RF Test Tool User Guide for Android

Revision History

Date	Version	Description	Author
2010/07/09	0.1	Initial revision	Sam Chang
		Wi-Fi test tool installation instructions	
		2. Wi-Fi test tool application introduction	
2010/08/18	0.2	1. Add data rate selection for 11B and 11G	Terence Hsieh
		2. Add Tx power configuration	
2011/01/24	0.3	Add fixed power on/off function	Terence Hsieh
2012/02/10	2.3	Add 802.11a function	Terence Hsieh
2012/02/21	2.4	Add channel 14	Terence Hsieh
2012/02/29	2.5	Add a band channel for 802.11n	Terence Hsieh
2012/03/19	2.6	Fix failed to stop Continuous Tx	Terence Hsieh
2012/03/23	2.7	1. Support for Android 4.0.3	Terence Hsieh
		2. Remove a command in Wi-Fi Continuous Rx	
2012/03/28	2.8	1. Add Home page to Start/Stop Wi-Fi driver	Terence Hsieh
		2. Change wiservice to wifiservice	
2012/04/17	3.0	Change WiFiTestTool to RFTestTool	Terence Hsieh
		2. Add BT Test function	
2012/04/24	3.1	Move /data/wifi_bt to /system/etc/rftesttool	Terence Hsieh
2012/06/12	3.2	1. Add some delay after enabling Wi-Fi/BT power	Terence Hsieh
		Change hciattach_txrx_mode to hciattach_txrx	
		3. Change hciattach_test_mode to hciattach_test	
2012/07/31	3.3	Add Menu Settings	Terence Hsieh
2012/08/06	3.4	Add Certification test for Wi-Fi Continuous Rx	Terence Hsieh
2012/08/25	3.5	Add BT Unmodulation Tx	Terence Hsieh
2012/08/25	3.6	1. Fix bug of disabling Wi-Fi driver	Terence Hsieh
,		2. Move /system/etc/rftesttool to /data/rftesttool	
2013/01/08	3.7	Fix Bluetooth Test mode	Terence Hsieh
2013/04/06	3.8	1. Support for Android 4.2	Terence Hsieh
		2. Add Wi-Fi and BT driver type in Settings	
		3. Fix initialization error for BCM20710a1	
2013/05/08	3.9	Fix Certification RX to pass CE certification	Terence Hsieh
2013/05/26	4.0	1. Add BT 4.0 function	Terence Hsieh
		2. Move some configuration to Advanced	
		3. Add Wi-Fi module name in Settings	
2013/06/14	4.1	Add Rx_Test Sensitivity function	Terence Hsieh

	1.2 1.3	Add Bluetooth Adaptive Frequency Hopping	Terence Hsieh
2013/08/22 4	1.3	0 1/ 001/100/14 001/100/19 001/100/14	
		Support for BCM43241, BCM43340, BCM43341,	Terence Hsieh
		BCM4339	
2013/12/05 4	1.4	Support for Android 4.3	Terence Hsieh
2014/01/16 4	1.5	1. Upgrade BCM4339 firmware	Terence Hsieh
		2. Remove shared library	
		3. Remove Instrument configuration	
2014/02/12 4	1.6	Add receive parameter in Wi-Fi Rx Sensitivity	Terence Hsieh
2014/03/06 4	1.7	Fix Bluetooth block issue	Terence Hsieh
2014/05/14 4	1.8	1. Support for BCM43430	Terence Hsieh
		2. Fix HT20/HT40 can not be saved in Advanced	
		issue	
2014/09/10 5	5.0	Support for USB Wi-Fi, BCM43143, BCM43242,	Terence Hsieh
		BCM43569.	
2014/09/16 5	5.1	Support for USB BT BCM43242 and BCM43569	Luke Chen
2014/11/21 5	5.2	Support channel 144	Terence Hsieh
2014/12/29 5	5.3	Support for Android 5.0	Terence Hsieh
2015/09/29 5	5.4	Support for BCM4354, BCM4356, BCM43455	Terence Hsieh
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PREREQUISITES

In order to use RFTestTool, users will need following materials.

