

TEST REPORT

Reference No. : WTS18S05112397-2W
FCC ID : 2AP2U-SN3E
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 Extender
Model(s) : SN3E
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 : 2018-06-06
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:

Waltek Services (Shenzhen) Co., Ltd.

Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen,
Guangdong, China

Tel :+86-755-83551033

Fax:+86-755-83552400

Compiled by:

Frank Yin

Frank Yin / Test Engineer

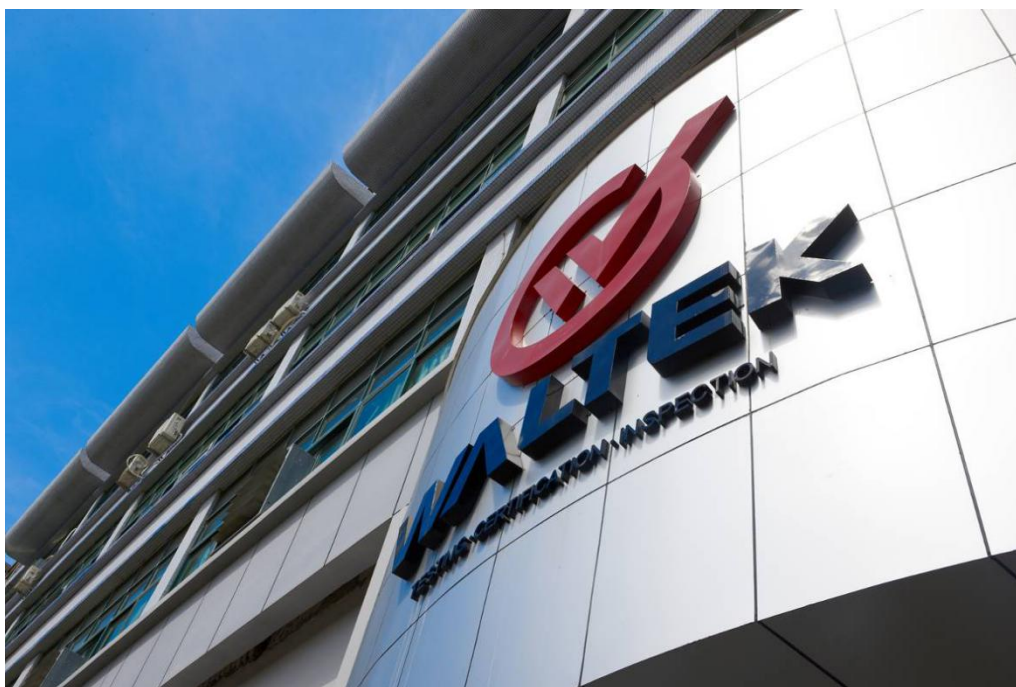
Approved by:

 Philo Zhong

Philo Zhong / Manager

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
WTS18S05112397-2W	2018-05-22	2018-05-23 to 2018-06-05	2018-06-06	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

5 Contents

	Page
COVER PAGE.....	1
2 LABORATORIES INTRODUCTION.....	2
2.1 TEST FACILITY.....	3
3 REVISION HISTORY	4
4 TEST SUMMARY	5
5 CONTENTS	6
6 GENERAL INFORMATION.....	8
6.1 GENERAL DESCRIPTION OF E.U.T	8
6.2 DETAILS OF E.U.T.....	8
6.3 CHANNEL LIST.....	9
7 EQUIPMENT USED DURING TEST	12
7.1 EQUIPMENTS LIST	12
7.2 DESCRIPTION OF SUPPORT UNITS	13
7.3 MEASUREMENT UNCERTAINTY	13
7.4 TEST EQUIPMENT CALIBRATION	13
8 CONDUCTED EMISSION	14
8.1 E.U.T. OPERATION	14
8.2 EUT SETUP.....	14
8.3 MEASUREMENT DESCRIPTION	14
8.4 CONDUCTED EMISSION TEST RESULT	15
9 RADIATED EMISSIONS.....	17
9.1 EUT OPERATION.....	17
9.2 TEST SETUP	18
9.3 SPECTRUM ANALYZER SETUP	19
9.4 TEST PROCEDURE	20
9.5 CORRECTED AMPLITUDE & MARGIN CALCULATION	20
9.6 SUMMARY OF TEST RESULTS.....	21
10 DUTY CYCLE.....	35
10.1 SUMMARY OF TEST RESULTS	35
11 BAND EDGE	36
11.1 TEST PRODUCE	36
11.2 TEST RESULT	37
12 6 DB BANDWIDTH.....	38
12.1 TEST PROCEDURE:.....	38
12.2 TEST RESULT:	38
13 26 DB BANDWIDTH AND 99% OCCUPIED BANDWIDTH.....	39
13.1 TEST PROCEDURE:.....	39
13.2 TEST RESULT:	40
14 CONDUCTED OUTPUT POWER	41
14.1 TEST PROCEDURE:.....	41
14.2 TEST RESULT :	42
15 POWER SPECTRAL DENSITY	43
15.1 TEST PROCEDURE:.....	43
15.2 TEST RESULT:	44
16 FREQUENCY STABILITY.....	45

16.1 TEST PROCEDURE:..... 45

16.2 TEST RESULT: 46

17 ANTENNA REQUIREMENT 47

18 FCC ID: 2AP2U-SN-3E EXPOSURE REPORT 48

19 PHOTOGRAPHS – TEST SETUP PHOTOS 49

20 PHOTOGRAPHS - CONSTRUCTIONAL DETAILS 49

20.1 EXTERNAL PHOTOS..... 49

20.2 INTERNAL PHOTOS 49

6 General Information

6.1 General Description of E.U.T

Product:	SimpliNET-2 AC2100 Mesh WiFi Extender
Model(s):	SN3E
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., L TD. 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

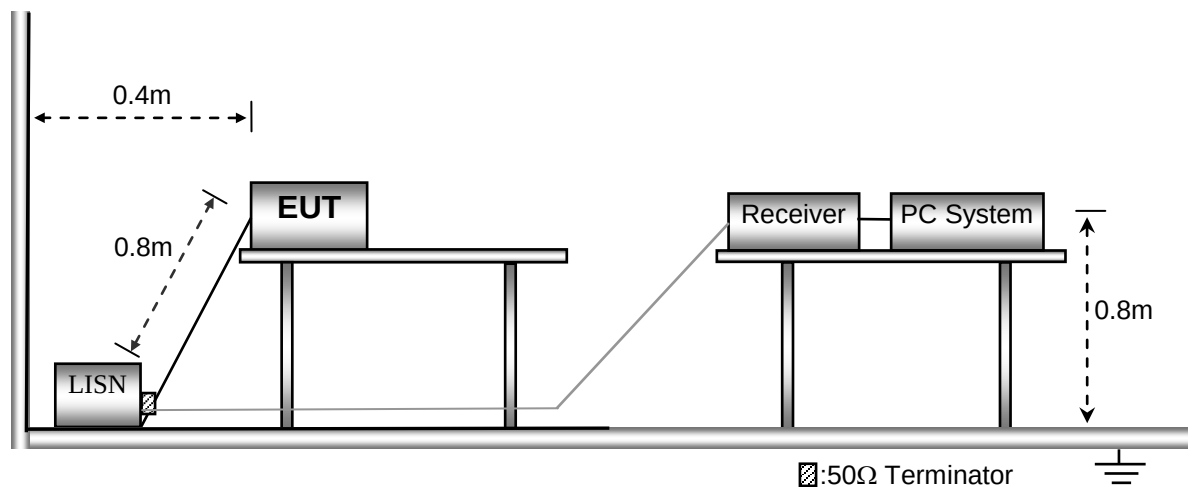
Operating Environment :

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.



