MT7981
QA Tool User Guide_V1.1

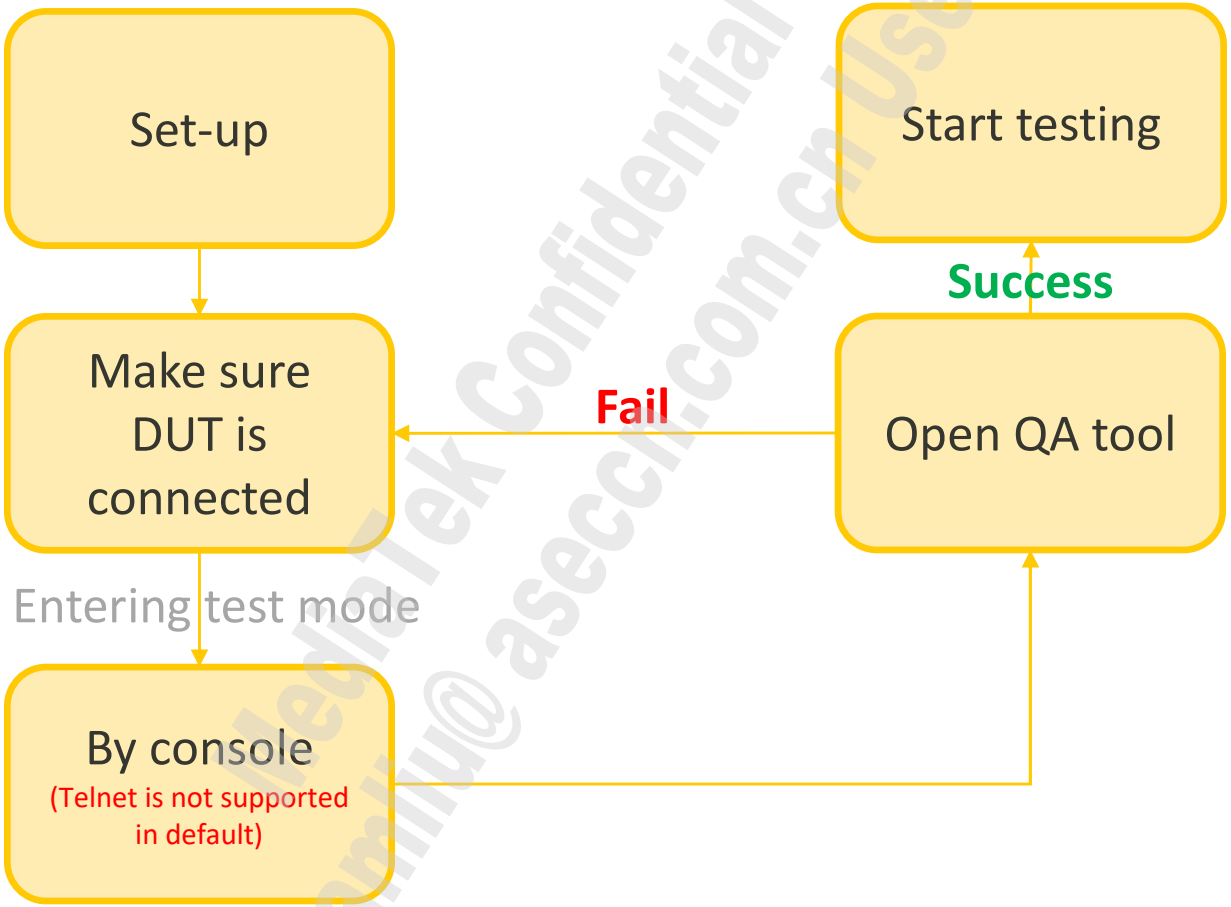
Outline

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

Note

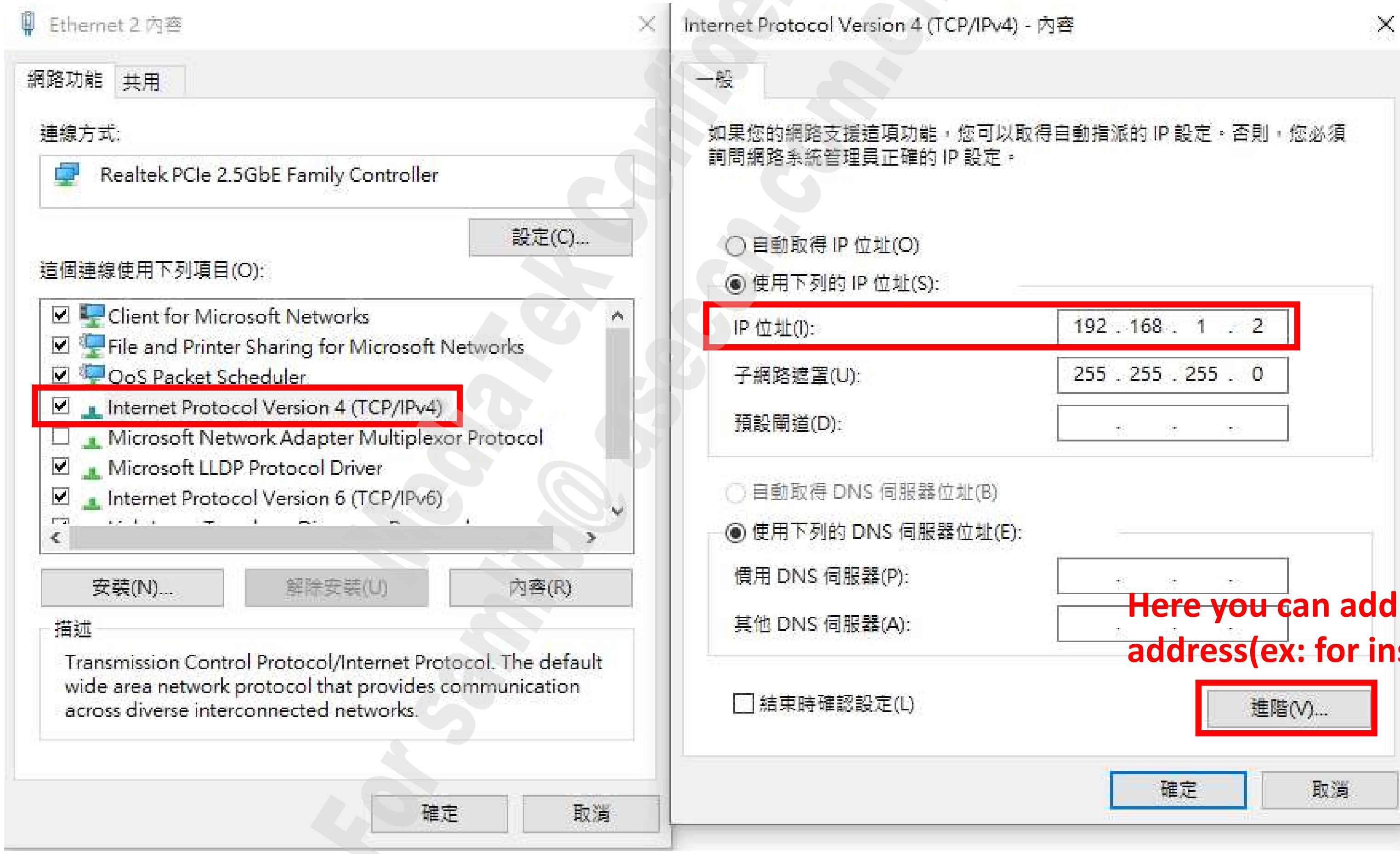
- * : Annotation
- 1 : Essential steps
- 1 : Function
- blue: noteworthy items

Flow



1. Set-up

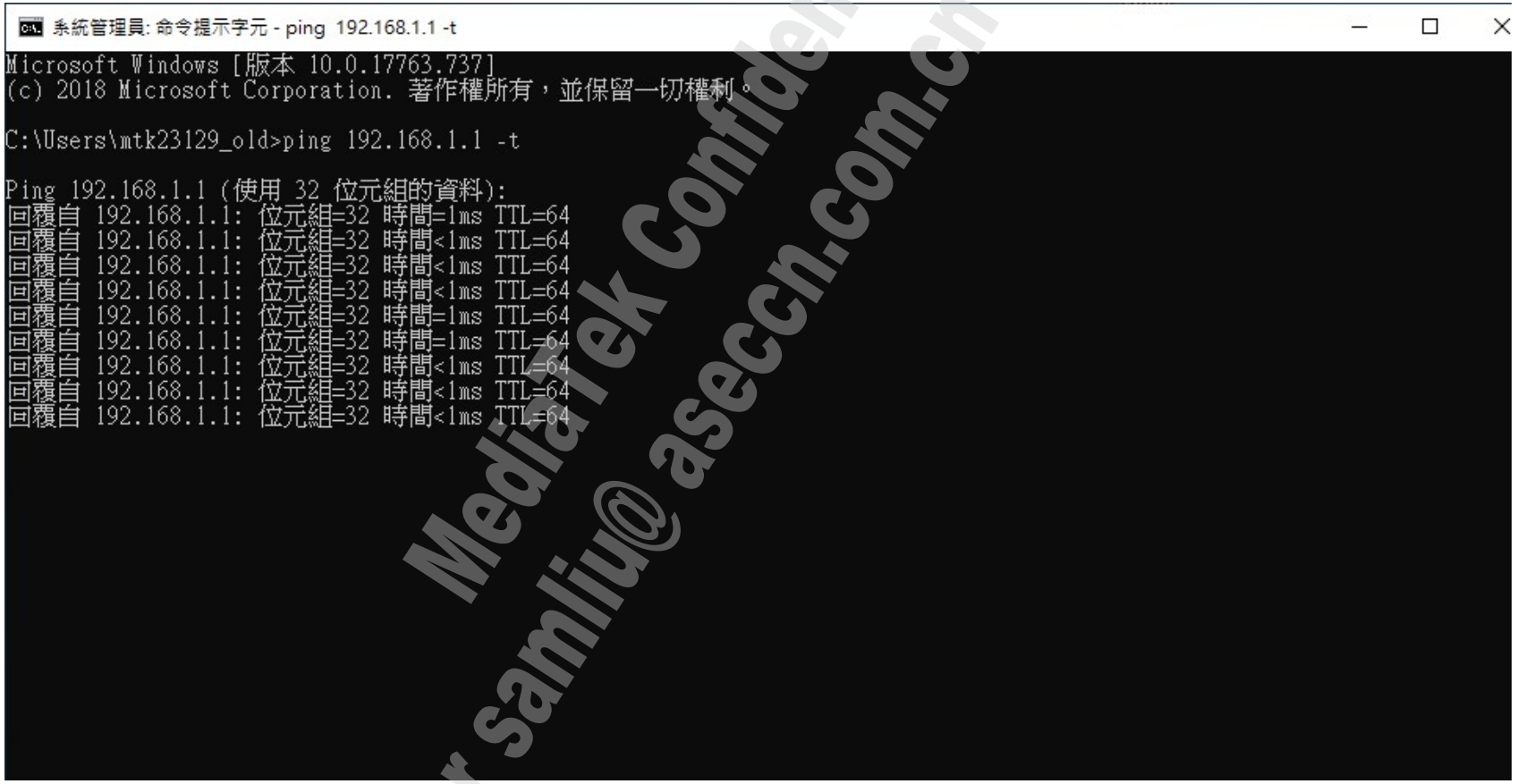
- **DUT Default IP: 192.168.1.1**
- **To connect to DUT, network IP should be set to same IP domain (ex: 192.168.1.2 or 192.168.1.3,...etc.)**



Here you can add another IP address(ex: for instrument)

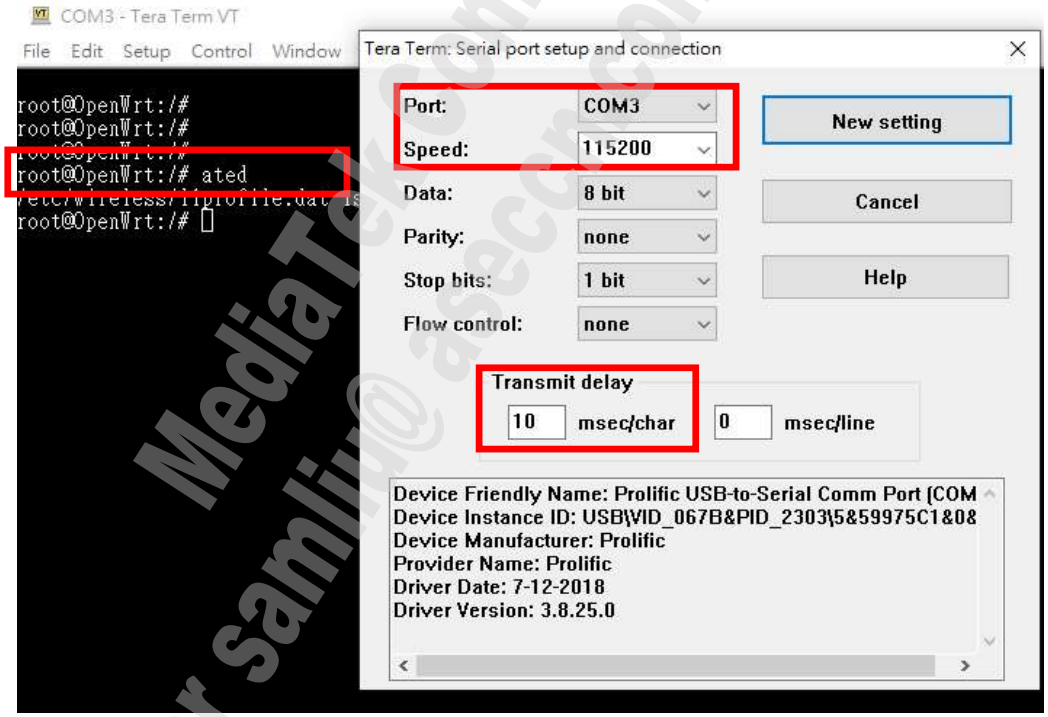
2. Make sure DUT is connected to testing PC/NB

- Open command window.
- Key-in "ping 192.168.1.1 -t" to ping DUT continuously.



