

**MEDIATEK**

# MT7981 QA Tool User Guide\_V1.1

# Outline

- **Before test** →
- **Static test**
  - TX →
  - RX →
- **Debug tool**
  - EEPROM →
  - DC tone(single, two) →
  - Duplicate mode(for EMI test) →



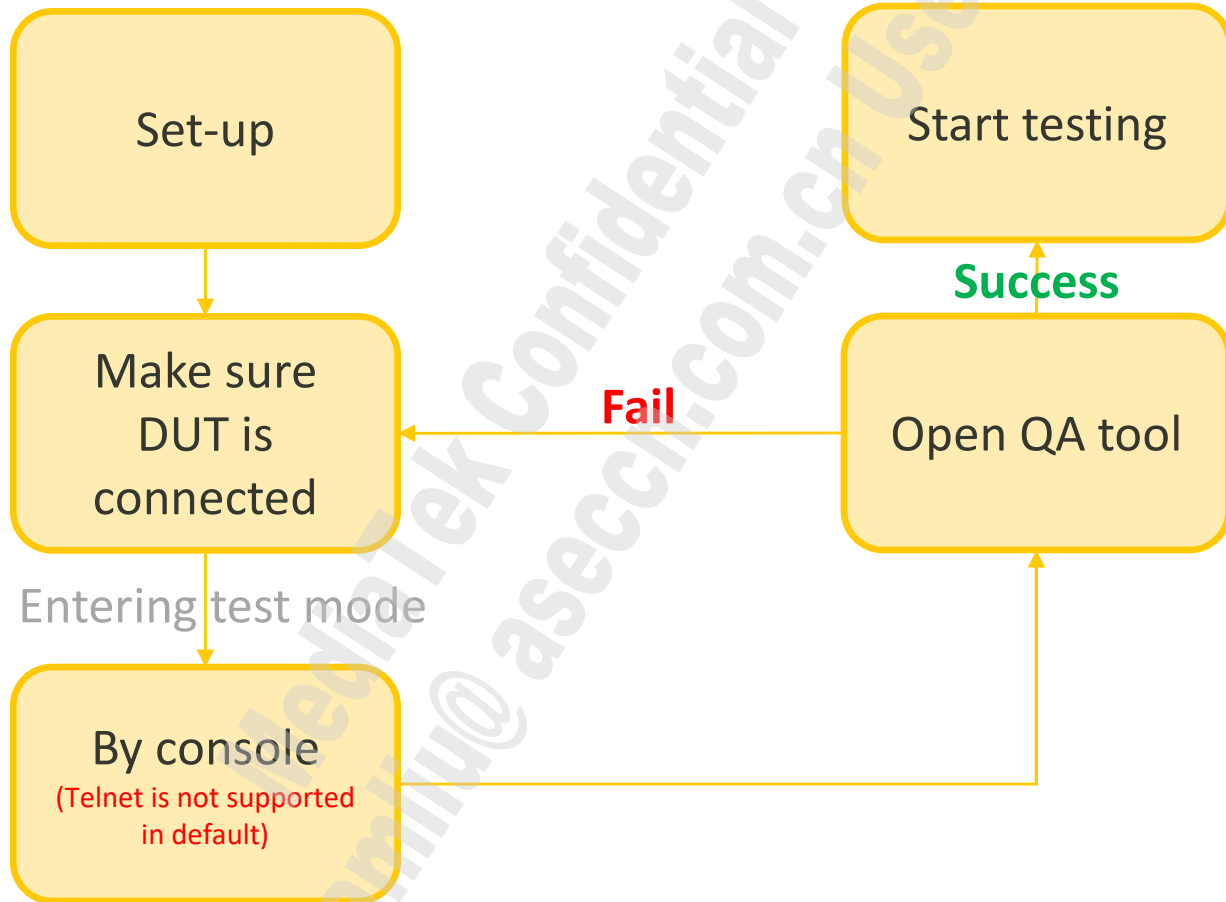
# Note

- \* : Annotation
- ① : Essential steps
- ① : Function
- blue: noteworthy items

MediaTek Confidential  
For samliu@asecch.com.cn Use Only



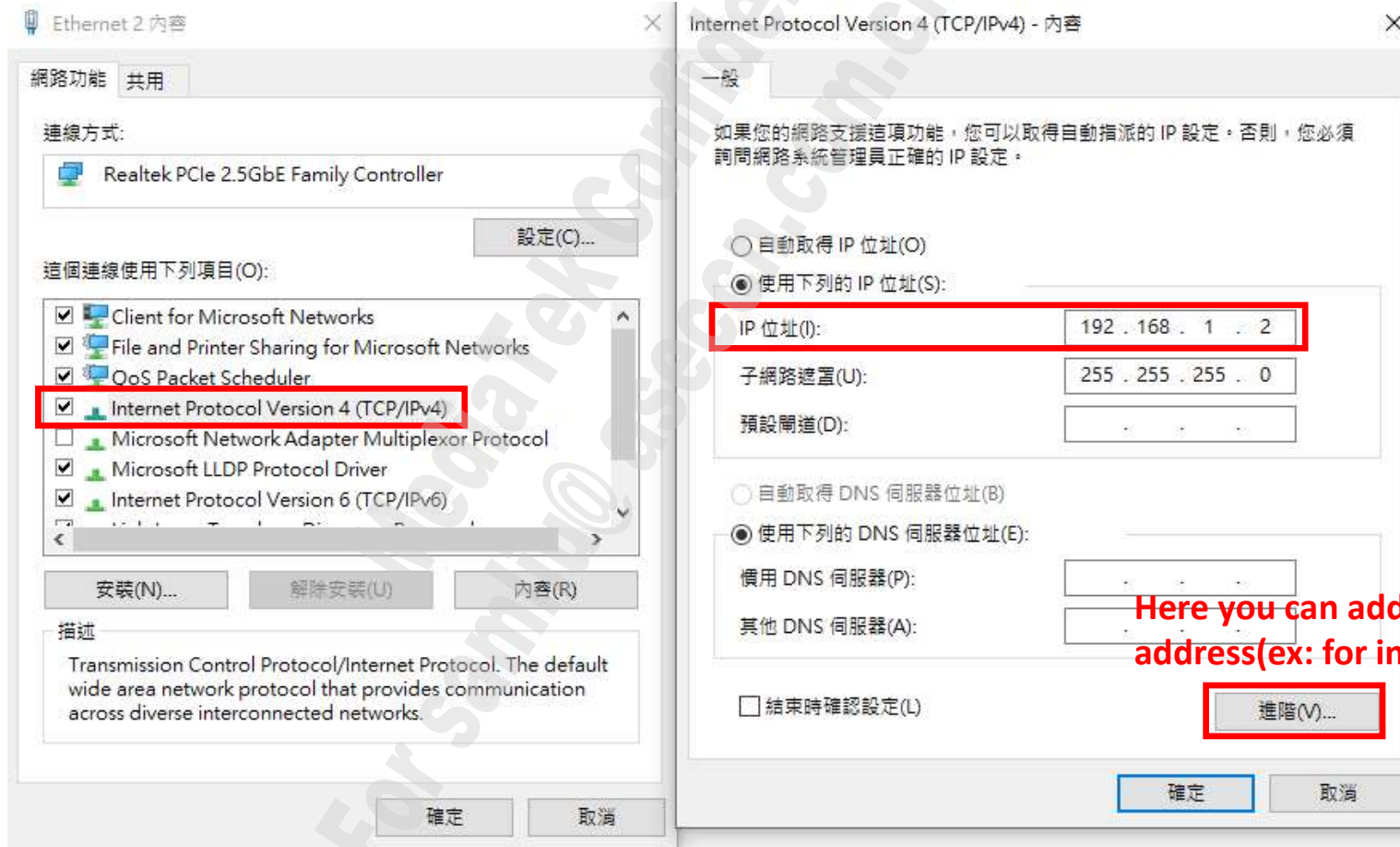
# Flow





# 1. Set-up

- DUT Default IP: 192.168.1.1
- To connect to DUT, network IP should be set to same IP domain  
(ex: 192.168.1.2 or 192.168.1.3,...etc.)





