User Manual

Mesh Network Support

Revision History

Revision	Release date	comment
1.0	2013/07/29	First issue

Table of Contends

How to setup Mesh Network

Mesh network only works under wireless operations modes as “AP+MESH”, or “MESH”. You could change operation mode at *Basic Settings* web page as Figure 1.

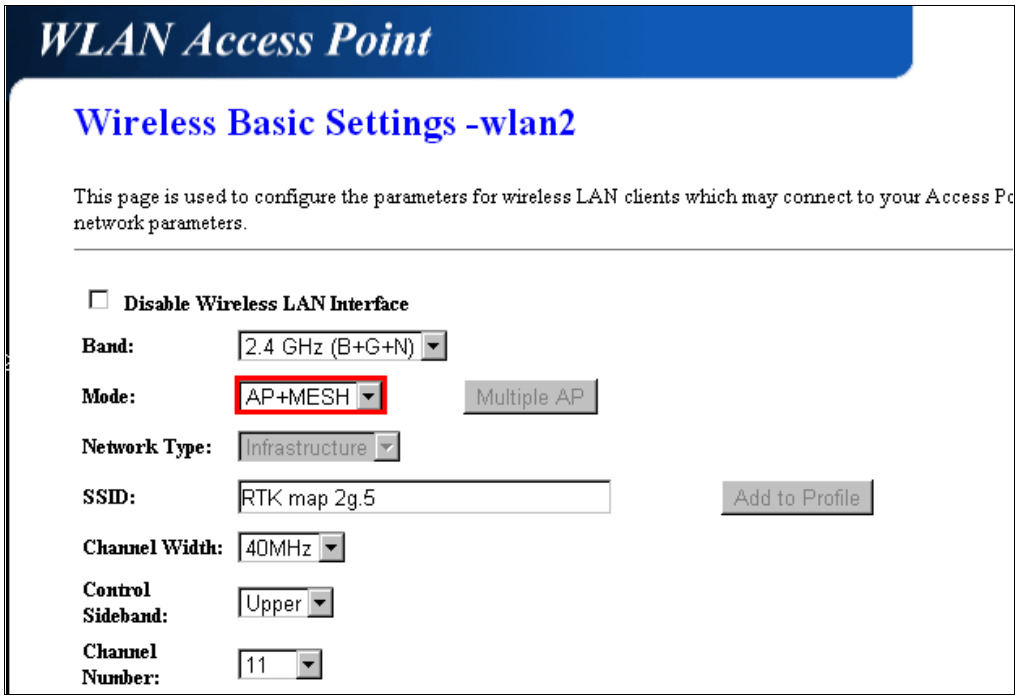


Figure 1

The mesh nodes will connect to each other automatically only when they are configured with same band, bandwidth, channel, mesh ID, and security suite. And be sure of all mesh nodes use the exactly pre-shared key. Or these nodes will be connected but traffic is not reachable.

Users could setup through web page as Figure 2. This page accessed by click the menu item, *Mesh settings*, of home page. This menu is expanded after user click the band required to setup.

