COMTREND

USER MANUAL

WAP-5903

WiFi 5 Mesh-Enhanced Extender

Version A1.0, May 21, 2020

261072-045

Preface

This manual provides information related to the installation and operation of this device. The individual reading this manual is presumed to have a basic understanding of telecommunications terminology and concepts.

If you find the product to be inoperable or malfunctioning, please contact technical support for immediate service by email at INT-support@comtrend.com

For product update, new product release, manual revision, or software upgrades, please visit our website at http://www.comtrend.com

EU Liaison Office :
COMTREND CORPORATION / Fijenhof 2, 5662AE Eindhoven, The Netherlands
Comtrend Central Europe, s.r.o. / nkovcova 1518/2, 170 00 Praha 7

Important Safety Instructions

With reference to unpacking, installation, use, and maintenance of your electronic device, the following basic guidelines are recommended:

- Do not use or install this product near water, to avoid fire or shock hazard. For example, near a bathtub, kitchen sink or laundry tub, or near a swimming pool. Also, do not expose the equipment to rain or damp areas (e.g. a wet basement).

- To safeguard the equipment against overheating, make sure that all openings in the unit that offer exposure to air are not blocked.

- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightening. Also, do not use the telephone to report a gas leak in the vicinity of the leak.

CAUTION:

- Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.
- Do not stack equipment or place equipment in tight spaces, in drawers, or on carpets. Be sure that your equipment is surrounded by at least 2 inches of air space.
- If you experience trouble with this equipment, disconnect it from the network until the problem has been corrected or until you are sure that equipment is not malfunctioning.

WARNING

- Disconnect the PLC from the power source before servicing
- For indoor user only
- Do NOT open the casing
- Do NOT use near water
- Do NOT insert sharp objects into the adapter's socket

■Power Specifications:

I/P： 100-240Vac, 50/60Hz, 0.6A

User Information
Any changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Aucune modification apportée à l'appareil par l'utilisateur, quelle qu'en soit la nature. Tout changement ou modification peuvent annuler le droit d'utilisation de l'appareil par l'utilisateur.

Note: 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.

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.

This Class B digital apparatus complies with Canadian ICES-003.
To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.
This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions:
1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 Canada.
Pour réduire le risque d'interférence aux autres utilisateurs, le type d'antenne et son gain doivent être choisies de façon que la puissance isotrope rayonnée équivalente (PIRE) ne dépasse pas ce qui est nécessaire pour une communication réussie.
Cet appareil est conforme à la norme RSS Industrie Canada exempts de licence norme(s).

Son fonctionnement est soumis aux deux conditions suivantes:
1. Cet appareil ne peut pas provoquer d'interférences et
2. Cet appareil doit accepter toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.

Radiation Exposure

FCC

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

2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 25 cm between the radiator and your body.

ISED

This device complies with the ISED radiation exposure limit set forth for an uncontrolled environment. This device should be installed and operated with minimum distance 25 cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

"This product meets the applicable Innovation, Science and Economic development Canada technical specifications".

The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

This product meets the applicable Industry Canada technical specifications.

The Ringer Equivalence Number (REN) indicates the maximum number of devices allowed to be connected to a telephone interface. The termination of an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices not exceed five.

Cet équipement est conforme avec l'exposition aux radiations ISED définies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à une distance minimum de 25 cm entre le radiateur et votre corps. Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec une autre antenne ou transmetteur.

«Ce produit est conforme aux spécifications techniques applicables d'Innovation, Sciences et Développement économique Canada».

les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

Le présent matériel est conforme aux specifications techniques applicables d'Industrie Canada.

L'indice d'équivalence de la sonnerie (IES) sert à indiquer le nombre maximal de terminaux qui peuvent être raccordés à une interface téléphonique. La terminaison d'une interface peut consister en une combinaison quelconque de dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas cinq.

Le numéro REN (Ringer Equivalence Number) indique le nombre maximal de périphériques pouvant être connectés à une interface téléphonique. La terminaison d'une interface peut consister en une combinaison quelconque d'appareils, à la condition que la somme des REN de tous les appareils ne dépasse pas cinq.

Certification

- FCC / IC standard
  - Part 15B / ICES-003
  - Part 15C / RSS-247(2.4GHz)
  - Part 15E / RSS-247(5GHz)

TIA-968 / IC-CS03
UL 62368-1 / CSA 62368-1

Copyright

Protect Our Environment

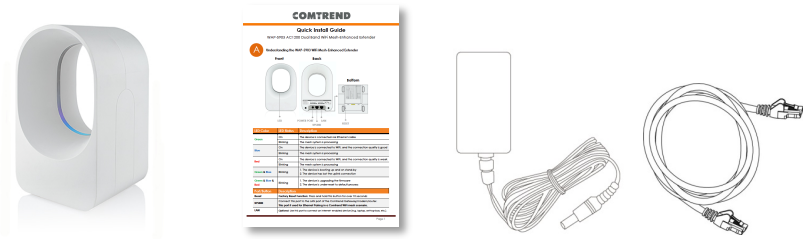
This symbol indicates that when the equipment has reached the end of its useful life, it must be taken to a recycling centre and processed separate from domestic waste.

CATALOG

The setup images used in this manual are for reference only. The contents of these images may vary according to firmware version. The official image contents are based on the newest firmware version.

Chapter 1 Quick Installation

1. Package Contents



- WAP-5903 Wireless Mesh Extender
- Quick Installation Guide (QIG)
- Power Adapter
- Ethernet Cable

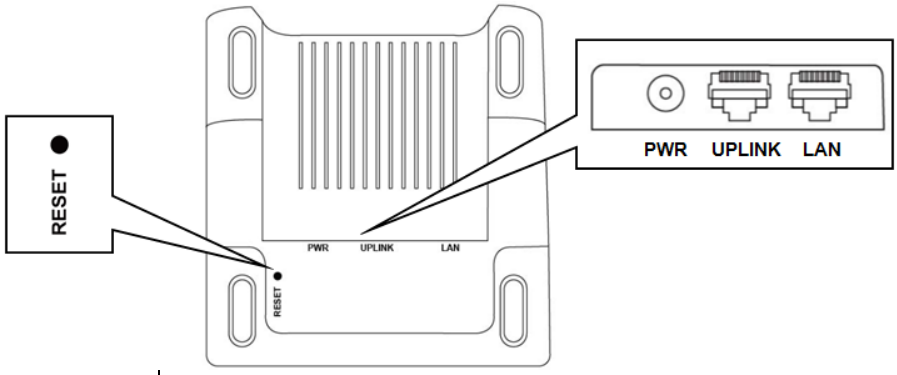
2. System Requirements

- Computer or network devices with wired or wireless network interface card.
- Any connected devices must feature a network port.
- Web browser (Microsoft Internet Explorer 8.0 or above, Google Chrome web browser, Opera web browser, or Safari web browser).

3. WAP-5903 Overview

The WAP-5903 Wireless Mesh Extender provides a simple way to "extend" your wireless signal to areas with weak or nonexistent coverage, and to build-up a WiFi mesh network in your home/office.

4. Hardware Explanation



Port / Button	Description
RESET Button	**Factory Reset Function**: Press and hold this button for over 10 seconds
UPLINK Port	Connect this port to the LAN port of the home broadband router **Ethernet Pairing:** Working in Comtrend WiFi mesh scenario
LAN Port	This port can also be used to connect to a pc/notebook for Internet access

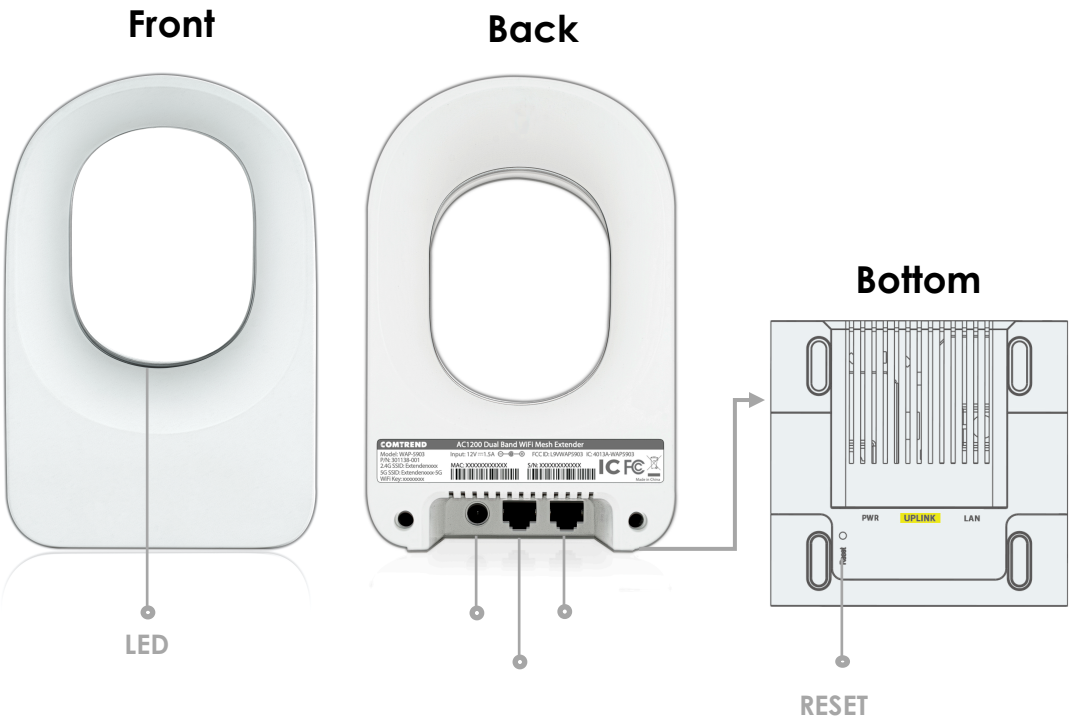
LED Explanation

LED Color	LED Status	Description
Green	On	The device is connected via Ethernet cable
	Blinking	The mesh system is processing
Blue	On	The device is connected to WiFi, and the connection quality is GOOD
	Blinking	The device is booting up
Red	On	The device is connected to WiFi, and the connection quality is WEAK
	Blinking	The mesh system is processing
Green & Blue	Blinking	1. The device is standing by after booting up 2. The device lost the uplink connection
Green & Blue & Red	Blinking	1. The device is under firmware upgrade 2. The device is under reset to default process

Quick Install Guide

WAP-5903 AC1200 Dual Band WiFi Mesh-Enhanced Extender

A Understanding the WAP-5903 WiFi Mesh-Enhanced Extender



LED Color	LED Status	Description
Green	On	The device is connected via Ethernet cable
	Blinking	The mesh system is processing
Blue	On	The device is connected to WiFi, and the connection quality is good
	Blinking	The mesh system is processing
Red	On	The device is connected to WiFi, and the connection quality is weak
	Blinking	The mesh system is processing
Green & Blue	Blinking	1. The device is booting up and on stand-by 2. The device has lost the uplink connection
Green & Blue & Red	Blinking	1. The device is upgrading the firmware 2. The device is under reset to default process

Port/Button	Description
Reset	**Factory Reset Function**: Press and hold this button for over 10 seconds
UPLINK	Connect this port to the LAN port of the Comtrend Gateway/modem/router. **This port it used for Ethernet Pairing in a Comtrend WiFi mesh scenario.**
LAN	***Optional:*** Use this port to connect an Internet- enabled device (e.g. laptop, set-top-box, etc.).

Choose One

Scenario I:
Setup with a Comtrend Gateway that supports WifiXtend2.0™
(Continue to Step B)

Scenario II:
Setup with either a non-Comtrend Gateway or
a Comtrend Gateway that does not support WifiXtend2.0™
(Continue to Step E)

WIFIXTEND 2.0

WifiXtend2.0™ is Comtrend's WiFi Mesh technology for enhanced whole-home WiFi coverage. The WAP-5903 and select Comtend Gatways support WifiXtend2.0™. When WifiXtend2.0™ technologies are being utilized, the WiFi network will automatically become a single network with one SSID and Password per band.

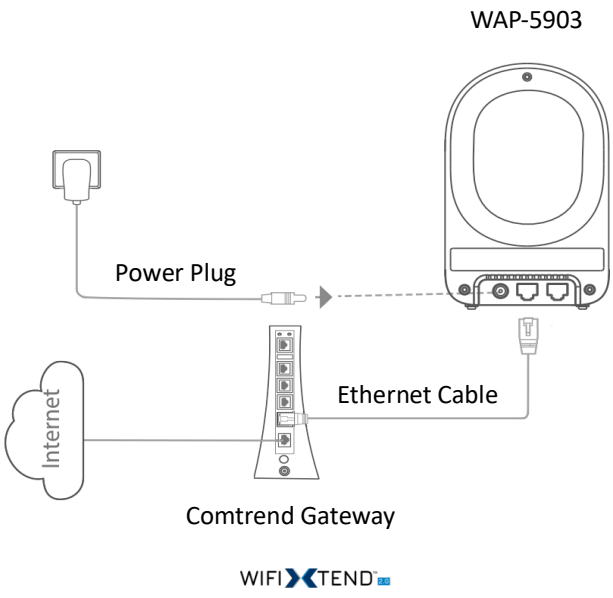
B

Scenario I: Setting up the WiFi Mesh Extender with a Comtrend Gateway that Supports WifiXtend2.0™

1. Use the included Ethernet cable to connect one end into the LAN port of the Comtrend Gateway that supports WifiXtend2.0™ and the other end into the UPLINK port of the WAP-5903.

2. Power on the WAP-5903 by connecting one end of the Power Adapter into the Power Port of the WAP-5903 and the other end into an outlet. The Ethernet Pairing will automatically start processing and the WAP-5903's LED will begin blinking **green**.

3. Wait until the WAP-5903's LED is solid **green**. This means that the WAP-5903 is paired and grouped in the same WiFi mesh network as the Comtrend gateway.



4. If you are setting up more than one WAP-5903, then please follow instructions 1-3 with the additional WAP-5903 units.

C Deploy the WiFi Mesh Extender

5. After the WAP-5903 is paired, move it to the nearest outlet where additional WiFi coverage is needed. Once it is plugged in, wait for the LED to light up solid **blue**, which means it is ready.

LED	Description
Solid Blue	The WAP-5903 is placed in an ideal location and is receiving a good WiFi signal.
Solid Red	The WAP-5903 is placed too far away from the Comtrend Gateway, and is receiving a weak WiFi signal. **Action Required:** Move the WAP-5903 closer to the Comtrend Gateway.

D The WiFi Mesh Network is Ready to Use!

6. The WiFi mesh network is automatically using the original WiFi configuration on the Comtrend Gateway. If you would like to further change the network settings, then please refer to the Comtrend Gateway's User Manual to make changes directly to the Gateway.

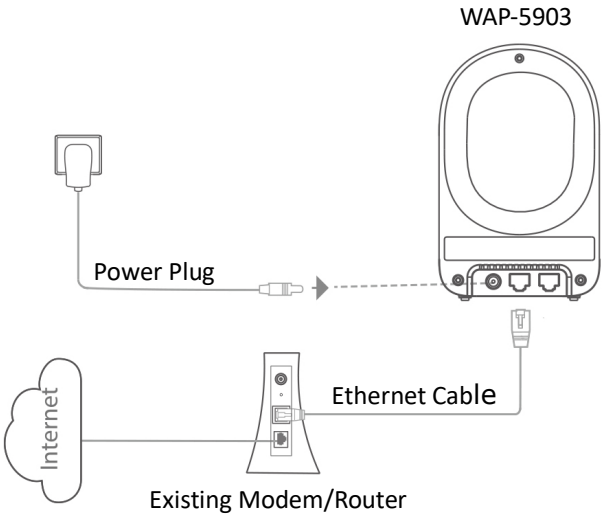
E Scenario II: Setting up the WiFi Mesh Extender with a Non-Comtrend Gateway/Comtrend Gateway that does not Support WifiXtend2.0™.

