Avaya Solution & Interoperability Test Lab

Application Note for Configuring the Ascom Wireless IP-DECT SIP Solution with Avaya Distributed Office - Issue 1.0

Abstract

These Application Notes describe a solution for supporting wireless interoperability between the Ascom wireless IP-DECT SIP Solution with Avaya Distributed Office. Emphasis of the testing was placed on verifying good voice quality on calls from and to Ascom wireless IP-DECT SIP handsets registered to the Avaya telephony infrastructure.

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 detail the steps for creating a SIP VoIP-enabled wireless network using Digital Enhanced Cordless Telecommunications (DECT) with connectivity that enables interoperability between the Ascom wireless IP-DECT SIP Solution with Avaya Distributed Office. The specific calling features that were verified to operate correctly include transfer (attended and unattended), hold/return from hold, multiple call appearances, caller ID operation, call forwarding (unconditional, on busy/no answer and clear), pickup groups, call pickup, bridged appearances, and voicemail Message Waiting Indicator (MWI).

1.1. Ascom IP DECT Base Station

The Ascom IP-DECT system is a modular solution for large and small deployments with full handover capabilities with one PBX. The Ascom IP-DECT Base Station works as a conduit between the Avaya Distributed Office and the Ascom IP-DECT wireless handsets.

After the Ascom IP-DECT wireless handsets register with the Ascom IP-DECT Base Station, the Base station registers the handsets to the Avaya Distributed Office.

1.2. Network Diagram

The network diagram shown in **Figure 1** illustrates the testing environment used for compliance testing. The network consists of an Avaya Distributed Office, one Avaya 9630 one-X Deskphone Edition IP Telephone, one Avaya 9620 one-X Deskphone Edition IP Telephone, one Avaya 2420 Digital Telephone one Ascom wireless IP-DECT Base Station, one Ascom wireless 9d24, one Ascom wireless OfficeT DECT Handset and one OfficeM DECT Handset. One computer is present in the network providing network services such as DHCP, TFTP, HTTP and RADIUS.

