# IFW56810 / IFW56811


# IEEE 802.11 b/g/n MAC/baseband/radio and Bluetooth 5.2 IoT Module


# <u>EVB User Guide</u>


**Rev. A**


**(For Standard)**

# Revision History

| Version | Revision Date | Description | Initials | Approved |
|---------|---------------|-------------|----------|----------|
| A | 2022/03/ | ●    Initial version | Steven Jian | Chihhao Liao |

# Table of Contents
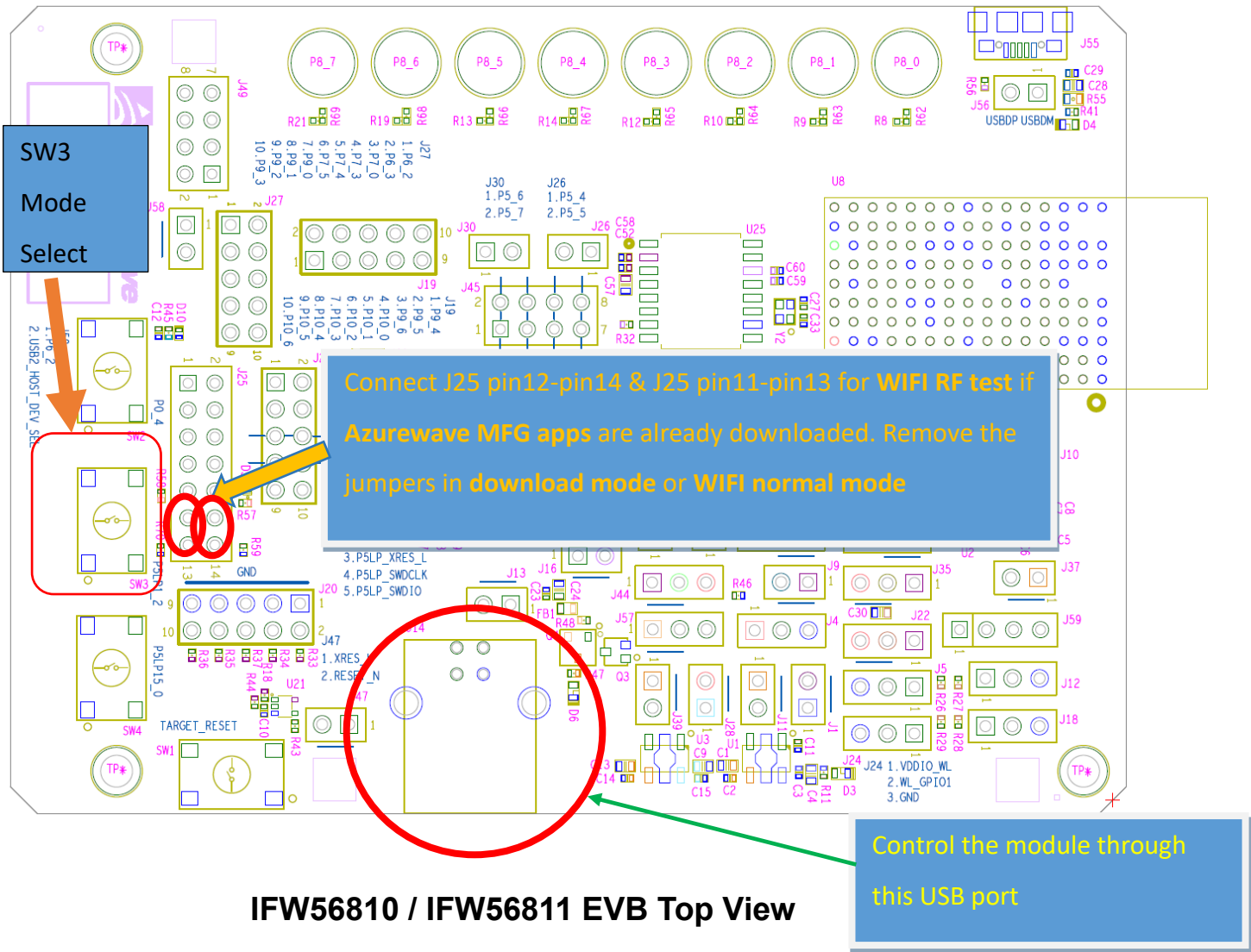
# 1. WLAN Basic Test

## 1.1 Components

-Windows 10 or above

-Install ModusToolBox 2.3.1 or above (optional)

-Download MFG app to the EVB (the Azurewave MFG app is stored in the EVB by default)

-Make sure the DUT is in **CMSIS-DAP Bulk** mode (Amber Status LED ON). If the DUT is not in **CMSIS-DAP Bulk** mode (Amber Status LED ON), short push SW3 button to cycle through the **CMSIS-DAP Bulk** and **DAPlink** (Amber Status LED Ramping with 2Hz rate) mode.

