



everyday genius

MT7925B22M

Test-Mode Software Application Note

Part-1: QA-Tool User Guideline

Version: V1.0
Release Date: 2023-04-07

Document Revision History

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

Table of Contents

Document Revision History	2
Table of Contents	3
1 System overview	5
1.1 General Description	5
2 QA-Tool	6
2.1 How to install QA-tool	6
2.1.1 Install WinPcap	7
2.1.2 Windows 10 install note	8
2.1.3 QA-Tool Windows driver	9
2.2 How to use QA-tool	12
2.2.1 Launch QA-Tool	12
2.2.2 Start QA-Tool in BIN-file Mode	13
2.2.3 Start QA-Tool in E-fuse Mode	13
2.3 How to Use the QA-Tool	14
2.3.1 WIFI Packets Transmitting –1 stream	14
2.3.2 WIFI Packets Transmitting –2 stream	16
2.3.3 WIFI Packets 11ax RU TX (HE TB (trigger based)) Transmitting setting	18
2.3.4 WIFI Packets 11be RU&MRU TX (EHT TB (trigger based)) Transmitting setting	20
2.3.5 VSA Setting	26
2.3.6 WIFI Packets Receiving –1 stream	27
2.3.7 WIFI Packets Receiving –2 stream	29
2.4 Read, Write E-fuse Table	31
2.4.1 Read a Value from E-fuse	31
2.4.2 Write a Value to E-fuse	32

2.5 Homologation suggest setting 33

2.6 RU Setting example..... 34

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1 System overview

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

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

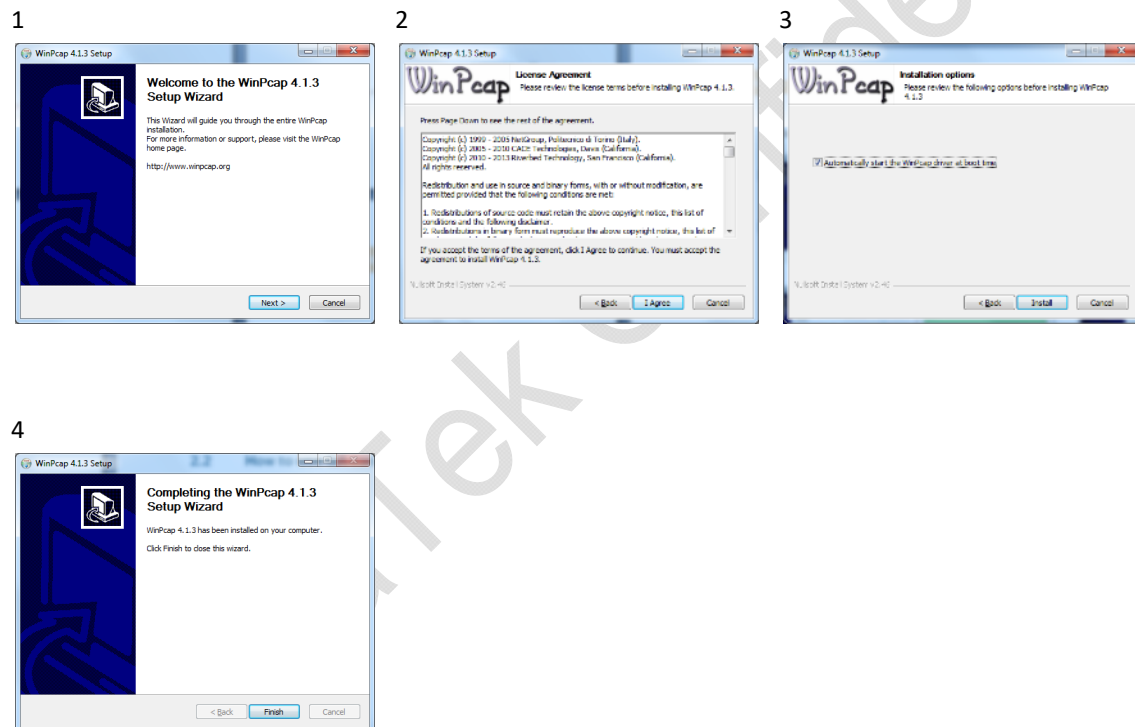
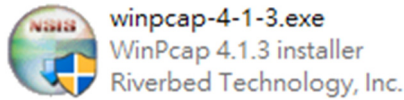
- 1st : Install WinPcap
- 2nd : Update Windows7 security package to register x64 signature mechanism
- 3rd : Instal QA-Tool Windows driver.

