



# Telink

## Telink SoC EMI Test

## User Guide

AN-20071700-E4

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### Keyword

EMI; Test; Function

### Brief

This document mainly introduces the test steps and related protocols of Telink chip EMI test.

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## Revision History

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Version	Change Description
V1.0.0	Initial release
V1.1.0	Added some table contents; added chapter 2.7.1.
V1.2.0	Added description about TLSRB91.
v1.3.0	Added descriptions related to 8366, B80, and B89; Modify the chip description TLSR8258/8253/8251/8656/8359 to TLSRB85; Modify the chip description TLSR8278 to TLSRB87.

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# 1 Overview

The purpose of this document is to guide customers to conduct EMI test and to help customers develop EMI test related tools. It mainly includes the following two parts.

The first part introduces the test process of EMI and the selection of related tools.

The flow of test using the EMI program is:

**Step1:** Write the calibration parameters to the specified position of the Flash (OTP), the calibration parameters refer to some parameters related to RF performance (cap value, tp value, etc.);

**Step2:** Burn the corresponding EMI bin file into the DUT (Flash or SRAM);

**Step3:** Use the EMI test tool to switch test modes to complete different test items.

The EMI test tools provided by Telink include EMI\_Test\_Tool and Non\_Signaling\_Test\_Tool, both for different test items, users can refer to the table below for tool selection.

**Table 1.1:** EMI tool selection reference table

Tool	Test items
EMI_Test_Tool	Output power, 20dB bandwidth, sideband, harmonic, frequency offset, frequency hopping, standing time-single packet time.
Non_Signaling_Test_Tool	Sideband (according to customer demand), standing time: -3.16s.

For how to select the test bin file and the test program's support for tool functions, customers can refer to [chapter 2](#).

The second part mainly introduces the control protocol of the EMI test procedure.

How is the EMI test procedure controlled?

An area is defined in the SRAM of the DUT to store the control parameters, users can modify each control parameter through the USB or Swire interface to switch between different test modes. The control parameters include "run", "mode", "power", "channel", "cmd", "hop", etc. The functions of each parameter are shown in the table below.

**Table 1.2:** Control parameter function description table

Control parameter	Function
run	Used to control the enable and disable of the EMI test
mode	Used to select RF working mode
power	Used to select the energy level of Tx
channel	Used to select the frequency point
cmd	Used to select the mode for EMI test

Control parameter	Function
hop	Used to control whether to use frequency hopping mode (only carrier_data test mode)

What is the control flow of the EMI program?

**Step1:** Modify control parameters other than "run". Generally, as long as the control parameters other than "run" change, the EMI test program will enter the idle state, that is, the "run" parameter will be set to 0.

**Step2:** Modify the value of the "run" parameter to 1, that is, control the EMI program to enter the specified test mode.

What is the default mode after the EMI program is powered on?

In general, the EMI program will enter the carrier mode after the DUT is powered on (the frequency point is 2402, the RF mode is ZigBee250K, and the Power is the maximum energy). Some programs are supported to modify the default mode after power-on by writing the value of the specified location in Flash, please refer to the content of chapter 3 for details.

Due to the differences in the storage locations and supported functions of the control parameters of each chip, you need to refer to [chapter 3](#) when developing tools.



## 2 EMI\_BIN Supported Function

### 2.1 TLSR8261

#### 2.1.1 bin File Description

There are a total of 4 bin files used for 8261 EMI test, which are:

“8261\_emi\_test\_12M\_external\_cap.bin”, supports 12MHz crystal oscillator, uses external capacitor;

“8261\_emi\_test\_12M\_internal\_cap.bin”, supports 12MHz crystal oscillator, uses internal capacitor;

“8261\_emi\_test\_16M\_external\_cap.bin”, supports 16MHz crystal oscillator, uses external capacitor;

“8261\_emi\_test\_16M\_internal\_cap.bin”, supports 16MHz crystal oscillator, uses internal capacitor.

In addition, the user can configure the size of the internal capacitance (cap) and set the calibration parameter (Tp) by writing the value at the corresponding address of the Flash, refer to the table below for the specific address of each parameter in the Flash.

**Table 2.1:** 8261 configuration parameter storage address reference table

Parameter name	Flash address
cap	0x77000
Tp0	0x77040
Tp1	0x77041

#### 2.1.2 Test Tool Supported Function

The functional support of “EMI\_Tool” and “Non\_Signaling\_Test\_Tool” for the above bin files is shown in the following table.

**Table 2.2:** “EMI\_Tool” function support reference table for 8261 test bin file

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (supports Hop)
	RX	RxTest
	PA	Supports custom PA
PM	PM	Deep, Suspend

**Table 2.3:** "Non\_Signaling\_Test\_Tool" function support reference table for 8261 test bin file

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi
	PA	Supports custom PA
PM	PM	Deep, Suspend

## 2.2 TLSR8266

### 2.2.1 bin File Description

There are a total of 4 bin files used for 8266 EMI test, which are:

"8266\_12M\_emi\_test\_external\_cap.bin", supports 12MHz crystal oscillator, uses external capacitor;

"8266\_12M\_emi\_test\_internal\_cap.bin", supports 12MHz crystal oscillator, uses internal capacitor;

"8266\_16M\_emi\_test\_external\_cap.bin", supports 16MHz crystal oscillator, uses external capacitor;

"8266\_16M\_emi\_test\_internal\_cap.bin", supports 16MHz crystal oscillator, uses internal capacitor.

In addition, the user can configure the size of the internal capacitance (cap) and set the calibration parameter (Tp) by writing the value at the corresponding address of the Flash, refer to the table below for the specific address of each parameter in the Flash.

**Table 2.4:** 8266 configuration parameter storage address reference table

Parameter name	Flash address
cap	0x1e000
Tp0	0x1e040
Tp1	0x1e041

### 2.2.2 Test Tool Supported Function

The functional support of "EMI\_Tool" and "Non\_Signaling\_Test\_Tool" for the above bin files is shown in the following table.

