Document Title

DK5133 User Manual

Revision History

| Rev. No.	History	Date	REV. BY
1.0	Initial issue.	July. 10, 2020	Eric Wu
1.1	Remove Data Rate 500K and modify Data Rate 1M, 2M, 4M config.	Dec. 07, 2021	Eric Wu

A5133 DEVELOPMENT KIT(DK) User Manual

◆ **Introduction：**

● A5133 Development kit (DK) is used for demo and supporting developing the wireless application in 5800MHz ISM band by AMICCOM RF IC "A5133".

※DK5133 supports two operation mode, FIFO and DIRECT mode with different data rate.
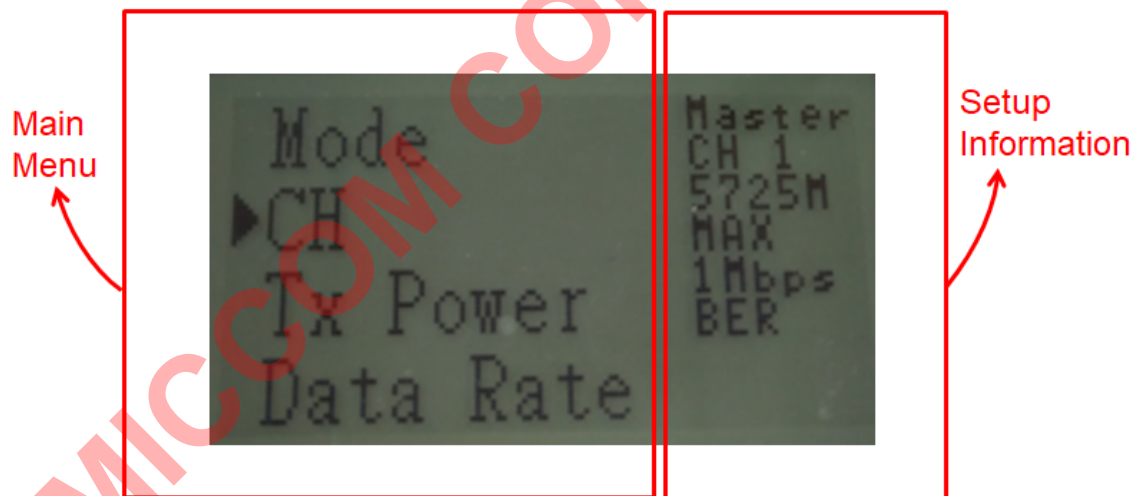
◆ **Appearance**
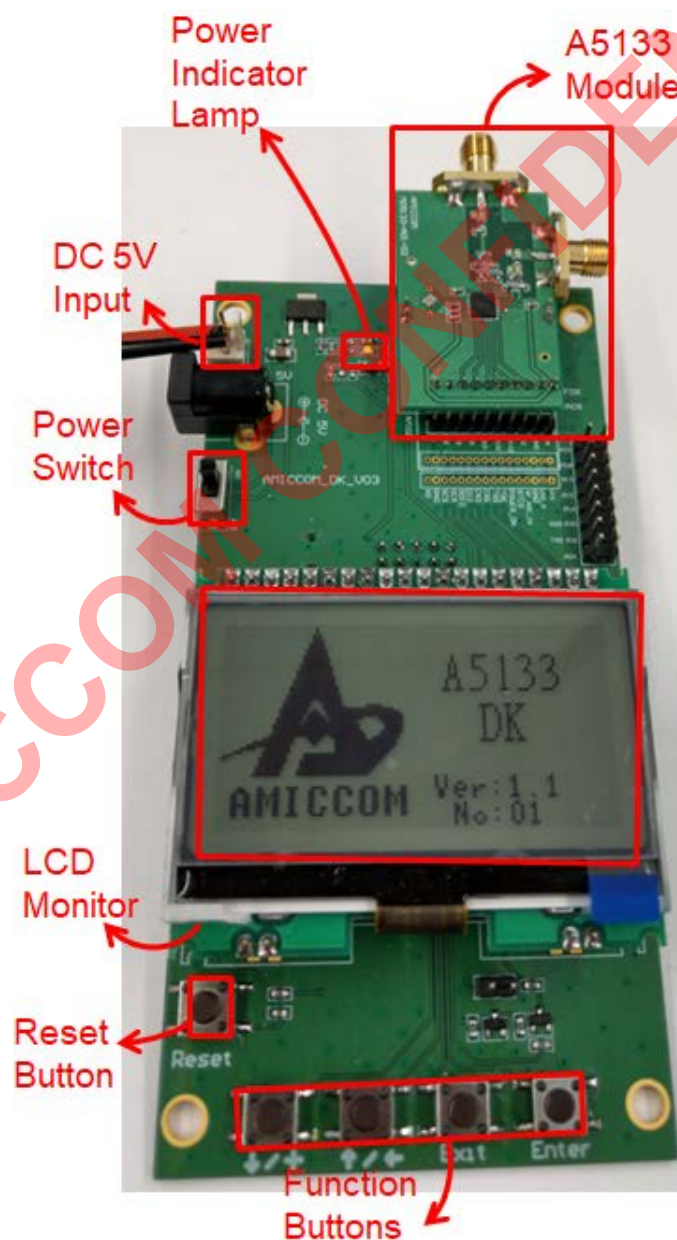
◆ **Initialization Display:**
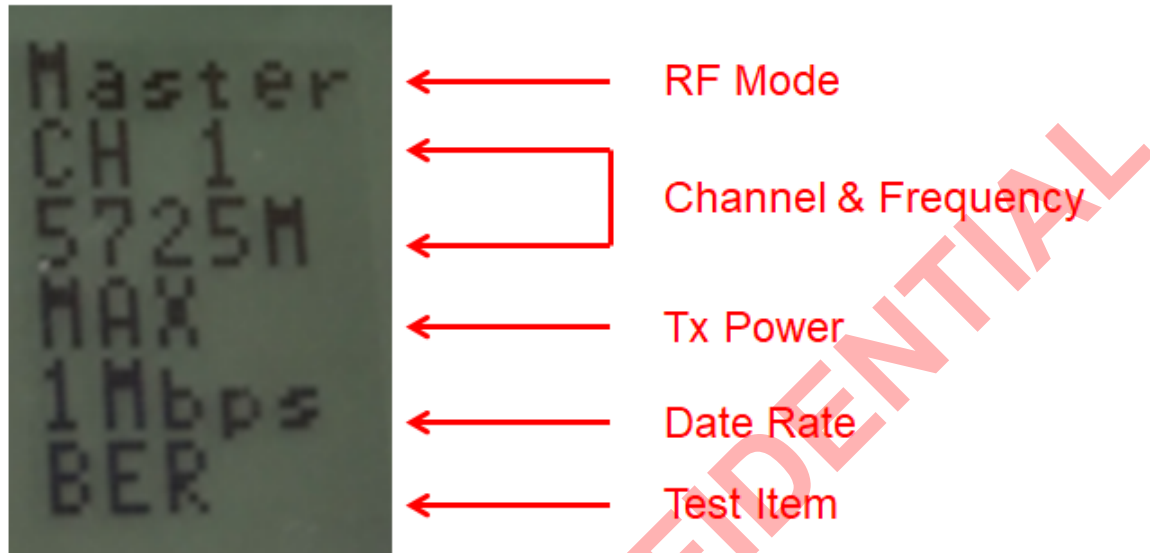

