



## **pan107x tool box user's guide**

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# 1.Summarize

PAN107x Toolbox tool.

Tools include: **RF Test**, **DFU** , **Pinout**, **RF Signal Collection** and other tool features.

## 2.Toolbox tools

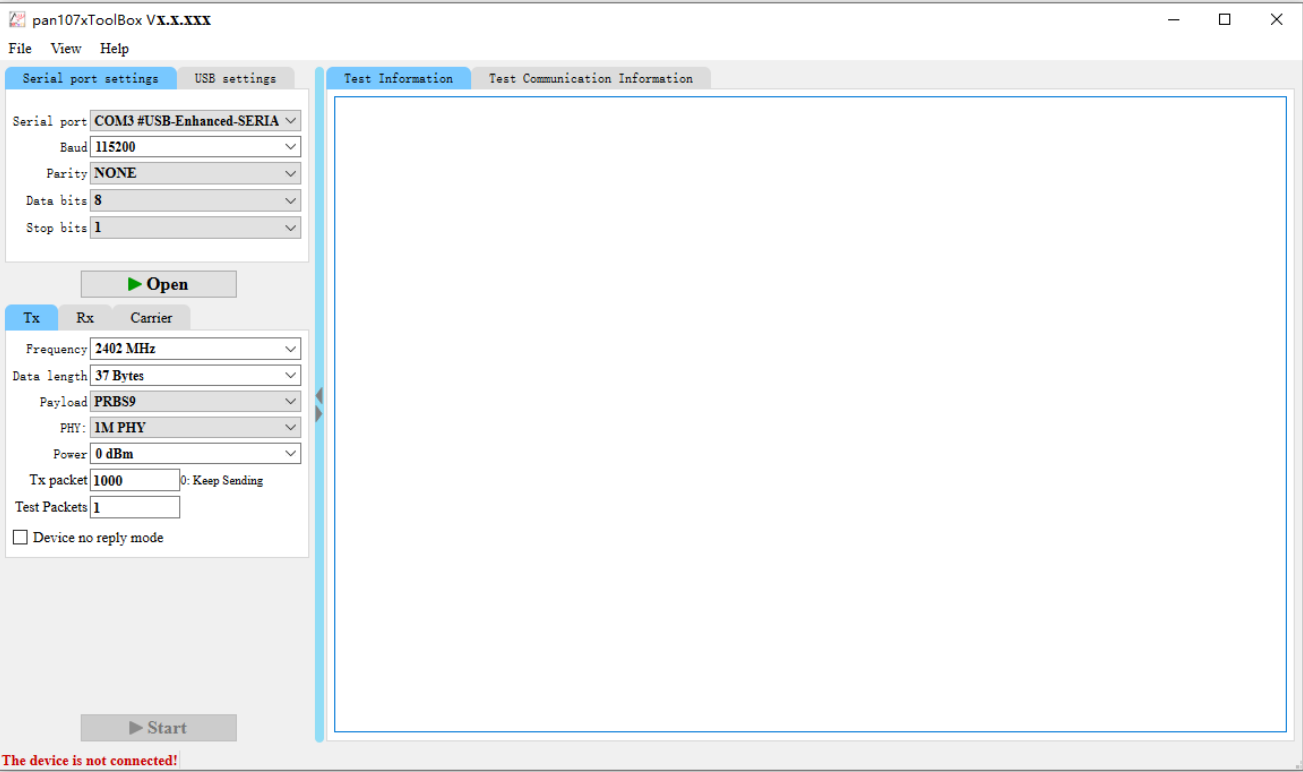


Figure 2-1 PAN107x toolbox tool interface

The PAN107x toolbox tool interface is shown in Figure 2-1.

### 2.1.Menu bar

The menu bar has three functions: **File**, **View**, and **Help**. As shown in Figure 2-1-1.

File View Help

Figure 2-1-1 menu bar

#### 2.1.1.File

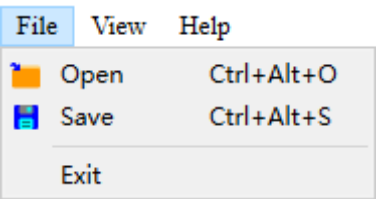


Figure 2-1-1-1 File menu

The file menu is shown in Figure 2-1-1-1, including **Open**, **Save**, and **Exit**.

**Open:** To open the load saved profile to the interface function.Shortcut key: **Ctrl + Alt + O**.

**Save:** To save the current interface functionality to a file..Shortcut key: **Ctrl + Alt + S**.

**Exit:** is the exit tool.

2.1.2.View



Figure 2-1-2-1 View menu

The display menu is shown in Figure 2-1-2-1, including language mode display 简体中文, **English**, functional interface display **RF Test** , **DFU**, etc.

Language pattern display:

简体中文 : For setting the screen display in simplified Chinese. Shortcut: **Ctrl + Alt + C**.

**English** : This is the English language for the interface. Shortcut: **Ctrl + Alt + E**.

Functional interface display:

**RF test** : This screen is displayed for switching to RF test. Shortcut: **Ctrl + Alt + R**.

**DFU** : Displays the interface for switching to DFU. Shortcut: **Ctrl + Alt + D**.

**Pinout** : Displays the interface for switching to Pinout. Shortcut: **Ctrl + Alt + P**.

**RF Signal Collection** : Displays the interface for switching to RF Signal Collection. Shortcut: **Ctrl + Alt + I**.

2.1.3.Help

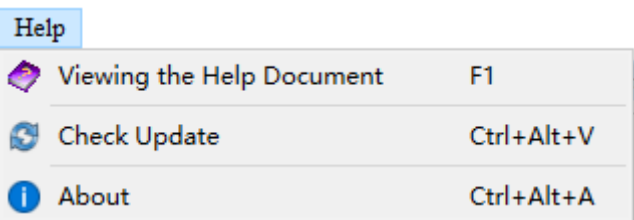


Figure 2-1-3-1 Help menu

The help menu is shown in Figure 2-1-3-1 and includes \*\* View help documentation , Detect version updates , About \*\*, etc.

**Viewing the Help Documentation** : To open, view help documentation. Shortcut: **F1**.

**Check updates** : Version detection for communication with our servers. Successful detection can be used for version **download** and version **upgrade** and other functions. Shortcut: **Ctrl+Alt+V**.

**About** : To see information about the current tool. Shortcut: **Ctrl+Alt+A**. This is shown in Figure 2-1-3-2.



Figure 2-1-3-2 Abort

## 2.2.Status bar

The status bar at the bottom of the function interface shows the status function.

