

Grandstream Networks, Inc.

GWN76xx Wi-Fi Access Points Master/Slave Architecture Guide



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INTRODUCTION

The GWN76xx Wireless Access Points Series can be deployed in a network environment as standalone (using only one GWN76xx to provide wireless network access) or in Master/Slave architecture (using multiple GWN76xx units) to extend wireless network access range.

In Master/Slave configuration, a unique/chosen GWN76xx acts as master/controller and can manage (up to 50 when using GWN7610 as Master and up to 30 when using GWN7600 as Master) other GWN76xx series considered as slaves. Note that master GWN7600 can act as controller and can also be member of network group(s).

This guide covers Master/Slave architecture mode giving steps to successfully configure GWN76xx access points in your network environment; including steps to discover and pair GWN76xx units, create and manage network groups and SSIDs.

The figure below shows a sample setup of a GWN7610 master with different slave units, and connected Wi-Fi clients through different SSIDs defined in network groups.

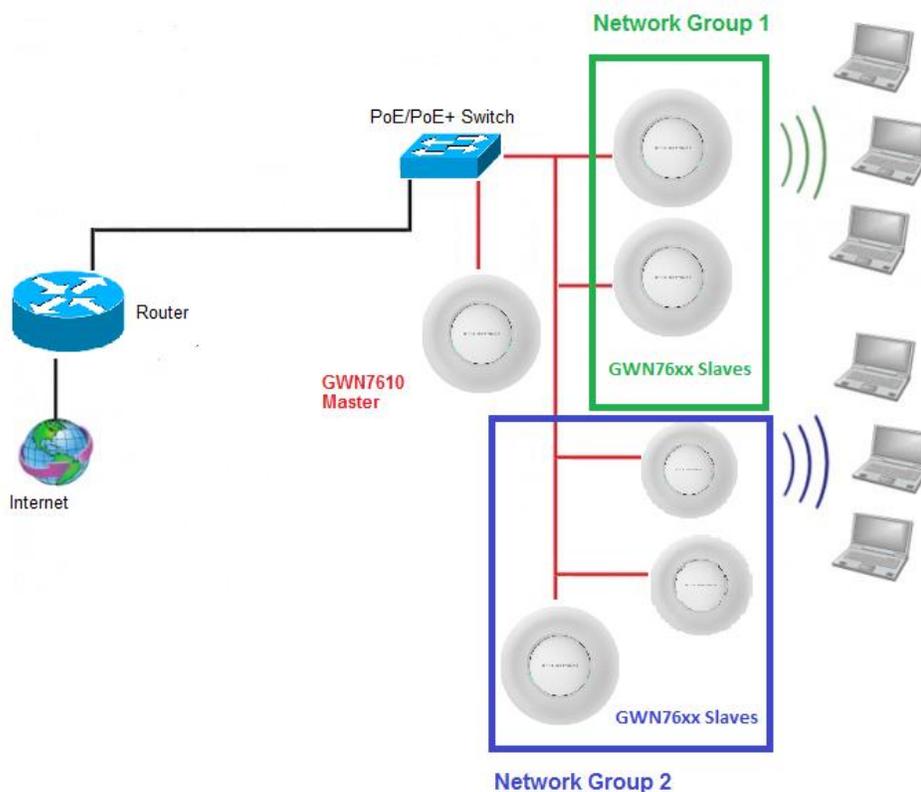


Figure 1: GWN76XXs Setup sample



DISCOVER AND PAIR GWN76XX ACCESS POINTS

In this guide, we will consider an environment where different GWN76xx access points models are installed, one of them will be Master over the remaining ones (Slaves) as shown in Figure 1.

To set a GWN76xx as Master, we need to access to its web interface by discovering it first on the network.

The following chapter describes two methods how to discover a GWN76xx connected to network and configure it as Master.

Discover GWN76xx

Once the GWN76xx is powered up and connected to the network correctly, it can be discovered using one of the following methods:

Method 1: Discover GWN76xx using its MAC address

1. Locate the MAC address on the MAC tag of the unit, which is on the underside of the device, or on the package.
2. From a computer connected to same network as the GWN76xx, type in the following address [https://gwn_\[MAC_address\].local/](https://gwn_[MAC_address].local/) using the GWN76xx's MAC address on your browser.

For example, if a GWN7610 has the MAC address **00:0B:82:8B:4E:28**, this unit can be accessed by typing https://gwn_000b828b4e28.local/ on the browser.

