802.11b Modulation

Lowest channel



Middle channel

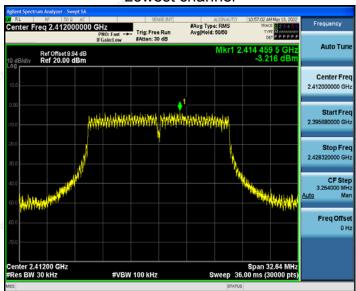


Highest channel

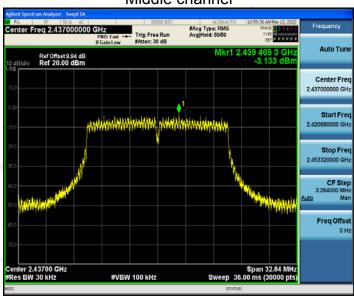


802.11g Modulation

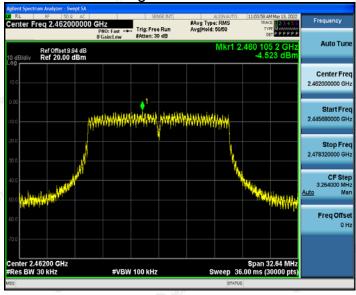
Lowest channel



Middle channel



Highest channel

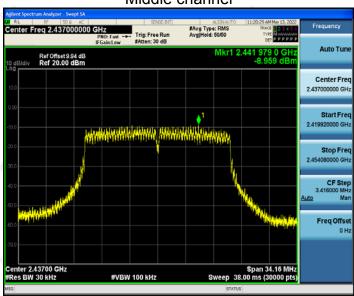


802.11n (HT20) Modulation

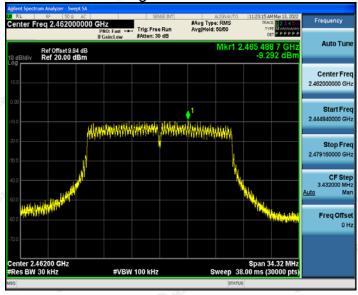
Lowest channel



Middle channel

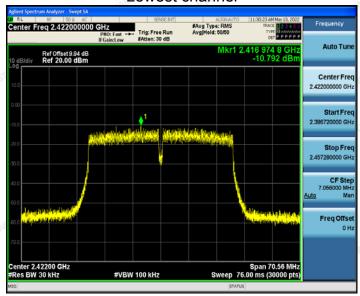


Highest channel

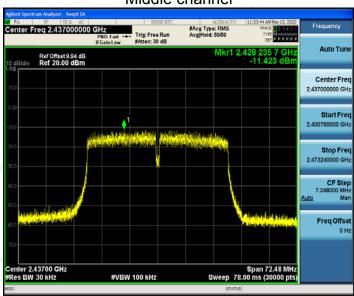


802.11n (HT40) Modulation

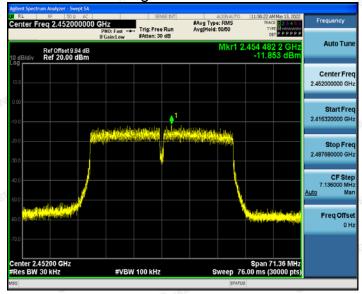
Lowest channel



Middle channel



Highest channel

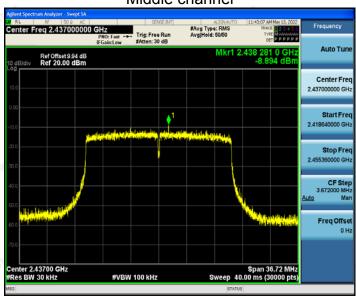


802.11ax (HT20) Modulation

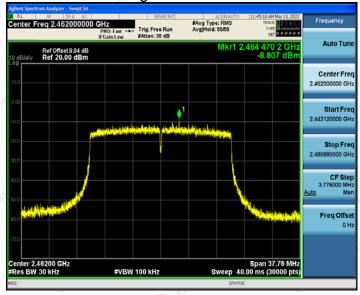
Lowest channel



Middle channel



Highest channel

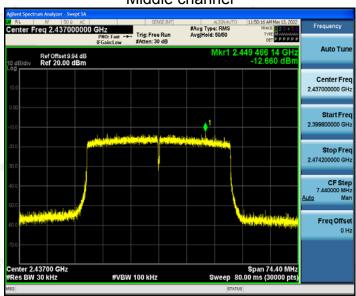


802.11ax (HT40) Modulation

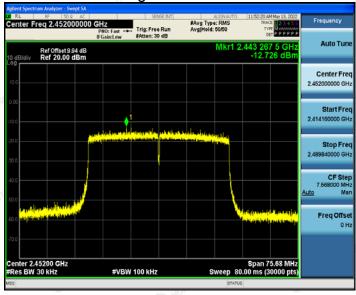
Lowest channel



Middle channel



Highest channel



The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at http://www.cer-mark.com.