Note: This scenario requires at least two WAP-5903 units to create a connection.

1. ***Optional:*** Disable the WiFi on the non-Comtrend modem/router. This will help improve the performance of the WiFi Mesh Extender and avoid confusing the Internet-enabled devices.

2. Use the included Ethernet cable to connect one end into the LAN port of the existing home modem/router and the other end into the UPLINK port of the first WAP-5903.

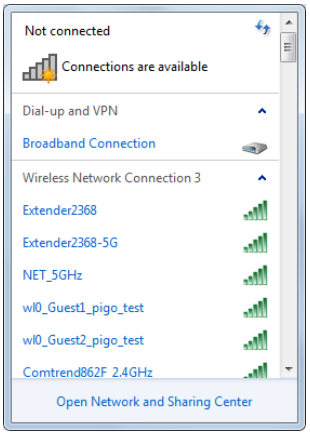
3. Power on this WAP-5903 by connecting one end of the Power Adapter into the Power Port of the WAP-5903 and the other end into an outlet.

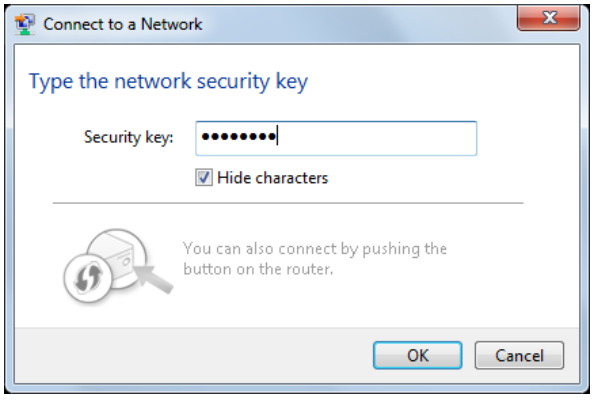


F Setup the WiFi Network

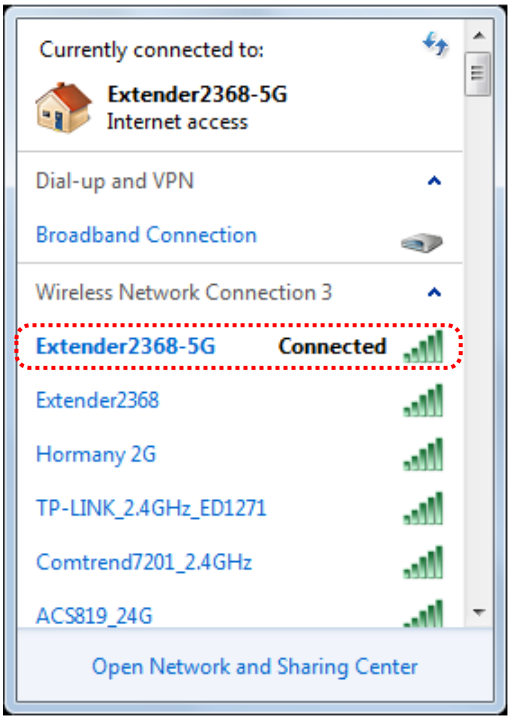
4. You can now use your computer's wireless configuration utility to search for a Wireless Network name such as: **Extender2368** or **Extender2368-5G**. (The default SSID of this extender device is '**Extender2368**', and 2368 is for reference. It is the last 4 digits of the device's MAC number.)

5. When you are prompted to input the security key, the WiFi Key (password) can be found on the label at the back of the WAP-5903 device.

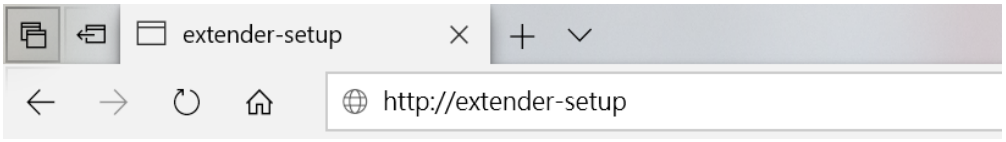




6. Click the **OK** button to connect to the network.

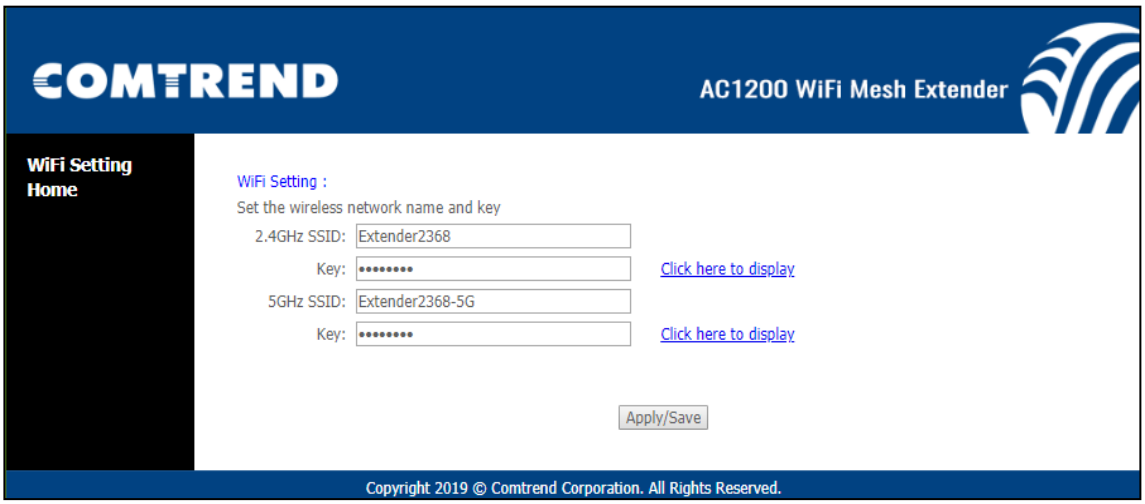


7. Open your web browser, and input 'http://extender-setup/' in the address bar.

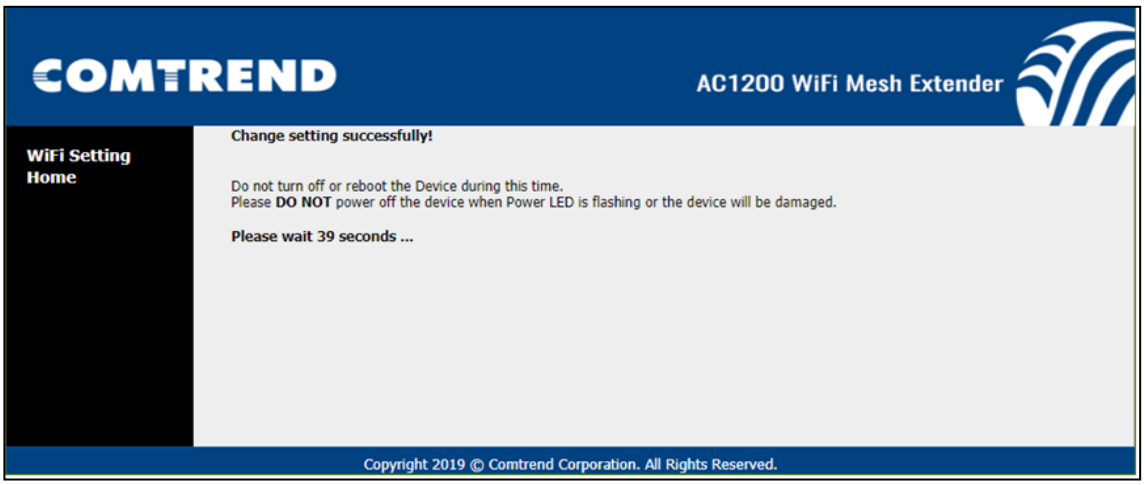


8. The system will prompt you to input the username and password. Default username is '**root**' and password is '**12345**'. Click the **OK** button to continue.

9. After logging into the Web page, input the new **SSID** for both the 2.4GHz and 5GHz fields. The user can setup a new password by inputting it in both the Key fields. Click the **Apply/Save** button to complete setup.



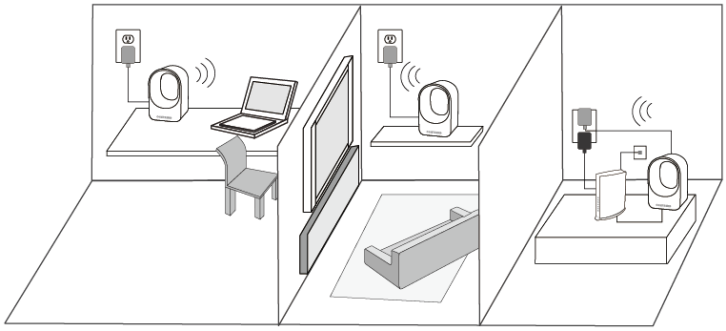
10. After applying the wireless setting the WAP-5903 will reboot. When the WAP-5903's LED is solid **green** it means it is ready.



11. You can now connect the additional WAP-5903. Power on the additional WAP-5903 by connecting one end of the Power Adapter into the Power Port of the WAP-5903 and the other end into an outlet. The Ethernet Pairing will automatically start processing and the WAP-5903's LED will begin blinking **green**.

12. Wait until the WAP-5903's LED is solid **green**. This means that the WAP-5903 is paired and grouped in the same WiFi mesh network as the first WAP-5903.

13. You can now move the additional WAP-5903 extender to the nearest outlet where more WiFi coverage is needed. Once plugged in, wait for the LED to light up solid **blue**, which means it is ready.



LED	Description
Solid Blue	The WAP-5903 is placed in an ideal location and is receiving a good WiFi signal.
Solid Red	The WAP-5903 is placed too far away from the first WAP-5903 (i.e. the one connected to the modem/router), and is receiving a weak WiFi signal. **Action Required:** Move the WAP-5903 closer to the first WAP-5903.

14. Repeat steps 11-13 to add more WAP-5903 extenders to the mesh network.

The WiFi Mesh Network is Ready to Use!

FOR MORE HELP: For instructions on advanced features, FAQ, etc., please visit our online Product Webpage.

For more information:
YouTube: https://www.youtube.com/user/ComtrendConnection
Facebook: https://facebook.com/Comtrend
Website: http://us.comtrend.com/
Support: Visit our website or call (949) 753-9640

Chapter 2: Web User Interface

2.1 Default Settings

The factory default settings of this device are summarized below.

- LAN IP address: 192.168.2.252
- LAN subnet mask: 255.255.255.0
- Administrative access (username: **root** , password: **12345**)
- WLAN access: **enabled**

Technical Note

During power on, the device initializes all settings to default values. It will then read the configuration profile from the permanent storage section of flash memory. The default attributes are overwritten when identical attributes with different values are configured. The configuration profile in permanent storage can be created via the web user interface or telnet user interface, or other management protocols. The factory default configuration can be restored either by pushing the reset button for more than five seconds until the power indicates LED blinking or by clicking the Restore Default Configuration option in the Restore Settings screen.

2.2 IP Configuration

DHCP MODE

When the WAP-5903 powers up, the onboard DHCP server will switch on. Basically, the DHCP server issues and reserves IP addresses for LAN devices, such as your PC.

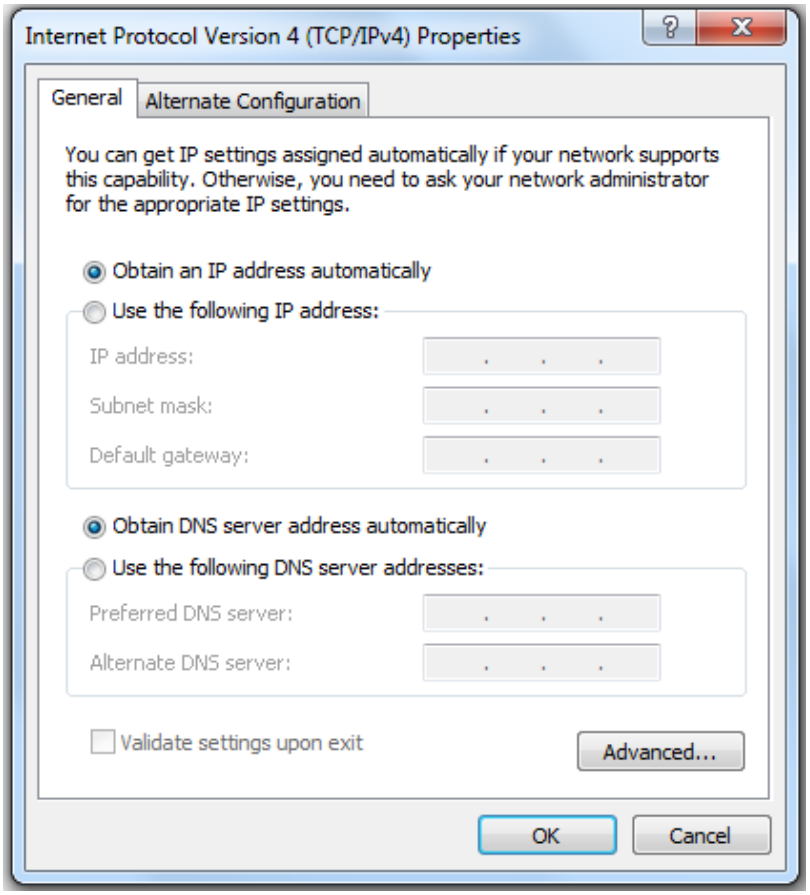
To obtain an IP address from the DCHP server, follow the steps provided below.

NOTE:	The following procedure assumes you are running Windows. However, the general steps involved are similar for most operating systems (OS). Check your OS support documentation for further details.

STEP 1: From the Network Connections window, open Local Area Connection (*You may also access this screen by double-clicking the Local Area Connection icon on your taskbar*). Click the **Properties** button.

STEP 2: Select Internet Protocol (TCP/IP) **and click the** Properties button.

STEP 3: Select Obtain an IP address automatically as shown below.



STEP 4: Click **OK** to submit these settings.

If you experience difficulty with DHCP mode, you can try static IP mode instead.

STATIC IP MODE

In static IP mode, you assign IP settings to your PC manually.

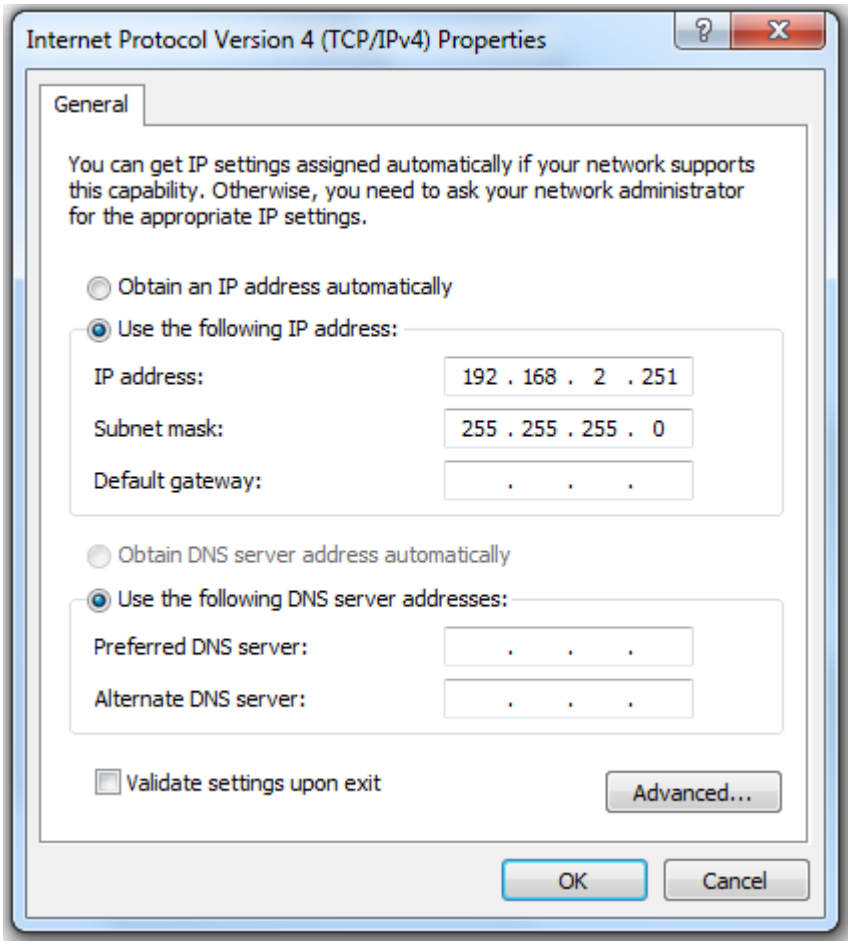
Follow these steps to configure your PC IP address to use subnet 192.168.2.x.

