FCC Test Report

Test Report
On Behalf of
GUANGDONG DP CO., LTD.
For
portable power station
Model No.: DP-HW1000L

FCC ID: 2BEU2-DP-HW1000L

Prepared For: GUANGDONG DP CO., LTD.
No.12 Keyuan Road, Private Science Park, Baiyun District, Guangzhou, China

Prepared By: Shenzhen HUAK Testing Technology Co., Ltd.
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Date of Test: Jan. 09, 2024 ~ May. 08, 2024
Date of Report: May. 08, 2024
Report Number: HK2310164780-1E

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Test Result Certification

Applicant's Name..... : GUANGDONG DP CO., LTD.

Address..... : No.12 Keyuan Road, Private Science Park, Baiyun District, Guangzhou, China

Manufacturer's Name ..... : GUANGDONG DP CO., LTD.

Address..... : No.12 Keyuan Road, Private Science Park, Baiyun District, Guangzhou, China

Product Description

Trade Mark ..... : DP

Product Name ..... : portable power station

Model and/or Type Reference: DP-HW1000L

Standards ..... : FCC Rules and Regulations Part 15 Subpart C (Section 15.209), ANSI C63.10: 2013

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Date of Test .....:

Date (s) of Performance of Tests .....: **Jan. 09, 2024 ~ May. 08, 2024**

Date of Issue.....: **May. 08, 2024**

Test Result.....: **Pass**

Testing Engineer : Len Liao

(Len Liao)

Technical Manager : Sliver Wan

(Sliver Wan)

Authorized Signatory : Jason Zhou

(Jason Zhou)

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** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	May. 08, 2024	Jason Zhou

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Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

1. Test Summary

1.1. Test Procedures and Results

Description of Test	Section Number	Result
CONDUCTED EMISSIONS TEST	15.207	COMPLIANT
RADIATED EMISSION TEST	15.209	COMPLIANT
ANTENNA REQUIREMENT	15.203	COMPLIANT

Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

1.2. Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization：
A2LA Accreditation Code is 4781.01.
FCC Designation Number is CN1229.
Canada IC CAB identifier is CN0045.
CNAS Registration Number is L9589.

1.3. Measurement Uncertainty

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.71dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.90dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	3.90dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.28dB, k=2

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2. General Information

2.1. General Description of EUT

Equipment:	portable power station
Model Name:	DP-HW1000L
Series Models:	N/A
Model Difference:	N/A
Trade Mark:	N/A
FCC ID:	**2BEU2-DP-HW1000L**
Antenna Type:	Coil Antenna
Antenna Gain:	0dBi
Operation Frequency:	112KHz~205KHz
Test Frequency:	118KHz
Number of Channels:	1
Modulation Type:	ASK
Power Source:	DC Input: 12-26VDC, 180W Max. PV Input: 12-26VDC, 8A DC5521 Output: 12VDC, 5A Cigarette lighter Output: 12VDC, 10A Wireless Output: 15W USB-A Output: 5VDC or 9VDC or 12VDC, 18W Max. USB-C Output: 5VDC or 9VDC or 12VDC or 15VDC or 20VDC, 60W Max. AC Output: 230V, 50Hz, 1000W Battery capacity: 22.4V, 45Ah, 1008Wh
Power Rating:	DC Input: 12-26VDC, 180W Max. PV Input: 12-26VDC, 8A DC5521 Output: 12VDC, 5A Cigarette lighter Output: 12VDC, 10A Wireless Output: 15W USB-A Output: 5VDC or 9VDC or 12VDC, 18W Max. USB-C Output: 5VDC or 9VDC or 12VDC or 15VDC or 20VDC, 60W Max. AC Output: 230V, 50Hz, 1000W Battery capacity: 22.4V, 45Ah, 1008Wh

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2.2. Carrier Frequency of Channels

Operation Frequency each of channel	
Channel	Frequency
Middle CH	118KHz

2.3. Operation of EUT during Testing

Test Item	Test mode	Description
Radiated & Conducted test cases	Mode 1	AC/DC Adapter+ EUT +Wireless load (Full Load)
	Mode 2	AC/DC Adapter+ EUT +Wireless load (Half Load)
	Mode 3	AC/DC Adapter+ EUT +Wireless load (Null Load)
	Mode 4	EUT +Wireless load (Full Load)
	Mode 5	EUT +Wireless load (Half Load)
	Mode 6	EUT +Wireless load (Null Load)

Note:

1. All modes and configurations above have been tested, Only the result of the worst case was recorded in the report, the conducted worst-case configuration is Mode 1 and the radiated worst-case configuration is Mode 4.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. The wireless load replaces the Mobile Phone by Lab.
4. According to the manufacturer's design principle, the wireless charging power will reach its maximum when the client device's battery level is between 1% and 10%.