For antenna port 2

	"I Pir	
Channel	Result (dBm/30kHz)	Result (dBm/3kHz)
Lowest	-1.49	-11.49
Middle	-1.39	-11.39
Highest	0.05	-9.95
Lowest	-4.91	-14.91
Middle	-5.06	-15.06
Highest	-6.92	-16.92
Lowest	-6.14	-16.14
Middle	-5.19	-15.19
Highest	-4.79	-14.79
Lowest	-10.8	-20.8
Middle	-11.04	-21.04
Highest	-9.52	-19.52
Lowest	-6.74	-16.74
Middle	-6.68	-16.68
Highest	-7.9	-17.9
Lowest	-9.92	-19.92
Middle	-9.67	-19.67
Highest	-10.27	-20.27
3kHz)= PSD test	result (dBm/30kHz)-10	
gain-6dBi)=8dBm): 	
	PASS	
	Lowest Middle Highest Lowest	Lowest -1.49 Middle -1.39 Highest 0.05 Lowest -4.91 Middle -5.06 Highest -6.92 Lowest -6.14 Middle -5.19 Highest -4.79 Lowest -10.8 Middle -11.04 Highest -9.52 Lowest -6.74 Middle -6.68 Highest -7.9 Lowest -9.92 Middle -9.67 Highest -9.67 Highest -10.27 3kHz)= PSD test result (dBm/30kHz)-10 gain-6dBi)=8dBm

Test plots as follows:

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannont be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at http://www.cer-mark.com.

TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com

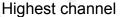
802.11b Modulation

Lowest channel



Middle channel

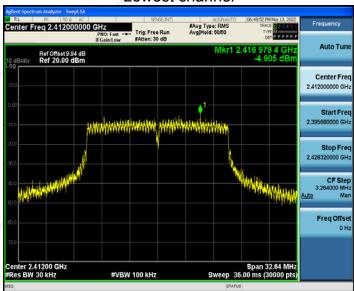




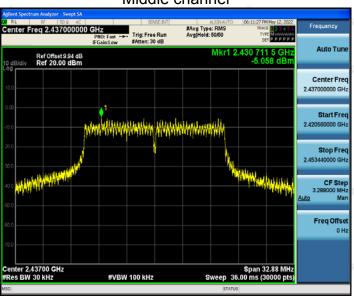


802.11g Modulation

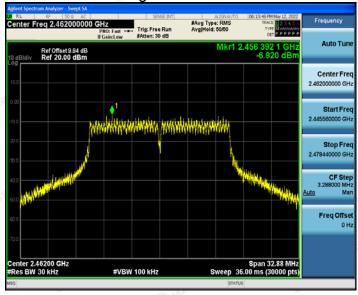
Lowest channel



Middle channel

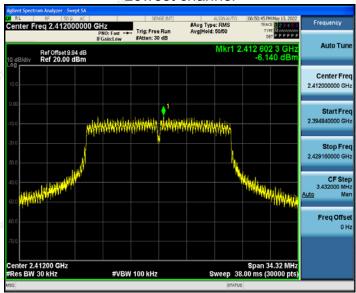


Highest channel

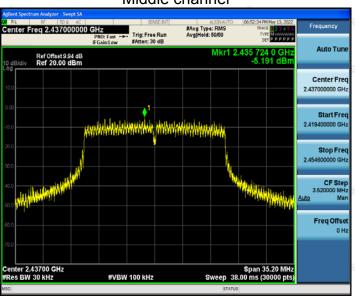


802.11n (HT20) Modulation

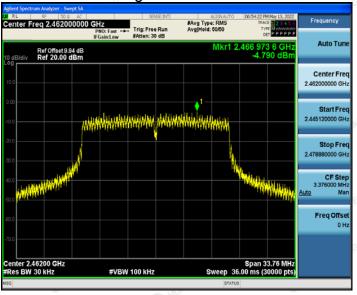
Lowest channel



Middle channel

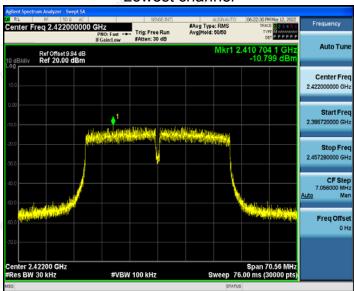


Highest channel

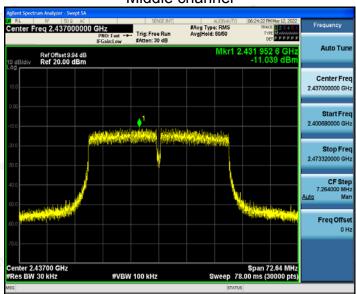


802.11n (HT40) Modulation

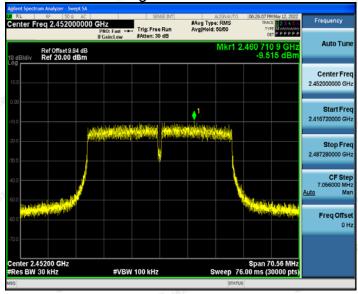
Lowest channel



Middle channel

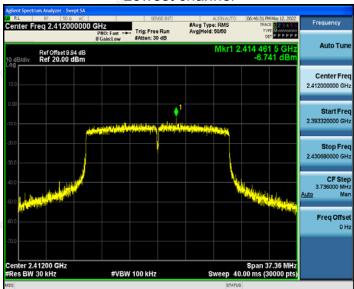


Highest channel

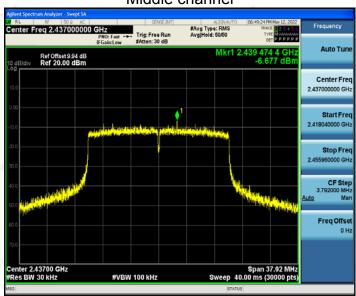


802.11ax (HT20) Modulation

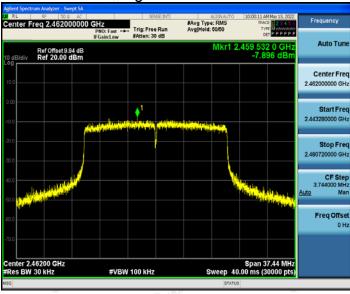
Lowest channel



Middle channel



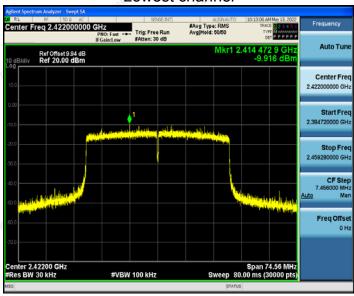
Highest channel



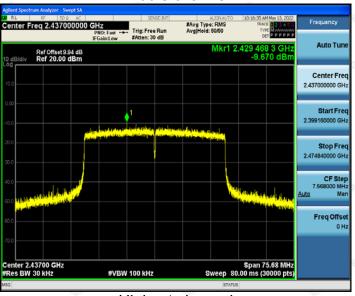
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannon be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at http://www.cer-mark.com.

