Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

TEST REPORT
FCC PART 15.407

Report Reference No. ..... :	**CTA26082700903**
FCC ID. ..... :	**2BP5V-ZK301**
Compiled by (position+printed name+signature). :	File administrators Zoey Cao
Supervised by (position+printed name+signature). :	Project Engineer Ace Chai
Approved by (position+printed name+signature). :	RF Manager Eric Wang
Date of issue ..... :	Sep. 23, 2026
Testing Laboratory Name ..... :	**Shenzhen CTA Testing Technology Co., Ltd.**
Address ..... :	Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name ..... :	**Dong Guan Zhen Ke Technology Co., LTD**
Address ..... :	No.1 Helong Road, Chang'an Town, Dongguan City, China
Test specification ..... :	
Standard ..... :	**FCC Part 15 Subpart E 15.407** **KDB 789033 D02 General UNII Test Procedures New Rules v02r01**

Shenzhen CTA Testing Technology Co., Ltd. All rights reserved.
This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen CTA Testing Technology Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen CTA Testing Technology Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description ..... :	**Weather Station**
Trade Mark ..... :	N/A
Manufacturer ..... :	Dong Guan Zhen Ke Technology Co., LTD
Model/Type reference ..... :	WS-SA9
Listed Models ..... :	N/A
Modulation Type ..... :	GFSK
Operation Frequency ..... :	From 5180MHz to 5320MHz, 5500MHz to 5700MHz, 5745MHz to 5825MHz
Rating ..... :	Input: 5V ⎓ 1A
Result ..... :	**PASS**

TEST REPORT

Equipment under Test	:	Weather Station
Model /Type	:	WS-SA9
Listed Models	:	N/A
Applicant	:	**Dong Guan Zhen Ke Technology Co., LTD**
Address	:	No.1 Helong Road, Chang'an Town, Dongguan City, China
Manufacturer	:	**Dong Guan Zhen Ke Technology Co., LTD**
Address	:	No.1 Helong Road, Chang'an Town, Dongguan City, China

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS 4

2. SUMMARY 5

2.1. General Remarks 5
2.2. Product Description 5
2.3. Equipment Under Test 6
2.4. Short description of the Equipment under Test (EUT) 6
2.5. EUT operation mode 6
2.6. Block Diagram of Test Setup 7
2.7. Related Submittal(s) / Grant (s) 7
2.8. Modifications 7

3. TEST ENVIRONMENT 8

3.1. Address of the test laboratory 8
3.2. Test Facility 8
3.3. Environmental conditions 8
3.4. Test Description 9
3.5. Statement of the measurement uncertainty 9
3.6. Equipments Used during the Test 10

4. TEST CONDITIONS AND RESULTS 12

4.1. AC Power Conducted Emission 12
4.2. Radiated Emission 21
4.3. Maximum Conducted Average Output Power 35
4.4. Power Spectral Density 36
4.5. 6dB Bandwidth 38
4.6. 26dB Bandwidth 39
4.7. Frequency Stability 40
4.8. On Time and Duty Cycle 43
4.9. Antenna Requirement 44
4.10. Emissions at Restricted Band 45

5. TEST SETUP PHOTOS OF THE EUT 47

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT 48

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.407: UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE DEVICES.
ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024: American National Standard for Testing Unlicensed Wireless Devices
KDB 789033 D02: GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORAMTION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Aug. 28, 2026
Testing commenced on	:	Aug. 28, 2026
Testing concluded on	:	Sep. 23, 2026

2.2. Product Description

Product Name:	Weather Station
Model/Typereference:	WS-SA9
Power supply:	Input: 5V ⎓ 1A
Adapter information:	Model: CZH008N0S0100USWP Input: 100-240V~ 50/60Hz 0.2A MAX Output: 5V ⎓ 1000mA
testing sample ID:	CTA260827009-1# (Engineer sample) CTA260827009-2# (Normal sample)
Hardware version:	V1.0
Software version:	V1.0
WIFI	
WLAN	Supported 802.11 a/n
Modulation Type	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK, BPSK)
Operation frequency	IEEE 802.11a:5180-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11n HT20: 5180-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11n HT40: 5190-5310MHz,5510-5670MHz,5755-5795MHz
Antenna type:	PCB antenna
Antenna gain:	3.42 dBi

2.3. Equipment Under Test

Power supply system utilised

Refer to section 2.2

2.4. Short description of the Equipment under Test (EUT)

This is a Weather Station.
For more details, refer to the user's manual of the EUT.

Test Software Version	Tools software(EspRFTestTool)		
Frequency	5180 MHz	5220 MHz	5240 MHz
802.11a	Default	Default	Default
802.11n20	Default	Default	Default
Frequency	5190 MHz	/	5230 MHz
802.11n40	Default	/	Default

Test Software Version	Tools software(EspRFTestTool)		
Frequency	5260 MHz	5300 MHz	5320 MHz
802.11a	Default	Default	Default
802.11n20	Default	Default	Default
Frequency	5270 MHz	/	5310 MHz
802.11N40	Default		Default

Test Software Version	Tools software(EspRFTestTool)		
Frequency	5500 MHz	5580 MHz	5700 MHz
802.11a	Default	Default	Default
802.11n20	Default	Default	Default
Frequency	5510 MHz	5550 MHz	5670 MHz
802.11N40	Default	Default	Default

Test Software Version	Tools software(EspRFTestTool)		
Frequency	5745 MHz	5785 MHz	5825 MHz
802.11a	Default	Default	Default
802.11n20	Default	Default	Default
Frequency	5755 MHz	/	5795 MHz
802.11n40	Default	/	Default

2.5. EUT operation mode

The application provider specific test software to control sample in continuous TX and RX.

IEEE 802.11a/n20/n40:

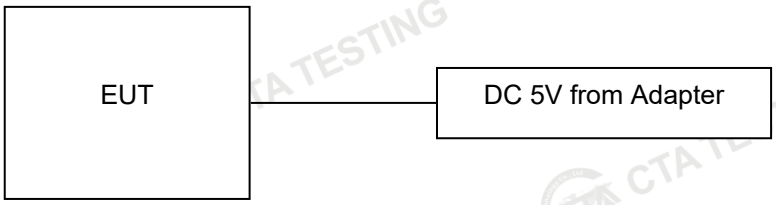
U-NI-1		U-NI-1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190
40	5200	46	5230
44	5220		
48	5240		

U-NI-2A		U-NI-2A	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270
56	5280	62	5310
60	5300		
64	5320		

U-NI-2C		U-NI-2C	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510
104	5520	110	5550
108	5540	118	5590
112	5560	126	5630
116	5580	134	5670
120	5600		
124	5620		
128	5640		
132	5660		
136	5680		
140	5700		

U-NI-3		U-NI-3	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755
153	5765	159	5795
157	5785		
161	5805		
165	5825		

2.6. Block Diagram of Test Setup



2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules.

2.8. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.
Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:
FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Radiated Emission:

Temperature:	23 ° C
Humidity:	44 %
Atmospheric pressure:	950-1050mbar

AC Main Conducted testing：

Temperature:	24 ° C
Humidity:	47 %
Atmospheric pressure:	950-1050mbar

Conducted testing：

Temperature:	24 ° C
Humidity:	46 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

FCC Requirement		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.407(a)	Emission Bandwidth(26dBm Bandwidth)	PASS
FCC Part 15.407(e)	Minimum Emission Bandwidth(6dBm Bandwidth)	PASS
FCC Part 15.407(a)	Maximum Conducted Output Power	PASS
FCC Part 15.407(a)	Peak Power Spectral Density	PASS
FCC Part 15.407(g)	Frequency Stability	PASS
FCC Part 15.407(b)	Undesirable emission	PASS
FCC Part 15.407(b)/15.205/15.209	Radiated Emissions	PASS
FCC Part 15.407(h)	Dynamic Frequency Selection	PASS
FCC Part 15.203/15.247(b)	Antenna Requirement	PASS

Remark:
1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen CTA Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen CTA Testing Technology Co., Ltd. :

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	9KHz~30MHz	3.02 dB	(1)
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)
Output Peak power	30MHz~18GHz	0.55 dB	(1)
Power spectral density	/	0.57 dB	(1)
Spectrum bandwidth	/	1.1%	(1)
Radiated spurious emission (30MHz-1GHz)	30~1000MHz	4.10 dB	(1)
Radiated spurious emission (1GHz-18GHz)	1~18GHz	4.32 dB	(1)
Radiated spurious emission (18GHz-40GHz)	18-40GHz	5.54 dB	(1)
Time	/	±2%	(1)

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3.6. Equipments Used during the Test

Item.	Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
AC Conducted Test Equipment						
☒1	LISN	R&S	ENV216	CTA-308	2026/07/23	2027/07/22
☒2	LISN	R&S	ENV216	CTA-314	2026/07/23	2027/07/22
☒3	EMI Test Receiver	R&S	ESPI	CTA-307	2026/07/23	2027/07/22
☒4	CE Cable	SKET	RF Cable (9kHz-30MHz)	CTA-367	2026/07/23	2027/07/22
☒5	Temperature and humidity meter	Chigo	ZG-7020	CTA-327	2026/07/25	2027/07/24
☒6	EMI Test Software	Tonscend	TS®JS32-CE	5.0.0.1	N/A	N/A
RF Radiation Test Equipment						
☒1	EMI Test Receiver	R&S	ESCI	CTA-306	2026/07/23	2027/07/22
☒2	Spectrum analyzer	R&S	FSV40-N	CTA-344	2026/05/16	2027/05/15
☒3	Ultra-Broadband Antenna	Schwarzbeck	VULB9163	CTA-310	2023/10/17	2026/10/16
☒4	Horn Antenna	Schwarzbeck	BBHA 9120D	CTA-309	2023/10/13	2026/10/12
☒5	Loop Antenna	Zhinan	ZN30900C	CTA-311	2023/10/17	2026/10/16
☒6	Horn Antenna	Schwarzbeck	BBHA 9170	CTA-346	2025/05/18	2028/05/17
☒7	Amplifier	Schwarzbeck	BBV9745	CTA-312	2026/07/23	2027/07/22
☒8	Amplifier	Tonscend	TAP-011840	CTA-313	2026/07/23	2027/07/22
☒9	Amplifier	SKET	LNPA 1840G-50	CTA-345	2026/05/16	2027/05/15
☒10	6dB attenuator	Shanghaihuaxiang	GZL-TS5-6-6	CTA-347	2026/05/16	2027/05/15
☒11	RF cable	SKET	RF Cable (9kHz-1GHz)	CTA-360	2025/09/25	2026/09/24
☒12	RF cable	SKET	RF Cable (1GHz-18GHz)	CTA-361	2025/09/25	2026/09/24
☒13	Coaxialcable (1GHz-40GHz)	SKET	RE-04-D	CTA-348	2026/05/16	2027/05/15
☒14	Coaxialcable (1GHz-40GHz)	SKET	RE-04-M	CTA-349	2026/05/16	2027/05/15
☒15	Coaxialcable (1GHz-40GHz)	SKET	RE-04-L	CTA-350	2026/05/16	2027/05/15
☒16	Temperature and humidity meter	Chigo	ZG-7020	CTA-328	2026/07/25	2027/07/24
☐17	2.4GFilter	HX Microwave	HXLBQ-DZA61	CTA-365	2026/07/23	2027/07/22
☒18	5GFilter	CONCEPT	CNF05150M05850Q16A	CTA-366	2026/07/23	2027/07/22
☐19	902-928Filter	HX Microwave	HXLBQ-DZA05	CTA-371	2026/07/23	2027/07/22
☐20	400-415MHzFilter	HX Microwave	HXLBQ-DZA257LC	CTA-369	2026/07/23	2027/07/22
☐21	500-650MHzFilter	Tonscend	TSSF6-500-650	CTA-370	2026/07/23	2027/07/22
☐22	High-Pass Filter	XingBo	XBLBQ-GTA18	CTA-402	2026/07/23	2027/07/22
☐23	High-Pass Filter	XingBo	XBLBQ-GTA27	CTA-403	2026/07/23	2027/07/22
☐24	High-Pass Filter	XingBo	XBLBQ-GTA10	CTA-364	2026/07/23	2027/07/22
☒25	EMI Test Software	Tonscend	TS®JS32-RE	5.0.0.2	N/A	N/A
RF Conducted Test Equipment						
☒1	Spectrum Analyzer	Agilent	N9020A	CTA-342	2026/07/23	2027/07/22
☒2	Spectrum Analyzer	Agilent	N9020A	CTA-301	2026/07/23	2027/07/22

