Demo Board User Guide

Version 0.1

Device Name: AW-AM634NF (HSTNN-AR01)

Device Type: IEEE 802.11 a/b/g/n Wireless LAN, Bluetooth and FM /Rx Combo Module

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TITLE: DOCUMENT RELEASE INSTRUCTION

Rev.	Date	DCR NO.	Originator	Description
01	2013/01/23	N/A	N.C. Chen	Initial Version

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1. Activate AW-AM634NF

1-1. what you need

Hardware:

*AW-AM634NF Demo Board V.01

*SDIO to PCI Host Controller

*USB-B type to A type Cable

Software (Windows XP):

*WLAN- bcmsddhd.sys , bcmsddhd.inf, dhd.exe, wl.exe

*Bluetooth /FM –Bluetool V1.1.9.3, HCD HCI download file, ActivePerl 5.8 and driver for Prolific USB to UART Bridge.

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FIG. 1.1

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1-2. Power UP AW-AM634NF

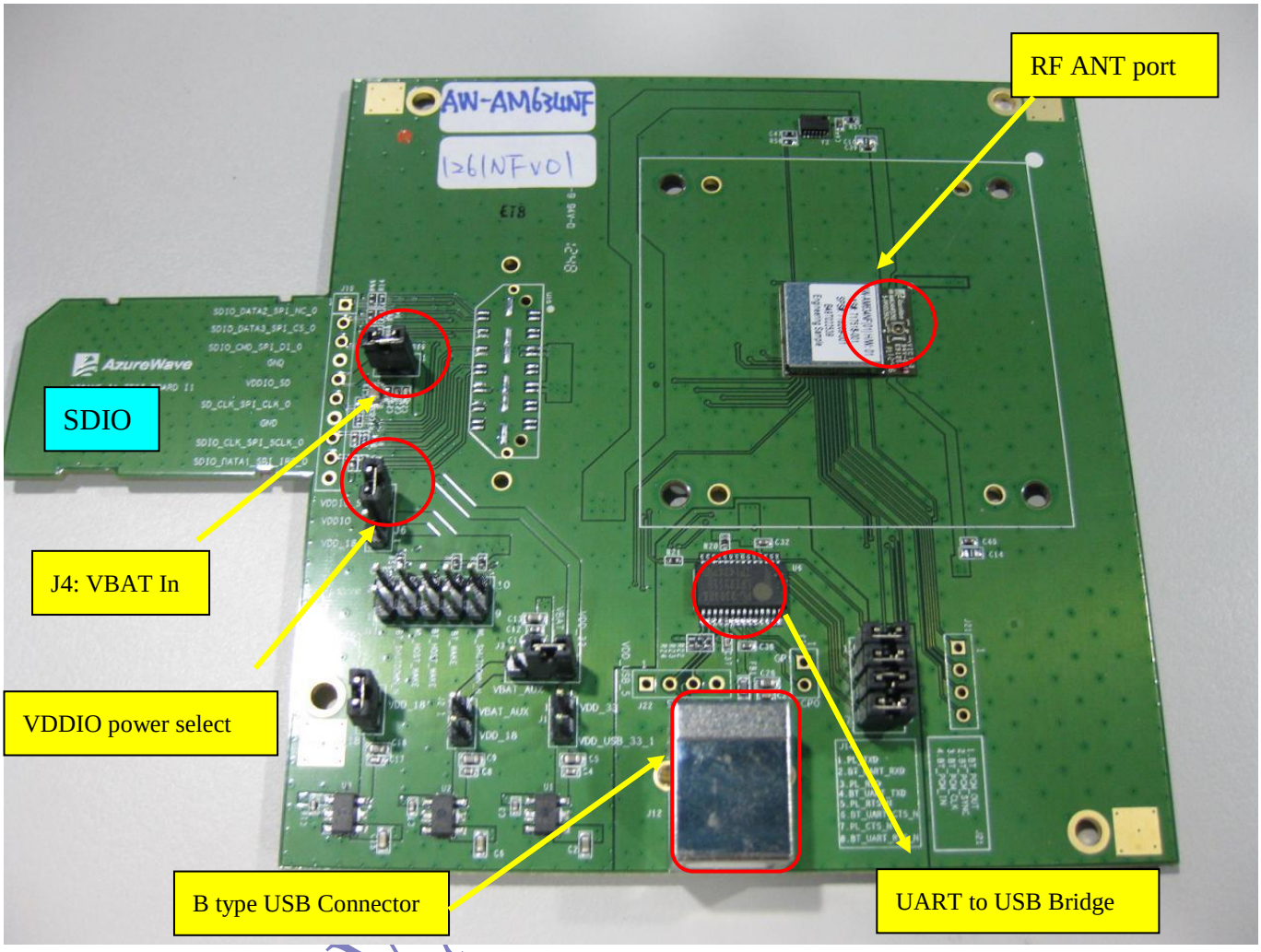

FIG. 1.2

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1-3. Test Software Version

	Test Station	Item	Version	Remarks
		Test Driver	PHOENIX2_REL_6_10_58_75	
	F1-WLAN&BT	HCD File	BCM4334B0_002.001.013.0767.0866.hcd	
		UART to USB Bridge Driver		

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2. WLAN Basic Test

2,1 Driver Installation

COMPONENTS

bcmsddhd.sys and bcmsddhd.inf

bcmsddhd.sys and bcmsddhd.inf are the dongle host driver for SDIO-PCI Bridge Card. It also includes a dongle image for download to the SDIO dongle.

dhd.exe

dhd.exe is an utility application that one can use to control the software running in the dongle host for test and debug purposes.

wl.exe

wl is an utility application that one can use to control the software running in the SDIO dongle, e.g. initiate an association and modify WLAN parameters.

DRIVER INSTALLATION

There is no installer provided for the host software. The instructions below describe how to install it manually. Install hardware prior to software.

- If a previous version of the driver was used, then it needs to be removed.
  - Uninstall Microsoft SDIO driver. We will be using our own.
    - Device Manager -> Find entry for Secure Digital IO Bus (or winPCI)
    - Right click-> Uninstall
  - Uninstall Broadcom wl driver. Get rid of any previously installed Broadcom wireless driver
    - Device manager - >Networks -> Broadcom driver(s)->Right click/uninstall
  - Edit c:\windows\inf\sdbus.inf:
    - Search for the section '[Generic]'.
    - Comment out these lines by inserting a semicolon ';' in the first column, like so:
      - [Generic]
        ;PCI\CC_080500.DeviceDesc%=SDHost,PCI\CC_080500
        ;PCI\CC_080501.DeviceDesc%=SDHost,PCI\CC_080501
    - Also comment out these lines:
      - ;PCI\CC_080500.DeviceDesc="SDA Standard Compliant SD Host Controller"
        ;PCI\CC_080501.DeviceDesc="SDA Standard Compliant SD Host Controller"

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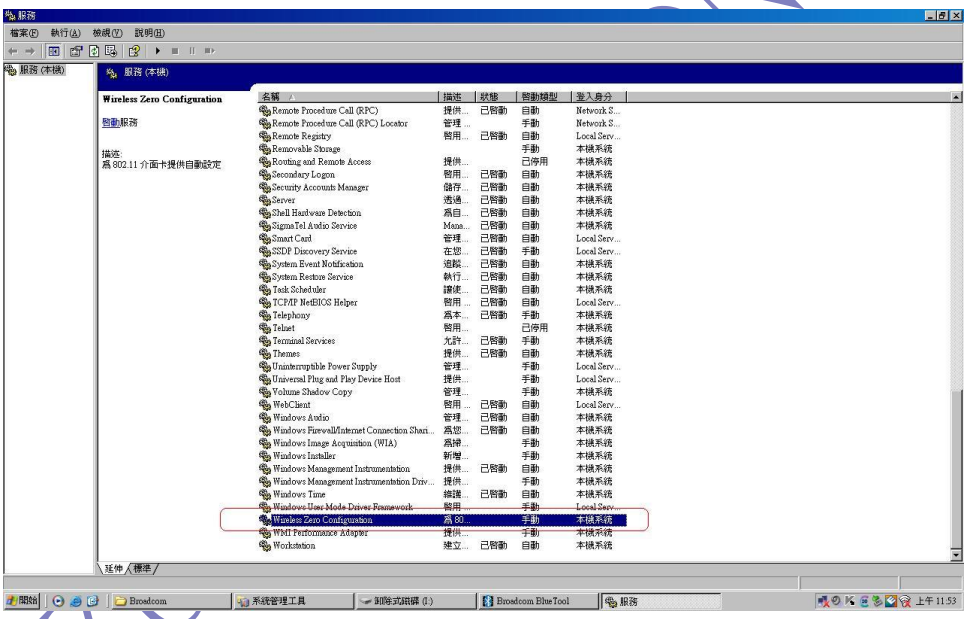
- Rename sdbus.PNF to sdbus_old.sav
- Edit c:\windows\inf\usb.inf.
  - Search for any line containing '1095' (which is the Arasan/CMD Vendor ID).
  - Comment out these lines by inserting a semicolon ';' in the first column:
- Edit c:\windows\inf\usbport.inf.
  - Search for any line containing '1095' (which is the Arasan/CMD Vendor ID).
  - Comment out these lines by inserting a ';' in the first column.
- Rename usb.PNF to usb_old.sav
- Reboot

