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. ..... :	**CTA25122901716**
FCC ID. ..... :	**2BUO5-APOLLO2-12**
Compiled by (position+printed name+signature) . :	File administrators Zoey Cao
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Date of issue ..... :	Feb. 02, 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 ..... :	**CP Device Co., Ltd**
Address ..... :	5F, Bldg 15,Wisdomland Business Park, No.15 Gate 2nd Rd, Nanshan, Shenzhen City, Guangdong Province, 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..... :	**Vehicle Mount Computer**
Trade Mark..... :	CPDEVICE
Manufacturer..... :	CP Device Co., Ltd
Model/Type reference ..... :	LC:TWO MAX
Listed Models..... :	APOLLO2 12, APOLLO 12A, APOLLO 12PRO, APOLLO 12 GEN2, APOLLO 12
Modulation Type ..... :	DSSS,OFDM
Operation Frequency ..... :	From 5180MHz to 5240MHz,5260MHz to 5320MHz, 5500MHz to 5700MHz, 5745MHz to 5825MHz
Rating..... :	Input: DC 7-36V, 1600mA, Max 20W
Result..... :	**PASS**

TEST REPORT

Equipment under Test	:	Vehicle Mount Computer
Model /Type	:	LC:TWO MAX
Listed Models	:	APOLLO2 12, APOLLO 12A, APOLLO 12PRO, APOLLO 12 GEN2, APOLLO 12
Model difference	:	The PCB board, circuit, structure and internal of these models are the same, Only model number is different for these model.
Applicant	**:**	**CP Device Co., Ltd**
Address	:	5F, Bldg 15,Wisdomland Business Park, No.15 Gate 2nd Rd, Nanshan, Shenzhen City, Guangdong Province, China
Manufacturer	**:**	**CP Device Co., Ltd**
Address	:	5F, Bldg 15,Wisdomland Business Park, No.15 Gate 2nd Rd, Nanshan, Shenzhen City, Guangdong Province, China
Factory	**:**	**Shenzhen CP Device Technology Co., Ltd.**
Address	:	5F, Building 15. 5F Building 16, Zhiheng Industrial Park, No.15 Guankou 2nd Road, Anle Community,Nantou Street, Nanshan District, Shenzhen, Guangdong, 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.

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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	:	Dec. 29, 2025
Testing commenced on	:	Dec. 29, 2025
Testing concluded on	:	Feb. 02, 2026

2.2. Product Description

Product Name:	Vehicle Mount Computer
Model/Typereference:	LC:TWO MAX
Power supply:	Input: DC 7-36V, 1600mA, Max 20W
Hardware version:	CP022-MAIN-V1.3
Software version:	android11/debian11
testing sample ID：	CTA251229017-1# (Engineer sample) CTA251229017-2# (Normal sample)
WIFI	
WLAN	Supported 802.11 a/n/ac
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) IEEE 802.11ac20/40/80: OFDM(64QAM, 16QAM, QPSK, BPSK)
Operation frequency	IEEE 802.11a:5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11n HT20: 5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11n HT40: 5190-5230MHz,5270-5310MHz,5510-5670MHz,5755-5795MHz IEEE 802.11ac20: 5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11ac40: 5190-5230MHz,5270-5310MHz,5510-5670MHz,5755-5795MHz IEEE 802.11ac80:5210MHz,5290MHz,5530MHz, 5610MHz, 5775MHz
Channel number	4 Channels for 20MHz bandwidth(5180-5240MHz) 4 Channels for 20MHz bandwidth(5260-5320MHz) 11 Channels for 20MHz bandwidth(5500-5700MHz) 5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5190~5230MHz) 2 channels for 40MHz bandwidth(5270~5310MHz) 5 Channels for 40MHz bandwidth(5510-5670MHz) 2 channels for 40MHz bandwidth(5755~5795MHz) 1 channels for 80MHz bandwidth(5210MHz) 1 channels for 80MHz bandwidth(5290MHz) 2 Channels for 80MHz bandwidth(5530MHz, 5610MHz) 1 channels for 80MHz bandwidth(5775MHz)
Antenna type:	PIFA Antenna
Antenna gain:	1.81dBi(Max.)
Internal EUT markings ofthe customer:	10000003

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 Vehicle Mount Computer.

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

Test Software Version	Tools software(ADB command)		
Frequency	5180 MHz	5220 MHz	5240 MHz
802.11a	13	13	13
802.11n20	13	13	13
802.11ac20	13	13	13
Frequency	5190 MHz	/	5230 MHz
802.11n40	13	/	13
802.11ac40	13	/	13
Frequency	/	5210 MHz	/
802.11ac80	/	13	/

Test Software Version	Tools software(ADB command)		
Frequency	5260 MHz	5300 MHz	5320 MHz
802.11a	13	13	13
802.11n20	13	13	13
802.11ac20	13	13	13
Frequency	5270 MHz	/	5310 MHz
802.11n40	13	/	13
802.11ac40	13	/	13
Frequency	/	5290 MHz	/
802.11ac80	/	13	/

Test Software Version	Tools software(ADB command)		
Frequency	5500 MHz	5580 MHz	5700 MHz
802.11a	13	13	13
802.11n20	13	13	13
802.11ac20	13	13	13
Frequency	5510 MHz	5550 MHz	5670 MHz
802.11n40	13	/	13
802.11ac40	13	/	13
Frequency	/	5530 MHz	/
802.11ac80	/	13	/

Test Software Version	Tools software(ADB command)		
Frequency	5745 MHz	5785 MHz	5825 MHz
802.11a	13	13	13
802.11n20	13	13	13
802.11ac20	13	13	13
Frequency	5755 MHz	/	5795 MHz
802.11n40	13	/	13
802.11ac40	13	/	13
Frequency	/	5775 MHz	/
802.11ac80	/	13	/

2.5. EUT operation mode

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

IEEE 802.11a/ac20/ac40/ac80/n20/n40:

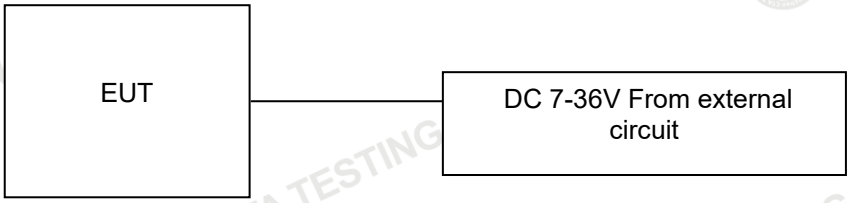
U-NI-1		U-NI-1		U-NI-1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

