COMTREND

WAP-5945s(Series)
Home Gateway

User Manual

Power
5G
2.4G
WPS
AP
Repeater
2.5GE
2.5GE

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).
- Do not connect the power supply cord on elevated surfaces.   Allow it to lie freely.   There should be no obstructions in its path and no heavy items should be placed on the cord.   In addition, do not walk on, step on, or mistreat the cord.
- Use only the power cord and adapter that are shipped with this device.
- Never install telephone wiring during stormy weather conditions.

CAUTION:
- Always disconnect all telephone lines from the wall outlet before servicing or disassembling this equipment.
- 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.
- To prevent interference with cordless phones, ensure that the gateway is at least 5 feet (1.5m)from the cordless phone base station.
- 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 power line from the device before servicing
- For indoor use only
- Do NOT open the casing
- Do NOT use near water
- Keep away from the fire
- For use in ventilated environment / space

- Débranchez l'alimentation électrique avant l'entretien
- Cet appareil est conçu pour l'usage intérieur seulement
- N'ouvrez pas le boîtier
- N'utilisez pas cet appareil près de l'eau
- N'approchez pas du feu
- Veuillez utiliser dans un environnement aéré

Power Specifications (Alimentation) :
Input : 12Vdc, 2.0A ⊖–Ⓒ–⊕

C E FC IC

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 contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
1. This device may not cause interference.
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.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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 30 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 20 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.

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.

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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 20 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.

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

L'indice d'équivalence de la sonnerie (IES) sert à indiquer le nombre maximal de dispositifs 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 des IES de tous les dispositifs n'excède pas cinq.

Certification
- CE / FCC / IC standard
    EN 55032 / EN 55035 / Part 15B / ICES-003
    EN 301 489-1 / EN 301 489-17
    EN 300 328 / Part 15C / RSS-247(2.4GHz)
    EN 301 893 / Part 15E / RSS-247(5GHz)
    EN 62311
    EN 62368-1(include ErP) / UL 62368-1 / CSA 62368-1

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You are allowed to modify all open source code (except for proprietary programs)

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and to conduct reverse engineering for the purpose of debugging such modifications; to the extent such programs are linked to libraries licensed under the GNU Lesser General Public License. You are not allowed to distribute information resulting from such reverse engineering or to distribute the modified proprietary programs.

The rights owners of the open source software require you to refer to the following disclaimer which shall apply with regard to those rights owners:

Warranty Disclaimer

THE OPEN SOURCE SOFTWARE IN THIS PRODUCT IS DISTRIBUTED IN THE HOPE THAT IT WILL BE USEFUL, BUT WITHOUT ANY WARRANTY, WITHOUT EVEN THE IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SEE THE APPLICABLE LICENSES FOR MORE DETAILS. Comtrend's products will strictly follow the market's standard requirements. It is not permitted to modify any Wi-Fi parameters, including the Wi-Fi power setting.

Obtain Source Code
If you wish to download the open source code please see:
https://www.comtrend.com/gplcddl.html

If you do not see the required source code on our website link and wish to be provided with the entire source code for that product, we will provide it to you and any third party with the source code of the software licensed under an open source software license. Please send us a written request by email or mail to one of the following addresses:

Email: Comtrend support team - opensource@comtrend.com

Postal: Comtrend Corporation
          3F-1, 10 Lane 609,
          Chongxin Rd., Section 5,
          Sanchong Dist,
          New Taipei City 24159,
          Taiwan
          Tel: 886-2-2999-8261

In detail name the product and firmware version for which you request the source code and indicate means to contact you and send you the source code.

PLEASE NOTE WE WILL CHARGE THE COSTS OF A DATA CARRIER AND THE POSTAL CHARGES TO SEND THE DATA CARRIER TO YOU.THE AMOUNT WILL VARY ACCORDING TO YOUR LOCATION AND THE COMTREND SUPPORT TEAM WILL NOTIFY THE EXACT COSTS WHEN REVIEWING THE REQUEST.

THIS OFFER IS VALID FOR THREE YEARS FROM THE MOMENT WE DISTRIBUTED THE PRODUCT. FOR MORE INFORMATION AND THE OPEN SOURCE LIST (& RESPECTIVE LICENCES) FOR INDIVIDUAL PRODUCTS PLEASE SEE:
https://www.comtrend.com/gplcddl.html

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.

The cardboard box, the plastic contained in the packaging, and the parts that make up this router can be recycled in accordance with regionally established regulations.   Never dispose of this electronic equipment along with your household waste; you may be subject to penalties or sanctions under the law. Instead, please be responsible and ask for disposal instructions from your local government.

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Chapter 1 Introduction

The WAP-5945s is a high performance dual band (IEEE 802.11ax) WiFi 6 access point. The Wi-Fi interface operates 802.11ax 4T4R at 2.4GHz which is backward compatible with 802.11n/g/b and also supports high performance 802.11ax, 5T5R at 5GHz which is backward compatible with 802.11n/a.
Compatible with WPS 2.0, it provides an easy paring method in order to link Personal Computers, Smart phones, Tablets, etc. by just pushing a button.

Chapter 2 Installation

2.1 Hardware Setup

DO NOT STACK

<u>Non-stackable</u>
This device is not stackable – do not place units on top of each other, otherwise damage could occur.

Follow the instructions below to complete the hardware setup.

2.1.1 Back Panel

The figure below shows the back panel of the device.
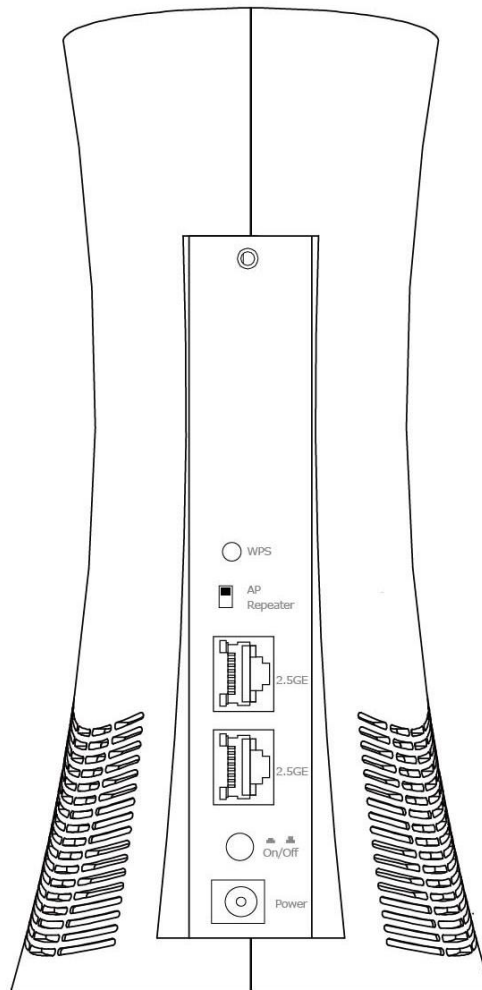
WPS Button

AP/Repeater Switch

Push the switch to the up position for AP (Access Point) mode.

Push the switch to the down position for Repeater mode.