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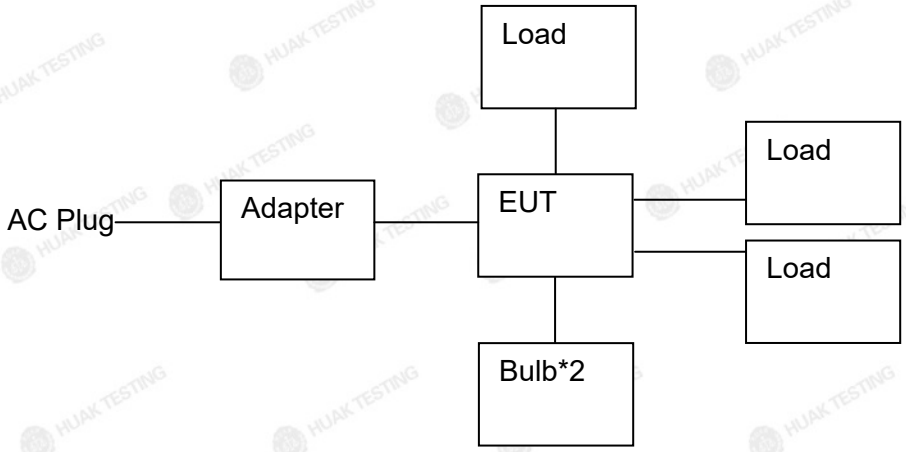
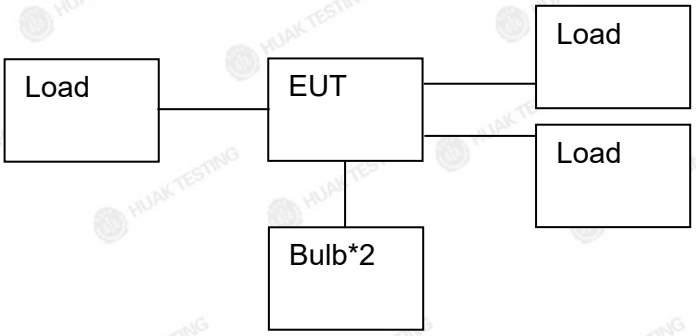
2.4. Description of Test Setup

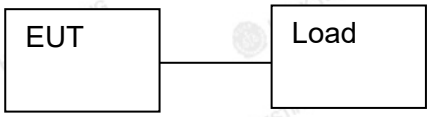
Operation of EUT during conducted testing:



Operation of EUT during radiation below 1GHz testing:



Operation of EUT during radiation 9KHz-30MHz testing:



The sample was placed (0.8m (30MHz~1GHz), 0.8m (9KHz~30MHz)) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.

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2.5. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Note
1	portable power station	DP	DP-HW1000L	N/A	EUT
2	Adapter	N/A	A1801-24007200DI	Input: AC100-240V, 50/60Hz, 2.5A USB Output: DC24V-7.2A,172.8W	Accessory
3	Bulb*2	N/A	N/A	AC220V, 200W	Peripheral
4	Load	YBZ	N/A	15W Max	Peripheral
5	Cement load	N/A	N/A	4 Ω	Peripheral
6	Cement load	N/A	N/A	1.2 Ω	Peripheral

Note:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

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2.6. Measurement Instruments List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N.	R&S	ENV216	HKE-002	Feb. 20, 2024	1 Year
2.	L.I.S.N.	R&S	ENV216	HKE-059	Feb. 20, 2024	1 Year
3.	EMI Test Receiver	R&S	ESR	HKE-005	Feb. 20, 2024	1 Year
4.	Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 20, 2024	1 Year
5.	Spectrum analyzer	R&S	FSV3044	HKE-126	Feb. 20, 2024	1 Year
6.	Preamplifier	EMCI	EMC051845 S	HKE-006	Feb. 20, 2024	1 Year
7.	Preamplifier	Schwarzbeck	BBV 9743	HKE-016	Feb. 20, 2024	1 Year
8.	Preamplifier	A.H. Systems	SAS-574	HKE-182	Feb. 20, 2024	1 Year
9.	6d Attenuator	Pasternack	6db	HKE-184	Feb. 20, 2024	1 Year
10.	EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	Feb. 20, 2024	1 Year
11.	Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	Feb. 21, 2024	2 Year
12.	Loop Antenna	COM-POWER	AL-130R	HKE-014	Feb. 21, 2024	2 Year
13.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Feb. 21, 2024	2 Year
14.	EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	/	/
15.	EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/

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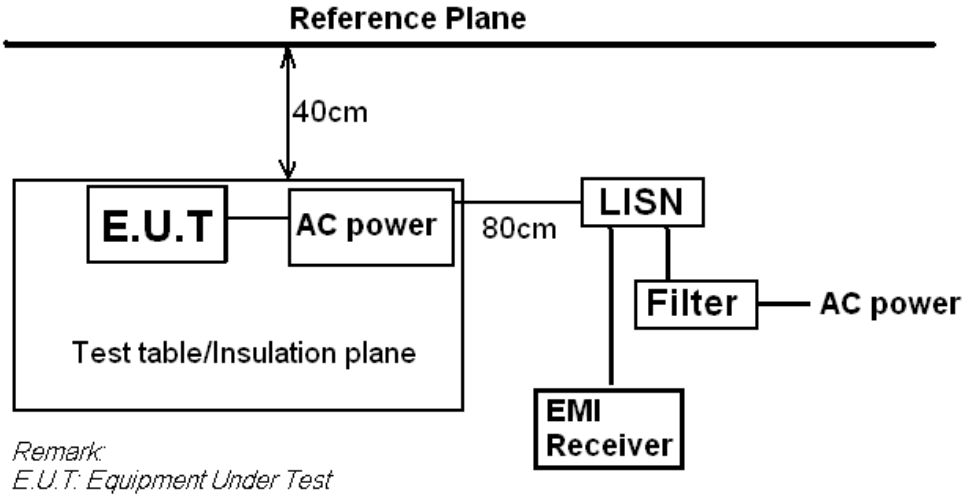
3. Conducted Emission Test

3.1. Block Diagram of Test Setup



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

3.2. Conducted Power Line Emission Limit

According to FCC Part 15.207(a)

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency
For intentional device, according to §15.207 Line Conducted Emission Limit is same as above table.