## 2.3.Functional interface

### 2.3.1.RF Test interface

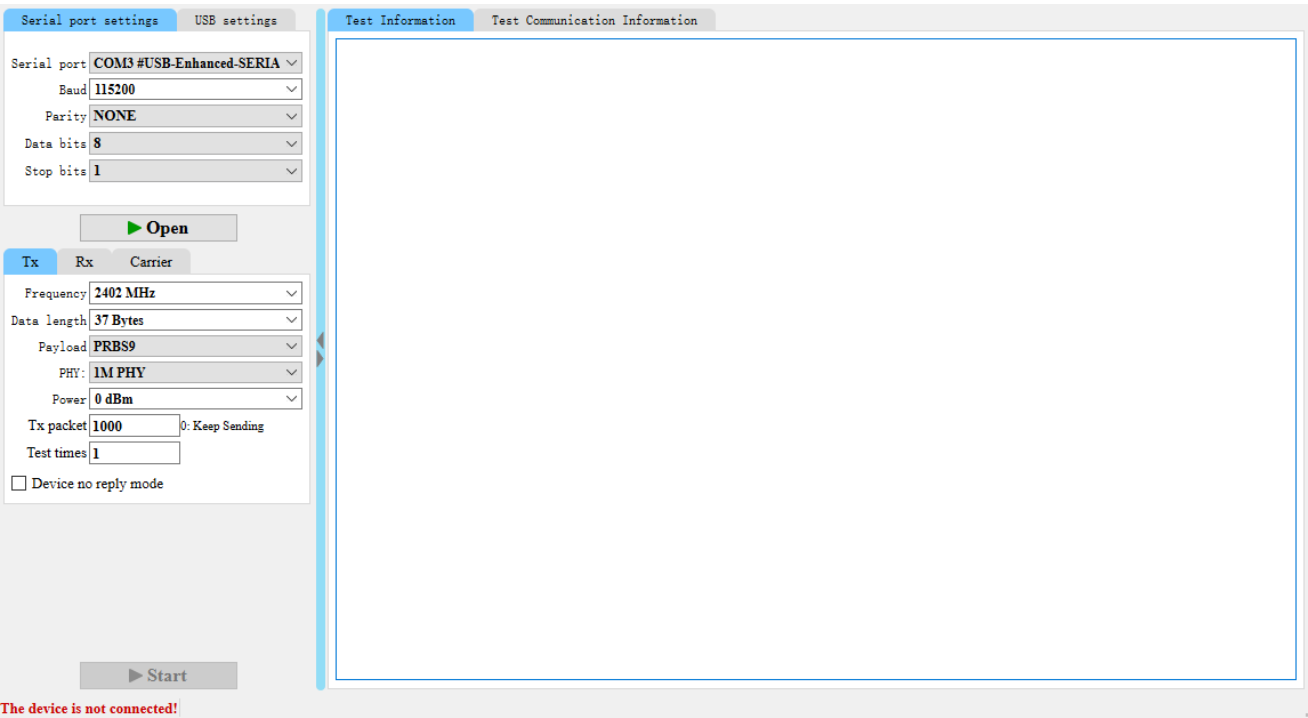


Figure 2-3-1-1 RF Test interface

Figure 2-3-1-1 shows the RF test interface.

2.3.1.1.Serial port settings

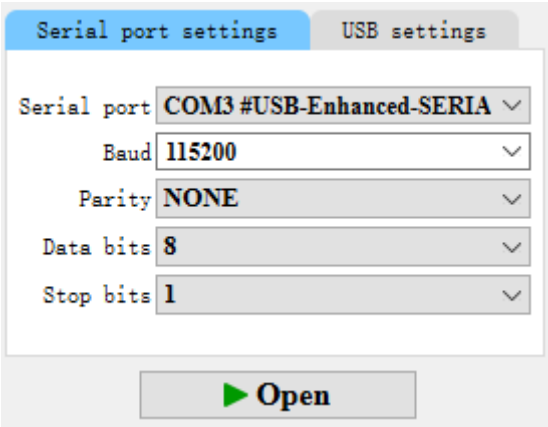


Figure 2-3-1-1-1 Serial port settings

As shown in Figure 2-3-1-1-1, it is the serial port setting when the communication is serial communication in RF test.

**Serial port:** To set the communication serial port number. When **click**, the serial device will be automatically queried and the queried serial number will be added to the optional serial number drop-down list. The selected is the serial port number of the setting.

**Baud:** Is to set the baud rate of serial communication. When selecting **Customize**, any value from 110Hz to 1000000Hz can be entered manually.

**Parity:** To set the check bit mode of serial communication. Support **NONE/ODD/EVEN/MARK/SPACE** mode, default **NONE**.

**Data bits:** Is to set the data bit value of serial communication. Support **5, 6, 7, 8** bits, default **8** bits.

**Stop bits:** Is to set the stop bit value of serial communication. Support **1, 1.5, 2** bits, default **1** bits.

**Open:** Open the selected serial number device and open it according to the configured value. After successful opening, it is displayed for **Close**.

2.3.1.2.USB settings

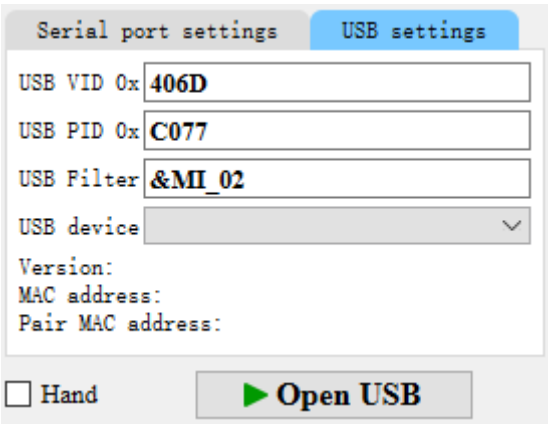


Figure 2-3-1-2-1 USB settings

As shown in Figure 2-3-1-2-1, the communication in RF test is the USB setting in USB communication.

**USB VID:** This sets the USB VID value. The supported Settings range from **0x000** to **0xFFFF** and the default value is **0x406D**.

**USB PID:** This sets the USB PID value. The supported Settings range from **0x000** to **0xFFFF** and the default value is **0xC077**.