**Table 2.5:** “EMI\_Tool” function support reference table for 8266 test bin file

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (supports Hop)
	RX	RxTest
	PA	Supports custom PA
PM	PM	Not support

**Table 2.6:** “Non\_Signaling\_Test\_Tool” function support reference table for 8266 test bin file

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi
	PA	Supports custom PA
PM	PM	Not support

## 2.3 TLSR8267/8269/8646

### 2.3.1 bin File Description

There are a total of 4 bin files used for the 8267/8269/8646 EMI test, which are:

“8267\_8269\_8646\_emi\_test\_12M\_external\_cap.bin”, supports 12MHz crystal oscillator, uses external capacitor;

“8267\_8269\_8646\_emi\_test\_12M\_internal\_cap.bin”, supports 12MHz crystal oscillator, uses internal capacitor;

“8267\_8269\_8646\_emi\_test\_16M\_external\_cap.bin”, supports 16MHz crystal oscillator, uses external capacitor;

“8267\_8269\_8646\_emi\_test\_16M\_internal\_cap.bin”, supports 16MHz crystal oscillator, uses internal capacitor.

In addition, the user can configure the size of the internal capacitance (cap) and set the calibration parameter (Tp) by writing the value at the corresponding address of the Flash, refer to the table below for the specific address of each parameter in the Flash.

**Table 2.7:** 8267/8269/8646 configuration parameter storage address reference table

Parameter name	Flash address
cap	0x77000
Tp0	0x77040
Tp1	0x77041

### 2.3.2 Test Tool Supported Function

For the functional support of "EMI\_Tool" and "Non\_Signaling\_Test\_Tool" for the above bin files, please refer to tables 2.2 and 2.3 in chapter 2.1.2.

## 2.4 TLSR8366

### 2.4.1 bin File Description

The bin file used for the 8366 EMI test is:

"8366\_EMI\_V0001.bin", uses internal capacitor.

### 2.4.2 Test Tool Supported Function

The functional support of "EMI\_Tool" and "Non\_Signaling\_Test\_Tool" for the above bin files is shown in the following table.

**Table 2.8:** "EMI\_Tool" function support reference table for 8366 test bin file

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (Hop is not supported)
	RX	RxTest
	PA	Not support
PM	PM	Not support

**Table 2.9:** "Non\_Signaling\_Test\_Tool" function support reference table for 8366 test bin file

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi
	PA	Not support
PM	PM	Not support

## 2.5 TLSR8367/8369

### 2.5.1 bin File Description

The bin files used for the 8367/8369 EMI test are:

"8369\_EMI\_ExternalCap\_VXXX.bin", uses external capacitor;

"8369\_EMI\_InternalCap\_VXXX.bin", uses internal capacitor.

In addition, the user can configure the size of the internal capacitance (cap) and set the calibration parameter (Tp) by writing the value at the corresponding address of the OTP, refer to the table below for the specific address of each parameter in the OTP.

**Table 2.10:** 8367/8369 configuration parameter storage address reference table

Parameter name	OTP address
cap	0x3FA8
Tp0	0x3FA6
Tp1	0x3FA7

### 2.5.2 Test Tool Supported Function

The functional support of "EMI\_Tool" and "Non\_Signaling\_Test\_Tool" for the above bin files is shown in the following table.

**Table 2.11:** “EMI\_Tool” function support reference table for 8367/8369 test bin files

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (Hop is not supported)
	RX	RxTest
	PA	Supports custom PA
PM	PM	Not support

**Table 2.12:** “Non\_Signaling\_Test\_Tool” function support reference table for 8367/8369 test bin files

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi
	PA	Supports custom PA
PM	PM	Not support

## 2.6 TLSR8232

### 2.6.1 bin File Description

The bin files used for the 8232 EMI test are:

“8232\_EMI\_ExternalCap\_VXXXX.bin”, uses external capacitor;

“8232\_EMI\_InternalCap\_VXXXX.bin”, uses internal capacitor.

In addition, the user can configure the size of the internal capacitance (cap) and set the calibration parameter (Tp) by writing the value at the corresponding address of the Flash, refer to the table below for the specific address of each parameter in the Flash.

**Table 2.13:** 8232 configuration parameter storage address reference table

Parameter	Flash address
cap	0xE000(64K), 0x1E000(128K/256K), 0x77000(512K)
Tp0	0xE040(64K), 0x1E040(128K/256K), 0x77040(512K)
Tp1	0xE041(64K), 0x1E041(128K/256K), 0x77041(512K)

## 2.6.2 Test Tool Supported Function

The functional support of "EMI\_Tool" and "Non\_Signaling\_Test\_Tool" for the above bin files is shown in the following table.

**Table 2.14:** "EMI\_Tool" function support reference table for 8232 test bin file

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (Hop is not supported)
	RX	RxTest
	PA	Supports custom PA
PM	PM	Not support

**Table 2.15:** "Non\_Signaling\_Test\_Tool" function support reference table for 8232 test bin file

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi
	PA	Supports custom PA
PM	PM	Not support

## 2.7 TLSRB80

### 2.7.1 bin File Description

The bin files used for the B80 EMI test are:

"B80\_EMI\_CapExternal\_CalibFlash\_ProgramFlashSRAM\_VXXXXX.bin", uses external capacitor, reads calibration values from Flash, which can be downloaded to SRAM or Flash to run;

"B80\_EMI\_CapInternal\_CalibFlash\_ProgramFlashSRAM\_VXXXXX.bin", uses internal capacitor, reads calibration values from Flash, which can be downloaded to SRAM or Flash to run;

"B80\_EMI\_CapExternal\_CalibOTP\_ProgramFlashSRAM\_VXXXXX.bin", uses external capacitor, reads calibration values from OTP, which can be downloaded to SRAM or Flash to run;

"B80\_EMI\_CapInternal\_CalibOTP\_ProgramFlashSRAM\_VXXXXX.bin", uses internal capacitor, reads calibration values from OTP, which can be downloaded to SRAM or Flash to run.

In addition, the user can configure the size of the internal capacitance (cap) by writing the value in the corresponding address of Flash or OTP. The specific address is shown in the following table.