Internal antenna

External main antenna connector

Move the 0R from the orange rectangular to the green rectangular for external antenna test

**IFW56810 / IFW56811 Top View**

**IFW56810 / IFW56811 EVB Top View**

The annotations on the figure read:

- SW3 Mode Select
- Connect J25 pin12-pin14 & J25 pin11-pin13 for **WIFI RF test** if **Azurewave MFG apps** are already downloaded. Remove the jumpers in **download mode** or **WIFI normal mode**
- Control the module through this USB port
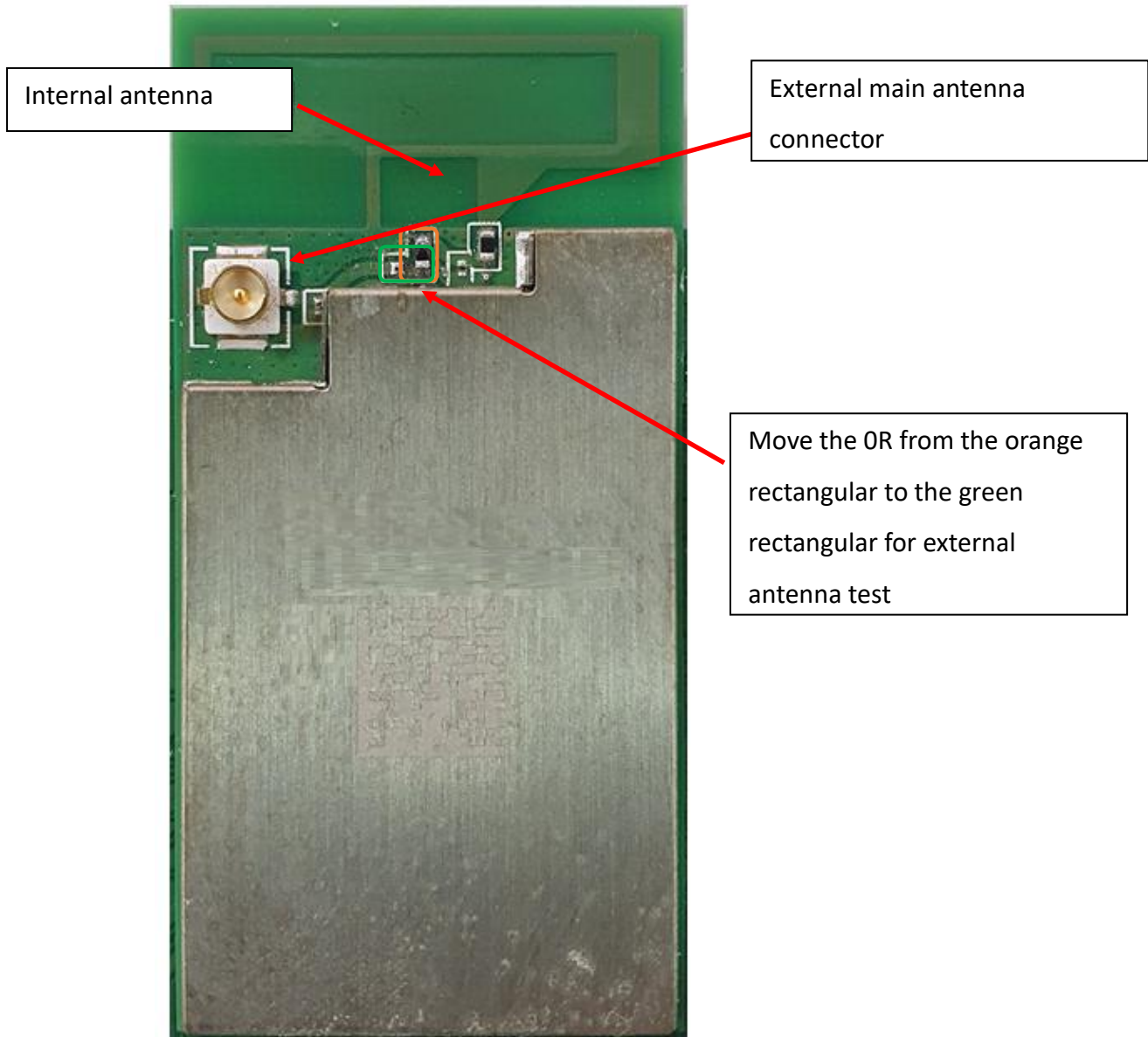
## 1.2 Using the Application

The following steps describe how to use the manufacturing test application.

*1. Ensure that the Evaluation board is connected to the PC and loaded with the manufacturing test application, then press the reset button.*