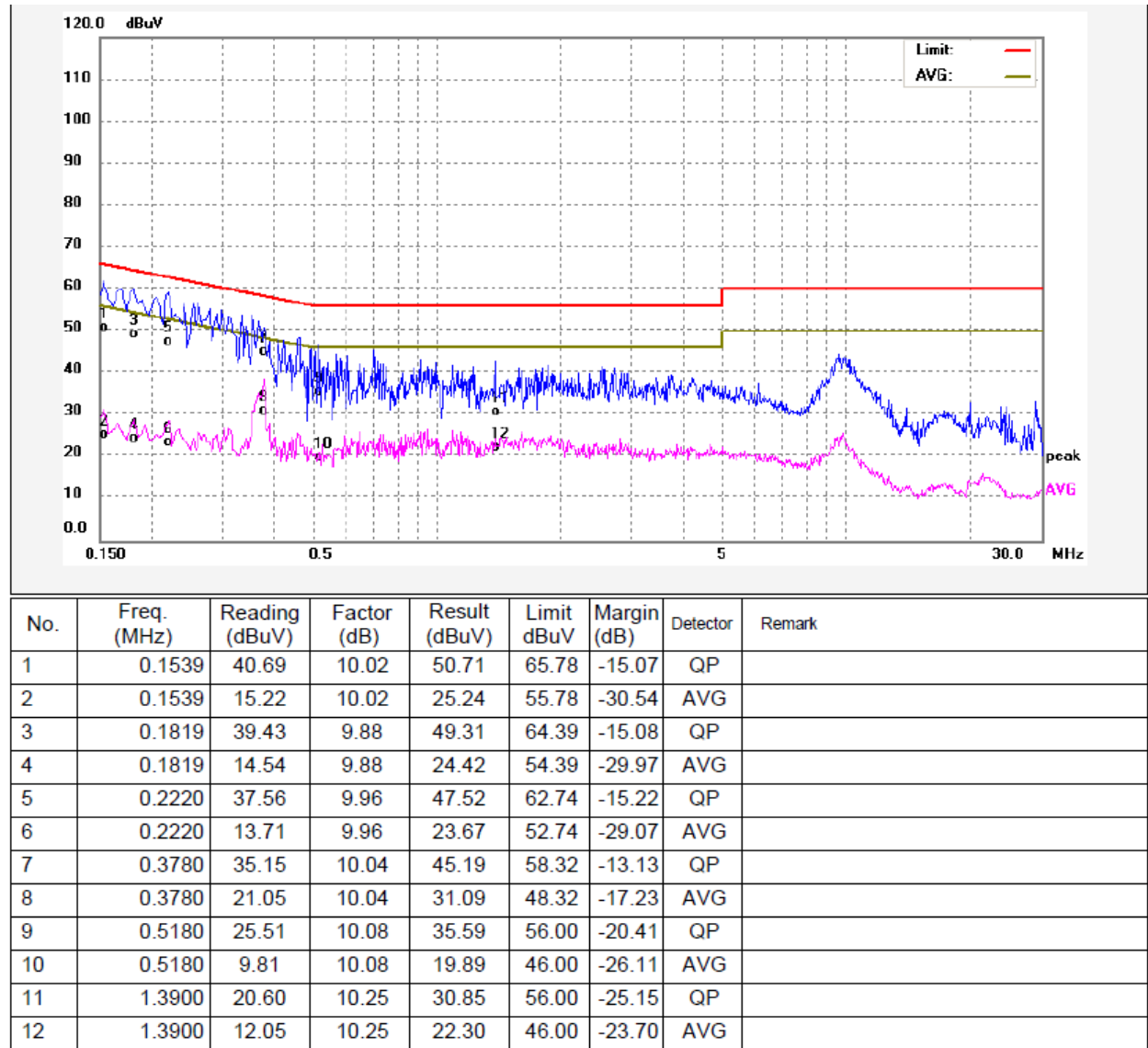
8.3 Measurement Description

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.

