SONIX TECHNOLOGY CO., LTD.

User Manual

SN9380 RF User Guide

Version: 1.1

Language: English

Apply to: SN9380 series

Revision History

Date	Revision	Description
2022-8-12	V1.0	First version
2023-12-15	V1.1	Add setting snapshots

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1 Test tool

1.1 SN9380_RF Tool FW_V1.53_UART1_1M&2M.bin : Firmware file for FCC test

1.2 SN9380 RF Test V2.00_20220804.exe : SN9380 RF test tool

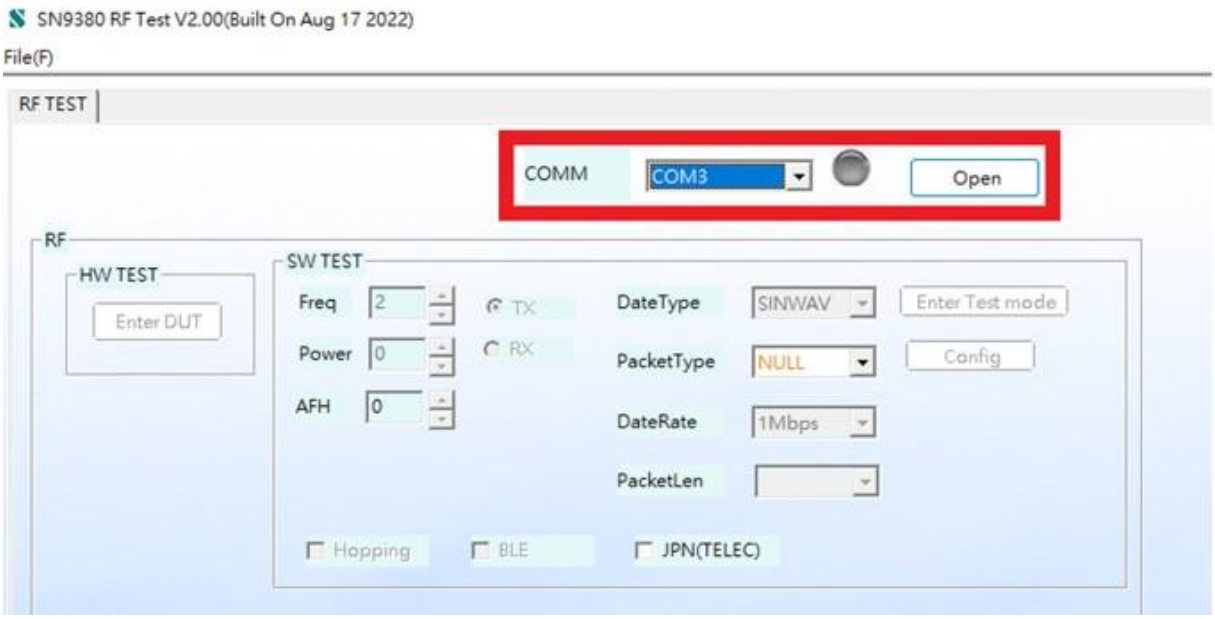
2 Test flow

2.1 Program "SN9380_RF Tool FW V1.53.bin" using SPI daughter board

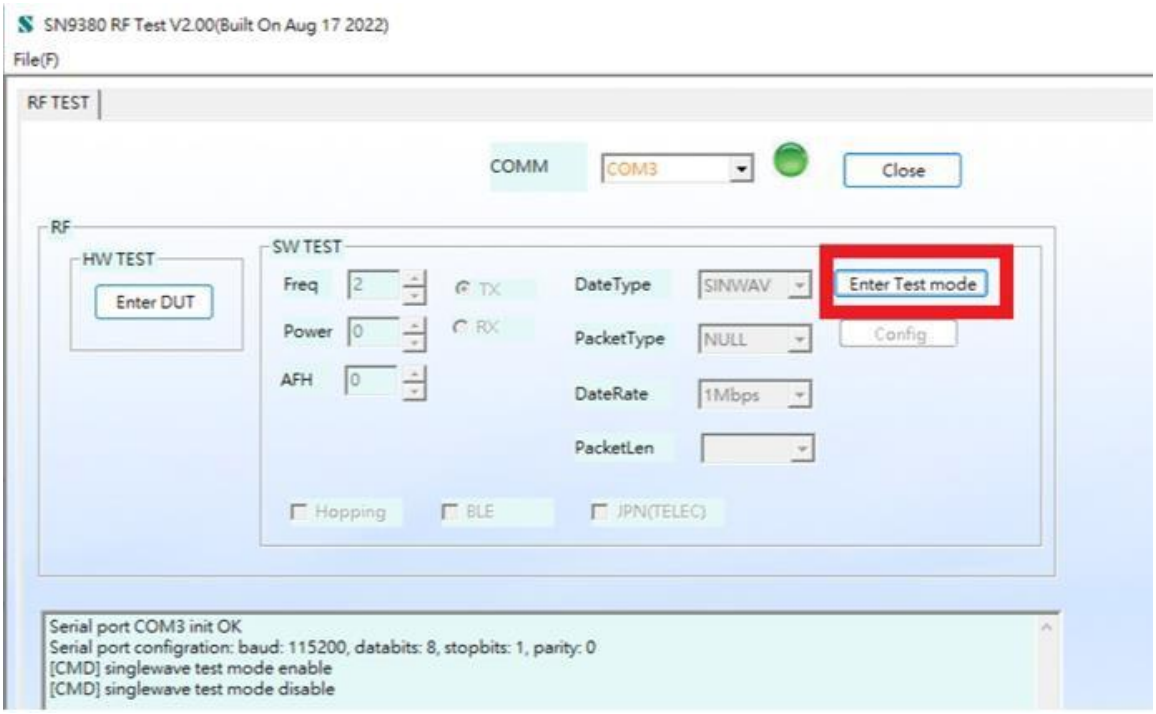
2.2 Connect SN9380 UART to PC using USB to UART tool

