windows XP Wireless Client Configuration

This section presents the Windows XP Wireless client configuration on the Dell Latitude D800 laptop. The Dell Latitude D800 laptop has a built-in Wireless interface. This configuration verifies that the Avaya IP Softphone can use this client to communicate with Avaya Communication Manager with WEP enabled.

Step	Description
1.	Assume that the IP address **20.1.1.160/24** and default gateway **20.1.1.1** have been configured on the Wireless interface. The laptop will use "802.11g" radio to connect to the Access Point. From the Laptop desktop, click **Start → Connect To → Wireless Network Connection** to open the **Wireless Network Connection Status** menu as shown below. • Click the **Properties** button as shown below. 

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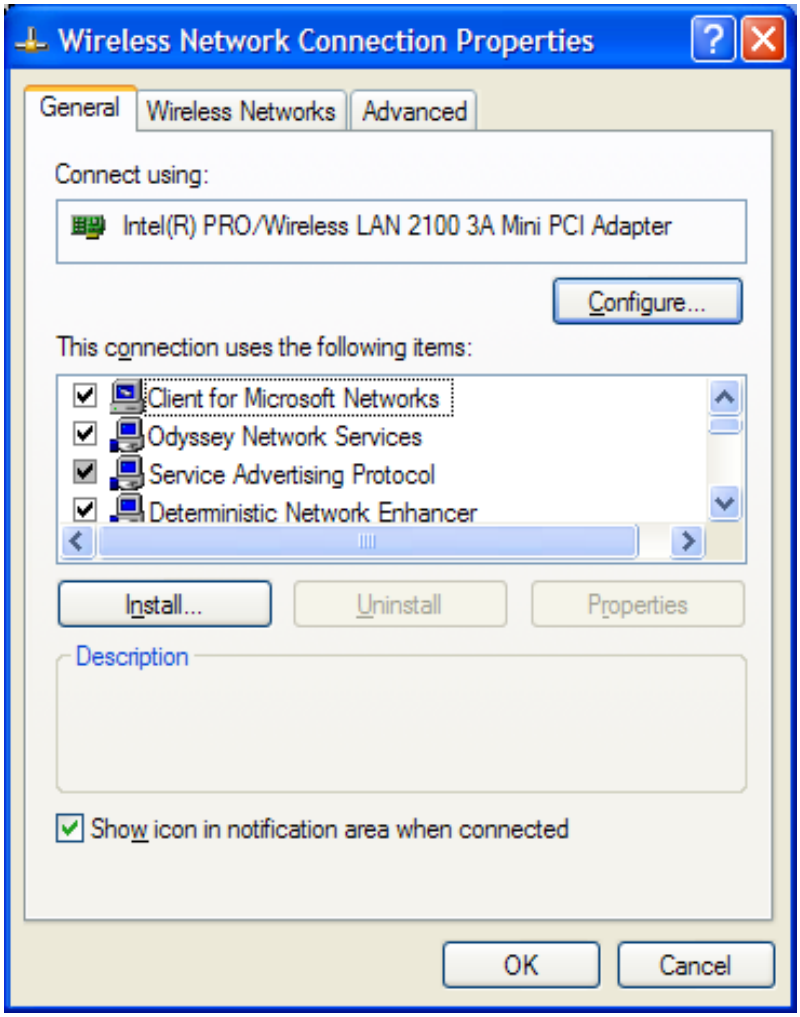
Step	Description
2.	• Click the **Wireless Networks** tab. 

