

Report No.: HK2011123502-2E

# FCC TEST REPORT

### Test report On Behalf of GROUPSFIT For 14.1 INCH NEO Notebook Model No.: WWNEO14C4BK64-P, Please refer to page 7 for Serial models

### FCC ID: 2AQOO-N14AC464P

Prepared for : GROUPSFIT 80/84 route de la Liberation PONTAULT COMBAULT, 77340 France

Prepared By : Shenzhen HUAK Testing Technology Co., Ltd. 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

 Date of Test:
 Nov. 12, 2020 ~Nov. 25, 2020

 Date of Report:
 Nov. 25, 2020

 Report Number:
 HK2011123502-2E



## **TEST RESULT CERTIFICATION**

Applicant's name	GROUPSFIT
Address	80/84 route de la Liberation PONTAULT COMBAULT, 77340 France
Manufacture's Name	Shenzhen Orango Technology Co.,Ltd
Address	5th-6th floor,Building B6,Hengfeng Industrial Park,Hezhou,Bao'an,Shenzhen,China
Product description	
Trade Mark:	THOMSON
Product name:	14.1 INCH NEO Notebook
Model and/or type reference .:	WWNEO14C4BK64-P, Please refer to page 7 for Serial models
Standards	FCC Rules and Regulations Part 15 Subpart C Section 15.247 ANSI C63.10: 2013

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Date of Test	
Date (s) of performance of tests:	Nov. 12, 2020 ~Nov. 25, 2020
Date of Issue	Nov. 25, 2020
Test Result	Pass

:

2

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## \*\* Modifited History \*\*

Revison	Description	Issued Data	Remark
Revsion 1.0	Initial Test Report Release	Nov. 25, 2020	Jason Zhou



## 1. Test Result Summary

## **1.1. TEST PROCEDURES AND RESULTS**

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203/§15.247 (c)	PASS
AC Power Line Conducted Emission	§15.207	PASS
Conducted Peak Output Power	§15.247 (b)(3)	PASS
6dB Emission Bandwidth	§15.247 (a)(2)	PASS
Power Spectral Density	§15.247 (e)	PASS
Band Edge	1§5.247(d)	PASS
Spurious Emission	§15.205/§15.209	PASS

#### Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

## **1.2. TEST FACILITY**

Test Firm : Shenzhen HUAK Testing Technology Co., Ltd.

Address 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China



## **1.3. Measurement Uncertainty**

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	±2.71dB
2	RF power, conducted	±0.37dB
3	Spurious emissions, conducted ±0.11	
4	All emissions, radiated(<1G)	±3.90dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%



## 2. EUT Description

## 2.1. GENERAL DESCRIPTION OF EUT

Equipment	14.1 INCH NEO Notebook	
Model Name	WWNEO14C4BK64-P	
Serial Model	WWNEO14C4WH64-P, WWNEO14C4PK64-P, WWNEO14C4SL64-P, WWNEO14C4BL64-P, WWNEO14A4BK64-P, WWNEO14A4WH64-P, WWNEO14A4PK64-P, WWNEO14A4SL64-P, WWNEO14A4BL64-P	
Model Difference	All model's the function, software and electric circuit are the same, only with a product model named different. Test sample model: WWNEO14C4BK64-P.	
Trade Mark	THOMSON	
FCC ID	2AQOO-N14AC464P	
Antenna Type	Internal Antenna	
Antenna Gain	Antenna 1:1.64dBi Antenna 2:1.64dBi MIMO: 4.65dBi	
Operation frequency	802.11b/g/n 20:2412~2462 MHz 802.11n 40: 2422~2452MHz	
Number of Channels	802.11b/g/n20: 11CH 802.11n 40: 7CH	
Modulation Type	CCK/OFDM/DBPSK/DAPSK	
Power Source	DC 12V From Adapter or DC 7.6V From Battery	
Power Rating	DC 12V From Adapter or DC 7.6V From Battery	

Note: The EUT incorporates a MIMO function. Physically, it provides two completed transmitters and receivers(2T2R), two transmit signals are completely correlated, then, Direction gain=GANT + Array Gain(Array Gain=10 log(2) dB for power spectral density; Array Gain=0 for power measurement).



## 2.2. Carrier Frequency of Channels

	Channel List for 802.11b/802.11g/802.11n (HT20)						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

	Channel List For 802.11n (HT40)						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
		04	2427	07	2442		
		05	2432	08	2447		
03	2422	06	2437	09	2452		

#### Note:

In section 15.31(*m*), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

## 2.3. Operation of EUT during testing

Operating Mode

#### The mode is used: Transmitting mode for 802.11b/802.11g/802.11n (HT20)

Low Channel: 2412MHz Middle Channel: 2437MHz High Channel: 2462MHz

#### The mode is used: Transmitting mode for 802.11n (HT40)

Low Channel: 2422MHz Middle Channel: 2437MHz High Channel: 2452MHz



## 2.4. DESCRIPTION OF TEST SETUP

Operation of EUT during conducted testing and radiation below 1GHz testing:

Adapter

AC Plug

	EUT

Display

Operation of EUT during radiation above 1GHz testing:

EUT	
EOI	

Adapter information Model:JHD-AP024U-120200BA-A Input: 100-240V, 50-60Hz, 0.55A Output: 12V, 2000mA

Display information Model: SE2417HG Input: 100-240V, 50/60Hz, 1.6A

The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.



## 3. Genera Information

## 3.1. Test environment and mode

Operating Environment:				
Temperature:	25.0 °C			
Humidity:	56 % RH			
Atmospheric Pressure:	1010 mbar			
Test Mode:				
Engineering mode: Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 98.46%)				
The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground				

plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. For the full battery state and The output power to the maximum state.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(H20)	6.5Mbps
802.11n(H40)	13.5Mbps

#### **Final Test Mode:**

Operation mode:	Keep the EUT in continuous transmitting
	with modulation

1. For WIFI function, the engineering test program was provided and enabled to make EUT continuous transmit/receive.

2.According to ANSI C63.10 standards, the test results are both the "worst case" and "worst setup" 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20), 13.5Mbps for 802.11(H40). Duty cycle setting during the transmission is 98.5% with maximum power setting for all modulations.



### 3.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

Note:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
- 3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



## 4. Test Results and Measurement Data

## 4.1. Conducted Emission

## 4.1.1. Test Specification

Test Requirement:	FCC Part15 C Section	15.207			
Test Method:	ANSI C63.10:2013				
Frequency Range:	150 kHz to 30 MHz				
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto				
Limits:	Frequency range (MHz)         Limit (dBuV)           0.15-0.5         66 to 56*         56 to 46*           0.5-5         56         46           5-30         60         50				
Test Setup:	Reference Plane 40cm 80cm LISN Filter AC power E.U.T AC power Filter AC power EMI Receiver Remark: E.U.T Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m				
Test Mode:	Charging + transmitting with modulation				
Test Procedure:	<ol> <li>The E.U.T is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>Both sides of A.C. line are checked for maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</li> </ol>				
Test Result:	PASS				



### 4.1.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)							
Equipment Manufacturer Model Serial Number Calibration Due							
Receiver	R&S	ESCI 7	HKE-010	Jun. 17, 2021			
LISN	R&S	ENV216	HKE-002	Jun. 17, 2021			
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A			

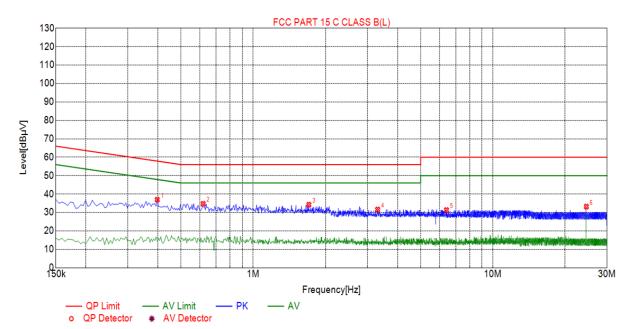
**Note:** The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).



#### 4.1.3. Test data

All the test modes completed for test. only the worst result was reported as below:

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)

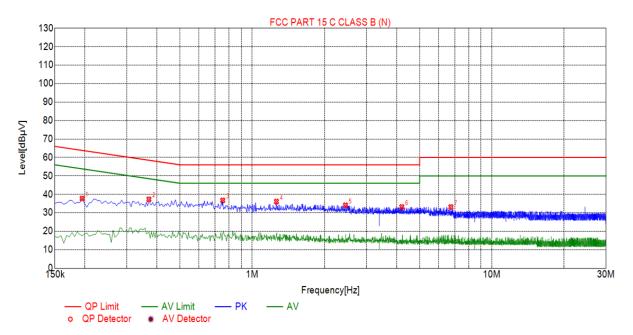


Sus	Suspected List							
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре
1	0.3975	36.95	20.04	57.91	20.96	16.91	PK	L
2	0.6180	34.70	20.05	56.00	21.30	14.65	PK	L
3	1.7070	34.23	20.13	56.00	21.77	14.10	PK	L
4	3.3045	31.61	20.24	56.00	24.39	11.37	PK	L
5	6.4050	31.31	20.22	60.00	28.69	11.09	PK	L
6	24.5760	33.20	20.23	60.00	26.80	12.97	PK	L

Remark: Margin = Limit – Level Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor





#### Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)

Sus	Suspected List							
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Туре
1	0.1950	37.74	20.03	63.82	26.08	17.71	PK	N
2	0.3705	37.31	20.05	58.49	21.18	17.26	PK	N
3	0.7530	36.73	20.06	56.00	19.27	16.67	PK	N
4	1.2615	36.11	20.09	56.00	19.89	16.02	PK	N
5	2.4495	34.07	20.19	56.00	21.93	13.88	PK	N
6	4.2090	33.17	20.25	56.00	22.83	12.92	PK	N
7	6.7470	33.13	20.21	60.00	26.87	12.92	PK	N

Remark: Margin = Limit – Level Correction factor = Cable lose + LISN insertion loss Level=Test receiver reading + correction factor