802.11ax (HT40) Modulation

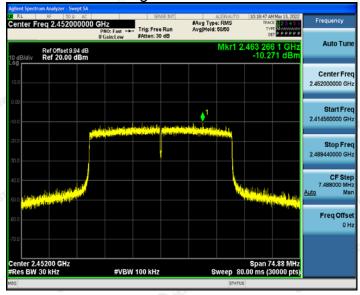
Lowest channel



Middle channel



Highest channel





For MIMO antenna port 1+antenna port 2 **Power Density** Limit **Frequency** Result (dBm) (dBm) TX 802.11n/HT20 Mode 2412 MHz -15.22 7.99 **PASS** 7.99 **PASS** 2437 MHz -14.04**PASS** 2462 MHz -14.16 7.99 TX 802.11n/HT40 Mode 2422 MHz -15.957.99 **PASS** 2437 MHz -16.58 **PASS** 7.99 2452 MHz -17.54 7.99 **PASS** TX 802.11ax/HT20 Mode -14.02 2412 MHz 7.99 **PASS** 2437 MHz 7.99 -15.09 **PASS** -16.06 7.99 2462 MHz **PASS** TX 802.11ax/HT40 Mode 2422 MHz -18.02 7.99 **PASS** 2437 MHz 7.99 **PASS** -18.19 2452 MHz -17.72 **PASS**

Note: 1 According to KDB 662911, Result power = 10log(10^{(ant1/10}+10^(ant2/10)). 2 Result unit: W, The end result is converted to units of dBm. limit=8dBm-(direction gain-6dBi)=7.99dBm

Note: This product supports antenna 1 and antenna 2 launch, but only support 802.11 n/802.11ax for MIMO mode, not support 802.11 b and 802.11 g for MIMO mode.



4.5. CONDUCTED BAND EDGE AND SPURIOUS EMISSION MEASUREMENT

4.5.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (d)				
Test Method:	KDB558074				
Limit:	In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).				
Test Setup:	Spectrum Analyzer EUT				
Test Mode:	Transmitting mode with modulation				
Test Procedure:	 The testing follows FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d). Measure and record the results in the test report. The RF fundamental frequency should be excluded against the limit line in the operating frequency band. 				
	PASS				

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannon be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at http://www.cer-mark.com.

TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com



4.5.2. Test Instruments

WENT A		All In the	DESARY .	All Andrews	DICTION .		
RF Test Room							
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due		
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 18, 2022	Feb. 17, 2023		
Signal generator	Agilent	N5183A	HKE-071	Feb. 18, 2022	Feb. 17, 2023		
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Feb. 18, 2022	Feb. 17, 2023		
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 18, 2022	Feb. 17, 2023		

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannont be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at http://www.cer-mark.com.

TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com



4.5.3. Test Data

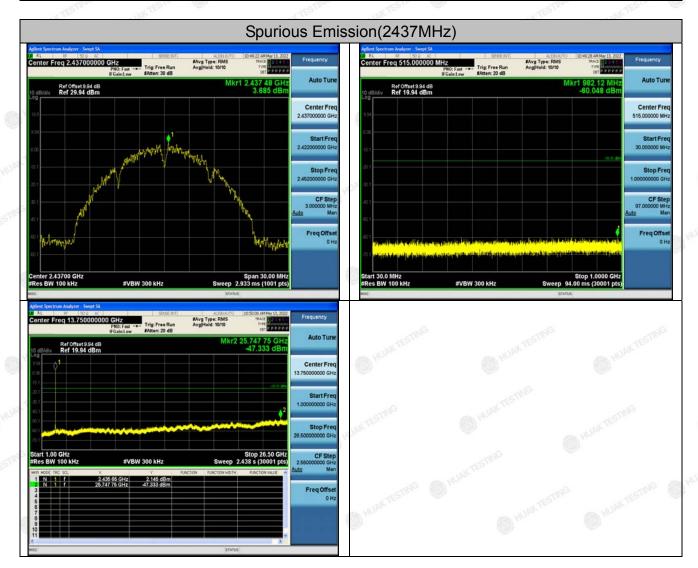
802.11b Modulation **Highest Channel Lowest Channel** Band Edge Band Edge #Avg Type: RMS AvgiHold: 300/30 #Avg Type: RM: Avg|Hold: 300/3 Ref Offset 9.94 dB Ref 20.00 dBm Center Fr CFS Freq Offs Spurious Emission(2412MHz) Spurious Emission(2462MHz) Ref Offset 9.94 dB Ref 29.94 dBm Ref Offset 9.94 dB Ref 29.94 dBm er Freq 515.000000 MHz er Freq 515.000000 MH: 1 877.91 N -60.097 d Ref Offset 9.94 dB Ref 19.94 dBm Ref Offset 9.94 dB Ref 19.94 dBm

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannon be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at http://www.cer-mark.com.

TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com



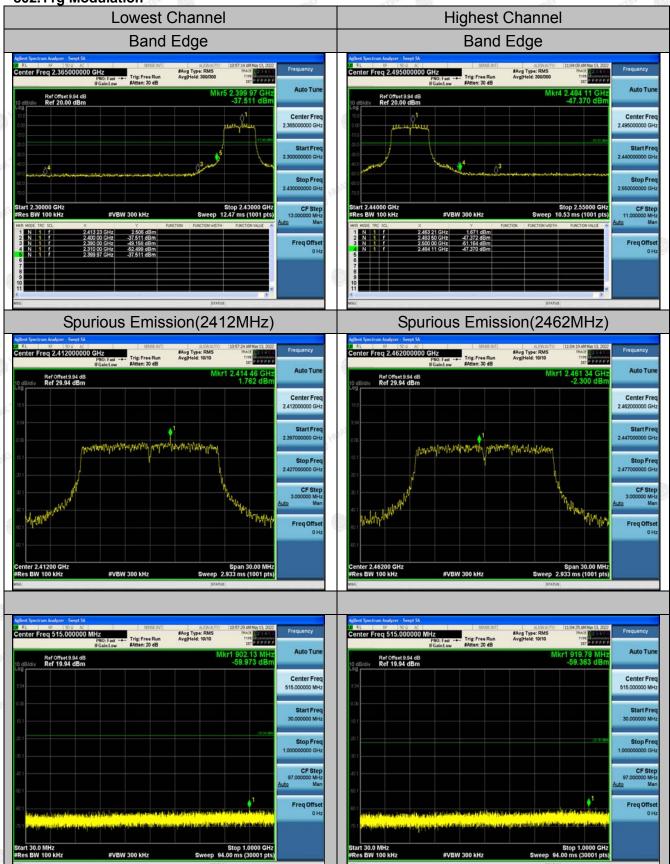




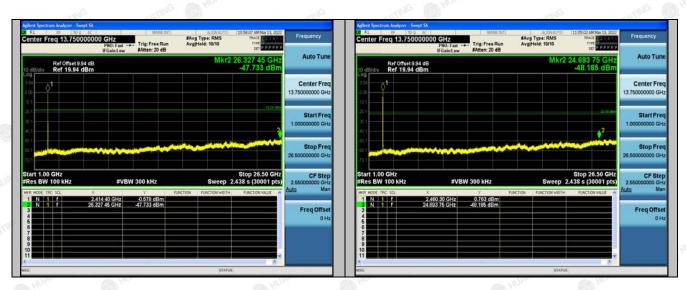
The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannont be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at http://www.cer-mark.com.

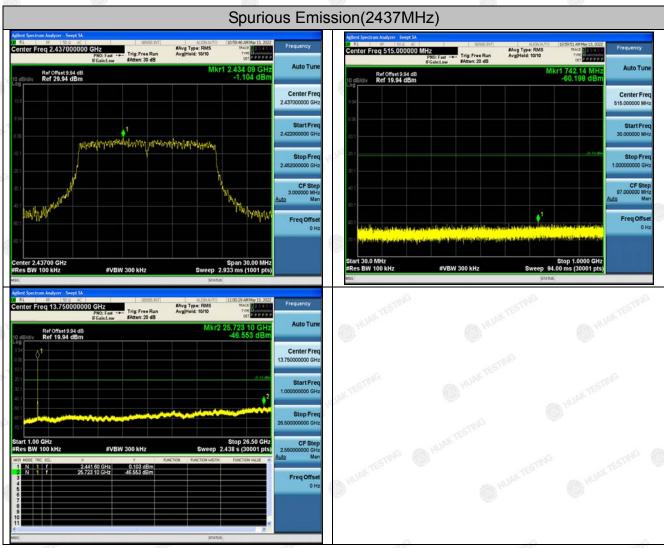
TEL: +86-755 2302 9901 FAX: +86-755 2302 9901 E-mail: service@cer-mark.com