2.5G ETH WAN Port
This port is designated to be used for Ethernet WAN functionality only. Use 1000-BASE-T RJ-45 cables to connect to Gigabit WAN server, or 10/100BASE-T RJ-45 cables for standard network usage. This ports is auto-sensing MDI/X; so either straight-through or crossover cable can be used.

Power ON
Press the power button to the OFF position (OUT). Connect the power adapter to the power port. Attach the power adapter to a wall outlet or other AC source. Press the power button to the ON position (IN). If the Power LED displays as expected then the device is ready for setup (see section – LED Indicators).

Caution 1: If the device fails to power up, or it malfunctions, first verify that the power cords are connected securely and then power it on again. If the problem persists, contact technical support.
Caution 2: Before servicing or disassembling this equipment, disconnect all power cords and telephone lines from their outlets.

2.1.2 Bottom Panel

Reset Button
Restore the default parameters of the device by pressing the Reset button for 10 seconds. After the device has rebooted successfully, the front panel should display as expected (see section 2.1.3 Front Panel for details).
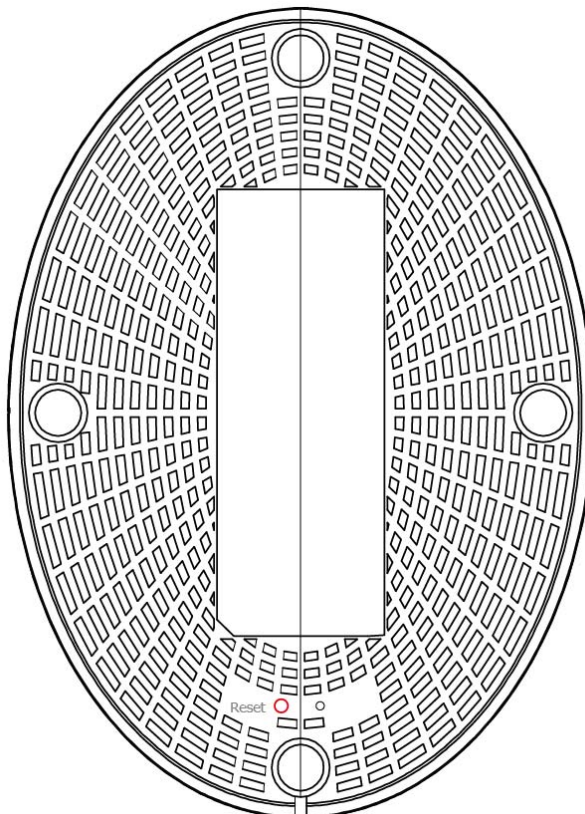
NOTE:	If pressed down for more than 60 seconds, the WAP-5945s will go into a firmware update state (CFE boot mode). The firmware can then be updated using an Internet browser pointed to the default IP address.

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2.1.3 Front Panel

The front panel LED indicators are shown below and explained in the following table.
This information can be used to check the status of the device and its connections.
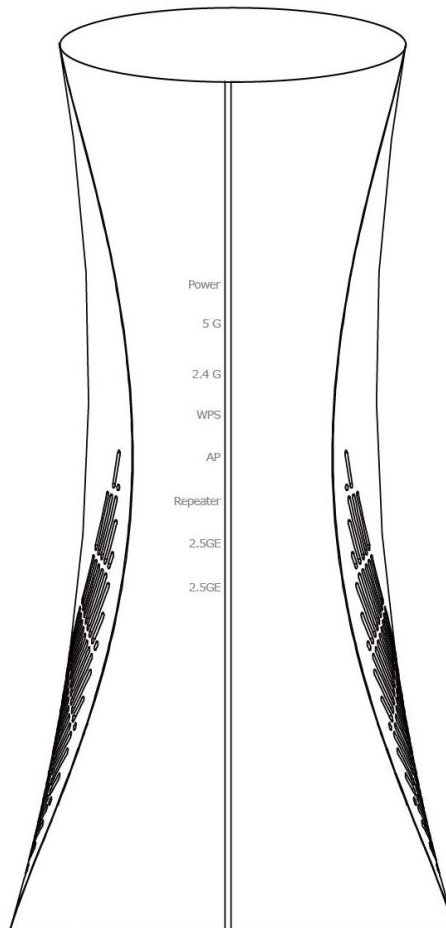
LED	Color	Mode	Description
POWER	GREEN	On	The device is powered up
		Off	The device is powered down
	RED	On	POST (Power On Self Test) failure (not bootable) or Device malfunction A malfunction is any error of internal sequence or state that will prevent the device from normal operation.
5G WiFi	GREEN	On	(5GHz) Wi-Fi enabled in AP mode (5GHz) Wi-Fi connected with AP in Repeater mode
		Off	(5GHz) Wi-Fi disabled in AP mode (5GHz) No connection in Repeater mode
		Blink	(5GHz) Wi-Fi is transmitting/receiving
2.4G WiFi	GREEN	On	(2.4GHz) Wi-Fi enabled in AP mode (2.4GHz) Wi-Fi connected with AP in Repeater mode
		Off	(2.4GHz) Wi-Fi disabled in AP mode (2.4GHz) No connection in Repeater mode

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		Blink	(2.4GHz) Wi-Fi is transmitting/receiving
WPS	GREEN	On	(2.4GHz+5GHz) WPS connection successful
		Off	No WPS association process ongoing
		Blink	(2.4GHz+5GHz)WPS connection in progress
AP	GREEN	On	Working in AP mode
		Off	Not in AP mode
REPEATER	GREEN	On	Working in Repeater mode
		Off	Not in Repeater mode
2.5GE	GREEN	On	2.5 Giga Ethernet connected
		Off	2.5 Giga Ethernet not connected
		Blink	2.5 Giga Ethernet is transmitting/receiving

Note:

A malfunction is any error of internal sequence or state that will prevent the device from connecting to the DSLAM or passing customer data. This may be identified at various times such after power on or during operation through the use of self testing or in operations which result in a unit state that is not expected or should not occur.

IP connected (the device has a WAN IP address from IPCP or DHCP and DSL is up or a static IP address is configured, PPP negotiation has successfully complete – if used – and DSL is up) and no traffic detected. If the IP or PPPoE session is dropped for any other reason, the light is turned off. The light will turn red when it attempts to reconnect and DHCP or PPPoE fails.

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Chapter 3 Web User Interface

This section describes how to access the device via the web user interface (WUI) using an Internet browser such as Internet Explorer (version 5.0 and later).

3.1 Default Settings

The factory default settings of this device are summarized below.

- LAN IP address: 192.168.1.251 (Access Point)
- LAN IP address: 192.168.1.252 (Repeater)
- 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 ten seconds until the power indicates LED blinking or by clicking the Restore Default Configuration option in the Restore Settings screen.

