ZYXEL
Your Networking Ally

DRAFT

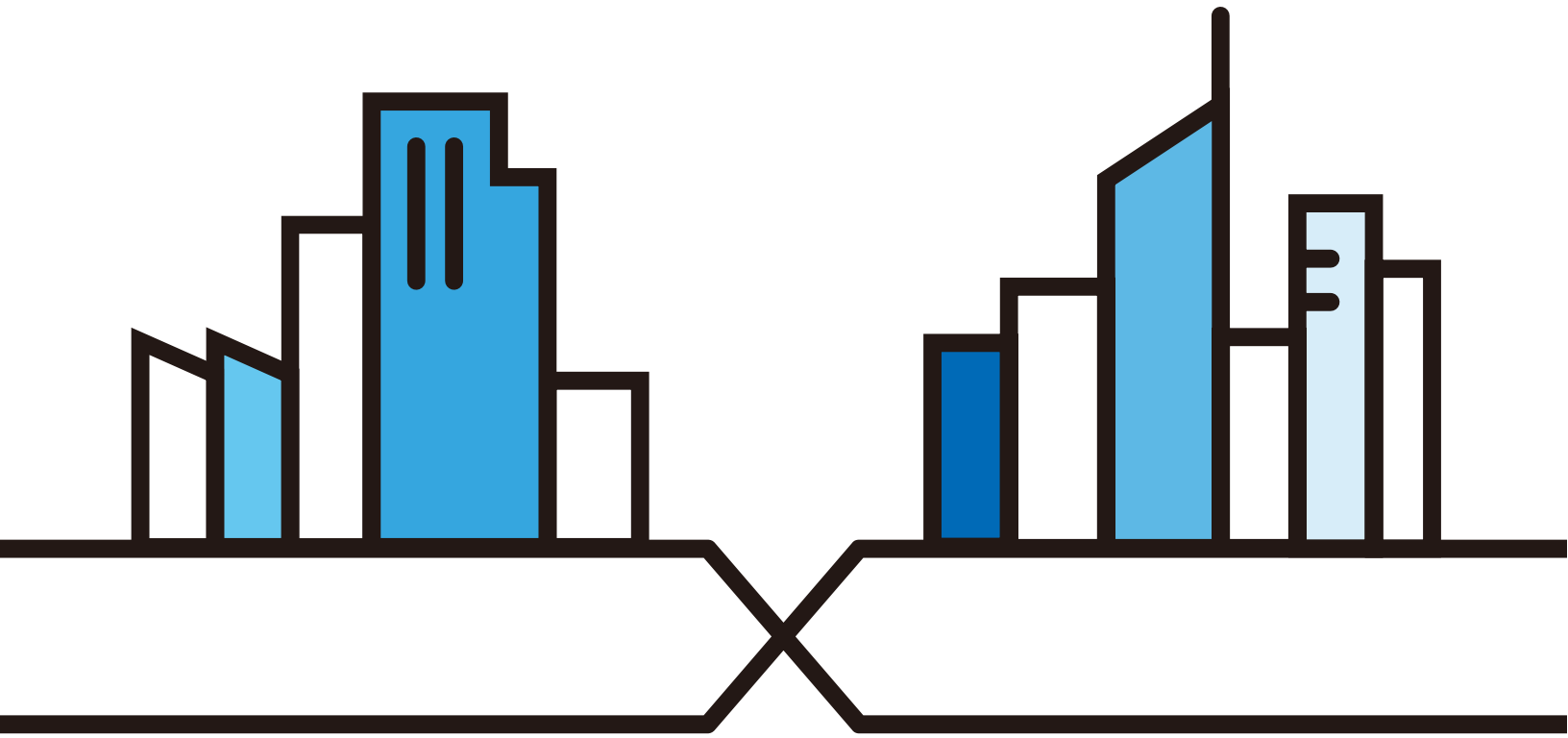
User's Guide

DX5510-B0

Wireless AX VDSL Bonding Gateway

Default Login Details	
LAN IP Address	http://192.168.1.1
Login	admin
Password	See the device label

Version 5.16 Ed 1, 9/2019



IMPORTANT!

READ CAREFULLY BEFORE USE.

KEEP THIS GUIDE FOR FUTURE REFERENCE.

Screenshots and graphics in this book may differ slightly from what you see due to differences in your product firmware or your computer operating system. 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 the Zyxel Device.

- More Information

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

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 DX5510-B0 in this user's guide may be referred to as the "Zyxel Device" 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, **Network Setting > Routing > DNS Route** means you first click **Network Setting** in the navigation panel, then the **Routing** sub menu and finally the **DNS Route** tab to get to that screen.

Icons Used in Figures

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

Zyxel Device 	Wireless Device 	Laptop Computer 
Switch 	Firewall 	Server 
Internet 	User 	Smartphone 

Contents Overview

Table of Contents

PART I
User's Guide

CHAPTER 1
Introducing the Zyxel Device

1.1 Overview

The Zyxel Device is a G.fast /VDSL router, which provides fast Internet access over telephone lines. G.fast provides Gigabit speeds over a telephone line. VDSL bonding combines 2 VDSL lines into one virtual VDSL connection that allows double the speed over short distances or delivers the same speed over longer distances.

The Zyxel Device has four 1 Gbps Ethernet LAN ports. It also has one 2.5 Gbps Multi-Gigabit Ethernet LAN port that can be configured as a backup WAN port in case the DSL connection has a problem. See Section 1.1.1 on page 16 for more information on Multi-Gigabit Ethernet.

It also supports WiFi6 that is most suitable in areas with a high concentration of users. You can schedule WiFi usage using Parental Control. See Section 7.1.2 on page 100 for more information on WiFi6.

The Zyxel Device supports Multy Pro that lets you easily extend WiFi in your home or office using a compatible WiFi Extender. See the Zyxel website for more information on Multy Pro.

1.1.1 Multi-Gigabit

Some network devices such as gaming computers, servers, network attached storage (NAS) devices, or access points may have network cards that are capable of 2.5 Gbps connectivity.

If these devices are connected to a 1 Gbps or 10 Gbps Ethernet port, they can only transmit or receive up to 1 Gbps as speeds of 10 Gbps cannot be attained. Moreover, if network devices with 10 Gbps network cards are connected to a 10 Gbps Ethernet port, you must use Cat 6A or better Ethernet cables to achieve 10 Gbps speeds. Most buildings, at the time of writing, use Cat 5e or Cat 6 Ethernet cables.

2.5 Gbps Multi-Gigabit (IEEE 802.3bz) Ethernet ports on the Zyxel Device automatically allow connections up to the speed of the connected network device (100 Mbps, 1 Gbps, 2.5 Gbps), and you just need to use a Cat 5e or Cat 6 Ethernet cable.

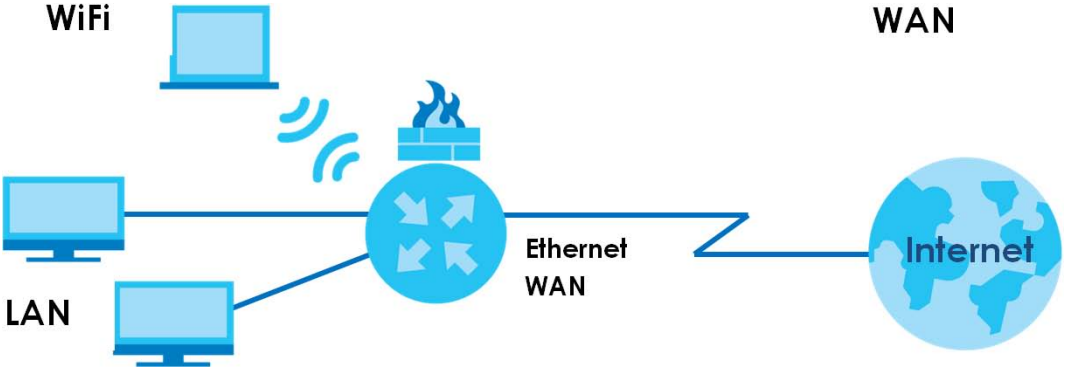
1.2 Example Applications

This section shows a few examples of using the Zyxel Device in various network environments. Note that the Zyxel Device in the figure is just an example Zyxel Device and not your actual Zyxel Device.

1.2.1 Internet Access

Your Zyxel Device has a Gigabit Ethernet port for super-fast Internet access. It provides Internet access by connecting the WAN port to your ISP. Computers can connect to the Zyxel Device's LAN ports (or wirelessly) and access the Internet simultaneously.

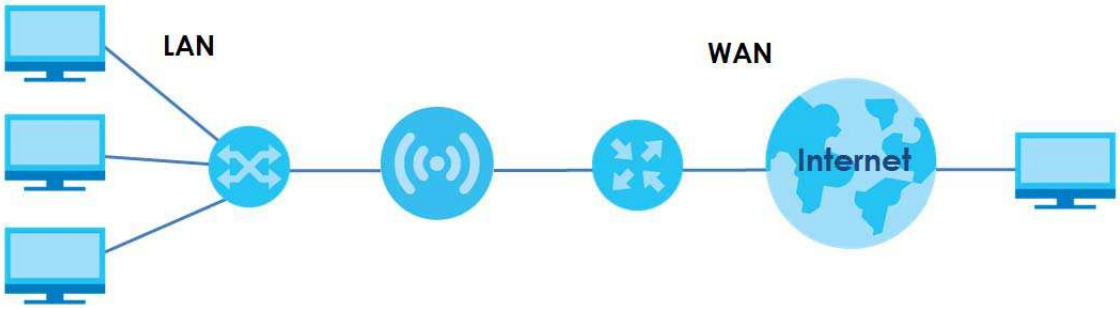
Figure 1 Internet Access Application



When the Firewall is on, all incoming traffic from the Internet to your network is blocked by default unless it is initiated from your network. This means that probes from the outside to your network are not allowed, but you can safely browse the Internet and download files.

Connect the WAN port to the broadband modem or router. This way, you can access the Internet via an Ethernet connection and use the QoS, Firewall and parental control functions on the Zyxel Device.

Figure 2 Zyxel Device's Internet Access Application: Ethernet WAN



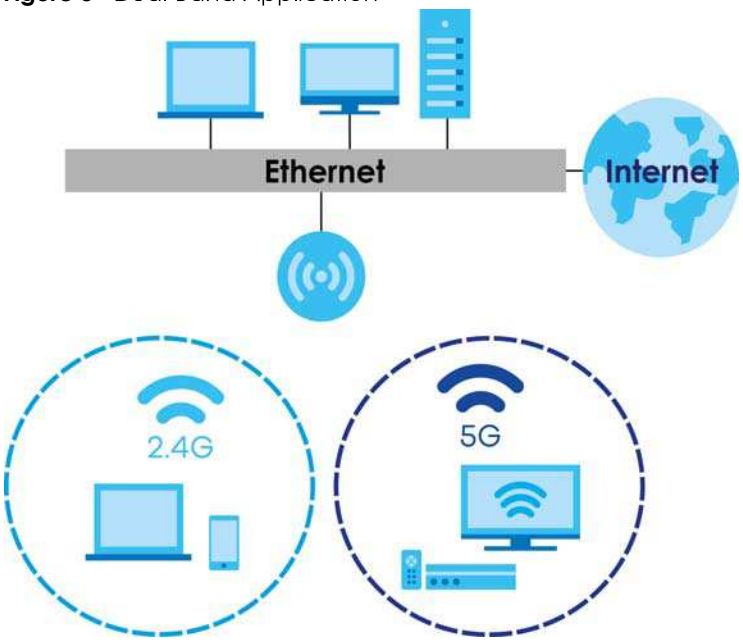
1.2.2 Dual-Band WiFi

By default, the wireless LAN (WLAN) is enabled on the Zyxel Device. IEEE 802.11a/b/g/n/ac/ax compliant clients can wirelessly connect to the Zyxel Device to access network resources.

The Zyxel Device is a dual-band gateway that can use both 2.4G and 5G networks at the same time. You could use the 2.4 GHz band for regular Internet surfing and downloading while using the 5 GHz

band for time sensitive traffic like high-definition video, music, and gaming.

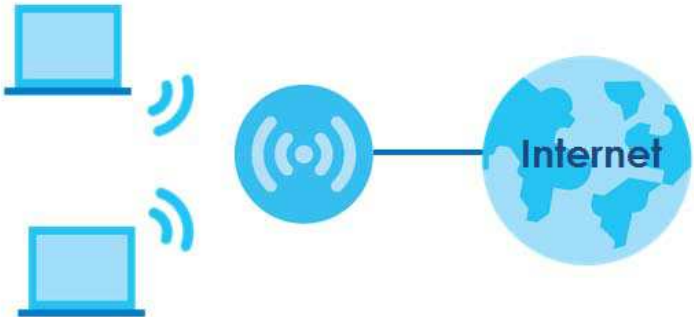
Figure 3 Dual-Band Application



The Zyxel Device is a wireless Access Point (AP) for IEEE 802.11b/g/n/a/ac/ax wireless clients, such as notebook computers, iPads, smartphones, and so on. It allows them to connect to the Internet without having to rely on inconvenient Ethernet cables.

Your Zyxel Device supports WiFi Protected Setup (WPS), which allows you to quickly set up a wireless network with strong security.

Figure 4 Wireless Access Example



1.3 Ways to Manage the Zyxel Device

Use any of the following methods to manage the Zyxel Device.

- Web Configurator. This is recommended for management of the Zyxel Device using a (supported) web browser.
- Simple Network Management Protocol (SNMP). Use to monitor and/or manage by an SNMP manager, see Section 31.1 on page 261.
- Secure Shell (SSH), Telnet. Use for troubleshooting the Zyxel Device by qualified personnel.

- FTP. Use FTP for firmware upgrades and configuration backup/restore.

1.4 Good Habits for Managing the Zyxel Device

Do the following things regularly to make the Zyxel Device more secure and to manage the Zyxel Device more effectively.

- Change the WiFi and Web Configurator passwords. Use a password that is not easy to guess and that consists of different types of characters, such as numbers and letters.
- Write down the passwords and put it in a safe place.
- Back up the configuration (and make sure you know how to restore it). Restoring an earlier working configuration may be useful if the device becomes unstable or even crashes. If you forget your password, you will have to reset the Zyxel Device to its factory default settings. If you backed up an earlier configuration file, you would not have to totally re-configure the Zyxel Device. You could simply restore your last configuration.

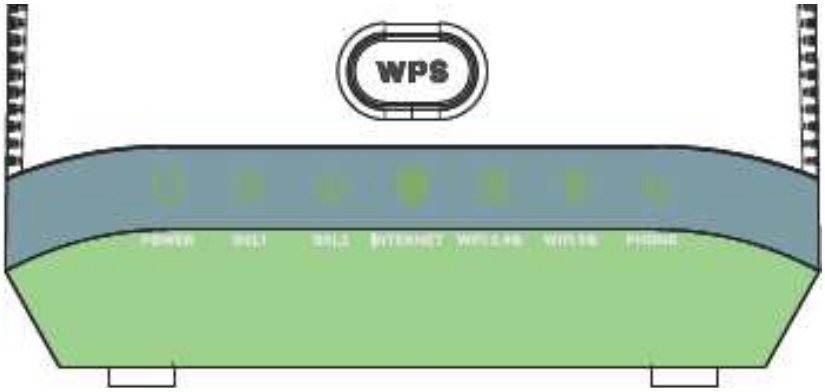
1.5 Hardware

This section describes the front and rear panels for each model. If your model is not shown here, refer to the Zyxel Device's Quick Start Guides to see the product drawings and how to make the hardware connections.

