TEST REPORT

Applicant:	MATTER INNOVATION PTE. LTD.
Address:	1 KIM SENG PROMENADE #17-04 GREAT WORLD CITY SINGAPORE (237994)
Equipment Type:	AI device
Model Name:	G001
Brand Name:	JARVIS
FCC ID:	2BGOW-G001
Test Standard:	47 CFR Part 15 Subpart B ANSI C63.4-2014
Sample Arrival Date:	Jun. 25, 2024
Test Date:	Jul. 10, 2024 - Jul. 12, 2024
Date of Issue:	Oct. 09, 2024

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: He Shichang	**Checked by:** Xia Long	**Approved by:** Sunny Zou (Technical Director)
He Shichang	Xia Long	Sunny Zou

Revision History

Version	Issue Date	Revisions
Rev. 01	Oct. 09, 2024	Initial Issue

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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	MATTER INNOVATION PTE. LTD.
Address	1 KIM SENG PROMENADE #17-04 GREAT WORLD CITY SINGAPORE (237994)

2.2 Manufacturer Information

Manufacturer	MATTER INNOVATION PTE. LTD.
Address	1 KIM SENG PROMENADE #17-04 GREAT WORLD CITY SINGAPORE (237994)

2.3 General Description for Equipment under Test (EUT)

EUT Name	AI device
Model Name Under Test	G001
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	Cdk8A
Software Version	QL7282A_FAC_USERDEBUG_0615_01
Dimensions (Approx.)	98.43mm*65.41mm*4.93mm
Weight (Approx.)	N/A

2.4 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	N/A
	Model No.	AB255942-202401
	Serial No.	N/A
	Capacity	900mAh/3.52Wh
	Rated Voltage	3.91 V
	Limit Charge Voltage	4.5 V
Ancillary Equipment 2	Type-C Cable	
	Length (Approx.)	1.0 m

2.5 Technical Information

Network and Wireless connectivity	Bluetooth, WIFI, Galileo, GPS, SBAS, WPC
Classification of equipment	Class B
The highest internal frequency of EUT	5.8 GHz

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#2	4.4 dB
Radiated emissions (1 GHz-18 GHz)-966#2	5.0 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Enclosure List

Description	Manufacturer	Model	Serial No.	Length	Description	Use
Adapter	HNONR	HN-200325CP1	N/A	N/A	N/A	☒
Mobile phones	Apple	iPhone 11ProMax	N/A	N/A	N/A	☒
Wireless charging base	HUAWEI	CP61	N/A	N/A	MAX：27W	☒

4.2 Test Configurations

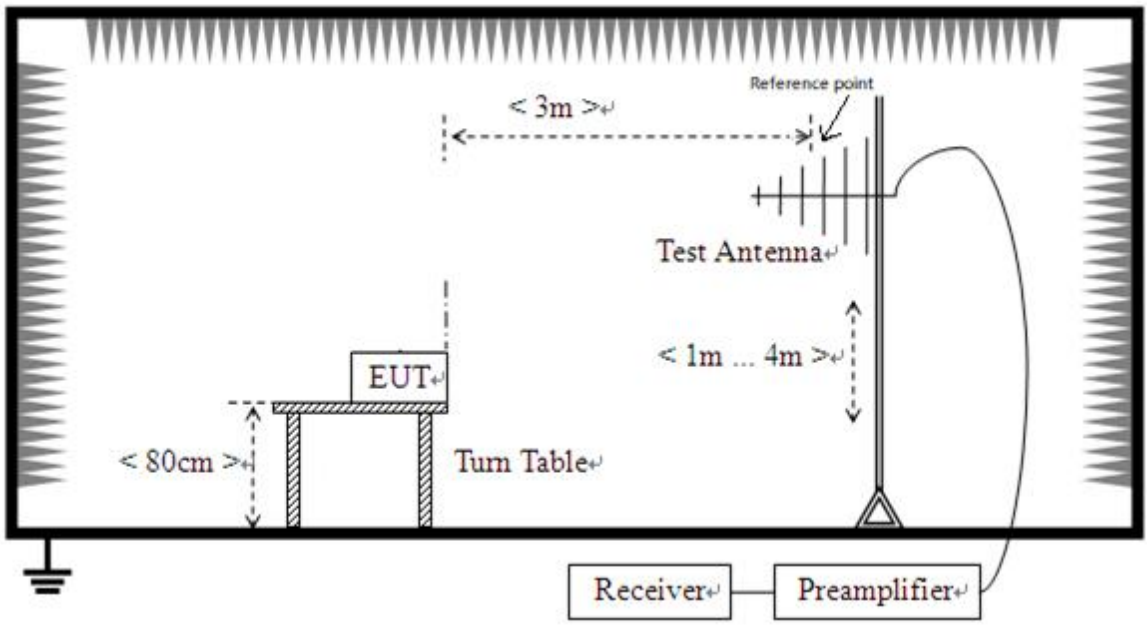
All test modes of EUT are listed in the table below.

