



FCC TEST REPORT

FCC ID: 2BKAN-K68

Applicant: Shenzhen good friend Electronics Co., Ltd
Address: Room 6709, Building 7, Building 6, Zone A, Baoan Internet Industry Base, Oyster Industry Community, Xixiang Street, Baoan District, Shenzhen
Manufacturer: Shenzhen good friend Electronics Co., Ltd
Address: Room 6709, Building 7, Building 6, Zone A, Baoan Internet Industry Base, Oyster Industry Community, Xixiang Street, Baoan District, Shenzhen
EUT: Detector
Trade Mark: N/A
Model Number: K68
K66, K88, K99, K18, S698
Date of Receipt: Aug. 10, 2024
Test Date: Aug. 10, 2024 - Aug. 27, 2024
Date of Report: Aug. 27, 2024
Prepared By: Shenzhen DL Testing Technology Co., Ltd.
Address: 101-201, Building C, Shuanghuan, No.8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China
Applicable Standards: FCC Part 15 Subpart B
ANSI C63.4:2014
Test Result: Pass
Report Number: DL-240810011ER

Prepared (Test Engineer): Alisa Song

Reviewer (Supervisor): Jack Bu

Approved (Manager): Jade Yang



This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen DL Testing Technology Co., Ltd.



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**1. VERSION**

Version No.	Date	Description
00	Aug. 27, 2024	Original

2. TEST SUMMARY

EMC Emission				
Standard	Test Item	Limit	Result	Remark
FCC PART 15 B	Conducted Emission at power ports	Class B	PASS	
	Radiated Emission below 1GHz	Class B	PASS	
	Radiated Emission above 1GHz	Class B	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) Test Facility: Shenzhen DL Testing Technology Co., Ltd.

Address: 101-201, Building C, Shuanghuan, No. 8, Baoqing Road, Baolong Industrial Zone, Baolong Street, Longgang District, Shenzhen, Guangdong, China



3. GENERAL INFORMATION

3.1 Description of Device (EUT)

EUT: Detector

Trade Mark: N/A

Model Number: K68
K66, K88, K99, K18, S698

Test Model: K68

Model Difference: The product's different for model number.

Power Supply: DC 5V from adapter
DC 3.7V from battery

Working Frequency: 1MHz-8GHz(RX)

NOTE:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) The EUT's all information provided by client.

3.2 Tested System Details

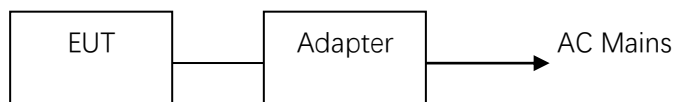
None.

3.3 Block Diagram of Test Set-up

Radiated Spurious Emission Test



Power Line Conducted Emission test





3.4 Test Mode Description

Mode1. On Mode

Mode2. Charging Mode

3.5 Test Auxiliary Equipment

Adapter (Provide by test lab):

Manufacturer: HAIWEI

Model: HW-0501000E

I/P: AC 100-240V 50/60Hz

O/P: DC 5V 1A

3.6 Test Uncertainty

Conducted Emission Uncertainty : $\pm 2.56\text{dB}$

Radiated Emission Uncertainty(< 1GHz) : $\pm 3.24\text{dB}$

Radiated Emission Uncertainty(> 1GHz) : $\pm 4.89\text{dB}$



4. TEST INSTRUMENT USED

For Conducted Emission Test (843 Shielded Room)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
843 Shielded Room	YIHENG	843 Room	843	Nov. 06, 2023	Nov. 05, 2026
EMI Receiver	R&S	ESR	101421	Nov. 04, 2023	Nov. 03, 2024
LISN	R&S	ENV216	102417	Nov. 04, 2023	Nov. 03, 2024
Clamp	COM-POWER	CLA-050	431072	Nov. 04, 2023	Nov. 03, 2024
3-Loop Antenna	DAZE	ZN30401	13021	Nov. 04, 2023	Nov. 03, 2024
ISN T8	Schwarzbeck	NTFM 8158	101135	Nov. 04, 2023	Nov. 03, 2024
ISN T5	Schwarzbeck	NTFM 8158	101136	Nov. 04, 2023	Nov. 03, 2024
843 Cable 1#	ChengYu	CE Cable	001	Nov. 04, 2023	Nov. 03, 2024
843 Cable 1#	ChengYu	CE Cable	002	Nov. 04, 2023	Nov. 03, 2024

For Radiated Emission Test (966 chamber)

