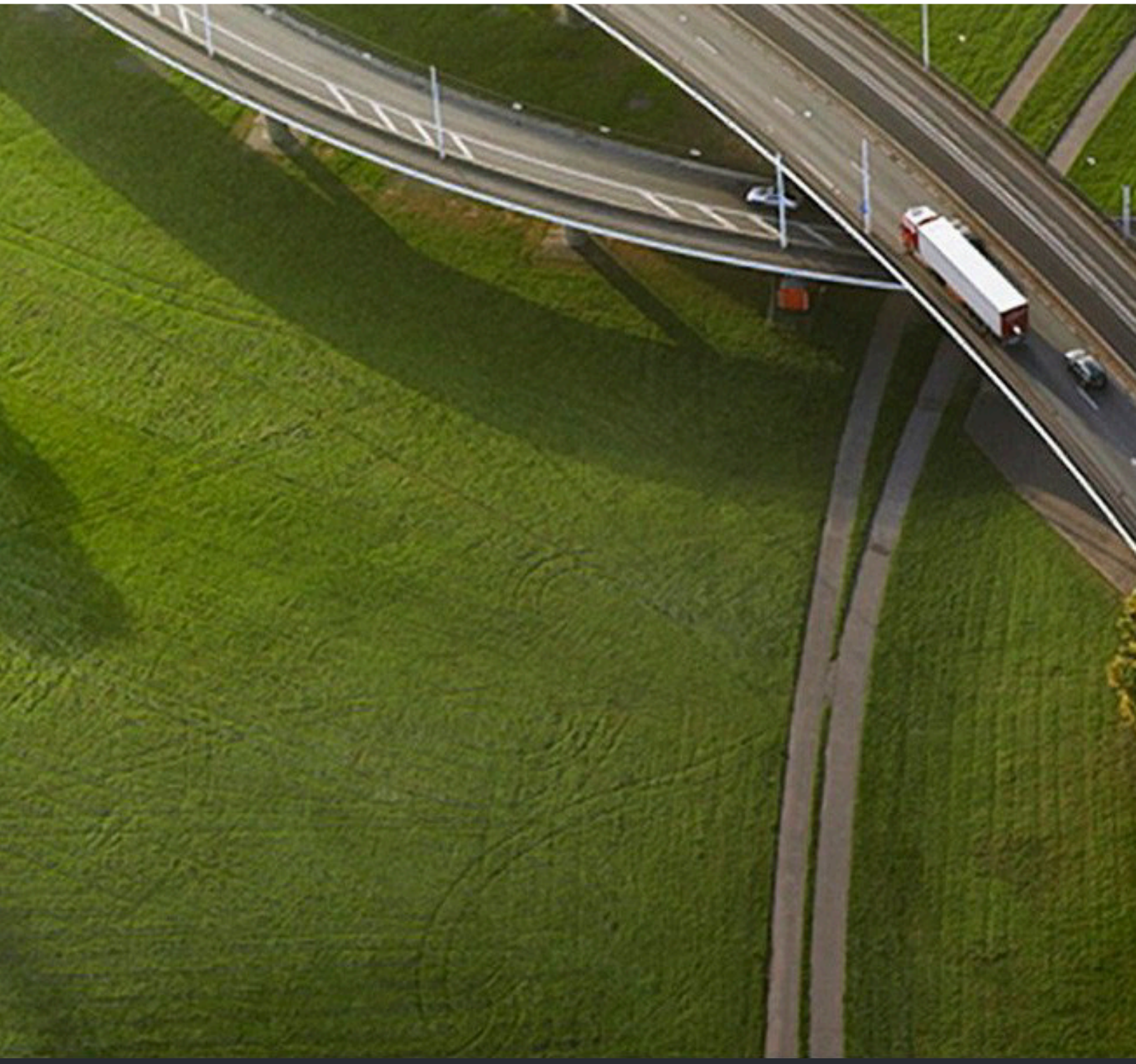

OpenScape WLAN Phone WL4
OpenScape WLAN Phone WL4 Plus

Configuration Manual

A31003-M2000-S101-01-7620

Provide feedback to further optimize this document to edoku@atos.net

As reseller please address further presales related questions to the responsible presales organization at Unify or at your distributor. For specific technical inquiries you may use the support knowledgebase, raise - if a software support contract is in place - a ticket via our partner portal or contact your distributor.

Our Quality and Environmental Management Systems are implemented according to the requirements of the ISO9001 and ISO14001 standards and are certified by an external certification company.

Reference No.: A31003-M2000-S101-01-7620

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Contents

1 Introduction

This document provides guidelines for deploying, configuring, maintaining, and troubleshooting the OpenScape WLAN Phone WL4.

The VoWiFi system provides wireless IP telephony, messaging, and alarm functions. Using third-party WLAN products, hardware, and software developed in-house, the system enables data and voice transmission together with seamless roaming.

The document is targeted at the following personnel:

- System administrators
- Service technicians

It is recommended to have a basic knowledge of the Unify Software and Solutions VoWiFi system and handset registration in the PBX.

1.1 GDPR Considerations

The handset provides data protection. To comply with the GDPR by default, the **Auto phone lock** and **Clear lists in charger** parameters must be enabled in the handset. For more information, see User Manual, Unify OpenScape WLAN Phone WL4.

2 Handset Deployment

This section describes how to deploy handsets to a VoWiFi system.

2.1 Prerequisites

Deploying handsets to a VoWiFi system requires the following prerequisites:

- The handset batteries are charged.
- Chargers are set up in case WinPDM is used.
- A phone number plan is available for the handsets.
- The IP address plan is set up to support the number of handsets to be deployed.
- A VoWiFi system where some or all of the following components (depending on the system configuration) are available:
  - DHCP Server – It allows devices to request and obtain IP addresses from the server that has a list of addresses available for assignment. If the WLAN does not have access to a DHCP server, it is necessary to have a list of static IP addresses.
  - WinPDM – It is a stand-alone device management system used for administering and configuring handsets. All settings and updates are performed using the DP1 Desktop Programmer cradle connected over USB.
  - WSG – It handles all communication between the WLAN and its built-in WSG DM . Before installing the handset, make sure the WSG address is available.
  - NTP server – It ensures network time synchronization.

2.2 Handset Deployment into the VoWiFi System

The Unify Software and Solutions OpenScape WLAN Phone WL4 can be deployed to a VoWiFi system in the following ways:

- **Over the Air (OTA) using the WSG Device Manager (WSG DM)** — This is the recommended option to deploy handsets in a large VoWiFi system. The WSG DM can install, upgrade, and configure a large amount of handsets simultaneously without collecting them from the users.

  For more information, see Deploy the Handset Using the WSG DM on page 10 and Configure the Handset Using Easy Deployment on page 12.
- **Using Portable Device Manager (WinPDM)** — WinPDM can configure only one handset at a time, which is feasible in small VoWiFi systems. The handsets need to be collected from the users.

  For more information, see Deploy the Handset Using WinPDM on page 14.
- **Using the Admin menu of the handset** — This option can be used in case only a quick change of a parameter value is needed, for example, in a lab environment or in a test installation.

  For more information, see Deploy the Handset Using the Admin Menu on page 16.

When deploying handsets using WinPDM/WSG DM , it is recommended to create templates to be able to apply the same configuration to several handsets si-

multaneously. For more information, see Create a Template in WinPDM/WSG DM on page 12, Apply a Template to a Handset without a Number on page 14, and Apply a Template to a Handset with a Number on page 14.

2.2.1 Deploy the Handset Using the WSG DM

For OTA device management, the handset needs to have a WLAN association that can be IP routed to WSG DM .

It is recommended to use Easy Deployment, where the handset first obtains the WSG IP address using a DHCP server or the Ascom Service Discovery Protocol (ASDP), then the WLAN parameters and the device manager information is distributed automatically to the handset from the WSG .

If Easy Deployment is not used, the WLAN and WSG DM parameters can be set manually using the Admin menu in the handset or WinPDM.

Then the handset logs into the WSG DM , and downloads the intended handset profile, which contains all other needed parameters for a site.

For more information, see Configure the Handset Using the Admin Menu on page 17 and Easy Deployment on page 120.

NOTICE: If the WLAN system uses an 802.1X security protocol that requires certificates for authentication/encryption to the WLAN, the certificates must be prepared and stored individually in the WSG DM for each number before starting the Easy Deployment process. Alternatively, if a SCEP server is available, this can be accomplished by following the steps in SCEP on page 138 to have the necessary certificates automatically generated and downloaded to the handset.

If the handset must use a certificate to access a WLAN, follow the instructions in Deploy the Handset Using WinPDM on page 14.

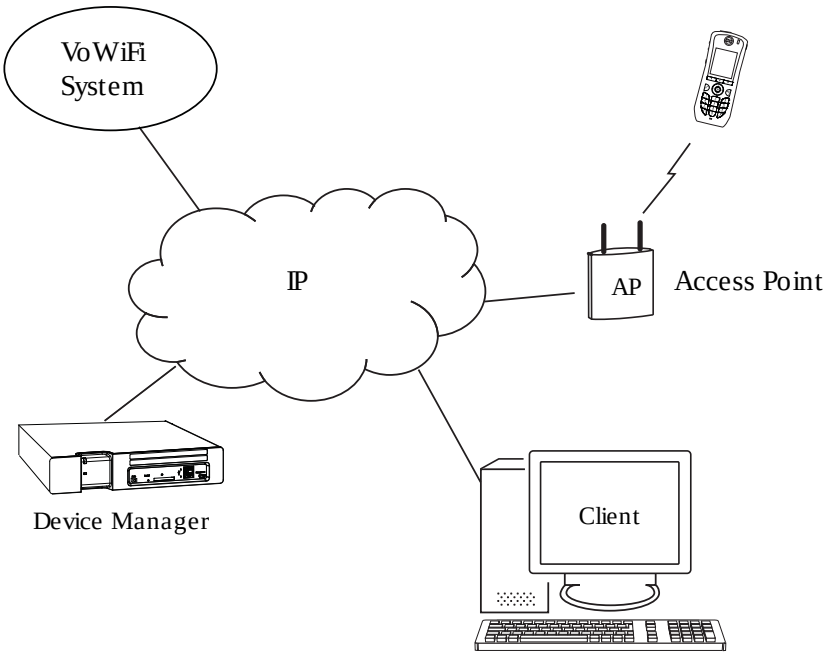

Figure 1: Configuration of Handsets Over-the-Air (OTA)

To deploy handsets to the VoWiFi system using the WSG DM , perform the following steps:

NOTICE: This section includes only the main steps of the deployment procedure. For details, see the corresponding sections.

---

1) Open a web browser and enter the address of the WSG .

2) Open WSG DM and log in if necessary.

3) Create a template with the following network parameters:

- Network settings in **Network** > **General**:

  Under the respective network (**Network A**, **Network B**, **Network C**, or **Network D**), set the required parameters, for example, system settings for WLAN, such as **SSID**, **Security mode**, and any certificates for 802.1X. If using a security mode that requires certificates, also use an NTP server to assure the correct time in the handset, as certificates are only valid within a certain time.
- VoIP settings in the **VoIP** menu:

  Configure, for example, VoIP information, SIP proxy ID and address.
- Syslog settings in **Device** > **Log**:

  To be able to set the **Syslog server IP address**, the parameter **Syslog** must be enabled by selecting **On**.

- WSG settings in **Device** > **WSG**:

  Enter the IP address and password (if any) to the WSG .

For details, see Create a Template in WinPDM/WSG DM on page 12.

Include only non-default parameters to minimize network traffic when applying the template.

NOTICE: If using Easy Deployment, the IP address of the WSG DM in the template can either be set or it can be left blank in which case the server discovery process is used at every startup. For more information, see WSG Discovery on page 122.

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4) Create numbers for the handsets.

For details, see Create Numbers in WinPDM/WSG DM on page 13.

5) Apply the network template to the handsets.

For details, see Apply a Template to a Handset with a Number on page 14 and Configure the Handset Using Easy Deployment on page 12.

For more information, see the User Manual, Device Manager.

2.2.1.1 Configure the Handset Using Easy Deployment

With the Easy Deployment procedure, handsets can be installed using a (staging) WLAN with a predefined SSID and security profile and a WSG with WSG DM .

The handsets are automatically installed if the following requirements are met:

- The LAN and VoWiFi system is configured for Easy Deployment.
- No network (SSID) is configured in the handset.
- The Call ID (endpoint number), that is, the phone number of the handset is configured.

NOTICE: When using Easy Deployment, make sure that the phone number plan and the parameters are correct. Inaccurate configuration can only be corrected in the WSG DM .

For further details, see Easy Deployment on page 120.

2.2.1.2 Create a Template in WinPDM/WSG DM

NOTICE: Select only the modified parameters. If all parameters are selected, the system performance decreases.

To create a template, perform the following steps:

1) In WinPDM/WSG DM , select the **Templates** tab and click **Template** > **New…** or **CTRL + N**. The **New template** window is opened.

2) In the **Device type** and **Parameter definition** drop-down lists, select the corresponding device type and parameter definition to use.

3) In the **Name** field, enter a descriptive name for the template.
4) Click **OK**. The **Edit template** window is opened.
5) Set the required parameters.
6) Click **OK** to save the template.

For more information, see Manage Templates using WinPDM and WSG DM on page 114.

2.2.1.3 Create Numbers in WinPDM/WSG DM

Create a range of numbers and apply the templates previously created in WinPDM/WSG DM .

IMPORTANT:

When adding numbers to handsets that already exist in the system, WinPDM/WSG DM overwrites the existing parameters in the handset, since these handsets are not saved in WinPDM/WSG DM .

Do not add numbers to handsets that are already configured and functional.

NOTICE: The parameter version of the template must be equal to or less than the selected parameter version.

---

1) Open WinPDM/WSG DM .
2) Select the **Numbers** tab and click **Number** > **New…** or **CTRL + N**. The **New numbers** window is opened.
3) In the **Device type** and **Parameter definition** drop-down lists, select the corresponding device type and parameter definition to use.
4) In the **Prefix** field, enter the numbers' prefix (if needed).
5) Create a range of numbers by selecting the **Range** option. Enter the start call number and the end call number in the fields. Click **OK**.

NOTICE: The maximum range that can be added at a time is 100 numbers.

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6) Apply the network settings template to the selected handsets. See Apply a Template to a Handset with a Number on page 14.
7) Apply the common settings template to the selected handsets. See Apply a Template to a Handset with a Number on page 14.

NOTICE: If the 802.1X security protocol with EAP-TLS or EAP-PEAP/MSCHAPv2 is used, also include the trusted CA certificate(s) and select the required application certificate.

Application certificates cannot be distributed using a template, as they are individual. The application certificates must be installed first by editing each number. See Easy Deployment and Certificates on page 137.

2.2.1.4 Apply a Template to a Handset without a Number

NOTICE: Applying a template to a handset without a number is possible only in WinPDM.

1) Place the handset in the DP1 Desktop Programmer cradle.
2) In the **Found Device Wizard** window, select **Apply template**.
3) Click **Next**. Only templates with a parameter version matching the selected handset are shown.
4) Select the template to apply and click **OK**.

   The number of parameters in the template affects the time it takes to apply the template to the selected handset.

2.2.1.5 Apply a Template to a Handset with a Number

1) Open WinPDM/WSG DM .
2) In the **Numbers** tab, select the handset(s) you want to apply the template to.

   NOTICE: If several handsets are selected, they must be of the same device type and have the same parameter version.

3) Right-click and select **Apply template**.

   Only templates with a parameters version matching the selected handsets are shown.
4) Select the template to apply and click **OK**.

   The number of parameters in the template affects the time it takes to apply the template to the selected handsets.

When looking at a handset on the Numbers tab, the column **Last run template** shows the name of the most recently applied template.

2.2.2 Deploy the Handset Using WinPDM

Using WinPDM only one handset can be deployed at a time. After configuring the WLAN parameters, it is possible to log in to the WSG DM for future OTA management.

To deploy a handset using WinPDM, perform the following steps:

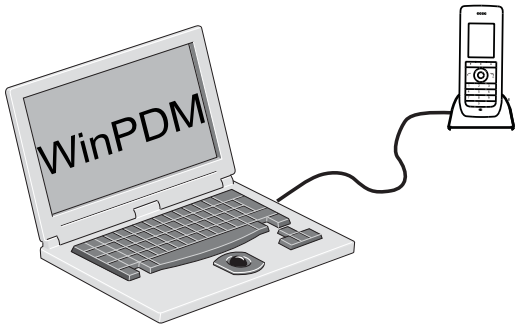


Figure 2: Connecting Handsets to the computer

1) Open WinPDM.
2) Create numbers for the handsets.

   For details, see Create Numbers in WinPDM/WSG DM on page 13.
3) Create a template with the following network parameters:

   - Network settings in **Network** > **General**:

     Under the respective network (**Network A**, **Network B**, **Network C**, or **Network D**), set the required parameters, for example, system settings for WLAN, such as **SSID**, **Security mode**, and any certificates for 802.1X. If using a security mode that requires certificates, also use an NTP server to assure the correct time in the handset, as certificates are only valid within a certain time.
   - VoIP settings in the **VoIP** menu:

     Configure, for example, VoIP information, SIP proxy ID and address.
   - Syslog settings in **Device** > **Log**:

     To be able to set the **Syslog server IP address**, the parameter **Syslog** must be enabled by selecting **On**.
   - WSG settings in **Device** > **WSG**:

     Enter the IP address and password (if any) to the WSG .

   For details, see Create a Template in WinPDM/WSG DM on page 12.

   NOTICE: If the production system is using 802.1X security, this method is not the best option since the certificates must be manually installed in the handset before the first login. The Easy Deployment process overcomes this problem by using a staging WLAN, which does not use 802.1X.

   If a network template has already been created in WSG DM , it can be exported and imported to WinPDM. For more information, see Manage Templates using WinPDM and WSG DM on page 114.
4) Place the handset into the DP1 Desktop Programmer cradle via a USB port. In the dialog window that appears after connecting the handset, select **WinPDM**. For more information, see USB Behavior on page 31.
5) In the Device Wizard window, select **Associate with number** and press **OK**.
6) Select the handset to associate with and press **OK**.

   The number and parameter settings saved in the WinPDM are now synchronized with the handset. In addition, the handset's Device ID is also synchronized with the number in the WinPDM.

   If certificates must be used to access a VoWiFi system, also perform 8 on page 15–13 on page 16.
7) Apply the network settings template to the handset. See Apply a Template to a Handset with a Number on page 14.
8) In the **Numbers** tab, right-click the handset's number and select **Manage certificates**. A manage certificate window opens.
9) In the **Trust list** tab and **Application certificates** tab, click **Browse** and select the certificates to import. Click **Close**.
10) In the **Numbers** tab, right-click the handset's number and select **Edit parameters**.

11) Select the active network (**Network A**, **Network B**, **Network C**, or **Network D**).
12) In the **Security mode** drop-down list, select **EAP-TLS** or **PEAP-MSCHAPv2**.
13) In the **EAP application certificate** drop-down list, select the application certificate to be used. Click **OK**.
14) Remove the handset when the synchronization is finished.

Repeat 4 on page 15–14 on page 16 for every handset.

2.2.3 Deploy the Handset Using the Admin Menu

It is possible to configure a handset using the Admin menu. This can be useful when neither WinPDM nor WSG DM is available and only a few handsets need to be configured.

NOTICE: Only a limited set of settings can be configured using the Admin menu. WPA2 Enterprise authentication, for example, cannot be configured.

To deploy a handset using the Admin menu, perform the following steps:

1) In the handset menu, select **Settings**.
2) Enter the Admin access code `40022`.

NOTICE: `40022` is the default Admin access code that can be configured in WinPDM/WSG DM . In case none of them is available, contact the system administrator. For more information, see Change Admin Access Code on page 41.

3) Set the following parameters:
   - In the **Network setup** menu, set all the required system settings for the WLAN, for example **SSID** and **Security mode**. No certificates can be entered, or referred to using the Admin menu.
   - In the **WSG** menu, set the IP address and password (if any) to the WSG .
   - In the **VoIP** menu, set **VoIP protocol** and **SIP proxy IP address** to access the PBX.
   - In the **Syslog** menu, the parameter **Syslog mode** must be enabled by selecting **On** to be able to set the **Syslog server IP**.

2.3 Handset Configuration

Handsets can be configured in the following ways:

- **Using WinPDM/WSG DM**

  For more information, see Configure Handsets Using WinPDM/WSG DM on page 17.
- **Using the Admin menu of the handset**

  For more information, see Configure the Handset Using the Admin Menu on page 17.

2.3.1 Configure Handsets Using WinPDM/WSG DM

This requires that handsets are deployed to the VoWiFi system with access to WinPDM/WSG DM . For more information, see Handset Deployment into the VoWiFi System on page 9.

To configure handsets, perform the following steps:

1) Open the WinPDM/WSG DM .
2) Create a template with the required settings.

For details, see Create a Template in WinPDM/WSG DM on page 12.

3) Apply the template to the handsets.

For details, see Apply a Template to a Handset with a Number on page 14 or Apply a Template to a Handset without a Number on page 14.

2.3.2 Configure the Handset Using the Admin Menu

The Admin menu of the handset can be used to perform quick changes in the handset.

For more information, see System Administration in the Handset on page 39.

2.4 Handset Synchronization

Handset synchronization transfers parameter changes between the handset and the WinPDM/WSG DM and vice versa as follows:

- The handset synchronizes with the WSG DM at startup and immediately after every handset parameter change. (The change is done either by using the handset keypad or by editing parameters in the WSG DM.)

  If a parameter has been changed in the handset, it is transferred to the WinPDM/WSG DM.
- If a parameter has been changed in the WinPDM/WSG DM while the handset was offline, the changes are transferred when the handset is online.
- If a parameter has been changed in the WinPDM/WSG DM , it is transferred to the handset.
- If the same parameter has been changed in both the WinPDM/WSG DM and the handset, the value in the WinPDM/WSG DM overrides the value in the handset.
- Changes made in the WSG DM are not stored in the WinPDM as there is no connection between the two systems. The database of the WinPDM synchronizes with the handset when the handset is placed in the DP1 Desktop Programmer cradle via USB.

NOTICE: Since there is no connection between the WinPDM and WSG DM except over the handset, the WLAN and device manager settings can differ in the WinPDM and WSG DM . Parameters can revert to old values when the WinPDM

synchronization process runs, that is, when the handset is placed in the DP1 Desktop Programmer cradle.

When the handset is removed from the DP1 Desktop Programmer cradle, the handset goes online with the Messaging system, and the synchronization process with the WSG DM starts. The solution for this is to avoid storing handset numbers in the WinPDM.

3 Parameter Configuration

This section describes how to configure handset parameters using WinPDM/WSG DM .

NOTICE: The parameters are defined in `.def` files that are regularly updated. For example, parameters are added or removed, or their values are changed.

For more information, see the help text that is accessible for each parameter by clicking the Help icon in the **Edit parameters** view.

3.1 Networks

The handset can switch between four different WLAN system configurations called **Network A**, **Network B**, **Network C**, and **Network D**. The name can be changed (using the Admin menu in the handset or the WinPDM/WSG DM) and is visible in the handset. For more information, see Change Name of Network on page 19.

A handset can be configured for up to four different WLANs but only for one WSG and one VoIP System.

Network A is the default system that is used throughout this manual.

3.1.1 Change Active Network

1) Select **Network** > **General**.
2) In the **Active network** drop-down list, select **Network A**, **Network B**, **Network C**, or **Network D** .

3.1.2 Change Name of Network

The name is shown when selecting network in the handset.

1) Select **Network** > **Network A** (**Network B**, **Network C**, or **Network D**).
2) In the **Network name** field, enter the name of the network.

3.1.3 Enable Switch Between Networks

The handset can be configured to switch between networks on the site.

1) Select **Network** > **General**.
2) In the **Auto-switch network** drop-down list, select **On**.

   The parameter **Auto-switch network timeout** appears, which defines the time before the handset tries to connect with the next included network.
3) Enter a value in seconds for **Auto-switch network timeout**.

4) For the networks that should be included in the auto-switch network:

   Select **Network** > **Network A Network B**, **Network C**, or **Network D** . In the **Include in auto-switch network** drop-down list, select **Yes** to enable the switch to **Network A** > **Network B** > **Network C** > **Network D**.

3.2 Handset IP Address Settings

The handset IP address settings can be configured in two ways:

- The handset can be configured to receive an IP address automatically from a DHCP server, see Automatic IP Address Settings on page 20.
- If no DHCP server is used, a unique IP address must be entered manually for each handset, see Static IP Address (Manual) Settings on page 20.

3.2.1 Automatic IP Address Settings

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **DHCP mode** drop-down list, select **On**.

   The phone IP address, subnet mask, and default gateway are automatically set up.

3.2.2 Static IP Address (Manual) Settings

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **DHCP mode** drop-down list, select **Off (static)**. Additional parameters will be displayed.
3) In the **Phone IP address** field, enter the unique IP address for the handset.
4) In the **Subnet mask** field, enter the subnet mask.
5) In the **Default gateway** field, enter the IP address for the default gateway.

3.2.2.1 DNS Server Settings

It is possible to configure the DNS server that the handset uses. If the primary DNS server is available, it is always used. Otherwise, the secondary DNS server is used.

Primary DNS Server

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **Primary DNS** field, enter the IP address for the primary DNS server.

Secondary DNS Server

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **Secondary DNS** field, enter the IP address for the secondary DNS server.

3.3 Network Settings

3.3.1 Radio and Channel Selection

The handset supports both 5 GHz radio and 2.4 GHz radio, but 5 GHz radio and 2.4 GHz radio cannot be used simultaneously. The radio defines the channels that can be used.

5 GHz Channels

It defines which 5 GHz channels to use. It is recommended to use the value **UNII-1**.

Select **Advanced** only if the channels are to be set in the **802.11 channels** parameter, see Advanced: 802.11 Channels on page 22.

To select a 5 GHz channel, perform the following steps:

1) Select **Network** > **Network A** **Network B**, **Network C**, or **Network D** .
2) In the **Frequency band** drop-down list, select **5 GHz**.
3) In the **5 GHz channels** drop-down list, select one of the following:

- **All**
- **Non DFS**
- **UNII-1**
- **UNII-3**
- **UNII-1, UNII-2**
- **UNII-1, UNII-2, UNII-3**
- **UNII-1, UNII-2 Extended**
- **Advanced**
- **802.11k**

OpenScape WLAN Phone WL4 has optional support for roaming based on 802.11k neighbor lists. To enable it, set this parameter to **802.11k**. If 802.11k is enabled, only a subset of the 2.4/5 GHz channels that are enabled are scanned for a new AP candidate when roaming. It is decided by a 802.11k neighbor list which channels to scan, which must be sent by the current AP. If this partial scan fails to find a roaming candidate, a full scan of all channels is performed as if the parameter had been set to **All**.

NOTICE: The selected World Mode Regulatory Domain defines which channels to use. For more information, see table below.

Table 1: Bands and Channels Used by WiFi A-radio

Channel denomination	Frequency band	Channels
Non DFS	5.150–5.250 GHz, 5.725–5.845 GHz	36, 40, 44, 48 149, 153, 157, 161, 165
UNII-1	5.150–5.250 GHz	36, 40, 44, 48
UNII-2	5.250–5.350 GHz	52, 56, 60, 64
UNII-2 Extended	5.470–5.725 GHz	100, 104, 108, 112,116, 120, 124, 128, 132, 126, 140

Channel denomination	Frequency band	Channels
UNII-3	5.725–5.850 GHz	149, 153, 157, 161, 165

2.4 GHz Channels

It defines which 2.4 GHz channels to use. It is recommended to use the default value **1, 6, 11**.

If set to **All**, all channels are scanned for APs, which decreases WLAN performance. Select **Advanced** only if the channels are to be set in the parameter **802.11 channels**. For more information, see Advanced: 802.11 Channels on page 22.

To select a 2,4 GHz channel, perform the following steps:

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **Frequency band** drop-down list, select **2.4 GHz**.
3) In the **2.4 GHz channels** drop-down list, select one of the following:
   - **All**
   - **1, 6, 11**
   - **Advanced**

Advanced: 802.11 Channels

It defines which 802.11 channels to use. It is only used if the parameter in **2.4 GHz channels** or **5 GHz channels** is set to **Advanced**.

