

TEST REPORT

Reference No. : WTS18S05112396-2W
FCC ID : 2AP2U-SN3R
Applicant : IoT Defense Inc.
Address : 1600 Spring Hill Rd., Suite 200, Vienna, VA 22182 USA
Manufacturer : Winstars Technology Limited
Address : Block 4, TaiSong Industrial Park, DaLang Street, LongHua Town,
Bao'an district, Shenzhen, China
Product : SimpliNET-2 AC2100 Mesh WiFi Router
Model(s) : SN3R
Brand name : SimpliNET
Standards : FCC CFR47 Part 15 C Section 15.407: 2018
Date of Receipt sample : 2018-05-22
Date of Test : 2018-05-23 to 2018-06-05
Date of Issue : 2018-06-09
Test Result : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.
The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation, the certification number is 4243.01) of USA, CNAS (China National Accreditation Service for Conformity Assessment, the registration number is L3110) of China. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), ISED Canada (Innovation, Science and Economic Development Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

2.1 Test Facility

A. Accreditations for Conformity Assessment (International)

Country/Region	Scope Covered By	Scope	Note
USA	ISO/IEC 17025	FCC ID \ SDoC(VOC/DOC)	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		WPC	-
Thailand		NTC	-
Singapore		IDA	-
Note: 1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476. 2. ISED Canada Registration No.: 7760A			

B.TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of ...	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd.	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

3 Revision History

Test report #	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS18S05112396-2W	2018-05-22	2018-05-23 to 2018-06-05	2018-06-09	Original	-	Valid

4 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207(a)	PASS
Radiated Emissions	15.407(a) 15.205(a) 15.209(a)	PASS
Duty Cycle	KDB 789033	PASS
6dB Bandwidth	15.407(a)	PASS
26 dB Emission Bandwidth & 99% Occupied Bandwidth	15.407(a)	PASS
Maximum Conducted Output Power	15.407(a)	PASS
Power Spectral Density	15.407(a)	PASS
Restricted bands around fundamental frequency	15.407(a)	PASS
Antenna Requirement	15.203	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

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6 General Information

6.1 General Description of E.U.T

Product:	SimpliNET-2 AC2100 Mesh WiFi Router
Model(s):	SN3R
Operation Frequency:	IEEE 802.11a/ n(HT20/40)/ac(VHT20/40/80): 5150MHz to 5250MHz IEEE 802.11a/ n(HT20/40)/ac(VHT20/40/80): 5725MHz to 5850MHz
Type of modulation:	IEEE for 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE for 802.11n : OFDM(BPSK/QPSK/16QAM/64QAM) IEEE for 802.11ac : OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)
Antenna installation:	Integrated Antenna
Antenna Gain:	3dBi

6.2 Details of E.U.T

Ratings	Input: AC 100~240V, 50/60Hz, 0.6A Output: 5V, 3A
Adapter	Model: P05W3000U

6.3 Channel List

U-NII-1 (5.15-5.25GHz)		U-NII-3 (5.725-5.85GHz)	
channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	149	5745
38	5190	151	5755
40	5200	153	5765
42	5210	155	5775
44	5220	157	5785
46	5230	159	5795
48	5240	161	5805
		165	5825

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:

For 802.11a/n(HT20)/ac(VHT20):

channel	Frequency(MHz)	channel	Frequency(MHz)
36	5180	149	5745
40	5200	157	5785
48	5240	165	5825

For 802.11 n(HT40)/ac(VHT40):

channel	Frequency(MHz)	channel	Frequency(MHz)
38	5190	151	5755
46	5230	159	5795

For 802.11 ac(VHT80):

channel	Frequency(MHz)	channel	Frequency(MHz)
42	5210	155	5775

Test Mode Description:

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Transmitting duty cycle is no less 98%.

Test Items	Mode	Data Rate	Channel	TX/RX
Radiated Emissions	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(VHT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Duty Cycle	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(VHT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Band Edge	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(VHT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
6dB Bandwidth	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX

	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(VHT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
26dB Bandwidth and 99% Occupied Bandwidth	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(VHT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Conducted Output Power	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(VHT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Power Spectral Density	802.11a	6 Mbps	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11n(HT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT20)	MCS0	U-NII-1 36/40/48 U-NII-3 149/155/165	TX
	802.11ac(VHT40)	MCS0	U-NII-1 38/46 U-NII-3 151/159	TX
	802.11ac(VHT80)	MCS0	U-NII-1 42 U-NII-3 155	TX
Frequency Stability	Un-modulation	/	U-NII-1 36/40/48 U-NII-3 149/155/165	TX

7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	2017-09-15	2018-09-14
2.	LISN	R&S	ENV216	101215	2017-09-15	2018-09-14
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-15	2018-09-14
3m Semi-anechoic Chamber for Radiation Emissions Test site						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP30	100091	2018-04-20	2019-04-19
2	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2018-05-18	2019-05-17
3	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2018-04-07	2019-04-06
4	Coaxial Cable (above 1GHz)	Top	1GHz-18GHz	EW02014-7	2018-04-07	2019-04-06
5	Spectrum Analyzer	R&S	FSP40	100501	2017-10-20	2018-10-19
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2017-09-14	2018-09-13
7	Microwave Broadband Preamplifier	SCHWARZBECK	BBV 9721	100472	2017-10-25	2018-10-24
8	Cable	Top	18GHz-40GHz	-	2017-10-25	2018-10-24
3m Semi-anechoic Chamber for Radiation Emissions Test site						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	2018-04-20	2019-04-19
2	Ative Loop Antenna	Beijing Dazhi	ZN30900A	-	2018-04-17	2019-04-16
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2018-04-19	2019-04-18
4	Amplifier	ANRITSU	MH648A	M43381	2018-04-20	2019-04-19
5	Cable	HUBER+SUHNER	CBL2	525178	2018-04-20	2019-04-19
6	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2017-09-12	2018-09-11
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Spectrum Analyzer	Agilent	N9020A	MY49100060	2017-09-15	2018-09-14
2.	Spectrum Analyzer	R&S	FSP40	100501	2017-10-20	2018-10-19
3.	Coaxial Cable	Top	10Hz-30GHz	-	2017-09-12	2018-09-11

4	DC Block	Gwave	GDCB-3G-N-SMA	140307001	2017-09-12	2018-09-11
5.	Humidity Chamber	GF	GTH-225-40-1P	IAA061213	2017-09-15	2018-09-14
6.	Antenna Connector*	/	/	/	2017-09-12	2018-09-11

“*”: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

7.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

7.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (A mains 150KHz~30MHz)

7.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave, Tianhe District, Guangzhou, Guangdong, China.

