



FCC TEST REPORT

FCC ID:2AIZY20S-02

Product Name	:	2.1Channel Soundbar with Wireless Subwoofer
Model Name	:	Live2,Live 2 PLUS
Brand Name	:	iDeaPLAY
Report No.	:	PTC20082901502E-FC03
Prepared for		
IDEA ELECTRONICS INC		
13620 Benson Ave. Suite B, Chino, CA. 91710 United States		
Prepared by		
Precise Testing & Certification Co., Ltd.		
Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China		



1 TEST RESULT CERTIFICATION

Applicant's name : IDEA ELECTRONICS INC
Address : 13620 Benson Ave. Suite B, Chino, CA. 91710 United States
Manufacture's name : Dongguan Aiue Electronic Technology Co., Ltd
Address : Room 103, No. 42, Yanhe East Street, Ailingkan Village, Dalingshan Town, Dongguan City, Guangdong Province, China
Product name : 2.1Channel Soundbar with Wireless Subwoofer
Model name : Live2, Live2 PLUS
Standards : FCC CFR47 Part 15 Section 15.236
Test procedure : ANSI C63.10:2013
Test Date : Sep.4, 2020 to Nov. 02, 2020
Date of Issue : Nov. 02, 2020
Test Result : Pass

This device described above has been tested by PTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Test Engineer:

A handwritten signature in black ink that reads "Leo Yang".

Leo Yang / Engineer

Technical Manager:

A handwritten signature in black ink that appears to read "Chris Du".

Chris Du / Manager



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2 Test Summary

Test case	Para. Number	Required	Test passed	Test failed
RF Power Output	§15.236(d)	☒	☒	
Occupied Bandwidth	§15.236(f)	☒	☒	
Emission Mask	§15.236(g) ETSI EN 300 422-1 v1.4.2	☒	☒	
Radiated Spurious Emission	§15.236(g)			
Line Conducted Emissions	15.207	☒	☒	
Frequency Stability vs. Temperature Frequency Stability vs. Voltage	§15.236(f)(3)	☒	☒	



3 TEST FACILITY

Precise Testing & Certification Co., Ltd.

Address: Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

4 General Information

4.1 General Description of E.U.T.

Product Name	:	2.1Channel Soundbar with Wireless Subwoofer
Model Number	:	Live2,Live 2 PLUS Note:Different appearance colors, the others are the same
Specification	:	N/A
Operating frequency	:	662.9MHz
Number of Channel	:	1
Antenna installation	:	Internal Antenna
Antenna Gain	:	0 dBi
Power supply	:	Adapter model:N/A Input:100-240V 50/60HZ Output:24V/1.6A/2A
Hardware Version	:	V4.0
Software Version	:	V4.0

4.2 Prescribed requirements

4.2.1 Definition

Wireless Microphone.

An intentional radiator that converts sound into electrical audio signals that are transmitted using radio signals to a receiver which converts the radio signals back into audio signals that are sent through a sound recording or amplifying system. Wireless microphones may be used for cue and control communications and synchronization of TV camera signals as defined in §74.801 of this chapter. Wireless microphones do not include auditory assistance devices as defined in §15.3(a) of this part.

4.2.2 Frequencies Available

According to section. 15.236 of Part 15, the following frequencies are available for wireless microphones :

Frequencies (MHz)	
54.000-72.000	470.000-608.000
76.000-88.000	614.000-698.000
174.000-216.000	

5 Equipment During Test

5.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
MXG Signal Analyzer	Agilent	N9020A	SER MY5111038	10Hz-30GHz	Aug. 21, 2021
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Aug. 21, 2021
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Aug. 21, 2021
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Aug. 21, 2021

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug. 21, 2021
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Aug. 21, 2021
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Aug. 21, 2021
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Aug. 21, 2021
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Aug. 21, 2021
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Aug. 21, 2021
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Aug. 21, 2021
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Aug. 21, 2021
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	Aug. 21, 2021
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	Aug. 21, 2021
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Aug. 21, 2021
RF Cable	R&S	R204	R21X	1GHz-40GHz	Aug. 21, 2021

Conducted Emissions



Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug. 21, 2021
Artificial Mains Network	Rohde&Schwarz	ENV216	102453	9KHz-300MHz	Aug. 21, 2021
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	9KHz-300MHz	Aug. 21, 2021

5.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	$\pm 1.0\text{dB}$
Power Spectral Density, conducted	$\pm 2.2\text{dB}$
Radio Frequency	$\pm 1 \times 10^{-6}$
Bandwidth	$\pm 1.5 \times 10^{-6}$
Time	$\pm 2\%$
Duty Cycle	$\pm 2\%$
Temperature	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 3\%$
Conducted Emissions (150kHz~30MHz)	$\pm 3.64\text{dB}$
Radiated Emission(30MHz~1GHz)	$\pm 5.03\text{dB}$
Radiated Emission(1GHz~25GHz)	$\pm 4.74\text{dB}$



5.3 Description of Support Units

Equipment	Model No.	Series No.
Adapter	Input:100-240V 50/60Hz Output:DC 24V 1.6A	N/A

6 RF Power Output, FCC15.236 (d)

6.1 Provision Applicable

According to §2.1046, Measurements required: RF power output.

According to §15.236(d)(1), In the bands allocated and assigned for broadcast television and in the 600 MHz service band: 50 mW EIRP.

(maximum radiated power shall not exceed 50 milliwatts (EIRP))

According to §15.236(d)(2), In the 600 MHz guard band and the 600 MHz duplex gap: 20 mW EIRP.

