FCC TEST REPORT

Test report
On Behalf of
Qixiang Electron Science & Technology Co., Ltd.
For
Digital DMR and Analog UHF/VHF Two Way Radio
Model No.: AT-D878UV, AT-D878UV PLUS, AT-D878UVII, AT-D878UVIII, AT-D9

FCC ID: T4KD878UV

Prepared for :	**Qixiang Electron Science & Technology Co., Ltd.** **Qixiang Building,Tangxi Industrial Zone,Luojiang District,Quanzhou,Fujian, China**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China**
Date of Test:	**Aug. 10, 2018~Sep. 18, 2018**
Date of Report:	**Oct. 09, 2018**
Report Number:	**HK1809191113E**

TEST RESULT CERTIFICATION

Applicant's name ..... :	Qixiang Electron Science & Technology Co., Ltd.
Address ..... :	Qixiang Building,Tangxi Industrial Zone,Luojiang District,Quanzhou,Fujian, China
Manufacture's Name ..... :	Qixiang Electron Science & Technology Co., Ltd.
Address ..... :	Qixiang Building,Tangxi Industrial Zone,Luojiang District,Quanzhou,Fujian, China
Product description	Digital DMR and Analog UHF/VHF Two Way Radio
Brand Name	AnyTone
Mode Name	AT-D878UV
Serial Name	AT-D878UV PLUS, AT-D878UVII, AT-D878UVIII, AT-D9
Difference Description	Only the model is different, the circuit, appearance and function are exactly the same
Standards ..... :	FCC Rules and Regulations Part 15B

Date of Test ..... :	
Date (s) of performance of tests ..... :	Aug. 10, 2018~Sep. 18, 2018
Date of Issue ..... :	Oct. 09, 2018
Test Result ..... :	**Pass**

Testing Engineer : 

(Gary Qian)

Technical Manager : 

(Eden Hu)

Authorized Signatory : 

(Jason Zhou)

Revision	Issue Date	Revisions	Revised By
V1.0	Sep. 19, 2018	Initial Issue	Jason Zhou
V1.1	Oct. 09, 2018	Revise Report	Jason Zhou

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1. VERIFICATION OF COMPLIANCE

Hardware Version	D868UV2
Software Version	V1.0
Measurement Procedure	ANSI C63.4: 2014
Deviation:	None
Condition of Test Sample	Normal

The test results of this report relate only to the tested sample identified in this report.

2. PRODUCT INFORMATION

The EUT is a **Digital DMR and Analog UHF/VHF Two Way Radio** designed for voice communication. It is designed by way of utilizing the F3E modulation achieves the system operating.
A major technical description of EUT is described as following:

Communication Type	Voice / Tone only
Modulation	FM
RX Frequency Range	Rx:88.1 MHz -107.9 MHz
Emission Type	F3E
Antenna Designation	Detachable
Antenna Gain	2.15dBi
Power Supply	DC 7.4V 3100mAh; by DC 8.4V, 1A (Desktop charger)
Adapter Parameter	INPUT:AC 100-240V~ 50/60Hz ,0.3A OUTPUT:DC 12V 1A

I/O Port Information (☒Applicable ☐Not Applicable)

I/O Port of EUT			
I/O Port Type	**Q'TY**	**Cable**	**Tested with**
Microphone	1	0	1
Antenna Connect Port	1	0.2	1

3. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

Site	Shenzhen HUAK Testing Technology Co., Ltd.
Location	1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China
Designation Number	CN1229
Test Firm Registration Number : 616276	

List Of Test Equipment:

Conducted Emission Shielding Room Test Site (744)					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Cal. Date**	**Cal. Due**
Receiver	R&S	ESCI 7	HKE-010	Dec. 29, 2017	Dec. 28, 2018
LISN	R&S	ENV216	HKE-002	Dec. 29, 2017	Dec. 28, 2018
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A	N/A

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	**Manufacturer**	**Model**	**S/N**	**Cal. Date**	**Cal. Due**
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Dec. 29, 2017	Dec. 28, 2018
Receiver	R&S	ESCI 7	HKE-010	Dec. 29, 2017	Dec. 28, 2018
Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 29, 2017	Dec. 28, 2018
Position controller	Taiwan MF	MF7802	HKE-011	Dec. 29, 2017	Dec. 28, 2018
Horn antenna	Schwarzbeck	9120D	HKE-013	Dec. 29, 2017	Dec. 28, 2018