RFTestTool application: RFTestTool.apk

Wi-Fi:

- 1. Driver: bcmdhd.ko (No use if driver is built in kernel image)
- 2. Manufacture firmware: fw_bcmdhd_mfg.bin
- 3. Firemware configuration file: nvram.txt
- 4. Tools: wifiservice, wl

BT:

- 1. Driver: brcm_patchram_plus2 or hciattach
- 2. Firmware: bcmdhd.hcd
- 3. Tools: btservice, hciconfig and hcitool
- 4. For USB module, you will need HCI USB driver module which can be built from linux kernel

INSTALLATION STEPS

- If your system support Bluetooth function:
 Set config_bluetooth_adapter_quick_switch to false in frameworks/base/core/res/res/values/config.xml
- 2. Add "wifiservice" and "btservice" into init.rc to auto running when system booting up. service wifiservice /data/rftesttool/wifiservice

class main

user root

service btservice /data/rftesttool/btservice

class main

user root

- 3. Enable CONFIG_BT_HCIUART and CONFIG_BT_HCIUART_H4 in kernel configuration.
- 4. For USB interface BT module, you should add the following USB VID/PID patch in kernel to support AP6242 and AP6269 and set CONFIG_ BT_HCIBTUSB=m to build out

btusb.ko kernel module.

- 5. Rebuild Android image and download the image to your device.
- Push prerequisite files into target platform adb push rftesttool /data/rftesttool
- 7. If your Wi-Fi driver is built a kernel module, copy your Wi-Fi driver to /data/rftesttool/bcmdhd.ko # busybox cp /system/lib/modules/bcmdhd.ko /data/rftesttool/bcmdhd.ko
- Copy Wi-Fi NVRAM(nvram.txt) to /data/rftesttool/
 # busybox cp /system/etc/firmware/nvram.txt /data/rftesttool/nvram.txt
- Copy BT firmware(bcmdhd.hcd) to /data/rftesttool/bcmdhd.hcd
 # busybox cp /system/etc/firmware/bcmdhd.hcd /data/rftesttool/bcmdhd.hcd
- 10. If you are using USB BT module, please copy your btusb.ko to /data/rftesttool/ Assume btusb.ko is located at /vendor/modules/btusb.ko of your platform. # busybox cp /vendor/modules/btusb.ko /data/rftesttool/btusb.ko
- 11. If Wi-Fi driver does not include power on/off Wi-Fi function, please create two script files, wifi_power_on.sh and wifi_power_off.sh, to pull HIGH and pull LOW WL_REG and

WL_RST. And push the two script files to /data/rftesttool/.

Ex1: wifi_power_on.sh

#!/system/bin/sh

This is a sample code to Pull HIGH WL_REG and WL_RST
echo 1 > /sys/devices/platform/hkc1xx-sysfs/wifi_onoff

Ex2: wifi_power_off.sh

#!/system/bin/sh

This is a sample code to Pull LOW WL_REG and WL_RST
echo 0 > /sys/devices/platform/hkc1xx-sysfs/wifi_onoff

12. Create bt_power_on.sh and bt_power_off.sh script files to pull HIGH and pull LOW BT_RST and BT_RST. And push the two script files to /data/rftesttool/.

Ex1: bt_power_on.sh

#!/system/bin/sh

This is a sample code to Pull HIGH BT_RST
echo 1 > /sys/class/rfkill/rfkill0/state

Ex2: bt_power_off.sh

#!/system/bin/sh

This is a sample code to Pull LOW BT_RST
echo 0 > /sys/class/rfkill/rfkill0/state

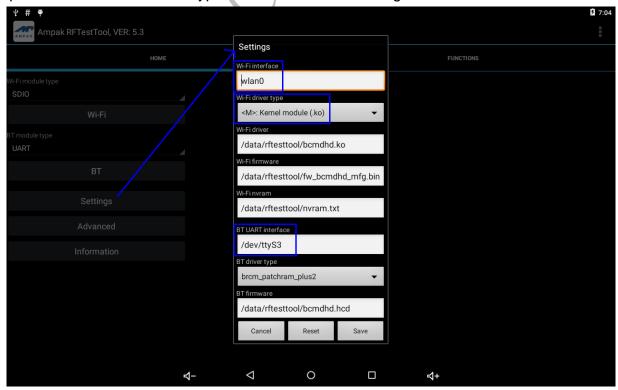
- 13. Make sure execution permission after pushed into your platform # chmod 777 /data/rftesttool/*
- 14. Please confirm following is included in /etc/hosts127.0.0.1 localhost
- 15. In order to install RFTestTool.apk , you have to enable Unknown sources in Settings/Applicantions
- 16. If your system is **engineer version** please install RFTestTool-eng.apk # adb install RFTestTool-**eng**.apk else install RFTestTool-user.apk # adb install RFTestTool-**user**.apk