3.2 IP Configuration

DHCP MODE

When the WAP-5945s 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.
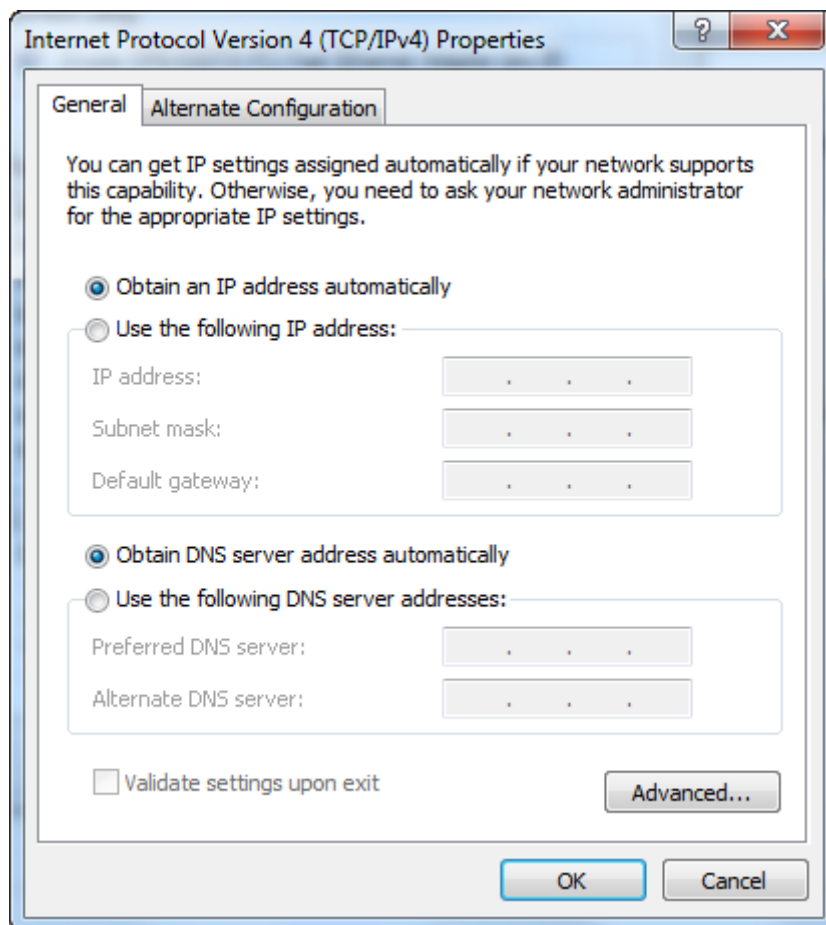
STEP 4: Click **OK** to submit these settings.

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 192.168.1.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 192.168.1.x (1<x<250) subnet with subnet mask of 255.255.255.0. The screen should now display as shown below.
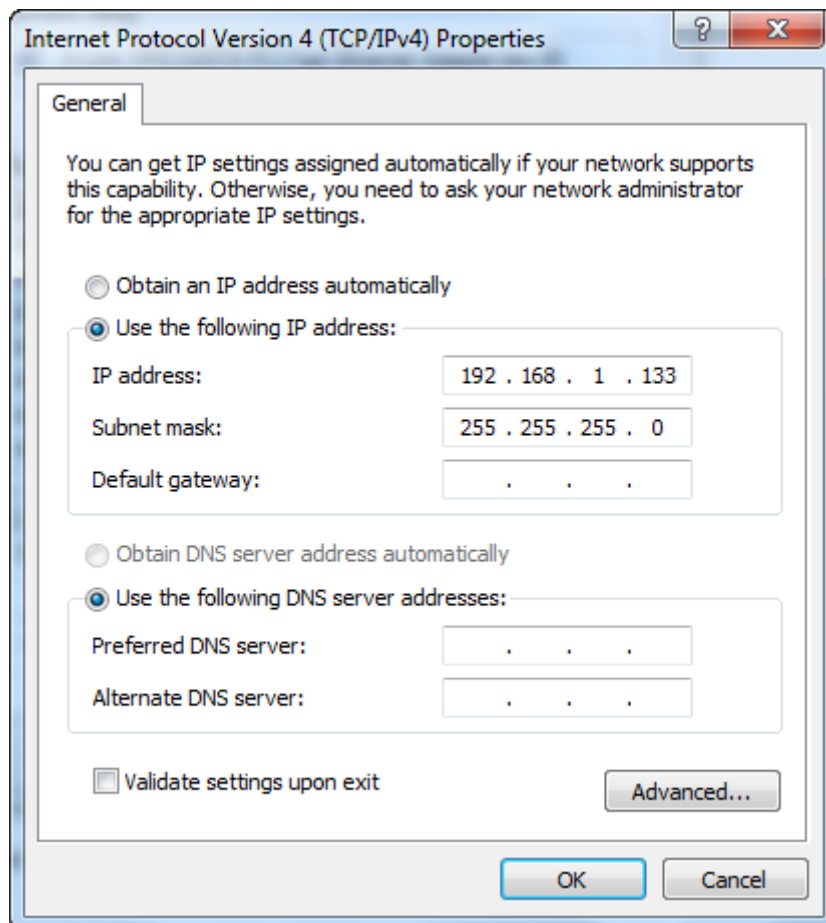
STEP 4: Click **OK** to submit these settings.

3.3 Login Procedure

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

NOTE:	The default settings can be found in section 3.1 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 192.168.1.251, type http://192.168.1.251.

NOTE:	For local administration (i.e. LAN access), the PC running the browser must be attached to the Ethernet, and not necessarily to the device. For remote access (i.e. WAN), use the IP address shown on the Device Information screen and login with remote username and password.

STEP 2: A dialog box will appear, such as the one below.   Enter the default username and password, as defined in section 3.1 Default Settings.

Click **OK** to continue.

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

Chapter 4 Access Point Mode
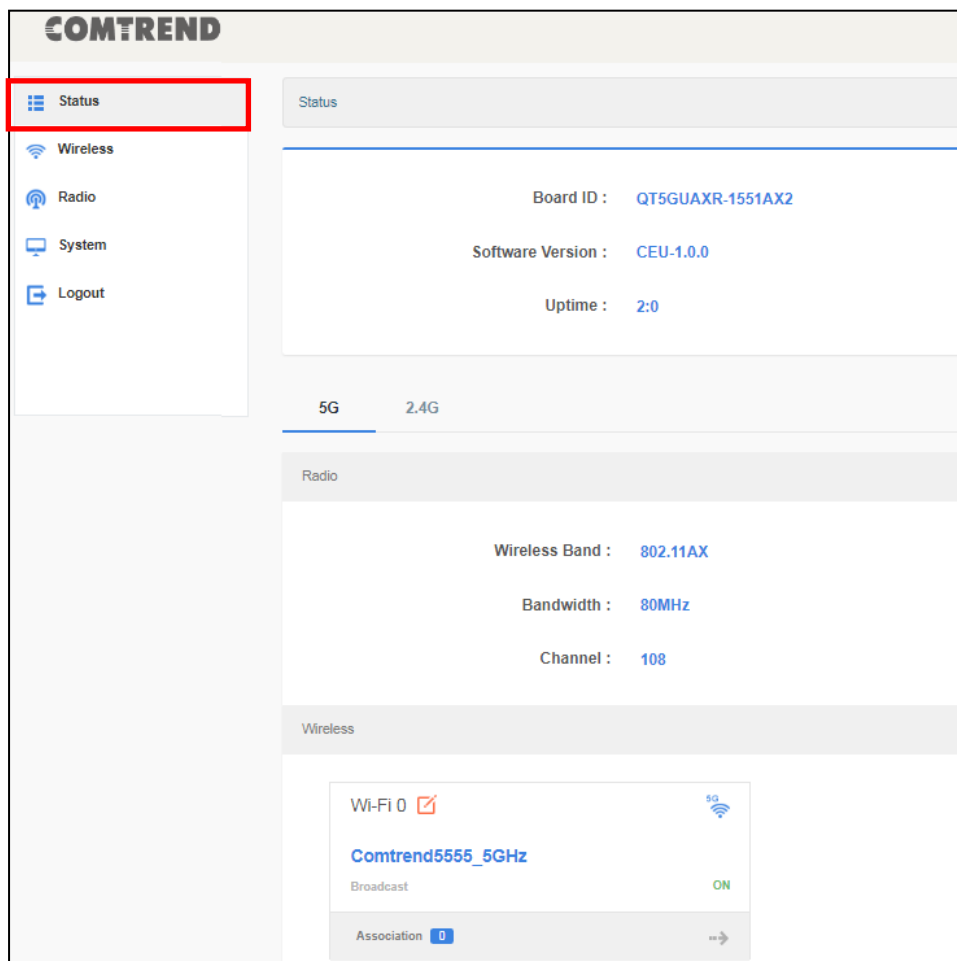
The web user interface window is divided into two frames, the main menu (on the left) and the display screen (on the right). The main menu has several options and selecting each of these options opens a submenu with more selections.
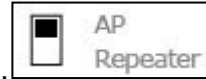
Make sure that you are in Access Point (AP) mode. See Chapter 3 for login details.