**Table 2.16:** B80 configuration parameter storage address reference table

Parameter name	Flash address	OTP address
cap	0x1E000(128K), 0x77000(512K), 0xFE000(1M)	0x3FC8

## 2.7.2 Test Tool Supported Function

The functional support of “EMI\_Tool” and “Non\_Signaling\_Test\_Tool” for the above bin files is shown in the following table.

**Table 2.17:** “EMI\_Tool” function support reference table for B80 test bin file

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (supports Hop)
	RX	RxTest
	PA	Supports custom PA
PM	PM	Deep, Suspend, Deep with retention

**Table 2.18:** “Non\_Signaling\_Test\_Tool” function support reference table for B80 test bin file

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi
	PA	Supports custom PA
PM	PM	Deep, Suspend, Deep with retention

## 2.8 TLSRB85

### 2.8.1 bin File Description

The bin file used for B85 EMI test is:



"B85\_EMI\_InternalCap\_VXXXX.bin", uses internal capacitor.

In addition, the user can configure the size of the internal capacitance (cap) by writing the value in the corresponding address of the Flash. The specific address is shown in the table below.

**Table 2.19:** B85 configuration parameter storage address reference table

Parameter name	Flash address
cap	0x1E000(128K), 0x77000(512K)

## 2.8.2 Test Tool Supported Function

The functional support of "EMI\_Tool" and "Non\_Signaling\_Test\_Tool" for the above bin files is shown in the following table.

**Table 2.20:** "EMI\_Tool" function support reference table for B85 test bin file

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (supports Hop)
	RX	RxTest
	PA	Supports custom PA
PM	PM	Deep, Suspend, Deep with retention

**Table 2.21:** "Non\_Signaling\_Test\_Tool" function support reference table for B85 test bin file

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi
	PA	Supports custom PA
PM	PM	Deep, Suspend, Deep with retention

## 2.9 TLSRB87

### 2.9.1 bin File Description

The bin files used for the B87 EMI test are:

“B87\_EMI\_DCDC\_ExternalCap\_VXXXX.bin”, adopts DCDC power supply mode, uses external capacitor;

“B87\_EMI\_DCDC\_InternalCap\_VXXXX.bin”, adopts DCDC power supply mode, uses internal capacitor;

“B87\_EMI\_LDO\_ExternalCap\_VXXXX.bin”, adopts LDO power supply mode, uses external capacitor;

“B87\_EMI\_LDO\_InternalCap\_VXXXX.bin”, adopts LDO power supply mode, uses internal capacitor.

In addition, the user can configure the size of the internal capacitance (cap) by writing the value in the corresponding address of the Flash. The specific address is shown in the table below.

**Table 2.22:** B87 configuration parameter storage address reference table

Parameter name	Flash address
cap	0x1E000(128K), 0x77000(512K), 0xFE000(1M)

### 2.9.2 Test Tool Supported Function

The functional support of “EMI\_Tool” and “Non\_Signaling\_Test\_Tool” for the above bin files is shown in the following table.

**Table 2.23:** “EMI\_Tool” function support reference table for B87 test bin file

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (supports Hop)
	RX	RxTest
	PA	Supports custom PA
PM	PM	Deep, Suspend, Deep with retention

**Table 2.24:** “Non\_Signaling\_Test\_Tool” function support reference table for B87 test bin file

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi

Category 1	Category 2	Supported function
	PA	Supports custom PA
PM	PM	Deep, Suspend, Deep with retention

## 2.10 TLSRB89

### 2.10.1 bin File Description

The bin files used for the B89 EMI test are:

“B89\_EMI\_CapExternal\_PowerDCDC\_CalibFlash\_ProgramFlashSRAM\_VXXXX.bin”, adopts DCDC power supply mode, uses external capacitor, reads calibration values from Flash, which can be downloaded to SRAM or Flash to run;

“B89\_EMI\_CapInternal\_PowerDCDC\_CalibFlash\_ProgramFlashSRAM\_VXXXX.bin”, adopts DCDC power supply mode, uses internal capacitor, reads calibration values from Flash, which can be downloaded to SRAM or Flash to run;

“B89\_EMI\_CapExternal\_PowerDCDC\_CalibOTP\_ProgramFlashSRAM\_VXXXX.bin”, adopts DCDC power supply mode, uses external capacitor, reads calibration values from OTP, which can be downloaded to SRAM or Flash to run;

“B89\_EMI\_CapInternal\_PowerDCDC\_CalibOTP\_ProgramFlashSRAM\_VXXXX.bin”, adopts DCDC power supply mode, uses internal capacitor, reads calibration values from OTP, which can be downloaded to SRAM or Flash to run.

In addition, the user can configure the size of the internal capacitance (cap) by writing the value in the corresponding address of Flash or OTP. The specific address is shown in the following table.

**Table 2.25:** B89 configuration parameter storage address reference table

Parameter name	Flash address	OTP address
cap	0x1E000(128K), 0x77000(512K), 0xFE000(1M)	0x7F14

### 2.10.2 Test Tool Supported Function

The functional support of “EMI\_Tool” and “Non\_Signaling\_Test\_Tool” for the above bin files is shown in the following table.

**Table 2.26:** “EMI\_Tool” function support reference table for B89 test bin file

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (supports Hop)
	RX	RxTest
	PA	Supports custom PA
PM	PM	Deep,Suspend, Deep with retention

**Table 2.27:** “Non\_Signaling\_Test\_Tool” function support reference table for B89 test bin file

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi
	PA	Supports custom PA
PM	PM	Deep, Suspend, Deep with retention

## 2.11 TLSRB91

### 2.11.1 bin File Description

The bin files used for the B91 EMI test are:

“B91\_EMI\_CapExternal\_PowerDCDC1V4LDO1V8\_CalibFlash\_ProgramFlash\_VXXXX.bin”, uses external capacitor, adopts DCDC1V4\_LDO1V8 power supply mode, reads calibration values from Flash, which can be downloaded to Flash to run;

“B91\_EMI\_CapInternal\_PowerDCDC1V4LDO1V8\_CalibFlash\_ProgramFlash\_VXXXX.bin”, uses internal capacitor, adopts DCDC1V4\_LDO1V8 power supply mode, reads calibration values from Flash, which can be downloaded to Flash to run;