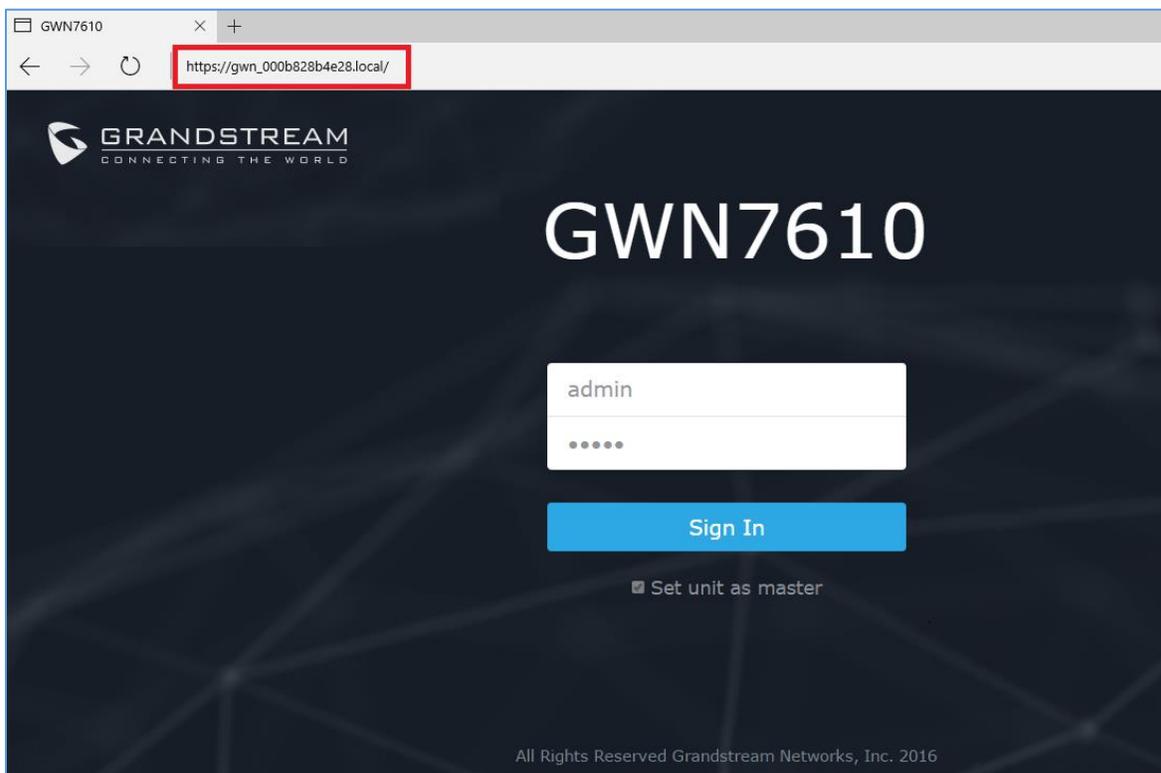


Figure 2: Discover the GWN76xx using its MAC Address



Method 2: Discover GWN76xx using GWN Discovery Tool

1. Download and install **GWN Discovery Tool** from the following link:
<http://www.grandstream.com/sites/default/files/Resources/GWNDiscoveryTool.zip>
2. Open the “GWN Discovery Tool”, click on **Select** to define the network interface, then click on **Scan**.
3. The tool will discover all GWN76xx Access Points models connected on the network showing their MAC, IP addresses and firmware version.
4. Click on **Manage Device** to be redirected directly to the GWN76xx's configuration interface, or type in manually the displayed IP address on your browser.