4.1 Status (AP)

The Status page is the first selection on the main menu so it will be discussed first.   Subsequent chapters will introduce the other main menu options in sequence.

This screen shows Software Version, 5G/2.4G Radio and wireless information.

4.2 Wireless (AP)

Click the wireless tab to access the wireless page.

5G

Click the [Save] button to save your settings.

Item	Description
SSID	Sets the Service Set Identifier (also known as the network name) of this network
Broadcast	Check the checkbox to enable
Priority	Select the priority (0-3) from the drop-down menu
Encryption	Select the encryption method from the

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	drop-down menu
Passphrase	
PMF	

Click the button to display the following.

Click the button to add an entry.

Click the button to save the entry.

Item	Description
WPS Configured State	Select from the drop-down menu
WPS PBC	This is the software WPS (WiFi Protected Setup) PBB Push Button Configuration button)
WPS PIN	The WPS PIN needs to be four or eight characters

| WPA AP PIN | To regenerate a new WPA AP PIN click on the Regenerate button |
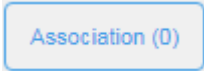
Click the button to display the following.

Item	Description
NO.	
Station	
RSSI	The received signal strength indicator
Rx Bytes	Number of Bytes received
Tx Bytes	Number of Bytes transmitted
Bw	

Click the 🗑 icon to delete a wireless interface. The following window will pop up.

Click the **Delete** button to confirm or the **Cancel** button to close the window.

4.3 Radio (AP)

Click the radio tab to access the radio page.

Radio 5G

Click the [Save] button to save your settings.

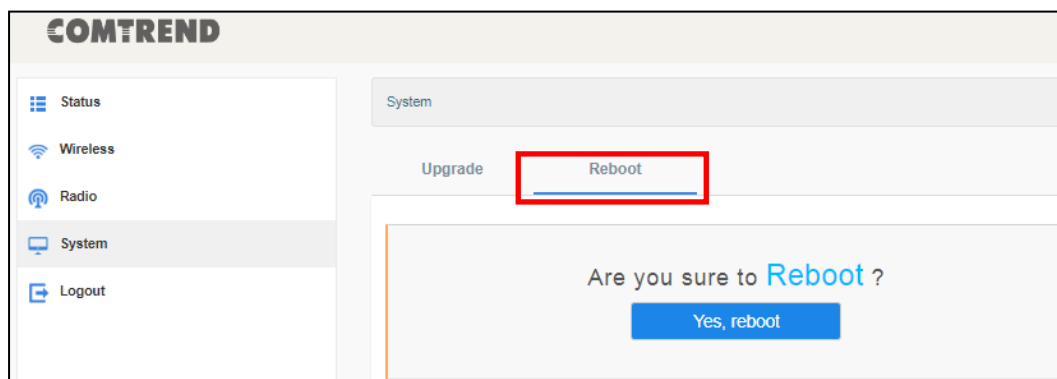| Item	Description
Radio Mode	Select Repeater or Access Point from the drop-down menu
Wireless Band	Select the wireless band from the drop-down menu
Bandwidth	Select the bandwidth (20-160MHz) from the drop-down menu
Channel	Select the channel from the drop-down menu
DTIM Period	Set the DTIM period of wireless radio. Do not modify default value if you don't know what it is, default value is 3.
Short GI	Check the checkbox to enable

Radio 2.4G

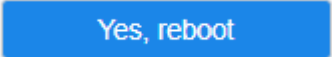| Item	Description
Radio Mode	Select the radio mode (Repeater or Access Point) from the drop-down menu.
Wireless Band	Select the wireless band from the drop-down menu.
Bandwidth	Select the bandwidth from the drop-down menu.
Channel	Select the channel from the drop-down menu.
DTIM Period	Set the DTIM period of wireless radio. Do not modify default value if you don't know what it is, default value is 3.
Short GI	Tick the box to activate the Short GI (Guard Interval).

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4.4 System (AP)