## 2. Make sure DUT is connected to testing PC/NB

- Open command window.
- Key-in “**ping 192.168.1.1 -t**” to ping DUT continuously.

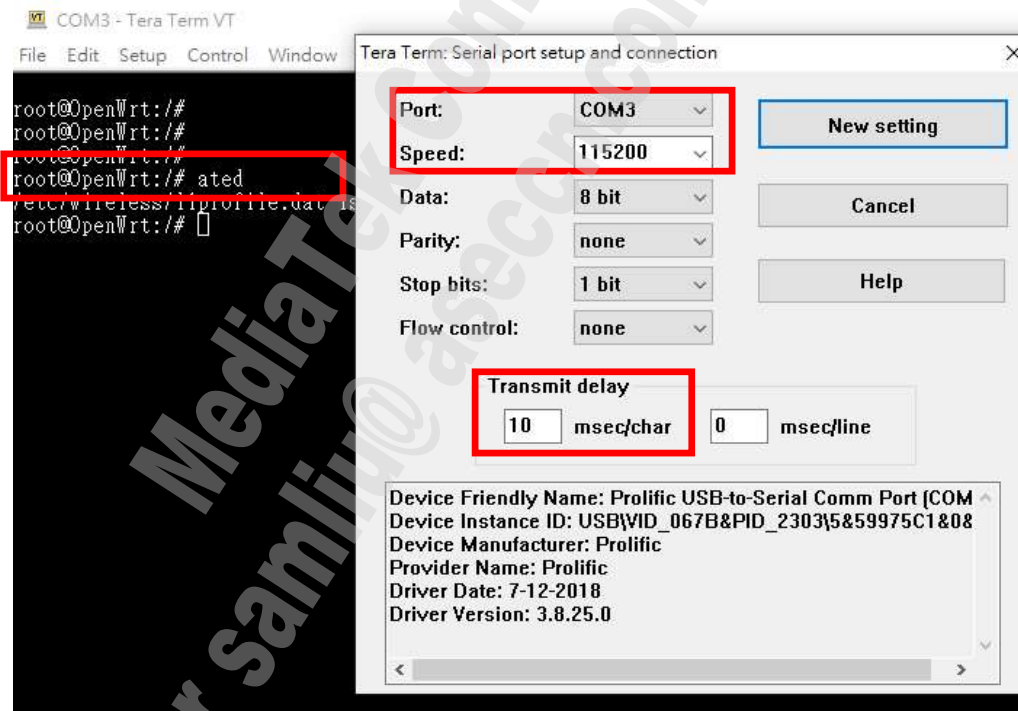
```
系統管理員: 命令提示字元 - ping 192.168.1.1 -t
Microsoft Windows [版本 10.0.17763.737]
(c) 2018 Microsoft Corporation. 著作權所有，並保留一切權利。
C:\Users\mtk23129_old>ping 192.168.1.1 -t

Ping 192.168.1.1 (使用 32 位元組的資料):
回覆自 192.168.1.1: 位元組=32 時間=1ms TTL=64
回覆自 192.168.1.1: 位元組=32 時間<1ms TTL=64
回覆自 192.168.1.1: 位元組=32 時間<1ms TTL=64
回覆自 192.168.1.1: 位元組=32 時間<1ms TTL=64
回覆自 192.168.1.1: 位元組=32 時間=1ms TTL=64
回覆自 192.168.1.1: 位元組=32 時間<1ms TTL=64
回覆自 192.168.1.1: 位元組=32 時間<1ms TTL=64
回覆自 192.168.1.1: 位元組=32 時間<1ms TTL=64
回覆自 192.168.1.1: 位元組=32 時間<1ms TTL=64
```



### 3. Entering test mode

- By Console(**telnet is not supported**)
  - Select port, and baud rate(speed) set to 115200.
  - 10 ms transmit delay is recommended.
  - Key-in “ated” right after “root@LEDE:/#” to enter test-mode.

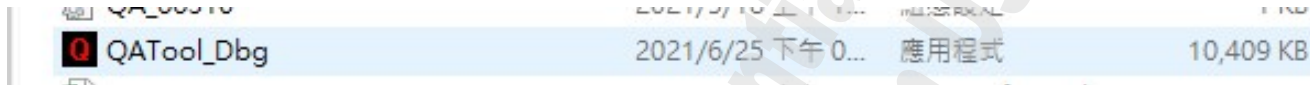




## 4. Open QA tool

- Open “QATool\_Dbg.exe”.

\*If you can't launch QA tool (popup can't find wpcap.dll message), please install WinPcap.



- Choose “APSOC”.



- Select corresponded net (IT)