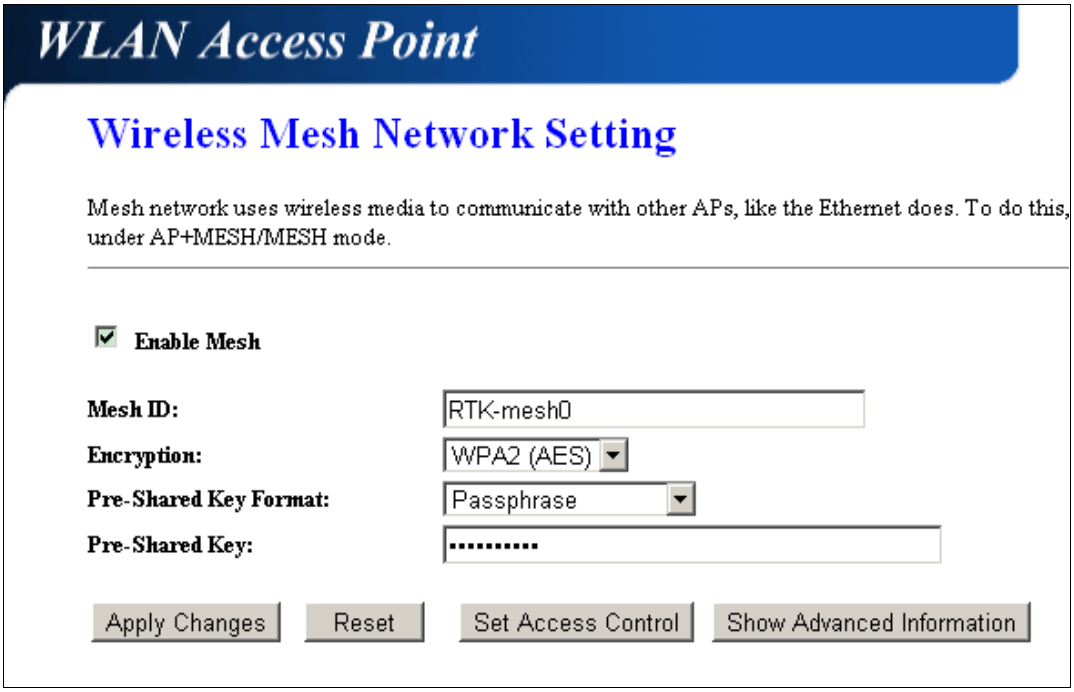


Figure 2, Page of setup mesh network by band

As Figure 2 demonstrate, there is a mesh network enabled with Mesh ID,*RTK-mesh0*, and take WPS2/AES as security suite.

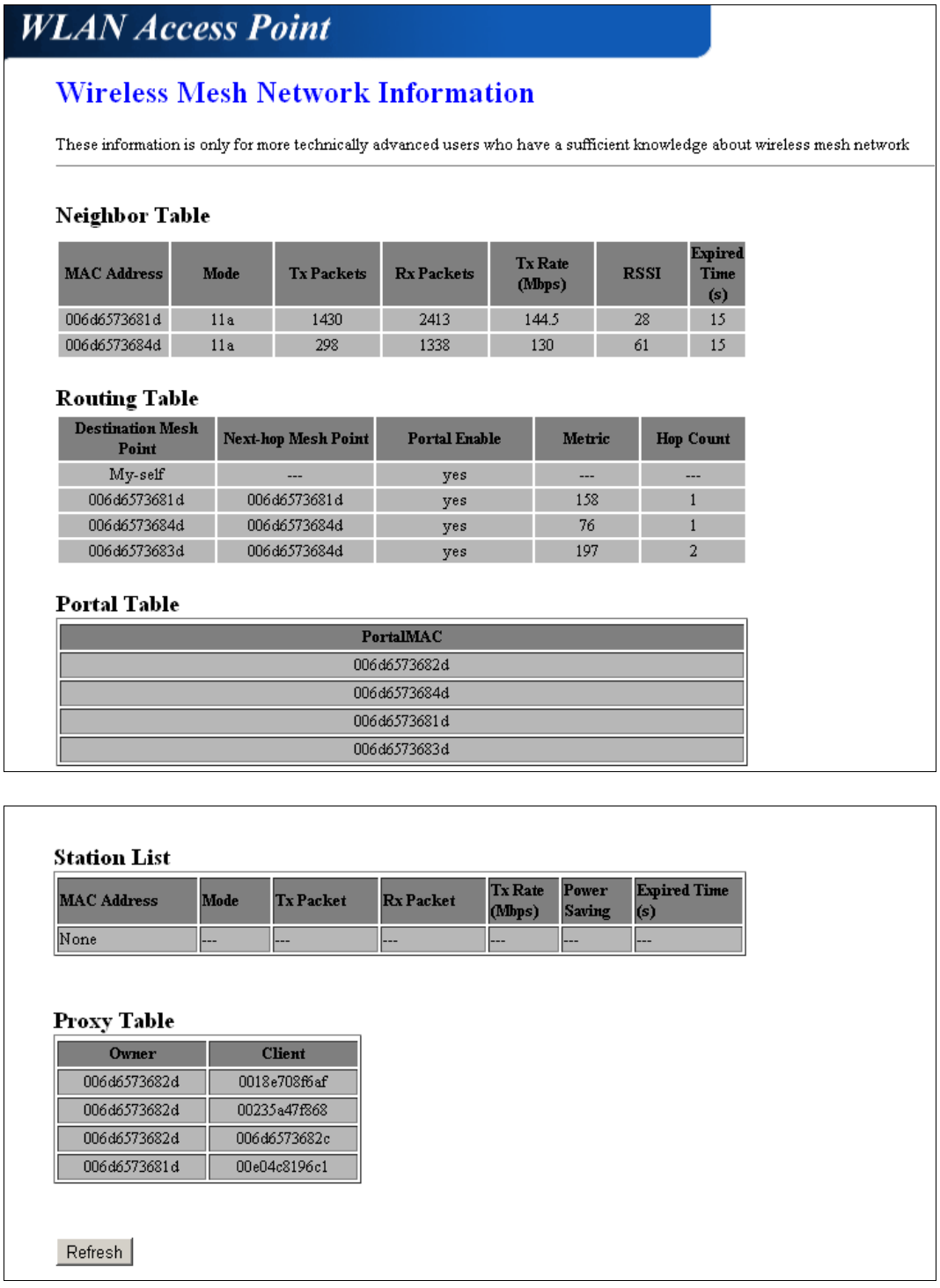
The security settings is independent to WiFi applied