802.11g Modulation

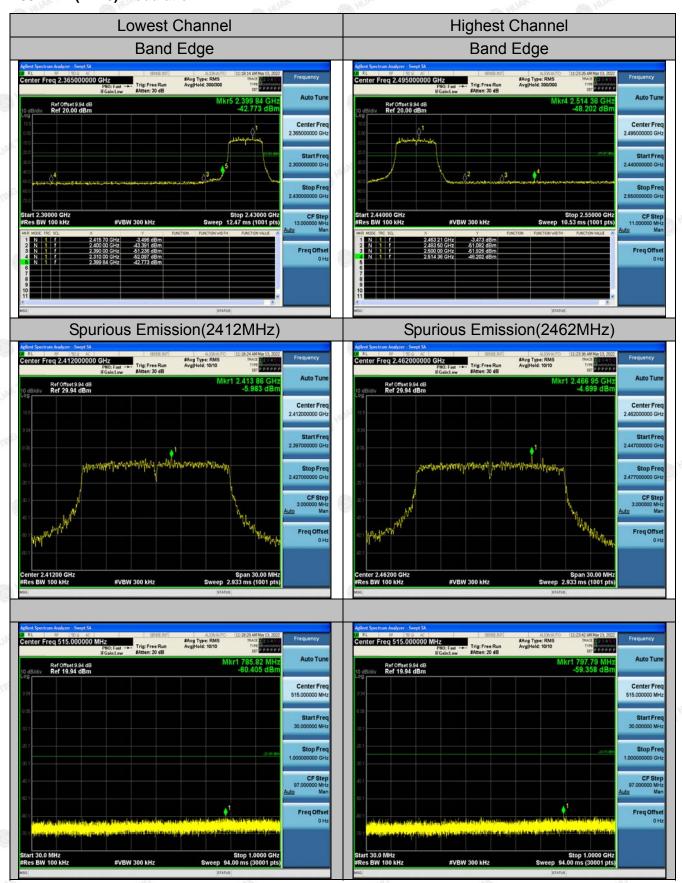


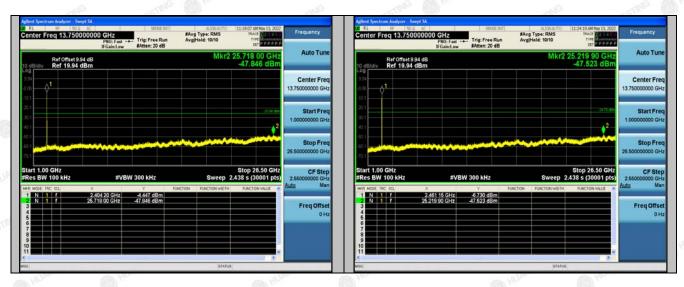


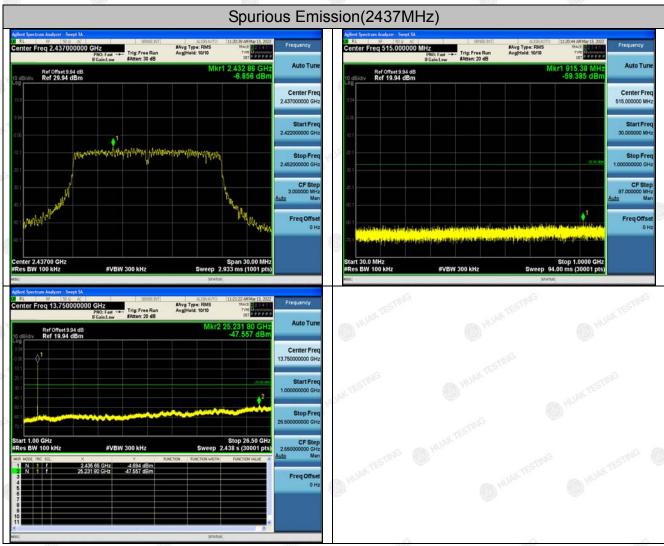




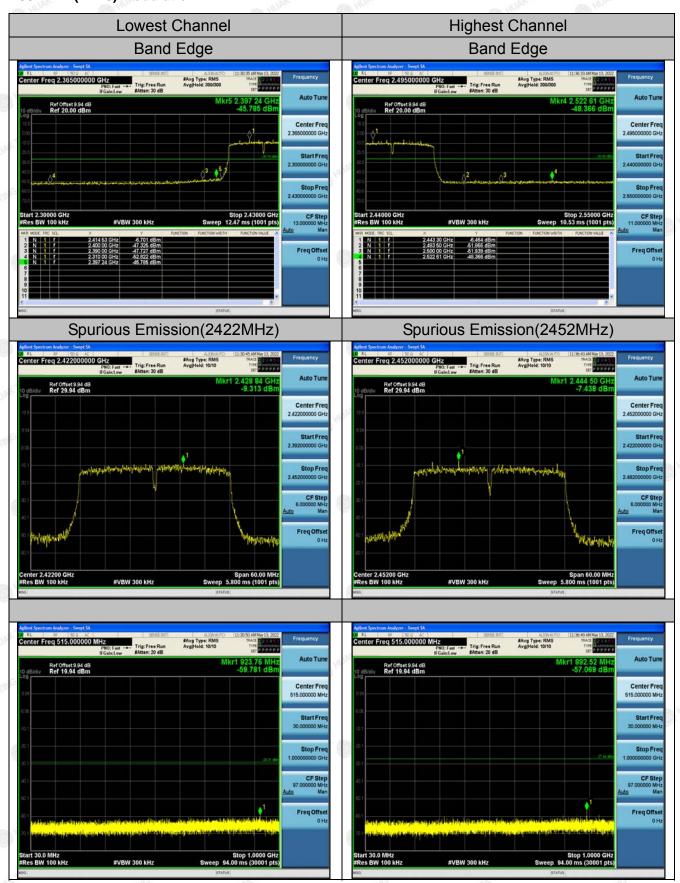
802.11n (HT20) Modulation



