RF Test Report

For

Applicant Name:	**Unify Data Technology LLC**
Address:	1013 Centre Road, Suite 403S.2Wilmington, DE 19805, County of New Castle
EUT Name:	Desktop server
Brand Name:	UNIFYDRIVE
Model Number:	UP6
Series Model Number:	UP6A, UP6S, UP6C, UP6 Pro, UP6 Max
FCC ID:	2BGV2UP6

Issued By

Company name:	**BTF Testing Lab (Shenzhen) Co., Ltd.**
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Report number:	BTF250527R00104
Test standards:	FCC CFR Title 47 Part 15 Subpart E (§15.407)
Test conclusion:	Pass
Date of sample receipt:	2025-02-28
Test date:	2025-03-03 to 2025-07-04
Date of issue:	2025-07-04

Test by: Sean He

Sean He / Tester

Prepared by: Chris Liu

Chris Liu/ Project engineer

Approved by: Ryan.CJ

Ryan.CJ /EMC manager

Note: All the test results in this report only related to the testing samples. Which can be duplicated completely for the legal use with approval of applicant; it shall not be reproduced except in full without the written approval of BTF Testing Lab (Shenzhen) Co., Ltd., All the objections should be raised within thirty days from the date of issue. To validate the report, you can contact us.

Revision History		
Version	Issue date	Revisions content
R_V0	2025-07-04	Original
Note: *Once the revision has been made, then previous versions reports are invalid.*		

Table of Contents

1 Introduction

1.1 Laboratory Location

Test location:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Description:	All measurement facilities used to collect the measurement data are located at F101,201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone number:	+86-0755-23146130
Fax number:	+86-0755-23146130

1.2 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Designation No.: CN1409**

  BTF Testing Lab (Shenzhen) Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The test firm Registration No. is 518915.

- **CNAS - Registration No.: CNAS L17568**

  BTF Testing Lab (Shenzhen) Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L17568.

- **A2LA - Registration No.: 6660.01**

  BTF Testing Lab (Shenzhen) Co., Ltd. is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.

1.3 Announcement

(1) The test report reference to the report template version v0.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.

(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

(6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 Product Information

2.1 Application Information

Company name:	Unify Data Technology LLC
Address:	1013 Centre Road, Suite 403S.2Wilmington, DE 19805, County of New Castle

2.2 Manufacturer Information

Company name:	Beijing Zentreadi Intelligence Information Technology Co.,Ltd
Address:	Room1109, 10th Floor, Building A, No.2 Zhongguancun South Street, Haidian District, Beijing

2.3 Factory Information

Company name:	SHENZHEN XINWUJIE TECHNOLOGY CO.,LTD.
Address:	Floor 2&3,Building 2, Mobi Technology Building, Genyu Road, Tianliao Community, Yutang Street, Guangming District, Shenzhen City, Guangdong Province, P.R.China

2.4 General Description of Equipment under Test (EUT)

EUT name	Desktop server
Under test model name	UP6
Series model name	UP6A, UP6S, UP6C, UP6 Pro, UP6 Max
Description of model name differentiation	There is no difference except the name of the model
Hardware Version	I JK JBOX04_V0.3
Software Version	T6MTLJKJBOXV0707
Rating:	DC 19V from ADAPTER or DC 14.4V from recharge Li-ion battery
ADAPTER	Manufacturer: Shenzhen Huntkey Electric Co., Ltd Model: HKA12019063-6BA INPUT: 100-240V～ 60/50Hz, 2.0A OUTPUT: 19.0V⎓ 6.32A, 120.08W

2.5 Technical Information

Operation frequency:	Band U-NII-1: 5180MHz ~ 5240MHz Band U-NII-2A: 5260MHz ~ 5320MHz Band U-NII-2C: 5500MHz ~ 5700MHz Band U-NII-3: 5745MHz ~ 5825MHz
Modulation technology: (IEEE 802.11a/n)	OFDM-BPSK, QPSK, 16QAM, 64QAM
Modulation technology: (IEEE 802.11ac)	OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM
Modulation technology: (IEEE 802.11ax)	OFDMA (64QAM,16QAM,QPSK,BPSK,256QAM,1024QAM)
Max. Conducted Power:	16.56dBm (802.11N40 MIMO)
Antenna type:	FPC Antenna
Antenna gain:	ANT1&ANT2 1.88dBi (declare by Applicant)
Antenna transmit mode:	MIMO (2TX, 2RX)

Channel List

Band U-NII-1

20MHz		40MHz		80MHz	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180	38	5190	42	5210
40	5200	46	5230		
48	5240				

Band U-NII-2A

20MHz		40MHz		80MHz	
Channel	Frequency	Channel	Frequency	Channel	Frequency
52	5260	54	5270	58	5290
56	5280	62	5310		
64	5320				

Band U-NII-2C

20MHz		40MHz		80MHz	
Channel	Frequency	Channel	Frequency	Channel	Frequency
100	5500	102	5510	106	5530
120	5600	118	5590	122	5610
140	5700	134	5670		

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Band U-NII-3

20MHz		40MHz		80MHz	
Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745	151	5755	155	5775
157	5785	159	5795		
165	5825				

U-NII-1&U-NII-2A

160MHz	
Channel	Frequency
50	5250
114	5570

Note:

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

3 Test Information

3.1 Test Standards

Identity	Document Title
FCC CFR Title 47 Part 15 Subpart E (§15.407)	Unlicensed National Information Infrastructure Devices
ANSI C63.10-2020	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 789033 D02 General U-NII Test Procedures New Rules v02r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E

3.2 Summary of Test

Clauses	Test Items	Result
§ 15.203	Antenna Requirement	Pass
§ 15.207 § 15.407(b)(9)	AC Power Line Conducted Emission	Pass
§ 15.407(a)(1)(iv)-(B1), (a)(3)(i)-(B4)	Conducted Peak Output Power Power Spectral Density	Pass
§ 15.407(a) § 15.407(e)	26dB Emission Bandwidth 99% Occupied Bandwidth	Pass
§ 15.407(e)	6dB Emission Bandwidth	Pass
§ 15.205 § 15.209 § 15.407(b)(1)-(B1), (4) -(B4)	Unwanted Emissions	Pass
§ 15.407(g)	Frequency Stability	Pass
Remark: *1. Pass: met the requirements.* *2. N/A: not applicable.*		