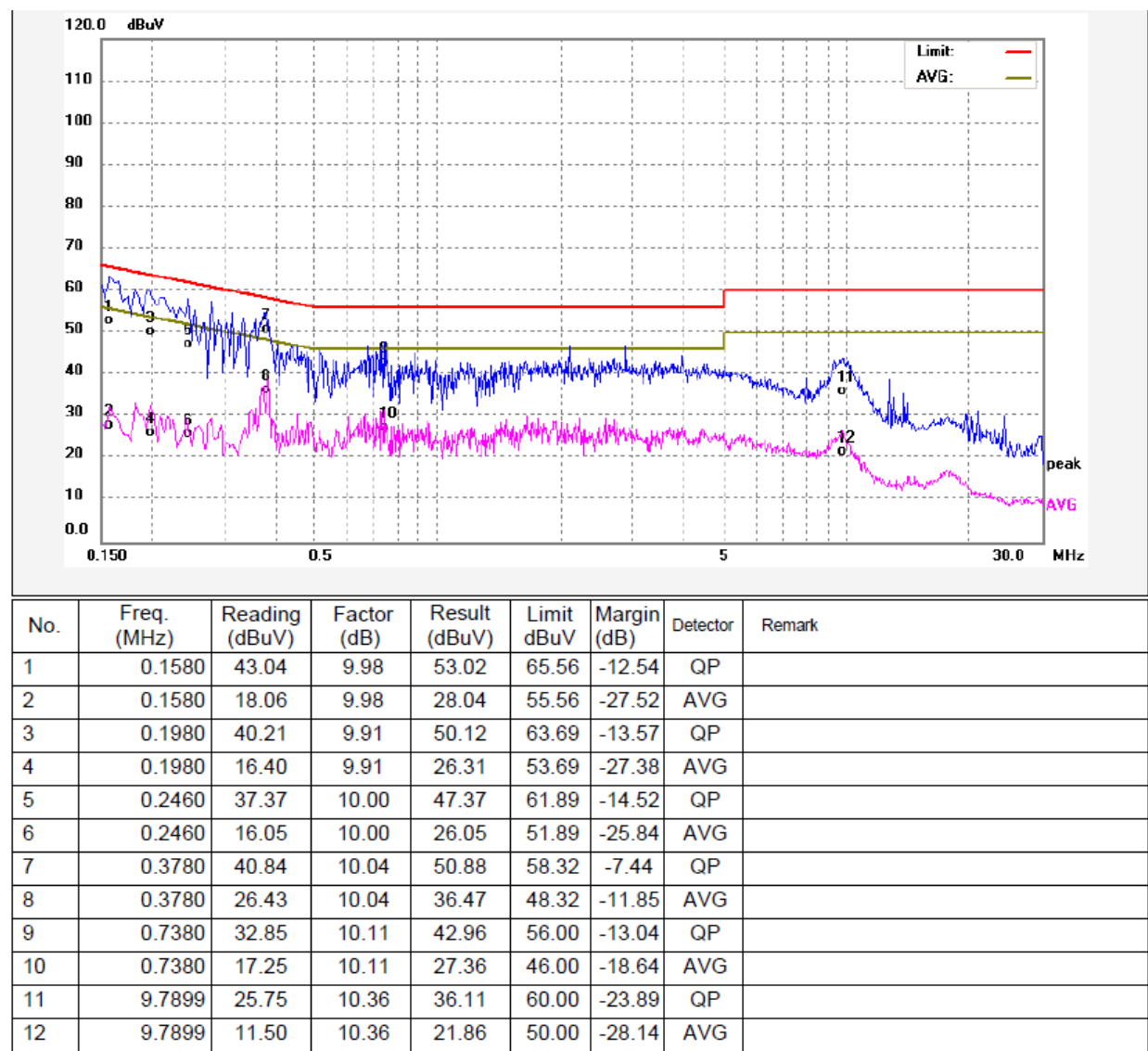
8.4 Conducted Emission Test Result

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

Live line:



Neutral line:



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	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
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

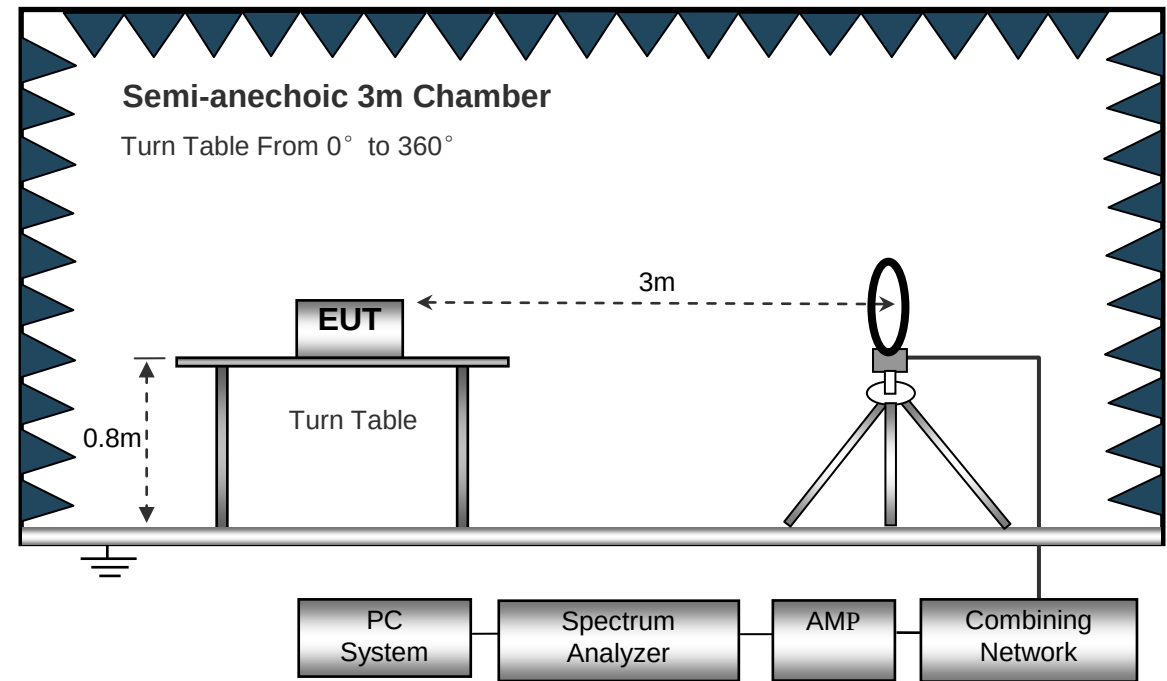
EUT Operation :

