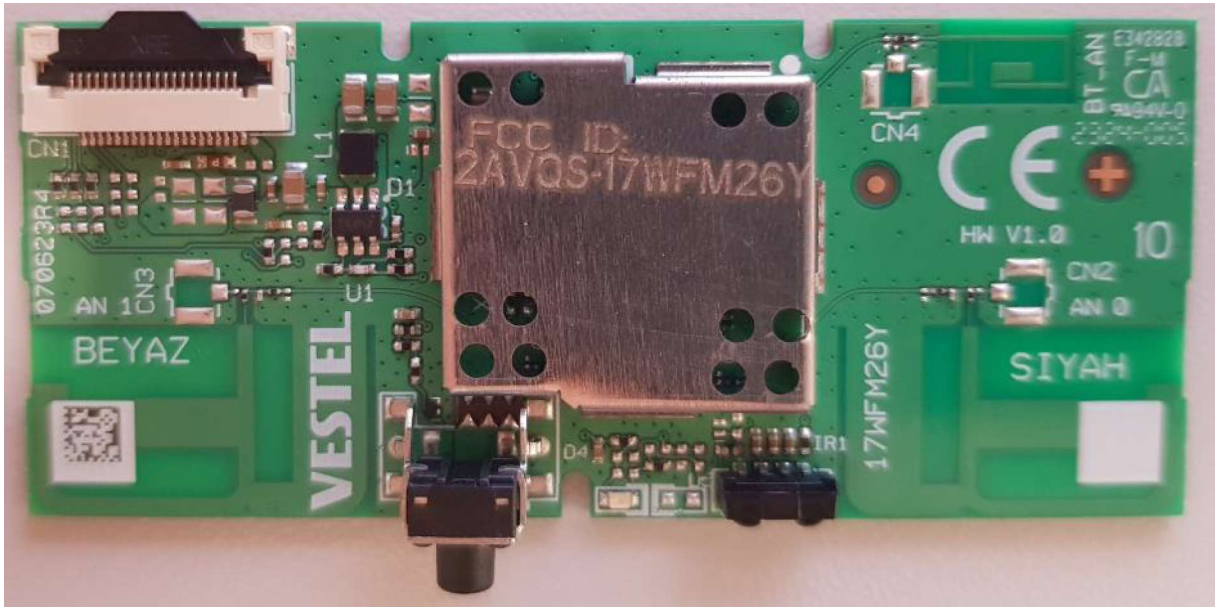


17WFM26Y

Product Specification and User Manual



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Author	Note	Date	Version
Cevdet Ersavaş	Initial Draft	15.04.2022	V1.0
Cevdet Ersavaş	Add statements for FCC	14.08.2023	V2.0

Information given in this document may change without any notification.

1. General Description

The 17WFM26Y 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. 17WFM26Y 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)
- Optional remote control IR support and TV on/off control switch

3. Key Specification

Main chipset	MT7663BUN, Mediatek
Frequency range *	2412-2472MHz/2462MHz, 5180-5320MHz, 5500-5700MHz
	Bluetooth: 2402-2480MHz
Channels support *	WLAN: CH1-13(EU), CH1-11(FCC),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	10.8 V	12 V	13.2

4.2 Current consumption

Note (VCC 12V)	Typ (mA rms)	Max peak (mA)
Idle (2.4G, HT20, Ch6) *	125.8	475
2.4G, HT20, Ch6, Rx mode	138.3	456
2.4G, HT20, Ch6, Tx mode	198.1	438
2.4G, HT20, Ch6, Rx mode + BT	142.3	475
2.4G, HT20, Ch6, Tx mode + BT	195.2	438
Idle (5G, VHT20, Ch48) *	140.2	475
5G, VHT20, Ch48, Rx mode	149.8	475
5G, VHT20, Ch48, Tx mode	225.3	488
5G, VHT20, Ch48, Rx mode + BT	152.7	475

5G, VHT20, Ch48, Tx mode + BT	227.6	488
Idle (5G, VHT80, Ch108) *	143.4	469
5G, VHT80, Ch108, Rx mode	168.5	506
5G, VHT80, Ch108, Tx mode	201	494
5G, VHT80, Ch108, Rx mode + BT	207.2	506
5G, VHT80, Ch108, Tx mode + BT	203.4	469

