

# **RTL8762x RF Test Tool User Guide**

**V0.5**

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## Revision History

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## Glossary

Abbreviation	Implication
<b>BLE</b>	Bluetooth Low Energy 4.0
<b>BT Enhance</b>	Bluetooth 5.0
<b>Single Tone</b>	Single Tone

# 1 Overview

This document introduces how to setup the testing environment for RTL8762x RF, including the test mode specified in BT spec and the single tone test mode. It can be used for a whole series of RTL8762x chip. FCC/BQB/CE/SRRC/KC and other certifications can use this tool to assist in testing. Contact Realtek Bluetooth FAE if any problem arises in the use of test.

## 2 Download Image

### 2.1 Download/Erase Flow

RF Test Tool download process is shown in Figure 2-1.

1. Choose "IC Type", support RTL8762C/52C, RTL8762D, RTL8762E.
2. Choose "Download" radio button.
3. Detect the port (UART mode) and select com port.
4. Click "Download or Erase" button to download or Erase images.

Note:

- 1) Before downloading, users need to pull P0\_3 to low level.
- 2) RF Test Tool only can download one port at one time.

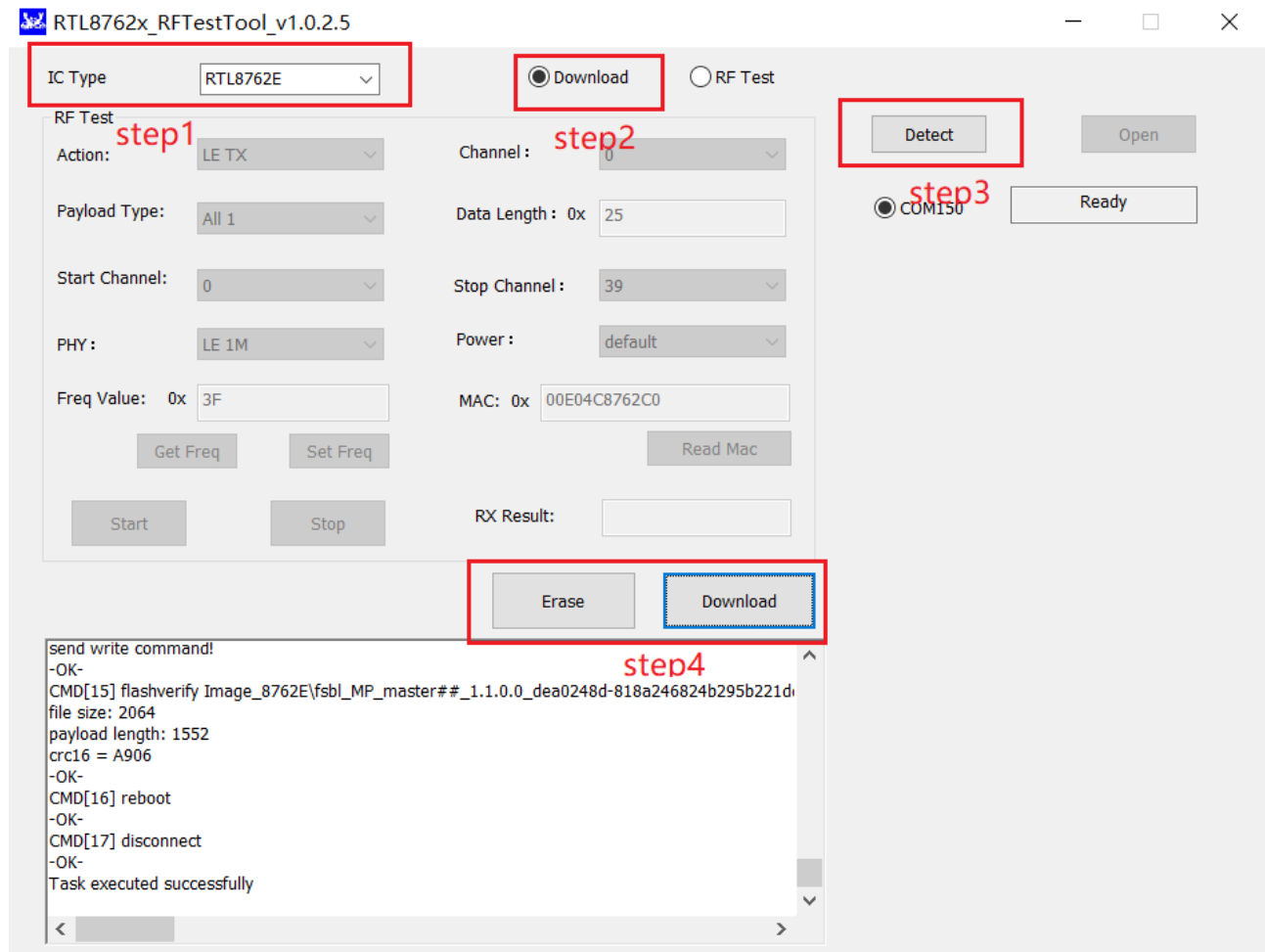


Figure 2-1 Download Flow

## 2.2 Download Status

The downloading status is shown in Figure 2-2.

