Avaya Solution & Interoperability Test Lab

Application Notes for Configuring the Hitachi Cable WirelessIP 5000 with Avaya Communication Manager and Avaya SIP Enablement Services using RADIUS Authentication over Meru Networks Wireless Infrastructure - Issue 1.0

Abstract

These Application Notes describe the steps for configuring the Hitachi Cable WirelessIP 5000 to communicate with Avaya Communication Manager and Avaya SIP Enablement Services (SES). The Hitachi Cable WirelessIP 5000 is a wireless SIP telephone that registers with Avaya SIP Enablement Services (SES). Emphasis of the testing was placed on verifying good voice quality from the Hitachi Cable WirelessIP 5000 and its ability to interoperate with Avaya SIP Enablement Services. Information in these Application Notes has been obtained through Developer*Connection* compliance testing and additional technical discussions. Testing was conducted via the Developer*Connection* Program at the Avaya Solution and Interoperability Test Lab.

©2006 Avaya Inc. All Rights Reserved.

1. Introduction

Avaya Communication Manager and Avaya SIP Enablement Services (SES) have the capability to extend advanced telephony features to SIP stations. This feature set can be extended to non-Avaya SIP phones such as the Hitachi Cable WirelessIP 5000.

These Application Notes describe a solution for configuring the Hitachi Cable WirelessIP 5000 to interoperate with Avaya Communication Manager and Avaya SIP Enablement Services (SES). The Hitachi Cable WirelessIP 5000 is a wireless SIP telephone capable of registering with the Avaya SIP Enablement Services (SES). Quality of Service was achieved through the use of Hitachi Cable WirelessIP 5000 telephone Layer-3 (DiffServ) setup and Meru Networks native support for SIP. Authentication is provided by the use of 802.1x authentication against Steel Belted Radius Server.

1.1. Configuration

Figure 1 illustrates the configuration used in these Application Notes. The extension numbers used by the Hitachi Cable WirelessIP 5000 phones are registered to Avaya SIP Enablement Services (SES) and are administered as Outboard Proxy SIP (OPS) stations in Avaya Communication Manager. As a result, each Hitachi Cable WirelessIP 5000 has access to OPS[1] features available from Avaya Communication Manager. The names of the Meru Networks Access Points (APs) "AP-6", "AP-7", and "AP-9" were automatically assigned by the Meru Networks MC500 Controller as each AP was connected onto the network.

[1] Depending on the Avaya server product, the acronym OPS stands for two different feature names that are functionally equivalent. For SIP Enablement Services, the extended features capability is referred to as Outboard Proxy SIP. This capability is provided by Avaya Communication Manager as part of a more general feature extension package known as Off-PBX Stations, which can be applied to other remote devices such as cell phones. For that reason, the administration screens in this document will refer to the latter name or "off-pbx-telephone." For the purposes of the Avaya SIP offer and these Application Notes, the terms can be used interchangeably.

©2006 Avaya Inc. All Rights Reserved.

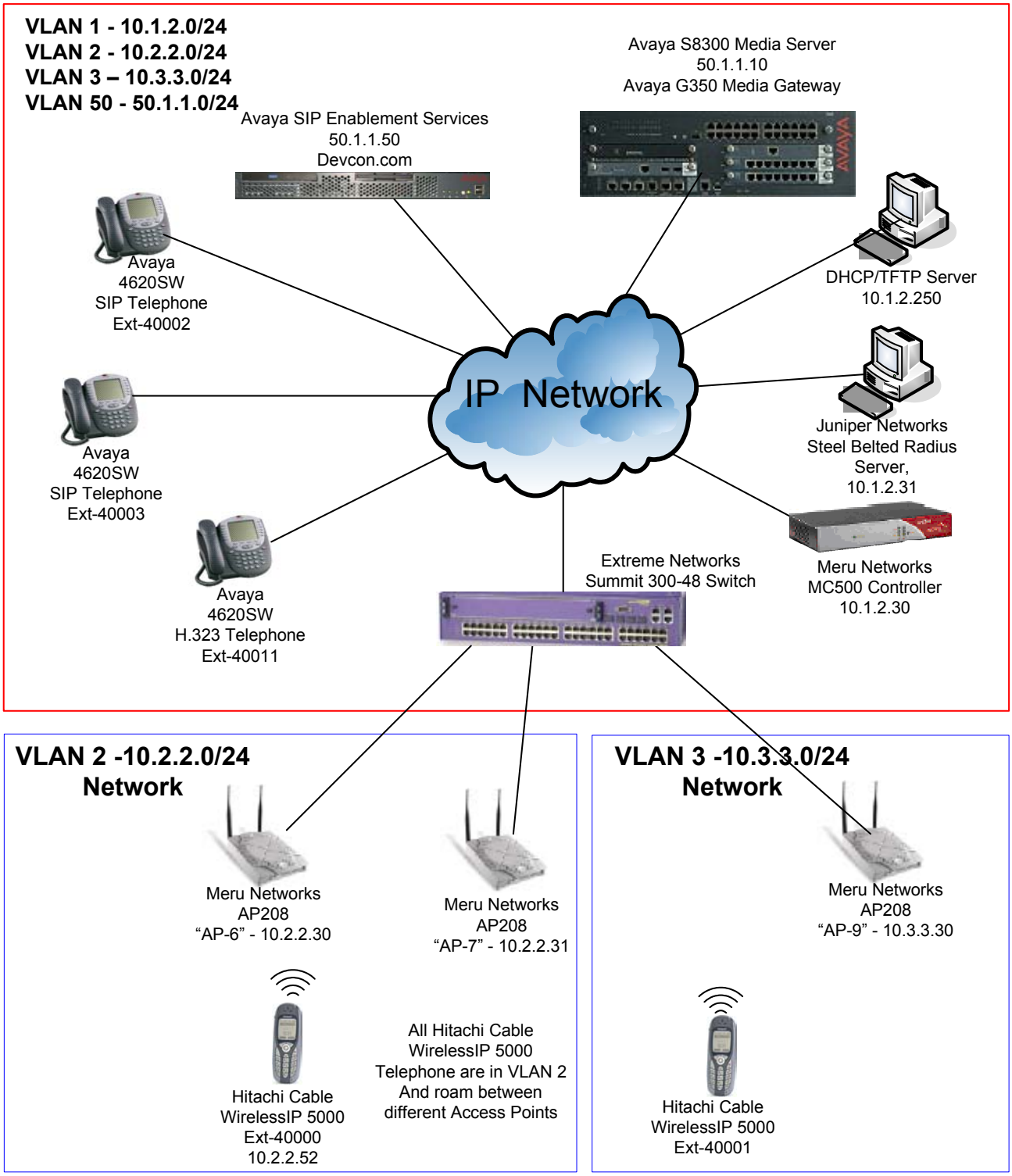


Figure 1: Sample Network Configuration

©2006 Avaya Inc. All Rights Reserved.

2. Equipment and Software Validated

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

Equipment	Software/Firmware
Avaya S8300 Media Server with Avaya G350 Media Gateway	Communication Manager 3.1 (R03.1-01.0.628.6)
Avaya SIP Enablement Services (SES)	3.1 (build 18)
Avaya 4610SW/4620SW SIP Telephones	2.2.21a
Avaya 4620SW H.323 IP Telephone	2.2.3
Extreme Networks Summit 300-48 Switch	ExtremeWare 7.4e.1.5
Meru Networks MC500 Controller	3.1.3-7
Meru Networks AP208	N/A
Juniper Networks Steel Belted Radius Server	5.03.1532
Hitachi Cable WirelessIP 5000 telephone	Software release 2.2.1 Boot Rom 1.0.4

3. Configure Avaya Communication Manager

This section highlights the important commands for defining SIP telephones on Avaya Communication Manager. For complete documentation, see references [1], [2], [4], [5], and [6]. Use the System Access Terminal (SAT) interface to perform these steps. Log in with the appropriate credentials.

3.1. Verify OPS Capacity

Use the display **system-parameters customer-options** command to verify that **Maximum Off-PBX Telephones – OPS** has been set to a value that will accommodate the number of phones to be supported. Contact Avaya or Avaya Business Partner to increase or change the maximum Off-PBX-Telephones allowed.

```
change system-parameters customer-options                       Page   1 of  10
                                OPTIONAL FEATURES
     G3 Version: V13
       Location: 1
       Platform: 13
       Location: 1                            RFA System ID (SID): 1
       Platform: 13                           RFA Module ID (MID): 1
                                                              USED
                                Platform Maximum Ports: 900   48
                                      Maximum Stations: 40    20
                              Maximum XMOBILE Stations: 0     0
                    Maximum Off-PBX Telephones - EC500: 50    0
                    Maximum Off-PBX Telephones -   OPS: 50    10
                    Maximum Off-PBX Telephones - SCCAN: 0     0
        (NOTE: You must logoff & login to effect the permission changes.)
```


©2006 Avaya Inc. All Rights Reserved.

3.2. Add New Stations to Avaya Communication Manager

Using the **add station** command, add a station for each SIP phone to be supported. The sample configuration uses ***6408D+*** for the station type. The **Port** must be set to ***X***, since this will be used as SIP Station. Use the appropriate COS value. Make sure that the station has three (3) ***call-appr*** buttons for **Button Assignment**. The number of call-appr buttons must match the call limit set in the **off-pbx-telephone station-mapping** command for this extension, which will be configured in a later step. Repeat the following steps to add additional SIP telephone extensions.

```
add station 40000                                          Page   1 of   4
                                    STATION

Extension: 40000                          Lock Messages? n          BCC: 0
     Type: 6408D+                         Security Code:             TN: 1
     Port: X                            Coverage Path 1             COR: 1
     Name: SIP40000                     Coverage Path 2:            COS: 1
STATION OPTIONS
              Loss Group: 2
             Data Module? n
            Speakerphone: 2-way
        Display Language: english
              Loss Group: 2             Personalized Ringing Pattern: 1
             Data Module? n                        Message Lamp Ext: 40000
            Speakerphone: 2-way                  Mute Button Enabled? y
                                                   Media Complex Ext:
                                                        IP SoftPhone? N
```

```
add station 40000                                          Page   3 of   4
                                    STATION
 SITE DATA
       Room:                                            Headset? n
       Jack:                                            Speaker? n
      Cable:                                           Mounting: d
      Floor:                                       Cord Length: 0
   Building:                                         Set Color:
ABBREVIATED DIALING
     List1:                    List2:                    List3:
BUTTON ASSIGNMENTS
 1: call-appr                            5:
 2: call-appr                            6:
 3: call-appr                            7:
```

Use the **change off-pbx-telephone station-mapping** command to map Avaya Communication Manager extensions to the Avaya SIP Enablement Services (SES) extensions. The **Station Extension** is the extension number configured with the **add station** command. The **Phone Number** is the number that will be used in SES for the media server extension. Make sure the **Call Limit** is equal to the number of call-appr buttons set using the **add station** command. In the **Trunk Selection** field, enter the trunk-group number for the trunk-group configured between Avaya Communication Manager and the Avaya SIP Enablement Services server. Select the **Configuration Set** number applicable for this configuration. The sample configuration uses **Configuration Set *1***. For additional information related to Avaya Communication Manager and Off-PBX-Station support, refer to references [2], [4], and [5].

©2006 Avaya Inc. All Rights Reserved.

```
change off-pbx-telephone station-mapping 40000                  Page   1 of   2
                  STATIONS WITH OFF-PBX TELEPHONE INTEGRATION

 Station     Application   Dial   Phone Number      Trunk       Configuration
 Extension                 Prefix                   Selection   Set
 40000         OPS              - 40000              1           1
 40001         OPS              - 40001              1           1


change off-pbx-telephone station-mapping 40000                  Page   2 of   2
                  STATIONS WITH OFF-PBX TELEPHONE INTEGRATION

 Station       Call       Mapping      Calls       Bridged
 Extension     Limit      Mode         Allowed     Calls
 40000        3         both           all         both
 40001        3         both           all         both
```

The screenshot below shows the settings for **trunk-group 1**.

```
display trunk-group 1                                           Page   1 of  20
                              TRUNK GROUP
Group Number: 1                   Group Type: sip           CDR Reports: y
  Group Name: To CCS                     COR: 1        TN: 1        TAC: 101
   Direction: two-way        Outgoing Display? n
 Dial Access? n                Busy Threshold: 255       Night Service:
Queue Length: 0
Service Type: tie                   Auth Code? n
                                                     Signaling Group: 1
                                                   Number of Members: 24
TRUNK PARAMETERS
     Unicode Name? y
                                          Redirect On OPTIM Failure: 5000
            SCCAN? n                             Digital Loss Group: 18
```

The screenshot below shows the settings for **configuration-set 1**.

```
change off-pbx-telephone configuration-set 1                    Page   1 of   1
                              CONFIGURATION SET: 1
      Configuration Set Description: Remote Extension
               Calling Number Style: network
                CDR for Origination: phone-number
 CDR for Calls to EC500 Destination? y
        Fast Connect on Origination? n
       Post Connect Dialing Options: dtmf
      Cellular Voice Mail Detection: none
                   Barge-in Tone? n
            Identity When Bridging: principal
```


©2006 Avaya Inc. All Rights Reserved.

