

EWS850AP

Setup and Configuration

02/08/2020

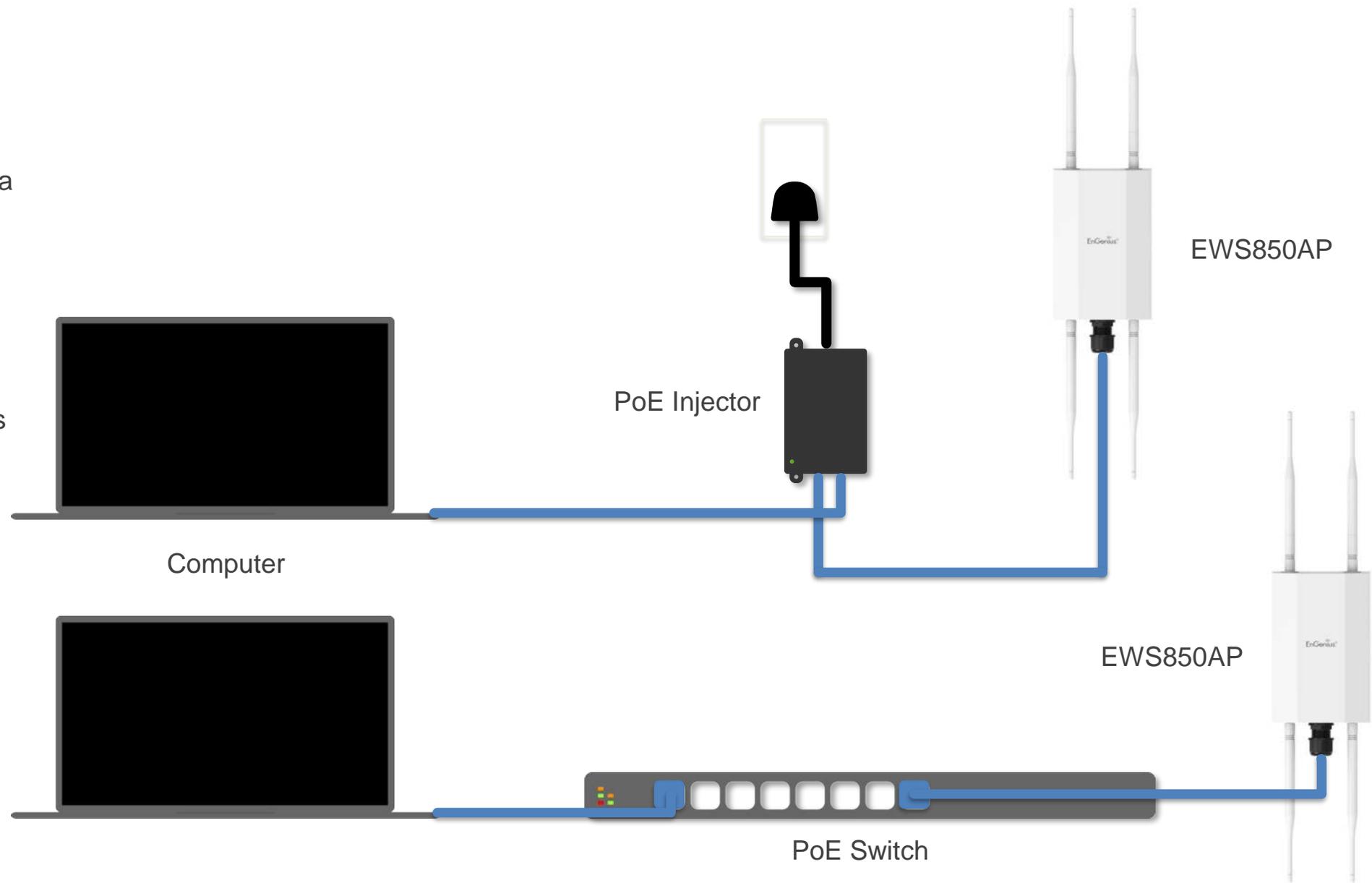




Initial Configuration | 01



1. Power up the EWS850AP either through an injector, or a PoE switch.
2. Configure your computer with a static LAN IP in this range: **192.168.1.0/24**
3. Access the GUI of the EWS850AP through the unit's default IP: **192.168.1.1**
4. The default login of credentials of the EWS850AP are: **admin/password**



4. Once logged in, modify the IP address of the unit to match that of your test environment. You can configure the IP address of the EWS850AP through **Network>Basic>IP Settings**. Make sure to use a free IP, a valid Subnet Mask and Gateway IP, and DNS if necessary.
5. Click on **Save** at the bottom.
6. Changes made on the GUI can be consolidated and applied in bulk.
7. Additional setting to configure before proceeding to the test procedures: Under **Network>Wireless>Operation Mode**, **Green Mode** must be unchecked. Click save afterwards for the AP to reload and apply the new IP settings as well.

The screenshot shows the configuration page for an EnGenius EWS850AP. The top navigation bar includes the EnGenius logo, the device model 'EWS850AP', and the description 'Dual Radio Outdoor AP, 2T2R, 574Mbps + 1201Mbps'. There are buttons for 'Changes: 0', 'Reset', and 'Logout'. A language dropdown menu is set to 'English'.