Click the System tab to access the system page.
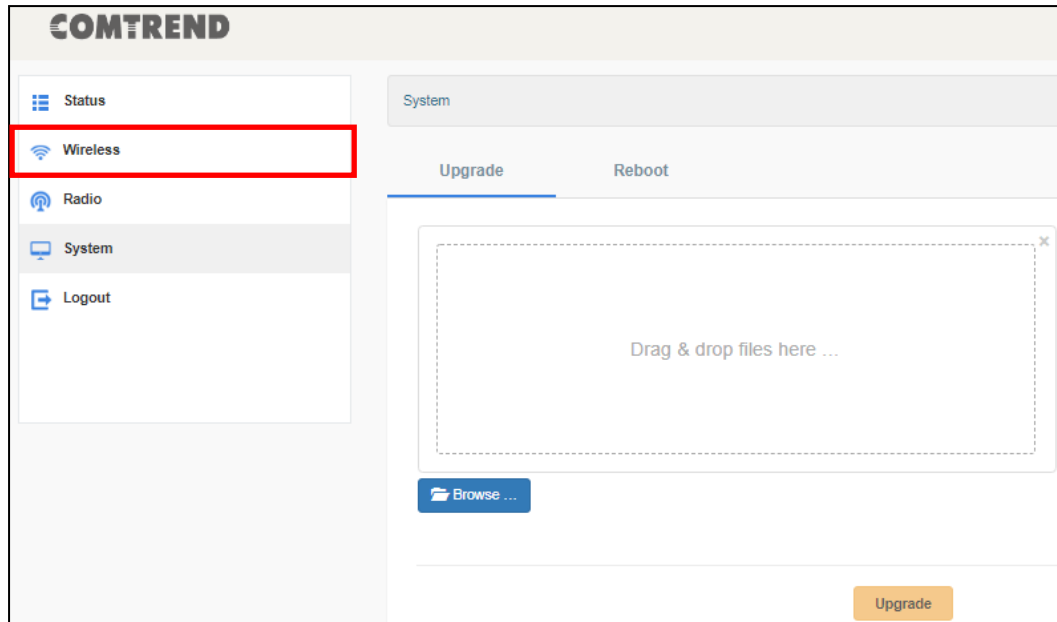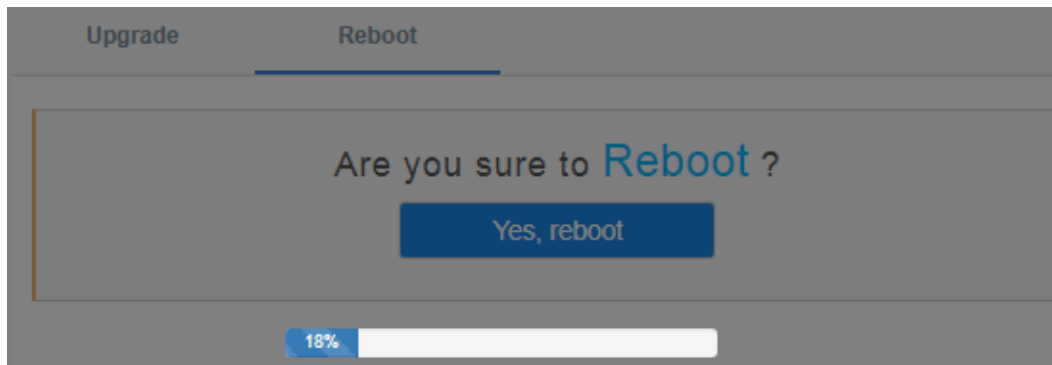

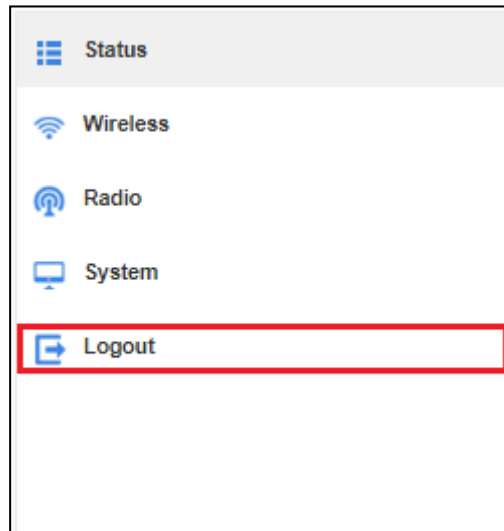Once on the System page, click on the Reboot tab to display the reboot page.

If you are sure that you want to reboot your WAP-5945s, click the

 button.

The reboot process is shown below for your reference.

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4.5 Logout (AP)

Click on the ![Logout] tab to logout from your WAP-5945s.

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Chapter 5 Repeater Mode

The web user interface window is divided into two frames, the main menu (on the left) and the display screen (on the right). The main menu has several options and selecting each of these options opens a submenu with more selections.
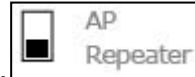
Make sure that you are in Repeater mode. See Chapter 3 for login details.

5.1 Status (Repeater)

The Status page is the first selection on the main menu so it will be discussed first.   Subsequent chapters will introduce the other main menu options in sequence.

This screen shows Software Version, 5G/2.4G Radio and wireless information.

5.2 Wireless (Repeater)

Click the wireless tab to access the wireless page.
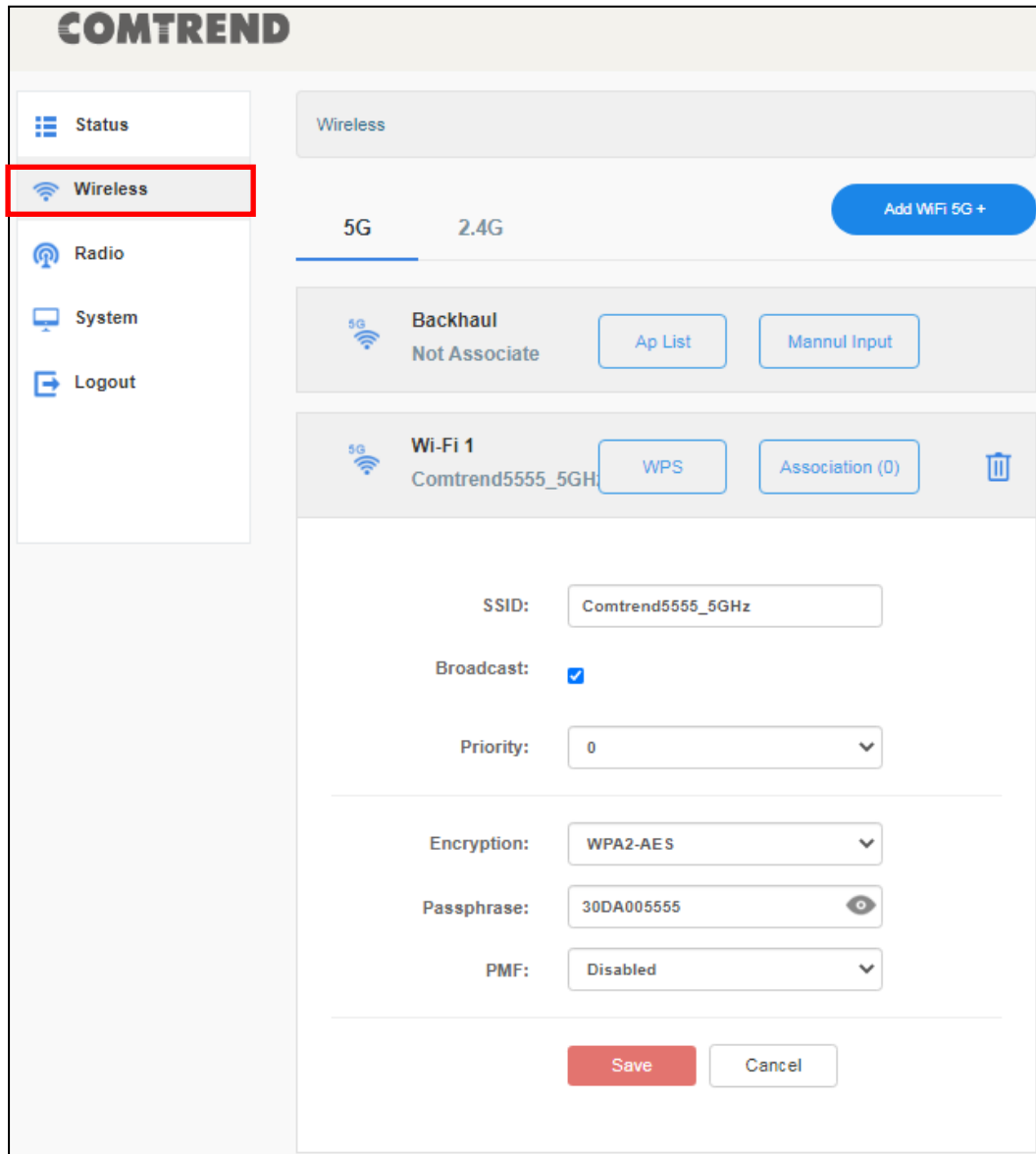
5G

Click the Save button to save your settings.