1.5.1 Front Panel

The LED indicators are located on the front panel.

Figure 5 LED Indicators



None of the LEDs are on if the Zyxel Device is not receiving power.

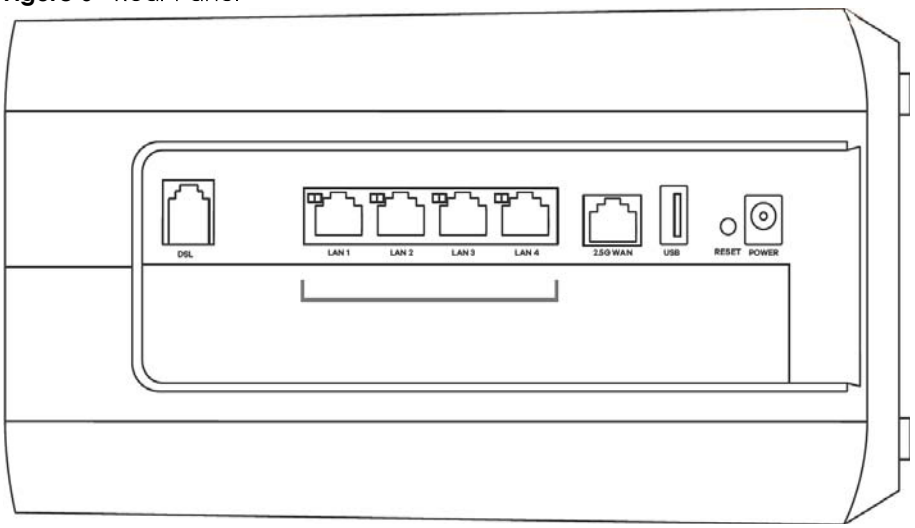
Table 1 LED Descriptions

LED	COLOR	STATUS	DESCRIPTION
POWER	Green	On	The Zyxel Device is receiving power and ready for use.
		Blinking	The Zyxel Device is self-testing.
	Red	On	The Zyxel Device detected an error while self-testing, or there is a device malfunction.
		Blinking	The Zyxel Device is upgrading firmware.
		Off	The Zyxel Device is not receiving power.
DSL1~2	Green	On	The DSL line is up.
		Blinking	The Zyxel Device is initializing the DSL line.
		Off	The DSL line is down.
INTERNET	Green	On	The Zyxel Device has an IP connection but no traffic. Your device has a WAN IP address (either static or assigned by a DHCP server), PPP negotiation was successfully completed (if used).
		Blinking	The Zyxel Device is sending or receiving IP traffic.
		Off	There is no Internet connection or the gateway is in bridged mode.
	Red	On	The Zyxel Device attempted to make an IP connection but failed. Possible causes are no response from a DHCP server, no PPPoE response, PPPoE authentication failed.
2.4G WiFi	Green	On	The 2.4G wireless network is activated.
		Blinking	The Zyxel Device is communicating with 2.4G wireless clients.
		Off	The 2.4G wireless network is not activated.
5G WiFi	Green	On	The 5G wireless network is activated.
		Blinking	The Zyxel Device is communicating with 5G wireless clients.
		Off	The 5G wireless network is not activated.
WPS	Green	Blinking	The Zyxel Device is setting up a WPS connection with a wireless client.
		Off	The Zyxel Device has set up a WPS connection with a wireless client or WPS has not been enabled.

1.5.2 Rear Panel

The connection ports are located on the rear panel.

Figure 6 Rear Panel



The following table describes the items on the rear panel.

Table 2 Panel Ports and Buttons

LABEL	DESCRIPTION
WPS	Press the WPS button for more than one second to quickly set up a secure wireless connection between the device and a WPS-compatible client.
DSL	Connect a RJ-11 cable to the DSL port for Internet access.
LAN1 ~ LAN4	Connect computers or other Ethernet devices to Ethernet ports for Internet access.
2.5G WAN	Connect an Ethernet cable to the Ethernet WAN port for Internet access.
USB	The USB port is reserved for future development.
Reset	Press the button to return the Zyxel Device to the factory defaults.
Power	Connect the power adapter and then can press the power button to start the device.

1.5.3 Using the WPS Button

You can use the **WPS** button to quickly set up a secure wireless connection between the Zyxel Device and a WPS-compatible client by adding one device at a time.

To activate WPS:

1. Make sure the **POWER** LED is on and not blinking.
2. Press the **WPS** button for one second and release it.
3. Press the WPS button on another WPS-enabled device within range of the Zyxel Device within 120 seconds. The **WPS** LED flashes green while the Zyxel Device sets up a WPS connection with the other wireless device.
4. Once the connection is successfully made, the **WPS** LED will turn off.

Note: Your Zyxel Device supports both 2.4G and 5G WiFi networks, the connection to the 2.4G wireless network had priority.

1.5.4 The RESET Button

If you forget your password or cannot access the Web Configurator, you will need to use the **RESET** button to reload the factory-default configuration file. This means that you will lose all configurations that you had previously. The password will be reset to the factory default (see the device label), and the LAN IP address will be "192.168.1.1".

1 Make sure the **POWER** LED is on (not blinking).

2 To set the device back to the factory default settings, press the **RESET** button for more than 5 seconds or until the **POWER** LED begins to blink and then release it. When the **POWER** LED begins to blink, the defaults have been restored and the device restarts.

CHAPTER 2
The Web Configurator

2.1 Overview

The Web Configurator is an HTML-based management interface that allows easy Zyxel Device setup and management via Internet browser. Use Internet Explorer 11 and later versions or Mozilla Firefox 67.0.2 and later versions or Safari 5.0 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 Zyxel Device. Web pop-up blocking is enabled by default in Windows 10.
- JavaScript (enabled by default).
- Java permissions (enabled by default).

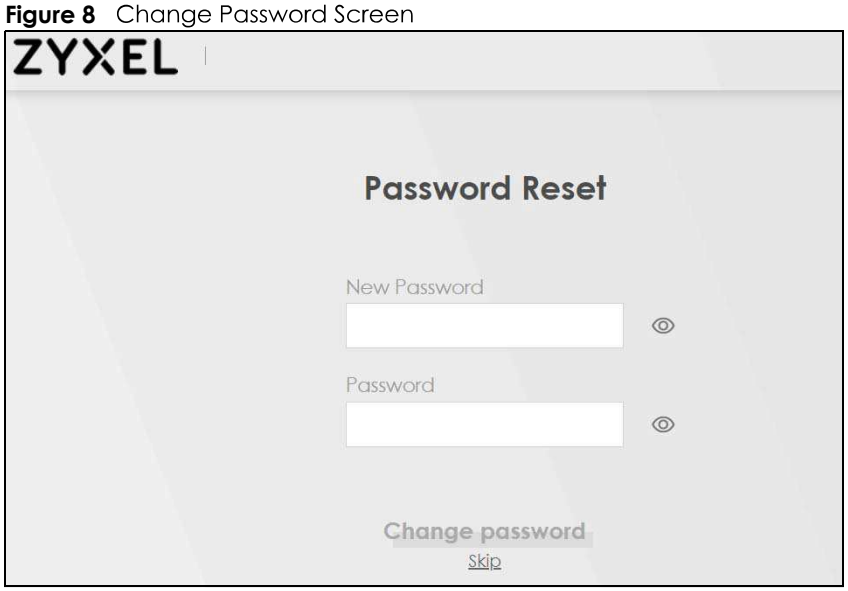
2.1.1 Accessing the Web Configurator

1. Make sure your Zyxel Device hardware is properly connected (refer to the Quick Start Guide).
2. Launch your web browser. If the Zyxel Device does not automatically re-direct you to the login screen, go to http://192.168.1.1.
3. A login screen displays. Select the language you prefer.
4. To access the administrative Web Configurator and manage the Zyxel Device, type the default username **admin** and the randomly assigned default password (see the device label) in the login screen and click **Login**. If you have changed the password, enter your password and click **Login**.

Figure 7 Login Screen

5 The following screen displays when you log into the Web Configurator for the first time. Enter a new password, retype it to confirm, and click **Change password**. If you prefer to use the default password, click **Skip**.

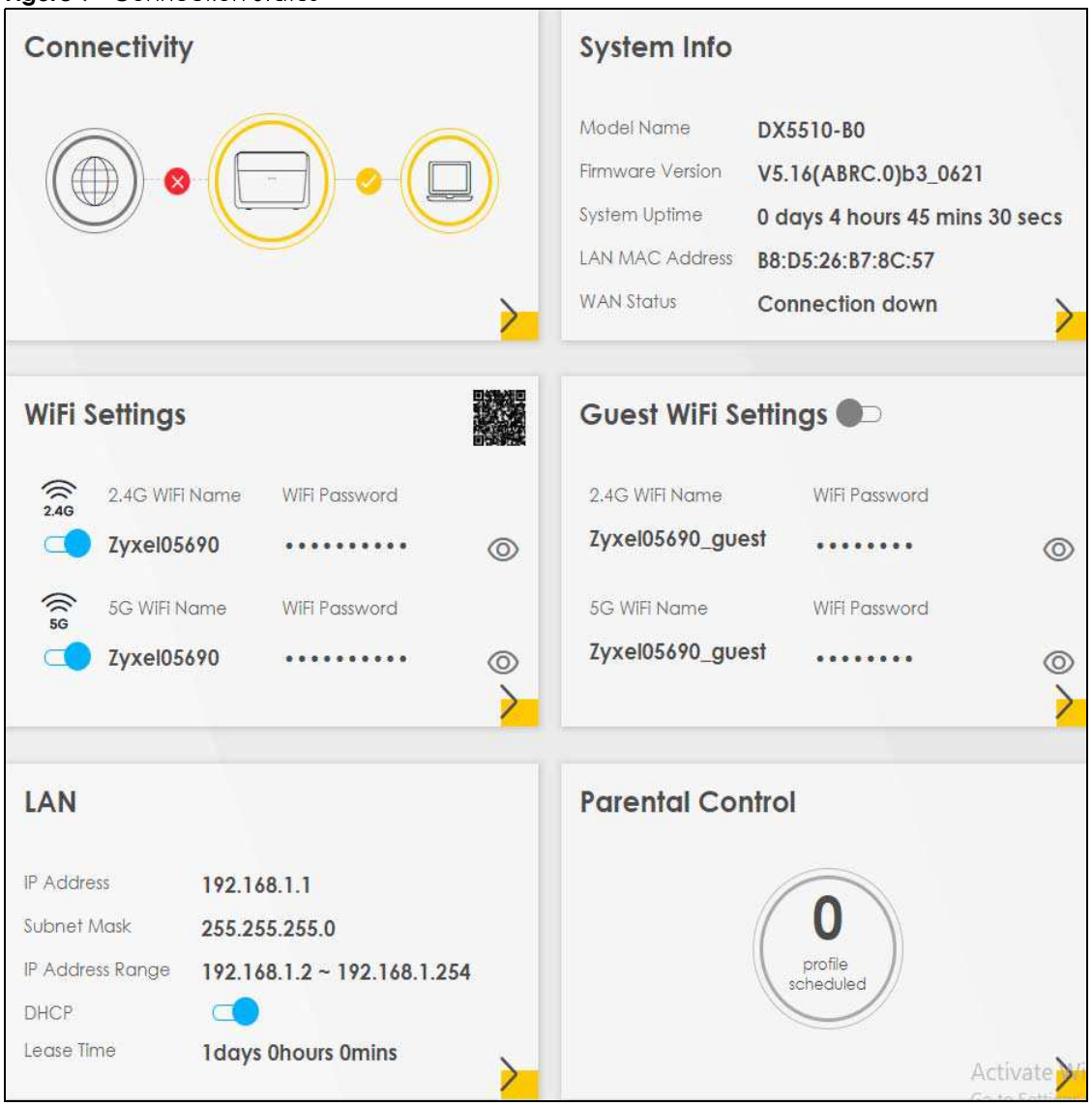
Figure 8 Change Password Screen



6 The **Wizard** screen displays when you log into the Web Configurator for the first time. Use the **Wizard** screens to configure the Zyxel Device's time zone, basic Internet access, and wireless settings. See Chapter 3 on page 31 for more information about the **Wizard** screens.

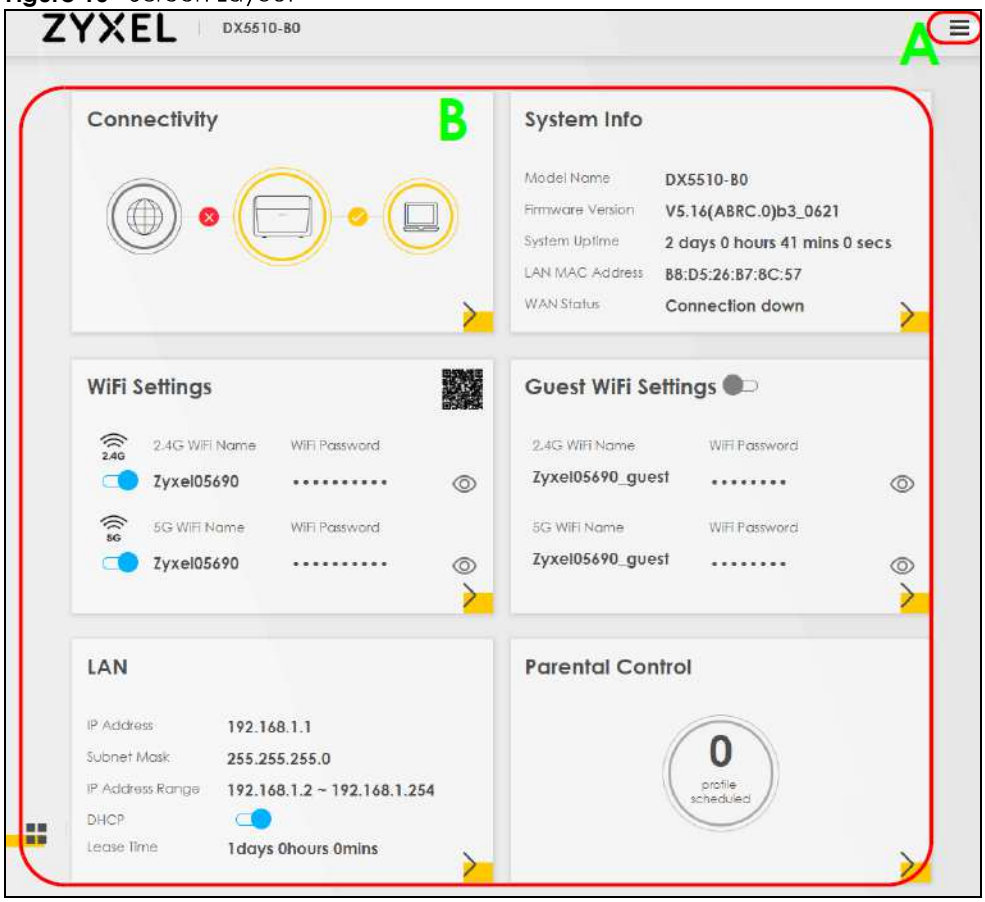
7 The **Connection Status** page appears. Use this screen to configure basic Internet access, wireless settings, and parental control settings (see Section 5.1 on page 58 for details).

