

ETSI EN 301 489-1 & -17 TEST REPORT For

Dongguan Jingheng Electron Co., Ltd.

Active Loudspeaker System

Model Number: MegaSys 1

Additional Model: AXV15.12

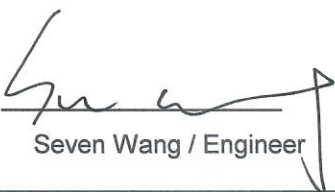
Applicant:	Dongguan Jingheng Electron Co., Ltd.
Address:	Room 101, Building 1, No. 15, Shenle 1st Road, Hengli Town, Dongguan City, 523465 Guangdong, P. R. China
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Report Number:	ESTE-R2404175
Date of Test:	Apr. 10~Apr. 19, 2024
Date of Report:	Apr. 24, 2024

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Manufacturer:	Dongguan Jingheng Electron Co., Ltd.		
Address:	Room 101, Building 1, No. 15, Shenle 1st Road, Hengli Town, Dongguan City, 523465 Guangdong, P. R. China		
Factory:	Dongguan Jinheng Electron Co., Ltd.		
Address:	No. 15, Shenle 1st Road, Hengli Town, Dongguan City, 523465 Guangdong, P.R. China		
E.U.T:	Active Loudspeaker System		
Model Number:	MegaSys 1		
Additional Model:	AXV15.12 Note: They are identical except model name.		
Power Supply:	AC 110-240V, 50/60Hz		
Test Voltage:	AC 230V/50Hz		
Trade Name:	SHOW, TOPP PRO	Serial No.:	-----
Date of Receipt:	Apr. 10, 2024	Date of Test:	Apr. 10~Apr. 19, 2024
Test Specification:	ETSI EN 301 489-1 V2.2.3 :2019-11 ETSI EN 301 489-17 V3.2.4 :2020-09		
Test Result:	The device described above is tested by EST Technology Co., Ltd.. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the ETSI EN 301 489-1/-17 requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd. Date: Apr. 24, 2024		
Prepared by:	Reviewed by:	Approved by:	
			
Zephyr Zhu / Assistant	Seven Wang / Engineer	Iceman Hu / Manager	
Other Aspects:	N/A		
Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested			
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 EST Technology Co., Ltd.			

1.SUMMARY OF MEASUREMENTS AND RESULTS

1.1.Standard description

ETSI EN 301 489-1 V2.2.3 (2019): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility.

ETSI EN 301 489-17 V3.2.4 (2020): ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU.

1.2.Compliance with ETSI EN301 489-1 & -17

NO	TEST PARAMETER	APPLICATION	BASIC STANDARD OR TEST METHOD	RESULTS
EMC emission				
1	Radiated emission	Enclosure of ancillary equipment	EN 55032: 2015	PASS
2	Conducted emission	DC power input/ output port	CISPR 25	N/A
3	Conducted emission	AC mains input/ output port	EN 55032: 2015	PASS
4	Harmonic Current Emissions	AC mains input port	EN 61000-3-2: 2014	N/A
5	Voltage Fluctuation & Flicker	AC mains input port	EN 61000-3-3: 2013	PASS
6	Conducted emission	Wired network port	EN 55032: 2015	N/A
Immunity				
7	RF electromagnetic field	Enclosure	EN 61000-4-3: 2006+A1: 2008+A2: 2010	PASS
8	Electrostatic Discharge	Enclosure	EN 61000-4-2: 2009	PASS
9	Fast transients common mode	Signal, wired network and control ports, DC and AC power ports	EN 61000-4-4: 2012	PASS
10	RF Common mode	Signal, wired network and control ports, DC and AC power ports	EN 61000-4-6: 2014	PASS
11	Transients and Surges	DC power input ports for vehicular use	ISO 7637-2: 2004	N/A
12	Voltage dips and interruptions	AC mains power input ports	EN 61000-4-11: 2004	PASS
13	Surges, line to line and line to ground	AC mains power input ports, wired network ports	EN 61000-4-5: 2014+A1: 2017	PASS
N/A is an abbreviation for Not Applicable.				

2.GENERAL INFORMATION

2.1.Description of Device (EUT)

Product Name	:	Active Loudspeaker System
Model Number	:	MegaSys 1
Module Model No.	:	HJ-7188
Operation frequency	:	BT/BLE: 2402MHz~2480MHz
Antenna	:	PCB antenna, Gain:-0.58dBi
Software Version	:	N/A
Hardware Version	:	N/A
Temperature Range	:	0℃~+45℃

2.2. Test Facilities

EMC Lab : Accredited by CNAS, CHINA
Registration No.: L5288
This Accreditation is valid until: November 12, 2029

Recognized by FCC, USA
Designation Number: CN1215
This Recognition is valid until: January 31, 2026

Accredited by A2LA, USA
Registration No.: 4366.01
This Accreditation is valid until: January 31, 2026

Recognized by Industry Canada
CAB identifier No.: CN0035
This Recognition is valid until: January 31, 2026

Recognized by VCCI, Japan
Registration No.: C-14103; T-20073; R-13663;
R-20103; G-20097
Date of registration: Apr. 20, 2020
This Recognition is valid until: Apr. 19, 2026

Recognized by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Recognized by Intertek
Registration No.: 2011-RTL-L2-64
Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan,
Guangdong, China

2.3.Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	±3.48dB
Uncertainty for spurious emissions test (30MHz-1GHz)	±4.60 dB(Polarize: H)
	±4.68 dB(Polarize: V)
Uncertainty for spurious emissions test (1GHz to 18GHz)	±4.96dB
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	0.20dB
Uncertainty for Power density test	0.26dB

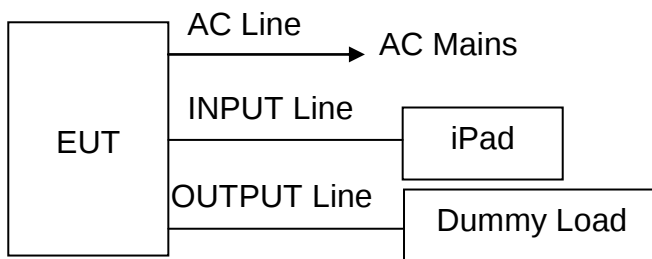
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

2.4.Assistant equipment used for test

2.4.1.iPad

M / N	:	A1893
S / N	:	DMPY3KL5JF8K
Manufacturer	:	Apple

2.5.EUT Configuration and operation conditions for test.



(EUT: Active Loudspeaker System)

1	AC Line	Unshielded, Detachable 2.0m
2	INPUT Line	Unshielded, Detachable 1.2m
3	OUTPUT Line	Unshielded, Detachable 1.2m

2.6.Test mode

2.6.1.INPUT

2.6.2.Bluetooth Mode

Note: The worst case has recorded in the report.

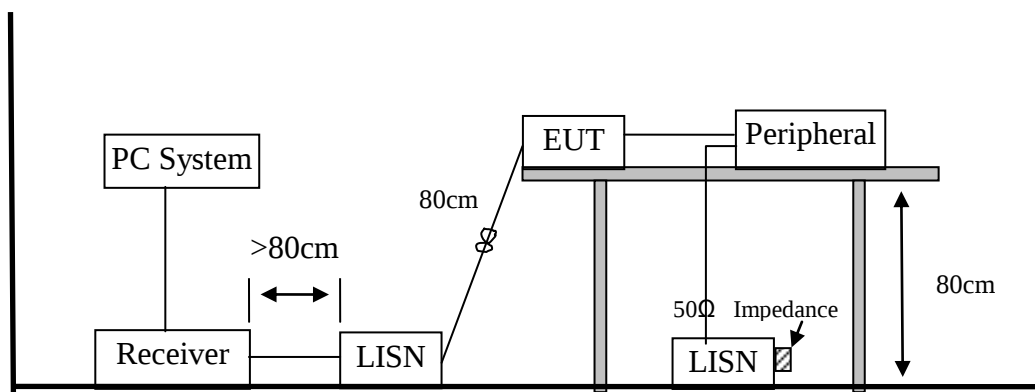
3.CONDUCTED DISTURBANCE AT MAINS TERMINALS TEST

3.1.Test Equipment

3.1.1.For AC Main Port (2# conduction)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI3	EST-E071	June 12,23	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E048	June 12,23	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A
Calibration Lab: LISAI					

3.2.Block Diagram of Test Setup



3.3.Operating Condition of EUT

3.3.1.Setup the EUT and simulator as shown as Section 2.5.

3.3.2.Turned on the power of all equipment.

3.3.3.Reference 2.6.

3.4. Test Procedure

3.4.1. For AC Main Port (Main Terminal)

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 55032 on conducted Disturbance test.

3.5. Conducted Disturbance at Mains Terminals Test Results

PASS.

(All emissions not reported below are too low against the prescribed limits.)

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Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

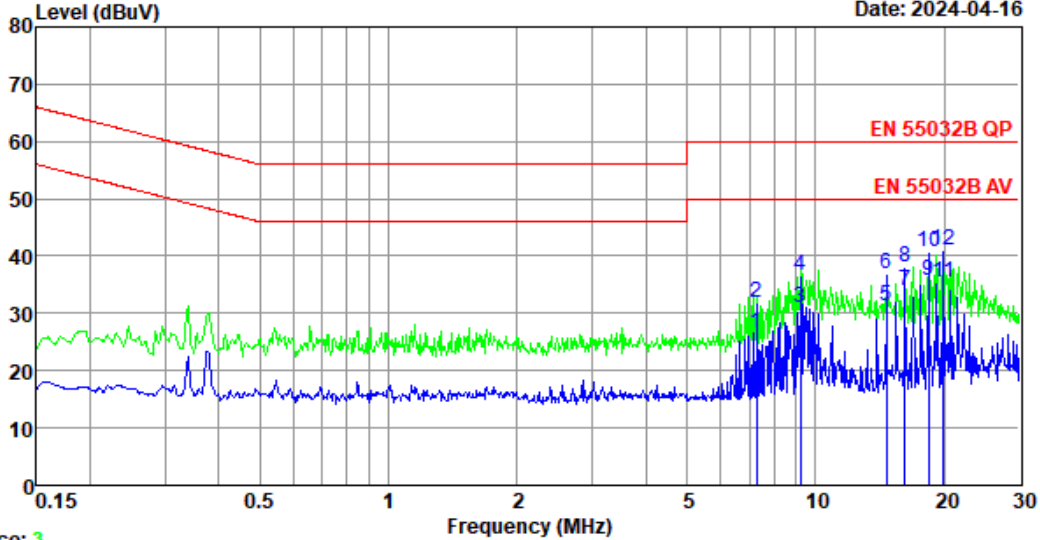
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Data: 4

File: \\EMC-ce-2\Test Data\2024\RF\JJing Heng\MegaSys 1.EM6 (4)

Date: 2024-04-16



Trace: 3

Site no : 2#CE Shield Room Data no. : 4
Env. / Ins. : Temp:24.8°C Humi:65% Press:101.50kPa LINE Phase : LINE
Limit : EN 55032B QP
Engineer : XJF
EUT : Active Loudspeaker System
Power : AC 230V/50Hz
M/N : MegaSys 1
Test Mode : Bluetooth Mode

	Freq. (MHz)	LISN Factor (db)	Cable Loss (db)	Reading dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	7.290	10.14	9.99	6.54	26.67	50.00	23.33	Average
2	7.290	10.14	9.99	11.65	31.78	60.00	28.22	QP
3	9.204	10.24	10.00	10.84	31.08	50.00	18.92	Average
4	9.204	10.24	10.00	16.35	36.59	60.00	23.41	QP
5	14.672	10.44	10.05	10.81	31.30	50.00	18.70	Average
6	14.672	10.44	10.05	16.49	36.98	60.00	23.02	QP
7	16.226	10.52	10.11	13.38	34.01	50.00	15.99	Average
8	16.226	10.52	10.11	17.36	37.99	60.00	22.01	QP
9	18.426	10.63	10.22	15.01	35.86	50.00	14.14	Average
10	18.426	10.63	10.22	19.80	40.65	60.00	19.35	QP
11	19.950	10.72	10.30	14.48	35.50	50.00	14.50	Average
12	19.950	10.72	10.30	19.95	40.97	60.00	19.03	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

4.RADIATED EMISSION TEST

4.1.Test Equipment

4.1.1.For frequency range 30MHz~1GHz (At Anechoic Chamber; 1# 966 radiation)

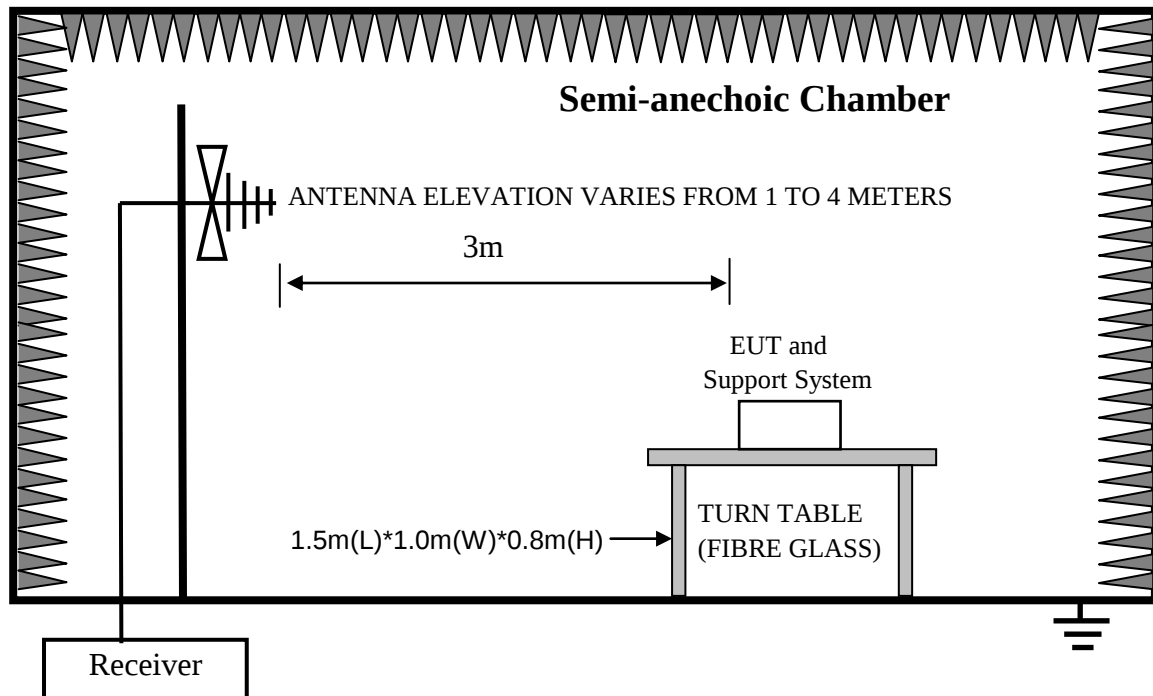
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	June 12,23	1 Year
Bilog Antenna	Teseq	CBL 6111D	EST-E034	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A
Calibration Lab: LISAI					