3. Entering test mode

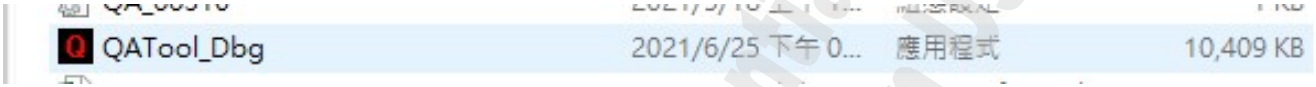
- **By Console(telnet is not supported)**
  - Select port, and baud rate(speed) set to 115200.
  - 10 ms transmit delay is recommended.
  - Key-in “ated” right after “root@LEDE:/#” to enter test-mode.



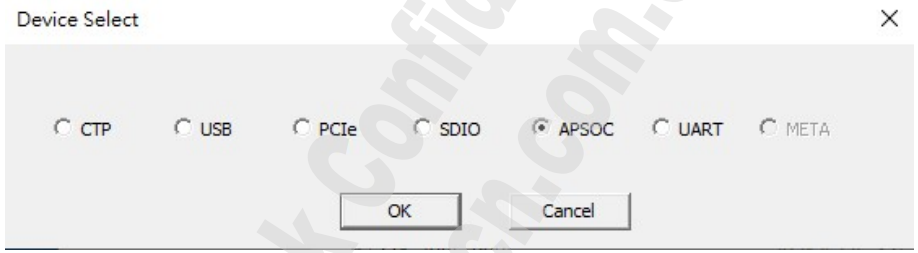
4. Open QA tool

- Open “QATool_Dbg.exe”.

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



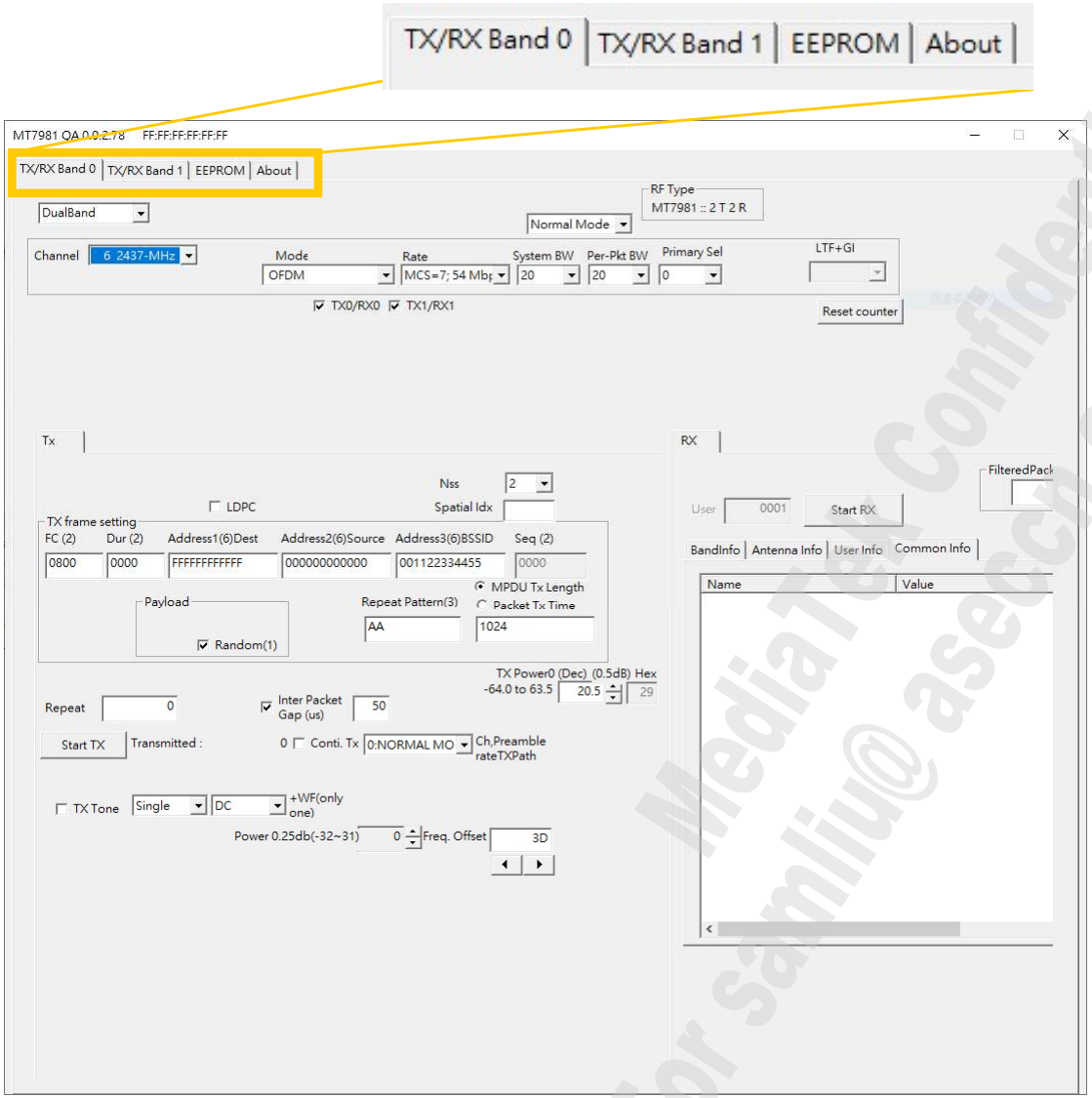
- Choose “APSOC”.



- Select corresponded net IT)

- Press OK

5. Start using QA Tool



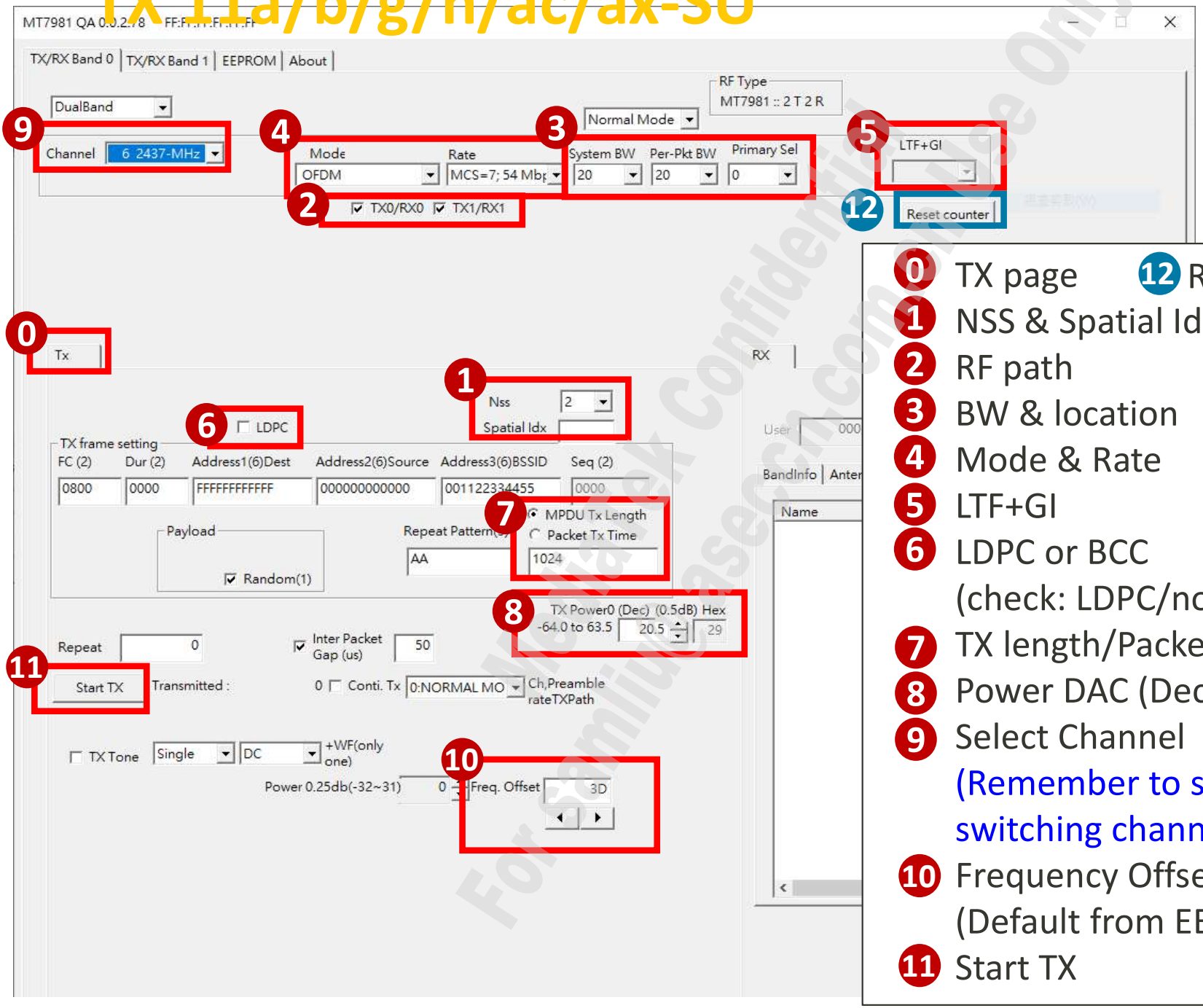
Page	Usage
TX/RX Band0 *	(PHY0) G Band TX/RX
TX/RX Band1 *	(PHY1) A Band TX/RX
EEPROM	Read/Write/Save EEPROM