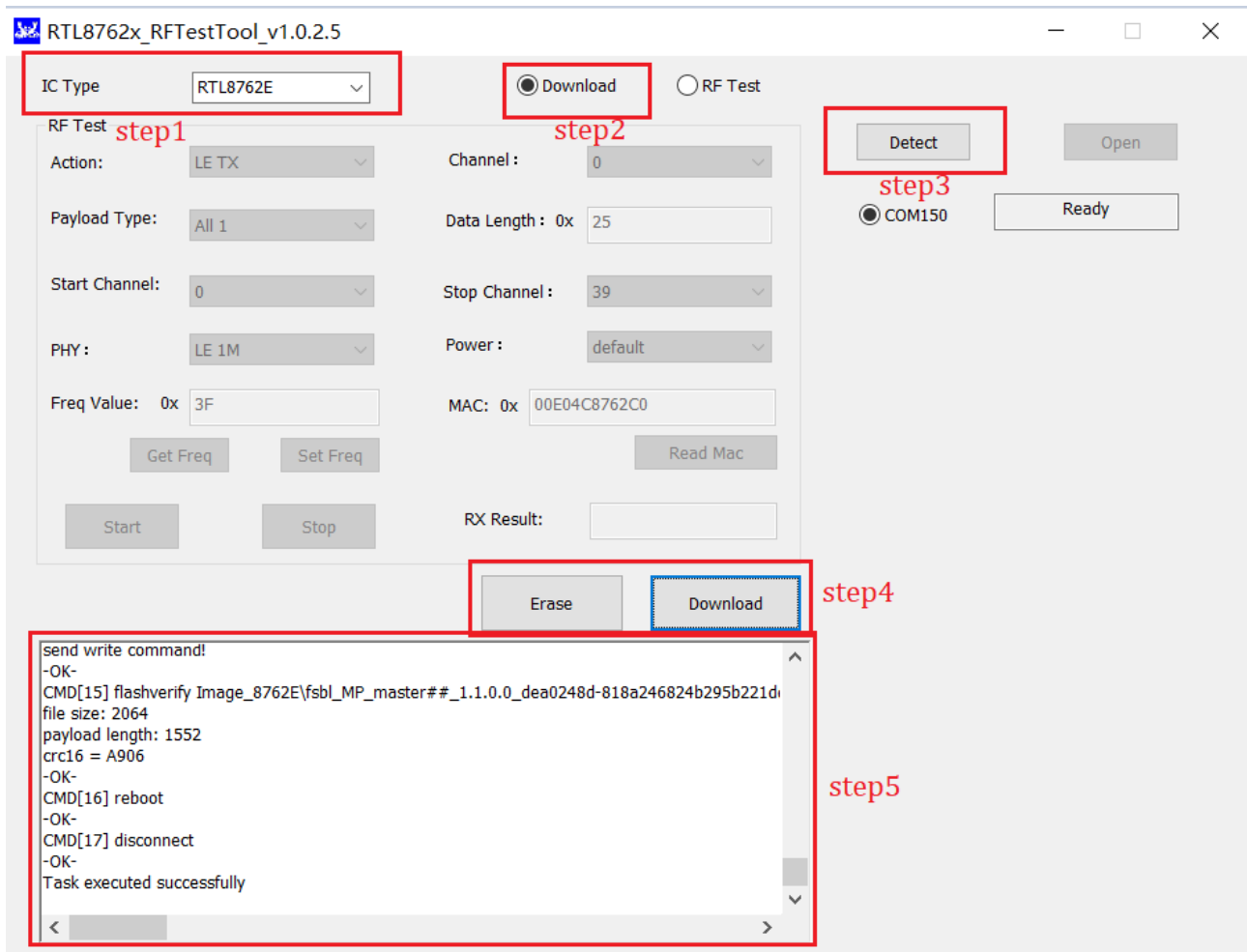


Figure 2-2 Download Status



## 3 BLE Direct Test Mode (BQB Test)

### 3.1 UART Port

RTL8762x supports two types of RF Test interfaces (HCI and 2-wire UART for DTM) specified by BT spec. This document mainly introduces HCI Test Interface. HCI Test interface uses P3\_0 (TX\_OUTPUT) and P3\_1 (RX\_INPUT) of the chip as the pin of UART port.

UART interface parameters used by RTL8762x HCI Interface are as below:

- Baud rate: 115200
- Data bit: 8
- Stop bit: 1
- Parity bit: No
- Flow control: No

Note: The instrument should use the same UART interface settings as chip for communication.

### 3.2 Instrument Connection

Please refer to Figure 3-1 for connection between the instrument and RTL8762x, the RF port of instrument is connected with RTL8762x RFIO by cable. The UART of instrument is connected with the UART interface of RTL8762x.

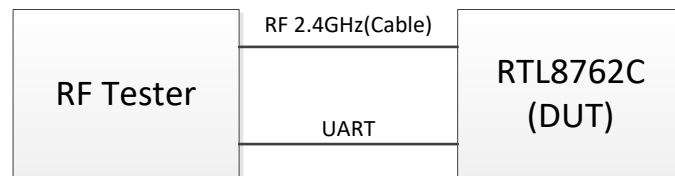


Figure 3-1 Wiring diagram of RF Tester and RTL8762x

### 3.3 Enter Test Mode

After downloading corresponding Image, reset RTL8762x and enters the appointed test mode. HCI Test Interface needs to download HCI patch image and OTA Header bin and Config file.

### 3.4 Precautions

1. The chip will automatically perform parameter calibration when it is powered on. Connect with the cable, turn on the instrument, and then power on RTL8762x, so that the chip can detect the correct resistance value. Avoid abnormal RF test results caused by external impedance change.
2. Component values of RF matching circuits need readjustment to adapt to the impedance of cable.

