

WIRELESS OUTDOOR DUAL RADIO 802.11a/b/g/n ACCESS POINT

Model: ENH700EXT



User Manual
Version 1.0

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About This Document

This document is written by EnGenius Technologies, Inc. EnGenius Technologies, Inc. reserves the right to change this document without notice and all rights are reserved. This document is written and edited for use of the configuration of the ENH700EXT by EnGenius Technologies, Inc. Please read this document carefully before setting up the ENH700EXT. Any damage which is caused by inappropriate use will not be covered under the warranty.

About EnGenius Technologies, Inc.

EnGenius Technologies, Inc. is an industry expert in wireless communications and radio frequency (RF) technology. The company pioneered “Affordable Long-Range Wireless” communication solutions, and creates wireless voice and data products for home, SOHO, and SMB use that are versatile, feature-rich, business-class and affordable. Our complete line of award-winning devices is designed to deliver long-range, fast speeds, robust security, and ease-of-use. Established in 1999, EnGenius Technologies, Inc. is a wholly-owned subsidiary of Senao Networks, a Taiwan RF communications company.

Product Manual Formatting

The following symbols are using in the ENH700EXT Product manual to highlight key items.



Caution: This symbol represents a vital message and is critical for the device and/or its settings.



Note: This Symbol represents an important message of the settings.



Tip: This symbol represents an alternative choice that can save time or resources.

Before You Start

The following equipment is required to setup the ENH700EXT:

- Computer Desktop or Laptop (Windows®, Macintosh®, or Linux-Based with Ethernet Adaptor)
- CAT 5E or CAT 6 Ethernet Cables (QTY: 2)
- EnGenius Technologies, Inc. ENH700EXT

- Ethernet crimping tool
- Screw driver set
- Refer to Chapter 2 for additional equipment that may be needed based on the network infrastructure.

1 Product Overview

Thank you for purchasing the ENH700EXT. It is a powerful and enhanced Enterprise class Dual-Band Wireless-N Access Point product with 4 multi-functions: Access Point, Client Bridge, WDS (AP & Bridge), and Client Router.

The EnGenius Technologies, Inc. ENH700EXT uses the latest IEEE802.11 standard, 802.11n, which allows for faster wireless throughput. The ENH700EXT affords a great advantage to minimize the time and cost required to expand an existing business network. It operates in both 2.4 GHz and 5 GHz frequency spectrums and is also backwards compatible with legacy 802.11a/b/g networking equipment.

The ENH700EXT is easy to install in virtually any locations with its included PoE (Power over Ethernet) injector for quick outdoor installation. In addition, the ENH700EXT enables network administrators to control its transmit power and features settings for selecting narrow bandwidth and traffic shaping. The ENH700EXT supports wireless encryption including Wi-Fi Protected Access (WPA-PSK/WPA2-PSK), [64/128/152]-bit WEP Encryption, and IEEE 802.1x with RADIUS. Additionally, the ENH700EXT can be paired with other EnGenius Technologies, Inc. Outdoor Wireless Access Point and Bridge products in Access Point – Client Bridge or WDS Bridge – WDS Bridge deployments.



Damage may occur if installing with another PoE adaptor that is not provided with the ENH700EXT.

1.1 Contents

Open the ENH700EXT Wireless Access Point / Client Bridge package to ensure that all the following contents are present:

- EnGenius Technologies, Inc. ENH700EXT Wireless Access Point / Client Bridge
- 48V/380mA Power Adaptor
- PoE (Power Over Ethernet) Injector (EPE-48GR)
- 2.4 GHz 5dBi Onmi Antenna (x 2) and 5 GHz 5dBi Onmi Antenna (x 2)
- Mounting Kit with Bracket-Mount Special Screw Set

- Mounting Installation Guide
- ENH700EXT Quick Installation Guide
- ENH700EXT Product CD - includes EZ Controller Access Point Management Software and ENH700EXT User Manual in Adobe Acrobat PDF)

Do not discard the packing materials in case of a return. The unit must be shipped in its original packaging for a valid return. If any of the contents are missing, please contact your reseller.



Using a power adaptor other than the one included with the ENH700EXT may cause damage to the device and void the product warranty.

1.2 Features and Benefits

Dual Mode	Simultaneously transmits wireless signals in both the 2.4GHz and 5GHz frequency spectrums. This expands the number of wireless client devices that can access the network.
Separate Mode	Each one of the two radio having its own operation mode. This increase more options to have a flexible wireless network design.
Access Point Mode	The most typically used operation mode for the ENH700EXT. In Access Point mode, the ENH700EXT will allow wireless devices access to transmit and receive data from ENH700EXT
Client Bridge Mode	In this mode, the ENH700EXT can connect to another Access Point to extend the range of the wireless network.
Client Router Mode	In this mode, the ENH700EXT can be used as a Client Bridge but with support for a WAN type of Internet connection. This is rarely used in commercial environment.
WDS AP	With this mode selected, the device can pair with other devices with either WDS AP mode or WDS STA mode. When connected with other ENH700EXT with WDS AP, the device acts as AP plus WDS bridge, therefore repeater function is available while with significant performance cut; When paring WDS AP to WDS STA to other devices (point-to-multipoints), transparent bridging is supported.
WDS Station mode	WDS Station (STA) pairs with WDS AP mode. see above
WDS Bridge mode	In the WDS Bridge Mode, the ENH500 can wirelessly connect different local area networks by configuring each device's MAC address and security settings. WDS Bridge mode provide transparent bridging function. unlike Access Point Mode. APs linked by WDS are using the same wireless channel, and connecting excessive numbers of APs on the same channel may result in lower throughput. Please be aware to avoid loop connections; otherwise enable the Spanning Tree Function.

Multiple SSIDs	<p>The ENH700EXT supports up to 16 SSIDs (Service Set Identifiers) in Access Point mode (8 SSIDs per frequency band). The following options can be set to each SSID:</p> <ul style="list-style-type: none"> • SSID for public or private network • Each SSID can be suppressed • Authentication is fully supported • VLAN Identifier
WMM	This feature provide QoS (Quality of service) for prioritizing multimedia traffic.
Wi-Fi Protected Access	<p>Wi-Fi Protected Access is a standards-based interoperable security enhancement that increases the level of data protection and access control for existing and future Wireless LAN systems. It is compatible with the IEEE802.11i standard WPA that leverages TKIP and 802.1x for authenticated key management.</p>
High Speed Data Rate (Up to 300 Mbps)	As specified in the IEEE802.11n standard; capable of handling heavy data payloads such as HD Video Streaming.
High Output Power (Up to 27 dBm)	Designed to extend range and maximize signal coverage area.
IEEE 802.11 a/b/g/n Compliant	Fully interoperable with IEEE 802.11 a/b/g/n compliant devices.
MAC Address filtering in Access Point mode	Allows network administrators to grant network access only to computers and other devices based on their known MAC (Media Access Control) addresses
Support RSSI Indicator in Client Bridge mode	Enables device installer to select the best signal when aiming to Access Points therefore to have proper installation
Power-Over-Ethernet	<p>Enables installers to connect the ENH700EXT to a switch via Ethernet in locations where a power outlet may be unavailable. (NOTE: The ENH700EXT includes the proprietary PoE Adaptor, EPE-48GR).</p>
IP 68	The ENH700EXT'S housing is rated with IP68, which is highest IP rating with total water and dust proof. so it to be placed on a building's exterior for maximum range and coverage and allows it to operate in the extremely harsh environmental conditions.

1.3 A Cost-Effective Wireless Solution to Extend and Expand an Existing Network

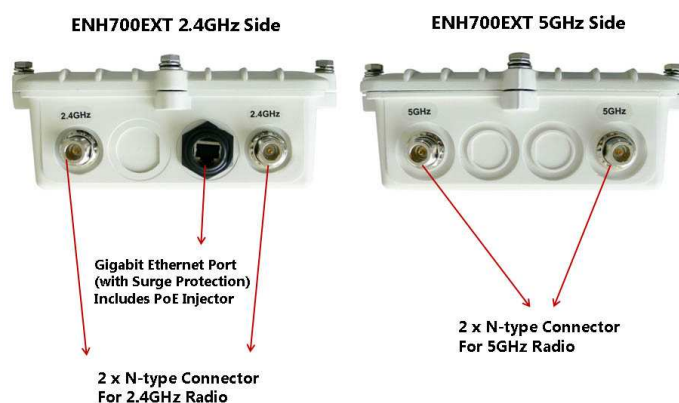
The following list describes the solutions that the ENH700EXT offers as a flexible, robust and powerful Outdoor Access Point or Bridge:

- **Difficult-to-Wire Environments** - In outdoor environments sometimes extending a network by laying Ethernet or fiber cabling is either cost prohibitive or physically not possible. The ENH700EXT, enables the extension of an existing company network via the propagation of a wireless signal rather than cable as a much more cost-effective alternative.
- **Temporary Workgroups** – Creating a wired network infrastructure for a temporary outdoor worksite/workgroup or special event venue may not be a cost- or time-efficient solution and may present deployment issues if trenches for cabling cannot be dug in existing landscaping. The ENH700EXT enables companies, in a matter of minutes, to create an outdoor wireless network that can provide Internet access (based on an existing broadband connection) or access to the company's networked resources like printers, hard drives and databases.
- **Wireless Extensions of Ethernet Networks** – The range of a wired network is typically limited within the confines of a single building. In situations where there are multiple buildings on a campus or another company building very remote from the main building then a Wireless Access Point or Bridge deployment using the ENH700EXT provides a very cost-effective way to cover large outdoor areas around a company office or even connect to other company buildings.
- **Expanding User Capacity and Connectivity To Additional Devices** – The ENH700EXT is designed specifically to extend and expand existing company networks. Its high transmit power capability and enhanced receive sensitivity results in the ability for a company to connect to more employees, company guests or other wireless clients. The ENH700EXT's additional 5GHz frequency radio can be act as a separate AP or bridge to either provide 5GHz wireless access to 5GHz clients; Or connect to other 5GHz devices to provide backhaul service.
- **Redundancy** – In situations where a portion of an existing wired network may fail, the ENH700EXT offers a measure of stability and redundancy to other employees can continue to communicate with one another or access mission critical databases.

1.4 Hardware Overview

Physical Interface	10/100/1000 LAN Port with (48v Proprietary) PoE Support
Maximum Wireless Data Rate	300Mbps + 300Mbps
Antennas	2.4 GHz – 5dBi Omni directional antenna x2 5 GHz – 5dBi Omni directional antenna x2

Physical Appearance



1.5 System Requirements for Installation

The minimum requirements for settings up the ENH700EXT are:

- A computer with an Ethernet interface and a Windows (XP, Vista, 7), Mac OSX, or Linux based Operating System.
- An Internet browser the supports HTTP and JavaScript.

2 Installation and Setup

This chapter will describe how to assemble and set up the ENH700EXT. It will also cover where to place the ENH700EXT to allow for maximum range and signal.



Only experienced installation professionals who are familiar with outdoor wireless network should attempt to install the ENH700EXT.

2.1 Installation Considerations

There are many considerations on where to place the ENH700EXT. The followings are the main considerations on where to mount the device. The first consideration is available line of sight to the area or building that you wish to provide wireless network connectivity. Other buildings, mountains, hills, trees, thick brush can all attenuate the or inhibit the wireless signal.

The second consideration is distance. You should calculate the EIRP (Effective Isotropic Radiated Power) correctly to properly configure the ENH700EXT using this calculation for the distance you intend to build the wireless link (see Glossary at the end of this manual for the EIRP formula). Don't place multiple ENH700EXT's too far away from one another since the AP uses default Omni directional (not directional) antennas. If you plan to have a longer range connection, you can consider identically-matching directional antennas to connect to the ENH700EXT on both transmit and receiving ends.

2.2 Assembling the ENH700EXT

Carefully remove the ENH700EXT unit, the Omni 5dBi and 2.4dBi Antennas(two each), EPE-48GR PoE Injector, and power adaptor. As mentioned earlier in this Manual, the Ethernet cables are required and not provided within the ENH700EXT package.

1. Install all 4 antennas onto the ENH700EXT by screwing them toward the ENH700EXT until the threads on the screw are not visible.

