Mediatek MT7921 (WiFi6) BLE Combo Card User Guide

Contents

MEDIATEK

Mediatek MT7921 (WiFi6) BLE Combo Card

Document Revision History

Version	Date	Author	Change List
V0.1	20200217	Jane	Initial draft release.
V0.2	20200227	Jian-Lun	2nd draft release. Added 2.3.9~2.3.17
V0.3	20200724	TW	Add section 2.5 for dual-band dual concurrent (DBDC) operation

System Overview

General Description

MT7921 chip is highly integrated single chip which have built in 2×2 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.

QA-Tool

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

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

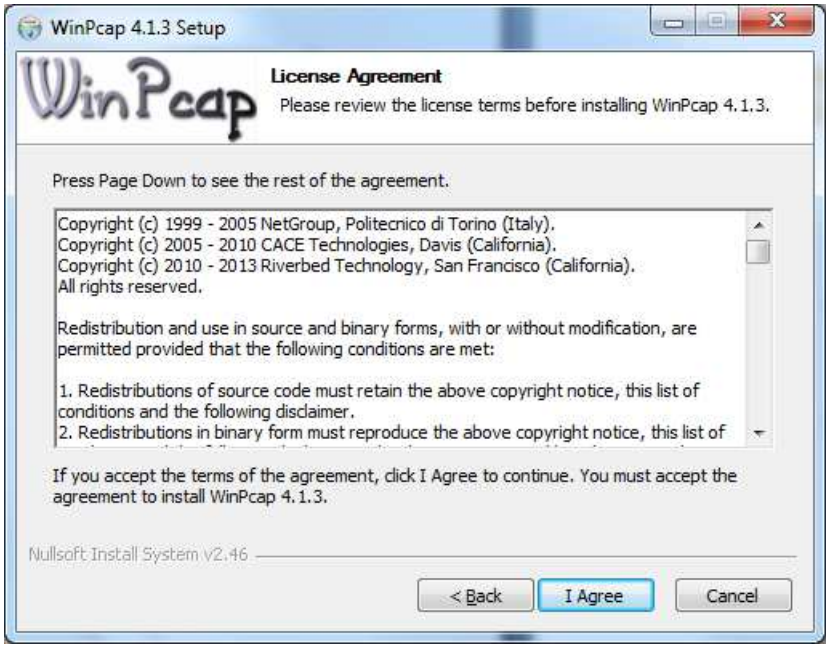
MTK strongly recommends install QA-Tool on Windows 7-64bit operating system.

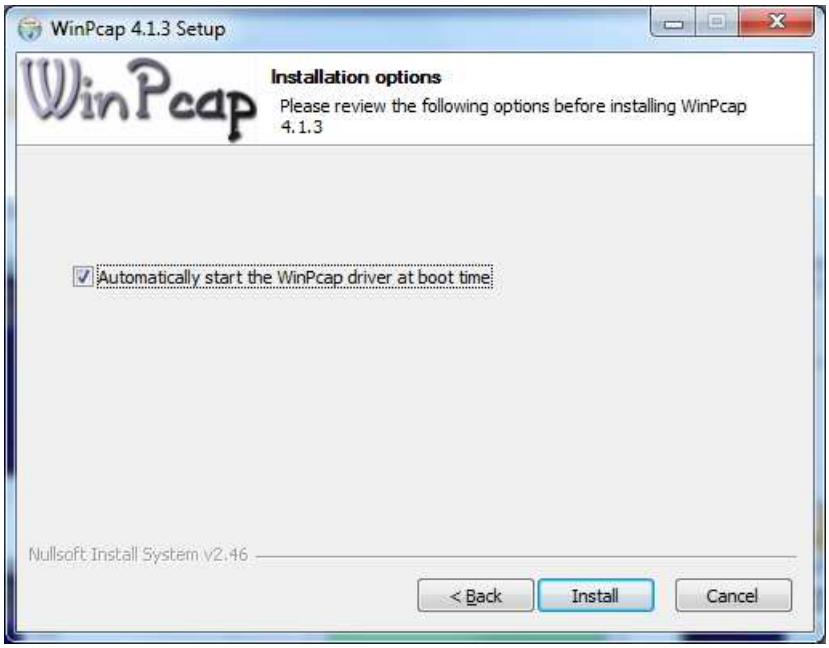
How to install QA-tool

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

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

Install WinPcap
If users are the 1st 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: 4.1.2 or later.

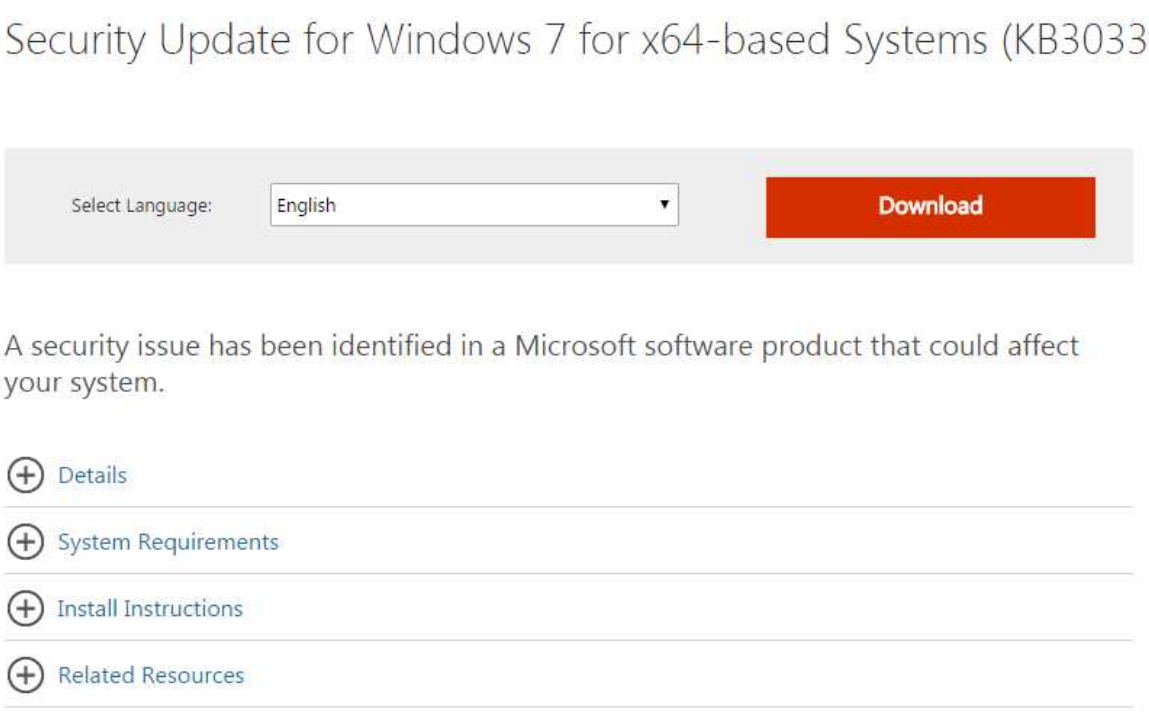




Windows 7 Security for new x64 signature mechanism

If you are the 1st time to use this tool, you should update Windows Security for new X64 signature mechanism at first. Please follow below link to install this software.