**USB Filter :** Filters USB devices that have a specified string for the setup. Default filter string **&MI\_02**.

**USB device :** This is the USB device for setting up communication. When clicking, the existing USB HID device will be searched according to **VID** and **PID**, and the device with the specified string will be added to the drop-down list. The selected is the USB device for the setup.

**Hand/Auto :** Hand is not selected, automatic is selected. Hand, open the USB device for manual control; Automatically, click the test item to start testing and then enter the detection USB device connection and then automatically open the connection and start testing.

### 2.3.1.3.Tx

The screenshot shows the 'Tx' configuration tab for an RF test. It includes dropdown menus for Frequency (2402 MHz), Data length (37 Bytes), Payload (PRBS9), PHY (1M PHY), and Power (0 dBm). There are also input fields for Tx packet (1000) and Test times (1). A checkbox labeled '0: Keep Sending' is next to the Tx packet field, and another checkbox labeled 'Device no reply mode' is at the bottom left. A 'Start' button is located at the bottom right.

Figure 2-3-1-3-1 RF Tx test configuration

As shown in Figure 2-3-1-3-1, the RF emission test configuration display and configuration function interface.

The launch test can only start if the serial port is successfully opened, the USB connection is successfully opened, or the USB automatically detects the connection.

**Frequency:** To set the tx frequency. Supports **2402 MHz ~ 2480 MHz** Settings.

**Data length:** To set the length of the emission data. Supports **0 Bytes ~ 255 Bytes** Settings.

**Payload:** To set the launch packet payload. Support the mode Settings shown in Table 2-3-1-3-1.

Table 2-3-1-3-1 Packet payload pattern

Mode	Notes
<b>PRBS9</b>	PRBS9 sequence '1111111100000111101...' 'Transmission order
<b>11110000</b>	Repeat the '11110000' transfer sequence
<b>10101010</b>	Repeat the '10101010' transfer sequence
<b>PRBS15</b>	According to the PRBS15 sequence
<b>11111111</b>	Repeat the '11111111' transfer sequence
<b>00000000</b>	Repeat the '00000000' transfer sequence
<b>01010101</b>	Repeat the '01010101' transfer sequence

**PHY:** To set up the transmit PHY configuration. Support **1M PHY**、**2M PHY**、**Code PHY(S=8)**、**Code PHY(S=2)** mode, etc.

**Power** : This sets the transmit power. Supports **-45 dBm to 7 dBm**.

**Tx packet** : This sets the number of outgoing packets. Supports **0-65535**.

**0** : Always launch mode, this mode needs to manually click stop test to end the launch.

**1-65535** : After the start of the launch, the number of Settings will be automatically launched, and the launch will stop automatically.

**Test times** : Sets the number of test launches. Support **1-65535**.

**Note** : This is valid only if the number of packages issued is **1-65535**.

**Device No Reply Mode** : This is the mode allowed when setting the UART communication test. When the mode is enabled, the chip can be sent for testing without connecting the TX pin of the chip.

**Start** : Start launching tests for execution. When the number of packets sent is 0, the chip will always send packets according to the transmission configuration. When the number of packets sent is 1 ~ 65535, the number of cycle test times sends the specified packet according to the transmission configuration. Test information and test communication information will be displayed in the log box.

Test Information	Test Communication Information
[2023-12-13 09:37:50.814990] [Reset Command]	
>>> Success!	
[2023-12-13 09:37:50.863033] [Tx Power Command]	
>>> Power: 0 dBm	
>>> Success!	
[2023-12-13 09:37:50.870068] [Tx Packet Count Command]	
>>> Tx packet: 1000	
>>> Success!	
[2023-12-13 09:37:50.879077] [LE Transmitter Command]	
>>> Frequency: 2402 MHz	
>>> Data length: 37 Byte	
>>> Payload: PRBS9	
>>> PHY: 1M PHY	
>>> Success!	
[2023-12-13 09:37:50.886178] [Wait LE Tx End]	
>>> Success!	

Figure 2-3-1-3-2 RF Tx test information display

Figure 2-3-1-3-2 shows the RF emission test information display.

Test Information	Test Communication Information
[2023-12-13 09:37:50.814990]	->: 01 03 0C 00
[2023-12-13 09:37:50.862039]	<-: 04 0E 04 01 03 0C 00
[2023-12-13 09:37:50.863033]	->: 01 C3 FF 01 00
[2023-12-13 09:37:50.869064]	<-: 04 0E 04 01 C3 FF 00
[2023-12-13 09:37:50.870068]	->: 01 D1 FF 04 00 00 E8 03
[2023-12-13 09:37:50.877070]	<-: 04 0E 04 01 D1 FF 00
[2023-12-13 09:37:50.879077]	->: 01 34 20 04 00 25 00 01
[2023-12-13 09:37:50.886178]	<-: 04 0E 04 01 34 20 00
[2023-12-13 09:37:51.514107]	<-: 04 0E 06 01 1F 20 00 00 00

Figure 2-3-1-3-2 RF Tx test communication information display

As shown in Figure 2-3-1-3-3, it shows the RF emission test communication information display.

#### 2.3.1.4.Rx



Figure 2-3-1-4-1 RF Rx test configuration

As shown in Figure 2-3-1-4-1, the RF receiving test configuration display and configuration function interface.

The reception test can only start if the serial port is opened successfully, the USB connection is opened successfully, or the USB automatically detects the connection.

**Frequency** : This sets the receiving frequency. Supports **2402 MHz ~ 2480 MHz** Settings.

**PHY** : Receive PHY configuration for setting. **1M PHY**, **2M PHY**, **Code PHY** and other modes are supported.

**Modulation Index** : This sets the received modulation index mode. Support **Standard Modulation Index**, **Stable Modulation Index**, etc.

**Standard Modulation Index**: is the standard modulation index.

**Stable Modulation Index**: This is the stable modulation index.

**Read Rx Cnt** : Once in receive mode, the click will read the received packet count once. If **Read RSSI** is checked, RSSI data will be read if the number of packets received is greater than 0. The read successfully enters the receive mode again.

**Only read information is displayed** : To set the receiving test information only show read information and no other information.

**Start** : Start receiving tests for execution. When stopping the test, the information of the number of previously received packets will be read. If **Read RSSI** is checked, the RSSI data information will be read when the number of received packets is greater than 0 packets. Test information and test communication information will be displayed in the log box.