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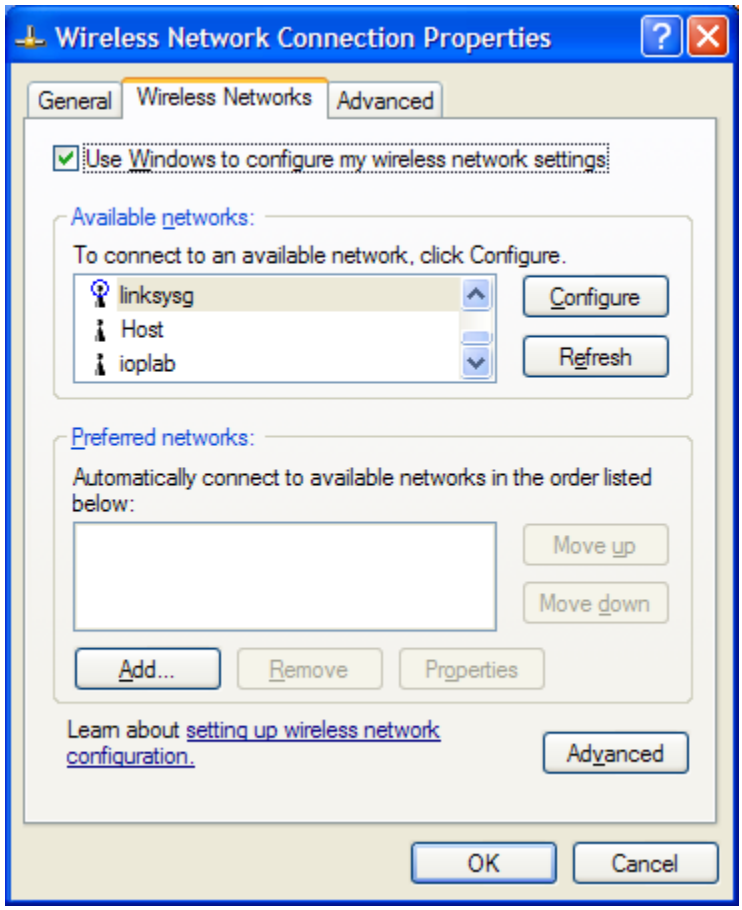
Step	Description
3.	• Check the **Use Windows to configure my network settings** box. • Under the **Available networks**, highlight **linksysg** and click the **Configure** button as shown below. 

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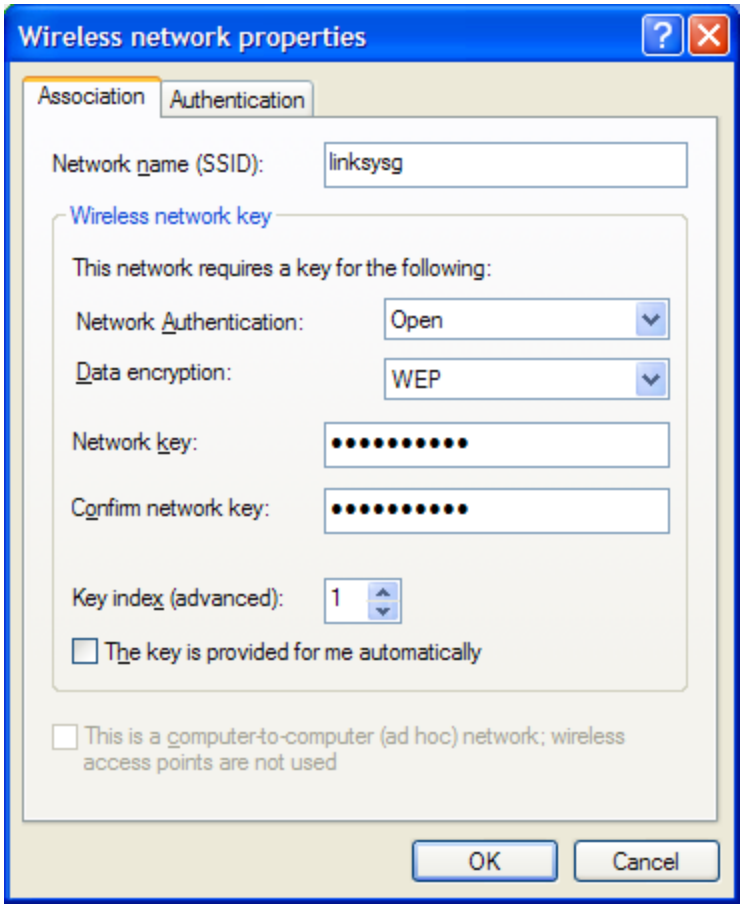
Step	Description
4.	• Click the **Association** tab. • Select **Open** in the **Network Authentication** field. • Select **WEP** in the **Data encryption** field. • Select **1** in the **Key index (advanced)** field. Make sure to match the key 1 configured in Linksys AP. • Click **OK.** 