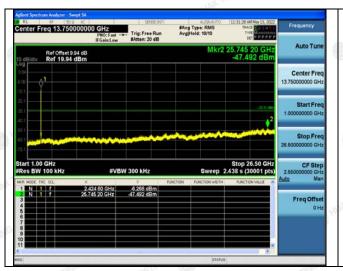




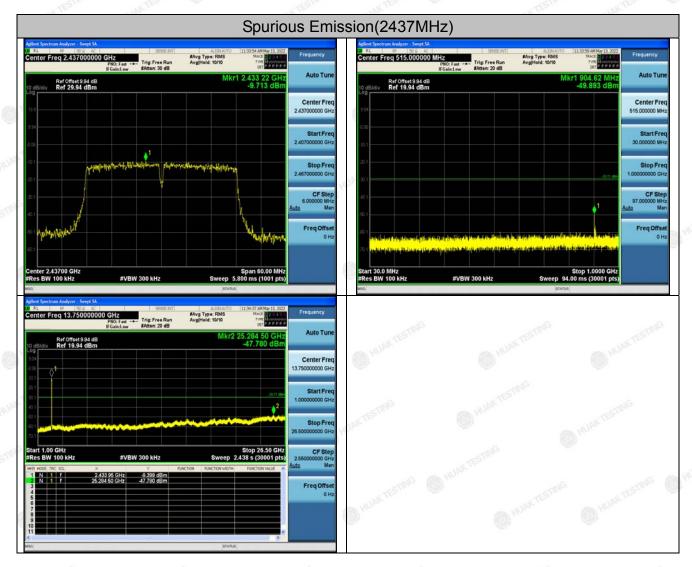
802.11n (HT40) Modulation



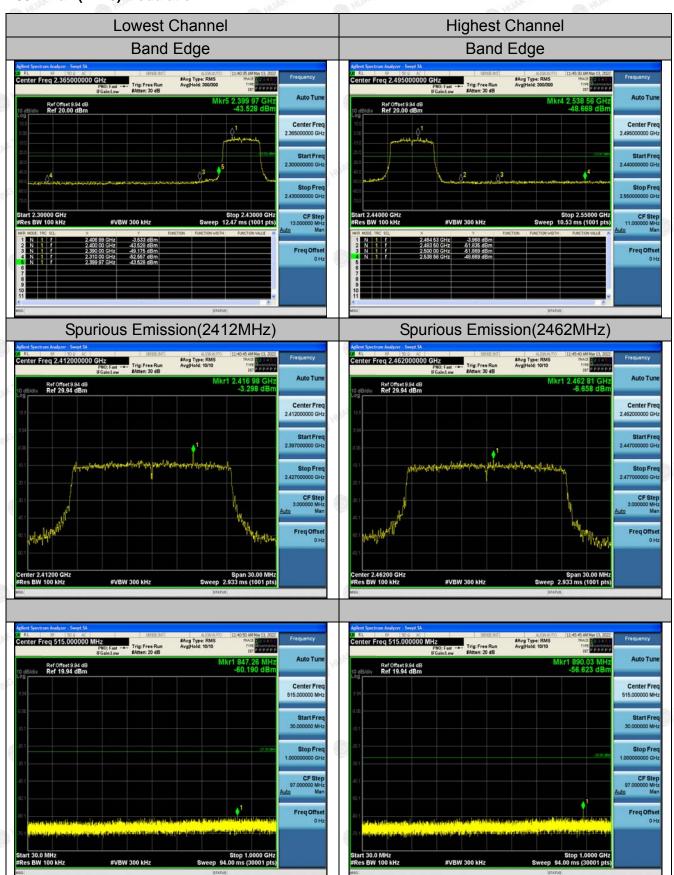


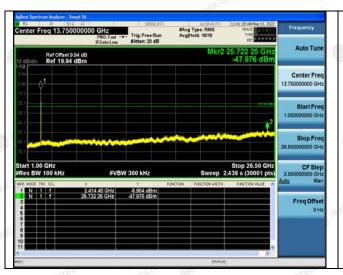


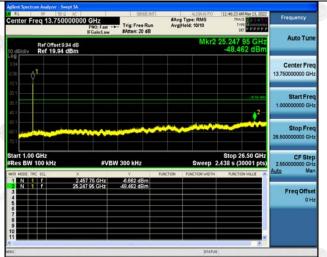