2.1.1 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: 4.1.3 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:

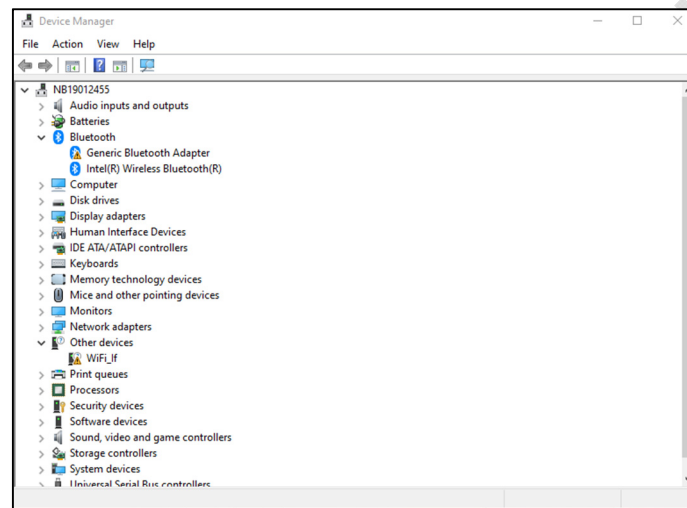
<https://docs.microsoft.com/en-us/windows-hardware/manufacture/desktop/disabling-secure-boot>

2.1.3 QA-Tool Windows driver

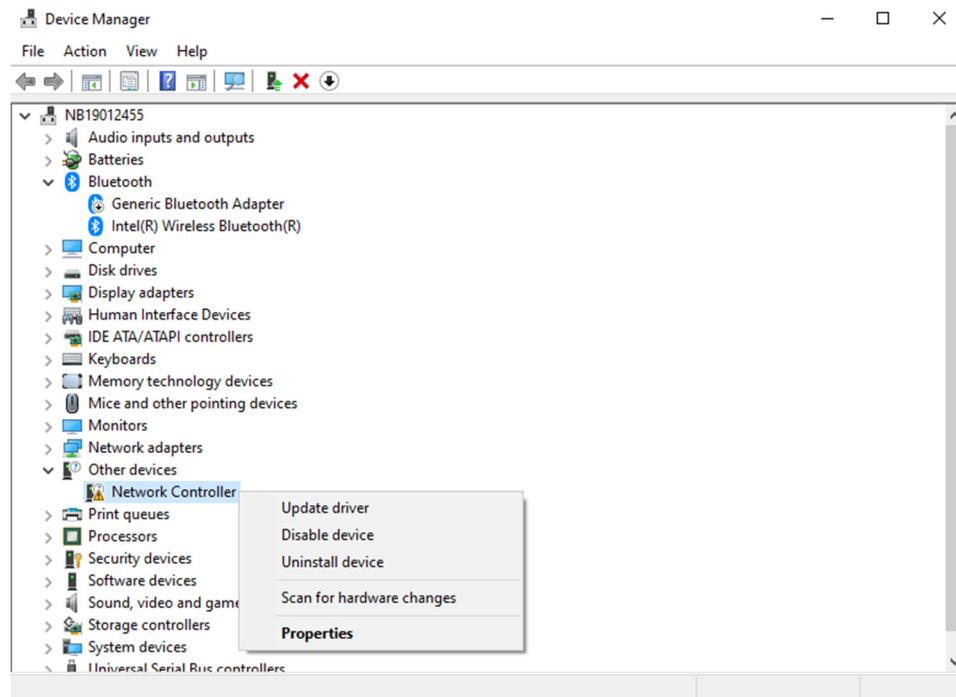
MT7925B22M supports USB, and PCIE interface. According to interface type of MT7925B22M on users' hand, please refer to steps shown below to install QA-Tool Windows driver:

USB interface:

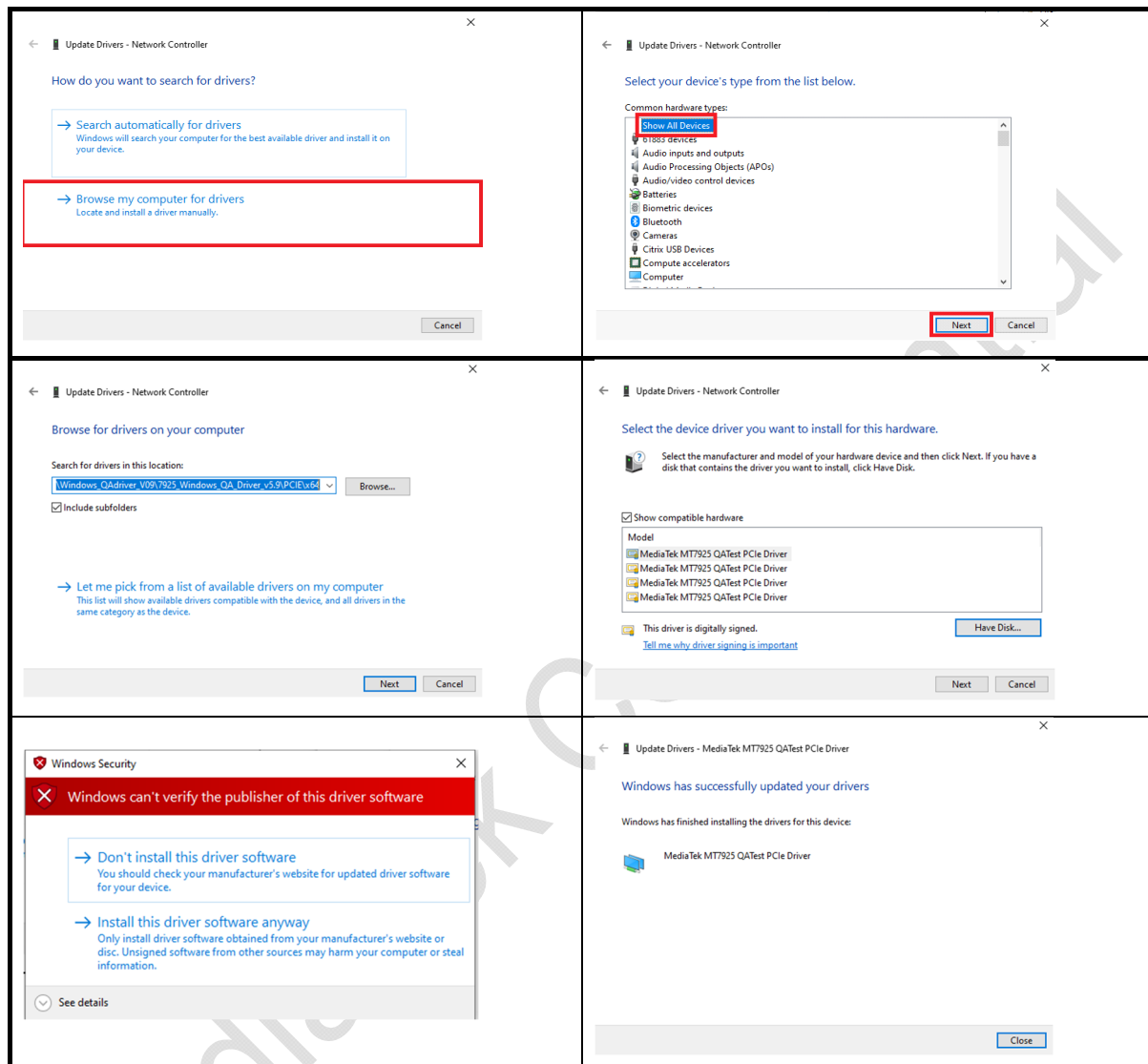
1. Connect DUT to PC/NB and check Windows Device Manager.
2. Window Device Manager would discover DUT shows "**Generic Bluetooth Adapter**"(BT device) and "**WiFi_If**"(WiFi device).