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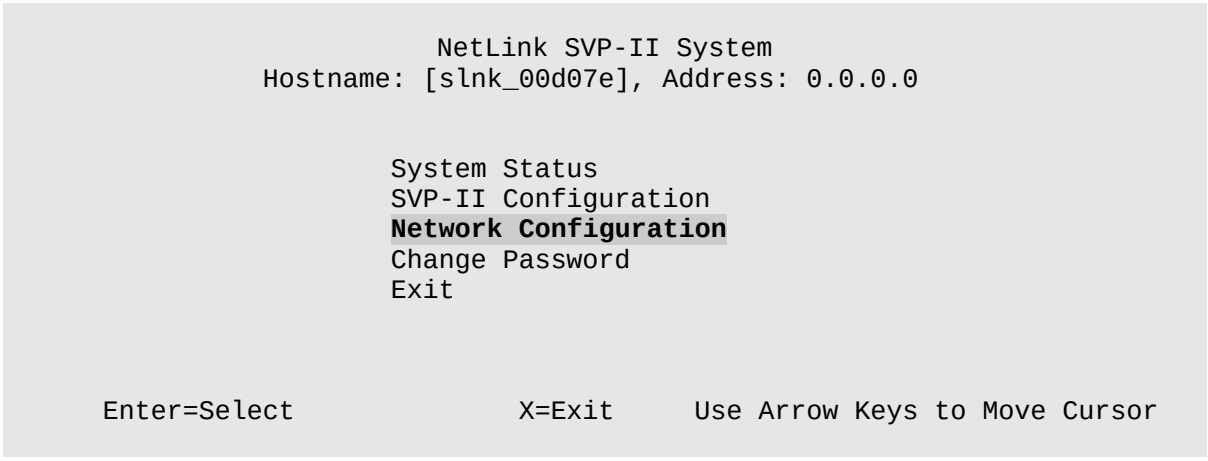
4. Configure the Avaya Voice Priority Processor

The Avaya Voice Priority Processor (AVPP) functions as a Wireless VoIP gateway and provides voice priority service for IP Wireless telephones. The following steps describe the configuration. Each IP network (subnet) requires one Avaya Voice Priority Processor.

Step	Description
1.	Using a console cable, connect the Avaya Voice Priority Processor to the PC.
2.	Start a HyperTerminal session to the Avaya Voice Priority Processor. • Bits per second **9600** • Data bits **8** • Parity **None** • Stop bits **1** • Flow control **None**
3.	Provide the **User Name** and **Password** to access the Avaya Voice Priority Processor. • The **Gateway Connection Selection** window will be displayed.  Select **Network Configuration** and press **Enter**.
4.	The **Network Configuration** window will be displayed. • Provide the following information: o **IP Address** = 50.1.1.9 o **Subnet Mask** = 255.255.255.0 o **Default Gateway** = 50.1.1.1

