



*everyday genius*

**MT7663**

## **Test-Mode Software Application Note**

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

Version: V1.1  
Release Date: 2019-04-12

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## Document Revision History

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Version	Date	Author	Change List
V1.0	20190308	Louis	<ul style="list-style-type: none"> <li>Initial release.</li> </ul>
V1.1	20190412	Shihmis	<ul style="list-style-type: none"> <li>2.3.6-2.3.8 Wording changed.</li> </ul>

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## 1 System overview

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### 1.1 General Description

MT7663 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.

## 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

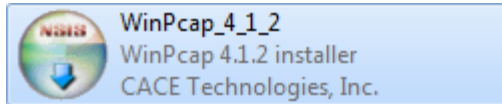
- 1<sup>st</sup> : Install WinPcap
- 2<sup>nd</sup> : Update Windows7 security package to register x64 signature mechanism
- 3<sup>rd</sup> : Instal QA-Tool Windows driver.

## 2.1.1 Install WinPcap

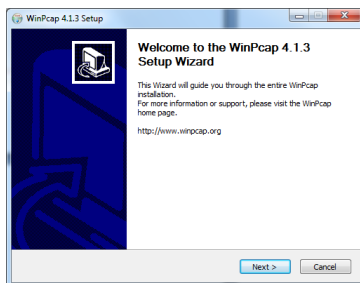
If users are the 1<sup>st</sup> time operating this tool, users should install WinPcap at first. Please follow below link and steps to install this software.

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

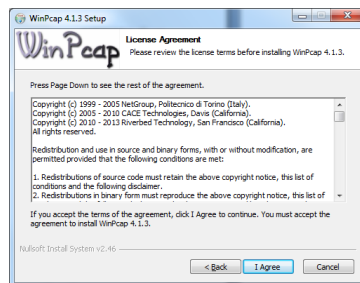
WinPcap version: 4.1.2 or later.



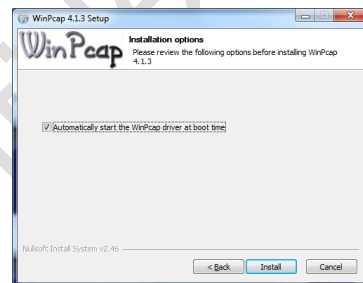
1



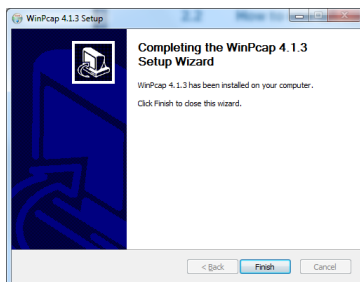
2



3



4



## 2.1.2 Windows 7 Security for new x64 signature mechanism

If you are the 1<sup>st</sup> 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>

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



### 2.1.3 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:

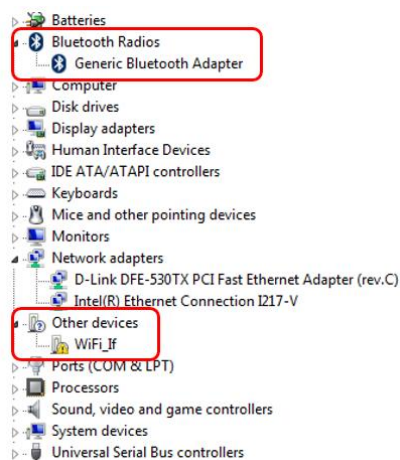
<https://docs.microsoft.com/en-us/windows-hardware/manufacture/desktop/disabling-secure-boot>

## 2.1.4 QA-Tool Windows driver

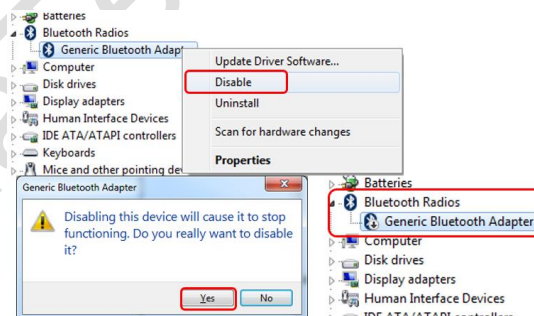
MT7663 supports USB and SDIO interface. According to interface type of MT7663 on users' hand, please refer to steps shown below to install QA-Tool Windows driver:

### USB interface:

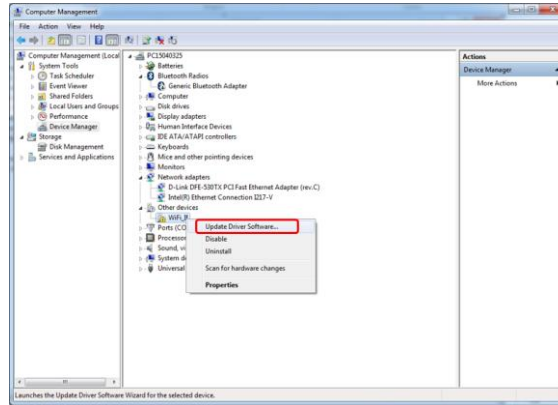
1. Connect DUT to PC/NB and check Windows Device Manager.
2. Window Device Manager would discover DUT shows **"Generic Bluetooth Adapter"**(BT device) and **"WiFi\_If"**(WiFi device).