Test Mode	Description
Mode 1	The TX Charging Test Mode EUT + Adapter + Type-C Cable + Battery + Mobile phones + Wireless charging TX + charging + video
Mode 2	The RX Charging Test Mode EUT + Battery + Adapter + Type-C Cable + Wireless charging dock + wireless charging RX + charging + video

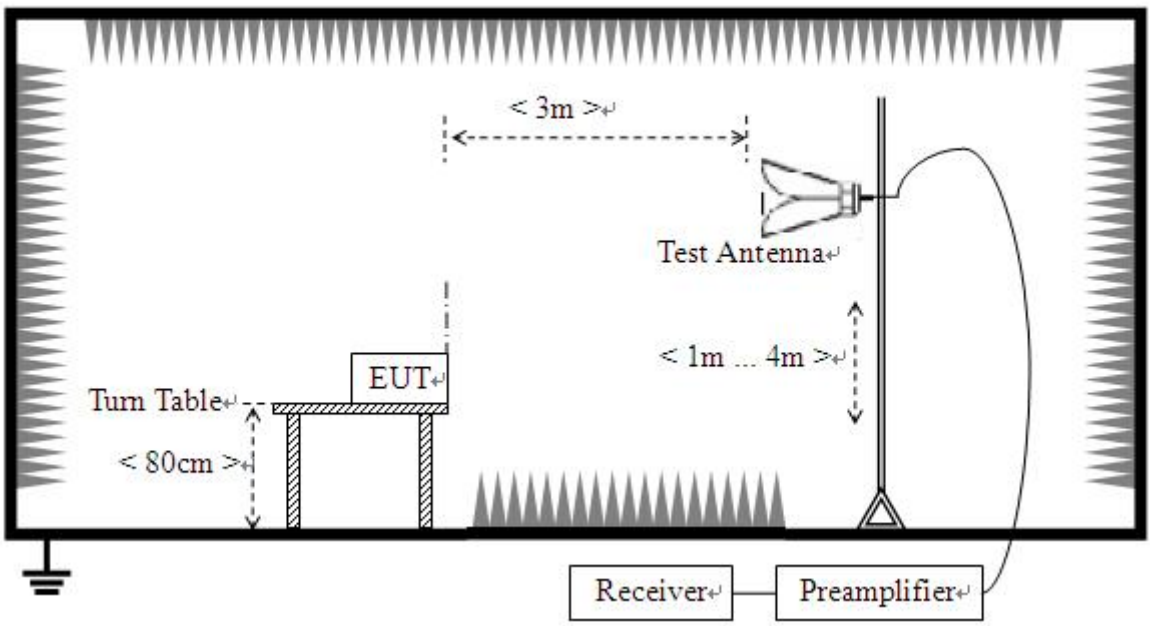
Test Case	Test Mode Configuration	Worst Mode
Radiated Emission	Mode 1- Mode 2	1
Conducted Emission, AC Ports	Mode 1 - Mode2	1
Note: All operation modes were tested, but only test data of the worst mode was presented in this report.		

4.3 Test Setups

Test Setup 1

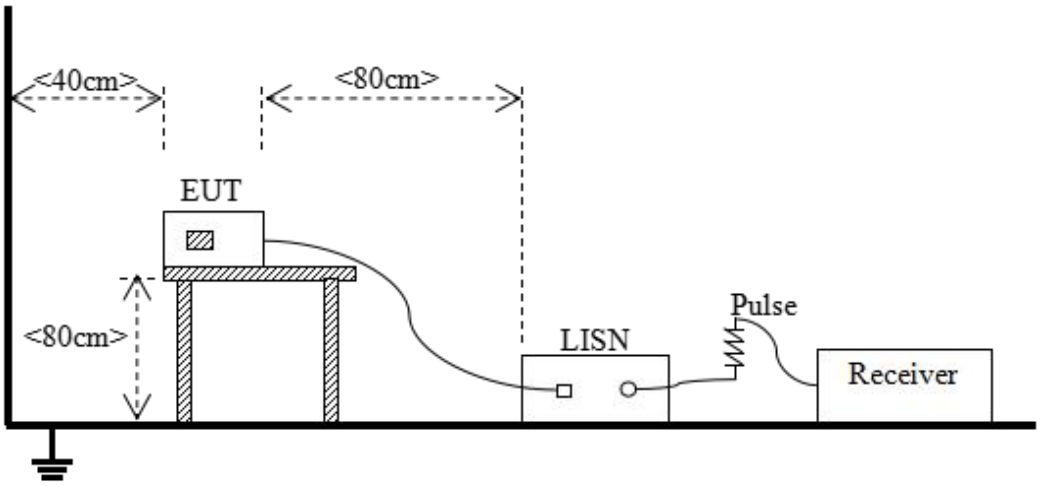


Radiated Emission (30 MHz-1 GHz)



