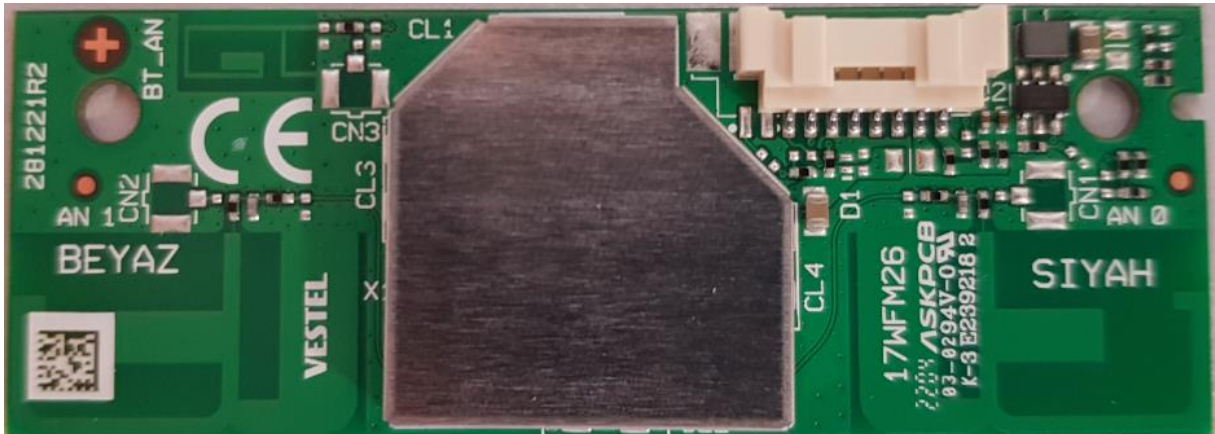


17WFM26

Product Specification and User Manual



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Author	Note	Date	Version
Büşra Demirtaş	Initial Draft	13.08.2021	V1.0
Büşra Demirtaş	Add target power table and power consumption	26.09.2021	V1.1
Cevdet Ersavaş	Add statements for FCC	08.02.2022	V1.2
Cevdet Ersavaş	Add statements for FCC	27.06.2022	V1.3

Information given in this document may change without any notification.

1 General Description

The 17WFM26 WI-FI + BT combo module design is a highly integrated MIMO wireless LAN (WLAN) and BT solution to let users enjoy the digital content via the wireless technology and connect wireless sound devices, HID devices, BT remote controller etc. The card is built with WI-FI 2T2R and Bluetooth v5.1 with Low Energy (LE) capable RF/baseband single chip. 17WFM26 is based on MediaTek MT7663BUN solution.

2 Features

- IEEE 802.11a/b/g/n/ac Dual Band WLAN standards
- Support 20/40MHz bandwidth in 2.4GHz and 20/40/80MHz bandwidth in 5GHz bands
- Bluetooth 5.1 with BLE
- Support Dual band 2T2R mode
- USB2.0 interface
- Printed PIFA antennas (WLAN Printed Antennas, BT Printed Antenna)
- External antenna option with U.F.L micro coax RF socket (with BOM option)

3 Key Specification

Main chipset	MT7663BUN, Mediatek
Frequency range *	WLAN: 2402-2482MHz, 5180-5320MHz, 5500-5700MHz
	Bluetooth: 2402-2480MHz
Channels support *	WLAN: CH1-13, CH36-64, CH100-140
	Bluetooth: CH0-78
Host interface	USB 2.0

* Supported channels/frequencies are controlled by country information which is selected after first boot up. Not supported frequency ranges (according to country regulations) are disabled/deactivated by device driver. Please refer to related sections.