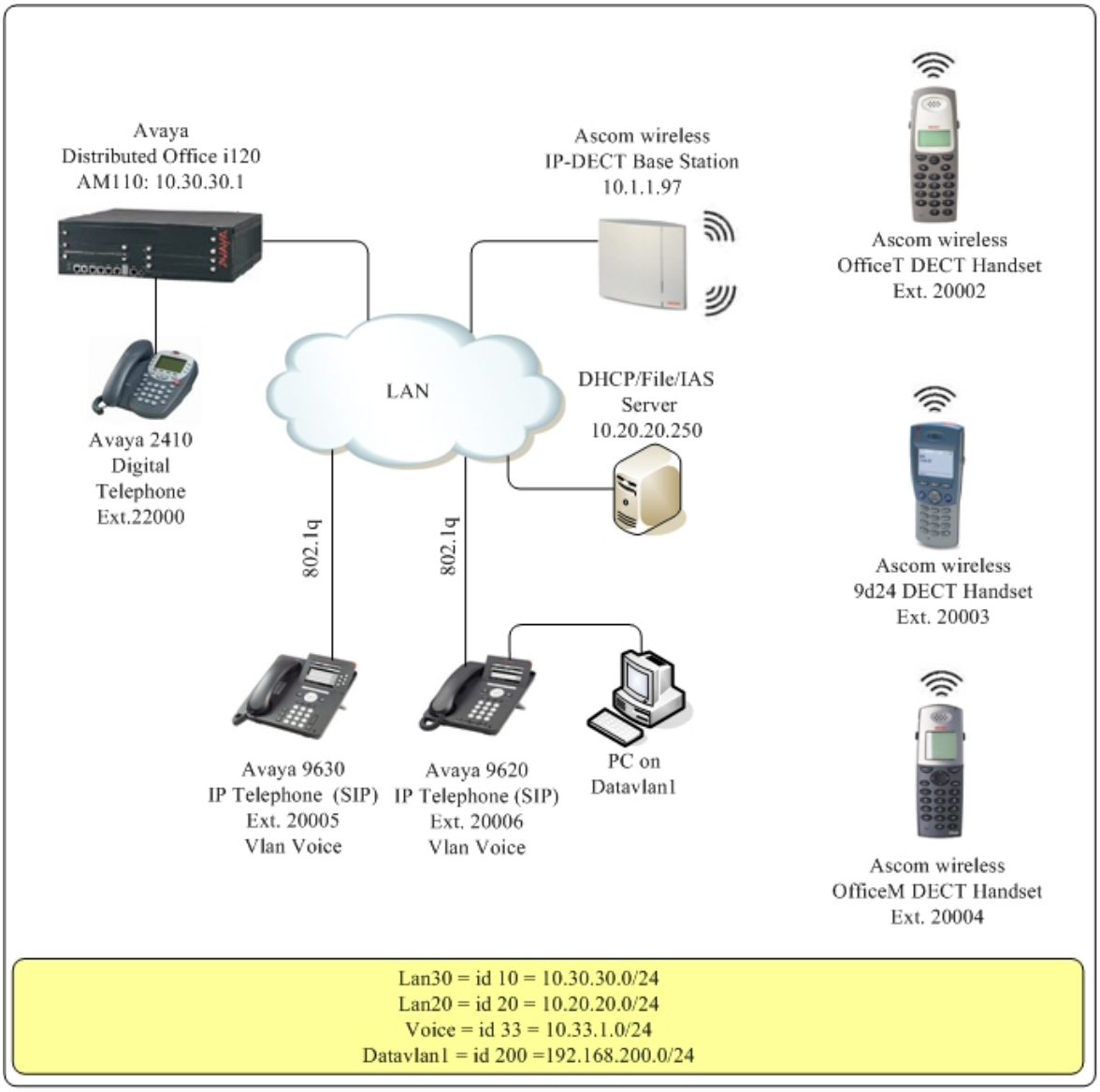


Figure 1: Sample Network Diagram

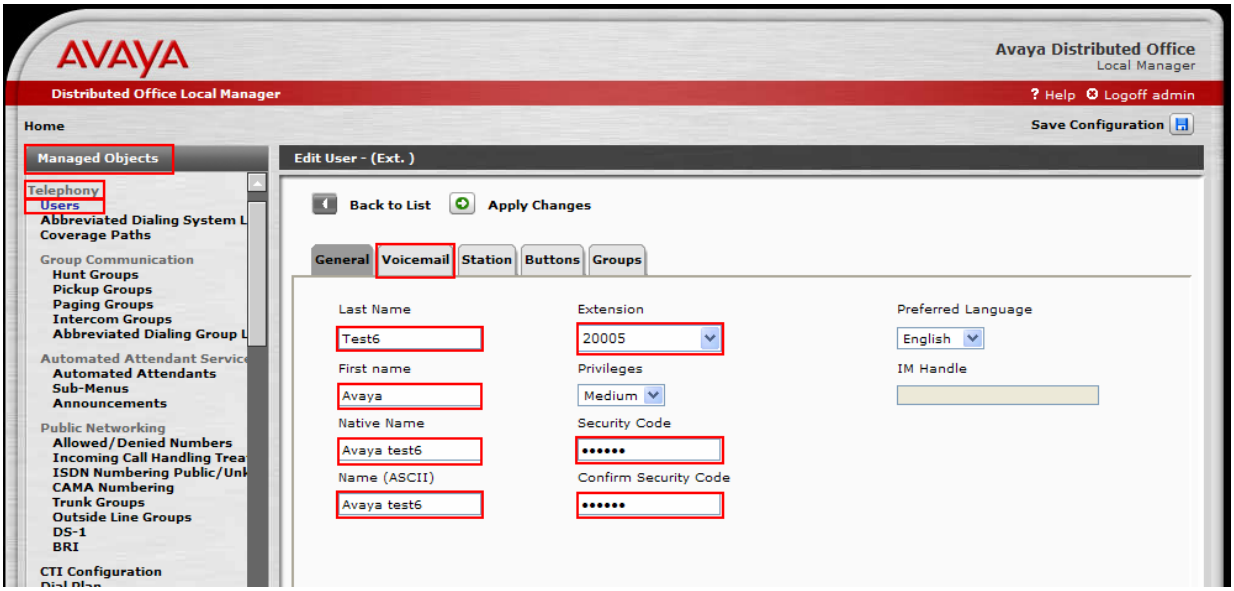
2. Equipment and Software Validated

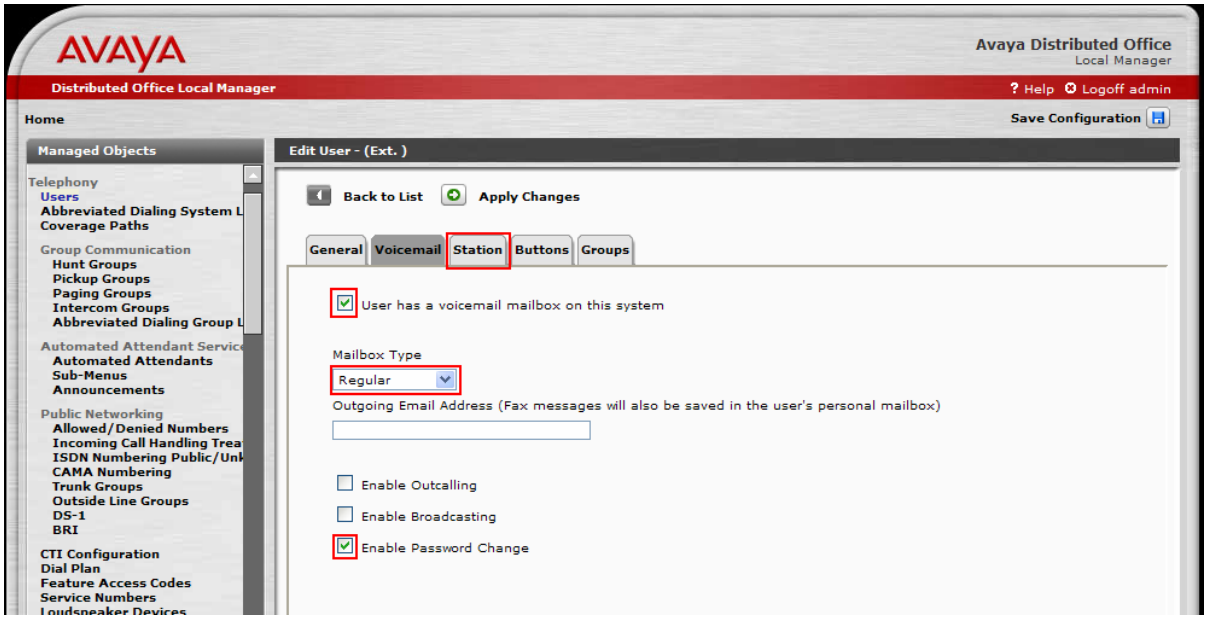
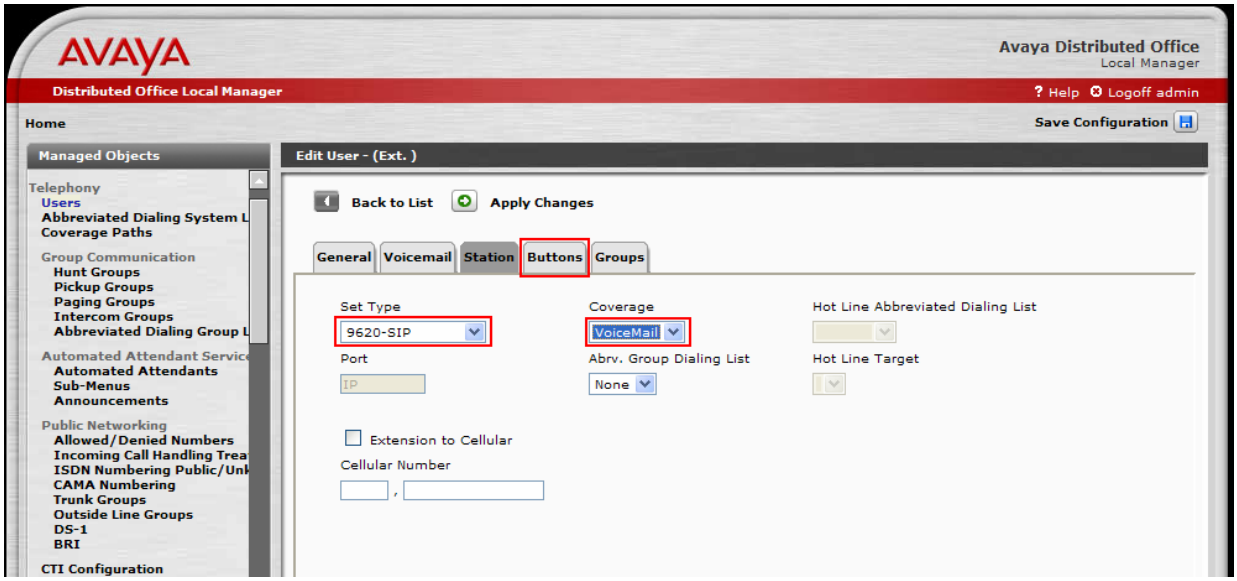
The following equipment and software were used for the sample configuration provided:

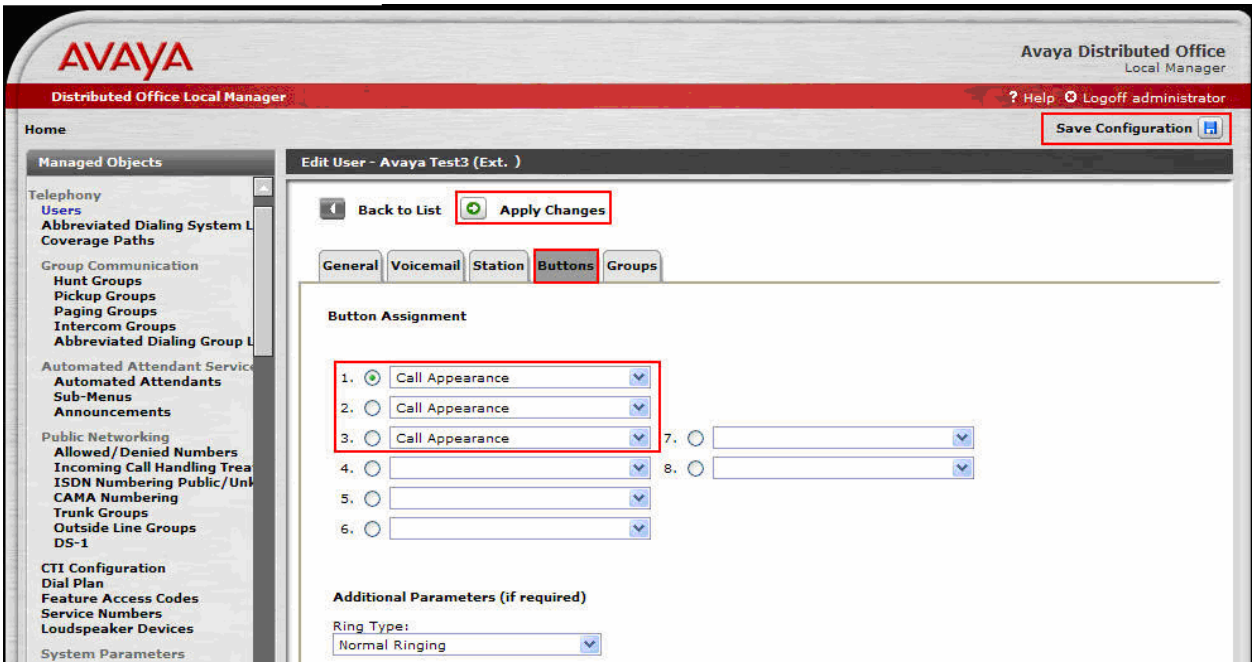
Equipment	Software
Avaya Distributed Office i120 Avaya Distributed Office AM110	27.17.1 1.1.1_41.03
Avaya 2420 Digital Telephone	5.0
Avaya 9600 Series IP Telephones	Avaya one-X Deskphone SIP 2.0.3 (SIP)
Ascom wireless IP-DECT Base Station	2.1.5 (SIP)
Ascom wireless 9d24 DECT Handset	3.26
Ascom wireless OfficeT DECT Handset	1.08
Ascom wireless OfficeM DECT Handset	1.08

3. Avaya Distributed Office Configuration

Avaya Distributed Office is administered via a web interface. In the sample network the Avaya Distributed Office was assigned the IP address 10.30.30.1 and the URL http://10.30.30.1 was used to access the administration interface. For information on how to access and setup a factory default system, refer to **Section 10** [**1**].

Step	Description
1.	Navigate to the **Edit User** frame by clicking **Managed Object→Telephony→Users**. Enter the values displayed below and then click **Apply Changes**. **Last Name**, **First name** and **Native Name** can be any descriptive text that identifies this user. **Name (ASCII)** may be populated with the same information that is entered in **Native Name**. **Security Code** and **Confirm Security code** are numeric codes that must match. Use the drop-down list for **Extension** and select any available extension. The remaining parameters were left to default values. Click the **Voicemail** tab to continue. 