3. Cable of RF cable needs compensation.
4. When using MT8852B for testing, it is required to set the Power range of instrument. On MT8852B Front panel, select config→MT8852B→RX/TX setting→range, set range as 2 or 3.
5. The test needs to be done in a shield room to avoid signal interference from other 2.4GH frequency bands such as Wi-Fi.

## 4 RF Certification Test

Before doing RF test, selecting "RF Test" radio button is necessary. It is shown in Figure 4-1.

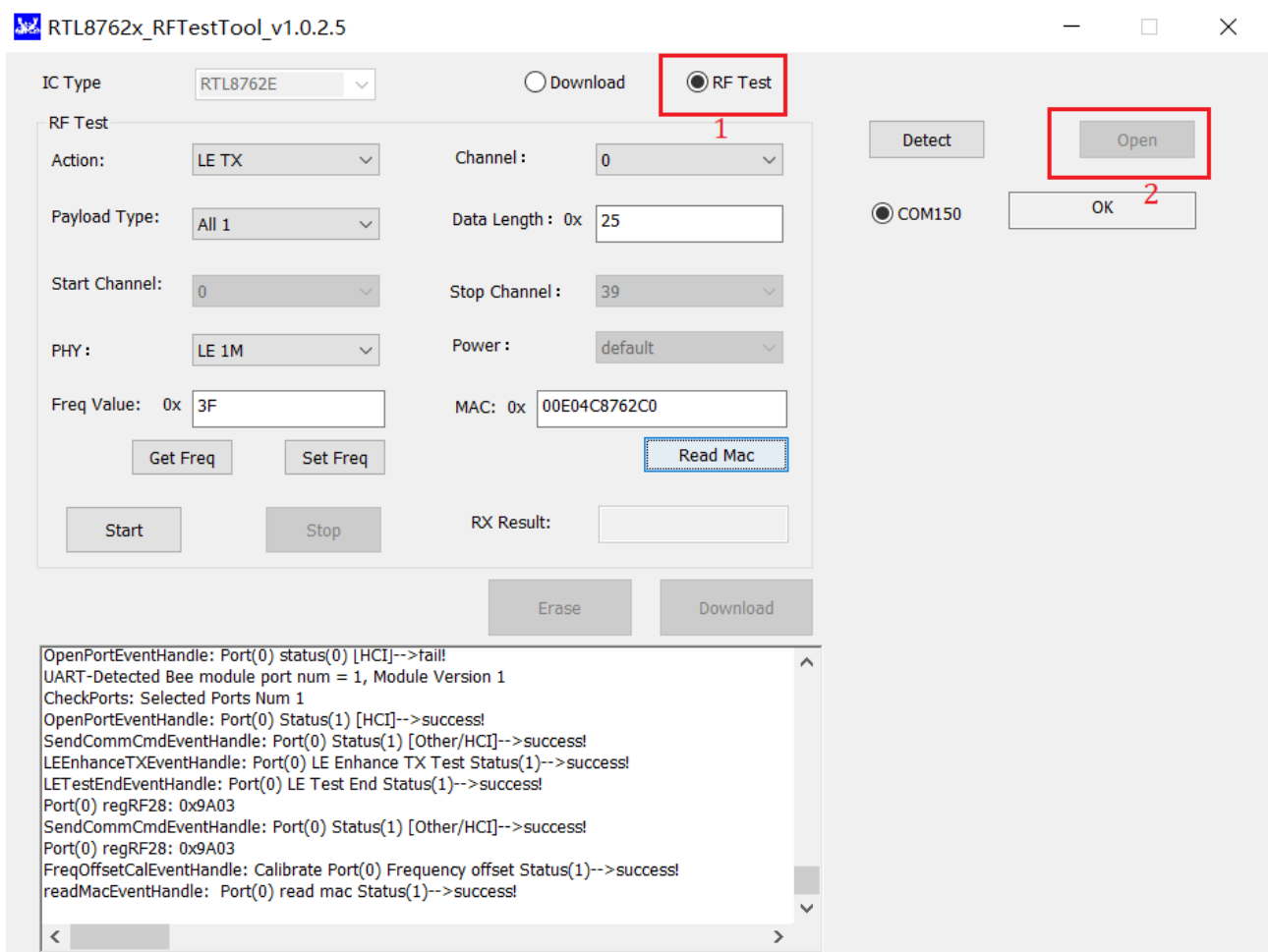


Figure 4-1 Open Success

### 4.1 LE Cont TX Test (duty cycle 100%)

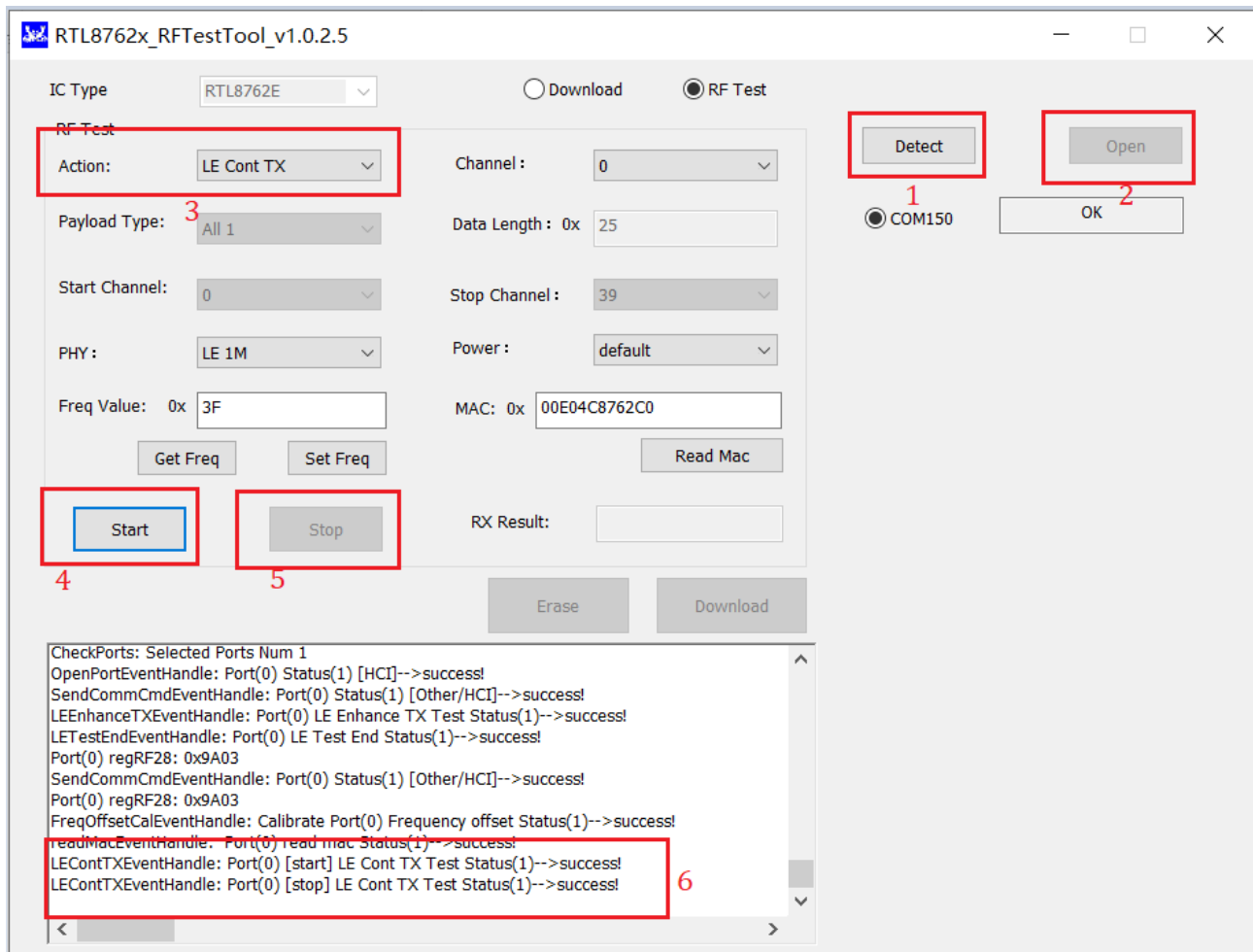
It is required to directly make TX measurement for RF test, such as Band Edge verification.

TX test setting is shown in Figure 4-2, TX Channel and TX Enable need to be configured for TX test, properly select Channel and set TX Enable to enable state before starting TX test.

Operation steps:

1. Detect UART com port.
2. Open UART com port.
3. You can see the message below to check open com port successes.
4. Select TX test item.
5. Choose TX channel.

6. Click "Start" button and DUT will transmit TX signal.
7. Click "Stop" to end test.



**Figure 4-2 LE Cont TX Test Setting**

Users can check the test state diagram of LE Cont\_TX by the spectrum analyzer. The waveforms are shown in Figure 4-3 display on the spectrum analyzer.