NOTE:	The following procedure assumes you are running Windows. However, the general steps involved are similar for most operating systems (OS). Check your OS support documentation for further details.

STEP 1: From the Network Connections window, open Local Area Connection (*You may also access this screen by double-clicking the Local Area Connection icon on your taskbar*). Click the **Properties** button.

STEP 2: Select Internet Protocol (TCP/IP) **and click the** Properties button.

STEP 3: Change the IP address to the 192.168.2.x (1<x<252) subnet with subnet mask of 255.255.255.0. The screen should now display as shown below.



STEP 4: Click **OK** to submit these settings.

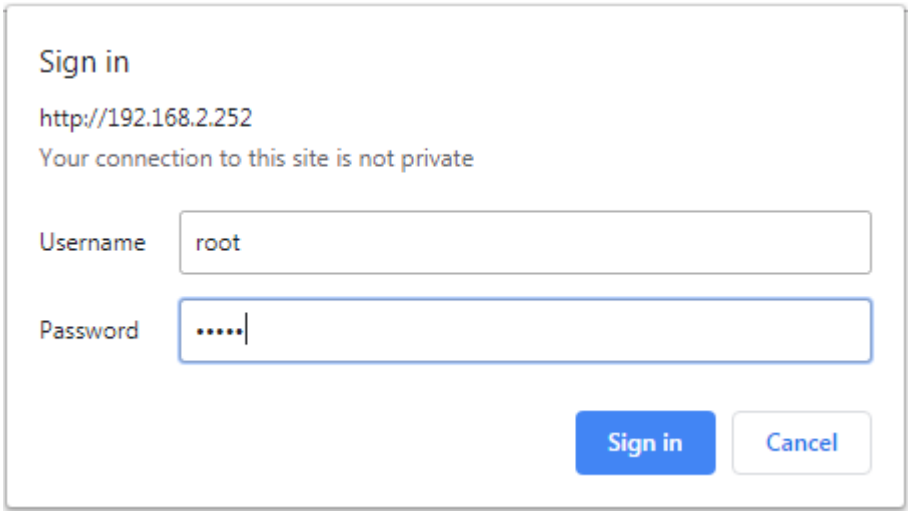
2.3 Login Procedure

Perform the following steps to login to the web user interface.

NOTE:	The default settings can be found in 2.1 Default Settings.

STEP 1: Start the Internet browser and enter the default IP address for the device in the Web address field. For example, if the default IP address is 192.168.2.252, type http://192.168.2.252.

STEP 2: A dialog box will appear, such as the one below. Enter the default username and password, as defined in section 2.1 Default Settings.

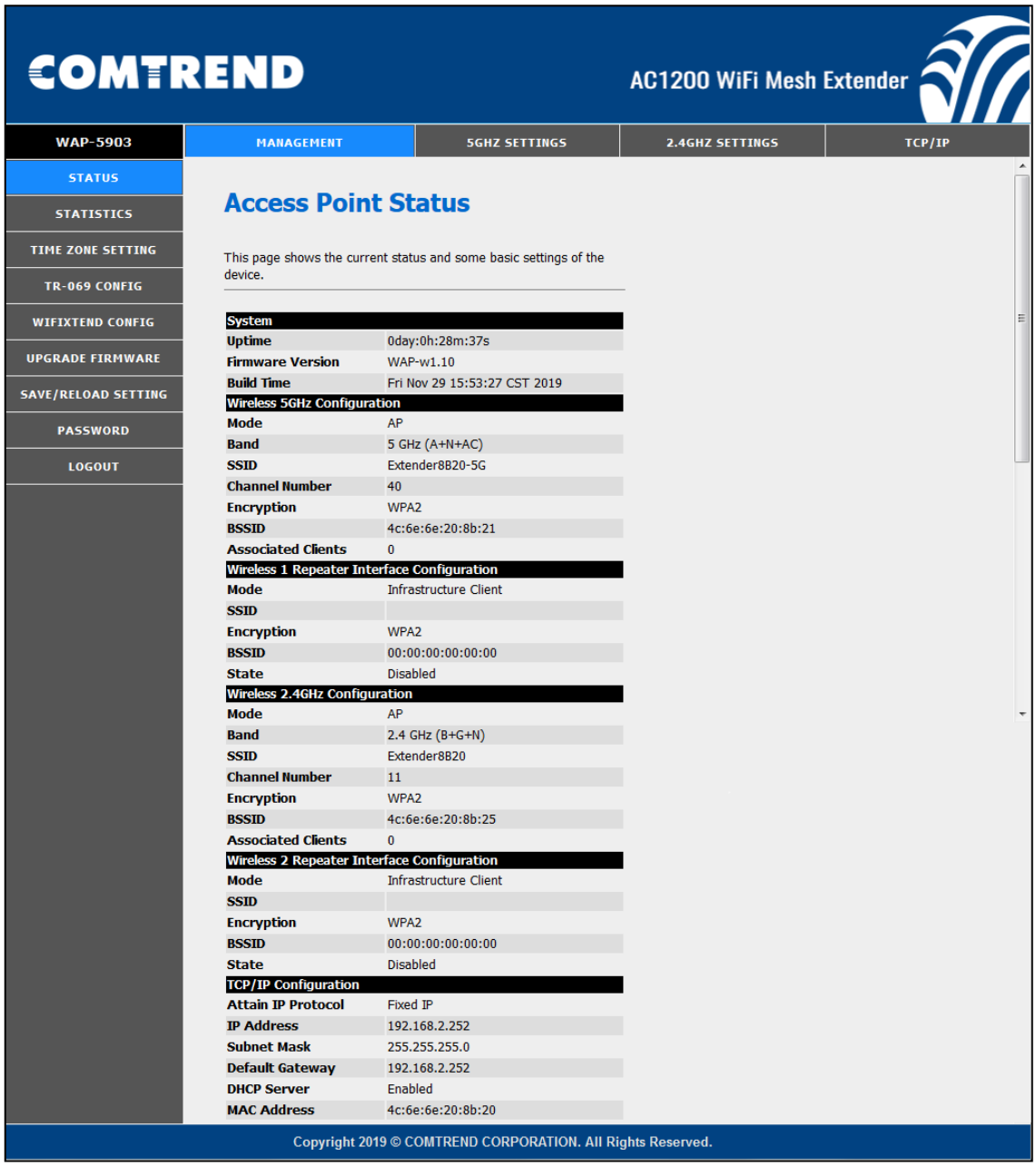


Click **OK** to continue.

NOTE: If you can't see the web management interface, and you're being prompted to input user name and password again, it means you didn't input username and password correctly. Please retype user name and password again. If you're certain about the user name and password you type are correct, please go to section 3.7 to perform a factory reset or to set the password back to the default value.

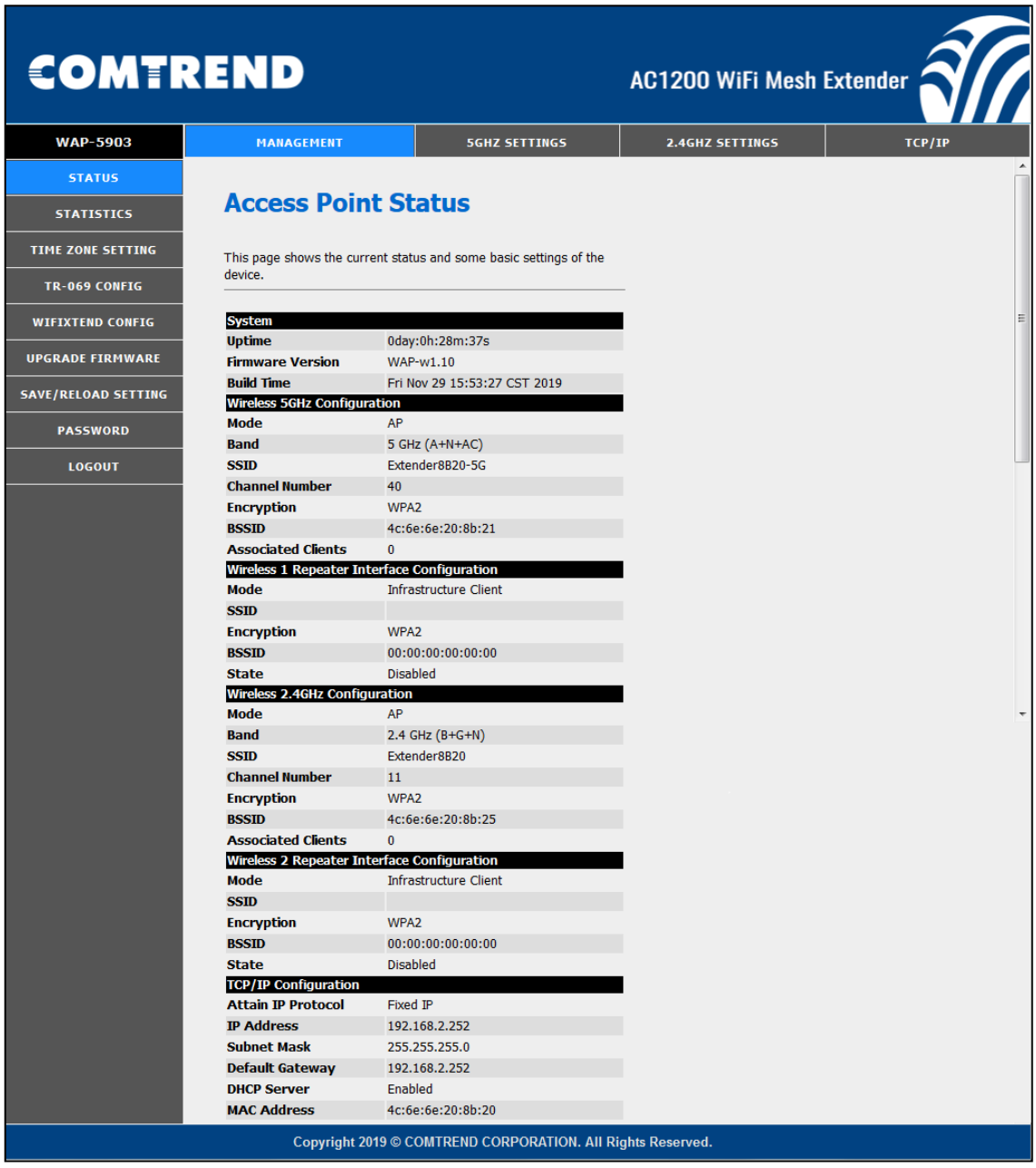
The login password can be changed later (see section3.8).

STEP 3: After successfully logging in for the first time, you will reach this screen.



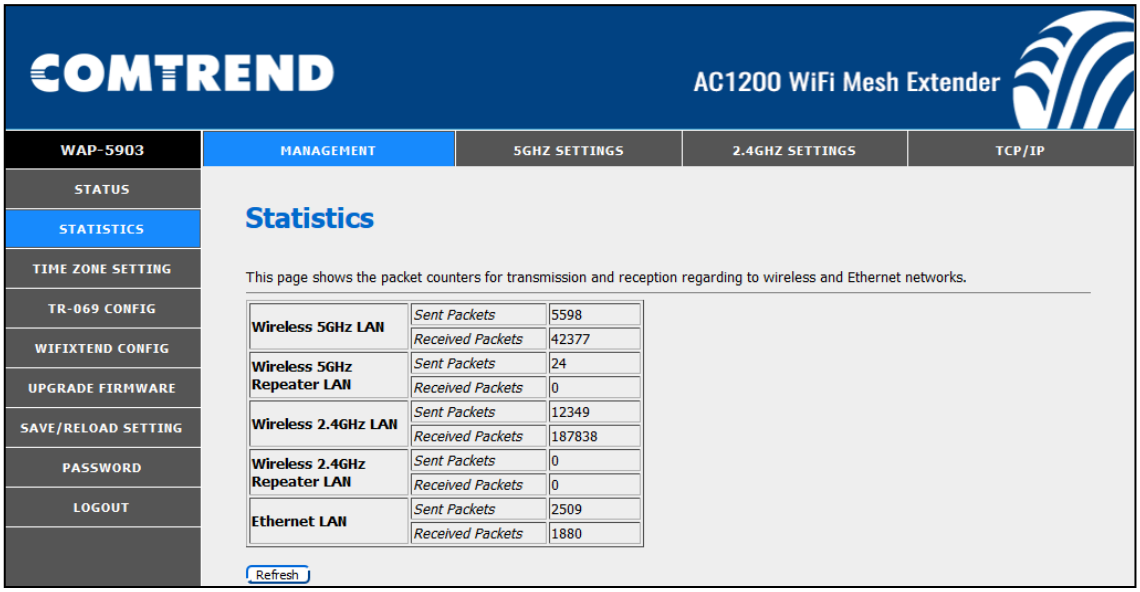
3.1 Status

This page shows the current status and some basic settings of the device.



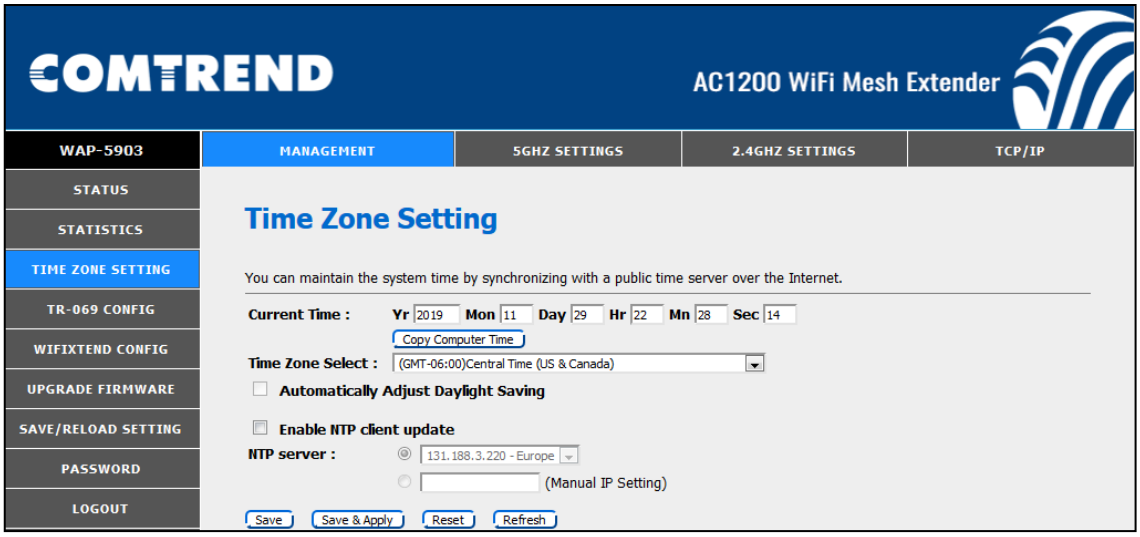
3.2 Statistics

This page shows the packet counters for transmission and reception regarding to wireless and Ethernet networks.



