



How to configure STA+SoftAP concurrent on Realtek WiFi IC

Support Linux Kernel <= 2.6.34

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Document Version	Note
V1.1	1.Added Linux system related STA+SoftAP concurrent configuration
V1.2	1.Added STA Mode wpa_supplicant related issues dealing 2.Added Android system related STA+SoftAP concurrent configuration

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This document intends to give you a guidance of configuring STA+SoftAP Concurrent on Realtek WiFi IC include but not less than 8188CUS/8192CU/8192DU/8188EUS/8188ETV/8189ES/8189ETV/8192EU/8723AS/8723VAU/8723BS/8723BU/8812AU in pure Linux system as well as in Android system whose version is 4.1 or even higher. And here we take 8192DU for example.

Firstly, You should get our latest driver, assume that you've already got the WiFi IC corresponded.

Ftp Server : ftp3.realtek.com.tw

- a)Account:RTL8192C Password: 3ubP7C (8188CUS/CTV/8192CU/8192CE)
- b)Account:RTL8192D Password: a6dWF2 (8192DU)
- c)Account:RTL8723 Password: F4v9Ws (8723AS/AS-VAU)
- d)Account:RTL8188E Password: M6b3Er (8188EUS/ETV/8189ES)
- e)Account:RTL8812A Password: J2e8Fg (8811AU/8812AU)
- f)Account:RTL8192E Password: N5c6Sx (8192EU)
- g)Account: RTL8723B Password: G3q6Wp (RTL8723B)

For 8192DU, the latest version of driver currently is RTL8192DU_linux_v4.0.4_10867.20140321 in the following directory:

ftp://RTL8192D@ftp3.realtek.com.tw/Linux/USB/v4.0/RTL8192DU_linux_v4.0.4_10867.20140321.zip

1.STA+SoftAP concurrent in Linux system

1.1. SoftAP configuration

After getting the driver, you can start your configuration by following the steps below::

1.1.1.Decompress the Driver package under Linux.

1.1.2.Configure the Makefile under

driver\rtl8192DU_linux_v4.0.4_10867.20140321_beta, and make it adaptive to your platform type. The platform type is i386 by default, after changing the right platform type, you should also write the cross-compile tool-chain and kernel version related to your platform.

To enable STA+SoftAP, it's necessary to enable the #define CONFIG_CONCURRENT_MODE flag in autoconf.h under driver\rtl8192DU_linux_v4.0.4_10867.20140321_beta\include. (However, if you just want to configure our WiFi IC to support only SoftAP, then you can leave the flag as what it is):

```
//#define CONFIG_CONCURRENT_MODE -->#define CONFIG_CONCURRENT_MODE
```

Compile the driver, and get 8192du.ko

1.1.3. Decompress wpa_supplicant_hostapd-0.8_rtw_r7475.20130812.tar.gz and enter wpa_supplicant_hostapd-0.8_rtw_r7475.20130812

\wpa_supplicant_hostapd-0.8_rtw_r7475.20130812\hostapd , type in the command make.

```
-->sudo make
```

Copy rtl_hostapd_2G.conf in

RTL8192DU_linux_v4.0.4_10867.20140321\wpa_supplicant_hostapd to wpa_supplicant_hostapd-0.8_rtw_r7475.20130812

\wpa_supplicant_hostapd-0.8_rtw_r7475.20130812\hostapd, modify its access authority to 777.

```
-->sudo chmod 777 rtl_hostapd_2G.conf
```

1.1.4. Plug the RTL8192DU dongle, and insmod 8192du.ko, use ifconfig -a to see the interface, which mostly appear with wlanx(x is a number), choose one interface to configurate hostapd.

Before we enable the hostapd function, we should firstly set the gateway with the command sudo ifconfig wlanx 192.168.1.1 up, (It can also be configurated to be other gateway as you like). and secondly the interface in rtl_hostapd_2G.conf should be modified from wlan0 in default to wlanx.

```
-->sudo ifconfig wlanx 192.168.1.1 up
```

1.1.5. Use the following two commands to disable the system service which may disturb the STA+SoftAP function:

```
-->sudo /etc/init.d/network-manager stop
```

```
-->sudo killall wpa_supplicant
```

Now, we can go to the directory of

wpa_supplicant_hostapd-0.8_rtw_r7475.20130812

\wpa_supplicant_hostapd-0.8_rtw_r7475.20130812\hostapd and execute the command to enable the SoftAP:

```
-->sudo ./hostapd rtl_hostapd_2G.conf -dd -B
```

1.1.6. If you want to connect with the SoftAP, you should set your wireless device with a Static IP within the IP limitation, and the Gateway can be 192.168.1.1 if you have set the IP of the SoftAP as 192.168.1.xxx.

After connecting to the SoftAP, ping 192.168.1.1, if the ping process is ok, then it indicates that the connection is ok.