**For DBDC: TX/RX pages are separated into:*

G band ➔TX/RX Band0

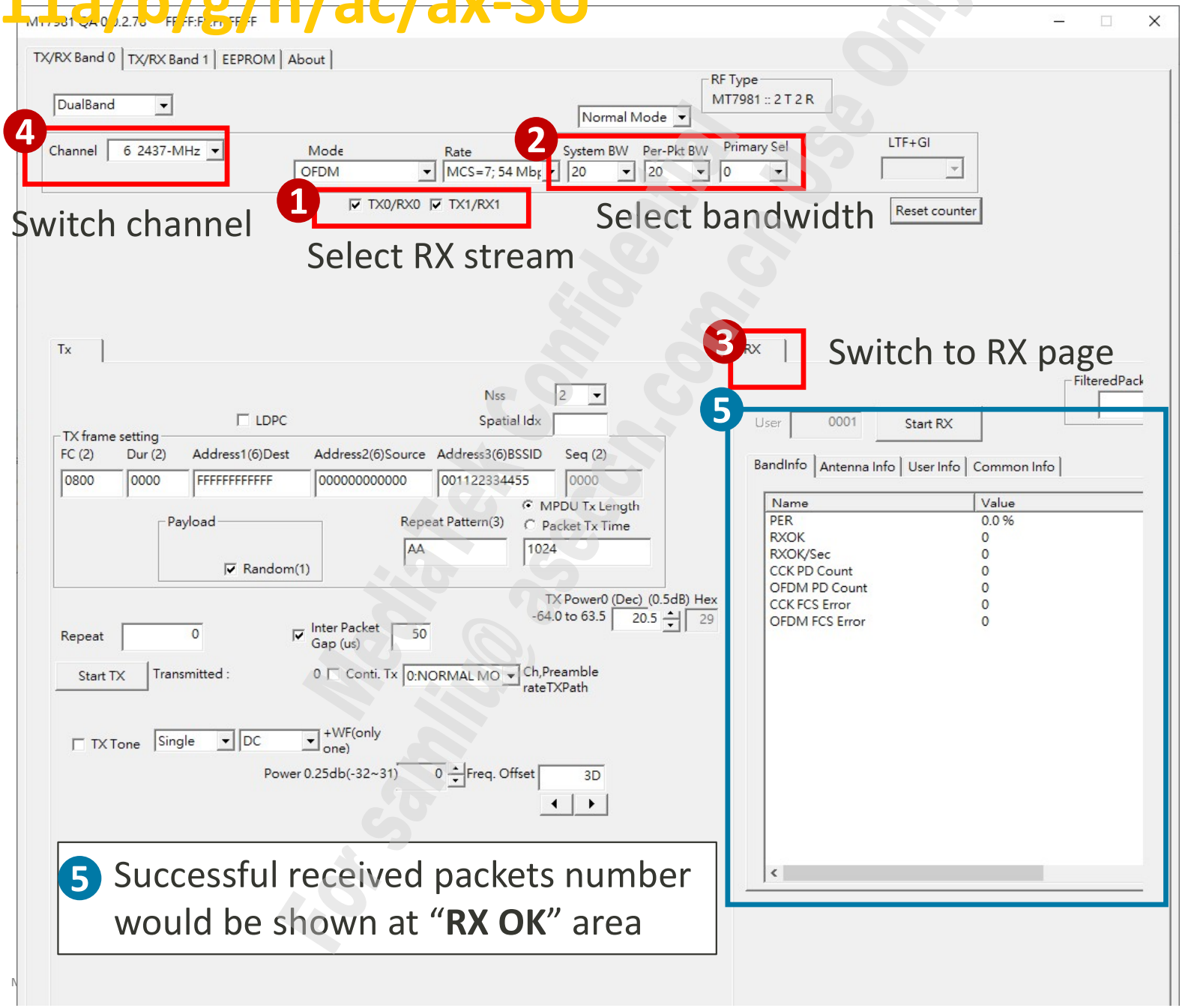
A band ➔TX/RX Band1

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

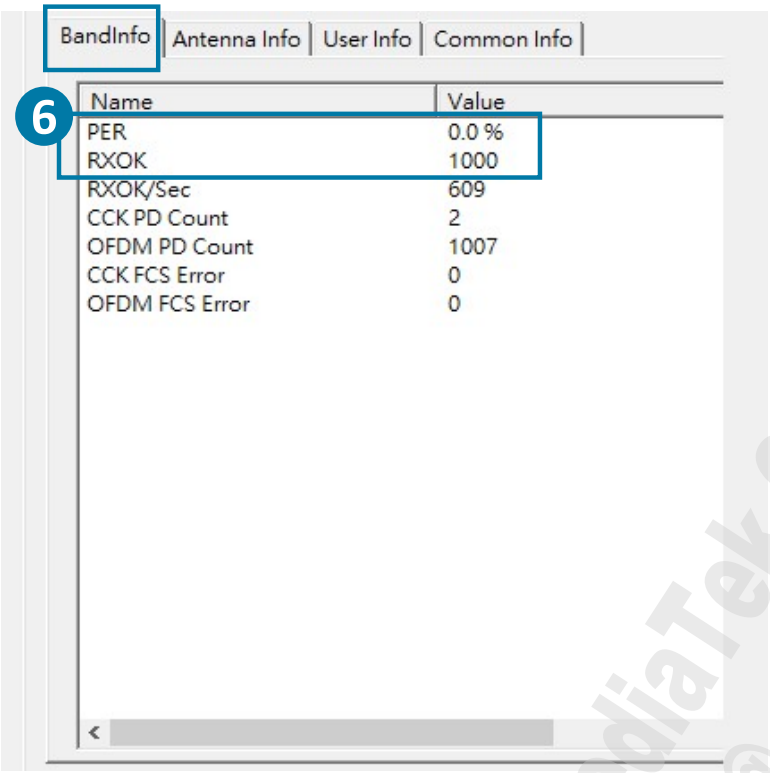


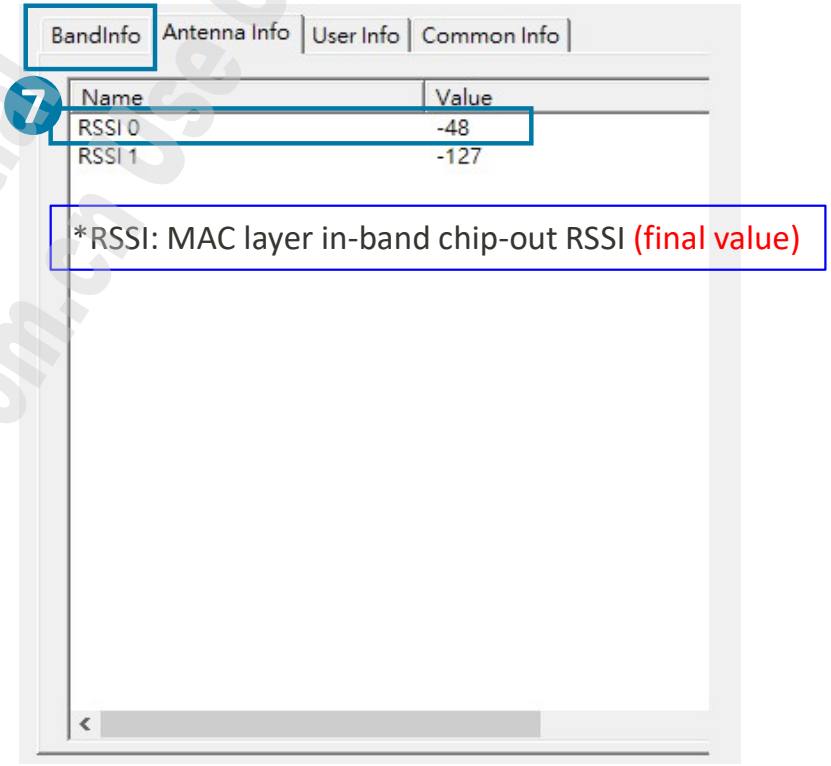
0 TX page
12 Reset TX/RX counter
1 NSS & Spatial Idx
2 RF path
3 BW & location
4 Mode & Rate
5 LTF+GI
6 LDPC or BCC
(check: LDPC/non-check: BCC)*
7 TX length/Packet time
8 Power DAC (Dec/Hex,0.5dB)
9 Select Channel
(Remember to stop TX before switching channel)
10 Frequency Offset
(Default from EEPROM)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

