CMT2300A RF-EB Usage Guideline

Summary

CMT2300A RF-EB is designed to help users evaluate CMT2300A, a wireless transceiver chipset from CMOSTEK. The evaluation platform include a general wireless test motherboard (RF-EB) and a pair wireless module of CMT2300A chipset (CMT2300A-EM). The user can evaluate the main characteristics of the CMT2300A performance, such as communication distance in the actual environment, signal strength, packet loss rate, etc.

This document covers the product shown in the following table.

Table 1. This document covers the part number

Part No.	Frequency	Modem	Function	Configuration	Package
CMT2300A	140 - 1020MHz	(G)FSK/OOK	Transceiver	Register	QFN16

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1. Hardware Platform

1.1 Evaluation Main Board（RF-EB）

A major part of the evaluation main board is shown in figure1.

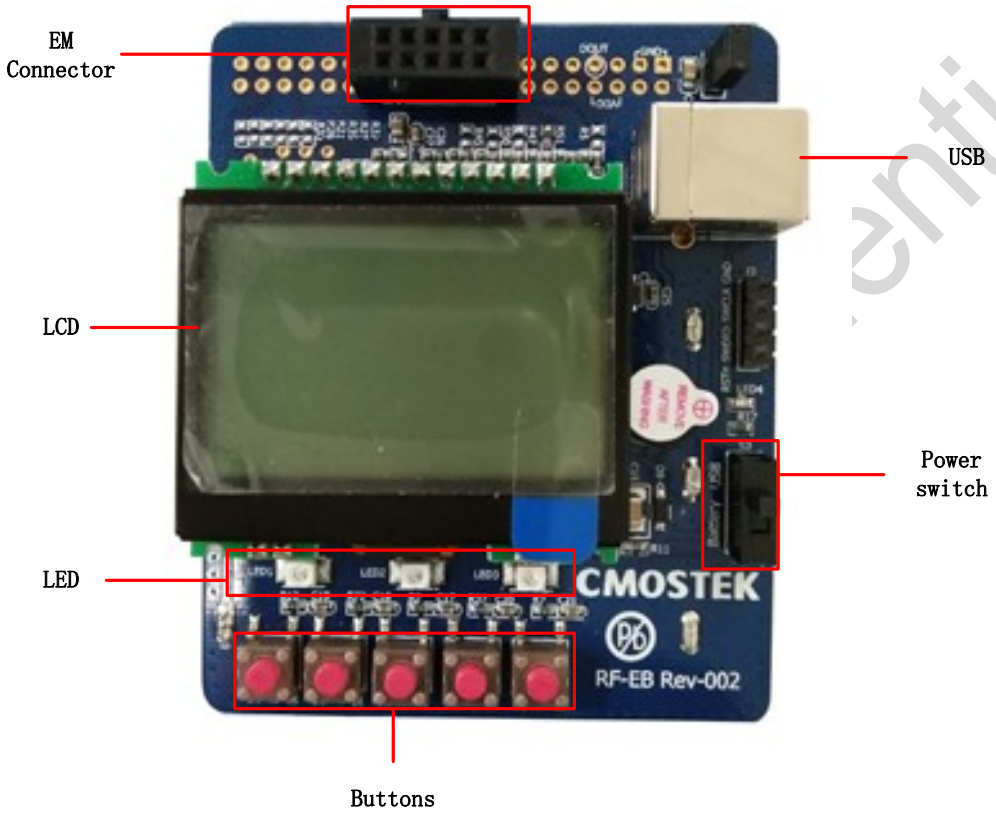

Figure 1. Evaluation Main Board

1. EM-Connector ------ It is a 10-pin connector, which standard for 2.54mm spacing. It is used to connect EM and EB.

2. **LED** —— There is 3 LEDs in evaluation main board. There is indicate different work status.
   - **LED1** – one blink for indicate success to transmit one packet
   - **LED2** – one blink for indicate success to receive one packet
   - **LED3** – one blink for indicate fail to transmit or receive one packet

3. **Power Switch** — The power switch (S3) determines the RF - EB voltage supply. When the power switch to 'USB' side, the RF - EB voltage is supply by USB Conntector; When the power switch to ' Battery' side, the RF - EB voltage is supply by Batterys.

4. **USB** —— USB Connector. It is used to connect RF-EB and PC. It is used to supply power to the RF-EB.

5. **LCD** —— It is a 128 x 64 pixel LCD monitor, which use to show the option or information.
6. **Buttons** — RF-EB has 5 Keys(K1 to K5). The user can according to the LCD information guide to configure the wireless module.

