User's Manual

Powerline Wireless N Extender Kit

Table of Content

1. Important Information

1.1 Important Safety Notes

the Device is intended for connection to the AC power line. For installation instructions, refer to the Installation section. The following precautions should be taken when using this product..

- Please read all instructions before installing and operating this product.
- Please keep all instructions for later reference.
- Please follow all warnings and instructions marked on the product.
- **For safety reason, when device is being powered on, this product should NOT be installed in any electric socket which makes the surface with venting holes on the product to face downward (facing the floor).**
- **Unplug the Powerline device from the wall outlet before cleaning. Use a dry cloth for cleaning. DO NOT use liquid cleaners or aerosol cleaners.**
- **DO NOT** operates this product near water.
- This product should **never** be placed near or over a radiator, or heat register.
- This product relies on the building's electrical installation for short-circuit (over current) protection.
- **DO NOT** allow anything to rest on the product interconnect plug. **DO NOT** locates this product where people may walk on the cords.
- Because this product sends data over the power line, it is recommended that you plug directly into a power outlet. Do not plug the Device into a UPS or power strip with surge protection. The product has its own power filter for protection against surges.
- **Only** a qualified technician should service this product. Opening or removing covers may result in exposure to dangerous voltage points or other risks.
- Unplug the product from the wall outlet and refer the product to qualified service personnel for the following conditions:

  - ➢ When the interconnect cords are damaged or frayed.
  - ➢ If liquid has been spilled into the product.
  - ➢ If the product has been exposed to rain or water.
  - ➢ If the product does not operate normally when the operating instructions are followed.
  - ➢ If the product exhibits a distinct change in performance.

CONSIGNES DE SECURITE

Avant d'utiliser l'appareil pour la premiere fois, veuillez lire attentivement ces instructions se rapportant a la securite et les conserver pour reference ulterieure.

Aucune piece de cet appareil ne peut etre reparee ou remplacee par l'utilisateur. Confiez les reparations et l'entretien exclusivement a un personnel qualifie. Tout demontage de l'appareil entrainera l'annulation de la garantie.

ATTENTION
RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR

Attention : pour prevenir tout risque d'electrocution, ne retirez pas le couvercle (ou le dos) de l'appareil.

- Verifiez que la tension d'alimentation indiquee sur la plaque signaletique de la prise correspond bien a celle de votre installation electrique.
- N'utilisez pas l'appareil :

1. si la prise est endommagee de quelque facon que ce soit,
2. en cas de mauvais fonctionnement,
3. si un liquide a ete deverse sur le produit ou des objets ont penetre dans l'appareil,
4. si la prise a ete exposee a la pluie ou mis en contact avec de l'eau
5. si le boitier du produit est endommage,
6. ou si le produit ne fonctionne pas alors que toutes les instructions d'utilisation ont ete suivies a la lettre.

- Branchez l'adaptateur CPL sur une prise secteur facilement accessible.
- L'adaptateur CPL est uniquement destine a une utilisation domestique en interieur.
- N'installez pas l'adaptateur a proximite d'une quelconque source de chaleur, telle qu'un radiateur, une arrivee d'air chaud, un four ou tout autre appareil (notamment les amplificateurs) produisant de la chaleur.
- Veuillez ne pas exposer l'adaptateur a la lumiere directe du soleil et a la poussiere.
- Utilisez l'adaptateur dans un endroit sec.
- N'utilisez pas l'adaptateur a proximite d'eau ou d'une source d'humidite, telle qu'une baignoire, un lavabo, un evier de cuisine, une piscine, dans un sous-sol humide ou tout autre emplacement humide.
- Ne placez pas de sources de flamme nues (une bougie allumee, par exemple) a proximite de l'appareil.
- Les fentes et ouvertures presentes sur de l'adaptateur CPL servent a l'aeration et ne doivent etre ni obstruees ni recouvertes.
- N'utilisez jamais d'objets dans les ouvertures de l'adaptateur CPL ou pour acceder a l'interieur de celles-ci.
- Debranchez l'adaptateur pendant les orages ou au cours des longues periodes de non-utilisation afin d'eviter de l'endommager.
- Debranchez l'adaptateur pour couper l'alimentation de l'appareil.

- Gardez l'adaptateur CPL hors de portee des enfants. Il convient de surveiller les enfants pour s'assurer qu'ils ne jouent pas avec l'adaptateur.
- Si vos prises fonctionnent de maniere inhabituelle, et particulierement s'ils emettent des sons ou des odeurs qui vous paraissent anormaux, debranchez-les immediatement et faites les examiner par un reparateur qualifie.
- Debranchez l'adaptateur CPL avant tout nettoyage. Nettoyez-le uniquement a l'aide d'un chiffon doux et sec et evitez l'usage d'aerosols.
- Utilisez cet adaptateur uniquement dans des climats moderes. Evitez les climats tropicaux et particulierement humides.
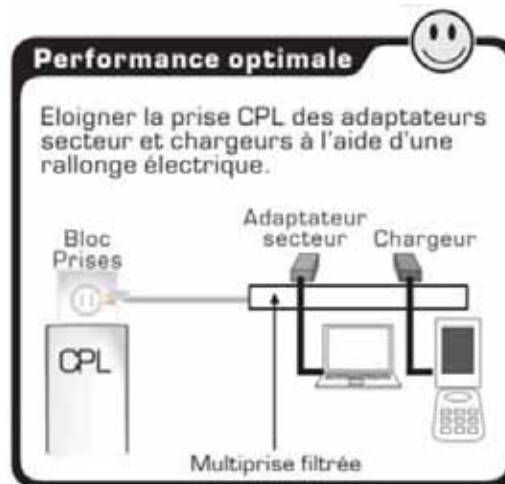
1.2 Federal Communications Commission Interference Statement

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 or more 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.

CAUTION:
Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

Labeling Requirements
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.

RF Exposure Warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Canada, Industry Canada (IC) Notices
This Class B digital apparatus complies with Canadian ICES-003 and RSS-210. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the Device.

Radio Frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the IC RF Exposure limits under mobile exposure conditions. (antennas are greater than 20cm from a person's body).

Canada, avis d'Industry Canada (IC)

Cet appareil numérique de classe B est conforme aux normes canadiennes ICES-003 et RSS-210.

Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

Informations concernant l'exposition aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d'Industry Canada (IC). Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal.

Ce périphérique a également été évalué et démontré conforme aux limites d'exposition aux RF d'IC dans des conditions d'exposition à des appareils mobiles (les antennes se situent à moins de 20 cm du corps d'une personne).