Equipment	Manufacturer	Model	Serial	Last Cal.	Next Cal.
966 chamber	YIHENG	966 Room	966	Nov. 05, 2023	Nov. 04, 2026
Spectrum Analyzer	Agilent	E4408B	MY50140780	Nov. 04, 2023	Nov. 03, 2024
EMI Receiver	R&S	ESRP7	101393	Nov. 04, 2023	Nov. 03, 2024
Amplifier	Schwarzbeck	BBV9743B	00153	Nov. 04, 2023	Nov. 03, 2024
Amplifier	EMEC	EM01G8GA	00270	Nov. 04, 2023	Nov. 03, 2024
Broadband Trilog Antenna	Schwarzbeck	VULB9162	00306	Nov. 04, 2023	Nov. 03, 2024
Horn Antenna	Schwarzbeck	BBHA9120D	02139	Nov. 04, 2023	Nov. 03, 2024
966 Cable 1#	ChengYu	966	004	Nov. 04, 2023	Nov. 03, 2024
966 Cable 2#	ChengYu	966	003	Nov. 04, 2023	Nov. 03, 2024

Other

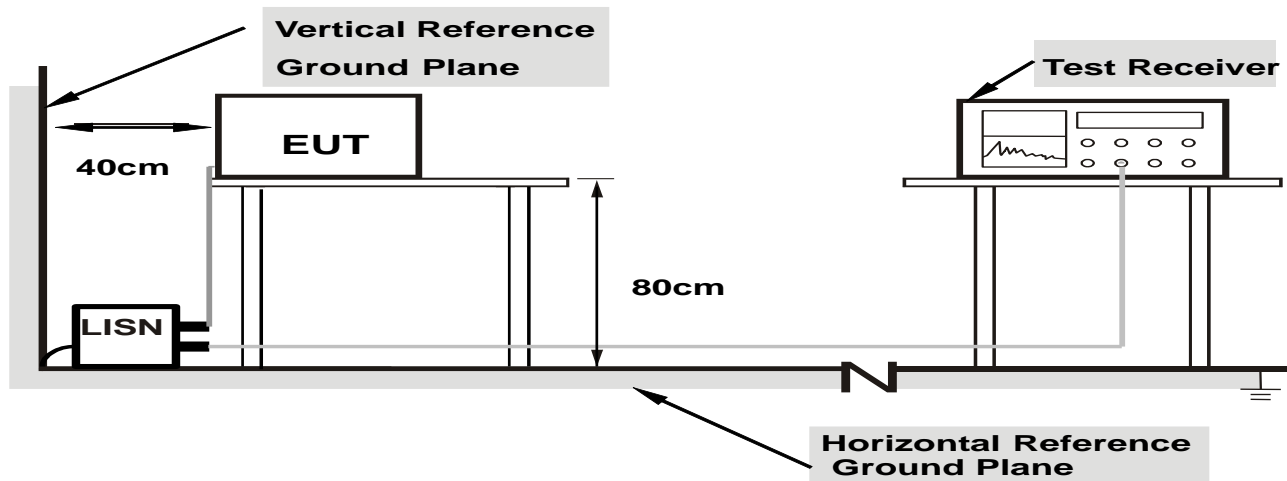
Name	Manufacturer	Model	Software version
EMC Conduction Test System	FALA	EZ_EMG	EMC-CON 3A1.1
EMC radiation test system	FALA	EZ_EMG	FA-03A2



5. CONDUCTED EMISSION TEST

5.1 Block Diagram of Test Setup

For Mains Terminals Test



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

5.2 Test Standard and Limit

FCC PART 15 B

Frequency MHz	Limits dB(μ V)	
	Quasi-peak Level	Average Level
0.15~0.50	66 ~ 56*	55 ~ 46*
0.50~5.00	56	46
5.00~30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

5.3 EUT Configuration on Test

The following equipment's are installed on conducted emission test to meet FCC PART 15 B requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

5.4 Operating Condition of EUT

5.4.1 Setup the EUT and simulators as shown in Section 5.1.

5.4.2 Turn on the power of all equipments.

5.4.3 Let the EUT work in test modes and test it.



5.5 Test Procedure

The EUT is put on the table and connected to the AC mains through a Artificial Mains Network (AMN) or ISN. This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission levels according to the **ANSI C63.4** regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESR) is set at 10KHz.

The frequency range from 150 KHz to 30 MHz is investigated.