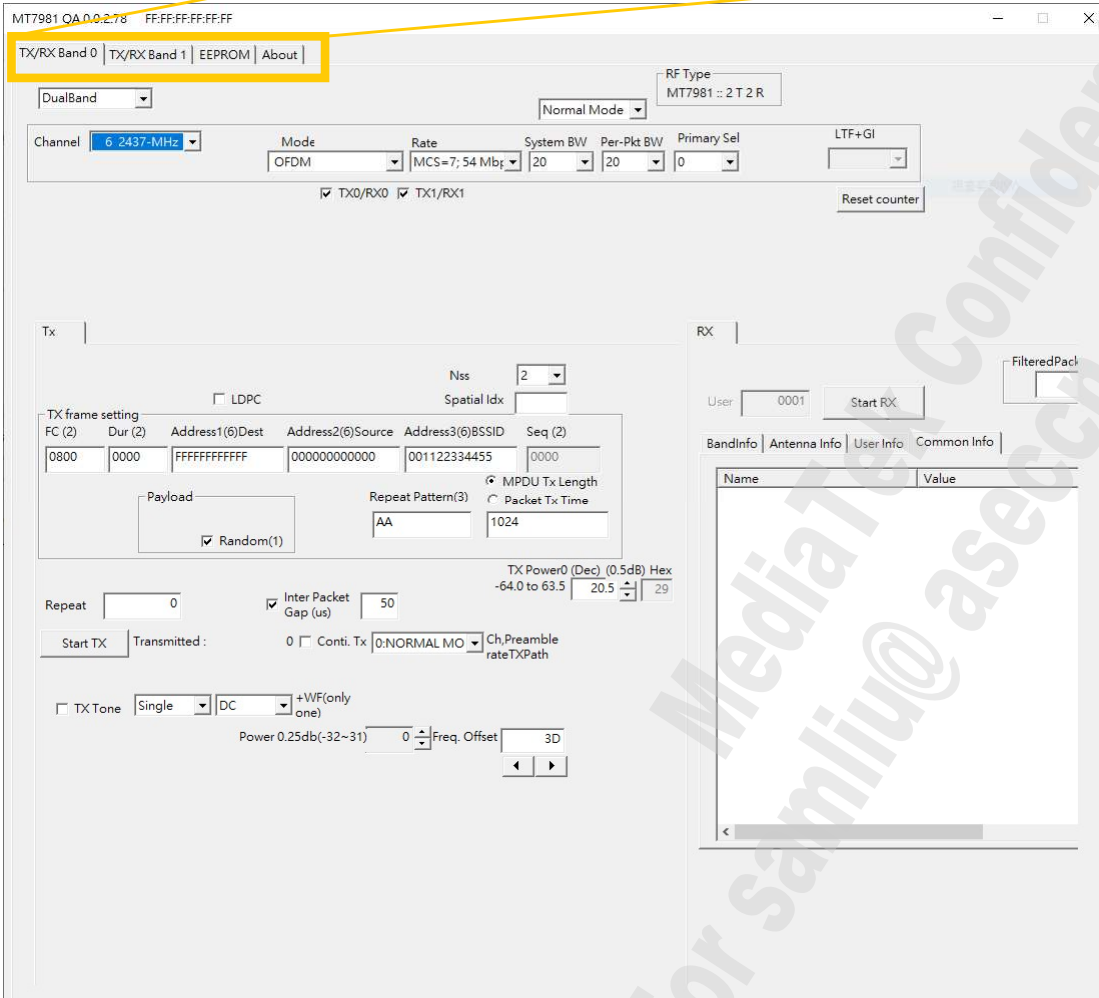
- Press OK





# 5. Start using QA Tool

TX/RX Band 0 | TX/RX Band 1 | EEPROM | About



Page	Usage
<b>TX/RX Band0 *</b>	(PHY0) G Band TX/RX
<b>TX/RX Band1 *</b>	(PHY1) A Band TX/RX
<b>EEPROM</b>	Read/Write/Save EEPROM

*\*For DBDC: TX/RX pages are separated into:  
 G band → TX/RX Band0  
 A band → TX/RX Band1*



# TX 11a/b/g/n/ac/ax-SU

MT7981 QA 0.0.2.7.8 FF.FF.FF.FF.FF.FF

TX/RX Band 0 | TX/RX Band 1 | EEPROM | About

DualBand

RF Type  
MT7981 :: 2 T 2 R

Normal Mode

Channel 6 2437-MHz

Mode OFDM Rate MCS=7; 54 Mb/s System BW 20 Per-Pkt BW 20 Primary Sel 0

TX0/RX0  TX1/RX1

LTF+GI

Reset counter

Tx

Nss 2 Spatial Idx

LDPC

MPDU Tx Length 1024 Packet Tx Time

TX Power0 (Dec) (0.5dB) Hex -64.0 to 63.5 20.5 29

Start TX Transmitted: 0  Conti. Tx 0:NORMAL MO Ch,Preamble rateTXPath

TX Tone Single DC +WF(only one) Power 0.25db(-32~31) 0 Freq. Offset 3D

- 0 TX page
- 1 NSS & Spatial Idx
- 2 RF path
- 3 BW & location
- 4 Mode & Rate
- 5 LTF+GI
- 6 LDPC or BCC  
(check: LDPC/non-check: BCC)\*
- 7 TX length/Package time
- 8 Power DAC (Dec/Hex,0.5dB)
- 9 Select Channel  
(Remember to stop TX before switching channel)
- 10 Frequency Offset  
(Default from EEPROM)
- 11 Start TX
- 12 Reset TX/RX counter



# RX 11a/b/g/n/ac/ax-SU

MT7981 QA 00.2.70 FF FF FF FF FF

TX/RX Band 0 | TX/RX Band 1 | EEPROM | About

DualBand | Normal Mode | RF Type: MT7981 :: 2 T 2 R

4 Channel: 6 2437-MHz

Mode: OFDM | Rate: MCS=7; 54 Mbps | System BW: 20 | Per-Pkt BW: 20 | Primary Sel: 0

1  TX0/RX0  TX1/RX1

2 Select bandwidth

3 RX | Switch to RX page

5

TX frame setting

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

MPDU Tx Length: 1024

Inter Packet Gap (us): 50

TX Power0 (Dec) (0.5dB) Hex: 20.5 | 29

Start TX | Transmitted: 0 | Conti. Tx: 0:NORMAL MO

TX Tone: Single | DC | +WF(only one)

Power 0.25db(-32~31): 0 | Freq. Offset: 3D

BandInfo | Antenna Info | User Info | Common Info

Name	Value
PER	0.0 %
RXOK	0
RXOK/Sec	0
CCK PD Count	0
OFDM PD Count	0
CCK FCS Error	0
OFDM FCS Error	0

5 Successful received packets number would be shown at "RX OK" area



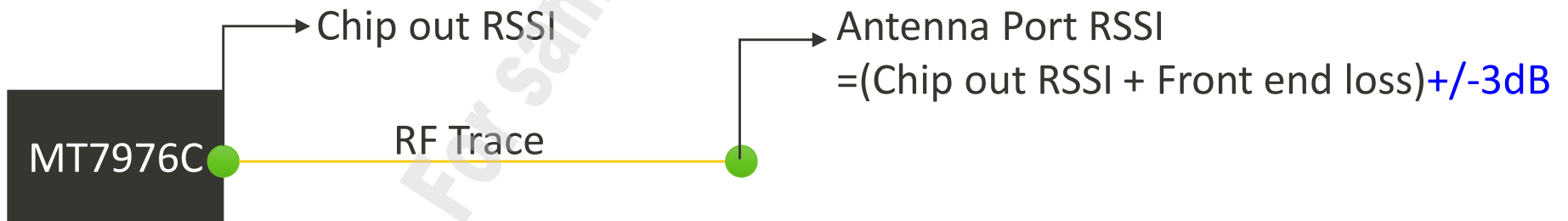
# RX 11a/b/g/n/ac/ax-SU

Name	Value
PER	0.0 %
RXOK	1000
RXOK/Sec	609
CCK PD Count	2
OFDM PD Count	1007
CCK FCS Error	0
OFDM FCS Error	0

Name	Value
RSSI 0	-48
RSSI 1	-127

\*RSSI: MAC layer in-band chip-out RSSI (final value)

7 RSSI means **chip-out RSSI** in QATool.





# EEPROM

MT7981 QA 0.0.2.78 FF:FF:FF:FF:FF:FF

TX/RX Band 0 | TX/RX Band 1 | EEPROM | About

EEPROM Type : Flash

Single Read/Write Mode:  READ  WRITE

Offset: 0000  
Value: 00  
Length: 0000

Write Back Done: FLASH\_MODE

LED Behavior: [Dropdown]

**EEPROM contents**

```

00000000 81 79 00 00 00 0C 43 26 60 00 00 00 00 00 00 00 .y....Cs`...^
00000010 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000020 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000040 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000050 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000060 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000070 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000080 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000090 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
000000A0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
000000B0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
000000C0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
000000D0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
000000E0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
000000F0 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000100 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000110 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000120 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000130 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000140 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000150 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000160 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000170 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
00000180 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....

```

FreeBlock: 0 / 30

Buttons: Read ALL, Load File, Save As...

