



**MEDIATEK**

*everyday genius*

**MT7925B22M**

**Test-Mode Software Application Note**

**Part-1: QA-Tool User Guideline**

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## Document Revision History

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Version	Date	Author	Change List
V1.0	20230407	Henry Hsiao	Initial draft release.

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## 1 System overview

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### 1.1 General Description

MT7925B22M chip is highly integrated single chip which have built in 2x2 dual-band wireless LAN and Bluetooth combo radio. It can be configured in test-mode for performance validation, production testing and regulatory certification. There are two software tools, QA-Tool and Combo-Tool responsible for evaluating WIFI and Bluetooth signal and performance testing. This document is introducing how to install and use QA-Tool.

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## 2 QA-Tool

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Users have to install 3 major software before using QA-Tool.

- WinPcap
- Windows7 X64 security package
- QA-Tool Windows driver

MTK strongly recommends install QA-Tool on Windows 7-64bit operating system.

### 2.1 How to install QA-tool

Please follow the procedure listed in below to install QA-Tool

- 1<sup>st</sup> : Install WinPcap
- 2<sup>nd</sup> : Update Windows7 security package to register x64 signature mechanism
- 3<sup>rd</sup> : Instal QA-Tool Windows driver.

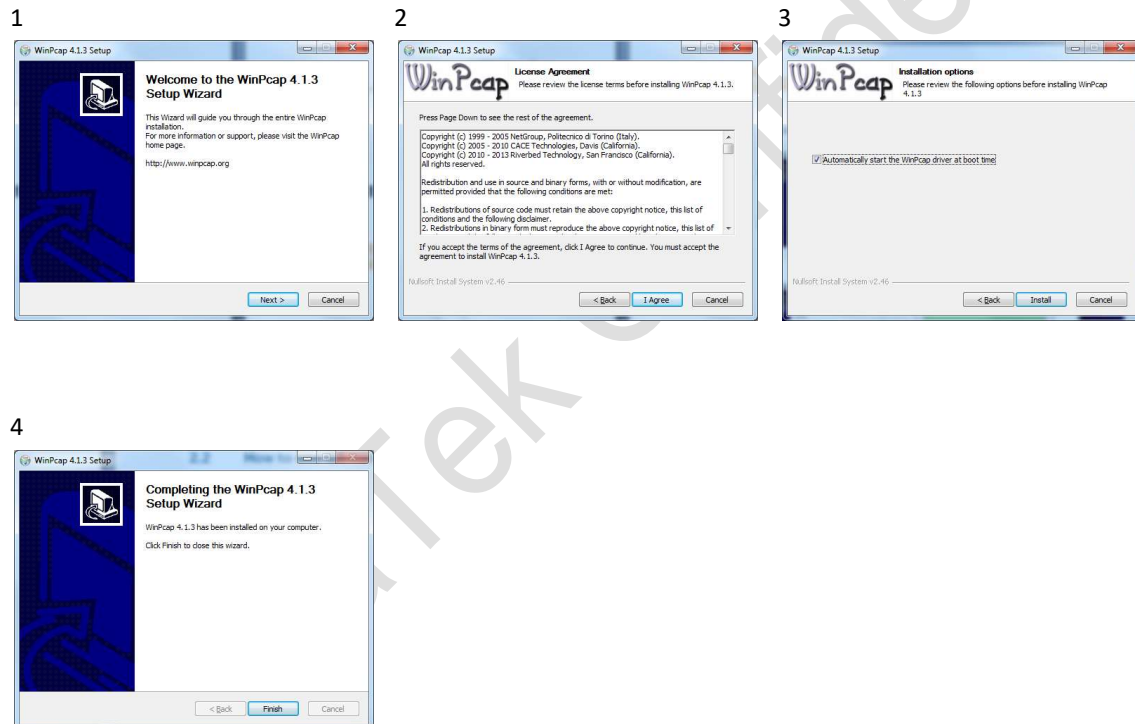
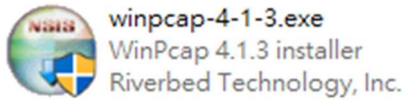
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## 2.1.1 Install WinPcap

If users are the 1<sup>st</sup> time operating this tool, users should install WinPcap at first. Please follow below link and steps to install this software.

<https://www.winpcap.org/install/>

WinPcap version: 4.1.3 or later.



## 2.1.2 Windows 10 install note

If users can't install the driver in Windows 10 due to driver integrity check. Try to disable the integrity check to allow installation.

- **Disable Driver Integrity Check**

1. Open cmd as Administrator.
2. Execute 'bcdedit /set nointegritychecks on'
3. Reboot
4. Then install again. If still fail, try do 'Disable Secure Boot' below.

NOTE: Re-enable the driver integrity check by executing 'bcdedit /set nointegritychecks off' and then rebooting.

- **Disable Secure Boot**

Please refer to:

<https://docs.microsoft.com/en-us/windows-hardware/manufacture/desktop/disabling-secure-boot>

