Realtek
Bluetooth Mass Production Tool
RTLBTAPP
User Manual

Draft v0.6

2016/07/25

Revision History

Date	Version	
2014/9/11	Draft v0.1	
2014/10/27	Draft v0.2	Add read/write efuse
2015/08/10	Draft v0.3	Add LE Test
2016/05/24	Draft v0.4	Certification TX
2016/06/07	Draft v0.5	Modify RF Test
2016/07/25	Draft v0.6	Modify UI

Catalog

Figure List

1. Overview

This document is used to introduce MP (Mass Production) test tool "RTLBTAPP" for Realtek Bluetooth chip series. Customers should comply with the steps and requirements under this document. Contact Realtek Bluetooth FAE if any problem arises in the use of MP flow.

2.   Files

MP tool package is provided to customers in binary format:

RTLBTAPP.exe	MP executable file
RtlBluetoothMP.dll	MP dll library
BTPatchCode\ Patch_rtl8723a.bin	RTL8723A firmware patch
BTPatchCode\ Patch_rtl8723b.bin	RTL8723B firmware patch
BTPatchCode\ Patch_rtl8821a.bin	RTL8821A firmware patch
BTPatchCode\ Patch_rtl8761a.bin	RTL8761A firmware patch
BTPatchCode\ Patch_rtl8703b.bin	RTL8703B firmware patch
BTPatchCode\ Patch_rtl8723d.bin	RTL8723D firmware patch
BTPatchCode\ Patch_rtl8822b.bin	RTL8822B firmware patch
BTPatchCode\ Patch_rtl8821c.bin	RTL8821C firmware patch

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/USB port. The connection between Bluetooth and HOST chip must be cut off.
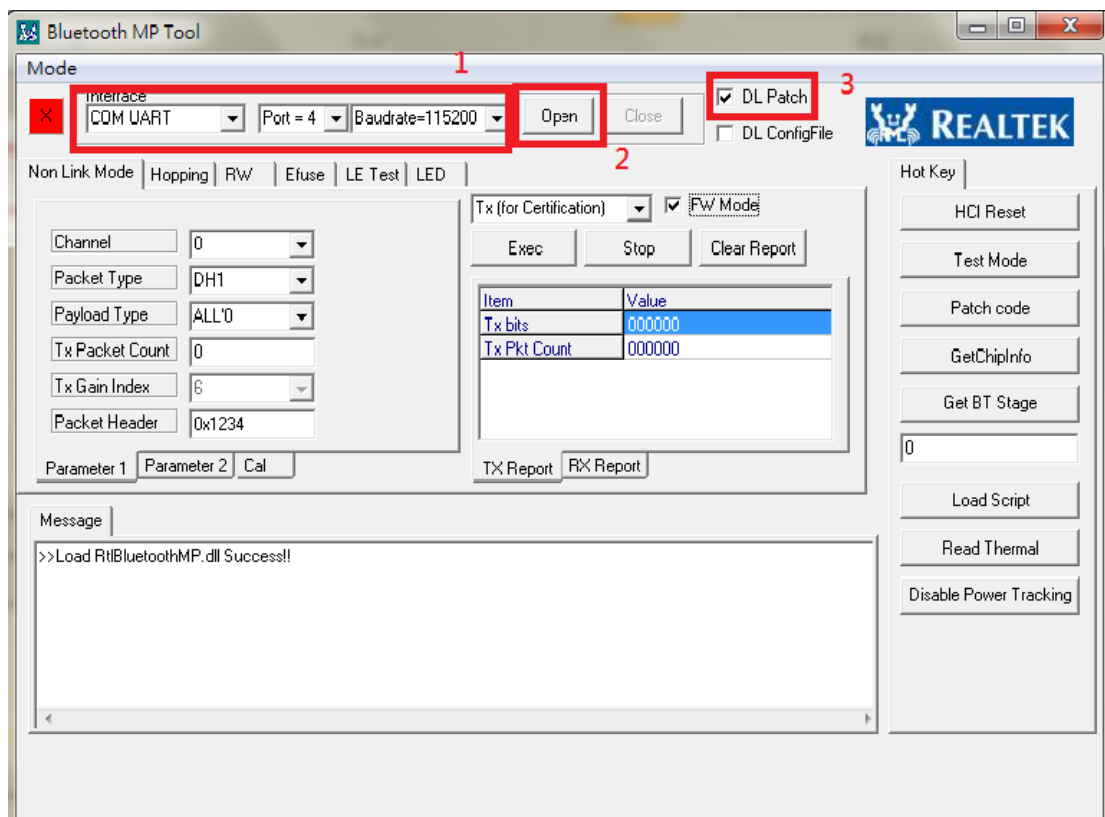
4. Open RTLBTAPP

Figure 2 Open BTLBTAPP

Step 1: Select correct interface.

- USB :

   If the module interface is "USB", please select "USB" and "Port =1" to Open.

- UART:

   If the module interface is UART, please select "UART" and check COM port number in Device Manager. "RTLBTAPP" only supports COM port number is smaller than "10". If COM port number is larger than "10", open operation will fail.
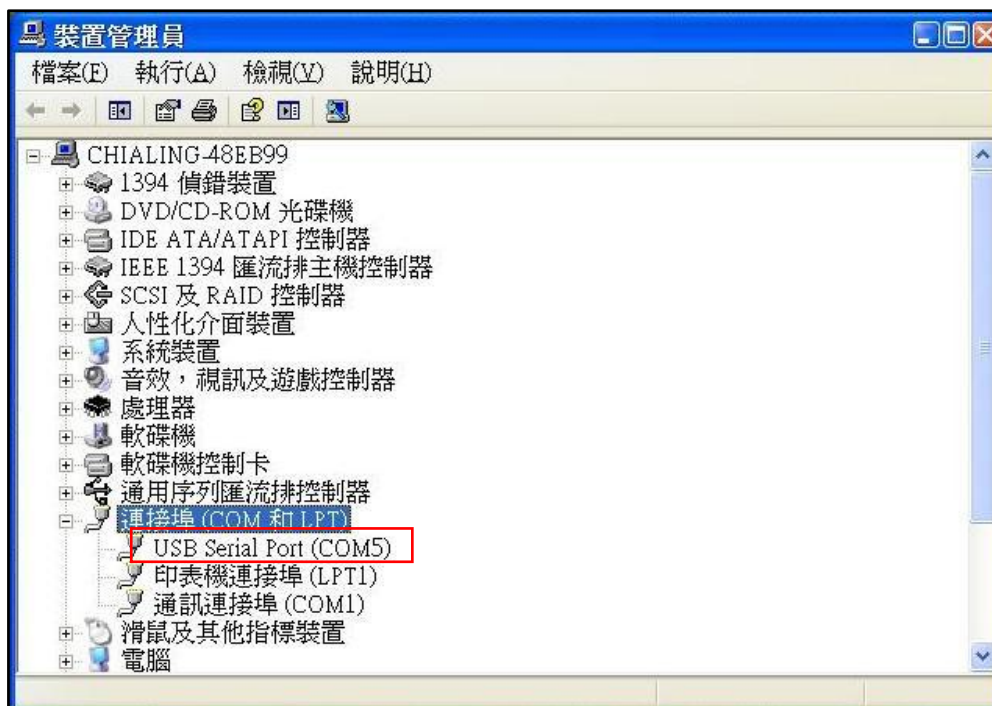
Figure 3 Check COM port number