3.3 Uncertainty of Test

Measurement	Value
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Supply voltages	±3 %
Time	±5 %
Conducted Emission for LISN (9kHz ~ 150kHz)	±2.97 dB
Conducted Emission for LISN (150kHz ~ 30MHz)	±2.45 dB
Radiated Emission (30MHz ~ 1000MHz)	±4.80 dB
Radiated Emission (1GHz ~ 18GHz)	±4.82 dB
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3.4 Additions to, deviations, or exclusions from the method

None

3.5 Test Auxiliary Equipment

No.	Description	Manufacturer	Model	Serial Number	Certification
1	ADAPTER	Shenzhen Huntkey Electric Co., Ltd	HKA12019063-6BA	N/A	N/A
2	N/A	N/A	N/A	N/A	N/A

3.6 Test Equipment List

Radiated test method					
Test Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Receiver	Rohde &Schwarz	ESCI7	101032	2024/10/25	2025/10/24
Signal Analyzer	Rohde & Schwarz	FSQ40	100010	2024/10/25	2025/10/24
Log periodic antenna	Schwarzbeck	VULB 9168	01328	2024/10/28	2025/10/27
Preamplifier (30MHz ~ 1GHz)	Schwarzbeck	BBV9744	00246	2024/09/24	2025/09/23
Horn Antenna (1GHz ~18GHz)	Schwarzbeck	BBHA9120D	2597	2024/10/30	2025/10/29
Horn Antenna (15GHz ~ 40GHz)	SCHWARZBECK	BBHA9170	1157	2024/10/24	2025/10/23
Preamplifier (1GHz ~ 40GHz)	TST Pass	LNA10180G45	246	2024/09/24	2025/09/23
Test Software	Frad	EZ_EMC	Version: FA-03A2 RE+		

Conducted Emission Test					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Receiver	Rohde & Schwarz	ESCI3	101422	2024/10/25	2025/10/24
V-LISN	Schwarzbeck	NSLK 8127	01073	2024/10/25	2025/10/24
Coaxial Switcher	Schwarzbeck	CX210	CX210	2024/10/25	2025/10/24
Pulse Limiter	Schwarzbeck	VTSD 9561-F	00953	2024/10/25	2025/10/24
Test Software	Frad	EZ_EMC	Version: EMC-CON 3A1.1+		

Conducted test method					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020A	MY50410020	2024/10/25	2025/10/24
ESG Vector Signal Generator	Agilent	E4438C	MY45094854	2024/10/25	2025/10/24
MXG Vector Signal Generator	Agilent	N5182A	MY46240163	2024/10/25	2025/10/24
Wideband Radio Communication Tester	Rohde&Schwarz	CMW500	161997	2024/10/25	2025/10/24
Temperature Humidity Chamber	ZZCKONG	ZZ-K02A	20210928007	2024/10/25	2025/10/24
DC Power Supply	Tongmen	etm-6050c	20211026123	2024/10/25	2025/10/24
RF Control Unit	Techy	TR1029-1	/	2024/10/25	2025/10/24
RF Sensor Unit	Techy	TR1029-2	/	2024/10/25	2025/10/24
Test Software	TST	/	Version: 2.0		

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4 Test Configuration

4.1 Test mode

Transmitting mode:	Keep the EUT in continuously transmitting mode with modulation
Remark: Per-scan all kind of data rate, and report only reflects the test data of worst data rate mode.	

4.2 Test Channel of EUT

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:

Operation frequency: 5180 MHz – 5240 MHz					
IEEE 802.11a, IEEE 802.11n20, IEEE 802.11ac20, IEEE 802.11ax20					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
36	5180	40	5200	48	5240
IEEE 802.11n40, IEEE 802.11ac40, IEEE 802.11ax40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
38	5190	/	/	46	5230
802.11ac80, 802.11ax80					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
/	/	42	5210	/	/
802.11ac160, 802.11ax160					
/	/	50	5250	/	/

Operation frequency: 5260MHz – 5320MHz					
IEEE 802.11a, IEEE 802.11n20, IEEE 802.11ac20, IEEE 802.11ax20					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
52	5260	60	5300	64	5320
IEEE 802.11n40, IEEE 802.11ac40, IEEE 802.11ax40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
54	5270	/	/	62	5310
802.11ac80, 802.11ax80					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
/	/	58	5290	/	/

Operation frequency: 5500MHz – 5700MHz					
IEEE 802.11a, IEEE 802.11n20, IEEE 802.11ac20, IEEE 802.11ax20					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
100	5500	120	5600	140	5700
IEEE 802.11n40, IEEE 802.11ac40, IEEE 802.11ax40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
102	5510	118	5590	134	5670
802.11ac80, 802.11ax80					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
106	5530	/	/	122	5610
802.11ac160, 802.11ax160					
/	/	114	5570	/	/

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Operation frequency: 5745 MHz – 5825 MHz IEEE 802.11a, IEEE 802.11n20, IEEE 802.11ac20, IEEE 802.11ax20					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
149	5745	157	5785	165	5825
IEEE 802.11n40, IEEE 802.11ac40					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
151	5755	/	/	159	5795
IEEE 802.11ac80					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
/	/	155	5775	/	/

4.3 Test procedure

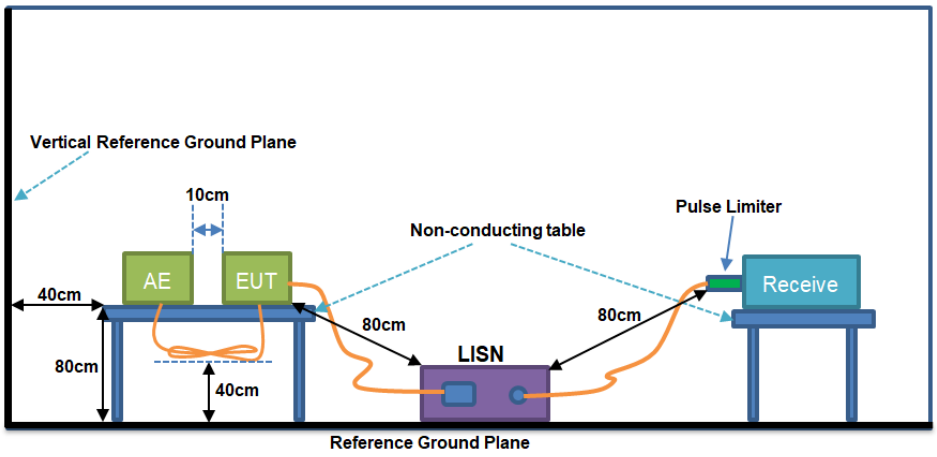
AC Power Line Conducted Emission
The EUT is connected to the power mains through a LISN which provides 50 Ω/50 μH of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.
Radiated test method
For below 1GHz: 1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data. **For above 1GHz:** 1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m. 2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations. 3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
Conducted test method
1. The WiFi antenna port of EUT was connected to the test port of the test system through an RF cable. 2. The EUT is keeping in continuous transmission mode and tested in all modulation modes. 3. Open the test software, prepare a test plan, and control the system through the software. After the test is completed, the test report is exported through the test software.

