Shenzhen CTL Testing Technology Co., Ltd.
Tel: +86-755-89486194 E-mail: ctl@ctl-lab.com

TEST REPORT

FCC PART 15 SUBPART E 15.407

Report Reference No. ..... : **CTL2207112041-WF02**

Compiled by: (position+printed name+signature)	Happy Guo (File administrators)	Happy Guo
Tested by: (position+printed name+signature)	Gary Gao (Test Engineer)	Gary Gao
Approved by: (position+printed name+signature)	Ivan Xie (Manager)	Ivan Xie

Product Name ..... :	Wireless Car Play adapter
Model/Type reference ..... :	U2-AIR
List Model(s)..... :	See next page
Trade Mark..... :	N/A
FCC ID..... :	**2A7ZS-U2-AIR**
Applicant's name ..... :	**Shenzhen Ottocast Technology Co.,Ltd**
Address of applicant ..... :	201, Building 13th, Software Town of Shenzhen Universiade, 8288 Longgang Avenue, Heao Community, Yuanshan Street, Longgang District, Shenzhen, China
Test Firm..... :	**Shenzhen CTL Testing Technology Co., Ltd.**
Address of Test Firm ..... :	Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055
Test specification..... :	
Standard ..... :	**47 CFR FCC Part 15 Subpart E 15.407**
TRF Originator ..... :	Shenzhen CTL Testing Technology Co., Ltd.
Master TRF..... :	Dated 2011-01
Date of receipt of test item ..... :	July 11, 2022
Date of sampling..... :	July 11, 2022
Date of Test Date..... :	July 12, 2022- July 24, 2022
Date of Issue ..... :	July 25, 2022
Result..... :	**Pass**

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TEST REPORT

Test Report No. :	CTL2207112041-WF02	July 25, 2022 Date of issue

Equipment under Test	:	Wireless Car Play adapter
Sample No.		CTL220711204-1-S001(Normal sample) CTL220711204-1-S002(Engineer sample)
Model /Type	:	U2-AIR
Listed Models	:	PLC-S21, U2-PLUS, PLC-S31, PLC-S32, U2-GT, CP-76, CP-81, U2-NOW, CPA-300, U2-X, CA360, PCS17, PCS40, PCS41, PCS45, PCS46, PCS50, CP79, CP82, CA400, CA450, CA480, PCS25, PCS35
Applicant	:	**Shenzhen Ottocast Technology Co.,Ltd**
Address	:	201, Building 13th, Software Town of Shenzhen Universiade, 8288 Longgang Avenue, Heao Community, Yuanshan Street, Longgang District, Shenzhen, China
Manufacturer	:	**ShenZhen Bijiasuo Electronic Co.,Ltd**
Address	:	105,Building 13th, Software Town of Shenzhen Universiade, 8288 Longgang Avenue, Heao Community, Yuanshan Street, Longgang District, Shenzhen, China

Test result	Pass *

＊ In the configuration tested, the EUT complied with the standards specified page 5.

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

** Modified History **

Revisions	Description	Issued Data	Report No.	Remark
Version 1.0	Initial Test Report Release	2022-07-25	CTL2207112041-WF02	Tracy Qi

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1. SUMMARY

1.1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15 Subpart E—Unlicensed National Information Infrastructure Devices

ANSI C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

KDB789033 D02: General UNII Test Procedures New Rules v02r01

1.2. Test Description

FCC Requirement		
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.407(a)	Emission Bandwidth(26dBm Bandwidth)	PASS$_{Note1}$
FCC Part 15.407(e)	Minimum Emission Bandwidth(6dBm Bandwidth)	PASS$_{Note2}$
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	N/A$_{Note3}$
FCC Part 15.203	Antenna requirement	PASS

Note 1: Apply to U-NII 1, U-NII 2A, and U-NII 2C band.
Note 2: Apply to U-NII 3 band only.
Note 3: N/A means not applicable in this report.
.

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.
Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China

There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.10 and CISPR 32/EN 55032 requirements.

1.3.2 Laboratory accreditation

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

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd, EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9618B CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9618B on Jan. 22, 2019.

FCC-Registration No.: 399832 Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832, December 08, 2017.

1.4. 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 CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL 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 CTL laboratory is reported:

Test	Measurement Uncertainty	Notes
Transmitter power conducted	±0.57 dB	(1)
Transmitter power Radiated	±2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	±2.20 dB	(1)
Occupied Bandwidth	±0.01ppm	(1)
Radiated Emission 30~1000MHz	±4.10dB	(1)
Radiated Emission Above 1GHz	±4.32dB	(1)

Conducted Disturbance0.15~30MHz	±3.20dB	(1)

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

2. GENERAL INFORMATION

2.1. Environmental conditions

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

Normal Temperature:	25°C
Relative Humidity:	55 %
Air Pressure:	101 kPa

2.2. General Description of EUT

Product Name:	Wireless Car Play adapter			
Model/Type reference:	U2-AIR			
Power supply:	DC 5V from external circuit			
Hardware version:	CP-76-V2.0			
Software version:	V1.0			
WIFI				
Supported type:	20MHz system	40MHz system	80MHz system	160MHz system
	802.11a 802.11n 802.11ac	802.11n 802.11ac	802.11ac	N/A
Operation frequency:	5180-5240MHz 5745-5825MHz	5190MHz, 5230MHz 5755MHz, 5795MHz	5210MHz, 5775MHz	N/A
Modulation:	OFDM	OFDM	OFDM	N/A
Channel number:	9	4	2	N/A
Channel separation:	20MHz	40MHz	80MHz	N/A
Antenna type:	FPC Antenna			
Antenna gain:	1.0dBi			

Note1: For more details, please refer to the user's manual of the EUT.

2.3. Description of Test Modes and Test Frequency

The Applicant provides communication tools software(CMD Command) to control the EUT for staying in continuous transmitting and receiving mode for testing.

All test performed at the low, middle and high of operational frequency range of each mode.

Operation Frequency List WIFI on 5G Band：

<table>
<tr><th rowspan="2">Operating band</th><th colspan="2">20MHz</th><th colspan="2">40MHz</th><th colspan="2">80MHz</th></tr>
<tr><th>Channel</th><th>Frequency (MHz)</th><th>Channel</th><th>Frequency (MHz)</th><th>Channel</th><th>Frequency (MHz)</th></tr>
<tr><td rowspan="4">U-NII 1
(5150MHz-5250MHz)</td><td>36</td><td>5180</td><td rowspan="2">38</td><td rowspan="2">5190</td><td rowspan="4">42</td><td rowspan="4">5210</td></tr>
<tr><td>40</td><td>5200</td></tr>
<tr><td>44</td><td>5220</td><td rowspan="2">46</td><td rowspan="2">5230</td></tr>
<tr><td>48</td><td>5240</td></tr>
<tr><td rowspan="5">U-NII 3
(5725MHz-5850MHz)</td><td>149</td><td>5745</td><td rowspan="2">151</td><td rowspan="2">5755</td><td rowspan="4">155</td><td rowspan="4">5775</td></tr>
<tr><td>153</td><td>5765</td></tr>
<tr><td>157</td><td>5785</td><td rowspan="2">159</td><td rowspan="2">5795</td></tr>
<tr><td>161</td><td>5805</td></tr>
<tr><td>165</td><td>5825</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
</table>

Note:

1. “--“Means no channel(s) available any more.

