CMOSTEK

AN148

CMT2300AW RF-EB User Guideline

Summary

The CMT2300AW evaluation platform is designed to help users evaluate the performance of CMOSTEK's wireless transceiver chip CMT2300AW. The evaluation platform consists of a pair of universal wireless evaluation boards (RF-EB) and a pair of wireless modules（CMT2300AW-EM）. Users can evaluate the main characteristics of the CMT2300AW chip through the platform, such as the actual environment communication distance, signal strength and packet loss rate.

The part numbers covered in this document are shown below.

Table1. The part numbers covered in this document

Part No.	Frequency	Modem	Function	Configuration	Package
CMT2300AW	127 - 1020MHz	(G)FSK/OOK	Transceiver	Register	QFN16

www.cmostek.com

Table of Contents

       www.cmostek.com

1. Hardware Platform

1.1 Evaluation Motherboard (RF-EB)

The main components of the evaluation motherboard are as shown in figure 1.

模块连接头

USB插座

LCD

电源开关

LED

按键
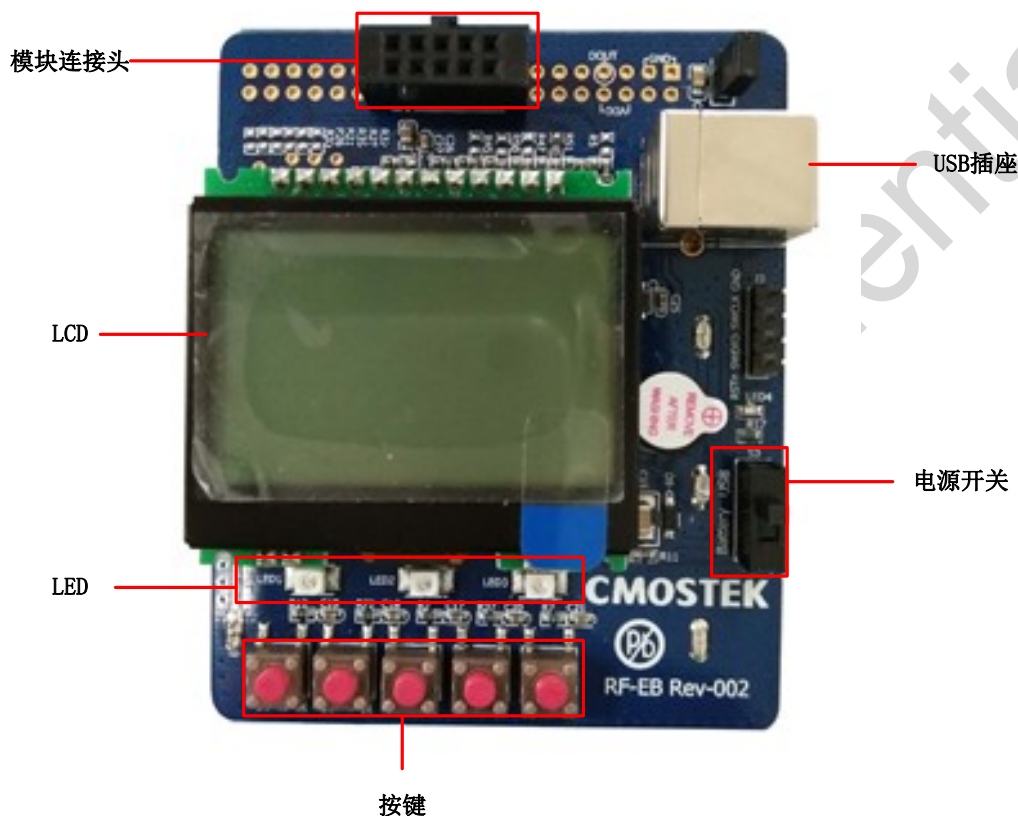
Figure1. Evaluation Motherboard

1. Module Connector (EM-Connector) – The module connector is a 10 pins, 2.54mm female connector, mainly connecting the evaluation motherboard and the wireless module.

2. **LED** –There are 3 LEDs on the evaluation motherboard, indicating the working state of the evaluation motherboard.