4.1.2.For frequency range 1GHz~6GHz (At Anechoic Chamber)

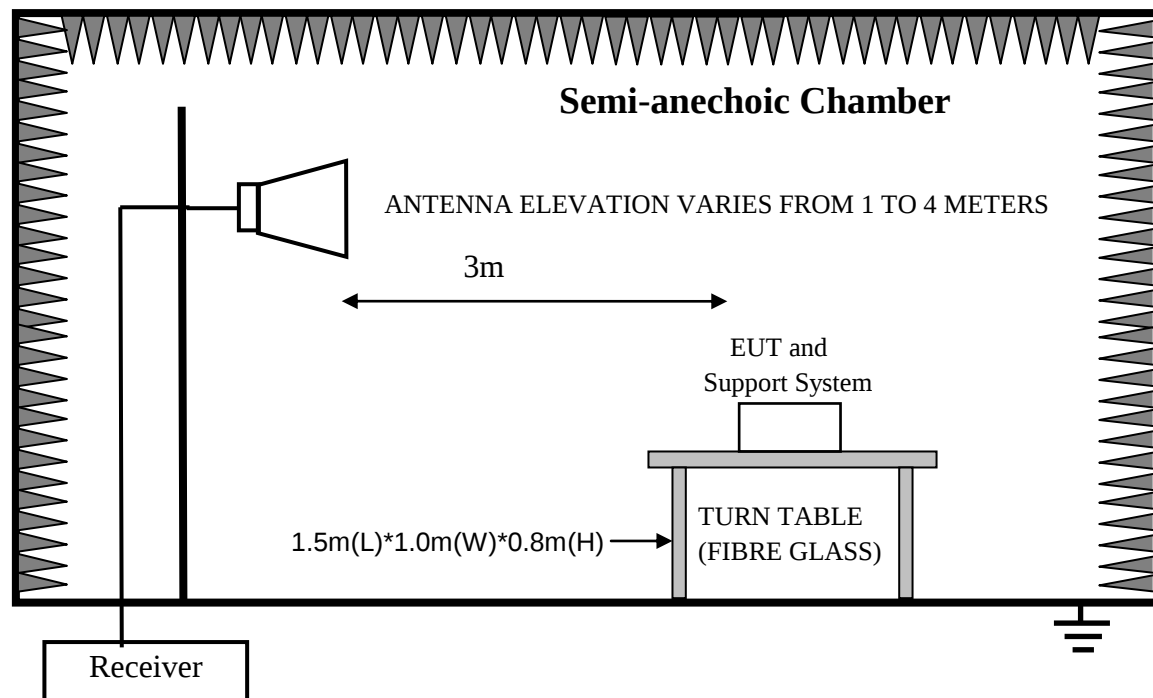
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	June 12,23	1 Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	EST-E031	June 12,23	1 Year
Low Noise Amplifier	RF	TRLA-010180G4 5N	EST-E142	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A
Calibration Lab: LISAI					

4.2. Block Diagram of Test Setup

4.2.1. In Anechoic Chamber Test Setup Diagram for 30MHz~1000MHz



4.2.2. In Anechoic Chamber Test Setup Diagram for 1-6GHz



4.3. Operating Condition of EUT

4.3.1. Setup the EUT and simulator as shown as Section 2.5.

4.3.2. Turned on the power of all equipment.

4.3.3. Reference 2.6.

4.4. Test Procedure

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m or 10m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all the interface cables were changed according to EN 301489 on Radiated Disturbance test.

The bandwidth setting on the test receiver (R&S TEST RECEIVER ESCI) is 120 kHz.

The resolution bandwidth of the Spectrum Analyzer ESR7 was set at 1MHz. (For above 1GHz)

The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values.

The frequency range from 1GHz to 6GHz was checked with peak and average detector, measurement distance is 3m chamber.

4.5. Test Results

PASS.

(All emissions not reported below are too low against the prescribed limits.)

4.6.TEST DATA

30MHz-1GHz

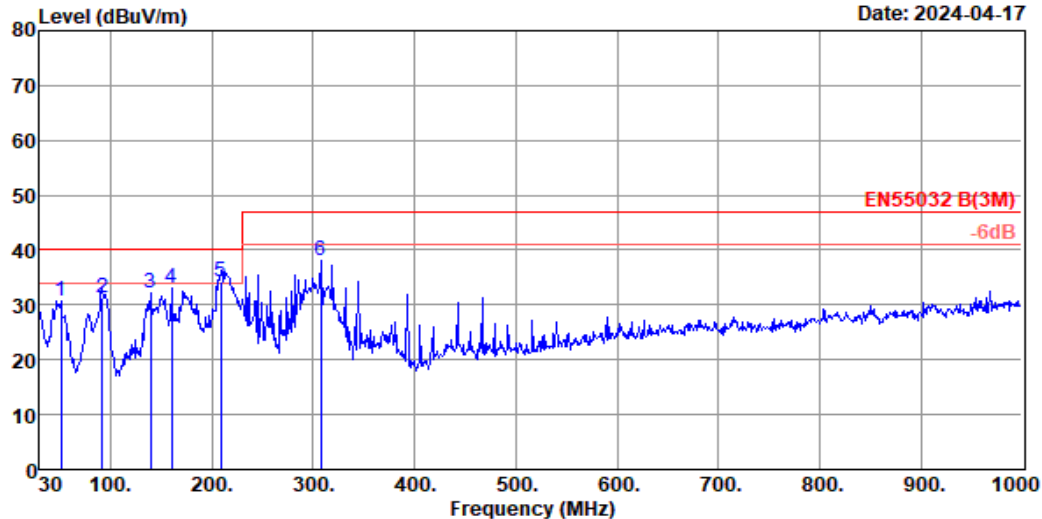
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Data: 39

File: \\EMC-966-1\\test data\\2024\\RF\\Jing Heng\\MegaSys 1.EM6 (40)

Date: 2024-04-17



Site no. : 1# 966 Chamber Data no. : 39
Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL
Limit : EN55032 B(3M)
Env. / Ins. : Temp:24.5°C;Humi:46.3%;Press:101.47kPa
Engineer : DCY
EUT : Active Loudspeaker System
Power : AC 230V/50Hz
M/N : MegaSys 1
Test Mode : Bluetooth Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	51.34	8.20	0.98	21.62	30.80	40.00	9.20	QP
2	92.08	10.30	1.35	19.55	31.20	40.00	8.80	QP
3	139.61	12.80	1.69	17.80	32.29	40.00	7.71	QP
4	159.98	11.00	1.82	20.37	33.19	40.00	6.81	QP
5	208.48	8.93	2.10	23.34	34.37	40.00	5.63	QP
6	307.42	13.14	2.66	22.14	37.94	47.00	9.06	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

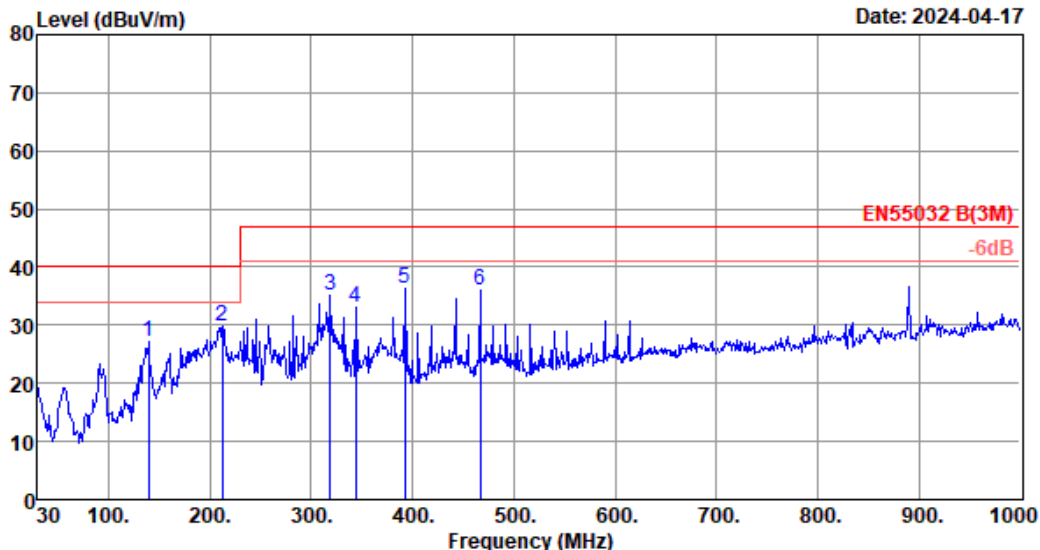
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Data: 40

File: \\EMC-966-1\\test data\\2024\\RF\\Jing Heng\\Mega Sys 1.EM6 (40)

Date: 2024-04-17



Site no. : 1# 966 Chamber Data no. : 40
Dis. / Ant. : 3m 37062 Ant. pol. : HORIZONTAL
Limit : EN55032 B(3M)
Env. / Ins. : Temp:24.5°C;Humi:46.3%;Press:101.47kPa
Engineer : DCY
EUT : Active Loudspeaker System
Power : AC 230V/50Hz
M/N : MegaSys 1
Test Mode : Bluetooth Mode

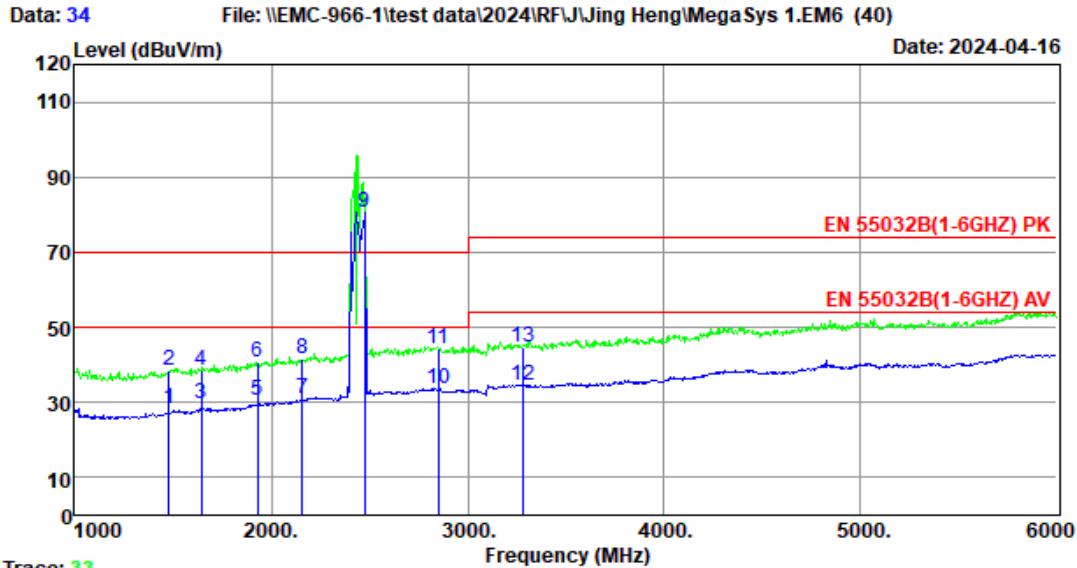
	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	139.61	12.80	1.69	12.67	27.16	40.00	12.84	QP
2	212.36	9.50	2.12	18.15	29.77	40.00	10.23	QP
3	319.06	13.74	2.71	18.61	35.06	47.00	11.94	QP
4	344.28	14.94	2.82	15.29	33.05	47.00	13.95	QP
5	392.78	15.94	3.03	17.39	36.36	47.00	10.64	QP
6	466.50	18.13	3.30	14.44	35.87	47.00	11.13	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

Above 1GHz

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Site no. : 1# 966 Chamber Data no. : 34
Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : HORIZONTAL
Limit : EN 55032B(1-6GHz) PK
Env. / Ins. : Temp:23.4°C.Humi:59%;Press:101.1kPa
Engineer : DCY
EUT : Active Loudspeaker System
Power : AC 230V/50Hz
M/N : MegaSys 1
Test Mode : Bluetooth Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1480.00	25.40	2.71	0.23	28.34	50.00	21.66	Average
2	1480.00	25.40	2.71	10.57	38.68	70.00	31.32	Peak
3	1645.00	26.10	2.89	0.47	29.46	50.00	20.54	Average
4	1645.00	26.10	2.89	9.72	38.71	70.00	31.29	Peak
5	1930.00	26.40	3.19	0.90	30.49	50.00	19.51	Average
6	1930.00	26.40	3.19	10.96	40.55	70.00	29.45	Peak
7	2160.00	27.20	3.37	0.52	31.09	50.00	18.91	Average
8	2160.00	27.20	3.37	10.98	41.55	70.00	28.45	Peak
9	2475.00	27.77	3.62	49.35	80.74	74.00	-6.74	2.4G TX
10	2850.00	28.70	3.90	1.17	33.77	50.00	16.23	Average
11	2850.00	28.70	3.90	11.55	44.15	70.00	25.85	Peak
12	3285.00	29.60	4.09	1.05	34.74	54.00	19.26	Average
13	3285.00	29.60	4.09	10.96	44.65	74.00	29.35	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

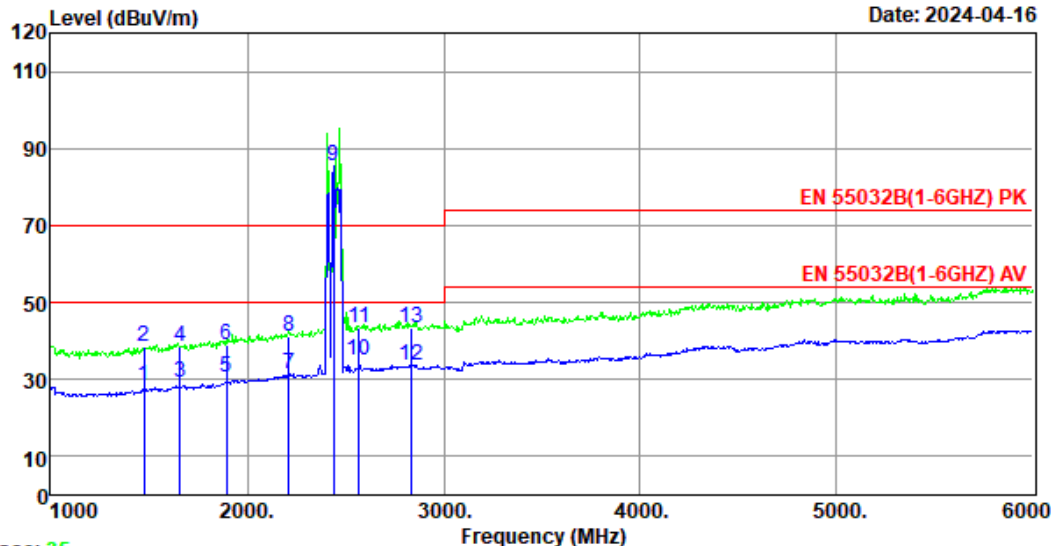
EST Technology

Chilingxiang, Qishantou, Santun,
Houjie, Dongguan, Guangdong, China
Tel: +86-769-83081888
Fax: +86-769-83081878