## 4.2. Maximum Conducted Output Power

## 4.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)			
Test Method:	KDB 558074			
Limit:	30dBm			
Test Setup:	Power meter EUT			
Test Mode:	Transmitting mode with modulation			
Test Procedure:	<ol> <li>The testing follows the Measurement Procedure of FCC KDB 558074 D01 15.247 Meas Guidance v05r02.</li> <li>The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>Measure the Peak output power and record the results in the test report.</li> </ol>			
Test Result:	PASS			

### 4.2.2. Test Instruments

RF Test Room							
Equipment Manufacturer Model Serial Number Calibrat							
Power meter	Agilent	E4419B	HKE-085	Jun. 17, 2021			
Power Sensor	Agilent	E9300A	HKE-086	Jun. 17, 2021			
RF cable	Times	1-40G	HKE-034	Jun. 17, 2021			
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Jun. 17, 2021			

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



### 4.2.3. Test Data

Test	Frequency	ut Power (dBm)	LIMIT					
Channel	(MHz)	Antenna port 1	Antenna port 2	MIMO	dBm			
TX 802.11b Mode								
CH01	2412	7.84	7.71	/	30			
CH06	2437	8.03	7.16	/	30			
CH11	2462	8.19	8.43	/	30			
TX 802.11g Mode								
CH01	2412	7.56	6.45	/	30			
CH06	2437	6.47	6.39	/	30			
CH11	2462	6.5	7.73	/	30			
		Т	X 802.11n20 Mode	•				
CH01	2412	5.05	4.2	7.66	30			
CH06	2437	4.28	3.35	6.85	30			
CH11	2462	4.22	5.25	7.78	30			
TX 802.11n40 Mode								
CH03	2422	4.29	4.39	7.35	30			
CH06	2437	3.61	3.33	6.48	30			
CH09	2452	4.4	4.48	7.45	30			
CH01 CH06 CH11 CH03 CH06 CH09	2412 2437 2462 2422 2437 2452	TX 5.05 4.28 4.22 TX 4.29 3.61 4.4	X 802.11n20 Mode 4.2 3.35 5.25 X 802.11n40 Mode 4.39 3.33 4.48	7.66 6.85 7.78 7.35 6.48	3 3 3 3 3 3 3			

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



## 4.3. Emission Bandwidth

## 4.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)			
Test Method:	KDB 558074			
Limit:	>500kHz			
Test Setup:				
	Spectrum Analyzer EUT			
Test Mode:	Transmitting mode with modulation			
Test Procedure:	<ol> <li>The testing follows FCC KDB Publication 558074 D01 15.247 Meas Guidance v05r02.</li> <li>Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz.</li> <li>Measure and record the results in the test report.</li> </ol>			
Test Result:	PASS			

### 4.3.2. Test Instruments

RF Test Room							
Equipment Manufacturer Model Serial Number Calibration Du							
Spectrum analyzer	Agilent	N9020A	HKE-048	Jun. 17, 2021			
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Jun. 17, 2021			
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Jun. 17, 2021			

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



### 4.3.3. Test data

For antenna port 1				
Test shannel	6dB Emission Bandwidth (MHz)			
Test channel	802.11b	802.11g	802.11n(H20)	802.11n(H40)
Lowest	9.090	16.38	17.67	36.38
Middle	9.076	16.42	17.65	36.43
Highest	9.071	16.38	17.66	36.39
Limit:	>500k			
Test Result:	PASS			

Test plots as follows:



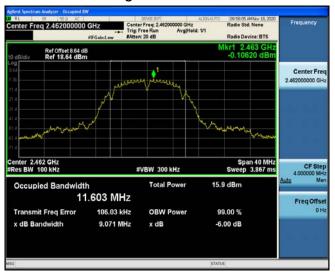
#### 802.11b Modulation

#### Lowest channel



#### Middle channel







#### 802.11g Modulation

Lowest channel



#### Middle channel





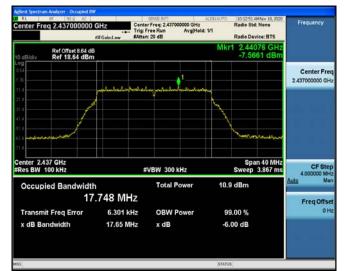


#### 802.11n (HT20) Modulation

10:10:05 AMNov 18, 20 Radio Std: None Frequency enter Freq 2.412000000 GHz Center Free 2.412000000 GHz Trig: Free Run Avg[Hold: 1/1 #Atten: 20 dB Radio Device: BTS 2.41576 GH -7.5753 dB Ref Offset 8.64 dB Ref 18.64 dBm Center Fred ø CF Ster 4.000000 MH Mr Center 2.412 GHz #Res BW 100 kHz Span 40 MHz Sweep 3.867 ms #VBW 300 kHz Total Power 11.1 dBm Occupied Bandwidth 17.738 MHz Freq Offse 16.990 kHz **OBW Power** 99.00 % Transmit Freg Error OH x dB Bandwidth 17.67 MHz x dB -6.00 dB

Lowest channel

#### Middle channel





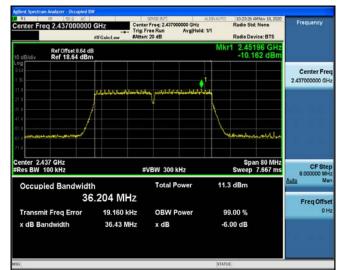


#### 802.11n (HT40) Modulation

10-20-45 AMNov 18, 20 Radio Std: None Frequency enter Freq 2.422000000 GHz Center Freq: 2.4220 Trig: Free Run Avg|Hold: 1/1 Radio Device: BTS 2.43696 GH -10.155 dB Ref Offset 8.64 dB Ref 18.64 dBm Center Fred 2.422000000 GHz ٠ CF Ster 8.000000 MH Ma Center 2.422 GHz #Res BW 100 kHz Span 80 MHz Sweep 7.667 ms #VBW 300 kHz Occupied Bandwidth Total Power 11.3 dBm 36.169 MHz Freq Offse 11.178 kHz **OBW Power** 99.00 % Transmit Freg Error OH x dB Bandwidth 36.38 MHz x dB -6.00 dB

Lowest channel

#### Middle channel







For antenna port 2				
Test channel	6dB Emission Bandwidth (MHz)			
	802.11b	802.11g	802.11n(H20)	802.11n(H40)
Lowest	9.072	16.40	17.65	36.41
Middle	9.081	16.40	17.67	36.41
Highest	9.093	16.38	17.65	36.40
Limit:	≥500 (kHz)			
Test Result:	PASS			

## For antonna port 2

Test plots as follows:



#### 802.11b Modulation

#### Lowest channel



#### Middle channel







#### 802.11g Modulation

Lowest channel



#### Middle channel







#### 802.11n (HT20) Modulation

10:57:39 AMNov 18, 20 Radio Std: None Frequency enter Freq 2.412000000 GHz Center Free 2.412000000 GHz Trig: Free Run Avg|Hold>1/1 Radio Device: BTS kr1 2.417 GH -7.3379 dB Ref Offset 8.64 dB Ref 18.64 dBm Center Fred ø CF Ster 4.000000 MH Mr Center 2.412 GHz #Res BW 100 kHz Span 40 MHz Sweep 3.867 ms #VBW 300 kHz Total Power 11.2 dBm Occupied Bandwidth 17.743 MHz Freq Offse 7.221 kHz **OBW Power** 99.00 % Transmit Freg Error OH x dB Bandwidth 17.65 MHz x dB -6.00 dB

#### Middle channel



### Highest channel



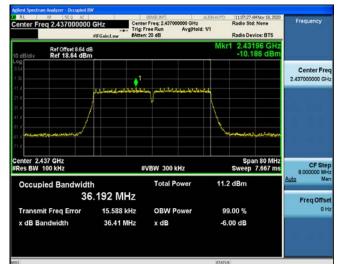
Lowest channel

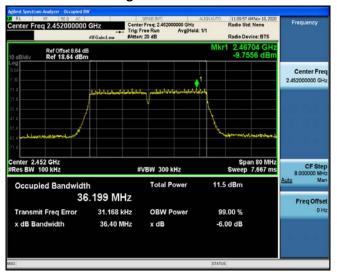


#### 802.11n (HT40) Modulation

#### Lowest channel enter Freq 2.422000000 GHz 11:04:56 AMNov 18, 2 Radio Std: None Frequency Center Free 2.422000000 GHz Trig: Free Run Avg|Hold: 1/1 #Atten: 20 dB Radio Device: BTS 2.43696 GI -10.002 dB Ref Offset 8.64 dB Ref 18.64 dBm Center Freq 2.422000000 GHz • Center 2.422 GHz #Res BW 100 kHz Span 80 MHz Sweep 7.667 ms CF Step 8.000000 MH Mar #VBW 300 kHz Occupied Bandwidth Total Power 11.4 dBm 36.182 MHz Freq Offse 6.786 kHz Transmit Freq Error **OBW Power** 99.00 % 01 x dB Bandwidth 36,41 MHz x dB -6.00 dB

#### Middle channel







## 4.4. Power Spectral Density

## 4.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (e)		
Test Method:	KDB 558074		
Limit:	The average power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.		
Test Setup:	Spectrum Analyzer EUT		
Test Mode:	Transmitting mode with modulation		
Test Procedure:	<ol> <li>The testing follows Measurement procedure 10.2 method PKPSD of FCC KDB Publication No.558074 D01 15.247 Meas Guidance v05r02</li> <li>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.</li> <li>Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): 3 kHz ≤ RBW ≤ 100 kHz. Video bandwidth VBW ≥ 3 x RBW. Set the span to at least 1.5 times the OBW.</li> <li>Detector = Peak, Sweep time = auto couple.</li> <li>Employ trace averaging (Peak) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level.</li> <li>Measure and record the results in the test report.</li> </ol>		
Test Result:	PASS		

### 4.4.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-048	Jun. 17, 2021
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Jun. 17, 2021
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Jun. 17, 2021