4 Electrical Specification

4.1 Power supply voltages

DC supply to module	Min	Typ	Max
VCC	4.75 V	5 V	5.25

4.2 Current consumption

Note (VCC 5V)	Typ (mA rms)	Max peak (A)
Idle (2.4G, HT20, Ch6) *	83,14	1,096
2.4G, HT20, Ch6, Rx mode	153,3	1,200
2.4G, HT20, Ch6, Tx mode	276	1,208
2.4G, HT20, Ch6, Rx mode + BT	181,3	1,272
2.4G, HT20, Ch6, Tx mode + BT	330,6	1,248
Idle (5G, VHT20, Ch48) *	96,74	1,44
5G, VHT20, Ch48, Rx mode	160,6	1,3
5G, VHT20, Ch48, Tx mode	475	1,336
5G, VHT20, Ch48, Tx mode + BT	513	1,44
Idle (5G, VHT80, Ch108) *	104,9	1,24
5G, VHT80, Ch108, Rx mode	217,8	1,38

5G, VHT80, Ch108, Tx mode	405,2	1,38
5G, VHT80, Ch108, Rx mode + BT	234	1,44

* Idle means, it is connected to access point but no data streaming.

4.3 Thermal characteristics

Operating temperature is 65 degree. Tj max 125 degree for wifi/BT SOC.

5 RF Characteristic

5.1 Wi-Fi

Typical power levels for wi-fi radio are given in figure below.

	2.4G BAND			
Standard	802.11b	802.11g	802.11n	802.11n
Modulation	DSS,CCK	OFDM	OFDM	OFDM
Data Rate	1,2,5,5,11	6,9,12,18,24,36,48,54	MCS0 - 9 (HT20)	MCS0 - 9 (HT40)
Channel	CH 1-13	CH 1-13	CH 1-13	CH 1-13
Power (dBm) +/-3	11,5	13,5	13,5	13,5
	5G BAND			
Standard	802.11a	802.11n/ac	802.11n/ac	802.11ac
Modulation	OFDM	OFDM	OFDM	OFDM
Data Rate	6,9,12,18,24,36,48,54	MCS0 - 9 (HT20)	MCS0 - 9 (HT40)	MCS0 - 9 (HT80)
Channel	CH 36-64, CH 100-140	CH 36-64, CH 100-140	CH 36-64, CH 100-140	CH 36-64, CH 100-140
Power (dBm) +/-3	14	14	14	14

Typical Rx sensitivity levels for wi-fi radio are given in figure below.

	2.4G BAND			
Standard	802.11b	802.11g	802.11n	802.11n
Modulation	DSS,CCK	OFDM	OFDM	OFDM
Data Rate	CCK1 / CCK11	OFDM6 / OFDM54	MCS0 / MCS7 (HT20)	MCS0 / MCS7 (HT40)
Channel	CH 1-13	CH 1-13	CH 1-13	CH 1-13
Power (dBm) +/-3	-98,5 / -90,5	-95,5 / -77,5	-95,5 / -76	-92,5 / -73
	5G BAND			
Standard	802.11a	802.11n/ac	802.11n/ac	802.11ac
Modulation	OFDM	OFDM	OFDM	OFDM
Data Rate	OFDM6 / OFDM54	MCS0 / MCS7 (HT20)	MCS0 / MCS7 (HT40)	MCS0 / MCS9 (HT80)
Channel	CH 36-64, CH 100-140	CH 36-64, CH 100-140	CH 36-64, CH 100-140	CH 36-64, CH 100-140
Power (dBm) +/-3	-95 / -77	-94,5 / -75	-91,5 / -72	-88 / -63

5.2 Bluetooth

Typical power levels for BT radio are given in figure below.