2.INTRODUCTION

the Device is a wireless AP device with Powerlione Communication (PLC) technology integrated. The Powerline Wireless N Extender turns your home's existing wall outlet into instant "WLAN-ready" access point. It takes advantages of your home's existing wiring to deliver high speed network and wireless high-speed Internet access at the same time.

This product is suitable for general users to operate in their homes/houses, while advanced configurations through web-browser described in later chapters are suitable for seasoned users to change and manage the **Powerline Wireless N Extender** product settings.

2.1 Package Content

Before starting the installation of the Device, please make sure the package contains the following items:

	Single pack	Combo pack	
Device	 **Powerline Wireless** **N Extender**	**Powerline Ethernet** **Bridge**	**Powerline Wireless** **N Extender**
Accessories	➤ RJ-45 Cable x 1	➤ RJ-45 Cable x 2	

2.2 Product Overview

500 Mbps Powerline Wireless N Extender

WPS Button
Press to join the encrypted
Wi-Fi network.

Group Button
Press 1~3 secs to
join the encrypted
PLC network.
Press over 10
secs to create
the encrypted
PLC network.

LAN Port

Power Button

Power LED

PLC LED
ON: Linked w/other
PLC device

WLAN Link/Act LED
Green: Wi-Fi is encrypted
Red: Wi-Fi is not encrypted

Ethernet Link/Act LED
ON: Ethernet link detected

Reset Button
Reset to factory default

500 Mbps Powerline Bridge

Power LED

**Ethernet Link
/Act LED**

Group Button

PLC LED

LAN Port

2.2.1 Buttons and LEDs

LED	
⏻	<u>ON</u>: Power on and ready. <u>Blinking</u>: PLC group pairing. <u>OFF</u>: Power off.

➡⌂	<u>ON</u>: PLC connection detected.
	
	<u>Blinking</u>:
	1. **Fast**:
	   Powerline data rate > 60Mbps
	2. **Normal**:
	   60Mbps > Powerline data rate > 10Mbps
	3. **Slow**:
	   10Mbps > Powerline data rate
	
	<u>OFF</u>: No PLC connection detected.
	   (They are too far to communicate or it is alone in its logical network).

((•))	<u>Steady Green</u>: Wi-Fi network with security protection. <u>Flash Green</u>: Wi-Fi network traffic in transaction with security protection. <u>Steady Red</u>: Wi-Fi network without security protection. <u>Flash Red</u>: Wi-Fi network traffic in transaction without security protection. <u>Blinking Green</u> (0.5 sec ON / 0.5 sec OFF): WPS negotiation. <u>OFF</u>：Wi-Fi disabled.
🖧	<u>ON</u>: Ethernet connection detected. <u>Blinking</u>: Network traffic in transaction. <u>OFF</u>: No Ethernet connection detected.
Buttons	
🔑	WPS negotiation.
🔒	<u>Press 10 seconds</u>: Randomly generate a new PLC network group name. <u>Press 2 to 3 seconds</u>: Start paring with the other PLC device. Paring procedure keeps for 2 minutes or ends automatically when they are paired. It can be stopped manually by pressing the button for 2 to 3 seconds again.
Power Button	Push to power on/off the Device.
Reset Button	<u>Press 1 second</u>: Reset to factory default setting. Press the button when the Device is powered (not in standby mode)

3. HARDWARE INSTALLATION
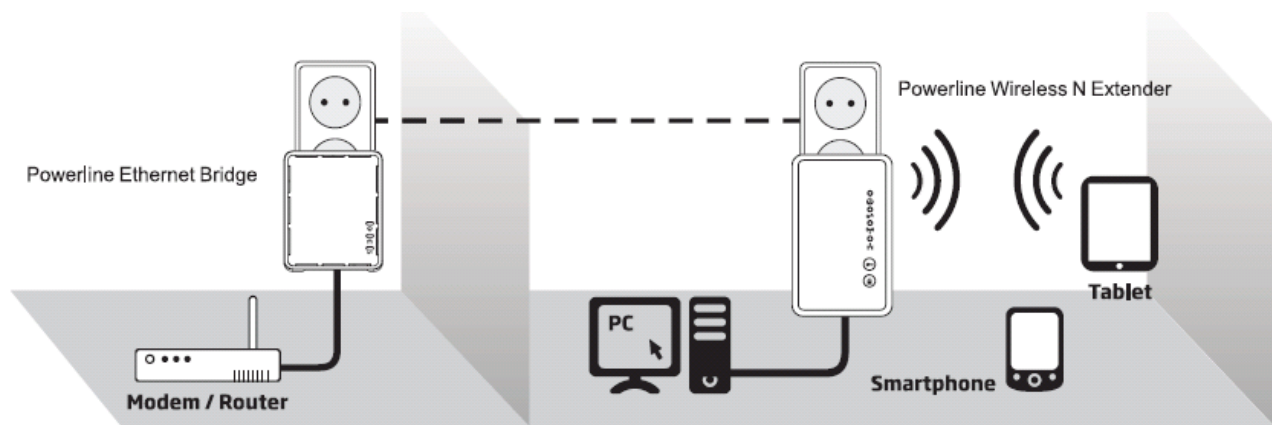
Step 1
Plug the PLC adapter to a AC outlet and connect to router or broadband modem with an Ethernet cable (provided)

Step 2
Plug the PLC Wi-Fi Extender to a AC outlet and place it in a location you wish to extend Wi-Fi access

Step 3
Search Wi-Fi network and connect it with (WPA-PSK) default password*

*The default Wi-Fi password appears on the product label.

