

Bluetooth RF Test Tool RTLBTAPP User Manual

Draft v0.4

2018/02/08

Revision History

Date	Version	
2017/07/11	Draft v0.1	
2017/10/23	Draft v0.2	Add set/get frequency offset, Hopping, Select TPM/IQM
2018/01/30	Draft v0.3	Add save tx settings to device
2018/02/08	Draft v0.4	Add the range of hopping channels

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Catalog

Revision History	2
-------------------------------	----------

Figure List	4
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1. Overview	5
2. Files	6
3. Hardware environment	6
4. Open RTLBTAPP	7
5. DUT (Link) Test Mode	9
6. LE DUT TX/RX Test(MP)	10
7. BLE Direct Test Mode.....	11
8. Set/Get frequency offset.....	13
9. Hopping Test (Certification)	14
10. Select TPM or IQM mode.....	15
11. Save Tx Settings to Device.....	16

Figure List

Figure 1 File List	6
Figure 2 Open BTLBTAPP	7
Figure 3 Check COM port number.....	8
Figure 4 Device opens successfully	8
Figure 5 Enter link test mode	9
Figure 6 LE Test	10
Figure 7 set/get crystal value directly	13
Figure 8 Hopping mode test	14
Figure 9 Select TPM or IQM mode	15
Figure 10 Save Tx Settings to Device	16

1. Overview

This document is used to introduce RF test tool “RTLBTAPP” for Realtek Bluetooth chip RTL876x series. Customers should comply with the steps and requirements under this document. Contact Realtek Bluetooth FAE if any problem arises in RF test flow.

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2. Files

MP tool package is provided to customers in binary format:

RTLBTAPP.exe

MP executable file

RtlBluetoothMP.dll

MP dll library

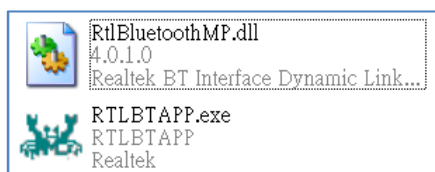


Figure 1 File List

Double click “RTLBTAPP.exe” to open this tool. However, please use “Run Administrator” to open it in Vista/Windows7 or higher.

3. Hardware environment

Before use this tool, PC should direct connected UART port. The connection between Bluetooth and HOST chip must be cut off.