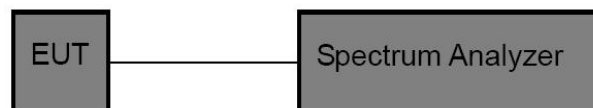
(maximum radiated power shall not exceed 20 milliwatts (EIRP))

6.2 Measurement Procedure

- 1: The transmitter output (antenna port) is connected to the spectrum analyzer.
2. Turn on the EUT and the spectrum analyzer, set the parameters and record the power value.
3. Repeat above procedures on all channels needed to be tested.

Note: The cable loss and attenuator loss were offset into measure device as amplitude offset.

6.3 Test Setup

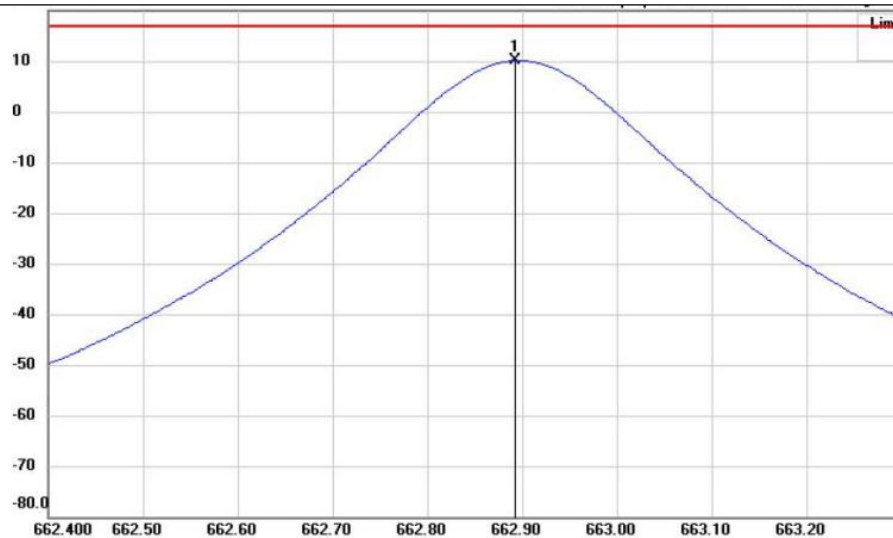


6.4 Test Results

Test Item	:	Max. peak output power	Test Mode	:	662.9Mhz
Test Voltage	:	120V	Temperature	:	24.5°C
Test Result	:	PASS	Humidity	:	55%RH

Channel Frequency (MHz)	Peak Power output (ERP/dBm)	antenna gain (dbi)	EIRP	Limit (EIRP/dBm)	Results
662.9	10.09	0	10.09	13.01	PASS

EIRP=ERP+antenna Gain



7 Occupied Bandwidth, FCC15.236 (f) / Emission Mask, FCC15.236 (g)

7.1 Provisions Applicable

According to §2.1049,

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(e) Transmitters for use in the Radio Broadcast Services:

(3) FM broadcast transmitter not used for multiplex operation—when modulated 85 percent by a 15 kHz input signal.

According to §15.236(f)(2), One or more adjacent 25 kHz segments within the assignable frequencies may be combined to form a channel whose maximum bandwidth shall not exceed 200 kHz. The operating bandwidth shall not exceed 200 kHz.

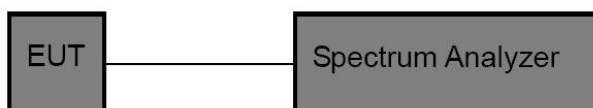
7.2 Measurement Method

1:Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2:Position the EUT as shown in figure 2, and Install new batteries in the EUT. Turn on the EUT and set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

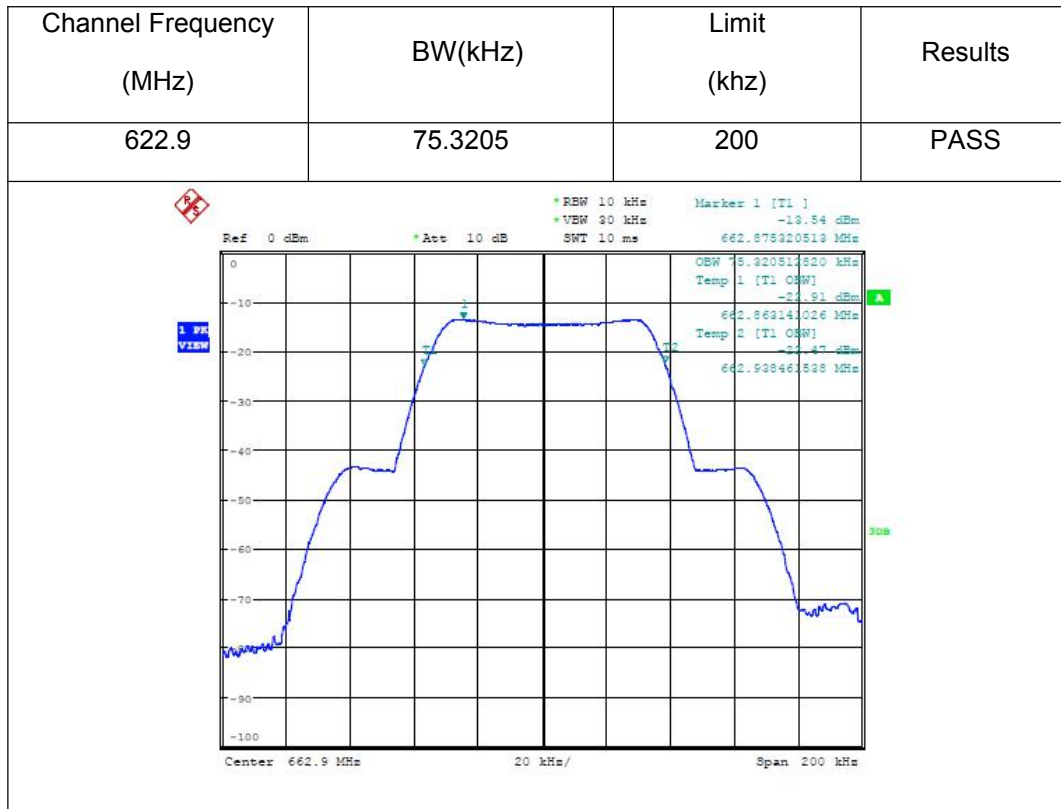
3:Apply a 15 kHz 85% modulation signal to EUT and measure the frequencies of the modulated signal from the EUT by using the 99% power OBW function of the spectrum analyzer. This is the occupied bandwidth specified.

