TEST REPORT

Report No.:	BCTC2110418681E
Applicant:	SANWAY AUDIO EQUIPMENT CO LIMITED
Product Name:	Class-D Power Amplifier
Model/Type reference:	DA18K4
Tested Date:	2021-11-13 to 2021-11-25
Issued Date:	2022-06-22

Shenzhen BCTC Testing Co., Ltd.





Product Name:	Class-D Power Amplifier
Trademark:	sanwe·audio, SANWAY
Model/Type reference:	DA18K4 DA24K2, DA1004, DA1004D, DA1008, DA2004, DA2004D, DA2006, DA2008, DA2504, DA2506, DA2508, DA2504D, DA5002, DA5002D, DA5004, DA5004D, DA5008, DA20K4, DA15K4, DA10K4, DA30K2, DA18K2, DA12K2, DA9K2, DA20K4D, DA15K4D, DA10K4D, DA30K2D, DA18K2D, DA12K2D, DA9K2D
Prepared For:	SANWAY AUDIO EQUIPMENT CO LIMITED
Address:	901 HUITONG APARTMENT, YONGFA ROAD, HUADU DISTRICT 510800, GUANGZHOU, GUANGDONG, CHINA
Manufacturer:	ZHAOQING SANWAY AUDIO CO., LIMITED
Address:	C40 WANYANG CROAD INNOVATION PARK, NO.41 DAWANG AVENUE, ZIP:526238 ZHAOQING NATIONAL HIGH-TECH ZONE, GUANGDONG, CHINA
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2021-11-12
Sample tested Date:	2021-11-13 to 2021-11-25
Issue Date:	2022-06-22
Report No.:	BCTC2110418681E
Test Standards	EN 55032:2015+A1:2020, EN 55035: 2017+A11:2020 EN IEC 61000-3-2:2019, EN 61000-3-3:2013+A1:2019
Test Results	PASS

Tested by:

Lucas Chan

Lucas Chan /Project Handler

Approved by:

Zero Zhou/Reviewer

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 BCTC Testing Co., Ltd, this report can’t be reproduced except in full.The tested sample(s) and the sample information are provided by the client.

Table Of Content

Test Report Declaration Page
1. Version 5
2. Test Summary 6
3. Measurement Uncertainty 7
4. Product Information And Test Setup 8
4.1 Product Information 8
4.2 Test Setup Configuration 8
4.3 Support Equipment 8
4.4 Test Mode 9
5. Test Facility And Test Instrument Used 10
5.1 Test Facility 10
5.2 Test Instrument Used 10
6. Conducted Emissions 13
6.1 Block Diagram Of Test Setup 13
6.2 Limit 13
6.3 Test procedure 13
6.4 Test Result 14
7. Radiated Emissions Test 16
7.1 Block Diagram Of Test Setup 16
7.2 Limits 16
7.3 Test Procedure 16
7.4 Test Results 17
8. Harmonic Current Emission(H) 19
8.1 Block Diagram of Test Setup 19
8.2 Limit 19
8.3 Test Procedure 19
8.4 Test Results 19
9. Voltage Fluctuations & Flicker(F) 20
9.1 Block Diagram of Test Setup 20
9.2 Limit 20
9.3 Test Procedure 20
9.4 Test Results 21
10. Immunity Test Of General The Performance Criteria 22
11. Electrostatic Discharge (ESD) 23
11.1 Test Specification 23
11.2 Block Diagram of Test Setup 23
11.3 Test Procedure 23
11.4 Test Results 24
12. Continuous Rf Electromagnetic Field Disturbances (RS) 25
12.1 Test Specification 25
12.2 Block Diagram of Test Setup 25
12.3 Test Procedure 25
12.4 Test Results 26

13. Electrical Fast Transients/Burst (EFT) 27
13.1 Test Specification 27
13.2 Block Diagram of EUT Test Setup 27
13.3 Test Procedure 27
13.4 Test Results 27
14. Surges Immunity Test 28
14.1 Test Specification 28
14.2 Block Diagram of EUT Test Setup 28
14.3 Test Procedure 28
14.4 Test Result 29
15. Continuous induced RF disturbances (CS) 30
15.1 Test Specification 30
15.2 Block Diagram of EUT Test Setup 30
15.3 Test Procedure 30
15.4 Test Result 31
16. Voltage dips and interruptions (DIPS) 32
16.1 Test Specification 32
16.2 Block Diagram of EUT Test Setup 32
16.3 Test Procedure 32
16.4 Test Result 32
17. Eut Photographs 33
18. Eut Test Setup Photographs 40

(Note: N/A means not applicable)

1. Version

Report No.	Issue Date	Description	Approved
BCTC2110418681E	2022-06-22	Original	Valid

2. Test Summary

The Product has been tested according to the following specifications:

Emission		
Standard	**Test Item**	**Test result**
EN 55032	Conducted emissions from the AC mains power ports	Pass
EN 55032	Asymmetric mode conducted emissions	N/A[1]
EN 55032	Conducted differential voltage emissions	N/A[2]
EN 55032	Radiated emissions	Pass
EN IEC 61000-3-2	Harmonic current emission(H)	Pass
EN 61000-3-3	Voltage fluctuations & flicker(F)	Pass

Immunity (EN 55035)		
Standard	**Test Item**	**Test result**
EN 55035	Electrostatic discharge (ESD)	Pass
EN 55035	Continuous RF electromagnetic field disturbances(RS)	Pass
EN 55035	Electrical fast transients/burst (EFT)	Pass
EN 55035	Surges	Pass
EN 55035	Continuous induced RF disturbances (CS)	Pass
EN 55035	Broadband impulse noise disturbances, repetitive	N/A[3]
EN 55035	Broadband impulse noise disturbances, isolated	N/A[3]
EN 55035	Power frequency magnetic field (PFMF)	N/A[4]
EN 55035	Voltage dips and interruptions (DIPS)	Pass

Remark:
1. Applicable to ports listed above and intended to connect to cables longer than 3 m.
2. The Product has no antenna port.
3. Applicable only to CPE xDSL ports.
4. The Product doesn't contain any device susceptible to magnetic fields.

3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product 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.

Test item	Value (dB)
Conducted Emission (150kHz-30MHz)	3.20
Radiated Emission(30MHz~1GHz)	4.80

4. Product Information And Test Setup

4.1 Product Information

Ratings:	Input：AC 230V / 50Hz Output power：1800W ×4@8Ω；2800W ×4@4Ω
Model difference:	All models are identical except for the appearance color, the test model is DA18K4 and the test results are applicable to other tests.

4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
1.	Low-frequency signal generator	ZHONGXIN	TAG-101	---	---	---

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

4.4 Test Mode

Test item	Test Mode	Test Voltage
Conducted emissions from the AC mains power ports (150KHz-30MHz) Class B	Working	AC230V/50Hz
Radiated emissions(30MHz-1GHz) Class B	Working	AC230V/50Hz
Harmonic current emission Class A	Working	AC230V/50Hz
Voltage fluctuations & flicker(F)	Working	AC230V/50Hz
Electrostatic discharge (ESD) ☒Air Discharge: ±2,4,8kV ☒Contact Discharge: ±2,4kV ☒HCP & VCP: ±2,4kV 10 times each point/	Working	AC230V/50Hz
Continuous RF electromagnetic field disturbances(RS) 80MHz-1000MHz, 1800MHz, 2600MHz,3500MHz,5000MHz 3V/m,80% AM Front, Rear, Left, Right H/V	Working	AC230V/50Hz
Electrical fast transients/burst (EFT) ☒1kV AC(Input) ☐0.5kV DC(Input) ☐0.5kV signal,Telec,control	Working	AC230V/50Hz
Surges ☒1kV Line-Line, ☒2kV Line-PE, N-PE ☐0.5kVDC(Input) ☐1KV,☐4KV signal,Telec, control Line-Line:90°+1kV,270°-1kV Line-PE:90°+2kV,270°-2kV N-PE:90°-2kV,270°+2kV	Working	AC230V/50Hz
Continuous induced RF disturbances (CS) A 0.15MHz to 10MHz 3V, 10MHz-30MHz 3 to 1V, 30MHz-80MHz 1V ☒ AC(Input) ☐ DC(Input) ☐ signal, Telec, control	Working	AC 230V/50Hz
Voltage dips and interruptions (DIPS) Less 5% 0.5P 10ms B 70% 25P 500ms C Voltage Interruptions less5% 250P 5000ms C	Working	AC 230V/50Hz

5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Tangwei, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

Conducted Emissions Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Receiver	R&S	ESR3	102075	May 28, 2021	May 27, 2022
LISN	R&S	ENV216	101375	May 28, 2021	May 27, 2022
ISN	HPX	ISN T800	S1509001	May 28, 2021	May 27, 2022
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\

Radiated Emissions Test (966 Chamber)					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023
Receiver	R&S	ESRP	101154	May 28, 2021	May 27, 2022
Receiver	R&S	ESR3	102075	May 28, 2021	May 27, 2022
Amplifier	SKET	LAPA_01G18G-45dB	\	May 28, 2021	May 27, 2022
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 28, 2021	May 27, 2022
TRILOG Broadband Antenna	schwarzbeck	VULB9163	942	Jun. 01, 2021	May 31, 2022
Horn Antenna	schwarzbeck	BBHA9120D	1541	Jun. 02, 2021	Jun. 01, 2022
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Harmonic / Flicker Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Harmonic & Flicker Tester	LAPLAEC	AC2000A	439263	May 31, 2021	May 30, 2022
AC Power Supply	KIKUSUI	PCR4000M	UK001879	May 28, 2021	May 27, 2022
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Electrostatic Discharge Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
ESD Tester	KIKUSUI	KES4201A	UH002321	May 31, 2021	May 30, 2022

Continuous RF Electromagnetic Field Disturbances Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Power meter	Keysight	E4419	\	May 28, 2021	May 27, 2022
Power sensor	Keysight	E9300A	\	May 28, 2021	May 27, 2022
Power sensor	Keysight	E9300A	\	May 28, 2021	May 27, 2022
Amplifier	SKET	HAP_801000-250W	\	May 28, 2021	May 27, 2022
Amplifier	SKET	HAP_0103-75W	\	May 28, 2021	May 27, 2022
Amplifier	SKET	HAP_0306-50W	\	May 28, 2021	May 27, 2022
Stacked double Log.-Per. Antenna	Schwarzbeck	STLP 9129	\	\	\
Field Probe	Narda	EP-601	\	Jun. 29, 2021	Jun. 28, 2022
Signal Generator	Agilent	N5181A	MY50143748	Jun. 29, 2021	Jun. 28, 2022
Software	SKET	EMC-S	1.2.0.18	\	\