3.3. 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.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's 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.

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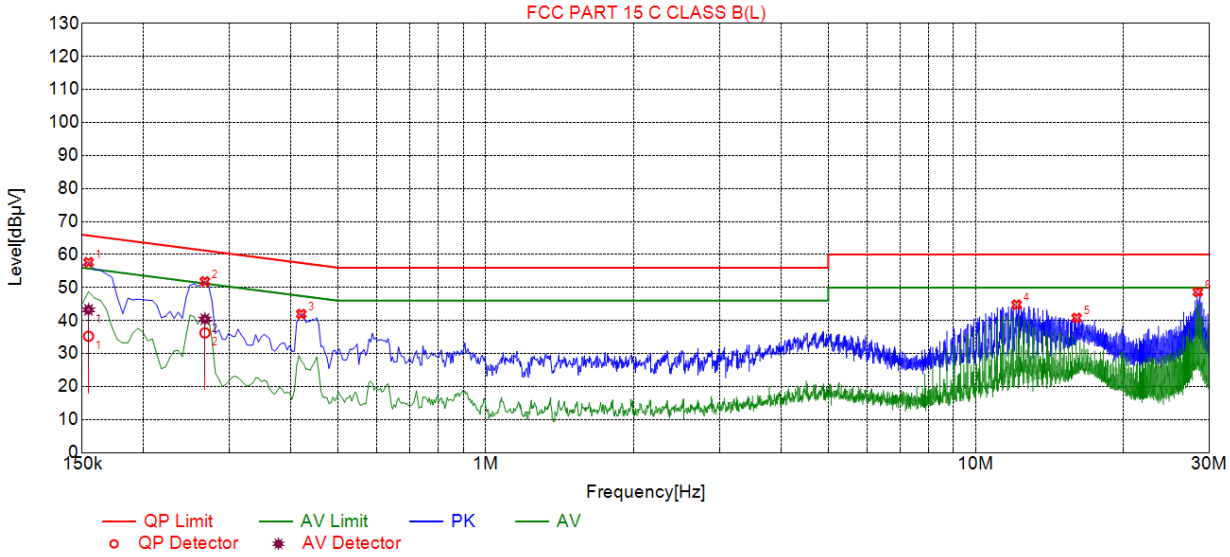
3.4. Test Result

PASS

All the test modes completed for test. Only the worst result of Full Load was reported as below:

Test Specification: Line



Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.1545	57.66	20.03	65.81	8.15	37.63	PK	L
2	0.2670	51.84	20.03	61.26	9.42	31.81	PK	L
3	0.4200	41.98	20.04	57.46	15.48	21.94	PK	L
4	12.1200	44.82	19.99	60.00	15.18	24.83	PK	L
5	16.0665	40.80	19.98	60.00	19.20	20.82	PK	L
6	28.4190	48.65	20.26	60.00	11.35	28.39	PK	L

Final Data List											
NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	QP Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	AV Reading [dBµV]	Type
1	0.1545	20.03	35.25	65.75	30.50	15.22	43.25	55.75	12.50	23.22	L
2	0.2670	20.03	36.26	61.21	24.95	16.23	40.42	51.21	10.79	20.39	L

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

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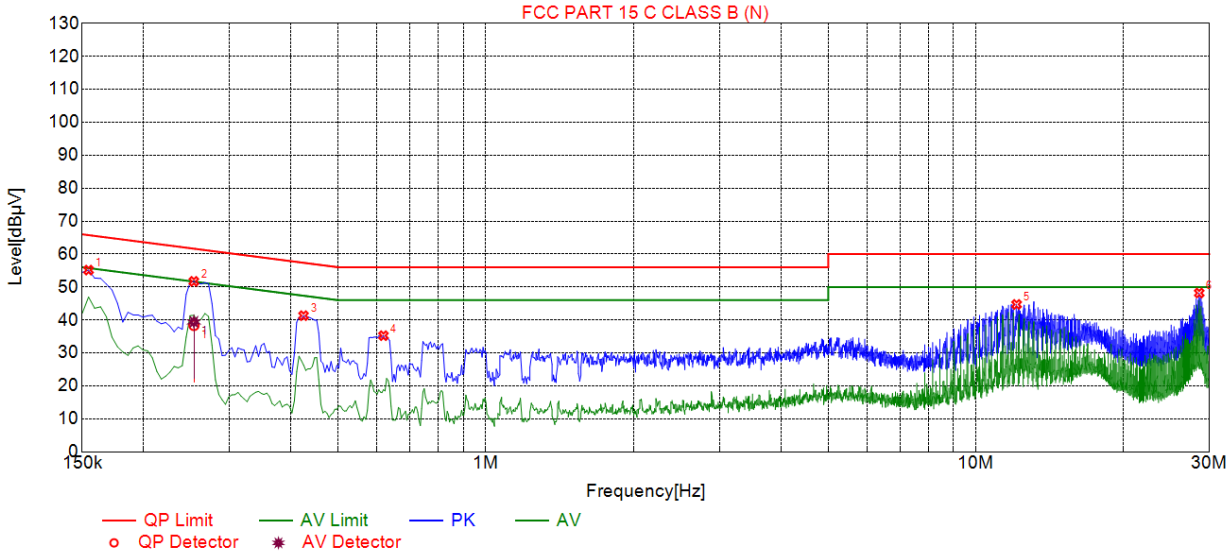
Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1545	55.14	20.03	65.81	10.67	35.11	PK	N
2	0.2535	51.73	20.04	61.71	9.98	31.69	PK	N
3	0.4245	41.31	20.04	57.39	16.08	21.27	PK	N
4	0.6180	35.24	20.05	56.00	20.76	15.19	PK	N
5	12.1200	44.72	19.99	60.00	15.28	24.73	PK	N
6	28.5990	48.18	20.26	60.00	11.82	27.92	PK	N

