

# Point-to-Point and Point-to-MultiPoint bridge links with EnGenius 5GHz outdoor units

A quick setup guide for outdoor bridge links using 5GHz EnGenius units. There are several different 'modes' that can be used in the setup for EnGenius products to facilitate outdoor network links but this document covers a simple setup which gives fast and reliable connectivity.

So basic setup is you have a 'master' unit and then one or more 'slave' units. Think of it like the spokes on a wheel, the master is at the hub of the wheel and each spoke is a link to a slave device. The example screen shots are for the ENS500-AC device but the underlying methodology is applicable for all the EnGenius bridge products.

What we're going to do is setup a 'master' in 'WDS AP' mode and each 'slave' in 'WDS Station' mode. We're using WDS modes because that gives us transparent data links so things like VLAN and DHCP requests work correctly.

Before setting up either unit as 'WDS AP' or 'WDS Station', ensure that you have given each unit has its own unique IP address. By default, the 'IP Network Setting' will be set to 'DHCP', so this will need to be changed to 'Static IP'. In the below example, the 'WDS AP' will use 192.168.1.2 and the 'WDS Station' will use 192.168.1.3.

Please note that you only need to supply the 'IP Address' and 'Subnet Mask', the 'Gateway' and 'DNS' fields should be blank.

Click 'Save' once done and apply the changes at the top. Repeat this process for all units.

The screenshot shows the EnGenius EnStationAC web interface. The top navigation bar includes the EnGenius logo, a language dropdown set to 'English', and the device model 'Single Radio AP, 2T2R, 867Mbps'. There are buttons for 'Changes: 0', 'Reset', and 'Logout'. A left sidebar menu contains sections for 'Overview', 'Network', 'Management', and 'System Manager'. The main content area is titled 'IPv4 Settings' and shows the following configuration:

IPv4 Settings	
IP Network Setting	<input type="radio"/> DHCP <input checked="" type="radio"/> Static IP
IP Address	<input type="text" value="192.168.1.2"/>
Subnet Mask	<input type="text" value="255.255.255.0"/>
Gateway	<input type="text"/>
Primary DNS	<input type="text"/>
Secondary DNS	<input type="text"/>

Below the IPv4 settings is the 'IPv6 Settings' section, which includes a checked 'Link-local Address' option and empty input fields for IP Address, Subnet Prefix Length, Gateway, Primary DNS, and Secondary DNS.

The 'Spanning Tree Protocol (STP) Settings' section is also visible, with the following configuration:

Spanning Tree Protocol (STP) Settings	
Status	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Hello Time	<input type="text" value="2"/> seconds (1-10)
Max Age	<input type="text" value="20"/> seconds (6-40)
Forward Delay	<input type="text" value="15"/> seconds (4-30)
Priority	<input type="text" value="32768"/> (0-65535)

At the bottom of the settings area is a 'Save' button with the text 'Save current setting(s)'.

## Basic config for the 'master'

Using the IP address set previous, log into the web interface for the device to be configured as the master and go to Network/Wireless...

Wireless Settings

Device Name: ENS500-AC  
Country / Region: United Kingdom

5GHz

Operation Mode: WDS Access Point  Green 🔵  
Wireless Mode: 802.11 AC/N  
Channel HT Mode: 80MHz(AC Only)  
Channel: Configuration  
Transmit Power: Auto  
Data Rate: Auto  
RTS/CTS Threshold (1 - 2346): 2346  
Client Limits: 127  Enable  Disable  
AP Detection: Scan  
Distance (0-30km): 1 (0.6miles)

Wireless Settings - 5GHz

Enabled	SSID	Edit	Security	Hidden SSID	Client Isolation	VLAN Isolation	L2 Isolation	VLAN ID
<input checked="" type="checkbox"/>	EnGenius6413A5_1-5GHz	Edit	None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	51
<input type="checkbox"/>	EnGenius6413A5_2-5GHz	Edit	None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	52
<input type="checkbox"/>	EnGenius6413A5_3-5GHz	Edit	None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	53
<input type="checkbox"/>	EnGenius6413A5_4-5GHz	Edit	None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	54

So things you need to set for the 'master'...