8 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

8.1 E.U.T. Operation

Operating Environment :

Temperature:	21.5 °C
Humidity:	51.9 % RH

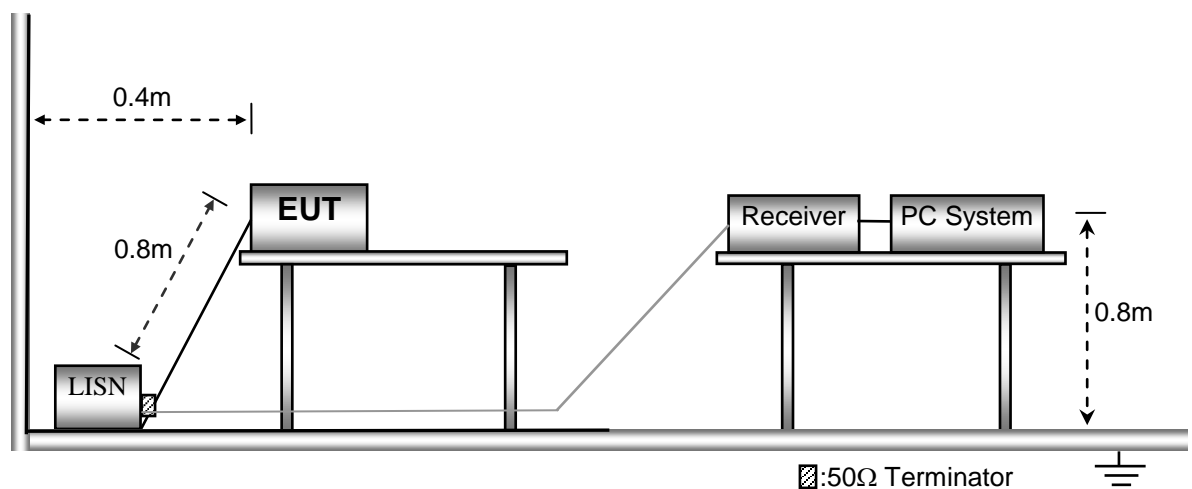
Atmospheric Pressure: 101.2kPa

EUT Operation : Transmitting mode

The test was performed in Transmitting mode(For WIFI), Only the worst case 802.11a mode were record in the report.

8.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



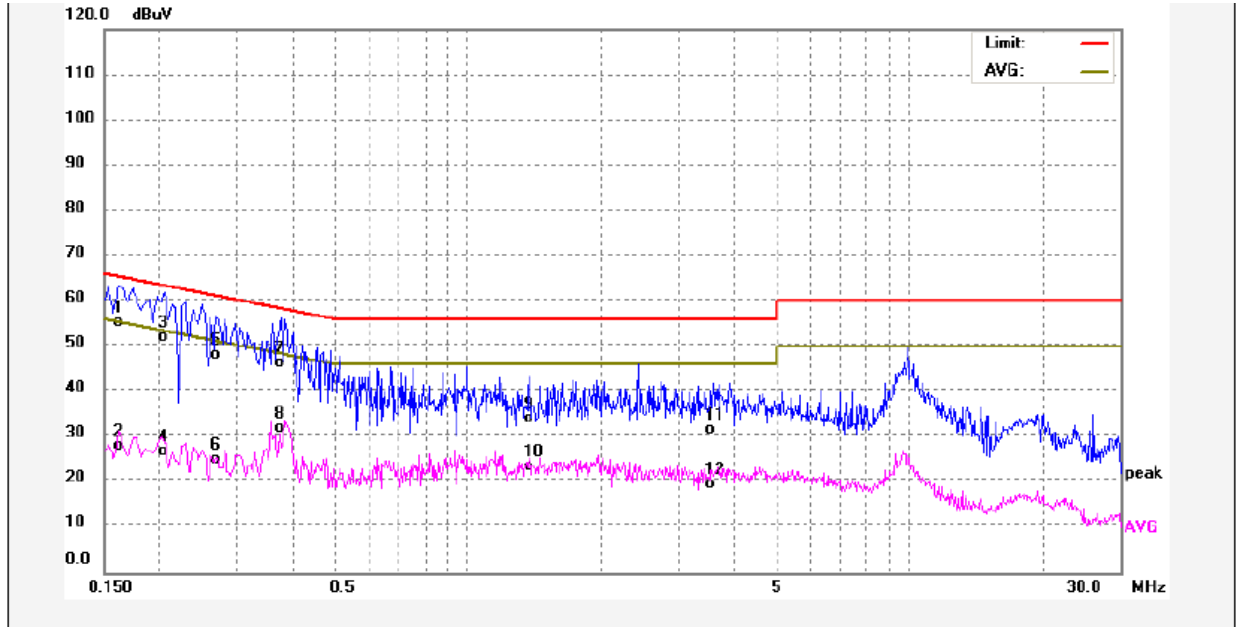
8.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

8.4 Conducted Emission Test Result

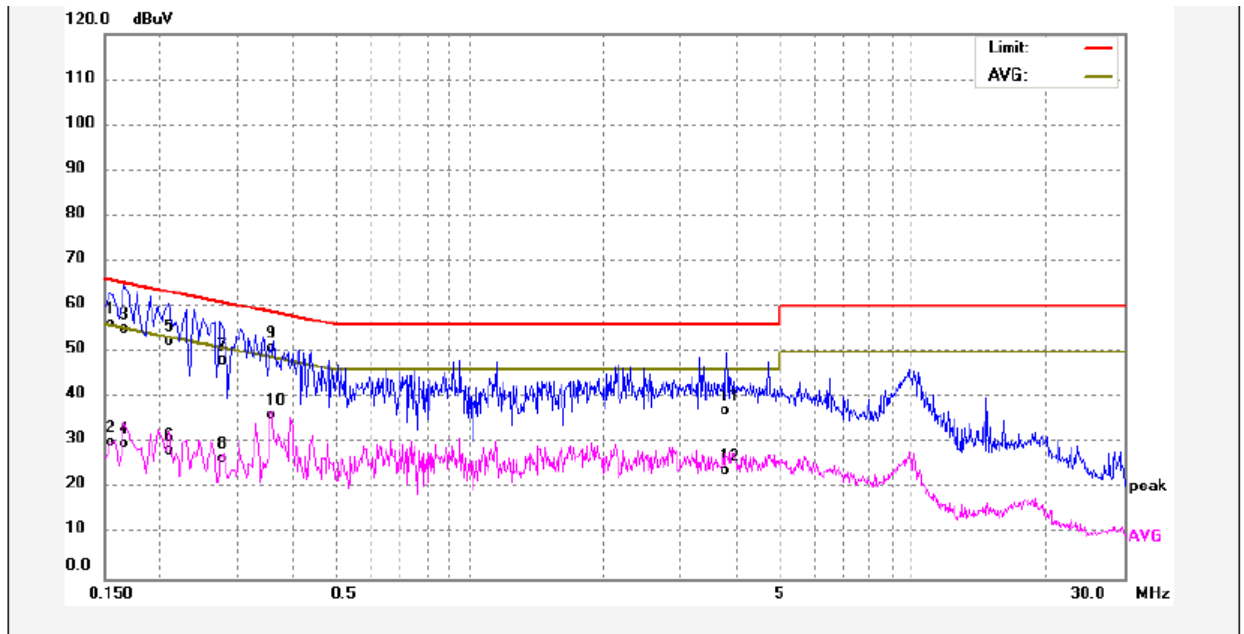
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1620	45.29	9.94	55.23	65.36	-10.13	QP	
2	0.1620	18.23	9.94	28.17	55.36	-27.19	AVG	
3	0.2040	42.16	9.92	52.08	63.44	-11.36	QP	
4	0.2040	17.06	9.92	26.98	53.44	-26.46	AVG	
5	0.2700	38.17	10.00	48.17	61.12	-12.95	QP	
6	0.2700	15.04	10.00	25.04	51.12	-26.08	AVG	
7	0.3780	36.32	10.04	46.36	58.32	-11.96	QP	
8	0.3780	21.88	10.04	31.92	48.32	-16.40	AVG	
9	1.3779	23.80	10.26	34.06	56.00	-21.94	QP	
10	1.3779	13.16	10.26	23.42	46.00	-22.58	AVG	
11	3.5940	21.31	10.26	31.57	56.00	-24.43	QP	
12	3.5940	9.54	10.26	19.80	46.00	-26.20	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	46.34	10.02	56.36	65.78	-9.42	QP	
2	0.1539	20.16	10.02	30.18	55.78	-25.60	AVG	
3	0.1660	45.07	9.90	54.97	65.15	-10.18	QP	
4	0.1660	19.82	9.90	29.72	55.15	-25.43	AVG	
5	0.2100	42.27	9.93	52.20	63.20	-11.00	QP	
6	0.2100	18.32	9.93	28.25	53.20	-24.95	AVG	
7	0.2740	38.24	10.00	48.24	60.99	-12.75	QP	
8	0.2740	16.54	10.00	26.54	50.99	-24.45	AVG	
9	0.3620	40.80	10.05	50.85	58.68	-7.83	QP	
10	0.3620	26.03	10.05	36.08	48.68	-12.60	AVG	
11	3.8100	26.68	10.26	36.94	56.00	-19.06	QP	
12	3.8100	13.65	10.26	23.91	46.00	-22.09	AVG	