Data Rate Used:

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.

Test Items	Mode	Data Rate
Maximum Conducted Output Power Power Spectral Density Emission Bandwidth(26dBm Bandwidth) Minimum Emission Bandwidth(6dBm Bandwidth) Undesirable emission Frequency Stability	11a/OFDM	6 Mbps
	11n(20MHz),11ac(20MHz)/OFDM	7.2 Mbps
	11n(40MHz),11ac(40MHz)/OFDM	15.0Mbps
	11ac(80MHz)/OFDM	32.5Mbps

Power setting during the test:

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters:

Test Software Version Frequency	CMD Command
UNII Band 1	50
UNII Band 3	55

2.4. Special Accessories

Follow auxiliary equipment(s) test with EUT that provided by the manufacturer or laboratory is listed as follow:

Description	Manufacturer	Model	Technical Parameters	Certificate	Provided by
Adapter	MASS POWER	E010-1D050200VUU	Input: 100-240V~, 50/60Hz, 0.3A Output: 5.0V⎓2A	UL	laboratory
/	/	/	/	/	/

2.5. Equipments Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	R&S	ESH2-Z5	860014/010	2022/05/07	2023/05/06
Double cone logarithmic antenna	Schwarzbeck	VULB 9168	824	2020/04/07	2023/04/06
Horn Antenna	Ocean Microwave	OBH100400	26999002	2019/11/28	2022/11/27
EMI Test Receiver	R&S	ESCI	1166.5950.03	2022/05/07	2023/05/06
Spectrum Analyzer	Agilent	E4407B	MY41440676	2022/05/07	2023/05/06
Spectrum Analyzer	Agilent	N9020A	US46220290	2022/05/07	2023/05/06
Spectrum Analyzer	Keysight	N9020A	MY53420874	2022/05/07	2023/05/06
Horn Antenna	Sunol Sciences Corp.	DRH-118	A062013	2021/12/23	2024/12/22
Active Loop Antenna	Da Ze	ZN30900A	/	2021/05/13	2024/05/12
Amplifier	Agilent	8449B	3008A02306	2022/05/07	2023/05/06
Amplifier	Agilent	8447D	2944A10176	2022/05/06	2023/05/05
Amplifier	Brief&Smart	LNA-4018	2104197	2022/05/07	2023/05/06
Temperature/Humidity Meter	Ji Yu	MC501	/	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55130004	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55130006	2022/05/07	2023/05/06

Power Sensor	Agilent	U2021XA	MY54510008	2022/05/07	2023/05/06
Power Sensor	Agilent	U2021XA	MY55060003	2022/05/07	2023/05/06
Spectrum Analyzer	RS	FSP	1164.4391.38	2022/05/07	2023/05/06
RF Cable	Megalon	RF-A303	N/A	2021/06/15	2022/06/14
RF Control Unit	Tonsecnd	JS0806-2	20J8060323	2022/05/07	2023/05/06

Test Software

Name of Software	Version
JS1120-3	2.6.880341
EZ_EMC(Below 1GHz)	V1.1.4.2
EZ_EMC((Above 1GHz)	V1.1.4.2

The calibration interval was one year

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

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

2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST CONDITIONS AND RESULTS

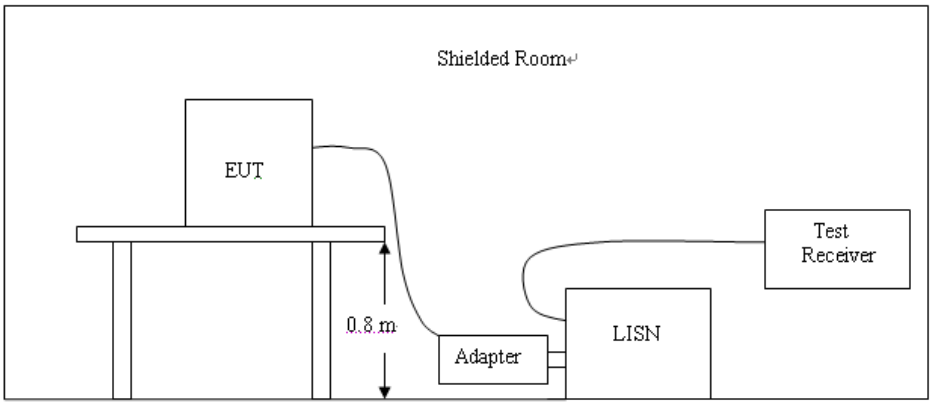
3.1. Conducted Emissions Test

LIMIT

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 CONFIGURATION



TEST PROCEDURE

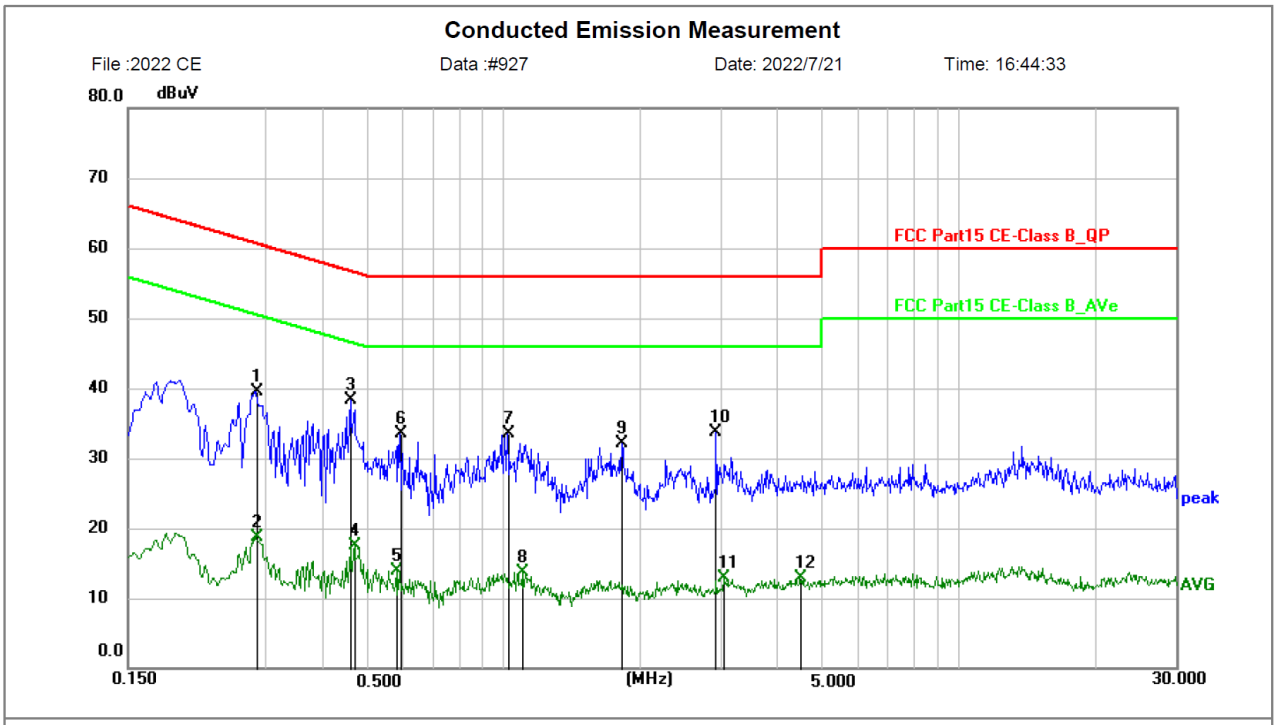
1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/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.