By default, this page is “grey colored” to limit users’ configuration. Users should access *Basic Settings* page then switch wireless operation mode as *AP+MESH* to unlock. There is an operation mode, *MESH*, for users which need to setup a device only be capable of mesh network connectivity without Wireless Access Point capability.

When configuration is completed, please apply changes and reboot the device.

Mesh Network Information

Users click the button named *Show Advanced Information* on web page as Figure 1, the browser tab is flushed by another web page as Figure 2. Users could read all mesh information through scroll bar.



WLAN Access Point

Wireless Mesh Network Information

These information is only for more technically advanced users who have a sufficient knowledge about wireless mesh network

Neighbor Table

MAC Address	Mode	Tx Packets	Rx Packets	Tx Rate (Mbps)	RSSI	Expired Time (s)
006d6573681d	11a	1430	2413	144.5	28	15
006d6573684d	11a	298	1338	130	61	15

Routing Table

Destination Mesh Point	Next-hop Mesh Point	Portal Enable	Metric	Hop Count
My-self	---	yes	---	---
006d6573681d	006d6573681d	yes	158	1
006d6573684d	006d6573684d	yes	76	1
006d6573683d	006d6573684d	yes	197	2

Portal Table

PortalMAC
006d6573682d
006d6573684d
006d6573681d
006d6573683d

Station List

MAC Address	Mode	Tx Packet	Rx Packet	Tx Rate (Mbps)	Power Saving	Expired Time (s)
None	---	---	---	---	---	---

Proxy Table

Owner	Client
006d6573682d	0018e708f6af
006d6573682d	00235a47f868
006d6573682d	006d6573682c
006d6573681d	00e04c8196c1

Refresh

Figure 3, Web Page of Mesh Information

Neighbor Table

This table shows basic information of all mesh nodes connected. Any mesh nodes configured with the same settings exceed proper distance, or behind some block that extremely degrade signal strength, or limited by Access Control List will not be present.

Routing Table

All mesh nodes discovered a routing path to reach are showed as this table. If some mesh node broadcast that it supports to be a *Portal*, the *Portal Enable* attribute recorded as " recorded as "*yes*". The *Metric* attributes explain cost of reaching this mesh node and *Hop Count* describe the path distance.

For example in Figure 2, *006d6573681d* and *006d6573684d* are 1-hop reachable. Path to reach *006d6573681d* is better than *006d6573684d* because of lower metric. *006d6573683d* is 2-hop reachable, and any packets with destination relative to *006d6573683d* will be forwarded to the Next-hop Mesh Node, *006d6573684d*.