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



### 4.4.3. Test data

EUT Set Mode	Channel	Result (dBm/30kHz)	Result (dBm/3kHz)	
802.11b	Lowest	-4.42	-14.42	
	Middle	-4.71	-14.71	
	Highest	-4.55	-14.55	
802.11g	Lowest	-12.68	-22.68	
	Middle	-12.79	-22.79	
	Highest	-12.51	-22.51	
802.11n(H20)	Lowest	-12.2	-22.2	
	Middle	-12.32	-22.32	
	Highest	-12.28	-22.28	
802.11n(H40)	Lowest	-15.33	-25.33	
	Middle	-15.34	-25.34	
	Highest	-15.19	-25.19	
PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10				
Limit: 8dBm/3kHz				
Test Result:	PASS			

## For antenna port 1

Test plots as follows:



#### 802.11b Modulation

Lowest channel



Middle channel







#### 802.11g Modulation

Lowest channel



Middle channel







#### 802.11n (HT20) Modulation



Lowest channel

Middle channel







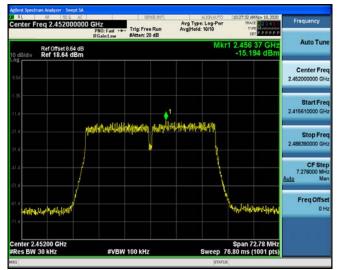
#### 802.11n (HT40) Modulation

Lowest channel



Middle channel







## For antenna port 2

EUT Set Mode	Channel	Result (dBm/30kHz)	Result (dBm/3kHz)	
	Lowest	-3.89	-13.89	
802.11b	Middle	-3.72	-13.72	
	Highest	-2.95	-12.95	
	Lowest	-12.91	-22.91	
802.11g	Middle	-12.62	-22.62	
	Highest	-12.17	-22.17	
	Lowest	-11.85	-21.85	
802.11n(H20)	Middle	-11.14	-21.14	
	Highest	-12.02	-22.02	
	Lowest	-15.3	-25.3	
802.11n(H40)	Middle	-15.62	-25.62	
	Highest	-15.22	-25.22	
PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10				
Limit: 8dBm/3kHz				
Test Result:	PASS			

Test plots as follows:



#### 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

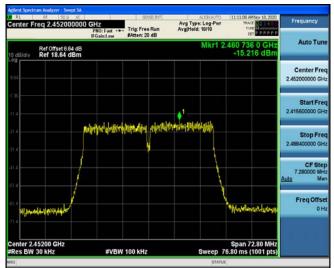
Lowest channel



Middle channel



## Highest channel





Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result								
	TX 802.11n/HT20 Mode										
2412 MHz	-19.01	8	PASS								
2437 MHz	-18.68	8	PASS								
2462 MHz	-19.14	8	PASS								
	TX 802.11n/HT40 Mode	9									
2422 MHz	-22.30	8	PASS								
2437 MHz	-22.47	8	PASS								
2452 MHz	-22.19	8	PASS								
Note: 1 According to KDB 662911, Result power = 10log(10 <sup>(ant1/10</sup> +10 <sup>(ant2/10)</sup> ). 2 Result unit: W, The end result is converted to units of dBm.											

## For MIMO antenna port 1+antenna port 2

Note: This product supports antenna 1 and antenna 2 launch, but only support 802.11 n 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:	
Test Mode:	Spectrum Analyzer         EUT           Transmitting mode with modulation         Image: Contract of the second secon
Test Procedure:	<ol> <li>The testing follows FCC KDB Publication 558074 D01 15.247 Meas Guidance v05r02.</li> <li>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.</li> <li>Set to the maximum power setting and enable the EUT transmit continuously.</li> <li>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).</li> <li>Measure and record the results in the test report.</li> <li>The RF fundamental frequency should be excluded against the limit line in the operating frequency band.</li> </ol>
Test Result:	PASS



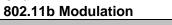
## 4.5.2. Test Instruments

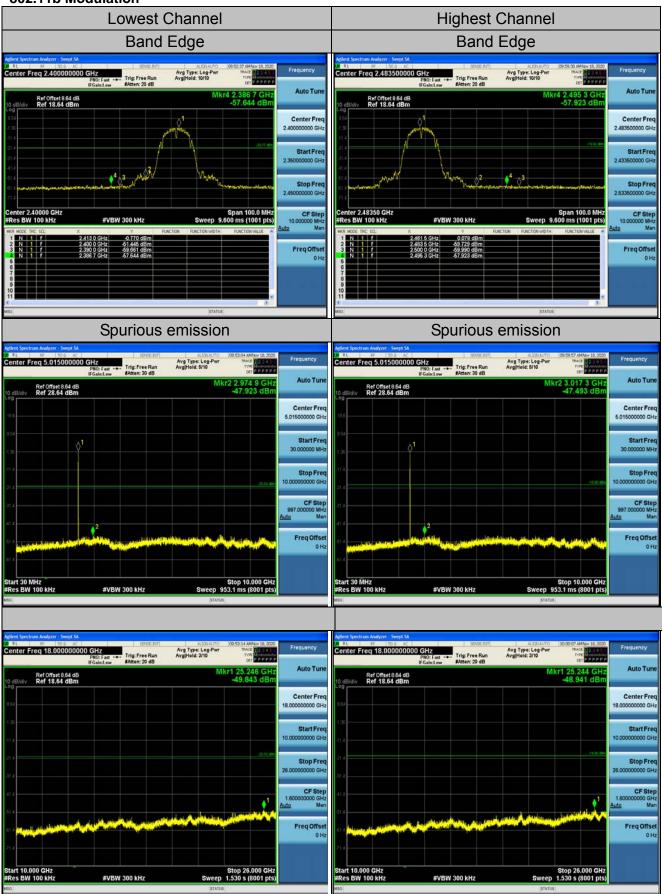
	RF Test Room											
Equipment	Manufacturer	Model	Serial Number	Calibration Due								
Spectrum analyzer	Agilent	N9020A	HKE-048	Jun. 17, 2021								
Signal generator	Agilent	N5183A	HKE-071	Jun. 17, 2021								
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Jun. 17, 2021								
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Jun. 17, 2021								

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



## 4.5.3. Test Data Chain 1



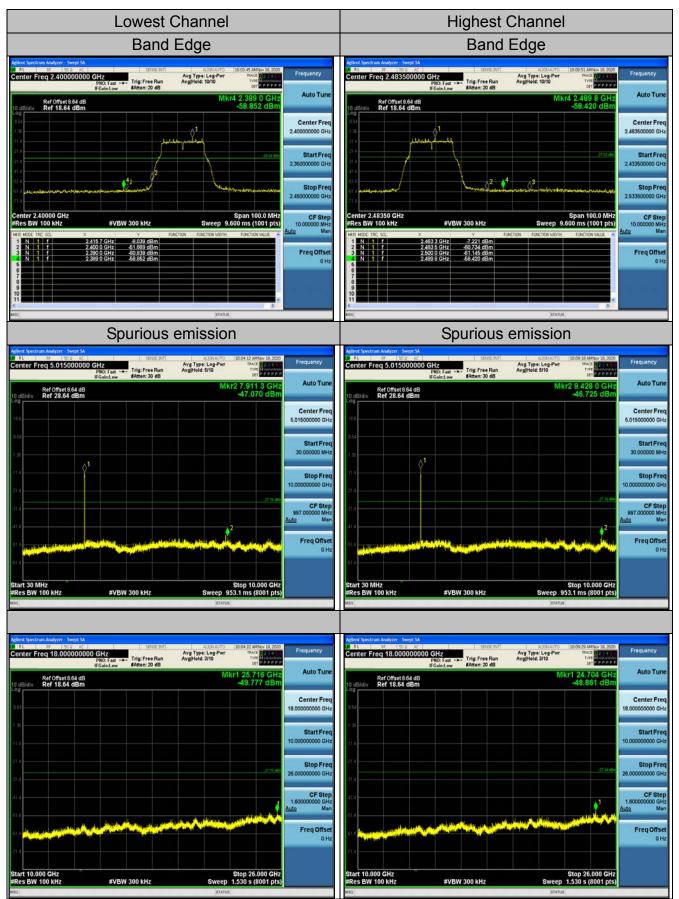




				IIIIei	middle Ch						
				ission	purious e	Sp					
	USONAUTO 09-56-16 AMNev 18, 2020	SENSE INT ALXAND		ectrum Analyzer - Swept S	Agil	09-56-06 AMNov 18, 2020	ALMANAUTO	SENSE BAT		um Analyzer - Swept SA	
Frequency	Log-Per TRACE 12343 3/10 Trive Corr Date Part	Avg Type: Log-Pv	PNO: Fast	Freq 18.00000	Frequency		Avg Type: Log-Pwr Avg[Heid: 5/10	Trig: Free Run	PNO: Fast	req 5.015000000 (	
Auto Tu	Mkr1 25.310 GHz -49.957 dBm		B	Ref Offset 8.64 d	Auto Tune	2 6.925 5 GHz -47.508 dBm	Mkr	#Atten: 30 dB	IFGain:Low	Ref Offset 8.64 dB Ref 28,64 dBm	B/div
Center F 18.000000000					Center Freq 5.01500000 GHz						6
Start F					Start Freq 30.000000 MHz					¢1	6
Stop F 26.000000000	-20 15 offer				Stop Freq 10.00000000 GHz	-2015-05-					4
CF S 1.600000000 0 Auto	•1.				CF Step 997.000000 MHz Auto Man						-
Freq Off C	Antional State of the State of	and the second state of the second states of the second states of the second states of the second states of the	the states	in the second second	Freq Offset 0 Hz	نه التي والتي و والتي والتي وال		aller for the liter bit	and the second	and the second second	
	Stop 26.000 GHz			0.000 GHz	Sta	Stop 10.000 GHz				IHz	art 30 M
	Sweep 1.530 s (8001 pts)		#VBW 3	W 100 kHz	#R	i3.1 ms (8001 pts)	Sweep 95	300 kHz	#VBW	100 kHz	es BW



