![Wavion Wireless Networks logo]

WBSn-2400

Outdoor Wi-Fi Base Station

Quick Start Guide

Contents

Introduction

This document is intended to help you set up and configure your WBSn-2400-O or WBSn-2400-S base station, using the online Setup wizard.

Note: Throughout this document, unless specified otherwise, the use of the product name WBSn-2400 refers to both the WBSn-2400-O and WBSn-2400-S base stations.
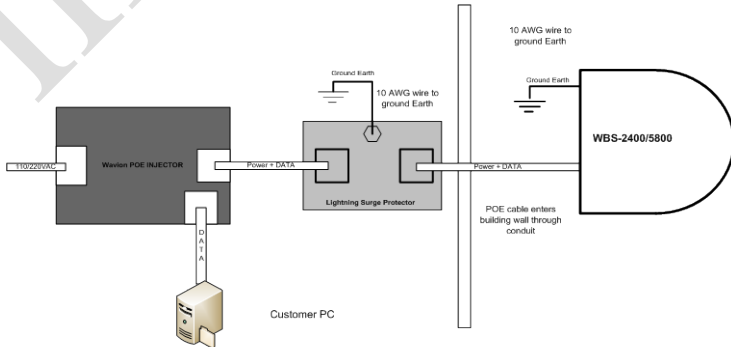
WBSn-2400 Pre-Installation Checklist

The following checklist covers all the procedures and equipment that you need to acquire and assemble, prior to beginning the installation and configuration procedures. Ensure that you check this list carefully, before beginning any of the procedures described later in this Guide.

⚠ Warning	Only experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities should install outdoor units and antennas. Failure to comply with this may void the WBSn-2400 product warranty and may consequently expose the end user or Service Provider to legal and financial liabilities. Wavion and its resellers or distributors are not liable for injury, damage or regulation violations associated with the installation of Outdoor Units or antennas

Check contents of package	
WBSn-2400-O	• WBSn-2400-O base station unit (Omni) • PoE injector unit • 3 antennas • Post-clamp • Two steel bands • 4 screws, each with attached spring and flat washers • Iron security cable • Waterproof sealing tape for IP67 (band to sealing rubber) • Plastic cap and cap cover
WBSn-2400-S	• WBSn-2400-S unit (Sector) • PoE injector unit • Post-clamp • Two steel bands • 4 screws, each with attached spring and flat washers • Iron security cable • Plastic cap and cap cover
⚠ **Warning**	• The WBSn-2400 should only be installed using the antennas provided as part of the original package. • Ensure that the USB port on the base station unit is properly sealed.

Additional equipment and tools required for installation

- Ethernet cable (outdoor CAT5e 4-pair data cable, with RJ45 connectors)
  Note: Maximum cable length -- 100 meters
- Ground cable
- Portable PC
- Lightning protection
- 1"-6" diameter pole (on which to mount the unit)

Ensure a safe and secure environment	
⚠️ **Warning**	Connect the PoE injector to the unit using only a straight Ethernet cable. Do not use crossed cables between the PoE injector and the unit!
Follow these guidelines to ensure safe operation of the WBSn-2400 base station:	- Do not touch or move the antennas while the unit is transmitting or receiving. - Make sure the antennas are connected when operating the radio or attempting to transmit data, otherwise, the radio may be damaged. - Do not hold the antenna close to or touching any exposed parts of the body, especially the face or eyes, while transmitting. - The use of wireless devices on airplanes is governed by the Federal Aviation Administration (FAA). (US only) - The use of wireless devices in hazardous locations is limited to the constraints posed by the safety directors of such environments. - The use of wireless devices in hospitals is restricted to the limits set forth by each hospital. - Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment. - The Wavion WBSn-2400 must be used only with Wavion-approved components and antennas.

Note:
The Federal Communications Commission (FCC) with its action in ET Docket 96-8 has adopted a safety standard for human exposure to RF electromagnetic energy emitted by FCC certified equipment. Proper operation of the Wavion WBSn-2400 according to the instructions found in this manual, results in user exposure that is substantially below the FCC recommended limits.

