

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. I'm going to assume that you've already gone through the basics of giving each bridge unit a static IP address suitable for the final network.

Basic config for the 'master'

Starting with the 'master' then log into the web interface for the device to be configured as the master and goto 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: 2346 (1 - 2346)
Client Limits: 127 Enable Disable
AP Detection: Scan
Distance (0-30km): 1 (0.6miles)

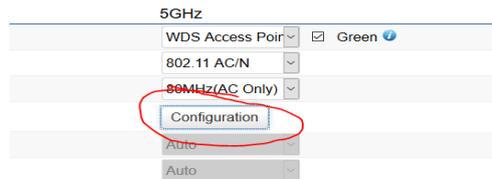
Wireless Settings - 5GHz

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)

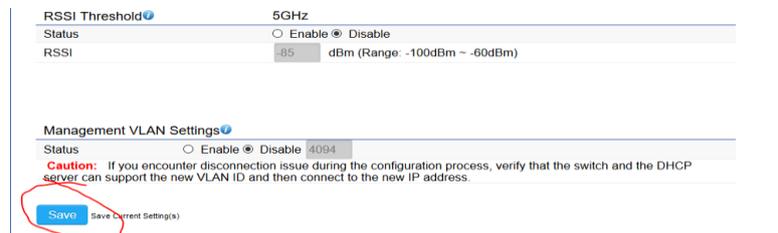
The click on Channel/Configuration to choose a suitable WiFi channel...



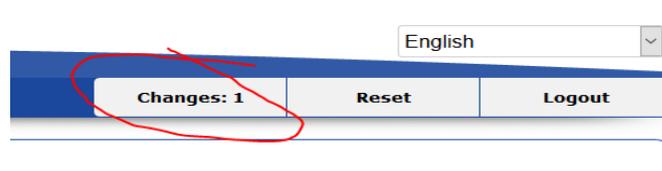
The actual choice of channels offered will depend if this is 11ac (80MHz wide channels) or 11n (40MHz wide channels). Pick a suitable channel. Note for legal outdoor use in the UK/EU then you can only use channels 100 upwards. In this example I simply choose channel 100. 'Save' after choosing the channel.



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



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



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	SynerGroup_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	<input type="radio"/> Enable <input checked="" type="radio"/> 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)

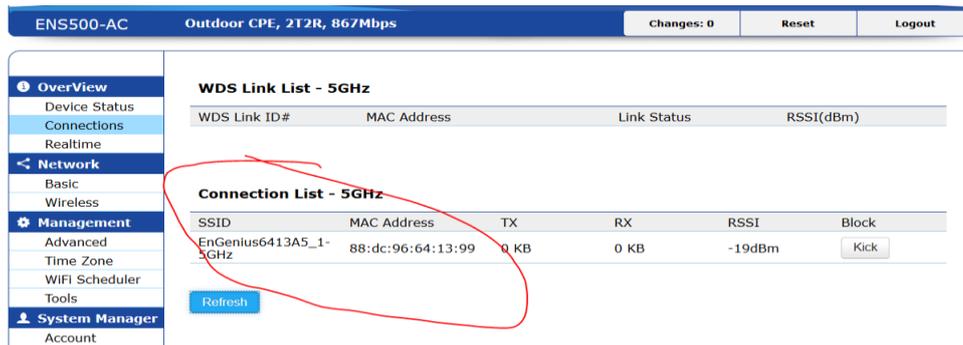
and to the top of the page to apply the 'Changes'.

ENS500-AC Outdoor CPE, 2T2R, 867Mbps	
Changes: 2 Reset Logout	
Overview	Wireless Settings
Device Status	Device Name: ENS500-AC
Connections	Country / Region: United Kingdom
Realtime	
Network	

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

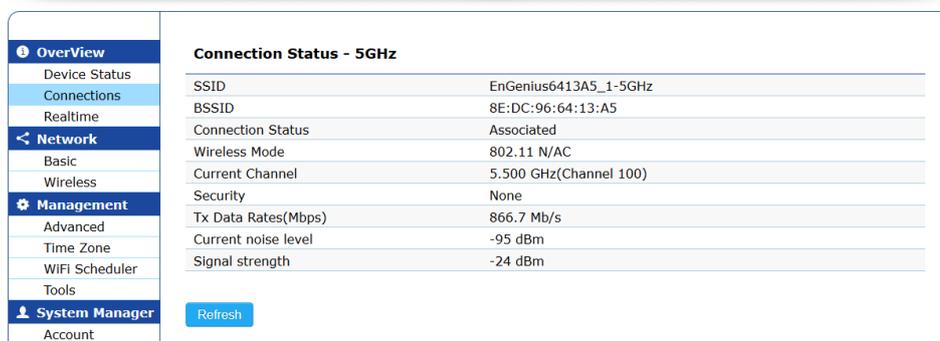
WDS Link List - 5GHz

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....

The screenshot shows the '5GHz' wireless settings page. On the left is a navigation menu with 'Management' selected. The main area contains various settings like 'Operation Mode', 'Wireless Mode', 'Channel HT Mode', etc. At the bottom, there is a table titled 'Wireless Settings - 5GHz' with columns for 'Enabled', 'SSID', 'Edit', 'Security', 'Hidden SSID', 'Client Isolation', 'VLAN Isolation', 'L2 Isolation', and 'VLAN ID'. Two SSIDs are listed: 'EnGenius6413A5_1-5GHz' and 'EnGenius6413A5_2-5GHz'. The 'Edit' button for the first SSID is circled in red.

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

The screenshot shows the 'Wireless Security - 5GHz' settings page. It includes fields for 'Security Mode' (WPA2-PSK), 'Encryption' (Both(TKIP+AES)), 'Passphrase' (fredfred23), and 'Group Key Update Interval' (3600).

then 'Save' on the security page.

The screenshot shows the 'Wireless Traffic Shaping' settings page. It includes options for 'Enable Traffic Shaping' (radio buttons for Enable and Disable), 'Download Limit' (100 Mbps), and 'Upload Limit' (100 Mbps). A 'Save' button is circled in red at the bottom left.

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 goto Network/Wireless page on the 'slave' (WDS Station) unit...

The screenshot shows a network configuration page with a sidebar menu on the left containing: Network, Basic, Wireless, Management, Advanced, Time Zone, WiFi Scheduler, Tools, System Manager, Account, Firmware, and Log. The main content area is titled '5GHz' and includes the following settings:

- Operation Mode: WDS Station (with a Green status indicator)
- 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 (with radio buttons for Enable and Disable)
- AP Detection: Scan
- Distance (0-30km): 1 (0.6 miles)

Below these settings is a table titled 'Wireless Settings - 5GHz':

SSID	Edit	Security
EnGenius6413A5_1-5GHz	Edit	None

Click on Edit for the AP link.

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

The screenshot shows the 'Wireless Security - 5GHz' configuration page. It includes the following fields:

- Preferred BSSID: 8E : DC : 96 : 64 : 13 : A5
- SSID: EnGenius6413A5_1-5GHz
- Security Mode: WPA2-PSK
- Encryption: AES
- Passphrase: fredfred23

A 'Save' button is located at the bottom left, with the text 'Save current setting(s)' next to it. Red circles highlight the Security Mode, Encryption, and Passphrase fields.

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.