## 802.11g Modulation

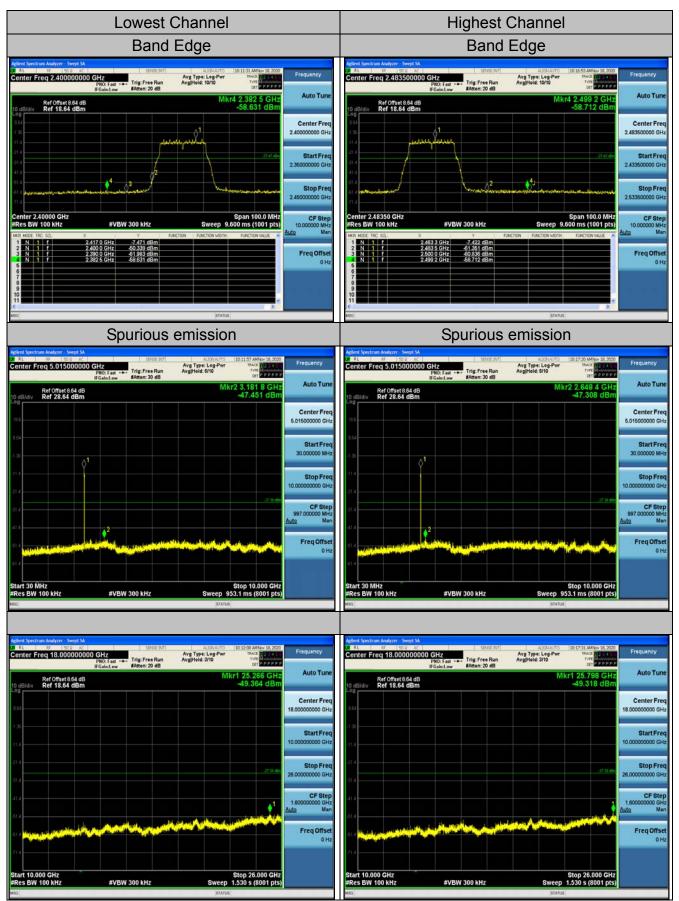




			nnel	middle (	l					
			ssion	purious	S					
Frequency	ALSOLAUTO 10.06-47 AMNov 10, 2020 Avg Type: Log-Pwr TRACE TO A Avg/Hold: 3/10 Trace TO PPPPP	Fast Trig: Free Run	trum Analyzer - Swept SA IF 50 0 AC Freq 18.000000000 GHz PN0: F IFGaint	Frequency	10.06-37 AMNov 10, 2020 TRACE R 2 3 4 5 TYPE M	Aug Type: Log-Pwr Avg Hold: 5/10	Trig: Free Run #Atten: 30 dB	GHz PN0: Fast ↔	rum Analyzer - Swept SA NF 500 AC Treq 5.01500000	RL
	Mkr1 25.742 GHz -50.036 dBm	The survey sa an	Ref Offset 8.64 dB Ref 18.64 dBm	Auto Tune	r2 2.629 7 GHz -47.458 dBm	Mk	Printers of the	Pointew	Ref Offset 8.64 dB Ref 28.64 dBm	dB/div
Center Fre 18.000000000 GH				Center Freq 5.015000000 GHz						1.6
Start Fre 10.000000000 GH				Start Freq 30.000000 MHz						36
Stop Fre 26.000000000 GH	-27 70 db			Stop Freq 10.00000000 GHz						4
CF Ste 1.60000000 GH <u>Auto</u> Ma				CF Step 997.000000 MHz <u>Auto</u> Man	-27.30.dBe					4
Freq Offse 0 H	المراجمة المتلاطين والمتلاطي المواجلا	were and the second	يحقيه المستحد المتعاد المعاد المع	Freq Offset 0 Hz	وأراقهم والمتلجه المرا	halling in a singer	al manher and the second			4
	014.0 26 020 014				Clas 40 000 Clas					
	Stop 26.000 GHz Sweep 1.530 s (8001 pts) status	#VBW 300 kHz	000 GHz / 100 kHz		Stop 10.000 GHz 53.1 ms (8001 pts)		300 kHz	#VBV	MHZ 100 kHz	tart 30 N Res BW



## 802.11n (HT20) Modulation

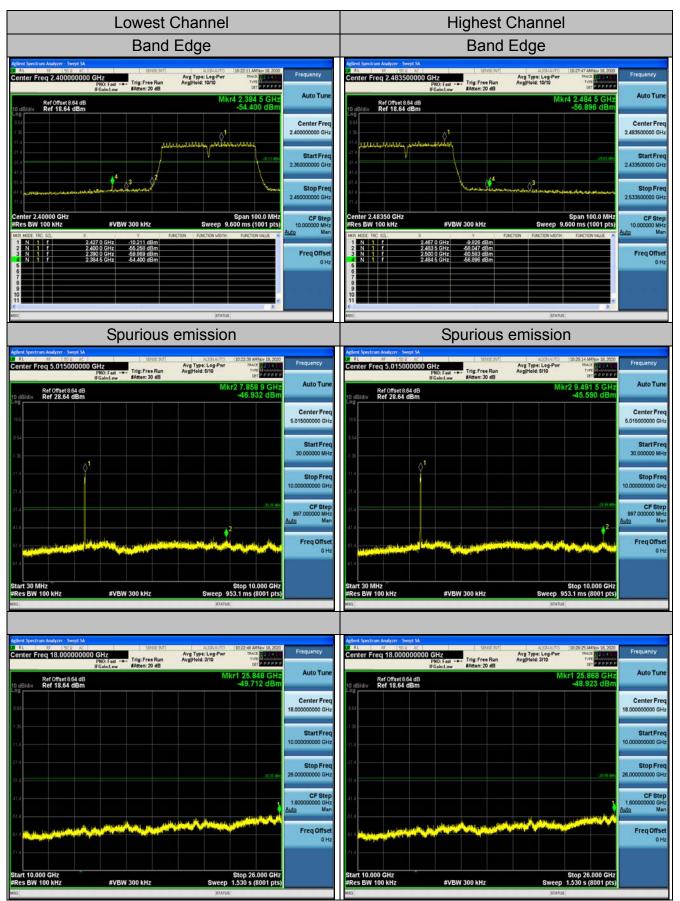




					middle	Char	nnel					
				S	purious	emi	ssion					
	zer - Swept SA 50 0 AC D15000000 GHz PN0: Fast - IFGainclaw	Trig: Free Run	ALSONAUTO Avg Type: Log-Pwr Avg[Hold: 5/10	10:14:28 AMNov 18, 2020 TRACE 12, 2020 Trite Off P.P.P.P.P.P.P.	Frequency	UN RL	trum Analyzer - Swep IIF 500 Freq 18.00000	NC .	Trig: Free Run #Atten: 20 dB	Augwauto Avg Type: Log-Pwr Avg[Hold: 3/10	10:14:39 AMNev 18, 2020 TRACE 12, 24 TVFE M DET P.P.P.P.P.P.	Frequency
10 dB/div Ref 2	Tset 8.64 dB 18.64 dBm		Mki	r2 7.001 5 GHz -46.745 dBm	Auto Tune	10 dB/div	Ref Offset 8.64 Ref 18.64 de	dB		M	kr1 25.252 GHz -50.228 dBm	Auto Tune
18.6					Center Freq 5.015000000 GHz	8.64						Center Fre 18.00000000 GH
1 30					Start Freq 30.000000 MHz	-11.4						Start Fre 10.00000000 GF
21.4	<b>0</b>				Stop Freq 10.00000000 GHz	-21.4						Stop Fre 26.00000000 GH
81.4				-27.26 684	CF Step 997.000000 MHz <u>Auto</u> Man	-41.4						CF Ste 1.600000000 GH Auto Ma
51.4 Jacob Literatur	-			وينطبن بالمريالي	Freq Offset 0 Hz	61.4	the state of the s	فيعفنه يجتمعها فيعاليه		in the second second	الرياف المتروض والمسترجي	Freq Offse 0 H
				Oten 40 000 Oten		Start 10.	000 0117				01-1 00 000 000	
Start 30 MHz #Res BW 100 kH #80	iz #VB	W 300 kHz		Stop 10.000 GHz 53.1 ms (8001 pts)		Start 10. #Res BW		#VBV	1 300 kHz	Sweep	Stop 26.000 GHz 1.530 s (8001 pts)	



## 802.11n (HT40) Modulation

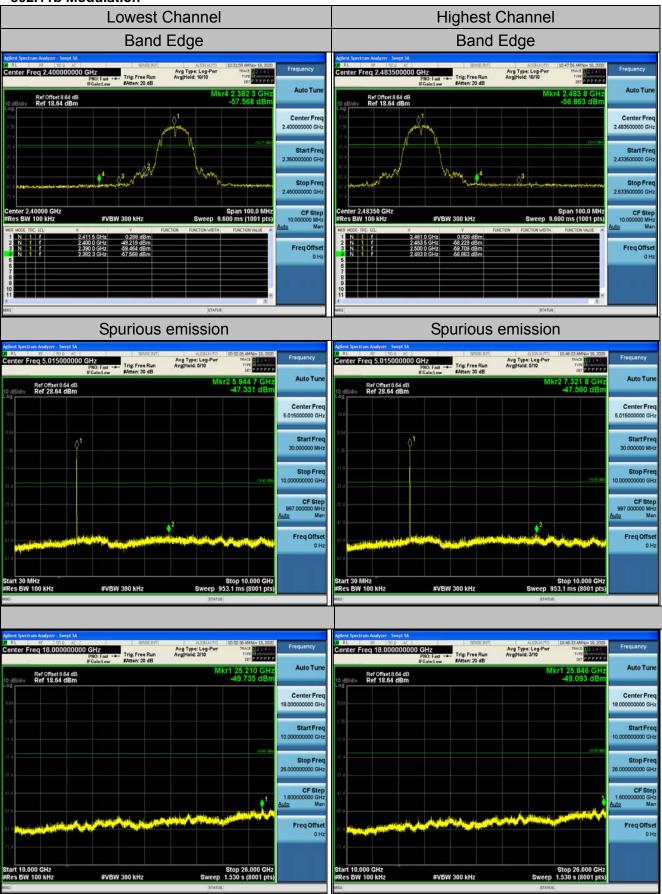




			inel	middle Ch	I				
			ssion	purious er	S				
Frequency	AUGNAUTO 10:25:13 AMNew 18, 2020 Avg Type: Leg-Pwr TMAXE 12, 2020 Avg[Hold: 3/10 TVPE DET 2PPPPP	SHZ NO: Fast Gain:Low #Atten: 20 dB		Frequency Cer	10:25:03 AMNor 18, 2020 TRACE 02:000 TYPE 02:000 DET 02:000000	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 5/10		Analyzer - Swept SA IF 50.9 AC 5.015000000 GHz PN0: Fast IFGain:Low	RL
Auto Tun	Mkr1 25.248 GHz -49.505 dBm		Ref Offset 8.64 dB Ref 18.64 dBm	Auto Tune	2 2.668 3 GHz -47.174 dBm	Mkr		ef Offset 8.64 dB ef 28.64 dBm	0 dB/div
Center Free 18.000000000 GH				Center Freq 5.01500000 GHz					18.5
Start Fre 10.000000000 GH				Start Freq 30.000000 MHz					1.35
Stop Fre 26.00000000 GH				Stop Freq 10.000000000 GHz				<u> </u>	21.4
CF Ste 1.600000000 GH Auto Ma				CF Step 997.000000 MHz <u>Auto</u> Man	311.05			42	31.4
Freq Offse 0 H	alan di kalan partikaka di kalan	and the second	and the second	Freq Offset 0 Hz 71 d	it an an the		la and a second		51.4 51.4 51.4
	Stop 26.000 GHz Sweep 1.530 s (8001 pts)	#VBW 300 kHz	00 GHz 100 kHz		Stop 10.000 GHz j3.1 ms (8001 pts)		VBW 300 kHz		tart 30 M Res BW



