ZYXEL

Your Networking Ally

User's Guide

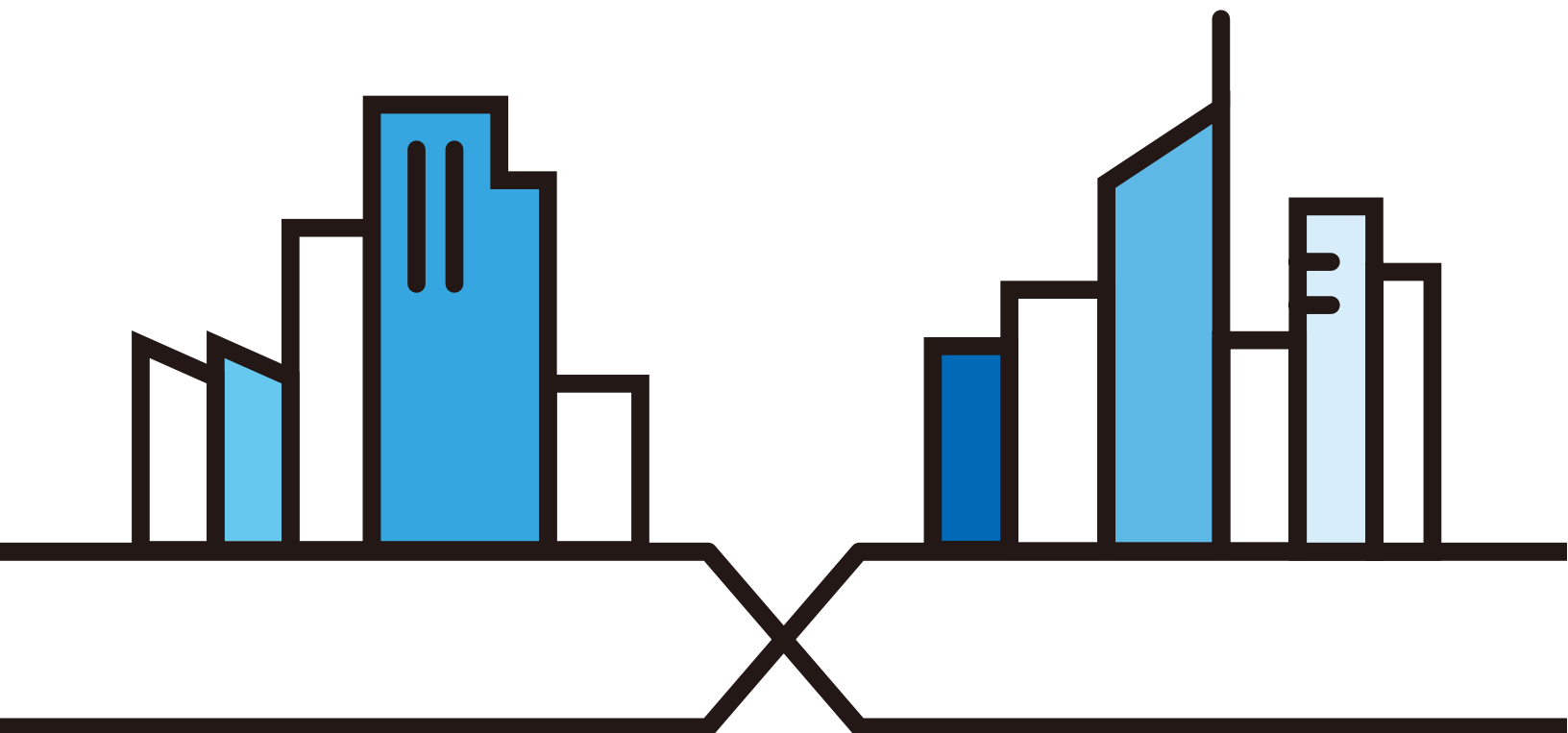## WAH7608

4G LTE Portable Router

Default Login Details

Zyxel App	LTE Ally
LAN IP Address	http: //192.168.1.1
Username	admin
Password	1234

Version 1.0 Edition 1, 12/2017

IMPORTANT!

READ CAREFULLY BEFORE USE.

KEEP THIS GUIDE FOR FUTURE REFERENCE.

Screenshots and graphics in this book may differ slightly from your product due to differences in your product firmware or your app version. Every effort has been made to ensure that the information in this manual is accurate.

Related Documentation

- Quick Start Guide

  The Quick Start Guide shows how to connect and install the WAH7608.

- More Information

  Go to **support.zyxel.com** to find other information on the WAH7608.

Contents Overview

Table of Contents

Document Conventions

Warnings and Notes

These are how warnings and notes are shown in this guide.

Warnings tell you about things that could harm you or your device.

Note: Notes tell you other important information (for example, other things you may need to configure or helpful tips) or recommendations.

Syntax Conventions

- The WAH7608 may be referred to as the "WAH7608" in this guide.
- Product labels, screen names, field labels and field choices are all in **bold** font.
- A right angle bracket (>) within a screen name denotes a mouse click. For example, **Configuration > LAN > DHCP > Leased Hosts** means you first click **Configuration** in the navigation panel, then **LAN,** then the **DHCP** sub menu and finally the **Leased Hosts** tab to get to that screen.

Icons Used in Figures

Figures in this user guide may use the following generic icons. The WAH7608 icon is not an exact representation of your device.

WAH7608	Generic Router	Switch
Server	Firewall	Smartphone
Tablet	Antenna Tower	Home
Outdoors	Printer	

Get to Know Your WAH7608

1.1 Overview

Your WAH7608 (**A**) is a hotspot solution that allows you to share Internet Access via WiFi anytime. It is a super-fast WiFi sharing resource on the go simply by using a SIM card. The WAH7608 supports 4G/3G/2G multi-mode and 802.11b/g/n WiFi technology. It can provide data rates of up to 150Mbps to up to 10 simultaneous WiFi clients. The WAH7608's slim design is easy to use anywhere anytime and leaves your smart phone's bandwidth and battery free for other purposes.

You can also configure Internet sharing with your friends and family, control connected devices and data usage using the LTE Ally app.

1.2 Applications

You can have the following networks with the WAH7608:

- **Wireless (WiFi)**: Wireless clients can connect to the WAH7608 to access network resources. Wireless clients can connect to the WAH7608 using the network's **WiFi Name** and **Password**. For WPS-compatible devices you can create an instant network connection using WPS (WiFi Protected Security).
- **WAN**: Connect to a mobile network for Internet access.

1.3 Way to Manage the WAH7608

You can use any of the following ways to manage the WAH7608.

LTE Ally App

The LTE Ally app allows the WAH7608 setup and management from your mobile device. This User's Guide provides information about key uses of the LTE Ally app.

Web Configurator

The Web Configurator is recommended for everyday management when using a supported web browser.

1.4 Hardware Description

The following images show the WAH7608 hardware.

Figure 1   WAH7608 Exterior Hardware
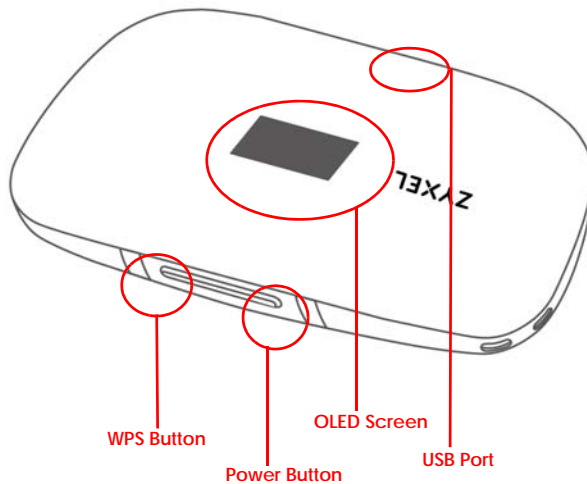
Figure 2   WAH7608 Interior Hardware
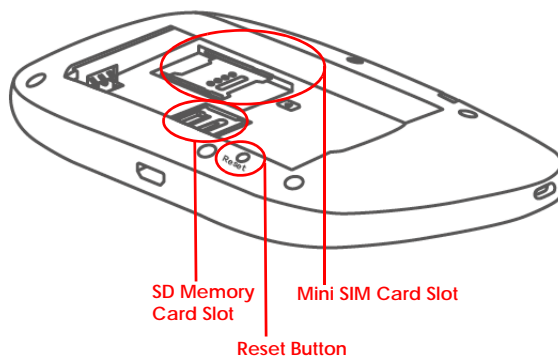
1.5 Hardware Connections

See your Quick Start Guide for more information about hardware installation.

1 Remove the lid. Gently place the SIM card and lock it into place.

Note: If you have a Nano or Micro SIM card, use a SIM card adapter to correctly fit it into the Mini SIM card slot..
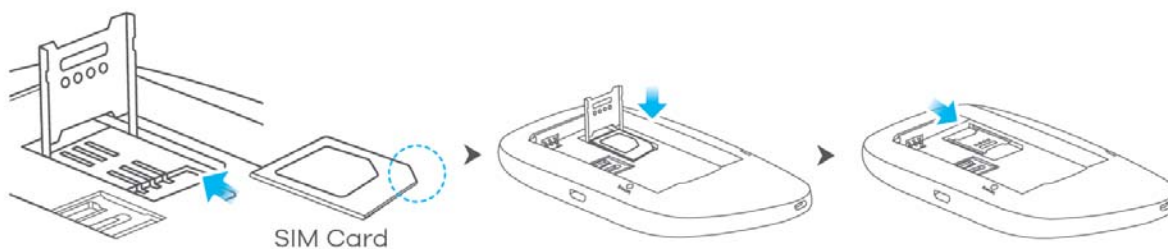
Make sure the SIM card is placed correctly to avoid damage to the pins.

2 Then insert the battery and close the lid.
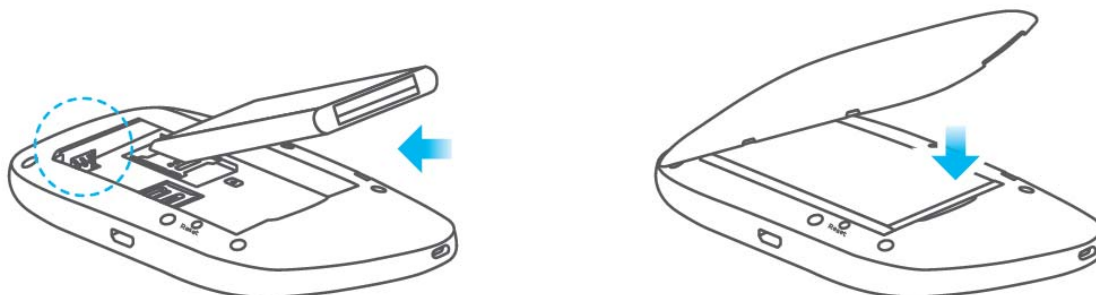
1.6 Power Button

Use the power button on the side panel to turn the WAH7608 on or off. To turn on, press the power button until the OLED screen displays **ZYXEL**.

Note: The WAH7608 OLED screen turns on automatically when it is connected to an appropriate power source.

Power Off

• To turn the WAH7608 off, press the power button once and release it when the OLED screen displays **Shut Down...**

1.6.1 Reset the WAH7608

• Remove the lid. Press the reset button and release it when the OLED screen displays **Reset.**

This resets the WAH7608 to the factory default configuration. This means that you will lose all configurations that you had previously, such as WiFi SSID and password.

1.7 The WPS Button

Your WAH7608 supports WiFi Protected Setup (WPS), which is an easy way to set up a secure WiFi network. WPS is an industry standard specification, defined by the WiFi Alliance.

WPS allows you to quickly set up a WiFi network with strong security, without having to configure security settings manually. Each WPS connection works between two devices. Both devices must support WPS (check each device's documentation to make sure). When WPS is activated on a device, it has two minutes to find another device that also has WPS activated. Then, the two devices connect and set up a secure network by themselves.

Your WAH7608 WPS button has two functions:

• **Press the WPS button for more than 1 second:** You can use the WPS button on the side panel of the WAH7608 to activate WPS in order to quickly set up a WiFi network with strong security. Press the WPS button for more than 1 second and release it. Press the WPS button on another WPS-enabled device within range of the WAH7608.

Note: You must activate WPS on the WAH7608 and on another device within 2 minutes of each other.

- **Press the WPS button for more than 5 seconds**: You can disable the WAH7608 WiFi network. No device will be able to connect wirelessly to your WAH7608. Press for more than 5 seconds to reenable the WiFi network.

1.8 OLED screens

This section describes the labels or icons displayed in the OLED screen of your WAH7608. When the WAH7608 first turns on the following screen displays.

Figure 3   WAH7608 OLED Home screen

The following table describes the labels in this screen.

Table 1   WAH7608's OLED Home screen

LABEL	DESCRIPTION
	This displays the type of network your WAH7608 is connected to and its signal strength. Your network can be either **2G**, **3G**, or **4G**. It displays **No Service** if the SIM card does not have an active data plan or you inserted the SIM card incorrectly and it could not be detected by the WAH7608. It displays **Pin Locked** when the WAH7608 cannot access the SIM card because it is locked.
	This displays when the WAH7608 is receiving/transmitting data to/from the Internet.
	This displays the WiFi network status, The number indicates how many clients are currently connected to the WAH7608.
	This displays when the WAH7608 receives an SMS (Short Message Service) message.
	This icon shows the WAH7608 battery life.
	This shows your WAH7608's Internet Service Provider.

To change to the second screen, press the **Power** button twice. The following screen displays.

Figure 4   Data Usage Screen
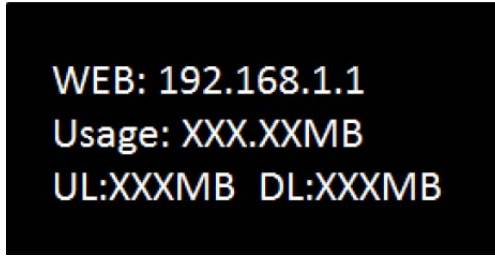
The following table describes the labels in this screen.

Table 2   Data Usage Screen

LABEL	DESCRIPTION
WEB	This displays the WAH7608's management IP address.
Usage	This displays the mobile data used in total by your WAH7608 in MB.
UL	This displays the amount of data in MB currently uploaded by the WAH7608.
DL	This displays the amount of data in MB currently downloaded by the WAH7608.

Press the **Power** button three times for the following screen to display.

Note: The WAH7608 factory-default WiFi settings are also in the WAH7608 interior label.

Figure 5   WiFi Network Information Screen
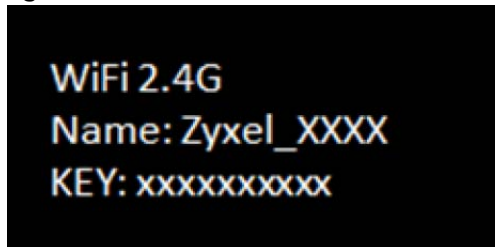
The following table describes the labels in this screen.

Table 3   WiFi Network Information Screen

LABEL	DESCRIPTION
WiFi	This displays the kind of WiFi network the WAH7608 provides.
Name	This displays the name used to identify the WiFi network.
KEY	This displays the password used to log into the WiFi network.

Note: The OLED screen turns off after 45 seconds. Press the **Power** button once to turn the OLED screen on again.

PART I
App User's Guide

CHAPTER 2
LTE Ally App

2.1 Set up Your WAH7608 Using LTE Ally

Zyxel LTE Ally app lets you manage connected devices, track your WAH7608 data usage and set up reminders to top up your WAH7608. This chapter will show you how to use LTE Ally's various features and how to set up your WAH7608 successfully using LTE Ally.

Compatibility

- Android 4.3 or later
- iOS 8 or later.

This section provides the following tutorials for setting up your WAH7608.

- Connect to your WAH7608 using LTE Ally
- Set Up Your WiFi Network
- Manage Your WiFi Clients
- Configure Data Usage and Statistics
- Check Your Inbox and Send Messages
- Configure the Mobile Network Manually

2.2 Connect to your WAH7608 using LTE Ally

1   Look at the WAH7608's third OLED screen to view its WiFi settings. Use your smart phone to search for the network WiFi **Name**. Enter the password (**Key**) to connect.
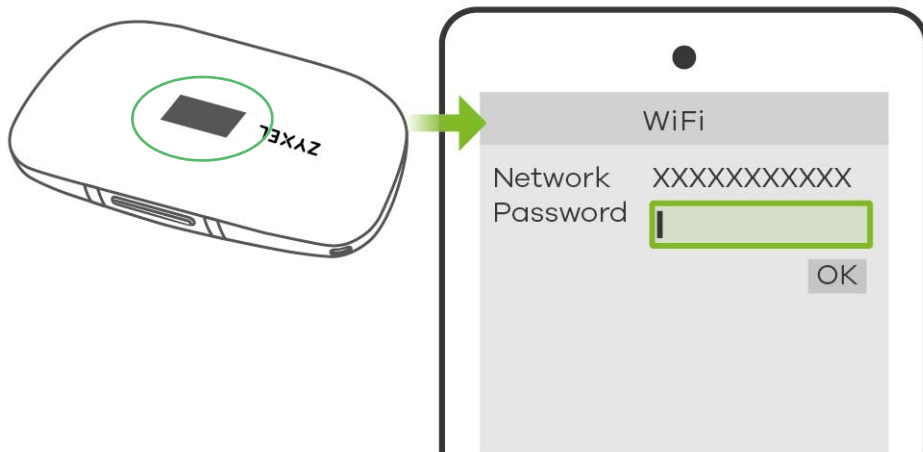
2 Download and install the LTE Ally app from Google Play or the Apple App store. Then tap the LTE Ally icon to open it.
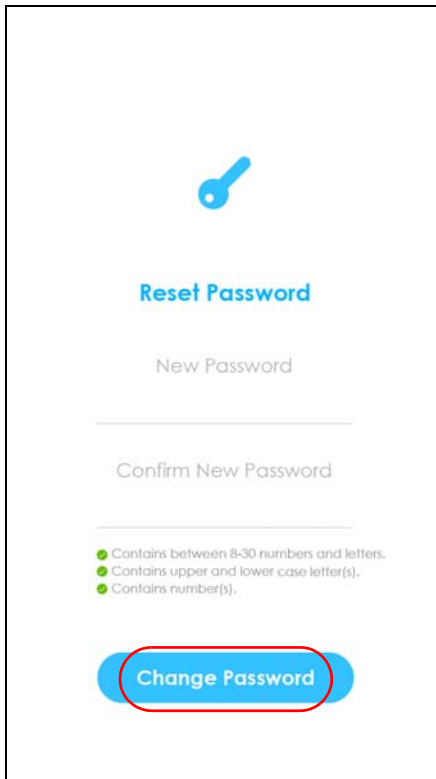
Figure 6   LTE Ally App Icon

3 Swipe your way through the introduction screens until the login page displays. Enter your web configurator's password (default is 1234) and tap **Log in** to sign in.
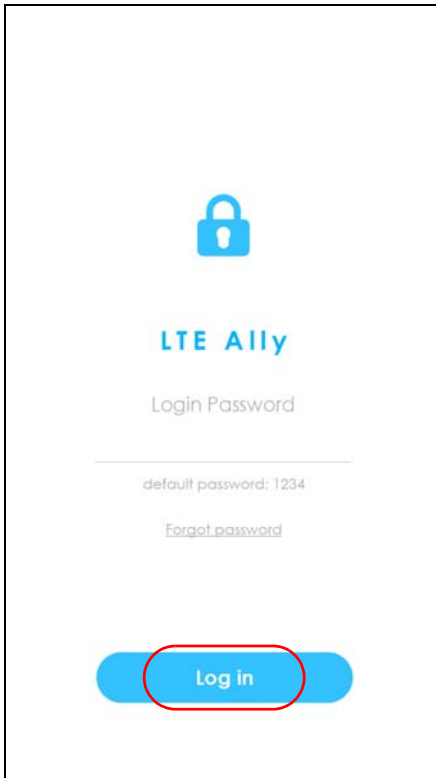
4   Enter a new password for your LTE Ally and tap **Change Password**. The password should be between 8-30 characters long, special characters are not allowed (" !"#$%&'()*+,-./:;<=>?@[\]^_`{|}~"). The password should contain at least one number, upper case letter and lower case letter.

5 Enter the PIN code to unlock the SIM card in your WAH7608.
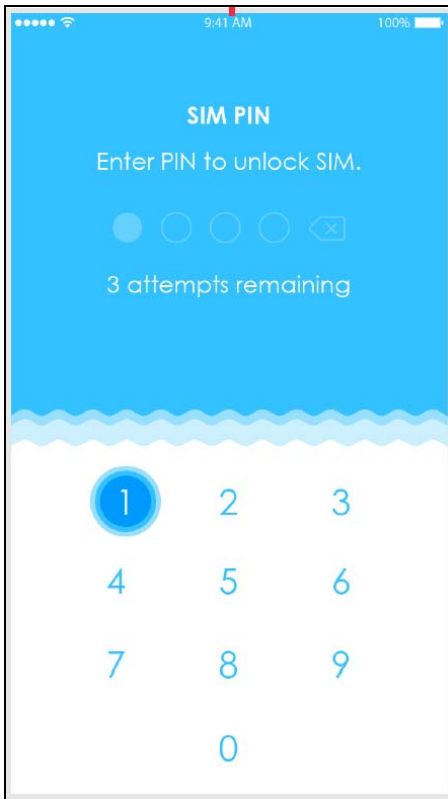
Note: If you fail to enter the correct PIN code in three attempts, you will need the PUK (Personal Unlocking Key) code from your ISP (Internet Service Provider). Your SIM card will be permanently damaged if you input the PUK code incorrectly 10 times.

6 The **Home** screen displays. Use this screen to monitor your WAH7608 battery life, data usage, and the current upload and download speed for transmitting data. You can also view how many devices are currently connected to the WAH7608, and check if there is a new message in your SMS inbox.
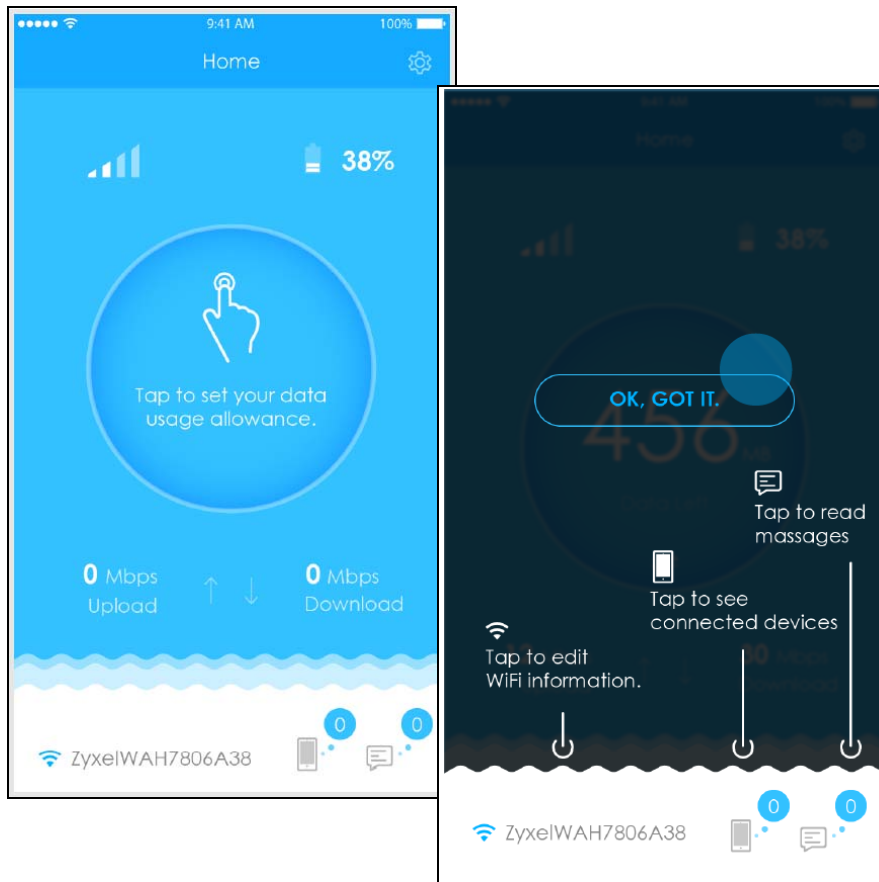
2.3 Set Up Your WiFi Network

You can change the WAH7608 network's WiFi name and password. It is recommended you change your password regularly for your own security. Use a password that is not easy to guess and that consists of different types of characters, such as numbers and letters.

1 In the **Home** screen tap on the network's WiFi name. Tap **Edit** to modify your WiFi network settings.
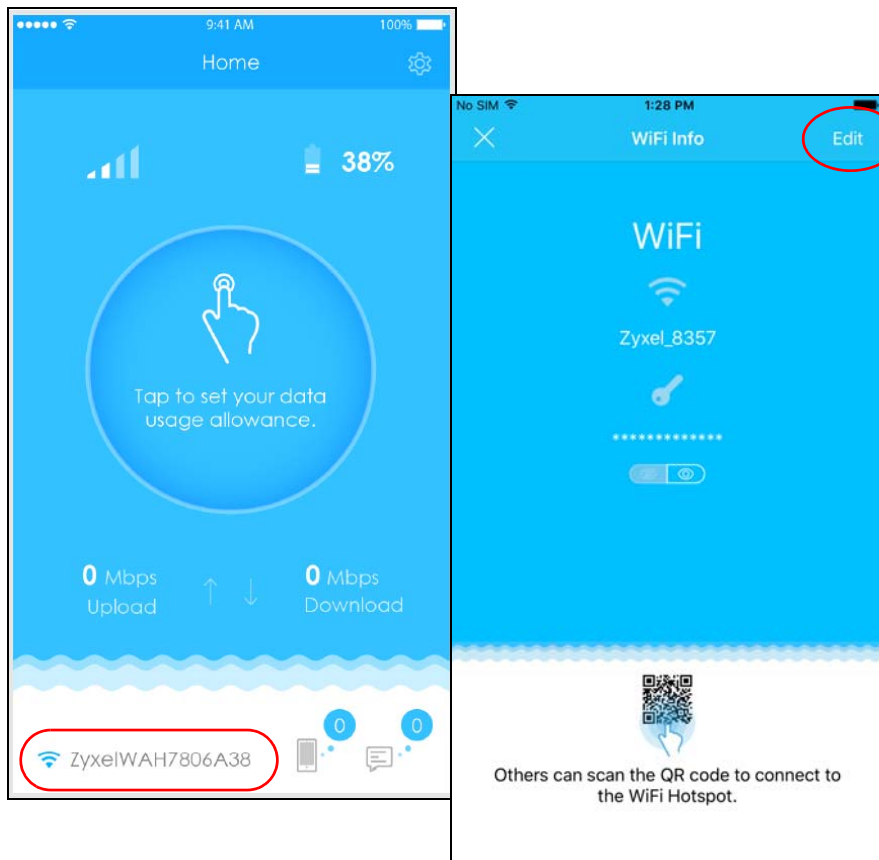
2 Enter a new WiFi **Name** and/or **Key**. Tap **Save** to apply your changes. You will be disconnected from the WAH7608. Connect again using the new WiFi **Name** and/or **Key**.

3 Share the new WiFi **Name** and **Key** so your WiFi clients can connect to the WAH7608. Clients can also scan the **QR code** for the WiFi network settings to appear on their devices.