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

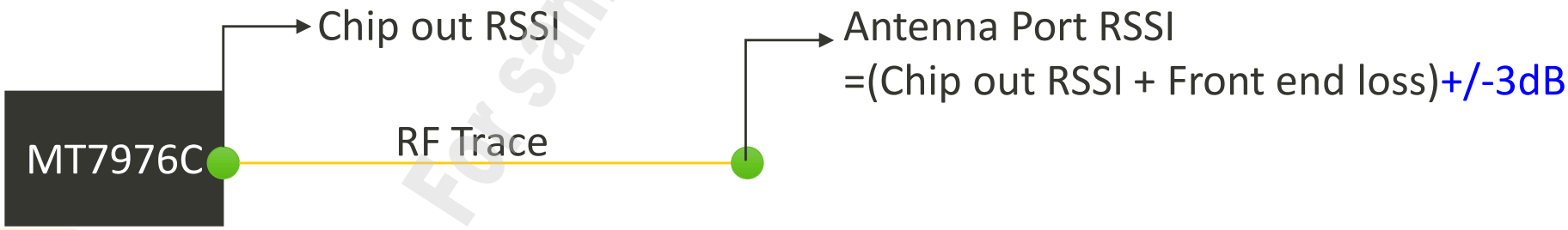


RX 11a/b/g/n/ac/ax-SU

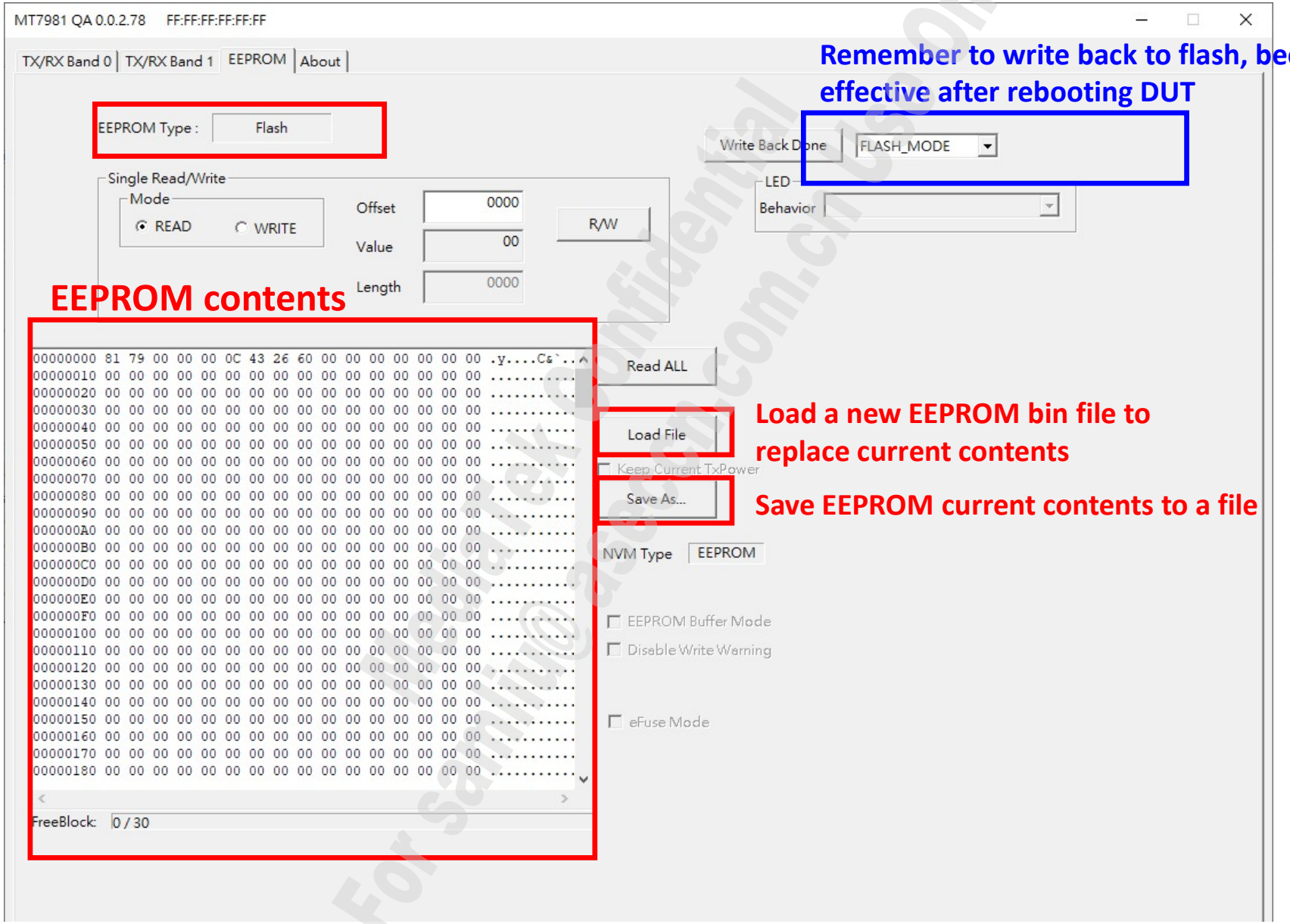




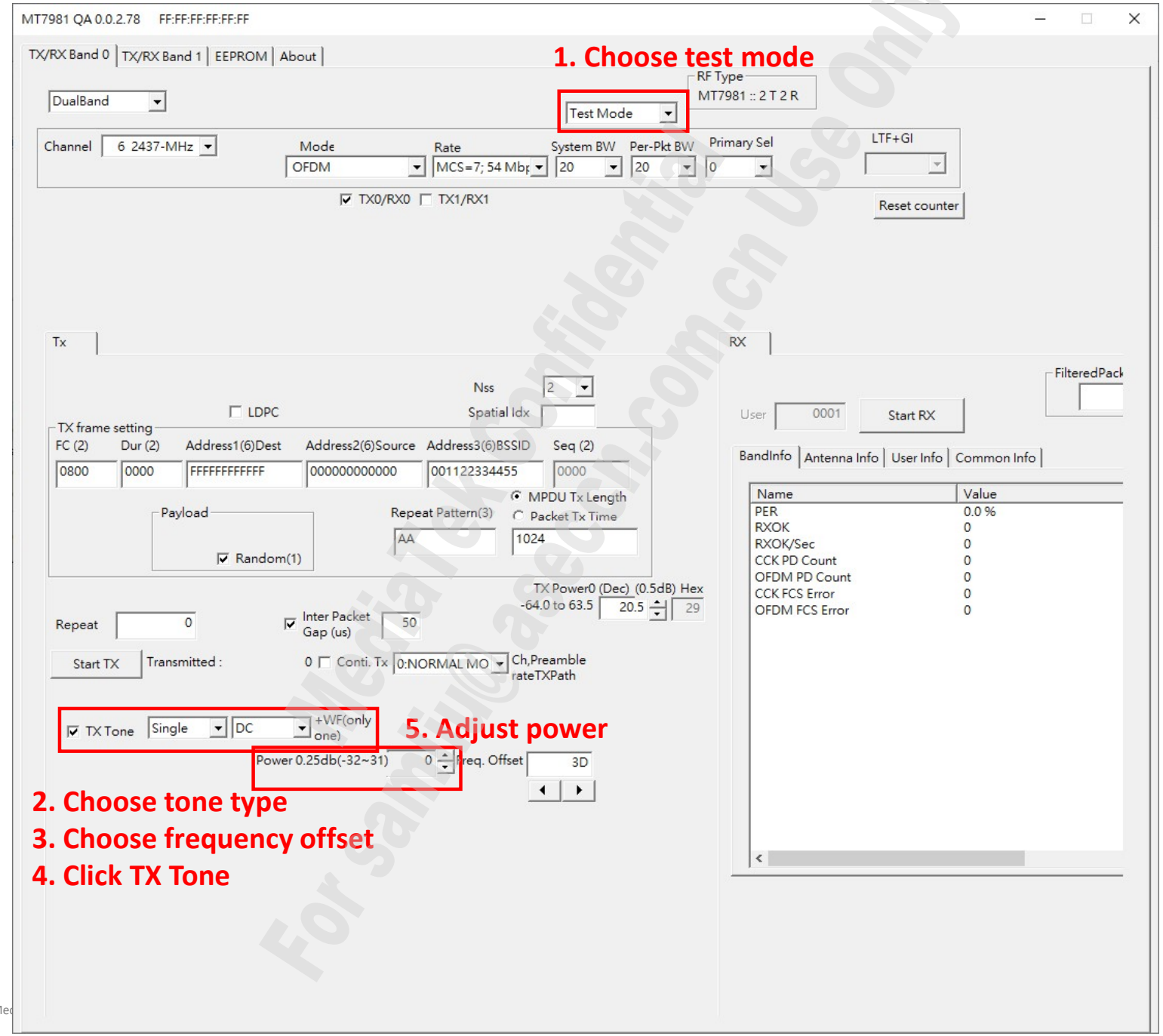
- 7 RSSI means chip-out RSSI in QATool.



EEPROM

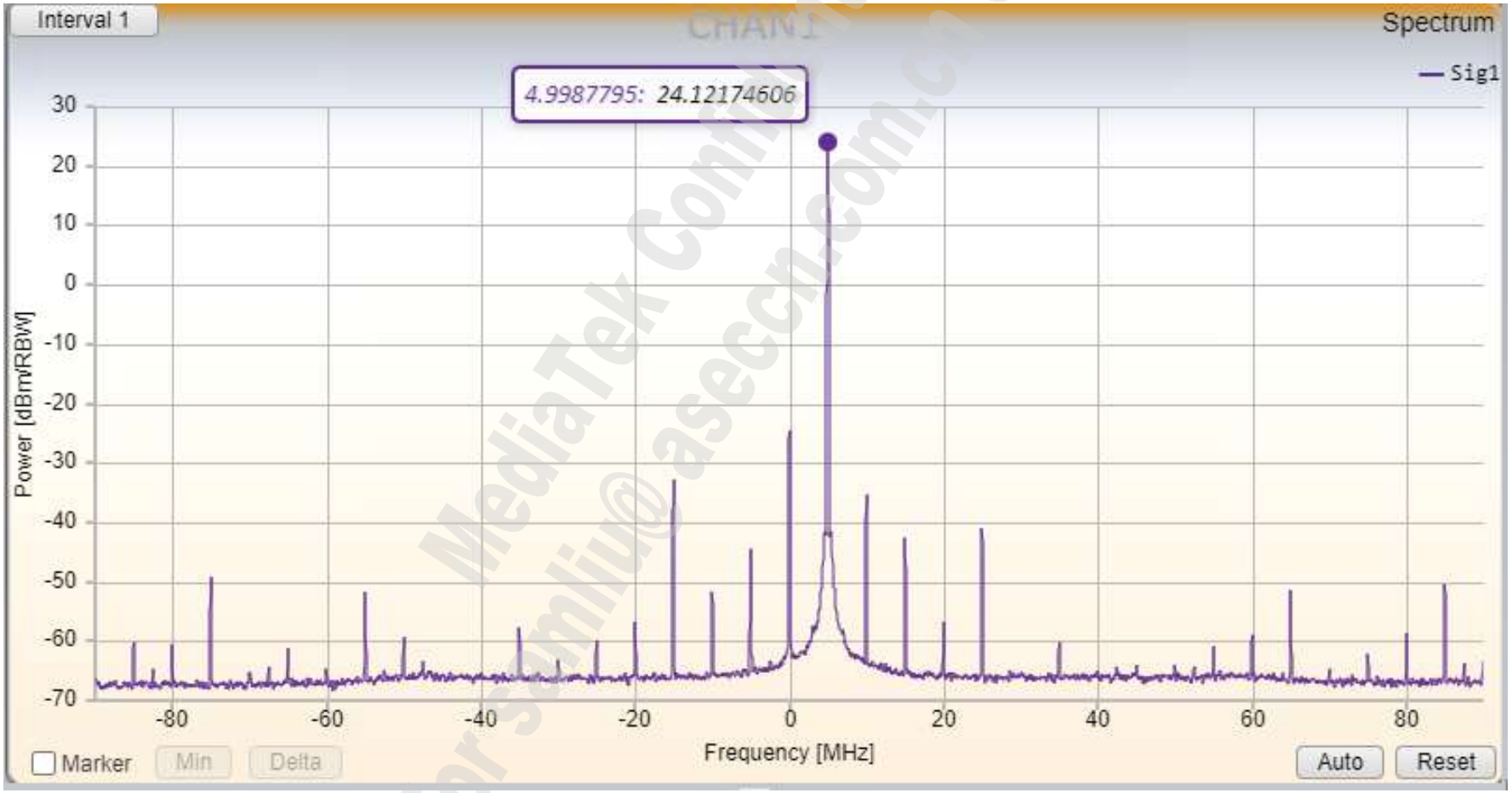


DC tone



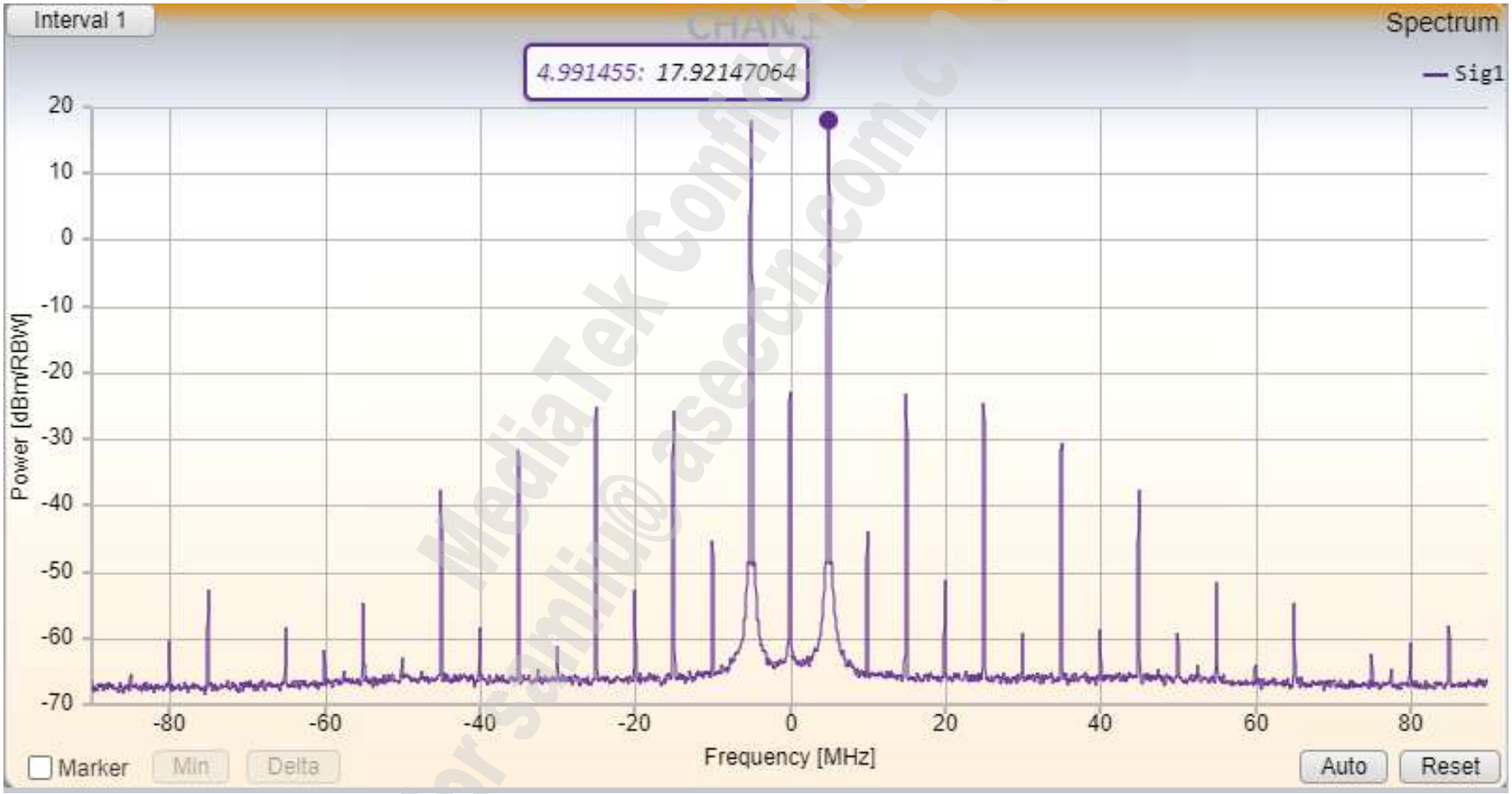
Single tone

- **5M single tone for IRR**

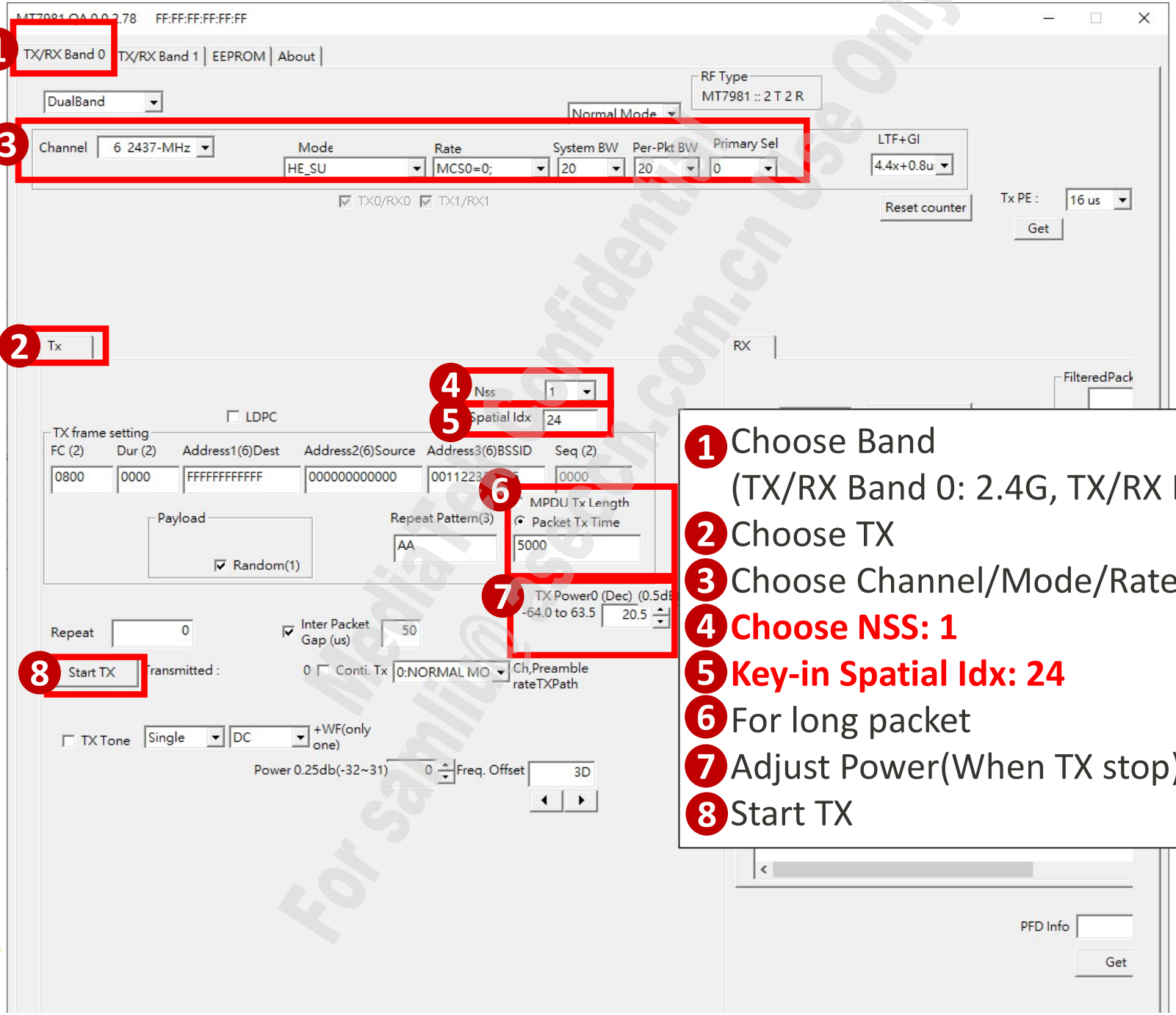


Two tone

- **5M two tone for IM3**



Duplicate Mode (For EMI test)