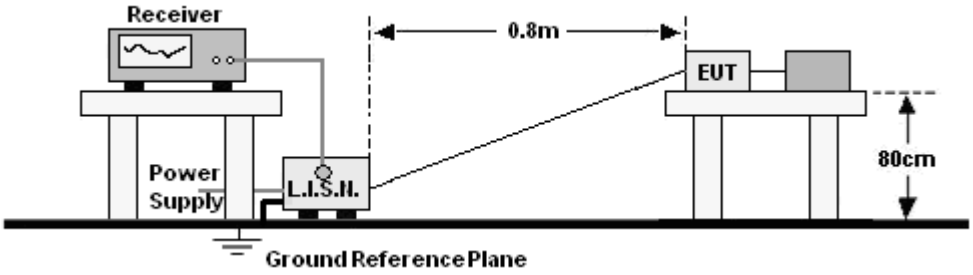
EFT And Surge And Voltage Dips And Interruptions Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Compact Generator	TRANSIENT	TRA2000	646	Jun. 29, 2021	Jun. 28, 2022
Coupling Clamp	PARTNER	CN-EFT1000	CN-EFT1000 0-1624	May 28, 2021	May 27, 2022

Continuous Induced RF Disturbances Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
C/S Test System	SCHLODER	CDG-6000-75	126B1405/2016	May 28, 2021	May 27, 2022
Attenuator	SCHLODER	6DB DC-1G	HA1630	May 28, 2021	May 27, 2022
CDN	SCHLODER	CDN M2+M3	A2210389/2016	May 28, 2021	May 27, 2022
Injection Clamp	SCHLOBER	EMCL-20	132A1272/2016	May 28, 2021	May 27, 2022
Software	HUBERT	HUBERT EN 61000-4-6	1.4.1.0	\	\

6. Conducted Emissions

6.1 Block Diagram Of Test Setup

For mains ports:



6.2 Limit

Limits for Conducted emissions at the mains ports of Class B MME

Frequency range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56*	56 to 46*
0,50 to 5	56	46
5 to 30	60	50

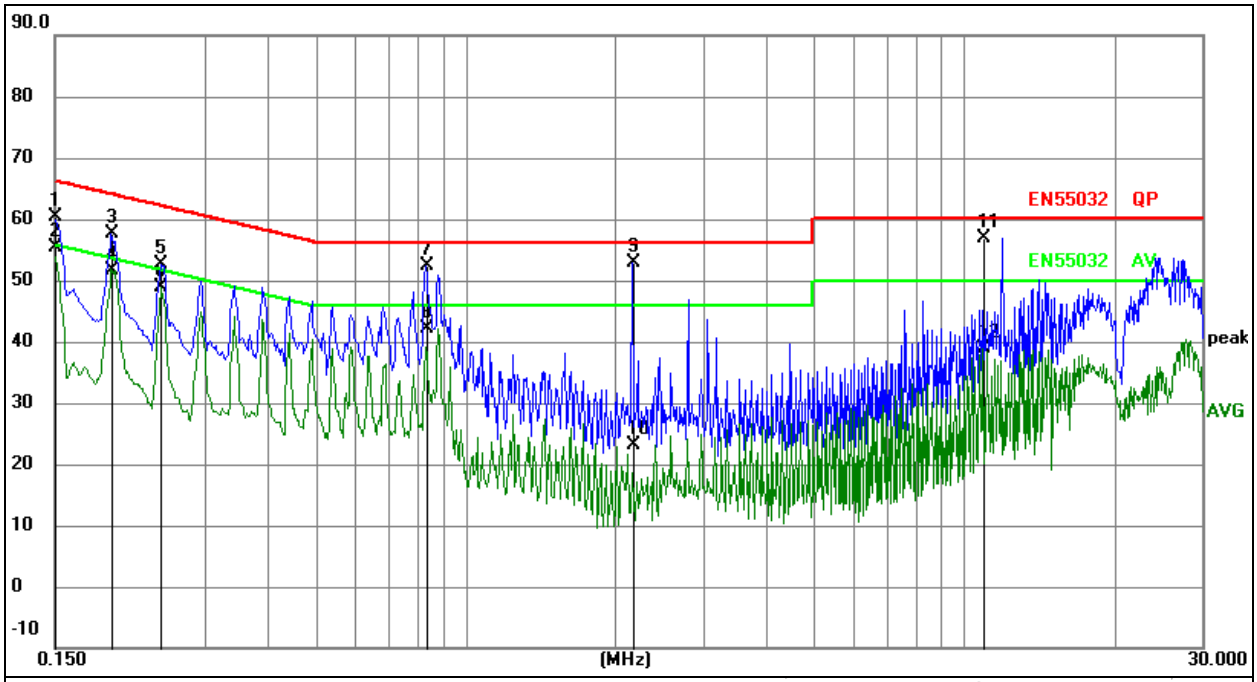
Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

6.3 Test procedure

For mains ports:
a. The Product was placed on a nonconductive table 0. 8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).
b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.
c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

6.4 Test Result

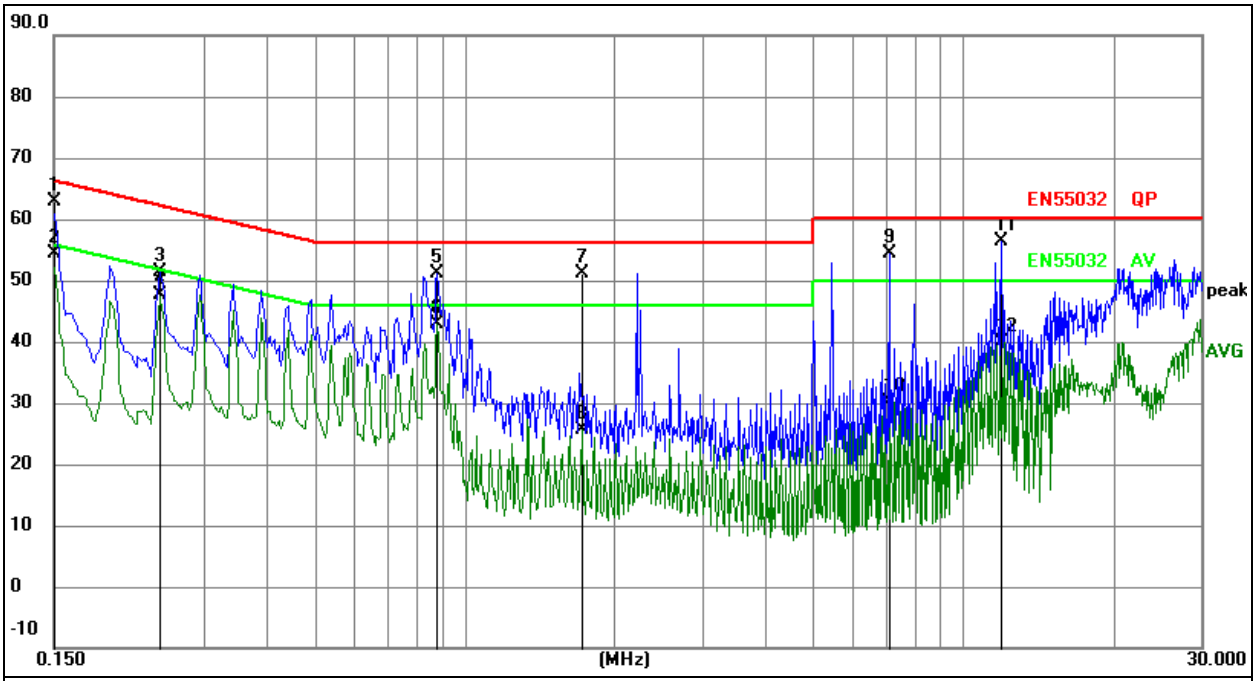
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Line
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1500	40.86	19.61	60.47	66.00	-5.53	QP
2	*	0.1500	35.73	19.61	55.34	56.00	-0.66	AVG
3		0.1949	38.00	19.61	57.61	63.83	-6.22	QP
4		0.1949	31.95	19.61	51.56	53.83	-2.27	AVG
5		0.2444	33.08	19.61	52.69	61.95	-9.26	QP
6		0.2444	29.22	19.61	48.83	51.95	-3.12	AVG
7		0.8338	32.83	19.62	52.45	56.00	-3.55	QP
8		0.8338	22.62	19.62	42.24	46.00	-3.76	AVG
9		2.1613	33.22	19.63	52.85	56.00	-3.15	QP
10		2.1613	3.52	19.63	23.15	46.00	-22.85	AVG
11		10.9454	36.97	19.80	56.77	60.00	-3.23	QP
12		10.9454	18.98	19.80	38.78	50.00	-11.22	AVG

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Phase :	Neutral
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