* 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

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	17	17	16	13
	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	17	17	16	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	-99,5 / -91,5	-96,5 / -79	-96,5 / -77	-93,5 / -74.5
	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	-95.5 / -77.5	-95 / -76	-92 / -73	-89 / -64

FCC/IC: 2412-2462MHz for 2.4GHz WIFI

Channels and channel band falling in 5600-5650MHz is not used in ISED

5.2 Bluetooth

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

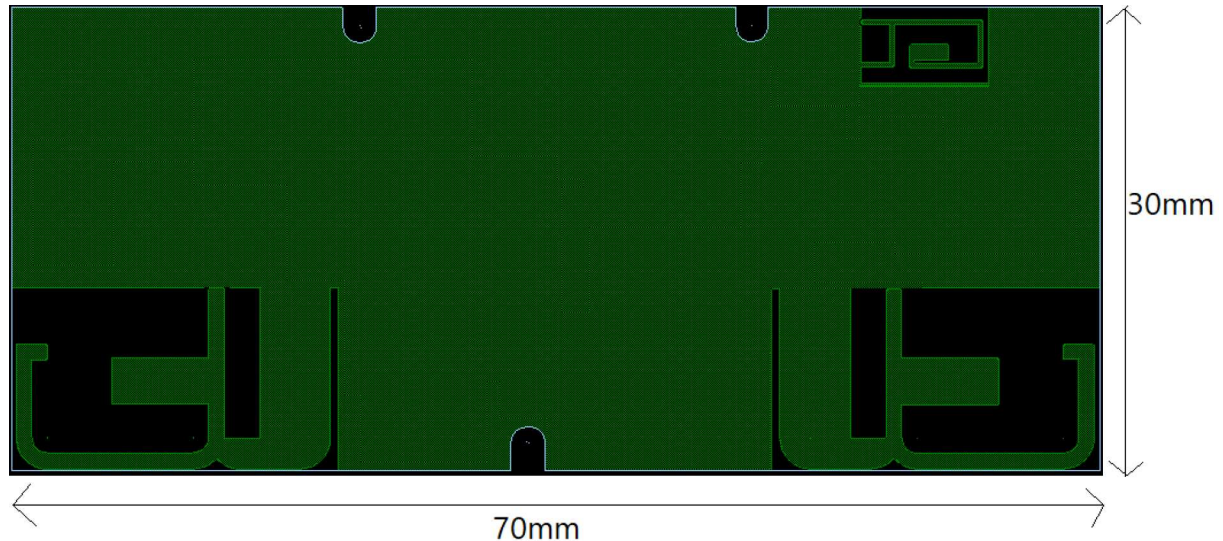
Standard	Bluetooth 5.1
Modulation	FHSS/ GFSK, pi/4-DQPSK, 8DPSK
Data Rate	1Mbps(GFSK),2Mbps(pi/4-DQPSK),3Mbps (8DPSK)
Channel	CH 0 ~ 78
Power (dBm) +/- 3	6 dBm
Sens. Power Level (dBm) +/-3	-95,5(1DH5)/-89.5(3DH5)

6. Antenna Characteristic

Module has on board printed antennas with the given gain values in below.