- ✓ Country (United Kingdom),
- ✓ Operation Mode (WDS Access Point),
- ✓ Wireless Mode (AC/N in this instance),
- ✓ HT Mode (80MHz for 11ac, you might only be able to choose 40MHz if the bridge devices you are using don't support 11ac)

The click on Channel/Configuration to choose a suitable WiFi channel...

5GHz

WDS Access Point  Green 🔵  
802.11 AC/N  
80MHz(AC Only)  
Configuration  
Auto  
Auto

The actual choice of channels offered will depend if this is 11ac (80MHz wide channels) or 11n (40MHz wide channels). Pick a suitable channel. Note for legal outdoor use in the UK/EU then you can only use channels 100 upwards. In this example I simply choose channel 100. 'Save' after choosing the channel.

**5GHz**

All	None
U-NII-1	U-NII-2B
Ch 36 : 5.180 GHz	Ch 40 : 5.200 GHz
Ch 44 : 5.220 GHz	Ch 48 : 5.240 GHz
Ch100 : 5.500 GHz	Ch104 : 5.520 GHz
Ch108 : 5.540 GHz	Ch112 : 5.560 GHz

**Save** Save current setting(s)

Then 'Save' on the bottom of the Wireless Settings screen...

RSSI Threshold **5GHz**

Status  Enable  Disable

RSSI  dBm (Range: -100dBm ~ -60dBm)

---

Management VLAN Settings

Status  Enable  Disable

**Caution:** If you encounter disconnection issue during the configuration process, verify that the switch and the DHCP server can support the new VLAN ID and then connect to the new IP address.

**Save** Save Current Setting(s)

Then scroll to the top of the Settings screen and click on the 'Changes' button, what this does is apply your changes...

English

**Changes: 1** **Reset** **Logout**

Then wait for it to set the config and reboot.

That's all you have to do on the 'master' to get you initially going.

## Basic 'slave' setup

So now the 'slave' units. You might have multiple slave units but the setup is pretty much the same for one, two, or even ten! Log into the web interface for the device to be configured as the slave and goto Network/Wireless...

So things you need to set for the 'slave'...

- ✓ Country (United Kingdom),
- ✓ Operation Mode (WDS Station),

Everything else is greyed out because it's set by the master.

Wireless Settings

Device Name	ENS500-AC
Country / Region	United Kingdom

5GHz

Operation Mode	WDS Station	<input checked="" type="checkbox"/> Green
Wireless Mode	802.11 AC/N	
Channel HT Mode	40MHz	
Channel	Configuration	
Transmit Power	Auto	
Data Rate	Auto	
RTS/CTS Threshold (1 - 2346)	2346	
Client Limits	127	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
AP Detection	Scan	
Distance (0-30km)	1	(0.6miles)

The only other setting to do is to Scan the WiFi for the master to connect to. So set the mode etc... and then click on Scan. \*\*

BSSID	SSID	Channel	Signal Level	Security	Mode
0E:18:1A:6F:46:CC	NGNGuest	36	-78 dBm	open	Master
8E:DC:96:64:13:A5	EnGenius6413A5_1.5GHz	100	-15 dBm	open	Master
88:DC:96:64:13:A5		100	-14 dBm	open	Master
12:18:1A:6F:46:CC	GGWDCIS	36	-78 dBm	mixed WPA/WPA2 - PSK	Master
16:18:1A:6F:46:CC	GGWIS	36	-78 dBm	mixed WPA/WPA2 - PSK	Master
1E:18:1A:6F:46:CC		36	-78 dBm	mixed WPA/WPA2 - PSK	Master
02:18:1A:6F:46:CC	NGNCorporate	36	-78 dBm	WPA/WPA2	Master
06:18:1A:6F:46:CC	HHT	36	-78 dBm	mixed WPA/WPA2 - PSK	Master
0A:18:1A:6F:46:CC	NGNColleague	36	-78 dBm	WPA/WPA2	Master
10:7B:EF:3B:F0:C0	SytnerGroup_5G	40	-51 dBm	mixed WPA/WPA2 - PSK	Master

Repeat scan

Wait whilst it builds up the list for access points (masters) it can see. Then double click on the line for the master (EnGenius WDS AP) you want to connect to.