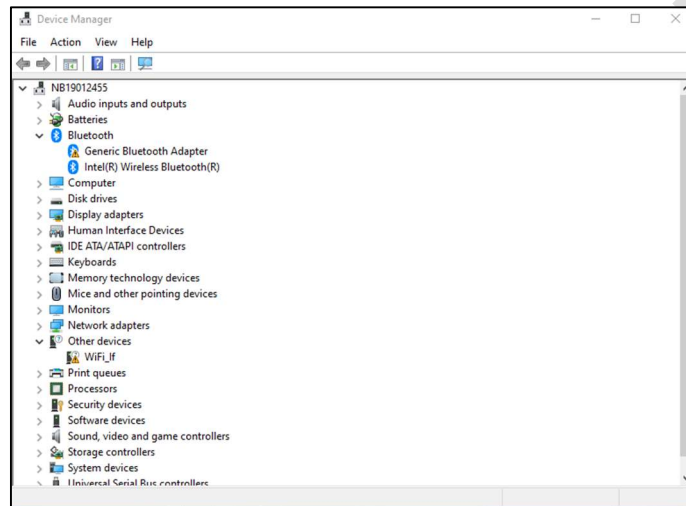


### 2.1.3 QA-Tool Windows driver

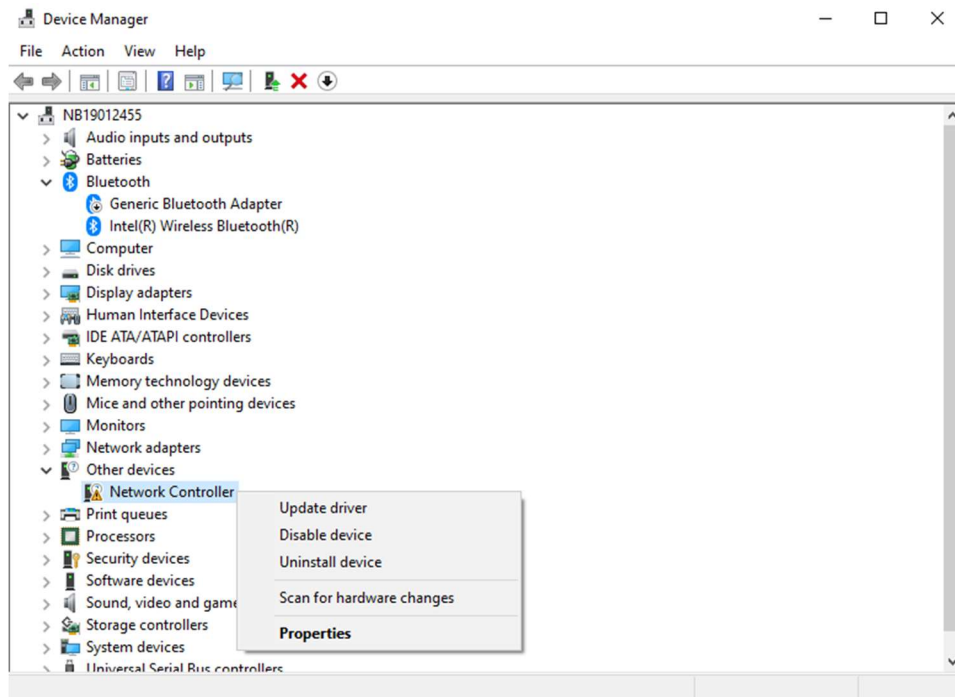
MT7925B22M supports USB, and PCIE interface. According to interface type of MT7925B22M on users' hand, please refer to steps shown below to install QA-Tool Windows driver:

#### USB interface:

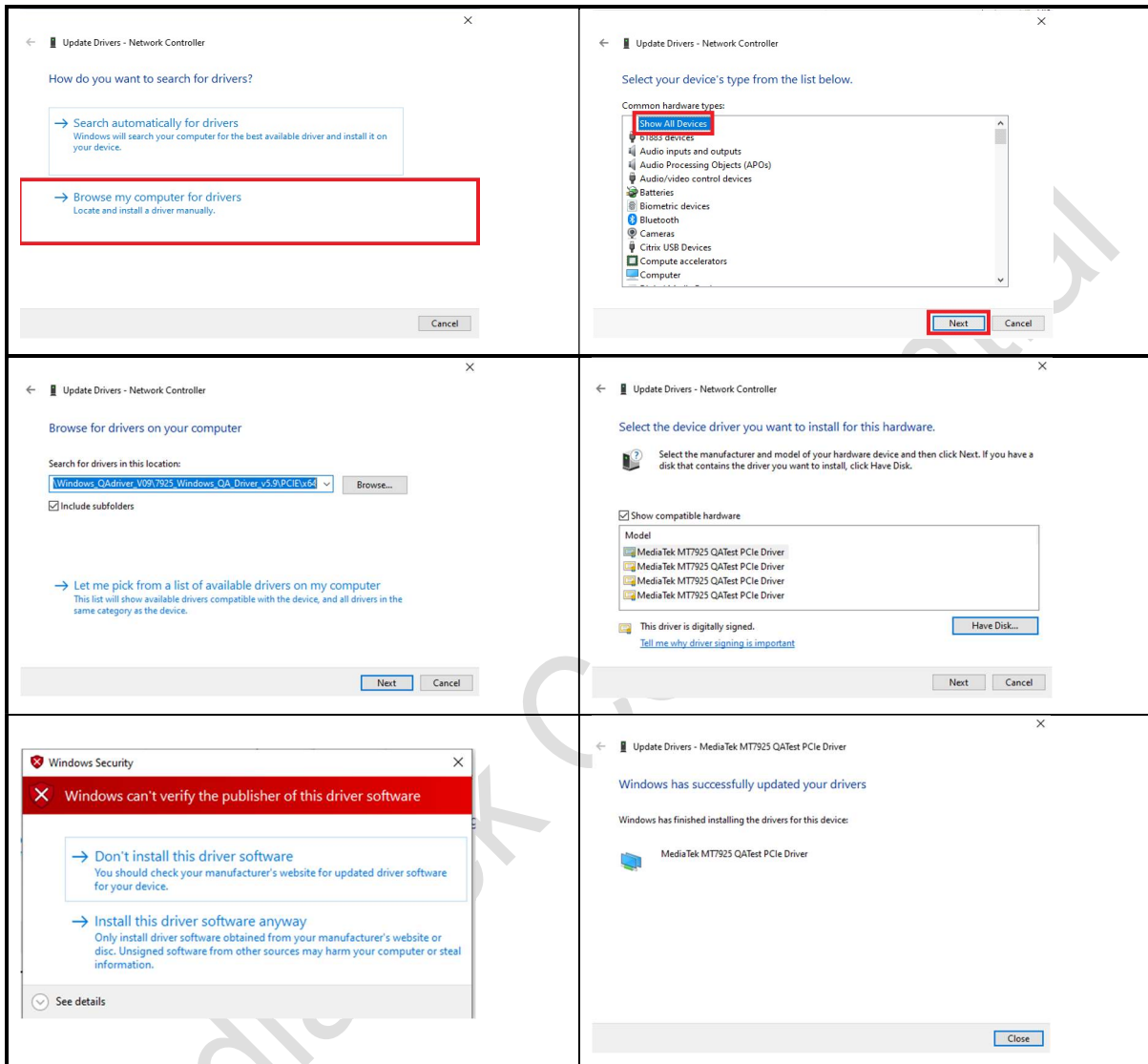
1. Connect DUT to PC/NB and check Windows Device Manager.
2. Window Device Manager would discover DUT shows "**Generic Bluetooth Adapter**"(BT device) and "**WiFi\_If**"(WiFi device).