4. SUPPORT EQUIPMENT LIST

Device Type	Manufacturer	Model Name	Serial No.	Data Cable	Power Cable
Adaprer	QIXIANG	--	--	--	2.0m Unshielded
Desktop Charger	ANYUAN	--	--	--	--

5. SYSTEM DESCRIPTION

EUT test procedure:

1. Connect EUT and peripheral devices.
2. Power on the EUT, the EUT begins to work.
3. Make sure the EUT normal working.

EMC TEST MODES

No.	TEST MODES
1	FM Receiving

Note: Only the result of the worst case was recorded in the report.

6. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.107	Conduction Emission	Compliant
§15.109	Radiated Emission	Compliant

7. FCC RADIATED EMISSION TEST

7.1. TEST EQUIPMENT OF RADIATED EMISSION

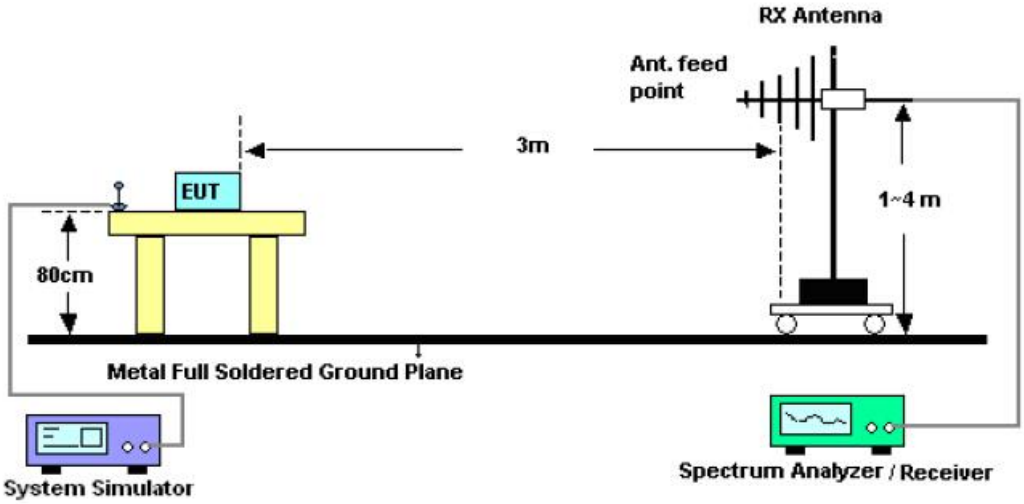
7.2. LIMITS OF RADIATED EMISSION TEST

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBuV/m/ Q.P.)
30~88	3	41.0
88~216	3	45.0
216~960	3	48.0
960~2000	3	53.5

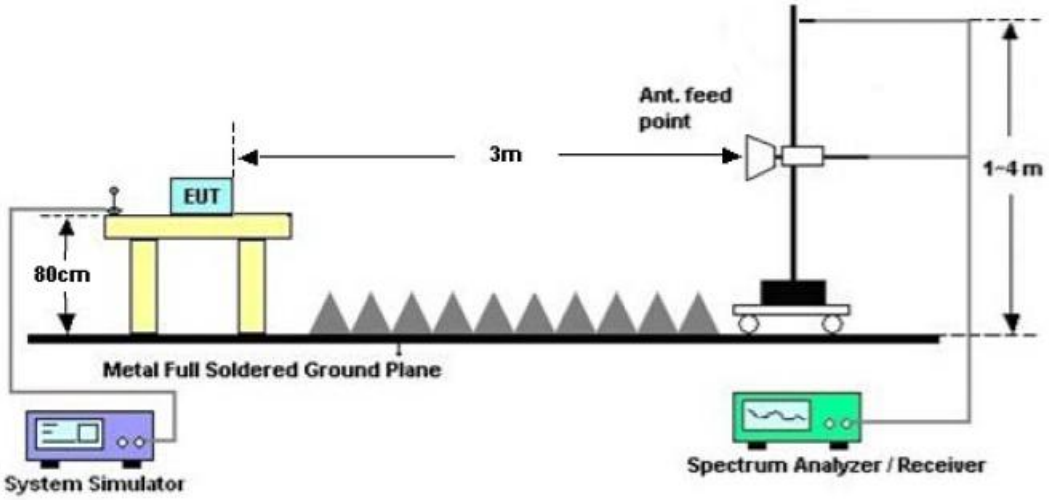
**Note: The lower limit shall apply at the transition frequency. Because the EUT RX frequency range up to 480 MHz, so the upper the frequency range up to 2 GHz.