## 3.1 Application 1 –Extend Wireless Access Point Coverage

To extend wireless AP coverage in different room or floor, user can place the **Powerline Wireless N extender** near the mobile devices such as iPad, Tablet, Smartphone and Notebook. Then connect the **Powerline Wireless N extender** to powerline network for delivering Internet signal.
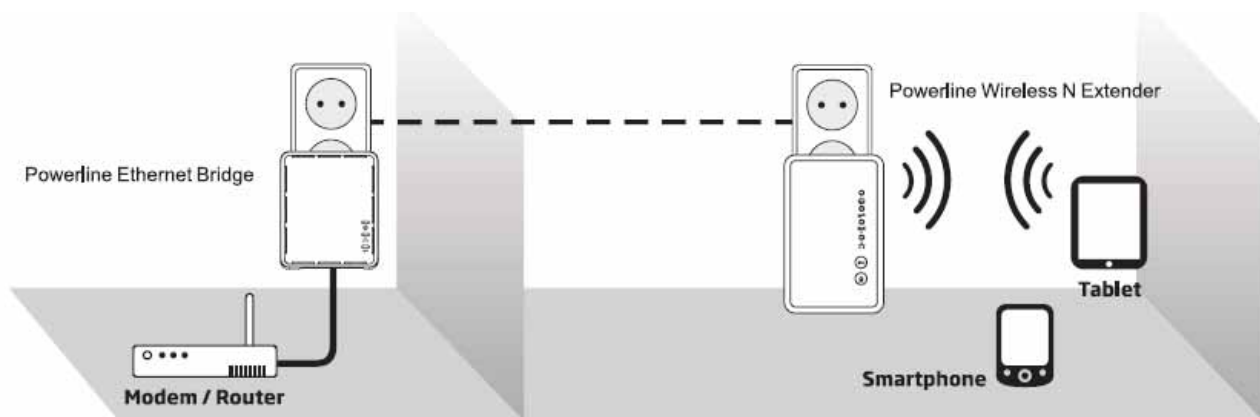
3.2 Application 2 – High Speed Network For HD Video Streaming

Wireless N Extender can serve as **Powerline Ethernet Bridge** to provide wired connection for Ethernet compatible devices such as cable box or SmartTV. With advanced Powerline technology, it can offer reliable and stable Internet network for HD video streaming. Lag-Free.

3.3 Quick Wi-Fi Encrypted Connection- WPS Button
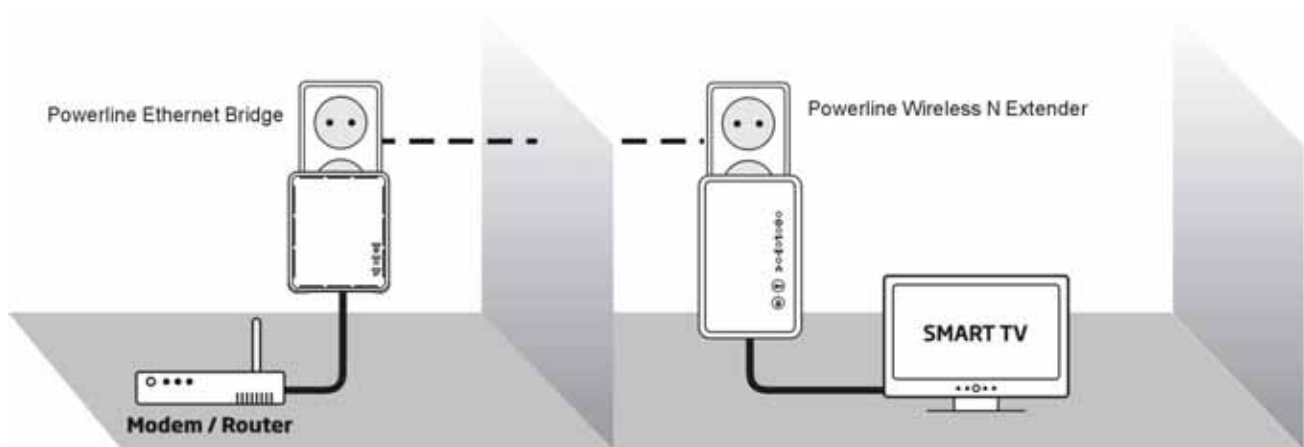
The default wireless encryption is set as "**WPA-PSK**" mode with Wi-Fi SSID and password that appear on printing label at back of the Device.

For Quick Wi-Fi encrypted connection, user can simply press "WPS" button on the Device to establish encrypted wireless network between your network compatible device and powerline wireless N extender.

4. Encrypted PLC Network

4.1 Create an Encrypted PLC Network Group

The Powerline bridges are compliant HomePlug AV specification. Every 'HomePlug AV' compliant PLC device that has the same default network name, "**HomePlug AV**", is capable of communicating with other "HomePlug AV" devices. This is so called the **"Public Network**". Two or more powerline devices under the same network can communicate with one another.

If you have a pair of powerline device, either one in the pair can be "device A" or "device B". By pressing the GROUP button more than 10 seconds; it will generate a random network group (different from HomePlug AV). Users can take the following two steps to change the public network group to the private network group to protect their data while transmitting over the powerline. Users also can create more than one private network groups by pressing GROUP button directly without software installation required.

*NOTE: Put the Devices side by side will be more convenient during the setting procedure. After network group is set, the Devices can be deployed anywhere at home.

Step I: Clear Group Attribute
Clear the original network group of device B by pressing its GROUP button more than 10 seconds until all LED lights simultaneously turns off and on once. At this moment, its network group name has been changed to a random name. It means that this device is (**1**) **ready to be assigned another network name** or (**2**) **to be used as a seed device so other PLC devices can join to a private network group.**

Step II: Join to Other Network Group
1. Press GROUP button of device A for 2 to 3 seconds (make sure POWER LED starts blinking).
2. Press GROUP button of device B for 2 to 3 seconds (make sure POWER LED starts blinking).

The Device B which has cleared its group attribute will join to the Device A which has not. This step makes device A and B are under the same encrypted network. Additional device C can be added into device A's logical network by taking same steps, thus all of the Device A, B, and C in the same encrypted network group. User can assign as many powerline devices into the logical network group as described in the SPECIFICATION section.

*NOTE: It does not matter which device's button is pressed first, but please press the second device's GROUP button **within two minutes** after pressing first device's GROUP button. After 10 seconds, device will start communicating with device A.

4.2 Remove Device from an Existing Network Group

If you would like to remove powerline device from an existing network group, you can generate a new group name (referring to Step I) to stop communication with an existing network group.

4.3 Create Additional Encrypted Network

If you want to create additional private network for your powerline devices that co-existence with your existing powerline private network group, please repeat the **Step 1** & **2** to generate new private network group for selected powerline devices.

P.S. Users can press the RESET button to reset the network name back to its factory default.

# 5. ADVANCED WI-FI SETTINGS VIA WEB BROWSER

5.1 Getting Started

To setup advanced Wi-Fi features such as SSID or password, please connect to PLC Wireless N Extender via Ethernet or wireless connection, and login to setting page through web browser.

Default username: root
Default password: root

Before login to the setting page, PC or mobile device should be in the same subnet as this device. To do so, please manually change PC or mobile's IP address.