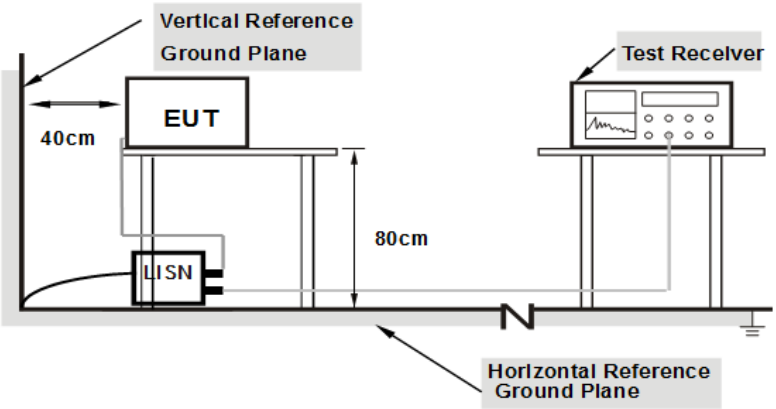
☐3	Spectrum analyzer	R&S	FSV40-N	CTA-344	2026/05/16	2027/05/15
☒4	RF Coaxial Cable	SKET	RF Cable (9kHz-40GHz)	CTA-368	2026/07/23	2027/07/22
☒5	Temperature and humidity meter	ZG-7020	Chigo	CTA-329	2026/07/25	2027/07/24
☒6	Programmable Constant Temperature And Humidity Test Chamber	DONGGUAN JINGYU	HT-H-408	CTA-053	2026/07/23	2027/07/22
☐7	Vector Signal generator	Agilent	N5182A	CTA-305	2026/07/23	2027/07/22
☐8	Analog Signal Generator	R&S	E4421B	CTA-304	2026/07/23	2027/07/22
☐9	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW500	CTA-302	2026/07/23	2027/07/22
☒10	Automatic control unit	Tonscend	JS0806-2	CTA-351	2026/07/23	2027/07/22
☒11	RF Test Software	Tonscend	TS®JS1120-3	3.1.65	N/A	N/A
☒12	RF Test Software	Tonscend	TS®JS1120-3	3.1.65	N/A	N/A
☒13	RF Test Software	Tonscend	TS®JS1120	3.1.46	N/A	N/A
☒14	RF Connection Cable	N/A	N/A	1#	Each time	N/A

Note: The automatic control unit integrated Power sensor

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

TEST PROCEDURE

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2020.
2 Support equipment, if needed, was placed as per ANSI C63.10-2020
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2020
4 The EUT received DC 12V power from adapter, the adapter received AC120V/60Hz and AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT.The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency range (MHz)	Limit (dBuV)	
	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.		

TEST RESULTS

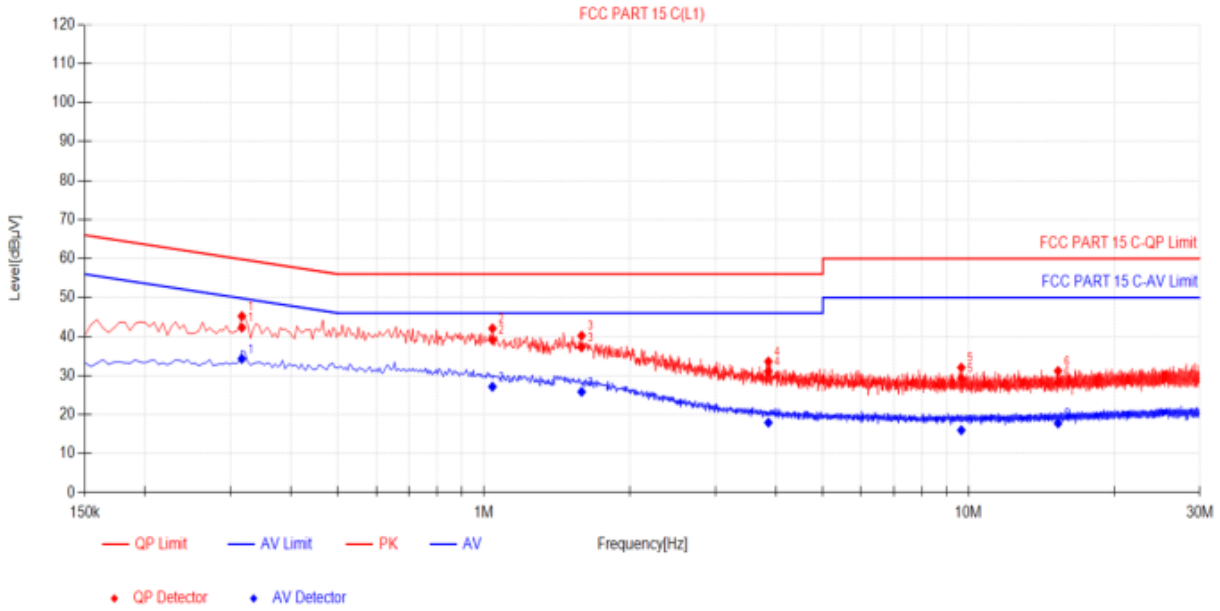
Remark:

1. All modes of 802.11a/n were test at Low, Middle, and High channel; only the worst result of UNII-1 a mode High Channel and UNII-2A a mode Low Channel and UNII-2C a mode high Channel and UNII-3 a mode Middle Channel were reported as below:

Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below:

UNII-1:

Polarization:	L



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.3165	10.09	32.20	42.29	59.80	17.51	24.20	34.29	49.80	15.51	PASS
2	1.041	10.42	28.73	39.15	56.00	16.85	16.72	27.14	46.00	18.86	PASS
3	1.59	10.46	26.82	37.28	56.00	18.72	15.37	25.83	46.00	20.17	PASS
4	3.8625	10.73	20.36	31.09	56.00	24.91	7.21	17.94	46.00	28.06	PASS
5	9.6585	11.50	17.81	29.31	60.00	30.69	4.49	15.99	50.00	34.01	PASS
6	15.297	12.27	16.06	28.33	60.00	31.67	5.49	17.76	50.00	32.24	PASS

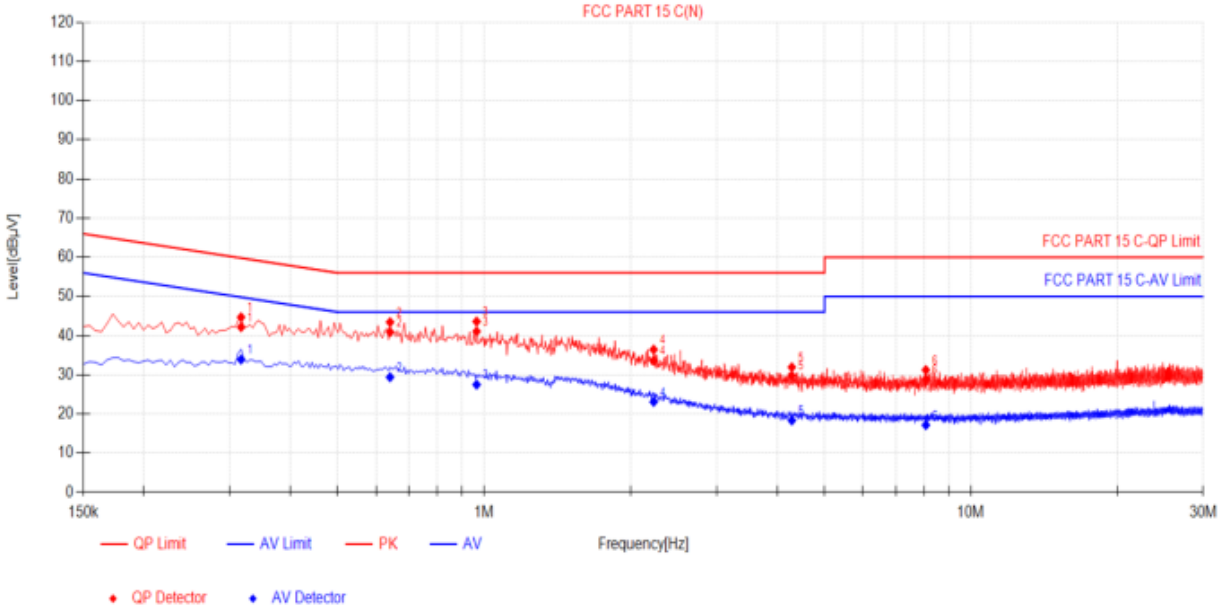
Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)

2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)

3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)