3.3. IP Network Region

Use the **display ip-network-region** command to verify the **UDP Port Min** and **UDP Port Max** settings. These should match the **RTP Port Min** and **RTP Port Max** settings in the Hitachi WirelessIP 5000 in Section 7.5 Step 4. Note the **Call Control PHB Value** and **Audio PHB Value**. The **Signal DSCP** and **Voice DSCP** values set in Section 7.2 Step 5 should be set to the same value.

```
change ip-network-region 1                                      Page   1 of  19
                              IP NETWORK REGION

  Region: 1
Location: 1       Authoritative Domain: devcon.com
MEDIA PARAMETERS                Intra-region IP-IP Direct Audio: yes
      Codec Set: 1              Inter-region IP-IP Direct Audio: yes
   UDP Port Min: 2048                      IP Audio Hairpinning? y
   UDP Port Max: 3028
DIFFSERV/TOS PARAMETERS                  RTCP Reporting Enabled? y
 Call Control PHB Value: 46      RTCP MONITOR SERVER PARAMETERS
        Audio PHB Value: 46       Use Default Server Parameters? y
        Video PHB Value: 26
802.1P/Q PARAMETERS
 Call Control 802.1p Priority: 6
        Audio 802.1p Priority: 6
        Video 802.1p Priority: 5      AUDIO RESOURCE RESERVATION PARAMETERS
H.323 IP ENDPOINTS                                     RSVP Enabled? n
  H.323 Link Bounce Recovery? y
 Idle Traffic Interval (sec): 20
   Keep-Alive Interval (sec): 5
            Keep-Alive Count: 5
```

3.4. Configure Audio Codec

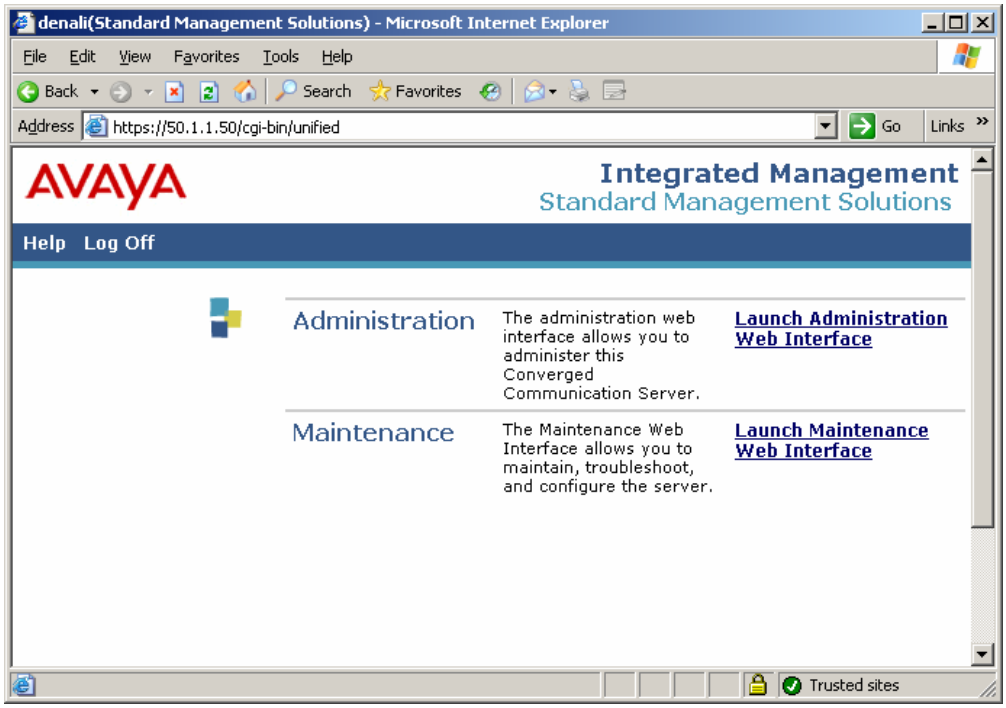
Use the **change ip-codec-set** command to configure the codec set Avaya Communication Manager and Avaya telephones will use to communicate with the WirelessIP 5000 handset. Both G.711MU and G.729AB codecs are supported by WirelessIP 5000 handset.

```
change ip-codec-set 1                                           Page   1 of   2
                         IP Codec Set
    Codec Set: 1
    Audio        Silence      Frames   Packet
    Codec        Suppression  Per Pkt  Size(ms)
 1: G.711MU           n         2        20
 2: G.729AB           n         2        20
```


©2006 Avaya Inc. All Rights Reserved.

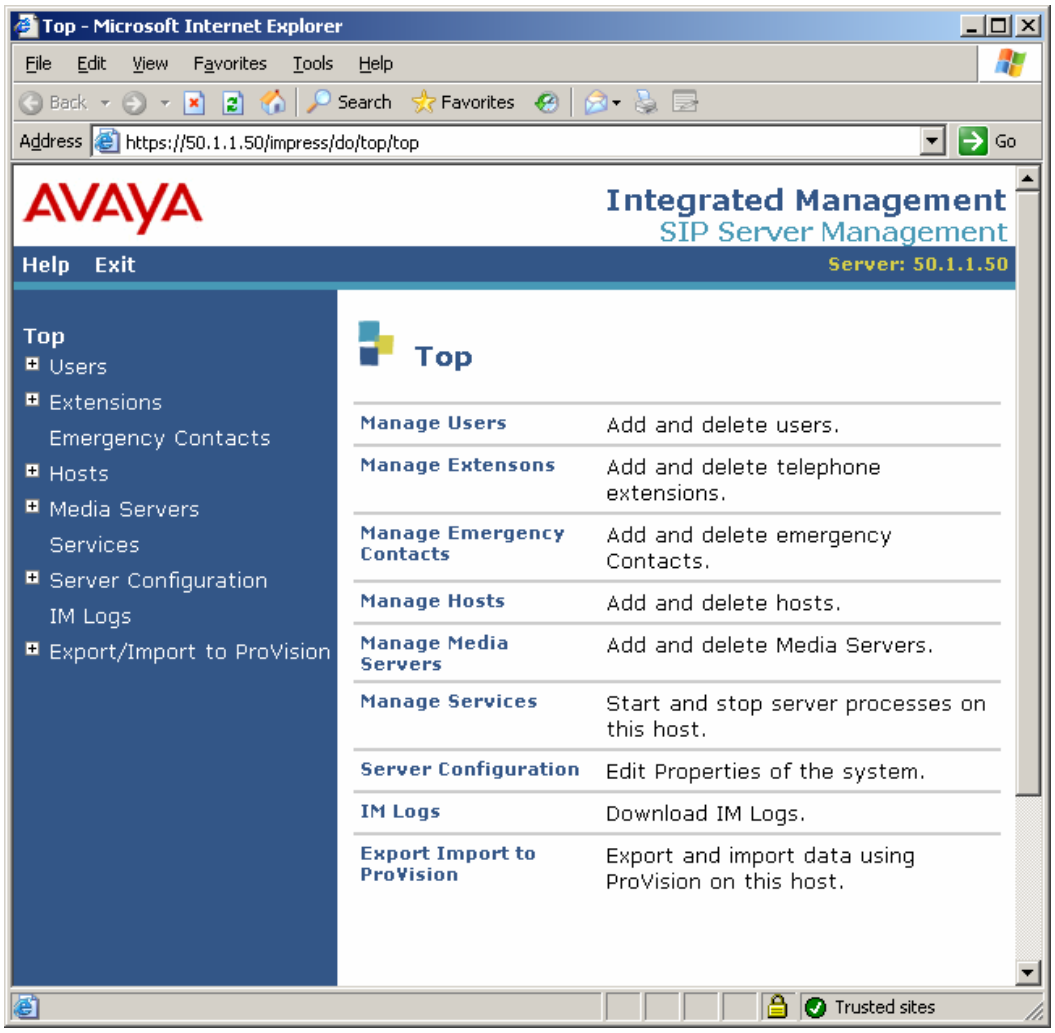
4. Configure Avaya SIP Enablement Services

The following steps describe the configuration of the Avaya SIP Enablement Services (SES) to support WirelessIP 5000 handset.

Step	Description
1.	Avaya SES is configured using a web browser. Set the URL to the IP address of the SES, and log in using appropriate user name and password. The URL in the sample configuration is **https://50.1.1.50/admin**. Select **Launch Administration Web Interface** to continue. 

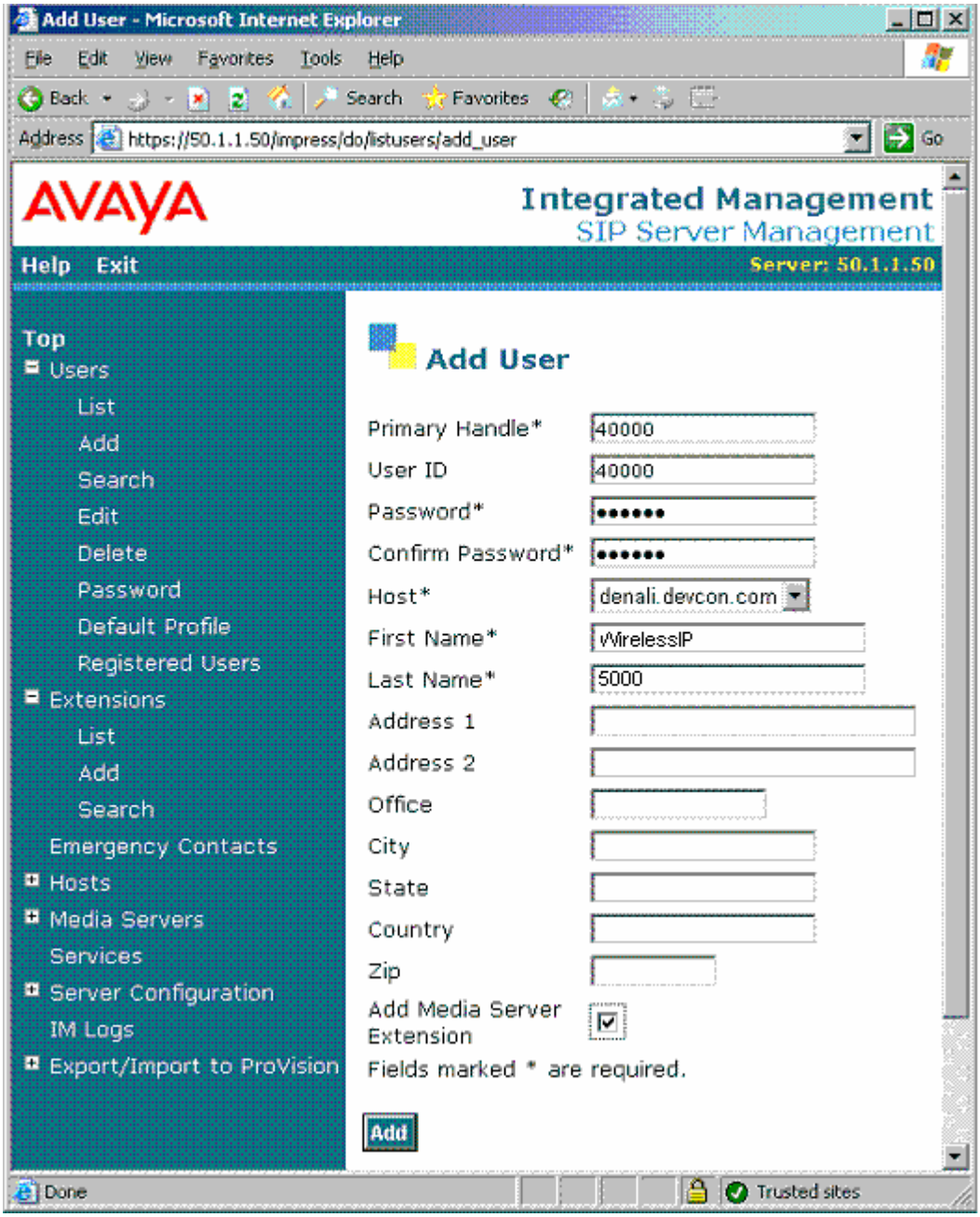
©2006 Avaya Inc. All Rights Reserved.