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



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 cud as Administrator.
2. Execute 'credit /set no integrity checks on'
3. Reboot
4. Then install again. If still fail, try do 'Disable Secure Boot' below.

NOTE: Reenable the driver integrity check by executing 'credit /set no integrity checks off' and then rebooting.

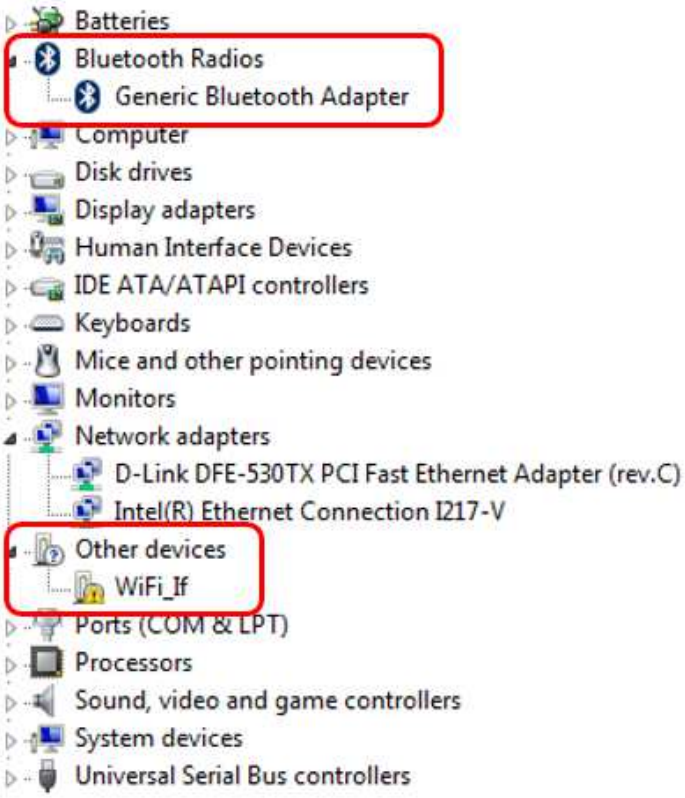
- **Disable Secure Boot**

Please refer to:
https://docs.microsoft.com/en-us/windows-hardware/manufacture/desktop/disabling-secure-boot

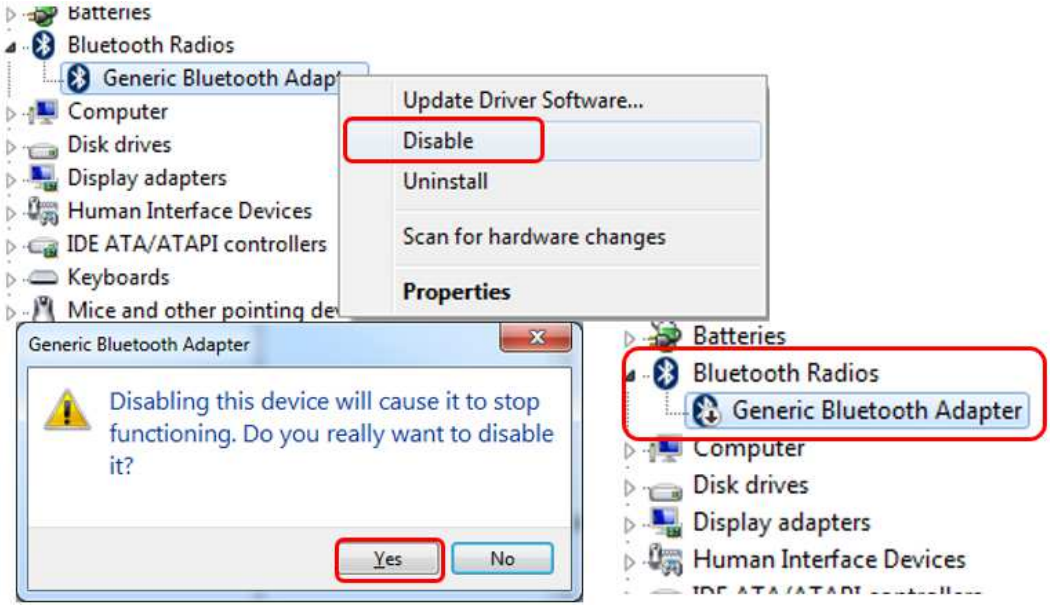
QA-Tool Windows driver
MT7921 supports USB, SDIO and PCIE interface. According to interface type of MT7921 on users' hand, please refer to steps shown below to install QA-Tool Windows driver:

USB interface:

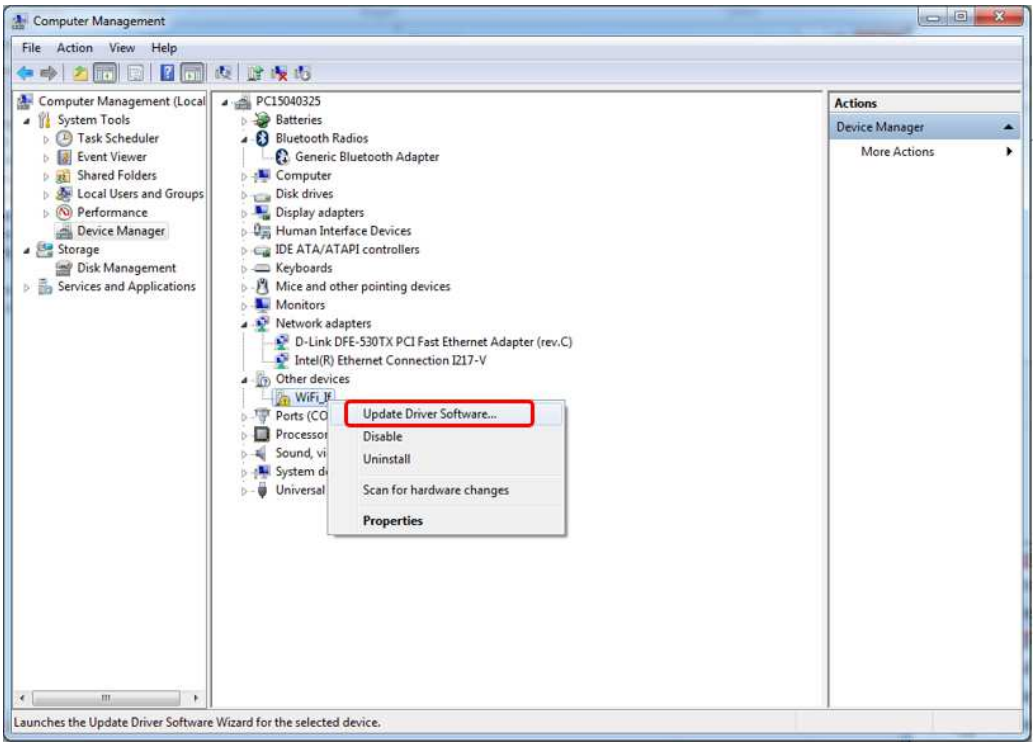
1. Connect DUT to PC/NB and check Windows Device Manager.
2. Window Device Manager would discover DUT shows "Generic Bluetooth Adapter" (BT device) and "**WiFi_If**"(Wi-Fi device).