7.3 Test Setup



7.4 Test results

Test Item	:	Occupied Bandwidth	Test Mode	:	662.9Mhz
Test Voltage	:	120V	Temperature	:	24.5°C
Test Result	:	PASS	Humidity	:	55%RH



8 Emission Mask

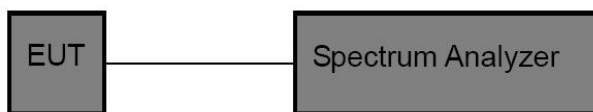
8.1 Provisions Applicable

According to §15.236(g), Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in §8.3 of ETSI EN 300 422-1 V2.1.2 (2017-01), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Emissions outside of this band shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 V2.1.2 (2017-01).

8.2 Measurement Procedure & Method

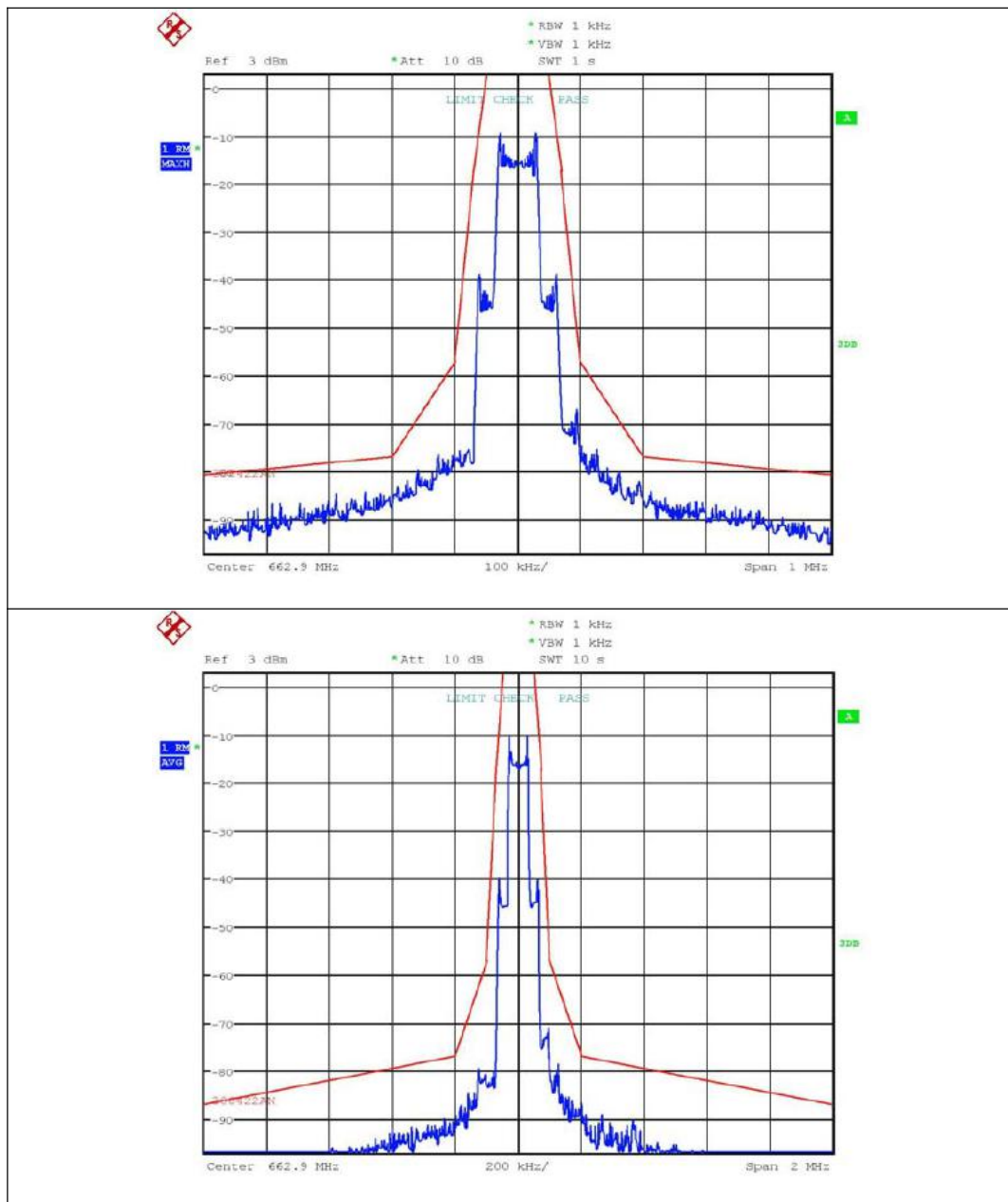
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 3, and Install new batteries in the EUT. Turn on the EUT and set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Apply a 500Hz modulation signal to EUT and measure the frequencies of the modulated signal from the EUT where it is the specified number of dB below the reference level set in step 2. This is the occupied bandwidth specified.
4. Declared Channel Bandwidth B: 200 kHz

8.4 Test Setup



8.5 Test results

Test Item	:	Emission Mask	Test Mode	:	662.9Mhz
Test Voltage	:	120V	Temperature	:	24.5°C
Test Result	:	PASS	Humidity	:	55%RH



9 Radiated Spurious Emission , FCC 15.236(g)

9.1 Provisions Applicable

According to §15.236 (g), Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in §8.3 of ETSI EN 300 422-1 V2.1.2 (2017-01), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Emissions outside of this band shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 V2.1.2 (2017-01).