3.3 Time Zone Setting

You can maintain the system time by synchronizing with a public time server over the Internet.

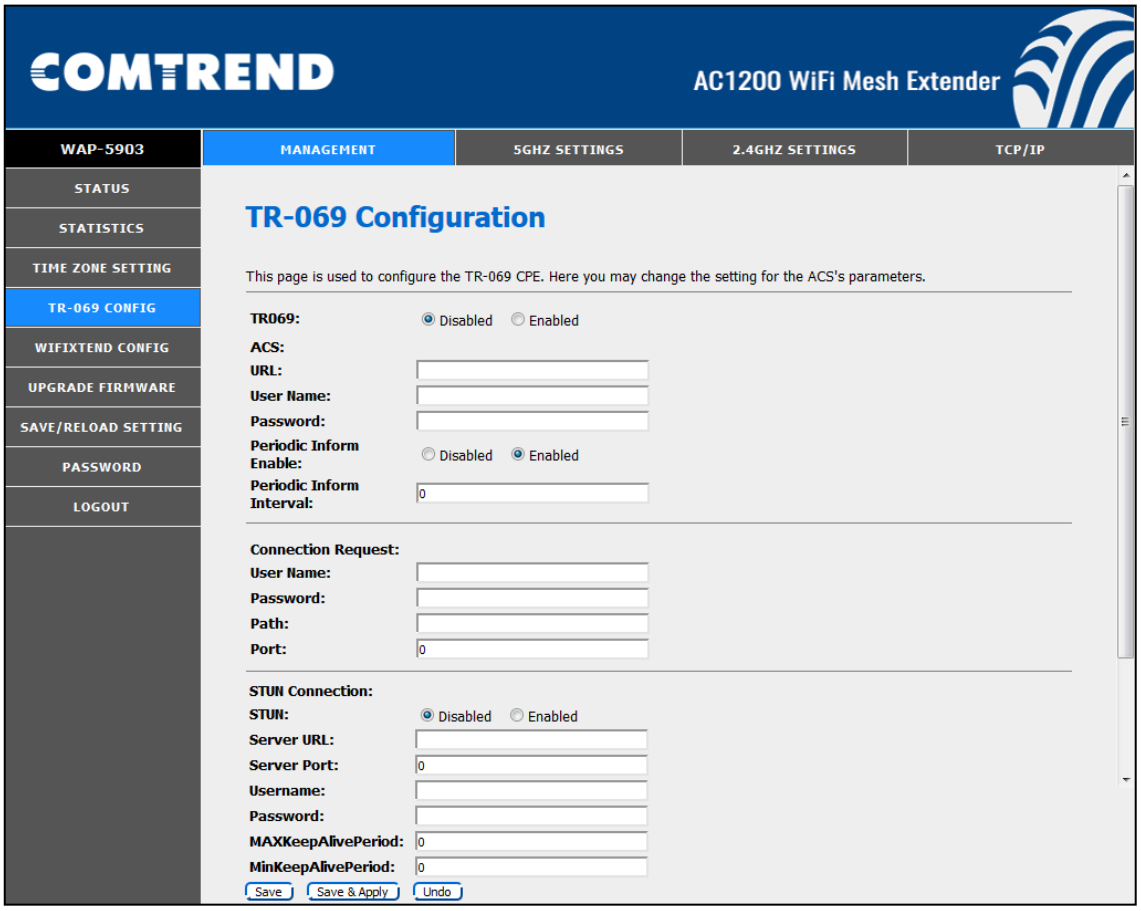


Consult the table below for descriptions.

Heading	Description
Current Time	Input the current time manually or click on the Copy Computer Time button
Time Zone Select	Select your time zone from the Drop-down menu
Automatically Adjust Daylight Saving	Check the checkbox ☑ to select
Enable NTP client update	Check the checkbox ☑ to select
NTP server	Select from the drop-down list or manually input the NTP server address

3.4 TR-069 Config

This page is used to configure the TR-069 CPE. Here you may change the setting for the ACS's parameters.



Consult the table below for descriptions.

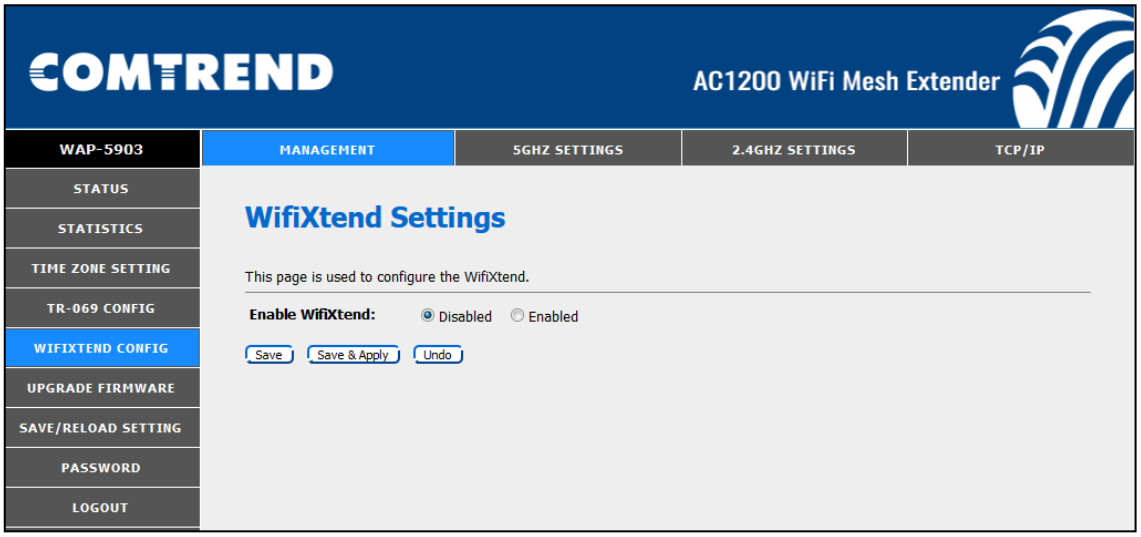
Option	Description
Enable TR-069	Select the Disabled or Enabled radio button to disable or enable TR-069
ACS URL	URL for the CPE to connect to the ACS using the CPE WAN Management Protocol. This parameter MUST be in the form of a valid HTTP or HTTPS URL. An HTTPS URL indicates that the ACS supports SSL. The "host" portion of this URL is used by the CPE for validating the certificate from the ACS when using certificate-based authentication.
ACS User Name	Username used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol. This username is used only for HTTP-based authentication of the CPE.

Option	Description
ACS Password	Password used to authenticate the CPE when making a connection to the ACS using the CPE WAN Management Protocol. This password is used only for HTTP-based authentication of the CPE.
Periodic Inform Enable	Select the Disabled or Enabled radio button to disable or enable Periodic Inform. Whether enabled or not the CPE MUST periodically send CPE information to the ACS using the Inform method call.
Periodic Inform Interval	The duration in seconds of the interval for which the CPE attempts to connect with the ACE if periodic inform is enabled
Connection Request	
User Name	Username used to authenticate an ACS making a Connection Request to the CPE
Password	Password used to authenticate an ACS making a Connection Request to the CPE
Path	The Path of the TR069 connection request URL
Port	The Port of the TR-069 connection request URL
STUN Connection	
STUN	Select the Disabled or Enabled radio button to disable or enable STUN
Server URL	The URL for STUN server
Server Port	The Port for STUN server
Username	The Username for STUN server
Password	The Password for STUN server
MaxKeepAlivePeriod	The maximum value in seconds to check the server connection
MinKeepAlivePeriod	The minimum value in seconds to check the server connection

1.5 WiFiXTEND Config

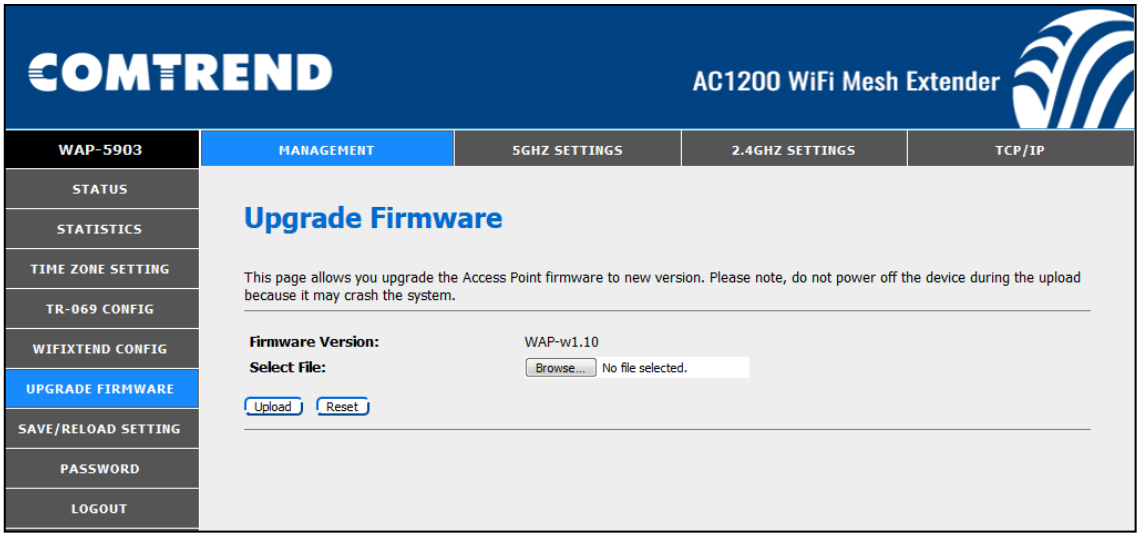
WifiXtend is a Whole-Home WiFi Mesh system that creaters an ultimate WiFi Mesh network quickly and easily . Service providers can use WifiXtend to deploy theirdevices into the WiFi Mesh system.

Select the required radio button to enable or disable. Then, click the **Save & Apply** button to save and apply your changes.



3.6 Upgrade Firmware

This page allows you upgrade the Access Point firmware to new version. Please note, do not power off the device during the upload because it may crash the system.



STEP 1: Click the Browse button to select the required file.

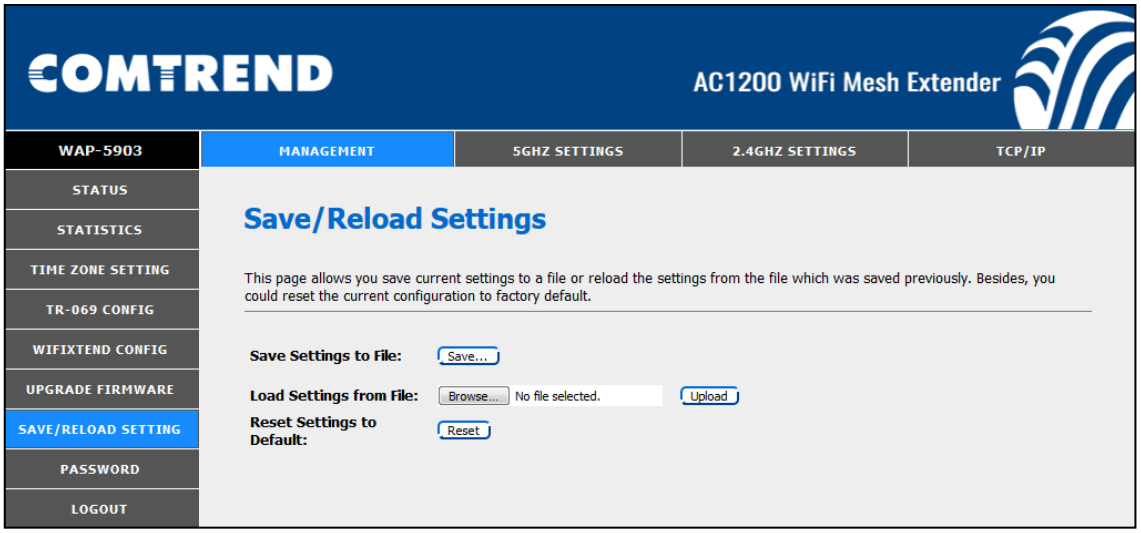
STEP 2: Then, click the Upload button to upgrade the new firmware.

NOTE1: The update process will take a few minutes to complete. The device will reboot and the browser window will refresh to the default screen upon successful installation. It is recommended that you compare the Software Version on the Status screen with the firmware version installed, to confirm the installation was successful.

NOTE2: The Power LED indicates the status of firmware update progress. Please **DO NOT** power off the device when Power LED is flashing or the device will be damaged.

3.7 Save/Reload Setting

This page allows you save current settings to a file or reload the settings from the file which was saved previously. Besides, you could reset the current configuration to factory default.

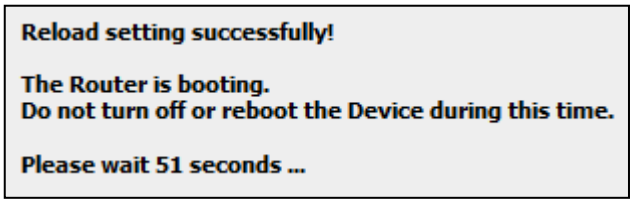


Save Settings to File: Click the Save button to save your settings to a file on your computer.

Load Settings from File: Click the Browse button to select the required file. Then, click the Upload button to upgrade the new firmware.

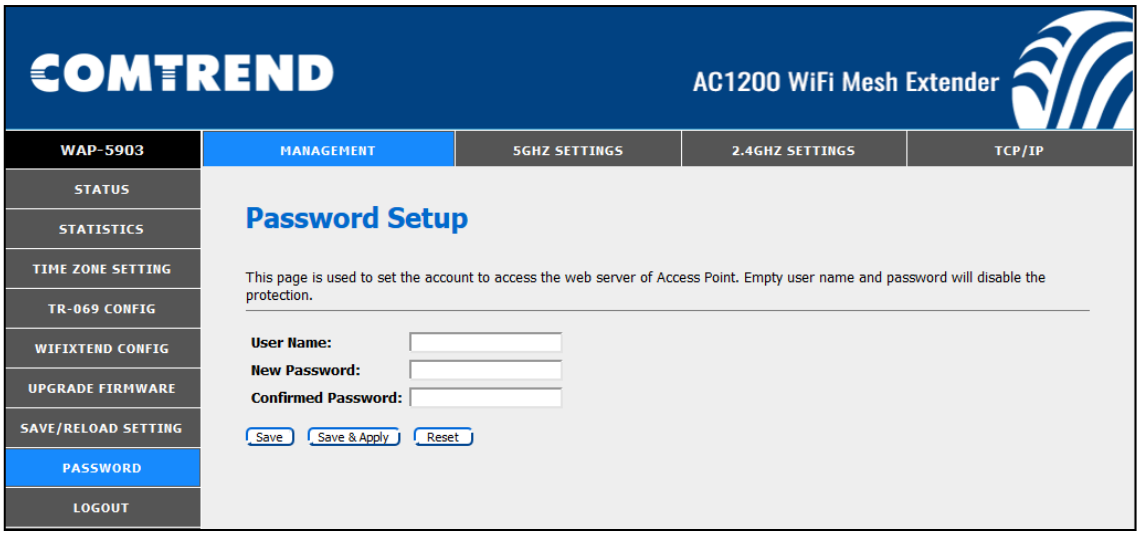
Reset Settings to Default: Click the Reset button to display the following.

Click the OK button to proceed. Then you will need to wait for one minute for the device to reboot.



3.8 Password

This page is used to set the account to access the web server of Access Point. Empty user name and password will disable the protection.



STEP 1: Input the User Name.

STEP 2: Input the New Password.

STEP 3: Confirm the New Password by inputting it again.

STEP 4: Click the Save and Apply button to save and apply your change.

If you just click the Save button, it is saved to flash memory.