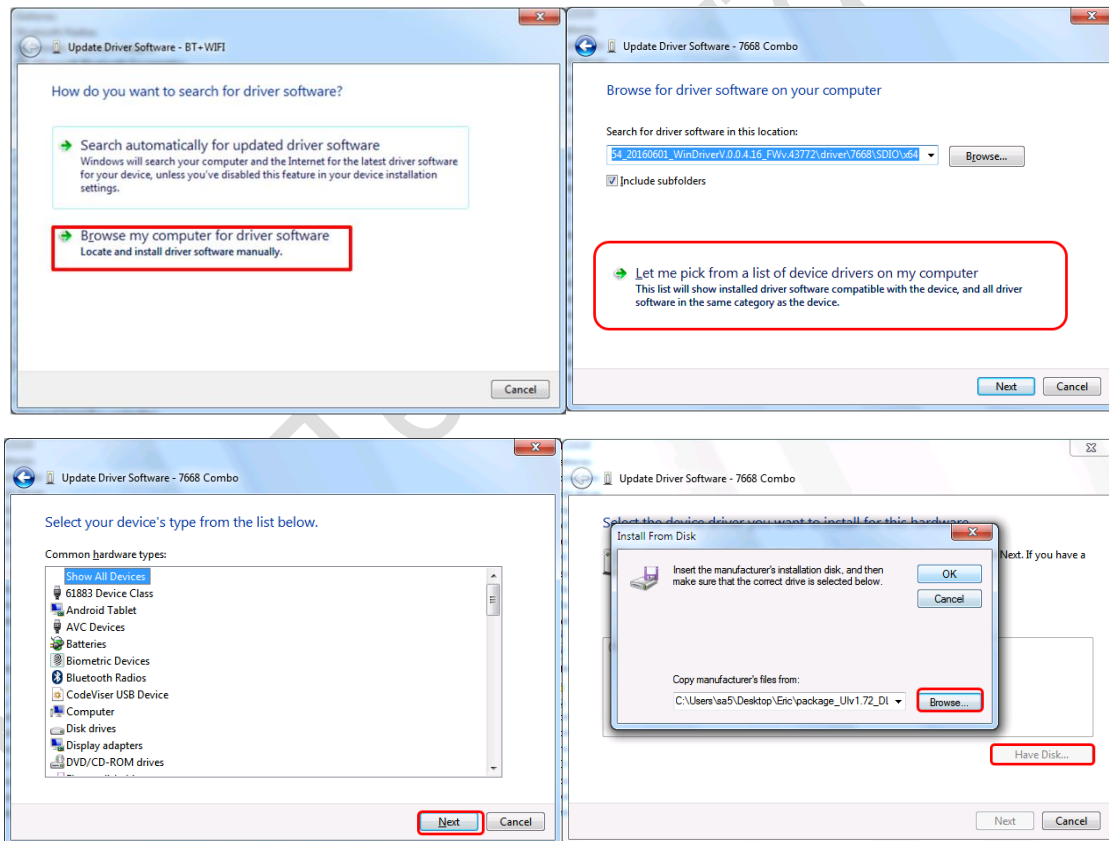
3. Right click the **"Generic Bluetooth Adapter"** BT device and select disable as follows.

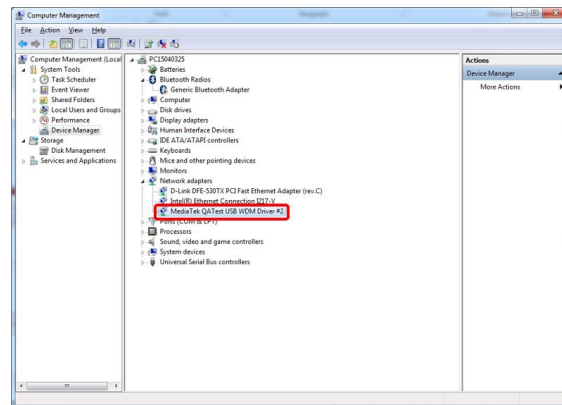
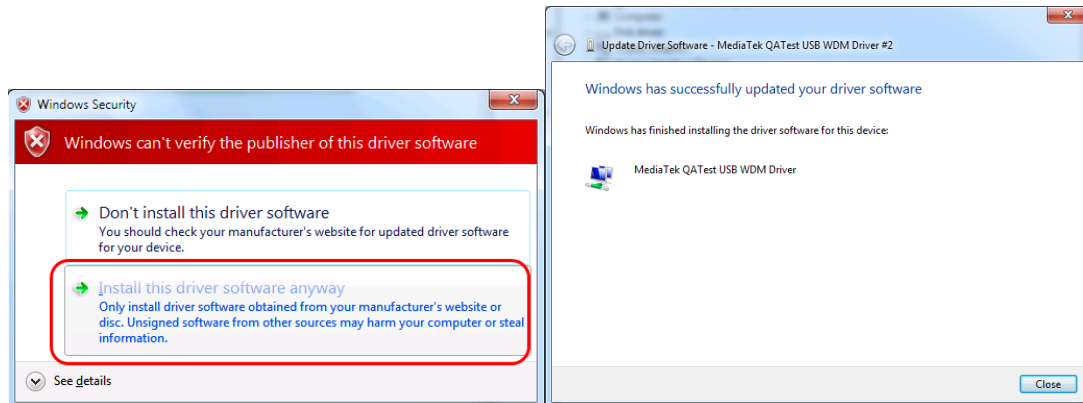


- Right-click on “WiFi\_IF” Wifi device and Update Driver Software.



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

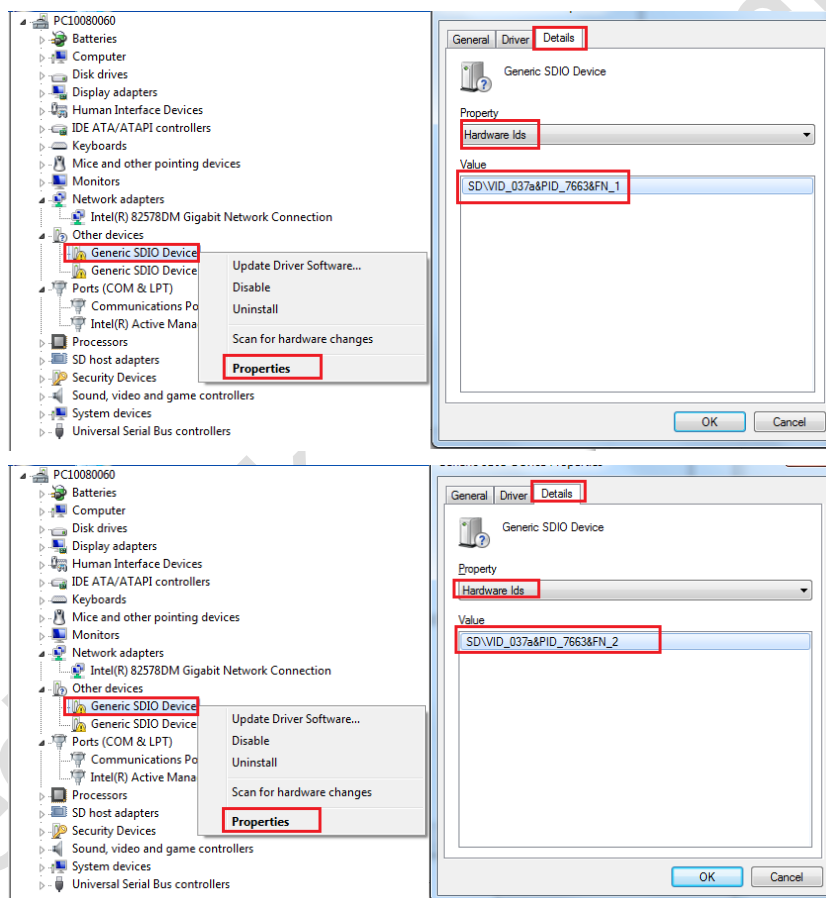




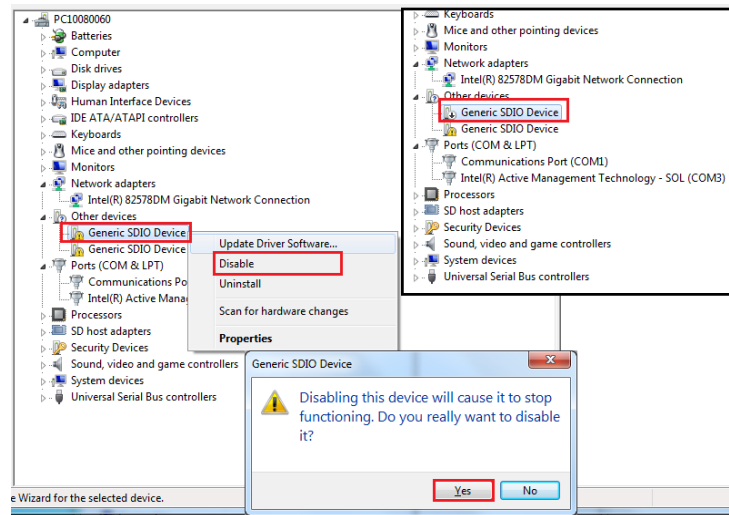
### SDIO interface:

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 WiFi and BT device. Please refer to following figure and table to identify WIFI and BT devices:

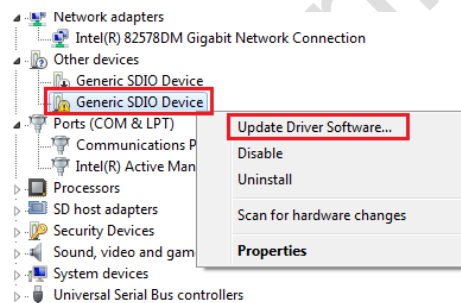
Hardware Ids	Feature
SD\VID_037a&PID_7663&FN_1	MT7663S-WiFi
SD\VID_037a&PID_7663&FN_2	MT7663S-BT



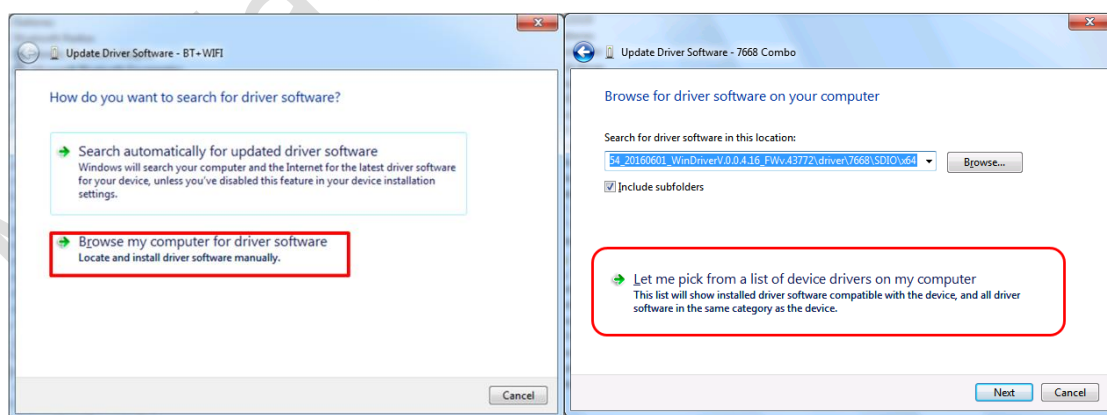
- Right click the “7663 Combo” BT device (SD\VID\_037a&PID\_7663&FN\_2) and select disable as follows.

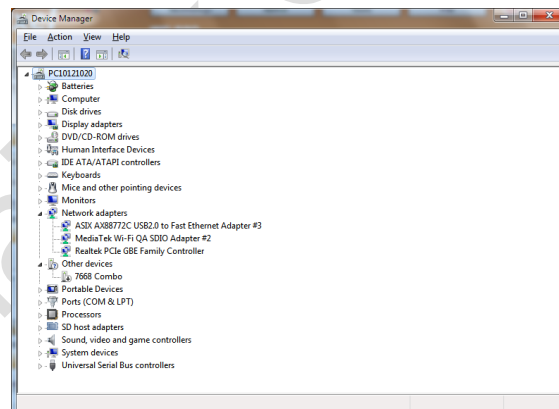
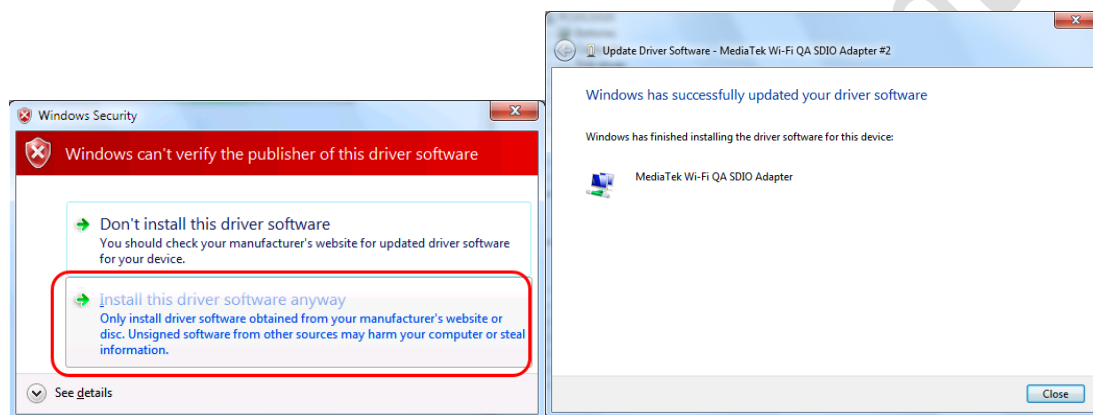
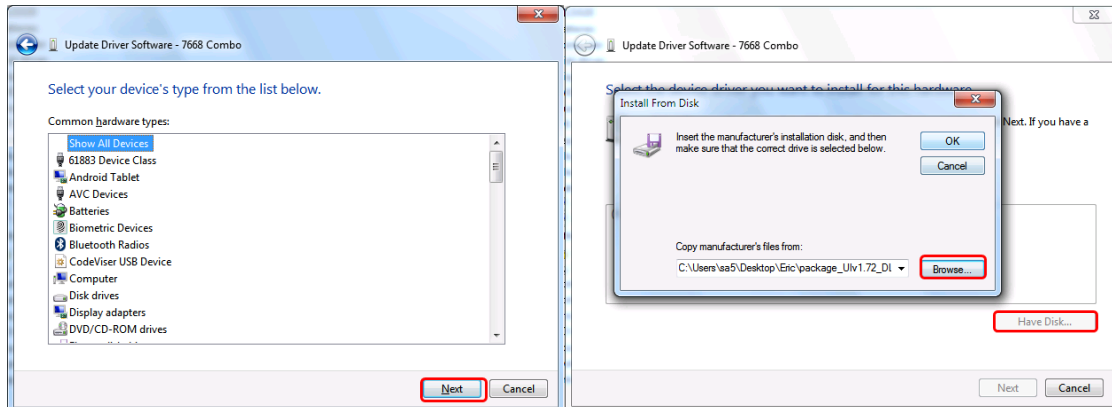


- Right-click on “7663 Combo” Wifi device (SD\VID\_037a&PID\_7663&FN\_1) and Update Driver Software.