2.4 Manage Your WiFi Clients

1   In the **Home** screen you can view the number of devices currently connected wirelessly to your WAH7608. Tap on the Phone icon to view more details about your WiFi clients.
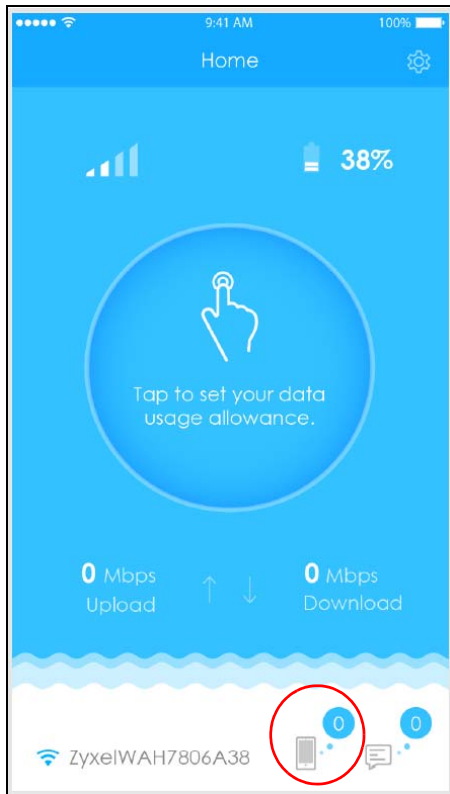
2 You can view the number of devices connected and blocked, their device name, and MAC address. Tap on a device to block its Internet access.
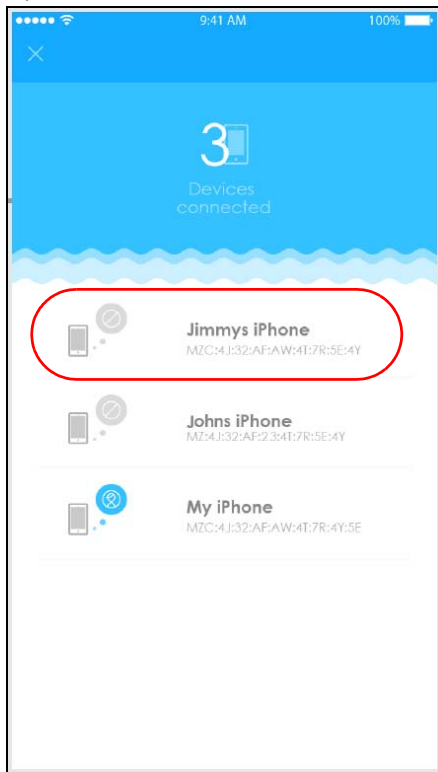
3 To unblock a device you need to exit this screen, reenter, and tap the blocked device.
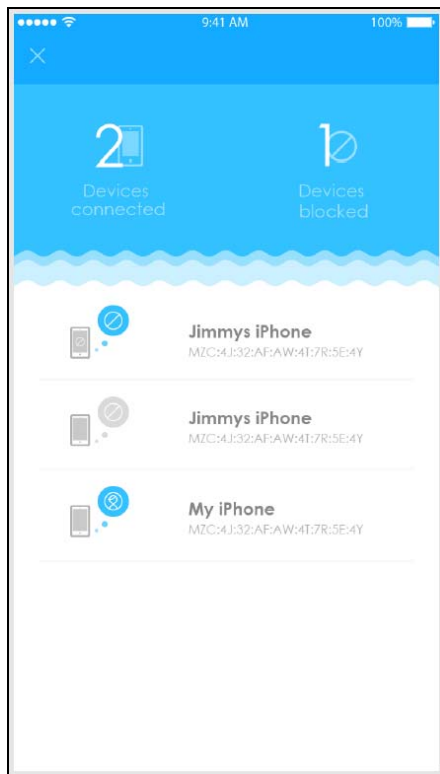
2.5 Configure Data Usage and Statistics

1 In the **Home** screen tap the **data usage allowance** circle to view your data statistics and/or set up a maximum allowance for data.
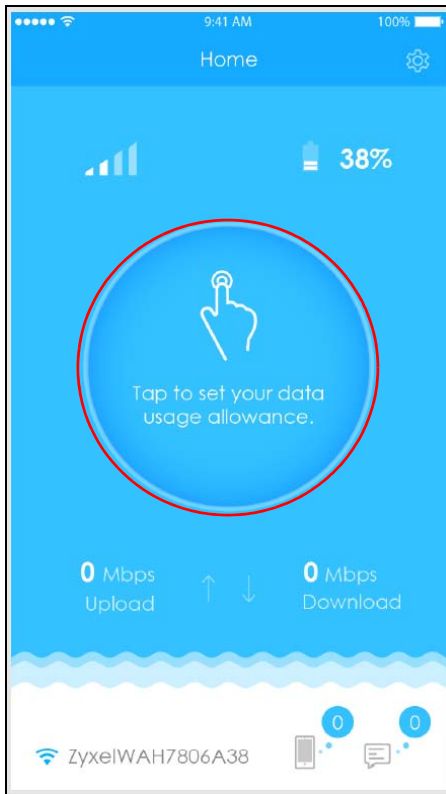
2 Set up a data limit to control data usage, otherwise select **Unlimited Plan**. Tap **Save** to apply your changes.
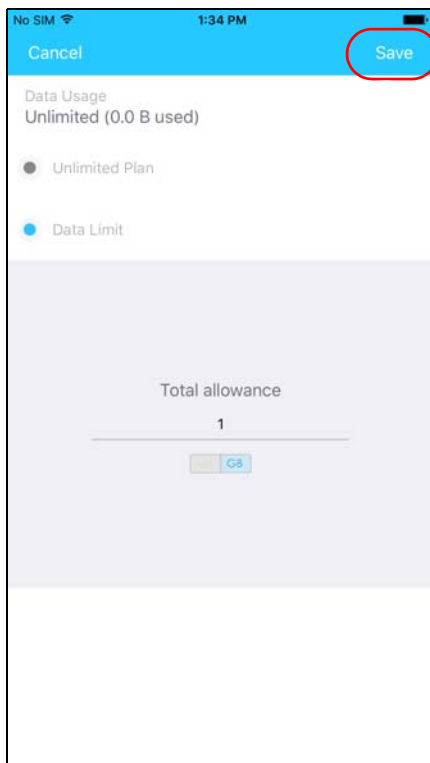
3 You return to the **Home** screen. To change your data usage allowance again or configure other data usage settings tap on the **data used**. You can also access this screen by tapping on the Settings icon ⚙ and then tapping on **Data Usage / Statistics**.

OR
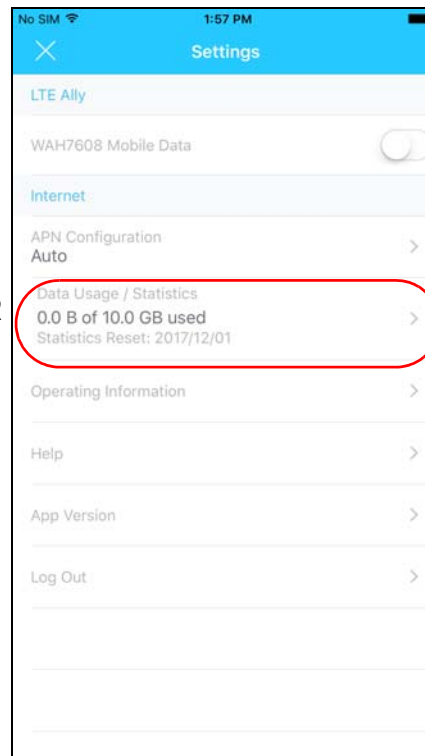
4 You can set up a **Notification** to know when you are reaching your data usage limit. Click **Save** to apply your changes.
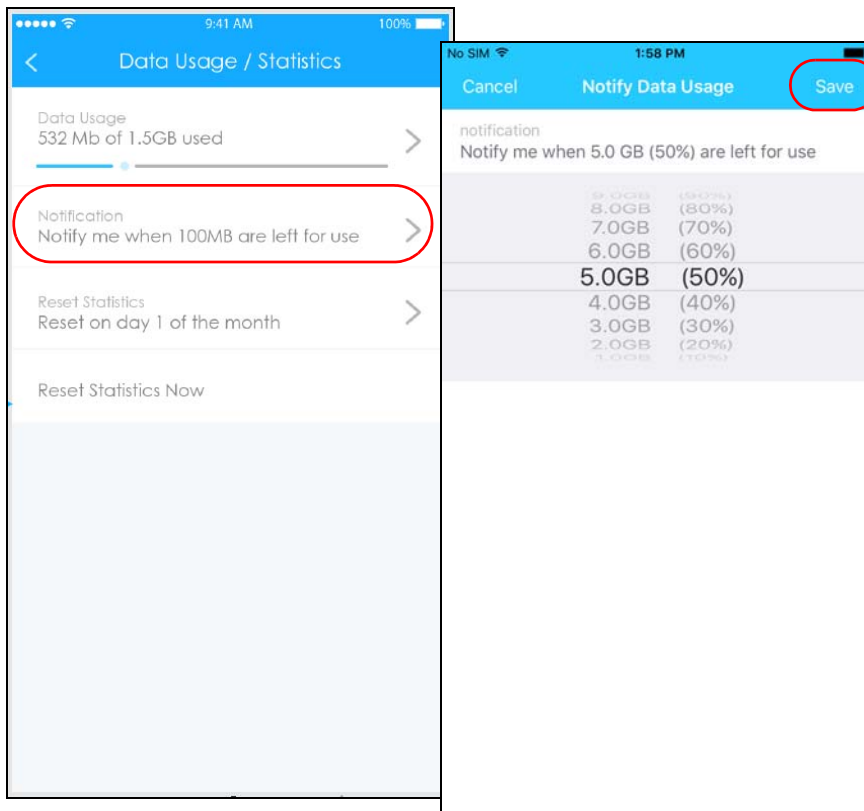
5 You can choose to reset your data usage by tapping on **Reset Statistics Now** or you can program LTE Ally to do it automatically on a specific day of the month. Tap **Save** to apply your changes.
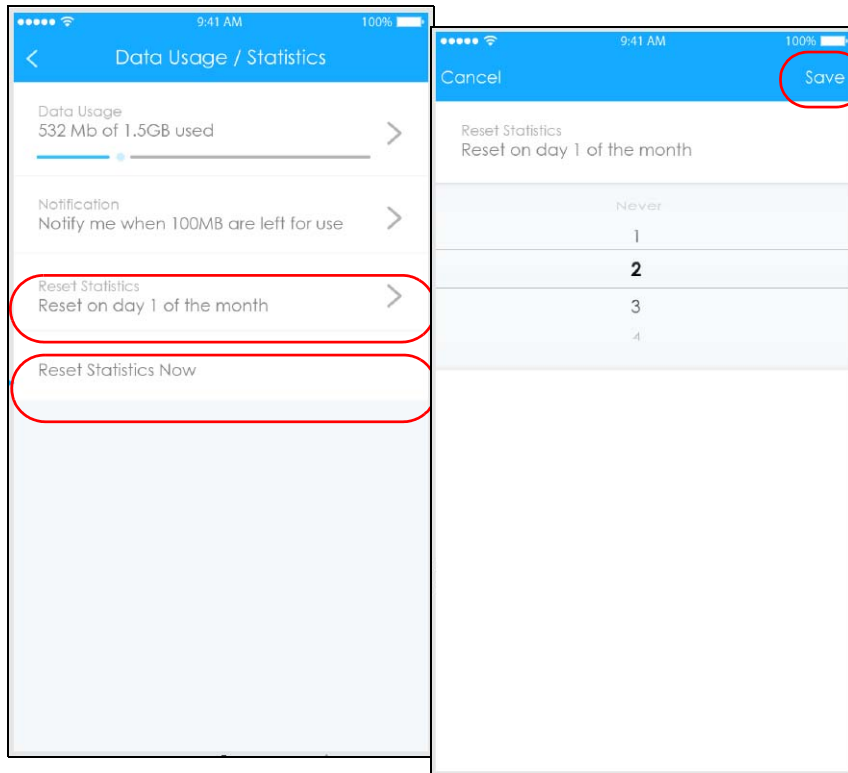
6 Return to the **Home** page to view how much data you have left from your allowance. Tap the icon or swipe on the circle to view the amount of **Data Left** or the percentage of **Data Used**.

OR
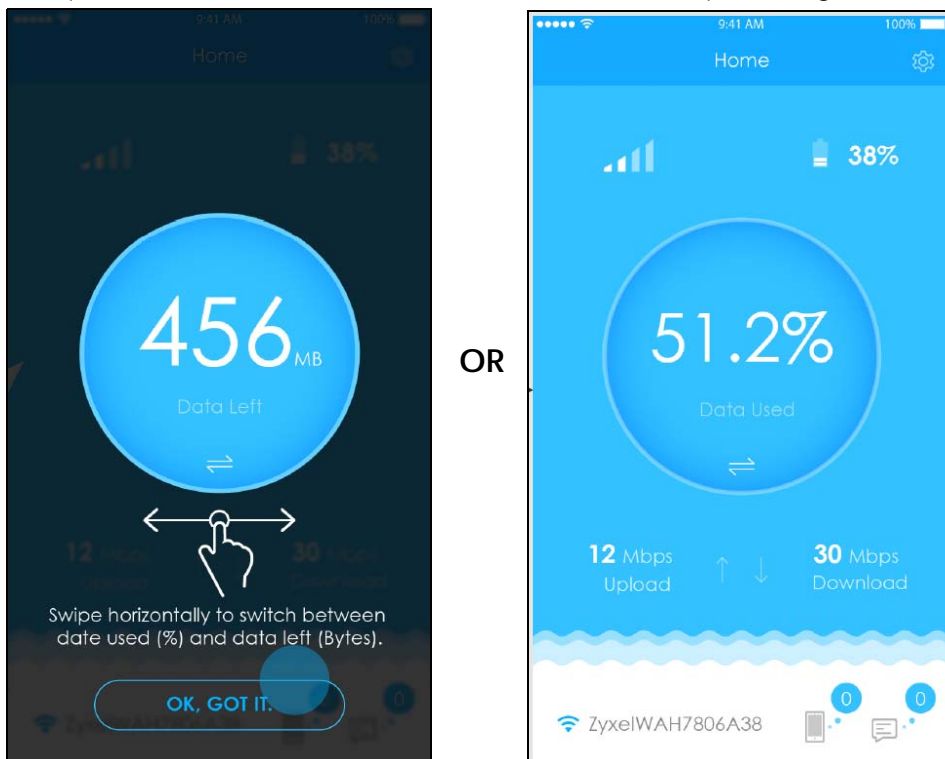
2.6 Check Your Inbox and Send Messages

Use LTE Ally to send and view the SMS messages received in your SIM card.

1   In the **Home** screen tap on the Envelope icon to open your SMS inbox.
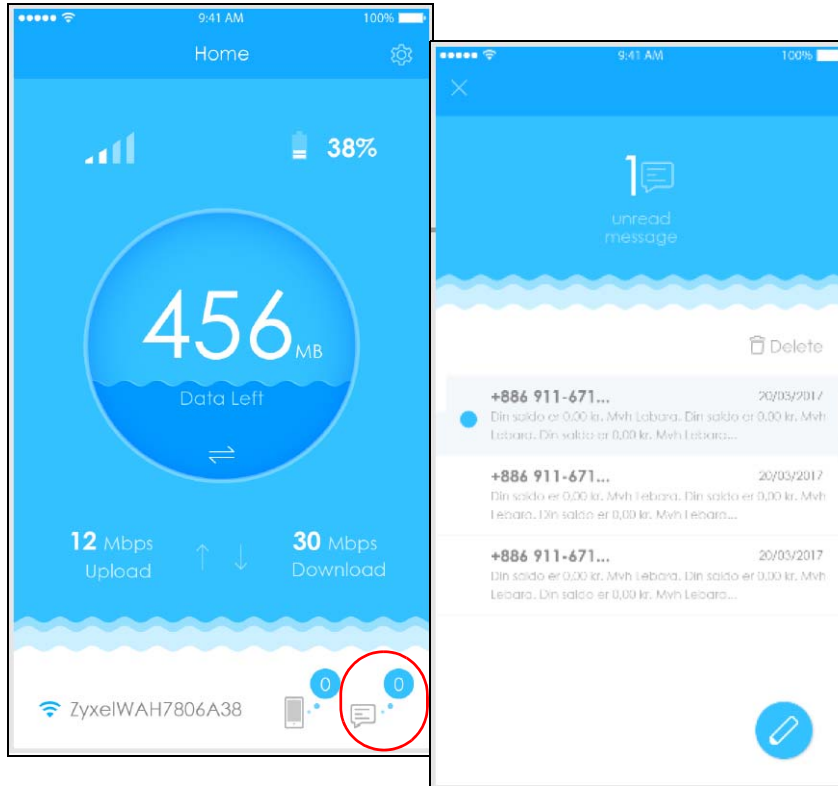
2   Tap on an unread message to view it.
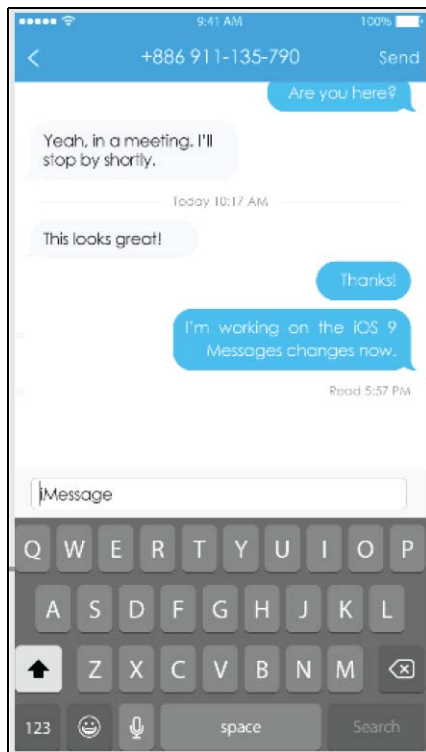
3   Tap the New icon to write a new message. Tap **Send**.
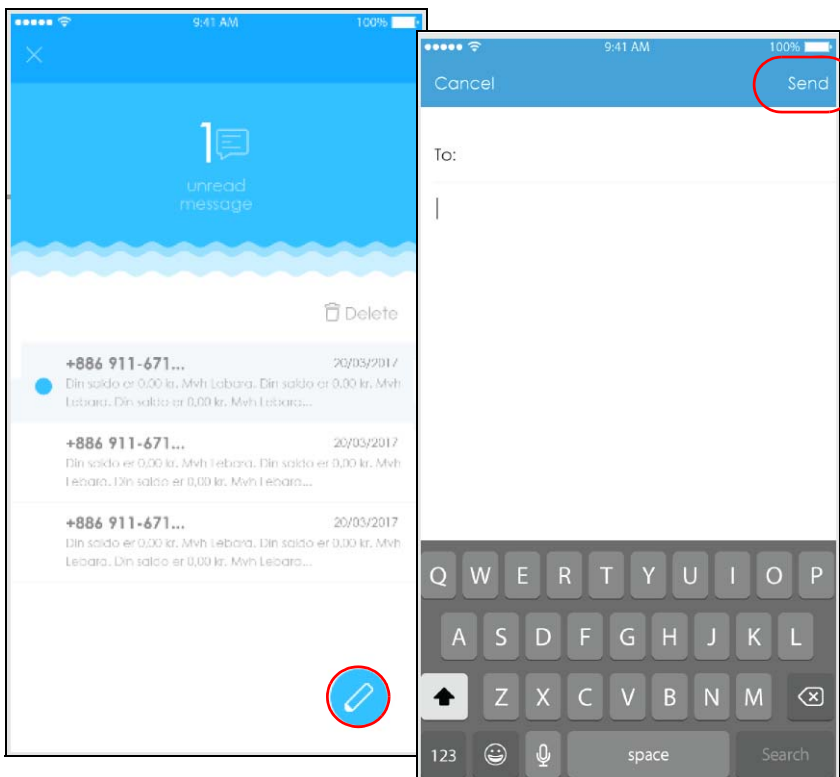
4 To delete messages tap **Delete**. Select the messages you want to eliminate and tap **Delete**.
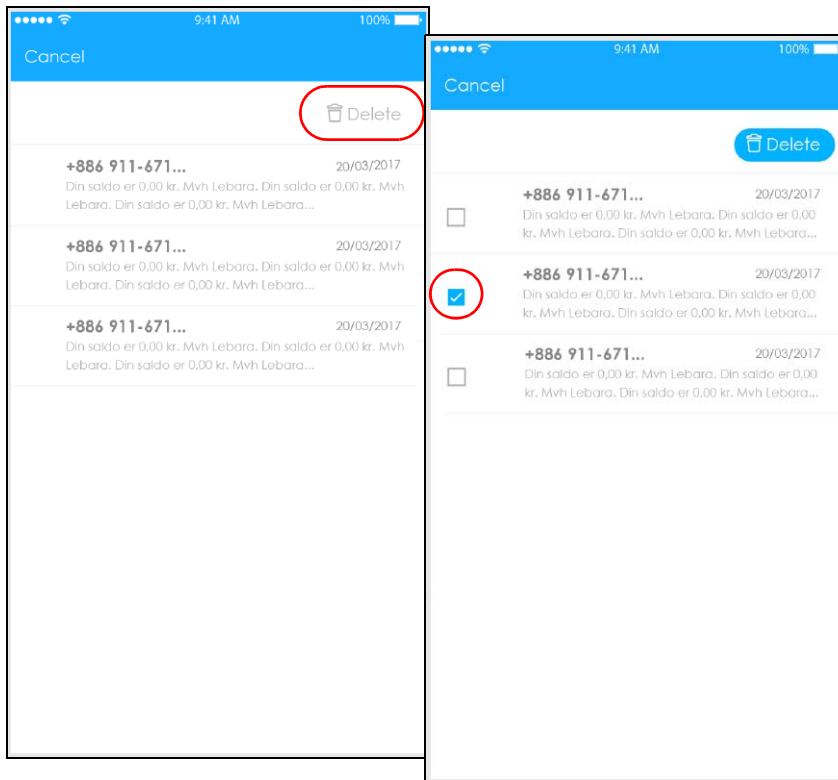
2.7 Configure the Mobile Network Manually

You can define an APN (Access Point Name) which is a connection profile with the parameters you need to connect to a mobile network. By default APN is **Auto**, which means the WAH7608 can get the connection parameters automatically after booting up. To set a connection profile manually follow these steps. Different APN connection profiles may provide different services and charging methods.

1 In the **Home** screen tap on the Settings icon. Tap on **APN Configuration**.
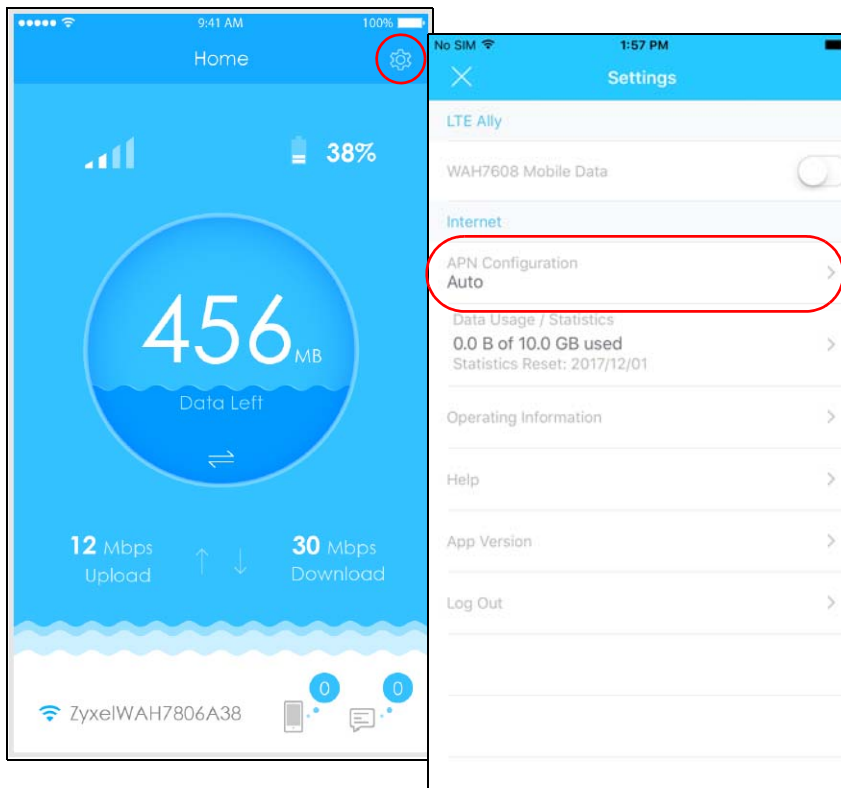
2 Select **Manual** and enter the **Username** and **Password** provided by your ISP. Click **Apply** to save your changes.
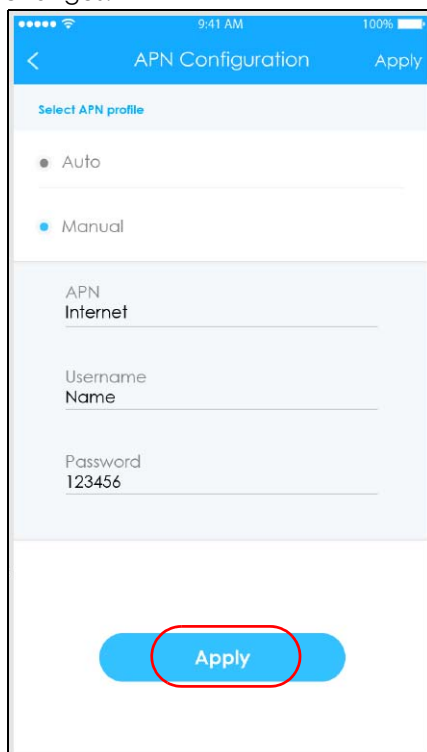
PART II
Web Configurator User's Guide

CHAPTER 3
The Web Configurator

3.1 Introduction

The web configurator is an HTML-based management interface that allows easy WAH7608 setup and management via Internet browser. Use Internet Explorer 8.0 and later versions or Mozilla Firefox 3 and later versions or Safari 2.0 and later versions. The recommended screen resolution is 1024 by 768 pixels.

In order to use the web configurator you need to allow:

- Web browser pop-up windows from your WAH7608. Web pop-up blocking is enabled by default in Windows XP SP (Service Pack) 2.
- JavaScript (enabled by default).
- Java permissions (enabled by default).
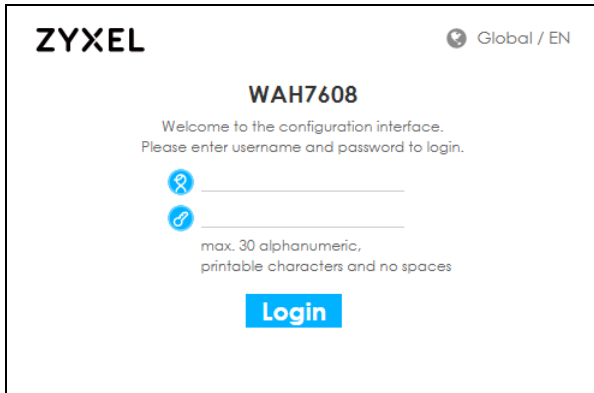
3.2 Accessing the Web Configurator

1   Make sure your WAH7608 hardware is properly connected (refer to the Quick Start Guide).

1   Look at the WAH7608's third OLED screen to view its WiFi settings. Use your computer, tablet or smart phone to search for the network WiFi name. Enter the password (**key**) to connect.
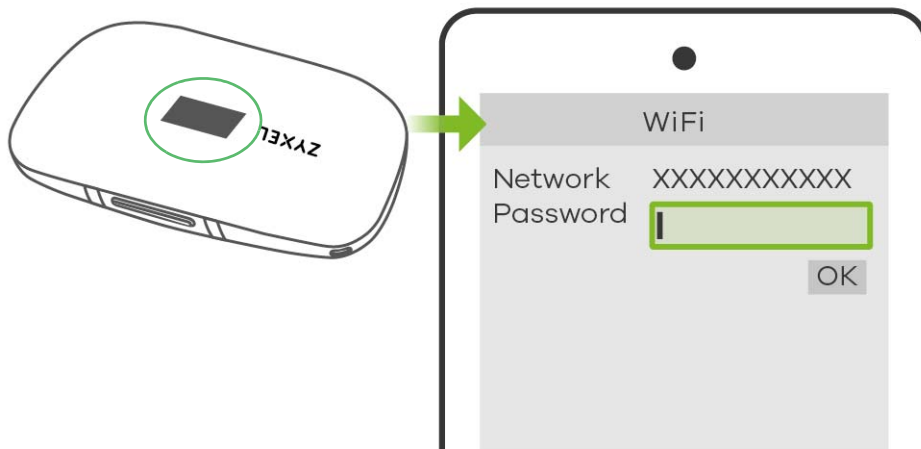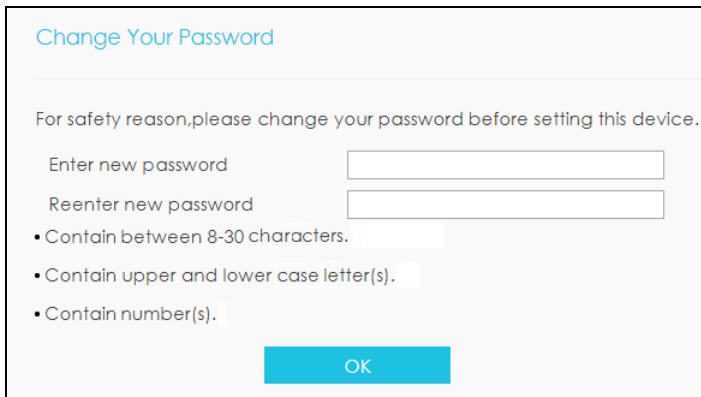
2   Launch your web browser. Go to http://192.168.1.1.

3 A password screen displays. To access the administrative web configurator and manage the WAH7608, type the default username **admin** and password **1234** in the login screen and click **Login**. If you have changed the password, enter your password and click **Login**.

4 The following screen displays if you have not changed your password yet. Enter a new password, retype it to confirm, and click **OK**.

5 After changing your password you are automatically logged out. Log in again with your new password. The **Status** screen appears. Use this screen to view your device's information and status, your mobile connection status and Internet traffic details.

ZYXEL								Global / EN

Device Information

Item	Data
Host Name:	WAH7608
Model Number:	WAH7608
Firmware Version:	V1.00(ABKW.0)B7
WAN Information:	
-IP Address:	
-IP Subnet Mask:	
-IPv6 Address:	
-Operation Band:	

Signal Status

Item	Data
SIM Status:	SIM Detached
Signal Strength:	
Signal Type:	
New Message:	0
Roaming Status:	
WiFi Name:	Zyxel_8357
Encryption:	WPA Personal
Clients:	1

System Status

Item	Data
System Up Time:	0 day 02 hr 36 min 10 sec
Current Date/Time:	2017/10/13 14:00:16
System Resource:	
-CPU Usage:	17%
-Memory Usage:	73%

Internet Status

Item	Data
Total Allowance:	Unlimited
Total Traffic:	0B
-Upload:	0B
-Download:	0B

Summary

Packet Statistics(Detail...)

LTE Modem Status(Detail...)

3.3 Navigating the Web Configurator

The following section summarizes how to navigate the web configurator from the **Status** screen.

Figure 7 The Web Configurator's Main Screen
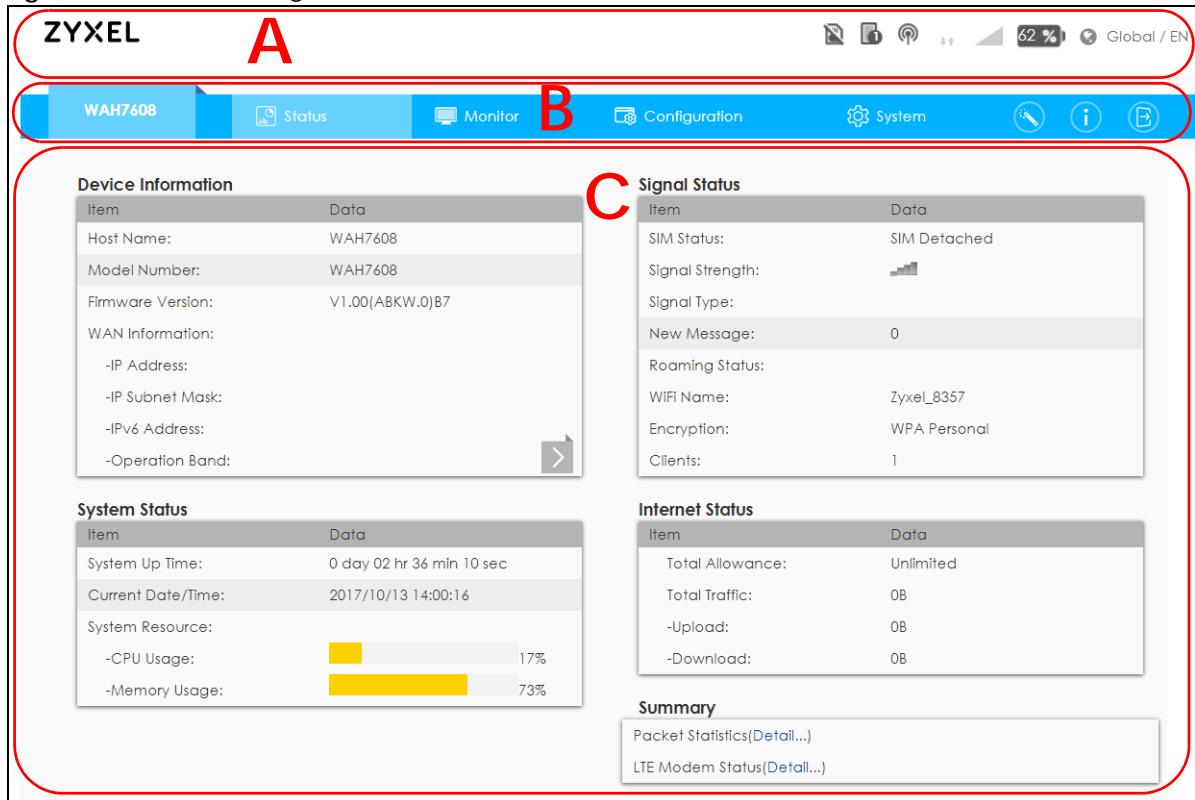
The Web Configurator's main screen is divided into these parts:

- **A** - Title Bar
- **B** - Navigation Panel
- **C** - Main Window

3.3.1 Title Bar

The title bar provides some useful links that always appear over the screens below, regardless of how deep into the Web Configurator you navigate.