- If Windows detects the new hardware and pop up a dialog box, follow this procedure.
  - Select ‘No, not this time’ and click ‘Next’
  - Select 'Install from a list or specific location' and click ‘Next’
  - Select 'Don't search. I will choose the driver' and click ‘Next’
  - Choose 'Have Disk'
  - Choose ‘Browse’, and specify path to bcmsddhd.inf for SDIO-PCI Host Controller
  - Click ‘OK’
- Disable Windows zero configuration and the Broadcom tray application (if installed and enabled)



-
  - net stop wltrysvc
  - net stop wzcsvc

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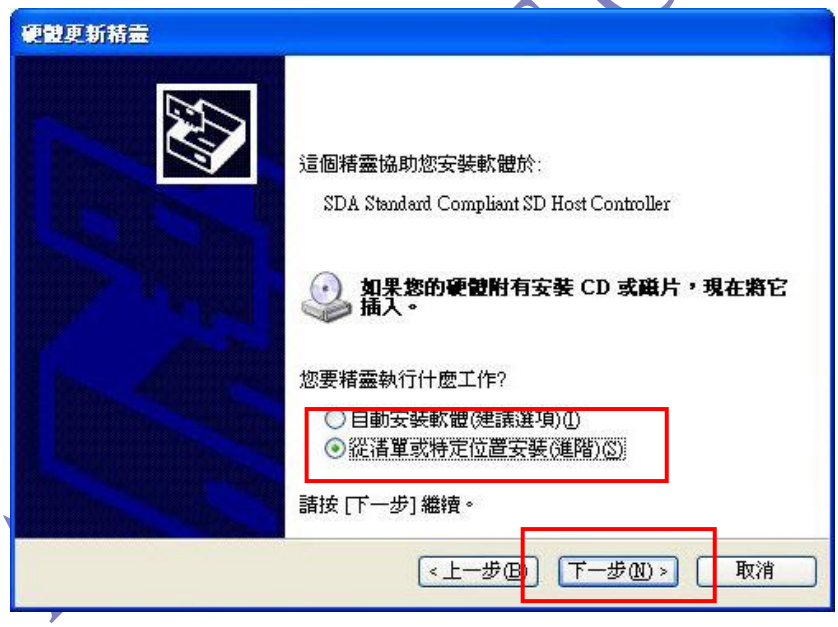
(1) INSTALL SDIO DRIVER:

Please follow step as below:

1. Select “No, not this time”, and click “Next” to next step.

2. Select “Install from a list or specific location [Advanced]”, and click “Next” to next step.



3. Select No search, I will choose driver -> Next.

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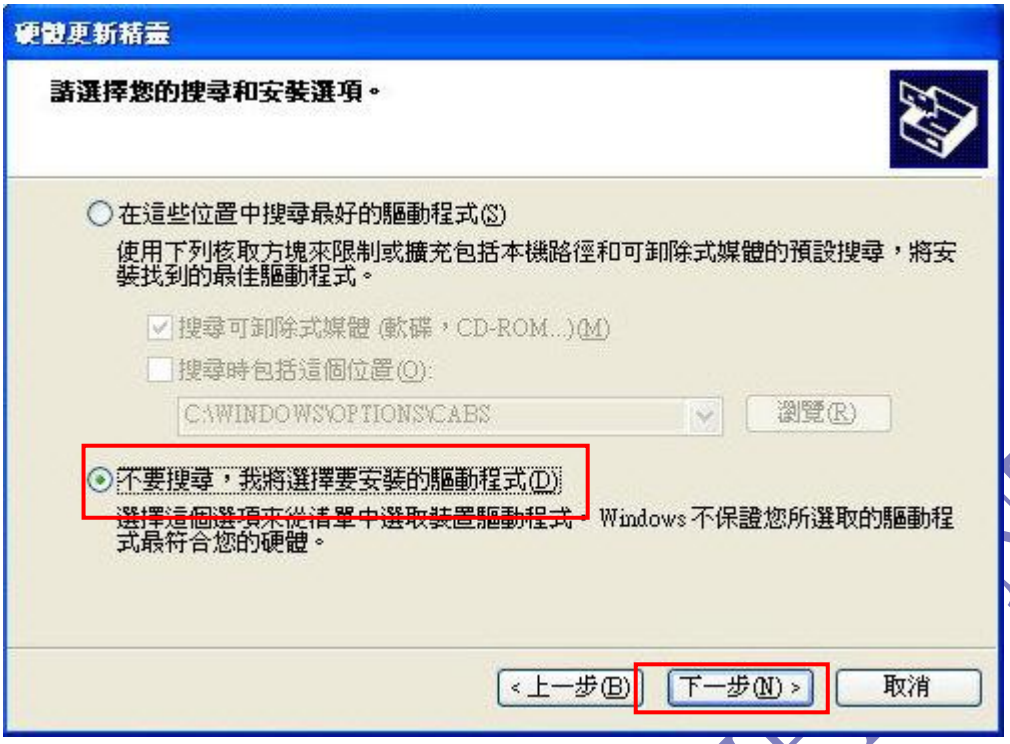

4. Select From Disk to setup -> Next

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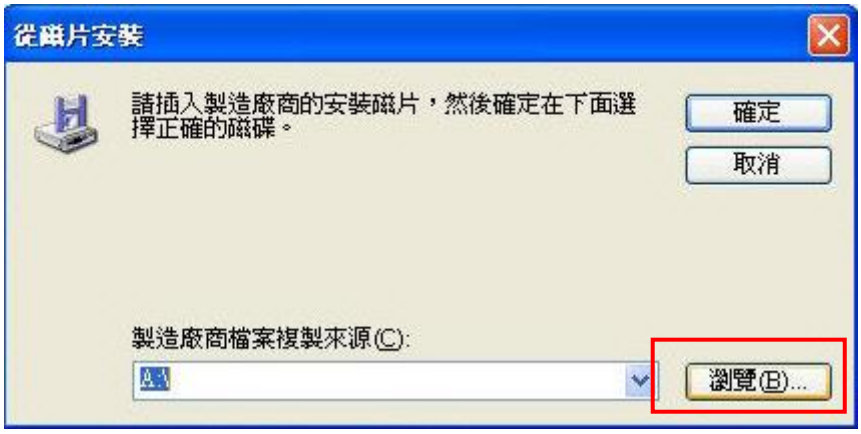
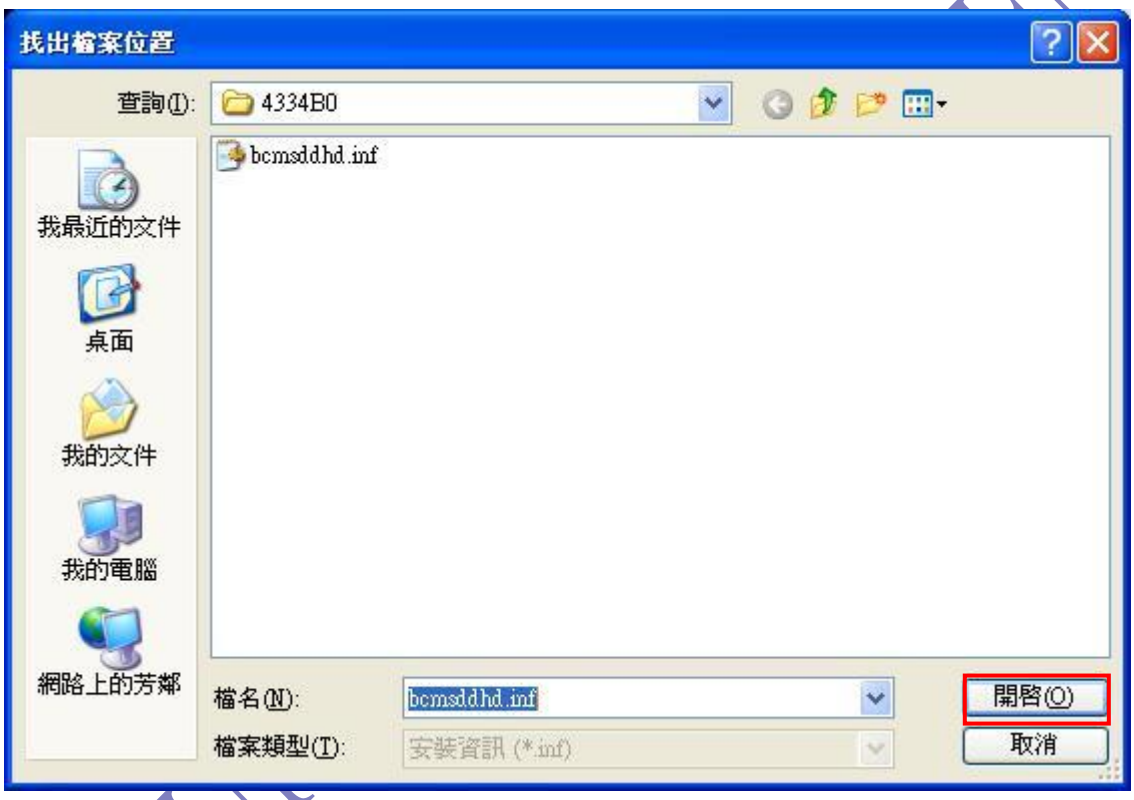
5. Select Browse



