

TEST REPORT

Applicant: Powerstick.com Inc.
Address: 39 Camelot Drive, Ottawa, Ontario CANADA, K2G 5W6
Equipment Type: Nova+
Model Name: Nova+
Brand Name: Powerstick.com
FCC ID: 2AITN-NOVAPLUS
Test Standard: 47 CFR Part 15 Subpart B
ANSI C63.4-2014
Sample Arrival Date: Aug. 10, 2024
Test Date: Aug. 10, 2024
Date of Issue: Aug. 16, 2024

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Xiao Tangqi

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Xia Long

Sunny Zou

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Aug. 16, 2024</u>	<u>Initial Issue</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☒ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Powerstick.com Inc.
Address	39 Camelot Drive, Ottawa, Ontario CANADA, K2G 5W6

2.2 Manufacturer Information

Manufacturer	Powerstick.com Inc.
Address	39 Camelot Drive, Ottawa, Ontario CANADA, K2G 5W6

2.3 General Description for Equipment under Test (EUT)

EUT Name	Nova+
Model Name Under Test	Nova+
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	NovaPlus-V5
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	N/A
	Model No.	18650*2
	Serial No.	N/A
	Capacity	4400 mAh
	Rated Voltage	3.7 V
	Limit Charge Voltage	4.2 V
	Manufacturer	ZHUHAI GREAT POWER ENERGY CO., LTD
	Manufacturer Address	Xinqing Technology Garden. Xinqing 5th.Doumen District Zhuhai City Guangdong province China

2.5 Technical Information

Network and Wireless connectivity	N/A
Classification of equipment	Class B
The highest internal frequency of EUT	Less than 108MHz

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15 Subpart B	Unintentional Radiators
2	ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3.2 Verdict

No.	Description	FCC Rule	Test Verdict	Remark
1	Radiated Emission	15.109	Pass	--
2	Conducted Emission, AC Ports	15.107	Pass	--

3.3 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Measurement	Value
Conducted emissions (9 kHz-30 MHz)	3.2 dB
Radiated emissions (30 MHz-1 GHz)-966#4	4.4 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Enclosure List

Description	Manufacturer	Model	Serial No.	Length	Description	Use
Adapter	OPPO	AVC56JAJ H	N/A	N/A	N/A	☒
Load	N/A	N/A	N/A	N/A	N/A	☒
Type-C Cable	OPPO	N/A	N/A	1m	shielded with core	☒
Adapter	Aohai	V12060L1 B0-CN	N/A	N/A	N/A	☒

4.2 Test Configurations

All test modes of EUT are listed in the table below.

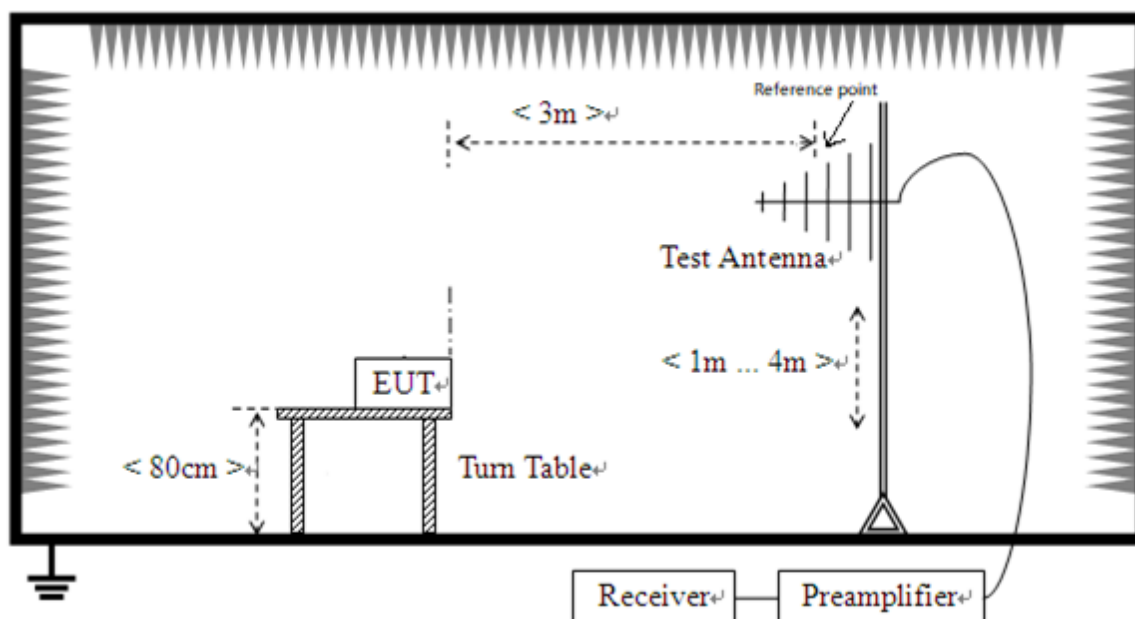
Test Mode Configuration	Description
Mode 1	<u>The Charging Test Mode</u> EUT + Adapter + Battery + Type-c cable
Mode 2	<u>The Discharging Test Mode</u> EUT + Battery + Type-c cable + Load (Type-A :5V2A)
Mode 3	<u>The Discharging Test Mode</u> EUT + Battery + Type-c cable + Load (Type-C :5V2A)