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





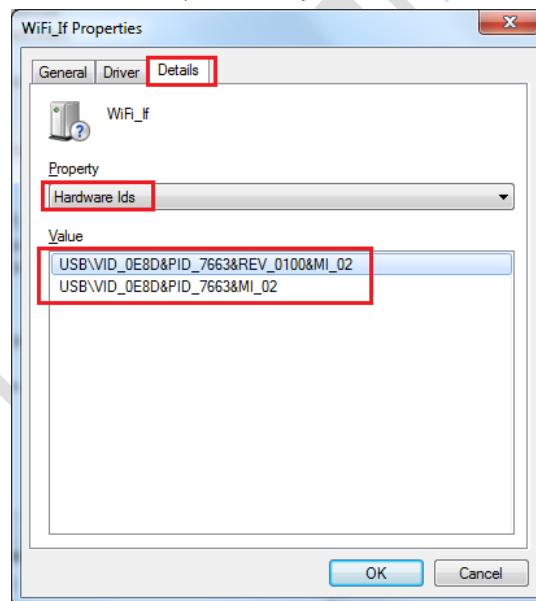
### 2.1.5 Non MTK PID/VID driver install

If user can't install driver in previous section due to change PID/VID by burning e-fuse. Please follow below steps to add PID/VID permission in driver information file.

1. Check the PID/VID (User could skip this step if already have PID/VID)
  - a. Open Windows **Device Manager**.
  - b. Click right on "**WiFi\_If**" (USB WiFi device) and select **Properties**.



- c. Select **Detail** sheet and select **Hardware ids** item.  
User can find PID/VID of DUT here. (For example, below VID = 0E8D/PID = 7663)





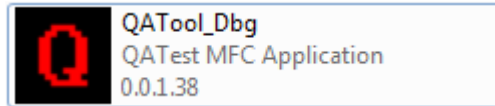
2. Open PID/VID permission file.
  - USB interface : ..\driver\MT7663\USB\x64\MTKUQA3.inf
  - SDIO interface : ..\driver\MT7663\SDIO\x64\MTKSQA3.inf
3. Find x86 or x64 in the file.
4. Copy a line and modify new PID/VID of DUT in the file and save it.  
(For example: %UsbDumpr\_Mt7603.DeviceDesc% =UsbDumpr\_Mt7603.ndi,  
USB\VID\_FFFF&PID\_EEEE&REV\_0100&MI\_02)
5. Back to previous section and install driver again.

```
%UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_04DA&PID_2341&MI_02
%UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_04DA&PID_2341&REV_0100&MI_00
*****
x64
*****
[Adapters.NTAMD64]
; DisplayName
; Section DeviceID
;-----
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7603&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7603&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7603
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7606
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7636&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7637&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7607
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7657&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7657&MI_00
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7666&REV_0100&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7666&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7668&REV_0100&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7668&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_0E8D&PID_7668&REV_0100&MI_00
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_04DA&PID_3920&REV_0100&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_04DA&PID_3920&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_04DA&PID_3920&REV_0100&MI_00
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_04DA&PID_2341&REV_0100&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_04DA&PID_2341&MI_02
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_04DA&PID_2341&REV_0100&MI_00
; %UsbDumpr_Mt7603.DeviceDesc% =UsbDumpr_Mt7603.ndi, USB\VID_FFFF&PID_EEEE&REV_0100&MI_02
```

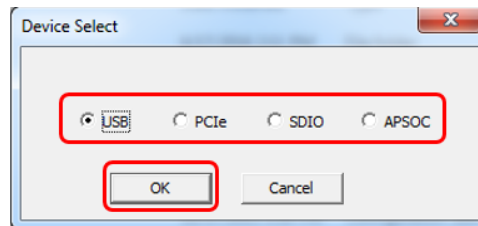
## 2.2 How to use QA-tool

### 2.2.1 Launch QA-Tool

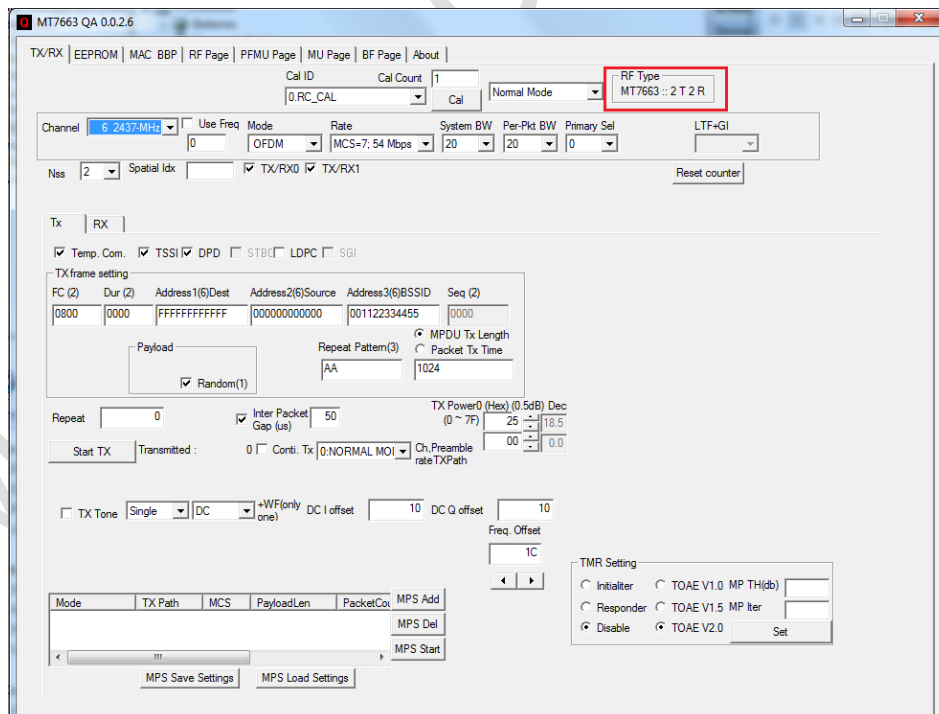
Double-click on QA-Tool icon “QATool\_Dbg.exe” and Device Select window will pop up.



