

PKM8721DAF-C13-F10&PKM8721DAF-D23-F10
technical manuals

20250628

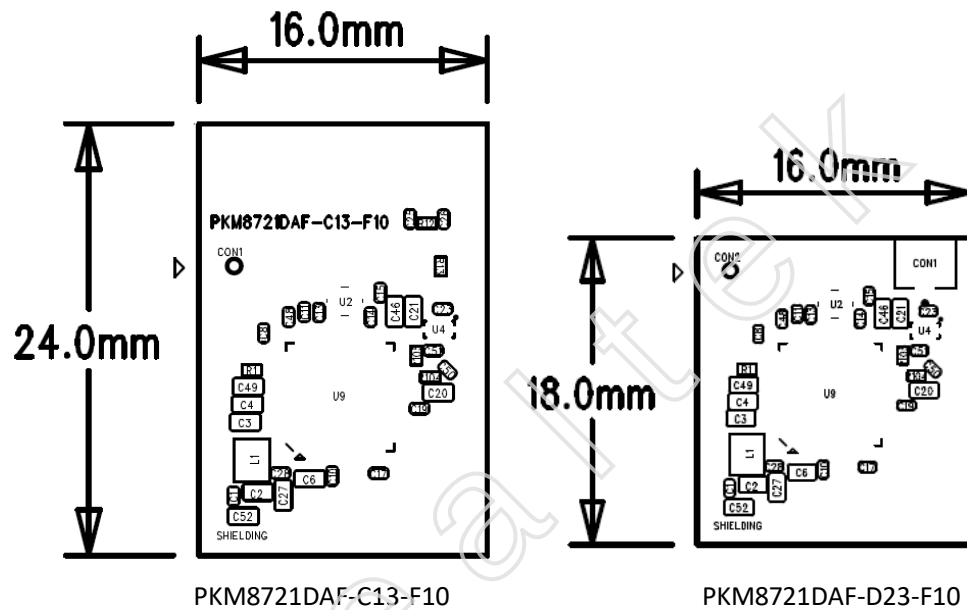
1. Module definition

-- Module package: 22 Pin

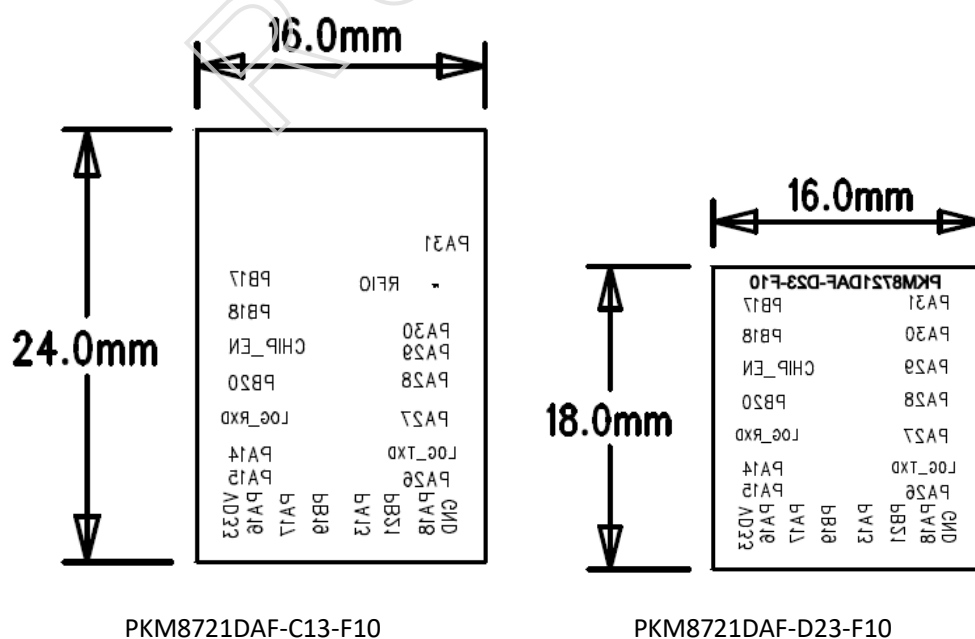
-- module size:

PKM8721DAF-C13-F10: 16mm(W)×24mm(L)×2.8mm(H)

