

# Telink

## Application Note

# Telink Non\_Signaling\_Test\_Tool User Guide

AN-20041500-E1

---

**Ver.1.0.0**

2020/04/15

## Brief

This document provides the guide for users on how to implement the non-signaling test for DUT by using "Non\_Signaling\_Test\_Tool".

## **Published by**

**Telink Semiconductor**

**Bldg 3, 1500 Zuchongzhi Rd,  
Zhangjiang Hi-Tech Park, Shanghai, China**

**© Telink Semiconductor**

**All Right Reserved**

## **Legal Disclaimer**

This document is provided as-is. Telink Semiconductor reserves the right to make improvements without further notice to this document or any products herein. This document may contain technical inaccuracies or typographical errors. Telink Semiconductor disclaims any and all liability for any errors, inaccuracies or incompleteness contained herein.

Copyright © 2020 Telink Semiconductor (Shanghai) Ltd, Co.

## **Information:**

For further information on the technology, product and business term, please contact Telink Semiconductor Company ([www.telink-semi.com](http://www.telink-semi.com)).

For sales or technical support, please send email to the address of:

[telinkcnsales@telink-semi.com](mailto:telinkcnsales@telink-semi.com)

[telinkcnsupport@telink-semi.com](mailto:telinkcnsupport@telink-semi.com)

# Revision History

---

## **Version 1.0.0 (2020-04-15)**

Initial release.

---

# Contents

---

Revision History .....	2
1. Overview .....	5
2. Test Guide .....	6
3. Test Example.....	12

## List of Figures

---

Figure 2-1 USB Connection Method .....	6
Figure 2-2 Swire Connection Method .....	6
Figure 2-3 Firmware Burning Steps.....	7
Figure 2-4 Non_Signaling_Test_Tool Interface .....	8
Figure 2-5 Test Swire Connection and Communication .....	9
Figure 2-6 Configure PA Option .....	9
Figure 2-7 Set Frequency Point, TX Power and RF Mode .....	10
Figure 2-8 TX Test Mode .....	10
Figure 2-9 RX Test Mode.....	11
Figure 2-10 Read Number of Received Packets and RSSI Value in RX Test Mode .....	11

# 1. Overview

---

This document presents the usage guide for Telink “Non\_Signaling\_Test\_Tool” which is a software on PC side used to implement non-signaling tests.

Before a non-signaling test, the DUT (Device Under Test) must be pre-calibrated (generally calibrated on Jig system) with calibration values written into corresponding flash addresses.

## 2. Test Guide

### 1. Hardware connection

Connect miniUSB interface of Telink burning EVK with PC USB via a USB cable; the LEDs on the EVK will flash once to indicate the normal connection between the EVK and PC.

Then connect the USB interface of the burning EVK with DUT via USB or Swire.

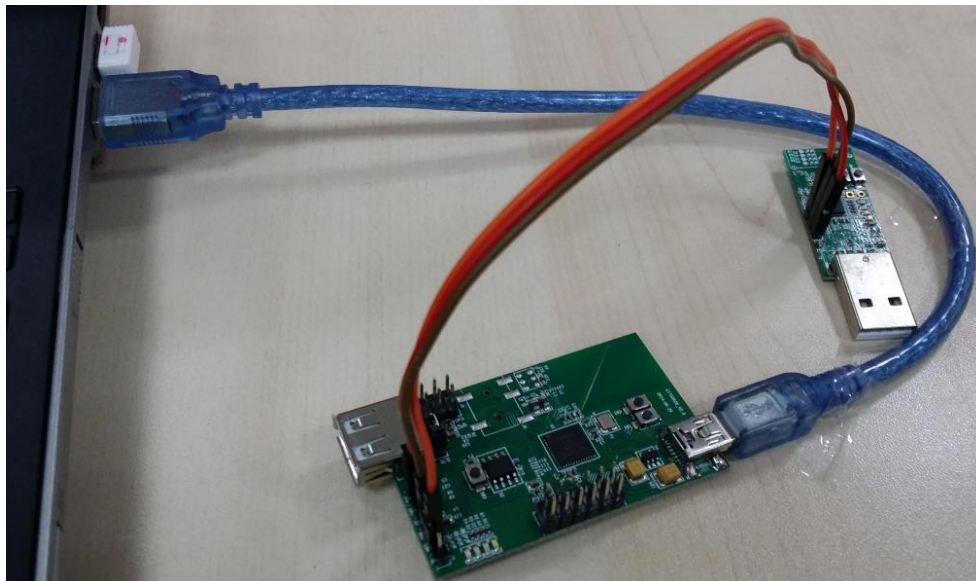
- ✧ USB connection method: Connect the DUT with the burning EVK via USB interface directly. This method only applies to DUT with USB interface, e.g. a dongle board.