The left sidebar contains a menu with the following items: Overview, Device Status, Connections, Realtime, Network (highlighted with a red box), Basic (highlighted with a blue box), Wireless, Mesh, Status, Settings, Tools, Management, Advanced, Time Zone, WiFi Scheduler, Tools, System Manager, Account, Firmware, and Log.

The main content area is titled 'IPv4 Settings' and includes the following fields:

- IP Network Setting: DHCP Static IP
- IP Address:
- Subnet Mask:
- Gateway:
- Primary DNS:
- Secondary DNS:

Below this is the 'IPv6 Settings' section, which includes a checked checkbox for 'Link-local Address' and the following fields:

- IP Address:
- Subnet Prefix Length:
- Gateway:
- Primary DNS:
- Secondary DNS:

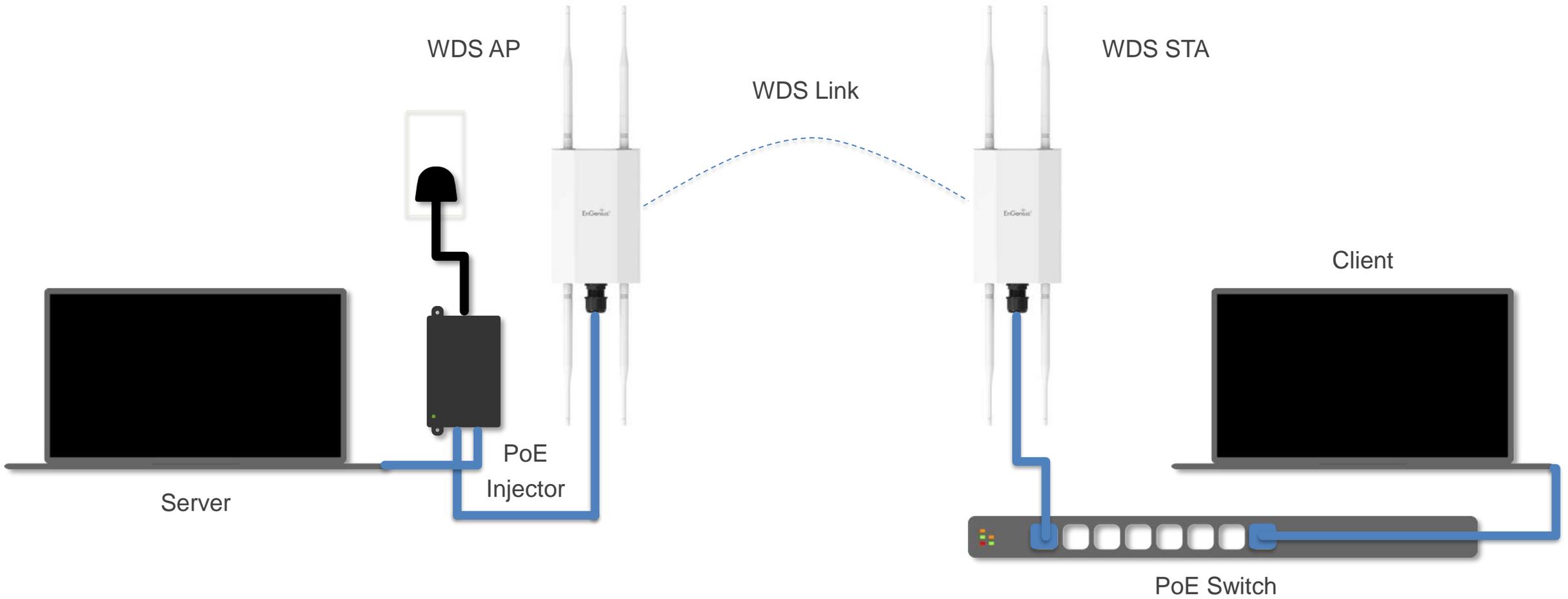
- Repeat steps 2-6 for the other EWS850AP. **Note:** If you're on static and have configured the AP on a different range, don't forget to modify your computer's LAN configuration to match that of the AP.

The screenshot shows the EnGenius configuration web interface for an EWS850AP. The page title is "Dual Radio Outdoor AP, 2T2R, 574Mbps + 1201Mbps". The interface is in English. A left sidebar contains navigation menus: Overview, Network (with sub-items Basic, Wireless, Mesh), Management, and System Manager. The "Wireless" menu item is highlighted with a red box. The main content area is titled "Wireless Settings" and contains two columns of settings for 2.4GHz and 5GHz bands. A blue callout box labeled "Green Mode" points to the "Green" checkboxes in the "Operation Mode" row for both bands. The "Green" checkbox for the 5GHz band is checked.

	2.4GHz (n/g/b)	5GHz (ax/ac/n/a)
Operation Mode	Access Point <input type="checkbox"/> Green	Access Point <input checked="" type="checkbox"/> Green
Channel HT Mode	20MHz	80MHz
Channel	Configuration	Configuration
Transmit Power	Auto	Auto
Bit Rate	Configuration	Configuration
Client Limits	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Multicast to Unicast Stream Conversion	<input checked="" type="radio"/> Enable <input type="radio"/> Disable	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
AP Detection	Scan	Scan
11ax mode	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Distance (0-30km)	1 (0.6miles)	1 (0.6miles)

Point to Point / Point to Multipoint | 02





1. Logon to the EWS850AP.
2. On the *first* unit, configure the **Operation Mode** as **WDS Access Point** (base station). This can be done on **Network>Wireless>Operation Mode**.
3. Modify the **Channel HT Mode** to **80MHz**.
4. Configure the channel to the best available 5GHz channel on the environment. Do not use DFS Channels.
5. Leave the **Transmit Power** with its default values if you are uncertain of what to set.