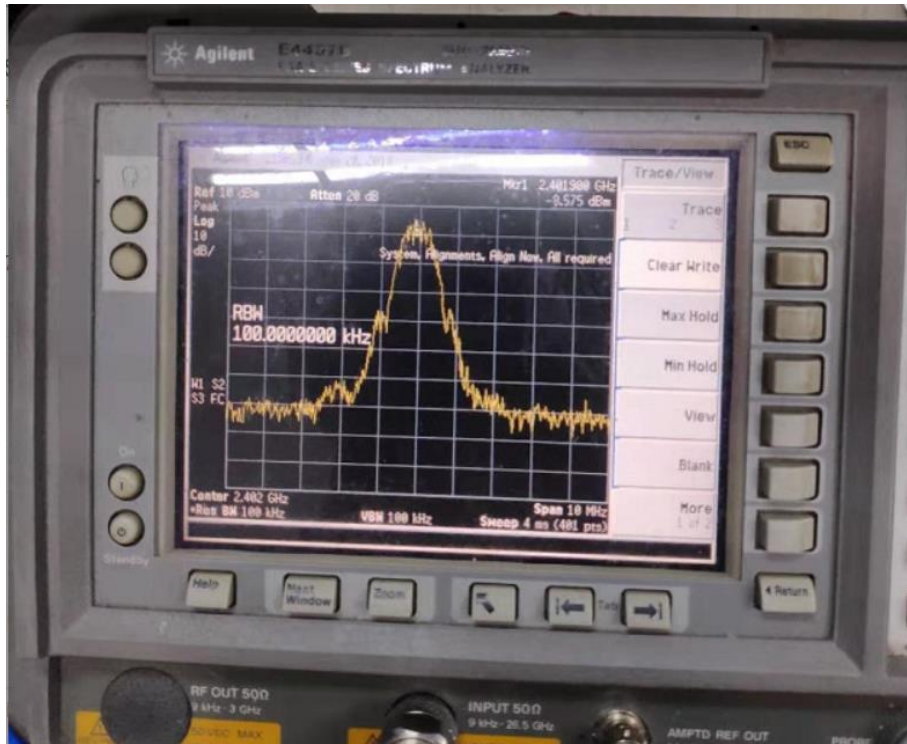


Figure 4-3 LE Cont\_TX Test Waveforms

## 4.2 LE RX Test

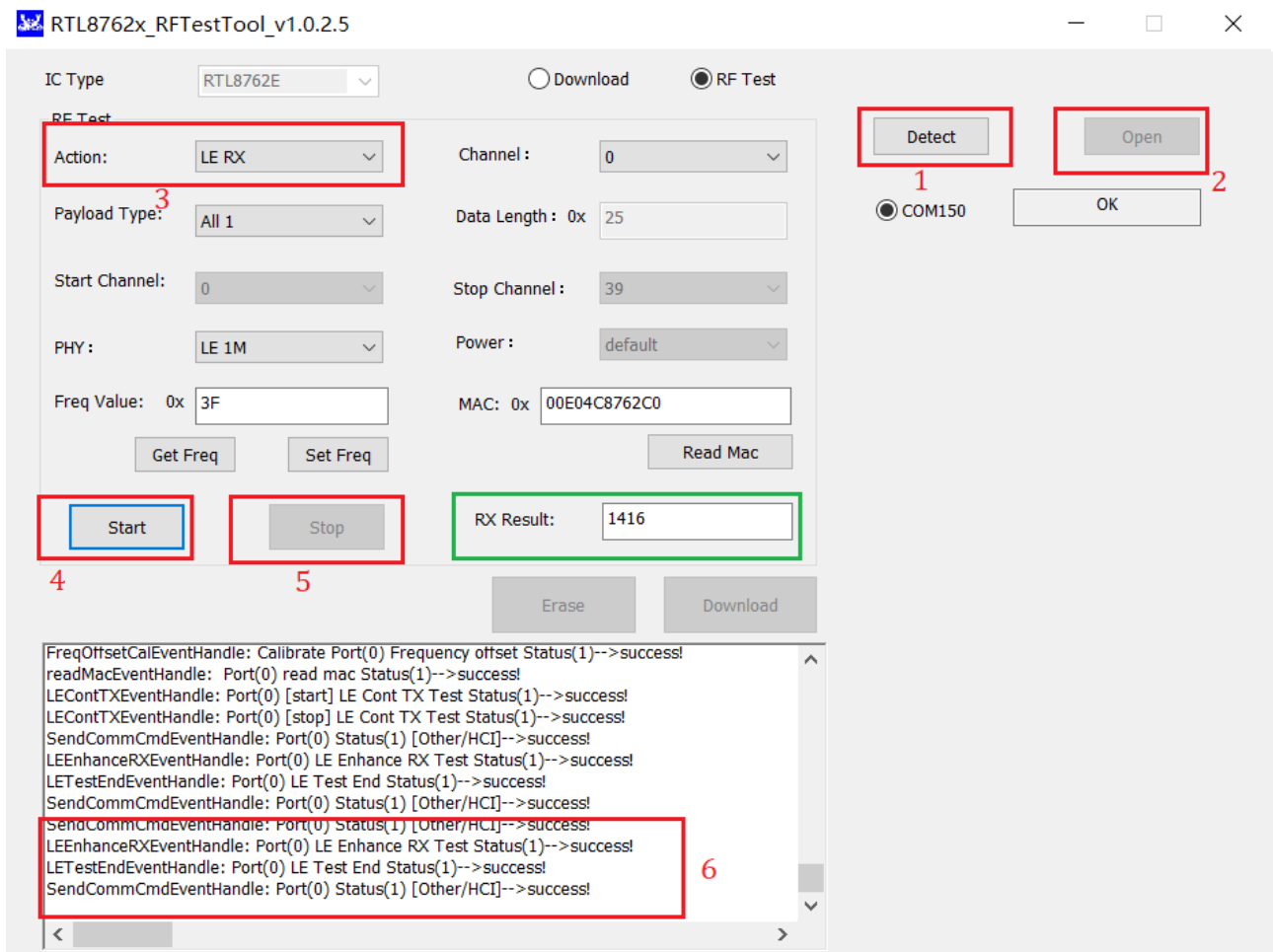
If the DUT supports BT5.0, the spec of RX will follow the standard of BT5.0; otherwise, it will follow the standard of BT4.0. Prepare the test environment and set the parameters first, and click "Detect", and then click "Open" to open the port after UART is detected.

As is shown in Figure 4-4, select LE RX, click "Start" to start testing, and click "Stop" to stop testing.

Operation steps:

1. Detect UART com port.
2. Open UART com port.
3. Select RX test item.
4. Choose RX channel . (If your DUT supports BT5.0, you will need to set the PHY and payload parameters)
5. Click "Start" to start test.
6. Click "Stop" to end test.

Note: The "RX Result" is the total number of Rx received.



### Figure 4-4 LE RX Parameter Setting

## 4.3 LE TX Test

If the DUT supports BT5.0, the spec of TX will follow the standard of BT5.0; otherwise, it will follow the standard of BT4.0. Prepare testing environment first, and click "Detect", and then click "Open" to open the port after UART is detected.

LE TX test setting is as shown in Figure 4-5, select LE TX, click "Start" to start testing, and click "Stop" to stop testing.

Operation steps:

1. Detect UART com port.
2. Open UART com port.
3. Select LE TX test item.
4. Choose channel and set payload and data length. (If your DUT supports BT5.0, you will need to set the PHY)
5. Click "Start" to start test.
6. Click "Stop" to end test.