**Figure 2-1 USB Connection Method**



- ✧ Swire connection method: Connect VCC, GND and SWM of the burning EVK with VCC, GND and SWS of the DUT, respectively.

**Figure 2-2 Swire Connection Method**



## 2. Download non-signaling test file

Use Telink WtcdB tool to download test binary file into DUT flash.

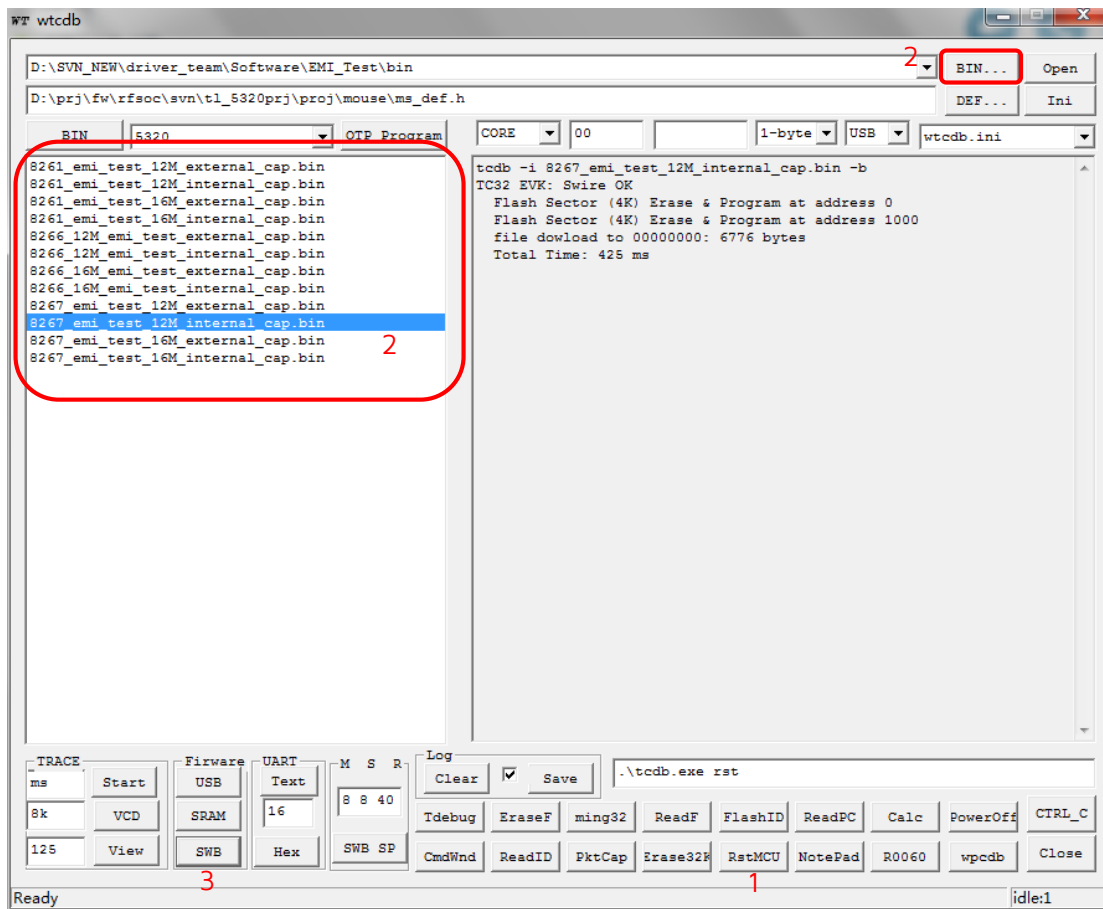
**Step 1.** Start the WtcdB on PC side, click the “RstMCU” button to reset MCU and check hardware connection.