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

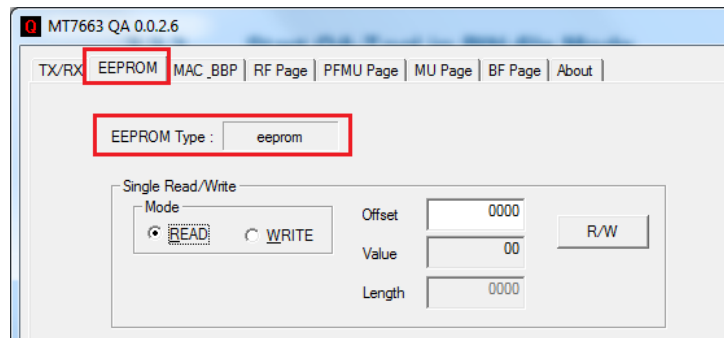


After QA-Tool UI pops out, users can check RF Type which should be shown **MT7663 :: 2T2R** to make sure the QA-Tool is working normally. There are two modes, BIN-file mode and E-fuse mode, supported by QA-tool. Section 2.2.2 & 2.2.3 provide details about respective mode.



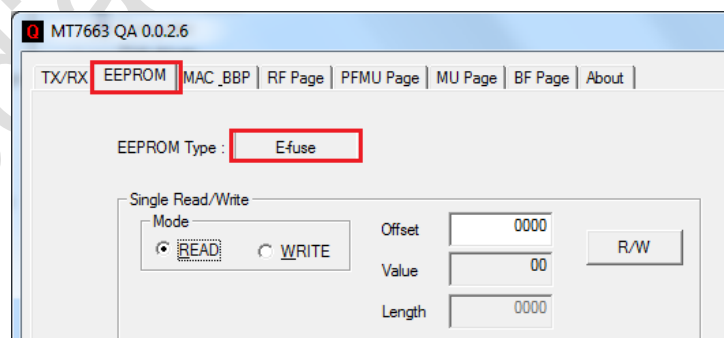
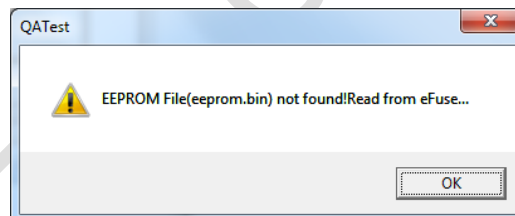
### 2.2.2 Start QA-Tool in BIN-file Mode

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.



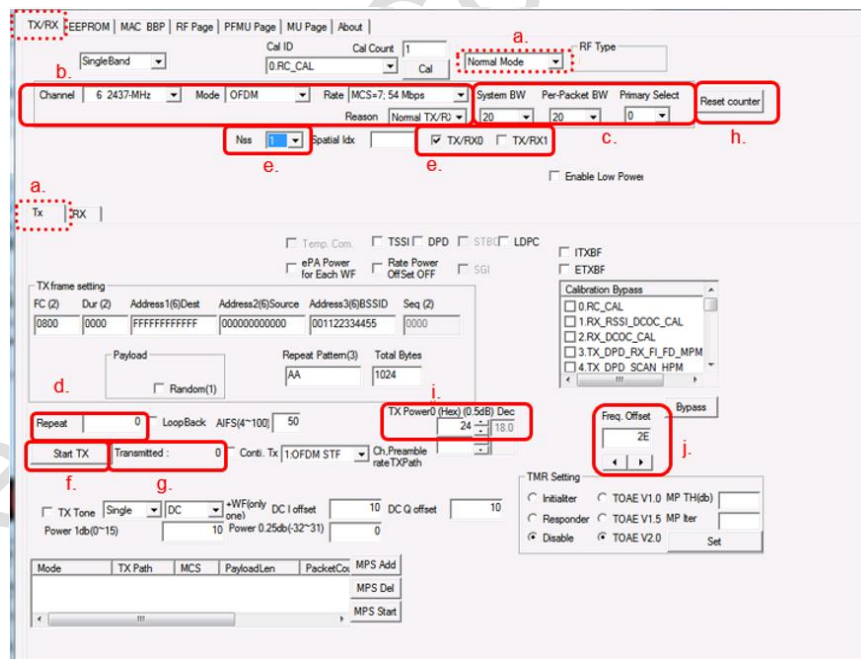
## 2.3 How to Use the QA-Tool

All functionalities introduced in this section support both BIN-file mode and E-fuse mode.

### 2.3.1 WIFI Packets Transmitting –TX0

On TX/RX page:

- Select TX sub-page and “Normal Mode” as following figure.
- Set Channel/Mode/Rate.
- Set BW. (Generally, System BW = Pre-Packet BW).
- Set packet number. (0 means infinite packets)
- Select “Nss=1” and choose “TX/RX0” to do transmitting.
- Click “Start TX” button to start packet transmitting and click “Stop TX” button to stop.
- The transmitted packets number is shown at “Transmitted :” area.
- Users can click “Reset counter” button to reset “Transmitted :” area.
- Users can click “-” button to modify power level of transmitting signal after clicking “Stop TX”
- Users can click “< >” button to modify frequency offset of transmitting signal after clicking “Stop TX”

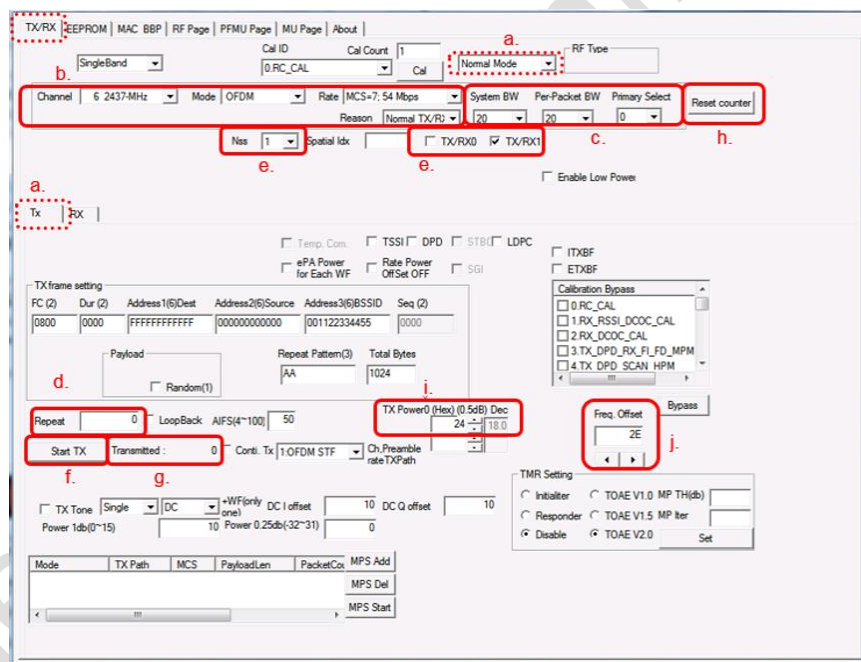


An example of TX0 transmitting OFDM 54M infinite packets at 2437MHz

### 2.3.2 WIFI Packets Transmitting –TX1

On TX/RX page:



- Select TX sub-page and “Normal Mode” as following figure.
- Set Channel/Mode/Rate.
- Set BW. (Generally, System BW = Pre-Packet BW).
- Set packet number. (0 means infinite packets)
- Select “Nss=1” and choose “TX/RX1” to do transmitting.
- Click “Start TX” button to start packet transmitting and click “Stop TX” button to stop.
- The transmitted packets number is shown at “Transmitted :” area.
- Users can click “Reset counter” button to reset “Transmitted :” area.
- Users can click “-” button to modify power level of transmitting signal after clicking “Stop TX”
- Users can click “< >” button to modify frequency offset of transmitting signal after clicking “Stop TX”

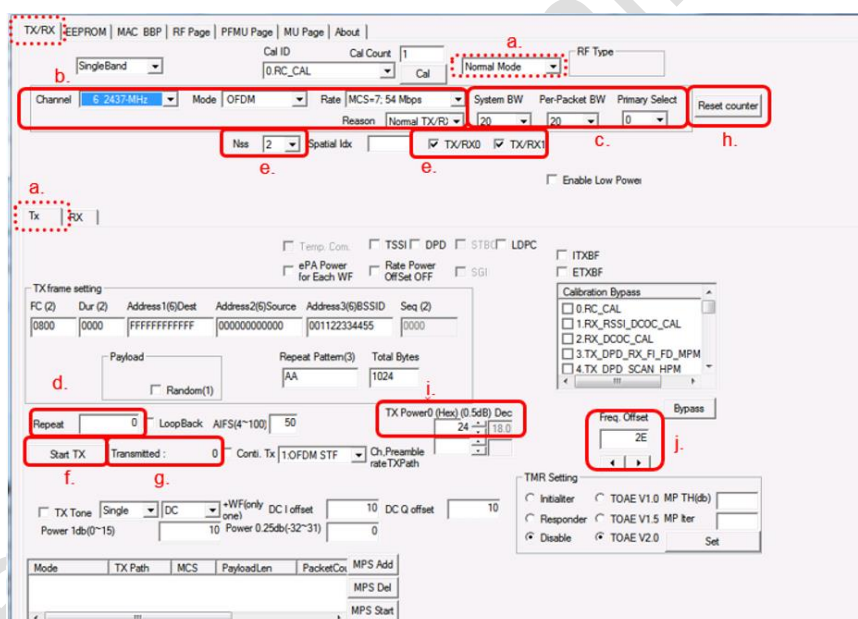


An example of TX1 transmitting OFDM 54M infinite packets at 2437MHz

### 2.3.3 WIFI Packets Transmitting -2TX

On TX/RX page:

- Select TX sub-page and “**Normal Mode**” as following figure.
- Set Channel/Mode/Rate.
- Set BW. (Generally, System BW = Pre-Packet BW).
- Set packet number. (0 means infinite packets)
- Select “**Nss=2**” and choose both “TX/RX0” and “TX/RX1” to do transmitting.
- Click “**Start TX**” button to start packet transmitting and click “**Stop TX**” button to stop.
- The transmitted packets number is shown at “**Transmitted :**” area.
- Users can click “**Reset counter**” button to reset “**Transmitted :**” area.
- Users can click “” button to modify power level of transmitting signal after clicking “**Stop TX**”
- Users can click “” button to modify frequency offset of transmitting signal after clicking “**Stop TX**”

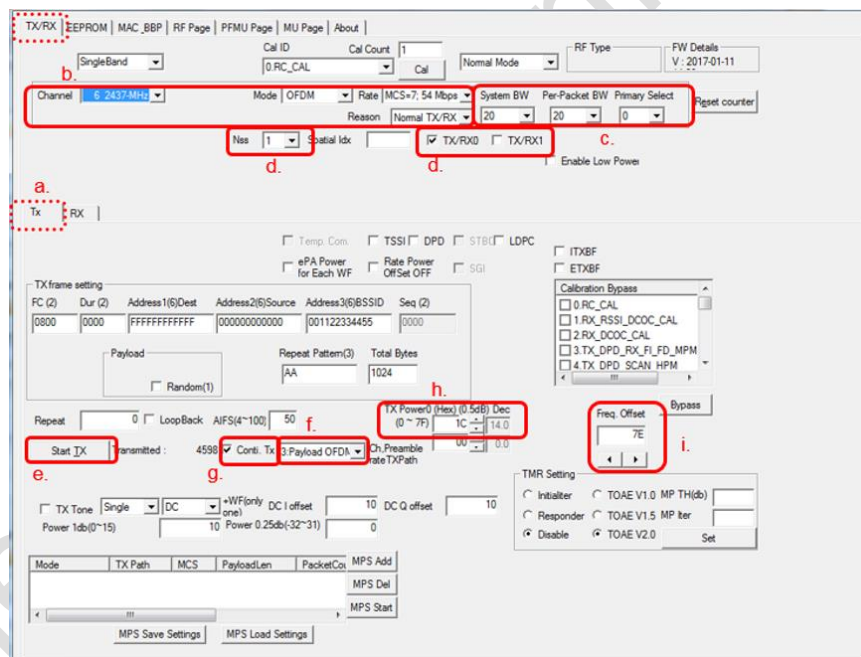


An example of 2TX transmitting OFDM 54M infinite packets at 2437MHz

### 2.3.4 WIFI Continuous Packet Transmitting

On TX/RX page:

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



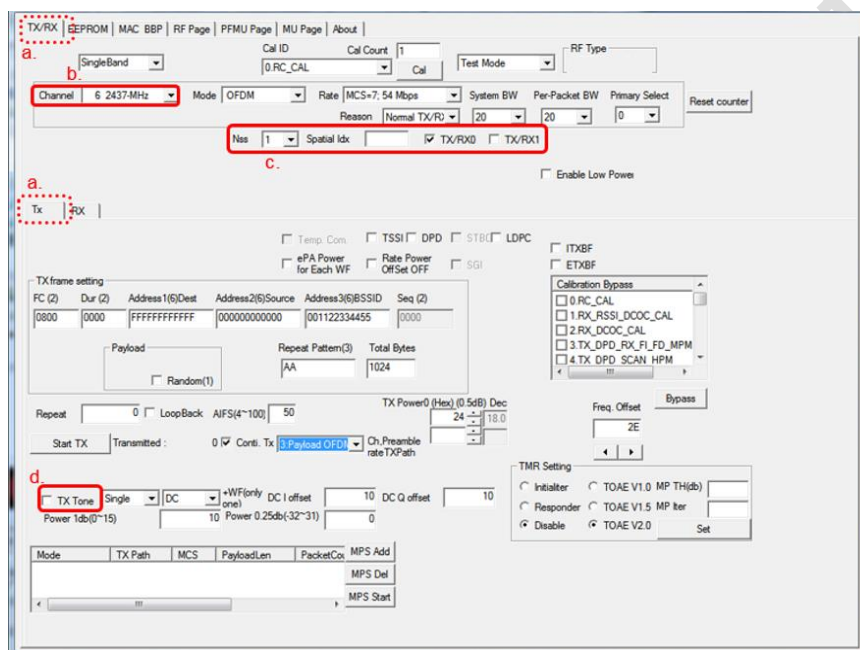
An example of TX0 continuous packet transmitting (OFDM 54M at 2437MHz)



### 2.3.5 WIFI Single Tone Transmitting

On TX/RX page:

- Select TX sub-page as following figure.
- Set Channel.
- Select “Nss=1 or Nss=2” and choose “TX/RX0” or “TX/RX1” to do transmitting.
- Check “TX Tone” to start Tx single tone transmitting and uncheck “TX Tone” to stop.
- Users should uncheck “TX Tone” before change channel.



