Application Note：
Telink 8261 EMI Test Guide

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Brief：

This document is the EMI test guide for 8261-based DUT board.

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Revision History

Version	Major Changes	Date	Author
1.0.0	Initial release	2017/1	C.K.X., L.X., Cynthia

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1 Overview

EMI test for Telink 8261-based DUT board is implemented by operating specific SRAM or flash address.

1) The default EMI test parameters after power on without any configuration are shown as below:
   - ✧ mode=1, BLE 1M mode
   - ✧ power=0, 7dBm Tx power
   - ✧ channel=2, 2402MHz frequency point
   - ✧ cmd=1, carry mode

   By default, after EMI test is started, the DUT will send carrier at 2402MHz frequency with 7dBm Tx power in BLE 1M mode.

2) As shown in Table 1, user can modify EMI test parameters by writing either specific SRAM address or specific flash address with specific value.
   - ✧ Configure parameter via Flash:

     By writing flash address 0xf007~0xf00a with specific value, user can switch EMI test mode, Tx power level, frequency point and working mode correspondingly.

     It's needed to power cycle the DUT, so that EMI test will be started automatically and the new parameters configured via flash will take effect.

     Note that before writing new value, user should erase the corresponding flash sector first.

     The internal load capacitance value and calibration parameters "Tp0" and "Tp1" will be automatically written into DUT flash 0x1e000, 0x1e040 and 0x1e041 after calibration by Telink jig. It's highly recommended not to adjust the Cap_value, Tp0 and Tp1 manually.

✧ Configure parameter via SRAM:

By writing SRAM address 0x808007~0x80800a with specific value, and writing SRAM address 0x808006 with 1, user can switch EMI test mode, Tx power level, frequency point and working mode correspondingly, and start EMI test.

When the DUT is configured as RX mode, SRAM address 0x80800c~0x80800f serves to store the 4-byte number of received packets.

Note that parameters configured via SRAM addresses are not non-volatile, i.e. the parameters will be cleared to their default values after power cycle.

Table 1 SRAM/Flash address specified for 8261 EMI test

SRAM address	Flash address	Function definition for EMI test
0x808006		**Run** 0: default; 1: start EMI test.
0x808007	0xf007	**Cmd: select EMI test mode.** 1: emi_carrier_only, select carry mode. 2: emi_carrier_data, select CD mode. 3: emi_rx_test, select RX mode. 4: emi_tx_test, select TX mode.
0x808008	0xf008	**Power: Select Tx power level.** 0：7dBm 1：5dBm 2：-0.6dBm 3：-4.3dBm 4：-9.5dBm 5：-13.6dBm 6：-18.8dBm 7：-23.3dBm 8：-27.5dBm 9：-30dBm 10：-37dBm 11：Disable PA

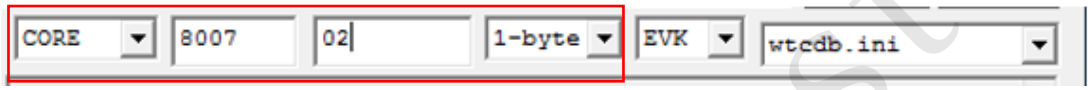
SRAM address	Flash address	Function definition for EMI test
0x808009	0xf009	**Channel: Select frequency point.** Frequency = (2400+ channel) MHz 0≤channel≤100
0x80800a	0xf00a	**Mode: Select working mode.** 0: ble_2M, select BLE 2M mode. 1: ble_1M, select BLE 1M mode. 2: zigbee, select ZigBee mode.
0x80800c~0x80800f		**RX_packet_num:** Store the 4-byte number of received packets In RX mode.
	0x1e000	0x81_Cap_value Internal load capacitance value. 0xbf<cap<0xe0
	0x1e040	Tp0. BLE 1M: 0x13<Tp0<0x27; BLE 2M: 0x36<Tp0<0x4a.
	0x1e041	Tp1. BLE 1M: 0x0f<Tp1<0x23; BLE 2M: 0x2f<Tp1<0x43.

2 Configuration Example

Telink Wtcdb tool can be used to configure DUT parameters for EMI test by writing specific SRAM or flash addresses.

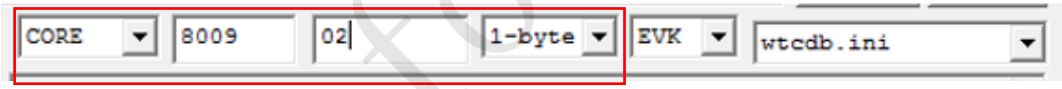
Configuration example: Set DUT as BLE 1M mode, 2402MHz frequency point, 7dBm output power, and Carrier+Data (CD) mode.

✧ On Wtcdb window, successively select “CORE”, select “1-byte”, input “8007”, input “2”, and then click the “Enter” key. This step writes DUT RAM “0x8007” with “0x02”, and serves to set DUT as CD mode.



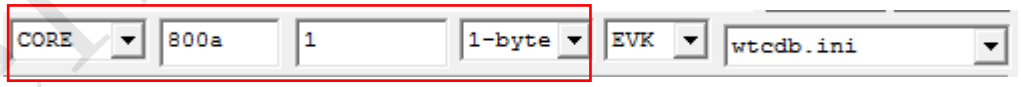
✧ On Wtcdb window, successively select “CORE”, select “1-byte”, input “8009”, input “2”, and then click the “Enter” key. This step writes DUT RAM “0x8009” with “0x02”, and serves to set frequency point of DUT as 2402MHz.

Since frequency point is 2402MHz by default, this step can be skipped.



✧ On Wtcdb window, successively select “CORE”, select “1-byte”, input “800a”, input “1”, and then click the “Enter” key. This step writes DUT RAM “0x800a” with “0x01”, and serves to set DUT as BLE 1M mode.

Since the working mode is BLE 1M mode by default, this step can be skipped.



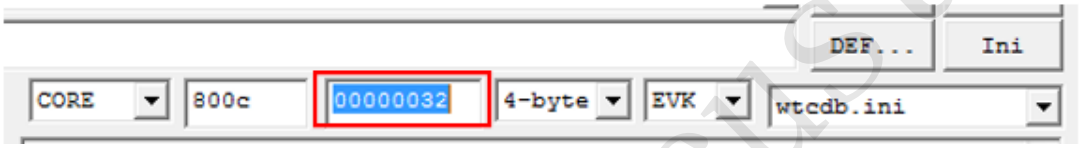
✧ On Wtcdb window, successively select “CORE”, select “1-byte”, input “8008”, input “0”, and then click the “Enter” key. This step writes DUT RAM “0x8008” with “0x00”, and serves to set DUT Tx power as 7dBm.

Since the Tx power is 7dBm by default, this step can be skipped.

✧ On Wtcdb window, successively select “CORE”, select “1-byte”, input “8006”, input “1”, and then click the “Enter” key. This step writes DUT RAM “0x8006” with “0x01”, and then DUT starts transmitting CD data packets at 2402MHz point and 7dBm power in BLE 1M mode.

Read the number of received packets in RX mode:

✧ On Wtcdb window, successively select “CORE”, select “4-byte”, input “800c”, and then click the “Tab” key. This step reads 4-byte data (i.e. the number of packets received by DUT) from RAM 0x800c~0x800f.



For each read of DUT RAM 0x800c~0x800f, the new data is accumulated based on the previous data; user can clear the data of RAM 0x800c~0x800f via Wtcdb: successively select “CORE”, select “1-byte”, input “8006”, input “1”, and then click the “Enter” key.