**Step 2.** Click the “BIN” button and select the directory containing the test bin file to be downloaded. The test bin file should be selected according to chip part number, crystal (12MHz/16MHz) as well as crystal capacitor (internal/external). Then select this bin file in the left “Bin file list window”.

**Step 3.** Click the “SWB” button to download the selected bin file into DUT flash starting from address 0x0.

**Step 4.** Power cycle the DUT, i.e. reconnect the DUT with the burning EVK.

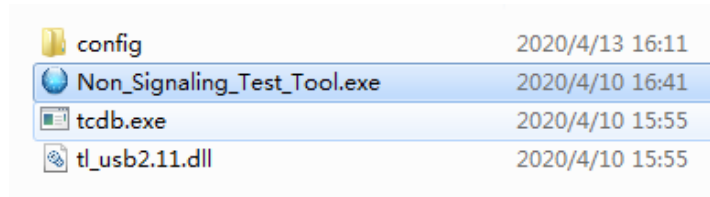
**Figure 2-3 Firmware Burning Steps**





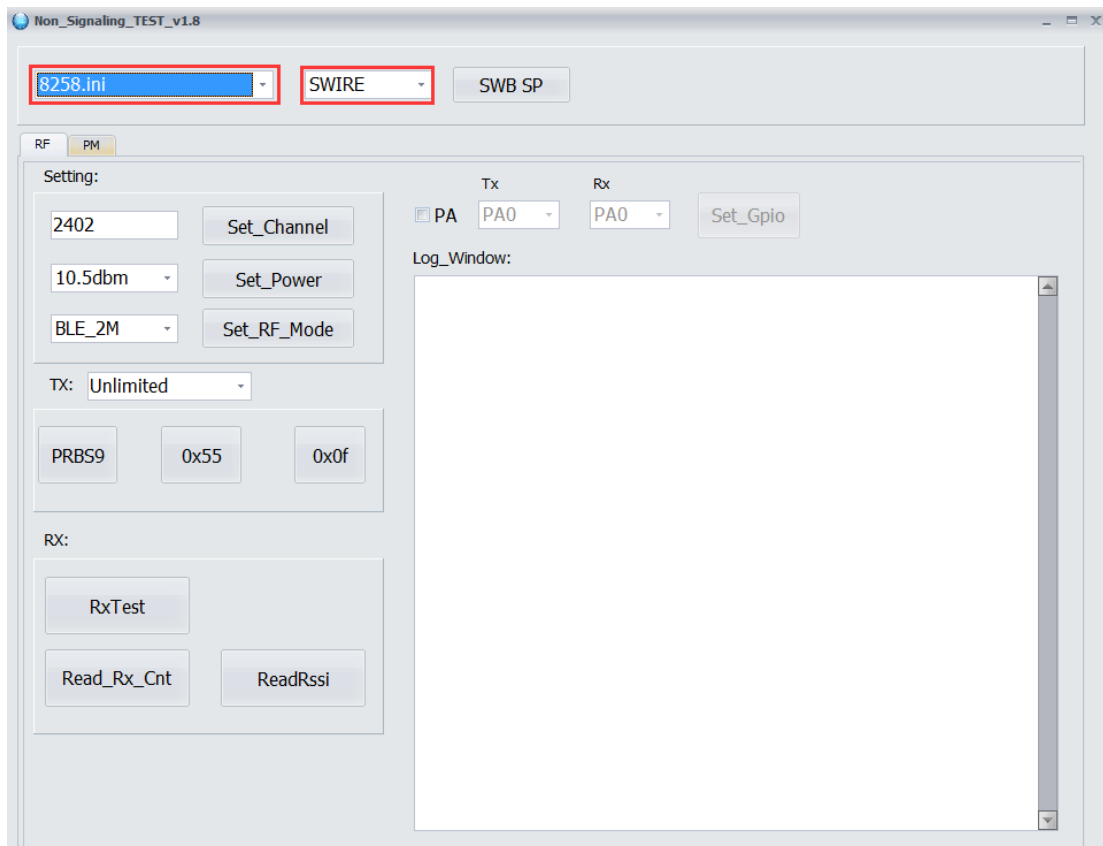
### 3. Non-signaling test

**Step 1.** Double click “Non\_Signaling\_Test\_Tool.exe” to start this tool.



The figure below shows the tool interface.