NVM Type: EEPROM

Options:  EEPROM Buffer Mode,  Disable Write Warning,  eFuse Mode

Remember to write back to flash, become effective after rebooting DUT

EEPROM contents

Load a new EEPROM bin file to replace current contents

Save EEPROM current contents to a file

# DC tone

MT7981 QA 0.0.2.78 FF:FF:FF:FF:FF:FF

TX/RX Band 0 | TX/RX Band 1 | EEPROM | About

DualBand

RF Type: MT7981 :: 2 T 2 R

**1. Choose test mode**

Test Mode

Channel: 6 2437-MHz Mode: OFDM Rate: MCS=7; 54 Mb/s System BW: 20 Per-Pkt BW: 20 Primary Sel: 0 LTF+GI: [ ]

TX0/RX0  TX1/RX1

Reset counter

Tx

Nss: 2

LDPC

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

MPDU Tx Length: 1024

Packet Tx Time: [ ]

TX Power0 (Dec) (0.5dB) Hex: 20.5 29

Repeat: 0

Inter Packet Gap (us): 50

Start TX Transmitted: 0  Conti. Tx 0:NORMAL MO Ch,Preamble rateTXPath

**2. Choose tone type**

**3. Choose frequency offset**

**4. Click TX Tone**

TX Tone Single DC **5. Adjust power**

Power 0.25db(-32~31) 0 freq. Offset: 3D

RX

User: 0001 Start RX

BandInfo | Antenna Info | User Info | Common Info

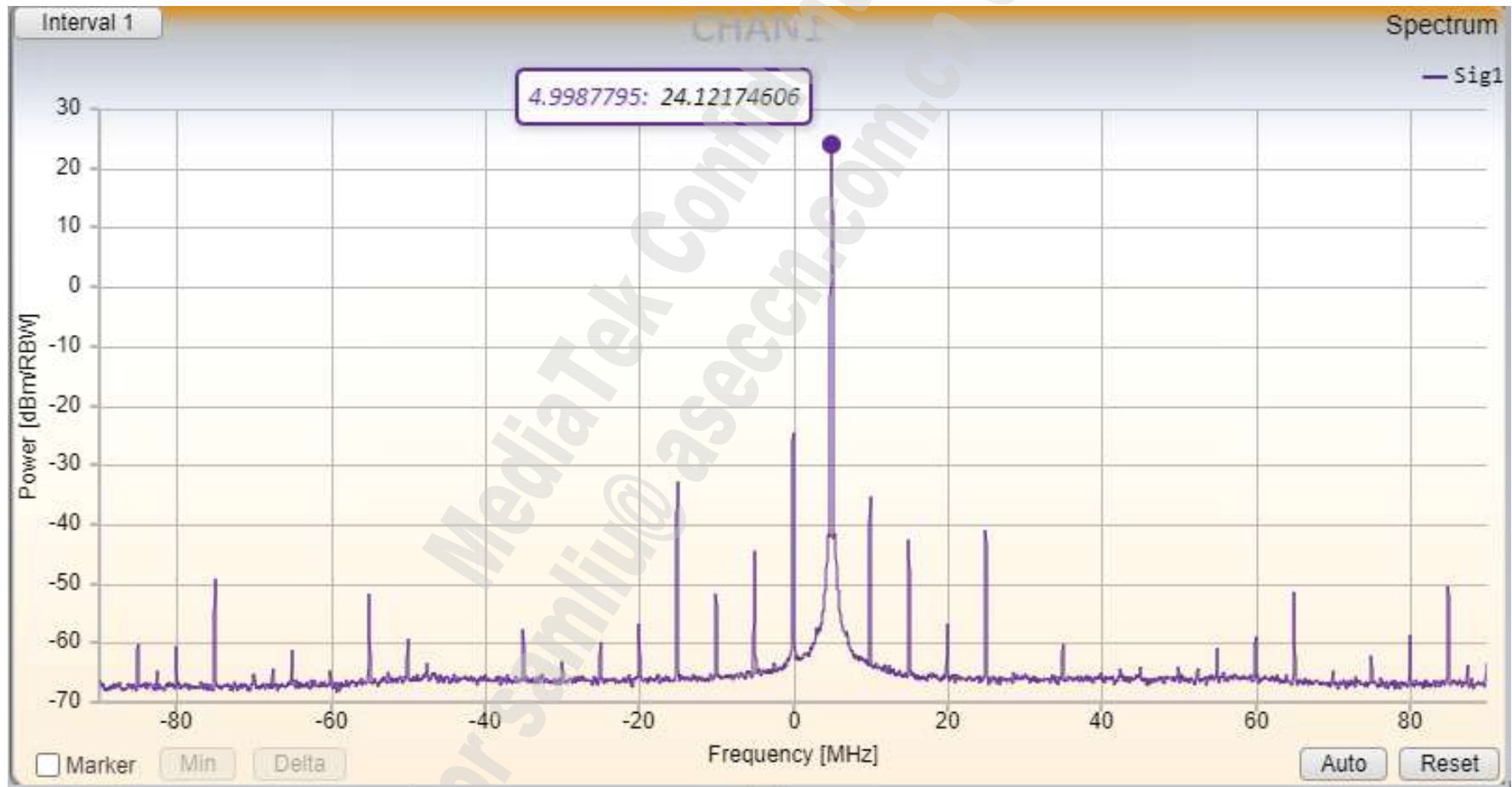
Name	Value
PER	0.0 %
RXOK	0
RXOK/Sec	0
CCK PD Count	0
OFDM PD Count	0
CCK FCS Error	0
OFDM FCS Error	0