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) Enter channels to scan in a comma-separated list, for example **1, 6, 11**. The order has no impact, that is, **11, 6, 1** gives the same result.

NOTICE: It is not possible to scan channels in 2.4 GHz and 5 GHz simultaneously.

NOTICE: If **Advanced** is selected in WinPDM/WSG DM , it is indicated in the handset display by having all options unchecked in the **Settings** > **Admin menu** > **Network set-up** > **2.4 GHz channels**, or **5 GHz channels** menu. If any of these unchecked channels are selected using the handset's Admin menu, the only way to reselect **Advanced**, is to reconfigure it in WinPDM/WSG DM .

3.3.2 SSID

Service Set Identifier (SSID) is the name of the network that the handset associates with.

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **SSID** field, enter system SSID.

NOTICE: SSID is case-sensitive.

3.3.3 Security Settings

The WLAN can be configured in WinPDM/WSG DM to use various encryption and authentication schemes. The most frequently used encryption and authentication modes are directly available in the **Security mode** drop-down list of **Network** > **Network A Network B**, **Network C**, or **Network D** .

NOTICE: The use of extensive authentication schemes without any fast roaming method can cause incidents of dropped speech during handover due to the time to process the authentication.

3.3.3.1 Open

If no encryption or authentication is required, perform the following steps:

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **Security mode** drop-down list, select **Open**.

3.3.3.2 WPA/WPA2-PSK

To select WPA/WPA2-PSK as the security mode, perform the following steps:

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **Security mode** drop-down list, select **WPA/WPA2-PSK**.
3) In the **WPA/WPA2-PSK passphrase** field, enter the passphrase for WPA/WPA2-PSK.

3.3.3.3 PEAP-MSCHAPv2

PEAP-MSCHAPv2 (PEAPv0/EAP-MSCHAPv2) recommends the use of trusted certificates for authentication of the WLAN.

To select PEAP-MSCHAPv2 as the authentication method, perform the following steps:

1) For server validation, import the trusted certificate by performing the following steps:
   - In the **Numbers** tab, right-click the handset's number and select **Manage certificates**.
   - In the **Trust list** tab of the Manage Certificates window, click **Browse** and select the trusted certificates to import. Click **Close**.

     This is not needed if validation is disabled in 7 on page 24.

     NOTICE: Skip this step, if SCEP is used to automatically download trusted certificates to the handset. For more information, see SCEP on page 138.
2) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
3) In the **Security mode** drop-down list, select **PEAP-MSCHAPv2**.

4) In the **EAP authentication identity** field, enter the user name for EAP authentication.
5) In the **EAP authentication password** field, enter the password for EAP authentication.
6) The **EAP anonymous identity** is an optional parameter. This field is used for unencrypted use with EAP types that support different tunnelled identity, such as EAP-PEAP/MSCHAPv2, in order to reveal the real identity only to the authentication server.
7) In the **Validate server certificate** field, select **No** to disable the validation of server certificate during authentication.

NOTICE: By disabling the validation, the server is not authenticated and may be a rouge one.

NOTICE: The server must send its complete certificate chain.

3.3.3.4 EAP-TLS

It is recommended to use trusted certificates to authenticate the WLAN, and it is required to use application certificates to present to the WLAN for client authentication.

To select EAP-TLS as the authentication method, perform the following steps:

1) For server validation, import the trusted certificate:
   - In the **Numbers** tab, right-click the handset's number and select **Manage certificates**.
   - In the **Trusted list** and the **Application certificates** tabs of the Manage Certificates window, click **Browse** and select the certificates to import. Click **Close**.

   This is not needed if validation is disabled in 7 on page 24.
2) Select **Network** > **Network A** **Network B**, **Network C**, or **Network D** .
3) In the **Security mode** drop-down list, select **EAP-TLS**.
4) In the **EAP authentication identity** field, enter the user name for EAP authentication.
5) **EAP anonymous identity** is an optional parameter. This field is used for unencrypted use with EAP types that support different tunnelled identity, such as EAP-PEAP/MSCHAPv2, in order to reveal the real identity only to the authentication server.
6) In the **EAP client certificate** drop-down list, select the application certificate (in PKCS#12 format).
7) In the **Validate server certificate** field, select **No** to disable the validation of server certificate during authentication.

NOTICE: By disabling the validation, the server is not authenticated and may be a rouge one.

NOTICE: The server must send its complete certificate chain.

3.3.3.5 WinPDM Authentication

When this parameter is enabled, it is required to enter the Admin access code to the handset before connecting to WinPDM.

NOTICE: This parameter is only visible if **USB behavior** is set to **Ask** or **WinPDM** in **Device** > **General**.

To enable **WinPDM authentication**, perform the following steps:

1) Select **Device** > **General**.
2) In the **WinPDM authentication** drop-down list, select **On**.

3.3.4 World Mode Regulatory Domain

There is a set of regional rules for the world mode settings and the a-band that the handset complies with. The preferred setting is **World mode (802.11d)**. The handset gets its regulatory settings from the AP. If it is not supported by the AP, perform the following steps:

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **World mode regulatory domain** drop-down list, select one of the following:
   - **World mode (802.11d)** (default)
   - **USA**
   - **Canada**

3.3.5 IP DSCP for Voice/Signaling

Differentiated Services Code Point (DSCP) defines the value to use for outgoing voice and signaling traffic. The DSCP value is used for QoS on the LAN. The settings in the handset must agree with the settings in the system, otherwise it results in bad voice quality.

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **IP DSCP for voice** and/or **IP DSCP for signaling** drop-down list, select one of the following:
   - **0x38 (56) - Class selector 7**
   - **0x30 (48) - Class selector 6**
   - **0x2E (46) - Expedited Forwarding (default for voice)**
   - **0x28 (40) - Class selector 5**
   - **0x20 (32) - Class selector 4**
   - **0x1A (26) - Assured forwarding 31 (default for signaling)**
   - **0x18 (24) - Class selector 3**
   - **0x10 (16) - Class selector 2**
   - **0x08 (8) - Class selector 1**
   - **0x00 (0) - Default**

3.3.6 TSPEC Call Admission Control

This parameter defines if Call Admission Control via WMM TSPECs (Traffic Specifications) is to be used or not on the WLAN.

To configure **TSPEC Call Admission Control**, perform the following steps:

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **TSPEC Call Admission Control** drop-down list, select one of the following:
   - **Off** to disable traffic streams allocation for each call.
   - **Automatic** to enable traffic streams allocation for each call if required by the system. Even if the system does not require admission control the call will be set up.
   - **Required** if the system must require admission control to set up a call.

3.3.7 Roaming Method

To select a roaming method, perform the following steps:

1) Select **Network** > **Network A Network B**, **Network C**, or **Network D** .
2) In the **Roaming method** drop-down list, select one of the following:
   - **PMKSA Caching** — Use it in systems that do not support FT or OKC.
   - **Fast BSS Transition (FT)** — Use FT if supported by the system, otherwise OKC.
   - **OKC** — Select this option to use Opportunistic Key Caching instead of FT on an AP that supports both.

3.3.8 IP Connectivity after Roaming

If the **Check IP connectivity after roaming** is set to **Yes**, it sends ICMP pings to the default gateway after each roam to verify that the local IP address is still valid.

3.3.9 A-MPDU Packet Aggregation

During interoperability testing there has been issues with the Aruba controllers when the A-MPDU aggregation was enabled in the handset. Therefore, it is recommended to set this parameter to **Off** when connecting to Aruba WiFi and **On** when connecting to other networks.

3.4 Handset Settings

Parameters described in this section can be changed using the handset and/or the WinPDM/WSG DM to assist the user or set the initial value when the handset is deployed.

For more information, see the User Manual, Unify OpenScape WLAN Phone WL4.

NOTICE: When the handset is placed in the charger, some settings for audio adjustments, messaging settings, and actions cannot be changed using the keypad.

3.4.1 Automatic Key Lock

Automatic key lock is used to avoid unintentional key presses. It can also be configured using the handset.

NOTICE: If configured, it is possible to dial any of up to five predefined emergency numbers when the keypad is locked, see Emergency Call Numbers on page 57.

Other examples of exceptions that override the key lock is personal alarm, shortcut call, mute ALS, and cancel Man-down/No-movement alarms.

To activate or deactivate **Automatic key lock**, perform the following steps:

1) Select **Device** > **Settings**.
2) In the **Automatic key lock** drop-down list, select one of the following:
   - **On** – Activates the automatic key lock, also during an ongoing call.
   - **Off** – Deactivates automatic key lock.

3.4.2 Automatic Key Unlock

To enable or disable the **Automatic key unlock**, perform the followings steps:

1) Select **Device** > **Settings**.
2) In the **Automatic key unlock** drop-down list, select one of the following:
   - **On** – The handset keypad is unlocked automatically at incoming calls and messages.
   - **Off** – The handset is not unlocked automatically.

3.4.3 Phone Lock

Phone lock is used to prevent unauthorized usage of the handset. A phone lock code is required to unlock the handset and access its functions.

NOTICE: If configured, it is possible to dial any of up to five predefined emergency numbers when the handset is locked. For more information, see Emergency Call Numbers on page 57.

Another example of exception that overrides the phone lock is personal alarm.

It is not recommended to use phone lock when using the shared phone feature. For more information, see Shared Phone on page 35.

To activate or deactivate **Phone lock**, perform the following steps:

1) Select **Device** > **Settings**.
2) In the **Phone lock** drop-down list, select one of the following:
   - **On** – The handset is locked after a specified time when it is not used. For more information, see Automatic Lock Time on page 28.
   - **On in charger** – The handset is locked when placed in a charger.
   - **Off** – The handset is not locked.

When **Phone lock** is activated, define a password in the **Phone lock code** field.

3.4.4 Automatic Lock Time

When either the key lock or the phone lock is set to **On**, the lock is activated after a specified period of time. It is possible to change the default time (20 seconds).

To change the **Automatic lock time**, perform the following steps:

1) Select **Device** > **Settings**.
2) In the **Automatic lock time** drop-down list, select one of the following:
   - **5 seconds**
   - **10 seconds**
   - **20 seconds**
   - **30 seconds**
   - **1 minute**
   - **3 minutes**

3.4.5 Audio Settings

To set the volumes for the different audio signals of the handset, perform the following steps:

1) Select **Audio** > **Volume**.
2) Select the appropriate volume type from the drop-down lists:
   - **Handsfree volume** — Sets the volume used in an active call in loudspeaking mode.
   - **Headset volume** — Sets the volume used in an active call when a headset is connected.
   - **Speaker volume** — Sets the volume used in an active call in speaker mode (normal call mode).
3) In the **Persistent volumes** drop-down list, select **Enable** to automatically store volume changes in the handset for future calls.

   The parameter affects the **Normal**, **Headset**, and **Loudspeaking** mode.

For selection of headset, see Headset Type on page 29.

NOTICE: Changing volume parameters can result in lower sound quality and high sound level. Evaluate carefully before applying.

3.4.5.1 Hearing Aid

When **Hearing aid** is enabled, the volume is changed so that the magnetic signal fulfill the requirements for a hearing aid with telecoil.

To enable this parameter, perform the following steps:

1) Select **Audio** > **General**.
2) In the **Hearing aid** drop-down list, select **On** to enable it.

3.4.5.2 Ring Signal in Handset

To define if the ring signal should be available in both the headset and the loudspeaker or only in the loudspeaker, perform the following steps:

1) Select **Audio** > **General**.
2) In the **Ring signal in headset** drop-down list, select **Both headset and loudspeaker** or **Only loudspeaker**.

3.4.5.3 Gain Offset Calibration

To optimize audio quality, perform the following steps:

1) Select **Audio** > **Handset**, **Audio** > **Headset**, **Audio** > **Loudspeaker**, and/or **Audio** > **Bluetooth**.
2) Change the values of the following as necessary:
   - Michrophone gain offset
   - Speaker gain offset
   - Microphone side-tone gain offset

NOTICE: Changing the parameters can result in lower sound quality and high sound level. Evaluate carefully before applying.

3.4.6 Headset Configuration

3.4.6.1 Headset Type

To select the headset model that is used, perform the following:

1) Select **Headset** > **General**.

2) Select the applicable item from the **Headset type** drop-down list:

- **Mic on boom**
- **Mic on cable**
- **User model**

  If none of the headsets above are selected, this option can be used to configure an own headset profile.

  If selected, additional configuration is required, see Headset User Model on page 30.

3.4.6.2 Headset User Model

The following settings are required if **User model** is selected under **Headset** > **General**:

1) Select **Headset** > **User model**.
2) In the **Name of headset** field, enter a descriptive name. For example the headset model to be used.
3) In the following drop-down lists, select the applicable values for the headset:

- **Microphone gain**
- **Speaker gain**
- **Side tone**

NOTICE: Changing the parameters can result in lower sound quality and high sound level. Evaluate carefully before applying.

3.4.6.3 Call with Headset

To make a call using a wired or Bluetooth headset, perform the following:

1) Select **Headset** > **General**.
2) In the **Call with headset** drop-down list, select one of the following:

- **Not activated** – It is only possible to answer/end a call.
- **Last called number** – The last called number is dialed.
- **Predefined number** – A predefined number is called. If selected, in the **Predefined number** field, enter the number to be dialed when the headset button is pressed.

3.4.7 Actions when the Handset is Placed in the Charger

The behavior of the handset can be configured when placed in a charger.

3.4.7.1 In Charger Action when Not in Call

To configure the **In charger action when not in call** parameter, perform the following steps:

1) Select **Device** > **Settings**.

2) In the **In charger action** drop-down list, select one of the following:

- **No action** – No action is performed when handset is placed in the charger.
- **Switch off** – The handset is switched off when placed in the charger.
- **Sound off** – The handset is muted when placed in the charger (except for messages with set **Break through** parameter, for example, **Prio 1** messages).

  To mute all messages (regardless of priority), set the **Device** > **Messaging** > **Show and indicate messages in charger** to **Off**. This function is applicable to WL4 Messaging and WL4 Plus only.
- **Change profile** (OpenScape WL4 Plus only) – The handset changes profile when placed in the charger.
  - In the **Change profile in charger** drop-down list, select the profile to be used.
  - If needed, configure the selected profile, see Profiles on page 42.

3) In the **In charger Message absent** drop-down list, select one of the following:

- **No** – Messages are saved in the handset's messaging inbox while the handset is placed in the charger (default).
- **Yes** – If a message is sent from a system it is notified that the handset is absent. Messages are not sent to the handset.

3.4.7.2 Clear Lists in Charger

If **Clear lists in charger** is set to **Yes**, message and call lists are deleted when the handset is placed in the charger. To configure this parameter, perform the following steps:

1) Select **Device** > **General**.
2) In the **Clear lists in charger** drop-down list, select one of the following:

- **Yes** – Message lists and call lists are deleted when the handset is placed in the charger.
- **No** – No action is performed when the handset is placed in the charger.

3.4.7.3 USB Behavior

When set to **Ask**, a dialog window is displayed every time the phone is connected to a PC over USB. Otherwise, it behaves as defined.

1) Select **Device** > **General**.

2) In the **USB Behavior** drop-down list, select one of the following:

- **Ask** — A dialog window is displayed every time the handset is connected to a PC over USB where one of the below modes may be chosen.
- **WinPDM** — This mode allows the handset to communicate to the application WinPDM on a PC.
- **MTP** — This mode shows the handset as a media device and allows transferring and viewing log files from the handset.
- **Charge** — This option sets the handset to charge only mode.

If **Ask** or **WinPDM** is selected, it is possible to configure the **WinPDM authentication** parameter to restrict access to WinPDM. For more information, see WinPDM Authentication on page 25.

3.4.7.4 Show and Indicate Messages in Charger

It defines how incoming messages are displayed/indicated while the handset is in the charger.

NOTICE: All incoming messages are affected by this setting including PTT invitations received as messages and all other messages regardless of priority (even messages with breakthrough such as high/alarm priority).

To silence only messages without breakthrough (low/normal priority), enable the **Sound off** parameter instead in **Device** > **Settings** > **In charger action**.

---

1) Select **Device** > **Messaging**.
2) In the **Show and indicate messages in charger** drop-down list, select one of the following:

- **On** – Messages are shown and indicated (by beep) while the handset is in the charger (default).
- **Off** – The message alert (if any) is muted and only the New message icon is displayed. The messages are still stored as unread messages in the Message inbox.

3.4.8 Transfer Unlock File

1) Select **Device** > **General**.
2) In the **Transfer Unlock File** drop-down list, enter the unlock file as a string.

NOTICE: Unlocking is performed for debugging purposes. Due to security reasons, the handset needs to be factory-reset after debugging is finished.

3.4.9 Hide Missed Call Window

By default, a Missed call window indicates a missed call. It is possible to hide this window, for example, if both a handset and a mobile is used. If the user an-

swers the call using the mobile, the Missed call window is not displayed in the handset.

To hide the Missed call window, perform the following steps:

1) Select **Device** > **Call**.
2) In the **Show missed calls dialog window** drop-down list, select **No**.

3.4.10 Disable Mute Function

To prevent the user from muting the handset, perform the following steps:

1) Select **Audio** > **General**.
2) In the **Prevent silent** drop-down list, select one of the following:
   - **On** – The handset cannot be set to silent by using mute or by decreasing the volume.
   - **Off** – The handset can be set to silent by using mute or by decreasing the volume (default).

3.4.11 Prevent Calls from Being Saved in the Call List

It is possible to disable storing outgoing and incoming calls in the Call list, which can be useful to prevent unauthorized access to the Call list.

To prevent all calls from being saved, perform the following steps:

1) Select **Device** > **Call**.
2) In the **Enable call list** drop-down list, select **Off**.

3.4.12 Battery Warning

The warning when the battery is low can be set to different modes.

1) Select **Device** > **Settings**.
2) In the **Battery warning** drop-down list, select one of the following:
   - **Sound repeatedly**
   - **Sound once**
   - **Sound off**

3.4.13 No Network and No Access Warning

3.4.13.1 No Network Warning

If the handset has no coverage, it shows `No network` in the handset display in idle mode. It also gives a vibrating alert (if enabled), a beep signal (if enabled), and displays a dialog window (if enabled by the system administrator).

To configure the **No network warning**, perform the following steps:

1) Select **Device** > **General**.

2) In the **No network warning** drop-down list, select one of the following:

- **Indicate repeatedly** – The beep is on (if enabled), `No network` is displayed in idle mode, the vibrating alert is on (if enabled), the dialog window is on (if enabled). This simultaneous indication is repeated every minute for 30 minutes.
- **Indicate once** – The beep is on (if enabled), `No network` is displayed in idle mode, the vibrating alert is on (if enabled), the dialog window is on (if enabled). This simultaneous indication is made only once.
- **Indication off** – The beep is off (even if enabled), `No network` is displayed in idle mode, the vibrating alert is off (even if enabled), the dialog window is either on or off, depending on the parameter settings.

NOTICE: Even if **Indication off** is set, the dialog window still appears when **Dialog window for no network and no access warnings** (in **Device** > **General**) is set to **Yes**.

3.4.13.2 No Access Warning

If the handset has no access, has lost messaging and/or voice connection, it shows `No access`, `Voice only`, or `Messaging only` in the handset display in idle mode. It also gives a vibrating alert (if enabled), a beep signal (if enabled), and a dialog window (if enabled by the system administrator).

`No access` means that there is neither voice nor messaging connection.

To configure the **No access warning**, perform the following steps:

1) Select **Device** > **General**.
2) In the **No access warning** drop-down list, select one of the following:

- **Indicate repeatedly** – This is the default and recommended setting for any handset used with medical devices. The beep is on, `No access`/`Voice only`/`Messaging only` is displayed in idle mode, the vibrating alert is on (if enabled). This simultaneous indication is repeated every minute for 30 minutes.
- **Indicate once** – The beep is on, `No access` is displayed in idle mode, the vibrating alert is on (if enabled). This simultaneous indication is made only once.
- **Indication off** – The beep is off, `No access` is displayed in idle mode, the vibrating alert is off (if enabled) depending on the parameter settings.

NOTICE: Even if **Indication off** is set, the dialog window still appears when **Dialog window for no network and no access warnings** (in **Device** > **General**) is set to **Yes**.

3.4.13.3 Dialog Window for No Network/No Access Warnings

This parameter defines if the dialog windows `No network`, `No access`, `Voice only`, and `Messaging only` are visible or not on the handset display.

1) Select **Device** > **General**.

2) In the **Dialog window for no network/no access warnings** drop-down list, select one of the following:

   - **Yes** – The dialog window `No network`/`No access`/`Voice only`/`Messaging only` appears on the handset display.

     NOTICE: When set to **Yes** (default), it overrides the **Indication off** setting (in **Device** > **General** > **No network warning** or **No access warning**), that is, the dialog window is still shown.

   - **No** – The dialog window `No network`/`No access`/`Voice only`/`Messaging only` does not appear on the handset display.

3.4.14 Shared Phone

It is possible to use the handset as a shared phone. When sharing a phone with multiple users, each user has their individual settings that are accessible using a personal user name and password (the password can be a common password for all users or the call number).

To use the shared phone functionality, the following is required:

- A handset without certificates
- A WSG

It is possible to set the same password on multiple personal handsets.

NOTICE: If a personal phone number is accidentally entered into the shared handset, the handset becomes personal and cannot be used as a shared phone any longer. The handset must be configured to be a shared phone again.

By default, the handset is in **Personal** mode. To set it to **Shared**, perform the following steps in WinPDM/WSG DM :

1) Select **Device** > **General**.
2) In the **Phone mode** drop-down list, select one of the following:
   - **Personal**
   - **Shared**

3.4.15 Shortcuts

One-click access to predefined functions can be configured for soft keys, hot keys, navigation keys, and the multifunction button. For example, a soft key can be configured to make a call. Generally, shortcuts are only available when not in a call and in idle mode. Although, a hot key configured to Services with, for example, **Send data**, is available during calls in case of WL4 Plus .

Shortcuts can be configured in the **Shortcuts** menu in WinPDM/WSG DM , except for soft keys that can be configured in the **User Profiles** folder.

3.4.15.1 Configure a Hot Key

A hot key is activated by pressing a pre-programmed button **0**, **2**–**9** for more than 1 second in idle mode. For example, the hot key function can be used to change the profile, send a message, or make a phone call to a specific number.

1) Select **Shortcuts** > **Hot keys 0** (or 2–9).
2) Continue with Shortcut Settings on page 37.

3.4.15.2 Configure a Soft Key

When configuring soft keys, both name and function must be set.

1) Select **User Profiles** > **Normal/Profile X** > **Soft keys** > **Soft key left**, **Soft key middle**, or **Soft key right**.
2) In the **Soft key name** field, enter the name of the soft key shortcut to be displayed in the handset.
3) Continue with Shortcut Settings on page 37.

3.4.15.3 Configure a Navigation Key

1) Select **Shortcuts** > **Navigation Key Up** (or **Down**, **Left**, or **Right**).
2) Continue with Shortcut Settings on page 37.

3.4.15.4 Configure the Multifunction Button

NOTICE: Applicable to OpenScape WL4 Messaging and WL4 only.

1) Select **Shortcuts** > **Multifunction Button Longpress** (or **Multipress**).
2) Continue with Shortcut Settings on page 37.

3.4.15.5 Shortcut Settings

1) In the **Function** drop-down list, select the required function:
   - **Not used**
   - **Phone call**
   - **Phone call loudspeaker**
   - **Call list**
   - **Contact list**
   - **Central phone book** (system-dependent feature)
   - **Message inbox**
   - **Send message**
   - **Change profile normal**
   - **Change profile X** (1–4) (If selecting profile 1–4, the profile must first be configured, see Profiles on page 42.)
   - **Open menu** (**Main menu**, **Calls**, **Call pickup groups**, **Connections**, **Contacts**, **Messaging** (Applicable to WL4 Plus and OpenScape WL4 WL4 Messaging.), **Services** (Applicable to WL4 Plus.), **Profiles**, **Settings**.
   - **Executive service X** (1–10) (Applicable to WL4 Plus only.)
   - **Logout** (Applicable to license-dependent **Shared phone** feature.)
   - **Call diversions**
   - **RSSI measure**
2) In the **Value** field, enter the applicable value. This is mandatory when using the **Phone call** function.
3) In the **Control question** drop-down list, select **Yes** to display the `Proceed?` window after the key is pressed. This is used to prevent a function from being accessed by mistake.
4) In the **Read only** drop-down list, select **True** to prevent the user from changing the shortcut.

3.4.15.6 Soft Key Functions During Call

It is possible to configure the In Call functions for the left and right soft keys. The In Call functions are accessed by pressing the left or right soft key during a call.

To configure the soft key functions, perform the following steps:

1) Select **Device** > **Call**.
2) In the **Left in call soft key name** or **Right in call soft key name** field, enter the name of the soft key to be displayed during a call.

3) In the **Left in call soft key action** or **Right in call soft key action** drop-down list, select one of the following functions:

- **Conference**
- **Contacts**
- **Messaging** (Applicable to WL4 Plus and WL4 Messaging.)
- **No action**
- **End call**
- **Hold**
- **Loudspeaker**
- **New call** (Put active on hold)
- **Retrieve**
- **Switch**
- **Transfer** (To held call)
- **Transfer to new call** (Blind transfer)

In case **No action** is selected, soft keys are hidden during a call. Instead, the default soft keys **Loudspeaker** and **End call** are displayed.

3.4.16 Import Contacts

Phone book files (local phone book) can be imported to the handset using WinPDM/WSG DM . The phone book file is a tab-separated `.txt` file that contains two items per row, number and name.

For more information, see Installation and Operation Manual, Portable Device Manager for Windows (WinPDM).

3.4.17 Company Phone Book

It is possible to create a phone book that is administered centrally and uploaded to the handset from WinPDM/WSG DM . If this feature is used, the entries from **Contacts** and **Company Phone Book** are merged. The **Company Phone Book** entries are locked and cannot be edited in the handset.

Perform the following steps:

1) Create a Company phone book file. For more information, see Create a Company Phone Book File on page 38.
2) Import the Company phone book file to the WinPDM/WSG DM . For more information, see the Installation and Operation Manual, Portable Device Manager for Windows (WinPDM).
3) Upload the Company phone book file to the handset(s), see the Installation and Operation Manual, Portable Device Manager for Windows (WinPDM).

Create a Company Phone Book File

The company phone book file (`.cpb`) is normally created from an Excel file using a script to extract the information and create the phone book file (`.cpb`). The Excel file, `Company Phonebook.xls`, is delivered by the supplier.

The format of the rows in the phone book file is as follows:
`<Name><tab><phone number><carriage return>`, followed by additional rows for each entry.

The following characters are accepted in the handset number field in the phone book file, but are ignored when the phone book file is created:

- Left parenthesis: (
- Right parenthesis:)
- Hyphen: -
- Space: “ ”

3.4.18 Central Phone Book

NOTICE: Applicable only if your system supports the function.

If the system is equipped with a messaging server with a phone book service, the Central phone book on that server can be accessed from the handset.

1) Select **Device** > **WSG**.
2) In the **Central phone book number** field, enter the number to the Central phone book.

   The number to be used is set to 999999 by default. If the system is not equipped with a Central phone book, this menu option can be removed from the handset by entering an empty value.