Portable Table

All mesh nodes broadcast that it supports to be a Portal, which means they are capable to forward traffic to PC plugged in its Ethernet port.

Station List

Basic information of all WiFi clients connected to Access Point interface are listed.

Proxy Table

Data of this table is constructed through traffic learning. The learning happens to all packets received with mesh network formatted, or which are forwarded from its own Ethernet LAN/WiFi.

Refresh

Flush this page for latest information by click this button.

Layer-II Filtering in Mesh Network

If there is requirement to limit traffic go-through some link in mesh network, users could access web page as Figure 3 below. Click the button named *Set Access Control* at page Figure 1 shows will display this page.

There are three policies for limit traffic. **Disable** means turn off this functionality. All rules stored will not be cleaned up unless users demand. **Allow** makes packets destination of MAC(s) in rule(s) pass through, or **Deny** drop packets fit rules.

Rules append could be removed through clicking two buttons, *Delete Selected* or *Delete All*. Delete Selected will delete those rules users checked at check box. Delete All will remove all entries.

Reset will clean up all changes ever done, including MAC address just input and policy just choose.

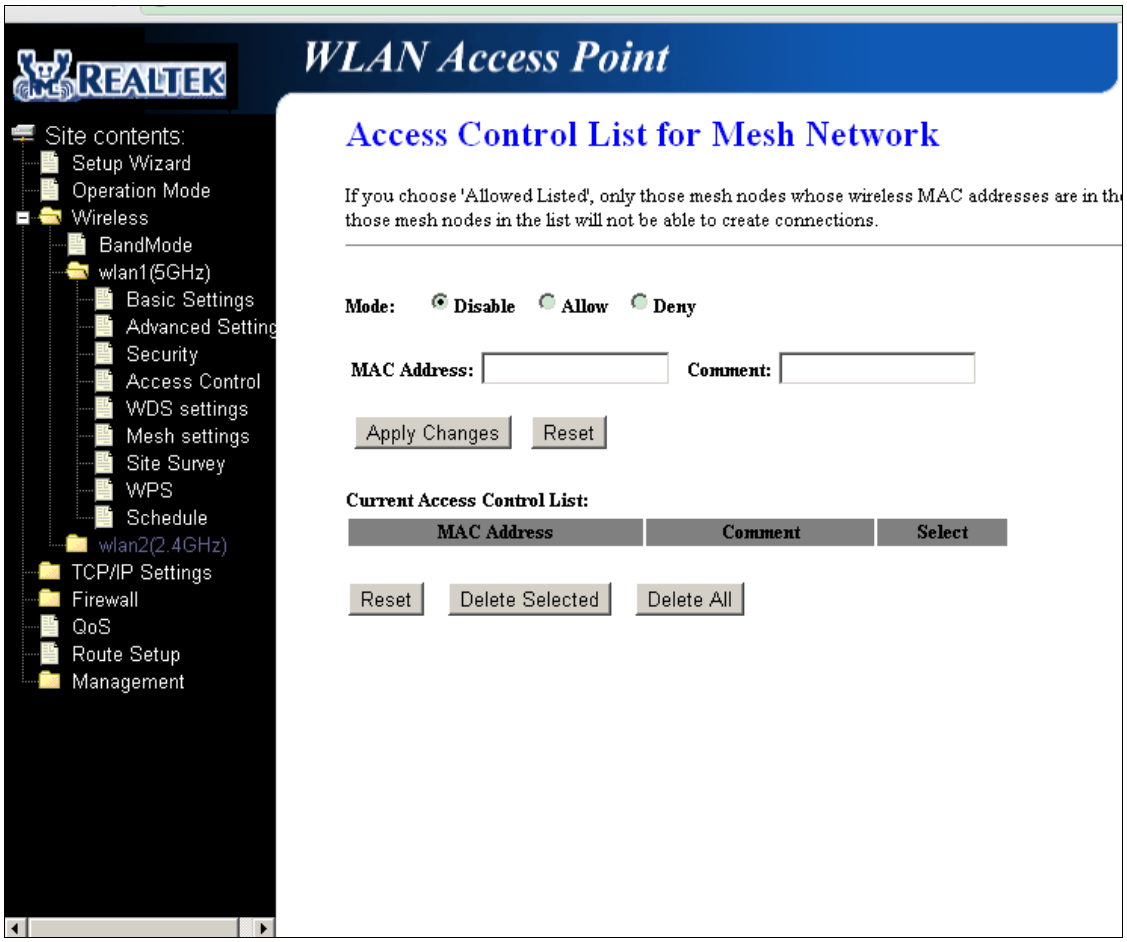


Figure 4, Access Control List for Mesh

This L-II filtering is independent to *Access Control* for WiFi.

Constrain of Mesh Network Application