Step	Description
2.	Navigate to the **Voicemail** tab by clicking **Voicemail**. Check the **User has a voice mailbox on this system** and **Enable Password Change** check boxes. Use the drop-down list for **Mailbox Type** to select "**Regular**". Click the **Station** tab to continue. 
3.	Navigate to the **Station** tab by clicking **Station**. Use the drop-down list for **Set Type** to select "**9620-SIP**". This release of Avaya Distributed Office has no specific **Set Type** for the Avaya 3631 Wireless Telephone. Therefore, the "**9620-SIP**" **Set Type** was used. Use the drop-down list for **Coverage** to select "**VoiceMail**". The remaining parameters were left to default values. Click the **Buttons** tab to continue. 

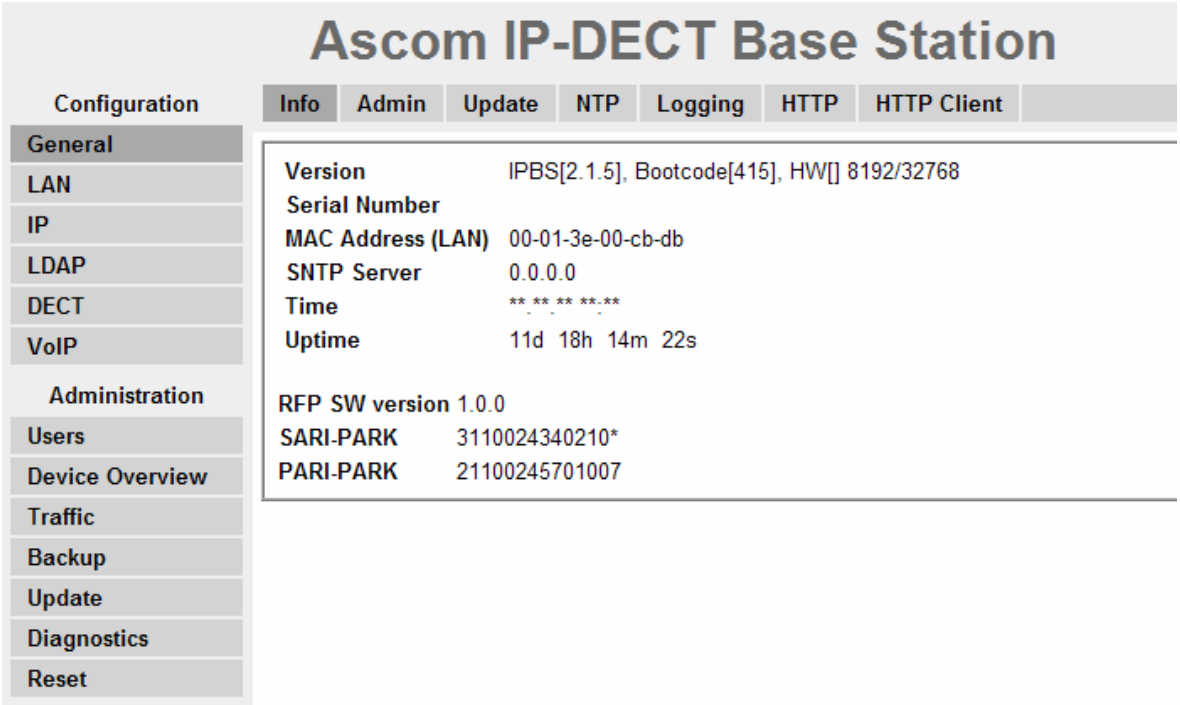
Step	Description
4.	Navigate to the **Buttons** tab by clicking **Buttons**. Use the drop list for **Button Assignment 1 – 3** and select "Call Appearance". The remaining parameters were left to default values. Click **Apply Changes** and then click **Save Configuration**. Note the user may receive a message indicating the system is busy if **Save Configuration** is clicked immediately after **Apply Changes**. If that occurs, simply click **Save Configuration** after one or two minutes. Repeat this process for each Avaya 3631 Wireless Telephone. Click **Apply Changes**. 

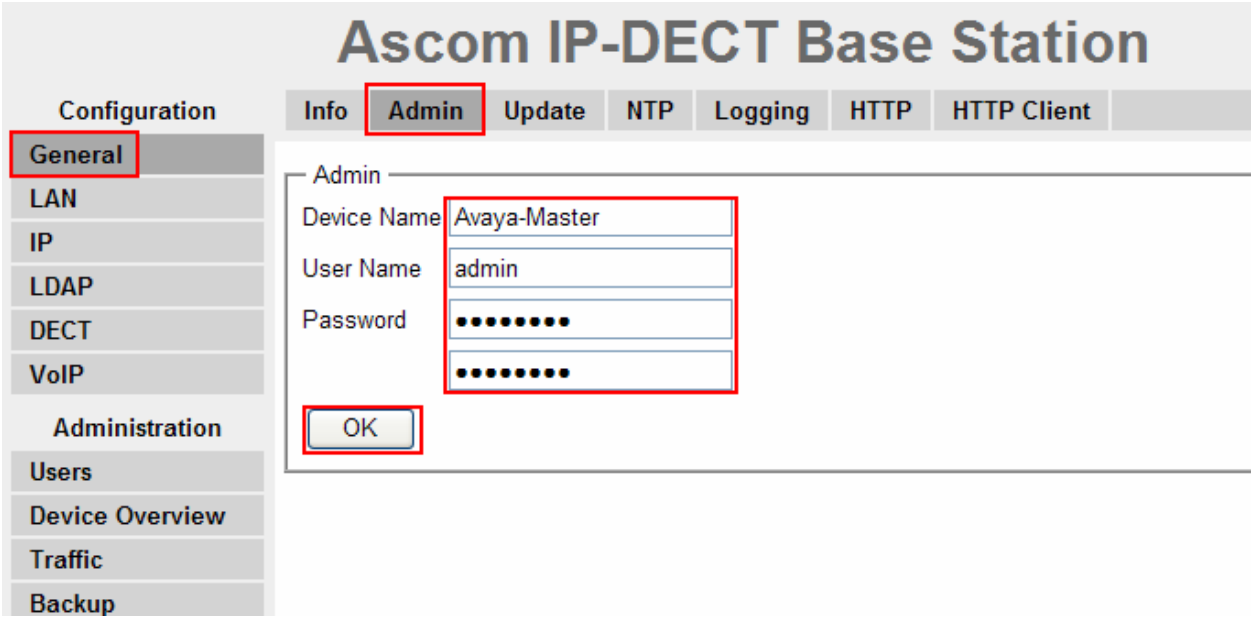
4. Ascom Wireless IP-DECT SIP Solution Configuration