TEST RESULTS

Remark:

1. All Wi-Fi operation modes have been tested, only the worst case 802.11ac80 channel 155 was recorded.
2. 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:

Test Mode	WIFI	Line:	L



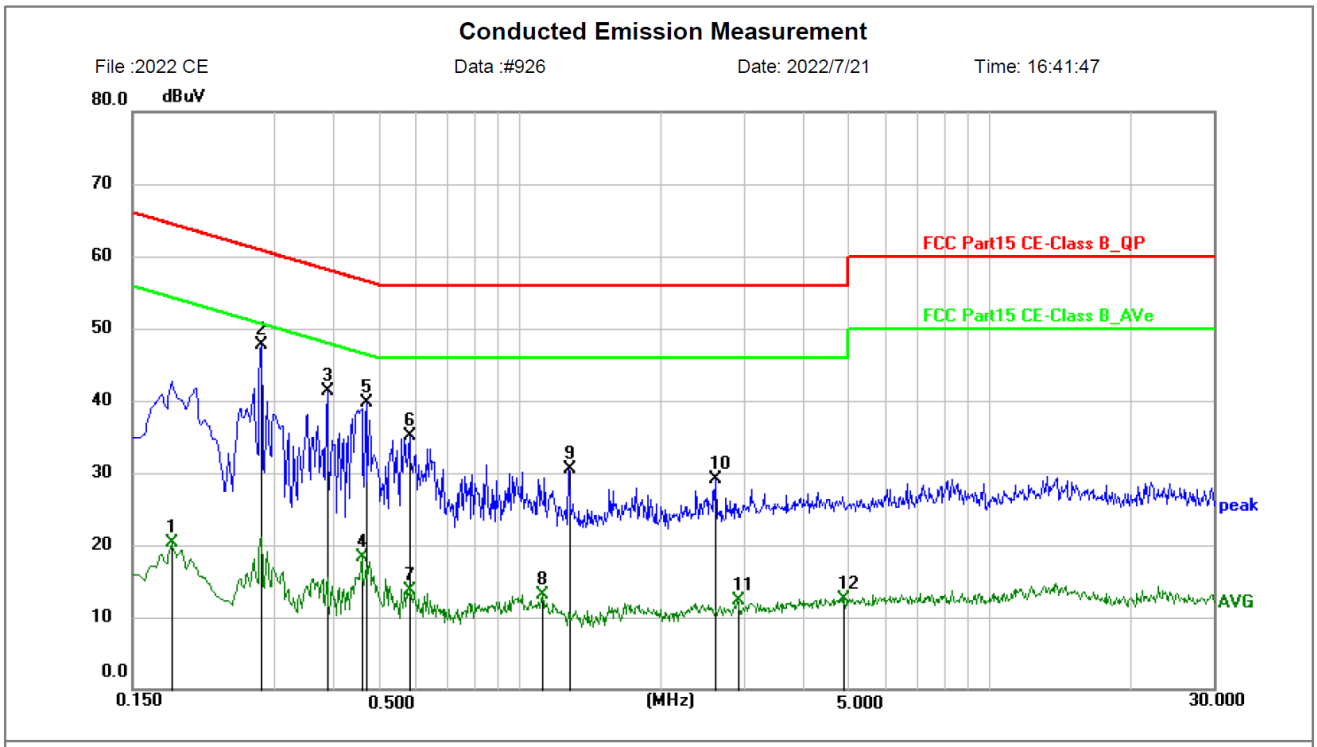
Site EMC 1#
Limit: FCC Part15 CE-Class B_QP
EUT: Wireless CarPlay adapter
M/N: U2-ARI
Mode: WORKING
Note: Shenzhen Ottocast Technology Co.,Ltd

Phase: *L1*
Power: AC120/60Hz

Temperature: 26(C)
Humidity: 54 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2850	29.50	10.04	39.54	60.67	21.13	peak	P	
2	0.2850	8.64	10.04	18.68	50.67	31.99	AVG	P	
3 *	0.4605	28.23	10.04	38.27	56.68	18.41	peak	P	
4	0.4695	7.53	10.04	17.57	46.52	28.95	AVG	P	
5	0.5820	3.79	10.05	13.84	46.00	32.16	AVG	P	
6	0.5910	23.41	10.05	33.46	56.00	22.54	peak	P	
7	1.0230	23.55	10.05	33.60	56.00	22.40	peak	P	
8	1.1040	3.73	10.06	13.79	46.00	32.21	AVG	P	
9	1.8240	22.02	10.07	32.09	56.00	23.91	peak	P	
10	2.9445	23.62	10.08	33.70	56.00	22.30	peak	P	
11	3.0480	2.80	10.09	12.89	46.00	33.11	AVG	P	
12	4.4970	2.73	10.10	12.83	46.00	33.17	AVG	P	

Test Mode	WIFI	Line:	N



Site EMC 1#
Limit: FCC Part15 CE-Class B_QP
EUT: Wireless CarPlay adapter
M/N: U2-ARI
Mode: WORKING
Note: Shenzhen Ottocast Technology Co.,Ltd

Phase: *N*
Power: AC120/60Hz

Temperature: 26(C)
Humidity: 54 %RH

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1815	10.31	10.05	20.36	54.42	34.06	AVG	P	
2 *	0.2805	37.64	10.05	47.69	60.80	13.11	peak	P	
3	0.3885	31.32	10.05	41.37	58.10	16.73	peak	P	
4	0.4605	8.19	10.05	18.24	46.68	28.44	AVG	P	
5	0.4695	29.68	10.05	39.73	56.52	16.79	peak	P	
6	0.5820	24.98	10.05	35.03	56.00	20.97	peak	P	
7	0.5865	3.67	10.05	13.72	46.00	32.28	AVG	P	
8	1.1174	3.10	10.06	13.16	46.00	32.84	AVG	P	
9	1.2705	20.48	10.07	30.55	56.00	25.45	peak	P	
10	2.6204	19.07	10.09	29.16	56.00	26.84	peak	P	
11	2.9130	2.13	10.09	12.22	46.00	33.78	AVG	P	
12	4.9245	2.45	10.12	12.57	46.00	33.43	AVG	P	

Remark: Level(dBuV)=Reading(dBuV) + Factor(dB)
Margin=Limit(dBuV/m)-Level(dBuV/m)