Step 2: Click "Open".

After clicking "Open" button, the up left corner changes to green means it is successful to open BT Device and download firmware patch. You could double check it by the two lines in the "Message". The firmware patch is downloaded one time only, after the device module is powered on. Therefore if you want to re-download firmware patch, first you should power off device and re-start.
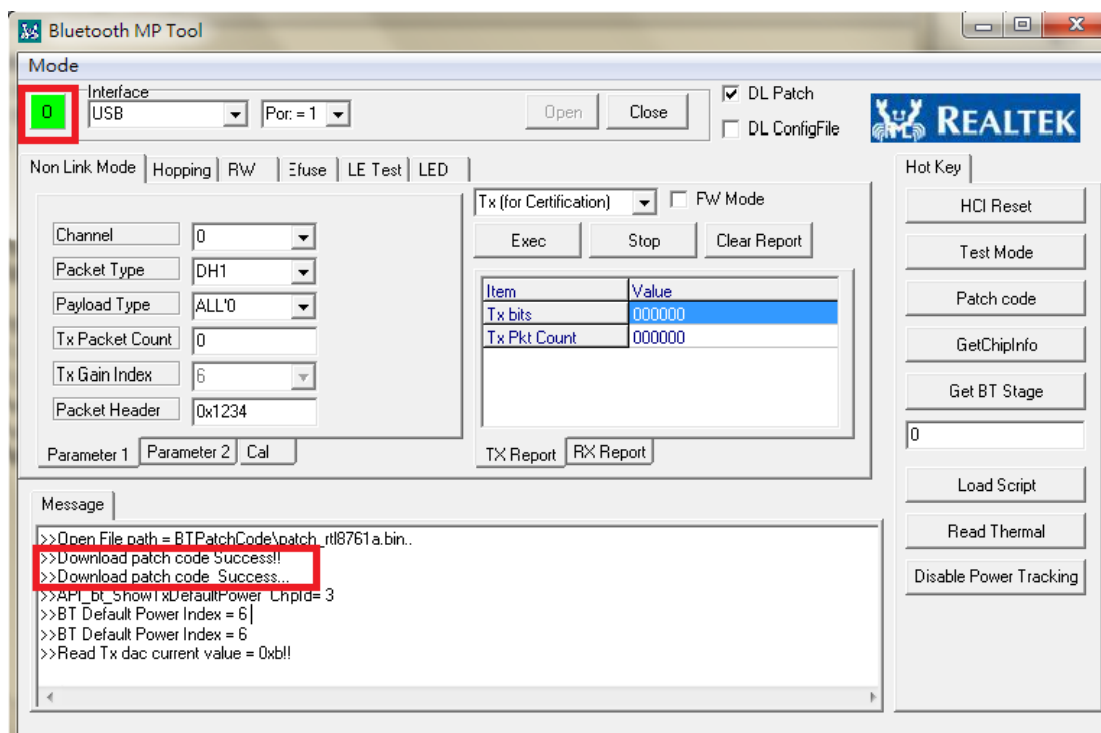
5. DUT (Link) Test Mode