4. Open RTLBTAPP

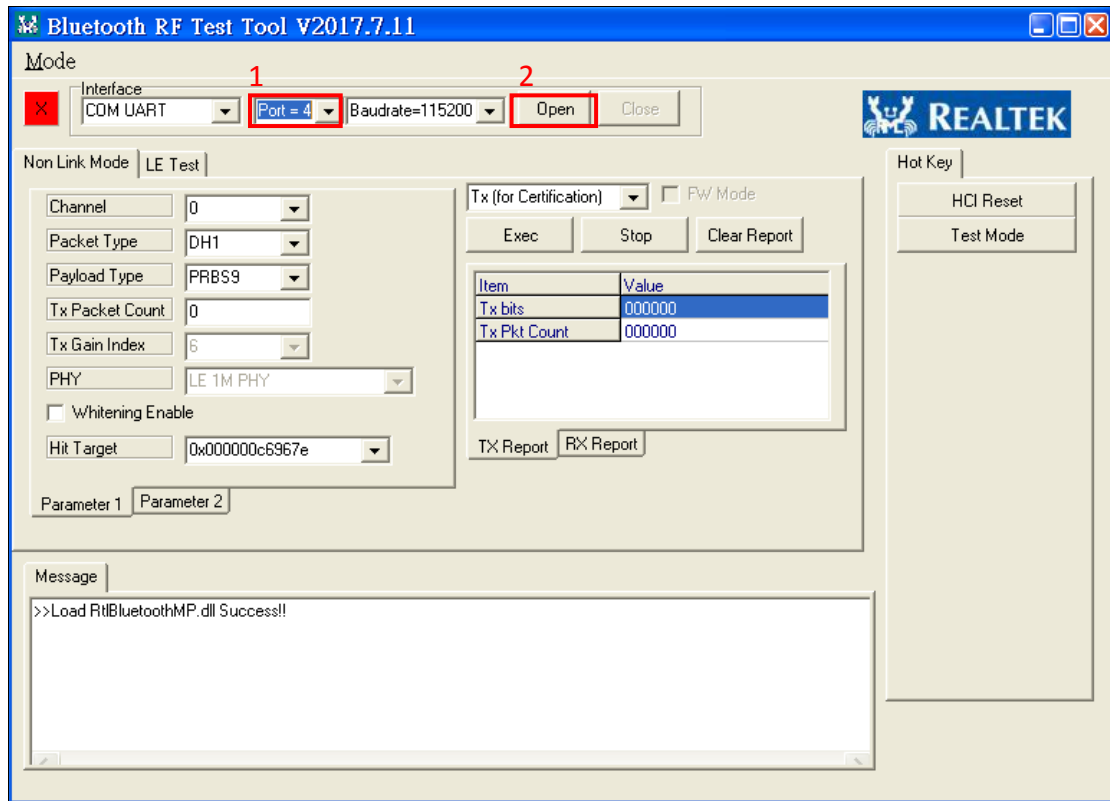


Figure 2 Open BTLBTAPP

Step 1: Select correct interface.

- UART:

If the module interface is UART, please select “UART” and check COM port number in Device Manager.

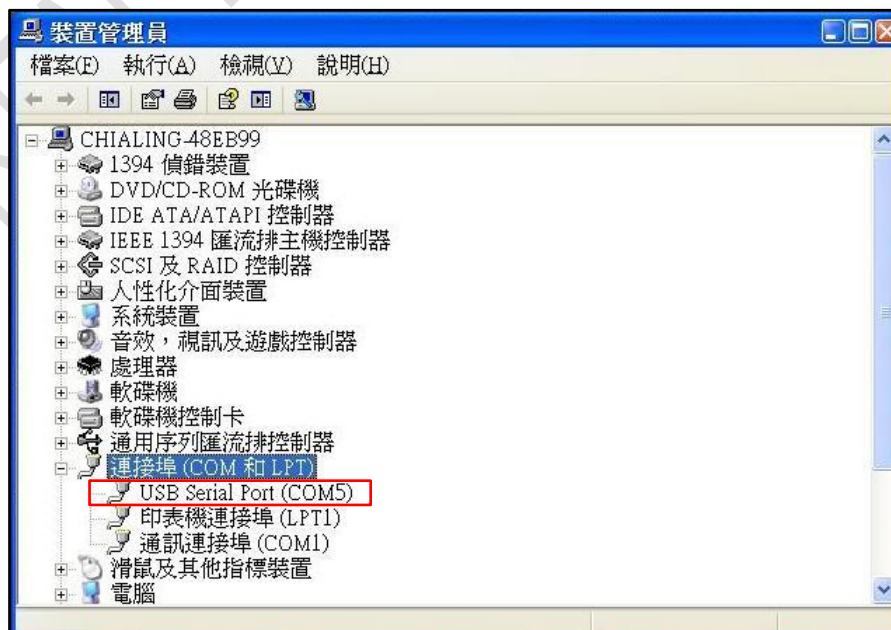
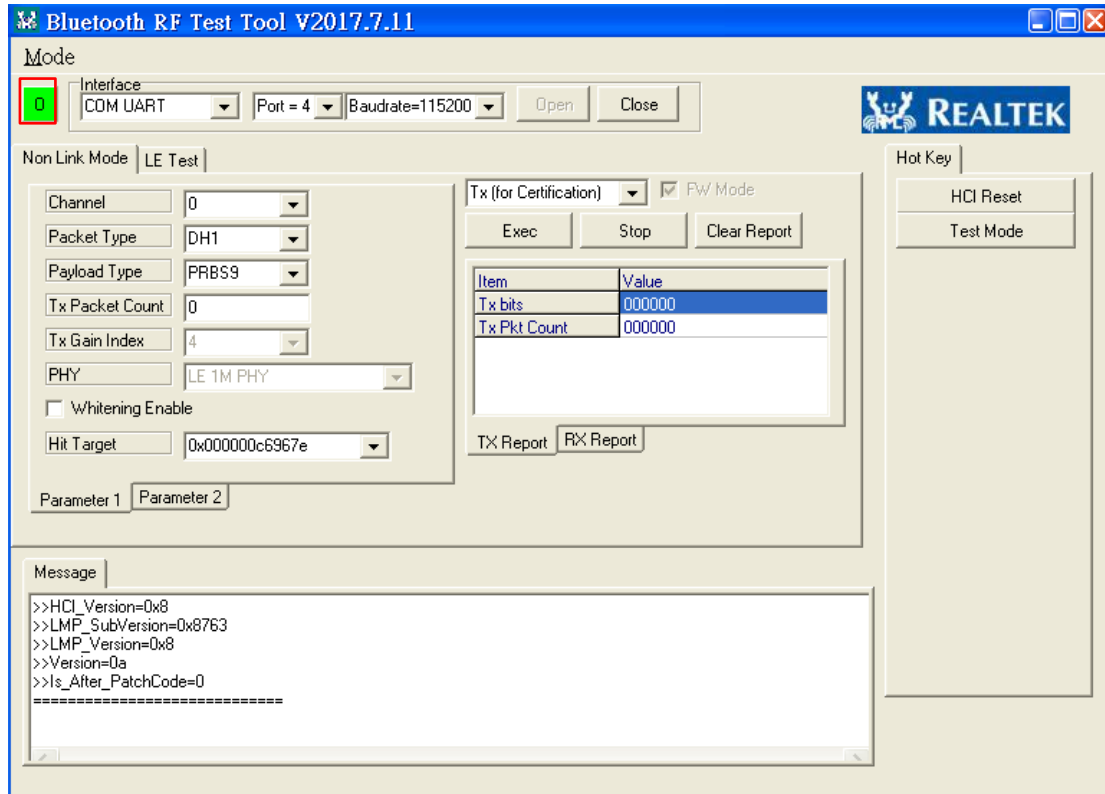