For sample use only



# Single tone

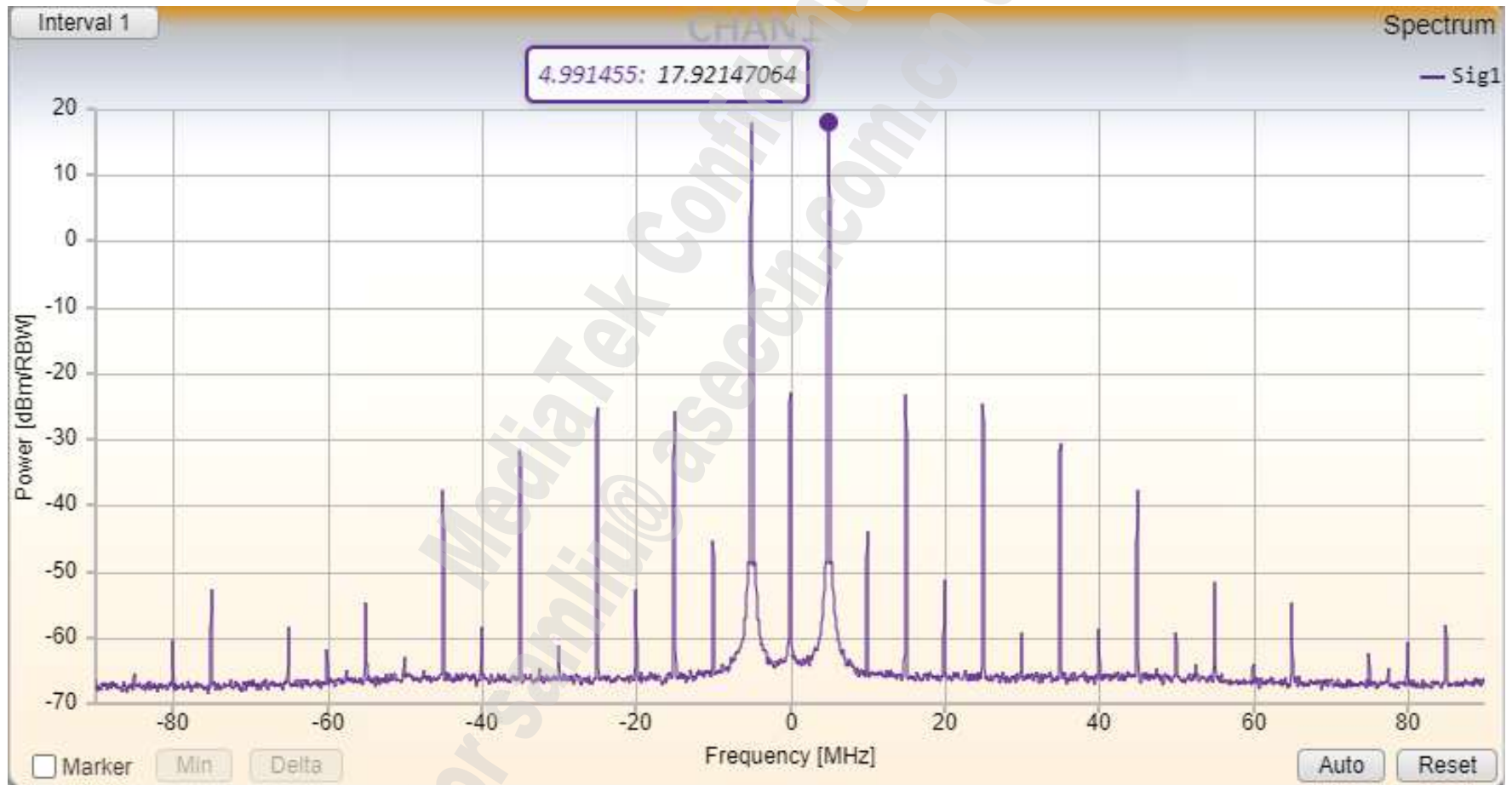
- 5M single tone for IRR





# Two tone

- 5M two tone for IM3



# Duplicate Mode (For EMI test)

MT7981-CA 0.0.2.78 FF:FF:FF:FF:FF:FF

1 TX/RX Band 0

3 Channel 6 2437-MHz Mode HE\_SU Rate MCS0=0; System BW 20 Per-Pkt BW 20 Primary Sel 0

2 Tx

4 Nss 1

5 Spatial Idx 24

6 MPDU Tx Length 5000 Packet Tx Time

7 TX Power0 (Dec) (0.5dB) -64.0 to 63.5 20.5

8 Start TX

RF Type MT7981 :: 2 T 2 R

Normal Mode

LTF+GI 4.4x+0.8u

Tx PE : 16 us

FilteredPack

TX frame setting

FC (2) Dur (2) Address1(6)Dest Address2(6)Source Address3(6)BSSID Seq (2)

0800 0000 FFFFFFFF 000000000000 00112233 0000

Repeat Pattern(3) AA

MPDU Tx Length 5000

Packet Tx Time

TX Power0 (Dec) (0.5dB) -64.0 to 63.5 20.5

Inter Packet Gap (us) 50

Start TX

TX Tone Single DC +WF(only one)

Power 0.25db(-32~31) 0 Freq. Offset 3D

PFD Info

Get

- 1 Choose Band  
(TX/RX Band 0: 2.4G, TX/RX Band1: 5G)
- 2 Choose TX
- 3 Choose Channel/Mode/Rate/BW
- 4 Choose NSS: 1
- 5 Key-in Spatial Idx: 24
- 6 For long packet
- 7 Adjust Power(When TX stop)
- 8 Start TX



# TX- HE MU

The screenshot shows the MT7915 QA 0.0.2.15 software interface. The top menu bar includes 'TX/RX', 'TX/RX Band1', 'EEPROM', 'MAC BBP', 'RF Page', 'RU Page', 'Settings Page', and 'About'. The 'RU Page' tab is selected, indicated by a red box and the number 3. In the main configuration area, the 'Mode' dropdown is set to 'HE\_MU' (marked with a red box and number 1). The 'System BW' and 'Per-Pkt BW' dropdowns are both set to '20' (marked with a red box and number 2). The 'Channel' is set to '6 2437-MHz'. The 'Tx PE' is set to '16 us'. The 'Tx' section is active, showing various settings like TSSI, LDPC, and a table for TX frame settings. A legend box on the right side of the interface contains the following instructions:

- 1 Select HE-MU
- 2 Select BW
- 3 Go to RU Page

# RU Page (HE-MU/ HE-TB)

## 4 Select Band: 0 for G band, 1 for A band

The screenshot shows the 'RU Page' configuration interface. The 'RU' section is highlighted with a red box. The 'Select Band' dropdown is set to '1'. The 'Category' dropdown is set to '1: 26 \* 9'. The 'Allocation' dropdown is set to '0'. The 'RU Index' dropdown is set to '0'. The 'MCS' dropdown is set to 'MCS11=11;'. The 'PwrBoost Factor' is set to '0'. The 'MU Nss' dropdown is set to '1'. The 'LDPC' checkbox is checked. The 'Nss' dropdown is set to '2'. The 'Stream Idx' dropdown is set to '1'. The 'Length' is set to '128'.

RU	Select Band:	Category :	Allocation :	Sta ID :	RU Index	MCS :	PwrBoost Factor	MU Nss	LDPC	Nss	Stream Idx	Length
1: 26 * 9	1	1: 26 * 9	0		0	MCS11=11;	0	1	<input checked="" type="checkbox"/>	2	1	128
0: Disable		0: Disable					0	1	<input type="checkbox"/>	2	1	1024
0: Disable		0: Disable					0	1	<input type="checkbox"/>	2	1	1024
0: Disable		0: Disable					0	1	<input type="checkbox"/>	2	1	1024
0: Disable		0: Disable					0	1	<input type="checkbox"/>	2	1	1024

## 5 Choose Category for every BW20

- Those rows are enabled only after setting relevant BW in TX/RX page.
- Each row represent BW20 waveform.

# RU Page (HE-MU/ HE-TB)

RU

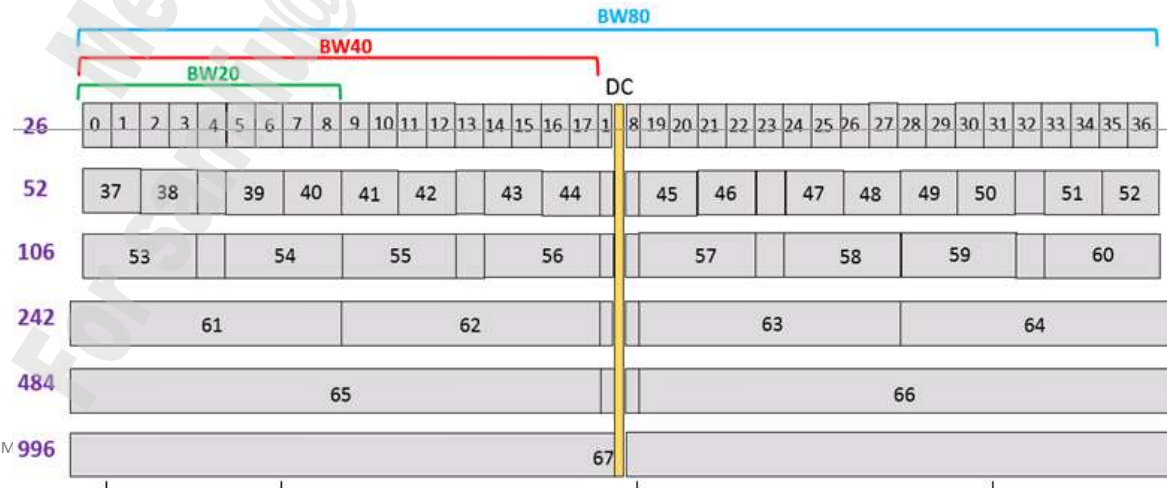
Select Band:  **7** **8** Select detail settings