9 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.407

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Distance	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

9.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

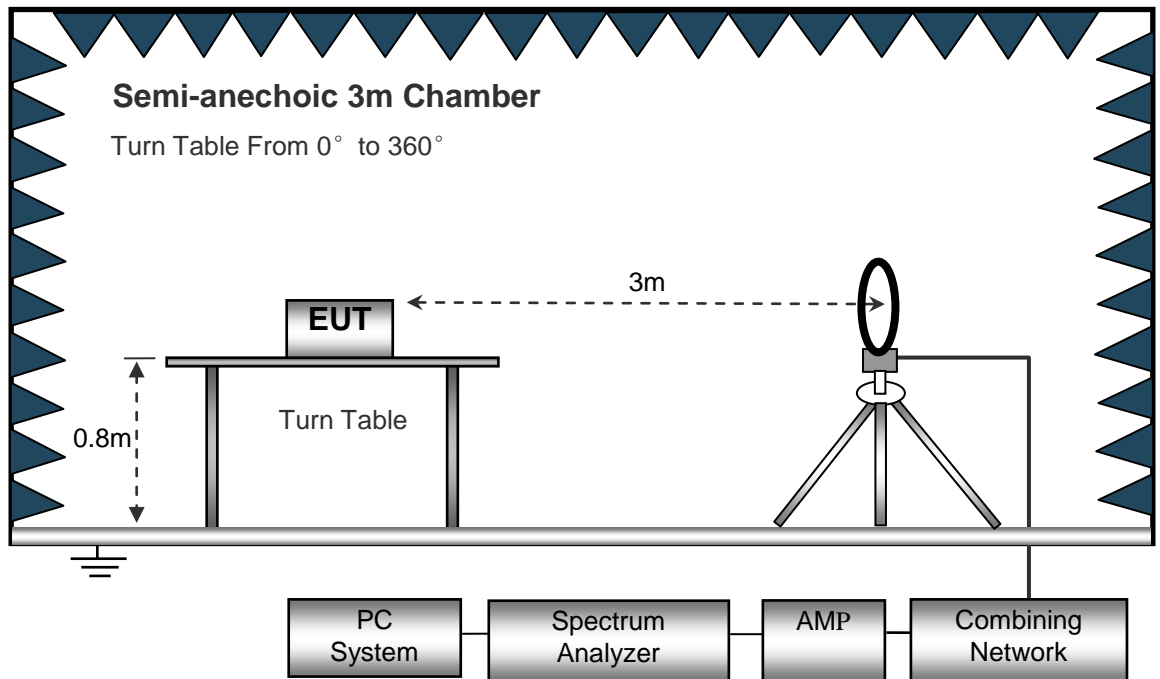
EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

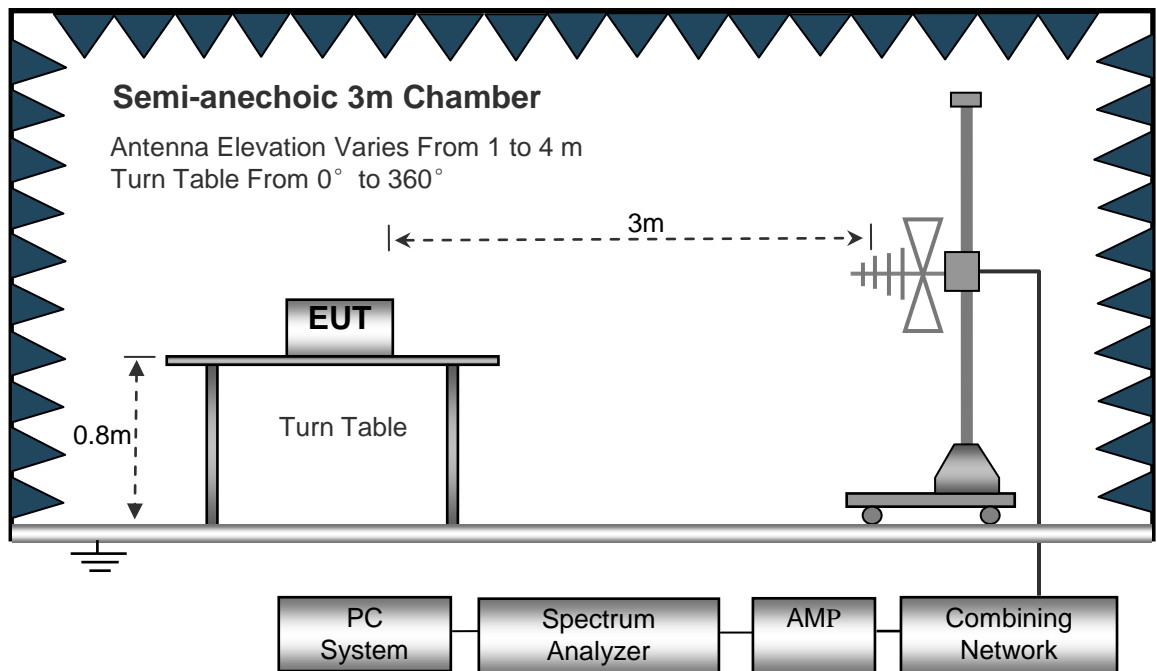
9.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.