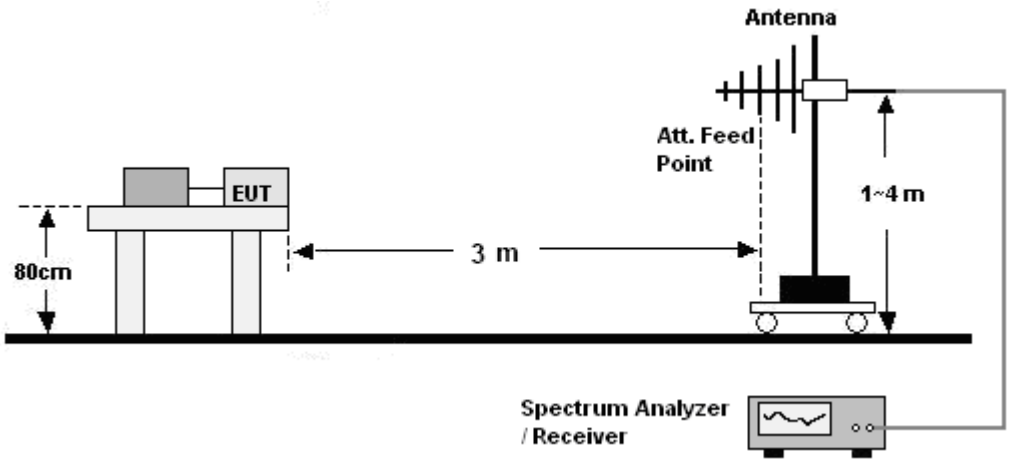
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1		0.1500	43.34	19.61	62.95	66.00	-3.05	QP
2	*	0.1500	34.69	19.61	54.30	56.00	-1.70	AVG
3		0.2442	31.71	19.61	51.32	61.95	-10.63	QP
4		0.2442	27.96	19.61	47.57	51.95	-4.38	AVG
5		0.8802	31.51	19.62	51.13	56.00	-4.87	QP
6		0.8802	23.18	19.62	42.80	46.00	-3.20	AVG
7		1.7253	31.57	19.63	51.20	56.00	-4.80	QP
8		1.7253	6.02	19.63	25.65	46.00	-20.35	AVG
9		7.0997	34.57	19.74	54.31	60.00	-5.69	QP
10		7.0997	10.37	19.74	30.11	50.00	-19.89	AVG
11		11.9327	36.64	19.79	56.43	60.00	-3.57	QP
12		11.9327	20.12	19.79	39.91	50.00	-10.09	AVG

7. Radiated Emissions Test

7.1 Block Diagram Of Test Setup

30MHz ~ 1GHz:



7.2 Limits

Limits for radiated disturbance of Class B MME

Frequency (MHz)	Quasi-peak limits at 3m dB(μV/m)
30-230	40
230-1000	47

7.3 Test Procedure

30MHz ~ 1GHz:

a. The Product was placed on the nonconductive turntable 0.8 m above the ground in a semi anechoic chamber.

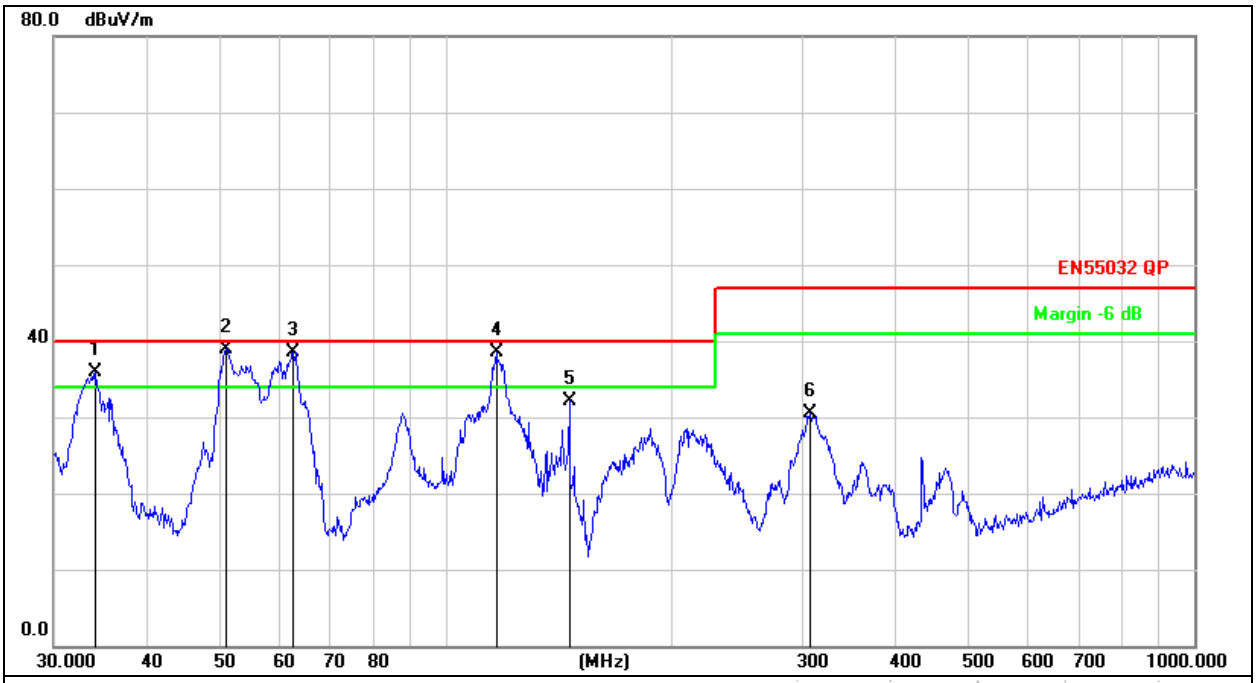
b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

7.4 Test Results

30MHz ~ 1GHz:

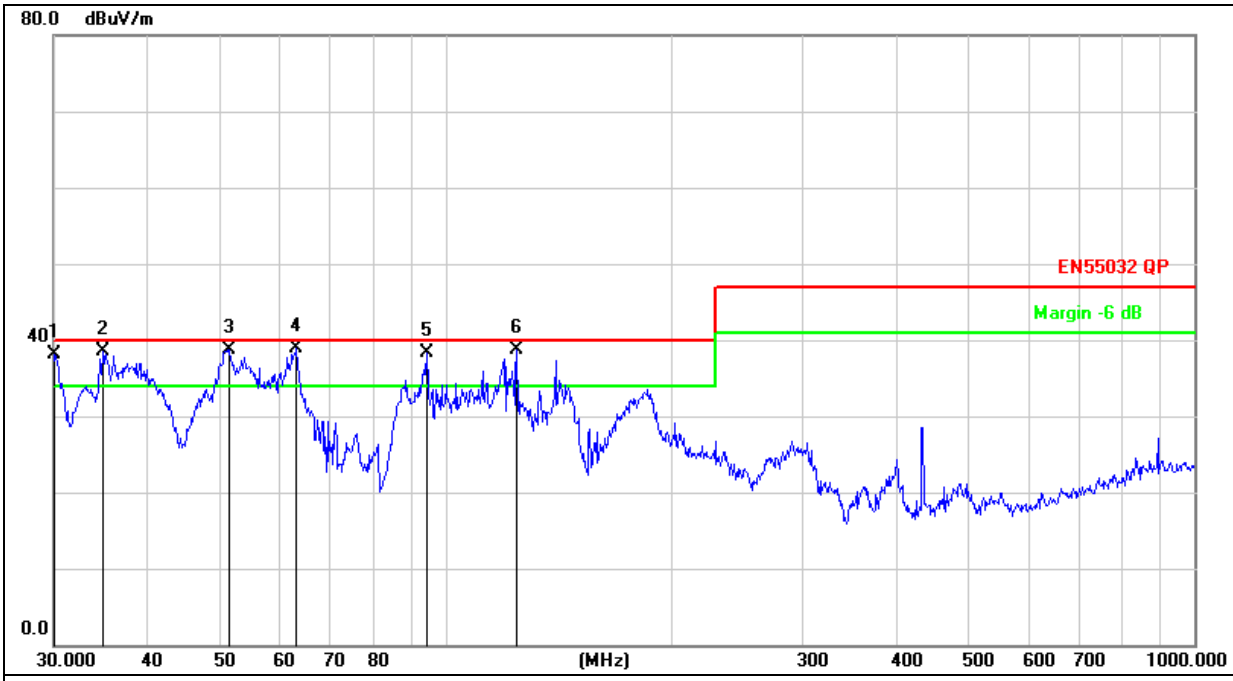
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Horizontal
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	!	34.1561	53.70	-17.80	35.90	40.00	-4.10	QP
2	*	50.9420	54.44	-15.48	38.96	40.00	-1.04	QP
3	!	62.6507	55.30	-16.73	38.57	40.00	-1.43	QP
4	!	116.9495	55.73	-17.27	38.46	40.00	-1.54	QP
5		146.3735	51.31	-19.25	32.06	40.00	-7.94	QP
6		306.7536	43.99	-13.56	30.43	47.00	-16.57	QP

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Voltage :	AC 230V/50Hz	Test Mode:	Working

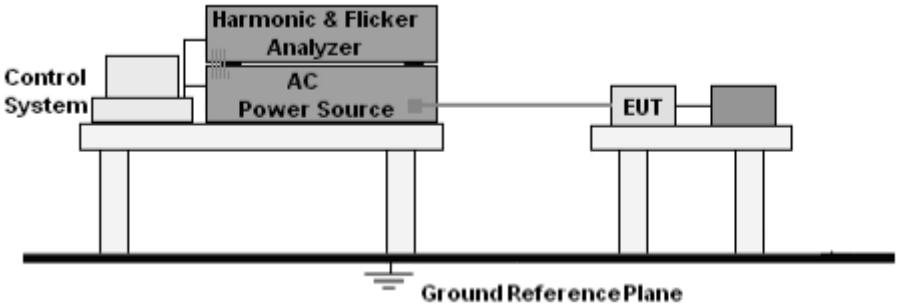


Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	!	30.1051	56.54	-18.43	38.11	40.00	-1.89	QP
2	!	34.8823	56.23	-17.69	38.54	40.00	-1.46	QP
3	!	51.4806	54.26	-15.51	38.75	40.00	-1.25	QP
4	*	63.3132	55.76	-16.91	38.85	40.00	-1.15	QP
5	!	94.4282	55.93	-17.58	38.35	40.00	-1.65	QP
6	!	124.5690	56.49	-17.78	38.71	40.00	-1.29	QP

8. Harmonic Current Emission(H)

8.1 Block Diagram of Test Setup



8.2 Limit

EN IEC 61000-3-2:2019.

8.3 Test Procedure

a. The Product was placed on the top of a non-conductive table above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
b. The correspondent test program of test instrument to measure the current harmonics emanated from Product was chosen. The measure time shall be not less than the time necessary for the Product to be exercised.