Test Case	Test Mode Configuration	Worst Mode
Radiated Emission	Mode 1~Mode 3	3
Conducted Emission, AC Ports	Mode 1	1

Note: All operation modes were tested, but only test data of the worst mode was presented in this report.

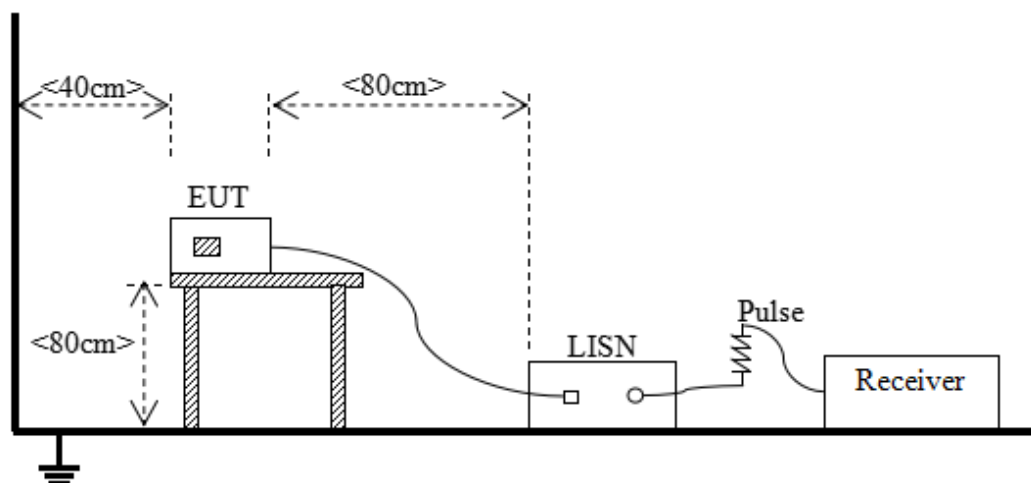
4.3 Test Setups

Test Setup 1



Radiated Emission (30 MHz-1 GHz)

Test Setup 2



Conducted Emissions, AC Ports

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency range (MHz)	Class B (at 3 m)		Class A (at 3 m)
	Field Strength ($\mu\text{V/m}$)	Field Strength (dB $\mu\text{V/m}$)	Field Strength (dB $\mu\text{V/m}$)
30 - 88	100	40	49.5
88 - 216	150	43.5	54
216 - 960	200	46	56.9
Above 960	500	54	60

NOTE:

- 1) Field Strength (dB $\mu\text{V/m}$) = $20 \times \log [\text{Field Strength } (\mu\text{V/m})]$.
- 2) In the emission tables above, the tighter limit applies at the band edges.
- 3) For 30 MHz to 1000 MHz, the CISPR quasi-peak is employed.