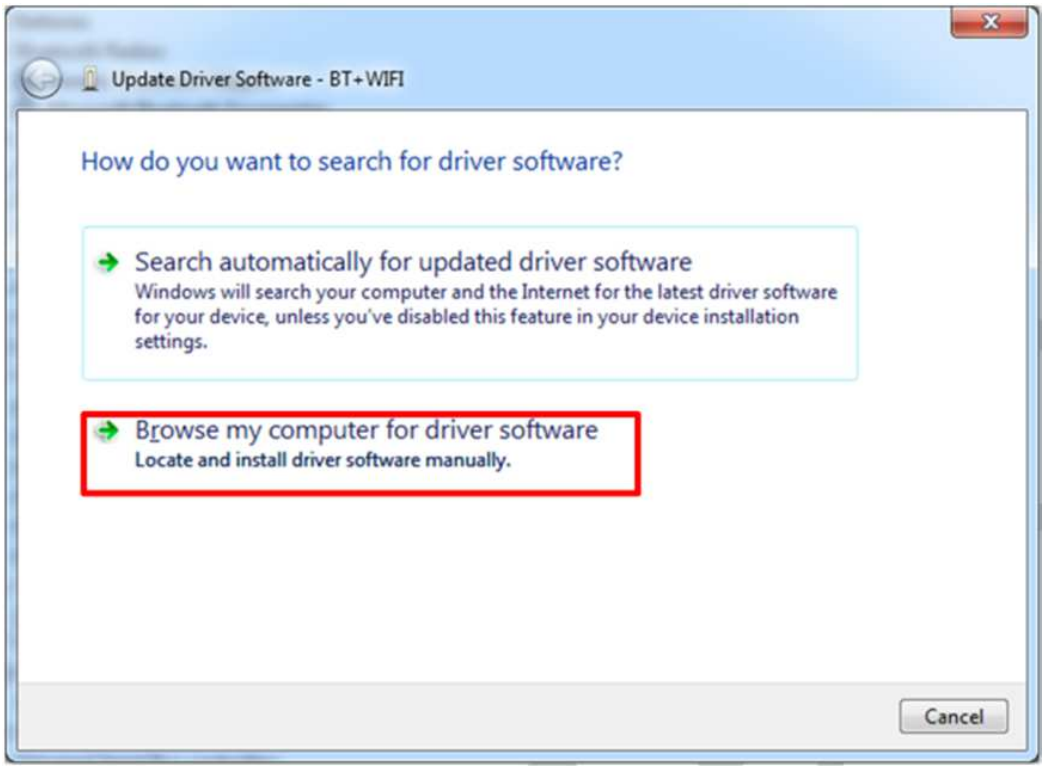
3. Right click the "**Generic Bluetooth Adapter**" BT device and select disable as follows:

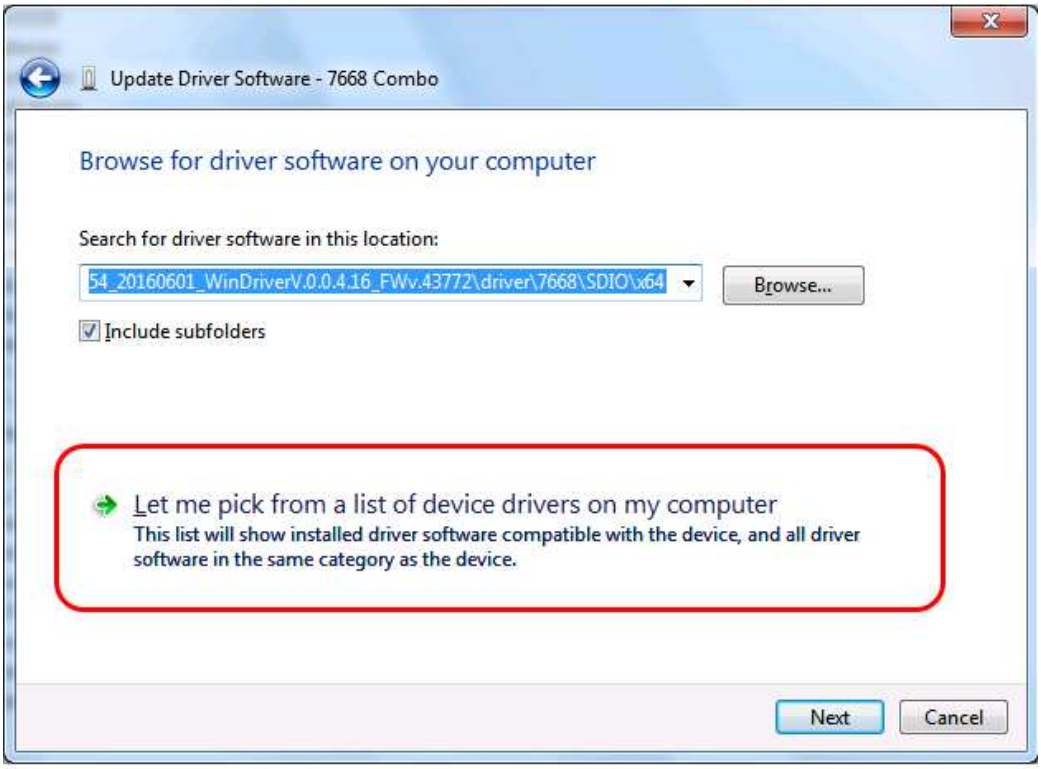


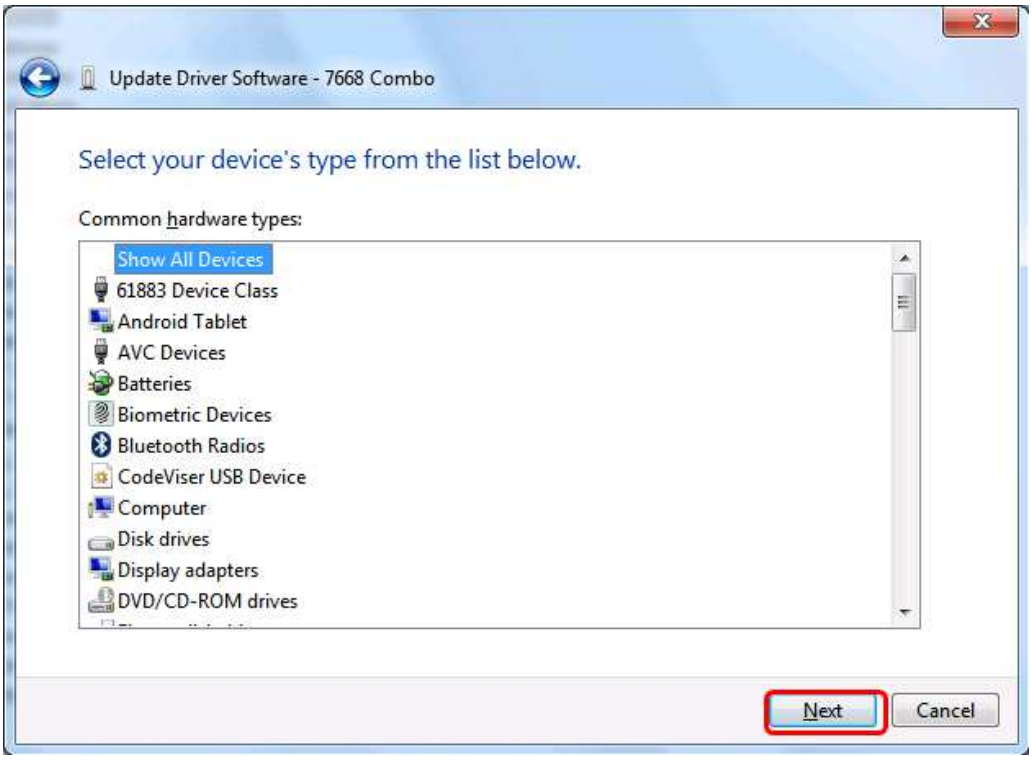
4. Right-click on "**WiFi_If**" Wi-Fi device and Update Driver Software.

