



EMC TEST REPORT

Product Name: HUD speed display

FCC ID: 2BQ58-Y03

Trade mark: N/A

Model No.: Y03, Y02, Y05

S/N: /

Report No.: CTB25070411801E01

Applicant: Shenzhen Shadow Leopard Technology Co., Ltd

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Manufacturer: Shenzhen Shadow Leopard Technology Co., Ltd

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Date of Receipt: Jul. 04, 2025

Date of Test(s): Jul. 04, 2025 ~ Jul. 21, 2025

Date of Issue: Jul. 01, 2025

Test Standard(s): CFR47, FCC Part 15 Subpart B, ANSI C63.4: 2014

Test Result: Pass

In the configuration tested, the EUT complied with the standards specified above.

Compiled by:

Reviewed by:

Approved by:

Michael Niu

Bin Mei

Rita Xiao

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "★" indicates the testing items were fulfilled by subcontracted lab. "※" indicates the items are not in CNAS accreditation scope.

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1. Description of version

Report No.	Issue Date	Description	Approved
CTB25070411801E01	Jul. 21, 2025	Original	Valid

2. Test summary

Test procedures according to the technical standards:

Standard	Test Item	Test Result
§15.107	Conducted Emission	PASS
§15.109	Radiated Emission	PASS

3. Measurement uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %

Test Item	Frequency	Expanded Uncertainty (U_{Lab})
Conducted Emission	150 kHz to 30 MHz	± 3.1 dB
Radiated Emission	30 MHz to 1000 MHz	± 4.1 dB
Radiated Emission	1000 MHz to 6000 MHz	± 4.8 dB

4. General information

4.1. Description of EUT

Product name	HUD speed display
Trade mark	N/A
Model No.	Y03
Serial Model No.	Y02, Y05
Model Difference	All the model are the same circuit and RF module, only the appearance and model naming are different. Test sample model: Y03
Configuration	☒ Table-top ☐ Floor-standing
The highest frequency of the internal sources of the EUT	☐ below 1.705 MHz, the measurement shall only be made up to 30 MHz. ☒ between 1.705 MHz and 108 MHz, the measurement shall only be made up to 1 GHz. ☐ between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. ☐ between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. ☐ above 1 GHz, the measurement shall be made up to 5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Note: The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

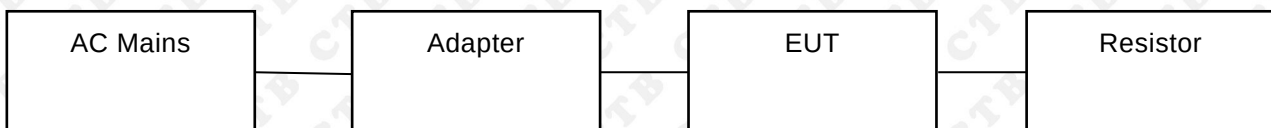
4.2. Description of accessory device

No.	Device Type	Brand	Model	Specification	Note
1.	Adapter	JIYIN	JY-05100C	N/A	AE

4.3. Test conditions

Temperature: 15-25℃
 Relative Humidity: 30-60 %
 Atmospheric pressure: 800hPa-1060hPa

4.4. Block diagram of EUT configuration



4.5. Operating condition of EUT

Operating condition	Mode 1	GPS RX	Test Voltage	DC 5V
Note: This test covers all possible operating modes of the device, only the worst data are listed in report. The worst data are shown (*) is the nearest standard limit which were recorded in this report.				

5. List of Test and Measurement Instruments

Continuous disturbance							
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated Date	Calibrated until
1	843 Shield Room	C/ R/ T	843	/	/	2024/6/22	2027/6/21
2	LISN	ROHDE&SCHWARZ	ESH3-Z5	831551852	/	2025/5/22	2026/5/21
3	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100428	V4.42.SP3	2025/5/22	2026/5/21
4	Coaxial cable	ZDECL	Z302S	18091904	/	2025/5/22	2026/5/21
5	ISN	Schwarzbeck	NTFM8158	183	/	2025/6/18	2026/6/17
6	Voltage sensor	Schwarzbeck	TK 9420	01189	/	2024/10/26	2025/10/25
7	EZ-EMC	Frad	EMC-con3A1.1	/	/	/	/
8	Current Probe	FCC	F-52B	199453	/	2025/5/24	2026/5/23
9	Communication test set	R&S	CMW500	108058	B.19.07 (E1962B)	2025/5/23	2026/5/22
10	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/5/23	2026/5/22