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Step	Description
	Network Configuration Hostname: [slnk_00d07e], Address: 0.0.0.0 Ethernet Address (fixed): 00:90:7A:00:D0:7E **IP Address:** **50.1.1.9** Hostname: slnk_00d07e **Subnet Mask:** **255.255.255.0** **Default Gateway:** **50.1.1.1** SVP-II TFTP Download Master: NONE Primary DNS Server: NONE Secondary DNS Server: NONE DNS Domain: NONE WINS Server: NONE Workgroup: WORKGROUP Syslog Server: NONE Maintenance Lock: N Enter=Change Esc=Exit Use Arrow Keys to Move Cursor • Press **Enter**
5.	On the **NetLink SVP-II System** window: • Select **SVP-II Configuration**, and press **Enter**. NetLink SVP-II System Hostname: [slnk_00d07e], Address: 50.1.1.9 System Status **SVP-II Configuration** Network Configuration Change Password Exit Enter=Select X=Exit Use Arrow Keys to Move Cursor
6.	On the **SVP-II Configuration** window: • Select **Reset System**, and press **Enter**. This will reconfigure the AVPP with current settings.

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Step	Description
	SVP-II Configuration Hostname: [slnk_00d07e], Address: 50.1.1.9 Phones per Access Point: 5 SVP-II Mode: Netlink IP System Locked: N Maintenance Lock: N Reset System Enter=Change Esc=Exit Use Arrow Keys to Move Cursor

5. Avaya S8500 Media Server and G650 Media Gateway

This section describes the steps necessary to configure the Avaya S8500 Media Server with a G650 Media Gateway.

5.1. Configuring Avaya S8500 Media Server Ethernet Interfaces

The Avaya S8500 Media Server is configured using a web interface. To access the web interface, connect a computer's Ethernet interface to the services port of the Avaya S8500 Media Server with a crossover Ethernet cable. The services port uses the pre-configured IP address 192.11.13.6 with mask 255.255.255.252. Configure the computer's IP address as 192.11.13.5 with mask 255.255.255.252. Launch a web browser with the URL http://192.11.13.6. After logging in, click **Launch Maintenance Web Interface** to get to the main menu on the left hand side. Click **Configure Server** from the lower left of this main menu.

The Avaya S8500 Media Server has two IP interfaces. Ethernet 1 is used for the control network to communicate with the IPSI circuit pack of the Avaya G650 Media Gateway. Ethernet 2 is dedicated to the services port.