For above 1000 MHz, according to the requirements of FCC 15.35, unless otherwise specified, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

Frequency range (GHz)	Class B (at 3 m)			Class A (at 3 m)	
	Field Strength ($\mu\text{V/m}$)	Field Strength Average (dB $\mu\text{V/m}$)	Field Strength Peak (dB $\mu\text{V/m}$)	Field Strength Average (dB $\mu\text{V/m}$)	Field Strength Peak (dB $\mu\text{V/m}$)
1 - F_M	500	54	74	60	80

Note 1: The highest measurement frequency, F_M , in GHz, shall be determined as next Table.

Note 2: Average Class A limit at 3m L_{3m} is determined by the following conversion formula:

$$L_{3m} = L_{10m} + 20 \times \log(d_{10m}/d_{3m})$$
Where:
 L_{3m} is Average Class A limit at 3m;
 L_{10m} is Average Class A limit at 10m;
 d_{10m} is Measurement distance in 10m;
 d_{3m} is Measurement distance in 3m.
For this case: $L_{3m} = 49.5 + 20 \times \log(10/3) = 60$ (dB $\mu\text{V/m}$).

Highest internal frequency (F_X)	Highest measurement frequency (F_M)
$F_X \leq 108 \text{ MHz}$	1 GHz
$108 \text{ MHz} \leq F_X \leq 500 \text{ MHz}$	2 GHz
$500 \text{ MHz} \leq F_X \leq 1 \text{ GHz}$	5 GHz
$F_X \geq 1 \text{ GHz}$	5 * F_X or 40 GHz, whichever is lower.
Note: F_X is Highest frequency generated or used in the device or on which the device operates or tunes.	

5.1.1.2 Test Setup

Refer to 4.3 section (test setup 1) for radiated emission test, the photo of test setup please refer to ANNEX B.

5.1.1.3 Test Procedure

All Radiated Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

An initial pre-scan was performed in the chamber using the EMI Receiver in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bi-Log antenna with 2 orthogonal polarities.

The measurement frequency range is from 30 MHz to the 5th harmonic of the maximum frequency of the EUT internal source. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1 \text{ GHz}$, 100 kHz for $f < 1 \text{ GHz}$

VBW $\geq$ RBW

Sweep = auto

Detector function = peak for $f < 1 \text{ GHz}$, peak & RMS Average for $f \geq 1 \text{ GHz}$

Trace = max hold

5.1.1.4 Test Result and Test Equipment List

Please refer to ANNEX A.1.

NOTE:

1. Results (dB μ V/m) = Reading (dB μ V) + Factor (dB/m)

The reading level is calculated by software which is not shown in the sheet

2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain (dB)

3. Margin = Limit - Results

5.1.2 Conducted Emission, AC Ports

5.1.2.1 Test Limit

Frequency range (MHz)	Class A	
	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	79	66
0.50 - 30	73	60

Frequency range (MHz)	Class B	
	Quasi-peak (dB μ V)	Average (dB μ V)
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.

5.1.2.2 Test Setup

Refer to 4.3 section test (test setup 2) for conducted emission, the photo of test setup please refer to ANNEX B.

5.1.2.3 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50 Ω /50 μ H of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

Use the following spectrum analyzer settings:

RBW = 9 kHz

VBW $\geq$ RBW

Sweep = 10ms

Detector function = peak & Average

Trace = max hold

5.1.2.4 Test Result and Test Equipment List

Please refer to ANNEX A.2.