7.3 BLOCK DIAGRAM OF RADIATED EMISSION TEST

RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz

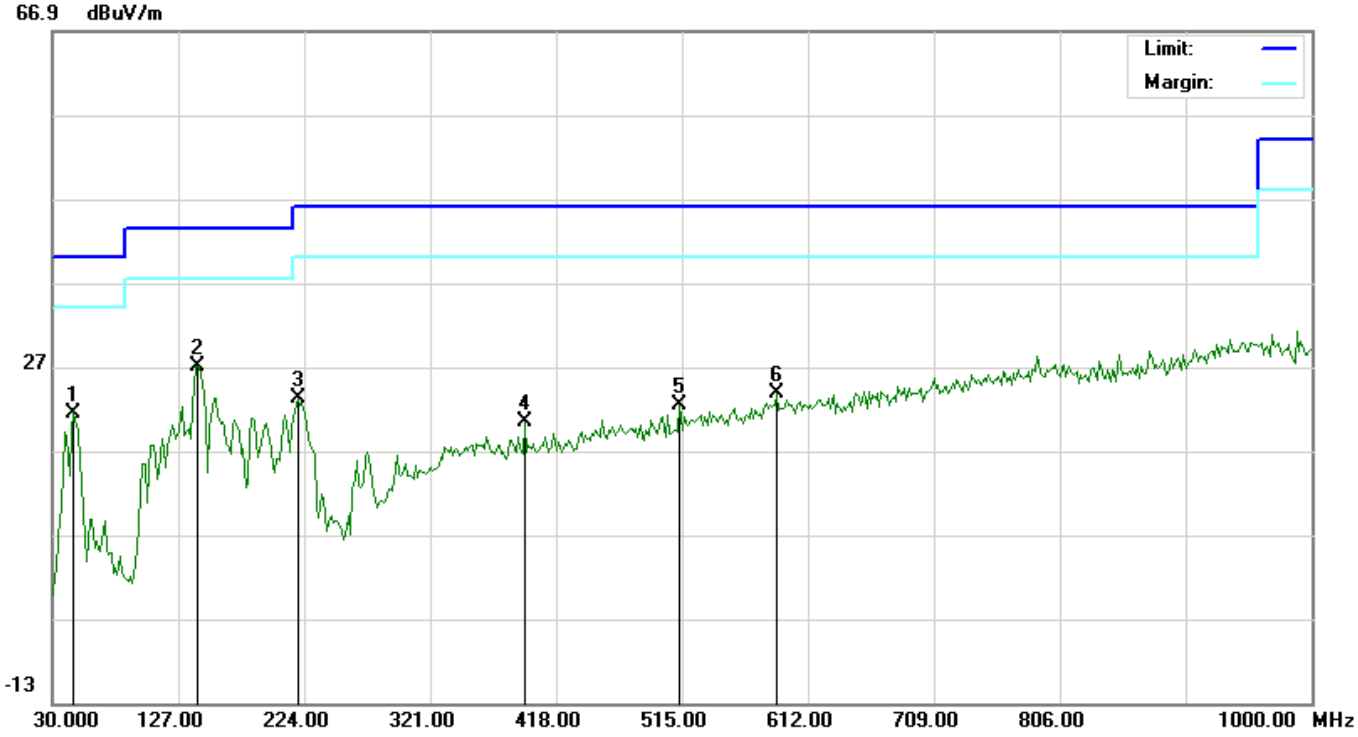


7.4 PROCEDURE OF RADIATED EMISSION TEST

1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4) The EUT received power by AC 120V/60Hz.
5) The antenna was placed at 3 meter away from the EUT as stated in FCC Part 15. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
7) The test mode(s) were scanned during the test:
8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented. For emissions below 1GHz, use 120KHz RBW and VBW>=3RBW for QP reading.
9) For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
10) When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
11) If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
12) For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
13) In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.
14) The test data of the worst case condition (mode 1) was reported on the following Data page