U-NI-2A		U-NI-2A		U-NI-2A	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270	58	5290
56	5280	62	5310		
60	5300				
64	5320				

U-NI-2C		U-NI-2C		U-NI-2C	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510	106	5530
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		U-NI-3	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	**5745**	151	5755	155	5775
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:

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	N/A
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)

(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

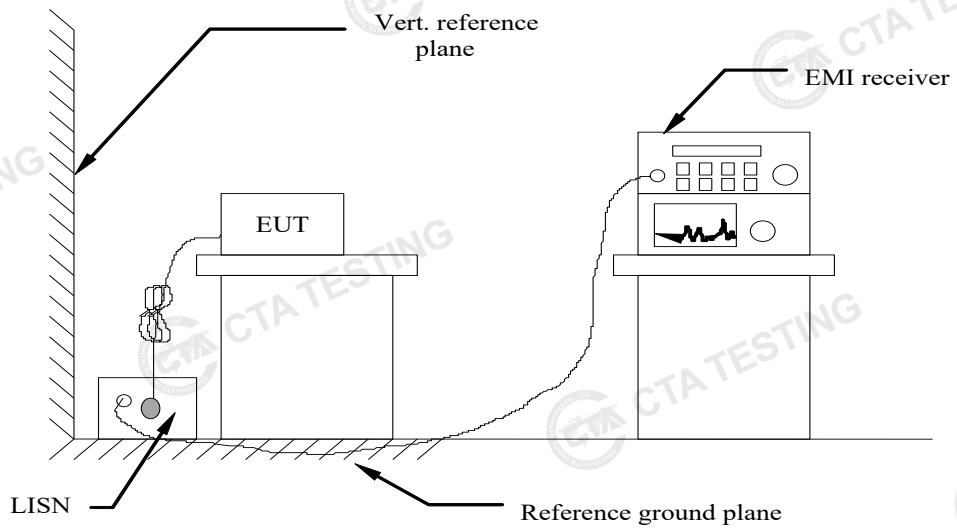
Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	CTA-308	2025/08/04	2026/08/03
LISN	R&S	ENV216	CTA-314	2025/07/30	2026/07/29
EMI Test Receiver	R&S	ESPI	CTA-307	2025/07/30	2026/07/29
EMI Test Receiver	R&S	ESCI	CTA-306	2025/07/30	2026/07/29
Spectrum Analyzer	Agilent	N9020A	CTA-342	2025/07/30	2026/07/29
Vector Signal generator	Agilent	N5182A	CTA-305	2025/07/30	2026/07/29
Analog Signal Generator	R&S	E4421B	CTA-304	2025/07/30	2026/07/29
WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW500	CTA-302	2025/07/30	2026/07/29
Temperature and humidity meter	Chigo	ZG-7020	CTA-326	2025/07/31	2026/07/30
Ultra-Broadband Antenna	Schwarzbeck	VULB9163	CTA-310	2023/10/17	2026/10/16
Horn Antenna	Schwarzbeck	BBHA 9120D	CTA-309	2023/10/13	2026/10/12
Loop Antenna	Zhinan	ZN30900C	CTA-311	2023/10/17	2026/10/16
Horn Antenna	Schwarzbeck	BBHA 9170	CTA-346	2025/05/18	2028/05/17
Amplifier	Schwarzbeck	BBV9745	CTA-312	2025/07/30	2026/07/29
Amplifier	Tonscend	TAP-011840	CTA-313	2025/07/30	2026/07/29
High-Pass Filter	XingBo	XBLBQ-GTA18	CTA-402	2025/07/30	2026/07/29
High-Pass Filter	XingBo	XBLBQ-GTA27	CTA-403	2025/07/30	2026/07/29
Automatic control unit	Tonscend	JS0806-2	CTA-351	2025/07/30	2026/07/29
Amplifier	SKET	LNPA 1840G-50	CTA-345	2025/05/17	2026/05/16
Spectrum analyzer	R&S	FSV40-N	CTA-344	2025/05/17	2026/05/16
Attenuator	XINQY	10dB	N/A	N/A	N/A
Programmable Constant Temperature And Humidity Test Chamber	DONGGUAN JINGYU	HT-H-408	CTA-053	2025/07/30	2026/07/29
EMI Test Software	Tonscend	TS®JS32-RE	5.0.0.2	N/A	N/A
EMI Test Software	Tonscend	TS®JS32-CE	5.0.0.1	N/A	N/A
RF Test Software	Tonscend	TS®JS1120-3	3.1.65	N/A	N/A
RF Test Software	Tonscend	TS®JS1120	3.1.46	N/A	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 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

The EUT is an in-vehicle device, so this test item is not applicable for the EUT.

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)

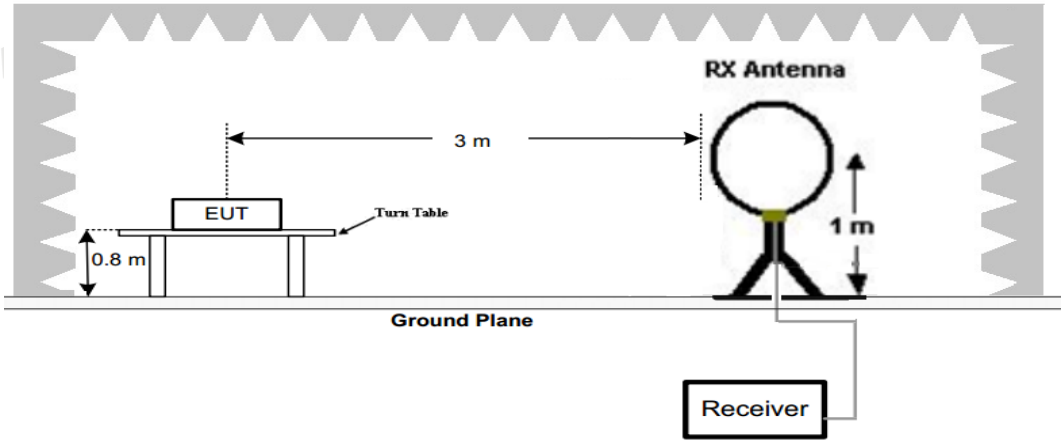
(5) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209
(6)In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