NOTE:

1. Results (dB μ V) = Reading (dB μ V) + Factor (dB)

The reading level is calculated by software which is not shown in the sheet

2. Factor = Insertion loss + Cable loss

3. Margin = Limit - Results

ANNEX A TEST RESULTS

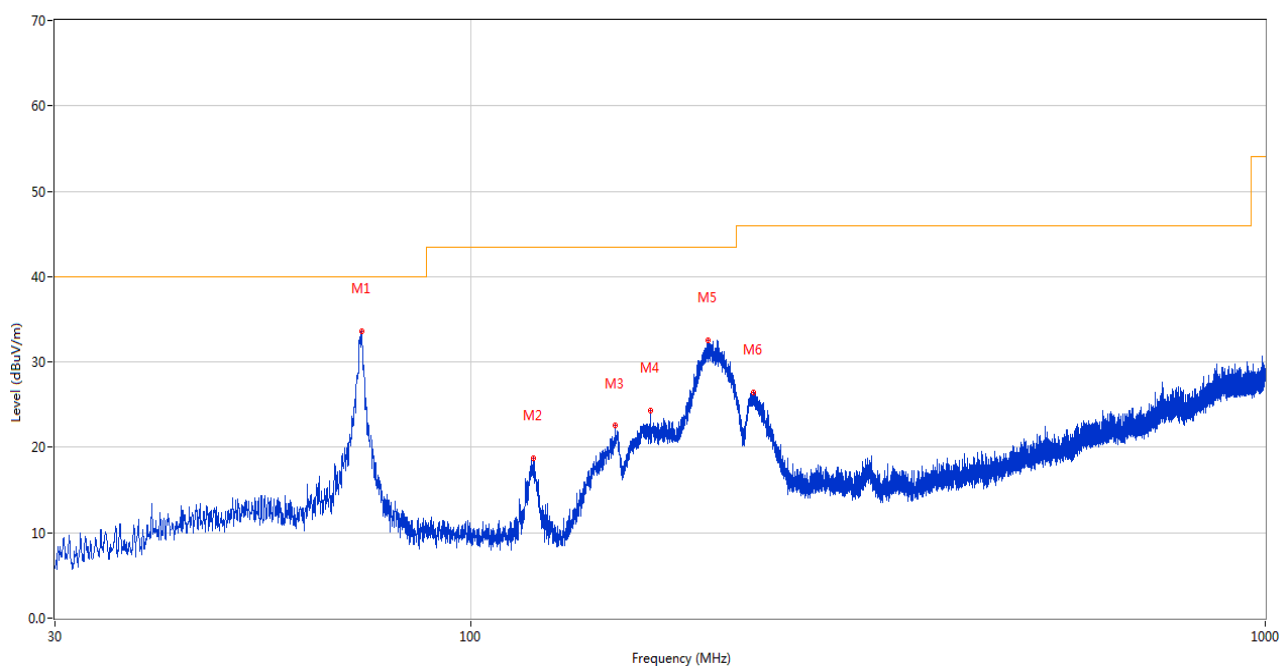
A.1 Radiated Emission

Note 1: The symbol of "--" in the table which means not application.

Sample No.	S02	Temperature	23.3℃
Humidity	55%RH	Pressure	101kPa
Test Engineer	Huang Xinghong	Test Date	2024.08.10