Data: 36

File: \\EMC-966-1\test data\2024\RF\Jing Heng\MegaSys 1.EM6 (40)

Date: 2024-04-16



Trace: 35

Site no. : 1# 966 Chamber Data no. : 36
Dis. / Ant. : 3m 9120D 1-18G Ant. pol. : VERTICAL
Limit : EN 55032B(1-6GHz) PK
Env. / Ins. : Temp:23.4°C.Humi:59%;Press:101.1kPa
Engineer : DCY
EUT : Active Loudspeaker System
Power : AC 230V/50Hz
M/N : MegaSys 1
Test Mode : Bluetooth Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	1475.00	25.40	2.71	0.35	28.46	50.00	21.54	Average
2	1475.00	25.40	2.71	10.57	38.68	70.00	31.32	Peak
3	1660.00	25.97	2.90	0.33	29.20	50.00	20.80	Average
4	1660.00	25.97	2.90	9.64	38.51	70.00	31.49	Peak
5	1895.00	26.20	3.15	0.98	30.33	50.00	19.67	Average
6	1895.00	26.20	3.15	9.76	39.11	70.00	30.89	Peak
7	2210.00	27.70	3.41	0.32	31.43	50.00	18.57	Average
8	2210.00	27.70	3.41	9.94	41.05	70.00	28.95	Peak
9	2440.00	27.10	3.59	54.77	85.46	74.00	-11.46	2.4G TX
10	2570.00	28.03	3.68	3.30	35.01	50.00	14.99	Average
11	2570.00	28.03	3.68	11.66	43.37	70.00	26.63	Peak
12	2835.00	28.63	3.88	1.26	33.77	50.00	16.23	Average
13	2835.00	28.63	3.88	10.86	43.37	70.00	26.63	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. Margin= Limit - Emission Level.
3. The emission levels that are 20dB below the official limit are not reported.

5.VOLTAGE FLUCTUATIONS & FLICKER TEST

5.1.Test Equipment

Same as Section 5.1.

5.2.Block Diagram of Test Setup

Same as Section 5.2.

5.3.Operating Condition of EUT

5.3.1.Setup the EUT and simulator as shown as Section 2.5.

5.3.2.Turned on the power of all equipment.

5.3.3.Reference 2.6.

5.4.Test Procedure

The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal conditions During the flick measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

5.5.Test Results

PASS.

Please refer to the following page.

Flicker Test Summary per IEC61000-3-3:2013/AMD1:2017 (Run time)

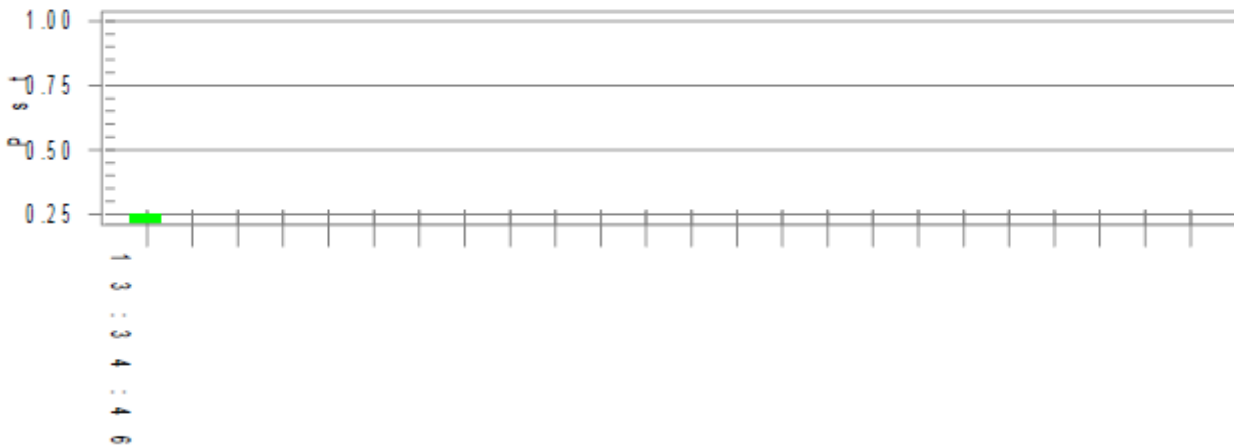
EUT: Active Loudspeaker System **M/N:** MegaSys 1 **Tested by:** Tank
Test category: All parameters (European limits) **Test Margin:** 100
Test date: 2024/4/10 **Start time:** 13:24:25 **End time:** 13:34:52
Test duration (min): 10 **Data file name:** F-000218.cts_data
Comment: Bluetooth Mode
Customer: Jing Heng

Test Result: Pass

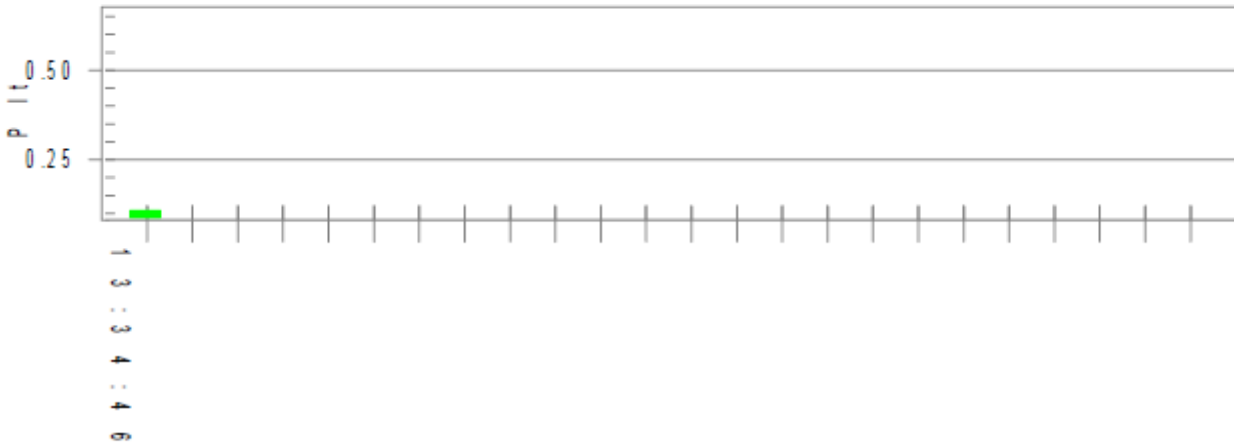
Status: Test Completed

Pst, and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt): 230.75

Highest dt (%):

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.247

Highest Plt (2 hr. period): 0.108

Test limit (%):

Test limit (mS): 500.0 **Pass**

Test limit (%): 3.30 **Pass**

Test limit (%): 4.00 **Pass**

Test limit: 1.000 **Pass**

Test limit: 0.650 **Pass**

6. IMMUNITY PERFORMANCE CRITERIA

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:

1. Based on the used product standard

2. Based on the declaration of the manufacturer, requestor or purchaser

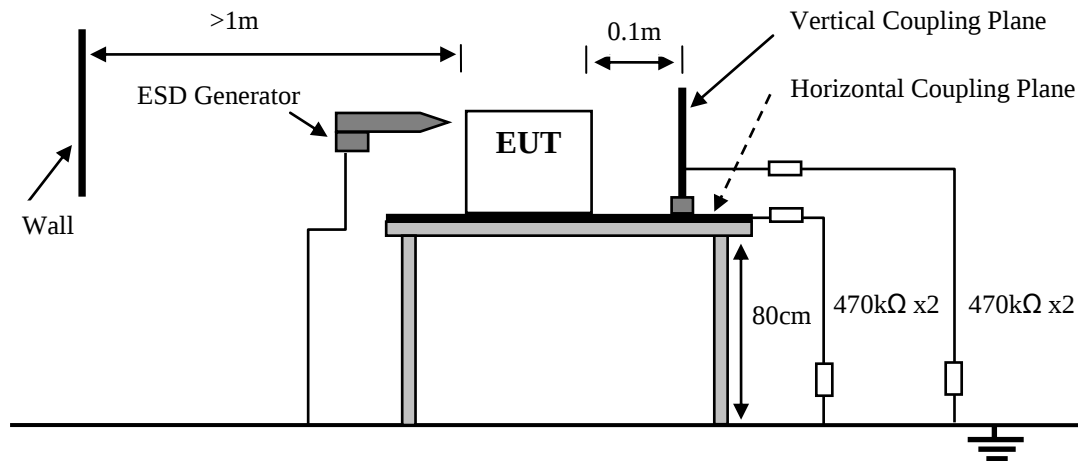
Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).
NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended. NOTE 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.		

7.ELECTROSTATIC DISCHARGE IMMUNITY TEST

7.1.Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ESD Tester	Tesq	NSG437	EST-E073	June 12,23	1 Year
Calibration Lab: LISAI					

7.2.Block Diagram of Test Setup



7.3.Test Levels and Performance Criteria

Severity Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)	Performance criterion
1	2	2	B
2	4	4	
3	6	8	
4	8	15	
X	Special	Special	

7.4.Operating Condition of EUT

Refer to 2.6.

7.5. Test Procedure

7.5.1. Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed

7.5.2. Contact Discharge:

All the procedure was same as Section 8.7.1. except that the generator was re-triggered for a new single discharge and repeated 50 times for each pre-selected test point. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

7.5.3. Indirect discharge for horizontal coupling plane

At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

7.5.4. Indirect discharge for vertical coupling plane

At least 20 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

7.6. Test Information

Applicant	:	Dongguan Jingheng Electron Co., Ltd.
EUT	:	Active Loudspeaker System
M/N	:	MegaSys 1
Test Voltage	:	AC 230V/50Hz
Test Engineer	:	Tank
Test Date	:	2024-04-17
Temperature	:	25°C
Humidity	:	43%
Pressure	:	101.4KPa
Test Mode	:	Refer to 2.6
Required Performance	:	B
Actual Performance	:	B

7.7. Test Results

Air Discharge: $\pm 2\text{kV}$ $\pm 4\text{kV}$ $\pm 8\text{kV}$ # For Air Discharge each Point Positive 10 times and negative 10 times discharge.

Contact Discharge: $\pm 2\text{kV}$ $\pm 4\text{kV}$ # For Contact Discharge each point positive 25 times and negative 25 times discharge

For the time interval between successive single discharges an initial value of one second.

Discharge Voltage (kV)	Type of discharge	Dischargeable Points	Performance		Result (Pass/Fail)
			Required	Observatio	
± 2	Contact	1,2,3,4	B	B	Pass
± 4	Contact	1,2,3,4	B	B	Pass
± 2	Air	5,6,7	B	B	Pass
± 4	Air	5,6,7	B	B	Pass
± 8	Air	5,6,7	B	B	Pass
± 2	HCP-Bottom	Edge of the HCP	B	B	Pass
± 2	VCP-Front	Center of the VCP	B	B	Pass
± 2	VCP-Left	Center of the VCP	B	B	Pass
± 2	VCP-Back	Center of the VCP	B	B	Pass
± 2	VCP-Right	Center of the VCP	B	B	Pass
± 4	HCP-Bottom	Edge of the HCP	B	B	Pass
± 4	VCP-Front	Center of the VCP	B	B	Pass
± 4	VCP-Left	Center of the VCP	B	B	Pass
± 4	VCP-Back	Center of the VCP	B	B	Pass
± 4	VCP-Right	Center of the VCP	B	B	Pass

Discharge Points Description

<u>1</u>	Screw	<u>5</u>	Slot
<u>2</u>	Metal	<u>6</u>	Light
<u>3</u>	INPUT	<u>7</u>	Button
<u>4</u>	OUTPUT		

Note: The Voice appeared noise during the test, but self-recoverable after the test.

Discharge was considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).