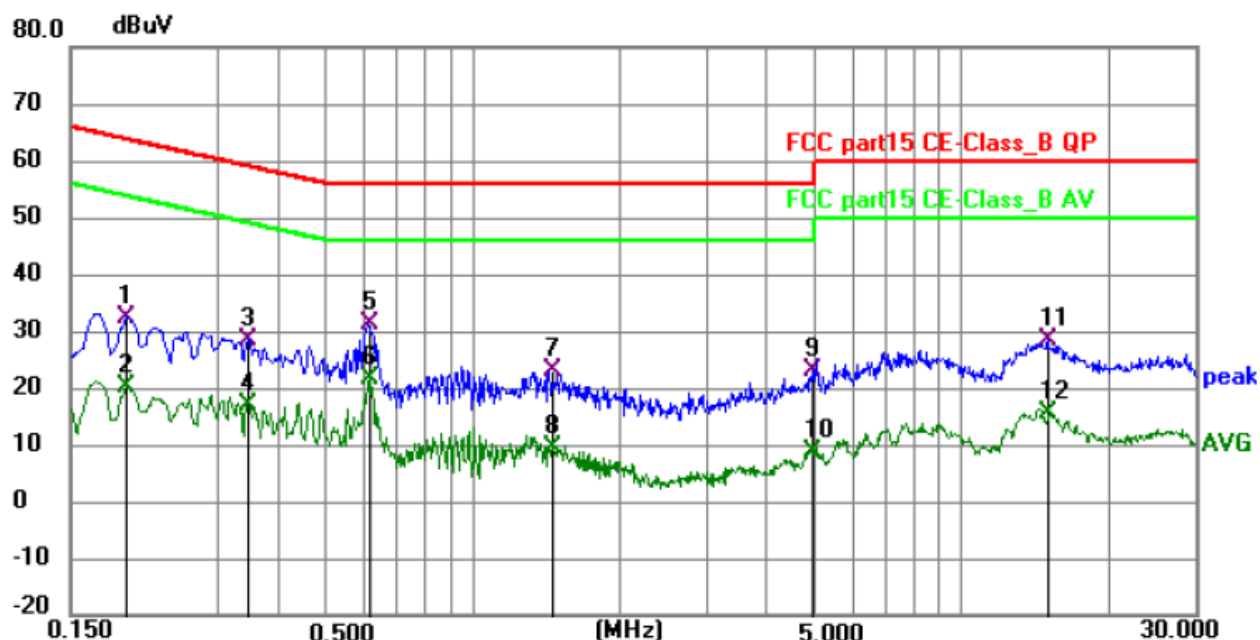
5.6 Test Result

PASS

Please refer to the following page.



Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 2



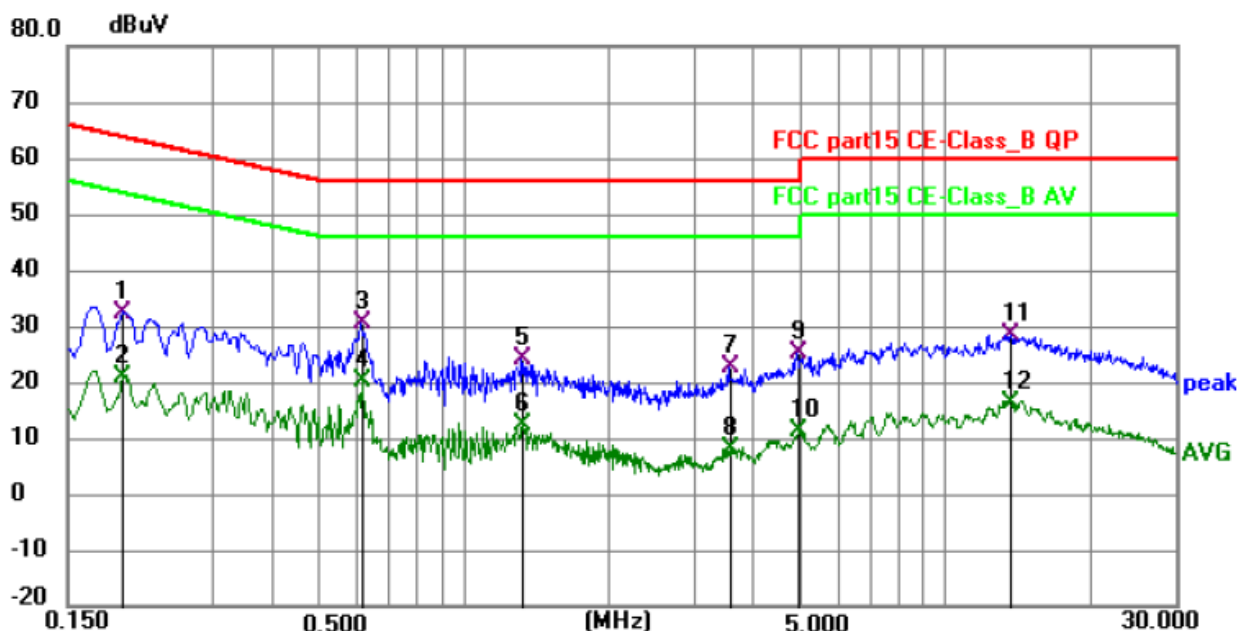
Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1949	22.33	10.08	32.41	63.83	-31.42	QP	P	
2	0.1949	10.14	10.08	20.22	53.83	-33.61	AVG	P	
3	0.3480	18.19	10.25	28.44	59.01	-30.57	QP	P	
4	0.3480	6.89	10.25	17.14	49.01	-31.87	AVG	P	
5	0.6180	21.13	10.13	31.26	56.00	-24.74	QP	P	
6 *	0.6180	11.41	10.13	21.54	46.00	-24.46	AVG	P	
7	1.4550	12.84	10.05	22.89	56.00	-33.11	QP	P	
8	1.4550	-0.58	10.05	9.47	46.00	-36.53	AVG	P	
9	4.9604	12.67	10.38	23.05	56.00	-32.95	QP	P	
10	4.9604	-1.55	10.38	8.83	46.00	-37.17	AVG	P	
11	14.9954	16.64	11.67	28.31	60.00	-31.69	QP	P	
12	14.9954	3.72	11.67	15.39	50.00	-34.61	AVG	P	



Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 2



Remark:

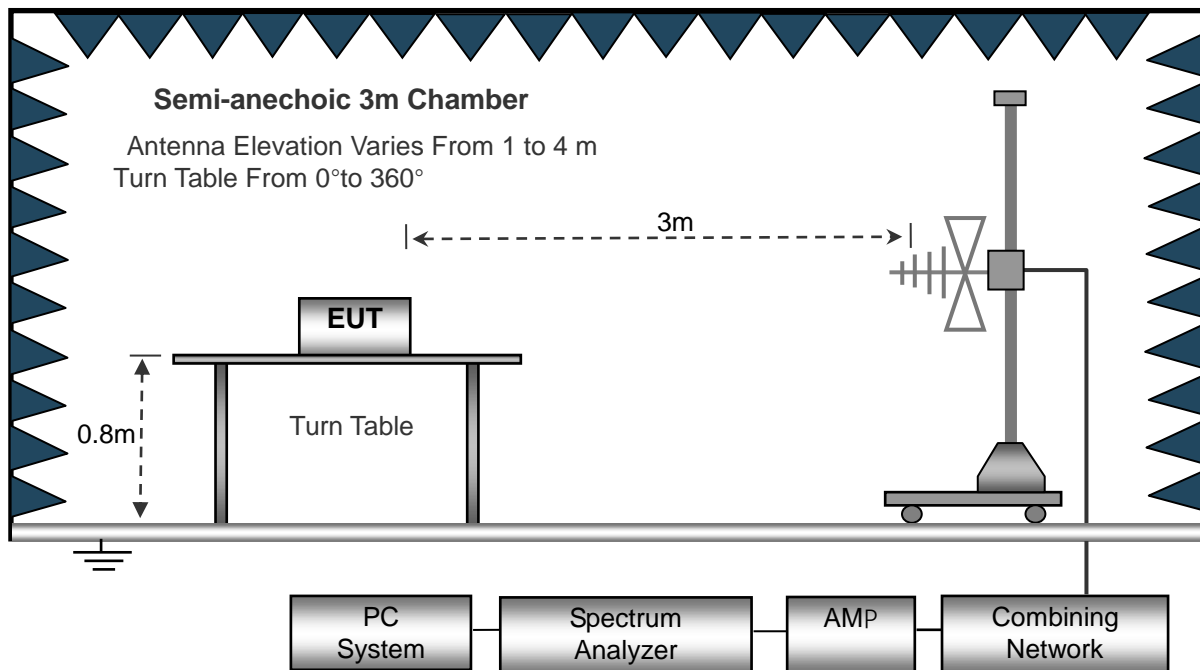
Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1965	22.23	10.16	32.39	63.76	-31.37	QP	P	
2	0.1965	10.75	10.16	20.91	53.76	-32.85	AVG	P	
3 *	0.6180	20.38	10.16	30.54	56.00	-25.46	QP	P	
4	0.6180	9.90	10.16	20.06	46.00	-25.94	AVG	P	
5	1.3245	13.85	10.09	23.94	56.00	-32.06	QP	P	
6	1.3245	2.10	10.09	12.19	46.00	-33.81	AVG	P	
7	3.5700	12.57	10.11	22.68	56.00	-33.32	QP	P	
8	3.5700	-1.90	10.11	8.21	46.00	-37.79	AVG	P	
9	4.9425	14.85	10.31	25.16	56.00	-30.84	QP	P	
10	4.9425	1.08	10.31	11.39	46.00	-34.61	AVG	P	
11	13.6230	16.94	11.48	28.42	60.00	-31.58	QP	P	
12	13.6230	4.83	11.48	16.31	50.00	-33.69	AVG	P	