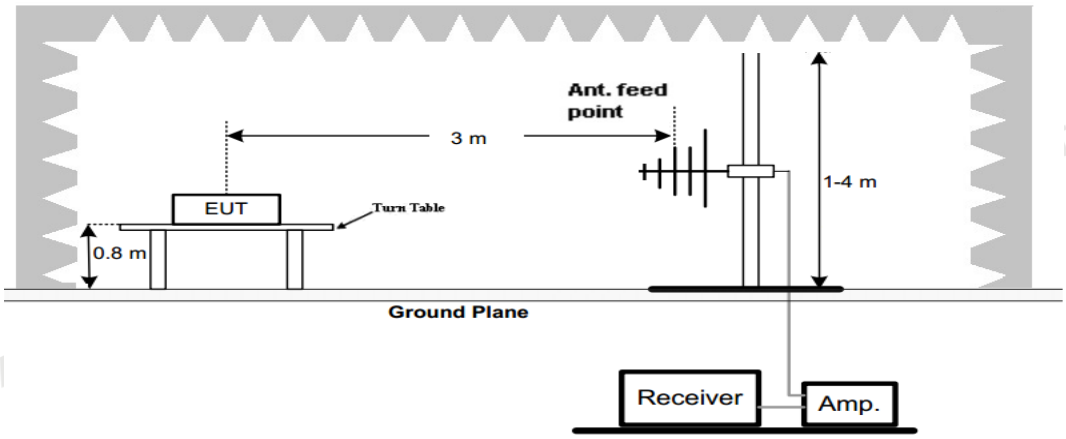
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

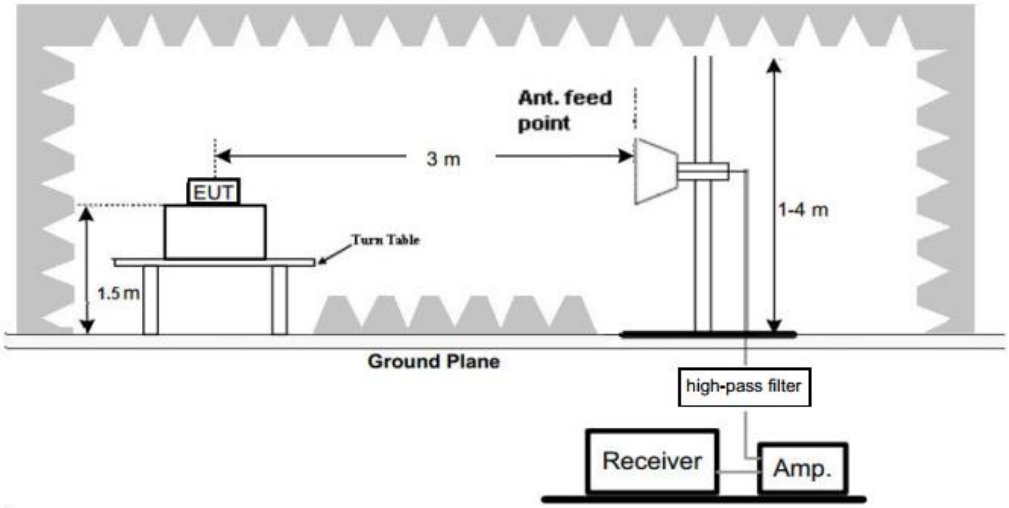
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz

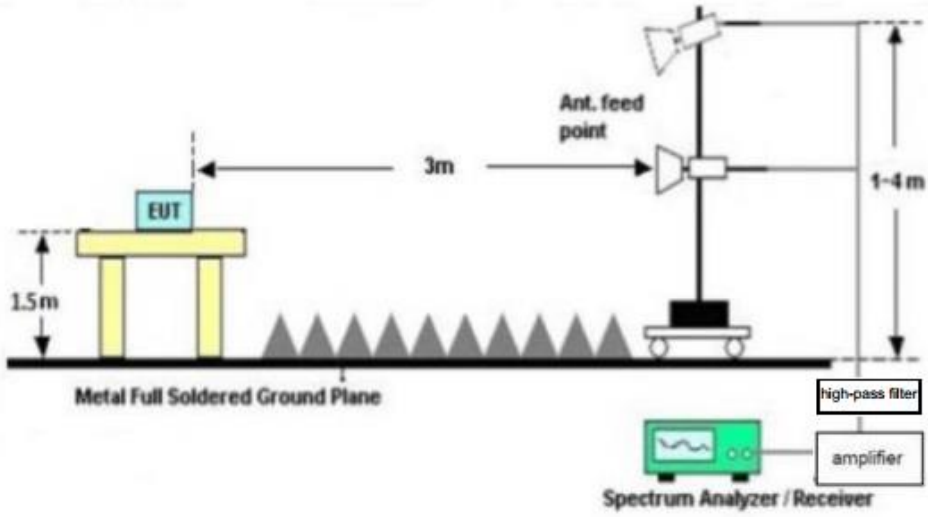


(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(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	1

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

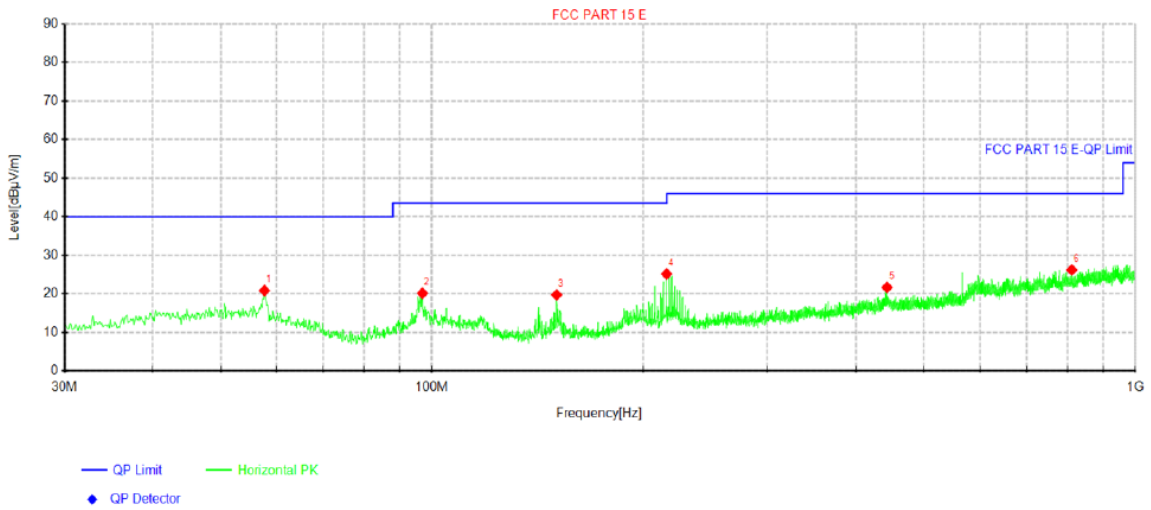
Remark:

1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
1. All 802.11a / 802.11n/ac (HT20) /802.11n/ac (HT40)/ 802.11ac (HT80) modes have been tested for above 1GHz test, for below 1GHz test, only the worst case 802.11a low channel of U-NII 1 band was recorded.
2. All 802.11a / 802.11n/ac (HT20) /802.11n/ac (HT40)/ 802.11ac (HT80) modes have been tested for above 1GHz test, for above 1GHz test, only the worst case 802.11a was recorded.
3. 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.
4. 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

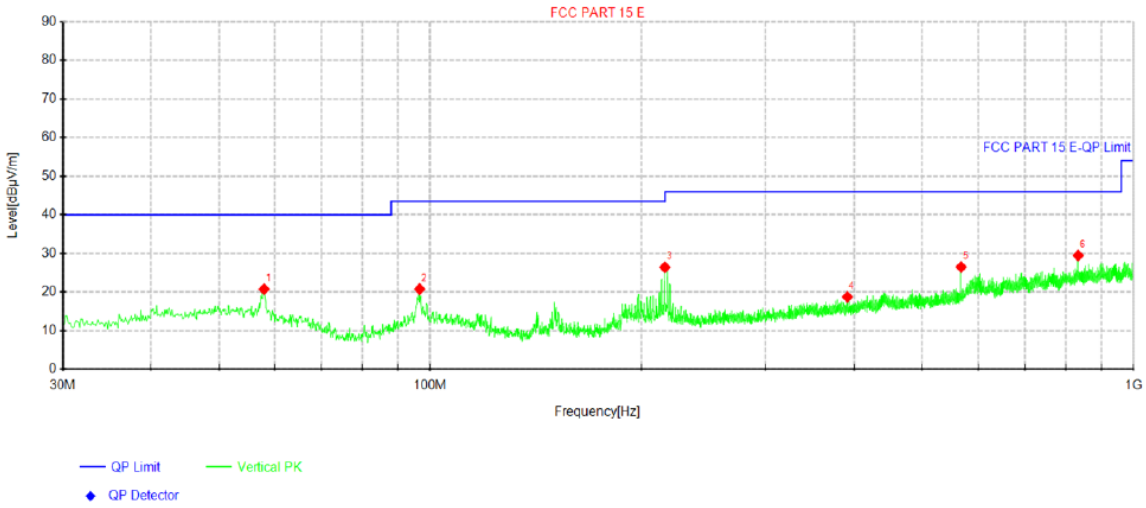


Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	57.7662	32.40	20.86	-11.54	40.00	19.14	Horizonta
2	96.93	33.30	20.18	-13.12	43.50	23.32	Horizonta
3	150.522	36.28	19.75	-16.53	43.50	23.75	Horizonta
4	215.876	38.86	25.17	-13.69	43.50	18.33	Horizonta
5	442.977	31.12	21.69	-9.43	46.00	24.31	Horizonta
6	811.698	29.15	26.20	-2.95	46.00	19.80	Horizonta

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

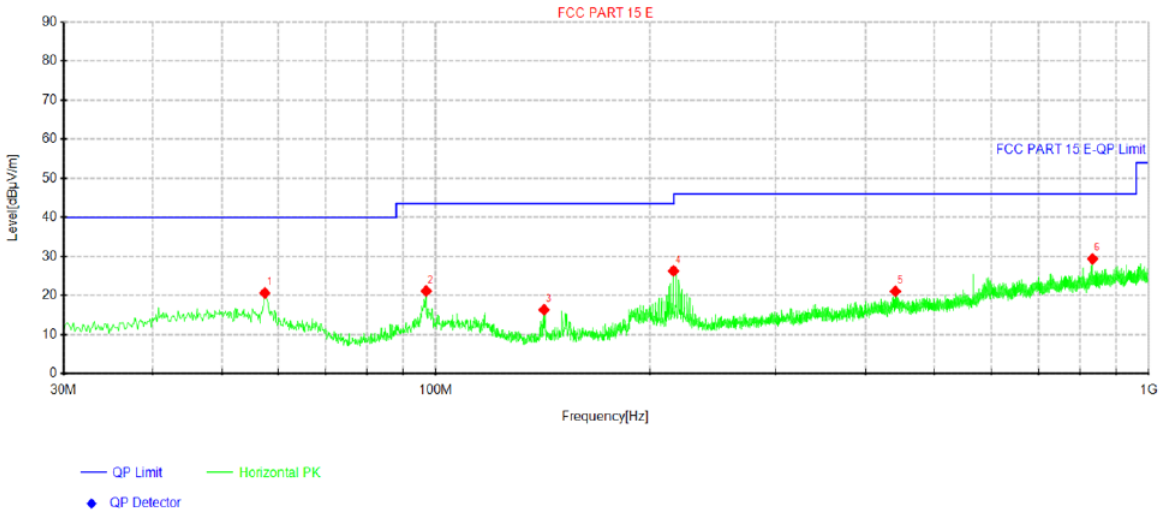
NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	58.0088	32.33	20.74	-11.59	40.00	19.26	Vertical
2	96.5662	33.96	20.76	-13.20	43.50	22.74	Vertical
3	215.876	40.10	26.41	-13.69	43.50	17.09	Vertical
4	391.203	28.92	18.76	-10.16	46.00	27.24	Vertical
5	567.986	34.24	26.49	-7.75	46.00	19.51	Vertical
6	833.523	32.24	29.47	-2.77	46.00	16.53	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