8.RF FIELD STRENGTH SUSCEPTIBILITY TEST

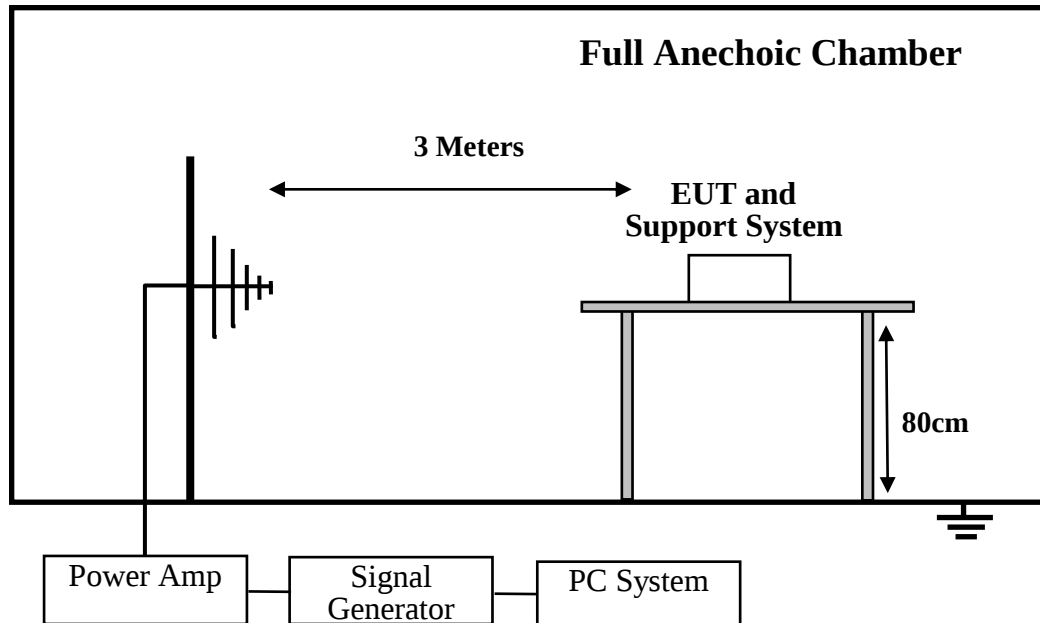
8.1.Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	Agilent	N5181A	EST-E060	June 12,23	1 Year
Power Amplifier	SKET	HAP801000M-250W	EST-E061	N/A	N/A
Power Amplifier	SKET	HAP0103G-75W	EST-E062	N/A	N/A
Power Amplifier	SKET	HAP0306G-50W	EST-E063	N/A	N/A
Power Meter	Agilent	E4419B	EST-E064	June 12,23	1 Year
Power sensor	Agilent	E9301A	EST-E065	June 12,23	1 Year
Power sensor	HP	E9301A	EST-E066	June 12,23	1 Year
Antenna	Schwarzbeck	STLP 9129	EST-E059	N/A	N/A
E-Field Probe	Narda	EP-601	EST-E067	June 12,23	1 Year
Test Software	SKET	EMC-S	V1.2.0.48	N/A	N/A

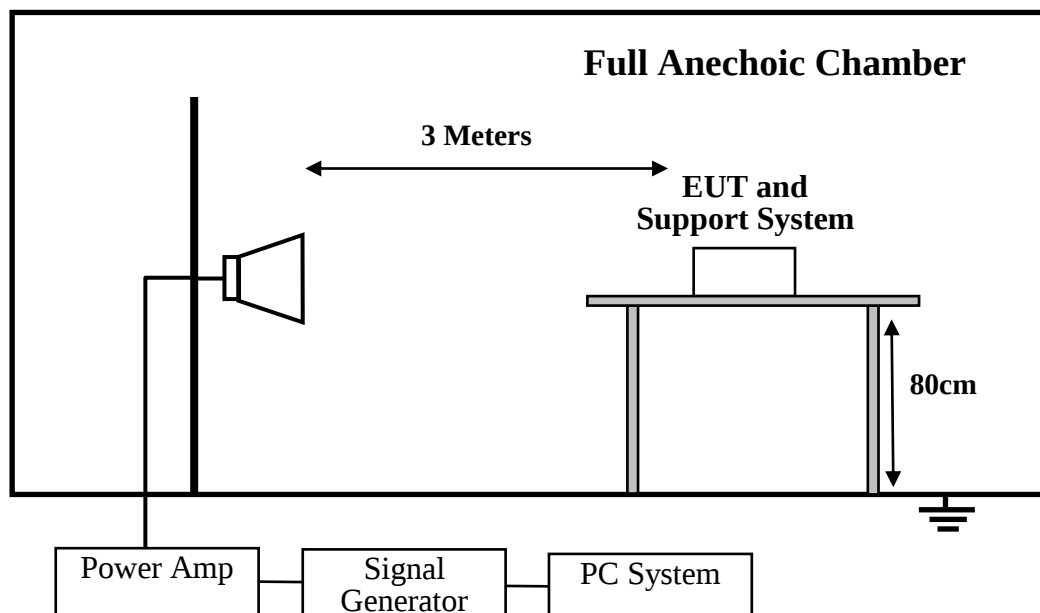
Calibration Lab: LISAI

8.2. Block Diagram of Test Setup

Frequency For 80-1000MHz



Frequency For 1.0-6.0GHz



8.3. Test Severity Level and Performance Criteria

Severity Level	Test Field Strength V/m	Performance Criteria
1	1	A
2	3	
3	10	
X	Special	

8.4. Operating Condition of EUT

Refer to 2.6

8.5. Test Procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters (for frequency range 80MHz-1GHz) and 1 meters (for 1.0GHz-6.0GHz) away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range 80MHz-1000MHz, 1.0GHz-6.0GHz and records the signal generator's output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 3 meter height above the ground. Using the recorded signal generator's output level to measure the EUT from frequency range 80MHz-1000MHz, 1.0GHz-6.0GHz and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

All the scanning conditions are as follows:

Test conditions	
Frequency	80MHz-1GHz, 1.0GHz—6.0GHz
Frequency increments step	1% of momentary used
Test level	3V/m (unmodulated)
Dwell time	3s
Test signal	80% amplitude modulated by 1kHz sinusoidal audio signal

8.6. Test Information

Applicant	:	Dongguan Jingheng Electron Co., Ltd.
EUT	:	Active Loudspeaker System
M/N	:	MegaSys 1
Test Voltage	:	AC 230V/50Hz
Test Engineer	:	Tank
Test Date	:	2024-04-17
Temperature	:	24℃
Humidity	:	58%
Pressure	:	101.4KPa
Test Mode	:	Refer to 2.6
Required Performance	:	A
Actual Performance	:	A

8.7. Test Results

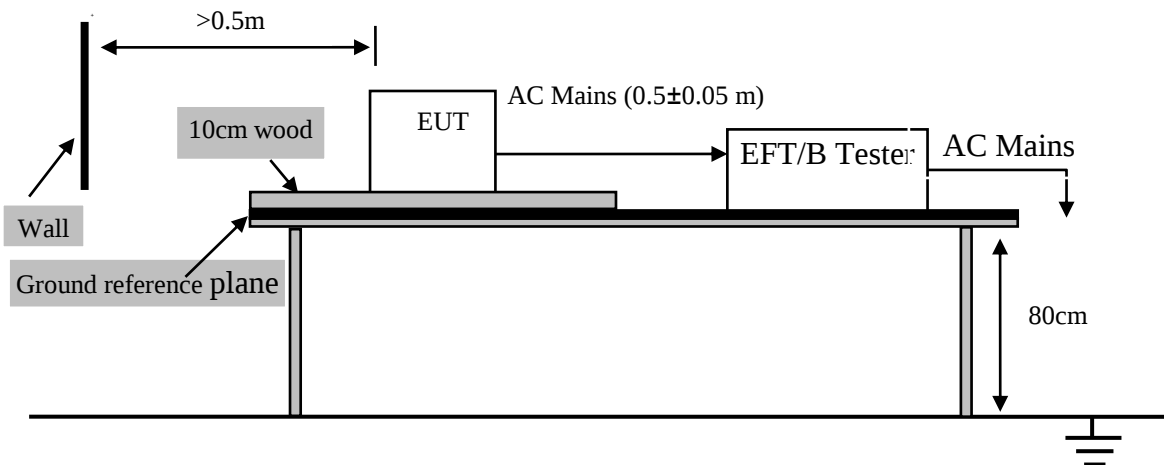
Modulation: ☒ AM ☐ Pulse ☐ none 1 kHz 80%					
Frequency Range :80 MHz -1000MHz					
EUT vs Antenna Position	Test antenna :Horizontal		Test antenna :Vertical		Result (Pass / Fail)
	Required	Observation	Required	Observatio	
Front	A	A	A	A	Pass
Right	A	A	A	A	Pass
Rear	A	A	A	A	Pass
Left	A	A	A	A	Pass
Performance: There was no change compared with initial operation during the test.					
Frequency Range : 1.0GHz—6.0GHz					
EUT vs Antenna Position	Test antenna :Horizontal		Test antenna :Vertical		Result (Pass / Fail)
	Required	Observation	Required	Observatio	
Front	A	A	A	A	Pass
Right	A	A	A	A	Pass
Rear	A	A	A	A	Pass
Left	A	A	A	A	Pass
Note: There was no change compared with initial operation during the test.					

9.ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

9.1.Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
EFT Generator	EMC PARTNER	TRANSIENT 2000	EST-E074	June 12,23	1 Year
Capacitive Coupling Clamp	HAEFELY	IP4A	EST-E040	June 12,23	1 Year
Test Software	HAEFELY	emv check 2000	N/A	N/A	N/A
Calibration Lab: LISAI					

9.2.Block Diagram of Test Setup



9.3.Operating Condition of EUT

Refer to 2.6

9.4.Test Procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support $0.1\text{m} \pm 0.01\text{m}$ thick. The ground reference plane was $1\text{m} \times 1\text{m}$ metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

9.4.1.For input and AC power ports:

The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

9.4.2.For signal lines and control lines ports:

Ports which are intended to be connected to telecommunication networks (e.g. public switched telecommunication networks, integrated services digital networks, local area networks and similar networks.)

9.4.3.For DC input and DC output power ports:

It's unnecessary to test.

9.5. Test Information

Applicant	:	Dongguan Jingheng Electron Co., Ltd.
EUT	:	Active Loudspeaker System
M/N	:	MegaSys 1
Test Voltage	:	AC 230V/50Hz
Test Engineer	:	Tank
Test Date	:	2024-04-17
Temperature	:	24°C
Humidity	:	58%
Pressure	:	101.4KPa
Test Mode	:	Refer to 2.6
Required Performance	:	B
Actual Performance	:	B

9.6. Test Results

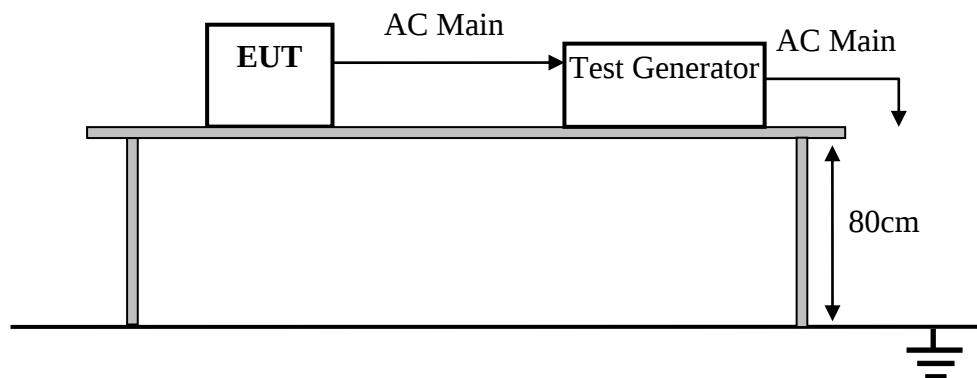
Repetition Frequency : <u>5 kHz</u> Burst Duration : <u>15ms</u> Burst Period: <u>300ms</u>					
Inject Time(s): <u>120s</u> Inject Method: <u>Direct</u>					
Inject Line: ☒ AC Mains ☐ DC Supply ☐ Signal					
Line	Test Voltage	Performance			Result (Pass/Fail)
		Required	Observation(+)	Observation(-)	
L	1kV	B	B	B	Pass
N	1kV	B	B	B	Pass
PE	1kV	B	B	B	Pass
L N	1kV	B	B	B	Pass
L PE	1kV	B	B	B	Pass
N PE	1kV	B	B	B	Pass
L N PE	1kV	B	B	B	Pass
Signal Line	0.5kV	B	-	-	N/A
Note: The Voice appeared noise during the test, but self-recoverable after the test.					

10.SURGE TEST

10.1.Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Surge Controller	HAEFELY	PSURGE8000	EST-E015	June 12,23	1 Year
Surge Impulse Module	HAEFELY	PIM100	EST-E016	June 12,23	1 Year
Surge Coupling Network	HAEFELY	PCD100	EST-E017	June 12,23	1 Year
Calibration Lab: LISAI					

10.2.Block Diagram of Test Setup



10.3.Severity Levels and Performance Criterion

Severity Level	Open-Circuit Test Voltage kV
1	0.5
2	1.0
3	2.0
4	4.0
X	Special

10.4.Operating Condition of EUT

Refer to 2.6

10.5. Test Procedure

- 1) Set up the EUT and test generator as shown on Section 11.2
- 2) For line-to-line coupling mode, provide a 1kV 1.2/50 μ s voltage surge (at open-circuit condition) and 8/20 μ s current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.
- 3) For testing symmetrical communication lines that are intended to be directly connected to outdoor telecommunication networks (e.g. public switched telecommunications networks (PSTN)) the 1,2/50 μ s – 8/20 μ s waveform may not be appropriate. Outdoor telecommunications networks typically have cable lengths in excess of 300 m and may be many kilometres in length. As a result of the nature of these networks the 10/700 μ s – 5/320 μ s waveform is more representative of actual surges encountered in the field. Annex A defines the testing methods and generator characteristics for testing using the 10/700 μ s – 5/320 μ s generator.
- 4) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.
- 5) Different phase angles are done individually.
- 6) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

10.6. Test Information

Applicant	:	Dongguan Jingheng Electron Co., Ltd.
EUT	:	Active Loudspeaker System
M/N	:	MegaSys 1
Test Voltage	:	AC 230V/50Hz
Test Engineer	:	Tank
Test Date	:	2024-04-17
Temperature	:	24°C
Humidity	:	58%
Pressure	:	101.4KPa
Test Mode	:	Refer to 2.6
Required Performance	:	B
Actual Performance	:	B

10.7. Test Results

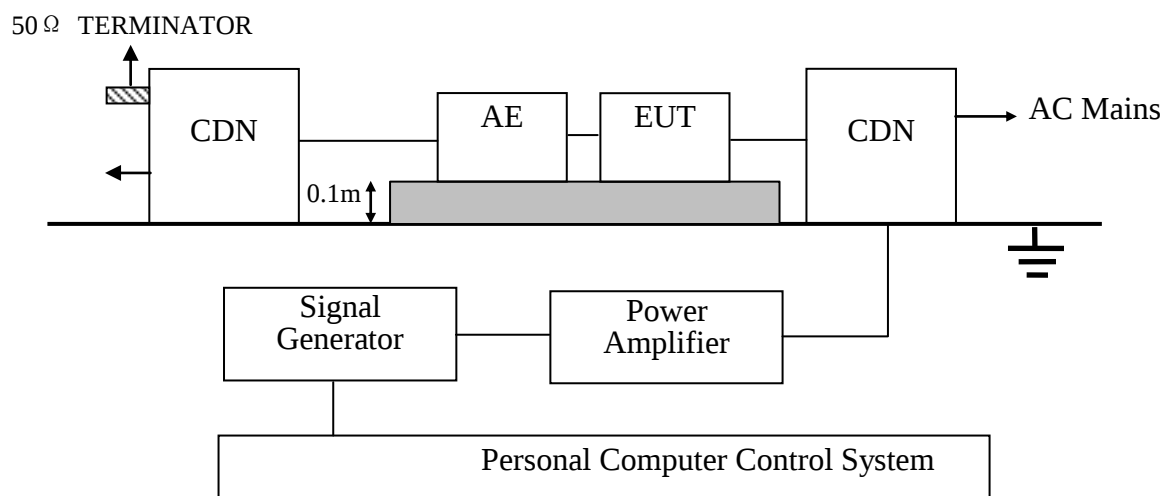
No.of pluse: ±5		Interval:60 Seconds									
Line : ☒ AC Mains ☐ DC Supply ☐ Signal											
Location	Volt	500V			1kV			2kV			Result
	Phase	Performance			Performance			Performance			(Pass/Fail)
		Required	+	-	Required	+	-	Required	+	-	
L-N	0°	---	---	---	B	B	B	---	---	---	Pass
	90°	---	---	---	B	B	B	---	---	---	Pass
	180°	---	---	---	B	B	B	---	---	---	Pass
	270°	---	---	---	B	B	B	---	---	---	Pass
L-PE	0°	---	---	---	---	---	---	B	B	B	Pass
	90°	---	---	---	---	---	---	B	B	B	Pass
	180°	---	---	---	---	---	---	B	B	B	Pass
	270°	---	---	---	---	---	---	B	B	B	Pass
N-PE	0°	---	---	---	---	---	---	B	B	B	Pass
	90°	---	---	---	---	---	---	B	B	B	Pass
	180°	---	---	---	---	---	---	B	B	B	Pass
	270°	---	---	---	---	---	---	B	B	B	Pass
LAN Port	0°	---	---	---	---	---	---	---	---	---	N/A
WAN Port	0°	---	---	---	---	---	---	---	---	---	N/A
Note: The Voice appeared noise during the test, but self-recoverable after the test.											