4.4 Test software

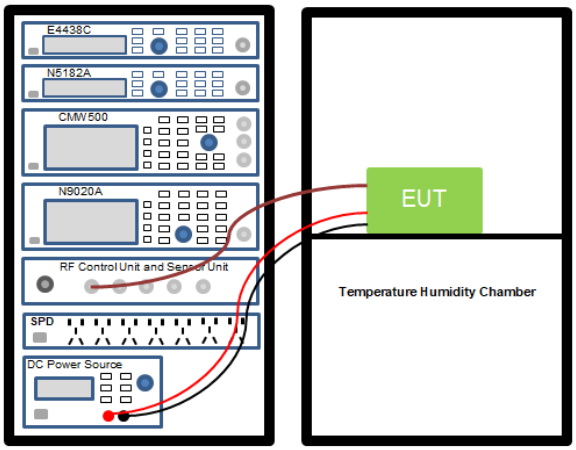
Test software:	DRTU	Version:	WTF 1.0.10
Power Class:	Default		

4.5 Test Setup Block

1) Conducted emission measurement:

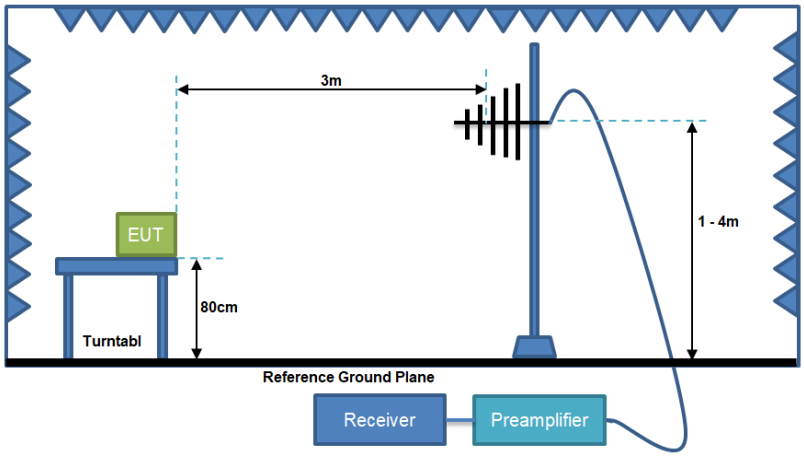


2) Conducted test method:

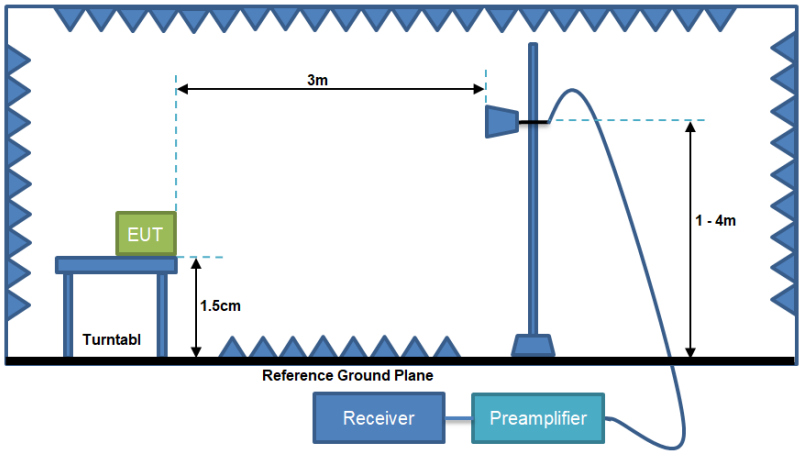


3) Radiated test method:

Below 1GHz



Above 1GHz

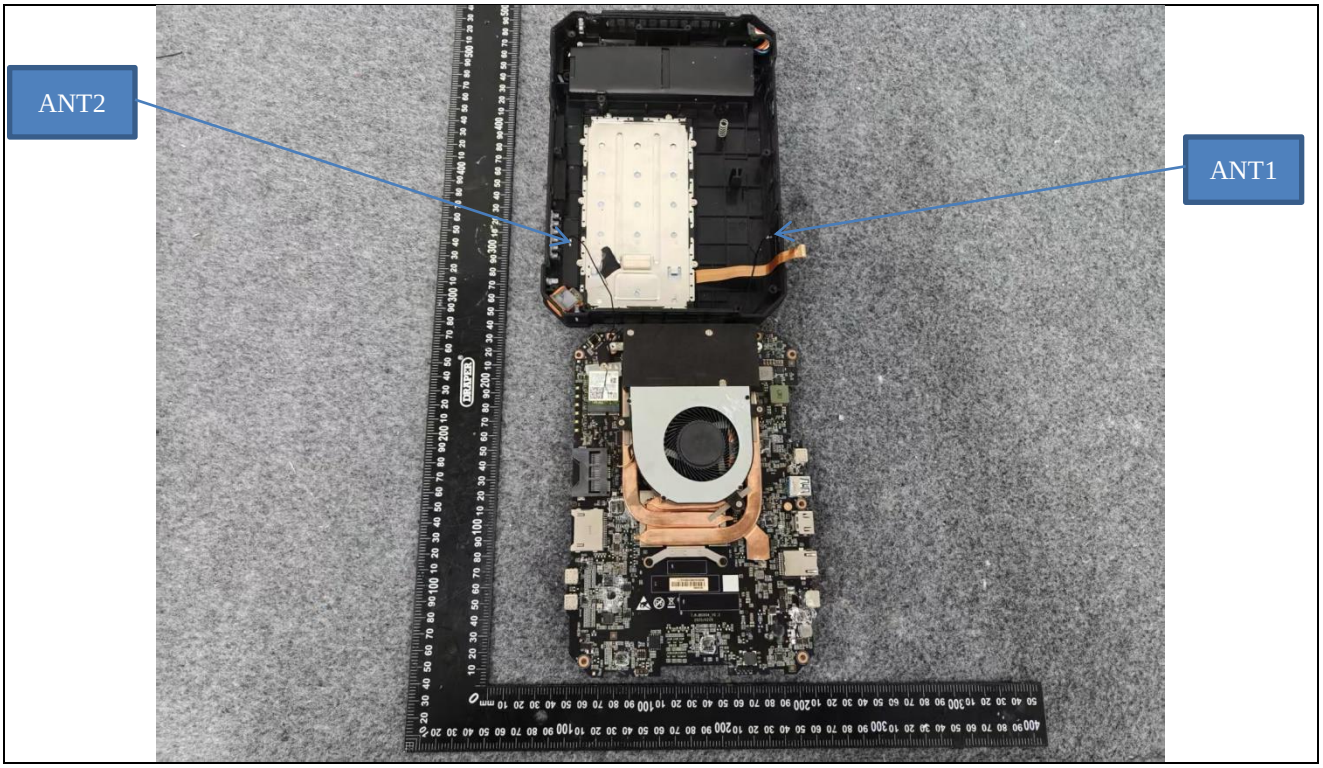


5 Technical requirements specification

5.1 Antenna Requirement

Test 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.