Figure 5 Enter link test mode

Enter link test mode, please follow the below operations.
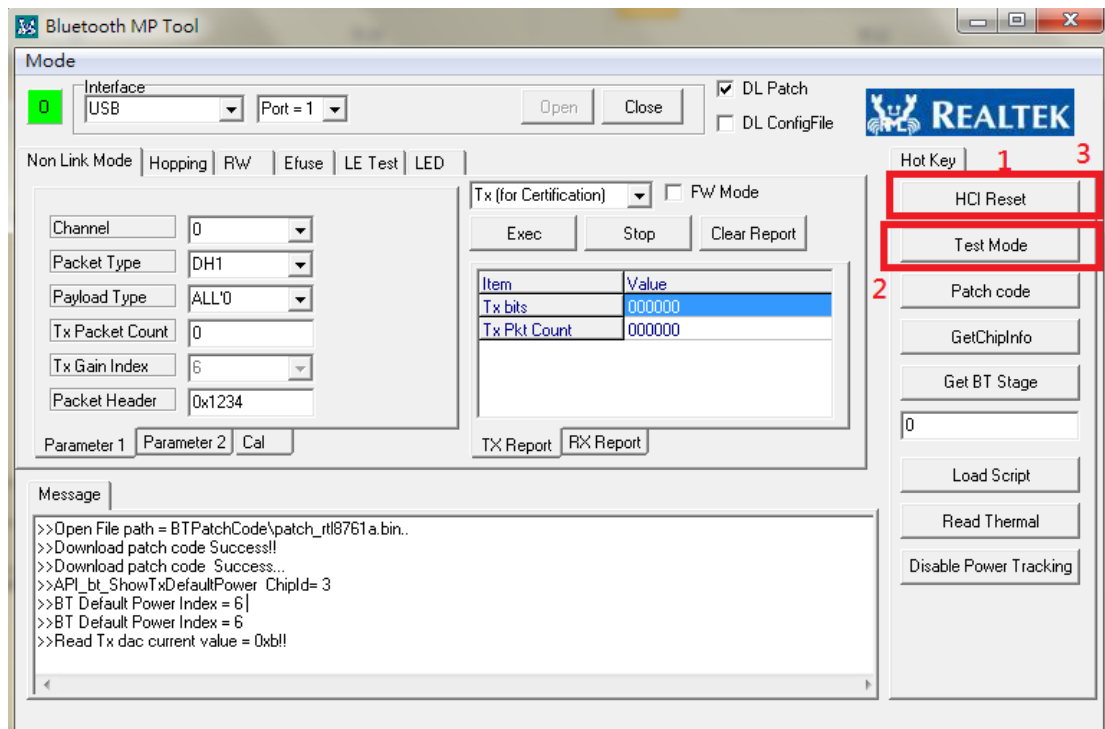
- **Step 1:** Click "HCI Reset" button to reset.
- **Step 2:** Click "Test Mode" button to enter DUT Test Mode (link test mode).
- **Step 3:** After testing, click "HCI Reset" button to exit DUT Test Mode
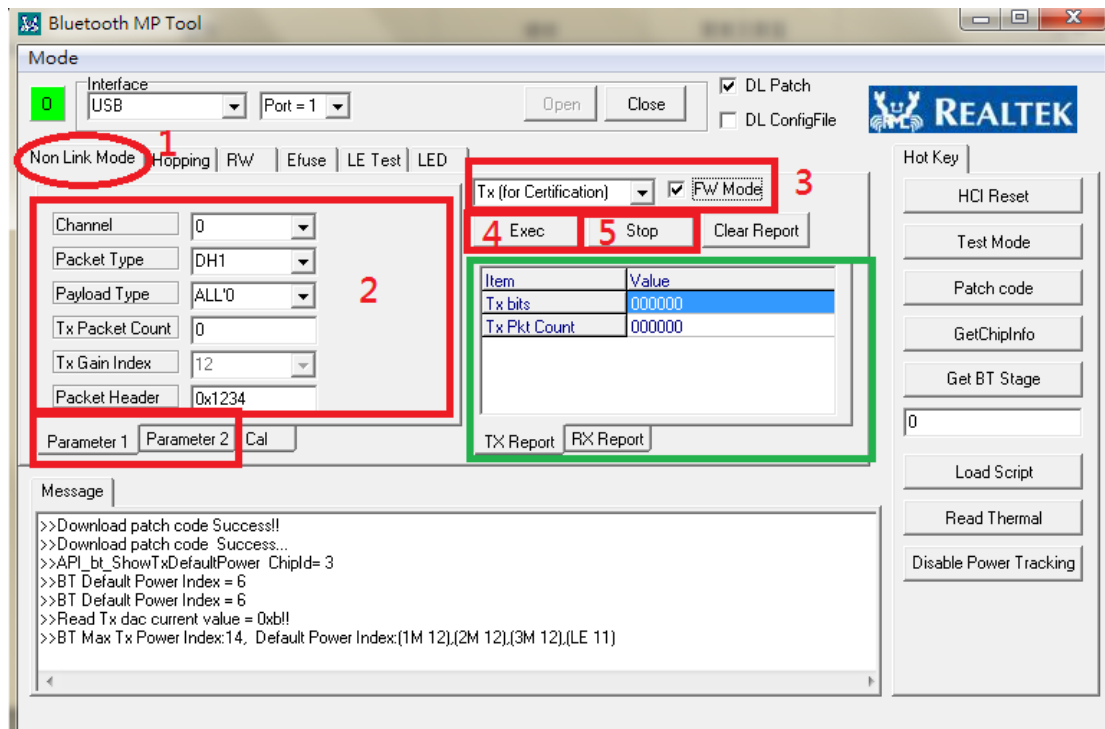
6. Non Link Mode Test

Figure 6 How to set non-link mode parameter

Parameter No.	Name	Value Range
Parameter 1	Channel	0~78
Parameter 1	Packet Type	DH1, DH3, DH5 2DH1, 2DH3, 2DH5 3DH1, 3DH3, 3DH5
Parameter 1	Payload Type	ALL0,ALL1,0101,1010, 0x0_0xF,0000_1111,1111_0000, PRBS9
Parameter 1	Tx Packet Count (for packet tx)	0~0xFFF 0 : infinite Tx packet count
Parameter 1	Tx Gain Index	1~7
Parameter 1	Tx Gain Value	Realtek define
Parameter 2	PacketHeader	0x0~0x3FFFF
Parameter 2	Tx DAC	Realtek define
Parameter 3	Whitening Coeff Value	0x00~0x7F:Enable Whitening 0x80~0xFF:Disable Whitening

Parameter 3	HitTarget	6 bytes

Use non-link test mode, please follow below step and select correct parameter

- **Step 1:** Select "Non Link Mode".
- **Step 2:** Choose parameters in "Parameter 1", "Parameter 2" and "Parameter 3".
- **Step 3:** Select "Con-Tx", "Pkt-Tx", "Pkt-Rx", or "Single Tone".
- **Step 4:** Click "Exec" button.
- **Step 5:** After testing, click "Stop" button.

The green rectangle shows current information about TX/RX packet counts.

7. Hopping Mode Test

Hopping Test supports three kinds of parameters that are "Packet Type", "Channel", and "Ckb_Whitening".