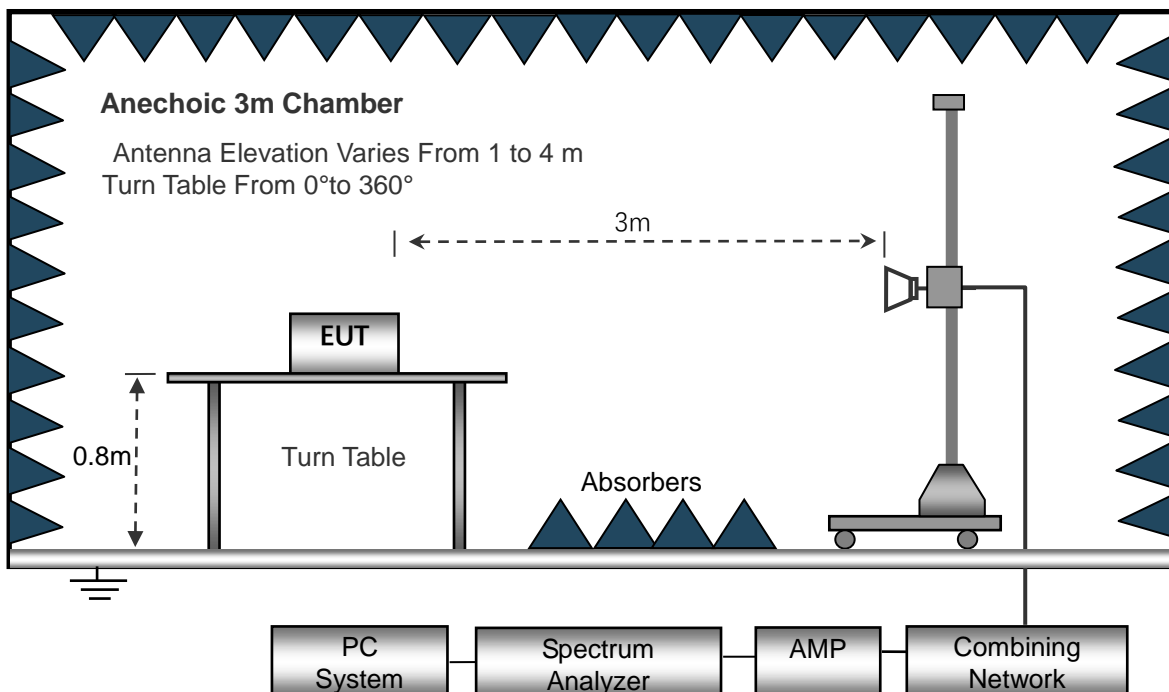
6. RADIATION EMISSION TEST

6.1 Block Diagram of Test Setup

Below 1GHz



Above 1GHz



6.2 Test Standard and Limit

FCC PART 15 B

Below 1GHz



Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 88	3	40.0
88 ~ 216	3	43.5
216 ~ 960	3	46.0
960 ~ 1000	3	54.0

Above 1GHz

Frequency MHz	Distance (Meters)	Field Strengths Limits dB(μ V)/m	Detector
1000 ~ 40000	3	74.0	PEAK
1000 ~ 40000	3	54.0	AVERAGE

Remark:

(1) The smaller limit shall apply at the cross point between two frequency bands.

(2) Distance refers to the distance in meters between the measuring instrument, antenna and the closed point of any part of the device or system.

6.3 EUT Configuration on Test

The FCC PART 15 B regulations test method must be used to find the maximum emission during radiated emission test.

The configuration of EUT is the same as used in conducted emission test.

Please refer to Section 5.3.

6.4 Operating Condition of EUT

Same as conducted emission test, which is listed in Section 5.4 except the test set up replaced as Section 6.2.