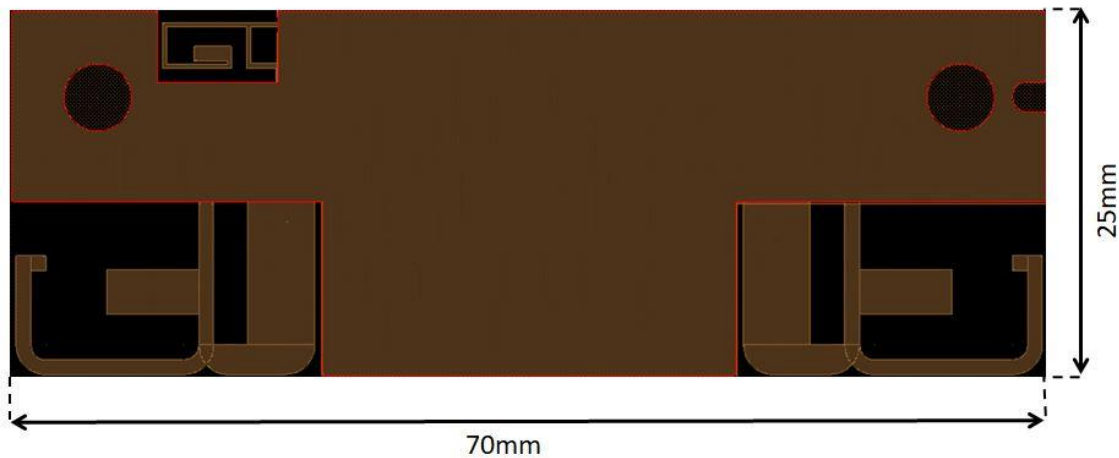
Standard	Bluetooth 5.1
Modulation	FHSS/ GFSK, pi/4-DQPSK, 8DPSK
Data Rate	1Mbps(GFSK),2Mbps(pi/4-DQPSK),3Mbps (8DPSK)
Channel	CH 0 ~ 78
Power (dBm) +/- 3	4 dBm
Sens. Power Level (dBm) +/-3	-93,5(1DH5)/-87(3DH5)

6 Antenna Characteristic

Module has on board printed antennas with the given gain values in below. It can support also external antenna option with U.F.L micro coax RF socket (with BOM option).

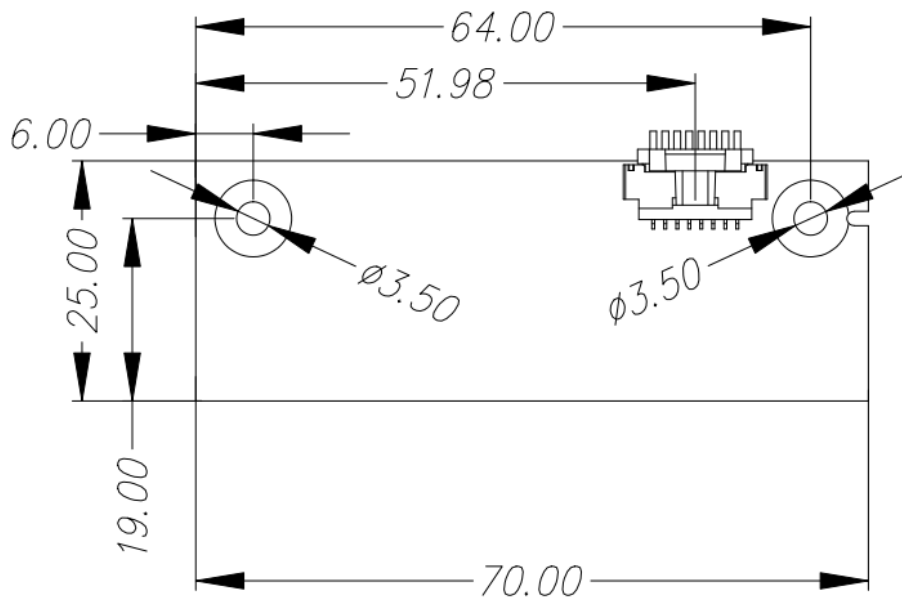
6.1 Onboard Printed Antenna Gains

	2.4 Ghz	5 Ghz low band (5180 to 5320) (ch 36-64)	5 Ghz medium band (5500 to 5700) (ch100-140)	5 Ghz high band (5745 to 5825) (ch149-165)
Antenna 0	3,4 dBi	2,97 dBi	3,69 dBi	2,89 dBi
Antenna 1	2,12 dBi	3,7 dBi	3,68 dBi	2,83 dBi
BT	0,29 dBi			



7 Mechanical Characteristics

Module dimension is 70x25 mm.