Figure 8 Title Bar
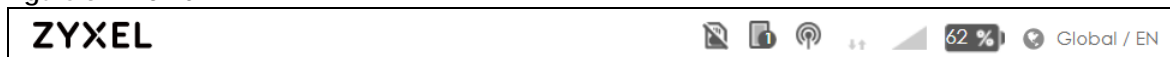
The icons provide the following functions.

Table 4 Title Bar: Web Configurator Icons

LABEL	DESCRIPTION
Service Provider *No Service*	This shows the name of the service provider for the mobile network to which the WAH7608 is connected. This shows **Searching...** if the WAH7608 is looking for a mobile network to connect to. This shows **No Service** if your WAH7608 could not connect to its ISP.
SIM	This shows whether a SIM card is inserted in the WAH7608. The icon shows if there is no SIM card inserted.

Table 4   Title Bar: Web Configurator Icons (continued)

LABEL	DESCRIPTION
Connected Devices	This displays the number of devices currently connected to the WAH7608.
WiFi	This shows whether the WAH7608's WiFi network is active and the number of the connected wireless clients.
	This displays when the WAH7608 is receiving/transmitting data to/from the Internet.
Signal Strength	This shows the current signal strength to the mobile network. The icon is grayed out if the mobile data connection is not up.
Roaming	This shows an **R** when the WAH7608 is connected to another service provider's mobile network using roaming.
Battery 57 %	The icon shows the battery status.
Language	Choose your language from the drop-down list on the upper right corner of the title bar.
Logout	Click this to log out of the Web Configurator.

3.3.2 The Main Window

The main window displays information and configuration fields. It is discussed in the rest of this document.

After you log in the **Status** screen is displayed. See for more information about the Status screen.

3.3.3 Navigation Panel

Use the menu items on the navigation panel to open screens to configure WAH7608 features. The following sections introduce the WAH7608's navigation panel menus and their screens.

Figure 9   Navigation Panel

The following table describe each menu item..

Table 5   Navigation Panel Summary

LINK	TAB	DESCRIPTION
Status		Use this screen to view the network status of the WAH7608 and devices connected to it.
Monitor		
Log	Log	Use this screen to view the WAH7608 system logs.
DHCP Table	DHCP Table	Use this screen to assign an IP address to a device in the WAH7608's LAN.
ARP Table	ARP Table	Use this screen to view the ARP table. It displays the IP and MAC address of each DHCP connection.
Packet Statistics	Packet Statistics	Use this screen to view port status and packet specific statistics.

Table 5   Navigation Panel Summary

LINK	TAB	DESCRIPTION
LTE Modem Status	LTE Modem Status	Use this screen to view information on your ISP, and your SIM status.
Configuration		
Network	Connection	Use this screen to select the connection mode and activate roaming.
	APN Setting	Use this screen to configure user-defined connection profiles.
	4G/3G/2G Modem	Use this screen to select the type of network to which you want the WAH7608 to connect.
	PIN	Use this screen to turn on or off PIN code authentication.
	PLMN	Use this screen to view available Public Land Mobile Networks (PLMNs) and select a preferred network.
	WiFi Client	Use this screen to change your WAH7608 to client mode.
	Data Usage	Use this screen to specify limiting amount of package data.
LAN	LAN	Use this screen to view or configure the management IP address.
	DHCP	Use this screen to enable DHCP server.
	File Sharing	Use this screen to enable file sharing through the WAH7608.
Security	Firewall	Use this screen to enable the firewall.
	NAT	Use this screen to configure NAT type and configure port forwarding rules.
	DMZ	Use this screen to configure a default server.
WiFi	Basic	Use this screen to enable the wireless LAN, enter the SSID or select the wireless security mode.
	WPS	Use this screen to activate WPS.
	MAC Filter	Use this screen to block or allow traffic from devices of certain MAC addresses to the Device.
SMS	New Message	Use this screen to send messages using the WAH7608.
	USSD	Use this screen to send USSD (Unstructured Supplementary Service Data) messages on the WAH7608.
	Inbox	Use this screen to view messages received on the WAH7608.
	Outbox	Use this screen to view messages sent from the WAH7608.
	Draftbox	Use this screen to view messages not yet sent from the WAH7608.
	Settings SMS	Use this screen to set the SMSC (Short Message Service Center) Address and storage location.
System		
About	About	Use this screen to view the device information.
Setting	Firmware Upgrade	Use this screen to upload new firmware to your WAH7608.
	Password	Use these screens to change your web configurator's login password and configure the inactive time before the WAH7608 logs out from the web configurator.
	Language	Use this screen to change the web configurator's language.
	Date and Time	Use this screen to change your WAH7608 time and date.
	Power Saving	Use this screen to configure the WAH7608 sleep mode and OLED display timeout.
	Reset	Use this screen to reset the WAH7608 and return it to factory default settings.
	Reboot	Use this screen to reboot the WAH7608 without turning the power off.

Table 5   Navigation Panel Summary

LINK	TAB	DESCRIPTION
Wizard		Click this to access the Wizard and configure the WAH7608's basic settings.
Information		Click this to access Zyxel's product website.
Logout		Click this to log out from the WAH7608's web configurator.

CHAPTER 4
Setup Wizard

4.1 Overview

This chapter provides information on the wizard setup screens in the Web Configurator.

The Web Configurator's wizard helps you configure your device to access the Internet and change the wireless LAN settings. Refer to your ISP for your Internet account information. Leave a field blank if you don't have that information.

4.2 Accessing the Wizard

1 Launch your web browser and type "http://192.168.1.1" as the website address. Type "admin" (default) as the user name, "1234" (default) as the password and click **Login**.

2 Click the **Wizard** icon in the navigation panel of the web configurator to open the Wizard screen.
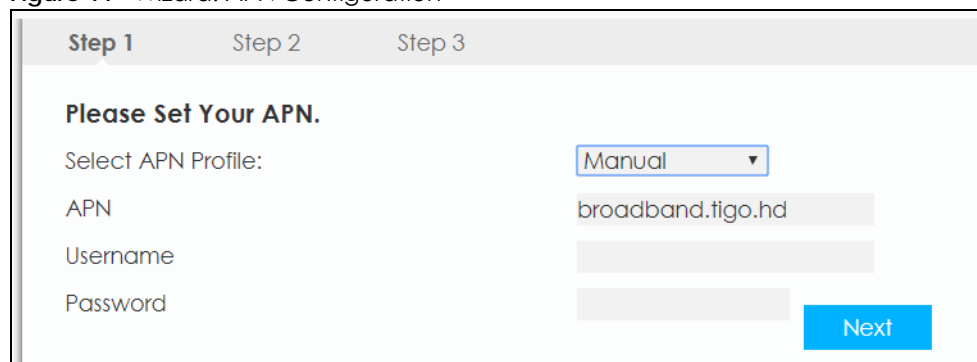
Figure 10 Title Bar: Wizard icon

4.3 Wizard Setup

1 The first screen opens, use this screen to configure your APN (Access Point Name) provided by your ISP (Internet Service Provider). Select **Auto** so the WAH7608 can get the connection parameters automatically. Select **Manual** to enter a connection profile provided by your ISP. Click **Next** to proceed to the setup Internet screen.

Figure 11 Wizard: APN Configuration

2   The **Set Up Internet** screen appears, select **Always maintain the internet connection** so the WAH7608 connects automatically to the mobile network. Select **Connect & Disconnect manually** to do connect manually every time you turn the WAH7608 on. Click **Next**.

Figure 12   Wizard: Set Up Internet

3   The Data Usage/Statistics screen appears. Select **Enable Data Limit** to activate a limiting amount of package data. Enter the maximum allowance of data (in GB) and set up notifications for when you reach it. Select Click **Next**.

Figure 13   Wizard: Data Usage/ Statistics

4   Use this screen to configure the WAH7608's wireless LAN. Enter the wireless network name (SSID) and password (**key**). The screen and fields may vary depending on the **Encryption Mode** you have selected. Click **Next**. For more information see Section 12.2 on page 90.

Figure 14   Wizard: Set Up WiFi

5 The **Apply Settings** appears. Click **Apply** to save your settings. Otherwise, click **Back** to go back to the previous screens.

Figure 15 Wizard: Apply Settings

Step 1	Step 2	**Step 3**

Apply Settings

Note:Applying settings may cause the Wi-Fi to

disconnect and lose connection to this website.

Please check all the changes before you click

"Apply".

[Back] [Apply]
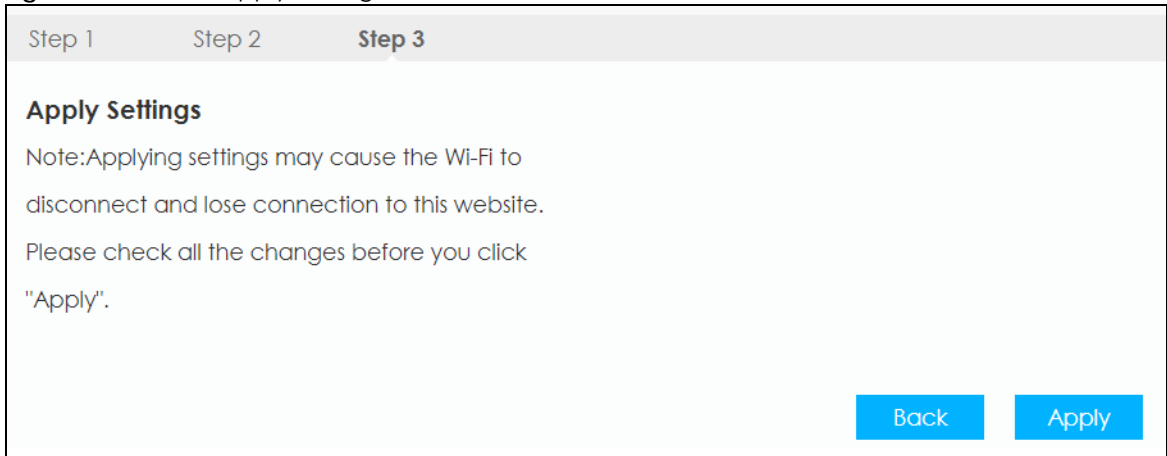
6 You are now ready to connect wirelessly to your WAH7608 and access the Internet.

CHAPTER 5
Tutorials

5.1 Overview

This chapter shows you how to use the WAH7608's various features using the web configurator. To learn how to do these steps using LTE Ally see.

- Set Up Your WiFi Network
- Connect to the WAH7608 WiFi Network
- Set Up a Wireless Network Using WPS
- Configure Data Usage and Statistics

5.2 Set Up Your WiFi Network

You can change the WAH7608's WiFi network name and password. It is recommended you change your password regularly for your own security. Use a password that is not easy to guess and that consists of different types of characters, such as numbers and letters.

1   Go to the **Configuration > WiFi** screen to configure the WAH7608 WiFi network settings. After changing the WiFi settings click **Apply** to save your changes.

Basic	
Enable☑	
Mode	802.11 B/G/N mixed ▼
Channel	Auto ▼
WiFi Name (SSID)	Zyxel_8357
Hide SSID	☐
MAX Clients	10
Encryption Type	WPA Personal ▼
WPA Mode	WPA2 ▼
Cipher Type	AES ▼
Key	2NKV963AQR
	Apply

2   When your changes are applied you will be disconnected from the WAH7608. Connect to the WAH7608's WiFi network once again with the new WiFi settings.

5.3 Connect to the WAH7608 WiFi Network

In this example, you've changed the WAH7608's wireless settings in the wizard to the following settings.

SSID	SSID_Example3
Channel	6
Security	WPA2-PSK
	(Pre-Shared Key: ThisismyWPA-PSKpre-sharedkey)

Note: In this example, we use a Windows 7 laptop that has a built-in wireless adapter as the wireless client.

1 The WAH7608 supports IEEE 802.11b, IEEE 802.11g, and IEEE 802.11n wireless clients. Make sure that your notebook or computer's wireless adapter supports one of these standards.

2 Click the WiFi icon in your computer's system tray.
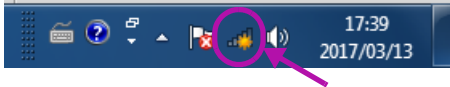
3 The **Wireless Network Connection** screen displays. Click the refresh button to update the list of the available wireless APs within range.

4 Select **SSID_Example3** and click **Connect**.
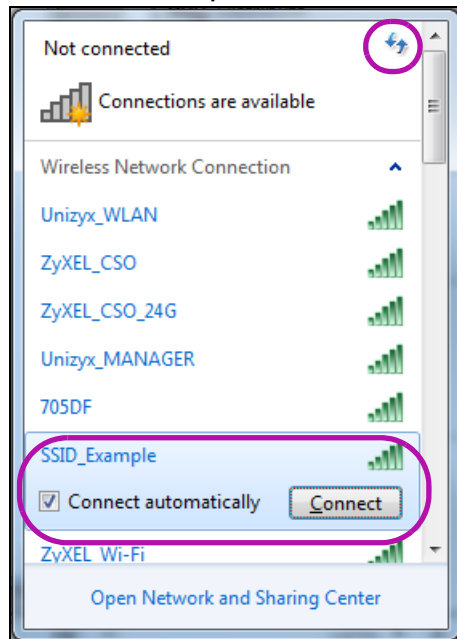
5 The following screen displays if WPS is enabled on the WAH7608 but you didn't press the WPS button. Click **Connect using a security key instead**.
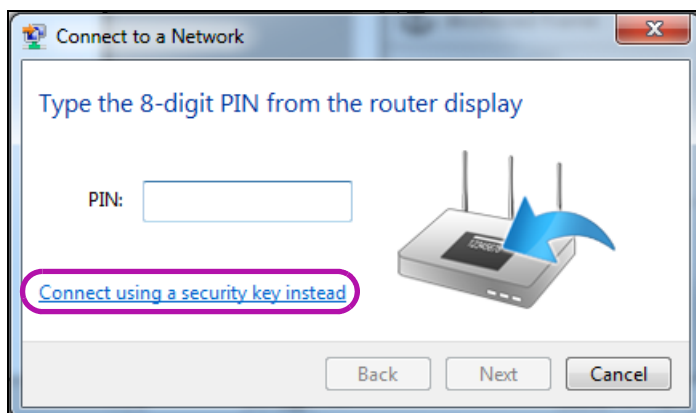
6 Type the security key in the following screen. Click **OK**.
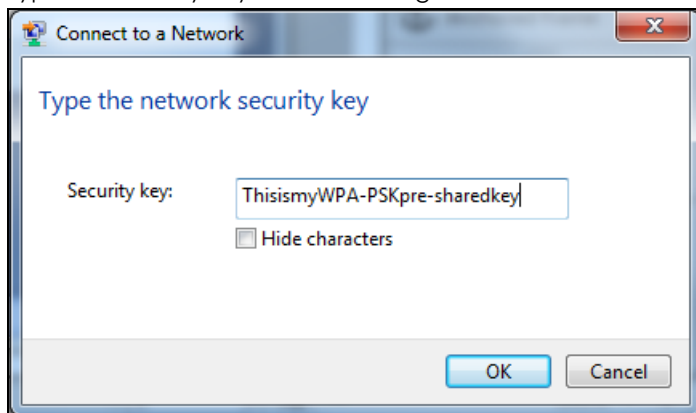
7 Check the status of your wireless connection in the screen below.

8 If the wireless client keeps trying to connect to or acquiring an IP address from the WAH7608, make sure you entered the correct security key.

If the connection has limited or no connectivity, make sure the DHCP server is enabled on the WAH7608.

If your connection is successful, open your Internet browser and enter http://www.zyxel.com or the URL of any other web site in the address bar. If you are able to access the web site, your wireless connection is successfully configured.

5.4 Set Up a Wireless Network Using WPS

This section gives you an example of how to set up wireless network using WPS. This example uses the WAH7608 as the AP and a WPS-enabled Android smartphone as the wireless client.

The Push Button Configuration (PBC) is a WPS method for creating a secure connection. PBC creates a secure wireless network simply by pressing a button.

Follow these steps to successfully connect your WPS compatible device with the WAH7608.

1 Make sure that your WAH7608 is turned on. Make sure the wireless LAN is turned on, and that the WAH7608 is placed within range of the device you want to connect.

2 Press the WPS button for 1 second on the WAH7608's side panel.

3 Go to your phone settings and turn on WiFi. Open the WiFi networks list and tap WPS Push Button or the WPS icon (   ).

Note: It doesn't matter which button is pressed first. You must press the second button within two minutes of pressing the first one.

The WAH7608 sends the proper configuration settings to the wireless client. This may take up to two minutes. Then the wireless client is able to communicate with the WAH7608 securely.

The following figure shows you an example to set up wireless network and security by pressing a button on both WAH7608 and wireless client (the Android smartphone in this example).

Figure 16 Example WPS Process: PBC Method

Wireless Client

Press for 1 second

WITHIN 2 MINUTES

WPS ON

SECURITY INFO

COMMUNICATION
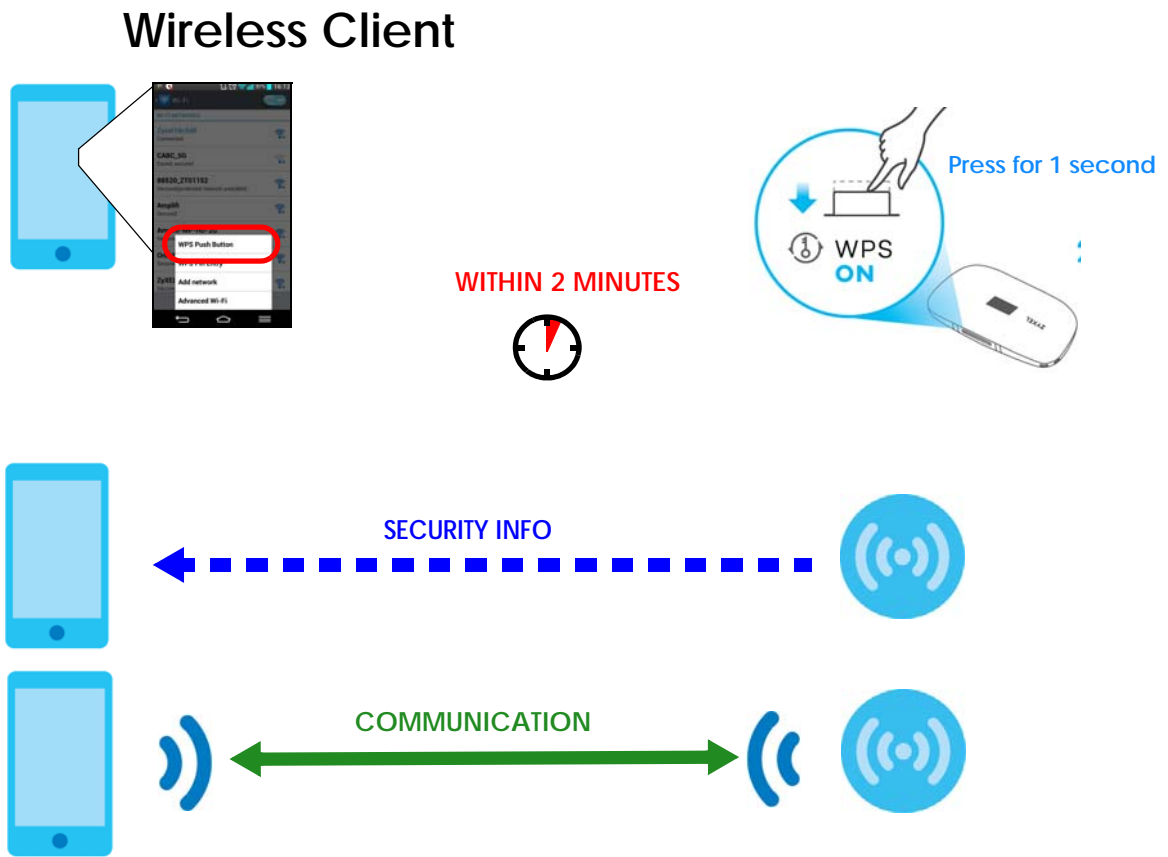
5.5 Configure Data Usage and Statistics

This tutorial shows you how to set up a limited allowance of data.

Dani traveled to a foreign country with her two friends. They purchased a SIM card with a limited data package plan of 15GB that will help them with directions and entertainment during their trip. Dani brought her WAH7608 to share Internet wherever they go during their stay, whilst saving their phone's battery for pictures and more. They cannot go over the purchased data package plan, because it will result in additional costs for them. To control this Dani can set up a data usage limit in the WAH7608, and notifications that will let them know when they are reaching the limit.

1 Go to **Configuration** > **Network** > **Data Usage/Statistics** screen. Select the check box for **Enable Data Limit** to set up a maximum allowance for data to 15GB in the **Total Allowance** field. Set up a notification for when 80% of the limit is reached. Click **Apply** to save your changes.

Data Usage/Statistics	Reset Statistics	Current Data Statistics	Total Data Statistics

Enable Data Limit ☑

Total Allowance   15.00   GB

Notify me when data usage   80   %

reaches

Reset Date   1   (Date of each month)

                                    Apply   Reset

2 To check the overall data consumption go to **Configuration** > **Network** > **Data Usage** and click on the **Total Data Statistics** tab. You can also view this in the **Status** Screen in the **Internet Status** table.

Data Usage/Statistics	Reset Statistics	Current Data Statistics	Total Data Statistics

Enable Data Limit ☑

Total Allowance   10.00   GB

Notify me when data usage reaches   80   %

Reset D

Data Usage/Statistics	Reset Statistics	Current Data Statistics	**Total Data Statistics**

Total Connections Statistics(from 10/1)

Data Amount	Sent	Received
0.00B	0.00B (Max 0.00B/s)	0.00B (Max 0.00B/s)

PART III
Technical Reference

6.1 Overview

Use the **Status** screen to check status information about the WAH7608.

6.2 Status

This screen is the first thing you see when you log into the WAH7608. It also appears every time you click the **Status** icon in the navigation panel. The **Status** screen displays the WAH7608's connection mode, wireless LAN information and traffic statistics.

Figure 17 Status
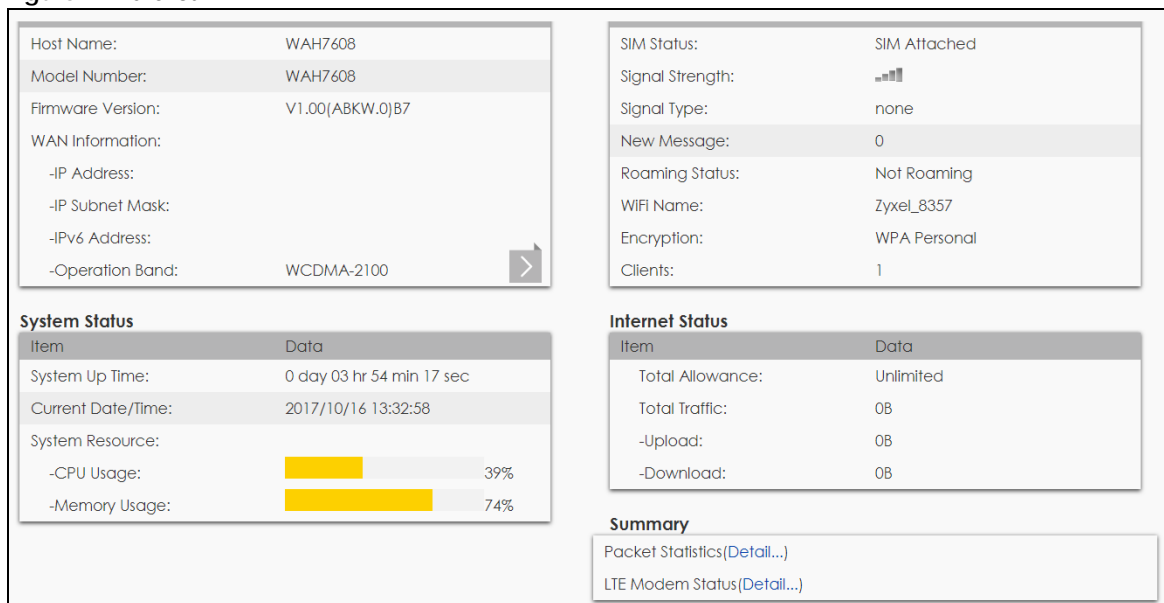
The following table describes the labels in this screen.

Table 6   Home

LABEL	DESCRIPTION
Device Information	
Host Name	This field displays the WAH7608 system name. It is used for identification.
Model Number	This shows the model number of your Zyxel device.
Firmware Version	This is the current version of the firmware inside the WAH7608.
WAN Information (These fields display when you have a WAN Connection) To change from WAN information to LAN Information click the gray arrow ⟩ .	

Table 6   Home (continued)

LABEL	DESCRIPTION
IP Address	This field displays the current IPv4 address of the WAH7608 in the WAN.
IP Subnet Mask	This field displays the current subnet mask in the WAN.
IPv6 Address	This field displays the current IPv6 address of the WAH7608 in the WAN.
Operation Band	This field displays the frequency band on which your ISP is operating.
LAN Information To change from LAN information to WAN Information click the gray arrow ▶ .	
MAC Address	This shows the LAN MAC (Media Access Control) Address of your WAH7608.
IP Address	This is the current IPv4 address of the WAH7608 in the LAN.
IP Subnet Mask	This is the current subnet mask in the LAN.
DHCP	This field displays what DHCP services the Device is providing to the LAN. Choices are: **Server** - The Device is a DHCP server in the LAN. It assigns IP addresses to other devices in the LAN. **Relay** - The Device acts as a surrogate DHCP server and relays DHCP requests and responses between the remote server and the clients. **None** - The Device is not providing any DHCP services to the LAN.
IPv6 Address	This is the current IPv6 address of the WAH7608 in the LAN.
System Status	
System Up Time	This field displays how long the WAH7608 has been running since it last started up. The Device starts up when you plug it in, when you restart it (**System > Setting > Reboot**), or when you reset it.
Current Date/Time	This field displays the current date and time in the Device. You can change this in **System > Setting > Date and Time**.
System Resource	
CPU Usage	This field displays what percentage of the WAH7608's processing ability is currently used. When this percentage is close to 100%, the WAH7608 is running at full load, and the throughput is not going to improve anymore.
Memory Usage	This field displays what percentage of the Device's memory is currently used. Usually, this percentage should not increase much. If memory usage does get close to 100%, the WAH7608 is probably becoming unstable, and you should restart the device.
Signal Status	
SIM status	This displays the status of the attached SIM card. **SIM Detached** displays if there is no SIM card inserted.
Signal Strength	This displays the current signal strength to the mobile network.
Signal Type	This shows the type of the mobile network (such as LTE, 3G, 2G, etc.) to which the WAH7608 is connecting.
New Message	This displays the number of new messages received in your SIM card.
Roaming Status	This displays whether the WAH7608 is connected to another service provider's mobile network using roaming.
WiFi Name	This displays a descriptive name used to identify the WAH7608 in the wireless LAN.
Encryption	This displays the level of wireless security the WAH7608 is using.
Clients	This displays the total number of devices connected to the WAH7608.
Internet Status	
Total Allowance	This displays the total limiting amount of data that can be used by the WAH7608.
Total Traffic	This displays the total traffic flow transmitting from/to the WAH7608.

Table 6   Home (continued)

LABEL	DESCRIPTION
Upload	This displays the number of transmitted packets on the WAH7608.
Download	This displays the number of received packets on the WAH7608.
Summary	
Packet Statistics	Click **Detail...** to access the **Monitor > Packet Statistics** screen, and view port status and packet specific statistics.
LTE Modem Status	Click **Detail...** to access the **Monitor > LTE Modem Status** screen, and view information on your ISP, and your SIM status.

7.1 Overview

This chapter discusses read-only information related to the device state of the WAH7608.

To access the **Monitor** screens, click [Monitor] after login.

You can also click the links in the Summary table of the **Status** screen to view the packets sent/received as well as the status of your WAN connection.

7.1.1 What You Can Do in this Chapter

- Use the **Log** screen to see the logs for the activity on the WAH7608 (Section 7.2 on page 55).
- Use the **DHCP Table** screen to view information related to your DHCP status (Section 7.3 on page 56).
- Use the **ARP Table** screen to view the mappings of IP and MAC addresses. (Section 7.4 on page 57).
- Use the **Packet Statistics** screen to view port status, packet specific statistics, the "system up time" and so on (Section 7.5 on page 57).
- Use the **LTE Modem Status** screen to view the detailed information about the LTE module, cellular interface, and SIM card. You can also check the LTE connection status (Section 7.6 on page 58).

7.2 The Log Screen

The Web Configurator allows you to look at all of the WAH7608's logs in one location.

Use the **Log** screen to see the logged messages for the WAH7608. The log wraps around and deletes the old entries after it fills. Click **Refresh** to renew the log screen. Click **Clear Log** to delete all the logs.