6.5 Test Procedure

- 1) The radiated emissions test was conducted in a semi-anechoic chamber.
- 2) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.8m of insulation.
- 3) Before final measurements of radiated emissions, a pre-scan was performed in the spectrum mode with the peak detector to find out the maximum emissions spectrum plots of the EUT.
- 4) The frequencies of maximum emission were determined in the final radiated emissions measurement. At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the maximum disturbance. Measurements were performed for both horizontal and vertical antenna polarization.
- 5) The bandwidth setting on the field strength meter (R&S Test Receiver ESCI) is set at 120KHz.
- 6) The frequency range from 30MHz to 40000MHz is checked.
- 7) The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

6.6 Test Result

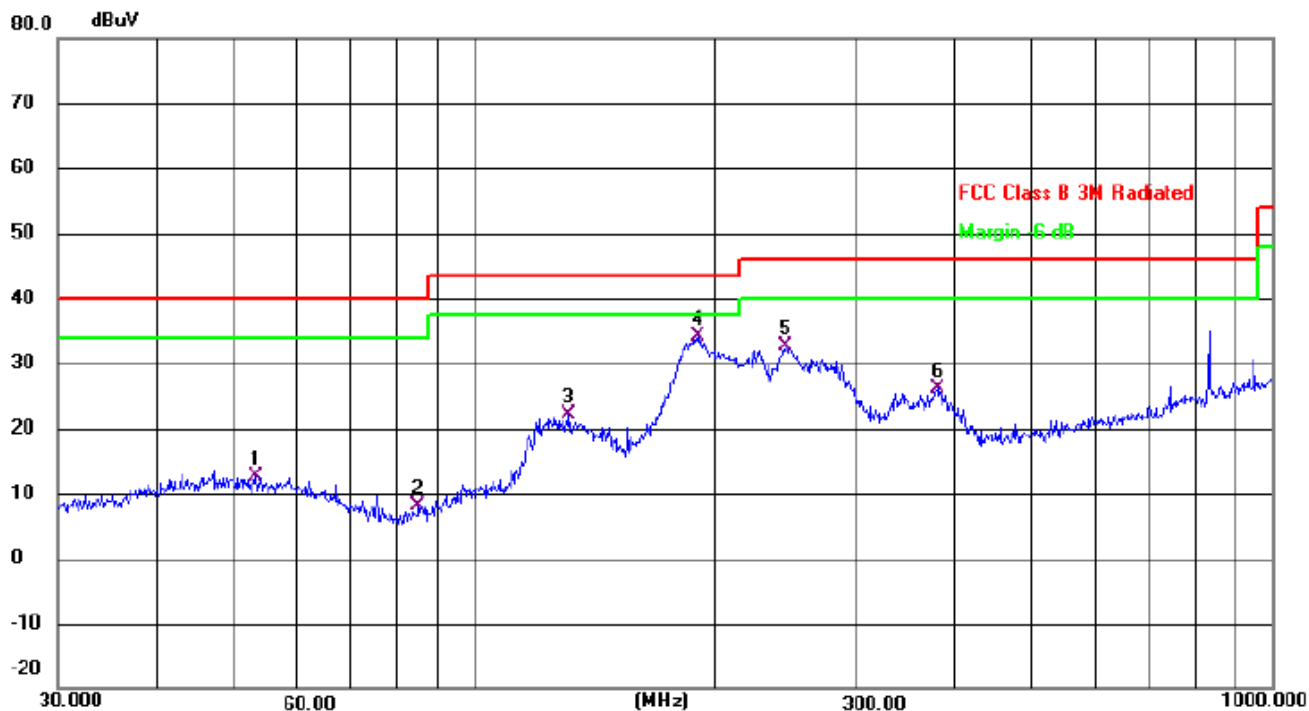
PASS

Please refer to the following page.



Radiation Emission Test Data(Below 1GHz)

Temperature:	24.5℃	Relative Humidity:	54%
Pressure:	1009hPa	Polarization:	Horizontal
Test Voltage:	DC 3.7V	Test Mode:	Mode 1



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dB	Margin dB	Detector
1	53.1313	25.67	-13.07	12.60	40.00	-27.40	QP
2	84.9993	26.10	-18.01	8.09	40.00	-31.91	QP
3	131.2965	39.96	-17.87	22.09	43.50	-21.41	QP
4 *	190.4050	49.83	-15.61	34.22	43.50	-9.28	QP
5	245.0900	45.89	-13.23	32.66	46.00	-13.34	QP
6	379.9141	35.72	-9.64	26.08	46.00	-19.92	QP