#### Chain 2 802.11b Modulation

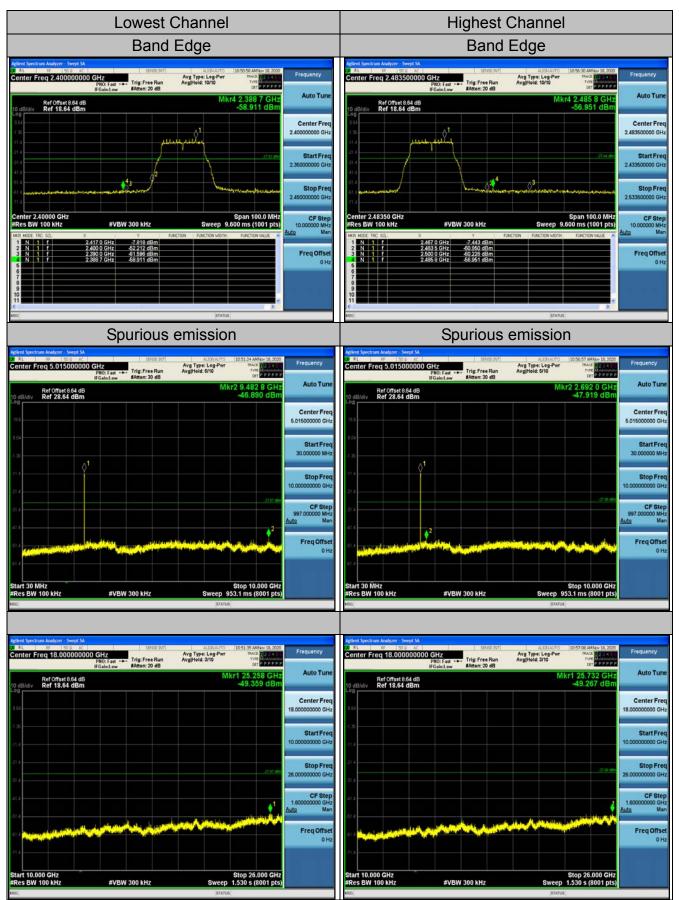




					middle (	har	nnel					
				S	purious	emis	ssion					
Aglent Spectrum Analyzer - Swept S IRL IIF 500 MC Center Freq 5.0150000		Trig: Free Run #Atten: 30 dB	ALSONADITO Avg Type: Log-Pwr Avg Hold: 5/10	10.45.18 AMNov 18, 2020 TRACE 12.2 4 TVFE MALANNOV CET P P P P P	Frequency	AN RL	nen Analyzer - Swept SA RF 50 0 AC req 18.0000000		Trig: Free Run #Atten: 20 dB	Avg Type: Log-Pwr Avg[Hold: 3/10	10-45-29 AMNov 10, 2020 TRACE 11 2 4 Tret Monte 11 2 4 CET P P P P P P	Frequency
Ref Offset 8.64 di	B		Mk	r2 7.873 9 GHz -47.458 dBm	Auto Tune	10 dB/div	Ref Offset 8.64 dB Ref 18.64 dBm			MI	(r1 24.764 GHz -49.836 dBm	Auto Tun
18.6					Center Freq 5.015000000 GHz	8.64						Center Free 18.000000000 GH
1.35	¢1				Start Freq 30.000000 MHz	-11.4						Start Fre 10.000000000 GH
21.4				-1105 @Pe	Stop Freq 10.00000000 GHz	-21.4 -31.4					-11.05 dBe	Stop Fre 26.000000000 GH
11.4					CF Step 997.000000 MHz Auto Man	-41.4					¢¹	CF Ste 1.500000000 GH <u>Auto</u> Ma
61.4 <mark> </mark>	in an		finalities and the second	-	Freq Offset 0 Hz	61.4 <b>()</b>	<b>ابنده الدول الدول</b>	يتجذوا والمحاصيه والمجيها	میلینانی، الا			Freq Offse 0 H
tart 30 MHz Res BW 100 kHz	#VBW	300 kHz	Sweep 9	Stop 10.000 GHz 53.1 ms (8001 pts)		Start 10.0 #Res BW		#VBW	300 kHz	Sweep	Stop 26.000 GHz 1.530 s (8001 pts)	



## 802.11g Modulation

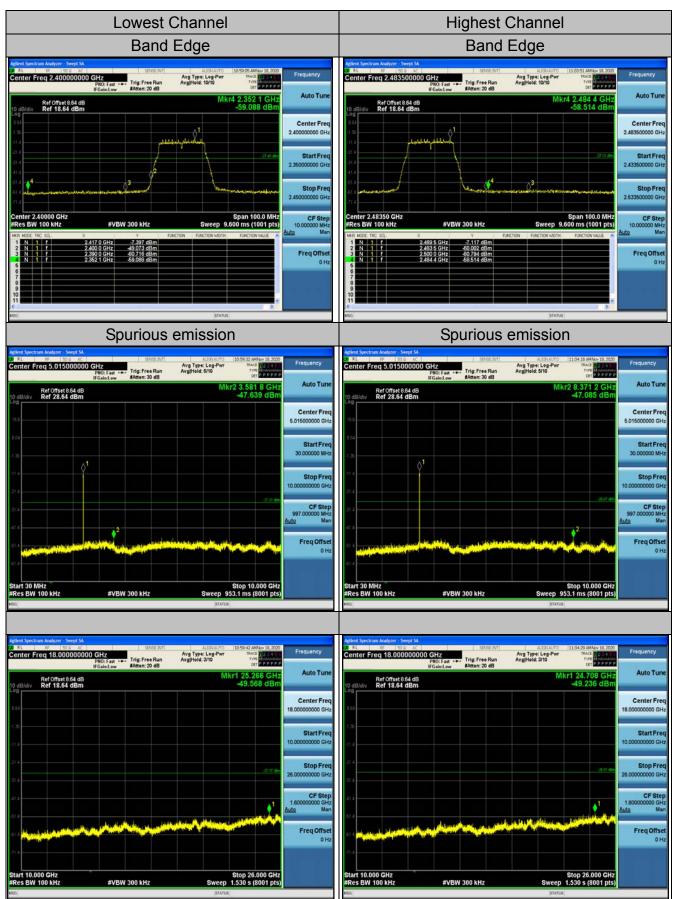




				middle	Channel	
			S	purious	emission	
Aglient Spectrum Analyzer - Swept SA Od RL NF 150 AC Center Freq 5.015000000		Avg Type: Run Avg[Hold: 0	101AUTO 10.54:13 AMNov 18, 2020 Log-Pwr TRACE 10.44 10 Type	Frequency	Aginet Spectrum Analyzer - Swrpt SA         SINVERT         AUXXMUTO         1054-94 MMay 10,2020           28         Fit         SINVERT         AUXXMUTO         1054-94 MMay 10,2020           Center Freq 18,000000000 GHz         Free Run         AvgTyse: Log-Per         Work PEr           PRO: Free Run         AvgTyse: Log-Per         Trig: Free Run         AvgTyse: Log-Per         Trig: Free Run	Frequency
Ref Offset 8.64 dB 10 dB/div Ref 28.64 dBm	H GBILLEN		Mkr2 5.301 6 GHz -47.399 dBm	Auto Tune	Ref0m5et8.64 dB Mkr1 25.774 GHz 10 dB/div Ref18.64 dBm -50.167 dBm	Auto Tune
18.5				Center Freq 5.015000000 GHz	864	Center Fred
-136	ji			Start Freq 30.000000 MHz	136 10 114 10	Start Free
21.4				Stop Freq 10.000000000 GHz	271 A	Stop Free
31.4		.2	-27.61.489	CF Step 997.000000 MHz Auto Man		CF Step 60000000 GH: 2 Mar
	فتحفينا فالمتجان	in here the second in	ومفاطرته والمرد المؤاخ والمجرود	Freq Offset 0 Hz		Freq Offse 0 Hi
Start 30 MHz #Res BW 100 kHz	#VBW 300 kH	7 8	Stop 10.000 GHz weep 953.1 ms (8001 pts)		Start 10.000 GHz Stop 26.000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 1.530 \$ (8001 pts)	