Wireless Setting - 5GHz

Preferred BSSID	8E : DC : 96 : 64 : 13 : A5
SSID	EnGenius6413A5_1-5GHz

Wireless Security - 5GHz

Security Mode	Disabled
---------------	----------

Save Save current setting(s)

It should then show a screen with the BSSID for the master. You also have the option to tick and lock the slave to this particular master (WDS AP) – this is worth doing! Click on Save.

It should then show the SSID in the 'Wireless Settings - 5GHz' on the bottom of the page

Wireless Settings	
Device Name	ENS500-AC
Country / Region	United Kingdom

5GHz	
Operation Mode	WDS Station <input checked="" type="checkbox"/> Green
Wireless Mode	802.11 AC/N
Channel HT Mode	40MHz
Channel	Configuration
Transmit Power	Auto
Data Rate	Auto
RTS/CTS Threshold (1 - 2346)	2346
Client Limits	127 <input checked="" type="radio"/> Enable <input type="radio"/> Disable
AP Detection	Scan
Distance (0-30km)	1 (0.6miles)

Wireless Settings - 5GHz		
SSID	Edit	Security
EnGenius6413A5_1-5GHz	Edit	None

\*\*Alternatively, if you do not want to carry out a site survey by clicking the 'AP Detection Scan' button, it is possible for you to type the name of the 'SSID' of the master directly into the SSID field under the 'Wireless Setting - 5Ghz' section. Just remember to click 'Edit' if you need to set any security.

Then go to the bottom of the screen and click on 'Save'

Management VLAN Settings

Status  Enable  Disable 4094

**Caution:** If you encounter disconnection issue during the configuration process, verify that the switch and the DHCP server can support the new VLAN ID and then connect to the new IP address.

[Save](#) Save Current Setting(s)

and to the top of the page to apply the 'Changes'.

ENS500-AC Outdoor CPE, 2T2R, 867Mbps

Changes: 2 Reset Logout

Overview  
Device Status  
Connections  
Realtime  
Network

Wireless Settings

Device Name ENS500-AC  
Country / Region United Kingdom

5GHz

Now wait for the unit to reboot.

## Is the link up?

To check it's up then look at 'Connections' on the master unit and you should see slave devices listed

ENS500-AC Outdoor CPE, 2T2R, 867Mbps Changes: 0 Reset Logout

**Overview**  
Device Status  
Connections  
Realtime

**Network**  
Basic  
Wireless

**Management**  
Advanced  
Time Zone  
WiFi Scheduler  
Tools

**System Manager**  
Account

**WDS Link List - 5GHz**

WDS Link ID#	MAC Address	Link Status	RSSI(dBm)
--------------	-------------	-------------	-----------

**Connection List - 5GHz**

SSID	MAC Address	TX	RX	RSSI	Block
EnGenius6413A5_1-5GHz	88:dc:96:64:13:99	0 KB	0 KB	-19dBm	<input type="button" value="Kick"/>

and when you look at 'Connections' on the slave units they should show they're associated with the master.

**Overview**  
Device Status  
Connections  
Realtime

**Network**  
Basic  
Wireless

**Management**  
Advanced  
Time Zone  
WiFi Scheduler  
Tools

**System Manager**  
Account

**Connection Status - 5GHz**

SSID	EnGenius6413A5_1-5GHz
BSSID	8E:DC:96:64:13:A5
Connection Status	Associated
Wireless Mode	802.11 N/AC
Current Channel	5.500 GHz(Channel 100)
Security	None
Tx Data Rates(Mbps)	866.7 Mb/s
Current noise level	-95 dBm
Signal strength	-24 dBm

## Adding Security to the link

Up to now this is an open WiFi link. The slave (WDS Station) is locked to the master (WDS AP) but there is no security on the WiFi connection. So you might want to add some WiFi security.