Radiated emission(No.2 Chamber)							
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated Date	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2024/6/8	2027/6/7
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2025/6/1	2026/5/31
3	Broadband Antenna	Schwarzbeck	VULB 9168	1471	/	2024/10/26	2025/10/25
4	Amplifier	Agilent	8449B	3008A01838	/	2025/6/3	2026/6/2
5	Preamplifier	Schwarzbeck	BBV 9743 B	00500	/	2025/5/30	2026/5/29
6	EMI TEST RECEIVER	R&S	ESCI7	100861	/	2024/10/26	2025/10/25
7	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/5/23	2026/5/22
8	EMI test software	Farad	EZ-EMC	/	Ver. FARAD-3A1+	/	/
9	Coaxial cable	Rosenberg	8m	/	/	2024/10/26	2025/10/25
10	Coaxial cable	Times	2m	/	/	2024/10/26	2025/10/25
11	Coaxial cable	Times	2m	/	/	2024/10/26	2025/10/25
12	Coaxial cable	Times	1m	/	/	2024/10/26	2025/10/25
13	loop antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/2	2026/6/1
14	Communication test set	R&S	CMW500	108058	B.19.07	2025/5/23	2026/5/22

					(E1962B)		
15	Communication test set	Agilent	E5515C	MY50102567	V3.5.80	2025/5/23	2026/5/22

6. Conducted Emission

6.1. Limit

Except for Class A devices:

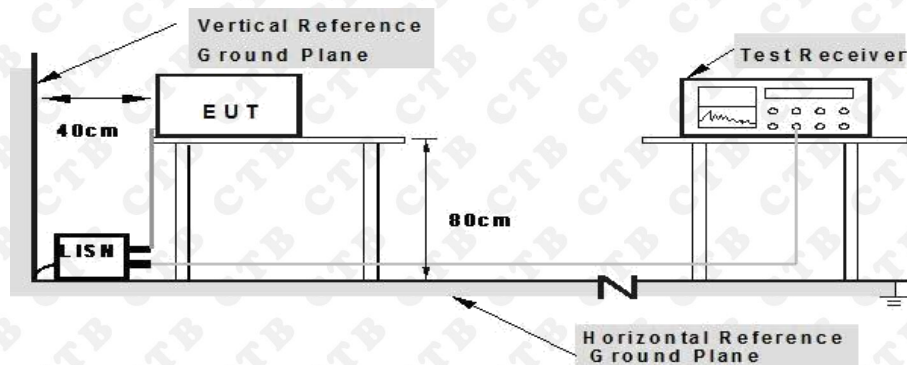
Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

Note: Decreases with the logarithm of the frequency.

For Class A devices:

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	79	66
0.5-30	73	60

6.2. Test setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

The setup of EUT is according with ANSI C63.4 measurement procedure. Specification used with FCC Part 15 limits.

6.3. EMI test receiver setup

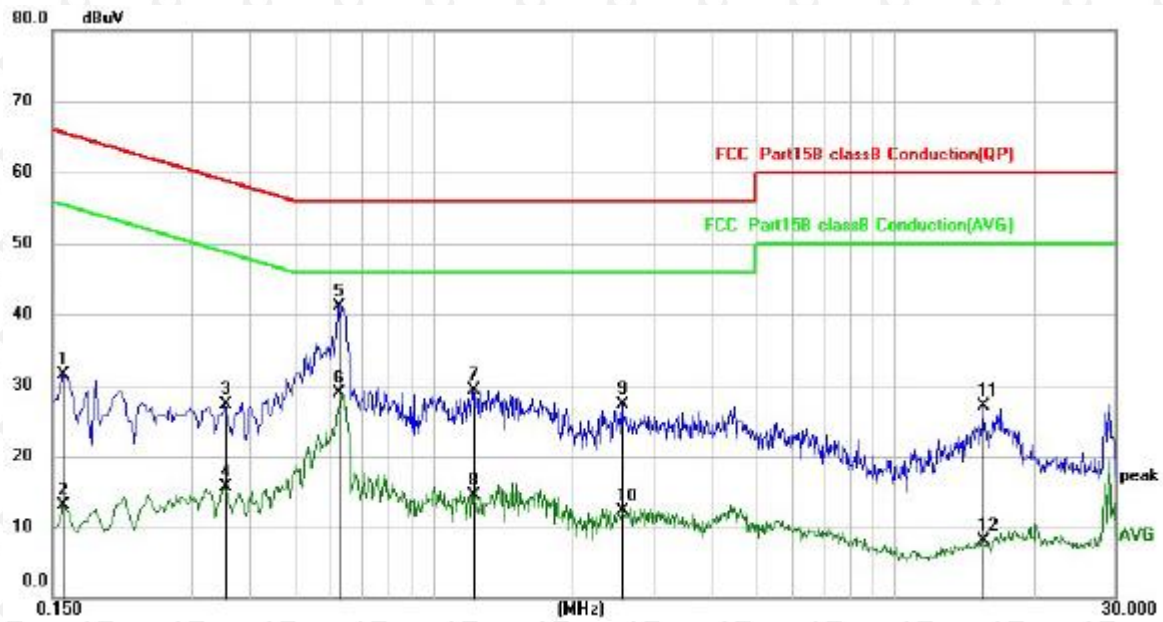
Frequency Range	9kHz-30MHz
Resolution Bandwidth	200Hz (9kHz-150kHz) 9kHz (150kHz-30MHz)