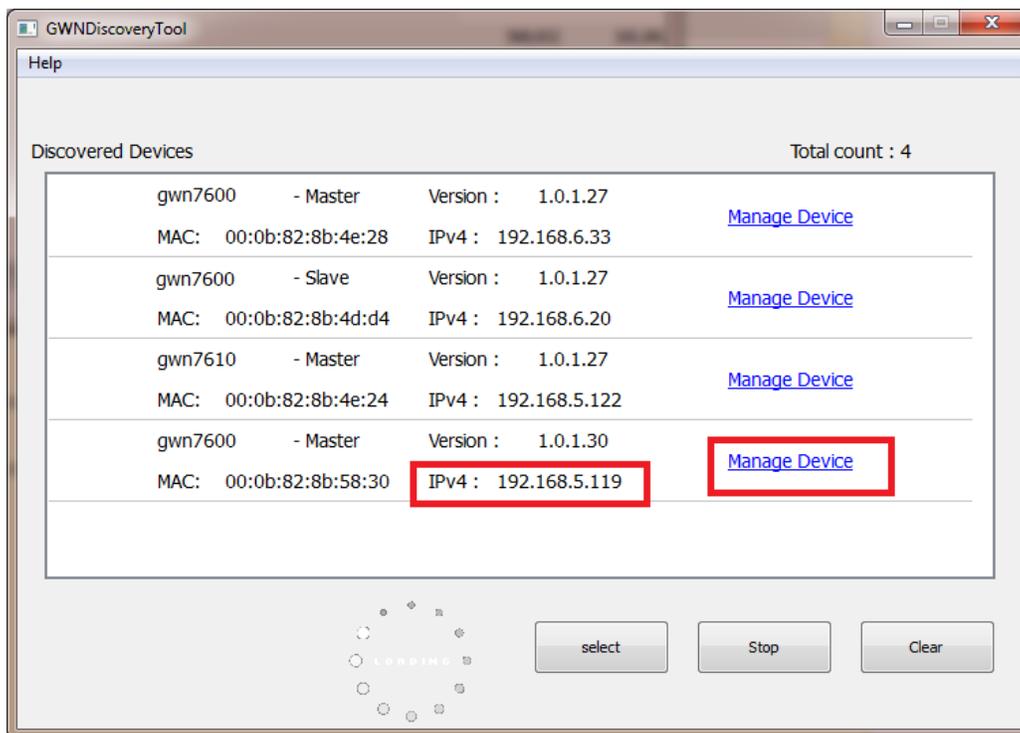


Figure 3: GWN Discovery Tool

Notes:

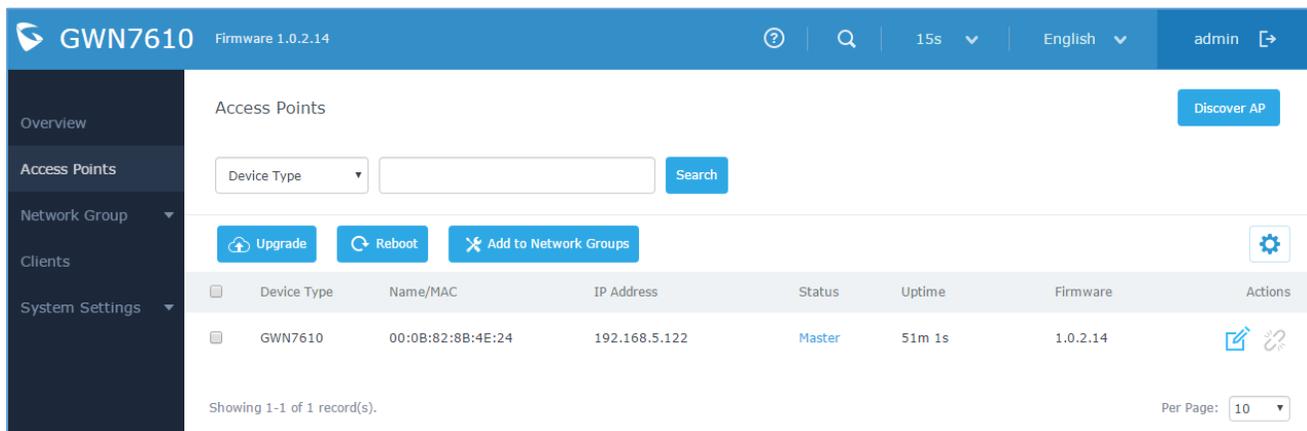
- At first boot or after factory reset, users will be asked to change the default administrator and user passwords before accessing GWN76xx web interface. The new password fields are case sensitive with a maximum length of 32 characters. Using strong passwords including letters, digits and special characters are recommended for better security.
- At factory reset, “**Set unit as Master**” will be checked by default, click on “**Sign In**” after typing the admin’s username and password as shown above.



Pair Slave GWN76xx Access Points

To pair a GWN76xx access points (slaves) connected to the same network as the Master GWN76xx follow the below steps:

1. Connect to the GWN76xx Web GUI as Master and go to **Access Points**.



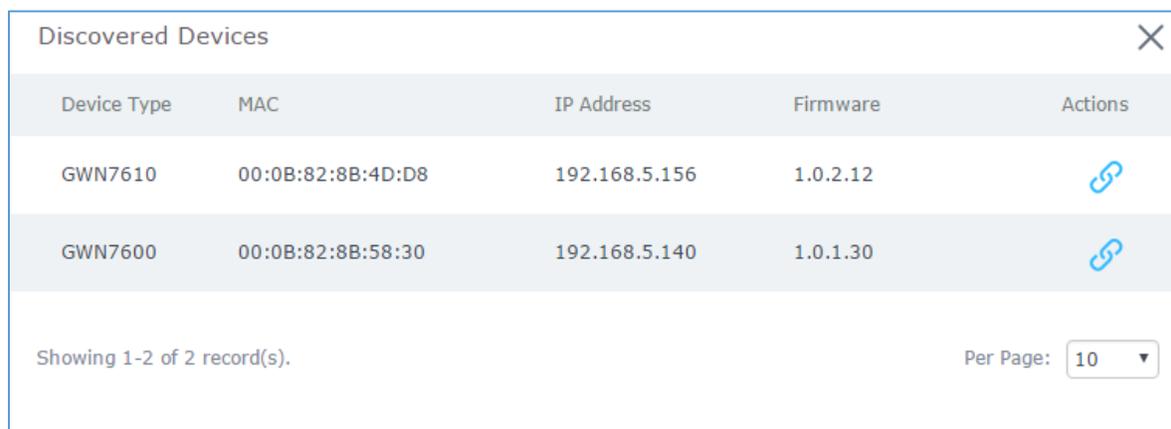
The screenshot shows the GWN7610 Web GUI interface. The top header displays 'GWN7610' and 'Firmware 1.0.2.14'. The left sidebar contains navigation links: Overview, Access Points, Network Group, Clients, and System Settings. The main content area is titled 'Access Points' and features a 'Discover AP' button. Below this is a search bar with a 'Device Type' dropdown and a 'Search' button. There are also buttons for 'Upgrade', 'Reboot', and 'Add to Network Groups'. A table lists the discovered devices:

Device Type	Name/MAC	IP Address	Status	Uptime	Firmware	Actions
GWN7610	00:0B:82:8B:4E:24	192.168.5.122	Master	51m 1s	1.0.2.14	[Edit] [Refresh]

Showing 1-1 of 1 record(s). Per Page: 10

Figure 4: Discover AP

2. Click on **Discover AP** in order to discover different GWN76xx access points models within GWN76xx's Network, the following page will appear.



The screenshot shows a modal window titled 'Discovered Devices'. It contains a table with the following data:

Device Type	MAC	IP Address	Firmware	Actions
GWN7610	00:0B:82:8B:4D:D8	192.168.5.156	1.0.2.12	[Link]
GWN7600	00:0B:82:8B:58:30	192.168.5.140	1.0.1.30	[Link]

Showing 1-2 of 2 record(s). Per Page: 10

Figure 5: Discovered Devices



- Click on Pair  under Actions, to pair the discovered Access Point as Slave with the GWN76xx acting as Master.
- The paired GWN76xx will appear Online, click on  to unpair it.

<input type="checkbox"/>	GWN7610	00:0B:82:8B:4D:D8	192.168.5.156	Online	56m 27s	1.0.2.12	 
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Figure 6: GWN76xx online

- Click on  next to Master or paired access point to check device configuration for its status, users connected to it and configuration. Refer to below table for Device Configuration tabs.

Table 1: Device Configuration

Status	Shows the device's status information such as firmware version, IP address, link speed, uptime and users count via different Radio channels.
Users	Shows the connected users to the GWN76xx access point.
Configuration	<ul style="list-style-type: none"> Device Name: Set GWN76xx's name to identify it along with its MAC address. Fixed IP: Used to set a static IP for the GWN76xx, if checked, the following fields will need to be configured: <ul style="list-style-type: none"> IPv4 Address: Enter the IPv4 address to be set as static for the device. IPv4 Subnet Mask: Enter the Subnet Mask. IPv4 Gateway: Enter the Network Gateway's IPv4 Address. Preferred IPv4 DNS: Enter the Primary IPv4 DNS. Alternate IPv4 DNS: Enter the Alternate IPv4 DNS. Frequency: Set the GWN76xx's frequency, it can be either 2.4GHz, 5GHz or Dual-band. Enable Band Steering: When Frequency is set to Dual-Band, checking this option will enable Band Steering on the Access Point, this will help redirecting clients to 5GHz radio band if supported on the device (otherwise, 2.4GHz radio band will be used) for efficient use and to benefit from the maximum throughput. Mode: Choose the mode for the frequency band, 802.11n/g/b for 2.4Ghz and 802.11ac for 5Ghz. Channel Width: Choose the Channel Width. Note that Wide channel will give better speed/throughput, and narrow channel will have less interference. 20Mhz is suggested in very high density environment. 40MHz Channel Location: Configure the 40MHz channel location when using 20MHz/40MHz in Channel Width; it can be set to "Secondary Below Primary", "Primary Below Secondary" or "Auto". Channel: Select "Auto" or a specific channel. Default is "Auto". Note that the proposed channels depend on Country Settings under System Settings→Maintenance→Basic. Enable Short Guard Interval: Check to activate this option to half the guard



interval (from 800ns to 400ns) ensuring that distinct transmissions do not interfere with one another, this will help increasing throughput.

- **Active Spatial Streams:** Choose active spatial stream. Available options: "Auto", "1 stream", "2 streams" and "3 streams" (3 streams is supported on GWN7610 model only).
- **Radio Power:** Set the Radio Power depending on desired cell size to be broadcasted, three options are available: "Low", "Medium" or "High". Default is "High".

Note:

If a GWN76xx is not being paired or pair icon is grayed, make sure that it is not already paired with another GWN76xx Master Access Point. If yes, it needs to be unpaired first, or reset to factory default settings in order to make it available for pairing by other GWN76xx Access Point Controller.