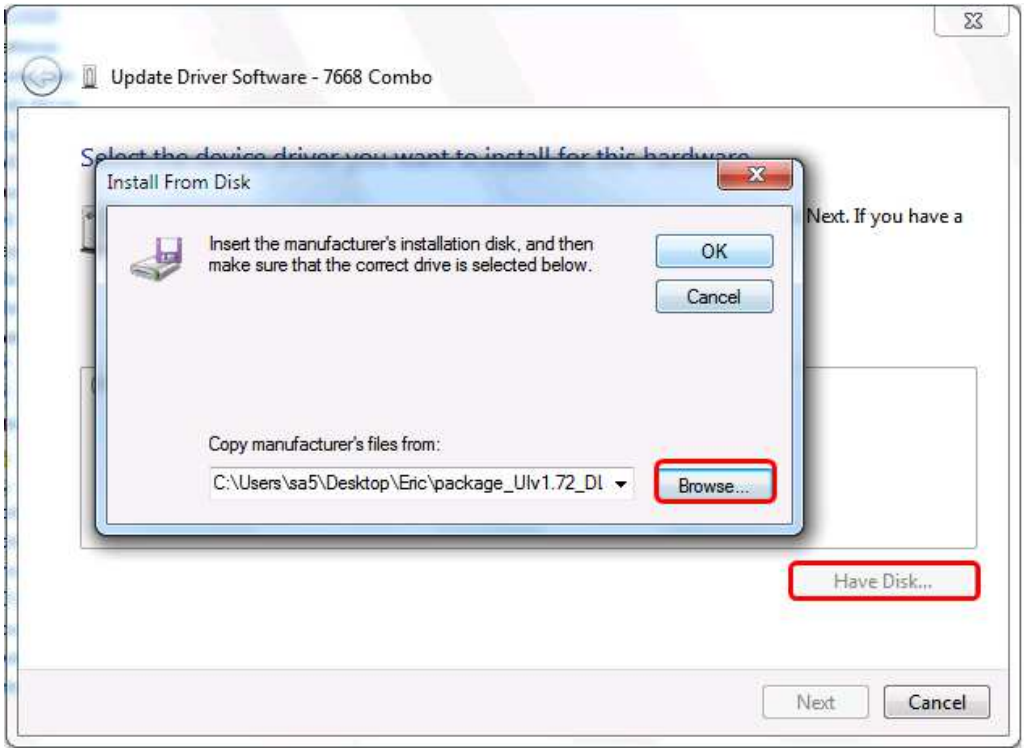


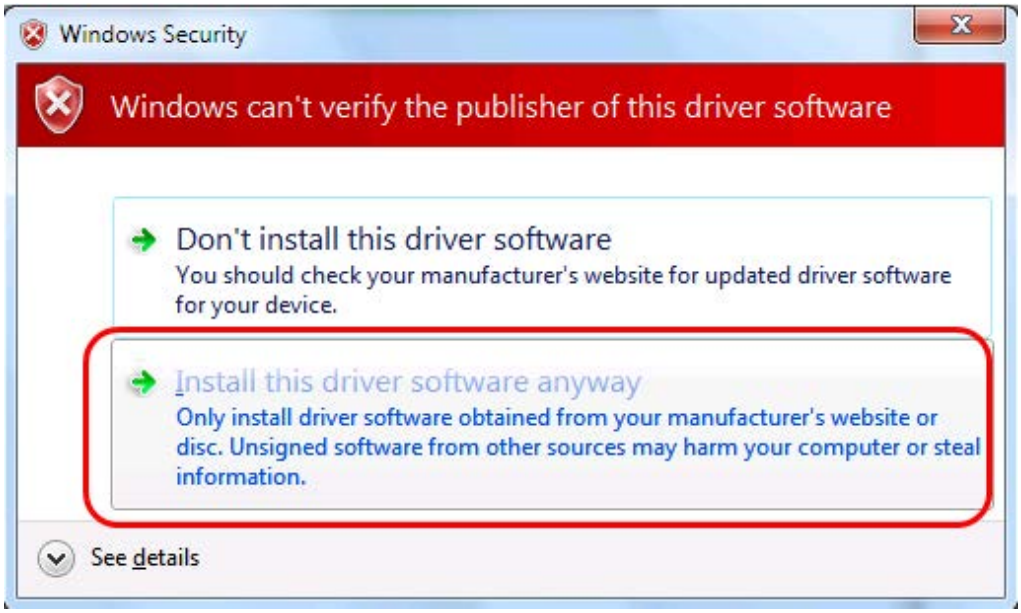
5. According user's Windows' OS to select and install test tool driver.