**Figure 2-4 Non\_Signaling\_Test\_Tool Interface**

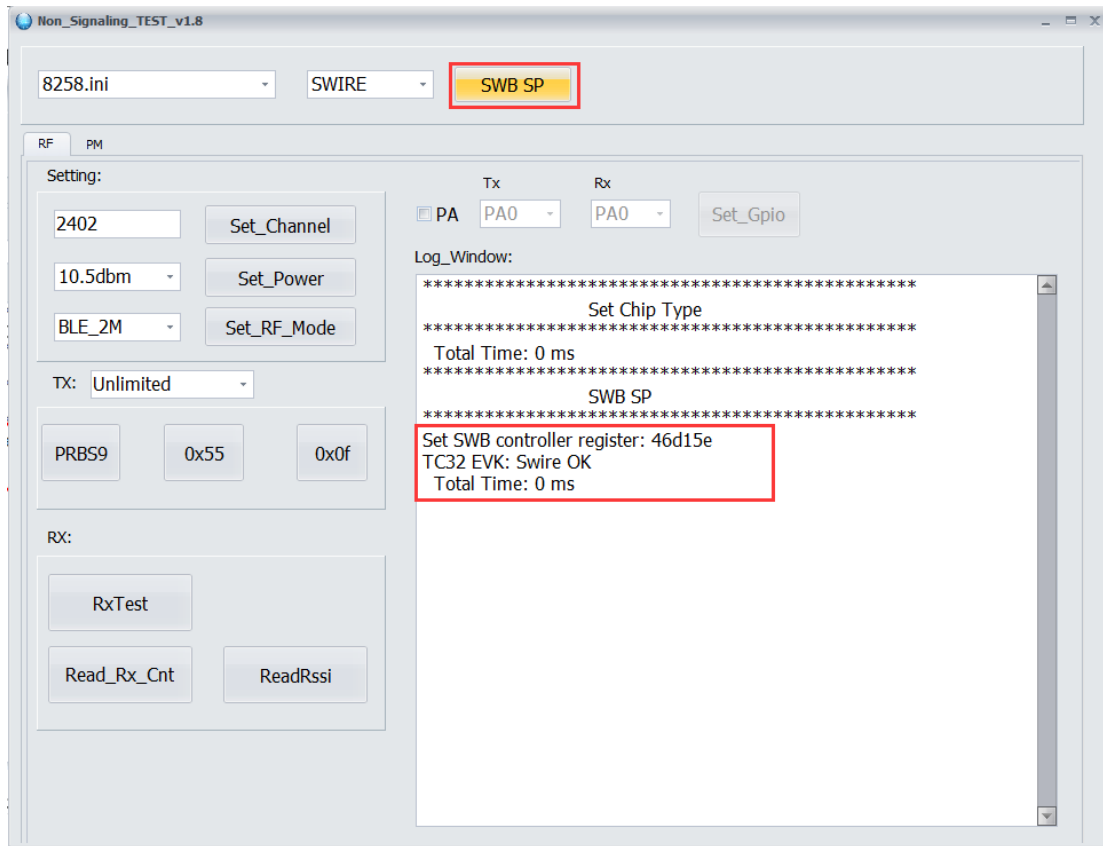


**Step 2.** Select chip type, and then choose communication method according to the connection method between DUT and PC.

- ✧ SWIRE method: If DUT is connected to PC via a burning EVK, the “SWIRE” method should be selected.
- ✧ USB method: If DUT is directly connected to PC without using a burning EVK as adapter, the “USB” method should be selected. This USB option is not supported currently.

**Step 3.** Click the “SWB SP” button to ensure normal Swire connection and communication, as shown below.

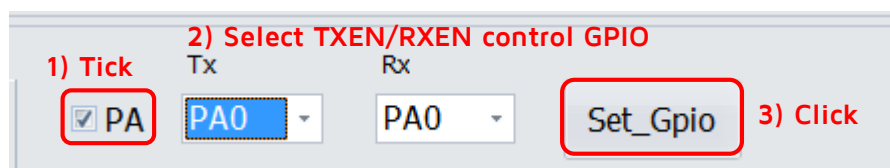
**Figure 2-5 Test Swire Connection and Communication**



**Step 4.** Configure PA option.

If the DUT has PA (Power Amplifier) module, it's needed to follow the steps below to configure the PA option: Tick the “PA” box, select the TXEN GPIO and RXEN GPIO to control the PA via the Tx and Rx drop-down box, then click the “Set\_Gpio” button to enable high-level output of the TX\_gpio and low-level output of the RX\_gpio. This operation will take a relatively long duration. After the PA option is configured, the normal test items can be started.

**Figure 2-6 Configure PA Option**



If the DUT has no PA (Power Amplifier) module, this step can be skipped.