4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

Polarization:	N



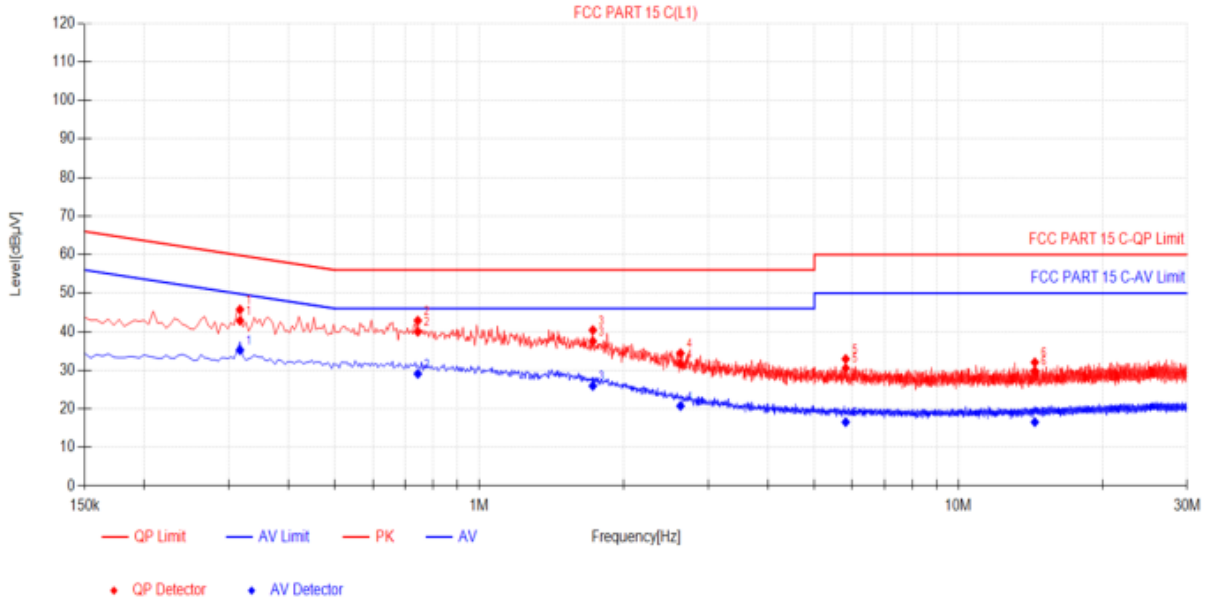
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.3165	10.06	32.10	42.16	59.80	17.64	23.83	33.89	49.80	15.91	PASS
2	0.6405	10.26	30.63	40.89	56.00	15.11	19.12	29.38	46.00	16.62	PASS
3	0.9645	10.37	30.70	41.07	56.00	14.93	17.11	27.48	46.00	18.52	PASS
4	2.229	10.48	23.11	33.59	56.00	22.41	12.59	23.07	46.00	22.93	PASS
5	4.2855	10.83	18.95	29.78	56.00	26.22	7.50	18.33	46.00	27.67	PASS
6	8.079	11.33	17.55	28.88	60.00	31.12	5.82	17.15	50.00	32.85	PASS

Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

UNII-2A:

Polarization:	L

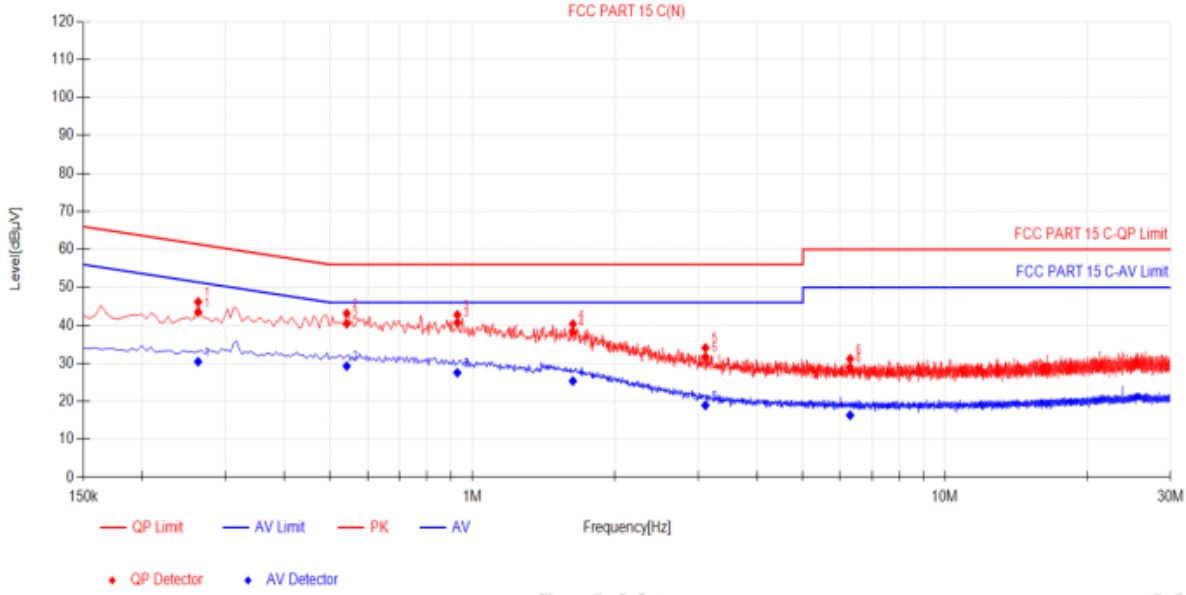


Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.3165	10.09	32.77	42.86	59.80	16.94	25.14	35.23	49.80	14.57	PASS
2	0.744	10.43	29.56	39.99	56.00	16.01	18.65	29.08	46.00	16.92	PASS
3	1.725	10.47	27.06	37.53	56.00	18.47	15.47	25.94	46.00	20.06	PASS
4	2.6295	10.57	21.04	31.61	56.00	24.39	10.16	20.73	46.00	25.27	PASS
5	5.8155	10.96	19.56	30.52	60.00	29.48	5.58	16.54	50.00	33.46	PASS
6	14.433	12.15	17.70	29.85	60.00	30.15	4.40	16.55	50.00	33.45	PASS

Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

Polarization:	N



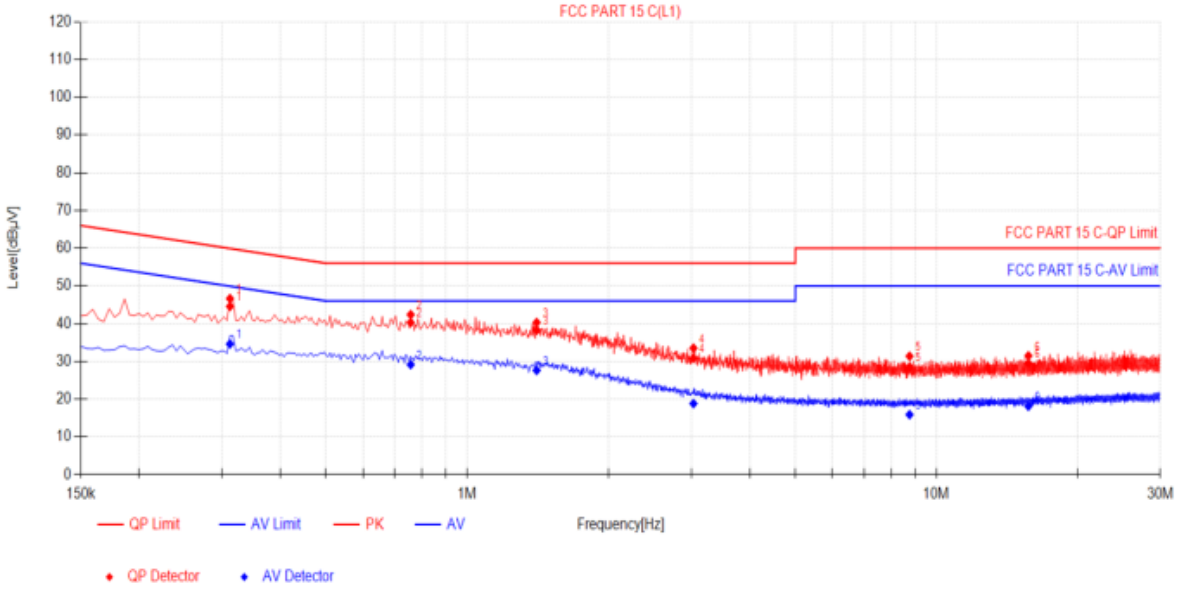
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.2625	9.70	33.73	43.43	61.35	17.92	20.72	30.42	51.35	20.93	PASS
2	0.5415	10.25	30.16	40.41	56.00	15.59	19.01	29.26	46.00	16.74	PASS
3	0.9285	10.36	30.35	40.71	56.00	15.29	17.17	27.53	46.00	18.47	PASS
4	1.6305	10.42	27.86	38.28	56.00	17.72	14.92	25.34	46.00	20.66	PASS
5	3.111	10.64	21.06	31.70	56.00	24.30	8.29	18.93	46.00	27.07	PASS
6	6.297	11.09	17.83	28.92	60.00	31.08	5.24	16.33	50.00	33.67	PASS

Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

UNII-2C:

Polarization:	L

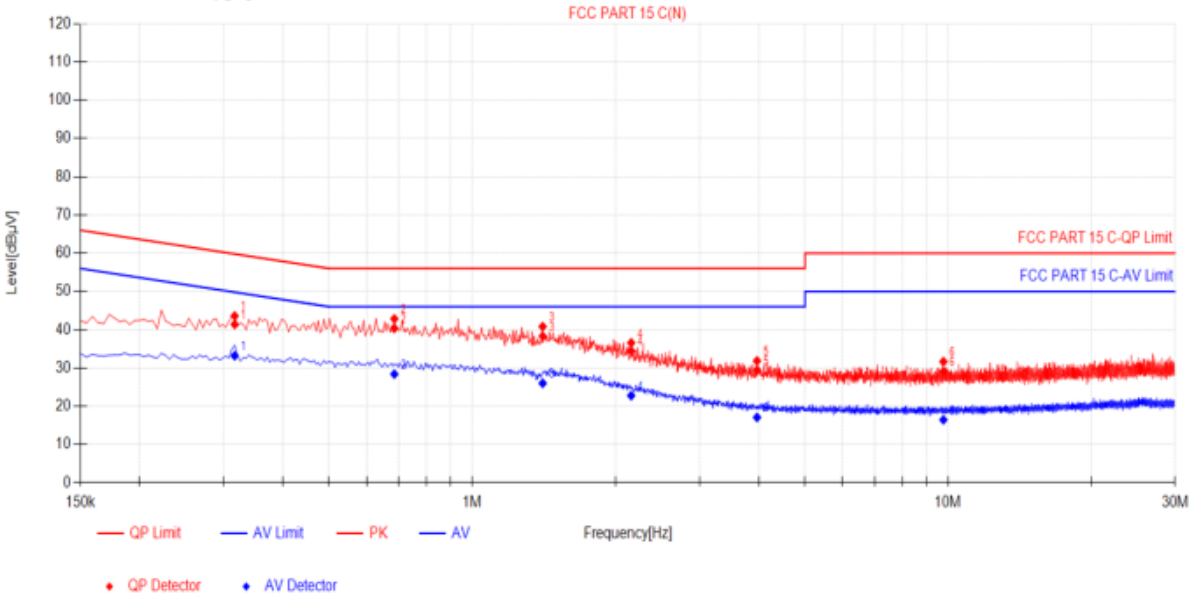


Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.312	10.07	34.49	44.56	59.92	15.36	24.54	34.61	49.92	15.31	PASS
2	0.7575	10.43	29.87	40.30	56.00	15.70	18.71	29.14	46.00	16.86	PASS
3	1.4055	10.45	27.76	38.21	56.00	17.79	17.17	27.62	46.00	18.38	PASS
4	3.0345	10.62	20.21	30.83	56.00	25.17	8.19	18.81	46.00	27.19	PASS
5	8.763	11.37	17.11	28.48	60.00	31.52	4.52	15.89	50.00	34.11	PASS
6	15.702	12.32	17.16	29.48	60.00	30.52	5.79	18.11	50.00	31.89	PASS

Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

Polarization:	N



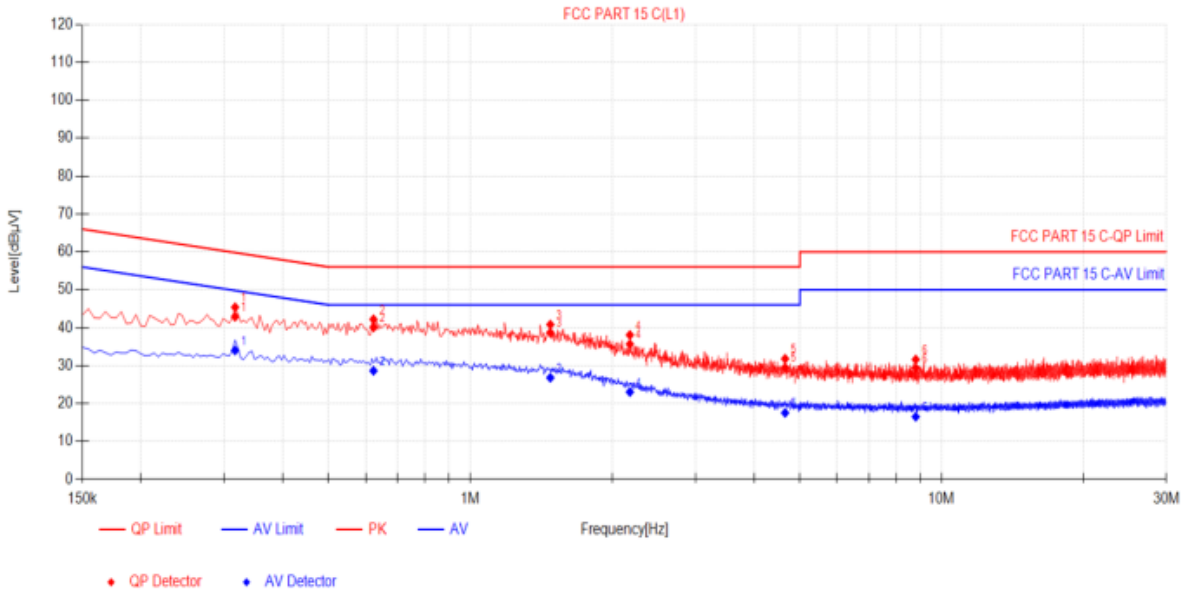
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.3165	10.06	31.33	41.39	59.80	18.41	23.13	33.19	49.80	16.61	PASS
2	0.6855	10.32	30.02	40.34	56.00	15.66	18.07	28.39	46.00	17.61	PASS
3	1.4055	10.41	27.89	38.30	56.00	17.70	15.59	26.00	46.00	20.00	PASS
4	2.157	10.47	23.98	34.45	56.00	21.55	12.29	22.76	46.00	23.24	PASS
5	3.966	10.79	18.64	29.43	56.00	26.57	6.28	17.07	46.00	28.93	PASS
6	9.7755	11.58	17.45	29.03	60.00	30.97	4.85	16.43	50.00	33.57	PASS

Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

UNII-3:

Polarization:	L

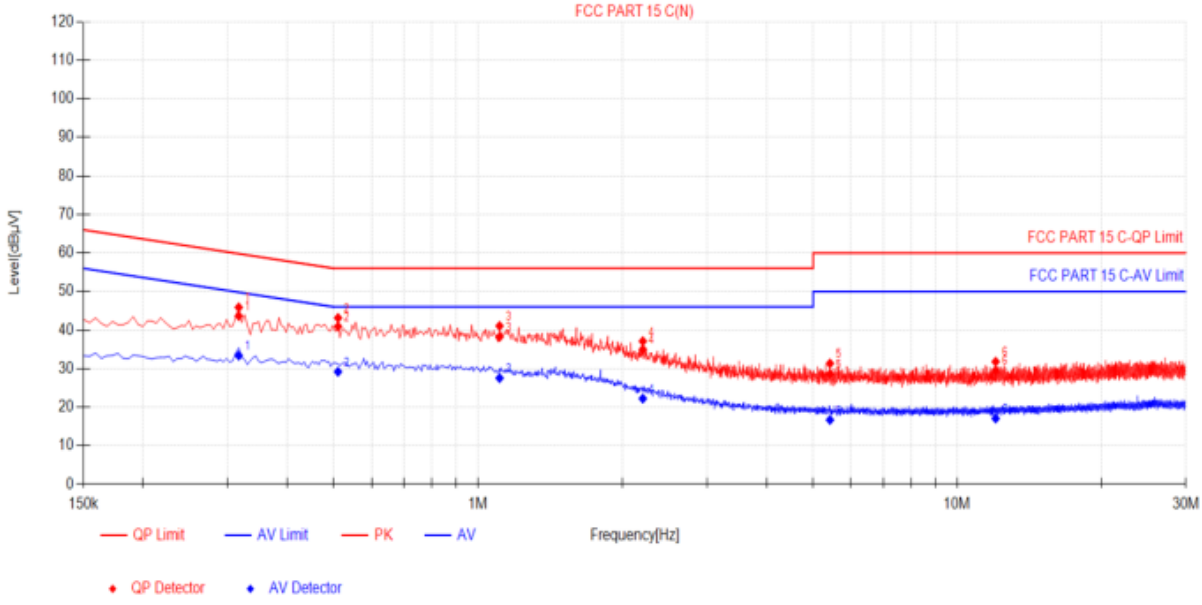


Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.3165	10.09	32.79	42.88	59.80	16.92	23.90	33.99	49.80	15.81	PASS
2	0.6225	10.19	29.90	40.09	56.00	15.91	18.43	28.62	46.00	17.38	PASS
3	1.4775	10.45	28.26	38.71	56.00	17.29	16.34	26.79	46.00	19.21	PASS
4	2.1795	10.52	25.12	35.64	56.00	20.36	12.51	23.03	46.00	22.97	PASS
5	4.6545	10.83	18.64	29.47	56.00	26.53	6.69	17.52	46.00	28.48	PASS
6	8.8125	11.37	18.00	29.37	60.00	30.63	5.12	16.49	50.00	33.51	PASS

Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

Polarization:	N



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.3165	10.06	33.59	43.65	59.80	16.15	23.30	33.36	49.80	16.44	PASS
2	0.51	10.26	30.66	40.92	56.00	15.08	18.92	29.18	46.00	16.82	PASS
3	1.1085	10.39	27.84	38.23	56.00	17.77	17.15	27.54	46.00	18.46	PASS
4	2.2065	10.48	24.48	34.96	56.00	21.04	11.74	22.22	46.00	23.78	PASS
5	5.424	10.98	17.61	28.59	60.00	31.41	5.70	16.68	50.00	33.32	PASS
6	12.0255	11.91	17.62	29.53	60.00	30.47	5.14	17.05	50.00	32.95	PASS

Note:1).QP Value (dBμV)= QP Reading (dBμV)+ Factor (dB)
2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)
3). QPMargin(dB) = QP Limit (dBμV) - QP Value (dBμV)
4). AVMargin(dB) = AV Limit (dBμV) - AV Value (dBμV)

4.2. Radiated Emission

Limit

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(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 −27 dBm/MHz.
(2) 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.
(3) 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.
(4) 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.

Undesirable emission limits

Requirement	Limit(EIRP)	Limit (Field strength at 3m) Note1
15.407(b)(1)	PK:-27(dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)		

Note1: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

(5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209
(6)In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

Conducted measurement Test Procedure:

The testing follows the ANSI C63.10 Section 12.7.6 and 6.10.4:

The procedure for peak unwanted emissions measurements above 1000 MHz is as follows:
b) Peak emission levels are measured by setting the instrument as follows:
1) RBW = 1 MHz.
2) VBW ⩾ [3 × RBW]
3) Detector = peak.
4) Sweep time = No faster than coupled (auto) time.
5) Trace mode = max-hold.
6) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, then the time required for the trace to stabilize will increase by a factor of approximately 1 / D, where D is the duty cycle. For example, at 50% duty cycle, the measurement time will increase by a factor of two, relative to measurement time for continuous transmission.