9.2 Measurement Procedure

1: Setup the configuration per figure 4 and 5 for frequencies measured below and above 1 GHz respectively.

2: For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively.

3: The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0° to 360° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

4: Repeat step 3 until all frequencies need to be measured were complete.

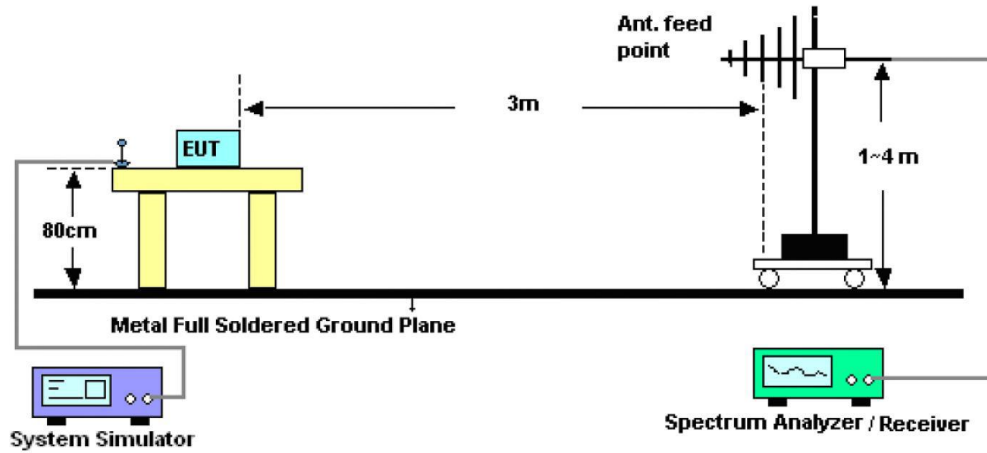
5: Repeat step 5 with search antenna in vertical polarized orientations.

Table2 : Limits for spurious emissions (Subclause 8.4.3)

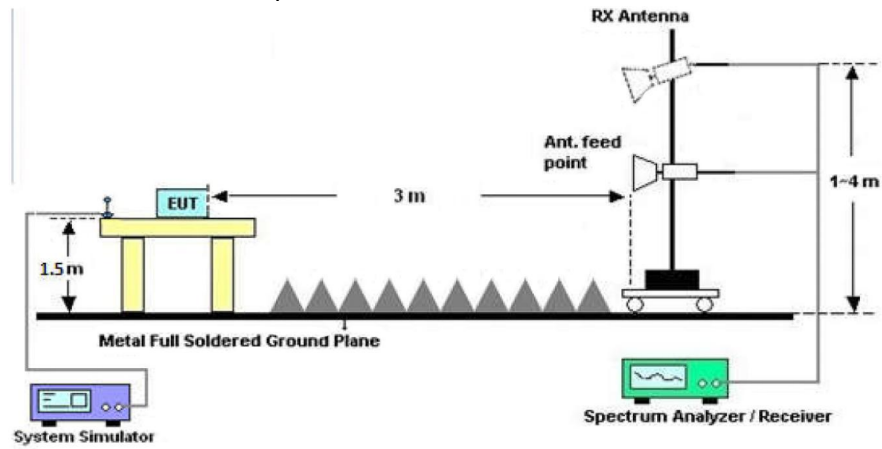
State	Frequency		
	47 MHz to 74 MHz 87,5 MHz to 137 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other Frequencies below 1 000 MHz	Frequencies above 1 000 MHz
Operation	4 nW (-54dBm)	250 nW (-36dBm)	1µW (-30dBm)
Standby	2 nW (-57dBm)	2 nW (-57dBm)	20 nW(-47dBm)

9.3 Test Setup

The test setup for emission measurement from 30 MHz to 1 GHz.



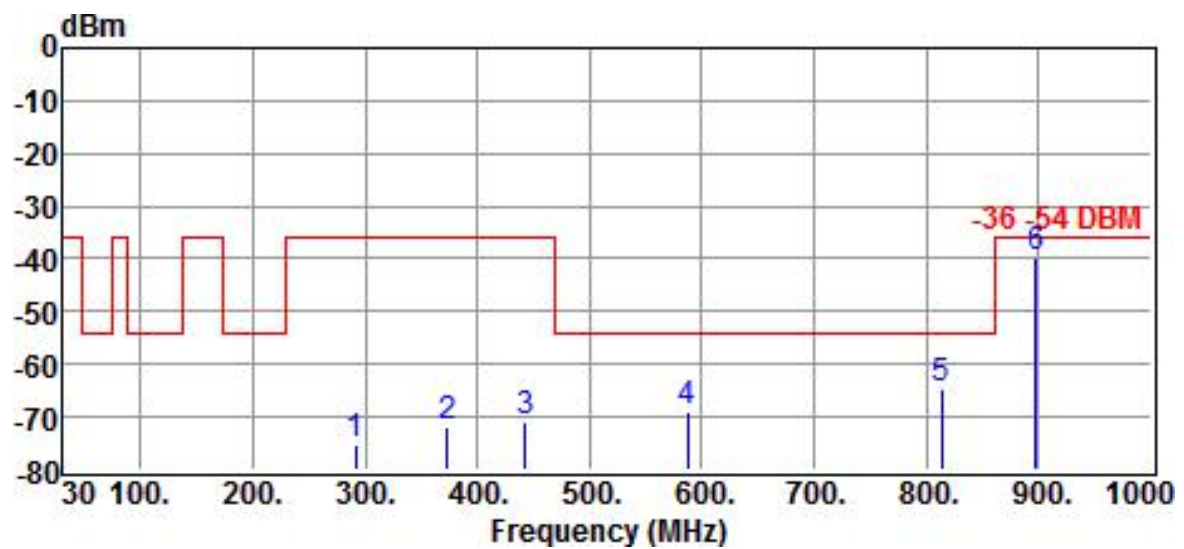
The test setup for emission measurement above 1 GHz.