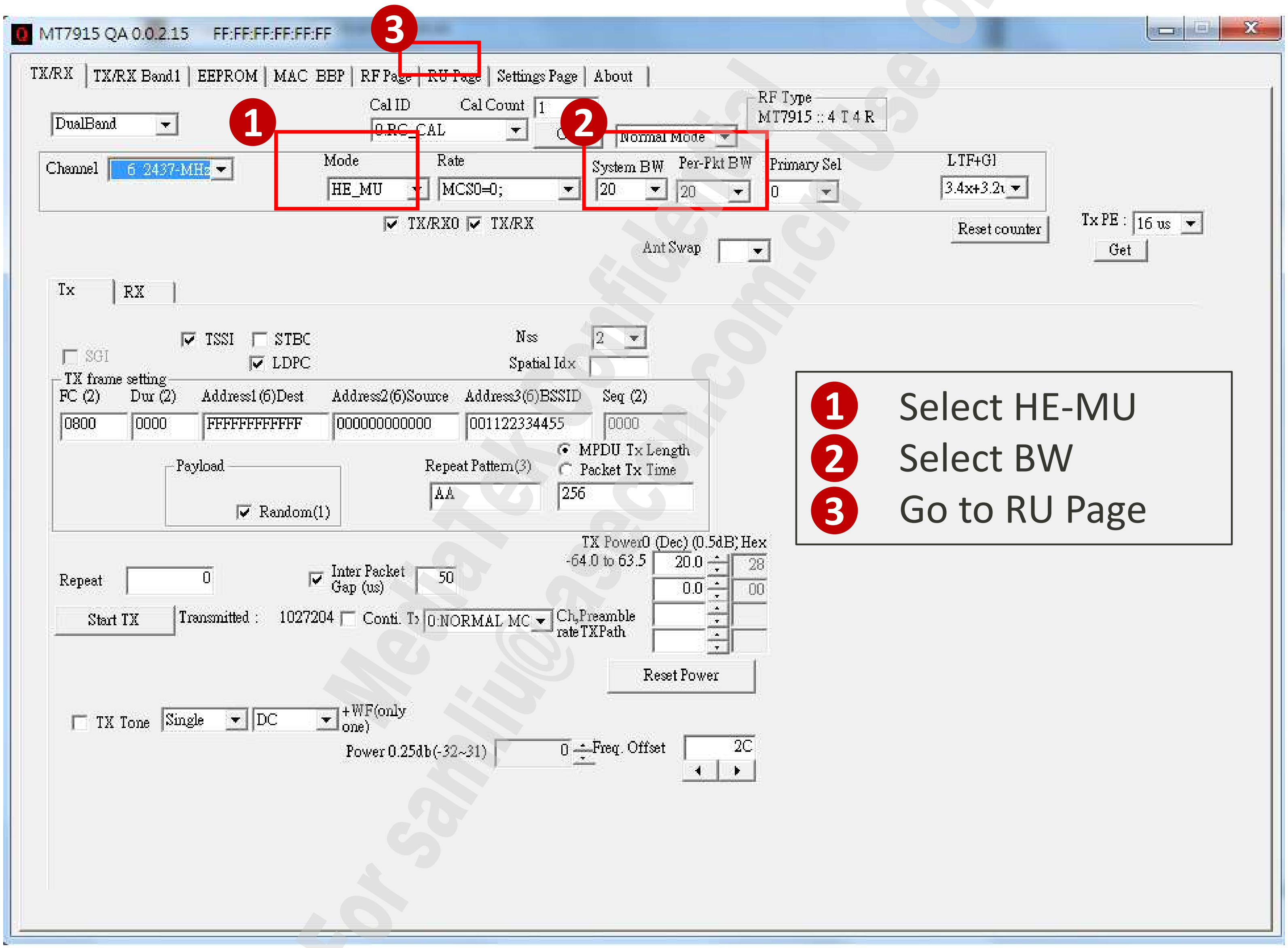


1. Choose Band
   (TX/RX Band 0: 2.4G, TX/RX Band1: 5G)
2. Choose TX
3. Choose Channel/Mode/Rate/BW
4. **Choose NSS: 1**
5. **Key-in Spatial Idx: 24**
6. For long packet
7. Adjust Power(When TX stop)
8. Start TX

TX HE-MU

26	26	26	26	26	26	26	26	26																											
52		52		26	52		52																												
106				26	106																														
242																																			
26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26																		
52		52		26	52		52		52		52		26	52		52																			
106				26	106				106				26	106																					
242									242																										
484																																			
26	26	26	26	26	26	26	26	26	106				26	52		26	26	26	242																
242									242									26	26	26	52		26	106				26	26	26	26	26	26	26	26	26
52		52		26	52		52		52		52		26	52		52		26	52		26	52		52		52		26	52		52				
106				26	106				106				26	106				26	106				106				26	106							
242									242									26	242																
484																		26	484																
996																																			
484																		26	242																
106		26		106					242									26	242																
106		26		106					106				26	106				26	106				26	106											
484																		26	242																
242									52		52		26	52		52		26	52		52		26	52		52		52		26	52				

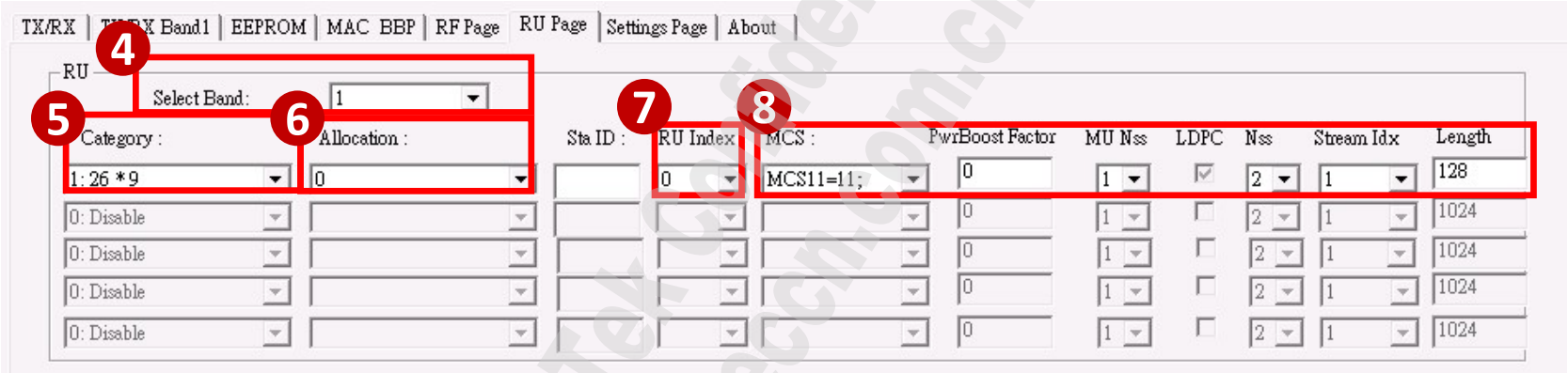
TX- HE MU



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



5 Choose Category for every BW20

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

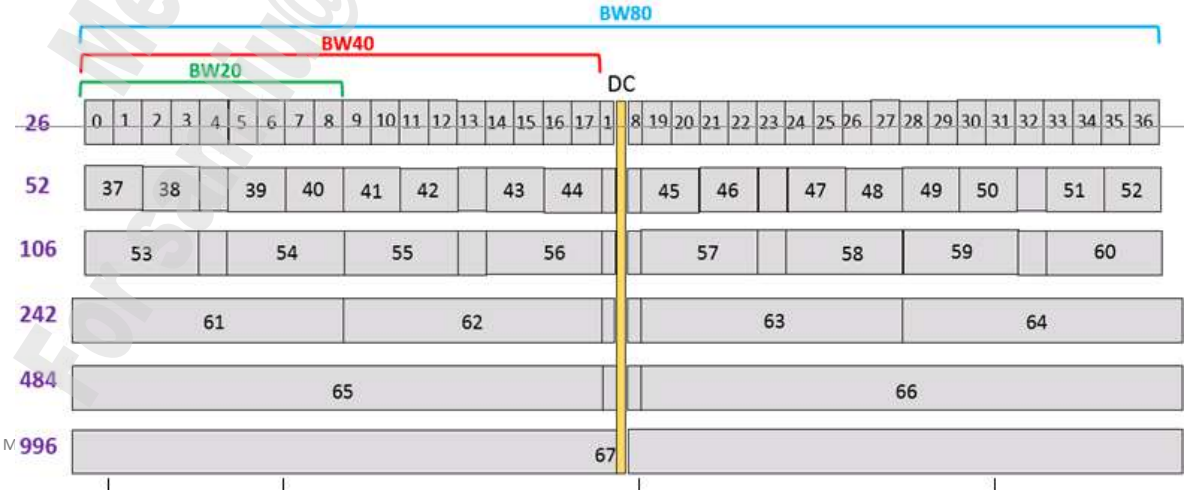
RU Page (HE-MU/ HE-TB)

6 Allocation

8 bits indices	#1	#2	#3	#4	#5	#6	#7	#8	#9
00000000	26	26	26	26	26	26	26	26	26
00000001	26	26	26	26	26	26	26	52	
00000010	26	26	26	26	26	52		26	26
00000011	26	26	26	26	26	52		52	
00000100	26	26	52		26	26	26	26	26
00000101	26	26	52		26	26	26	52	
00000110	26	26	52		26	52		26	26
00000111	26	26	52		26	52		52	
00001000	52		26	26	26	26	26	26	26
00001001	52		26	26	26	26	26	52	
00001010	52		26	26	26	52		26	26
00001011	52		26	26	26	52		52	
00001100	52		52		26	26	26	26	26
00001101	52		52		26	26	26	52	
00001110	52		52		26	52		26	26
00001111	52		52		26	52		52	
00010$y_2y_1y_0$	52		52		-	106 (number of users)			
00011$y_2y_1y_0$	106 (number of users)				-	52		52	
00100$y_2y_1y_0$	26	26	26	26	26	106			