- 6. Scroll down and modify the **SSID**.
- 7. Configure a wireless name as needed, set the security to **WPA2-Personal** and key in your password.
- 8. Save the SSID settings, and click on apply again under the Wireless page.
- 9. Once done, click on **Changes** on the top right part of the page and **Apply**, or the **Apply** button found on the bottom of the page. The AP will reboot and broadcast the SSID that you have created.

Wireless Settings - 5GHz

Enabled	SSID	Edit	Security	VLAN ID
<input checked="" type="checkbox"/>	EnGenius8AFB9F_1	Edit	None	-
<input type="checkbox"/>	EnGenius8AFB9F_2	Edit	None	-
<input type="checkbox"/>	EnGenius8AFB9F_3	Edit	None	-
<input type="checkbox"/>	EnGenius8AFB9F_4	Edit	None	-

SSID Settings

Wireless Security

Security Mode	WPA2-Personal
Encryption	AES
Passphrase	test1234
Group Key Update Interval	3600 (30~3)

English

Changes: 2 Reset Logout

Waiting for changes to be applied (2)

Apply Revert

1. For the **second** unit, configure the **Operation Mode** as **WDS Station**. This can be done on **Network>Wireless>Operation Mode**.
2. Press the **Scan** button, and select the SSID that you have created on the first unit.
3. Key in the wireless password you have set and apply.
4. Once done, click on **Changes** on the top right part of the page and **Apply**. The AP will reboot.

	2.4GHz (n/g/b)		5GHz (ax/ac/n/a)	
Operation Mode	Access Point <input type="checkbox"/> Green		WDS Station <input type="checkbox"/> Green	
Channel HT Mode	20MHz		Access Point	
Channel	Configuration		WDS Access Point	
Transmit Power	Auto		WDS Bridge	
Bit Rate	Configuration		WDS Station	
Client Limits	<input checked="" type="radio"/> Enable <input type="radio"/> Disable 127		<input checked="" type="radio"/> Enable <input type="radio"/> Disable 127	
Multicast to Unicast Stream Conversion	<input checked="" type="radio"/> Enable <input type="radio"/> Disable			
AP Detection	Scan		Scan	
11ax mode	<input type="radio"/> Enable <input checked="" type="radio"/> Disable			
Distance (0-30km)	1 (0.6miles)		1 (0.6miles)	

Scan to connect

Site Survey

BSSID	SSID	Channel	Signal Level	Type	Security	Mode
78:54:2E:4E:1A:8A	TBTNet_5G	149	-92 dBm	11ac	mixed WPA/WPA2 - PSK	Master
8E:DC:96:7B:E5:CB	EnGenius-Bypass-5	153	-81 dBm	11ac	WPA2 -PSK	Master
88:DC:96:67:4C:CF	For Aunty	36	-80 dBm	11ac	WPA2 -PSK	Master
06:DC:96:7B:E5:D1		153	-83 dBm	11ac	WPA2 -PSK	Master

Wireless Security

Preferred BSSID 8E : DC : 96 : 7B : E5 : CB

SSID

Wireless Security

Security Mode

Encryption

Passphrase

Save current setting(s)

- Verify the connection status via **Overview>Connections**. Here you can confirm the SSID you are connected to, the wireless mode, channel, data rate, and signal strength (RSSI).

The screenshot displays the EnGenius web interface. On the left is a navigation sidebar with the following items: Overview (with an info icon), Device Status, Connections (highlighted with a red border), Realtime, Network (with a back icon), Basic, Wireless, Mesh (with a plus icon), Status, Settings, Tools, Management (with a gear icon), Advanced, Time Zone, WiFi Scheduler, Tools, System Manager (with a person icon), and Account. The main content area shows two sections: 'Connection List - 2.4GHz' with a table of SSID, MAC Address, TX (KB), and RX (KB); and 'Connection Status - 5GHz' with a table of SSID, BSSID, Connection Status, Wireless Mode, Current Channel, Security, Tx Data Rates(Mbps), Current noise level, and Signal Strength. A blue callout circle highlights the 'Signal Strength' row in the 5GHz table, with a line pointing to a grey box labeled 'Connection Information'.

SSID	MAC Address	TX (KB)	RX (KB)

SSID	Guest
BSSID	8E:DC:96:7B:E5:E0
Connection Status	Associated
Wireless Mode	802.11 ac/n
Current Channel	5.220 GHz(Channel 44)
Security	WPA2-Personal
Tx Data Rates(Mbps)	975 Mb/s
Current noise level	-95 dBm
Signal Strength	-69 dBm