## 802.11n (HT20) Modulation

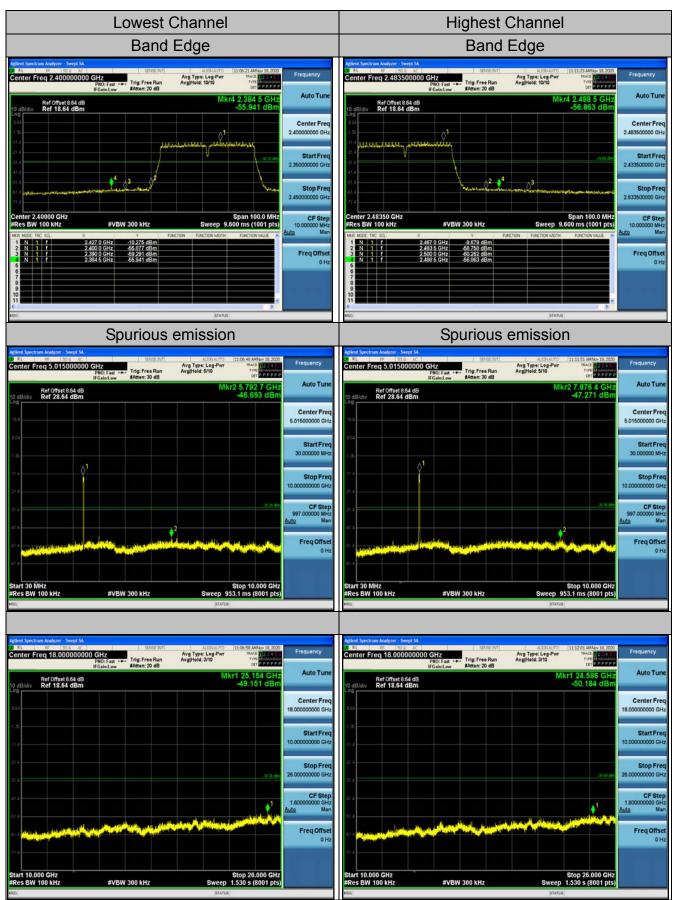




			nnel	middle (	I				
			ission	purious	S				
	ALIGHAUTO 11:01:58 AMNov 18, 2020 Avg Type: Log-Pwr Avg[Held: 3/10 cer DPPPP	Trig: Free Run #Atten: 20 dB		Frequency	11:01:47 AMNov 18, 2020 TRACE DE 4.2. TYPE COMMAND CET P.P.P.P.P.P	ANNAUTO Avg Type: Log-Pwr Avg[Hold: 5/10		AC	ectrum Analyzer - Sw IFF 50 0 7 Freq 5.01501
Auto Tun	Mkr1 25.818 GHz -49.690 dBm		Ref Offset 8.64 dB Ref 18.64 dBm	Auto Tune	r2 6.064 3 GHz -46.696 dBm	Mk		dB 3m	Ref Offset 8.
Center Fre 18.000000000 GH				Center Freq 5.015000000 GHz					
Start Fre 10.000000000 GH				Start Freq 30.000000 MHz				41	
Stop Fre 26.00000000 GH	-27.23 dbs			Stop Freq 10.000000000 GHz				Q.	
CF Ste 1.60000000 GH <u>Auto</u> Ma				CF Step 997.000000 MHz <u>Auto</u> Man	-(1) 33 dim.				
Freq Offse 0 H		المتلونية بمياجه المراسلية ا	فالمي المجمعة المتحاصية العراقية	Freq Offset 0 Hz	where where	en e	t an an think a faith of	ha h	a ta
	Stop 26.000 GHz Sweep 1.530 s (8001 pts)	#VBW 300 kHz	0.000 GHz W 100 kHz		Stop 10.000 GHz 53.1 ms (8001 pts)	Sweep 9	BW 300 kHz	#VE	0 MHz
	STATUS					STATUS			



## 802.11n (HT40) Modulation





					middle	Char	nnel						
				S	purious	emis	ssion						
	50 R AC 015000000 GHz PNC	: Fast Trig: Free in:Low #Atten: 30	Avg Type: I Run Avg Held: 5	2014UTO 11:09:04 AMNov 18, 2020 Log-Pwr 18442 02:04 H0 1746 02:04 (21 02:05:05:05:05:05:05:05:05:05:05:05:05:05:	Frequency	LOD RL	rum Analyzer - Sweg #F  50.0 Freq 18.00001	AC	Trig: Free Ru #Atten: 20 dB	Avg Typ- n Avg[Held	Log-Pwr	09-15 AMNov 10, 2020 TRACE P 2 3 4 3 TYPE MUMANIN GET P P P P P P	Frequency
to dB/div Ref 2	ffset 8.64 dB 28.64 dBm			Mkr2 6.198 9 GHz -47.455 dBm	Auto Tune	10 dB/div	Ref Offset 8.64 Ref 18.64 di	4 dB Bm			Mkr1	23.930 GHz 49.009 dBm	Auto Tun
186					Center Freq 5.015000000 GHz	8.64							Center Fre 18.000000000 GH
1.35					Start Freq 30.000000 MHz	-11.4							Start Fre 10.000000000 Gi
27.4	- Å.				Stop Freq 10.00000000 GHz	-21.4						- 20 Vi dbe	Stop Fre 26.00000000 GR
1.4				-3014 alte	CF Step 997.000000 MHz <u>Auto</u> Man	-41.4							CF Ste 1.60000000 Gi Auto M
1.4 Aligentiefente	ta an	New we we shall		بهالي المراجع	Freq Offset 0 Hz	61.4	۵۵٬۰۵۰٬۰۵۰٬۰۵۰	at a start	******	and a state of the			Freq Offs 0 H
itart 30 MHz Res BW 100 kH	1z	#VBW 300 kHz	s	Stop 10.000 GHz weep 953.1 ms (8001 pts)		Start 10.0 #Res BW		#VE	W 300 kHz			op 26.000 GHz 30 s (8001 pts)	
	łz	#VBW 300 kHz	5					#VE	W 300 kHz			i30 s (8001 pts)	

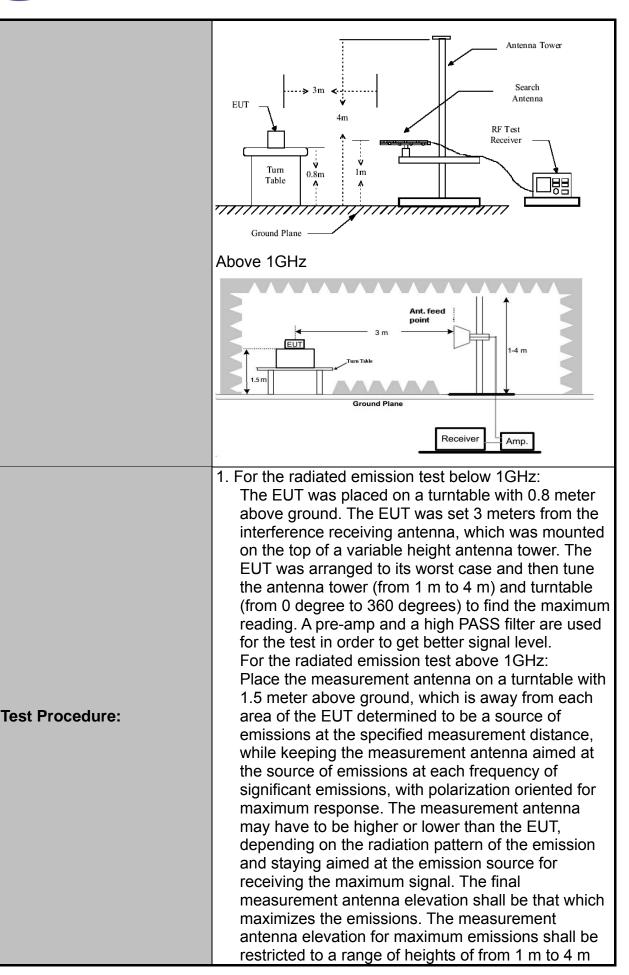


# 4.6. Radiated Spurious Emission Measurement

# 4.6.1. Test Specification

Test Requirement:	FCC Part15	C Section	on '	15.209			
Test Method:	ANSI C63.10	): 2013					
Frequency Range:	9 kHz to 25 (	GHz					
Measurement Distance:	3 m						
Antenna Polarization:	Horizontal &	Vertica					
Operation mode:	Transmitting	mode v	vith	modulati	on		
	Frequency	Detecto	or	RBW	VBW		Remark
	9kHz- 150kHz	Quasi-pe		200Hz	1kHz		si-peak Value
Receiver Setup:	150kHz- 30MHz	Quasi-pe		9kHz	30kHz		si-peak Value
	30MHz-1GHz	Quasi-pe Peak		120KHz 1MHz	300KHz 3MHz		si-peak Value eak Value
	Above 1GHz	Peak		1MHz	10Hz		erage Value
	Frequen			Field Stre (microvolts/		Ме	asurement
	0.009-0.4	90		2400/F(k		2.010	300
	0.490-1.7			24000/F(	KHz)	30	
	1.705-30			30			30
	30-88 88-216	3		<u>100</u> 150		3	
Limit:	216-96			200			3
	Above 9		500			3	
					Measurement		
	Frequency		ield Strength		n Distan		Detector
	l	(mi	crov	olts/meter)	(meter		Deteotor
	Above 1GHz	,		500			Average
			5	000	3		Peak
	For radiated	emissic	ns	below 30	MHz		
					RX Ante	nna	
	►		— 3	m	→(	).	
Test setup:		,тил	Table			1	
lest setup.	0.8 m				Å	1m	<
		G	round	Plane			
					Receiver	<u>_</u>	
	30MHz to 10	θHz					







	<ul> <li>above the ground or reference ground plane.</li> <li>Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level</li> <li>For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</li> <li>Use the following spectrum analyzer settings: <ul> <li>(1) Span shall wide enough to fully capture the emission being measured;</li> <li>(2) Set RBW=100 kHz for f &lt; 1 GHz; VBW ≥RBW; Sweep = auto; Detector function = peak; Trace = max hold;</li> <li>(3) Set RBW = 1 MHz, VBW= 3MHz for f 1 GHz for peak measurement.</li> <li>For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</li> </ul> </li> </ul>
Test results:	PASS