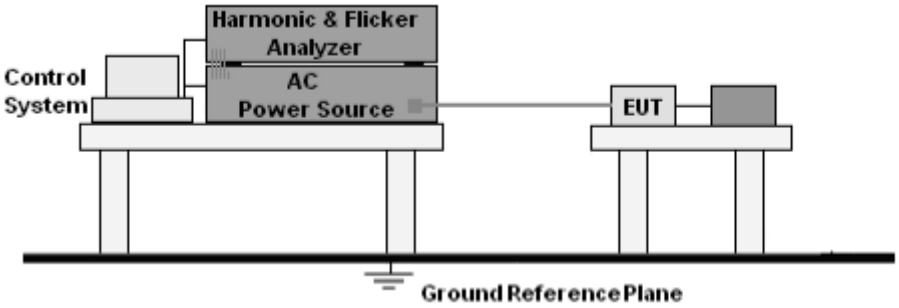
8.4 Test Results

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Working
Test Voltage :	AC 230V/50Hz		

PASS

9. Voltage Fluctuations & Flicker(F)

9.1 Block Diagram of Test Setup



9.2 Limit

EN 61000-3-3:2013+A1:2019 Clause 5.

9.3 Test Procedure

a. The Product was placed on the top of a non-conductive table above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
b. During the flick test, the measure time shall include that part of whole operation cycle in which the Product produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

9.4 Test Results

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Working
Test Voltage :	AC 230V/50Hz		

Test duration (sec):600

Describe:

Load Power : 0.112 kW **Power Factor:0.423**

Load Current : 1.148 Arms **Crest Factor:2.497**

Nominal Voltage : 230.26 Vrms

Test Result: pass **Status: Test Completed**

Result:

T-max (ms):	**0.00**	**Test limit (ms):**	**500.00**	**Pass**
Highest dc (%):	**0.00**	**Test limit (%):**	**3.30**	**Pass**
Highest dmax (%):	**0.00**	**Test limit (%):**	**4.00**	**Pass**
Highest Pst (10 min. period):	**0.000**	**Test limit:**	**1.000**	**Pass**

10. Immunity Test Of General The Performance Criteria

Product Standard	EN 55035: 2017+A11:2020 clause 8
CRITERION A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
CRITERION B	During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
CRITERION C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

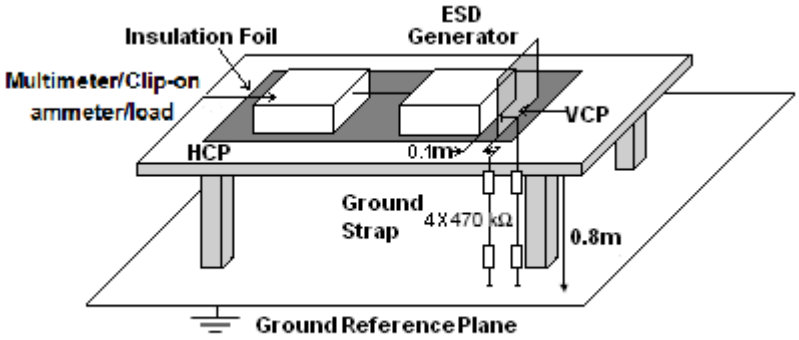
11. Electrostatic Discharge (ESD)

11.1 Test Specification

Test Port	:	Enclosure port
Discharge Impedance	:	330 ohm / 150 pF
Discharge Mode	:	Single Discharge
Discharge Period	:	one second between each discharge

11.2 Block Diagram of Test Setup

For Floor Stand:



11.3 Test Procedure

a. Electrostatic discharges were applied only to those points and surfaces of the Product that are accessible to users during normal operation.
b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
c. The time interval between two successive single discharges was at least 1 second.
d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the Product.
e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the Product as fast as possible (without causing mechanical damage) to touch the Product. After each discharge, the ESD generator was removed from the Product and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
g. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the Product were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the Product.

11.4 Test Results

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Working
Test Voltage :	AC 230V/50Hz		

Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Required Level	Performance Criterion
Contact Discharge	Conductive Surfaces	4	10	B	A
	Indirect Discharge HCP	4	10	B	A
	Indirect Discharge VCP	4	10	B	A
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	B	A
Note: N/A					

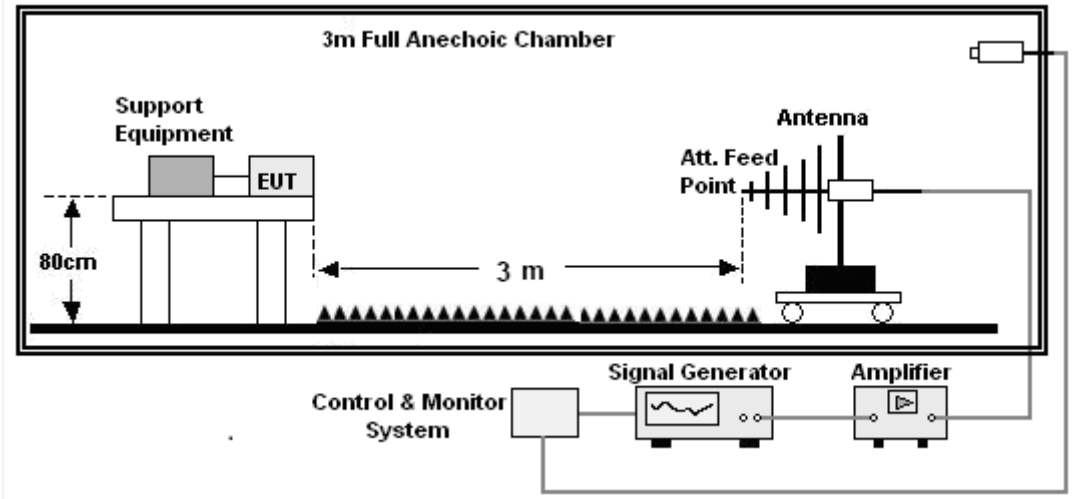
12. Continuous Rf Electromagnetic Field Disturbances (RS)

12.1 Test Specification

Test Port	:	Enclosure port
Step Size	:	1%
Modulation	:	1kHz, 80% AM
Dwell Time	:	1 second
Polarization	:	Horizontal & Vertical

12.2 Block Diagram of Test Setup

Below 1GHz:



12.3 Test Procedure

a. The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the Product.
b. The frequency range is swept from 80MHz to 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz,with the signal 80% amplitude modulated with a 1 kHz sine wave,and the step size was 1%.
c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond, but should not exceed 5 s at each of the frequencies during the scan.
d. The test was performed with the Product exposed to both vertically and horizontally polarized fields on each of the four sides.
e. For Broadcast reception function:Group 2 not apply in this test.

12.4 Test Results

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Working
Test Voltage :	AC 230V/50Hz		

Frequency	Position	Field Strength (V/m)	Required Level	Performance Criterion
80 - 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz	Front, Right, Back, Left	3	A	A
Note: N/A				

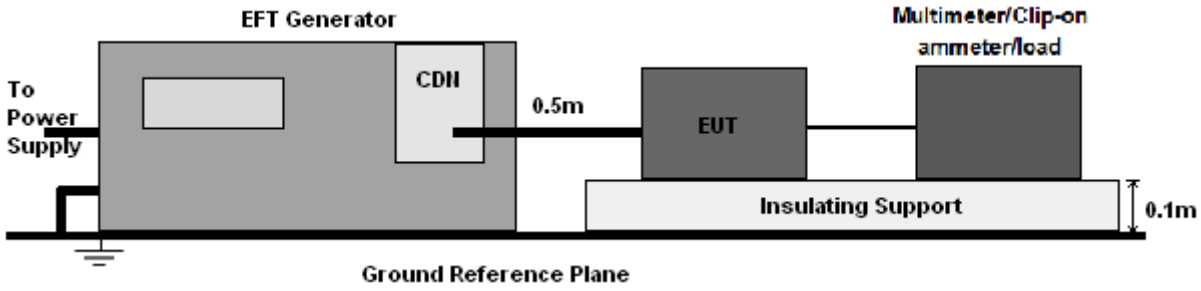
13. Electrical Fast Transients/Burst (EFT)

13.1 Test Specification

Test Port	:	input ac/dc. power port
Impulse Frequency	:	5 kHz
Impulse Wave-shape	:	5/50 ns
Burst Duration	:	15 ms
Burst Period	:	300 ms
Test Duration	:	2 minutes per polarity

13.2 Block Diagram of EUT Test Setup

For input ac/dc. power port:



13.3 Test Procedure

a. The Product and support units were located on a non-conductive table above ground reference plane.

b. A 0.5m-long power cord was attached to Product during the test.

13.4 Test Results

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Working
Test Voltage :	AC 230V/50Hz		

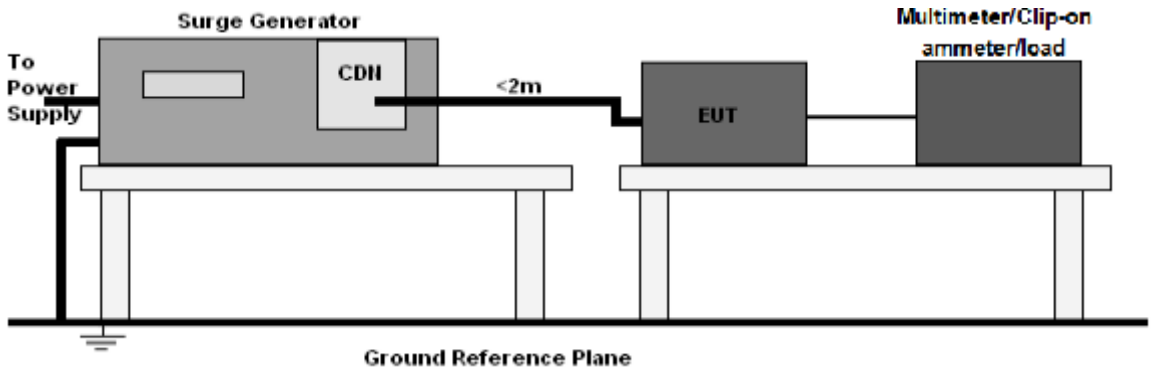
Coupling	Voltage (kV)	Polarity	Required Level	Performance Criterion
AC MainsL-N-P	1.0	±	B	A
Note: N/A				

14. Surges Immunity Test

14.1 Test Specification

Test Port	:	input ac/dc. power port
Wave-Shape	:	Open Circuit Voltage - 1.2 / 50 us Short Circuit Current - 8 / 20 us
Pulse Repetition Rate	:	1 pulse / min.
Phase Angle	:	0° / 90° / 180° / 270°
Test Events	:	5 pulses (positive & negative) for each polarity

14.2 Block Diagram of EUT Test Setup



14.3 Test Procedure

a. The surge is to be applied to the Product power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave.
b. The power cord between the Product and the coupling/decoupling networks shall be 2 meters in length (or shorter). Interconnection line between the Product and the coupling/decoupling networks shall be 2 meters in length (or shorter).

