MT7921K Install User Guideline

Version: V0. 3

Release Date: 2021-06-15

Document Revision History

Version	Date	Author	Change List
V0.1	20201214	Jane	Initial draft release.
V0.2	20210109	Jane	Added antenna set 4 information – " RFMTA311020EMMB301_V02"
V0.3	20210527		Added antenna set 5 information – " JR2Q00340-1"

Table of Contents

1   System overview

1.1   General Description

MT7921K chip is highly integrated single chip which have built in 2x2 dual-band wireless LAN and Bluetooth combo radio. WiFi works on the ISM band, which means many other devices such as microwave oven, radar, and Bluetooth use the same frequencies and channels with WiFi devices.

Therefore, governments make regulations to avoid interference between devices. The specifications include usable channels, scan rule, and transmit power.

2 Driver install

2.1 How to install driver

Please follow the procedure listed in below to install driver

- 1st : Update Windows security package to register signature mechanism
- 2nd : Install Windows driver.

2.1.1　Windows Security for new signature mechanism

If you are the 1st time to use this driver, you should update Windows Security for new signature mechanism at first. Please follow below link to install this software.

https://www.microsoft.com/en-us/download/details.aspx?id=46148

For windows 7 x64 example:

Security Update for Windows 7 for x64-based Systems (KB3033929)

| Select Language: | English ▾ | **Download** |
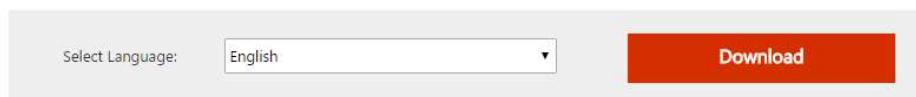
A security issue has been identified in a Microsoft software product that could affect your system.

⊕ Details

⊕ System Requirements

⊕ Install Instructions

⊕ Related Resources

2.1.2 Windows 10 install note

If manufacturer 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   Install Windows driver

MT7921K supports PCIE interface. According to interface type of MT7921K, please refer to steps shown below to install Windows driver:

PCIE 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).
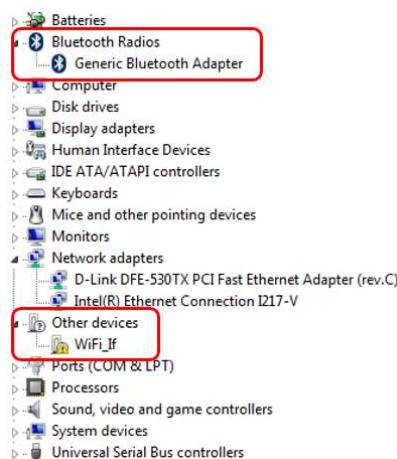
3.   Right click the "**Generic Bluetooth Adapter**" BT device and select disable as follows.
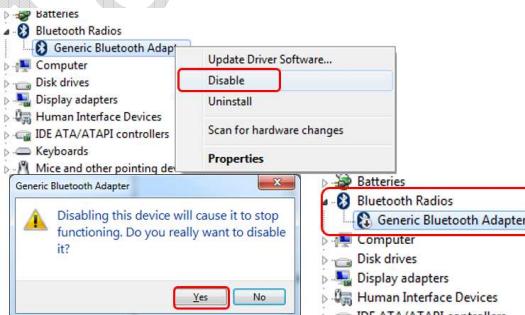
4. Right-click on "**WiFi_If**" Wifi device and Update Driver Software.
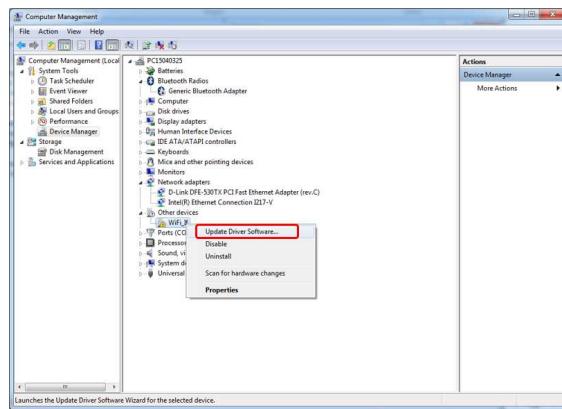
5. According host's Windows' OS to select and install driver.
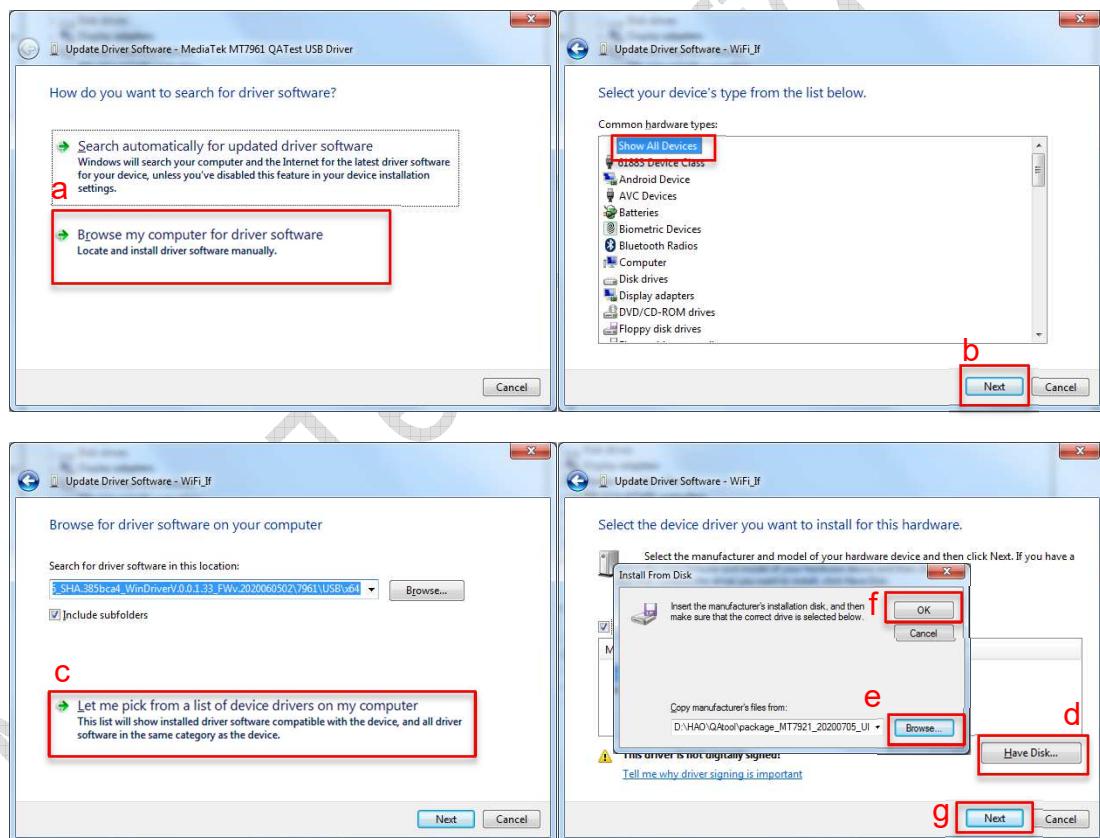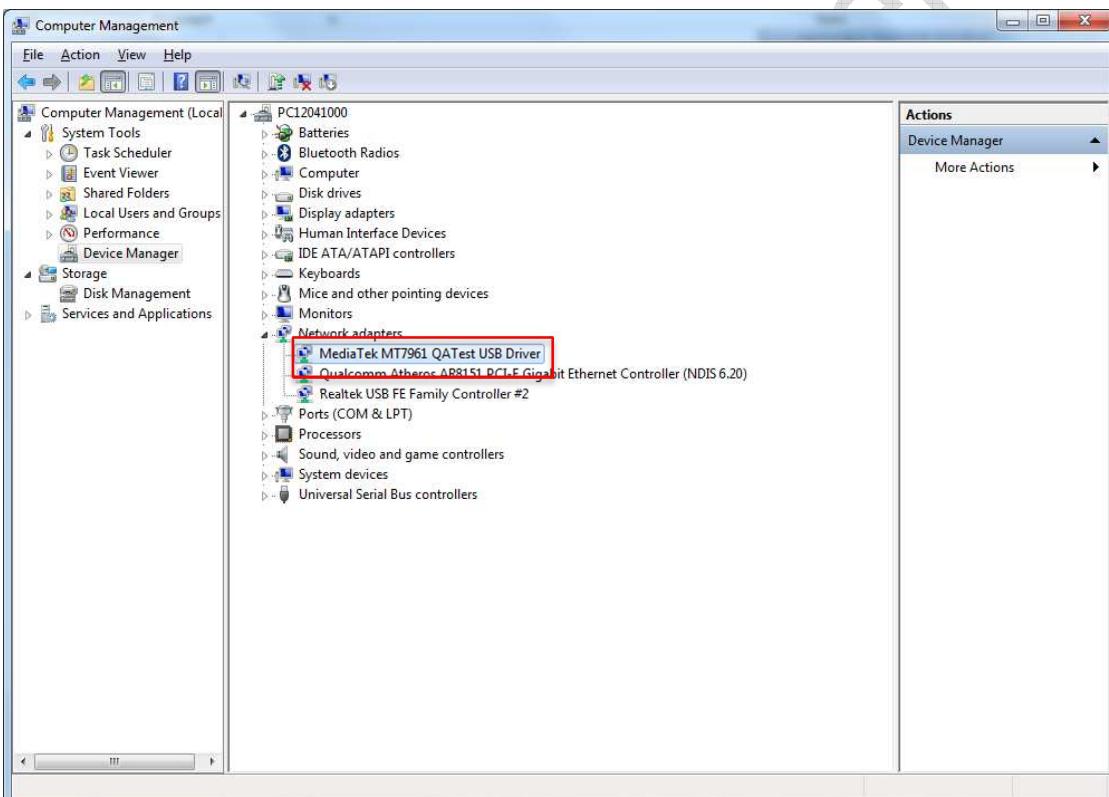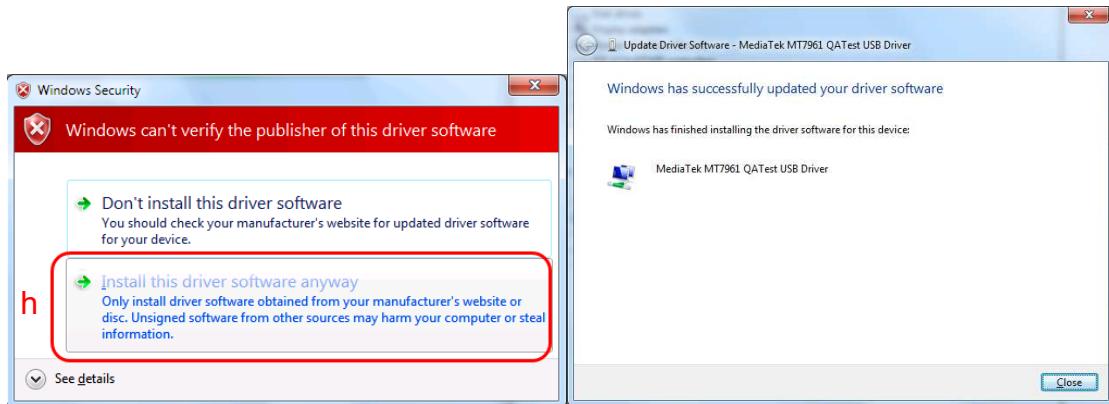
3   General Information & Integration Instructions