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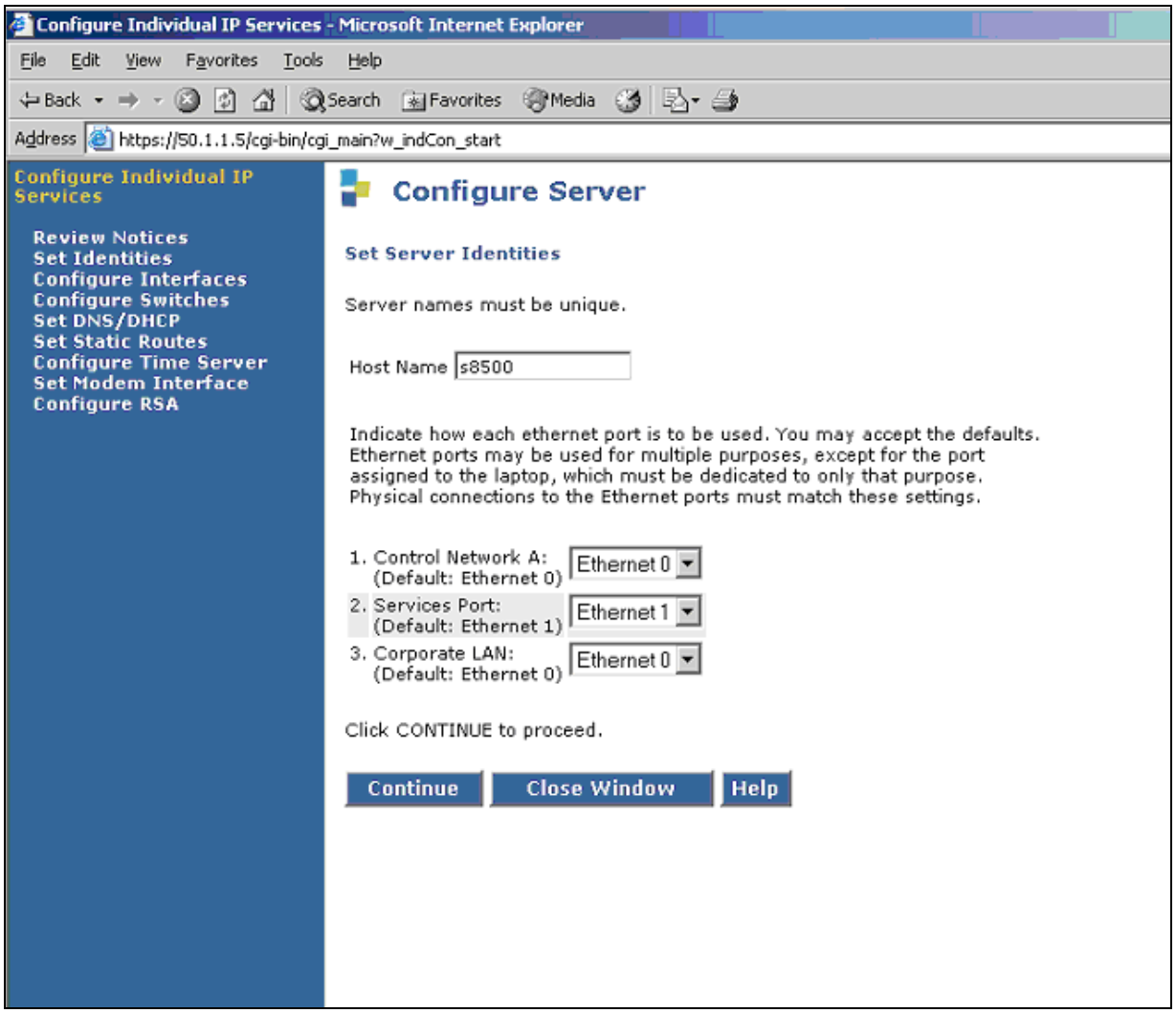
Step	Description
1.	***Configuring S8500 Media Server*** • Click **Set Identities** and enter the information shown below. • Click **Continue**. 