1. Packet Type: The "Packet Type" is from "DH1" to "3DH5", "LE" for BT4.0, and "NULL" for null packet.
2. Channel: The number from "0" to "39" is to transmit fixed frequency. Only the option of "Hopping" will transmit hopping frequency.
3. Ckb_Whitening : To select "Ckb_Whitening" causes whitening enable.
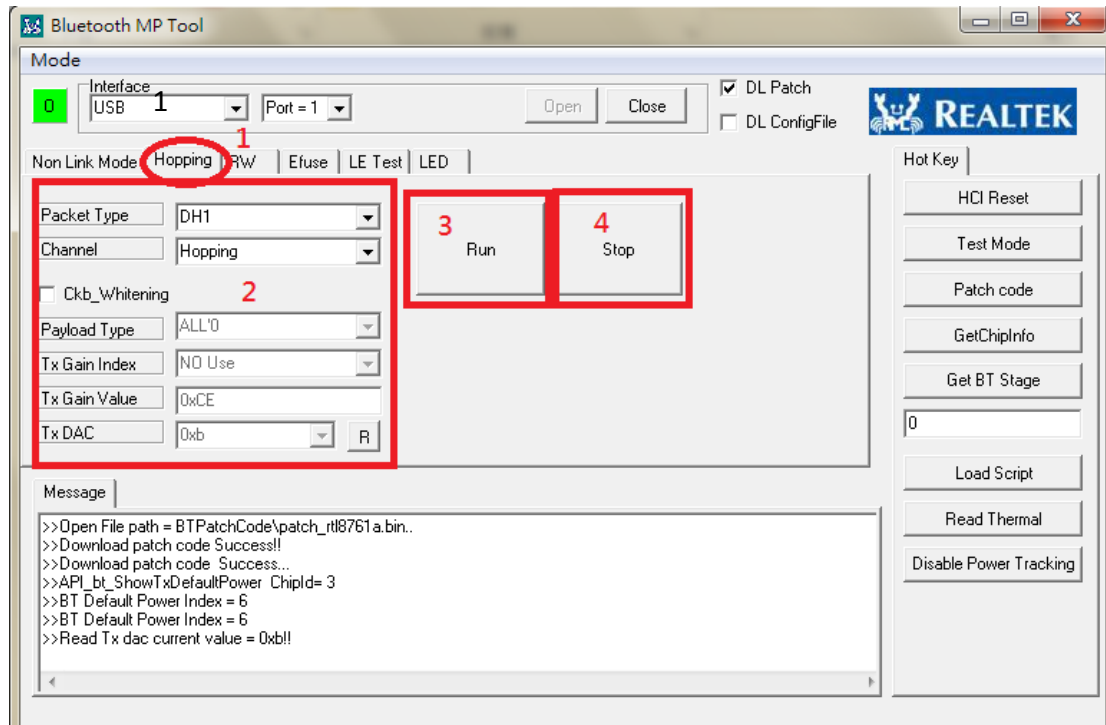
Figure 7 Set non-link mode parameter

- **Step 1:** Select "Hopping".
- **Step 2:** Choose "Packet Type", "Channel" and "Ckb_Whitening"

- **Step 3:** Click "Run" button.
- **Step 4:** After testing, click "Stop" button.

Name	Value Range
Packet Type	DH1, DH3, DH5, 2DH1, 2DH3, 2DH5, 3DH1, 3DH3, 3DH5, LE : For BT 4.0 NULL :For NULL packet
Channel	0~39 : Fix Channel Mode Hopping : Hopping Mode
Ckb_Whitening	Enable/Disable Whitening

8. Step by Step Examples
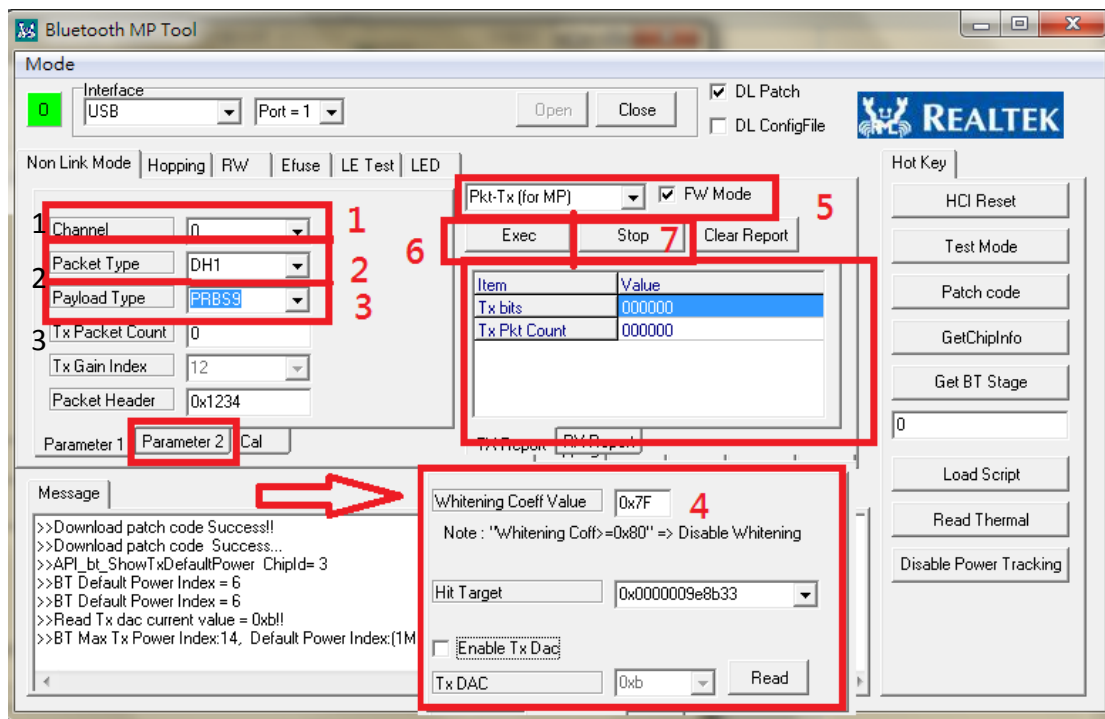
8.1 Bluetooth DUT TX Test(MP)

Figure 8 non-link mode TX test

Figure 9 Set non-link mode TX test parameter

Follow below steps to enter non-link mode, DUT will enter TX mode, send packet to tester.

- **Step 1:** Choose "Channel".
- **Step 2:** Choose "Packet Type".
- **Step 3:** Set "Payload Type" = "PRBS9";
  Set "Tx Packet Count" = "0";
  Set "Tx Gain Index" = "6";
- **Step 4:** Use default settings in "Parameter 2".
- **Step 5:** Select "Pkt-Tx".
- **Step 6:** Click "Exec" button and start to test.
- **Step 7:** After testing, click "Stop" button.

