



Shenzhen CTA Testing Technology Co., Ltd.

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

FCC PART 15 SUBPART C TEST REPORT FCC PART 15.407

Report Reference No. : CTA26081003602

FCC ID. : 2A525-AFF400

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Date of issue : Aug. 24, 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 : Jiangsu Zhong Heng Pet Articles Joint-stock CO., LTD

Address..... : NO.1388 Century Avenue, Yandu District, Yancheng City, Jiangsu,
China

Test specification..... :

Standard..... : FCC Part 15 Subpart E 15.407

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

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Test item description..... : Automatic Cat Feeder and Water Dispenser with 4 Bowls

Trade Mark..... : N/A

Manufacturer : Jiangsu Zhong Heng Pet Articles Joint-stock CO., LTD

Model/Type reference : AFF400

Listed Models : N/A

Modulation Type : OFDM

Operation Frequency : From 5180MHz to 5240MHz, 5260MHz to 5320MHz,
5500MHz to 5700MHz, 5745MHz to 5825MHz

Rating..... : Input: DC 5V, 2A

Battery: DC 4.5V

Result..... : PASS

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TEST REPORT

Equipment under Test : **Automatic Cat Feeder and Water Dispenser with 4 Bowls**

Model /Type : AFF400

Applicant : **Jiangsu Zhong Heng Pet Articles Joint-stock CO., LTD**

Address : NO.1388 Century Avenue, Yandu District, Yancheng City, Jiangsu,
China

Manufacturer : **Jiangsu Zhong Heng Pet Articles Joint-stock CO., LTD**

Address : NO.1388 Century Avenue, Yandu District, Yancheng City, Jiangsu,
China

Test Result:	PASS
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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.

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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

[KDB789033 D02](#): General UNII Test Procedures New Rules v02r01

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Aug. 10, 2026
Testing commenced on	:	Aug. 10, 2026
Testing concluded on	:	Aug. 24, 2026

2.2. Product Description

Product description:	Automatic Cat Feeder and Water Dispenser with 4 Bowls
Model/Type reference:	AFF400
Power supply:	Input: DC 5V, 2A Battery: DC 4.5V
Adapter information:	MODEL: KA12C-0502000US INPUT: AC 100–240V, 50/60Hz, 0.35A Max OUTPUT: DC 5V, 2000mA
Testing sample ID:	CTA260810036-1# (Engineer sample) CTA260810036-2# (Normal sample)
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: 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz IEEE 802.11n HT20: 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz IEEE 802.11n HT40: 5190MHz-5230MHz, 5270MHz-5310MHz, 5510MHz-5670MHz, 5755MHz-5795MHz
Channel number:	4 Channels for 20MHz bandwidth(5180MHz-5240MHz) 4 Channels for 20MHz bandwidth(5260MHz-5320MHz) 11 Channels for 20MHz bandwidth(5500MHz-5700MHz) 5 channels for 20MHz bandwidth(5745MHz-5825MHz) 2 channels for 40MHz bandwidth(5190MHz-5230MHz) 2 channels for 40MHz bandwidth(5270MHz-5310MHz) 5 Channels for 40MHz bandwidth(5510MHz-5670MHz) 2 channels for 40MHz bandwidth(5755MHz-5795MHz)
Antenna type:	PCB Antenna
Antenna gain:	UNII-1: 1.97dBi UNII-2A: 2.64dBi UNII-2C: 2.64dBi UNII-3: -0.76dBi

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 an Automatic Cat Feeder and Water Dispenser with 4 Bowls.

For more details, refer to the user's manual of the EUT.

Test Software Version	AmebaD_mptool_2V1		
Frequency	5180 MHz	5200 MHz	5240 MHz
802.11a	106	106	106
802.11n20	106	106	106
Frequency	5190 MHz	/	5230 MHz
802.11n40	106	106	106

Test Software Version	AmebaD_mptool_2V1		
Frequency	5260 MHz	5280 MHz	5320 MHz
802.11a	95	95	95
802.11n20	95	95	95
Frequency	5270 MHz	/	5310 MHz
802.11n40	95	95	95

Test Software Version	AmebaD_mptool_2V1		
Frequency	5500 MHz	5600 MHz	5700 MHz
802.11a	92	92	92
802.11n20	92	92	92
Frequency	5510 MHz	5590 MHz	5670 MHz
802.11n40	92	92	92

Test Software Version	AmebaD_mptool_2V1		
Frequency	5745 MHz	5785 MHz	5825 MHz
802.11a	95	95	95
802.11n20	95	95	95
Frequency	5755 MHz	/	5795 MHz
802.11n40	95	95	95

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

○ - supplied by the manufacturer

● - supplied by the lab

● PC (Auxiliary test supplied by testing Lab)	Model: TB000602317 Trade Mark: ThinkPad
● USB serial port board (Auxiliary test supplied by testing Lab)	Model: USB To TTL

2.6. 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

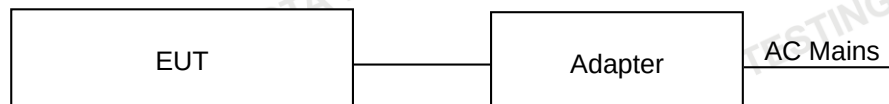
56	5280	62	5310
60	5300		
64	5320		

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		

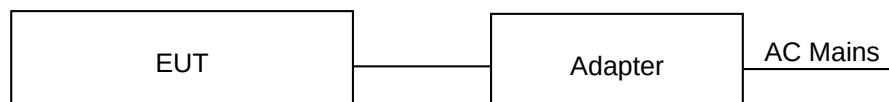
U-NI-3		U-NI-3	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755
153	5765	159	5795
157	5785		
161	5805		
165	5825		

2.7. Block Diagram of Test Setup

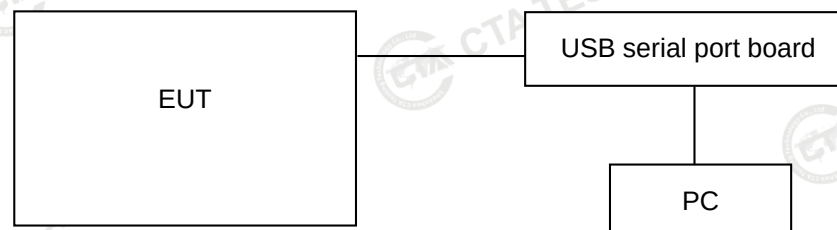
AC Power Conducted Emission



Radiated Emission



RF Conducted



2.8. 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.

2.9. Modifications

No modifications were implemented to meet testing criteria.

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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:

Temperature:	15-35 ° C
Humidity:	30-60 %
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

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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)

- (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	CNF05150M058 50Q16A	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

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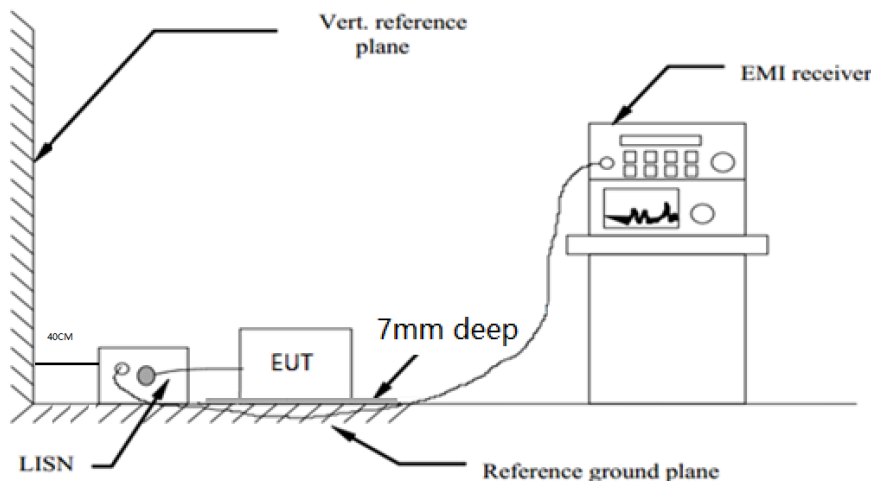
☐ 2	Spectrum analyzer	R&S	FSV40-N	CTA-344	2026/05/16	2027/05/15
☒ 3	RF Coaxial Cable	SKET	RF Cable (9kHz-40GHz)	CTA-368	2026/07/23	2027/07/22
☒ 4	Temperature and humidity meter	ZG-7020	Chigo	CTA-329	2026/07/25	2027/07/24
☒ 5	Programmable Constant Temperature And Humidity Test Chamber	DONGGUAN JINGYU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



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 7mm 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.

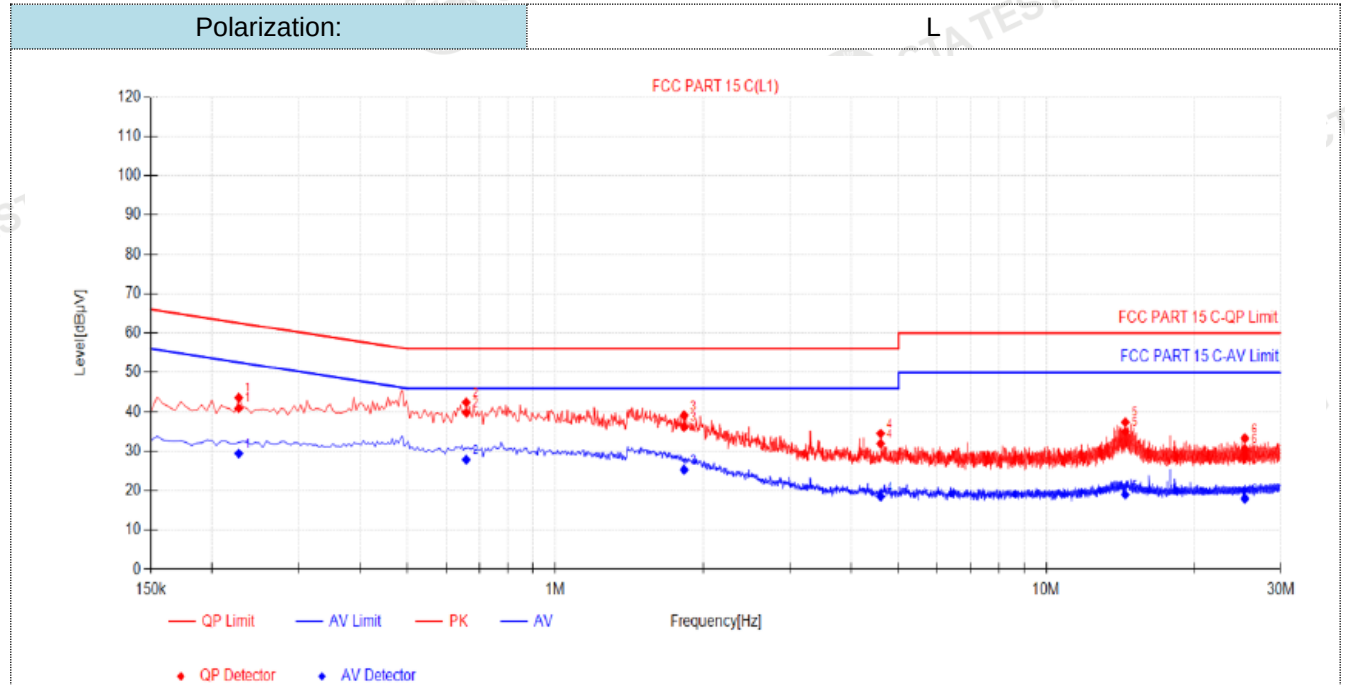
TEST RESULTS

Remark:

1. All modes of 802.11a/n were test at Low, Middle, and High channel; only the worst result of 802.11a(UNII-1&UNII-3) and 802.11n20 (UNII-2A&UNII-2C) 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:



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dB μV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.2265	9.82	31.12	40.94	62.58	21.64	19.58	29.40	52.58	23.18	PASS
2	0.6585	10.30	29.49	39.79	56.00	16.21	17.53	27.83	46.00	18.17	PASS
3	1.8285	10.48	25.68	36.16	56.00	19.84	14.84	25.32	46.00	20.68	PASS
4	4.596	10.82	21.12	31.94	56.00	24.06	7.64	18.46	46.00	27.54	PASS
5	14.4825	12.16	22.86	35.02	60.00	24.98	6.81	18.97	50.00	31.03	PASS
6	25.3545	13.25	17.34	30.59	60.00	29.41	4.70	17.95	50.00	32.05	PASS

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

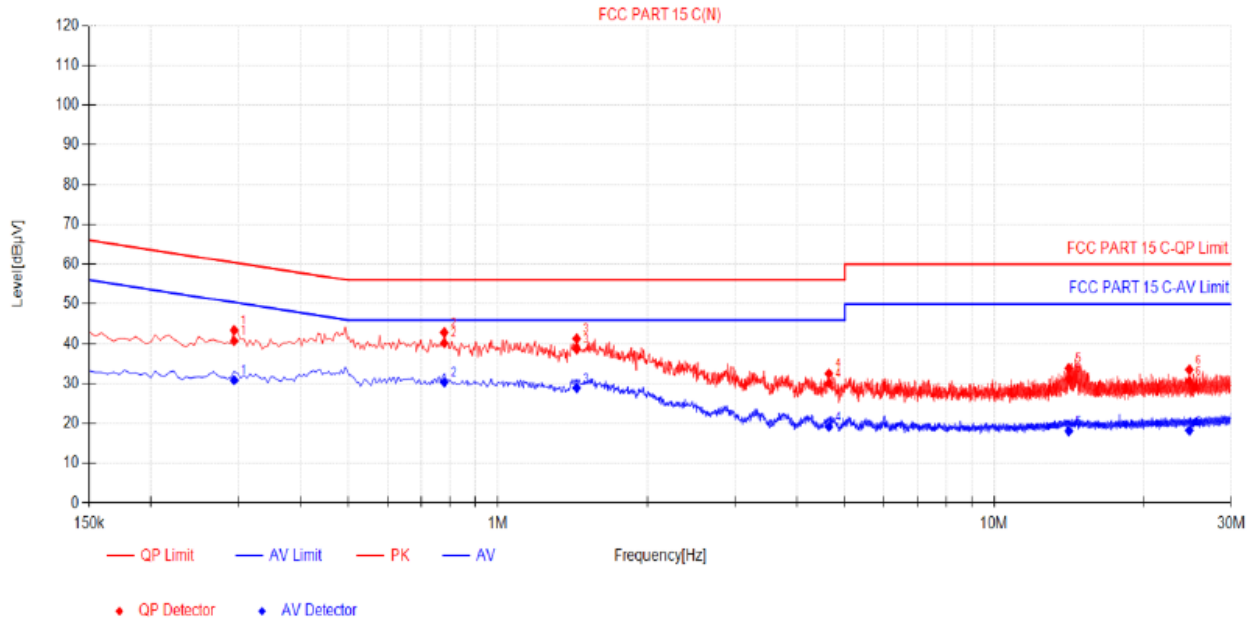
2). Factor (dB) = insertion loss of LISN (dB) + Cable loss (dB)

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

4). AV Margin(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	0.294	9.95	30.77	40.72	60.41	19.69	20.91	30.86	50.41	19.55	PASS
2	0.78	10.33	29.84	40.17	56.00	15.83	19.98	30.31	46.00	15.69	PASS
3	1.4415	10.41	28.23	38.64	56.00	17.36	18.49	28.90	46.00	17.10	PASS
4	4.641	10.88	19.27	30.15	56.00	25.85	8.25	19.13	46.00	26.87	PASS
5	14.1315	12.21	19.10	31.31	60.00	28.69	5.85	18.06	50.00	31.94	PASS
6	24.729	13.40	17.25	30.65	60.00	29.35	4.82	18.22	50.00	31.78	PASS

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

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

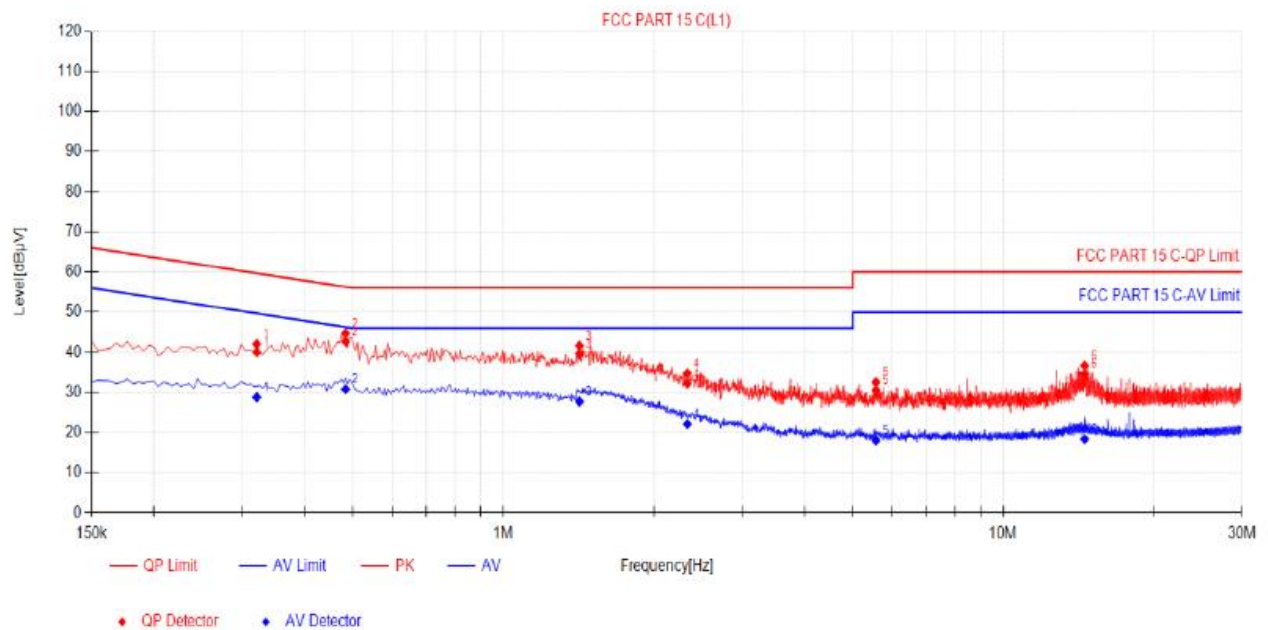
3). QP Margin (dB) = QP Limit (dBμV) - QP Value (dBμV)

4). AV Margin (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	0.321	10.11	29.94	40.05	59.68	19.63	18.67	28.78	49.68	20.90	PASS
2	0.483	10.29	32.41	42.70	56.29	13.59	20.50	30.79	46.29	15.50	PASS
3	1.419	10.45	29.18	39.63	56.00	16.37	17.24	27.69	46.00	18.31	PASS
4	2.3325	10.53	21.65	32.18	56.00	23.82	11.58	22.11	46.00	23.89	PASS
5	5.5635	10.93	19.59	30.52	60.00	29.48	7.10	18.03	50.00	31.97	PASS
6	14.541	12.17	22.39	34.56	60.00	25.44	6.15	18.32	50.00	31.68	PASS

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

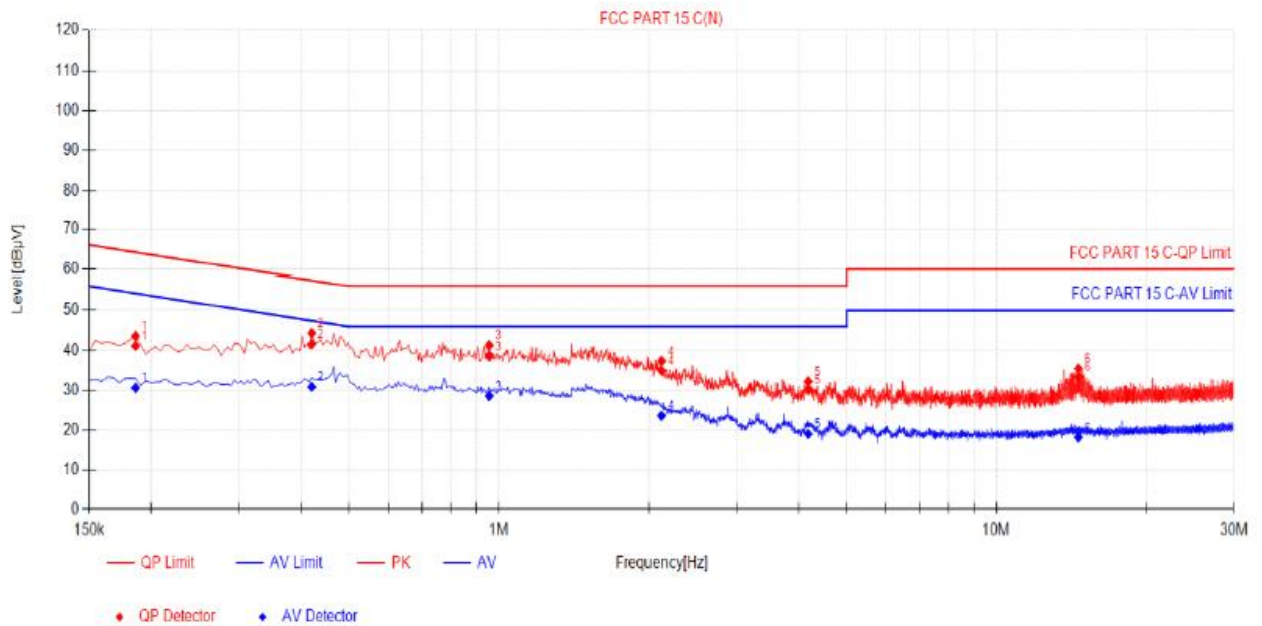
2). Factor (dB) = insertion loss of LISN (dB) + Cable loss (dB)