Final Data List

NO.	Freq. [MHz]	Correction factor[dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	QP Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	AV Reading [dBμV]	Type
1	0.2535	20.04	38.36	61.64	23.28	18.32	39.42	51.64	12.22	19.38	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

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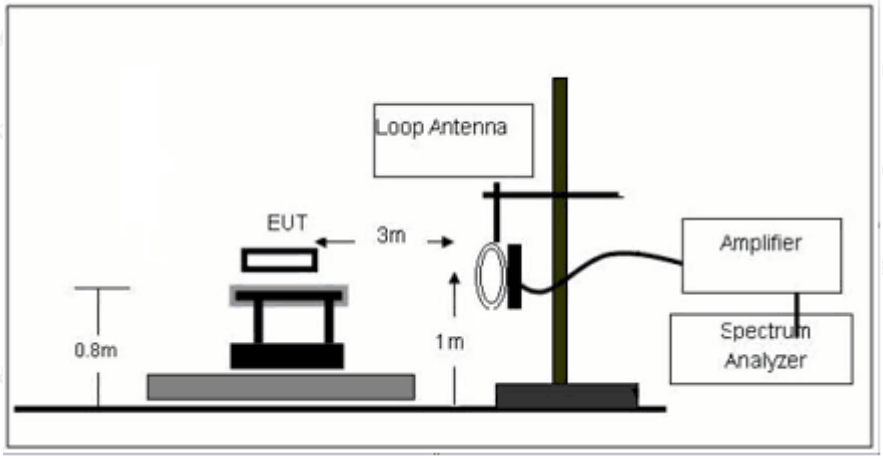
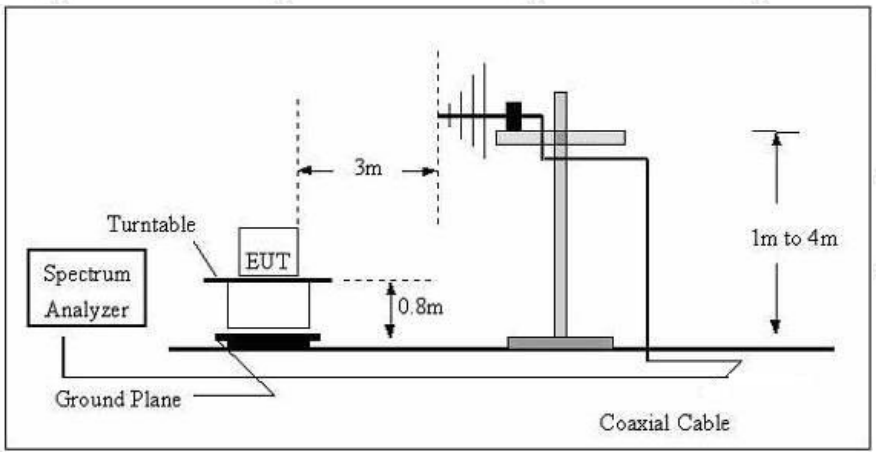
4. Radiated Emissions

4.1. Block Diagram of Test Setup





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4.2. Rules and Specifications

CFR 47 Part 15, section 15.205

Only spurious emissions are permitted in any of the frequency bands listed the tables in these sections.

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
\1\ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293.	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(\2\)
13.36-13.41			

CFR 47 Part 15, section 15.209

The emissions from an intentional radiator shall not exceed the limits in the tables in these sections using an average detector.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

Limit calculation and transfer to 3m distance as showed in the following table:

Frequency (MHz)	Limit (dBuV/m)	Distance (m)
0.009-0.490	20log(2400/F(KHz))+40log(300/3)	3
0.490-1.705	20log(24000/F(KHz))+40log(30/3)	3
1.705-30.0	69.5	3
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

CFR 47 Part 15, section 15.35

When average radiated emission measurements are specified, the limit on the peak level of the radio Frequency emission is 20dB above the maximum permitted average emission limit.