Step	Description
2.	Click on the "+" sign next to **Users** on the left side to expand the selection. Select **Add** from the list under **Users** to add a new user.

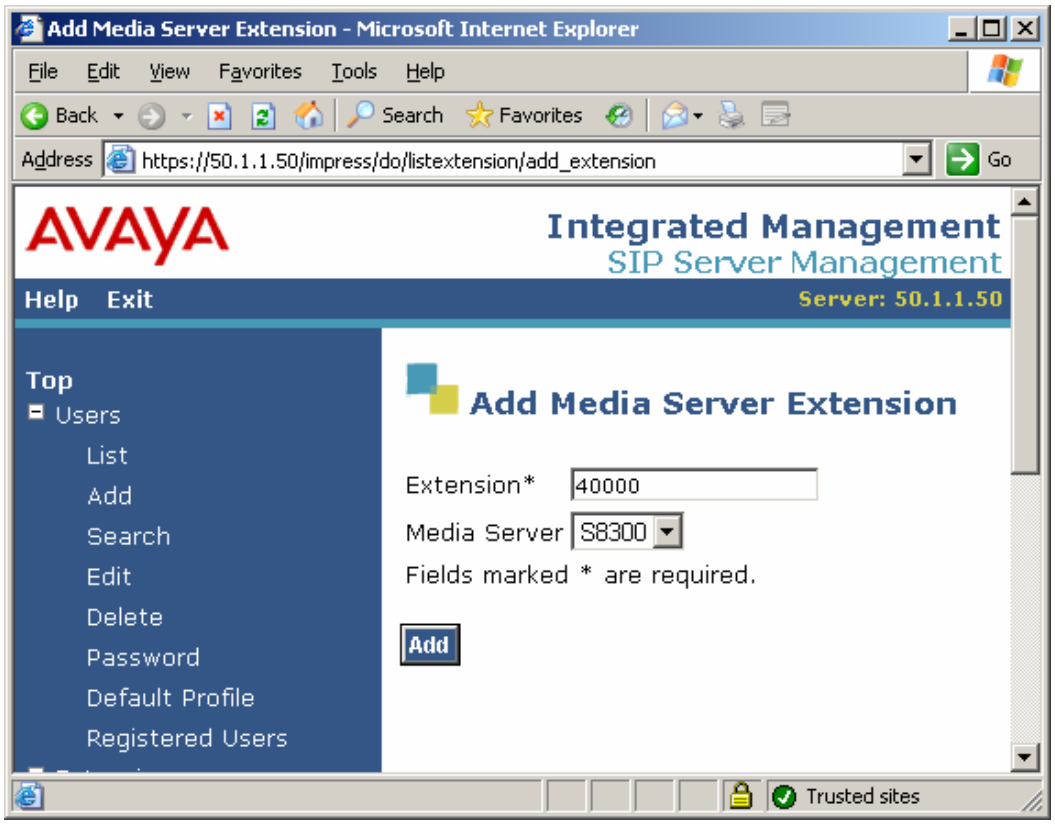


©2006 Avaya Inc. All Rights Reserved.

Step	Description
3.	Enter the phone number in both the **Primary Handle** and **User ID**. Enter the password for this extension. Select the appropriate SES server for the **Host** field. The **First Name** and **Last Name** are for informational purpose only, but are required fields. Check the **Add Media Server Extension** field at the bottom. Click **Add** to continue.



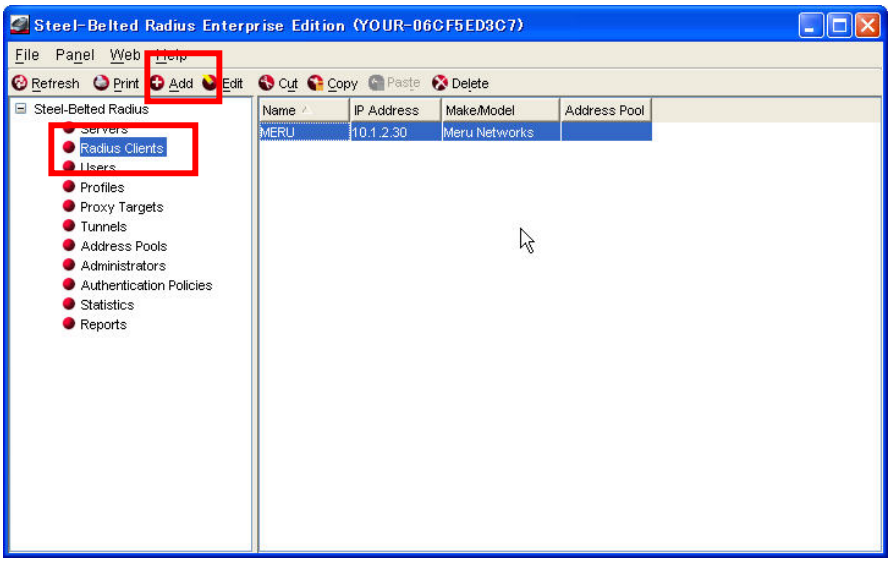
©2006 Avaya Inc. All Rights Reserved.

Step	Description
4.	Type in the phone number in the **Extension** field. The **Extension** field must match the extension configured in Section 3.2. Click **Add** to complete. 
5.	Click **update** on the bottom of the left blue panel to implement all the changes.

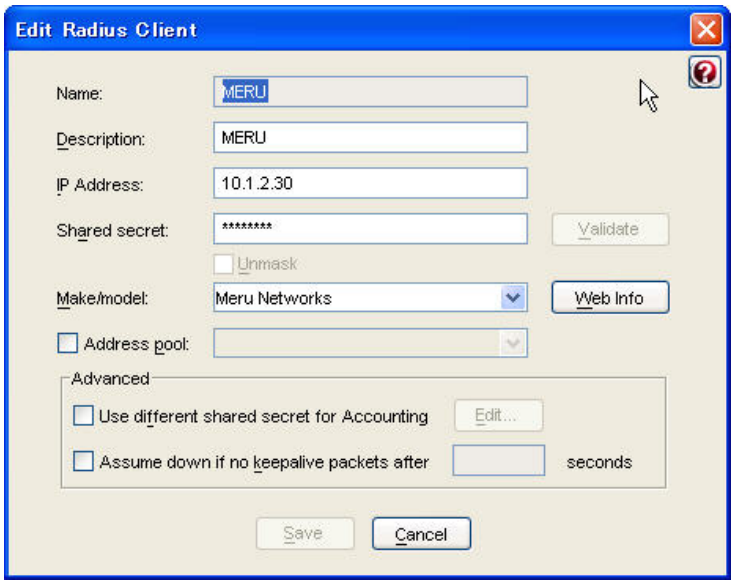
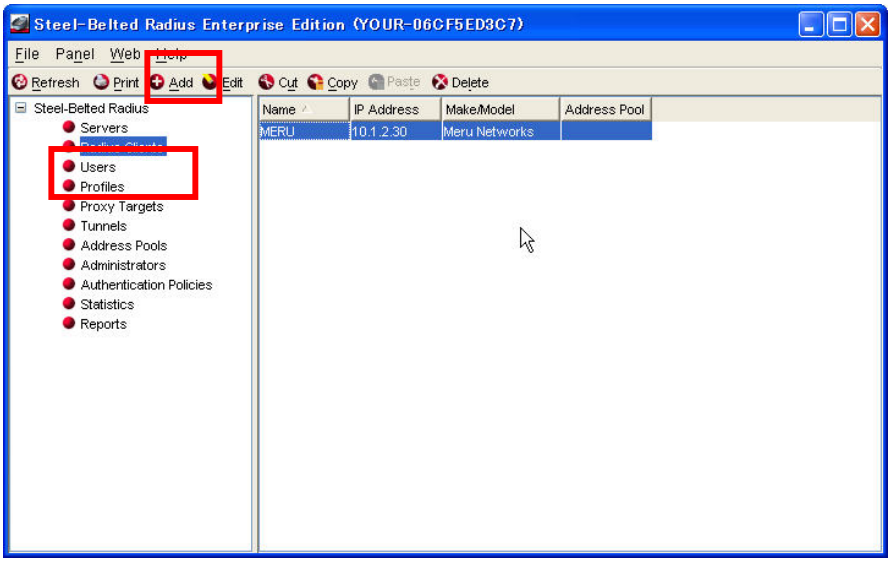
©2006 Avaya Inc. All Rights Reserved.

5. Configure the Juniper Networks Steel Belted Radius (SBR) Server

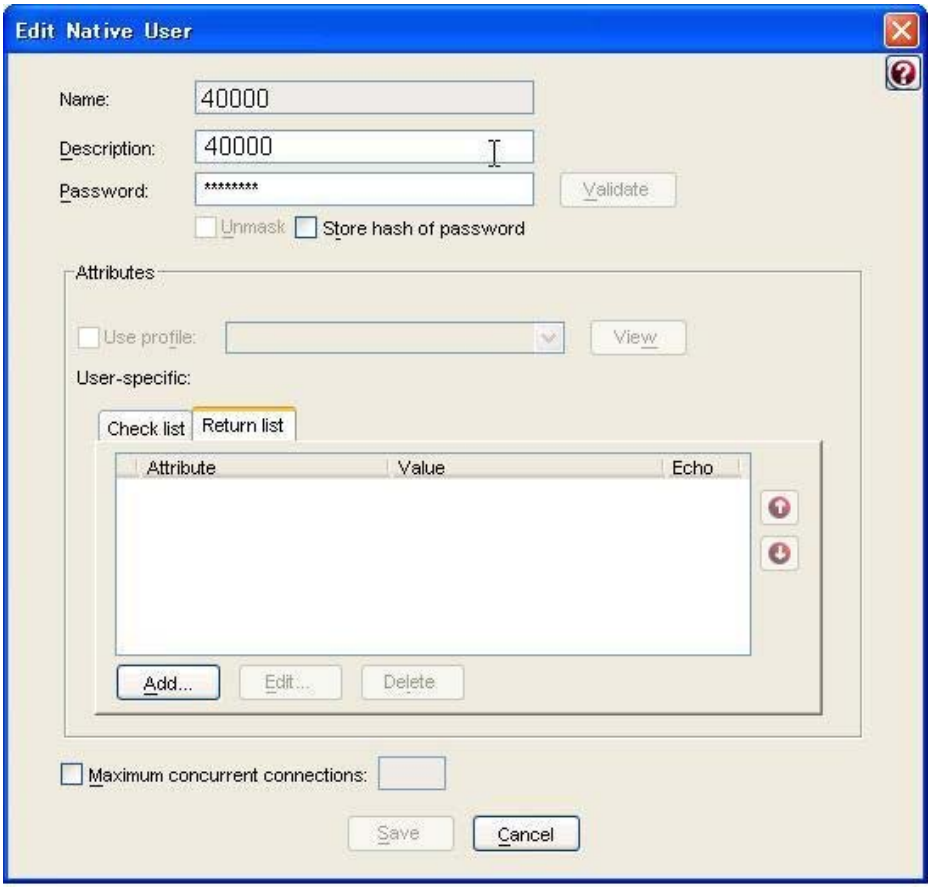
The following steps describe the configuration for the Steel Belted Radius Server in the sample configuration.

Step	Description
1.	From the Steel Belted Radius Server GUI, select the **Radius Clients** field on the left. Click **Add** from the menu bar to display the **Add Radius Client** pop-up window. 

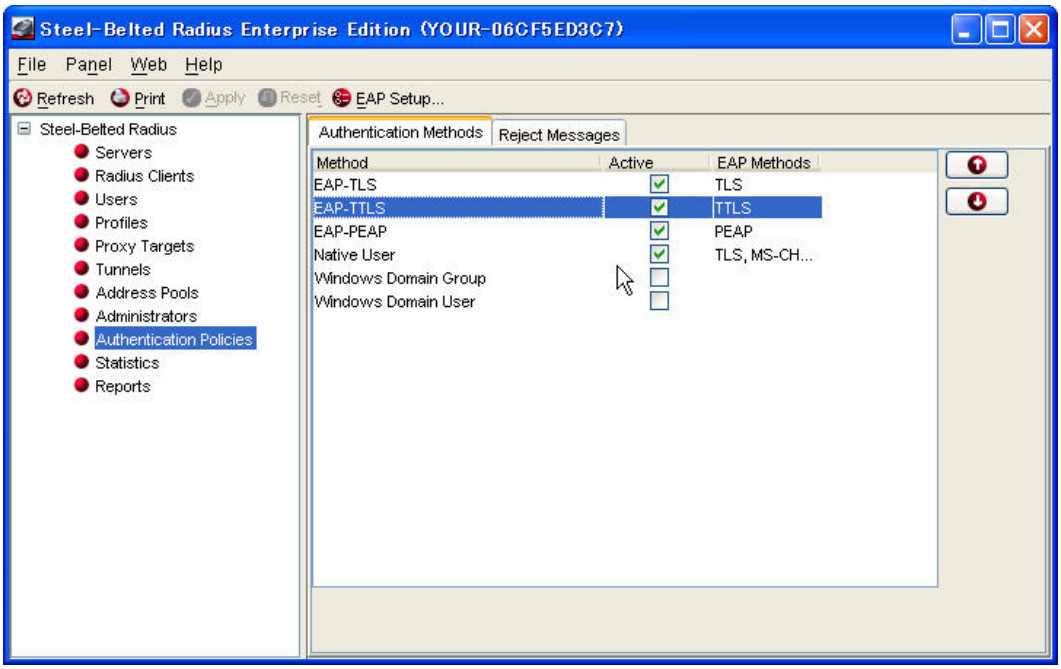
©2006 Avaya Inc. All Rights Reserved.