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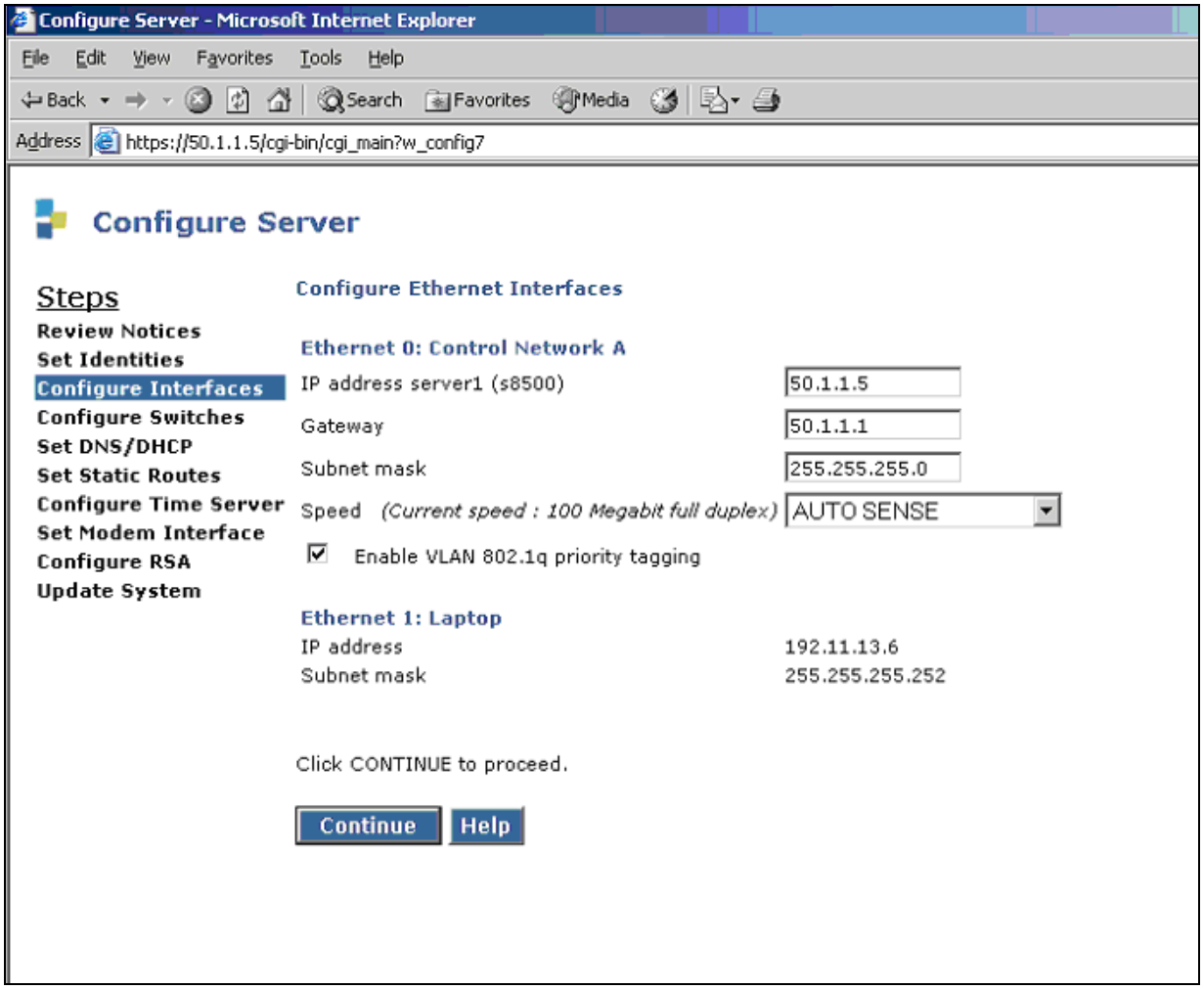
Step	Description
2.	***Configuring S8500 Media Server Interfaces***

- Click **Configure Interfaces** and enter the information shown below.
- Click **Continue**.



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5.2. Configuring IPSI on the Avaya G650 Media Gateway

The IP address of an IPSI board has to be configured via its services port. To configure the IPSI board, connect the computer (already configured with the services IP address and mask as above) to the services port of the IPSI. Telnet to 192.11.13.6 and supply the appropriate login credentials. The following screenshot illustrates the appropriate commands. The IPSI IP address is configured to **50.1.1.6** with default gateway **50.1.1.1**.

Step	Description
1.	***Configuring IPSI***

```
TN2312 IPSI IP Admin Utility
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[IPSI]: ipsilogin
Login: craft
Password:
[IPADMIN]: set control interface 50.1.1.6 255.255.255.0
WARNING!! The control network interface will change upon exiting IPADMIN
[IPADMIN]: set control gateway 50.1.1.1
WARNING!! The control network interface will change upon exiting IPADMIN
[IPADMIN]: set VLAN tag off
[IPADMIN]: set diffserv 46

[IPADMIN]: show control interface

Control Network IP Address = 50.1.1.6
Control Network Subnetmask = 255.255.255.0
Control Network Default Gateway = 50.1.1.1
IPSI is not configured for DHCP IP address administration

[IPADMIN]: show qos

QoS values currently in use:
    VLAN tagging       :      off
    VLAN id            :      0
    VLAN user priority :      6
    Diffserv value     :      46
```


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5.3. Configuring the Avaya Media Server and Media Gateway

This section presents the relevant configuration for Avaya Communication Manager software to administer an Avaya S8500 Media Server with Avaya G650 Media Gateway. The Avaya Communication Manager SAT screens can be accessed using "telnet 192.11.13.6 5023" from a computer connected to the server's services port, or "telnet 50.1.1.5 5023" through the control network.