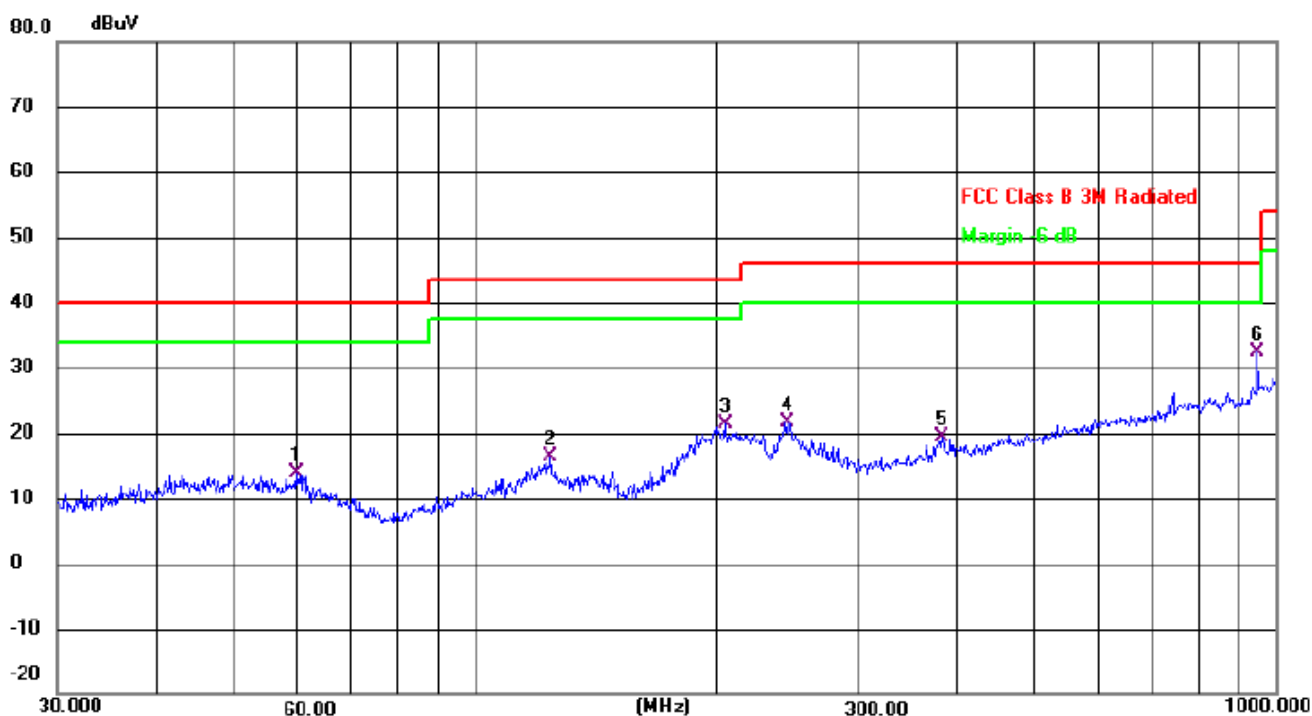
Remark:

Correct Factor=Cable loss+Antenna factor-Preamplifier

Measurement Level = Reading Level + Correct Factor; Margin = Measurement Level- Limit;



Radiation Emission Test Data(Below 1GHz)			
Temperature:	24.5℃	Relative Humidity:	54%
Pressure:	1009hPa	Polarization:	Vertical
Test Voltage:	DC 3.7V	Test Mode:	Mode 1



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz	dBuV	dB	dBuV	dB	dB	Detector
1		59.6492	27.47	-13.61	13.86	40.00	-26.14	QP
2		124.1329	33.66	-17.40	16.26	43.50	-27.24	QP
3		204.9550	36.14	-14.85	21.29	43.50	-22.21	QP
4		245.0900	34.81	-13.23	21.58	46.00	-24.42	QP
5		382.5878	29.04	-9.71	19.33	46.00	-26.67	QP
6	*	948.7608	32.59	-0.27	32.32	46.00	-13.68	QP

Remark:

Correct Factor=Cable loss+Antenna factor-Preamplifier

Measurement Level = Reading Level + Correct Factor; Margin = Measurement Level- Limit;



1GHz-40GHz has been tested, and the test margin above 6G is greater than 20dB, which is not recorded in the report.