RF Test Tool Application Operation

- 1 Disable Wi-Fi and BT in Settings Menu and enable Airplane mode.
- 2 Click on the icon to start RFTestTool.



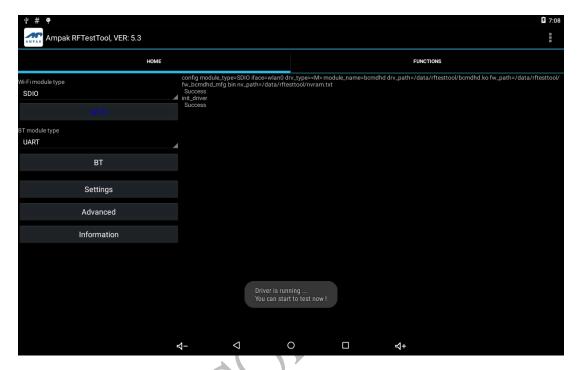
3 Enter to Settings page and edit Wi-Fi/BT interface. If your driver is built in kernel image, please select Wi-Fi driver type to "*: Built in kernel image".



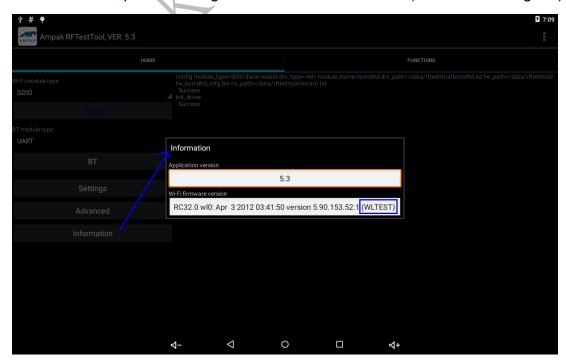


Wi-Fi:

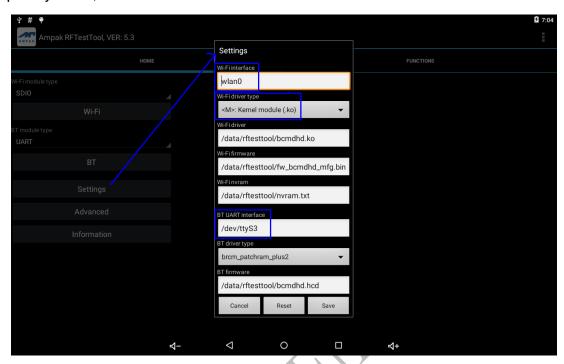
- 4 If wifiservice is not running, you have to initial wifiservice through command. #/data/rftesttool/wifiservice&
- 5 Click "Wi-Fi" to initial Wi-Fi driver.



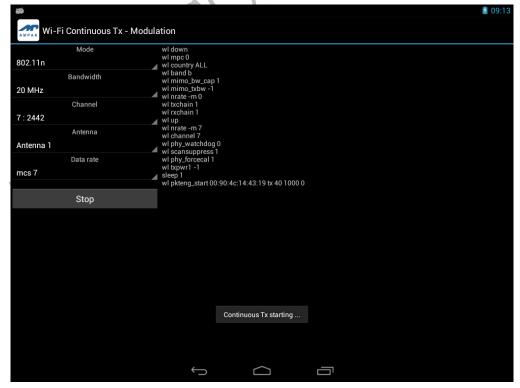
6 Enter to Information page and check the Wi-Fi firmware version with "WLTEST". If you do not see "WLTEST", please change to manufacture firmware (fw_bcmdhd_mfg.bin).