1.2 CMT2300A-EM Wireless Module

CMT2300A-EM is a wireless transceiver evaluation module, which is embed CMT2300A. It is composed of simple peripheral circuit, matching network and CMT2300A. CMT2300A-EM top view and bottom view, as shown below, pin is defined as shown in the table 2.

Figure 2. Top View of CMT2300A-EM

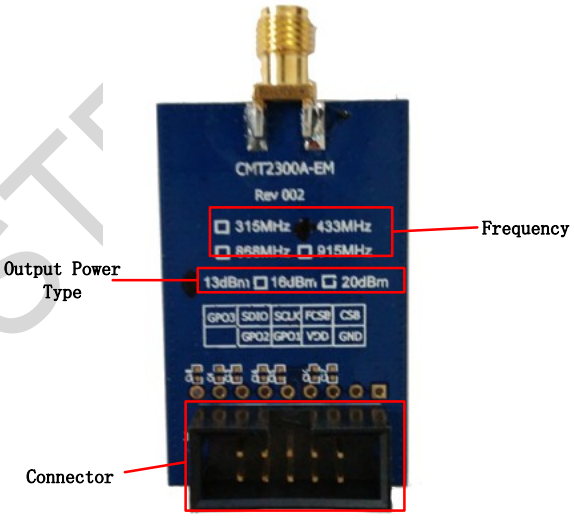

Figure 3. Bottom View of CMT2300A-EM

Table 1. CMT2300A-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

Evaluation Module Type（EM-Type）—— only support +13dBm & +20dBm EM

Test Frequency——only support 315, 433, 868, 915MHz

2. Usage Guideline

2.1 LCD Indicator Icon

LCD function icon as shown in table 3 below.

Table 2. LCD Indicator Icon Decription

Icon	Decription
>	Cursor pointer, point to the configurable option
⇅	Up or down the cursor pointer
Reset	Return to the initial page, for reset the option
<-	Return to the previous page
->	Go to the next page
+	Increase the option value or select the next option
-	Decrease the option vaule or select the previous option
OK	Confirm the settings of the EM, and ready for Go_Tx/Go_Rx
TxOn	Start Tx mode, and continue send message until TxOff icon is being pressed.
TxOff	Stop Tx mode
RxOn	Start Rx mode, and continue receive message until RxOff icon is being pressed
RxOff	Stop Rx mode

2.2 Operation process

CMT2300A Evaluation platform user operation process is as follows:

1) Power off the RF-EB by the Power Swith. Put the CMT2300A-EM inserted into the RF-EB, and ensure the CMT2300A-EM and RF-EB connected correctly.
2) Power on the RF-EB, there is “NextGenRF Production CMOSTEK RF-EB Vxx.xx” shown on the screen about 2 seconds, and then LED1, LED2, LED3 blink one time.
3) Follow the instruction which shown on the screen, configuration the settings step by step. At the end, start the TxOn or RxOn.

2.3 Parameters Introduce

CMT2300A evaluation platform has four configuration page, respectively for ***Chip Setting configuration page***, ***RF Parameters configuration page 1, RF Parameters configuration page2*** and ***Packet configuration page***. In addition, the platform has a configuration information display page, to display some important information to the user.

2.3.1 Chip Setting configuration page

In this configuration page, the user can choose chip function, the device type(Master/Slave), wireless module type and other information, as shown in the figure below.

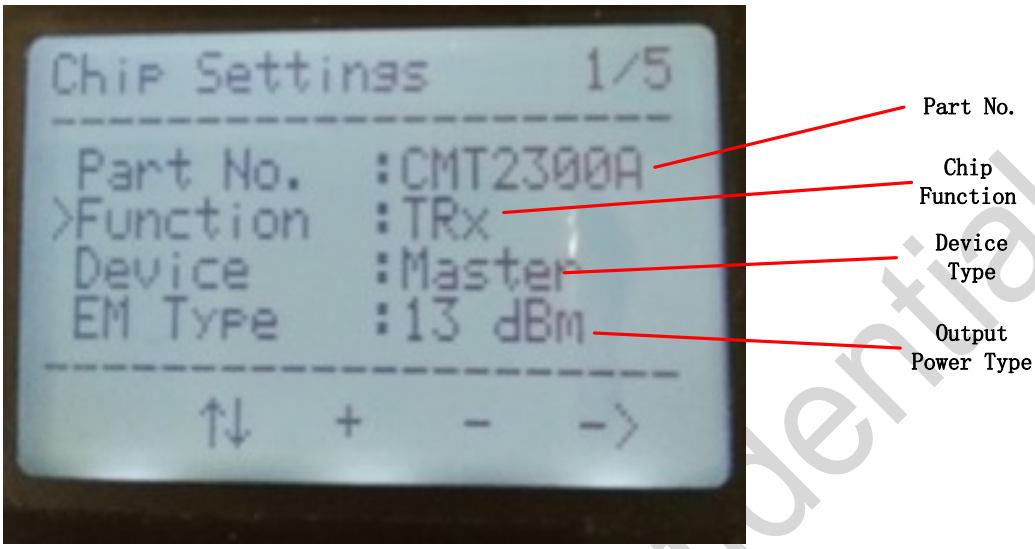

Figure 4. Chip Settings Configuration Page

Part Number—— RF-EB automatic detect when power on.