11.INJECTED CURRENTS SUSCEPTIBILITY TEST

11.1.Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Signal Generator	Rohde &Schwarz	SMB100A	EST-E025	June 12,23	1 Year
Power Amplifier	FRANKONIA	CIT-10	EST-E021	June 12,23	1 Year
Power Meter	Rohde &Schwarz	NRVS	EST-E027	June 12,23	1 Year
CDN	FRANKONIA	CDN-M2+M3	EST-E022	June 12,23	1 Year
EM-Clamp	FRANKONIA	EMCL-20	EST-E042	June 12,23	1 Year
Test Software	SKET	EMC-S	V1.2.0.80	N/A	N/A
Calibration Lab: LISAI					

11.2.Block Diagram of Test Setup



11.3.Severity Levels and Performance Criterion

Level	Voltage Level (e.m.f.) V
1.	1
2.	3
3.	10
X	Special

11.4.Operating Condition of EUT

Refer to 2.6

11.5. Test Procedure

- 1) Setup the EUT, CDN and test generators as shown on Section 12.2.
- 2) Let the EUT work in test mode and test it.
- 3) The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
- 4) The disturbance signal described below is injected to EUT through CDN.
- 5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.
- 6) The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.
- 7) The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
- 8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

11.6. Test Information

Applicant	:	Dongguan Jingheng Electron Co., Ltd.
EUT	:	Active Loudspeaker System
M/N	:	MegaSys 1
Test Voltage	:	AC 230V/50Hz
Test Engineer	:	Tank
Test Date	:	2024-04-17
Temperature	:	24°C
Humidity	:	58%
Pressure	:	101.4KPa
Test Mode	:	Refer to 2.6
Required Performance	:	A
Actual Performance	:	A

11.7. Test Results

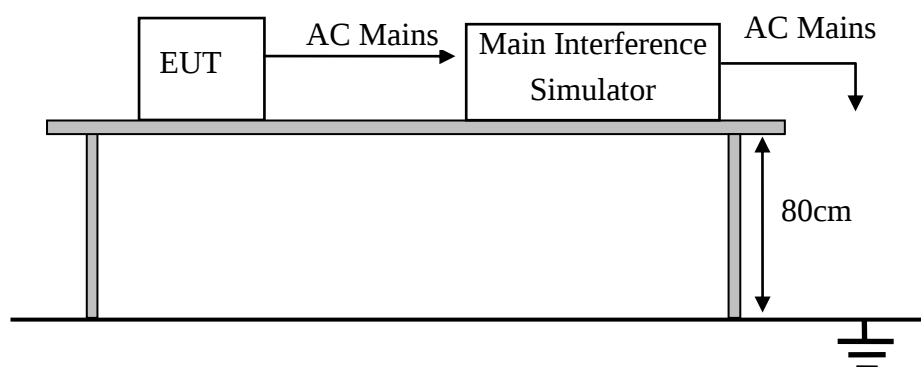
Frequency Range (MHz)	Injected Position	Voltage Level (e.m.f.)	Required	Observation	Result
					(Pass / Fail)
0.15 ~ 20	AC mains	3V	A	A	PASS
20 ~ 80	AC mains	3V	A	A	PASS
0.15 ~ 20	WAN Port	3V	-	-	N/A
20 ~ 80	WAN Port	3V	-	-	N/A
0.15 ~ 20	LAN Port	3V	-	-	N/A
20 ~ 80	LAN Port	3V	-	-	N/A
Modulation Signal:1kHz 80% AM					
Note: There was no change compared with initial operation during the test.					

12.VOLTAGE DIPS AND INTERRUPTIONS TEST

12.1.Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Fail Simulator	3ctest	PFS 2216SD	EST-E136	Aug. 01,23	1 Year
Calibration Lab: LISAI					

12.2.Block Diagram of Test Setup



12.3.Operating Condition of EUT

Refer to 2.6

12.4.Test Procedure

- 1) The EUT and test generator were setup as shown on Section 13.2.
- 2) The interruptions are introduced at selected phase angles with specified duration.
- 3) Record any degradation of performance.

12.5.Test Information

Applicant	:	Dongguan Jingheng Electron Co., Ltd.
EUT	:	Active Loudspeaker System
M/N	:	MegaSys 1
Test Voltage	:	AC 230V/50Hz
Test Engineer	:	Tank
Test Date	:	2024-04-17
Temperature	:	24℃
Humidity	:	58%
Pressure	:	101.4KPa
Test Mode	:	Refer to 2.6
Required Performance	:	B&B&B&C
Actual Performance	:	B&B&B&C

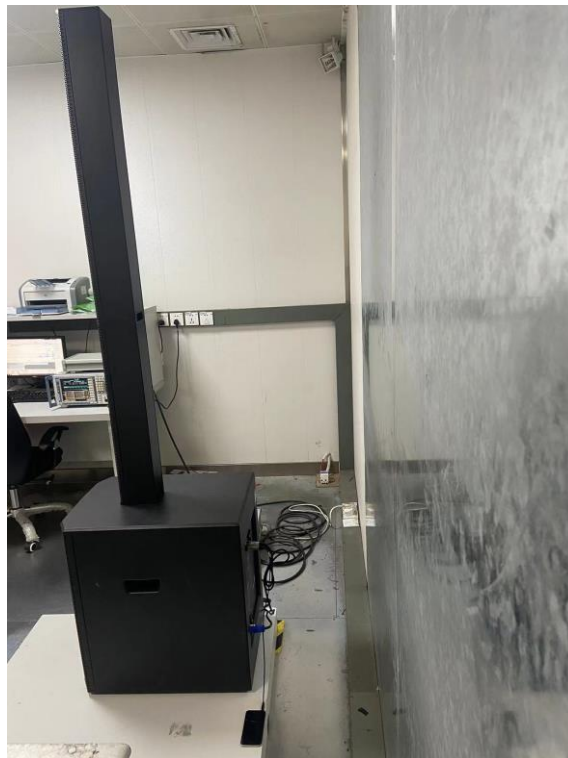
12.6. Test Results

Test Level % U _T	Voltage Dips & Short Interruptions % U _T	Duration (in period)	Phase Angle	Required	Observation	Result
						(Pass / Fail)
0	100	0.5P	0° -360°	B	B	PASS
0	100	1P	0° -360°	B	B	PASS
70	30	25P	0° -360°	B	B	PASS
0	100	250P	0° -360°	C	C	PASS

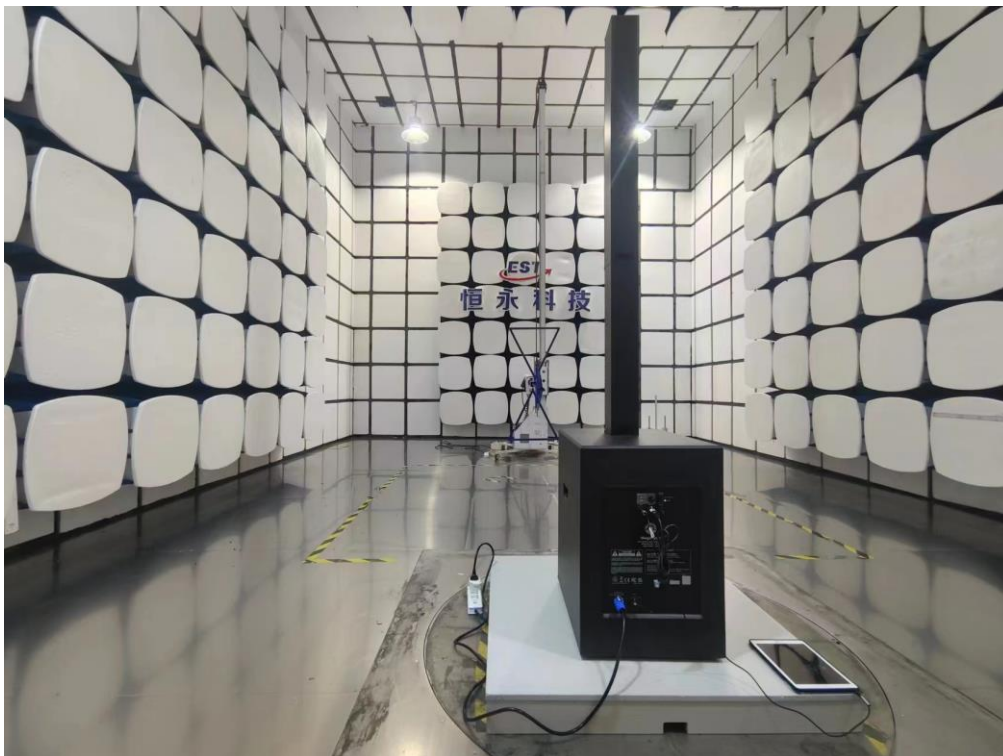
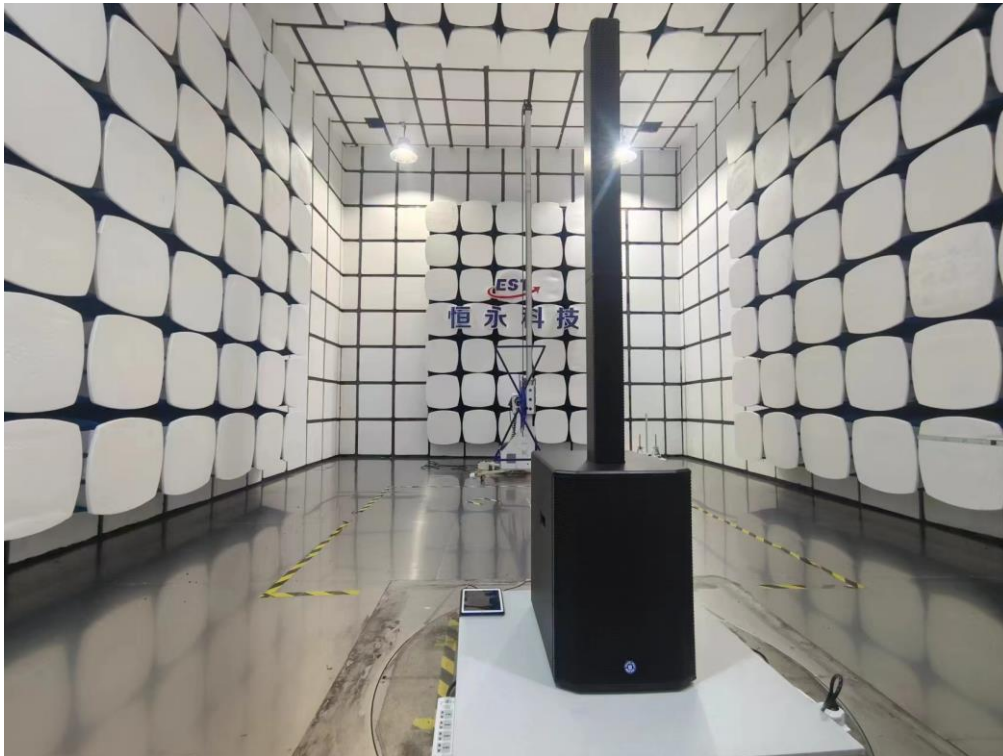
Note: The EUT was Stopped during the test, but recoverable by user after the test.