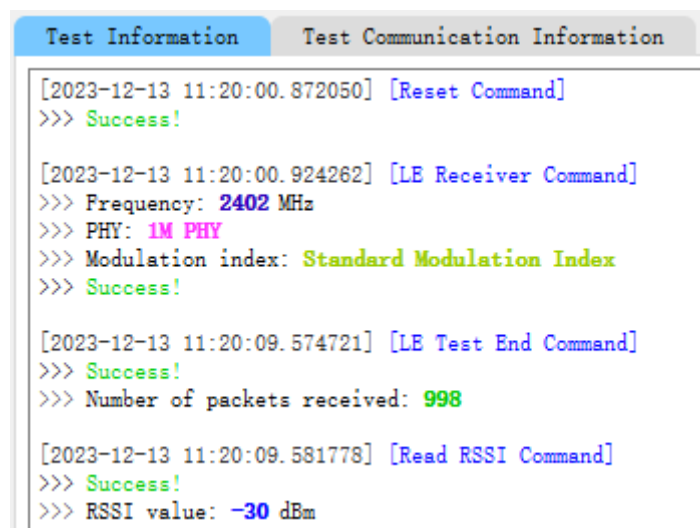


Figure 2-3-1-4-2 RF Rx test information display

Figure 2-3-1-4-2 shows the RF receiving test information display.

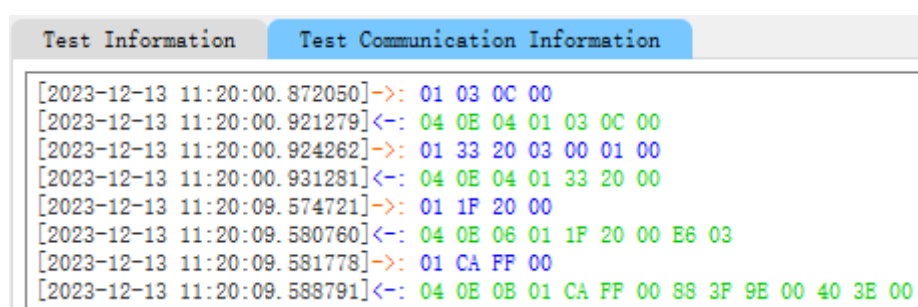


Figure 2-3-1-4-2 RF Rx test communication information display

Figure 2-3-1-4-3 shows the RF receiving test communication information display.

### 2.3.1.5.Carrier

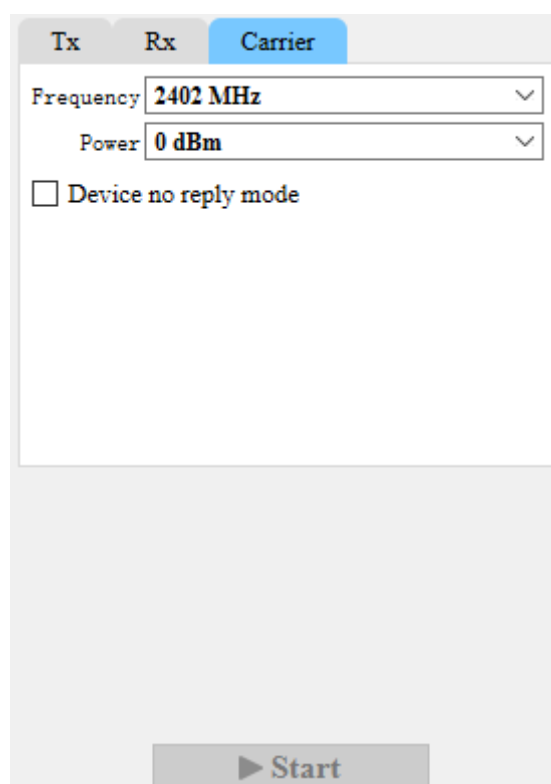


Figure 2-3-1-5-1 RF Carrier test configuration

As shown in Figure 2-3-1-5-1, the RF single-carrier test configuration display and configuration function interface.

The single-carrier test can only start if the serial port is opened successfully, the USB connection is opened successfully, or the USB automatically detects the connection.

**Frequency** : Sets the frequency of a single carrier. Supports **2402 MHz ~ 2480 MHz** Settings.

**Power** : This sets the single carrier transmit power. Supports **-45 dBm to 7 dBm**.

**Device No Reply Mode** : This is the mode allowed when setting the UART communication test. When the mode is enabled, the TX pin of the chip can be not connected to the chip, and the chip can also be used for single-carrier testing.

**Start** : The successful chip continues to emit a single carrier in order to perform the start single carrier test. When the test is stopped, the single carrier is stopped. Test information and test communication information will be displayed in the log box.

Test Information

Test Communication Information

```
[2023-12-13 10:55:46.727486] [Reset Command]
>>> Success!

[2023-12-13 10:55:46.778044] [Tx Power Command]
>>> Power: 0 dBm
>>> Success!

[2023-12-13 10:55:46.786606] [Carrier Command]
>>> Frequency: 2402 MHz
>>> Success!
```

Figure 2-3-1-5-2 RF Carrier test information display

Figure 2-3-1-5-2 shows the RF single-carrier test information display.

Test Information

Test Communication Information

```
[2023-12-13 10:55:46.727486]->: 01 03 0C 00
[2023-12-13 10:55:46.777024]<-: 04 0E 04 01 03 0C 00
[2023-12-13 10:55:46.778044]->: 01 C3 FF 01 00
[2023-12-13 10:55:46.784605]<-: 04 0E 04 01 C3 FF 00
[2023-12-13 10:55:46.786606]->: 01 CB FF 01 00
[2023-12-13 10:55:46.792607]<-: 04 0E 04 01 CB FF 00
```

Figure 2-3-1-5-3 RF Carrier test communication information display

As shown in Figure 2-3-1-5-3, the RF single-carrier test communication information display.