Figure 9 Connection Status



2.2 Web Configurator Layout

Figure 10 Screen Layout



As illustrated above, the main screen is divided into these parts:

- **A** - Navigation Panel
- **B** - Main Window

2.2.1 Navigation Panel

Click the menu icon ( ) to display the navigation panel that contains configuration menus and icons (quick links). Click **X** to close the navigation panel.

2.2.1.1 Configuration Menus

Use the menu items on the navigation panel to open screens to configure Zyxel Device features. The following tables describe each menu item.

Table 3 Configuration Menus Summary

LINK	TAB	FUNCTION
Connection Status		Use this screen to configure basic Internet access, wireless settings, and parental control settings. This screen also shows the network status of the Zyxel Device and computers/devices connected to it.
Network Setting		
Broadband	Broadband	Use this screen to view and configure ISP parameters, WAN IP address assignment, and other advanced properties. You can also add new WAN connections.
Wireless	General	Use this screen to configure the WiFi settings and WLAN authentication/ security settings.
	Guest/More AP	Use this screen to configure multiple BSSs on the Zyxel Device.
	MAC Authentication	Use this screen to block or allow wireless traffic from wireless devices of certain SSIDs and MAC addresses to the Zyxel Device.
	WPS	Use this screen to configure and view your WPS (WiFi Protected Setup) settings.
	WMM	Use this screen to enable or disable WiFi MultiMedia (WMM).
	Others	Use this screen to configure advanced wireless settings.
	Channel Status	Use this screen to scan WiFi channel noises and view the results.
Home Networking	LAN Setup	Use this screen to configure LAN TCP/IP settings, and other advanced properties.
	Static DHCP	Use this screen to assign specific IP addresses to individual MAC addresses.
	UPnP	Use this screen to turn UPnP and UPnP NAT-T on or off.
	Additional Subnet	Use this screen to configure IP alias and public static IP.
	STB Vendor ID	Use this screen to configure the Vendor IDs of the connected Set Top Box (STB) devices, which have the Zyxel Device automatically create static DHCP entries for the STB devices when they request IP addresses.
	Wake on LAN	Use this screen to remotely turn on a device on the local network.
	TFTP Server Name	Use DHCP option 66 to identify a TFTP server name.
Routing	Static Route	Use this screen to view and set up static routes on the Zyxel Device.
	DNS Route	Use this screen to forward DNS queries for certain domain names through a specific WAN interface to its DNS server(s).
	Policy Route	Use this screen to configure policy routing on the Zyxel Device.
	RIP	Use this screen to configure Routing Information Protocol to exchange routing information with other routers.
QoS	General	Use this screen to enable QoS and traffic prioritizing. You can also configure the QoS rules and actions.
	Queue Setup	Use this screen to configure QoS queues.
	Classification Setup	Use this screen to define a classifier.
	Shaper Setup	Use this screen to limit outgoing traffic rate on the selected interface.
	Policer Setup	Use this screen to configure QoS policers.

Table 3 Configuration Menus Summary (continued)

LINK	TAB	FUNCTION
NAT	Port Forwarding	Use this screen to make your local servers visible to the outside world.
	Port Triggering	Use this screen to change your Zyxel Device's port triggering settings.
	DMZ	Use this screen to configure a default server which receives packets from ports that are not specified in the **Port Forwarding** screen.
	ALG	Use this screen to enable the ALG (Application Layer Gateways) in the Zyxel Device to allow applications to operate through NAT.
	Address Mapping	Use this screen to change your Zyxel Device's address mapping settings.
	Sessions	Use this screen to configure the maximum number of NAT sessions each client host is allowed to have through the Zyxel Device.
DNS	DNS Entry	Use this screen to view and configure DNS routes.
	Dynamic DNS	Use this screen to allow a static hostname alias for a dynamic IP address.
IGMP/MLD	IGMP/MLD	Use this screen to configure multicast settings (IGMP for IPv4 and MLD for IPv6 multicast groups) on the WAN.
Vlan Group	Vlan Group	Use this screen to group and tag VLAN IDs to outgoing traffic from the specified interface.
Interface Grouping	Interface Grouping	Use this screen to map a port to a PVC or bridge group.
Security		
Firewall	General	Use this screen to configure the security level of your firewall.
	Protocol	Use this screen to add Internet services and configure firewall rules.
	Access Control	Use this screen to enable specific traffic directions for network services.
	DoS	Use this screen to activate protection against Denial of Service (DoS) attacks.
MAC Filter	MAC Filter	Use this screen to block or allow traffic from devices of certain MAC addresses to the Zyxel Device.
Scheduler Rule	Scheduler Rule	Use this screen to configure the days and times when a configured restriction (such as parental control) is enforced.
Certificates	Local Certificates	Use this screen to view a summary list of certificates and manage certificates and certification requests.
	Trusted CA	Use this screen to view and manage the list of the trusted CAs.
System Monitor		
Log	System Log	Use this screen to view the status of events that occurred to the Zyxel Device. You can export or email the logs.
	Security Log	Use this screen to view all security related events. You can select level and category of the security events in their proper drop-down list window. •
Traffic Status	WAN	Use this screen to view the status of all network traffic going through the WAN port of the Zyxel Device.
	LAN	Use this screen to view the status of all network traffic going through the LAN ports of the Zyxel Device.
	NAT	Use this screen to view NAT statistics for connected hosts.
ARP Table	ARP Table	Use this screen to view the ARP table. It displays the IP and MAC address of each DHCP connection.
Routing Table	Routing Table	Use this screen to view the routing table on the Zyxel Device.

Table 3 Configuration Menus Summary (continued)

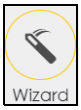
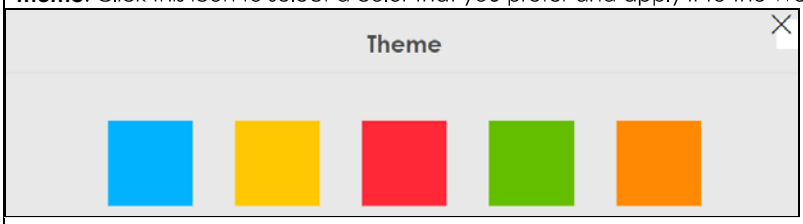
LINK	TAB	FUNCTION
Multicast Status	IGMP Status	Use this screen to view the status of all IGMP settings on the Zyxel Device.
	MLD Status	Use this screen to view the status of all MLD settings on the Zyxel Device.
WLAN Station Status	WLAN Station Status	Use this screen to view the wireless stations that are currently connected to the Zyxel Device.
Maintenance		
System	System	Use this screen to set Device name and Domain name.
User Account	User Account	Use this screen to change user password on the Zyxel Device.
Remote Management	MGMT Services	Use this screen to enable specific traffic directions for network services.
	Trust Domain	Use this screen to view a list of public IP addresses which are allowed to access the Zyxel Device through the services configured in the **Maintenance** > **Remote Management** > **MGMT Services** screen.
SNMP	SNMP	Use this screen to configure SNMP (Simple Network Management Protocol) settings.
Time	Time	Use this screen to change your Zyxel Device's time and date.
E-mail Notification	E-mail Notification	Use this screen to configure up to two mail servers and sender addresses on the Zyxel Device.
Log Settings	Log Setting	Use this screen to change your Zyxel Device's log settings.
Firmware Upgrade	Firmware Upgrade	Use this screen to upload firmware to your Zyxel Device.
Backup/Restore	Backup/Restore	Use this screen to backup and restore your Zyxel Device's configuration (settings) or reset the factory default settings.
Reboot	Reboot	Use this screen to reboot the Zyxel Device without turning the power off.
Diagnostic	Ping&Traceroute &Nslookup	Use this screen to identify problems with the Zyxel Device. You can use Ping, TraceRoute, or Nslookup to help you identify problems.

2.2.1.2 Icons

The icons can be found on the right hand side.

The icons provide the following functions.

Table 4 Web Configurator Icons

ICON	DESCRIPTION
	**Wizard**: Click this icon to open screens where you can configure the Zyxel Device's time zone Internet access, and wireless settings. See Chapter 3 on page 31 for more information about the **Wizard** screens.
	**Theme**: Click this icon to select a color that you prefer and apply it to the Web Configurator. 
	**Language**: Select the language you prefer.
	**Restart**: Click this icon to reboot the Zyxel Device without turning the power off.
	**Logout**: Click this icon to log out of the Web Configurator.

CHAPTER 3
Quick Start Wizard

3.1 Overview

Use the **Wizard** screens to configure the Zyxel Device's time zone, basic Internet access, and wireless settings.

Note: See the technical reference chapters (starting on Chapter 4 on page 35) for background information on the features in this chapter.

3.2 Wizard Setup

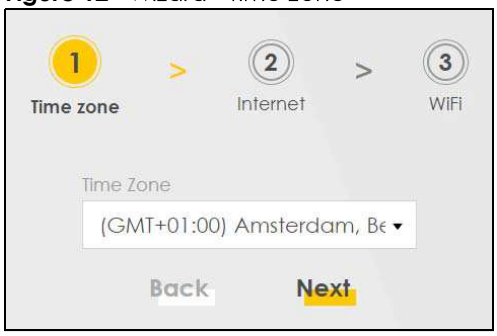
You can click the **Wizard** icon in the navigation panel to open the **Wizard** screens. See Section 2.2.1.1 on page 26 for more information about the navigation panel. After you click the **Wizard** icon, the following screen appears. Click **Let's Go** to proceed with settings on time zone, basic Internet access, and wireless networks. It will take you a few minutes to complete the settings on the **Wizard** screens. You can also click **Skip** to leave the **Wizard** screens.

Figure 11 Wizard - Home

3.2.1 Time Zone

Select the time zone of your location. Click **Next**.

Figure 12 Wizard - Time Zone



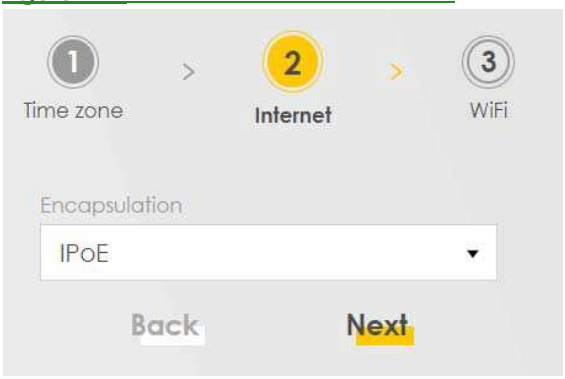
3.2.2 Internet

1 The Zyxel Device will check the Internet status automatically, and determine your connection type. Click **Next** to proceed. You can also click **Skip** to bypass checking for an Internet connection in the **Wizard**.

Figure 13 Wizard - Internet

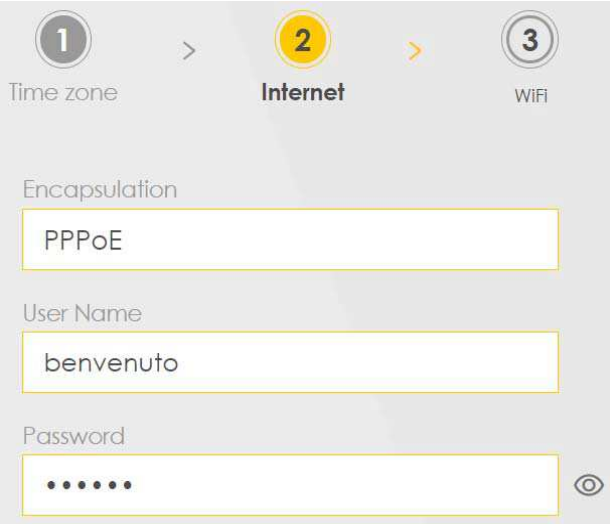
2 If the following screen displays, select the encapsulation type your ISP uses. Click **Next**.

Figure 14 Wizard - Internet Information



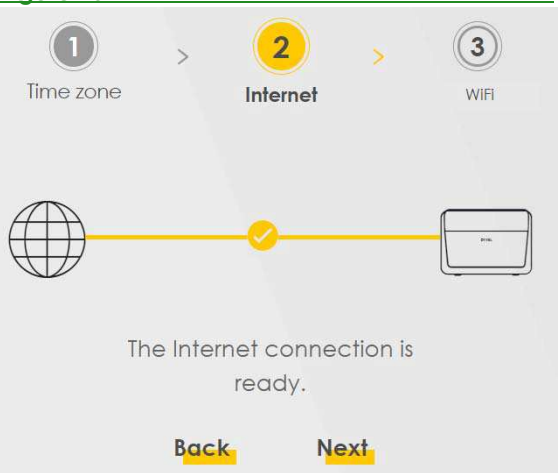
Enter your Internet connection information. The screen and fields to enter may vary depending on your current connection type. Click **Next**.

Figure 15 Wizard - Internet Connection Information



3 Click **Next** when the Zyxel Device has a successful Internet connection.

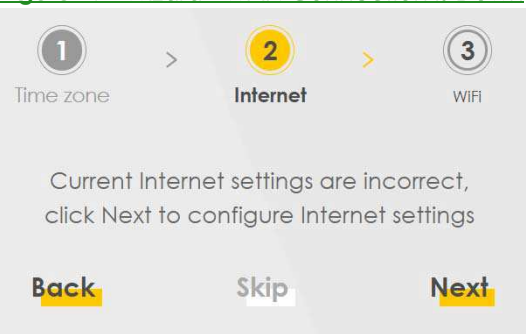
Figure 16 Wizard - Successful WAN Connection



Unsuccessful Internet Connection

The following screen displays when the Zyxel Device did not detect a WAN connection. Click **Next** to configure the Internet settings.

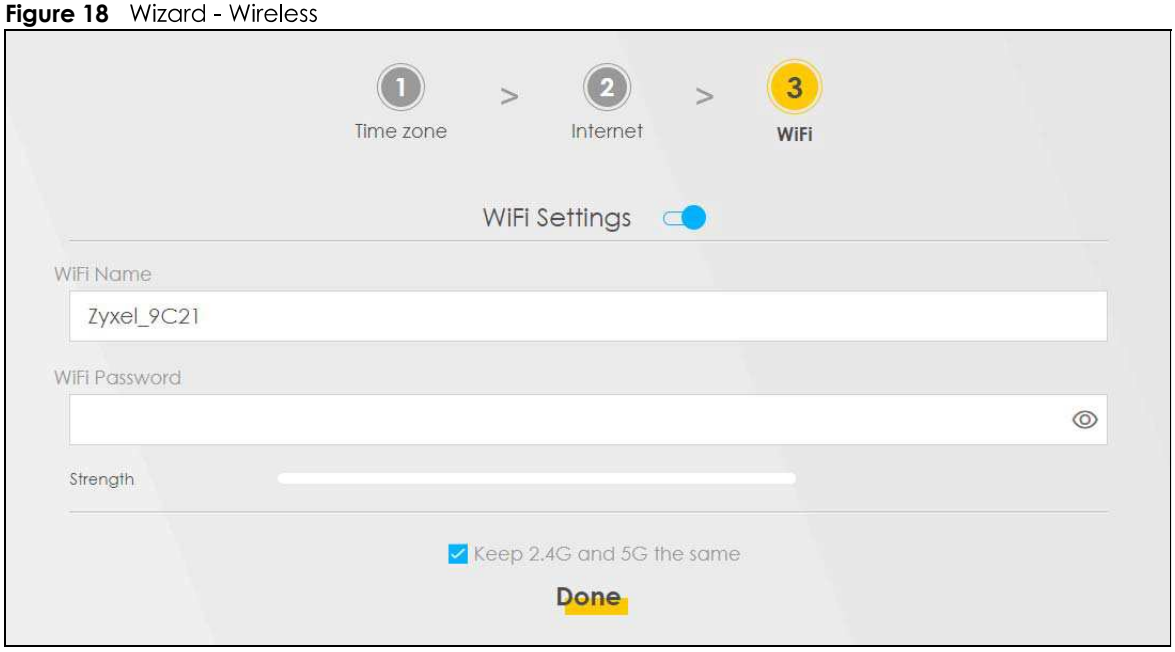
Figure 17 Wizard - WAN Connection is Down



3.2.3 WiFi

Turn WiFi on or off. If you keep it on, record the security settings so you can configure your wireless clients to connect to the Zyxel Device.
Click the **Keep 2.4G and 5G the same** check box to use the same SSID for 2.4G and 5G wireless networks. Otherwise, deselect the check box to have two different SSIDs for 2.4G and 5G wireless networks. The screen and fields to enter may vary when you select or deselect the check box.
Click **Done** to complete the setup and close the **Wizard** screen.