Figure 3 Check COM port number
Step 2: Click “Open”.

After clicking “Open” button, the up left corner changes to green means it is successful to open BT Device.


Figure 4 Device opens successfully

5. DUT (Link) Test Mode

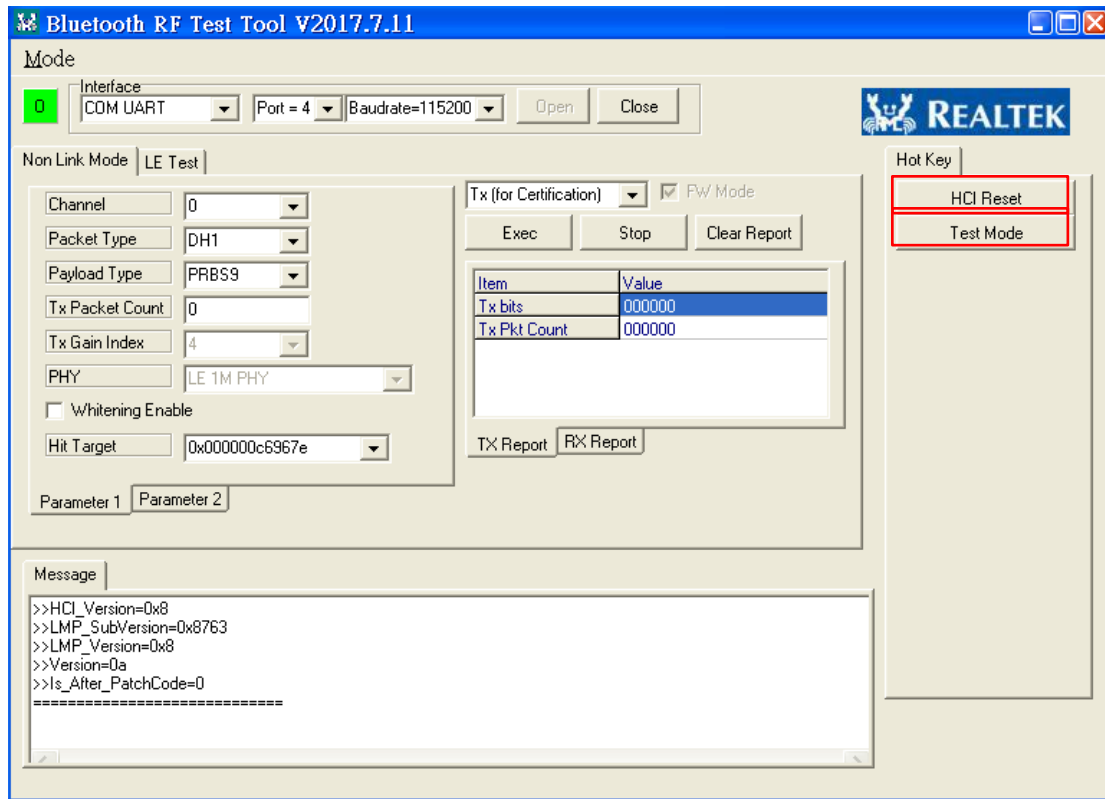


Figure 5 Enter link test mode

Enter link test mode, please follow the below operations.