The green rectangle shows current TX packet counts and TX bits which are evaluated by TX times and are not completely correct.
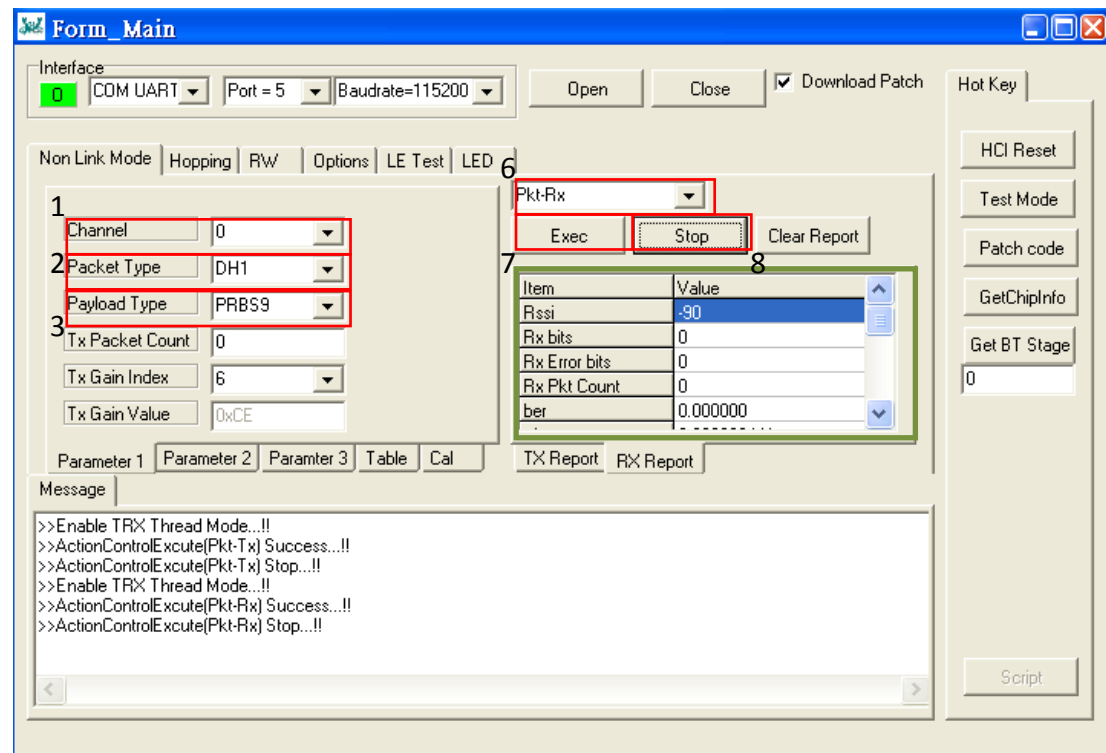
8.2 Bluetooth DUT RX Test(MP)
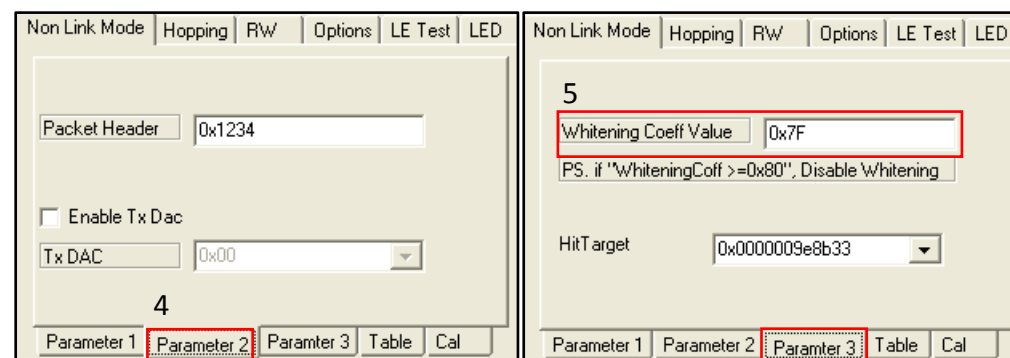

Figure 10 non-link mode RX test

Figure 11 Set non-link mode RX test parameter

Follow below steps to enter non-link mode, DUT will enter RX mode, receive packet from tester.

- **Step 1:** Choose "Channel".
- **Step 2:** Choose "Packet Type".
- **Step 3:** Set "Payload Type" = "PRBS9";
  Set "Tx Packet Count" = "0";
  Set "Tx Gain Index" = "6";
- **Step 4:** Use default settings in "Parameter 2".
- **Step 5:** Use default settings in "Parameter 3".
- **Step 6:** Select "Pkt-Rx".

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- **Step 7:** Click "Exec" button and start to test.
- **Step 8:** After testing, click "Stop" button.

The green rectangle shows correct RSSI, RX bits, RX error bits, RX packet counts, ber and CFO.

8.3 Single Carrier (Tone) Test

This mode only could transmit single carrier (tone).
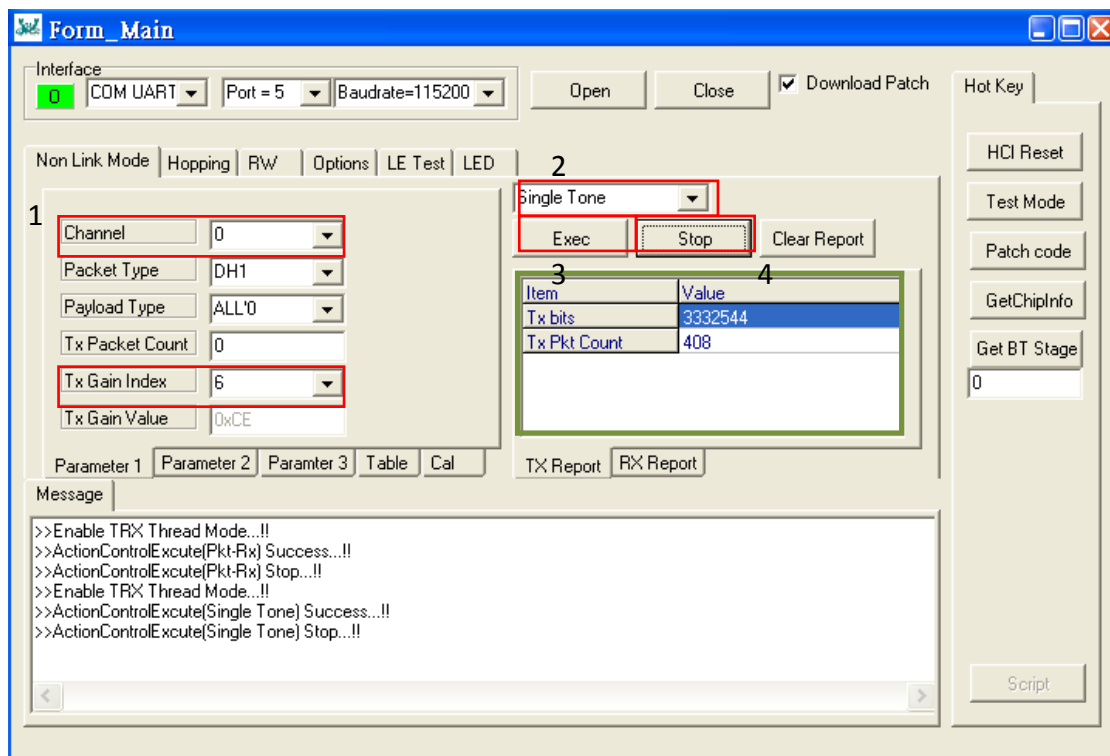
Figure 12 non-link mode receive single carrier test

- **Step 1:** Choose "Channel" and "Tx Gain Index" = "6".
- **Step 2:** Select "Single Tone".
- **Step 3:** Click "Exec" button and start to test.
- **Step 4:** After testing, click "Stop" button.