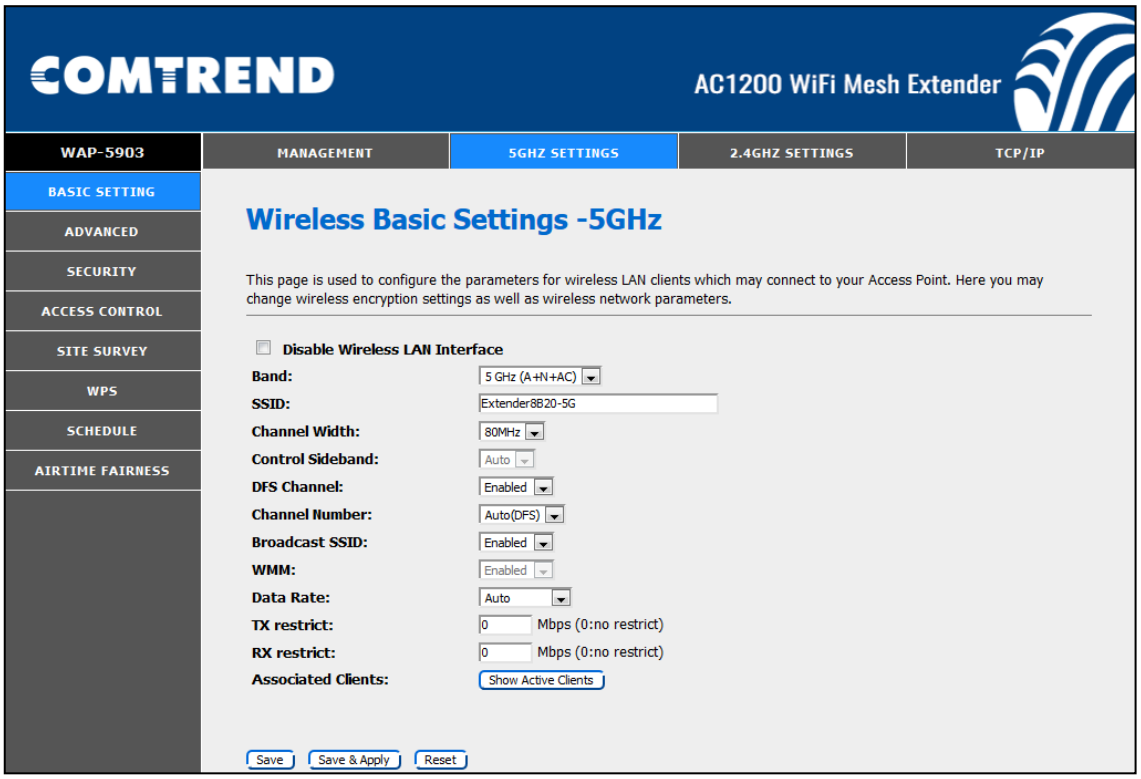
3.9 Logout

This page is used to logout.

Chapter 4 5GHz Settings

4.1 Basic Setting

The Basic option allows you to configure basic features of the wireless LAN interface. Among other things, you can enable or disable the wireless LAN interface, hide the network from active scans, and set the wireless network name (also known as SSID).

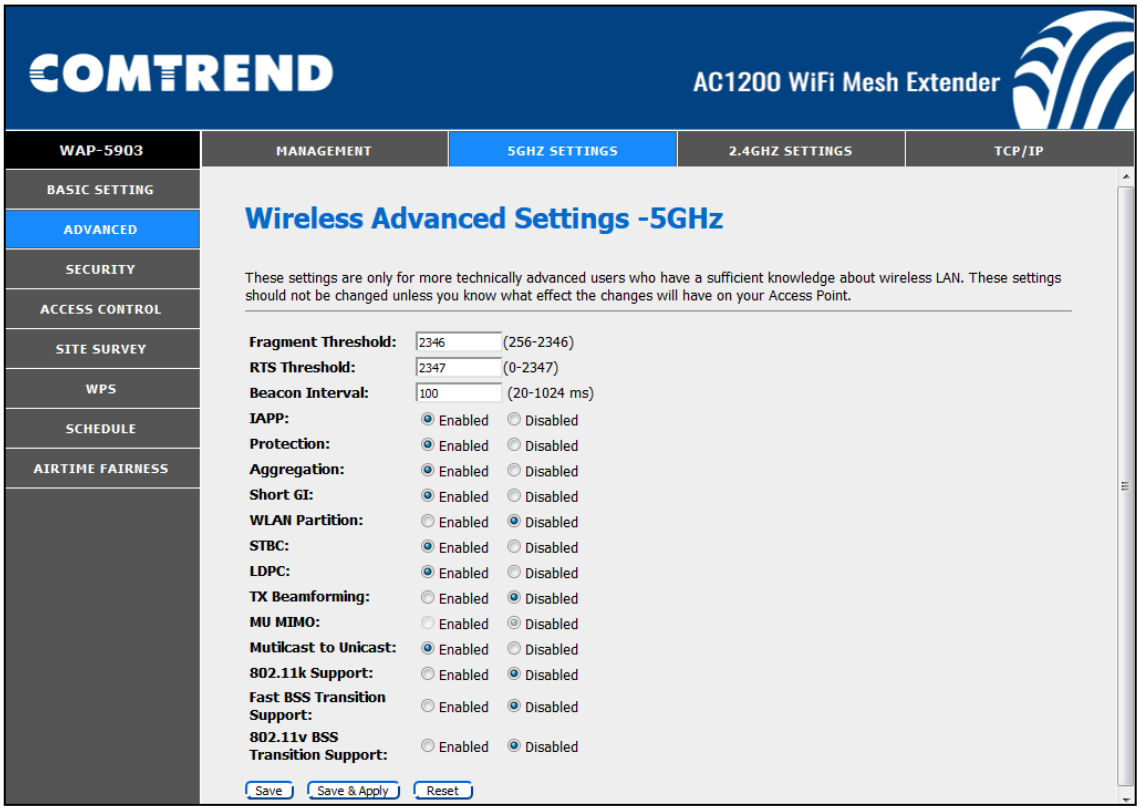


Heading	Description
Disable Wireless LAN Interface	A checkbox ☑ that enables or disables the wireless LAN interface
Band	Select from the drop-down menu
SSID [1-32 characters]	Sets the wireless network name. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that user will not be granted access.
Channel Width	Drop-down menu that allows the widening of the signal for transferring data.
Control Sideband	Select Upper or Lower sideband when in 20MHz/40MHz mixed mode.
DFS Channel	If DFS channel is enabled, the access point can use DFS channels reserved for radars.
Channel Number	Drop-down menu that allows selection of a specific channel.
Broadcast SSID	If SSID broadcast is on, the access point will broadcast the network name (SSID) every few seconds, computers in the neighborhood are quickly informed of the network

Heading	Description
WMM (Wi-Fi Multimedia)	The technology maintains the priority of audio, video and voice applications in a Wi-Fi network. It allows multimedia service get higher priority.
Data Rate	Drop-down menu that allows the changing of the data rate for transferring data.
TX restrict	Transmission limit
RX restrict	Receive limit
Associated Clients	Display connected device information including (MAC Address, Mode, Tx Packet…)

4.2 Advanced

These settings are only for more technically advanced users who have a sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your Access Point.

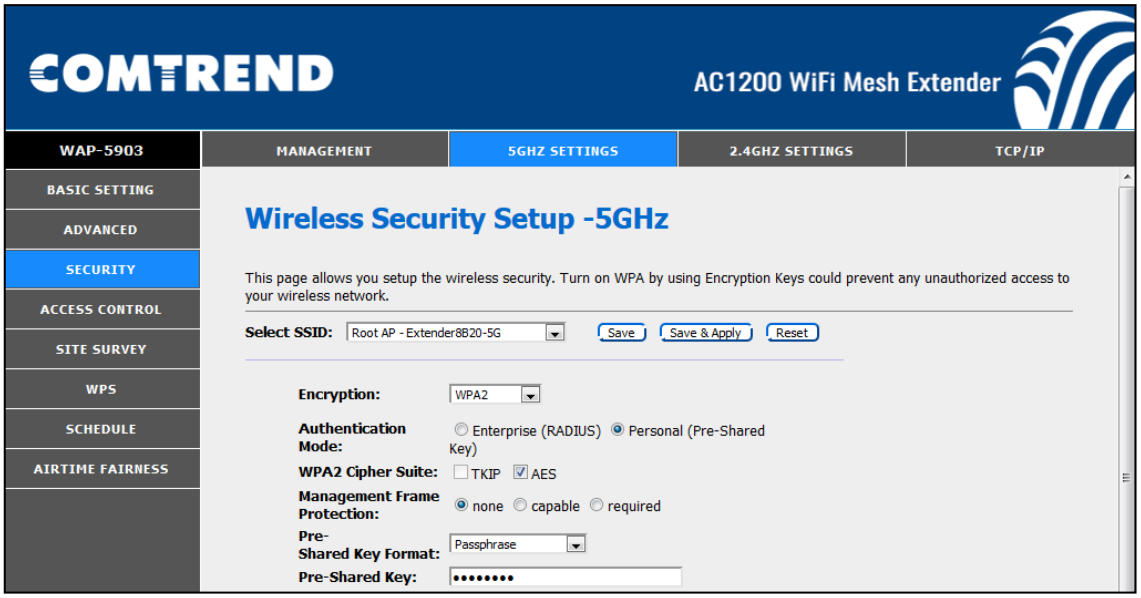


Heading	Description
Fragment Threshold	*Set the Fragment threshold of wireless radio.* ***Do not modify the default value if you don't know what it is, default value is 2346.***
RTS Threshold	The RTS (Request To Send) threshold parameter controls what size data packet (number of bytes) the low level RF protocol issues to an RTS packet. ***Do not modify the default value if you don't know what it is, default value is 2347.***
Beacon Interval	The Beacon Interval value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the Router to synchronize the wireless network. ***Do not modify the default value if you don't know what it is, default value is 100.***
IAPP	Click to enable or disable the IEEE 802.11f Inter-Access Point Protocol (*IAPP*)
Protection	Click to enable or disable the Management Frame Protection
Aggregation	Frame aggregation is a feature of the IEEE 802.11e, 802.11n and 802.11ac wireless LAN standards that increases throughput by sending two or more data frames in a single transmission. Click to enable or disable.

Heading	Description
Short GI	Short GI(*Short Guard Interval) guard intervals are used to ensure that distinct transmissions do not interfere with one another, or otherwise cause overlapping transmissions.* Click to enable or disable.
WLAN Partition	WLAN Partition prevents associated wireless clients from communicating with each other. Click to enable or disable.
STBC	By enabling Space-Time Block Coding (STBC), the transmission rate is reduced; however the transmission quality is improved. Click to enable or disable.
LDPC	Low-Density Parity Check (LDPC) In the 802.11 association process, the LDPC-encoded frame is negotiated. If the peer indicates that the LDPC is supported in the Beacon or Association Request frame, the 802.11n device only transmits the LDPC-encoded frame. Click to enable or disable.
TX Beamforming	Beamforming Beam, which can be directional to transmit signals, mainly for the receiver. Click to enable or disable.
MU MIMO	MU-MIMO (Multi-User MIMO), at the same time, data can be transferred to multiple users at the same time. Click to enable or disable.
Multicast to Unicast	Multicast: this article is about one-to-many communications Unicast: refers to a one-to-one transmission from one point in the network to another point. Click to enable or disable.
802.11k Support	Helps the client to generate the optimized AP list for Wi-Fi roaming. Click to enable or disable.
Fast BSS Transition Support	Provides a quick authentication method for Wi-Fi roaming. Click to enable or disable.
802.11v BSS Transition Support	Provides wireless network management to assist client roaming to better AP. Click to enable or disable.

4.3 Security

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.



Heading	Description
Select SSID	Select the wireless network name from the drop-down box. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that client will not be granted access.
Encryption	This option specifies whether a network key is used for authentication to the wireless network. If network authentication is set to Disable, then no authentication is provided. Despite this, the identity of the client is still verified. Each authentication type has its own settings.
Authentication Mode	Select the authentication server(RADIUS) authentication or personal authentication
WPA2 Cipher Suite	Select WPA2 type of encryption
Management Frame Protection	Provide protection for unicast and multicast management action frames
Pre-Shared Key Format	Pre-Shared Key Format has Passphrase and HEX(64 characters)
Pre-Shared Key	Pre-shared key (PSK) is a shared secret which was previously shared between the two parties using some secure channel before it needs to be used

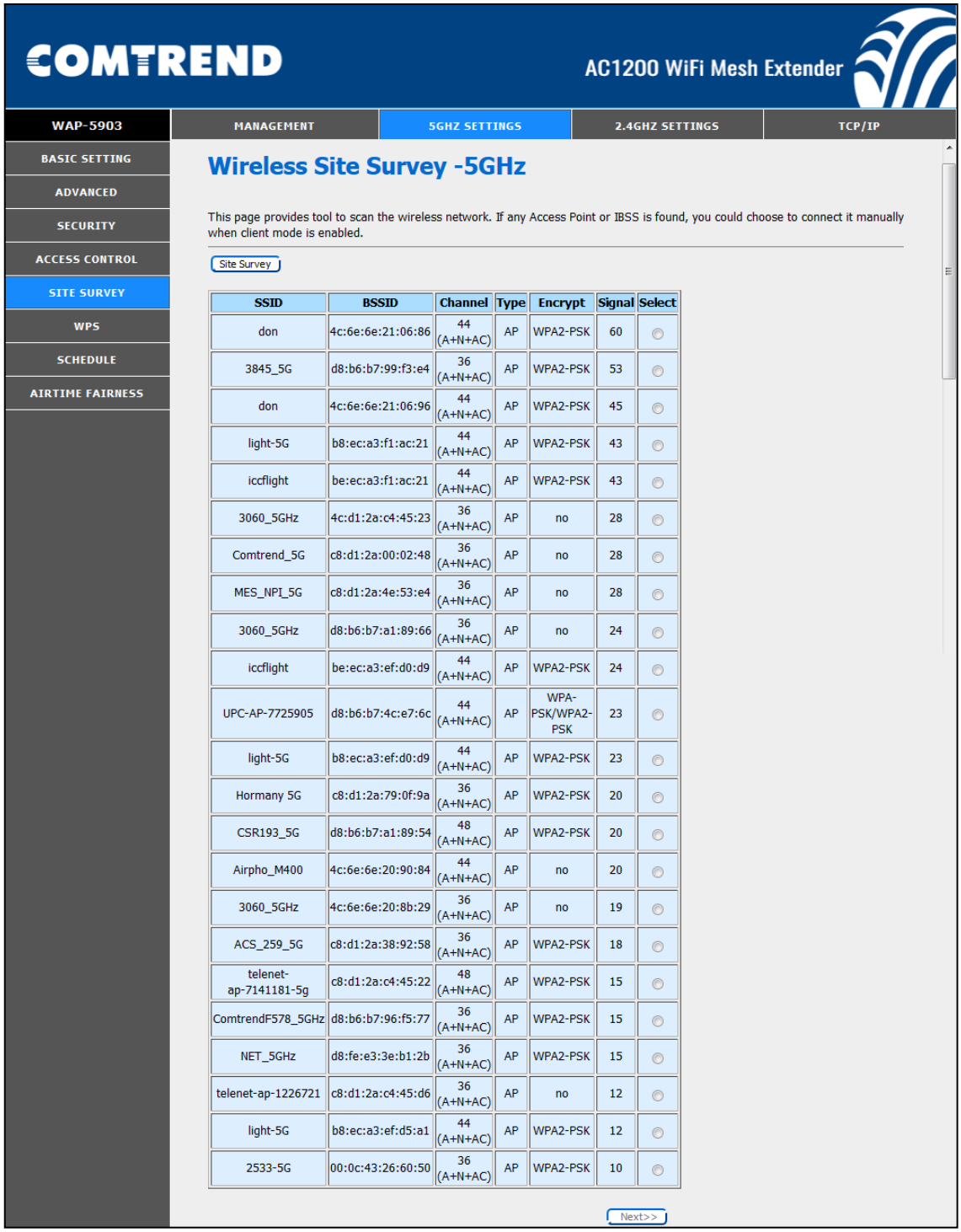
4.4 Access Control

If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point. When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point.