Figure 18 Wizard - Wireless



CHAPTER 4
Tutorials

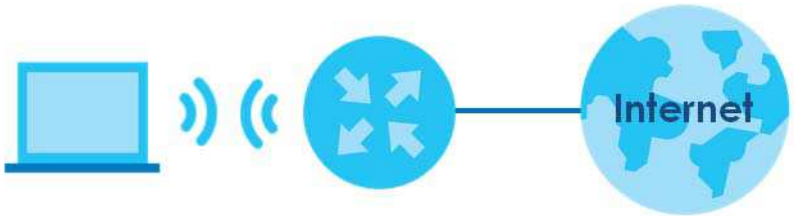
4.1 Overview

This chapter shows you how to use the Zyxel Device's various features.

- Setting Up a Secure Wireless Network, see page 35
- Setting Up Multiple Wireless Groups, see page 42
- Configuring Static Route for Routing to Another Network, see page 47
- Configuring QoS Queue and Class Setup, see page 49
- Access the Zyxel Device Using DDNS, see page 53
- Configuring the MAC Address Filter, see page 55

4.2 Setting Up a Secure Wireless Network

Thomas wants to set up a wireless network so that he can use his notebook to access the Internet. In this wireless network, the Zyxel Device serves as an access point (AP), and the notebook is the wireless client. The wireless client can access the Internet through the AP.



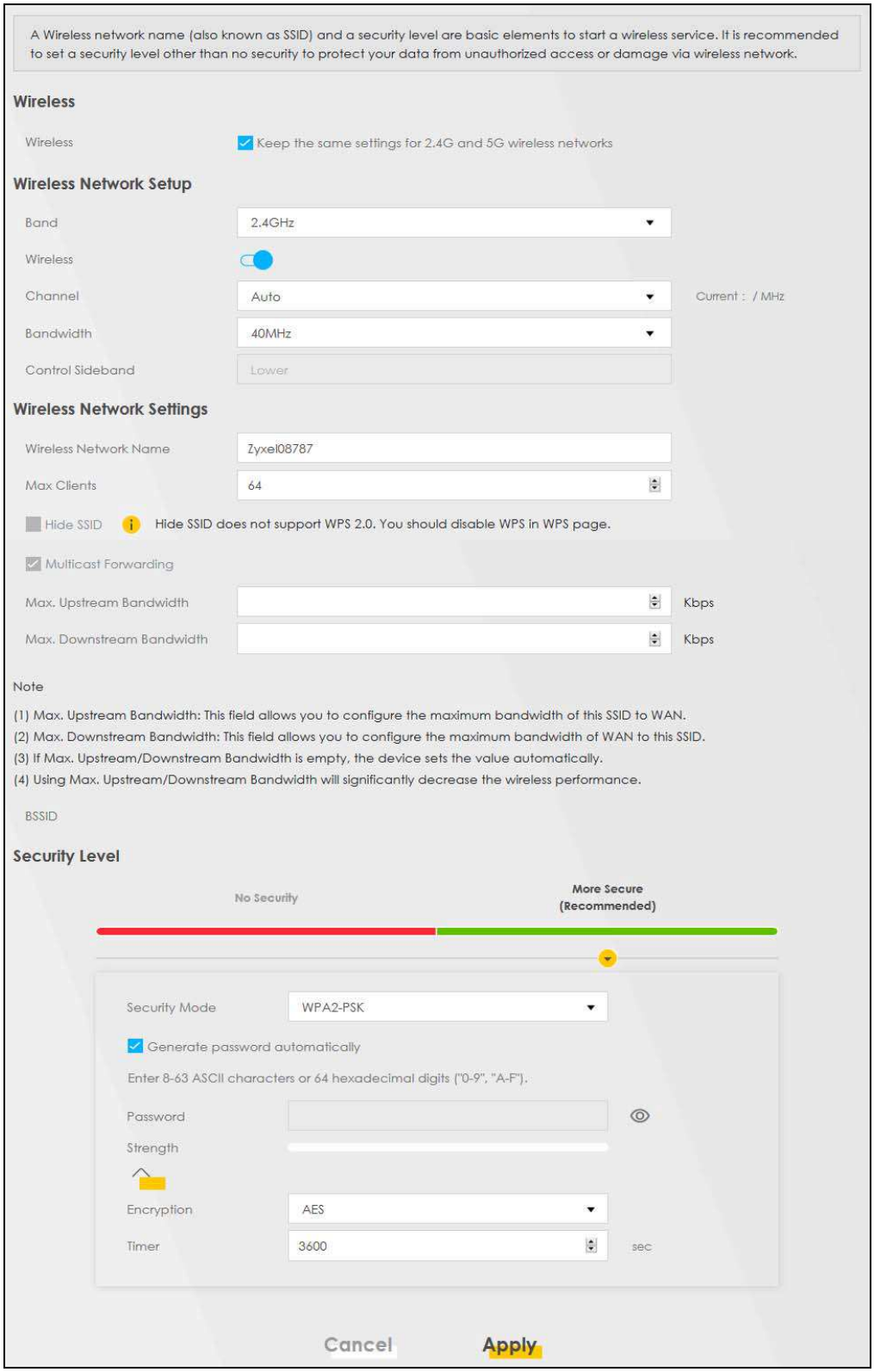
Thomas has to configure the wireless network settings on the Zyxel Device. Then he can set up a wireless network using WPS (Section 4.2.2 on page 37) or manual configuration (Section 4.2.3 on page 41).

4.2.1 Configuring the Wireless Network Settings

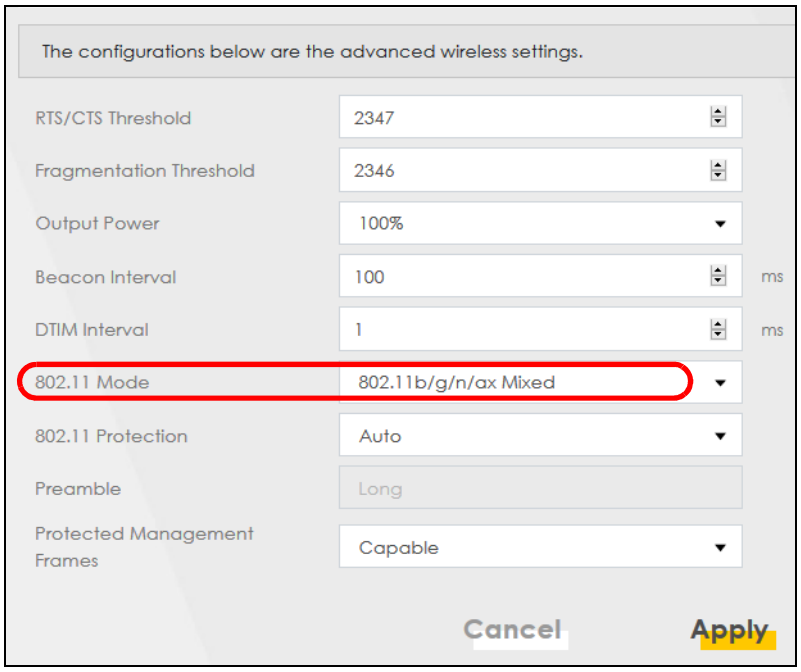
This example uses the following parameters to set up a wireless network.

SSID	Example
Security Mode	WPA2-PSK
Pre-Shared Key	DoNotStealMyWirelessNetwork
802.11 Mode	802.11b/g/n/ax Mixed

1 Click **Network Setting** > **Wireless** to open the **General** screen. Select **More Secure** as the security level and **WPA2-PSK** as the security mode. Configure the screen using the provided parameters (see page 35). Click **Apply**.



2 Go to the **Wireless > Others** screen and select **802.11b/g/n/ax Mixed** in the **802.11 Mode** field. Click **Apply**.



Thomas can now use the WPS feature to establish a wireless connection between his notebook and the Zyxel Device (see Section 4.2.2 on page 37). He can also use the notebook's wireless client to search for the Zyxel Device (see Section 4.2.3 on page 41).

4.2.2 Using WPS

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

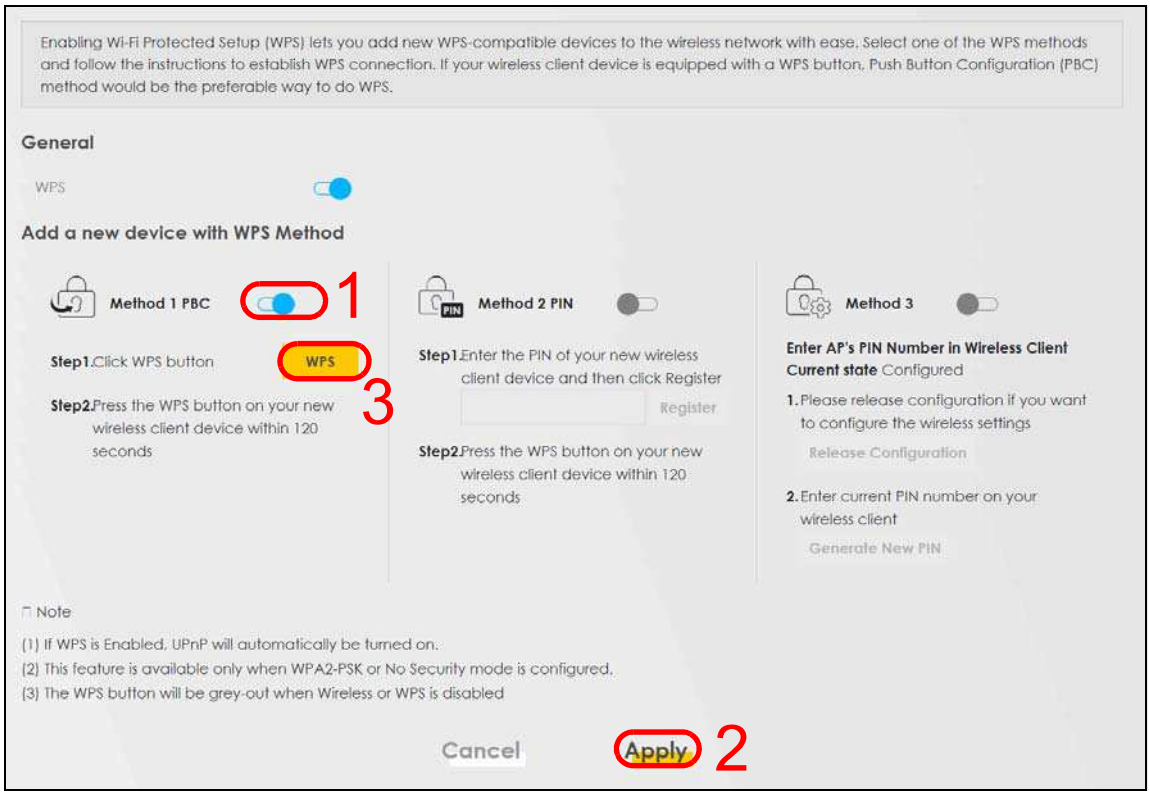
There are two WPS methods for creating a secure connection. This tutorial shows you how to do both.

- **Push Button Configuration (PBC)** - create a secure wireless network simply by pressing a button. See Section on page 37. This is the easier method.
- **PIN Configuration** - create a secure wireless network simply by entering a wireless client's PIN (Personal Identification Number) in the Zyxel Device's interface. See Section on page 39. This is the more secure method, since one device can authenticate the other.

Push Button Configuration (PBC)

1 Make sure that your Zyxel Device is turned on and your notebook is within the cover range of the wireless signal.

2 Push and hold the **WPS** button located on the Zyxel Device's front panel for one second. Alternatively, you may log into the Zyxel Device's Web Configurator and go to the **Network Setting > Wireless > WPS** screen. Enable the WPS function for method 1 and click **Apply**. Then click the **Connect** button.



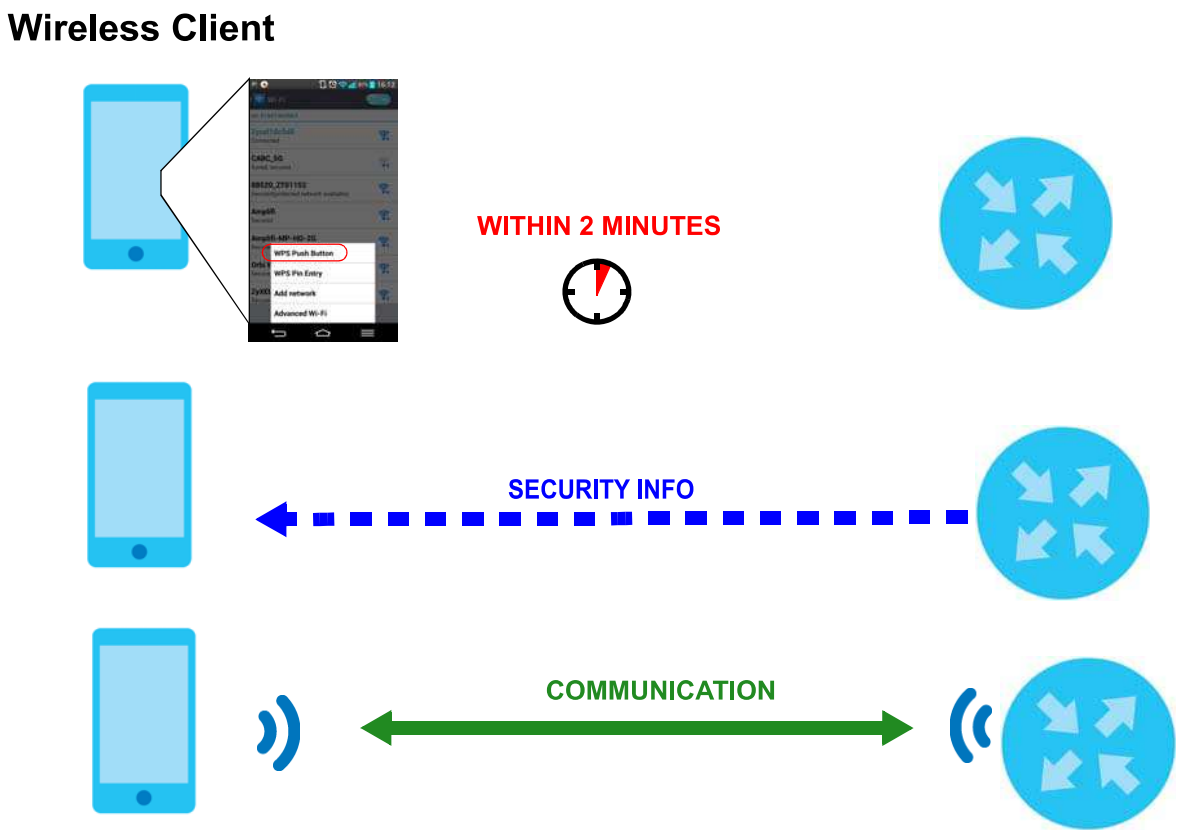
Note: Your Zyxel Device has a WPS button located on its side panel as well as a WPS button in its configuration utility. Both buttons have exactly the same function: you can use one or the other.