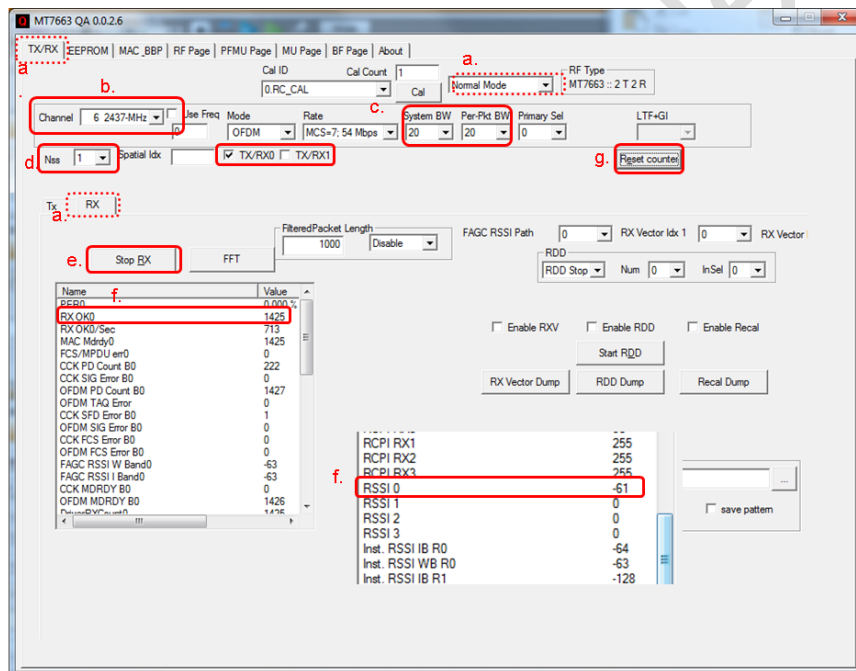
An example of TX0 Tx single tone transmitting at 2437MHz.



## 2.3.6 WIFI Packets Receiving –RX0

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 “**RSSI 0**” area.
- Users can click “**Reset counter**” button to reset counter value.

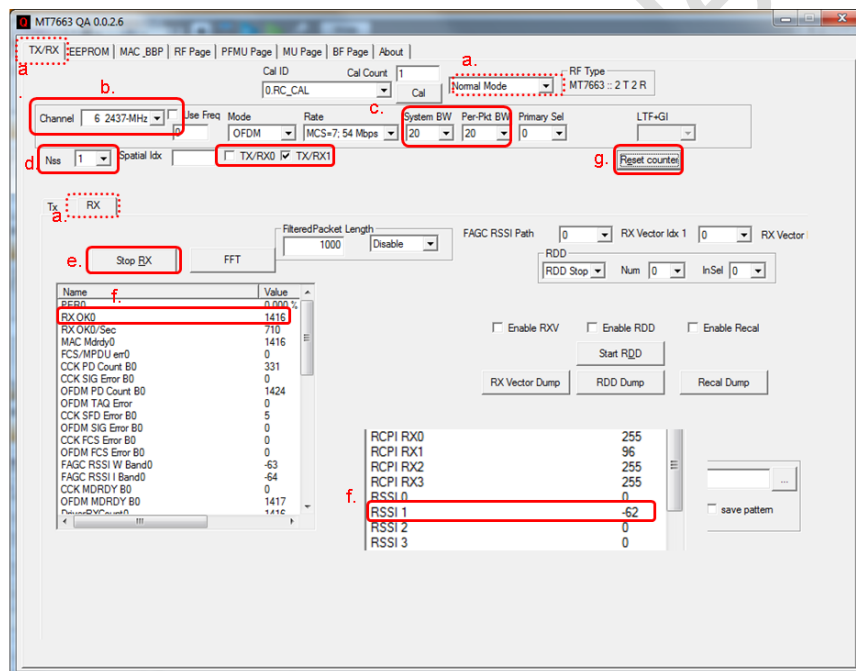


An example of WiFi packets receiving – RX0 (BW20 at 2437MHz)

### 2.3.7 WIFI Packets Receiving –RX1

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/RX1” 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 “**RSSI 1**” area.
- Users can click “**Reset counter**” button to reset counter value.

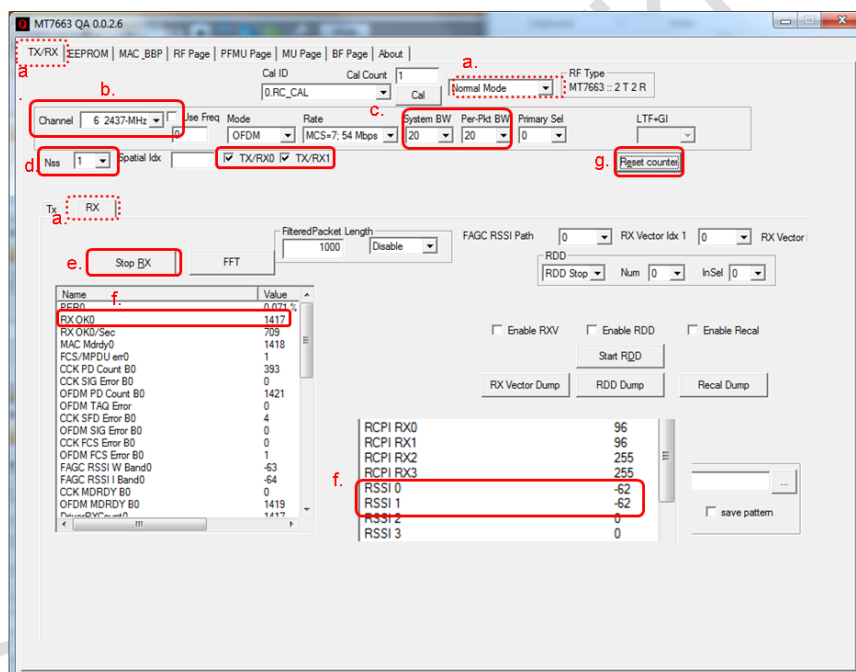


An example of WiFi packets receiving – RX1 (BW20 at 2437MHz)

### 2.3.8 WIFI Packets Receiving –2RX

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=2” and choose botj “TX/RX0” and “TX/RX1” 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 “RSSI 0/RSSI 1” area.
- Users can click “**Reset counter**” button to reset counter value.