Figure 18 Log
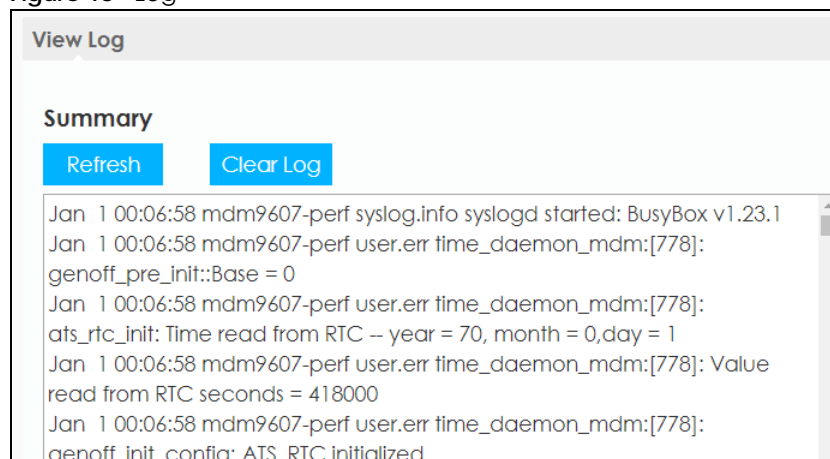
7.3 DHCP Table

DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients to obtain TCP/IP configuration at start-up from a server. You can configure the WAH7608's LAN as a DHCP server or disable it. When configured as a server, the WAH7608 provides the TCP/IP configuration for the clients. If DHCP service is disabled, you must have another DHCP server on that network, or else the device must be manually configured.

Click **Monitor > DHCP Table**. Read-only information here relates to your DHCP status. The DHCP table shows current DHCP client information (including **MAC Address**, and **IP Address**) of all network clients using the WAH7608's DHCP server.

Figure 19   Monitor > DHCP Table

The following table describes the labels in this screen.

Table 7   Monitor > DHCP Table

LABEL	DESCRIPTION
#	This is the index number of the host device.
Host Name	This field displays the device host name.
IP Address	This field displays the IP address relative to the # field listed above.
MAC Address	This field shows the MAC address of the device with the name in the **Host Name** field. Every Ethernet device has a unique MAC (Media Access Control) address which uniquely identifies a device. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02.
Reserve	Select this if you want to reserve the IP address for this specific MAC address.
Cancel	Click **Cancel** to reload the previous configuration for this screen.
Refresh	Click **Refresh** to update this screen.
Apply	Click **Apply** to save your changes back to the WAH7608.

7.4 ARP Table

Address Resolution Protocol (ARP) is a protocol for mapping an Internet Protocol address (IP address) to a physical machine address, also known as a Media Access Control or MAC address, on the local area network.

Use the ARP table to view IP-to-MAC address mapping(s).

Figure 20 Monitor > ARP Table

The following table describes the labels in this screen.

Table 8 System Monitor > ARP Table

LABEL	DESCRIPTION
#	This is the index number of the entry.
IP Address	This is the learned IPv4 or IPv6 IP address of a device connected to a port.
MAC Address	This is the MAC address of the device with the listed IP address.
Device	This is the type of interface used by the device. • **br0** indicates a LAN interface where 0 represents LAN1 or LAN2. • **WAN** indicates a connection via mobile network (4G, 3G or 2G). • **WLAN** indicates a connection via WiFi network. • **RNDIS** indicates a connection via USB.
State	This column shows the current status of the connection.
Refresh	Click **Refresh** to update this screen.

7.5 Packet Statistics

Click **Monitor** > **Packet Statistics** or the **Packet Statistics (Details...)** hyperlink in the **Status** screen. Read-only information here includes port status and packet specific statistics.

Figure 21 Monitor > Packet Statistics

Packet Statistics					
			10 ▾ per page	◄◄ ◄ 1 ▾ page ► ►►	
#	Port	Status	TxPkts	RxPkts	Collisions
1	WLAN	up	47778	551207	0
2	WAN	down	0	0	0
3	RNDIS	down	0	0	0
Total Num : 3					

The following table describes the labels in this screen.

Table 9   Monitor > Packet Statistics

LABEL	DESCRIPTION
#	This is the index number of the entry.
Port	This is the WAH7608's interface type.
Status	For the LAN ports, this displays the port speed and duplex setting or **Down** when the line is disconnected.
	For the WAN port, it displays **Up** when the mobile data connection is up, **Connecting** when the WAH7608 is trying to bring the mobile data connection up, and displays **Down** when the 3G/4G connection is down or not activated.
	For the WLAN, it displays the maximum transmission rate when the WLAN is enabled and **Down** when the WLAN is disabled.
TxPkts	This is the number of transmitted packets on this port.
RxPkts	This is the number of received packets on this port.
Collisions	This is the number of collisions on this port.

7.6 LTE Modem Status

Click **Monitor > LTE Modem Status** or the **LTE Modem Status (Details...)** hyperlink in the **Status** screen. Use this screen to view the detailed information about the modem, SIM card status, and details. You can also check the LTE connection status.

Figure 22   Monitor > LTE Modem Status

LTE Modem Status									
Modem Information									
Physical Information		Module Name		IMEI/MEID		HW Version		FW Version	
		WAH7608		359094080000201		2.0		V1.00(ABKW.0)B7	
SIM Status									
SIM	PIN Code Status		PIN Code Remaining Times			PUK Code Remaining Times			
N/A	NO SIM		N/A			N/A			
Service Information									
Operator	Cell Broadcast	MCC	MNC	LAC	TAC	Cell ID	Service Type	Operation Band	RSSI
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CS Register Status	Eclo		PS Register Status	PS Attached Status	Roaming Status	IMSI		SMSC	MSISDN
unregistered	N/A		unregistered	Detached	N/A	N/A		N/A	N/A
RSRP		RSRQ		SINR	PLMN		MIMO		Support Band List
N/A		N/A		N/A	N/A		1T2R		GSM-850/GSM-900/GSM-1800/GSM-1900/WCDMA-850/WCDMA-900/WCDMA-PCS-1900/WCDMA-2100/LTE 2100/LTE 1900/LTE 1800/LTE 850/LTE 2600/LTE 900/LTE 800/LTE TD 2600/LTE TD 2300

The following table describes the labels in this screen.

Table 10   Monitor > LTE Modem Status

LABEL	DESCRIPTION
Modem Information	
Physical Information	This displays the interface used for the mobile data connection.
Module Name	This displays the name of the built-in LTE module.
IMEI/MEID	This displays the International Mobile Equipment Number (IMEI) or Mobile Equipment Identifier (MEID), which is the serial number of the built-in LTE module. It is a unique 15-digit number used to identify a mobile device.
HW Version	This displays the hardware version of the built-in LTE module.
FW Version	This displays the firmware version of the built-in LTE module.
SIM Status	
SIM	This displays the status of the inserted SIM card. **No SIM** displays if there is no SIM card inserted.
PIN Code Status	This displays the status of PIN code authentication.
PIN Code Remaining Times	This displays how many times you can enter the PIN code.
PUK Code Remaining Times	This displays how many times you can enter the PUK code.
Service Information	
Operator	This displays the name of the service provider.
Cell Broadcast	This displays whether the one-to-many messaging service is available.
MCC	This displays the Mobile Country Code (MCC), which is used to identify the country of a mobile subscriber.

Table 10   Monitor > LTE Modem Status (continued)

LABEL	DESCRIPTION
MNC	This displays the Mobile Network Code (MNC), which is used in combination with MCC to identify the public land mobile network (PLMN) of a mobile subscriber.
LAC	This displays the 2-octet Location Area Code (LAC), which is used to identify a location area within a PLMN.
TAC	This displays the Tracking Area Code (TAC), which is to identify a tracking area within a PLMN.
Cell ID	This displays the ID of a cell at the physical layer.
Service Type	This displays the type of the mobile network to which the WAH7608 is connecting.
Operation Band	This displays the network type and the frequency band used by the mobile network to which the WAH7608 is connecting.
RSSI	This displays the received signal strength indicator (RSSI), that is, the received signal strength in dBm.
CS Register Status	This displays the Circuit Switched network registration status.
Eclo	This displays the ratio (in dB) of the received energy per chip and the interference level.
PS Register Status	This displays the packet switched network registration status.
PS Attached Status	This displays the Packet switched Domain Attachment status.
Roaming Status	This displays whether the WAH7608 is connected to another service provider's mobile network using roaming.
IMSI	This displays the International Mobile Subscriber Identity (IMSI) stored in the SIM (Subscriber Identity Module) card. The SIM card is installed in a mobile device and used for authenticating a customer to the carrier network. IMSI is a unique 15-digit number used to identify a user on a network.
SMSC	This displays the number for Short Message Service Center (SMSC), which stores, forwards and delivers SMS text message.
MSISDN	This displays the MSISDN (Mobile Subscriber ISDN) number, a phone number assigned to a mobile subscriber to call a mobile device.
RSRP	This displays the Reference Signal Receive Power (RSRP), which is the average received power of all Resource Elements (RE) that carry cell-specific Reference Signals (RS) within the specified bandwidth.
RSRQ	This displays the Reference Signal Received Quality (RSRQ), which is the ratio of RSRP to the E-UTRA carrier RSSI and indicates the quality of the received reference signal.
SINR	This displays the Signal to Interference plus Noise Ratio (SINR). A negative value means more noise than signal.
PLMN	This displays the Public Land Mobile Network (PLMN) code of the mobile network.
MIMO	This displays the MIMO (Multi-input Multi-output) technology supported by the WAH7608, such as 1T2R (1 Transmit and 2 Receive paths/antennas) or TM1-TM4 (Transmission Mode 4).
Support Band List	This displays the frequency bands that are supported by the WAH7608.

8.1 Overview

This chapter discusses the WAH7608's **WAN** screens. Use these screens to configure your WAH7608 for Internet access.

A WAN (Wide Area Network) connection is an outside connection to another network or the Internet. It connects your private networks such as a LAN (Local Area Network) and other networks, so that a device in one location can communicate with devices in other locations.

3G and 4G standards for the sending and receiving of voice, video, and data in a mobile environment. You can insert a 4G SIM card and set the WAH7608 to use this 3G/4G connection as your WAN.

Figure 23 LAN/Wireless LAN and Wireless WAN
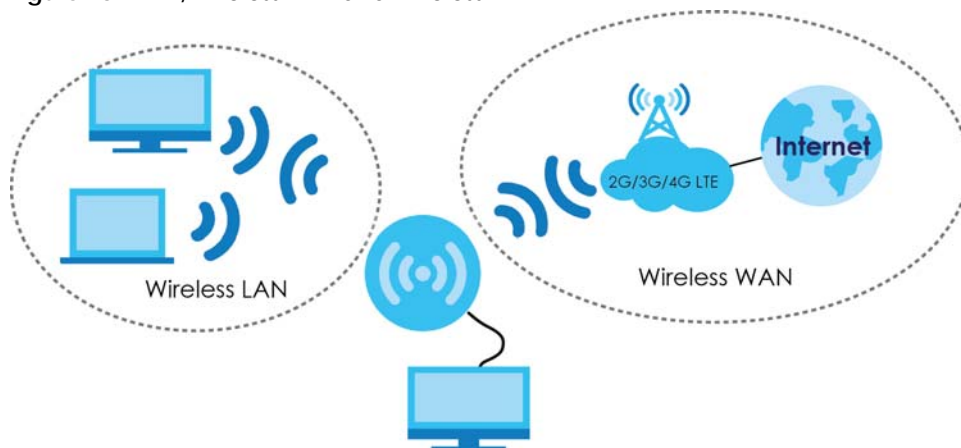
8.1.1 What You Can Do in this Chapter

- Use the **Connection** screen to configure the WAN settings on the WAH7608 for Internet access (Section 8.2 on page 63).
- Use the **APN Setting** screen to configure user-defined connection profiles (Section 8.3 on page 64).
- Use the **4G/3G/2G Modem** screen to select the type of network to which you want the WAH7608 to connect (Section 8.4 on page 65).
- Use the **PIN** screen to enable or disable PIN code authentication (Section 8.5 on page 66).
- Use the **PLMN** screen to display available Public Land Mobile Networks and select a preferred network for roaming (Section 8.6 on page 66).
- Use the **WiFi Client** screen to change the WAH7608 to client mode (Section 8.7 on page 67).
- Use the **Data Usage/Statistics** screen to specify limiting the amount of the package data and view the WAH7608's traffic statistics (Section 8.8 on page 69).
- Use the **Data Usage > Reset Statistics** screen to reset all traffic statistics (Section 8.9 on page 70).

- Use the **Data Usage** > **Current Data Statistics** screen to view the WAH7608's current traffic statistics (Section 8.10 on page 70).

- Use the **Data Usage** > **Total Data Statistics** screen to view the WAH7608's total traffic statistics (Section 8.11 on page 71).

8.1.2 What You Need To Know

The information in this section can help you configure the screens for your WAN connection, as well as enable/disable some advanced features of your WAH7608.

3G

3G (Third Generation) is a digital, packet-switched wireless technology. Bandwidth usage is optimized as multiple users share the same channel and bandwidth is only allocated to users when they send data. It allows fast transfer of voice and non-voice data and provides broadband Internet access to mobile devices.

4G

4G is the fourth generation of the mobile telecommunications technology and a successor of 3G. Both the WiMAX and Long Term Evolution (LTE) standards are the 4G candidate systems. 4G only supports all-IP-based packet-switched telephony services and is required to offer gigabit speed access.

DNS Server Address Assignment

Use Domain Name System (DNS) to map a domain name to its corresponding IP address and vice versa, for instance, the IP address of www.zyxel.com is 204.217.0.2. The DNS server is extremely important because without it, you must know the IP address of a computer before you can access it.

The WAH7608 can get the DNS server addresses in the following ways.

1 The ISP tells you the DNS server addresses, usually in the form of an information sheet, when you sign up. If your ISP gives you DNS server addresses, manually enter them in the DNS server fields.

2 If your ISP dynamically assigns the DNS server IP addresses (along with the WAH7608's WAN IP address), set the DNS server fields to get the DNS server address from the ISP.

IPv6 Introduction

IPv6 (Internet Protocol version 6), is designed to enhance IP address size and features. The increase in IPv6 address size to 128 bits (from the 32-bit IPv4 address) allows up to 3.4×10^{38} IP addresses. The WAH7608 can use IPv4/IPv6 dual stack to connect to IPv4 and IPv6 networks, and supports IPv6 rapid deployment (6RD).

IPv6 Addressing

The 128-bit IPv6 address is written as eight 16-bit hexadecimal blocks separated by colons (:). This is an example IPv6 address `2001:0db8:1a2b:0015:0000:0000:1a2f:0000`.

IPv6 addresses can be abbreviated in two ways:

- Leading zeros in a block can be omitted. So `2001:0db8:1a2b:0015:0000:0000:1a2f:0000` can be written as `2001:db8:1a2b:15:0:0:1a2f:0`.
- Any number of consecutive blocks of zeros can be replaced by a double colon. A double colon can only appear once in an IPv6 address. So `2001:0db8:0000:0000:1a2f:0000:0000:0015` can be written as `2001:0db8::1a2f:0000:0000:0015`, `2001:0db8:0000:0000:1a2f::0015`, `2001:db8::1a2f:0:0:15` or `2001:db8:0:0:1a2f::15`.

IPv6 Prefix and Prefix Length

Similar to an IPv4 subnet mask, IPv6 uses an address prefix to represent the network address. An IPv6 prefix length specifies how many most significant bits (start from the left) in the address compose the network address. The prefix length is written as "/x" where x is a number. For example,

        `2001:db8:1a2b:15::1a2f:0/32`

means that the first 32 bits (`2001:db8`) is the subnet prefix.

IPv6 Subnet Masking

Both an IPv6 address and IPv6 subnet mask compose of 128-bit binary digits, which are divided into eight 16-bit blocks and written in hexadecimal notation. Hexadecimal uses four bits for each character (1 ~ 10, A ~ F). Each block's 16 bits are then represented by four hexadecimal characters. For example, FFFF:FFFF:FFFF:FFFF:FC00:0000:0000:0000.

8.2 The Connection Screen

Use this screen to change your WAH7608's Internet access settings. Click **Configuration > Network > Connection**. The screen appears as shown next.

Figure 24 Configuration > Network > Connection

The following table describes the labels in this screen.

Table 11   Configuration > Network > Connection

LABEL	DESCRIPTION
Connection Operation	
Connection Control	This field displays the connected mode of the WAH7608. Select **Auto Mode** to connect to the mobile network automatically if there is an available mobile network. Otherwise, select **Manual Mode**. Click **Change** to apply your changes.
Roaming Mode	Select **Enable** data roaming on the WAH7608. Otherwise, select **Disable**. Click **Change** to apply your changes. 4G roaming is to use your mobile device in an area which is not covered by your service provider. Enable roaming to ensure that your WAH7608 is kept connected to the Internet when you are traveling outside the geographical coverage area of the network to which you are registered.
Item	This field always displays **WAN Status**.
PDN Type	This displays the type PDN (Packet Data Network) of the connection profile.
State	• This displays **Connected** when the connection profile has a connection with the ISP. • This displays **Connecting** when the connection profile is attempting a connection with the ISP. • This displays **Disconnected** when the connection profile is not connected to the ISP. • This displays **Disconnecting** when the connection profile is disconnecting from the ISP. Click **Connect** for the WAH7608 to attempt a connection with the ISP.
Cellular Profile	This is the profile ID automatically by the WAH7608 to the connection profile.

8.3 The APN Setting Screen

Use this screen to view or configure a connection profile. A connection profile defines the parameters that you need to connect to a mobile network, such as the APN, user name and password. Click **Configuration > Network > APN Configuration**. The screen appears as shown next.

Figure 25   Configuration > Network > APN Configuration

The following table describes the labels in this screen.

Table 12   Configuration > Network > APN Configuration

LABEL	DESCRIPTION
Cellular Profile	
Profile List	This displays the available connection profiles in the WAH7608. Select **Add New** to configure a new connection profile. The profile with the * indicates it's the connection profile currently in use by the WAH7608.
Profile ID	This is the profile ID automatically assigned to the APN profile by the WAH7608.
Name	This displays the name of your Internet Service Provider (ISP). Enter a descriptive name for your ISP.
APN	This field displays the Access Point Name (APN) in the profile. Enter the Access Point Name (APN) provided by your service provider. Connections with different APNs may provide different services (such as Internet access or MMS (Multi-Media Messaging Service) and charging method.
User	This field displays the user name in the profile. Type the user name given to you by your service provider.
Password	This field displays the password in the profile. Type the password associated with the user name above.
PDP Type	Select **IPv4** if you want the WAH7608 to run IPv4 only. Select **IPv4/IPv6** to allow the WAH7608 to run IPv4 and IPv6 at the same time. Select **IPv6** if you want the WAH7608 to run IPv6 only.
Authentication Preference	The WAH7608 supports **PAP** (Password Authentication Protocol) and **CHAP** (Challenge Handshake Authentication Protocol). **CHAP** is more secure than **PAP**; however, **PAP** is readily available on more platforms Select an authentication protocol used by the service provider. Otherwise, select **PAP/CHAP** to have the WAH7608 accept either CHAP or PAP.
Apply	Click **Apply** to save your changes back to the WAH7608.
Delete	Click **Reset** to reload the previous configuration for this screen.

8.4 The 4G/3G/2G Modem Screen

Use this screen to set how you want the WAH7608 to connect to an available mobile network. Click **Configuration** > **Network** > **4G/3G/2G Modem**. The screen appears as shown next.

Figure 26   Configuration > Network > 4G/3G/2G Modem
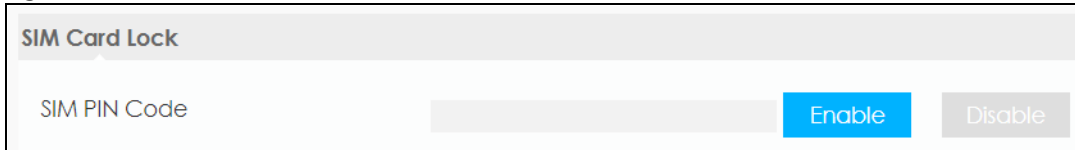
Select the type of network (**4G/3G**, **3G/2G**, **LTE Only**, **WCDMA Only**, or **GSM Only**) to which you want the WAH7608 to connect and click **Change** to save your settings.

Otherwise, select **Auto** to have the WAH7608 connect to an available network using the default settings on the SIM card. If the currently registered mobile network is not available or the mobile network's signal strength is too low, the WAH7608 switches to another available mobile network.

8.5 The PIN Screen

Use this screen to enable PIN code authentication. Click **Configuration** > **Network** > **PIN**. The screen appears as shown next.

Figure 27 Configuration > Network > PIN

A PIN (Personal Identification Number) code is a 4-digit key (0000 for example) to a SIM card.
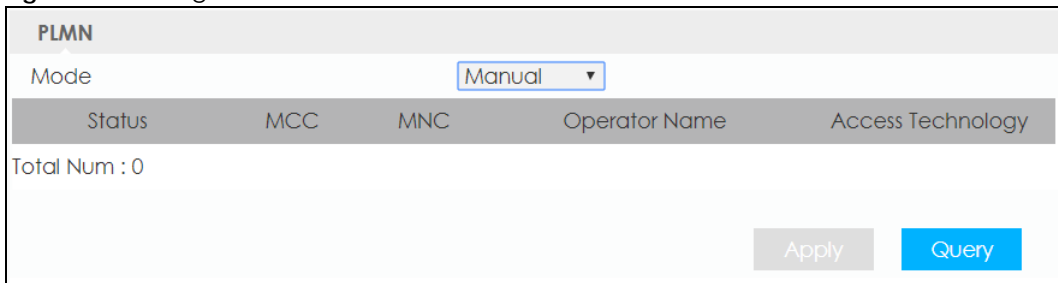
Select **Enable** to enter the PIN code every time the WAH7608 reboots. To turn PIN code authentication enter the PIN code and click **Disable**.

8.6 The PLMN Screen

This screen allows you to view available Public Land Mobile Networks (PLMNs) and select your preferred network when the WAH7608 is outside the geographical coverage area of the network to which you are registered and roaming is enabled.

Click **Configuration** > **Network** > **PLMN**. The screen appears as shown next.

Figure 28 Configuration > Network > PLMN

The following table describes the labels in this screen.

Table 13   Configuration > Network > PLMN

LABEL	DESCRIPTION
Mode	Select **Automatic** to have the WAH7608 automatically connect to the first available mobile network using roaming when it is outside the coverage area of the original service provider's network.
	Select **Manual** to display the network list and manually select a preferred network.
Status	This displays **Current** displays the PLMN to which your WAH7608 is currently connected.
	This displays **Available** displays other PLMNs available by your ISP. Go to the screen to connect to another available PLMN.
	This displays **Forbidden** displays PLMNs available by other ISPs. To connect to one of these networks you need a working SIM card of the ISP shown in

Table 13   Configuration > Network > PLMN

LABEL	DESCRIPTION
MCC	This displays the Mobile Country Code (MCC), which is used to identify the country of a mobile subscriber.
MNC	This displays the Mobile Network Code (MNC), which is used in combination with MCC to identify the public land mobile network (PLMN) of a mobile subscriber.
Operator Name	This displays the name of the service provider.
Access Technology	This displays the mobile phone standard of data transfer on this mobile network.
Apply	Click **Apply** to save your changes back to the WAH7608.
Query	Click **Query** so the WAH7608 can scan for PLMN in the area, you need a working SIM card to be able to scan for PLMNs.

8.7 The WiFi Client Screen

Your WAH7608 can act as a wireless client. In wireless client mode, it can connect to an existing network via an access point. Use this mode if you already have an access point or wireless router in your network.

In the example below, one WAH7608 (**A**) is configured as a wireless client and another is used as an access point (**B**). The WAH7608 has two clients that need to connect to the Internet. The WAH7608 wirelessly connects to the available access point (**B**).

Figure 29   Wireless Client Mode
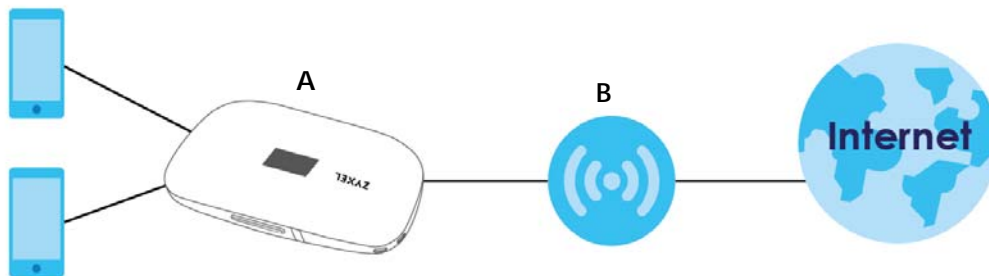
After the WAH7608 and the access point connect, the WAH7608 acquires its WAN IP address from the access point. The clients of the WAH7608 can now surf the Internet.

Click **Configuration** > **Network** > **WiFi Client**. The screen appears as shown next.

Figure 30 Configuration > Network > WiFi Client

The following table describes the labels in this screen.

Table 14 Configuration > Network > WiFi Client

LABEL	DESCRIPTION
WiFi Client	
Enable	Select the check box and click **Apply** to enable client mode in the WAH7608.
Connected WLAN	
This shows the settings of the current AP to which your WAH7608 is connected.	
WiFi Client Scan Result	
This shows a list of the APs the WAH7608 currently detects in the area.	
BSSID	This shows the MAC address of the wireless network.

Table 14   Configuration > Network > WiFi Client

LABEL	DESCRIPTION
SSID	This shows the descriptive name of the wireless network detected by the WAH7608. Tap on an SSID and a pop-up window appears. Enter the **Pre-Shared Key** or password and click **Connect** so the WAH7608 connects to the wireless network. **Figure 31** Pre-shared Key Pre-shared Key : _____ Connect
Signal Strength (dBm)	This shows the strength of the wireless network's radio signal measured in dBm.
Channel	This shows the channel the wireless network uses.
Encryption Type	This shows the data encryption method the WAH7608 uses for the wireless connection.
Total Num	This shows the total number of wireless networks your WAH7608 detects.
Scan	Click **Scan** to refresh the list of available wireless networks.

8.8 The Data Usage/Statistics Screen

This screen allows you to configure limiting the amount of the package data.Click **Configuration > Network > Data Usage > Data Usage/Statistics**. The screen appears as shown next.

Figure 32   Configuration > Network > Data Usage > Data Usage/Statistics

Data Usage/Statistics	Reset Statistics	Current Data Statistics	Total Data Statistics

Enable Data Limit ☑

Total Allowance	10.00	GB
Notify me when data usage reaches	80	%
Reset Date	1	(Date of each month)

Apply   Reset

The following table describes the labels in this screen.

Table 15   Configuration > Network > Data Usage > Data Usage/Statistics

LABEL	DESCRIPTION
Enable Data Limit	Select the check box to activate a limiting amount of package data.
Total Allowance	Specify the limiting the amount of the package data (in GB) in this field.
Notify me when data usage reaches	Specify the percentage of data usage the WAH7608 has to reach to send a notification.
Reset Date	Select the day of the month on which the WAH7608 restarts calculating the amount of package data per month.

Table 15   Configuration > Network > Data Usage > Data Usage/Statistics

LABEL	DESCRIPTION
Apply	Click **Apply** to save your changes back to the WAH7608.
Reset	Click **Reset** to reload the previous configuration for this screen

8.9 The Reset Statistics Screen

This screen allows you to reset the data usage statistics. Click **Configuration > Network > Data Usage > Reset Statistics**. The screen appears as shown next.

Figure 33   Configuration > Network > Data Usage > Reset Statistics

Data Usage/Statistics	**Reset Statistics**	Current Data Statistics	Total Data Statistics

Reset Statistics Now   Reset

Click **Reset** so the WAH7608 clears all data usage statistics at that moment.

8.10 The Current Data Statistics Screen

This screen allows you to view the current data usage statistics. Click **Configuration > Network > Data Usage > Current Data Statistics** screen. The screen appears as shown next.

Figure 34   Configuration > Network > Data Usage > Current Data Statistics

Data Usage/Statistics	Reset Statistics	**Current Data Statistics**	Total Data Statistics

Current Data Statistics

Data Amount	Sent	Received
0KB	0KB 0.00B/s (Max 0.00B/s)	0KB 0.00B/s (Max 0.00B/s)

The following table describes the labels in this screen.

Table 16   Configuration > Network > Data Usage > Current Data Statistics

LABEL	DESCRIPTION
Data Amount	This indicates the current traffic flow transmitting from/to the WAH7608.
Sent	This indicates the number of transmitted packets on the WAH7608.
Received	This indicates the number of received packets on the WAH7608.

8.11 The Total Data Statistics Screen

This screen allows you to view the total data usage statistics in a month (starting from the day entered in The Data Usage/Statistics Screen). Click **Configuration > Network > Data Usage > Total Data Statistics** screen. The screen appears as shown next.

Figure 35 Configuration > Network > Data Usage > Total Data Statistics

Data Usage/Statistics	Reset Statistics	Current Data Statistics	**Total Data Statistics**

Total Connections Statistics(from 10/1)

Data Amount	Sent	Received
0.00B	0.00B (Max 0.00B/s)	0.00B (Max 0.00B/s)

The following table describes the labels in this screen.

Table 17   Configuration > Network > Data Usage > Total Data Statistics

LABEL	DESCRIPTION
Data Amount	This indicates the total traffic flow transmitting from/to the WAH7608.
Sent	This indicates the total number of transmitted packets on the WAH7608.
Received	This indicates the total number of received packets on the WAH7608.

CHAPTER 9
LAN

9.1 Overview

This chapter describes how to configure LAN settings.

A Local Area Network (LAN) is a shared communication system to which many devices are attached. A LAN is a network limited to the immediate area, such as the same building or a floor of a building.

Figure 36   LAN Example
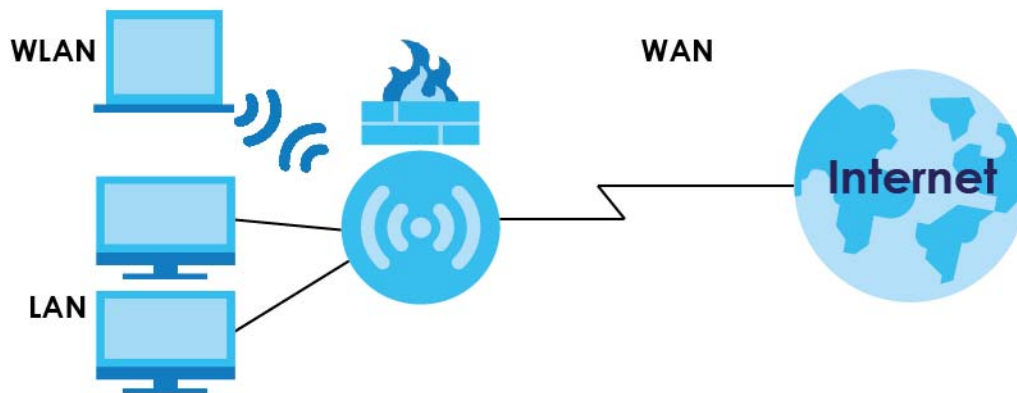
The LAN screens can help you configure and manage IP address, and partition your physical network into logical networks.