◆ **Main Menu and Sub Menu**

Press 'Enter' after turn on to entry the main menu as shown below:

Main Menu List:

- Mode**:** RF Mode(Master/Slave)
- CH **:** Channel(Ch 1 /Ch 2 /Ch3 /Ch4)
- TX Power **:** TX output power(0 dBm / 6 dBm / 10 dBm / Max)
- Date Rate **:** 4Mbps /2Mbps /1Mbps
- Test Item **:** BER Test /Data Link / Dot Function /Direct Link

Sub Menu List: show the information of user's setting.

◆ **Button:**

There are 4 buttons on DK board, they are:

- ↓ / + : to make the cursor downward or incremental by 1.
- ↑ / ← : to make the cursor upward or the place shift leftward.
- Exit : to exit current state.
- Enter : to entry or confirm.

◆ **FUNCTION**：

● Mode：

1. Press '↓' or '↑' button to move the cursor to 'Mode' as shown in Fig.1.
2. Press ' Enter ' button, the cursor jumps to Sub Menu as shown in Fig.2.
3. Press '↓' or '↑' button to select Master or Slave mode
4. Press 'Enter' button to confirm and the cursor jump back to Main Menu.

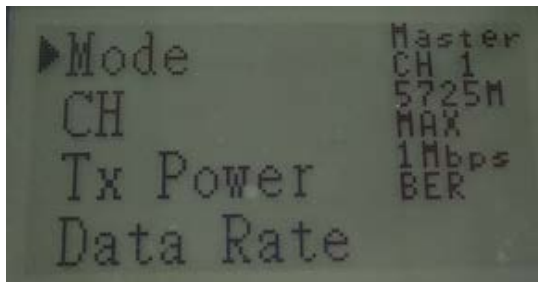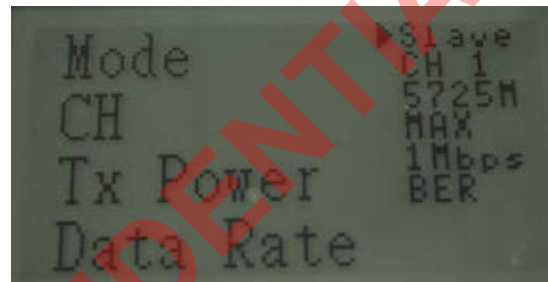Fig.1   Fig.2