Go to "Network Connections" - "Local Area Connection" "Connection Status" and choose the **Internet Protocol (TCP/IP)** and click on **"Properties".**
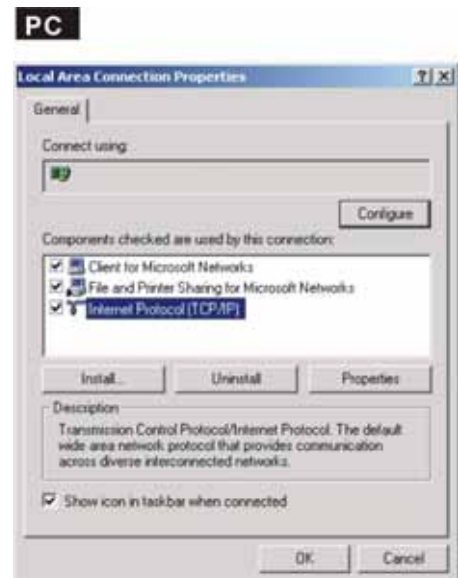
Enter IP address such as **192.168.2.XXX** (**XXX** can be set from 1-128) and click OK

Go to "Settings" - "Wi-Fi" - "Selected SSID" -
"advanced settings", then click on "Static"
to enter IP address such as **192.168.2.XXX.**
(**XXX** can be set from 1-128) and Subnet Mask
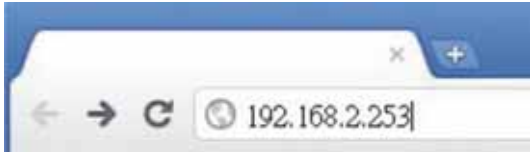**255.255.255.0**

Mobile device (Android)
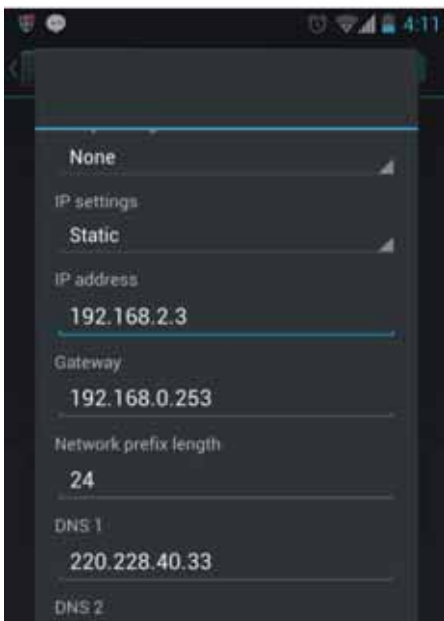
Go to "Settings" - "Wi-Fi" - press &   hold
"Selected SSID" to modify network - then
click on "Show advanced options".
Click "IP settings" to choose "Static" to enter
address such as **192.168.2.XXX.**
(XXX can be set from 1-128)

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5.2 Login to Setting Page

Step 1
Running Web browser and type the IP address of this device **(192.168.2.253)**

Step2
When see the login window enter "root" in both user name and password fields. **Note:** you can change user name and password in **Administration tab.**

Step 3
The Powerline Wireless N Extender setting page will show up after successfully login.

Note: After the setup process is completed, **DO NOT** forget to set the PC or mobile device's IP address back to the original settings (DHCP) for web surfing.

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5.3 Home

5.3.1 Select Language

The Device provides 3 languages, English, Tradition Chinese and Simple Chinese for you to select one you want to use.

5.3.2 Setup Wizard

The setup Wizard can help you to setup the Device with minimum setting. Open the page from the left panel and click "Next" button.

Step 1 Set up account and password for login the Device configuration in the future.

Step 2 Set up LAN interface.

Step 3 The page is for basic wireless setting, to set network mode and SSID…etc

Step 4 Set wireless security and encryption to prevent from unauthorized access.

Step 5 Click "Finish" button and the Device will reboot to apply the settings.

5.3.3 Operation Mode Configuration

This device supports five operation modes for the IP network. Click to select one between the following wireless operation modes, then click Apply button.

AP Mode

This device act as Wireless Access Point (**AP**) for wireless clients and provides a connection to Ethernet and PLC.

Powerline Wireless N Extender

HOME	INTERNET SETTINGS	WIRELESS SETTINGS	ADMINISTRATION	REBOOT

SELECT LANGUAGE
SETUP WIZARD
OPERATION MODE

Operation Mode Configuration

You may configure the operation mode suitable for you environment.

Operation Mode	
Startup Mode	AP

[Apply]   [Cancel]

Client Mode

This mode enables the establishment of connection with the other AP using infrastructure /Ad-hoc networking types. With bridge operation mode, you can directly connect one of the wired Ethernet port to your PC and the Device
become a wireless adapter

Powerline Wireless N Extender

HOME	INTERNET SETTINGS	WIRELESS SETTINGS	ADMINISTRATION	REBOOT

SELECT LANGUAGE
SETUP WIZARD
OPERATION MODE

Operation Mode Configuration

You may configure the operation mode suitable for you environment.

Operation Mode	
Startup Mode	Client

Wi-Fi Protected Setup	
WPS switch	Disable

Parameters	
SSID	
AP MAC Address	
Security Mode	Disable

[Apply]   [Cancel]

WDS (Root AP)

The wireless radio of device serves for the other AP and provides a connection to a wired LAN (the other AP must use the same chipset with this device)

Powerline Wireless N Extender

HOME	INTERNET SETTINGS	WIRELESS SETTINGS	ADMINISTRATION	REBOOT

SELECT LANGUAGE
SETUP WIZARD
OPERATION MODE

Operation Mode Configuration

You may configure the operation mode suitable for you environment.

Operation Mode	
Startup Mode	WDS (rootap) ∨

[Apply] [Cancel]

WDS + AP Mode

This mode combines WDS plus AP modes, and it not only allows WDS connections but also the wireless clients can survey and associate to the Device

Powerline Wireless N Extender

HOME	INTERNET SETTINGS	WIRELESS SETTINGS	ADMINISTRATION	REBOOT

SELECT LANGUAGE
SETUP WIZARD
OPERATION MODE

Operation Mode Configuration

You may configure the operation mode suitable for you environment.

Operation Mode	
Startup Mode	WDS+AP ∨

Parameters	
Secondary SSID	
AP MAC Address	
Security Mode	Disable ∨

[Apply] [Cancel]

WDS Mode

The WDS system is used to create a network of AP's that can be used as a single "virtual" AP. The Device forwards the packets to another AP with WDS function. When this mode is selected, all the wireless clients can't survey and connect to the Device. The Device only allows the WDS connection.

Powerline Wireless N Extender

HOME	INTERNET SETTINGS	WIRELESS SETTINGS	ADMINISTRATION	REBOOT

SELECT LANGUAGE
SETUP WIZARD
OPERATION MODE

Operation Mode Configuration

You may configure the operation mode suitable for you environment.