*2. Using Windows Device Manager, look in the section "Ports (COM & LPT)" and note the COM port in use by the EVB (e.g. COM63).*
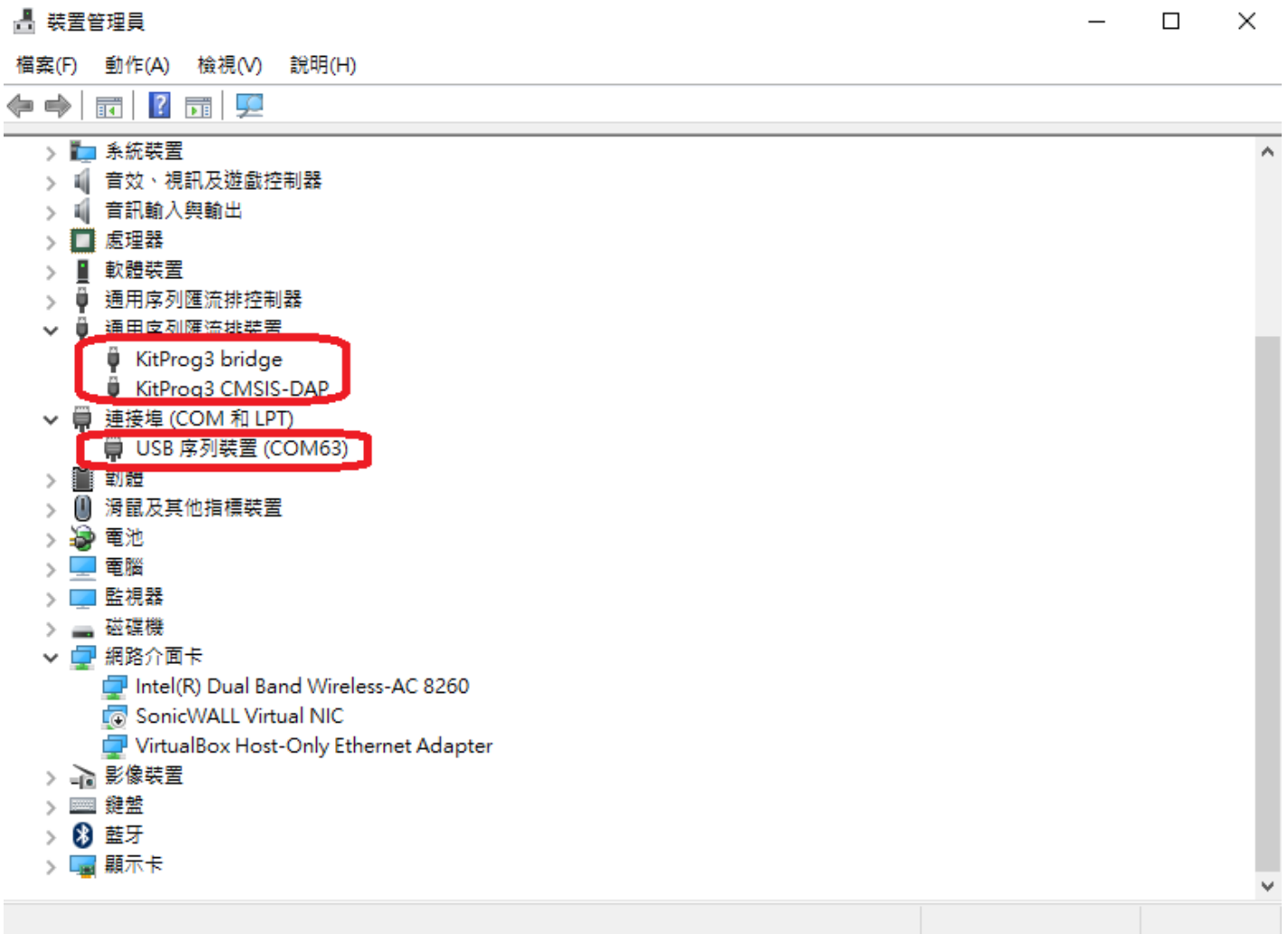
3. *Open a command prompt and navigate to the directory which contain the wl tool (e.g. d:\mfgtest\)*

4. *Verify that the application is working by entering the following command at the command prompt (where 63 corresponds to the COM port number of the DUT).*
*d:\mfgtest\wl43438A1.exe --serial 63 ver*

A list of available commands is displayed using the command: *wl43438A1.exe --serial 63 cmds*

Detailed help is available by entering the command: *wl43438A1.exe --serial 63 –h*

## 1.3 Example Commands

**1.** From the **Start** menu, select **Run**.

**2.** Type **cmd**, then click **OK**.

**3.** Navigate to the directory that contains **wl43438A1.exe**

**4.** Enter **wl43438A1.exe --serial %1 ver** command to check the current WL driver version (%1 is the com port number).

**5**. Run the following command set:

**11b rate:**

wl43438A1.exe --serial %1 pkteng_stop tx

wl43438A1.exe --serial %1 pkteng_stop rx

wl43438A1.exe --serial %1 down

wl43438A1.exe --serial %1 up

wl43438A1.exe --serial %1 country ALL

wl43438A1.exe --serial %1 mpc 0

wl43438A1.exe --serial %1 scansuppress 1

wl43438A1.exe --serial %1 band b

wl43438A1.exe --serial %1 channel **1**

wl43438A1.exe --serial %1 nrate -r **1**

wl43438A1.exe --serial %1 up

wl43438A1.exe --serial %1 phy_forcecal 1

wl43438A1.exe --serial %1 txpwr1 -o -q **64**

wl43438A1.exe --serial %1 pkteng_start 00:11:22:33:44:55 tx 300 1000 0

This will send continuous Tx Packets with 300 us packet interval, 1000 byte packet length. Data rate =1Mbps, Channel=1 and output power =16dBm.

**11g rate:**

```
wl43438A1.exe --serial %1 pkteng_stop tx
wl43438A1.exe --serial %1 pkteng_stop rx
wl43438A1.exe --serial %1 down
wl43438A1.exe --serial %1 up
wl43438A1.exe --serial %1 country ALL
wl43438A1.exe --serial %1 mpc 0
wl43438A1.exe --serial %1 scansuppress 1
wl43438A1.exe --serial %1 band b
wl43438A1.exe --serial %1 channel 1
wl43438A1.exe --serial %1 nrate -r 54
wl43438A1.exe --serial %1 up
wl43438A1.exe --serial %1 phy_forcecal 1
wl43438A1.exe --serial %1 txpwr1 -o -q 60
wl43438A1.exe --serial %1 pkteng_start 00:11:22:33:44:55 tx 300 1000 0
```

This will send continuous Tx Packets with 300 us packet interval, 1000 byte packet length. Data rate =54Mbps, Channel=1 and output power =15dBm.