● CH：

1. Press '↓' or '↑' button to move indicator to ' CH' as shown in Fig.3.
2. Press ' Enter ' button, the cursor jumps to Sub Menu as shown in Fig.4.
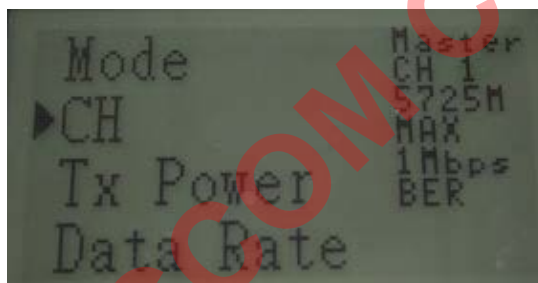3. Press '↓' or '↑' button to select CH1/CH2/CH3/CH4.

Fig.3   Fig.4

4. Press 'Enter' button to confirm and the cursor jump back to Main Menu.

- Tx Power：

    1. Press '↓' or '↑' button to move indicator to ' Tx Power' as shown in Fig.5.

    2. Press ' Enter ' button, the cursor jumps to Sub Menu as shown in Fig.6.

    3. Press '↓' or '↑' button to select TX Power Level.

    Each Tx Power Level is shown below：

    - 0   dBm
    - 6   dBm
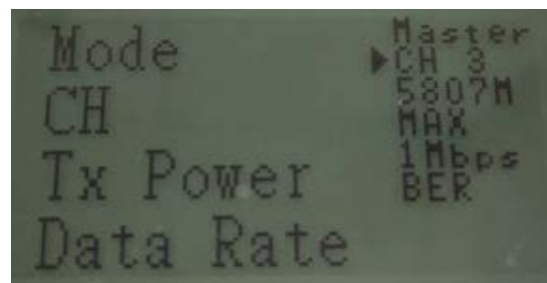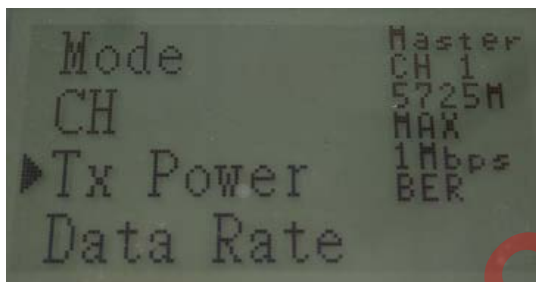   - 10   dBm
    - Max (15.8dBm)

Fig.5	Fig.6

4. Press 'Enter' button to confirm and the cursor jump back to Main Menu.

● Data Rate：

1. Press '↓' or '↑' button to move indicator to ' Data Rate' as shown in Fig.7.

2. Press ' Enter ' button, the cursor jumps to Sub Menu as shown in Fig.8.

3. Press '↓' or '↑' button to select each data rate.

Each data rate is shown below：

   4Mbps

   2Mbps

   1Mbps

Fig.7   Fig.8
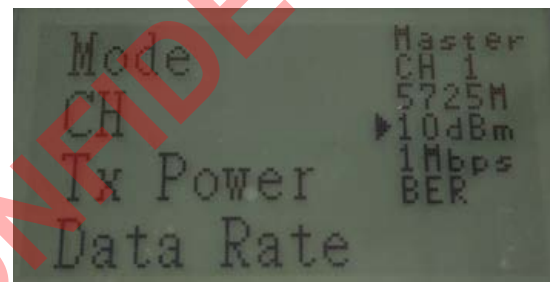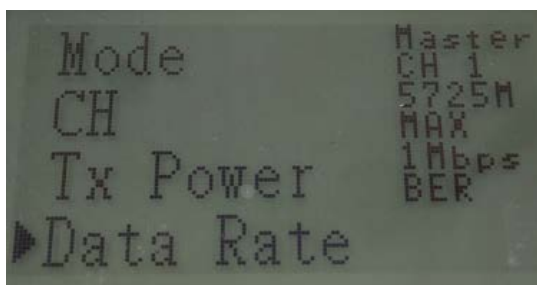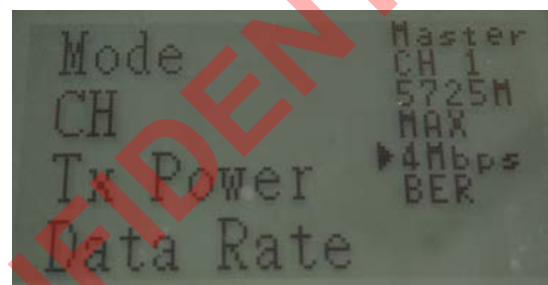
4. Press 'Enter' button to confirm and the cursor jump back to Main Menu.

