



TELINK SEMICONDUCTOR

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## **Application Note: User Guide for Telink EMI\_Test\_Tool**

AN-17120700-E5

**Ver 1.4.0**

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**2020/3/6**

### **Brief:**

This document aims to guide user on how to implement EMI test for DUT by using "EMI\_Test\_Tool".

**Published by  
Telink Semiconductor**

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

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## Revision History

Version	Major Changes	Date	Author
1.0.0	Initial release	2017/12	CKX, Cynthia
1.1.0	Updated section 1 Overview: 8266 flash_address	2017/12	CKX, Cynthia
1.2.0	Updated section 2 Test Guide: EMI test Step 6	2018/9	CKX, LX, Cynthia
1.3.0	Updated to EMI_TEST_v1.4 in section 1 Overview, 2 Test Guide and 3 Test Example	2018/10	CKX, Cynthia
1.4.0	Removed TX, RX related function description, changes including:  2 Test Guide: Updated EMI test Step 3 Figure 5 Test Swire connection and communication; removed “Set test mode as TX mode, RX mode” in EMI test Step 6  3 Test Example: Removed Step 5	2020/3	CKX, YJL

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## 1 Overview

This document presents the usage guide for Telink “EMI\_Test\_Tool” which is a software on PC side used to implement EMI test.

Before EMI 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 an USB cable; the indicating light on the EVK will blink once to indicate 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 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.