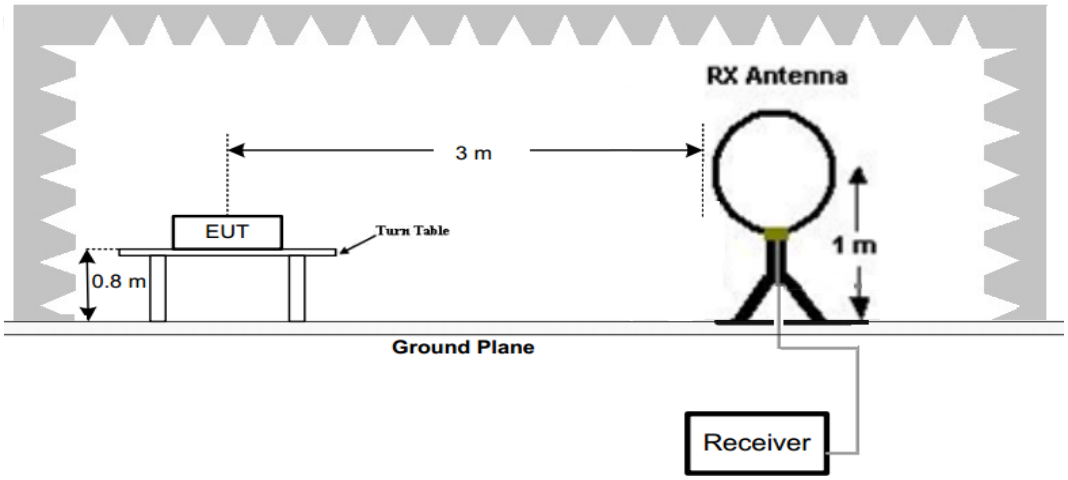
Test Results

Please refer to FCC Appendix RF Test Data for 5GWIFI

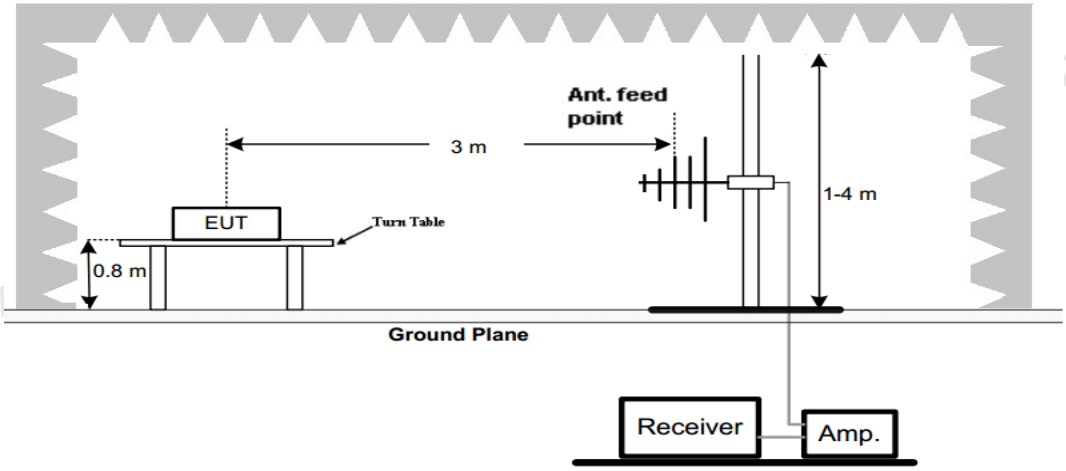
Note:RF Conducted test Offset= cable loss,For conducted spurious emission test, cable loss is the maximum value in the range of test.

TEST CONFIGURATION

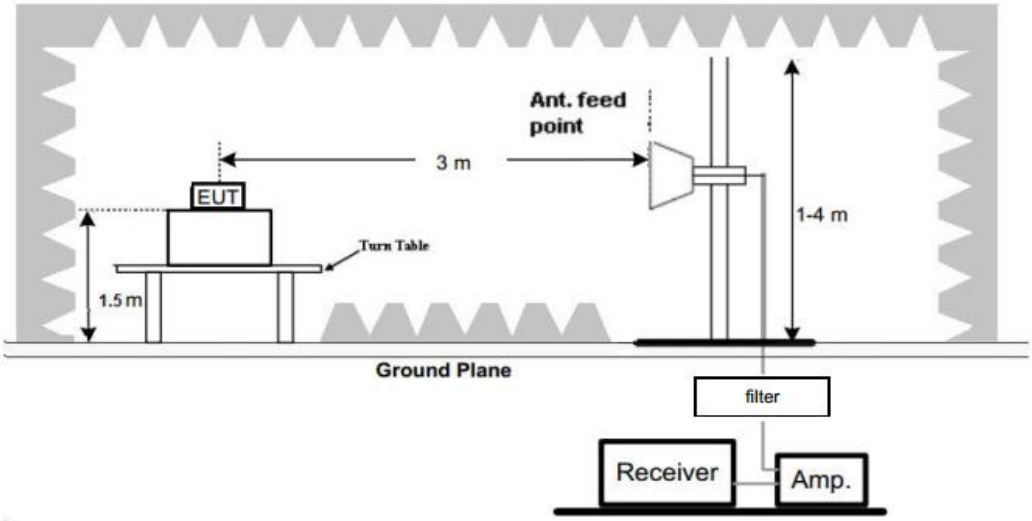
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz

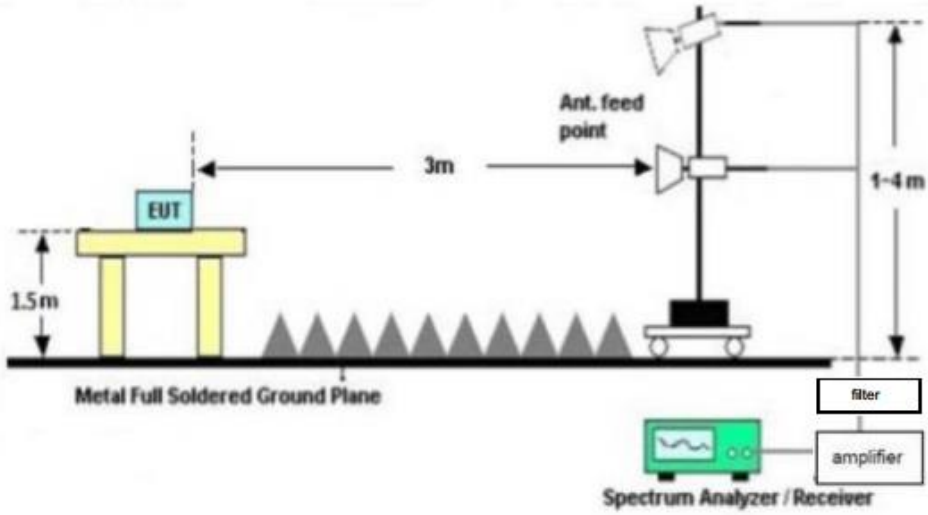


(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz





Test Procedure

1. Below 1GHz measurement the EUT is placed on a turntable which is 0.8m above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. Radiated emission test frequency band from 9KHz to 40GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Bilog Antenna	3
1GHz-18GHz	Horn Antenna	3
18GHz-25GHz	Horn Anternna	3

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

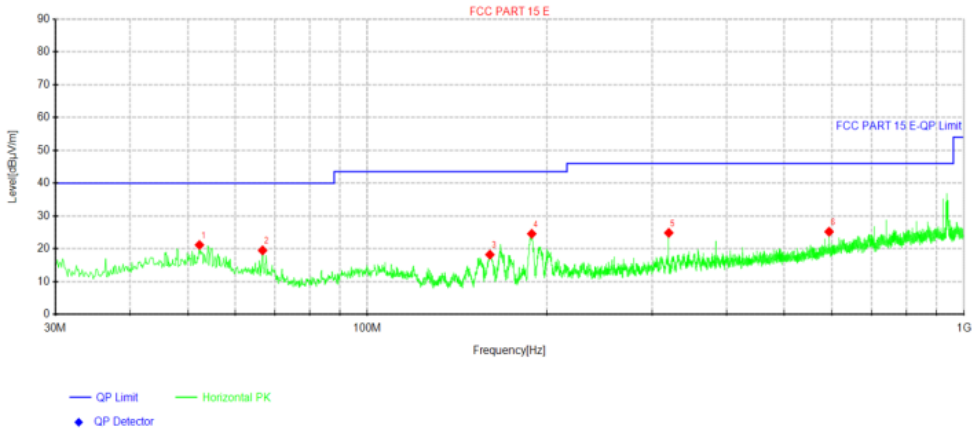
TEST RESULTS

Remark:
1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. All modes of 802.11a/n have been tested for below 1GHz test, only the worst result of UNII-1 a mode High Channel and UNII-2A a mode Low Channel and UNII-2C a mode high Channel and UNII-3 a mode Middle Channel were recorded.
3. All modes of 802.11a/n have been tested for above 1GHz test, only the worst case UNII-1 a mode and UNII-2A a mode and UNII-2C a mode and UNII-3 a mode were recorded.
4. Radiated emission test from 9 KHz to 40GHz harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.
5. Conducted emission test from 30MHz to 40GHz harmonic of fundamental was verified, and emission margin is greater than 20dB in 27GHz to 40GHz and not recorded in this report.

UNII-1:

For 30MHz-1GHz

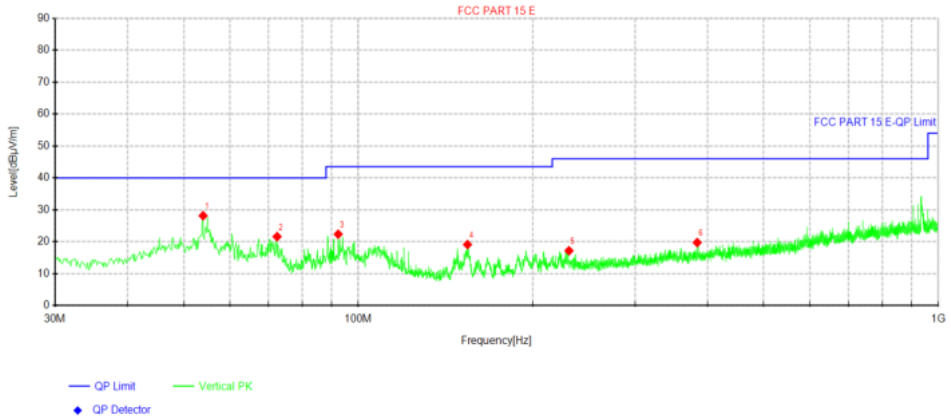
Horizontal



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	52.31	31.82	21.17	-10.65	40.00	18.83	100	176	Horizontal
2	66.7388	33.07	19.52	-13.55	40.00	20.48	100	4	Horizontal
3	160.465	34.28	18.23	-16.05	43.50	25.27	100	187	Horizontal
4	188.595	39.12	24.58	-14.54	43.50	18.92	100	164	Horizontal
5	320.03	36.51	24.87	-11.64	46.00	21.13	100	0	Horizontal
6	594.055	31.86	25.21	-6.65	46.00	20.79	100	351	Horizontal

Note:1).Level (dBµV/m)= Reading (dBµV)+ Factor (dB/m)
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)
3). Margin(dB) = Limit (dBµV/m) - Level (dBµV/m)

Vertical



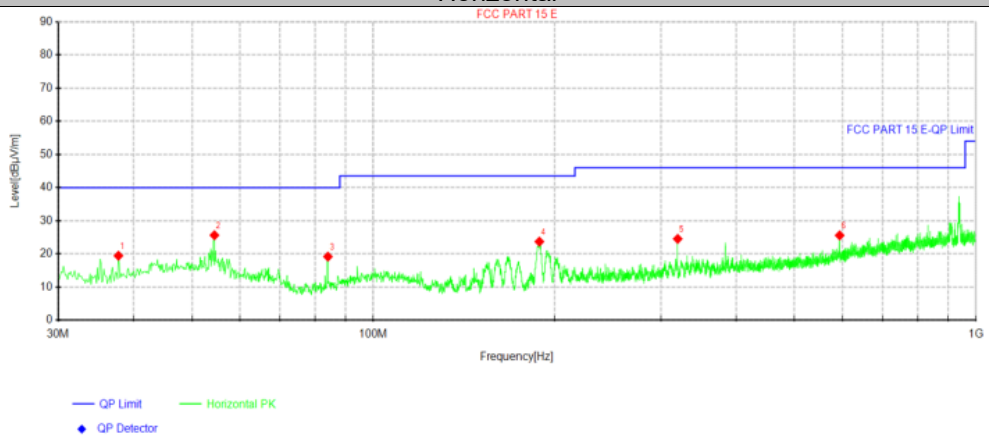
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.0075	38.97	28.16	-10.81	40.00	11.84	100	255	Vertical
2	72.4375	37.60	21.61	-15.99	40.00	18.39	100	360	Vertical
3	92.3225	36.24	22.37	-13.87	43.50	21.13	100	69	Vertical
4	154.281	35.40	19.12	-16.28	43.50	24.38	100	22	Vertical
5	230.79	30.27	17.19	-13.08	46.00	28.81	100	222	Vertical
6	383.928	30.27	19.75	-10.52	46.00	26.25	100	91	Vertical