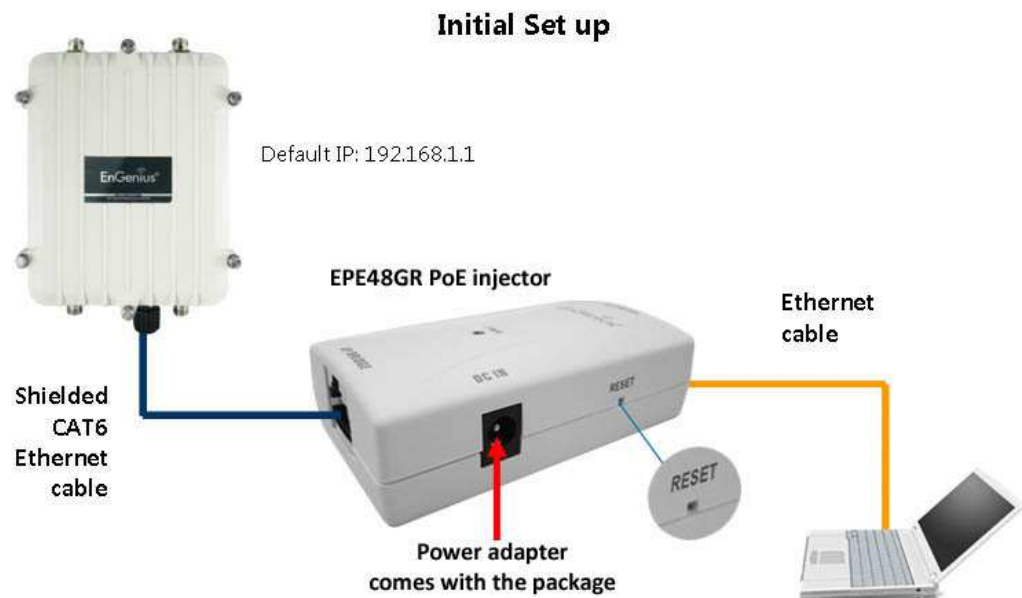
2.



Ensure that all antennas screw on straight. Failure to do so may damage the ENH700EXT antenna connectors

3. Insert a shielded Ethernet cable into the RJ-45 port on the ENH700EXT. You need to consider the length of this cable based on the distance from where the PoE injector is which in a weather protected place such as indoor or a water tight box to the ENH700EXT. Use high quality cable is highly recommended.
4. Insert the other end of the Ethernet cable to the EPE-48GR PoE Injector on the port labeled **AP/Bridge**.
5. Take a second Ethernet cable and connect it to the **Network** port of the EPE-48GR PoE Injector.

6. Insert the other end of the second Ethernet cable into the Ethernet controller of the computer system in which the ENH700EXT will be set up.
7. Plug the power cord of the power adapter into the EPE-48GR port labeled **DC IN**.
8. Plug the power adaptor into the power outlet.

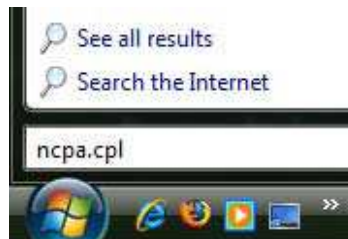


The ENH700EXT provides a proprietary PoE adapter. Please only use the supplied PoE adapter and its power adapter.

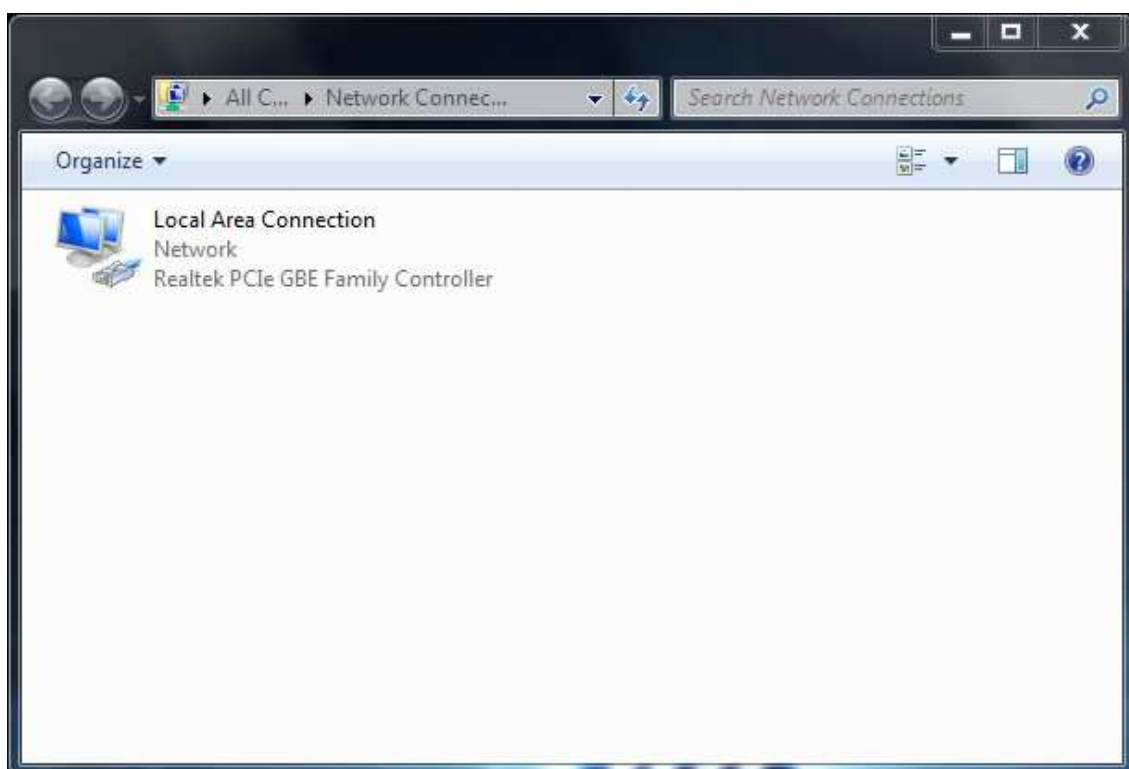
2.3 Configuring a TCP/IP connection on Windows® 7/Vista

Use the following procedure to configure a computer running *Microsoft® Windows 7*.

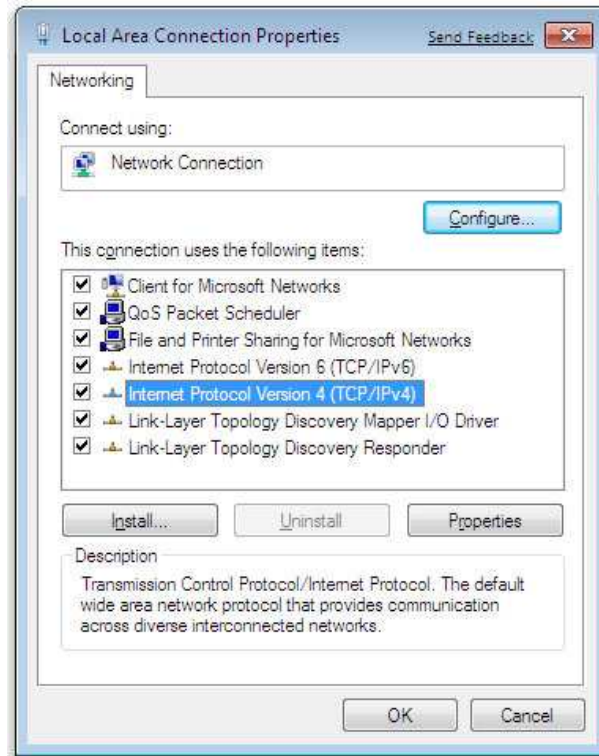
1. In the Start menu search box, type: **ncpa.cpl**



2. When the Network Connections List appears, right-click the **Local Area Connection** icon and click **Properties**.



3. In the Networking tab, click **Internet Protocol Version 4 (TCP/IPv4)**, and then click **Properties**.



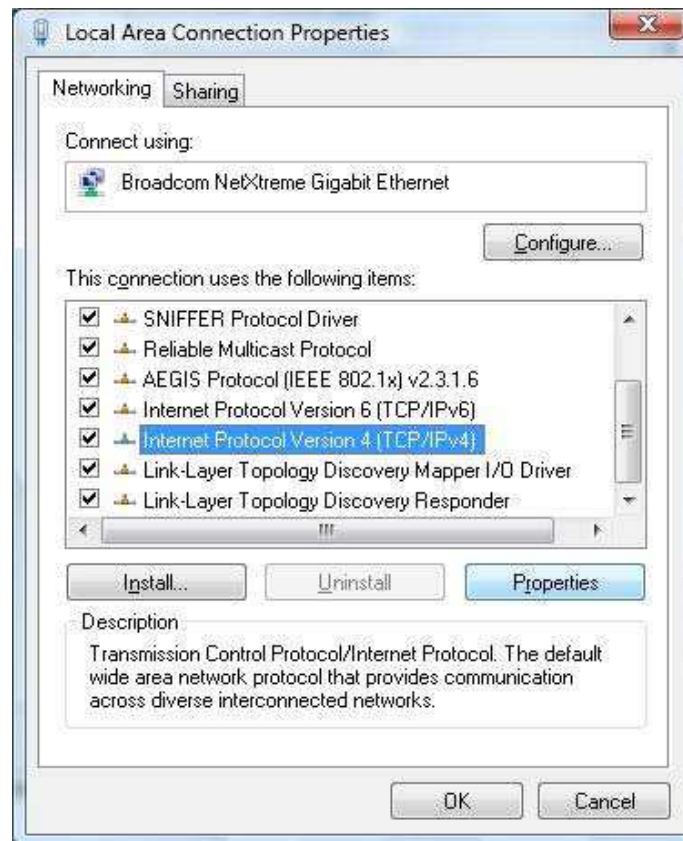
4. In the properties dialog box, click **Use the following IP address:** to configure your computer for Static TCP/IP. Enter an **IP address** (i.e. 192.168.1.10), the **subnet mask** of the ENH700EXT, and the **default gateway** which is the ENH700EXT's IP address, 192.168.1.1. Note: the subnet mask must match that of the ENH700EXT and the IP address must be on that subnet.
5. Click the **OK** button to save your changes and close the dialog box.
6. Click the **OK** button again to save your changes.

Configuring Microsoft® Windows Vista

Use the following procedure to configure a computer running *Microsoft® Windows Vista* with the default Windows interface.

1. On the Windows taskbar, click **Start**, click **Control Panel**, and then select the **Network and Internet** icon.
2. Click **View Network Status and tasks** and then click **Manage Networks Connections**.
3. Right-click the **Local Area Connection** icon and click **Properties**.
4. Click **Continue**. The Local Area Connection Properties dialog box appears.

5. In the Local Area Connection Properties dialog box, verify that **Internet Protocol (TCP/IPv4)** is checked. Then select **Internet Protocol (TCP/IPv4)** and click the **Properties** button. The Internet Protocol Version 4 Properties dialog box appears.



6. In the properties dialog box, click **Use the following IP address:** to configure your computer for Static TCP/IP. Enter an **IP address** (i.e. 192.168.1.10), the **subnet mask** of the ENH700EXT, and the **default gateway** which is the ENH700EXT's IP address, 192.168.1.1. Note: the subnet mask must match that of the ENH700EXT and the IP address must be on that subnet.

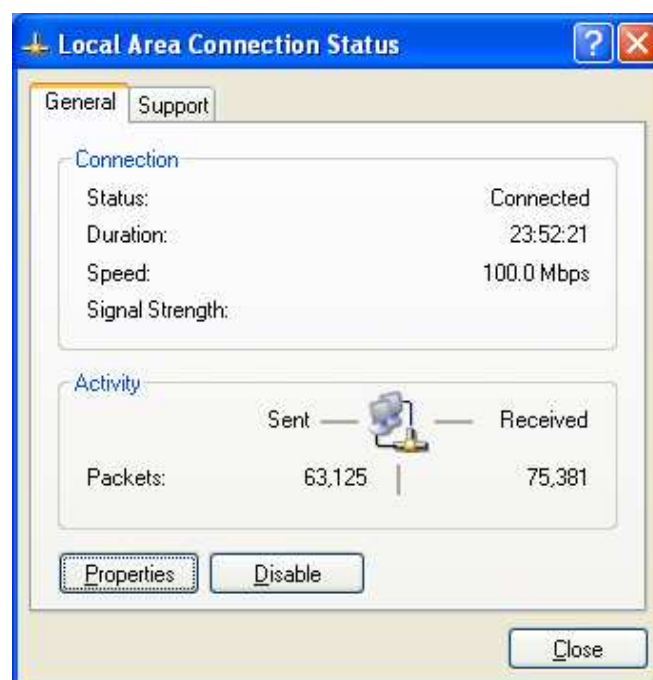


7. Click the **OK** button to save your changes and close the dialog box.
8. Click the **OK** button again to save your changes.

2.4 Configuring a TCP/IP connection on Windows® XP

Use the following procedure to configure a computer running *Microsoft® Windows XP* with the default Windows interface.

1. On the Windows taskbar, click **Start**, click **Control Panel**, and then click **Network and Internet Connections**.
2. Click the **Network Connections** icon.
3. Click **Local Area Connection** for the Ethernet adapter connected to the ENH700EXT. The Local Area Connection Status dialog box appears.
4. In the Local Area Connection Status dialog box, click the **Properties** button. The Local Area Connection Properties dialog box appears.