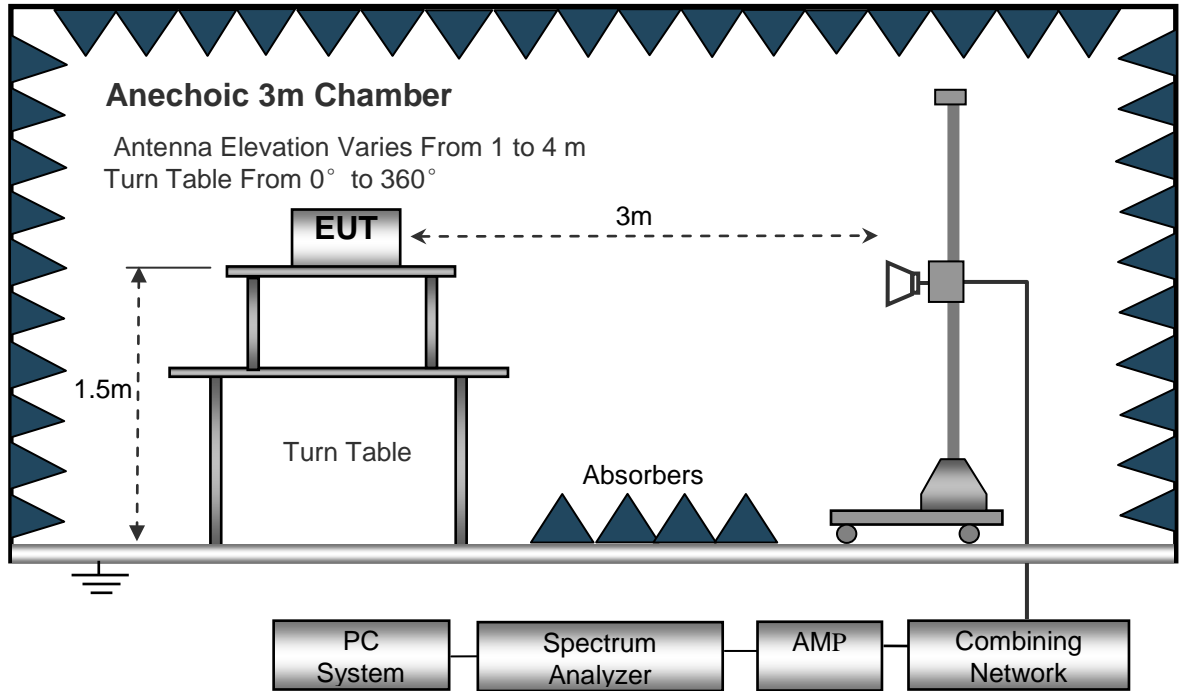
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



9.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed Auto
 IF Bandwidth..... 10kHz
 Video Bandwidth..... 10kHz
 Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed Auto
 Detector PK
 Resolution Bandwidth..... 100kHz
 Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed Auto
 Detector PK
 Resolution Bandwidth..... 1MHz
 Video Bandwidth..... 3MHz
 Detector Ave.
 Resolution Bandwidth..... 1MHz
 Video Bandwidth..... 10Hz

9.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the EUT in X axis,so the worst data were shown as follow.
8. A 2.4GHz high-pass filter is used during radiated emissions above 1GHz measurement.

9.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

9.6 Summary of Test Results

Test Frequency: 9kHz ~ 30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency : 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11a U-NII-1 low Channel 5180MHz									
601.43	45.45	QP	150	1.3	H	-7.75	37.70	46.00	-8.30
601.43	47.56	QP	83	1.8	V	-7.75	39.81	46.00	-6.19
4506.07	48.74	PK	205	2.0	H	-1.54	47.20	74.00	-26.80
4506.07	40.98	Ave	205	2.0	H	-1.54	39.44	54.00	-14.56
5146.24	46.93	PK	111	1.1	H	-0.75	46.18	74.00	-27.82
5146.24	41.43	Ave	111	1.1	H	-0.75	40.68	54.00	-13.32
10360.00	36.47	PK	102	1.1	H	5.33	41.80	74.00	-32.20
10360.00	24.16	Ave	102	1.1	H	5.33	29.49	54.00	-24.51
15540.00	43.93	PK	176	1.4	H	5.29	49.22	74.00	-24.78
15540.00	38.57	Ave	176	1.4	H	5.29	43.86	54.00	-10.14
802.11a U-NII-1 middle channel 5200MHz									
601.43	46.02	QP	102	1.7	H	-7.75	38.27	46.00	-7.73
601.43	46.14	QP	253	1.0	V	-7.75	38.39	46.00	-7.61
4533.45	50.03	PK	25	1.8	H	-1.64	48.39	74.00	-25.61
4533.45	40.04	Ave	25	1.8	H	-1.64	38.40	54.00	-15.60
5123.88	48.76	PK	101	1.7	H	-0.91	47.85	74.00	-26.15
5123.88	42.72	Ave	101	1.7	H	-0.91	41.81	54.00	-12.19
10400.00	36.41	PK	50	1.2	H	5.21	41.62	74.00	-32.38
10400.00	23.12	Ave	50	1.2	H	5.21	28.33	54.00	-25.67
15600.00	45.82	PK	160	1.6	H	5.30	51.12	74.00	-22.88
15600.00	37.00	Ave	160	1.6	H	5.30	42.30	54.00	-11.70

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11a U-NII-1 High channel 5240MHz									
601.43	44.74	QP	78	1.7	H	-7.75	36.99	46.00	-9.01
601.43	45.13	QP	62	2.0	V	-7.75	37.38	46.00	-8.62
4510.27	43.28	PK	160	1.6	H	-1.56	41.72	74.00	-32.28
4510.27	39.33	Ave	160	1.6	H	-1.56	37.77	54.00	-16.23
5140.13	43.11	PK	70	1.1	H	-0.81	42.30	74.00	-31.70
5140.13	40.24	Ave	70	1.1	H	-0.81	39.43	54.00	-14.57
10480.00	36.42	PK	111	1.3	H	5.14	41.56	74.00	-32.44
10480.00	22.96	Ave	111	1.3	H	5.14	28.10	54.00	-25.90
15720.00	46.24	PK	259	1.3	H	5.10	51.34	74.00	-22.66
15720.00	38.35	Ave	259	1.3	H	5.10	43.45	54.00	-10.55
802.11a U-NII-3 low Channel 5745MHz									
601.43	43.39	QP	271	1.5	H	-7.75	35.64	46.00	-10.36
601.43	49.42	QP	100	1.9	V	-7.75	41.67	46.00	-4.33
4516.68	42.01	PK	6	1.3	H	-1.80	40.21	74.00	-33.79
4516.68	38.19	Ave	6	1.3	H	-1.80	36.39	54.00	-17.61
5122.57	37.81	PK	357	1.1	H	-0.96	36.85	74.00	-37.15
5122.57	23.26	Ave	357	1.1	H	-0.96	22.30	54.00	-31.70
11490.00	45.95	PK	264	1.3	H	5.93	51.88	74.00	-22.12
11490.00	37.92	Ave	264	1.3	H	5.93	43.85	54.00	-10.15
17235.00	46.68	PK	12	1.8	H	10.35	57.03	74.00	-16.97
17235.00	37.88	Ave	12	1.8	H	10.35	48.23	54.00	-5.77

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11a U-NII-3 middle channel 5785MHz									
601.43	44.23	QP	258	1.8	H	-7.75	36.48	46.00	-9.52
601.43	48.59	QP	258	1.1	V	-7.75	40.84	46.00	-5.16
4536.33	42.17	PK	52	1.7	H	-1.59	40.58	74.00	-33.42
4536.33	36.42	Ave	52	1.7	H	-1.59	34.83	54.00	-19.17
5143.82	37.20	PK	159	1.0	H	-0.95	36.25	74.00	-37.75
5143.82	23.17	Ave	159	1.0	H	-0.95	22.22	54.00	-31.78
11570.00	46.78	PK	91	1.2	H	5.81	52.59	74.00	-21.41
11570.00	39.02	Ave	91	1.2	H	5.81	44.83	54.00	-9.17
17355.00	45.59	PK	295	1.6	H	10.37	55.96	74.00	-18.04
17355.00	37.26	Ave	295	1.6	H	10.37	47.63	54.00	-6.37
802.11a U-NII-3 High channel 5825MHz									
601.43	45.53	QP	284	1.2	H	-7.75	37.78	46.00	-8.22
601.43	48.16	QP	55	1.5	V	-7.75	40.41	46.00	-5.59
4532.12	42.72	PK	67	1.8	H	-1.68	41.04	74.00	-32.96
4532.12	37.92	Ave	67	1.8	H	-1.68	36.24	54.00	-17.76
5139.95	36.42	PK	252	1.9	H	-0.96	35.46	74.00	-38.54
5139.95	22.79	Ave	252	1.9	H	-0.96	21.83	54.00	-32.17
11650.00	46.49	PK	209	1.9	H	5.84	52.33	74.00	-21.67
11650.00	40.00	Ave	209	1.9	H	5.84	45.84	54.00	-8.16
17475.00	45.78	PK	73	1.7	H	10.41	56.19	74.00	-17.81
17475.00	39.02	Ave	73	1.7	H	10.41	49.43	54.00	-4.57