Radiated Emission (above 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 (μV/m)	Field Strength (dBμV/m)	Field Strength (dBμV/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 (dBμV/m) = 20*log [Field Strength (μV/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 (μV/m)	Field Strength Average (dBμV/m)	Field Strength Peak (dBμV/m)	Field Strength Average (dBμV/m)	Field Strength Peak (dBμV/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:
$L_{3m} = L_{10m} + 20*\log(d_{10m}/d_{3m})$
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*log(10/3)=60 (dBμV/m).

Highest internal frequency (F_X)	Highest measurement frequency (F_M)
$F_X \leq 108$ MHz	1 GHz
108 MHz $\leq F_X \leq$ 500 MHz	2 GHz
500 MHz $\leq F_X \leq$ 1 GHz	5 GHz
$F_X \geq 1$ 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 ≥ 1 GHz, 100 kHz for f < 1 GHz

VBW ≥ RBW

Sweep = auto

Detector function = peak for f <1 GHz, peak & RMS Average for f ≥ 1 GHz

Trace = max hold

5.1.1.4 Test Result and Test Equipment List

Please refer to ANNEX A.1.

NOTE:

1. Results (dBμV/m) = Reading (dBμV) + 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 (dBμV)	Average (dBμV)
0.15 - 0.50	79	66
0.50 - 30	73	60

Frequency range (MHz)	Class B	
	Quasi-peak (dBμV)	Average (dBμV)
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 μH 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 ≥ 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 (dBμV) = Reading (dBμV) + 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.

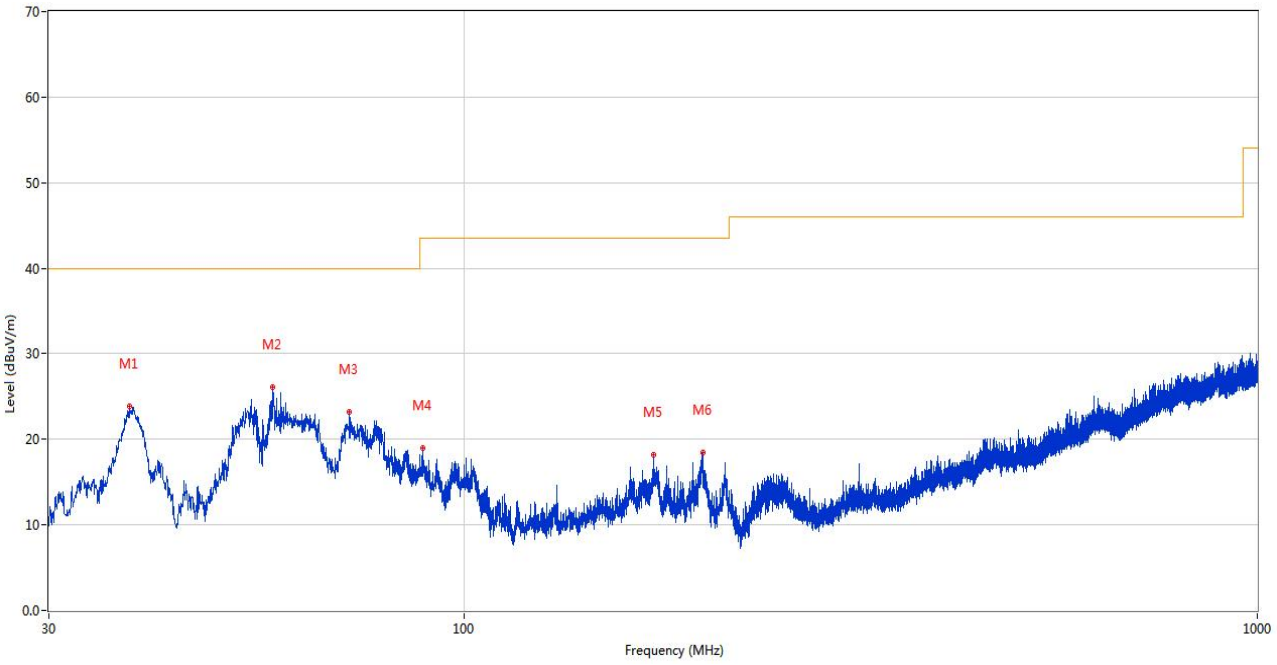
Note 2: For the test data above 1 GHz, according the ANSI C63.4-2014, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note 3: The Radiated Emission is required to be investigated to the upper frequency of 5th harmonic of the highest internal frequency of EUT or 40 GHz, whichever is lower. The test results above 18GHz are only noise and are not recorded in the report.