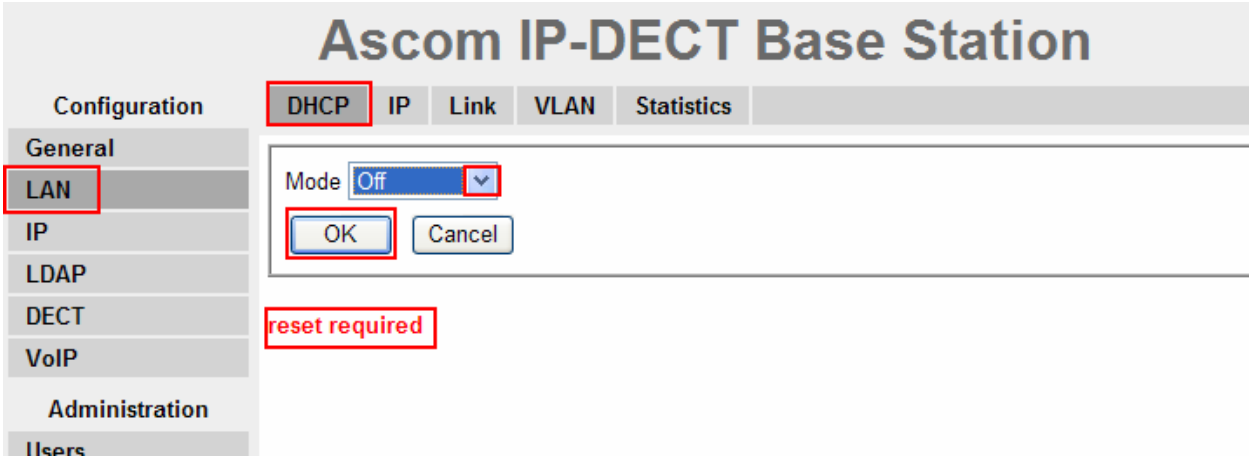
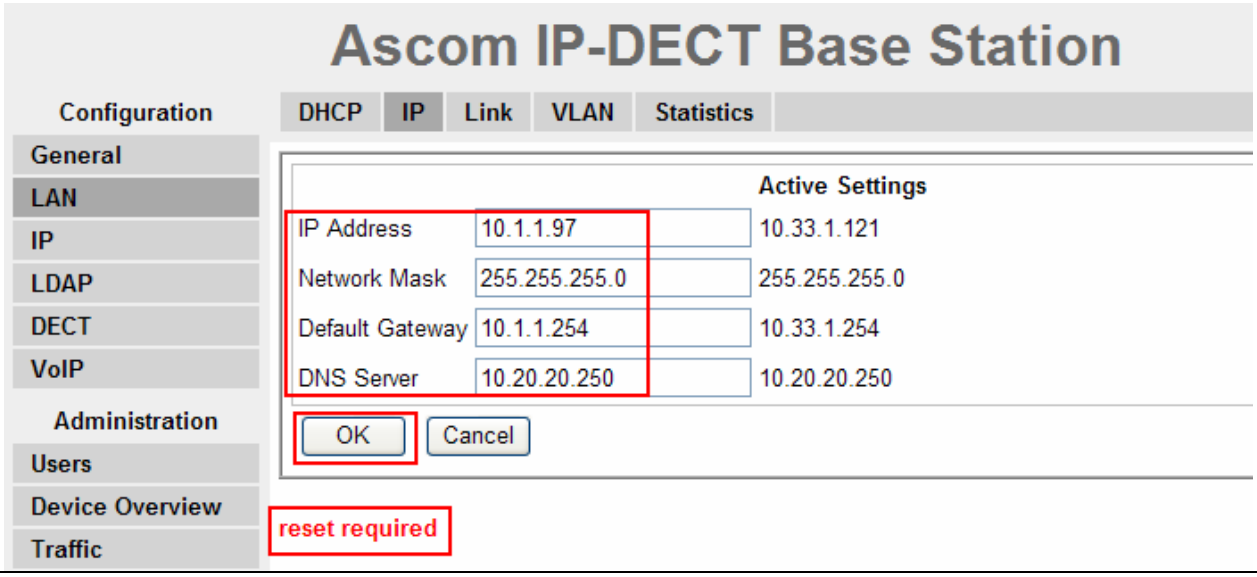
The following steps detail the initial configuration for the Ascom wireless IP-DECT SIP Solution. In the sample network the DHCP server was configured to register DHCP client information to a DNS server. This allows the Ascom wireless IP-DECT Base Station to be reachable via a DNS name using the following format: http://IPBS-XX-XX-XX, where XX-XX-XX are the last 3 bytes of the MAC address of the Ascom wireless IP-DECT Base Station. For example, an Ascom wireless IP-DECT Base Station with a MAC address of 00-01-3E-00-CB-DB could be accessed using http://IPBS-00-CB-DB or via the IP address assigned by DHCP.

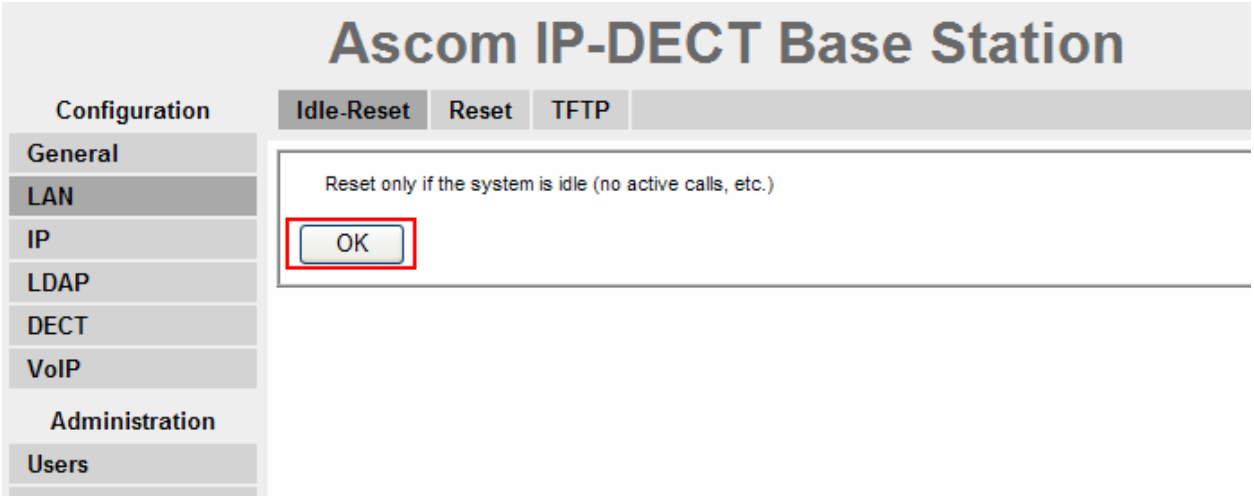
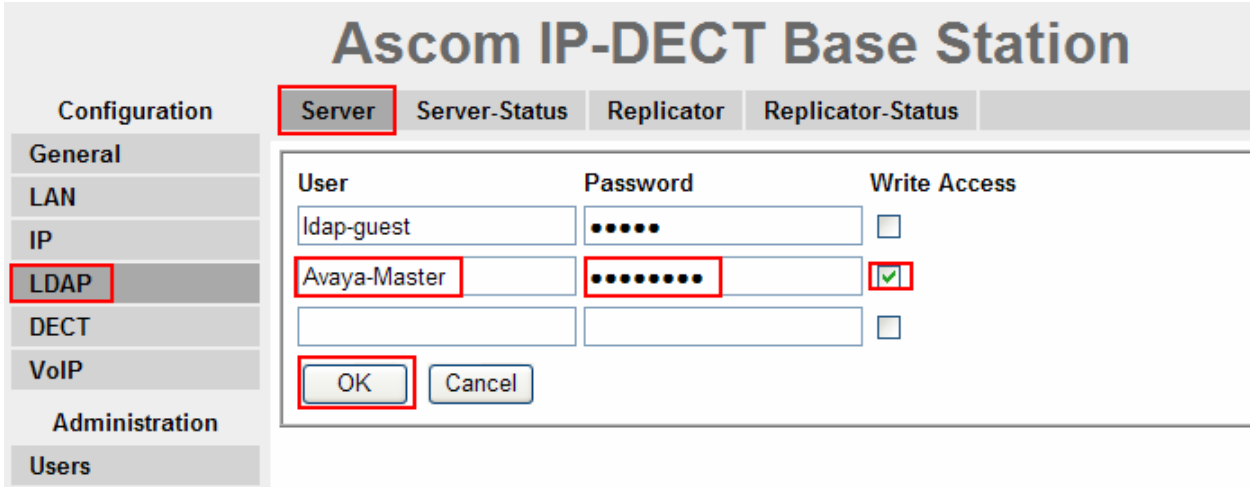
4.1. Configure IP-DECT Base Station