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

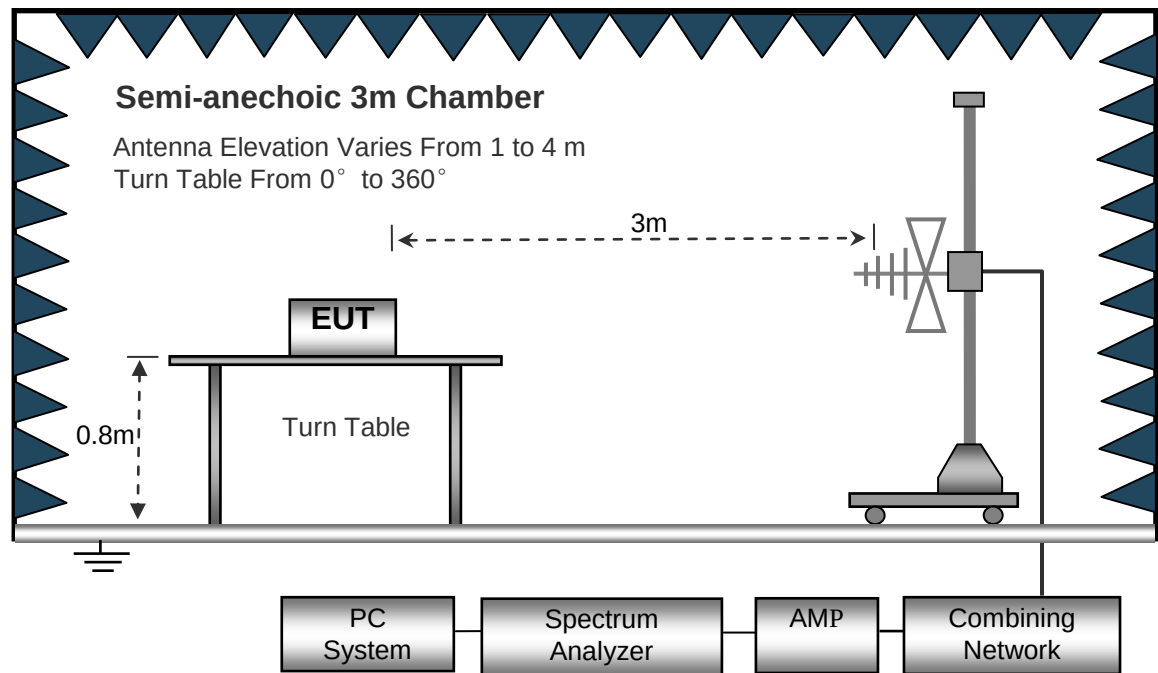
9.2 Test Setup

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

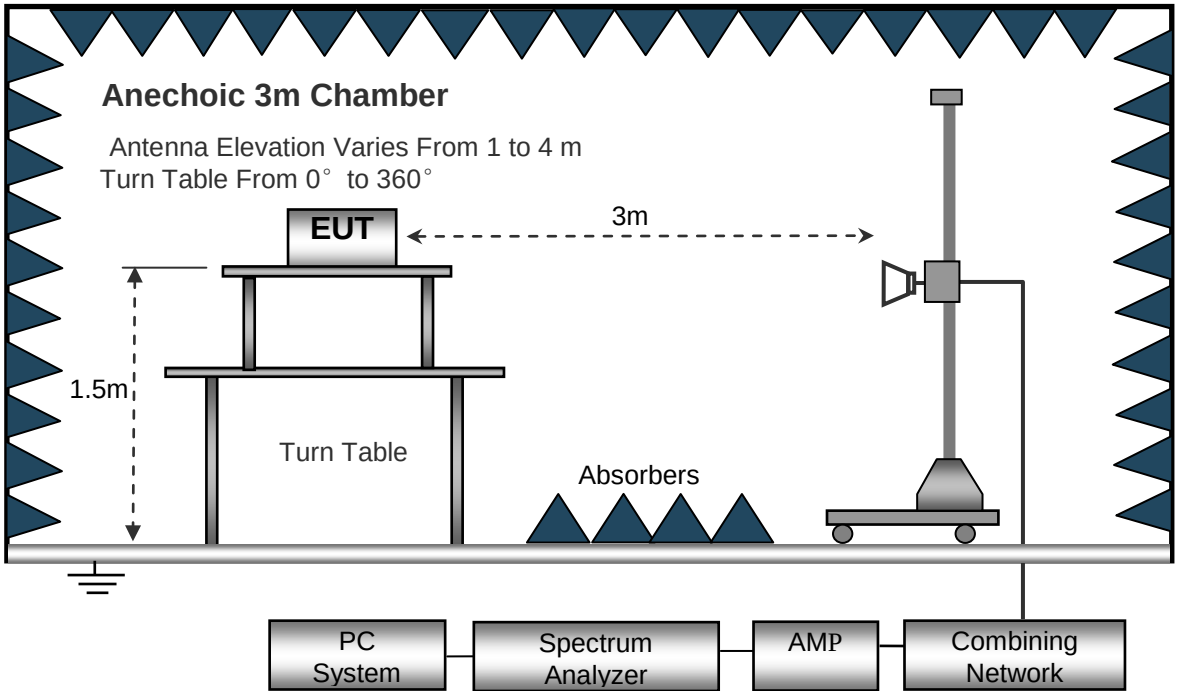
The test setup for emission measurement below 30MHz.



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	35.38	QP	1	1.8	H	-7.75	27.63	46.00	-18.37
601.43	46.28	QP	117	1.1	V	-7.75	38.53	46.00	-7.47
4520.98	49.26	PK	34	1.9	H	-1.54	47.20	47.72	-26.28
4520.98	41.85	Ave	34	1.9	H	-1.54	39.44	40.31	-13.69
5117.73	46.89	PK	278	1.5	H	-0.75	46.18	46.14	-27.86
5117.73	43.40	Ave	278	1.5	H	-0.75	40.68	42.65	-11.35
10360.00	37.34	PK	341	1.4	H	5.33	41.80	42.67	-31.33
10360.00	24.48	Ave	341	1.4	H	5.33	29.49	29.81	-24.19
15540.00	43.33	PK	213	1.3	H	5.29	49.22	48.62	-25.38
15540.00	36.78	Ave	213	1.3	H	5.29	43.86	42.07	-11.93
802.11a U-NII-1 middle channel 5200MHz									
601.43	36.57	QP	56	1.3	H	-7.75	28.82	46.00	-17.18
601.43	47.43	QP	68	1.9	V	-7.75	39.68	46.00	-6.32
4507.58	49.61	PK	96	1.4	H	-1.64	47.97	74.00	-26.03
4507.58	39.97	Ave	96	1.4	H	-1.64	38.33	54.00	-15.67
5130.18	48.34	PK	284	1.2	H	-0.91	47.43	74.00	-26.57
5130.18	43.48	Ave	284	1.2	H	-0.91	42.57	54.00	-11.43
10400.00	36.98	PK	289	1.7	H	5.21	42.19	74.00	-31.81
10400.00	22.35	Ave	289	1.7	H	5.21	27.56	54.00	-26.44
15600.00	46.55	PK	312	2.0	H	5.30	51.85	74.00	-22.15
15600.00	37.71	Ave	312	2.0	H	5.30	43.01	54.00	-10.99

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 High channel 5240MHz									
601.43	36.02	QP	119	2.0	H	-7.75	28.27	46.00	-17.73
601.43	47.44	QP	176	1.9	V	-7.75	39.69	46.00	-6.31
4523.89	42.75	PK	351	1.5	H	-1.56	41.19	74.00	-32.81
4523.89	38.60	Ave	351	1.5	H	-1.56	37.04	54.00	-16.96
5121.26	44.54	PK	91	1.5	H	-0.81	43.73	74.00	-30.27
5121.26	39.28	Ave	91	1.5	H	-0.81	38.47	54.00	-15.53
10480.00	37.20	PK	214	1.1	H	5.14	42.34	74.00	-31.66
10480.00	21.77	Ave	214	1.1	H	5.14	26.91	54.00	-27.09
15720.00	45.22	PK	161	1.6	H	5.10	50.32	74.00	-23.68
15720.00	39.23	Ave	161	1.6	H	5.10	44.33	54.00	-9.67
802.11a U-NII-3 low Channel 5745MHz									
601.43	35.72	QP	326	1.9	H	-7.75	27.97	46.00	-18.03
601.43	45.91	QP	311	1.5	V	-7.75	38.16	46.00	-7.84
4500.86	41.43	PK	26	1.2	H	-1.80	39.63	74.00	-34.37
4500.86	38.96	Ave	26	1.2	H	-1.80	37.16	54.00	-16.84
5138.62	35.34	PK	172	1.8	H	-0.96	34.38	74.00	-39.62
5138.62	21.93	Ave	172	1.8	H	-0.96	20.97	54.00	-33.03
11490.00	45.09	PK	115	1.1	H	5.93	51.02	74.00	-22.98
11490.00	39.47	Ave	115	1.1	H	5.93	45.40	54.00	-8.60
17235.00	45.25	PK	10	1.6	H	10.35	55.60	74.00	-18.40
17235.00	39.67	Ave	10	1.6	H	10.35	50.02	54.00	-3.98