“B91\_EMI\_CapExternal\_PowerDCDC1V8DCDC1V4\_CalibFlash\_ProgramFlash\_VXXXX.bin”, uses external capacitor, adopts DCDC1V8\_DCDC1V4 power supply mode, reads calibration values from Flash, which can be downloaded to Flash to run;

“B91\_EMI\_CapInternal\_PowerDCDC1V8DCDC1V4\_CalibFlash\_ProgramFlash\_VXXXX.bin”, uses internal capacitor, adopts DCDC1V8\_DCDC1V4 power supply mode, reads calibration values from Flash, which can be downloaded to Flash to run;

“B91\_EMI\_CapExternal\_PowerLDO1V4LDO1V8\_CalibFlash\_ProgramFlash\_VXXXX.bin”, uses external capacitor, adopts LDO1V4\_LDO1V8 power supply mode, reads calibration values from Flash, which can be down-

loaded to Flash to run;

“B91\_EMI\_CapInternal\_PowerLDO1V4LDO1V8\_CalibFlash\_ProgramFlash\_VXXXX.bin”, uses internal capacitor, adopts LDO1V4\_LDO1V8 power supply mode, reads calibration values from Flash, which can be downloaded to Flash to run;

“B91\_EMI\_CapExternal\_PowerDCDC1V4LDO1V8\_CalibFlash\_ProgramSRAM\_VXXXX.bin”, uses external capacitor, adopts DCDC1V4\_LDO1V8 power supply mode, reads calibration values from Flash, which can be downloaded to SRAM to run;

“B91\_EMI\_CapInternal\_PowerDCDC1V4LDO1V8\_CalibFlash\_ProgramSRAM\_VXXXX.bin”, uses internal capacitor, adopts DCDC1V4\_LDO1V8 power supply mode, reads calibration values from Flash, which can be downloaded to SRAM to run;

“B91\_EMI\_CapExternal\_PowerDCDC1V8DCDC1V4\_CalibFlash\_ProgramSRAM\_VXXXX.bin”, uses external capacitor, adopts DCDC1V8\_DCDC1V4 power supply mode, reads calibration values from Flash, which can be downloaded to SRAM to run;

“B91\_EMI\_CapInternal\_PowerDCDC1V8DCDC1V4\_CalibFlash\_ProgramSRAM\_VXXXX.bin”, uses internal capacitor, adopts DCDC1V8\_DCDC1V4 power supply mode, reads calibration values from Flash, which can be downloaded to SRAM to run;

“B91\_EMI\_CapExternal\_PowerLDO1V4LDO1V8\_CalibFlash\_ProgramSRAM\_VXXXX.bin”, uses external capacitor, adopts LDO1V4\_LDO1V8 power supply mode, reads calibration values from Flash, which can be downloaded to SRAM to run;

“B91\_EMI\_CapInternal\_PowerLDO1V4LDO1V8\_CalibFlash\_ProgramSRAM\_VXXXX.bin”, uses internal capacitor, adopts LDO1V4\_LDO1V8 power supply mode, reads calibration values from Flash, which can be downloaded to SRAM to run.

In addition, the user can configure the size of the internal capacitance (cap) by writing the value in the corresponding address of the Flash. The specific address is shown in the table below.

**Table 2.28:** B91 configuration parameter storage address reference table

Parameter name	Flash address
cap	0x7E000(512K), 0xFE000(1M), 0x1FE000(2M)

## 2.11.2 Test Tool Supported Function

The functional support of “EMI\_Tool” and “Non\_Signaling\_Test\_Tool” for the above bin files is shown in the following table.

**Table 2.29:** “EMI\_Tool” function support reference table for B91 test bin file

Category 1	Category 2	Supported function
RF	Carrier	Carrier, CarrierData (supports Hop)

Category 1	Category 2	Supported function
	RX	RxTest
	PA	Custom PA is not supported
PM	PM	Deep, Suspend, Deep with retention are not supported

**Table 2.30:** "Non\_Signaling\_Test\_Tool" function support reference table for B91 test bin file

Category 1	Category 2	Supported function
RF	TX	PRBS9, 0x55, 0xf (supports cyclic sending and single sending of 1000 packets)
	RX	RxTest, Read_Rx_Cnt, ReadRssi
	PA	Custom PA is not supported
PM	PM	Deep, Suspend, Deep with retention are not supported

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## 3 Control Protocol

This chapter mainly introduces the control parameters of each chip and their corresponding functions in detail. Besides to the control parameters mentioned above, there are also some parameters used to obtain test information (such as RSSI value, number of received packets, etc.). In addition, some chips support custom configuration of PA control pins, and two new control parameters "pa\_tx\_pin" and "pa\_rx\_pin" are added, which are used to configure the tx and rx pins of the PA respectively.

### 3.1 TLR8261

The detailed description of each parameter of TLR8261 is shown in the following table.

**Table 3.1:** TLR8261 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	1	SRAM: 0x808006
mode	0: ble_2M; 1: ble_1M; 2: zigbee	1	Flash: 0xF00A SRAM: 0x80800A
power	0: 7dBm; 1: 6dBm; 2: 5dBm; 3: -0.6dBm; 4: -4.3dBm; 5: -9.5dBm; 6: -11dBm; 7: -11.5dBm; 8: -12dBm; 9: -13dBm; 10: -14dBm; 11: -15dBm; 12: -18.8dBm; 13: -23.3dBm; 14: -27.5dBm; 15: -30dBm; 16: -37dBm; 17: Disable PA	0	Flash: 0xF008 SRAM: 0x808008
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	Flash: 0xF009 SRAM: 0x808009
cmd	1: emi_carrier_only; 2: emi_carrier_data; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f; 7: pm_pad_deep; 8: pm_32kTimer_deep; 9: pm_pad_suspend; 10: pm_32kTimer_suspend	1	Flash: 0xF007 SRAM: 0x808007
hop	the following two modes can be configured for cmd(2): 0: disable frequency hopping mode; 1: enable frequency hopping mode	0	SRAM: 0x80800B
cap	0xbf < cap < 0xe0	-	Flash: 0x1E000
Tp0	BLE 1M: 0x13 < Tp0 < 0x27; BLE 2M: 0x36 < Tp0 < 0x4a	-	Flash: 0x1E040
Tp1	BLE 1M: 0x0f < Tp0 < 0x23; BLE 2M: 0x2f < Tp0 < 0x43	-	Flash: 0x1E041
rssi	read only (1 byte)	-	SRAM: 0x808004

Parameter	Value description	Default value	Storage address
tx_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	0	SRAM: 0x808005
rx_packet_num	read only (4 bytes)	-	SRAM: 0x80800C

## 3.2 TSLR8266

The detailed description of each parameter of TSLR8266 is shown in the following table.