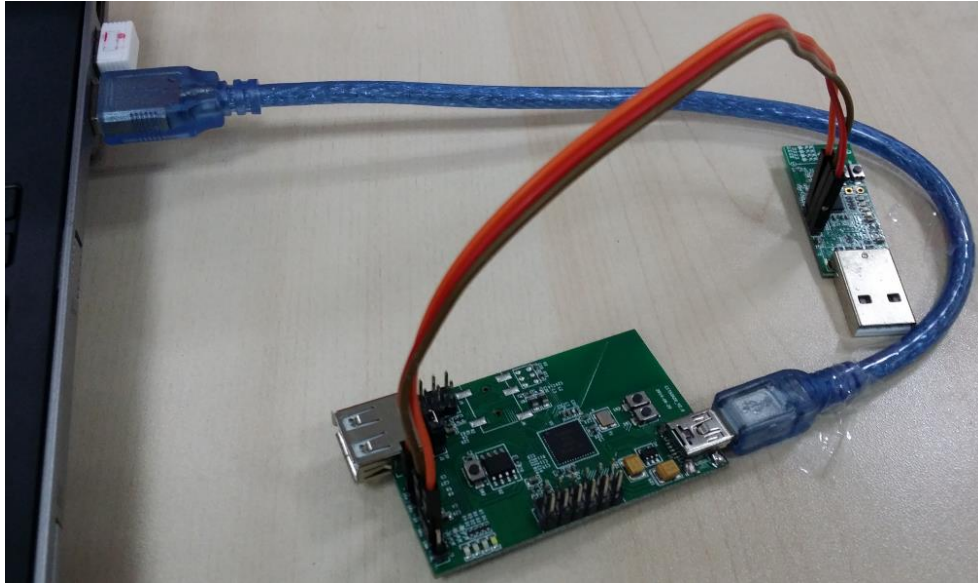


Figure 2 Swire connection method

## 2) Download EMI 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.

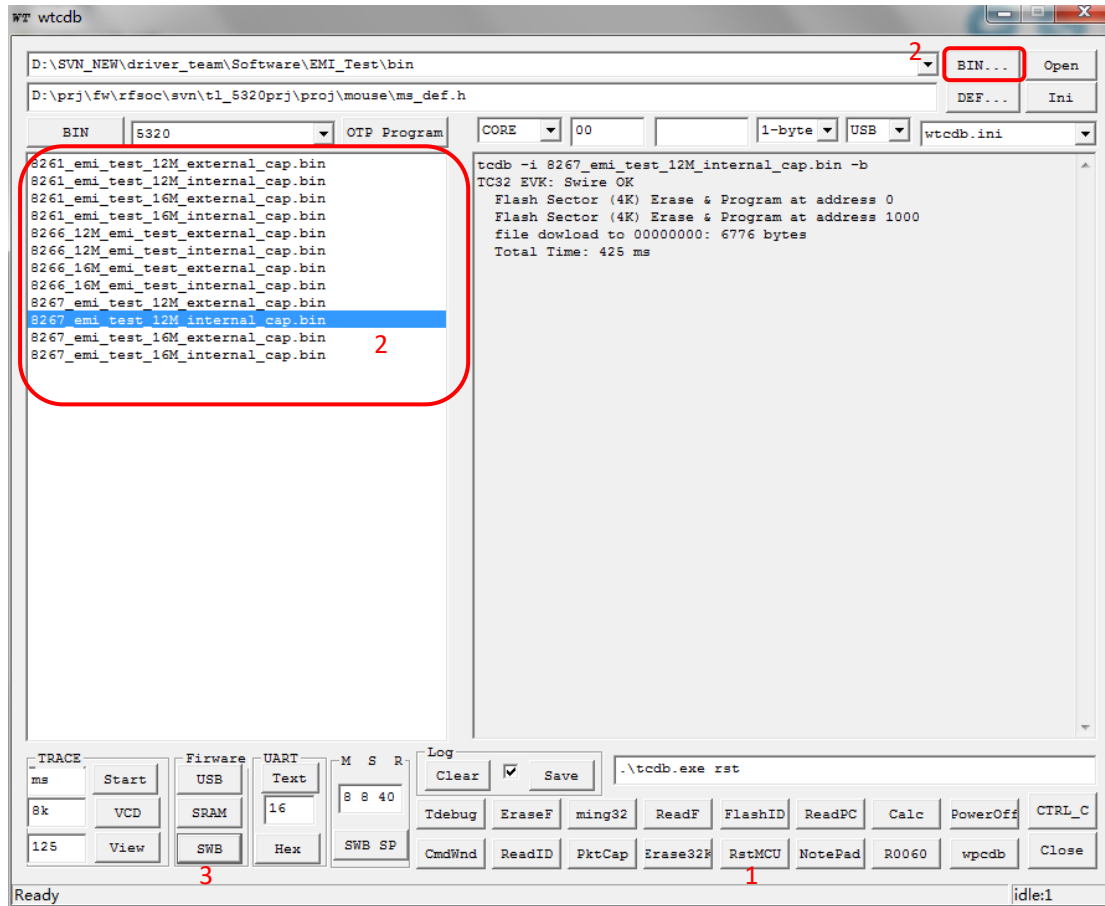
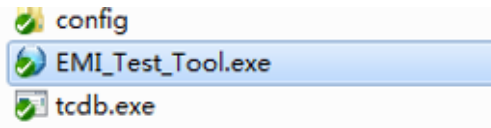


Figure 3 Firmware burning steps

### 3) EMI test

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



The figure below shows the tool interface.