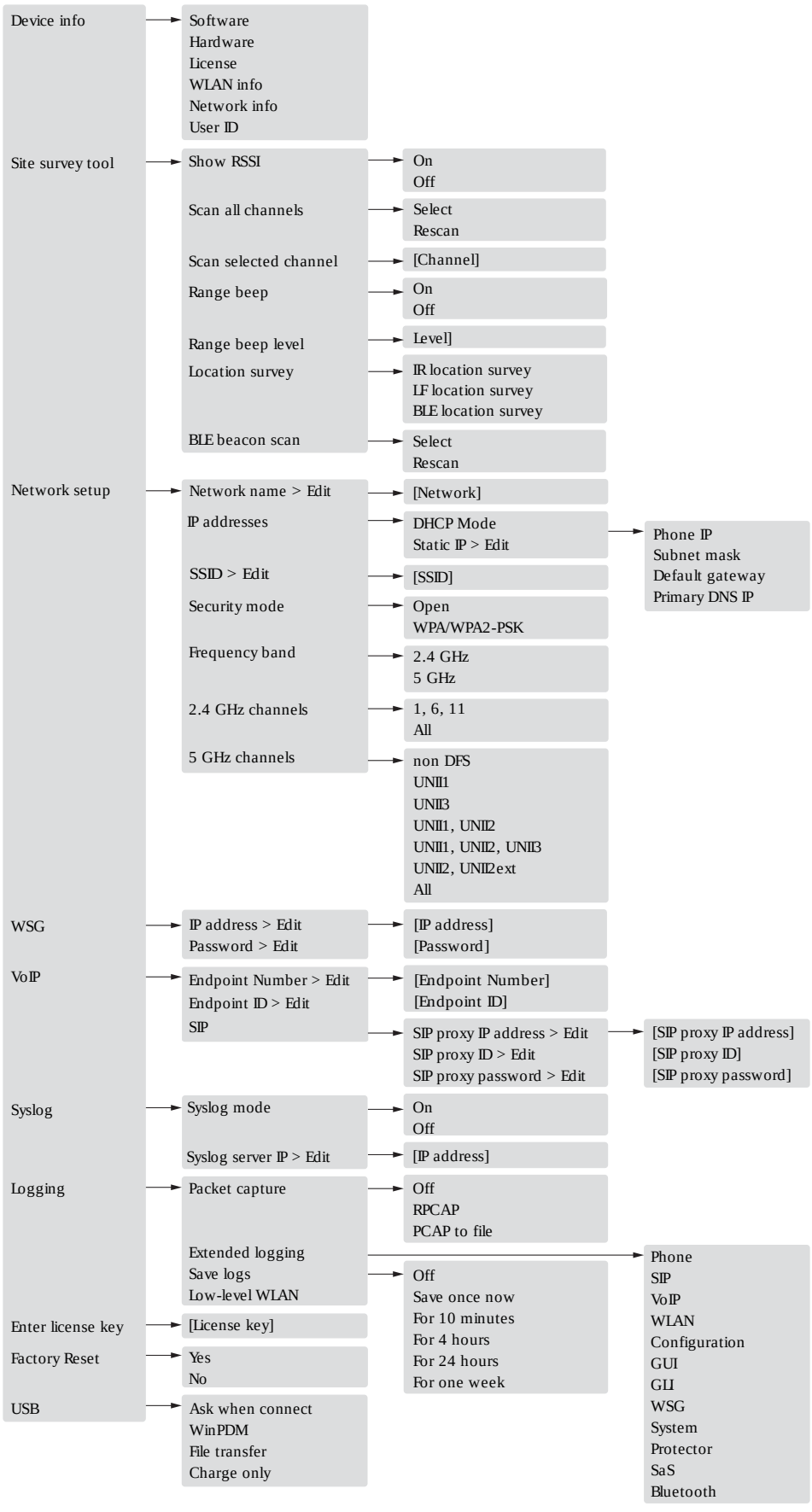
3.4.19 System Administration in the Handset

The handset has a hidden menu for system administrators that contains the following information:

- Device information including software, hardware, WLAN, network, and license information
- Site survey tool
- Network setup menus
- IP address and endpoint number options for WSG, VoIP, SIP, and Syslog server
- Logging options
- Entering license key
- Factory reset option
- USB behavior

To access the **Admin menu**, select **Menu** > **Settings**, and enter the Admin access code. The default code is `40022`, which is configurable in WinPDM/WSG DM .

3.4.19.1 Admin Menu Tree in the Handset



Other menus are described in the User Manual, Unify OpenScape WLAN Phone WL4.

3.4.19.2 Quick Access to Admin Menu Functions and Device Information

For quick access to device information and certain functions, the following codes can be used in idle mode.

Code	Information
*#34#	To access **Device info** in the Admin menu. Select either of the following menus: **Software**, **Hardware**, **License**, **WLAN info**, **Network info**, **User ID**.
*#35#	To access **Enter license key** in the Admin menu.
*#76#	To view RSSI information.
*#77#	To access **Site survey tool** in the Admin menu. Select either of the following menus: **Show RSSI**, **Scan all channels**, **Scan selected channels**, **Range beep**, **Range beep level**, **Location survey**, **BLE beacon scan**.

3.4.20 Change Admin Access Code

In case of a forgotten Admin access code, it is possible to reset it by performing the following steps:

1) Open WinPDM/WSG DM .
2) Select **Device** > **General**.
3) In the **Admin access code** field, enter a new password.

3.4.21 Block Access to the Admin Menu

By default, it is possible to access the Admin menu from the handset. To prevent users from accessing the Admin menu, perform the following steps:

1) Open WinPDM/WSG DM .
2) Select **Device** > **General**.
3) In the **Admin menu access** drop-down list, select **Off**.

3.5 Profiles

3.5.1 User Profiles

User profiles are used to set up customized profiles for incoming calls, message alerts, message volume, vibrating alerts, key sound, etc. This can be useful when more users use the same handset, who want different sound profiles. It can also be used for temporary settings, for example, while in a meeting, incoming calls can be set to silent.

To create a user profile, perform the following steps:

1) Select **User Profiles** > **Profile X** (where X represents the **Normal** profile (default) or **Profile 1**–**Profile 4**).
2) In the **Profile name** field, enter the name of the profile.
3) Configure the following parameters:
   - **Sound and Alerts** — Contains sound and alert settings for calls and messages. See Configure Sound and Alerts on page 42.
   - **Presence and diversion** — Contains settings for message absent and call diversion. See Configure Presence and Diversion on page 43.
   - **Answering** — Contains settings for how incoming calls are answered. See Configure Answering on page 44.
   - **Alarm settings** — Contains settings for which alarm type is used. Applicable to OpenScape WL4 Plus only. See Configure Alarm Settings on page 45.
   - **Soft keys** — Contains shortcut settings to predefined functions using key press. See Configure Soft Keys on page 45.
4) If desired, select the profile to be active, by selecting **User Profiles** and change the default **Active Profile** to the desired profile.

INFO: It is possible to configure profiles through the handset menu as well. See the User Manual, Unify OpenScape WLAN Phone WL4.

3.5.1.1 Configure Sound and Alerts

To configure sounds and alerts, perform the following steps:

1) Select **User Profiles** > **Profile X** > **Sound and Alerts**.
2) In the **Internal ring signal**, **External ring signal**, **Call pickup group ring signal**, and **Callback ring signal** drop-down lists, select one of the following signals:
   - **Ring signal X** – Defines one of the 15 different predefined melodies.
   - **Beep X** — Defines one of the 7 beeps.
   - **Custom sound X** (Custom sound 8–10) – Defines one of the 3 proprietary melodies made by coding with the help of a specific code table.
3) In the **Ring volume mode** drop-down list, select one of the following:
   - **Silent** – There is no ring signal.
   - **Volume X (1–8)** – Different ring signal volumes from lowest (1) to highest (8).

4) In the **Vibrator** drop-down list, select one of the following:
   - **On** – The vibrating alert is active for incoming calls and messages.
   - **On if silent** – The vibrating alert is active for incoming calls and messages only if the handset is muted or the volume is set to **Silent**.
   - **Off** – The vibrating alert is off.
5) In the **Key sound** drop-down list, select one of the following:
   - **Click** – A click is heard when a key is pressed on the handset.
   - **Tone** – A tone is heard when a key is pressed on the handset.
   - **Silent** – There is no sound when a key is pressed on the handset.
6) In the **Message alert** drop-down list, select one of the following:

   NOTICE: Applicable to WL4 Plus and WL4 Messaging only.

   NOTICE: The message sound for incoming messages can be either a melody or a single beep.

   Only the parameter **Custom sounds according to beep code** can be customized. For more information, see Customize the Default Handset Beeps on page 118.

   - **Message X** (1–7) – Defines the message sound for incoming messages as a certain melody.
   - **Beeps according to beep code** – Defines the message sound for incoming messages according to the melody or beep coming from the system.
   - **High beeps according to beep code** – The same type as **Beeps according to beep code**, but with a higher pitch.
   - **Enhanced beeps according to beep code** – The same type as **Beeps according to beep code**, but in the form of a melody.
   - **Custom sounds according to beep code** – Melody coming from defined custom sounds.
7) In the **Message volume** drop-down list, select one of the following:

   NOTICE: Applicable to WL4 Plus and WL4 Messaging only.

   - **Silent** – There is no audible message indication for incoming messages.
   - **Volume X** (1–8) – Different message indication volumes from lowest (1) to highest (8).
   - **Follow ring volume** – The message indication volume follows the ring volume.

3.5.1.2 Configure Presence and Diversion

To configure message absent and call diversion parameters, perform the following steps:

1) Select **User Profiles** > **Profile X** > **Presence and diversion**.

2) In the **Message absent** drop-down list, select one of the following:

NOTICE: Applicable to WL4 Plus only.

- **On** – When a handset receives a message, it indicates that it is absent. The message can be redirected to another destination.
- **Off** – Message absence is disabled.

3) In the **Default diversion number** field, enter a number that will be used if a diversion is activated but no diversion number is set.
4) In the **Diversion no answer number of seconds** field, enter the number of seconds to define the time before a call is diverted when diversion for no answer is enabled.
5) In the **Diversion for all calls (external)** drop-down list, select **Yes** to divert external calls to the number specified in .
6) In the **Diversion on user busy (external)** drop-down list, select **Yes** to divert external calls to the number specified in **On busy diversion number (external)** if the user is busy.
7) In the **Diversion on no answer (external)** drop-down list, select **Yes** to divert external calls to the number specified in **No answer diversion number (external)** if an incoming call is not answered.
8) In the **Diversion for all calls (internal)** drop-down list, select **Yes** to divert internal calls to the number specified in **All calls diversion number (internal)**.
9) In the **Diversion on user busy (internal)** drop-down list, select **Yes** to divert internal calls to the number specified in **On busy diversion number (internal)** if the user busy.
10) In the **Diversion on no answer (internal)** drop-down list, select **Yes** to divert internal calls to the number specified in **No answer diversion number (internal)** if an incoming call is not answered.

3.5.1.3 Configure Answering

To configure how to answer incoming calls, perform the following steps:

1) Select **User Profiles** > **Profile X** > **Answering**.
2) In the **Answering key** drop-down list, select one of the following:
   - **Call key** — Incoming calls are answered by pressing the Call key.
   - **Any key** — Incoming calls are answered by pressing any key.
3) In the **Answer mode** drop-down list, select one of the following:
   - **Normal** – The Call key needs to be pressed to answer the call.
   - **Automatically** – The call is automatically answered after 1 second.
   - **Loudspeaking** – The call is answered in loudspeaking mode by pressing the Call key.
   - **Automatically loudspeaking** – The call is automatically answered in loudspeaking mode after 1 second.

4) In the **Can reply with a message template when rejecting a call** drop-down list, select **Yes**. The dialog window `Reply with a message template?` appears when rejecting an incoming call.

NOTICE: Applicable to WL4 Plus and WL4 Messaging only.

NOTICE: If no message templates are defined, the dialog window is not shown.

For more information, see Message Templates on page 71.

3.5.1.4 Configure Alarm Settings

NOTICE: Applicable to WL4 Plus only.

To configure alarm settings for the different profiles, perform the following steps:

1) Select **User Profiles** > **Profile X** > **Alarm settings**.
2) In the **Man-down alarm** drop-down list, select **Off** or **On** to disable or enable the alarm.
3) In the **No-movement alarm** drop-down list, select **Off** or **On** to disable or enable the alarm.

3.5.1.5 Configure Soft Keys

To configure soft key functions, perform the following steps:

1) Select **User Profiles** > **Profile X** > **Soft keys** > **Soft Key X** (where X represents the left, middle, or right soft key).
2) The following parameters can be configured:

Soft key name – Defines the text that is shown in the handset display above the soft key.

NOTICE: A maximum number of 6 characters fits in the soft key name.

Function – Defines the function to be connected to the soft key. For the list of functions, see Shortcut Settings on page 37.

Value – Defines a value (for example, a phone number) for a function.

NOTICE: Only certain functions require a value.

Control Question – Defines if a `Proceed?` dialog window appears when pressing a soft key.

3.5.2 System Profiles

NOTICE: Applicable to WL4 Plus only.

A system profile can be used when there are certain settings in a handset that the user is not allowed to change.

NOTICE: A system profile overrides all profile **Normal** or **Profile 1**–**Profile 4** settings, on all parameters in the group, for example, soft keys.

To create a system profile, perform the following steps:

1) Create a **System Profiles Sub-Group**.

   The following sub-groups are available:

   - **Presence groups** — Contains settings for message absent and call diversion. See Configure Presence Groups (Sub-group) on page 46.
   - **Answering groups** — Contains settings for how incoming calls are answered. See Configure Answering Groups (Sub-group) on page 47.
   - **Sound and alerts groups** — Contains sound and alert settings for calls and messages. See Configure Sounds and Alerts Groups (Sub-group) on page 47.
   - **Soft key groups** — Contains shortcut settings to predefined functions using soft keys. See Configure Soft Key Groups (Sub-group) on page 48.
   - **Alarm settings groups** — Contains settings for which alarm type is used and how. See Configure Alarm Settings Group (Sub-group) on page 49.
   - **Idle display groups** — Contains settings to show the system profile name during idle mode.

   For more information, see Create System Profile Using Predefined Sub-Groups on page 50.
2) Connect the system profile to the created sub-group(s).

   Once a system profile is created, it can be used whenever desired and can be turned off and on again. For more information, see Activate and Deactivate System Profile on page 51.

3.5.2.1 Configure Presence Groups (Sub-group)

To configure presence groups, perform the following steps:

1) Select **System Profiles** > **System Profiles Sub Groups** > **Presence groups** > **Presence group X**.
2) In the **Name of group** field, enter a descriptive name.

3) In the **Message absent** drop-down list, select one of the following:

NOTICE: Applicable to WL4 Plus only.

- **On** – When a handset receives a message, it indicates that it is absent. The message can be redirected to another destination.
- **Off** – Message absence is disabled.

3.5.2.2 Configure Answering Groups (Sub-group)

To configure answering groups, perform the following steps:

1) Select **System Profiles** > **System Profiles Sub Groups** > **Answering groups** > **Answering group X**.
2) In the **Name of group** field, enter a descriptive name.
3) In the **Answer mode** drop-down list, select one of the following:
   - **Normal** – The Call key needs to be pressed to answer the call.
   - **Automatically** – The call is automatically answered after 1 second.
   - **Loudspeaking** – The call is answered in loudspeaking mode by pressing the Call key.
   - **Automatically loudspeaking** – The call is automatically answered in loudspeaking mode after 1 second.

3.5.2.3 Configure Sounds and Alerts Groups (Sub-group)

To configure sounds and alerts groups, perform the following steps:

1) Select **System Profiles** > **System Profiles Sub Groups** > **Sound and alerts groups** > **Sound and alerts group X**.
2) In the **Name of group** field, enter a descriptive name.
3) In the **Ring volume mode** drop-down list, select one of the following:
   - **Silent** – There is no ring signal.
   - **Volume X (1–8)** – Different ring signal volumes from lowest (1) to highest (8).
4) In the **Vibrator** drop-down list, select one of the following:
   - **On** – The vibrating alert is active for incoming calls and messages.
   - **On if silent** – The vibrating alert is active for incoming calls and messages only if the handset is muted or the volume is set to **Silent**.
   - **Off** – The vibrating alert is off.
5) In the **Internal ring signal**, **External ring signal**, **Call pickup group ring signal**, and **Callback ring signal** drop-down lists, select one of the following signals:
   - **Ring signal X** – Defines one of the 15 different predefined melodies.
   - **Beep X** — Defines one of the 7 beeps.
   - **Custom sound X** (Custom sound 8–10) – Defines one of the 3 proprietary melodies made by coding with the help of a specific code table.

6) In the **Key sound** drop-down list, select one of the following:
   - **Click** – A click is heard when a key is pressed on the handset.
   - **Tone** – A tone is heard when a key is pressed on the handset.
   - **Silent** – There is no sound when a key is pressed on the handset.
7) In the **Message alert** drop-down list, select one of the following:

   NOTICE: Applicable to WL4 Plus and WL4 Messaging only.

   NOTICE: The message sound for incoming messages can be either a melody or a single beep.

   Only the parameter **Custom sounds according to beep code** can be customized. For more information, see Customize the Default Handset Beeps on page 118.

   - **Message X** (1–7) – Defines the message sound for incoming messages as a certain melody.
   - **Beeps according to beep code** – Defines the message sound for incoming messages according to the melody or beep coming from the system.
   - **High beeps according to beep code** – The same type as **Beeps according to beep code**, but with a higher pitch.
   - **Enhanced beeps according to beep code** – The same type as **Beeps according to beep code**, but in the form of a melody.
   - **Custom sounds according to beep code** – Melody coming from defined custom sounds.
8) In the **Message volume** drop-down list, select one of the following:

   NOTICE: Applicable to WL4 Plus and WL4 Messaging only.

   - **Silent** – There is no audible message indication for incoming messages.
   - **Volume X** (1–8) – Different message indication volumes from lowest (1) to highest (8).
   - **Follow ring volume** – The message indication volume follows the ring volume.

3.5.2.4 Configure Soft Key Groups (Sub-group)

To configure soft key groups, perform the following steps:

1) Select **System Profiles** > **System Profiles Sub Groups** > **Soft key groups** > **Soft key group X**.
2) In the **Name of group** field, enter a descriptive name.

3) Select **Soft key group X** > **Soft key X** (left/middle/right), and edit the required settings.

- **Soft key name** – Defines the text that is shown in the handset display above the soft key.

  NOTICE: A maximum number of 6 characters fits in the soft key name.

- **Function** – Defines the function to be connected to the soft key. For the list of functions, see Shortcut Settings on page 37.
- **Value** – Defines a value (for example, a phone number) for a function.

  NOTICE: Only certain functions require a value.

Control Question – Defines if a `Proceed?` dialog window appears when pressing a soft key.

3.5.2.5 Configure Alarm Settings Group (Sub-group)

To configure alarm settings groups, perform the following steps:

1) Select **System Profiles** > **System Profiles Sub Groups** > **Alarm settings groups** > **Alarm settings group X**.
2) In the **Name of group** field, enter a descriptive name.
3) In the **Common** menu, the following parameters can be configured:

- **Stored alarm data** – Predefined information that is sent with the alarm (for example a room number)
- **Indicate triggered alarm with beep signal**
- **Indicate triggered alarm with vibrator**

  NOTICE: If **Silent alarm** enabled, the handset does not show that an alarm has been triggered, that is, there is no sound signal, vibrating alert, dialog window, ALS, or notification light on the display.

4) In the **Alarm on long press** menu, the following parameters can be configured:

- **Alarm type for long press** – Defines the type of alarm that is sent by a long press (press and hold) on the Alarm button. If **Not used** is selected, a predefined number can still be called automatically after an alarm without sending an alarm. For more information, see Call Predefined Number without Sending Alarm on page 75.
- **ALS** – Enables or disables the ramped-up ALS after the alarm has been sent.

  NOTICE: The ALS is paused if the automatic call after alarm is active. For more information, see Call Predefined Number without Sending Alarm on page 75.

5) In the **Alarm on multiple press** menu, the following parameters can be configured:

- **Alarm type for multiple press** – Defines the type of alarm that is sent when pressing the Alarm button twice or more. If **Not used** is selected, a predefined number can still be called automatically after an alarm without sending an alarm. For more information, see Call Predefined Number without Sending Alarm on page 75.
- **ALS** – Enables or disables the ramped up ALS after the alarm has been sent.

> **NOTICE:** The ALS is paused if the automatic call after alarm is active. For more information, see Call Predefined Number without Sending Alarm on page 75.

6) In the **No-movement and Man-down** menu, the following parameters can be configured:

- **Man-down alarm** — Enables or disables the alarm.
- **Man-down detection time** — Delay before the alarm is triggered.
- **No-movement alarm** — Enables or disables the alarm.
- **No-movement detection time** — Delay before the alarm is triggered.
- **Warning phase duration** — Delay before the triggered alarm is sent.
- **ALS** — Enables or disables the ramped-up ALS after the alarm has been sent.

> **NOTICE:** The ALS is paused if the automatic call after alarm is active. For more information, see Call Predefined Number without Sending Alarm on page 75.

3.5.2.6 Configure Idle Display Groups (Sub-group)

> **NOTICE:** By default, the system profile name is displayed in the handset. In case it is not needed to show the system profile name, perform the following steps:

1) Select **System Profiles** > **System Profiles Sub Groups** > **Idle display groups** > **Idle display group X**.
2) In the **Name of group** field, enter a descriptive name.
3) In the **Show name of system profile** drop-down list, select one of the following:

- **Yes** – The system profile name is shown in the handset display in idle mode.
- **No** – The system profile name is not shown in the handset display in idle mode.

3.5.2.7 Create System Profile Using Predefined Sub-Groups

To create a system profile, it must be connected to the desired predefined sub-groups.

NOTICE: Not Used keeps **Normal** profile settings.

To create a system profile using predefined sub-groups, perform the following steps:

1) Select **System Profiles** > **System Profile X**.
2) Configure the required parameters:
   - In the **Profile name** field, enter a descriptive name to identify this system profile.
   - **Activation and deactivation sound** — Defines the sound that is heard when the profile is activated or deactivated.
   - **Presence group** – Defines which predefined presence group (sub-group) is used in this system profile.
   - **Sound and alerts group** – Defines which predefined sound and alerts group (sub-group) is used in this system profile.
   - **Soft keys group** – Defines which predefined soft key group (sub-group) is used in this system profile.
   - **Answering group** – Defines which predefined answering group (sub-group) is used in this system profile.
   - **Alarm settings group** – Defines which predefined alarm settings group (sub-group) is used in this system profile.
   - **Idle display group** – Defines which predefined idle display group (sub-group) is used in this system profile.

3.5.2.8 Activate and Deactivate System Profile

When a system profile is created, it can be activated using WSG DM or a WSG application. For example, the application could be triggered by a positioning beacon.

NOTICE: If a certain system profile always needs to be active on a handset, it is recommended to hide the settings/menus that the user cannot change.

To activate a system profile, perform the following steps:

1) Select **System profiles**.
2) In the **Active system profile** drop-down list, select one of the following:
   - **Normal** – No system profile is used.
   - **System profile 1**–**System profile 5**

A system profile overrides all **User Profile X** and **Normal** (profile) settings on all parameters in the group, see the following two examples.

Example 1

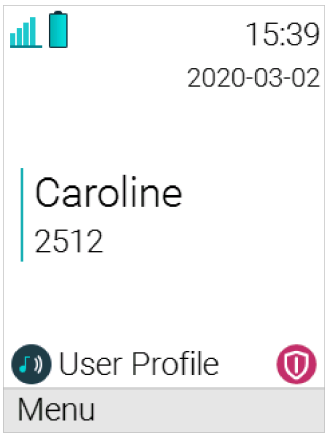


Figure 3: User Profile X/Normal — Soft Key Settings

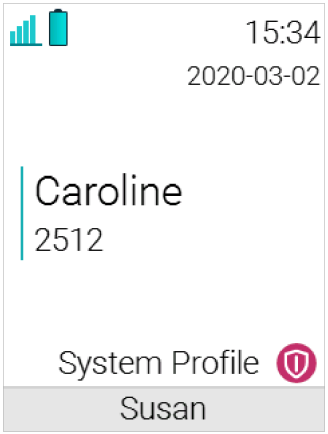


Figure 4: System Profile — Soft Key Settings

In Figure 1, the **User Profile X** (or the profile **Normal**) is configured with a shortcut to open the menu on the left soft key.

In Figure 2, a system profile shortcut to make a call to the administrator Susan, is configured for the free middle soft key (2). When activating the system profile **Susan**, the left soft key **Menu** disappears, because the system profile overrides the complete group of the soft key parameters.

NOTICE: The way parameter groups are arranged is seen under **System Profiles** > **System Profiles Sub Groups**.

Example 2

If any settings are changed that are specified in the system profile, the settings are not applied. In this case, the alarm settings have been configured in the system profile **Alarm**. Then the user cannot change any alarm settings using the handset, although the **Alarm** menu is still visible.

3.6 Telephony

3.6.1 Endpoint ID and Endpoint Number

The **Endpoint ID** and **Endpoint number** are automatically received when registering the handset in the VoWiFi system. The **Endpoint ID** is normally the user's name registered in the PBX and it is displayed in the handset in idle mode. To change the displayed name, see User Display Text on page 77. The **Endpoint number** cannot be changed.

NOTICE: If the **Endpoint ID** needs to be changed, in WinPDM/WSG DM select **VoIP** → **General,** and enter a new ID in the **Endpoint ID** field.

INFO: If required, shorten the **Endpoint number**. For more information, see Endpoint Number Display Length on page 53.

3.6.2 Endpoint Number Display Length

It defines the total number of digits to be displayed on the handset display in idle mode when the Endpoint number is shown. From 1 up to 6 digits (starting from the end of the number), or all, can be displayed.

1) Select **Device** > **Settings**.
2) In the **Endpoint number display length text** field, enter the number length to be displayed.

3.6.3 VoIP Protocol

A protocol is a set of standard rules for data traffic required to send information over a communication channel. The supported VoIP protocol is Session Initiation Protocol (SIP).

1) Select **VoIP** > **SIP**.
2) The following SIP parameters are available:
   - **SIP Transport** – Defines the protocol (**UDP**, **TCP** or **TLS**) to be used for SIP signaling. The TLS setting requires the Root certificate of the PBX certificate (The server must send its complete certificate chain.) to be uploaded as a trusted certificate. It is also possible to turn off the validation of the server certificate by setting **Validate server certificate** to **No**. In the **SIP TLS client certificate** drop-down list, select a certificate to be used for TLS applications, for example. secured VoIP signaling.
   - **Outbound proxy mode** – Select **Yes** if the handsets are to connect with the SIP proxy through an outbound proxy. Set to **No** if the handsets are to connect directly with the SIP proxy (there may be two).

- **Primary SIP proxy** – Defines the primary SIP proxy by either an IP address, a domain name, or an IP address together with a port number.

  Examples of valid formats are the following:

  – `192.168.1.1`
  – `proxy1.mydomain.com`
  – `192.168.1.1:5060`

  Domain names are resolved using DNS records, and refer either to a DNS A record (address record) or a DNS SRV record (service record). While an A record is a single IP address, a SRV record originates from multiple A records, of which the handset tries the two highest prioritized IP addresses it receives in the DNS response when it registers with the primary SIP proxy.

  NOTICE: Only a plain IP address is shown in the handset's Admin menu (under **VoIP** > **SIP** > **SIP proxy IP address**).

  If the handset fails to register with the primary SIP proxy, it can register with the optional secondary SIP proxy.

  NOTICE: The parameter is only visible if **Outbound Proxy mode** is set to **No**.

- **Secondary SIP proxy** – Defines the optional secondary SIP proxy, which is used if the handset fails to register with the primary SIP proxy. See definition examples in Primary SIP proxy above.

  When the handset has connected to the Secondary SIP proxy, it continuously tries to reconnect to the Primary SIP proxy.
- **Outbound proxy** – Defines the primary outbound proxy by a domain name, an IP address, or an IP address with a port number.

  NOTICE: The parameter is only visible if **Outbound Proxy mode** is set to **Yes**.

- **Listening port** – Defines the port that the handset listens to for incoming SIP traffic.
- **SIP proxy ID** – Defines the SIP proxy by a domain name.

  NOTICE: This parameter is only needed when an outbound proxy is defined. It can also be used to specify a domain name when parameters **Primary SIP proxy** and **Secondary SIP proxy** have assigned IP addresses.

- **SIP proxy password** — Defines the password to be used when the handset registers at the SIP proxy.
- **Send DTMF using RFC 2833 or SIP INFO** – Defines the path the DTMF signaling should take. If set to **RFC 2833**, the DTMF signaling is sent in the RTP stream, that is, from handset to handset. If set to **SIP INFO**, the DTMF signaling is sent using SIP signaling, that is, through the PBX.
- **Hold type** – Defines the type of hold that is sent when the handset puts a call on hold. The selection depends on what types of hold the PBX sup-

port. For more information about what types of hold the PBX support, see the applicable documentation for the PBX.