5.1.1 Conclusion:



5.2 AC Power Line Conducted Emission

Test Requirement:	47 CFR Part 15.207(a)
Test Method:	Refer to ANSI C63.10-2020 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices
Test Limit:	Frequency of emission (MHz) / Conducted limit (dBμV) Quasi-peak / Average 0.15-0.5 / 66 to 56* / 56 to 46* 0.5-5 / 56 / 46 5-30 / 60 / 50 *Decreases with the logarithm of the frequency.

5.2.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar
Test Voltage	AC 120V 60Hz

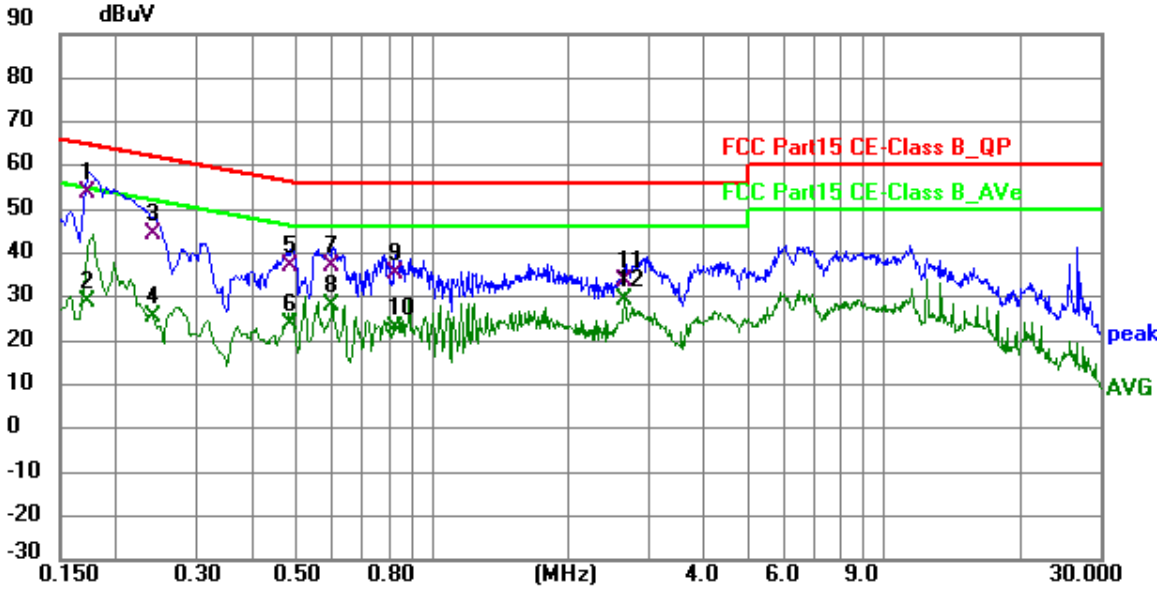
5.2.2 Test Setup

See section 4.5 for test setup description. The photo of test setup please refer to Appendix I Test Setup Photos

5.2.3 Test Data:

Note: All ANT and mode had been tested, only show the worst IEEE 802.11a TX 5180MHz ANT1 test data

Test phase: L phase



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.1718	44.13	9.63	53.76	64.87	-11.11	QP	P	
2	0.1718	19.41	9.63	29.04	54.87	-25.83	AVG	P	
3	0.2425	34.94	9.63	44.57	62.01	-17.44	QP	P	
4	0.2425	15.92	9.63	25.55	52.01	-26.46	AVG	P	
5	0.4873	27.47	9.62	37.09	56.21	-19.12	QP	P	
6	0.4873	14.06	9.62	23.68	46.21	-22.53	AVG	P	
7	0.6003	27.62	9.62	37.24	56.00	-18.76	QP	P	
8	0.6003	18.45	9.62	28.07	46.00	-17.93	AVG	P	
9	0.8344	25.85	9.63	35.48	56.00	-20.52	QP	P	
10	0.8344	13.32	9.63	22.95	46.00	-23.05	AVG	P	
11	2.6619	24.10	9.65	33.75	56.00	-22.25	QP	P	
12	2.6619	19.87	9.65	29.52	46.00	-16.48	AVG	P	