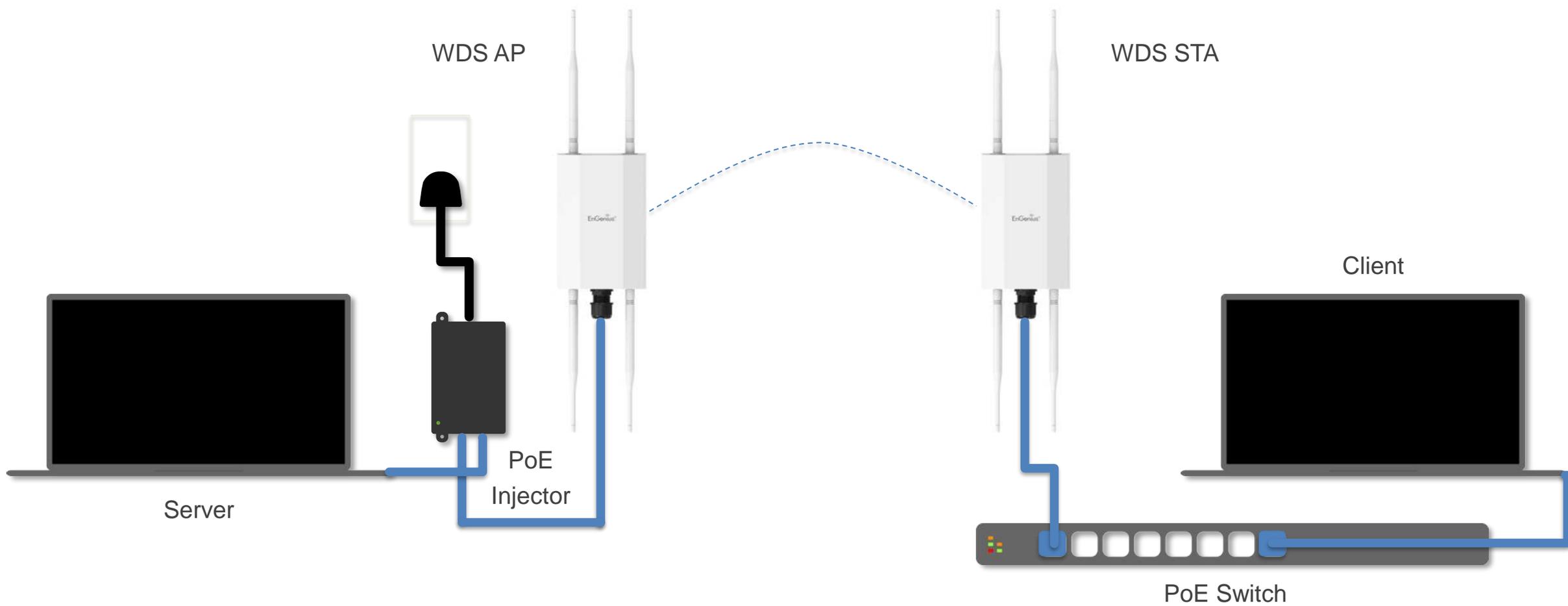
Refresh

Connection Information

802.11ax Channel Width Support
20, 40, and 80 MHz

03



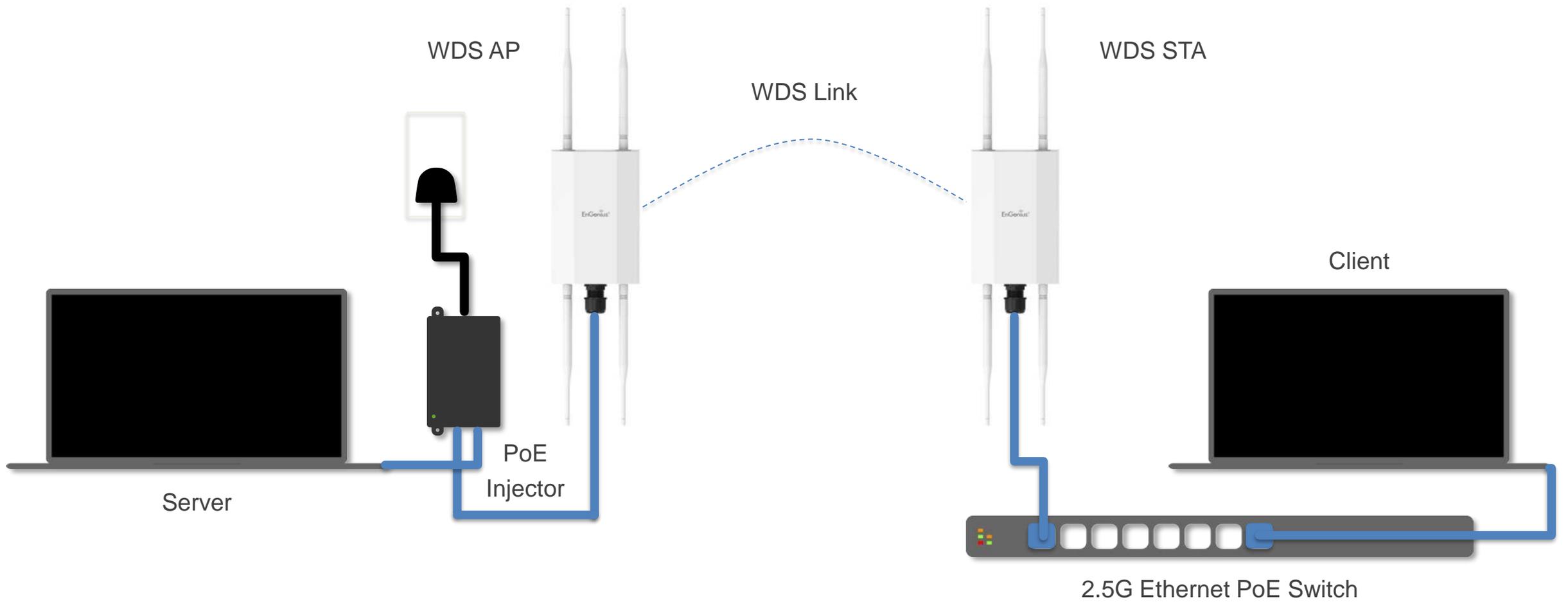


1. On the **WDS AP** you may toggle between the available channel widths for testing. The **WDS Station** will follow the channel width of the **WDS AP**.
2. You may also connect a wireless client (laptop/mobile phone) directly to the **WDS AP**, to perform a test.