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

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

The following figure shows you how to set up wireless network and security by pressing a button on both Zyxel Device and wireless client (the Android phone in this example).

Figure 19 Example WPS Process: PBC Method

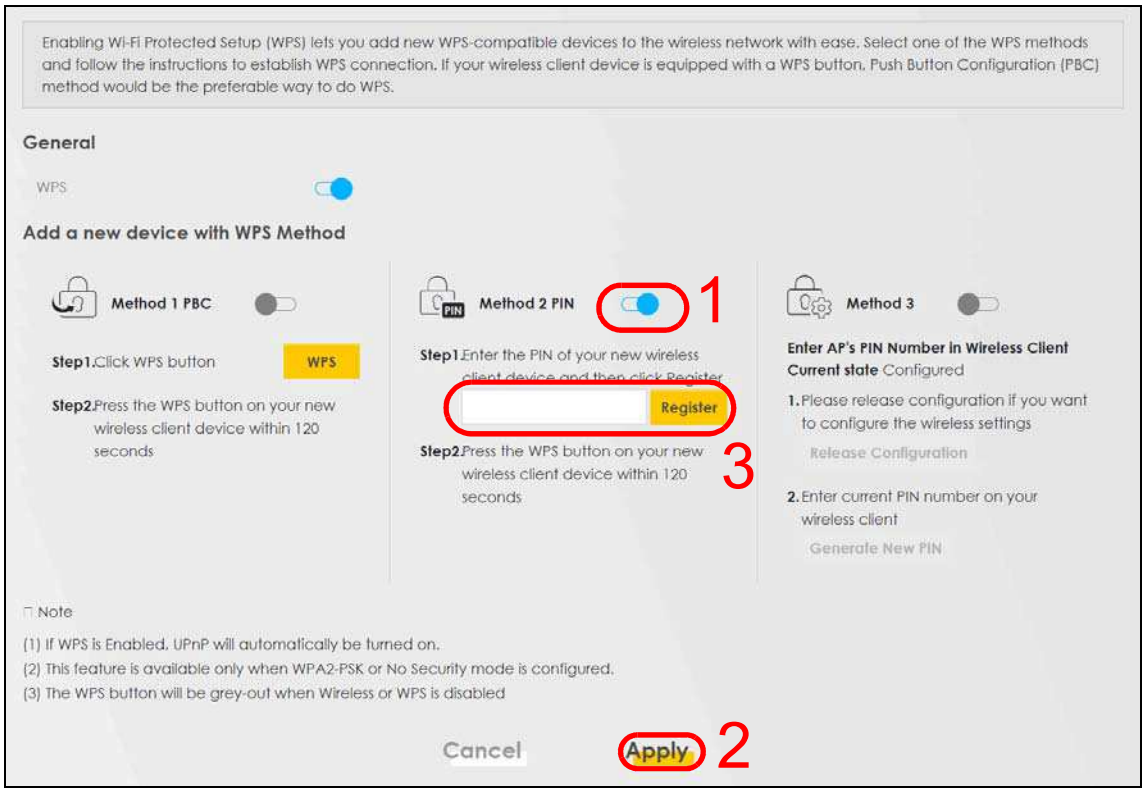


PIN Configuration

When you use the PIN configuration method, you need to check the client's PIN number and use the Zyxel Device's configuration interface.

1 Go to your phone settings and turn on WiFi. Open the WiFi networks list and tap **WPS PIN Entry** to get a PIN number.

2 Log into Zyxel Device's Web Configurator and go to the **Network Setting > Wireless > WPS** screen. Enable the WPS function and click **Apply**.

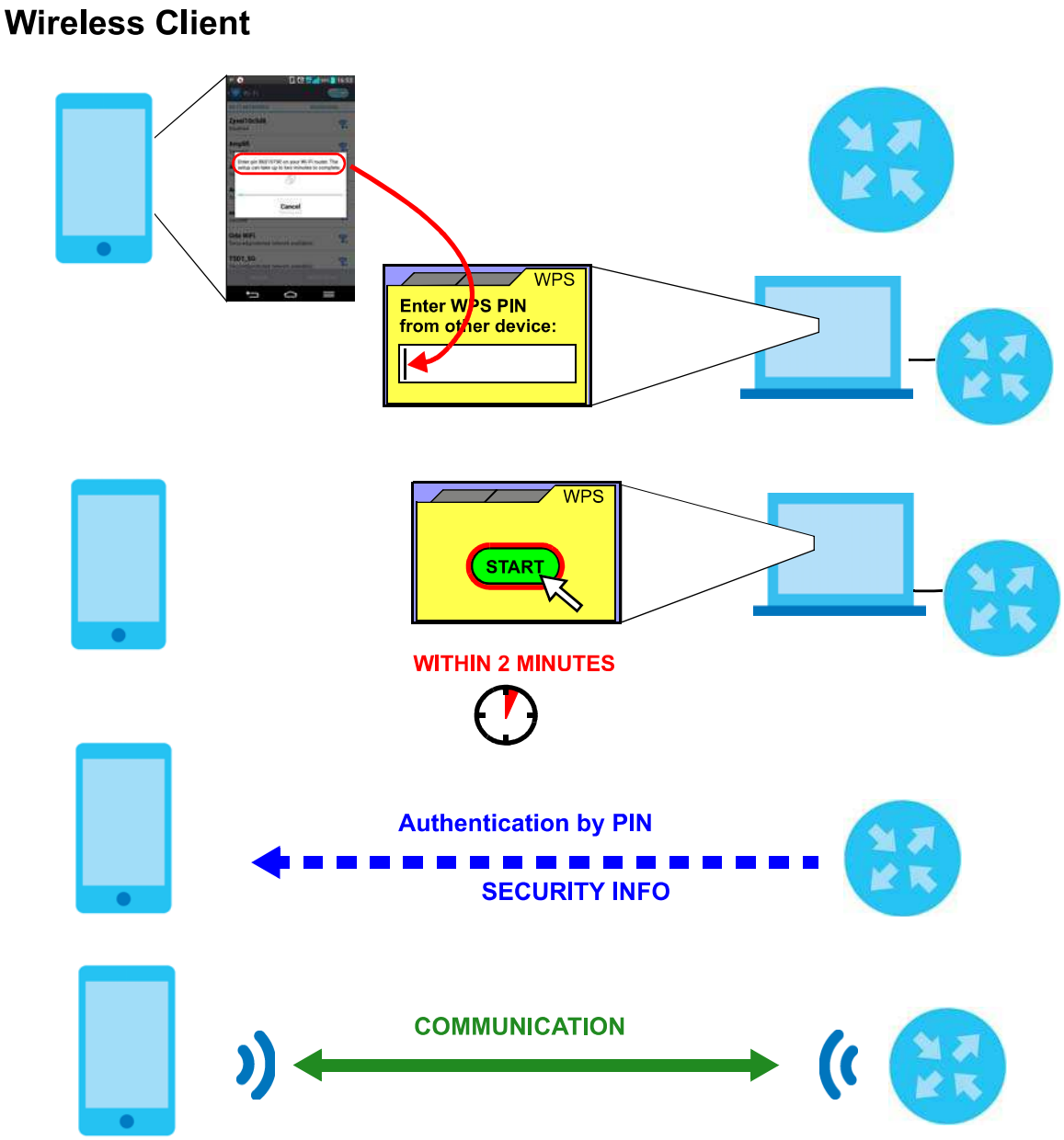


3 Enter the PIN number of the wireless client and click the **Register** button. Activate WPS function on the wireless client utility screen within two minutes.

The Zyxel Device authenticates the wireless client and sends the proper configuration settings to the wireless client. This may take up to two minutes. The wireless client is then able to communicate with the Zyxel Device securely.

The following figure shows you how to set up wireless network and security on Zyxel Device and wireless client (Android smartphone in this example) by using the PIN method.

Figure 20 Example WPS Process: PIN Method



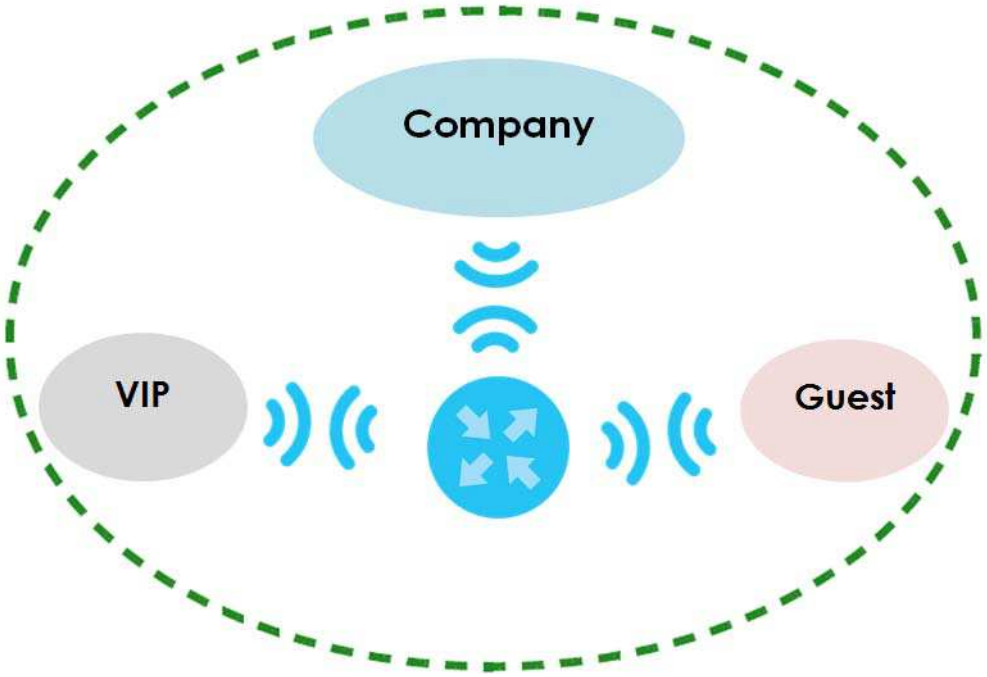
4.2.3 Without WPS

Use the wireless adapter's utility installed on the notebook to search for the "Example" SSID. Then enter the "DoNotStealMyWirelessNetwork" pre-shared key to establish a wireless Internet connection.

Note: The Zyxel Device supports IEEE 802.11a/b/g/n/ac/ax wireless clients. Make sure that your notebook or computer's wireless adapter supports one of these standards.

4.3 Setting Up Multiple Wireless Groups

Company A wants to create different wireless network groups for different types of users as shown in the following figure. Each group has its own SSID and security mode.

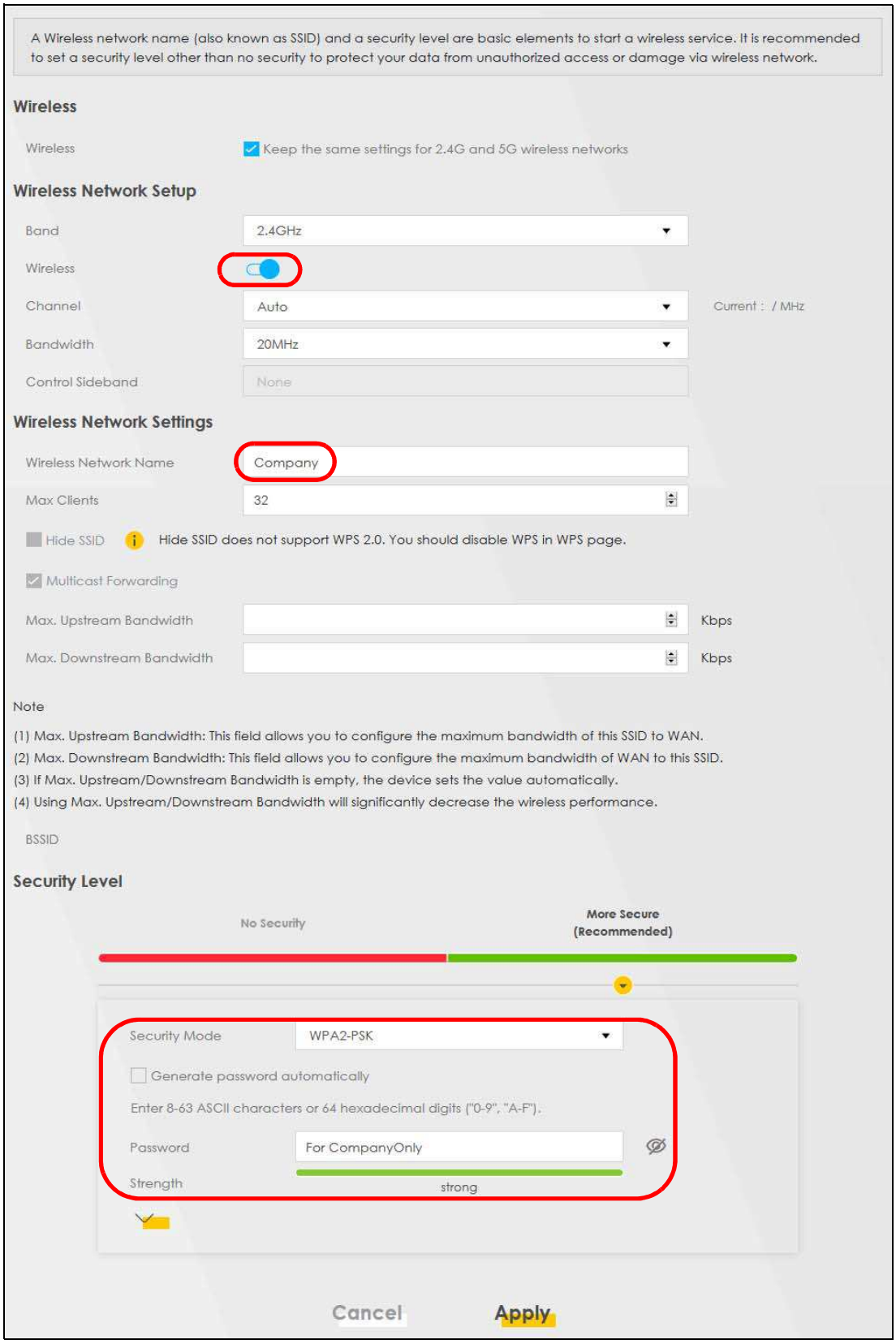


- Employees in Company A will use a general **Company** wireless network group.
- Higher management level and important visitors will use the **VIP** group.
- Visiting guests will use the **Guest** group, which has a different SSID and password.