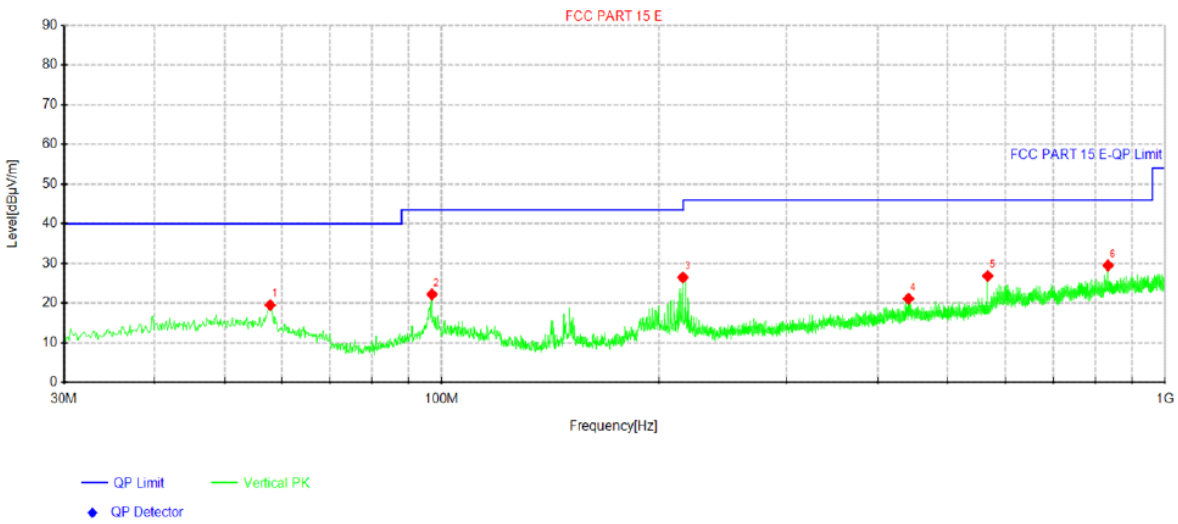


Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	57.5238	32.15	20.66	-11.49	40.00	19.34	Horizonta
2	96.93	34.29	21.17	-13.12	43.50	22.33	Horizonta
3	141.913	33.40	16.36	-17.04	43.50	27.14	Horizonta
4	215.755	40.01	26.31	-13.70	43.50	17.19	Horizonta
5	440.673	30.53	21.07	-9.46	46.00	24.93	Horizonta
6	833.645	32.18	29.41	-2.77	46.00	16.59	Horizonta

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

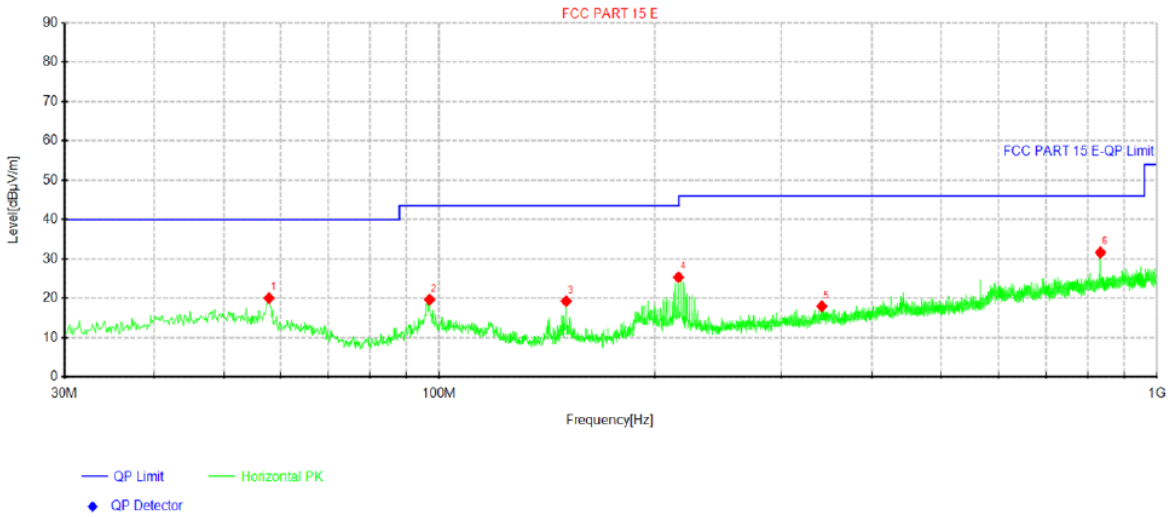
NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	57.8875	31.09	19.52	-11.57	40.00	20.48	Vertical
2	96.93	35.33	22.21	-13.12	43.50	21.29	Vertical
3	215.755	40.17	26.47	-13.70	43.50	17.03	Vertical
4	441.28	30.57	21.12	-9.45	46.00	24.88	Vertical
5	567.986	34.60	26.85	-7.75	46.00	19.15	Vertical
6	833.523	32.28	29.51	-2.77	46.00	16.49	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

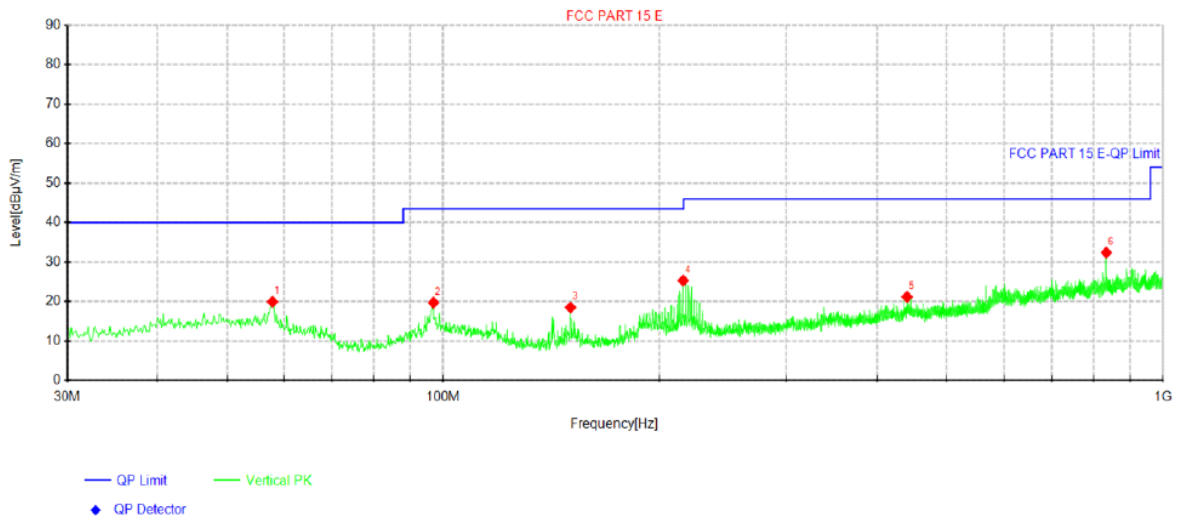
Horizontal



Suspected Data List							
NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Polarity
1	57.8875	31.63	20.06	-11.57	40.00	19.94	Horizonta
2	96.93	32.81	19.69	-13.12	43.50	23.81	Horizonta
3	150.401	35.81	19.29	-16.52	43.50	24.21	Horizonta
4	215.755	39.06	25.36	-13.70	43.50	18.14	Horizonta
5	341.855	28.87	17.98	-10.89	46.00	28.02	Horizonta
6	833.645	34.40	31.63	-2.77	46.00	14.37	Horizonta