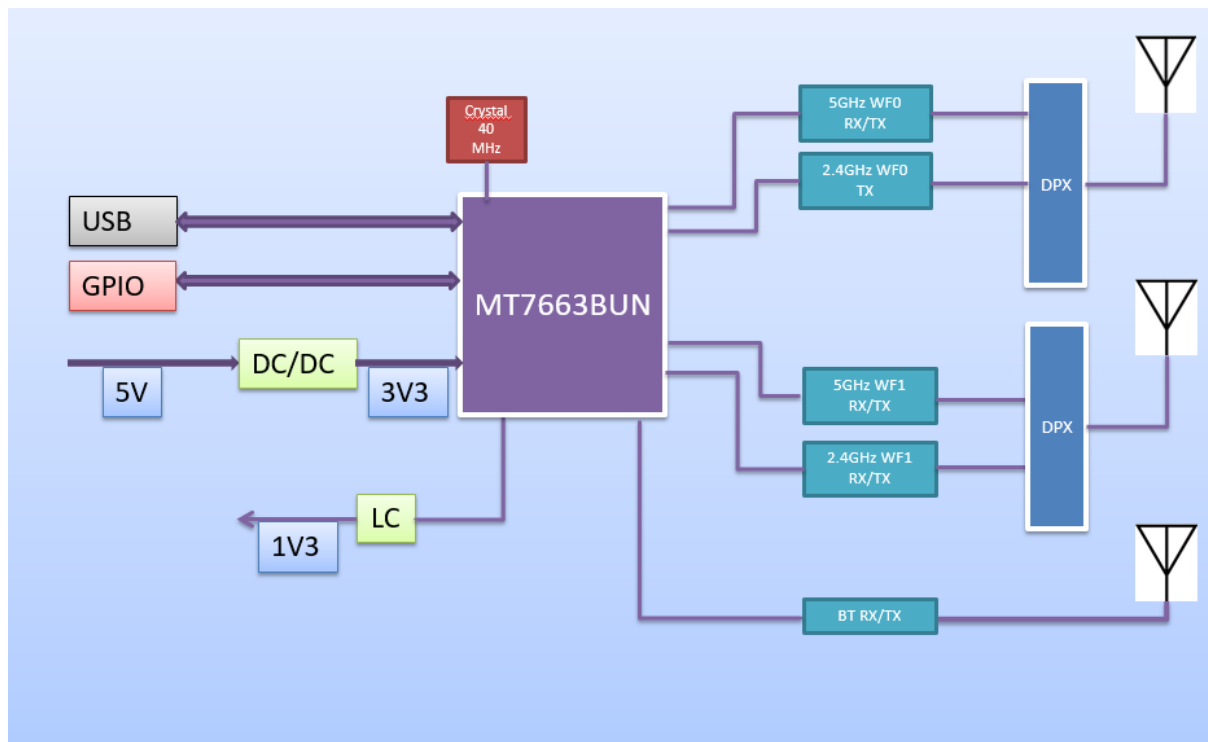


8 Pin Description

Pin No.	Pin Name	I/O	Pin Description
1*	PW_RST	I/O	Stepdown Enable Control Signal
2	WoWLAN	I/O	Wake on Wireless LAN Control Signal
3	GND	-	Ground
4	GND	-	Ground
5	USB_DP	I/O	USB Communication Signal
6	USB_DN	I/O	USB Communication Signal
7	VCC	I	VCC 5V
8	VCC	I	VCC 5V

* Optional and depend on BOM and mother board. PW_RST signal disables 5V -> 3.3V regulator, can be used for power down and hard reset of module.

9 Block diagram



10 Environmental

10.1 Operating

Operating Temperature: 0 to 65 °C
Relative Humidity: 5-60% (non-condensing)

10.2 Storage

Temperature: -20 to 80 °C
Relevant Humidity: 5-85% (non-condensing)

11 Hardware & Software installation

11.1 Hardware Installation

The module is a build in module. It will be used in-house production as an embedded device over USB 2.0 interface and there is no need any interaction with end-user. Positioning of the module is defined by assembly operator instructions for each product by Vestel.

The WI-FI + BT combo module should be mounted by considering operating temperature. The temperature of the installation location should be between 0°C and 65 °C.

The module can be installed in mobile or fixed hosts and must meet the RF exposure compliance separation distance of “20cm” between the user / bystander and the antenna. The implementation of the module in a specific end-product should also be reviewed to ensure compliance with the FCC and IC requirements for SAR and MPE.

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.

FCC Caution:

Changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

FCC Statement:

"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."

RSS-Gen & RSS-247 statement:

This device complies with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

RSS-102 Statement:

This equipment complies with Industry Canada radiation exposure limits set forth for an uncontrolled environment.