   ◆ **LED1** –Blinking once indicates that the RF-EB has successfully transmitted one packet.

   ◆ **LED2** –Blinking once indicates that the RF-EB has successfully received one packet.

   ◆ **LED3** –Blinking once indicates that the RF-EB failed to transmit or receive one packet.

3. **Power Switch** - The power switch (S3) determines the power supply of the RF-EB. When the power switch is switched to 'USB', the RF-EB voltage is supplied by the USB socket. When the power switch is switched to 'Battery', the RF-EB voltage is supplied by the battery.

4. **USB Socket** –The USB socket connects the RF-EB with the PC, powering for the RF-EB.

5. **LCD** –RF-EB has a 128X64 pixels LCD, used for the wireless module configuration information display and the feature performance demonstration.

6. **Button**–RF-EB has five buttons (K1-K5). The user can configure the wireless module according to the information provided by the LCD.

1.2 Wireless Module (CMT2300AW-EM)

CMT2300AW-EM is the evaluation module of the wireless transceiver chip CMT2300AW provided by CMOSTEK. It consists of the simple peripheral circuit, the matching network and the CMT2300AW chip. The top and bottom view of CMT2300AW-EM are shown below. The pins are defined as shown in the following table.
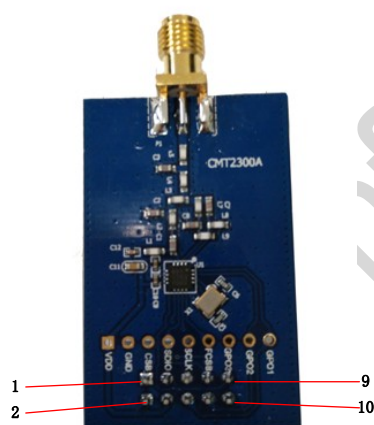
Figure2. CMT2300AW-EM Top View

Figure3. CMT2300AW-EM Bottom View

Table2. CMT2300AW-EM Pin Definition

Pin	Definition
1	CSB
2	GND
3	FCSB
4	VDD
5	SCLK
6	GPO1
7	SDIO
8	GPO2
9	GPO3
10	NC

Evaluate Module Type (EM Type)–Currently only support the 13dBm and 20dBm module.

Evaluate Module Frequency (EM Frequency)– Currently support 315MHz, 433MHz, 868MHz and 915MHz frequency.

2. User Operation Guideline for Evaluation Platform

2.1 LCD Function Icon

The LCD function icon guides the user to configure the CMT2300AW-EM. The specific functions are shown in Table 3 below.

Table3. LCD Function Icon Description

Function Icon	Description
>	Cursor pointer. It only points to the configurable option.
↑↓	Move the cursor pointer up and down.
Reset	Return to the initial configuration interface so that the user can reconfigure the parameters.
<-	Return to the previous configuration interface.
->	Go to the next configuration interface.
+	Add a parameter value or select the next option.
-	Reduce a parameter value or select the previous option.
OK	Confirm the setting of the EM and prepare to start Tx or Rx.
TxOn	Start the Tx mode and continuously transmit the packet until the TX Off icon is pressed.
TxOff	Stop the Tx mode.
RxOn	Start the Rx mode and continuously receive the packet until the RX Off icon is pressed.
RxOff	Stop the Rx mode.

2.2 Evaluation Platform Operation Process

CMT2300AW evaluation platform user operation processes are as follows:

1) Turn off the RF-EB power, see section 2.1. Insert the wireless module (CMT2300AW-EM) into the slot of the connector on the RF-EB and make sure that CMT2300AW-EM and RF-EB are properly connected.

2) Turn on the RF-EB power, see section 2.1. At this point, " NextGenRF Production CMOSTEK RF-EB Vxx.xx " is displayed on the LCD screen. The display time lasts about 2 seconds, and LED1, LED2, and LED3 blinks once.

3) According to LCD's display instruction, step by step, configure the parameters you need to the CMT2300 chip. At the end, start Tx On or Rx On.

2.3 Configure Interface Parameter

The CMT2300AW evaluation platform has four configuration interfaces, which are the chip function configuration interface, the wireless parameter configuration interface 1, the wireless parameter configuration interface 2 and the packet configuration interface. In addition, the platform also has a configuration

information display interface to display some important information to the user.