## 4.6.2. Test Instruments

	Radiated Emission Test Site (966)									
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due						
Receiver	R&S	ESCI-7	HKE-010	Jun. 17, 2021						
Spectrum analyzer	Agilent	N9020A	HKE-048	Jun. 17, 2021						
Preamplifier	EMCI	EMC051845 SE	HKE-015	Jun. 17, 2021						
Preamplifier	Agilent	83051A	HKE-016	Jun. 17, 2021						
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Jun. 17, 2021						
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Jun. 17, 2021						
Horn antenna	Schwarzbeck	9120D	HKE-013	Jun. 17, 2021						
Antenna Mast	Keleto	CC-A-4M	N/A	N/A						
Position controller	Taiwan MF	MF7802	HKE-011	Jun. 17, 2021						
Radiated test software	Tonscend	TS+ Rev 2.5.0.0	HKE-082	N/A						
RF cable (9KHz-1GHz)	Times	381806-001	N/A	N/A						
RF cable	Times	1-40G	HKE-034	Jun. 17, 2021						

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



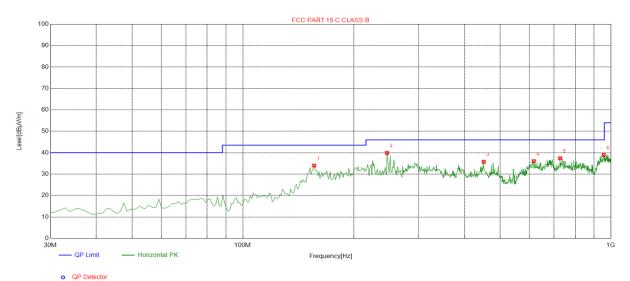
## 4.6.3. Test Data

# Please refer to following diagram for individual Below 1GHz

#### test mode: TX 802.11b 2412MHz

All the test modes completed for test. The worst case of Radiated Emission; the test data of this mode was reported.

#### Horizontal

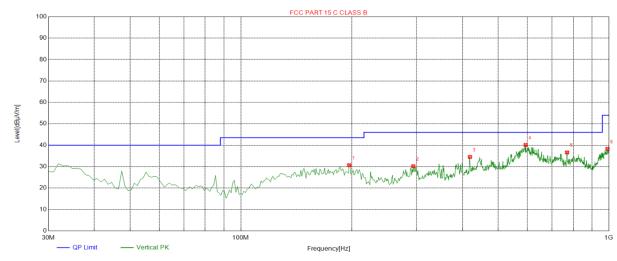


Suspe	Suspected List									
NO.	Freq.	Factor	Reading	Level	Limit	Margin	Height	Angle	Delerity	
NO.	[MHz]	[dB]	[dBµV/m]	[dBµV/m]	[dBµV/m] [dBµV/m] [dB] [cm		[cm]	[°]	Polarity	
1	156.2262	-18.49	52.49	34.00	43.50	9.50	100	278	Horizontal	
2	246.5265	-13.55	53.44	39.89	46.00	6.11	100	144	Horizontal	
3	451.4014	-8.94	44.72	35.78	46.00	10.22	100	208	Horizontal	
4	617.4374	-5.53	41.62	36.09	46.00	9.91	100	29	Horizontal	
5	728.1281	-4.57	41.97	37.40	46.00	8.60	100	316	Horizontal	
6	956.3063	-1.32	40.32	39.00	46.00	7.00	100	307	Horizontal	

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



#### Vertical



• QP Detector

Suspe	Suspected List									
NO.	Freq.	Factor	Reading	Level	Limit	Margin	Height	Angle	Delevity	
NO.	[MHz]	[dB]	[dBµV/m]	[dBµV/m]	[dBµV/m]	[dB]	[cm]	[°]	Polarity	
1	197.0070	-15.34	46.01	30.67	43.50	12.83	100	191	Vertical	
2	294.1041	-12.80	43.00	30.20	46.00	15.80	100	306	Vertical	
3	419.3594	-10.05	44.58	34.53	46.00	11.47	100	331	Vertical	
4	594.1341	-6.50	46.60	40.10	46.00	5.90	100	283	Vertical	
5	769.8799	-3.25	39.88	36.63	46.00	9.37	100	15	Vertical	
6	991.2613	-0.98	39.25	38.27	54.00	15.73	100	354	Vertical	

## Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

## Harmonics and Spurious Emissions

#### Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBµV/m)	Limit@3m (dBµV/m)

Note: 1. Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement



## Above 1GHz

## RADIATED EMISSION TEST

LOW CH1 (802.11b Mode)/2412 All modes of operation were investigated and the worst-case of Antenna 1 are reported.

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре			
4824	60.97	-3.64	57.33	74	-16.67	peak			
4824	45.44	-3.64	41.8	54	-12.2	AVG			
7236	56.65	-0.95	55.7	74	-18.3	peak			
7236	42.20	-0.95	41.25	54	-12.75	AVG			
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4824	60.71	-3.64	57.07	74	-16.93	peak		
4824	45.62	-3.64	41.98	54	-12.02	AVG		
7236	56.29	-0.95	55.34	74	-18.66	peak		
7236	43.44	-0.95	42.49	54	-11.51	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



## MID CH6 (802.11b Mode)/2437

## Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4874	65.37	-3.51	61.86	74	-12.14	peak		
4874	44.27	-3.51	40.76	54	-13.24	AVG		
7311	56.81	-0.82	55.99	74	-18.01	peak		
7311	36.80	-0.82	35.98	54	-18.02	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4874	60.28	-3.51	56.77	74	-17.23	peak		
4874	43.46	-3.51	39.95	54	-14.05	AVG		
7311	54.35	-0.82	53.53	74	-20.47	peak		
7311 41.46 -0.82 40.64 54 -13.36 A								
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



## HIGH CH11 (802.11b Mode)/2462

#### Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4924	59.81	-3.43	56.38	74	-17.62	peak		
4924	41.7	-3.43	38.27	54	-15.73	AVG		
7386	52.52	-0.75	51.77	74	-22.23	peak		
7386	39.3	-0.75	38.55	54	-15.45	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4924	61.4	-3.43	57.97	74	-16.03	peak
4924	43.18	-3.43	39.75	54	-14.25	AVG
7386	52.57	-0.75	51.82	74	-22.18	peak
7386	36.09	-0.75	35.34	54	-18.66	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

#### Remark:

(1) Measuring frequencies from 1 GHz to the 25 GHz.

(2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.

(3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) The emissions are attenuated more than 20dB below the permissible limits are not recorded in the report.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



LOW CH1 (802.11g Mode)/2412 All modes of operation were investigated and the worst-case of Antenna 1 are reported.

Horizontal	•
TIONZONIA	

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре			
4824	61.64	-3.64	58	74	-16	peak			
4824	42.3	-3.64	38.66	54	-15.34	AVG			
7236	52.05	-0.95	51.1	74	-22.9	peak			
7236	42.79	-0.95	41.84	54	-12.16	AVG			
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4824	60.87	-3.64	57.23	74	-16.77	peak		
4824	42.18	-3.64	38.54	54	-15.46	AVG		
7236	55.73	-0.95	54.78	74	-19.22	peak		
7236	40.69	-0.95	39.74	54	-14.26	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



## MID CH6 (802.11g Mode)/2437

## Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4874	61.75	-3.51	58.24	74	-15.76	peak		
4874	48.71	-3.51	45.2	54	-8.8	AVG		
7311	52.63	-0.82	51.81	74	-22.19	peak		
7311	41.84	-0.82	41.02	54	-12.98	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4874	63.51	-3.51	60	74	-14	peak		
4874	42.62	-3.51	39.11	54	-14.89	AVG		
7311	50.4	-0.82	49.58	74	-24.42	peak		
7311	41.34	-0.82	40.52	54	-13.48	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



## HIGH CH11 (802.11g Mode)/2462

#### Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4924	58.53	-3.43	55.1	74	-18.9	peak		
4924	44.2	-3.43	40.77	54	-13.23	AVG		
7386	53.64	-0.75	52.89	74	-21.11	peak		
7386	37.66	-0.75	36.91	54	-17.09	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

#### Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4924	59.78	-3.43	56.35	74	-17.65	peak
4924	44.72	-3.43	41.29	54	-12.71	AVG
7386	51.5	-0.75	50.75	74	-23.25	peak
7386	39.98	-0.75	39.23	54	-14.77	AVG
Remark: Factor	= Antenna Factor	+ Cable Loss –	Pre-amplifier.			

#### Remark:

(1) Measuring frequencies from 1 GHz to the 25 GHz.

(2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.

(3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) The emissions are attenuated more than 20dB below the permissible limits are not recorded in the report.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



# MIMO:

## LOW CH1 (802.11n/H20 Mode)/2412

## Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре			
4824	57.93	-3.64	54.29	74	-19.71	peak			
4824	44.88	-3.64	41.24	54	-12.76	AVG			
7236	56.54	-0.95	55.59	74	-18.41	peak			
7236	42.44	-0.95	41.49	54	-12.51	AVG			
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4824	60.8	-3.64	57.16	74	-16.84	peak		
4824	46.84	-3.64	43.2	54	-10.8	AVG		
7236	55.57	-0.95	54.62	74	-19.38	peak		
7236	40.37	-0.95	39.42	54	-14.58	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



## MID CH6 (802.11n/H20 Mode)/2437

## Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4874.00	62.18	-3.51	58.67	74.00	-15.33	peak		
4874.00	39.91	-3.51	36.40	54.00	-17.60	AVG		
7311.00	52.72	-0.82	51.90	74.00	-22.10	peak		
7311.00	41.71	-0.82	40.89	54.00	-13.11	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре		
4874.00	60.42	-3.51	56.91	74.00	-17.09	peak		
4874.00	44.94	-3.51	41.43	54.00	-12.57	AVG		
7311.00	52.55	-0.82	51.73	74.00	-22.27	peak		
7311.00	41.33	-0.82	40.51	54.00	-13.49	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



## HIGH CH11 (802.11n/H20 Mode)/2462

### Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
4924	55.27	-3.43	51.84	74	-22.16	peak		
4924	41.68	-3.43	38.25	54	-15.75	AVG		
7386	52.10	-0.75	51.35	74	-22.65	peak		
7386	41.94	-0.75	41.19	54	-12.81	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
4924	63.65	-3.43	60.22	74	-13.78	peak		
4924	43.4	-3.43	39.97	54	-14.03	AVG		
7386	50.93	-0.75	50.18	74	-23.82	peak		
7386	37.92	-0.75	37.17	54	-16.83	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