3. Right-click on “WiFi\_IF” Wifi device and Update Driver Software.



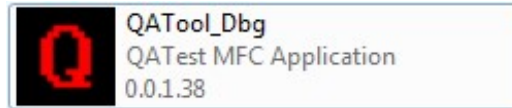
4. According user's Windows' OS to select and install test tool driver.



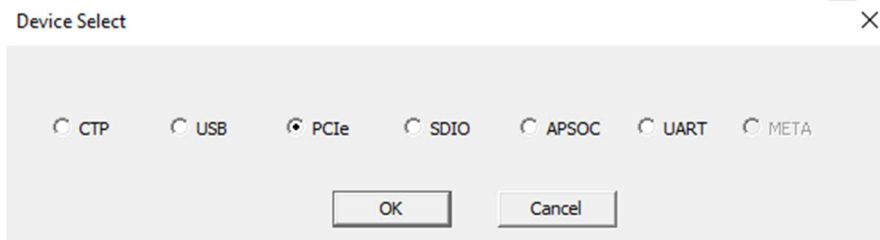
## 2.2 How to use QA-tool

### 2.2.1 Launch QA-Tool

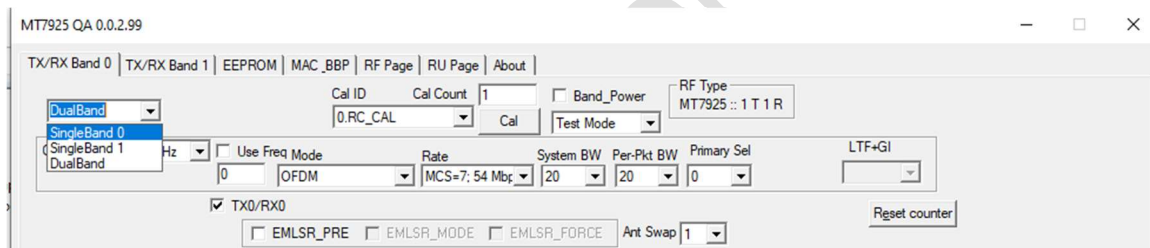
Double-click on QA-Tool icon “QATool\_Dbg.exe” and Device Select window will pop up.



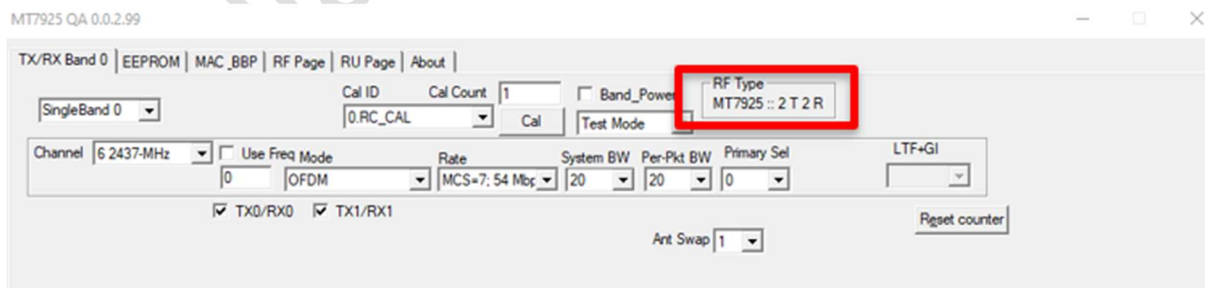
Select interface type and click “OK” button to launch QA-Tool.



After QA-Tool UI pops out, select “SingleBand 0”.



Users can check RF Type which should be shown **MT7925B22M : 2 T 2 R** to make sure the QA-Tool is working normally. There are two modes, BIN-file mode and E-fuse mode, supported by QA-tool. Section 2.2.2 & 2.2.3 provide details about respective mode.

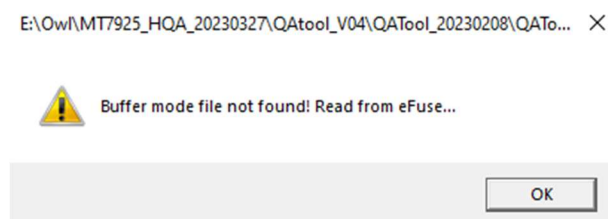


### 2.2.2 Start QA-Tool in BIN-file Mode

To start in BIN-file mode user can use “**eeeprom.bin**” while launching QA tool. If “**QATool\_Dbg.exe**” accompanies “**eeeprom.bin**” file in the same folder, QA-tool will start in BIN-file mode. After QA-tool is launched, users can check “EEPROM” sheet to have **EEPROM Type : eeeprom** to know the mode of QA-Tool in operating.

### 2.2.3 Start QA-Tool in E-fuse Mode



If “**eeeprom.bin**” file leaves the folder of “**QATool\_Dbg.exe**”, QA-tool will starts in E-fuse mode. User also check **EEPROM Type : E-fuse** in “EEPROM” sheet.