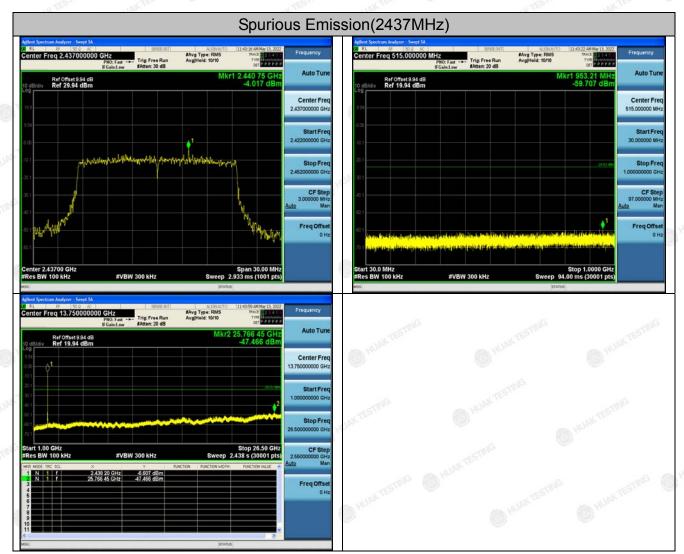


802.11ax (HT20) Modulation









The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAK, this document cannont be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at http://www.cer-mark.com.

MOATO