13. PHOTOGRAPHS OF TEST SETUP

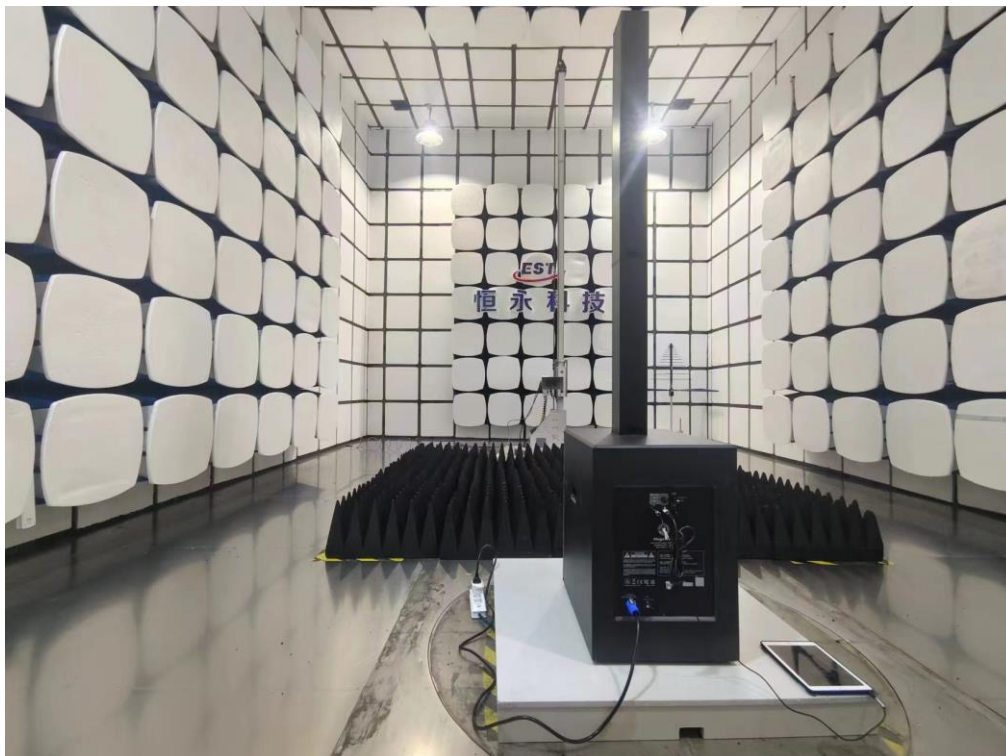
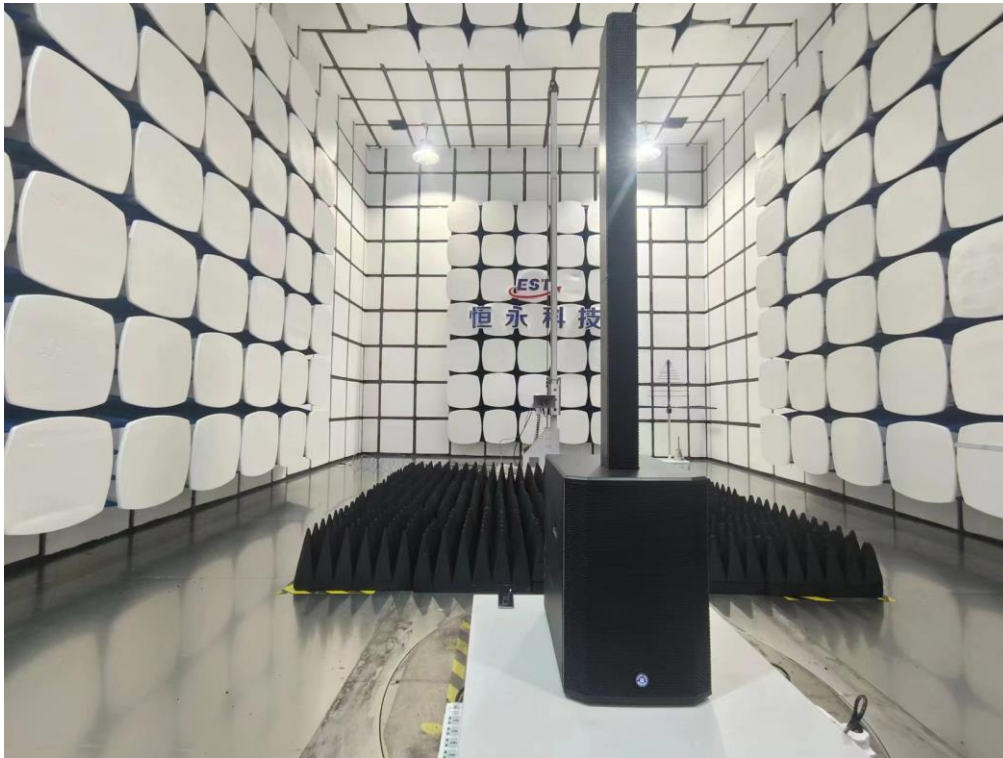
13.1. Set-up for Conducted disturbance at mains terminals test



13.2.Set-up for Radiated(30MHz-1GHz) test



13.3.Set-up for Radiated(Above 1GHz) test



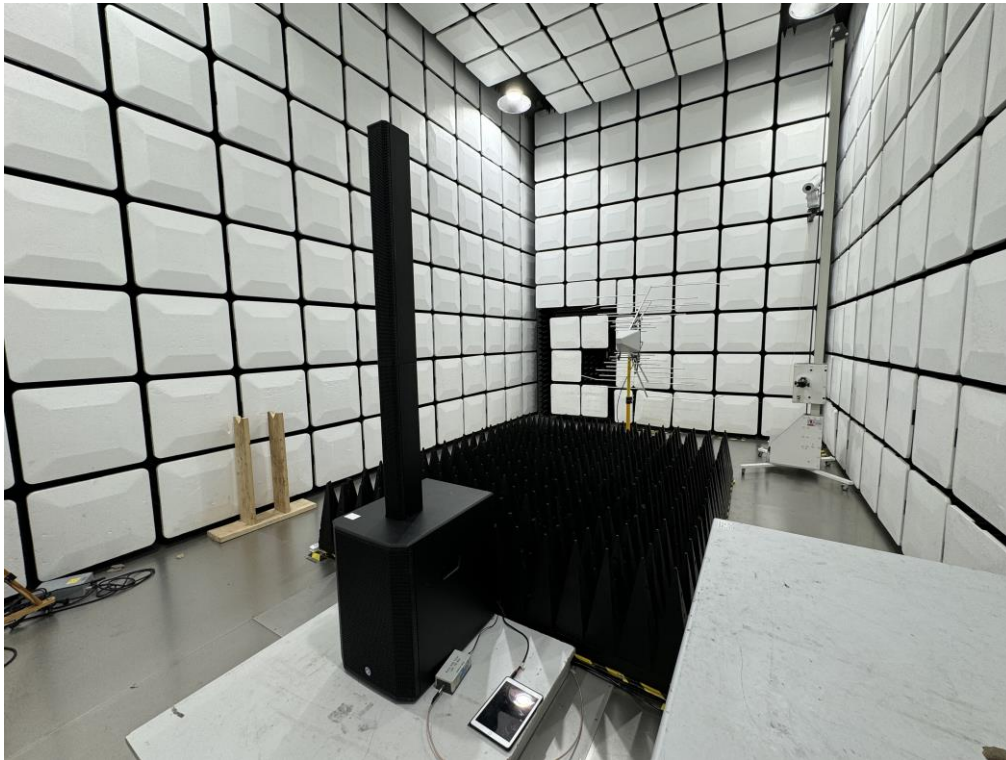
13.4. Set-up for Harmonic current and Voltage fluctuations & flicker test



13.5. Set-up for Electrostatic discharge immunity test



13.6. Set-up for RF field strength susceptibility test



13.7. Set-up for Electrical fast transient/burst immunity test



13.8.Set-up for Surge test



13.9.Set-up for Injected currents susceptibility test



13.10.Set-up for Voltage dips and interruptions test



14. PHOTOGRAPHS OF EUT

External Photos
M/N: MegaSys 1



External Photos

M/N: MegaSys 1



External Photos

M/N: MegaSys 1



External Photos

M/N: MegaSys 1



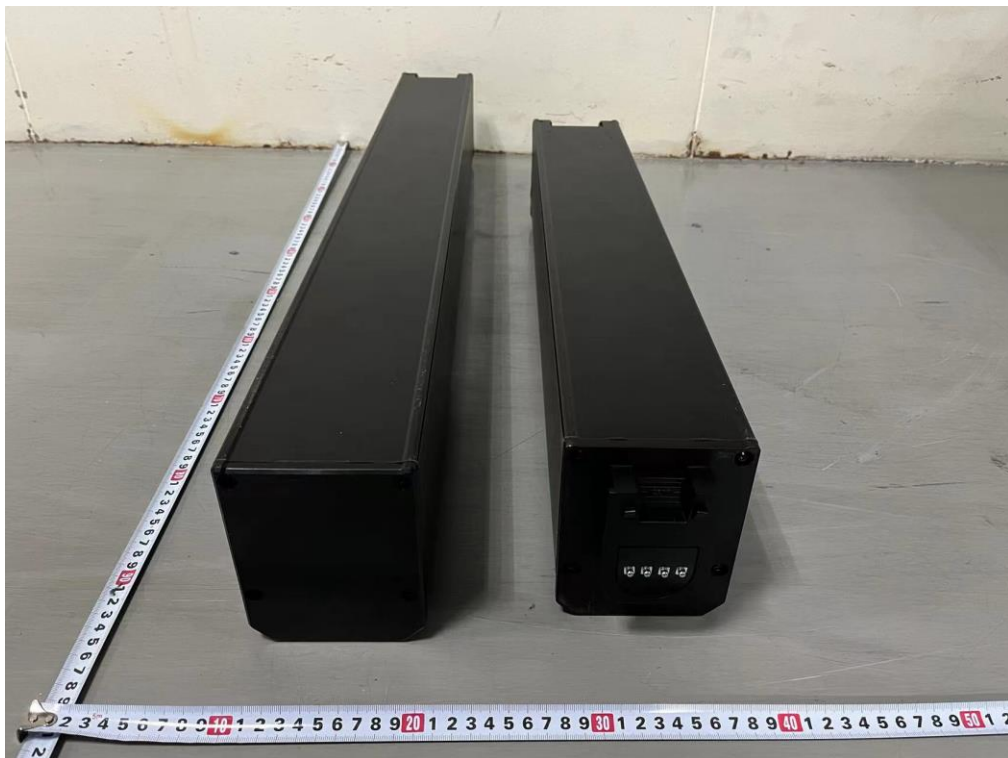
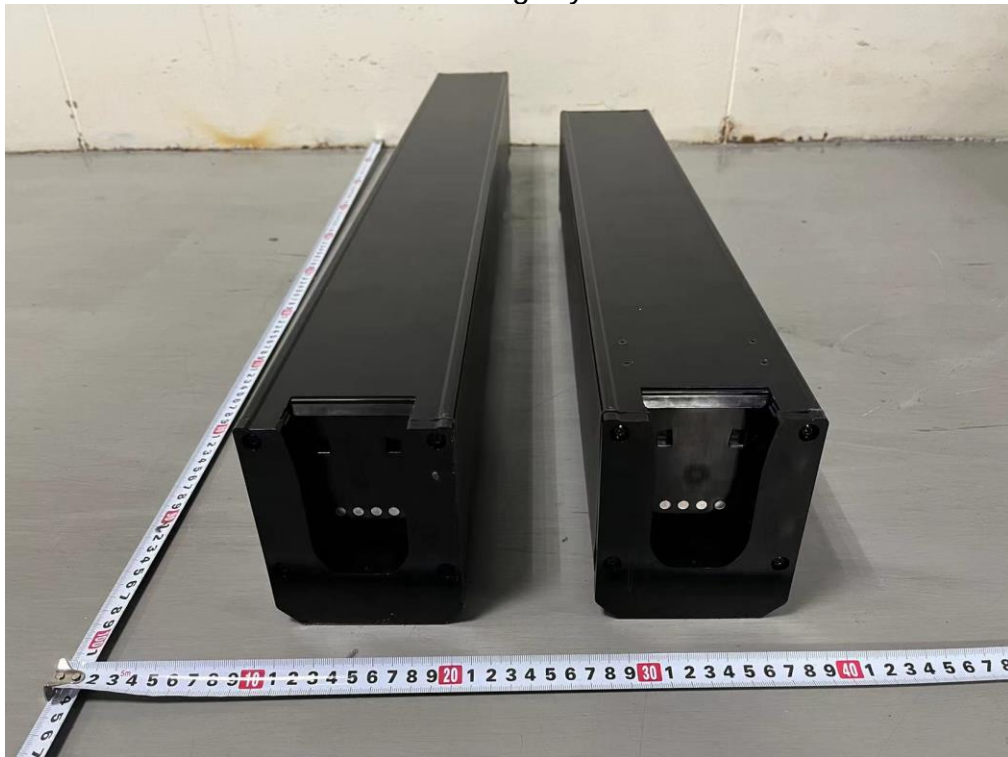
External Photos