- **Step 1:** Click “HCI Reset” button to reset.
- **Step 2:** Click “Test Mode” button to enter DUT Test Mode (link test mode).
- **Step 3:** After testing, click “HCI Reset” button to exit DUT Test Mode

6. LE DUT TX/RX Test (MP)

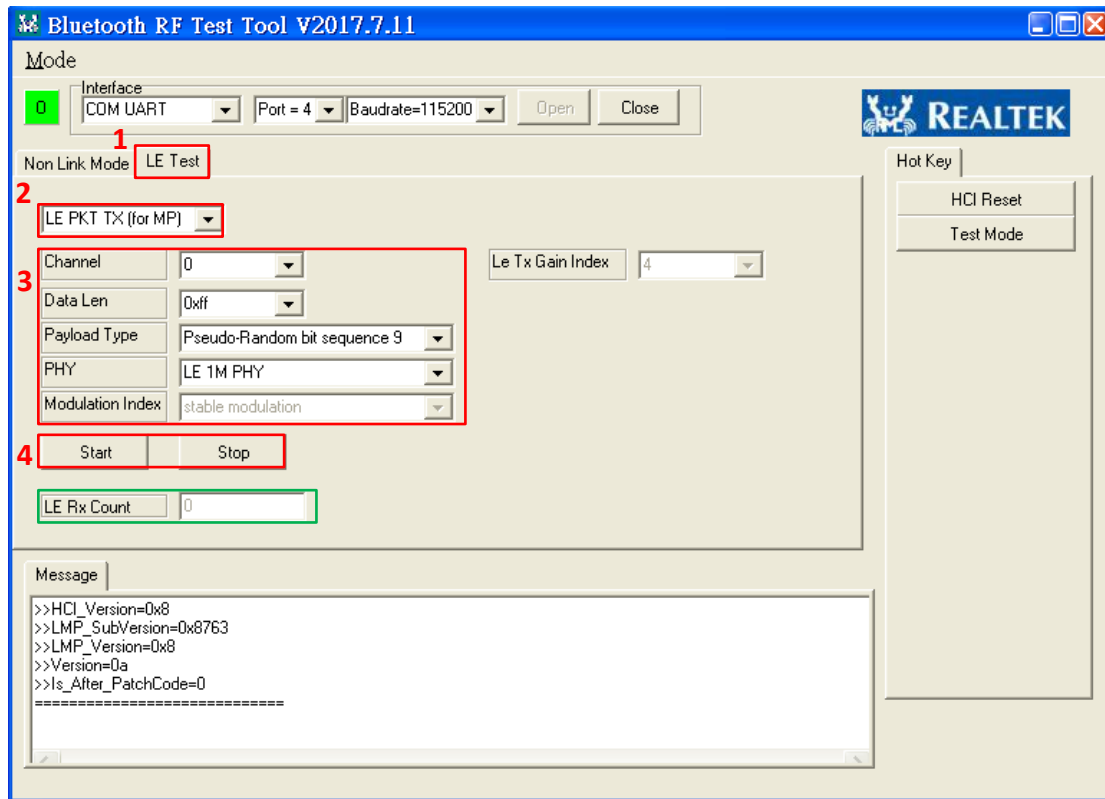


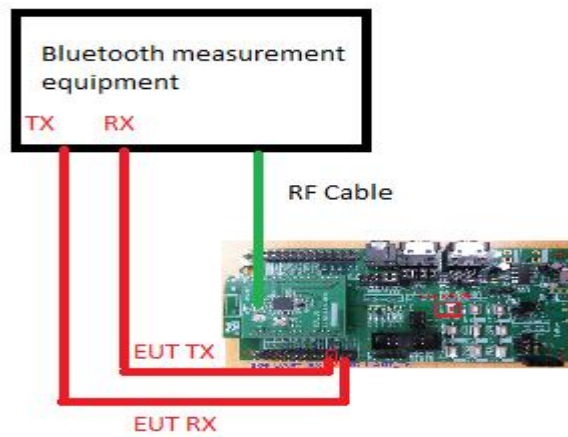
Figure 6 LE Test

- **Step 1:** Choose “LE Test”.
- **Step 2:** Choose “LE PKT TX” or “LE PKT RX”
- **Step 3:** Choose LE Test Parameters :
 - (a) Channel :0~39.
 - (b) Data length:0~0xFF
 - (c) PayType: PRBS9, 1111_0000, 1010, PRBS15, ALL1, ALL0, 0000_1111, 0101
 - (d) PHY: LE 1M PHY, LE 2M PHY, LE Coded PHY with S=8, LE Coded PHY with S=2
- **Step 4:** Click “Start” button and start to test. After testing, click “Stop” button.
The green rectangle shows received LE Rx Packets in LE PKT RX mode.