1.1.7.The DHCP process of the system will assign IP after connection to AP. The static IP is just for testing,You also need to handle the DHCP process of the system after the previous steps.

1.1.8.The configuration of SoftAP in 5G is similiar, but the configuration file is rtl_hostapd_5.conf, instead of the rtl_hostapd_2G.conf。

1.2.STA configuration

1.2.1.Enter wpa_supplicant in the directory

```
wpa_supplicant_hostapd-0.8_rtw_r7475.20130812
```

```
\wpa_supplicant_hostapd-0.8_rtw_r7475.20130812\wpa_supplicant.
```

```
-->sudo make
```

After this step,you'll see some new documents like wpa_supplicant and wpa_cli.

1.2.2 Confirm the state of wpa_supplicant after executing the commands in subclause 1.5, you can use the following commands to get the state of wpa_supplicant:

```
-->ps aux | grep wpa_supplicant ,or -->ps | grep wpa_supplicant
```

It's expected that there would be no PID of wpa_supplicant,otherwise you need to kill the wpa_supplicant manually.

What's more,if there was no PID of wpa_supplicant,but responses like

```
/ # /etc/init.d/network-manager stop
-/bin/ash: /etc/init.d/network-manager: not found
/ # killall wpa_supplicantkillall: wpa_supplicant: no process
killed
```

,then your system may be different from the normally used Linux system,you should try other ways to stop processes like network-managet and wpa_supplicant in your system.

1.2.3 Copy wpa_0_8.conf in the

wpa_supplicant_hostapd-0.8_rtw_r7475.20130812/wpa_supplicant_hostapd to the current directory

```
-->sudo chmod 777 wpa_0_8.conf
```

```
-->sudo ./wpa_supplicant -Dwext -iwlanx -c ./wpa_0_8.conf -B
```

The x in -iwlanx should be the interface corresponds to the wireless interface created by the Realtek chip,but different from the one use as the interface for Soft AP.

If you see the words ioctl[SIOCSIWAP]:Operation not permitted,just ignore it.

The following command will be the same as what the the file wpa_cli_with_wpa_supplicant the directory is

RTL8192DU_linux_v4.0.4_10867.20140321\document says,but you should add sudo to the very front of each command if you see the warnings like :Failed to connect to

wpa_supplicant -wpa_ctrl_open:Permission denied

1.2.4 After connect to the AP,you still need one more step to help you to get IP.
-->sudo dhclient wlanx

1.3.Other things need to be concerned

1.3.1.How to cnfigure RTL8192DU-VC as 2T2R

If you want to enable the 8192DU-VC as 2T2R,
you can see RTL8192D_operation_mode.PDF in the
RTL8192DU_linux_v4.0.4_10867.20140321\document when you get the driver from
our FTP site. you should read it and follow the steps in it.

1.3.2.How to cnfigure STA+SoftAP in 8812AU to work in 11ac mode

8812AU can support 11ac mode,which can offer a relatively high speed.if you want
to enable 8812AU to work in 11ac mode.you need to modify the steps in SoftAP
configuration above:

-->sudo insmod ./8812au.ko **rtw_vht_enable=2**(The red part should be added)

What's more,the configuration file for 11ac mode is also rtl_hostapd_5.conf.

2.STA+SoftAP concurrent in Android system

Here we take Android4.2 in CSR platform Primall for example.

2.1. System configuration

2.1.1. For system configuration,you need to follow the PDF file android_ref_codes_JB_4.2 in
RTL8192DU_linux_v4.0.4_10867.20140321,and the wpa_supplicant should be

wpa_supplicant_8_jb_4.2_rtw_r8680.20130821.tar.gz under

RTL8192DU_linux_v4.0.4_10867.20140321\wpa_supplicant_hostapd.

If your Android system is 4.1 or higher version other than 4.2,you should choose the
corresponded PDF to follow and the right wpa_supplicant to use.

Mostly ,after following the PDF and using the right wpa_supplicant,the STA and SoftAP function
will work fine.But sometimes there may be problems in enabling the STA and SoftAP function
from the Android UI,then you need to check whether you have followed the PDF file and use the
right wpa_supplicant.

If you have followed the PDF file and use the right wpa_supplicant,and still have problems,you
can try the following ways to see where the probles is.

2.1.2. Check the status of interface after insmod ko manually:

-->netcfg

You may see wlan0/wlan1 or wlan0/p2p0 after you type in this command.

Let the interface up by using the following Commands if the interfaces are wlan0/wlan1:

-->netcfg wlan0 up

-->netcfg wlan1 up (or netcfg p2p0 up if the interfaces are wlan0/p2p0)

After this you can use netcfg to see whether the interfaces is in the up state.