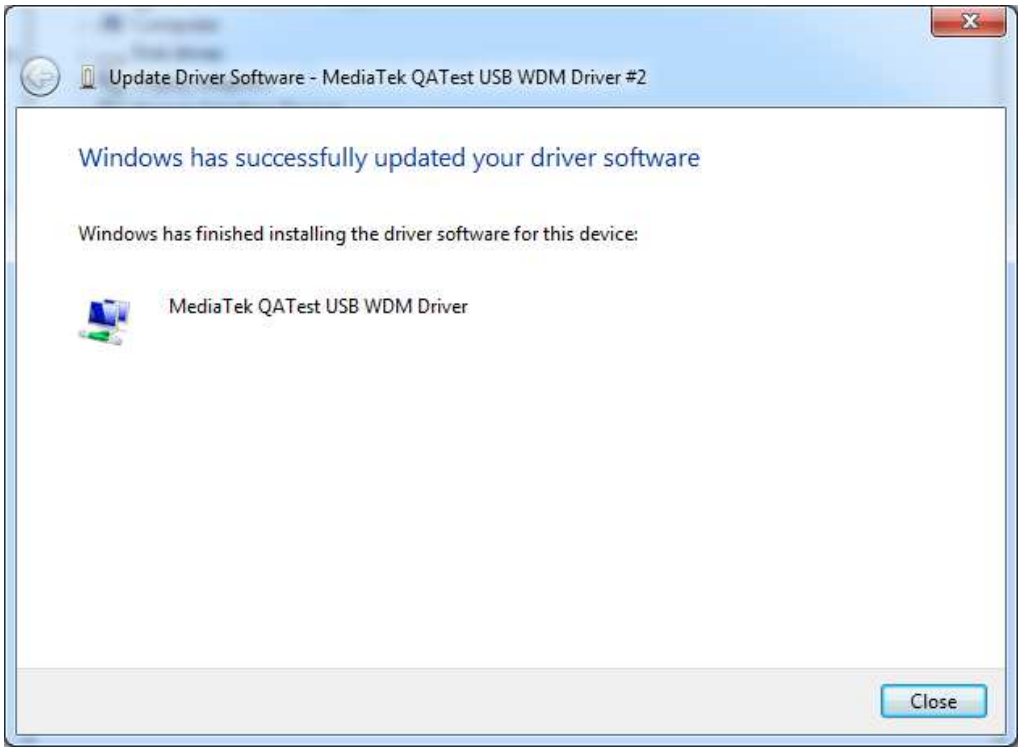


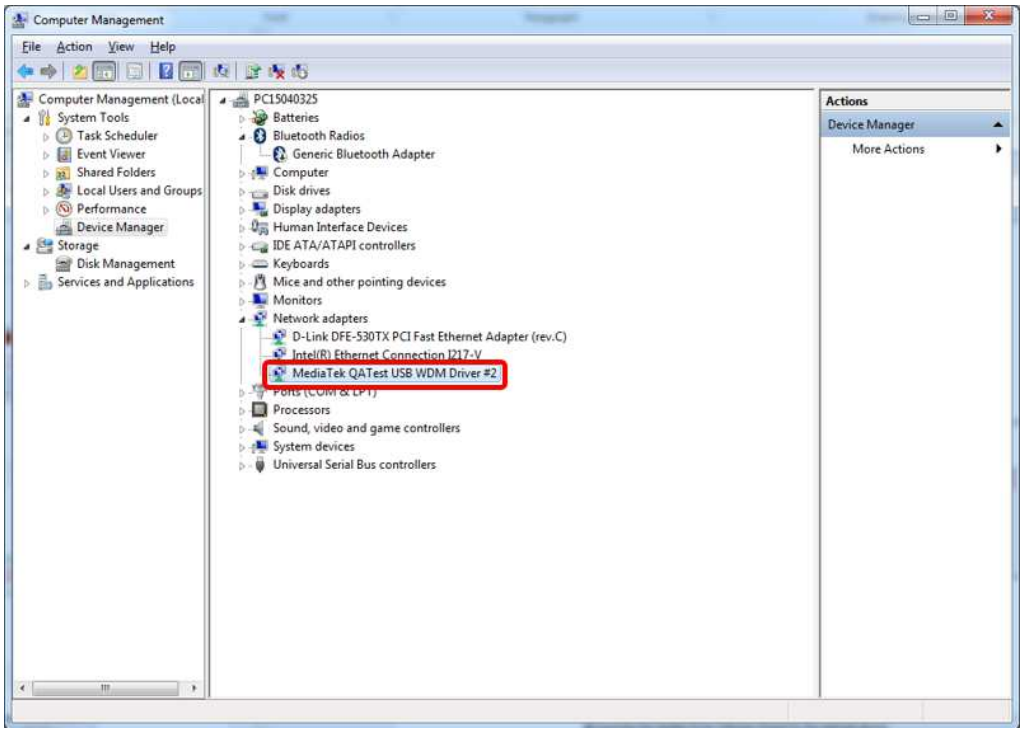

Update Driver Software - 7668 Combo
Browse for driver software on your computer
Search for driver software in this location:
54_20160601_WinDriverV.0.0.4.16_FWv.43772\driver\7668\SDIO\x64
Browse...
Include subfolders
Let me pick from a list of device drivers on my computer
This list will show installed driver software compatible with the device, and all driver software in the same category as the device.
Next
Cancel


Update Driver Software - 7668 Combo
Select your device's type from the list below.
Common hardware types:
Show All Devices
61883 Device Class
Android Tablet
AVC Devices
Batteries
Biometric Devices
Bluetooth Radios
CodeViser USB Device
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Next
Cancel


Update Driver Software - 7668 Combo
Install From Disk
Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.
OK
Cancel
Copy manufacturer's files from:
C:\Users\sa5\Desktop\Eric\package_Ulv1.72_Dl
Browse...
Next. If you have a
Have Disk...
Next
Cancel


Windows Security
Windows can't verify the publisher of this driver software
Don't install this driver software
You should check your manufacturer's website for updated driver software for your device.
Install this driver software anyway
Only install driver software obtained from your manufacturer's website or disc. Unsigned software from other sources may harm your computer or steal information.
See details