1. Because Mesh Network will be L2 connected to form a LAN, please make sure that there is only one DHCP server/Gateway in one mesh network. Or multiple DHCP servers will deliver IP to clients within the same LAN and suffer IP confliction.
2. Although each mesh node is capable to connect 31 other mesh nodes, it is suggested to deploy five mesh nodes at most within an area such as at home. Or too much media access contention will drop throughput dramatically. In general, it is more then enough to deploy three nodes.

How to enable Mesh using SDK

Please turn on the Mesh Network support through menuconfig of SDK. This option behind Wireless LAN as following demonstrated.

First, access the configuration for kernel,

```
--- select components
    Selected Target (rtl8196e)  --->
    Selected Kernel (linux-2.6.30)  --->
    Selected Busybox (busybox-1.13)  --->
    Selected toolchain (rsdk-1.3.6-4181-EB-2.6.30-0.9.30)  --->
--- rtl8196e
    Selected Board Configuration (96E+92E GW)  --->
--- config components
[*] Config kernel
[ ] Config users
[ ] Config busybox
[ ] Load default settings
[ ] Save default settings
```

then exist.

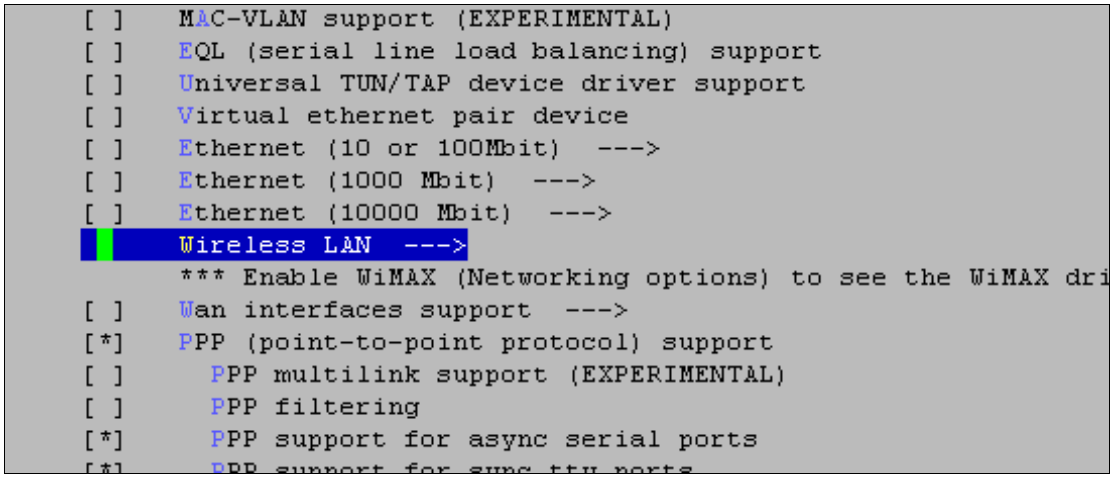
Select option of “Device Drivers”.

```
        System Configuration  --->
        Kernel type  --->
        General setup  --->
    [ ] Enable loadable module support  --->
    [*] Enable the block layer  --->
        Bus options (PCI/USB)  --->
        Power management options  --->
    [*] Networking support  --->
        Device Drivers  --->
        File systems  --->
        Kernel hacking  --->
        Security options  --->
    [*] Cryptographic API  --->
        Library routines  --->
```