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11n(HT20) U-NII-1 low Channel 5180MHz									
601.43	45.70	QP	260	1.2	H	-7.75	37.95	46.00	-8.05
601.43	47.64	QP	282	1.5	V	-7.75	39.89	46.00	-6.11
4504.97	47.50	PK	115	1.5	H	-1.54	45.96	74.00	-28.04
4504.97	39.97	Ave	115	1.5	H	-1.54	38.43	54.00	-15.57
5147.85	44.99	PK	215	1.8	H	-0.75	44.24	74.00	-29.76
5147.85	40.07	Ave	215	1.8	H	-0.75	39.32	54.00	-14.68
10360.00	37.66	PK	341	1.5	H	5.33	42.99	74.00	-31.01
10360.00	23.79	Ave	341	1.5	H	5.33	29.12	54.00	-24.88
15540.00	42.60	PK	170	1.3	H	5.29	47.89	74.00	-26.11
15540.00	36.58	Ave	170	1.3	H	5.29	41.87	54.00	-12.13
802.11n(HT20) U-NII-1 middle channel 5200MHz									
601.43	45.04	QP	215	1.3	H	-7.75	37.29	46.00	-8.71
601.43	46.94	QP	121	1.5	V	-7.75	39.19	46.00	-6.81
4523.81	47.32	PK	135	1.4	H	-1.64	45.68	74.00	-28.32
4523.81	43.88	Ave	135	1.4	H	-1.64	42.24	54.00	-11.76
5136.64	45.55	PK	113	2.0	H	-0.91	44.64	74.00	-29.36
5136.64	42.89	Ave	113	2.0	H	-0.91	41.98	54.00	-12.02
10400.00	38.38	PK	82	1.9	H	5.21	43.59	74.00	-30.41
10400.00	22.58	Ave	82	1.9	H	5.21	27.79	54.00	-26.21
15600.00	45.09	PK	238	1.4	H	5.30	50.39	74.00	-23.61
15600.00	38.84	Ave	238	1.4	H	5.30	44.14	54.00	-9.86

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11n(HT20) U-NII-1 High channel 5240MHz									
601.43	44.31	QP	127	1.9	H	-7.75	36.56	46.00	-9.44
601.43	46.52	QP	44	1.4	V	-7.75	38.77	46.00	-7.23
4516.56	44.72	PK	159	1.4	H	-1.56	43.16	74.00	-30.84
4516.56	40.22	Ave	159	1.4	H	-1.56	38.66	54.00	-15.34
5126.22	43.95	PK	214	1.6	H	-0.81	43.14	74.00	-30.86
5126.22	40.79	Ave	214	1.6	H	-0.81	39.98	54.00	-14.02
10480.00	39.49	PK	273	1.9	H	5.14	44.63	74.00	-29.37
10480.00	22.63	Ave	273	1.9	H	5.14	27.77	54.00	-26.23
15720.00	45.26	PK	225	1.9	H	5.10	50.36	74.00	-23.64
15720.00	37.79	Ave	225	1.9	H	5.10	42.89	54.00	-11.11
802.11n(HT20) U-NII-3 low Channel 5745MHz									
601.43	44.48	QP	356	1.3	H	-7.75	36.73	46.00	-9.27
601.43	49.09	QP	115	1.9	V	-7.75	41.34	46.00	-4.66
4539.96	42.44	PK	332	1.5	H	-1.80	40.64	74.00	-33.36
4539.96	38.82	Ave	332	1.5	H	-1.80	37.02	54.00	-16.98
5136.47	38.81	PK	130	1.8	H	-0.96	37.85	74.00	-36.15
5136.47	23.84	Ave	130	1.8	H	-0.96	22.88	54.00	-31.12
11490.00	46.24	PK	199	1.4	H	5.93	52.17	74.00	-21.83
11490.00	38.11	Ave	199	1.4	H	5.93	44.04	54.00	-9.96
17235.00	45.23	PK	149	1.6	H	10.35	55.58	74.00	-18.42
17235.00	37.42	Ave	149	1.6	H	10.35	47.77	54.00	-6.23

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT20) U-NII-3 middle channel 5785MHz									
601.43	44.87	QP	274	1.2	H	-7.75	37.12	46.00	-8.88
601.43	47.68	QP	3	1.8	V	-7.75	39.93	46.00	-6.07
4529.74	41.46	PK	111	1.6	H	-1.59	39.87	74.00	-34.13
4529.74	39.22	Ave	111	1.6	H	-1.59	37.63	54.00	-16.37
5148.82	39.23	PK	9	1.5	H	-0.95	38.28	74.00	-35.72
5148.82	23.38	Ave	9	1.5	H	-0.95	22.43	54.00	-31.57
11570.00	46.94	PK	159	1.2	H	5.81	52.75	74.00	-21.25
11570.00	39.02	Ave	159	1.2	H	5.81	44.83	54.00	-9.17
17355.00	46.85	PK	74	2.0	H	10.37	57.22	74.00	-16.78
17355.00	31.96	Ave	74	2.0	H	10.37	42.33	54.00	-11.67
802.11n(HT20) U-NII-3 High channel 5825MHz									
601.43	44.36	QP	114	1.7	H	-7.75	36.61	46.00	-9.39
601.43	46.78	QP	93	1.2	V	-7.75	39.03	46.00	-6.97
4536.39	43.48	PK	10	1.9	H	-1.68	41.80	74.00	-32.20
4536.39	40.90	Ave	10	1.9	H	-1.68	39.22	54.00	-14.78
5142.41	37.09	PK	179	1.6	H	-0.96	36.13	74.00	-37.87
5142.41	23.46	Ave	179	1.6	H	-0.96	22.50	54.00	-31.50
11650.00	46.21	PK	122	1.7	H	5.84	52.05	74.00	-21.95
11650.00	38.91	Ave	122	1.7	H	5.84	44.75	54.00	-9.25
17475.00	46.92	PK	32	1.7	H	10.41	57.33	74.00	-16.67
17475.00	30.98	Ave	32	1.7	H	10.41	41.39	54.00	-12.61