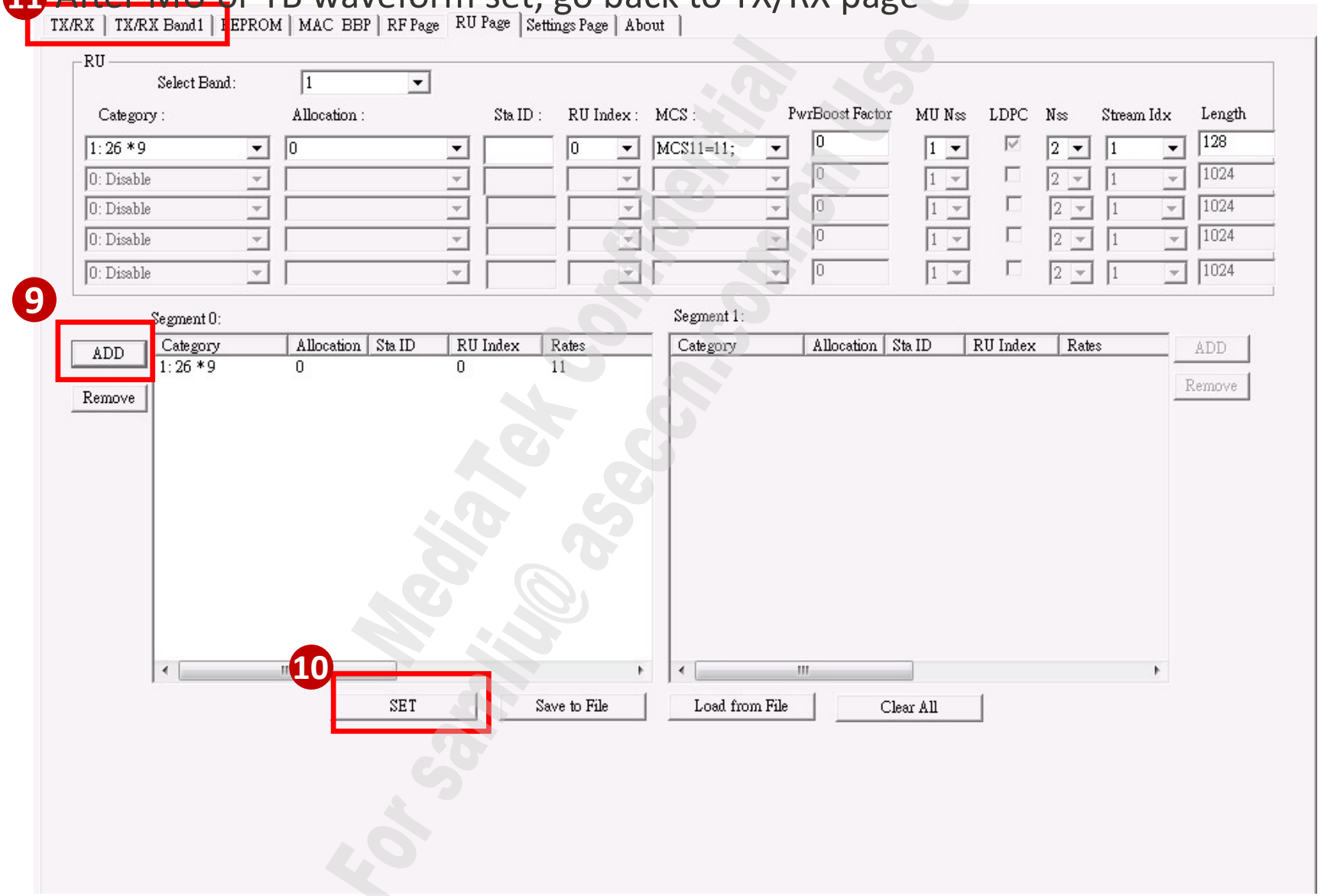
00101$y_2y_1y_0$	26	26	52		26	106			
00110$y_2y_1y_0$	52		26	26	26	106			
00111$y_2y_1y_0$	52		52		26	106			
01000$y_2y_1y_0$	106				26	26	26	26	26
01001$y_2y_1y_0$	106				26	26	26	52	
01010$y_2y_1y_0$	106				26	52		26	26
01011$y_2y_1y_0$	106				26	52		52	
0110$y_1y_0z_1z_0$	106				-	106			
01110000	52		52		-	52		52	
01110001	242-tone RU empty								
01110010	484-tone RU with zero HE-SIG-B User Specific field in the corresponding HE-SIG-B Content Channel								
01110011	996-tone RU with zero HE-SIG-B User Specific field in the corresponding HE-SIG-B Content Channel								
10$y_2y_1y_0z_2z_1z_0$	106				26	106			
11000$y_2y_1y_0$	242								
11001$y_2y_1y_0$	484								
11010$y_2y_1y_0$	996								
11011$y_2y_1y_0$	2*996								

7 RU Index

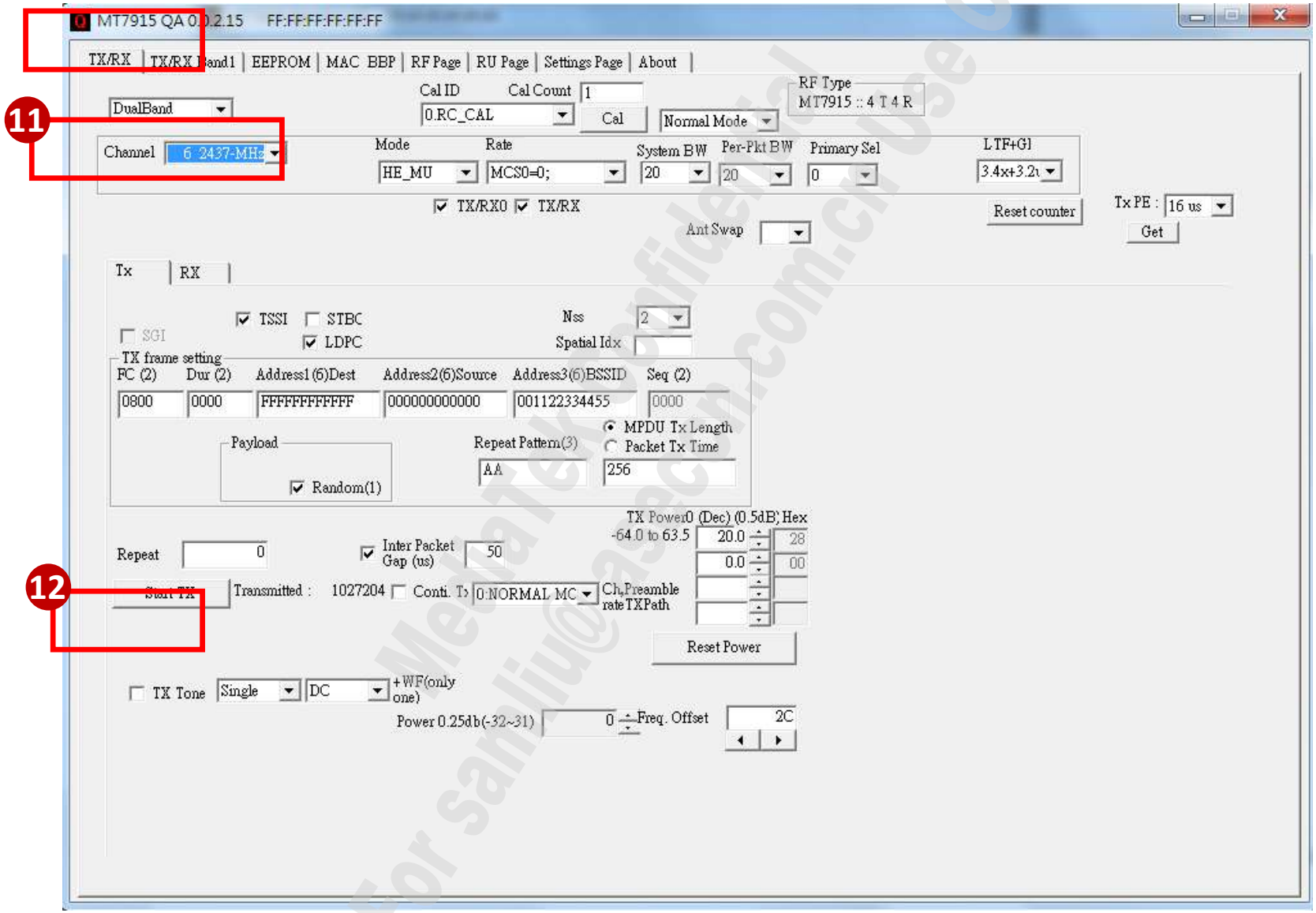


RU Page (HE-MU/ HE-TB)

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



TX- HE MU



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
26	32	64	128	128	128	128	128	128	128	128	128	128
52	64	128	256	256	256	256	256	256	256	256	256	256
106	128	256	512	512	512	512	512	512	512	512	512	512
242	256	512	1024	1024	1024	1024	1024	1024	1024	1024	1024	1024
484	512	1024	2048	2048	2048	2048	2048	2048	2048	2048	2048	2048
996	1024	2048	4096	4096	4096	4096	4096	4096	4096	4096	4096	4096
996*2	2048	4096	8192	8192	8192	8192	8192	8192	8192	8192	8192	8192

