Realtek STA Control Development guide

Date: 2015/05/19

Version: 1.0

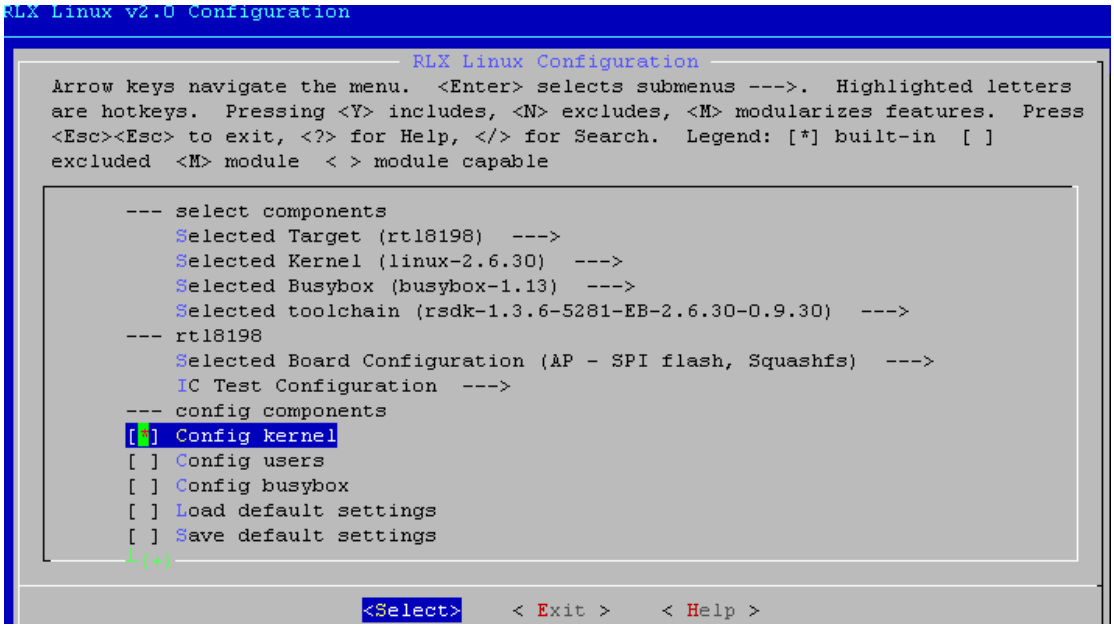
CHANGE HISTORY

VERSION	DATE	REMARKS
1.0	2015/05/19	INITIAL RELEASE

1. How to Enable Sta Control Function

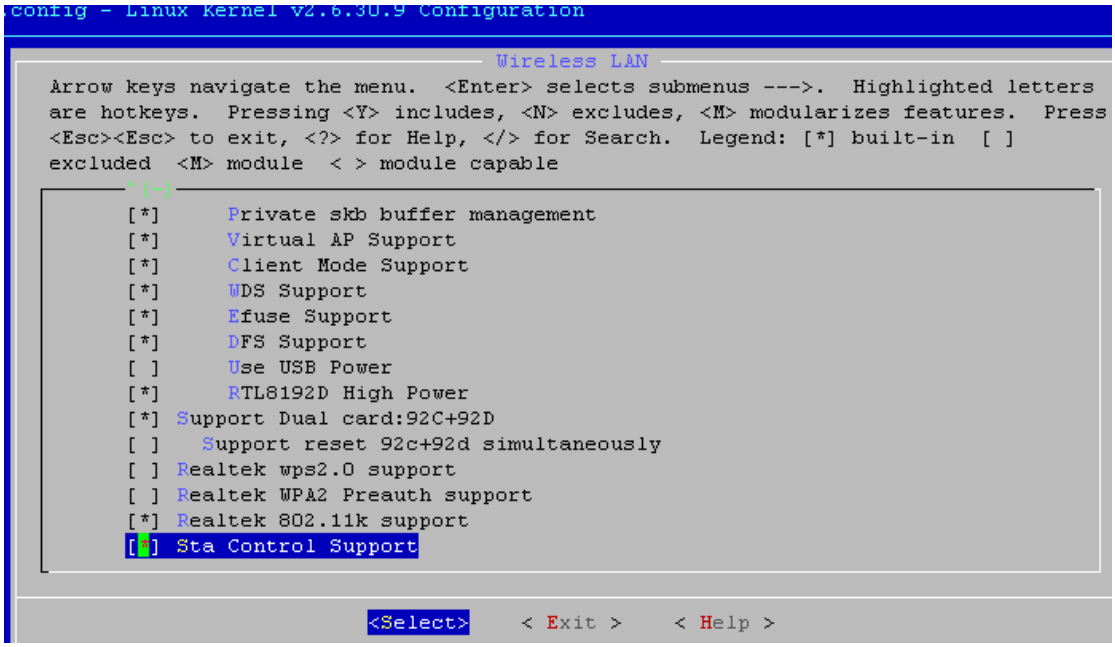
To enable sta control support, select the “Sta Control Support“ in menuconfig, as following demonstrated.

Select “Config kernel”



, and then exist.

Select option of “Device Drivers”->“Network device support”->“Wireless LAN”, you would see bellow figure.



Make sure “Sta Control Support” is selected. Compile SDK to generate new image.