Category:  **6** Allocation:  Sta ID:  **7** RU Index:  MCS:  PwrBoost Factor:  MU Nss:  LDPC:  Nss:  Stream Idx:  Length:

## 6 Allocation

8 bits indices	#1	#2	#3	#4	#5	#6	#7	#8	#9								
00000000	26	26	26	26	26	26	26	26	26	00101y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	26	26	52	26			106
00000001	26	26	26	26	26	26	26	26	52	00110y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	52	26	26	26			106
00000010	26	26	26	26	26	52	26	26	26	00111y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	52	52	26			106	
00000011	26	26	26	26	26	52	52	26	26	01000y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	106	106	26	26	26	26	26
00000100	26	26	52	26	26	26	26	26	26	01001y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	106	26	26	26	26	52	
00000101	26	26	52	26	26	26	26	52	26	01010y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	106	26	52	26	26		
00000110	26	26	52	26	52	26	26	26	26	01011y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	106	26	52	26	26		
00000111	26	26	52	26	52	52	26	26	26	0110y <sub>2</sub> y <sub>0</sub> z <sub>1</sub> z <sub>0</sub>	106	-	-	-	-	106	
00001000	52	26	26	26	26	26	26	26	26	01110000	52	52	-	52	52		
00001001	52	26	26	26	26	26	26	52	26	01110001	242-tone RU empty						
00001010	52	26	26	26	26	52	26	26	26	01110010	484-tone RU with zero HE-SIG-B User Specific field in the corresponding HE-SIG-B Content Channel						
00001011	52	26	26	26	26	52	52	26	26	01110011	996-tone RU with zero HE-SIG-B User Specific field in the corresponding HE-SIG-B Content Channel						
00001100	52	52	26	26	26	26	26	26	26	10y <sub>2</sub> y <sub>1</sub> y <sub>0</sub> z <sub>2</sub> z <sub>1</sub> z <sub>0</sub>	106	26	106				
00001101	52	52	26	26	26	26	26	52	26	11000y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>			242				
00001110	52	52	26	52	26	52	26	26	26	11001y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>			484				
00001111	52	52	26	52	26	52	26	26	26	11010y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>			996				
00010y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	52	52	-	106 (number of users)	52	52				11011y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>			2*996				
00011y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	106 (number of users)	-	52	52													
00100y <sub>2</sub> y <sub>1</sub> y <sub>0</sub>	26	26	26	26	26	106											

## 7 RU Index



# RU Page (HE-MU/ HE-TB)

11 After MU or TB waveform set, go back to TX/RX page

TX/RX | TX/RX Band1 | EEPROM | MAC BBP | RF Page | RU Page | Settings Page | About

RU

Select Band: 1

Category :	Allocation :	Sta ID :	RU Index :	MCS :	PwrBoost Factor	MU Nss	LDPC	Nss	Stream Idx	Length
1: 26 *9	0		0	MCS11=11;	0	1	<input checked="" type="checkbox"/>	2	1	128
0: Disable					0	1	<input type="checkbox"/>	2	1	1024
0: Disable					0	1	<input type="checkbox"/>	2	1	1024
0: Disable					0	1	<input type="checkbox"/>	2	1	1024
0: Disable					0	1	<input type="checkbox"/>	2	1	1024

9

Segment 0:

Category	Allocation	Sta ID	RU Index	Rates
1: 26 *9	0		0	11

Segment 1:

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

10

SET

Save to File

Load from File

Clear All

# TX- HE MU

The screenshot shows the configuration interface for the MT7915 QA 0.2.15 device. The window title is "MT7915 QA 0.2.15 FF:FF:FF:FF:FF:FF". The interface includes several sections:

- Navigation:** TX/RX | TX/RX Band1 | EEPROM | MAC BBP | RF Page | RU Page | Settings Page | About
- General Settings:** DualBand (dropdown), CalID (0), Cal Count (1), RF Type (MT7915 :: 4 T 4 R), Normal Mode (dropdown), Cal (button).
- Channel and Mode:** Channel (6 2437-MHz), Mode (HE\_MU), Rate (MCS0=0), System BW (20), Per-Pkt BW (20), Primary Sel (0), LTF+GI (3.4x+3.2x), Tx PE (16 us), Get (button).
- Advanced Settings:**  TX/RX0,  TX/RX, Ant Swap (dropdown), Nss (2), Spatial Idx (dropdown).
- TX frame setting:**  SGI,  TSSI,  STBC,  LDPC. Table below:

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

MPDU Tx Length (256), Packet Tx Time (checkbox), Payload (Random(1) checked), Repeat Pattern(3) (AA).
- Inter Packet Gap:** Repeat (0), Inter Packet Gap (us) (50), Start TX (button, highlighted with red box 12), Transmitted (1027204), Cont. Tx (checkbox), Ch. Preamble rate (NORMAL MC), TX Path (dropdown), Reset Power (button).
- TX Tone:**  TX Tone (Single), DC (dropdown), +WF(only one), Power 0.25db(-32~-31) (0), Freq. Offset (2C).

# MPDU TX Length Setting in HQA

For NSS=1/2

PSDU Length : Short

RU size	0	1	2	3	4	5	6	7	8	9	10	11
<b>26</b>	32	64	128	128	128	128	128	128	128	128	128	128
<b>52</b>	64	128	256	256	256	256	256	256	256	256	256	256
<b>106</b>	128	256	512	512	512	512	512	512	512	512	512	512
<b>242</b>	256	512	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
<b>484</b>	512	1024	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048
<b>996</b>	1024	2048	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
<b>996*2</b>	2048	4096	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192

For NSS=3/4

PSDU Length : long

RU size	0	1	2	3	4	5	6	7	8	9	10	11
<b>26</b>	128	256	512	512	512	512	512	512	512	512	512	512
<b>52</b>	256	512	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
<b>106</b>	512	1024	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048
<b>242</b>	1024	2048	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
<b>484</b>	2048	4096	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192
<b>996</b>	4096	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192
<b>996*2</b>	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192

# TX HE-TB

< 2 steps refer to HE-MU >

< 3 steps refer to TX a/b/g/n/ac >

The screenshot shows a network configuration interface with several sections and callouts:

- Callout 1:** Points to the **Mode** dropdown menu, which is currently set to **HE\_TB**.
- Callout 2:** Points to the **RF Page** tab in the top navigation bar.
- Callout 3:** Points to the **Channel** dropdown (set to 36 5180-MHz) and the **Rate** dropdown (set to MCS=7; 54 Mbps).
- Callout 4:** Points to the **Get** and **Set** buttons in the right-hand configuration panel.