7.5 TEST RESULT OF RADIATED EMISSION TEST

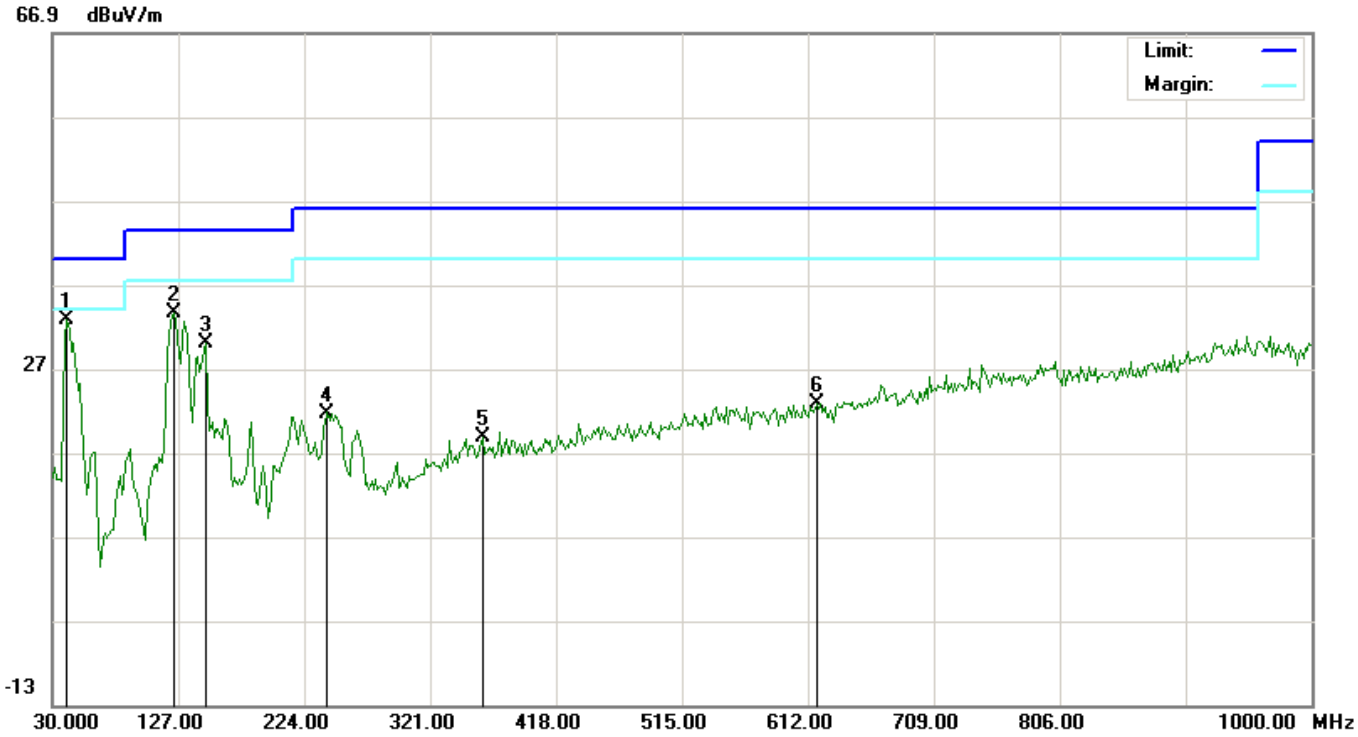
Radiated Emission Test –Horizontal -3m Below 1G



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		46.1667	10.01	11.49	21.50	40.00	-18.50	peak			
2	*	141.5500	12.25	14.82	27.07	43.50	-16.43	peak			
3		219.1500	13.20	10.05	23.25	46.00	-22.75	peak			
4		393.7500	1.45	19.03	20.48	46.00	-25.52	peak			
5		513.3833	0.86	21.49	22.35	46.00	-23.65	peak			
6		587.7500	0.43	23.42	23.85	46.00	-22.15	peak			