2.3 After the connection is successful, the PC device will display the corresponding port

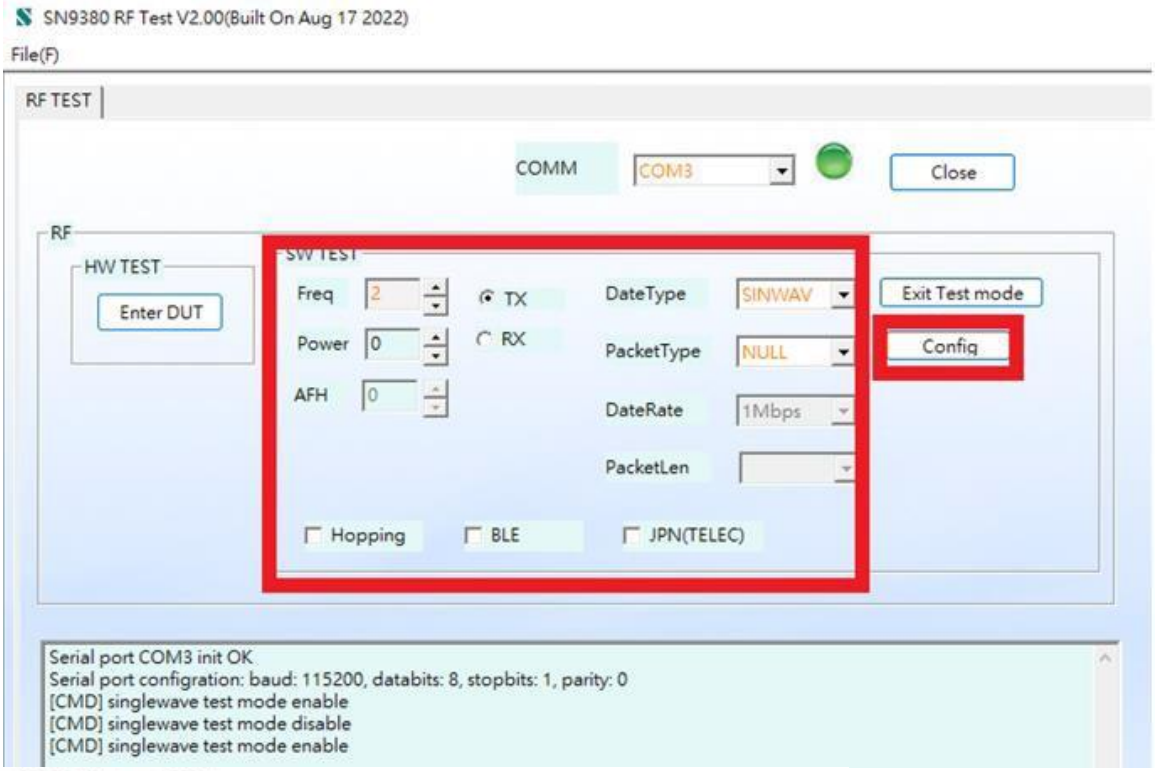
2.4 Open the SN9380 RF Test V2.00 software, select the corresponding communication port, click the open button to open the UART

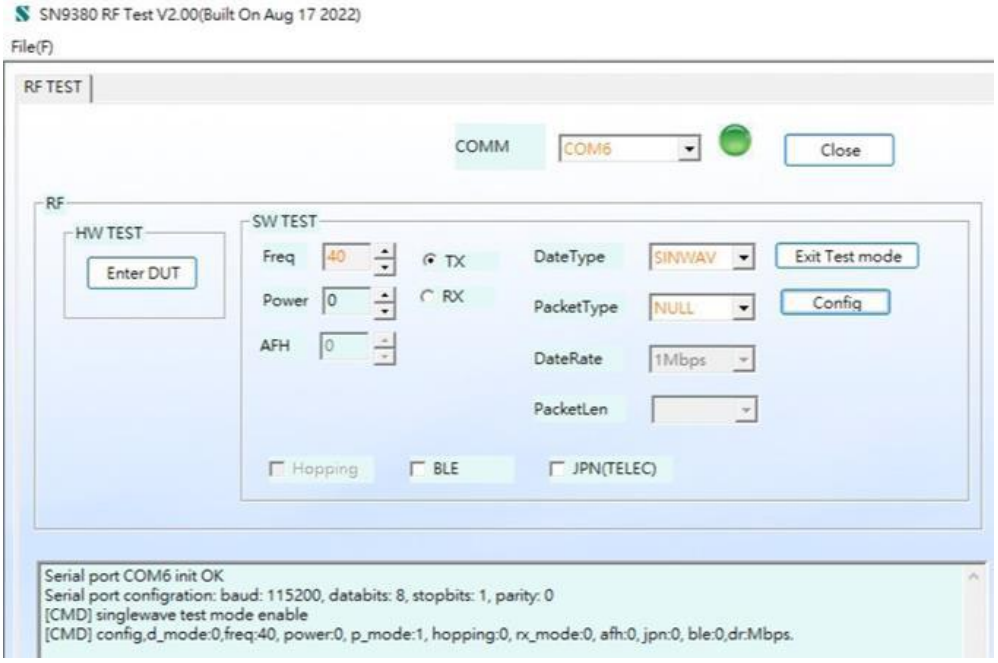


2.5 Click the Enter Test button to start the RF test function



2.6 According to test item, select the frequency point, power, mode (TX/RX), data type and packet type, and then click the configure button to start the test