Function———CMT2300A evaluation platform provides the Tx, Rx, TRx, three work mode for option,specifically described in the table 4.

Table 3. CMT2300A RF-EB Decription

Work Mode	Decription
TX	CMT2300A RF-EB Cyclical repeat transmit packet, and show the counter number on the screen.
RX	CMT2300A RF-EB receive packet, and show the counter number on the screen.
TRX	The function is depend on Device Type, Device Type = Master, RF-EB transmit one packet first, and then change to receive mode, wait for Slave transmit an ACK Packet; Device Type = Slave, RF-EB normally on Rx Mode, when receive one packet from Master, and then transmit an ACK Packet to Master.

Device Type ——there is two type: Master and Slave, only active in TRX work mode

EM Type———there **is onl**y two kinds: +13dBm and +20dBm

2.3.2 RF Parameters configuration page 1

In this configuration page, the user can configure the modulation, data rate, frequency and deviation, as shown in the figure 5.

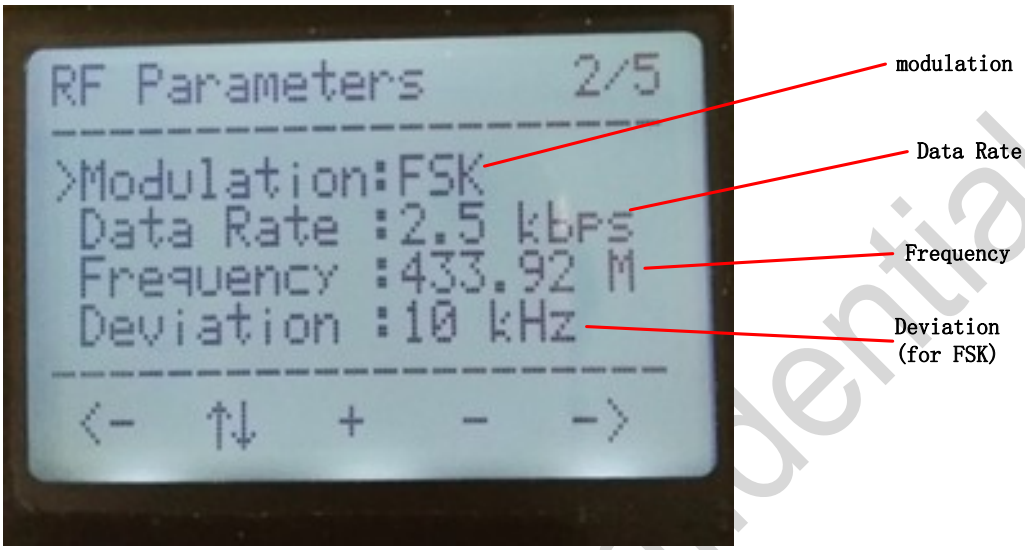

Figure 5. RF Parameters configuration page 1

Modulation ——— CMT2300A RF-EB has three modulation mode : OOK, FSK and GFSK.
Data Rate ——— CMT2300A RF-EB has many option as shown in table 5.

Table 4. Data Rate

Modem	OOK	FSK/GFSK	
Data 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 ——— CMT2300A RF-EB has many option as shown in table 6.

Table 5. 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 for FSK or GFSK to used. In addition, the deviation is associated with the data rate. The recommended of data rate and deviation shown in the following table.

Table 6. Data Rate & Recommended Deviation

Data 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 RF Parameters configuration page 2

In this configuration page, the user can configure the Packet Mode or Direct Mode, and the Output Power. As shown in the Figure 6.