The green rectangle shows current TX packet counts and TX bits which are evaluated by TX times and are not completely correct.
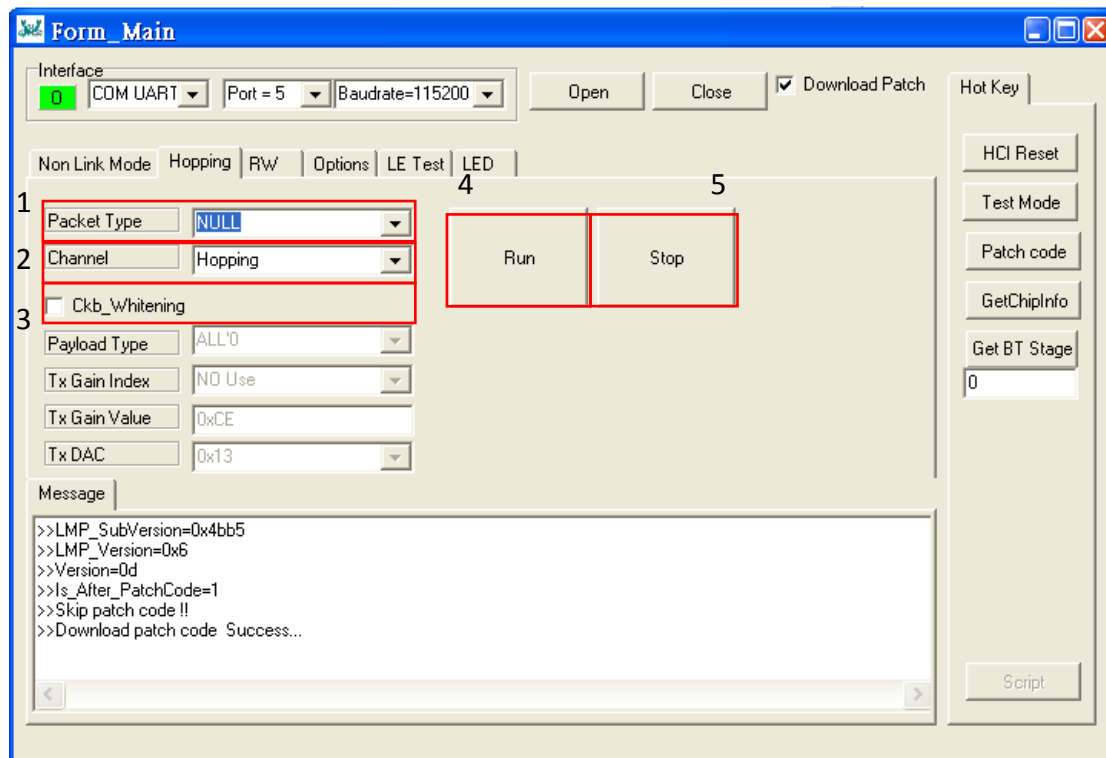
8.4 Hopping Test (Certification)

Figure 13 non-link mode hopping test

- Step 1: Choose "Packet Type".
- Step 2: Choose "Channel".
- Step 3: If whitening is enable, click the "Cbk_Whitening" checkbox.
- Step 4: Click "Run" button and start to test.
- Step 5: After testing, click "Stop" button.

Name	Value Range
Packet Type	DH1, DH3, DH5, 2DH1, 2DH3, 2DH5, 3DH1, 3DH3, 3DH5, LE : For BT 4.0 NULL : For NULL packet
Channel	0~39 : Fix Channel Mode Hopping : Hopping Mode
Ckb_Whitening	Enable/Disable Whitening

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8.5 BR/EDR /LE Certification TX(Certification)

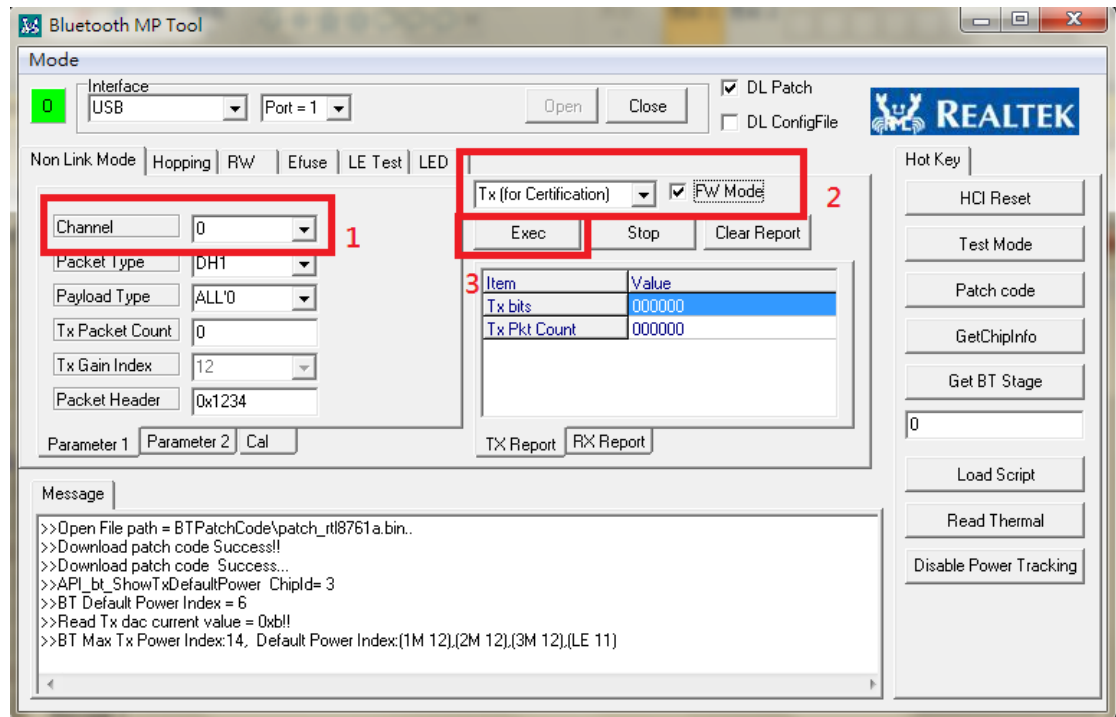For RF safety, we used Tx to test RF safety test item.