2.3.1 Chip Function Configuration Interface (Chip Setting)

On this configuration interface, the user can select the chip function, device type (Master/Slave) and wireless module type and other information, as shown in the following figure.

芯片型号
芯片功能
设备类型
模块类型
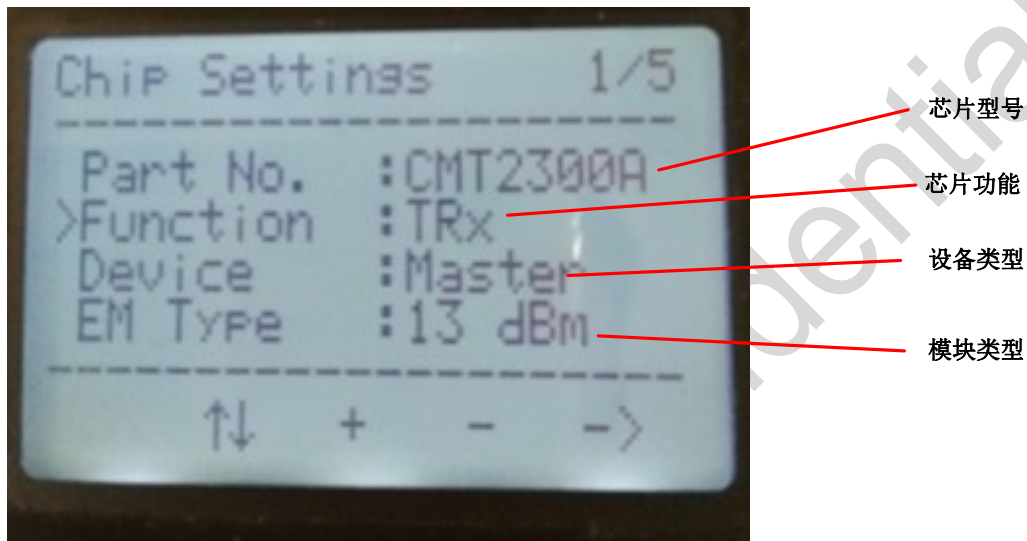
Figure4. Function Configuration Interface

Chip Part No. –The chip model is automatically identified through the RF-EB boot phase.

Chip Function–The CMT2300AW evaluation platform provides options for TX, RX, and TRX functions. The specific description is as the follow table.

**Table4. CMT2300AW RF-EB Function Description**

Function type	Description
TX	CMT2300AW RF-EB periodically repeatedly transmits the packet and displays the number of packets that have been transmitted on the LCD.
RX	CMT2300AW RF-EB receives the packet and displays the number of packets that have been received on the LCD.
TRX	This function should be used with the device type. If the device type is the Master, RF-EB first transmits a packet, and then enters the Rx mode and wait for the Slave device to transmit an ACK Packet. If the device type is the Slave, RF-EB receives a packet, and then enters the Tx mode and transmits an ACK Packet to the Master.

Device Type–Device type can be divided into master device (Master) and slave device (Slave). It must be used with the TRX function.

EM Type–Currently only support 13dBm and 20dBm module type, the details see section 2.2.