9.1.1 What You Can Do

- Use the **LAN** screen to change the IP address for your WAH7608 (Section 9.2 on page 73).
- Use the **DHCP Server** screen to enable the DHCP server on the WAH7608 (Section 9.3 on page 74).
- Use the **Leased Hosts** screen to assign IP addresses on the LAN to specific individual devices based on their MAC Addresses (Section 9.4 on page 74).
- Use the **File Sharing** screen to allow file sharing via the WAH7608 (Section 9.5 on page 75).

9.1.2 What You Need To Know

The actual physical connection determines whether the WAH7608 ports are LAN or WAN ports. There are two separate IP networks, one inside the LAN network and the other outside the WAN network as shown next.

Figure 37 LAN and WAN IP Addresses
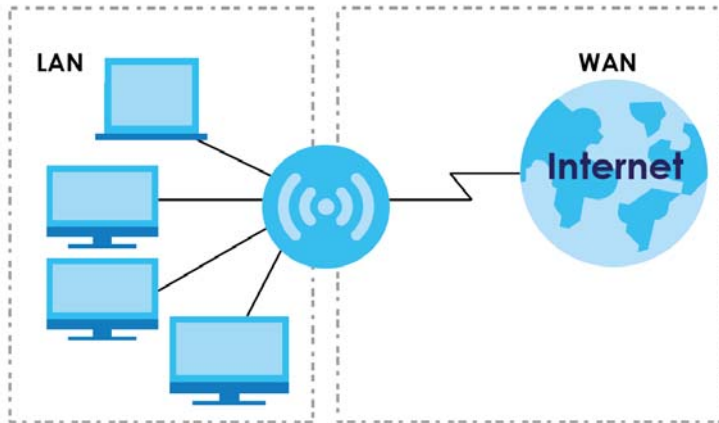
The LAN parameters of the WAH7608 are preset in the factory with the following values:

• IP address of 192.168.1.1 with subnet mask of 255.255.255.0 (24 bits)

• DHCP server enabled with 40 client IP addresses starting from 192.168.1.20 to 192.168.1.60.

These parameters should work for the majority of installations. If your ISP gives you explicit DNS server address(es), read the embedded Web Configurator help regarding what fields need to be configured.

9.2 The LAN Screen

Use this screen to change the IP address for your WAH7608. Click **Configuration** > **Network** > **LAN**. The screen appears as shown next.

Figure 38 Configuration > Network > LAN

The following table describes the labels in this screen.

Table 18 Configuration > Network > LAN

LABEL	DESCRIPTION
IP Address	Type the IP address of your WAH7608 in dotted decimal notation.
IP Subnet Mask	The subnet mask specifies the network number portion of an IP address. Your WAH7608 will automatically calculate the subnet mask based on the IP address that you assign. Unless you are implementing subnetting, use the subnet mask computed by the WAH7608.
Apply	Click **Apply** to save your changes back to the WAH7608.

9.3 The DHCP Server Screen

The WAH7608 has built-in DHCP server capability that assigns IP addresses to systems that support DHCP client capability. Use this screen to enable the DHCP server. To access this screen, click **Configuration > LAN> DHCP > DHCP Server**.

Figure 39 Configuration > LAN> DHCP > DHCP Server

DHCP Server	Leased Hosts	
DHCP Mode	Server ▼	
Start IP	192.168.1.20	
End IP	192.168.1.60	
Lease Time(minutes)	720	
		Apply

The following table describes the labels in this screen.

Table 19 Configuration > LAN > DHCP > DHCP Server

LABEL	DESCRIPTION
DHCP Mode	Select **DHCP Server** to activate DHCP for LAN. DHCP (Dynamic Host Configuration Protocol, RFC 2131 and RFC 2132) allows individual clients (computers) to obtain TCP/IP configuration at startup from a server. Enable the DHCP server unless your ISP instructs you to do otherwise. Select **None** to stop the WAH7608 acting as a DHCP server. When configured as a server, the WAH7608 provides TCP/IP configuration for the clients. If not, DHCP service is disabled and you must have another DHCP server on your LAN, or else the devices must be manually configured. When set as a server, fill in the following four fields.
Start IP	The WAH7608 is pre-configured with a pool of IP addresses starting from 192.168.1.20 to 192.168.1.60. This field specifies the first of the contiguous addresses in the IP address pool.
End IP	This field specifies the last of the contiguous addresses in the IP address pool.
Lease Time (minutes)	Specify how long (in minutes) each device can use the information (especially the IP address) before it has to request the information again.
Apply	Click **Apply** to save your changes back to the WAH7608.

9.4 The Leased Hosts Screen

This screen shows the current DHCP client information. To change your WAH7608's static DHCP settings, click **Configuration > Network > DHCP > Leased Hosts**. The following screen displays.

The following table describes the labels in this screen.

Table 20   Configuration > Network > DHCP > Leased Hosts

LABEL	DESCRIPTION
#	This is the index number of the static IP table entry (row).
Host Name	This displays the name of a device connected to the WAH7608.
MAC Address	This displays the MAC address (with colons) of a device on the WAH7608 LAN.
IP Address	This displays the LAN IP address of a device on the WAH7608 LAN.
Remaining Time	This displays an IP address remaining leased time for a device in the LAN.
Refresh	Click this button to update the screen.

9.5 The File Sharing Screen

Use this screen to share files on a micro SD card connected to your WAH7608 with users on your network. To access this screen, click **Configuration** > **LAN** > **File Sharing**.

Figure 41 Configuration > LAN > File Sharing

The following table describes the labels in this screen.

Table 21   Configuration > LAN > File Sharing

LABEL	DESCRIPTION
Enable File Sharing	Select this to enable file sharing through the WAH7608 using Windows Explorer or by browsing to your work group.
Server Name	Specify the name to identify the WAH7608 in a work group.

Table 21   Configuration > LAN > File Sharing

LABEL	DESCRIPTION
Sharing Name	You can add the WAH7608 to an existing or a new workgroup on your network. Enter the name of the workgroup which your WAH7608 automatically joins. You can set the WAH7608's workgroup name to be exactly the same as the workgroup name to which your device belongs to. Note: The WAH7608 will not be able to join the workgroup if your local area network has restrictions set up that do not allow devices to join a workgroup. In this case, contact your network administrator.
Apply	Click this button to save your changes back to the WAH7608.
Reset	Click **Reset** to reload the previous configuration for this screen.

CHAPTER 10
Firewall

10.1 Overview

Use these screens to enable and configure the firewall that protects your WAH7608 and your LAN from unwanted or malicious traffic.

Enable the firewall to protect your LAN devices from attacks by hackers on the Internet and control access between the LAN and WAN. By default the firewall:

- allows traffic that originates from your LAN devices to go to all of the networks.
- blocks traffic that originates on the other networks from going to the LAN.

The following figure illustrates the default firewall action. User **A** can initiate an IM (Instant Messaging) session from the LAN to the WAN (1). Return traffic for this session is also allowed (2). However other traffic initiated from the WAN is blocked (3 and 4).

Figure 42   Default Firewall Action
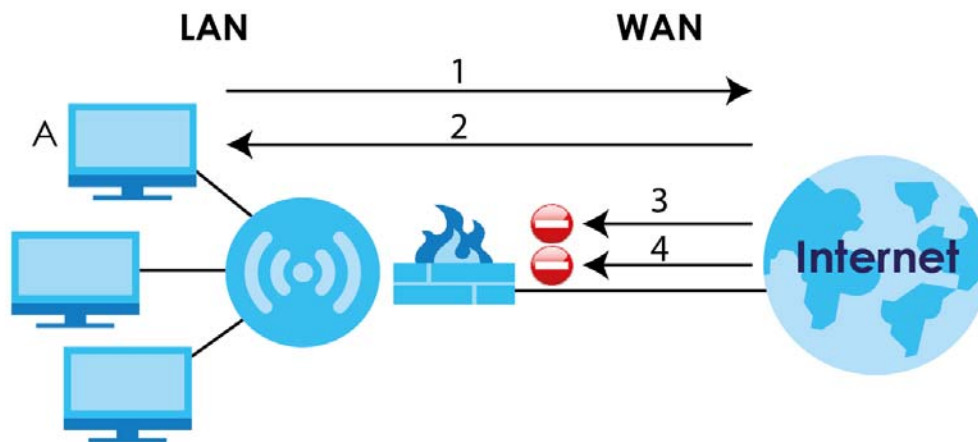
10.1.1 What You Can Do

- Use the **Configure** screen to enable or disable the WAH7608's firewall (Section 10.2 on page 78).
- Use the **IPv4/IPv6 Firewall Entries** screens to view and configure IPv4/IPv6 port filtering rules (Section 10.3 on page 79).

10.1.2 What You Need To Know

The following terms and concepts may help as you read through this chapter.

About the WAH7608 Firewall

The WAH7608's firewall feature physically separates the LAN and the WAN and acts as a secure gateway for all data passing between the networks.

It is a stateful inspection firewall and is designed to protect against Denial of Service attacks when activated (click the **Configure** tab under **Firewall** and then click the **Firewall Enable** check box). The WAH7608's purpose is to allow a private Local Area Network (LAN) to be securely connected to the Internet. The WAH7608 can be used to prevent theft, destruction and modification of data, as well as log events, which may be important to the security of your network.

The WAH7608 is installed between the LAN and a broadband modem connecting to the Internet. This allows it to act as a secure gateway for all data passing between the Internet and the LAN.

The WAH7608 has one Ethernet WAN port and four Ethernet LAN ports, which are used to physically separate the network into two areas.The WAN (Wide Area Network) port attaches to the broadband (cable or DSL) modem to the Internet.

The LAN (Local Area Network) port attaches to a network of computers, which needs security from the outside world. These computers will have access to Internet services such as e-mail, FTP and the World Wide Web. However, "inbound access" is not allowed (by default) unless the remote host is authorized to use a specific service.

Guidelines For Enhancing Security With Your Firewall

1 Change the default password via Web Configurator.

2 Think about access control before you connect to the network in any way, including attaching a modem to the port.

3 Limit who can access your WAH7608.

4 Don't enable any local service (such as NTP) that you don't use. Any enabled service could present a potential security risk. A determined hacker might be able to find creative ways to misuse the enabled services to access the firewall or the network.

5 For local services that are enabled, protect against misuse. Protect by configuring the services to communicate only with specific peers, and protect by configuring rules to block packets for the services at specific interfaces.

6 Protect against IP spoofing by making sure the firewall is active.

7 Keep the firewall in a secured (locked) room.

10.2 The Configure Screen

Use this screen to enable or disable the WAH7608's firewall, and set up firewall logs. Click **Configuration > Security > Firewall** to open the **Configure** screen.

Figure 43 Configuration > Security > Firewall > Configure I

The following table describes the labels in this screen.

Table 22 Configuration > Security > Firewall > Configure

LABEL	DESCRIPTION
Firewall Enable	Select this check box to activate the firewall. The WAH7608 performs access control and protects against Denial of Service (DoS) attacks when the firewall is activated.
Packets Allowed	Select **Accept** to allow access to the firewall rule in the list and block access to the ones that don't match. Select **Drop** to block access to the firewall rule in the list and allow access to the ones that don't match.
Apply	Click **Apply** to save the settings.

10.3 The IPv4/IPv6 Firewall Entries

The WAH7608 firewall is a packet filtering firewall and restricts access based on the source/destination device network address of a packet and the type of application. Use this screen to configure IP filtering rules. To access these screens, click **Configuration > Firewall > IPv4 Firewall Entries** or **Configuration > Firewall > IPv6 Firewall Entries**.

Figure 44 Configuration > Security > Firewall > IPv4 Firewall Entries

Figure 45 Configuration > Security > Firewall > IPv6 Firewall Entries

The following table describes the labels in this screen.

Table 23 Configuration > Security > Firewall > IPv4/IPv6 Firewall Entries

LABEL	DESCRIPTION
#	This is your firewall rule number. The ordering of your rules is important as rules are applied in turn. Note: The last rule entered is the first rule be applied.
Source IP	This is the IP address of the device from which traffic for the application or service is initialized.
Destination IP	This is the IP address of the device to which traffic for the application or service is entering.
Source from Port	This field displays a single port number of the source or the starting port number of a range. Enter the first port number in the range of the source that define the traffic type, for example TCP port 80 defines web traffic. Note: To enter a single port you can enter it in **Source from Port** and a **0** in the **Source to Port** field. Or you can enter the same port number in the **Source from Port** and **Source to Port** fields. Both options will have the same behavior.
Source to Port	This field displays the ending port number of a range. Enter the last port number in the range of the source that define the traffic type, for example TCP port 80 defines web traffic.
Destination from Port	This field displays a single port number of the destination or the starting port number of a range. Enter the port number/range of the destination that define the traffic type, for example TCP port 80 defines web traffic. Note: To enter a single port you can enter it in **Destination from Port** and a **0** in the **Destination to Port** field. Or you can enter the same port number in the **Destination from Port** and **Destination to Port** fields. Both options will have the same behavior.
Destination to Port	This field ending port number of a range. Enter the last port number in the range of the destination that define the traffic type, for example TCP port 80 defines web traffic.
Protocol	This field displays the protocol (**ICMP**, **TCP**, **UDP**, **TCP+UDP** or **None**) used to transport the packets for which you want to apply the rule.
Delete	Click the Delete icon to remove the filtering rule.
Add	Click **Add** to create a new rule.

Table 23   Configuration > Security > Firewall > IPv4/IPv6 Firewall Entries

LABEL	DESCRIPTION
OK	Click **OK** to save a filtering rule.
Delete All	Click this button to remove all filtering rules.
Apply	Click this button to save your changes back to the WAH7608.

11.1 Overview

NAT (Network Address Translation - NAT, RFC 1631) is the translation of the IP address of a host in a packet. For example, the source address of an outgoing packet, used within one network is changed to a different IP address known within another network.

The figure below is a simple illustration of a NAT network. You want to assign ports 21-25 to one FTP, Telnet and SMTP server (**A** in the example), port 80 to another (**B** in the example) and assign a default server IP address of 192.168.1.35 to a third (**C** in the example).

You assign the LAN IP addresses to the devices (**A** to **D**) connected to your WAH7608. The ISP assigns the WAN IP address. The NAT network appears as a single host on the Internet. All traffic coming from **A** to **D** going out to the Internet use the IP address of the WAH7608, which is 192.168.1.1.

Figure 46 NAT Example
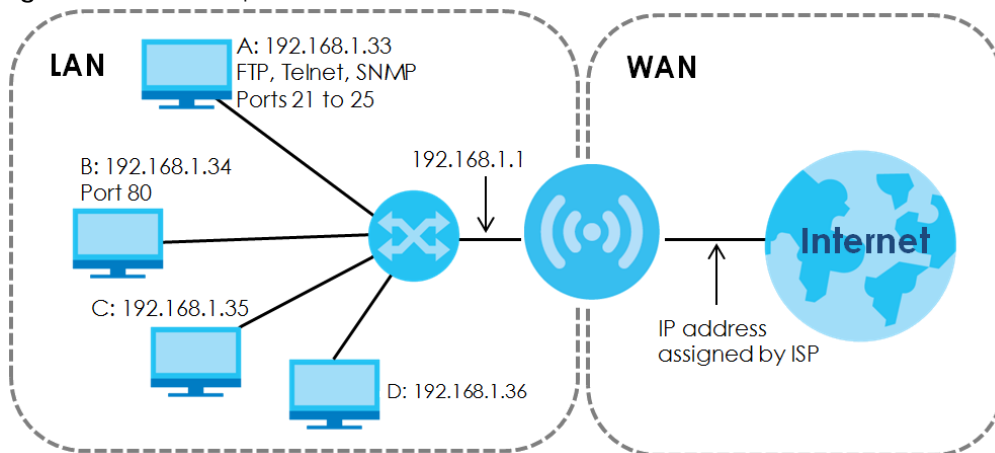
Note: You must create a firewall rule in addition to setting up NAT, to allow traffic from the WAN to be forwarded through the WAH7608.

11.1.1 What You Can Do

- Use the **Configure** screen to enable NAT (Section 11.2 on page 84).
- Use the **Entries** screen to set a default server and change your WAH7608's port forwarding settings to forward incoming service requests to the server(s) on your local network (Section 11.3 on page 85).

11.1.2 What You Need to Know

Inside/Outside

Inside/outside denotes where a host is located relative to the WAH7608, for example, the computers of your subscribers are the inside hosts, while the web servers on the Internet are the outside hosts.

Global/Local

Global/local denotes the IP address of a host in a packet as the packet traverses a router, for example, the local address refers to the IP address of a host when the packet is in the local network, while the global address refers to the IP address of the host when the same packet is traveling in the WAN side.

NAT

In the simplest form, NAT changes the source IP address in a packet received from a subscriber (the inside local address) to another (the inside global address) before forwarding the packet to the WAN side. When the response comes back, NAT translates the destination address (the inside global address) back to the inside local address before forwarding it to the original inside host.

NAT Types

This section discusses the following NAT types that are implemented on the WAH7608.

- **Full Cone:** In full cone NAT, the NAT router maps all outgoing packets from an internal IP address and port to a single IP address and port on the external network. The NAT router also maps packets coming to that external IP address and port to the internal IP address and port.

- **Address Restricted or Restricted Cone:** As in full cone NAT, a restricted cone NAT router maps all outgoing packets from an internal IP address and port to a single IP address and port on the external network. The difference from full cone NAT is in how the restricted cone NAT router handles packets coming in from the external network.

- **Port Restricted:** Port restricted cone NAT maps all outgoing packets from an internal IP address and port to a single IP address and port on the external network.

- **Symmetric:** The full, restricted and port restricted cone NAT types use the same mapping for an outgoing packet's source address regardless of the destination IP address and port. In symmetric NAT, the mapping of an outgoing packet's source address to a source address in another network is different for each different destination IP address and port.

The following table summarizes how these NAT types handle outgoing and incoming packets.

Table 24   NAT Types

	FULL CONE	ADDRESS RESTRICTED	PORT RESTRICTED	SYMMETRIC
Incoming Packets	Any external host can send packets to the mapped external IP address and port.	Only external hosts with an IP address to which the internal host has already sent a packet can send packets to the mapped external IP address and port.	Only external hosts with an IP address and port to which the internal host has already sent a packet can send packets to the mapped external IP address and port.	A host on the external network can only send packets to the specific mapped external IP address and port that the NAT router used in sending a packet to the external host's IP address and port.
Outgoing Packets	The NAT router maps the internal IP address and port of all outgoing packets to a single IP address and port on the external network.			The NAT router maps the internal IP address and port of each outgoing packet to a different external IP address and port for each different destination IP address and port.

11.2 The Configure Screen

Use this screen to enable NAT and enable/disable he ALGs (Application Layer Gateways) in the WAH7608. Click **Configuration > Security > NAT** to open the **Configure** screen.

Figure 47   Configuration > Security > NAT > Configure

The following table describes the labels in this screen.

Table 25   Configuration > Security > NAT > General

LABEL	DESCRIPTION
NAT Type	Select the NAT type for the WAH7608. For more information see Table 24 on page 84.
IPSEC VPN Pass Through	Enable this to turn on the IPsec ALG (Application Layer Gateway) on the WAH7608 to detect IPsec traffic and help build IPsec sessions through the WAH7608's NAT.
PPTP VPN Pass Through	Enable this to turn on the PPTP ALG on the WAH7608 to detect PPTP traffic and help build PPTP sessions through the WAH7608's NAT.
L2TP VPN Pass Through	Enable this to turn on the L2TP ALG on the WAH7608 to detect L2TP traffic and help build L2TP sessions through the WAH7608's NAT.

Table 25   Configuration > Security > NAT > General (continued)

LABEL	DESCRIPTION
Webserver WWAN Access	Select **Enable** to allow access to web configurator using the WAH7608 WAN IP address. Otherwise, select **Disable**.
Apply	Click **Apply** to save your changes back to the WAH7608.

11.3 The Entries Screen

Use this screen to forward incoming service requests to the server(s) on your local network and set a default server. You may enter a single port number to be forwarded, and the local IP address of the desired server. The port number identifies a service; for example, web service is on port 80 and FTP on port 21.

Click **Configuration > Network > NAT > Entries** to open the following screen.

Figure 48   Configuration > Network > NAT > Entries

The following table describes the labels in this screen.

Table 26   Configuration > Network > NAT > Entries

LABEL	DESCRIPTION
#	This field displays the rule index number.
IP	This field displays the inside IP address of the server. Enter the inside IP address of the virtual server here.
Private Port	A private port is a port that causes (or triggers) the WAH7608 to record the IP address of the LAN device that sent the traffic to a server on the WAN. Enter the port number of the private in this field.
Global Port	A global port is a port that a server on the WAN uses when it sends out a particular service. The WAH7608 forwards the traffic with this port to the client device on the LAN that requested the service. Enter the port number of the global in this field.
Protocol	Select the transport layer protocol (**TCP**, **UDP**, **ICMP**) used to transport the packets for which you want to apply the rule.
Delete	Click **Delete** to remove the port forwarding rule.
Add	Click **Add** to create a new rule.

Table 26   Configuration > Network > NAT > Entries

LABEL	DESCRIPTION
OK	Click **OK** to save a port forwarding rule.
Delete All	Click **Delete All** to remove all port forwarding rules.
Apply	Click **Apply** to save your changes back to the WAH7608.

11.4 Technical Reference

The following section contains additional technical information about the WAH7608 features described in this chapter.

11.4.1 NATPort Forwarding: Services and Port Numbers

A port forwarding set is a list of inside (behind NAT on the LAN) servers, for example, web or FTP, that you can make accessible to the outside world even though NAT makes your whole inside network appear as a single machine to the outside world.

Use the **Port Forwarding** screen to forward incoming service requests to the server(s) on your local network. You may enter a single port number or a range of port numbers to be forwarded, and the local IP address of the desired server. The port number identifies a service; for example, web service is on port 80 and FTP on port 21. In some cases, such as for unknown services or where one server can support more than one service (for example both FTP and web service), it might be better to specify a range of port numbers.

In addition to the servers for specified services, NAT supports a default server. A service request that does not have a server explicitly designated for it is forwarded to the default server. If the default is not defined, the service request is simply discarded.

Note: Many residential broadband ISP accounts do not allow you to run any server processes (such as a Web or FTP server) from your location. Your ISP may periodically check for servers and may suspend your account if it discovers any active services at your location. If you are unsure, refer to your ISP.

11.4.2 NAT Port Forwarding Example

Let's say you want to assign ports 21-25 to one FTP, Telnet and SMTP server (**A** in the example), port 80 to another (**B** in the example) and assign a default server IP address of 192.168.1.35 to a third (**C** in the example). You assign the LAN IP addresses and the ISP assigns the WAN IP address. The NAT network appears as a single host on the Internet.

Figure 49   Multiple Servers Behind NAT Example
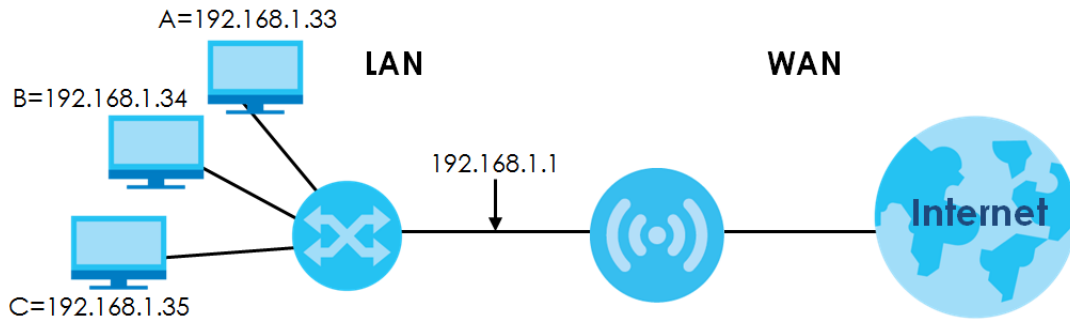
11.4.3 Trigger Port Forwarding

Some services use a dedicated range of ports on the client side and a dedicated range of ports on the server side. With regular port forwarding you set a forwarding port in NAT to forward a service (coming in from the server on the WAN) to the IP address of a computer on the client side (LAN). The problem is that port forwarding only forwards a service to a single LAN IP address. In order to use the same service on a different LAN computer, you have to manually replace the LAN computer's IP address in the forwarding port with another LAN computer's IP address.

Trigger port forwarding solves this problem by allowing computers on the LAN to dynamically take turns using the service. The WAH7608 records the IP address of a LAN computer that sends traffic to the WAN to request a service with a specific port number and protocol (a "trigger" port). When the WAH7608's WAN port receives a response with a specific port number and protocol ("incoming" port), the WAH7608 forwards the traffic to the LAN IP address of the computer that sent the request. After that computer's connection for that service closes, another computer on the LAN can use the service in the same manner. This way you do not need to configure a new IP address each time you want a different LAN computer to use the application.

11.4.4 Trigger Port Forwarding Example

The following is an example of trigger port forwarding.

Figure 50   Trigger Port Forwarding Process: Example
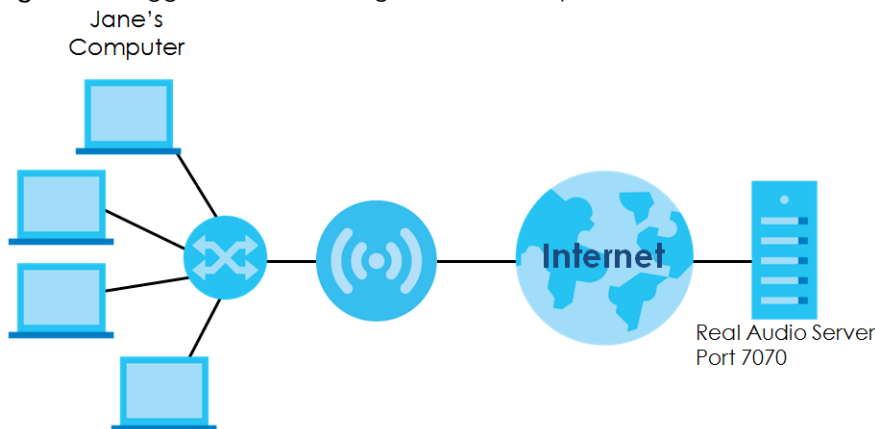
1   Jane requests a file from the Real Audio server (port 7070).

2 Port 7070 is a "trigger" port and causes the WAH7608 to record Jane's computer IP address. The WAH7608 associates Jane's computer IP address with the "incoming" port range of 6970-7170.

3 The Real Audio server responds using a port number ranging between 6970-7170.

4 The WAH7608 forwards the traffic to Jane's computer IP address.

5 Only Jane can connect to the Real Audio server until the connection is closed or times out. The WAH7608 times out in three minutes with UDP (User Datagram Protocol), or two hours with TCP/IP (Transfer Control Protocol/Internet Protocol).

11.4.5 Two Points To Remember About Trigger Ports

1 Trigger events only happen on data that is coming from inside the WAH7608 and going to the outside.

2 If an application needs a continuous data stream, that port (range) will be tied up so that another computer on the LAN can't trigger it.

12.1 Overview

This chapter discusses how to configure the wireless network settings in your WAH7608.

The following figure provides an example of a wireless network.

Figure 51   Example of a Wireless Network
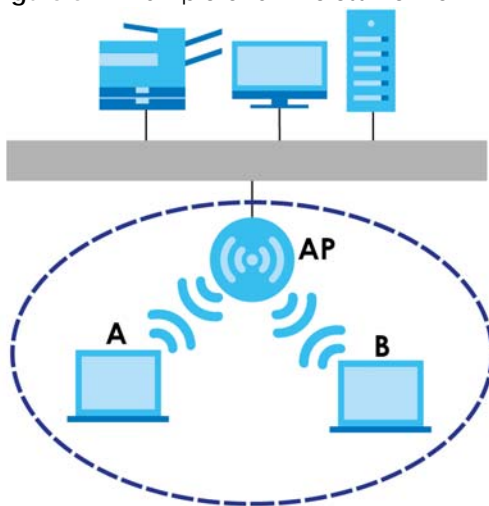
The wireless network is the part in the blue circle. In this wireless network, devices **A** and **B** are called wireless clients. The wireless clients use the access point (AP) to interact with other devices (such as the printer) or with the Internet. Your WAH7608 is the AP.

12.1.1 What You Can Do in this Chapter

- Use the **Basic** screen to enable the wireless LAN, enter the SSID and select the wireless security mode (Section 12.2 on page 90).
- Use the **WPS** screen to activate WPS via PBC or PIN configuration (Section 12.3 on page 92).
- Use the **MAC Filter** screen to deny wireless clients based on their MAC addresses from connecting to the WAH7608 (Section 12.4 on page 93).

12.1.2 What You Need to Know

Wireless Basics

"Wireless" is essentially radio communication. In the same way that walkie-talkie radios send and receive information over the airwaves, wireless networking devices exchange information with one another. A wireless networking device is just like a radio that lets your computer exchange information with radios attached to other computers. Like walkie-talkies, most wireless networking devices operate at radio frequency bands that are open to the public and do not require a license to use. However, wireless networking is different from that of most traditional radio communications in that there a number of wireless networking standards available with different methods of data encryption.

Guest WLAN

Guest WLAN allows you to set up a wireless network where users can access to Internet via the WAH7608 (**Z**), but not other networks connected to the **Z**. In the following figure, a guest user can access the Internet from the guest wireless network **A** via **Z** but not the home or company network **N**.

Note: The home or company network **N** and Guest WLAN network are independent networks.

Figure 52   Guest Wireless LAN Network
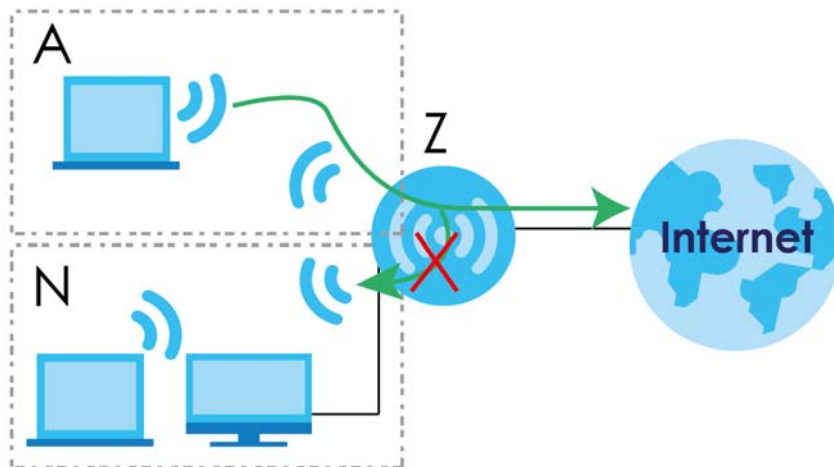
Finding Out More

See for advanced technical information on wireless networks.