If test BR/EDR for RF Test:

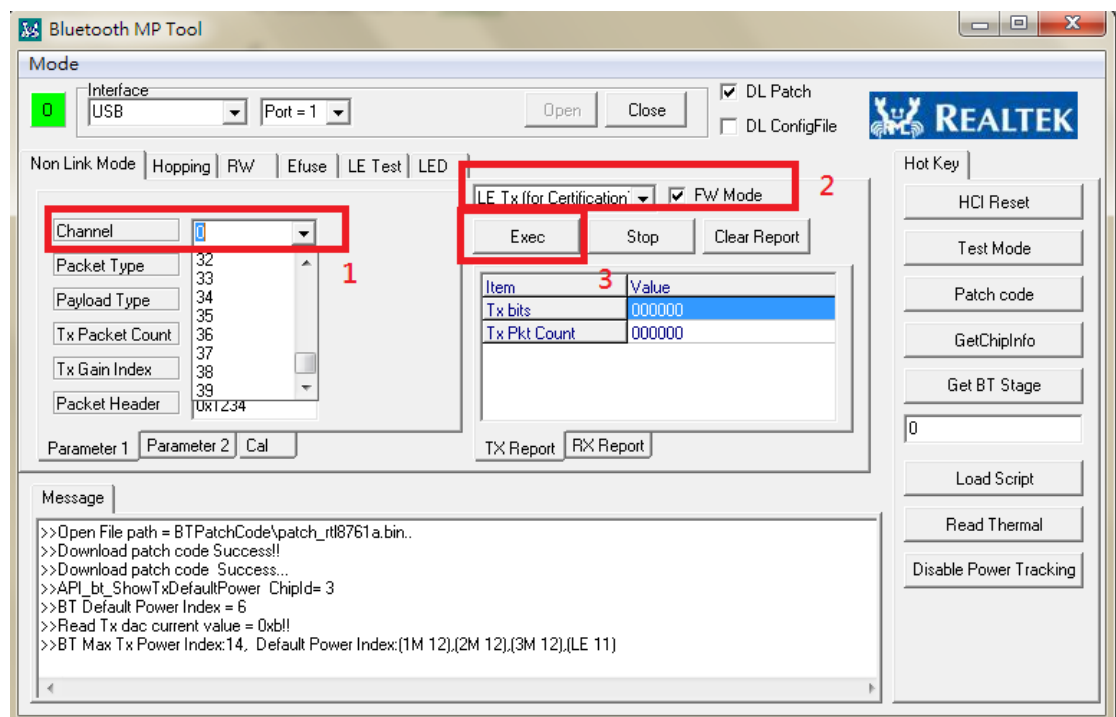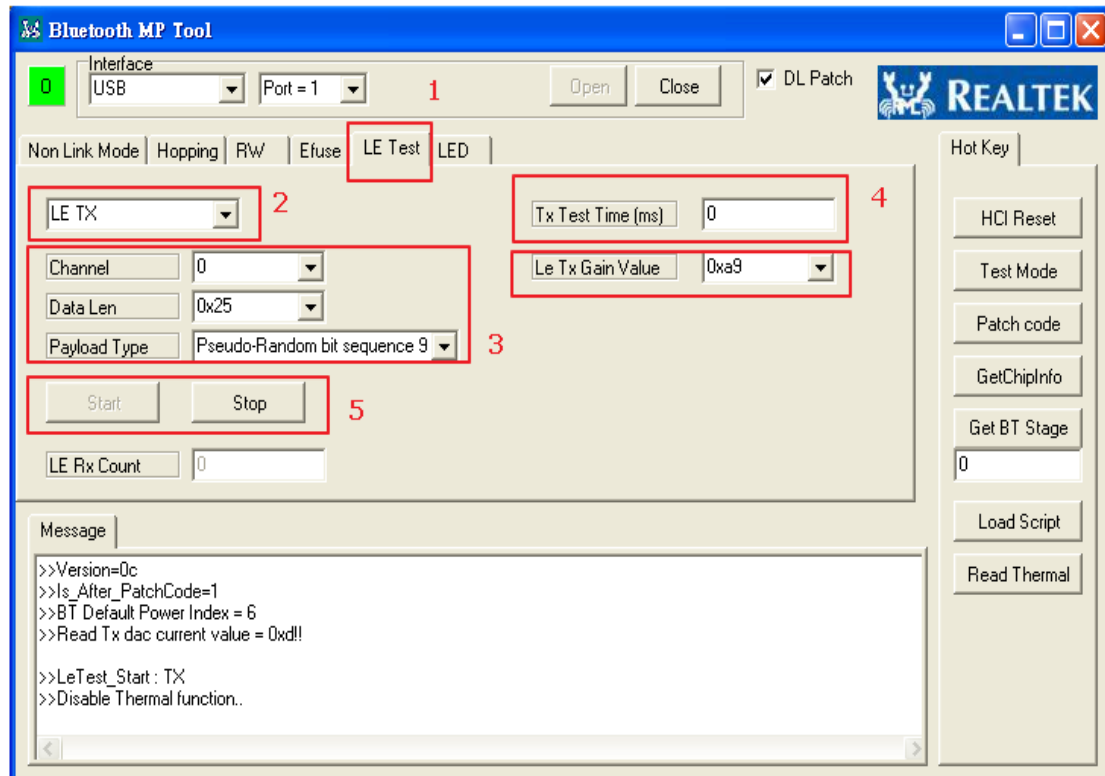**Figure 144 BR/EDR RF TX Test**

If test LE for RF Test :