For NSS=3/4

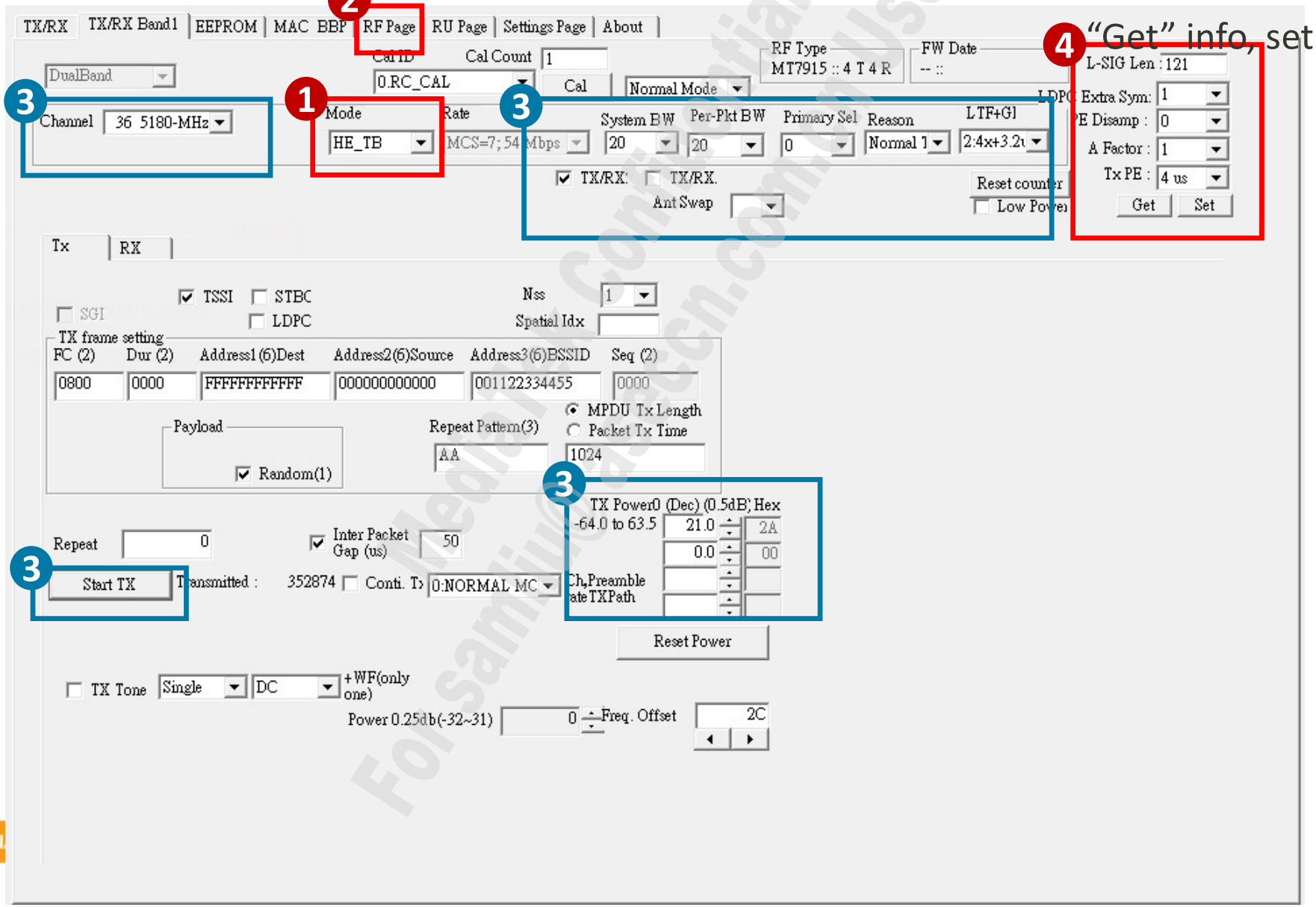
PSDU Length : long

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

TX HE-TB

< 2 steps refer to HE-MU>

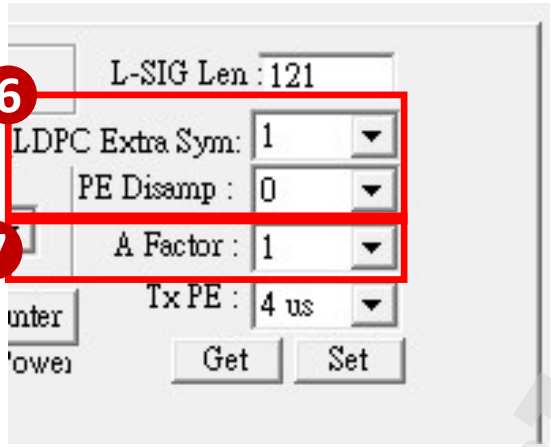
< 3 steps refer to TX a/b/g/n/ac>



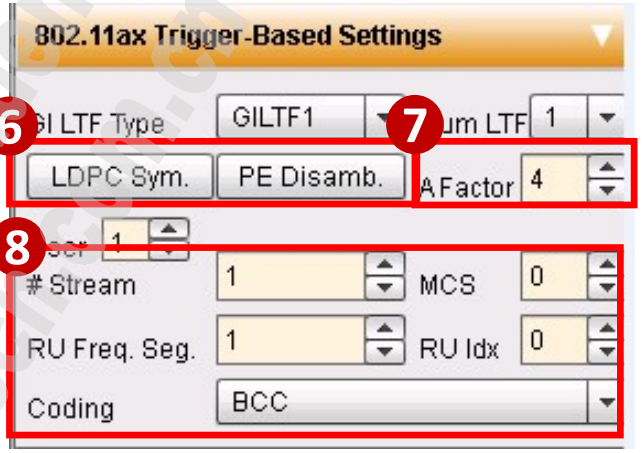
"Get" info, set on VSA

HT-TB M2W Settings

QA Tool



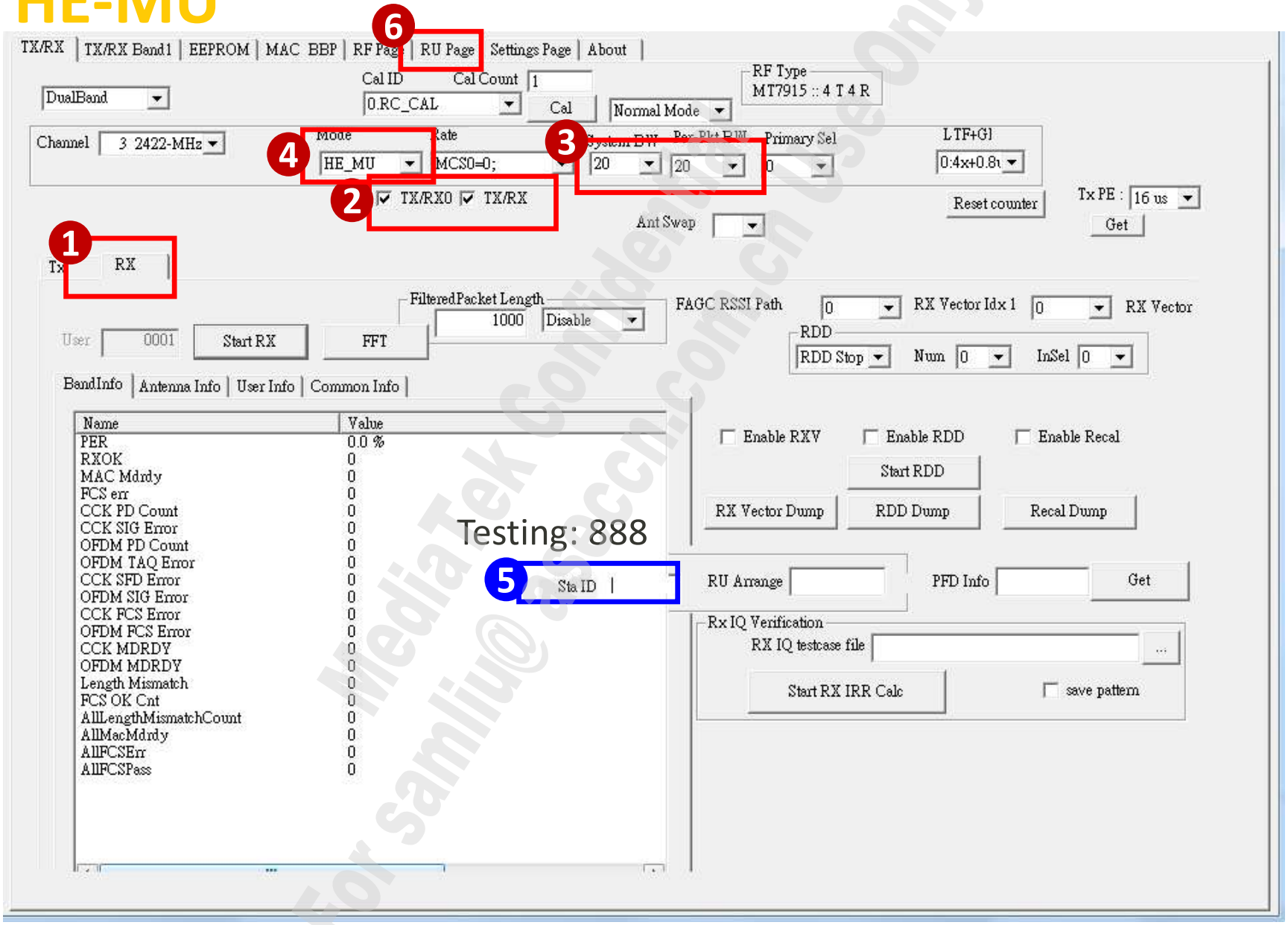
M2W



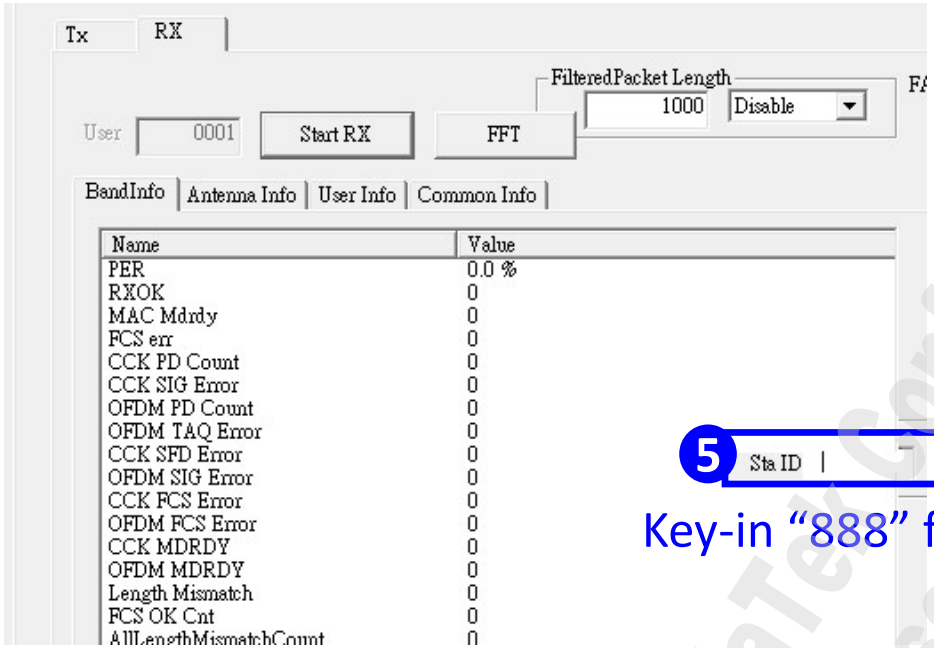
6 LDPC Extra Sym/PE Disamp:1/0 ➔ choose or not choose on M2W

7 A Factor:0 ➔ A Factor:4
A Factor:1,2,3 ➔ A Factor:1,2,3

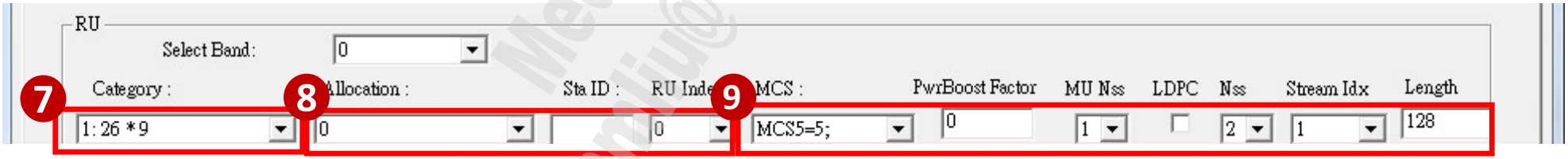
RX HE-MU



RU Page (HE-MU/ HE-TB)



Key-in “888” for identifying wanted Station ID



RX HE-TB

- **From 802.11ax:**

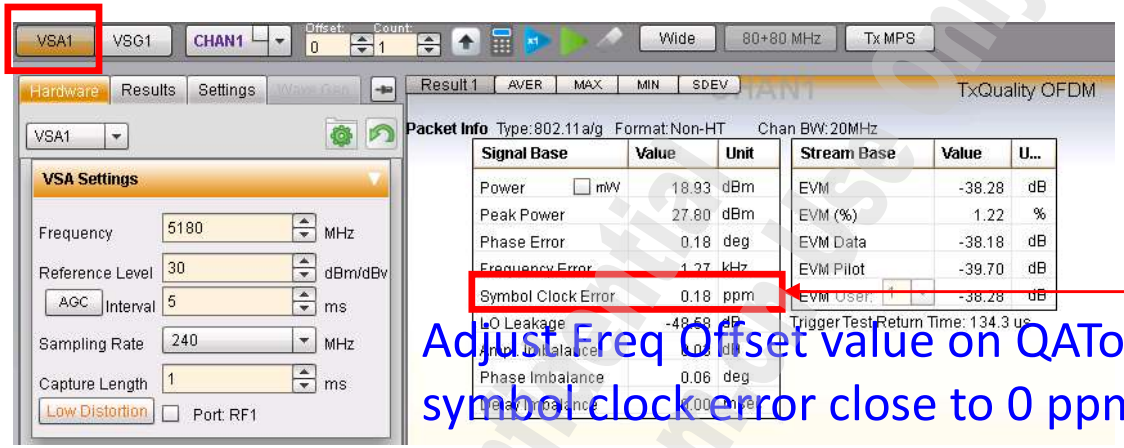
> **A STA that transmits an HE TB PPDU compensates for carrier frequency offset (CFO) error and symbol clock error. After compensation, the absolute value of residual CFO error with respect to the PPDU carrying the soliciting Trigger frame shall not exceed 350 Hz for data subcarriers when measured as 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

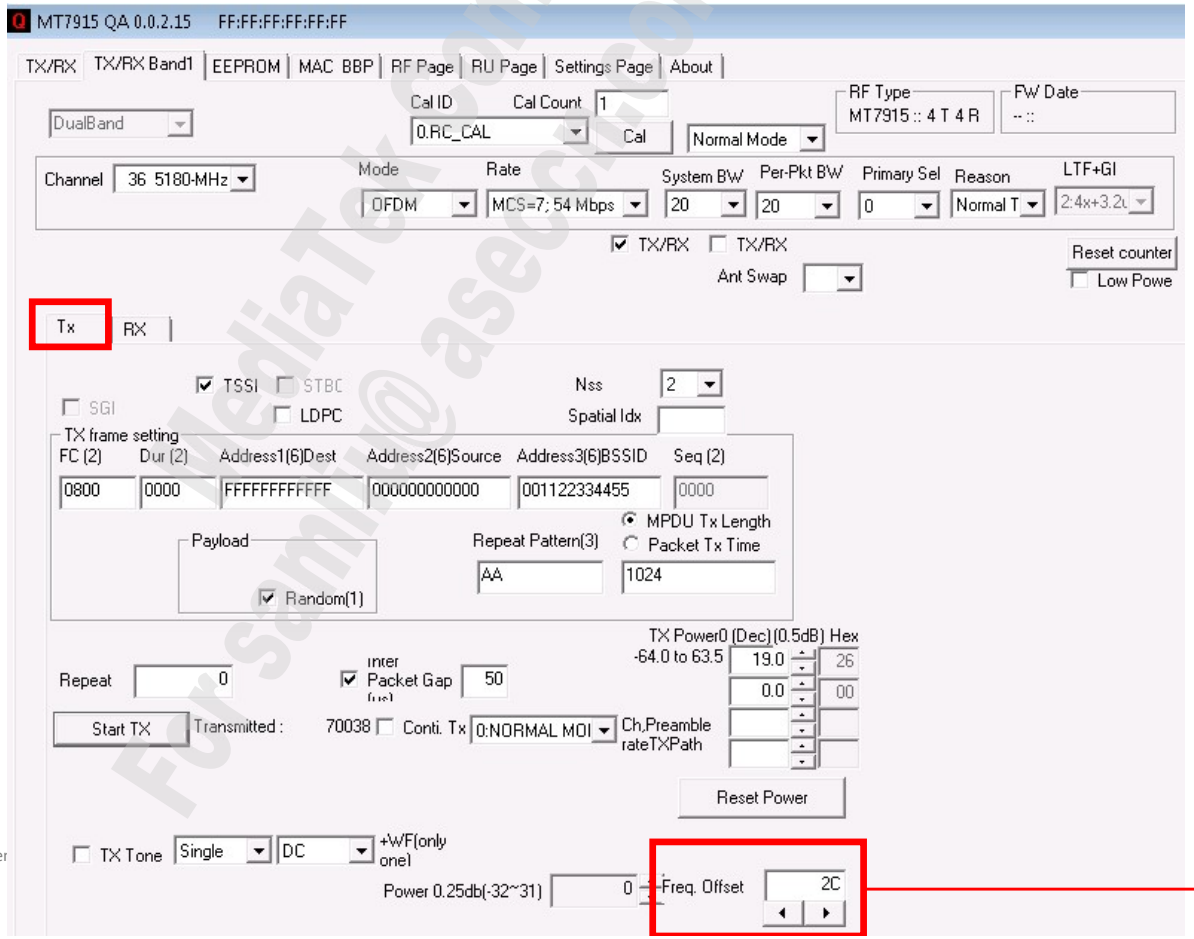
❶ Use TX and VSA to check rough frequency offset