3.2. Radiated Emissions

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

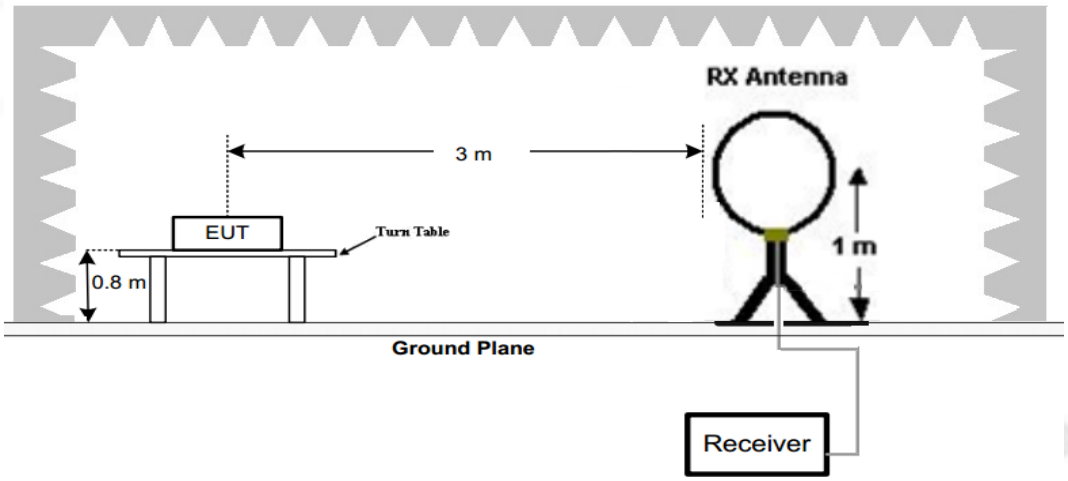
(6)In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

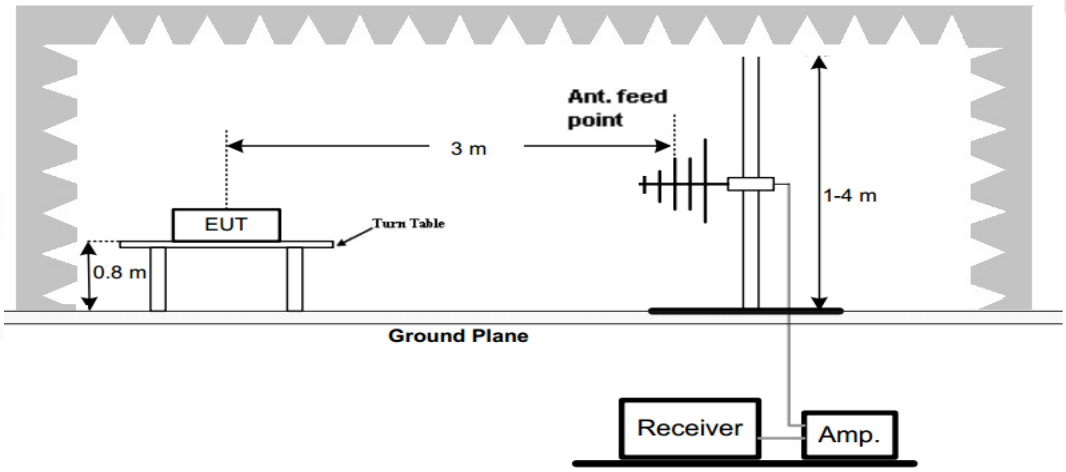
Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	20log(2400/F(KHz))+40log(300/3)	2400/F(KHz)
0.49-1.705	3	20log(24000/F(KHz))+ 40log(30/3)	24000/F(KHz)
1.705-30	3	20log(30)+ 40log(30/3)	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

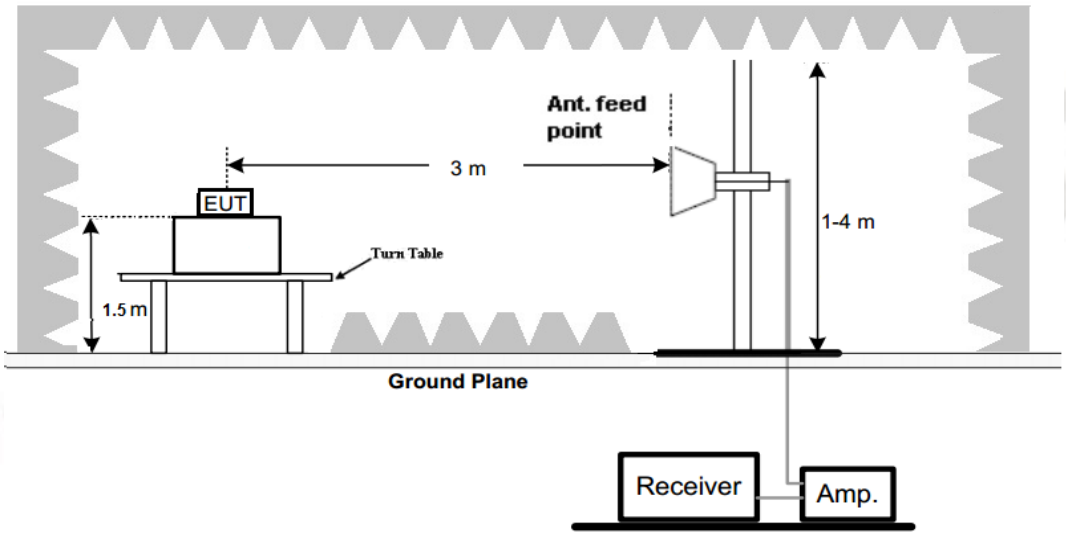
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(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:

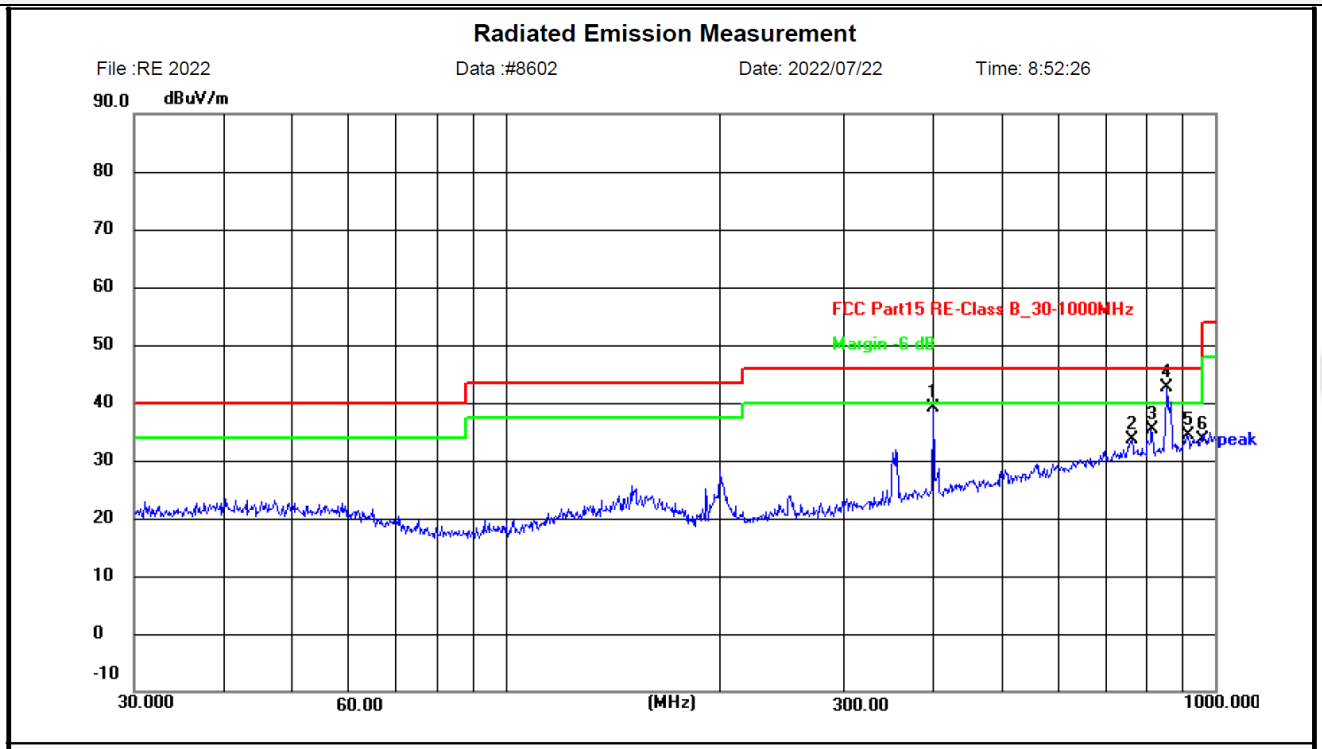
Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz,Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz,Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz,Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz,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