Figure 155 Test LE RF TX Test

8.6 LE DUT TX/RX Test(MP)

If want to **LE DUT TX**

Figure 16 LE DUT TX TEST

- Step 1: Choose "LE Test Page".
- Step 2: Choose "LE Tx".
- Step 3: Choose   LE Test Parameters :
    - (a) Channel   :0~39.
    - (b) Data length:0~0x2D (0~Byte 39)
    - (c) PayType:0xF0 ,0xA0 , ALL 0, ALL 1, prbs9, prbs1,0x05,0x0F.
- Step 4: Choose execute Test Parameters :
    - (a) Tx Time : execute time ,unit "mSec".
    - (b) Tx Power: by chip.
- Step 5: Click "Start" button and start to test. After testing, click "Stop" button.
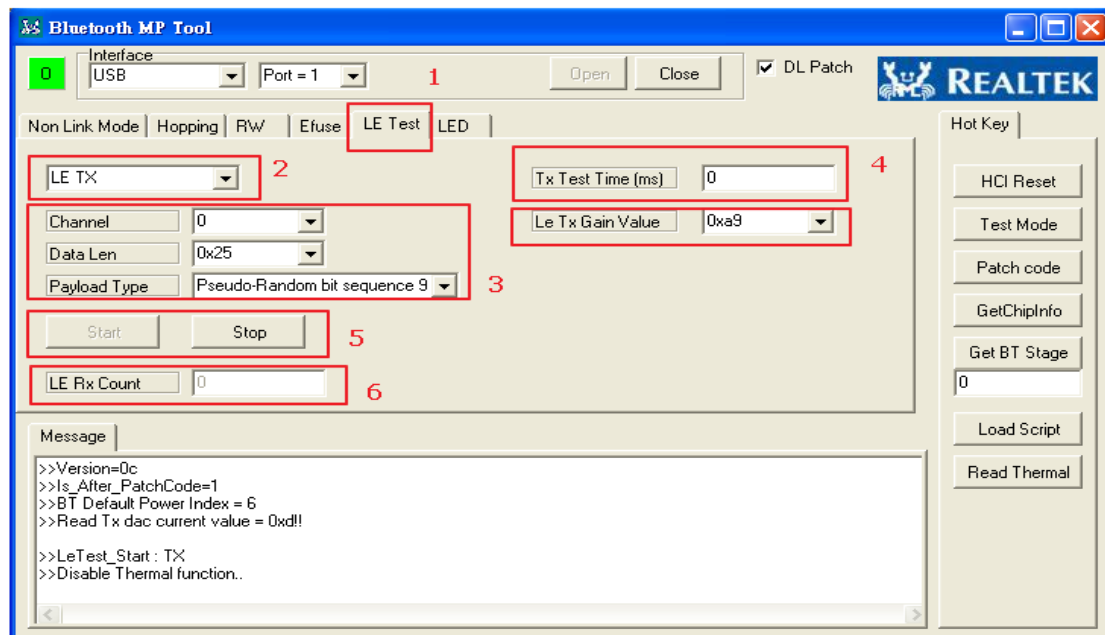
If want to **LE DUT RX**

Figure 17 LE RX TEST

- Step 1: Choose "LE Test Page".
- Step 2: Choose "LE Rx".
- Step 3: Choose LE Test Parameters :
    To Setting Channel   :0~39.
- Step 4: Click "Start" button and start to test. After testing, click "Stop" button
- Step 6: Show received LE Rx Packet

9. Calibration frequency offset

The calibration frequency function only support RTL8761A.

Before writing the proper crystal value to efuse, users should tune it. The following steps show how to change the crystal value directly.

- Step 1: Select "Non Link Mode".
- Step 2: Select "Cal".
- Step 3: Set or Get Crystal(Xtal) vale.

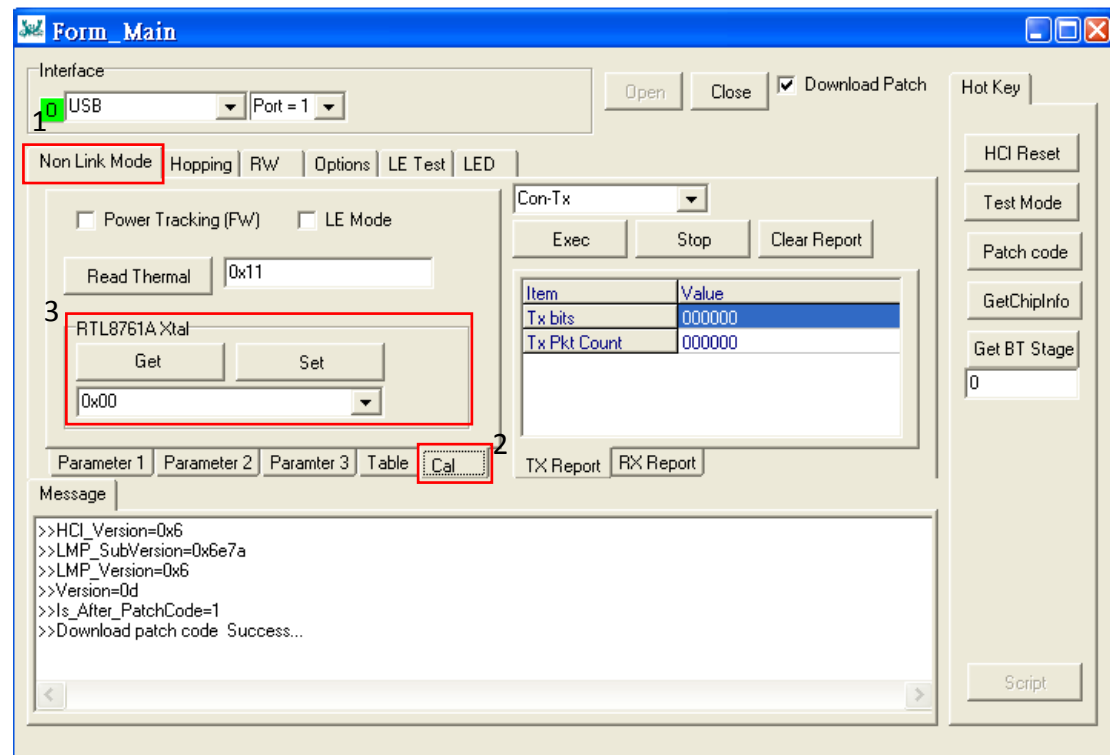By changing the crystal value and transmitting signal tone (Chapter 8.3) over and over again, users could find the most accurate one and write it to config file.

Figure 18 set crystal value directly