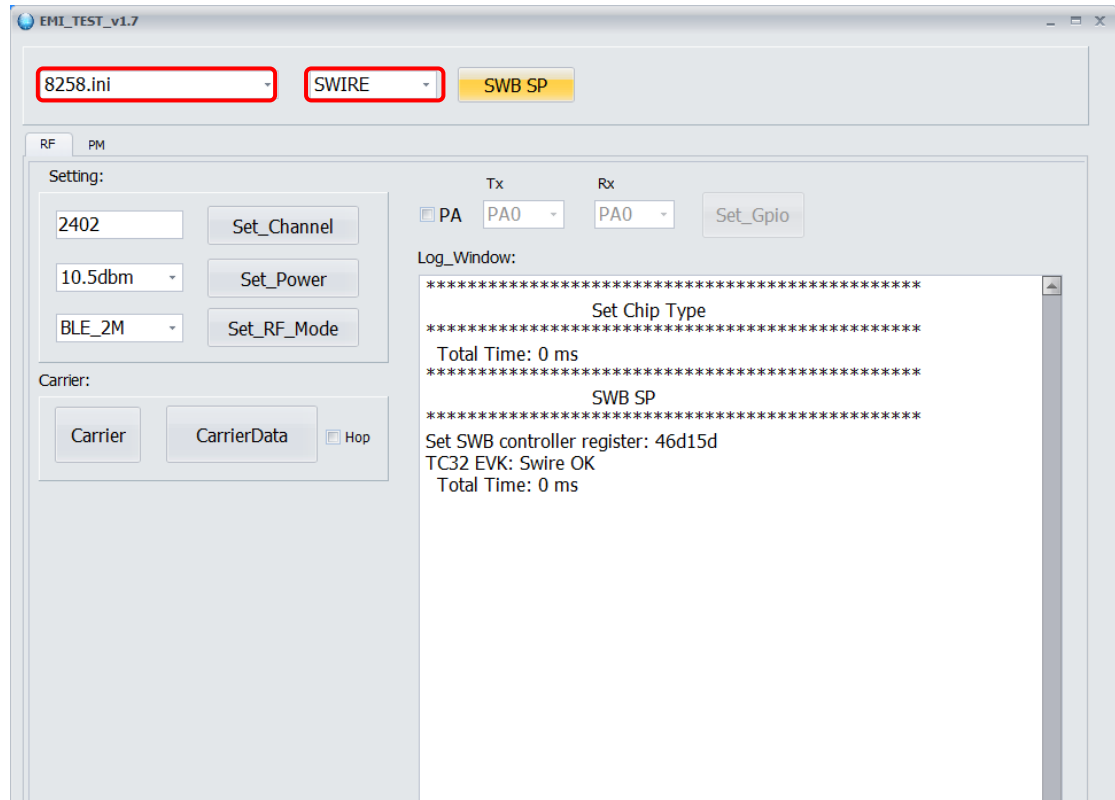


Figure 4 EMI\_Test\_Tool interface

**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.

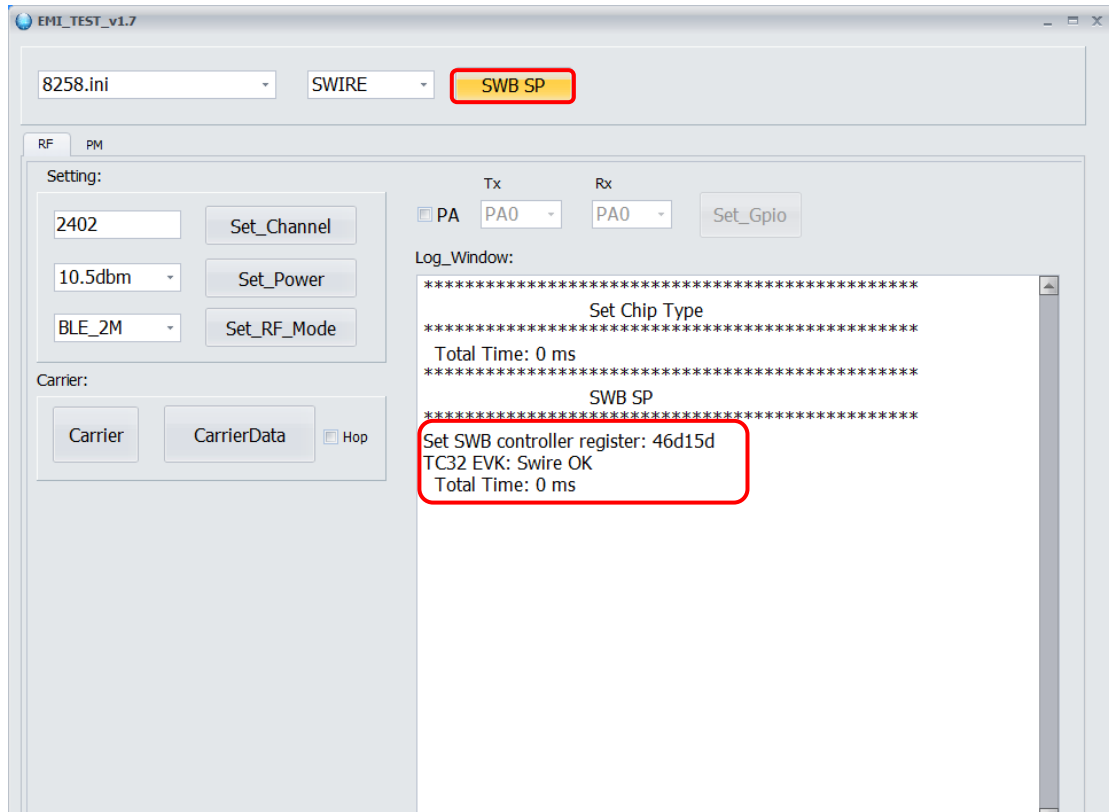


Figure 5 Test Swire connection and communication

#### 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.

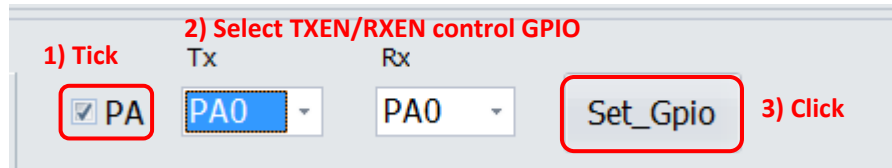


Figure 6 Configure PA option

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.

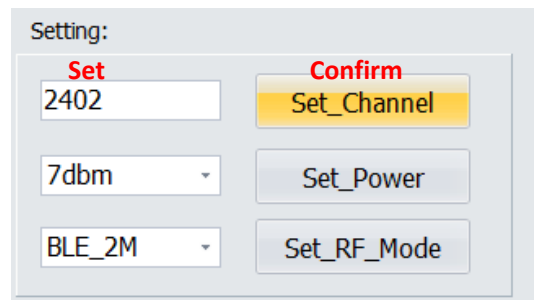


Figure 7 Set frequency point, Tx power and RF mode

**Step 6:** Set test mode.

- ✧ Set test mode as carrier mode. As shown below, the DUT will enter “single carrier mode” by clicking the “Carrier” button, or enter “Carrier+Data mode” by clicking the “CarrierData” button.

**\*Note:** “CarrierData” (CD, Carrier+Data mode) is continuous transmission mode, and it should be adopted for certification test including FCC/CE/KCC/SRRC.

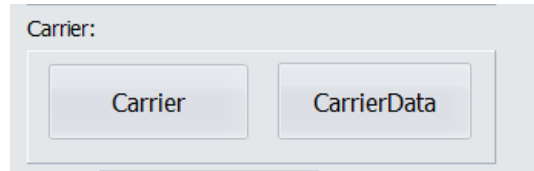