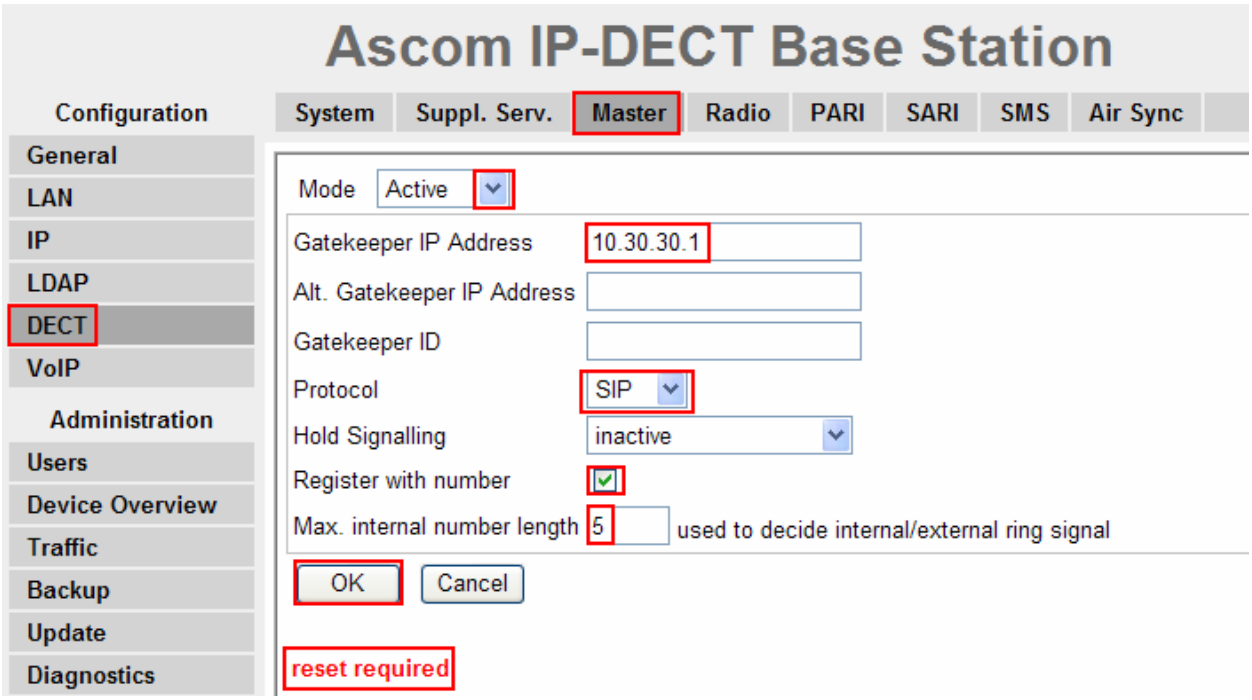
The Ascom wireless IP-DECT Base Stations can be configured in a Master/Standby Master scenario to provide redundancy or to extend the radius of coverage. The following configuration steps detail the configuration process used to configure an Ascom wireless IP-DECT Base Station in Master mode only.

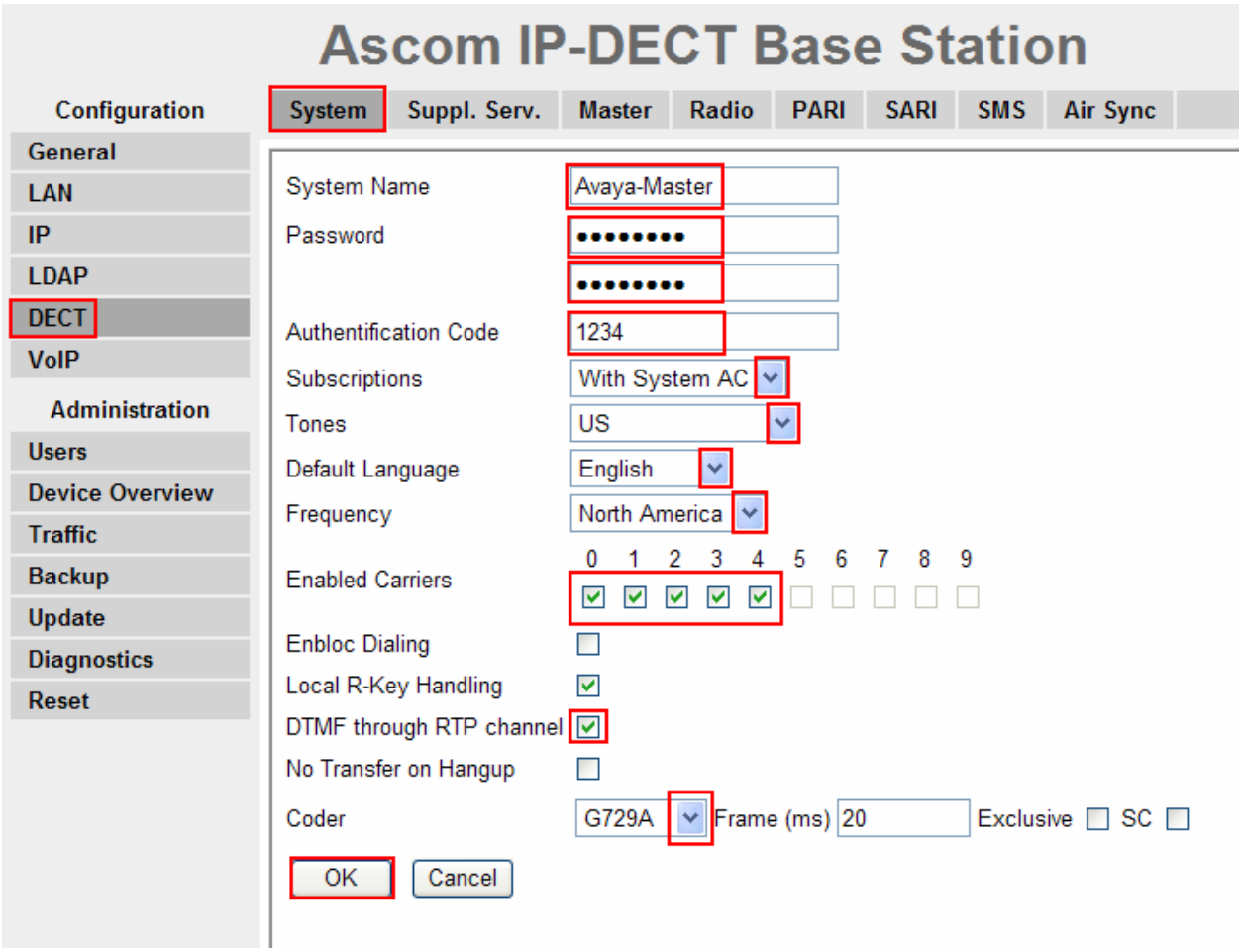
Step	Description
1.	Launch a web browser and place either the IP address or the DNS name of the Ascom wireless IP-DECT Base Station into the URL field. The user will be presented with a login screen. Refer to **Section 10** [**3**] for appropriate credentials needed to access the Ascom wireless IP-DECT Base Station. Enter the appropriate login information and then click **OK**. 
2.	The user is presented with the **General Info** frame where the system information for the Ascom wireless IP-DECT Base Station is displayed. 

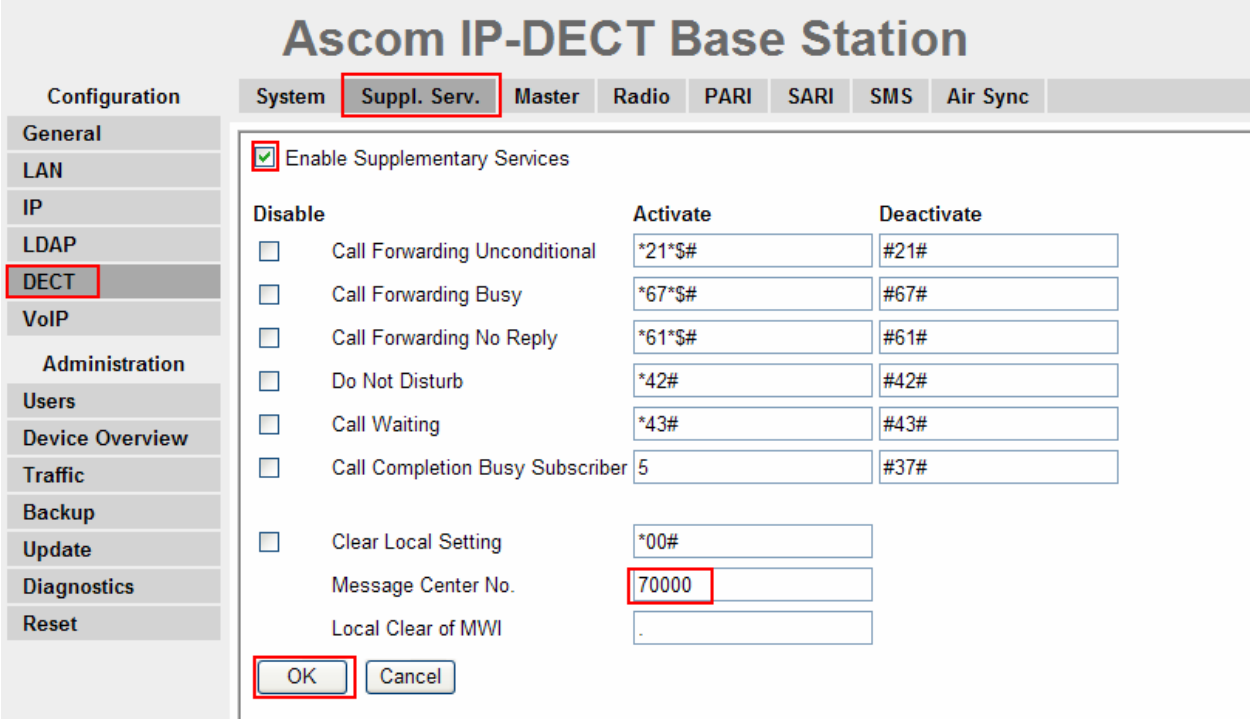
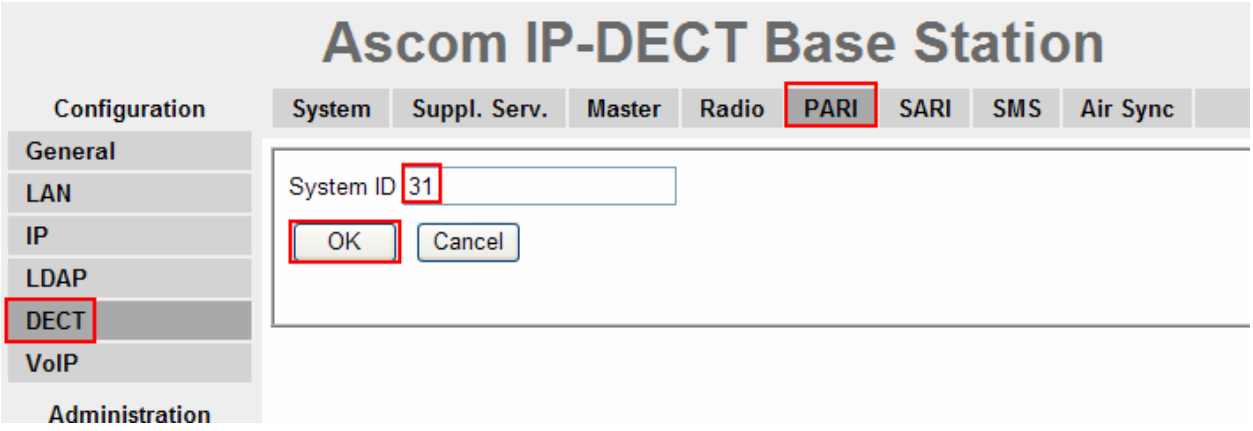
Step	Description
3.	To navigate the web interface on the Ascom wireless IP-DECT Base Station the user will navigate through a series of frames which lead to forms and web pages for configuration or to display information. The user flow is a two-click process where a category and then an option are clicked. Categories are found below **Configuration**, which is displayed in the top left portion of the frame, and options are found to the right. Navigate to the **General Admin** frame by clicking **General** and then clicking **Admin**. Configure the fields displayed below and then click **OK**. The **Device Name** can be any descriptive name that identifies this Ascom wireless IP-DECT Base Station. In the sample network the name "Avaya-Master" was chosen. The **User Name** and **Password** fields were populated using the default credentials. The box below **Password** is used to confirm the password and the value entered for the **Password** field must be entered here. Click **OK** to continue. 