**2.4G 11n 20 SISO rate:**

```
wl43438A1.exe --serial %1 pkteng_stop tx
wl43438A1.exe --serial %1 pkteng_stop rx
```

wl43438A1.exe --serial %1 up

wl43438A1.exe --serial %1 phy_watchdog 0

wl43438A1.exe --serial %1 country ALL

wl43438A1.exe --serial %1 band b

wl43438A1.exe --serial %1 mpc 0

wl43438A1.exe --serial %4 chanspec **1**/20

wl43438A1.exe --serial %1 nrate -m **7**

wl43438A1.exe --serial %1 up

wl43438A1.exe --serial %1 phy_forcecal 1

wl43438A1.exe --serial %1 phy_txpwrctrl 1

wl43438A1.exe --serial %1 txpwr1 -o -q **56**

wl43438A1.exe --serial %1 pkteng_start 00:11:22:33:44:55 tx 300 1000 0

This will send continuous Tx Packets with 300 us packet interval,1000 byte packet length. Data rate =MCS7, Bandwidth=20Mhz, Channel=1 and output power =14dBm.

## CREATING A Rx TEST

**11b/g/n rate:**

wl43438A1.exe --serial %1 pkteng_stop tx

wl43438A1.exe --serial %1 pkteng_stop rx

wl43438A1.exe --serial %1 disassoc

wl43438A1.exe --serial %1 down

wl43438A1.exe --serial %1 up

wl43438A1.exe --serial %1 country ALL

wl43438A1.exe --serial %1 mpc 0

wl43438A1.exe --serial %1 up

wl43438A1.exe --serial %1 cur_etheraddr 00:11:22:33:44:55

wl43438A1.exe --serial %1 band b

wl43438A1.exe --serial %1 channel **7**

wl43438A1.exe --serial %1 phy_forcecal 1

wl43438A1.exe --serial %1 pkteng_start 00:11:22:33:44:55 rxwithack 100 1500 0

wl43438A1.exe --serial %1 scansuppress 1

wl43438A1.exe --serial %1 counters

This will enter Channel 7 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 .

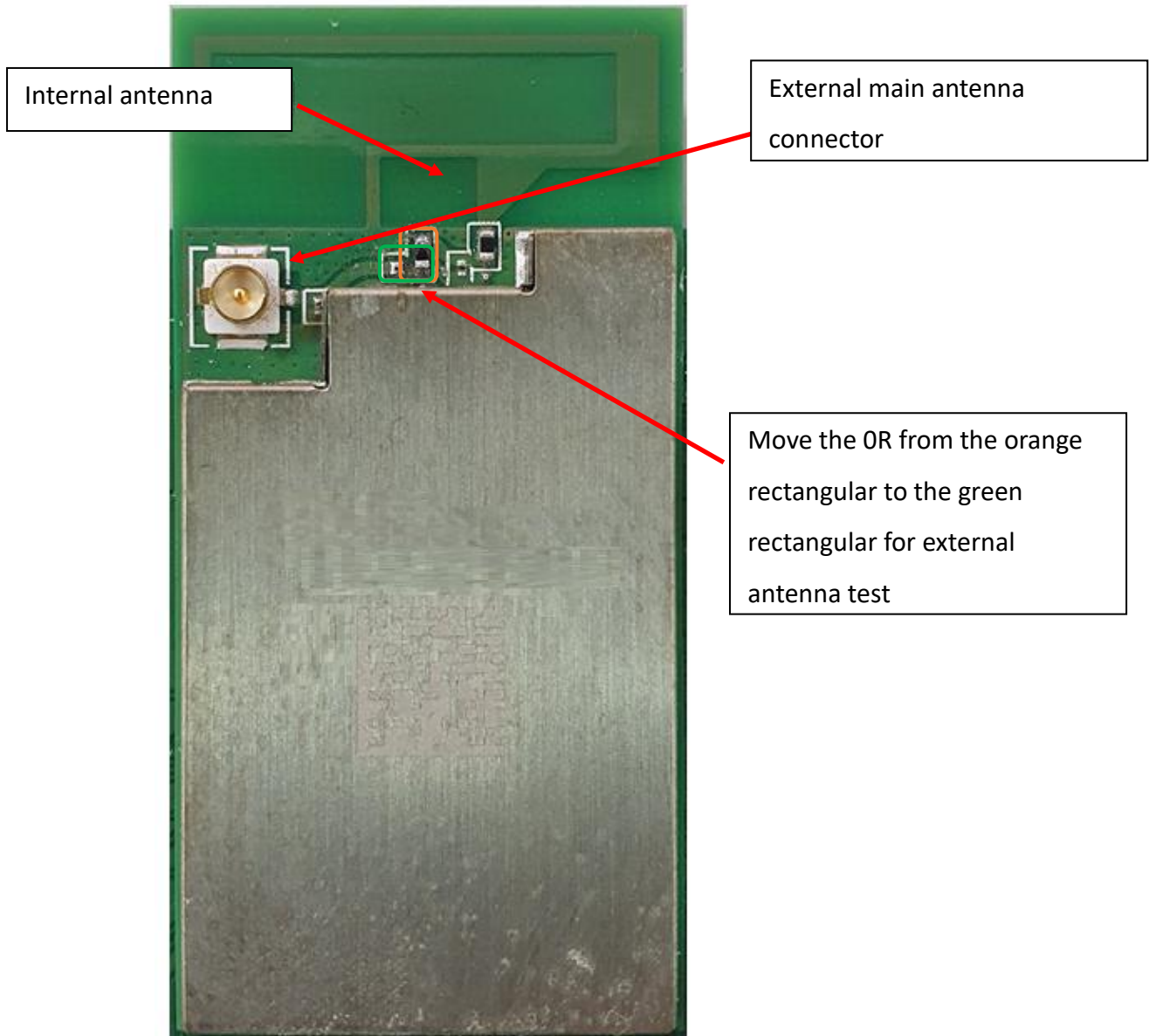※. Use "**wl counters**" and find the received frame numbers in "**rxdfrmocast**".