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-3 middle channel 5785MHz									
601.43	35.52	QP	44	1.3	H	-7.75	27.77	46.00	-18.23
601.43	46.67	QP	232	1.7	V	-7.75	38.92	46.00	-7.08
4507.32	41.49	PK	152	1.3	H	-1.59	39.90	74.00	-34.10
4507.32	36.59	Ave	152	1.3	H	-1.59	35.00	54.00	-19.00
5127.35	35.18	PK	255	1.9	H	-0.95	34.23	74.00	-39.77
5127.35	23.62	Ave	255	1.9	H	-0.95	22.67	54.00	-31.33
11570.00	45.52	PK	306	1.1	H	5.81	51.33	74.00	-22.67
11570.00	38.82	Ave	306	1.1	H	5.81	44.63	54.00	-9.37
17355.00	46.17	PK	290	1.0	H	10.37	56.54	74.00	-17.46
17355.00	39.90	Ave	290	1.0	H	10.37	50.27	54.00	-3.73
802.11a U-NII-3 High channel 5825MHz									
601.43	35.21	QP	40	1.9	H	-7.75	27.46	46.00	-18.54
601.43	44.94	QP	191	1.9	V	-7.75	37.19	46.00	-8.81
4511.48	43.60	PK	33	1.5	H	-1.68	41.92	74.00	-32.08
4511.48	36.48	Ave	33	1.5	H	-1.68	34.80	54.00	-19.20
5148.11	36.58	PK	181	1.8	H	-0.96	35.62	74.00	-38.38
5148.11	24.62	Ave	181	1.8	H	-0.96	23.66	54.00	-30.34
11650.00	45.82	PK	142	1.9	H	5.84	51.66	74.00	-22.34
11650.00	38.94	Ave	142	1.9	H	5.84	44.78	54.00	-9.22
17475.00	45.93	PK	332	1.6	H	10.41	56.34	74.00	-17.66
17475.00	38.06	Ave	332	1.6	H	10.41	48.47	54.00	-5.53

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-1 low Channel 5180MHz									
601.43	34.34	QP	309	1.5	H	-7.75	26.59	46.00	-19.41
601.43	45.58	QP	195	1.5	V	-7.75	37.83	46.00	-8.17
4510.30	46.49	PK	220	1.6	H	-1.54	44.95	74.00	-29.05
4510.30	38.57	Ave	220	1.6	H	-1.54	37.03	54.00	-16.97
5149.00	43.67	PK	110	1.0	H	-0.75	42.92	74.00	-31.08
5149.00	45.19	Ave	110	1.0	H	-0.75	44.44	54.00	-9.56
10360.00	37.98	PK	269	1.4	H	5.33	43.31	74.00	-30.69
10360.00	23.68	Ave	269	1.4	H	5.33	29.01	54.00	-24.99
15540.00	42.12	PK	246	1.6	H	5.29	47.41	74.00	-26.59
15540.00	36.70	Ave	246	1.6	H	5.29	41.99	54.00	-12.01
802.11n(HT20) U-NII-1 middle channel 5200MHz									
601.43	35.77	QP	333	1.7	H	-7.75	28.02	46.00	-17.98
601.43	47.59	QP	160	1.4	V	-7.75	39.84	46.00	-6.16
4504.13	46.99	PK	270	1.4	H	-1.64	45.35	74.00	-28.65
4504.13	44.26	Ave	270	1.4	H	-1.64	42.62	54.00	-11.38
5141.68	44.92	PK	170	1.6	H	-0.91	44.01	74.00	-29.99
5141.68	42.96	Ave	170	1.6	H	-0.91	42.05	54.00	-11.95
10400.00	38.51	PK	354	1.1	H	5.21	43.72	74.00	-30.28
10400.00	22.54	Ave	354	1.1	H	5.21	27.75	54.00	-26.25
15600.00	46.99	PK	54	1.7	H	5.30	52.29	74.00	-21.71
15600.00	38.95	Ave	54	1.7	H	5.30	44.25	54.00	-9.75

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-1 High channel 5240MHz									
601.43	35.09	QP	94	1.9	H	-7.75	27.34	46.00	-18.66
601.43	47.54	QP	319	1.8	V	-7.75	39.79	46.00	-6.21
4528.37	44.19	PK	78	1.5	H	-1.56	42.63	74.00	-31.37
4528.37	44.83	Ave	78	1.5	H	-1.56	43.27	54.00	-10.73
5113.74	42.09	PK	323	1.4	H	-0.81	41.28	74.00	-32.72
5113.74	44.59	Ave	323	1.4	H	-0.81	43.78	54.00	-10.22
10480.00	38.47	PK	217	1.1	H	5.14	43.61	74.00	-30.39
10480.00	21.91	Ave	217	1.1	H	5.14	27.05	54.00	-26.95
15720.00	46.99	PK	66	1.3	H	5.10	52.09	74.00	-21.91
15720.00	37.01	Ave	66	1.3	H	5.10	42.11	54.00	-11.89
802.11n(HT20) U-NII-3 low Channel 5745MHz									
601.43	34.15	QP	176	1.0	H	-7.75	26.40	46.00	-19.60
601.43	46.57	QP	145	1.9	V	-7.75	38.82	46.00	-7.18
4524.81	43.16	PK	300	1.7	H	-1.80	41.36	74.00	-32.64
4524.81	38.65	Ave	300	1.7	H	-1.80	36.85	54.00	-17.15
5125.12	41.44	PK	289	1.9	H	-0.96	40.48	74.00	-33.52
5125.12	36.10	Ave	289	1.9	H	-0.96	35.14	54.00	-18.86
11490.00	45.64	PK	206	1.8	H	5.93	51.57	74.00	-22.43
11490.00	37.31	Ave	206	1.8	H	5.93	43.24	54.00	-10.76
17235.00	45.10	PK	120	1.5	H	10.35	55.45	74.00	-18.55
17235.00	37.61	Ave	120	1.5	H	10.35	47.96	54.00	-6.04