PKM8721DAF-D23-F10: 16mm(W)×18mm(L)×2.8mm(H)



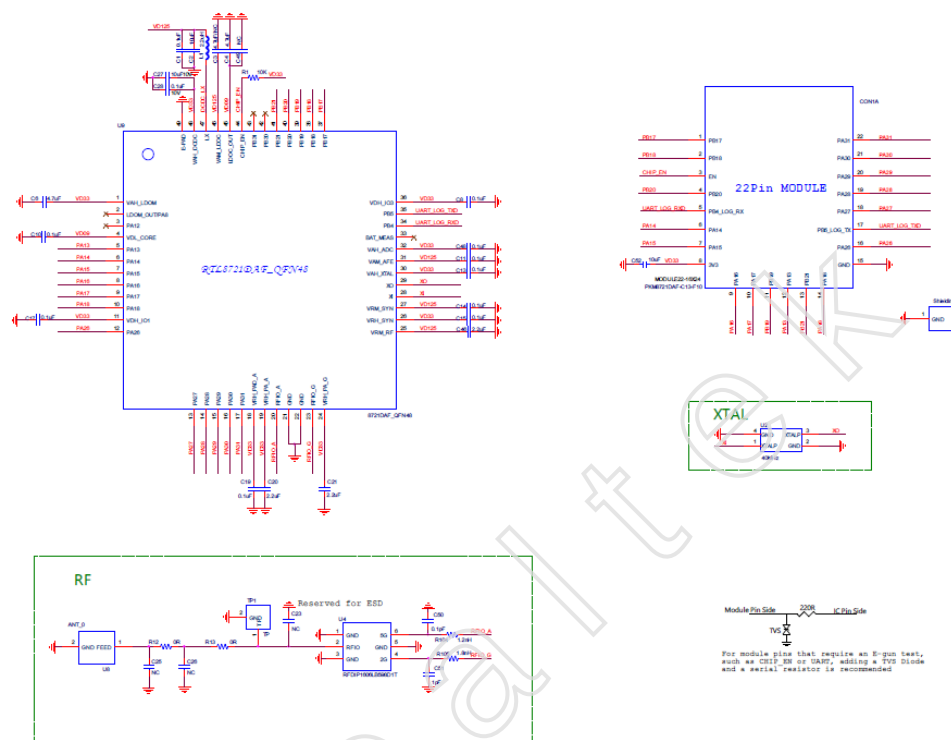
Top view



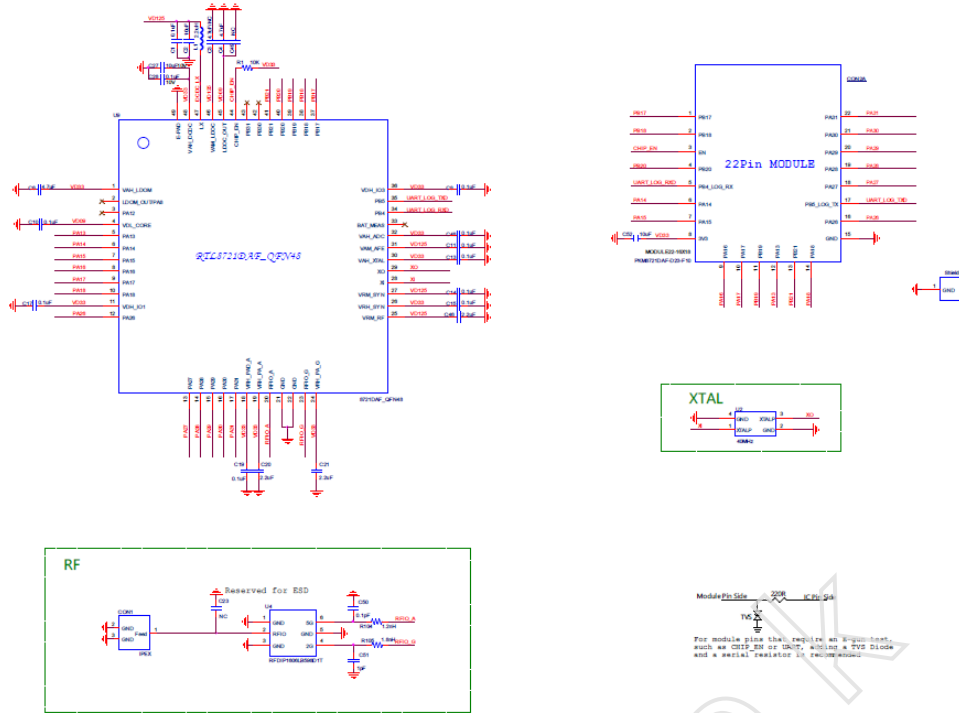
Bottom view

2. Schematic diagram and pin definition

--Schematic diagram:

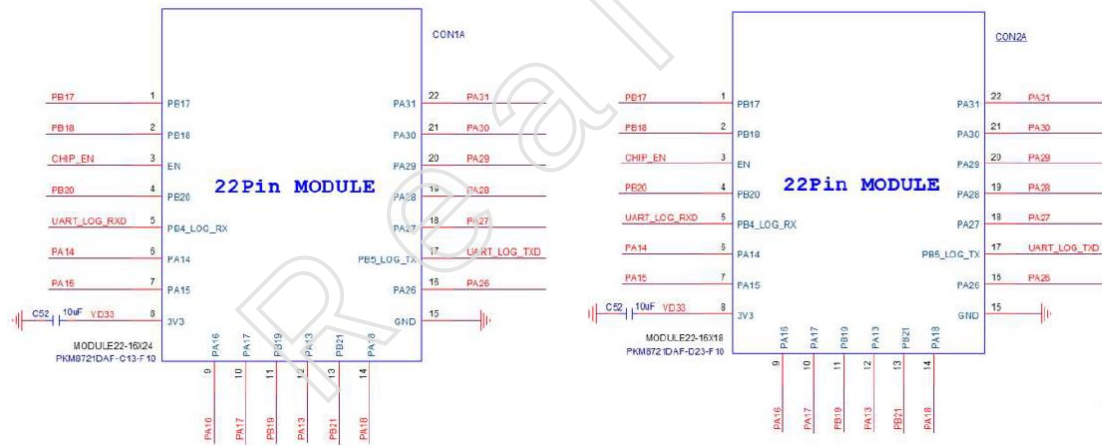


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-- Pin definition:



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-- Pin function(two modules have the same output pin):

PIN name	Pin number	Function
CHIP_EN	3	Enable pin, 3.3V is required for use
PAxx/PBxx	1,2,4,6,7,9 ~14,16,18~22	GPIO pin, is configurable
VD33	8	3.3V power pin of module
PB5	17	Log Uart TX
PB4	5	Log Uart RX
GND	15	Ground

3. RF characteristics

Parameter item	description
Frequency Center channel	2.412~2.484GHz, 5.180~5.825 GHz
Wi-Fi standard	IEEE 802.11a/b/g/n(2.4G channel1-14, 5G channel 36-165)
Data transmission rate	11b:1,2,5.5, 11 (Mbps) 11a/g:6,9,12,18,24,36,48,54(Mbps) 11n:HT20 MCS0~7, HT40 MCS0~7
Antenna type	PCB Antenna:2.4G@4.3dbi, 5G@1.8dbi FPC Antenna:2.4G@3.6dbi, 5G@3.9dbi

4. Demo board instructions

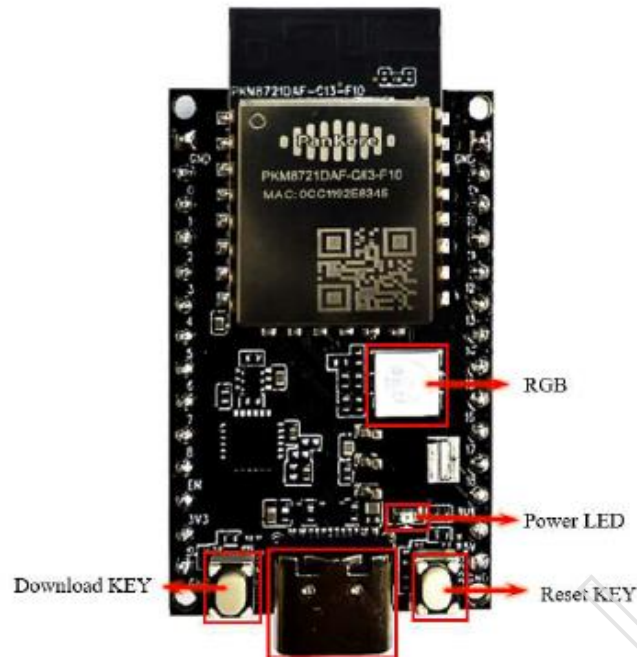
4.1 Required software and hardware

Taking PKM8721DAF-C13-F10 as an example, the usage methods of the two modules are basically the same.