● Test Item：

1、 Press '↓' or '↑' button to move indicator to ' Test Item' as shown in Fig 9.

2、 Press ' Enter ' button, the cursor jumps to Sub Menu as shown in Fig 10.

3、 Press '↓' or '↑' button to select BER Test/ Data Link / Dot Function/ Direct Mode.

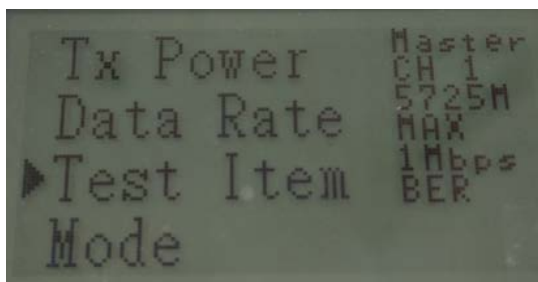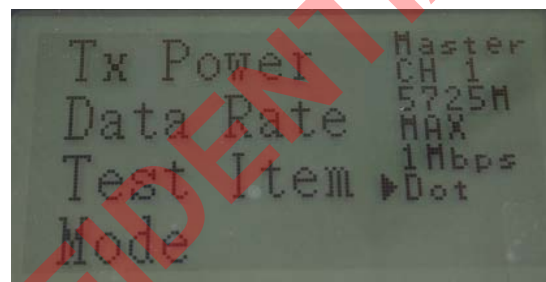4、 Press 'Enter' button to confirm and the cursor jump back to Main Menu.

Fig 9   Fig 10

Each item is shown below：

■ DATA Link:

This function supports user to do packet transmission between two DK boards for wireless

development by user defined payload.

● CH Selection: as show as Fig 11, Fig 12.

● Fixed ID code = { 0x34, 0x75, 0xC5, 0x8C,0xC7,0x33,0x45,0xE7 }
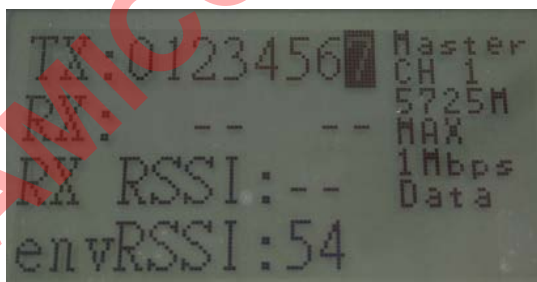

Fig 11 Master Board   Fig12 Slave Board

DK board1 (Master Board)

1. Press '↓' or '↑' button to select Data Link.

2. Press ' + ' button to edit user defined payload as shown in Fig 11.

3. Press '←" button to make left shift of the cursor.

4. Press ' Enter ' button to deliver user defined TX payload and Wait for acknowledgment.

5. If user does not edit the TX payload and press ' Enter ' button, DK5133 will deliver random TX payload and Wait for acknowledgment.

6. If get the acknowledgment from DK board2, display ack. message as shown in Fig 13, otherwise display Fail! As shown in Fig 14.

DK board2 (Slave Board)

1. Press '↓' or '↑' button to select Data Link.

2. Press ' + ' button to edit user defined acknowledgment message as shown in Fig 12.

3. Press '←" button to make left shift of the cursor.

4. If get the Tx payload from DK board1, display TX payload as shown in Fig 13, otherwise keeping display last received payload from Tx.
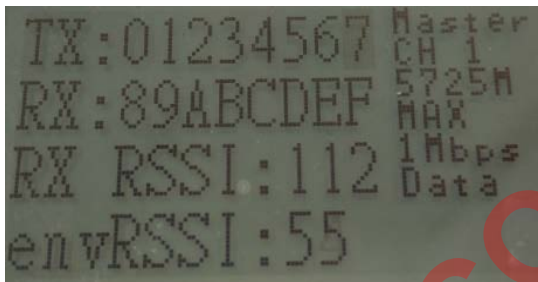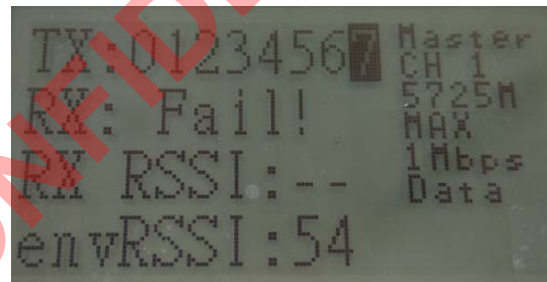

Fig 13

Fig 14

■ Direct:

Be notice, to make Direct Mode work, user has to input 4 bytes preamble + defined payload to RFM (RF Module) GIO1 pin.

Dire_1:

This function supports user to do direct mode testing between DK board1 and DK board2.

In Dire_1 mode, A5133 needs 4 byte preamble (010101….) with supporting max 512 byte payload.