M/N: MegaSys 1



External Photos

M/N: MegaSys 1

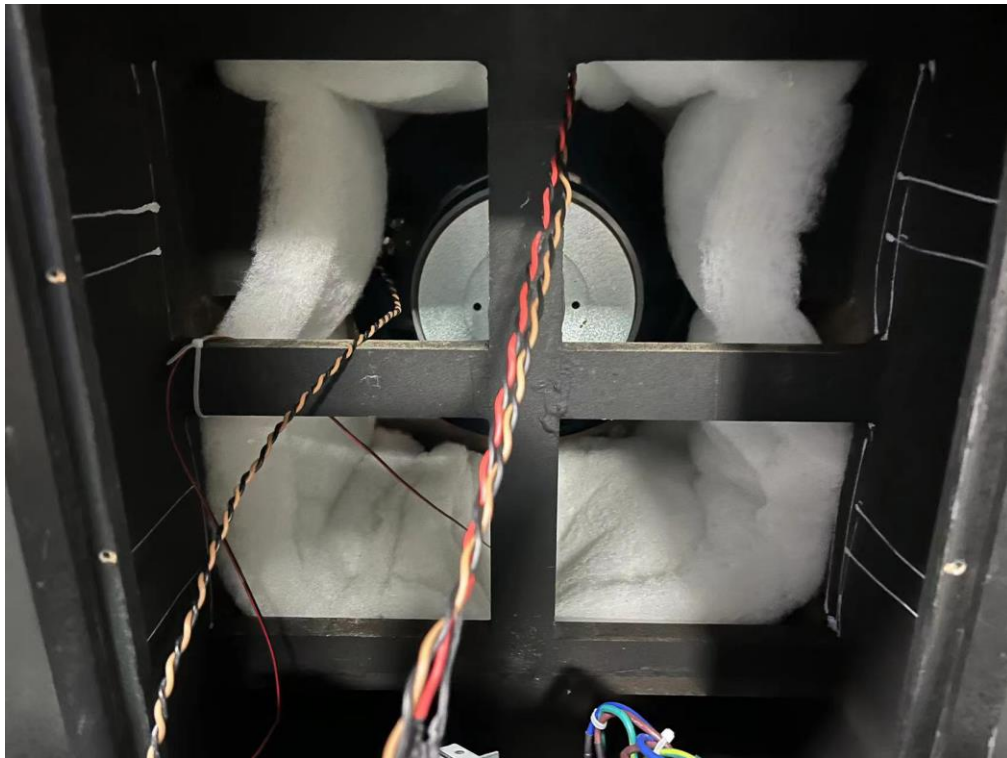


External Photos

M/N: MegaSys 1

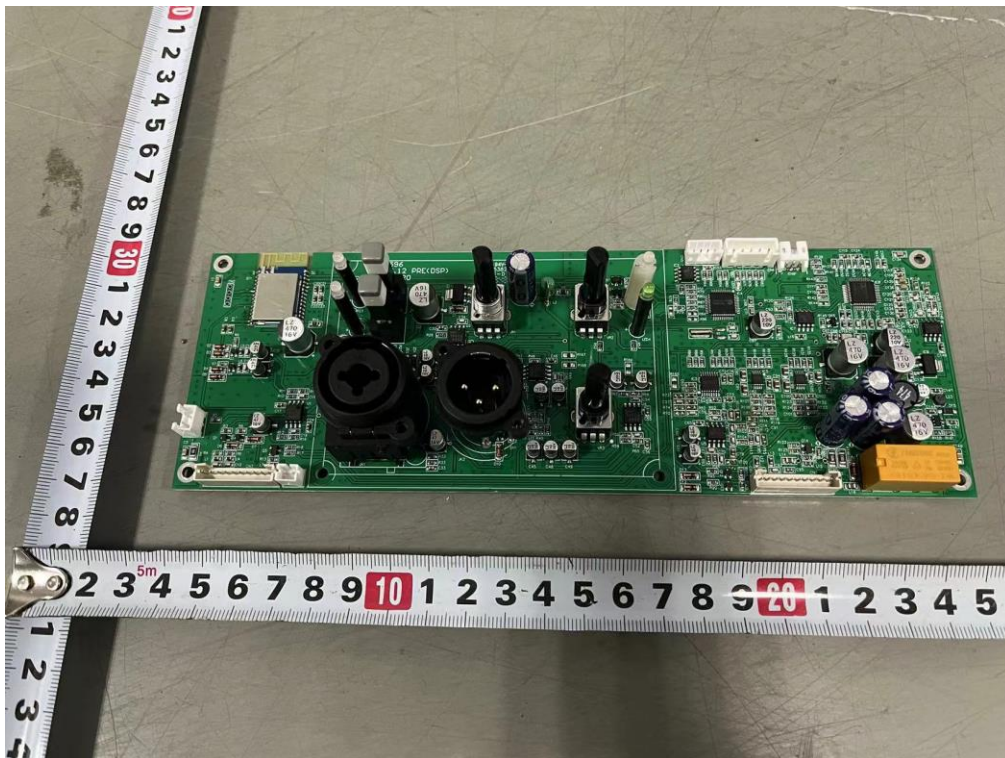
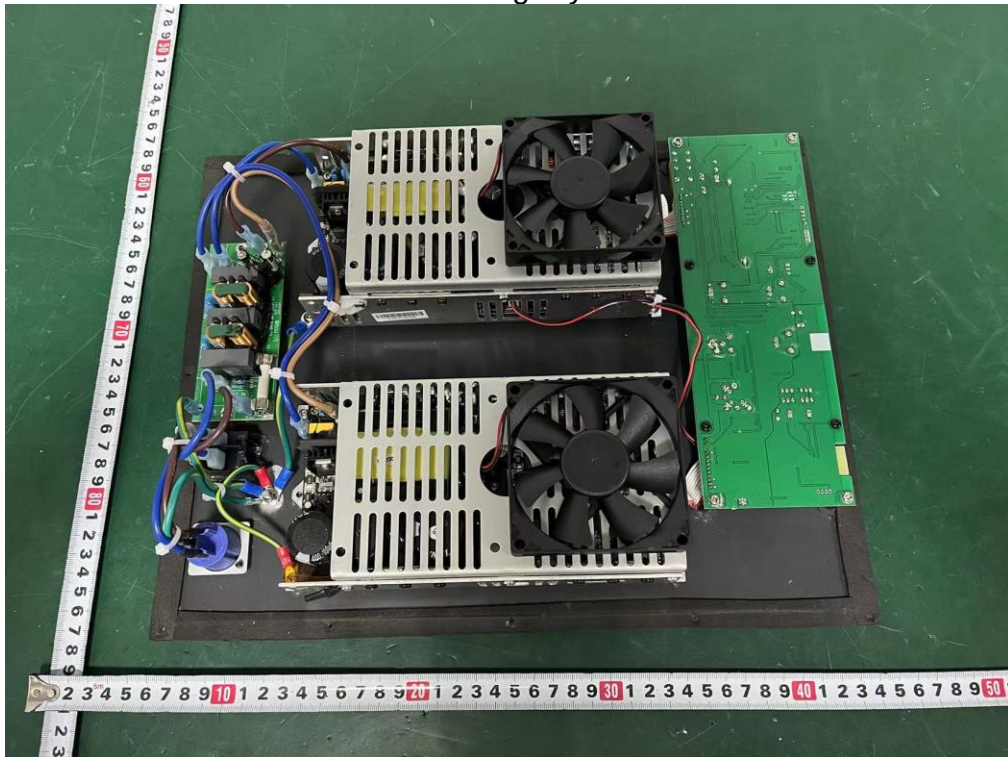


Internal Photos M/N: MegaSys 1

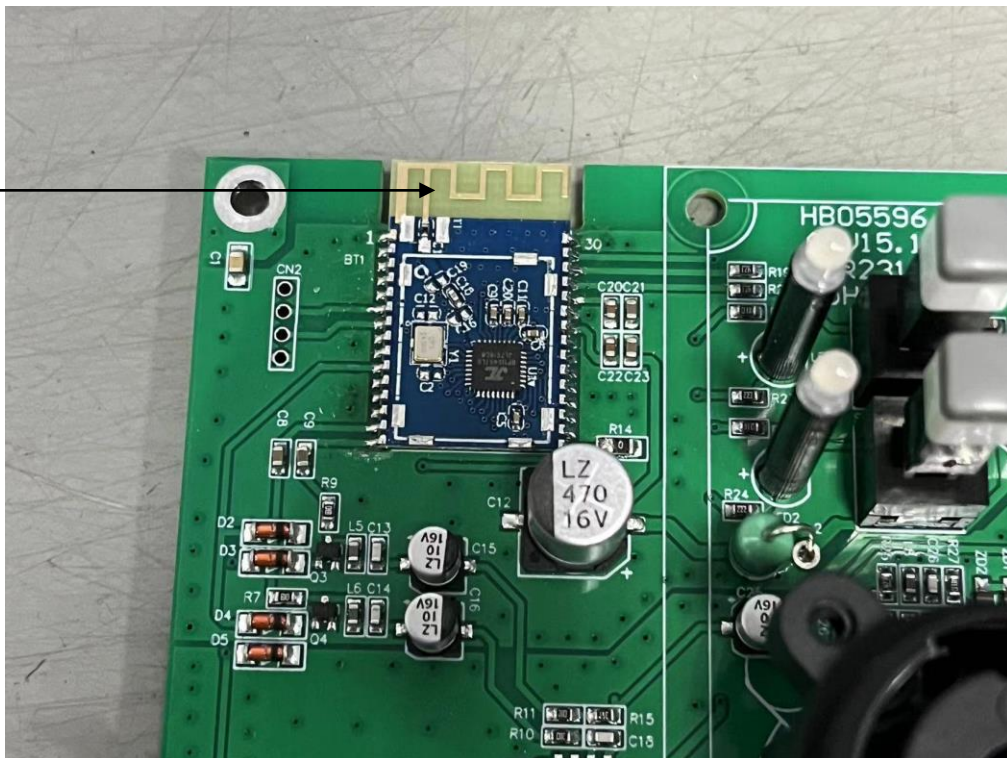
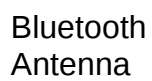


Internal Photos

M/N: MegaSys 1

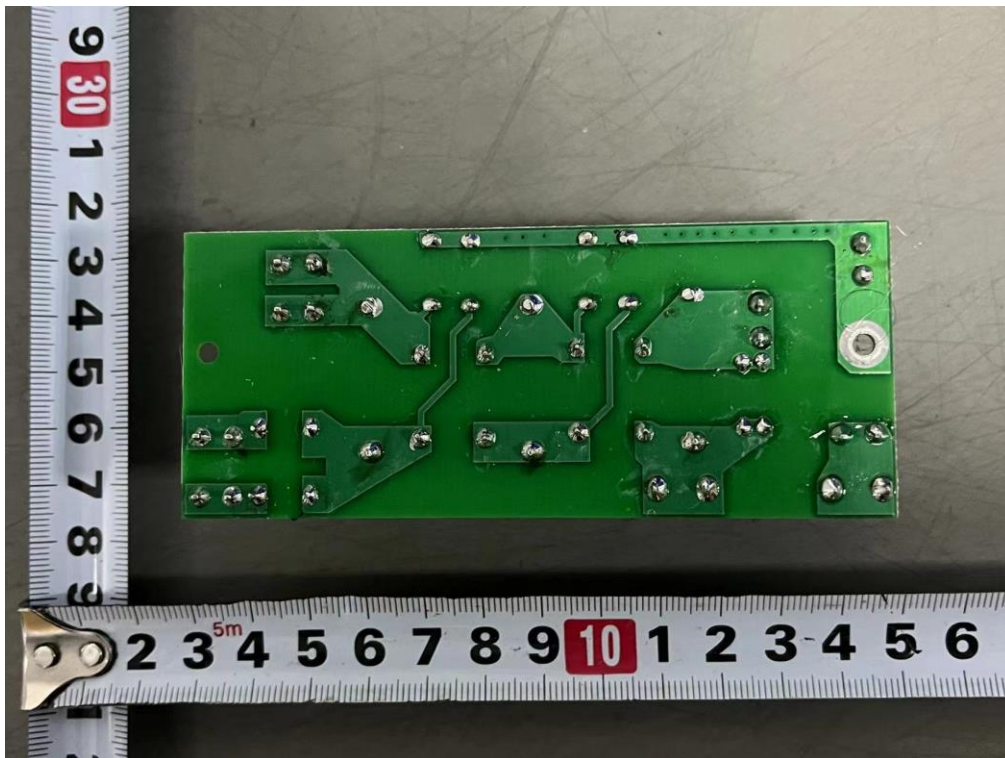
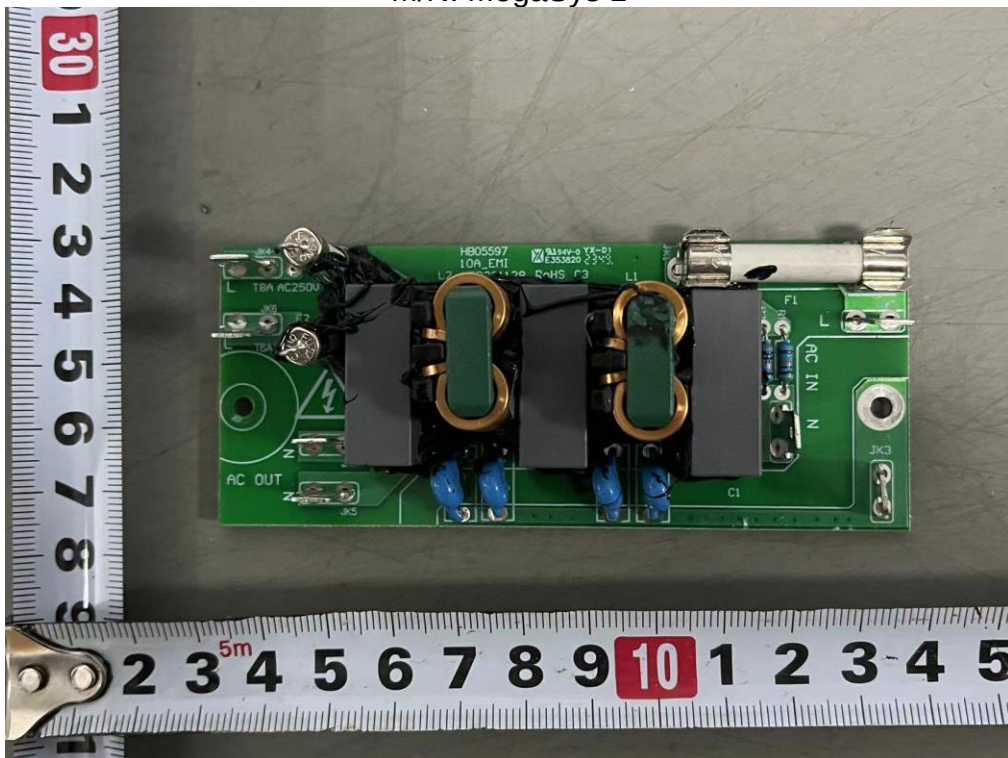


M/N: MegaSys 1



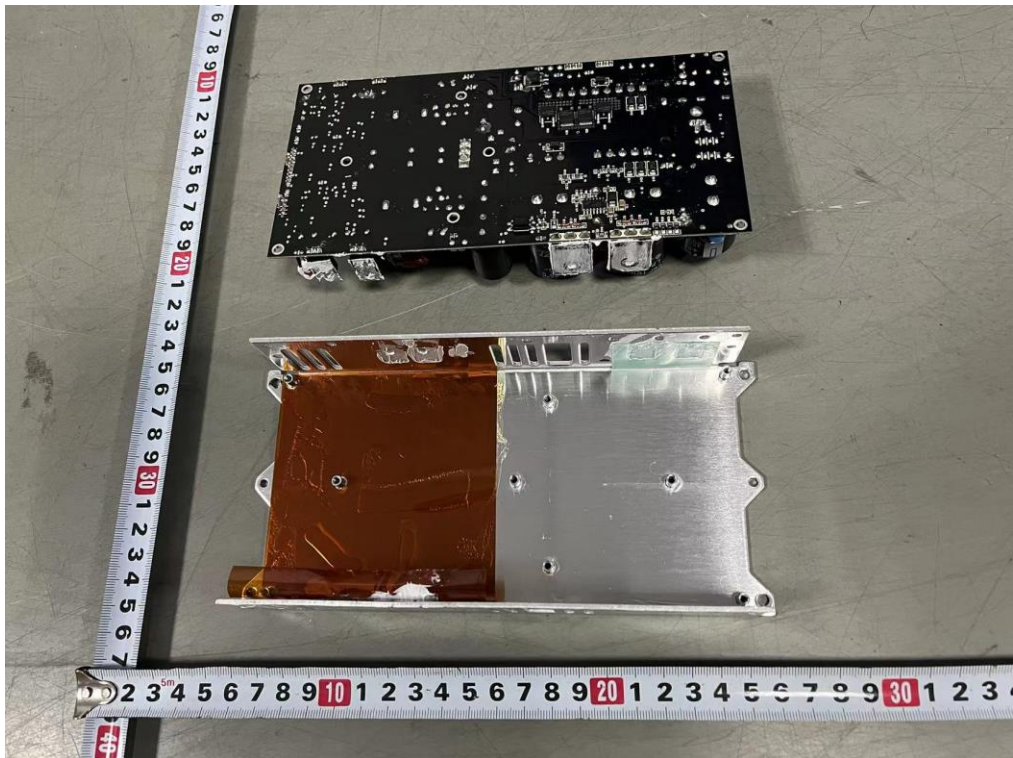
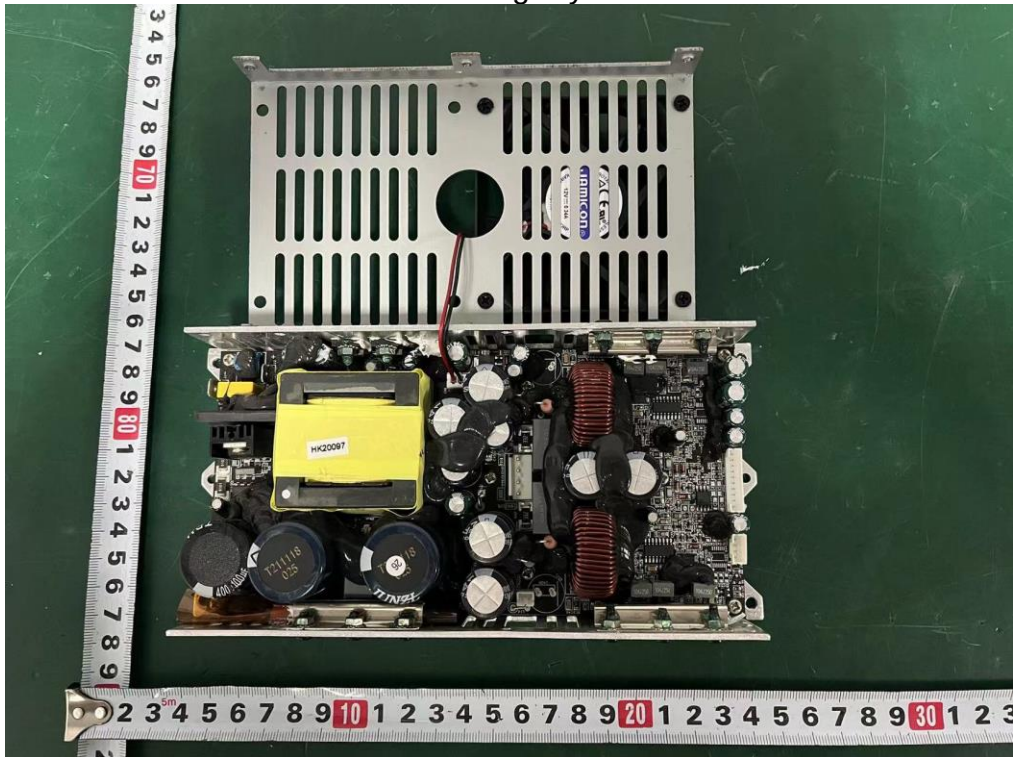
Internal Photos