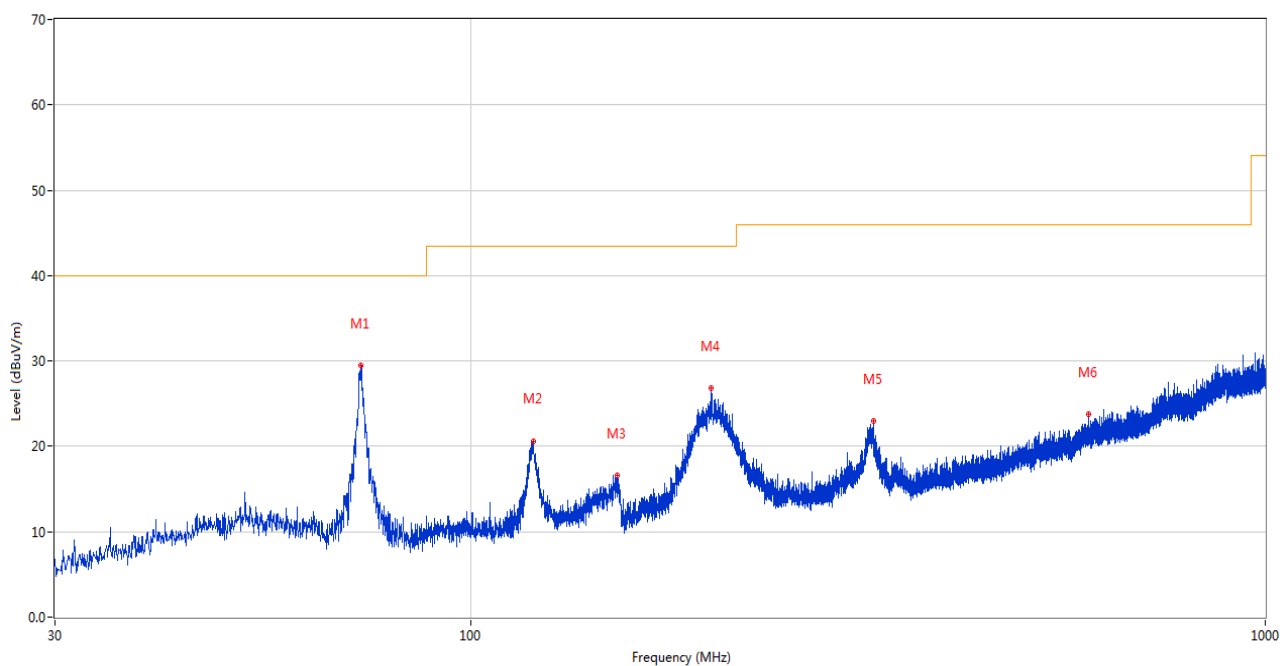
Test Mode 3

1) Test Antenna Vertical, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	72.923	33.65	-30.01	40.0	6.35	Peak	28.80	200	Vertical	Pass
2	120.113	18.77	-28.79	43.5	24.73	Peak	247.90	100	Vertical	Pass
3	152.171	22.55	-29.32	43.5	20.95	Peak	308.80	100	Vertical	Pass
4	168.274	24.31	-28.85	43.5	19.19	Peak	297.70	100	Vertical	Pass
5	198.780	32.59	-25.74	43.5	10.91	Peak	91.20	100	Vertical	Pass
6	227.104	26.45	-25.51	46.0	19.55	Peak	0.00	100	Vertical	Pass

2) Test Antenna Horizontal, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	72.874	29.45	-29.99	40.0	10.55	Peak	49.80	200	Horizontal	Pass
2	120.064	20.65	-28.78	43.5	22.85	Peak	118.80	200	Horizontal	Pass
3	152.753	16.55	-29.22	43.5	26.95	Peak	97.00	200	Horizontal	Pass
4	201.059	26.77	-26.15	43.5	16.73	Peak	114.90	100	Horizontal	Pass
5	321.048	22.91	-22.83	46.0	23.09	Peak	117.60	100	Horizontal	Pass
6	599.244	23.74	-15.30	46.0	22.26	Peak	72.00	200	Horizontal	Pass

Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
Frequency Below 1 GHz						
EMI Receiver	Keysight	N9038A	MY53220118	2024.08.01	2025.07.31	☒
Amplifier (30MHz-1GHz)	COM-MV	ZT30-1000M	B2017119082	2023.12.05	2024.12.04	☒
Test Antenna- Bi-Log	SCHWARZB ECK	VULB 9163	9163-624	2024.07.06	2027.07.05	☒
Anechoic Chamber (#4)	ChangNing	9m*6m*6m	101	2023.03.04	2026.03.03	☒
Description	Supplier	Name	Version	/		Use
Test Software	BALUN	BL410-E	V22.930	/		☒