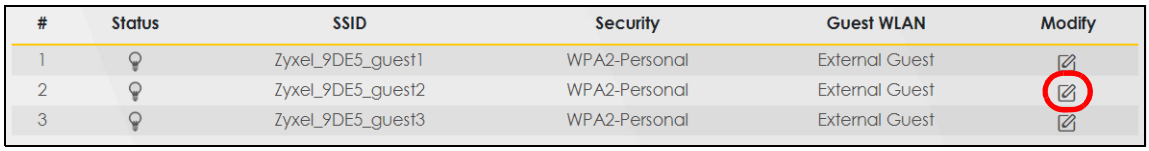
Company A will use the following parameters to set up the wireless network groups.

	COMPANY	VIP	GUEST
SSID	Company	VIP	Guest
Security Level	More Secure	More Secure	More Secure
Security Mode	WPA2-PSK	WPA2-PSK	WPA2-PSK
Pre-Shared Key	ForCompanyOnly	123456789	guest123

1 Click **Network Setting > Wireless** to open the **General** screen. Use this screen to set up the company's general wireless network group. Configure the screen using the provided parameters and click **Apply**.

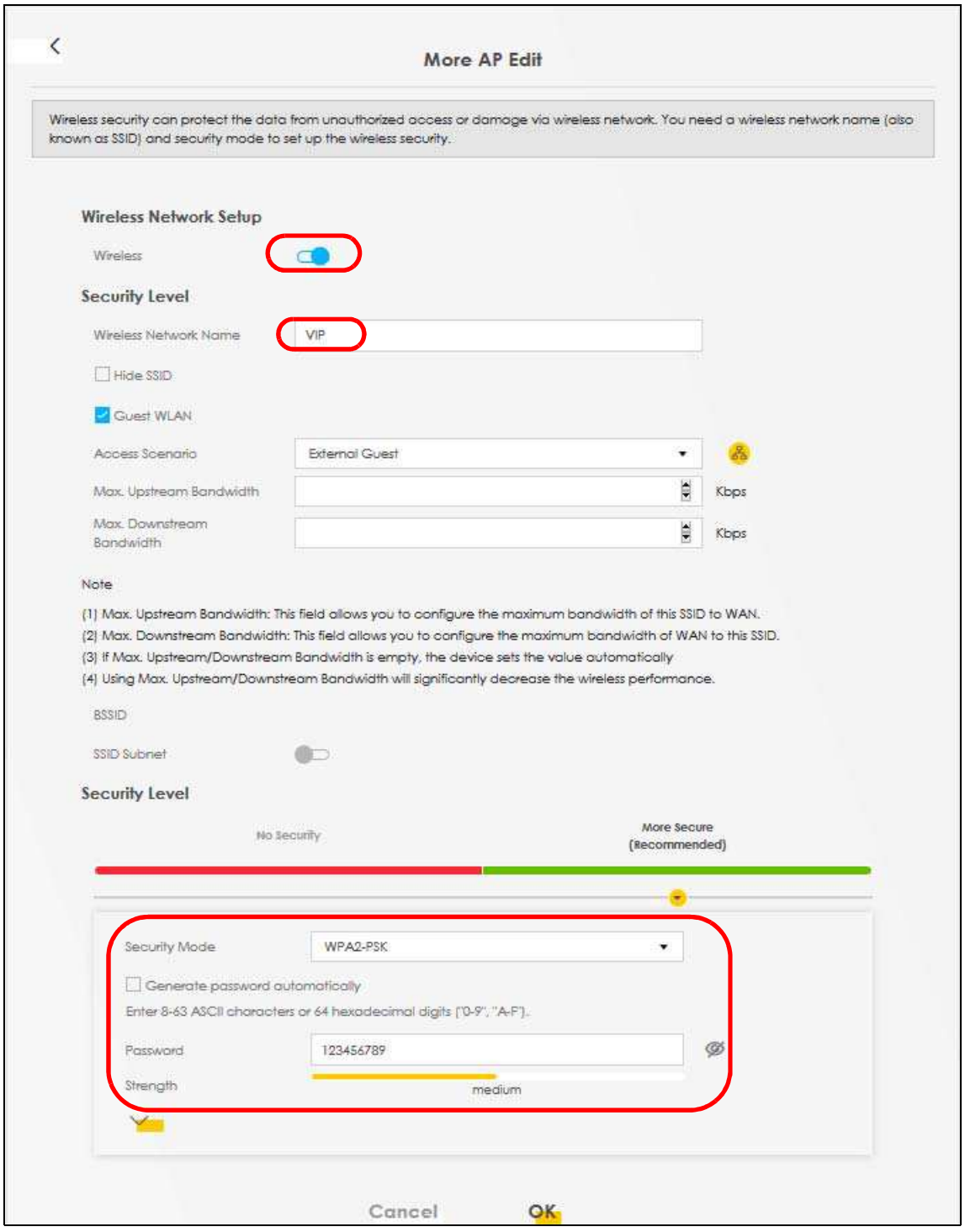

A Wireless network name (also known as SSID) and a security level are basic elements to start a wireless service. It is recommended to set a security level other than no security to protect your data from unauthorized access or damage via wireless network.
Wireless
Wireless
Keep the same settings for 2.4G and 5G wireless networks
Wireless Network Setup
Band
2.4GHz
Wireless
Channel
Auto
Current : / MHz
Bandwidth
20MHz
Control Sideband
None
Wireless Network Settings
Wireless Network Name
Company
Max Clients
32
Hide SSID
Hide SSID does not support WPS 2.0. You should disable WPS in WPS page.
Multicast Forwarding
Max. Upstream Bandwidth
Kbps
Max. Downstream Bandwidth
Kbps
Note
(1) Max. Upstream Bandwidth: This field allows you to configure the maximum bandwidth of this SSID to WAN.
(2) Max. Downstream Bandwidth: This field allows you to configure the maximum bandwidth of WAN to this SSID.
(3) If Max. Upstream/Downstream Bandwidth is empty, the device sets the value automatically.
(4) Using Max. Upstream/Downstream Bandwidth will significantly decrease the wireless performance.
BSSID
Security Level
No Security
More Secure (Recommended)
Security Mode
WPA2-PSK
Generate password automatically
Enter 8-63 ASCII characters or 64 hexadecimal digits ("0-9", "A-F").
Password
For CompanyOnly
Strength
strong
Cancel
Apply

2 Click **Network Setting > Wireless > Guest/More AP** to open the following screen. Click the **Edit** icon to configure the second wireless network group.

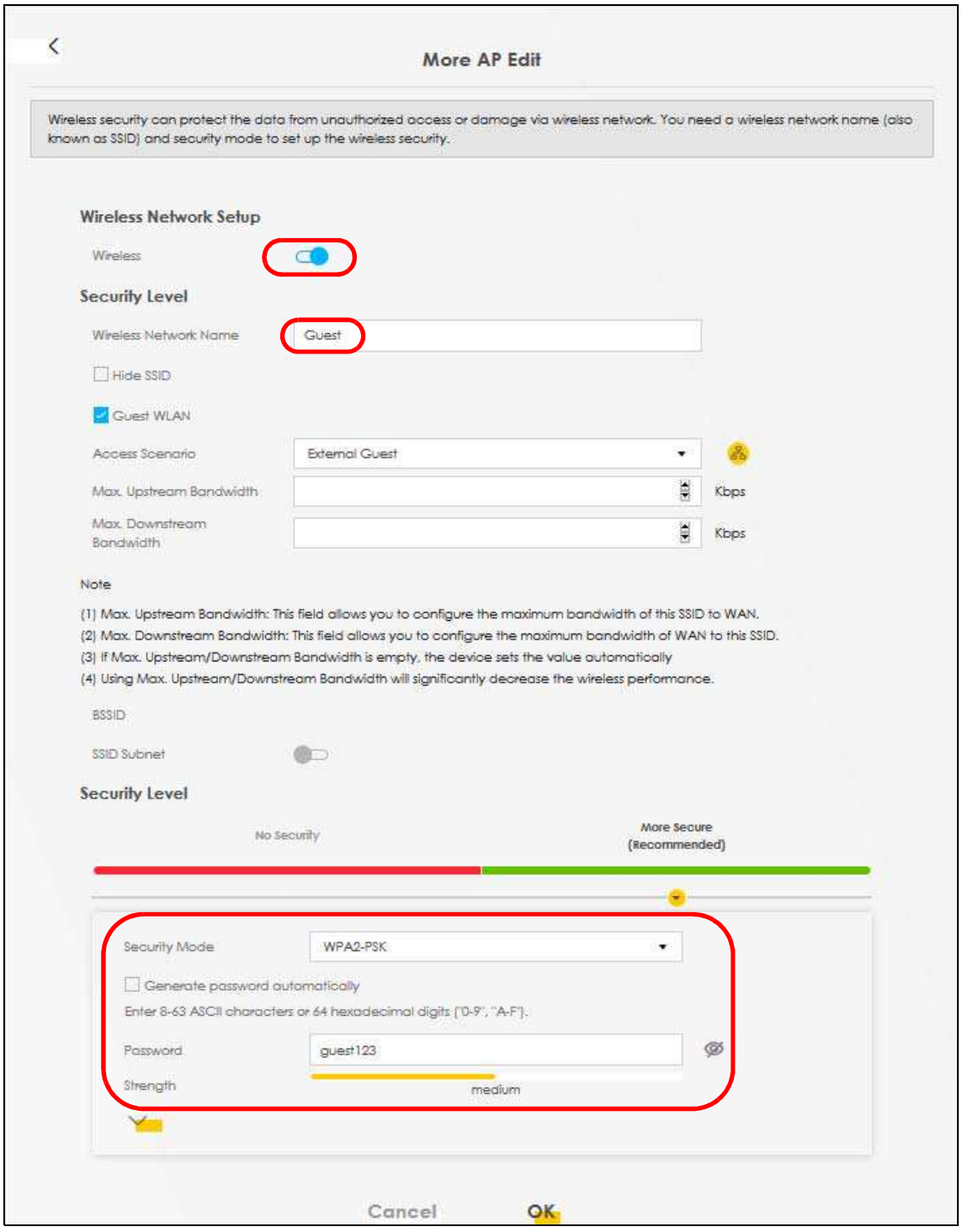


#	Status	SSID	Security	Guest WLAN	Modify
1		Zyxel_9DE5_guest1	WPA2-Personal	External Guest	
2		Zyxel_9DE5_guest2	WPA2-Personal	External Guest	
3		Zyxel_9DE5_guest3	WPA2-Personal	External Guest	

3 Configure the screen using the provided parameters and click **Apply**.



4 In the **Guest/More AP** screen, click the **Edit** icon to configure the third wireless network group. Configure the screen using the provided parameters and click **Apply**.



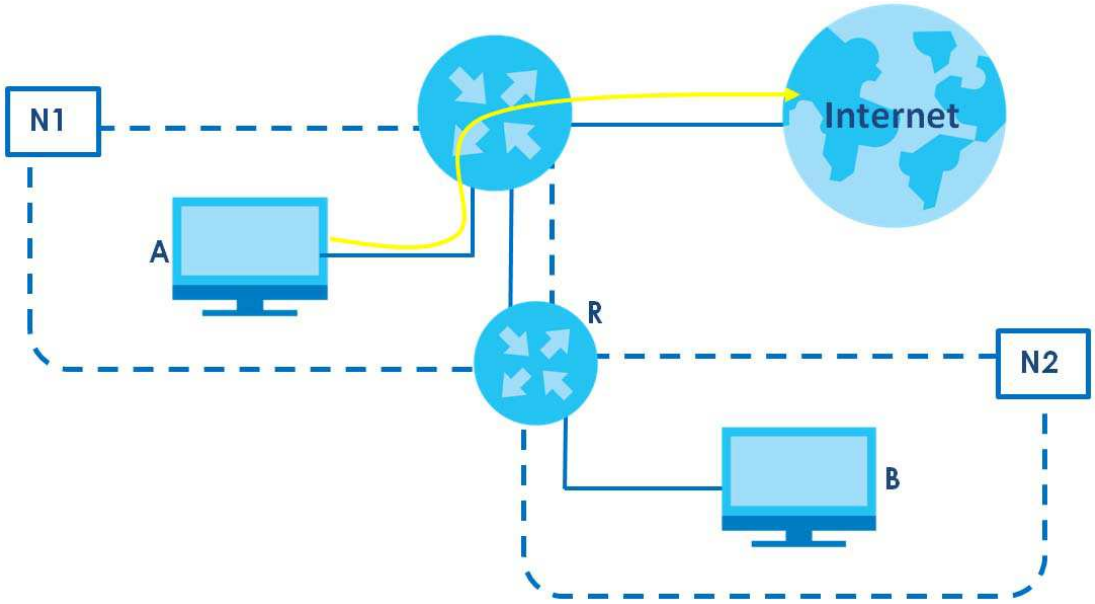
5 Check the status of **VIP** and **Guest** in the **Guest/More AP** screen. The yellow bulbs signify that the SSIDs are active and ready for wireless access.

#	Status	SSID	Security	Guest WLAN	Modify
1		Home&Life SuperWiFi-F0FD_guest1	WPA2-Personal	External Guest	
2		VIP	WPA2-Personal	External Guest	
3		Guest	WPA2-Personal	External Guest	

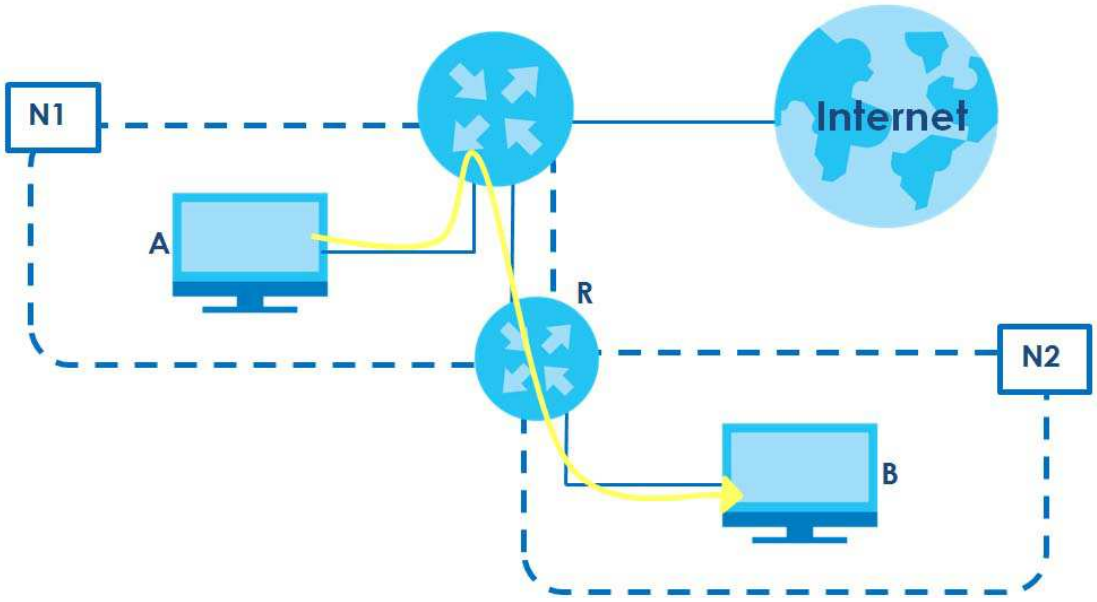
4.4 Configuring Static Route for Routing to Another Network

In order to extend your Intranet and control traffic flowing directions, you may connect a router to the Zyxel Device's LAN. The router may be used to separate two department networks. This tutorial shows how to configure a static routing rule for two network routings.