Operation Mode	
Startup Mode	WDS

Wi-Fi Protected Setup	
WPS switch	Disable

Parameters	
SSID	
AP MAC Address	
Security Mode	Disable

[Apply]   [Cancel]

5.4 Internet Settings

5.4.1 LAN (Local Area Network Settings)

LAN setup	
Item	**Description**
IP Address	The Internet Protocol (IP) address.
Subnet mask	The number used to identify the IP subnet network.
Default Gateway	This is the default gateway for the LAN PCs.
Primary DNS Server	This is the primary DNS server for the LAN PCs which automatically get DNS IP address from this device.
Secondary DNS Server	This is the second DNS server for the LAN PCs which automatically get DNS IP address from this device.
DHCP Server	When enabling the DHCP server, there should be NO other DHCP server in this IP sub-domain, and you must setup the information below.
Start IP Address	This is the first IP Address of the IP pool from which the server assigns the IP Address to DHCP client PCs.
End IP Address	This is the last IP Address of the IP pool from which the server assigns the IP Address to DHCP client PCs.
Subnet mask	This is the subnet mask of this domain. The default value is "255.255.255.0".
Primary DNS Server	This is the primary DNS server for the LAN PCs which automatically get DNS IP address from this device.
Secondary DNS Server	This is the second DNS server for the LAN PCs which automatically get DNS IP address from this device.
Default Gateway	This is the default gateway for the LAN PCs.
Lease Time	This is the DHCP lease time. When it is short, the IP release/renew of the LAN will be faster but the network congestion will be more.
Statically Assigned	You can manually assign the IP Address to the certain PCs. Enter the MAC Address and IP Address in the table.
LLTD	Enable this function to support LLTD (Link Layer Topology Discovery) for Windows Vista. It shows the status of connection in the Windows Vista.
QoS	
Item	**Description**
IGMP command packet (join, leave..)	recommend to set the highest priority (3) to keep it work smoothly
IGMP Stream	recommend to set the higher priority (2) to make sure the good streaming video and audio quality
Unicast	recommend to set priority 1
Multicast/Broadcast	recommend to set priority 1
IGMP Reports To Non-Querier Host	default disable but recommend to turn on this function while using the Device in China
IGMP Snooping	default and also recommend to enable IGMP snooping

5.4.2 DHCP Clients

When DHCP server is enabled, you can monitor DHCP clients here.

Powerline Wireless N Extender

| HOME | INTERNET SETTINGS | WIRELESS SETTINGS | ADMINISTRATION | REBOOT |

LAN

DHCP CLIENTS

DHCP Client List

It shows the DHCP clients connecting to the device.

DHCP Clients

MAC Address	IP Address	Expires in

5.5 Wireless Settings

5.5.1 Basic (Basic Wireless Settings)

Powerline Wireless N Extender

| HOME | INTERNET SETTINGS | WIRELESS SETTINGS | ADMINISTRATION | REBOOT |

BASIC

ADVANCED

SECURITY

WPS

STATION LIST

SITE SURVEY

MAC FILTER

Basic Wireless Settings

You could configure the basic wireless settings such as Network Name (SSID) and Channel.

Wireless Network

Radio On/Off	⊙ Enable ○ Disable
Network Mode	11g/n HT40 PLUS ▾
Network Name(SSID)	PWQ-5101
Hidden SSID	○ Hidden ⊙ broadcast
MAC 1	00:a1:23:00:00:94
Frequency (Channel)	2437MHz (Channel 6) ▾

HT Physical Mode

Operating Mode	⊙ Mixed Mode ○ Green Field
Short Guard Interval	○ Long ⊙ Short
MCS	Auto ▾
Aggregation MSDU(A-MSDU)	○ Disable ⊙ Enable
Auto Block ACK	○ Disable ⊙ Enable

[Apply]   [Cancel]

Wireless Network	
Item	**Description**
Radio On/Off	Click to enable/disable wireless function.
Network Mode	The available options are 11b, 11g, 11g/n HT20, 11g/n HT40 PLUS (default), 11 g/n HT40 MINUS
Network Name (SSID)	The SSID, which is also called ESSID is a unique identifier that wireless networking devices use in order to establish and maintain wireless connectivity. SSID can contain up to 32 alphanumeric characters.
Hidden SSID	Click to enable/disable, With hidden SSID, the AP can't be scanned and the wireless client must input SSID manually to associate this AP.
BSSID	The BSSID is displayed in this field.
Frequency (Channel)	Click the drop down box to select the radio channel. Select the unused channel to prevent the radio overlapping.

HT Physical Mode	
Item	**Description**
Operating Mode	Default: Mixed (Mixed, Green Field). Mixed mode: In this mode the Device transmits the packets with preamble compatible legacy (802.11g), so they can be decoded by legacy devices. The Device receives and decodes both Mixed Mode packets and legacy packets. Green Field mode: the Device transmits HT packets without legacy compatible part. But the Device receives and decodes both Green Field and legacy packets.
Short Guard Interval	The 11n device inserts the Guard Interval into the signal. You can choose the interval between "Long" and "Short". This option affects the Phy data rate of radio. Please refer to the table below.
MCS	It is Modulation Coding Scheme. The available options are "Auto, 0, 1-7". It changes the modulation of this device and effect the maximum Phy data rate. We recommend "Auto" setting. For the details, please refer to the table below.
Aggregation MSDU (A-MSDU)	The multiple HT packets can be transmitted with single ACK reply packet. Enable it to apply this function and reduce the network congestion.
Auto Block ACK	It is another aggregation technique which prevents sending ACK in the communication to increase the throughput. If this option is enabled, the Device will activate this function when transmitting massive data.

5.5.2 Advanced (Advance Wireless Settings)

Advanced Wireless	
Item	**Description**
BG Protection Mode	You can select the other options including On and Off. The B/G protection technology is CTS-To-Self. It will try to reserve the throughput for 11g clients from 11b clients connecting to the Device as AP mode.
Beacon Interval	Beacons are the packets sending by Access point to synchronize the wireless network. The beacon interval is the time interval between beacons sending by this unit in AP or AP+WDS mode. The default and recommended beacon interval is 100 milliseconds.
Data Beacon Rate (DTIM)	This is the Delivery Traffic Indication Map. It is used to alert the clients that multicast and broadcast packets buffered at the AP will be transmitted immediately after the transmission of this beacon frame. You can change the value from 1 to 255. The AP will check the buffered data according to this value. For example, selecting "1" means to check the buffered data at every beacon.
Short Preamble	Default: Disable. It is a performance parameter for 802.11 b/g mode and not supported by some of very early stage of 802.11b station cards. If there is no such kind of stations associated to this AP, you can enable this function.
Tx Burst	The Device will try to send a serial of packages with single ACK reply from the clients. Enable this function to apply it.