software: “USB to UART tool \PL2303G...” is the USB to UART driver, which needs to be installed;

“Ameba mptool”, is a tool to control sample TX/RX and can be used directly;

Hardware: as shown in the figure below, the sample is module + development board; the lower left corner is the chip PL2303GC for USB to UART



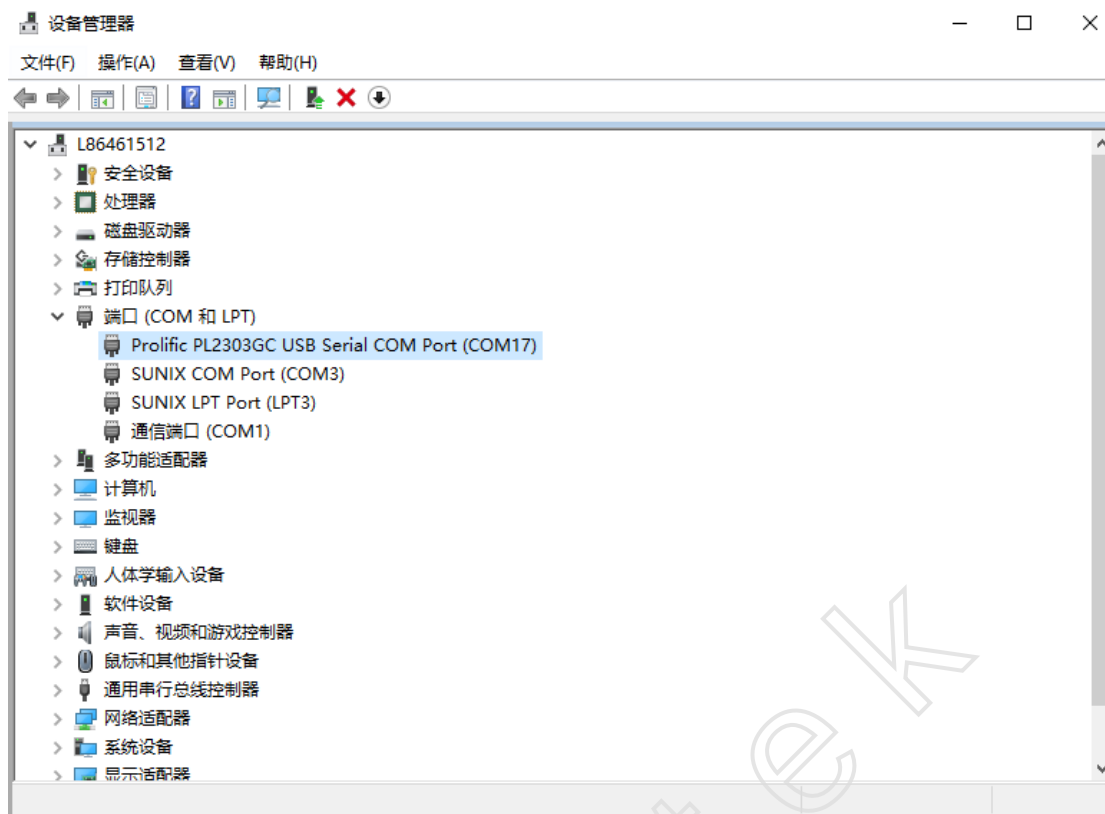
-- Connection steps:

The software driver should be installed before test

In the folder: " USB to UART tool PL2303G Windows_ In v402", double-click the installer to install the PL2303 driver. Follow the prompts to complete the installation.