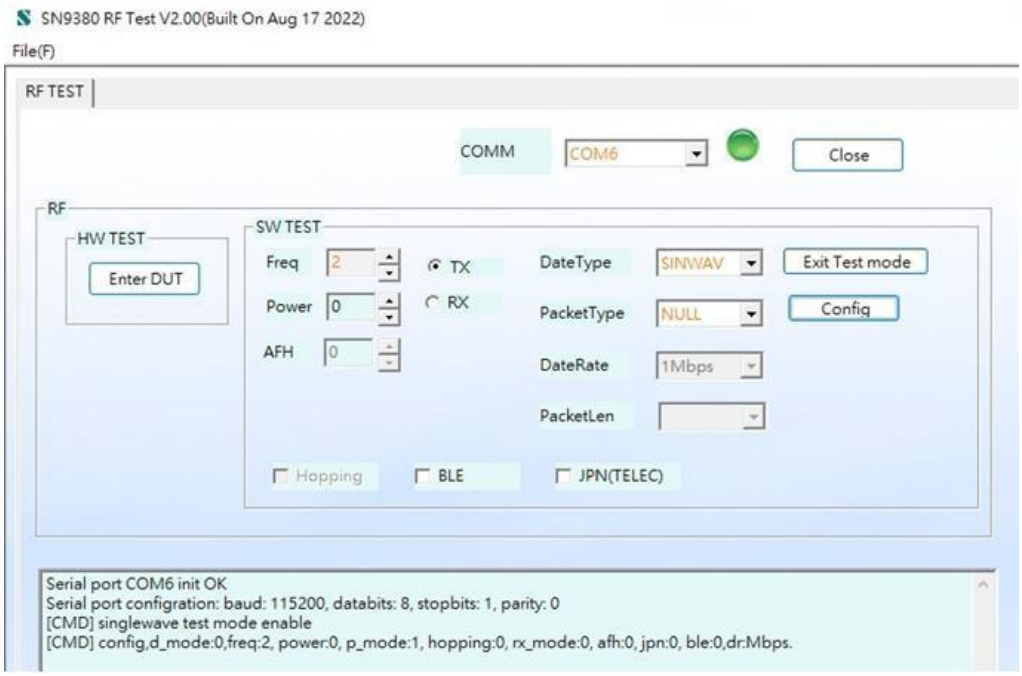




3 Option description

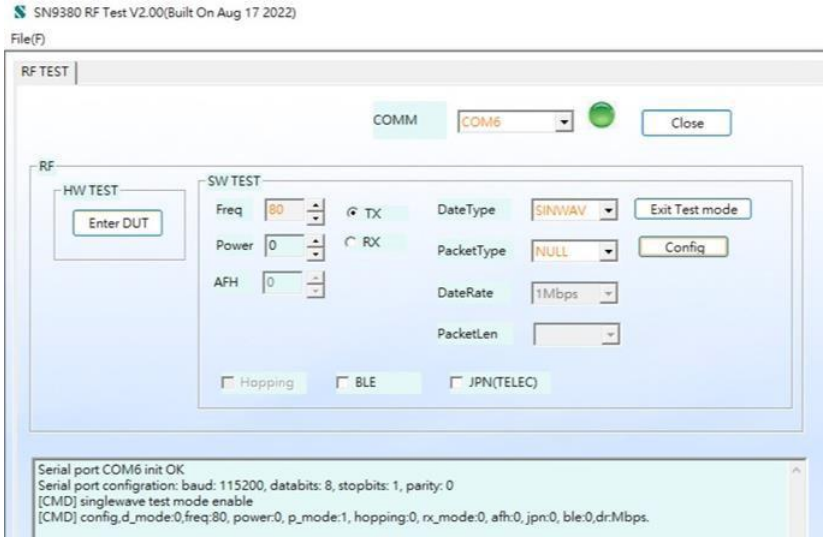
3.1 Frequency point: Set the center frequency (range 2402MHz - 2480MHz), for example: select 40, which means the center frequency is 2440MHz