- **Registration identity** – Defines if the endpoint uses its number, ID, or MAC address for the registration with the SIP proxy.
- **Authentication identity** – Defines if the endpoint uses its number, ID, or MAC address for the authentication with the SIP proxy.
- **MOH locally** (Music on Hold) – If supported by the PBX, the handset plays music when a call is on hold. If the PBX does not support MOH, the handset plays a tone when the call is on hold.
- **Hold on transfer** – Puts a second call on hold before transfer, which is required by some SIP proxy servers.
- **Direct signaling** – Defines whether calls originating from other sources than the configured SIP Proxy should be accepted or redirected using `USE PROXY` message.
- **SIP Register Expiration** – Defines the number of seconds for register expiration to the PBX.
- **Disable PRACK** — Disables sending provisional ACK message.
- **Far-End NAT Traversal** — Used when the SIP server is not local and the phones are behind a NAT. Enabling it allows phone communications to traverse a NAT device that is farthest away from the SIP server and near the handsets.

3.6.4 Codec

A codec encodes a stream or signal for transmission, which is often used in streaming media applications. This setting defines how to packetize and compress the sound in a voice call.

1) Select **VoIP** > **General**.
2) In the **Codec configuration** drop-down list, select the applicable codec.
   - **Opus Wideband**
   - **G.711 A-law (EU)**
   - **G.711 u-law (US)**
   - **G.722**
   - **G.729**
   - **G.729A**
3) In the **Codec packetization time configuration** drop-down list, select the packetization time to use for speech (value 20–60 ms).

3.6.5 Offer Secure RTP

When enabled, voice is sent over Secure RTP, if the other party also supports Secure RTP.

SIP Protocol

1) Go to **VoIP** > **SIP**
2) In the **SIP Transport** drop-down list, select **TLS**.
3) Go to **VoIP** > **General**
4) In the **Offer Secure RTP** drop-down list, select **Yes**.

5) Select the preferred SRTP encryption by assigning a value to **VoIP** > **General** > **Secure RTP Crypto**, which appears when enabling **Offer Secure RTP**.

   A padlock icon up left in the handset display indicates either a secure call (locked padlock) or a non-secure call (crossed padlock). Note that the relevant padlock icon only appears if both **TLS** (encrypted signalling), and **Offer Secure RTP** > **Yes** is set.

3.6.6 Internal Call Number Length

Defines the maximum number of digits to be interpreted as an internal call. **0** means the same number of digits as in the endpoint number.

1) Select **VoIP** > **General**.
2) In the **Internal call number length** field, enter the number of digits.

3.6.7 ICE Negotation

ICE negotiation can be used during call setup to enable NAT traversal and WebRTC interoperability. NAT traversal allows data traffic to get to a specified destination when a device does not have a public IP address. The handset supports the ICE, STUN and TURN protocols for NAT traversal.

1) Go to **VoIP** > **General**.
2) In the **ICE Negotiation** drop-down list, select **Yes**.
3) Set the **STUN** and **TURN** parameters depending on the protocol used.

   The following parameters are available when ICE negotiation is enabled:

   - **STUN server address** – Defines the STUN server to use for NAT traversal. Up to two STUN servers can be configured which should be queried

in parallel. The STUN server addresses to the different servers should be separated by a semi-colon (`;`).

The server address must be entered in one of the following formats:

– A single DNS name and an optional port (for example, `stun.example.com:1234`)
– A comma-separated list of one or two IP addresses and optional ports (for example, `172.16.13.1:1234, 172.16.13.2`)

- **TURN server address** – Defines the TURN server to use for NAT traversal.

  A TURN server can be configured and the server address must be entered in one of the following formats:

  – A single DNS name and an optional port (for example, `turn.example.com:1234`)
  – A comma-separated list of one or two IP addresses and optional ports (for example, `172.16.13.1:1234, 172.16.13.2`)

  A TURN server configuration can optionally be followed by a protocol specification such as `turn.company.tld?protocol=prot`, where **prot** can be either `tcp` or `udp`.
- **TURN server user name** – Defines the user name for accessing the TURN server.
- **TURN server password** – Defines the password for accessing the TURN server.

3.6.8 Emergency Call Numbers

Up to five different phone numbers can be reserved for emergency calls. These numbers can always be called even when the phone or key locks are active.

NOTICE: If emergency numbers of varying length are used, care must be taken to ensure that longer numbers do not begin with the same digits and ordering used by a shorter number. For example, if 124 and 1245 define two emergency numbers, the number 1245 cannot be used, because 124 is always evaluated and called before the longer number. However, 5421 and 1256 is, for example, allowed.

1) Select **Device** > **Emergency call Numbers**.
2) In the **Emergency call Numbers** field, enter the desired emergency number(s).

Emergency Ring Signal

A separate ring signal for incoming emergency callbacks can be configured in the WinPDM. It is used to distinguish the emergency ring signal from other handset ring signals. When an emergency call is made from the handset, it first goes to an emergency center that switches the call to the appropriate emergency service. This local emergency service then calls back the handset user who can identify the incoming call by this specific callback emergency ring signal.

1) Select **Audio** > **General**.

2) In the **Emergency ring signal** field, choose the ring signal for incoming emergency callback calls.

For more information, see Emergency Call Alarm on page 75.

3.6.9 Voice Mail Number

In some systems it is needed to assign the handset number of the voice mail service.

1) Select **Device** > **Message center**.
2) In the **Voice mail number** field, enter the number to the handset's voice mail inbox.

3.6.10 Message Center Number

Specifies the number for the server responsible for Message Waiting Indication (MWI), if included in the system.

1) Select **Device** > **Message center**.
2) In the **Message Center number** field, enter the number for the server.

3.6.11 Voice Mail Call Clears MWI

If enabled, the handset deactivates voice mail message waiting indications in the **Message Center** when calling the defined voice mail number.

To enable **Voice mail call clears MWI**, perform the following steps:

1) Select **Device** > **Message center**
2) In the **Voice mail call clears MWI** drop-down list, select **Yes**.

3.6.12 Dial Pause Time

By adding a `P` to a phone number, a pause is added and is activated when dialing.

To configure the duration of the pause, perform the following steps:

1) Select **Device** > **Call**.
2) In the **Dial pause time** field, enter a pause time in the interval 1–3 s.

3.6.13 Quick Answer

The handset automatically answers a call (quick answer) when removed from the charger.

To enable **Quick answer**, perform the following steps:

1) Select **Device** > **Call**.
2) In the **Quick answer** drop-down list, select **Yes**.

3.6.14 Code for Call Completion

Code completion allows the caller of a failed call to be notified when the callee becomes available. To configure this feature, perform the following steps:

1) Select **Device** > **Call**.
2) Configure the following parameters:
   - **Code for call completion busy subscriber** — Enter the code (for example *1) that is used to order call completion on busy subscriber. Leave it empty to disable this feature.
   - **Code for call completion no reply** — Enter the code (for example *2) that is used to order call completion on no reply. Leave it empty to disable this feature.
   - **Code for cancel all call completions** — Enter the code (for example *3) that is used to cancel any active call completions for this handset. Leave it empty to disable this feature.

3.6.15 Code for Hiding Call ID

To enter a code for hiding the call ID, perform the following steps:

1) Select **Device** > **Call**.
2) In the **Code for hide calling ID (CLIR)**, enter the required code.

If left empty, this feature is disabled.

3.6.16 Replace Call Rejected with User Busy

It is used if the system does not support call rejected.

To configure this function, perform the following steps:

1) Select **VoIP** > **General**.
2) In the **Replace Call Rejected with User Busy** drop-down list, select **Yes** or **No**.

3.6.17 Call Waiting Behavior

The default behavior is to indicate call waiting to the user. It is possible to change this behavior so that the next incoming call is rejected, and a busy indication is sent back to the SIP proxy.

To configure **Call waiting behavior**, perform the following steps:

1) Select **Device** > **Call**.
2) In the **Call waiting behavior** drop-down list, select one of the following:
   - **Call waiting indication** – The call is usually indicated by a short two-beep tone and an `Incoming call` dialog window in the handset display.
   - **Reject call** – The call is automatically rejected (No beep tone or dialog window occurs).

3.6.18 Call Waiting Sound

NOTICE: Applicable to OpenScape WL4 Plus and OpenScape WL4 Messaging only.

This parameter defines the sound of the call waiting indication, that is, how the user hears that a second call is waiting, while already in a call. The call waiting sound is either a short two-beep tone, or if the user is located in a noisy environment, a louder melody.

To enable the **Call waiting sound**, perform the following steps:

1) Select **Device** > **Call**.
2) In the **Call waiting sound** drop-down list, select one of the following:
   - **Beep** – The call waiting sound is a short two-beep tone.
   - **Melody** – The call waiting sound is a melody suitable for noisy environments.

WARNING:

Changing to the parameter **Melody** may result in a high sound level as the **Call waiting sound** follows the volume of the active call, and can cause hearing damage.

3.6.19 PTT Call Disconnect Warning

NOTICE: Applicable to WL4 Plus only.

To enable a warning sound if the PTT session is terminated for any other reason than the user ending the call, perform the following steps:

1) Select **Device** > **Call**.
2) In the **PTT Call disconnect warning** drop-down list, select **Yes**.

3.6.20 Hide In Call Function for PTT Calls

To hide the In Call function menu for PTT calls, perform the following steps:

1) Select **Device** > **Call**.
2) In the **Hide In Call function for PTT calls** drop-down list, select **Yes**.

3.6.21 Calling Line Identification Restriction (CLIR)

The handset can be configured to hide the caller's number and name from the callee.

NOTICE: Even if CLIR is enabled, there is an override function available to authorities, such as the police, that allows the caller's identity to be seen.

To hide the caller's number and name, perform the following steps:

1) Select **Device** > **Call**.
2) In the **CLIR (Calling Line Identification Restriction)** drop-down list, select **On**.

3.6.22 Allow Blind Transfer

1) Select **Device** > **Call**.
2) Select **No** to disable the option to do a blind transfer. By default, it is set to **Yes**.

3.6.23 OpenScape 4000 Busy Actions

If supported by the PBX, it is possible to configure up to four prioritized options to be presented to the user when an outgoing call is rejected because the remote party is busy.

To make it available, the SIP server must signal support for the feature and both the function and a valid feature code for it must be set by performing the following steps:

1) In the **OpenScape 4000 busy actions** menu, select option **1**, **2**, **3**, or **4**.
2) In the **Function** drop-down list, select one of the following parameters:
   - **None**
   - **Call completion**
   - **Busy override**
   - **Emergency disconnect**
   - **Emergency intrusion**
3) In the **FAC** field, enter a code to be used.

3.6.24 Pickup Groups

Pickup groups make it possible to answer other users' incoming calls when they are not available.

To configure pickup groups, perform the following steps:

1) Select **Pickup groups** > **1–10**.
2) Configure the following parameters:
   - **Pickup group name** — Enter a descriptive name that identifies this call pickup group in the handset menu.
   - **Pickup group URI** — Enter the URI that identifies this call pickup group in the PBX.
   - **Pickup group status** — Set it to **On** to enable this call pickup group.

3.7 Messaging Settings

NOTICE: Applicable to WL4 Plus and WL4 Messaging.

It is possible to configure how incoming messages are indicated and displayed in the handset.

1) In **User Profiles** > **Normal, Profile X**, the following parameters can be configured:
   - **Vibrator** — Defines if the handset vibrates when receiving incoming calls and messages.
   - **Message alert** — Defines the message sound for incoming messages. For more information, see Configure Sound and Alerts on page 42.
   - **Message volume** — Defines the message volume for incoming messages. By default, the message volume follows the ring volume, but a different message volume can be set with this parameter. For more information, see Configure Sound and Alerts on page 42.
2) In **Device** > **Messaging**, the following parameters can be configured:
   - **Message list representation** — Can be set to number/name or message text.
   - **Message text size** — Defines the text size used when displaying messages.
   - **Time to read (TTR)** — Defines if the user needs to close a message manually, or if the message automatically closes when the TTR expires. Regardless of how a message is closed, it is removed from the message queue and stored in the Messaging Inbox. TTR starts when a message is displayed and continues to run when the message is placed in the messaging queue. If a user presses any key when a message is displayed, the TTR is reset. See also Examples of TTR and TTP Settings on page 67.

     The following options can be selected:

     – **Close manually**
     – **10/20/30 seconds**
     – **1/2/5/10 minutes**
   - **Time to prioritize (TTP)** — Defines how long time messages keep their priority status. The TTP starts when a message is displayed. If a user presses any key when a message is displayed, the TTP is reset. If receiving a message with higher priority than the displayed message, the message with lower priority is placed in queue and its TTP is paused. When the TTP elapses for a message, it is put last in the queue. See also Examples of TTR and TTP Settings on page 67.

     The following options can be selected:

     – **No prioritization**
     – **Prioritize 10/20/30 seconds**
     – **Prioritize 1/2/5/10 minutes**
     – **Prioritize forever**
   - **Repeat message indication** — This parameter enables/disables message indications. It sets whether a message indication is repeated until

confirmed by the user or not. The repetition rate is 7 seconds. If the message itself contains a repetition, it overrides this setting.

- **Vibrator for message during call** — Defines if the handset vibrates when receiving messages during an ongoing call. The following options are available:
- **Message alert during call** — Defines if a message alert should be played when receiving a message during a call. The following options are available:
  - **Never activated**
  - **Only for urgent messages**
  - **Always activated**
- **IM option mode** — This parameter is used for customer-specific applications and sets that three soft keys are placed automatically, that is on soft keys or in an option menu (list).
- **Call priority**

  This parameter defines the following:

  - Whether call information presented on the display during an incoming, ongoing, and outgoing call is suppressed when viewing a message.
  - Whether an ongoing call is disconnected when receiving a PTT invitation with **Answer mode** set to **Automatically**.

  0 – Call indication overrides all messages and the ongoing call is never disconnected (default).

  1–9 – Comparison with message priority; highest priority is shown, and a PTT invitation with higher priority causes disconnection of ongoing call.

  10 – Call indication on the display is always suppressed and the ongoing call is always disconnected by a PTT invitation.

  The tables below show examples of priority settings and how they affect the handset's behavior.

Table 2: Call Priority vs PTT Priority

Call priority	PTT invitation (priority)[1]	Disconnection of ongoing call?
0	1	No, since this call priority setting overrides all PTT invitations regardless of priority.
6	6	No, an ongoing call is not disconnected when the priority is equal.
2	1	Yes, immediately since the PTT priority is set to 1 and is also higher than Call priority.
3	2	Yes, after 10 seconds since the PTT priority is higher than Call priority.

[1] PTT invitation received as incoming call has always priority 6, while PTT invitation received as message can have priority 1–9 depending on configuration.

Call priority	PTT invitation (priority)[1]	Disconnection of ongoing call?
10	1	Yes, immediately since the PTT priority is set to 1 and also is higher than Call priority.
10	2	Yes, after 10 seconds since the PTT priority is higher than Call priority.

Table 3: Call Priority vs Message Priority

Call priority	Displayed message (priority)	Call information suppressed?
0	1	No, since this call priority setting overrides all messages regardless of priority.
7	6	Yes, since the priority of the displayed message is higher than the incoming call.
6	6	Yes, since the message is considered as most important when the priority is equal.
1	3	No, since the priority of the incoming call is higher than the displayed message.
10	1	Yes, the call information is always suppressed regardless of the message priority.

- **Show and indicate messages in charger** — Defines how incoming messages are displayed/indicated when the handset is placed in the charger.

  NOTICE: All incoming messages are affected by this setting including PTT invitations received as messages and all other messages regardless of priority (even messages with breakthrough such as high/alarm priority).

  To silence only messages without breakthrough (low/normal priority), enable the **Sound off** parameter instead in **Device** > **Settings** > **In charger action**.

To silence only messages without breakthrough (low/normal priority), enable the **Sound off** parameter instead in **Device** > **Settings** > **In charger action**.

For more information, see Rotate Display Text on page 78.

[1] PTT invitation received as incoming call has always priority 6, while PTT invitation received as message can have priority 1–9 depending on configuration.

3.7.1 Configure Message Alerts with Beep Codes

The handset can map beep codes sent from a system/an application to different message alerts. There are several ways to treat the beep codes.

INFO: Message alerts can be configured in WinPDM/WSG DM in **Profiles** > **Normal/Profile X** > **Message alert**.

NOTICE: Only the parameter **Custom sounds according to beep code** can be customized. For more information, see Customize the Default Handset Beeps on page 118.

3.7.1.1 Configure Beeps or High Beeps According to Beep Code

Beep code sent from a system or application	Corresponding sound from the handset
Beep code 0	No message alert is played
Beep codes 1–6	1–5, and 10 beeps, respectively
Beep code 7	Siren

In case of regular beeps, the handset plays the original message alerts that are mapped to the beep codes. In case of high beep codes, the handset plays the original message alerts that are mapped to the beep codes with a higher pitch than the regular beeps.

1) Select **Settings** > **Sound and alert**.
2) In the **Message alert** drop-down list, select **Beeps** or **High beeps**.

3.7.1.2 Enhanced Beeps According to Beep Code

Beep code sent from a system or application	Corresponding sound from the handset
Beep code 0	No message alert is played
Beep codes 1–3	1–3 beeps, respectively
Beep code 4	3 tones chime
Beep code 5	10 beeps
Beep code 6	Alarm sweep
Beep code 7	Siren

The handset plays the extended message alerts that are mapped to the beep codes, but in the form of melodies.

1) Select **Settings** > **Sound and alerts**.

2) In the **Message alert** drop-down list, select **Enhanced beeps**.

3.7.1.3 Custom Sounds According to Beep Code

Beep code sent from a system or application	Corresponding sound from the handset
Beep code 0	No message alert is played
Beep codes 1–7	Corresponding customized sound

The handset can play customized message alerts that are mapped to beep codes. The message alerts must first be customized and then mapped to the beep codes.

NOTICE: It is recommended to use this feature to create a message alert that sounds like the equipment (for example a respirator) that generates an alarm. Also use custom sound, if it is desired to customize any of the default handset beeps (Beeps and Enhanced beeps), see Configure Custom Sounds on page 116.

Create Customized Sound

1) Select **Audio** > **Custom sounds** > **Custom sound X** (where X represent 1–10).
2) Set the following parameters:
   - **Label** – The name of the custom sound (required). The name is visible when mapping the custom sound to a beep code later on.
   - **Melody** – The text string represents a non-polyphonic sound. By default, example of melodies, which are based on Enhanced beeps, are set for Custom Sound 1–7, see Configure Custom Sounds on page 116.
   - **Beat** – The tempo in beats per minute to be used when playing the sound.
   - **Style** – The ratio of note to rest period to be used when playing the sound.
   - **Instrument** – The instrument to be used when playing the sound.

Map Beep Codes to Customized Sounds

1) Select **Audio** > **Custom message alert**.
2) In the **Beep code** drop-down lists, select the customized sounds (8–10 available) to be used for respective beep codes.

Enable Customized Sound

1) Select **User profiles** > **Profile X** > **Sound and alerts**.
2) In the **Message alert** drop-down list, select **Custom sounds according to beep code**.

3.7.2 Message Retransmit Limit

This parameter defines the number of retransmissions before the transmission of the message is considered as failed. The retransmission procedure begins if a sent message is not acknowledged within 15 seconds.

1) Select **Device** > **WSG**.
2) In the **Message Retransmit Limit**, set the maximum number of retransmissions.

3.7.3 Examples of TTR and TTP Settings

Example 1

This example describes the message handling with the following message settings:

TTP – Prioritize forever

TTR – Close manually

NOTICE: It is recommended to use these settings if messages with the highest priority are always displayed until the user closes the current message.

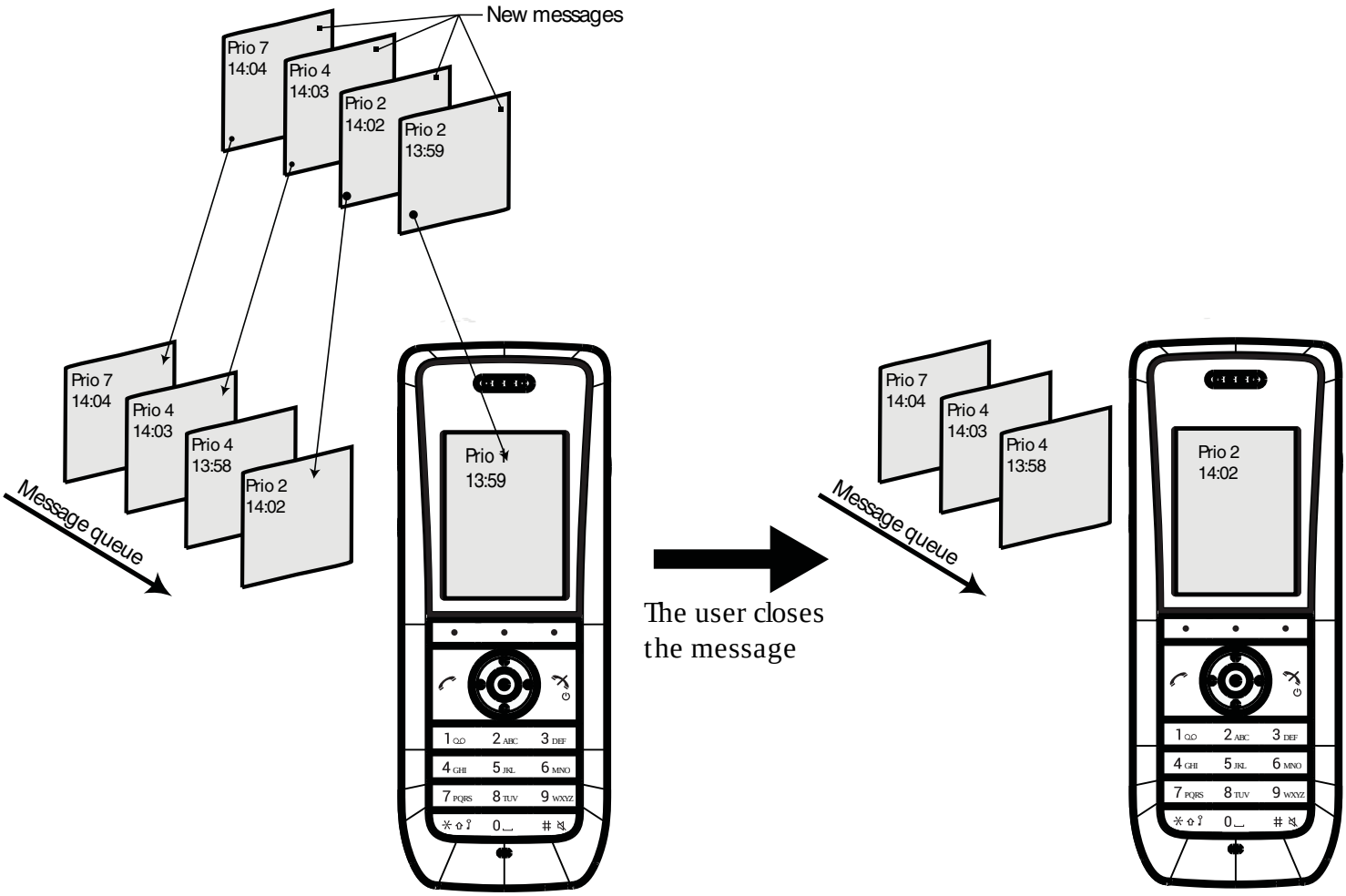


Figure 5: Queuing and Prioritizing for Messages with Equal Priorities

In Figure 5: Queuing and Prioritizing for Messages with Equal Priorities on page 68, a message with priority 2 is received at 13:59 and is displayed in the handset. Another message with equal priority is received at 14:02 and is placed in the queue. If no messages with higher priority are received, the user needs to close the currently displayed message to show the next message in the queue, in this case, the message received at 14:02. The closed message is indicated as a read message in the Messaging inbox.

Example 2

This example describes the message handling with the following message settings:

TTP – 20 seconds

TTR – Close manually

NOTICE: It is recommended to use these settings in case the user needs not to be interrupted for 20 seconds while reading a message, unless a message with a higher priority is received. After the user has read a message, its priority is no longer important, and the TTP expires.

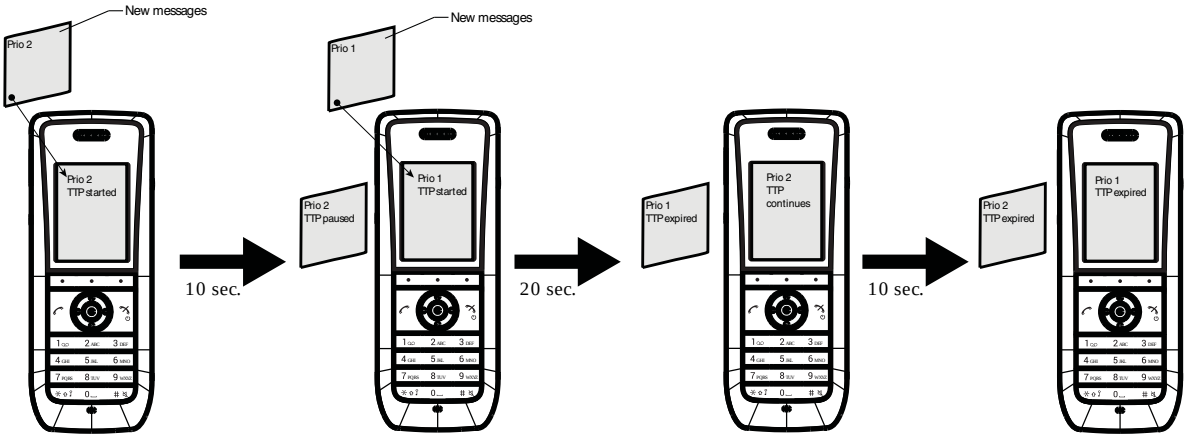


Figure 6: Queuing and Prioritizing for Messages with Different Priorities

In Figure 6: Queuing and Prioritizing for Messages with Different Priorities on page 69, a message with priority 2 is received and displayed in the handset, and the TTP for the message is started.
After 10 seconds, a second message with priority 1 is received and displayed while the message with priority 2 is put in the queue. TTP for the message with priority 2 is paused, and TTP for the message with priority 1 is started.

After 20 seconds, TTP expires for the message with prio 1 and the message is placed in the queue. The message with priority 2 is shown again and its TTP continues.

TTP expires after 10 seconds for the message with priority 2. In this case, all messages have been shown for 20 seconds each, and the oldest shown message with the highest priority is displayed, in this case, the message with priority 1. The handset does not indicate when it shows the message again, since it already has been shown and indicated once. The message with priority 2 is placed in the queue.

Example 3

This example describes the message handling with the following message settings:

TTP – 20 seconds

TTR – 2 minutes

NOTICE: It is recommended to use these settings in case the user needs not to be interrupted for 20 seconds while reading a message, unless a message with a higher priority is received. After the user has read a message, its priority is no longer important, and the TTP expires.

In addition, if a message is not shown again within the TTR interval, it is considered as not important and is removed from the queue.

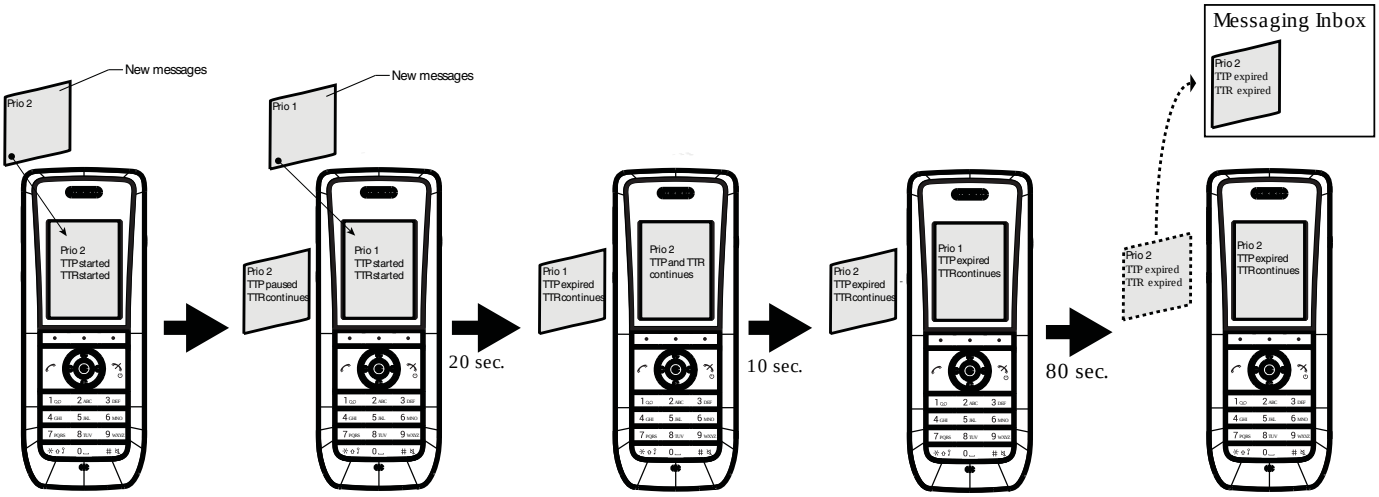


Figure 7: Message Handling without Manually Closing a Message

In Figure 7: Message Handling without Manually Closing a Message on page 70, a message with priority 2 is received and displayed in the handset. TTP and TTR for the message is started.