9.4 Test results

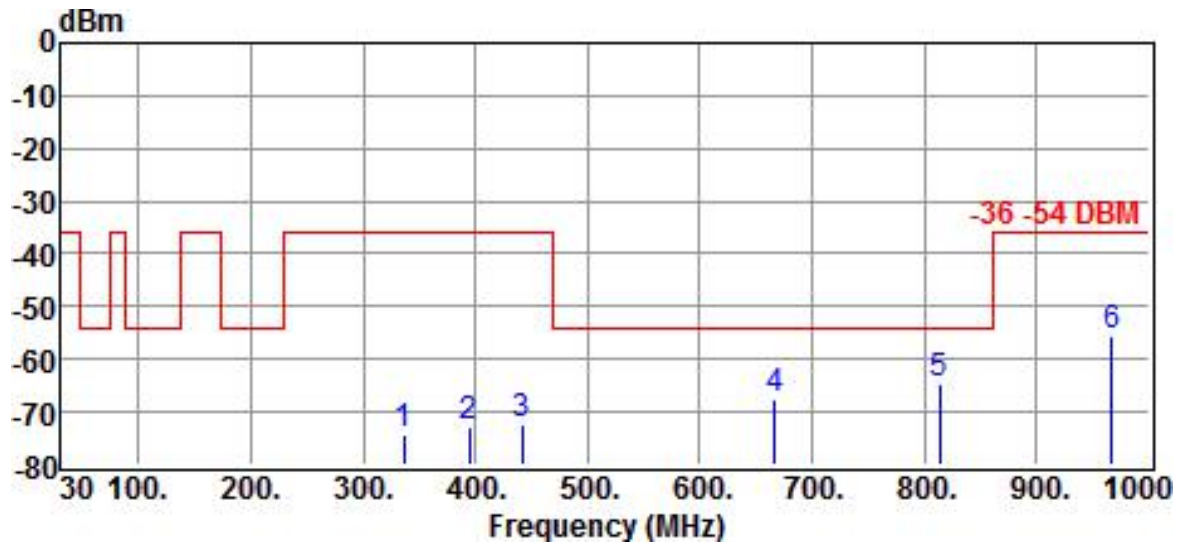
Test Item : Emission
 Test Voltage : 120V
 Test Result : PASS
 Test Mode : 662.9Mhz
 Temperature : 24.5°C
 Humidity : 55%RH

Test plot for Horizontal (30Mhz-1G)



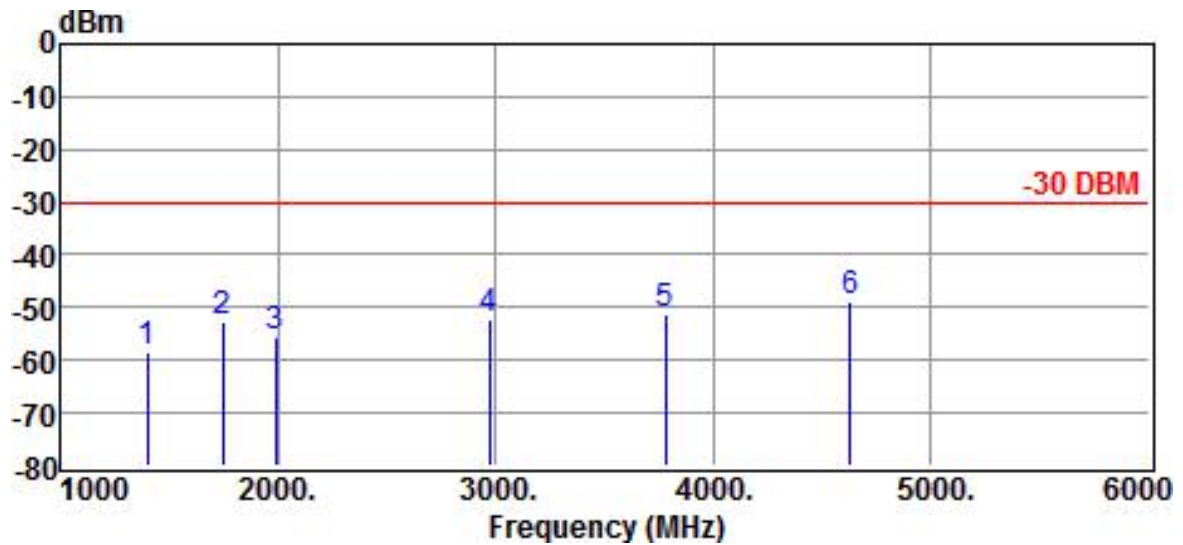
Freq MHz	Reading dBμV	Correction Factor dB	Result dBm	Limits dBm	Over limit dB	Detector
291.9000	29.67	-105.01	-75.34	-36.00	-39.34	Peak
373.3800	31.64	-103.62	-71.98	-36.00	-35.98	Peak
443.2200	31.63	-102.57	-70.94	-36.00	-34.94	Peak
586.7800	31.27	-100.20	-68.93	-54.00	-14.93	Peak
813.7600	31.09	-95.80	-64.71	-54.00	-10.71	Peak
897.1800	54.84	-94.46	-39.62	-36.00	-3.62	Peak