2.3.2.DFU interface

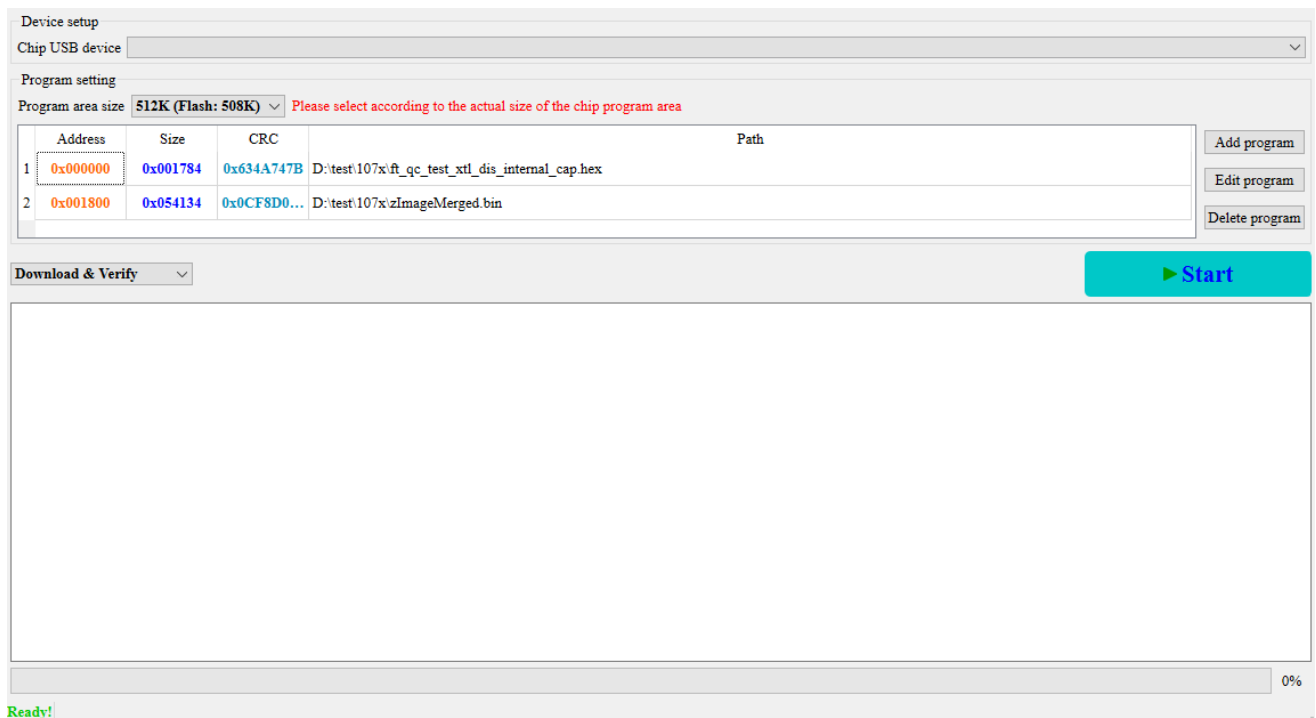


Figure 2-3-2-1 DFU interface

Figure 2-3-1-1 shows the DFU interface.

### 2.3.2.1.Device setup

Set the connected chip DFU USB device for selection.

When clicking on the USB device list item, the existing USB device will be automatically queried to add to the list to display the provided selection.

### 2.3.2.2.Program setting

Set the program file for DFU upgrade.

**Program area size :** This sets the Flash size of the chip on which DFU will be performed. **256K (Flash: 252K)**, **512K (Flash: 508K)**, **1M (Flash: 1020K)** and other options are supported.

**Note :** The choice must be made according to the actual size of the chip program area.

**Add program :** To add the program file to download. **.hex** or **.bin** format program files are supported.

**Add program** ? X

Address 0x  Size: 0x1784 - 5.879 KB ☒ Program data display

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
000000	08	08	00	20	F1	00	00	00	F9	00	00	00	D5	00	00	00
000010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
000020	00	00	00	00	00	00	00	00	00	00	00	00	FD	00	00	00
000030	00	00	00	00	00	00	00	00	FF	00	00	00	01	01	00	00
000040	03	01	00	00	03	01	00	00	00	00	00	00	03	01	00	00
000050	03	01	00	00	03	01	00	00	03	01	00	00	03	01	00	00
000060	03	01	00	00	00	00	00	00	03	01	00	00	03	01	00	00
000070	03	01	00	00	03	01	00	00	03	01	00	00	9D	0A	00	00
000080	03	01	00	00	03	01	00	00	03	01	00	00	00	00	00	00
000090	00	00	00	00	03	01	00	00	03	01	00	00	03	01	00	00
0000A0	00	00	00	00	00	00	00	00	00	00	00	00	03	01	00	00
0000B0	03	01	00	00	65	0B	00	00	1D	0B	00	00	00	00	00	00

Figure 2-3-2-2-1 Adding the application screen

When you click **Add Program**, you will see the Add program screen shown in Figure 2-3-2-2-1.

**Address** : This is a hexadecimal value that sets the download start address of the loaded program file. Must be 256 bytes aligned. And the address value must be within the program size range.