※. The RX PER = [ (Total lost packets at the receiver) / (Total sent packets from the Signal Generator) ] x 100%.

Thus, PER =100% - [(**rxdfrmocast** numbers after sequence play) – (**rxdfrmocast** numbers before sequence play)] / (Total sent packets from the signal Generator) x 100%.

# 2.Bluetooth Basic Test

## 2.1 Components

-bluetool 1.8.9.3 or later

-Windows 10 or above

-Install ModusToolBox 2.3.1 or above (optional)

-Download MFG app to the EVB (the Azurewave MFG app is stored in the EVB by default)

-Make sure the DUT is in **CMSIS-DAP Bulk** mode (Amber Status LED ON). If the DUT is not in **CMSIS-DAP Bulk** mode (Amber Status LED ON), short push SW3 button to cycle through the **CMSIS-DAP Bulk** and **DAPlink** (Amber Status LED Ramping with 2Hz rate) mode.

Internal antenna

External main antenna connector

Move the 0R from the orange rectangular to the green rectangular for external antenna test

**IFW56810 / IFW56811 Top View**

SW3 Mode Select

Connect J25 pin12-pin14 & J25 pin9-pin11 for **BT RF test** if **Azurewave MFG apps** are already downloaded. Remove the jumpers in **download mode** or **BT normal mode**

Control the module through this USB port

**IFW56810 / IFW56811 EVB Top View**
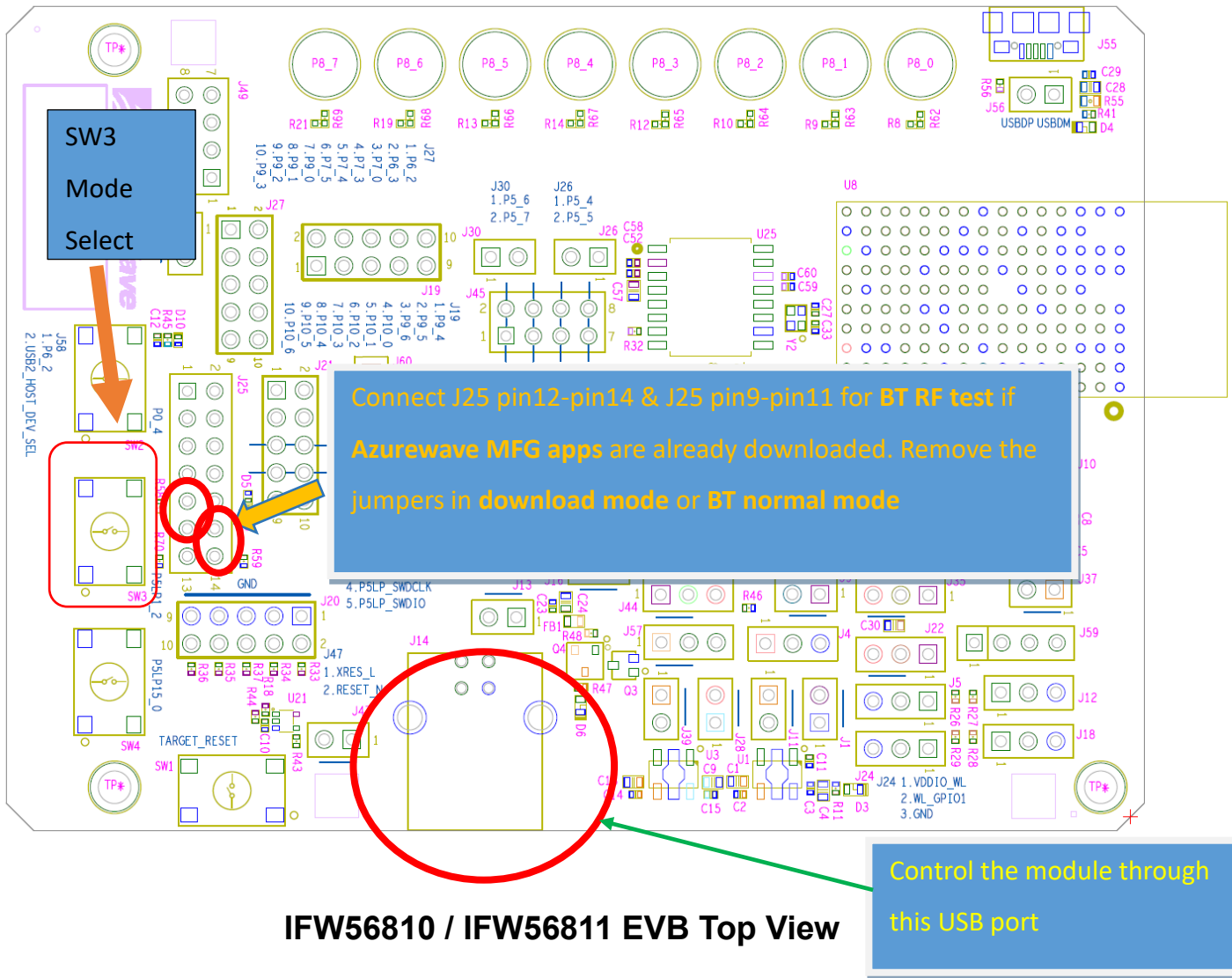
## 2.2 RF Performance Test

The following procedure explains how to configure the IFW56810 and IFW56811 for Bluetooth BR/EDR RF loopback testing using Broadcom BlueTool. At the completion of the procedure, connect the Bluetooth test instrument to the IFW56810 and IFW56811 with RF cable and performs the RF tests.