Wi-Fi Multimedia	
Item	**Description**
WMM Capable	Choose "Enable" to enable WMM function.
APSD Capable	Turn on this feature so this device can detect whether the connecting wireless client device has turned on power saving feature. If yes, this device will send packets with power saving tag accordingly.
WMM Parameter	Click the button to edit the WMM parameter.

5.5.3 Security (Wireless Security/Encryption Settings)

The default SSID and Wi-Fi key

Wireless Security/Encryption Settings	
Item	**Description**
Security Mode	Disable, OPEN, SHARED, WEPAUTO, WPA, WPA-PSK, WPA2, WPA2-PSK, WPA/WPA2 PSK, WPA/WPA2, 802.1X.

Security Mode: Choose one as the wireless authentication among the following types: Open, Shared, WEP Auto, WPA, WPA-PSK, WPA2, WPA2-PSK, WPA/WPA2-PSK, WPA/WPA2, and 802.1 X.

● Encryption Type: Select one for the encryption type. The options vary depending on the Authentication mode. The corresponding options shows below.

Authentication	Encryption type	Key option
Open/Shared/WEP Auto	WEP	Default Key ID, Key content of Key 1/2/3/4
WPA/WPA2-PSK (Pre-Shared Key)	TKIP, AES, TKIP/AES	Pass Phrase (8-32 bytes), Key Renewal Interval

WPA/WPA2 Enterprise	TKIP, AES, TKIP/AES	Radius Server Network/Address/Port/Key/Session timeout

WEP Encryption Setting

Wired Equivalent Privacy (WEP) is implemented in this device to prevent unauthorized access to your wireless network. The WEP setting must be as same as each client in your wireless network.

- Authentication Type: Open, Shared and Auto. When choose "Open" or "Shared", all of the clients must select the same authentication to associate this AP. If select "WEP Auto", the clients don't have to use the same "Open" or "Shared" authentication. They can choose any one to authenticate.
- Default Key ID: Select the Key ID as the default Key.
- Key 1/2/3/4: Select "ASCII" or "Hex" and then type the key in the text field. It will check whether the number of characters meet 10 or 26. If not, an error message is shown.
  - 64-bit WEP Encryption 64-bit WEP keys are as same as the encryption method of 40-bit WEP. When input 10 hexadecimal digits (0-9, a-f or A-F) or 5 ACSII chars as the key, it is using 64-bit WEP encryption.
  - 128-bit WEP Encryption 128-bit WEP keys are as same as the encryption method of 104-bit WEP. When input 26 hexadecimal digits (0-9, a-f or A-F) or 10 ACSII chars, it is using 128-bit WEP encryption.

WPA Authentication Mode

This device supports six WPA modes including WPA-PSK (Pre-Shared Key), WPA, WPA2-PSK, WPA2 and additional WPA/WPA2 PSK and WPA/WPA2 mixed mode. For individual and residential user, it is recommended to select WPA-PSK or WPA2-PSK to encrypt the link without additional RADIUS server. This mode requires only an access point and client station that supports WPA-PSK. For WPA/WPA2, authentication is achieved via WPA RADIUS Server.

- **WPA/WPA2-PSK:**
  - Pass Phrase:
  Option: Pass Phrase (8-32bytes). This mode requires only an access point and client station that supports WPA-PSK. The WPA-PSK settings include Key Format, Length and Value. They must be as same as each wireless client in your wireless network. When Key format is Passphrase, the key value should have 8-63 ACSII chars.
  - Key Renewal Interval:
  The WPA Algorithm will regroup the key for a period. The default value is 3600 seconds and you can adjust the time interval.

● **WPA/WPA2:**

When selecting WPA/WPA2, you have to add user accounts and the target device to the RADIUS Server. In the Device, you need to specify the Server Network, Server address, Server Port and Server Key of the target RADIUS server.

- ■ WPA Algorithms: TKIP, AES, TKIP/AES. Select the encryption type. When selecting TKIP/AES, the client can use whether TKIP or AES for the authentication.
- ■ Pre-Authentication Support option: This option only appears when selecting WPA2 or WPA/WPA2 as the authentication mode. Enable it to use this function.

● **Radius Server Setting:**
- ■ IP Address: Input the IP Address of the Radius server.
- ■ Port: Input the port of the Radius server. The default port is 1812.
- ■ Shared Secret: Input the Authentication Key.
- ■ Session Timeout: Input the maximum idle time for this connection.

5.5.4 WPS (Wi-Fi Protected Setup)

This function helps to establish the Wi-Fi security. For AP mode, it can be setup one WPS method including PIN (Personal Identification Number) and PBC (Push Button Certification). To begin the WPS progress, the WLAN security must be setup first. Please setup one among WPAPSK, WPA2PSK, WPA/WPA2PSK and then apply WPS setting. WPS will only be available in these encryption types.

PIN: query the PIN code in the utility of the WLAN client connecting to this AP, and then enter it in the PIN field. The Wi-Fi link between the WLAN client and the Device should be encrypted.

PBC: Select PBC, and then you can begin the PBC process. Press the PBC button in the front panel can also trigger this process. Press or click the PBC button on the WLAN client to finish the communication. You can press the PBC button on the WLAN client first and then click the PBC button on this device to establish the encryption.

The options and the information fields are showed below.

WPS Config	
Item	**Description**
WPS Capable	Select enable then press Apply button to start this function.

NOTE   WPS will be available only with the two conditions:

1   WPA-PSK, WPA2-PSK or WPA/WPA2-PSK is set

2   Hidden SSID is disabled.

5.5.5 Station list

In the Station list, the information of associated clients is displayed.

Powerline Wireless N Extender

HOME	INTERNET SETTINGS	WIRELESS SETTINGS	ADMINISTRATION	REBOOT

BASIC
ADVANCED
SECURITY
WPS
STATION LIST
SITE SURVEY
MAC FILTER

Station List

You could monitor stations which associated with the device.

Wireless Network

MAC Address	AID	CHAN	RATE	RSSI	IDLE	TXSEQ	RXSEQ

5.5.6 Site Survey (AP Mode Site Survey)

Site survey shows information of APs nearby; you may choose one of these APs connecting.