## 3.1   General Description of MT7921K

Product	2TX 11ax (WiFi6E) + BT/BLE Combo Card
Brand	MediaTek
Model	MT7921K
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	GFSK, π/4-DQPSK, 8DPSK for FHSS CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	**BT EDR:** FHSS **BT LE:** GFSK **WLAN:** DSSS, OFDM, OFDMA
Transfer Rate	**BT EDR:** up to 3 Mbps **BT LE:** up to 2 Mbps 802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201.0 Mbps
Operating Frequency	**BT EDR:** 2402MHz ~ 2480MHz **BT LE 1M:** 2402MHz ~ 2480MHz **BT LE 2M:** 2404MHz ~ 2478MHz **2.4GHz:** 2.412 ~ 2.472GHz **5GHz:** 5.18~5.32GHz, 5.50~5.72GHz, 5.745 ~ 5.825GHz **6GHz:** 5.955 ~ 6.415GHz, 6.435 ~ 6.525GHz, 6.525 ~ 6.875GHz, 6.875 ~ 7.115GHz
Number of Channel	**BT EDR:** 79 **BT LE:** 40 **2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 13 802.11n (HT40), VHT40, 802.11ax (HE40): 9 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 25 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 12 802.11ac (VHT80), 802.11ax (HE80): 6 **6GHz:** 802.11ax (HE20): 59 802.11ax (HE40): 29 802.11ax (HE80): 14