DK board1 (Set in Master Mode)

1. Press '↓' or '↑' button to select Dire_1 as shown in Fig.15.
2. Press ' Enter ' button to confirm as shown in Fig.16.
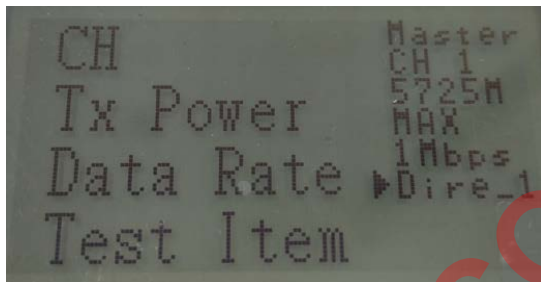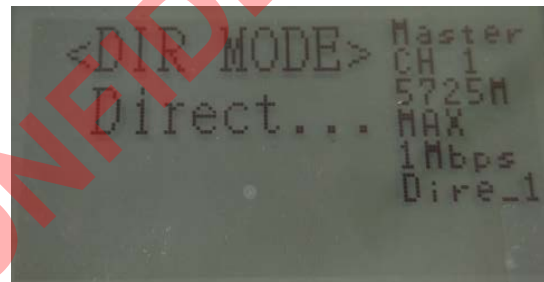3. Input TX-Data (Preamble + Payload) to RFM GIO1 pin.

Fig.15

Fig.16

DK board2 (Set in Slave mode)