To ensure optimal performance, select the location for the equipment using the following guidelines:

- The antenna should be directed towards the area intended to be covered, with maximum possible lines of sight for client locations. Generally speaking, the higher the placement of the antenna, the better the link quality achievable. For WBSn-2400-S, the coverage zone is 120° wide.
- The location of the unit should enable easy access for installation and testing.
- When installing in locations where other devices exist that operate in the same frequency range, ensure that recommended distances are adhered to.
- The ideal height at which a base station should be installed is 2 meters above the rooftops of the buildings within the coverage zone.
- The omni-directional unit should be installed at the highest point of a metal pole. This is to ensure that there is no interference caused by the close proximity of the unit to the metal. Where this is not possible, the unit should be kept at least 1 meter from the metal pole.
- Keeping the maximum distance possible from an RF radiating source is recommended.

Preparing the installation site	
Only experienced installation professionals who are familiar with local building and safety codes and are licensed, wherever applicable, by the appropriate government regulatory authorities, should install outdoor units and antennas.	
Warnings	Do not modify the construction of this product. Modifying the operating frequency or enhancing the transmit output power through the use of external amplifiers or other equipment is illegal.
	This device is for outdoor or indoor use on the condition that operation of this device causes no harmful interference to authorized radio stations. This device shall not influence aircraft security and/or interfere with legal communications. If this device is found to cause interference, the operator of this equipment shall cease operating this device immediately.
How to prepare the site:	• Determine the existence of potential posts or poles to which a base station could be attached. Consider the axis of the post, its placement, and whether extenders are required. • Follow the appropriate electrical and building codes to ensure safe and durable wiring. • The length of the Ethernet cable connecting the unit to the network device (PC, switch, router, and so on) should not exceed 100 meters. There is no limitation on the length of the cable connecting the PoE to the unit, as long as the combined length of the cables connecting the network device to the PoE and the PoE to the unit does not exceed 100 meters.
Grounding best practices, using a data protection device	1. Position the protection device as close to the building entrance as possible. 2. Attach a 10 AWG grounding cable to the ground point on the data protection device. 3. Attach the other end of the grounding cable to the grounding bar of the building. **Grounding indoors injector by Network Protection Unit**

Grounding best practices, using a data protection device (continued)	**Grounding outdoors injector by Network Protection Unit** 10 AWG wire to ground Earth Ground Earth WBS-2400/5800 110/220vAC — Wavion POE INJECTOR — Power + DATA POE cable enters building wall through conduit Customer PC Ground Earth 10 AWG wire to ground Earth DATA Lightning Surge Protector

Connecting Antennas (for WBSn-2400-O only)

Important note: The antennas should only be connected once the installation procedure has been successfully completed.

How to connect the antennas:	Screw each of the three antennas into the three N-type connectors on the WBSn-2400-O base station unit.
Warnings	• In order for the WBSn-2400-O to work properly, all three antennas must be connected. • Only connect the unit to the power supply once all the antennas are connected. • Use caution when connecting the antennas. Undue haste can damage the unit. • Do not screw in the antenna when holding its top section, or you may damage the antenna.

Antenna Sealing **The following procedure describes how to correctly seal the antennas against moisture.**

Caution	• It is important to carefully read this procedure and perform all the steps, to ensure maximal moisture protection. • Use high quality sealing material to ensure IP-67 compliant protection against dust and water.
How to seal the antennas:	1. After the antenna is connected, use the supplied isolation tape to cover the N-Type connectors and the lower part of the antennas. 2. Cut 18 cm of the attached splicing tape and ensure that the sticky side of the tape is exposed. 3. Stretch and wrap the tape in an even, half-lapping manner around the antenna and N-Type connector. Cover this with a layer of vinyl plastic tape.