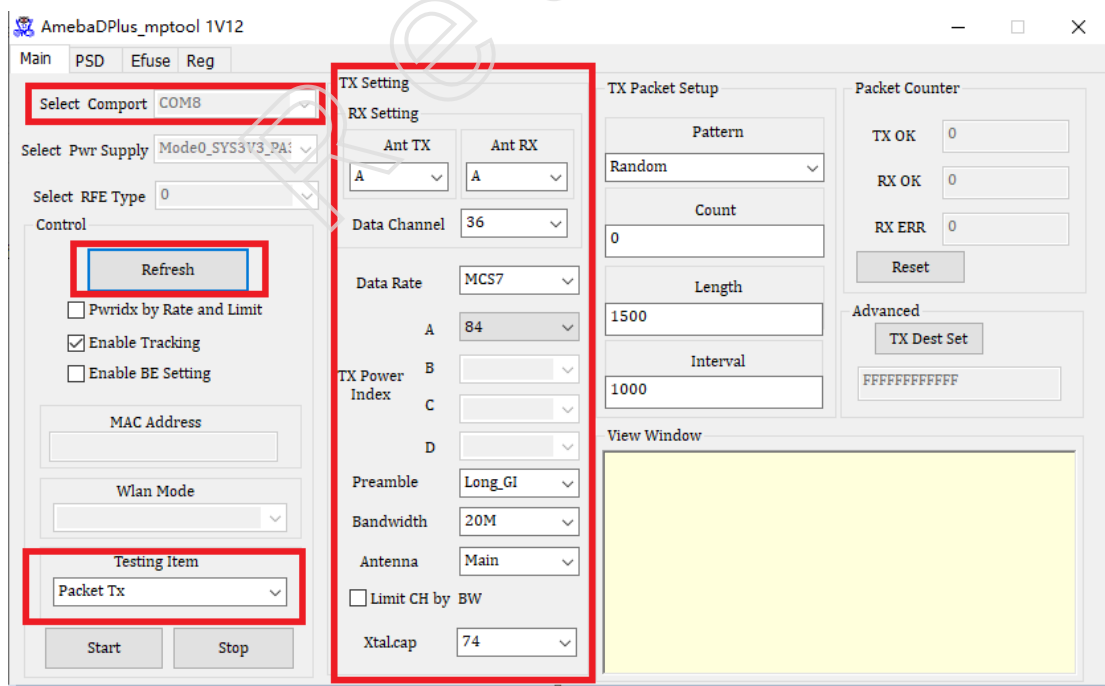
> FILE > AD > PK模块 > 认证 > 8720DF-A00-F10-认证资料 > USB to UART tool > PL2303G > Windows_v402			
名称	修改日期	类型	大小
PL23XX-M_LogoDriver_Setup_402_20...	2022/6/13 14:34	应用程序	9,718 KB

A USB cable is needed to connect the sample to the computer through the specified Type-C USB port. The driver may need to be installed twice, that is, repeat the above twice, and then you can see the serial port [Prolific PL2303GC USB Serial COM Port \(COM17\)](#) as shown in the figure below;



4.2 Using ameba mptool

Unzip the document AmebaDPlus_MP_top_1V12.7z, and double-click UI_mptool.exe Choose com8 from the "select com" menu and click "initialize". The following dialog box appears.