Powerline Wireless N Extender

HOME	INTERNET SETTINGS	WIRELESS SETTINGS	ADMINISTRATION	REBOOT

BASIC
ADVANCED
SECURITY
WPS
STATION LIST
SITE SURVEY
MAC FILTER

AP Mode Site Survey

It shows the nearby APs. You could choose one of these to connect.

Site Survey

	SSID	BSSID	Channel	Encryption
○	VAR-PERL	00:13:F7:58:6D:C7	8	ON
○	Wendy_Cha	00:D0:41:C7:62:89	6	ON
○	8tec-01	80:1F:02:1F:2D:F0	6	ON
○	oneplus2	00:18:F3:63:E4:2B	6	ON

Back   Next   Rescan   Final

5.5.7 MAC Filter

MAC filtering allows the user to either limit specific MAC addresses from associating with the AP, or specifically indicates which MAC addresses can associate with the AP.

Powerline Wireless N Extender

HOME	INTERNET SETTINGS	WIRELESS SETTINGS	ADMINISTRATION	REBOOT

BASIC
ADVANCED
SECURITY
WPS
STATION LIST
SITE SURVEY
MAC FILTER

MAC Filter

MAC filtering allows the user to allow or deny specific MAC addresses which associated with the device.

MAC Filter Disable ▾   [Apply]

MAC address Filter Settings

| Action | ○ Allow ⦿ Deny |
| MAC Address | [   ] [Add MAC] |

The maximum allow rule count is 8

Index	MAC Address	Comment

[Delete ALLOW Selected]

The maximum deny rule count is 8

Index	MAC Address	Comment

[Delete DENY Selected]

5.6 Administration

5.6.1 Management (System Management)

Administrator Settings	
Item	**Description**
Account	Enter the name for login. The default name is "root".
Password	Enter the password for login. The default password is "root".

NTP Settings	
Item	**Description**
Sync with host	Synchronizing current time with your PC
Time Zone	Select local time zone.
NTP server	Input the NTP server address. If you are not sure about the local NTP server address, you can input pool.ntp.org.
NTP Synchronization	This is the time interval of NTP synchronization. The range is 1-300 hours. It is the necessary field for NTP setting and please input it to apply.

5.6.2 Upgrade firmware

This page provides the firmware upgrade function.

Click the browse button to browse the file and click "open" button to select the file. The upgrade process takes about 1 minute and **DO NOT POWER OFF** the Device during this period. In order to continue configuration, please refresh the PC web-browser to reflect new upgraded FW settings.

5.6.3 Settings management

You might save system settings by exporting them to a configuration file, restore them by importing the file, or reset them to factory default.

5.6.4 Status

The page shows system status information.

5.6.5 Statistics

Administrator Settings	
Item	**Description**
Memory total	This is the total memory size for this device.
Memory left	The available memory size shows in this field.

All interfaces

The information likes "Rx Packet", "Rx Byte", "Tx Packet" and "Tx Byte" shows the status of all interface including "Ethernet and Wireless".

5.6.6 System log

The system log shows in this window. For technical support, you may need to copy and save the log to text file and send it to the technical service. Click "Refresh" button to refresh the page or "Clear" button to clear the log.

5.7 Reboot

5.7.1 Reboot System

5.8 Channel Number

The following table is the available frequencies (in MHz) for the 2.4 GHz radio:

Channel No.	Frequency	Region Domain
1	2412	Americas, Taiwan, EMEA, Japan, Australia and China
2	2417	Americas, Taiwan, EMEA, Japan, Australia and China
3	2422	Americas, Taiwan, EMEA, Japan, Australia and China
4	2427	Americas, Taiwan, EMEA, Japan, Australia and China
5	2432	Americas, Taiwan, EMEA, Japan, Australia and China
6	2437	Americas, Taiwan, EMEA, Japan, Australia and China
7	2442	Americas, Taiwan, EMEA, Japan, Australia and China
8	2447	Americas, Taiwan, EMEA, Japan, Australia and China
9	2452	Americas, Taiwan, EMEA, Japan, Australia and China
10	2457	Americas, Taiwan, EMEA, Japan, Australia and China
11	2462	Americas, Taiwan, EMEA, Japan, Australia and China
12	2467	EMEA, Japan, Australia and China
13	2472	EMEA, Japan, Australia and China
14	2484	Japan, only in 802.11b mode

*: EMEA (Europe, the Middle East and Africa).

The available channel is set by the factory according to the region of distribution and can't be changed by user. For example, the available channel of the American model is from ch1 to ch11.

6. ENHANCE PLC PERFORMANCE

While Powerline device delivers data over the existing electrical wiring in the house, the actual performance may be affected by electrical noises or the length of the wiring. To improve PLC performance, please refer to below recommendations while placing the Powerline device.

AC outlets connection

- Avoid connecting PLC device to an uninterruptible power supply (UPS) or backup power supply device. For best results, connect the adaptors directly to a wall outlet is recommended.
- Avoid connecting high-power consuming appliances to the same wall outlet.

See the following illustration:

For better performance, the following connection is recommended.
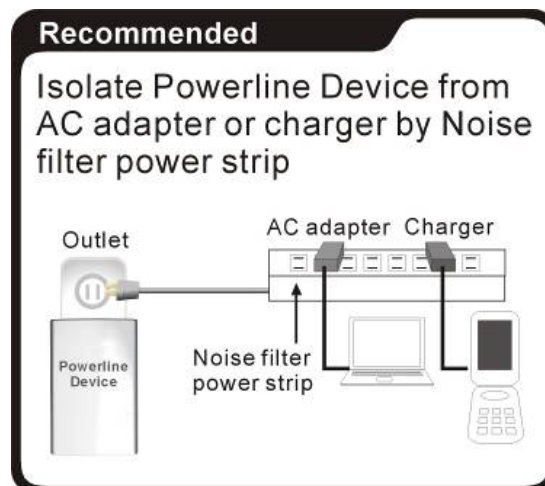
The following connections are **NOT** recommended.
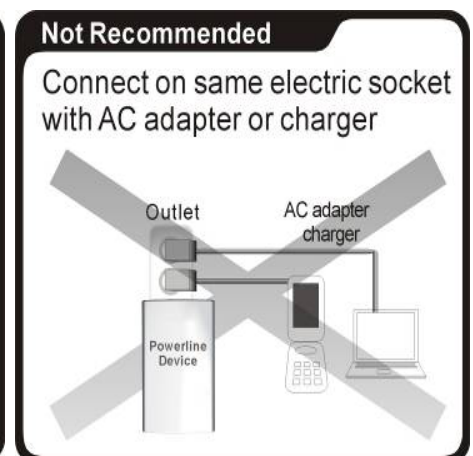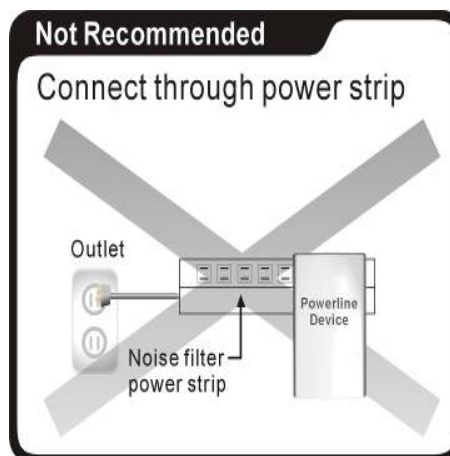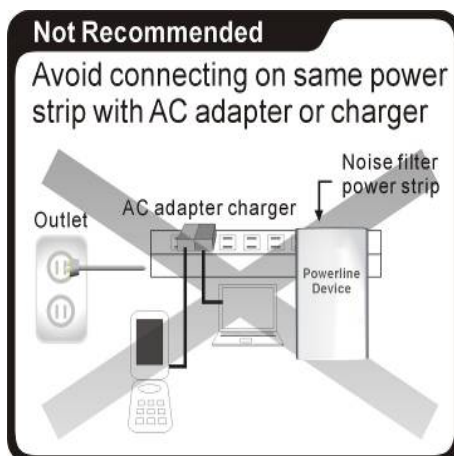
Connection via Power Strip