After 10 seconds, a second message with priority 1 is received and displayed while the message with priority 2 is put in the queue. TTP for the message with priority 2 is paused, but TTR continues. TTP and TTR for the message with priority 1 is started.

After 20 seconds, TTP expires but TTR continues for the message with prio 1 and the message is placed in the queue. The message with priority 2 is shown again and its TTP continues.

TTP expires after 10 seconds but TTR continues for the message with priority 2. In this case, all messages have been shown 20 seconds each, and the oldest shown message with the highest priority is displayed, in this case, the message with priority 1. The handset does not indicate when it shows the message again, since it already has been shown and indicated once. The message with priority 2 is placed in the queue.

After 80 seconds, the TTR expires for the message with priority 2, and it is removed from the queue and is indicated as an unread message in the Messaging inbox. When TTR expires for the message with priority 1, it is also indicated as an unread message in the Messaging inbox.

If no messages have been read/closed manually and TTP expires for each message, a dialog window `New message(s): [number of messages]. View now?` is displayed. All messages are indicated as unread messages in the Messaging inbox.

Example 4

This example describes the message handling with the following message settings:

TTP – No prioritization

TTR – Close manually

NOTICE: It is recommended to use these settings if messages regardless of priority are read in chronological order, that is, the newest message is displayed first.

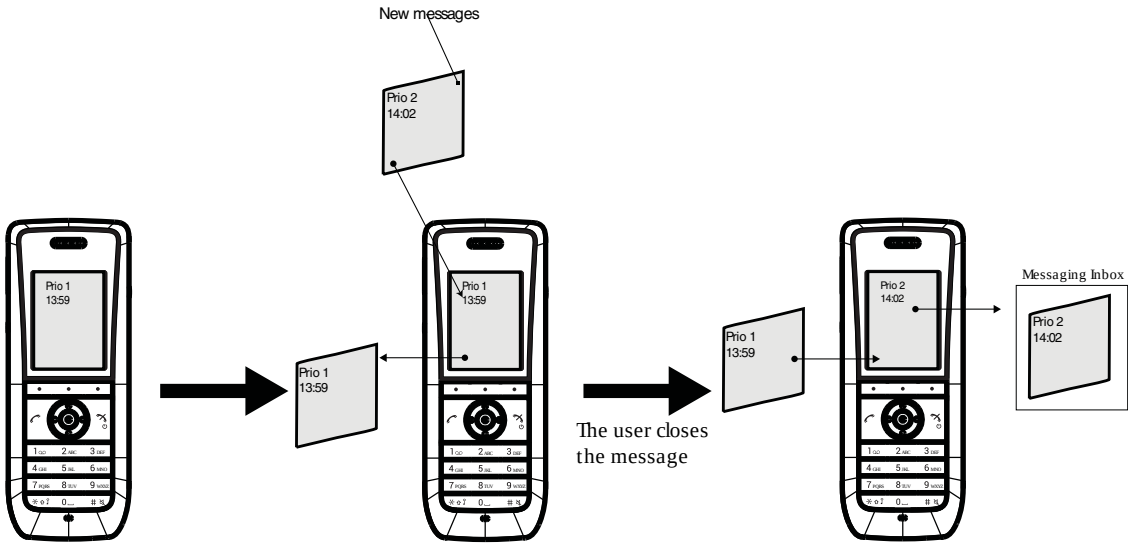


Figure 8: Messages Displayed in Chronological Order Regardless of Priority

In Figure 8: Messages Displayed in Chronological Order Regardless of Priority on page 71, a message with priority 1 is received at 13:59. Another message with priority 2 is received at 14:02 and is displayed. The message with priority 1 is put in the message queue. The user needs to close the current message with priority 2 to show the message with priority 1 in the queue. When closing the message with priority 2 it is indicated as a read message in the Messaging inbox.

3.8 Message Templates

NOTICE: Applicable to OpenScape WL4 Plus and OpenScape WL4 Messaging.

Handsets can be configured with predefined messages using the message template function.

A predefined message can be used in the following ways:

- The user can decline the call but still acknowledge the receipt of the call by selecting a predefined message and sending it to the caller (requires a parameter setting, see Configure the Handset for Message Templates on page 72 below).
- The user replies to an incoming text message by selecting a predefined message and sending it to the message sender (works by default).
- The user can construct a text message from a predefined message (works by default).

For additional information about how the message template function is used, see the User Manual, Unify OpenScape WLAN Phone WL4.

3.8.1 Configure the Handset for Message Templates

To activate the message template function in the handset so that a user can decline a call with a predefined message, perform the following steps using WinPDM/WSG DM :

1) Select **User Profiles** > **Profile X** > **Answering**.
2) In the **Can reply with a message template when rejecting a call** drop-down list, select **Yes**. The dialog window `Reply with a message template?` appears when rejecting an incoming call.

NOTICE: Applicable to WL4 Plus and WL4 Messaging only.

NOTICE: If no message templates are defined, the dialog window is not shown.

3.8.2 Create Message Templates

A handset can be configured with up to five predefined messages. A message cannot exceed 50 characters.

To create a message, perform the following steps in WinPDM/WSG DM :

1) Select **Device** > **Messaging** > **Message Template X** (where X is 1–5).
2) In the **Message text** field, write a message, then click **OK**.

NOTICE: If a system uses a character set other than UTF-8 for SMS, make sure that the characters entered into the message strings are compatible with the character set used by the system. Entering characters that cannot be encoded by the system may cause a type conversion error, the failure of the message to arrive at the intended recipient, and a `Message failed` dialog window appears in the sender handset.

3.9 Alarm Settings

NOTICE: Applicable to WL4 Plus only.

The following alarm types can be configured in the WinPDM/WSG DM :

- Push-button alarm
- Test alarm
- Emergency call alarm
- Man-down and No-movement alarm

3.9.1 Common Alarm Settings

To configure the common alarm settings, perform the following steps:

1) Select **Alarm** > **Common**.
2) Set any of the following parameters:

   - **Stored alarm data** — Information that is sent together with an alarm (for example a room number).
   - **Indicate triggered alarm with vibrator**
   - **Indicate triggered alarm with beep signal**

   NOTICE: If the parameter **Silent alarm** is set, no indication will be shown that an alarm has been sent or received, that is, there is no beep, vibrating alert, or dialog window.

   - **Password protect ALS** — Defines if a password is required to turn off the Acoustic Location Signal (ALS).
   - **Number for automatic call after alarm** — Defines which number the handset automatically calls after an alarm is sent. This number can also be dialed without sending an alarm, see Call Predefined Number without Sending Alarm on page 75.

   See also Push-Button Alarm on page 73–Man-down and No-movement Alarm on page 74 for additional parameter settings.

3.9.2 Push-Button Alarm

It is possible to configure how push-button alarms are handled in a system.

A push-button alarm can be activated by a user in two different ways:

- By a single long press
- By multiple presses

The following alarm types can be set:

- Push-button alarm
- Test alarm

1) Select **Alarm**.
2) Select **Multiple-press** or **Long-press**.
3) In the **Alarm type for multiple press** drop-down list or **Alarm type for long press** drop-down list, select **Push button alarm 1**.
4) In the Number for automatic call after alarm field, enter the number to be called after an alarm has been activated (optional).
5) In the ALS drop-down list, select **Yes** to define if a ramped up Acoustic Location Signal (ALS) sounds after pressing the Alarm button.
6) In the **Text indication for alarm on multiple press** field or **Text indication for alarm on long press**, write the text to be shown in the handset display when the Alarm button is pressed. If this field is empty, the default text for long press `Test alarm` or for multiple press `Personal alarm` is shown.
7) In the **Mode for automatic call after alarm** drop-down list, select one of the following:

   - **Monitor** – The loudspeaker is muted and the microphone is on.
   - **Loudspeaker** – The loudspeaker is turned on.
   - **Ordinary** – The loudspeaker is turned off.

3.9.3 Test Alarm

To test if an alarm is working properly, perform the following steps:

1) Select **Alarm**.
2) Select **Multiple-press** or **Long-press**.
3) In the **Alarm type for multiple press** drop-down list or **Alarm type for long press** drop-down list, select **Test alarm**.
4) In the **Number for automatic call after alarm** field, enter the number to be called after an alarm has been activated (optional).
5) In the **ALS** drop-down list, select **Yes** to define if a ramped ALS sounds after pressing the Alarm button.
6) In the **Text indication for alarm on multiple press** field or **Text indication for alarm on long press**, enter the text to be displayed in the handset when the alarm has been activated.
7) Select an option in the **Mode for automatic call after alarm** drop-down list. See **Mode for automatic call after alarm**
.

3.9.4 Man-down and No-movement Alarm

NOTICE: Applicable to WL4 Plus only.

The following parameters are available in the **Alarm** > **Man-down and No-movement alarm** menu:

- **Man-down detection time** — Time in seconds before the man-down warning phase is started.
- **Man-down warning angle** — The handset tilt from vertical position at which the alarm is detected.
- **No-movement detection time** — Time in seconds before the no-movement warning phase is started.
- **Warning phase duration** — Delay before the triggered alarm is sent.
- **NM-MD extra delay used** — Enables or disables the possibility of an extra delay by pressing the Sound off key and then confirming it by selecting **Yes**.
- **NM-MD extra delay time** — The time of the extra delay in minutes before the alarm is triggered.
- **ALS** — Enables or disables the ramped-up ALS after the alarm has been triggered.

  NOTICE: The ALS is not triggered if **Automatic call after alarm** is active.

- **Mode for automatic call after alarm**:
  - **Off** – No automatic call after alarm.
  - **Normal** – The call is established as an ordinary call.
  - **Loudspeaker** – The loudspeaker on the back of the handset is turned on.
  - **Monitoring** – A one-way speech channel is established, that is, the called part can only listen to a conversation.

- **Turn off NM-MD during call** — Enables or disables Man-down and No-movement alarms during a call.
- **Reset man-down warning automatically** — Resets Man-down warning when the handset is below the warning angle.

3.9.5 Emergency Call Alarm

1) Select **Alarm** > **Emergency call**
2) In the **Emergency call alarm** drop-down list, select one of the following:
   - **On** – An alarm is sent when the user calls an emergency number.
   - **Off** – No alarm is sent when the user calls an emergency number.
3) In the **Alarm type text** field, write the text to be shown in the handset display when an emergency call alarm is triggered. If this field is empty, the default text `Emergency call alarm` is shown.

For more information, see Emergency Call Numbers on page 57.

3.9.6 Call Predefined Number without Sending Alarm

It is possible to use the push-button to automatically dial a predefined number without sending an alarm, that is, using the Alarm button only to call a predefined number. The following example describes how to configure the push-button (alarm on long press). The corresponding settings can also be configured for the push-button when it is pressed twice or more (alarm on multiple press).

1) Select **Alarm** > **Common**.
2) In the **Number for automatic call after alarm** field, enter the number to be dialed.
3) Select **Alarm** > **Alarm on long press**.
4) In the **Alarm type for long press** drop-down list, select **Not used**.
5) In the **Mode for automatic call after alarm** drop-down list, select one of the following:
   - **Off** – No call is established after alarm.
   - **Normal** – The call is established as an ordinary call.
   - **Loudspeaking** – The loudspeaker is turned on.
   - **Monitoring** – A one-way speech channel is established, that is, the called part can only listen to a conversation.

Information about the handset's location is sent using an alarm (if available). For details, see Location on page 81.

3.10 Regional Settings

3.10.1 Set Time & Date

To set the time and date, perform the following steps:

1) Select **Device** > **General**.
2) In the **Time zone** drop-down list, select the applicable time zone.

3) If the time zone **Other** is selected, a string must be entered in the **Time zone string** field to define the time zone.

   For time zones, see `http://www.timeanddate.com`.

   NOTICE: Only unquoted format is supported.

   Enter the time zone string to automatically update for daylight saving time:
   `<String = StdOffset [Dst[Offset], Date/Time, Date/Time]>`

   - **Std** – Time zone (for example EST for Eastern Standard Time).
   - **Offset** – Time difference between the time zone and the UTC (Universal Time Coordinator).
   - **Dst** – Daylight saving time zone (for example EDT for Eastern Daylight Time).
   - **Second Offset** – Time difference between the daylight saving time and the UTC.
   - **Date/ Time, Date/ Time** – The beginning and end of daylight saving time.
     - **Date format** – Mm.n.d (d day of n week in the m month)
     - **Time format** – hh:mm:ss in 24-hour format

   NOTICE: A week always starts on a Sunday and the number for Sunday is 0.

   Example:

   North Carolina is located in the Eastern Time Zone. Eastern Standard Time (EST) is 5 hours behind UTC (StdOffset = EST5), the Eastern Daylight Time (EDT) is 4 hours behind UTC (DstOffset = EDT4). The daylight saving time for the year 2013 begins at two a clock, on a Sunday, the second week in March (M3.2.0/2). The daylight saving time ends at two a clock, on a Sunday, the first week in November (M11.1.0/2).

   `<String = EST5EDT4,M3.2.0/2,M11.1.0/2>`

4) In the **NTP server** field, enter the address of the time server. If it is not set, the IP PBX address is used.
5) Select **Device** > **Settings**.
6) In the **Time format** drop-down list, select one of the following time formats.
   - 12:00 (AM/PM)
   - 24:00
7) In the **Date format** drop-down list, select the required date format.

3.10.2 Select Default Language and Writing Language

The **Language** option defines the default language of the handset. This setting can later be changed by the user.

The **Writing language** option defines the language used when writing in text fields.

1) Select **Device** > **Settings**.
2) In the **Language** and the **Writing Language** drop-down lists, select the languages to be used.

3.10.3 Dialing Tone Pattern

To define the tone pattern to use when dialing, perform the following steps:

1) Select **Audio** > **General**.
2) In the **Dialing tones pattern** drop-down list, select the applicable region.

3.11 Display

3.11.1 Hide Menu Items

It is possible to hide certain menu items in the handset.

To configure **Visibility**, perform the following steps:

1) Select **Customization** > **Visibility**.
2) Select **Hide**, **Show**, or **Read only** for the applicable menu item in the drop-down list. If **Read only** is selected, the menu item is visible in the handset, but cannot be edited by the user.

   Several menu items of the following categories can be hidden:

   - **Connections**
   - **Calls**
   - **Contacts**
   - **Shortcuts**
   - **Messaging** (Applicable to WL4 Messaging and WL4 Plus only.)
   - **Services** (Applicable to only WL4 Plus.)
   - **Profiles**
   - **Settings**

3.11.2 User Display Text

It defines the text to be shown on the display in idle mode. If nothing is entered in this text field, the endpoint ID is displayed.

1) Select **Device** > **Settings**.
2) In the **User display text** field, enter the text to be displayed.

3.11.3 User Display Number

It defines the number to be shown on the display in idle mode. If this parameter is empty, the Endpoint number is shown.

1) Select **Device** > **Settings**.
2) In the **User display number** field, enter the number to be displayed.

3.11.4 Rotate Display Text

The handset can be configured to show the contents of the display (except the soft key bar) upside-down at incoming calls or messages. It can also be configured in the handset menu.

1) Select **Device** > **Settings**.
2) In the **Rotate display text** list, select **Off** or **On**.

3.11.5 Font Style

The display font style can be changed to bold for improved readability. It can also be configured in the handset menu.

1) Select **Device** > **Settings**.
2) In the **Font style** list, select **Normal** or **Bold**.

3.11.6 Backlight Timeout

The **Backlight timeout** option defines the number of seconds before the backlight of the handset is turned off in idle mode.

To set the time that passes before the backlight is turned off, perform the following steps:

1) Select **Device** > **General**.
2) In the **Backlight timeout** field, enter the number of seconds (1–60 s).

3.11.7 Brightness

To configure the brightness of the handset, perform the following steps:

1) Select **Device** > **Settings**.
2) In the **Brightness** drop-down list, select one of the following:
   - **Normal** – Maximum backlight is used.
   - **Power save** – Reduced backlight is used.

The brightness can also be set in the handset menu.

3.11.8 Screen Saver

The handset can be configured to display some or no information when it is not in use and when it is placed in a charger.

To configure the screen saver, perform the following steps:

1) Select **Device** > **Settings**.

2) In the **Screen saver** drop-down list, select one of the following:
   - **Information** – Time and status is shown on the screen saver.
   - **Black** – No information is shown on the screen saver.
   - **Black also in call** – The **Black** screen saver (with no information) is shown also during phone calls.

NOTICE: It is recommended to use the screen saver setting **Black also in call** to extend battery life.

The screen saver can also be configured in the handset menu.

3.12 Services

NOTICE: Applicable to WL4 Plus only.

It is possible to configure up to 10 services that can be accessed from the handset's **Services** menu.

1) Select **Services**.
2) Select in the range of 1–10.
3) In the **Service name** field, enter the name of the service to be displayed in the handset's **Services** menu.
4) Under **Service function**, select the service to be used:
   - **Phone Call**
   - **Send data** (predefined data and/or prompt for the data)
   - **Send a message** (prompt for the message text)
   - **Push-to-Talk**
   - **Edit alarm data**
5) In the **Service user data** field, enter the data to be sent/dialed when using the service.

NOTICE: This field is not applicable for PTT.

---

6) In the **Service prefix for user data** field, enter the prefix for the service user data (if needed).
7) In the **Service index** field, enter the corresponding index used for PTT. For example, if PTT group 1 is configured (located under **Push-To-Talk** > **1**), the service index must be set to **1**.

NOTICE: This field is only applicable for PTT.

If the PTT is not configured, continue, with Push-to-Talk Group Call on page 80.

INFO: It is also possible to configure soft keys to reach services quickly, see Shortcuts on page 35.

3.13 Push-to-Talk Group Call

NOTICE: Applicable to OpenScape WL4 Plus only.

To be able to configure a PTT session, the following data is required:

- The group number of the PTT group defined in WinPDM/WSG DM
- The PTT group numbers in OSCAR
- The phone number to the conference bridge

For more information, see the Function Description, VoWiFi System or the User Manual, Unify OpenScape WLAN Phone WL4.

NOTICE: If Music on hold (MOH) is used in the system, it can affect an ongoing PTT group call. If someone in the group conference answers another incoming call, MOH is played for the whole group.

To configure a PTT group call, perform the following steps:

1) Configure the PTT group in OSCAR.
2) Open WinPDM/WSG DM . Select **Push-To-Talk** > **X** (where X represents 1–10).
3) The following parameters can be configured:
   - **Session name** — Defines the name of the PTT session.
   - **Group number** — Defines the group number to which the call setup for this PTT session is sent.
   - **Display text** — Defines the text shown on the display during the PTT session.
   - **PTT session signal** — Defines how the PTT session is indicated.
   - **Conference number** — Defines the call number to the conference bridge. The call number is sent when a PTT session is initiated from or accepted by the handset.
   - **Answer mode** — Defines which answer mode the handset has for the PTT session. Select **Manual** if the user must accept the session. Select **Auto** to set up the session automatically.
   - **Speaker mode** — Defines which speaker mode the handset has for the PTT session. Select **Normal** to start session with the speaker turned on. Select **Loud** to start the session with the loudspeaker turned on.
4) If it is desired to have the automatic key lock on during an ongoing call, select **Device** > **Settings**. In the **Automatic key lock** drop-down list, change the automatic key lock setting to **On**. For more information, see Automatic Key Lock on page 27 and Automatic Lock Time on page 28.
5) A Service can be configured to access the PTT session from the handset. If not configured, continue with Services on page 79.

The **In call** menu can be hidden for PTT calls. For more information, see Hide In Call Function for PTT Calls on page 60.

3.14 Location

NOTICE: Applicable to WL4 Plus only.

There are two types of supported locations, a basic location solution that gives an approximate location using Access Point (AP) location and a personal security solution that gives a more accurate location using a third-party Real-Time Location System (RTLS) solution.

The following RTLS solutions are supported:

- Cisco MSE — The handset must be configured to use this option.
- AiRISTA Flow RTLS — The handset must be configured to use this option.

The following can be configured in the **Location** menu of the WinPDM/WSG DM :

- **BLE location**— For more information, see Enable BLE Location on page 81.

NOTICE: Applicable to WL4 Plus only.

To allow sending location information when entering the range of a BLE location device, which is defined as a special location, select **On** in the **Special location** drop-down list.

3.14.1 Enable BLE Location

NOTICE: Applicable to WL4 Plus only.

When this parameter is enabled the identification of the four latest detected BLE Locators is included in an alarm or location request.

To enable BLE location, perform the following steps:

1) In the **BLE location** drop-down list, select **On**.
2) Configure the following parameters:
   - **BLE idle duration** — Defines the idle time (in seconds) between BLE scans. If the idle duration is zero, the handset scans continuously.
   - **BLE scan duration** — Defines (in seconds) for how long the handset should scan.
   - **BLE RSSI offset** — Defines (in dBm) the BLE location RSSI offset. A higher value makes the BLE location less sensitive by increasing the perceived RSSI value of the current location.
   - **BLE RSSI threshold** — Defines (in dBm) the RSSI threshold for a BLE location. The handset filters out any BLE location below the set RSSI.
   - **BLE UUID filter** — Defines the UUID that the handset should scan for.

3.14.2 Configure Handset for Cisco MSE or AiRISTA Flow RTLS Solution

1) Select **Location** > **Common**.
2) In the **WLAN Location scanning** drop-down list, select **On**.

3) In the **WLAN Scanning interval** field, set the time between the scanning periods.

   Close scanning periods and frequent scans per period shorten the battery time.

4) In the **WLAN Scans per scanning period** drop-down list, select how many scans should be performed during each scanning period.

   Close scanning periods and frequent scans per period shorten the battery time.

   If the AiRISTA Flow RTLS solution is used, also perform 5 on page 82–7 on page 82.

5) Select **Location** > **AiRISTA Flow**.

6) In the **AiRISTA flow location scanning** drop-down list, select **Yes**.

7) In the **Listening port** field, enter the port that the location appliance is listening to.

4 System Deployment Planning

4.1 Site Survey Tool

It is recommended to do site surveys with the built-in tools in the handset.

This provides a true measurement of the RF environment based upon the radio of the handset. Wireless analyzers can be used to provide additional assistance during a site survey.

4.2 Scan the Channels

To be able to use the site survey functions in the handset, configure the site survey functions correctly.

The default configuration for the handset is to use channels 1, 6, and 11 on the 2.4 GHz frequency band. To perform a site survey, it is important to configure the handset to use the frequency band and channels on which the site survey will be performed.

For instance, it is possible to scan all 2.4 GHz or 5 GHz channels by setting the frequency band parameter accordingly and then setting parameter 2.4 GHz channels or 5 GHz channels to **All**, respectively.

It is important to remember to revert back to the original settings after the site survey is finished.

The regulatory domain also affects the channels that can be used. For instance, channels 12 and 13 are only possible to scan if the handset is configured to operate in **World mode**.

The channel information is upgraded regularly, starting with scanning channel 1, then 6, and finally 11. In between, the handset is in sleep mode. The handset consults this information when making roaming decisions.

For 2.4 GHz channels, it is strongly recommended to set back the handset to **1,6,11** before normal use. For 5 GHz channels, it is strongly recommended to set back the handset to **UNII-1** before normal use.

There are two ways of scanning channels:

- Scan all channels

  See Scan All Channels on page 83.
- Scan a specific channel

  See Scan a Specific Channel on page 84.

4.2.1 Scan All Channels

This function gives a filtered list of the channels in the SSID found during the scan.

It is possible to access the **Site Survey Tool** menu if the handset has been factory reset or not configured. In idle mode, enter the Admin access code and se-

lect **Site survey tool**. For more information, see Deploy the Handset Using the Admin Menu on page 16.

1) In the Admin menu, select **Site survey tool** > **Scan all channels**.
2) Select the SSID to display the associated AP.
3) Select an AP to display information on SSID, Channel, and MAC address.

4.2.2 Scan a Specific Channel

This option gives a list of all the APs found on that channel in the specified SSID.

It is possible to access the **Site Survey Tool** menu if the handset has been factory reset or not configured. In idle mode, enter the Admin access code and select **Site survey tool**. For more information, see Deploy the Handset Using the Admin Menu on page 16.

1) In the Admin menu, select **Site survey tool** > **Scan selected channel**.
2) Enter the channel to be scanned.
3) Select an AP to display information on SSID, Channel, and MAC address.

4.3 Range Beep

The range beep function enables a beep to be played whenever the handset experiences a filtered field strength of below the configured value (default −70 dBm) from the currently associated AP.

Sudden drops in field strength caused by the environment are delayed because the value of field strength is filtered, for example when walking through a door into a room. Therefore it is important to walk slowly through the site to cover all weak spots.

4.3.1 Configurable RSSI Threshold

The RSSI threshold of the handset is set to −70 dBm by default. In the site survey menu it is possible to change the RSSI threshold. This is useful if a specific area is designed to have a coverage level other than −70 dBm.

It is possible to access the **Site Survey Tool** menu if the handset has been factory reset or not configured. In idle mode, enter the Admin access code and select **Site survey tool**. For more information, see Deploy the Handset Using the Admin Menu on page 16.

1) Select **Range beep level**.
2) Enter the new RSSI threshold and press **OK**.

4.3.2 Range Beep on a Configurable RSSI Threshold

By enabling **Range beep**, the handset gives a beep sound when the signal goes below the selected threshold. To configure this parameter, perform the following steps:

1) Go to the **Site Survey Tool** menu using one of the followings ways:
   - If the handset has been factory-reset or not configured, enter the Admin access code and select **Site survey tool** in idle mode.
   - If the handset has been configured, enter `*#77#` in idle mode.
2) Select **Range beep**.
3) Select one of the following:
   - **On** – Activates the range beeps.
   - **Off** – Deactivates the range beeps.

For more information, see Deploy the Handset Using the Admin Menu on page 16.

4.4 Location Survey

NOTICE: Applicable to OpenScape WL4 Plus only.

The location survey function makes it possible to use Site survey mode for AiRISTA Flow that causes location scanning to be performed at intervals of 1 s.

It is possible to access the **Site Survey Tool** menu if the handset has been factory reset or not configured. In idle mode, enter the Admin access code and select **Site survey tool**. For more information, see Deploy the Handset Using the Admin Menu on page 16.

For more information, see BLE Location survey.

4.5 BLE Beacon Scan

It is possible to access the **Site Survey Tool** menu if the handset has been factory reset or not configured. In idle mode, enter the Admin access code and select **Site survey tool**. For more information, see Deploy the Handset Using the Admin Menu on page 16.

1) In the Admin menu, select **Site survey tool** > **BLE beacon scan**.
2) It is possible to repeat the scan by selecting **Rescan**.

5 Maintenance

5.1 Maintaining the Handset

In an existing VoWiFi system, it is important to be able to replace handsets, install new handsets, and replace faulty handsets. The recommended procedure is to use a template with basic network settings created in the WinPDM/WSG DM , and then import the rest of the settings that were created by the templates.

It is also important to be able to upgrade system parameters and security settings in the handsets. These upgrades are preferably done in WSG DM , if available.

If WinPDM/WSG DM is used, perform one of the following:

- To install a new handset, see Configure the Handset Using the Admin Menu on page 17.
- To create spare handsets to be used when broken handsets need to be replaced later on, see Configure Spare Handsets without a Number in Large Systems on page 86.