**Table 3.2:** TSLR8266 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	1	SRAM: 0x808006
mode	0: ble_2M; 1: ble_1M; 2: zigbee	1	Flash: 0x3F00A SRAM: 0x80800A
power	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	0	Flash: 0x3F008 SRAM: 0x808008
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	Flash: 0x3F009 SRAM: 0x808009
cmd	1: emi_carrier_only; 2: emi_carrier_data; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f	1	Flash: 0x3F007 SRAM: 0x808007
hop	the following two modes can be configured for cmd(2): 0: disable frequency hopping mode; 1: enable frequency hopping mode	0	SRAM: 0x80800B
cap	0xbf< cap< 0xe0	-	Flash: 0x77000
Tp0	BLE 1M: 0x15< Tp0< 0x29; BLE 2M: 0x39< Tp0< 0x4a	-	Flash: 0x77040
Tp1	BLE 1M: 0x11< Tp0< 0x25; BLE 2M: 0x32< Tp0< 0x46	-	Flash: 0x77041
rsi	read only (1 byte)	-	SRAM: 0x808004
tx_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	-	SRAM: 0x808005



Parameter	Value description	Default value	Storage address
rx_packet_num	read only (4 bytes)	-	SRAM: 0x80800cC

### 3.3 TLSR8267/8269/8646

The detailed description of each parameter of TLSR8267/8269/8646 is shown in the following table.

**Table 3.3:** TLSR8267/8269/8646 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	1	SRAM: 0x808006
mode	0: ble_2M; 1: ble_1M; 2: zigbee	1	Flash: 0x3F00A SRAM: 0x80800a
power	0: 7dBm; 1: 6dBm; 2: 5dBm; 3: -0.6dBm; 4: -4.3dBm; 5: -9.5dBm; 6: -11dBm; 7: -11.5dBm; 8: -12dBm; 9: -13dBm; 10: -14dBm; 11: -15dBm; 12: -18.8dBm; 13: -23.3dBm; 14: -27.5dBm; 15: -30dBm; 16: -37dBm; 17: Disable PA	0	Flash: 0x3F008 SRAM: 0x808008
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	Flash: 0x3F009 SRAM: 0x808009
cmd	1: emi_carrier_only; 2: emi_carrier_data; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f; 7: pm_pad_deep; 8: pm_32kTimer_deep; 9: pm_pad_suspend; 10: pm_32kTimer_suspend	1	Flash: 0x3F007 SRAM: 0x808007
hop	the following two modes can be configured for cmd(2): 0: disable frequency hopping mode; 1: enable frequency hopping mode	0	SRAM: 0x80800B
cap	0xbf< cap< 0xe0	-	Flash: 0x77000
Tp0	BLE 1M: 0x13< Tp0< 0x27; BLE 2M: 0x36< Tp0< 0x4a	-	Flash: 0x77040
Tp1	BLE 1M: 0x0f< Tp0< 0x23; BLE 2M: 0x2f< Tp0< 0x43	-	Flash: 0x77041
rssi	read only (1 byte)	-	SRAM: 0x808004

Parameter	Value description	Default value	Storage address
tx_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	-	SRAM: 0x808005
rx_packet_num	read only (4 bytes)	-	SRAM: 0x80800C

### 3.4 TLSR8366

The detailed description of each parameter of TLSR8366 is shown in the following table.

**Table 3.4:** TLSR8366 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	1	SRAM: 0x808006
mode	0: Private_2M	0	SRAM: 0x80800A
power	0: 8dBm; 1: 4dBm; 2: 3dBm; 3: 2dBm; 4: 0dBm; 5: -4dBm; 6: -8dBm; 7: -12dBm; 8: -16dBm; 9: -20dBm; 10: -24dBm; 11: -28dBm; 12: -32dBm	1	SRAM: 0x808008
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	SRAM: 0x808009
cmd	1: emi_carrier_only; 2: emi_con_prbs9; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f	1	SRAM: 0x808007
rssi	read only (1 byte)	-	SRAM: 0x808004
tx_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	0	SRAM: 0x808005
rx_packet_num	read only (4 bytes)	-	SRAM: 0x80800C

### 3.5 TLSR8367/8369

The detailed description of each parameter of TLSR8367/8369 is shown in the following table.

**Table 3.5:** TLSR8367/8369 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	1	SRAM: 0x808006
mode	0: ble_1M_NO_PN; 1: ble_2M_NO_PN; 3: Private_1M; 4: Private_2M	0	SRAM: 0x80800A
power	0: 7dBm; 1: 6dBm; 2: 3dBm; 3: 2dBm; 4: 0dBm; 5: -1dBm; 6: -2dBm; 7: -10dBm; 8: -12dBm; 9: -14dBm; 10: -15dBm; 11: -17dBm	1	SRAM: 0x808008
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	SRAM: 0x808009
cmd	1: emi_carrier_only; 2: emi_con_prbs9; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f	1	SRAM: 0x808007
hop	the following two modes can be configured for cmd(2): 0: disable frequency hopping mode; 1: enable frequency hopping mode	0	SRAM: 0x80800B
cap	0xbf < cap < 0xe0	-	Flash: 0x77000
Tp0	0 < Tp0 < 0xff	-	Flash: 0x77040
Tp1	0 < Tp1 < 0xff	-	Flash: 0x77041
rssi	read only (1 byte)	-	SRAM: 0x808004
tx_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	0	SRAM: 0x808005
rx_packet_num	read only (4 bytes)	-	SRAM: 0x80800C
pa_tx_pin	(port_v << 3)   bit_v example: PB4 = (("B"- "A") << 3)   ("4"- "0") = 0x0C	0	SRAM: 0x808014
pa_rx_pin	the setting method is the same as pa_tx_pin	0	SRAM: 0x808015

### 3.6 TLSR8232

The detailed description of each parameter of TLSR8232 is shown in the following table.