6. Select bcmsdhid.inf -> Open



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7. Select Yes

8. Select Next

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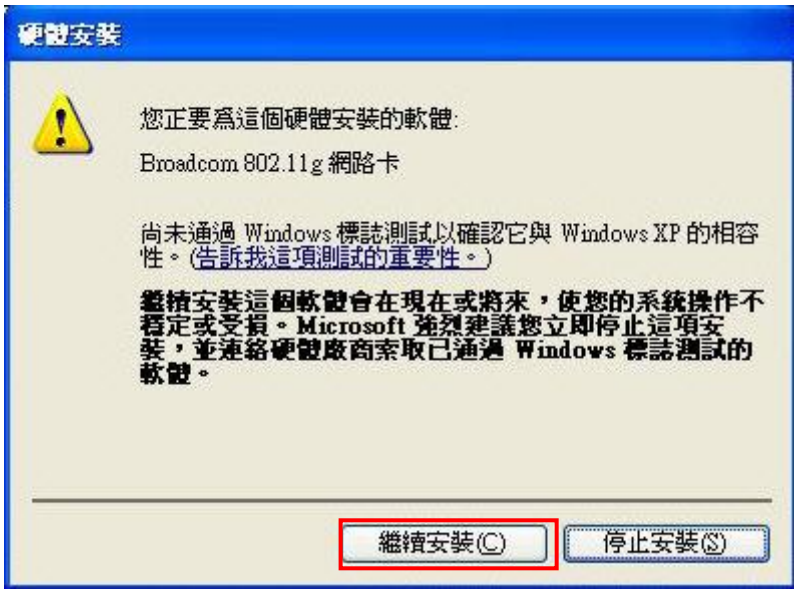
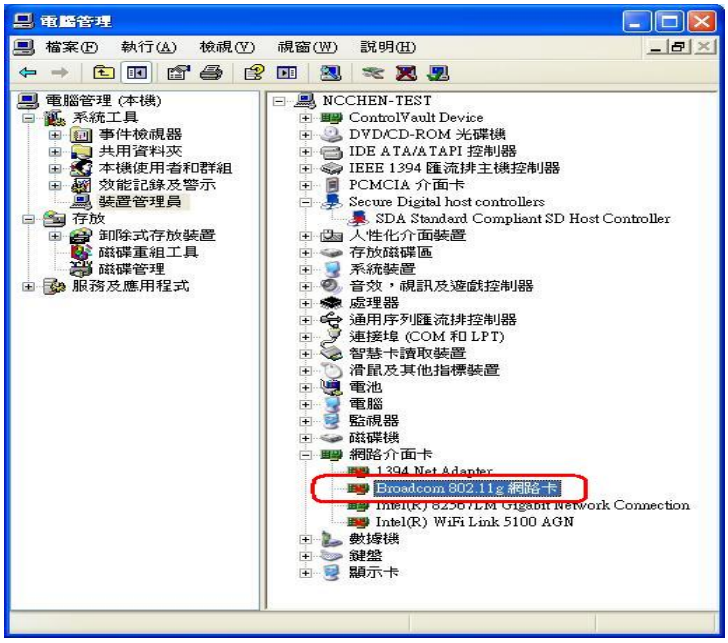
9. Select Keep install

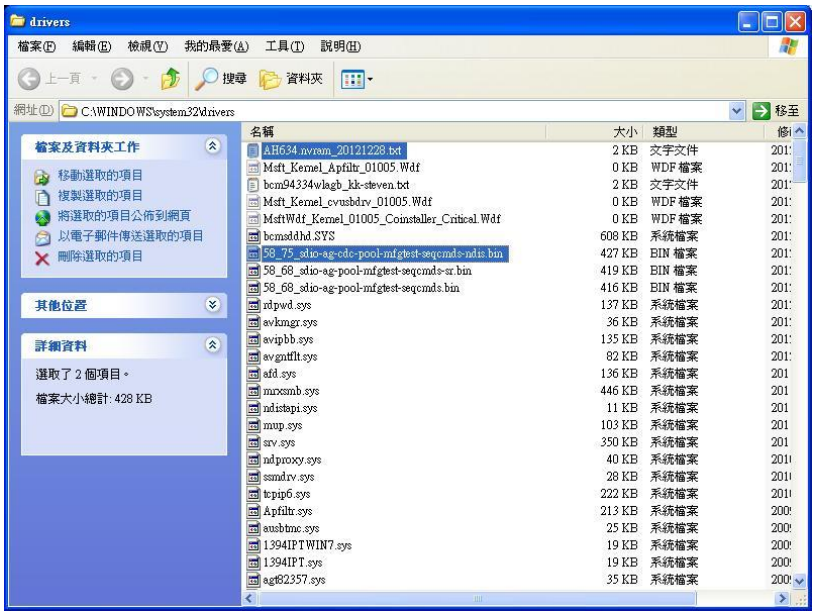


10. If success, click Finish.

11. Disable Broadcom 802.11g card



12. Copy file into C_WINDOWS_system32_drivers path



13. Entry device manager and select Broadcom 802.11g Network Adapter

DongleImagePath : \SystemRoot\system32\drivers\58_75_sdio-ag-cdc-pool-mfgtest-seqcmds-ndis.bin

IBSS 54g(tm) Mode: select 54g-Auto

IBSS Link Indication: select Legacy

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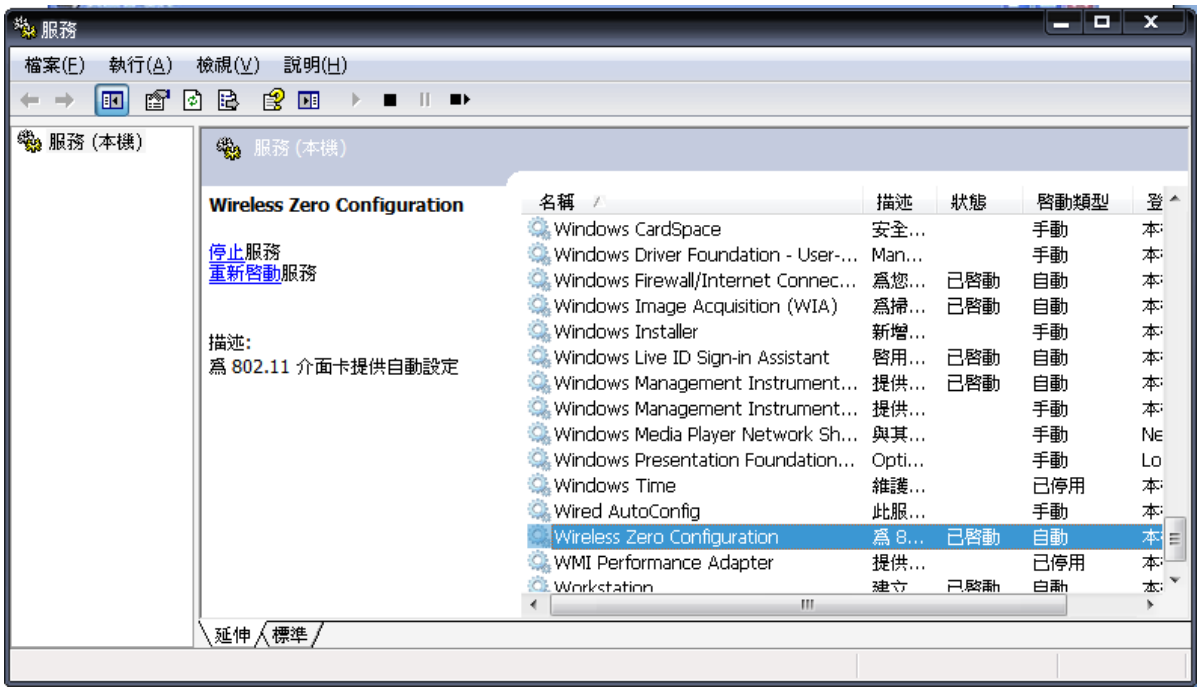
SROMImagePath : \SystemRoot\system32\drivers\AM634NF.nvram_20121228.txt