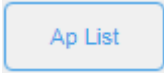| Item	Description
SSID	Sets the Service Set Identifier (also known as the network name) of this network

| Broadcast	Check the checkbox to enable
Priority	Select the priority (0-3) from the drop-down menu
Encryption	Select the encryption method from the drop-down menu
Passphrase	
PMF	

Click the **Add WiFi 5G +** button to display the following.
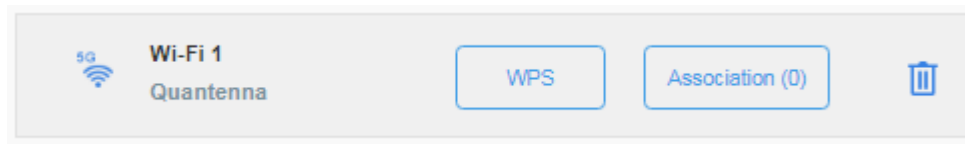
Click the [Ap List] button to display the following.

Status	SSID	BSSID	Channel	RSSI
🔒	MIWIFI_tigV	1C:64:99:B9:FC:EA	44	-25dbm
🔒	CTMIS-INT-V	54:EC:2F:8B:D6:6C	120	-37dbm
🔒	CTMIS-GUEST	54:EC:2F:4B:D6:6C	120	-37dbm
🔒	CTMIS-INT	54:EC:2F:0B:D6:6C	120	-37dbm
🔒	3845_5G	1C:64:99:23:8C:87	100	-47dbm
🔒	Justine 5G	1C:64:99:B7:72:E6	36	-49dbm
🔒	iccfmixer	B8:EC:A3:F1:AC:21	44	-50dbm
🔒	don5G	C8:D1:2A:79:0F:72	108	-51dbm
🔒	don5G	4C:6E:6E:20:90:61	108	-51dbm
🔒	don5G	4C:6E:6E:20:8F:11	108	-52dbm
🔒	iccflight	BE:EC:A3:F1:AC:21	44	-53dbm
🔒	Dr-Chiang-5G	64:09:80:4F:2D:0E	132	-54dbm
🔒	CTMIS-INT-V	54:EC:2F:8B:BE:6C	136	-57dbm
🔒	CTMIS-GUEST	54:EC:2F:4B:BE:6C	136	-57dbm
🔒	CTMIS-INT	54:EC:2F:0B:BE:6C	136	-57dbm
🔒	CTMIS-INT	54:EC:2F:0B:9A:6C	56	-67dbm
🔒	MES_NPI_5G	C8:D1:2A:4E:53:E4	36	-69dbm
🔒	CTMIS-INT-V	54:EC:2F:8B:9A:6C	56	-70dbm
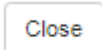
Click the [Close] button to close the window.

Item	Description
Status	Shows where the access point is open or encrypted
SSID	Displays the Service Set Identifier (also known as the network name) of this network
BSSID	Basic service set identifiers
Channel	Displays the channel number
RSSI	The received signal strength indicator
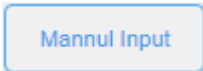
Click the [Mannul Input] button to display the following.
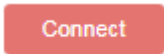
Click the [Connect] button to connect a new access point.
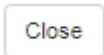
Click the [Close] button to close the window.

Item	Description
SSID	Input the service set identifier
Encryption	Select the encryption method

Click the [Add WiFi 5G +] button to
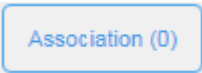
Click the [WPS] button to add an entry.

Click the [Save] button to save the entry.

Item	Description
WPS Configured State	Select from the drop-down menu
WPS PBC	This is the software WPS (WiFi Protected Setup) PBB Push Button Configuration button)
WPS PIN	The WPS PIN needs to be four or eight characters
WPA AP PIN	To regenerate a new WPA AP PIN click on the Regenerate button

Click the [Association (0)] button to display the following.

Click the 🗑 icon to delete a wireless interface. The following window will pop up.

Delete Wireless Interface   ✕

Are you sure to delete this wireless?

     Cancel   Delete

Click the **Delete** button to confirm or the **Cancel** button to close the window.

5.3 Radio (Repeater)

Click the radio tab to access the radio page.
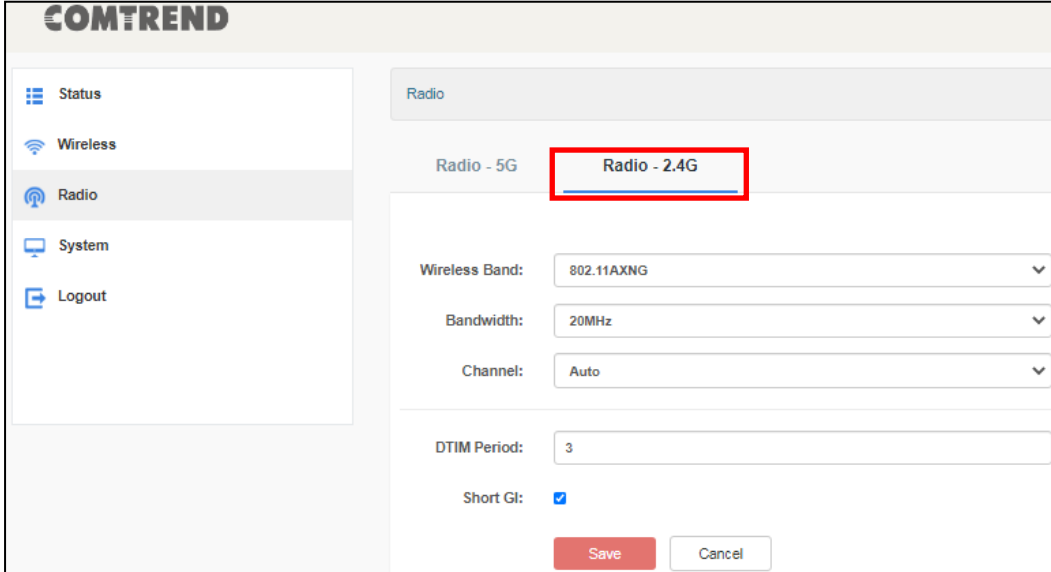
Radio 5G

Click the [Save] button to save your settings.

Item	Description
Radio Mode	Select the radio mode (Repeater or Access Point) from the drop-down menu
Wireless Band	Select the wireless band from the drop-down menu
Bandwidth	Select the bandwidth bandwidth (20-160MHz) from the drop-down menu
Channel	Select the channel from the drop-down menu
DTIM Period	Set the DTIM period of wireless radio. Do not modify default value if you don't know what it is, default value is 3.

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Short GI	Tick the box to activate the Short GI (Guard Interval).

Click the [Save] button to save your changes.