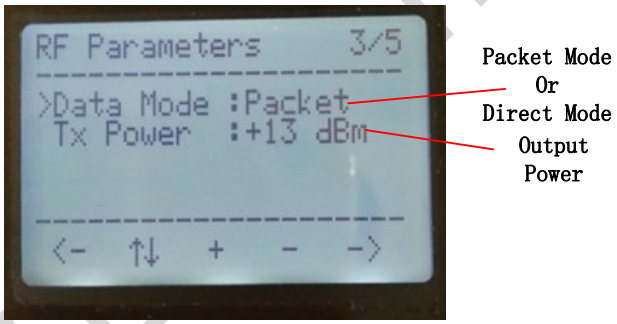

Figure 6. RF Parameters configuration page 2

Data Mode ——— CMT2300A RF-EB data handle type has two type: Direct Mode and Packet Mode. If data rate is high than 100kbps, CMT2300A RF-EB is only can use Packet Mode.

TX Power ——— CMT2300A RF-EB is associate with EM-Type.

If it is used Max. +13dBm Output Power Module, the output power can be selected from -10dBm to +13dBm;

If it is used Max. +20dBm Output Power Module, the output power can be selected from -10dBm to +20dBm.

2.3.4 Packet configuration page

In this configuration page, the user can configure the Preamble, SyncWord, the length of Packet, etc. As shown in the Figure 7.

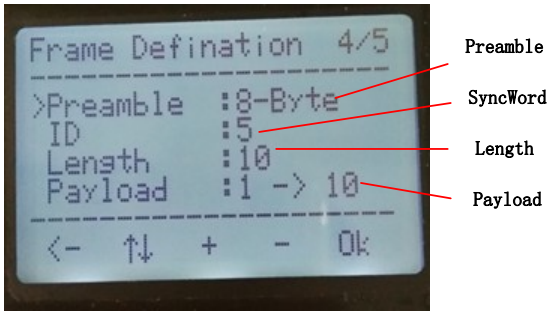

Figure 7. Packet configuration page

Preamble ——— Preamble can select from 1to 8 bytes.

ID(SyncWord)——It can select from 0 to 9 in CMT2300A RF-EB. Actually, it is setting 4 Bytes for SyncWord to CMT2300A, which the value is 0x(0x55+ID), 0x(0x55+Length), 0x56, 0x78.

Length ———— The length of packet, it can select from 1 to 32.

Payload ———— It is depend on packet length, and the value is 1 to Length.

Packet Structure is shown as below:

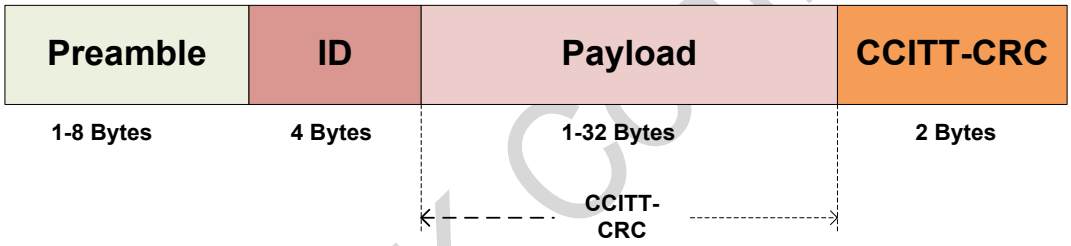

Figure 8. Packet Structure

2.3.5 Summary Information Page

User can get the information of the configuration from this page. As shown in the Figure 9.

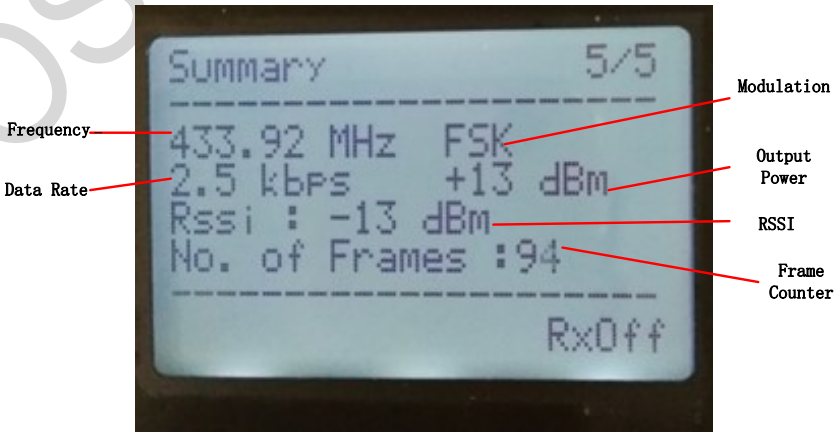

Figure 9. Summary Information Page

RSSI ——— Received Signal Strength Indicator

Frames —— The counter of Tx Packet number or Rx Packet number.

3. Document Modification Record

Table 8. Document Modification Record Sheet

Version	Chapter	Modification descriptions	Date
0.8	All	Preliminary	2017-08-18

4. Contact Information

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