14. Entry control Panel_Administrative Tools_Services

Wireless Zero Configuration

Startup type: Disabled

Service status: Stopped



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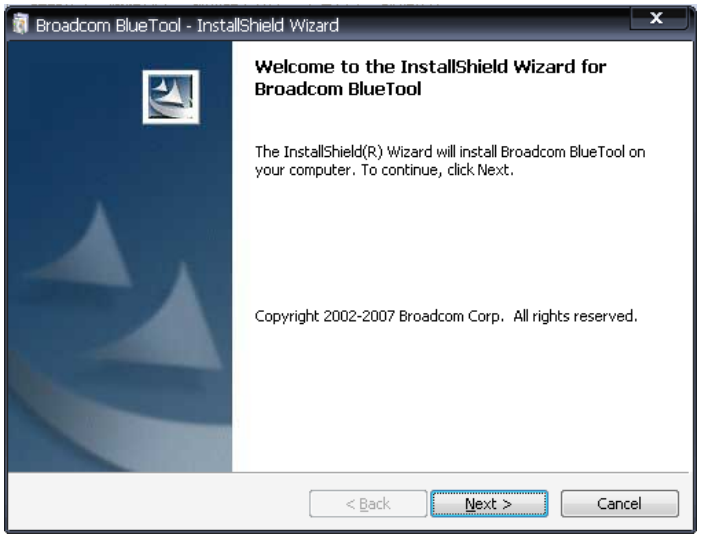
15. Setup Active Perl_5.8.4.810 and BLUETOOL_MI_1.3.8.0 tool



16. Setup USB bridge driver

2.1 Throughput Test

CONNECTING TO WIRELESS NETWORKS

The examples in the following sections illustrate how to connect to both infrastructure and ad hoc networks, including infrastructure networks that use no security, WEP security, and WPA/PSK and WPS2/PSK security.

SCANNING FOR WIRELESS NETWORKS

To force the dongle to scan

• Run **wl scan**.

To force the dongle to return the results of the scan

• Run **wl scanresults**.

Example results returned when an AP is found:

• SSID: "Eval4334"

• Mode: Managed: RSSI: -48 dBm noise: -105 dBm Channel: 1

• BSSID: 00:10:18:90:2E:C1 Capability: ESS ShortSlot

• Supported Rates: [1(b) 2(b) 5.5(b) 11(b) 18 24 36 54 6 9 12 48]

Example results returned when an ad hoc network is found:

• SSID: "ADHOC#1"

• Mode: Ad Hoc RSSI: -41 dBm noise: -105 dBm Channel: 1

• BSSID: B2:51:28:6B:3C:A1 Capability: IBSS

• Supported Rates: [1(b) 2(b) 5.5(b) 11(b)]

CONNECTING TO AN INFRASTRUCTURE NETWORK WITH NO SECURITY (AP CONNECTION)

To connect to the network through an AP with SSID = Eval4334

Run **wl join Eval4334**.

CONNECTING TO AN INFRASTRUCTURE NETWORK WITH WEP SECURITY

To connect to the network that uses 12345 as the network key

• Run **wl join Eval4334 key 12345**.

CONNECTING TO AN INFRASTRUCTURE NETWORK WITH WPA-PSK/WPA2-PSK SECURITY

To specify TKIP or AES as the data encryption method

• Run **wl wsec 3/7**.

To enable the supplicant

• Run **wl sup_wpa 1**.

To specify the PSK passphrase (network key) to use

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• Run **wl set_psk $passphrase**.

To connect to a network that uses WPA-PSK security

• Run **wl join Eval4334 imode bss amode wpapsk**.

To connect to a network that uses WPA2-PSK security

• Run **wl join Eval4334 imode bss amode wpa2psk**.

CONNECTING TO AN AD HOC NETWORK USING CHANNEL 1

To set the channel to channel 1

• Run **wl channel 1**.

To connect to the ad hoc network with SSID = 4334-ADHOC

• Run **wl join 4334-ADHOC imode ibss**.

MANAGING POWER CONSUMPTION

To disable Power Save (PS) mode (default)

• Run **wl PM 0**.

To enable legacy IEEE 802.11 Power Save (PS) mode

• Run **wl PM 1**.

To enable Fast IEEE 802.11 Power Save mode

• Run **wl PM 2**.

Note:

• The STA automatically transitions to Legacy PS mode when no data is being sent or received.

• The STA automatically disables PS mode when data is being sent or received.

MEASURING WLAN THROUGHPUT

The throughput measurement shows the performance of the TCP/IP layer over the wireless link. To achieve the best results, run the measurement test in a clean environment with as little interference as possible. The test can be run with the adapter connected to either an Infrastructure network (see Fig. 2.2) or an ad hoc network (see Fig. 2.3). An AP that is known to be

In good working order should be used for the infrastructure mode test.

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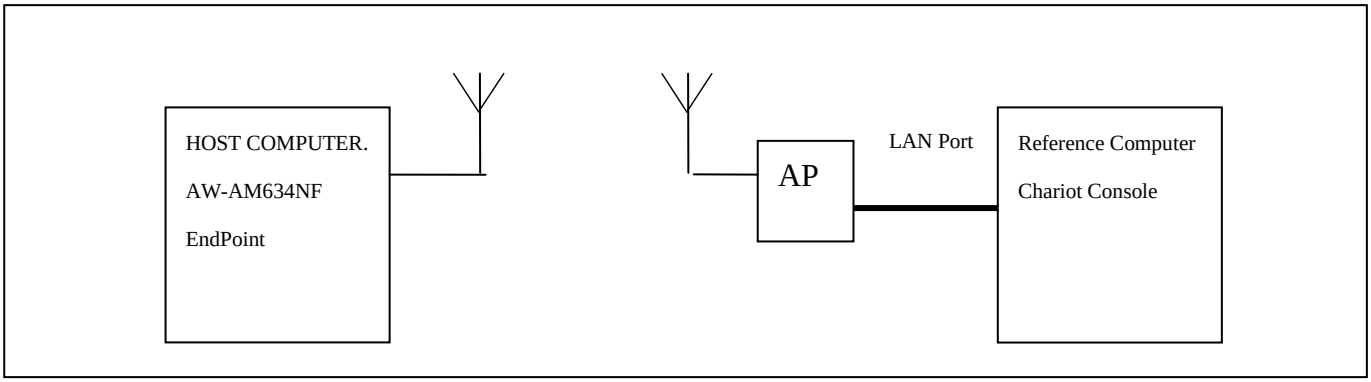

FIG. 2.2

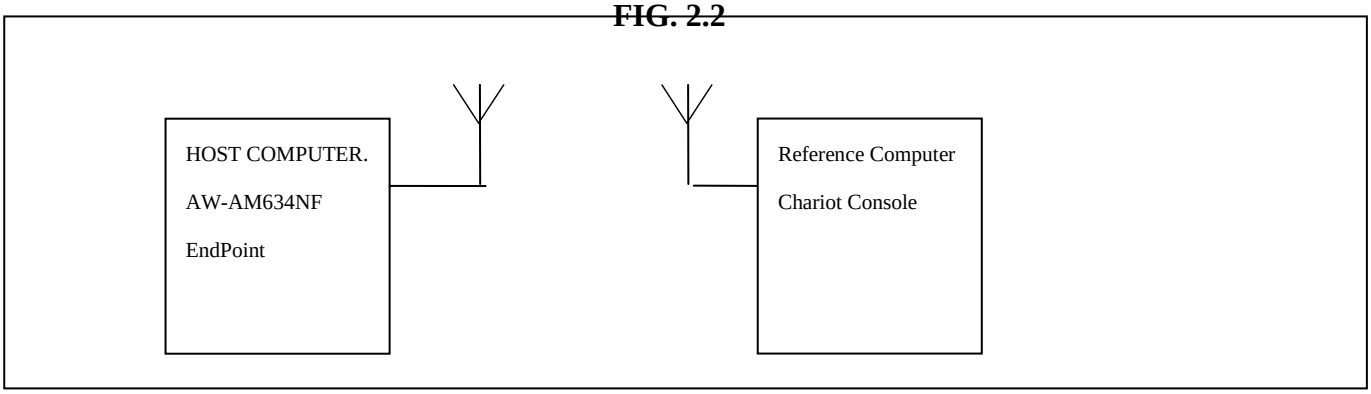

FIG. 2.3

MEASURING THROUGHPUT USING NETIQ CHARIOT

Test Procedure

1. Bring up the AW-AM634NF demo boar with the IP address set as 192.168.1.110.

2. Connect the reference computer with Chariot Console, which is assigned an IP address of 192.168.1.100, to the LAN port of the AP

3. Verify that communication exists between the reference computer and the AW-AM634NF demo board by pinging **192.168.1.100** from the AW-AM634NF host console.

4. Set up Chariot.

a. On the host computer, activate EndPoint:

b. Using Chariot Console on the reference computer, create two pair groups (192.168.1.100 and 192.168.1.110) using the Chariot Throughput.scr script. Run the throughput test for a specified period of time and observe the results.