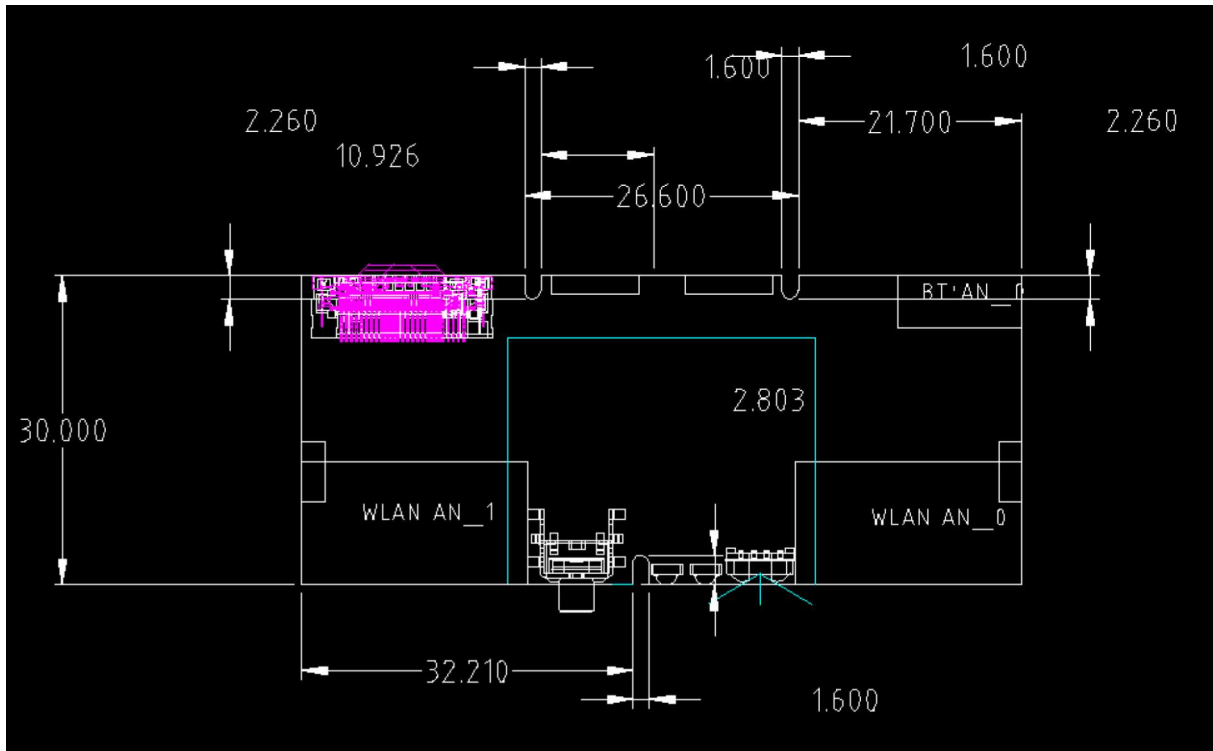
6.1 Onboard Printed Antenna Gains

	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 70x30 mm.



8. Pin Description

Pin No.	Pin Name	I/O	Pin Description
1	NC	-	-
2	VCC	I	VCC 12V
3	VCC	I	VCC 12V
4	VCC	I	VCC 12V
5	NC	-	-
6	GND	-	Ground
7	USB_DP	I/O	USB Communication Signal
8	USB_DN	I/O	USB Communication Signal
9	GND	-	Ground
10	WoWLAN	I/O	Wake on Wireless LAN Control Signal
11	WoBLE	I/O	Wake on Bluetooth Control Signal
12*	PW_RST	I/O	Stepdown Enable Control Signal
13**	BT_IR / GND	I/O	BT IR Signal or Ground
14**	BT_IR_SLC / GND	I/O	BT IR Control Signal or Ground
15	Keyboard	O	Tact Switch on/off Signal
16	3V3_stby	I	IR Standby Voltage
17	IR_RC	O	IR Data
18	LED2	I	LED Signal
19	LED1	I	LED Signal
20	GND	-	Ground

9. Block diagram

Refer to 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

17WFM26Y 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.

The recommended installation of 17WFM26Y module is shown below. 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.



*Given pictures are representative only, its position may change based on model.

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."

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. Privacy of communications may not be ensured when using this device.

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.

RF exposure

RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.

Déclaration d'exposition Attention: Cet émetteur doit être installé pour fournir une distance de séparation d'au moins 20 cm de toute personne.

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

§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.

§15.407 General technical requirements.

Radio frequency 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

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:

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

TX/RX | EEPROM | MAC_BB | RF Page | PFNU Page | MU Page | About |

Cal ID: 0RC_CAL | Cal Count: 1 | Normal Mode | RF Type: MT7968 : Z T Z R | FW Details: V : 2017-01-11

Channel: 5 / 2437 MHz | Mode: OFDM | Rate: MCS-7, 54 Mbps | System BW: 20 | Per-Packet BW: 20 | Primary Select: 0 | Reset counter

Nss: 1 | Spatial Idx: | ☒ TX/RX0 | ☐ TX/RX1 | Enable Low Power

a. Tx | RX |

☐ Temp. Comp. | ☐ TSSI | ☐ DPD | ☐ STBC | ☐ LDPC | ☐ ITXBF | ☐ ETXBF

☐ ePA Power for Each WF | ☐ Rate Power OffSet OFF | ☐ SGI

TX frame setting

FC (2)	Dur (2)	Address 1(6)Dest	Address 2(6)Source	Address 3(6)BSSID	Seq (2)
0800	0000	FFFFFFFFFFFF	000000000000	001122334455	0000