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

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

Polarization:

N



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dB μV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.186	9.94	31.19	41.13	64.21	23.08	20.65	30.59	54.21	23.62	PASS
2	0.42	10.18	31.41	41.59	57.45	15.86	20.70	30.88	47.45	16.57	PASS
3	0.9555	10.37	28.20	38.57	56.00	17.43	18.19	28.56	46.00	17.44	PASS
4	2.121	10.46	24.47	34.93	56.00	21.07	13.17	23.63	46.00	22.37	PASS
5	4.182	10.82	19.38	30.20	56.00	25.80	8.24	19.06	46.00	26.94	PASS
6	14.604	12.28	21.04	33.32	60.00	26.68	5.91	18.19	50.00	31.81	PASS

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

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

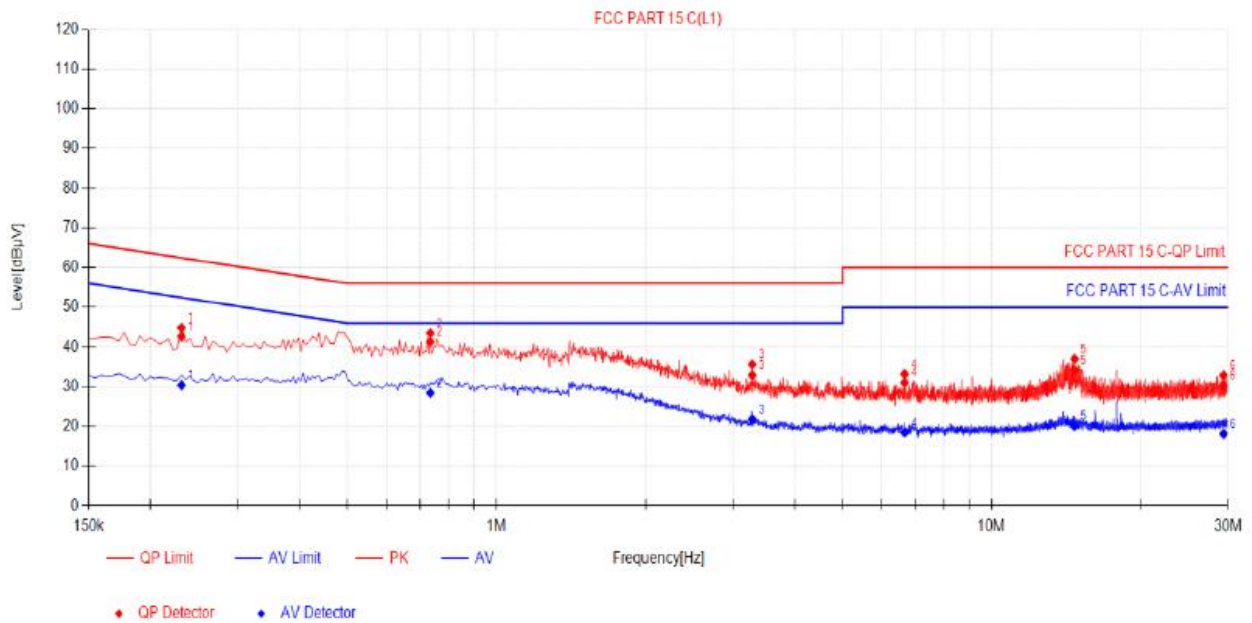
3). QP Margin(dB) = QP Limit (dBμV) - QP Value (dBμV)

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

UNII-2C:

Polarization:

L



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dB μV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.231	9.78	32.87	42.65	62.41	19.76	20.57	30.35	52.41	22.06	PASS
2	0.735	10.43	30.90	41.33	56.00	14.67	17.96	28.39	46.00	17.61	PASS
3	3.282	10.66	22.20	32.86	56.00	23.14	11.08	21.74	46.00	24.26	PASS
4	6.6705	11.07	19.94	31.01	60.00	28.99	7.36	18.43	50.00	31.57	PASS
5	14.6985	12.19	21.94	34.13	60.00	25.87	7.84	20.03	50.00	29.97	PASS
6	29.4	13.52	16.82	30.34	60.00	29.66	4.57	18.09	50.00	31.91	PASS

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

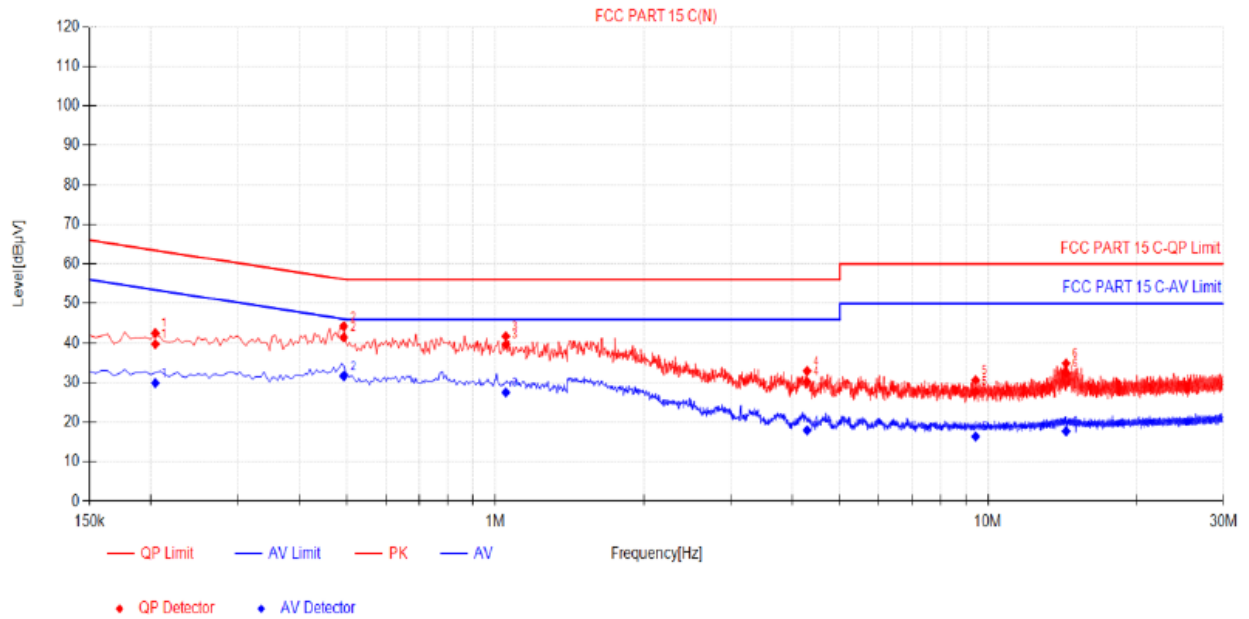
2). Factor (dB) = insertion loss of LISN (dB) + Cable loss (dB)

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

4). AV Margin(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	0.204	9.94	29.80	39.74	63.45	23.71	19.96	29.90	53.45	23.55	PASS
2	0.492	10.26	31.20	41.46	56.13	14.67	21.43	31.69	46.13	14.44	PASS
3	1.05	10.38	29.29	39.67	56.00	16.33	17.12	27.50	46.00	18.50	PASS
4	4.29	10.83	19.43	30.26	56.00	25.74	7.08	17.91	46.00	28.09	PASS
5	9.429	11.53	16.24	27.77	60.00	32.23	4.86	16.39	50.00	33.61	PASS
6	14.397	12.25	20.23	32.48	60.00	27.52	5.43	17.68	50.00	32.32	PASS

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

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

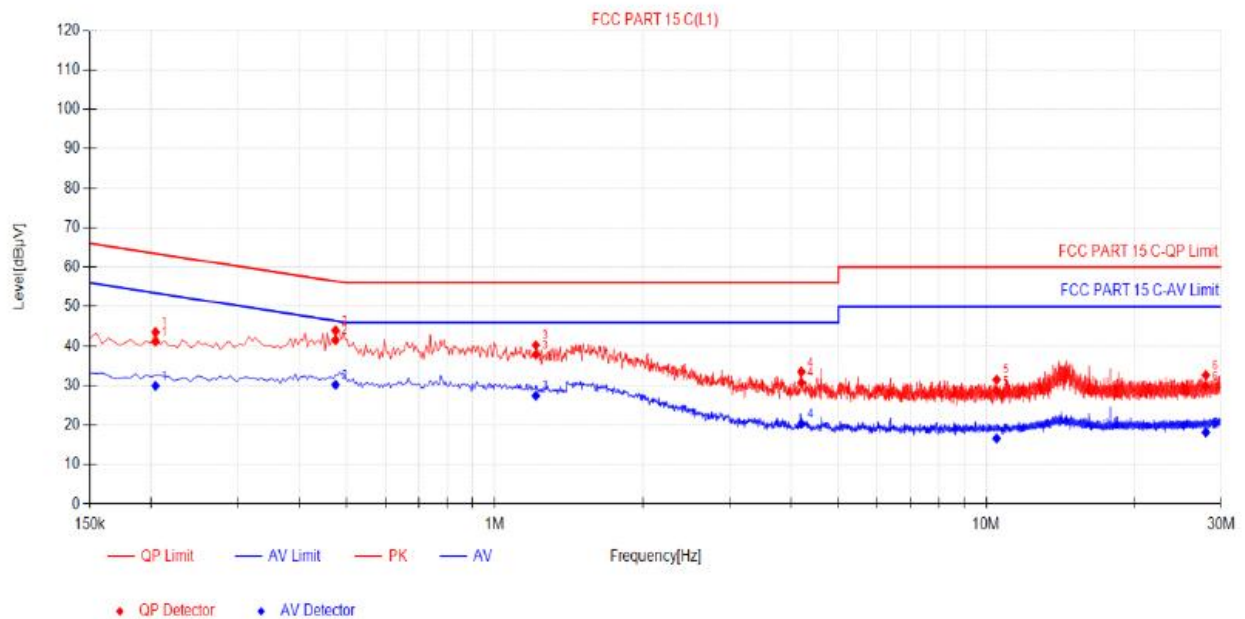
3). QP Margin(dB) = QP Limit (dBμV) - QP Value (dBμV)

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

UNII-3:

Polarization:

L



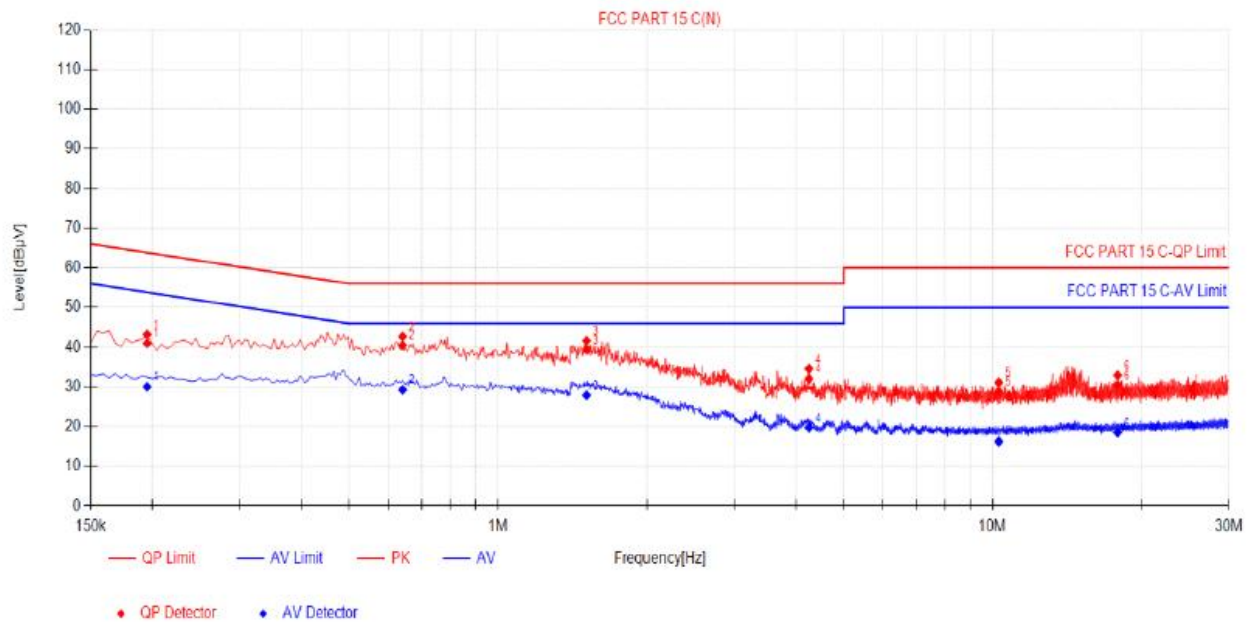
Final Data List

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	0.204	10.01	31.12	41.13	63.45	22.32	19.92	29.93	53.45	23.52	PASS
2	0.474	10.27	31.28	41.55	56.44	14.89	19.93	30.20	46.44	16.24	PASS
3	1.212	10.44	27.42	37.86	56.00	18.14	16.99	27.43	46.00	18.57	PASS
4	4.2	10.77	19.98	30.75	56.00	25.25	9.60	20.37	46.00	25.63	PASS
5	10.491	11.62	17.00	28.62	60.00	31.38	4.99	16.61	50.00	33.39	PASS
6	27.9375	13.43	16.37	29.80	60.00	30.20	4.67	18.10	50.00	31.90	PASS

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

Polarization:

N



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dB μV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict
1	0.195	9.96	31.01	40.97	63.82	22.85	20.04	30.00	53.82	23.82	PASS
2	0.6405	10.26	30.21	40.47	56.00	15.53	18.98	29.24	46.00	16.76	PASS
3	1.509	10.41	28.98	39.39	56.00	16.61	17.47	27.88	46.00	18.12	PASS
4	4.2495	10.83	21.18	32.01	56.00	23.99	8.91	19.74	46.00	26.26	PASS
5	10.2885	11.65	17.11	28.76	60.00	31.24	4.56	16.21	50.00	33.79	PASS
6	17.8935	12.75	17.69	30.44	60.00	29.56	5.72	18.47	50.00	31.53	PASS

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

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

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

4). AV Margin(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:

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

- (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	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	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 $\geq [3 \times \text{RBW}]$
- 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.

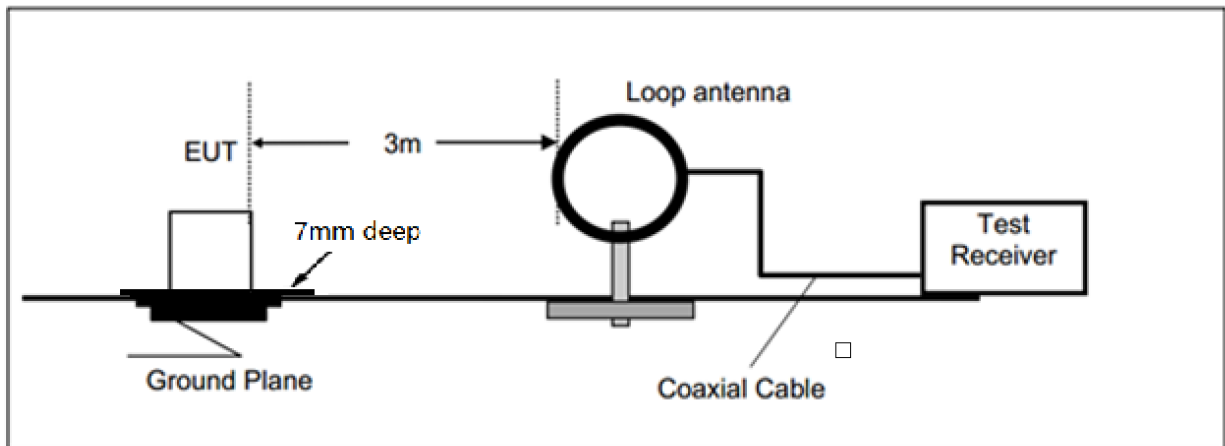
Test Results

Please refer to FCC Appendix RF Test Data for 5G WIFI

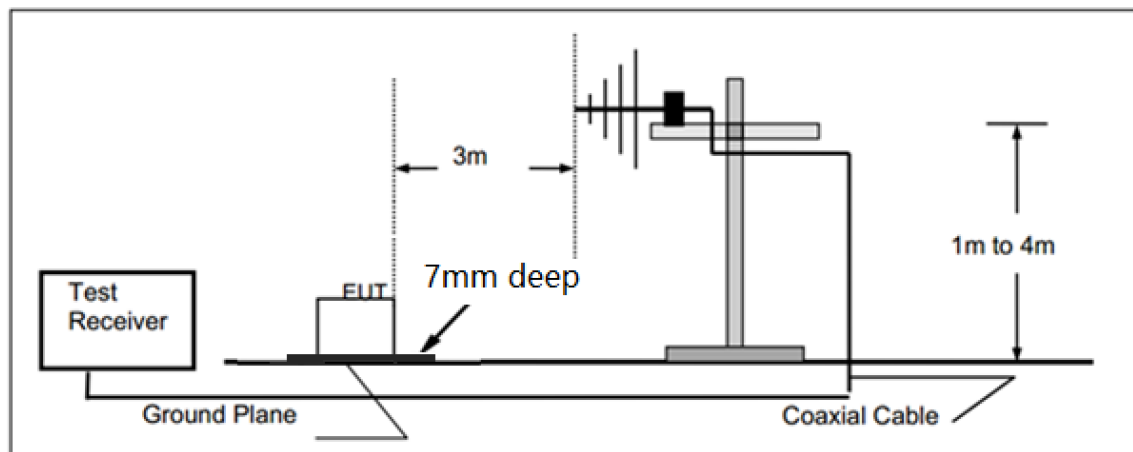
Note: RF Conducted test Offset= cable loss, For conducted spurious emission test, cable loss is the maximum value in the range of test.

TEST CONFIGURATION

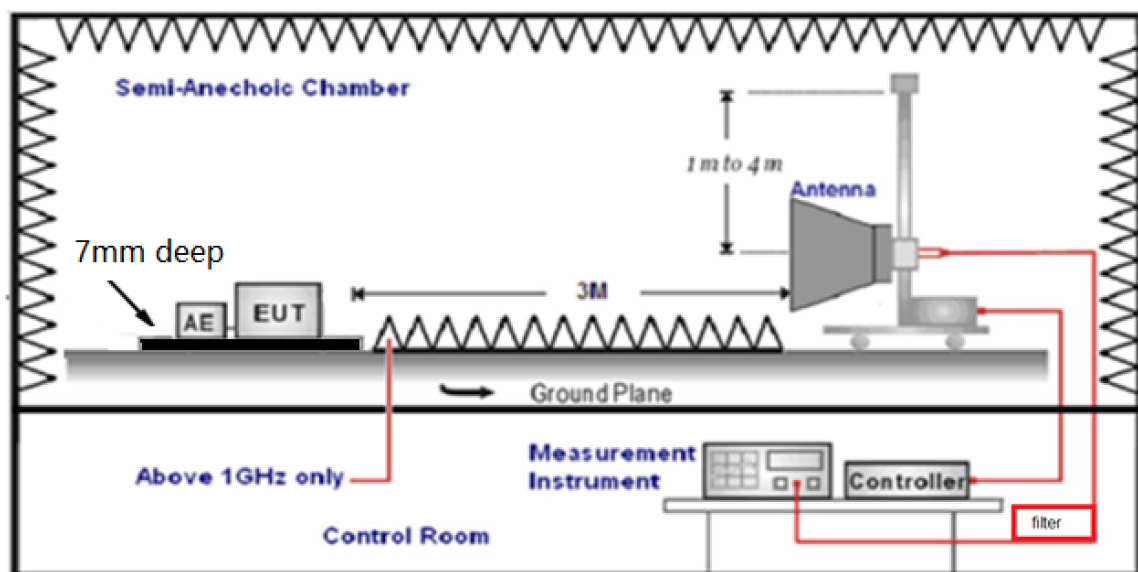
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz

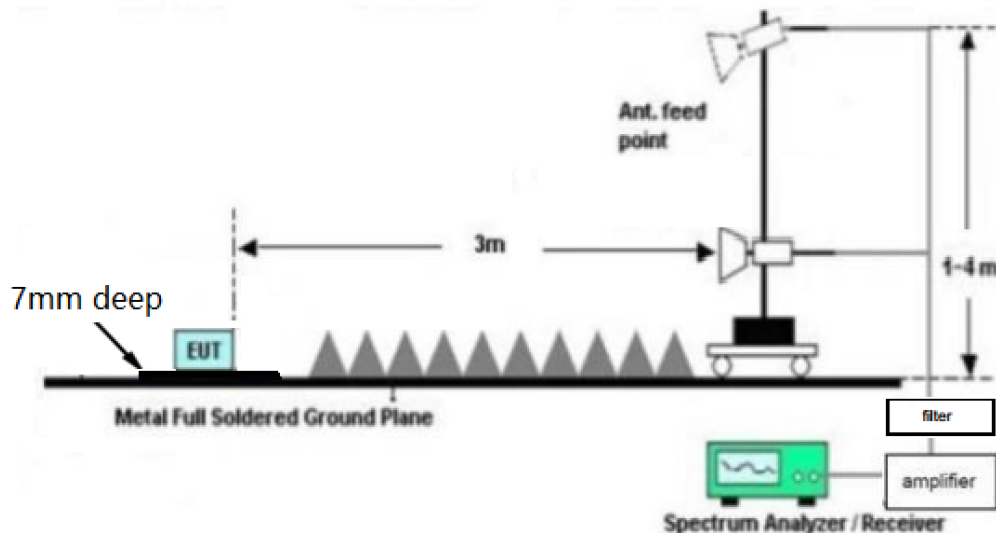


(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



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





Test Procedure

- Below 1GHz measurement the EUT is placed on a turntable which is 7 mm above ground plane, and above 1GHz measurement EUT was placed on a low permittivity and low loss tangent turn table which is 7 mm above ground plane.
- 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
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- Repeat above procedures until all frequency measurements have been completed.
- Radiated emission test frequency band from 9KHz to 40GHz.
- 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 Antenna	3