	2.4GHz (n/g/b)	5GHz (ax/ac/n/a)
Operation Mode	Access Point <input type="checkbox"/> Green <i>i</i>	WDS Access Poir <input type="checkbox"/> Green <i>i</i>
Channel HT Mode	20MHz	80MHz
Channel	Configuration	80MHz 40MHz 20MHz
Transmit Power	Auto	
Bit Rate <i>i</i>	Configuration	
Client Limits	<input checked="" type="radio"/> Enable <input type="radio"/> Disable 127	<input checked="" type="radio"/> Enable <input type="radio"/> Disable 127
Multicast to Unicast Stream Conversion	<input checked="" type="radio"/> Enable <i>i</i> <input type="radio"/> Disable <i>i</i>	
AP Detection	Scan	Scan
11ax mode	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	
Distance (0-30km)	1 (0.6miles)	1 (0.6miles)

Throughput Test | 04





1. Running the same topology, a throughput test may be initiated by utilizing two computers, one acting as a server and the other as a client. Do take note that in order to maximize and get the actual wireless throughput of the **EWS850AP**, the **LAN port** of the server and client device, the **Ethernet cable**, as well as the **PoE switch** you are using, must be capable of delivering **2.5 Gbps**. Otherwise, your throughput test will be capped at **1 Gbps**.
2. When running the throughput test, set **multiple parallel streams** to maximize the bandwidth.

iPerf3 Throughput Test

Windows:

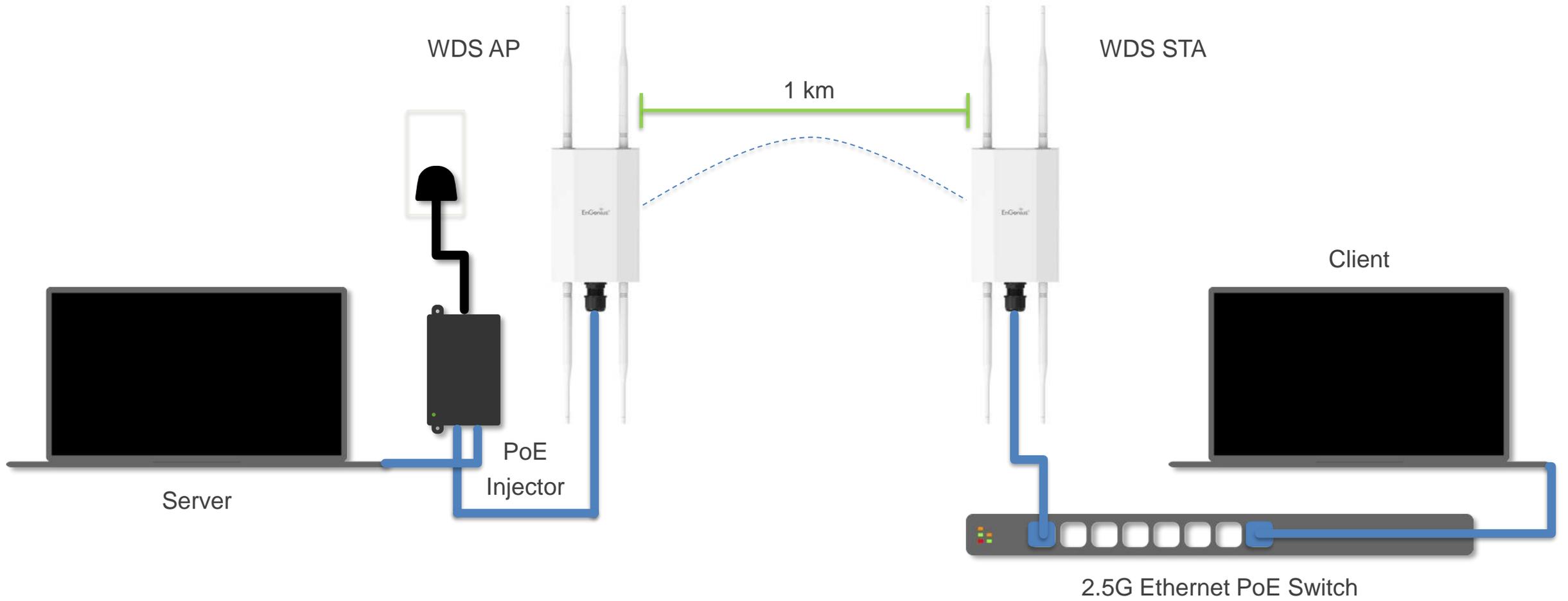
1. Pre-configure the PCs with static IP addresses
2. Open CMD as Administrator on both PCs
3. Change directory to the folder containing iperf3 and related files
4. For the server, key in *iperf3 -s*
5. On the client, key in *iperf3 -c server_ip_address -P 20*
6. The results shall be displayed at the end of the test

Common commands:

- s: Run in Server mode -c: Run in Client mode -R: Reversed mode, server sends and client receives
-P: Parallel Streams (simulate number of streams)

Throughput vs Range Test | 05





1. Following the above throughput test parameters, when testing based on the distance, you can expect to reach about the same figures as on the table based on optimum environments with clear **LOS** (line-of-sight).
2. Please share your throughput results to us based on the various distances you have tested.