**Step 5.** Depending on specific test items, set frequency point, TX power and RF mode, and click corresponding setting button ("Set\_Channel", "Set\_Power", "Set\_RF\_Mode") to confirm the configuration.

**Figure 2-7 Set Frequency Point, TX Power and RF Mode**

**Step 6.** Set test mode.

- ✧ Set test mode as TX mode. As shown below, by click the "PRBS9"/"0x55"/"0x0f" button, the DUT will send packets in the specific "Channel" with the specific "Power" and "RF Mode", the payload of which are PRBS9 data/0x55/0x0f respectively.

By default, if no other button is pressed to enter other test mode, the DUT will continuously send out packets. User can also change the default "Unlimited" as "1000" in the TX drop-down box, and then click a button to enter corresponding TX mode, the DUT will only send 1000 packets.

**Figure 2-8 TX Test Mode**

**Note:** "PRBS9", "0x55" and "0x0f" in TX mode are all burst mode. Since they do not meet the requirements of certification test including FCC/CE/KCC/SRRC, TX mode should not be used during certification.

- ✧ Set test mode as RX mode. As shown below, the DUT will enter RX mode by clicking the “RxTest” button. In the RX mode, user can view the count number of received packets as well as average RSSI value by clicking “Read\_Rx\_Cnt” and “ReadRssi”.