- 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:

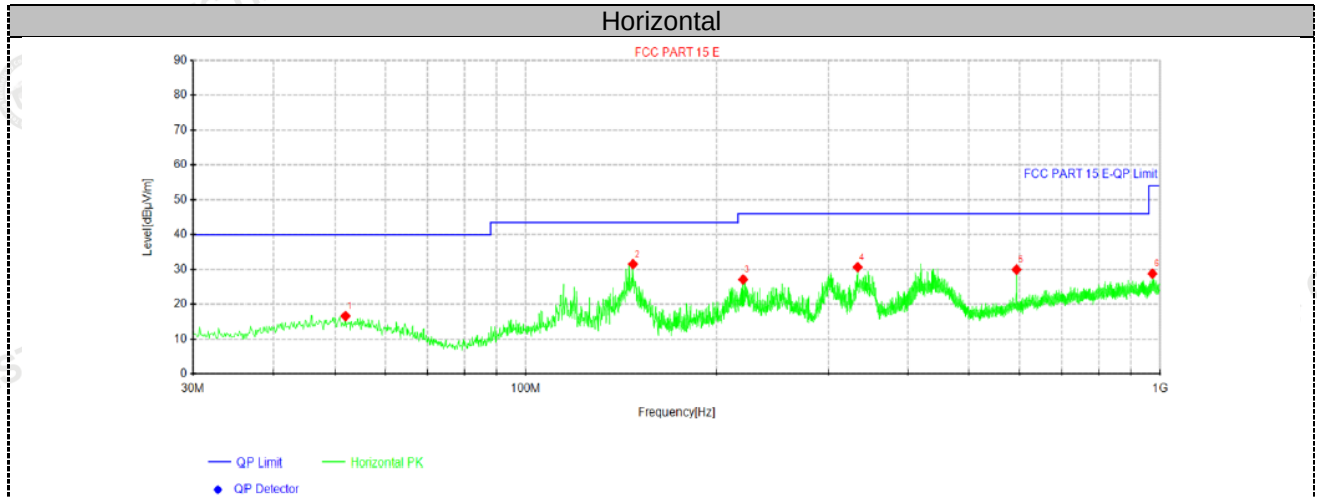
- This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
- All 802.11a/ 802.11n (HT20)/ 802.11n (HT40) modes have been tested for below 1GHz test, only the worst case 802.11a(UNII-1&UNII-3) and 802.11n20 (UNII-2A&UNII-2C) were recorded.
- All 802.11a/ 802.11n (HT20)/ 802.11n (HT40) modes have been tested for above 1GHz test, only the worst case 802.11a(UNII-1&UNII-3) and 802.11n20 (UNII-2A&UNII-2C) were recorded.
- Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.
- 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.
- Both adapter-powered and battery-powered modes were tested. Only the worse data from the adapter-powered mode is reported.

Shenzhen CTA Testing Technology Co., Ltd.

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UNII-1:

For 30MHz-1GHz



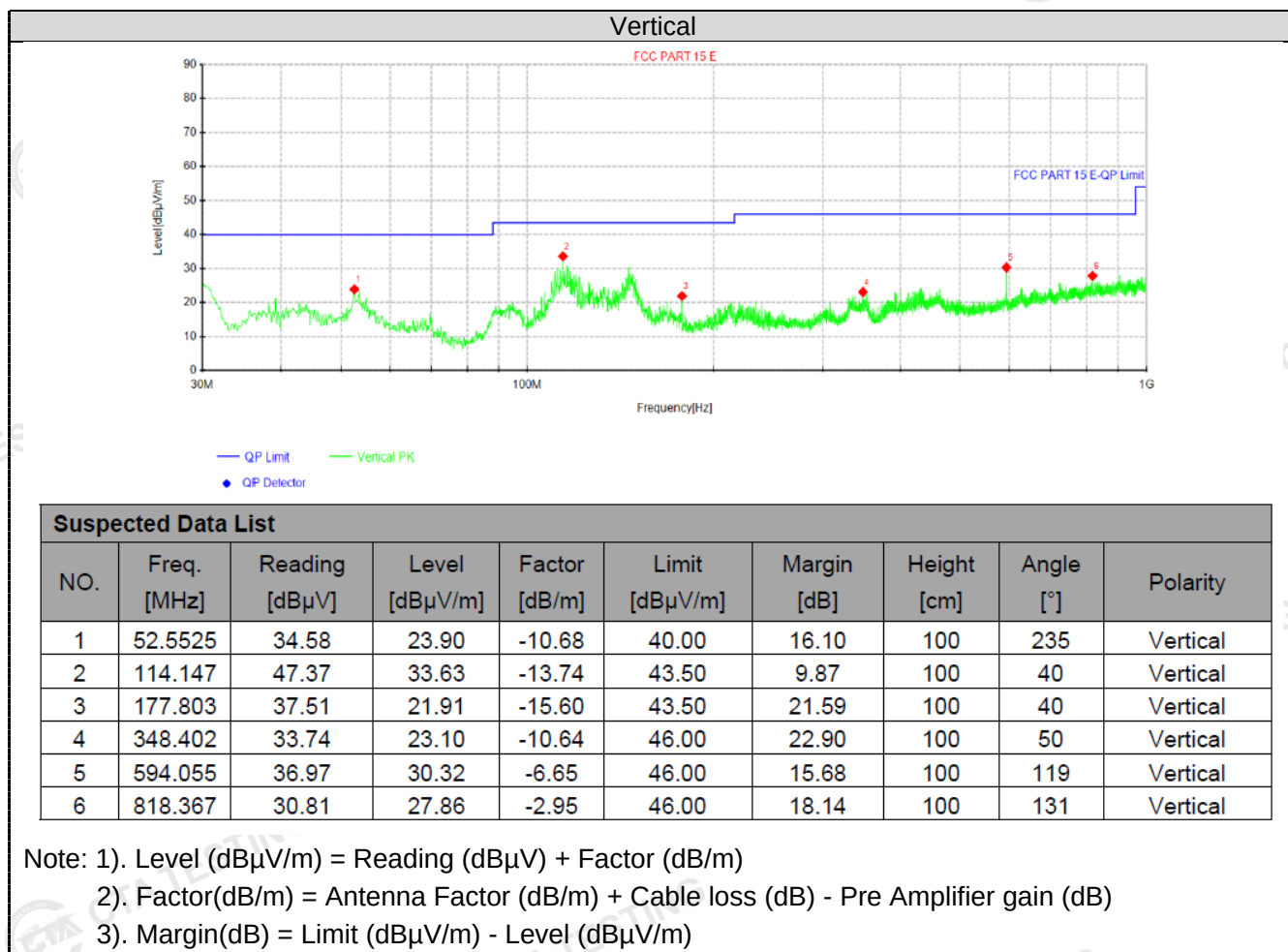
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	51.9462	27.27	16.63	-10.64	40.00	23.37	100	263	Horizontal
2	147.491	48.42	31.55	-16.87	43.50	11.95	100	149	Horizontal
3	220.12	40.69	27.13	-13.56	46.00	18.87	100	251	Horizontal
4	333.61	41.87	30.66	-11.21	46.00	15.34	100	308	Horizontal
5	594.055	36.63	29.98	-6.65	46.00	16.02	100	67	Horizontal
6	972.718	30.08	28.79	-1.29	54.00	25.21	100	320	Horizontal

Note: 1). Level (dBμV/m) = Reading (dBμV) + Factor (dB/m)

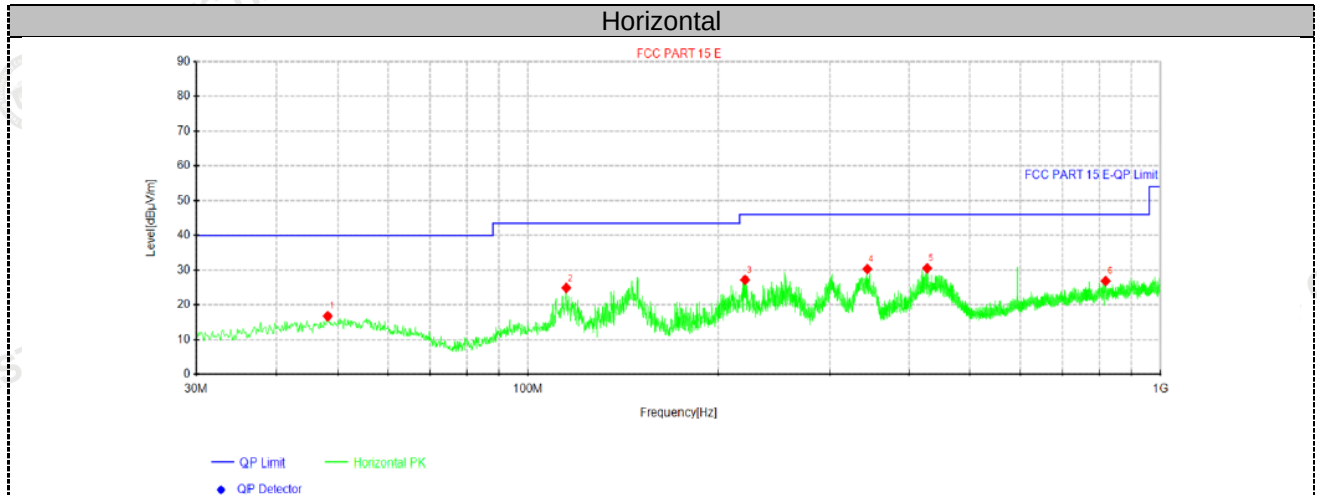
2). Factor(dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)



UNII-2A:

For 30MHz-1GHz



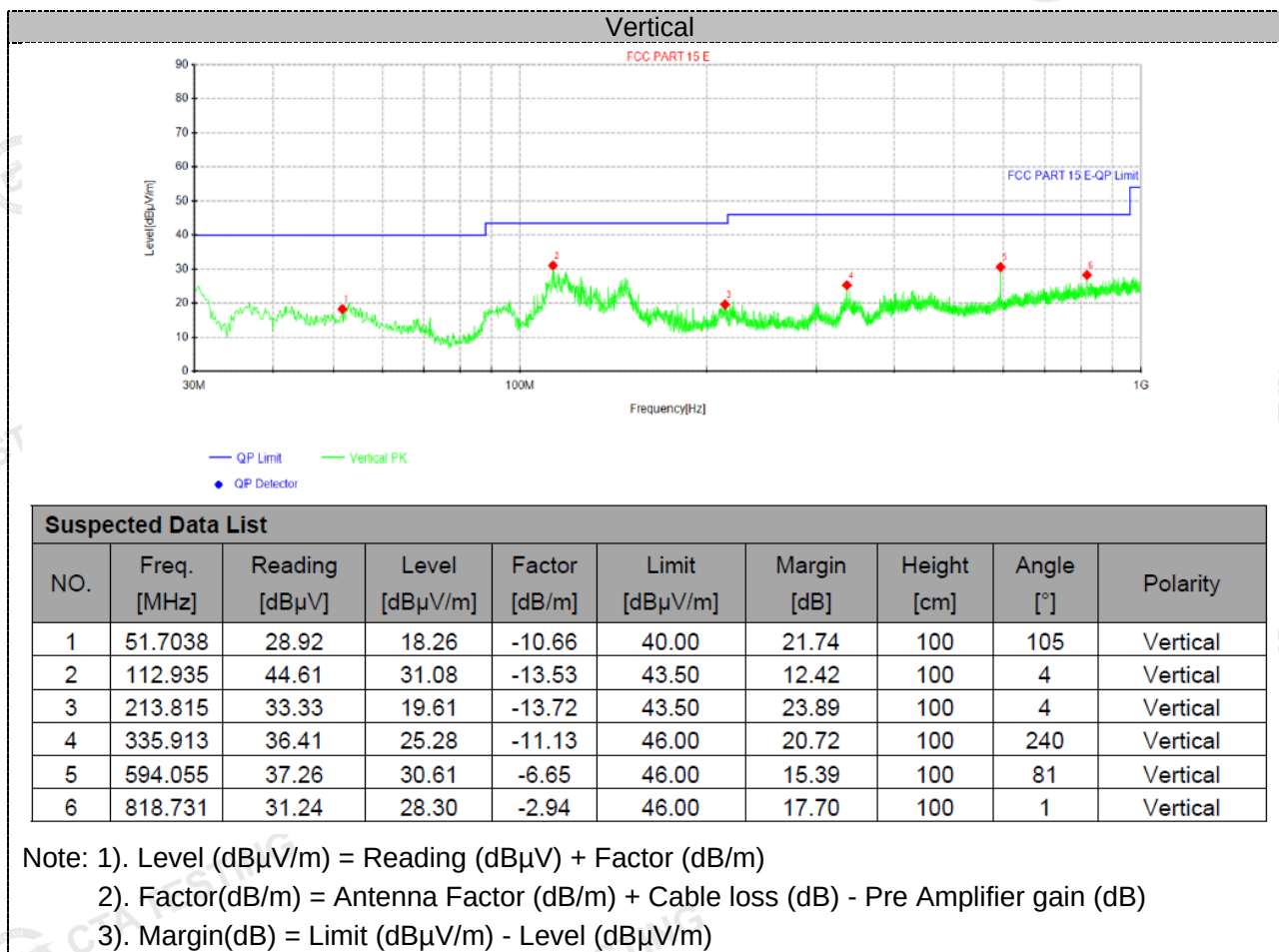
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.1875	27.34	16.77	-10.57	40.00	23.23	100	70	Horizontal
2	114.875	38.63	24.89	-13.74	43.50	18.61	100	294	Horizontal
3	220.362	40.76	27.21	-13.55	46.00	18.79	100	340	Horizontal
4	343.795	41.12	30.30	-10.82	46.00	15.70	100	294	Horizontal
5	427.578	40.01	30.52	-9.49	46.00	15.48	100	360	Horizontal
6	819.216	29.79	26.87	-2.92	46.00	19.13	100	268	Horizontal

Note: 1). Level (dBμV/m) = Reading (dBμV) + Factor (dB/m)

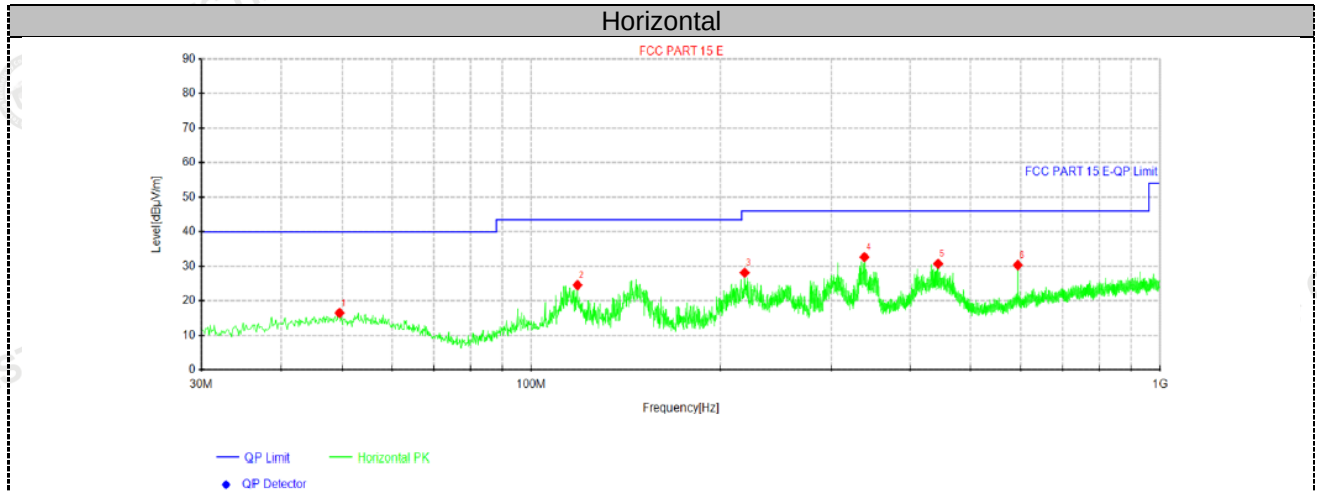
2). Factor(dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBμV/m) - Level (dBμV/m)



UNII-2C:

For 30MHz-1GHz



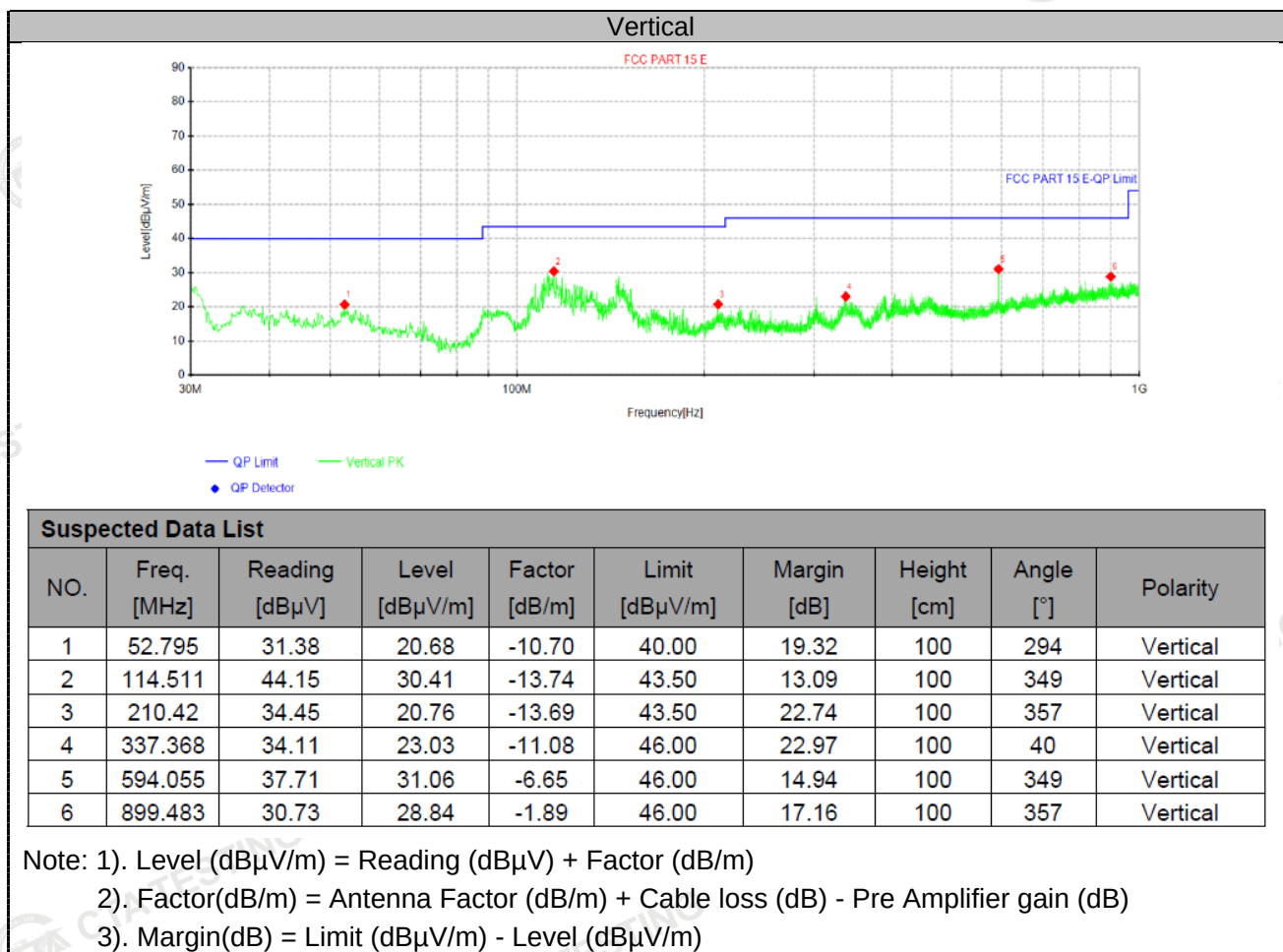
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	49.5212	27.05	16.50	-10.55	40.00	23.50	100	22	Horizontal
2	118.391	38.95	24.57	-14.38	43.50	18.93	100	91	Horizontal
3	218.422	41.76	28.15	-13.61	46.00	17.85	100	293	Horizontal
4	338.702	43.68	32.67	-11.01	46.00	13.33	100	305	Horizontal
5	443.826	40.13	30.72	-9.41	46.00	15.28	100	360	Horizontal
6	594.055	36.99	30.34	-6.65	46.00	15.66	100	338	Horizontal