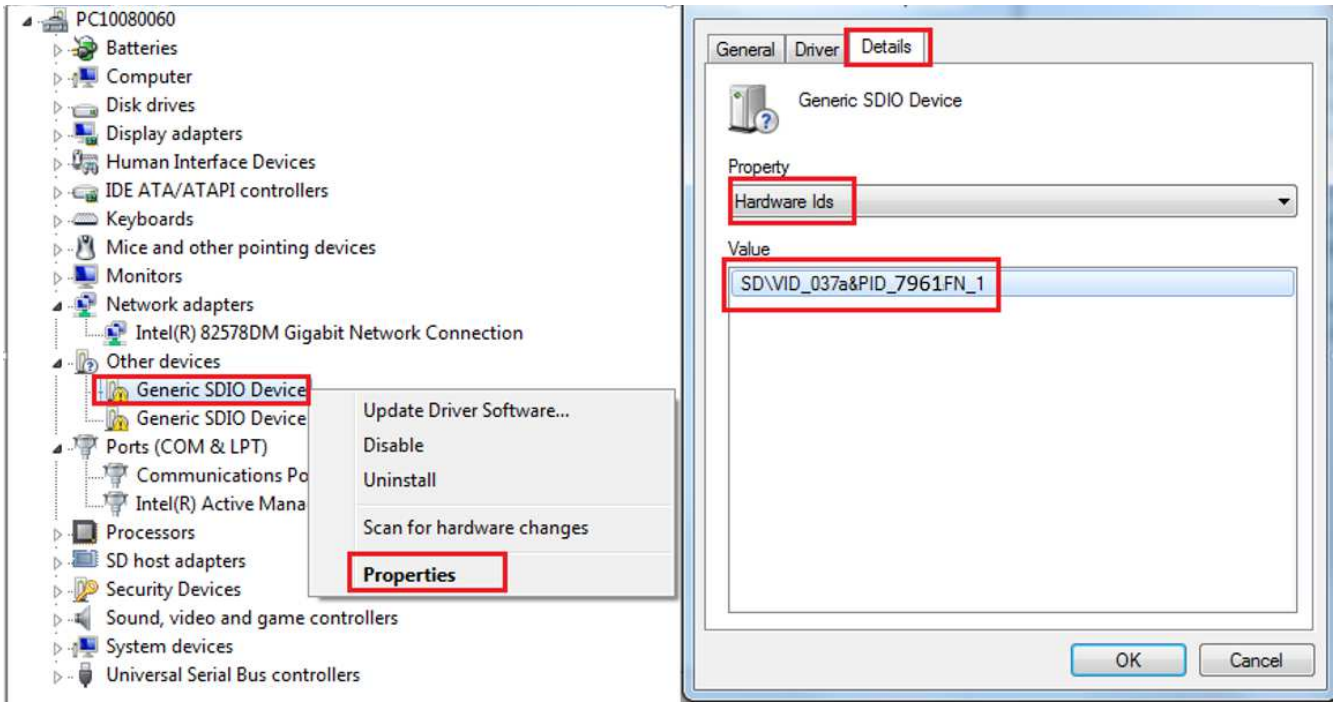


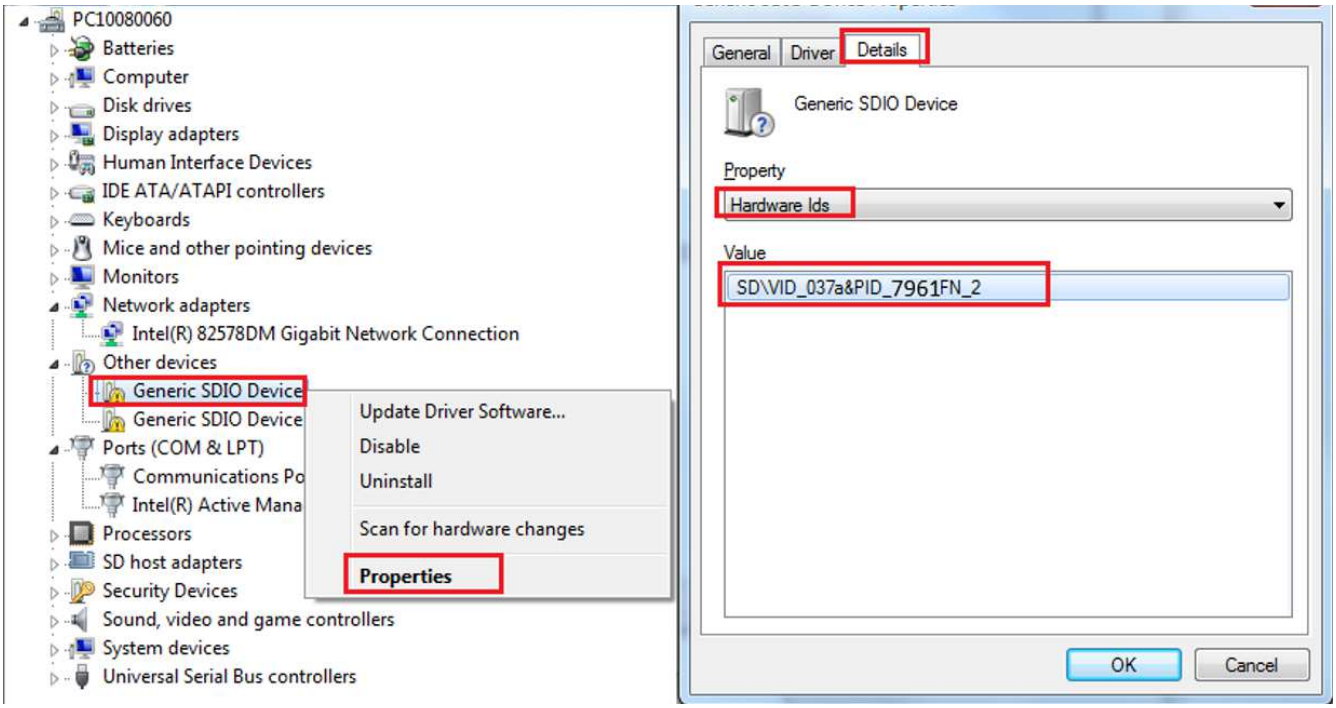


SDIO interface:

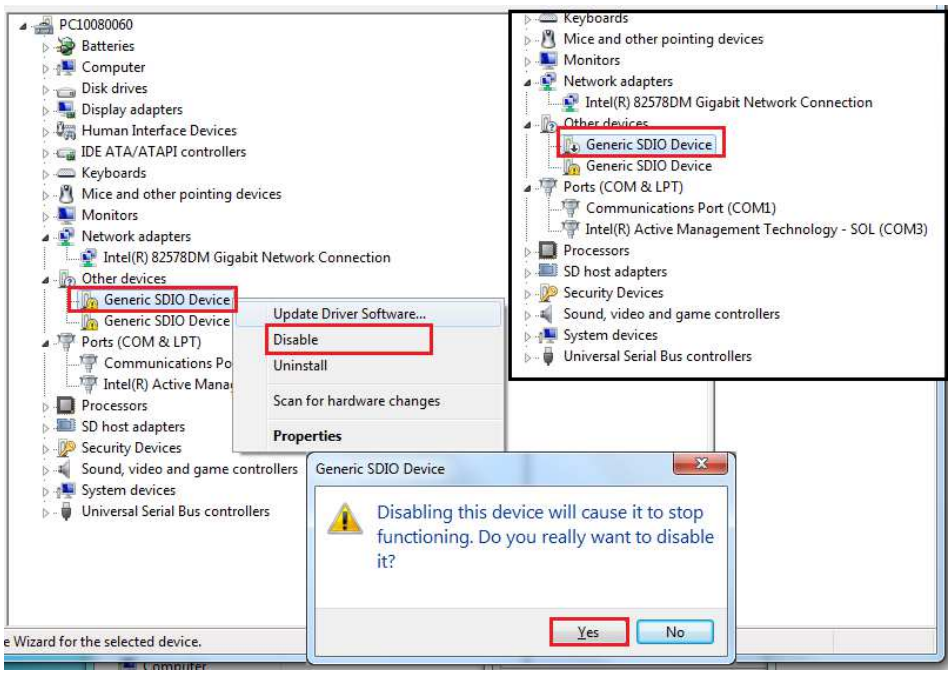
1. Connect DUT to PC/NB and check Windows Device Manager.
2. Window Device Manager would discover DUT shows two “Generic SDIO Device”. User should check DUT VID and PID from “Hardware Ids” of Device Manager to know Wi-Fi and BT device. Please refer to following figure and table to identify WIFI and BT devices:

Hardware Ids	Feature
SD\VID_037a&PID_7961&FN_1	MT7961S-WiFi
SD\VID_037a&PID_7961&FN_2	MT7961S-BT