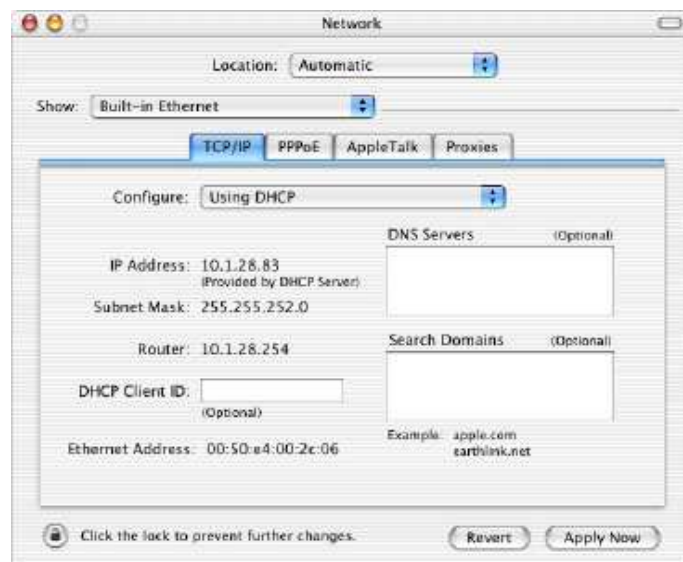
5. In the Local Area Connection Properties dialog box, verify that **Internet Protocol (TCP/IP)** is checked. Then select **Internet Protocol (TCP/IP)** and click the **Properties** button. The Internet Protocol (TCP/IP) Properties dialog box appears.
6. In the properties dialog box, click **Use the following IP address:** to configure your computer for Static TCP/IP. Enter an **IP address** (i.e. 192.168.1.10), the **subnet mask** of the ENH700EXT, and the **default gateway** which is the ENH700EXT's IP address, 192.168.1.1. Note: the subnet mask must match that of the ENH700EXT and the IP address must be on that subnet.
7. Click the **OK** button to save your changes and close the dialog box.

8. Click the **OK** button again to save your changes.

2.4.1 Configuring Apple® Mac OS X

The following procedure describes how to configure TCP/IP on an Apple® Macintosh running *Mac OS X* 10.2 or later. Note: The menu titles and placement vary in each OS X (10.x) operating system but are similar.

1. Pull down the Apple Menu, click **System Preferences**, and select **Network**.
2. Verify that the NIC connected to the ENH700EXT is selected in the **Show** field.
3. In the **Configure** field on the **TCP/IP** tab, select **Manually**.
4. Click **Apply Now** to apply your settings and close the TCP/IP dialog box.
5. Enter an **IP address** (i.e. 192.168.1.10), the **subnet mask** of the ENH700EXT, and the **Router** which is the ENH700EXT's IP address, 192.168.1.1. Note: the subnet mask must match that of the ENH700EXT and the IP address must be on that subnet.
6. Click **Apply Now** to apply your settings and close the TCP/IP dialog box.

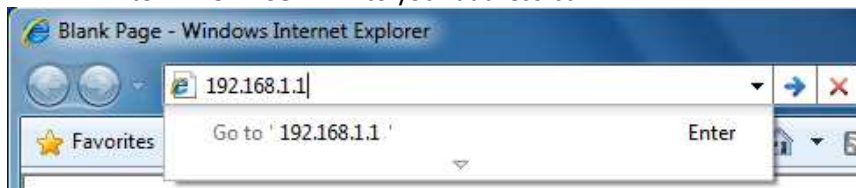


In Step 2, if the **Configure IPv4** menu list isn't available, select **Advanced**. In the **TCP/IP** tab, you will be able to enter the information in Step 4.

2.5 Logging onto the ENH700EXT

After completing the TCP/IP settings from the beginning of the Chapter, you can now access the web-based configuration menu.

1. Open your web browser.
2. Enter IP **192.168.1.1** into your address bar.



The default username of the ENH700EXT is **admin**. The default password of the ENH700EXT is **admin**. If you have changed the ENH700EXT LAN IP address, make sure to enter the correct IP Address.

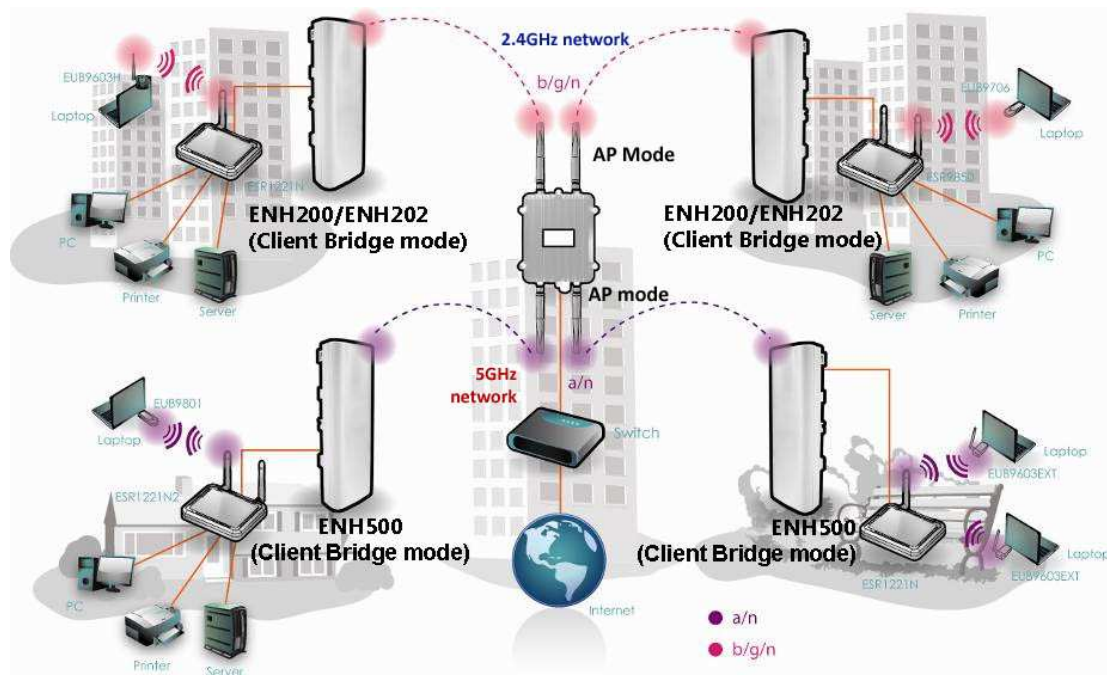
3 Wireless Network Modes

This chapter will explain the different operation modes that the ENH700EXT has to offer. This will help in determining how you would like to set up the ENH700EXT for the proper mode for your specific networking needs in the later chapters of the User Manual.

The three native operation modes of the ENH700EXT are Access Point, Client Bridge, and WDS (WDS AP, WDS STA, WDS Bridge). Both Radio 1 and Radio 2 support these modes.

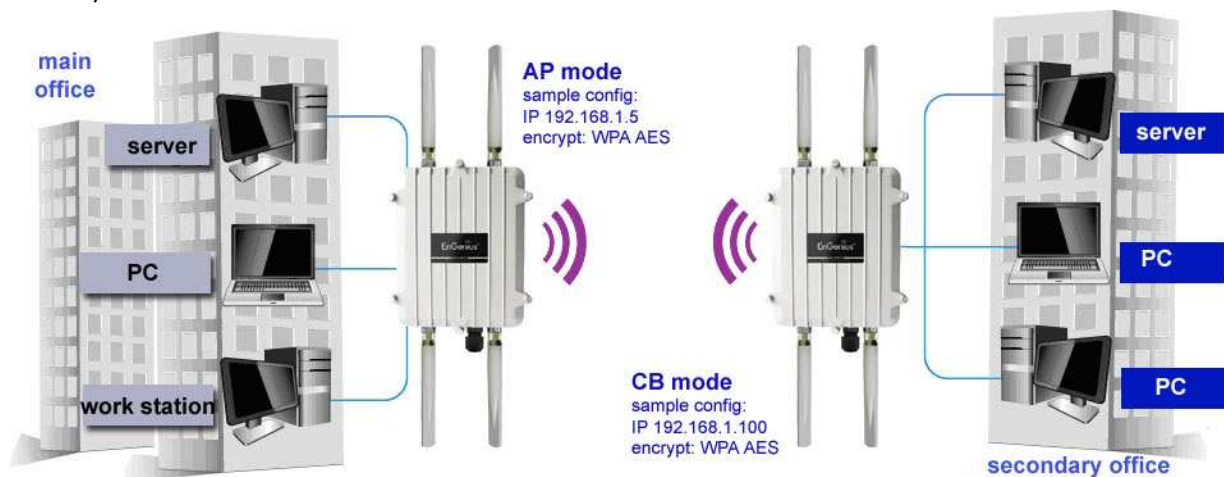
3.1 Access Point Mode (AP mode)

Access Point Mode is the most typically used mode for the ENH700EXT. In Access Point mode, the ENH700EXT extends an existing network by providing signal coverage outside of a building creating a Wireless LAN enabling employees or company guest to access the company network and the company's broadband Internet connection as designated and authorized by the network administrator. Stations and clients must utilize the same SSID and Security Password to associate while within range of the wireless signal.



3.2 Client Bridge Mode

In the Client Bridge mode, the ENH700EXT functions like a wireless network adaptor. This allows the ENH700EXT to share the acquired wireless network access (via another device in Access Point mode) with wired devices connected via Ethernet to it (typically via a networked switch).

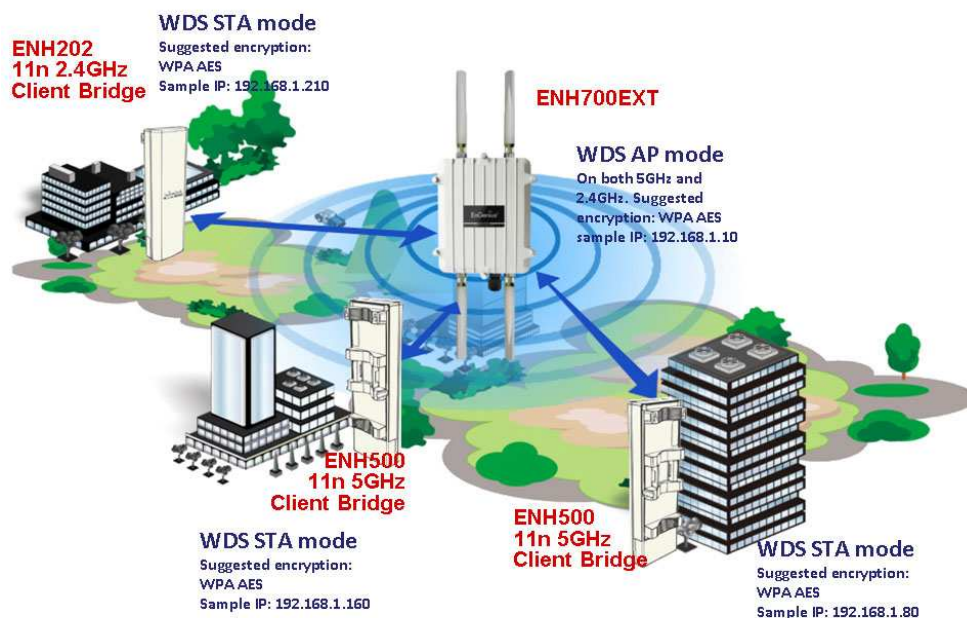


3.3 WDS Mode

In WDS (Wireless Distribution System) mode, the ENH700EXT connects multiple networks wirelessly without being just an Access Point. It maximizes range of service but at a loss of throughput speeds.

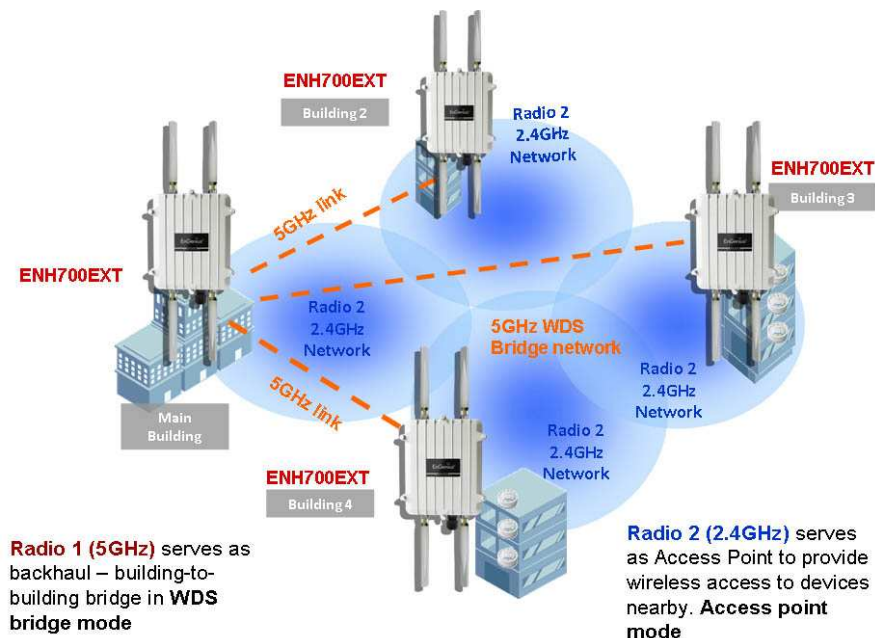
- 1) WDS with Access Point – Expands the WDS through the use of Access Points. Clients can connect to the device as a normal Access Point.
- 2) WDS Station – Expands the WDS by receiving a wireless signal/service and sharing through the Ethernet port.