Note: 1). Level (dBµV/m) = Reading (dBµV) + Factor (dB/m)

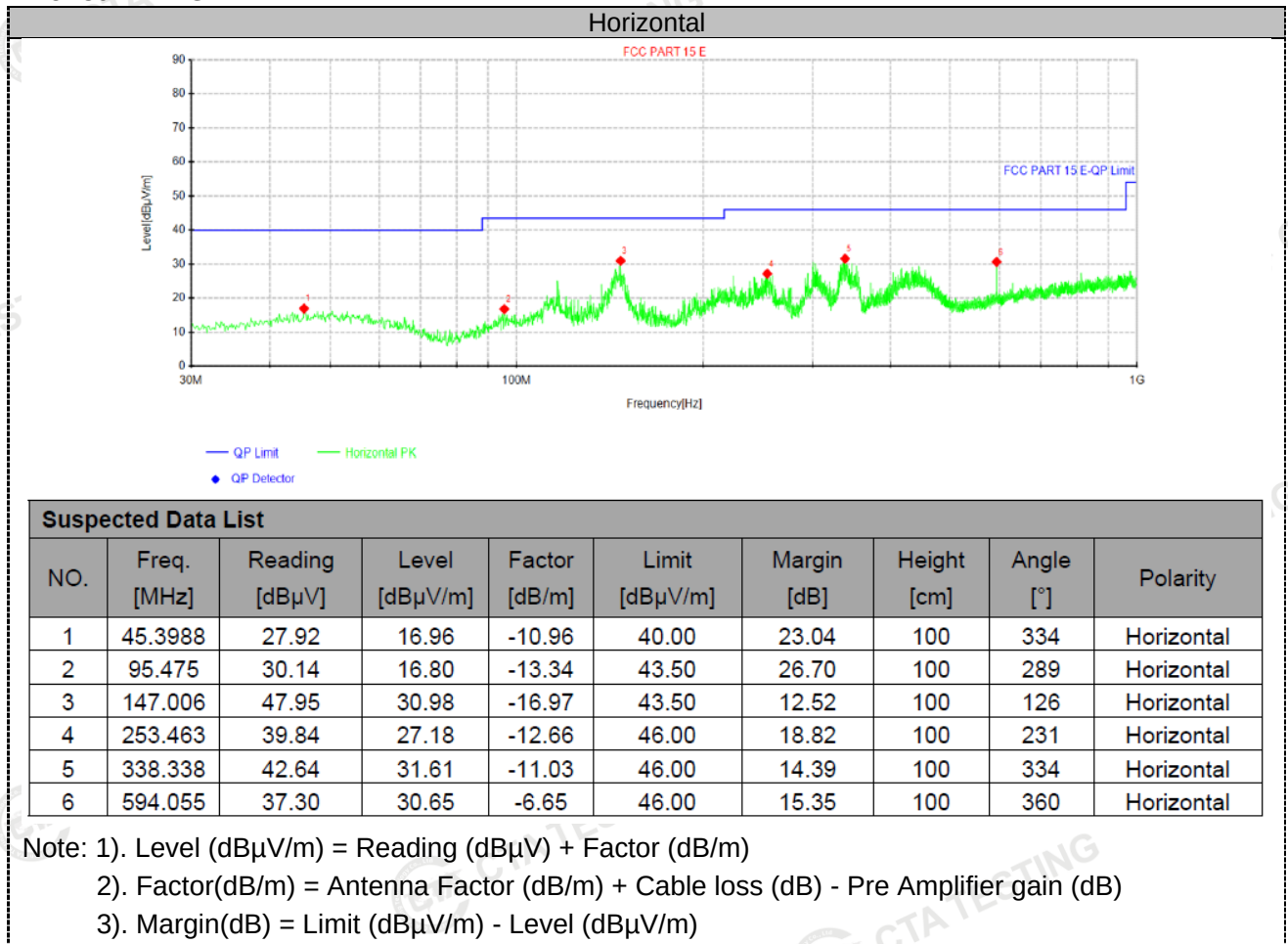
2). Factor(dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

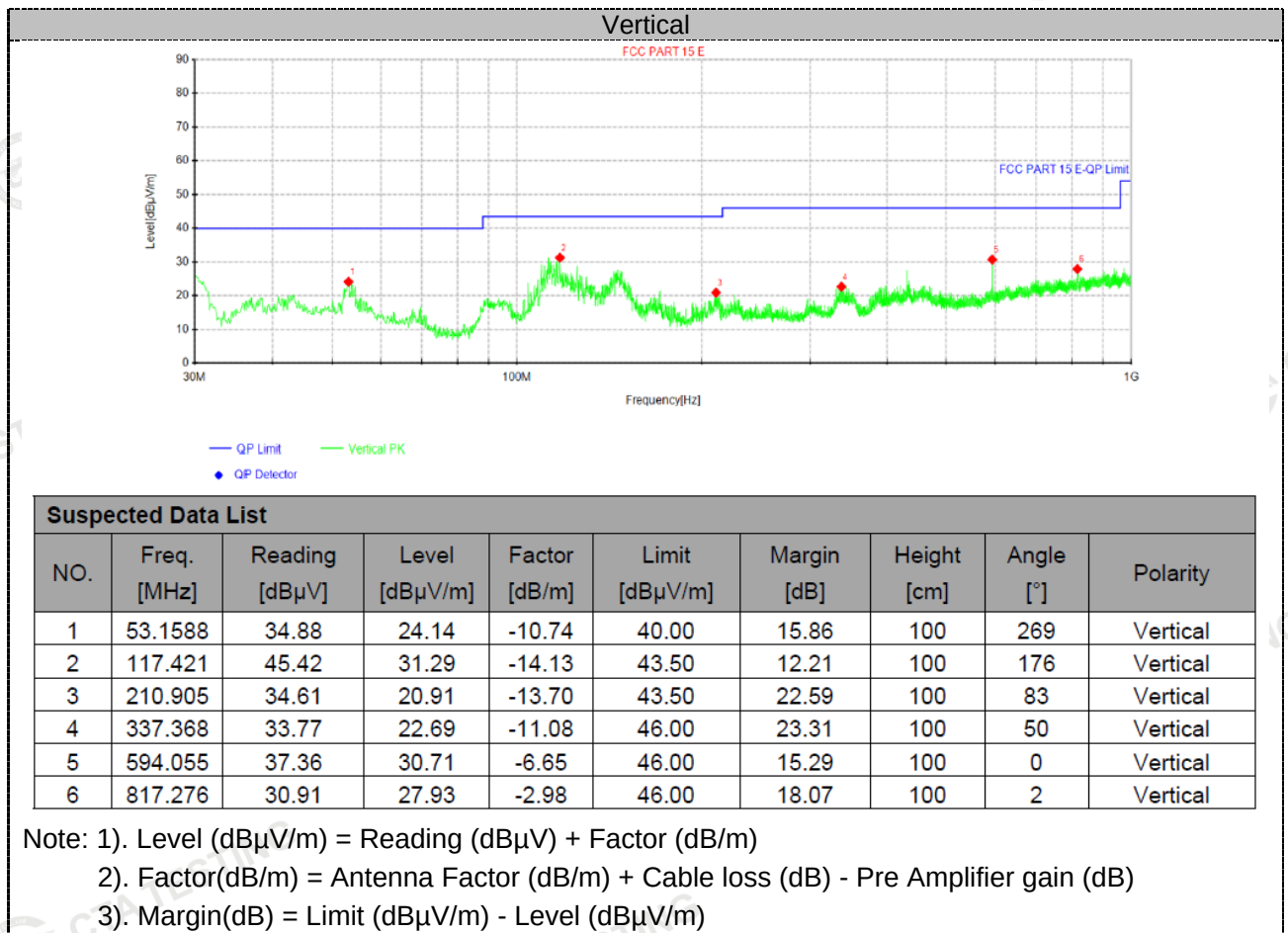
3). Margin(dB) = Limit (dBµV/m) - Level (dBµV/m)



UNII-3:

For 30MHz-1GHz





For 1GHz to 40GHz

Note: All 802.11a/ 802.11n (HT20)/ 802.11n (HT40) modes have been tested for above 1GHz test, only the worst case 802.11a(UNII-1&UNII-3) and 802.11n20 (UNII-2A&UNII-2C) were recorded.

U-NII 1 & 802.11n20 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 (5180MHz)	10360.0	42.52	PK	H	68.3	25.78	48.22	38.90	8.19	52.79	-5.70
	10360.0	33.11	AV	H	54.0	20.89	38.81	38.90	8.19	52.79	-5.70
40.00 (5200MHz)	10400.0	43.00	PK	H	68.3	25.30	48.71	38.90	8.21	52.82	-5.71
	10400.0	33.23	AV	H	54.0	20.77	38.94	38.90	8.21	52.82	-5.71
48.00 (5240MHz)	10480.0	42.62	PK	H	68.3	25.68	48.28	38.98	8.24	52.88	-5.66
	10480.0	32.44	AV	H	54.0	21.56	38.10	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 (5180MHz)	10360.0	42.70	PK	V	68.3	25.60	48.40	38.90	8.19	52.79	-5.70
	10360.0	32.77	AV	V	54.0	21.23	38.47	38.90	8.19	52.79	-5.70
40.00 (5200MHz)	10400.0	42.64	PK	V	68.3	25.66	48.35	38.90	8.21	52.82	-5.71
	10400.0	32.69	AV	V	54.0	21.31	38.40	38.90	8.21	52.82	-5.71
48.00 (5240MHz)	10480.0	42.59	PK	V	68.3	25.71	48.25	38.98	8.24	52.88	-5.66
	10480.0	32.73	AV	V	54.0	21.27	38.39	38.98	8.24	52.88	-5.66

UNII-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 (5260MHz)	10520.0	43.60	PK	H	68.3	24.70	49.24	39.02	8.26	52.92	-5.64
	10520.0	34.31	AV	H	54.0	19.69	39.95	39.02	8.26	52.92	-5.64
56.00 (5280MHz)	10560.0	43.64	PK	H	68.3	24.66	49.25	39.06	8.28	52.95	-5.61
	10560.0	33.73	AV	H	54.0	20.27	39.34	39.06	8.28	52.95	-5.61
64.00 (5320MHz)	10640.0	43.74	PK	H	68.3	24.56	49.26	39.18	8.31	53.01	-5.52
	10640.0	33.85	AV	H	54.0	20.15	39.37	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 (5260MHz)	10520.0	43.69	PK	V	68.3	24.61	49.33	39.02	8.26	52.92	-5.64
	10520.0	34.03	AV	V	54.0	19.97	39.67	39.02	8.26	52.92	-5.64
56.00 (5280MHz)	10560.0	44.00	PK	V	68.3	24.30	49.61	39.06	8.28	52.95	-5.61
	10560.0	34.15	AV	V	54.0	19.85	39.76	39.06	8.28	52.95	-5.61
64.00 (5320MHz)	10640.0	44.45	PK	V	68.3	23.85	49.97	39.18	8.31	53.01	-5.52
	10640.0	34.01	AV	V	54.0	19.99	39.53	39.18	8.31	53.01	-5.52