Transmitter Spurious Emissions 9KHz-30MHz			
	9-150KHz	150-490KHz	490KHz-30MHz
Resolution Bandwidth	200Hz	9KHz	9KHz
Video Bandwidth	600Hz	30KHz	30KHz
Detector	Peak	Peak	Peak
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep Time	Auto	Auto	Auto

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4.3. Test Procedure

Measurement distance 3m
For the measurement range up to 30MHz in the following plots the field strength result from 3m
Distance measurements are extrapolated to 300m and 30m distance respectively, by 40dB/decade, Per antenna factor scaling.
Measurements below 1000MHz are performed with a peak detector and compared to average limits, Measurements with an average detector are not required.

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

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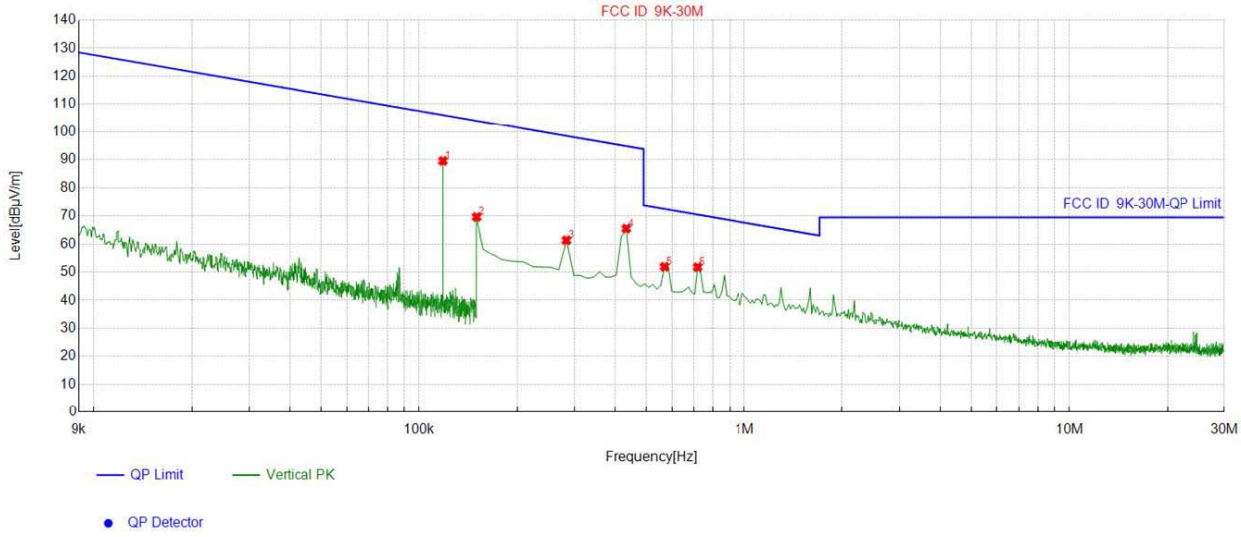
4.4. Test Result

PASS

Note: All the test modes completed for test. Only the worst result Full Load was reported as below:
For 9KHz - 30MHz

For 9KHz - 30MHz
Coaxial:



Suspected List						
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
1	0.118259	13.79	75.78	89.57	106.14	16.57
2	0.15	13.76	55.72	69.48	104.08	34.60
3	0.284392	13.69	47.62	61.31	98.52	37.21
4	0.433717	13.77	51.72	65.49	94.86	29.37
5	0.568109	13.72	38.18	51.90	72.52	20.62
6	0.717434	13.84	37.92	51.76	70.50	18.74

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

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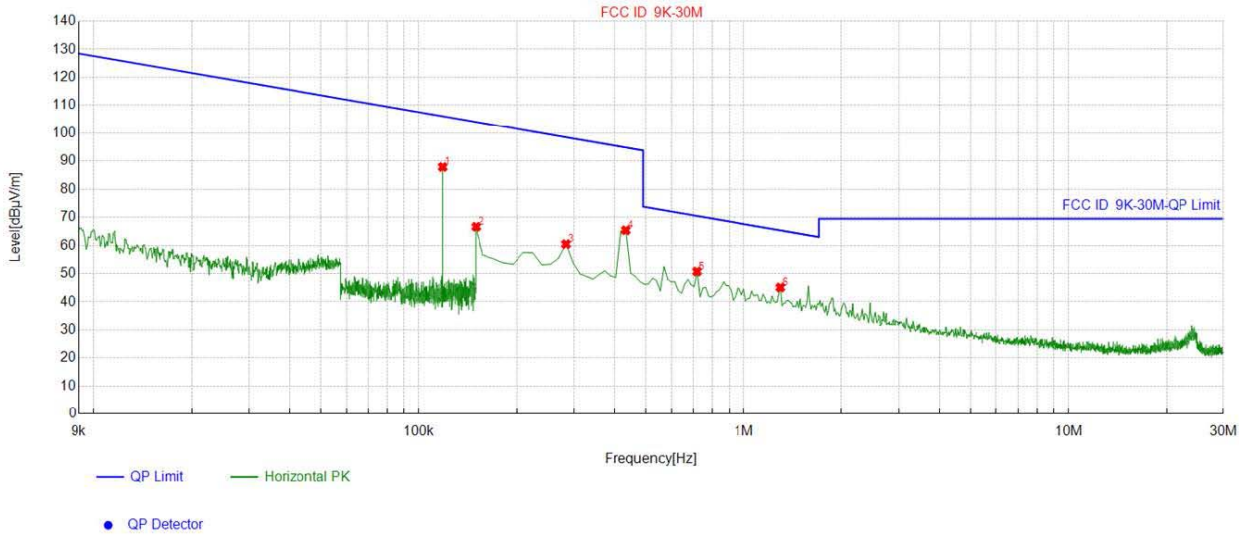
Coplanar:



Suspected List						
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]
1	0.11833	13.79	74.10	87.89	106.14	18.25
2	0.15	13.76	52.75	66.51	104.08	37.57
3	0.284392	13.69	46.80	60.49	98.52	38.03
4	0.433717	13.77	51.62	65.39	94.86	29.47
5	0.717434	13.84	36.93	50.77	70.50	19.73
6	1.2998	14.24	30.84	45.08	65.35	20.27

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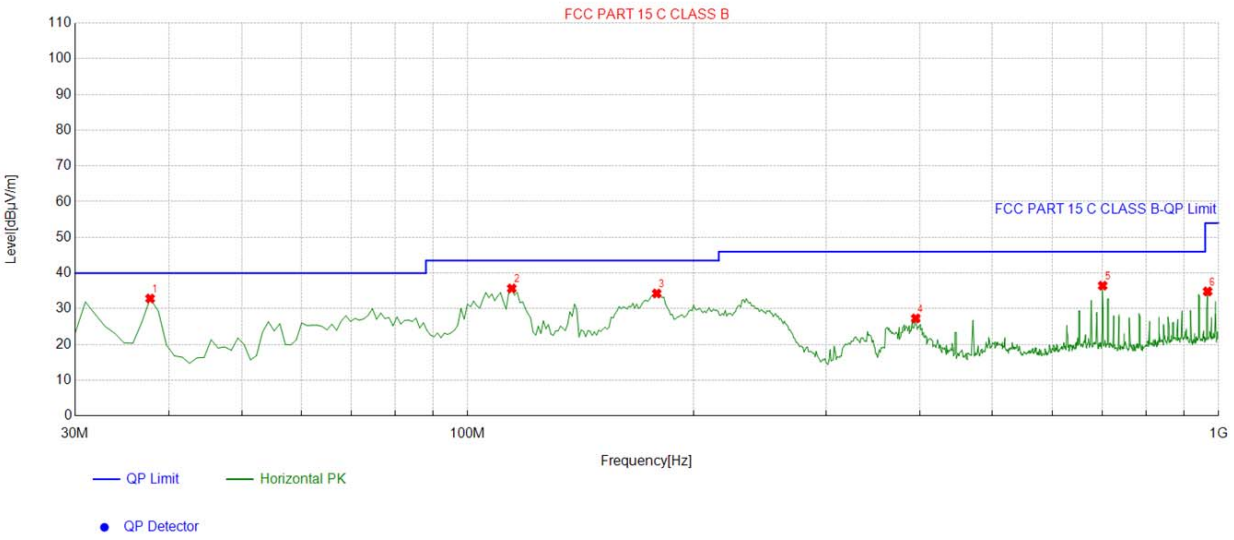
For 30MHz-1GHz

Antenna polarity: H



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	37.767768	-15.62	48.50	32.88	40.00	7.12	100	1	Horizontal
2	114.47447	-15.10	50.79	35.69	43.50	7.81	100	357	Horizontal
3	178.55855	-17.36	51.64	34.28	43.50	9.22	100	327	Horizontal
4	395.08508	-9.78	37.09	27.31	46.00	18.69	100	0	Horizontal
5	700.94094	-3.72	40.19	36.47	46.00	9.53	100	40	Horizontal
6	966.98698	0.03	34.83	34.86	54.00	19.14	100	305	Horizontal

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;

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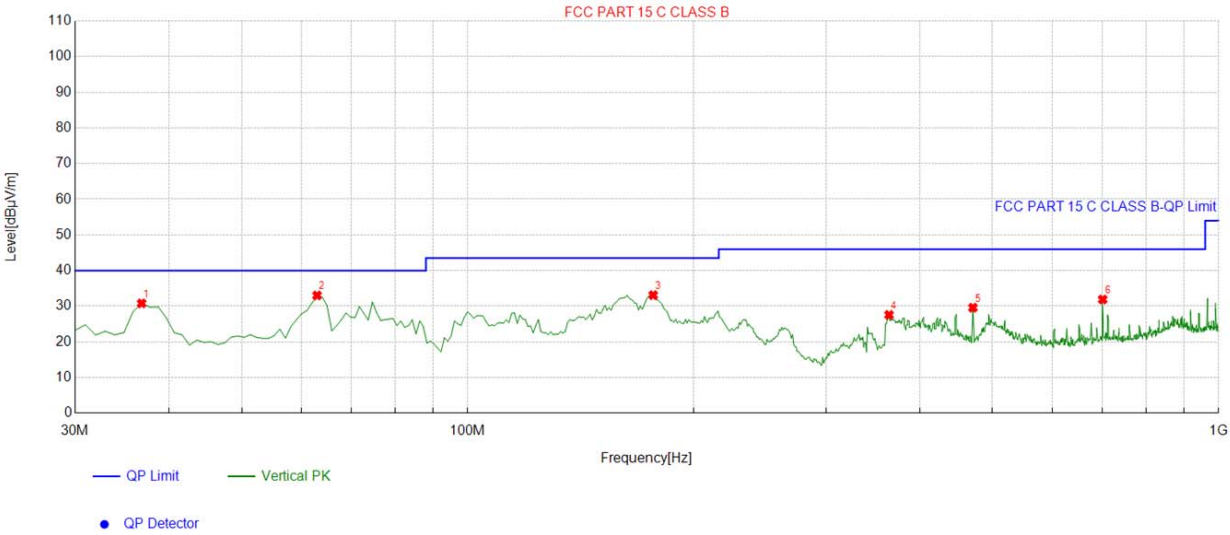
Antenna polarity: V