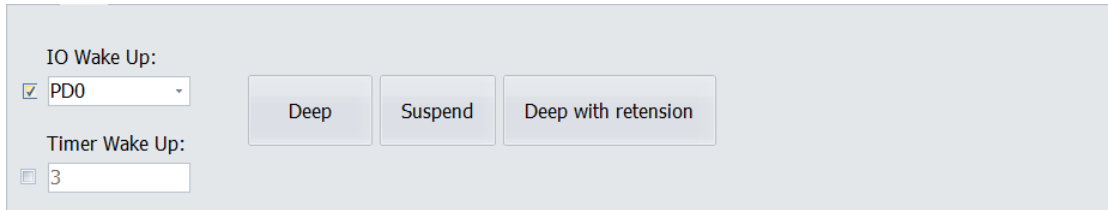


Figure 8 Carrier test mode

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:



The screenshot shows a configuration window with two sections: "IO Wake Up:" and "Timer Wake Up:". Under "IO Wake Up:", there is a checked checkbox, a dropdown menu showing "PD0", and three buttons: "Deep", "Suspend", and "Deep with retention". Under "Timer Wake Up:", there is an unchecked checkbox and a text input field containing the number "3".

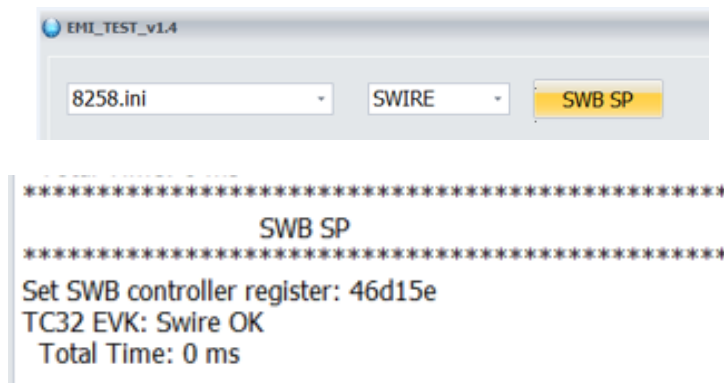
- 1) Connect the DUT with specific current test device, and then select either IO wakeup or Timer wakeup as needed.
  - ✧ To select IO wakeup, please tick the box for “IO Wake Up”, and select wakeup GPIO pin.
  - ✧ To select Timer wakeup, please tick the box for “Timer Wake Up”, and fill in wakeup time (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