Sample No.	S05	Temperature	22.6℃
Humidity	50%RH	Pressure	101kPa
Test Engineer	Chen Jingran	Test Date	2024.07.10-2024.07.12

Test Mode 1

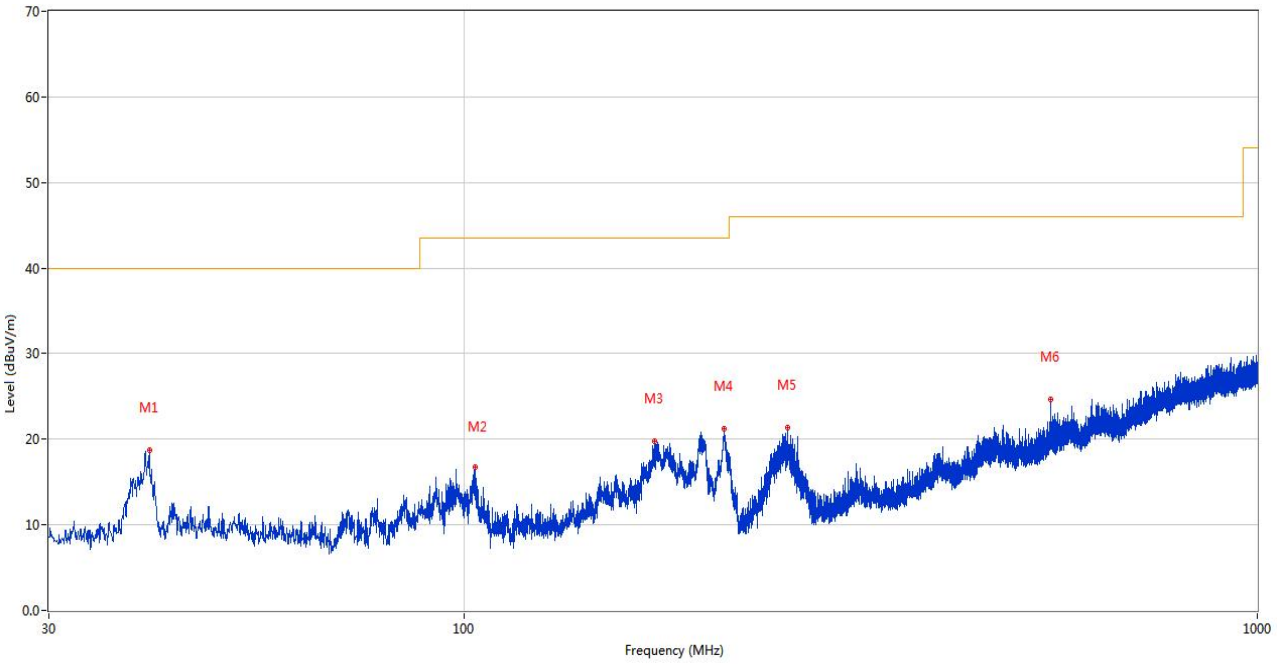
1) Test Antenna Vertical, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	37.906	23.82	-26.81	40.0	16.18	Peak	128.00	100	Vertical	Pass
2	57.451	26.07	-27.20	40.0	13.93	Peak	183.00	100	Vertical	Pass
3	71.661	23.18	-29.02	40.0	16.82	Peak	114.00	100	Vertical	Pass
4	88.830	19.04	-30.17	43.5	24.46	Peak	131.00	100	Vertical	Pass
5	173.560	18.20	-26.22	43.5	25.30	Peak	73.00	100	Vertical	Pass