On the master goto the Network/Wireless page and click on Edit for the WiFi link....

Enabled	SSID	Edit	Security	Hidden SSID	Client Isolation	VLAN Isolation	L2 Isolation	VLAN ID
<input checked="" type="checkbox"/>	EnGenius6413A5_1-5GHz	Edit	None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	51
<input type="checkbox"/>	EnGenius6413A5_2-5GHz	Edit	None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	52

The select the WiFi security and enter a suitable passphrase e.g.

Wireless Security - 5GHz

Security Mode: WPA2-PSK

Encryption: Both(TKIP+AES)

Passphrase: fredfred23

Group Key Update Interval: 3600

then 'Save' on the security page.

Wireless Traffic Shaping

Enable Traffic Shaping:  Enable  Disable

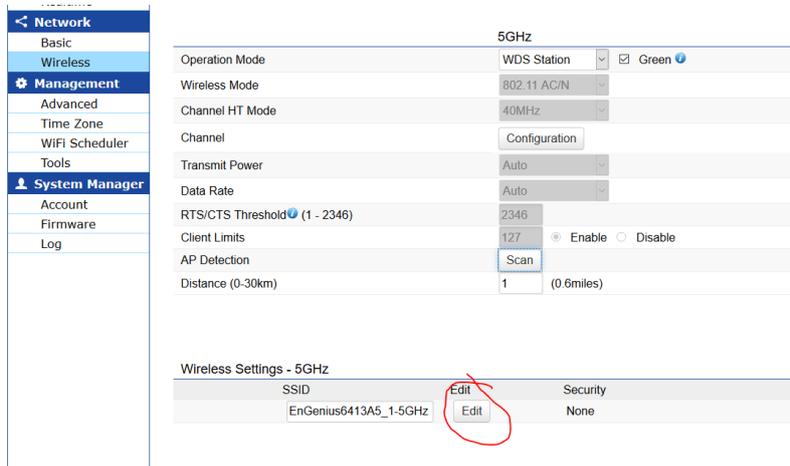
Download Limit: 100 Mbps (1-999)  Per User

Upload Limit: 100 Mbps (1-999)  Per User

Save Save current setting(s)

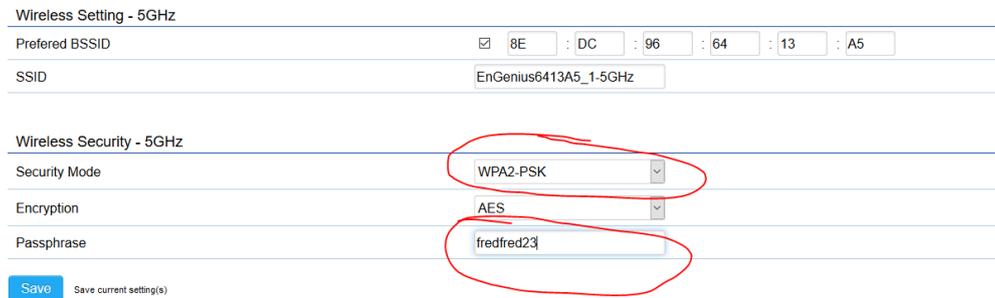
then 'Save' on the Settings page. Then click on 'Changes' on the top of the page to apply the settings. Remember, until you've set security on the slave units then this will break the bridge links!

Now go to Network/Wireless page on the 'slave' (WDS Station) unit...



Click on Edit for the AP link.

Select the required security and enter the passphrase (the same that you set on the WDS AP):



Then Save. Then Save on the settings page and then apply the Changes at the top of the page.

Now you will have to wait for the Station (slave) to reboot and then reconnect to the AP (master).

Job done.