TEST RESULTS

Remark:
1. All Wi-Fi operation modes have been tested for below 1GHz test, only the worst case 802.11ac20 low channel of U-NII 3 band was recorded.
2. All Wi-Fi operation modes have been tested for above 1GHz test, only the worst case 802.11ac20 mode was recorded.
3. All Wi-Fi operation modes have been tested for U-NII 3 bandedge test, only the worst case of 802.11ac20 mode was recorded.
4. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and the emission levels from 9kHz to 30MHz are attenuated 20dB below the limit and not recorded in report.

For 30MHz-1GHz

Horizontal



Site CTL 966 Chamber 1 Polarization: ***Horizontal*** Temperature: 25(C)

Limit: FCC Part15 RE-Class B_30-1000MHz Power: AC120V/60Hz Humidity: 50 %

EUT: Wireless CarPlay adapter Distance: 3m

M/N: U2-ARI

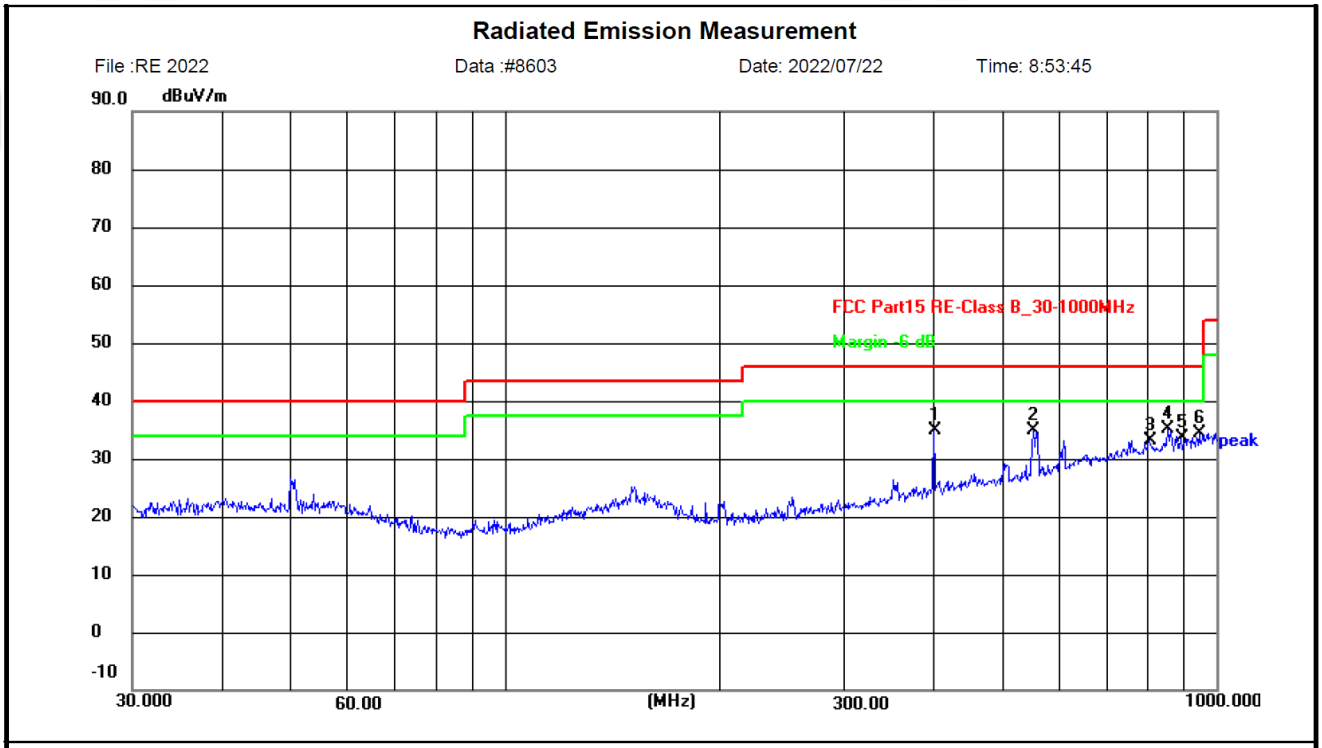
Mode: WORKING

Note:

Company name: ShenZhen Bijiasuo Electronic Co.,Ltd

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	400.4318	51.89	-12.74	39.15	46.00	6.85	peak	100	215	P	
2	763.3757	39.14	-5.51	33.63	46.00	12.37	peak	100	254	P	
3	813.1115	40.21	-4.89	35.32	46.00	10.68	peak	100	351	P	
4	854.0247	46.95	-4.41	42.54	46.00	3.46	peak	100	210	P	
5	912.8620	37.76	-3.41	34.35	46.00	11.65	peak	100	259	P	
6	955.4381	36.42	-2.88	33.54	46.00	12.46	peak	100	58	P	

Vertical



Site CTL 966 Chamber 1 Polarization: *Vertical* Temperature: 25(C)

Limit: FCC Part15 RE-Class B_30-1000MHz Power: AC120V/60Hz Humidity: 50 %

EUT: Wireless CarPlay adapter Distance: 3m

M/N: U2-ARI

Mode: WORKING

Note:

Company name: ShenZhen Bijiasuo Electronic Co.,Ltd

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	400.4319	47.64	-12.74	34.90	46.00	11.10	peak	100	248	P	
2	552.8832	44.26	-9.37	34.89	46.00	11.11	peak	100	208	P	
3	804.6028	38.21	-4.99	33.22	46.00	12.78	peak	100	149	P	
4	854.0247	39.59	-4.41	35.18	46.00	10.82	peak	100	146	P	
5	890.7278	37.43	-3.80	33.63	46.00	12.37	peak	100	304	P	
6	945.4399	37.45	-2.98	34.47	46.00	11.53	peak	100	318	P	