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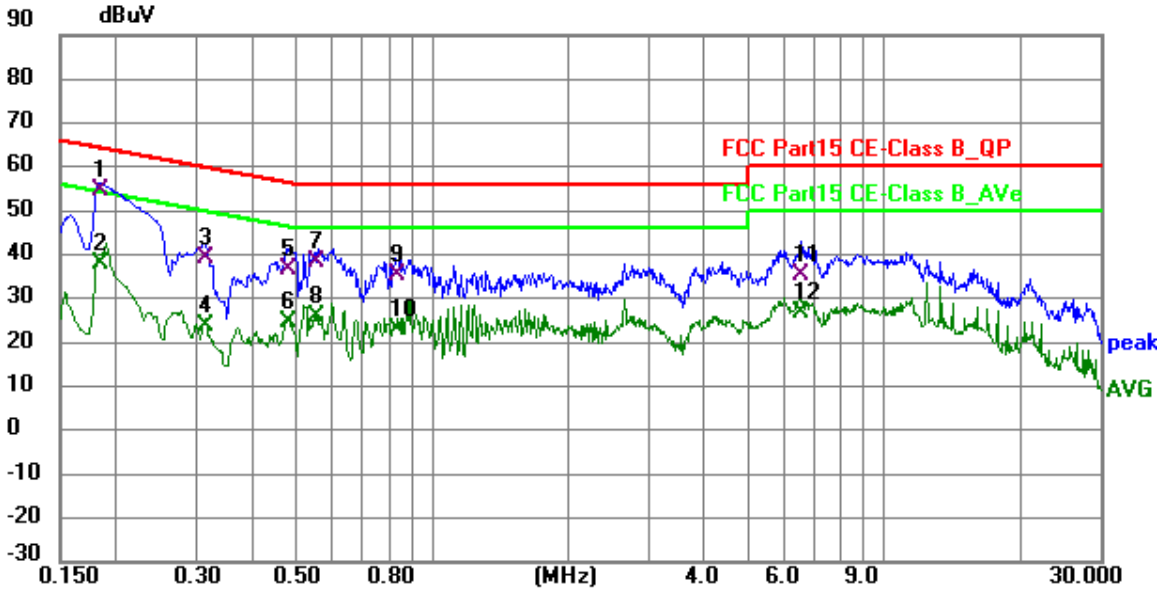
Test phase: N phase IEEE 802.11a TX 5180MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.1839	44.86	9.63	54.49	64.31	-9.82	QP	P	
2	0.1839	28.48	9.63	38.11	54.31	-16.20	AVG	P	
3	0.3151	29.72	9.62	39.34	59.83	-20.49	QP	P	
4	0.3151	14.13	9.62	23.75	49.83	-26.08	AVG	P	
5	0.4826	27.02	9.62	36.64	56.29	-19.65	QP	P	
6	0.4826	14.91	9.62	24.53	46.29	-21.76	AVG	P	
7	0.5556	28.65	9.62	38.27	56.00	-17.73	QP	P	
8	0.5556	16.24	9.62	25.86	46.00	-20.14	AVG	P	
9	0.8332	25.93	9.62	35.55	56.00	-20.45	QP	P	
10	0.8332	13.11	9.62	22.73	46.00	-23.27	AVG	P	
11	6.5431	25.68	9.70	35.38	60.00	-24.62	QP	P	
12	6.5431	17.22	9.70	26.92	50.00	-23.08	AVG	P	

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5.3 Duty Cycle

Test Requirement:	All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.
Test Method:	ANSI C63.10-2020 section 12.2 (b)
Test Limit:	No limits, only for report use.
Procedure:	i) Set the center frequency of the instrument to the center frequency of the transmission. ii) Set RBW >= EBW if possible; otherwise, set RBW to the largest available value. iii) Set VBW >= RBW. iv) Set detector = peak. v) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T, where T is defined in item a1) of 12.2, and the number of sweep points across duration T exceeds 100.

5.3.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

5.3.2 Test Setup

See section 4.5 for test setup description. The photo of test setup please refer to Appendix I Test Setup Photos

5.3.3 Test Data:

Please Refer to Appendix-5GWIFI

5.4 Maximum conducted output power

Test Requirement:	47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(2) 47 CFR Part 15.407(a)(3)(i)
Test Method:	ANSI C63.10-2020, section 12.3
Test Limit:	For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
Procedure:	Method SA-1 a) Set span to encompass the entire 26 dB EBW or 99% OBW of the signal. b) Set RBW = 1 MHz. c) Set VBW >= 3 MHz. d) Number of points in sweep >= [2 × span / RBW]. (This gives bin-to-bin spacing <= RBW / 2, so that narrowband signals are not lost between frequency bins.) e) Sweep time = auto. f) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode. g) If transmit duty cycle < 98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. The transmitter shall operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle >= 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run.” h) Trace average at least 100 traces in power averaging (rms) mode. i) Compute power by integrating the spectrum across the 26 dB EBW or 99% OBW of the signal using the instrument’s band power measurement function, with band limits set equal to the EBW or OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW or 99% OBW of the spectrum.

5.4.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

5.4.2 Test Setup

See section 4.5 for test setup description. The photo of test setup please refer to Appendix I Test Setup Photos

5.4.3 Test Data:

Please Refer to Appendix-5GWIFI

5.5 Power spectral density

Test Requirement:	47 CFR Part 15.407(a)(1)(iv) 47 CFR Part 15.407(a)(2) 47 CFR Part 15.407(a)(3)(i)
Test Method:	ANSI C63.10-2020, section 12.5
Test Limit:	For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. For the band 5.725-5.850 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
Procedure:	a) Create an average power spectrum for the EUT operating mode being tested by following the instructions in 12.3.2 for measuring maximum conducted output power using a spectrum analyzer or EMI receiver; that is, select the appropriate test method (SA-1, SA-2, SA-3, or their respective alternatives) and apply it up to, but not including, the step labeled, “Compute power….” (This procedure is required even if the maximum conducted output power measurement was performed using the power meter method PM.) b) Use the peak search function on the instrument to find the peak of the spectrum. c) Make the following adjustments to the peak value of the spectrum, if applicable: 1) If method SA-2 or SA-2A was used, then add [10 log (1 / D)], where D is the duty cycle, to the peak of the spectrum. 2) If method SA-3A was used and the linear mode was used in step h) of 12.3.2.7, add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. d) The result is the PPSD. e) The procedure in item a) through item c) requires the use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified by some regulatory authorities.This requirement also permits use of resolution bandwidths less than 1 MHz “provided that the

	measured power is integrated to show the total power over the measurement bandwidth" (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth, the following adjustments to the procedures apply: 1) Set RBW >= 1 / T, where T is defined in 12.2 a). 2) Set VBW >= [3 × RBW]. 3) Care shall be taken such that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

5.5.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

5.5.2

5.5.3 Test Setup

See section 4.5 for test setup description. The photo of test setup please refer to Appendix I Test Setup Photos

5.5.4 Test Data:

Please Refer to Appendix-5GWIFI

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5.6 Emission bandwidth and occupied bandwidth

Test Requirement:	U-NII 1: No limits, only for report use. U-NII 2A: No limits, only for report use. U-NII 2C: No limits, only for report use. U-NII 3: 47 CFR Part 15.407(e)
Test Method:	ANSI C63.10-2020, section 6.9.3 & 12.4 KDB 789033 D02, Clause C.2
Test Limit:	U-NII 1: No limits, only for report use. U-NII 3: Within the 5.725-5.850 GHz, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.
Procedure:	Emission bandwidth: a) Set RBW = approximately 1% of the emission bandwidth. b) Set the VBW > RBW. c) Detector = peak. d) Trace mode = max hold. e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%. Occupied bandwidth: a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2. d) Step a) through step c) might require iteration to adjust within the specified range. e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used. f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth. g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached;

	that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies. h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s). 6 dB emission bandwidth: a) Set RBW = 100 kHz. b) Set the video bandwidth (VBW) ≥ 3 >= RBW. c) Detector = Peak. d) Trace mode = max hold. e) Sweep = auto couple. f) Allow the trace to stabilize. g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.6.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 ℃
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

5.6.2 Test Setup

See section 4.5 for test setup description. The photo of test setup please refer to Appendix I Test Setup Photos

5.6.3 Test Data:

Please Refer to Appendix-5GWIFI

5.7 Band edge emissions (Radiated)

Test Requirement:	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(2) 47 CFR Part 15.407(b)(3) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)
Test Method:	ANSI C63.10-2020, section 12.7.4, 12.7.5, 12.7.6
Test Limit:	For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.25 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating solely in the 5.725-5.850 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.