Step	Description
1.	***Enable IPSI*** Use the command **change system-parameters ipserver-interface** to globally enable the server to control the IPSI installed in slot A1 on the gateway. Set the field **IPSI Control of Port Networks** to **enabled** as shown below. **change system-parameters ipserver-interface** IP SERVER INTERFACE (IPSI) SYSTEM PARAMETERS SERVER INFORMATION IPSI Host Name Prefix: Primary Control Subnet Address: . . . Secondary Control Subnet Address: . . . OPTIONS Switch Identifier: **A** IPSI Control of Port Networks: **enabled**
2.	***Add data-module for C-LAN*** Use the command **add data-module** to enable the C-LAN. Set the field **Type** to **ethernet** and the field **Port** to the C-LAN circuit pack (from **list configuration all**) location with port 17. The following snapshot displays the C-LAN configuration. **display data-module 20000** DATA MODULE Data Extension: 20000 Name: C-LAN Type: **ethernet** Port: **01A0317** Link: 1

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Step	Description
3.	***Add Cabinet*** Use the command **add cabinet X** (X is the cabinet number) to add a cabinet for the G650 gateway. **Cabinet Layout** must be configured as **G650-rack-mount-stack** for the Avaya G650 Media Gateway. **add cabinet 1** Page 1 of 1 CABINET CABINET DESCRIPTION Cabinet: 1 Cabinet Layout: **G650-rack-mount-stack** Cabinet Type: expansion-portnetwork Location: 1 Rack: Room: Floor: Building: CARRIER DESCRIPTION Carrier Carrier Type Number E not-used D not-used C not-used B not-used A G650-port
4.	***Add G650 Media Gateway*** Use the command **add ipserver-interface X** (X is the cabinet number) to add a G650 Media Gateway. Type the IPSI IP address (50.1.1.6 in this sample configuration) in the **Host** field. The following displays the ipserver-interface configuration. Note that QoS parameters are configured for the communication from the Avaya S8500 Media Server to the IPSI of the Avaya G650 Media Gateway. **display ipserver-interface 1** IP SERVER INTERFACE (IPSI) ADMINISTRATION - PORT NETWORK 1 IP Control? y Socket Encryption? n Enable QoS? **y** Primary IPSI QoS Parameters Location: 1A02 Call Control 802.1p: **6** Host: **50.1.1.6** Call Control DiffServ: **46** DHCP ID: ipsi-A01a

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Step	Description
5.	***Configuring C-LAN and MEDPRO*** Use the command **add ip-interface** to add and configure the C-LAN and the MEDPRO of the Avaya G650 Media Gateway. The following two screens display the configurations of the C-LAN (01A03) and the MEDPRO (01A04). Note that the C-LAN and MEDPRO are assigned to Network Region 1.

```
display ip-interface 01A03

                                IP INTERFACES

                 Type: C-LAN                              ETHERNET OPTIONS
                 Slot: 01A03                                     Auto? y
          Code/Suffix: TN799  D
            Node Name: C-LAN
           IP Address: 50.1.1.7
          Subnet Mask: 255.255.255.0
      Gateway Address: 50.1.1.1
  Enable Ethernet Port? y
       Network Region: 1
                 VLAN:
```

```
display ip-interface 01A04

                                IP INTERFACES

                 Type: MEDPRO                             ETHERNET OPTIONS
                 Slot: 01A04                                     Auto? y
          Code/Suffix: TN2302
            Node Name: MedPro
           IP Address: 50.1.1.8
          Subnet Mask: 255.255.255.0
      Gateway Address: 50.1.1.1
  Enable Ethernet Port? y
       Network Region: 1
                 VLAN:
```

6.	Use the command **change ip-network-region** to configure the QoS and other parameters for a network region. Note that Avaya components including C-LAN, MEDPRO, IP telephones, Softphone, and Media Gateways can be configured to a network region. These components will receive QoS and other parameters from their IP network regions' configuration upon their registration.