CREATE AND MANAGE NETWORK GROUPS

After creating Master/Slave architecture using deployed GWN76xx access points, It is possible to create different Network Groups on the Master GWN76xx and select specific GWN76xx Slave Access Points as members in the Network Group.

i

Information

Network Group:
 Each set of devices communicating directly with each other is called a Basic Service Set (BSS). Several BSSs can be joined together to form one logical WLAN segment, referred to as an Extended Service Set (ESS). A GWN76xx group is an Extended Service Set. A Group also can contain different SSIDs.

SSID:
 A Service Set Identifier (SSID) is the name given to each ESS. It is also the primary name associated with an 802.11 wireless local area network (WLAN) including home networks and public hotspots. Client devices use this name to identify and join wireless networks. SSIDs are case-sensitive text strings. The SSID is a sequence of alphanumeric characters (letters or numbers) with a maximum length of 32 characters.

The following steps show how to create and manage network groups:

1. Login to the Master GWN76xx AP web GUI and navigate to **Network Group->Network Group**.

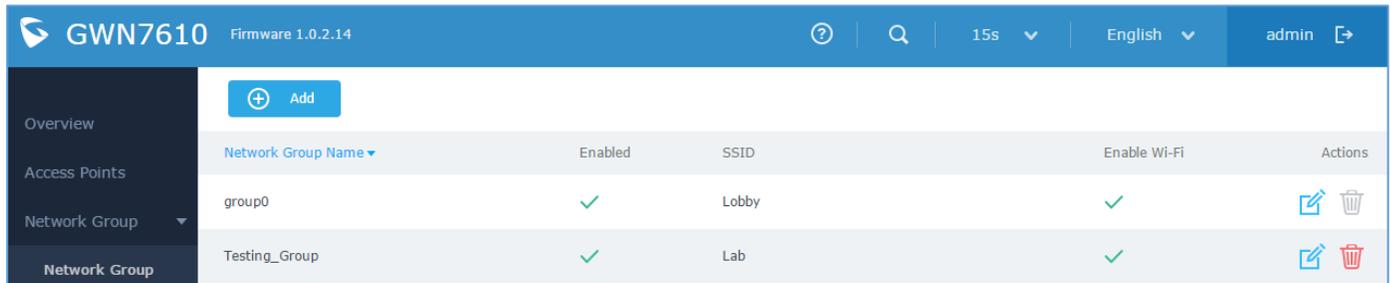
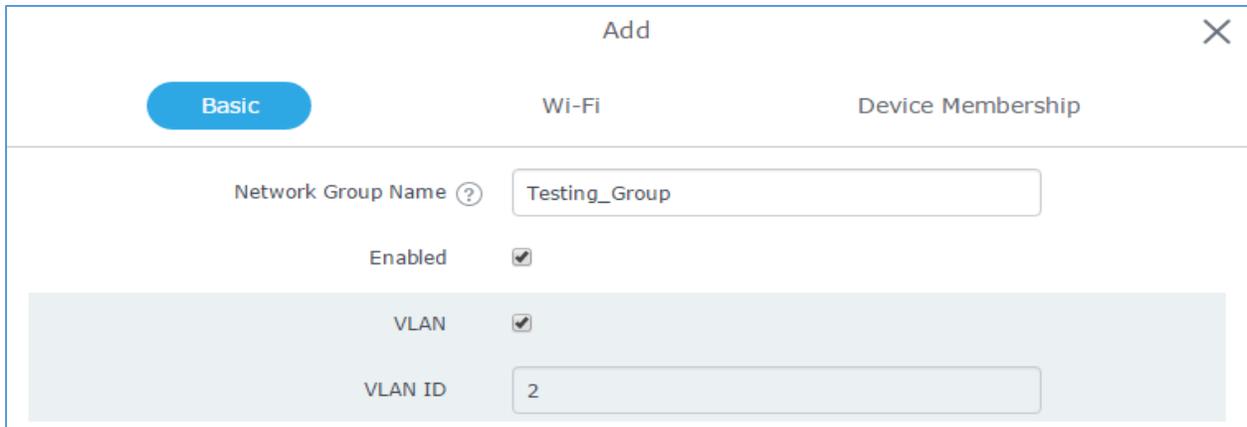


Figure 7: Network Group

2. The GWN76xx has a default network group named **group0** (enabled by default). Click on  to edit it, or click on  to add a new network group if needed.





Add ✕

Basic
Wi-Fi
Device Membership

Network Group Name ?

Enabled

VLAN

VLAN ID

Figure 8: Add a New Network Group

Notes:

A network group can be formed by one or multiple GWN76xx access points (including Master GWN76xx). Each network group can have a unique or different SSIDs (up to 16). A slave access point can be member of different network groups.

GWN76xx does not support DHCP server and cannot assign IP addresses to devices. GWN76xx acts only as a relay of the router connected to it.