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

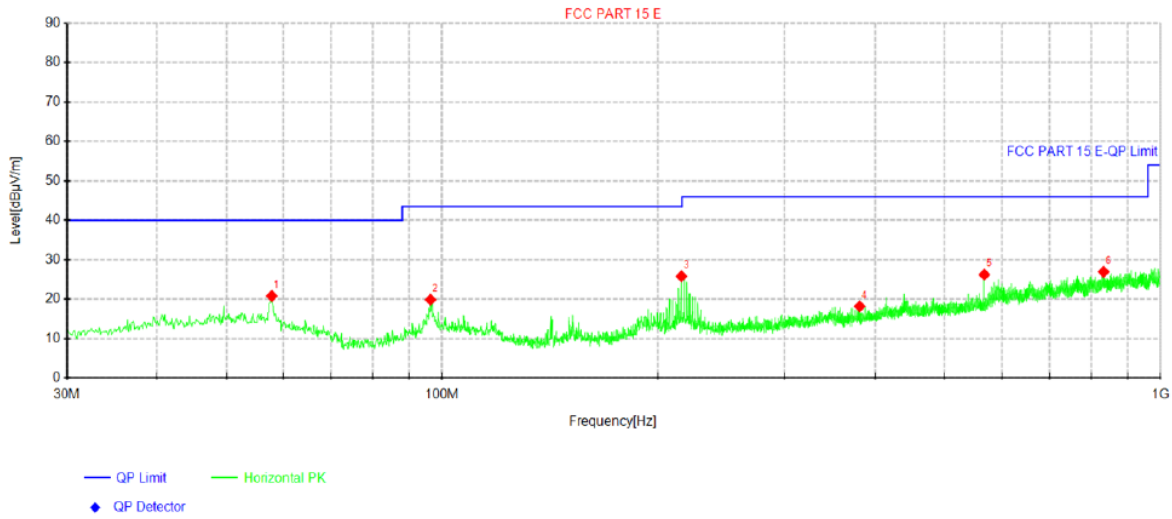
NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	57.8875	31.51	19.94	-11.57	40.00	20.06	Vertical
2	96.93	32.84	19.72	-13.12	43.50	23.78	Vertical
3	150.401	35.03	18.51	-16.52	43.50	24.99	Vertical
4	215.755	39.02	25.32	-13.70	43.50	18.18	Vertical
5	440.431	30.64	21.18	-9.46	46.00	24.82	Vertical
6	833.645	35.19	32.42	-2.77	46.00	13.58	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

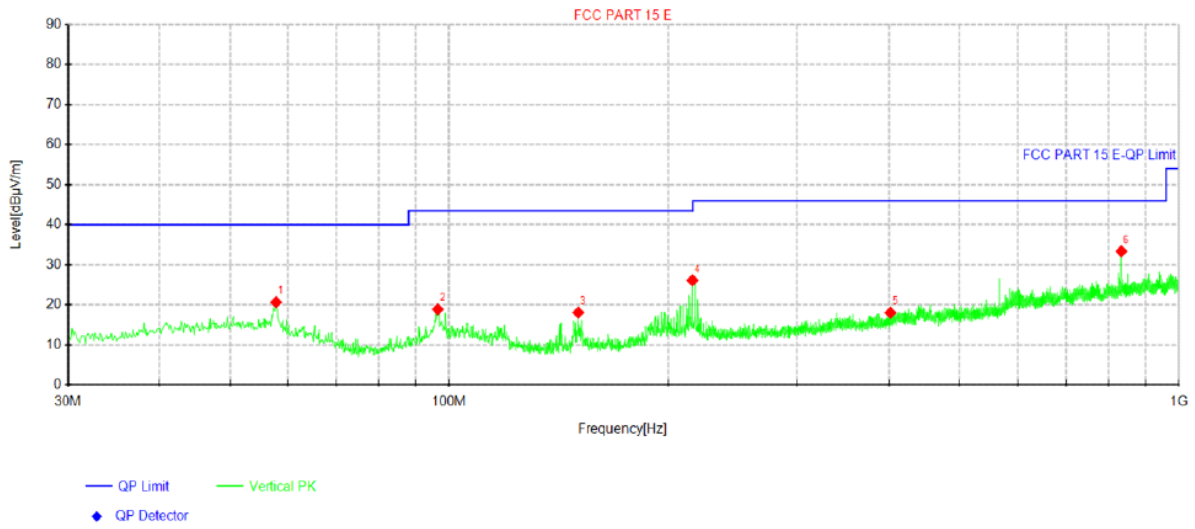


Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	57.8875	32.37	20.80	-11.57	40.00	19.20	Horizonta
2	96.3238	33.11	19.87	-13.24	43.50	23.63	Horizonta
3	215.633	39.51	25.80	-13.71	43.50	17.70	Horizonta
4	380.655	28.88	18.19	-10.69	46.00	27.81	Horizonta
5	567.986	33.97	26.22	-7.75	46.00	19.78	Horizonta
6	832.675	29.74	26.93	-2.81	46.00	19.07	Horizonta

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]	Polarity
1	57.8875	32.23	20.66	-11.57	40.00	19.34	Vertical
2	96.445	32.11	18.90	-13.21	43.50	24.60	Vertical
3	150.401	34.61	18.09	-16.52	43.50	25.41	Vertical
4	215.755	39.82	26.12	-13.70	43.50	17.38	Vertical
5	401.873	28.01	18.04	-9.97	46.00	27.96	Vertical
6	833.523	36.15	33.38	-2.77	46.00	12.62	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

For 1GHz to 40GHz

Note: All modes of 802.11a/n/11ac have been tested for above 1GHz test, only the worst case 802.11a was recorded.

5150-5250MHz:

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	10360.0	43.48	PK	H	68.3	24.82	49.18	38.90	8.19	52.79	-5.70
(5180MHz)	10360.0	32.97	AV	H	54.0	21.03	38.67	38.90	8.19	52.79	-5.70
44.00	10440.0	42.75	PK	H	68.3	25.55	48.44	38.94	8.22	52.85	-5.69
(5220MHz)	10440.0	32.70	AV	H	54.0	21.30	38.39	38.94	8.22	52.85	-5.69
48.00	10480.0	43.03	PK	H	68.3	25.27	48.69	38.98	8.24	52.88	-5.66
(5240MHz)	10480.0	33.06	AV	H	54.0	20.94	38.72	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	42.65	PK	V	68.3	25.65	48.35	38.90	8.19	52.79	-5.70
(5180MHz)	10360.0	32.94	AV	V	54.0	21.06	38.64	38.90	8.19	52.79	-5.70
44.00	10440.0	42.94	PK	V	68.3	25.36	48.63	38.94	8.22	52.85	-5.69
(5220MHz)	10440.0	32.94	AV	V	54.0	21.06	38.63	38.94	8.22	52.85	-5.69
48.00	10480.0	43.28	PK	V	68.3	25.02	48.94	38.98	8.24	52.88	-5.66
(5240MHz)	10480.0	32.93	AV	V	54.0	21.07	38.59	38.98	8.24	52.88	-5.66