M/N: MegaSys 1



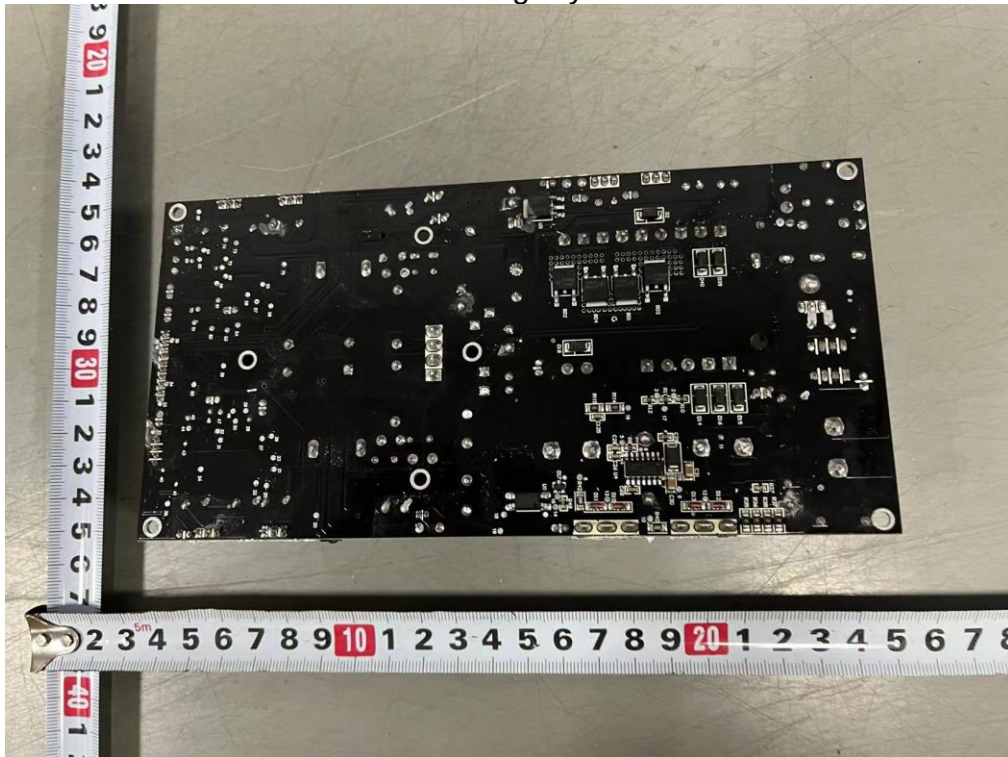
Internal Photos

M/N: MegaSys 1



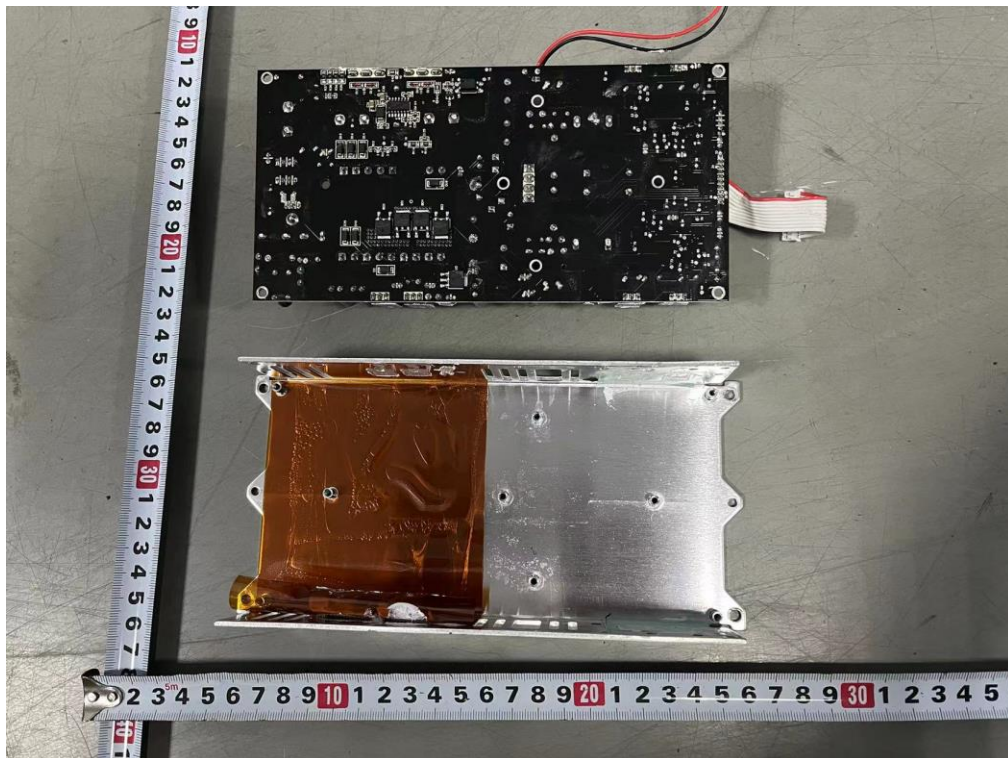
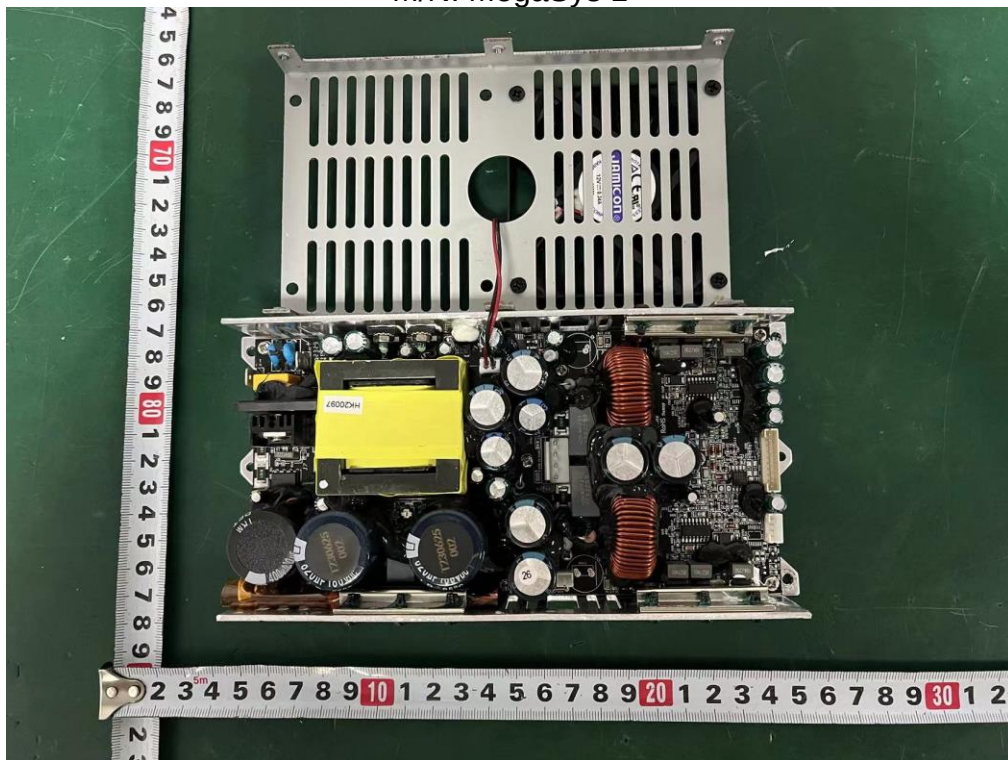
Internal Photos

M/N: MegaSys 1



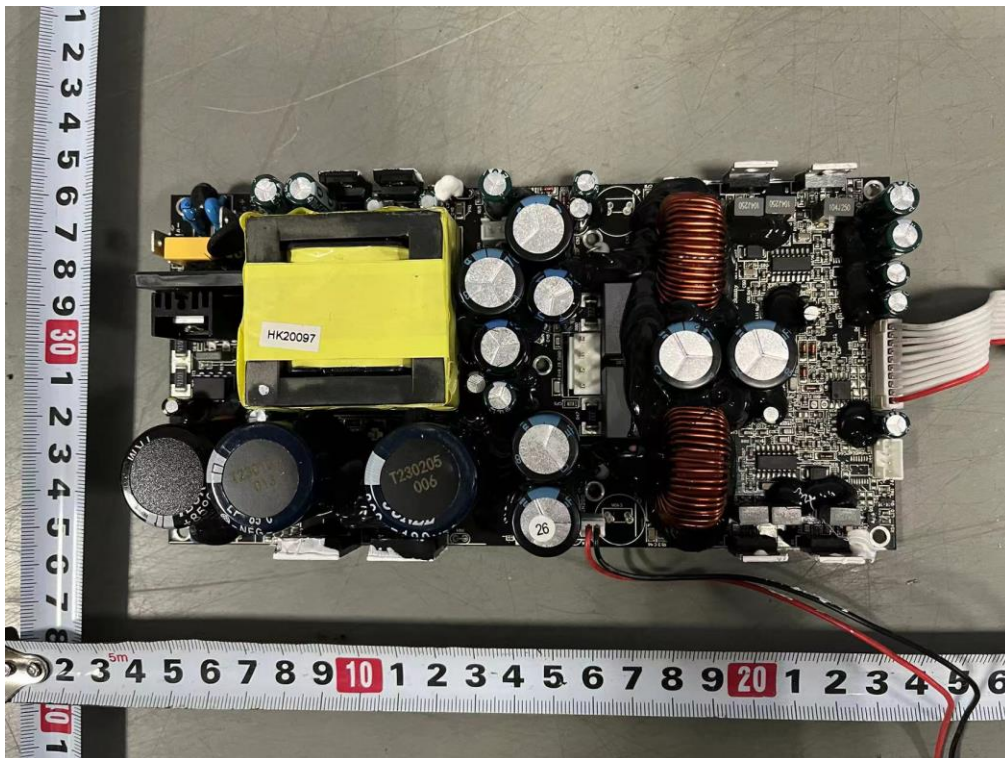
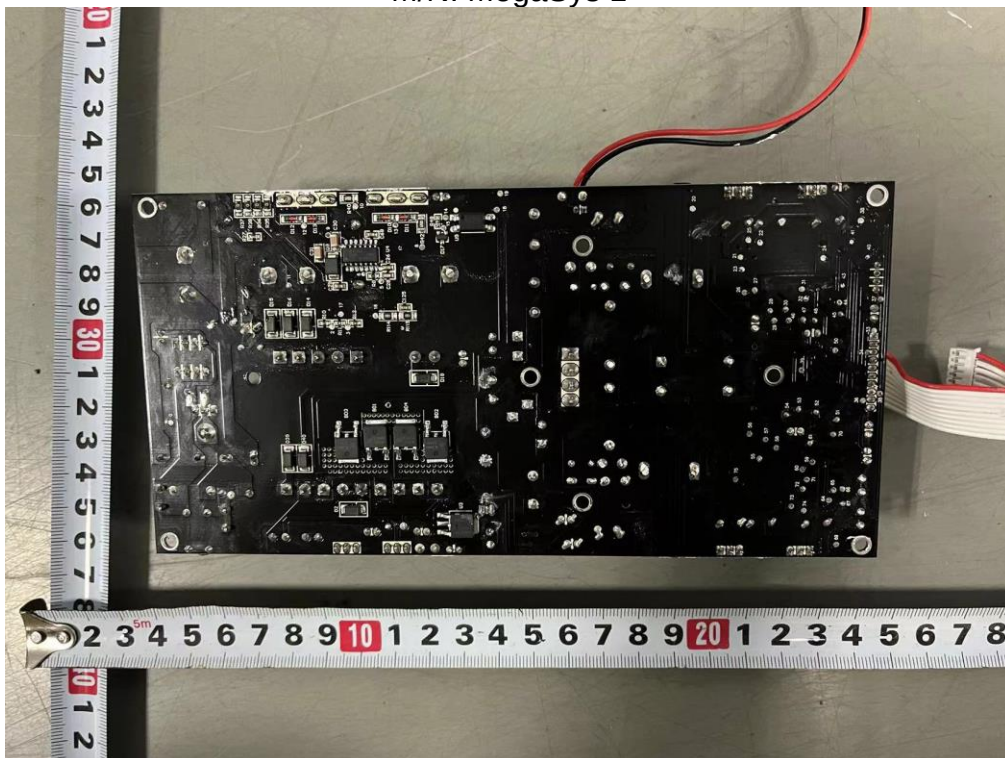
Internal Photos

M/N: MegaSys 1



Internal Photos

M/N: MegaSys 1



End of Test Report