Note:
Mac Address format: 831bf4d5c14
No colons between characters required

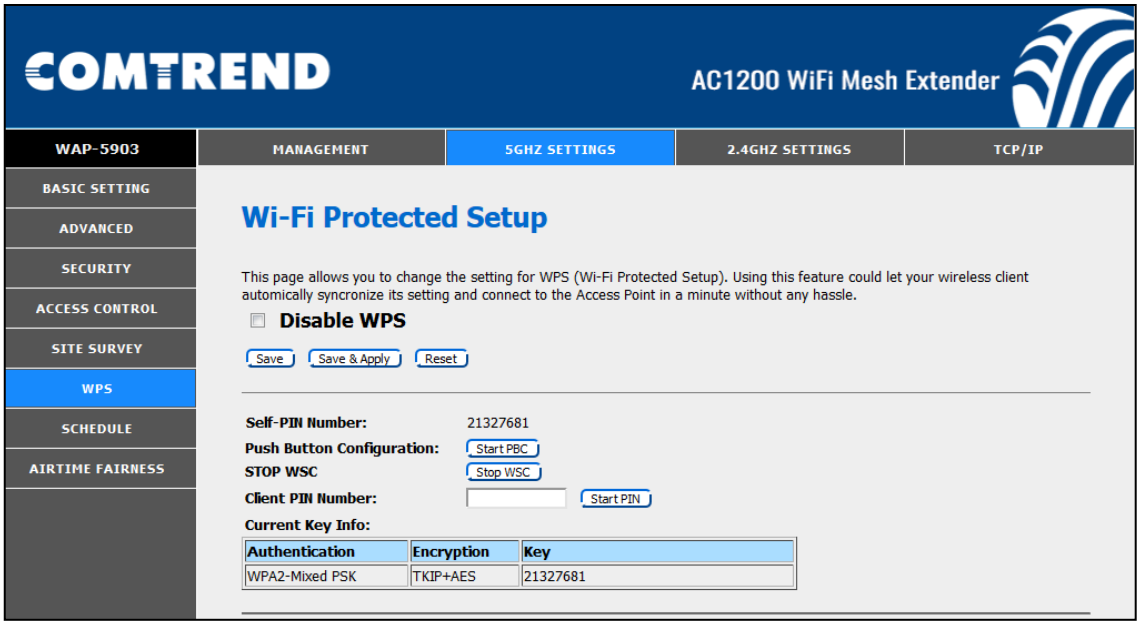
4.5 Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.



4.6 WPS

This page allows you to change the setting for WPS (Wi-Fi Protected Setup). Using this feature could let your wireless client automatically synchronize its setting and connect to the Access Point in a minute without any hassle.

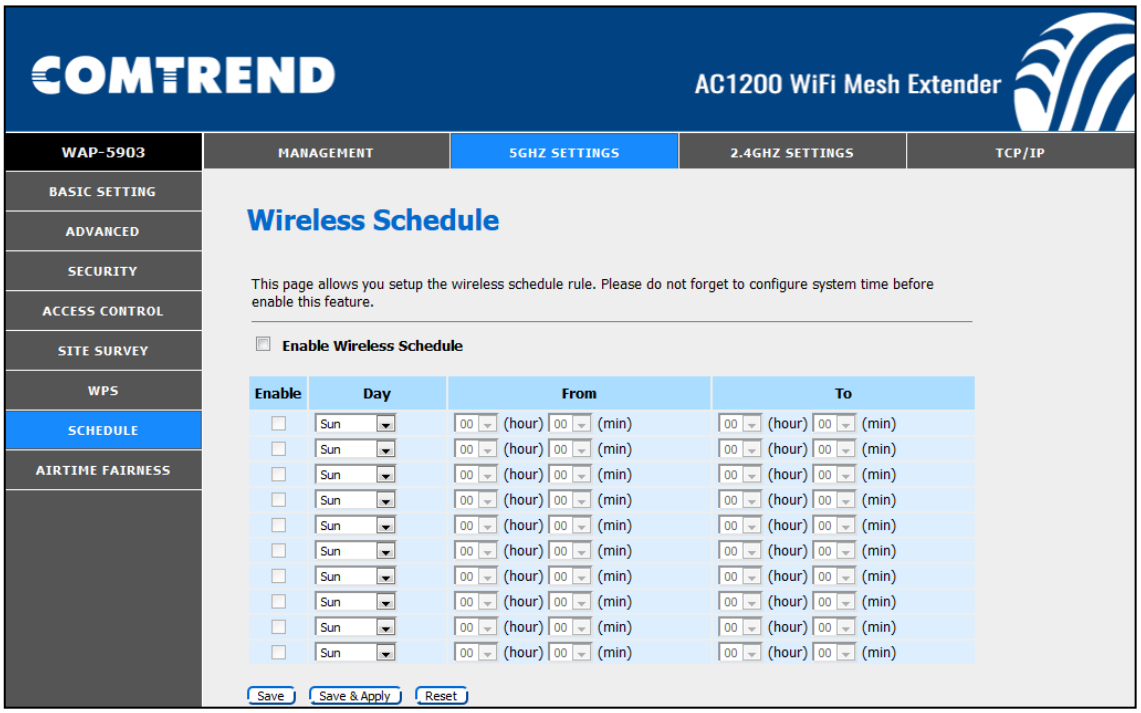


Consult the table below for descriptions.

Heading	Description
Disable WPS	A checkbox ☑ that enables or disables the Wi-Fi Protected Setup (WPS)
Self-PIN Number	This AP itself is the WPS Personal Identification Number
Push Button Configuration	Start Wi-Fi Simple Configuration process
Stop WSC	Stop Wi-Fi Simple Configuration process
Client-PIN Number	Shows the current value of client PIN
Current Key Info	Shows Wi-Fi Security information

4.7 Schedule

This page allows you setup the wireless schedule rule. Please do not forget to configure system time before enable this feature.



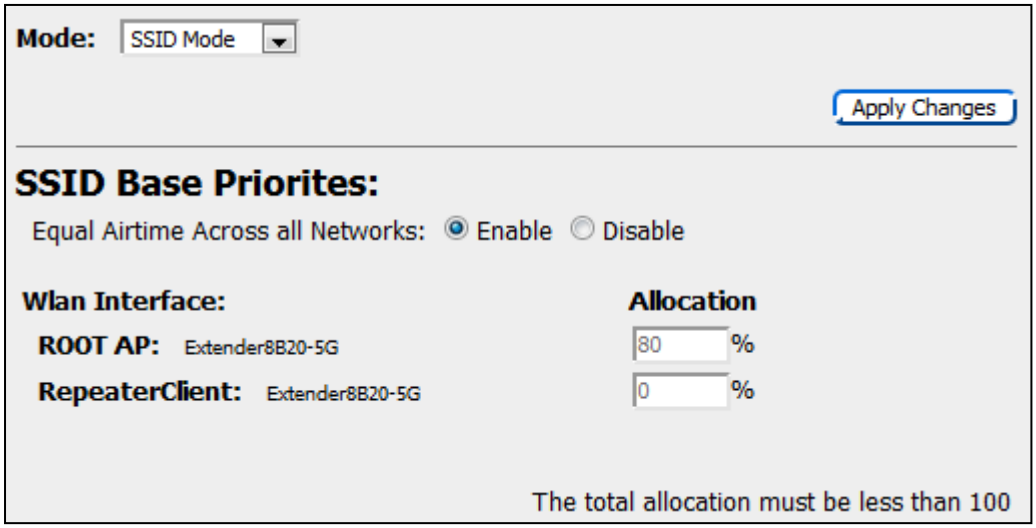
Consult the table below for descriptions.

Heading	Description
Enable Wireless Schedule	A checkbox ☑ that enables or disables the wireless schedule
Enable	A checkbox ☑ that enables or disables an entry
Day	Select the day form the drop-down menu
From	Select the hour and the minute form the drop-down menu
To	Select the hour and the minute form the drop-down menu

4.8 Airtime Fairness

Airtime Management, sometimes called Airtime Fairness is based on TDMA (Time Division Multiple Access) technology. This function can allocate airtime time evenly or set a dedicated airtime to a different network (by SSID) or devices (by Mac/IP address). The Allocation is used to make all clients getting airtime fairly or make some network or device getting airtime proportional. In this way, the capacity and efficiency of Wi-Fi will be improved.

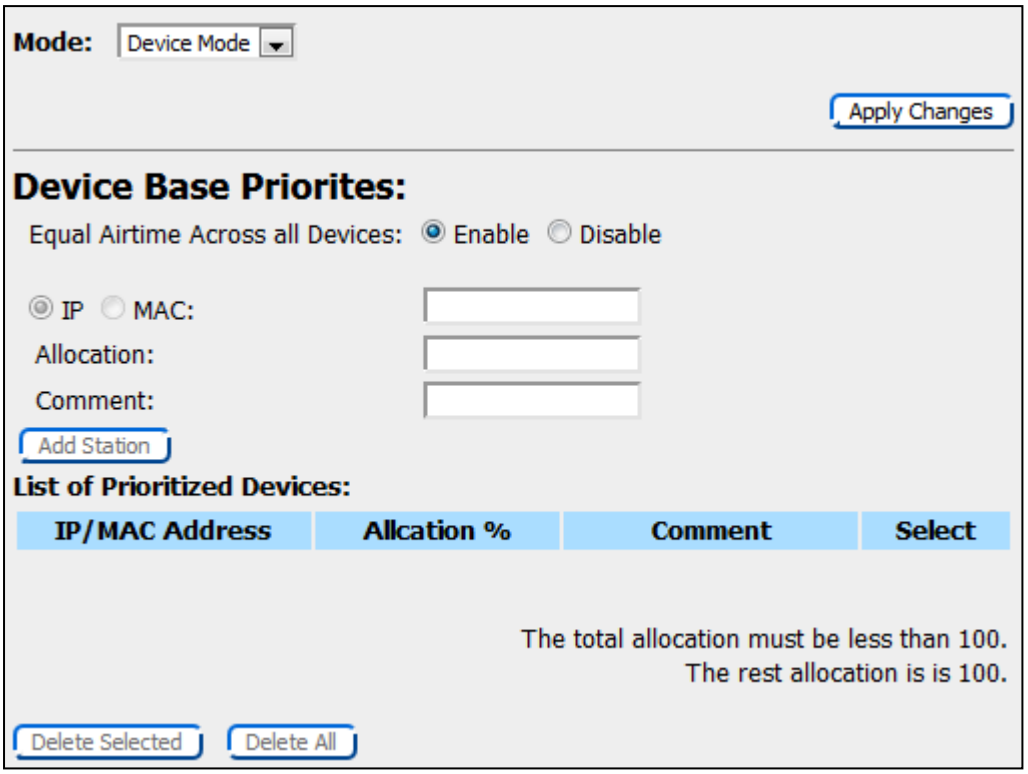
Select SSID Mode from the drop-down menu to display the following.



To apply your changes, click the Apply Changes button.

Heading	Description
Equal Airtime Across all Networks	Set equal airtime for all Wi-Fi netoworks. Click to enable or disable.
Root AP	Allocation (percentage) for Root AP
RepeaterClient	Allocation (percentage) for Repeater Client

Select Device Mode from the drop-down menu to display the following.



To apply your changes, click the Apply Changes button.

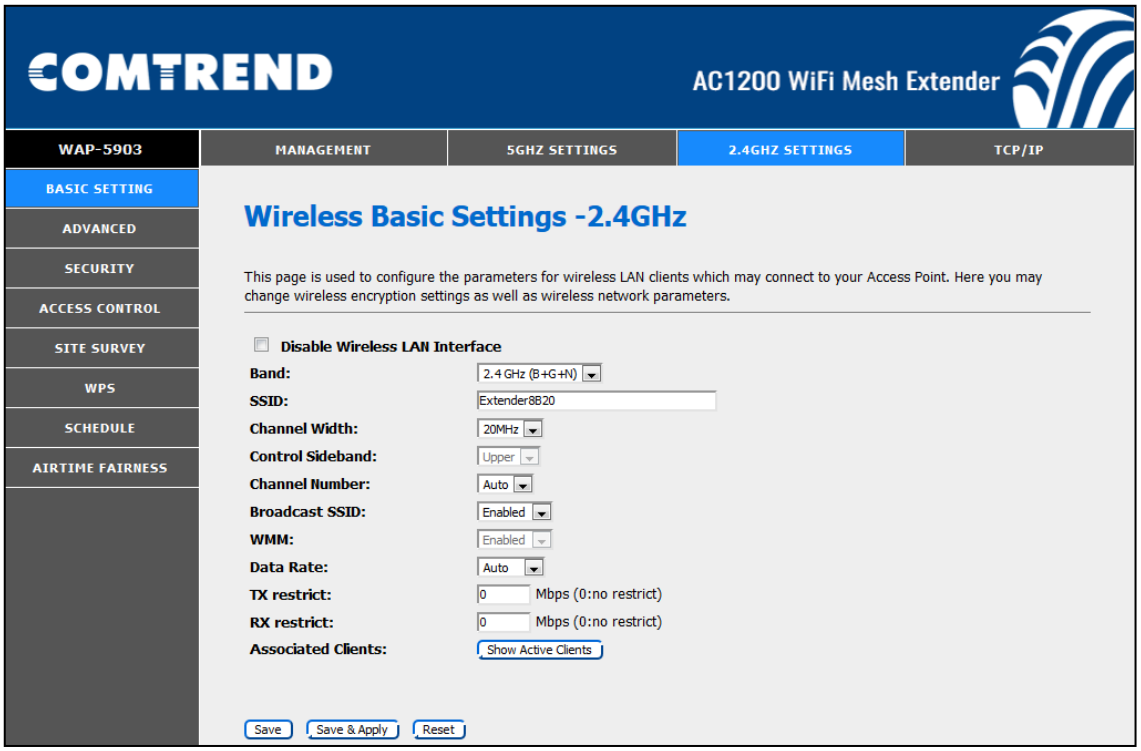
Heading	Description
Equal Airtime Across all Devices	Set equal airtime for all devices. Click to enable or disable.
IP / MAC	Device information for Airtime Priorities
Allocation	Allocation (percentage) for this device
Comment	A note for this client

Click the **Add Station** button to add the station.

Chapter 5 2.4GHz Settings

5.1 Basic Setting

The Basic option allows you to configure basic features of the wireless LAN interface. Among other things, you can enable or disable the wireless LAN interface, hide the network from active scans, and set the wireless network name (also known as SSID).