Distance	RSSI	TX	RX	TX+RX
1 km	-79	205.8	198.7	203.1
500 m	-	-	-	-
250 m	-	-	-	-
100 m	-	-	-	-
50 m	-	-	-	-

RSSI Test | 06



- The RSSI can also be read under **Overview>Connections**. The information here will provide you an accurate representation of the RSSI based on what the AP is reading. RSSI measured from the AP itself is more reliable vs client device RSSI readings due to the difference in the transmit power of the chipsets.

The screenshot shows the EnGenius web interface. On the left is a navigation menu with categories: Overview, Network, Mesh, Management, and System Manager. The 'Connections' item under 'Overview' is highlighted with a red box. On the right, there are two tables: 'Connection List - 2.4GHz' and 'Connection Status - 5GHz'. The 'Connection Status - 5GHz' table has a callout circle around the 'Signal Strength' row, which points to a grey box labeled 'Connection Information'.

Connection List - 2.4GHz			
SSID	MAC Address	TX (KB)	RX (KB)

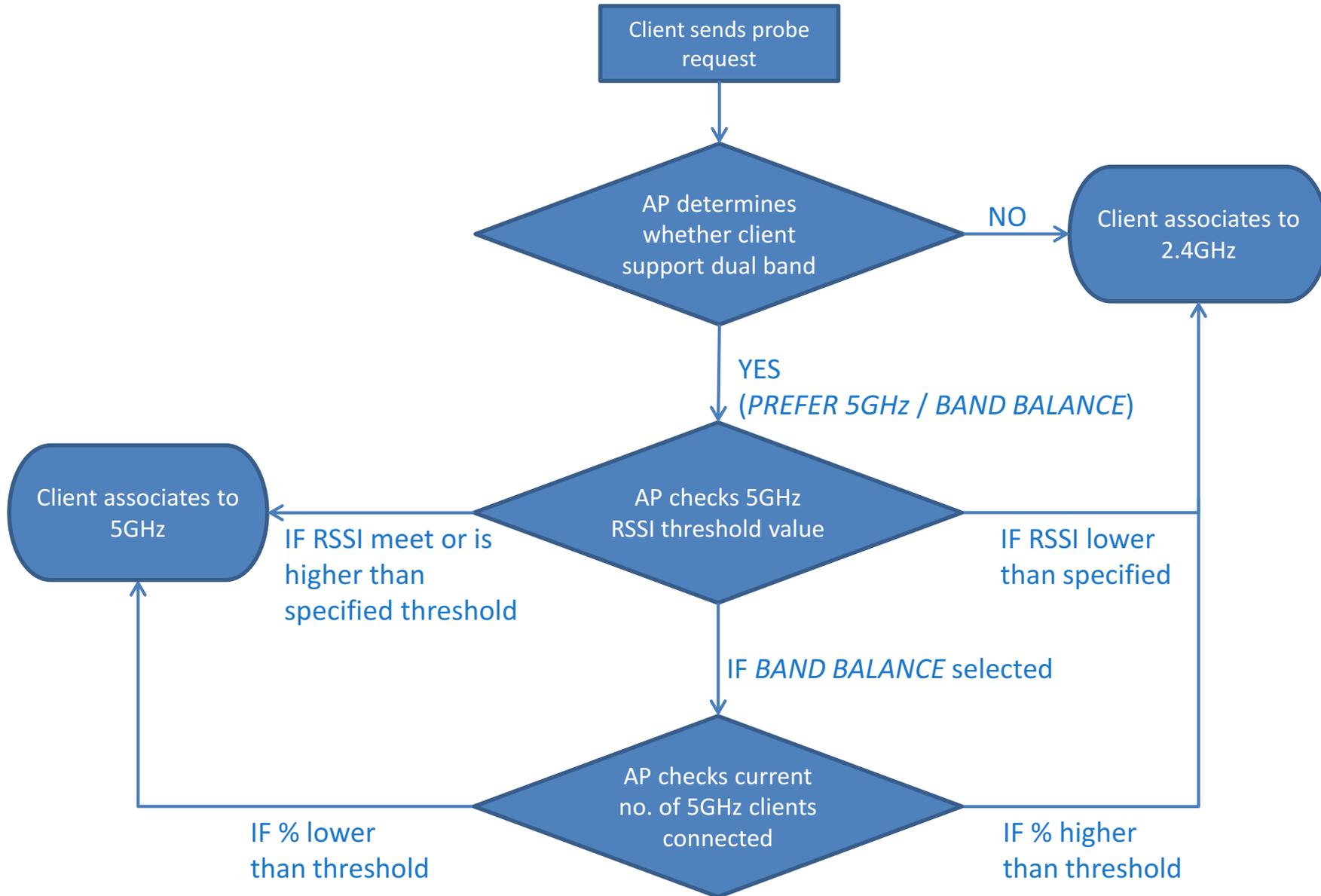
Connection Status - 5GHz	
SSID	Guest
BSSID	8E:DC:96:7B:E5:E0
Connection Status	Associated
Wireless Mode	802.11 ac/n
Current Channel	5.220 GHz(Channel 44)
Security	WPA2-Personal
Tx Data Rates(Mbps)	975 Mb/s
Current noise level	-95 dBm
Signal Strength	-69 dBm

Refresh

Connection Information

Band Steering | 07





1. To proceed with the **band steering** test, the operation mode of the AP must be set to **Access Point**.
2. Ensure that both radios for 2.4 GHz and 5 GHz are enabled, prior to editing the SSID options.