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)
3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

UNII-2A:

For 30MHz-1GHz

Horizontal

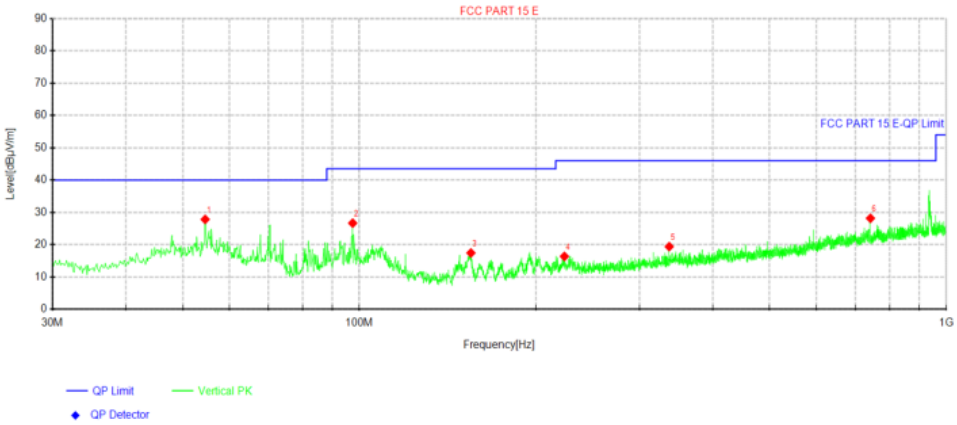


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.76	31.97	19.45	-12.52	40.00	20.55	100	246	Horizontal
2	54.4925	36.49	25.63	-10.86	40.00	14.37	100	339	Horizontal
3	84.0775	35.28	19.18	-16.10	40.00	20.82	100	15	Horizontal
4	188.595	38.25	23.71	-14.54	43.50	19.79	100	176	Horizontal
5	319.908	36.18	24.54	-11.64	46.00	21.46	100	0	Horizontal
6	594.055	32.24	25.59	-6.65	46.00	20.41	100	0	Horizontal

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)
3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

Vertical



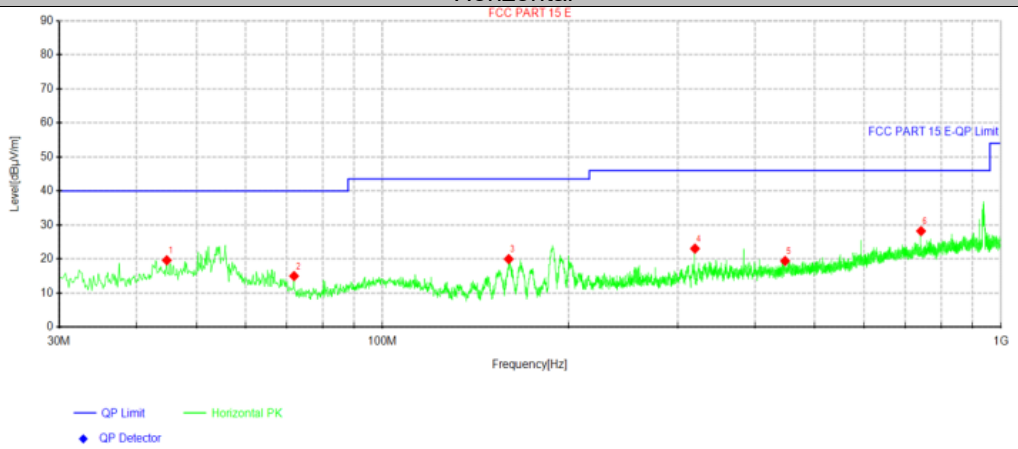
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.6138	38.71	27.84	-10.87	40.00	12.16	100	20	Vertical
2	97.415	39.71	26.68	-13.03	43.50	16.82	100	20	Vertical
3	154.887	33.66	17.44	-16.22	43.50	26.06	100	360	Vertical
4	223.515	29.84	16.38	-13.46	46.00	29.62	100	244	Vertical
5	337.247	30.49	19.41	-11.08	46.00	26.59	100	149	Vertical
6	742.586	32.17	28.18	-3.99	46.00	17.82	100	149	Vertical

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)
3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

UNII-2C:

For 30MHz-1GHz

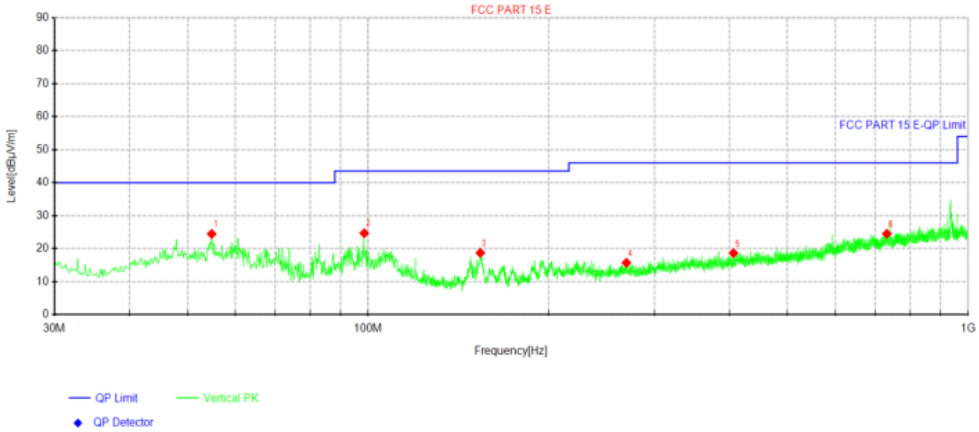
Horizontal



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.7925	30.62	19.63	-10.99	40.00	20.37	100	254	Horizontal
2	71.9525	30.80	15.00	-15.80	40.00	25.00	100	349	Horizontal
3	159.98	36.03	19.98	-16.05	43.50	23.52	100	162	Horizontal
4	320.03	34.70	23.06	-11.64	46.00	22.94	100	220	Horizontal
5	447.585	28.84	19.42	-9.42	46.00	26.58	100	70	Horizontal
6	742.586	32.20	28.21	-3.99	46.00	17.79	100	266	Horizontal

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)
3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

Vertical



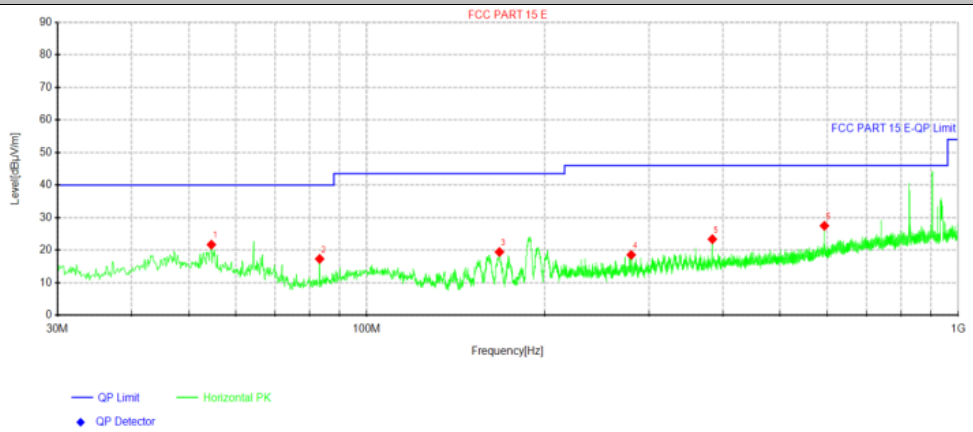
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.8562	35.37	24.47	-10.90	40.00	15.53	100	116	Vertical
2	98.5062	37.57	24.69	-12.88	43.50	18.81	100	359	Vertical
3	153.796	35.10	18.75	-16.35	43.50	24.75	100	359	Vertical
4	269.468	28.25	15.72	-12.53	46.00	30.28	100	246	Vertical
5	406.36	28.63	18.65	-9.98	46.00	27.35	100	104	Vertical
6	732.037	28.51	24.52	-3.99	46.00	21.48	100	304	Vertical

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)
3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

UNII-3:

For 30MHz-1GHz

Horizontal

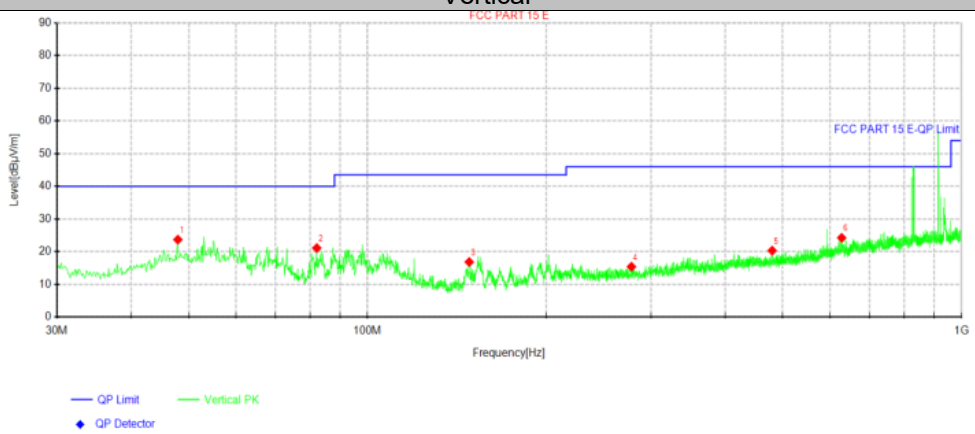


Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.6138	32.57	21.70	-10.87	40.00	18.30	100	0	Horizontal
2	83.2288	33.59	17.32	-16.27	40.00	22.68	100	33	Horizontal
3	167.618	35.14	19.44	-15.70	43.50	24.06	100	198	Horizontal
4	280.017	30.94	18.56	-12.38	46.00	27.44	100	0	Horizontal
5	384.05	33.90	23.38	-10.52	46.00	22.62	100	0	Horizontal
6	594.055	34.15	27.50	-6.65	46.00	18.50	100	45	Horizontal