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2.2 RF Tx/Rx Performance Test

CREATING A TX TEST

1. From the **Start** menu, select **Run**.
2. Type **cmd**, and then click **OK**.
3. Navigate to the directory that contains **wl.exe**
4. Enter the **wl ver** command to check the current WL driver version.
5. Run the following command set:

(b mode)
wl down
wl country ALL
wl cur_etheraddr 00:11:22:33:44:55
wl cur_etheraddr
wl perm_etheraddr
wl ver
wl down
wl mpc 0
wl scansuppress 1
wl band b
wl channel 1 **(Channel 1~13)**
wl nrate -r 11 **(Modulation Rate)**
wl chanspec -c 1 -b 2 -w 20 -s 0
Wl up
wl txpwr1 -o -d 16 **(Please follow our typical power level of each module datasheet)**
wl phy_forcecal 1
wl pkteng_start 00:11:22:33:44:55 tx 300 1500 0
pause
wl pkteng_stop tx
wl pkteng_stop rx
wl down

This will send continuous Tx Packets with 300 us packet interval, 1500 byte packet length. Data rate is 11Mbps and output power is 16dBm

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(g mode)

```
wl down
wl country ALL
wl cur_etheraddr 00:11:22:33:44:55
wl cur_etheraddr
wl perm_etheraddr
wl ver
wl down
wl mpc 0
wl scansuppress 1
wl band b
wl channel 7
wl nrate -r 54
wl chanspec -c 1 -b 2 -w 20 -s 0
wl up
wl txpwr1 -o -q 64
wl pkteng_start 00:11:22:33:44:55 tx 300 1500 0
wl phy_forcecal 1
pause
wl pkteng_stop tx
wl pkteng_stop rx
wl down
```

This will send continuous Tx Packets with 300 us packet interval, 1500 byte packet length. Data rate is 54Mbps and output power is 14dBm

(n mode HT20)

```
wl down
wl country ALL
wl cur_etheraddr 00:11:22:33:44:55
wl cur_etheraddr
wl perm_etheraddr
wl ver
wl down
wl mpc 0
wl scansuppress 1
wl band b
wl channel 1
```


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```
wl nrate -m 7
wl chanspec -c 1 -b 2 -w 20 -s 0
wl up
wl txpwr1 -o -d 13
wl pkteng_start 00:11:22:33:44:55 tx 300 1500 0
wl phy_forcecal 1
pause
wl pkteng_stop tx
wl pkteng_stop rx
wl down
```

This will send continuous Tx Packets with 300 us packet interval, 1500 byte packet length. Data rate is MCS7 and output power is 13dBm

(n mode HT40)

```
wl down
wl country ALL
wl cur_etheraddr 00:11:22:33:44:55
wl cur_etheraddr
wl perm_etheraddr
wl ver
wl down
wl mimo_bw_cap 1
wl mimo_txbw 4
wl mpc 0
wl scansuppress 1
wl band b
wl channel 3
wl nrate -m 7
wl chanspec -c 3 -b 2 -w 40 -s 1
wl up
wl txpwr1 -o -d 11
wl pkteng_start 00:11:22:33:44:55 tx 300 1500 0
wl phy_forcecal 1
pause
wl pkteng_stop tx
wl pkteng_stop rx
```


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```
wl down

(11a mode)
wl down
wl country ALL
wl cur_etheraddr 00:11:22:33:44:55
wl cur_etheraddr
wl perm_etheraddr
wl ver
wl down
wl mpc 0
wl scansuppress 1
wl band a
wl channel 36
wl nrate -r 6
wl chanspec -c 36 -b 5 -w 20 -s 0
wl up
wl txpwr1 -o -d 14
wl pkteng_start 00:11:22:33:44:55 tx 30 1500 0
wl phy_forcecal 1
pause
wl pkteng_stop tx
wl pkteng_stop rx
wl down


(11a n mode HT20)
wl down
wl country ALL
wl cur_etheraddr 00:11:22:33:44:55
wl cur_etheraddr
wl perm_etheraddr
wl ver
wl down
wl mpc 0
wl scansuppress 1
wl band a
```

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```
wl channel 36
wl nrate -m 0
wl chanspec -c 36 -b 5 -w 20 -s 0
wl up
wl txpwr1 -o -d 13
wl pkteng_start 00:11:22:33:44:55 tx 30 1500 0
wl phy_forcecal 1
pause
wl pkteng_stop tx
wl pkteng_stop rx
wl down
```

(11a n mode HT40)

```
wl down
wl country ALL
wl cur_etheraddr 00:11:22:33:44:55
wl cur_etheraddr
wl perm_etheraddr
wl ver
wl down
wl mimo_bw_cap 1
wl mimo_txbw 4
wl mpc 0
wl scansuppress 1
wl band a
wl channel 38
wl nrate -m 0
wl chanspec -c 38 -b 5 -w 40 -s 1
wl up
wl txpwr1 -o -d 11
wl pkteng_start 00:11:22:33:44:55 tx 30 1500 0
wl phy_forcecal 1
pause
wl pkteng_stop tx
wl pkteng_stop rx
wl down
```

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CREATING A Rx TEST

1. From the **Start** menu, select **Run**.
2. Type **cmd**, and then click **OK**.
3. Navigate to the directory that contains **wl.exe**.
4. Run the following command set

```
wl disassoc
wl down
wl up
wl mpc 0
wl up
wl channel 1
wl rate 54
wl rateset 54b

(b/g/n Rx mode)
wl down
wl country ALL
wl cur_etheraddr 00:11:22:33:44:55
wl cur_etheraddr
wl perm_etheraddr
wl ver
wl down
wl mpc 0
wl scansuppress 1
wl band b
wl channel 7
wl up
wl pkteng_start 00:11:22:33:44:55 rxwithack 100 1500 0
wl counters
pause
wl counters
pause
wl pkteng_stop tx
wl pkteng_stop rx
wl down
```

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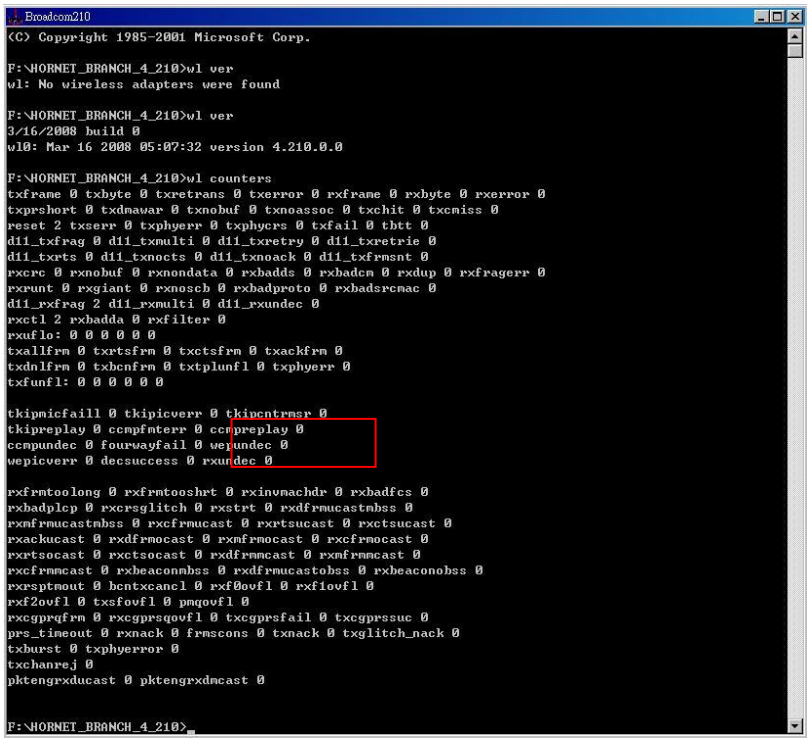
This will enter channel 1 : 54Mbps receive mode. The default MAC address is 001122334455. Packets sent from Signal Generator **must** have the same MAC address as the DUT's MAC address (Runtime mac address can be overrode by using wl cur_etheraddr xx:xx:xx:xx:xx:xx .

5. Use WL counters and find the received frame numbers in "rxdfrmucastmbss".



```
Broadcom210
(C) Copyright 1985-2001 Microsoft Corp.