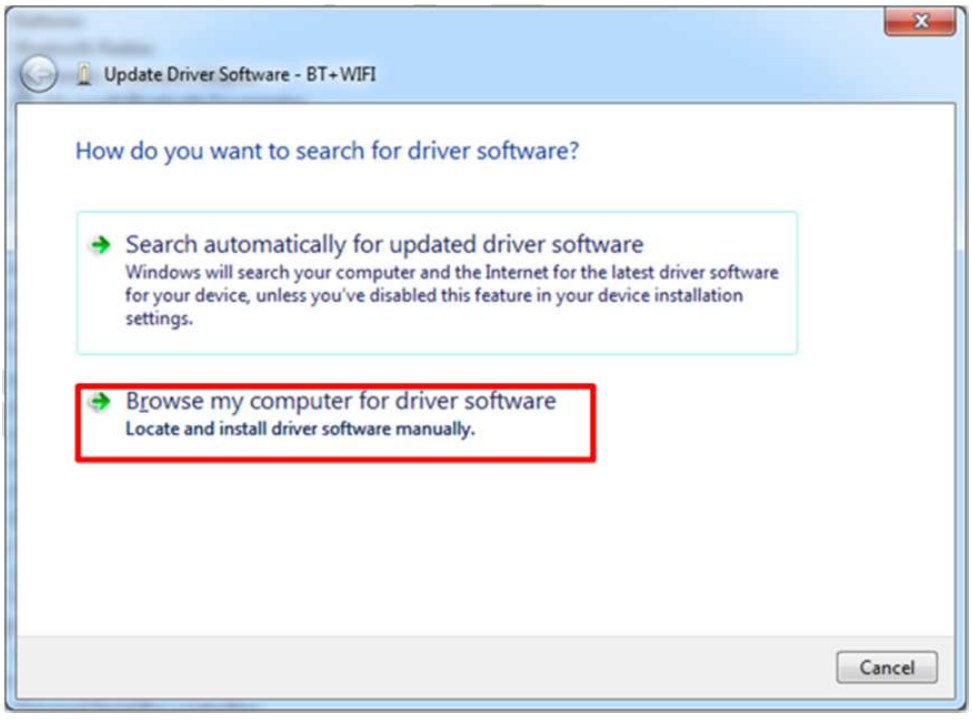


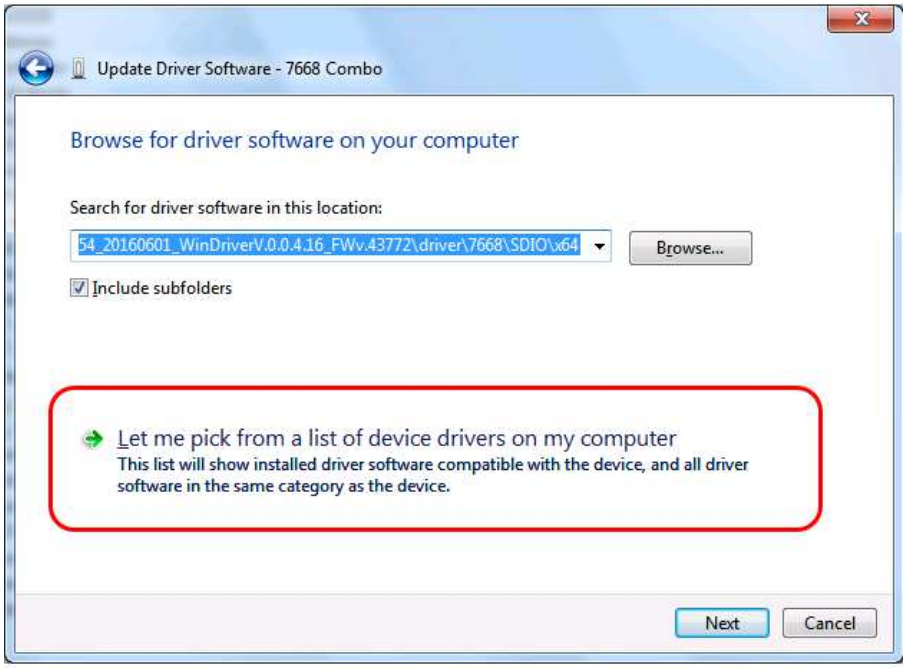
3. Right click the “7961 Combo” BT device (SD\VID_037a&PID_7961&FN_2) and select disable as follows.

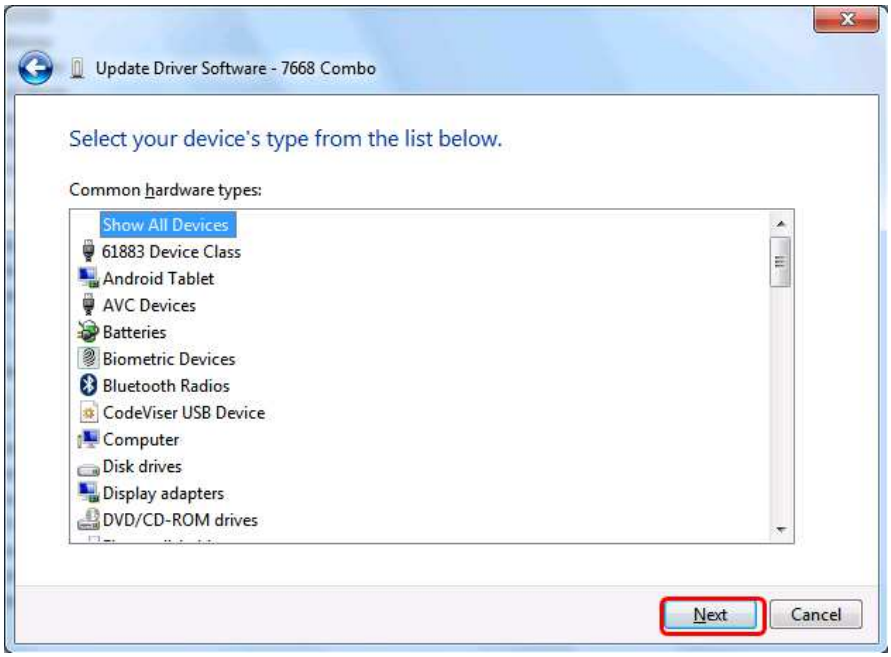


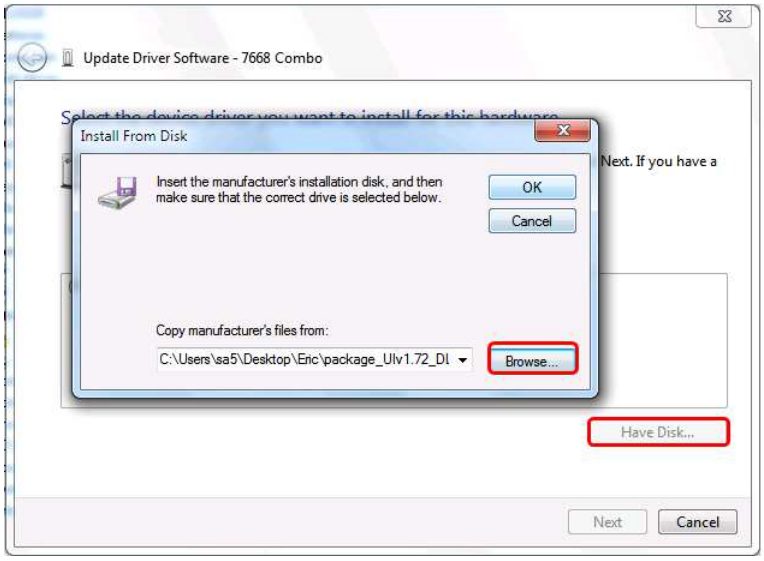
4. Right-click on “7961 Combo” Wifi device (SD\VID_037a&PID_7961&FN_1) and Update Driver Software.

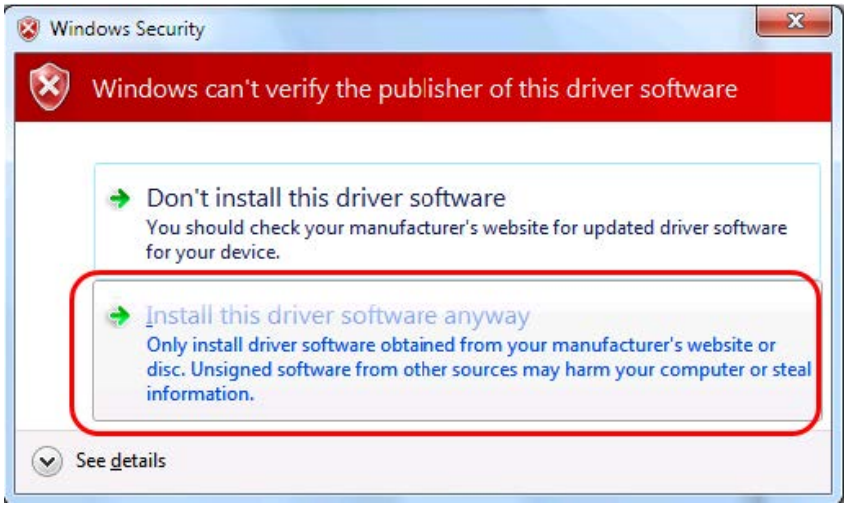
5. According user’s Windows’ OS to select and install test tool driver.