**Table 3.6:** TLSR8232 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	0	SRAM: 0x808006
mode	0: ble_2M; 1: ble_1M; 2: zigbee; 3: Private_2M; 4: Private_1M	1	SRAM: 0x80800A
power	0: 7.9dBm; 1: 7dBm; 2: 6.3dBm; 3: 4.9dBm; 4: 3.3dBm; 5: 1.6dBm; 6: 0dBm; 7: -1.5dBm; 8: -3.1dBm; 9: -5dBm; 10: -7.3dBm; 11: -9.6dBm; 12: -11.5dBm; 13: -13.3dBm; 14: -16dBm; 15: -17.8dBm; 16: -19.5dBm	0	SRAM: 0x808008
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	SRAM: 0x808009
cmd	1: emi_carrier_only; 2: emi_con_prbs9; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f	1	SRAM: 0x808007
hop	the following two modes can be configured for cmd(2): 0: disable frequency hopping mode; 1: enable frequency hopping mode	0	SRAM: 0x80800B
cap	0xbf < cap < 0xe0	-	Flash: 0x77000
Tp0	0 < Tp0 < 0xff	-	Flash: 0x77040
Tp1	0 < Tp1 < 0xff	-	Flash: 0x77041
rssi	read only (1 byte)	-	SRAM: 0x808004
tx_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	0	SRAM: 0x808005
rx_packet_num	read only (4 bytes)	-	SRAM: 0x80800C
pa_tx_pin	(port_v << 3)   bit_v example: PB4 = (("B"- "A") << 3)   ("4"- "0") = 0x0C	0	SRAM: 0x808014
pa_rx_pin	the setting method is the same as pa_tx_pin	0	SRAM: 0x808015

### 3.7 TLSRB80

The detailed description of each parameter of TLSRB80 is shown in the following table.

**Table 3.7:** TLSRB80 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	1	SRAM: 0x840006
mode	0: BLE_2M; 1: BLE_1M; 2: Zigbee_250K; 3: BLE_125k; 4: BLE_500k; 5: Private_2M; 6: Private_1M Note: Zigbee_250K mode only supports TX	1	SRAM: 0x84000A Flash: 0x1C004(128K), 0x7C004(512K), 0x7C004(1M)
power	0: 11.5dbm; 1: 11.3dbm; 2: 11.0dbm; 3: 10.8dbm; 4: 10.4dbm; 5: 10.2dbm; 6: 9.9dbm; 7: 9.6dbm; 8: 9.3dbm; 9: 9.0dbm; 10: 8.6dbm; 11: 8.3dbm; 12: 7.8dbm; 13: 7.4dbm; 14: 7.0dbm; 15: 6.4dbm; 16: 5.9dbm; 17: 5.5dbm; 18: 4.7dbm; 19: 4.1dbm; 20: 4.0dbm; 21: 3.7dbm; 22: 3.5dbm; 23: 3.2dbm; 24: 2.9dbm; 25: 2.6dbm; 26: 2.3dbm; 27: 2.0dbm; 28: 1.7dbm; 29: 1.3dbm; 30: 0.8dbm; 31: 0.6dbm; 32: -0.2dbm; 33: -0.4dbm; 34: -0.7dbm; 35: -1.2dbm; 36: -1.7dbm; 37: -2.3dbm; 38: -2.8dbm; 39: -3.5dbm; 40: -4.2dbm; 41: -5.0dbm; 42: -5.9dbm; 43: -6.8dbm; 44: -8.0dbm; 45: -9.3dbm; 46: -10.8dbm; 47: -12.8dbm; 48: -15.0dbm; 49: -18.4dbm; 50: -24.3dbm	0	SRAM: 0x840008 Flash: 0x1C002(128K), 0x7C002(512K), 0x7C002(1M)
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	SRAM: 0x840009 Flash: 0x1C003(128K), 0x7C003(512K), 0x7C003(1M)
cmd	1: emi_carrier_only; 2: emi_con_prbs9; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f; 7: emi_deep_io_no_retension; 8: emi_deep_timer_no_retension; 9: emi_suspend_io_no_retension; 10: emi_suspend_timer_no_retension; 11: emi_deep_io_retension; 12: emi_deep_timer_retension	1	SRAM: 0x840007 Flash: 0x1C001(128K), 0x7C001(512K), 0x7C001(1M)

Parameter	Value description	Default value	Storage address
hop	the following two modes can be configured for cmd(2): 0: disable frequency hopping mode; 1: enable frequency hopping mode	0	SRAM: 0x84000B Flash: 0x1C005(128K), 0x7C005(512K), 0x7C005(1M)
cap	0x40 < cap < 0x7f	-	Flash: 0x1E000(128K), 0x77000 (512K), 0x7E000(1M), OTP: 0x3FC8
cap_close_en	0xff: enable internal capacitor; 0: disable internal capacitor	0xff	Flash: 0x1C006(128K), 0x7C006(512K), 0xFC006(1M)
rssi	read only (1 byte)	-	SRAM: 0x840004
tx_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	0	SRAM: 0x840005 Flash: 0x1C000(128K), 0x7C000(512K), 0xFC000(1M)
rx_packet_num	read only (4 bytes)	-	SRAM: 0x84000C
pa_tx_pin	(port_v << 3)   bit_v example: PB4 = ((“B”-“A”) << 3)   (“4”-“0”) = 0x0C	0	SRAM: 0x840014
pa_rx_pin	the setting method is the same as pa_tx_pin	0	SRAM: 0x840015

### 3.8 TLSRB85

The detailed description of each parameter of TLSRB85 is shown in the following table.