Step	Description
2.	The following **Edit Radius Client** pop-up window shows the information that needs to be entered to add a Radius Client. The IP address is the address of the Meru Controller. Enter a **Shared secret** string. This same string will be needed in configuring the Meru Controller in Section 5 Step 5. Click **Save** to complete. 
3.	From the Steel Belted Radius Server GUI, select the **Users** field on the left. Click **Add** from the menu bar to display the **Add Native Users** pop-up window. 

©2006 Avaya Inc. All Rights Reserved.

Step	Description
4.	The following **Edit Native User** pop-up window shows the information that needs to be entered to add a Native User. Enter a **Name**, **Description** and **Password** for the new user. The name is the station number. Click **Save** to complete. This Name and Password will need to be entered into the WirelessIP 5000 handset. Repeat Step 3 and 4 for each WirelessIP 5000 handset. 

©2006 Avaya Inc. All Rights Reserved.

Step	Description
5.	From the Steel Belted Radius Server GUI, select the **Authentication Policies** field on the left. Click the check box for **EAP-TTLS** to make it Active. 

6. Configure the Meru Networks MC500 Controller

The following steps describe the configuration for the Meru Networks wireless setup in the sample configuration.

Step	Description
1.	To perform the initial configuration of the Meru Networks MC500 Controller, set up a serial connection from a PC or laptop. On the PC or laptop, set up a terminal session as follows: ▪ 115200 baud ▪ 8 bits ▪ no parity ▪ 1 stop bit Log in via the Meru command-line interface (CLI) using appropriate credentials. The CLI prompt displayed depends on the hostname of the MC500 Controller. At the CLI prompt, type **configure terminal** to enter configuration mode. After assigning an IP address to the MC500 Controller in the step below, a telnet session may be used to access the CLI of the MC500 Controller.

©2006 Avaya Inc. All Rights Reserved.

Step	Description

2.	Assign a host name, IP address, and default gateway to the MC500 Controller. In addition, specify the IP address of the DHCP server. This enables DHCP relay on the MC500 Controller to allow dynamic IP addressing for the wireless IP endpoints. The MC500 Controller does not get its IP address from the DHCP server.
	`MC500# configure terminal`
	`MC500(config)# hostname MC500`
	`MC500(config)# ip address 10.1.2.30 255.255.255.0`
	`MC500(config)# ip default-gateway 10.1.2.1`
	`MC500(config)# ip dhcp-server  10.1.2.250`

3.	Configure the three Access Points (APs) in the WLAN configuration depicted in **Figure 1**. AP-6, AP-7 and AP-9 are in different subnets than the MC500 Controller. Therefore these APs are configured for Layer 3 connectivity, which requires the MC500 Controller IP address to be specified.
	
	`MC500(config)# ap 6`
	`MC500(config)# description AP-6`
	`MC500(config)# mac-address  00:0c:e6:00:40:58`
	`MC500(config-ap)# connectivity l3-preferred`
	`MC500(config-ap-connectivity)# ip address 10.2.2.30 255.255.255.0`
	`MC500(config-ap-connectivity)# ip default-gateway 10.2.2.1`
	`MC500(config-ap-connectivity)# controller ip 10.1.2.30`
	`MC500(config-ap-connectivity)# end`
	
	`MC500(config)# ap 7`
	`MC500(config)# description AP-7`
	`MC500(config)# mac-address  00:0c:e6:00:40:6c`
	`MC500(config-ap)# connectivity l3-preferred`
	`MC500(config-ap-connectivity)# ip address 10.2.2.31 255.255.255.0`
	`MC500(config-ap-connectivity)# ip default-gateway 10.2.2.1`
	`MC500(config-ap-connectivity)# controller ip 10.1.2.30`
	`MC500(config-ap-connectivity)# end`
	
	`MC500(config)# ap 9`
	`MC500(config)# description AP-9`
	`MC500(config)# mac-address  00:0c:e6:00:3e:e1`
	`MC500(config-ap)# connectivity l3-preferred`
	`MC500(config-ap-connectivity)# ip address 10.3.3.30 255.255.255.0`
	`MC500(config-ap-connectivity)# ip default-gateway 10.3.3.1`
	`MC500(config-ap-connectivity)# controller ip 10.1.2.30`
	`MC500(config-ap-connectivity)# end`

©2006 Avaya Inc. All Rights Reserved.

Step	Description

4.	The Hitachi WirelessIP 5000 that register with Avaya SIP Enablement Services are all assigned to VLAN 2. Create a VLAN named ***vlan2*** with a tag of ***2***. Assign an IP address, default gateway, and DHCP server to the VLAN interface. This enables 802.1Q trunking on the MC500 Controller for VLAN 2 only. In this configuration, VLAN 2 was mapped to ESSID ***sip***, to be configured in Step 6.
	`MC500(config)# vlan vlan2 tag 2`
	`MC500(config-vlan)# ip address 10.2.2.35 255.255.255.0`
	`MC500(config-vlan)# ip default-gateway 10.2.2.1`
	`MC500(config-vlan)# ip dhcp-server 10.1.2.250`
	`MC500(config-vlan)# exit`

5.	To require the wireless IP endpoints to use RADIUS authentication, create a security profile that will be assigned to the ESSID in Step 6. Security profile ***eap*** was configured to support 802.1x authentication. The **key** must match the **Shared Secret** configured in Section 5 Step 2.
	`MC500(config)# radius-profile RADIUS-SRV`
	`MC500(config-radius)# ip-address 10.1.2.31`
	`MC500(config- radius)# key 1234`
	`MC500(config- radius)# exit`
	`MC500(config)# security-profile radius`
	`MC500(config-security)# allowed-l2-modes 802.1x`
	`MC500(config-security)# encryption-modes wep128`
	`MC500(config-security)# radius-server primary RADIUS-SRV`
	`MC500(config-security)# exit`

6.	Create **ESSID *EAP*** and assign security profile ***radius*** and **VLAN2** that was created in Step 4 to this ESSID.
	`MC500(config)# essid EAP`
	`MC500(config-essid)# security-profile radius`
	`MC500(config-essid)# vlan name vlan2`
	`MC500(config-essid)# vlan support radius-and-configured-vlan`
	`MC500(config-essid)# ssid EAP`
	`MC500(config-essid)# ap-discovery join-virtual-ap`
	`MC500(config-essid)# exit`

7.	After making the configuration changes, save the changes using the following command: `MC500# copy running-config startup-config`
8.	Some configuration commands require a MC500 Controller reboot for the changes to take effect. To manually reboot the MC500 Controller and its associated Access Points, use the following command: `MC500# reload all`

©2006 Avaya Inc. All Rights Reserved.

7. Configure the Hitachi Cable WirelessIP 5000

The following steps describe the configuration for the Hitachi Cable WirelessIP 5000 telephone to interoperate with Avaya SIP Enablement Services (SES).

7.1. Log into the Hitachi Cable WirelessIP 5000

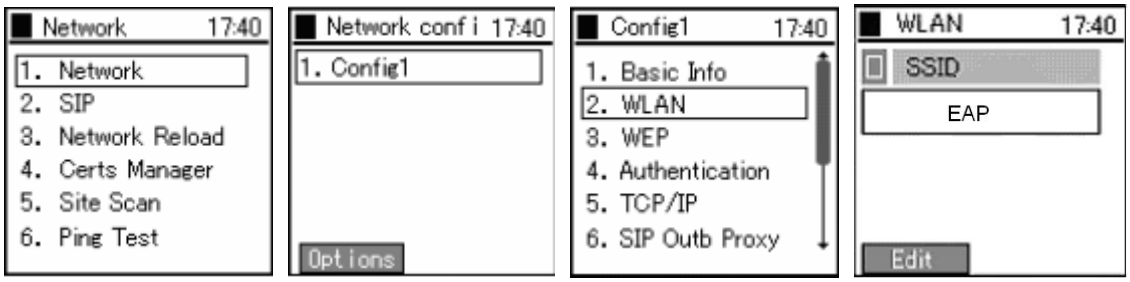
Step	Description
1.	The Hitachi Cable WirelessIP 5000 telephone is shown below. Some of the buttons are highlighted to facilitate referencing in this document. **Note:** A full explanation of the Hitachi Cable WirelessIP 5000 is beyond the scope of this document. Refer to the Hitachi Cable documentation [8] for additional details.
2.	Press and hold the **END** Key to turn on the Hitachi Cable WirelessIP 5000.

©2006 Avaya Inc. All Rights Reserved.

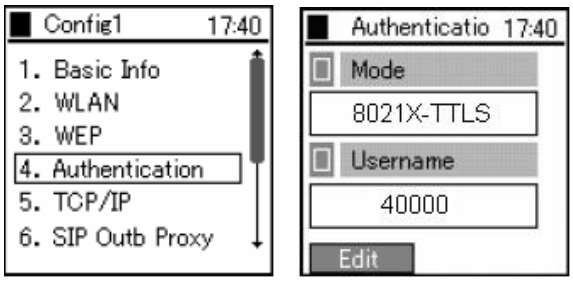
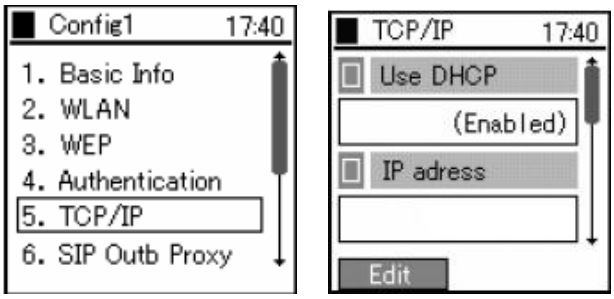
Step	Description
3.	Begin configuration by pressing the **LeftSoft** key. This will display the **Menu** screen. From the **Menu** screen, press the key sequence "**5**","**2**", "**1**" (**Setup→Phone lock →User Pwd**) to display the login prompt. Enter the appropriate password and press in the **Joystick** to enter. The **Admin** menu screen below will appear after logging in.

©2006 Avaya Inc. All Rights Reserved.

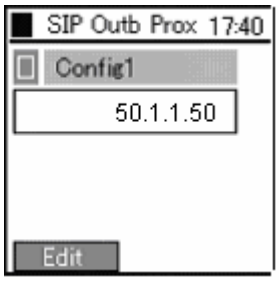
7.2. Network Configuration for Hitachi Cable WirelessIP 5000

Step	Description
1.	From the **Admin** menu screen, press "**1**" to select **Network**. From the **Network** menu screen, press the key sequence "**1**", "**1**", "**2**" (**Network→Config1→WLAN**) to access the **WLAN** screen. Press the **LeftSoft** key to select **Edit**. Use the keypad to enter the **SSID**, which must match the SSID configured on the wireless network. The sample configuration uses the SSID ***EAP***. Press in the **Joystick** to save.  **Note:** Push the **LeftSoft** key and push the **Joystick** left/right to change between Upper/Lower case letters, special characters or numbers. Press in the **Joystick** to select the highlighted selection. Press the **CLR** key to move back up one menu screen.

©2006 Avaya Inc. All Rights Reserved.

Step	Description
2.	From **Config1** menu screen, press "**4**" (**Authentication**) to display the **Authentication** menu screen. Press the **LeftSoft** key to edit.  1. Push the joystick to the left or right in the **Mode** field until the desired authentication mode is displayed. The sample configuration uses 8021X-TTLS for authentication. 2. Push downward on the joystick to highlight the **Username** field. Enter a user name that is configured on the Steel Belted RADIUS (SBR) Server in Section 5 Step 4. 3. Push downward on the joystick to highlight the **Password** field (not shown above). Enter the Password that was configured in Section 5 Step 4. 4. Press in on the joystick to save.
3.	From the **Config1** menu screen, press "**5**" (**TCP/IP**) to display the **TCP/IP** menu screen. Press the **LeftSoft** key to edit.  1. Push the joystick to the left or right in the Use **DHCP** field to Enable DHCP on the WirelessIP 5000 handset. This allows the WirelessIP 5000 to automatically obtain an IP address from the DHCP Server. 2. Press in on the joystick to save.