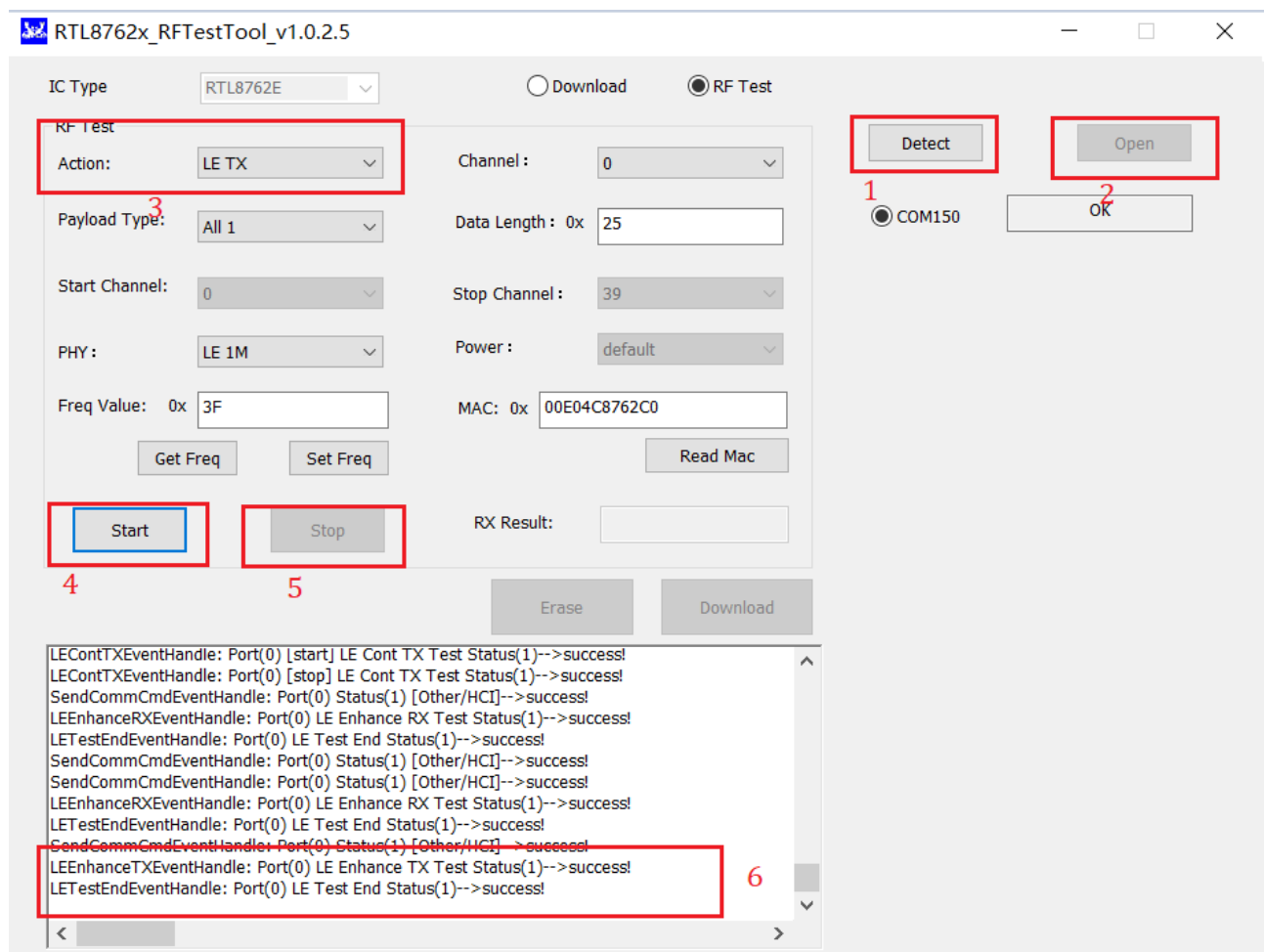


Figure 4-5 LE TX Parameter Setting

## 4.4 Single Tone TX

To test Single Tone, prepare testing environment first, and click "Detect", and then click "Open" to open the port after UART is detected.

Channel is the only parameter to be set. As is shown in Figure 4-6, select Single Tone, click "Start" to start testing, and click "Stop" to stop testing.

Operation steps:

1. Detect UART com port.
2. Open UART com port.
3. Select Single Tone test item.
4. Choose channel.
5. Click "Start" to start test.
6. Click "Stop" to end test.

Note: On Single Tone test, users can get/set frequency offset through "GetFreqValue" and "SetFreqValue" buttons.