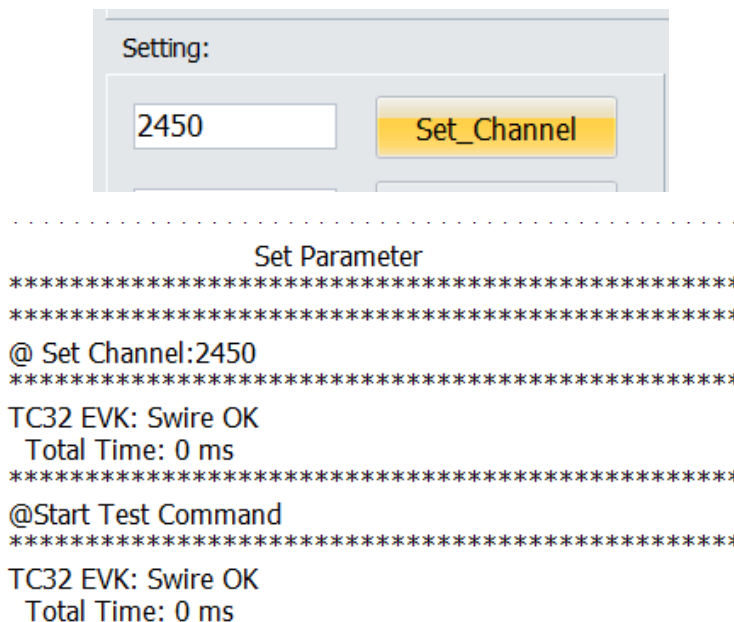
Suppose it's needed to continuously send packets with payload of "0x55" in the Channel "2450MHz" with the "5dBm" Power and "BLE\_1M" RF Mode, the steps below should be followed.

- 1) First ensure hardware connection is correct. Select "SWIRE" and click the "SWB SP" button.

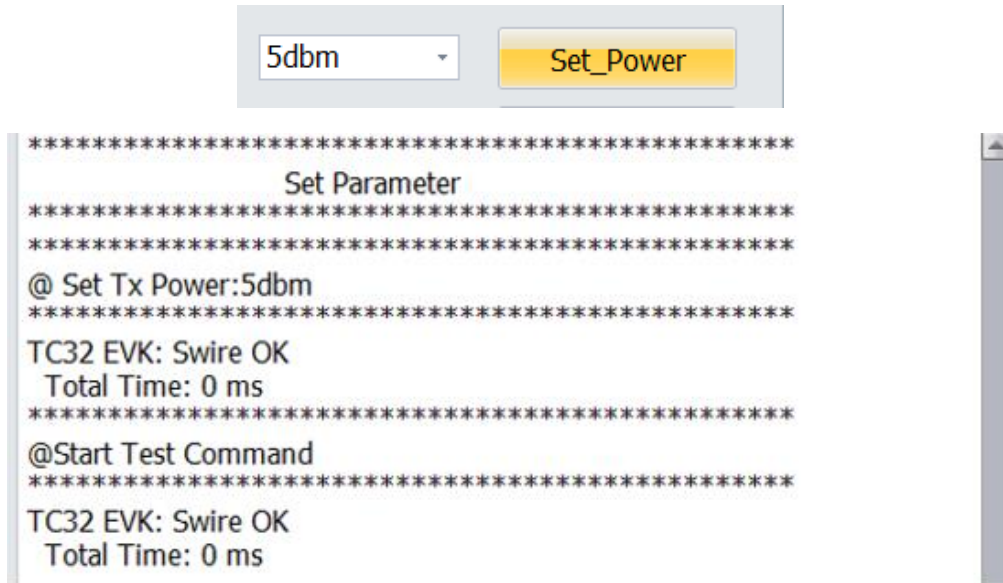
If the right log window shows "Swire OK", it indicates hardware connection is normal and user can continue the test; otherwise user should check the hardware connection.



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



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



- 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.