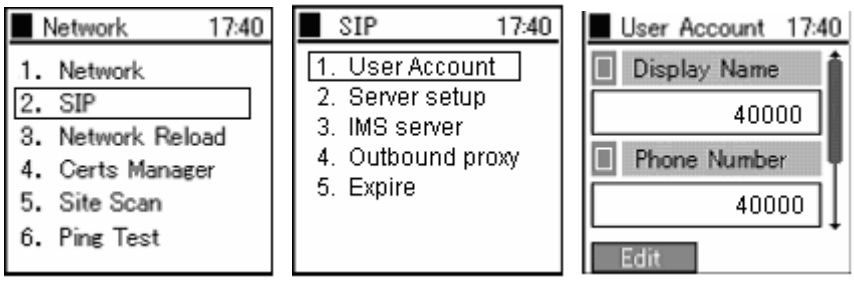
©2006 Avaya Inc. All Rights Reserved.

Step	Description
4.	From the **Config1** menu screen, press "**6**" (**SIP Outb Proxy**) to display the **SIP Outb Proxy** menu screen. Press the **LeftSoft** key to edit. Use the keypad on the Hitachi Cable WirelessIP 5000 telephone to enter the IP address of the Avaya SIP Enablement Services (SES) Server. The Avaya SIP Enablement Services Server in the sample network has IP address ***50.1.1.50***. Press in the **Joystick** to save. 
5.	From the **Config1** menu screen, press "**8**"(**IP DiffServ**) to display the **IP DiffServ** menu screen. Press the **LeftSoft** key to edit. Use the keypad on the phone to enter the appropriate DiffServ value in hex. The sample configuration uses the value below. This is also the same value configured in the **ip-network-region** of Avaya Communication Manager. **Hex** **Decimal** **Signal DSCP** 0x2e 46 **Voice DSCP** 0x2e 46

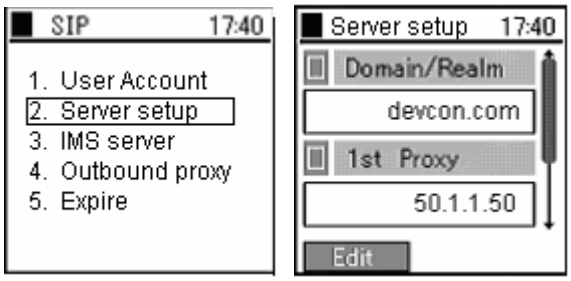
©2006 Avaya Inc. All Rights Reserved.

7.3. SIP Configuration for the Hitachi Cable WirelessIP 5000

The following steps describe the SIP configuration for the Hitachi Cable WirelessIP 5000 telephone.

Step	Description
1.	From the **Network** menu screen, press the key sequence "**2**", "**1**" (**SIP→User Account**) to display the **User Account** menu screen.  Press the **LeftSoft** key to edit. Push the **Joystick** upward or downward to scroll and enter the following information. The sample below uses extension ***40000***. The **User Password** must match what is configured in the Avaya SIP Enablement Services server for the extension being configured. **Display Name** ***40000*** **Phone Number** ***40000*** **User ID** ***40000*** **User Password** ***123456*** **URL scheme** ***sip*** Press in the **Joystick** to save and return to the **SIP** menu screen. Note: Make sure that each Hitachi Cable WirelessIP 5000 telephone has the appropriate **User ID** and **User Password** as this information will be used to register the phone with the Avaya SIP Enablement Services Server.

©2006 Avaya Inc. All Rights Reserved.

Step	Description
2.	From the **SIP** menu screen, press "**2**" (**Server setup**) to display the **Server setup** menu screen.  Press the **LeftSoft** key to edit. Push the **Joystick** upward or downward to scroll and enter the **Domain/Realm** and **1st Proxy** information. Press in the **Joystick** to save and return to the **SIP** menu screen. The sample configuration uses the following information: **Domain/Realm** ***devcon.com*** Domain of the SES server **1st Proxy** ***50.1.1.50*** IP address of the SES server
3.	Press the **END** key to exit out of the menu.

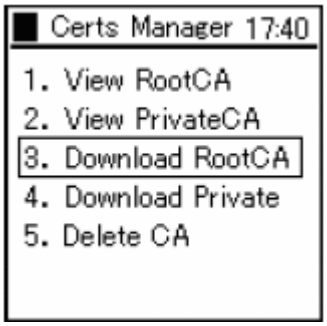
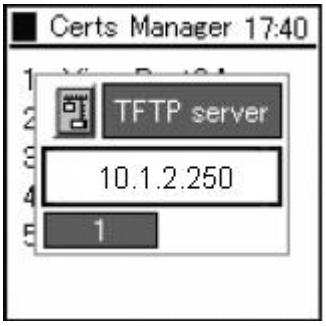
7.4. Loading of the Certificate on the Hitachi Cable WirelessIP 5000

The following steps describe the steps necessary to load the Certificate onto the WirelessIP 5000 handset required for 802.1X authentication.

Note: The issuance and administration of the authentication Certificate is beyond the scope of this document.

To download the Certificate from the TFTP Server to the WirelessIP 5000 handset, it must be able to connect to the wireless network. Therefore, it may be necessary to associate the handset with another SSID that does not require 802.1X authentication, download the certificate, then reconfigure the handset to use 802.1X authentication. Consult the Hitachi Cable documents [7] and [8] for additional methods for downloading the certificate to the WirelessIP 5000.

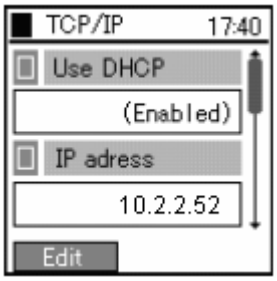
©2006 Avaya Inc. All Rights Reserved.

Step	Description
1.	From the Network menu screen, press "**4**" (**Certs Manager**) to display the **Certs manager** menu screen. Press "**3**" (**Download RootCA**) to begin the download process.  A warning message is displayed. Press down on the **Joystick** to acknowledge the warning message. Push the **joystick** to left or right to select **Yes** for "**Upgrade Root Certificate?**" and press down on the **Joystick**. Enter the TFTP server IP address using the handset keypad. Use the "*" to enter the dot. Press in the Joystick to save and begin download of the Certificate. 

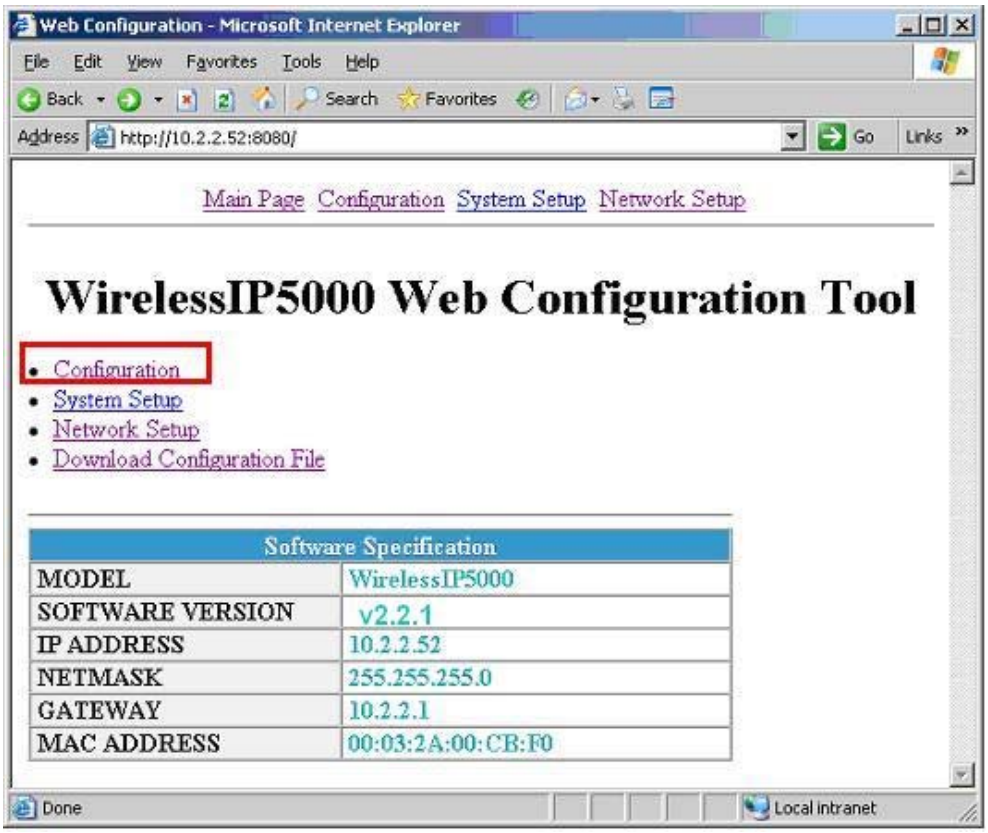
©2006 Avaya Inc. All Rights Reserved.

7.5. Other Hitachi Cable WirelessIP 5000 Telephone Configuration

This section describes other settings that are not accessible through the keypad from the Hitachi Cable WirelessIP 5000 telephone. The following settings are accessible using the Hitachi Cable Web Server interface.

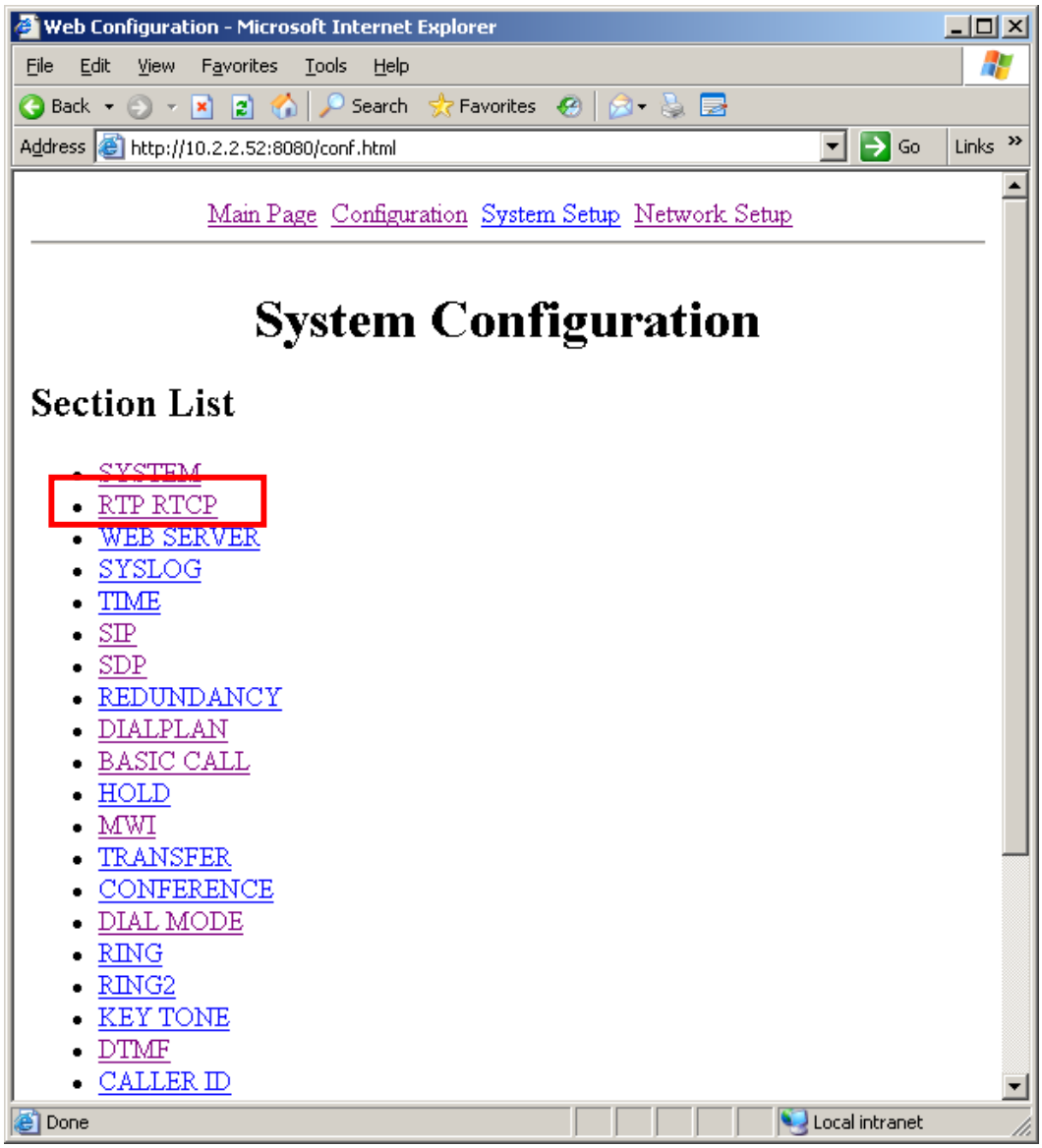
Step	Description
1.	To obtain the IP address information for the Hitachi Cable WirelessIP 5000 telephone, press the **LeftSoft** key to display the **Menu**. Press the key sequence "**5**", "**6**", "**1**"(**Setup→Information→TCP/IP**) to display the TCP/IP information for the Hitachi Cable WirelessIP 5000 telephone. 