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.796797	-15.71	46.51	30.80	40.00	9.20	100	99	Vertical
2	63.013013	-14.38	47.41	33.03	40.00	6.97	100	248	Vertical
3	176.61661	-17.08	50.19	33.11	43.50	10.39	100	300	Vertical
4	364.01401	-11.12	38.69	27.57	46.00	18.43	100	251	Vertical
5	470.82082	-8.02	37.61	29.59	46.00	16.41	100	143	Vertical
6	700.94094	-3.72	35.61	31.89	46.00	14.11	100	124	Vertical

Remark: Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;

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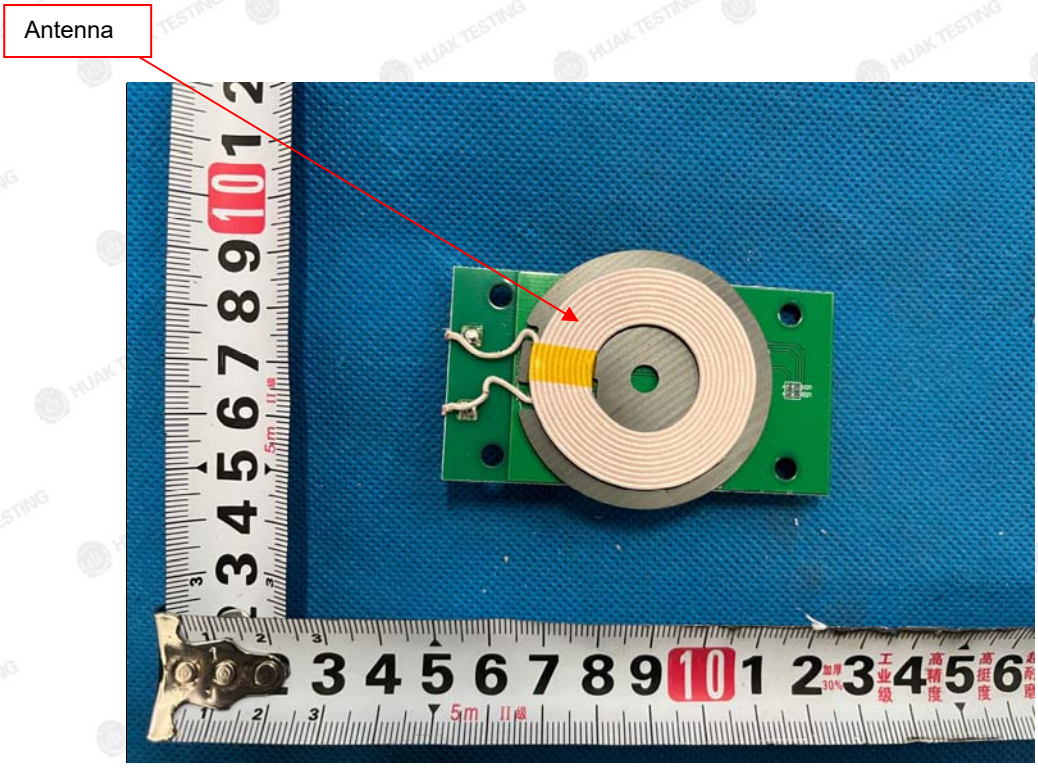
5. Antenna Requirement

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.

Refer to statement below for compliance.
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction
The antenna used in this product is a Coil Antenna, which permanently attached. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 0dBi.