If only WinPDM is used, perform one of the following:

- To install a new handset, see Deploy the Handset Using WinPDM on page 14.
- To replace a broken handset, see Replace the Handset using WinPDM Only on page 94.

5.1.1 Configure Spare Handsets without a Number in Large Systems

In VoWiFi systems where WinPDM/WSG DM is used, it is recommended to configure a few spare handsets without a number to be able to quickly replace a broken handset later on.

For more information, see Create a Template and Apply a Template to a Handset without a Number on page 14.

5.1.2 Handset Software Upgrade

NOTICE: Read the software release notes before changing the software.

The handset software can be upgraded using WinPDM/WSG DM .

Upgrade Handset Parameter

A parameter upgrade can restart the handset. The text `Remotely updated` is shown in the handset display when the handset restarts after the upgrade.

5.1.2.1 Upgrade Software using WSG DM

The handset software can be upgraded using WSG DM . Perform the following steps:

1) Open the **Devices** tab and select the handsets to be upgraded.
2) Right-click and click **Upgrade software…**.
3) In the **Available software** drop-down list, select the desired software file (`.bin`).

   If needed, import the software file to be used by clicking **Import**. Locate the software file (`.bin` or `.pkg`) and click **Open**.
4) In the **Upgrade** section and **Activate new software** section, select when the software is upgraded and activated on the handset, respectively.
5) Click **OK**. The dialog window `Shutting down` followed by `Remotely updated` is shown in the handset display.

INFO: It is also possible to upgrade several handsets of the same device type simultaneously using the Baseline function in the WSG DM .

5.1.3 Restore Earlier Software

The handset stores two software versions, which makes it possible to revert back to the earlier software. This feature is used if the current software does not start up properly, therefore it is not possible to downgrade using WinPDM/WSG DM . After a handset has started up correctly, using this procedure is not possible for security reasons.

To restore the earlier software version, perform the following steps:

1) Switch off the handset.
2) Press and hold keys **7** and **8**, and press **On/Off** at the same time. The handset loads the earlier software and keeps it until the handset is restarted.

5.1.4 Upgrade Handset Functionality Using Licenses

Users can upgrade a handset by downloading a license.

The following licenses are available:

- Upgrade license WL4 to WL4 Messaging

There are three alternatives to upgrade a handset:

- Automatic upgrade, see Automatic License Upgrade on page 88.
- License upgrade using import/export, see Upgrade License Using Import/Export on page 88.
- Manual upgrade, see Manual License Upgrade on page 89.

NOTICE: A license move from one handset to another requires internet access from either the PC (using WinPDM) or the WSG .

NOTICE: A handset can be re-licensed up to 99 times.

5.1.4.1 Automatic License Upgrade

Use this option if the WinPDM has an internet connection to the License Server.

1) Open the WinPDM.
2) Place the handset in the DP1 Desktop Programmer cradle.

   The first time the handset logs on the WinPDM, the license key is automatically downloaded to the handset, go to 4 on page 88.
3) If the handset is logged on to the WinPDM after the first time, no automatic check for licenses is done. Synchronize the WinPDM and license server as follows:

   - Select the **Licences** tab.
   - Right-click the handset in the list.
   - Select **Refresh**.

   The license key is downloaded to the handset.
4) The handset restarts. See also Upgrade Handset Functionality Using Licenses on page 87 to view the handset's license option(s).

   If the handset is updated to a new device type (to WL4 Messaging or WL4 Plus), both the new device and the old device is displayed in WinPDM. The old device has to be manually removed.

5.1.4.2 Upgrade License Using Import/Export

Use this option if the WinPDM has no internet connection to the License Server. A product information file (`.xml`) must first be exported from the WinPDM and then imported to the License Web.

To upgrade the license, perform the following steps:

1) Place the handset in the DP1 Desktop Programmer cradle.
2) Open the WinPDM.

   - Select the **Licences** tab.
   - Right-click the handset(s) in the list.
   - Select **Export**.
   - Save the file on a computer with an internet connection to access the License Web later on.
3) Contact the Central License Server (CLS).
4) When the license file (`.xml`) containing the license key(s) is downloaded from the License Server, select **File** > **Import** > **Licences** in the WinPDM to import the file.
5) When the file is imported, the license key(s) is downloaded to the handset(s) and the handset restarts. For more information, see Upgrade Handset Functionality Using Licenses on page 87 to view the handset's license option(s).

   If the handset is updated to a new device type (to WL4 Messaging), the new device and the old device is displayed in WinPDM. The old device has to be manually removed.

5.1.4.3 Manual License Upgrade

Use this option if the serial numbers of the handset cannot be exported to a file because WinPDM is not in use. The serial number(s) must be manually entered in the License Web to get the corresponding license key for the handset. The license key must also be manually entered in the handset.

If several handsets are upgraded, it is recommended to use Upgrade License Using Import/Export on page 88.

The license key is added using the Admin menu in the handset. For more information, see System Administration in the Handset on page 39.

To manually upgrade the license, perform the following steps:

1) In the handset menu, select **Settings**.
2) Enter the Admin menu using the Admin access code.
3) Select **Enter license key**.
4) Enter license key without blanks.
5) Press **OK**.

If the license key is valid, a dialog window `License key accepted` is shown. The handset restarts.

If the handset is updated to a new device type (to WL4 Messaging), the new device and the old device is displayed in WinPDM. The old device has to be manually removed.

5.1.4.4 Move License

It is possible to move a product license (WL4 Messaging Upgrade License) to an unlicensed handset. Any optional licenses follow. For example, a WL4 Messaging Upgrade license can be moved from a handset with a broken display to an unlicensed handset. The broken handset can then be sent for repairs.

It is required to have WinPDM/WSG DM that supports the license move function and to have connection to the license server.

Move a License Using the WinPDM

1) Place the licensed handset in the DP1 Desktop Programmer.
2) On the **Licenses** tab, select the handset online.
3) On the **License** menu, click **Move license…**.
4) In the **Move license** dialog, select the unlicensed handset and click **OK**.

   The handset in the DP1 Desktop Programmer is restarted.
5) Place the unlicensed handset in the DP1 Desktop Programmer.
6) On the **Licenses** tab, select the handset online.
7) On the **License** menu, click **Refresh**.

   The handset in the DP1 Desktop Programmer is restarted.

5.1.5 Perform a Factory Reset

The factory reset of a handset can be performed using WinPDM/WSG DM or the handset. A factory reset restores all configuration settings to their default

values. For example, PBX subscriptions, contacts, messages, certificate, and so on are removed. The software and licenses are left intact.

To perform a factory reset using WinPDM/WSG DM , perform the following steps:

1) In the **Devices** tab, mark the handset to be factory reset. Note that the handset must be online.
2) In the **Device** menu, select **Factory reset**. Alternatively, right-click the handset and select **Factory reset**.
3) In the **Reset devices** window that appears, click **Yes**. The handset restarts.

To perform a factory reset using the handset, perform the following steps:

1) In the handset menu, select **Settings**.
2) Enter the Admin access code to access the Admin menu.
3) Select **Factory Reset**.
4) In the **Reset portable?** window that appears, click **Yes**. The handset restarts.

5.2 Handset Replacement

It is possible to replace a WL3 phone with WL4, or a broken handset with a spare handset. Handsets registered in WinPDM/WSG DM are associated with a device type, device ID, and extension. During the replacement procedure, the broken/old handset's device type and extension are associated with the spare handset's device ID.

NOTICE: If the spare handset has been previously used, perform a factory reset. For more information, see Perform a Factory Reset on page 89.

Handsets can be replaced in the following ways:

- Using the WSG DM with the network template already applied to the spare handset(s) to log in later. For more information, see Replace the Handset using WSG DM on page 91.
- Using both WinPDM and the WSG DM with the network template not yet applied to the spare handset(s) to log in later. For more information, see Replace the Handset using WinPDM and WSG DM on page 92.
- Using only WinPDM. For more information, see Replace the Handset using WinPDM Only on page 94.

The following data is replaced during a replacement:

- User parameters
- Contacts (entered by the user)

The following data is not replaced during a replacement:

- Call list
- Messages
- Company phone book
- Certificates

- Licenses

> **INFO:** A handset's license(s) can be moved to an unlicensed handset (WL4).

For more information, see Replace and Move Licenses in the WSG DM on page 92.

5.2.1 Parameter Migration

The parameter migration feature allows templates and numbers of a certain handset variant to be applied to any compatible handset. Every WL3 and WL4 handset variant is compatible, which means that it is possible to replace a WL3 with a WL4.

The same template can be used for different WL4 variants, such as WL4 and WL4 Messaging. WL4 specific parameters are ignored by the WL4 Messaging.

> **NOTICE:** It is not guaranteed that parameter migration results in the optimal configuration of the destination handset. For example, parameters related to features not present in the source handset are left at their default values in the destination handset. That is why, it is recommended to check the configuration of the destination handset after parameter migration and make sure that the configuration is correct.

5.2.2 Replace the Handset using WSG DM

The following two replacement procedures are available:

- If the broken handset and the spare handset have the same device type and functionality license. For more information, see Replace without Moving Licenses in the WSG DM on page 91.
- If the broken handset and the spare handset do not have the same device type or functionality license, or neither, the license must be moved to the spare handset.

  For more information, see Replace and Move Licenses in the WSG DM on page 92.

Replace without Moving Licenses in the WSG DM

Both the broken handset and the spare handset must be of the same device type and have the same functionality license.

1) In both handsets, enter `*#34#` in idle mode and select **License** to check that they have the same device type and licenses.

   If the login screen is displayed in the spare handset, press **Info**, and select **License**.
2) If the broken handset is online in the WSG DM , switch off the handset to make it offline.
3) Take a spare handset prepared with the network settings (including the IP address to the WSG).

4) Enter the broken handset's number and leave the password field blank. Press **Login**.

   The spare handset is automatically updated from the WSG DM and might be restarted depending on the changed settings. The last stored settings for the broken handset in the WSG DM are transferred to the spare handset.

Replace and Move Licenses in the WSG DM

The spare handset must be an unlicensed WL4 to be able to move the licenses to the spare handset. To check that the handset is unlicensed, enter `*#34#` in idle mode and select **License**. Only WL4 must be displayed here.

The broken handset and the spare handset do not have the same device type or do not have the same functionality license, or both.

1) Make sure that the broken handset is saved (indicated by a ✔) in the **Saved** column of the WSG DM . If not, right-click the broken handset in the **Numbers** tab and select **Save**.
2) Switch off the broken handset. The handset appears as offline in the WSG DM .
3) Take an unlicensed spare handset (WL4) prepared with the network settings (including the IP address of the WSG).
4) Enter the broken handset's number and leave the password field blank. Press **Login**. The handset is now online.
5) Switch off the spare handset. The handset appears as offline.
6) Switch on the broken handset. The handset appears as online.
7) Select the **Licenses** tab.
8) Right-click the broken handset and select **Move license…**.
9) In the **Move license** window, select the WL4 that should receive the license and press **OK**.
10) The broken handset restarts and has now become a WL4 . Switch off the broken handset. The handset appears as offline.
11) Switch on the spare handset. The handset appears as online.
12) Select the **Licenses** tab. Right-click the spare handset and select **Refresh**.

    The spare handset is automatically updated from the WSG DM and restarted. The last stored settings and licenses for the broken handset are transferred to the spare handset.

5.2.3 Replace the Handset using WinPDM and WSG DM

If the spare handset to be used must be factory reset or no network template has been applied, the network template needs to be applied to the spare handset in WinPDM. When the network template is added, the handset can log in to the WSG DM .

The following two replacement procedures are available:

- If the broken handset and the spare handset have the same device type and functionality license. For more information, see Replace without Moving Licenses Using WinPDM and WSG DM on page 93.

- If the broken handset and the spare handset do not have the same device type or functionality license, or neither, the license must be moved to the spare handset.

  For more information, see Replace and Move License Using WinPDM and WSG DM on page 93.

Replace without Moving Licenses Using WinPDM and WSG DM

Both the broken handset and the spare handset must be of the same device type and have the same functionality license.

1) In both handsets, enter `*#34#` in idle mode and select **License** to check that they have the same device type and licenses.
2) Make sure that the broken handset is saved (indicated by a ✓) in the **Saved** column of the WSG DM . If not, right-click the broken handset in the **Numbers** tab and select **Save**.
3) Switch off the broken handset. The handset appears as offline in the WSG DM .

   If the spare handset is not prepared with the basic network settings, also perform step 4 on page 93 – step 7 on page 93.
4) Open WinPDM.
5) Place the spare handset in the DP1 Desktop Programmer cradle.
6) Run the template with the basic network settings as follows (see Create a Template in WinPDM/WSG DM on page 12):
   - Network settings in **Network** > **Network A**, **Network B**, **Network C**, or **Network D**

     All required system settings for the WLAN. For example SSID and Security mode.
   - VoIP settings in the **VoIP** menu:

     Configure, for example, VoIP information, SIP proxy ID and address.
   - Syslog settings in **Device** > **Log**:

     To be able to set the **Syslog server IP address**, the parameter **Syslog** must be enabled by selecting **On**.
   - WSG settings in **Device** > **WSG**:

     Enter the IP address and password (if any) to the WSG .
7) Remove the handset from the DP1 Desktop Programmer cradle. The handset restarts, depending on the parameter changes.
8) Enter the broken handset's number and leave the password field blank. Press **Login**.

   The spare handset is automatically updated from the WSG DM and might be restarted depending on the changed settings. The last stored settings for the broken handset in the WSG DM are transferred to the spare handset.

Replace and Move License Using WinPDM and WSG DM

The spare handset must be an unlicensed WL4 to be able to move the licenses to the spare handset. To check that the handset is unlicensed, enter `*#34#` in idle mode and select **License**. Only WL4 must be displayed here.

The broken handset and the spare handset do not have the same device type or do not have the same functionality license, or both.

1) Make sure that the broken handset is saved (indicated by a ✔) in the **Saved** column of the WSG DM . If not, right-click the broken handset in the **Numbers** tab and select **Save**.
2) Switch off the broken handset to take the handset offline.
3) Open the WinPDM.
4) Place the unlicensed spare handset in the DP1 Desktop Programmer cradle.
5) Run the template with the basic network settings as follows (see Create a Template in WinPDM/WSG DM on page 12):
   - Network settings in **Network** > **Network A**, **Network B**, **Network C**, or **Network D**

     All required system settings for the WLAN. For example SSID and Security mode.
   - VoIP settings in the **VoIP** menu:

     Configure, for example, VoIP information, SIP proxy ID and address.
   - Syslog settings in **Device** > **Log**:

     To be able to set the **Syslog server IP address**, the parameter **Syslog** must be enabled by selecting **On**.
   - WSG settings in **Device** > **WSG**:

     Enter the IP address and password (if any) to the WSG .
6) Remove the handset from the DP1 Desktop Programmer cradle. The handset restarts, depending on the parameter changes.
7) Enter the broken handset's number and leave the password field blank. Press **Login**.
8) Switch off the spare handset. The handset appears as offline.
9) Switch on the broken handset. The handset appears as online.
10) Select the **Licenses** tab.
11) Right-click the broken handset and select **Move license…**.
12) In the **Move license** window, select the WL4 that should receive the license and press **OK**.
13) The broken handset restarts and has now become a WL4 . Switch off the broken handset. The handset appears as offline.
14) Switch on the spare handset. The handset appears as online.
15) Select the **Licenses** tab. Right-click the spare handset and select **Refresh**.

    The spare handset is automatically updated from the WSG DM and restarted. The last stored settings and licenses for the broken handset are transferred to the spare handset.

5.2.4 Replace the Handset using WinPDM Only

Replacement through WinPDM is used in small VoWiFi systems or when WSG DM is not available.

The following two replacement procedures are available:

- If the broken handset and the spare handset have the same device type and functionality license. For more information, see Replace without Moving Licenses Using WinPDM on page 95.

- If the broken handset and the spare handset do not have the same device type or functionality license, or neither, the license must be moved to the spare handset.

  For more information, see Replace and Move Licenses Using WinPDM on page 95.

Replace without Moving Licenses Using WinPDM

Both the broken handset and the spare handset must be of the same device type and have the same functionality license.

1) In both handsets, enter `*#34#` in idle mode and select **License** to check that they have the same device type and licenses.

   Alternatively, if the spare handset has been factory reset, press **Info** and select **License**.
2) Place the broken handset in the DP1 Desktop Programmer cradle.
3) Open the WinPDM.
4) Make sure that the broken handset is saved in the WinPDM (indicated by a ) in the **Saved** column. If not, right-click the broken handset in the **Numbers** tab and select **Save**.
5) Place the spare handset in the DP1 Desktop Programmer cradle.
6) A **Found Device Wizard** window appears. Select **Associate with Number** and click **Next >**.
7) In the list, select the broken handset to be replaced with the spare handset and click **OK**.

Replace and Move Licenses Using WinPDM

The spare handset must be an unlicensed WL4 to be able to move the licenses to the spare handset. To check that the handset is unlicensed, enter `*#34#` in idle mode and select **License**. Only WL4 must be displayed here.

The broken handset and the spare handset do not have the same device type or do not have the same functionality license, or both.

1) Place the broken handset in the DP1 Desktop Programmer cradle.
2) Make sure that the broken handset is saved in the WinPDM (indicated by a ) in the **Saved** column. If not, right-click the broken handset in the **Numbers** tab and select **Save**.
3) Remove the broken handset from the DP1 Desktop Programmer cradle.
4) Place the unlicensed spare handset in the DP1 Desktop Programmer cradle.

5) Run the template with the basic network settings as follows (see Create a Template in WinPDM/WSG DM on page 12):
   - Network settings in **Network** > **Network A**, **Network B**, **Network C**, or **Network D**

     All required system settings for the WLAN. For example SSID and Security mode.
   - VoIP settings in the **VoIP** menu:

     Configure, for example, VoIP information, SIP proxy ID and address.
   - Syslog settings in **Device** > **Log**:

     To be able to set the **Syslog server IP address**, the parameter **Syslog** must be enabled by selecting **On**.
   - WSG settings in **Device** > **WSG**:

     Enter the IP address and password (if any) to the WSG .
6) Place the broken handset in the DP1 Desktop Programmer cradle.
7) In the WinPDM, select the **Licenses** tab.
8) Right-click the broken handset and select **Move license…**.
9) In the **Move license** window, select the WL4 that should receive the license and select **Do nothing**. The broken handset restarts and has now become a WL4 .
10) Remove the broken handset from theDP1 Desktop Programmer cradle.
11) Place the spare handset in the DP1 Desktop Programmer cradle.

    The spare handset is restarted and the licenses for the broken handset has been transferred to the spare handset.
12) In the **Found Device Wizard** window, select **Associate with number** and click **Next >**.
13) In the list, select the broken handset to be replaced with the spare handset and click **OK**.

    The spare handset can be restarted and the settings for the broken handset in the WinPDM are transferred to the spare handset.

5.3 Change the Number of a Handset

It is possible to change the number of a handset, but keep all other settings in the handset.

1) Open WinPDM/WSG DM .
2) Open the **Numbers** tab, and select the handset to be updated with a new number.
3) In the Number menu, select **Rename…**. Alternatively, right-click the handset and select **Rename…** from the menu that appears.
4) In the **New prefix** field, enter the new prefix (if needed).
5) In the **New number** field, enter the new number.

NOTICE: Make sure that the new number does not exist in another system. If several handsets have the same number, their settings overwrite each other when synchronizing with WinPDM/WSG DM .

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6) Click **OK**.

The new number is synchronized with the handset when it is connected to WinPDM/WSG DM .

5.4 Update Parameters Using WinPDM/WSG DM

The parameter update in WinPDM/WSG DM starts when the handset is idle and does not interrupt an ongoing call.

NOTICE: Select only the parameters that are changed, if all parameters are selected, the system performance decreases.

1) Open WinPDM/WSG DM .
2) Create a new template with only the parameters to be changed.
3) Select the numbers that should be updated and apply the template.

The handsets are automatically updated from the WSG DM and can be restarted depending on which parameters are changed.

NOTICE: Templates can be applied for several handsets under the **Templates** tab . Parameters or templates can be set on individual handsets under the **Numbers** tab.

5.5 Perform a Security Upgrade Using WSG DM

IMPORTANT:

The synchronization of new settings to the handset settings cannot be performed if the settings in the AP is changed before the settings in the handset.

Change settings in the handset before change settings in the AP.

It is recommended to leave one access point with the old configuration to allow switched off handsets to receive the updates when they are turned on. Bring the handset to that APs coverage area.

To change the WLAN password/authentication, perform the following steps:

1) Open WSG DM .
2) Create a new template with the new security settings.

- Security mode:

  All required settings for the WLAN. For example User name, Password, Regulatory domain, and so on.

3) Apply the new template to the handsets.

The handsets are automatically updated from WSG DM and restarted.

NOTICE: During the update and restart, the handsets have no access to the WLAN system.

4) Change the security settings for the APs. The handsets are now able to access the WLAN.

5.6 Upgrade the Template

The upgrade procedure of the templates definition version is described in the Installation and Operation Manual, Portable Device Manager for Windows (WinPDM).

5.7 Create a Configuration Backup

It is recommended to have a backup of the configuration in the handsets and the site.

The backup procedure is described in the Installation and Operation Manual, Portable Device Manager for Windows (WinPDM).

5.8 Logging

5.8.1 Syslog

Enables logging of system events to a syslog server.

1) Select **Device** > **Log**.
2) In the **Syslog** drop-down list, select **On** to enable logging.

5.8.2 PCAP Capturing

If enabled, the selected data is sent as PCAP logs to the indicated output.

PCAP to file

Before testing, start PCAP logging by performing the following steps:

1) Select **Device** > **Log**.
2) In the **PCAP Capturing** drop-down list, select **PCAP to file**.

After the test is done, stop PCAP logging by preforming the following steps:

1) Select **Device** > **Log**.
2) In the **PCAP Capturing** drop-down list, select **Off**.

The PCAP files are not encrypted and can be extracted with USB or SFTP, and can be viewed using, for example, Wireshark. To reduce the size of the generated files, RTP packets are not included.

Remote PCAP

Before test, configure a PC that receives the logs (for example with Wireshark) and start PCAP logging:

1) Select **Device** > **Log**.
2) In the **PCAP Capturing** drop-down list, select **RPCAP**.

When the test is done, stop PCAP logging:

1) Select **Device** > **Log**.
2) In the **PCAP Capturing** drop-down list, select **Off**.

5.8.3 Save Logs

The handset continuously generates encrypted logs that can be sent for investigation to Ascom support in case any issue occurs. The following procedure explains how to collect these logs.

Logs are normally kept in volatile memory for a short period before they are deleted.

When this function is enabled, all logs that are collected for the defined period of time are also saved to persistent storage.

Logs already stored in volatile memory when the function is enabled are also written to persistent storage. This means that the function **Save once now** can be used to store logs of a problem that has occurred a short while ago.

If the persistent storage becomes full, the oldest logs are overwritten by newer ones.

Use SFTP or USB transfer to retrieve the saved logs and send them to Ascom support.

NOTICE: Depending on the nature of the issue, it may be required to change the default log levels as described in Trace Configuration on page 100. This controls which logs are generated and must be set before the problem occurs.

Save Logs after a Problem Has Occurred

Right after a problem has occurred, it is possible to save the logs that show the problem even if **Save logs** was not previously enabled.

1) Select **Device** > **Log**.
2) In the **Save logs** drop-down list, select **Save once now**.

Continuously Save Logs from Memory to Flash

To continuously save logs while trying to reproduce the problem, use one of the time-limited variants:

1) Select **Device** > **Log**.
2) In the **Save logs** drop-down list, select **Save for X time**.

5.8.4 Enable Sending Logs over SFTP

Continuously transferring logs over SFTP makes it possible to have logging enabled for a long period of time without the risk of running out of storage space on the handset. There is a delay before a file is transferred from the handset.

To enable sending saved logs to the remote server over SFTP, perform the following steps:

1) Select **Device** > **Log**.
2) In the **Enable Sending Logs over SFTP** drop-down list, select **On**.

5.8.5 SFTP Server Settings

1) Select **Device** > **Log**.
2) The following SFTP parameters can be configured:
   - **SFTP server IP address** — Defines the IP address of the remote server, which the handset sends logs to over SFTP.
   - **SFTP server authentication identity** — The name is used when logs is about to be sent to a remote server using SFTP.
   - **SFTP remote server authentication password** — The password is used when the SFTP remote server requires a password.

5.8.6 Trace Configuration

In normal operation, all extended trace levels should be set to **Normal** since excessive logging can affect handset performance. When logs are enabled, it is indicated by the text `Trace active` on the idle screen.

1) Select **Device** > **Log**.
2) The trace level can be set on the following parameters:
   - **Set WLAN Trace**
   - **Set Configuration Trace Level**
   - **Set GUI Trace Level**
   - **Set GLI Trace**
   - **Set WSG Trace**
   - **Set VoIP Trace**
   - **Set System Trace**
   - **Set Protector Trace**
   - **Set SAS Trace**
   - **Set Bluetooth Trace**
3) Select one of the following logging levels:
   - **Normal**
   - **Verbose**
   - **Extreme**

   These settings only affect the encrypted internal handset logs, not the remote syslog functionality.

NOTICE: Restore the handset to **Normal** logging after logs are captured, since extra logging can affect handset performance.

5.8.7 Low Level WLAN debug

This parameter can be used to enable even more verbose WLAN debug information. It must be enabled only when requested by a support contact.

1) Select **Device** > **Log**.
2) In the **Low Level WLAN debug** field, enter the required string.

5.8.8 SNMP

Simple Network Management Protocol (SNMP) with version 1.0 is supported using the standard port for SNMP: UDP port 161.

NOTICE: There is no server functionality, so the handset status cannot be requested.

To enable SNMP, perform the following steps:

1) Select **Device** > **Log**.
2) In the **SNMP** drop-down list, select **On**.
3) The standard SNMP community name **public**, can be changed to a specific name to enhance the security of the device. Enter the new name in the **SNMP community name** field.

5.8.8.1 SNMP Traps

The handset can send the following SNMP traps:

Table 4: SNMP Traps

SNMP Trap	Description
In service	When the handset is started up and logged in to the SIP server.
Out of service	When the handset is switched off.
SIP online	When logged in to the SIP server again after the SIP connection had been lost.
SIP offline	When the SIP connection is lost, but the handset still has WLAN connection.
WLAN back	When handset's WLAN connection is back, after being disconnected.

To configure SNMP traps, perform the following steps:

1) Select **Device** > **Log**.
2) In the **SNMP traps** drop-down list, select **On**. The **SNMP manager IP address** and the **Port number for SNMP traps** fields appear.
3) In the **Port number for SNMP traps** field, enter the port number of the SNMP manager.
4) In the **SNMP manager IP address** field, enter the IP address of the SNMP manager.

6 Troubleshooting

This section offers possible solutions for common operational errors. In case you need further assistance, contact Ascom support.

NOTICE: If other users experience similar issues, there may be a system error.

6.1 Fault Symptoms

Fault	Probable cause	Action or comment
It is not possible to mute the handset by long-pressing the Sound off key/Mute button. It is not possible to set the ring volume to **Silent**.	A handset restriction prevents the user to silence the handset.	Change the parameter **Prevent silent** in **Audio** > **General**.
Connected call but no sound or one way sound	IP addressing fault, or muted or bad speaker/microphone	**1)** Make a note of the IP address of the handset. Turn the handset off and ping the IP address. If something is found, the problem is an IP address conflict. **2)** Check if the handsets are muted. **3)** Use a headset to eliminate bad speakers/microphone.
There are no entries in the Call list.	A handset restriction prevents calls from being saved in the call list.	Change the parameter **Enable call list** to **Yes** in **Device** > **Call**.

Fault	Probable cause	Action or comment
Voice quality is bad.	Increased traffic load or interference.	**1)** Check if QoS is working in both directions. Voice traffic should be prioritized on both the LAN and the WLAN. **2)** Connect to other phones (wired, analogue or external) to define if it is the other end that may cause bad quality. **3)** Do a site survey and check for areas with too low or too high coverage and other interfering 802.11 systems. **4)** Do a network performance test to ensure the wired LAN/backbone has adequate capacity. **5)** Use a spectrum analyzer and look for non–802.11 interference.