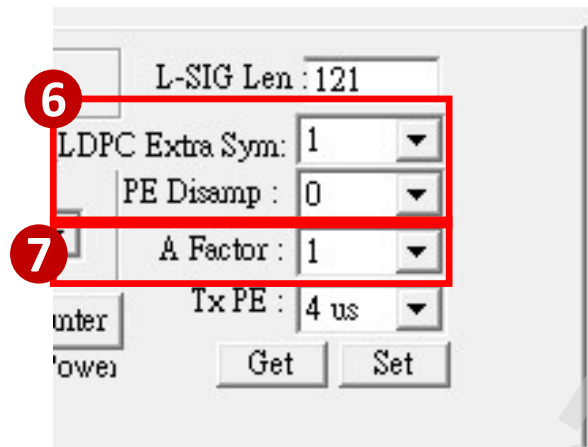
Other visible settings include:

- Channel:** 36 5180-MHz
- Mode:** HE\_TB
- Rate:** MCS=7; 54 Mbps
- System BW:** 20
- Per-Pkt BW:** 20
- Primary Sel:** 0
- Reason:** Normal 1
- LTP+GI:** 2:4x+3.2x
- TX Power0 (Dec) (0.5dB): Hex:** 21.0 (2A)
- TX Power0 (Dec) (0.5dB): Hex:** 0.0 (00)
- Start TX:** Transmitted: 352874

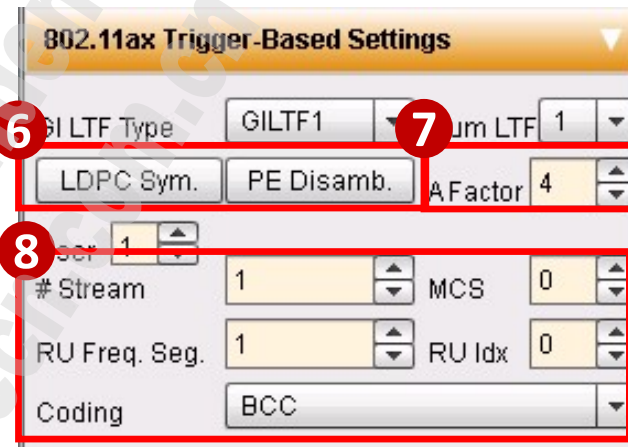
“Get” info, set on VSA

# HT-TB M2W Settings

QA Tool



M2W



- 6** LDPC Extra Sym/PE Disamp:1/0 → choose or not choose on M2W
- 7** A Factor:0 → A Factor:4  
A Factor:1,2,3 → A Factor:1,2,3

# RX HE-MU

TX/RX | TX/RX Band1 | EEPROM | MAC BBP | RF Page | RU Page | Settings Page | About

DualBand | Cal ID | Cal Count 1 | RF Type MT7915 :: 4 T 4 R

0.RC\_CAL | Cal | Normal Mode

Channel 3 2422-MHz | Mode HE\_MU | Rate MCS0=0; | System BW 20 | Per Pkt BW 20 | Primary Sel 0 | LTF+GI 0.4x+0.8x

TX/RX0  TX/RX | Ant Swap | Reset counter | Tx PE: 16 us | Get

1. Tx RX

User 0001 | Start RX | FFT | FilteredPacket Length 1000 | Disable | FAGC RSSI Path 0 | RX Vector Idx 1 0 | RX Vector RDD | RDD Stop | Num 0 | InSel 0

BandInfo | Antenna Info | User Info | Common Info

Name	Value
PER	0.0 %
RXOK	0
MAC Mdrdy	0
FCS err	0
CCK PD Count	0
CCK SIG Error	0
OFDM PD Count	0
OFDM TAQ Error	0
CCK SFD Error	0
OFDM SIG Error	0
CCK FCS Error	0
OFDM FCS Error	0
CCK MDRDY	0
OFDM MDRDY	0
Length Mismatch	0
FCS OK Cnt	0
AllLengthMismatchCount	0
AllMacMdrdy	0
AllFCSErr	0
AllFCSPass	0

Testing: 888

5. Sta ID | RU Arrange | PFD Info | Get

Rx IQ Verification | RX IQ testcase file | Start RX IRR Calc |  save pattern



# RU Page (HE-MU/ HE-TB)

Tx RX

User: 0001 Start RX FFT FilteredPacketLength: 1000 Disable

BandInfo | Antenna Info | User Info | Common Info

Name	Value
PER	0.0 %
RXOK	0
MAC Mdrdy	0
FCS err	0
CCK PD Count	0
CCK SIG Error	0
OFDM PD Count	0
OFDM TAQ Error	0
CCK SFD Error	0
OFDM SIG Error	0
CCK FCS Error	0
OFDM FCS Error	0
CCK MDRDY	0
OFDM MDRDY	0
Length Mismatch	0
FCS OK Cnt	0
AllLengthMismatchCount	0

5 Sta.ID |



Key-in "888" for identifying wanted Station ID

RU

Select Band: 0

7 Category: 1: 26 \* 9

8 Allocation: 0

Sta.ID: 0

RU Index: 0

9 MCS: MCS5=5;

PwrBoost Factor: 0

MU Nss: 1

LDPC:

Nss: 2

Stream Idx: 1

Length: 128

# RX HE-TB

- From 802.11ax:

A STA that transmits an HE TB PPDU compensates for carrier frequency offset (CFO) error and symbol clock error. After compensation, the absolute value of residual CFO error with respect to the PPDU carrying the soliciting Trigger frame **shall not exceed 350 Hz** for data subcarriers when measured as the 10% point of the complementary cumulative distribution function (CCDF) of CFO errors in AWGN at a received power of -60 dBm in the primary 20 MHz. The residual CFO error measurement shall be made on the HE TB PPDU following the HE-SIG-A field. The symbol clock error shall be compensated by the same ppm amount as CFO error.

- As AP in test-mode, RX HE-TB should consider frequency offset within 350Hz.
- In manual test, rough frequency offset should be calibrated in DUT first (Use TX and VSA to check and adjust Freq. offset). Then, accurate frequency adjustment should be set on VSG.

# RX HE-TB 0 Use TX and VSA to check rough frequency offset

M2W

VSA1 VSG1 CHAN1 Offset: Count: 0 1 Wide 80+80 MHz Tx MPS

Hardware Results Settings Waveform

VSA1

**VSA Settings**

Frequency: 5180 MHz  
Reference Level: 30 dBm/dBv  
AGC Interval: 5 ms  
Sampling Rate: 240 MHz  
Capture Length: 1 ms  
Low Distortion Port: RF1

Result 1 AVER MAX MIN SDEV TxQuality OFDM

Packet Info Type: 802.11a/g Format: Non-HT Chan BW: 20MHz

Signal Base	Value	Unit	Stream Base	Value	U...
Power	18.93	dBm	EVM	-38.28	dB
Peak Power	27.80	dBm	EVM (%)	1.22	%
Phase Error	0.18	deg	EVM Data	-38.18	dB
Frequency Error	1.27	kHz	EVM Pilot	-39.70	dB
Symbol Clock Error	0.18	ppm	EVM User	-38.28	dB
LO Leakage	-48.58	dB	Trigger Test Return Time	134.3	us
Ant. Imbalance	0.00	dB			
Phase Imbalance	0.06	deg			
Carrier Frequency Error	0.00	Hz			