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)
3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

Vertical



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	47.945	34.31	23.70	-10.61	40.00	16.30	100	360	Vertical
2	82.1375	37.72	21.12	-16.60	40.00	18.88	100	199	Vertical
3	148.34	33.55	16.84	-16.71	43.50	26.66	100	47	Vertical
4	278.198	27.84	15.40	-12.44	46.00	30.60	100	81	Vertical
5	479.958	29.39	20.33	-9.06	46.00	25.67	100	175	Vertical
6	628.368	29.47	24.25	-5.22	46.00	21.75	100	360	Vertical

Note:1).Level (dBμV/m)= Reading (dBμV)+ Factor (dB/m)
2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)
3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)

For 1GHz to 40GHz

U-NII 1 & 802.11a Mode (above 1GHz)

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
36.00	10360.0	42.84	PK	H	68.3	25.46	48.54	38.90	8.19	52.79	-5.70
(5180MHz)	10360.0	32.75	AV	H	54.0	21.25	38.45	38.90	8.19	52.79	-5.70
44.00	10440.0	43.29	PK	H	68.3	25.01	48.98	38.94	8.22	52.85	-5.69
(5220MHz)	10440.0	33.04	AV	H	54.0	20.96	38.73	38.94	8.22	52.85	-5.69
48.00	10480.0	42.70	PK	H	68.3	25.60	48.36	38.98	8.24	52.88	-5.66
(5240MHz)	10480.0	33.05	AV	H	54.0	20.95	38.71	38.98	8.24	52.88	-5.66

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
36.00	10360.0	42.98	PK	V	68.3	25.32	48.68	38.90	8.19	52.79	-5.70
(5180MHz)	10360.0	33.14	AV	V	54.0	20.86	38.84	38.90	8.19	52.79	-5.70
44.00	10440.0	43.13	PK	V	68.3	25.17	48.82	38.94	8.22	52.85	-5.69
(5220MHz)	10440.0	32.58	AV	V	54.0	21.42	38.27	38.94	8.22	52.85	-5.69
48.00	10480.0	42.70	PK	V	68.3	25.60	48.36	38.98	8.24	52.88	-5.66
(5240MHz)	10480.0	33.46	AV	V	54.0	20.54	39.12	38.98	8.24	52.88	-5.66

U-NII 2A & 802.11a Mode (above 1GHz)

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
52.00	10520.0	43.32	PK	H	68.3	24.98	48.96	39.02	8.26	52.92	-5.64
(5260MHz)	10520.0	34.17	AV	H	54.0	19.83	39.81	39.02	8.26	52.92	-5.64
56.00	10600.0	43.76	PK	H	68.3	24.54	49.35	39.10	8.29	52.98	-5.59
(5280MHz)	10600.0	34.51	AV	H	54.0	19.49	40.10	39.10	8.29	52.98	-5.59
64.00	10640.0	43.60	PK	H	68.3	24.70	49.12	39.18	8.31	53.01	-5.52
(5320MHz)	10640.0	34.27	AV	H	54.0	19.73	39.79	39.18	8.31	53.01	-5.52

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
52.00	10520.0	43.88	PK	V	68.3	24.42	49.52	39.02	8.26	52.92	-5.64
(5260MHz)	10520.0	34.05	AV	V	54.0	19.95	39.69	39.02	8.26	52.92	-5.64
56.00	10600.0	44.39	PK	V	68.3	23.91	49.98	39.10	8.29	52.98	-5.59
(5280MHz)	10600.0	33.80	AV	V	54.0	20.20	39.39	39.10	8.29	52.98	-5.59
64.00	10640.0	44.57	PK	V	68.3	23.73	50.09	39.18	8.31	53.01	-5.52
(5320MHz)	10640.0	33.58	AV	V	54.0	20.42	39.10	39.18	8.31	53.01	-5.52

U-NII 2C & 802.11a Mode (above 1GHz)

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
100	11000.0	42.27	PK	H	68.3	26.03	47.90	39.20	8.47	53.30	-5.63
(5500MHz)	11000.0	32.48	AV	H	54.0	21.52	38.11	39.20	8.47	53.30	-5.63
116	11160.0	41.77	PK	H	68.3	26.53	47.42	39.14	8.54	53.33	-5.65
(5580MHz)	11160.0	33.23	AV	H	54.0	20.77	38.88	39.14	8.54	53.33	-5.65
140	11400.0	42.06	PK	H	68.3	26.24	47.29	39.50	8.65	53.38	-5.23
(5700MHz)	11400.0	33.76	AV	H	54.0	20.24	38.99	39.50	8.65	53.38	-5.23

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
100	11000.0	42.05	PK	V	68.3	26.25	47.68	39.20	8.47	53.30	-5.63
(5500MHz)	11000.0	33.21	AV	V	54.0	20.79	38.84	39.20	8.47	53.30	-5.63
116	11160.0	42.08	PK	V	68.3	26.22	47.73	39.14	8.54	53.33	-5.65
(5580MHz)	11160.0	32.94	AV	V	54.0	21.06	38.59	39.14	8.54	53.33	-5.65
140	11400.0	42.09	PK	V	68.3	26.21	47.32	39.50	8.65	53.38	-5.23
(5700MHz)	11400.0	34.02	AV	V	54.0	19.98	39.25	39.50	8.65	53.38	-5.23

U-NII 3 & 802.11a Mode (above 1GHz)

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
149.00	11490.0	41.82	PK	H	68.3	26.48	47.12	39.41	8.69	53.40	-5.30
(5745MHz)	11490.0	31.20	AV	H	54.0	22.80	36.50	39.41	8.69	53.40	-5.30
157.00	11570.0	41.65	PK	H	68.3	26.65	47.01	39.33	8.72	53.41	-5.36
(5785MHz)	11570.0	31.33	AV	H	54.0	22.67	36.69	39.33	8.72	53.41	-5.36
165.00	11650.0	41.05	PK	H	68.3	27.25	46.47	39.25	8.76	53.43	-5.42
(5825MHz)	11650.0	31.35	AV	H	54.0	22.65	36.77	39.25	8.76	53.43	-5.42

Tested Channel	Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre amplifier (dB)	Correction Factor (dB/m)
149.00	11490.0	41.31	PK	V	68.3	26.99	46.61	39.41	8.69	53.40	-5.30
(5745MHz)	11490.0	31.18	AV	V	54.0	22.82	36.48	39.41	8.69	53.40	-5.30
157.00	11570.0	41.44	PK	V	68.3	26.86	46.80	39.33	8.72	53.41	-5.36
(5785MHz)	11570.0	31.12	AV	V	54.0	22.88	36.48	39.33	8.72	53.41	-5.36
165.00	11650.0	41.84	PK	V	68.3	26.46	47.26	39.25	8.76	53.43	-5.42
(5825MHz)	11650.0	31.58	AV	V	54.0	22.42	37.00	39.25	8.76	53.43	-5.42

4.3. Maximum Conducted Average Output Power

TEST CONFIGURATION

TEST PROCEDURE

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power sensor.
Method PM is Measurement using an RF average power sensor. The procedure for this method is as follows:
1. The testing follows the ANSI C63.10 Section 12.4.3
2. The maximum average conducted output power may be measured using a broadband average RF power sensor.
3. The power sensor shall have a video bandwidth that is greater than or equal to the OBW bandwidth and shall use a fast-responding diode detector.

LIMIT

According to §15.407(a): The maximum output power should be not exceed follow:

Frequency Range (MHz)	Limit
5150-5250	Fixed:1 Watt (30dBm) Mobile and portable: 250mW (24dBm)
5250-5350	250mW (24dBm)
5470-5725	250mW (24dBm)
5725-5850	1 Watt (30dBm)
Note: The maximum e.i.r.p at anyelevation angle above 30 degrees as measured from the horizon must not exceed 125mW(21dBm)	

For the band 5.15-5.25 GHz.
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

(iv) 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.

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.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W

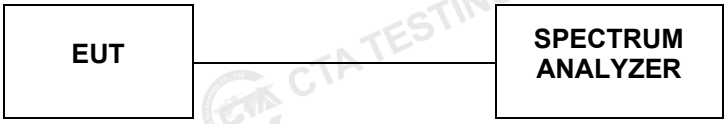
TEST RESULTS

Please refer to FCC Appendix RF Test Data for 5GWIFI

Total Output Average power(dBm)= Output Average power(dBm)+ Duty Factor(dB)

4.4. Power Spectral Density

TEST CONFIGURATION



TEST PROCEDURE

a. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
b. Set the RBW = 1MHz for U-NII 1, U-NII 2A, U-NII C band and 500KHz for U-NII 3 band.
c. Set the VBW ⩾ 3× RBW.
d. Set the span to encompass the entire EBW.
e. Detector = Average.
f. Sweep time = auto couple.
g. Trace mode = Average hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum power level.

LIMIT

According to §15.407(a): The maximum output power should be not exceed follow:

Frequency Range (MHz)	Limit
5150-5250	Other then Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz
5250-5350	11dBm/MHz
5470-5725	11dBm/MHz
5725-5850	30dBm/500kHz

TEST RESULTS

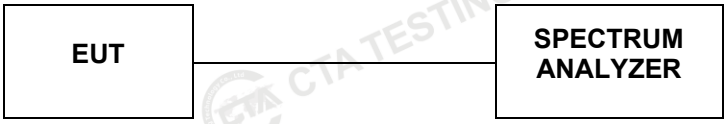
Please refer to FCC Appendix RF Test Data for 5GWIFI

Total Power Spectral Density (dBm/MHz)= Power Spectral Density (dBm/MHz)+ Duty Factor (dB)
Remark: P.S.D(dBm/500KHz)= P.S.D(dBm/300KHz)+10 log (500 kHz/300KHz)+ Duty Factor (dB).

RBW factor = 10 log (500 KHz / 300 KHz) = 2.22 dB

4.5. 6dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max-hold.
e) Sweep = No faster than coupled (auto) time.
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.

LIMIT

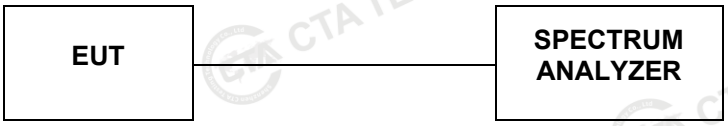
For Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz

TEST RESULTS

Please refer to FCC Appendix RF Test Data for 5GWIFI

4.6. 26dB Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

The procedure for this method is as follows:
a) Set RBW = shall be in the range of 1% to 5% 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 in the range of 1% to 5%.