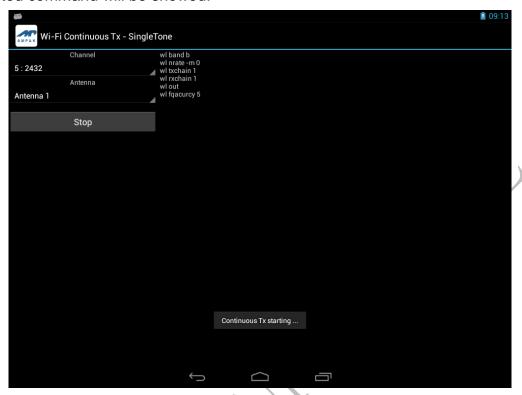
7 Enter to Advanced page and choose to correct country, 802.11 type, bandwidth, frequency band, and Wi-Fi 2.4 GHz channels.



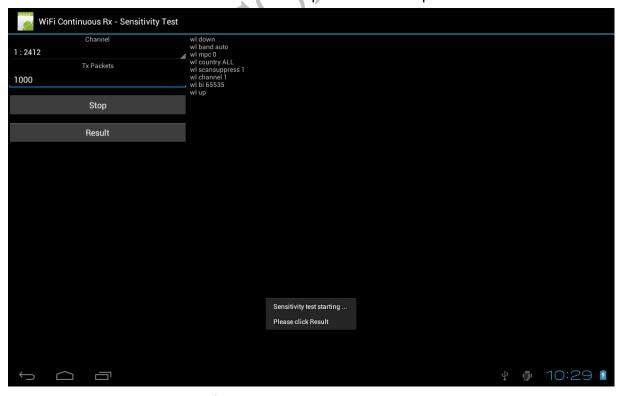
8 Wi-Fi Continuous Tx - Modulation: set the mode, channel, data rate, transmit power, and click "Start" button to send packets or "Stop" button to stop sending packets.



9 Wi-Fi Continuous Tx - SingleTone: set the channel and click "Start" button. The executed command will be showed.

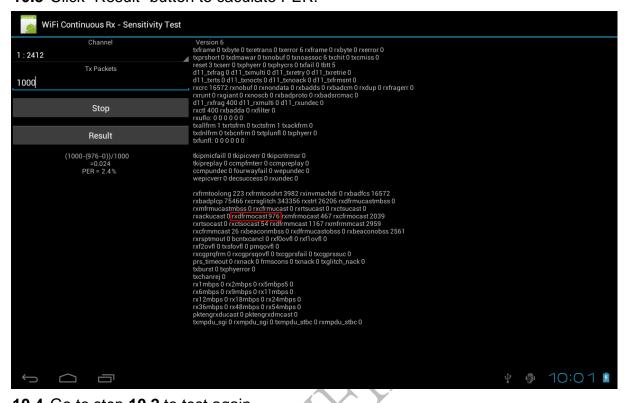


- 10 Wi-Fi Continuous Rx Sensitivity Test:
 - 10.1 Set the channel and total transmitted packets from equiment and click "Start" button.



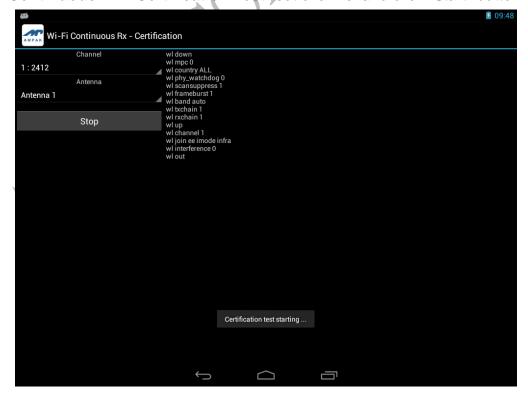
10.2 Transmit 1000 packets from your equiment.