M2W

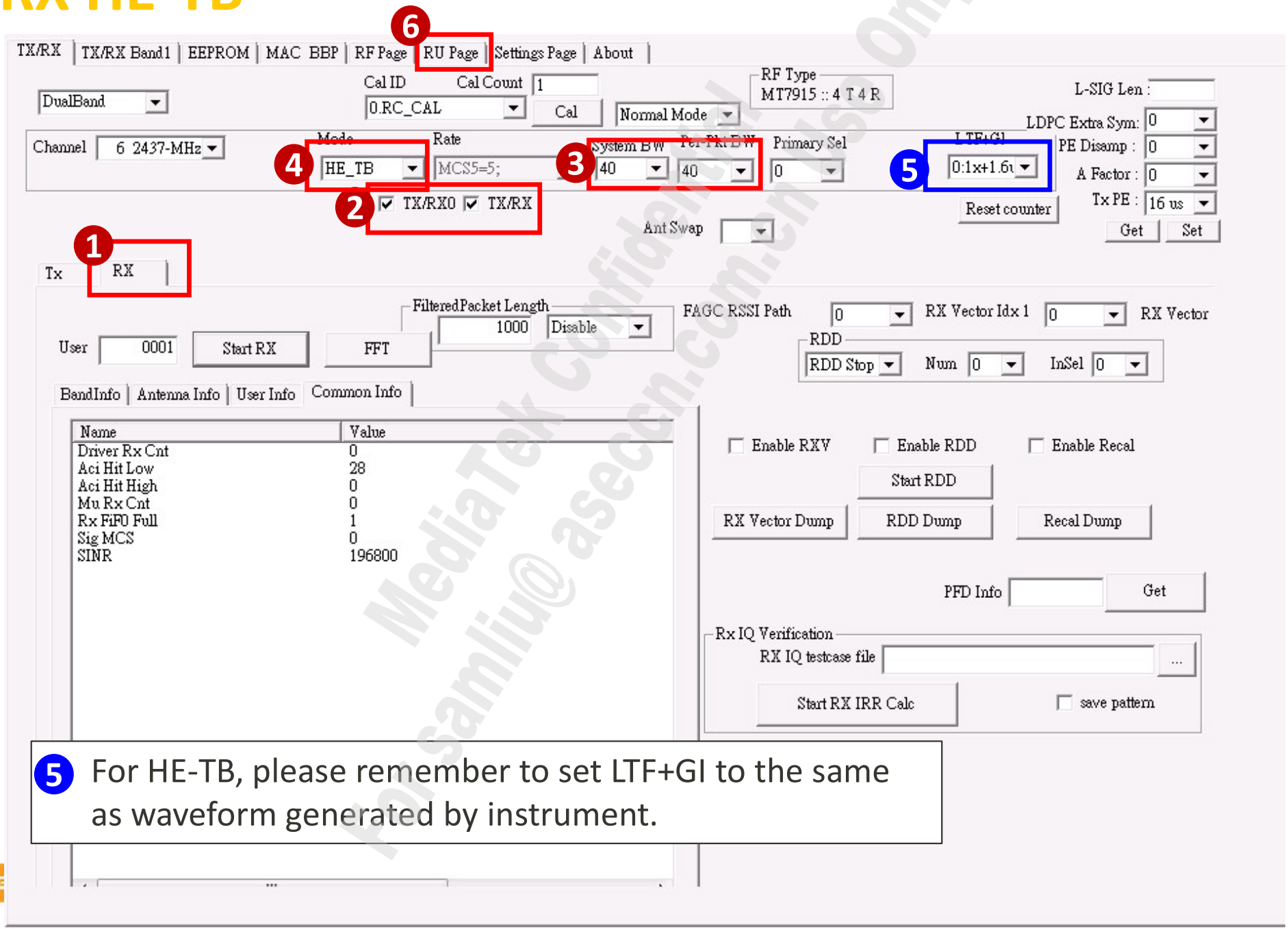


Adjust Freq Offset value on QATool until symbol clock error close to 0 ppm

QATool

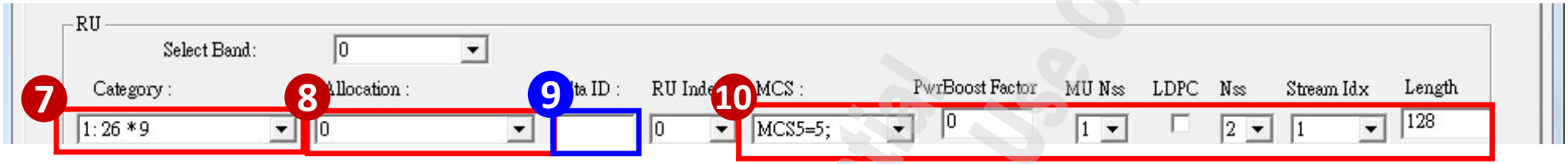


RX HE-TB



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

RU Page (HE-MU/ HE-TB)



9 Station ID

- Starting from 100, 101, 102,….

RX HE-TB

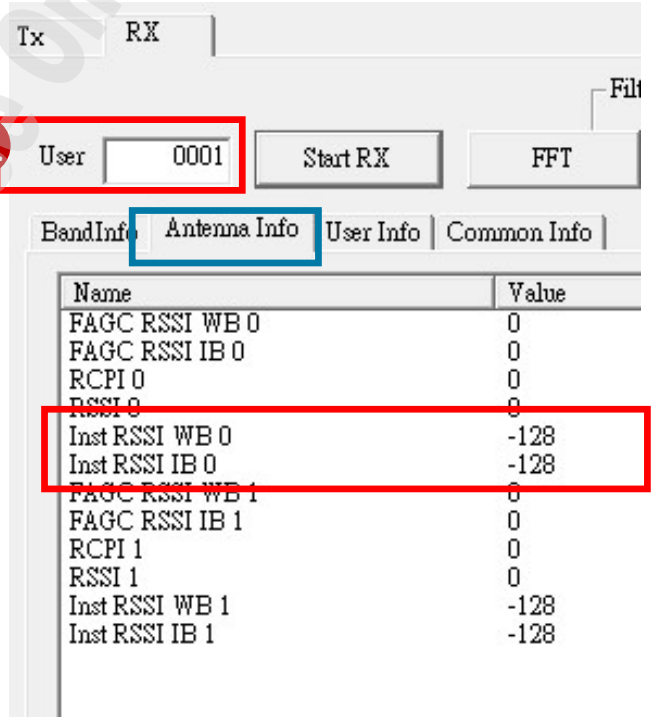
11 User number

User number limit:

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

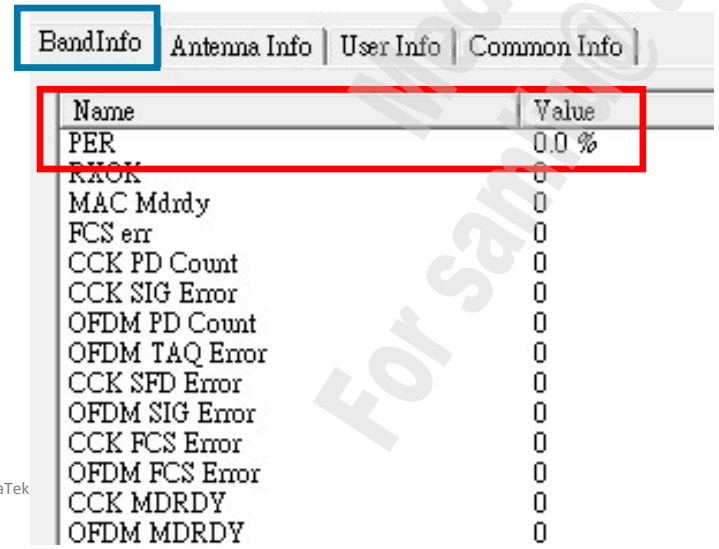
For example

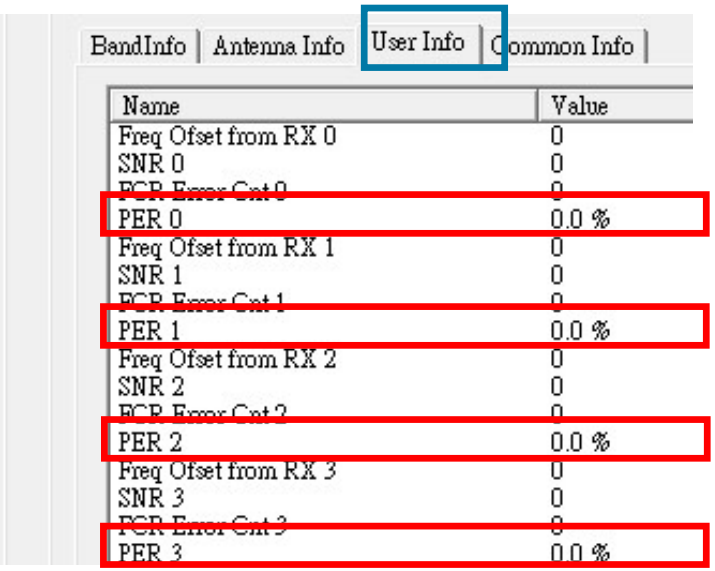
- user #1 only: 0000 0000 0000 0001 ➔ 0001
- user #2 only: 0000 0000 0000 0010 ➔ 0002
- 16 users: 1111 1111 1111 1111 ➔ FFFF



Band Info/User Info

- "Band Info" ➔average PER (MAC)
- "User Info" ➔all users' PER separately (PHY)

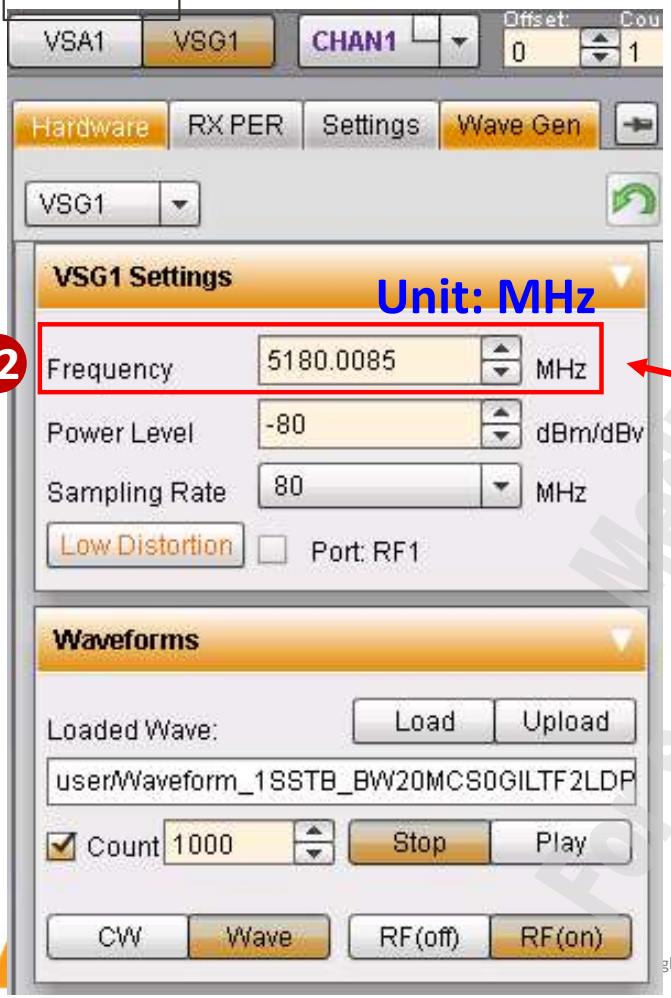




RX HE-TB, M2W Setup

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

M2W



QATool