Remark: Level(dBuV)=Reading(dBuV) + Factor(dB)
Margin=Limit(dBuV/m)-Level(dBuV/m)

For 1GHz to 40GHz

U-NII 1 @ 802.11ac20 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 (5180MHz)	5150	46.20	PK	V	68.20	22.00	57.89	34.44	7.12	53.25	-11.69
	10360	49.24	PK	V	68.20	18.96	52.36	39.2	11.45	53.77	-3.12
	--	--	--	--	--	--	--	--	--	--	--
40 (5200MHz)	10400	49.66	PK	V	68.20	18.54	52.73	39.22	11.48	53.77	-3.07
	--	--	--	--	--	--	--	--	--	--	--
48 (5240MHz)	5350.5	48.06	PK	V	68.20	20.14	59.41	34.69	7.23	53.27	-11.35
	10480	53.11	PK	V	68.20	15.09	56.06	39.27	11.55	53.77	-2.95
	--	--	--	--	--	--	--	--	--	--	--

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 (5180MHz)	5150	45.94	PK	H	68.20	22.26	57.63	34.44	7.12	53.25	-11.69
	10360	48.78	PK	H	68.20	19.42	51.90	39.2	11.45	53.77	-3.12
	--	--	--	--	--	--	--	--	--	--	--
40 (5200MHz)	10400	49.57	PK	H	68.20	18.63	52.64	39.22	11.48	53.77	-3.07
	--	--	--	--	--	--	--	--	--	--	--
48 (5240MHz)	5350.5	47.72	PK	H	68.20	20.48	59.07	34.69	7.23	53.27	-11.35
	10480	52.70	PK	H	68.20	15.50	55.65	39.27	11.55	53.77	-2.95
	--	--	--	--	--	--	--	--	--	--	--

U-NII 3 @ 802.11ac20 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 (5745MHz)	11490	56.60	PK	V	68.20	11.60	57.28	39.69	12.90	53.27	-0.68
	11490	48.48	AV	V	54.00	5.52	49.16	39.69	12.90	53.27	-0.68
	--	--	--	--	--	--	--	--	--	--	--
157 (5785MHz)	11570	57.22	PK	V	68.20	10.98	57.65	39.71	13.05	53.19	-0.43
	11570	48.46	AV	V	54.00	5.54	48.89	39.71	13.05	53.19	-0.43
	--	--	--	--	--	--	--	--	--	--	--
165 (5825MHz)	11650	60.08	PK	V	68.20	8.12	60.26	39.73	13.19	53.10	-0.18
	11650	50.78	AV	V	54.00	3.22	50.96	39.73	13.19	53.10	-0.18
	--	--	--	--	--	--	--	--	--	--	--

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 (5745MHz)	11490	56.98	PK	H	68.20	11.22	57.66	39.69	12.90	53.27	-0.68
	11490	48.88	AV	H	54.00	5.12	49.56	39.69	12.90	53.27	-0.68
	--	--	--	--	--	--	--	--	--	--	--
157 (5785MHz)	11570	57.33	PK	H	68.20	10.87	57.76	39.71	13.05	53.19	-0.43
	11570	48.86	AV	H	54.00	5.14	49.29	39.71	13.05	53.19	-0.43
	--	--	--	--	--	--	--	--	--	--	--
165 (5825MHz)	11650	60.29	PK	H	68.20	7.91	60.47	39.73	13.19	53.10	-0.18
	11650	51.08	AV	H	54.00	2.92	51.26	39.73	13.19	53.10	-0.18
	--	--	--	--	--	--	--	--	--	--	--

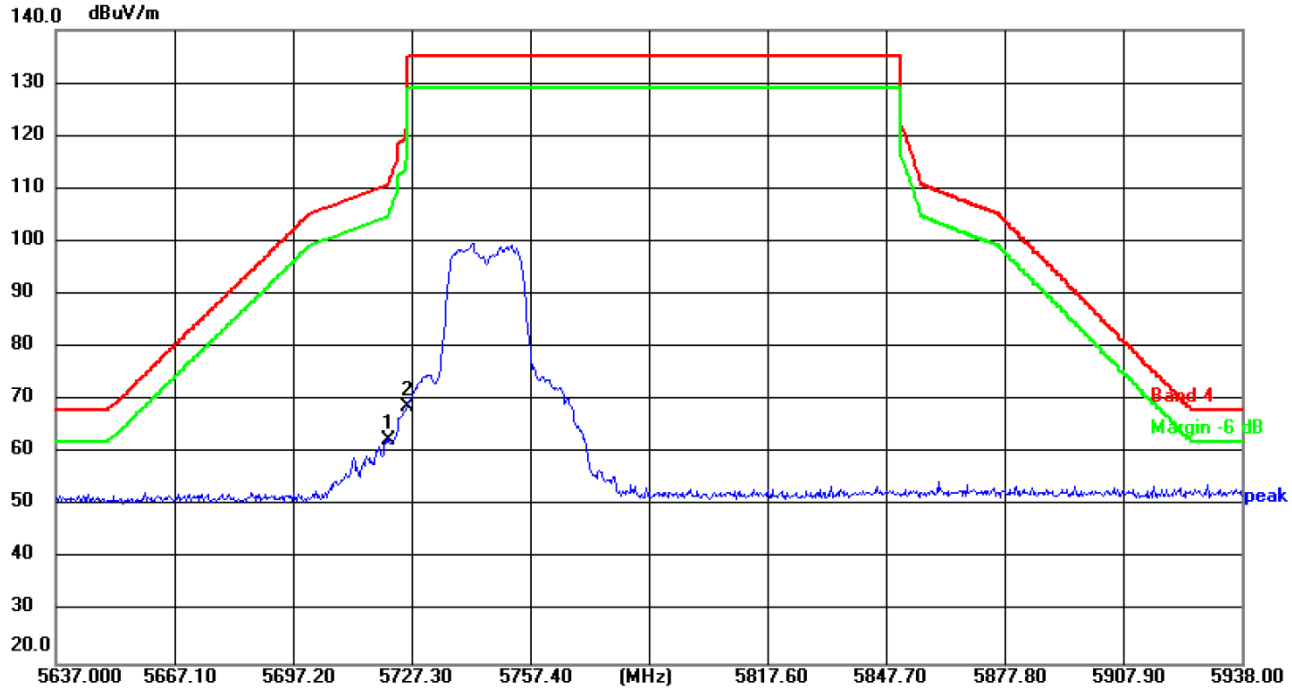
REMARKS:

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. --Other emission levels are attenuated 20dB below the limit and not recorded in report.
5. RBW1MHz VBW3MHz Peak detector is for PK value; RBW 1MHz VBW10Hz Peak detector is for AV value.