Safety instructions and information	
Please ensure that you read and understand the following safety information. Ensure that you carefully read and follow all instructions in this manual, and heed all warnings.	
Warnings	It is illegal to modify the construction of this product. Modifying the operating frequency or enhancing the transmit output power through the use of external amplifiers or other equipment is specifically disallowed by the "Telecommunications Act.
	There is a risk of personal injury or death if the WBSn-2400 antennas are close to electric power lines.
	By nature of the outdoor installation, you may be exposed to hazardous environments and high voltage. Use extreme caution when installing the system.
	All servicing should be referred to qualified service personnel only. There are no user-serviceable parts inside. Servicing is required when the apparatus has been damaged in any way.
	This apparatus must be properly grounded.
	Do not open the unit – risk of electric shock.
	Any change or modification not expressly described in this manual or approved by the manufacturer could void your authority to operate this equipment.
	The WBSn-2400 should only be installed using the antennas that were provided as part of the original package.
	A minimum distance of 40cm should be kept from the WBSn-2400 antenna when the system is in operation.
	Only UL-listed parts and components should be used for installation.
	To maintain Overvoltage (Installation) Category II, install a suitable surge suppressor device in the branch circuit to limit expected transients to Overvoltage Category II values. The limits are based on IEC60664 and are also located in Table 2H of UL60950 (for mains 110V, the transient rating is 1500V).

Installation and Set-up

The following section describes the installation and configuration procedures for your WBSn-2400-O or WBSn-2400-S base station, that will enable the establishment of a basic set-up.

Further information regarding configuration procedures and information will be available in the *WBSn-2400 User Guide*.

Installing the WBSn-2400-S base station

Prior to performing the procedures described in this section, ensure that you have read all the information, and followed all instructions and safety precautions in the Pre-Installation Checklist.

To install WBSn-2400-S:

1. Decide the manner in which the post-clamp will be attached to the post, whether horizontally or vertically.

   Note: If you wish to install WBSn-2400-S on a horizontal plane, you need to include special extenders in your order.

   Example: Horizontal post-clamp

2. Slide the steel bands into the appropriate side slots of the post clamp.
   Note: For a thinner post, the steel bands should be threaded through the inner slots, and for a wider post, through the outer slots.

3. Attach the post-clamp to the post, and close and tighten the steel bands.

   Example: Steel bands tightened around a post

4. If you are installing the WBSn-2400-S on a vertical post, attach the WBSn-2400-S unit to the post-clamp, with the screws and washers. Tighten the screws using a ratchet key, set at 13 mm, and proceed to this step.

5. If you are installing WBSn-2400-S on a horizontal post, select the direction in which the base station unit should point on the horizontal plane prior to continuing with the installation.

6. Once you have ascertained the correction direction, connect the two extenders to the post clamp.

7. Attach the WBSn-2400-S base station unit and connected extenders to the base station unit.

   WBSn attached with extenders

8. As you tighten the screws, verify that the tilt and direction of the base station unit are correct for the coverage area required.
   Note: In an urban setting, with a high-placed installation, a slight downwards tilt will help reduce noise and interference.

9. For extra security, thread the iron cable through the corner hole on the post-clamp, and the middle hole on the WBSn-2400-S unit, securing it with the caribena provided.
   Note: This will provide extra physical security for the WBSn-2400-S unit, as well as acting as a deterrent to burglars.

Wind Loading Considerations

The Wavion WBSn-2400 weighs approximately eight kilograms, including all mounting hardware. When the Wavion WBSn-2400 is mounted on a pole, the sail area of the WBSn-2400 is approximately 0.11 m^2. The Wavion WBSn-2400 can load a pole with a maximum load of 3400 Newton in wind conditions of 264 km/h (165 mph).

⚠	You should evaluate the static and dynamic load bearing capabilities for each assembly and installation individually.

Connecting Power and DATA

The following describes how to apply power and data to the WBSn-2400 .

Prior to connecting power to the WBSn-2400-S, ensure that you have read and performed all instructions in the pre-installation checklist.

The Wavion WBSn-2400 is equipped with two RJ45 connectors. The **TEST** port is for engineering purposes only. Use the **ETH** port to connect the PoE cable. Ensure that the **TEST** port is properly sealed with a plastic cap.

Please also note the following:

⚠	You must always install an external grounding wire. Make sure you have completed grounding before you connect power to the WBSn-2400 .
Warnings	This is not a mid-span powered device. Do not attempt to daisy-chain PoE devices.
Note:	National Electrical Codes (NEC) Article 800 requires the use of an Agency Listed (UL/CSA) Building Entrance Protector for all power and communications cables entering a building. Article 800 is intended to protect the building and occupants from fires caused by transient voltage and current surges.