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11ac(VHT20) U-NII-1 low Channel 5180MHz									
601.43	46.81	QP	240	1.3	H	-7.75	39.06	46.00	-6.94
601.43	47.42	QP	91	1.1	V	-7.75	39.67	46.00	-6.33
4511.56	40.30	PK	55	1.3	H	-1.80	38.50	74.00	-35.50
4511.56	38.41	Ave	55	1.3	H	-1.80	36.61	54.00	-17.39
5132.07	45.79	PK	282	1.6	H	-0.94	44.85	74.00	-29.15
5132.07	32.32	Ave	282	1.6	H	-0.94	31.38	54.00	-22.62
10360.00	42.09	PK	100	1.3	H	5.33	47.42	74.00	-26.58
10360.00	27.18	Ave	100	1.3	H	5.33	32.51	54.00	-21.49
15540.00	43.87	PK	185	1.2	H	5.29	49.16	74.00	-24.84
15540.00	38.58	Ave	185	1.2	H	5.29	43.87	54.00	-10.13
802.11ac(VHT20) U-NII-1 middle channel 5200MHz									
601.43	46.18	QP	308	1.4	H	-7.75	38.43	46.00	-7.57
601.43	47.37	QP	156	1.6	V	-7.75	39.62	46.00	-6.38
4534.37	43.08	PK	245	1.2	H	-1.69	41.39	74.00	-32.61
4534.37	40.34	Ave	245	1.2	H	-1.69	38.65	54.00	-15.35
5127.52	41.11	PK	210	1.3	H	-0.91	40.20	74.00	-33.80
5127.52	40.03	Ave	210	1.3	H	-0.91	39.12	54.00	-14.88
10400.00	41.10	PK	91	2.0	H	5.21	46.31	74.00	-27.69
10400.00	22.49	Ave	91	2.0	H	5.21	27.70	54.00	-26.30
15600.00	46.43	PK	121	1.6	H	5.30	51.73	74.00	-22.27
15600.00	37.13	Ave	121	1.6	H	5.30	42.43	54.00	-11.57

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11ac(VHT20) U-NII-1 High channel 5240MHz									
601.43	45.82	QP	212	2.0	H	-7.75	38.07	46.00	-7.93
601.43	46.75	QP	99	1.8	V	-7.75	39.00	46.00	-7.00
4538.90	41.65	PK	25	1.9	H	-1.77	39.88	74.00	-34.12
4538.90	40.62	Ave	25	1.9	H	-1.77	38.85	54.00	-15.15
5114.70	46.92	PK	213	1.9	H	-0.79	46.13	74.00	-27.87
5114.70	44.69	Ave	213	1.9	H	-0.79	43.90	54.00	-10.10
10480.00	40.04	PK	76	1.7	H	5.14	45.18	74.00	-28.82
10480.00	21.74	Ave	76	1.7	H	5.14	26.88	54.00	-27.12
15720.00	45.67	PK	59	1.3	H	5.10	50.77	74.00	-23.23
15720.00	39.48	Ave	59	1.3	H	5.10	44.58	54.00	-9.42
802.11ac(VHT20) U-NII-3 low Channel 5745MHz									
601.43	44.61	QP	343	1.9	H	-7.75	36.86	46.00	-9.14
601.43	49.04	QP	120	1.8	V	-7.75	41.29	46.00	-4.71
4513.47	42.70	PK	40	1.2	H	-1.64	41.06	74.00	-32.94
4513.47	39.63	Ave	40	1.2	H	-1.64	37.99	54.00	-16.01
5111.60	40.28	PK	298	2.0	H	-0.84	39.44	74.00	-34.56
5111.60	21.50	Ave	298	2.0	H	-0.84	20.66	54.00	-33.34
11490.00	46.55	PK	258	1.1	H	5.93	52.48	74.00	-21.52
11490.00	38.56	Ave	258	1.1	H	5.93	44.49	54.00	-9.51
17235.00	45.26	PK	114	1.6	H	10.35	55.61	74.00	-18.39
17235.00	33.28	Ave	114	1.6	H	10.35	43.63	54.00	-10.37

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11ac(VHT20) U-NII-3 middle channel 5785MHz									
601.43	44.49	QP	142	1.6	H	-7.75	36.74	46.00	-9.26
601.43	47.16	QP	217	1.5	V	-7.75	39.41	46.00	-6.59
4500.85	43.25	PK	280	1.6	H	-1.63	41.62	74.00	-32.38
4500.85	40.92	Ave	280	1.6	H	-1.63	39.29	54.00	-14.71
5140.04	40.68	PK	105	1.3	H	-0.73	39.95	74.00	-34.05
5140.04	22.87	Ave	105	1.3	H	-0.73	22.14	54.00	-31.86
11570.00	46.42	PK	223	1.6	H	5.81	52.23	74.00	-21.77
11570.00	38.68	Ave	223	1.6	H	5.81	44.49	54.00	-9.51
17355.00	45.00	PK	346	1.9	H	10.37	55.37	74.00	-18.63
17355.00	29.89	Ave	346	1.9	H	10.37	40.26	54.00	-13.74
802.11ac(VHT20) U-NII-3 High channel 5825MHz									
601.43	44.77	QP	213	1.3	H	-7.75	37.02	46.00	-8.98
601.43	48.64	QP	124	1.4	V	-7.75	40.89	46.00	-5.11
4535.79	44.33	PK	308	1.1	H	-1.67	42.66	74.00	-31.34
4535.79	40.06	Ave	308	1.1	H	-1.67	38.39	54.00	-15.61
5132.00	41.18	PK	47	2.0	H	-0.83	40.35	74.00	-33.65
5132.00	21.85	Ave	47	2.0	H	-0.83	21.02	54.00	-32.98
11650.00	46.18	PK	316	1.3	H	5.84	52.02	74.00	-21.98
11650.00	37.56	Ave	316	1.3	H	5.84	43.40	54.00	-10.60
17475.00	45.65	PK	38	1.1	H	10.41	56.06	74.00	-17.94
17475.00	32.68	Ave	38	1.1	H	10.41	43.09	54.00	-10.91

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11n(HT40) U-NII-1 low Channel 5190MHz									
601.43	44.30	QP	0	1.2	H	-7.75	36.55	46.00	-9.45
601.43	47.57	QP	212	1.4	V	-7.75	39.82	46.00	-6.18
4537.02	40.08	PK	119	1.6	H	-1.50	38.58	74.00	-35.42
4537.02	36.89	Ave	119	1.6	H	-1.50	35.39	54.00	-18.61
5110.02	45.63	PK	86	2.0	H	-0.86	44.77	74.00	-29.23
5110.02	38.95	Ave	86	2.0	H	-0.86	38.09	54.00	-15.91
10380.00	39.14	PK	332	1.6	H	5.26	44.40	74.00	-29.60
10380.00	20.38	Ave	332	1.6	H	5.26	25.64	54.00	-28.36
15570.00	45.48	PK	248	1.2	H	5.13	50.61	74.00	-23.39
15570.00	37.08	Ave	248	1.2	H	5.13	42.21	54.00	-11.79
802.11n(HT40) U-NII-1 High channel 5230MHz									
601.43	44.29	QP	71	1.4	H	-7.75	36.54	46.00	-9.46
601.43	47.85	QP	89	1.7	V	-7.75	40.10	46.00	-5.90
4526.61	42.72	PK	222	1.6	H	-1.63	41.09	74.00	-32.91
4526.61	40.39	Ave	222	1.6	H	-1.63	38.76	54.00	-15.24
5147.50	46.00	PK	51	1.7	H	-0.90	45.10	74.00	-28.90
5147.50	42.97	Ave	51	1.7	H	-0.90	42.07	54.00	-11.93
10460.00	40.90	PK	59	1.4	H	5.28	46.18	74.00	-27.82
10460.00	22.58	Ave	59	1.4	H	5.28	27.86	54.00	-26.14
15690.00	46.44	PK	215	1.1	H	5.02	51.46	74.00	-22.54
15690.00	39.65	Ave	215	1.1	H	5.02	44.67	54.00	-9.33