12.2 The Basic Screen

Use this screen to enable the wireless LAN, enter the SSID and select the wireless security mode.

Note: If you are configuring the WAH7608 from a device connected to the wireless LAN and you change the WAH7608's SSID, channel or security settings, you will lose your wireless connection when you press **Apply** to confirm. You must then change the wireless settings of your device to match the WAH7608's new settings.

To access this screen, click **Configuration > WiFi > Basic**.

Figure 53 Configuration > WiFi > Basic

The following table describes the labels in this screen.

Table 27 Configuration > WiFi > Basic

LABEL	DESCRIPTION
Enable	Select the check box to enable the wireless LAN of the WAH7608.
Mode	Select the 802.11 mode from the following: • **802.11 B only**: to allow only IEEE 802.11b compliant WLAN devices to associate with the WAH7608. • **802.11 B/G mixed**: to allow either IEEE 802.11b or IEEE 802.11g compliant WLAN devices to associate with the WAH7608. The transmission rate of your WAH7608 might be reduced. • **802.11 B/G/N mixed**: allows IEEE802.11b, IEEE802.11g and IEEE802.11n compliant WLAN devices to associate with the WAH7608. The transmission rate of your WAH7608 might be reduced. • **802.11 G only**: to allow only IEEE 802.11g compliant WLAN devices to associate with the WAH7608. • **802.11 N only**: to allow only IEEE 802.11n compliant WLAN devices to associate with the WAH7608.
Channel	Set the channel depending on your particular region. Select a channel or use **Auto** to have the WAH7608 automatically determine a channel to use. If you are having problems with wireless interference, changing the channel may help. Try to use a channel that is as many channels away from any channels used by neighboring APs as possible. The channel number which the WAH7608 is currently using then displays next to this field.
WiFi Name (SSID)	The SSID (Service Set IDentity) identifies the service set with which a wireless device is associated. Wireless devices associating to the access point (AP) must have the same SSID. Enter a descriptive name for the wireless LAN.
Hide SSID	Select the check box to hide the SSID in the outgoing beacon frame so a station cannot obtain the SSID through scanning using a site survey tool.
Max Clients	Select a number to specify maximum client the Guest WiFi network can use. Click **Apply** to save your changes.

Table 27   Configuration > WiFi > Basic

LABEL	DESCRIPTION
Encryption Type	Select **None**, or **WPA Personal** to add security on this wireless network. The wireless clients which want to associate to this network must have same wireless security settings as the WAH7608. When you select to use a security, additional options appear in this screen. Or you can select **None** to allow any client to associate this network without any data encryption or authentication.
WPA Mode	This field appears when you select **WPA Personal** in the **Encryption Type** field. Select **Auto** to allow wireless devices that support either WPA or WPA2 to connect to your WAH7608's wireless network. Select **WPA2** to allow only wireless devices that support WPA2 to connect to your WAH7608's wireless network.
Cipher Type	Select the encryption type (**AES**, **TKIP** or **TKIP and AES**) for data encryption. Select **AES** if your wireless clients can all use **AES-CCMP**. Select **TKIP** if your wireless clients can all use **TKIP**. Select **TKIP and AES** to allow the wireless clients to use either **TKIP** or **AES**.
Key	Enter the key used for authentication the wireless clients must use to connect to the WAH7608.
Apply	Click **Apply** to save your changes back to the WAH7608.

12.3 The WPS Screen

Use this screen to configure WiFi Protected Setup (WPS) on your WAH7608.

WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Set up each WPS connection between two devices. Both devices must support WPS. See Section 12.5.5.3 on page 101 for more information about WPS.

Note: To use the WPS feature, make sure you have wireless enabled in the **Configuration > WiFi > WPS** screen.

Note: If you want to use the WPS feature set the security type to **WPA** or **None**.

Click **Configuration > WiFi > WPS**. The following screen displays.

Figure 54   Configuration > WiFi > WPS

The following table describes the labels in this screen.

Table 28   Configuration > WiFi > WPS

LABEL	DESCRIPTION
Enable	Select the check box to activate WPS on the WAH7608.
Configure Method	• Select **PBC** to set up a WPS wireless network using Push Button Configuration (PBC). If you select **PBC**, press the physical WPS button on the WAH7608 to add another WPS-enabled wireless device (within wireless range of the WAH7608) to your wireless network. Note: You must press the other wireless device's WPS button within two minutes of pressing this button. • Select **PIN** to set up a WPS wireless network by entering the PIN of the client into the WAH7608.
Enrollee PIN	This field is available only when you set **Configure Method** to **PIN**. Select this option and enter the PIN of the device that you are setting up a WPS connection with and click **Apply** to authenticate and add the wireless device to your wireless network. You can find the PIN either on the outside of the device, or by checking the device's settings. Note: You must also activate WPS on that device within two minutes to have it present its PIN to the WAH7608.

12.4 The MAC Filter Screen

This screen allows you to configure the WAH7608 to exclude specific devices from accessing the WAH7608 (**Deny listed stations**). Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02. You need to know the MAC addresses of the devices to configure this screen.

Use this screen to view your WAH7608's MAC filter settings and add new MAC filter rules. Click **Configuration > WiFi > MAC Filter**. The screen appears as shown.

Figure 55   Configuration > WiFi > MAC Filter

The following table describes the labels in this screen.

Table 29   WiFi > MAC Filter

LABEL	DESCRIPTION
MAC Address Filter Mode	Define the filter action for the list of MAC addresses in the MAC Filter table. Select **Allow listed stations** to permit access to the WAH7608, MAC addresses not listed will be denied access to the WAH7608. Select **Deny listed stations** to block access to the LTE Device, MAC addresses not listed will be allowed to access the WAH7608. Select **Disable** to turn MAC filtering off on the WAH7608.
#	This field displays the index number of the MAC address entry.
Active	Select the check box to activate so the MAC Filter applies to this wireless device.
Name	Enter a descriptive name for the wireless device that are allowed or denied access to the WAH7608.
MAC Address	This field displays the MAC addresses of the wireless devices that are allowed or denied access to the WAH7608. Click **Add** to enter or change the MAC address of the wireless devices that are allowed or denied access to the WAH7608 in this field. Enter the MAC addresses in a valid MAC address format, that is, six hexadecimal character pairs, for example, 12:34:56:78:9a:bc.
Delete	Click **Delete** to remove the MAC address entry.
Add	Click **Add** to create a new entry.
Delete All	Click **Delete All** to remove all entries.
Apply	Click **Apply** to save your changes back to the WAH7608.

12.5 Technical Reference

This section discusses wireless LANs in depth.

12.5.1 Wireless Network Overview

Wireless networks consist of wireless clients, access points and bridges.

- A wireless client is a radio connected to a user's computer.

- An access point is a radio with a wired connection to a network, which can connect with numerous wireless clients and let them access the network.

- A bridge is a radio that relays communications between access points and wireless clients, extending a network's range.

Traditionally, a wireless network operates in one of two ways.

- An "infrastructure" type of network has one or more access points and one or more wireless clients. The wireless clients connect to the access points.

- An "ad-hoc" type of network is one in which there is no access point. Wireless clients connect to one another in order to exchange information.

The following figure provides an example of a wireless network.

Figure 56   Example of a Wireless Network
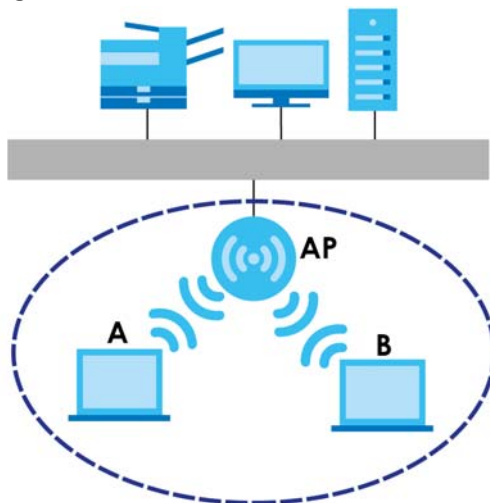
The wireless network is the part in the blue circle. In this wireless network, devices **A** and **B** use the access point (**AP**) to interact with the other devices (such as the printer) or with the Internet. Your WAH7608 is the AP.

Every wireless network must follow these basic guidelines.

- Every device in the same wireless network must use the same SSID.

    The SSID is the name of the wireless network. It stands for Service Set IDentifier.

- If two wireless networks overlap, they should use a different channel.

    Like radio stations or television channels, each wireless network uses a specific channel, or frequency, to send and receive information.

- Every device in the same wireless network must use security compatible with the AP.

    Security stops unauthorized devices from using the wireless network. It can also protect the information that is sent in the wireless network.

Radio Channels

In the radio spectrum, there are certain frequency bands allocated for unlicensed, civilian use. For the purposes of wireless networking, these bands are divided into numerous channels. This allows a variety of networks to exist in the same place without interfering with one another. When you create a network, you must select a channel to use.

Since the available unlicensed spectrum varies from one country to another, the number of available channels also varies.

12.5.2 Additional Wireless Terms

The following table describes some wireless network terms and acronyms used in the WAH7608's Web Configurator.

Table 30   Additional Wireless Terms

TERM	DESCRIPTION
RTS/CTS Threshold	In a wireless network which covers a large area, wireless devices are sometimes not aware of each other's presence. This may cause them to send information to the AP at the same time and result in information colliding and not getting through. By setting this value lower than the default value, the wireless devices must sometimes get permission to send information to the WAH7608. The lower the value, the more often the devices must get permission. If this value is greater than the fragmentation threshold value (see below), then wireless devices never have to get permission to send information to the WAH7608.
Preamble	A preamble affects the timing in your wireless network. There are two preamble modes: long and short. If a device uses a different preamble mode than the WAH7608 does, it cannot communicate with the WAH7608.
Authentication	The process of verifying whether a wireless device is allowed to use the wireless network.
Fragmentation Threshold	A small fragmentation threshold is recommended for busy networks, while a larger threshold provides faster performance if the network is not very busy.

12.5.3 Wireless Security Overview

By their nature, radio communications are simple to intercept. For wireless data networks, this means that anyone within range of a wireless network without security can not only read the data passing over the airwaves, but also join the network. Once an unauthorized person has access to the network, he or she can steal information or introduce malware (malicious software) intended to compromise the network. For these reasons, a variety of security systems have been developed to ensure that only authorized people can use a wireless data network, or understand the data carried on it.

These security standards do two things. First, they authenticate. This means that only people presenting the right credentials (often a username and password, or a "key" phrase) can access the network. Second, they encrypt. This means that the information sent over the air is encoded. Only people with the code key can understand the information, and only people who have been authenticated are given the code key.

These security standards vary in effectiveness. Some can be broken, such as the old Wired Equivalent Protocol (WEP). Using WEP is better than using no security at all, but it will not keep a determined attacker out. Other security standards are secure in themselves but can be broken if a user does not use them properly. For example, the WPA-PSK security standard is very secure if you use a long key which is difficult for an attacker's software to guess - for example, a twenty-letter long string of apparently random numbers and letters - but it is not very secure if you use a short key which is very easy to guess - for example, a three-letter word from the dictionary.

Because of the damage that can be done by a malicious attacker, it's not just people who have sensitive information on their network who should use security. Everybody who uses any wireless network should ensure that effective security is in place.

A good way to come up with effective security keys, passwords and so on is to use obscure information that you personally will easily remember, and to enter it in a way that appears random and does not include real words. For example, if your mother owns a 1970 Dodge Challenger and her favorite movie is

Vanishing Point (which you know was made in 1971) you could use "70dodchal71vanpoi" as your security key.

The following sections introduce different types of wireless security you can set up in the wireless network.

12.5.3.1 SSID

Normally, the WAH7608 acts like a beacon and regularly broadcasts the SSID in the area. You can hide the SSID instead, in which case the WAH7608 does not broadcast the SSID. In addition, you should change the default SSID to something that is difficult to guess.

This type of security is fairly weak, however, because there are ways for unauthorized wireless devices to get the SSID. In addition, unauthorized wireless devices can still see the information that is sent in the wireless network.

12.5.3.2 MAC Address Filter

Every device that can use a wireless network has a unique identification number, called a MAC address.[1] A MAC address is usually written using twelve hexadecimal characters[2]; for example, 00A0C5000002 or 00:A0:C5:00:00:02. To get the MAC address for each device in the wireless network, see the device's User's Guide or other documentation.

You can use the MAC address filter to tell the WAH7608 which devices are allowed or not allowed to use the wireless network. If a device is allowed to use the wireless network, it still has to have the correct information (SSID, channel, and security). If a device is not allowed to use the wireless network, it does not matter if it has the correct information.

This type of security does not protect the information that is sent in the wireless network. Furthermore, there are ways for unauthorized wireless devices to get the MAC address of an authorized device. Then, they can use that MAC address to use the wireless network.

12.5.3.3 User Authentication

Authentication is the process of verifying whether a wireless device is allowed to use the wireless network. You can make every user log in to the wireless network before using it. However, every device in the wireless network has to support IEEE 802.1x to do this.

For wireless networks, you can store the user names and passwords for each user in a RADIUS server. This is a server used in businesses more than in homes. If you do not have a RADIUS server, you cannot set up user names and passwords for your users.

Unauthorized wireless devices can still see the information that is sent in the wireless network, even if they cannot use the wireless network. Furthermore, there are ways for unauthorized wireless users to get a valid user name and password. Then, they can use that user name and password to use the wireless network.

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1.   Some wireless devices, such as scanners, can detect wireless networks but cannot use wireless networks. These kinds of wireless devices might not have MAC addresses.
2.   Hexadecimal characters are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F.

12.5.3.4 Encryption

Wireless networks can use encryption to protect the information that is sent in the wireless network. Encryption is like a secret code. If you do not know the secret code, you cannot understand the message.

The types of encryption you can choose depend on the type of authentication. (See Section 12.5.3.3 on page 97 for information about this.)

Table 31   Types of Encryption for Each Type of Authentication

	NO AUTHENTICATION	RADIUS SERVER
Weakest	No Security	WPA
	Static WEP	
	WPA-PSK	
Strongest	WPA2-PSK	WPA2

For example, if the wireless network has a RADIUS server, you can choose **WPA** or **WPA2**. If users do not log in to the wireless network, you can choose no encryption, **Static WEP**, **WPA-PSK**, or **WPA2-PSK**.

Usually, you should set up the strongest encryption that every device in the wireless network supports. For example, suppose you have a wireless network with the WAH7608 and you do not have a RADIUS server. Therefore, there is no authentication. Suppose the wireless network has two devices. Device A only supports WEP, and device B supports WEP and WPA. Therefore, you should set up **Static WEP** in the wireless network.

Note: It is recommended that wireless networks use **WPA-PSK**, **WPA**, or stronger encryption. The other types of encryption are better than none at all, but it is still possible for unauthorized wireless devices to figure out the original information pretty quickly.

When you select **WPA2** or **WPA2-PSK** in your WAH7608, you can also select an option (**WPA compatible**) to support WPA as well. In this case, if some of the devices support WPA and some support WPA2, you should set up **WPA2-PSK** or **WPA2** (depending on the type of wireless network login) and select the **WPA compatible** option in the WAH7608.

Many types of encryption use a key to protect the information in the wireless network. The longer the key, the stronger the encryption. Every device in the wireless network must have the same key.

12.5.4 Signal Problems

Because wireless networks are radio networks, their signals are subject to limitations of distance, interference and absorption.

Problems with distance occur when the two radios are too far apart. Problems with interference occur when other radio waves interrupt the data signal. Interference may come from other radio transmissions, such as military or air traffic control communications, or from machines that are coincidental emitters such as electric motors or microwaves. Problems with absorption occur when physical objects (such as thick walls) are between the two radios, muffling the signal.

12.5.5 WiFi Protected Setup (WPS)

Your WAH7608 supports WiFi Protected Setup (WPS), which is an easy way to set up a secure wireless network. WPS is an industry standard specification, defined by the WiFi Alliance.

WPS allows you to quickly set up a wireless network with strong security, without having to configure security settings manually. Each WPS connection works between two devices. Both devices must support WPS (check each device's documentation to make sure).

Depending on the devices you have, you can either press a button (on the device itself, or in its configuration utility) or enter a PIN (a unique Personal Identification Number that allows one device to authenticate the other) in each of the two devices. When WPS is activated on a device, it has two minutes to find another device that also has WPS activated. Then, the two devices connect and set up a secure network by themselves.

12.5.5.1 Push Button Configuration

WPS Push Button Configuration (PBC) is initiated by pressing a button on each WPS-enabled device, and allowing them to connect automatically. You do not need to enter any information.

Not every WPS-enabled device has a physical WPS button. Some may have a WPS PBC button in their configuration utilities instead of or in addition to the physical button.

Take the following steps to set up WPS using the button.

1   Ensure that the two devices you want to set up are within wireless range of one another.

2   Look for a WPS button on each device. If the device does not have one, log into its configuration utility and locate the button (see the device's User's Guide for how to do this - for the WAH7608, see Section 12.5 on page 94).

3   Press the button on one of the devices (it doesn't matter which). For the WAH7608 you must press the WPS button for more than three seconds.

4   Within two minutes, press the button on the other device. The registrar sends the network name (SSID) and security key through an secure connection to the enrollee.

If you need to make sure that WPS worked, check the list of associated wireless clients in the AP's configuration utility. If you see the wireless client in the list, WPS was successful.

12.5.5.2 PIN Configuration

Each WPS-enabled device has its own PIN (Personal Identification Number). This may either be static (it cannot be changed) or dynamic (in some devices you can generate a new PIN by clicking on a button in the configuration interface).

Use the PIN method instead of the push-button configuration (PBC) method if you want to ensure that the connection is established between the devices you specify, not just the first two devices to activate WPS in range of each other. However, you need to log into the configuration interfaces of both devices to use the PIN method.

When you use the PIN method, you must enter the PIN from one device (usually the wireless client) into the second device (usually the Access Point or wireless router). Then, when WPS is activated on the first

device, it presents its PIN to the second device. If the PIN matches, one device sends the network and security information to the other, allowing it to join the network.

Take the following steps to set up a WPS connection between an access point or wireless router (referred to here as the AP) and a client device using the PIN method.

1 Ensure WPS is enabled on both devices.

2 Access the WPS section of the AP's configuration interface. See the device's User's Guide for how to do this.

3 Look for the client's WPS PIN; it will be displayed either on the device, or in the WPS section of the client's configuration interface (see the device's User's Guide for how to find the WPS PIN - for the WAH7608, see Section 12.5 on page 94).

4 Enter the client's PIN in the AP's configuration interface.

5 If the client device's configuration interface has an area for entering another device's PIN, you can either enter the client's PIN in the AP, or enter the AP's PIN in the client - it does not matter which.

6 Start WPS on both devices within two minutes.

7 Use the configuration utility to activate WPS, not the push-button on the device itself.

8 On a computer connected to the wireless client, try to connect to the Internet. If you can connect, WPS was successful.

If you cannot connect, check the list of associated wireless clients in the AP's configuration utility. If you see the wireless client in the list, WPS was successful.

The following figure shows you how to set up a wireless network and its security on a WAH7608 and a wireless client (android 4.4.2 smartphone) by using PIN method.

Figure 57   Example WPS Process: PIN Method
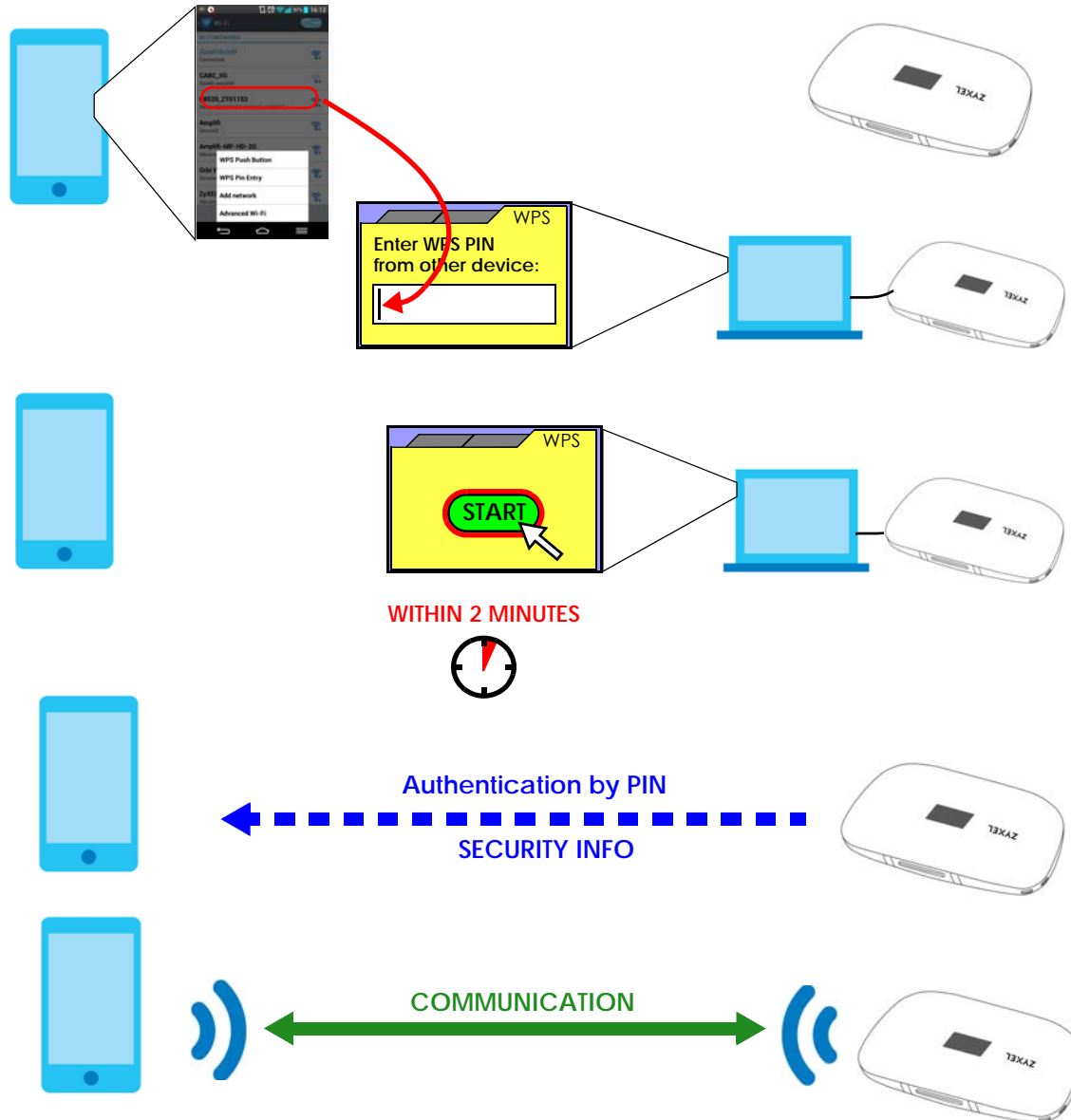
12.5.5.3 How WPS Works

When two WPS-enabled devices connect, each device must assume a specific role. One device acts as the registrar (the device that supplies network and security settings) and the other device acts as the enrollee (the device that receives network and security settings. The registrar creates a secure EAP (Extensible Authentication Protocol) tunnel and sends the network name (SSID) and the WPA-PSK or WPA2-PSK pre-shared key to the enrollee. Whether WPA-PSK or WPA2-PSK is used depends on the standards supported by the devices. If the registrar is already part of a network, it sends the existing information. If not, it generates the SSID and WPA(2)-PSK randomly.

The following figure shows a WPS-enabled client (installed in a notebook computer) connecting to a WPS-enabled access point.

Figure 58 How WPS works
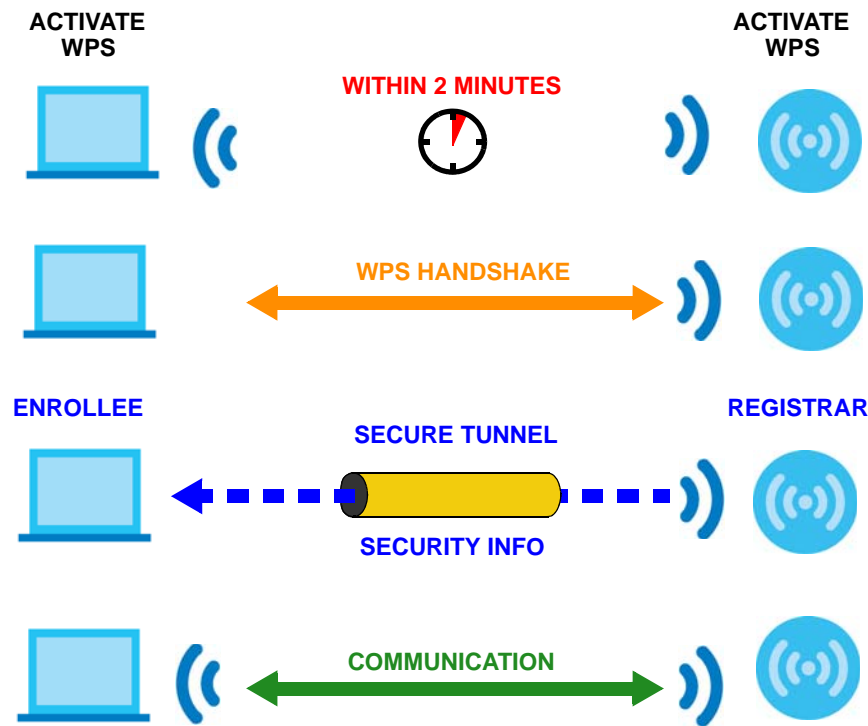
The roles of registrar and enrollee last only as long as the WPS setup process is active (two minutes). The next time you use WPS, a different device can be the registrar if necessary.

The WPS connection process is like a handshake; only two devices participate in each WPS transaction. If you want to add more devices you should repeat the process with one of the existing networked devices and the new device.

Note that the access point (AP) is not always the registrar, and the wireless client is not always the enrollee. All WPS-certified APs can be a registrar, and so can some WPS-enabled wireless clients.

By default, a WPS devices is "unconfigured". This means that it is not part of an existing network and can act as either enrollee or registrar (if it supports both functions). If the registrar is unconfigured, the security settings it transmits to the enrollee are randomly-generated. Once a WPS-enabled device has connected to another device using WPS, it becomes "configured". A configured wireless client can still act as enrollee or registrar in subsequent WPS connections, but a configured access point can no longer act as enrollee. It will be the registrar in all subsequent WPS connections in which it is involved. If you want a configured AP to act as an enrollee, you must reset it to its factory defaults.

12.5.5.4 Example WPS Network Setup

This section shows how security settings are distributed in an example WPS setup.

The following figure shows an example network. In step **1**, both **AP1** and **Client 1** are unconfigured. When WPS is activated on both, they perform the handshake. In this example, **AP1** is the registrar, and **Client 1** is the enrollee. The registrar randomly generates the security information to set up the network, since it is unconfigured and has no existing information.

Figure 59 WPS: Example Network Step 1

ENROLLEE

REGISTRAR

SECURITY INFO

CLIENT 1

AP1
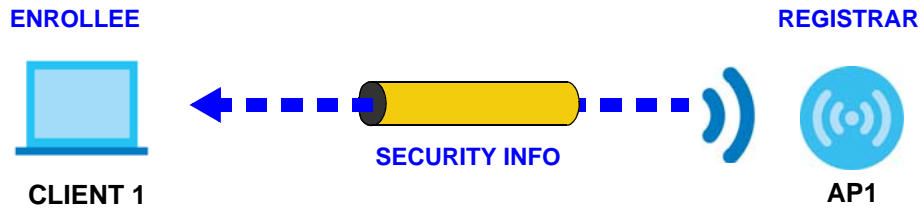
In step **2**, you add another wireless client to the network. You know that **Client 1** supports registrar mode, but it is better to use **AP1** for the WPS handshake with the new client since you must connect to the access point anyway in order to use the network. In this case, **AP1** must be the registrar, since it is configured (it already has security information for the network). **AP1** supplies the existing security information to **Client 2**.

Figure 60 WPS: Example Network Step 2

REGISTRAR

EXISTING CONNECTION

CLIENT 1

AP1

ENROLLEE

SECURITY INFO
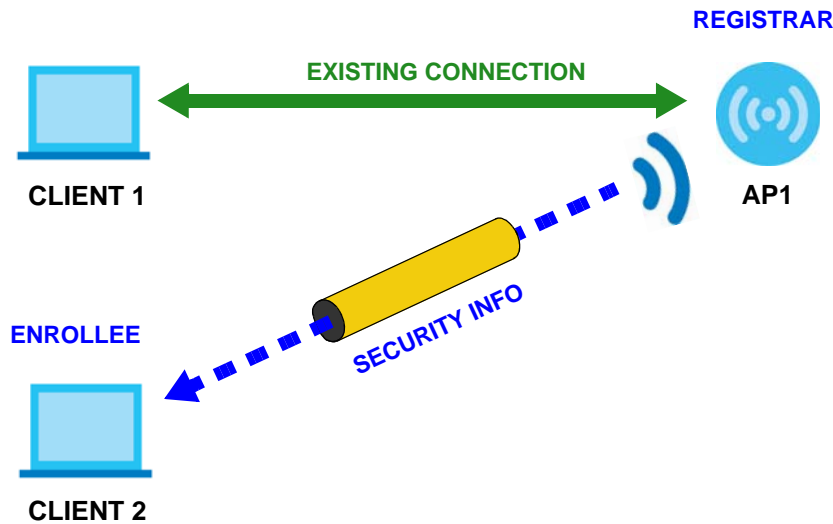
CLIENT 2

In step 3, you add another access point (**AP2**) to your network. **AP2** is out of range of **AP1**, so you cannot use **AP1** for the WPS handshake with the new access point. However, you know that **Client 2** supports the registrar function, so you use it to perform the WPS handshake instead.