**Load Program** : To select the loader file.

**Program data display** : When checked, the loaded application data will be displayed in the display box below.

**Edit program** : To edit the program function in the selected program list.

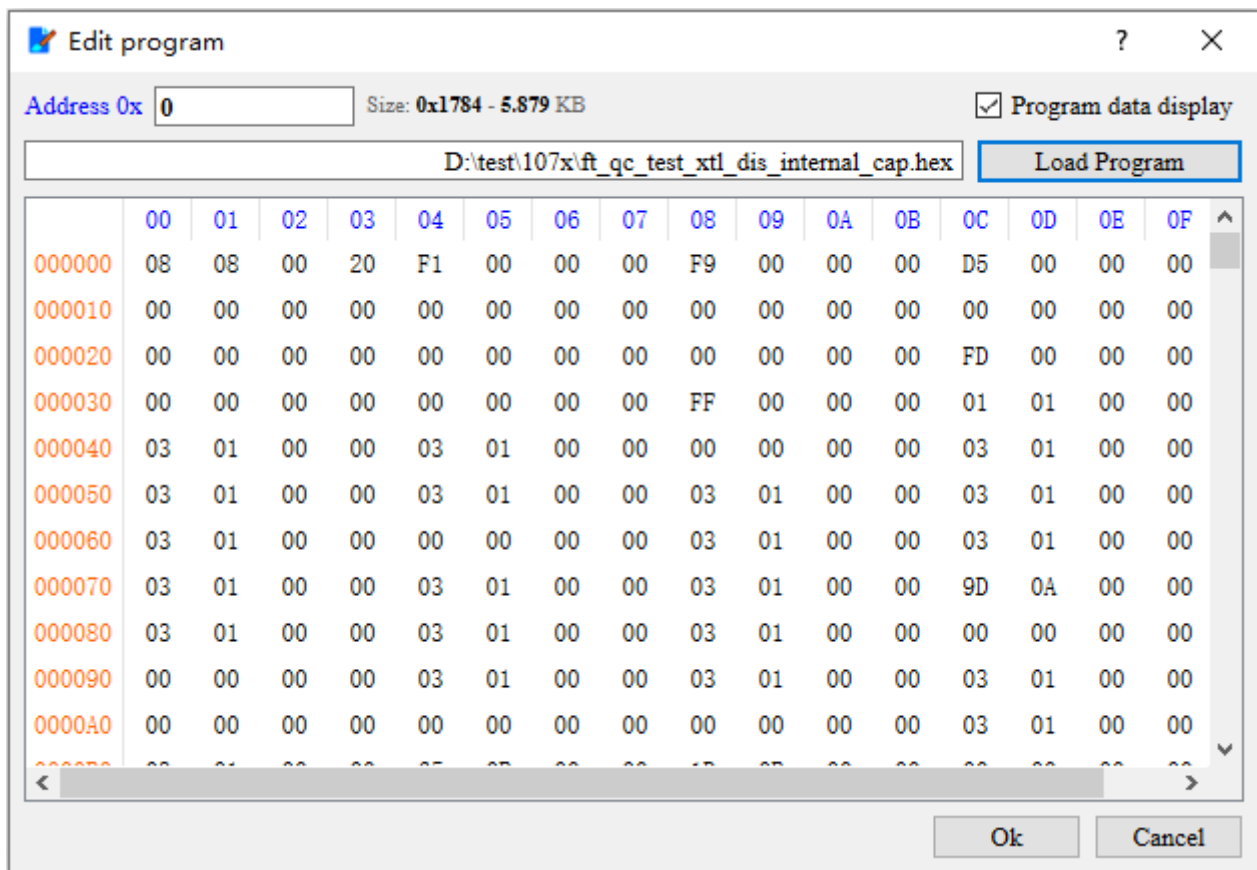


Figure 2-3-2-2-2 editing program interface

**Delete program** : To remove the program from the list of selected programs.

**Note** : You can continue adding multiple program files as long as the added program does not completely cover the program area specified by the selected program size. And there must be no overlapping area between program file data.

### 2.3.2.3.Download

Both **download** and **Download & Verify** modes are supported.

Select **Download** to download the program without read validation. The download takes a little less time, but there is no guarantee that the result will be downloaded.

Select **Download & Verify** to download the program, and the download completes the read verification. The download takes a little longer to ensure that the results are downloaded.

Click **Start** to start the download process. And the download process log is displayed in the log display box.

### 2.3.3.Pinout interface

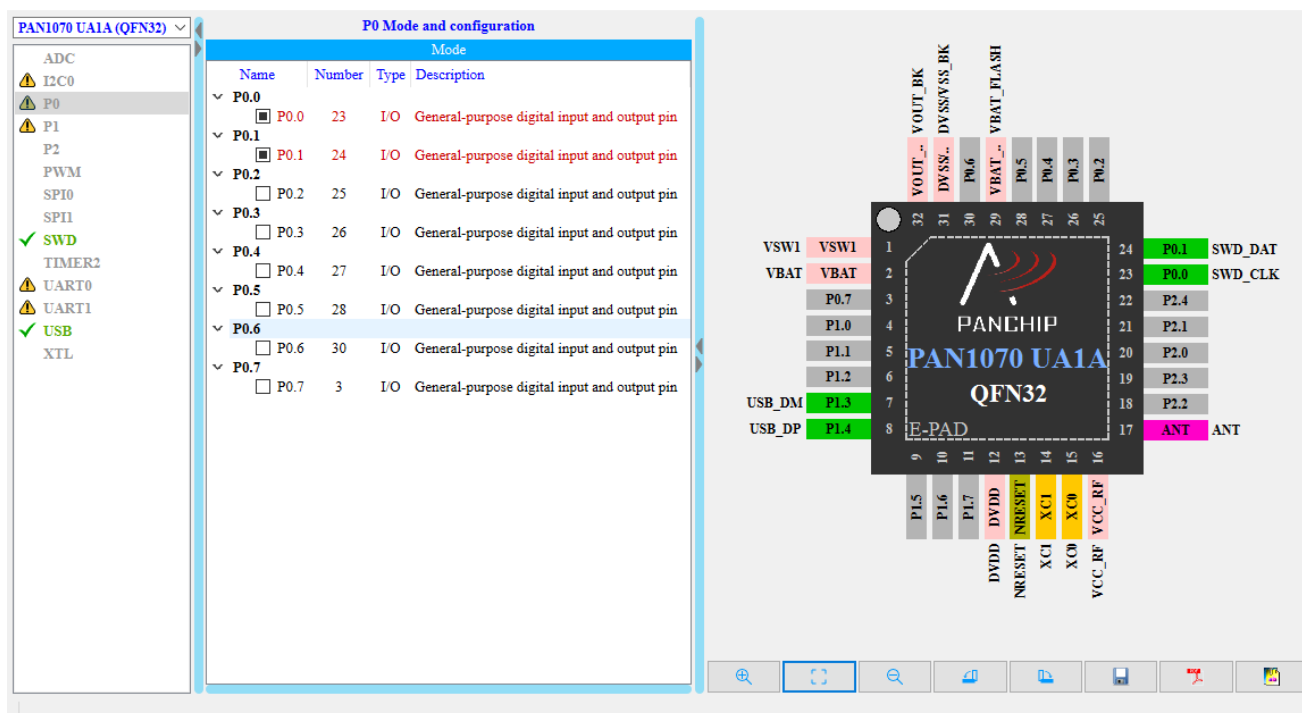


Figure 2-3-3-1 Pinout interface

As shown in Figure 2-3-3-1, for the elicited foot interface display, it provides a diagram of the pins of the view chip, as well as configuring the elicited foot configuration, and exporting the configured elicited foot configuration information.

**Chip model** : Select the chip model.

**Chip Pin Feature List** : Shows the list of pin feature names present for a given chip model. When selecting the corresponding function item, the information of the corresponding function foot will be listed and displayed in the middle.

**Modes and configurations** : Display the pin configuration corresponding to the specified feature mode, and support the pin configuration selection.

**Chip diagram display** : Provides a schematic display to display a specified chip model, a feature selection display to display a specified pin, and support to select and set the corresponding pin function.

When the mouse is moved over a specified pin, a prompt for that pin selection function is displayed.

When the mouse clicks on the specified pin, there is a multiplexing function pin, and the list of functions supported by the corresponding pin is listed, which can be selected for modification.