6	200.041	18.45	-28.77	43.5	25.05	Peak	97.00	100	Vertical	Pass

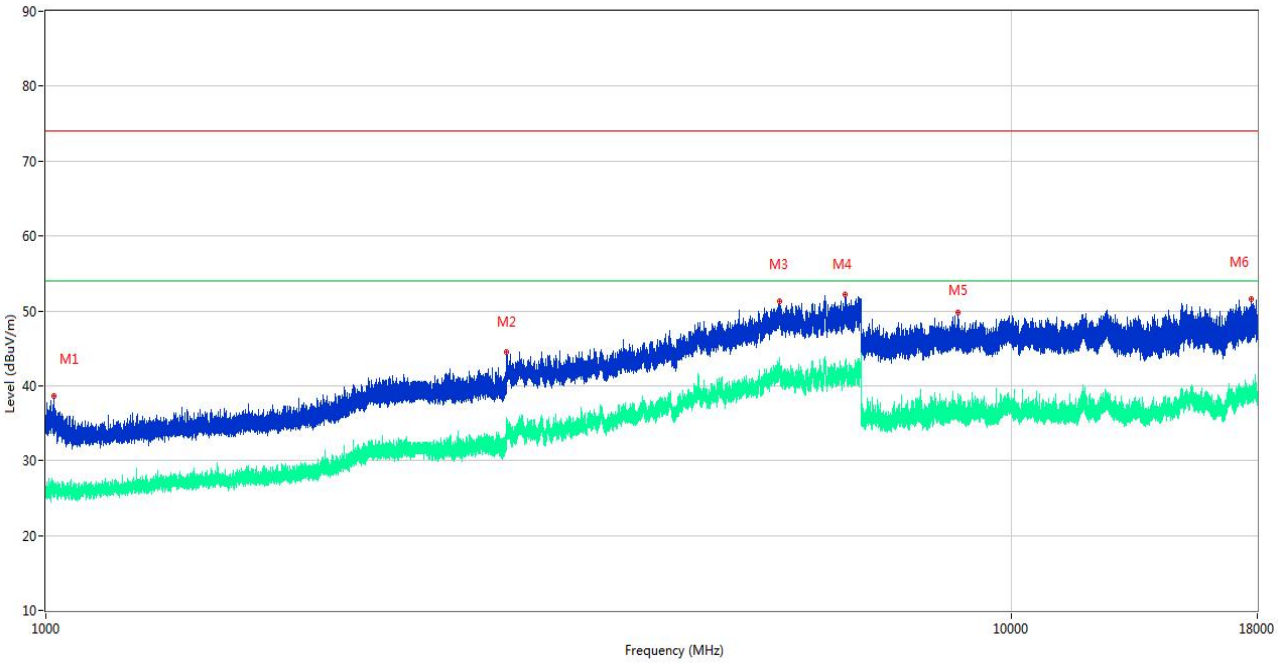
2) Test Antenna Horizontal, 30 MHz – 1 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	40.136	18.73	-26.05	40.0	21.27	Peak	206.00	100	Horizontal	Pass
2	103.284	16.68	-29.62	43.5	26.82	Peak	211.00	200	Horizontal	Pass
3	174.045	19.72	-26.32	43.5	23.78	Peak	262.00	200	Horizontal	Pass
4	212.845	21.18	-29.01	43.5	22.32	Peak	116.00	100	Horizontal	Pass
5	256.301	21.42	-26.50	46.0	24.58	Peak	244.00	100	Horizontal	Pass
6	549.435	24.63	-17.55	46.0	21.37	Peak	88.00	200	Horizontal	Pass