	2.4GHz (n/g/b)	5GHz (ax/ac/n/a)
Operation Mode	Access Point <input type="checkbox"/> Green ?	Access Point <input type="checkbox"/> Green ?
Channel HT Mode	20MHz	Access Point
Channel	Configuration	WDS Access Point
Transmit Power	Auto	WDS Bridge
Bit Rate ?	Configuration	WDS Station
Client Limits	<input checked="" type="radio"/> Enable <input type="radio"/> Disable 127	<input checked="" type="radio"/> Enable <input type="radio"/> Disable 127
Multicast to Unicast Stream Conversion	<input checked="" type="radio"/> Enable ? <input type="radio"/> Disable ?	
AP Detection	Scan	Scan
11ax mode	<input type="radio"/> Enable <input checked="" type="radio"/> Disable	
Distance (0-30km)	1 (0.6miles)	1 (0.6miles)

Wireless Settings - Access Point

Enabled	SSID	2.4GHz	5GHz	Ed
<input checked="" type="checkbox"/>	Band Steering Test	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ed
<input type="checkbox"/>	EnGenius8AFB9F_2	<input type="checkbox"/>	<input type="checkbox"/>	Ed
<input type="checkbox"/>	EnGenius8AFB9F_3	<input type="checkbox"/>	<input type="checkbox"/>	Ed
<input type="checkbox"/>	EnGenius8AFB9F_4	<input type="checkbox"/>	<input type="checkbox"/>	Ed

- You will find the option to enable **Band Steering** under the SSID settings and will be able to select from multiple options:

Force 5G: Client devices connect to 5 GHz so long as they are within range

Prefer 5G: Client devices connect to 5 GHz if they are within the set **RSSI** threshold

Band Balance: Client devices connect to 5 GHz if they are within the set **ratio** between both radios

- Save the settings and apply.
- Band steering may only be tested with client devices that support **dual band** functionality.

Band Steering

Status Enable Disable

Band Steering ⓘ

Force 5GHz
Prefer 5GHz
Force 5GHz
Band Balance

Band steering is configured to Force 5GHz. All dual band client to connect to the 5GHz radio if not currently associated on the 2.4GHz radio of this AP.

Enable Disable

Prefer 5GHz

5GHz RSSI dBm ⓘ

Enable Disable

Band Balance

5GHz RSSI dBm ⓘ

Percent of clients on 5GHz radio % ⓘ

Auto Channel | 08



1. In **stand alone mode, auto channel** is triggered upon AP boot up. It inspects the best available channel based on interference in the environment.
2. You may pre-set the only channels that the AP will select for auto channel, instead of having the AP pick from the full spectrum. The grayed out channels on the diagram represent which channel the AP will choose from.

2.4GHz		5GHz	
All	None	All	None
1,6,11	1,4,8,11	U-NII-1	U-NII-2A
1,7,13	1,5,9,13	U-NII-3	
Ch 1 : 2.412 GHz	Ch 2 : 2.417 GHz	Ch 36 : 5.180 GHz	Ch 40 : 5.200 GHz
Ch 3 : 2.422 GHz	Ch 4 : 2.427 GHz	Ch 44 : 5.220 GHz	Ch 48 : 5.240 GHz
Ch 5 : 2.432 GHz	Ch 6 : 2.437 GHz	Ch 52 : 5.260 GHz	Ch 56 : 5.280 GHz
Ch 7 : 2.442 GHz	Ch 8 : 2.447 GHz	Ch 60 : 5.300 GHz	Ch 64 : 5.320 GHz
Ch 9 : 2.452 GHz	Ch 10 : 2.457 GHz	Ch 149 : 5.745 GHz	Ch 153 : 5.765 GHz
Ch 11 : 2.462 GHz	Ch 12 : 2.467 GHz	Ch 157 : 5.785 GHz	Ch 161 : 5.805 GHz
Ch 13 : 2.472 GHz			

[Save](#) Save current setting(s)

3. You may verify the current channel selection of the AP via **Overview>Device Status** and scroll down under the **Wireless LAN Information**.

Wireless LAN Information - 2.4GHz

Operation Mode	Access Point
Wireless Mode	802.11 n/g/b
Channel Bandwidth	20 MHz
Channel	2.412 GHz(Channel 1)
Distance	1000 M

Wireless LAN Information - 5GHz

Operation Mode	Access Point
Wireless Mode	802.11 ax/ac/n/a
Channel Bandwidth	80 MHz
Channel	5.180 GHz(Channel 36)
Distance	1000 M

Multiple SSID | 09



1. On the same SSID page as the previous tests, you may enable multiple SSID profiles that are independent of each other.
2. Each SSID may have totally different options in terms of: security, radio, VLAN, band steering options, roaming, etc.