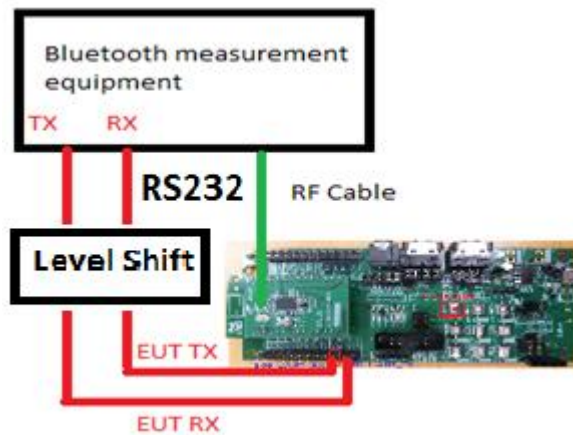
7. BLE Direct Test Mode

Test Realtek Bluetooth Low Energy Device Controlled through an HCI Uart Interface. This chapter describes the direct test mode mechanisms for testing Bluetooth Low Energy devices and explains how the direct test mode connection is established.

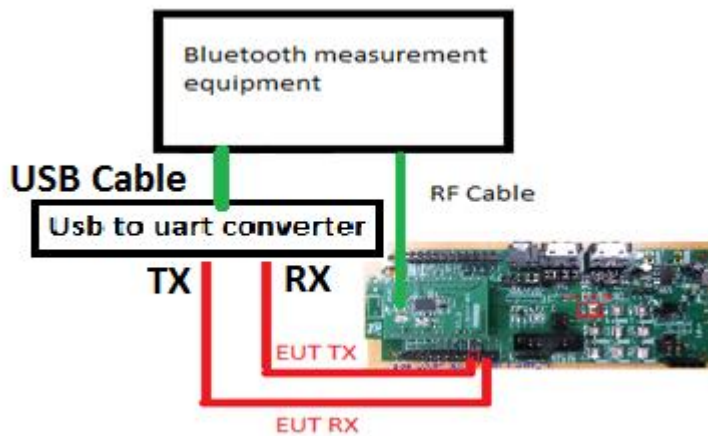
This Direct Test Mode MODE requires a direct connection to the Bluetooth measurement instrument. The Realtek Bluetooth Device uses the hci uart interface to connect to the Bluetooth measurement instrument.



If Bluetooth measurement instrument interface is RS232, you need a level shift board.



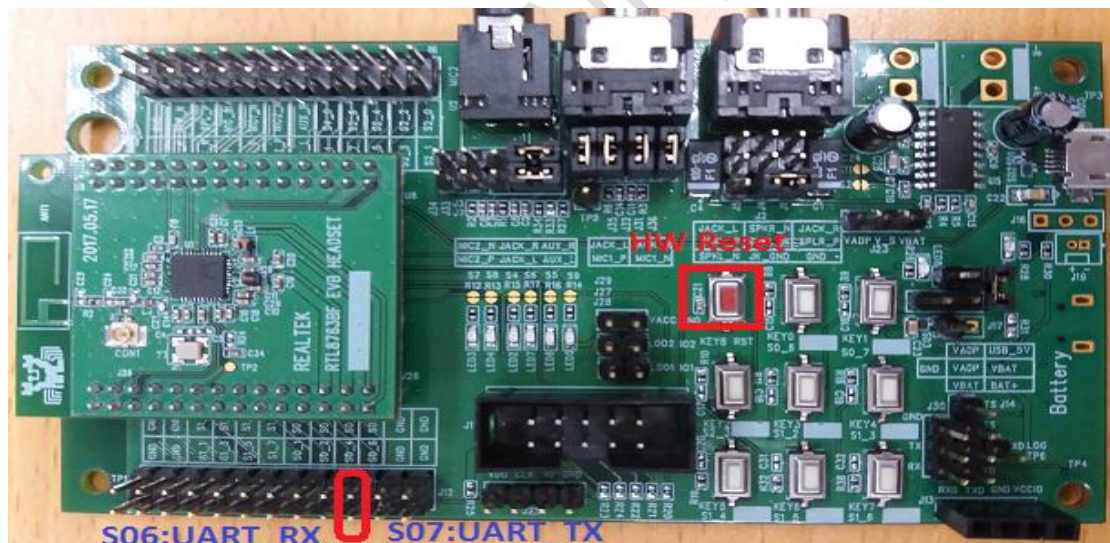
If Bluetooth measurement instrument interface has support USB converter UART board, such as FTDI USB converter board.