Fault	Probable cause	Action or comment
Battery life is short.	DTIM might not be set correctly. U-APSD is not used. Cisco MSE or AiRISTA Flow location client settings need to be changed.	**1)** Check the **Beacon interval** and **DTIM** settings in the AP. **2)** Verify the coverage, since low signal strength will make the handset to constantly search for other APs and thereby consuming more power. **3)** Use a sniffer and check the amount of broadcast traffic that is transmitted on the WLAN. **4)** Check if correct models of the chargers are used. **5)** Verify with another battery. **6)** If using Cisco MSE or AiRISTA Flow location client, change the settings.

6.2 Display Information

The following table contains errors that are shown on the handset display.

Table 5: Error Messages, Probable Cause, and Recommended Action

Display message	Probable cause	Action or comment
`No access` Displayed in idle mode and indicated by simultaneous vibration (if enabled), beep signal, and a dialog window (if enabled by the system administrator).	Handset has found and associated to the WLAN (a wireless network with the configured SSID and correct security settings), but cannot connect to the SIP proxy or the WSG .	Acknowledge the dialog window (if enabled) or press the mute button (the later keeps the dialog window visible). The `No access` warning can also be set to indicate repeatedly, or only once. See No Network and No Access Warning on page 33. **1)** Check if the handset is connected to the correct SSID by entering the WLAN info screen. (An unconfigured handset might connect to an open or staging network instead of the required one.) If the handset is not connected to the correct SSID, configure the WLAN parameters in the handset. **2)** Check if the handset has the correct network settings, for example, IP address (either static or received by the DHCP) by entering the Network info screen. If not, correct the handset network parameters and/or the DHCP server configuration. **3)** Check if it is possible to ping the handset, WSG , and SIP proxy from another PC. **4)** Check the VoIP settings in the handset and SIP proxy. For a Messenger and Protector handset, also check the WSG settings in the handset and WSG . **5)** Restart the handset.

Display message	Probable cause	Action or comment
`No network` Displayed in idle mode and indicated with a short beep repeated every minute for 30 minutes. It is also indicated by simultaneous vibration (if enabled) and a dialog window (if enabled by the system administrator).	The handset has lost WLAN connection.	Acknowledge the dialog window (if enabled) or press the mute button (the latter keeps the dialog window visible). The `No network` warning can also be set to indicate only once, or be turned off completely. See No Network and No Access Warning on page 33. **NOTICE:** When leaving a bad state for another bad state, the dialog window reopens, and the beep sounds again (if enabled).

Display message	Probable cause	Action or comment
`No network` (continued)	The handset is out of coverage, or faulty handset. The handset cannot find the wireless infrastructure with settings matching those configured in the handset.	The beeps can be stopped with the mute button. Then go into range. **NOTICE:** When re-entering the coverage area it can take a couple of minutes before the handset automatically has registered into the system. **1)** Check the SSID. The SSID configured in the handset must be identical to the SSID configured in the system infrastructure. **2)** Check the security settings. The security settings, that is, authentication and encryption must match the settings in the system infrastructure. **3)** Check for 802.11d multi regulatory domain settings. The handset must be able to detect in which country it is located to use the correct channel and transmit power settings. **4)** Check which channels are used. By default, the handset uses channels 1, 6, and 11 in the 2.4 GHz range and UNII-1 in the 5 GHz range. If the infrastructure is configured to use any other channel, change it to use only 1, 6, and 11 or UNII-1 as these are the recommended settings. **5)** Check that the correct Network (A, B, C or D) setting is selected.

Display message	Probable cause	Action or comment
`Voice only`	The handset is configured to use both SIP proxy and the WSG , but has lost contact with the WSG .	**1)** Check the WSG address. Try to ping the WSG from another PC. **2)** Remove the handset from the DP1 Desktop Programmer. When connected to the WinPDM through USB on the DP1 Desktop Programmer, the handset cannot connect to the WSG and may show `Voice only`. **3)** If messaging is not used in the system, verify that the WSG address is configured to 0.0.0.0.
`Limited mode`	The PBX is in “Server mode backup”.	No action needed. Wait for the PBX backup to be complete.

Display message	Probable cause	Action or comment
`Messaging only`	The handset is configured to use both a SIP proxy and the WSG but has lost contact with the SIP proxy.	**1)** Check the SIP proxy address. Try to ping the SIP proxy from another wireless client. **2)** Try to send a message. The idle connection check interval to the WSG is much longer than to the SIP proxy. Sometimes when all network connection is lost, the handset shows `Messaging only` for quite some time, because it discovers it has lost connection to the SIP proxy much faster than it discovers the loss of connection to the WSG . In this case the handset will eventually change to `No access`. **3)** If the handset is supposed to use SIP proxy discovery, verify that the configured SIP proxy IP address is 0.0.0.0. **4)** Check the Endpoint number and the Endpoint ID. If both are configured, they must match with the Endpoint ID and Endpoint number registered in the IP PBX. Clear the Endpoint ID.

Display message	Probable cause	Action or comment
`SERVICE NEEDED` An additional message is also displayed describing the cause of the error. **NOTICE:** This message is only shown in English.	Faulty handset.	**1)** Select the **Reboot** option on the left soft key. **2)** **3)** If the problem persists, try one of the following: • Power off the handset using the **Off** soft key in the middle and send the handset for service. • Perform a factory reset by selecting the**Factory** soft key on the right.
`Enter PIN code`	Phone lock is activated.	Enter the required PIN code. If the PIN code has been lost, enter a new PIN code or do a factory reset using WinPDM/WSG DM .
`Battery low, charge now`	The battery level is low.	Charge the handset, or replace or charge the battery.
`Phone book is not available at the moment.`	The phone book is not activated or does not respond.	Try again later or if the fault persists, do a factory reset using the Admin menu or WinPDM/WSG DM . **NOTICE:** It may take several minutes for the phone book to be available if there are many entries in the Contacts list and/or the company phone book.
`Voice mail number not defined`	There is no voice mail number defined in the handset.	Define a voice mail number using WinPDM/WSG DM .

Display message	Probable cause	Action or comment
`Remotely updated`	The handset starts up after a parameter update.	No action needed. Wait for the handset to start up.
`Updating handset…`	The handset has retrieved new software, which is now upgrading the handset.	No action needed. Handset might restart depending on the parameter setting. The new software becomes active after the next handset restarts.
`Handset is updated`	The handset starts up after a software upgrade.	No action needed. Wait for the handset to start up.

7 Related Documents

Data Sheet, Unify OpenScape WLAN Phone WL4

Quick Reference Guide, Unify OpenScape WLAN Phone WL4

User Manual, Unify OpenScape WLAN Phone WL4

Installation and Operation Manual, Portable Device Manager for Windows (Win-PDM)

Installation and Operation Manual, OpenStage Wireless Service Gateway (WSG)

System Planning, VoWiFi System

8 Templates

Templates enable the configuration of all parameters of a handset from sound volume to keypad shortcuts.

Your supplier can provide example templates for different PBX/Call Managers. The handset has full functionality towards the PBX/Call Manager even without a template. However, by using a template, the handset is customized for that PBX/Call Manager with menu options for functions specific to PBX/Call Manager.

8.1 Save Handset Configuration as a Template

It is possible to save the settings of a handset as a template. The template will only contain configuration data, it does not include contacts, certificates, and other personal data.

This template can be used as a backup if you want to restore the configuration of a handset at a later stage or as a template that can be applied to a number of handsets.

To save the handset configuration as a template, perform the following steps:

1) Open the WinPDM/WSG DM .
2) In the **Numbers** tab, right-click on the required handset.
3) Select **Use as template…** and enter a descriptive name for it.
4) In the **Edit template** window, all handset parameters are selected by default. If one or more parameters are not required, clear the check box next to the parameter.

   Some parameters are user-specific, and if this type of template needs to be applied to several handsets, it is recommended to exclude the following parameters:

   - **User display text** — A text string displayed in idle mode. The parameter is located in **Device** > **Settings**.
   - **Phone lock PIN code** — The security code used to unlock the keypad. The parameter is located in **Device** > **Settings** > **Locks**.
   - **Endpoint ID** — The identity/name of the user registered in the PBX. The parameter is located in **VoIP** > **General**.
   - **Admin access code** — The password used to enter the Admin menu of the handset. The parameter is located in **Device** > **General**.
   - **SCEP password** — The password used to authenticate the handset towards the SCEP server. The parameter is located in **Device** > **SCEP**.
5) Click **OK**.

8.2 Manage Templates using WinPDM and WSG DM

When creating a template in both WinPDM and the WSG DM , the templates must be identical to avoid that the parameters override each other when synchronizing the handset.

It is possible to export templates from one device manager and import them to the other. For more information, see Export a Template on page 115, Import a Parameter File on page 115, and Import a Template on page 115.

8.2.1 Export a Template

1) Open WinPDM/WSG DM .
2) In the **Templates** tab, select the template to be exported.
3) Select **Template** > **Export**. Alternatively, right-click on the template and select **Export…**. The **Export templates** window is opened.
4) Give the template (`*.tpl`) a descriptive name and click **Save**.

8.2.2 Import a Parameter File

If the parameter file (`*.def`) is not already included, it needs to be added to WinPDM/WSG DM before importing the template.

To import the parameter file, perform the following steps:

1) Open WinPDM/WSG DM .
2) Select **File** > **File management**.
3) On the **Parameter definition** tab, click **Add**. The **Import files** window is opened.
4) Locate the parameter file (`*.def`), or the package file (`*.pkg`) where the parameter file is included. For more information, ask the supplier.
5) Click **Open** to import the file.

8.2.3 Import a Template

1) Open WinPDM/WSG DM .
2) Select **File** > **Import** > **Templates…**. The **Import templates** window is opened.
3) Locate the template to be imported.
4) Click **Open** to import the template.

9 Configure Custom Sounds

Before configuring custom sounds, it is recommended to have a basic knowledge on notes.

The **Melody** in a custom sound is represented by a text string consisting of several elements. See below.

Table 6: Elements, Melody Strings, and Parameters for Melodies

Element		Sub element	Values
Note	>	Octave-prefix	*0 (A=55 Hz) *1 (A=110 Hz) *2 *3 *4 (default) *5 *6 *7 *8 (A=14080 Hz) If no octave prefix is added, the prefix *4 will be used.
		Basic notes	c d e f g a b

Element		Sub element	Values
		Ess notes (flat notes)	&d &e &g &a &b
		Iss notes (sharp notes)	#c #d #f #g #a
		Duration	0 (Full-note) 1 (1/2-note) 2 (1/4-note) 3 (1/8-note) 4 (1/16-note) 5 (1/32-note)
Silence	>	Rest	r
		Duration	1 to 5 (1 = long pause, 5= short pause)
		Duration specifier	. (Dotted note) : (Double dotted note) ; (2/3 length)
Vibration		N/A	Vibeon Vibeoff
Repeat		N/A	@0 (repeat forever) @<number of repetitions>, for example: “@2” repeats the melody string 2 times.

Figure 9: Example of a Melody String on page 118 and Table 7: Explanation of the Melody String Example on page 118 illustrates how to program a melody.

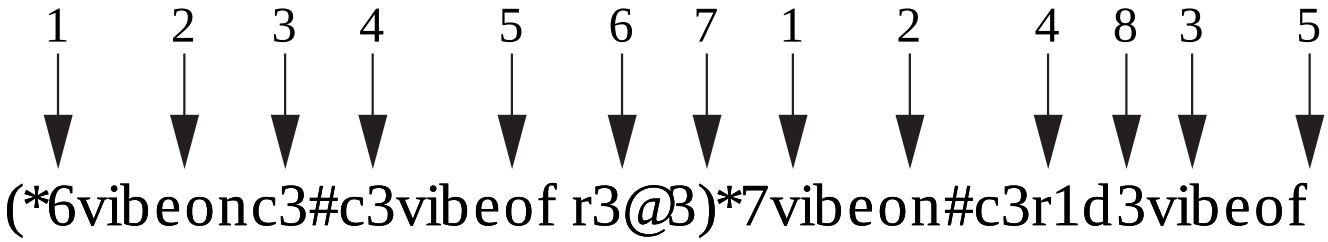


Figure 9: Example of a Melody String

Table 7: Explanation of the Melody String Example

1	Octave-prefix
2	Vibration is turned on. The handset vibrates continuously.
3	Basic note with 1/8 duration
4	Iss note with 1/8 duration
5	Vibration is turned off
6	Short pause
7	The melody within brackets is repeated 3 times before the handset plays the rest of the melody.
8	Long pause

9.1 Customize the Default Handset Beeps

If it is required to create a custom sound out of any of the default handset beeps (Beep 1–7 and Enhanced beeps 1–7), the default definition of each beep can be used as a starting point for further customizing the sound.

The default definitions are described below.

Table 8: Definitions of Beeps

Beeps	Definition (default)
Custom sound 1: 1 beep	*5b4r4
Custom sound 2: 2 beeps	(*5b4r4@2)
Custom sound 3: 3 beeps	(*5b4r4@3)
Custom sound 4: 3 tone chime	(*5b4r4@4)
Custom sound 5: 10 beeps	(*5b4r4@5)

Beeps	Definition (default)
Custom sound 6: Alarm sweep	(*5b4r4@10)
Custom sound 7: Alarm siren	(*6e4*6a4*6e4*6a4r4@10)
Custom sound 8	Not predefined
Custom sound 9	Not predefined
Custom sound 19	Not predefined

Table 9: Definitions of Enhanced Beeps

Enhanced beeps	Definition (default)
Enhanced beep 1	*6e2r2r1
Enhanced beep 2	*6e3r3e3r3r1
Enhanced beep 3	*6e4r4e4r4e4r4r1
Enhanced beep 4	*6c2r5:d2r5:e2r5r1
Enhanced beep 5	*6e4r4e4r4e4r3.e4r4e4r2e4r4e4r4e4r3.e4r4e4r4r1
Enhanced beep 6	Beat 500, (*5#f3g3#g3a3#a3b3*6c3#c3d3#d3e3r3@9)
Enhanced beep 7	*6(c4e4@52)

10 Easy Deployment

Easy deployment is done using a (staging) WLAN with a predefined SSID and security profile and a WSG .

10.1 Prerequisites

- The WLAN network needs at least one AP that allows access to the WSG .

  The following default configuration is used, which cannot be changed:

SSID	AWS-INIT
Security mode	WPA/WPA2-PSK
WPA/WPA2 passphrase	AWS-INIT

- In the handset, all other network parameters must be at their default settings. See, for example, the following:

DHCP mode	On
802.11 protocol	2.4 GHz or 5 GHz
2.4 GHz channels	1, 6, 11
5 GHz channels	UNII-1
World mode regulatory domain	World mode (802.11d)

- If it is used in the WSG , the password is needed to log in.
- The WSG port must be open and not blocked.
- No SSID for any of the networks A-D is configured in the handset.
- The DHCP offer for the AWS-INIT network must include an IP address of an NTP server to provide the handset with the correct system time (needed for the certificate validations).

NOTICE: The number to be used by a handset is entered using the handset's keypad, after a successful first access to the WSG.

Easy Deployment consists of the following three phases:

1) WLAN discovery

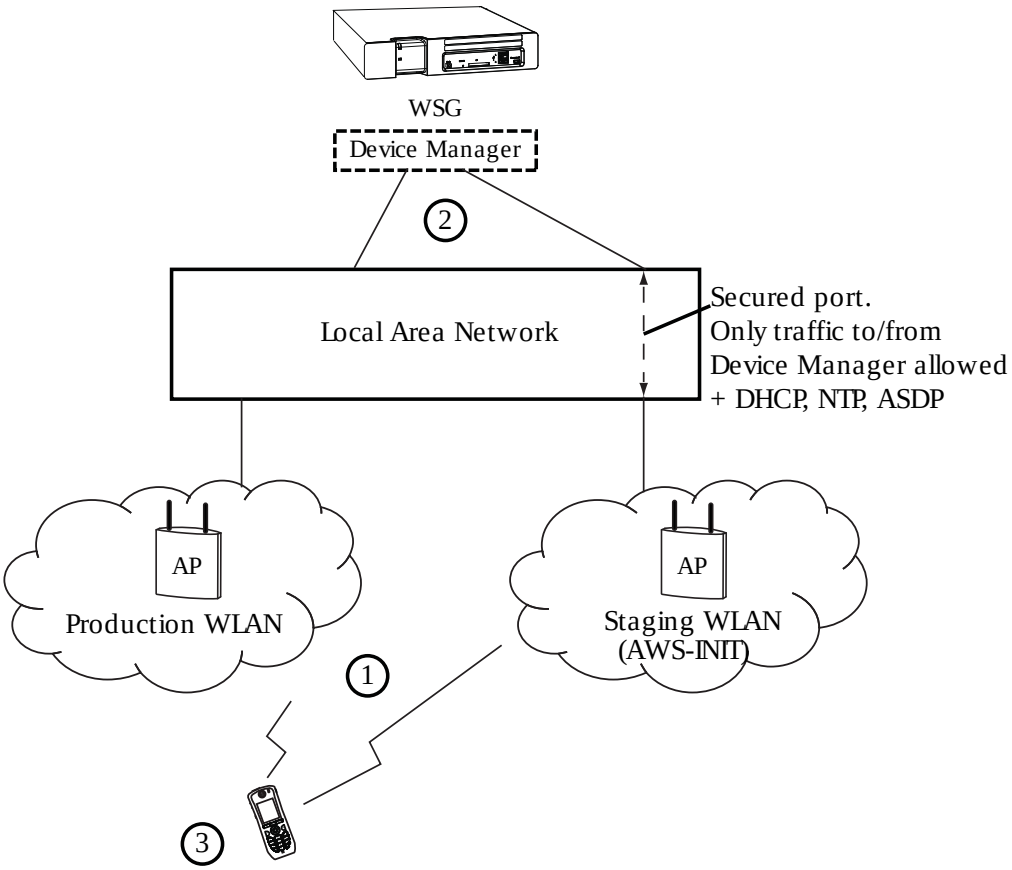
For more information, see WLAN Discovery on page 121.

2) WSG discovery

For more information, see WSG Discovery on page 122.

3) Parameter download

For more information, see Parameter Download on page 123.



10.2 WLAN Discovery

The WLAN discovery starts when the new handset starts up. An already configured handset uses an entry stored in Network A, B, C, or D, and tries to associate with a WLAN that uses the SSID that once was configured in the Network A–D.

If there is no WLAN network (SSID) configured in the handset, the handset tries to associate with a predefined default WLAN with SSID AWS-INIT, alternately on the 2.4 GHz frequency band and on the 5 GHz frequency band. See (1) in Figure Easy Deployment.

If the AWS-INIT is not connected on any frequency band within some seconds, the handset tries to connect to an open network. If it also fails, the alternatives are tried again, until succeeded.

CAUTION:

Due to security reasons, it is not recommended to use an open network for staging.

The staging network (AWS-INIT) should be set up to only allow traffic to/ from the WSG DM , and services for Easy Deployment (like DHCP, NTP, ASDP). It prevents unauthorized access to the network.

During this connection, a dialog window `No network` is displayed in the handset.

NOTICE: The WLAN discovery process stops if any SSID for Network A–D is manually filled in, either by using the handset's Admin menu or WinPDM/WSG DM .

The SSID can be accessed from the handset's Admin menu in **Device info** > **WLAN info**. The `SSID (channel):` field shows the SSID (network name). For more information, see Deploy the Handset Using the Admin Menu on page 16.

INFO: If the wireless network connection bars (up in the left of the handset display) come and go alternately, the pre-shared key (PSK) on the AP is probably wrongly configured, and the handset cannot connect to the AP. After a timeout, `No network` is shown on the handset display.

10.3 WSG Discovery

Once the handset has a WLAN connection, the second step is to automatically get the IP address to the WSG , which runs the WSG DM , see (2) in Figure Easy Deployment.

There are two ways of getting the IP address automatically:

- Using the vendor option functionality, Option 43 of a DHCP server. For more information, see Server Discovery Using the DHCP Option 43 on page 122.
- Using the Ascom Service Discovery Protocol (ASDP) implemented in the handset. For more information, see Server Discovery Using the Ascom Service Discovery Protocol (ASDP) on page 123.

In both cases, the received IP address is not saved, so this process is repeated on the next startup, unless a WSG IP address is set.

10.3.1 Server Discovery Using the DHCP Option 43

A DHCP server can be configured to return a WSG IP address, as part of the DHCP response to the handset, with other needed DHCP parameters. The WSG IP address is sent using Option 43 (Vendor-Specific Data).

A DHCP request from a handset uses the Option 60 Vendor Class Identifier (VCI) to identify itself to the DHCP server. The VCI string OpenScapeWL4 is the Object Identifier (OID) for the handset.

In this way, a DHCP server can be configured to return a WSG IP address only to those clients that expect it. Option 60 also allows different clients to use different settings in Option 43, if there are multiple clients in the network.

After the handset receives the (dynamic) IP address to the Messaging module, it tries to log in to the WSG DM . The DHCP Option 43 is ignored once the WSG IP address is configured (static) in the WSG DM .

There are many types of clients that can use this feature, for example, Cisco is using it for its LWAP APs to find a WLAN controller to attach to.

Examples on how to configure and troubleshoot Option 43 on a Linux and Microsoft Windows 2003/2008 server, is found in Configuration Example of a Lin-

ux Server Using DHCP Option 43 on page 130 and Configuration Example of an MS Windows 2003 Server Using DHCP Option 43 on page 131, respectively.

10.3.2 Server Discovery Using the Ascom Service Discovery Protocol (ASDP)

If the DHCP response does not contain a valid WSG IP address, the handset tries to find a WSG using the Ascom Service Discovery Protocol (ASDP) instead. An ASDP discovery message is sent to the broadcast IP address using UDP, which contains the MAC address of the handset.

A WSG , configured to respond to ASDP discovery messages, responds with an ASDP offer as a unicast UDP message sent to the handset.

The protocol allows each WSG support different client services, and can separate different types of handsets (WLAN and DECT) to be serviced by different modules. If there are multiple WSGs set up to support ASDP for WLAN, more than one response is received by the handset. A single response is randomly selected, normally the modules that respond fastest.

If no response is received, a new ASDP request is retransmitted periodically, and the IP address remains unconfigured.

For more information on how to configure a WSG DM to support the handset as an ASDP discovery client, see Ascom Service Discovery Protocol (ASDP) Overview on page 124.

10.4 Parameter Download

After successfully receiving the WSG IP address, the handset tries to log in to the Messaging system.

The handset has, at this stage, no number stored internally, and does not know its identity in the Messaging system. When the dialog window `Login:` is displayed in the handset, enter the intended endpoint number (that is, the phone number of the handset) that the handset uses to log in to the Messaging system.

Once a valid endpoint number is stored in the handset, the handset tries to log in.

After a successful login, the handset is synchronized with the parameters stored in the **Number record** of the WSG DM .

It is vital that, especially the WLAN network settings, are configured correctly as the handset receives a new set of parameters that contains the WLAN parameters for the production WLAN. If using a WLAN security protocol that uses certificates, make sure that the certificates (server/client) are saved to each handset number in the WSG DM . If the WLAN parameters are wrong, the handset cannot associate with neither the staging nor the production WLAN again.

INFO: If the wrong number is entered when the dialog window `Login:` is displayed, make a factory reset and start again. For more information, see Perform a Factory Reset on page 89.

If there are no **Number records** already configured in the WSG DM before the handset logs in for the first time, perform the following steps:

1) In the WSG DM , check and save the automatically created **Numbers record** by right-clicking on the number's entry.
2) In the created record under **Device** > **WSG** > **IP address**, check that the IP address for the Messaging system is correct. Then the handset can log in to the same WSG DM again.

INFO: The WSG DM 's IP address can also be checked using the Admin menu of the handset (in **Device Info** > **Network info** > **Device manager**).

10.5 Easy Deployment using Ascom Service Discovery Protocol

10.5.1 Ascom Service Discovery Protocol (ASDP) Overview

A handset can find the Messaging module using the Ascom Service Discovery Protocol (ASDP). The protocol is binary and uses WSG messaging.

For this purpose, a discovery message (BC) using the messaging protocol is sent to the network's broadcast IP address using UDP.

The discovery message contains data about the required service, see below.

Table 10: Client Description

Client class:	PP
Client family:	WLAN
Client name:	< MAC Address of the handset >
etc.	

Table 11: Service Wanted

Service family:	
Service name:	WGW
etc.	

A Messaging module that receives this message responds with an offer (UC) as a unicast UDP message sent to the handset.

If more than one response is received by the handset, a single response is randomly selected. If no response is received, a new request is retransmitted periodically, while the IP address to the WSG remains unconfigured.

10.5.1.1 Configure the WSG to Support WLAN Service Discovery Clients

For each module, the ASDP must be configured to support WLAN clients.

1) Log in to the module and select **Configuration** > **Other** > **Advanced configuration**.
2) Select **WLAN System** and enable **Service Discovery**.

10.5.2 DHCP Vendor Options Explained

The DHCP is described in the Request for Comment (RFC) No. 2131 and 2132. (The RFC is a publication of the Internet Engineering Task Force (IETF) and the Internet Society, which are the principal technical development and standards-setting bodies for the Internet.)

For information on how the vendor option 43 is used, configured, and troubleshooted, see Configuration of Option 60 and 43 Using the Standard DHCP Vendor Class on page 132.

The DHCP options described in the RFC 2132, can also, besides a DHCP server, be used by a client.

An example of how a handset sends a DHCP Discover message to a DHCP server during the boot process, is shown in Figure 10: Example of a DHCP Discover Message (Omnipeek Trace) on page 126.

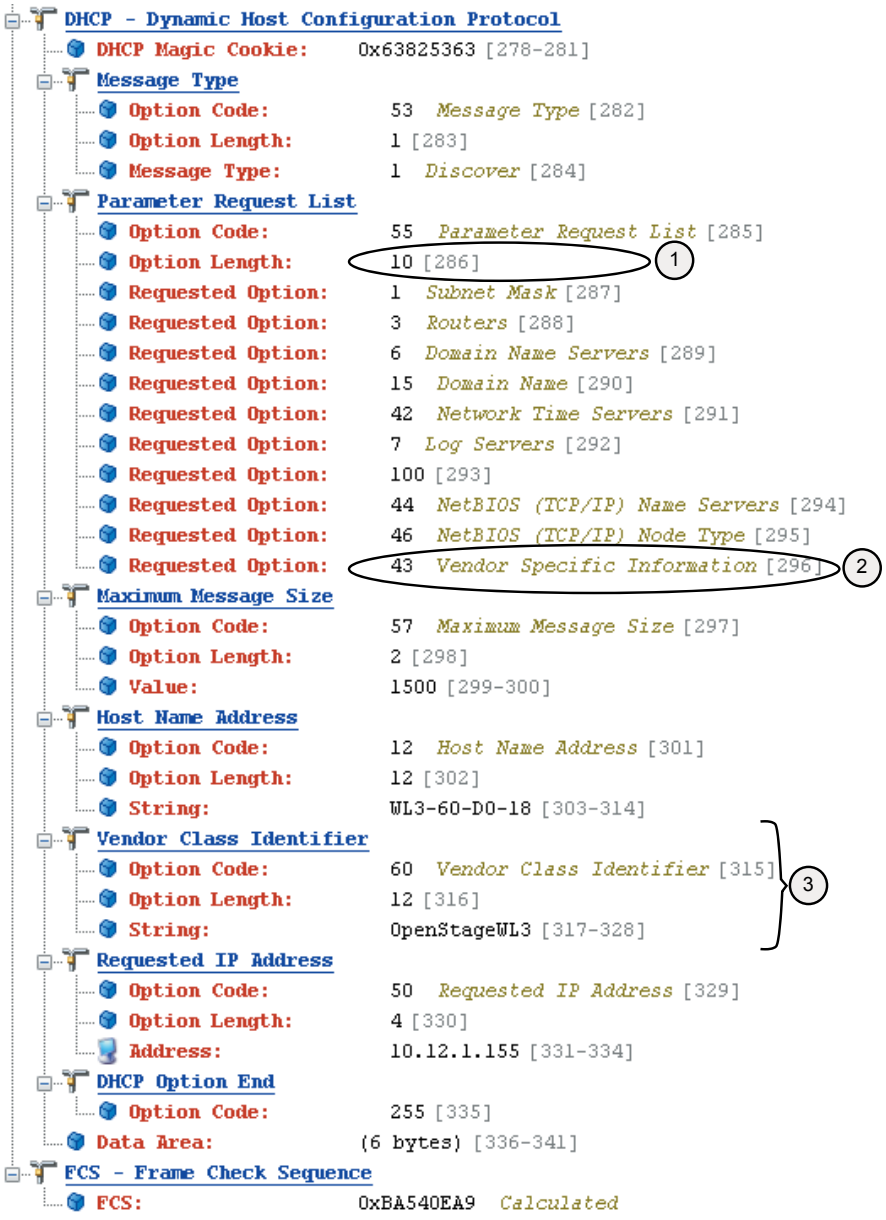


Figure 10: Example of a DHCP Discover Message (Omnipeek Trace)

In Figure 10: Example of a DHCP Discover Message (Omnipeek Trace) on page 126, the numbered points illustrate the following:

- The amount of options requested
- Vendor options requested by the handset
- A specific set of Vendor options requested by the handset, by sending a Vendor Class Identifier (VCI)

Figure 11: Example of a DHCP Acknowledge (Omnipeek Trace)

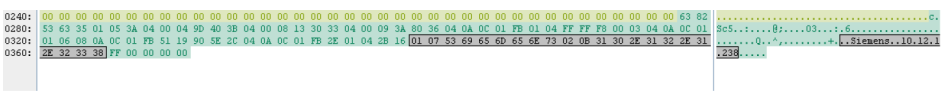


Figure 12: Example of a DHCP ACK in Hex (Omnipeek Trace)

In Figure 11: Example of a DHCP Acknowledge (Omnipeek Trace) on page 127, the handset sends a DHCP ACK that confirms the settings the handset agreed to use, like the **43 Vendor Specific Information**.