Extremely Robust Coverage



ENH700EXT with WDS AP and WDS STA (Station) modes example

- 3) WDS with Bridge – Expands the Wireless Distribution System through the use of wireless bridges. Clients won't connect to the device as a bridge



ENH700EXT with WDSAP and WDS Bridge mode as backhaul example

WDS Bridge Mode

In the WDS Bridge mode, the ENH700EXT can wirelessly connect different LANs (Local Area Networks) by applying a device's MAC address to its associated security settings as prescribed by the network administrator. WDS Bridge mode can bridge up to four local wired networks together as one logical network. Every computer on this logical network can see each other, sharing files as if they are in the same location. With high output power and MIMO antenna technology, the connection distance can extend beyond 1000 feet with great performance, assuming the antennae are within line of sight. The WDS bridge network is a MAC-based network that provides transparent bridging

4 User Interface

Once logged into the ENH700EXT, the home screen will appear.

The screenshot displays the ENH700EXT user interface. On the left is a yellow sidebar menu (1) with a 'Status' section (2) containing 'Save/Reload:2', 'Main', '2.4G Wireless Client List', '5G Wireless Client List', and 'System Log'. The main area (3) is titled 'Main' and shows system information in a table. At the top right are 'Home' (4) and 'Reset' (5) buttons.

System Information	
Device Name	ENH700EXT
Ethernet MAC Address	00:02:6F:CB:D3:B9
2.4G Wireless MAC Address (SSID/MAC)	1 00:02:6F:CB:D3:B9
	2 N/A
	3 N/A
	4 N/A
	5 N/A
	6 N/A
	7 N/A
	8 00:00:00:00:00:00
5G Wireless MAC Address (SSID/MAC)	1 00:00:00:00:00:00
	2 00:00:00:00:00:00
	3 N/A
	4 N/A
	5 N/A
	6 N/A
	7 N/A
	8 N/A
Country	N/A
Current Time	Fri Apr 27 09:42:37 UTC 2012
Firmware Version	1.1.6
Management VLAN ID	Untagged
LAN Settings	
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
Primary DNS	0.0.0.0
Secondary DNS	0.0.0.0
DHCP Client	Disabled
Spanning Tree Protocol	Disabled
Current 2.4G Wireless Settings	
Operation Mode	Access Point
Wireless Mode	802.11 B/G/N Mixed

1. The operation mode of the ENH700EXT will be displayed. The current 2.4GHz operation mode will be displayed first followed by the current 5GHz operation mode.
2. The main menu of the ENH700EXT will contain all the configuration options and settings.
3. The current configuration menu will be displayed in this section of the user interface.
4. Selecting the **Home** button will bring the user interface back to the main status page.
5. The **Reset** button will prompt you with a couple of system commands:
 - a. **Reboot the Device** – This selection will allow restart the ENH700EXT.
 - b. **Restore to Factory Defaults** – This selection will restore all the default settings of the ENH700EXT to the base factory settings.

5 Status

5.1 Save/Reload

When making any changes to ENH700EXT, it will be placed in the **Save / Reload** option of the **Status** section.

Save/Reload

HomeReset

Unsaved changes list

network.sys.opmode=ap'
wireless.wifi0.countryName=N/A

Caution: Network Setting changed, redirect IP to 192.168.1.1

Save & ApplyRevert



No changes made in the proceeding chapters of this manual will take effect until **Save & Apply** is selected. Selecting **Revert** will erase any changes made.

5.2 Main (System Information)

The **Main** option of the **Status** section of the user interface menu contains the information and status of the ENH700EXT. The device current status information includes four section:

- 1) **System Information** – This sections displays general information of the ENH700EXT such as the device name, firmware version, and the MAC addresses associated with different Wireless Bands and SSIDs.
- 2) **LAN Settings** – This section displays the LAN settings, such as the IP Address, subnet mask, default gateway and Spanning Tree Protocol, of the ENH700EXT.
- 3) **Current 2.4G Wireless Settings** – This sections displays the current operation mode of the 2.4 GHz wireless radio and the various settings associated with it.
- 4) **Current 5G Wireless Settings** – This sections displays the current mode of the 5 GHz wireless radio and the various settings associated with it.

5.3 2.4GHz Wireless Client List

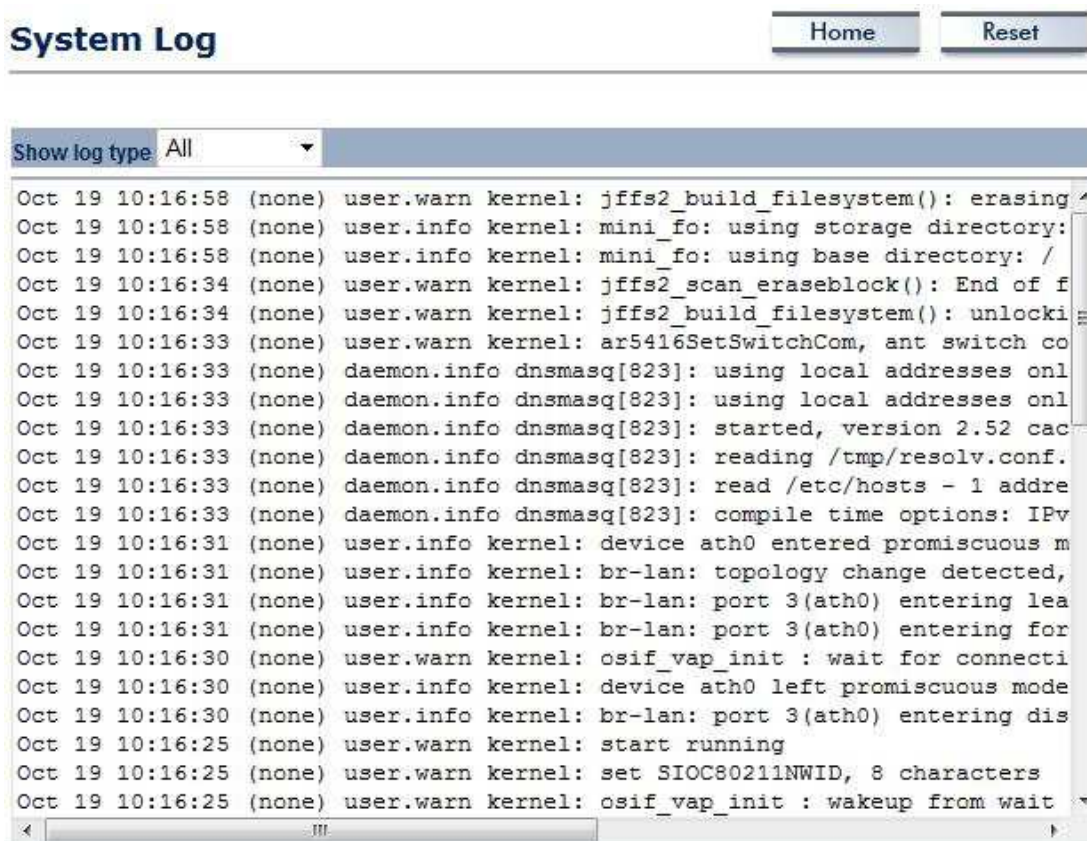
The **2.4GHz Wireless Client List** option of the **Status** section of the user interface menu displays all the clients connected to the **2.4GHz** operation of the ENH700EXT.

5.4 5GHz Wireless Client List

The **5GHz Wireless Client List** option of the **Status** section of the user interface menu displays all the clients connected to the **2.4GHz** operation of the ENH700EXT.

5.5 System Log

The **System Log** option of the **Status** section displays all actions and events taking place in the ENH700EXT. Older entries are deleted for newer entries. This option is used to help users debug the ENH700EXT.



6 System

The **System** section of the user interface menu allows the user to change of the operation modes of both the 2.4GHz and 5GHz radios as well as set up the Spanning Tree settings between multiple ENH700EXT units.



No changes made in the **System** section of the ENH700EXT will be in effect until **Save & Apply** is selected in the **Save/Reload** option of the **Status** section. Selecting **Accept** or **Save** in the **System** section will not reconfigure the router.

6.1 Operation Mode

In **Operation Mode**, the user will select how each wireless band will operate.

A screenshot of the "System Properties" configuration page. At the top right are "Home" and "Reset" buttons. The page has a left sidebar with "System Properties" and "Operation Mode" (selected). The main area shows "Device Name" as "ENH700EXT" with a "(1 to 32 characters)" hint. Below is a "Country/Region" dropdown menu with the text "Please Select a Country Code". The "Operation Mode" section is expanded, showing "2.4G Wireless Configuration" and "5G Wireless Configuration". Each has radio buttons for "Access Point", "Client Bridge", and "WDS". Under "WDS", there are further radio buttons for "Access Point", "Bridge", and "Station". At the bottom are "Accept" and "Cancel" buttons.

Device Name	The name associated with the ENH700EXT on the wireless network or to other network devices.
Country / Region	Select the country in which the ENH700EXT will operate in.
Operation Mode	Select the operation mode for both the 2.4GHz wireless band and the 5GHz wireless band. When WDS mode is selected, the type of WDS must be specified by selecting Access Point, Bridge, or WDS Station.

6.2 IP Settings

The **IP Settings** option of the **System** section allows the user to configure the IP settings.

IP Settings

HomeReset

System Information

IP Network Setting	<input type="radio"/> Obtain an IP address automatically (DHCP) <input checked="" type="radio"/> Specify an IP address
IP Address	192 . 168 . 10 . 7
IP Subnet Mask	255 . 255 . 255 . 0
Default Gateway	192 . 168 . 10 . 1
Primary DNS	192 . 168 . 10 . 1
Secondary DNS	4 . 2 . 2 . 2

AcceptCancel

- 1) IP Network Settings – The user can select whether the ENH700EXT will obtain the IP Settings automatically from the network or if the information will be inputted manually.
- 2) IP Address – Specify the default IP Address that the ENH700EXT will be accessed by.
- 3) IP Subnet Mask – Specify the Subnet Mask of the ENH700EXT.
- 4) Default Gateway – Specify the default gateway of the ENH700EXT.
- 5) Primary DNS - Specify the Primary DNS of the ENH700EXT.



When changing the IP Address or Default Gateway, the IP Address used to access the ENH700EXT when logging in will change.

6.3 Spanning Tree Settings

The **Spanning Tree Settings** option of the **System** section allows the user to configure the spanning tree settings of the ENH700EXT.



Setting up a Spanning Tree for large networks when using Client Bridge Mode or WDS Bridge can improve throughput. Spanning trees ensure that data will never pass through the same node when going from point A to point B.

Spanning Tree Settings

[Home](#)
[Reset](#)

Spanning Tree Status	<input checked="" type="radio"/> On <input type="radio"/> Off
Bridge Hello Time	2 seconds (1-10)
Bridge Max Age	20 seconds (6-40)
Bridge Forward Delay	4 seconds (4-30)
Priority	32768 (0-65535)

[Accept](#) [Cancel](#)

Spanning Tree Status	Enable the use of Spanning Tree on the ENH700EXT.
Bridge Hello Time	The amount of time before the connections times out.
Bridge Max Age	The maximum amount of time the connection between nodes will last.
Bridge Forward Delay	The amount of time to elapse before data is forwarded.
Priority	The priority of the device in the spanning tree.

7 2.4GHz Wireless and 5GHz Wireless

In both the **2.4GHz Wireless** and **5GHz Wireless** sections, the user will be able to configure operation mode settings the 2.4GHz or the 5GHz radio respectively. The settings that will be available to change is dependent on the selections chosen in **Operation Mode** (Chapter 6.1 - Page 13) option in the **System** section of the user interface menu. For more information about the modes of operation, refer to Chapter 3 (Page 10).



ENH700EXT can only operate a Client Bridge (WDS or not) or WDS Station on a single band. It cannot operate bridges or stations concurrently on both 2.4GHz or 5GHz.