14.4 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Working
Test Voltage :	AC 230V/50Hz		

Coupling Line	Voltage (kV)	Phase Angle	Required Level	Performance Criterion
L - N	+ 1	90°	B	A
	- 1	270°		
L - PE	+ 2	90°	B	A
	- 2	270°		
N - PE	+ 2	90°	B	A
	- 2	270°		
Note:N/A				

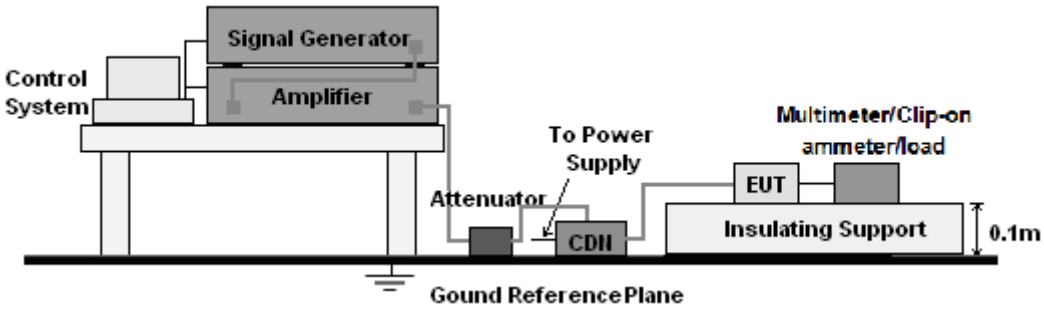
15. Continuous induced RF disturbances (CS)

15.1 Test Specification

Test Port	:	input ac/dc. power port
Step Size	:	1%
Modulation	:	1kHz, 80% AM
Dwell Time	:	1 second

15.2 Block Diagram of EUT Test Setup

For input ac/ac. power port:



15.3 Test Procedure

For input ac/dc. power port:
a. The Product and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.
b. The frequency range is swept from 150 kHz to 10MHz, 10MHz to 30MHz, 30MHz to 80MHz with the signal 80% amplitude modulated with a 1 kHz sine wave, and the step size was 1% of fundamental.
c. The dwell time at each frequency shall be not less than the time necessary for the Product to be able to respond.

15.4 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Working
Test Voltage :	AC 230V/50Hz		

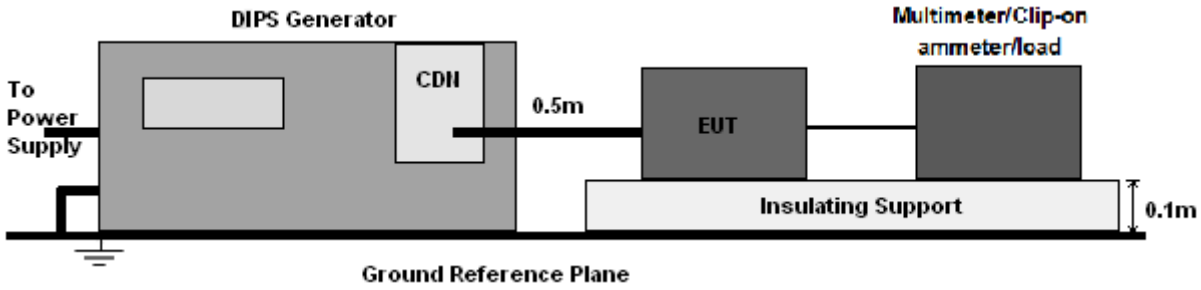
Inject Line	Frequency (MHz)	Voltage Level (V r.m.s.)	Required Level	Performance Criterion
a.c. port	0.15 - 10	3	A	A
	10 to 30	3 to 1	A	A
	30 to 80	1	A	A
Note: N/A				

16. Voltage dips and interruptions (DIPS)

16.1 Test Specification

Test Port	:	input ac. power port
Phase Angle	:	0°, 180°
Test cycle	:	3 times

16.2 Block Diagram of EUT Test Setup



16.3 Test Procedure

a. The Product and support units were located on a non-conductive table above ground floor.
b. Set the parameter of tests and then perform the test software of test simulator.
c. Conditions changes to occur at 0 degree crossover point of the voltage waveform.

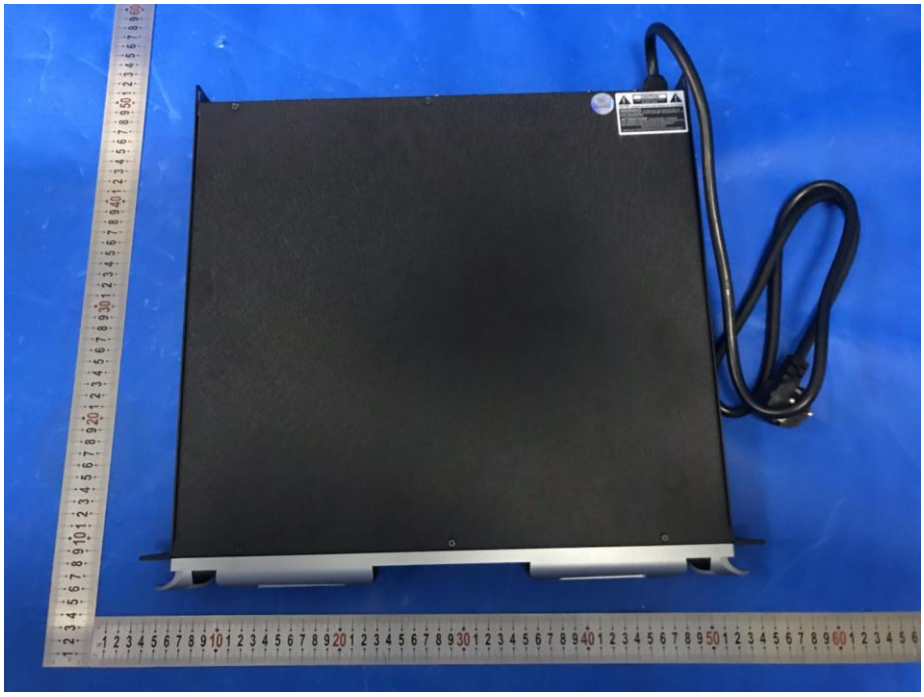
16.4 Test Result

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	101kPa	Test Mode:	Working
Test Voltage :	AC 230V/50Hz		

Test Level % U_T	**Voltage dips in % U_T**	**Duration (ms)**	**Required Level**	**Performance Criterion**
< 5	≥95	10	B	A
70	30	500	C	A
Voltage Interruptions:				
< 5	≥95	5000	C	B*
Note*: The EUT Unable to working during testing, and it end of the test can be restored automatically.				