RESULT: PASS

Radiated Emission Test –Vertical -3m Below 1G



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	41.3167	24.07	8.81	32.88	40.00	-7.12	peak			
2		123.7667	25.21	8.43	33.64	43.50	-9.86	peak			
3		148.0167	14.72	15.25	29.97	43.50	-13.53	peak			
4		241.7833	8.61	13.09	21.70	46.00	-24.30	peak			
5		361.4167	-0.03	18.82	18.79	46.00	-27.21	peak			
6		618.4667	-0.30	23.14	22.84	46.00	-23.16	peak			

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.
3. Emissions range from 1GHz to 2GHz have 20dB margin. No recording in the test report.
4. Only the data of the worst case would be record in this test report.

8. CONDUCTED EMISSION TEST

8.1 PROVISIONS APPLICABLE

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the, the radio frequency voltage that is conducted back onto the AC power line on any frequencies within the band 150 KHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50uH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit(dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

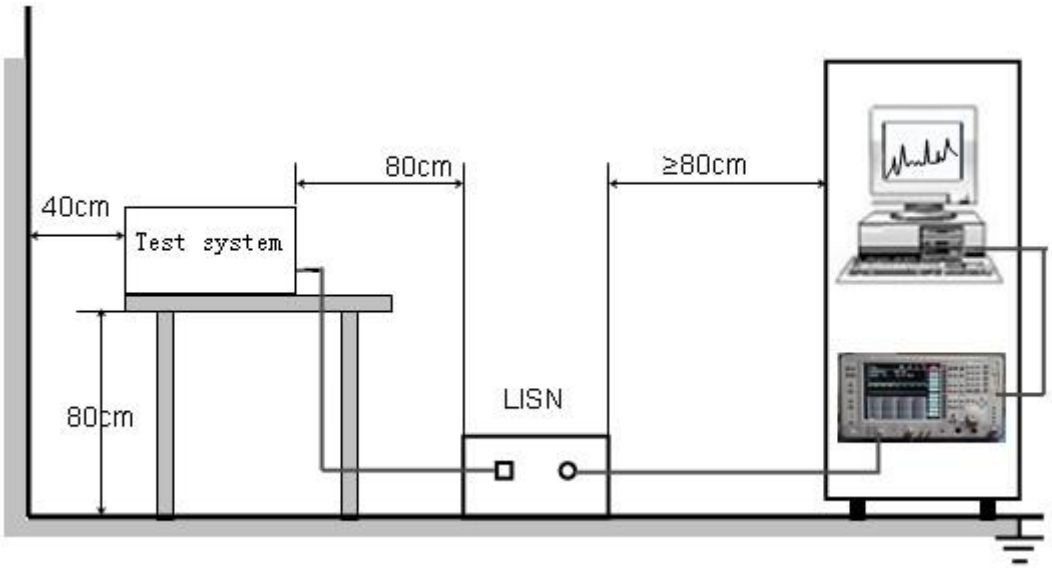
* Decreases with the logarithm of the frequency.

8.2 MEASUREMENT PROCEDURE

(1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When 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 C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
(2) Support equipment, if needed, was placed as per ANSI C63.4.
(3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
(4) The EUT received AC 120V/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.

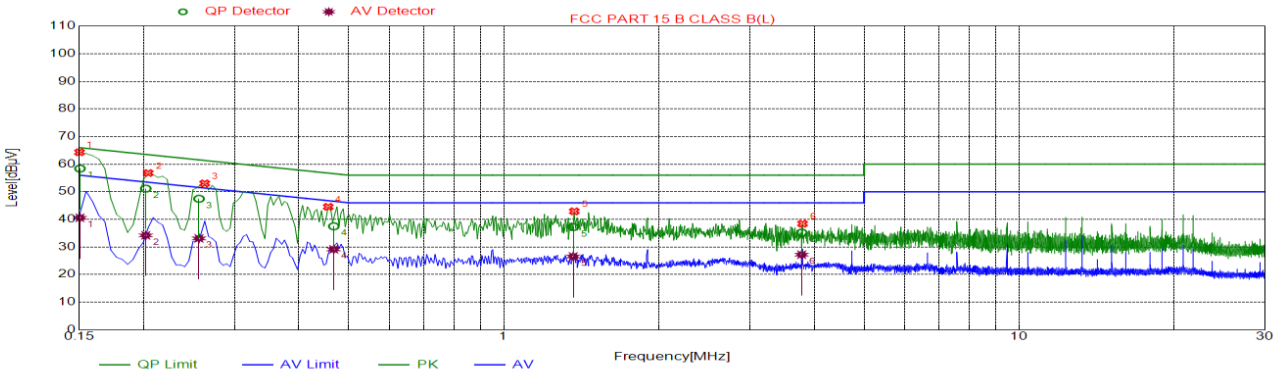
During the above scans, the emissions were maximized by cable manipulation.