**Table 3.8:** TLSRB85 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	1	SRAM: 0x840006

Parameter	Value description	Default value	Storage address
mode	0: BLE_2M; 1: BLE_1M; 2: Zigbee_250K; 3: BLE_125k; 4: BLE_500k; 5: Private_2M; 6: Private_1M	1	SRAM: 0x84000A Flash: 0x1C004(128K), 0x7C004(512K)
power	0: 10.5dBm; 1: 10.3dBm; 2: 10.0dBm; 3: 9.8dBm; 4: 9.5dBm; 5: 9.2dBm; 6: 9.0dBm; 7: 8.7dBm; 8: 8.4dBm; 9: 8.1dBm; 10: 7.8dBm; 11: 7.4dBm; 12: 7.0dBm; 13: 6.6dBm; 14: 6.1dBm; 15: 5.6dBm; 16: 5.1dBm; 17: 4.6dBm; 18: 3.9dBm; 19: 3.2dBm; 20: 3.0dBm; 21: 2.1dBm; 22: 2.6dBm; 23: 2.4dBm; 24: 2.0dBm; 25: 1.7dBm; 26: 1.4dBm; 27: 1.1dBm; 28: 0.9dBm; 29: 0.5dBm; 30: 0.0dBm; 31: -0.1dBm; 32: -0.9dBm; 33: -1.4dBm; 34: -1.8dBm; 35: -2.5dBm; 36: -3.0dBm; 37: -3.6dBm; 38: -4.2dBm; 39: -5.0dBm; 40: -5.8dBm; 41: -6.6dBm; 42: -7.6dBm; 43: -8.6dBm; 44: -9.8dBm; 45: -11.4dBm; 46: -13.2dBm; 47: -15.8dBm; 48: -19.2dBm; 49: -25.1dBm	0	SRAM: 0x840008 Flash: 0x1C002(128K), 0x7C002(512K)
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	SRAM: 0x840009 Flash: 0x1C003(128K), 0x7C003(512K)
cmd	1: emi_carrier_only; 2: emi_con_prbs9; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f; 7: emi_deep_io_no_retension; 8: emi_deep_timer_no_retension; 9: emi_suspend_io_no_retension; 10: emi_suspend_timer_no_retension; 11: emi_deep_io_retension; 12: emi_deep_timer_retension	1	SRAM: 0x840007 Flash: 0x1C001(128K), 0x7C001(512K)
hop	the following two modes can be configured for cmd(2): 0: disable frequency hopping mode; 1: enable frequency hopping mode	0	SRAM: 0x84000B Flash: 0x1C005(128K), 0x7C005(512K)
cap	0x40 < cap < 0x7f	-	Flash: 0x1E000(128K), 0x77000 (512K)

Parameter	Value description	Default value	Storage address
cap_close_en	0xff: enable internal capacitor; 0: disable internal capacitor	0xff	Flash: 0x1C006(128K), 0x7C006(512K)
rssi	read only (1 byte)	-	SRAM: 0x840004
tx_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	0	SRAM: 0x840005 Flash: 0x1C000(128K), 0x7C000(512K)
rx_packet_num	read only (4 bytes)	-	SRAM: 0x84000C
pa_tx_pin	(port_v << 3)   bit_v example: PB4 = (("B"- "A") << 3)   ("4"- "0") = 0x0C	0	SRAM: 0x840014
pa_rx_pin	the setting method is the same as pa_tx_pin	0	SRAM: 0x840015

### 3.9 TLSRB87

The detailed description of each parameter of TLSRB87 is shown in the following table.

**Table 3.9:** TLSRB87 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	0	SRAM: 0x840006
mode	0: BLE_2M; 1: BLE_1M; 2: Zigbee_250K; 3: BLE_125k; 4: BLE_500k; 5: Private_2M; 6: Private_1M	1	SRAM: 0x84000A Flash: 0x1C004(128K), 0x7C004(512K), 0x7C004(1M)



Parameter	Value description	Default value	Storage address
power	0: 11.3dBm; 1: 11.1dBm; 2: 10.8dBm; 3: 10.6dBm; 4: 10.3dBm; 5: 10.1dBm; 6: 9.8dBm; 7: 9.5dBm; 8: 9.2dBm; 9: 8.9dBm; 10: 8.6dBm; 11: 8.2dBm; 12: 7.8dBm; 13: 7.4dBm; 14: 6.9dBm; 15: 6.5dBm; 16: 5.9dBm; 17: 5.3dBm; 18: 4.7dBm; 19: 4.0dBm; 20: 3.5dBm; 21: 3.3dBm; 22: 3.1dBm; 23: 2.9dBm; 24: 2.6dBm; 25: 2.4dBm; 26: 2.1dBm; 27: 1.8dBm; 28: 1.6dBm; 29: 1.3dBm; 30: 0.7dBm; 31: 0.5dBm; 32: -0.3dBm; 33: -0.5dBm; 34: -0.7dBm; 35: -1.2dBm; 36: -1.7dBm; 37: -2.2dBm; 38: -2.8dBm; 39: -3.5dBm; 40: -4.2dBm; 41: -5.0dBm; 42: -5.9dBm; 43: -6.8dBm; 44: -7.9dBm; 45: -9.1dBm; 46: -10.7dBm; 47: -12.6dBm; 48: -15.0dBm; 49: -18.4dBm 50: -24.3dBm	0	SRAM: 0x840008 Flash: 0x1C002(128K), 0x7C002(512K), 0xFC002(1M)
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	SRAM: 0x840009 Flash: 0x1C003(128K), 0x7C003(512K), 0xFC003(1M)
cmd	1: emi_carrier_only; 2: emi_con_prbs9; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f; 7: emi_deep_io_no_retension; 8: emi_deep_timer_no_retension; 9: emi_suspend_io_no_retension; 10: emi_suspend_timer_no_retension; 11: emi_deep_io_retension; 12: emi_deep_timer_retension	1	SRAM: 0x840007 Flash: 0x1C001(128K), 0x7C001(512K), 0xFC001(1M)
hop	the following two modes can be configured for cmd(2): 0: disable frequency hopping mode; 1: enable frequency hopping mode	0	SRAM: 0x84000B Flash: 0x1C005(128K), 0x7C005(512K), 0xFC005(1M)
cap	0x00 < cap < 0x7f	-	Flash: 0x1E000(128K), 0x77000(512K), 0xFE000(1M)