## 2.3 How to Use the QA-Tool

### 2.3.1 WIFI Packets Transmitting –1 stream

On TX/RX page:

- a. Select TX sub-page and “**Test Mode**” as following figure.
- b. Select “**TX/RX Band0**”.
- c. Set Channel/Mode/Rate.
  - i. 802.11b CCK, 802.11g OFDM, 802.11n HT Mix Mode, 802.11ac VHT,
  - ii. 802.11ax HESU, 802.11ax RU HETB (need to set step g and RU Need to set in RU Page)
  - iii. 802.11be EHTSU, 802.11be RU EHTTB (need to set step g and RU Need to set in RU Page)
- d. Set BW. (Generally, System BW = Pre-Packet BW).
- e. Select TX0 or TX1 only
- f. Select “**Nss=1**” and choose “TX/RX0” to do transmitting.
- g. Set LFT+GI index. (Generally, setting index3) (this step for HESU, HETB(RU), EHTSU, EHTTB(RU))
- h. Set packet number. (0 means infinite packets)
- i. Click “**Start TX**” button to start packet transmitting and click “**Stop TX**” button to stop.
- j. The transmitted packets number is shown at “**Transmitted:**” area.
- k. Users can click “**Reset counter**” button to reset “**Transmitted:**” area.
- l. Users can click “” button to modify power level of transmitting signal.
- m. Users can click “” button to modify frequency offset of transmitting signal.

If users want to adjust packets duty cycle



- n. adjust packets lengths(L) to modify packets duty cycle (example 512)  
(Make sure “**Transmitted:**” area have counter when start TX. If not, reduce the packet lengths)

Note: Please \*re-trigger "HWTX" if users change Channel/Mode/Rate/BW.

\*Re-trigger "HWTX": click “**Stop TX**” button and un-click "HWTX", and then click "HWTX" and click “**Start TX**” button again.

### 2.3.2 WIFI Packets Transmitting –2 stream

On TX/RX page:

- a. Select TX sub-page and “**Test Mode**” as following figure.
- b. Select “**TX/RX Band0**”.
- c. Set Channel/Mode/Rate.
  - i. 802.11b CCK, 802.11g OFDM, 802.11n HT Mix Mode, 802.11ac VHT,
  - ii. 802.11ax HESU, 802.11ax RU HETB (need to set step g and RU Need to set in RU Page)
  - iii. 802.11be EHTSU, 802.11be RU EHTTB (need to set step g and RU Need to set in RU Page)
- d. Set BW. (Generally, System BW = Pre-Packet BW).
- e. Both TX0 and TX1
- f. Select “**Nss=2**” and choose both TX0 and TX1 to do transmitting.
- g. Set LFT+GI index. (Generally, setting index3) (this step for HESU, HETB(RU), EHTSU, EHTTB(RU))
- h. Set packet number. (0 means infinite packets)
- i. Click “**Start TX**” button to start packet transmitting and click “**Stop TX**” button to stop.
- j. The transmitted packets number is shown at “**Transmitted:**” area.
- k. Users can click “**Reset counter**” button to reset “**Transmitted:**” area.
- l. Users can click “” button to modify power level of transmitting signal.
- m. Users can click “” button to modify frequency offset of transmitting signal.

If users want to adjust packets duty cycle

- n. adjust packets lengths(L) to modify packets duty cycle (example 512)  
(Make sure “**Transmitted:**” area have counter when start TX. If not, reduce the packet lengths)

Note: Please \*re-trigger "HWTX" if users change Channel/Mode/Rate/BW.

\*Re-trigger "HWTX": click “**Stop TX**” button and un-click "HWTX", and then click "HWTX" and click “**Start TX**” button again.

### 2.3.3 WIFI Packets 11ax RU TX (HE TB (trigger based)) Transmitting setting

On RU page:

- a. Select RU sub-page
- b. Select band
- c. Set Category

RU size	Category
RU26	26*9
RU52	52*4
RU106	106+106
RU242	242*1
RU484	484*1
RU996	996*1
RU996*2	996*2

- d. Set RU index (wanted TB RU location).  
Refer to the RU Index from below
  
- e. Set data rate
- f. Set MU NSS/LDPC/stream index/length  
**"MU Nss=1"** for Antenna number.  
 Set LDPC or non-LDPC to do transmitting.  
 Set **"Nss=1"** to do transmitting.  
 Set **"stream index=1"**  
 Refer to the **"Length"** from below table. (For example, set to 128 at RU26/MCS0.....)
  
- g. Click **"ADD"** button to added test case.
- h. Click **"SET"** button to set test case.
- i. If user wanted to test another case can select origin test case and click **"Remove"** button to remove old case and resetting another case again.



### 2.3.4 WIFI Packets 11be RU&MRU TX (EHT TB (trigger based)) Transmitting setting

#### RU

On RU page:

- a. Select RU sub-page
- b. Select band
- c. Set Category

RU size	Category
RU26	26*9
RU52	52*4
RU106	106+106
RU242	242*1
RU484	484*1
RU996	996*1
RU996*2	996*2
RU996*4	996*4

- d. Set RU index (wanted TB RU location).

Refer to the RU Index from below

- e. Set data rate

- f. Set MU NSS/LDPC/stream index/length

“MU Nss=1” for Antenna number.

Set LDPC or non-LDPC to do transmitting.

Set “Nss=1” to do transmitting.

Set “stream index=1”

Refer to the “Length” from below table. (For example, set to 128 at RU26/MCS0.....)

- g. Click “ADD” button to added test case.

- h. Click “SET” button to set test case.

- i. If user wanted to test another case can select origin test case and click “Remove” button to remove old case and resetting another case again.

## MRU

On RU page:

- a. Select RU sub-page
- b. Select band
- c. Set Category
  
- d. Set RU index (wanted TB RU location).
  
- e. Set data rate
- f. Set MU NSS/LDPC/stream index/length  
"MU Nss=1" for Antenna number.  
Set LDPC or non-LDPC to do transmitting.  
Set "Nss=1" to do transmitting.  
Set "stream index=1"  
Refer to the "Length" from below table. (For example, set to 128 at RU26/MCS0.....)
  