Cet équipement est conforme à l'exposition aux rayonnements Industry Canada limites établies pour un environnement non contrôlé.

11.2 Software Installation

11.2.1 Wi-Fi:

The SW driver is already installed to TV software platform. Proper country information must be selected from UI during first time boot up settings. Country information is used to disable (deactivate) channels/frequency ranges which are not allowed by country regulations.

For the end-user following steps describing how to setup on a product;

1. Switch on your TV and using the navigation buttons choose Menu-Settings-Network Settings.
2. Select Wireless Device.
3. It will scan and list all available wifi networks. If the network you select is protected by a password, enter the correct password by using the virtual keyboard. Wait until the IP address is displayed, confirming a connection has been established. You can enable or disable a network connection by pressing OK button.

11.2.2 Bluetooth:

The SW driver is already installed to TV software platform which is a Linux based OS. For the end-user following steps describing how to setup on a product;

1. Switch on your TV and using the navigation buttons choose Menu-Settings-Remote&Accessories.
2. Select Auto link enable and scan.
3. It will scan and list all available devices.

12 Country Regulations

Device is intended for home and office use in all countries and countries may have their own regulations to prohibit some wlan frequencies. Proper country information must be selected from UI during first time boot up settings. Country information is used to disable (deactivate) channels/frequency ranges which are not allowed by country regulations. Below are notes on use of devices in countries. For further information please refer to product IB or consult country regulatory organization.

Country	Restriction
Bulgaria	General authorization required for outdoor use and public service
France	In-door use only for 2454-2483.5 MHz
Italy	If used outside of own premises, general authorization is required
Greece	In-door use only for 5470 MHz to 5725 MHz band
Luxembourg	General authorization required for network and service supply (not for spectrum)
Norway	Radio transmission is prohibited for the geographical area within a radius of 20

	km from the centre of Ny-Ålesund
Russian Federation	In-door use only
Israel	5 GHz band only for 5180 MHz-5320 MHz range

Basic transmitter specification is given below figure;

Frequency Ranges	Max Output Power (eirp)
2400 - 2483,5 MHz (CH1-CH13)	< 100 mW
5150 - 5250 MHz (CH36 - CH48)	< 200 mW
5250 - 5350 MHz (CH52 - CH64)	< 200 mW
5470 - 5725 MHz (CH100 - CH140)	< 200 mW

13 List of applicable FCC-rules

FCC-Rules

FCC CFR47, Chapter I, Subchapter A, Part 15

Subpart C—Intentional Radiators

§15.203 Antenna requirement.

§15.205 Restricted bands of operation.

§15.207 Conducted limits.

§15.209 Radiated emission limits; general requirements.

§15.212 Modular transmitters.

§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

Radiofrequency Radiation Exposure

FCC CFR47, Chapter I, Subchapter A, Part 2, Subpart J, §2.1091 Radiofrequency radiation exposure evaluation: mobile devices.

FCC CFR47, Chapter I, Subchapter A, Part 1, Subpart I, §1.1310 Radiofrequency radiation exposure limits

FCC CFR47, Chapter I, Subchapter A, Part 15

Subpart E—Unlicensed National Information Infrastructure Devices

§15.407 General technical requirements.

Note: Attention to host manufacturers, further testing is required.