Radio 2.4G

Item	Description
Radio Mode	Select the radio mode (Repeater or Access Point) from the drop-down menu.
Wireless Band	Select the wireless band from the drop-down menu.
Bandwidth	Select the bandwidth from the drop-down menu.
Channel	Select the channel from the drop-down menu.
DTIM Period	Set the DTIM period of wireless radio. Do not modify default value if you don't know what it is, default value is 3.
Short GI	Tick the box to activate the Short GI (Guard Interval).

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5.4 System (Repeater)

Click the System tab to access the system page.
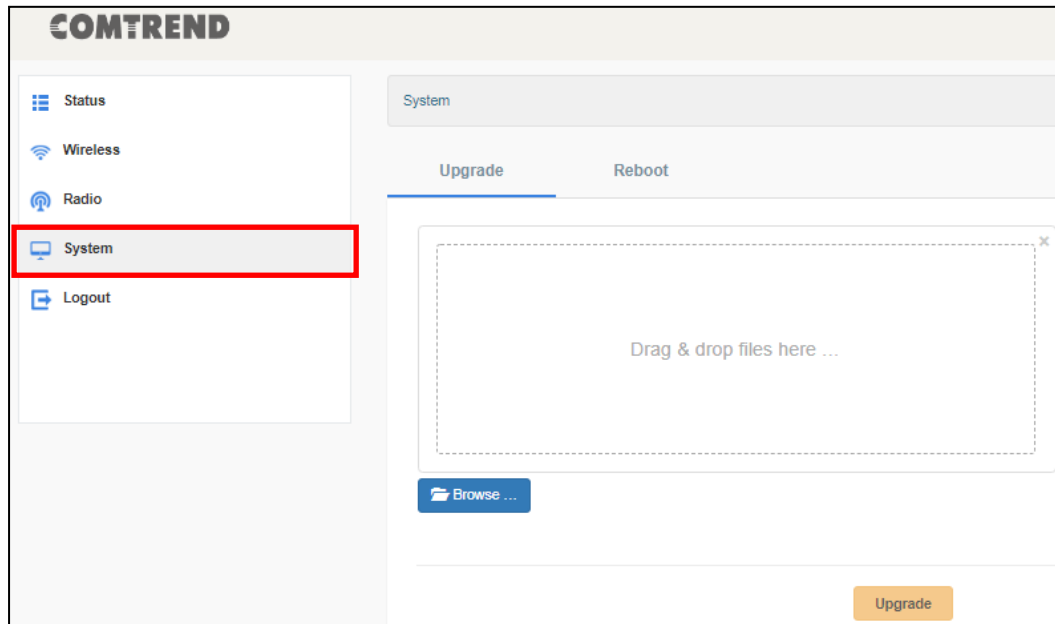
Once on the System page, click on the Reboot tab to display the reboot page.
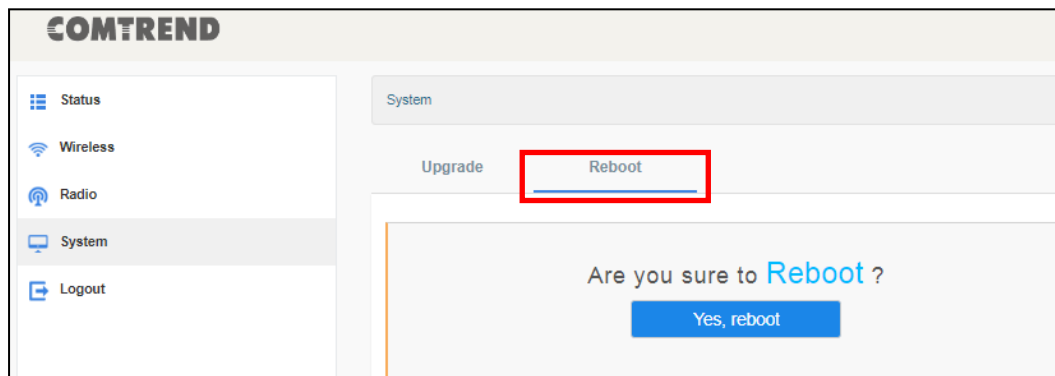
If you are sure that you want to reboot your WAP-5945s, click the
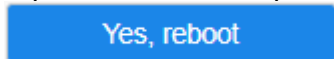
 button.

The reboot process is shown below for your reference.
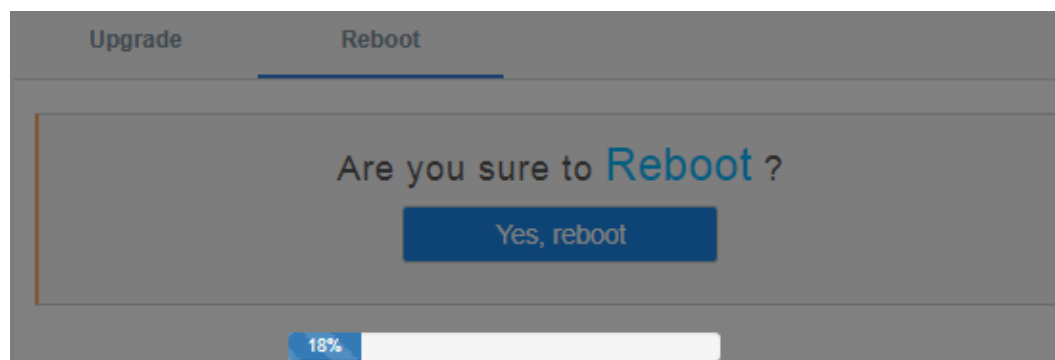
5.5 Logout (Repeater)

Click on the [→ Logout] tab to logout from your WAP-5945s.

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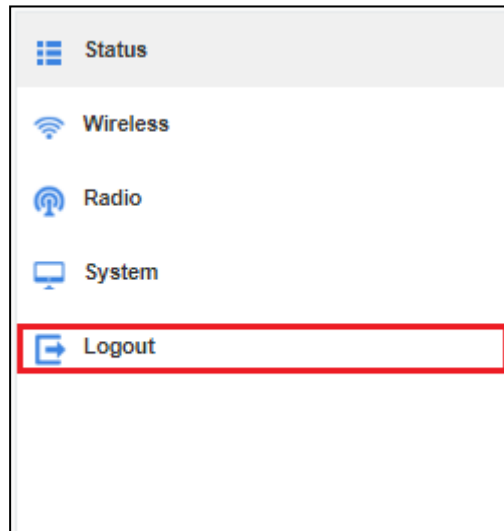
Appendix A - Firewall

STATEFUL PACKET INSPECTION
Refers to an architecture, where the firewall keeps track of packets on each connection traversing all its interfaces and makes sure they are valid. This is in contrast to static packet filtering which only examines a packet based on the information in the packet header.

DENIAL OF SERVICE ATTACK
Is an incident in which a user or organization is deprived of the services of a resource they would normally expect to have. Various DoS attacks the device can withstand are ARP Attack, Ping Attack, Ping of Death, Land, SYN Attack, Smurf Attack, and Tear Drop.

TCP/IP/PORT/INTERFACE FILTER
These rules help in the filtering of traffic at the Network layer (i.e. Layer 3). When a Routing interface is created, **Enable Firewall** must be checked. Navigate to Advanced Setup → Security → IP Filtering.