2.3.2   Wireless Parameter Configuration Interface1 (RF Parameters)

At this configuration interface, the user can configure the chip modulation, symbol rate, frequency, deviation and other information, as shown in the following figure.
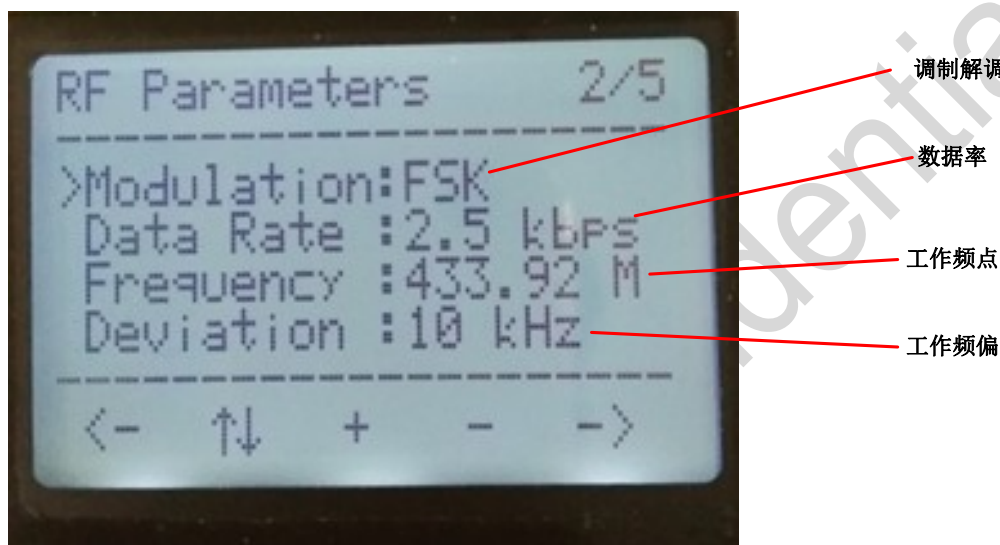
Figure5. Wireless Parameter Configuration Interface1

Modulation –MT2300A RF-EB has three modulation modes, OOK, FSK and GFSK.

Symbol rate–CMT2300AW RF-EB provides users with a wide variety of configurable symbol rates, as shown in the following table.

Table5. Symbol rate

Modem	OOK	FSK/GFSK	
Symbol rate(kbps)	1.2	1.2	50
	2.4	2.5	100
	4.8	5	150
	9.6	10	200
	19.2	20	250
		40	300

Frequency–CMT2300AW RF-EB provides users with a wide variety of configurable frequency points, as shown in the following table.

Table6. Frequency

Frequency(Unit：MHz)	
169.00	470.00
315.00	840.90
317.00	868.00
433.92	915.00
436.00	920.00

Deviation–Only select FSK or GFSK modulation, the deviation can be configured by the user. In addition, the deviation is also subject to the symbol rate configuration. The symbol rate and its corresponding optional deviation are shown in the following table.

Table7. Symbol rate and Corresponding Deviation

Symbol rate(kbps)	Deviation(kHz)
1.2、 2.5、 5	2.5、 5、 10、 20、 50、 80、 100、 200
10	5、 10、 20、 50、 80、 100、 200
20	10、 20、 50、 80、 100、 200
40	18.8、 20、 50、 80、 100、 200
50	20、 50、 80、 100、 200
100	50、 80、 100
150、 200、 250、 300	80、 100

2.3.3 Wireless Parameter Configuration Interface2 (RF Parameters)

At this configuration interface, the user can configure the data mode and TX power of the chip, as shown in figure 6.
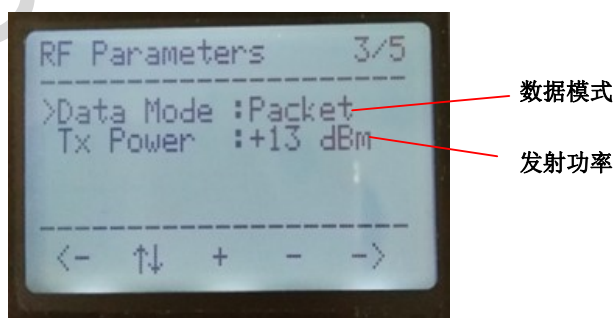

数据模式

发射功率

Figure6. Wireless Parameter Configuration Interface2

Data Mode–The CMT2300AW RF-EB data mode supports Direct mode and Packet mode. When the symbol rate is greater than 100 kbps, the CMT2300AW RF-EB only supports Packet mode.

TX Power–The transmitting power of the CMT2300AW RF-EB is subject to the module type (EM Type).

When the EM Type is 13dBm, the TX power can be selected from -10dBm to +13dBm. When the EM Type is 20dBm, the TX power can be selected from -10dBm to +20dBm.