**1.** Start Broadcom BlueTool.

**2.** On the **View** menu, click **Log Windows Details**.

**3.** On the **Transport** menu, click **HCI Control**.
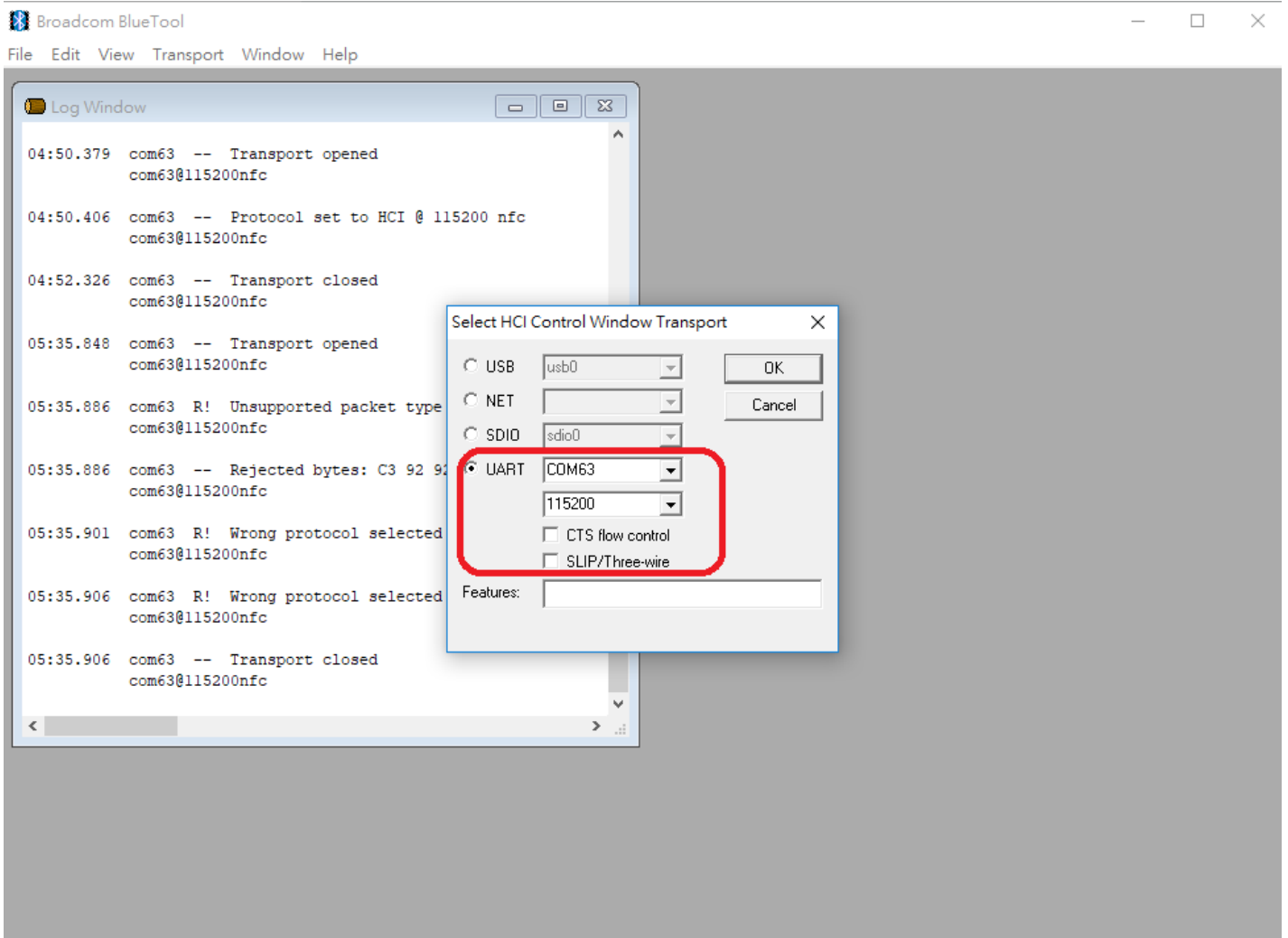


**4.** In Select HCI Control Window Transport:

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

b. In the COM port list, select **com63**. (check the port number in device manager)
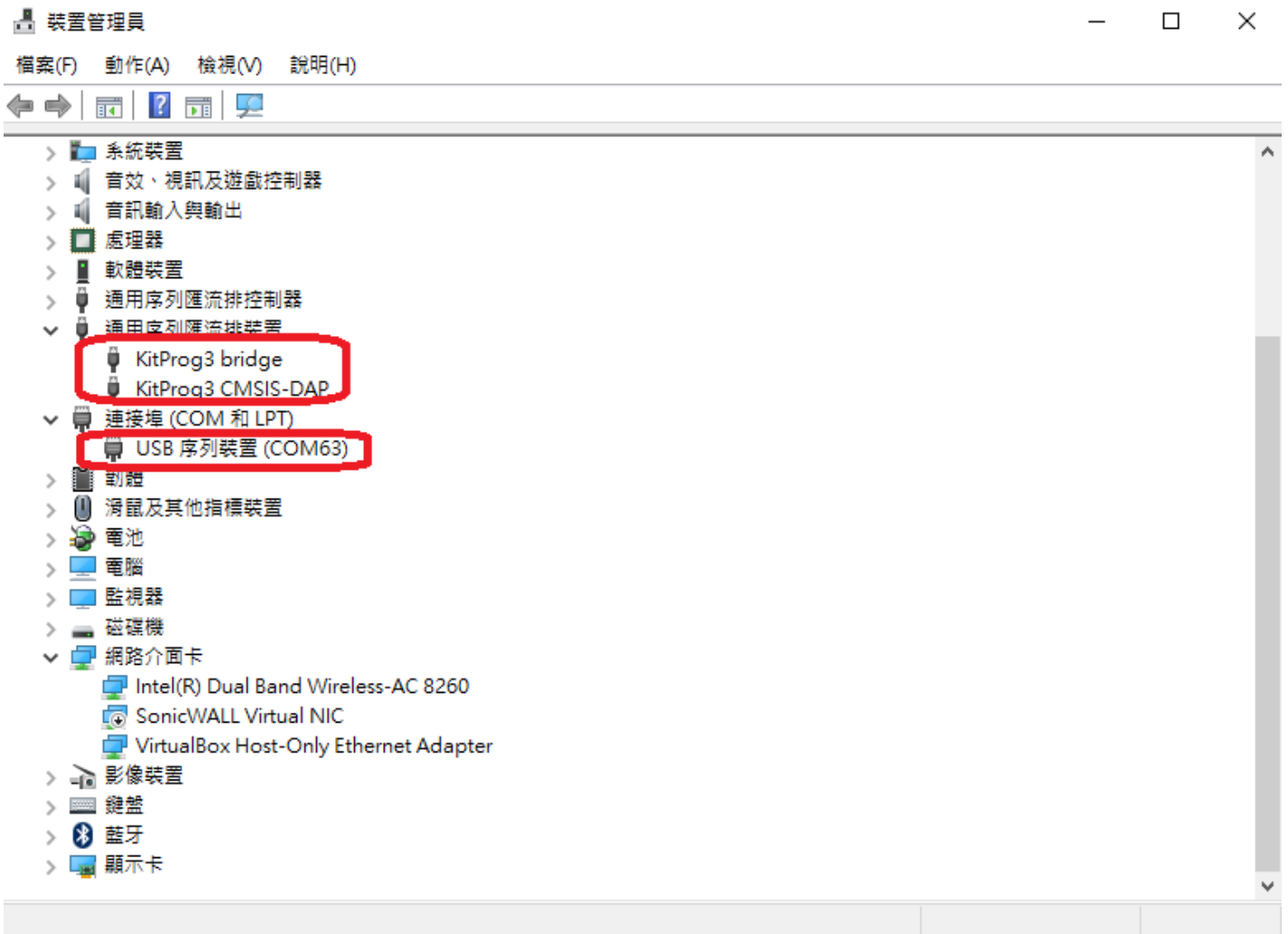
c. In the Baud list, type **115200**.

d. **Do not select** the **CTS flow control** and **SLIP/Three-wire** check box.

e. Click **OK**.

## 5. 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**.

## 6. READING THE BLUETOOTH DEVICE ADDRESS

**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

## 7. 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 disabled**.

## 8. 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**.

## 9. 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 **Enable_Device_Under_Test_Mode**.

The IFW56810 and IFW56811 are now ready to receive a connection request from the Bluetooth tester and begin testing specified RF parameters.

# 3. Device Provisioning

## 3.1 Components

-Windows 10 or above

-Install ModusToolBox 2.3.1 or above (**required**)

-Make sure the DUT is in **DAPlink** mode (Amber Status LED Ramping with 2Hz rate). Short push SW3 button to cycle through the **CMSIS-DAP Bulk** (Amber Status LED ON) and **DAPlink** mode.