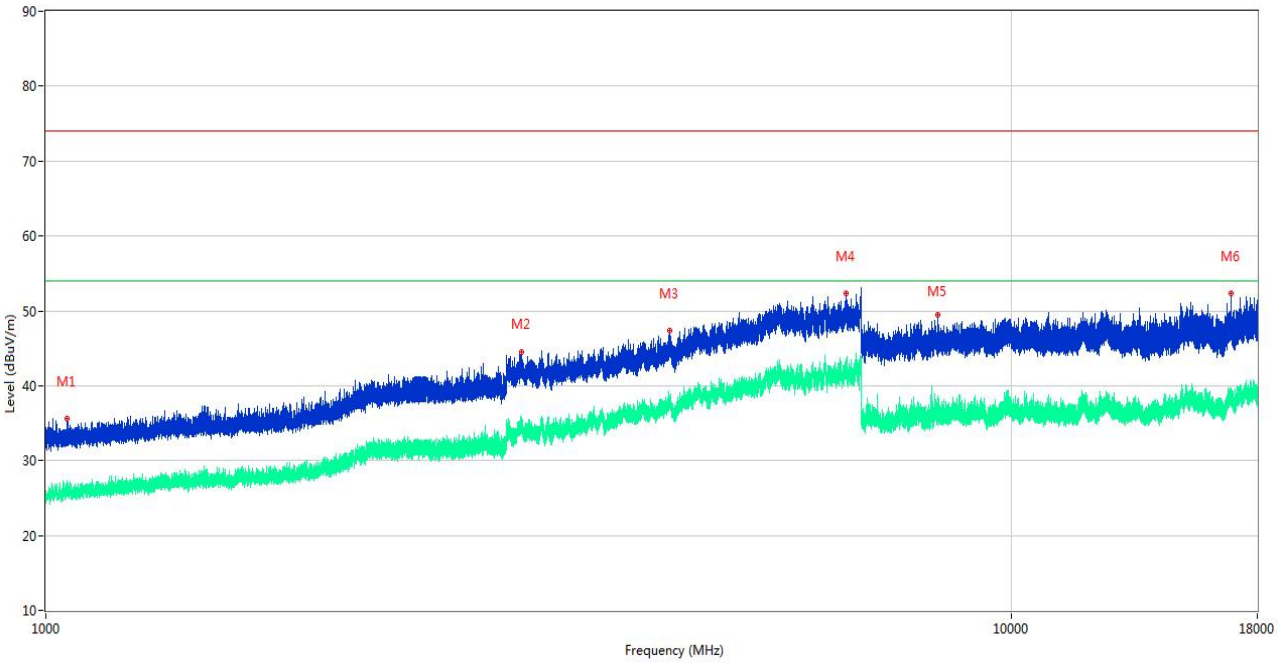
Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
Frequency Below 1 GHz						
EMI Receiver	Keysight	N9038A	MY55330120	2023.09.05	2024.09.04	☒
Amplifier (30MHz-1GHz)	COM-MV	ZT30-1000M	B2017119081	2023.12.05	2024.12.04	☒
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9168	9168-00867	2022.04.12	2025.04.11	☒
Anechoic Chamber（#2）	YiHeng	9m*6m*6m	142	2021.08.19	2024.08.18	☒
Description	Supplier	Name	Version	/		Use
Test Software	BALUN	BL410-E	V22.930	/		☒

3) Test Antenna Vertical, 1 GHz – 18 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1019.200	38.59	-16.21	74.0	35.41	Peak	339.00	100	Vertical	Pass
1**	1019.200	26.22	-16.21	54.0	27.78	AV	339.00	100	Vertical	Pass
2	3001.600	44.51	-7.67	74.0	29.49	Peak	99.00	100	Vertical	Pass
2**	3001.600	34.48	-7.67	54.0	19.52	AV	99.00	100	Vertical	Pass
3	5762.800	51.28	0.33	74.0	22.72	Peak	119.00	100	Vertical	Pass
3**	5762.800	41.16	0.33	54.0	12.84	AV	119.00	100	Vertical	Pass
4	6733.000	52.21	1.73	74.0	21.79	Peak	191.00	100	Vertical	Pass
4**	6733.000	41.47	1.73	54.0	12.53	AV	191.00	100	Vertical	Pass
5	8821.599	49.85	16.01	74.0	24.15	Peak	257.00	100	Vertical	Pass
5**	8821.599	37.59	16.01	54.0	16.41	AV	257.00	100	Vertical	Pass
6	17750.624	51.52	16.80	74.0	22.48	Peak	274.00	100	Vertical	Pass
6**	17750.624	39.38	16.80	54.0	14.62	AV	274.00	100	Vertical	Pass

4) Test Antenna Horizontal, 1 GHz – 18 GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1052.900	35.58	-16.41	74.0	38.42	Peak	85.00	100	Horizontal	Pass
1**	1052.900	26.57	-16.41	54.0	27.43	AV	85.00	100	Horizontal	Pass
2	3114.600	44.48	-8.44	74.0	29.52	Peak	276.00	100	Horizontal	Pass
2**	3114.600	33.60	-8.44	54.0	20.40	AV	276.00	100	Horizontal	Pass
3	4435.200	47.35	-4.48	74.0	26.65	Peak	100.00	100	Horizontal	Pass
3**	4435.200	37.31	-4.48	54.0	16.69	AV	100.00	100	Horizontal	Pass
4	6749.000	52.41	2.09	74.0	21.59	Peak	80.00	100	Horizontal	Pass
4**	6749.000	42.29	2.09	54.0	11.71	AV	80.00	100	Horizontal	Pass
5	8389.200	49.40	15.44	74.0	24.60	Peak	53.00	100	Horizontal	Pass
5**	8389.200	35.45	15.44	54.0	18.55	AV	53.00	100	Horizontal	Pass
6	16903.011	52.33	16.72	74.0	21.67	Peak	62.00	100	Horizontal	Pass
6**	16903.011	37.71	16.72	54.0	16.29	AV	62.00	100	Horizontal	Pass