Figure 2-9 RX Test Mode

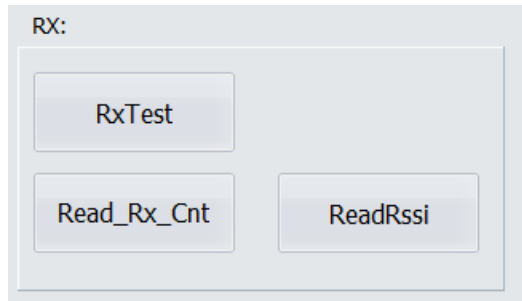
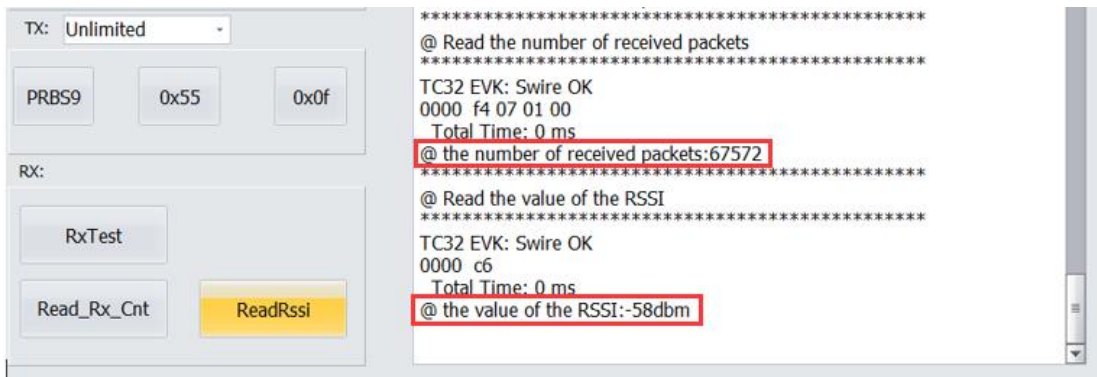
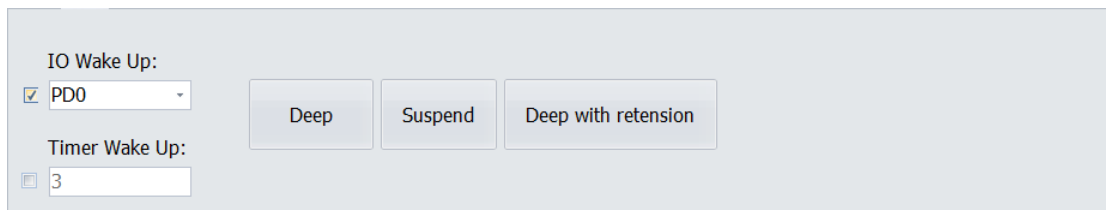


Figure 2-10 Read Number of Received Packets and RSSI Value in RX Test Mode



For chip types which support current test in Suspend and Deep Sleep low-power (PM) mode, the tool will also show related PM test items, as shown below:

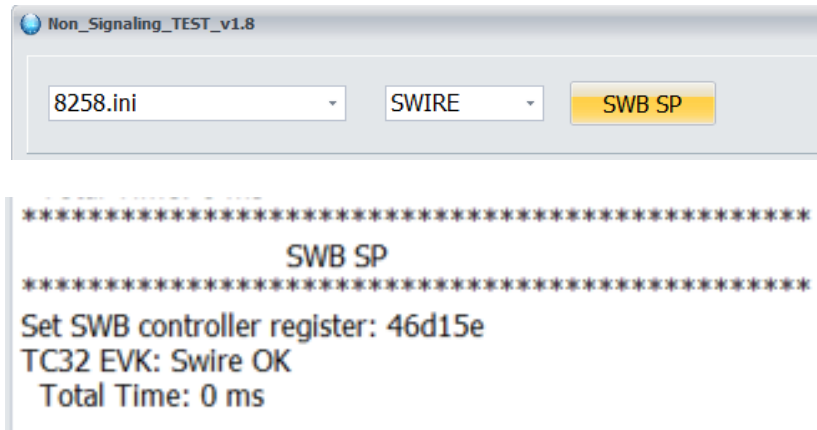


- 1) Connect the DUT with specific current test device, and then select either IO wakeup or Timer wakeup as needed.
  - To select IO wakeup, please tick the box for “IO Wake Up”, and select wakeup GPIO pin.
  - To select Timer wakeup, please tick the box for “Timer Wake Up”, and fill in wakeup time (unit: second).
- 2) Then click certain button to select working mode as needed. After clicking the working mode button, user can observe current in corresponding mode.