©2006 Avaya Inc. All Rights Reserved.

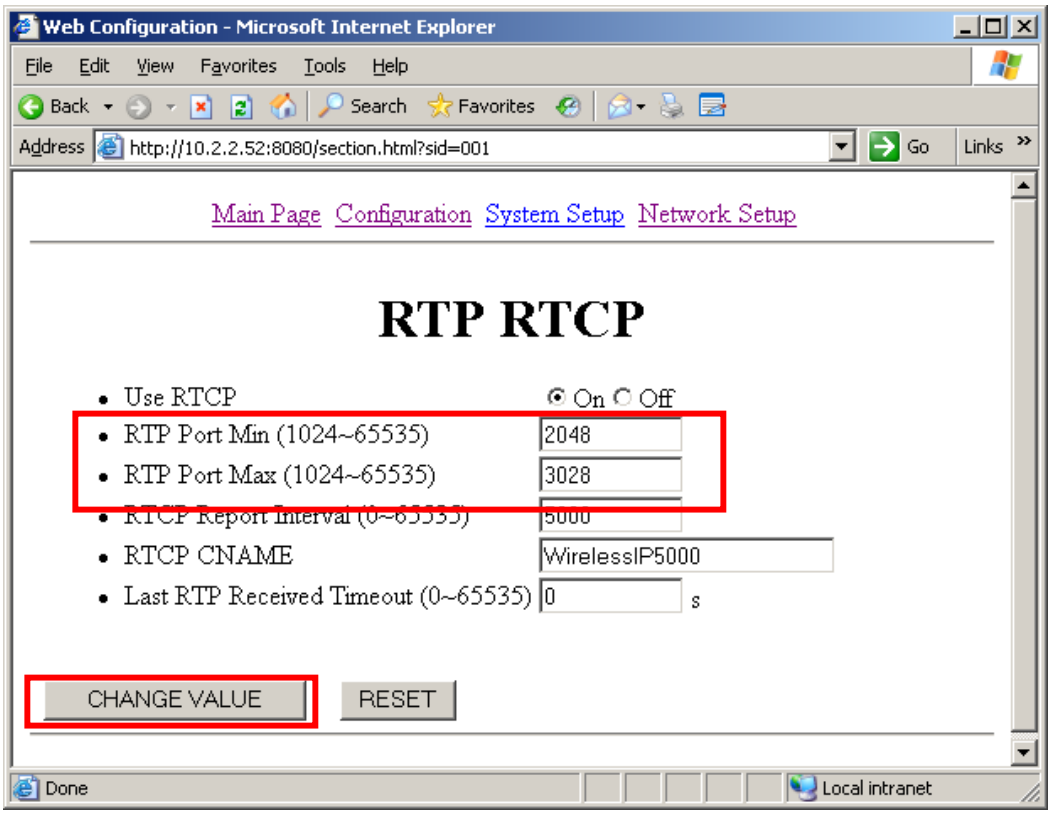
Step	Description
2.	From a Web browser, enter the IP address of the Hitachi Cable WirelessIP 5000 telephone with port 8080 (e.g. http://10.2.2.52:8080). The Hitachi Cable Wireless IP 5000 in the sample configuration has IP address 10.2.2.52. Enter the appropriate **User Name** and **Password** when prompted to log in. The following **WirelessIP 5000 Web Configuration Tool** will appear. Click on **Configuration**. 

©2006 Avaya Inc. All Rights Reserved.

Step	Description
3.	From the **System Configuration** menu screen, click on **RTP RTCP** to change RTP port settings.

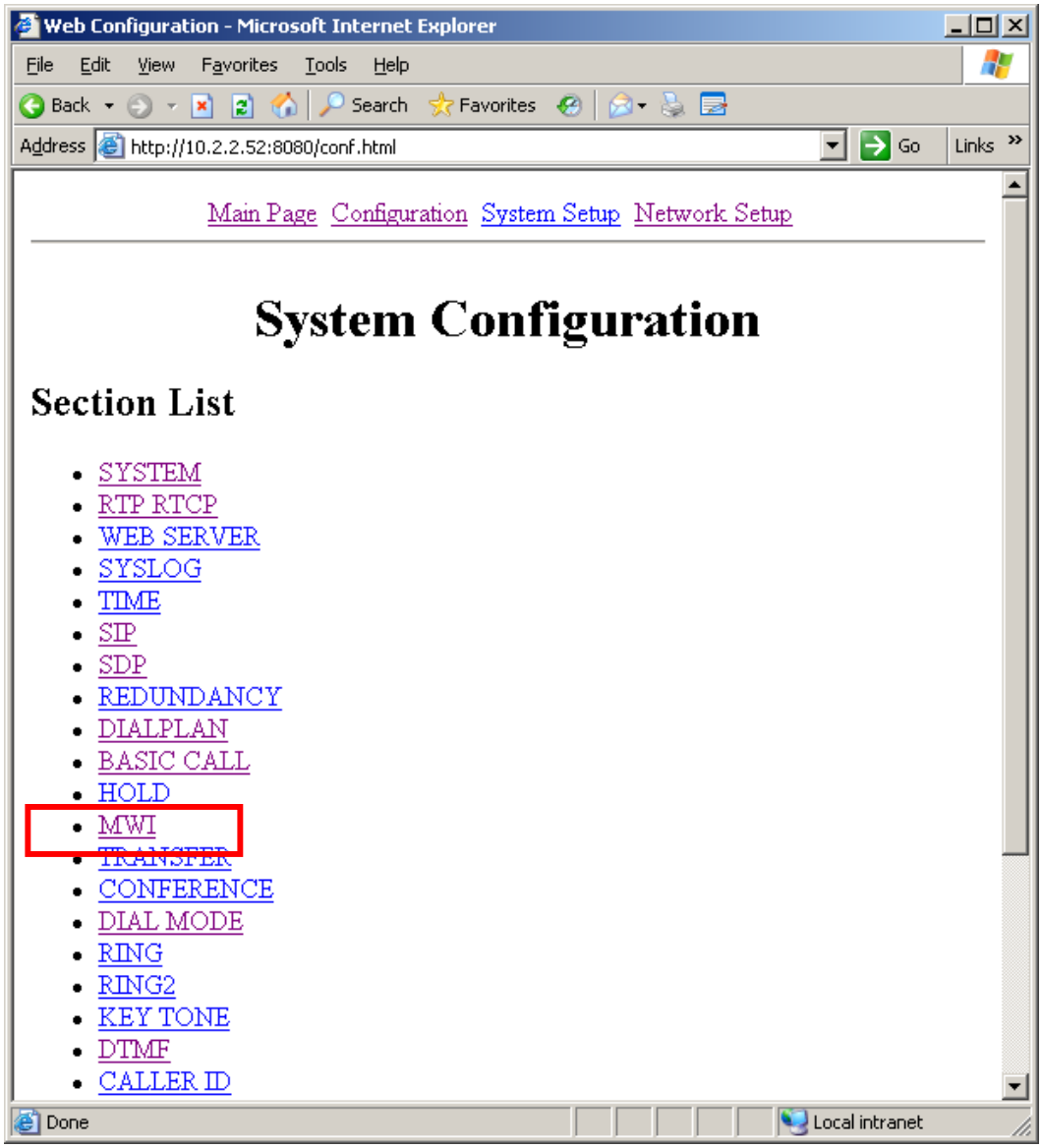


©2006 Avaya Inc. All Rights Reserved.

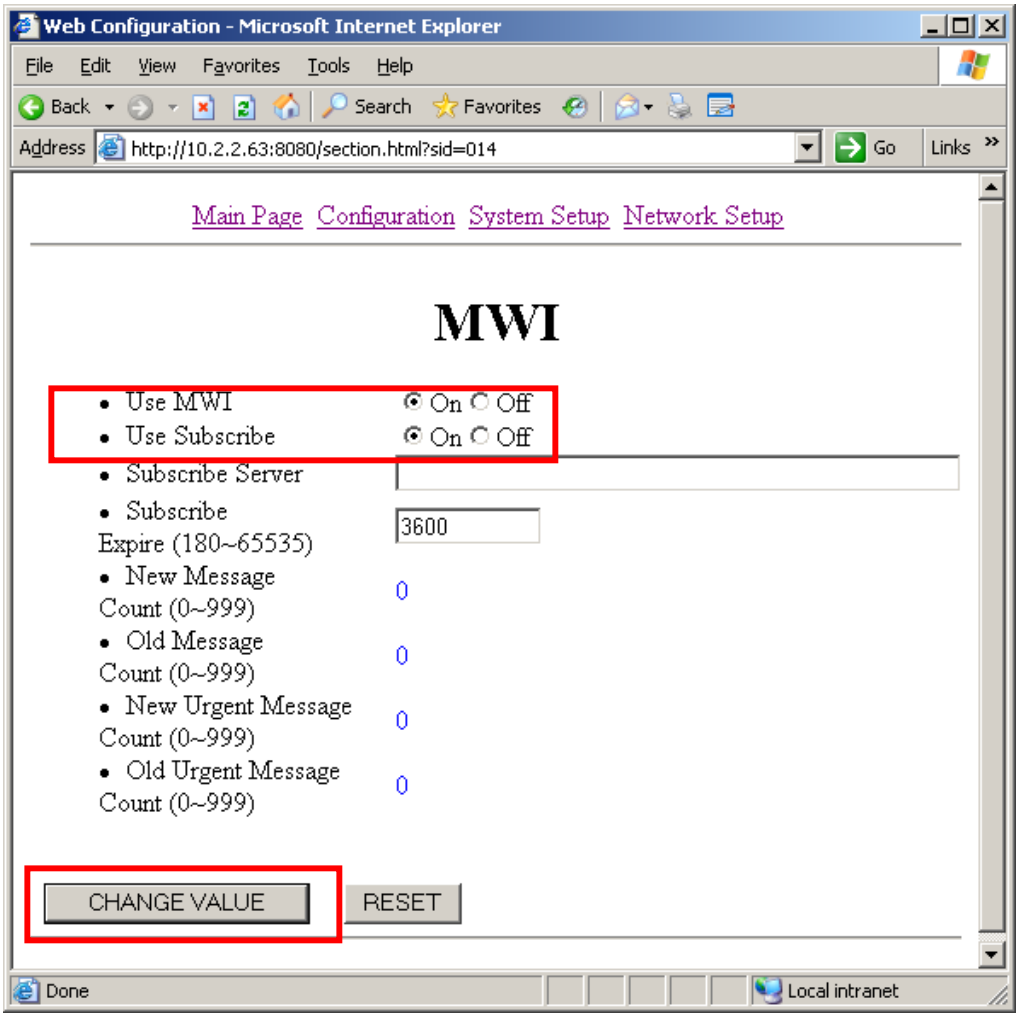
Step	Description
4.	From the **RTP RTCP** configuration screen, change the following to match the **ip-network-region** setting in Avaya Communication Manager in Section 3.3. **RTP Port Min (1024~65535)** ***2048*** **RTP Port Max (1024~65535)** ***3028*** Click on **CHANGE VALUE** to complete. 

©2006 Avaya Inc. All Rights Reserved.