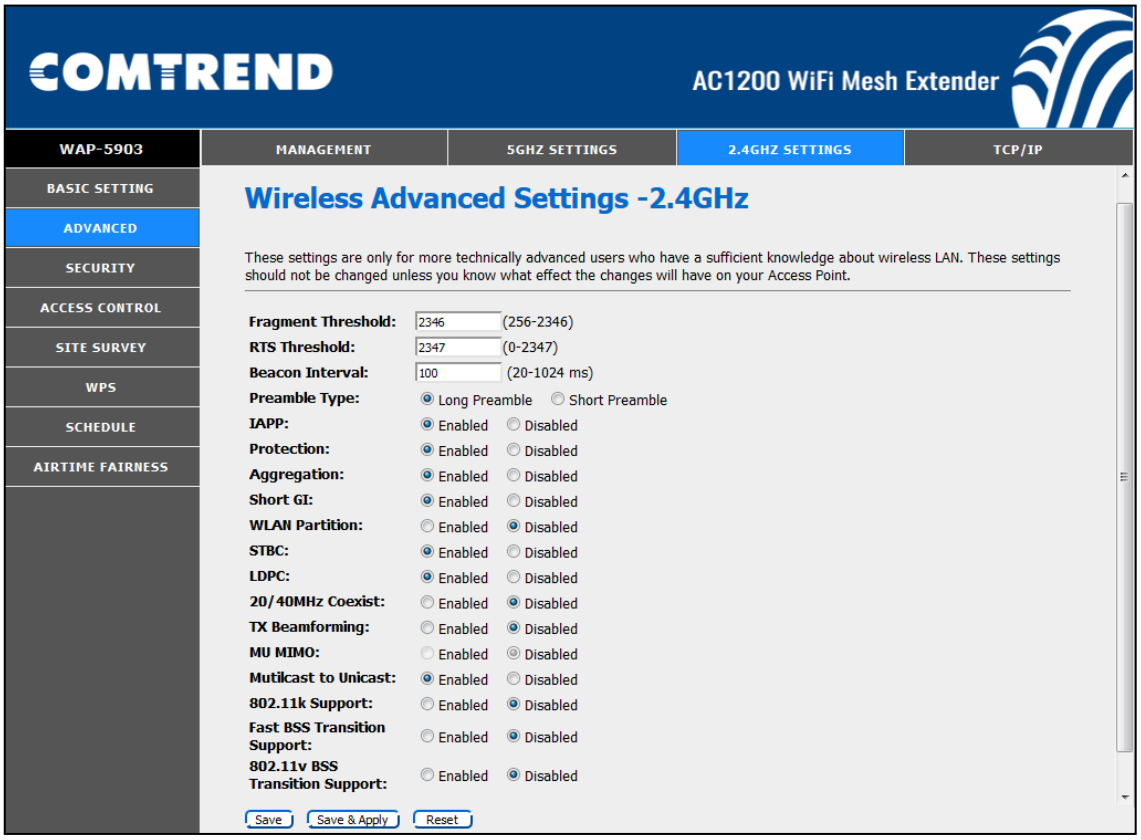


Heading	Description
Disable Wireless LAN Interface	A checkbox ☑ that enables or disables the wireless LAN interface
Band	Select from the drop-down menu
SSID [1-32 characters]	Sets the wireless network name. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that user will not be granted access.
Channel Width	Drop-down menu that allows the widening of the signal for transferring data.
Control Sideband	Select Upper or Lower sideband when in 20MHz/40MHz mixed mode.
Channel Number	Drop-down menu that allows selection of a specific channel.
Broadcast SSID	If SSID broadcast is on, the access point will broadcast the network name (SSID) every few seconds, computers in the neighborhood are quickly informed of the network
WMM (Wi-Fi Multimedia)	The technology maintains the priority of audio, video and voice applications in a Wi-Fi network. It allows multimedia service get higher priority.

Heading	Description
Data Rate	Drop-down menu that allows the changing of the data rate for transferring data.
TX restrict	Transmission limit
RX restrict	Receive limit
Associated Clients	Display connected device information including (MAC Address, Mode, Tx Packet…)

5.2 Advanced

These settings are only for more technically advanced users who have a sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your Access Point.



Heading	Description
Fragment Threshold	*Set the Fragment threshold of wireless radio.* ***Do not modify the default value if you don't know what it is, default value is 2346.***
RTS Threshold	The RTS (Request To Send) threshold parameter controls what size data packet (number of bytes) the low level RF protocol issues to an RTS packet. ***Do not modify the default value if you don't know what it is, default value is 2347.***
Beacon Interval	The Beacon Interval value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the Router to synchronize the wireless network. ***Do not modify the default value if you don't know what it is, default value is 100.***
Preamble Type	Preamble Type setting indicates the length of the CRC (Cyclic Redundancy Check) block: Long preamble: Provides better compatibility for older client or high interference environment. Short preamble: Provides better performance for newer clients. Check to choose "Long preamble" or "Short preamble"
IAPP	Click to enable or disable the IEEE 802.11f Inter-Access Point Protocol (*IAPP*)

Heading	Description
Protection	Click to enable or disable the Management Frame Protection
Aggregation	Frame aggregation is a feature of the IEEE 802.11e, 802.11n and 802.11ac wireless LAN standards that increases throughput by sending two or more data frames in a single transmission. Click to enable or disable.
Short GI	Short GI(*Short Guard Interval) guard intervals are used to ensure that distinct transmissions do not interfere with one another, or otherwise cause overlapping transmissions.* Click to enable or disable.
WLAN Partition	WLAN Partition prevents associated wireless clients from communicating with each other. Click to enable or disable.
STBC	By enabling Space-Time Block Coding (STBC), the transmission rate is reduced; however the transmission quality is improved. Click to enable or disable.
LDPC	Low-Density Parity Check (LDPC) In the 802.11 association process, the LDPC-encoded frame is negotiated. If the peer indicates that the LDPC is supported in the Beacon or Association Request frame, the 802.11n device only transmits the LDPC-encoded frame. Click to enable or disable.
20/40MHz Coexist (WLAN2 2.4GHz only)	If enabled, when interference occurs, it will be reduced to 20Mhz, and the speed will be reduced by half to enhance anti-interference and friendliness.
TX Beamforming	Beamforming Beam, which can be directional to transmit signals, mainly for the receiver. Click to enable or disable.
MU MIMO	MU-MIMO (Multi-User MIMO), at the same time, data can be transferred to multiple users at the same time. Click to enable or disable.
Multicast to Unicast	Multicast: this article is about one-to-many communications Unicast: refers to a one-to-one transmission from one point in the network to another point. Click to enable or disable.
802.11k Support	Helps the client to generate the optimized AP list for Wi-Fi roaming. Click to enable or disable.
Fast BSS Transition Support	Provides a quick authentication method for Wi-Fi roaming. Click to enable or disable.
802.11v BSS Transition Support	Provides wireless network management to assist client roaming to better AP. Click to enable or disable.

5.3 Security

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

Heading	Description
Select SSID	Select the wireless network name from the drop-down box. SSID stands for Service Set Identifier. All stations must be configured with the correct SSID to access the WLAN. If the SSID does not match, that client will not be granted access.
Encryption	This option specifies whether a network key is used for authentication to the wireless network. If network authentication is set to Disable, then no authentication is provided. Despite this, the identity of the client is still verified. Each authentication type has its own settings.
Authentication Mode	Select the authentication server(RADIUS) authentication or personal authentication
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Management Frame Protection	Provide protection for unicast and multicast management action frames
Pre-Shared Key Format	Pre-Shared Key Format has Passphrase and HEX(64 characters)
Pre-Shared Key	Pre-shared key (PSK) is a shared secret which was previously shared between the two parties using some secure channel before it needs to be used

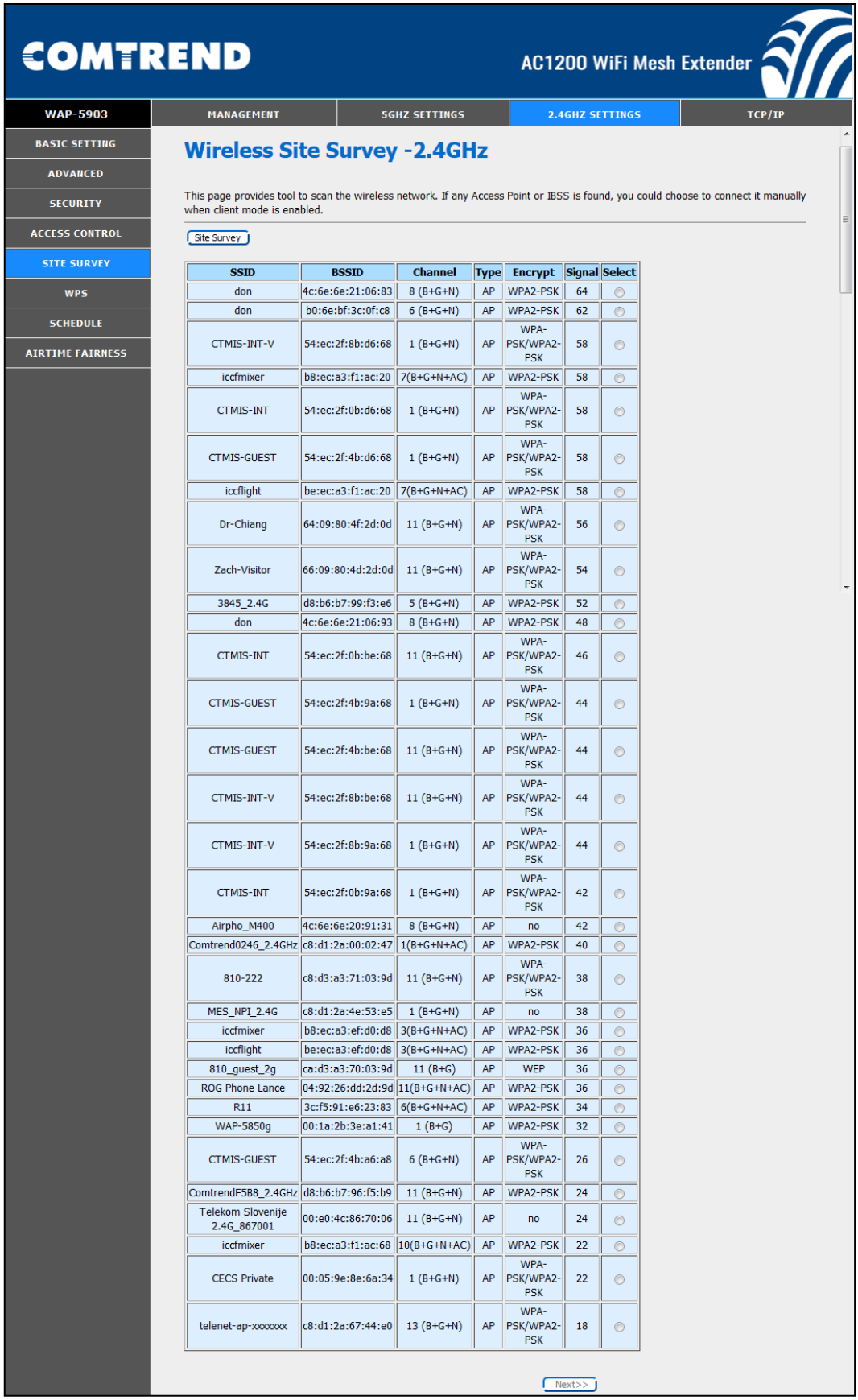
5.4 Access Control

If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point. When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point.

Note:
Mac Address format: 831bf4d5c14
No colons between characters required

5.5 Site Survey

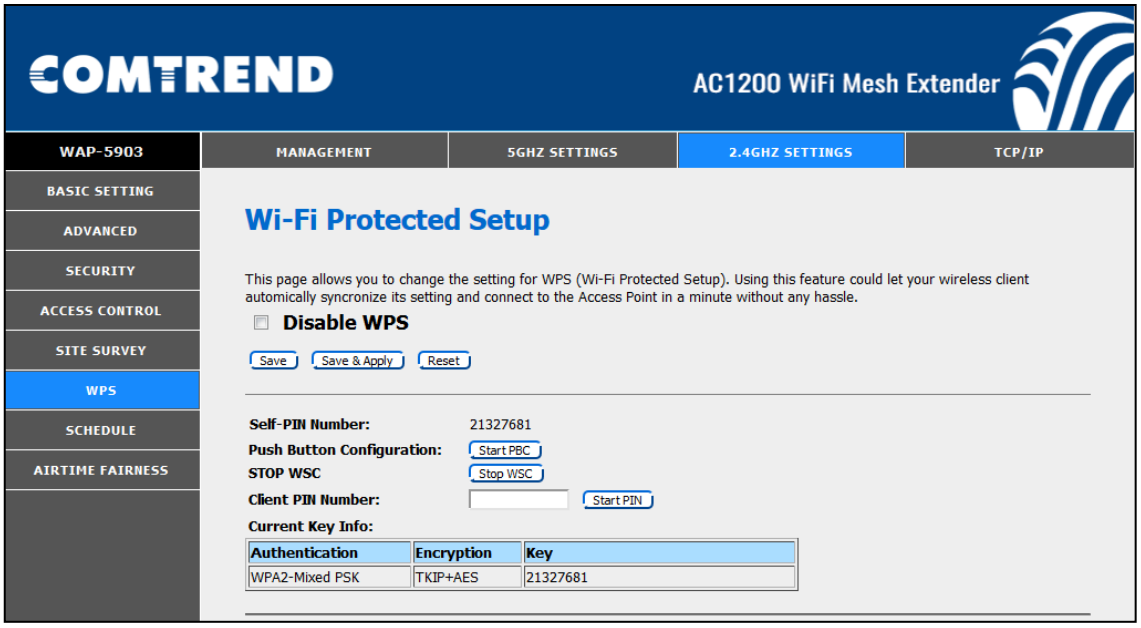
This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.



SSID	BSSID	Channel	Type	Encrypt	Signal	Select
don	4c:6e:6e:21:06:83	8 (B+G+N)	AP	WPA2-PSK	64	
don	b0:6e:bf:3c:0f:c8	6 (B+G+N)	AP	WPA2-PSK	62	
CTMIS-INT-V	54:ec:2f:8b:d6:68	1 (B+G+N)	AP	WPA-PSK/WPA2-PSK	58	
iccfmixer	b8:ec:a3:f1:ac:20	7(B+G+N+AC)	AP	WPA2-PSK	58	
CTMIS-INT	54:ec:2f:0b:d6:68	1 (B+G+N)	AP	WPA-PSK/WPA2-PSK	58	
CTMIS-GUEST	54:ec:2f:4b:d6:68	1 (B+G+N)	AP	WPA-PSK/WPA2-PSK	58	
iccflight	be:ec:a3:f1:ac:20	7(B+G+N+AC)	AP	WPA2-PSK	58	
Dr-Chiang	64:09:80:4f:2d:0d	11 (B+G+N)	AP	WPA-PSK/WPA2-PSK	56	
Zach-Visitor	66:09:80:4d:2d:0d	11 (B+G+N)	AP	WPA-PSK/WPA2-PSK	54	
3845_2.4G	d8:b6:b7:99:f3:e6	5 (B+G+N)	AP	WPA2-PSK	52	
don	4c:6e:6e:21:06:93	8 (B+G+N)	AP	WPA2-PSK	48	
CTMIS-INT	54:ec:2f:0b:be:68	11 (B+G+N)	AP	WPA-PSK/WPA2-PSK	46	
CTMIS-GUEST	54:ec:2f:4b:9a:68	1 (B+G+N)	AP	WPA-PSK/WPA2-PSK	44	
CTMIS-GUEST	54:ec:2f:4b:be:68	11 (B+G+N)	AP	WPA-PSK/WPA2-PSK	44	
CTMIS-INT-V	54:ec:2f:8b:be:68	11 (B+G+N)	AP	WPA-PSK/WPA2-PSK	44	
CTMIS-INT-V	54:ec:2f:8b:9a:68	1 (B+G+N)	AP	WPA-PSK/WPA2-PSK	44	
CTMIS-INT	54:ec:2f:0b:9a:68	1 (B+G+N)	AP	WPA-PSK/WPA2-PSK	42	
Airpho_M400	4c:6e:6e:20:91:31	8 (B+G+N)	AP	no	42	
Comtrend0246_2.4GHz	c8:d1:2a:00:02:47	1(B+G+N+AC)	AP	WPA2-PSK	40	
810-222	c8:d3:a3:71:03:9d	11 (B+G+N)	AP	WPA-PSK/WPA2-PSK	38	
MES_NPI_2.4G	c8:d1:2a:4e:53:e5	1 (B+G+N)	AP	no	38	
iccfmixer	b8:ec:a3:ef:d0:d8	3(B+G+N+AC)	AP	WPA2-PSK	36	
iccflight	be:ec:a3:ef:d0:d8	3(B+G+N+AC)	AP	WPA2-PSK	36	
810_guest_2g	ca:d3:a3:70:03:9d	11 (B+G)	AP	WEP	36	
ROG Phone Lance	04:92:26:dd:2d:9d	11(B+G+N+AC)	AP	WPA2-PSK	36	
R11	3c:f5:91:e6:23:83	6(B+G+N+AC)	AP	WPA2-PSK	34	
WAP-5850g	00:1a:2b:3e:a1:41	1 (B+G)	AP	WPA2-PSK	32	
CTMIS-GUEST	54:ec:2f:4b:a6:a8	6 (B+G+N)	AP	WPA-PSK/WPA2-PSK	26	
ComtrendF588_2.4GHz	d8:b6:b7:96:f5:b9	11 (B+G+N)	AP	WPA2-PSK	24	
Telekom Slovenije 2.4G_867001	00:e0:4c:86:70:06	11 (B+G+N)	AP	no	24	
iccfmixer	b8:ec:a3:f1:ac:68	10(B+G+N+AC)	AP	WPA2-PSK	22	
CECS Private	00:05:9e:8e:6a:34	1 (B+G+N)	AP	WPA-PSK/WPA2-PSK	22	
telenet-ap-xxxxxxx	c8:d1:2a:67:44:e0	13 (B+G+N)	AP	WPA-PSK/WPA2-PSK	18	

5.6 WPS

This page allows you to change the setting for WPS (Wi-Fi Protected Setup). Using this feature could let your wireless client automatically synchronize its setting and connect to the Access Point in a minute without any hassle.