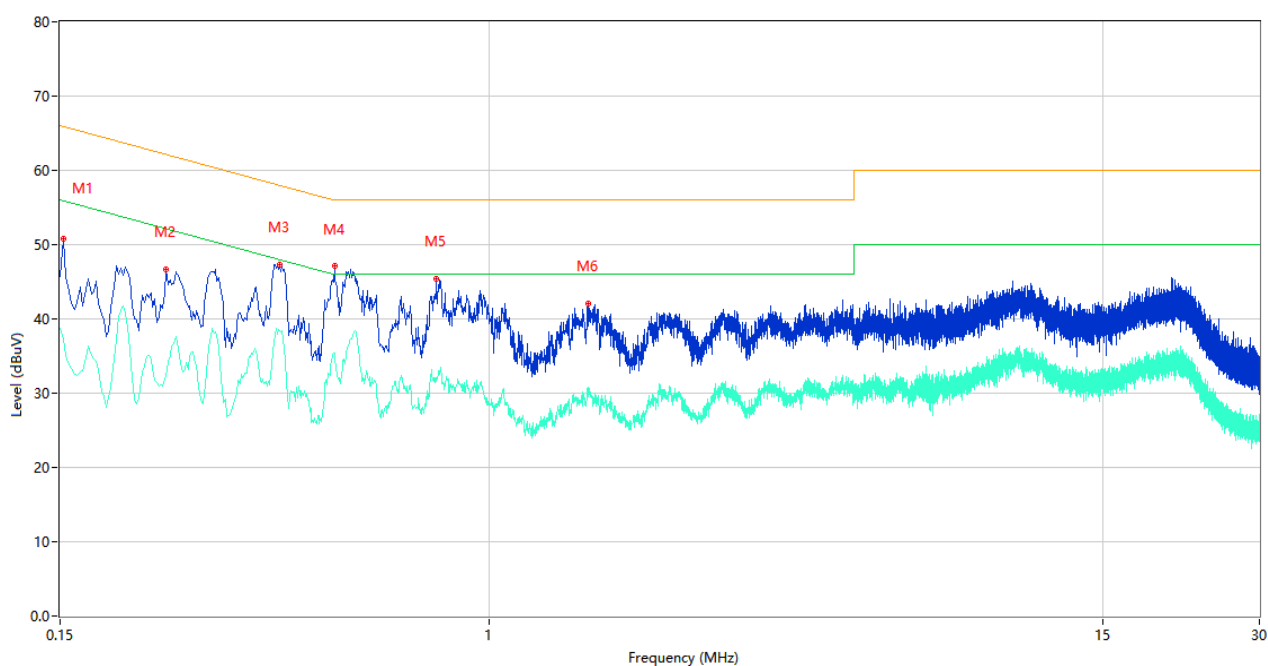
A.2 Conducted Emission, AC Ports

Note: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (240 VAC, 50 Hz) shown here.

Sample No.	S02	Temperature	25.1℃
Humidity	53%RH	Pressure	101kPa
Test Engineer	Huang Xinghong	Test Date	2024.08.10