3. Right-click on “WiFi_IF” Wifi device and Update Driver Software.



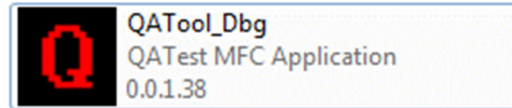
4. According user's Windows' OS to select and install test tool driver.



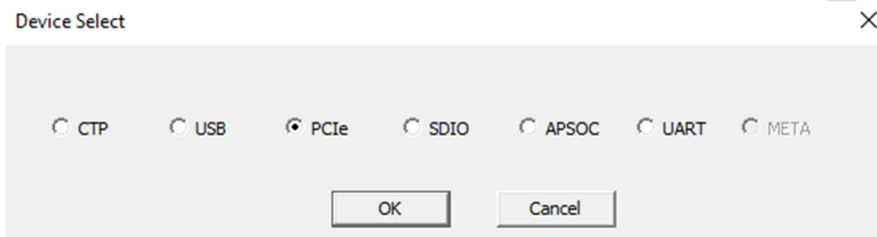
2.2 How to use QA-tool

2.2.1 Launch QA-Tool

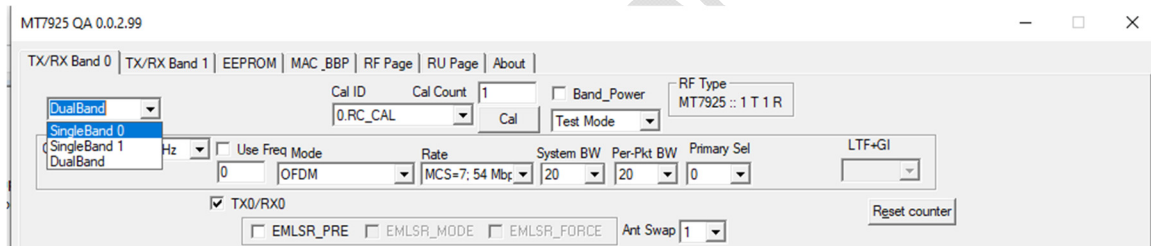
Double-click on QA-Tool icon “QATool_Dbg.exe” and Device Select window will pop up.



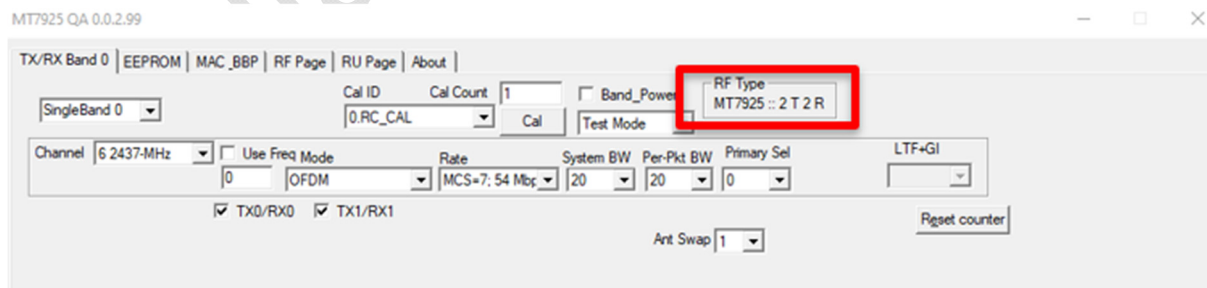
Select interface type and click “OK” button to lunch QA-Tool.