- g. Click "ADD" button to added test case.
- h. Click "SET" button to set test case.
- i. If user wanted to test another case can select origin test case and click "Remove" button to remove old case and resetting another case again.

### 2.3.5 VSA Setting

Open Litepoint MW Web page select VSA

Setting RU info.

1. litepoint GI LTF Type align to QAtool LTF+GI
2. litepoint LDPC sym.(1=Orange light; 0=Gray light) align to QAtool LDPC Extra Sym
3. litepoint PE Disamb.(1=Orange light; 0=Gray light) align to QAtool Tx PE
4. A Factor:
  1. If QAtool A Factor set =0, set litepoint A Factor =4
  2. If QAtool A Factor set =1, set litepoint A Factor =1
  3. If QAtool A Factor set =2, set litepoint A Factor =2
  4. If QAtool A Factor set =3, set litepoint A Factor =3
5. Litepoint Stream setting (1 or 2) align to QAtool RU-page stream setting.
6. Litepoint MCS rate setting align to QAtool RU-page MCS setting.
7. Litepoint RU idx setting align to QAtool RU-page RU index setting.
8. If QAtool RU-page LDPC checked, set litepoint Coding : LDPC; Otherwise, set litepoint Coding : BCC.

### 2.3.6 WIFI Packets Receiving –1 stream

On TX/RX page

- a. Select **"TX/RX Band0"**.
- b. Select RX sub-page and **"Test Mode"** as following figure.
- c. Set Channel frequency.
- d. Set BW. (Generally, System BW = Pre-Packet BW).
- e. Choose "TX0/RX0" or TX1/RX1 to do receiving.
- f. Select HE\_MU mode and Set RU Station ID (wanted RU location station ID) **(this step for HE\_MU/ EHT\_MU\_SU and the default sta ID is "888" or you can refer below step to check the correct sta ID)**

Check Station ID of wanted RU (MRU follow RU):

- Setting RU info
  1. Choose TxQuality Info OFDM
  2. Load test waveform
  3. Choose wanted RU user
  4. RU check Station ID
- g. Click **"Start RX"** button to receive WIFI packets.

- Enable WIFI signal generator to transmit packets. Click “**Stop RX**” button to stop receiving.
- h. Successful received packets number would be shown at “**RX OK**” area and RSSI shown at “**inst RSSI IB 0**” area.
  - i. Users can click “**Reset counter**” button to reset counter value.

### 2.3.7 WIFI Packets Receiving –2 stream

On TX/RX page

- a. Select “**TX/RX Band0**”.
- b. Select RX sub-page and “**Test Mode**” as following figure.
- c. Set Channel frequency.
- d. Set BW. (Generally, System BW = Pre-Packet BW).
- e. Choose “TX0/RX0” and TX1/RX1 to do receiving.
- f. Select HE\_MU mode and Set RU Station ID (wanted RU location station ID) *(this step for HE\_MU/ EHT\_MU\_SU and the default sta ID is “888” or you can refer below step to check the correct sta ID)*

Check Station ID of wanted RU:

- Setting RU info
  5. Choose TxQuality Info OFDM
  6. Load test waveform
  7. Choose wanted RU user
  8. RU check Station ID
- g. Click “**Start RX**” button to receive WIFI packets.  
Enable WIFI signal generator to transmit packets. Click “**Stop RX**” button to stop receiving.
- h. Successful received packets number would be shown at “**RX OK**” area and RSSI shown at “**inst RSSI IB 0**” area.
- i. Users can click “**Reset counter**” button to reset counter value.

## 2.4 Read, Write E-fuse Table

### 2.4.1 Read a Value from E-fuse

Users can use QA-Tool to read a value from an address offset of E-fuse.

On EEPROM page:

- a. In E-fuse Mode, EEPROM Type is "E-fuse".
- b. Select Single Read/Write is "**READ**".
- c. Set address offset in "**Offset**" text box then click on "**R/W**" button. The value of assigned address offset would be shown in the "**Value**" text box.

### 2.4.2 Write a Value to E-fuse

Users can use QA-Tool to write a value to an address offset of E-fuse.

On EEPROM page:

- a. In E-fuse Mode, EEPROM Type is "E-fuse".
- b. Select Single Read/Write mode is "**WRITE**".
- c. Set address offset and new value in "**Offset**" and "**Value**" text boxes then click on "**R/W**" button.
- d. Click "**Read ALL**" button to update e-fuse value in e-fuse table and check it.

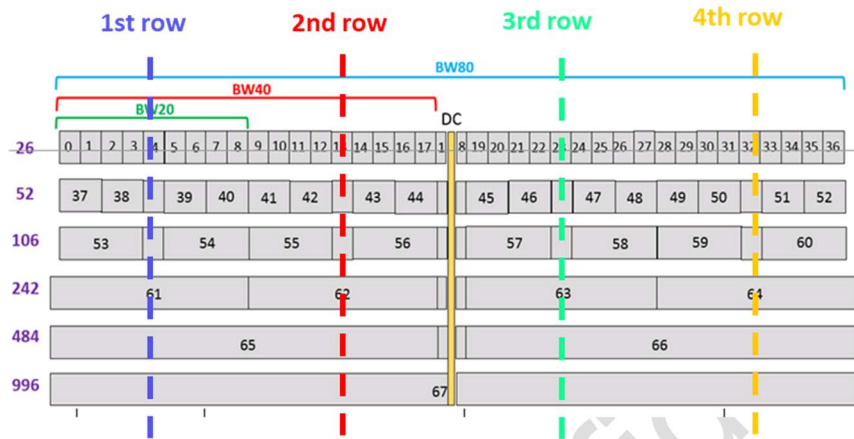
This is an example writing 0x01 to address offset\_0x55 of E-fuse and check value is correctly updated.