3.1.1 Frequency set 2402 MHz: Freq select 2 then press Config button

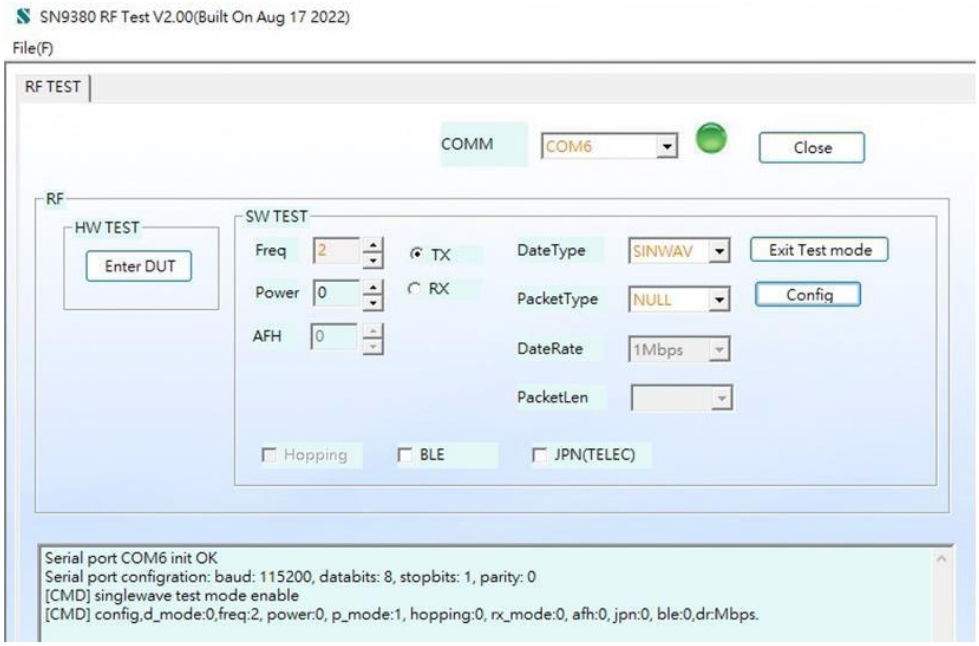


3.1.2 Frequency set 2440 MHz: Freq select 40 then press Config button

3.1.3 Frequency set 2480 MHz: Freq select 80 then press Config button



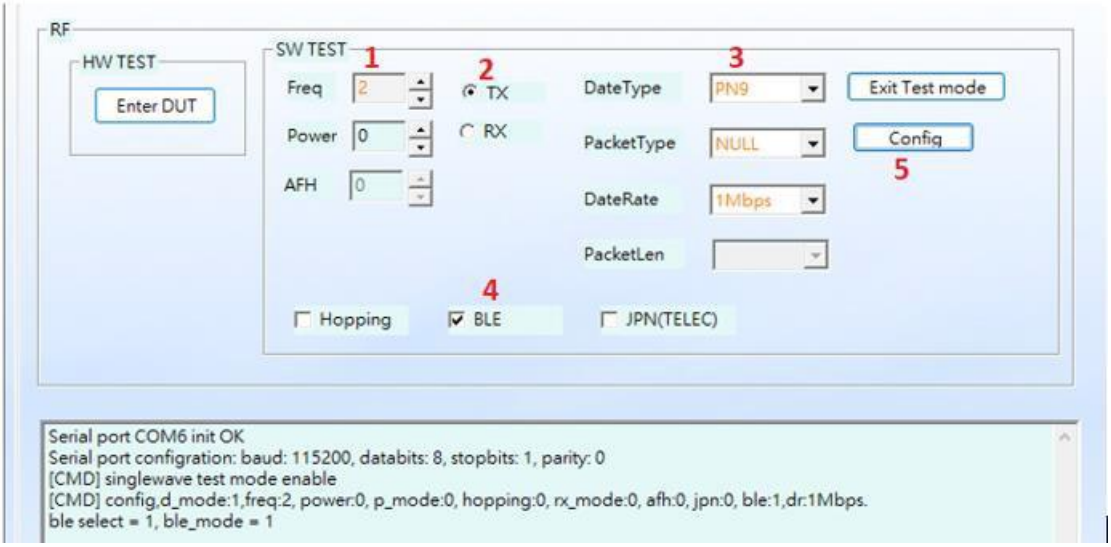
3.2 Power: Indicates the TX POWER to be set. The tool has 4 levels from 0 to 3. Selecting 0 means the value set to the register is 0xC, 1 means 0xD, 2 means 0xE, and 3 means 0xF



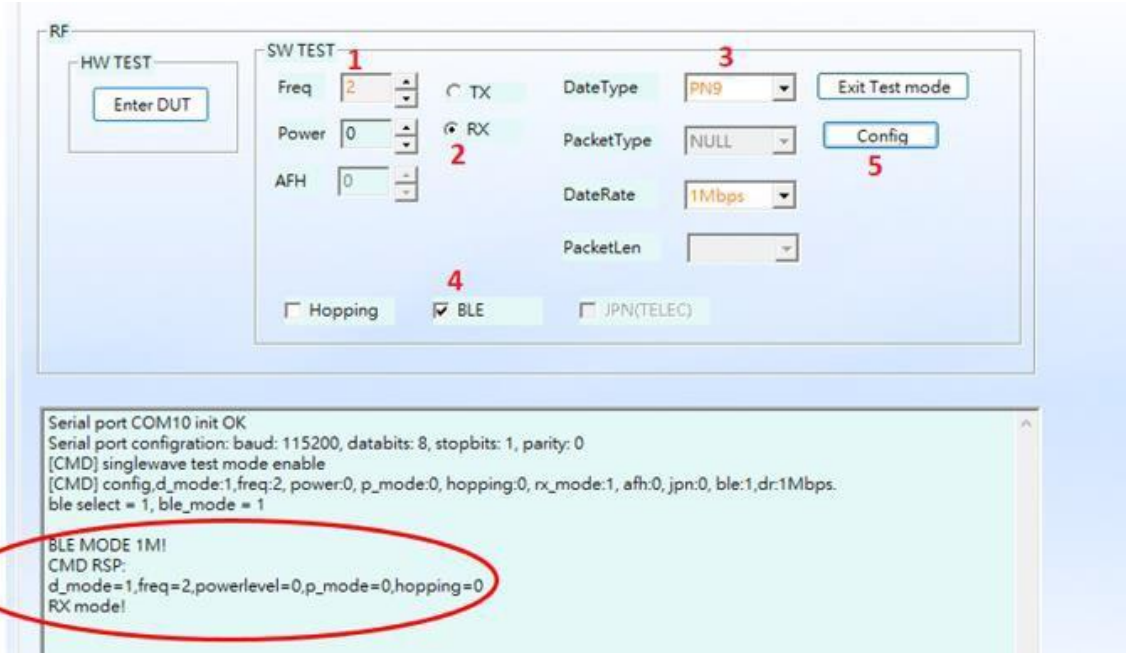
3.3 TX means transmit mode selection, RX means receive mode selection

3.3.1 Set RX 2402 MHz receiving

- TX device: Freq =2, TX=Enable, Data=PN9, BLE=Enable

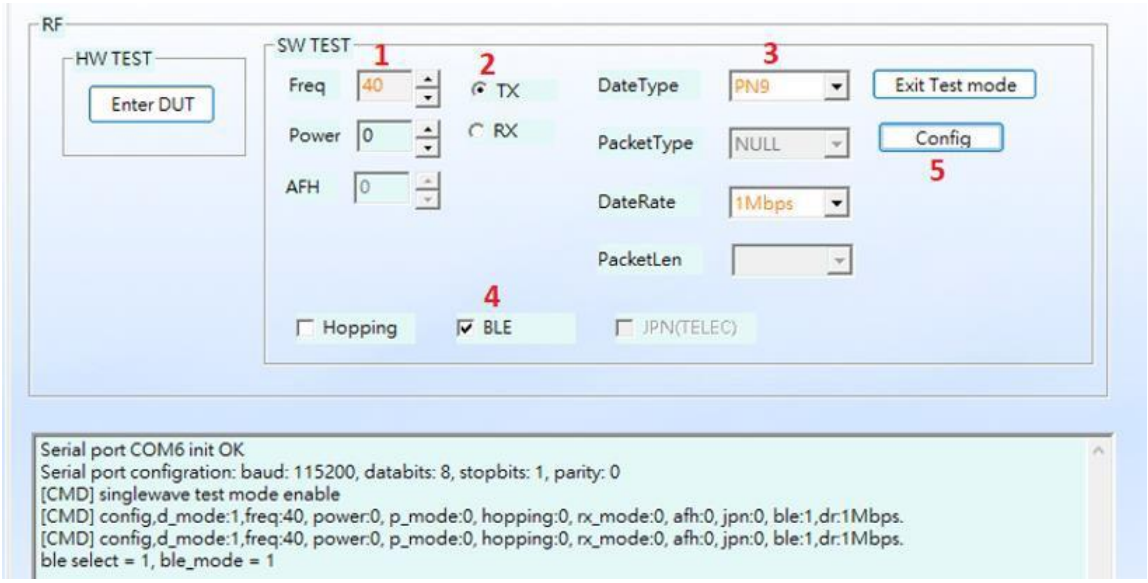


- RX device: Freq =2, RX=Enable, Data=PN9, BLE=Enable,
  Check log message, make sure frequency is correct freq=2