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2]Above 38.6

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in § 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in § 15.209shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in § 15.209shall be demonstrated based on the average value of the measured emissions. The provisions in § 15.35apply to these measurements.

	Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table: Frequency (MHz) / Field strength (microvolts/meter) / Measurement distance (meters) 0.009-0.490 / 2400/F(kHz) / 300 0.490-1.705 / 24000/F(kHz) / 30 1.705-30.0 / 30 / 30 30-88 / 100 ** / 3 88-216 / 150 ** / 3 216-960 / 200 ** / 3 Above 960 / 500 / 3
Procedure:	Above 1GHz: a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete. Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. 3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report. 4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

5.7.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 ℃
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar
Test Voltage	AC 120V 60Hz

5.7.2 Test Setup

See section 4.5 for test setup description. The photo of test setup please refer to Appendix I Test Setup Photos

5.7.3 Test Data:

Remark: During the test, pre-scan 802.11a/n/ac modulation mode, found 802.11a ANT1 modulation was worse case mode. The report only reflects the test data of worst mode.

Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150	40.85	12.01	52.86	68.2	-15.34	PK
V	5150	39.19	12.01	51.20	68.2	-17.00	PK

Mode:		802.11a		Frequency:		5180MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150	26.46	12.01	38.47	54	-15.53	AV
V	5150	27.40	12.01	39.41	54	-14.59	AV

Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350	41.48	13.86	55.34	68.2	-12.86	PK
V	5350	39.35	13.86	53.21	68.2	-14.99	PK

Mode:		802.11a		Frequency:		5240MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350	26.68	13.86	40.54	54	-13.46	AV
V	5350	26.62	13.86	40.48	54	-13.52	AV

Mode:		802.11a		Frequency:		5260MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150	35.74	17.19	52.93	68.2	-15.27	PK
V	5150	34.23	17.19	51.42	68.2	-16.78	PK

Mode:		802.11a		Frequency:		5260MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5150	26.10	17.19	43.29	54	-10.71	AV
V	5150	26.04	17.19	43.23	54	-10.77	AV

Mode:		802.11a		Frequency:		5320MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350	36.25	17.19	53.44	68.2	-14.76	PK
V	5350	34.15	17.19	51.34	68.2	-16.86	PK

Mode:		802.11a		Frequency:		5320MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5350	26.32	17.19	43.51	54	-10.49	AV
V	5350	24.39	17.19	41.58	54	-12.42	AV

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Mode:		802.11a		Frequency:		5500MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5470	35.54	17.21	52.75	68.2	-15.45	PK
V	5470	34.37	17.21	51.58	68.2	-16.62	PK

Mode:		802.11a		Frequency:		5500MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5470	26.07	17.21	43.28	54	-10.72	AV
V	5470	26.16	17.21	43.37	54	-10.63	AV

Mode:		802.11a		Frequency:		5700MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5725	36.06	17.21	53.27	68.2	-14.93	PK
V	5725	35.06	17.21	52.27	68.2	-15.93	PK

Mode:		802.11a		Frequency:		5700MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5725	26.27	17.21	43.48	54	-10.52	AV
V	5725	24.29	17.21	41.50	54	-12.50	AV

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Mode:		802.11a		Frequency:		5725MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5609	40.23	17.94	58.17	68.2	-10.03	PK
V	5632	39.16	17.5	56.66	68.2	-11.54	PK
H	5957	41.02	17	58.02	68.2	-10.18	PK
V	5976	38.97	16.94	55.91	68.2	-12.29	PK
Mode:		802.11a		Frequency:		5850MHz	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV)	Factor (dB/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
H	5604	40.69	17.56	58.25	68.2	-9.95	PK
V	5964	38.46	17.89	56.35	68.2	-11.85	PK
H	5625	41.05	16.95	58.00	68.2	-10.20	PK
V	5982	39.34	16.94	56.28	68.2	-11.92	PK

5.8 RADIATED EMISSIONS (below 1GHz)

Test Requirement:	47 CFR Part 15.407(b)(9)
Test Method:	ANSI C63.10-2020, section 12.7.4, 12.7.5, 12.7.6
Test Limit:	Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table: Frequency (MHz) — Field strength (microvolts/meter) — Measurement distance (meters) 0.009-0.490 — 2400/F(kHz) — 300 0.490-1.705 — 24000/F(kHz) — 30 1.705-30.0 — 30 — 30 30-88 — 100 ** — 3 88-216 — 150 ** — 3 216-960 — 200 ** — 3 Above 960 — 500 — 3
Procedure:	Below 1GHz: a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete. Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. 3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. Above 1GHz: a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

	c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete. Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. 3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report. 4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

5.8.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 ℃
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar
Test Voltage	AC 120V 60Hz