2.1.3. If you can still see wpa_supplicant when using the following command:

-->busybox ps | grep wpa_supplicant(or busybox ps aux| grep wpa_supplicant)

Then you can try subclause 2.3 STA configuration to see if it is possible to make wpa_supplicant run smoothly in command line, otherwise,go to the next subclause.

Type in the following command to see whether the SoftAP process is live :

-->busybox ps | grep hostapd(or busybox ps aux| grep hostapd)

If hostapd process is live,you can try subclause 2.2 SoftAP configuration to see whether it works fine,otherwise go to the next subclause.

2.1.4. Make sure the interfaces are still in up state, then you can check where the wpa_supplicant start when the system start to run,normally it should be something like init.xxx,rc,for Primall with Android4.2,it's init.siorfsoc.rc.

The wpa_supplicant related part should be like this :

```
service rtw_suppl_con /system/bin/wpa_supplicant \  
-ip2p0 -Dnl80211 -c /data/misc/wifi/p2p_supplicant.conf \  
-e/data/misc/wifi/entropy .bin-N \  
-iwlan0-Dnl80211 -c/data/misc/wifi/wpa_supplicant.conf  
....  
service rtw_suppl /system/bin/wpa_supplicant -iwlan0 -Dnl80211  
-c/data/misc/wifi/wpa_supplicant.conf  
socket wpa_wlan0 dgram 660 wifi wifi
```

This second ould be modified to be like this :

```
service rtw_suppl /system/bin/wpa_supplicant -iwlan0 -Dnl80211 \  
-c/data/misc/wifi/wpa_supplicant.conf  
socket wpa_wlan0 dgram 660 wifi wifi
```

If there's something wrong with SoftAP mode in command line ,and the interface is wlan0/wlan1, you can try to modify the first part to be like this :

```
service rtw_suppl_con /system/bin/wpa_supplicant \  
-iwlan1 -Dnl80211 -c /data/misc/wifi/softap.conf \  
-iwlan0 -Dnl80211 -c/data/misc/wifi/wpa_supplicant.conf
```

There should also be a softap.conf under /data/misc/wifi:

--> vi /data/misc/wifi/softap.conf

And the materials in it should be :

```
iface=wlan1
ssid=Softap_test
channel=6
ieee80211n=1
```

```
wpa=2
wpa_passphrase=87654321
```

The last two sentences is needed when you want to configure the SoftAP to be able to support WPA-2 encryption, and the password should be 87654321 when configured like this.

2.1.5.enable the wpa_supplicant

Mostly the wpa_supplicant will be in process after the device is power on, you can use the grep command above to see if the wpa_supplicant is in process. If you can't find it, you can also try the following two commands :

```
-->start rtw_suppl_con
-->setprop ctl.start rtw_suppl_con
```

Once you type in one command , you can see whether wpa_supplicant have already be enabled. If you can confirm that wpa_supplicant have been enabled, you can go to the next subclause, otherwise, check the steps above one by one.

2.2. SoftAP configuration

After the steps above, the wpa_supplicant have already enabled, search the Softap_test. If you can find it, then you can configure it's IP:

```
-->netcfg wlan1 192.168.1.1 up
```

Use netcfg to see if the IP was set successfully, if the IP was set successfully, then you should also set the peer device with static IP like 192.168.1.x (x should be a number other than 1).

Then you can connect the SoftAP named Softap_test, when you see "connected" in the UI, you can try ping it to see if the connection is ok.

Should you have any problem in this step, please get the logcat and kernel log since the device was power on and then communicate with us. Otherwise, you should communicate with the engineers who provide you with the platform to make the Android framework suitable for the SoftAP function.

2.3. STA configuration

After the steps above, the wpa_supplicant have already enabled, you can use the following commands to enter the interactive mode:

```
-->/system/bin/wpa_cli -iwlan0 -p /data/misc/wifi/wpa_supplicant
```

Then you can see the file wpa_cli_with_wpa_supplicant and do as it says.

Should you have any problem in this step, please get the logcat and kernel log since the device was power on and then communicate with us. Otherwise, you should communicate with the engineers who provide you with the platform to make the Android framework suitable for the STA function.

2.4. Other things need to be concerned

2.4.1. Differences between Android and Linux in STA+SoftAP concurrent

The STA and SoftAP in Android can't be concurrent due to the limits in the Android framework settings, while it's ok in Linux systems.

2.4.2. Different platforms have different configurations for STA+SoftAP in Android systems

There may be different settings for different platforms in configuring STA+SoftAP, for example, the Allwinner A23+Android4.4 platform may use wpa_supplicant of its own, when you want to use wpa_cli to enter the interactive mode, the commands should be :

```
-->/system/bin/wpa_cli wlan0 -p /data/misc/wifi/sockets
```

Which is different from above.

Should you have encountered cases like this, you should communicate with the platform provider for help.