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11n(HT40) U-NII-3 low Channel 5755MHz									
601.43	45.86	QP	320	1.3	H	-7.75	38.11	46.00	-7.89
601.43	49.46	QP	256	1.3	V	-7.75	41.71	46.00	-4.29
4535.57	37.16	PK	18	1.6	H	-1.69	35.47	74.00	-38.53
4535.57	32.50	Ave	18	1.6	H	-1.69	30.81	54.00	-23.19
5130.91	39.77	PK	225	1.5	H	-0.74	39.03	74.00	-34.97
5130.91	22.09	Ave	225	1.5	H	-0.74	21.35	54.00	-32.65
11510.00	44.93	PK	128	1.8	H	5.88	50.81	74.00	-23.19
11510.00	41.12	Ave	128	1.8	H	5.88	47.00	54.00	-7.00
17265.00	46.71	PK	52	1.4	H	10.42	57.13	74.00	-16.87
17265.00	33.88	Ave	52	1.4	H	10.42	44.30	54.00	-9.70
802.11n(HT40) U-NII-3 High channel 5795MHz									
601.43	44.27	QP	321	1.6	H	-7.75	36.52	46.00	-9.48
601.43	48.57	QP	218	1.9	V	-7.75	40.82	46.00	-5.18
4503.59	45.89	PK	79	1.5	H	-1.69	44.20	74.00	-29.80
4503.59	43.38	Ave	79	1.5	H	-1.69	41.69	54.00	-12.31
5115.58	40.08	PK	177	1.3	H	-0.89	39.19	74.00	-34.81
5115.58	37.07	Ave	177	1.3	H	-0.89	36.18	54.00	-17.82
11590.00	44.73	PK	16	1.1	H	5.63	50.36	74.00	-23.64
11590.00	35.94	Ave	16	1.1	H	5.63	41.57	54.00	-12.43
17385.00	46.63	PK	282	1.2	H	10.63	57.26	74.00	-16.74
17385.00	33.74	Ave	282	1.2	H	10.63	44.37	54.00	-9.63

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11ac(VHT40) U-NII-1 low Channel 5190MHz									
601.43	45.10	QP	133	1.2	H	-7.75	37.35	46.00	-8.65
601.43	49.40	QP	154	1.9	V	-7.75	41.65	46.00	-4.35
4526.93	38.92	PK	115	1.4	H	-1.70	37.22	74.00	-36.78
4526.93	34.05	Ave	115	1.4	H	-1.70	32.35	54.00	-21.65
5137.92	49.00	PK	84	1.3	H	-0.78	48.22	74.00	-25.78
5137.92	40.62	Ave	84	1.3	H	-0.78	39.84	54.00	-14.16
10380.00	38.16	PK	325	1.4	H	5.26	43.42	74.00	-30.58
10380.00	34.57	Ave	325	1.4	H	5.26	39.83	54.00	-14.17
15570.00	46.38	PK	152	1.2	H	5.13	51.51	74.00	-22.49
15570.00	31.06	Ave	152	1.2	H	5.13	36.19	54.00	-17.81
802.11ac(VHT40) U-NII-1 High channel 5230MHz									
601.43	44.40	QP	222	1.5	H	-7.75	36.65	46.00	-9.35
601.43	49.46	QP	275	1.1	V	-7.75	41.71	46.00	-4.29
4529.45	40.06	PK	217	1.1	H	-1.50	38.56	74.00	-35.44
4529.45	35.67	Ave	217	1.1	H	-1.50	34.17	54.00	-19.83
5149.70	40.43	PK	109	1.3	H	-0.85	39.58	74.00	-34.42
5149.70	34.19	Ave	109	1.3	H	-0.85	33.34	54.00	-20.66
10460.00	45.02	PK	111	1.5	H	5.28	50.30	74.00	-23.70
10460.00	37.05	Ave	111	1.5	H	5.28	42.33	54.00	-11.67
15690.00	46.75	PK	15	1.9	H	5.02	51.77	74.00	-22.23
15690.00	32.16	Ave	15	1.9	H	5.02	37.18	54.00	-16.82

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11ac(VHT40) U-NII-3 low Channel 5755MHz									
601.43	45.11	QP	69	1.9	H	-7.75	37.36	46.00	-8.64
601.43	46.72	QP	156	1.2	V	-7.75	38.97	46.00	-7.03
4528.11	41.81	PK	331	1.7	H	-1.79	40.02	74.00	-33.98
4528.11	40.59	Ave	331	1.7	H	-1.79	38.80	54.00	-15.20
5128.33	41.91	PK	337	1.6	H	-0.81	41.10	74.00	-32.90
5128.33	37.05	Ave	337	1.6	H	-0.81	36.24	54.00	-17.76
11510.00	46.52	PK	122	1.3	H	5.88	52.40	74.00	-21.60
11510.00	36.54	Ave	122	1.3	H	5.88	42.42	54.00	-11.58
17265.00	45.70	PK	105	1.2	H	10.42	56.12	74.00	-17.88
17265.00	33.16	Ave	105	1.2	H	10.42	43.58	54.00	-10.42
802.11ac(VHT40) U-NII-3 High channel 5795MHz									
601.43	46.36	QP	303	1.6	H	-7.75	38.61	46.00	-7.39
601.43	49.07	QP	275	1.7	V	-7.75	41.32	46.00	-4.68
4507.41	43.20	PK	136	1.7	H	-1.54	41.66	74.00	-32.34
4507.41	39.92	Ave	136	1.7	H	-1.54	38.38	54.00	-15.62
5143.83	42.76	PK	221	1.4	H	-0.89	41.87	74.00	-32.13
5143.83	38.13	Ave	221	1.4	H	-0.89	37.24	54.00	-16.76
11590.00	46.44	PK	119	2.0	H	5.63	52.07	74.00	-21.93
11590.00	38.19	Ave	119	2.0	H	5.63	43.82	54.00	-10.18
17385.00	45.17	PK	93	1.2	H	10.63	55.80	74.00	-18.20
17385.00	32.89	Ave	93	1.2	H	10.63	43.52	54.00	-10.48

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
802.11ac(VHT80) U-NII-1 low Channel 5210MHz									
601.43	47.06	QP	344	1.4	H	-7.75	39.31	46.00	-6.69
601.43	48.53	QP	247	1.5	V	-7.75	40.78	46.00	-5.22
4526.83	43.94	PK	150	1.2	H	-1.77	42.17	74.00	-31.83
4526.83	40.62	Ave	150	1.2	H	-1.77	38.85	54.00	-15.15
5115.44	42.50	PK	167	1.5	H	-0.82	41.68	74.00	-32.32
5115.44	40.56	Ave	167	1.5	H	-0.82	39.74	54.00	-14.26
10420.00	40.52	PK	162	1.0	H	4.65	45.17	74.00	-28.83
10420.00	36.93	Ave	162	1.0	H	4.65	41.58	54.00	-12.42
15630.00	46.04	PK	59	1.9	H	5.10	51.14	74.00	-22.86
15630.00	33.24	Ave	59	1.9	H	5.10	38.34	54.00	-15.66
802.11ac(VHT80) U-NII-3 low Channel 5775MHz									
601.43	46.75	QP	22	1.5	H	-7.75	39.00	46.00	-7.00
601.43	48.73	QP	88	1.8	V	-7.75	40.98	46.00	-5.02
4510.01	42.46	PK	297	1.6	H	-1.75	40.71	74.00	-33.29
4510.01	40.13	Ave	297	1.6	H	-1.75	38.38	54.00	-15.62
5121.90	43.34	PK	154	1.1	H	-0.95	42.39	74.00	-31.61
5121.90	40.45	Ave	154	1.1	H	-0.95	39.50	54.00	-14.50
11550.00	43.67	PK	123	1.2	H	4.83	48.50	74.00	-25.50
11550.00	38.46	Ave	123	1.2	H	4.83	43.29	54.00	-10.71
17325.00	46.67	PK	19	1.7	H	10.55	57.22	74.00	-16.78
17325.00	32.01	Ave	19	1.7	H	10.55	42.56	54.00	-11.44

Test Frequency: 18GHz~40GHz

The measurements were more than 20 dB below the limit and not reported.