LIMIT

No Limits for 26dBc Bandwith

TEST RESULTS

Please refer to FCC Appendix RF Test Data for 5GWIFI

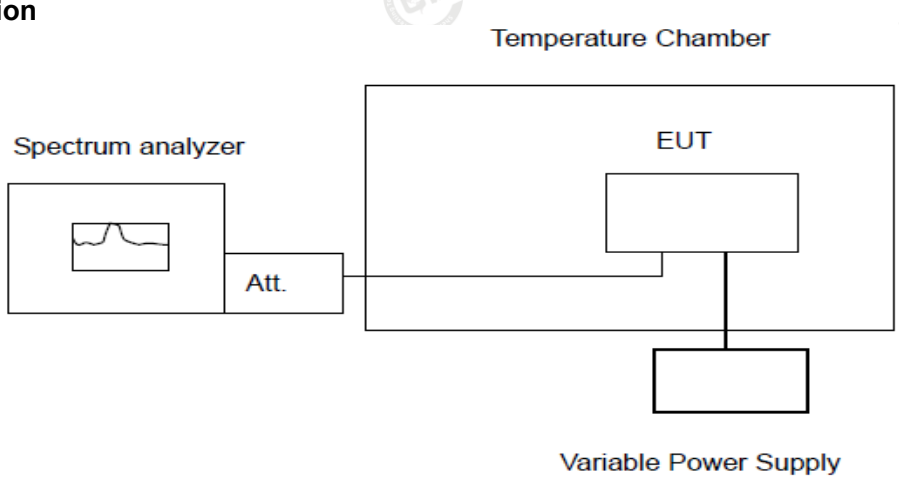
4.7. Frequency Stability

Standard Applicable

According to FCC §15.407(g) "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."
According to FCC §2.1055(a) "The frequency stability shall be measured with variation of ambient temperature as follows:"

(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
(2) From −20° to + 50° centigrade for equipment to be licensed for use in the Maritime Services under part 80 of this chapter, except for Class A, B, and S Emergency Position Indicating Radiobeacons (EPIRBS), and equipment to be licensed for use above 952 MHz at operational fixed stations in all services, stations in the Local Television Transmission Service and Point-to-Point Microwave Radio Service under part 21 of this chapter, equipment licensed for use aboard aircraft in the Aviation Services under part 87 of this chapter, and equipment authorized for use in the Family Radio Service under part 95 of this chapter.
(3) From 0° to + 50° centigrade for equipment to be licensed for use in the Radio Broadcast Services under part 73 of this chapter.

Test Configuration



Test Procedure

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum anzlyer via feed through attenators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low engouh to obtain the desired frequency resoluation and measure EUT 20 degree operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30 degree. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure wuth 10 degree increased per stage until the highest temperature of +50 degree reached.

Test Results

PASS

Note: *Measured all conditions and recorded worst case.*

Reference Frequency: 802.11a channel=36 frequency=5180MHz					
Voltage (V)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
DC 5.0	-30	120.14	0.023194	Within the band of operation	Pass
	-20	111.14	0.021455		
	-10	102.98	0.019881		
	0	172.26	0.033255		
	10	169.22	0.032668		
	20	164.12	0.031684		
	30	156.04	0.030124		
	40	147.10	0.028399		
	50	163.89	0.031640		
DC 5.5	25	142.93	0.027593		
DC 4.5	25	118.14	0.022808		

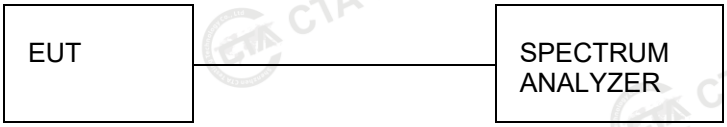
Reference Frequency: 802.11a channel=52 frequency=5260MHz					
Voltage (V)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
DC 5.0	-30	95.97	0.018245	Within the band of operation	Pass
	-20	106.17	0.020184		
	-10	105.92	0.020137		
	0	126.26	0.024003		
	10	121.07	0.023018		
	20	149.16	0.028357		
	30	106.14	0.020178		
	40	147.12	0.027970		
	50	135.96	0.025848		
DC 5.5	25	161.15	0.030637		
DC 4.5	25	139.07	0.026439		

Reference Frequency: 802.11a channel=100 frequency=5500MHz					
Voltage (V)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
DC 5.0	-30	140.00	0.025455	Within the band of operation	Pass
	-20	134.10	0.024383		
	-10	161.91	0.029438		
	0	167.24	0.030407		
	10	164.29	0.029871		
	20	165.12	0.030022		
	30	168.10	0.030564		
	40	122.08	0.022197		
	50	147.25	0.026773		
DC 5.5	25	147.18	0.026761		
DC 4.5	25	106.11	0.019292		

Reference Frequency: 802.11a channel=149 frequency=5745MHz					
Voltage (V)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
DC 5.0	-30	166.20	0.028929	Within the band of operation	Pass
	-20	154.20	0.026840		
	-10	145.06	0.025250		
	0	164.98	0.028717		
	10	133.16	0.023179		
	20	96.93	0.016872		
	30	124.21	0.021620		
	40	151.98	0.026454		
	50	115.02	0.020021		
DC 5.5	25	168.20	0.029277		
DC 4.5	25	155.92	0.027140		

4.8. On Time and Duty Cycle

TEST CONFIGURATION



Test Procedures

1). Set the Centre frequency of the spectrum analyzer to the transmitting frequency;
2). Set the span=0MHz, RBW=8MHz, VBW=8MHz, Sweep time=Auto;
3). Detector = peak;
4). Trace mode = Single hold.

TEST RESULTS

FCC Appendix RF Test Data for 5GWIFI.

4.9. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Antenna Information

Test Result:

The PCB antenna maximum gain of antenna was 3.42 dBi.

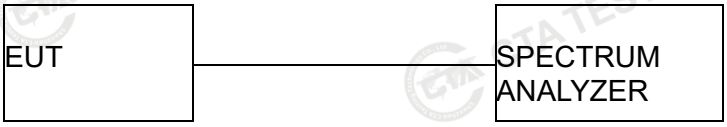
Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, Shenzhen CTA Testing Technology Co., Ltd. does not assume any responsibility.

4.10. Emissions at Restricted Band

Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



Test Procedures

According to ANSI C63.10 Field Strength Approach (linear terms):

$$E = EIRP - 20 \log d + 104.8$$

Where:
E is the electric field strength in dBuV/m
EIRP is the equivalent isotropically radiated power in dBm
d is the specified measurement distance in m
f) Compare the resultant electric field strength level with the applicable regulatory limit.
g) Perform the radiated spurious emission test.

Where all terms are as previously defined.

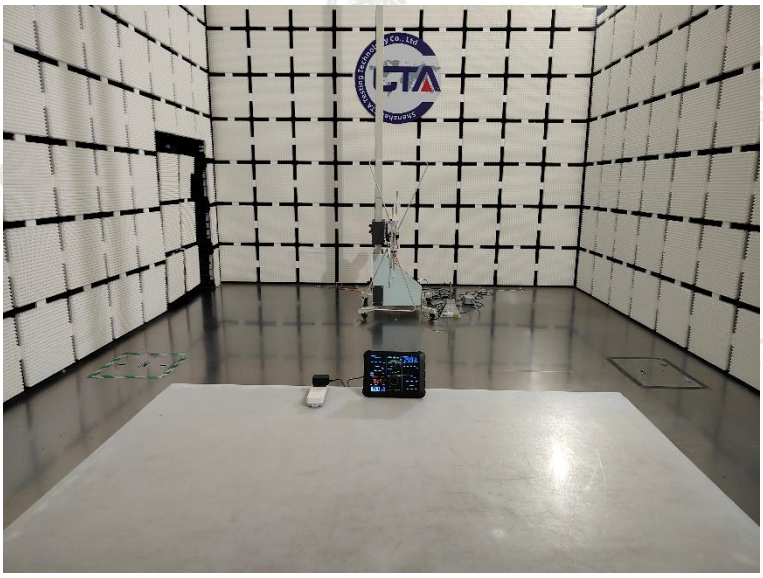
1). Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2). Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to an EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3). Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=3MHz for RMS detector, Max Hold=Average, Trace=100times for AV test.
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.
6). Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
7). Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)
8). Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
9). For devices with multiple antenna-ports, measure the power of each individual chain and sum

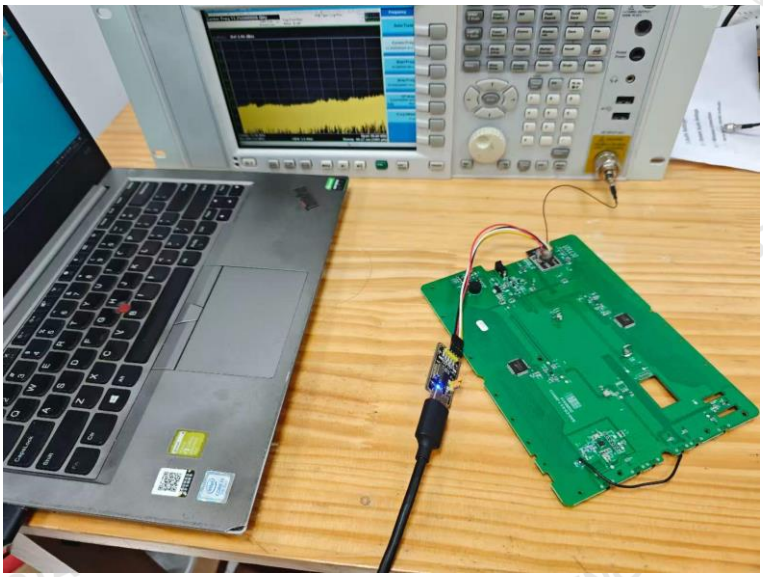
the EIRP of all chains in linear terms (e.g., Watts, mW).
10). Compare the resultant electric field strength level to the applicable regulatory limit.
11). Perform radiated spurious emission test duress until all measured frequencies were complete.

Test Results

Please refer to FCC Appendix RF Test Data for 5GWIFI.
Remark:
1). Test results including cable loss;
2). Measured at difference Packet Type for each mode and recorded worst case for each mode.
3). "---"means that the fundamental frequency not for 15.209 limits requirement.
4). Measured at Hopping and Non-Hopping mode, recorded worst at Non-Hopping mode.
5). The other emission levels were very low against the limit.
6). The average measurement was not performed when the peak measured data under the limit of average detection.
7). Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=3MHz/Sweep time=Auto/Detector=RMS, Max Hold=Average,Trace=100times.
8). Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

5. Test Setup Photos of the EUT





6. External and Internal Photos of the EUT

Reference to the test report No. **CTA26082700901**.

.....End of Report.....