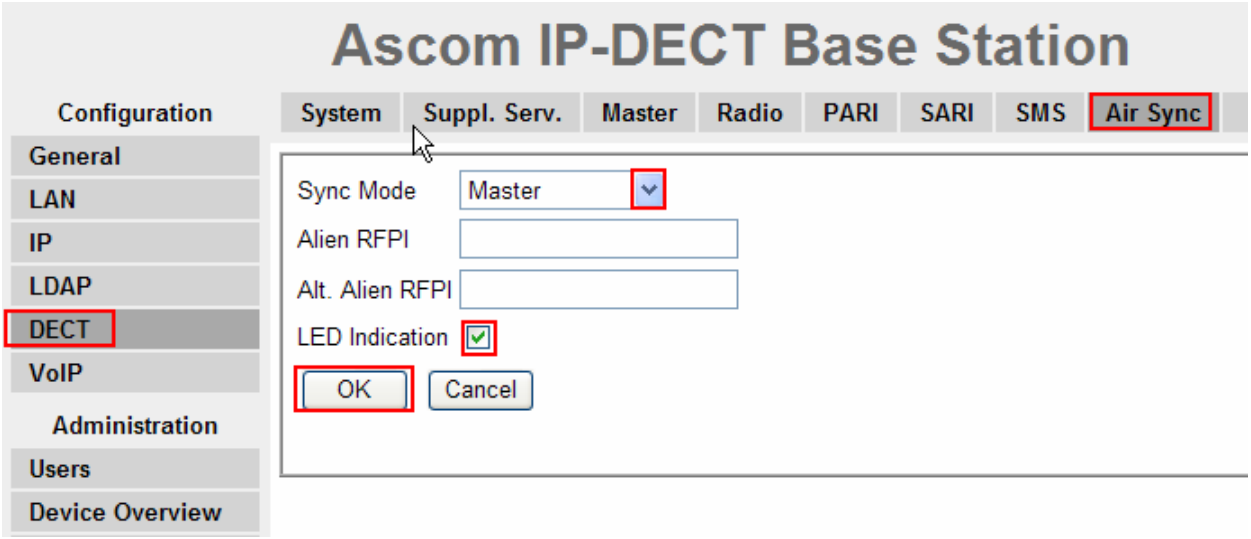
Step	Description
4.	Navigate to the **LAN DHCP** frame by first clicking **LAN** and then clicking **DHCP**. Using the drop-down list, set **Mode** to "Off" and then click **OK**. This will present the user with the clickable red text which reads "reset required". Click **IP** tab to continue**.** 
5.	Navigate to the **LAN IP** frame by first clicking **LAN** and then clicking **IP.** Set your static **IP Address, Network Mask**, **Default Gateway, DNS Server** and click **OK.** Click **reset required** to continue. 

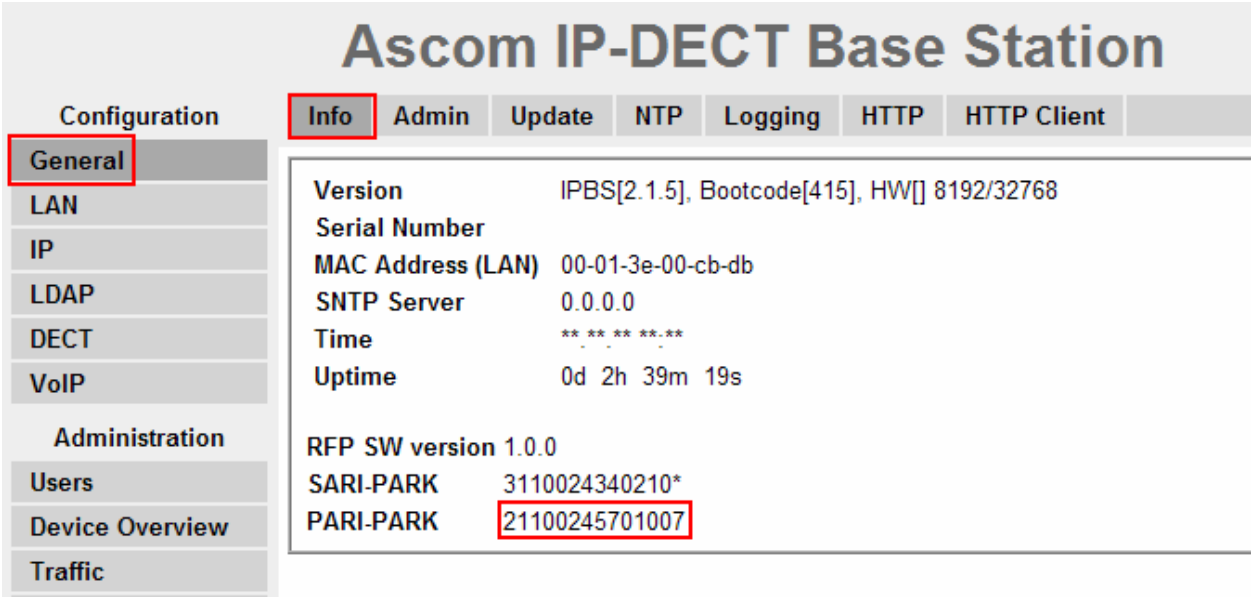
Step	Description
6.	The user is presented with the reset confirmation dialogue. Click **OK** to initiate the system reset. Many of the other changes made to the system during the configuration process require a reboot. **Repeat this process whenever a reset is required**. 
7.	After the Ascom wireless IP-DECT Base Station (**Avaya-Master**) has rebooted, navigate to the **LDAP Server** frame by clicking **LDAP** and then clicking **Server**. The "ldap-guest" account is a default system account. Configure **User** using the **Device Name** used in **Step 3**. Configure the **Password** field with the **Password** used in **Step 3.** Check the **Write Access** check box for the "**Avaya-Master**" user account and then click **OK** to continue. 