8.3 TEST SETUP BLOCK DIAGRAM



8.4 TEST RESULT

CONDUCTED EMISSION TEST – LINE L



Suspected List

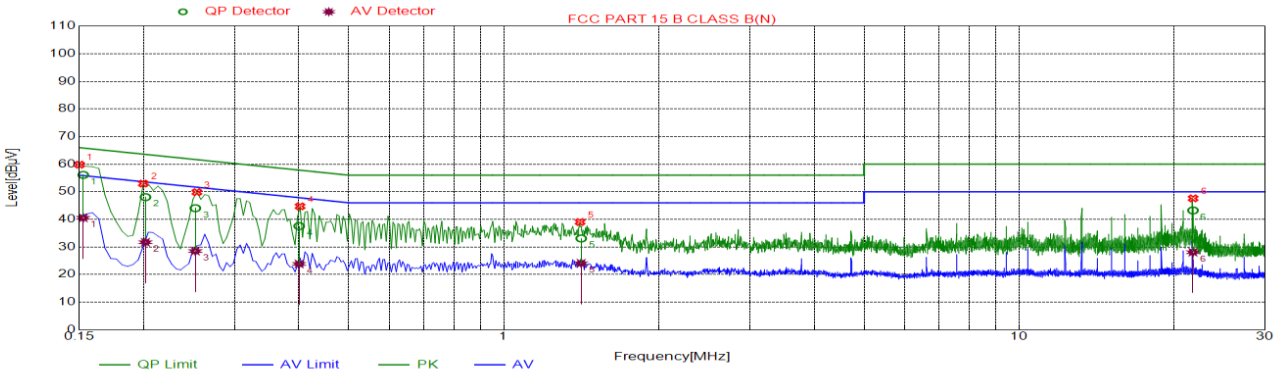
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1500	64.32	10.03	66.00	1.68	PK
2	0.2040	56.78	10.04	63.45	6.67	PK
3	0.2625	53.03	10.03	61.36	8.33	PK
4	0.4560	44.54	10.04	56.77	12.23	PK
5	1.3695	42.90	10.11	56.00	13.10	PK
6	3.7995	38.40	10.25	56.00	17.60	PK

Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.1503	10.03	58.40	65.98	7.58	40.57	55.98	15.41
2	0.2017	10.03	51.15	63.54	12.39	34.19	53.54	19.35
3	0.2559	10.04	47.46	61.56	14.10	33.09	51.56	18.47
4	0.4674	10.04	37.48	56.56	19.08	29.11	46.56	17.45
5	1.3628	10.11	37.20	56.00	18.80	26.54	46.00	19.46
6	3.7844	10.25	35.17	56.00	20.83	27.19	46.00	18.81

RESULT: PASS

CONDUCTED EMISSION TEST – LINE N



Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1500	59.81	10.03	66.00	6.19	PK
2	0.1995	52.96	10.03	63.64	10.68	PK
3	0.2535	49.85	10.04	61.64	11.79	PK
4	0.4020	44.71	10.04	57.81	13.10	PK
5	1.4055	39.03	10.11	56.00	16.97	PK
6	21.7680	47.60	10.15	60.00	12.40	PK