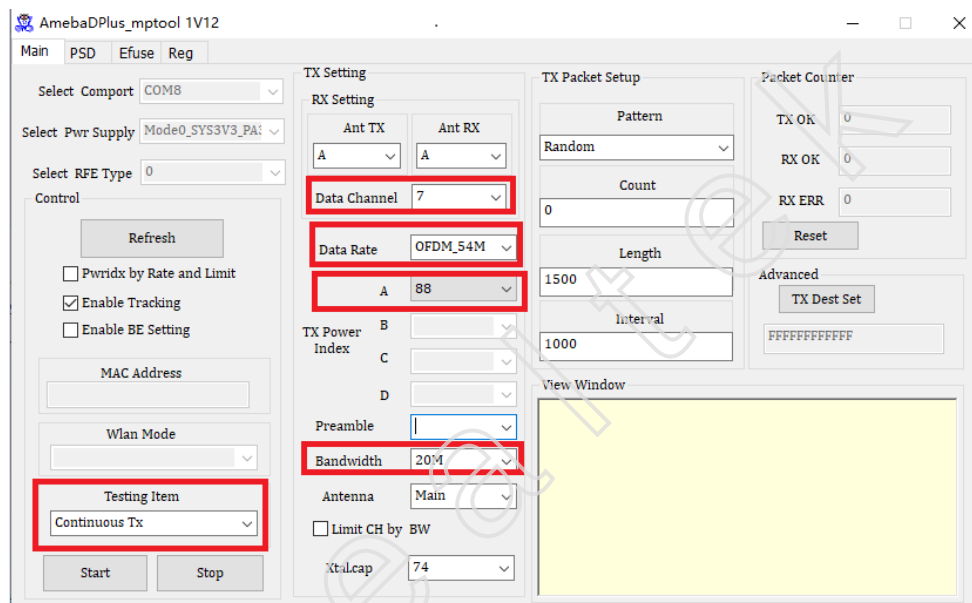
4.3 RF test

4.3.1 Normal 11a/b/g/n TX test

As shown in the figure below, the required settings are only a few items in the box. Select **channel**, **rate**, **power index** (adjustable range: 0-127,default 84) & **bandwidth**, and the test item select **continuous TX (TX duty cycle = 100%)**. Then click start, the waveform can be seen on the spectrum, and click stop when finished;

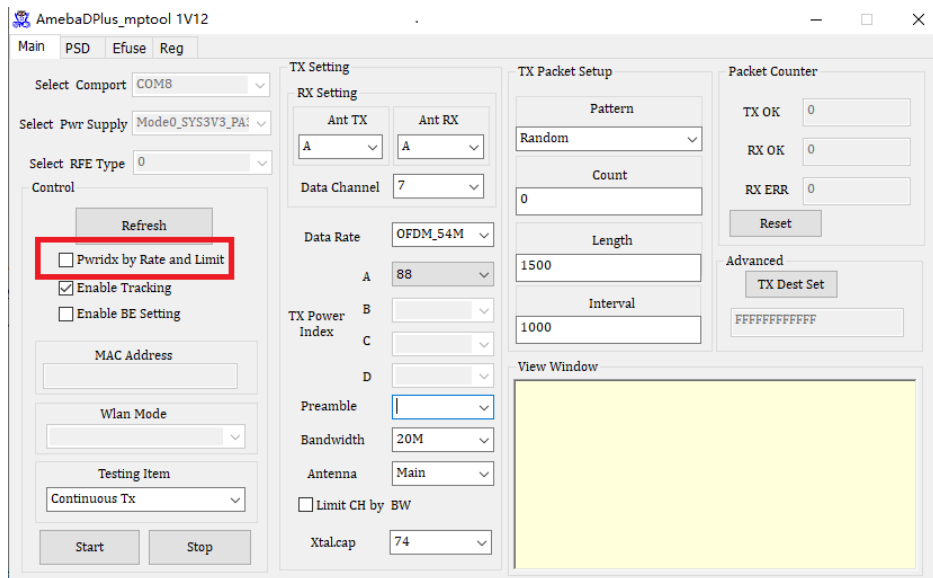
An example is shown in the figure below , **channel-7** , **OFDM-54M** , **power index=88** , **bandwidth=20M** , **continuous Tx**.

During certification, low rates (1M, 6M, HT20-MCS0, HT40-MCS0) are usually tested.