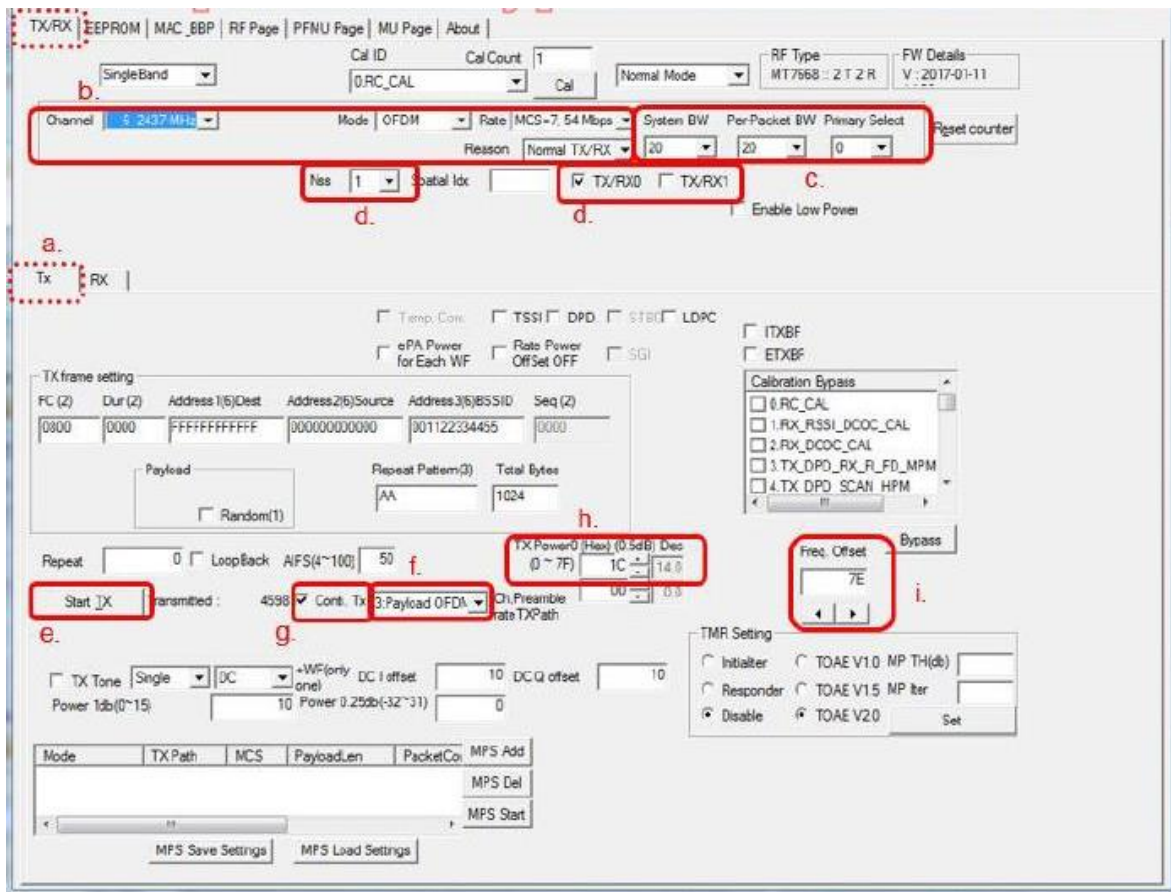
14 Test modes

Test tools of Mediatek (QA tool) allow to configure test modes for different operational conditions.

Below steps should have been followed for testing Tx power on module.

On TX/RX page:

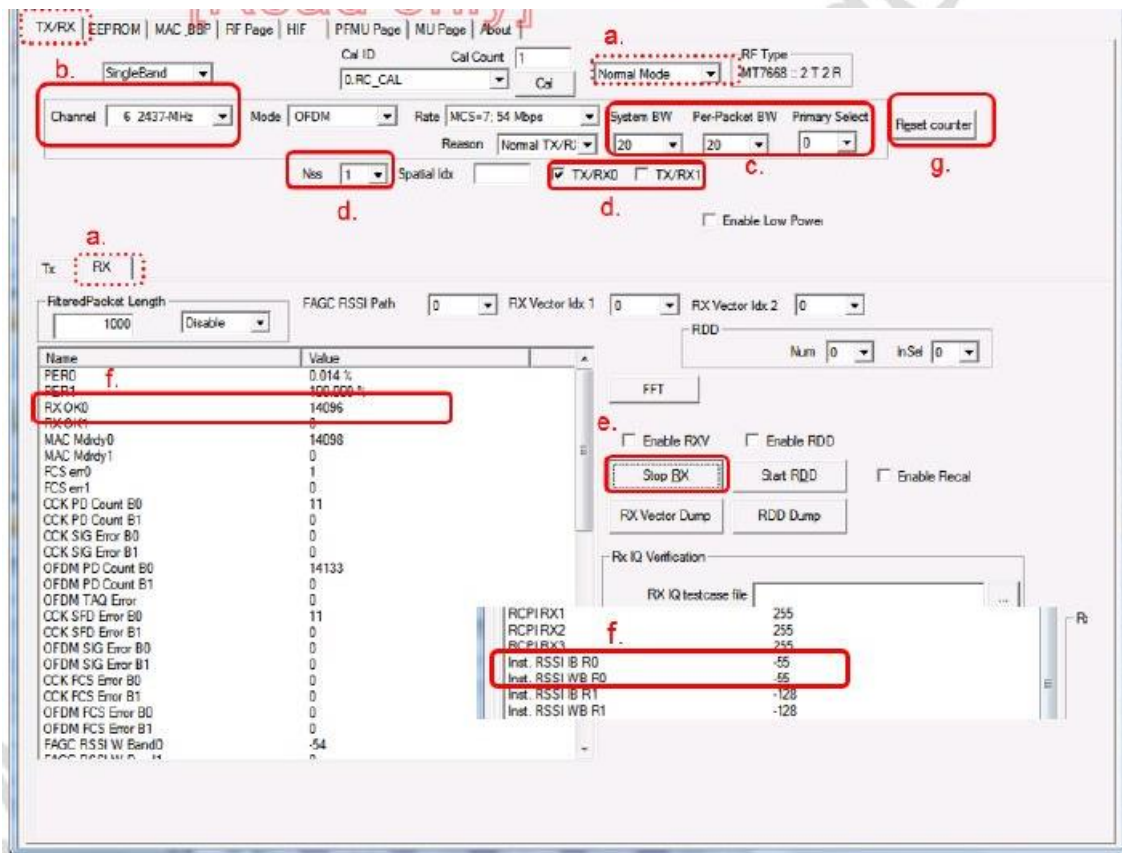
- Select TX sub-page as following figure.
- Set Channel/Mode/Rate.
- Set BW. (Generally, System BW = Pre-Packet BW).
- Select "Nss=1 or Nss=2" and choose "TX/RX0" or "TX/RX1" to do transmitting.
- Click "Start Tx" and waiting for a while then click "Stop Tx".
(Please repeat this step if user change channel/BW/Rate)
- Choose "Payload OFDM".
- Check "Conti. Tx" to start Tx 100% duty packet transmitting and uncheck "Conti. Tx" to stop.
- Users can click " $\div$ " button to modify power level of transmitting signal after uncheck "Conti. Tx".
- Users can click " $\leftarrow$ $\rightarrow$ " button to modify frequency offset of transmitting signal after uncheck "Conti. Tx".



Below steps should have been followed for testing Rx on module.

On TX/RX page

- Select RX sub-page and "Normal Mode" as following figure.
- Set Channel frequency.
- Set BW. (Generally, System BW = Pre-Packet BW).
- Select "Nss=1" and choose "TX/RX0" to do receiving.
- Click "Start RX" button to receive WIFI packets.
Enable WIFI signal generator to transmit packets. Click "Stop RX" button to stop receiving.
- Successful received packets number would be shown at "RX OK" area and RSSI shown at "Inst RSSI IB R0" area.
- Users can click "Reset counter" button to reset counter value.



15 ISED

1 :

The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems; le dispositif utilisé dans la bande 5150- 5250 MHz est réservé à une utilisation en intérieur afin de réduire le risque de brouillage préjudiciable aux systèmes mobiles par satellite dans le même canal;

2 :

The host product shall be properly labelled to identify the modules within the host product.

The certification label of a module shall be clearly visible at all times when installed in the host product; otherwise, the host product must be labelled to display the certification number for the module, preceded by the word "contains" or similar wording expressing the same meaning, as follows:

Contains FCC ID: 2AVQS-17WFM26, Contains IC: 25888-17WFM26.

Le produit hôte devra être correctement étiqueté, de façon à permettre l'identification des modules qui s'y trouvent. L'étiquette d'homologation d'un module d' devra être apposée sur le produit hôte à un endroit bien en vue, en tout temps. En l'absence d'étiquette, le produit hôte doit porter une étiquette sur laquelle figure le numéro d'homologation du module d', précédé du mot « contient », ou d'une formulation similaire allant dans le même sens et qui va comme suit :

Contient FCC ID: 2AVQS-17WFM26, Contient IC: 25888-17WFM26.