Payload: | Repeat Pattern(3): AA | Total Bytes: 1024 | ☐ Random(1)

Repeat: 0 | ☐ LoopBack | AIFS(4~100): 50 | **TX Power(0~7F) Dec: 1C** | **Dec: 14.0**

e. Start TX | transmitted: 4598 | **g.** ☒ Cont. Tx | **f.** 3: Payload OFDM | **h.** Ch. Presbire rate TXPath

i. Freq. Offset: 7E

TMR Setting

☐ Initiator | ☐ TOAE V1.0 MP TH(db) | ☐ Responder | ☐ TOAE V1.5 MP Iter | ☒ Disable | ☒ TOAE V2.0 | Set

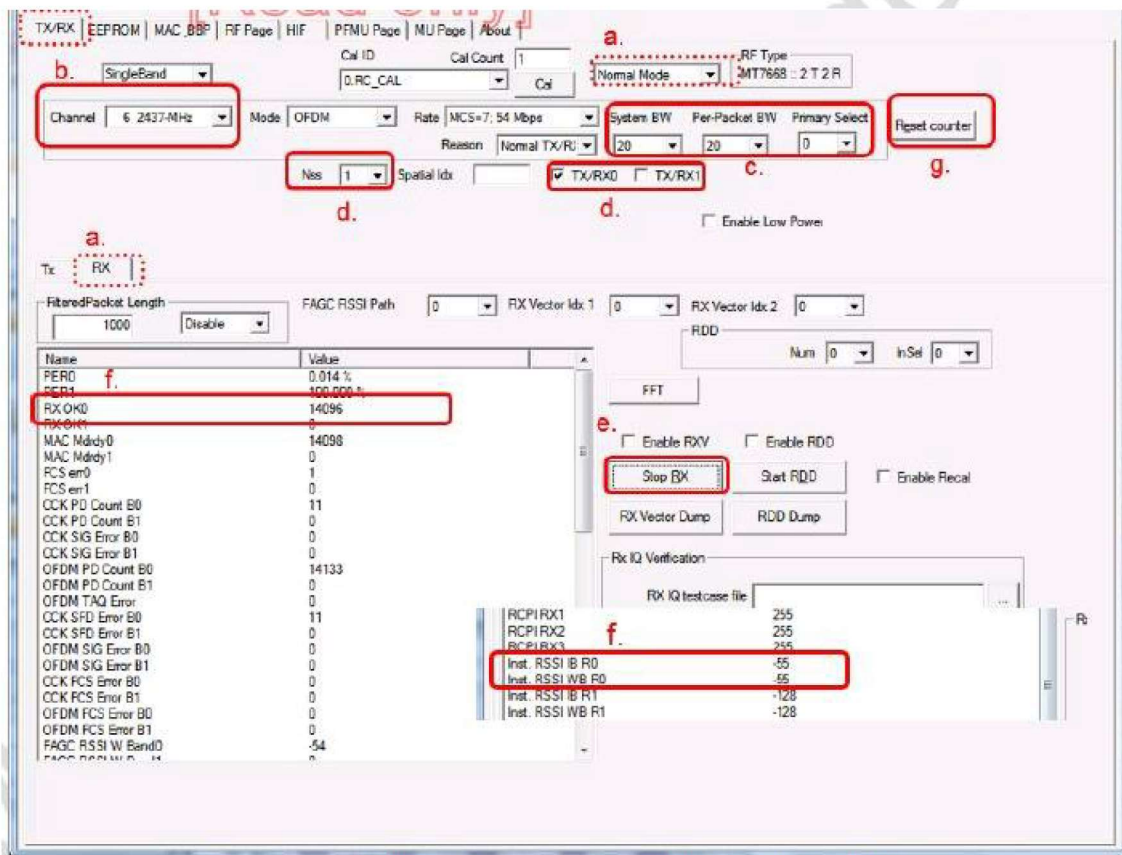
Mode: | TX Path: | MCS: | Payload Len: | Packet Co: | MPS Add: | MPS Del: | MPS Start: |

MFS Save Settings | MFS Load Settings

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-17WFM26Y, Contains IC: 25888-17WFM26Y.

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-17WFM26Y, Contient IC: 25888-17WFM26Y.