6.4. Test procedure

- Measurement was performed in shielded room, and instruments used were followed clause 4 of ANSI C63.4.
- Detailed test procedure was following clause 7 of ANSI C63.4.
- Frequency range 150kHz – 30MHz was checked and EMI receiver measurement bandwidth was set to 9 kHz.

6.5. Test results

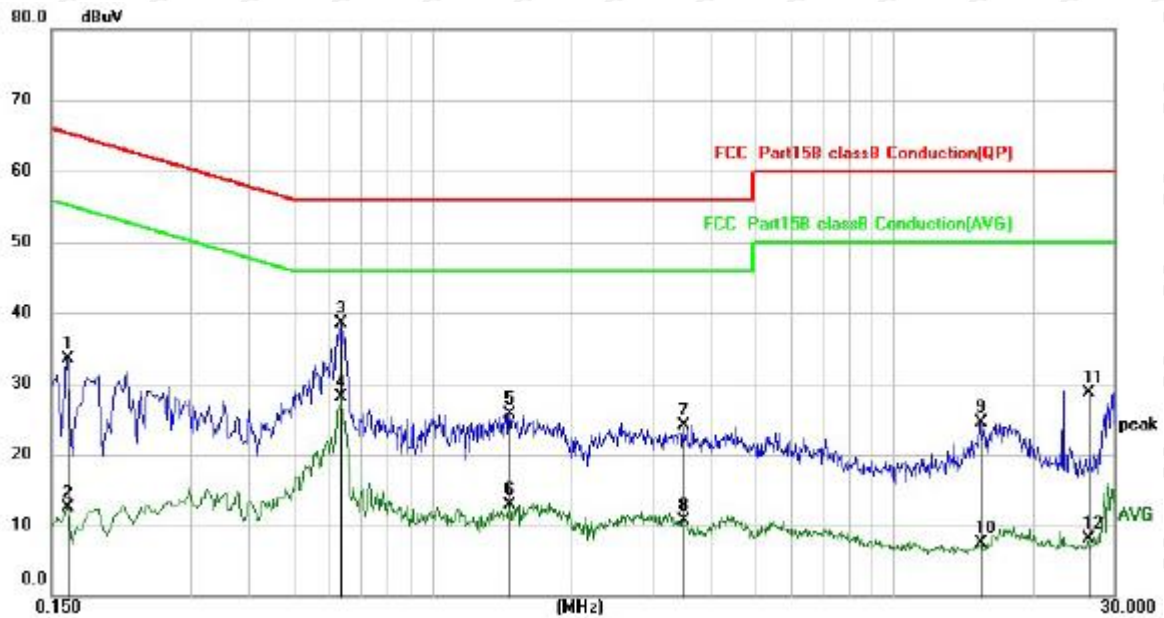
Temperature:	23℃	Relative Humidity:	54 %
Pressure:	101kPa	Phase :	Line
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	0.1580	21.50	10.07	31.57	65.57	-34.00	QP
2	0.1580	2.95	10.07	13.02	55.57	-42.55	AVG
3	0.3540	17.17	10.09	27.26	58.87	-31.61	QP
4	0.3540	5.63	10.09	15.72	48.87	-33.15	AVG
5 *	0.6260	31.09	10.10	41.19	56.00	-14.81	QP
6	0.6260	18.87	10.10	28.97	46.00	-17.03	AVG
7	1.2220	19.26	10.14	29.40	56.00	-26.60	QP
8	1.2220	4.42	10.14	14.56	46.00	-31.44	AVG
9	2.5740	17.20	10.19	27.39	56.00	-28.61	QP
10	2.5740	2.21	10.19	12.40	46.00	-33.60	AVG
11	15.5500	16.33	10.76	27.09	60.00	-32.91	QP
12	15.5500	-2.70	10.76	8.06	50.00	-41.94	AVG