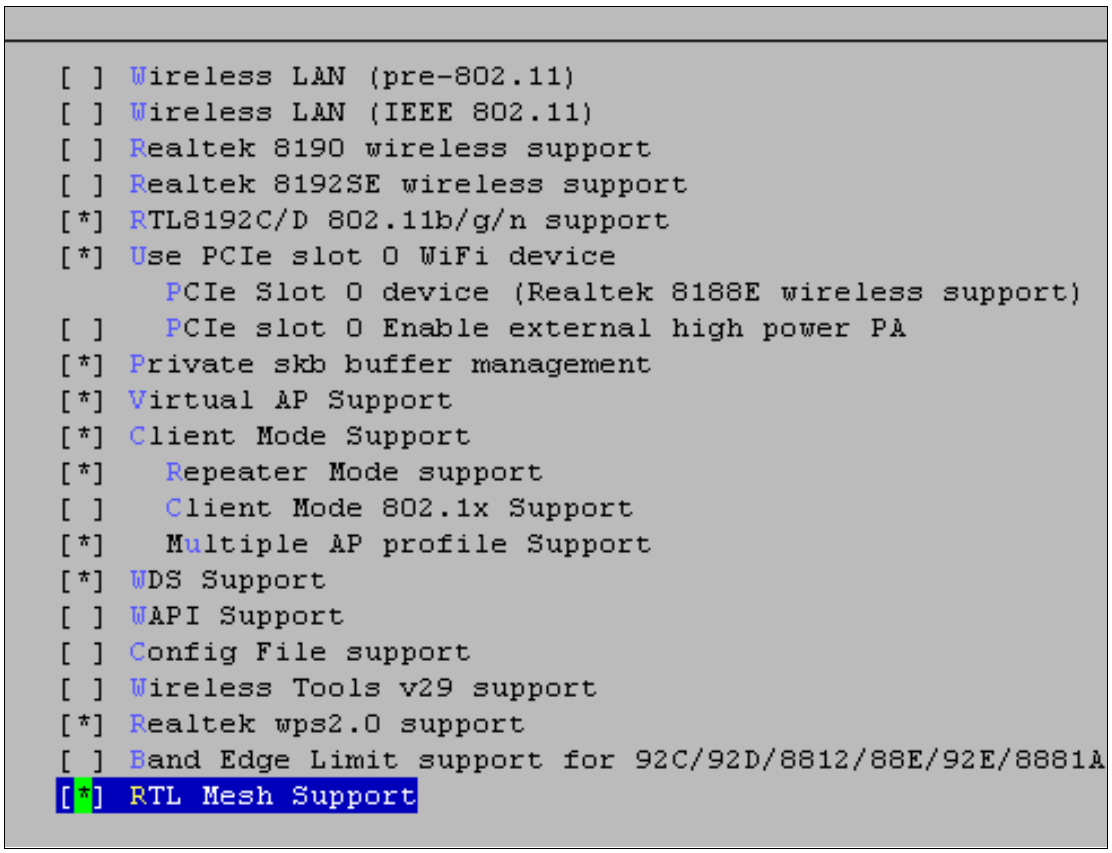
And choose to configure “Network device support”.

```
        Generic Driver Options  --->
    [ ] Connector - unified userspace <-> kernelspace linker  --->
    [*] Memory Technology Device (MTD) support  --->
    [ ] Parallel port support  --->
    [*] Block devices  --->
    [ ] Misc devices  --->
        SCSI device support  --->
    [ ] Serial ATA (prod) and Parallel ATA (experimental) drivers  --->
    [ ] Multiple devices driver support (RAID and LVM)  --->
    [*] Network device support  --->
    [ ] ISDN support  --->
    [ ] Telephony support  --->
        Input device support  --->
```

After choose “Wireless LAN”,



You will see the page as below.



Select the option “RTL Mesh Support” then save and exit to store the configuration for producing image involve Mesh. Then Compile SDK to generate image.