2. Related MIBs

Name	Meaning	Value	Default	Comment
stactrl_enable	Enable/Disable sta control feature	0 – disable, 1 - enable		
stactrl_groupID	Used to group different interfaces from different band. Only the interface with same groupID can steer clients to each other.	0 ~ 255		
stactrl_prefer_band	Set the prefer band	0 – non-prefer band , 1 – prefer band		Only one interface of the same group (identified by groupID) can set to prefer band.
stactrl_param_1	RSSI Threshold T	Unsigned integer value	40	Detail usage is described in section 1.4. When setting these mibs, be sure to set same value for both prefer and non-prefer band.
stactrl_param_2	RSSI Threshold Tolerance W	Unsigned integer value	5	Detail usage is described in section 1.4. When setting these mibs, be sure to set same value for both prefer and non-prefer band.
stactrl_param_3	X period in unit of second	Unsigned integer value	30	Detail usage is described in section 1.4. When setting these mibs, be sure to set same value for both prefer and non-prefer band.
stactrl_param_4	Y retries	Unsigned integer value	2	Detail usage is described in section 1.4. When setting these mibs, be sure to set same value for both prefer and non-prefer band.

*The default value of MIB will be ‘0’ if it is not specified

3. Enable/Disable Sta Control Feature Example

- Bellow is an example to enable sta control function on wlan0 and wlan1 with waln0 as the prefer band:

```
ifconfig wlan0 down
ifconfig wlan1 down
iwpriv wlan0 set_mib stactrl_enable=1      (enable wlan0 sta control)
iwpriv wlan1 set_mib stactrl_enable=1      (enable wlan1 sta control)
iwpriv wlan0 set_mib stactrl_prefer_band=1    (set wlan0 as prefer band)
iwpriv wlan1 set_mib stactrl_prefer_band=0    (set wlan1 as non-prefer band)
iwpriv wlan0 set_mib stactrl_groupID=0       (set wlan0 groupID)
iwpriv wlan1 set_mib stactrl_groupID=0       (set wlan1 groupID)
ifconfig wlan0 up
ifconfig wlan1 up
```

  *Note that the groupID could be any value as long as the groupIDs of wlan0 and wlan1 are same. Only the interfaces with same groupID can steer clients to each other.

- Bellow is an example to disable sta control function:

```
ifconfig wlan0 down
ifconfig wlan1 down
iwpriv wlan0 set_mib stactrl_enable=0
iwpriv wlan1 set_mib stactrl_enable=0
ifconfig wlan0 up
ifconfig wlan1 up
```

- Bellow is an example to enable sta control feature on guest SSIDs that wlan1-va3 is the prefer interface and we want to steer clients from wlan0-va0 to wlan1-va3:

```
ifconfig wlan0-va0 down
ifconfig wlan1-va3 down
iwpriv wlan0-va0 set_mib stactrl_enable=1 (enable wlan0-va0 sta control)
iwpriv wlan1-va3 set_mib stactrl_enable=1 (enable wlan1-va3 sta control)
iwpriv wlan0-va0 set_mib stactrl_prefer_band=0 (set wlan0-va0 as non-prefer
                                                band)
iwpriv wlan1-va3 set_mib stactrl_prefer_band=1 (set wlan1-va3 as prefer band)
iwpriv wlan0-va0 set_mib stactrl_groupID=2      (set wlan0-va0 groupID)
iwpriv wlan1-va3 set_mib stactrl_groupID=2      (set wlan1-va3 groupID)
ifconfig wlan0-va0 up
ifconfig wlan1-va3 up
```

4. STA Control Algorithm

- Detect/track if client is 5GHz capable (eg using historical client probe requests)
- If RSSI degrades > T for specific duration, then AP to ignore client on 2.4 band for X period and Y retries (temporary blacklist)
- When client on 5GHz, if RSSI improves < T+W for specific duration, remove client from 2.4 blacklist.

5. How to Get Sta Control Status

- cat /proc/<prefer band interface>/stactrl_info or cat /proc/<non-prefer band interface> /stactrl_info to see if sta control function starts

```
# cat /proc/wlan0/stactrl_info
-- sta control info --
      sta control status: 1
      is prefer band: 1
      algorithm: 1
      non-prefer band: wlan1
      -- prefer band capable client list --
         STA_MAC: e09d3113384c
            rssi: 48
            aging: 90
         STA_MAC: 00e04c02c074
            rssi: 49
            aging: 24
         STA_MAC: 000e8e63898c
            rssi: 44
            aging: 1
         STA_MAC: 68dfdd91d518
```

If the sta control status is “1”, it means the sta control function is started. The value “0” means the sta control function is not started.

It also shows if the band (wlan0, as the example) is the prefer band. If yes (with value “1”), it also show the interface name of the non-prefer band and lists all the prefer band capable clients nearby (with rssi > RSSI Threshold T). If no (with value “0”), it shows the interface name of prefer band, blacklist, and current X period and Y retries value.

```
#cat /proc/wlan1/stactrl_info
  -- sta control info --
       sta control status: 1
       is prefer band: 0
       algorithm: 1
       prefer band: wlan0
       -- non-prefer band blacklist --
          STA_MAC: c4850897a919
             timerX: 0
             retryY: 3
          STA_MAC: 001f3b16488f
             timerX: 90
             retryY: 3
          STA_MAC: 2016d82b7d0b
             timerX: 133
             retryY: 3
```