Note: Result=Reading + Factor
Over Limit=Result - Limit

Temperature:	23℃	Relative Humidity:	54 %
Pressure:	101kPa	Phase :	Neutral
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 1



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1620	23.35	10.07	33.42	65.36	-31.94	QP
2		0.1620	2.47	10.07	12.54	55.36	-42.82	AVG
3	*	0.6340	28.37	10.10	38.47	56.00	-17.53	QP
4		0.6340	18.08	10.10	28.18	46.00	-17.82	AVG
5		1.4660	15.46	10.15	25.61	56.00	-30.39	QP
6		1.4660	2.71	10.15	12.86	46.00	-33.14	AVG
7		3.5020	13.86	10.22	24.08	56.00	-31.92	QP
8		3.5020	0.56	10.22	10.78	46.00	-35.22	AVG
9		15.4020	13.73	10.75	24.48	60.00	-35.52	QP
10		15.4020	-3.27	10.75	7.48	50.00	-42.52	AVG
11		26.4860	17.41	11.21	28.62	60.00	-31.38	QP
12		26.4860	-3.02	11.21	8.19	50.00	-41.81	AVG

Note: Result=Reading + Factor

Over Limit=Result – Limit

7. Radiated emissions

7.1. Limit

Except for Class A devices (at 3m):

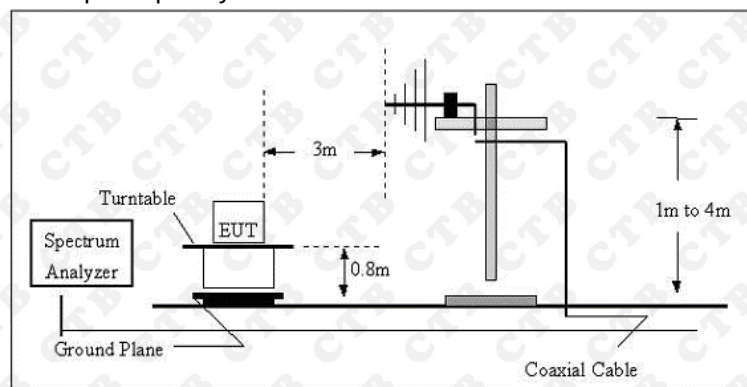
Frequency of emission (MHz)	Field strength (microvolts/meter)	
	(microvolts/meter)	(dB μ V/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

For Class A devices (at 10m):

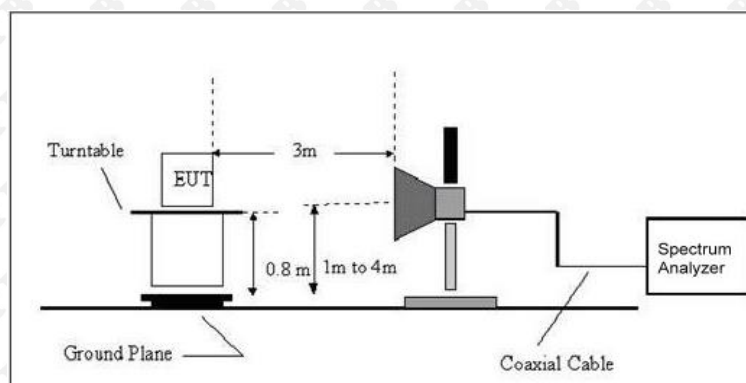
Frequency of emission (MHz)	Field strength (microvolts/meter)	
	(microvolts/meter)	(dB μ V/m)
30-88	90	39
88-216	150	43.5
216-960	210	46.4
Above 960	300	49.5

7.2. Test setup

Radiated Emission Test Set-Up Frequency Below 1 GHz



Radiated Emission Test Set-Up Frequency Above 1GHz



The radiated tests were performed in 3 meter Charmber test site, using the setup accordance with the ANSI C63.4:2014.