When comparing the acknowledged options with the handset Requested Options in the trace in Figure 10: Example of a DHCP Discover Message (Omnipeek Trace) on page 126, it shows that not all requests were agreed on by the DHCP server. For example, the DHCP server does not acknowledge the options **42 Network Time Servers**, **7 Log servers**, and – by Omnipeek unknown – option **100**. Some options are also added by the DHCP server (without being asked for by the handset), for example, options 58, 59, 51, and 54, which are compulsory.

10.5.2.1 The Vendor 43 Option Field Explained According to the RFC

A DHCP server is configured with options prepared to supply clients with networking information that is requested by the clients. The options are entered either in the IP address scope or for all scopes.

A selected set of options based on the client type can be sent to clients. This allows a DHCP server to override the standard scope settings with other settings that are unique for a specific client type, or transmit dedicated values that are not part of the DHCP standard. These are called vendor options and they are sent to the client using Option 43.

Adding vendor-specific information to Option 43 requires the use of tags (named fields) in the Option 43 record. Such options are called sub-options, and they are included in the DHCP offer as type-length-value (TLV) blocks, embedded within Option 43. The definition of the sub-option codes and their related message format is left to the vendors.

Option 43 is used in WLAN by several vendors. Handset vendors use it to send specific values to their family of handsets, and WLAN vendors use it to identify APs and find controllers (by distributing IP addresses using Option 43). A dedicated tag for a specific client is only identified by a client that asks for it and has a dedicated use for the tag. For example, the IP address to a WLAN controller that can be probably used only by the APs.

To avoid having to send all Option 43 codes with useless tags to all clients, the use of Option 60 creates a client identity itself as a specific client type. This type is then mapped to an entry in the DHCP server, which contains the vendor 43 options for that type.

Option 60 is normally coded as an ASCII string, but can also be binary. Option 60 is called Vendor Class Identifier (VCI), and is defined by the manufacturer and programmed into the DHCP client of their devices.

Table 12: Option 60 String Values on page 128 lists some examples of Option 60 string values.

Table 12: Option 60 String Values

Vendor	Device	String	Option 43 returned value
Aruba	Aruba AP	ArubaAP	Loopback address of the Aruba master controller
Cisco	Cisco AP	Cisco AP c1250	IP address of the WLAN controller
Unify	OpenScape WLAN Phone WL4	OpenScapeWL4	WSG IP address and hostname

10.5.2.2 Option 43 Field Definition

The information in Option 43 is an opaque object of n octets, and the definition of this information is vendor specific.

Table 13: Option 43

Code	Length	Vendor-specific information element	Vendor-specific information element	Vendor-specific information element
43 (2b)	n	i1	i2	i3,…

The code for the option is 43, and its minimum length is 1. The numbers i1, i2, i3…, and so on, refer to information bytes. The length value n refers to the amount of information bytes in the field.

The value of the length octet does not include the two octets specifying the tag and length.

10.5.2.3 Option 43 with Encapsulated Vendor-specific Information

Normally a vendor needs to use multiple parameters for the configuration of the clients. Then the options are encoded using the **Encapsulated vendor-specific extensions**. This format uses the TLV syntax (type length value) and is described in RFC 2152. When **Encapsulated vendor-specific extensions** are used, the information bytes 1–n have a format described in Table 14: Information Bytes Format when Using Encapsulated Vendor-specific Extensions on page 129.

Table 14: Information Bytes Format when Using *Encapsulated Vendor-specific Extensions*

Code (tag)	Length	Data items			Code	Length	Data items			Code	Length
T1	n	D1	D2	…	T2	n	D1	D2	…	…	…

The different information bytes, sub-options are called tags.

The tags codes are numbered options created by the vendor, like 01, 02, 83, 243, etc.

In the table above, the code for the option and the total length are omitted.

Depending on the system that is used to configure the DHCP options, an administrator can enter each sub-option separately, or enter all values in a single concatenated string. Since each value contains a header, a length field, and the parameter itself, this can be difficult to enter correctly. Some servers require the entry of values in the hexadecimal format, while others use ASCII strings.

For the handset, the Option 43 sub-fields are defined according to Table 15: Option 43 Sub-fields on page 130.

Table 15: Option 43 Sub-fields

Code (tag)	Length	Data items	Code	Length	Data items	Code (optional)
01	7	Unify	03	7–15	IPv4 address to WSG (dot-decimal)	255

The code `255` is used as an optional marker of the end of the vendor field.

When entering this information in a DHCP server, the administrator must observe that the field length of the IP address can vary, depending on the amount of digits used. If, for example, using the address `10.30.5.7`, the length is 6 numbers plus 3 dot separators in all 9 bytes. If using an IP address like `192.168.100.101`, the length is 15 bytes. Some server interfaces can assist in calculating the length.

Example of Sent Data with Option 43

To deploy a handset with the WSG DM with IP address `10.30.4.120`, data is sent as Option 43 as follows:

Hexadecimal	**01**:07:53:69:65:6D:65:6E:73:**03**:0B:31:30:2E:31:32:2E:31
Printable text	\x01\x05Siemens\x03\x1210.30.4.120

NOTICE: The first option in the OEM string (made bold in the table above) is used to verify that the data received in the client is for the WLAN handset. This is called a magic number.

INFO: Search the internet for a tool that can assist in creating this string in hexadecimal format.

Table 16: Vendor Class Identifier (VCI)

Vendor/OEM	Value
Siemens	OpenScapeWL4

10.5.3 Configuration Example of a Linux Server Using DHCP Option 43

The Code Example on page 130 is from a Ubuntu Linux server. Enter the information in the `/etc/ltsp/dhcpd.conf` file.

Code Example

```
# Defining the option 43 with the proprietary sub-opcodes.
option space easy;
option easy.oem code 1 = string;
```

```
option easy.ims code 2 = string;
class “vendors” {
match option vendor-class-identifier;
vendor-option-space easy;
}
subclass “vendors” “ OpenScapeWL4 ” {
option easy.oem “ Unify ”;
option easy.ims “10.30.4.120”;
}
```

There are two options configured as code 1 and code 2, and both are defined as strings.

The server maps the string “ OpenScapeWL4 ” that was received from the handset using Option 60, as defined in the subclass paragraph.

There is no need to describe the length of the fields.

10.5.4 Configuration Example of an MS Windows 2003 Server Using DHCP Option 43

The DHCP server in a Microsoft Windows Server system is by default already configured with the Vendor Classes (seen in the table below) and the DHCP standard options.

The standard options are used by all clients, while the Vendor class option adds/overrides options for specific clients.

Name	Options	Used by VCL clients with	Option 60 Vendor class mapping
Microsoft Windows 2000 options (overrules the other two)	1, 3, 6, 15, 31, 33, 43, 44, 46, 47, 121, and 249	Windows 2000 and higher. XP, Vista, Win 7, Win 8, and Win 10.	“MSFT 5.0”
Microsoft Windows 98 options		Windows 98 and Window ME	“MSFT 98”
Microsoft options		Windows 98, ME and 2000 clients	“MSFT”

An administrator can add new Vendor classes as described in Define New Vendor Class to Support Multiple Types of Clients on page 134, but it is not possible to delete the Microsoft built-in classes and the standard class.

The DHCP server is preconfigured with a list of normally used DHCP options. Any missing DHCP option can be added as an administrator-defined option, either for each scope or for the whole server.

10.5.5 Configuration of Option 60 and 43 Using the Standard DHCP Vendor Class

Adding Option 60 and 43 to the standard set of DHCP, at least in a lab environment, is a simple and fast solution, but has its drawbacks.

There can only be one set of options configured per scope, so having different vendor's equipment in the system requires different scopes. For example, lightweight APs and handsets may not use the same scope.

Option 43 should then contain a complete data set with all needed sub-options stored in a TLV format. This is, in some literature, described as using the RAW format of Option 43. The TLV format is best entered using a data type of binary.

NOTICE: By configuring Option 43 directly on the standard scope, any DHCP client is offered this value, independent of the Vendor Class ID that is used by the client. Only clients who understand the received string benefit from this value. Trying to solve this problem by manually setting Option 60 to a specific Vendor Class ID on the standard scope has no effect. On a Microsoft DHCP server, the Vendor class IDs are entered using a dedicated procedure, which allows the usage of Multiple Vendor Classes. This is why Option 60 is not listed as an option in the default standard DHCP class. Therefore, there is no need to enter Option 60 values directly on a scope by creating a new option.

INFO: There are several documents on the internet that get this process wrong.

If set, option 43 is also offered to client computers.

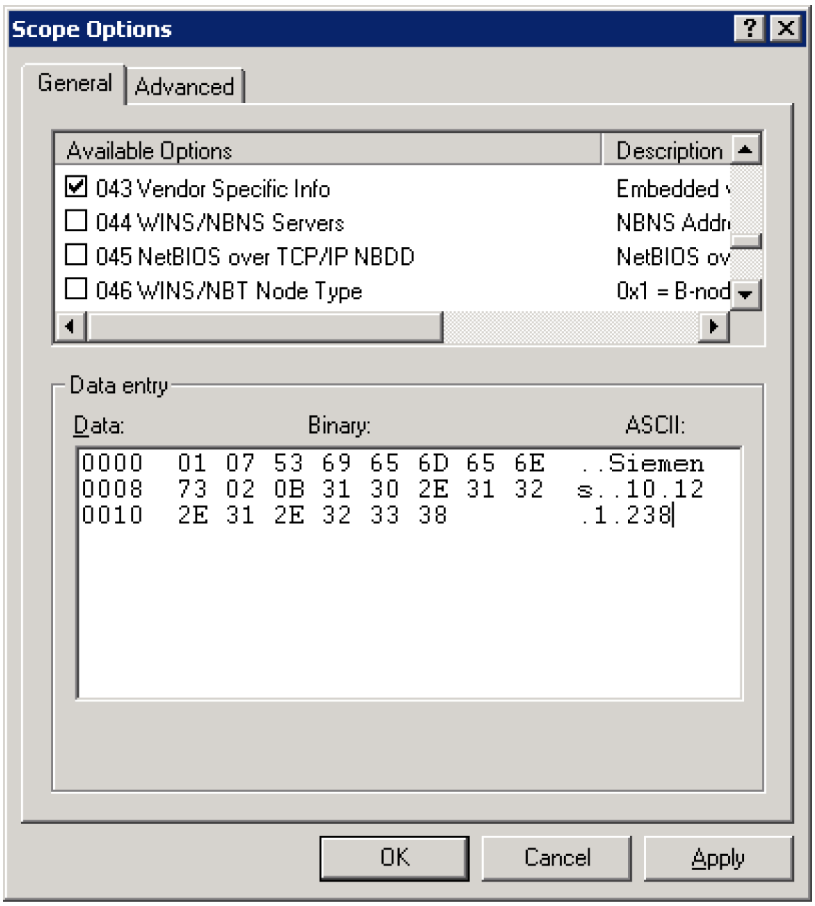
Configure Option 43

This example illustrates how to set a vendor 43 option on the standard DHCP class, which is feasible if only vendor Option 43 is needed.

1) On the DHCP server, click the scope that the handsets should use, then right-click on **Scope Options** and select **Configure Options**.
2) On the **General tab** (the default Standard DHCP class), scroll down, and select **043 Vendor Specific Info**.

3) In the data entry field, there are two ways of entering the information. Click to the left in the box to enter the string in binary, and to the right to enter the string in ASCII. It is possible to switch between binary and ASCII.

   Enter the values, as described in previous sections. Remember to get the length values in the TLV string correct.



   INFO: If the length value is unknown, enter the TLV value as follows, as everything inside the parenthesis is auto-calculated using the Auto-len feature:

   `01 ("Unify")03(192.168.5.1)`

   Click **OK** and save the new Option 43.

4) Check that the options are entered correctly. Note that the Vendor class is **Standard**, which means that no specific class is used, and that the User class is **None**, which means that it is the default user class. The handset does not send any request with a user class filled in.

   NOTICE: Do not enter the value `2b 14 (43 20)`, which is the option class and the total length. This is added by the DHCP server, when this option is presented to the client.

5) Test the configuration. If Option 43 is not working as expected, verify the behavior with a packet-capturing tool.

10.5.6 Advanced Configuration of Option 60 and 43 Using a New Vendor Class

The recommended way of setting up Vendor options is to use Vendor classes instead of the Global standard Default DHCP class. With this solution, Option 60 is not configured as an option in a scope, but instead, a Vendor class is created.

Microsoft uses a method that allows the administrator to set up the sub-options that will be part of the vendor options, as a complete set of sub-options, which then are concatenated to the 43 option string by the server. Each sub-option (called a code) is defined with the sub-option numbers as described by the vendor. In the case of the VoWiFi handset, the sub-options are `01` and `0203`.

NOTICE: The DHCP server automatically calculates the length of each sub-option and the total length of the whole string, and attaches the option ID of `43` to the beginning of the string.

NOTICE: If Option 43 is configured using `code 43`, the `code 43` option is added to the concatenated string. Then double headers are added (one created by you, and one created by the system), and the string is not functioning as intended.

Instead, fill in the created sub-options with correct values. The sub-options are then automatically concatenated to the string, which creates an Option 43 on the fly.

10.5.6.1 Define New Vendor Class to Support Multiple Types of Clients

To include the needed information for a handset, an administrator has to define a new vendor class as follows:

1) Right-click on the DHCP server object, select **Define Vendor Classes**, and click **Add**.
2) In the **New Class** dialog box, enter a descriptive name for the Vendor class. For example, in the **Display name** field, enter **Unify OpenScape WLAN Phone WL4**, and in the Description field, enter **Option 43 for Easy Deployment**. These fields are only used for displaying information for the administrator.

   In the ID field, enter the VCI string seen in the table in DHCP Vendor Options Explained on page 125 (**OpenScapeWL4**). Then click **OK**.

   INFO: Click on the right side of the field to be able to write in ASCII.

   NOTICE: The VCI string has to exactly match with the vendor specification, since it is used in the mapping of the information sent from the handset in Option 60 (case-sensitive).

10.5.6.2 Configure Sub-options for a Vendor Class in an MS Windows 2003 DHCP Server

The current sub-option string for the handset contains two codes (which in some documentation from vendors are referred to as tags). To build these two codes, one has to be defined with the value of Unify X-brand and one with the IP-address of the WSG DM .

1) Right-click on the DHCP server and select **Set Predefined Options**.
2) Select the vendor class created earlier (in section Define New Vendor Class to Support Multiple Types of Clients on page 134) in **Option class** and click **Add**. The **Option type** window opens.
3) Enter a descriptive name for the first sub-option in the **Name:** field, for example, **VoWiFi Vendor**, and in the **Description:** field, enter, for example, **Vendor Magic ID**.
4) In the **Data type:** field, select **Binary** to allow entering more than one byte.
5) In the **Code:** field, enter `001`, then click **OK**.

NOTICE: A predefined value (by selecting **Edit Array**) is not needed to be entered here. It can be preferred to be set per scope instead (explained below).

---

6) For the second sub-option, repeat 1 on page 135–2 on page 135.
7) Enter a descriptive name for the second sub-option in the **Name:** field, for example, **IP address**, and copy it to the **Description:** field.
8) In the **Data type:** field, select **Binary** to allow entering more than one byte.
9) In the **Code:** field, enter `002 003`, then click **OK**.
10) Add the two sub-options to a scope and assign the values needed as follows:

    Right-click on your scope, then select **Scope Options** > **Configure Options**.
11) Select the **Advanced** tab. In the **Vendor class:** field, select the new vendor class that was created in section Define New Vendor Class to Support Multiple Types of Clients on page 134 (Unify WL4 X-brand handset). Check the two sub-options that appear (**001 VoWiFi Vendor** and **002 WSG IP address**.

NOTICE: In the **User class:** field, leave the **Default User Class**.

---

12) Select the first sub-option **001 VoWiFi Vendor** and enter the Vendor magic ID (Unify or in Binary/Hex: 55:6E:69:66:79). Click to the left of the box for binary and to the right for ASCII code.

NOTICE: Remove `00` that is displayed by default.

NOTICE: A length value (in the **Data:** field) is not needed to be entered here (as normally done, when entering a TLV record). Click **OK**.

---

13) Select the second sub-option **002003 WSG IP address** and enter the WSG IP address in binary/hexadecimal or ASCII. Click **OK**.

14) Test the configuration by factory-resetting a handset. If the configuration does not work, do a trace with a sniffer to see why.

INFO: Install Wireshark on the DHCP server and filter on the `bootp` protocol to view the packet exchange when a handset is started up.

10.5.6.3 Configure DHCP Options in a Cisco Device Running the Cisco IOS DHCP Server

The Cisco IOS DHCP server only allows Option 43 definitions for one device type for each DHCP address pool, so only one device type can be supported for each DHCP address pool.

To configure DHCP Option 43 for VoWiFi handsets, perform the following steps:

1) Enter the configuration mode at the Cisco IOS command line interface (CLI).
2) Create the DHCP pool, which includes the necessary parameters, such as the default router and the server name. This is an example DHCP scope:

```
ip dhcp pool <pool name>
network <ip network> <netmask>
default-router <default-router IP address>
dns-server <dns server IP address>
```

3) Add the Option 60 line with the following syntax:

```
option 60 ascii “VCI string of the handset”
```

NOTICE: Avoid raw DHCP Option 43 without the specification of a VCI. Raw DHCP Option 43 limits the DHCP server to support a single device type for vendor-specific information for each DHCP scope. Besides, every DHCP client receives the Option 43 values in a DHCP Offer, whether the values are relevant to the device or not.

4) For the VCI string, use the value above. The quotation marks must be included.

   Add the Option 43 line with the following syntax:

   ```
   option 43 hex <hexadecimal string>
   ```

   This hexadecimal string is assembled as a sequence of the TLV values for the Option 43 sub-option: Type + Length + Value, as described in Configure Sub-options for a Vendor Class in an MS Windows 2003 DHCP Server on page 135.

10.5.7 Easy Deployment and VLAN

In a VoWiFi system, the WSG DM used for configuration must be positioned in the Voice VLAN, even if it is actually a data device (since the Voice and the WSG Messaging services cannot be separated to two different SSIDs and thus not simply mapped to different VLAN in the AP/Controller.

Although, a mapping rule can be created that uses TCP/UDP port mapping and connects the two services to different VLANs instead of mapping SSIDs.

VLANS are not defined in the 802.11 standard. To achieve the same traffic separation, for example, between a Data and a Voice VLAN (and maybe including even a Deployment/Management VLAN), different SSIDs are used which are mapped to different VLAN IDs in the AP/Controller. The WLAN system must, therefore, be set up to support multiple SSIDs.

If using the AWS-INIT SSID on a single AP, make sure that the handset can also associate with the production SSID after it has received its full configuration from the WSG DM used for Easy Deployment.

NOTICE: When getting the production WLAN SSID, it may be mapped to another VLAN. In this case, the IP address is changed. The DHCP server options are also served by another scope or eventually another DHCP server.

If using a deployment VLAN, it may be required to have two WSG DM or it is possible to set up a restrictive routing between VLANs.

A direct configuration of Option 60 and Option 43 may also be used on a scope-by-scope basis if the system allows the separation of DHCP client devices to use independent scope ranges.

10.5.8 Easy Deployment and Certificates

NOTICE: If using a security model that requires certificates use an NTP server as well to assure the correct time in the handset as certificates are only valid within a certain time.

Application Certificate

If the production network is using individual application certificates, which, for example, are required for using EAP-TLS, first associate the certificates with the predefined number in the

WSG DM
used for Easy Deployment, and then select the required application certificate. Perform the steps, as described below in this section.

INFO: If there is no application certificate in the WSG DM used for Easy Deployment, the handset is disconnected from the WLAN. To recover from this, first do a factory reset, and make sure that the application certificates are associated with the correct Number. You can also use the WinPDM to install the correct application certificate. Then try again.

Trusted Certificate

1) Upload at least one **Self-signed certificate** and up to three **Intermediate certificates**, which are used to establish the trust chain of the server certificate. The commonly understood name of these certificate types is **Trusted certificate**.

2) Perform the steps of association according to 3 on page 138 and 5 on page 138.

> **INFO:** For more information on certificates, see Installation and Operation Manual, Portable Device Manager for Windows (WinPDM), TD 92712EN and User Manual, Device Manager in , TD EN.

3) In the **Numbers** tab, right-click the handset's number and select **Manage certificates**. The **Manage certificates** window opens.
4) In the **Trust list** tab and **Application certificates** tab, click **Browse** and select the certificates to import. Click **Close**.
5) In the **Numbers** tab, right-click the handset's number and select **Edit parameters**.
6) Select **Network X** (X represents A, B, C, or D).
7) In the **Security mode** drop-down list, select **EAP-TLS**.
8) In the **EAP application certificate** drop-down list, select the application certificate to be used. Click **OK**.

10.5.9 Troubleshooting Easy Deployment in an MS 2003/2008 DHCP Server

If a predefined DCHP option has been created by mistake and it needs to be deleted, the server might deny the operation (even if you have created the DHCP option). This is indicated by a grey **Delete** button. In this case, open a command prompt and use the `netsh` command as follows:

```
netsh dhcp server \\servername delete optiondef xx
```

where `xx` is the option number.

10.6 SCEP

Simple Certificate Enrollment Protocol (SCEP) is used for handling certificates in large VoWiFi systems. It can be configured using WinPDM/WSG DM or DHCP.

> **NOTICE:** The handset implements the client-side SCEP functionality. A third-party SCEP server is required to get a working SCEP solution. An example of a SCEP server is Microsoft Network Device Enrollment Service (NDES).

10.6.1 Configure SCEP Using WinPDM/WSG DM

To configure SCEP using WinPDM/WSG DM , perform the following steps:

1) In the **Numbers** tab, right-click the handset's number and select **Edit parameters**
.
2) Select **Device** > **SCEP**.

3) Set the following parameters:

- **SCEP CA URL** — URL to the SCEP server. Example: http://myscepserver.example.com/certsrv/mscep/mscep.dll

  If left empty the handset uses SCEP configuration from the DHCP server, if available.

  For more information, see Configure SCEP Using DHCP Option 43 on page 139.
- **SCEP CA URL** — The URL of the SCEP server.
- **Password** — Password used to authenticate the handset towards the SCEP server.
- **Country** (optional) — Country name used in the generated certificate. It must be followed by the country code listed in https://www.ssl.com/csrs/country_codes/
- **Organization name** (optional) — Organization name used in the generated certificate.
- **Unit name** (optional) — Unit name used in the generated certificate.
- **State name** (optional) — State or province name used in the generated certificate.
- **Common name** (optional) — Common name used in the generated certificate. Different formats are allowed. MAC address in XXYYZZAABBCC format, or IPv4 address in abc.abc.abc.abc format, or string of printable characters. If left empty, the handset MAC address is used.
- **Subject alternative name** (optional) — Subject alternative name extension used in the generated certificate.
- **Key length** — The key length of the generated key pair.
- **Validate server certificate** — Enables or disables the validation of the SCEP CA certificate.

10.6.2 Configure SCEP Using DHCP Option 43

A DHCP server can be configured to return a SCEP URL, a password, and CSR customization options, as part of the DHCP response to the handset, with other needed DHCP parameters. The SCEP configuration is sent using Option 43 (Vendor-Specific Data).

A DHCP request from a handset uses the Option 60 Vendor Class Identifier (VCI) to identify itself to the DHCP server. The VCI string OpenScapeWL4 is the Object Identifier (OID) for the handset.

This way, a DHCP server can be configured to return SCEP options only to those clients that accept it. Option 60 also allows different clients to use different settings in the Option 43 if there are multiple clients in the network.

After the handset receives SCEP configuration, it tries to request a certificate from the supplied URL using the supplied configuration. The configuration is stored in the handset and the DHCP Option 43 is ignored until a new valid configuration is set.

The following sub-options are used with Option 43:

- Sub–option 70: SCEP URL

  For example: http://myscepserver.example.com/certsrv/mscep/mscep.dll

- Sub–option 71: Password (optional)

  For example: MYCHALLENGEPASSWORD

- Sub–option 72: CSR Custom (optional)

  For example: K:2048;C:SE;ST:State;O:Organization;OU:Unit;CN:AABBCCDDEEFF;SAN:127.0.0.1;

  CSR Custom format: <key>:<value>;

Table 17: Possible Key Value Pairs

Key	Value	Description
K	1024/2048 (4 characters)	Key length of the generated key pair.
C	2 characters	Country name to be used in the generated certificate. It must be followed by the country code listed in https://www.ssl.com/csrs/country_codes/
O	String (max 16 characters)	Organization name to be used in the generated certificate.
OU	String (max 16 characters)	Unit name to be used in the generated certificate.
ST	String (max 16 characters)	State or province name to be used in the generated certificate.
CN	String (max 32 characters)	Common name to be used in the generated certificate. Different formats are allowed. MAC address in XXYYZZAABBCC format, or IPv4 address in abc.abc.abc.abc format, or a string of printable characters. If left empty, the handset MAC address is used.
SAN	String (max 32 characters)	Subject alternative name extension to be used in the generated certificate.

For examples on how to configure and troubleshoot Option 43 on a Linux and Microsoft Windows 2003/2008 server, see Configuration Example of a Linux Server Using DHCP Option 43 on page 130 and Configuration Example of an MS Windows 2003 Server Using DHCP Option 43 on page 131, respectively.

11 Interactive Messaging in Handsets

NOTICE: Applicable to OpenScape WL4 Plus and OpenScape WL4 Messaging only.

The **interactiveMessage** service in the Open Access Protocol (OAP) client application is used to send an IM to the handset. OAP is an XML-based protocol that enables the exchange of data between external applications or systems and the WSG.

The following list contains the XML tags for interactive messaging supported by the handsets:

- Messaging
  - Subject
  - Body
  - Break through of silent mode
  - Beep characteristics/Number of beeps
  - Number of indications
  - Time between indications
  - Message priority used by handset
  - Message ID
  - Time to live in handset
  - Allow later erase of message
- IM-specific
  - Update existing IM
  - Sticky mode
  - Time between indications before option selection
  - Time between indications after option selection
- Options
  - Option text
  - Option ID
  - Assigned soft key
  - Requested call number
  - Display layer

- On option selection
  - Number to call
  - Request for call number
  - Disconnect ongoing call
  - Data to send when call is disconnected
  - Data to send
  - Erase specified option
  - Erase message
  - Update message time to live
  - Show prompt text and request data from user
  - Destination address for sent response
  - Enable Option ID
  - Display specified layer
  - Close message
  - Sticky mode
  - Change message priority
  - Feedback on selection
- IM response
  - Data received from handset
  - Data entered by user
  - Device ID from handset