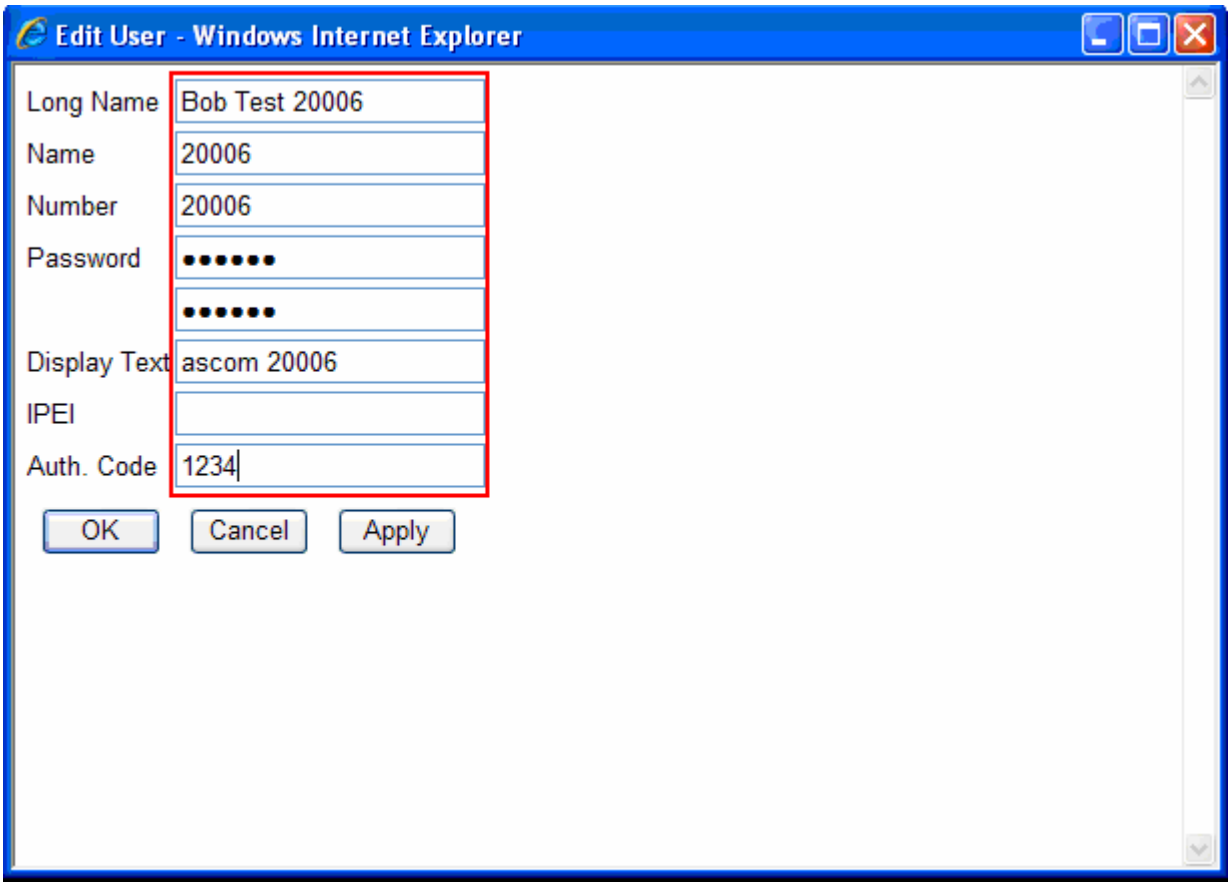
Step	Description
8.	Navigate to the **DECT Master** frame by clicking **DECT** and then clicking **Master**. Configure the fields displayed below and then click **OK**. Use the drop-down list for **Mode** and select "**Active**". **Gatekeeper IP Address** was set to the IP address of the Avaya Distributed Office (see **Figure 1**). Use the drop-down list for **Protocol** and select "**SIP**", select **Register with number** box. In the sample network, five digit extensions were used and **Max. internal number length** was set to "**5**", click **OK.** Click **reset required** to continue. 

Step	Description
9.	Navigate to the **DECT System** frame by clicking **DECT** and then clicking **System**. Configure the fields displayed below and then click **OK**. **System Name** is the **Device Name** used in **Step 3**. **Password** is the "**Password"** used in **Step 3**. The box below **Password** is to confirm the password and the value configured for the **Password** field must be entered here. The **Authentication Code** is a numerical code that every DECT handset will need to use to subscribe to this system. Using the drop-down list, **Subscriptions** can be set to "With User AC", "With System AC", or "Disable". In the sample configuration "With System AC" was used. This enables the system to use the **Authentication Code** when challenging DECT handsets during registration. Use the drop-down list for **Tones** and select "US". Use the drop-down list for **Default Language** and select "English". Use the drop-down list for **Frequency** and select "North America". Check the **0**,**1**,**2**,**3** and **4** check boxes. The **Enable Carrier** check boxes enable the DECT handsets to use different channels or frequencies when transmitting. Check the **DTMF through RTP channel** check box. Use the drop-down list for **Coder** and select "**G.729A**". Click **OK** to continue. 

Step	Description
10.	Navigate to the **DECT Suppl. Serv.** frame by clicking **DECT** and then clicking **Suppl. Serv.**. Check the **Enable Supplementary Services** check box. Enter the extension used for Voicemail in the **Message Center No.** field. Click **OK** to continue. 
11.	Navigate to the **DECT PARI** frame by clicking **DECT** and then clicking **PARI**. **PARI** is a user-defined system value and must range from 1-35. Enter any number from 1-35. Click **OK** to continue. 

Step	Description
12.	Navigate to the **DECT SARI** frame by clicking **DECT** and then clicking **SARI**. **SARI** is an Ascom wireless provided activation code which is needed for the system to function. Contact Ascom wireless to obtain a **SARI**. Enter the **SARI** value. Click **OK** to continue. 
13.	Navigate to the **DECT Air Sync** frame by clicking **DECT** and then clicking **Air Sync**. Use the drop-down list for **Sync Mode** and select "Master". Check the **LED Indication** check box. Click **OK** to continue. 

Step	Description
14.	Navigate to the **General Info** frame by clicking **General** and then clicking **Info**. The **PARI-PARK** is displayed. This value is needed when programming Ascom wireless DECT handsets. The **PARI-PARK** is similar to an SSID in an 802.11 wireless environment. 
15.	Navigate to the **Users** frame by clicking **Users** and then clicking **Users**. Click **new** to provision a new user account. 

Step	Description
16.	The user is presented with the **Edit User** web page. **Long Name** and **Name** can be any descriptive name that identifies this user. The **Number** field is the extension assigned to this user. The **Password** field is the password used to register with the Avaya Distributed Office. The box below **Password** is to confirm the password and the value entered for the **Password** field must be entered here. **Display Text** is the text string that will be displayed on the LCD screen of the Ascom wireless DECT Handset. **Auth. Code** is used only if **Subscriptions** in **Step 9** is set to "**With System AC**". Once all the user information has been configured, click **OK**. Repeat this process for each user being added to the system. 

5. Ascom Wireless DECT Handset Configuration

Refer to **Section 10 [3], [4], [5]** and **[6]** to obtain information on the procedures for subscribing and registering the Ascom wireless DECT Handsets to the Ascom wireless IP-DECT Base Station.

6. Interoperability Compliance Testing

The compliance testing focused on verifying interoperability of the Ascom wireless IP-DECT SIP solution which is comprised of the Ascom wireless IP-DECT Base Station and Ascom wireless DECT Handsets with Avaya Distributed Office. Additional testing verified proper

operation with the Avaya 9630 IP Telephone, Avaya 9620 IP Telephone and the Avaya 2420 Digital Telephone. Voicemail with MWI was tested and verified to operate correctly.

Avaya's formal testing and Declaration of Conformity is provided only on the headsets/handsets that carry the Avaya brand or logo. Avaya may conduct testing of non-Avaya headsets/handsets to determine interoperability with Avaya telephones. However, Avaya does not conduct the testing of non-Avaya headsets/handsets for: Acoustic Pressure, Safety, Hearing Aid Compliance, EMC regulations, or any other tests to ensure conformity with safety, audio quality, long-term reliability or any regulation requirements. As a result, Avaya makes no representations whether a particular non-Avaya headset will work with Avaya's telephones or with a different generation of the same Avaya telephone.

Since there is no industry standard for handset interfaces, different manufacturers utilize different handset/headset interfaces with their telephones. Therefore, any claim made by a headset vendor that its product is compatible with Avaya telephones does not equate to a guarantee that the headset will provide adequate safety protection or audio quality.