Test plot for VERTICAL



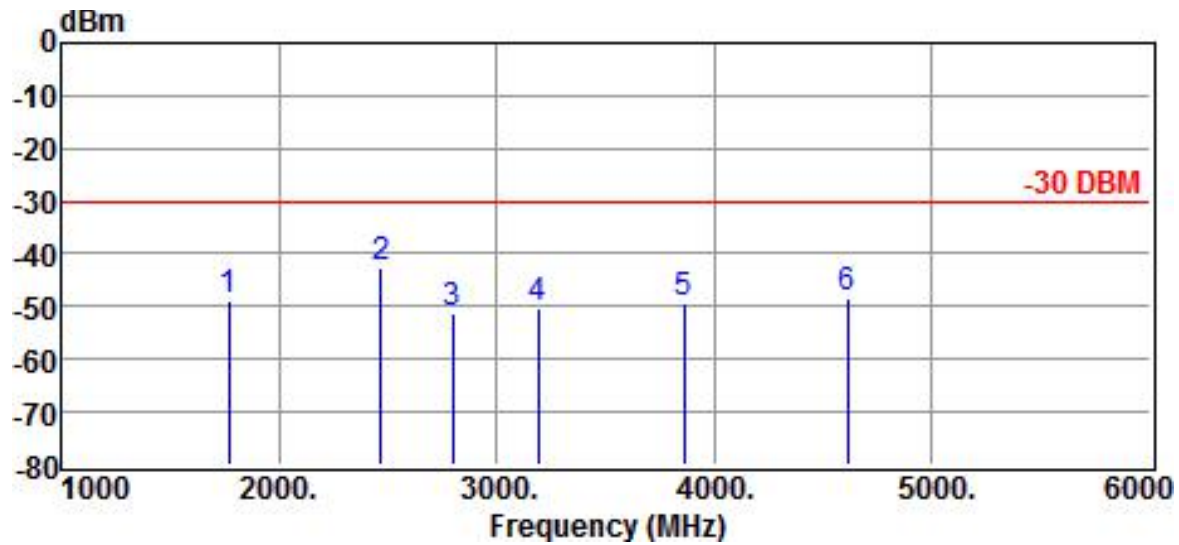
Freq MHz	Reading dBμV	Correction Factor dB	Result dBm	Limits dBm	Over limit dB	Detector
336.5200	29.94	-104.42	-74.48	-36.00	-38.48	Peak
394.7200	30.51	-103.31	-72.80	-36.00	-36.80	Peak
441.2800	30.49	-102.61	-72.12	-36.00	-36.12	Peak
666.3200	30.71	-98.06	-67.35	-54.00	-13.35	Peak
813.7600	31.06	-95.80	-64.74	-54.00	-10.74	Peak
967.0200	36.93	-92.35	-55.42	-36.00	-19.42	Peak

Test plot for Horizontal (Above 1G)



Freq MHz	Reading dBμV	Correction Factor dB	Result dBm	Limits dBm	Over limit dB	Detector
1400.0000	49.49	-107.71	-58.22	-30.00	-28.22	Peak
1750.0000	52.95	-105.70	-52.75	-30.00	-22.75	Peak
1990.0000	48.15	-103.79	-55.64	-30.00	-25.64	Peak
2970.0000	48.17	-100.60	-52.43	-30.00	-22.43	Peak
3780.0000	46.53	-97.81	-51.28	-30.00	-21.28	Peak
4630.0000	47.28	-96.30	-49.02	-30.00	-19.02	Peak

Test plot for VERTICAL



Freq MHz	Reading dBμV	Correction Factor dB	Result dBm	Limits dBm	Over limit dB	Detector
1770.0000	56.50	-105.55	-49.05	-30.00	-19.05	Peak
2470.0000	60.12	-102.58	-42.46	-30.00	-12.46	Peak
2800.0000	49.81	-101.29	-51.48	-30.00	-21.48	Peak
3190.0000	49.71	-99.84	-50.13	-30.00	-20.13	Peak
3860.0000	48.41	-97.52	-49.11	-30.00	-19.11	Peak
4610.0000	47.96	-96.36	-48.40	-30.00	-18.40	Peak

Note:

1. Correction Factor = Antenna Gain + Cable Loss + Amplifier Gain
2. The formula of measured value as: Test Result = Reading + Correction Factor

10 Frequency Stability, FCC 15.236(f)(3)

10.1 Test procedure

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.005\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. Battery operated equipment shall be tested using a new battery.

10.2 Test results

622.9	Freq	Error(kHz)	Error(ppm)
Norm	662.901322	--	--
Volt	662.901322	0.000	0.000
-30	662.907413	6.091	9.188
-20	662.906729	5.407	8.157
-10	662.905117	3.795	5.725
0	662.904041	2.719	4.102
+10	662.902592	1.270	1.916
+20	662.901322	0.000	0.000
+30	662.900021	-1.301	-1.963
+40	662.898684	-2.638	-3.979
+50	662.897757	-3.565	-5.378
Limit	--	--	50

11 Line Conducted Emission , FCC 15.207

11.1 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

11.2 Conducted Emission Limit

Frequency(MHz)	Conducted Emission	
	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