Realtek defines the uart pin as shown in the table below:

PIN Name	Interface
S06	UART RX
S07	UART TX

Reference EVB board define as:



Configuration test environment step by step :

1. Connect an RF cable between the antenna connector on the EUT and Bluetooth measurement equipment.
2. Connect the HCI UART(RS232) TX to UART RX of Bluetooth measurement equipment (level shift orusb converter board).
3. Connect the HCI UART(RS232) RX to UART TX of Bluetooth measurement equipment (level shift orusb converter board).
4. Connect GND between the EUT and Bluetooth measurement equipment or connect USB Cable to Tester.

5. Push HW Reset pin and to begin test.

8. Set/Get frequency offset

The following steps show how to change the crystal value directly.

- Step 1: Select “Non Link Mode”.
- Step 2: Select “Cal”.
- Step 3: Set crystal value to register or get crystal value from register.

By changing the crystal value and transmitting signal tone over and over again, users could find the most accurate one.

- Step 4: Set the accurate crystal value to device.

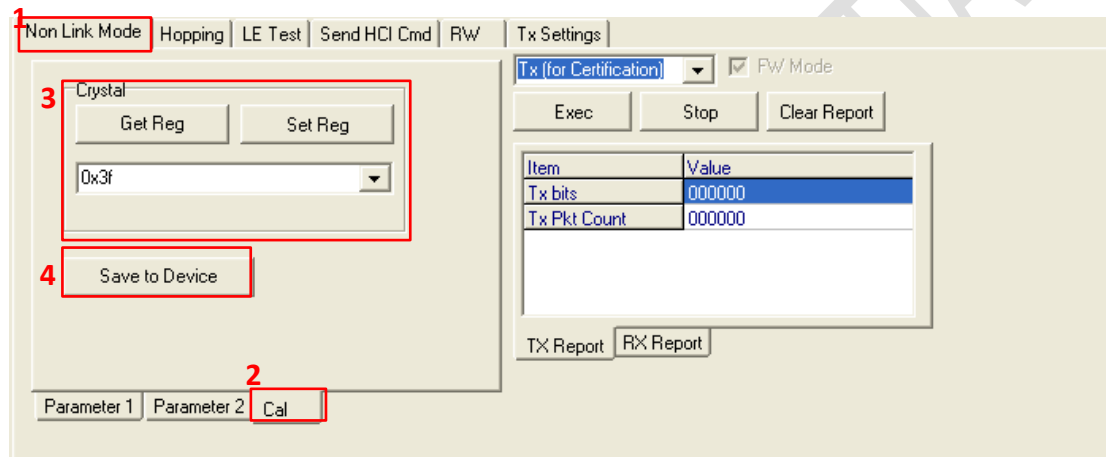


Figure 7 set/get crystal value directly

9. Hopping Test (Certification)

- Step1: Select “Hopping”
- Step 2: Choose “Packet Type”.
Choose “Channel”.
If whitening is enable, click the “Cbk_Whitening” checkbox.
- Step 3: Click “Run” button and start to test.
- Step 4: After testing, click “Stop” button.

Name	Value Range
Packet Type	DH1, DH3, DH5, 2DH1, 2DH3, 2DH5, 3DH1, 3DH3, 3DH5 LE : BT 4.0 NULL : NULL packet
Type	Fix Channel or Hopping Mode
Ckb_Whitening	Enable/Disable Whitening
Start Channel	The range of hopping channels is between start channel and stop channel.
Stop Channel	