In the following figure, router **R** is connected to the Zyxel Device's LAN. **R** connects to two networks, **N1** (192.168.1.x/24) and **N2** (192.168.10.x/24). If you want to send traffic from computer **A** (in **N1** network) to computer **B** (in **N2** network), the traffic is sent to the Zyxel Device's WAN default gateway by default. In this case, **B** will never receive the traffic.



You need to specify a static routing rule on the Zyxel Device to specify **R** as the router in charge of forwarding traffic to **N2**. In this case, the Zyxel Device routes traffic from **A** to **R** and then **R** routes the traffic to **B**.



This tutorial uses the following example IP settings:

Table 5 IP Settings in this Tutorial

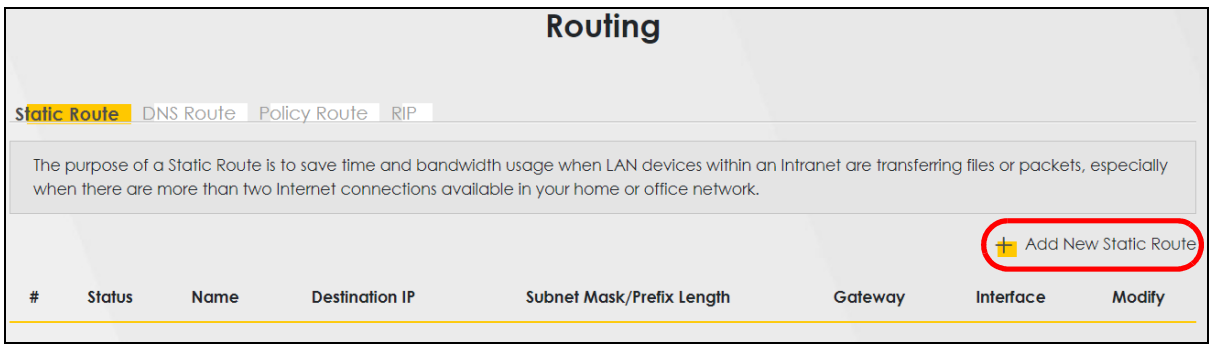
DEVICE / COMPUTER	IP ADDRESS
The Zyxel Device's WAN	172.16.1.1
The Zyxel Device's LAN	192.168.1.1
IP Type	IPv4
Use Interface	Ethernet
A	192.168.1.34
R's N1	192.168.1.253
R's N2	192.168.10.2
B	192.168.10.33

To configure a static route to route traffic from **N1** to **N2**:

1 Log into the Zyxel Device's Web Configurator in advanced mode.

2 Click **Network Setting** > **Routing**.

3 Click **Add new Static Route** in the **Static Route** screen.



4 Configure the **Static Route Setup** screen using the following settings:

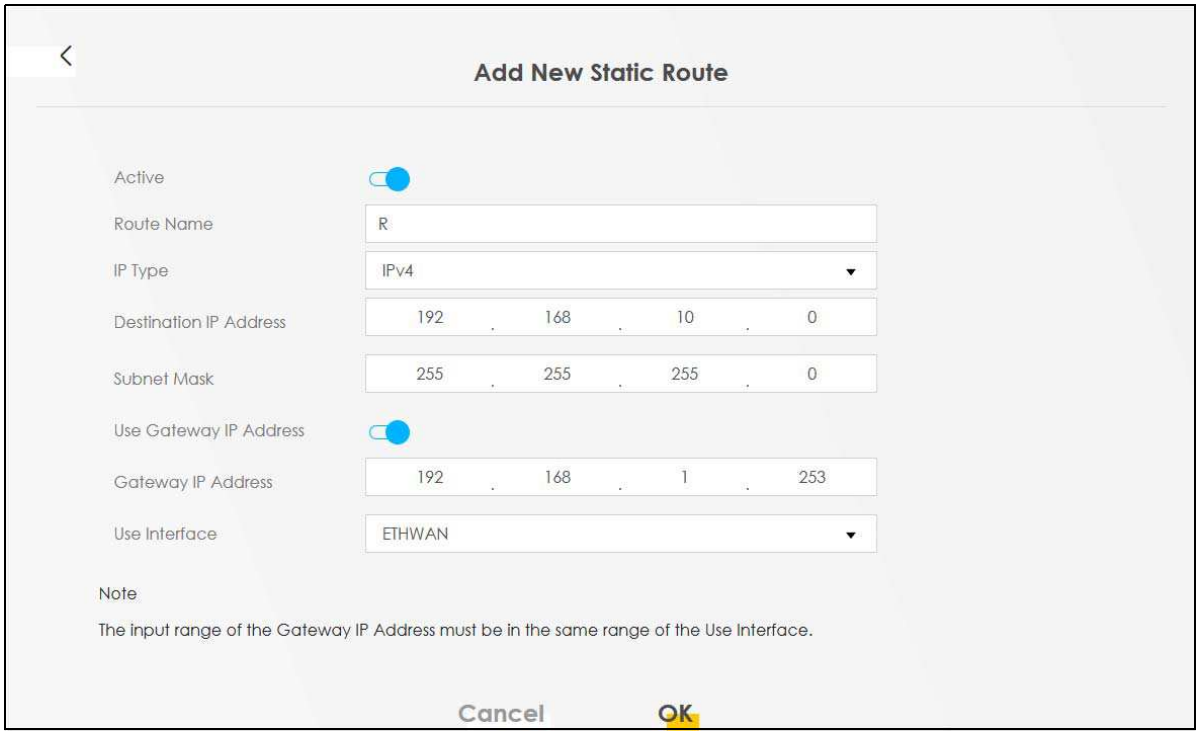
4a Click the **Active** button to enable this static route. When the switch goes to the right ( ), the function is enabled. Enter the **Route Name** as **R**.

4b Set **IP Type** to **IPv4**.

4c Type the **Destination IP Address 192.168.10.0** and **IP Subnet Mask 255.255.255.0** for the destination, **N2**.

4d Click the **Use Gateway IP Address** button to enable this function. When the switch goes to the right ( ), the function is enabled. Type **192.168.1.253** (**R**'s N1 address) in the **Gateway IP Address** field.

4e Select **ETHWAN** as the **Use Interface**.



4a Click **OK**.

Now **B** should be able to receive traffic from **A**. You may need to additionally configure **B**'s firewall settings to allow specific traffic to pass through.

4.5 Configuring QoS Queue and Class Setup

This section contains tutorials on how you can configure the QoS screen.

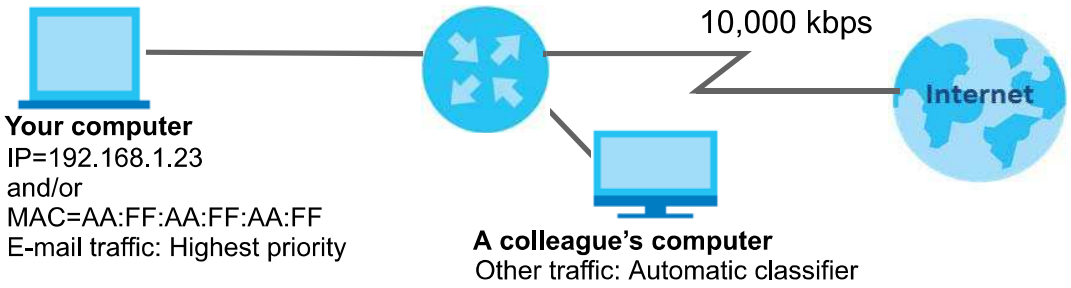
Let us say you are a team leader of a small sales branch office. You want to prioritize e-mail traffic because your task includes sending urgent updates to clients at least twice every hour. You also upload data files (such as logs and e-mail archives) to the FTP server throughout the day. Your colleagues use the Internet for research, as well as chat applications for communicating with other branch offices.

In the following figure, your Internet connection has an upstream transmission bandwidth of 10,000 kbps. For this example, you want to configure QoS so that e-mail traffic gets the highest priority with at least 5,000 kbps. You can do the following:

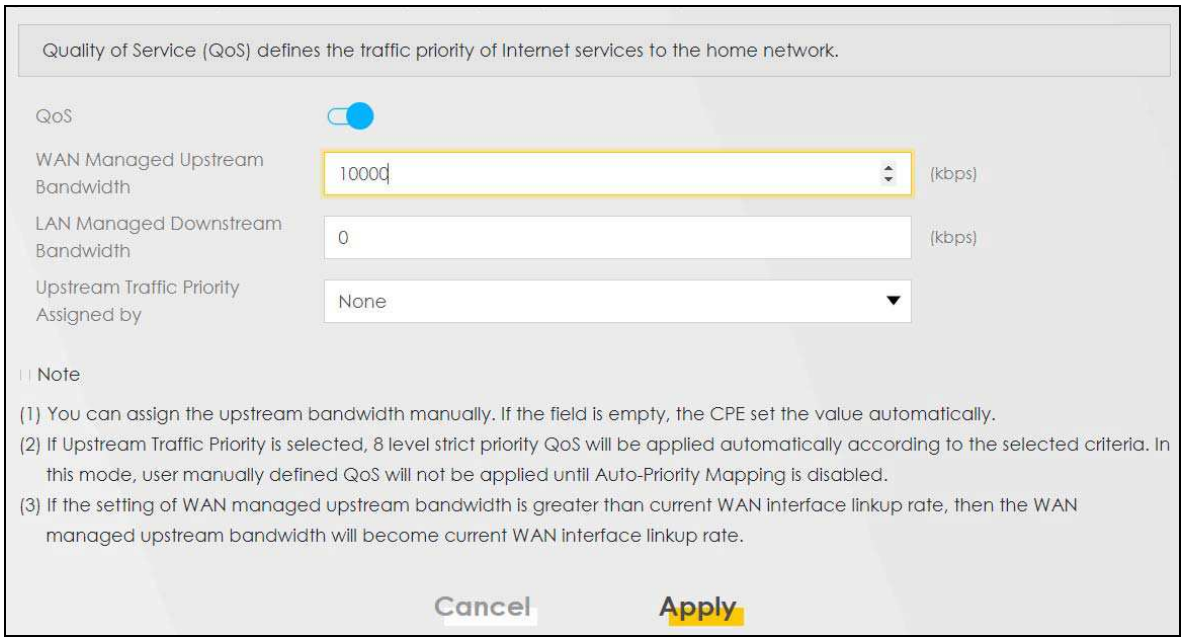
- Configure a queue to assign the highest priority queue (1) to e-mail traffic going to the WAN interface, so that e-mail traffic would not get delayed when there is network congestion.
- Note the IP address (192.168.1.23 for example) and/or MAC address (AA:FF:AA:FF:AA:FF for example) of your computer and map it to queue 7.

Note: QoS is applied to traffic flowing out of the Zyxel Device.

Traffic that does not match this class is assigned a priority queue based on the internal QoS mapping table on the Zyxel Device.



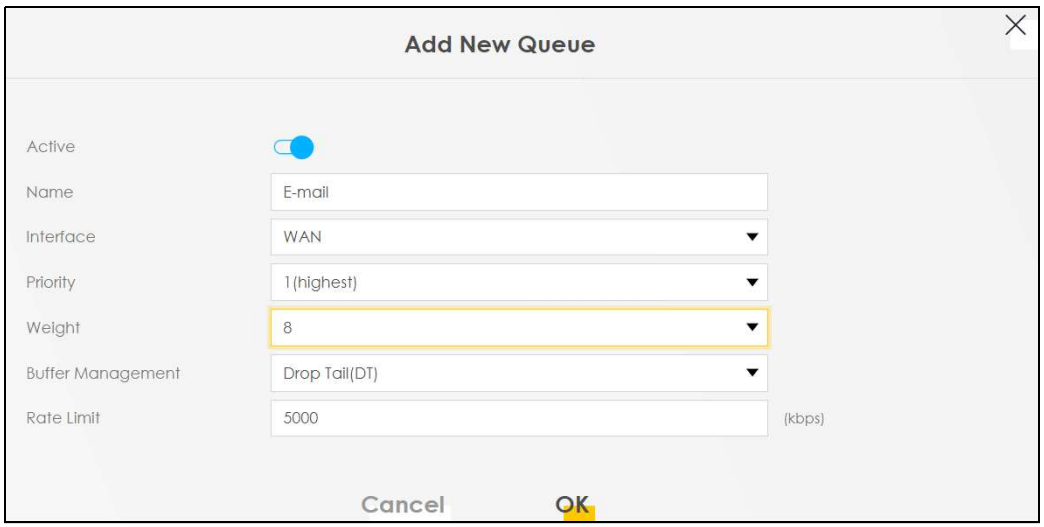
1 Click **Network Setting > QoS > General** and click the **QoS** button to enable. When the switch goes to the right ( ), the function is enabled. Set your **WAN Managed Upstream Bandwidth** to 10,000 kbps (or leave this blank to have the Zyxel Device automatically determine this figure). Click **Apply**.



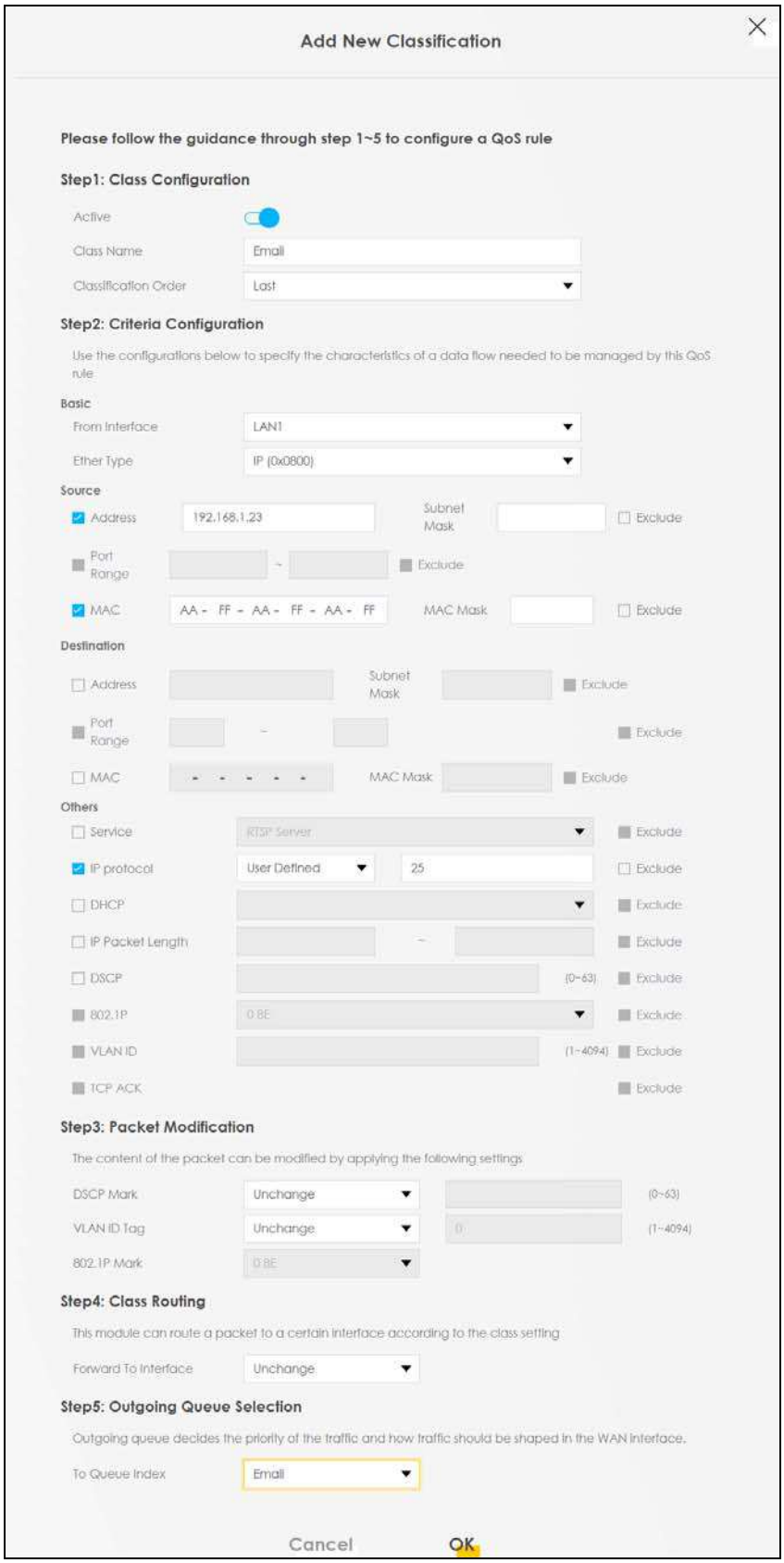
2 Click **Network** > **Queue Setup** > **Add new Queue** to create a new queue. In the screen that opens, click the **Active** field to enable. When the switch goes to the right ( ), the function is enabled. Enter or select the following values:

- **Name**: E-mail

- **Interface**: **WAN**
- **Priority**: 1 (High)
- **Weight**: 8
- **Rate Limit**: 5,000 (kbps)



3 Click **Network** > **QoS** > **Classification Setup** > **Add new Classification** to create a new class. Select **Enable** in the **Active** field and follow the settings as shown in the screen below.