Band Edge Test Plots of U-NII 3

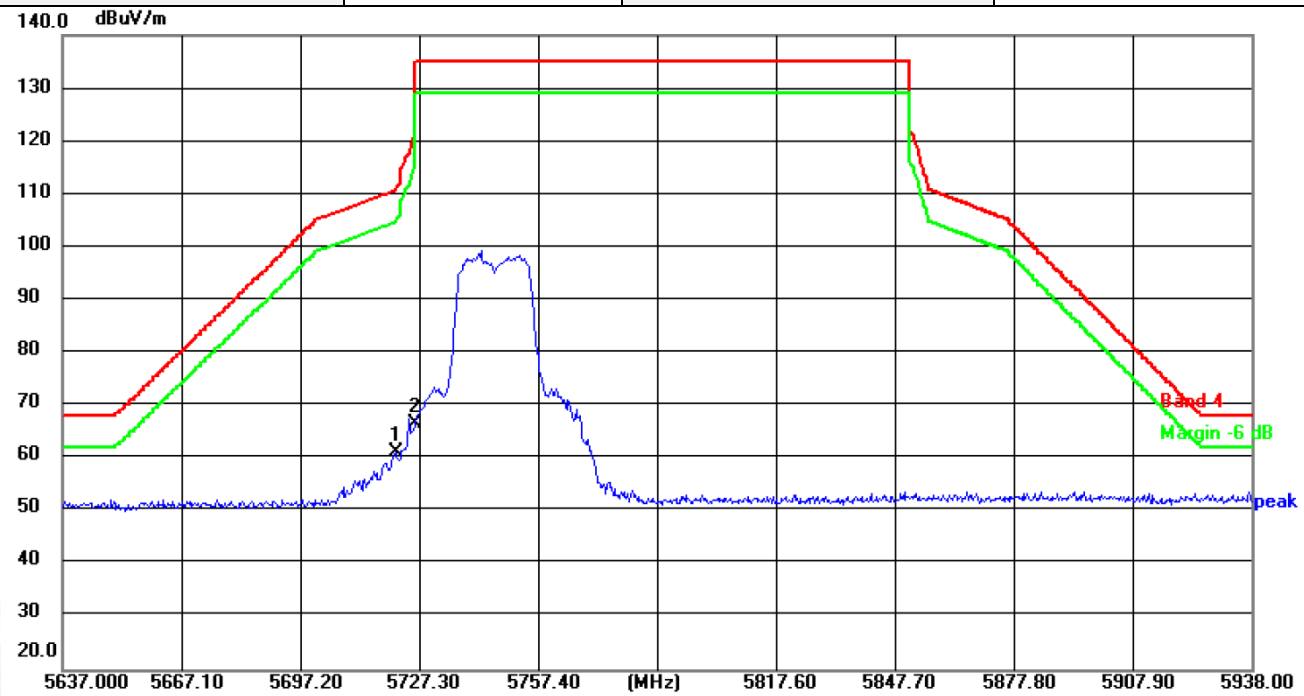
802.11ac20

Test frequency:	5745	Polarization:	Horizontal



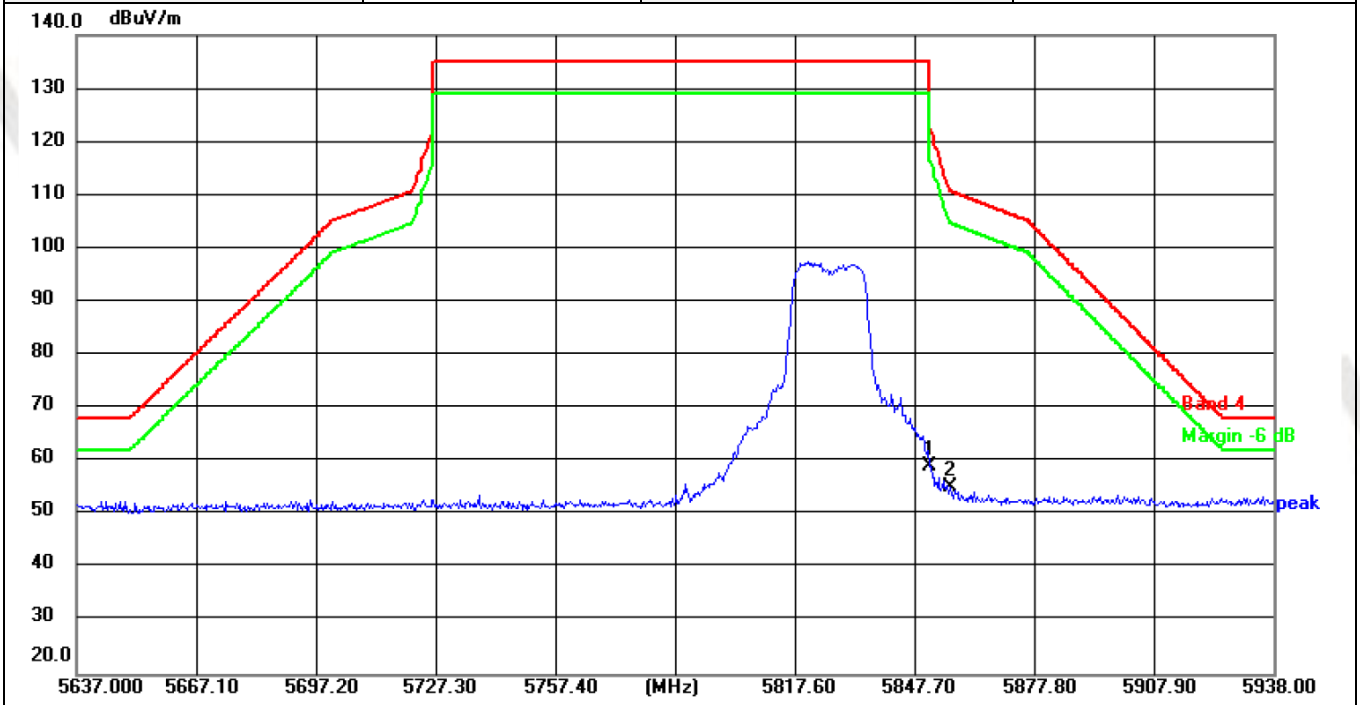
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	5720.000	59.57	2.95	62.52	110.80	48.28	peak	150	38	PK
2	5725.000	65.85	2.97	68.82	122.20	53.38	peak	150	137	PK