Support mouse drag schematic display, as well as scroll wheel zoom in and out of the schematic display.

Click **Enlarge icon** : This will enlarge the diagram up to 10x.

Click the **Adaptive Display icon** : This will display the usage map size according to the screen size.

Click **Shrink icon** : This will reduce the size of the diagram by at least 0.1 times.

Click the **90° Left icon** : This will rotate the diagram 90° to the left.

Click the **Right 90° icon** : This shows the diagram by turning it 90° right.

Click **Save icon** : This will save the diagram to a.png image file.

Click the **Generate PDF icon** : This will save the current pin configuration Settings to a PDF file.

Click the **Generate Data icon** : This will output the currently set pin configuration information to the overlay file, providing the zephyr project configuration.

2.3.4.RF Signal Collection interface

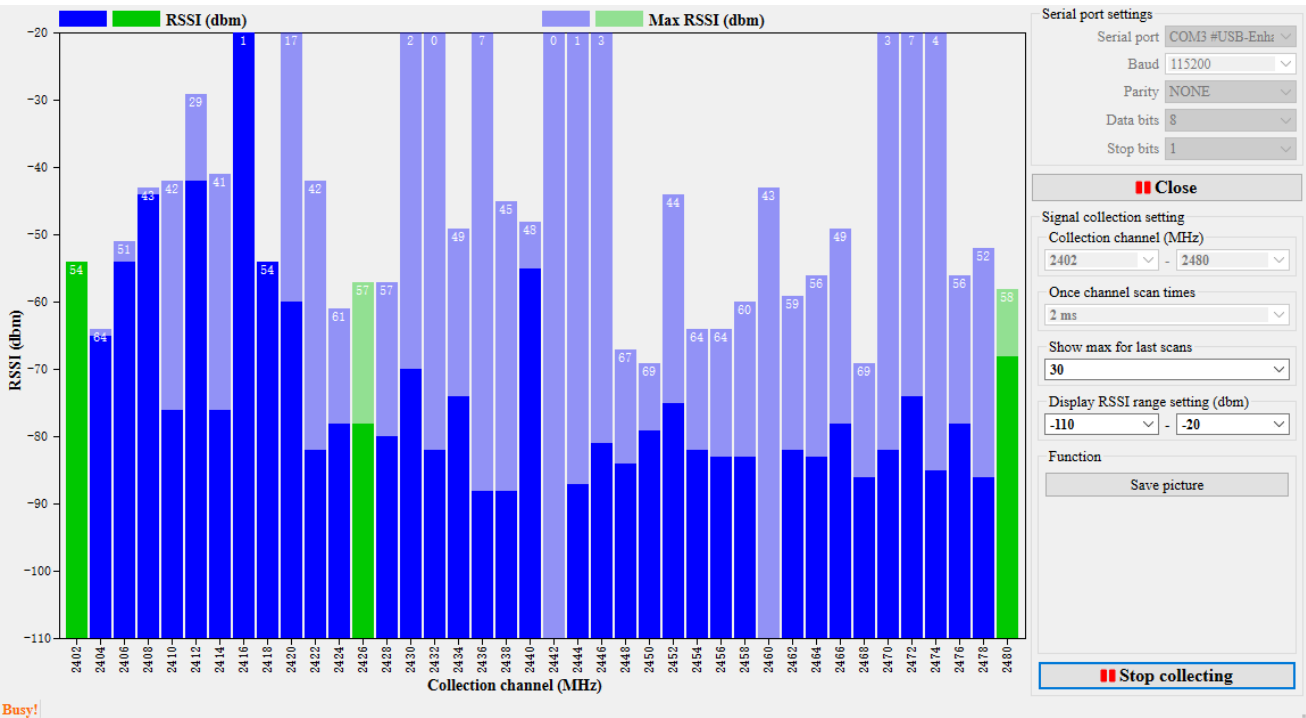


Figure 2-3-4-1 RF Signal Collection interface

FIG. 2-3-4-1 shows the RF signal collection interface. PAN107x chip module needs to download the corresponding RF signal collection firmware program before the collection test.

2.3.4.1.Serial port settings

The figure shows the Serial port settings dialog box. It contains the following settings: Serial port: COM3 #USB-Enh, Baud: 115200, Parity: NONE, Data bits: 8, and Stop bits: 1. There is an 'Open' button at the bottom.

Figure 2-3-4-1-1 Serial port settings

As shown in Figure 2-3-4-1-1, it is the setting of RF signal collection communication serial port.



**Serial port** : This is the device that sets the corresponding serial number. Click will automatically query the existence of serial devices, and added to the drop-down list display.

**Baud** : Set the baud rate of serial communication. The default communication baud rate is 115200 Hz.

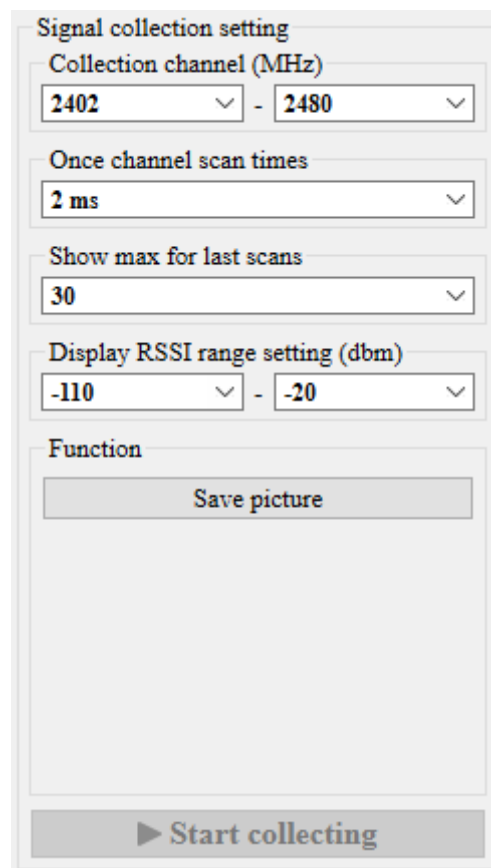
**Parity** : This is the check bit for serial communication. The default is NONE, which has no validation.

**Data bits** : This is used to set the serial communication data bit. The default is 8 bits.

**Stop bits** : This is the stop bit for serial communication. The default is 1 bit.

**Open** : To open the communication serial port device, the collection test can be carried out after the successful opening. **Close** : To close the serial port connection, if the collection is in progress, stop the collection first and then close it.