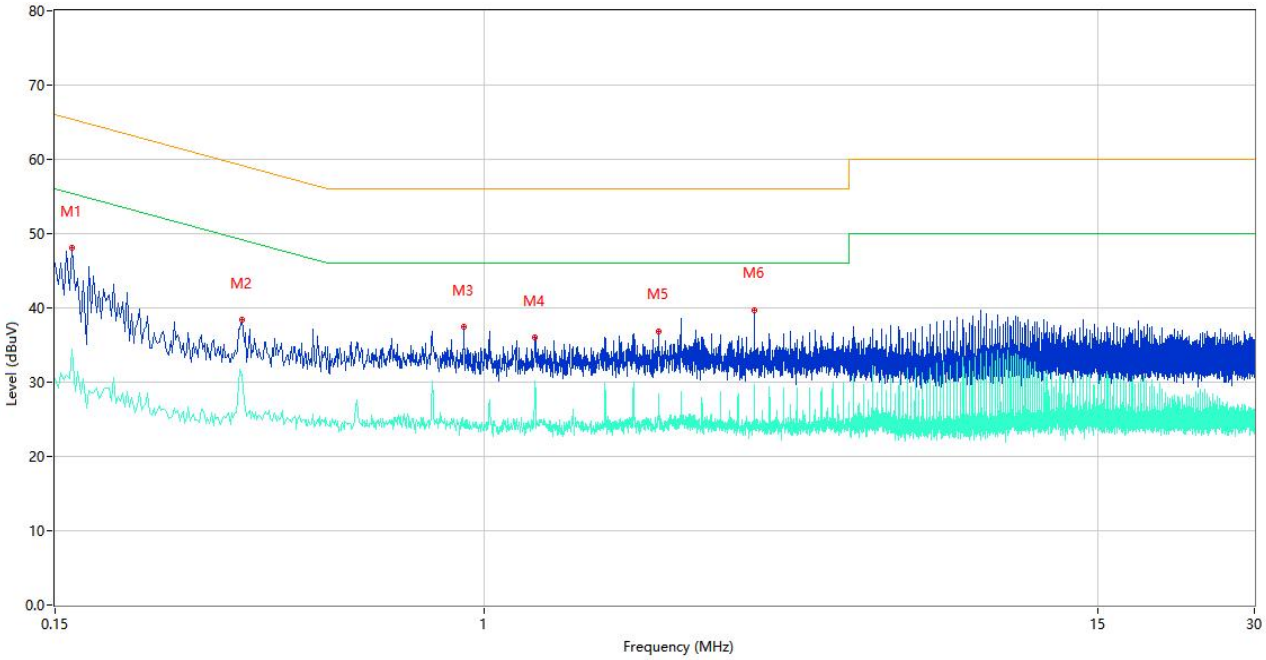
Equipment Information						
Equipment Name	Supplier	Model	Serial No.	Cal. Date	Cal. Due	Use
Frequency Above 1 GHz						
EMI Receiver	Keysight	N9038A	MY55330120	2023.09.05	2024.09.04	☒
Spectrum Analyzer	ROHDE & SCHWARZ	FSV40	101544	2023.12.27	2024.12.26	☒
Amplifier (1-12GHz)	Advanced Microwave	WLA652A	1740103	2023.12.05	2024.12.04	☒
Amplifier （0.8-21GHz）	Mini-Circuits	ZVA-213-S+	225321316	2023.12.05	2024.12.04	☒
Amplifier (18-40GHz)	COM-MV	KA_LNA18-40G-01	18050001	2024.06.15	2027.06.14	☒
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	01917	2022.06.09	2025.06.08	☒
Test Antenna-Horn	A-INFOMW	LB-180400KF	J211060273	2021.07.02	2024.07.01	☒
Anechoic Chamber（#2）	YiHeng	9m*6m*6m	142	2021.08.19	2024.08.18	☒
Description	Supplier	Name	Version	/		Use
Test Software	BALUN	BL410-E	V22.930	/		☒

A.2 Conducted Emission, AC Ports

Sample No.	S05	Temperature	23.2℃
Humidity	58%RH	Pressure	101kPa
Test Engineer	Yang Yang	Test Date	2024.07.11