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Step	Description

```
change ip-network-region 1                                    Page   1 of  19
                              IP NETWORK REGION
  Region: 1
Location: 1               Home Domain:
    Name: Location A
                               Intra-region IP-IP Direct Audio: yes
AUDIO PARAMETERS               Inter-region IP-IP Direct Audio: yes
   Codec Set: 1                          IP Audio Hairpinning? y
UDP Port Min: 2048
UDP Port Max: 3028                     RTCP Reporting Enabled? y
                             RTCP MONITOR SERVER PARAMETERS
DIFFSERV/TOS PARAMETERS       Use Default Server Parameters? y
 Call Control PHB Value: 34
        Audio PHB Value: 46
802.1P/Q PARAMETERS
 Call Control 802.1p Priority: 6
        Audio 802.1p Priority: 6      AUDIO RESOURCE RESERVATION PARAMETERS
H.323 IP ENDPOINTS                                    RSVP Enabled? n
  H.323 Link Bounce Recovery? y
 Idle Traffic Interval (sec): 20
   Keep-Alive Interval (sec): 5
            Keep-Alive Count: 5
```

7. ***Configure IP codec***

Use the command **change ip-codec-set** to select **G.711MU**.

```
change ip-codec-set 1                                         Page   1 of   1

                          IP Codec Set

    Codec Set: 1

    Audio      Silence      Frames   Packet
    Codec      Suppression  Per Pkt  Size(ms)
 1: G.711MU         n         2        20
 2:
 3:
 4:
```

8. Use the **save translation** command to save the configuration.

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6. Verification Steps

The following verification steps were used in these Application Notes to verify correct system operation:

- Verify network connectivity by launching pings between the S8500 Media Server and Wireless laptop PC. Verify that all pings are successful.
- Power up the Avaya 3616 and 3626 IP Wireless Telephones and verify that they can register with the S8500 Media Server.
- Launch IP Softphone and verify that the IP Softphone can register with the S8500 Media Server.
- Make calls between the two IP Telephones and verify that the voice quality is good.
- Make a call from the 3626 IP Wireless Telephone to the 4620SW IP Telephone, and verify that the voice quality is good
- Enable WEP on both IP Wireless Telephones and verify the call can be placed between these two phones and that the voice quality is good.
- While the call is up, make a conference call to the 4620SW IP Telephone. Verify that all three parties are in conference call and voice quality is good.
- Make a call from IP Softphone to the 4610SW IP Telephone and verify that voice quality is good.

7. Conclusion

These Application Notes illustrate the procedures necessary for configuring the Linksys WRT55AG Dual-band A+G Wireless Router to support Avaya IP Wireless Telephones and Avaya IP Softphone. The Linksys WRT55AG Dual-band A+G Wireless Router is able to support 802.11 a/b/g clients and WEP encryption.

8. References

Use this URL http://avaya.com/gcm/master-usa/en-us/pillars/iptelephony/index.htm to access these Application Notes.

[1] Configuring the Avaya IP Softphone with Compatible 802.11b Access Points from Avaya and Other Vendors– Issue 1.0

[2] Configuring the Avaya 3606 Wireless Telephone with Compatible 802.11b Access Points from Avaya and Other Vendors - Issue 1.0

[3] Application Notes for Configuring 3Com Wireless LAN Access Point 8750 to Support Avaya Communication Manager, Avaya IP Wireless Telephone and Avaya IP Softphone - Issue 1.0

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