17. Eut Photographs

EUT Photo 1



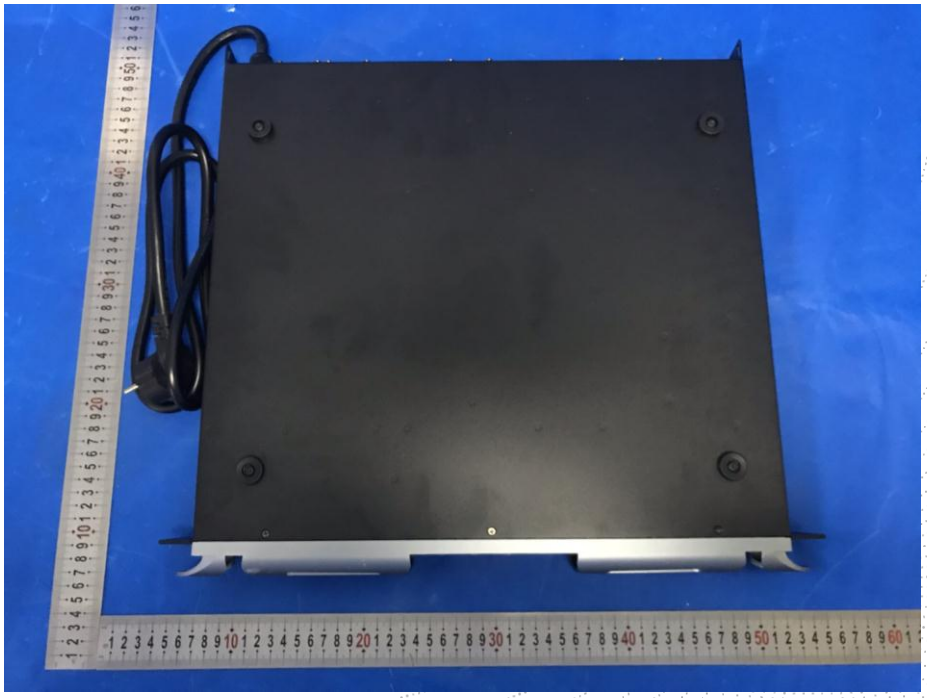
EUT Photo 2



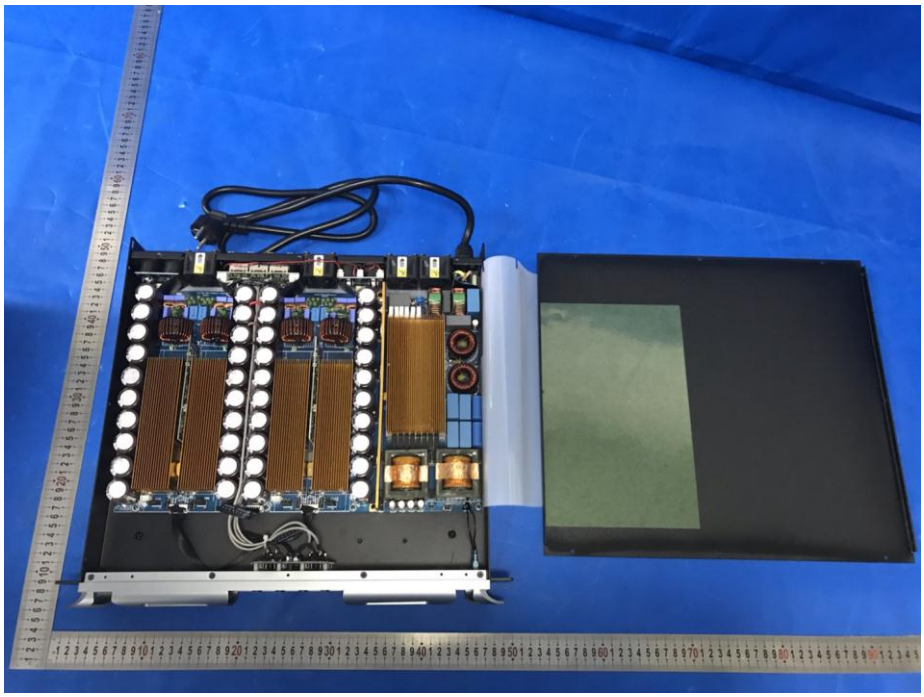
EUT Photo 3



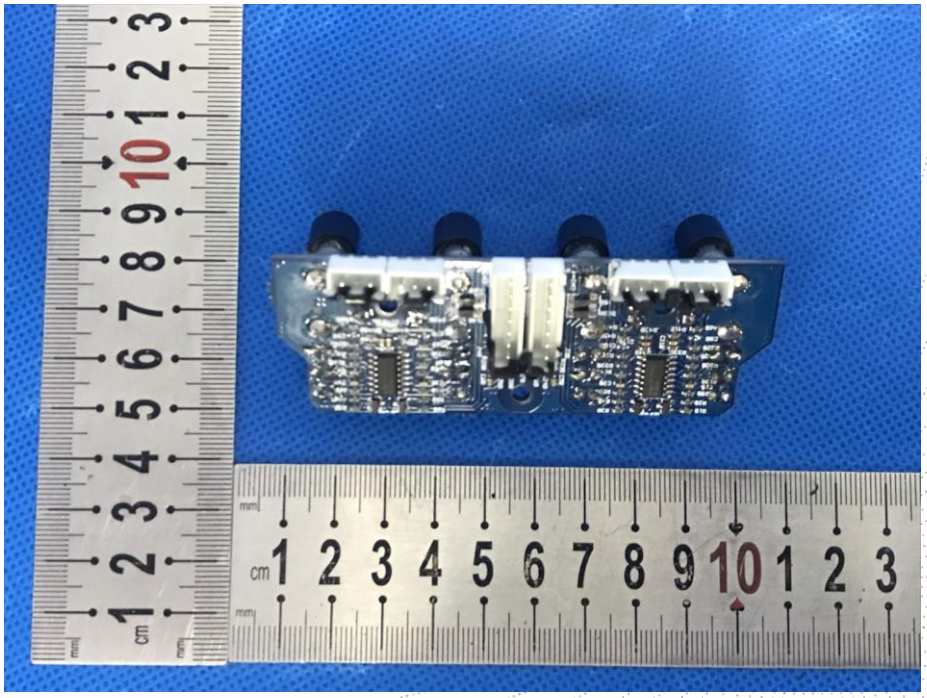
EUT Photo 4



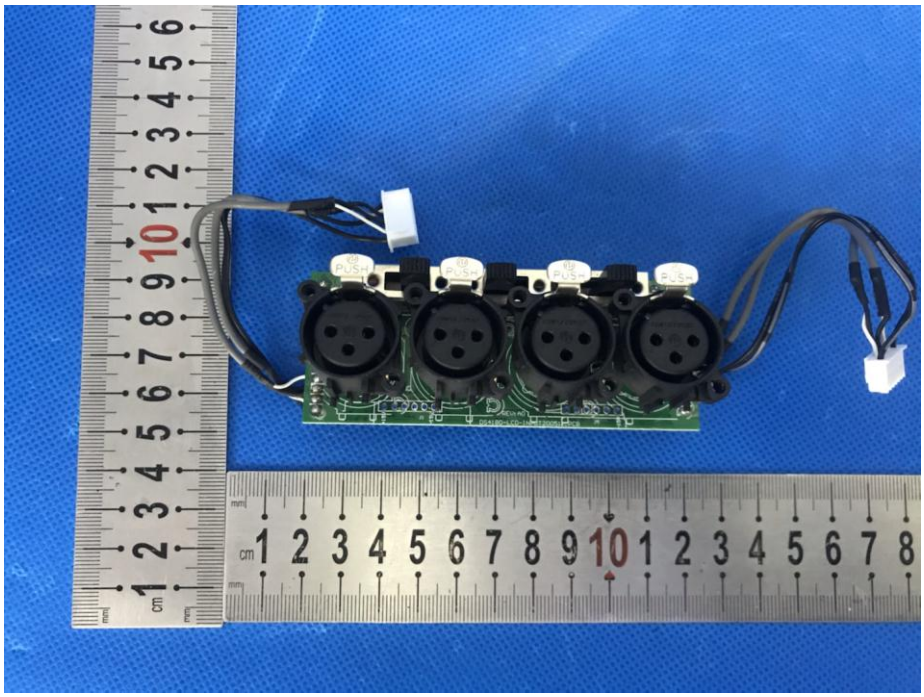
EUT Photo 5



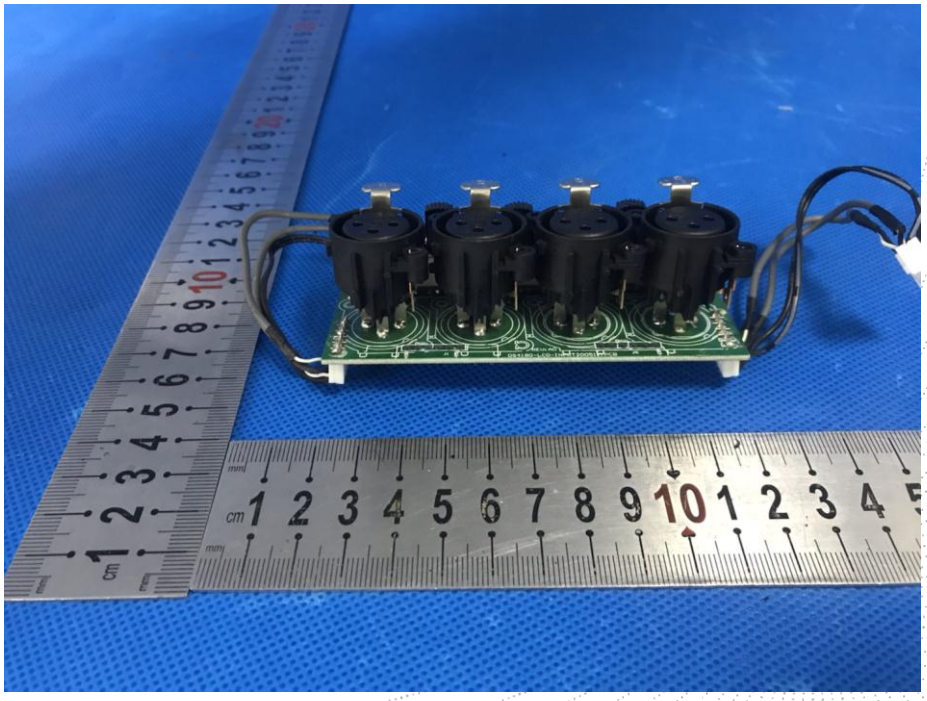
EUT Photo 6



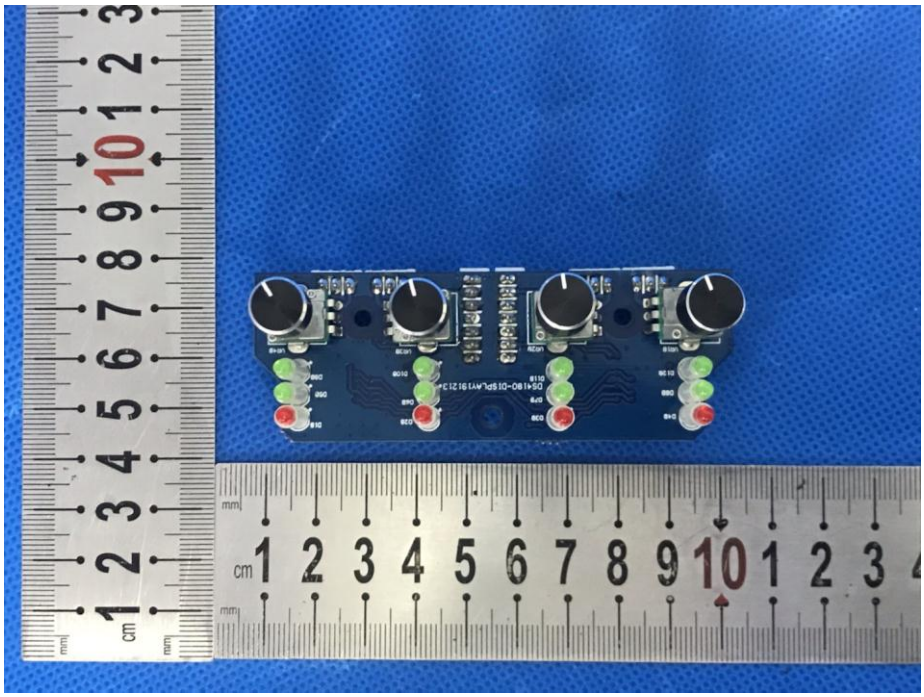
EUT Photo 7



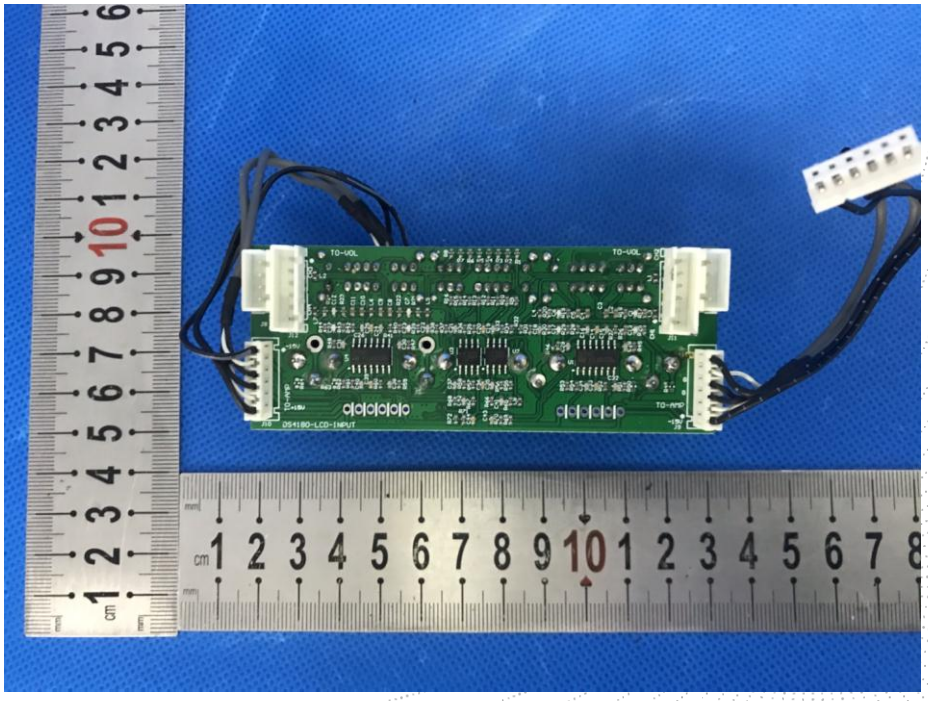
EUT Photo 8



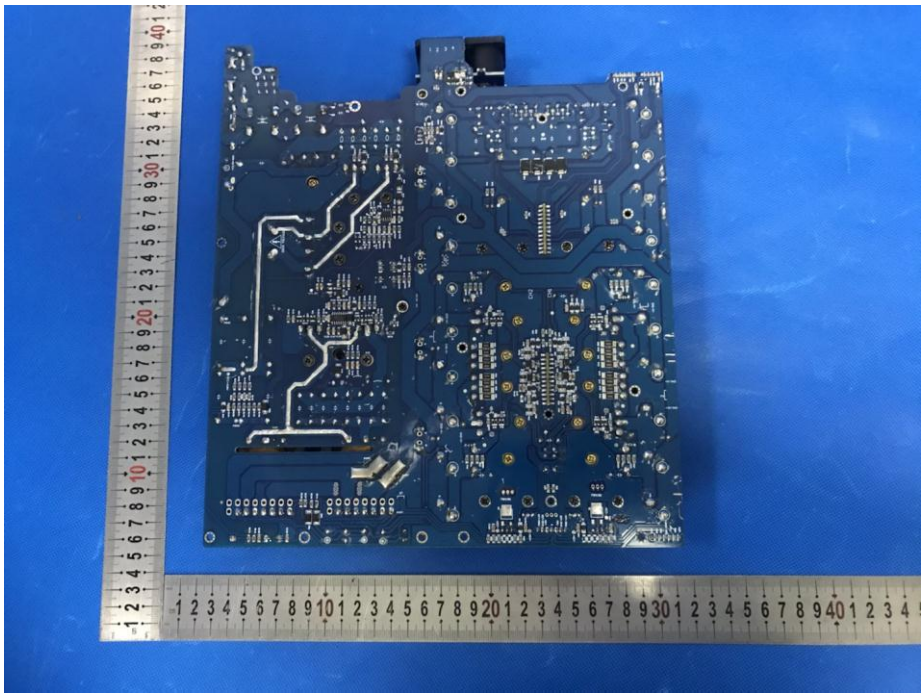
EUT Photo 9



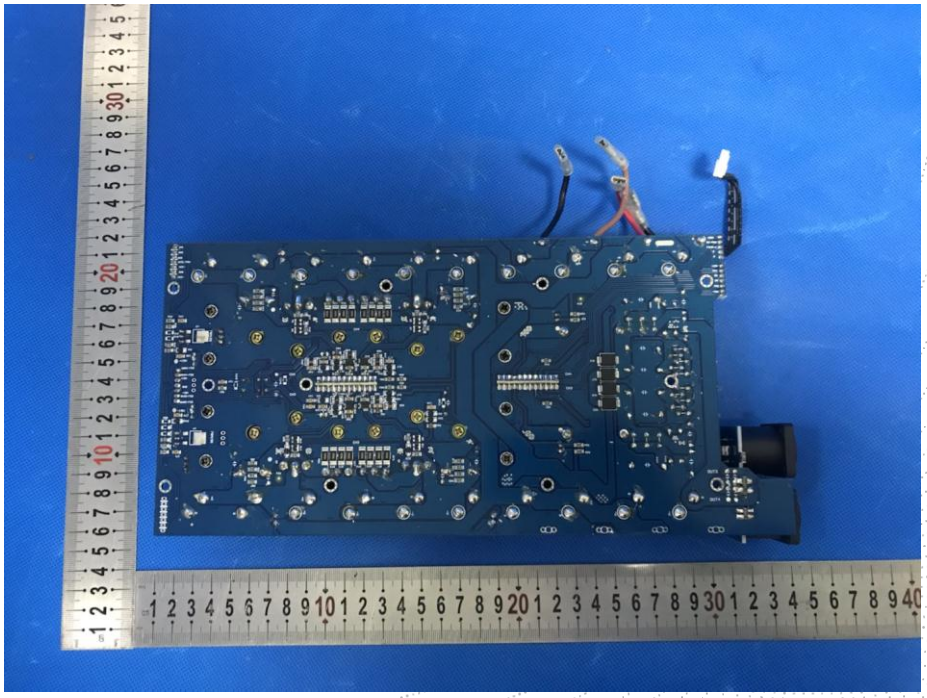
EUT Photo 10



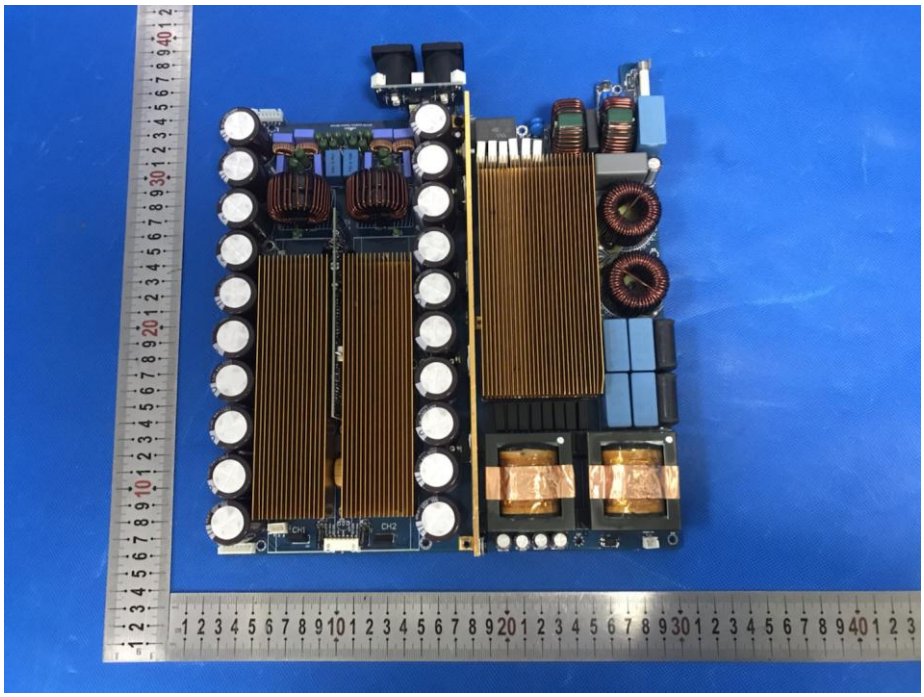
EUT Photo 11