Network Group & SSID Configuration

Network group configuration is available when editing or adding a new network group. The configuration is arranged in 3 tabs including Basic, Wi-Fi and Device Membership.

- **Basic:** This tab allows to define a name to identify the network group, enable or disable VLAN, and specify VLAN ID for the group.

Table 2: Network Group Settings – Basic

Network Group Name	Defines a name for the network group.
Enabled	Enables/disables a network group. group0 is by default enabled.
VLAN	Enables/disables VLAN setting.
VLAN ID	Set VLAN ID when VLAN option is enabled.

Note: “Enabled”, “VLAN” and “VLAN ID” options are available for created network groups only.

- **Wi-Fi:** This tab contains all Wi-Fi settings to be used by the group, including definition of SSID, security mode, MAC filtering...

Table 3: Network Group Settings – Wi-Fi

Enable Wi-Fi	Check to enable Wi-Fi for the network group.
SSID	Set or modify the SSID name.
SSID Hidden	Select to hide SSID. If checked, SSID will not be visible when scanning for Wi-Fi, to connect a device to hidden SSID, potential wireless clients will need to specify SSID name and authentication password manually.



Security Mode	<p>Set the security mode for encryption, 5 options are available:</p> <ul style="list-style-type: none"> • WEP 64-bit: Using a static WEP key. The characters can only be 0-9 or A-F with a length of 10, or printable ASCII characters with a length of 5. • WEP 128-bit: Using a static WEP key. The characters can only be 0-9 or A-F with a length of 26, or printable ASCII characters with a length of 13. • WPA/WPA2: Using “PSK” or “802.1x” as WPA Key Mode, with “AES” or “AES/TKIP” Encryption Type. • WPA2: Using “PSK” or “802.1x” as WPA Key Mode, with “AES” or “AES/TKIP” Encryption Type. Recommended configuration for authentication. • Open: No password is required. Wireless clients will be connected without authentication. Not recommended for security reasons.
Use MAC Filtering	<p>Choose Blacklist/Whitelist to specify MAC addresses to be excluded/included from connecting to the Wi-Fi zone. Default is Disabled.</p>
Client Isolation	<p>Client isolation feature blocks any TCP/IP connection between connected clients to GWN76xx’s Wi-Fi access point. Client isolation can be helpful to increase security for Guest networks/Public Wi-Fi.</p> <p>If enabled, the default LAN Gateway’s MAC address must be specified under Gateway MAC Address field. The clients will not be able to discover, ping or access other wireless devices connected to GWN7600’s network groups and only access to the default gateway, which usually means Internet access.</p> <p>If disabled, clients will have full access to any device connected to the network, including wireless clients across network groups. Default is “Disabled”.</p>
Gateway MAC Address	<p>This field is required when using Client Isolation, so users will not lose access to the Network (usually Internet).</p> <p>Type in the default LAN Gateway’s MAC address (router’s MAC address for instance) in hexadecimal separated by “:”.</p> <p>Example: 00:0B:82:8B:4D:D8</p>
RSSI Enabled	<p>Check to enable RSSI function, this will lead the AP to disconnect users below the configured threshold in Minimum RSSI (dBm).</p>
Minimum RSSI (dBm)	<p>Enter the minimum RSSI value in dBm. If the signal value is lower than the configured minimum value, the client will be disconnected. The input range is from “-94” or “-1”.</p>



+ Add ✕

BasicWi-FiDevice Membership

Enable Wi-Fi

SSID ?

SSID Hidden

Security Mode

WPA Key Mode

WPA Encryption Type

WPA Pre-Shared Key ? 👁

Use MAC Filtering

Client Isolation ?

Enable RSSI ?

Minimum RSSI (dBm) ?

Save Cancel

Figure 9: Wi-Fi Settings

- **Device Membership:** This tab lists available devices previously paired and allows to define slave GWN76xx access points as members of the network group.

Click on ➔ to add a paired GWN76xx to the network group, or click on ➜ to remove it.