10.3 Click "Result" button to caculate PER.



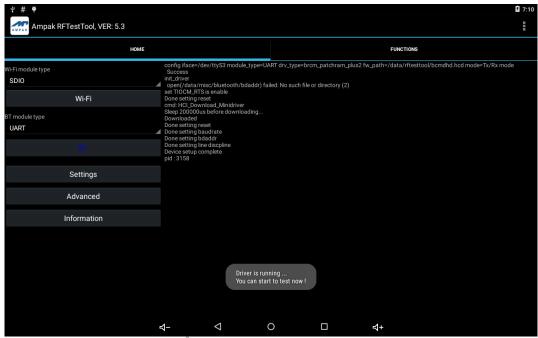
10.4 Go to step 10.2 to test again.

11 Wi-Fi Continuous Rx - Certification Test: set channel and click "Start" button.

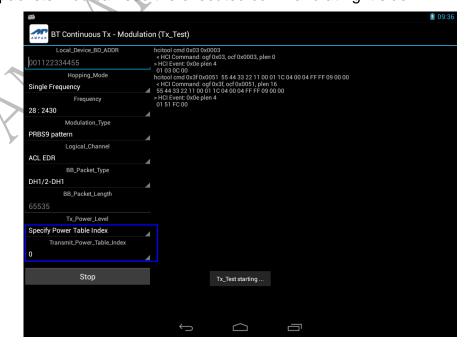


BT:

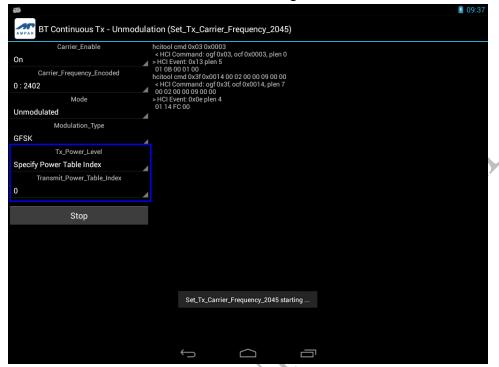
- **12** If btservice is not running, you have to initial btservice through command. #/data/rftesttool/btservice&
- **13** Enable airplane mode, remove /system/bin/hciattach, brcm_patchram_plus and bluetoothd in Android 4.1, and /system/app/Bluetooth.apk in Android 4.2.
- **14** Click "BT" to initial BT driver.



15 BT Continuous Tx - Tx_Test (Modulated): set the Hopping_Mode, Frequency, Modulation_Type ..., and click "Start" button to send packets or "Stop" button to stop sending packets. You can see the executed command at right side.

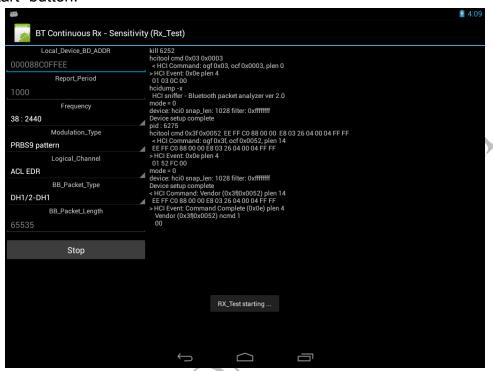


16 BT Continuous Tx – Set_Tx_Carrier_Frequency_2045 (Unmodulated): set the Carrier_Enable, Carrier_Frequeucy_Encoded, Mode ..., and click "Start" button or "Stop" button. You can see the executed command at right side.

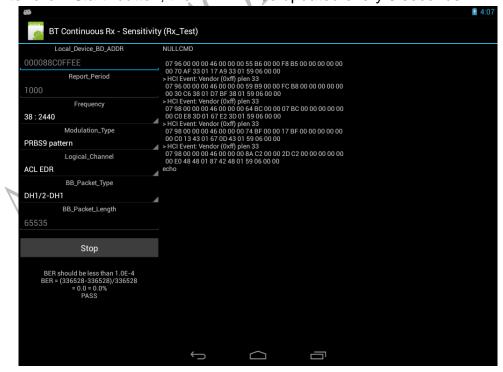


17 BT Continuous Rx – Rx_Test:

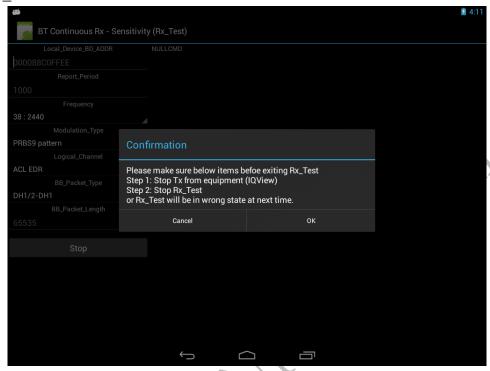
- 17.1 Select Continuous Tx from your equiment and start to transmit.
- **17.2** Set the Frequency, Modulation_Type, Logical_Channel, BB_Packet_Type and click "Start" button.