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



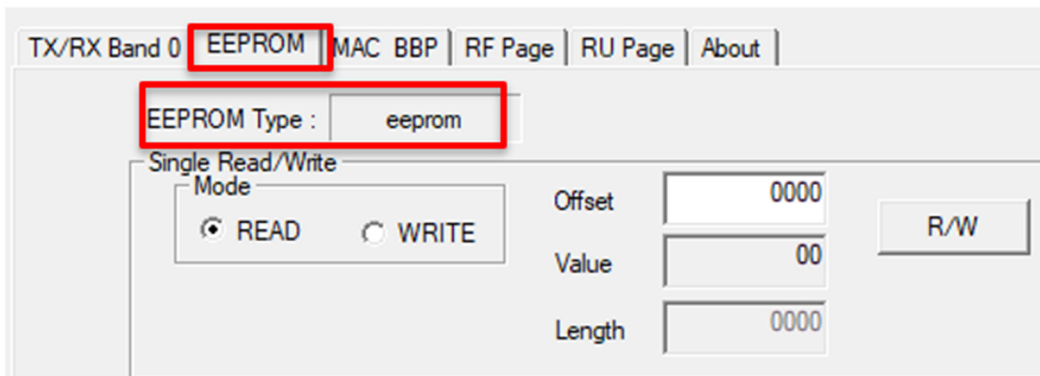
Users can check RF Type which should be shown **MT7925B22M : 2 T 2 R** to make sure the QA-Tool is working normally. There are two modes, BIN-file mode and E-fuse mode, supported by QA-tool. Section 2.2.2 & 2.2.3 provide details about respective mode.



2.2.2 Start QA-Tool in BIN-file Mode

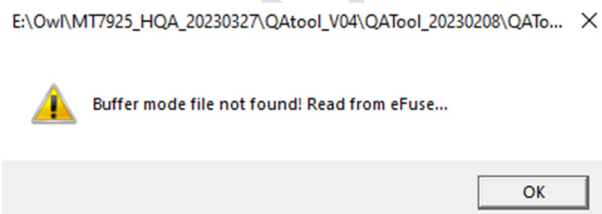
To start in BIN-file mode user can use “**eeeprom.bin**” while launching QA tool. If “**QATool_Dbg.exe**” accompanies “**eeeprom.bin**” file in the same folder, QA-tool will start in BIN-file mode. After QA-tool is launched, users can check “EEPROM” sheet to have **EEPROM Type : eeeprom** to know the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

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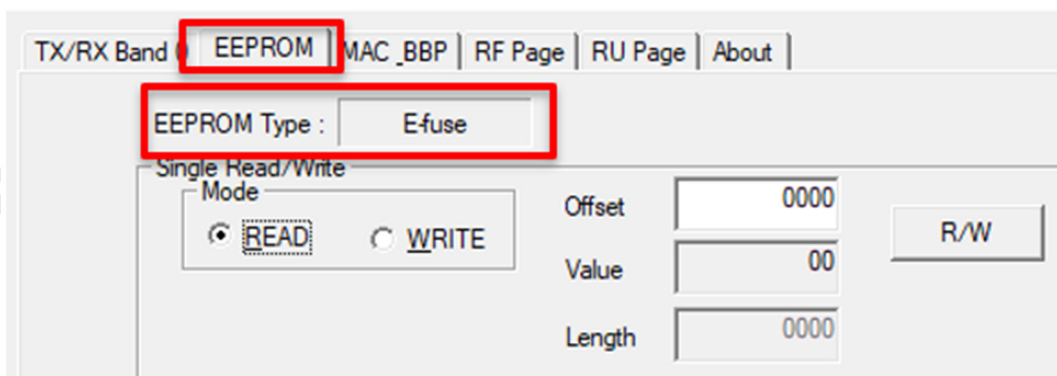


2.2.3 Start QA-Tool in E-fuse Mode

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.



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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.

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TX/RX Band 0 | EEPROM | MAC_BBP | RF Page | RU Page | About |

SingleBand 0 | Cal ID | Cal Count 1 | Band_Power | RF Type MT7925 :: 2 T 2 R

Channel 6 2437-MHz | Use Freq Mode | Rate MCS=7: 54 Mbps | System BW 20 | Per-Pkt BW 20 | Primary Sel 0 | LTF+GI

☒ TX0/RX0 ☒ TX1/RX1 | Ant Swap 1 | Reset counter

a. Tx | **f.** Nss 2 | Applied Profile ID(0 ~ 63)

☐ Temp. Com. ☒ TSSI ☐ STBC ☐ SGI ☐ DPD ☐ LDPC

TX frame setting

FC (2)	Dur (2)	Address1(6)Dest	Address2(6)Source	Address3(6)BSSID	Seq (2)
0800	0000	FFFFFFFFFFFF	000000000000	001122334455	0000