10 Duty cycle

Test Requirement:	47 CFR Part 15C 15.407 and 789033 D02 General UNII Test Procedures New Rules v02r01 , Section (B)
Test Method:	ANSI C63.10: 2013
Test Limit:	N/A
Test Result:	PASS
Remark:	Only the worst case is recorded in the report.

10.1 Summary of Test Results

Please refer to Annex for test report: Annex B

11 Band Edge

Test Requirement:	FCC CFR47 Part 15 Section 15.407
Test Method:	ANSI C63.10 2013
Test Limit:	(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27dBm/MHz. (2) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
Test Result:	PASS

11.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

11.2 Test Result

Please refer to Annex for test report: Annex B

12 6 dB Bandwidth

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Test Limit:	≥ 500 kHz
Test Result:	PASS

12.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

12.2 Test Result:

Please refer to Annex for test report: Annex B

13 26 dB Bandwidth and 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section D
Test Limit:	No restriction limits
Test Result:	PASS

13.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:
RBW = approximately 1% of the emission bandwidth,
VBW $\geq 3 \times$ RBW

13.2 Test Result:

Please refer to Annex for test report: Annex B

14 Conducted Output Power

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a) KDB789033 D02 General UNII Test Procedures New Rules
Test Method:	v02r01 Section E
Test Limit:	U-NII-1 250mW(24dBm) U-NII-3 1W(30dBm)
Test Result:	PASS Conducted output power= measurement power+10log(1/x)
Remark:	X is duty cycle=1, so 10log(1/1)=0 Conducted output power= measurement power

14.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function =RMS, Set the span to fully encompass the bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

14.2 Test Result :

*All transmit signals are completely uncorrelated with each other, Directional gain = G_{ANT} which is less than 6dBi. So the limit does not be reduced.

Please refer to Annex for test report: Annex B

15 Power Spectral density

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 , Section F
Test Limit:	$\leq 11.00\text{dBm/MHz}$ for Operation in the U-NII-1(5150MHz-5250MHz)of mobile device $\leq 30.00\text{dBm}/500\text{KHz}$ for Operation in the U-NII-3(5725MHz- 5850MHz)of device
Test Result:	PASS

15.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer:
U-NII-1
RBW = 1MHz, VBW $\geq 3^*$ RBW Sweep = auto; Detector Function = Peak. Trae = Max hold.
U-NII-3
RBW = 510KHz, VBW $\geq 3^*$ RBW Sweep = auto; Detector Function = Peak. Trae = Max hold.
3. Allow the trae to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjaent channels. The limit is specified in one of the subparagraphs of this Section
Submit this plot.

15.2 Test Result:

*All transmit signals are completely uncorrelated with each other, Directional gain = G_{ANT} which is less than 6dBi. So the limit does not be reduced.

Please refer to Annex for test report: Annex B

16 Frequency Stability

Test Requirement:	FCC CFR47 Part 15 Section 15.407(g)
Test Method:	ANSI C63.10:2013
Test Limit:	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual or 20ppm.
Test Result:	PASS

16.1 Test Procedure:

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
EUT have transmitted absence of unmodulation signal and fixed channelise. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and the limit is less than ± 20 ppm The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.
2. Extreme temperature rule is 5°C~ 35°C.

16.2 Test Result:

U-NII-1 Test Frequency:5180MHz				
Temperature (°C)	Power Supply (VAC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
40	120	1762	0.3046	20
30		1762	0.3046	20
25		1759	0.3040	20
20		1763	0.3048	20
15		1759	0.3041	20
10		1761	0.3044	20
0		1758	0.3039	20
20	108	1761	0.3044	20
20	132	1763	0.3048	20

U-NII-3 Test Frequency:5785MHz				
Temperature (°C)	Power Supply (VAC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
40		1753	0.3031	20
30		1751	0.3027	20
25		1758	0.3040	20
20		1758	0.3038	20
15		1756	0.3035	20
10		1755	0.3034	20
0		1756	0.3035	20
20	108	1752	0.3028	20
20	132	1758	0.3039	20

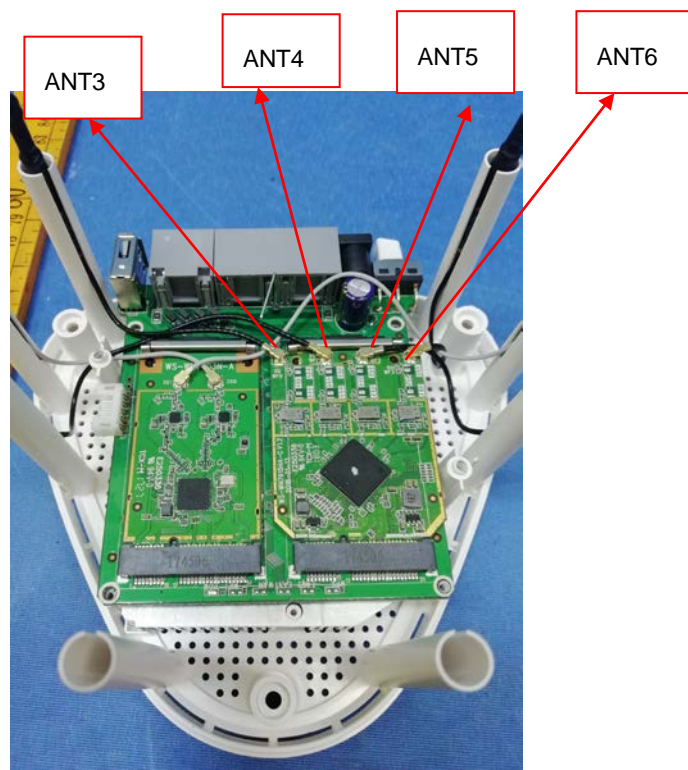
17 Antenna Requirement

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

This device uses two antennas that use a specified coupling to the intentional radiator. Antenna connectors complied with the requirement.

Result:

The EUT have four Integrated Antenna for 5G WiFi, meets the requirements of FCC 15.203.



18 FCC ID: 2AP2U-SN3R RF Exposure Report

Note: Please refer to RF Exposure Report: WTS18S05112396-3W.

19 Photographs – Test Setup Photos

Note: Please refer to Photos: WTS18S05112396-4W.

20 Photographs - Constructional Details

20.1 External Photos

Note: Please refer to Photos: WTS18S05112396-4W.

20.2 Internal Photos

Note: Please refer to Photos: WTS18S05112396-4W.

=====**End of Report**=====