Test frequency:	5745	Polarization:	Vertical



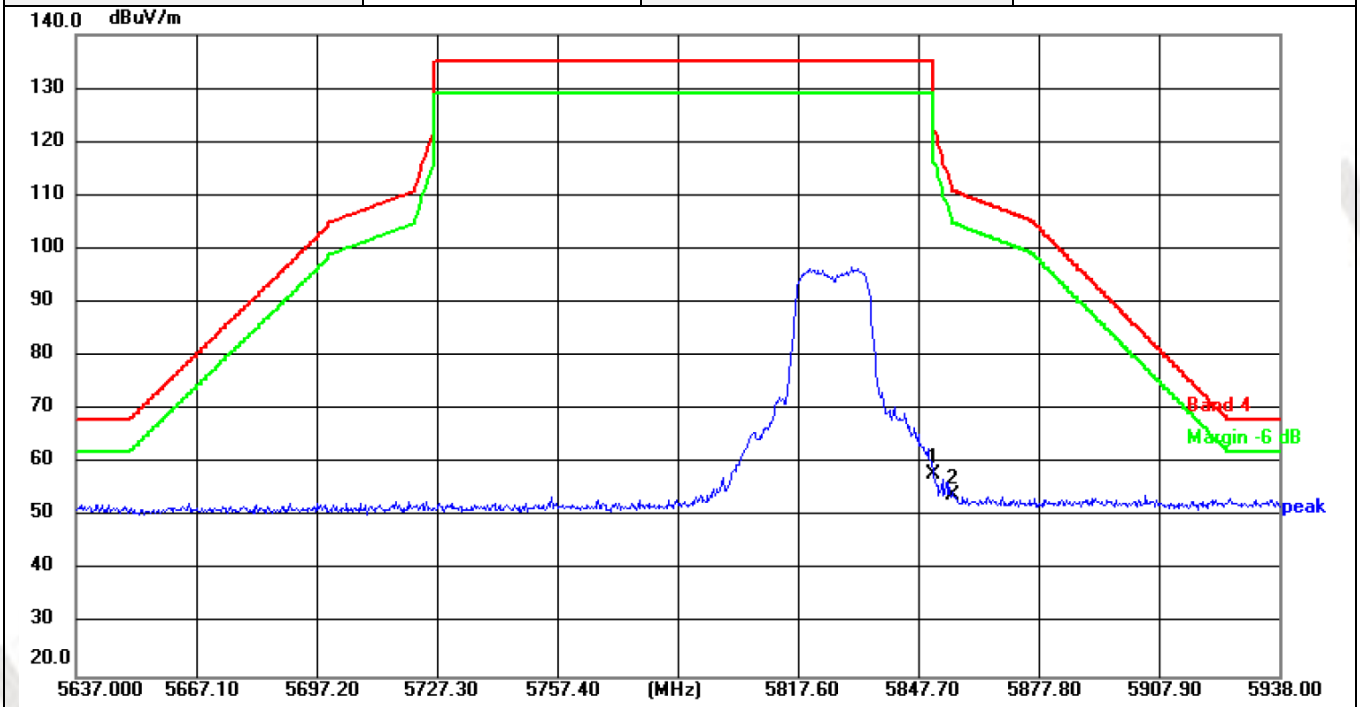
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	5720.000	58.34	2.95	61.29	110.80	49.51	peak	155	138	PK
2	5725.000	63.69	2.97	66.66	122.20	55.54	peak	155	274	PK

Test frequency:	5825	Polarization:	Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	5850.000	56.02	3.21	59.23	122.50	63.27	peak	150	38	PK
2	5855.000	51.88	3.22	55.10	110.80	55.70	peak	150	137	PK

Test frequency:	5825	Polarization:	Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)	Remark
1	5850.000	54.79	3.21	58.10	122.50	64.50	peak	155	138	PK
2	5855.000	50.91	3.22	54.13	110.80	56.67	peak	155	274	PK

3.3. Maximum Conducted Average Output Power

Limit

FCC requirement:

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 Spectrum Analyzer.

Test Configuration

Test Results

Raw data reference to Annex for FCC 5G WIFI Appendix B.

3.4. Power Spectral Density

Limit

FCC requirement:
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]

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands

The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

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]

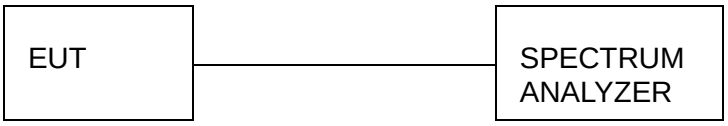
Note1: If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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 300KHz for U-NII 3 band.
3. Set the VBW ≥ 3× RBW.
4. Set the span to encompass the entire EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level.

Test Configuration



Test Results

Raw data reference to Annex for FCC 5G WIFI Appendix C.

3.5. Emission Bandwidth (26dBm Bandwidth)

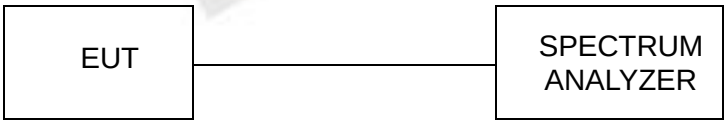
Limit

N/A

Test Procedure

1. Set resolution bandwidth (RBW) = approximately 1 % of the EBW.
2. Set the video bandwidth (VBW) > RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. 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 analyzer. Readjust RBW and repeat measurement as needed until the RBW / EBW ratio is approximately 1 %.

Test Configuration



Test Results

Raw data reference to Annex for FCC 5G WIFI Appendix A1, Appendix A2.

3.6. Minimum Emission Bandwidth (6dBm Bandwidth)

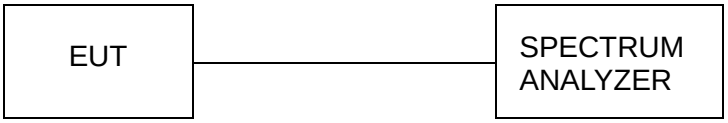
Limit

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

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth 3 x RBW.
3. Detector = Peak.
4. Trace mode = Max hold.
5. 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

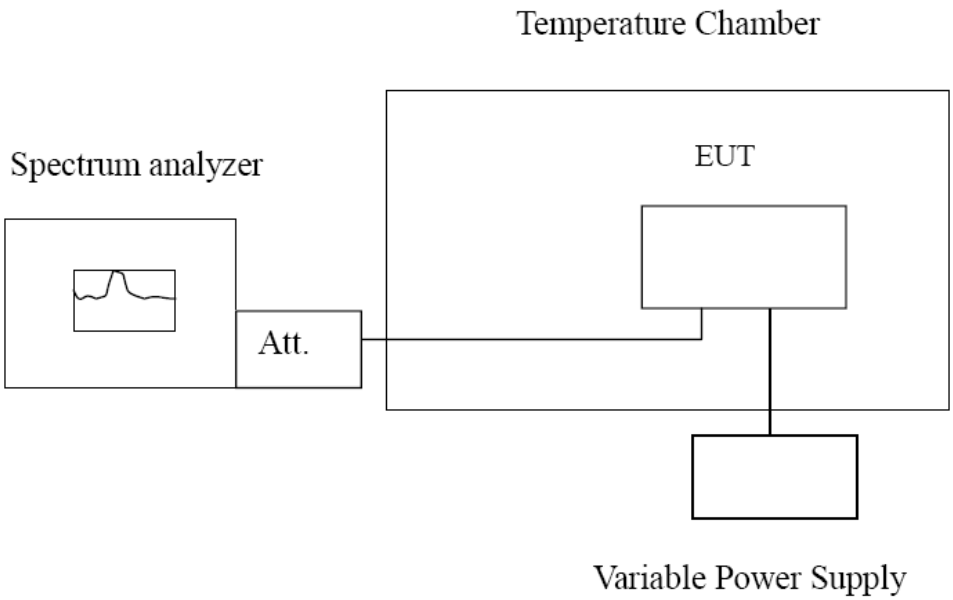
Raw data reference to Annex for FCC 5G WIFI Appendix A3.

3.7. 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

The worst data reference to Annex for FCC 5G WIFI Appendix D.

3.8. 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Test Result:

The device used an internal FPC antenna, the maximum gain is 1.0dBi for 5G WIFI.

4. Test Setup Photos of the EUT

5. Photos of the EUT

Reference to the test report No. CTL2207112041-WF01.

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