5260-5320MHz:

U-NII-2A & 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)
52.00	10520.0	43.51	PK	H	68.3	24.79	49.15	39.02	8.26	52.92	-5.64
(5260MHz)	10520.0	33.61	AV	H	54.0	20.39	39.25	39.02	8.26	52.92	-5.64
60.00	10600.0	44.57	PK	H	68.3	23.73	50.16	39.10	8.29	52.98	-5.59
(5300MHz)	10600.0	34.19	AV	H	54.0	19.81	39.78	39.10	8.29	52.98	-5.59
64.00	10640.0	44.02	PK	H	68.3	24.28	49.54	39.18	8.31	53.01	-5.52
(5320MHz)	10640.0	33.53	AV	H	54.0	20.47	39.05	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)
36.00	10520.0	44.22	PK	V	68.3	24.08	49.86	39.02	8.26	52.92	-5.64
(5260MHz)	10520.0	33.74	AV	V	54.0	20.26	39.38	39.02	8.26	52.92	-5.64
60.00	10600.0	44.46	PK	V	68.3	23.84	50.05	39.10	8.29	52.98	-5.59
(5220MHz)	10600.0	34.07	AV	V	54.0	19.93	39.66	39.10	8.29	52.98	-5.59
64.00	10640.0	44.07	PK	V	68.3	24.23	49.59	39.18	8.31	53.01	-5.52
(5320MHz)	10640.0	34.59	AV	V	54.0	19.41	40.11	39.18	8.31	53.01	-5.52

5500-5700MHz:

U-NII-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	11000.0	41.46	PK	H	68.3	26.84	47.09	39.20	8.47	53.30	-5.63
5500MHz	11000.0	33.38	AV	H	54.0	20.62	39.01	39.20	8.47	53.30	-5.63
120.00	11160.0	42.43	PK	H	68.3	25.87	48.08	39.14	8.54	53.33	-5.65
5580MHz	11160.0	33.00	AV	H	54.0	21.00	38.65	39.14	8.54	53.33	-5.65
140.00	11400.0	42.50	PK	H	68.3	25.80	47.73	39.50	8.65	53.38	-5.23
5700MHz	11400.0	33.04	AV	H	54.0	20.96	38.27	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	11000.0	41.83	PK	V	68.3	26.47	47.46	39.20	8.47	53.30	-5.63
5500MHz	11000.0	32.88	AV	V	54.0	21.12	38.51	39.20	8.47	53.30	-5.63
120.00	11160.0	42.34	PK	V	68.3	25.96	47.99	39.14	8.54	53.33	-5.65
5580MHz	11160.0	32.55	AV	V	54.0	21.45	38.20	39.14	8.54	53.33	-5.65
140.00	11400.0	42.77	PK	V	68.3	25.53	48.00	39.50	8.65	53.38	-5.23
5700MHz	11400.0	32.96	AV	V	54.0	21.04	38.19	39.50	8.65	53.38	-5.23

5725-5850MHz:

U-NII 3 & 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)
149.00	11490.0	41.58	PK	H	68.3	26.72	46.88	39.41	8.69	53.40	-5.30
(5745MHz)	11490.0	31.80	AV	H	54.0	22.20	37.10	39.41	8.69	53.40	-5.30
157.00	11570.0	40.97	PK	H	68.3	27.33	46.33	39.33	8.72	53.41	-5.36
(5785MHz)	11570.0	30.79	AV	H	54.0	23.21	36.15	39.33	8.72	53.41	-5.36
165.00	11650.0	40.78	PK	H	68.3	27.52	46.20	39.25	8.76	53.43	-5.42
(5825MHz)	11650.0	31.49	AV	H	54.0	22.51	36.91	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	41.11	PK	V	68.3	27.19	46.41	39.41	8.69	53.40	-5.30
(5745MHz)	11490.0	31.71	AV	V	54.0	22.29	37.01	39.41	8.69	53.40	-5.30
157.00	11570.0	41.14	PK	V	68.3	27.16	46.50	39.33	8.72	53.41	-5.36
(5785MHz)	11570.0	31.62	AV	V	54.0	22.38	36.98	39.33	8.72	53.41	-5.36
165.00	11650.0	40.73	PK	V	68.3	27.57	46.15	39.25	8.76	53.43	-5.42
(5825MHz)	11650.0	31.02	AV	V	54.0	22.98	36.44	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. -- Mean the other emission levels were very low against the limit.
5. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.
6. Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40, IEEE 802.11ac VHT20 ,IEEE 802.11ac VHT40 and IEEE 802.11ac VHT80;

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 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.

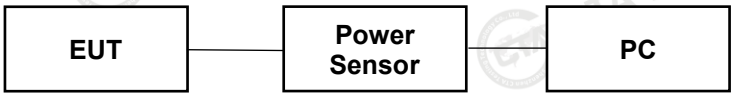
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

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 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 5.2GWIFI
FCC Appendix RF Test Data for 5.3GWIFI
FCC Appendix RF Test Data for 5.5GWIFI
FCC Appendix RF Test Data for 5.8GWIFI
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.

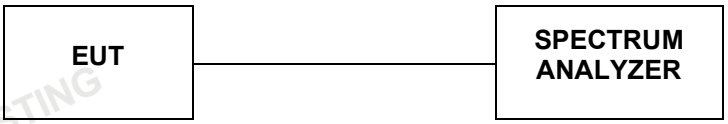
Note2: Fixed point - to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional 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 ≥ 3× 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 5.2GWIFI
FCC Appendix RF Test Data for 5.3GWIFI
FCC Appendix RF Test Data for 5.5GWIFI
FCC Appendix RF Test Data for 5.8GWIFI

Total Power Spectral Density (dBm/MHz)= Power Spectral Density (dBm/MHz)+ Duty Factor (dB)
Remark: P.S.D(dBm/500KHz)= P.S.D(dBm/500KHz)+10 log (500 kHz/510KHz).

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:
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.

Test Configuration

TEST RESULTS

FCC Appendix RF Test Data for 5.8GWIFI

4.6. 26dB Bandwidth

Limit

No Limits for 26dBc Bandwith

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%.