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	Cable Length (mm)	Cable Loss (dB)	Excluding Cable Loss Ant. Gain (dBi)
1	Chain0	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA	150	2.4~2.4835GHz : 0.5 5.15~5.85GHz : 0.8	2.92 4.67
	Chain1	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA	150	2.4~2.4835GHz : 0.5 5.15~5.85GHz : 0.8	2.92 4.67
2	Chain0	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)	200	included cable loss	-
	Chain1	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)	200	included cable loss	-
3	Chain0	PSA	RFMTA311020EMMB301	1.71 4.82 3.31	2.4~2.4835 5.15~5.85 5.92~7.125	PIFA	i-pex(MHF)	200	-	-
	Chain1	PSA	RFMTA311020EMMB301	1.71 4.82 3.31	2.4~2.4835 5.15~5.85 5.92~7.125	PIFA	i-pex(MHF)	200	-	-
4	Chain0	PSA	RFMTA311020EMMB301_V02	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)	200	-	-
	Chain1	PSA	RFMTA311020EMMB301_V02	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)	200	-	-

Newly

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding Cable Loss Ant. Gain (dBi)
5	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	40	-	-
	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	40	-	-

Please note that the above antennas are custom made for MediaTek MT7921K module and are not listed in Walsin Technology Corp standard catalogs. For the purchase of these antennas, please contact Walsin Technology as listed below directly. 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.

Contact info for above certified antennas:
Company/Dept.: Walsin Technology Corp./ Antenna Business Dept.
Contact window: Andrew Lin
Tel: +886-3-475-8711 # 8172
Cell phone: +886-938-286-596
Email address: andrewlin@passivecomponent.com
URL link: http://www.passivecomponent.com/zh-hant/products/antenna/

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.
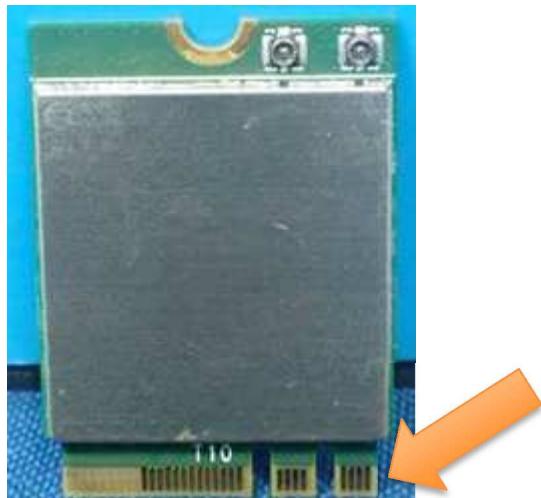
3.4 Host product testing guidance

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.

3.5 Regulatory notes

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.

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). Device is tested for compliance as a low power indoor client device within 5.925–7.125 GHz band.

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.

This module is authorized for Low Power Indoor Client applications only; final host product must be for indoor operations only.

Further operation restrictions on the host product include:
*Prohibited for control of or Communications with unmanned aircraft systems.

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.

2.7 Antennas

The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module except for operations within the 5.925~7.125GHz band. Use of any other antenna with a lower or higher gain in this band will require a separate reassessment through a Class II Permissive Change application or new certification.

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding Cable Loss Ant. Gain (dBi)
1	Chain0	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA	150	2.4~2.4835GHz : 0.5 5.15~5.85GHz : 0.8	2.92 4.67
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	Chain1	PSA	RFMTA311020E MMB301	1.71 4.82 3.31	2.4~2.4835 5.15~5.85 5.92~7.125	PIFA	i-pex(MHF)	200	-	-

Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding Cable Loss Ant. Gain (dBi)
4	Chain0	PSA	RFMTA311020E MMB301_V02	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)	200	-	-
	Chain1	PSA	RFMTA311020E MMB301_V02	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)	200	-	-

Newly										
Ant. Set	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Freq. Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)	Cable Loss (dB)	Excluding Cable Loss Ant. Gain (dBi)
5	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	40	-	-
	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	40	-	-

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following: "Contains FCC ID: RAS-MT7921K". 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.