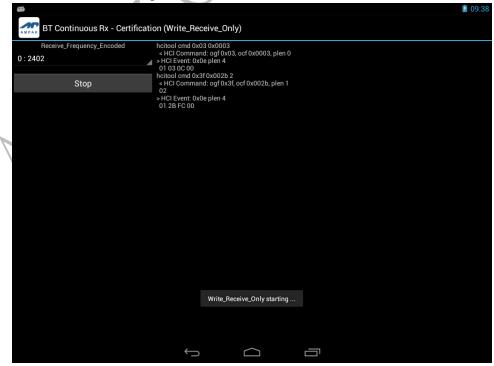
17.3 After click "Start" button, the BER will be updated every 5 seconds.



17.4 If you would like to click "Stop" or finish the Rx_Test, you have to stop the Tx from equipment at first, or you will need to enable BT in Home page again to restart Rx_Test at next time.



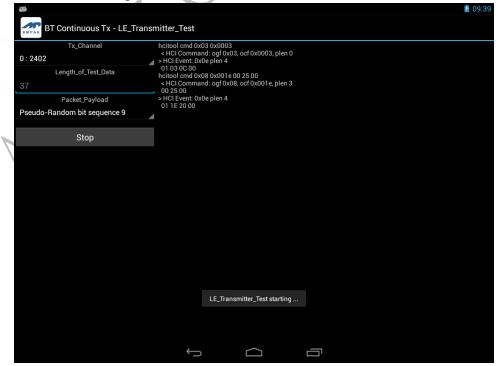
18 BT Continuous Rx - Write_Receive_Only: set the Receive_Frequency_Encoded and click "Start" button to send packets or "Stop" button to stop sending packets. You can see the executed command at right side.



19 BT Test Mode – Enable_Device_Under_Test_Mode: Click Start to initial BT Test mode and enable your equipment to Test mode, then the test mode will be starting automatically on both side.

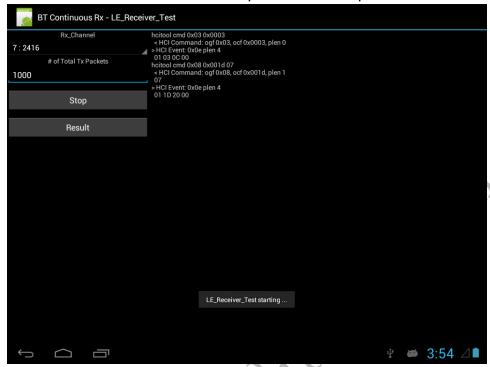


BT Continuous Tx – LE_Transmisster_Test: set the TXx_Channel and click "Start" button to send packets or "Stop" button to stop sending packets. You can see the executed command at right side.

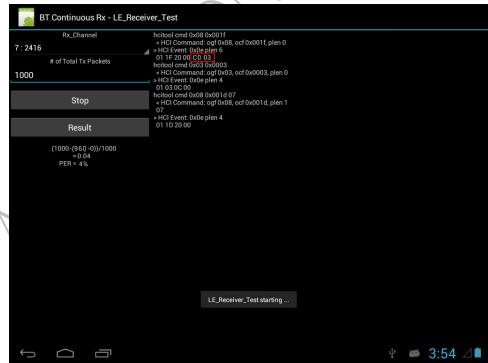


21 BT Continuous Rx – LE_Receiver_Test:

21.1 Set the channel and total transmitted packets from equiment and click "Start" button.



- **21.2** Transmit 1000 packets from your equipment.
- 21.3 Click "Result" button to caculate PER.



21.4 Go to step 21.2 to test again.