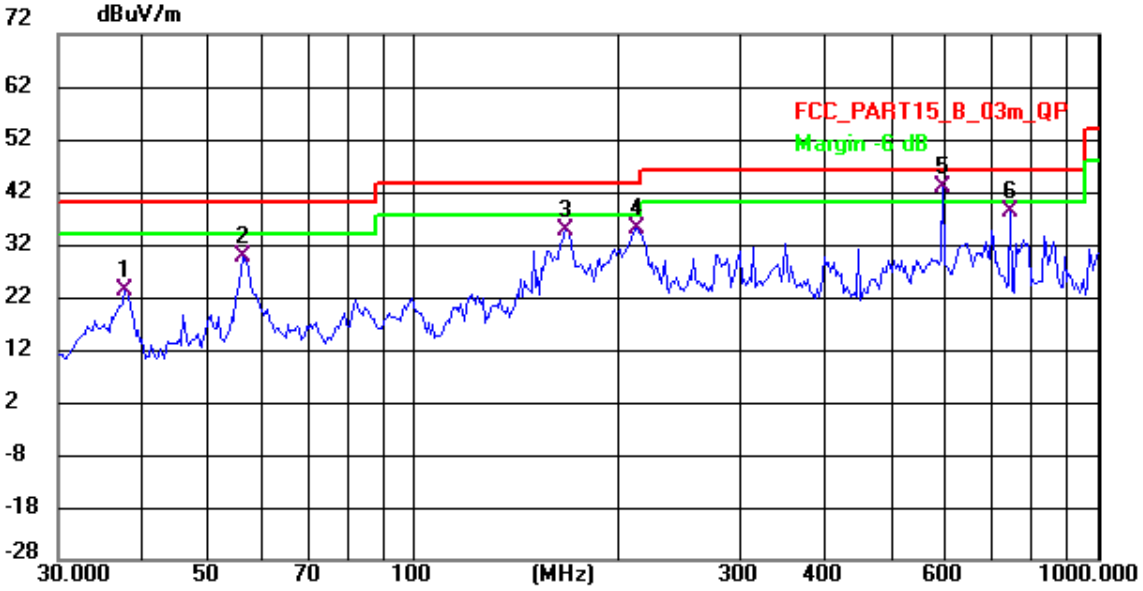
5.8.2 Test Setup

See section 4.5 for test setup description. The photo of test setup please refer to Appendix I Test Setup Photos

5.8.3 Test Data:

Note: During the test, pre-scan 802.11a/n/ac modulation mode, found 802.11a ANT1 modulation was worst case mode. The report only reflects the test data of worst mode.

TM1 / Polarization: Horizontal IEEE 802.11a TX 5180MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	37.5648	45.87	-22.49	23.38	40.00	-16.62	QP	200	187	P	
2	56.0708	52.01	-22.43	29.58	40.00	-10.42	QP	200	220	P	
3	166.6385	55.50	-20.91	34.59	43.50	-8.91	QP	100	225	P	
4	211.6112	60.00	-25.12	34.88	43.50	-8.62	QP	100	336	P	
5 *	594.5143	56.72	-13.95	42.77	46.00	-3.23	QP	200	15	P	
6	744.4265	49.10	-10.69	38.41	46.00	-7.59	QP	200	23	P	

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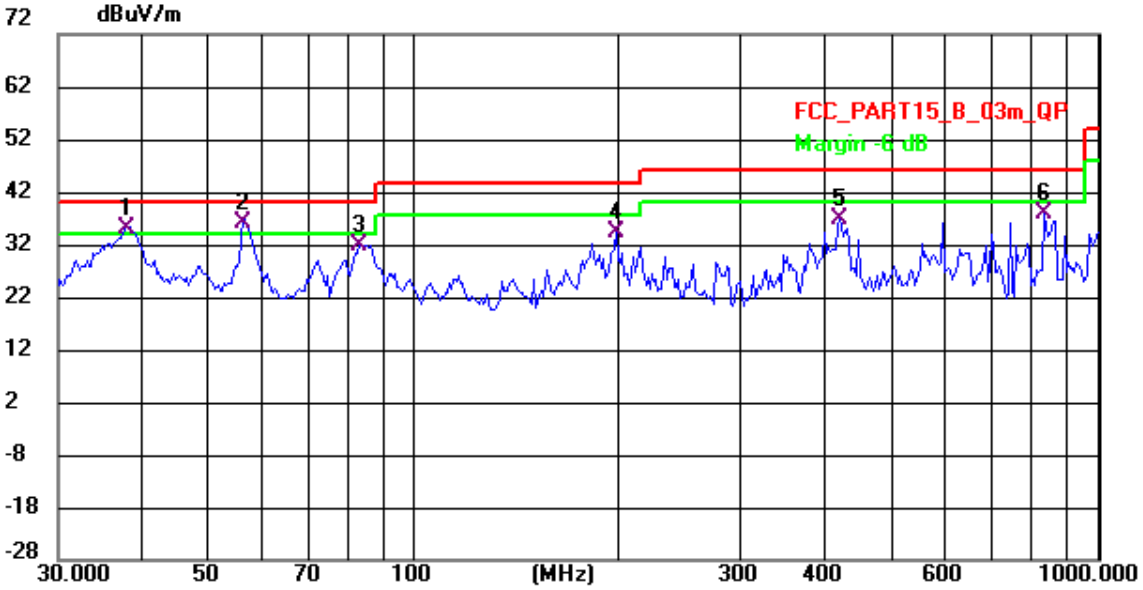
TM1 / Polarization: Vertical IEEE 802.11a TX 5180MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 !	37.8297	57.42	-22.44	34.98	40.00	-5.02	QP	100	274	P	
2 *	56.0708	58.70	-22.43	36.27	40.00	-3.73	QP	200	287	P	
3	83.1076	57.53	-25.84	31.69	40.00	-8.31	QP	100	65	P	
4	197.2514	58.95	-24.46	34.49	43.50	-9.01	QP	200	213	P	
5	418.3783	55.28	-18.54	36.74	46.00	-9.26	QP	100	188	P	
6	833.0127	47.15	-9.43	37.72	46.00	-8.28	QP	100	324	P	

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5.9 RADIATED EMISSIONS (above 1GHz)

Test Requirement:	47 CFR Part 15.407(b)(1) 47 CFR Part 15.407(b)(2) 47 CFR Part 15.407(b)(3) 47 CFR Part 15.407(b)(4) 47 CFR Part 15.407(b)(10)
Test Method:	ANSI C63.10-2020, section 12.7.4, 12.7.5, 12.7.6
Test Limit:	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 −27 dBm/MHz. For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz. For transmitters operating solely in the 5.725-5.850 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.

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35apply to these measurements.

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300

	0.490-1.705	24000/F(kHz)	30
	1.705-30.0	30	30
	30-88	100 **	3
	88-216	150 **	3
	216-960	200 **	3
	Above 960	500	3
Procedure:	Above 1GHz: a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak or average method as specified and then reported in a data sheet. g. Test the EUT in the lowest channel, the middle channel, the Highest channel. h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case. i. Repeat above procedures until all frequencies measured was complete. Remark: 1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor 2. Scan from 18GHz to 40GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. 3. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report. 4. The disturbance above 18GHz were very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.		

5.9.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 ℃
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar
Test Voltage	AC 120V 60Hz

5.9.2 Test Setup

See section 4.5 for test setup description. The photo of test setup please refer to Appendix I Test Setup Photos

5.9.3 Test Data:

Note: During the test, pre-scan 802.11a/n/ac modulation mode, found 802.11a ANT1 modulation was worst case mode. The report only reflects the test data of worst mode.