2.3.4 Data Frame Configuration Interface

At this configuration interface, the user can configure the preamble, the ID, the length of the data frame and other information, as shown in the following figure.
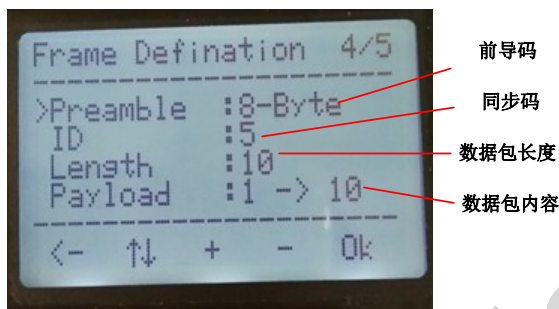

Figure7. Data Frame Configuration Interface

Preamble–The preamble can be configured with a range of 1-8 bytes.

ID–The ID on the CMT2300AW RF-EB interface can only select numbers between 0 and 9, but in fact the ID configured to CMT2300AW is 4 bytes, with the contents of 0x (0x55+ID) (0x55+Length) 5678.

Length–It is the length of the actual transmitted packet content. The configuration range is from 1 to 32. It affects the actual ID configuration and packet content.

Payload–Affected by the packet length, the specific packet content is 1 to the packet length (Length).

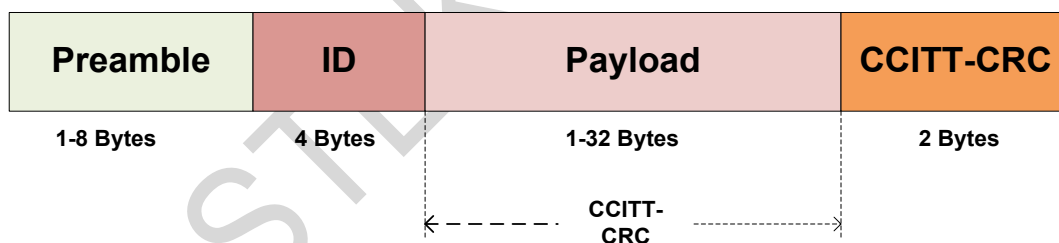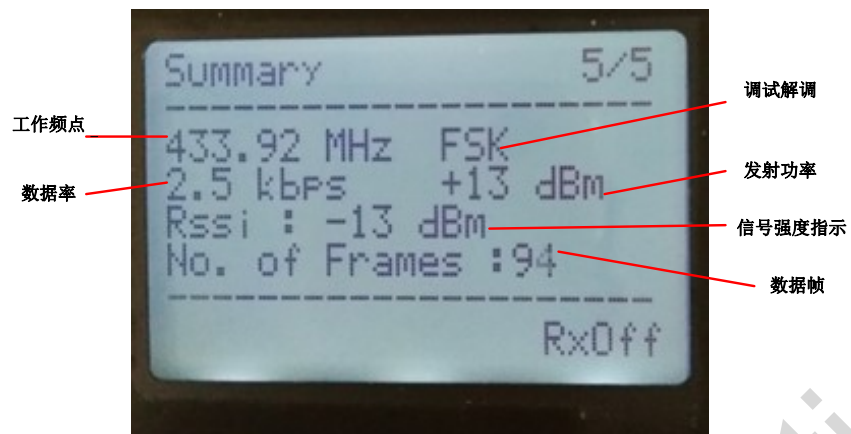The actual data frame format is shown in the following figure.

Figure8. Data Frame Format

2.3.5 Configuration Information Display Interface

From this interface, the user is aware of the configuration information of the chip and the number of data frames that have been received or transmitted, as shown in figure 9.

Figure9. **Configuration Information Display Interface**

Signal strength indicator (RSSI) –The signal strength when it receives the data frame.
Data Frame–It is the number of data frames that have been received or transmitted.

3. Document Modification Record

Table8. Document Modification Record Sheet

Version	Chapter	Modification descriptions	Date
0.8	All	Initial release	2017-10-08

4. Contact Information

Wuxi CMOSTEK Microelectronics Co., Ltd. Shenzhen branch

Room 203, Honghai Building, Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

Zip Code： 518000

Tel： +86 - 755 - 83235017

Fax： +86 - 755 - 82761326

Sales： sales@cmostek.com

Technical support： support@cmostek.com

Website： www.cmostek.com