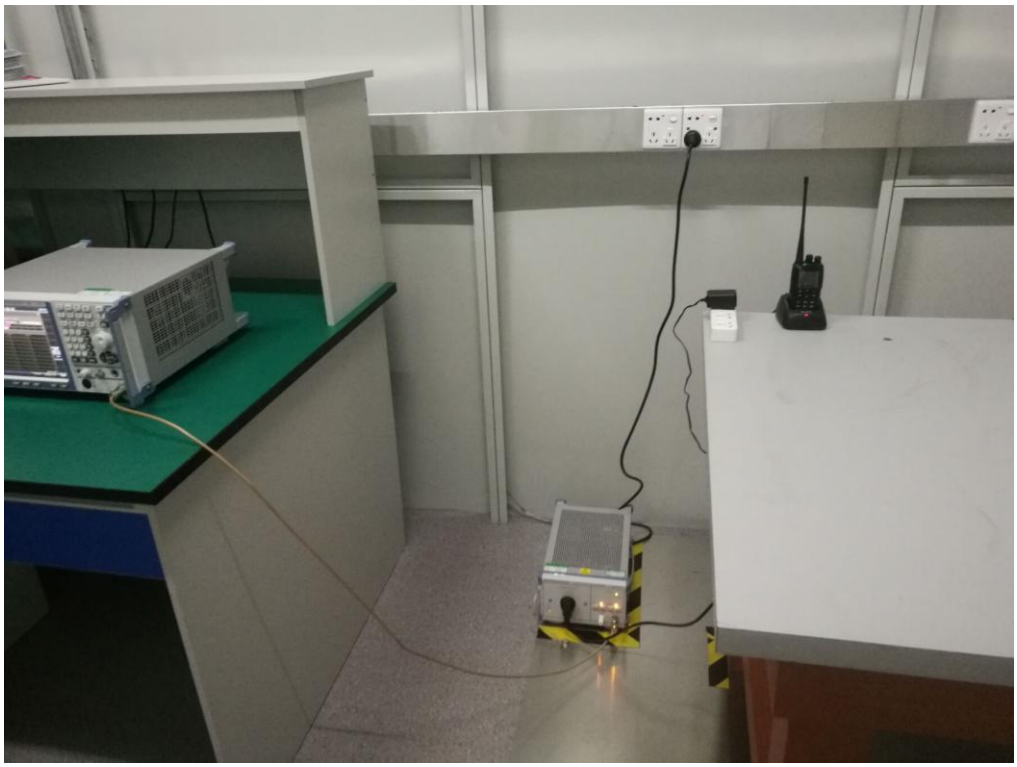
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]
1	0.1525	10.03	56.12	65.86	9.74	40.54	55.86	15.32
2	0.2014	10.03	48.06	63.55	15.49	31.69	53.55	21.86
3	0.2517	10.04	44.04	61.70	17.66	28.49	51.70	23.21
4	0.4003	10.04	37.55	57.85	20.30	23.84	47.85	24.01
5	1.4123	10.11	33.07	56.00	22.93	24.09	46.00	21.91
6	21.7507	10.15	43.23	60.00	16.77	28.09	50.00	21.91