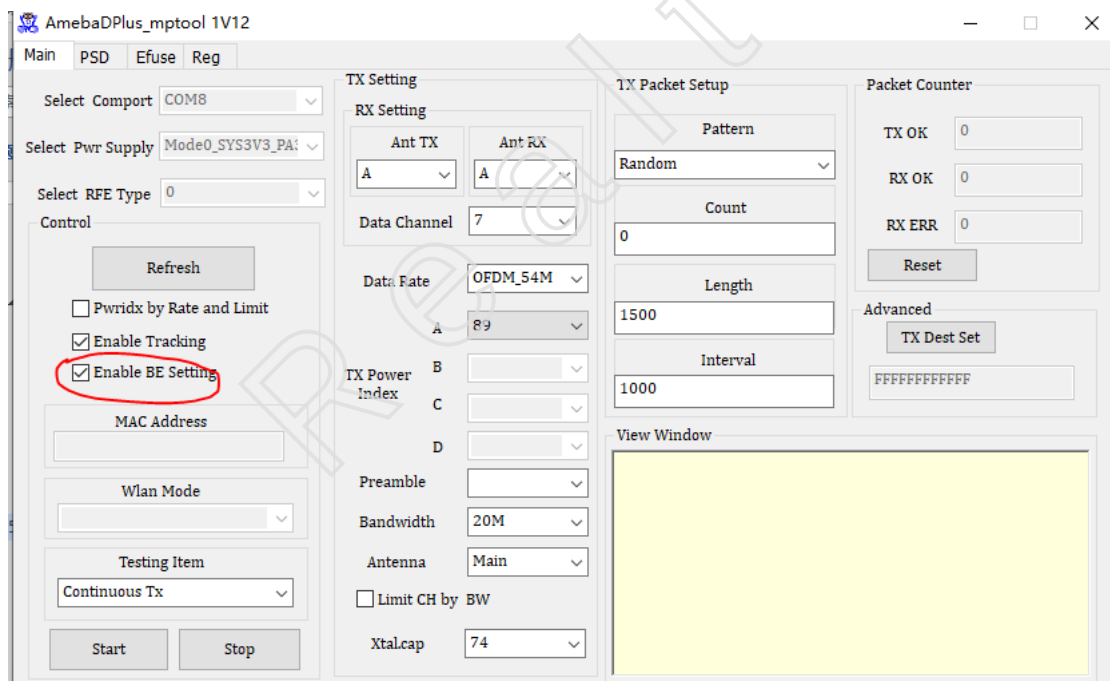
Before the TX test, you need to check the “**Pweidex by Rate and Limit**” option first. At this time, the power index is set as the default value. To modify the power setting, please uncheck “**Pweidex by Rate and Limit**”, and then change the tx power index(0.25db per step).

After setting, click “start”. If you need to modify channel / rate / power index, stop first and then modify.



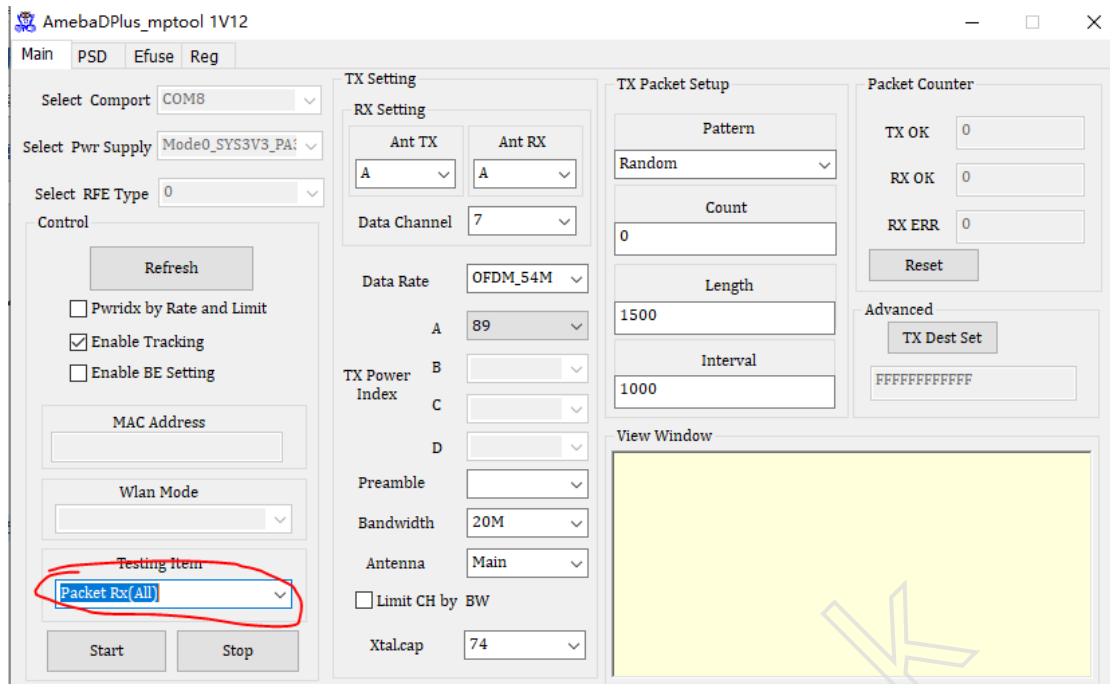
4.3.2 TX band edge test

The module has special tuning parameters for sidebands, and FCC and SRRC must check "Enable BE setting" when testing sidebands(only applicable to 11a/g/n).