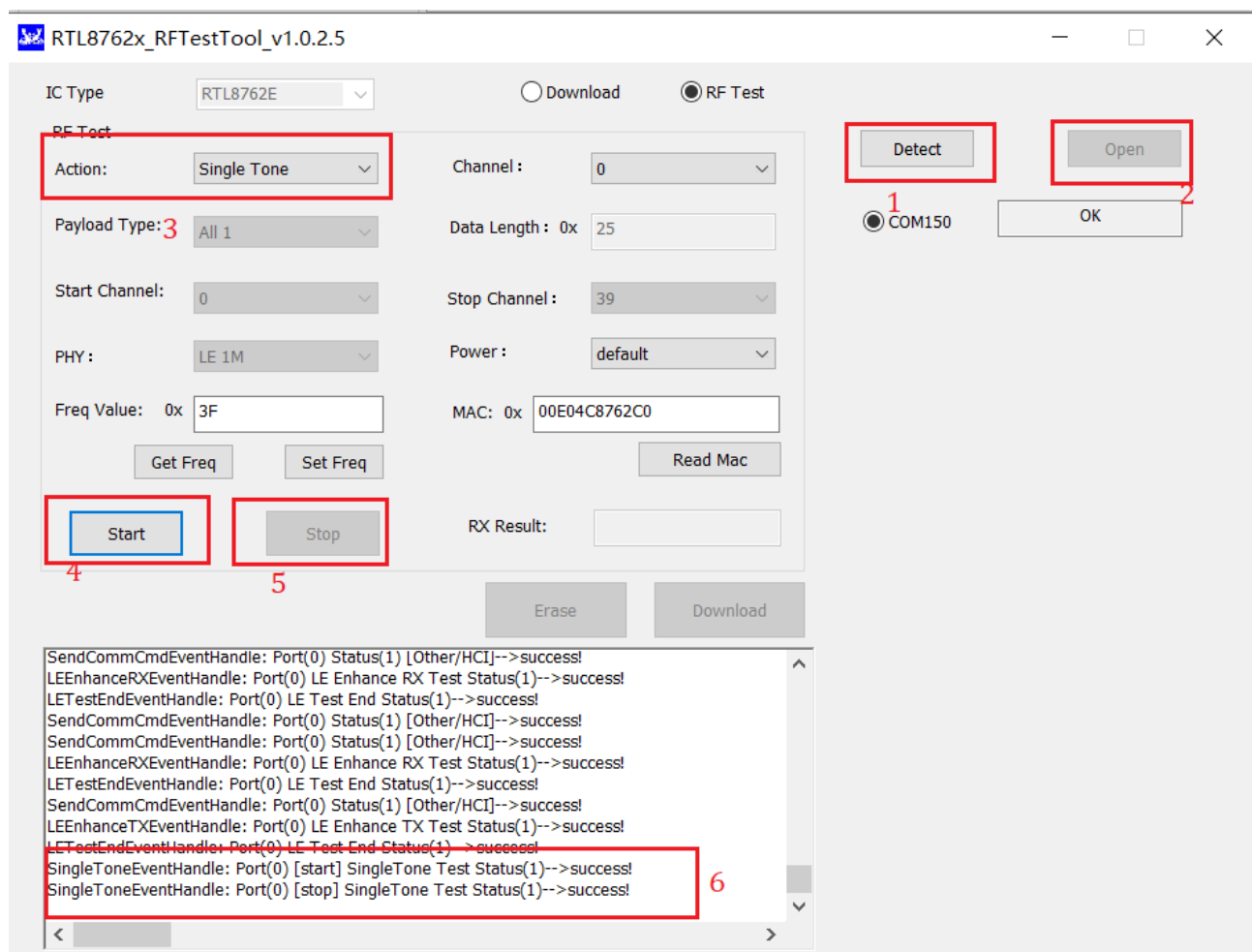


Figure 4-6 Single Tone Test



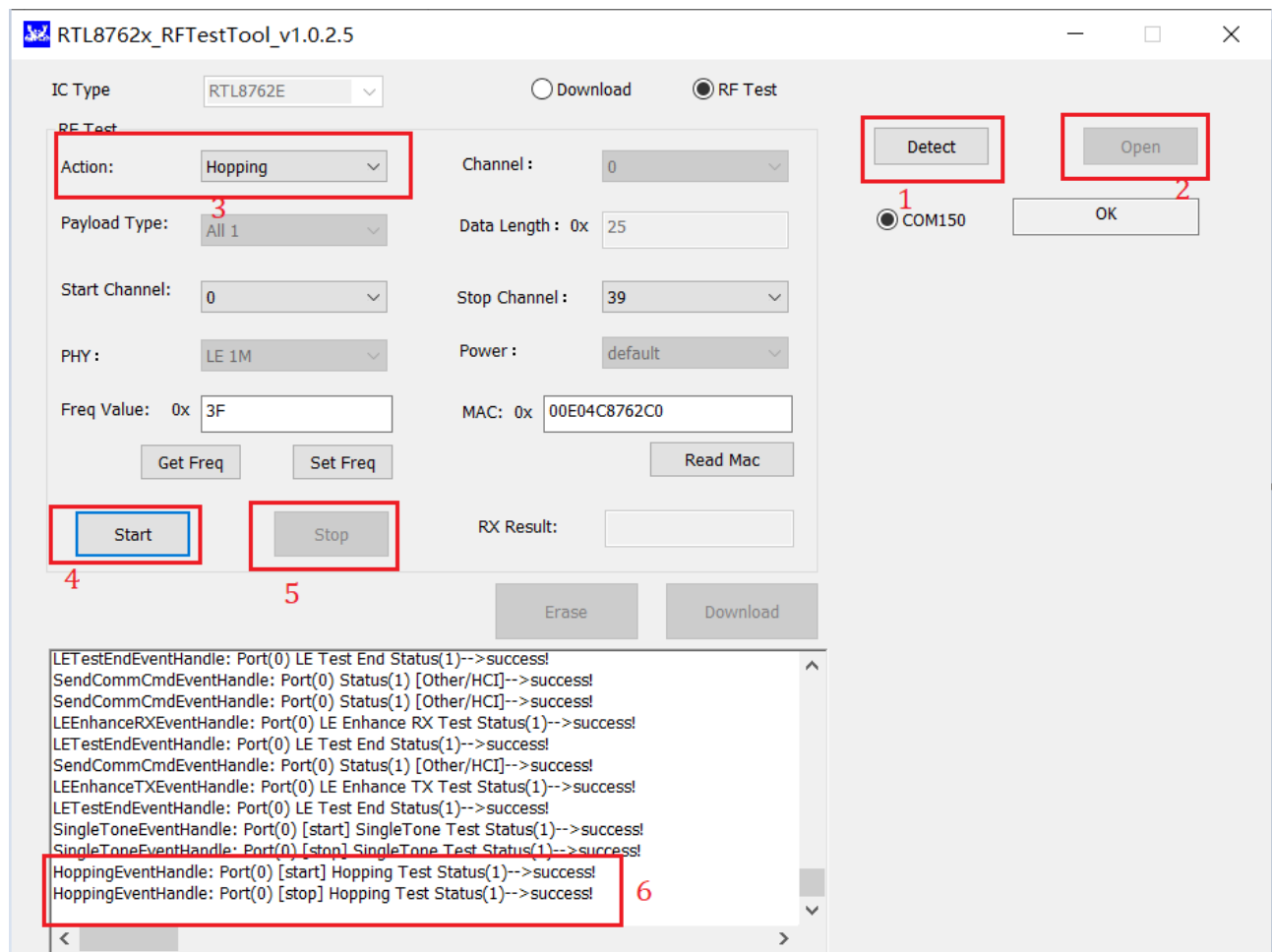
## 4.5 Hopping Test

To test Hopping, prepare testing environment first, and click "Detect", and then click "Open" to open the port after UART is detected.

Channel is the only parameter to be set. As shown in Figure 4-7, select Hopping, click "Start" to start testing, and click "Stop" to stop testing.

Operation steps:

1. Detect UART com port.
2. Open UART com port.
3. Select Hopping test item.
4. Choose start channel and stop channel.