11.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

11.4 Conducted Emission Test Result

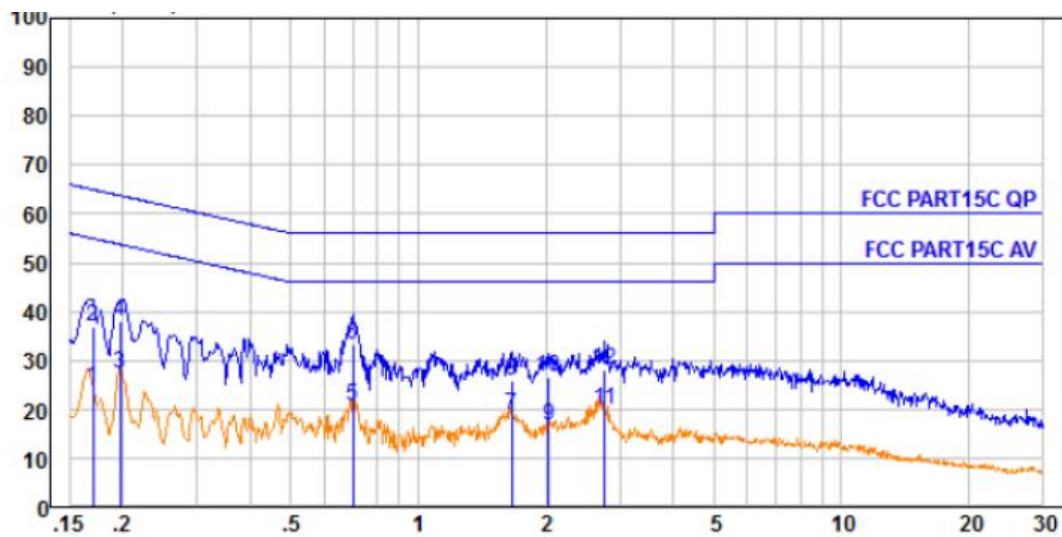
Pass

Conducted emission at both 120V & 240V is assessed, and emission at 120V represents the worst case. All the modulation modes were tested the data of the worst mode (120v) are recorded in the following pages and the others modulation methods do not exceed the limits.

11.5 Test results

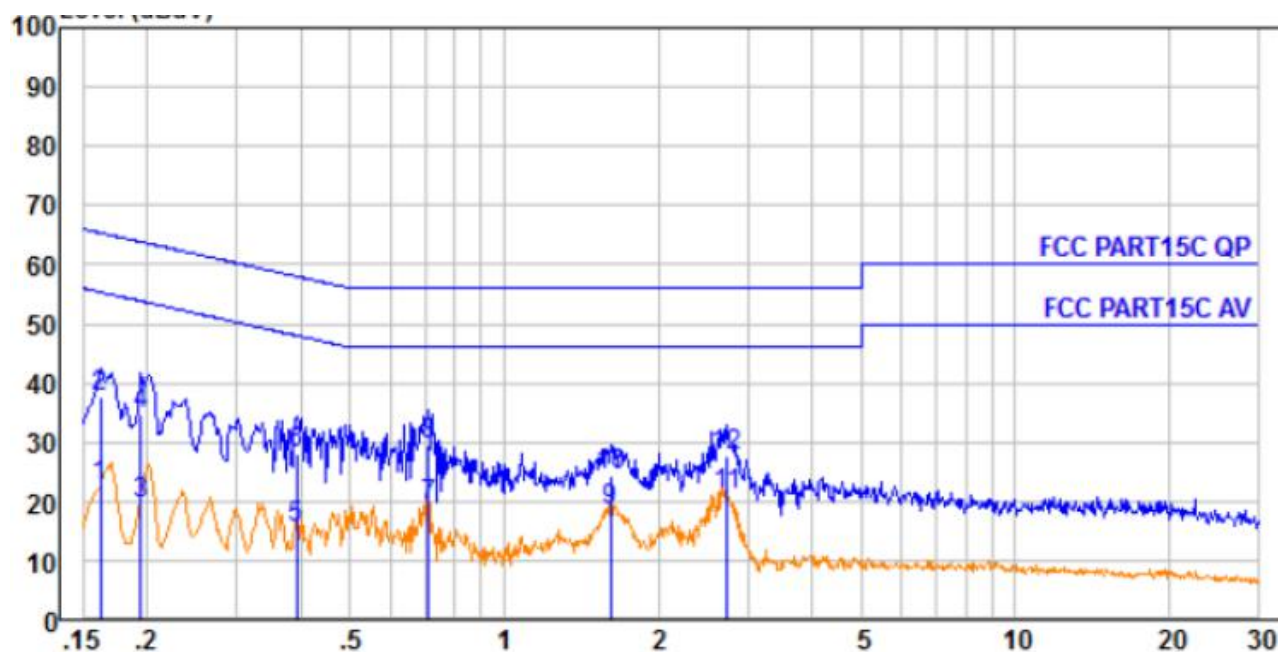
Test Item	: Emission Mask	Test Mode	: 662.9Mhz
Test Voltage	: 120V	Temperature	: 24.5°C
Test Result	: PASS	Humidity	: 55%RH

Line -120V/60Hz:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBμV	Emission Level dBμV	Limit dBμV	Over Limit dB	Remark
1.	0.170	0.24	9.59	14.60	24.43	54.94	-30.51	Average
2.	0.170	0.24	9.59	27.04	36.87	64.94	-28.07	QP
3.	0.198	0.28	9.59	17.61	27.48	53.71	-26.23	Average
4.	0.198	0.28	9.59	28.10	37.97	63.71	-25.74	QP
5.	0.701	0.44	9.61	10.52	20.57	46.00	-25.43	Average
6.	0.701	0.44	9.61	23.20	33.25	56.00	-22.75	QP
7.	1.662	0.47	9.61	8.77	18.85	46.00	-27.15	Average
8.	1.662	0.47	9.61	15.68	25.76	56.00	-30.24	QP
9.	2.033	0.47	9.61	6.46	16.54	46.00	-29.46	Average
10.	2.033	0.47	9.61	16.62	26.70	56.00	-29.30	QP
11.	2.765	0.47	9.63	9.68	19.78	46.00	-26.22	Average
12.	2.765	0.47	9.63	18.03	28.13	56.00	-27.87	QP