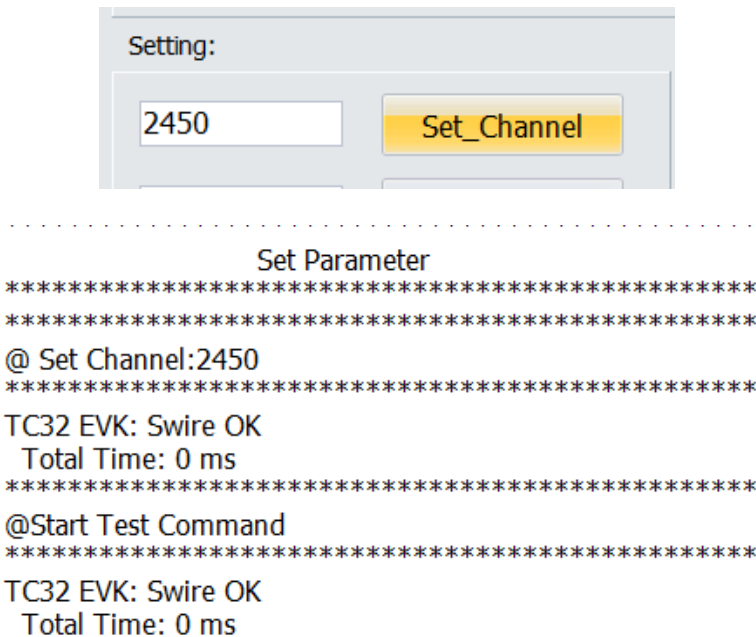
### 3. Test Example

Suppose it's needed to continuously send packets with payload of "0x55" in the Channel "2450MHz" with the "5dBm" Power and "BLE\_1M" RF Mode, the steps below should be followed.

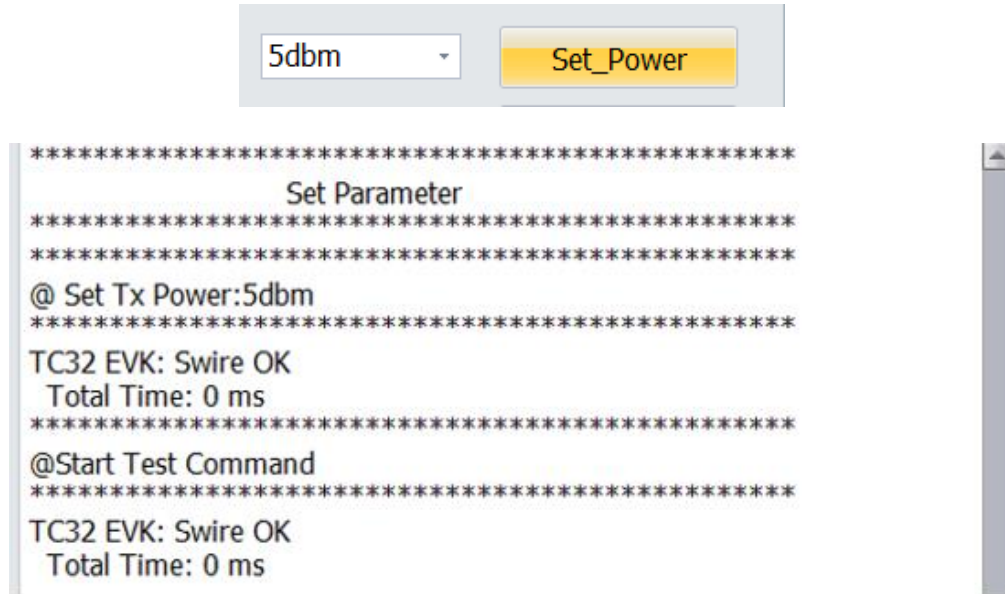
**Step 1.** First ensure hardware connection is correct. Select "SWIRE" and click the "SWB SP" button. If the right log window shows "Swire OK", it indicates hardware connection is normal and user can continue the test; otherwise user should check the hardware connection.