OUTGOING IP FILTER
Helps in setting rules to DROP packets from the LAN interface. By default, if the Firewall is Enabled, all IP traffic from the LAN is allowed. By setting up one or more filters, specific packet types coming from the LAN can be dropped.

Example 1:

Filter Name	: Out_Filter1
Protocol	: TCP
Source IP address	: 192.168.1.45
Source Subnet Mask	: 255.255.255.0
Source Port	: 80
Dest. IP Address	: NA
Dest. Subnet Mask	: NA
Dest. Port	: NA

This filter will Drop all TCP packets coming from the LAN with IP Address/Subnet Mask of 192.168.1.45/24 having a source port of 80 irrespective of the destination. All other packets will be Accepted.

Example 2:

Filter Name	: Out_Filter2
Protocol	: UDP
Source IP Address	: 192.168.1.45
Source Subnet Mask	: 255.255.255.0
Source Port	: 5060:6060
Dest. IP Address	: 172.16.13.4
Dest. Subnet Mask	: 255.255.255.0
Dest. Port	: 6060:7070

This filter will drop all UDP packets coming from the LAN with IP Address / Subnet Mask of 192.168.1.45/24 and a source port range of 5060 to 6060, destined to 172.16.13.4/24 and a destination port range of 6060 to 7070.

INCOMING IP FILTER
Helps in setting rules to Allow or Deny packets from the WAN interface. By default, all incoming IP traffic from the WAN is Blocked, if the Firewall is Enabled. By setting up one or more filters, specific packet types coming from the WAN

can be Accepted.

Example 1:   Filter Name   : In_Filter1
                    Protocol   : TCP
                    Policy   : Allow

Filter Name	: In_Filter1
Protocol	: TCP
Policy	: Allow
Source IP Address	: 210.168.219.45
Source Subnet Mask	: 255.255.0.0
Source Port	: 80
Dest. IP Address	: NA
Dest. Subnet Mask	: NA
Dest. Port	: NA
Selected WAN interface	: br0

This filter will ACCEPT all TCP packets coming from WAN interface "br0" with IP Address/Subnet Mask 210.168.219.45/16 with a source port of 80, irrespective of the destination. All other incoming packets on this interface are DROPPED.

Example 2:

Filter Name	: In_Filter2
Protocol	: UDP
Policy	: Allow
Source IP Address	: 210.168.219.45
Source Subnet Mask	: 255.255.0.0
Source Port	: 5060:6060
Dest. IP Address	: 192.168.1.45
Dest. Sub. Mask	: 255.255.255.0
Dest. Port	: 6060:7070
Selected WAN interface	: br0

This rule will ACCEPT all UDP packets coming from WAN interface "br0" with IP Address/Subnet Mask 210.168.219.45/16 and a source port in the range of 5060 to 6060, destined to 192.168.1.45/24 and a destination port in the range of 6060 to 7070. All other incoming packets on this interface are DROPPED.

MAC LAYER FILTER

These rules help in the filtering of Layer 2 traffic. MAC Filtering is only effective in bridge mode. After a bridge mode connection is created, navigate to Advanced Setup → Security → MAC Filtering in the WUI.

Example 1:

Global Policy	: Forwarded
Protocol Type	: PPPoE
Dest. MAC Address	: 00:12:34:56:78:90
Source MAC Address	: NA
Src. Interface	: eth1
Dest. Interface	: eth2

Addition of this rule drops all PPPoE frames going from eth1 to eth2 with a Destination MAC Address of 00:12:34:56:78:90 irrespective of its Source MAC Address. All other frames on this interface are forwarded.

Example 2:

Global Policy	: Blocked
Protocol Type	: PPPoE
Dest. MAC Address	: 00:12:34:56:78:90
Source MAC Address	: 00:34:12:78:90:56
Src. Interface	: eth1
Dest. Interface	: eth2

Addition of this rule forwards all PPPoE frames going from eth1 to eth2 with a Destination MAC Address of 00:12:34:56:78 and Source MAC Address of 00:34:12:78:90:56. All other frames on this interface are dropped.

DAYTIME PARENTAL CONTROL
This feature restricts access of a selected LAN device to an outside Network through the WAP-5945s, as per chosen days of the week and the chosen times.

Example: User Name   : FilterJohn
Browser's MAC Address : 00:25:46:78:63:21
Days of the Week   : Mon, Wed, Fri
Start Blocking Time   : 14:00
End Blocking Time   : 18:00

With this rule, a LAN device with MAC Address of 00:25:46:78:63:21 will have no access to the WAN on Mondays, Wednesdays, and Fridays, from 2pm to 6pm. On all other days and times, this device will have access to the outside Network.

Appendix B - Pin Assignments

Giga ETHERNET Ports (RJ45)

Pin	Name	Description
1	BI_DA+	Bi-directional pair A +
2	BI_DA-	Bi-directional pair A -
3	BI_DB+	Bi-directional pair B +
4	BI_DC+	Bi-directional pair C +
5	BI_DC-	Bi-directional pair C -
6	BI_DB-	Bi-directional pair B -
7	BI_DD+	Bi-directional pair D +
8	BI_DD-	Bi-directional pair D -

Appendix C – Specifications

Hardware
- Master / Slave Switch X 1
- RJ-45 X 2 for 2.5GEWAN
- Reset button X 1
- WPS button X 1
- Reset button X 1
- Single Band Internal Antenna X 4
- Dual Band Internal Antenna X 4
- Power Switch X 1

2.5Gigabit Ethernet
- IEEE 802.3bz
- 2.5G   BASE-T, auto-sense
- Support MDI/MDX

Wireless
- IEEE 802.11ax, 2.4GHz, 2T3R
  Backward compatible with 802.11n/g/b
  2412~2462 MHz (Channel 1-11 for FCC / IC)
  2412~2472 MHz (Channel 1-13 for CE)

- IEEE 802.11ax,5GHz, 2T3R,
  Backward compatible with 802.11ac/n/a
  For CE :
  Band 1 (5150 - 5250 MHz)
  Band 2 (5250 - 5350 MHz)
  Band 3 (5470 - 5725 MHz)

  For FCC / IC :
  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)

Power Supply
- External power adapter: 12Vdc/ 2.0A

Environment
- Operating Temperature: 0°C - 45°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

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Kit Weight

(1* WAP-5945s, 1*RJ45 cable, 1*power adapter) = 0.8 kg

NOTE:	Specifications are subject to change without notice.

WAP-60AX is the same as WAP-5945s(for different markets).

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Appendix D - SSH Client

Unlike Microsoft Windows, Linux OS has a ssh client included.   For Windows users, there is a public domain one called "putty" that can be downloaded from here:

http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

To access the ssh client you must first enable SSH access for the LAN or WAN from the Management → Access Control → Services menu in the web user interface.

To access the router using the Linux ssh client

For LAN access, type: ssh -l root 192.168.1.1

For WAN access, type: ssh -l root WAN IP address

To access the router using the Windows "putty" ssh client

For LAN access, type: putty -ssh -l root 192.168.1.1

For WAN access, type: putty -ssh -l root WAN IP address

NOTE: The WAN IP address can be found on the Device Info → WAN screen

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