7.3. EMI test receiver setup and spectrum analyzer setup

During the radiated emission test, the EMI test receiver and Spectrum Analyzer were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz-1000MHz	100kHz	300kHz	120kHz	QP
Above 1GHz	1MHz	3MHz	/	PK
	1MHz	10Hz	/	AVG

7.4. Test procedure

1. The measurement was performed in a semi-anechoic chamber, and instruments used were followed clause 4 of ANSI C63.4
2. Detailed test procedure was following clause 8 of ANSI C63.4.

7.5. Corrected Amplitude & Margin Calculation

1. The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

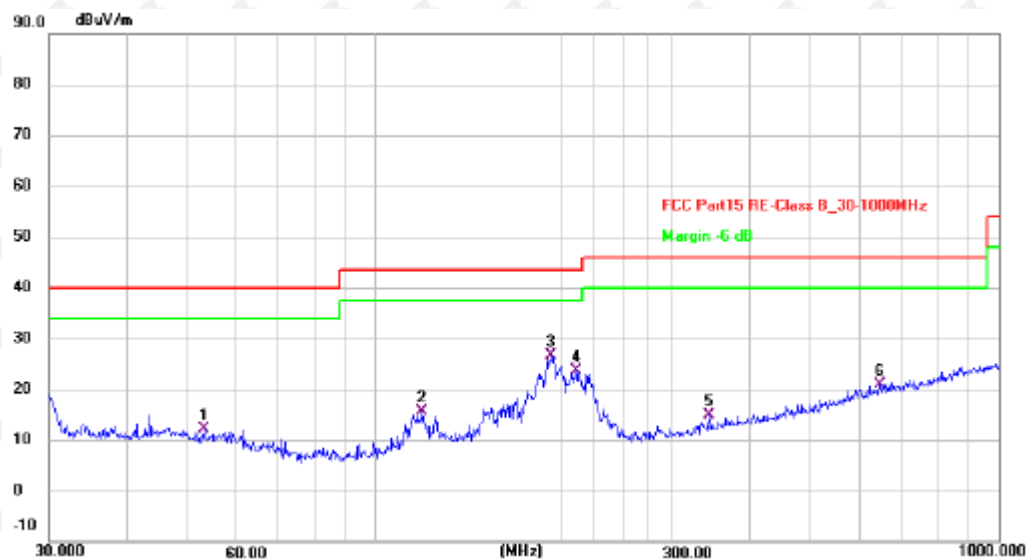
$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

2. The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

7.6. Test results

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Horizontal
Test Voltage :	DC 5V	Test Mode:	Mode 1



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	53.1313	26.17	-13.97	12.20	40.00	-27.80	QP
2	119.0180	31.06	-15.41	15.65	43.50	-27.85	QP
3 *	191.0738	42.40	-15.84	26.56	43.50	-16.94	QP
4	210.0482	40.29	-16.66	23.63	43.50	-19.87	QP
5	343.1800	27.43	-12.48	14.95	46.00	-31.05	QP
6	645.1195	26.12	-5.16	20.96	46.00	-25.04	QP

Note: Result=Reading+Factor
Over Limit=Result-Limit

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Vertical
Test Voltage :	DC 5V	Test Mode:	Mode 1



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	36.5092	38.02	-13.68	24.34	40.00	-15.66	QP
2 *	45.0583	37.98	-13.47	24.51	40.00	-15.49	QP
3	82.6482	37.97	-18.08	19.89	40.00	-20.11	QP
4	106.3850	36.63	-17.20	19.43	43.50	-24.07	QP
5	124.5690	38.17	-14.97	23.20	43.50	-20.30	QP
6	189.0743	42.21	-15.67	26.54	43.50	-16.96	QP

Note: Result=Reading+Factor
Over Limit=Result-Limit

Above 1 GHz Test Results:
Horizontal:

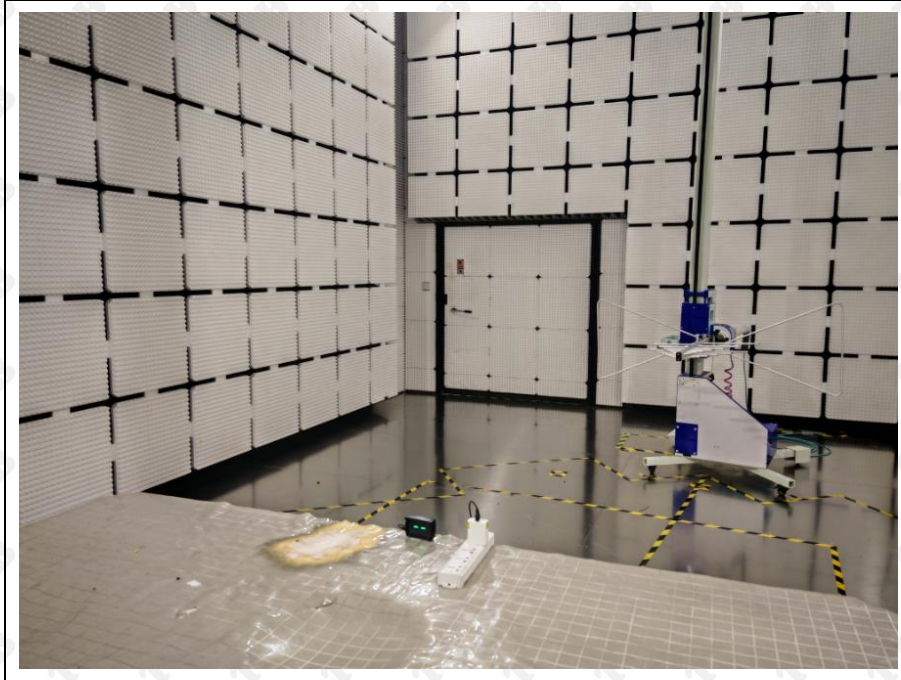
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402	109.47	-5.84	103.63	N/A	N/A	peak
2402	94.48	-5.84	88.64	N/A	N/A	AVG
4804	57.75	-3.64	54.11	74	-19.89	peak
4804	49.78	-3.64	46.14	54	-7.86	AVG
7206	58.46	-0.95	57.51	74	-16.49	peak
7206	48.33	-0.95	47.38	54	-6.62	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2402	108.41	-5.84	102.57	N/A	N/A	peak
2402	92.55	-5.84	86.71	N/A	N/A	AVG
4804	58.07	-3.64	54.43	74	-19.57	peak
4804	47.19	-3.64	43.55	54	-10.45	AVG
7206	59.17	-0.95	58.22	74	-15.78	peak
7206	48.48	-0.95	47.53	54	-6.47	AVG
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Emission level = Reading Result + Factor, Margin = Emission level - Limits						

8. Photographs of test setup

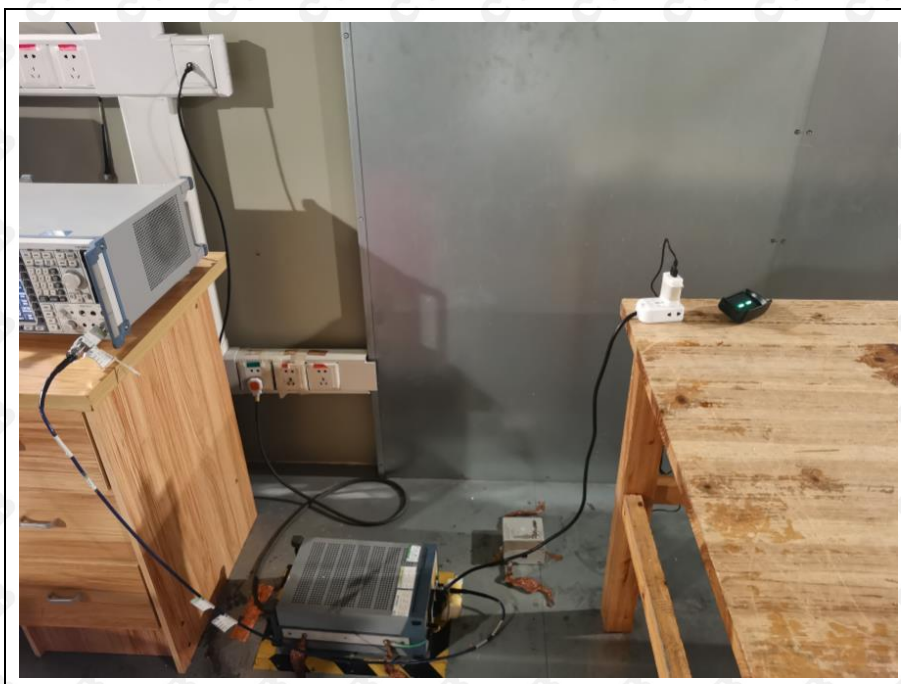
Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



CE



End of report