To connect to the data port:

1. Connect a grounding cable to the grounding terminal and tighten the grounding screw firmly. See Grounding the Data protection device for a connection diagram.
2. Ensure that the power is turned off for the designated circuits.
3. Unscrew the plastic cap and the cap cover (see above) from the Wavion WBSn-2400.
4. Run a shielded Category 5 Ethernet cable (appropriate for outdoor use) through the cap.
   Note: This cap acts as a protection device against lightning.
5. Connect one end of the Category 5 cable to the **OUT** port of the Wavion PoE injector.
6. Connect the other end of the Category 5 Ethernet cable to the **ETH** port on the Wavion WBSn-2400.
   Note: Use a shielded RJ45 8-pin modular plug to terminate the cables at the required length.
7. After connecting the Ethernet cable to the **ETH** port, close and firmly tighten the plastic cap. This ensures perfect sealing and IP-67 compliance.

POE port RJ45 Pin Descriptions

Pin	Signal	Color	Description
1	BI_DA+	Orange-White	Bi-directional pair A +, POE GND
2	BI_DA-	Orange	Bi-directional pair A -, POE GND
3	BI_DB+	Green-White	Bi-directional pair B +, POE +55V
4	BI_DC+	Blue	Bi-directional pair C +, POE +55V
5	BI_DC-	Blue-White	Bi-directional pair C -, POE +55V
6	BI_DB-	Green	Bi-directional pair B -, POE +55V
7	BI_DD+	Brown-White	Bi-directional pair D +, POE GND
8	BI_DD-	Brown	Bi-directional pair D -, POE GND

Accessing the Wavion Management Interface

The following procedure describes how to log in to the WBSn-2400 Wavion Management Interface, enter the Set-up Wizard, and access further configuration information.

1. In an internet browser, enter the Management IP address of the WBS unit in the URL navigation field. The default IP address of the unit is IP: 192.168.1.1 and the default mask is: 255.255.255.0.

   Note: Currently, both *Microsoft Internet Explorer* and *Mozilla Firefox* browsers are supported.

2. A log-in screen is displayed.

   a. Enter **admin** in the User Name field.

   b. Enter **admin** in the password field.

   c. Specify the language in which you wish to work. (Note: This field will be functional in a future release.)

   d. Click **Connect**. The Wavion EMS screen is displayed.

3. Select the Setup Wizard option.

4. The Installation screen is displayed. Click the arrow in the bottom left corner of the screen to proceed to the Network Configuration screen.

5. Complete the parameters, to set up your initial networking configuration.

   Note: Further configuration parameters are available, and should be specified in order to complete your set-up. For more information, see Further Configuration Features.

Parameter	Description and value
Network mode	Bridge
IP address	The current IP address of the unit
Mask	The current subnet mask used to establish the broadcast domain. The default mask of the unit is 255.255.255.0.
Gateway	The current IP address of the default gateway.
Client Protocol	Select DNS or DHCP
SSID Name	The full SSID string
Security	Specify the required Wi-Fi security protocol
Password	Specify a unique password for the Wi-Fi security

Automatic Channel Selection screen

The Automatic Channel Selection utilizes an embedded algorithm to scan for the best channel with which your base station can work, ensuring optimal capacity, minimal interference and maximum performance.

1. Click **Press to start ACS scan**. The scan begins, and a progress indicator is displayed, showing the percentage of completion.
2. When the scan is complete, (after approximately five seconds), the button label changes to ACS done.
3. The ACS results are presented on the screen, showing a bar graph with the quality of each channel presented by the height of the bar.
4. Click **Exit** to exit the Setup Wizard.