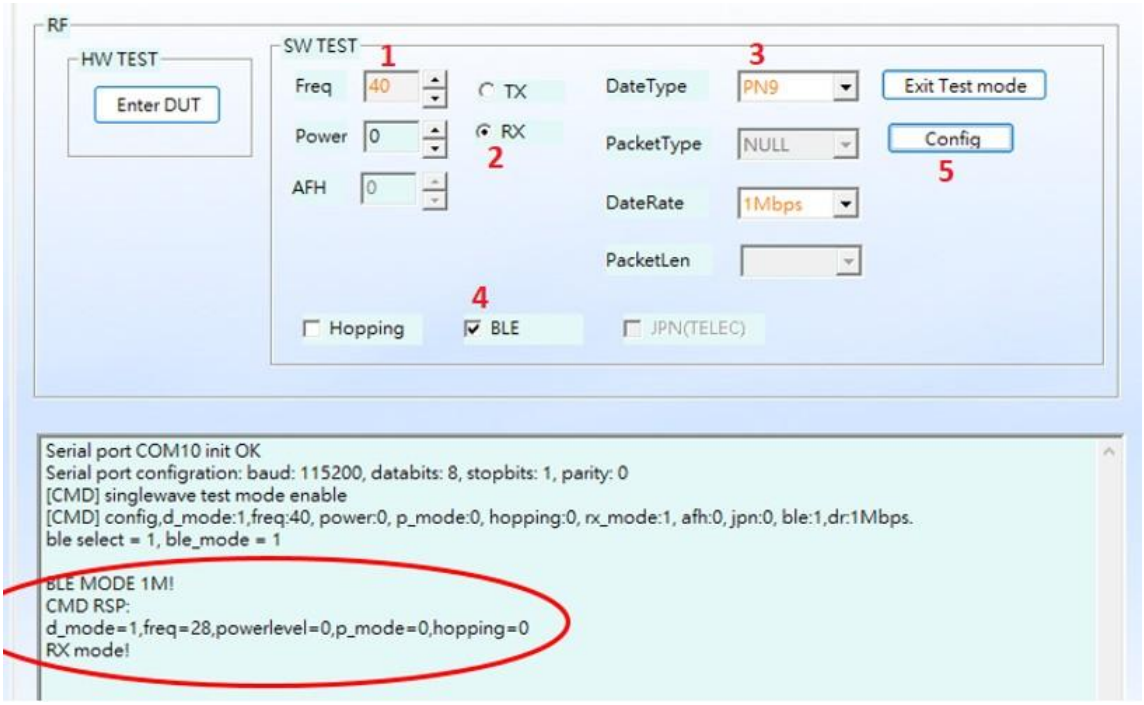


3.3.2 Set RX 2440 MHz receiving

- TX device: Freq =40, TX=Enable, Data=PN9, BLE=Enable

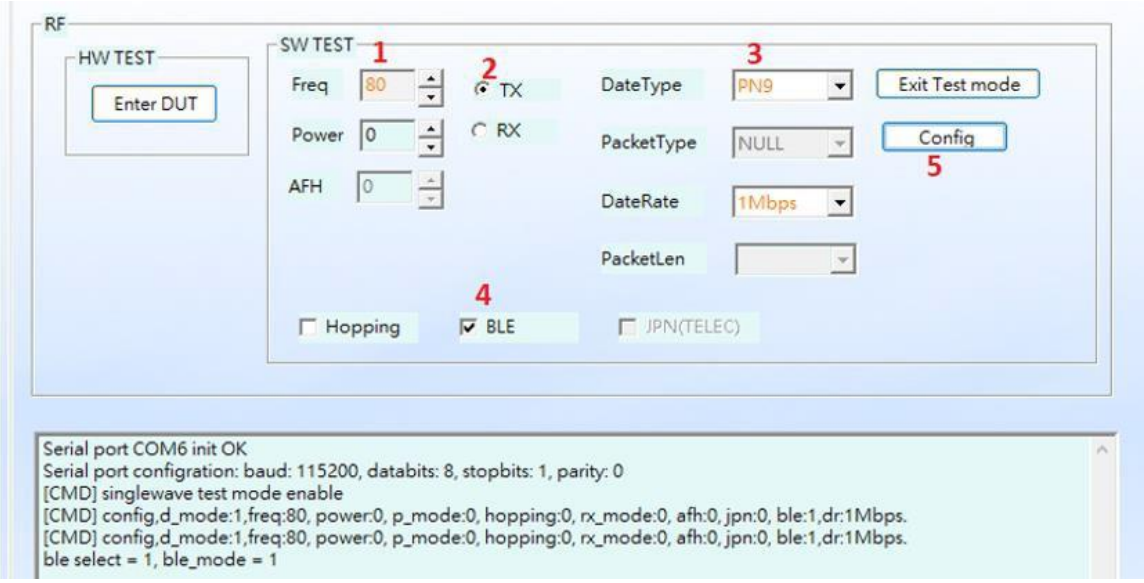


- RX device: Freq =40, RX=Enable, Data=PN9, BLE=Enable
  Check log message, make sure frequency is correct freq=28(0x28=40)