An example of WiFi packets receiving – 2RX (BW20 at 2437MHz)

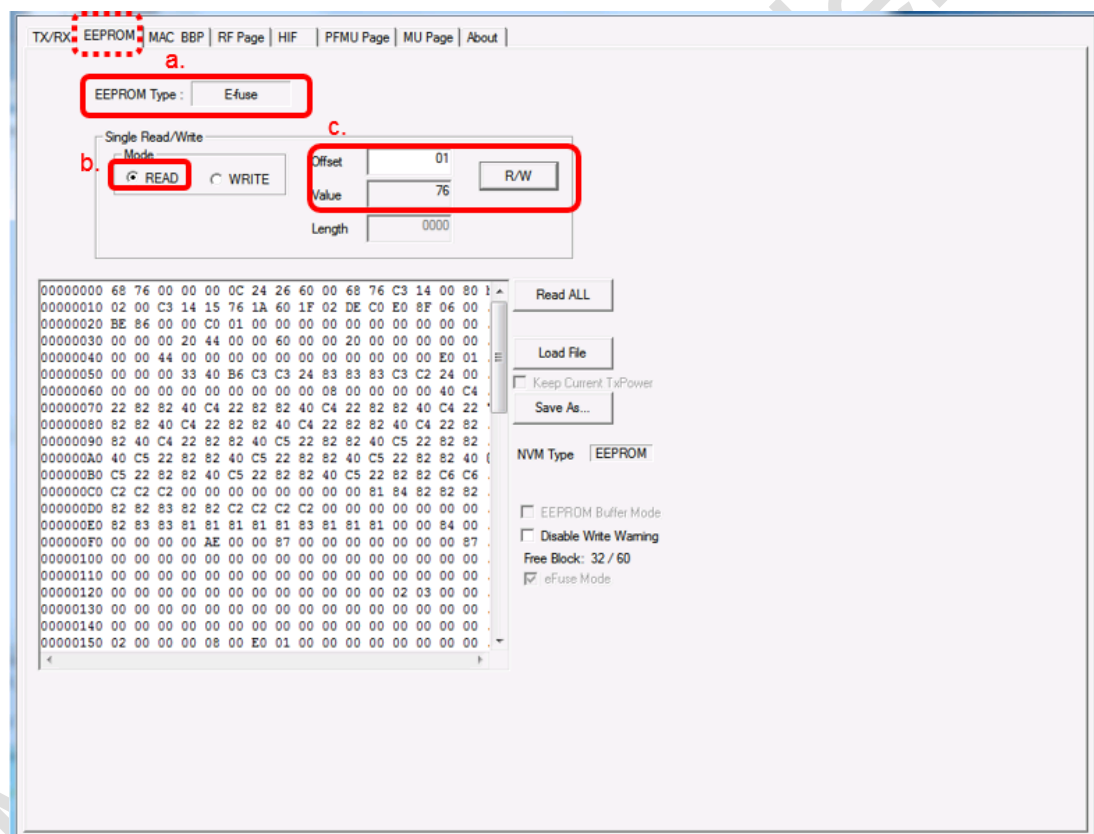
## 2.4 Read, Write E-fuse Table

### 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:

- In E-fuse Mode, EEPROM Type is "E-fuse".
- Select Single Read/Write is "READ".
- 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.



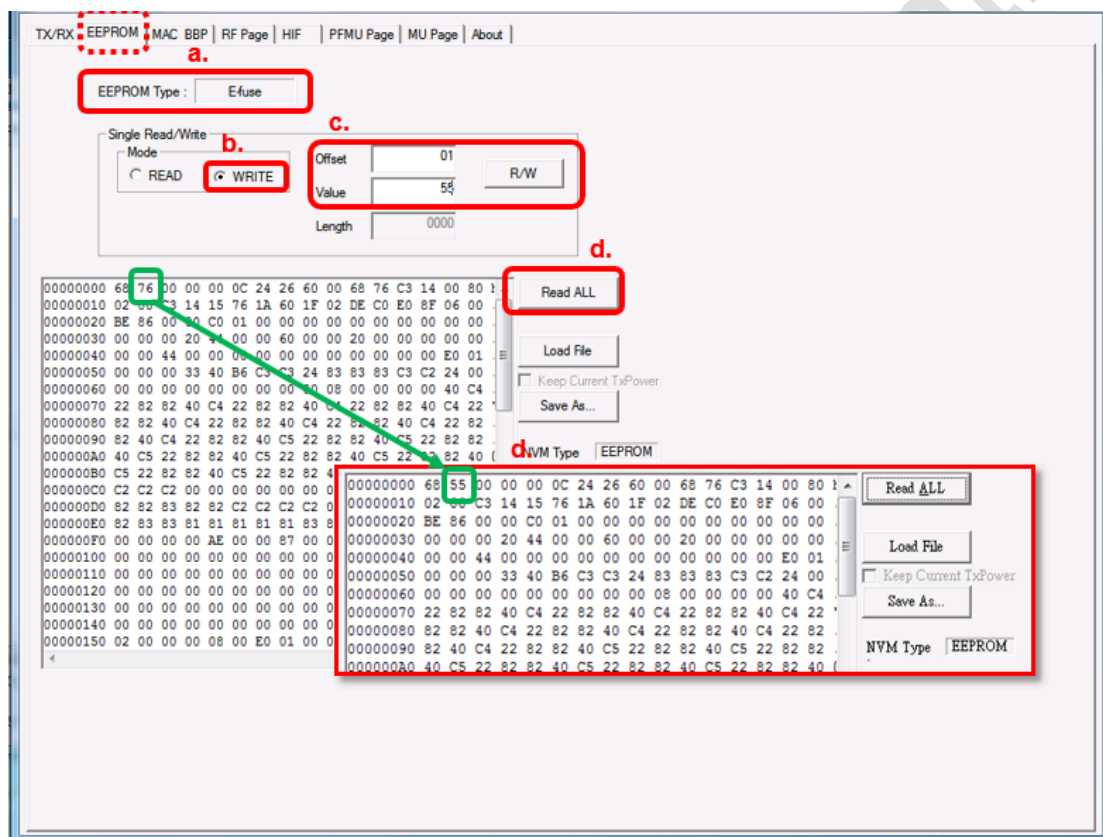
This is an example to read address offset\_0x01 and get value 0x76 from E-fuse

## 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:

- In E-fuse Mode, EEPROM Type is "E-fuse".
- Select Single Read/Write mode is "WRITE"
- Set address offset and new value in "Offset" and "Value" text boxes then click on "R/W" button.
- 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.