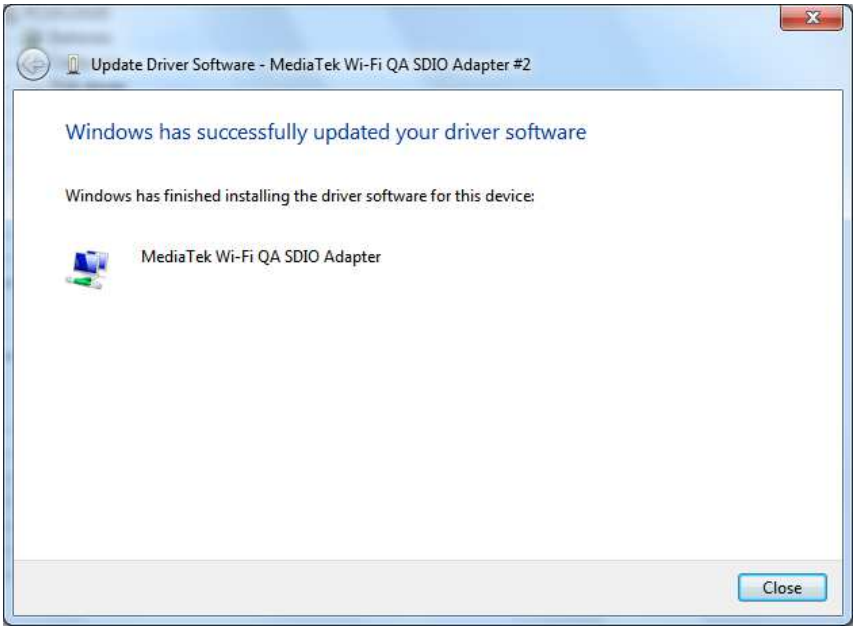


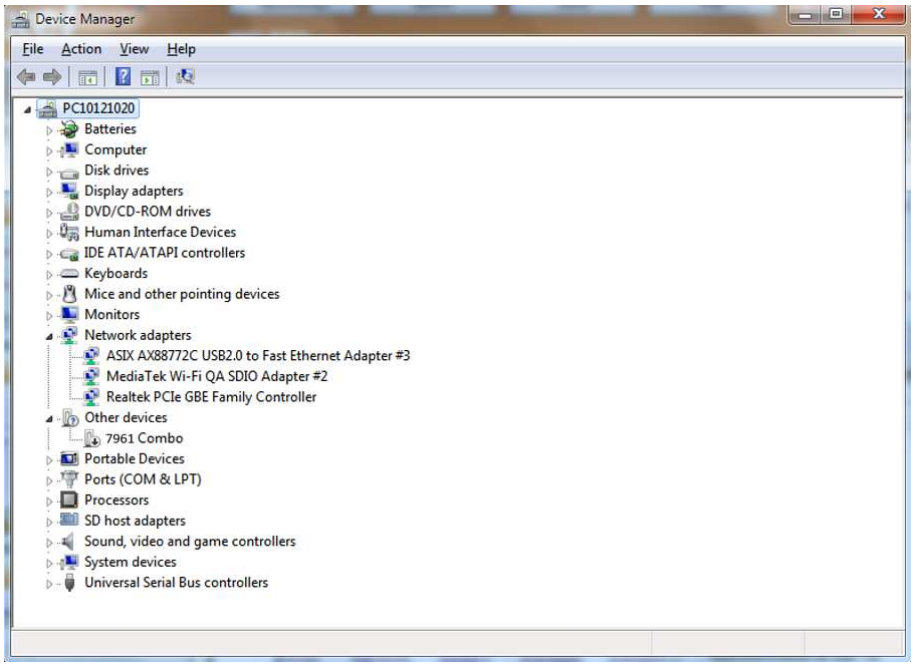

Update Driver Software - 7668 Combo
Browse for driver software on your computer
Search for driver software in this location:
54_20160601_WinDriverV.0.0.4.16_FWv.43772\driver\7668\SDIO\x64
Browse...
Include subfolders
Let me pick from a list of device drivers on my computer
This list will show installed driver software compatible with the device, and all driver software in the same category as the device.
Next
Cancel


Update Driver Software - 7668 Combo
Select your device's type from the list below.
Common hardware types:
Show All Devices
61883 Device Class
Android Tablet
AVC Devices
Batteries
Biometric Devices
Bluetooth Radios
CodeViser USB Device
Computer
Disk drives
Display adapters
DVD/CD-ROM drives
Next
Cancel


Update Driver Software - 7668 Combo
Install From Disk
Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.
OK
Cancel
Copy manufacturer's files from:
C:\Users\sa5\Desktop\Eric\package_Ulv1.72_DI
Browse...
Next. If you have a
Have Disk...
Next
Cancel







MT7921 support only below dual-band dual-concurrent (DBDC) mode operation:

- (Tab TX/RX) TX0/RX0 transceiver is operating in 5GHz (A-band)
- (Tab TX/RX Band 1) TX1/RX1 transceiver is operation in 2.4GHz (G-band)

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. For specific portable application, please follow grant condition(s).

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:

List of applicable FCC rules
This module has been tested for compliance to FCC Part 1

Summarize the specific operational use conditions
The module is tested for standalone mobile and portable 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.

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 evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

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.

Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type
2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA
2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA
3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)
3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)

Label and compliance information
The final end product must be labeled in a visible area with the following: “Contains FCC ID: RAS-MT7921”. The grantee’s FCC ID can be used only when all FCC compliance requirements are met.

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

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.

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

The SAR evaluations is according to KDB 616217, and the module approach distance is 5 mm for notebook.

Industry Canada statement:
This device complies with ISED's license-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.

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.

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.

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.

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-MT7921".

Caution:

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;
2. 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;
3. 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;
4. 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.

DETACHABLE ANTENNA USAGE
This radio transmitter (IC: 7542A-MT7921 / Model: MT7921) 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.
Approved antenna(s) list

Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type
2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA
2.42 3.87	2.4~2.4835 5.15~5.85	Dipole	R-SMA
3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)
3.18 4.92	2.4~2.4835 5.15~5.85	PIFA	i-pex(MHF)

Documents / Resources

	Mediatek MT7921 (WiFi6) BLE Combo Card [pdf] User Guide MT7921 WiFi6 BLE Combo Card, WiFi6 BLE Combo Card, Combo Card

References

- Disabling Secure Boot | Microsoft Docs
- Download Security Update for Windows 7 for x64-based Systems (KB3033929) from Official Microsoft Download Center
- WinPcap · Download