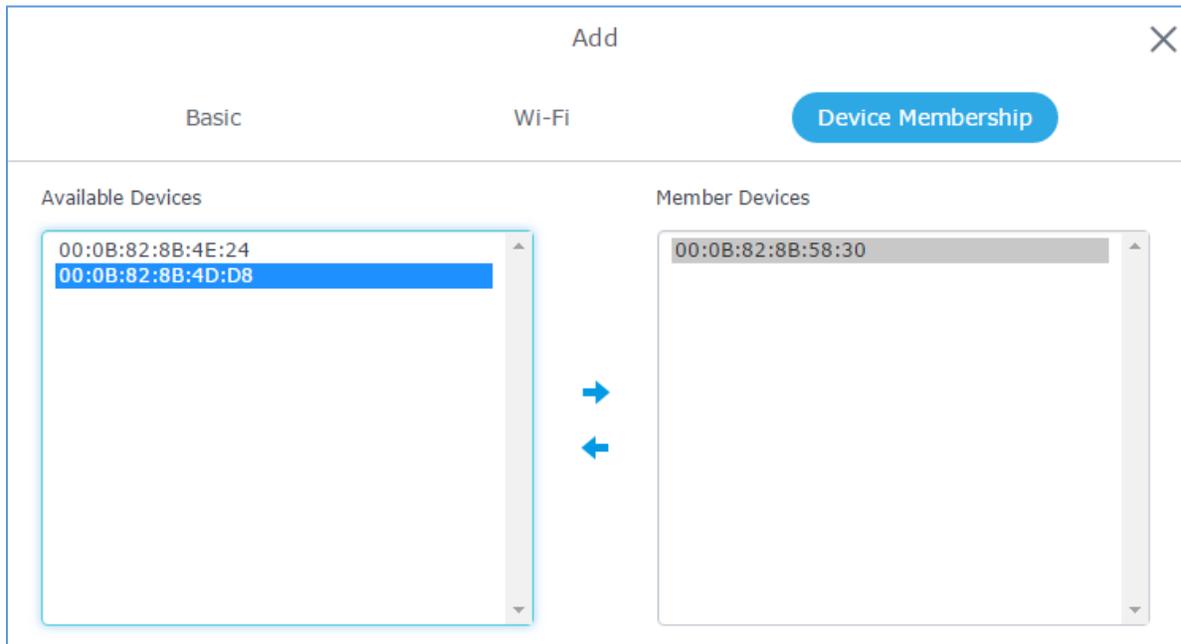


Figure 10: Device Membership

It is also possible to add a device to a Network Group from Access Points Page:

- Select the desired AP to add to a Network Group and click on **Add to Network Groups**.

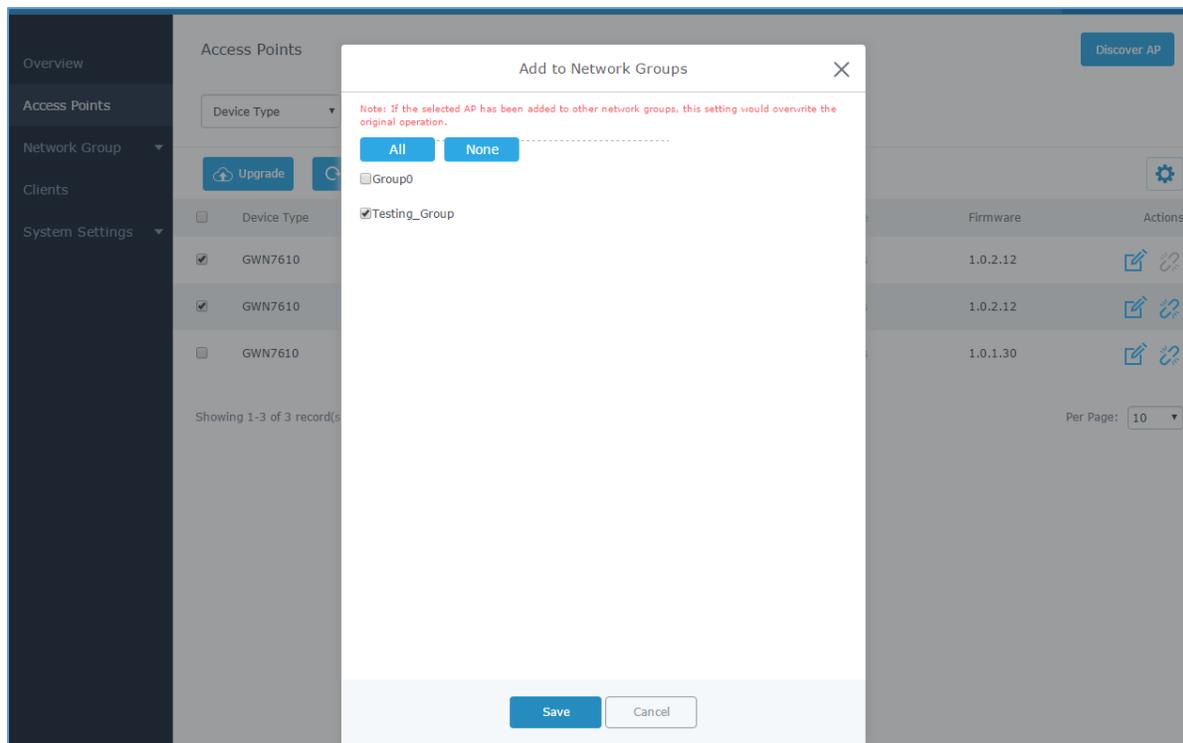


Figure 11: Add AP to Network Group from Access Points Page

- Check to select the desired Network, on which the selected APs will be added, as shown in the above figure.