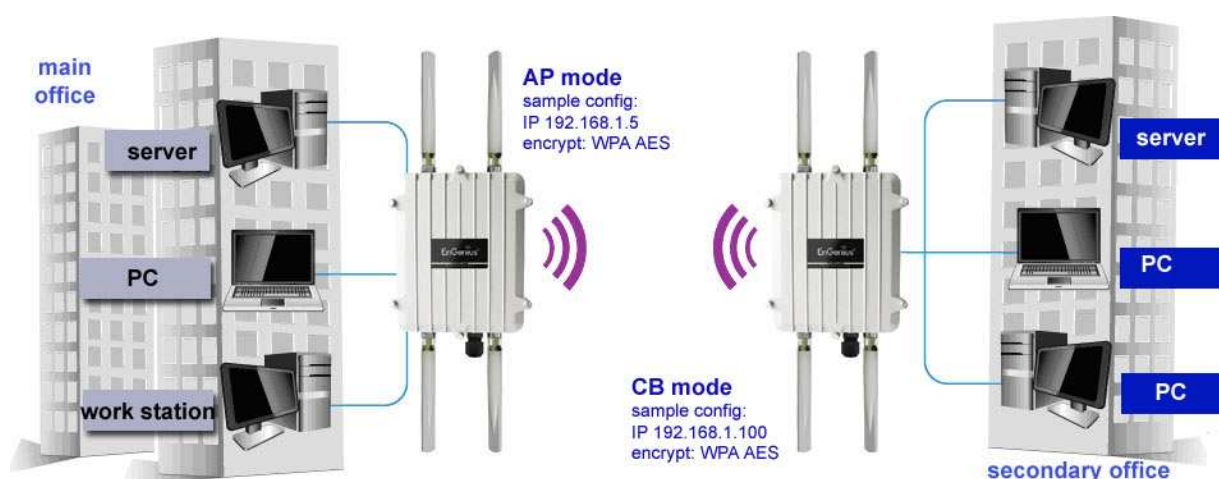
The changes made in the **2.4GHz Wireless** or **5GHz Wireless** sections of the ENH700EXT won't be in effect until **Save & Apply** is selected in the **Save/Reload** option of the **Status** section. Selecting **Accept** or **Save** in the **2.4GHz Wireless** or **5GHz Wireless** sections will not reconfigure the device.

7.1 Access Point Mode

When Access Point is the selected mode of operation for either the 2.4GHz or 5GHz bands, three options will be available to configure. The three options that can be configured are **Wireless Network**, **Wireless MAC Filter**, and **Wireless Advanced Settings**.

Access Point configuration

Step 1	Login to the web-based configuration interface with default IP 192.168.1.1
Step 2	Select your country or region's regulation.
Step 3	Use site survey to scan channels of the nearby area.
Step 4	Select a channel with less interference.
Step 5	Specify the SSID for your broadcast SSID and you can also configure multiple SSID at the same time.
Step 6	Verify VLAN identifier in order to separate services among clients
Step 7	Setup the authentication settings.
Step 8	Select Apply to process all of the configurations.



ENH700EXT Access Point to Client Bridge mode setting diagram

7.1.1 Wireless Network

Wireless Mode	802.11 B/G/N Mixed
Channel HT Mode	40MHz
Extension Channel	Upper Channel
Channel / Frequency	Ch1~2.412GHz <input checked="" type="checkbox"/> Auto
AP Detection	Scan

Current Profiles				
SSID	Security	VID	Enable	Edit
EnGenius1-2.4G	None	1	<input checked="" type="checkbox"/>	Edit
EnGenius2-2.4G	None	2	<input type="checkbox"/>	Edit
EnGenius3-2.4G	None	3	<input type="checkbox"/>	Edit
EnGenius4-2.4G	None	4	<input type="checkbox"/>	Edit
	None		<input type="checkbox"/>	Edit
	None		<input type="checkbox"/>	Edit
	None		<input type="checkbox"/>	Edit
AP SSID	None	1	<input checked="" type="checkbox"/>	Edit

Wireless Mode	Select the wireless mode that the current band of operation will use. The options are: 1) 802.11 b/g/n Mixed 2) 802.11 b 3) 802.11 b/g Mixed 4) 802.11 g 5) 802.11 n only
Channel HT Mode	Select the channel bandwidth of the antennas. The larger the channel used, the throughput will be much better. Using a lower channel, will increase the distance and stability of the signal.
Extension Channel	If the Channel HT Mode was set to 40Hz, the Channel Frequency can be set if Auto is not selected. The Upper Channel is associated with frequency channels 1-7, while the Lower Channel is associated with channels 5-11.
Channel / Frequency	Select the specific channel / frequency the ENH700EXT will operate in for the corresponding band. This option is only available if Auto is not selected.
AP Detection	To help select a specific channel / frequency to use, the ENH700EXT can scan all the wireless access points in the area to help select the optimal settings.
Current Profiles	The ENH700EXT can operate up to total 16 SSIDs

concurrently in Access Point mode (8 SSIDs per Radio). Each SSID will have associated settings that can be edited by pressing the **Edit** button. For an SSID to be active and discoverable, the checkbox associated to the SSID must be marked.

7.1.2 SSID Profile

Wireless Setting	
SSID	EnGenius1-2.4G (1 to 32 characters)
Suppressed SSID	<input type="checkbox"/>
Station Separation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

Wireless Security	
Security Mode	Disabled

SSID	The SSID is the identifier (name) of the Access Point .
Suppressed SSID	By checking the Suppressed SSID so clients scan for access point will not see the SSID of ENH700EXT
Station Separation	When enabled, clients will not be able to communicate with other devices connected via Access Point within the ENH700EXT.
Security Mode	Set the security options for the Access Point. For more information on Wireless security, refer to Chapter 8 (Page 23).

7.1.3 Wireless MAC Filter

ACL Mode

: : : : :

#	MAC Address

ACL Mode	Select whether the MAC Addresses listed will be the only clients granted access or denied service in the Access Point.
Add	Enter the MAC Address of the device to be added to the filtering list. Once entered, press Add .
#	The number on the list associated with the client MAC address.

MAC Address	The MAC Address of the client.
--------------------	--------------------------------

7.1.4 Wireless Advanced Settings

/ Wireless Advanced Settings

Home
Reset

Data Rate	Auto ▾
Transmit Power	20 dBm ▾ <input type="checkbox"/> Obey Regulatory Power
RTS/CTS Threshold (1 - 2346)	2346 bytes
Distance (1-30km)	1 km
Aggregation:	<input checked="" type="radio"/> Enable <input type="radio"/> Disable 32 Frames 50000 Bytes(Max)

Accept
Cancel

Data Rate	The Data Rate of the ENH700EXT affects the throughput of data transfer. A higher data rate selected will have a faster throughput. Lower will increase the distance in which the signal will reach.
Transmit Power	The transmit power will allow the ENH700EXT to extend the area of coverage. However, when increasing it too much, the wireless connection may be unstable.
RTS / CTS Threshold (1-2346)	The number on the list associated with the client MAC address. This option affects the size of the packets that will be passed along to transmit data. Smaller thresholds will result in more transmissions of data.
Distance (1-30km)	Specify the distance between the access points and clients. Further distances will result in lower connection speeds.
Aggregation	Aggregation allows packets to be sent together to lower the amount of transmissions.

7.2 Client Bridge

When Client Bridge is the selected mode of operation for either the 2.4GHz or 5GHz bands, two options will be available to configure. The two options that can be configured are **Wireless Network** and **Wireless Advanced Settings**.

7.2.1 Wireless Network

2.4G / Wireless Network

HomeReset

Wireless Mode	802.11 B/G/N Mixed
SSID	<div>Specify the static SSID : <input type="text"/> (1 to 32 characters) Or press the button to search for any available WLAN Service. <div>Site Survey</div></div>
Preferred BSSID	<input type="checkbox"/> <input type="text"/> : <input type="text"/> : <input type="text"/> : <input type="text"/> : <input type="text"/> : <input type="text"/>

Wireless Security

Changing the wireless security settings may cause this wireless client to associate with a different one. This may temporarily disrupt your configuration session.

Security Mode	Disabled
---------------	----------

AcceptCancel

Wireless Mode	Select the wireless mode that the current band of operation will use. The options are: 1) 802.11 b/g/n Mixed 2) 802.11 b 3) 802.11 b/g Mixed 4) 802.11 g 5) 802.11 n only
SSID	In Specify the static SSID , enter the name of the Access Point the client will connect to. This area is automatically filled out if an access point in Site Survey is selected.
Preferred BSSID	Specify the MAC address of the Access Point the client will connect to. This section will be filled if an access point in Site Survey is selected.
Security Mode	Set the security options for the client bridge. For more information on Wireless Security, refer to Chapter 8 (Page 23).

7.2.2 Wireless Advanced Settings

Data Rate	Auto
Transmit Power	20 dBm
RTS/CTS Threshold (1 - 2346)	2346 bytes
Distance (1-30km)	1 km
Aggregation:	<input checked="" type="radio"/> Enable <input type="radio"/> Disable 32 Frames 50000 Bytes(Max)

Accept Cancel

Data Rate	The Data Rate of the ENH700EXT affects the throughput of data transfer. A higher data rate selected will have a faster throughput. Lower will increase the distance in which the signal will reach.
Transmit Power	The transmit power will allow the ENH700EXT to extend the area of coverage. However, when increasing it too much, the wireless connection may be unstable.
RTS / CTS Threshold (1-2346)	The number on the list associated with the client MAC address. This option affects the size of the packets that will be passed along to transmit data. Smaller thresholds will result in more transmissions of data.
Distance (1-30km)	Specify the distance between the access points and clients. Further distances will result in lower connection speeds. Please note, the distance setting allows you to control to ACK timing, it is not a tool for you to measure distance.
Aggregation	Aggregation allows packets to be sent together to lower the amount of transmissions.



No changes made in the **System** section of the ENH700EXT will be in effect until **Save & Apply** is selected in the **Save/Reload** option of the **Status** section.



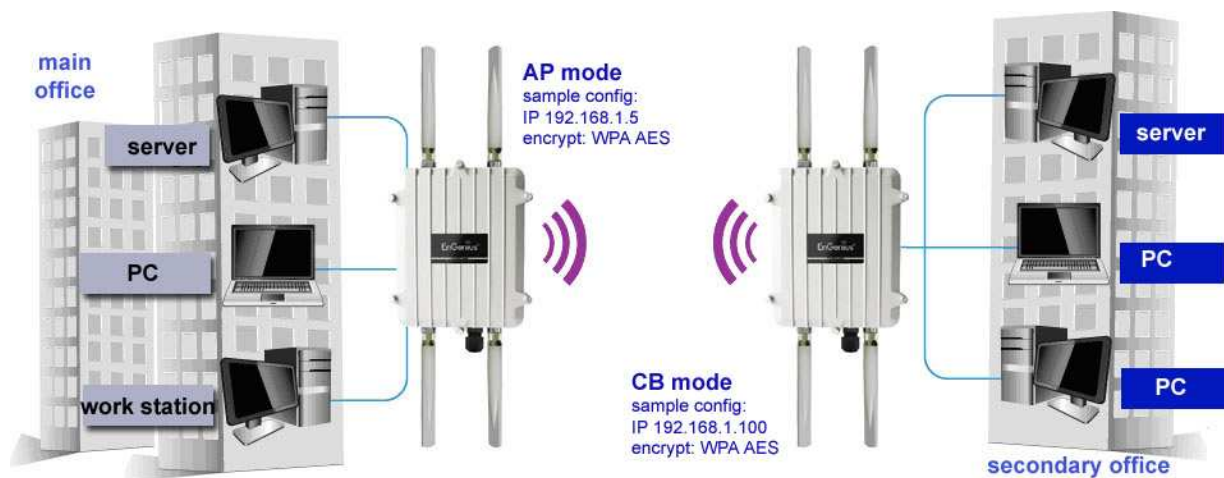
Selecting **Accept** or **Save** in the **System** section will not reconfigure the router. Changing Wireless Advanced Settings may lower the wireless connection quality. Please keep all settings as default unless you understand the modifications which you have made

Client Bridge Configuration

Step 1	Login to the web-based configuration interface with the default IP: 192.168.1.1
Step 2	Select your country or region's regulation.
Step 3	Select Operation Mode to Client Bridge from System Properties .
Step 4	Use site survey to scan channels of the nearby area.
Step 5	Select the AP that you would like to associate with.
Step 6	Setup the authentication settings that match to the Access Point's settings.
Step 7	Select Apply to process all of the configurations.



The Client-Bridge's IP settings must match the Access Point's settings to be on the same subnet.



ENH700EXT Access point to Client Bridge mode setting diagram

7.3 WDS Mode

When a **WDS** mode is selected, **WDS Access Point** is set up the same as **Access Point** mode and **WDS Bridge** is set up the same as **Client Bridge** mode. The only difference is **WDS Link Settings**. The **WDS Link Settings** is used to setup a connection between access points without limiting or removing functionality. Wireless Distributed Systems are used to greatly increase coverage and allow different LANs to communicate with each other.