#### 2.3.4.2.Signal collection setting

The image shows a 'Signal collection setting' dialog box. It contains several settings: 'Collection channel (MHz)' with a range of 2402 to 2480; 'Once channel scan times' set to 2 ms; 'Show max for last scans' set to 30; 'Display RSSI range setting (dbm)' with a range of -110 to -20; a 'Function' section with a 'Save picture' button; and a 'Start collecting' button at the bottom right.

Signal collection setting

Collection channel (MHz)

2402 - 2480

Once channel scan times

2 ms

Show max for last scans

30

Display RSSI range setting (dbm)

-110 - -20

Function

Save picture

Start collecting

Figure 2-3-4-2-1 Signal collection setting

**Collection channel** : Sets the collection channel frequency range. In MHz.

**Start channel frequency** : The preceding value sets the start channel frequency, which is allowed to be set in the range of 2402 ~ 2480 MHz. The setting value must be less than or equal to the end channel frequency.

**End channel frequency** : The last value is the set end channel frequency, which is allowed to be set in the range of 2402 ~ 2480 MHz and must be greater than or equal to the start channel frequency.

**Once channel scan times** : is the single channel scan time of the chip when the collection signal strength is set. The support range is 1–20 ms, and default is the default scan time.

**Show max for last scans** : To set the collection buffer, store the number of data sets of the latest collection signal strength information. Display collects the maximum intensity value from the cache to query the maximum value for display.

**Display RSSI range setting** : Sets the display signal strength range for the display signal strength graphic area.

**Minimum RSSI** : The preceding value is set to the minimum strength, which can be set from -110 to 0 dbm, and must be less than or equal to the maximum strength.

**Maximum RSSI** : The last value is the maximum strength, which can be set from -110 to 0 dbm, and must be greater than or equal to the minimum strength.

**Save picture** : To save the capture intensity display as .png image to a file.

**Start collecting** : The start collection button is enabled only after the serial port has been opened successfully. **Stop collecting** : This means stop ingest.

### 2.3.4.3.Signal RSSI display area

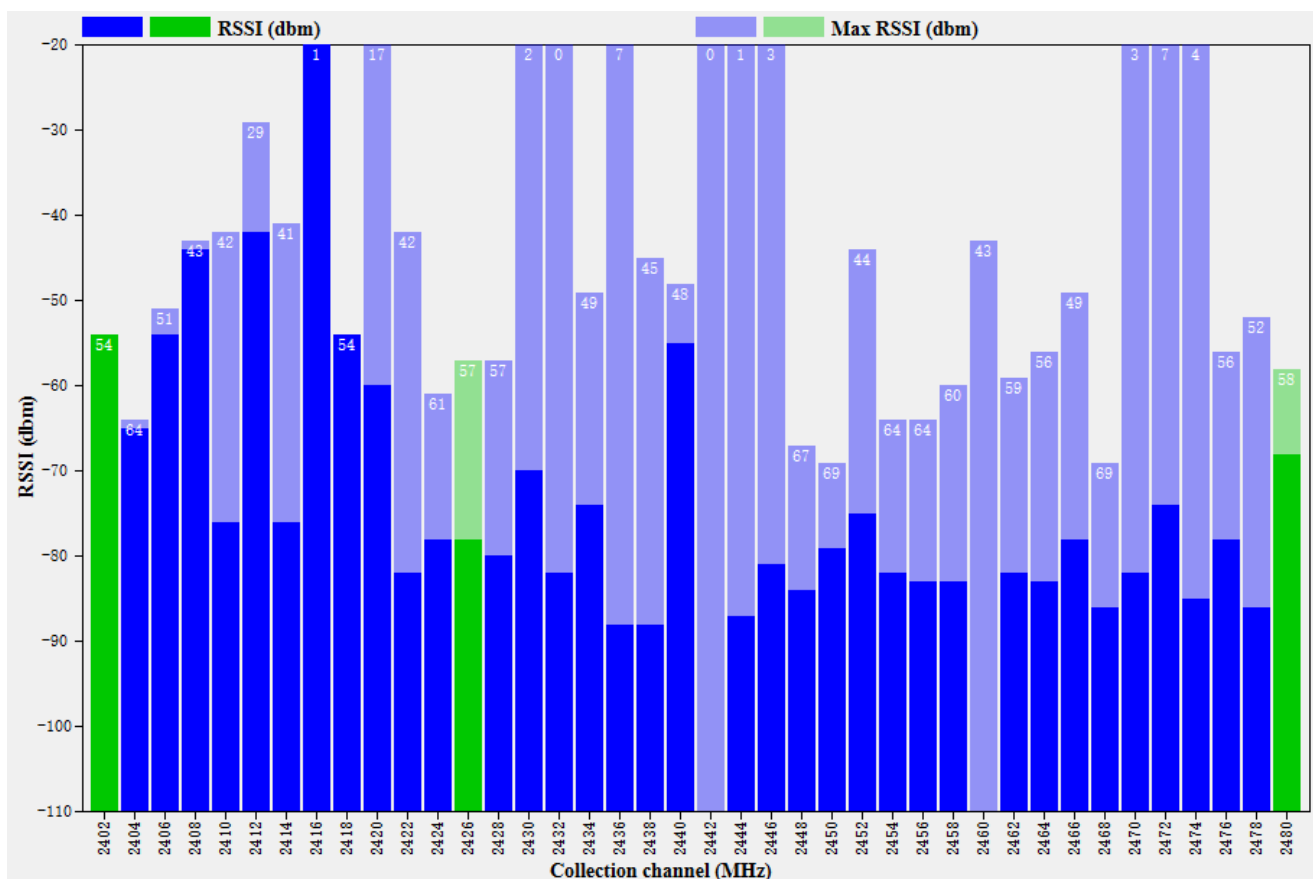


Figure 2-3-4-3-1 Signal RSSI display area

Figure 2-3-4-3-1 shows the display of the signal strength display area.

**Capture channels** : This is displayed on the horizontal axis, showing all supported channels.

**RSSI** : The height of the vertical bar chart is displayed.

**RSSI** : Dark color display, for the latest collected signal strength display.

**Max RSSI** : Light color display to show the maximum intensity display of the channel for which the latest cache acquisition signal strength is calculated, as well as the absolute value of the maximum intensity value.

**RSSI Display range** : displays the intensity range scale value.