Further Configuration Features

IP Management
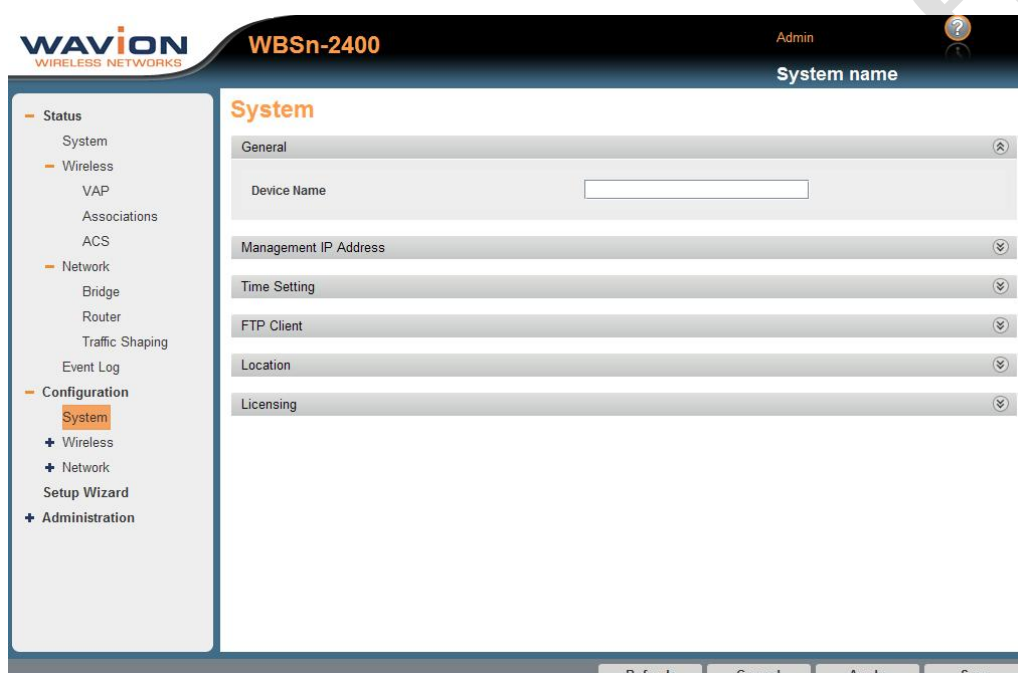
In the EMS application, use the System page to set up, configure and manage your IP. This page displays basic static information on the system, including contact details, and IP addresses. Default values and details are provided, which should be modified, by specifying parameter values according to your network system and requirements.

Management IP address

1. Ensure that you have navigated to **Configuration => Network => IP Configuration**, and configured the IP interfaces as required.
2. In **Current IP Address Configuration**, change the default IP address.
3. In **System => Management IP Address**, modify the default values provided.
4. Select the required VLAN to be used for management purposes, from the list of available VLANs.
5. Either:
   Enter the required static IP, and valid static Network Mask, Gateway and DNS parameter values in the relevant parameters.
   or
   Enter the DHCP Client Fallback IP Address and Network mask in the relevant parameters.
6. Specify **Yes** or **No** for the Enable management from Wireless Access Interfaces parameter, in order to enable or block a specific wireless device from having management access. The default parameter is **No**.

Management VLAN

The management VLAN enables a separate management channel of data traffic, enabling administrators to manage the WBSn-2400 traffic over a separate VLAN (that can be linked to a secured SSID) can be selected from the enabled VLAN list, and, to which is assigned additional security properties and settings than other available VLANs.

Note: Only one VLAN can be defined as the Management VLAN in the WBSn-2400 system.

Setting Up Your Base Station

Virtual AP (VAP)

You can define and set-up a Virtual AP (VAP), as well as viewing the status of any VAPs that were previously defined.

To define a VAP:

1. Navigate to **Configuration => Wireless => VAP**.
2. Click Add, and specify the parameters according to the parameter value definitions in the below table.

Parameter	Description
Name	Name of the VAP
Security Mode	Choose between the following: • None (Open) • WEP (shared key) • WPA (PSK and RADIUS) • WPA2 (PSK and RADIUS) For more information about authentication and encryption, please see the table below this one.
BSSID	Identifying MAC address of the WBSn
Enabled	Indicates if the VAP is enabled or not
Number of Associations	Number of associated stations

Parameter	Description
Hidden SSID	SSIDs that share the same BST MAC address, where only SSID #1 is broadcast, and this SSID cannot be disabled.
WMM Classification	Packet prioritization over Wi-Fi is based on four access categories defined by the WMM standard: • Voice traffic • Video traffic • Best effort traffic • Background traffic A packet sent to the Ethernet interface of the base station is classified as one of the Access categories. This classification is performed using ToS, DSCP or VLAN priorities. For information about classification configuration, please see QoS Packet Priority.
ACL Group	The ACL (Access Control List) controls who can access the VAP. A list is created according to specific parameters, and given a unique name, and will either define a white group (those users permitted VAP access), or a black group (those users denied VAP access). The group name specified here, is created and configured in XXXX
Radius Account	Account on the Radius server
BH SSID	Backhaul SSID
Band	2.4 GHz 5.0 GHz (not available in this release)

To view the status of a VAP:

To view the status of any or all defined VAPs, navigate to **Status => Wireless => VAP**.