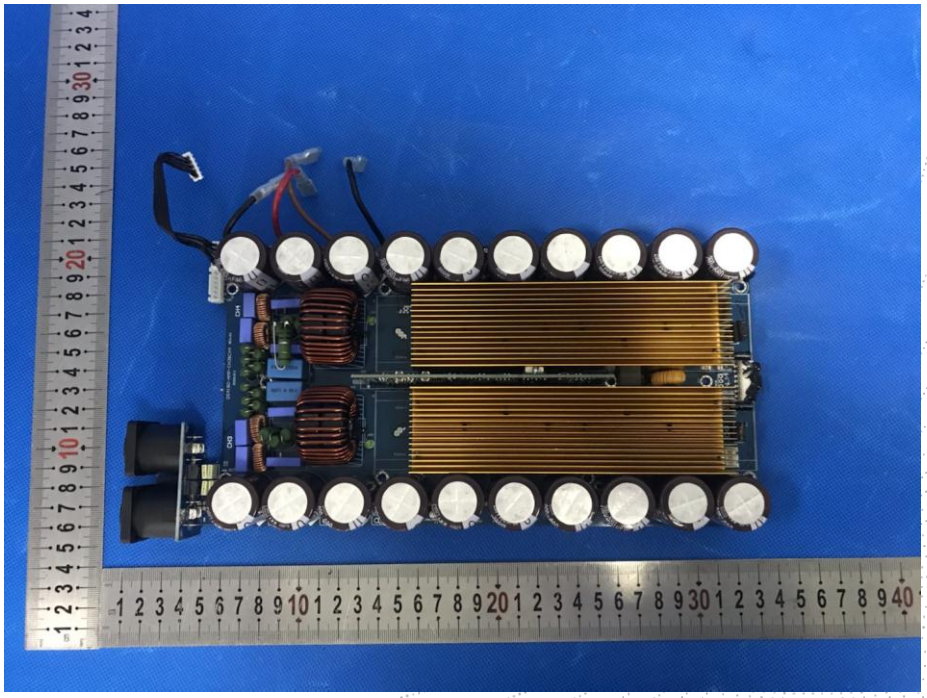
EUT Photo 12



EUT Photo 13



EUT Photo 14

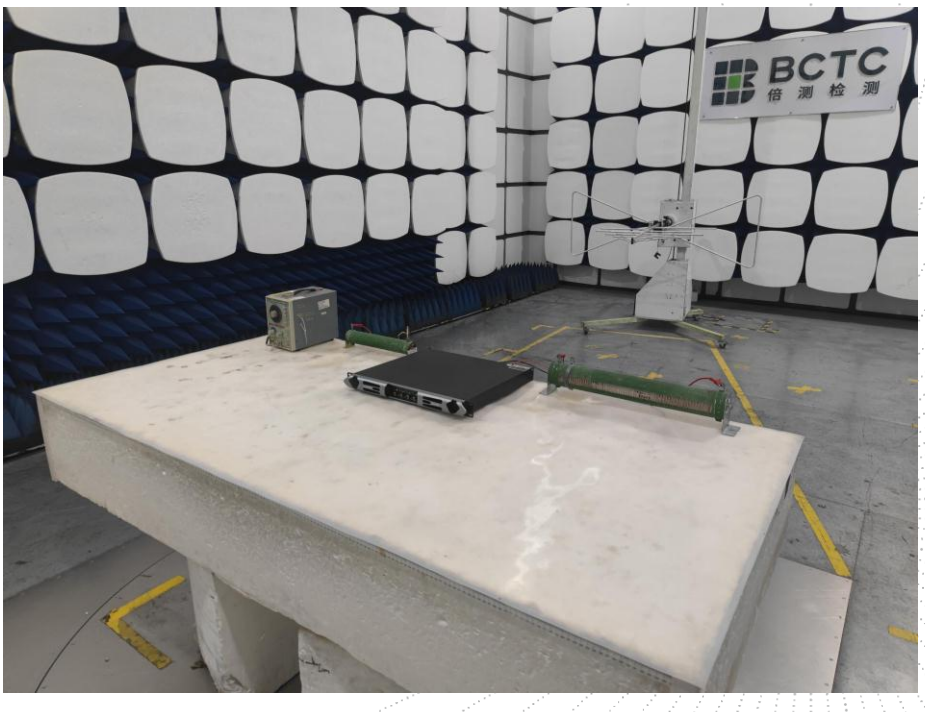


18. Eut Test Setup Photographs

Conducted emissions



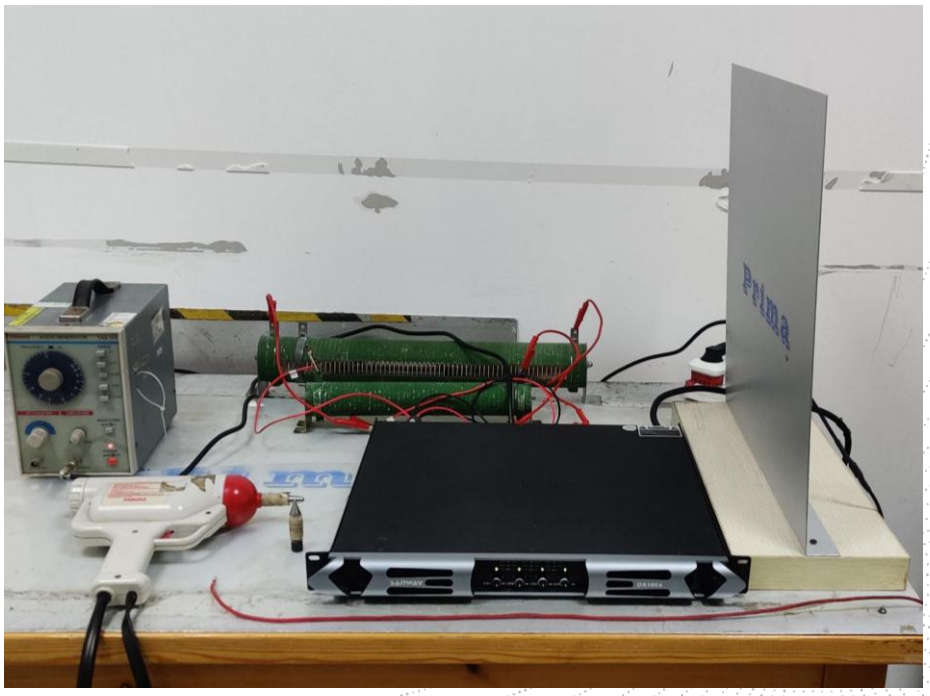
Radiated emissions



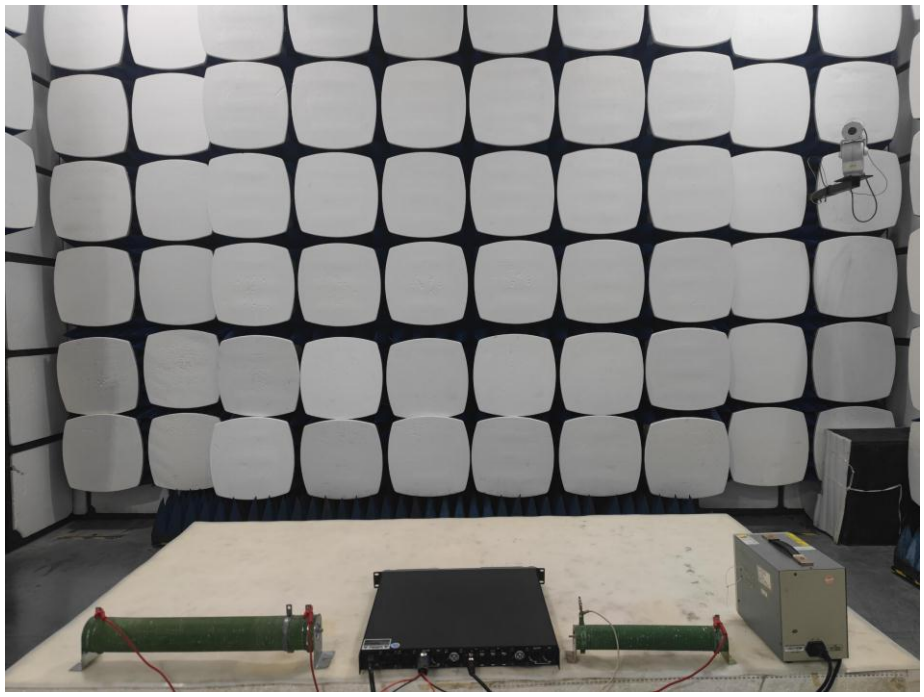
H/F


测试布置图布置
参考标准：
IEC 61000-3-2 IEC 61000-3-3
EN 61000-3-2 EN 61000-3-3
AC Mains
AC Power Source
EUT
LAPLACE INSTRUMENTS LTD

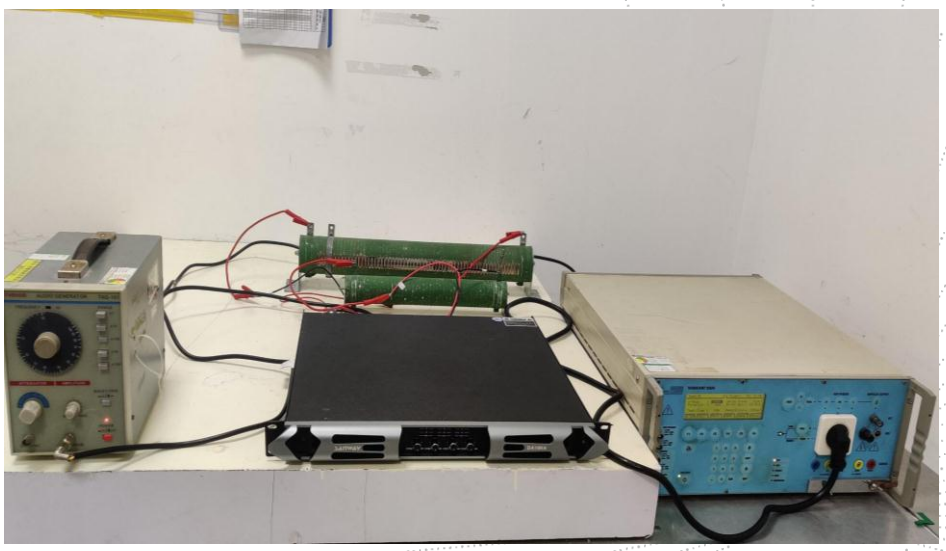
ESD



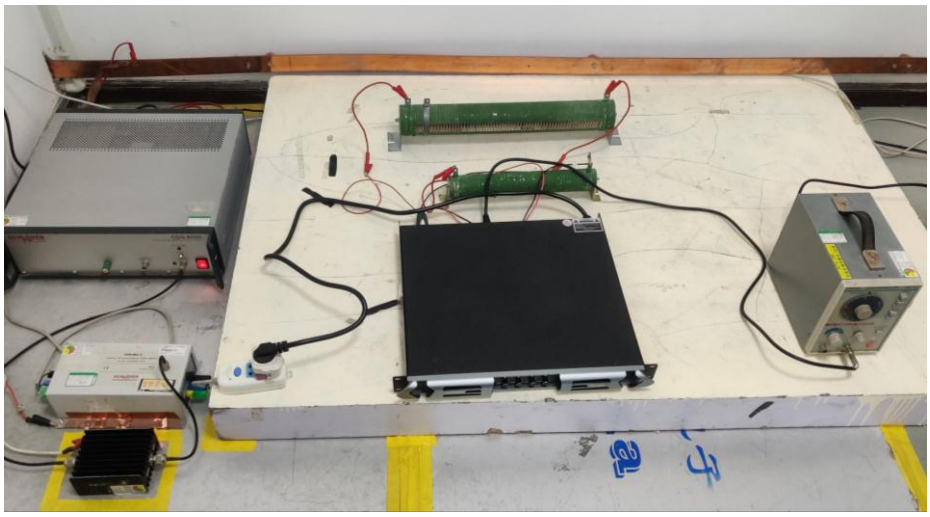
RS



EFT & Dips & Surge



CS



STATEMENT

1.The equipment lists are traceable to the national reference standards.

2.The test report can not be partially copied unless prior written approval is issued from our lab.

3.The test report is invalid without stamp of laboratory.

4.The test report is invalid without signature of person(s) testing and authorizing.

5.The test process and test result is only related to the Unit Under Test.

6.The quality system of our laboratory is in accordance with ISO/IEC17025.

7.If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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P.C.: 518103

FAX：0755-33229357

Website：http://www.chnbctc.com

E-Mail：bctc@bctc-lab.com.cn

※※※※※ **END** ※※※※※