7.3.1 WDS Station

Another mode of operation of the ENH700EXT is **WDS Station**. In **WDS Station**, the ENH700EXT will be used as the central location of the **WDS**. To setup the **Wireless Network** and **Wireless Advanced Settings** for the **WDS**, refer to Chapter 7.2 (Page 19).

7.3.2 WDS Link Settings

Security	None	
WEP Key		40/64-bit(10 hex digits)
AES Passphrase	(8-63 ASCII characters or 64 hexadecimal digits)	

ID	MAC Address	Mode
1	: : : : : :	Disable
2	: : : : : :	Disable
3	: : : : : :	Disable
4	: : : : : :	Disable

Accept Cancel

Security	Set the security options for the WDS Link Settings. For more information on Wireless security, refer to Chapter 8 (Page 23).
WEP Key	Enter the WEP Key to be used.
AES Passphrase	Enter the AES Passphrase (password) to be used.
MAC Address	Specify the distance between the access points and clients. Further distances will result in lower connection speeds.

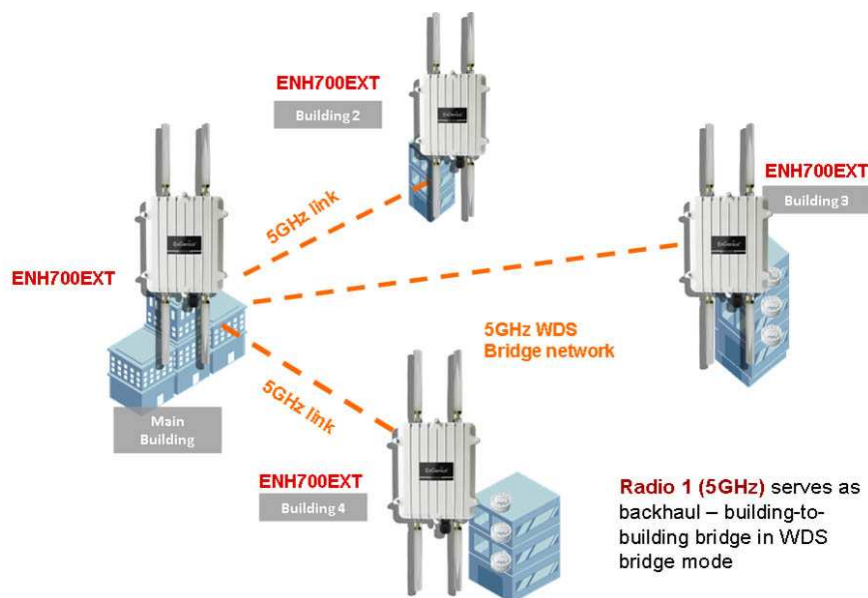
WDS Bridge Configuration

Step 1	Login to the web-based configuration interface with default IP 192.168.1.1
Step 2	Select your country or region's regulation.
Step 3	Change Operation Mode to WDS Bridge under System Properties .
Step 4	Set the device's IP settings under System -> IP Settings
Step 5	Set the WLAN settings under Wireless Network .
Step 6	Configure WDS Link Settings under Wireless .
Step 7	Specify the MAC address of the bridge(s) which you would like to connect with.
Step 8	Press Apply under Save / Reload to process all of the configurations.
Step 9	Verify the device's settings by browsing to Status -> Main . View the WDS link status.



* Each WDS bridge device must use the same Subnet, Wireless Mode, Wireless Channel, and Security Setting.

* With the MAC secured based WDS bridge network, only WEP encryption is available



ENH700EXT multiple buildings bridged network (WDS)

8 Wireless Security Settings

Wirelessly securing the Wireless network is essential to ensuring a safe and secure network for all the clients. The recommended security setting for wireless LANs is WPA2-PSK, however, the ENH700EXT allows the usage of WEP, WPA-PSK, WPA-PSK Mixed, WPA, WPA2, and WPA Mixed.



No changes made in the **System** section of the ENH700EXT be in effect until **Save & Apply** is selected in the **Save/Reload** option of the **Status** section. Selecting **Accept** or **Save** in the **System** section will not reconfigure the router.

8.1 WPA-PSK, WPA2-PSK, or WPA-PSK Mixed

Using WPA-PSK, WPA2-PSK, or WPA-PSK Mixed security allows for the most common data encryption. Using a Wi-Fi Protected Access security protocol with a Pre-Shared Key allows for both maximum security and ease of use. WPA2 is the newer security protocol of WPA, but setting up WPA in Mixed mode allows all clients with WPA access to use the wireless network.

Wireless Setting

SSID	EnGenius1-2.4G (1 to 32 characters)
Suppressed SSID	<input type="checkbox"/>
Station Separation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

Wireless Security

Security Mode	WPA-PSK
Encryption	Both(TKIP+AES)
Passphrase	(8 to 63 characters) or (64 Hexadecimal characters)
Group Key Update Interval	3600 seconds(30~3600, 0: disabled)

Security Mode	Select WPA-PSK , WPA2-PSK , or WPA-PSK Mixed .
Encryption	Select whether TKIP, AES, or both encryptions will be used.
Passphrase	Enter the password used for the current SSID.
Group Key Update Interval	Enter the amount of time (in seconds) for the Group Key to update.



When using TKIP, 802.11g will be selected by default.

8.2 WPA, WPA2, or WPA Mixed

When selecting one of the various modes of WPA encryption without a Pre-Shared Key, authentication can be determined through RADIUS (Remote Authentication Dial in User Service).

/ SSID Profile

Wireless Setting

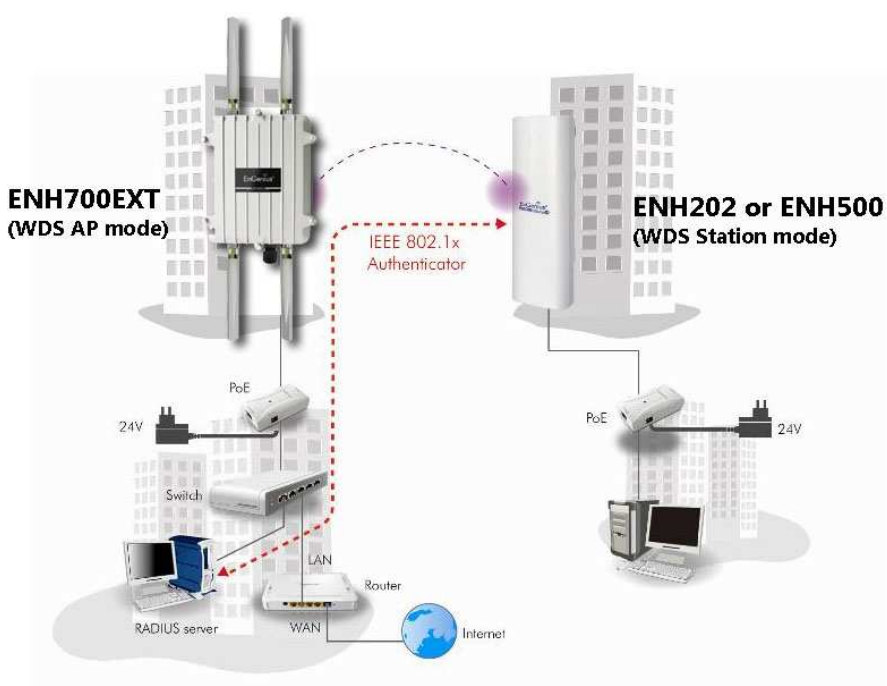
SSID	EnGenius1-2.4G (1 to 32 characters)
Suppressed SSID	<input type="checkbox"/>
Station Separation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

Wireless Security

Security Mode	WPA2
Encryption	AES
Radius Server	<input type="text"/>
Radius Port	1812
Radius Secret	<input type="text"/>
Group Key Update Interval	3600 seconds(30~3600, 0: disabled)
Radius Accounting	Enable
Radius Accounting Server	<input type="text"/>
Radius Accounting Port	1813
Radius Accounting Secret	<input type="text"/>
Interim Accounting Interval	600 seconds(60~600)

Security Mode	Select WPA , WPA2 , or WPA Mixed .
Encryption	Select whether TKIP, AES, or both encryptions will be used.
RADIUS Server	Enter the IP Address of the RADIUS server.
RADIUS Port	Enter the RADIUS port that will be used (Port 1812 is default).
RADIUS Secret	Enter the password in which the RADIUS server will use.
Group Key Update Interval	Enter the amount of time (in seconds) for the Group Key to

	update.
RADIUS Accounting Server	Enter the IP address of the Accounting server.
RADIUS Accounting Port	Enter the accounting port that will be used (Port 1813 is default).
RADIUS Accounting Secret	Enter the password in which the RADIUS Accounting will use.
Interim Accounting Interval	The interval in which the accounting will change.



Example diagram of ENH700EXT supports 802.1x with RADIUS server (sample encryption: WPA2 AES)

8.3 WEP

When using WEP encryption, the security protocol used on the wireless network uses the same principles used in a secure wired network.

Wireless Setting

SSID	EnGenius1-2.4G (1 to 32 characters)
Suppressed SSID	<input type="checkbox"/>
Station Separation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

Wireless Security

Security Mode	WEP
Auth Type	Open System
Input Type	Hex
Key Length	40/64-bit (10 hex digits or 5 ASCII char)
Default Key	1
Key1	
Key2	
Key3	
Key4	

Security Mode	Select WEP .
Auth Type	Select the type of authentication to be used in the WEP mode of encryption.
Input Type	Select the character type to be used in the WEP key.
Key Length	Select the length of the WEP key based on bit length.
Default Key	Select which of the 4 keys to use as the WEP key.
Key[1-4]	Enter the WEP key to be used.



Hexadecimal characters are 0-9 and A-F.

ASCII characters are the equivalent to the English alphanumeric characters and the common non-printable characters such as backspace.



The IEEE 802.11n standard does not include WEP/WPA-PSK/WPA-PSK TKIP security mode. To comply with the standard, when you use the above encryptions, the wireless transmit mode will drop from 802.11n to 802.11g.

9 Management

The **Management** portion of the ENH700EXT allows the user to change some generic system settings.



No changes made in the **Management** section of the ENH700EXT be in effect until **Save & Apply** is selected in the **Save/Reload** option of the **Status** section. Selecting **Accept** or **Save** in the **Management** section will not reconfigure the device.

9.1 Administration

In the **Administration** option of the **Management** section of the user interface, users change the username and password of the ENH700EXT. The default username is **admin** and the default password is **admin**.

Login Setting

[Home](#)[Reset](#)

New Name	<input type="text" value="admin"/>
Old Password	<input type="password"/>
New Password	<input type="password"/>
Confirm Password	<input type="password"/>

New Name	Enter the username used to login to the ENH700EXT.
Old Password	Enter the current password of the ENH700EXT.
New Password	Enter the password that will become the new password for the ENH700EXT.
Confirm Password	Reenter the password that will become the new password for the ENH700EXT.

9.2 Management VLAN

In the **Management VLAN** option in the **Management** section allows users to assign a VLAN tag to packets being transmitted in the ENH700EXT. Clients on a VLAN normally act if they were on a separate LAN.

Management VLAN Settings

[Home](#)[Reset](#)

2.4G Current Profiles				
SSID	Security	Isolation	VID	Enable
EnGenius1-2.4G	None	<input checked="" type="checkbox"/>	1	<input checked="" type="checkbox"/>
EnGenius2-2.4G	None	<input checked="" type="checkbox"/>	2	<input checked="" type="checkbox"/>
EnGenius3-2.4G	None	<input checked="" type="checkbox"/>	3	<input checked="" type="checkbox"/>
EnGenius4-2.4G	None	<input checked="" type="checkbox"/>	4	<input checked="" type="checkbox"/>
EnGenius5-2.4G	None	<input type="checkbox"/>	5	<input type="checkbox"/>
EnGenius6-2.4G	None	<input type="checkbox"/>	6	<input type="checkbox"/>
EnGenius7-2.4G	None	<input type="checkbox"/>	7	<input type="checkbox"/>
EnGenius8-2.4G	None	<input type="checkbox"/>	8	<input type="checkbox"/>

Caution: If you reconfigure the Management VLAN ID, you may lose connectivity to the access point. Verify that the switch and DHCP server can support the reconfigured VLAN ID, and then re-connect to the new IP address.

Management VLAN ID

- ☐ No VLAN tag
- ☒ Specified VLAN ID 1
(must be in the range 1 ~ 4094.)

2.4GHz Current Profiles	The user can change the VID of the 2.4GHz Access Points that have been set up as well as enable or disable them.
5GHz Current Profiles	The user can change the VID of the 2.4GHz Access Points that have been set up as well as enable or disable them.
Management VLAN ID	If the network includes VLANs and if tagged packets need to pass through the Access Point, specify the VLAN ID in this field. If not, select the No VLAN tag radio button.