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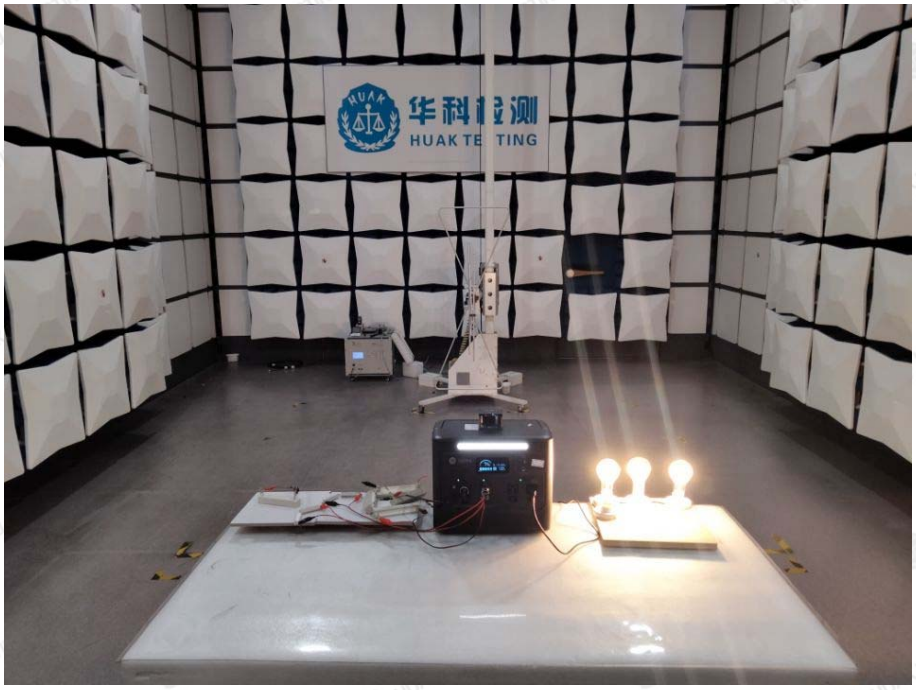
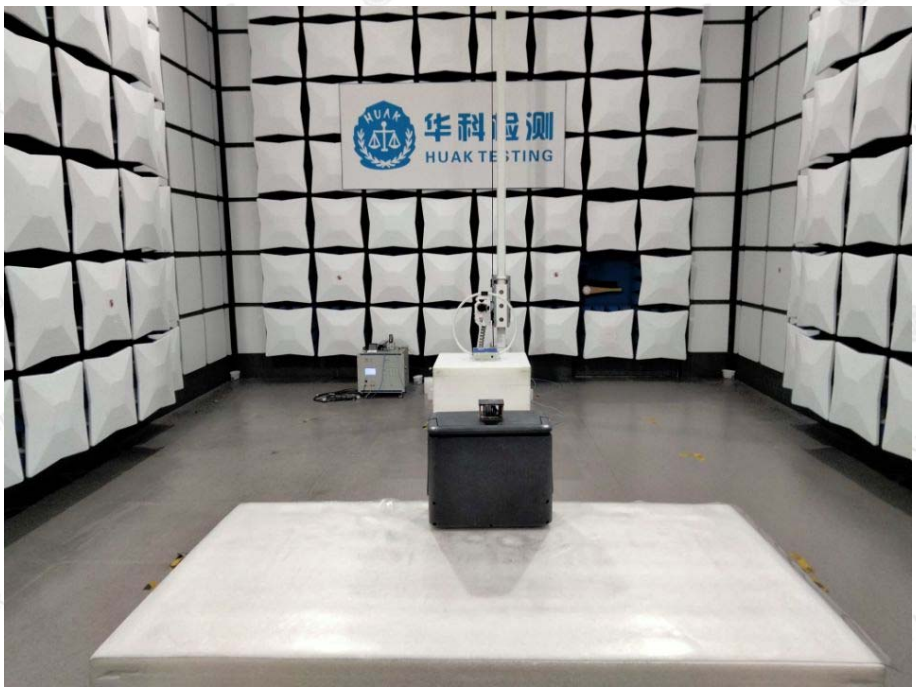
6. Photograph of Test

Radiated Emission





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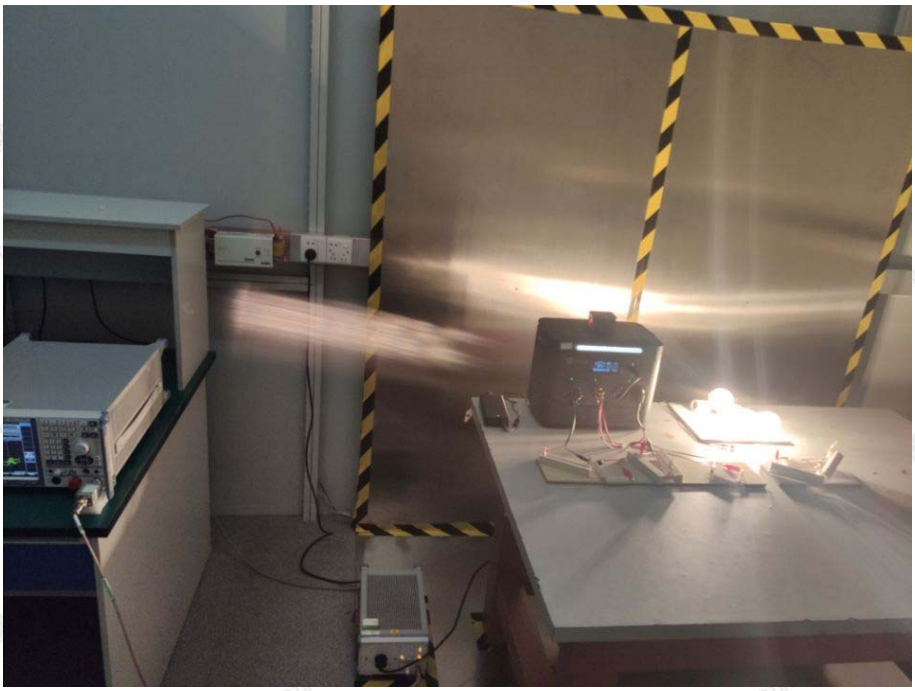
Conducted Emission



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7. Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos.

---------End of test report---------

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