Authentication Combinations

WBS-2400 allows the following authentication types and combinations.

- **Open** (none) and **Shared Key** are the basic 802.11n authentications. In **Shared Key** authentication, the WEP key is used as the shared key. If the VAP is configured to Open + Shared Key, both types of clients can associate to the WBSn.

- The WPA authentication automatically presumes that the basic 802.11 authentication is **Open**. WPA defines advanced authentications, either PSK (Pre-Shared Key) or RADIUS. The initial keys are determined during the last phase of the WPA authentication.

- When RADIUS Authentication is used, the RADIUS server can determine which VLAN belongs to which user.
  Note: WBSn-2400 supports multiple VLAN per VAP.

- WBSn-2400 enables a VAP that supports both RADIUS and PSK authentication, with the exact method determined according to the packet that comes from the client. If multiple VLANs are defined over such a VAP, clients authenticated using PSK are assigned to the default VLAN, while clients authenticated using RADIUS have their VLAN determined by the RADIUS.

- Each VAP can have a different RADIUS server configured. This allows for the transportation of several networks over the same infrastructure of WBSn-2400

Encryption Methods

Legacy 802.11 clients can either connect using the Open authentication (see above), or WEP. In WEP, the encryption key can be either 40bit or 104bit. In WPA, WBSn-2400 supports TKIP encryption.

In order to support legacy clients, (supporting only WEP), WBSn-2400 enables the TSN (Transient Security Network) mode, which allows VAPs that support both WEP and TKIP clients. In this case, the broadcast key is WEP, while the unicast key is either TKIP or WEP, depending on the manner in which the client is connected to the system.

Note: When you configure a TSN VAP, key #1 is used by TKIP, and you should therefore configure the WEP key as key #2.

Security Mode	Authentication Mode	Encryption Mode
None	Open system	None
WEP	• Shared key	• WEP/40 • WEP/104
WPA	• PSK (Pre-shared key) • Radius	• TKIP • TKIP+WEP/40 • TKIP+WEP/104
WPA2	• PSK (Pre-shared key) • Radius • Mixed mode PSK • Mixed mode Radius • Mixed mode PSK + Radius	• AES • AES + TKIP

Radio configuration (basic)

To configure the radio settings, navigate to **Configuration => Wireless => Radio**. Select the required channel bandwidth and specify the parameters, as described in the following table.

Note: Only 2.4 GHz is available for this WBSn release. 5.0 GHz will be available for future releases.

Field	Description
Radio	Specify that the radio waves are operational, or turn them off for purposes such as a maintenance.
Channel/Frequency [MHz]	Specify the channel/frequency
Wireless System Mode	Specify the wireless system mode: • Data • Video Surveillance • VOIP • Custom
TX Power	Specify the transmission power

VLAN configuration

1. To specify a new VLAN, navigate to **Configuration => Network => Bridge**.
2. Expand the **VLANs Configuration** window, and click **Add** to configure the VLAN Parameters. A pop-up box with the following parameters is displayed.

Parameter	Description and values
VLAN ID	This ID should be unique and must be supported by the backbone equipment that is connected to the WBS through the Ethernet port.
VLAN Tagging	Ensure this is enabled.
VLAN Name	Edit the VLAN name as required.

3. Scroll back up to the VLANs section, and specify a VAP for the VLAN.

4. Configure Authentication and Encryption parameters, as required (see Authentication Combinations, and Encryption Methods, above).
5. Configure the QoS Prioritization (see QoS Packet Priority, below).

QoS (Quality of Service) Packet Priority

Wireless Multimedia Extensions (WME), also known as WiFi MultiMedia (WMM), provide basic QoS features to IEEE 802.11n networks. WMM prioritizes traffic according to four Access Categories (AC):

- Voice
- Video
- Best Effort
- Background

Traffic is prioritized by these access categories, and the implementation defined by the WMM standard. Traffic is therefore suitable for applications that require QoS over WiFi, (for example, Voice over IP (VoIP).