Figure 61   WPS: Example Network Step 3
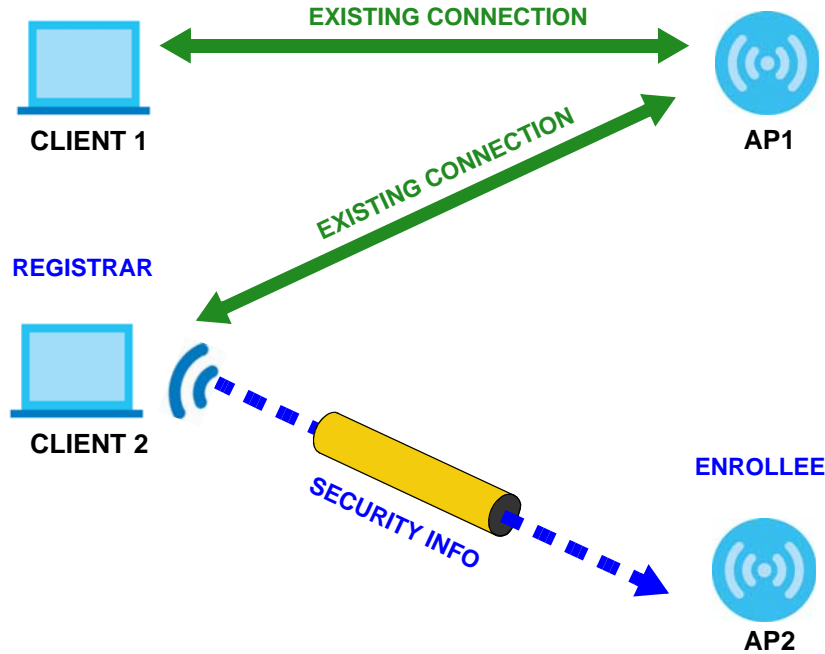
12.5.5.5 Limitations of WPS

WPS has some limitations of which you should be aware.

- WPS works in Infrastructure networks only (where an AP and a wireless client communicate). It does not work in Ad-Hoc networks (where there is no AP).

- When you use WPS, it works between two devices only. You cannot enroll multiple devices simultaneously, you must enroll one after the other.

  For instance, if you have two enrollees and one registrar you must set up the first enrollee (by pressing the WPS button on the registrar and the first enrollee, for example), then check that it successfully enrolled, then set up the second device in the same way.

- WPS works only with other WPS-enabled devices. However, you can still add non-WPS devices to a network you already set up using WPS.

  WPS works by automatically issuing a randomly-generated WPA-PSK or WPA2-PSK pre-shared key from the registrar device to the enrollee devices. Whether the network uses WPA-PSK or WPA2-PSK depends on the device. You can check the configuration interface of the registrar device to discover the key the network is using (if the device supports this feature). Then, you can enter the key into the non-WPS device and join the network as normal (the non-WPS device must also support WPA-PSK or WPA2-PSK).

- When you use the PBC method, there is a short period (from the moment you press the button on one device to the moment you press the button on the other device) when any WPS-enabled device could join the network. This is because the registrar has no way of identifying the "correct" enrollee, and cannot differentiate between your enrollee and a rogue device. This is a possible way for a hacker to gain access to a network.

  You can easily check to see if this has happened. WPS works between only two devices simultaneously, so if another device has enrolled your device will be unable to enroll, and will not have access to the network. If this happens, open the access point's configuration interface and look at the list of associated clients (usually displayed by MAC address). It does not matter if the access

point is the WPS registrar, the enrollee, or was not involved in the WPS handshake; a rogue device must still associate with the access point to gain access to the network. Check the MAC addresses of your wireless clients (usually printed on a label on the bottom of the device). If there is an unknown MAC address you can remove it or reset the AP.

CHAPTER 13
SMS

13.1 Overview

This chapter shows you how view the text messages.

SMS (Short Message Service) allows you to send and view the text messages that the WAH7608 received from mobile devices or the service provider.

When the SMS box is full the WAH7608 will begin to delete older entries as it adds new ones.

13.1.1 What You Can Do in this Chapter
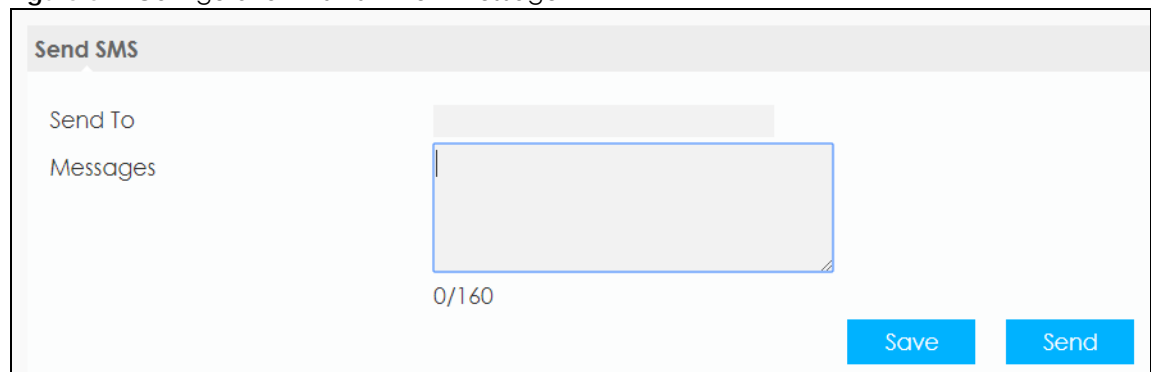
- Use the **New Message** screen to send new messages (Section 13.2 on page 106).
- Use the **USSD** screen to enter the USSD code for your WAH7608 (Section 13.3 on page 107).
- Use the **Inbox** screen to view messages received on the WAH7608 (Section 13.4 on page 107).
- Use the **Outbox** screen to view messages sent from the WAH7608 (Section 13.5 on page 108).
- Use the **Draftbox** screen to view messages not yet sent from the WAH7608 (Section 13.6 on page 109).
- Use the **Settings SMS** screen to set SMSC address and storage location (Section 13.7 on page 110).

13.2 The New Message Screen

Use this screen to send messages using the WAH7608. To access this screen, click **Configuration > SMS > New Message**.

Type a phone number in the **Send to** field and enter the message content in **Messages**. You can type up to 160 characters in one message. If the message exceeds 160 characters, more than one SMS will be sent. Click **Send** to send the message. Click **Save** to store the message as a draft.

Figure 62 Configuration > SMS > New Message
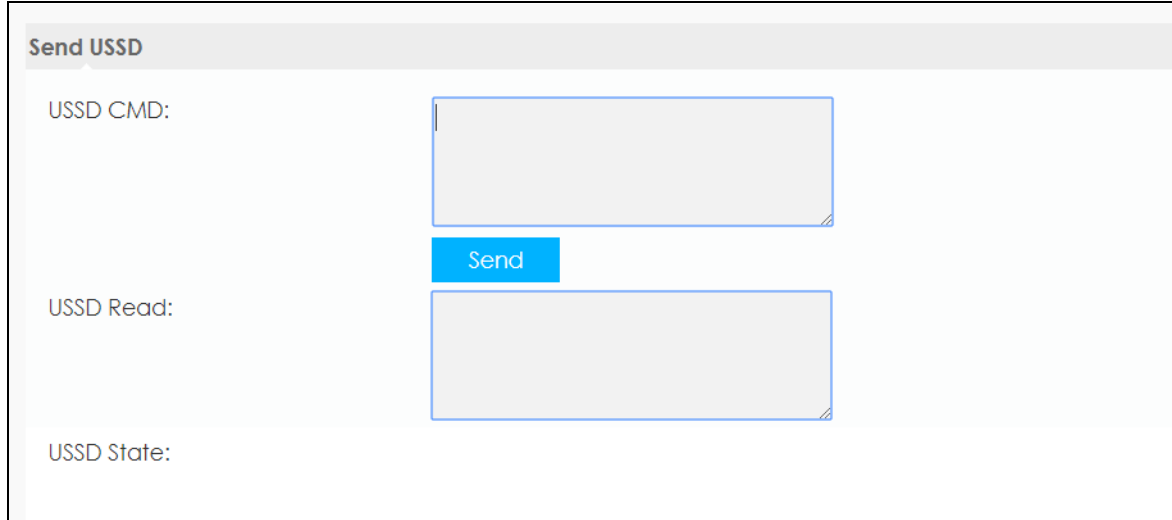
13.3 The USSD Screen

Use this screen to enter an Unstructured Supplementary Service Data (USSD) code. The WAH7608 sends this code to request different services or features to the Internet service provider. Click **Configuration > SMS > USSD**. Enter the code and click **Send**.

Figure 63   Configuration > SMS > USSD

Send USSD

USSD CMD:

Send

USSD Read:

USSD State:

13.4 The Inbox Screen

Use this screen to view messages received by the WAH7608. To access this screen, click **Configuration > SMS > Inbox**.

Click the **Local** tab to view the inbox messages stored in the WAH7608. Click the **SIM Card** tab to view the inbox messages stored in the SIM card. You can store an approximate total of 254 Messages, this includes inbox, outbox, and draftbox altogether. Once you have reached your storage limit the Message icon begins blinking in the WAH7608 OLED display, and a pop-up message will appear in the Web Configurator. If previous messages are not deleted new ones will not be stored in the WAH7608 or SIM card.

Figure 64 Configuration > SMS > Inbox

The following table describes the labels in this screen.

Table 32   Configuration > SMS > Inbox

LABEL	DESCRIPTION
Number	This field displays the name from which the message is sent.
Message	This field displays the content of the message.
Date/Time	This field displays the date and time the message was received.
Delete	Click Delete icon to remove the message record.
Reply	Click the blue envelope icon to reply to a message. You can also click on a message and press the **Reply** button in the message-window.
Forward	Click the green envelope icon to forward to a message. You can also click on a message and press the **Forward** button in the message-window.
Delete All	Click **Delete All** to remove all messages.

13.5 The Outbox Screen

Use this screen to view messages sent from the WAH7608. To access this screen, click **Configuration > SMS > Outbox**.

Click the **Local** tab to view the inbox messages stored in the WAH7608. Click the **SIM Card** tab to view the inbox messages stored in the SIM card. You can store an approximate total of 254 Messages, this includes inbox, outbox, and draftbox altogether. Once you have reached your storage limit the Message icon begins blinking in the WAH7608 OLED display, and a pop-up message will appear in the

Web Configurator. If previous messages are not deleted new ones will not be stored in the WAH7608 or SIM card.

Figure 65   Configuration > SMS > Outbox

The following table describes the labels in this screen.

Table 33   Configuration > SMS > Outbox

LABEL	DESCRIPTION
Delete All	Click **Delete All** to remove all messages.
Number	This field displays the name the message is sent to.
Message	This field displays the content of the message.
Date/Time	This field displays the date and time the message was sent.
Delete	Click Delete icon to remove the message record.
Delete All	Click **Delete All** to remove all messages.

13.6 The Draftbox Screen

Use this screen to view messages not yet sent from the WAH7608. To access this screen, To access this screen, click **Configuration > SMS > Draftbox**.

Click the **Local** tab to view the inbox messages stored in the WAH7608. Click the **SIM Card** tab to view the inbox messages stored in the SIM card. You can store an approximate total of 254 Messages, this includes inbox, outbox, and draftbox altogether. Once you have reached your storage limit the Message icon begins blinking in the WAH7608 OLED display, and a pop-up message will appear in the Web Configurator. If previous messages are not deleted new ones will not be stored in the WAH7608 or SIM card.

Figure 66 Configuration > SMS > Draftbox

The following table describes the labels in this screen.

Table 34 Configuration > SMS > Draftbox

LABEL	DESCRIPTION
Number	This field displays the name the message is sent to.
Message	This field displays the content of the message.
Date/Time	This field displays the date and time the message was sent.
Delete	Click Delete icon to remove the message record.
Send	Click Send icon to deliver the message.
Delete All	Click **Delete All** to remove all messages.

13.7 The Setting SMS Screens

Use these screens to configure the WAH7608 SMS settings.

13.7.1 Set SMSC
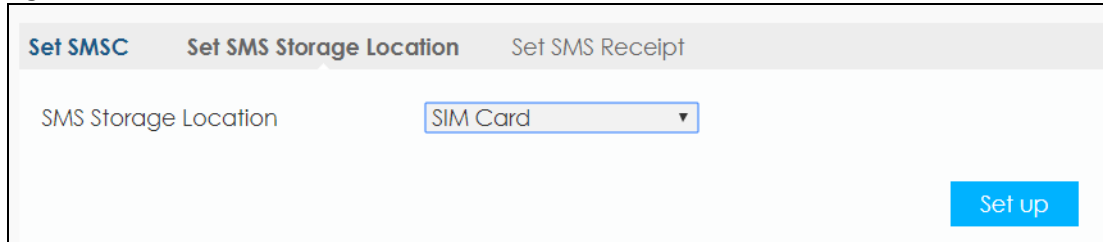
Click **Configuration > SMS > Settings SMS > Set SMSC** to open the following screen. Use this screen to enter the SMSC (Short Message Service Center) address, click **Set Up** to apply your changes.

Figure 67 Configuration > SMS > Settings SMS

13.7.2 Set SMS Storage Location

Click **Configuration > SMS > Settings SMS > Set SMS Storage Location** to open the following screen. Use this screen select define the SMS storage location. Select **Local** to store SMS in the WAH7608 internal memory. Select **SIM Card** to store SMS in the inserted SIM card. Click **Set up** to apply your changes.
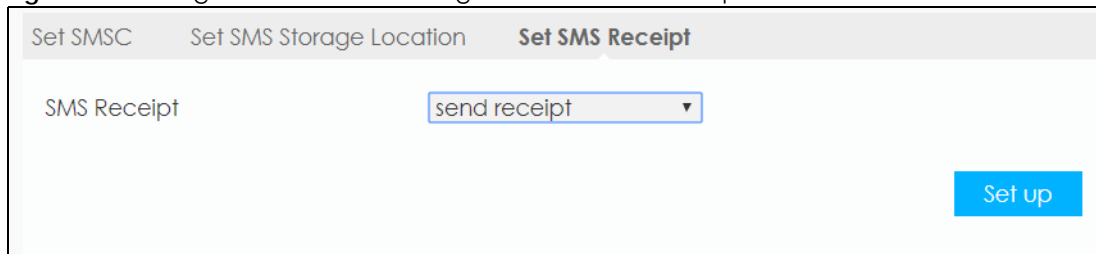
Figure 68 Configuration > SMS > Settings SMS > Set SMS Storage Location

Set SMSC	Set SMS Storage Location	Set SMS Receipt
SMS Storage Location	SIM Card ▾	
		Set up

13.7.3 Set SMS Receipt

Click **Configuration > SMS > Settings SMS > Set SMS Receipt** to open the following screen. Use this screen configure SMS receipts. Select **send receipt** to receive one after every message sent on the WAH7608. Otherwise, select **not send receipts**. Click **Set up** to apply your changes.

Figure 69 Configuration > SMS > Settings SMS > Set SMS Receipt

Set SMSC	Set SMS Storage Location	Set SMS Receipt
SMS Receipt	send receipt ▾	
		Set up

14.1 Overview

Use the system screens to configure general WAH7608 settings.

14.1.1 What You Can Do in this Chapter

- Use the **About** screen to view basic information about the WAH7608 and restart the WAH7608 (Section 14.2 on page 112).
- Use the **Firmware Upgrade** screen to upload new firmware to your WAH7608 (Section 14.3 on page 113).
- Use the **Password** screen to change the WAH7608's system password (Section 14.4 on page 114).
- Use the **Password** > **Session Timeout** screen to configure the web configurator's inactive time (Section 14.5 on page 114).
- Use the **Language** screen to change the language of the web configurator (Section 14.6 on page 115).
- Use the **Date and Time** screen to change the WAH7608's time and date and configure daylight saving time (Section 14.7 on page 115).
- Use the **Power Saving** screen to enable the power saving settings in the WAH7608 (Section 14.8 on page 117).
- Use the **Power Saving** > **OLED Display** screen to configure the OLED display screen time before it turns off (Section 14.9 on page 118).
- Use the **Reset** screen to reset your device settings back to the factory default (Section 14.10 on page 118).
- Use the **Reboot** screen to restart your WAH7608 (Section 14.11 on page 118).

14.2 The About Screen

Use this screen to view basic information about the WAH7608. To access this screen, click **System** > **About**.

Figure 70 System > About

About	
Device Name:	WAH7608
FW Version:	V1.00(ABKW.0)B7
IMEI:	359094080000201
Serial Numbers:	S175335000020

The following table describes the labels in this screen.

Table 35   System > About

LABEL	DESCRIPTION
Device Name	This displays the model name of this Zyxel device.
FW Version	This displays the current firmware version of the WAH7608.
IMEI	This displays the International Mobile Equipment Number (IMEI) which is the serial number of the built-in 3G module. IMEI is a unique 15-digit number used to identify a mobile device.
Serial Number	This displays the serial number of the WAH7608.
Reboot Device	Click **Reboot** to restart the device. Wait a few minutes until the login screen appears. If the login screen does not appear, type the IP address of the device in your Web browser.

14.3 The Firmware Upgrade Screen

This screen allows you to upload new firmware to your WAH7608. You can download new firmware releases from your nearest Zyxel FTP site (or www.zyxel.com) to use to upgrade your device's performance.

Only use firmware for your device's specific model.

To access this screen, click **System > Setting > Firmware Upgrade**. This screen displays the current firmware version and status of the WAH7608. Click **Choose File** to find the location of the file. Remember that you must decompress compressed (.ZIP) files before you can upload them. Click **Update** to begin the upload process.

The upload process uses HTTP (Hypertext Transfer Protocol) and may take up to two minutes. After a successful upload, the system will reboot.

Do NOT turn off the WAH7608 while firmware upload is in progress!

Figure 71 System > Setting > Firmware Upgrade

Firmware Upgrade	
File name	Choose File No file chosen
Status:	Ready
	Update

14.4 The Password Screen

This screen allows you to change the WAH7608's system password. It is strongly recommended that you change your WAH7608's system password. To access this screen, click **System > Setting > Password**.

Figure 72 System > Setting > Password

Password Session Timeout	
Current password	
New password	
Reenter New password	
	Apply
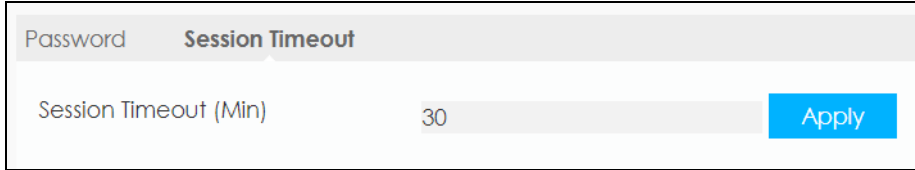
The following table describes the labels in this screen.

Table 36 System > Setting > Password

LABEL	DESCRIPTION
Current Password	Type the password you are currently using to log into the WAH7608 web configurator.
Password	Type your new system password of between 4 and 24 characters. Note that as you type a password, the screen displays as dot (.) for each character you type.
Reenter New Password	Type the new password again in this field.
Apply	Click **Apply** to save your changes back to the WAH7608.
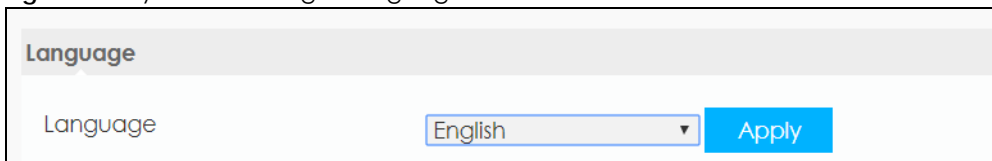
14.5 The Session Timeout Screen

To access this screen, click **System > Setting > Password > Session Timeout**. Use this screen to configure the length of inactive time before the WAH7608 automatically logs a user out of the web configurator. Enter the time in the **Session Timeout (Min)** field, then click **Apply** to save your changes.

Figure 73   System > Setting > Password > Session Timeout

Password	**Session Timeout**		
Session Timeout (Min)	30		Apply

14.6 The Language Screen

To access this screen, click **System > Setting > Language**. Use this screen to select a display language for the WAH7608 web configurator. Select a **Language** and click **Apply** to save your changes.

Figure 74   System > Setting > Language

Language		
Language	English ▼	Apply

14.7 The Date and Time Screen

For effective scheduling and logging, the WAH7608 system time must be accurate. The WAH7608 has a software mechanism to get the current time and date from an external server. To change your WAH7608's time zone, click **System > Setting > Date and Time**. The screen displays as shown. You can have the WAH7608 get the date and time from a time server or change the IP address or URL of your time server.

Figure 75   System > Setting > Date and Time

Basic					
Current System Time	2017/10/19 14:59:04		Sync with host		
Time Zone	(GMT+08:00) Be ▼				
Enable Daylight Saving	☐				
Start Date	First ▼	Sunday ▼	of		
	April ▼	at 2	o'clock		
End Date	Last ▼	Sunday ▼	of		
	October ▼	at 2	o'clock		
Time Server Address 1	1.my.pool.ntp.org				
Time Server Address 2	2.my.pool.ntp.org				
Time Server Address 3	3.my.pool.ntp.org				
				Apply	

The following table describes the labels in this screen.

Table 37   System > Setting > Date and Time

LABEL	DESCRIPTION
Current System Time	This field displays the present time and date of your WAH7608.
	Click **Sync with host** so the WAH7608 synchronizes its time with the time of the device currently connected to the web configurator.
Time Zone	Choose the time zone of your location. This will set the time difference between your time zone and Greenwich Mean Time (GMT).
Enable Daylight Saving	Daylight Saving Time is a period from late spring to early fall when many countries set their clocks ahead of normal local time by one hour to give more daytime light in the evening.
	Click the check box if you use Daylight Saving Time.
Start Date	Configure the day and time when Daylight Saving Time starts if you enabled Daylight Saving. You can select a specific date in a particular month or a specific day of a specific week in a particular month. Here are a couple of examples:
	Daylight Saving Time starts in most parts of the United States on the second Sunday of March. Each time zone in the United States starts using Daylight Saving Time at 2 A.M. local time. So in the United States, set the day to Second, Sunday, the month to March and the time to 2 in the hour field.
	Daylight Saving Time starts in the European Union on the last Sunday of March. All of the time zones in the European Union start using Daylight Saving Time at the same moment (1 A.M. GMT or UTC). So in the European Union you would set the day to Last, Sunday and the month to March. The time you select in the o'clock field depends on your time zone. In Germany for instance, you would select 2 in the hour field because Germany's time zone is one hour ahead of GMT or UTC (GMT+1).

Table 37   System > Setting > Date and Time

LABEL	DESCRIPTION
End Date	Configure the day and time when Daylight Saving Time ends if you enabled Daylight Saving. You can select a specific date in a particular month or a specific day of a specific week in a particular month. Here are a couple of examples:
	Daylight Saving Time ends in the United States on the first Sunday of November. Each time zone in the United States stops using Daylight Saving Time at 2 A.M. local time. So in the United States you would set the day to First, Sunday, the month to November and the time to 2 in the hour field.
	Daylight Saving Time ends in the European Union on the last Sunday of October. All of the time zones in the European Union stop using Daylight Saving Time at the same moment (1 A.M. GMT or UTC). So in the European Union you would set the day to Last, Sunday, and the month to October. The time you select in the o'clock field depends on your time zone. In Germany for instance, you would select 2 in the hour field because Germany's time zone is one hour ahead of GMT or UTC (GMT+1).
Time Server Address 1~3	Enter the IP address or URL of your time server. Check with your ISP/network administrator if you are unsure of this information.
Apply	Click **Apply** to save your changes back to the WAH7608.

14.8 The Power Saving Screen

To access this screen, click **System > Setting > Power Saving**. Use this screen to enable and configure the power saving settings in the WAH7608.

Select the number of minutes after which the WAH7608 activates power saving and enters sleep mode. In **System will enter into sleep** the WAH7608 turns off its wireless connections to save battery power when the USB port is not connected, and there are no wireless clients associating with the WAH7608.

Select the number of minutes after which the WAH7608 enters deep sleep mode. In **System will enter into deep sleep** the WAH7608 turns off the mobile networks to save battery power when the USB port is not connected, and there are no wireless clients associating with the WAH7608.

Click **Apply** to save your changes.

Figure 76   System > Setting > Power Saving

14.9 The OLED Display Screen

To access this screen, click **System > Setting > Power Saving > OLED Display**. Select the number of minutes the WAH7608 waits before it turns off the OLED display screen. Click **Apply** to save your changes.

Figure 77   System > Setting > Power Saving > OLED Display

Power Saving	**OLED Display**	
Display Timeout	45	Seconds
		Apply
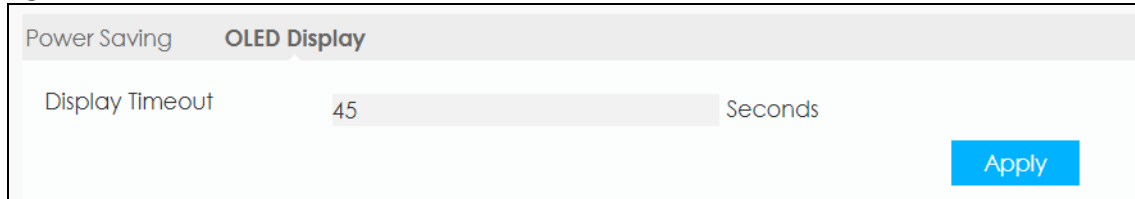
14.10 The Reset Screen

To access this screen, click **System > Setting > Reset**. The **Reset** screen allows you to reset your WAH7608 back to the factory default settings. When the **Status** field displays **Ready**, click **Reset**.

Figure 78   System > Setting > Reset

Reset to Default	
Status:	Ready
	Reset
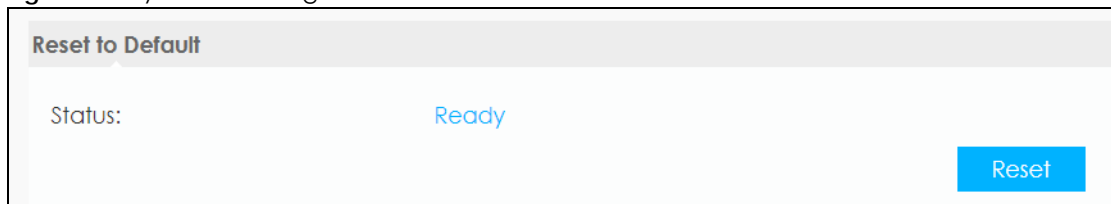
14.11 The Reboot Screen

Click **System > Setting> Reboot**, the following pop-up window appears. Use this screen to restart the WAH7608. System restart allows you to reboot the WAH7608 without turning the power off. Click **OK** to reboot the WAH7608. Wait a few minutes until the login screen appears. If the login screen does not appear, type the IP address of the WAH7608 in your Web browser.

Figure 79   System > Setting > Reboot

Do you want to reboot the device now ?

OK   Cancel
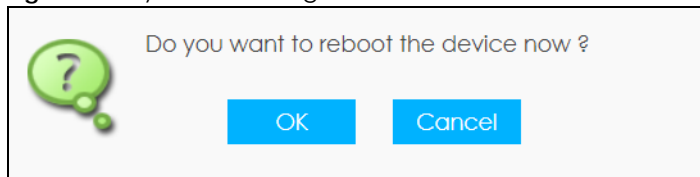
CHAPTER 15
Troubleshooting

15.1 Overview

Here are offers some suggestions to solve problems you might encounter. The potential problems are divided into the following categories.

- Power, and Hardware Installation
- WAH7608 Access and Login
- Internet Access
- WiFi Connections

15.2 Power, and Hardware Installation

The WAH7608 does not turn on. The OLED display is not on.

1 Make sure the WAH7608 is correctly installed (refer to your Quick Start Guide).

2 Make sure the battery is installed and charged. Press the power button to turn the WAH7608 on. See Section 1.6 on page 12.

3 If the problem continues, contact the vendor.

15.3 WAH7608 Access and Login

I forgot the IP address for the WAH7608.

1 The default IP address is 192.168.1.1.

2 If you changed the IP address and have forgotten it, you have to reset the device to its factory defaults. To reset your WAH7608 press the power button and release it when the OLED screen displays **Reset**.

I cannot see or access the **Login** screen in the web configurator.

1   Make sure you are using the correct IP address.

- The default IP address is 192.168.1.1.
- If you changed the IP address, use the new IP address.
- If you changed the IP address and have forgotten it, see the troubleshooting suggestions for I forgot the IP address for the WAH7608.

2   Make sure the WAH7608 is correctly installed and turned on. See the Quick Start Guide and Section 1.6 on page 12.

3   Make sure your Internet browser does not block pop-up windows and has JavaScripts and Java enabled.

4   Make sure your device is connected to the WAH7608 and is in the same subnet as the WAH7608.

5   Make sure the WAH7608's WiFi LAN is enabled. You can enable or disable the WAH7608's WiFi network by pushing on the WPS on the WAH7608 on the WAH7608. See Section 1.7 on page 12.

6   Reset the device to its factory defaults, and try to access the WAH7608 with the default IP address. To reset your WAH7608 press the power button and release it when the OLED screen displays **Reset**. See

7   Disconnect your device from the Internet (WiFi) and then connect to the WAH7608 once again.

8   If the problem continues, contact the vendor.

I forgot the password of the web configurator.

1   The default user name is **admin**. The default password is **1234**.

2   If this does not work, you have to reset the device to its factory defaults. To reset your WAH7608 press the power button and release it when the OLED screen displays **Reset**.

I can access the **Login** screen, but I cannot log in to the WAH7608.

1   Make sure you have entered the user name and password correctly. The default user name is **admin** and the default password is **1234**. These fields are case-sensitive, so make sure [Caps Lock] is not on.

2   This can happen when you fail to log out properly from your last session. Try logging in again after five minutes.

3   Disconnect and connect to the WAH7608 again.

4 If this does not work, you have to reset the device to its factory defaults. To reset your WAH7608 press the power button and release it when the OLED screen displays **Reset**.

15.4 Internet Access

I cannot access the Internet through a 2G/3G/4G wireless WAN connection.

1 Make sure you insert a 4G SIM card into the card slot before turning on the WAH7608.

2 If your SIM card has a PIN code, use LTE Ally or connect to the web configurator (http://192.168.1.1) using the user name (Default: **admin**) and password (Default: **1234**) to unlock your SIM card. When your SIM is locked the Unlock SIM card screen is one of the first screens that appears in LTE Ally.