UNII-1

11A Channel 36 / 5180 MHz ANT1 UNII-1									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
10651	H	43.43	---	9.03	52.46	---	74	54	-21.54
15523	H	39.38	---	9.87	49.25	---	74	54	-24.75
---	H	.	---	---	---	---	---	---	---
10655	V	44.87	---	9.03	53.90	---	74	54	-20.10
15542	V	39.06	---	9.88	48.94	---	74	54	-25.06
---	V	---	---	---	---	---	---	---	---
11A Channel 40 / 5200 MHz ANT1									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
10601	H	44.88	---	9.09	53.97	---	74	54	-20.03
15600	H	40.92	---	9.91	50.83	---	74	54	-23.17
---	H	---	---	---	---	---	---	---	---
10601	V	44.48	---	9.09	53.57	---	74	54	-20.43
15600	V	43.32	---	9.91	53.23	---	74	54	-20.77
---	V	---	---	---	---	---	---	---	---
11A Channel 48 / 5240 MHz ANT1									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
10680	H	44.75	---	9.24	53.99	---	74	54	-20.01
15722	H	43.81	---	10.01	53.82	---	74	54	-20.18
---	H	---	---	---	---	---	---	---	---
10680	V	44.69	---	9.24	53.93	---	74	54	-20.07
15722	V	43.82	---	10.01	53.83	---	74	54	-20.17
---	V	---	---	---	---	---	---	---	---

11A Channel 52 / 5260 MHz ANT1 UNII-2A									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
10621	H	44.56	---	9.44	54.00	---	74	54	-20.00
15781	H	43.72	---	10.12	53.84	---	74	54	-20.16
---	H	.	---	---	---	---	---	---	---
10623	V	43.15	---	9.46	52.61	---	74	54	-21.39
15782	V	43.37	---	10.13	53.50	---	74	54	-20.50
---	V	---	---	---	---	---	---	---	---
11A Channel 56 / 5280 MHz ANT1									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
10661	H	43.09	---	9.51	52.60	---	74	54	-21.40
15842	H	43.08	---	10.51	53.59	---	74	54	-20.41
---	H	---	---	---	---	---	---	---	---
10661	V	43.50	---	9.51	53.01	---	74	54	-20.99
15841	V	43.04	---	10.49	53.53	---	74	54	-20.47
---	V	---	---	---	---	---	---	---	---
11A Channel 64 / 5320 MHz ANT1									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
10641	H	41.99	---	9.63	51.62	---	74	54	-22.38
15961	H	42.72	---	11.25	53.97	---	74	54	-20.03
---	H	---	---	---	---	---	---	---	---
10642	V	43.68	---	9.63	53.31	---	74	54	-20.69
15959	V	42.38	---	11.23	53.61	---	74	54	-20.39
---	V	---	---	---	---	---	---	---	---

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11A Channel 100 / 5500 MHz ANT1 UNII-2C									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
10651	H	44.35	---	9.15	53.50	---	74	54	-20.50
15799	H	43.43	---	10.25	53.68	---	74	54	-20.32
---	H	.	---	---	---	---	---	---	---
10758	V	43.30	---	9.99	53.29	---	74	54	-20.71
15836	V	42.75	---	10.95	53.70	---	74	54	-20.30
---	V	---	---	---	---	---	---	---	---
11A Channel 116 / 5580 MHz ANT1									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
10793	H	41.04	---	10.01	51.05	---	74	54	-22.95
15902	H	42.02	---	10.79	52.81	---	74	54	-21.19
---	H	---	---	---	---	---	---	---	---
10963	V	43.92	---	10.05	53.97	---	74	54	-20.03
15991	V	41.14	---	11.93	53.07	---	74	54	-20.93
---	V	---	---	---	---	---	---	---	---
11A Channel 140 / 5700 MHz ANT1									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
10789	H	43.88	---	10.00	53.88	---	74	54	-20.12
16199	H	40.82	---	12.04	52.86	---	74	54	-21.14
---	H	---	---	---	---	---	---	---	---
10853	V	43.37	---	10.12	53.49	---	74	54	-20.51
16014	V	42.04	---	11.32	53.36	---	74	54	-20.64
---	V	---	---	---	---	---	---	---	---

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11A Channel 149 / 5745 MHz ANT1 UNII-3									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
11491	H	43.40	---	9.81	53.21	---	74	54	-20.79
17736	H	40.74	---	12.96	53.70	---	74	54	-20.30
---	H	.	---	---	---	---	---	---	---
11493	V	42.78	---	9.81	52.59	---	74	54	-21.41
17735	V	40.42	---	12.95	53.37	---	74	54	-20.63
---	V	---	---	---	---	---	---	---	---
11A Channel 153 / 5765 MHz ANT1									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
11531	H	43.35	---	9.91	53.26	---	74	54	-20.74
17796	H	39.51	---	13.21	52.72	---	74	54	-21.28
---	H	---	---	---	---	---	---	---	---
11532	V	43.85	---	9.92	53.77	---	74	54	-20.23
17797	V	40.48	---	13.22	53.70	---	74	54	-20.30
---	V	---	---	---	---	---	---	---	---
11A Channel 165 / 5825 MHz ANT1									
Frequency	Ant.Pol. H/V	Peak reading (dBuV)	AV reading (dBuV)	Correction Factor	Emission Level		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)			
11651	H	43.80	---	10.01	53.81	---	74	54	-20.19
17878	H	39.09	---	14.01	53.10	---	74	54	-20.90
---	H	---	---	---	---	---	---	---	---
11649	V	42.90	---	9.98	52.88	---	74	54	-21.12
17877	V	39.53	---	13.99	53.52	---	74	54	-20.48
---	V	---	---	---	---	---	---	---	---

Remark: Test frequency up to 40GHz, and the emission levels of other frequencies are lower than the limit 20dB, not show in test report.

5.10 Frequency Stability Measurement

Test Requirement:	FCC Part15 Section 15.407(g) &Part2 J Section 2.1055
Test Method:	ANSI C63.10: 2013
Limit:	The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 45 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.
Test Procedure:	The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

5.10.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.5 °C
Humidity:	50.6 %
Atmospheric Pressure:	1010 mbar

5.10.2 Test Setup

See section 4.5 for test setup description. The photo of test setup please refer to Appendix I Test Setup Photos

5.10.3 Test Data:

Please Refer to Appendix-5GWIFI

6 Test Setup Photos

Please refer to the Appendix I Test Setup Photos

7 EUT Constructional Details (EUT Photos)

Please refer to the Appendix II External Photos & Appendix III Internal Photos

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