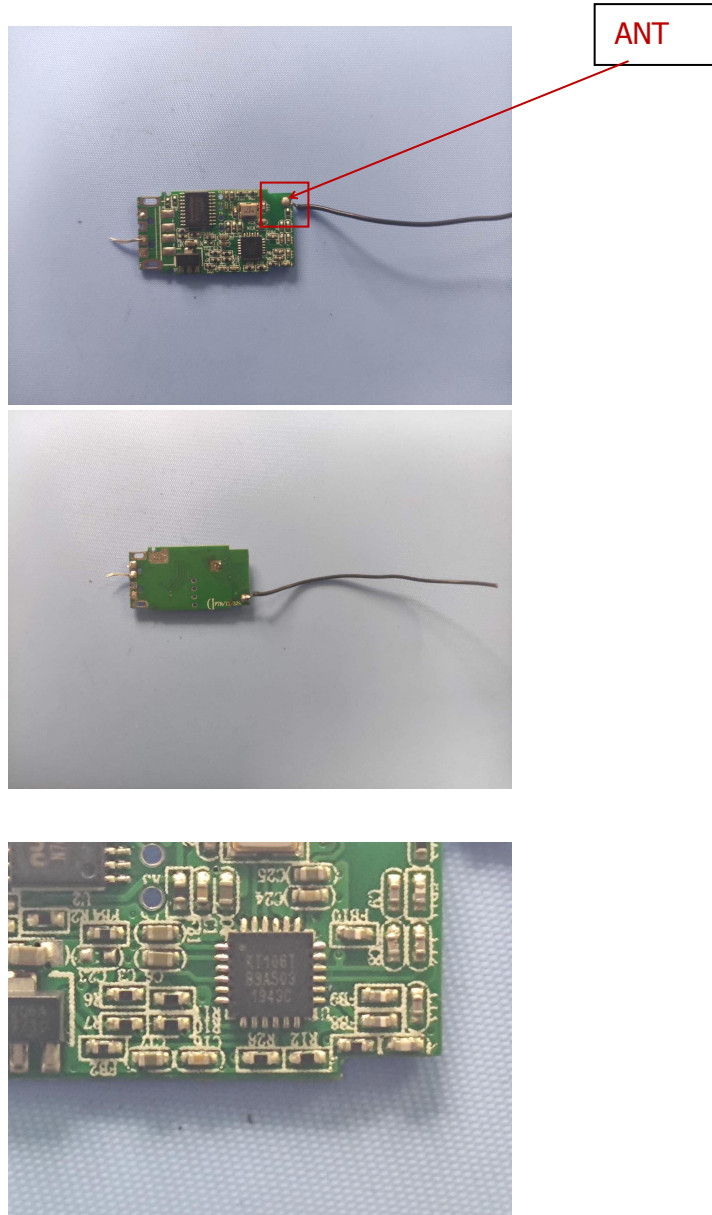
Neutral -120V/60Hz:



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBμV	Emission Level dBμV	Limit dBμV	Over Limit dB	Remark
1.	0.162	0.23	9.60	12.50	22.33	55.34	-33.01	Average
2.	0.162	0.23	9.60	27.98	37.81	65.34	-27.53	QP
3.	0.194	0.27	9.61	9.66	19.54	53.84	-34.30	Average
4.	0.194	0.27	9.61	24.62	34.50	63.84	-29.34	QP
5.	0.393	0.40	9.62	5.43	15.45	47.99	-32.54	Average
6.	0.393	0.40	9.62	17.91	27.93	57.99	-30.06	QP
7.	0.712	0.44	9.64	9.16	19.24	46.00	-26.76	Average
8.	0.712	0.44	9.64	19.60	29.68	56.00	-26.32	QP
9.	1.619	0.47	9.64	8.27	18.38	46.00	-27.62	Average
10.	1.619	0.47	9.64	14.35	24.46	56.00	-31.54	QP
11.	2.736	0.47	9.65	10.86	20.98	46.00	-25.02	Average
12.	2.736	0.47	9.65	17.56	27.68	56.00	-28.32	QP

12 Antenna Connected Construction

The antenna is Internal antenna which permanently attached, and the best case gain of the antenna is 0 dBi. It complies with the standard requirement.

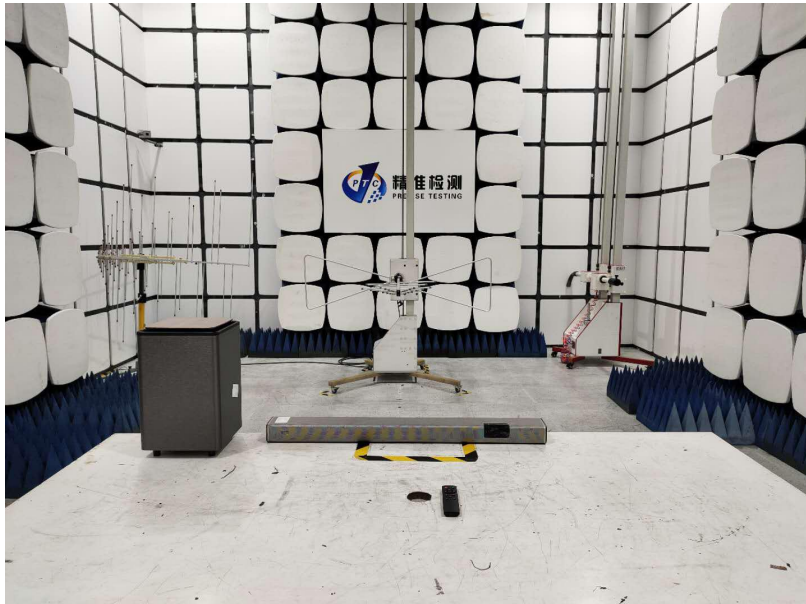


APPENDIX I -- TEST SETUP PHOTOGRAPH

Conducted Emissions



Radiated Emissions
From 30M-1GHz



Above 1GHz



NOTE;For sample photos, please see PTC20082901502E-FC02

----- End of Report -----