1. Press '↓' or '↑' button to select Dire_1 as shown in Fig.17.
2. Press ' Enter ' button to confirm as shown in Fig.18.
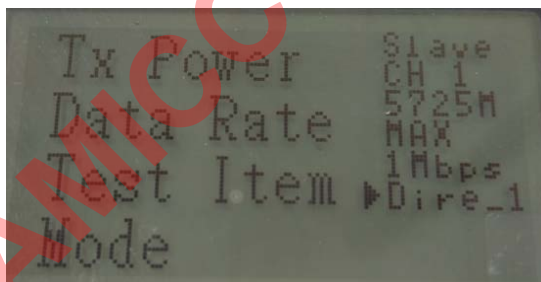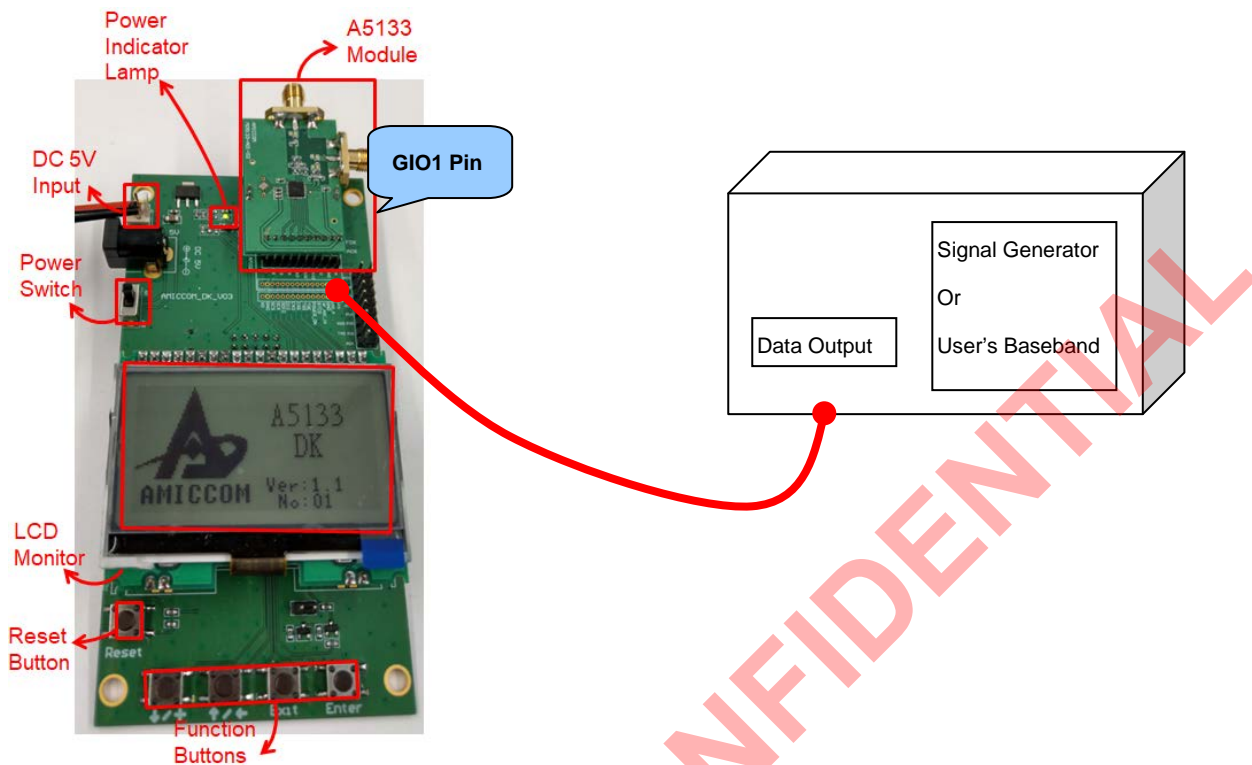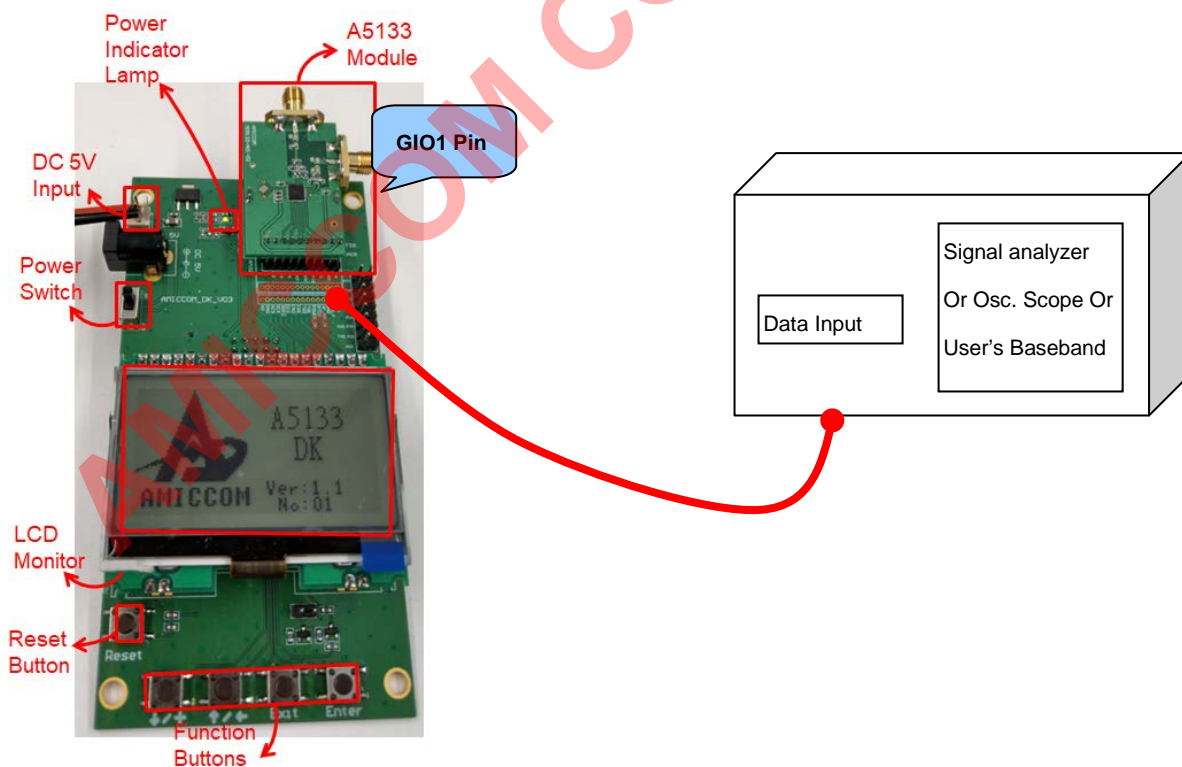3. Get RX-Data (Preamble + Payload) from RFM GIO1 pin.

Fig.17

Fig.18

(Master @ Dire_1)Data Output

(Slave @ Dire_1)Data Input

■ Dot function:

This function supports user to check packet transmission between two DK boards for link distance.

- CH Selection: as show as Fig 19 and Fig 22.
- Fixed ID code = { 0x34, 0x75, 0xC5, 0x8C,0xC7,0x33,0x45,0xE7 }
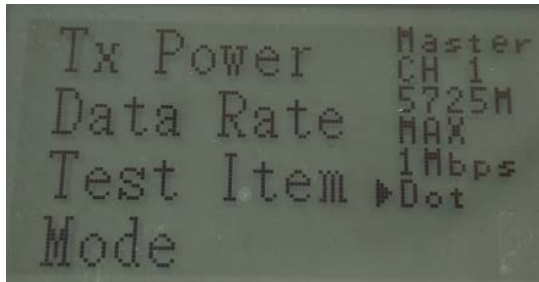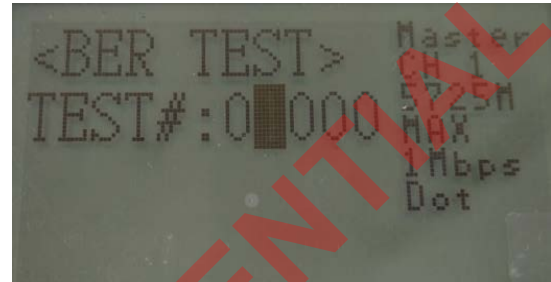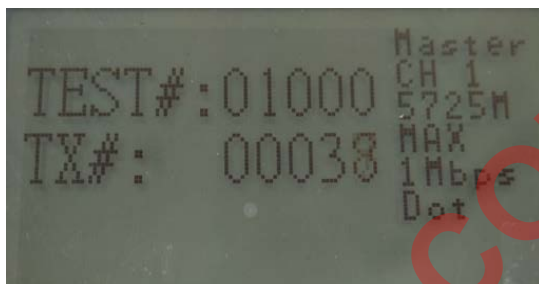