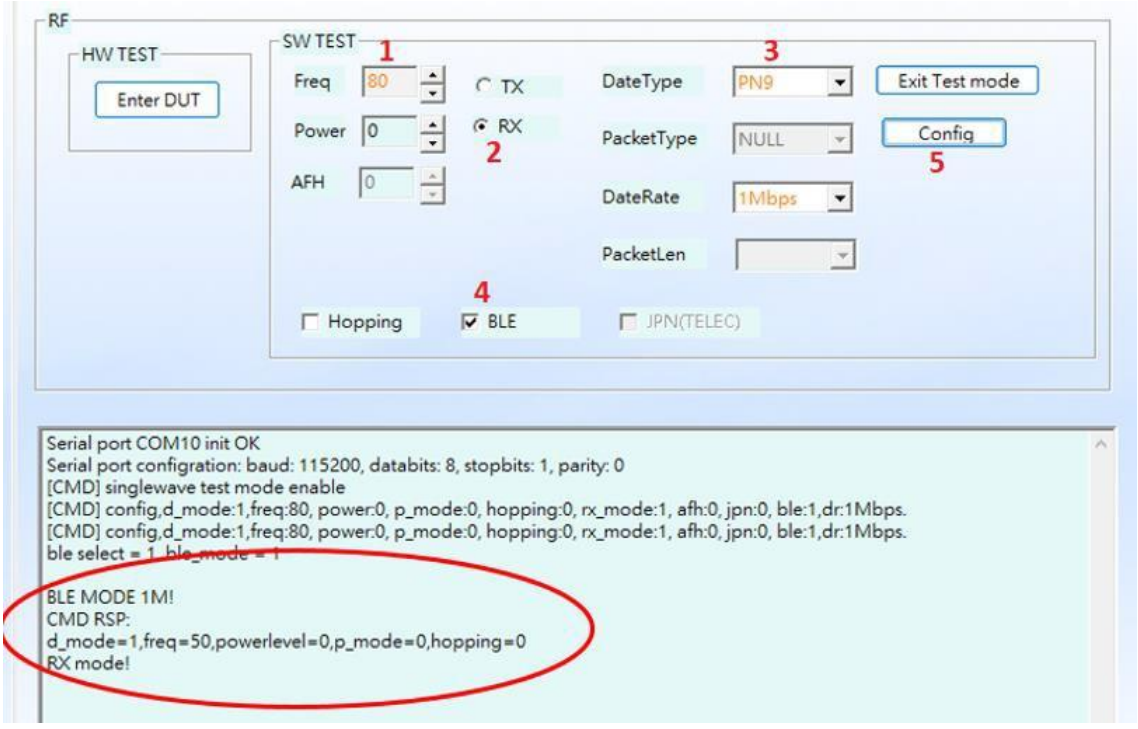


3.3.3 Set RX 2480 MHz receiving

- TX device: Freq =40, TX=Enable, Data=PN9, BLE=Enable



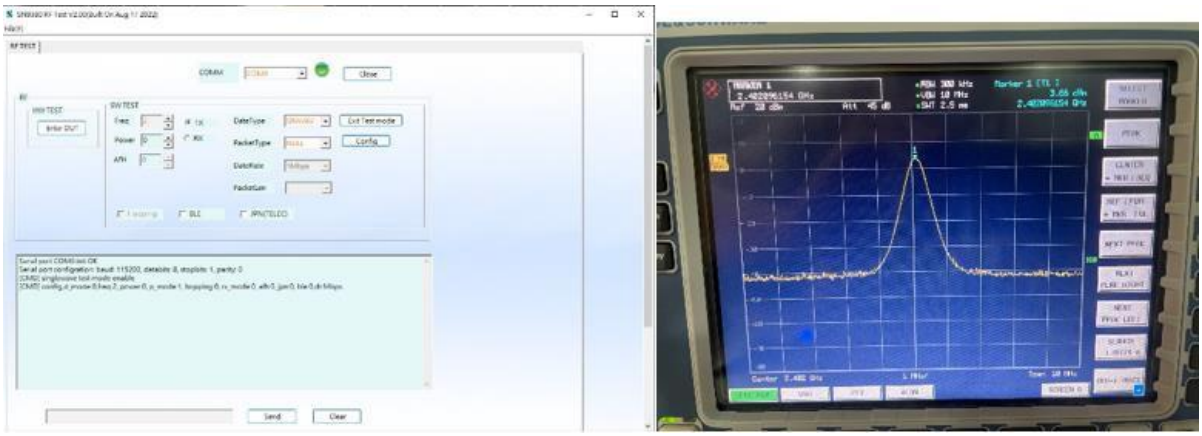
- RX device: Freq =40, RX=Enable, Data=PN9, BLE=Enable
  Check log message, make sure frequency is correct freq=50(0x50=80)



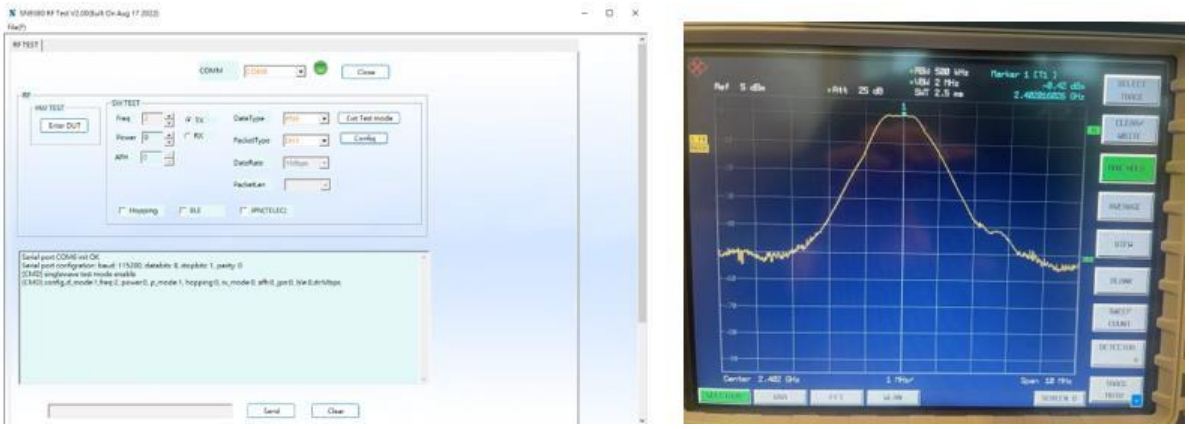
3.4 Data type: There are two types of data, one is single carrier, the other is PN9; single carrier means packet without data, PN9 means data packet with data ;