F:\WORNET_BRANCH_4_210>wl ver
wl: No wireless adapters were found

F:\WORNET_BRANCH_4_210>wl ver
3/16/2008 build 0
wl0: Mar 16 2008 05:07:32 version 4.210.0.0

F:\WORNET_BRANCH_4_210>wl counters
txframe 0 txbyte 0 txretrans 0 txerror 0 rxframe 0 rxbyte 0 rxerror 0
txprshort 0 txdmawar 0 txnobuf 0 txnoassoc 0 txchit 0 txcmiss 0
reset 2 txserr 0 txphyerr 0 txphycrs 0 txfail 0 tbtt 0
d11_txfrag 0 d11_txmulti 0 d11_txretry 0 d11_txretrie 0
d11_txrts 0 d11_txnocts 0 d11_txnoack 0 d11_txfrmsnt 0
rxcrc 0 rxnobuf 0 rxnondata 0 rxbadds 0 rxbadcm 0 rxdup 0 rxfragerr 0
rxrunt 0 rxgiant 0 rxnoscb 0 rxbadproto 0 rxbadsrcmac 0
d11_rxfrag 2 d11_rxmulti 0 d11_rxundec 0
rxctl 2 rxbadda 0 rxfilter 0
rxuflo: 0 0 0 0 0 0
txallfrm 0 txrtsfrm 0 txctsfrm 0 txackfrm 0
txdnlfrm 0 txbcnfrm 0 txtplunfl 0 txphyerr 0
txfunfl: 0 0 0 0 0 0

tkipmicfaill 0 tkipicverr 0 tkipcntrmsr 0
tkipreplay 0 ccmpfmterr 0 ccmpreplay 0
ccmpundec 0 fourwayfail 0 wepundec 0
wepicverr 0 decsuccess 0 rxundec 0

rxfrmtoolong 0 rxfrmtooshrt 0 rxinvmachdr 0 rxbadfcs 0
rxbadplcp 0 rxcrsglitch 0 rxstrt 0 rxdfrmucastmbss 0
rxmfrmucastmbss 0 rxcfrmucast 0 rxrtsucast 0 rxctsucast 0
rxackucast 0 rxdfrmocast 0 rxmfrmocast 0 rxcfrmocast 0
rxrtsocast 0 rxctsocast 0 rxdfrmmcast 0 rxmfrmmcast 0
rxcfrmmcast 0 rxbeaconmbss 0 rxdfrmucastobss 0 rxbeaconobss 0
rxrsptmout 0 bcntxcancl 0 rxf0ovfl 0 rxf1ovfl 0
rxf2ovfl 0 txsfovfl 0 pmqovfl 0
rxcgprqfrm 0 rxcgprsqovfl 0 txcgprsfail 0 txcgprssuc 0
prs_timeout 0 rxnack 0 frmscons 0 txnack 0 txglitch_nack 0
txburst 0 txphyerror 0
txchanrej 0
pktengrxducast 0 pktengrxdmcast 0