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	35.23	QP	36	1.9	H	-7.75	27.48	46.00	-18.52
601.43	45.45	QP	33	1.8	V	-7.75	37.70	46.00	-8.30
4534.76	42.70	PK	269	1.7	H	-1.59	41.11	74.00	-32.89
4534.76	40.17	Ave	269	1.7	H	-1.59	38.58	54.00	-15.42
5148.50	40.66	PK	44	1.1	H	-0.95	39.71	74.00	-34.29
5148.50	36.17	Ave	44	1.1	H	-0.95	35.22	54.00	-18.78
11570.00	46.05	PK	314	1.2	H	5.81	51.86	74.00	-22.14
11570.00	38.45	Ave	314	1.2	H	5.81	44.26	54.00	-9.74
17355.00	46.08	PK	351	1.7	H	10.37	56.45	74.00	-17.55
17355.00	33.78	Ave	351	1.7	H	10.37	44.15	54.00	-9.85
802.11n(HT20) U-NII-3 High channel 5825MHz									
601.43	34.81	QP	155	2.0	H	-7.75	27.06	46.00	-18.94
601.43	47.48	QP	323	1.3	V	-7.75	39.73	46.00	-6.27
4504.81	42.44	PK	85	1.6	H	-1.68	40.76	74.00	-33.24
4504.81	44.65	Ave	85	1.6	H	-1.68	42.97	54.00	-11.03
5145.33	41.96	PK	4	1.5	H	-0.96	41.00	74.00	-33.00
5145.33	36.20	Ave	4	1.5	H	-0.96	35.24	54.00	-18.76
11650.00	45.94	PK	323	1.5	H	5.84	51.78	74.00	-22.22
11650.00	39.32	Ave	323	1.5	H	5.84	45.16	54.00	-8.84
17475.00	45.30	PK	54	1.3	H	10.41	55.71	74.00	-18.29
17475.00	31.39	Ave	54	1.3	H	10.41	41.80	54.00	-12.20

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)
802.11ac(VHT20) U-NII-1 low Channel 5180MHz									
601.43	34.55	QP	48	1.4	H	-7.75	26.80	46.00	-19.20
601.43	46.08	QP	116	2.0	V	-7.75	38.33	46.00	-7.67
4501.55	41.60	PK	130	1.3	H	-1.80	39.80	74.00	-34.20
4501.55	44.64	Ave	130	1.3	H	-1.80	42.84	54.00	-11.16
5128.65	44.30	PK	266	1.5	H	-0.94	43.36	74.00	-30.64
5128.65	33.10	Ave	266	1.5	H	-0.94	32.16	54.00	-21.84
10360.00	42.47	PK	231	1.0	H	5.33	47.80	74.00	-26.20
10360.00	25.76	Ave	231	1.0	H	5.33	31.09	54.00	-22.91
15540.00	46.44	PK	75	2.0	H	5.29	51.73	74.00	-22.27
15540.00	37.61	Ave	75	2.0	H	5.29	42.90	54.00	-11.10
802.11ac(VHT20) U-NII-1 middle channel 5200MHz									
601.43	36.18	QP	142	1.7	H	-7.75	28.43	46.00	-17.57
601.43	46.67	QP	244	1.4	V	-7.75	38.92	46.00	-7.08
4504.48	42.98	PK	216	1.3	H	-1.69	41.29	74.00	-32.71
4504.48	42.36	Ave	216	1.3	H	-1.69	40.67	54.00	-13.33
5112.60	41.67	PK	190	1.7	H	-0.91	40.76	74.00	-33.24
5112.60	44.43	Ave	190	1.7	H	-0.91	43.52	54.00	-10.48
10400.00	40.98	PK	113	1.8	H	5.21	46.19	74.00	-27.81
10400.00	22.22	Ave	113	1.8	H	5.21	27.43	54.00	-26.57
15600.00	45.60	PK	359	1.8	H	5.30	50.90	74.00	-23.10
15600.00	38.34	Ave	359	1.8	H	5.30	43.64	54.00	-10.36

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)
802.11ac(VHT20) U-NII-1 High channel 5240MHz									
601.43	35.49	QP	194	1.2	H	-7.75	27.74	46.00	-18.26
601.43	47.67	QP	42	1.7	V	-7.75	39.92	46.00	-6.08
4521.42	42.62	PK	139	1.4	H	-1.77	40.82	74.00	-33.18
4521.42	44.04	Ave	139	1.4	H	-1.77	42.24	54.00	-11.76
5140.25	45.17	PK	284	1.1	H	-0.79	44.23	74.00	-29.77
5140.25	44.15	Ave	284	1.1	H	-0.79	43.21	54.00	-10.79
10480.00	40.79	PK	30	1.1	H	5.14	46.12	74.00	-27.88
10480.00	23.20	Ave	30	1.1	H	5.14	28.53	54.00	-25.47
15720.00	46.15	PK	346	1.2	H	5.10	51.44	74.00	-22.56
15720.00	38.78	Ave	346	1.2	H	5.10	44.07	54.00	-9.93
802.11ac(VHT20) U-NII-3 low Channel 5745MHz									
601.43	36.26	QP	33	1.7	H	-7.75	28.51	46.00	-17.49
601.43	47.40	QP	209	1.7	V	-7.75	39.65	46.00	-6.35
4522.53	41.80	PK	170	1.4	H	-1.64	40.16	74.00	-33.84
4522.53	40.88	Ave	170	1.4	H	-1.64	39.24	54.00	-14.76
5113.15	42.79	PK	22	1.8	H	-0.84	41.95	74.00	-32.05
5113.15	25.72	Ave	22	1.8	H	-0.84	24.88	54.00	-29.12
11490.00	44.82	PK	164	1.8	H	5.93	50.75	74.00	-23.25
11490.00	37.54	Ave	164	1.8	H	5.93	43.47	54.00	-10.53
17235.00	45.75	PK	10	1.1	H	10.35	56.10	74.00	-17.90
17235.00	31.28	Ave	10	1.1	H	10.35	41.63	54.00	-12.37

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Fator	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac(VHT20) U-NII-3 middle channel 5785MHz									
601.43	35.65	QP	70	1.4	H	-7.75	27.90	46.00	-18.10
601.43	46.49	QP	194	1.0	V	-7.75	38.74	46.00	-7.26
4508.12	41.76	PK	326	1.6	H	-1.63	40.13	74.00	-33.87
4508.12	41.67	Ave	326	1.6	H	-1.63	40.04	54.00	-13.96
5114.46	42.06	PK	316	1.1	H	-0.73	41.33	74.00	-32.67
5114.46	25.47	Ave	316	1.1	H	-0.73	24.74	54.00	-29.26
11570.00	47.22	PK	156	1.9	H	5.81	53.03	74.00	-20.97
11570.00	39.85	Ave	156	1.9	H	5.81	45.66	54.00	-8.34
17355.00	46.60	PK	159	1.0	H	10.37	56.97	74.00	-17.03
17355.00	33.20	Ave	159	1.0	H	10.37	43.57	54.00	-10.43
802.11ac(VHT20) U-NII-3 High channel 5825MHz									
601.43	35.63	QP	316	2.0	H	-7.75	27.88	46.00	-18.12
601.43	46.08	QP	310	1.1	V	-7.75	38.33	46.00	-7.67
4525.11	43.15	PK	189	1.9	H	-1.67	41.48	74.00	-32.52
4525.11	44.98	Ave	189	1.9	H	-1.67	43.31	54.00	-10.69
5148.05	41.08	PK	308	1.9	H	-0.83	40.25	74.00	-33.75
5148.05	24.26	Ave	308	1.9	H	-0.83	23.43	54.00	-30.57
11650.00	46.79	PK	342	1.9	H	5.84	52.63	74.00	-21.37
11650.00	36.71	Ave	342	1.9	H	5.84	42.55	54.00	-11.45
17475.00	45.97	PK	195	1.4	H	10.41	56.38	74.00	-17.62
17475.00	33.75	Ave	195	1.4	H	10.41	44.16	54.00	-9.84