Additional SSID

Additional SSID allows creating multiple SSIDs under the same group including one or multiple GWN76xx access points.

If configured, different SSID will be available for devices within nearest GWN76xx access points range under the same network group.

1. To create an additional SSID go to **Network Group->Additional SSID**

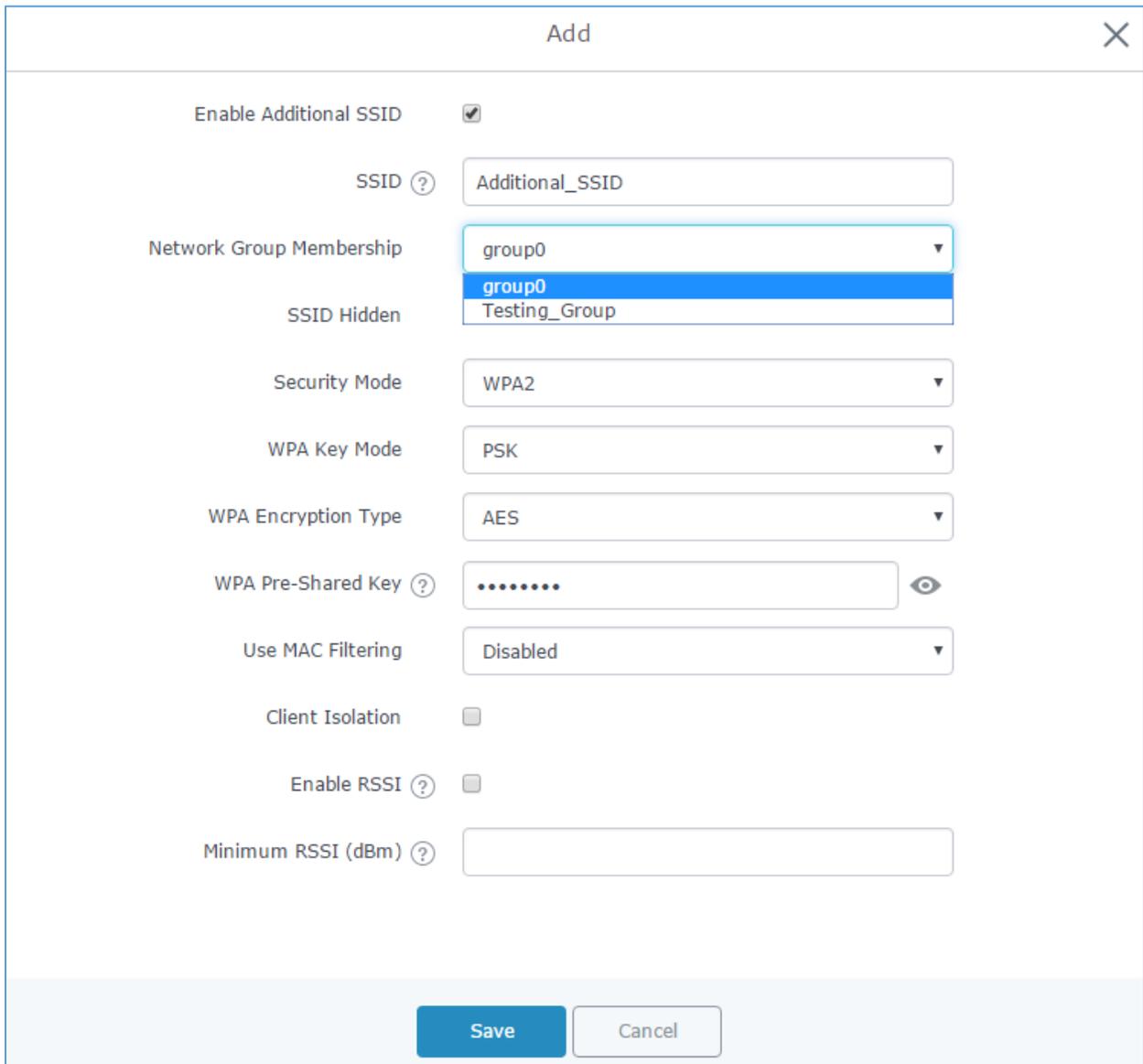


Figure 12: Additional SSID

2. Select one of the available network groups from **Network Group Membership** dropdown menu. This will create an additional SSID with the same Device Membership configured when creating the main network group.



SSID	Enabled	Network Group	Hidden	Security Mode	MAC Filtering	Client Isolati... RSSI	Actions
Additional_SSID	✓	group0	✗	WPA2	Disabled	✗ ✗	 

Figure 13: Additional SSID Created

3. Click on  to delete the additional SSID, or  to edit it.

Note: The GWN76xx Series support up to 16 SSID. This allows creating SSIDs under different groups or on the same group within this limit.