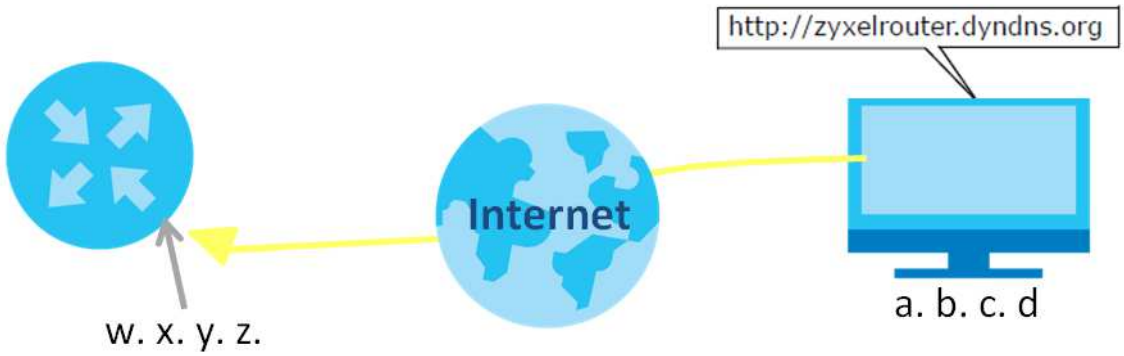

Add New Classification
Please follow the guidance through step 1~5 to configure a QoS rule
Step1: Class Configuration
Active
Class Name
Email
Classification Order
Last
Step2: Criteria Configuration
Use the configurations below to specify the characteristics of a data flow needed to be managed by this QoS rule
Basic
From Interface
LAN1
Ether Type
IP (0x0800)
Source
Address
192.168.1.23
Subnet Mask
Exclude
Port Range
Exclude
MAC
AA - FF - AA - FF - AA - FF
MAC Mask
Exclude
Destination
Address
Subnet Mask
Exclude
Port Range
Exclude
MAC
MAC Mask
Exclude
Others
Service
RTSP Server
Exclude
IP protocol
User Defined
25
Exclude
DHCP
Exclude
IP Packet Length
Exclude
DSCP
(0~63)
Exclude
802.1P
0 BE
Exclude
VLAN ID
(1~4094)
Exclude
TCP ACK
Exclude
Step3: Packet Modification
The content of the packet can be modified by applying the following settings
DSCP Mark
Unchange
(0~63)
VLAN ID Tag
Unchange
(1~4094)
802.1P Mark
0 BE
Step4: Class Routing
This module can route a packet to a certain interface according to the class setting
Forward To Interface
Unchange
Step5: Outgoing Queue Selection
Outgoing queue decides the priority of the traffic and how traffic should be shaped in the WAN interface.
To Queue Index
Email
Cancel
OK

Class Name	Give a class name to this traffic, such as **E-mail** in this example.
From Interface	This is the interface from which the traffic will be coming from. Select **LAN1** for this example.
Ether Type	Select **IP** to identify the traffic source by its IP address or MAC address.
IP Address	Type the IP address of your computer - **192.168.1.23**. Type the **IP Subnet Mask** if you know it.
MAC Address	Type the MAC address of your computer - **AA:FF:AA:FF:AA:FF**. Type the **MAC Mask** if you know it.
To Queue Index	Link this to an item in the **Network Setting > QoS > Queue Setup** screen, which is the **E-mail** queue created in this example.

This maps e-mail traffic coming from port 25 to the highest priority, which you have created in the previous screen (see the **IP Protocol** field). This also maps your computer's IP address and MAC address to the **E-mail** queue (see the **Source** fields).

4.6 Access the Zyxel Device Using DDNS

If you connect your Zyxel Device to the Internet and it uses a dynamic WAN IP address, it is inconvenient for you to manage the device from the Internet. The Zyxel Device's WAN IP address changes dynamically. Dynamic DNS (DDNS) allows you to access the Zyxel Device using a domain name.



To use this feature, you have to apply for DDNS service at www.dyndns.org.

This tutorial covers:

- Registering a DDNS Account on www.dyndns.org
- Configuring DDNS on Your Zyxel Device
- Testing the DDNS Setting

Note: If you have a private WAN IP address, then you cannot use DDNS.

4.6.1 Registering a DDNS Account on www.dyndns.org

1. Open a browser and type **http://www.dyndns.org**.
2. Apply for a user account. This tutorial uses **UserName1** and **12345** as the username and password.
3. Log into www.dyndns.org using your account.

4 Add a new DDNS host name. This tutorial uses the following settings as an example.

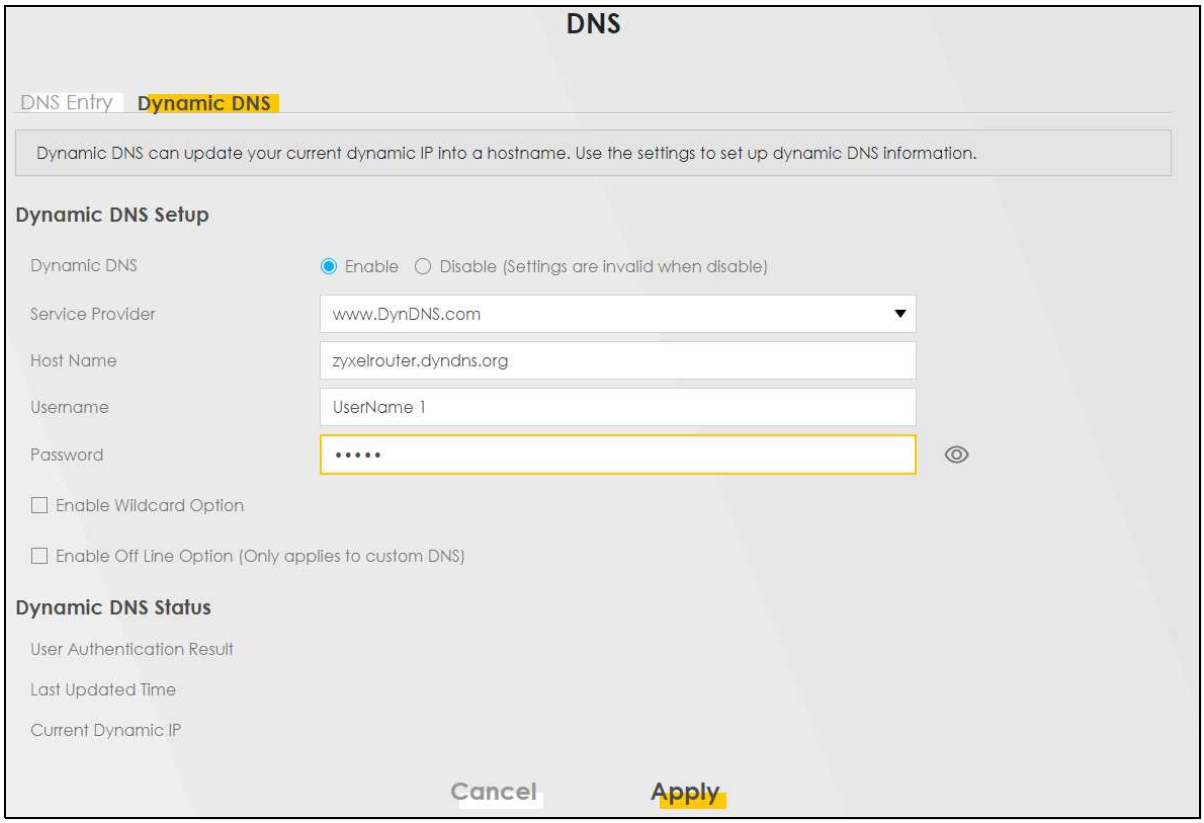
- Hostname: **zyxelrouter.dyndns.org**
- Service Type: **Host with IP address**
- IP Address: Enter the WAN IP address that your Zyxel Device is currently using. You can find the IP address on the Zyxel Device's Web Configurator **Status** page.

Then you will need to configure the same account and host name on the Zyxel Device later.

4.6.2 Configuring DDNS on Your Zyxel Device

Configure the following settings in the **Network Setting > DNS > Dynamic DNS** screen.

- Select **Enable Dynamic DNS**.
- Select **www.DynDNS.com** as the service provider.
- Type **zyxelrouter.dyndns.org** in the **Host Name** field.
- Enter the user name (**UserName1**) and password (**12345**).



Click **Apply**.

4.6.3 Testing the DDNS Setting

Now you should be able to access the Zyxel Device from the Internet. To test this:

1 Open a web browser on the computer (using the IP address **a.b.c.d**) that is connected to the Internet.

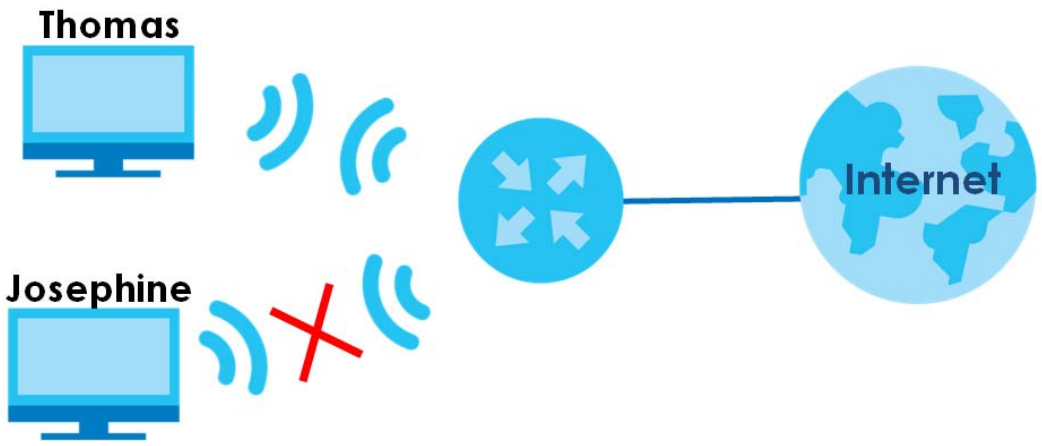
2 Type **http://zyxelrouter.dyndns.org** and press [Enter].

3 The Zyxel Device's login page should appear. You can then log into the Zyxel Device and manage it.

4.7 Configuring the MAC Address Filter

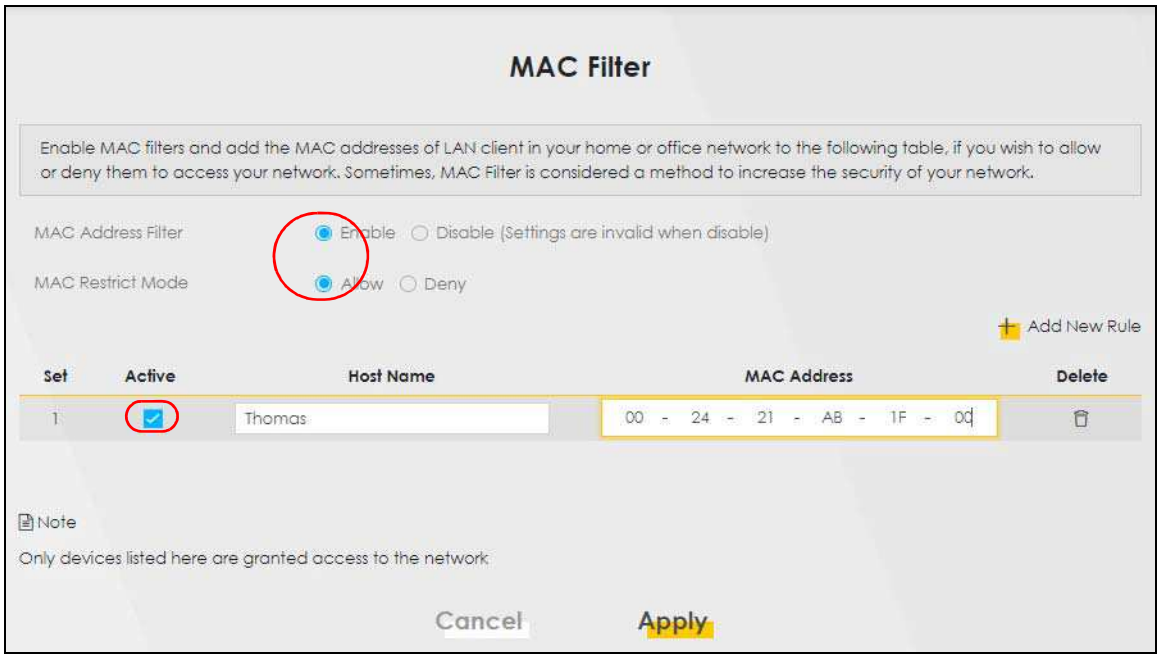
Thomas noticed that his daughter Josephine spends too much time surfing the web and downloading media files. He decided to prevent Josephine from accessing the Internet so that she can concentrate on preparing for her final exams.

Josephine's computer connects wirelessly to the Internet through the Zyxel Device. Thomas decides to use the **Security > MAC Filter** screen to grant wireless network access to his computer but not to Josephine's computer.



1 Click **Security** > **MAC Filter** to open the **MAC Filter** screen. Select the **Enable** check box to activate MAC filter function.

2 Select **Allow**. Click **Add a new setting** to add a new entry. Then enter the host name and MAC address of Thomas' computer in this screen. Click **Apply**.



Thomas can also grant access to the computers of other members of his family and friends. However, Josephine and others not listed in this screen will no longer be able to access the Internet through the Zyxel Device.