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	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(HT40) U-NII-1 low Channel 5190MHz									
601.43	34.25	QP	269	1.8	H	-7.75	26.50	46.00	-19.50
601.43	45.08	QP	30	1.1	V	-7.75	37.33	46.00	-8.67
4535.43	41.65	PK	264	1.6	H	-1.50	40.15	74.00	-33.85
4535.43	38.70	Ave	264	1.6	H	-1.50	37.20	54.00	-16.80
5114.77	46.10	PK	67	1.3	H	-0.86	45.24	74.00	-28.76
5114.77	38.36	Ave	67	1.3	H	-0.86	37.50	54.00	-16.50
10380.00	37.69	PK	32	1.9	H	5.26	42.95	74.00	-31.05
10380.00	34.85	Ave	32	1.9	H	5.26	40.11	54.00	-13.89
15570.00	45.84	PK	290	1.2	H	5.13	50.97	74.00	-23.03
15570.00	32.75	Ave	290	1.2	H	5.13	37.88	54.00	-16.12
802.11n(HT40) U-NII-1 High channel 5230MHz									
601.43	34.00	QP	178	1.9	H	-7.75	26.25	46.00	-19.75
601.43	46.86	QP	331	1.5	V	-7.75	39.11	46.00	-6.89
4524.27	43.07	PK	42	1.6	H	-1.63	41.44	74.00	-32.56
4524.27	43.55	Ave	42	1.6	H	-1.63	41.92	54.00	-12.08
5131.20	44.40	PK	240	1.3	H	-0.90	43.50	74.00	-30.50
5131.20	42.72	Ave	240	1.3	H	-0.90	41.82	54.00	-12.18
10460.00	40.74	PK	119	1.3	H	5.28	46.02	74.00	-27.98
10460.00	35.46	Ave	119	1.3	H	5.28	40.74	54.00	-13.26
15690.00	45.86	PK	341	2.0	H	5.02	50.88	74.00	-23.12
15690.00	33.49	Ave	341	2.0	H	5.02	38.51	54.00	-15.49

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	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(HT40) U-NII-3 low Channel 5755MHz									
601.43	35.73	QP	199	2.0	H	-7.75	27.98	46.00	-18.02
601.43	46.19	QP	90	1.1	V	-7.75	38.44	46.00	-7.56
4506.09	39.49	PK	329	1.8	H	-1.69	37.80	74.00	-36.20
4506.09	40.22	Ave	329	1.8	H	-1.69	38.53	54.00	-15.47
5121.97	39.28	PK	208	1.2	H	-0.74	38.54	74.00	-35.46
5121.97	33.37	Ave	208	1.2	H	-0.74	32.63	54.00	-21.37
11510.00	44.81	PK	58	1.0	H	5.88	50.69	74.00	-23.31
11510.00	39.50	Ave	58	1.0	H	5.88	45.38	54.00	-8.62
17265.00	46.13	PK	213	1.8	H	10.42	56.55	74.00	-17.45
17265.00	31.02	Ave	213	1.8	H	10.42	41.44	54.00	-12.56
802.11n(HT40) U-NII-3 High channel 5795MHz									
601.43	36.02	QP	55	1.6	H	-7.75	28.27	46.00	-17.73
601.43	47.64	QP	262	1.5	V	-7.75	39.89	46.00	-6.11
4520.11	45.71	PK	46	1.7	H	-1.69	44.02	74.00	-29.98
4520.11	42.34	Ave	46	1.7	H	-1.69	40.65	54.00	-13.35
5140.10	40.36	PK	164	1.2	H	-0.89	39.47	74.00	-34.53
5140.10	37.85	Ave	164	1.2	H	-0.89	36.96	54.00	-17.04
11590.00	45.04	PK	39	1.5	H	5.63	50.67	74.00	-23.33
11590.00	36.78	Ave	39	1.5	H	5.63	42.41	54.00	-11.59
17385.00	46.70	PK	163	1.7	H	10.63	57.33	74.00	-16.67
17385.00	31.64	Ave	163	1.7	H	10.63	42.27	54.00	-11.73

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	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)
802.11ac(VHT40) U-NII-1 low Channel 5190MHz									
601.43	35.68	QP	60	1.9	H	-7.75	27.93	46.00	-18.07
601.43	45.20	QP	130	1.7	V	-7.75	37.45	46.00	-8.55
4535.07	39.58	PK	305	1.1	H	-1.70	37.88	74.00	-36.12
4535.07	38.05	Ave	305	1.1	H	-1.70	36.35	54.00	-17.65
5128.21	48.60	PK	124	1.9	H	-0.78	47.82	74.00	-26.18
5128.21	40.57	Ave	124	1.9	H	-0.78	39.79	54.00	-14.21
10380.00	37.80	PK	91	1.3	H	5.26	43.06	74.00	-30.94
10380.00	35.72	Ave	91	1.3	H	5.26	40.98	54.00	-13.02
15570.00	46.20	PK	244	1.9	H	5.13	51.33	74.00	-22.67
15570.00	32.37	Ave	244	1.9	H	5.13	37.50	54.00	-16.50
802.11ac(VHT40) U-NII-1 High channel 5230MHz									
601.43	36.88	QP	115	1.4	H	-7.75	29.13	46.00	-16.87
601.43	47.31	QP	91	1.3	V	-7.75	39.56	46.00	-6.44
4500.21	40.85	PK	101	1.2	H	-1.50	39.35	74.00	-34.65
4500.21	40.92	Ave	101	1.2	H	-1.50	39.42	54.00	-14.58
5110.77	41.37	PK	113	1.8	H	-0.85	40.52	74.00	-33.48
5110.77	34.01	Ave	113	1.8	H	-0.85	33.16	54.00	-20.84
10460.00	45.41	PK	284	1.4	H	5.28	50.69	74.00	-23.31
10460.00	38.49	Ave	284	1.4	H	5.28	43.77	54.00	-10.23
15690.00	45.64	PK	216	1.3	H	5.02	50.66	74.00	-23.34
15690.00	33.68	Ave	216	1.3	H	5.02	38.70	54.00	-15.30