UNII-2C & 802.11n20 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)
100.00 (5500MHz)	11000.0	41.52	PK	H	68.3	26.78	47.15	39.20	8.47	53.30	-5.63
	11000.0	33.37	AV	H	54.0	20.63	39.00	39.20	8.47	53.30	-5.63
120.00 (5600MHz)	11200.0	42.01	PK	H	68.3	26.29	47.69	39.10	8.56	53.34	-5.68
	11200.0	32.49	AV	H	54.0	21.51	38.17	39.10	8.56	53.34	-5.68
140.00 (5700MHz)	11400.0	42.22	PK	H	68.3	26.08	47.45	39.50	8.65	53.38	-5.23
	11400.0	32.87	AV	H	54.0	21.13	38.10	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)
100.00 (5500MHz)	11000.0	41.89	PK	V	68.3	26.41	47.52	39.20	8.47	53.30	-5.63
	11000.0	32.84	AV	V	54.0	21.16	38.47	39.20	8.47	53.30	-5.63
120.00 (5600MHz)	11200.0	42.14	PK	V	68.3	26.16	47.82	39.10	8.56	53.34	-5.68
	11200.0	33.33	AV	V	54.0	20.67	39.01	39.10	8.56	53.34	-5.68
140.00 (5700MHz)	11400.0	42.02	PK	V	68.3	26.28	47.25	39.50	8.65	53.38	-5.23
	11400.0	33.18	AV	V	54.0	20.82	38.41	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 (5745MHz)	11490.0	41.88	PK	H	68.3	26.42	47.18	39.41	8.69	53.40	-5.30
	11490.0	30.83	AV	H	54.0	23.17	36.13	39.41	8.69	53.40	-5.30
157.00 (5785MHz)	11570.0	41.60	PK	H	68.3	26.70	46.96	39.33	8.72	53.41	-5.36
	11570.0	31.26	AV	H	54.0	22.74	36.62	39.33	8.72	53.41	-5.36
165.00 (5825MHz)	11650.0	40.90	PK	H	68.3	27.40	46.32	39.25	8.76	53.43	-5.42
	11650.0	31.27	AV	H	54.0	22.73	36.69	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 (5745MHz)	11490.0	41.00	PK	V	68.3	27.30	46.30	39.41	8.69	53.40	-5.30
	11490.0	31.66	AV	V	54.0	22.34	36.96	39.41	8.69	53.40	-5.30
157.00 (5785MHz)	11570.0	41.18	PK	V	68.3	27.12	46.54	39.33	8.72	53.41	-5.36
	11570.0	31.29	AV	V	54.0	22.71	36.65	39.33	8.72	53.41	-5.36
165.00 (5825MHz)	11650.0	41.57	PK	V	68.3	26.73	46.99	39.25	8.76	53.43	-5.42
	11650.0	31.37	AV	V	54.0	22.63	36.79	39.25	8.76	53.43	-5.42

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. Margin value = Limit value - Emission level.
4. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
5. Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40.

4.3. Maximum Conducted Average Output Power

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 any elevation 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 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.

Test Configuration



TEST RESULTS

FCC Appendix RF Test Data for 5G WIFI.

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

4.4. Power Spectral Density

Limit

(1) 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 power spectral density shall not exceed 17 dBm in any 1 MHz band. ^{note1}

(ii) For an indoor access point operating in the band 5.15 - 5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 MHz band. ^{note1}

(iii) For fixed point-to-point access points operating in the band 5.15 - 5.25 GHz, transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.

(iv) For mobile and portable client devices in the 5.15 - 5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 MHz band. ^{note1}

(2) For the 5.25 - 5.35 GHz and 5.47 - 5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. ^{note1}

(3) For the band 5.725 - 5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band. ^{note1, note2}

Note1: If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

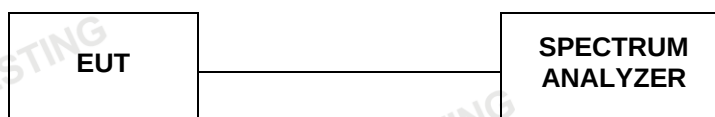
Note2: Fixed point - to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 1MHz for U-NII 1, U-NII 2A, U-NII C band and 500KHz for U-NII 3 band.
3. Set the VBW $\geq 3 \times$ RBW.
4. Set the span to encompass the entire EBW.
5. Detector = Average.
6. Sweep time = auto couple.
7. Trace mode = Average hold.
8. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum power level.

TEST CONFIGURATION



TEST RESULTS

FCC Appendix RF Test Data for 5G WIFI.

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).

RBW factor = $10 \log (500 \text{ KHz} / 300 \text{ KHz}) = 2.22 \text{ dB}$

4.5. 6dB Bandwidth

Limit

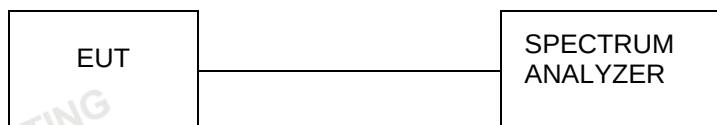
Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure

The following procedure shall be used for measuring this bandwidth:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
- Detector = Peak.
- Trace mode = max-hold.
- Sweep = No faster than coupled (auto) time.
- Allow the trace to stabilize.
- 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.

Test Configuration



TEST RESULTS

FCC Appendix RF Test Data for 5G WIFI.

4.6. 26dB Bandwidth

Limit

No Limits for 26dBc Bandwidth

Test Procedure

The procedure for this method is as follows:

- Set RBW = shall be in the range of 1% to 5% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = peak.
- Trace mode = max-hold.
- 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%.

Test Configuration

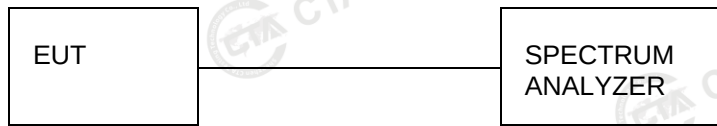


TEST RESULTS

FCC Appendix RF Test Data for 5G WIFI.

4.7. 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 5G WIFI.

4.8. 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 1.97dBi for 5180MHz-5240MHz, 2.64dBi for 5260MHz-5320MHz, 2.64dBi for 5500MHz-5700MHz, -0.76dBi for 5745MHz-5825MHz.

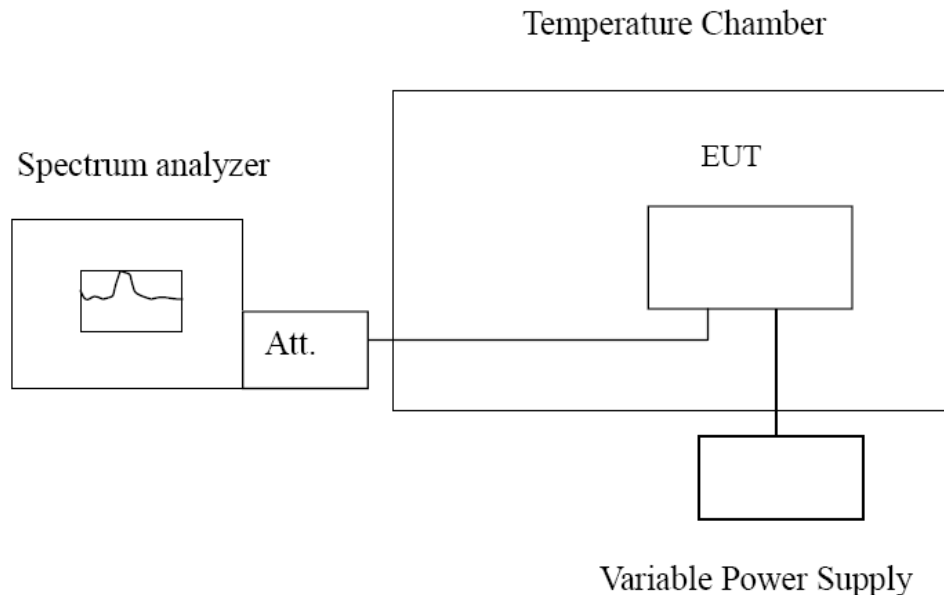
Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen CTA Testing Technology Co., Ltd. does not assume any responsibility.

4.9. Frequency Stability

LIMIT

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

TEST CONFIGURATION



TEST PROCEDURE

Frequency Stability under Temperature Variations:

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 analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

TEST RESULTS

Reference Frequency: 802.11n channel=36 frequency=5180MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
AC 120	-20	-40000	-7.72	Within the band of operation	Pass
	-10	-20000	-3.86		
	0	-40000	-7.72		
	10	-40000	-7.72		
	20	-20000	-3.86		
	30	-40000	-7.72		
	40	-20000	-3.86		
	50	-40000	-7.72		
AC 132	25	-40000	-7.72		
AC 108	25	-40000	-7.72		

Reference Frequency: 802.11n channel=52 frequency=5260MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
AC 120	-20	-20000	-3.8	Within the band of operation	Pass
	-10	-20000	-3.8		
	0	-20000	-3.8		
	10	-40000	-7.6		
	20	-40000	-7.6		
	30	-20000	-3.8		
	40	-20000	-3.8		
	50	-20000	-3.8		
AC 132	25	-40000	-7.6		
AC 108	25	-20000	-3.8		

Reference Frequency: 802.11n channel=100 frequency=5500MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
AC 120	-20	-40000	-7.27	Within the band of operation	Pass
	-10	-20000	-3.64		
	0	-20000	-3.64		
	10	-20000	-3.64		
	20	-40000	-7.27		
	30	-40000	-7.27		
	40	-40000	-7.27		
	50	-40000	-7.27		
AC 132	25	-20000	-3.64		
AC 108	25	-40000	-7.27		

Reference Frequency: 802.11n channel=149 frequency=5745MHz					
Voltage (V)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
AC 120	-20	-40000	-6.96	Within the band of operation	Pass
	-10	-60000	-10.44		
	0	-40000	-6.96		
	10	-60000	-10.44		
	20	-40000	-6.96		
	30	-40000	-6.96		
	40	-60000	-10.44		
	50	-40000	-6.96		
AC 132	25	-40000	-6.96	Within the band of operation	Pass
AC 108	25	-40000	-6.96		

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):

$$E = \text{EIRP} - 20 \log d + 104.8$$

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 5G WIFI.

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

Please refer to separated files for Test Setup Photos of the EUT.

6. External and Internal Photos of the EUT

Please refer to separated files for External Photos & Internal Photos of the EUT.

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