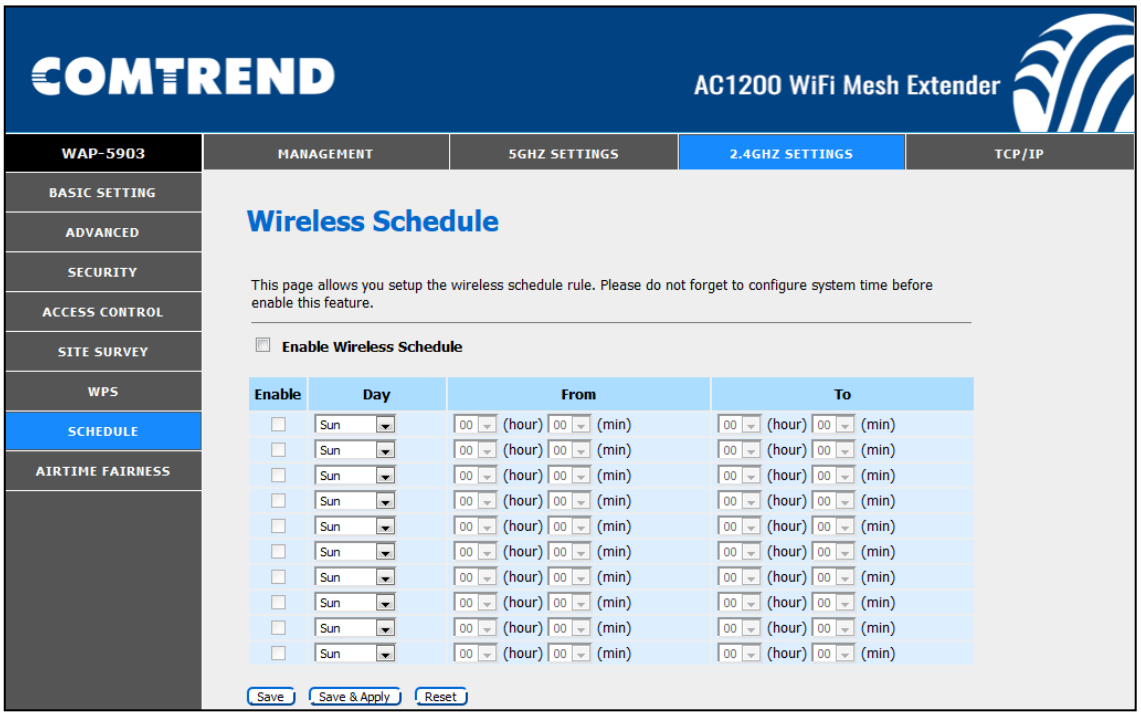


Consult the table below for descriptions.

Heading	Description
Disable WPS	A checkbox ☑ that enables or disables the Wi-Fi Protected Setup (WPS)
Self-PIN Number	This AP itself is the WPS Personal Identification Number
Push Button Configuration	Start Wi-Fi Simple Configuration process
Stop WSC	Stop Wi-Fi Simple Configuration process
Client-PIN Number	Shows the current value of client PIN
Current Key Info	Shows Wi-Fi Security information

5.7 Schedule

This page allows you setup the wireless schedule rule. Please do not forget to configure system time before enable this feature.

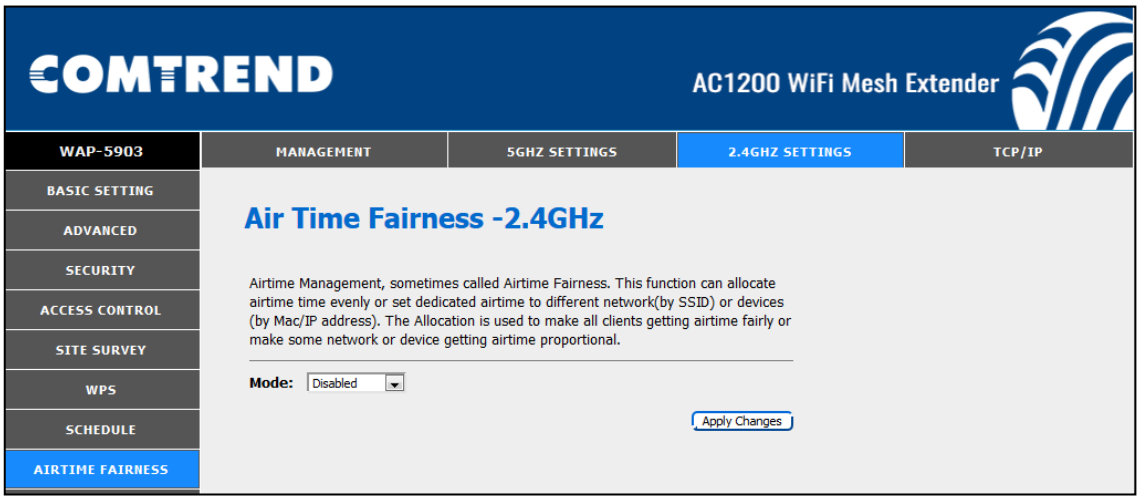


Consult the table below for descriptions.

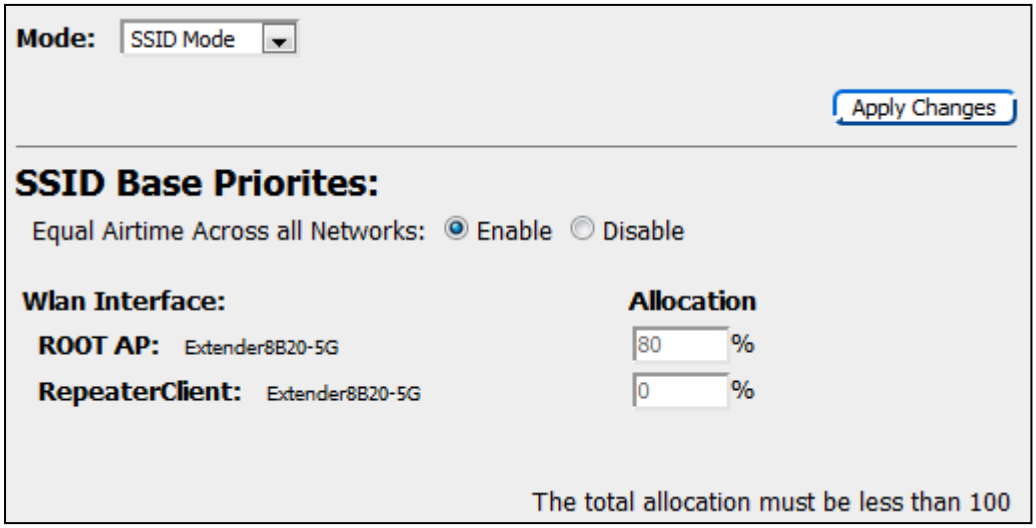
Heading	Description
Enable Wireless Schedule	A checkbox ☑ that enables or disables the wireless schedule
Enable	A checkbox ☑ that enables or disables an entry
Day	Select the day form the drop-down menu
From	Select the hour and the minute form the drop-down menu
To	Select the hour and the minute form the drop-down menu

5.8 Airtime Fairness

Airtime Management, sometimes called Airtime Fairness is based on TDMA (Time Division Multiple Access) technology. This function can allocate airtime time evenly or set a dedicated airtime to a different network (by SSID) or devices (by Mac/IP address). The Allocation is used to make all clients getting airtime fairly or make some network or device getting airtime proportional. In this way, the capacity and efficiency of Wi-Fi will be improved.



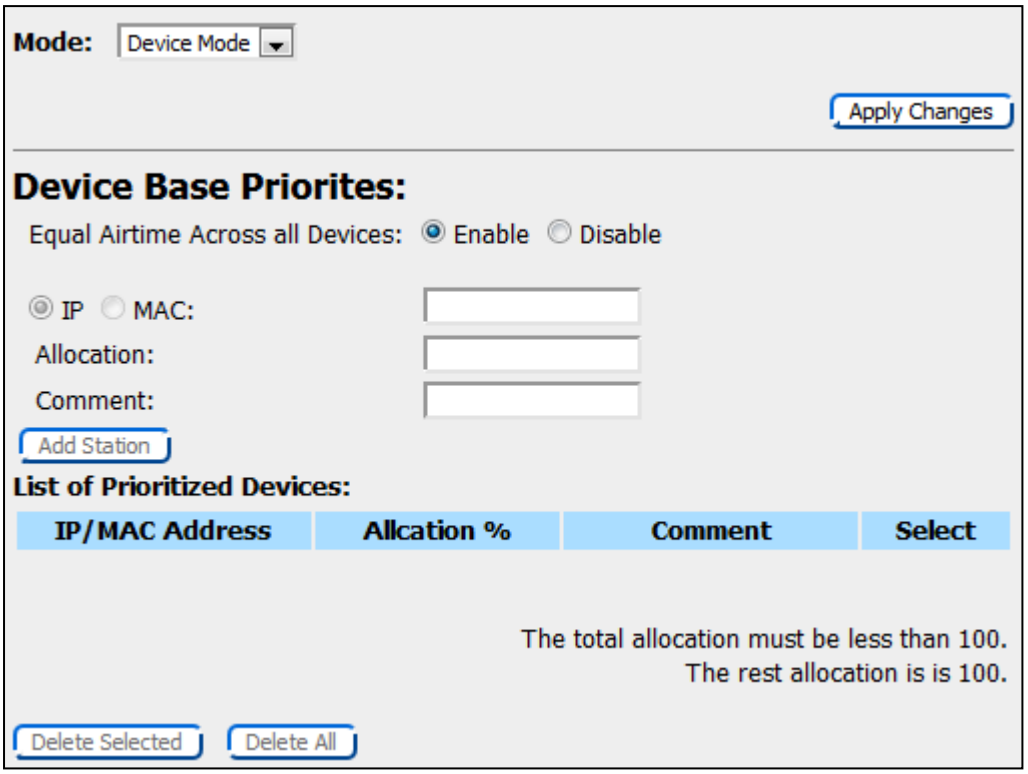
Select SSID Mode from the drop-down menu to display the following.



To apply your changes, click the Apply Changes button.

Heading	Description
Equal Airtime Across all Networks	Set equal airtime for all networks. Click to enable or disable.
Root AP	Allocation (percentage) for Root AP
RepeaterClient	Allocation (percentage) for Repeater Client

Select Device Mode from the drop-down menu to display the following.



To apply your changes, click the Apply Changes button.

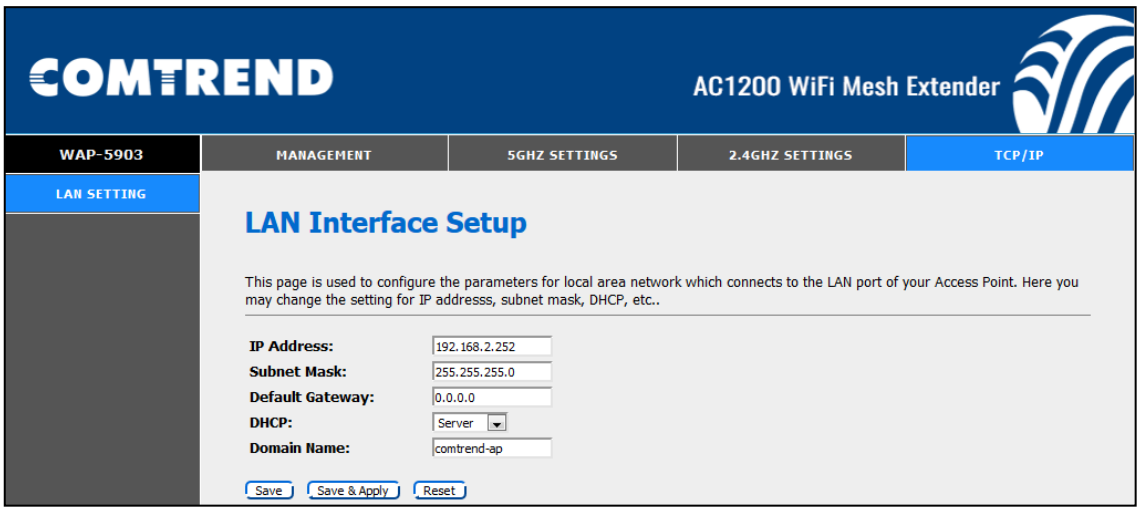
Heading	Description
Equal Airtime Across all Devices	Set equal airtime for all devices. Click to enable or disable.
IP / MAC	Device information for Airtime Priorities
Allocation	Allocation (percentage) for this device
Comment	A note for this client

Click the **Add Station** button to add the station.

Chapter 6 TCP/IP

4.1 LAN Setting

This page is used to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP address, subnet mask, DHCP, etc...



Consult the table below for descriptions.

Heading	Description
IP Address	Input the IP address for the LAN port
Subnet Mask	Input the subnet mask for the LAN port
Default Gateway	IP Address of the default gateway
DHCP	Select the method to get an IP address, DHCP or Static
Domain Name	Display Host name

Appendix A: Specifications

Hardware

· RJ-45 X 1 for LAN (10/100/1000)
· RJ-45 X 1 for UPLINK (10/100/1000)
· Reset button X 1
· Internal Antenna X 2

Ethernet

· IEEE 802.3, IEEE 802.3u

Management

· TR-069, SNMP, Telnet, Web- Based Management, Configuration Backup and Restoration
· Software Upgrade via HTTP

Wireless

· IEEE 802.11n, 2.4GHz, 2T2R
Backward compatible with 802.11g/b
2412 – 2462 MHz (for FCC / IC)
2412 – 2472 MHz (for CE)
· IEEE 802.11ac,5GHz, 2T2R,
Backward compatible with 802.11n/a
U-NII-1 (5150～5250 MHz)
U-NII-2a (5250～5350 MHz) optional
U-NII-2c/2e (5470～5725 MHz) optional
U-NII-3 (5725～5825 MHz) for FCC / IC only
WPA2/WPA2-PSK with TKIP & AES Security Type
· MAC Address Filtering

Power Supply

· External power adapter :
I/P： 100-240Vac, 50/60Hz, 0.6A 

Environment

· Operating Temperature: 0°C ~40°C (32°F ~104°F)
· Operating Humidity: 10%~90% non-condensing
· Storage Temperature: -25°C ~65°C (-23°F ~149°F)
· Storage Humidity: 5%~90% non-condensing

Kit Weight

(1* WAP-5903, 1*RJ45 cable, 1*power adapter) = 0.75 kg

NOTE: Specifications are subject to change without notice.