F:\WORNET_BRANCH_4_210>_
```

6. The RX PER = [(Total lost packets at the receiver) / (Total sent packets from the Signal Generator)] x 100%. Thus, PER =100% - [(rxframe numbers after sequence play) – (rxframe numbers before sequence play)] / (Total sent packets from the signal Generator) x 100%.

A simple PER calculation tool (fer.exe) can help you do the job:

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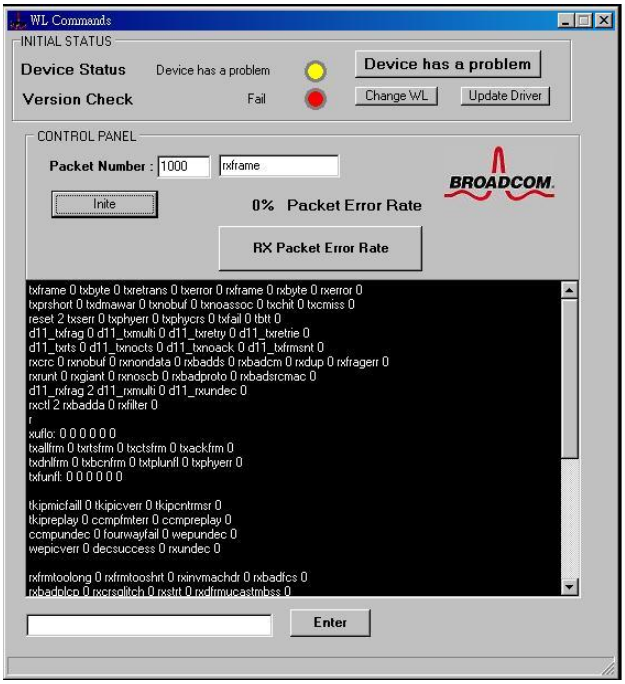

NOTE: The fer.exe must be located with WL.exe in the same directory.

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3. Bluetooth Basic Test

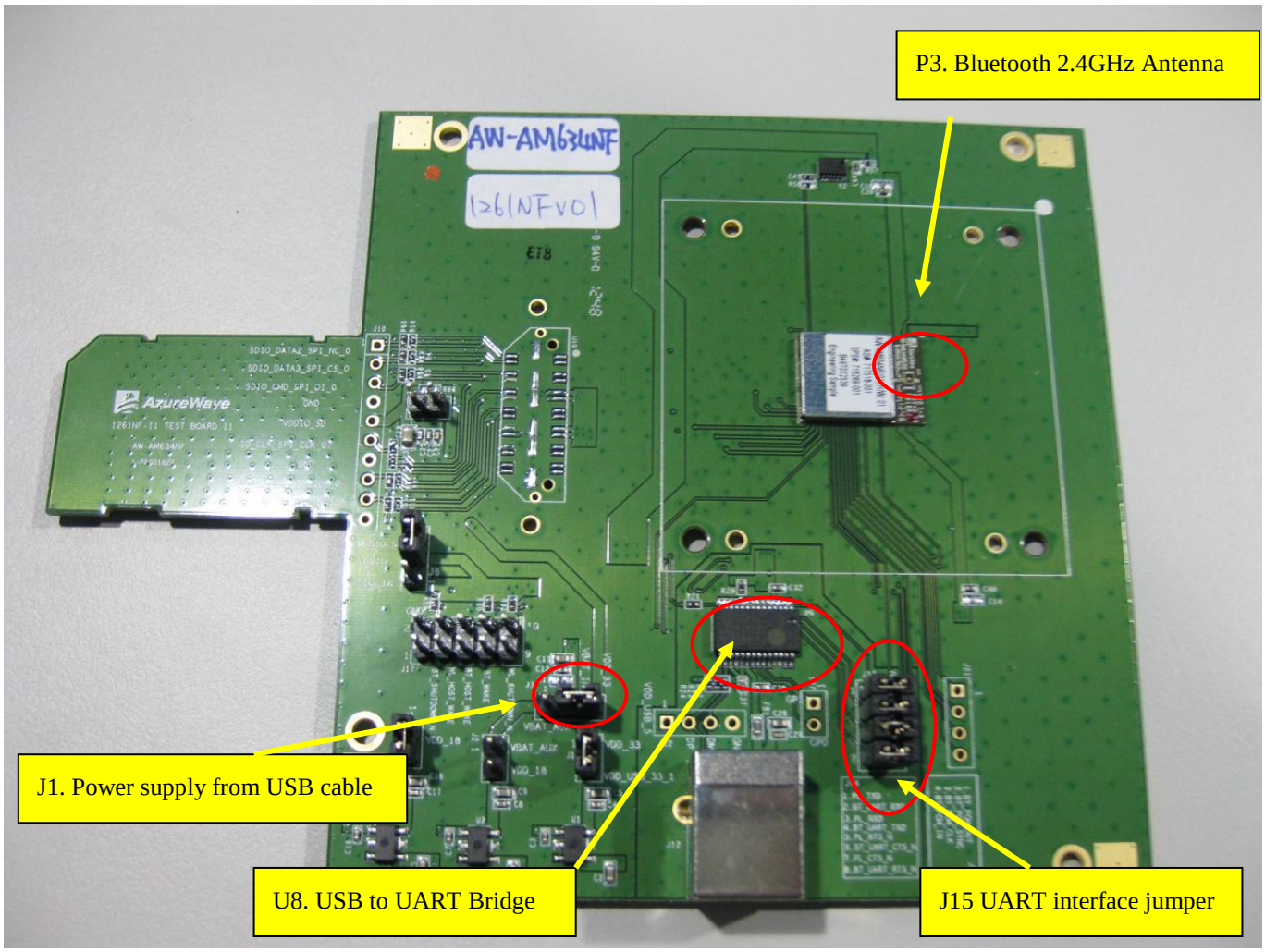

FIG. 3.1

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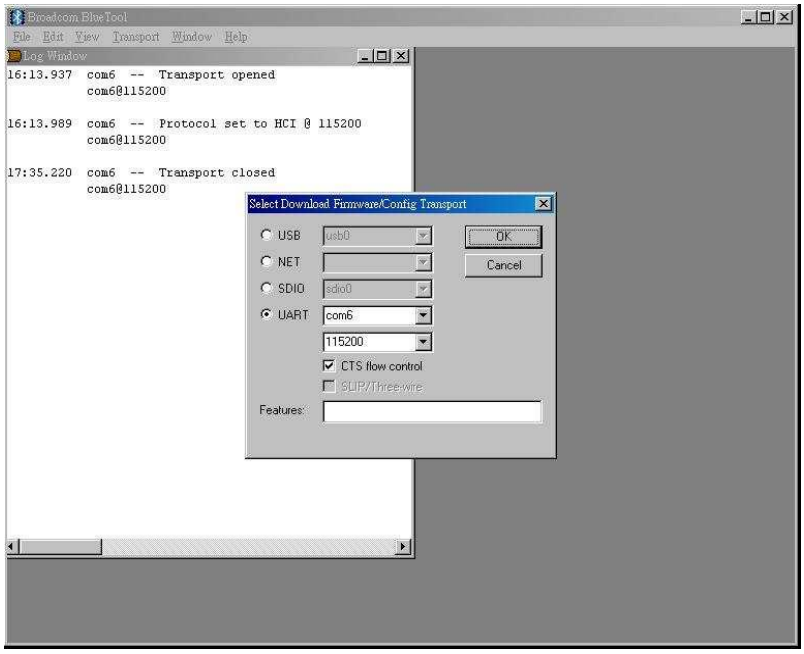
3-1. Download Mini-driver

1. Start Broadcom BlueTool.
2. On the **View** menu, click **Log Windows Details**.
3. On the **Transport** menu, click **HCI Control**.



4. in Select HCI Control Window Transport:
   a. Select **UART** as the type of transport.
   b. In the COM port list, select **com6**.(check the port number in device manager)

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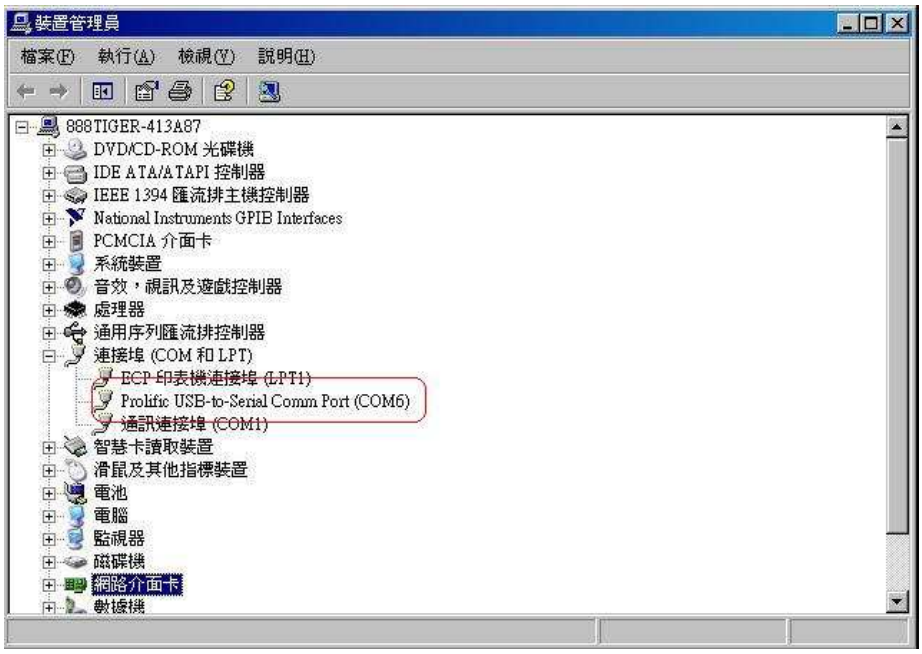
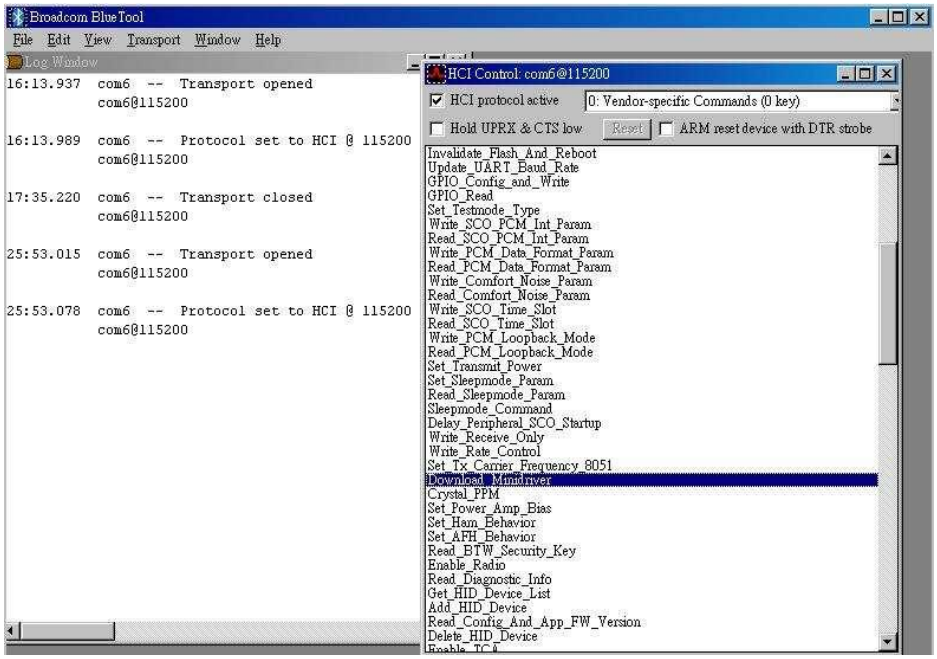


c. In the Baud list, type **115200**.

d. Select the **CTS flow control** check box.

e. Click **OK**.

5. In HCI Control, select the **HCI protocol active** check box



6. In the HCI Control commands list, select **0: Vendor-specific Commands (0 key)**, and then double-click **Download Minidriver**.

7. On the **Transport** menu, click **Download Firmware/Config**.

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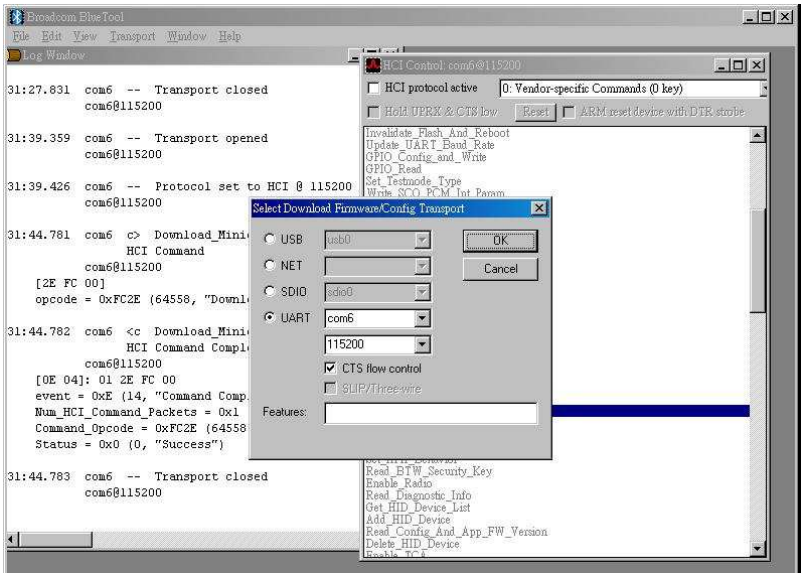
8. In **Select Download Firmware/Config Transport**:



a. Select **UART** as the type of transport.

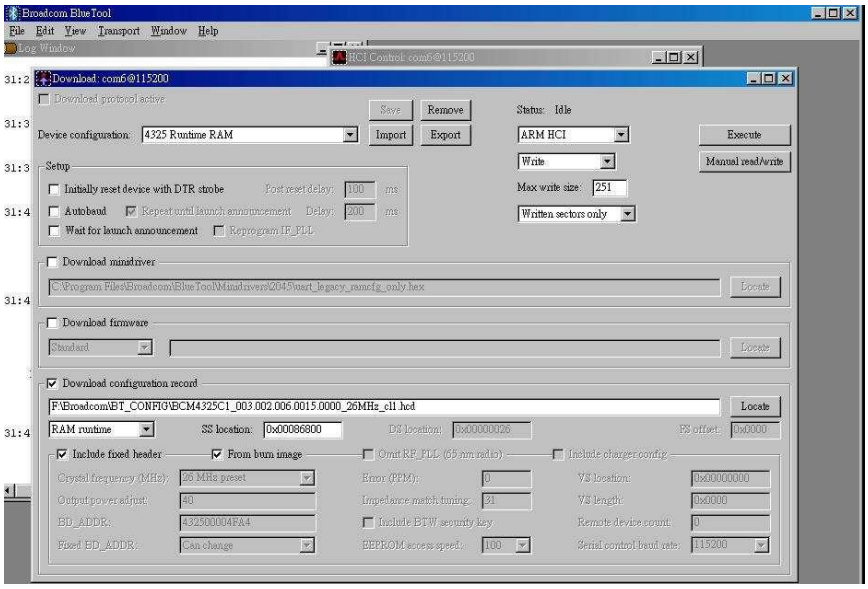
b. In the COM port list, select **com6**.

c. In the Baud list box, type **115200**.

d. Select the **CTS flow control** check box.

e. Click **OK**.

9. In **Download**, configure the settings to match those shown below



10. Click **Execute**.

11. Select the **HCI protocol active** check box

3-2. Throughput Test

Bluetool contains a throughput test feature that can be used with two or more AW-AM634NF devices.

※Note that each device runs on a separate PC with BlueTool installed. This document will provide basic directions for setting-up and running this test.

The next step in setting-up the test is establishing a connection between the devices.

3.2.1ESTABLISH A BLUETOOTH CONNECTION BETWEEN TWO USB DEVICES SET UP THE SLAVE DEVICE FIRST

1. On the **Slave** side, start Bluetool from the Start Menu.
2. If the Log Window is not already open, select “View” and then select “Log Window”.Select “Transport” and then select “HCI Control.” New window pop-up, select “UART” and enter com port number. Click “OK”.
3. Download mini driver (see 3.1)
4. In the “HCI Control” window, select “7.3 Host Controller & Baseband Commands” (Note: may be 4.3, depending on version)
5. Double Click the “Write Scan Enable” entry
6. Select “Inquiry and Page Scan Enabled” and click “OK”
7. Double Click “Set Event Filter”
8. Select “Connection Setup”
9. Select “Allow Connections from all devices”
10. Select “Do Auto accept the connection with role switch disabled”
11. Click “OK”
12. In the “HCI Control” window, select “0 Vendor-specific commands”.
13. Double Click the “Write_BD_ADDR” command

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14. Enter 001122334455
15. In the "HCI Control" window, select"0 Vendor-specific commands". Double Click"Update UART Baud Rate". Select 3000000 then click OK.

SET UP THE MASTER DEVICE, AND CREATE THE CONNECTION

1. On the **Master** side, start Bluetool.
2. Open the log window, if not already open, and open the UART HCI Transport.
3. Download mini driver (see 3.1)
4. In the "HCI Control" window, select "7.1 Link Control Commands" (Note: may be 4.5 depending on version)
5. Double Click "Create Connection" and put BD address of the slave device into the BDADDR box. Click "OK"
6. In the "HCI Control" window, select"0 Vendor-specific commands". Double Click"Update UART Baud Rate". Select 3000000 then click OK.

A connection should establish now. This can be verified by looking in the log windows for both devices, which should now contain Connection Complete events with "Success" in the status field.

NOTE: once the connection has been established, Inquiry and Page Scan can be disabled. Also, go to: "7.3 Host Controller & Baseband Commands" →→ "Set Event Filter". Select "Connection Setup"; Select "Allow Connections from all devices"; Select "Do NOT Auto accepts the connection" and hit 'OK'. This will make the slave device non-discoverable and increase throughput by reducing overhead.

3.2.2 SET UP AND EXECUTE THE THROUGHPUT TEST

SET UP THE SLAVE AS THE RECEIVER

1. On the **Slave** side, select "Transport" and then select "Throughput Tests". Select UART.
2. In the "Receive Test" (Bottom half of the window), fill in a data pattern such as "abcdef", and fill in a count such as "1000000"

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3. Close the "Log Window." If this window is left open or minimized, then the throughput test will not achieve maximum throughput because of delay that is added by Windows every time the log window is updated.

SET UP THE MASTER AS THE TRANSMITTER AND START THE TEST

1. On the **Master** side, select "Transport" and then select "Throughput Tests". Select UART.
2. In the "Transmit Test" window (top half of the window), fill in the same data pattern and count that was filled in for the receive test on the **Slave** side.
3. Close the "Log Window." If this window is left open or minimized, then the throughput test will not achieve maximum throughput because of delay that is added by Windows every time the log window is updated.
4. On the **Slave** side, click "Execute Test" in the "Receive Test" window.
5. On the **Master** side, click "Execute Test" in the "Transmit Test" window.

Bluetooth throughput test is now running.

To stop the test, click "Abort Test" on the Master side first, then on the slave side.

3-3. RF Tx/Rx Performance Test

The following procedure explains how to configure the AW-NH611 for RF testing using Broadcom BlueTool. At the completion of the procedure, connect the Bluetooth test instrument to the AW-AM634NF with RF cable and performs the RF tests.