Parameter	Value description	Default value	Storage address
cap_close_en	0xff: enable internal capacitor; 0: disable internal capacitor	0xff	Flash: 0x1C006(128K), 0x7C006(512K), 0xFC006(1M)
rsi	read only (1 byte)	-	SRAM: 0x840004
tx_num_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	0	SRAM: 0x840005 Flash: 0x1C000(128K), 0x7C000(512K), 0xFC000(1M)
rx_packet_num	read only (4 bytes)	-	SRAM: 0x84000c
pa_tx_pin	(port_v << 3)   bit_v example: PB4 = ((“B”-“A”) << 3)   (“4”-“0”) = 0x0C	0	SRAM: 0x840014
pa_rx_pin	the setting method is the same as pa_tx_pin	0	SRAM: 0x840015

### 3.10 TLSRB89

The detailed description of each parameter of TLSRB89 is shown in the following table.

**Table 3.10:** TLSRB89 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	1	SRAM: 0x840006
mode	0: BLE_2M; 1: BLE_1M; 2: Zigbee_250K; 3: BLE_125k; 4: BLE_500k; 5: Private_2M; 6: Private_1M Note: Zigbee_250K mode only supports TX	1	SRAM: 0x84000A Flash: 0x1C004(128K), 0x7C004(512K), 0x7C004(1M)
power	0: 5.0dbm; 1: 4.0dbm; 2: 3.1dbm; 3: 2.1dbm; 4: 1.1dbm; 5: 0.7dbm; 6: -0.1dbm; 7: -0.7dbm; 8: -1.8dbm; 9: -2.5dbm; 10: -3.4dbm; 11: -4.3dbm; 12: -5.5dbm; 13: -6.8dbm; 14: -9.4dbm; 15: -11.8dbm; 16: -15.2dbm; 17: -20.7dbm; 18: -26.5dbm	0	SRAM: 0x840008 Flash: 0x1C002(128K), 0x7C002(512K), 0x7C002(1M)

Parameter	Value description	Default value	Storage address
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	SRAM: 0x840009 Flash: 0x1C003(128K), 0x7C003(512K), 0x7C003(1M)
cmd	1: emi_carrier_only; 2: emi_con_prbs9; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f; 7: emi_deep_io_no_retension; 8: emi_deep_timer_no_retension; 9: emi_suspend_io_no_retension; 10: emi_suspend_timer_no_retension; 11: emi_deep_io_retension; 12: emi_deep_timer_retension	1	SRAM: 0x840007 Flash: 0x1C001(128K), 0x7C001(512K), 0x7C001(1M)
hop	the following two modes can be configured for cmd(2): 0: disable frequency hopping mode; 1: enable frequency hopping mode	0	SRAM: 0x84000B Flash: 0x1C005(128K), 0x7C005(512K), 0x7C005(1M)
cap	0x40 < cap < 0x7f	-	Flash: 0x1E000(128K), 0x77000(512K), 0x7E000(1M), OTP: 0x7F14
rssi	read only (1 byte)	-	SRAM: 0x840004
tx_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	0	SRAM: 0x840005 Flash: 0x1C000(128K), 0x7C000(512K), 0xFC000(1M)
rx_packet_num	read only (4 bytes)	-	SRAM: 0x84000C
pa_tx_pin	(port_v << 3)   bit_v example: PB4 = (("B"- "A") << 3)   ("4"- "0") = 0x0C	0	SRAM: 0x840014
pa_rx_pin	the setting method is the same as pa_tx_pin	0	SRAM: 0x840015

### 3.11 TLSRB91

The detailed description of each parameter of TLSRB91 is shown in the following table.

**Table 3.11:** TLSRB91 chip EMI test reference table

Parameter	Value description	Default value	Storage address
run	0: stop EMI test; 1: start EMI test	0	SRAM: 0xC0000006
mode	0: BLE_2M; 1: BLE_1M; 2: Zigbee_250K; 3: BLE_125k; 4: BLE_500k; 5: Private_2M; 6: Private_1M	1	SRAM: 0xC000000A
power	0: 9.1dBm; 1: 8.6dBm; 2: 8.1dBm; 3: 7.5dBm; 4: 7.0dBm; 5: 6.0dBm; 6: 4.4dBm; 7: 3.8dBm; 8: 3.3dBm; 9: 2.8dBm; 10: 2.3dBm; 11: 1.7dBm; 12: 0.8dBm; 13: 0dBm; 14: -0.5dBm; 15: -1.4dBm; 16: -2.0dBm; 17: -3.4dBm; 18: -4.8dBm; 19: -6.5dBm; 20: -8.8dBm; 21: -12.1dBm; 22: -17.8dBm; 23: -23.5dBm	0	SRAM: 0xC0000008
channel	frequency = (2400+channel)MHz (0≤channel≤100)	2	SRAM: 0xC0000009
cmd	1: emi_carrier_only; 2: emi_con_prbs9; 3: emi_rx_test; 4: emi_tx_prbs9; 5: emi_tx_0x55; 6: emi_tx_0x0f	1	SRAM: 0xC0000007
cap	0x40 < cap < 0x7f	-	Flash: 0x7E000(512K), 0xFE000(1M), 0x1FE000(2M)
rssi	read only (1 byte)	-	SRAM: 0xC0000004
tx_num_mode	for cmd (4/5/6), the following two modes can be configured: 1: send 1000 packets; 0: send packets all the time	0	SRAM: 0xC0000005
rx_packet_num	read only (4 bytes)	-	SRAM: 0xC000000C
pa_tx_pin	(port_v << 3)   bit_v example: PB4 = (("B"- "A") << 3)   ("4"- "0") = 0x0C	0	SRAM: 0xC0000014
pa_rx_pin	the setting method is the same as pa_tx_pin	0	SRAM: 0xC0000015