Fig 19

Fig 20

Fig 21

DK board1 (Master Board)

1. Press '↓' or '↑' button to select Dot as shown in Fig 19.

2. Press '↓' or '←" button to edit Packet Numbers (from 100 to 99900) as shown in Fig 20.

3. Press 'Enter' button to start linking to Slave.

4. Delivering default 64 bytes payload (PN9) as shown in Fig 21.

DK board2 (Slave Board)

1. Press '↓' or '↑' button to select Dot as shown in Fig 22 and Fig 23.

2. Now ready to receive packets. One point "." will be shown on display If one packet is received in expected period without error bit or lost packet as shown in Fig 24.

3. If there is any error bit or lost packet on the expected receive period, one denotation "x" will show on the display as shown in Fig 25.
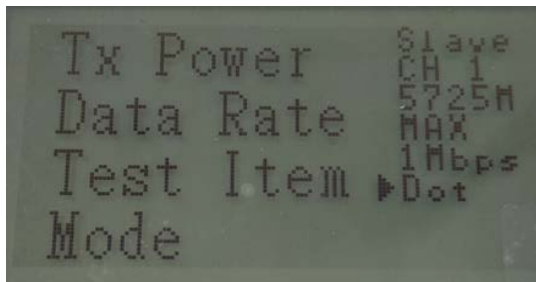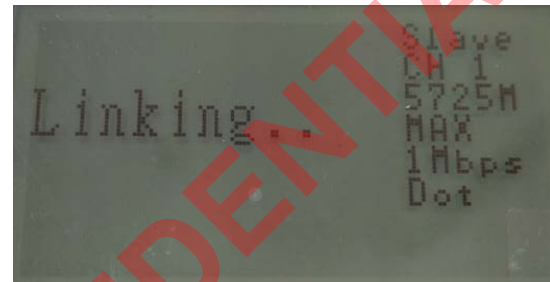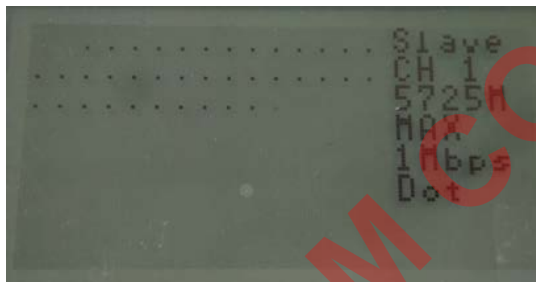

Fig 22

Fig 23

Fig 24

Fig 25

■ BER:

This function supports BER Test to do basic field testing to check basic RF performance.

DK board2 (Set in Slave mode)

1. In BER Test, Slave shall be set before Master for successful linking to Master.

2. Press '↓' or '↑' button to select BER and press enter as shown in Fig 26 and Fig 27.

3. After successful linking to Master, display RX# / BER / RX RSSI / envRSSI on LCD monitor as shown in Fig 28.
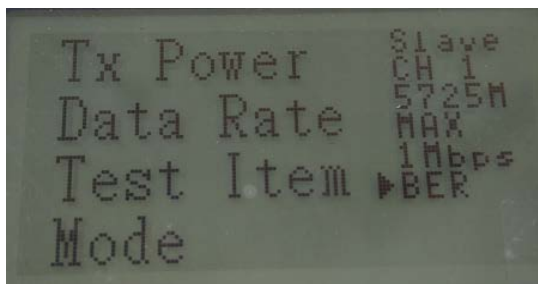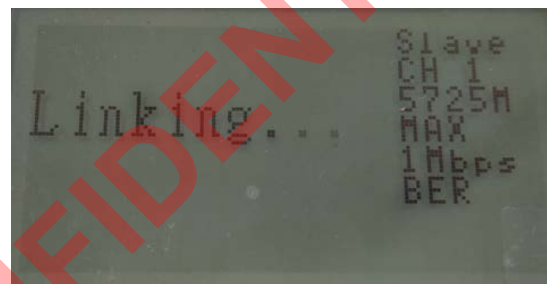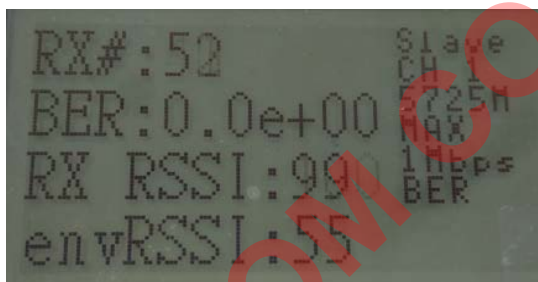