Step	Description
5.	From the **System Configuration** menu screen, click on **MWI.**

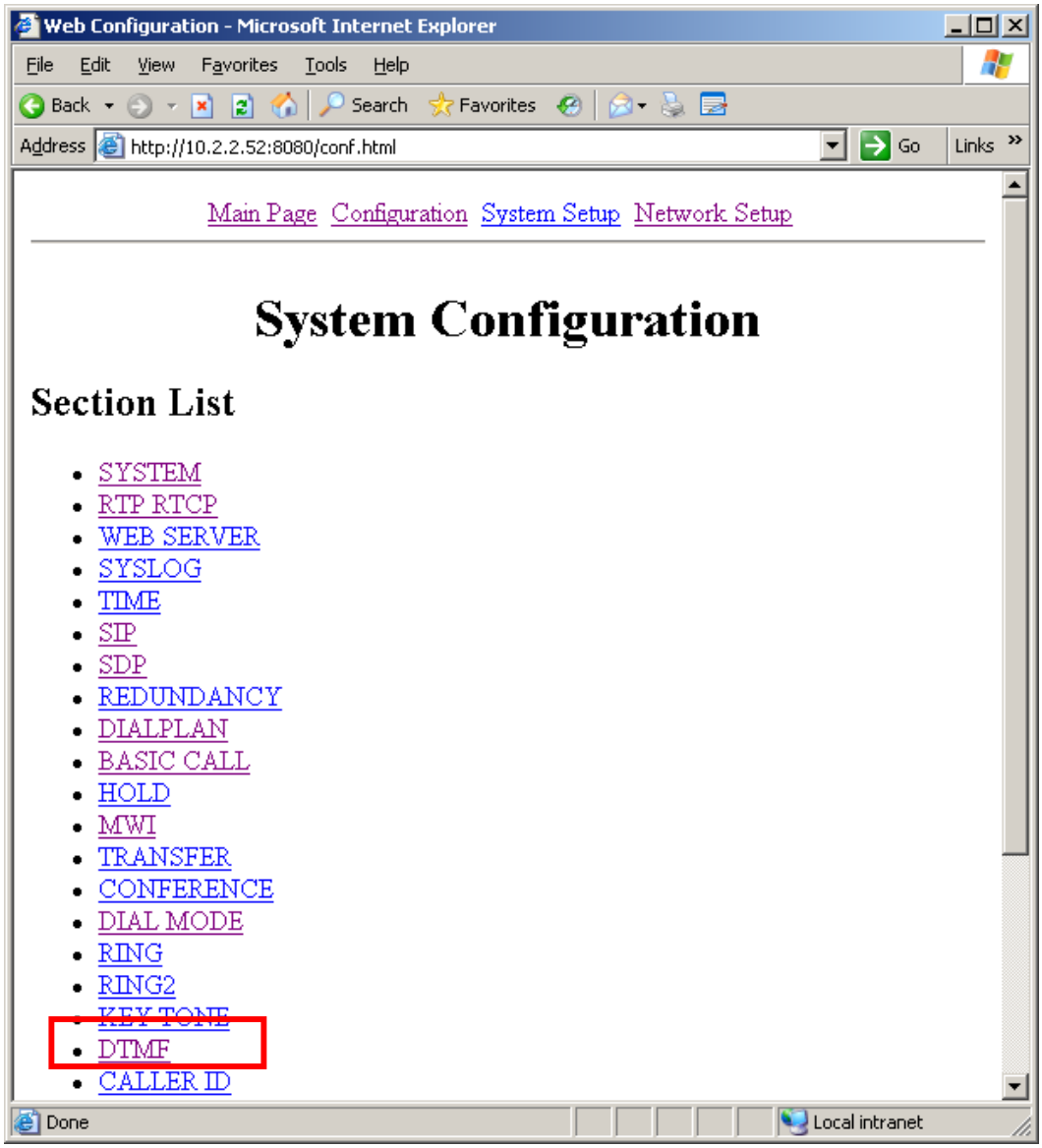


©2006 Avaya Inc. All Rights Reserved.

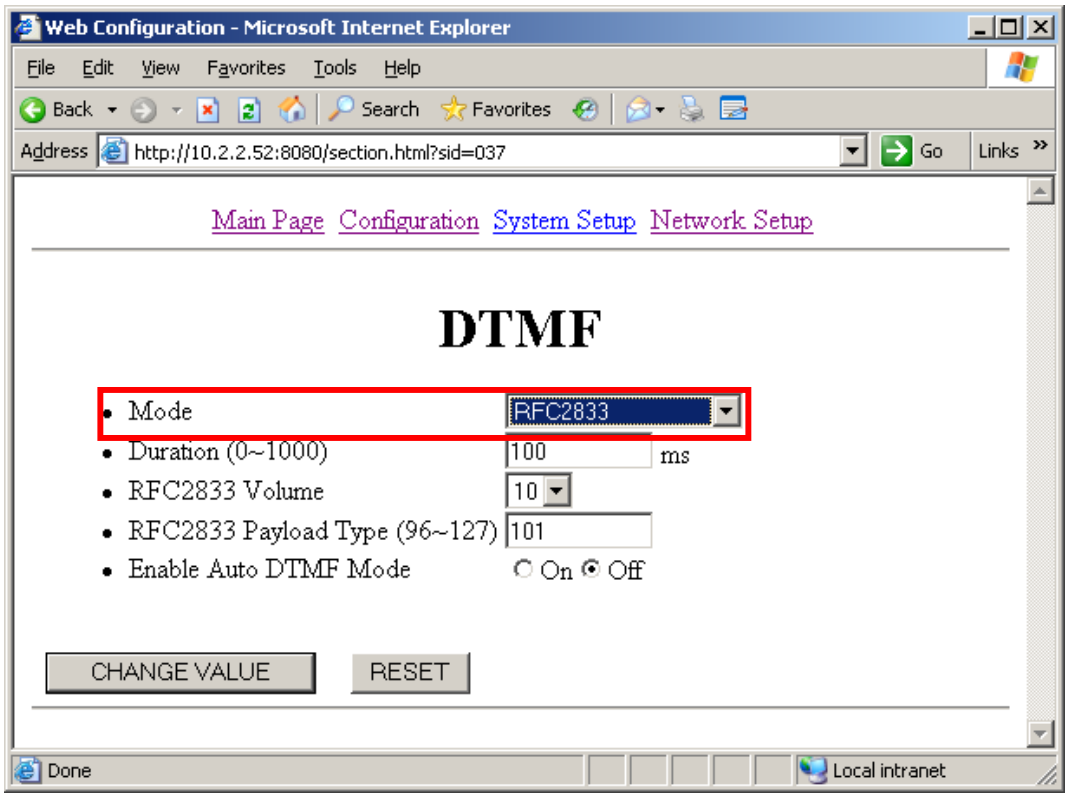
Step	Description
6.	From the **MWI** menu screen, check the **On** radio button for **Use MWI** and **Use Subscribe**. Click **CHANGE VALUE** to complete. 

©2006 Avaya Inc. All Rights Reserved.

Step	Description
7.	From the **System Configuration** menu screen, click on **DTMF.**

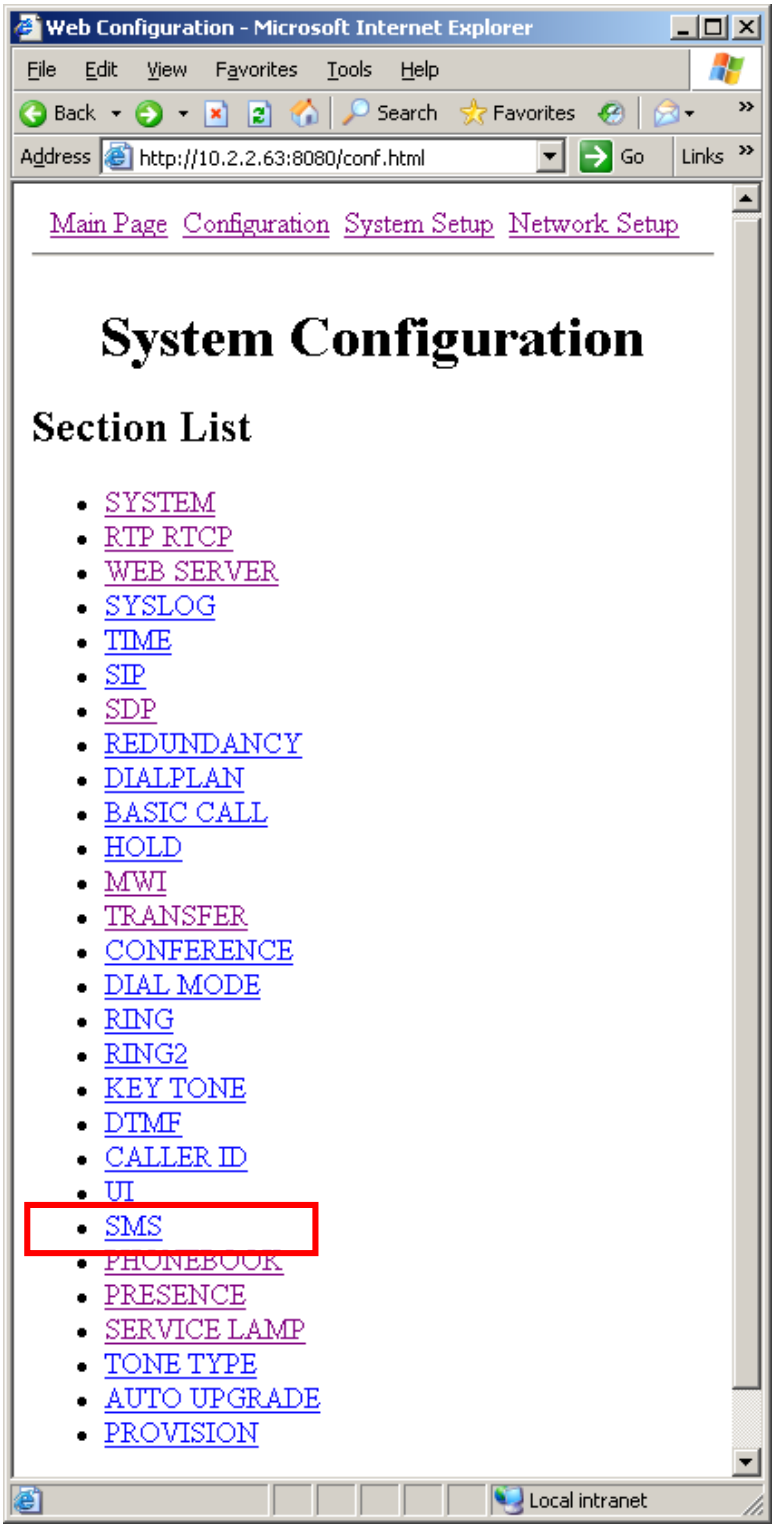


©2006 Avaya Inc. All Rights Reserved.

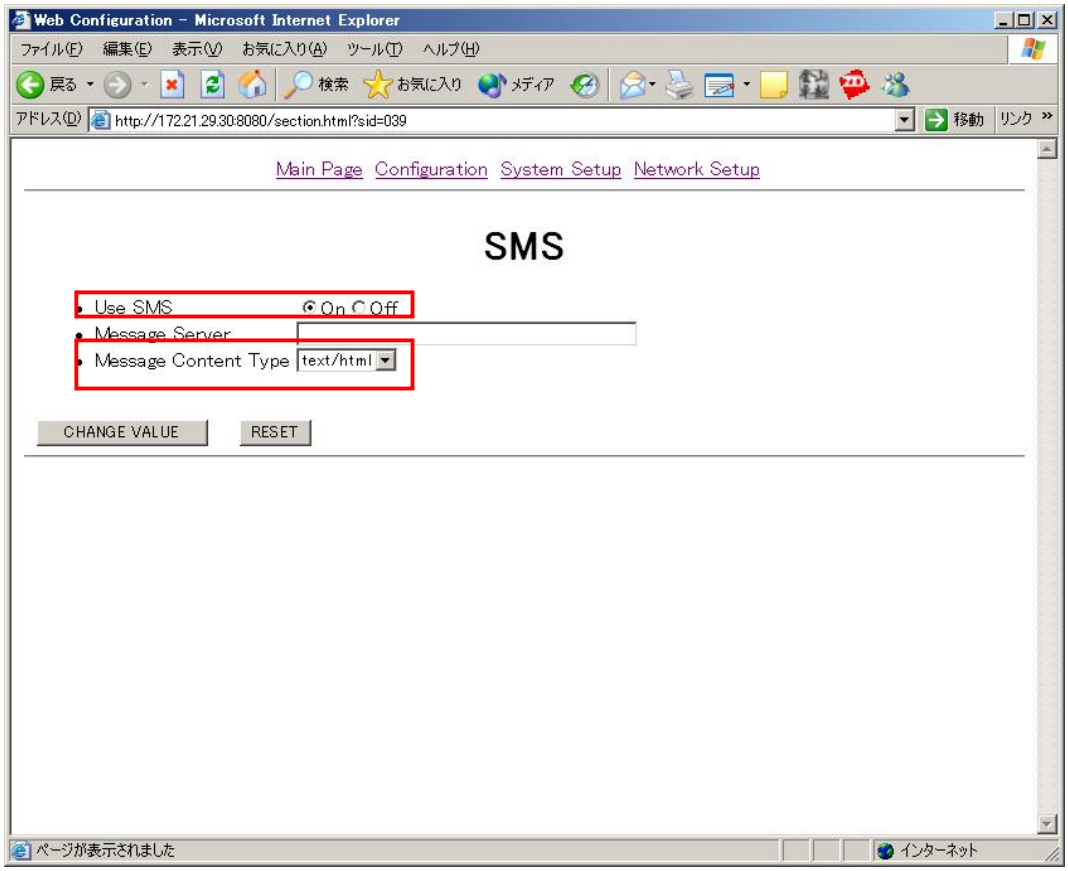
Step	Description
8.	From the **DTMF** menu screen, change the **Mode** to ***RFC2833*** from the drop down box. The default Mode "in-Audio" will prevent calls from Shuffling due to capability mismatch. **Mode** must be set to "***RFC2833***" for calls to be Shuffled. Click **CHANGE VALUE** to complete. 