9.3 Wireless Traffic Shaping

Wireless Traffic Shaping

HomeReset

Enable Traffic Shaping	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Incoming Traffic Limit	1000 kbit/s
Outgoing Traffic Limit	2000 kbit/s

AcceptCancel

Enable Traffic Shaping	The user can select whether or traffic shaping is enabled or not.
Incoming Traffic Limit	Specify the maximum rate of incoming traffic speed.
Outgoing Traffic Limit	Specify the maximum rate of outgoing traffic speed.

9.4 SNMP Settings

The **SNMP Settings** controls the how data is sent to the SNMP-compatible clients.

SNMP Settings

HomeReset

SNMP	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Contact	
Location	
Community Name (Read Only)	public
Community Name (Read/Write)	private
Trap Destination Address	
Trap Destination Community Name	public

Save/ApplyCancel

SNMP	The user can select whether SNMP is enabled or not.
Contact	Specify the contact details of the device.
Location	Specify the location of the device.
Community Name (Read Only)	Specify the password for access by the SNMP community for read only access.
Community Name (Read/Write)	Specify the password for access by the SNMP community for read and write access.
Trap Destination Address	Specify the IP address that receives the SNMP trap.
Trap Destination Community Name	Specify the password of the SNMP trap community.

9.5 Backup / Restore Settings

In the **Backup / Restore Settings** option of the **Management** section allows the users to save the configurations of the ENH700EXT into a file as backup to later restore.

Backup/Restore Settings

HomeReset

Save A Copy of Current Settings

Backup

Restore Saved Settings from A File

Choose Fileno file selected

Restore

Revert to Factory Default Settings

Factory Default

Save a Copy of Current Settings	The user can save the configuration settings of the ENH700EXT into a file.
Restore Saved Settings from A File	The user can browse the computer file system for a previously saved settings file of the ENH700EXT to restore to.
Revert to Factory Default Settings	The user can restore all settings of the ENH700EXT to the factory defaults.

9.6 Auto Reboot Settings

The users can use the **Auto Reboot Settings** option in the **Management** section to setup a time frame in which the ENH700EXT will automatically restart.

Auto Reboot Settings

HomeReset

Auto Reboot Setting

Disable

Frequency of Auto Reboot

Min10 Mins

Save/Apply

Cancel

Auto Reboot Setting	The user can enable automatic rebooting of the ENH700EXT.
Frequency of Auto Reboot	If enabled, the user can set the amount of time to elapse before the ENH700EXT will automatically restart.

9.7 Firmware Upgrade

In the **Firmware Upgrade** option of the **Management** section, users can view the current firmware version of the ENH700EXT. Also, if there is a new firmware upgrade, the user may download it from www.EnGeniusTech.com and upload it to the ENH700EXT.

Firmware Upgrade

HomeReset

Current firmware version: 1.1.6

Locate and select the upgrade file from your hard disk:

Choose File

no file selected

Upload

Current Firmware Version	Displays the current firmware version of the ENH700EXT.
Choose File	Selecting Choose File will bring up a prompt to locate the .bin file associated to the firmware upgrade. Once uploaded, the ENH700EXT will restart and the user will need to log in once again. Refer to Chapter 2.6 (Page 9) on how to log on to the ENH700EXT.

9.8 Time Settings

In the **Time Settings** option of the **Management** section, users can change the system time of the ENH700EXT.

Time Settings Home Reset

Time

☐ **Manually Set Date and Time**

2012 / 04 / 27 18 : 58

☒ **Automatically Get Date and Time**

Time Zone: UTC+00:00 Gambia, Liberia, Morocco

☐ **User defined NTP Server:** 209.81.9.7

☐ **Enable Daylight Saving**

Start Time: January 1st Sun 12 am

End Time: January 1st Sun 12 am

Save/Apply Cancel

Manually Set Date and Time	The user can manually set the date and time of the ENH700EXT. Date Format: <Year>/<Month>/<Day> Time Format: <Hour> : <Minute>
Automatically Get Date and Time	Allow the ENH700EXT to obtain the time automatically from either online or a NTP server specified by the user. Selecting the Time Zone will increase accuracy.
Enable Daylight Saving	Users can manually enter the Daylight Savings times by inputting the date and time of Daylight Savings.

9.9 Log

Log		Home	Reset
Syslog			
Syslog	Disable		
Log Server IP Address	0 . 0 . 0 . 0		
Local log			
Local Log	Enable		
<div>Save/Apply Cancel</div>			

Syslog	The user can select to enable the Syslog function of the ENH700EXT.
Log Server IP Address	The user can enter the IP address of the Log Server.
Local Log	The user can select to enable the Local Log service.

9.10 Diagnostics

The **Diagnostics** option in the **Management** section of the user interface allows users to test connection quality between the ENH700EXT and the specified client.

Diagnostics		Home	Reset
Ping Test Parameters			
Target IP			
Ping Packet Size	64 Bytes		
Number of Pings	4		
<div>Start Ping</div>			
Traceroute Test Parameters			
Traceroute target			
<div>Start Traceroute</div>			

Target IP	Specify the IP address of the client system that will be tested.
Ping Packet Size	Specify the size of the packets per ping.
Number of Pings	Specify the number of pings to be tested.
Traceroute of Pings	Specify the IP address of the client system that will be pinged back forth.

10 EnGenius Technologies Inc.: EZ Controller

The EnGenius Technologies Inc.'s EZ Controller Access Point Management software provides a robust suite of tools for IT managers, installers and network administrators who deploy, manage and maintain wireless networks. With EZ Controller, EnGenius Wireless Indoor and Outdoor Access Points and Client Bridges can be configured, controlled, and monitored from one central location.

For more information about the EZ Controller and for the download link, visit the EZ Controller Information page at: <http://www.engeniustech.com/networking/productsdatacom/business-networking/zone-controller>

10.1 EZ Controller Overview

In enhancing the real-time functionality of a network, applying the best network management software tool is necessary. With an aggressive network management tool you can perform monitoring, controlling, deploying and allocating of data that are being transmitted to different units/systems in a network. This application helps to ensure the entire network runs without fewer faults and interruptions.

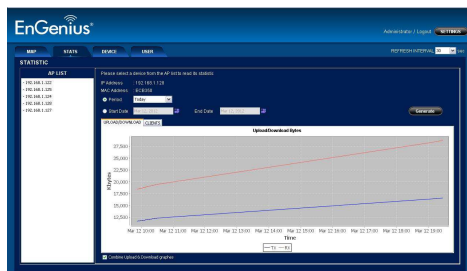
Real-time monitoring means that the requests made by the software tool to different units in a network must be executed with precision and manage simultaneously. Such equipment includes Access Points, Client Bridges, AP Routers and so forth for indoor or outdoor deployments.

If you are an IT manager, installer or network administrator tasked with meeting with the growing demand of new client devices, additional users and other performance-related requirements into the network then EZ Controller can help to identify issues that can effect network performance or help to optimize the network by indicating where additional Access Points or Client Bridges may be necessary.

10.2 Features



Users will have a visual representation of the coverage area in which all EnGenius Technology access point products (if they are compatible with the EZ Controller).



The EZ Controller has the ability to provide real time information of all the monitored devices.

Name/Address	IP Address	Model	Op. Mode	Status	Num. of Client	UP	Down	Channel	Last Update
ENP100	192.168.1.128	ENP100	Client Bridge	Active	0	5:4:46	627.5K	channel(1)	2011-11-14 17:46:03
ENP102	192.168.1.129	ENP102	AP Bridge	Active	1	6:58:16	360.4K	channel(1)	2011-11-14 17:46:05
AccessPoint	192.168.1.75	Unknown	Unknown	Active	0	6:53:36	755.3K	Auto	2011-11-14 17:46:03
ENP102	192.168.1.129	ENP102	Client Bridge	Active	0	6:55:26	557.7K	channel(1)	2011-11-14 17:46:05

The EZ Controller conveniently lists all the Access Points with some generic information such as MAC Address or number of connected clients.

10.3 Benefits

The EZ Controller provides the following features and benefits:

- An intuitive Graphical User Interface
- Helps to optimize network performance
- Helps to minimize AP/Bridge downtime
- Monitors and controls each EnGenius AP/Bridge asset
- Monitors traffic load by AP, MAC, or IP Address
- Sequential Firmware Upgrades to deployed Access Points and Bridges
- Enables network administrators to import and archive maps and floor plans for radio coverage plotting
- Label assets by IP Address, MAC Address, or manual aliases

10.4 Compatible Devices

Currently, not all EnGenius Technologies Inc. products are compatible with the EZ Controller. The current products compatible with EZ Controller are:

- EAP150 [v. 1.2.3]
- EAP300 [v. 1.2.3]
- EAP350 [v. 1.1.0]
- ECB150 [v. 1.0.3]
- ECB300 [v. 1.0.3]
- ECB350 [v. 1.1.3]
- ENH200 [v. 1.0.8]
- ENH200EXT [v. 1.0.8]
- **ENH700EXT** [v. 1.1.6]
- ENH202 [v. 1.1.0]
- ENH500 [v. 1.1.0]
- ENH210 [v. 1.1.0]
- ENH700EXT [v. 1.1.0]

Note: As EnGenius continues to improve the products. New firmware versions and new models will continue to be released. The above list is subject to change.

10.5 System Requirements

Currently, the system requirements of the EZ Controller require a Personal Computer running Windows XP, Windows Vista, or Windows 7.

Appendix A – Troubleshooting

If there are problems with the ENH700EXT, refer to the **Troubleshooting** section before contacting EnGenius Technologies Inc.

How do I reset the ENH700EXT back to factory defaults?	<p>There are two ways to reset the ENH700EXT. There is both a hardware method and a software method.</p> <p>Hardware Method: Press and hold the reset button behind the hole of the PoE projector for 10 seconds.</p> <p>Software Method: Refer to Chapter 9.5 (Page 30) on how to restore back to factory defaults.</p>
What is the default IP address of the ENH700EXT?	The default IP address of the ENH700EXT is 192.168.1.1 .
I plugged the PoE to the Ethernet port on the back of the ENH700EXT, but the unit isn't turning on, how come?	You need to connect the Ethernet cable to the PoE injector and connect the power adaptor to the DCIN port of the PoE injector. Refer to Chapter 2 (Page 8) on how to properly set up the ENH700EXT.
When I install the PoE injector to the ENH700EXT, what kind of PoE should I use?	The ENH700EXT uses a proprietary PoE injector and is also workable with standard 802.3af/at-compliant PoE switches.
What if my signal isn't strong?	Ensure that the ENH700EXT is positioned in such a way that will maximize signal radius. Refer to Chapter 2.1 (Page 8) for installation considerations.
Why can't I get a wireless connection?	Ensure that the encryption set on the client matches the one set up on the ENH700EXT.

Appendix B – Specification

Hardware Specification									
Standard	IEEE 802.11 a/b/g/n								
MCU	Atheros AR7161								
RF	2 x AR9220								
Memory	64MB								
Flash	8MB								
Physical Interface	1 x RJ-45 for 10/100/1000 Gigabit Ethernet Reset Button in PoE Injector								
Power Requirements	- Active Ethernet (Power over Ethernet) - Proprietary PoE design - Power Adapter 48V / 0.8A								
RF Specification									
Frequency Band	802.11a 5.15 ~ 5.35GHz, 5.47 ~ 5.725GHz, 5.725~5.825GHz 802.11b/g U.S., Europe and Japan product covering 2.400 to 2.484 GHz, programmable for different country regulations								
Data rate	300 Mbps per radio								
Receive Sensitivity (Typical)	<table> <tr> <th>802.11n (5GHz)</th><th>802.11n (2.4GHz)</th></tr> <tr> <td>-89dBm @ MCS0</td><td>-97dBm @ MCS0</td></tr> <tr> <td>-70dBm @ MCS7</td><td>-78dBm @ MCS7</td></tr> <tr> <td>-89dBm @ MCS8</td><td>-96dBm @ MCS8</td></tr> </table>	802.11n (5GHz)	802.11n (2.4GHz)	-89dBm @ MCS0	-97dBm @ MCS0	-70dBm @ MCS7	-78dBm @ MCS7	-89dBm @ MCS8	-96dBm @ MCS8
802.11n (5GHz)	802.11n (2.4GHz)								
-89dBm @ MCS0	-97dBm @ MCS0								
-70dBm @ MCS7	-78dBm @ MCS7								
-89dBm @ MCS8	-96dBm @ MCS8								