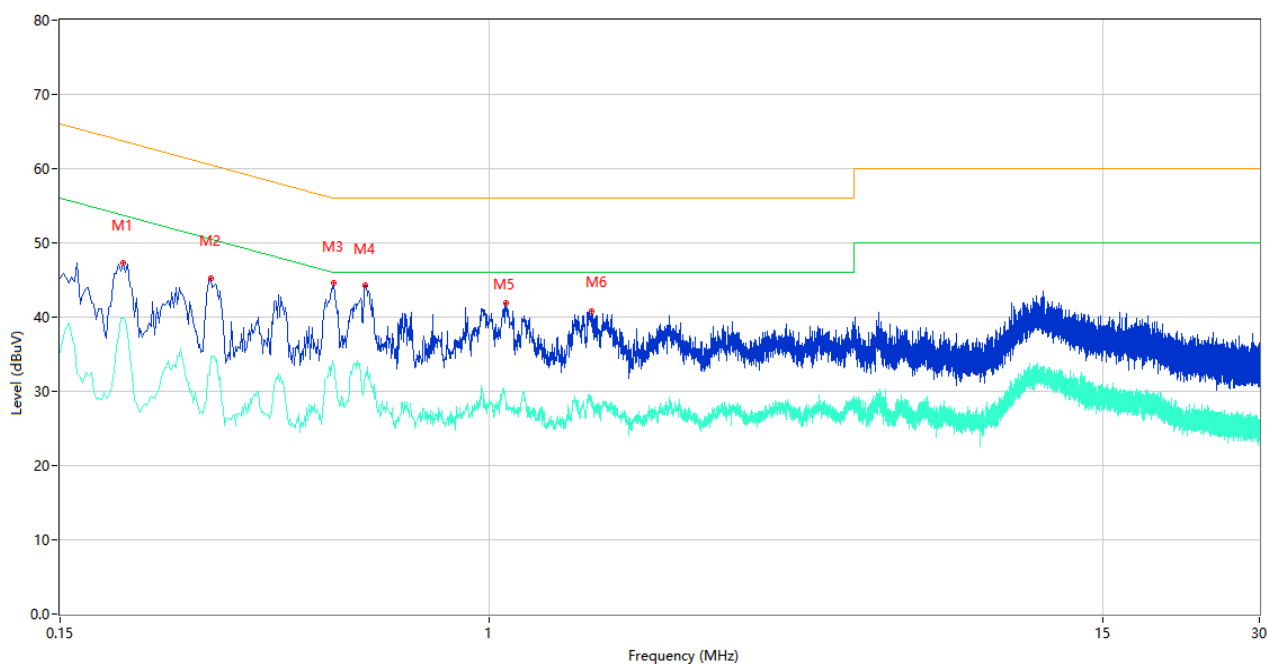
Test Mode 1

1) AC Ports - L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.152	50.77	9.78	65.89	15.12	Peak	L	Pass
1**	0.152	37.33	9.78	55.89	18.56	AV	L	Pass
2	0.240	46.70	9.77	62.10	15.40	Peak	L	Pass
2**	0.240	32.20	9.77	52.10	19.90	AV	L	Pass
3	0.396	47.34	10.57	57.94	10.60	Peak	L	Pass
3**	0.396	38.38	10.57	47.94	9.56	AV	L	Pass
4	0.504	47.12	9.98	56.00	8.88	Peak	L	Pass
4**	0.504	35.32	9.98	46.00	10.68	AV	L	Pass
5	0.792	45.43	10.47	56.00	10.57	Peak	L	Pass
5**	0.792	32.01	10.47	46.00	13.99	AV	L	Pass
6	1.544	42.10	10.17	56.00	13.90	Peak	L	Pass
6**	1.544	30.80	10.17	46.00	15.20	AV	L	Pass

2) AC Ports - N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.198	47.30	9.77	63.69	16.39	Peak	N	Pass
1**	0.198	39.91	9.77	53.69	13.78	AV	N	Pass
2	0.292	45.30	9.76	60.47	15.17	Peak	N	Pass
2**	0.292	34.71	9.76	50.47	15.76	AV	N	Pass
3	0.502	44.54	9.98	56.00	11.46	Peak	N	Pass
3**	0.502	33.37	9.98	46.00	12.63	AV	N	Pass
4	0.578	44.23	10.10	56.00	11.77	Peak	N	Pass
4**	0.578	32.35	10.10	46.00	13.65	AV	N	Pass
5	1.074	41.89	10.08	56.00	14.11	Peak	N	Pass
5**	1.074	28.73	10.08	46.00	17.27	AV	N	Pass
6	1.568	40.72	10.04	56.00	15.28	Peak	N	Pass
6**	1.568	29.22	10.04	46.00	16.78	AV	N	Pass

Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2023.09.05	2024.09.04	☒
LISN	SCHWARZB ECK	NSLK 8127	8127-687	2024.05.09	2025.05.08	☒
Shielded Room	YiHeng Electronic Co., Ltd	3.5m*3.1m*2. 8m	112	2022.02.19	2025.02.18	☒
Description	Supplier	Name	Version	/		Use
Test Software	BALUN	BL410-E	V22.930	/		☒

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2480491-AE.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2480491-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2480491-AI.PDF”.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
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4. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the "inspection and testing dedicated stamp" or test report stamp.
5. The test data and results are only valid for the tested samples provided by the customer.
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7. Any objection shall be raised to the laboratory within 30 days after receiving the report.

--END OF REPORT--