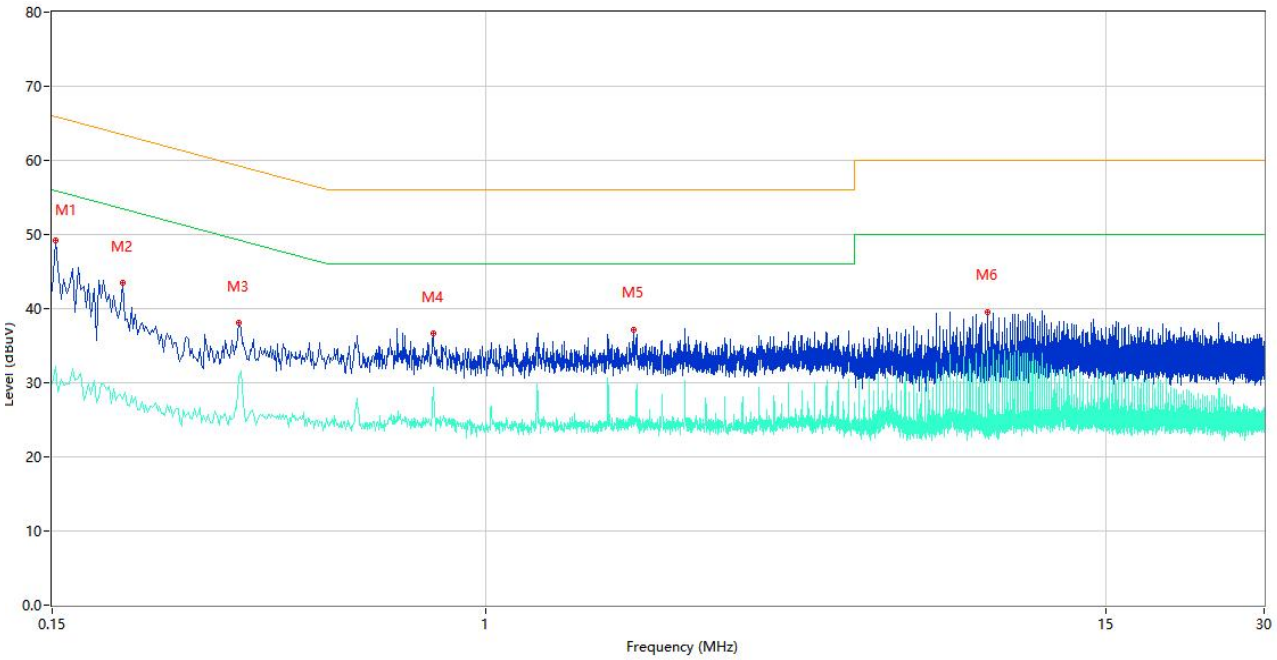
Test Mode 1

1) AC Ports - L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.162	48.03	9.78	65.36	17.33	Peak	L	Pass
1**	0.162	34.37	9.78	55.36	20.99	AV	L	Pass
2	0.342	38.35	10.60	59.15	20.80	Peak	L	Pass
2**	0.342	30.91	10.60	49.15	18.24	AV	L	Pass
3	0.914	37.40	10.14	56.00	18.60	Peak	L	Pass
3**	0.914	24.13	10.14	46.00	21.87	AV	L	Pass
4	1.248	36.00	10.44	56.00	20.00	Peak	L	Pass
4**	1.248	29.20	10.44	46.00	16.80	AV	L	Pass
5	2.160	36.87	10.14	56.00	19.13	Peak	L	Pass
5**	2.160	28.36	10.14	46.00	17.64	AV	L	Pass
6	3.294	39.72	10.33	56.00	16.28	Peak	L	Pass
6**	3.294	29.70	10.33	46.00	16.30	AV	L	Pass

2) AC Ports - N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.152	49.17	9.78	65.89	16.72	Peak	N	Pass
1**	0.152	32.20	9.78	55.89	23.69	AV	N	Pass
2	0.204	43.46	9.77	63.45	19.99	Peak	N	Pass
2**	0.204	27.80	9.77	53.45	25.65	AV	N	Pass
3	0.340	38.02	10.56	59.20	21.18	Peak	N	Pass
3**	0.340	30.87	10.56	49.20	18.33	AV	N	Pass
4	0.794	36.66	10.49	56.00	19.34	Peak	N	Pass
4**	0.794	29.30	10.49	46.00	16.70	AV	N	Pass
5	1.910	37.15	10.61	56.00	18.85	Peak	N	Pass
5**	1.910	24.96	10.61	46.00	21.04	AV	N	Pass
6	8.972	39.56	10.45	60.00	20.44	Peak	N	Pass
6**	8.972	33.47	10.45	50.00	16.53	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	SCHWARZBECK	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-SZ2460995-AE-1.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2460995-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2460995-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.
3. For the report with CNAS mark or A2LA mark, the items marked with "☆" are not within the accredited scope.
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.
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--END OF REPORT--