Adjust Freq Offset value on QATool until symbol clock error close to 0 ppm

QATool

MT7915 QA 0.0.2.15 FF:FF:FF:FF:FF:FF

TX/RX TX/RX Band1 EEPROM MAC BBP RF Page RU Page Settings Page About

DualBand Cal ID Cal Count 1 RF Type MT7915 :: 4 T 4 R FW Date

0.RC\_CAL Cal Normal Mode

Channel 36 5180-MHz Mode Rate System BW Per-Pkt BW Primary Sel Reason LTF+GI

OFDM MCS=7: 54 Mbps 20 20 0 Normal T 2:4x+3.2x

TX/RX  TX/RX Ant Swap Reset counter Low Power

**Tx** RX

SGI  TSSI  STBC  LDPC Nss 2 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

MPDU Tx Length Packet Tx Time

Repeat Pattern(3) AA 1024

Repeat 0  Packet Gap 50

Start TX Transmitted: 70038  Conti. Tx 0:NORMAL MDI Ch.Preamble rateTXPath

TX Power0 (Dec)(0.5dB) Hex -64.0 to 63.5 19.0 26 0.0 00

Reset Power

TX Tone Single DC +WF(only one) Power 0.25db(-32~31) 0 Freq. Offset 20

# RX HE-TB

TX/RX | TX/RX Band1 | EEPROM | MAC BBP | RF Page | **RU Page** | Settings Page | About

DualBand: [Dropdown] Cal ID: [0.RC\_CAL] Cal Count: [1] RF Type: [MT7915 :: 4 T 4 R] L-SIG Len: [Dropdown]

Channel: [6 2437-MHz] Mode: [HE\_TB] Rate: [MCS5=5;] System BW: [40] Per-Pkt BW: [40] Primary Sel: [0] LTF+GI: [0:1x+1.6v]

[1] Tx: [RX] [2]  TX/RXO  TX/RX [3] Ant Swap: [Dropdown] [5] Reset counter [Get] [Set]

User: [0001] FilteredPacket Length: [1000] Disable [FAGC RSSI Path: [0] RX Vector Idx 1: [0] RX Vector: [Dropdown]]

RDD: [RDD Stop] Num: [0] InSel: [0]

BandInfo | Antenna Info | User Info | Common Info

Name	Value
Driver Rx Cnt	0
Aci Hit Low	28
Aci Hit High	0
Mu Rx Cnt	0
Rx FIFO Full	1
Sig MCS	0
SINR	196800

Enable RXV  Enable RDD  Enable Recal

[Start RDD] [RX Vector Dump] [RDD Dump] [Recal Dump]

PFD Info: [Dropdown] [Get]

Rx IQ Verification: RX IQ testcase file: [Dropdown] [Start RX IRR Calc]  save pattern

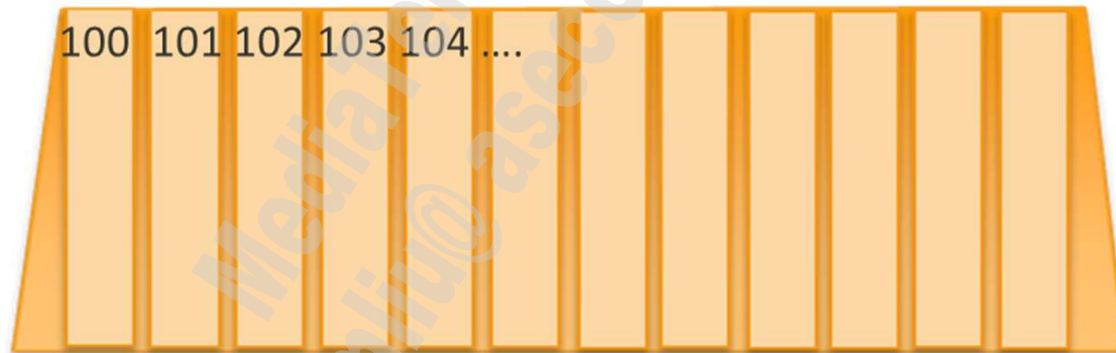
**5** For HE-TB, please remember to set LTF+GI to the same as waveform generated by instrument.

# RU Page (HE-MU/ HE-TB)

7	8	9	10							
Category :	Allocation :	Station ID :	RU Index :	MCS :	PwrBoost Factor	MU Nss	LDPC	Nss	Stream Idx	Length
1: 26 * 9	0		0	MCS5=5;	0	1	<input type="checkbox"/>	2	1	128

## 9 Station ID

- Starting from 100, 101, 102,....



# RX HE-TB

## 11 User number

User number limit:

- Single band:16, DBDC: 8 for each band



For example

- user #1 only: 0000 0000 0000 0001 → 0001
- user #2 only: 0000 0000 0000 0010 → 0002
- 16 users: 1111 1111 1111 1111 → FFFF

### Band Info/User Info

- “Band Info” → average PER (MAC)
- “User Info” → all users’ PER separately (PHY)

Name	Value
FAGC RSSI WB 0	0
FAGC RSSI IB 0	0
RCPI 0	0
RSSI 0	0
Inst RSSI WB 0	-128
Inst RSSI IB 0	-128
FAGC RSSI WB 1	0
FAGC RSSI IB 1	0
RCPI 1	0
RSSI 1	0
Inst RSSI WB 1	-128
Inst RSSI IB 1	-128

Name	Value
PER	0.0 %
RXOK	0
MAC Mdrdy	0
FCS err	0
CCK PD Count	0
CCK SIG Error	0
OFDM PD Count	0
OFDM TAQ Error	0
CCK SFD Error	0
OFDM SIG Error	0
CCK FCS Error	0
OFDM FCS Error	0
CCK MDRDY	0
OFDM MDRDY	0

Name	Value
Freq Offset from RX 0	0
SNR 0	0
PCR Error Cat 0	0
PER 0	0.0 %
Freq Offset from RX 1	0
SNR 1	0
PCR Error Cat 1	0
PER 1	0.0 %
Freq Offset from RX 2	0
SNR 2	0
PCR Error Cat 2	0
PER 2	0.0 %
Freq Offset from RX 3	0
SNR 3	0
PCR Error Cat 3	0
PER 3	0.0 %



# RX HE-TB, M2W Setup

- 12** Adjust frequency more accurate by change VSG Settings' "Frequency" according to "Freq Offset from RX" in QATool

M2W

VSA1 VSG1 CHAN1 Offset: 0 Cou 1

Hardware RX PER Settings Wave Gen

VSG1

**VSG1 Settings** Unit: MHz

**12** Frequency 5180.0085 MHz

Power Level -80 dBm/dBv

Sampling Rate 80 MHz

Low Distortion Port: RF1

**Waveforms**

Loaded Wave: Load Upload

user/Waveform\_1SSTB\_BW20MCS0GILTF2LDP

Count 1000 Stop Play

CW Wave RF(off) RF(on)

QATool

Tx RX

User 0001 Start RX FFT FilteredPacket Length 1000 Disable

BandInfo Antenna Info User Info Common Info

Name	Value	Unit: Hz
<b>12</b> Freq Offset from RX 0	-153	
SNR 0	14	
FCR Error Cnt 0	252	
PER 0	55.0 %	
Freq Offset from RX 1	135	
SNR 1	16	
FCR Error Cnt 1	0	
PER 1	0.0 %	
Freq Offset from RX 2	-450	
SNR 2	15	
FCR Error Cnt 2	0	
PER 2	0.0 %	

rights reserved.

**MEDIA TEK**

everyday genius

MediaTek Confidential  
For samliu@aseelectronics.com.cn Use Only