	-70dBm @ MCS15	-76dBm @ MCS15		
	802.11a	802.11g	802.11b	
	-90dBm @ 6Mbps	-96dBm @ 6Mbps	-99dBm @ 1Mbps	
	-72dBm @ 54Mbps	-82dBm @ 54Mbps	-93dBm @ 11Mbps	
Available transmit power	802.11n (5GHz)		802.11n (2.4GHz)	
	26dBm @ MCS0~2/MCS8~10		26dBm @ MCS0~2/MCS8~10	
	25dBm @ MCS3/MCS11		26dBm @ MCS3/MCS11	
	24dBm @ MCS4/MCS12		25dBm @ MCS4/MCS12	
	23dBm @ MCS5/MCS13		24dBm @ MCS5/MCS13	
	23dBm @ MCS6/MCS14		22dBm @ MCS6/MCS14	
	21dBm @ MCS7/MCS15		21dBm @ MCS7/MCS15	
	802.11a	802.11g	802.11b	
	26dBm @ 6~24Mbps	26dBm @ 6~24Mbps	26dBm @ 1~11Mbps	
	25dBm @ 36Mbps	25dBm @ 36Mbps		
	24dBm @ 48Mbps	24dBm @ 48Mbps		
	23dBm @ 54Mbps	23dBm @ 54Mbps		
	Antenna	4 x N-type connector		
	Software Specification			
	Operation Mode	Access Point / Client Bridge / WDS for each radio		
Wireless	Auto Channel Selection (Setting varies by Regular Domains)			
	Distance Control (802.1x Ack timeout)			
	Narrow Bandwidth Selection			
	Multiple SSID (8 SSID)			
	VLAN Function			

	WDS AP / WDS Bridge BSSID
Security	<ul style="list-style-type: none"> - WEP Encryption-64/128/152 bit - WPA/WPA2 Personal (WPA-PSK using TKIP or AES) - WPA/WPA2 Enterprise (WPA-EAP using TKIP) - 802.1x Authenticator - Hide SSID in beacons - MAC address filtering, up to 50 field - Wireless STA (Client) connected list
QoS	WMM
Management	
Configuration	Web-based configuration (HTTP)/Telnet
Firmware Upgrade	Upgrade firmware via web browser Fix latest setting parameter when firmware upgrading
Administrator Setting	Administrator password can be changed
System monitoring	Status in hand , useful statistic and Event log
Reset Setting	Reset to factory default and reboot
MIB	MIB I , MIB II and Private MIB
SNMP	V1 , V2c
Backup	Save all setting and condition to a file by web
Environment & Mechanical	
Temperature Range	Operating -20°C~70°C Storage -30°C to 80°C
Humidity (non-condensing)	0%~90% typical
Waterproof	IP68

Dimensions	245mm (L) x 200mm (W) x 75mm (H)
Weight	1450g

Note: As we continue to improve our products, the specification is subject to change without notice

Appendix C – Contacting Technical Support

If the problem could not be resolved using the ENH700EXT product manual, please contact the vendor who provided the ENH700EXT. If you cannot contact your vendor, or they were unable to resolve the issue, contact the EnGenius Customer Service department.

Before you contact the EnGenius Customer Service Department, please have the following information:

- Product Model Name and Serial Number
- Vendor Name and Location
- Warranty Information
- The Date of Purchase
- Firmware Version
- A Brief Description of the issue and the attempts were performed tried to resolved the issue.

Telephone: 1.888.735.7888

E-Mail: Support@EnGeniusTech.com

Appendix D – Glossary

Here is a selection of terms and definitions that may help reader to be more familiar with WLAN technologies and understand the user manual better.

Ad Hoc Network

A short-term WLAN framework created between two or more WLAN adapters, without going through an Access Point. An ad hoc network lets computers send data directly to and from one another. For an ad hoc network to work, each computer on the network needs a WLAN card installed configured for Ad Hoc mode.

Access point

A base station in a WLAN that acts as a central transmitter of data throughput and receiver of WLAN radio signals.

Antenna

A device that sends and receives radio-frequency (RF) signals. Often camouflaged on existing buildings, trees, water towers or other tall structures, the size and shape of antennas are generally determined by the frequency of the signal they manage.

Authentication

A process that verifies the identity of a wireless device or end-user. A common form of authentication is to verify identities by checking a user name and password to allow network access.

Backbone

A high-speed line or series of connections that form a major pathway within a network.

Bandwidth

The part of the frequency spectrum required to transmit desired information. Each radio channel has a center frequency and additional frequencies above and below this carrier frequency that carry the transmitted information. The range of frequencies from the lowest to the highest used is called the bandwidth.

Bridge

A wireless device that connects multiple networks that are physically separate or use different media, but which use similar standards.

Bridge Mode

An Access Point in bridge mode can operate as a WLAN bridge that connects two wired network segments. The peer device also must be in bridge mode. This wireless bridge connection is equivalent to a Wireless Distribution System (WDS).

CHAP

Challenge Handshake Authentication Protocol. An alternative protocol that uses a challenge/response technique instead of sending passwords over the wire.

Collision

Interference resulting from two network devices sending data at the same time. The network detects the collision of the two transmitted packets and discards both of them.

Coverage

The region within which a paging receiver can reliably receive the transmission of paging signals.

Coverage Area

The geographical area that can be served by a mobile communications network or system.

Coverage Hole

An area within the radio coverage footprint of a wireless system where the RF signal level is below the design threshold. Physical obstructions such as buildings, foliage, hills, tunnels, and indoor parking garages are usually the cause of coverage holes.

Cyclic Redundancy Check (CRC)

A common technique for detecting data transmission errors.

Dynamic Host Configuration Protocol (DHCP)

A protocol that assigns temporary IP addresses automatically to client stations logging onto an IP network, so the IP addresses do not have to be assigned manually. The ENH210EXT contains an internal DHCP server that automatically allocates IP address using a user-defined range of IP addresses.

Dead Spot

An area within the coverage area of a WLAN where there is no coverage or transmission falling off. Electronic interference or physical barriers such as hills, tunnels, and indoor parking garages are usually the cause of dead spots. See also coverage area.

802.11

A category of WLAN standards defined by the Institute of Electrical and Electronics Engineers (IEEE).

802.11a

An IEEE standard for WLANs that operate at 5 GHz, with data rates up to 54 Mbps.

802.11n

An IEEE standard for WLANs that operates at 2.4 GHz, with 5GHz band as option and data rate of 300 Mbps. The new standard also raises the encryption bar to WPA2. The 40 HT option can be added to increase the data rate.

Encryption

Translates data into a secret code to achieve data security. To read an encrypted file, you must have a secret key or password for decryption. Unencrypted data is referred to as plain text; encrypted data is referred to as cipher text

ESS ID

The unique identifier for an ESS. All Access Points and their associated wireless stations in the same group must have the same ESSID.

Footprint

Geographical areas where an entity is licensed to broadcast its signal.

Gateway

A computer system or other device that acts as a translator between two systems that use different communication protocols, data formatting structures, languages, and/or architecture.

HT mode

In the 802.11n system, two new formats, called High Throughput (HT), are defined for the Physical Layer, Mixed Mode, and Green Field. If a system runs 40 HT, two adjacent 20 MHz channels are used. The larger 40 MHz bandwidth can provide better transmit quality and speed.

Keys

Like passwords, keys open (decrypt) and close (encrypt) messages. While many encryption algorithms are commonly known and public, the key must be kept secret.

Local-Area Network (LAN)

A small data network covering a limited area, such as a building or group of buildings. Most LANs connect workstations or personal computers. LANs let many users share devices such as printers as well as data. LANs also facilitate communication through e-mail or chat sessions.

Media Access Control (MAC) Address

Address associated with every hardware device on the network. Every 802.11 wireless device has its own specific MAC address. This unique identifier is hard-coded into the device and can be used to provide security for WLANs. When a network uses a MAC table, only the 802.11 radios that have their MAC addresses added to that network's MAC table can access the network.

Network Address Translation (NAT)

An Internet standard that lets a LAN use one set of IP addresses for internal traffic and a second set of addresses for external traffic.

Network Time Protocol (NTP)

A protocol that lets devices synchronize their time with a time server. NTP uses TCP or UDP port 123 by default.

Passphrase

A text string that automatically generates WEP keys on wireless client adapters.

Power Over Ethernet (PoE)

A PoE provides power to PoE-enabled devices using an 8-pin CAT 5 Ethernet cable, eliminating the need for a power source.

Preamble

Synchronizes transmissions in a WLAN. The preamble type defines the length of the Cyclic Redundancy Check block for communication between a device and roaming wireless stations.

Protected Extensible Authentication Protocol (PEAP)

Authentication protocol of IEEE 802.1x used to send authentication data and passwords over 802.11 WLANs.

Quality of Service (QoS)

A network's ability to deliver data with minimum delay. QoS also refers to the networking methods used to provide bandwidth for real-time multimedia applications.

Remote Authentication Dial-In User Service (RADIUS)

Networking protocol that provides centralized authentication, authorization, and accounting management for computers to connect and use a network service. Because of its broad support and ubiquitous nature, the RADIUS protocol is often used by ISPs and enterprises to manage access to the Internet or internal networks, WLANs, and integrated e-mail services.

Service Set Identifier (SSID)

Name of a WLAN. All wireless devices on a WLAN must use the same SSID to communicate with each other.

Simple Network Management Protocol (SNMP)

An Internet-standard protocol for managing devices on IP networks.

Snooping

Passively watching a network for data, such as passwords, that can be used to benefit a hacker.

Temporal Key Integrity Protocol (TKIP)

An encryption protocol that uses 128-bit keys. Keys are dynamically generated and distributed by the authentication server. TKIP regularly changes and rotates encryption keys, with an encryption key never being used twice.

Transmission Control Protocol/Internet Protocol (TCP/IP)

A protocol that allows communications over and between networks. TCP/IP is the basis for Internet communications.

Weighted Fair Queuing (WFQ)

WFQ services queues are based on priority and queue weight. Queues with larger weights get more service than queues with smaller weights. This highly efficient queuing mechanism divides available bandwidth across different traffic queues.

Wired Equivalent Privacy (WEP)

Security protocol that provides a WLAN with a level of security and privacy comparable to that of a wired LAN. WEP encrypts data sent between wired and WLANs to keep transmissions private.

Wireless Local-Area Network (WLAN)

WLANs use RF technology to send and receive data wirelessly in a certain area. This lets users in a small zone send data and share resources such as printers without using cables to physically connect each computer.

Wi-Fi Protected Access (WPA)

A subset of the IEEE 802.11i standard. WPA applies IEEE 802.1x and Extensible Authentication Protocol (EAP) to authenticate wireless clients using an external RADIUS database. WPA uses Temporal Key Integrity Protocol (TKIP), Message Integrity Check (MIC), and IEEE 802.1x to encrypt data. See also WPA-PSK (WPA -Pre-Shared Key).

Wi-Fi MultiMedia (WMM)

Part of the IEEE 802.11e QoS enhancement to the Wi-Fi standard that ensures quality of service for multimedia applications in WLANs.

Wireless Client Supplicants

Software that runs on an operating system, instructing the wireless client how to use WPA.

WPA -Pre-Shared Key (WPA-PSK)

WPA-PSK requires a single (identical) password entered into each Access Point, wireless gateway, and wireless client. A client is granted access to a WLAN if the passwords match.

WPA2

A wireless security standard that defines stronger encryption, authentication, and key management than WPA. It includes two data encryption algorithms, Temporal Key Integrity Protocol (TKIP) and Advanced Encryption Standard (AES), in the Counter mode with Cipher block chaining Message authentication Code Protocol (CCMP).

Wireless Distribution System (WDS)

A technology that lets Access Points communicate with one another to extend the range of a WLAN.

Appendix E – Statements of Conformity

D.1 Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits 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 equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with 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 equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the 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.

IMPORTANT NOTE:

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note: Country selection is not available in the US model.

D.2 Industry Canada Statement

This device complies with RSS-210 of the Industry Canada 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.

Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

IMPORTANT NOTE: Radiation Exposure Statement:

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

NOTE IMPORTANTE: (Pour l'utilisation de dispositifs mobiles):

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.

D.3 Europe Declaration of Conformity

This device complies with the essential requirements of the R&TTE Directive 1999/5/EC. The following test methods have been applied in order to prove presumption of conformity with the essential requirements of the R&TTE Directive 1999/5/EC:

- EN60950-1:2006 A11:2009
Safety of Information Technology Equipment
- EN50385 : 2002
- Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz - 300 GHz)
- EN 300 328 V1.7.1: 2006-10
- Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using spread spectrum modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive

EN 301 489-1 V1.8.1: 2008-04

Electromagnetic compatibility and Radio Spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.

EN 301 489-17 V2.1.1 2009-05

Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2.4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

This device is a 2.4 GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except in France and Italy where restrictive use applies.

In Italy the end-user should apply for a license at the national spectrum authorities in order to obtain authorization to use the device for setting up outdoor radio links and/or for supplying public access to telecommunications and/or network services.

This device may not be used for setting up outdoor radio links in France and in some areas the RF output power may be limited to 10 mW EIRP in the frequency range of 2454 – 2483.5 MHz. For detailed information the end-user should contact the national spectrum authority in France.