If user intends to connect the PLC device via power strip, please follow below reference for better performance:
- Make sure the power strip does not support a noise filter or a surge protector.

Electrical Interference

Some household appliances may produce noise emission. If noise emission is spread over the electrical wiring it will affect PLC performance in the house. For the best results, we recommend to connect an electrical noise filter with the appliances such as:
- Battery chargers (including cell phone chargers)
- Hair dryers
- Power drills
- Halogen light
- Vacuum cleaner
- Lights or lamps with touch-sensitivity feature supported

Electrical Wiring

The PLC device delivers data over the existing electrical wiring in the house. Actual PLC data transfer rate might vary including the transmission distance between two PLC adapters..

7. SPECIFICATIONS

Powerline Wireless N Extender	
Standards	WLAN: IEEE 802.11 b/g, IEEE 802.11n
	LAN: IEEE 802.3, IEEE 802.3u
	Powerline: HomePlug AV 1.0
Maximum Throughput	WLAN to Ethernet: up to 93 Mbps (Under 802.11n 40MHz)
	Powerline to Ethernet: TCP: 92 Mbps
Frequency band	WLAN: 2.4~2.4835GHz
	PLC: 2~ 68MHz
WLAN transceiver spec	RF Power:
	802.11b TX: 16 dBm +/- 1.5dB (typ.)@1Mbps
	802.11g TX : 16 dBm +/- 1.5dB (typ.)@6Mbps
	802.11n TX : 14 dBm +/- 1.5dB (typ.)@6.5Mbps 802.11n TX : 13 dBm +/- 1.5dB (typ.)@13.5Mbps
	Sensitivity: 802.11b RX: -82 dBm(typ.)@11Mbps
	802.11g RX: -70 dBm(typ.)@54Mbps
	802.11n RX(20MHz): -67dBm(typ.)@ 72.2Mbps
	802.11n RX(40MHz): -64dBm(typ.)@ 150Mbps
	Physical Data Rate:
	802.11b: 1,2, 5.5, 11Mbps
	802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps
	802.11n (20MHz): MCS0~7, Up to 72.2Mbps
	802.11n (40MHz): MCS0~7, Up to 150Mbps
Wi-Fi mode	Wireless AP+ Bridge mode (Default)
Security mode	WLAN WPS PBC / PIN code, WPA-PSK, and WPA2-PSK
	PLC 128-bit AES
Antenna type	1T1R
LAN port	1 port
AC input	100 - 240 V 50-60Hz
Power consumption	5.28W @ 220V 4.52W @ 110V

LEDs	POWER LED (Green);
	PLC Link/Activity LED (Green);
	Wireless & Security LED (dual color);
	Ethernet (Green)
Buttons	WPS
	GROUP/Pairing
	Power on/off
	RESET
PLC PHY Rate	500 Mbps
PLC Modulation	OFDM (QAM 8/16/64/256/1024/4096, BPSK, QPSK, ROBO)
PLC Distance	AC Wire : up to 300 meters
Max. dev in a PLC network Group	8/16 (Active/Total)
Temperature	Operating: 0~40 ℃; Storage: -20~60 ℃
Relative Humidity	Operating: 10~85% Non-Condensing , Storage: 5~90% Non-Condensing
Dimension	56 x 105 x 48(H) mm
Certification	FCC, CE, CE-LVD, RoHS, WEEE

500Mbps Powerline Ethernet Bridge	
RJ-45 port	1 port
PHY Rate	500Mbps
Max Data Rate	TCP : 95 Mbps, UDP : 95 Mbps
Frequency Band	2 to 28 MHz, 30 to 68 MHz
Access Methods	TDMA and priority-based CSMA/CA channel access schemes
Modulation	Supports OFDM 4096/1024/256/64/16/8-QAM, QPSK, BPSK and ROBO
Other FW Features	* Dynamic channel adaptation and channel estimation maximizes throughput in harsh channel conditions, * Advanced Turbo Code Forward Error Correction, * HomePlug® AV MAC: TDMA and priority based CSMA/CA channel access schemes, * Integrated Quality of Service (QoS) Enhancements * Supports IGMP managed multicast sessions.
Transmission Distance	AC Wire : up to 300 meters

LAN Standards	100 BASE-TX, 10 BASE-T,
PLC Standard	IEEE 1901 compliant /HomePlug AV1.1
Computer OS	OS independent
Max. dev in a network Group	8 Active/ 16 Total
IGMP	Support for IPv4/IGMP v1,v2,v3 snooping
	Support for IPv6 and MLD v1,v2 snooping
Encryption	128-bit AES Link Encryption with key management
LEDs	Power(green), PLC Link/Activity(green), Ethernet Link/Activity (green)
Temperature	Operating: 0~40 ℃; Storage: -20~60 ℃
Relative Humidity	Operating: 10~85% Non-Condensing , Storage: 5~90% Non-Condensing
Power Source	100 ~ 240 VAC 50/60Hz
Power consumption	Full load : (230 VAC) = 2.2W;
	Standby mode: <0.5W
Certification	CE, CE-LVD, FCC Class B, RoHS