## LOW CH3 (802.11n/H40 Mode)/2422

### Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
4844	59.03	-3.63	55.4	74	-18.6	peak		
4844	45.26	-3.63	41.63	54	-12.37	AVG		
7266	53.58	-0.94	52.64	74	-21.36	peak		
7266	45.64	-0.94	44.7	54	-9.3	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
4844	59.90	-3.63	56.27	74	-17.73	peak		
4844	45.16	-3.63	41.53	54	-12.47	AVG		
7266	52.17	-0.94	51.23	74	-22.77	peak		
7266	40.57	-0.94	39.63	54	-14.37	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



## MID CH6 (802.11n/H40 Mode)/2437

#### Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
4874	59.79	-3.51	56.28	74	-17.72	peak		
4874	45.71	-3.51	42.2	54	-11.8	AVG		
7311	52.19	-0.82	51.37	74	-22.63	peak		
7311	43.88	-0.82	43.06	54	-10.94	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type		
4874	59.7	-3.51	56.19	74	-17.81	peak		
4874	43.33	-3.51	39.82	54	-14.18	AVG		
7311	55.24	-0.82	54.42	74	-19.58	peak		
7311	37.26	-0.82	36.44	54	-17.56	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



### HIGH CH9 (802.11n/H40 Mode)/2452 Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4904	60.44	-3.43	57.01	74	-16.99	peak
4904	42.91	-3.43	39.48	54	-14.52	AVG
7356	52.33	-0.75	51.58	74	-22.42	peak
7356	40.70	-0.75	39.95	54	-14.05	AVG
Remark: Factor	= Antenna Factor	+ Cable Loss –	Pre-amplifier.			

#### Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Deleciol Type
4904	60.4	-3.43	56.97	74	-17.03	peak
4904	47.17	-3.43	43.74	54	-10.26	AVG
7356	54.35	-0.75	53.6	74	-20.4	peak
7356	41.4	-0.75	40.65	54	-13.35	AVG
Remark: Factor	= Antenna Factor	+ Cable Loss –	Pre-amplifier.			

#### Remark:

(1) Measuring frequencies from 1 GHz to the 25 GHz.

(2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.
 (3) \* denotes emission frequency which appearing within the Restricted Bands specified in provision of

15.205, then the general radiated emission limits in 15.209 apply.

(4) The emissions are attenuated more than 20dB below the permissible limits are not recorded in the report.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

### Test Result of Radiated Spurious at Band edges

Operation Mode: 802.11b Mode TX CH Low (2412MHz) All modes of operation were investigated and the worst-case of Antenna 1 are reported.

#### Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2310	59.56	-5.81	53.75	74	-20.25	peak		
2310	1	-5.81	1	54	1	AVG		
2390	61.33	-5.84	55.49	74	-18.51	peak		
2390	52.69	-5.84	46.85	54	-7.15	AVG		
2400	62.22	-5.84	56.38	74	-17.62	peak		
2400	46.38	-5.84	40.54	54	-13.46	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2310	56.76	-5.81	50.95	74	-23.05	peak		
2310	1	-5.81	1	54	1	AVG		
2390	61.39	-5.84	55.55	74	-18.45	peak		
2390	48.55	-5.84	42.71	54	-11.29	AVG		
2400	61.69	-5.84	55.85	74	-18.15	peak		
2400	44.49	-5.84	38.65	54	-15.35	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

# Operation Mode: TX CH High (2462MHz)

## Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2483.50	58.66	-5.65	53.01	74	-20.99	peak		
2483.50	1	-5.65	1	54	1	AVG		
2500.00	55.38	-5.65	49.73	74	-24.27	peak		
2500.00	1	-5.65	1	54	1	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2483.50	55.47	-5.65	49.82	74	-24.18	peak		
2483.50	/	-5.65	1	54	/	AVG		
2500.00	54.32	-5.65	48.67	74	-25.33	peak		
2500.00	1	-5.65	/	54	1	AVG		
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.								
Remark: All the	other emissions n	ot reported were	e too low to read a	nd deemed to c	omply with FCC	; limit.		

### Operation Mode: 802.11g Mode TX CH Low (2412MHz) All modes of operation were investigated and the worst-case of Antenna 1 are reported.

### Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2310	56.33	-5.81	50.52	74	-23.48	peak		
2310	1	-5.81	/	54	1	AVG		
2390	61.57	-5.84	55.73	74	-18.27	peak		
2390	45.66	-5.84	39.82	54	-14.18	AVG		
2400	60.29	-5.84	54.45	74	-19.55	peak		
2400	50.49	-5.84	44.65	54	-9.35	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Deleciol Type		
2310	56.89	-5.81	51.08	74	-22.92	peak		
2310	1	-5.81	1	54	1	AVG		
2390	62.75	-5.84	56.91	74	-17.09	peak		
2390	48.29	-5.84	42.45	54	-11.55	AVG		
2400	61.43	-5.84	55.59	74	-18.41	peak		
2400	47.37	-5.84	41.53	54	-12.47	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



# Operation Mode: TX CH High (2462MHz)

## Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2483.50	58.47	-5.65	52.82	74	-21.18	peak		
2483.50	/	-5.65	1	54	1	AVG		
2500.00	56.33	-5.65	50.68	74	-23.32	peak		
2500.00	1	-5.65	1	54	1	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2483.50	51.62	-5.65	45.97	74	-28.03	peak		
2483.50	/	-5.65	1	54	/	AVG		
2500.00	52.34	-5.65	46.69	74	-27.31	peak		
2500.00	1	-5.65	/	54	1	AVG		
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.								
Remark: All the	other emissions n	ot reported were	e too low to read a	nd deemed to c	omply with FCC	; limit.		



### MIMO:

## Operation Mode: 802.11n/H20 Mode TX CH Low (2412MHz)

## Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2310	56.49	-5.81	50.68	74	-23.32	peak		
2310	1	-5.81	/	54	1	AVG		
2390	61.44	-5.84	55.6	74	-18.4	peak		
2390	47.67	-5.84	41.83	54	-12.17	AVG		
2400	60.49	-5.84	54.65	74	-19.35	peak		
2400	48.66	-5.84	42.82	54	-11.18	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2310	53.79	-5.81	47.98	74	-26.02	peak		
2310	1	-5.81	1	54	/	AVG		
2390	63.64	-5.84	57.8	74	-16.2	peak		
2390	47.77	-5.84	41.93	54	-12.07	AVG		
2400	64.29	-5.84	58.45	74	-15.55	peak		
2400	48.49	-5.84	42.65	54	-11.35	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



# Operation Mode: TX CH High (2462MHz)

## Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2483.50	54.79	-5.65	49.14	74	-24.86	peak		
2483.50	1	-5.65	1	54	1	AVG		
2500.00	54.29	-5.65	48.64	74	-25.36	peak		
2500.00	1	-5.65	1	54	1	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2483.50	56.66	-5.65	51.01	74	-22.99	peak		
2483.50	/	-5.65	/	54	1	AVG		
2500.00	54.73	-5.65	49.08	74	-24.92	peak		
2500.00	/	-5.65	/	54	1	AVG		
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.								
Remark: All the	other emissions n	ot reported were	e too low to read a	nd deemed to c	omply with FCC	; limit.		



# Operation Mode: 802.11n/H40 Mode TX CH Low (2422MHz)

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2310	59.49	-5.81	53.68	74	-20.32	peak		
2310	1	-5.81	/	54	1	AVG		
2390	61.66	-5.84	55.82	74	-18.18	peak		
2390	45.47	-5.84	39.63	54	-14.37	AVG		
2400	61.68	-5.84	55.84	74	-18.16	peak		
2400	45.71	-5.84	39.87	54	-14.13	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

### Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2310	58.64	-5.81	52.83	74	-21.17	peak		
2310	1	-5.81	1	54	1	AVG		
2390	61.49	-5.84	55.65	74	-18.35	peak		
2390	47.66	-5.84	41.82	54	-12.18	AVG		
2400	61.67	-5.84	55.83	74	-18.17	peak		
2400	47.33	-5.84	41.49	54	-12.51	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							



# Operation Mode: TX CH High (2452MHz)

## Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type		
2483.50	56.28	-5.65	50.63	74	-23.37	peak		
2483.50	/	-5.65	1	54	1	AVG		
2500.00	53.33	-5.65	47.68	74	-26.32	peak		
2500.00	1	-5.65	1	54	1	AVG		
Remark: Factor	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Delector Type			
2483.50	54.57	-5.65	48.92	74	-25.08	peak			
2483.50	/	-5.65	1	54	/	AVG			
2500.00	53.34	-5.65	47.69	74	-26.31	peak			
2500.00	1	-5.65	/	54	1	AVG			
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.									
Remark: All the	other emissions n	Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.							



## 4.7. ANTENNA REQUIREMENT

#### **Standard Applicable**

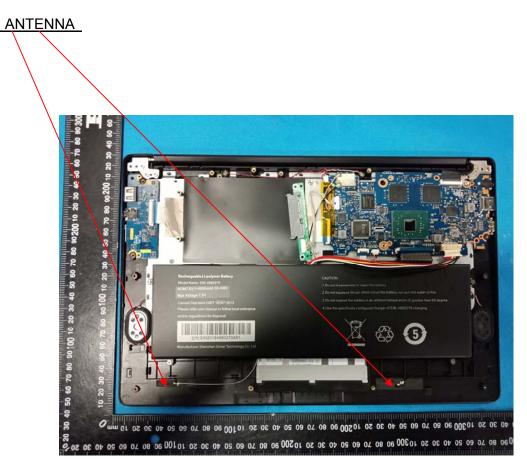
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

#### Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

#### **Antenna Connected Construction**

The antenna used in this product is a Internal Antenna need professional installation, not easy to remove. It conforms to the standard requirements. The gain of Antenna 1 and Antenna 2 is 1.64dBi.





## PHOTOGRAPH OF TEST

## Radiated Emission







## Conducted Emission





## 4.8. PHOTOS OF THE EUT

Reference to the reporter : ANNEX A of external photos and ANNEX B of internal photos

\*\*\*\*\*End of Report\*\*\*\*\*