## 2.5 Homologation suggest setting

1. Normal Test item, we suggest Packet lengths use 512 Byte
2. SAR test item, we suggest use HWTX, and adjust packet lengths that duty meet test conditions (duty 85%)

## 2.6 RU Setting example

RU index setting under QA Tool



Ex: RU Index 61 Can find it at RU242 1<sup>st</sup> ROW

RU

Select Band: 1

1st row

Category:	Allocation (binary):	Sta ID:	RU Index:	MCS:	PwrBoost Factor	MU Nss	LDPC	Nss	Stream Idx	Length
11: RU242*1	001000000		61	MCS7=7;	0	1	<input type="checkbox"/>	2	1	1024
11: RU242*1	001000000		62	MCS7=7;	0	1	<input type="checkbox"/>	2	1	1024
11: RU242*1	001000000		63	MCS7=7;	0	1	<input type="checkbox"/>	2	1	1024
11: RU242*1	001000000		64	MCS7=7;	0	1	<input type="checkbox"/>	2	1	1024
0: Disable					0	1	<input type="checkbox"/>	2	1	512

Segment 0: Segment 1:

### 3 General Information & Integration Instructions

#### 3.1 General Description of MT7925B22M

<b>Product</b>	2TX 11be (WiFi7) BW160 + BT/BLE Combo Card
<b>Brand</b>	MediaTek
<b>Model</b>	MT7925B22M
<b>Sku 1</b>	DVDDIO 3.3V, power from platform.
<b>Sku 2</b>	DVDDIO 1.8V, power from IC PMU. (Power Management Unit).
<b>Power Supply Rating</b>	3.3Vdc from host equipment
<b>Modulation Type</b>	GFSK, π/4-DQPSK, 8DPSK CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode 1024QAM for OFDMA in 11ax mode 4096QAM for OFDMA in 11be mode
<b>Modulation Technology</b>	<b>BT EDR:</b> FHSS <b>BT LE:</b> DTS <b>WLAN:</b> DSSS, OFDM, OFDMA
<b>Transfer Rate</b>	<b>BT EDR:</b> up to 3 Mbps <b>BT LE:</b> 125kbps / 500kbps / 1Mbps / 2 Mbps <b>2.4GHz:</b> 802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 300 Mbps VHT: up to 400 Mbps 802.11ax: up to 573.5 Mbps 802.11be: up to 688.2 Mbps <b>5GHz:</b> 802.11a: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 1733.3 Mbps 802.11ax: up to 2401.9Mbps 802.11be: up to 1441.2 Mbps <b>6GHz</b> 802.11a: up to 54 Mbps 802.11ax: up to 2401.9 Mbps 802.11be: up to 2882.4 Mbps
<b>Operating Frequency</b>	<b>BT EDR:</b> 2402MHz ~ 2480MHz <b>BT LE:</b> 2402MHz ~ 2480MHz <b>2.4GHz:</b> 2.412 ~ 2.472GHz <b>5GHz:</b> 5.18~5.24GHz, 5.26~5.32GHz, 5.5 GHz ~5.72 GHz, 5.745 ~ 5.825GHz, 5.815GHz ~5.885GHz <b>6GHz:</b> 5.955~6.415GHz, 6.435~6.525GHz, 6.535~6.865GHz, 6.875~7.115GHz
<b>Number of Channel</b>	<b>BT EDR:</b> 79 <b>BT LE:</b> 40 <b>2.4GHz:</b> 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20), 802.11be (EHT20): 13 802.11n (HT40), VHT40, 802.11ax (HE40), 802.11be (EHT40): 9 <b>5GHz:</b> <b>U-NII-1</b>

	<p>802.11a, 802.11n(HT20), 802.11ac(VHT20), 802.11ax(HE20), 802.11be(EHT20):4              802.11n(HT40), 802.11ac(VHT40), 802.11ax(HE40), 802.11be(EHT40):2              802.11ac(VHT80), 802.11ax(HE80), 802.11be(EHT80):1  <b>U-NII-2A + U-NII-2C</b>              802.11a, 802.11n(HT20), 802.11ac(VHT20), 802.11ax(HE20), 802.11be(EHT20):16              802.11n(HT40), 802.11ac(VHT40), 802.11ax(HE40), 802.11be(EHT40):8              802.11ac(VHT80), 802.11ax(HE80), 802.11be(EHT80):4              802.11ac(VHT160), 802.11ax(HE160), 802.11be(EHT160):2  <b>U-NII-3</b>              802.11a, 802.11n(HT20), 802.11ac(VHT20), 802.11ax(HE20), 802.11be(EHT20):5              802.11n(HT40), 802.11ac(VHT40), 802.11ax(HE40), 802.11be(EHT40):2              802.11ac(VHT80), 802.11ax(HE80), 802.11be(EHT80):1  <b>5.9GHz:</b>              802.11a, 802.11n(HT20), 802.11ac(VHT20), 802.11ax(he20), 801.11be(EHT20):3              802.11n(HT40), 802.11ac(VHT40), 802.11ax(HE40), 802.11be(EHT40):2              802.11ac(VHT80), 802.11ax(HE80), 802.11be(EHT80):1              802.11ac(VHT160), 802.11ax(HE160), 802.11be(EHT160):1  <b>6GHz:</b>              802.11a/ax(HE20), 802.11be(EHT20): 59              80211ax(HE40), 802.11be(EHT40): 29              80211ax(HE80), 802.11be(EHT80): 14              80211ax(HE160), 802.11be(EHT160): 7</p>
<p><b>Output power</b></p>	<p><b>BT EDR:</b> 12.95 dBm  <b>BT LE:</b> 12.94 dBm  <b>2.4GHz:</b>              1TX: 24.21 dBm              2TX: 26.03 dBm  <b>5GHz:</b>              5.18~5.24GHz: 23.79 dBm              5.26~5.32GHz: 23.48 dBm              5.5 GHz ~5.72 GHz: 23.21dBm              5.745 ~ 5.825GHz: 27.91dBm  <b>5.9GHz:</b> 29.93 dBm  <b>6GHz:</b>              (under control of a low-power indoor AP)              5.955~6.415GHz: 20.15dBm              6.435~6.525GHz: 20.16 dBm              6.535~6.865GHz: 20.06 dBm              6.875~7.115GHz: 20.11 dBm              (under control of a standard power AP)              5.955~6.415GHz: 29.99 dBm              6.535~6.855GHz: 29.96 dBm</p>