Payload: ☐ Random(1) | Repeat Pattern(3) AA | **n.** MPDU Tx Length 1024 | Packet Tx Time

h. Repeat 0 | **j.** ☒ Inter Packet Gap (us) 50 | **i.** Start TX Transmitted: 0 | **l.** TX Power0 (Dec)(0.5dB) Hex -64.0 to 63.5 0.0 00 | Reset Power

m. TX Tone: ☐ TX Tone Single | DC | +WF(only one) | DC I offset 10 | DC Q offset 10 | Power 0.25db(-32~31) 0 | XTAL Mode: AXM | Freq. Offset 40 40

TMR Setting

☐ Initialter	☐ TOAE V1.0 MP TH(db)
☐ Responder	☐ TOAE V1.5 MP Iter
☐ Disable	☐ TOAE V2.0

Set

Mode	TX Path	MCS	PayloadLen	PacketCot	MPS Add
MPS Del					
MPS Start					

MPS Save Settings | MPS Load Settings

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.

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TX/RX Band 0 b. EEPROM | MAC_BBp | RF Page c. RU Page | About

SingleBand 0 c. Cal ID Cal Count 1 Band_Power a. RF Type MT7925 :: 2 T 2 R

0_RC_CAL Cal Test Mode g. LTF+GI

Channel 6 2437-MHz Use Freq Mode Rate MCS=7; 54 Mbr System BW 20 Per-Pkt BW 20 Primary Sel 0

TX0/RX0 TX1/RX1 e. d. Ant Swap 1

Reset counter k.

a. Tx Rx

Temp. Com. TSSI STBC SGI DPD LDPC Nss 2 f. Applied Profile ID(0 ~ 63)

Spatial Idx

TX frame setting

FC (2)	Dur (2)	Address1(6)Dest	Address2(6)Source	Address3(6)BSSID	Seq (2)
0800	0000	FFFFFFFFFFFF	000000000000	001122334455	0000

Payload Repeat Pattern(3) MPDU Tx Length Packet Tx Time n. 1024

Random(1)

h. Repeat 0 i. Start TX Transmitted: 0 j. Inter Packet Gap (us) 50 l. TX Power0 (Dec)(0.5dB) Hex -64.0 to 63.5 0.0 00

Reset Power

TX Tone Single DC +WF(only one) DC I offset 10 DC Q offset 10

Power 0.25db(-32~31) 0 XTAL Mode: AXM m. Freq. Offset 40 40

TMR Setting

Initialiter TOAE V1.0 MP TH(db) Responder TOAE V1.5 MP Iter Disable TOAE V2.0 Set

Mode	TX Path	MCS	PayloadLen	PacketCov	MPS Add

MPS Del MPS Start

MPS Save Settings MPS Load Settings

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

On RU page:

- Select RU sub-page
- Select band
- 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

- Set RU index (wanted TB RU location).

Refer to the RU Index from below



- Set data rate
- 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.....)

RU size	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
26	128	256	512	512	1024	1024	1024	1024	1024	2048	2048	2048	2048	2048		32
52	256	512	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024		64
78	384	768	1536	1536	1536	1536	1536	1536	1536	1536	1536	1536	1536	1536		96
106	512	1024	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048		128
132	768	1536	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072		192
BW20 - 242	1024	2048	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096		256
BW40 - 484	2048	4096	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192		512
BW80 - 996	4096	8192	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	512	1024
BW160 - 996*2	8192	16384	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	1024	2048

- 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.

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TX/RX Band 0 | EEPROM | MAC BBP | RF Page | **RU Page** | About

RU Select Band: **a.** [0] **b.**

c. Category: [1: RU26*9] Allocation (binary): [000000000] Sta ID: [] **d.** RU Index: [0] **e.** MCS: [MCS7=7] PowerBoost Factor: [0] **f.** MU Nss: [1] LDPC: [] Nss: [2] Stream Idx: [1] Length: [128]

Category	Allocation (binary)	Sta ID	RU Index	MCS	PowerBoost Factor	MU Nss	LDPC	Nss	Stream Idx	Length
1: RU26*9	000000000		0	MCS7=7	0	1		2	1	128
Disable					0	1		2	1	1024
Disable					0	1		2	1	1024
Disable					0	1		2	1	1024
0: Disable					0	1		2	1	1024

g. Segment 0: **g.**

Category	Allocation	Sta ID	RU Index	Rates
1: RU26*9	000000...	0	7	

i. ADD Remove

Segment 1:

Category	Allocation	Sta ID	RU Index	Rates
----------	------------	--------	----------	-------

ADD Remove

Segment 2:

Category	Allocation	Sta ID	RU Index	Rates
----------	------------	--------	----------	-------

ADD Remove

Segment 3:

Category	Allocation	Sta ID	RU Index	Rates
----------	------------	--------	----------	-------

ADD Remove

h. SET Save to File Load from File Clear All

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

RU

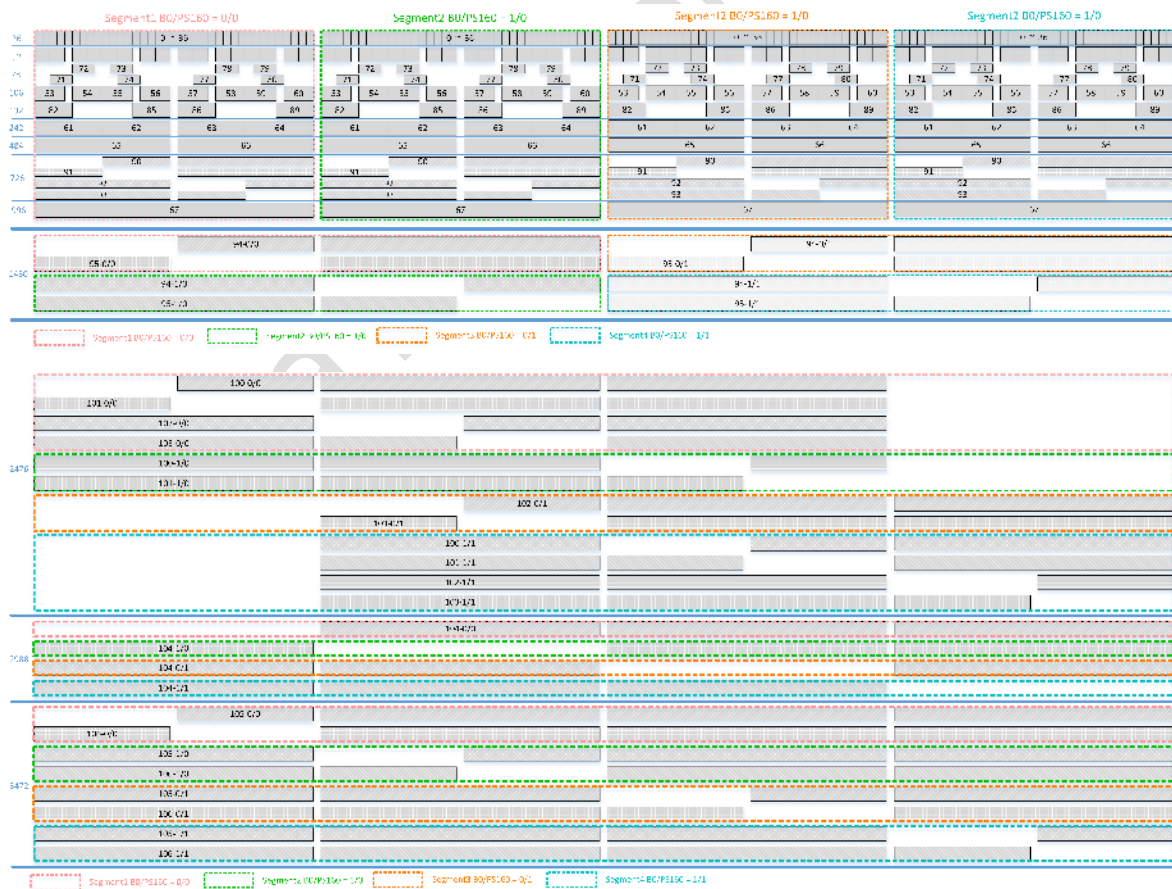
On RU page:

- Select RU sub-page
- Select band
- 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.....)