3 Make sure your mobile access information (such as APN) is entered correctly. You can check this in LTE Ally or the web configurator (http://192.168.1.1). Using LTE Ally, tap on to the Settings icon and then on **APN Configuration**. The APN fields are case-sensitive, so make sure [Caps Lock] is not on. Check with your service provider for the correct APN if you don't have it.

4 Make sure your SIM card's account is valid and has an active data plan. Check your service contract or contact your service provider directly.

5 Make sure your data plan has not reached its limit.

6 If you are using a pre-paid SIM card, insert the SIM card on another mobile device to check if the SIM card still works. If the SIM card works without any problems on another mobile device, contact the vendor. Otherwise, contact your service provider.

7 Make sure you are in the ISP's coverage area.

8 If the problem continues, contact your ISP.

I cannot access the Internet anymore. I had access to the Internet (with the WAH7608), but my Internet connection is not available anymore.

1 Reboot the WAH7608.

2 Make sure the WAH7608's WiFi network is enabled. You can enable WAH7608's WiFi network by pushing the button WPS on the WAH7608 or using the Web Configurator.

3 Make sure your SIM card's mobile data is enabled. Check this on LTE Ally by tapping on the Settings icon in the **Home** screen. If the **WAH7608 Mobile Data** button is gray it's disabled, tap on it to enable your mobile data.

4 If you have set a data limit, make sure you have not reached it yet. Check your data left in the **Home** screen on LTE Ally.

5 If the problem continues, contact your ISP.

One of my clients cannot access the Internet anymore. They had access to the Internet (with the WAH7608), but the Internet connection is not available anymore.

1 Make sure your client is not blocked. You can check this on LTE Ally, by tapping on the Phone icon in the **Home** screen. If the device is grayed out, it is blocked, tap on it to unblock it.

2 Make sure your SIM card's mobile data is enabled. Check this on LTE Ally by tapping on the Settings icon in the **Home** screen. If the **WAH7608 Mobile Data** button is gray it's disabled, tap on it to enable your mobile data.

3 If you have set a data limit, make sure you have not reached it yet. You can check your **Data Left** in the **Home** screen on LTE Ally.

4 Reboot the WAH7608.

The Internet connection is slow or intermittent.

1 There might be a lot of traffic on the network. If the WAH7608 is sending or receiving a lot of information, try closing some programs that use the Internet, especially peer-to-peer applications.

2 Check the signal strength on LTE Ally's **Home** screen or on the WAH7608 OLED screen. If the signal strength is low, try moving the WAH7608 closer to the ISP's base station if possible, or try pointing it directly to the ISP's base station. Look around to see if there are any devices that might be interfering with the wireless network (for example, microwaves, other wireless networks, and so on).

3 Reboot the WAH7608.

4 If the problem continues, contact the network administrator or vendor.

15.5 WiFi Connections

I cannot access the WAH7608.

1 Make sure the WiFi LAN is enabled on the WAH7608. You can enable or disable the WAH7608's WiFi network by pushing on the WPS on the WAH7608. See Section 1.7 on page 12.

2 Make sure the WiFi adapter (installed on your computer) is IEEE 802.11 compatible and supports the same WiFi standard as the WAH7608's active radio.

3 Make sure your device (with a WiFi adapter installed) is within the transmission range of the WAH7608.

4 Make sure you are using the correct WiFi network name and password to connect to your WAH7608. Check your WiFi network settings by tapping on the network name on the **Home** screen page of LTE Ally.

5 If you changed your network WiFi **Name** and/or **key** you will be automatically disconnected from the WAH7608, try reconnecting to the network wirelessly with the new network WiFi **Name** and/or **key**.

One of my clients cannot access the WAH7608.

1 Make sure the WiFi LAN is enabled on the WAH7608. You can enable or disable the WAH7608's WiFi network by pushing on the WPS on the WAH7608. See Section 1.7 on page 12.

2 Make sure the WiFi adapter (installed on your computer) is IEEE 802.11 compatible and supports the same WiFi standard as the WAH7608's active radio.

3 Make sure your client's device (with a WiFi adapter installed) is within the transmission range of the WAH7608.

4 Make sure your client is using the correct WiFi network name and password to connect to your WAH7608. Check your WiFi network settings by tapping on the network name on the **Home** screen page of LTE Ally.

15.6 Getting More Troubleshooting Help

Search for support information for your model at www.zyxel.com for more troubleshooting suggestions.

APPENDIX A
Customer Support

In the event of problems that cannot be solved by using this manual, you should contact your vendor. If you cannot contact your vendor, then contact a Zyxel office for the region in which you bought the device.

See *http://www.zyxel.com/homepage.shtml* and also *http://www.zyxel.com/about_zyxel/zyxel_worldwide.shtml* for the latest information.

Please have the following information ready when you contact an office.

Required Information

- Product model and serial number.
- Warranty Information.
- Date that you received your device.
- Brief description of the problem and the steps you took to solve it.

Corporate Headquarters (Worldwide)

Taiwan

- Zyxel Communications Corporation
- http://www.zyxel.com

Asia

China

- Zyxel Communications (Shanghai) Corp.
  Zyxel Communications (Beijing) Corp.
  Zyxel Communications (Tianjin) Corp.
- http://www.zyxel.cn

India

- Zyxel Technology India Pvt Ltd
- http://www.zyxel.in

Kazakhstan

- Zyxel Kazakhstan
- http://www.zyxel.kz

Korea

- Zyxel Korea Corp.
- http://www.zyxel.kr

Malaysia

- Zyxel Malaysia Sdn Bhd.
- http://www.zyxel.com.my

Pakistan

- Zyxel Pakistan (Pvt.) Ltd.
- http://www.zyxel.com.pk

Philippines

- Zyxel Philippines
- http://www.zyxel.com.ph

Singapore

- Zyxel Singapore Pte Ltd.
- http://www.zyxel.com.sg

Taiwan

- Zyxel Communications Corporation
- http://www.zyxel.com/tw/zh/

Thailand

- Zyxel Thailand Co., Ltd
- http://www.zyxel.co.th

Vietnam

- Zyxel Communications Corporation-Vietnam Office
- http://www.zyxel.com/vn/vi

Europe

Austria

- Zyxel Deutschland GmbH
- http://www.zyxel.de

Belarus

- Zyxel BY
- http://www.zyxel.by

Belgium

- Zyxel Communications B.V.
- http://www.zyxel.com/be/nl/
- http://www.zyxel.com/be/fr/

Bulgaria

- Zyxel България
- http://www.zyxel.com/bg/bg/

Czech Republic

- Zyxel Communications Czech s.r.o
- http://www.zyxel.cz

Denmark

- Zyxel Communications A/S
- http://www.zyxel.dk

Estonia

- Zyxel Estonia
- http://www.zyxel.com/ee/et/

Finland

- Zyxel Communications
- http://www.zyxel.fi

France

- Zyxel France
- http://www.zyxel.fr

Germany

- Zyxel Deutschland GmbH
- http://www.zyxel.de

Hungary

- Zyxel Hungary & SEE
- http://www.zyxel.hu

Italy

- Zyxel Communications Italy
- http://www.zyxel.it/

Latvia

- Zyxel Latvia
- http://www.zyxel.com/lv/lv/homepage.shtml

Lithuania

- Zyxel Lithuania
- http://www.zyxel.com/lt/lt/homepage.shtml

Netherlands

- Zyxel Benelux
- http://www.zyxel.nl

Norway

- Zyxel Communications
- http://www.zyxel.no

Poland

- Zyxel Communications Poland
- http://www.zyxel.pl

Romania

- Zyxel Romania
- http://www.zyxel.com/ro/ro

Russia

- Zyxel Russia
- http://www.zyxel.ru

Slovakia

- Zyxel Communications Czech s.r.o. organizacna zlozka
- http://www.zyxel.sk

Spain

- Zyxel Communications ES Ltd
- http://www.zyxel.es

Sweden

- Zyxel Communications
- http://www.zyxel.se

Switzerland

- Studerus AG

- http://www.zyxel.ch/

Turkey

- Zyxel Turkey A.S.
- http://www.zyxel.com.tr

UK

- Zyxel Communications UK Ltd.
- http://www.zyxel.co.uk

Ukraine

- Zyxel Ukraine
- http://www.ua.zyxel.com

Latin America

Argentina

- Zyxel Communication Corporation
- http://www.zyxel.com/ec/es/

Brazil

- Zyxel Communications Brasil Ltda.
- https://www.zyxel.com/br/pt/

Ecuador

- Zyxel Communication Corporation
- http://www.zyxel.com/ec/es/

Middle East

Israel

- Zyxel Communication Corporation
- http://il.zyxel.com/homepage.shtml

Middle East

- Zyxel Communication Corporation
- http://www.zyxel.com/me/en/

North America

USA

- Zyxel Communications, Inc. - North America Headquarters
- http://www.zyxel.com/us/en/

Oceania

Australia

- Zyxel Communications Corporation
- http://www.zyxel.com/au/en/

Africa

South Africa

- Nology (Pty) Ltd.
- http://www.zyxel.co.za

APPENDIX B
Legal Information

Copyright

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Regulatory Notice and Statement

UNITED STATES of AMERICA

The following information applies if you use the product within USA area.

FCC EMC Statement

- The device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

    (1) This device may not cause harmful interference, and

    (2) This device must accept any interference received, including interference that may cause undesired operation.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the device.
- This product has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This device generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
- If this device does cause harmful interference to radio or television reception, which is found by turning the device off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
    - Reorient or relocate the receiving antenna
    - Increase the separation between the devices
    - Connect the equipment to an outlet other than the receiver's
    - Consult a dealer or an experienced radio/TV technician for assistance
    - Operation of this device is restricted to indoor use only

The following information applies if you use the product with RF function within USA area.

FCC Radiation Exposure Statement

- This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment.
- This transmitter must be at least 20 cm from the user and must not be co-located or operating in conjunction with any other antenna or transmitter.

CANADA

The following information applies if you use the product within Canada area.

Industry Canada ICES Statement

CAN ICES-3 (B)/NMB-3(B)

Industry Canada RSS-GEN & RSS-247 statement

- This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
- This radio transmitter has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

If the product with 5G wireless function operating in 5150-5250 MHz and 5725-5850 MHz, the following attention must be paid,

- The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.
- For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits specified for point-to-point and non-point-to-point operation as appropriate; and
- The worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p. elevation mask requirement set forth in Section 6.2.2(3) of RSS 247 shall be clearly indicated.

If the product with 5G wireless function operating in 5250-5350 MHz and 5470-5725 MHz , the following attention must be paid.

- For devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit.
- Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
- Le présent émetteur radio de modèle s'il fait partie du matériel de catégoriel) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Lorsque la fonction sans fil 5G fonctionnant en 5150-5250 MHz and 5725-5850 MHz est activée pour ce produit , il est nécessaire de porter une attention particulière aux choses suivantes

- Les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;
- Pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5 725 à 5 850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée pour l'exploitation point à point et l'exploitation non point à point, selon le cas;
- Les pires angles d'inclinaison nécessaires pour rester conforme à l'exigence de la p.i.r.e. applicable au masque d'élévation, et énoncée à la section 6.2.2 3) du CNR-247, doivent être clairement indiqués.

Lorsque la fonction sans fil 5G fonctionnant en 5250-5350 MHz et 5470-5725 MHz est activée pour ce produit , il est nécessaire de porter une attention particulière aux choses suivantes.

- Pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5 250 à 5 350 MHz et de 5 470 à 5 725 MHz doit être conforme à la limite de la p.i.r.e.

Industry Canada radiation exposure statement

This device complies with IC radiation exposure limits set forth for an uncontrolled environment. This device should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

EUROPEAN UNION

The following information applies if you use the product within the European Union.

Declaration of Conformity with Regard to EU Directive 2014/53/EU (Radio Equipment Directive, RED)

- Compliance information for 2.4GHz and/or 5GHz wireless products relevant to the EU and other Countries following the EU Directive 2014/53/EU (RED). And this product may be used in all EU countries (and other countries following the EU Directive 2014/53/EU) without any limitation except for the countries mentioned below table:
- In the majority of the EU and other European countries, the 5GHz bands have been made available for the use of wireless local area networks (LANs). Later in this document you will find an overview of countries in which additional restrictions or requirements or both are applicable. The requirements for any country may evolve. Zyxel recommends that you check with the local authorities for the latest status of their national regulations for the 5GHz wireless LANs.
- If this device for operation in the band 5150-5350 MHz, it is for indoor use only.
- This equipment should be installed and operated with a minimum distance of 20cm between the radio equipment and your body.
- The maximum RF power operating for each band as follows:
- **GSM 900**
  The maximum RF power operating for each band as follows:
  the band 880.2 to 914.8 MHz is 776.25 mW.
- **GSM 1800**
  The maximum RF power operating for each band as follows:
  the band 1710.2 – 1784.8 MHz is 524.81 mW.
- **WCDMA Band I**
  The maximum RF power operating for each band as follows:
  the band 1922.6 to 1977.4 MHz is 95.28 mW.

- **WCDMA Band VIII**
  The maximum RF power operating for each band as follows:
  the band 882.6 to 912.4 MHz is 123.31 mW.
- **LTE Band 1**
  The maximum RF power operating for each band as follows:
  the band 1922.5 to 1977.5 MHz is 127.06 mW.
- **LTE Band 3**
  The maximum RF power operating for each band as follows:
  the band 1710.7 to 1784.3 MHz is 137.72 mW.
- **LTE Band 7**
  The maximum RF power operating for each band as follows:
  the band 2502.5 to 2567.5 MHz is 99.31 mW.
- **LTE Band 8**
  The maximum RF power operating for each band as follows:
  the band 880.7 to 914.3 MHz is 126.18 mW.
- **LTE Band 20**
  The maximum RF power operating for each band as follows:
  the band 834.5 to 859.5 MHz is 127.06 mW.
- **LTE Band 38**
  The maximum RF power operating for each band as follows:
  the band 2572.5 to 2617.5 MHz is 184.93 mW.
- **LTE Band 40**
  The maximum RF power operating for each band as follows:
  the band 2302.5 to 2397.5 MHz is 132.13 mW.
- **802.11 b**
  The maximum RF power operating for each band as follows:
  the band 2,400 to 2,483.5 MHz is 80.17 mW.
- **802.11 g**
  The maximum RF power operating for each band as follows:
  the band 2,400 to 2,483.5 MHz is 73.84 mW.
- **802.11 n**
  The maximum RF power operating for each band as follows:
  the band 2,400 to 2,483.5 MHz is 73.39 mW.

Български (Bulgarian)	С настоящото Zyxel декларира, че това оборудване е в съответствие със съществените изисквания и другите приложими разпоредбите на Директива 2014/53/ЕС. **National Restrictions** • The Belgian Institute for Postal Services and Telecommunications (BIPT) must be notified of any outdoor wireless link having a range exceeding 300 meters. Please check http://www.bipt.be for more details. • Draadloze verbindingen voor buitengebruik en met een reikwijdte van meer dan 300 meter dienen aangemeld te worden bij het Belgisch Instituut voor postdiensten en telecommunicatie (BIPT). Zie http://www.bipt.be voor meer gegevens. • Les liaisons sans fil pour une utilisation en extérieur d'une distance supérieure à 300 mètres doivent être notifiées à l'Institut Belge des services Postaux et des Télécommunications (IBPT). Visitez http://www.ibpt.be pour de plus amples détails.
Español (Spanish)	Por medio de la presente Zyxel declara que el equipo cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 2014/53/UE..
Čeština (Czech)	Zyxel tímto prohlašuje, že tento zařízení je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 2014/53/EU.
Dansk (Danish)	Undertegnede Zyxel erklærer herved, at følgende udstyr udstyr overholder de væsentlige krav og øvrige relevante krav i direktiv 2014/53/EU. **National Restrictions** • In Denmark, the band 5150 - 5350 MHz is also allowed for outdoor usage. • I Danmark må frekvensbåndet 5150 - 5350 også anvendes udendørs.
Deutsch (German)	Hiermit erklärt Zyxel, dass sich das Gerät Ausstattung in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 2014/53/EU befindet.
Eesti keel (Estonian)	Käesolevaga kinnitab Zyxel seadme seadmed vastavust direktiivi 2014/53/EL põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
Ελληνικά (Greek)	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Zyxel ΔΗΛΩΝΕΙ ΟΤΙ εξοπλισμός ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 2014/53/ΕΕ.
English	Hereby, Zyxel declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.
Français (French)	Par la présente Zyxel déclare que l'appareil équipements est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 2014/53/UE.
Hrvatski (Croatian)	Zyxel ovime izjavljuje da je radijska oprema tipa u skladu s Direktivom 2014/53/UE.
Íslenska (Icelandic)	Hér með lýsir, Zyxel því yfir að þessi búnaður er í samræmi við grunnkröfur og önnur viðeigandi ákvæði tilskipunar 2014/53/UE.

Italiano (Italian)	Con la presente Zyxel dichiara che questo attrezzatura è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 2014/53/UE. **National Restrictions** • This product meets the National Radio Interface and the requirements specified in the National Frequency Allocation Table for Italy. Unless this wireless LAN product is operating within the boundaries of the owner's property, its use requires a "general authorization." Please check http://www.sviluppoeconomico.gov.it/ for more details. • Questo prodotto è conforme alla specifiche di Interfaccia Radio Nazionali e rispetta il Piano Nazionale di ripartizione delle frequenze in Italia. Se non viene installato all 'interno del proprio fondo, l'utilizzo di prodotti Wireless LAN richiede una "Autorizzazione Generale". Consultare http://www.sviluppoeconomico.gov.it/ per maggiori dettagli.
Latviešu valoda (Latvian)	Ar šo Zyxel deklarē, ka iekārtas atbilst Direkfīvas 2014/53/ES būtiskajām prasībām un citiem ar to saisfītajiem noteikumiem. **National Restrictions** • The outdoor usage of the 2.4 GHz band requires an authorization from the Electronic Communications Office. Please check http://www.esd.lv for more details. • 2.4 GHz frekvenèu joslas izmantoðanai ârpus telpâm nepiecieðama afïauja no Elektronisko sakaru direkcijas. Vairâk informâcijas: http://www.esd.lv.
Lietuvių kalba (Lithuanian)	Šiuo Zyxel deklaruoja, kad šis įranga atitinka esminius reikalavimus ir kitas 2014/53/ES Direktyvos nuostatas.
Magyar (Hungarian)	Alulírott, Zyxel nyilatkozom, hogy a berendezés megfelel a vonatkozó alapvető követelményeknek és az 2014/53/EU irányelv egyéb előírásainak.
Malti (Maltese)	Hawnhekk, Zyxel, jiddikjara li dan tagħmir jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 2014/53/UE.
Nederlands (Dutch)	Hierbij verklaart Zyxel dat het toestel uitrusting in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 2014/53/EU.
Polski (Polish)	Niniejszym Zyxel oświadcza, że sprzęt jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 2014/53/UE.
Português (Portuguese)	Zyxel declara que este equipamento está conforme com os requisitos essenciais e outras disposições da Directiva 2014/53/UE.
Română (Romanian)	Prin prezenta, Zyxel declară că acest echipament este în conformitate cu cerinţele esenţiale şi alte prevederi relevante ale Directivei 2014/53/UE.
Slovenčina (Slovak)	Zyxel týmto vyhlasuje, že zariadenia spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 2014/53/EÚ.
Slovenščina (Slovene)	Zyxel izjavlja, da je ta oprema v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 2014/53/EU.
Suomi (Finnish)	Zyxel vakuuttaa täten että laitteet tyyppinen laite on direktiivin 2014/53/EU oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Svenska (Swedish)	Härmed intygar Zyxel att denna utrustning står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 2014/53/EU.
Norsk (Norwegian)	Erklærer herved Zyxel at dette utstyret er I samsvar med de grunnleggende kravene og andre relevante bestemmelser I direktiv 2014/53/EU.

Notes:

1. Although Norway, Switzerland and Liechtenstein are not EU member states, the EU Directive 2014/53/EU has also been implemented in those countries.

2. The regulatory limits for maximum output power are specified in EIRP. The EIRP level (in dBm) of a device can be calculated by adding the gain of the antenna used (specified in dBi) to the output power available at the connector (specified in dBm).

List of national codes

COUNTRY	ISO 3166 2 LETTER CODE	COUNTRY	ISO 3166 2 LETTER CODE
Austria	AT	Liechtenstein	LI
Belgium	BE	Lithuania	LT
Bulgaria	BG	Luxembourg	LU
Croatia	HR	Malta	MT
Cyprus	CY	Netherlands	NL
Czech Republic	CZ	Norway	NO
Denmark	DK	Poland	PL
Estonia	EE	Portugal	PT
Finland	FI	Romania	RO
France	FR	Serbia	RS
Germany	DE	Slovakia	SK
Greece	GR	Slovenia	SI
Hungary	HU	Spain	ES
Iceland	IS	Switzerland	CH
Ireland	IE	Sweden	SE
Italy	IT	Turkey	TR
Latvia	LV	United Kingdom	GB

Safety Warnings

- Do not use this product near water, for example, in a wet basement or near a swimming pool.
- Do not expose your device to dampness, dust or corrosive liquids.
- Do not store things on the device.
- Do not obstruct the device ventilation slots as insufficient airflow may harm your device. For example, do not place the device in an enclosed space such as a box or on a very soft surface such as a bed or sofa.
- Do not install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Connect ONLY suitable accessories to the device.
- Do not open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. Only qualified service personnel should service or disassemble this device. Please contact your vendor for further information.
- Make sure to connect the cables to the correct ports.
- Place connecting cables carefully so that no one will step on them or stumble over them.
- Always disconnect all cables from this device before servicing or disassembling.
- Do not remove the plug and connect it to a power outlet by itself; always attach the plug to the power adaptor first before connecting it to a power outlet.
- Do not allow anything to rest on the power adaptor or cord and do NOT place the product where anyone can walk on the power adaptor or cord.
- Please use the provided or designated connection cables/power cables/ adaptors. Connect it to the right supply voltage (for example, 110V AC in North America or 230V AC in Europe). If the power adaptor or cord is damaged, it might cause electrocution. Remove it from the device and the power source, repairing the power adapter or cord is prohibited. Contact your local vendor to order a new one.
- Do not use the device outside, and make sure all the connections are indoors. There is a remote risk of electric shock from lightning.
- CAUTION: Risk of explosion if battery is replaced by an incorrect type, dispose of used batteries according to the instruction. Dispose them at the applicable collection point for the recycling of electrical and electronic devices. For detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the store where you purchased the product.
- The following warning statements apply, where the disconnect device is not incorporated in the device or where the plug on the power supply cord is intended to serve as the disconnect device,

  - For permanently connected devices, a readily accessible disconnect device shall be incorporated external to the device;

  - For pluggable devices, the socket-outlet shall be installed near the device and shall be easily accessible.

Environment Statement

ErP (Energy-related Products)

Zyxel products put on the EU market in compliance with the requirement of the European Parliament and the Council published Directive 2009/125/EC establishing a framework for the setting of ecodesign requirements for energy-related products (recast), so called as "ErP Directive (Energy-related Products directive) as well as ecodesign requirement laid down in applicable implementing measures, power consumption has satisfied regulation requirements which are:

- Network standby power consumption < 8W, and/or
- Off mode power consumption < 0.5W, and/or
- Standby mode power consumption < 0.5W.

(Wireless setting, please refer to "Wireless" chapter for more detail.)

European Union - Disposal and Recycling Information

The symbol below means that according to local regulations your product and/or its battery shall be disposed of separately from domestic waste. If this product is end of life, take it to a recycling station designated by local authorities. At the time of disposal, the separate collection of your product and/or its battery will help save natural resources and ensure that the environment is sustainable development.

Die folgende Symbol bedeutet, dass Ihr Produkt und/oder seine Batterie gemäß den örtlichen Bestimmungen getrennt vom Hausmüll entsorgt werden muss. Wenden Sie sich an eine Recyclingstation, wenn dieses Produkt das Ende seiner Lebensdauer erreicht hat. Zum Zeitpunkt der Entsorgung wird die getrennte Sammlung von Produkt und/oder seiner Batterie dazu beitragen, natürliche Ressourcen zu sparen und die Umwelt und die menschliche Gesundheit zu schützen.

El símbolo de abajo indica que según las regulaciones locales, su producto y/o su batería deberán depositarse como basura separada de la doméstica. Cuando este producto alcance el final de su vida útil, llévelo a un punto limpio. Cuando llegue el momento de desechar el producto, la recogida por separado éste y/o su batería ayudará a salvar los recursos naturales y a proteger la salud humana y medioambiental.

Le symbole ci-dessous signifie que selon les réglementations locales votre produit et/ou sa batterie doivent être éliminés séparément des ordures ménagères. Lorsque ce produit atteint sa fin de vie, amenez-le à un centre de recyclage. Au moment de la mise au rebut, la collecte séparée de votre produit et/ou de sa batterie aidera à économiser les ressources naturelles et protéger l'environnement et la santé humaine.

Il simbolo sotto significa che secondo i regolamenti locali il vostro prodotto e/o batteria deve essere smaltito separatamente dai rifiuti domestici. Quando questo prodotto raggiunge la fine della vita di servizio portarlo a una stazione di riciclaggio. Al momento dello smaltimento, la raccolta separata del vostro prodotto e/o della sua batteria aiuta a risparmiare risorse naturali e a proteggere l'ambiente e la salute umana.

Symbolen innebär att enligt lokal lagstiftning ska produkten och/eller dess batteri kastas separat från hushållsavfallet. När den här produkten når slutet av sin livslängd ska du ta den till en återvinningsstation. Vid tiden för kasseringen bidrar du till en bättre miljö och mänsklig hälsa genom att göra dig av med den på ett återvinningsställe.

台灣

以下訊息僅適用於產品具有無線功能且銷售至台灣地區
- 第十二條 經型式認證合格之低功率射頻電機，非經許可，公司，商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
- 第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。 低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。
- 無線資訊傳輸設備忍受合法通信之干擾且不得干擾合法通信；如造成干擾，應立即停用， 俟無干擾之虞，始得繼續使用。
- 無線資訊傳設備的製造廠商應確保頻率穩定性，如依製造廠商使用手冊上所述正常操作， 發射的信號應維持於操作頻帶中

以下訊息僅適用於產品操作於 5.25-5.35 秭赫頻帶內並銷售至台灣地區
- 在 5.25-5.35 秭赫頻帶內操作之無線資訊傳輸設備，限於室內使用。

以下訊息僅適用於產品屬於專業安裝並銷售至台灣地區
- 本器材須經專業工程人員安裝及設定，始得設置使用，且不得直接販售給一般消費者。

安全警告 － 為了您的安全，請先閱讀以下警告及指示：
- 請勿將此產品接近水、火焰或放置在高溫的環境。
- 避免設備接觸：
  - 任何液體 － 切勿讓設備接觸水、雨水、高濕度、污水腐蝕性的液體或其他水份。
  - 灰塵及污物 － 切勿接觸灰塵、污物、沙土、食物或其他不合適的材料。
- 雷雨天氣時，不要安裝，使用或維修此設備。有遭受電擊的風險。
- 切勿重摔或撞擊設備，並勿使用不正確的電源變壓器。
- 若接上不正確的電源變壓器會有爆炸的風險。
- 請勿隨意更換產品內的電池。
- 如果更換不正確之電池型式，會有爆炸的風險，請依製造商說明書處理使用過之電池。
- 請將廢電池丟棄在適當的電器或電子設備回收處。
- 請勿將設備解體。
- 請勿阻礙設備的散熱孔，空氣對流不足將會造成設備損害。

- 請插在正確的電壓供給插座（如：北美／台灣電壓 110V AC，歐洲是 230V AC）。
- 假若電源變壓器或電源變壓器的纜線損壞，請從插座拔除，若您還繼續插電使用，會有觸電死亡的風險。
- 請勿試圖修理電源變壓器或電源變壓器的纜線，若有毀損，請直接聯絡您購買的店家，購買一個新的電源變壓器。
- 請勿將此設備安裝於室外，此設備僅適合放置於室內。
- 請勿隨一般垃圾丟棄。
- 請參閱產品背貼上的設備額定功率。
- 請參考產品型錄或是彩盒上的作業溫度。
- 產品沒有斷電裝置或者採用電源線的插頭視為斷電裝置的一部分，以下警語將適用：
  - 對永久連接之設備，在設備外部須安裝可觸及之斷電裝置；
  - 對插接式之設備，插座必須接近安裝之地點而且是易於觸及的。

About the Symbols

Various symbols are used in this product to ensure correct usage, to prevent danger to the user and others, and to prevent property damage. The meaning of these symbols are described below. It is important that you read these descriptions thoroughly and fully understand the contents.

Explanation of the Symbols

SYMBOL	EXPLANATION
$\sim$	Alternating current (AC): AC is an electric current in which the flow of electric charge periodically reverses direction.
⎓	Direct current (DC): DC if the unidirectional flow or movement of electric charge carriers.
⏚	Earth; ground: A wiring terminal intended for connection of a Protective Earthing Conductor.
▣	Class II equipment: The method of protection against electric shock in the case of class II equipment is either double insulation or reinforced insulation.

Viewing Certifications

Go to http://www.zyxel.com to view this product's documentation and certifications.

Zyxel Limited Warranty

Zyxel warrants to the original end user (purchaser) that this product is free from any defects in material or workmanship for a specific period (the Warranty Period) from the date of purchase. The Warranty Period varies by region. Check with your vendor and/or the authorized Zyxel local distributor for details about the Warranty Period of this product. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, Zyxel will, at its discretion, repair or replace the defective products or components without charge for either parts or labor, and to whatever extent it shall deem necessary to restore the product or components to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal or higher value, and will be solely at the discretion of Zyxel. This warranty shall not apply if the product has been modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

Note

Repair or replacement, as provided under this warranty, is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose. Zyxel shall in no event be held liable for indirect or consequential damages of any kind to the purchaser.

To obtain the services of this warranty, contact your vendor. You may also refer to the warranty policy for the region in which you bought the device at http://www.zyxel.com/web/support_warranty_info.php.

Registration

Register your product online to receive e-mail notices of firmware upgrades and information at www.zyxel.com for global products, or at www.us.zyxel.com for North American products.

Open Source Licenses

This product contains in part some free software distributed under GPL license terms and/or GPL like licenses. Open source licenses are provided with the firmware package. You can download the latest firmware at www.zyxel.com. To obtain the source code covered under those Licenses, please contact support@zyxel.com.tw to get it.