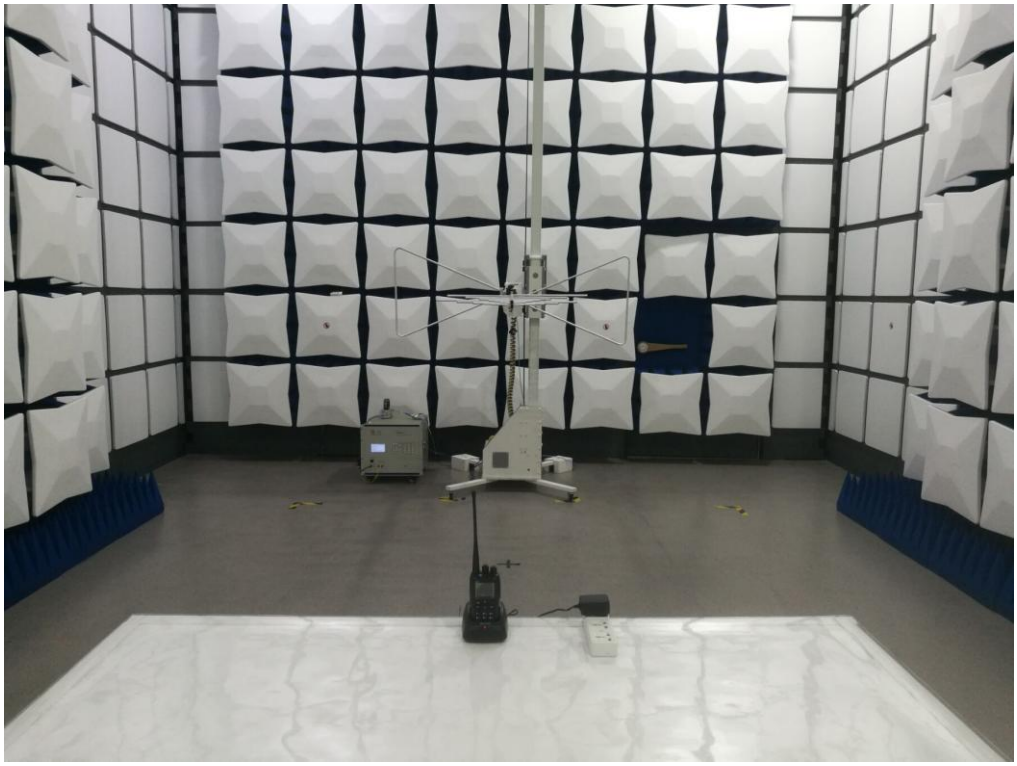
RESULT: PASS

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

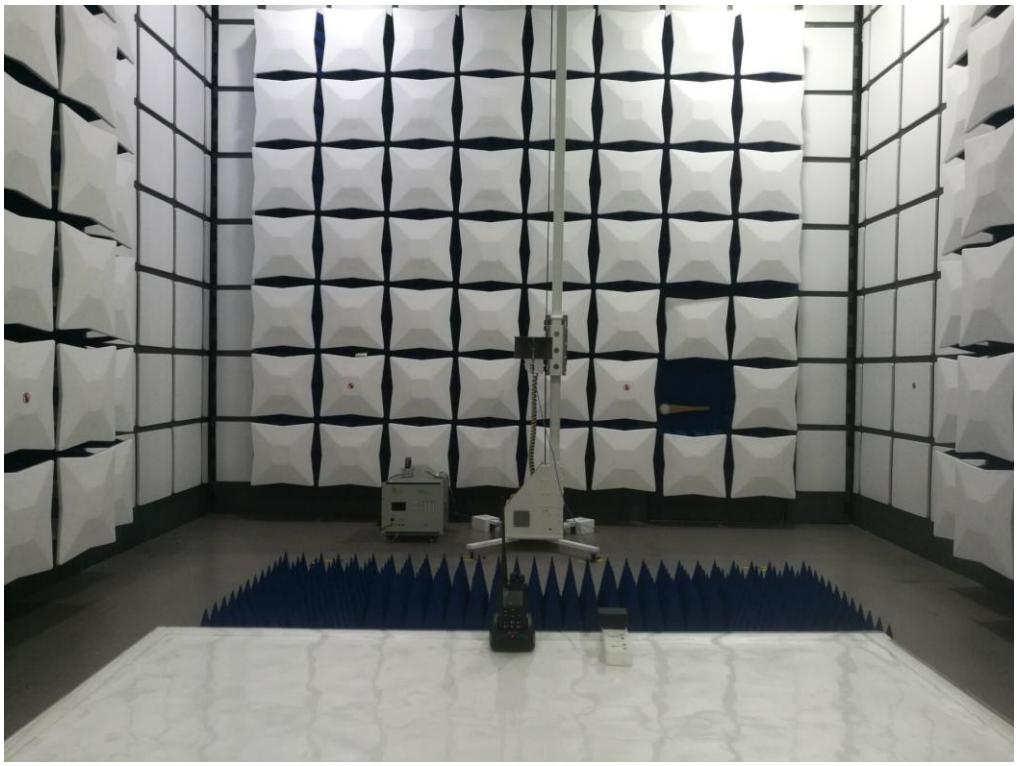
CONDUCTED EMISSION TEST SETUP



RADIATED EMISSION TEST SETUP



RADIATED EMISSION ABOVE 1G TEST SETUP



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