### 3.2 Antenna information

The antennas mentioned below are covered in the certification scope and the HOST can only be used with the following antennas:

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type
1	Chain0	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)
	Chain1	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)
2	Chain0	PSA	RFMTA311020EMMB301	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)
	Chain1	PSA	RFMTA311020EMMB301	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)
3	Chain0	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG
	Chain1	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG
4	Chain0	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	RP SMA
	Chain1	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	RP SMA
5	Chain0	PSA	RFPCA460632IMMB701	-13.2 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX
	Chain1	PSA	RFPCA460632IMMB701	-13.2 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX
6	Chain0	PSA	RFMTA421230IMMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex
	Chain1	PSA	RFMTA421230IMMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex
7	Chain0	HongBo	260-25096	3.11 4.88 4.91	2.4~2.4835 5.15~5.895 5.25~5.35	Monopole	i-pex(MHF)

				4.9	5.47~5.725		
				4.9	5.725~5.85		
				4.87	5.85~5.895		
				4.73	5.925~6.425		
				4.29	6.425~6.525		
				4.58	6.525~6.875		
				4.09	6.875~7.125		
	Chain1	HongBo	260-25096	3.11	2.4~2.4835	Monopole	i-pex(MHF)
				4.88	5.15~5.895		
				4.91	5.25~5.35		
				4.9	5.47~5.725		
				4.9	5.725~5.85		
				4.87	5.85~5.895		
				4.73	5.925~6.425		
				4.29	6.425~6.525		
				4.58	6.525~6.875		
				4.09	6.875~7.125		

Only the above antennas are tested for compliance with the FCC rules, and all other antennas (even same type with lower gain) will require a re-assessment to be used with this module.

### 3.3 Host Integration instructions

The product is designed to be used with “NGFF (Next Generation Form Factor) M.2 2230” PCIE Bus, please install module into a M.2 2230 PCIE slot.

### 3.4 Host product testing guidance

HOST must follow the specific restrictions listed in “3.5 Regulatory notes” section below and section 3 of KDB996369 D04 V02 Module Integration Guide v01, to verify that the host product meets all the applicable rules.

## FCC regulation requirements / installation restrictions

### Dual Client 6CD

1. This device not 6PP category and the maximum power does not exceed authorized values.
2. This device will only associate and connect with a low-power indoor Access Point, subordinate device, or standard access point and never directly link to any other client devices.
3. This device will always initiate transmission under the control of a low-power indoor AP or subordinate or standard client except access point for brief communications before joining a network. These quick messages will only occur if the client has detected an indoor AP, subordinate, or standard access point operating on a channel. These brief messages will have a time-out mechanism such that if it does not receive a response from an AP it will not continually repeat the request.
4. This device, when associated and connected with a low-power indoor access point, subordinate or standard access point device, will operate at a power lower as advertised by the indoor access point, subordinate, or standard access point:
  - i. lower than or equal to the power advertised by the low-power indoor access point or subordinate and never above the maximum output power allowed by the FCC grant for clients associated with indoor clients or subordinates.
  - ii. lower than or 6 dB below the power advertised by the standard access point.
1. Contention-based protocol as demonstrated in the test report is permanently embedded in the module and is not host-dependent based protocol demonstrated in the test report.

### Installation restrictions

1. Prohibited for control of or communications with unmanned aircraft systems, including drones.

### Federal Communication Commission Interference Statement

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 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

**Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

**Radiation Exposure Statement:**

The product comply with the FCC portable RF exposure limit set forth for an uncontrolled environment and are safe for intended operation as described in this manual.

The further RF exposure reduction can be achieved if the product can be kept as far as possible from the user body or set the device to lower output power if such function is available.

**This module is intended for OEM integrators only. Per FCC KDB 996369 D03 OEM Manual v01 guidance, the following conditions must be strictly followed when using this certified module:**

**KDB 996369 D03 OEM Manual v01 rule sections:**

2.2 List of applicable FCC rules

This module has been tested for compliance to FCC Part 15 Subpart C (15.247) and Subpart E (15.407).

2.3 Summarize the specific operational use conditions

The module is tested for standalone mobile RF exposure use condition. Any other usage conditions such as co-location with other transmitter(s) will need a separate reassessment through a class II permissive change application or new certification.

2.4 Limited module procedures

Not applicable.

2.5 Trace antenna designs

Not applicable.

2.6 RF exposure considerations

This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. A separate SAR/Power Density evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

This device was tested for typical body operations. To comply with RF exposure requirements, a minimum separation distance of 5 mm must be maintained between the user's body a including the antenna.

accessories that do not meet these requirements may not comply with RF exposure requirements and should be avoided.

## 2.7 Antennas

The following antennas have been certified with this module.

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type
1	Chain0	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)
	Chain1	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)
2	Chain0	PSA	RFMTA311020EMMB301	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)
	Chain1	PSA	RFMTA311020EMMB301	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)
3	Chain0	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG
	Chain1	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG
4	Chain0	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	RP SMA
	Chain1	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	RP SMA
	Chain0	PSA	RFPCA460632IMMB701	-13.2	5.925~6.425	Dipole	IPEX

5				-13.67 -13.67 -13.09	6.425~6.525 6.525~6.875 6.875~7.125		
	Chain1	PSA	RFPCA460632IMMB701	-13.2 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX
6	Chain0	PSA	RFMTA421230IMMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex
	Chain1	PSA	RFMTA421230IMMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex
7	Chain0	HongBo	260-25096	3.11 4.88 4.91 4.9 4.9 4.87 4.73 4.29 4.58 4.09	2.4~2.4835 5.15~5.895 5.25~5.35 5.47~5.725 5.725~5.85 5.85~5.895 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Monopole	i-pex(MHF)
	Chain1	HongBo	260-25096	3.11 4.88 4.91 4.9 4.9 4.87 4.73 4.29 4.58 4.09	2.4~2.4835 5.15~5.895 5.25~5.35 5.47~5.725 5.725~5.85 5.85~5.895 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Monopole	i-pex(MHF)

Note1: Use of other antenna types or the same type of antenna with higher gain than listed above must performed additional testing and appropriate permissive change approval.