3.4.1 Frequency 2402 MHz carrier setting:

- Carrier Off, Freq = 2, Data type = SINWAVE, Packet type = DH1

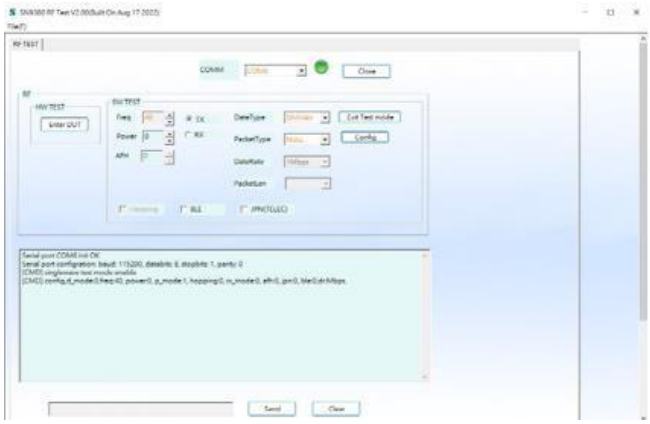


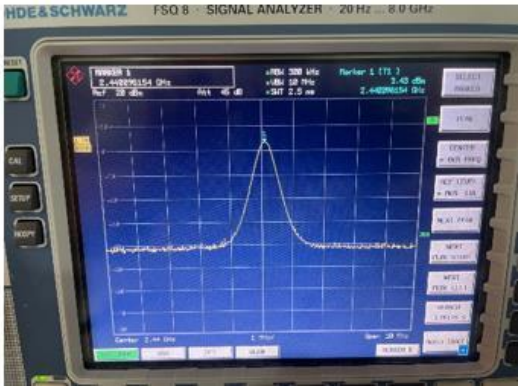
- Carrier On, Freq = 2, Data type = PN9, Packet type = DH1



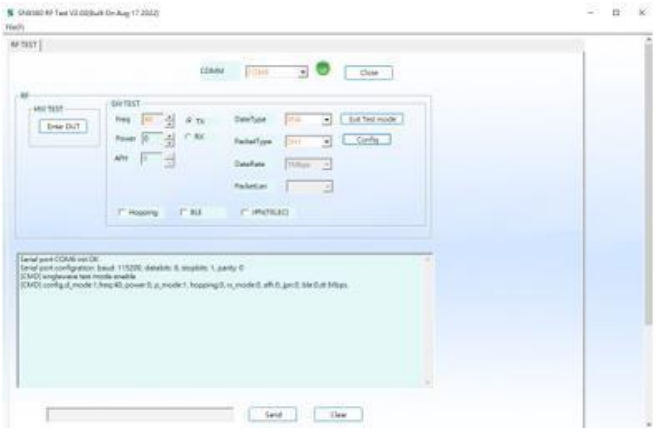
3.4.2 Frequency 2440 MHz carrier setting:

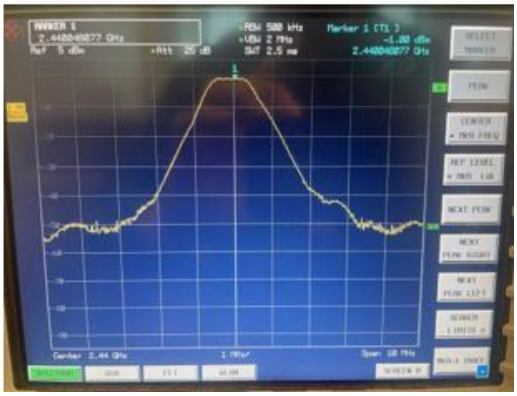
- Carrier Off, Freq = 40, Data type = SINWAVE, Packet type = DH1





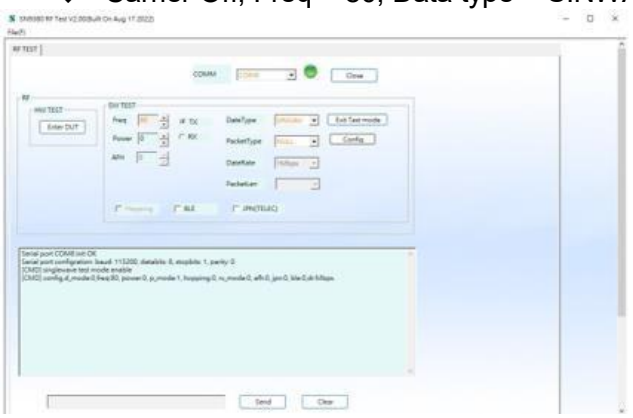
- Carrier On, Freq = 40, Data type = PN9, Packet type = DH1

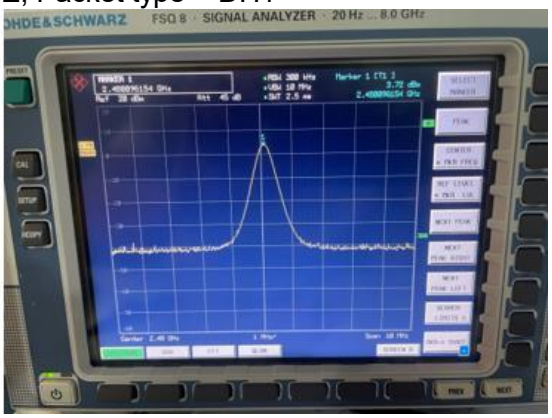




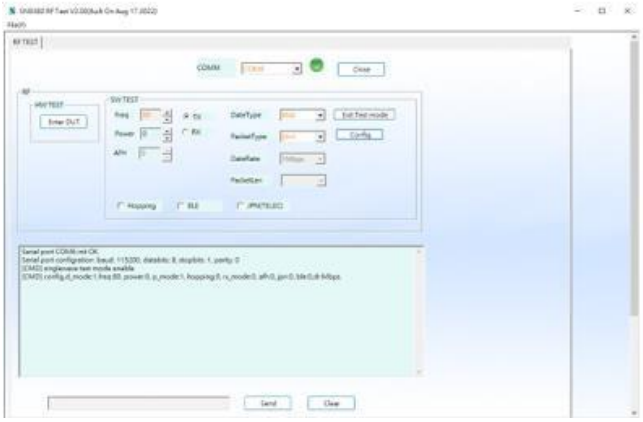
3.4.3 Frequency 2440 MHz carrier setting:

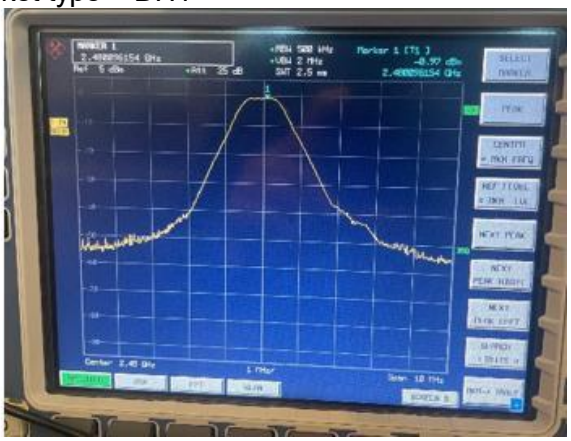
- Carrier Off, Freq = 80, Data type = SINWAVE, Packet type = DH1





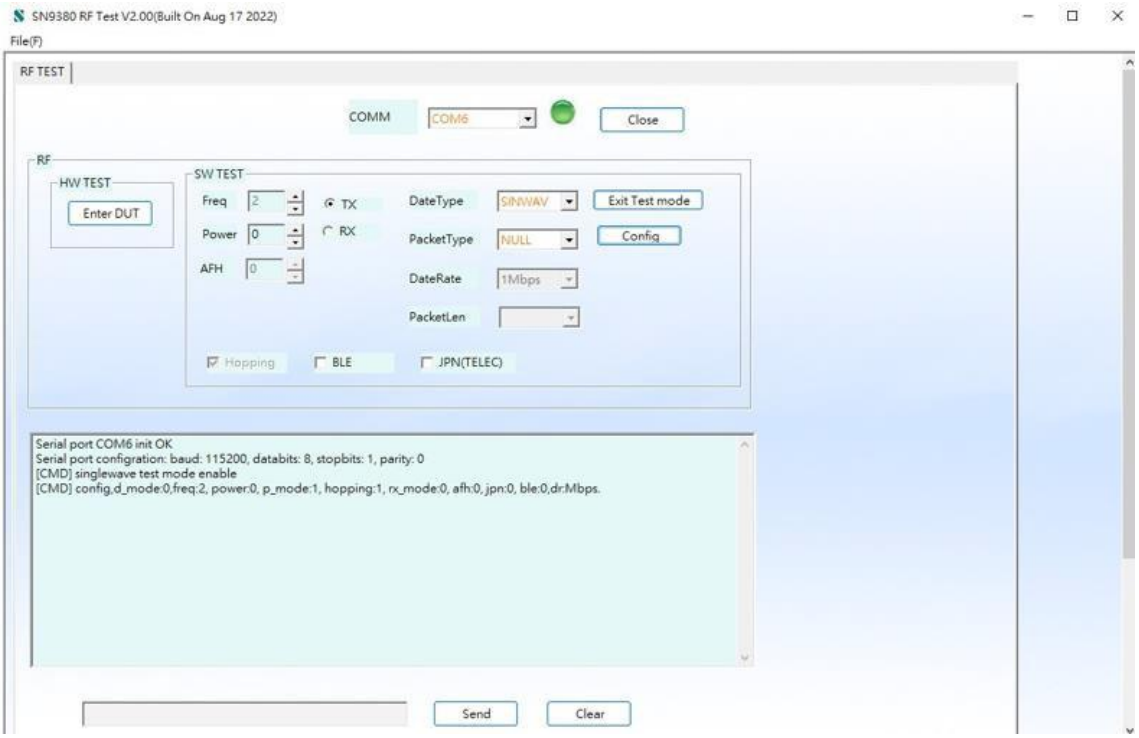
- Carrier On, Freq = 80, Data type = PN9, Packet type = DH1





3.5 Packet type: Packet type can choose NULL and DH1;

3.6 Hopping option indicates whether frequency hopping



Integration instructions for host product manufacturers according to KDB 996369
D03OEM Manual v01

4.2 List of applicable FCC rules
FCC Part 15.247
KDB558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10:2020

4.3 Specific operational use conditions
The module can be used for mobile applications with a maximum 2dBi antenna. The host manufacturer installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation. The host manufacturer has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warning as show in this manual.

4.4 Limited module procedures
The device is a Single module and complies with the requirement of FCC Part 15.247.

4.5 Trace antenna designs
Not applicable, The module has its own antenna, and doesn’t need a host sprinted board micro strip trace antenna etc

4.6 RF exposure considerations
The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction; and if RF exposure statement or module layout is changed, then the host product manufacturer required to take responsibility of the module through a change in FCC ID or new application The FCC ID of the module cannot be used on the final product In these circumstances, the host manufacturer will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization

4.7 Antennas
Antenna Specification are as follows:
Type of antenna: PCB Antenna
Gain of antenna: 2dBi Max.
This device is intended only for host manufacturers under the following conditions: The transmitter module may not be co-located with any other transmitter or antenna;
The module shall be only used with the internal antenna(s) that has been originally tested and certified with this module. The antenna must be either permanently attached or employ a “unique" antenna coupler
As long as the conditions above are met, further transmitter test will not be required
However, the host manufacturer is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc)

4.8 Label and compliance information
Host product manufacturers need to provide a physical or e-label stating " Contains FCC ID: 2BMXW-SN9380M1"with their finished product

4.9 Information on test modes and additional testing requirements

Host manufacturer must perform test of radiated & conducted emission and spurious emission, e.t.c according to the actual test modes for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

Only when all the test results of test modes comply with FCC requirements, then the end product can be sold legally.

4.10 Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only FCC authorized for FCC Part 15.247 KDB558074 D01 15.247 Meas Guidance v05r02, ANSI C63.10:20207 and that the host product manufacturer is responsible for compliance to any other

FCC rules that apply to the host not covered by the modular transmitter grant of certification.

If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuit), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed

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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) (2) this device must accept any interference received, including interference that may cause undesired operation.
Note: 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.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions (mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID:2BMXW-SN9380M1

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