Radiation Emission Test Data(Above 1GHz)			
Temperature:	24.5℃	Relative Humidity:	54%
Pressure:	1009hPa	Polarization:	Horizontal
Test Voltage:	DC 3.7V	Test Mode:	Mode 2



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		3175.000	52.94	-6.57	46.37	74.00	-27.63	peak
2		3475.000	53.09	-6.43	46.66	74.00	-27.34	peak
3		3910.000	54.37	-7.13	47.24	74.00	-26.76	peak
4		4250.000	54.24	-6.83	47.41	74.00	-26.59	peak
5	*	4955.000	53.05	-5.61	47.44	74.00	-26.56	peak
6		5455.000	52.44	-5.23	47.21	74.00	-26.79	peak

Remark:

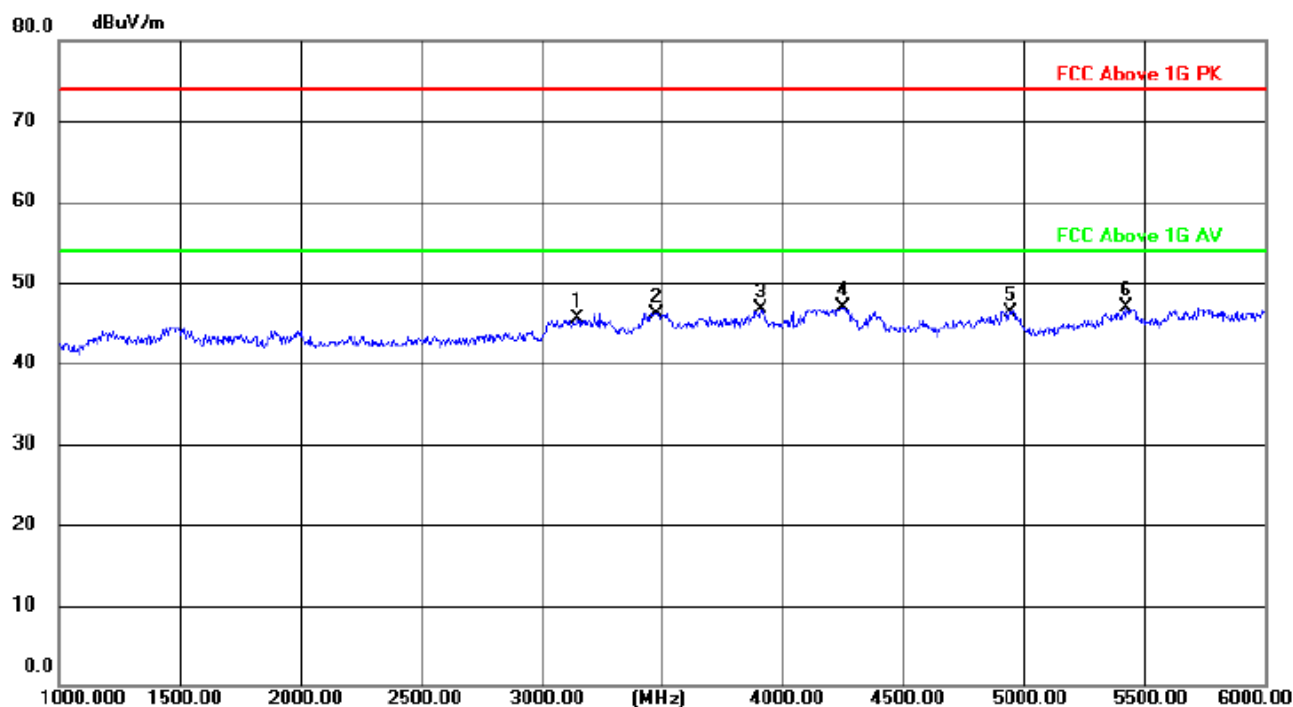
Correct Factor=Cable loss+Antenna factor-Preamplifier

Measurement Level = Reading Level + Correct Factor; Margin = Measurement Level- Limit;



Radiation Emission Test Data(Above 1GHz)

Temperature:	24.5℃	Relative Humidity:	54%
Pressure:	1009hPa	Polarization:	Vertical
Test Voltage:	DC 3.7V	Test Mode:	Mode 2



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		3150.000	52.02	-6.57	45.45	74.00	-28.55	peak
2		3475.000	52.59	-6.43	46.16	74.00	-27.84	peak
3		3910.000	53.87	-7.13	46.74	74.00	-27.26	peak
4	*	4250.000	53.74	-6.83	46.91	74.00	-27.09	peak
5		4940.000	51.97	-5.63	46.34	74.00	-27.66	peak
6		5425.000	52.06	-5.24	46.82	74.00	-27.18	peak

Remark:

Correct Factor=Cable loss+Antenna factor-Preamplifier

Measurement Level = Reading Level + Correct Factor; Margin = Measurement Level- Limit;



7. TEST SEUUP PHOTO

Reference to the appendix I for details.

8. EUT PHOTOGRAPHS

Reference to the appendix II for details.

******* END OF REPORT *******