Note2: In the 5.925-7.125GHz band, use of other similar type antennas and the antenna gain not higher/lower than listed above may only require a C1PC without any additional testing/submission.

Note3: Contact MTK for additional guidance, if choose to use different antenna types or higher/lower gain antennas in the end system.

**IMPORTANT:** The final host product must have an integral antenna which is not removable by the end-user.

### 2.8 Label and compliance information

The final end product must be labeled in a visible area with the following: "Contains FCC ID: RAS-MT7925B22M". The grantee's FCC ID can be used only when all FCC compliance requirements are met.

### 2.9 Information on test modes and additional testing requirements

This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) class II permissive change re-evaluation or new certification.

### 2.10 Additional testing, Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable.

As long as all conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

**IMPORTANT NOTE:** In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

### **Manual Information To the End User**

The OEM integrator 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.

### **OEM/Host manufacturer responsibilities**

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.

Modules: extended to host manufacturers by integration instructions.



MediaTek Confidential

**Industry Canada statement:**

This device complies with ISED's licence-exempt RSSs. 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.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

**Radiation Exposure Statement:**

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with greater than 20cm between the radiator & your body.

**Déclaration d'exposition aux radiations:**

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé à plus de 20 cm entre le radiateur et votre corps.

**This device is intended only for OEM integrators under the following conditions: (For module device use)**

- 1) The antenna must be installed and operated with greater than 20cm between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as **2** conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

**Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: (Pour utilisation de dispositif module)**

- 1) L'antenne doit être installée et exploitée avec plus de 20 cm entre l'antenne et les utilisateurs, et

**2) Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.**

Tant que les **2** conditions ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requises pour ce module installé.

### **IMPORTANT NOTE:**

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

### **IMPORTANTENOTE**

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l'ID IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

### **End Product Labeling**

This transmitter module is authorized only for use in device where the antenna may be installed and operated with greater than 20cm between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains IC:7542A-MT7925B22M".

### **Plaque signalétique du produit final**

Ce module émetteur est autorisé uniquement pour une utilisation dans un appareil où l'antenne peut être installée et utilisée à plus de 20 cm entre l'antenne et les utilisateurs. Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: "Contient des IC: 7542A-MT7925B22M"

### **Manual Information To the End User**

The OEM integrator 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.

### **Manuel d'information à l'utilisateur final**

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.

**Caution :**

- (i) 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;
- (ii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall be such that the equipment still complies with the e.i.r.p. limit;
- (iii) for devices with detachable antenna(s), the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall be such that the equipment still complies with the e.i.r.p. limits as appropriate;
- (iv) where applicable, antenna type(s), antenna models(s), and worst-case tilt angle(s) necessary to remain compliant with the e.i.r.p. elevation mask requirement set forth in section 6.2.2.3 shall be clearly indicated.

**Avertissement:**

Le guide d'utilisation des dispositifs pour réseaux locaux doit inclure des instructions précises sur les restrictions susmentionnées, notamment :

- (i) les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;
- (ii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis pour les dispositifs utilisant les bandes de 5 250 à 5 350 MHz et de 5 470 à 5 725 MHz doit être conforme à la limite de la p.i.r.e.;
- (iii) pour les dispositifs munis d'antennes amovibles, le gain maximal d'antenne permis (pour les dispositifs utilisant la bande de 5 725 à 5 850 MHz) doit être conforme à la limite de la p.i.r.e. spécifiée, selon le cas;
- (iv) lorsqu'il y a lieu, les types d'antennes (s'il y en a plusieurs), les numéros de modèle de l'antenne et les pires angles d'inclinaison nécessaires pour rester conforme à l'exigence de la p.i.r.e. applicable au masque d'élévation, énoncée à la section 6.2.2.3, doivent être clairement indiqués

**DETACHABLE ANTENNA USAGE**

This radio transmitter (IC: 7542A- MT7925B22M / Model: MT7925B22M) has been approved by ISED to operate with the antenna type listed below with maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (IC: 7542A-MT7925B22M / Model: MT7925B22M) a été approuvé par ISED pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

**Approved antenna(s) list**

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type
1	Chain0	PSA	RFMTA340718EMBL302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)
	Chain1	PSA	RFMTA340718EMBL302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)
2	Chain0	PSA	RFMTA311020EMMB301	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)
	Chain1	PSA	RFMTA311020EMMB301	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)
3	Chain0	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG
	Chain1	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG
4	Chain0	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	RP SMA
	Chain1	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	RP SMA
5	Chain0	PSA	RFPCA460632IMMB701	-13.2 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX
	Chain1	PSA	RFPCA460632IMMB701	-13.2	5.925~6.425	Dipole	IPEX

				-13.67 -13.67 -13.09	6.425~6.525 6.525~6.875 6.875~7.125		
6	Chain0	PSA	RFMTA421230IMMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex
	Chain1	PSA	RFMTA421230IMMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex
7	Chain0	HongBo	260-25096	3.11 4.88 4.91 4.9 4.9 4.87 4.73 4.29 4.58 4.09	2.4~2.4835 5.15~5.895 5.25~5.35 5.47~5.725 5.725~5.85 5.85~5.895 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Monopole	i-pex(MHF)
	Chain1	HongBo	260-25096	3.11 4.88 4.91 4.9 4.9 4.87 4.73 4.29 4.58 4.09	2.4~2.4835 5.15~5.895 5.25~5.35 5.47~5.725 5.725~5.85 5.85~5.895 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Monopole	i-pex(MHF)

**IMPORTANT:** The final host product must have an integral antenna which is not removable by the end-user.