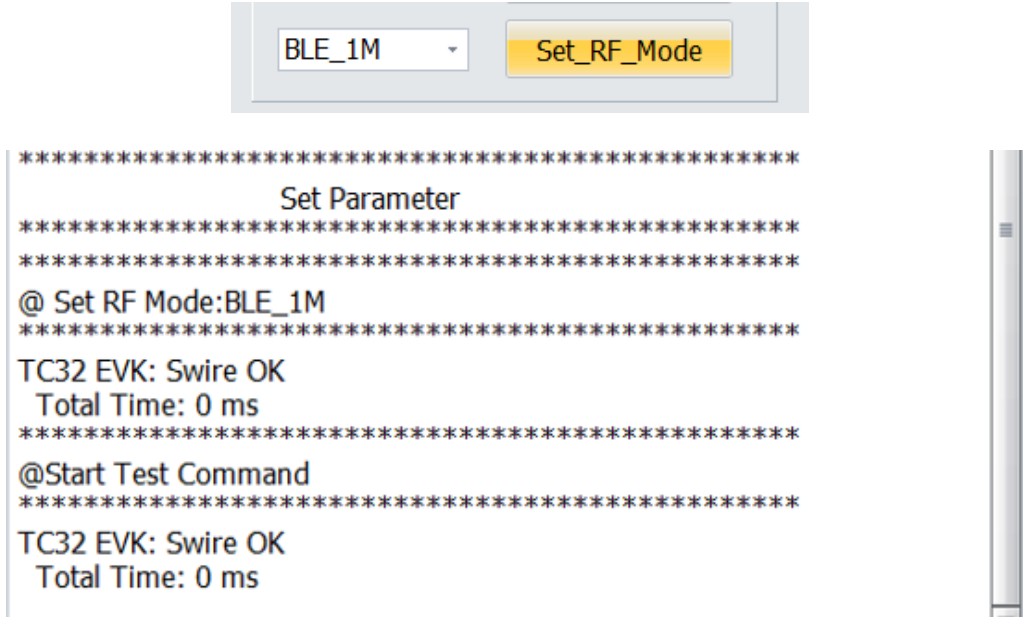
**Step 2.** Input the frequency point "2450" and click the "Set\_Channel" button. If the right log window shows setting success information, continue the test.



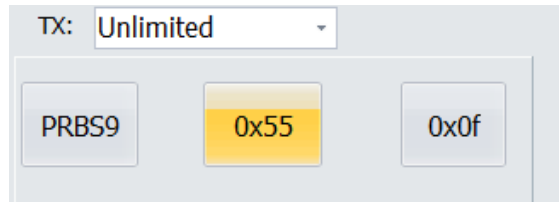
**Step 3.** Select TX power as “5dbm” and click the “Set\_Power” button. If the right log window shows setting success information, continue the test.



**Step 4.** Select RF mode as “BLE\_1M” and click the “Set\_RF\_Mode” button. If the right log window shows setting success information, continue the test.



**Step 5.** Click the “0x55” button (corresponding to the payload of 0x55), and DO NOT modify the default “Unlimited” setting of TX option (continuously send packets). If the right log window shows setting success information, all operations are finished.



```
*****
                          Set Parameter
*****
*****
@ Set the number of packet Command
*****
TC32 EVK: Swire OK
Total Time: 0 ms
*****
@ Send Tx(0x55) Command
*****
TC32 EVK: Swire OK
Total Time: 0 ms
*****
@ Send Start Tx(0x55) Command
*****
TC32 EVK: Swire OK
Total Time: 0 ms
```