RU size	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
26	128	256	512	512	1024	1024	1024	1024	1024	2048	2048	2048	2048	2048		32
52	256	512	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024		64
78	384	768	1536	1536	1536	1536	1536	1536	1536	1536	1536	1536	1536	1536		96
106	512	1024	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048		128
132	768	1536	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072	3072		192
BW20 - 242	1024	2048	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096		256
BW40 - 484	2048	4096	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192		512
BW80 - 996	4096	8192	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	16384	512	1024
BW160 - 996*2	8192	16384	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	32768	1024	2048
BW320 - 996*4	16384	32768	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	65536	2048	4096

- 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.

Media

MRU

On RU page:

- Select RU sub-page
- Select band
- Set Category

RU allocation (B8~B0)										RU allocation (B8~B0)										RU allocation (B8~B0)									
#1	#2	#3	#4	#5	#6	#7	#8	#9		#1	#2	#3	#4	#5	#6	#7	#8	#9		#1	#2	#3	#4	#5	#6	#7	#8	#9	
0	000000000	26	26	26	26	26	26	26	26	32	000100000	26	26	26	26	26	52+26	26	96	001100000									
1	000000001	26	26	26	26	26	26	26	52	33	000100001	26	26	52	26	26	52+26	26	104	001101000									
2	000000010	26	26	26	26	26	52	26	26	34	000100010	52	26	26	26	52+26	26	112	001110000										
3	000000011	26	26	26	26	26	52	52	52	35	000100011	52	52	26	26	52+26	26	120	001111000										
4	000000100	26	26	26	52	26	26	26	26	36	000100100	26	52+26	26	26	26	26	26	128	010000000									
5	000000101	26	26	52	26	26	26	26	52	37	000100101	26	52+26	26	26	26	52	52	136	010001000									
6	000000110	26	26	52	26	52	26	26	26	38	000100110	26	52+26	26	26	52	26	26	144	010010000									
7	000000111	26	26	52	26	52	52	52	52	39	000100111	26	52+26	26	52	52	52	52	152	010011000									
8	000001000	52	26	26	26	26	26	26	26	40	000101000	26	26	26	26	106+26			160	010100000									
9	000001001	52	26	26	26	26	26	26	52	41	000101001	26	26	52	52	106+26			168	010101000									
10	000001010	52	26	26	26	26	52	26	26	42	000101010	52	26	26	52	106+26			176	010110000									
11	000001011	52	26	26	26	26	52	52	52	43	000101011	52	52	52	106+26			184	010111000										
12	000001100	52	52	26	26	26	26	26	26	44	000101100	106+26			26	26	26	26	192	011000000									
13	000001101	52	52	26	26	26	26	26	52	45	000101101	106+26			26	26	52	52	200	011001000									
14	000001110	52	52	26	26	52	26	26	26	46	000101110	106+26			52	26	26	26	208	011010000									
15	000001111	52	52	26	26	52	52	52	52	47	000101111	106+26			52	52	52	52	216	011011000									
16	000010000	26	26	26	26	26	106			48	000110000	106+26			106	52+26	26	26	224	011100000									
17	000010001	26	26	52	26	26	106			49	000110001	106			106+26				232	011101000									
18	000010010	52	26	26	26	26	106			50	000110010	26	52+26		106+26				240	011110000									
19	000010011	52	52	26	26	26	106			51	000110011	106			26	52+26	26	26	248	011111000									
20	000010100	106			26	26	26	26	26	52	000110100	26	52+26		26	106			256	100000000									
21	000010101	106			26	26	26	52	52	53	000110101	26	52+26		26	52+26	26	26	264	100001000									
22	000010110	106			26	52	26	26	26	54	000110110	52	52+26		52	52	52	52	272	100010000									
23	000010111	106			26	52	52	52	52	64	001000000				242				280	100011000									
24	000011000	52	52	-	52	52	52			72	001001000				484				288	100100000									
25	000011001	106			26	106				80	001010000				996				296	100101000									
26	000011010	Punctured 242-tone RU								88	001011000				996x2														
27	000011011	Unassigned 242-tone RU																											
28	000011100	242-tone RU : contributes 0 user field																											
29	000011101	484-tone RU : contributes 0 user field																											
30	000011110	996-tone RU : contributes 0 user field																											

- Set RU index (wanted TB RU location).