RESETTING THE USB DEVICE

To reset the USB device

•In **HCI Control**, in the HCI Control commands list, select **7.3: Host Controller & Baseband Commands (3 key)**, and then double-click **Reset**.

READING THE BLUETOOTH DEVICE ADDRESS

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To read the Bluetooth Device Address

• In HCI Control, in the HCI Control commands list, select **7.4: Informational Parameters (4 key)**, and then double-click

Read_BD_ADDR.

The Bluetooth Device Address (BD_ADDR) is displayed in the log window. The Bluetooth Device Address might be needed by the Bluetooth tester

SETTING THE EVENT FILTER TO AUTOMATICALLY ALLOW CONNECTION

To set the event filter to automatically allow connection

1. In HCI Control, in the HCI Control commands list, select **7.3: Host Controller & Baseband Commands (3 key)**, and then double-click **Set_Event_Filter**.
2. In HCI Command: Set_Event_Filter:
   a. In the **Filter_Type** list, select **Connection Setup.**
   b. In the **Connection_Setup_Filter_Condition_Type** list, select **Allow Connections from all devices**.
   c. In the **Auto_Accept_Flag** list, select **Do Auto accept the connection with role switch**
   d. **disabled**.

ENABLING WRITE SCAN

To enable Write Scan

1. In HCI Control, in the HCI Control commands list, select **7.3: Host Controller & Baseband Commands (3 key)**, and then double-click **Write_Scan_Enable**.
2. In HCI Command: Write_Scan_Enable, in the **Scan_Enable** list, select **Inquiry and Page Scan enabled**.

ENABLING TEST MODE

To enable Test Mode

• In HCI Control, in the HCI Control commands list, select **7.6: Testing Commands (6 key)**, and then double-click

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Enable_Device_Under_Test_Mode.

The AW-NH611 is now ready to receive a connection request from the Bluetooth tester and begin testing specified RF parameters.

4. Known Limitations

*For **PC** test scenario. AW-AM634NF **only** supports the following Host Controller IC:

PCI\VEN_1095&DEV_0670 ;Arasan SDIO HC

PCI\VEN_104C&DEV_803B ;TI Std SDIO HC

PCI\VEN_104C&DEV_803C ;TI Std SDIO HC

PCI\VEN_104C&DEV_8033 ;TI Std SDIO HC

PCI\VEN_104C&DEV_8034 ;TI Std SDIO HC

PCI\VEN_1180&DEV_0822 ;Ricoh Std SDIO HC

*Officially, the SPI interface is obsolete. Please contact your sales representative for detail information.

*AW-AM634NF does not have MSL rating yet. **Do not** rework the module under any circumstances

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R&TTE

This equipment may be operated in:							
AT	BE	BG	CH	CY	CZ	DE	DK
EE	ES	FI	FR	GB	GR	HU	IE
IT	IS	LI	LT	LU	LV	MT	NL
NO	PL	PT	RO	SE	SI	SK	TR

DFS controls related to radar detection shall not be accessible to the user.

Complies with the essential requirements of Article 3 of the R&TTE 1999/5/EC Directive, if used for its intended use and that the following standards has been applied:

1. **Health (Article 3.1(a) of the R&TTE Directive)**
   Applied Standard(s):
   - EN62311: 2008
2. **Safety (Article 3.1(a) of the R&TTE Directive)**
   Applied Standard(s):
   - EN 60950-1:2006/A11:2009+A1:2010+A12:2011
3. **Electromagnetic compatibility (Article 3.1 (b) of the R&TTE Directive)**
   Applied Standard(s):
   - EN 301 489-1 V1.9.2/-17 V2.2.1
4. **Radio frequency spectrum usage (Article 3.2 of the R&TTE Directive)**
   Applied Standard(s):
   - EN 300 328 V1.7.1
   - EN 301 893 V1.6.1
5. **EMC Directive (2004/108 /EC)**
   Applied Standard(s):
   - EN55022:2010/ AC:2011 Class B ; EN55024: 2010
   - EN 61000-3-2:2006/A1:2009/A2:2009; EN 61000-3-3:2008

Identification mark: **1177** (Notified Body) **CE(!)** CE1177(!)

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FCC and IC

Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The country code selection is for non-US model only and is not available to all US model. Per FCC regulation, all WiFi product marketed in US must fixed to US operation channels only.

Operations in the 5.15-5.25GHz band are restricted to indoor usage only.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This device is intended only for OEM integrators under the following conditions:

(1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
(2) The transmitter module may not be co-located with any other transmitter or antenna.
As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed

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In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains FCC ID: B94HNAR01”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

Industry Canada Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement."

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Caution

* The device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

* The maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall comply with the e.i.r.p. limit; and

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* The maximum antenna gain permitted for devices in the band 5725-5825 MHz shall comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate.

* Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz

Radiation Exposure Statement

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This device is intended only for OEM integrators under the following conditions:
1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

IMPORTANT NOTE

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: “Contains IC: 466Q-HNAR01”.

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

This device has been designed to operate with a PIFA antenna have a maximum gain of 4.0 dBi. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada.
Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce

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potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter (IC: 466Q-HNAR01 / Model: HSTNN-AR01) has been approved by Industry Canada to operate with the antenna type, maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this user's manual, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

NCC
【低功率警語】

第十二條
　經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條
　低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
　前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。
※如產品有支援 WLAN5G 需另加註以下 5G 警語
在 5.25-5.35 秭赫頻帶內操作之無線資訊傳輸設備，限於室內使用。

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