SW3 Mode Select

Connect J23 pin2-pin3 so that the VDDD is 2.5V for device provision

Control the module through this USB port
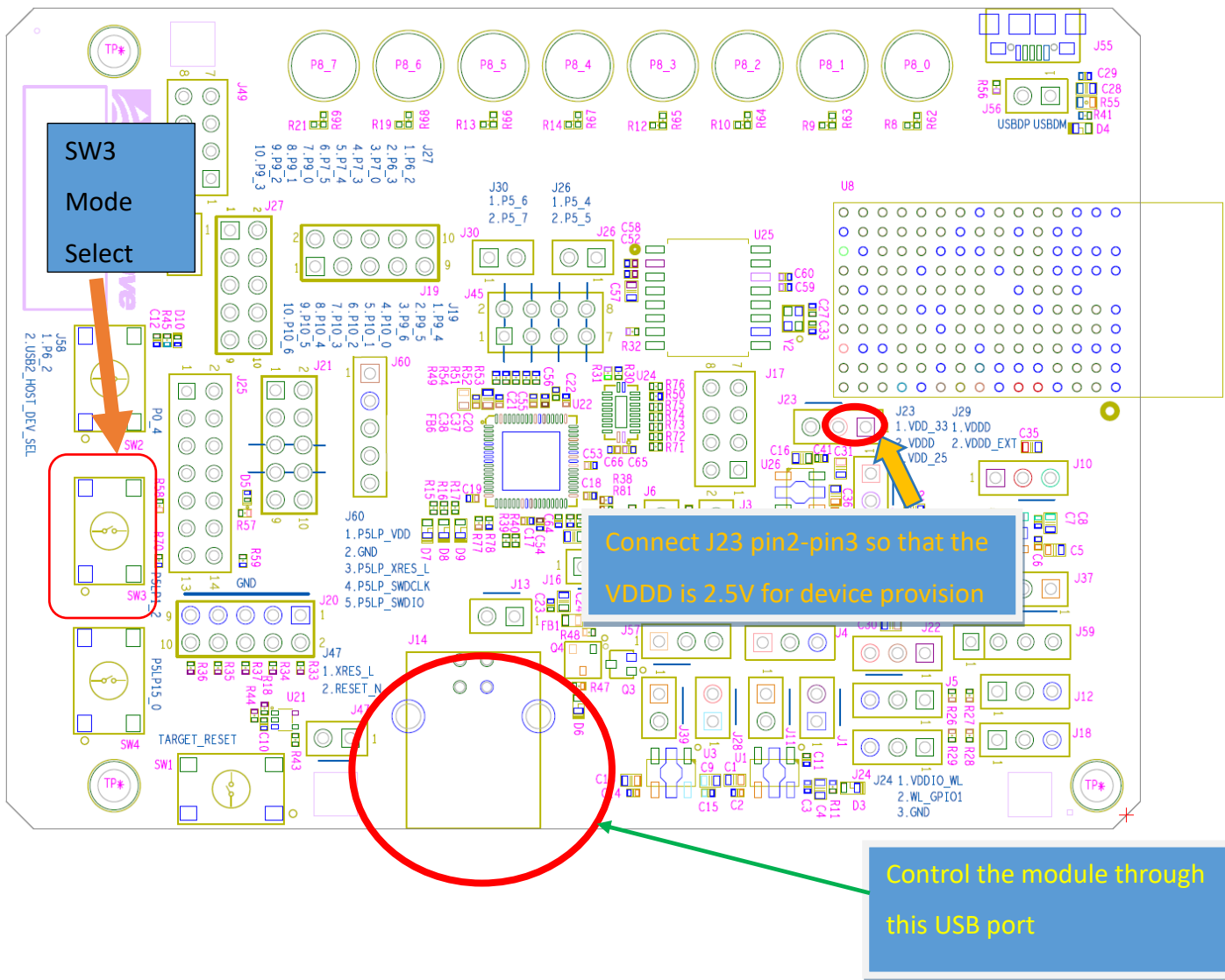
## 3.2 Provision the Device

**Use the following command to provision the device (<span style="color:red">path can vary depending on how the ModusToolbox is installed</span>):**

---------------------------------------------------------------------------------------------------

<span style="color:red">C:\Users\test</span>\ModusToolbox\tools_2.3\python-3.7.155\Scripts\cysecuretools.exe --no-interactive-mode --target cy8ckit-064s0s2-4343w --policy

<span style="color:red">C:/Users/test</span>/mtw/AnyCloud_BLE_Battery_Server/policy/policy_single_CM0_CM4_swap.json provision-device

---------------------------------------------------------------------------------------------------

**<span style="color:red">Re-provision</span> device if your device had been provisioned before (<span style="color:red">path can vary depending on how the ModusToolbox is installed</span>):**

---------------------------------------------------------------------------------------------------

<span style="color:red">C:\Users\test</span>\ModusToolbox\tools_2.3\python-3.7.155\Scripts\cysecuretools.exe --no-interactive-mode --target cy8ckit-064s0s2-4343w --policy

<span style="color:red">C:/Users/test</span>/mtw/AnyCloud_BLE_Battery_Server/policy/policy_single_CM0_CM4_swap.json re-provision-device

---------------------------------------------------------------------------------------------------

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 or more 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

The host product manufacturer must provide following statement in end-product manuals.
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.

The OEM or integrator is obligated to adhere to these requirements and restrictions as a condition for using the module's certification. The OEM or integrator is responsible to perform the required additional host regulatory testing and/or obtaining the required host approvals for compliance.
This module has been approved to operate with the antenna types listed below, with the maximum permissible gain indicated.

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|-------|------------|--------------|-----------|------------|
| 1 | MAG. LAYERS SCIENTIFIC-TECHNICS CO., LTD | MSA-4008-25GC1-A | PIFA | I-Pex | 2.98 |
| 2 | Azurewave | AW-CU544 | PCB | N/A | 3.12 |

**Label of the end product:**
The host product must be labeled in a visible area with the following " Contains FCC ID: **WAP-CMM1** ". The end product shall bear the following 15.19 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 module is only FCC authorized for the specific rule parts 15.247 listed on the grant, and the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host product as being Part 15 Subpart B compliant.

**The user manual of the end product should include (information for OEMs)**
The module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons.
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 device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment.

*Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé.*

This radio transmitter [IC: 7922A-CCM1] has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|------|-------|------------|--------------|-----------|------------|
| 1 | MAG. LAYERS SCIENTIFIC-TECHNICS CO., LTD | MSA-4008-25GC1-A | PIFA | I-Pex | 2.98 |
| 2 | Azurewave | AW-CU544 | PCB | N/A | 3.12 |

Le présent émetteur radio [IC: 7922A-CCM1] a été approuvé par Innovation, Sciences et Développement économique Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué pour tout type figurant sur la liste, sont strictement interdits pour l'exploitation de l'émetteur.

*CAN ICES-3 (B)/NMB-3(B)*

**Modular Approval**
OEM integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).
IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the IC authorization is no longer considered valid and the IC No. 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 IC authorization.

**Modular OEM Integrator Notice**
End Product Labeling
The final end product must be labeled in a visible area with the following: "Contains transmitter module IC: 7922A-CCM1".
*Contient le module d'émission IC:* 7922A-CCM1

*The Host Marketing Name (HMN) must be indicated at any location on the exterior of the end product or product packaging or product literature which shall be available with the end product or online.*