6.1. General Test Approach

The general test approach was to register the Ascom wireless DECT Handsets with Avaya Distributed Office through the Ascom wireless IP-DECT cordless network and that voice mail left on Avaya Distributed Office was able to be retrieved and that MWI worked. Calls were made between both wired and wireless telephones and specific calling features were exercised.

6.2. Test Results

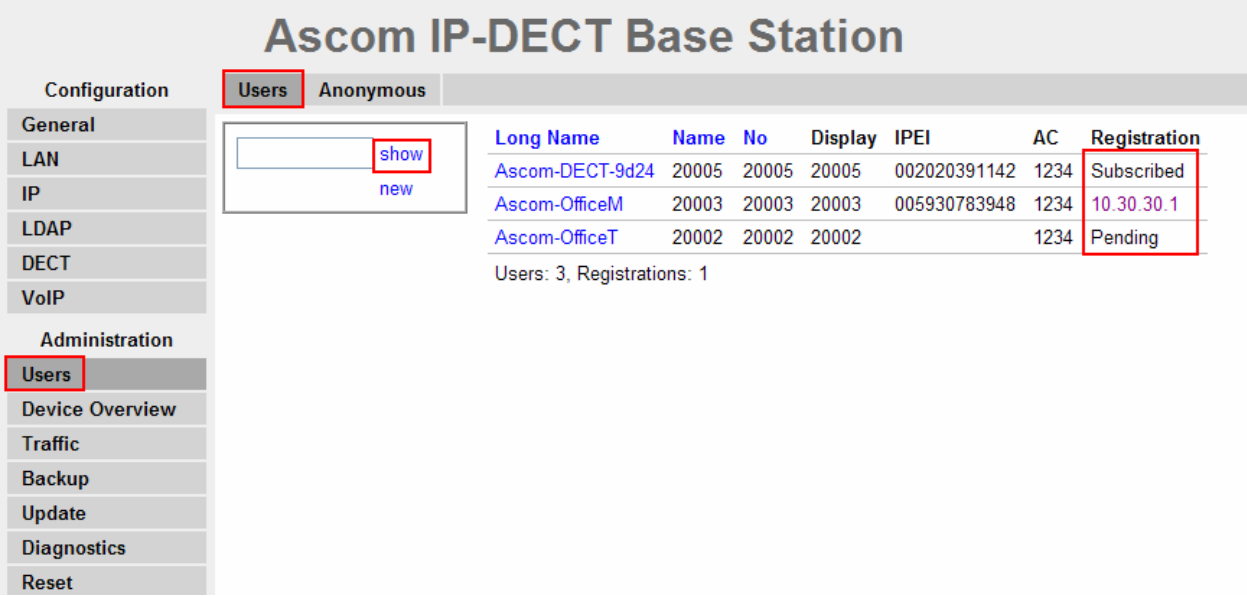
The Ascom wireless DECT Handsets passed all test cases. Ascom wireless DECT Handsets were verified to successfully register with Avaya Distributed Office. Calls were maintained for durations over one minute without degradation to voice quality. The telephony features verified to operate correctly included transfer (attended and unattended), hold/return from hold, multiple call appearances, caller ID operation, call forwarding (unconditional, on busy/no answer and clear), pickup groups, call pickup, bridged appearances, and verifying voicemail and MWI.

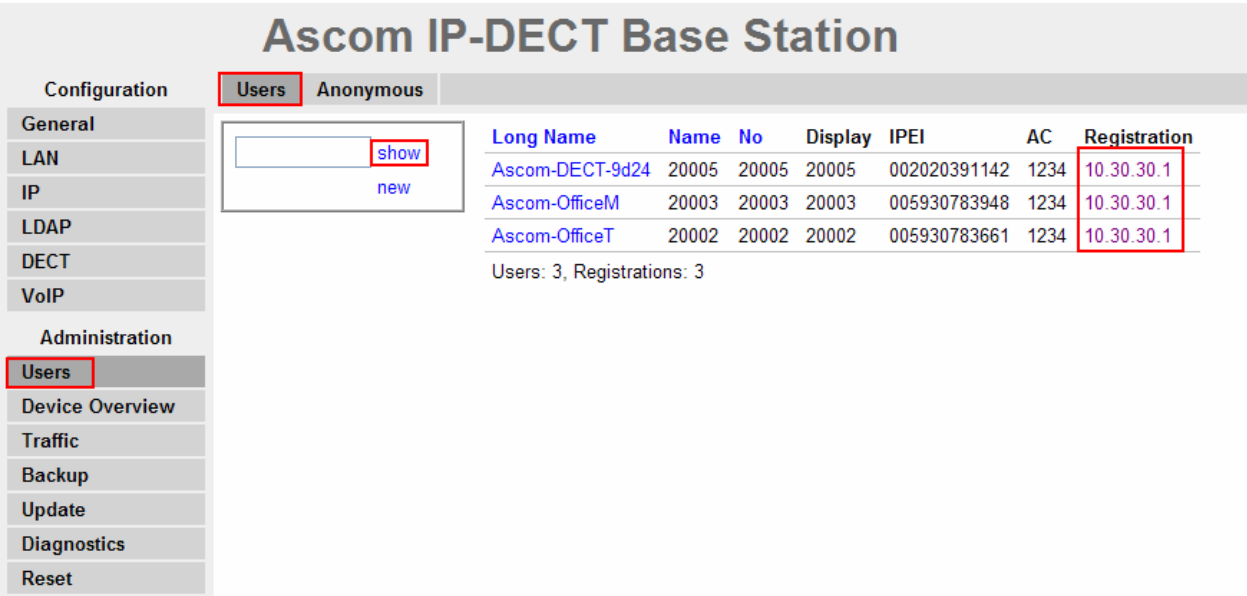
7. Verification Steps

7.1. Ascom Wireless DECT Handset Registration Verification

The following steps can be used to ascertain the registration state of the Ascom wireless DECT Handsets that the Ascom wireless IP-DECT Base Station is configured to support.

From a web browser open up a connection to the Ascom wireless IP-DECT Master Base Station, refer to **Section 4.1 Step 1**. Navigate to the **Users** frame by clicking **Users** then clicking **Users** and then clicking **show**. A **Registration** state of "**Pending**" indicates an Ascom wireless DECT Handset has not registered to the Ascom wireless IP-DECT Base Station with the requested extension. A **Registration** state of "**Subscribed**" indicates that an Ascom wireless DECT Handset has connected to the Ascom wireless IP-DECT Base Station and registered with the requested extension. A **Registration** state that displays the **IP Address** of the Avaya Distributed Office indicates the extension has successfully registered to both the Ascom wireless IP-DECT Base Station and Avaya Distributed Office.





7.2. Ascom Wireless DECT Handset Function Verification

The following steps can be used to verify proper operation of the Ascom wireless DECT Handsets.

- Place calls from the Ascom wireless DECT Handsets and verify two-way audio.
- Place a call to the Ascom wireless DECT Handsets, allow the call to be directed to voicemail, leave a voicemail message and verify the MWI message is received.
- For each Ascom wireless DECT Handset that received a voicemail, connect to the voicemail system to retrieve the voicemail and verify that MWI clears.
- Place calls to the Ascom wireless DECT Handsets and exercise calling features such as transfer and hold.

8. Support

Technical support for the Ascom wireless IP-DECT Base Station and Handsets can be obtained through the following:

- **Phone:** 1-877-71ASCOM or 1-877-712-7266
- **Email:** techsupport@ascomwireless.com

9. Conclusion

These Application Notes demonstrate how to build a sample SIP VoIP-enabled wireless network using Avaya Distributed Office, Ascom wireless IP-DECT Base Station and Ascom wireless DECT Handsets. These Application Notes also demonstrate interoperability between Avaya Distributed Office with the Ascom wireless IP-DECT Base station and Handsets.

10. Additional References

Avaya documentation was obtained from http://support.avaya.com.

[1] *Avaya Distributed Office i120 Installation Quick Start*, May 2007 Issue 1, Document Number 03-602289
[2] *Avaya one-X Deskphone Edition for 9600 Series IP Telephones Administrator Guide*

The Ascom wireless documentation was obtained from http://www.Ascom wireless.com.

[3] *Installation and Operation Manual IP-DECT Base Station*, January 2007 Ver. C, Document Number TD 92372GB
[4] *User Manual 9d24 MkII Cordless Handset USA*, February 2007 Ver. C, Document Number TD 92411GB
[5] *User Manual OfficeM Cordless Telephone*, May 2006 Ver. C, Document Number TD 92288GB
[6] *User Manual Cordless Telephone OfficeT*, May 2006 Ver. C, Document Number TD 92282GB

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 DevConnect Program at devconnect@avaya.com.