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	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)
802.11ac(VHT40) U-NII-3 low Channel 5755MHz									
601.43	34.32	QP	204	1.6	H	-7.75	26.57	46.00	-19.43
601.43	47.24	QP	288	1.4	V	-7.75	39.49	46.00	-6.51
4513.84	42.06	PK	217	1.2	H	-1.79	40.27	74.00	-33.73
4513.84	40.91	Ave	217	1.2	H	-1.79	39.12	54.00	-14.88
5125.62	41.50	PK	34	1.8	H	-0.81	40.69	74.00	-33.31
5125.62	36.86	Ave	34	1.8	H	-0.81	36.05	54.00	-17.95
11510.00	46.06	PK	343	1.4	H	5.88	51.94	74.00	-22.06
11510.00	36.82	Ave	343	1.4	H	5.88	42.70	54.00	-11.30
17265.00	45.27	PK	25	1.1	H	10.42	55.69	74.00	-18.31
17265.00	31.55	Ave	25	1.1	H	10.42	41.97	54.00	-12.03
802.11ac(VHT40) U-NII-3 High channel 5795MHz									
601.43	34.84	QP	57	1.8	H	-7.75	27.09	46.00	-18.91
601.43	47.45	QP	333	1.9	V	-7.75	39.70	46.00	-6.30
4539.26	44.45	PK	64	1.2	H	-1.54	42.91	74.00	-31.09
4539.26	40.60	Ave	64	1.2	H	-1.54	39.06	54.00	-14.94
5137.15	41.66	PK	50	1.2	H	-0.89	40.77	74.00	-33.23
5137.15	36.72	Ave	50	1.2	H	-0.89	35.83	54.00	-18.17
11590.00	45.75	PK	105	1.2	H	5.63	51.38	74.00	-22.62
11590.00	38.74	Ave	105	1.2	H	5.63	44.37	54.00	-9.63
17385.00	46.68	PK	139	1.7	H	10.63	57.31	74.00	-16.69
17385.00	33.20	Ave	139	1.7	H	10.63	43.83	54.00	-10.17

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	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)
802.11ac(VHT80) U-NII-1 low Channel 5210MHz									
601.43	35.56	QP	187	1.5	H	-7.75	27.81	46.00	-18.19
601.43	47.12	QP	76	1.1	V	-7.75	39.37	46.00	-6.63
4506.83	43.94	PK	150	1.2	H	-1.77	42.17	74.00	-31.83
4506.83	43.62	Ave	150	1.2	H	-1.77	41.85	54.00	-12.15
5136.33	42.50	PK	167	1.5	H	-0.82	41.68	74.00	-32.32
5136.33	47.56	Ave	167	1.5	H	-0.82	46.74	54.00	-7.26
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	36.03	QP	60	1.6	H	-7.75	28.28	46.00	-17.72
601.43	45.34	QP	71	1.2	V	-7.75	37.59	46.00	-8.41
4534.36	42.46	PK	297	1.6	H	-1.75	40.71	74.00	-33.29
4534.36	42.13	Ave	297	1.6	H	-1.75	40.38	54.00	-13.62
5117.15	43.34	PK	154	1.1	H	-0.95	42.39	74.00	-31.61
5117.15	44.45	Ave	154	1.1	H	-0.95	43.50	54.00	-10.50
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 $\leq 30.00\text{dBm/500KHz}$ 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 $\geq 3 \times$ RBW Sweep = auto; Detector Function = Peak. Trae = Max hold.
U-NII-3
RBW = 510KHz, VBW $\geq 3 \times$ 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	1756	0.3391	20
30		1755	0.3388	20
25		1752	0.3382	20
20		1755	0.3388	20
15		1758	0.3394	20
10		1752	0.3382	20
0		1754	0.3387	20
20	108	1755	0.3388	20
20	132	1753	0.3384	20

U-NII-3 Test Frequency:5785MHz				
Temperature (°C)	Power Supply (VAC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
40	120	1856	0.3209	20
30		1856	0.3208	20
25		1858	0.3212	20
20		1850	0.3198	20
15		1855	0.3207	20
10		1854	0.3204	20
0		1854	0.3205	20
20	108	1855	0.3206	20
20	132	1860	0.3214	20

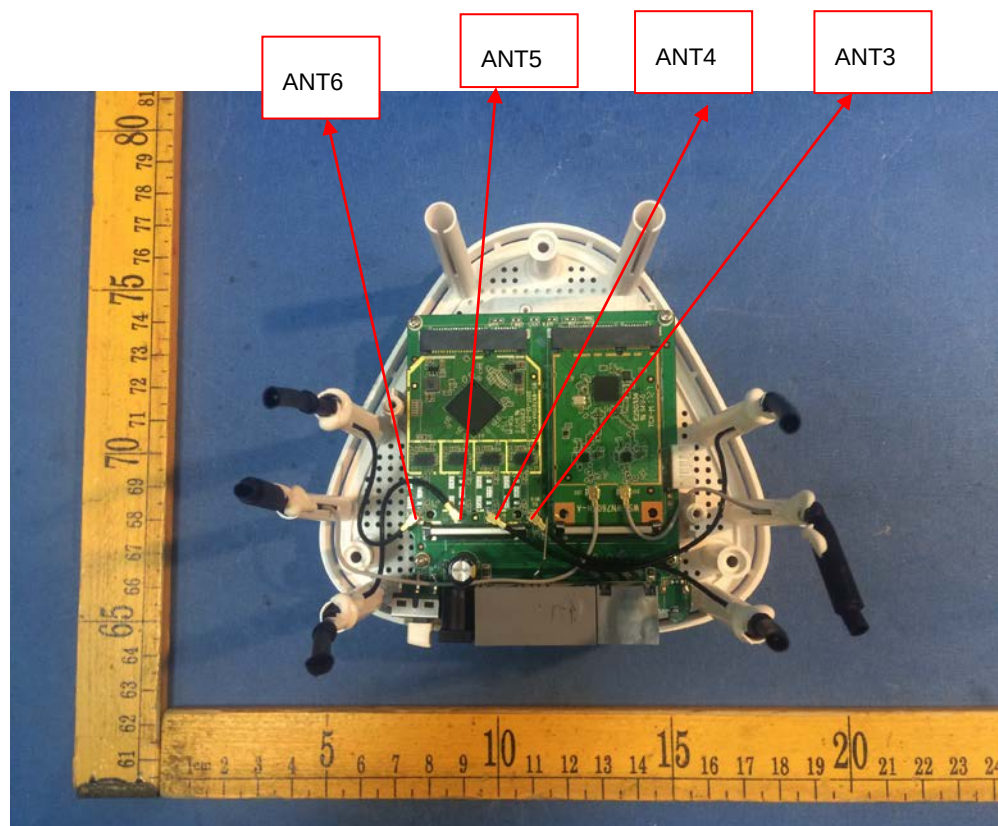
17 Antenna Requirement

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 comply with the requirement.

Result:

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



18 FCC ID: 2AP2U-SN-3E Exposure Report

Note: Please refer to RF Exposure Report: WTS18S05112397-3W.

19 Photographs – Test Setup Photos

Note: Please refer to Photos: WTS18S05112397-4W.

20 Photographs - Constructional Details

20.1 External Photos

Note: Please refer to Photos: WTS18S05112397-4W.

20.2 Internal Photos

Note: Please refer to Photos: WTS18S05112397-4W.

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