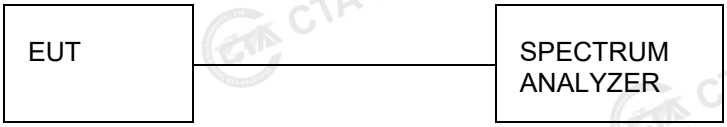
Test Configuration

TEST RESULTS

FCC Appendix RF Test Data for 5.2GWIFI
FCC Appendix RF Test Data for 5.3GWIFI
FCC Appendix RF Test Data for 5.5GWIFI

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 5.2GWIFI
FCC Appendix RF Test Data for 5.3GWIFI
FCC Appendix RF Test Data for 5.5GWIFI
FCC Appendix RF Test Data for 5.8GWIFI

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 PIFA Antenna maximum gain of antenna was 1.81dBi(Max.).

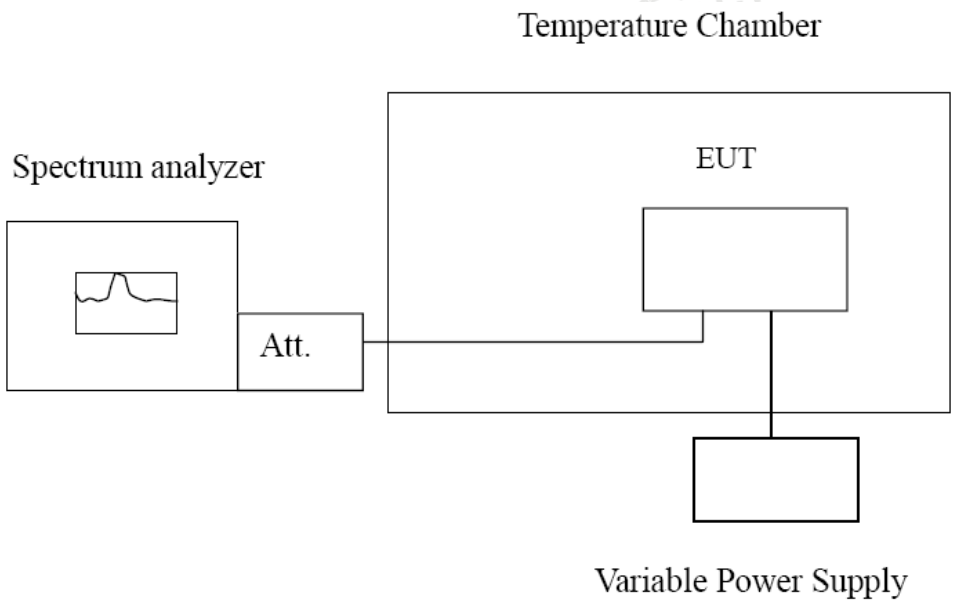
Remark:The antenna gain is provided by the customer , if the data provided by the customer is not accurate, Shenzhen CTA Testing Technology Co., Ltd. does not assume any responsibility.

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℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability under Voltage Variations:
Set chamber temperature to 20℃. 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 (±15%) and endpoint, record the maximum frequency change.

TEST RESULTS

Pass

FCC Appendix RF Test Data for 5.2GWIFI
FCC Appendix RF Test Data for 5.3GWIFI
FCC Appendix RF Test Data for 5.5GWIFI
FCC Appendix RF Test Data for 5.8GWIFI

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=1/T for Peak detector, Max Hold=Peak,
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).

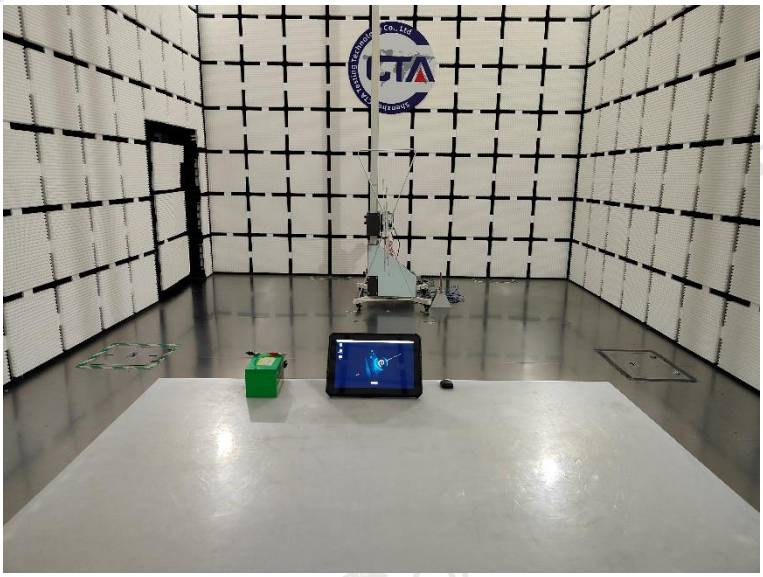
10). Compare the resultant electric field strength level to the applicable regulatory limit.
11). Perform radiated spurious emission test duress until all measured frequencies were complete.

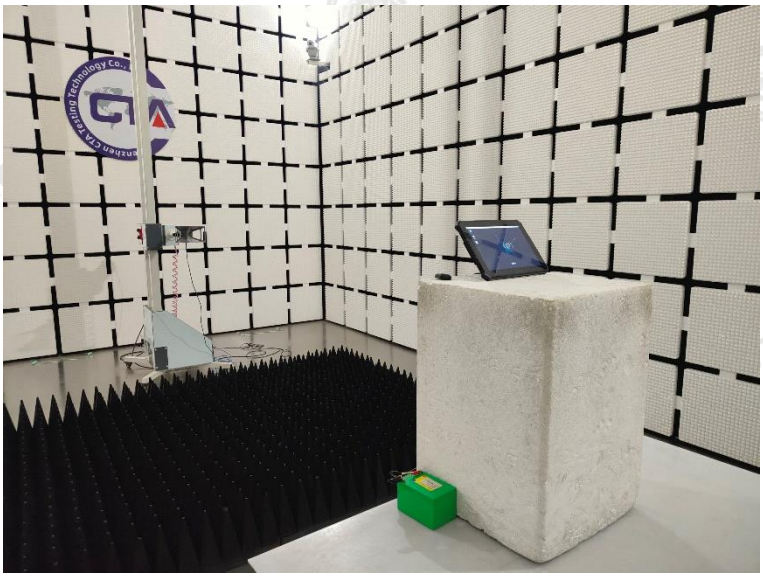
Test Results

FCC Appendix RF Test Data for 5.2GWIFI
FCC Appendix RF Test Data for 5.3GWIFI
FCC Appendix RF Test Data for 5.5GWIFI
FCC Appendix RF Test Data for 5.8GWIFI

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=1/T/Sweep time=Auto/Detector=Peak, Max Hold= Peak.
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. **CTA25122901701**

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