Wireless Settings - Access Point

Enabled	SSID	2.4GHz	5GHz	Edit	Security	Guest Network	VLAN ID
<input checked="" type="checkbox"/>	Test 1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Edit	None	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	Test 2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Edit	None	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	Test 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Edit	None	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	EnGenius8AFB9F_4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Edit	None	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	EnGenius8AFB9F_5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Edit	None	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	EnGenius8AFB9F_6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Edit	None	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	EnGenius8AFB9F_7	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Edit	None	<input type="checkbox"/>	-
<input checked="" type="checkbox"/>	EnGenius8AFB9F_8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Edit	None	<input type="checkbox"/>	-

RADIUS Authentication (802.1X) | 10

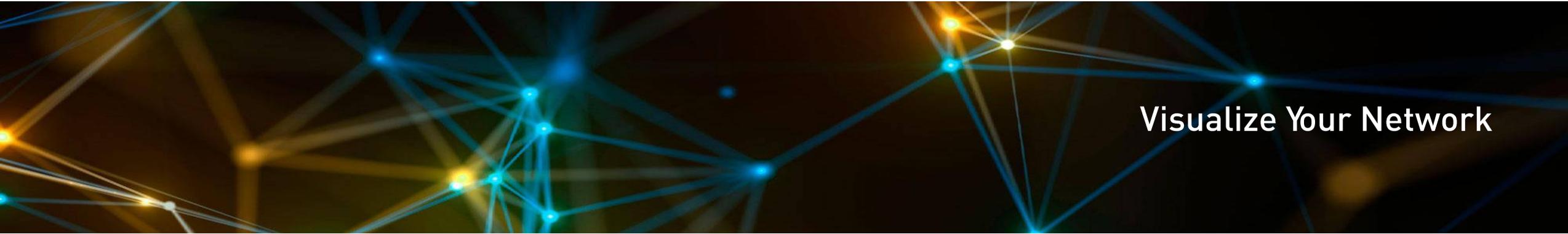


1. RADIUS authentication is set by selecting **WPA2/WPA3 Enterprise** options.
2. Upon selecting the security option, proceed with filling in your RADIUS server credentials.
3. After applying the settings, you will be asked to key in a **username** and **password** when you connect to the SSID. The login credentials are the ones stored on your RADIUS server database.

Wireless Security	
Security Mode	WPA2-Enterprise
Group Key Update Interval	(30~3600; 0:Disable)
Radius Server	
Radius Port	
Radius Secret	
Encryption	AES

Wireless Security	
Security Mode	WPA2-Enterprise
Group Key Update Interval	3600 (30~3600; 0:Disable)
Radius Server	
Radius Port	1812
Radius Secret	
Encryption	AES

Traffic Logs | 11

A decorative graphic at the bottom of the page featuring a network of glowing blue and yellow nodes connected by thin lines, set against a dark background.

Visualize Your Network

1. Traffic Logs can be enabled under **System Manager>Log** once remote log has been enabled.
2. The logs will then be redirected to your designated **Syslog Server** which you have to identify. Do take note that enabling **Traffic Log** will impact the performance of the AP depending on the activity level of the clients connected. This can reduce the number of concurrent users as well.

- Overview**
- Device Status
- Connections
- Realtime
- Network**
- Basic
- Wireless
- Mesh**
- Status
- Settings
- Tools
- Management**
- Advanced
- Time Zone
- WiFi Scheduler
- Tools
- System Manager**
- Account
- Firmware
- Log

System Log

Status Enable Disable

Log type ALL

Refresh Clear

```

Jul 23 14:28:00 EWS850AP cron.info crond[7088]: USER root pid 3559 cmd /bin/sh /sbin/reconnect_wds_ap
Jul 23 14:28:00 EWS850AP cron.info crond[7088]: USER root pid 3558 cmd /etc/init.d/systemd start ntp_retry
Jul 23 14:27:00 EWS850AP cron.info crond[7088]: USER root pid 2961 cmd /bin/sh /sbin/reconnect_wds_ap
Jul 23 14:26:00 EWS850AP cron.info crond[7088]: USER root pid 2510 cmd /bin/sh /sbin/reconnect_wds_ap
Jul 23 14:26:00 EWS850AP cron.info crond[7088]: USER root pid 2509 cmd /etc/init.d/systemd start ntp_retry
Jul 23 14:25:00 EWS850AP cron.info crond[7088]: USER root pid 2254 cmd /bin/sh /sbin/reconnect_wds_ap
Jul 23 14:24:00 EWS850AP cron.info crond[7088]: USER root pid 1894 cmd /bin/sh /sbin/reconnect_wds_ap
Jul 23 14:24:00 EWS850AP cron.info crond[7088]: USER root pid 1893 cmd /etc/init.d/systemd start ntp_retry
Jul 23 14:23:00 EWS850AP cron.info crond[7088]: USER root pid 1541 cmd /bin/sh /sbin/reconnect_wds_ap
Jul 23 14:22:00 EWS850AP cron.info crond[7088]: USER root pid 1186 cmd /bin/sh /sbin/reconnect_wds_ap
                    
```

Remote Log Enable Disable

Traffic Log Enable Disable

Log Server IP Address 0.0.0.0

Log Server Port 514

Apply Apply saved settings to take effect

EnGenius[®]

Unwire the Possibilities