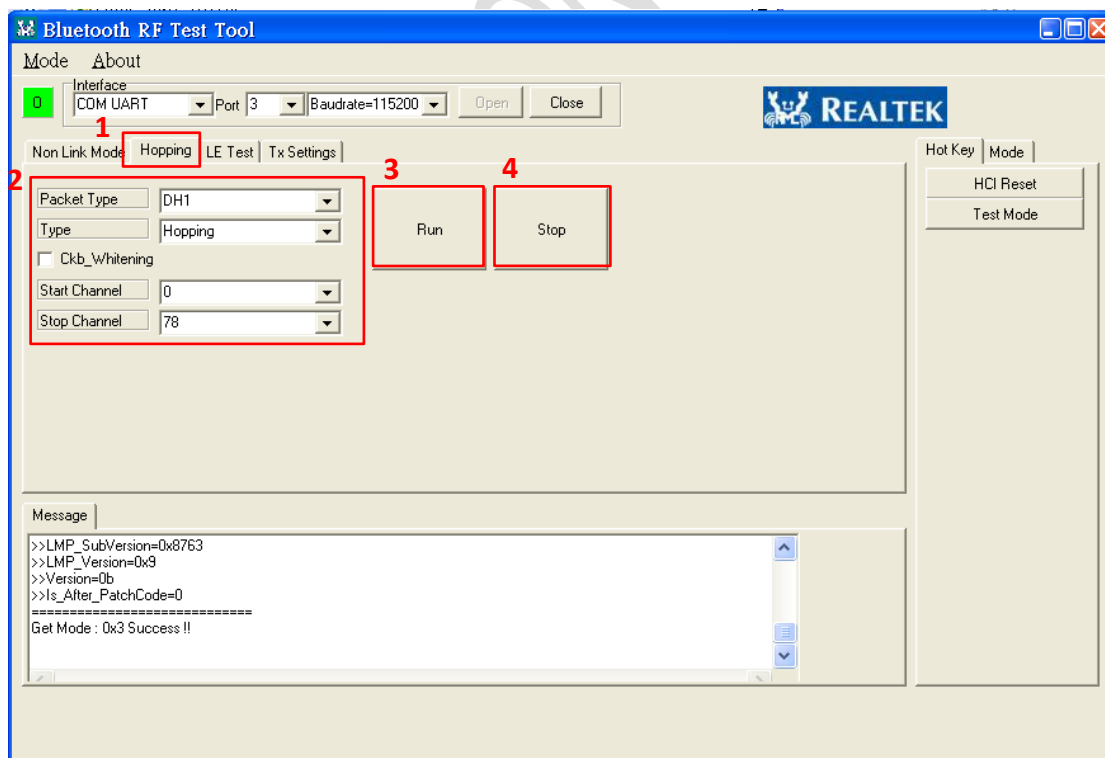


Figure 8 Hopping mode test

10. Select TPM or IQM mode

- Step1: Select TPM/IQM
- Step2: Set or get TPM/IQM mode

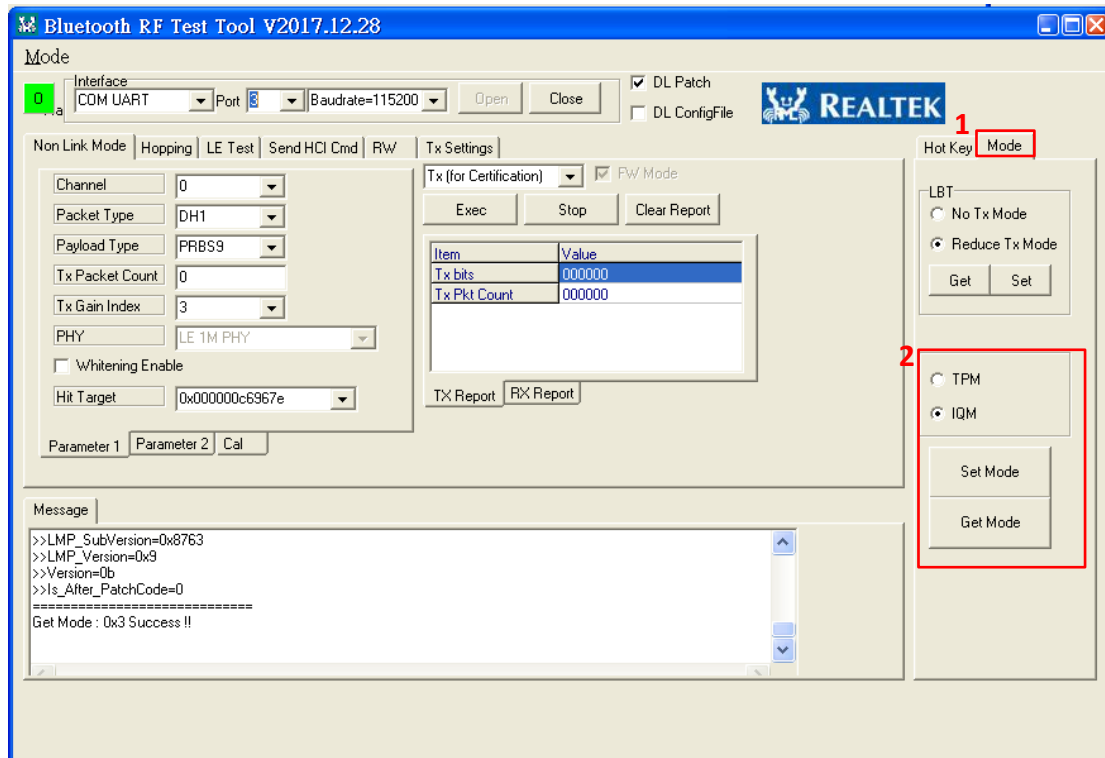


Figure 9 Select TPM or IQM mode

11. Save Tx Settings to Device

- Step1: Select “Tx Settings”
- Step2: Choose the suitable tx settings.
- Step3: Click “Save to Device” button to save them.