©2006 Avaya Inc. All Rights Reserved.

Step	Description
9.	From the **System Configuration** menu screen, click on **SMS.**

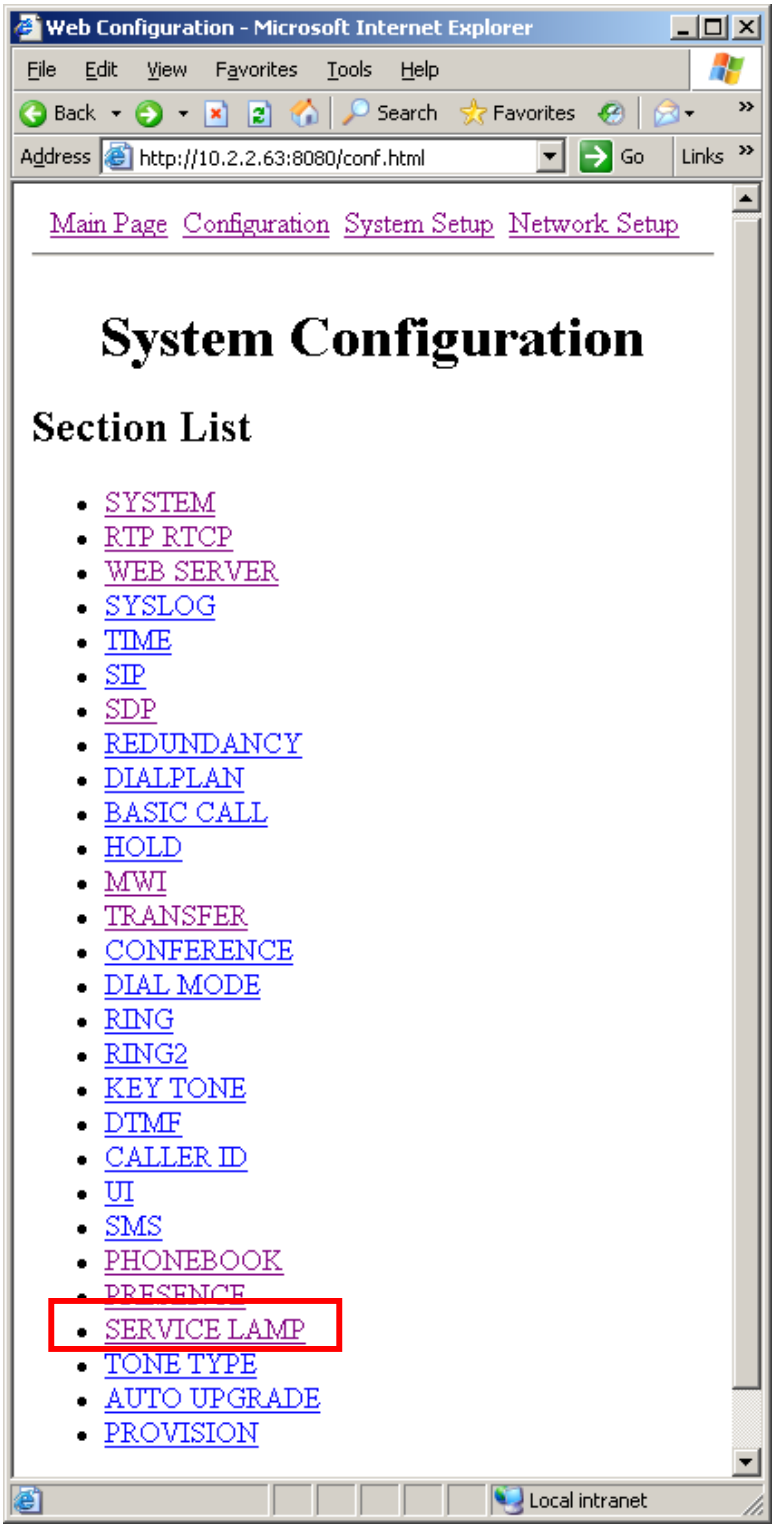


©2006 Avaya Inc. All Rights Reserved.

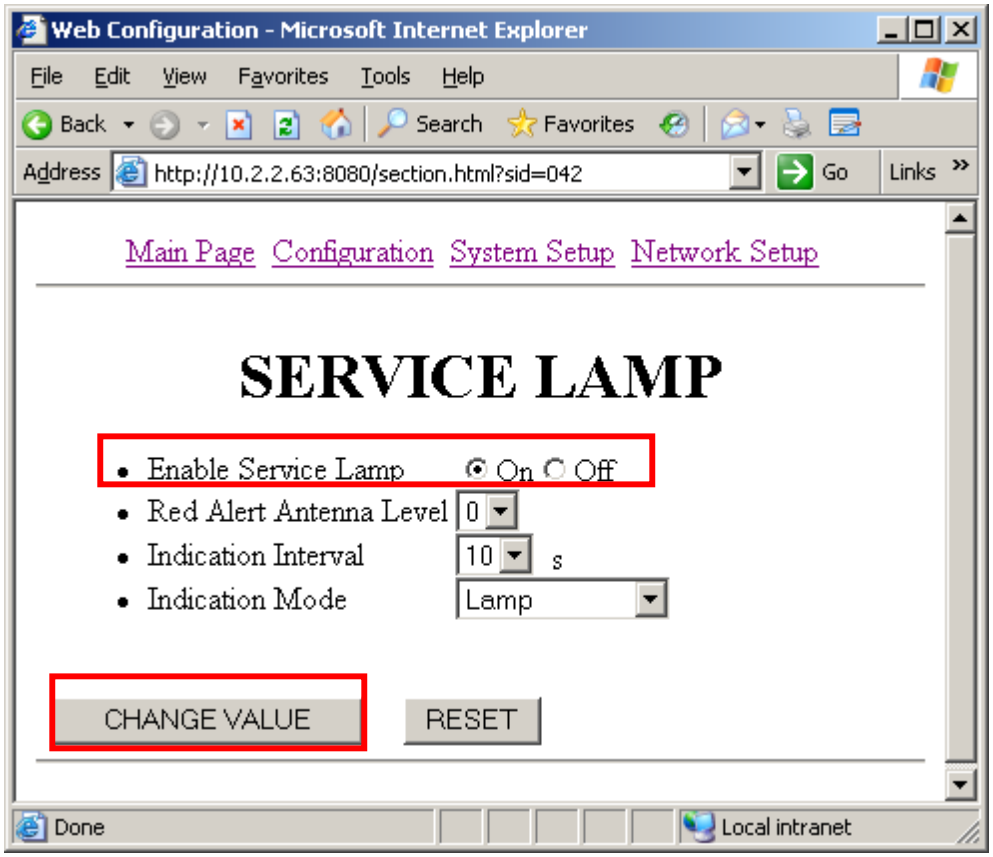
Step	Description
10.	From the **SMS** menu screen, check the **On** radio button for **Use SMS**. From the **Message Content Type** drop down menu, select ***Text/html***. Click **CHANGE VALUE** to complete. 

©2006 Avaya Inc. All Rights Reserved.

Step	Description
11.	From the **System Configuration** menu screen, click on **SERVICE LAMP.**



©2006 Avaya Inc. All Rights Reserved.

Step	Description
12.	From the **SERVICE LAMP** menu screen, check the **On** radio button for **Enable Service Lamp**. Click **CHANGE VALUE** to complete. 
13.	Close the Web browser to exit.

©2006 Avaya Inc. All Rights Reserved.

8. Interoperability Compliance Testing

The interoperability compliance testing focused on assessing the ability of the Hitachi Cable WirelessIP 5000 telephone to register with Avaya SIP Enablement Services and interoperate with Avaya 4600 series SIP telephones, Avaya SIP Softphone and Avaya 4600 series IP telephone.

8.1. General Test Approach

The general test approach was to place and receive calls through the Hitachi Cable WirelessIP 5000 telephones to and from Avaya 4600 series SIP telephone, Avaya SIP Softphone and Avaya 4600 series IP telephone as configured in **Figure 1**.

The main objectives were to verify:

- The WirelessIP 5000 can place and receive call to and from Avaya 4600 series SIP telephones, Avaya SIP Softphone, and Avaya 4600 series IP telephones.
- The WirelessIP 5000 supports both Shuffled[2] and Non-Shuffled calls[3].
- The WirelessIP 5000 can perform basic native features such as hold, and transfer.
- The WirelessIP 5000 supports QoS using DiffServ.
- The WirelessIP 5000 supports G.711, and G.729 codecs.
- The WirelessIP 5000 supports DTMF.
- The WirelessIP 5000 supports Avaya Off-PBX-Telephone Feature-Name-Extensions such as Forward all calls, Redial, Whisper Page.
- The WirelessIP 5000 supports of 802.1x Authentication using EAP/TTLS
- The WirelessIP 5000 can interoperate with Avaya SIP Softphone via Instant Messaging.

8.2. Test Results

The Hitachi Cable WirelessIP 5000 successfully completed the test objective outline above. Layer-3 (DiffServ) configuration was successfully verified for packets sent from Hitachi Cable WirelessIP 5000 telephones through packet capture. DTMF transmission accuracy was verified using Intuity Audix Voice Mail system as well as Meet-me conference. The Hitachi Cable WirelessIP 5000 telephones provided good voice quality through subjective measurement.

9. Verification Steps

The following steps may be used to verify the configuration:

- Place calls with the Hitachi Cable WirelessIP 5000 telephone.
- Log in to the Avaya SIP Enablement Service (SES) server via the Web browser. The registered users field under Users will also show all registered SIP users.

[2] In a Shuffled call, Media is send directly between the two telephones.
[3] In a Non-Shuffled call, Media between the two telephones are send to the Avaya Media Gateway for mixing.

©2006 Avaya Inc. All Rights Reserved.

10. Support

For technical support on the Hitachi Cable WirelessIP 5000 product, contact Hitachi Cable America at 1-914-993-0990, and also refer to www.wirelessip5000.com/eng/index.html.

11. Conclusion

These Application Notes describe the administration steps required to configure the Hitachi Cable WirelessIP 5000 telephone on Avaya SIP Enablement Services (SES) and Avaya Communication Manager in a Meru Networks wireless network.

12. Additional References

[1] *Administrator Guide for Avaya Communication Manager*, Doc # 03-300509, Issue 2, February 2006

[2] *Avaya Communication Manager Advanced Administration Quick Reference*, Doc # 03-300364, Issue 2, June 2005 Release 3.0

[3] *Avaya IA 770 INTUITY AUDIX Messaging Application,* Doc # 11-300532, May 2005

[4] *Converged Communications Server Installation and Administration*, Doc # 555-245-705, February, 2004

[5] *Avaya Extension to Cellular and Off-PBX Station (OPS) Installation and Administration Guide Release 3.0*, Doc # 210-100-500, Issue 9, June 2005

[6] *Configuring SIP IP Telephony Using Avaya SIP Enablement Services, Avaya Communication Manager, and CounterPath eyebeam SIP Softphone,* Issue 1.0,Jan 10,2006

[7] *WirelessIP 5000 User's Manual,* TD-2893

[8] *WirelessIP 5000 Administrator Manual*, *TD61-2895*

Product documentation for Avaya products may be found at
http://support.avaya.com

Product documentation for Hitachi Cable WirelessIP 5000 products may be found at http://www.wirelessip5000.com/eng/index.html and detailed documentation such as user manuals, adminstrators manuals, etc, can be obtained directly by contacting Hitachi Cable America, at 1-914-993-0990 or any authorized distributors and resellers.

©2006 Avaya Inc. All Rights Reserved.

©2006 Avaya Inc. All Rights Reserved.
Avaya and the Avaya Logo are trademarks of Avaya Inc. All trademarks identified by ® and ™ are registered trademarks or trademarks, respectively, of Avaya Inc. All other trademarks are the property of their respective owners. The information provided in these Application Notes is subject to change without notice. The configurations, technical data, and recommendations provided in these Application Notes are believed to be accurate and dependable, but are presented without express or implied warranty. Users are responsible for their application of any products specified in these Application Notes.

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.