Note: In order to allow QoS through the WBSn-2400, both ends of the network (CPE on the wireless side and the switch/router on the Ethernet side) should support priority tagging. This permits the marking of a specific packet with a specific priority.

Downlink, a packet from the wire-line network is received by the WBSn, and its priority detected. The packet will be prioritized over the air according to WMM AC prioritization. When the packet reaches the CPE, the CPE passes it to its LAN interface according to the packet definition.

Uplink, the CPE will detect the priority (as defined at the CPE) and will pass the frame with the correct WMM AC characteristics, thus providing the priority classification on the wireless side.

Wireless Associations

The Wireless associations is a list of clients that are connected to the base station.

Parameter	Description
IP Address	IP address of the associated station
MAC	MAC (Media Access Control) address of the associated station
SSID	SSID to which the station is associated
RSSI dBm	The RSSI (Received Signal Strength Indicator) power received by the WBSn base station from the associated station.
TX Rate	PHY Rate (modulation) at which the base station currently transmits to the associated station
RX Rate	PHY Rate (modulation) at which the associated station currently transmits to the base station
State	State in which the station is connected
Est. Range	Estimated range
WMM	A value of 'yes' in this field indicates that the associated station supports the WMM protocol
Auth. Status	Authorization status

ACS (online, Offline)

The Automatic Channel Selection (ACS) utilizes an embedded algorithm to scan for the best channel with which your base station can work, ensuring optimal capacity, minimal interference and maximum performance.

Offline ACS performs a full scan of the available channels while the system is down, determining which channels are the best and most interference-free, and prompting you to choose these channels prior to resuming and reactivating the system .

Online ACS will run in the background while the system is up, checking the available channels, and whether any of those available are better for use than the channels currently being utilized.

Note: The ACS will be enabled in a future release.

Accessing Automatic Channel Selection

1. Select **Configuration => Wireless => Radio**.
2. Expand the required field (**Online ACS** or **Offline ACS**) to specify the parameters, described in the following table.

Parameter	Description
Offline ACS	
Select Channel button	Click to select a specific channel

Scan	Click to scan, then define the following parameter values:
	 • Optimization mode:
	    o Throughput
	    o Range
	 • Auto Switch
	 • On
	 • Off
	 • Estimate Scan Time (specify)

Stop Scan button	Stops scan
Optimization Value	Specify the manner in which the channel will be optimized: • Data • Video Surveillance • VOIP • Custom
Number of loops	Specify how many times to loop the scan
Online ACS	
Parameters to be specified in a future version	

Glossary

Acronym	Description
2P	Two-Phase or Split Phase
2W	Two-Wire
3W	Three-Wire
AC	Alternating Current
ANSI	American National Standards Institute
AWG	American Wire Gauge
C	Celsius
CAT	Category
CCK	Complementary Code Keying
CFR	Code of Federal Regulations
CSA	Canadian Standard Association
dB	Decibels
dBi	Decibels Relative to an Isotropic Radiator
DBPSK	Differential-Binary Phase-Shift Keying
DC	Direct Current
DQPSK	Differential-Quadrature Phase-Shift Keying
DSSS	Direct-Sequence Spread Spectrum
EMC	Electromagnetic Compatibility
EN	IEC standard
ESD	Electrostatic Discharge
FCC	Federal Communications Commission
Hz	Hertz
HPoE	High Power over Ethernet
IEEE	Institute of Electrical and Electronics Engineers
IP67	Ingress Protection Standard
ISTA	International Safe Transit Association
LAN	Local Area Network
Mbps	Megabits Per Second
MHz	Megahertz
MIL-STD	Military Standard

Acronym	Description
N	Neutral
NEC	National Electrical Codes
NEMA	National Electrical Manufacturers Association
OFDM	Orthogonal Frequency Division Multiplexing
P	Phase
PE	Protective Earth
PoE	Power over Ethernet
RJ45	Registered Jack 45
RSS	Received Signal Strength
Rx	Receive
RXD	Receive Data
TUV	Technical Inspection Association
Tx	Transmit
TXD	Transmit Data
UL	Underwriters Laboratories
VAC	Voltage (Alternating Current)
VCCI	Voluntary Control Council for Interference
VDC	Voltage (Direct Current)
W	Watts