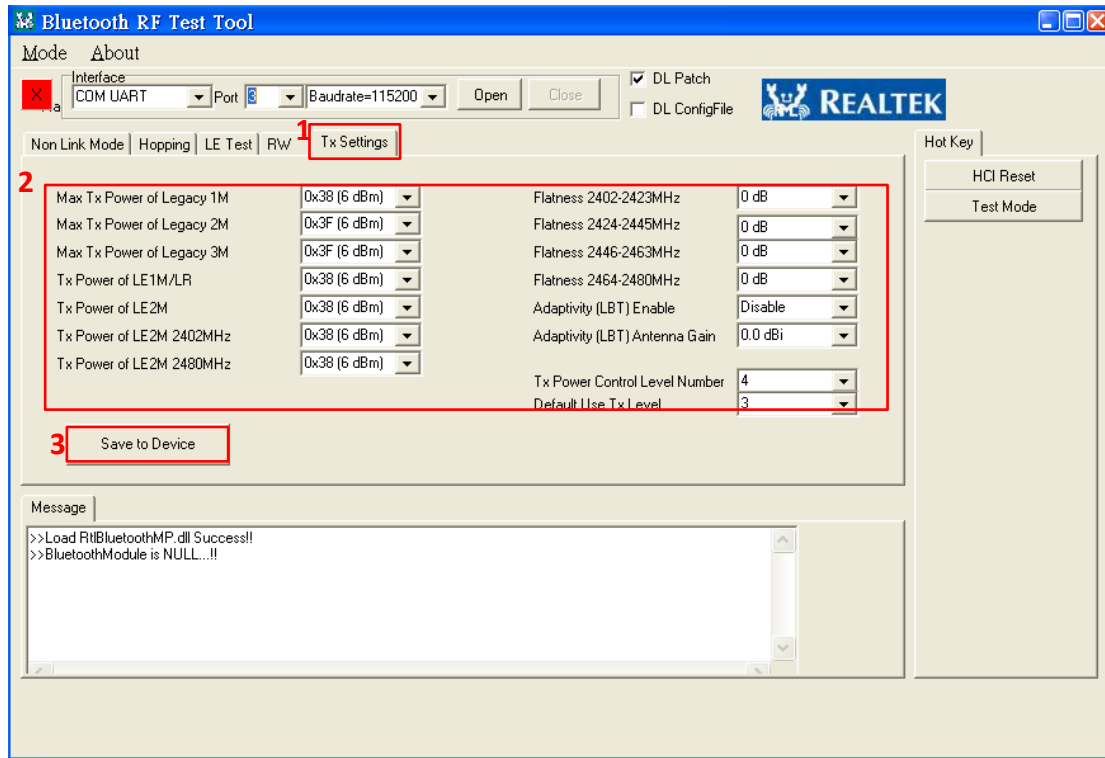


Figure 10 Save Tx Settings to Device

Name	Remarks
Max Tx Power of Legacy 1M	Decide the max tx power of legacy 1M (BR)
Max Tx Power of Legacy 2M	Decide the max tx power of legacy 2M (EDR)
Max Tx Power of Legacy 3M	Decide the max tx power of legacy 3M (EDR)
Tx Power of LE1M/LR	Decide the tx power of LE 1M and LE LR (BLE)
Tx Power of LE2M	Decide the tx power of LE 2M (BLE)
Tx Power of LE2M 2402MHz	Decide the tx power of LE 2M in 2402MHz(BLE)
Tx Power of LE2M 2480MHz	Decide the tx power of LE 2M in 2480MHz(BLE)
Flatness 2402-2423MHz	Fine tune tx power in 2402-2423MHz
Flatness 2424-2445MHz	Fine tune tx power in 2424-2445MHz
Flatness 2446-2463MHz	Fine tune tx power in 2446-2463MHz
Flatness 2464-2480MHz	Fine tune tx power in 2464-2480MHz

Adaptivity (LBT) Enable	Enable function for passing Adaptivity Test
Adaptivity (LBT) Antenna Gain	Adaptivity Test $EIRP = Tx\ Power + Antenna\ Gain$ (depending on antenna design)'
Tx Power Control Level Number	Decide the number of level for Power Control
Default Use Tx Power Level	Decide the default Tx power level of Basic Rate and Enhanced Data Rate, 0 represents the max power

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