Fig 26

Fig 27

Fig 28

4. After receiving all defined packets, BER REPORT will come out as shown in Fig 29.

5. Press '↓' button to browse next page of BER REPORT as shown in Fig 30 and Fig 31.

6. In Fig 29, Fig 30 and Fig 31, BER=0 means no packet loss.
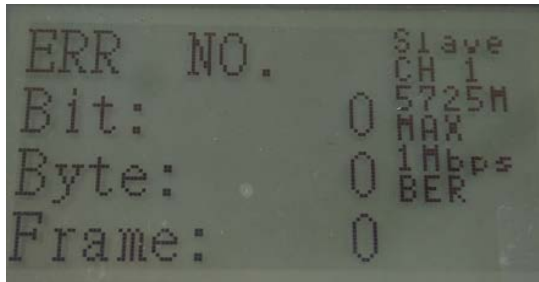

Fig 29

Fig 30

Fig 31

DK board2 (Set in Master mode)

1. In BER Test, Slave shall be set before Master for successful linking to Master.

2. Press '↓' or '↑' button to select BER and press enter as shown in Fig 32.

3. Press '↓' or '←' button to edit Packet Numbers (from 100 to 99900) as shown in Fig 33.
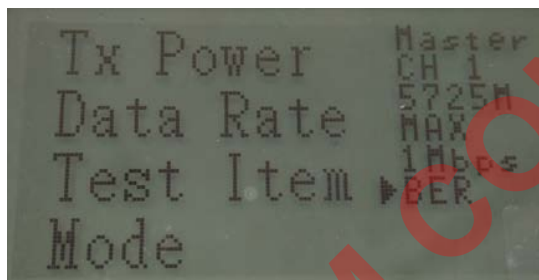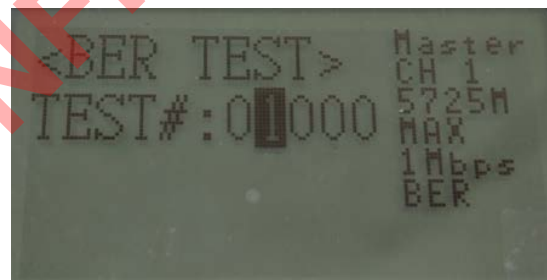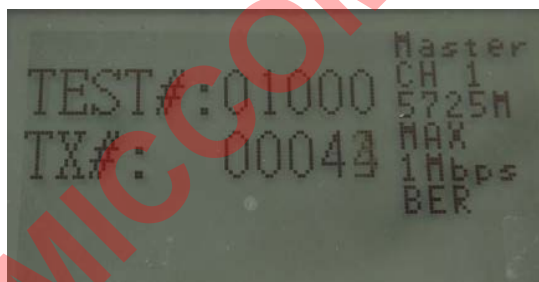

Fig 32

Fig 33

Fig 34

4. Press 'Enter' button to start linking to Slave.

5. Delivering default 64 bytes payload (PN9) as shown in Fig 34.

Calculation BER:

- In Fig 29, Fig 30 and Fig 31, BER=0 means no packet loss.

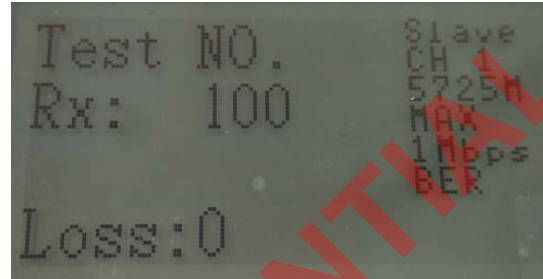- In Fig 35, Fig 36 and Fig 37, BER REPORT represents packet loss.

Fig 35

Fig 36

Fig 37

The BER is calculated by following formula:

1. From 100 packets, 100 packets are completed, 0 packets are lost as shown in Fig 36.

2. In Fig 37, it shows 2 incorrect Frames (payload) and 5 bits error in 4 bytes from total 2 packets .

3. Be notice, each Frame has 64 bytes (PN9).

BER calculates as follows ：

$$BER = \frac{Error\ bit}{Total\ bit}$$

$$BER = \frac{5}{(100 \times 64 \times 8)} = 0.0000976 \approx 9.8E - 05$$

◆ **Appendix:**

Sample module sensitivity performance on DK program:

Frequency	1Mbps	2Mbps	4Mbps
5725MHz	-93.85 dBm	-91.85 dBm	-89.85 dBm