5. Click "Start" to start test.
6. Click "Stop" to end test.



**Figure 4-7 Hopping Test**

Users can check the test state diagram of Hopping by spectrum analyzer. Set the center frequency of spectrum analyzer to 2441M, band width >80M, and set it as Max hold mode. Click "Start" to start Hopping test, observe

the spectrometer, it is found that the waveforms gradually fill these 40 channels from 2402M to 2480M within 3~5 minutes as shown in Figure 4-8. Click "Stop" to stop Hopping test.

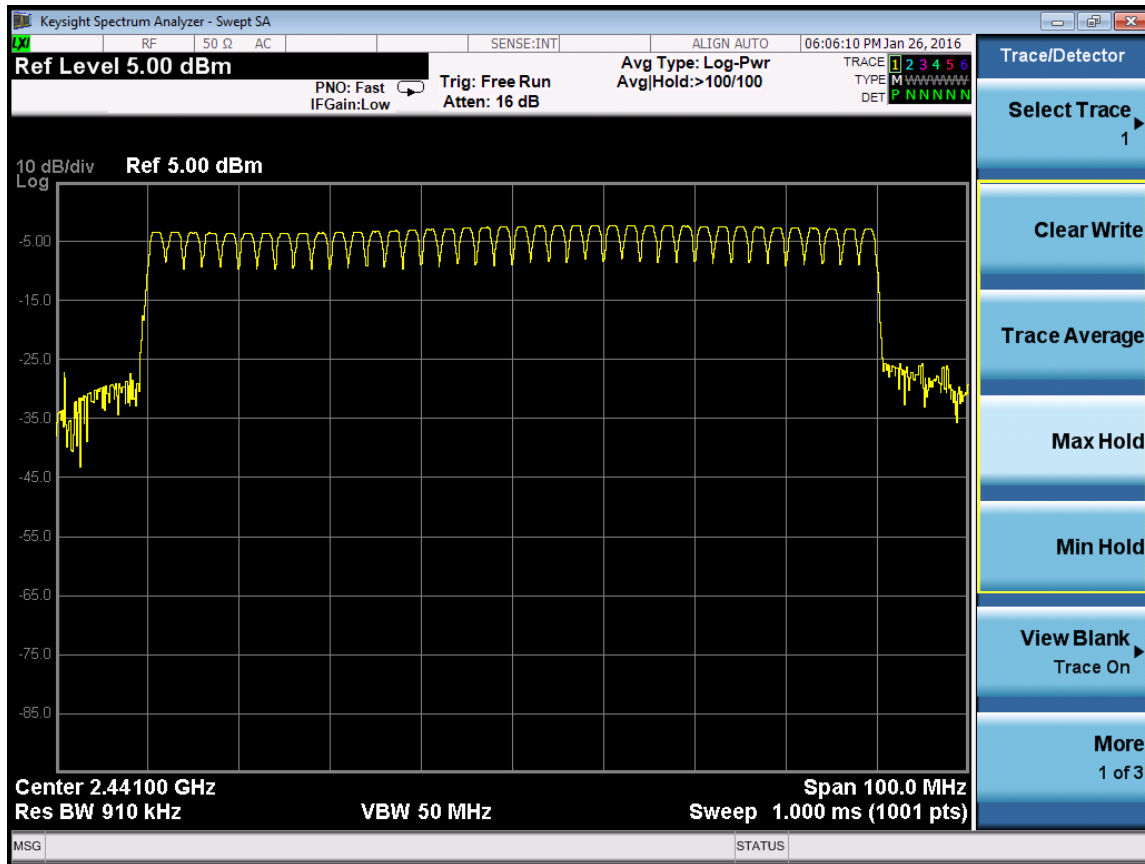


Figure 4-8 Hopping Test Waveforms