4.3.2 RX test

The rate/channel settings for RX testing are basically the same as TX, just select the testing item as "packet RX (all)".



5. Points for attention:

- 1) Different samples connected to the computer may have different COM numbers, so the number displayed at selectCOM will be different.
- 2) Please do not keep the Tx state for a long time without conducting any tests to avoid overheating the board and affecting the test results.
- 3) Regarding the tx power setting, select the "Pweindex by Rate and Limit" option, and the index value will be obtained from efuse and brought into the default power setting. To adjust the power, first uncheck "Power by Rate and Limit".
- 4) The default power setting for different speeds/channels of the module may vary, and the power setting for low rate is usually higher, making it easier to get stuck in regulations. Therefore, certification testing usually tests for low rate. Different channels may also have some differences, please make sure that high, medium, and low channels have been tested.

FCC Certification Requirements.

According to the definition of mobile and fixed device is described in Part 2.1091(b), this device is a mobile device.

And the following conditions must be met:

1. This Modular Approval is limited to OEM installation for mobile and fixed applications only. The antenna installation and operating configurations of this transmitter, including any applicable source-based time- averaging duty factor, antenna gain and cable loss must satisfy MPE categorical Exclusion Requirements of 2.1091.
2. The EUT is a mobile device; maintain at least a 20 cm separation between the EUT and the user's body and must not transmit simultaneously with any other antenna or transmitter.
3. A label with the following statements must be attached to the host end product: This device contains FCC ID: 2BASB-PKM8721DAF.
4. To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, maximum antenna gain (including cable loss) must not exceed:

For model PKM8721DAF-C13-F10:

Band	Antenna Gain (dBi)
Wi-Fi 2.4GHz	4.30
Wi-Fi 5G(U-NII-1)	1.80
Wi-Fi 5G(U-NII-2A)	1.00
Wi-Fi 5G(U-NII-2C)	1.00
Wi-Fi 5G(U-NII-3)	1.00
Bluetooth LE	4.30

For model PKM8721DAF-D23-F10:

Band	Antenna Gain (dBi)
Wi-Fi 2.4GHz	3.60
Wi-Fi 5G(U-NII-1)	3.10
Wi-Fi 5G(U-NII-2A)	3.70
Wi-Fi 5G(U-NII-2C)	3.40
Wi-Fi 5G(U-NII-3)	3.90
Bluetooth LE	3.60

5. This module must not transmit simultaneously with any other antenna or transmitter
6. The host end product must include a user manual that clearly defines operating requirements and conditions that must be observed to ensure compliance with current FCC RF exposure guidelines.

For portable devices, in addition to the conditions 3 through 6 described above, a separate approval is required to satisfy the SAR requirements of FCC Part 2.1093

If the device is used for other equipment that separate approval is required for all other operating configurations, including portable configurations with respect to 2.1093 and different antenna configurations.

For this device, OEM integrators must be provided with labeling instructions of finished products. Please refer to KDB784748 D01 v07, section 8. Page 6/7 last two paragraphs:

A certified modular has the option to use a permanently affixed label, or an electronic label. For a permanently affixed label, the module must be labeled with an FCC ID - Section 2.926 (see 2.2 Certification (labeling requirements) above). The OEM manual must provide clear instructions explaining to the OEM the labeling requirements, options and OEM user manual instructions that are required (see next paragraph).

For a host using a certified modular with a standard fixed label, if (1) the module's FCC ID is not visible when installed in the host, or (2) if the host is marketed so that end users do not have straightforward commonly used methods for access to remove the module so that the FCC ID of the module is visible; then an additional permanent label referring to the enclosed module: "Contains Transmitter Module FCC ID: 2BASB-PKM8721DAF" or "Contains FCC ID: 2BASB-PKM8721DAF" must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

The final host / module combination may also need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements.