



TEST REPORT

Report Number..... : **ZKT-2302271031E**

Date of Test..... Feb. 27, 2023 to Mar. 03, 2023

Date of issue..... : Mar. 03, 2023

Total number of pages..... 42

Test Result : PASS

Testing Laboratory..... : **Shenzhen ZKT Technology Co., Ltd.**

Address : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name : **Guangzhou TOPPING Technology Co., Ltd**

Address : Rm201, 26th Jiaomen Rd, Huangge, Nansha, Guangzhou, China.

Manufacturer's name : **Guangzhou TOPPING Technology Co., Ltd**

Address : Rm201, 26th Jiaomen Rd, Huangge, Nansha, Guangzhou, China.

Test specification:

Standard..... : EN 55032:2015+A11:2020, EN 55035:2017+A11:2020
EN IEC 61000-3-2:2019/A1:2021, EN 61000-3-3:2013/A2:2021
EN 61000-4-2:2009, EN IEC 61000-4-3:2020,
EN 61000-4-4:2012, EN 61000-4-5:2014+A1:2017,
EN 61000-4-6:2014, EN 61000-4-8:2010,
EN IEC 61000-4-11:2020

Test procedure..... : /

Non-standard test method : N/A

Test Report Form No..... : TRF-EL-144_V0

Test Report Form(s) Originator..... : ZKT Testing

Master TRF : Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the 2014/30/EU Directive requirements. And it is applicable only to the tested sample identified in the report.

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Product name..... : **Audio Amplifier**

Trademark : TOPPING

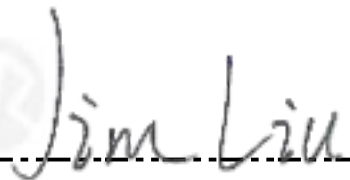
Model/Type reference..... : TP22A
TP22AA , TP22AB , TP22AC , TP22AD

Ratings..... : Input: AC 100-240V 5.0A 50/60Hz



Testing procedure and testing location:

Testing Laboratory.....: **Shenzhen ZKT Technology Co., Ltd.**
Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature).....: Jim Liu 

Reviewer (name + signature).....: Jackson Fang 


Approved (name + signature).....: Lake Xie 



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1. VERSION

Report No.	Version	Description	Approved
ZKT-2302271031E	Rev.01	Initial issue of report	Mar. 03, 2023



2. GENERAL INFORMATION

2.1 Description of Device (EUT)

EUT : Audio Amplifier
 Trademark : TOPPING
 Model Number : TP22A
 TP22AA , TP22AB , TP22AC , TP22AD
 Model Difference : Only for different model name
 Power Supply : Input: AC 100-240V 5.0A 50/60Hz

The highest frequency of the internal sources of the EUT is (less than 108)MHz:

- less than 108 MHz, the measurement shall only be made up to 1 GHz.
- between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
- between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.
- above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

Note: N/A

2.2 Tested System Details

None.

2.3 Test Facility

Site Description

Name of Firm : Shenzhen ZKT Technology Co., Ltd.
 Site Location : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

2.4 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 (150K-30MHZ)	3.20
Radiated disturbance30MHz-1000MHz	4.80
Radiated disturbance1000MHz-6000MHz	5.10



2.5 Test Instrument Used

Conducted emissions & Magnetic Emission & Disturbance power Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Oct. 21, 2022	Oct. 20, 2023
2	LISN	CYBERTEK	EM5040A	E1850400149	Oct. 21, 2022	Oct. 20, 2023
3	Test Cable	N/A	C-01	N/A	Oct. 21, 2022	Oct. 20, 2023
4	Test Cable	N/A	C-02	N/A	Oct. 21, 2022	Oct. 20, 2023
5	Test Cable	N/A	C-03	N/A	Oct. 21, 2022	Oct. 20, 2023
6	EMI Test Receiver	R&S	ESCI3	101393	Oct. 28, 2022	Oct. 27, 2023
7	Triple-Loop Antenna	N/A	RF300	N/A	Oct. 28, 2022	Oct. 27, 2023
8	Absorbing Clamp	DZ	ZN23201	15034	Oct. 31, 2022	Oct. 30, 2023
9	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	\	\

Radiated emissions Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	Oct. 28, 2022	Oct. 27, 2023
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSQ	100363	Oct. 28, 2022	Oct. 27, 2023
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	Oct. 28, 2022	Oct. 27, 2023
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	N/A	Nov. 02, 2022	Nov. 01, 2023
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	Nov. 01, 2022	Oct. 31, 2023
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	Oct. 28, 2022	Oct. 27, 2023
7	Loop Antenna	TESEQ	HLA6121	58357	Nov. 01, 2022	Oct. 31, 2023
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	060747	Nov. 15, 2022	Nov. 14, 2023
9	Amplifier (1GHz-26.5GHz)	Agilent	8449B	3008A00315	Oct. 28, 2022	Oct. 27, 2023
10	Amplifier (500MHz-40GHz)	全聚达	DLE-161	097	Oct. 28, 2022	Oct. 27, 2023
11	Test Cable	N/A	R-01	N/A	Oct. 28, 2022	Oct. 27, 2023
12	Test Cable	N/A	R-02	N/A	Oct. 28, 2022	Oct. 27, 2023
13	Test Cable	N/A	R-03	N/A	Oct. 28, 2022	Oct. 27, 2023
14	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	Nov. 15, 2022	Nov. 14, 2023
15	D.C. Power Supply	LongWei	TPR-6405D	N/A	\	\



16	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	\	\
17	Turntable	MF	MF-7802BS	N/A	\	\
18	Antenna tower	MF	MF-7802BS	N/A	\	\

Harmonic / Flicker Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Harmonic & Flicker	HTEC Instruments	AC2000A	548549	Nov. 02, 2022	Nov. 01, 2023
2	AC Power Source	/	HPHF4010	JN102209079 5	Oct. 28, 2022	Oct. 27, 2023

Electrostatic discharge Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	ESD TEST GENERATOR	HTEC	HESD16	N/A	Oct. 21, 2022	Oct. 20, 2023

EFT and Surge and Voltage dips and interruptions Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Surge Generator	HTEC	HCOMPACT5	N/A	Oct. 21, 2022	Oct. 20, 2023
2	DIPS Generator	HTEC	HV1P16T	202101	Nov. 15, 2022	Nov. 14, 2023
3	EFT/B Generator	HTEC	HCOMPACT5	N/A	Oct. 21, 2022	Oct. 20, 2023
4	EFT/B Clamp	HTEC	H3C	N/A	Oct. 28, 2022	Oct. 27, 2023

For Magnetic Field Immunity Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Generator	HTEC	HFMG 100	202602	Oct. 28, 2022	Oct. 27, 2023

Radio-frequency fields Immunity Test

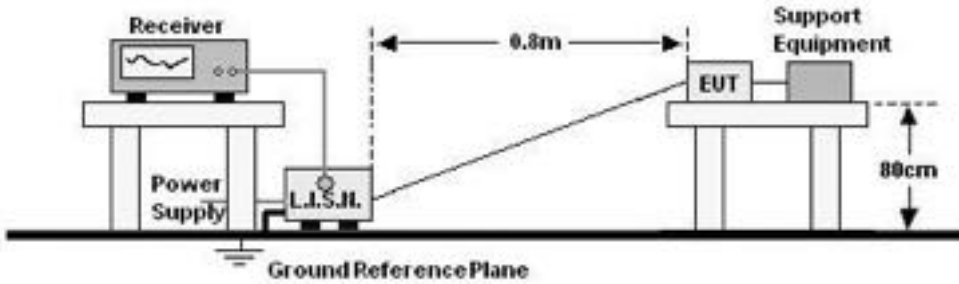
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Signal Generator	Teseq	NSG4070-75	31477	Oct. 28, 2022	Oct. 27, 2023
2	CDN	SCHWARZBECK	CDN M2/M3PE 16A	00128	Oct. 28, 2022	Oct. 27, 2023



3. CONDUCTED EMISSIONS

3.1 Block Diagram Of Test Setup

For mains ports:



3.2 Limit

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

Frequency range (MHz)	Limits dB(μ V)	
	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.

3.3 Test procedure

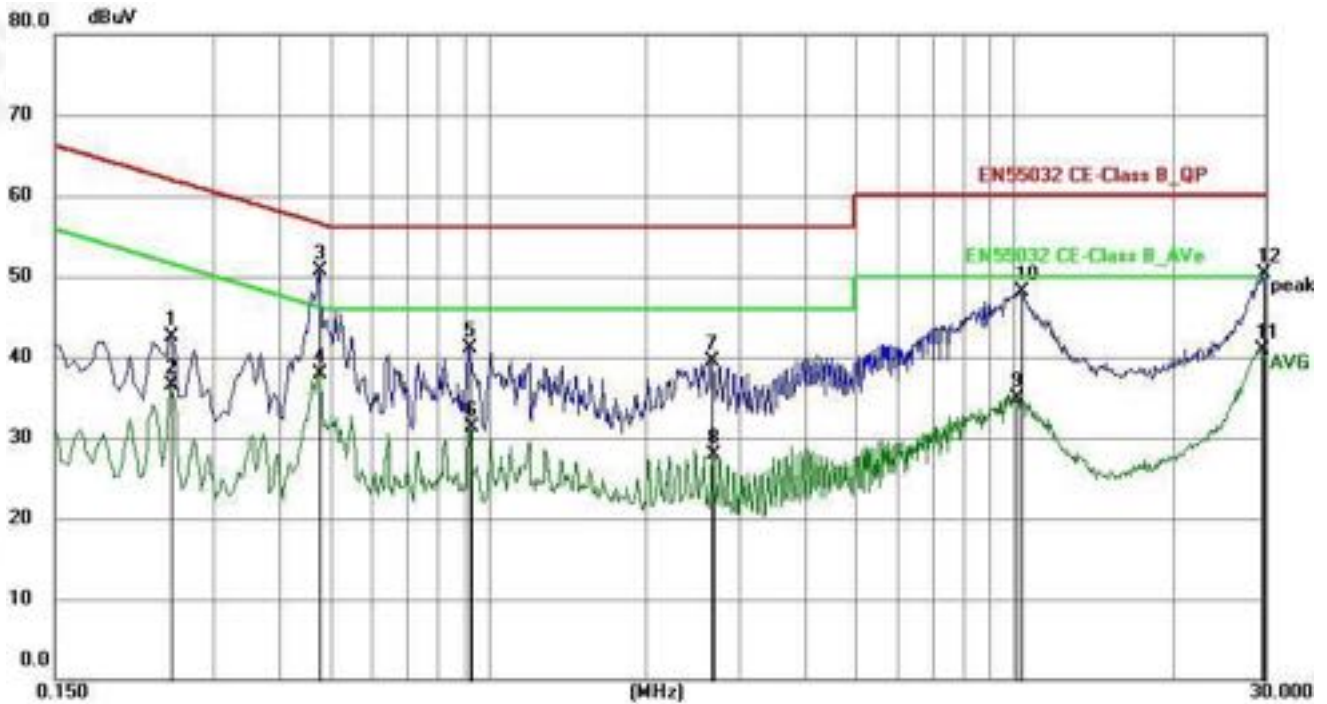
For mains ports:

- 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).
- 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.
- For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.



3.4 Test Result

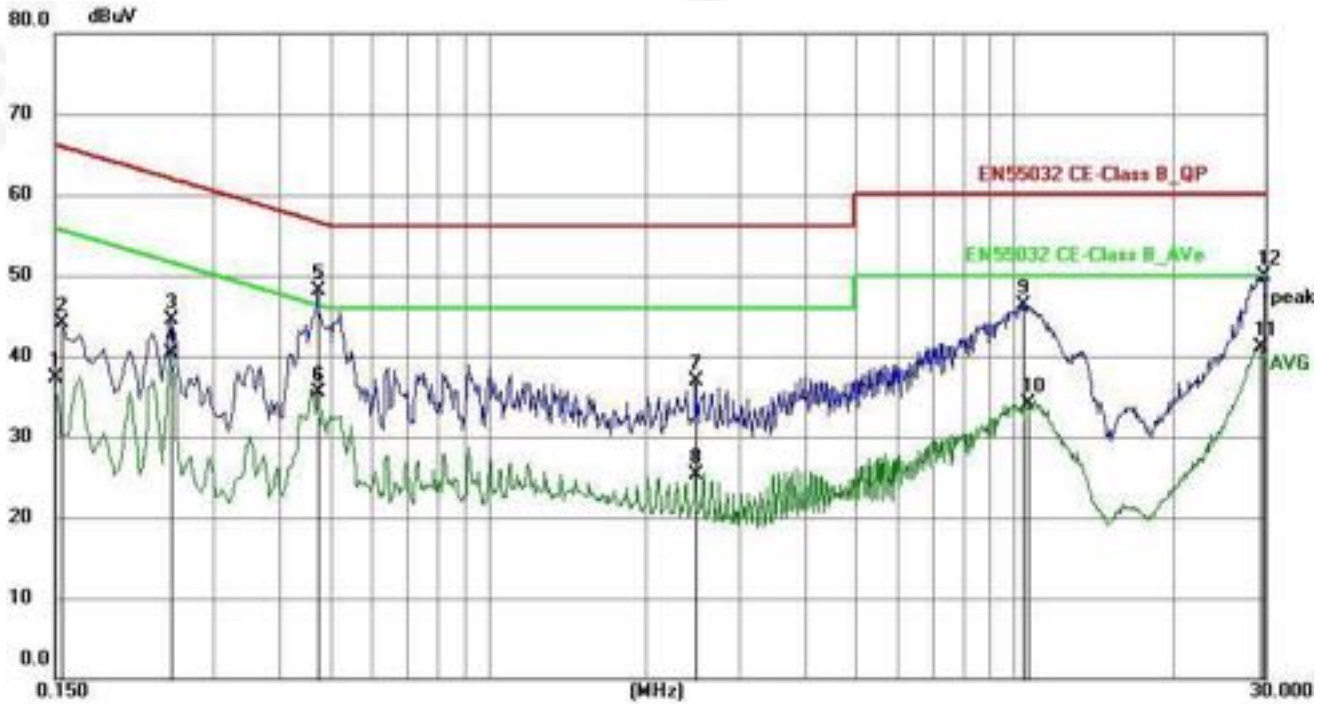
Conducted emissions at the Mains Ports Test Data			
Temperature:	24.9 °C	Relative Humidity:	42%
Pressure:	1009hPa	Phase :	Line
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2490	21.83	20.62	42.45	61.79	-19.34	QP	P	
2	0.2490	15.93	20.62	36.55	51.79	-15.24	AVG	P	
3	0.4785	30.05	20.64	50.69	56.37	-5.68	QP	P	
4	0.4785	17.33	20.64	37.97	46.37	-8.40	AVG	P	
5	0.9194	20.50	20.64	41.14	56.00	-14.86	QP	P	
6	0.9239	10.74	20.64	31.38	46.00	-14.62	AVG	P	
7	2.6610	18.81	20.72	39.53	56.00	-16.47	QP	P	
8	2.6655	7.13	20.72	27.85	46.00	-18.15	AVG	P	
9	10.1220	14.33	20.66	34.99	50.00	-15.01	AVG	P	
10	10.3065	27.44	20.66	48.10	60.00	-11.90	QP	P	
11	29.5665	20.47	20.46	40.93	50.00	-9.07	AVG	P	
12	29.7555	29.82	20.46	50.28	60.00	-9.72	QP	P	



Conducted emissions at the Mains Ports Test Data			
Temperature:	24.9°C	Relative Humidity:	42%
Pressure:	1009hPa	Phase :	Neutral
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



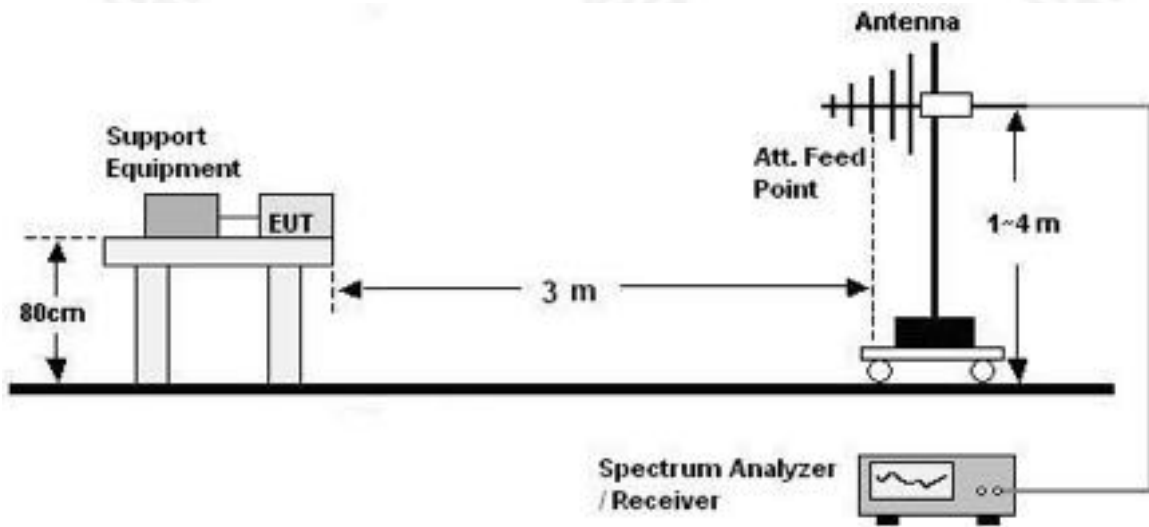
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	16.78	20.60	37.38	56.00	-18.62	AVG	P	
2	0.1545	23.61	20.59	44.20	65.75	-21.55	QP	P	
3	0.2490	23.91	20.54	44.45	61.79	-17.34	QP	P	
4	0.2490	19.80	20.54	40.34	51.79	-11.45	AVG	P	
5	0.4740	27.54	20.63	48.17	56.44	-8.27	QP	P	
6	0.4740	14.91	20.63	35.54	46.44	-10.90	AVG	P	
7	2.4810	16.18	20.69	36.87	56.00	-19.13	QP	P	
8	2.4810	4.53	20.69	25.22	46.00	-20.78	AVG	P	
9	10.3875	25.74	20.66	46.40	60.00	-13.60	QP	P	
10	10.6485	13.36	20.65	34.01	50.00	-15.99	AVG	P	
11	29.2380	20.36	20.65	41.01	50.00	-8.99	AVG	P	
12	29.7060	29.34	20.66	50.00	60.00	-10.00	QP	P	



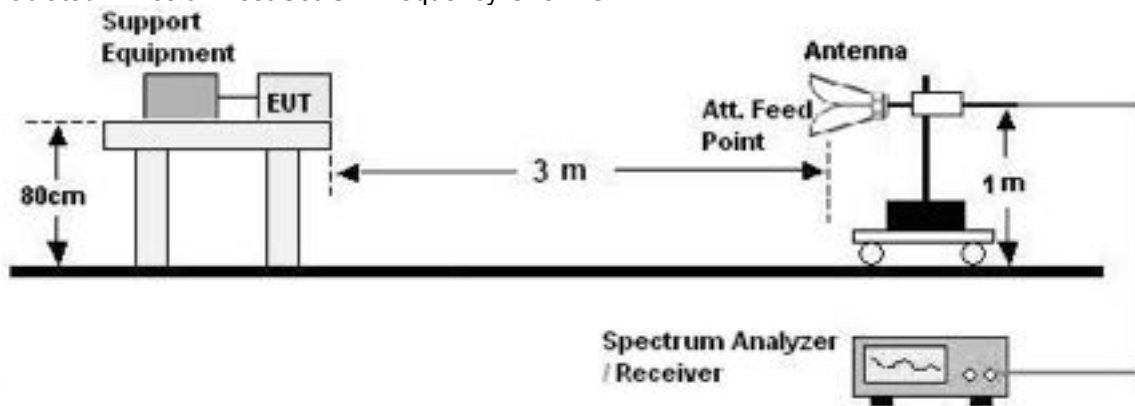
4. RADIATED EMISSIONS TEST

4.1 Block Diagram Of Test Setup

(A) Radiated Emission Test Set-UP Frequency 30MHz-1GHz



(B) Radiated Emission Test Set-UP Frequency Over 1GHz



4.2 Limits

Limits for radiated disturbance of Class B MME

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

FREQUENCY (MHz)	Class B (at 3m) dBuV/m	
	Peak	Avg
1000-3000	70	50
3000-6000	74	54



4.3 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.

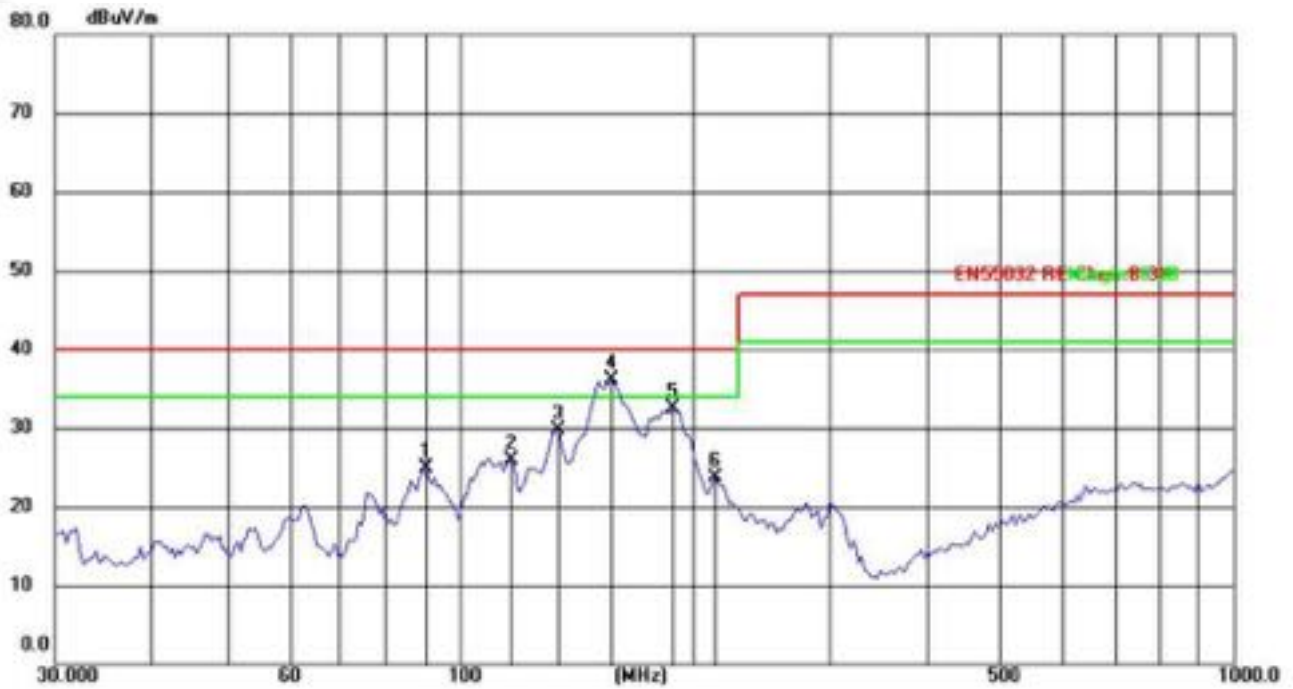
Above 1GHz:

- a. The Product was placed on the non-conductive turntable 0.8 m above the ground in a full anechoic chamber..
- b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied 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 AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.



4.4 Test Results

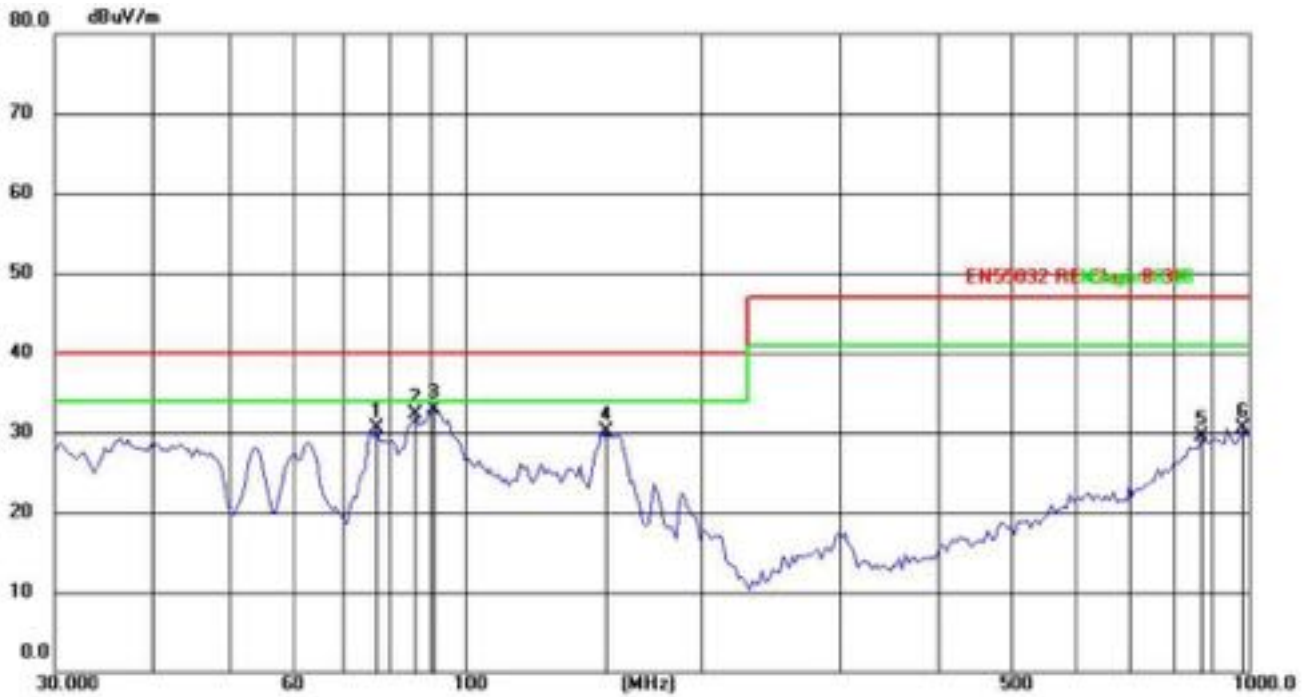
Radiated Emissions Test Data			
Temperature:	23.8°C	Relative Humidity:	42%
Pressure:	1009hPa	Phase :	Horizontal
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	90.5374	45.06	-20.17	24.89	40.00	-15.11	QP				
2	116.7445	44.73	-18.78	25.95	40.00	-14.05	QP				
3	134.3234	47.16	-17.40	29.76	40.00	-10.24	QP				
4	157.2828	52.40	-16.28	36.12	40.00	-3.88	QP				
5	189.0743	50.72	-18.27	32.45	40.00	-7.55	QP				
6	213.7634	41.81	-18.10	23.71	40.00	-16.29	QP				



Radiated Emissions Test Data			
Temperature:	23.8°C	Relative Humidity:	42%
Pressure:	1009hPa	Phase :	Vertical
Test Voltage :	AC 230V/50Hz	Test Mode:	Working

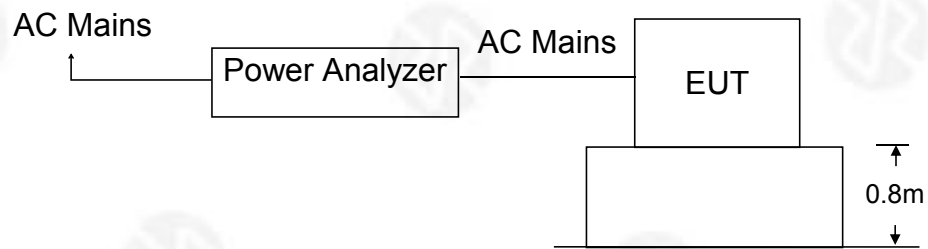


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	77.3210	51.65	-21.19	30.46	40.00	-9.54	QP				
2	86.6546	53.85	-21.62	32.23	40.00	-7.77	QP				
3	91.3345	54.30	-21.46	32.84	40.00	-7.16	QP				
4	151.8632	50.66	-20.49	30.17	40.00	-9.83	QP				
5	869.1302	31.16	-1.62	29.54	47.00	-17.46	QP				
6	982.6200	30.83	-0.31	30.52	47.00	-16.48	QP				



5. HARMONIC CURRENT EMISSION TEST

5.1 Block Diagram of Test Setup



5.2 Test Standard

EN IEC 61000-3-2:2019/A1:2021

5.3 Operating Condition of EUT

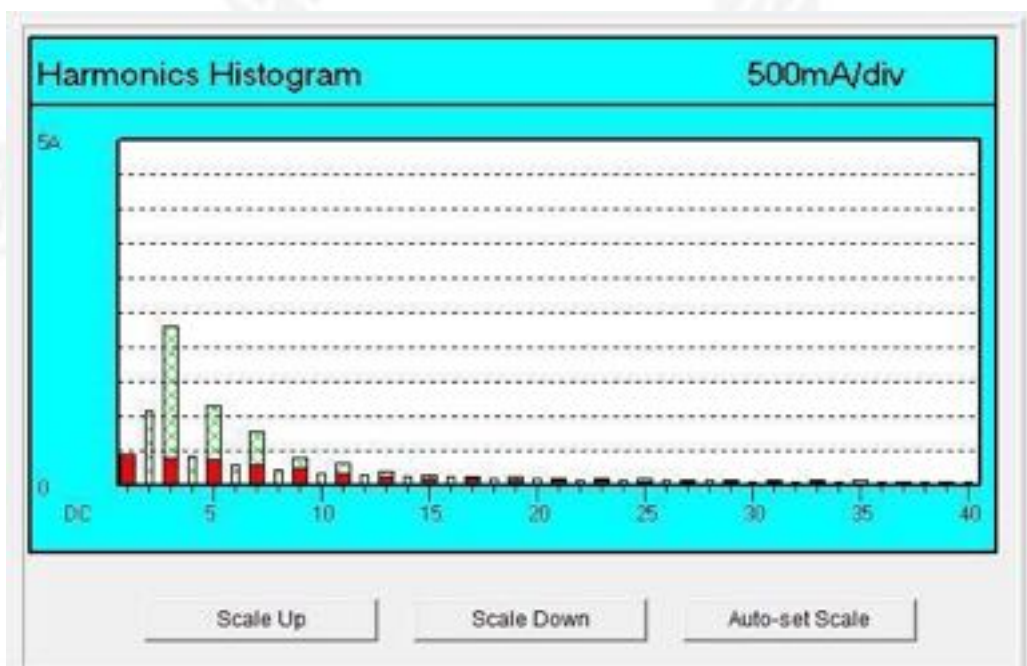
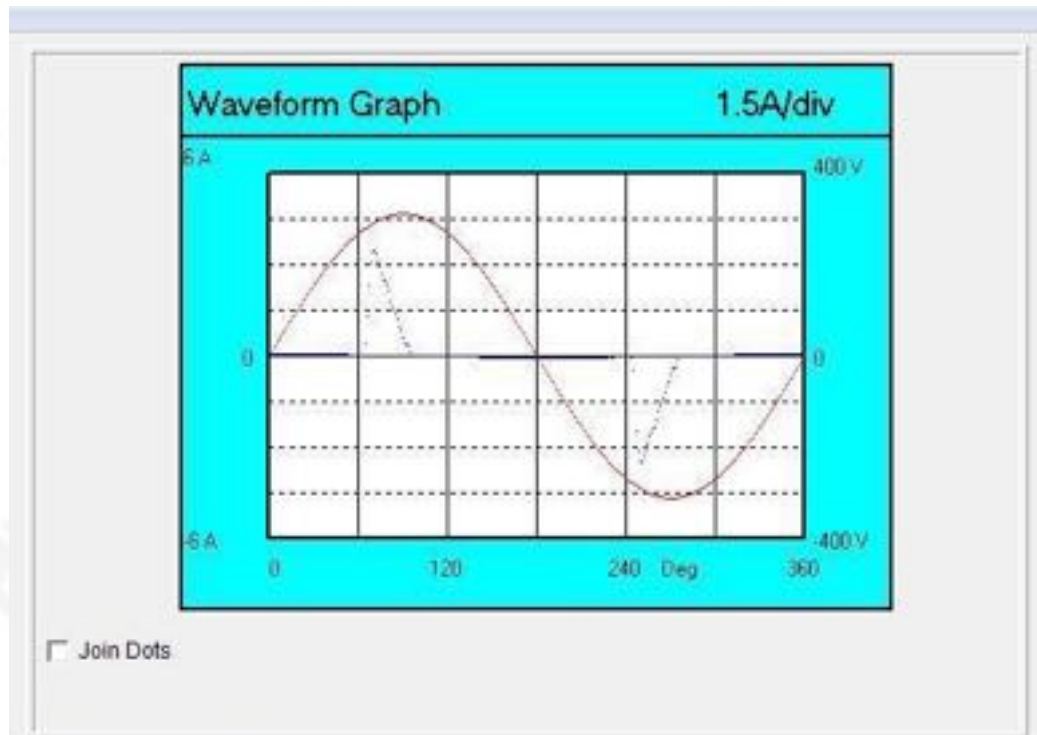
- 5.3.1 Setup the EUT as shown in Section 6.1.
- 5.3.2 Turn on the power of all equipment.
- 5.3.3 Let the EUT work in test mode and test it.

5.4 Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

5.5 Test Results

PASS
Please refer to the following page.





N	Filtered	Limit	Avg.	%Limit	Max.	%Limit	N	Filtered	Limit	Avg.	%Limit	Max.	%Limit
1	446.7			-		-	2	2.3	1080.0	2.5	0.2	2.8	0.3
3	411.8	2300.0	411.3	17.9	411.8	17.9	4	2.3	430.0	2.4	0.6	2.6	0.6
5	366.4	1140.0	366.0	32.1	366.6	32.2	6	2.3	300.0	2.5	0.8	2.6	0.9
7	308.9	770.0	308.5	39.8	307.3	39.9	8	2.1	230.0	2.6	1.1	2.8	1.2
9	241.3	400.0	241.0	60.3	241.8	60.5	10	2.3	184.0	2.6	1.4	3.0	1.6
11	179.6	330.0	179.3	54.3	180.1	54.6	12	2.5	153.3	2.7	1.8	3.0	2.0
13	130.7	210.0	130.4	62.1	131.0	62.4	14	2.5	131.4	2.8	2.1	3.2	2.4
15	101.6	150.0	101.2	67.5	101.7	67.8	16	2.5	115.0	2.8	2.4	3.2	2.8
17	89.7	132.3	89.4	67.6	90.0	68.0	18	2.5	102.2	2.8	2.7	3.2	3.1
19	84.3	118.4	84.0	70.9	84.5	71.4	20	2.5	92.0	2.7	2.9	3.2	3.5
21	76.8	107.1	76.7	71.6	77.3	72.2	22	2.6	83.6	2.7	3.2	3.0	3.6
23	66.8	97.8	66.7	68.2	67.0	68.5	24	2.5	76.7	2.6	3.4	3.0	3.9
25	56.6	90.0	56.4	62.7	56.8	63.1	26	2.5	70.8	2.5	3.5	2.8	4.0
27	49.2	83.3	49.0	58.8	49.4	59.3	28	2.5	65.7	2.5	3.8	2.8	4.3
29	45.3	77.6	45.0	58.0	45.4	58.5	30	2.3	61.3	2.4	3.9	2.6	4.2
31	42.6	72.6	42.4	58.4	42.7	58.8	32	1.9	57.5	2.1	3.7	2.5	4.3
33	39.0	68.2	38.7	56.7	39.0	57.2	34	1.7	54.1	2.0	3.7	2.3	4.3
35	34.1	64.3	33.9	52.7	34.1	53.0	36	1.6	51.1	1.8	3.5	2.1	4.1
37	29.3	60.8	29.1	47.9	29.3	48.2	38	1.4	48.4	1.6	3.3	1.9	3.9
39	25.7	57.7	25.5	44.2	25.7	44.5	40	1.4	46.0	1.6	3.5	1.7	3.7
P	155.3	251.4	154.5	61.5	155.5	61.9					-		-



6. VOLTAGE FLUCTUATIONS & FLICKER TEST

6.1 Block Diagram of Test Setup

Same as Section 6.1.

6.2 Test Standard

EN 61000-3-3:2013/A2:2021

6.3 Operating Condition of EUT

Same as Section 5.3.. The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

Flicker Test Limit

Test items	Limits
Pst	1.0
dc	3.3%
dmax	4.0%
dt	Not exceed 3.3% for 500ms

6.4 Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

6.5 Test Results

PASS

Please refer to the following page.



Flicker Test Data			
Temperature:	24.5 °C	Relative Humidity:	54%
Pressure:	1009hPa	Test Mode:	ON
Test Voltage :	AC 230V/50Hz		

Voltage Fluctuation	Limit	Value
Relative Voltage Change Characteristic Tmax (dc > 3%)	500 ms	0 ms
Maximum Relative Voltage Change d _{max}	4%	0.00
	6%	/
	7%	/
Relative Steady-state Voltage Change dc	3.3%	0.00

Flicker	Limit	Value
Short-term Flicker Indicator P _{st}	1.0	0.064
Long-term Flicker Indicator P _{lt}	0.65	/



7. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA

Product Standard	EN 55035:2017+A11:2020 clause 5
CRITERION A	<p>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.</p>
CRITERION B	<p>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.</p> <p>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.</p> <p>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.</p>
CRITERION C	<p>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.</p> <p>Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

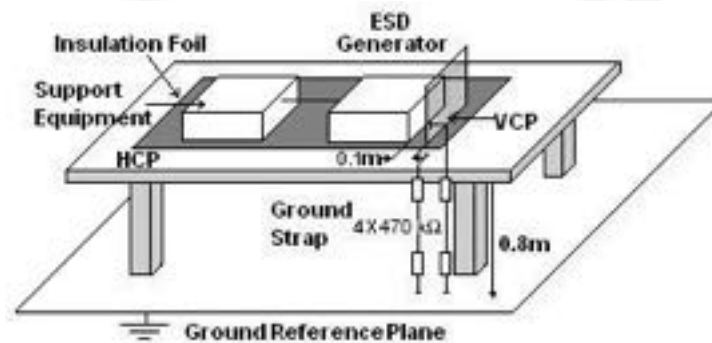


8. ELECTROSTATIC DISCHARGE (ESD)

8.1 Test Specification

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

8.2 Block Diagram of Test Setup



8.3 Test Procedure

- Electrostatic discharges were applied only to those points and surfaces of the Product that are accessible to users during normal operation.
- The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- The time interval between two successive single discharges was at least 1 second.
- 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.
- Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- 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.
- 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.



8.4 Test Results

Discharge Method	Discharge Position	Voltage (\pm 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					



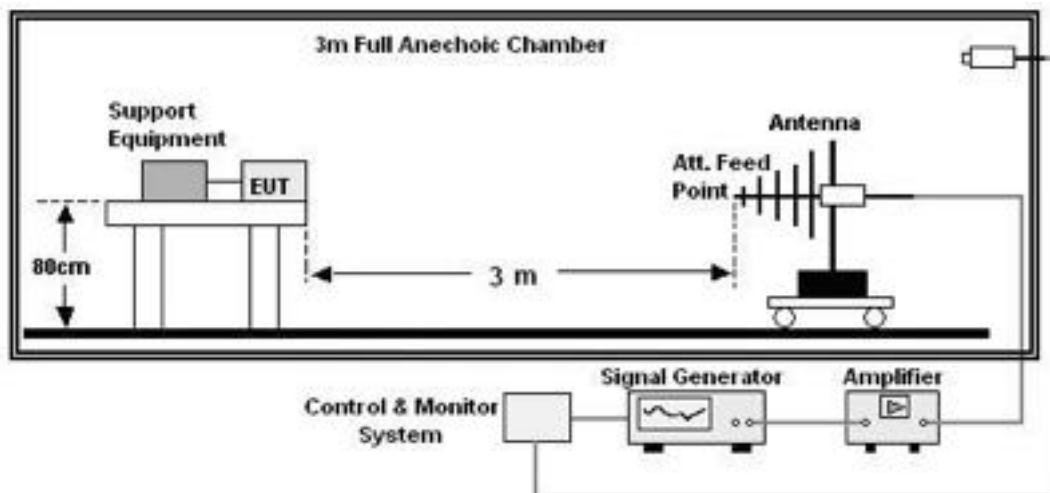
9. CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES(RS)

9.1 Test Specification

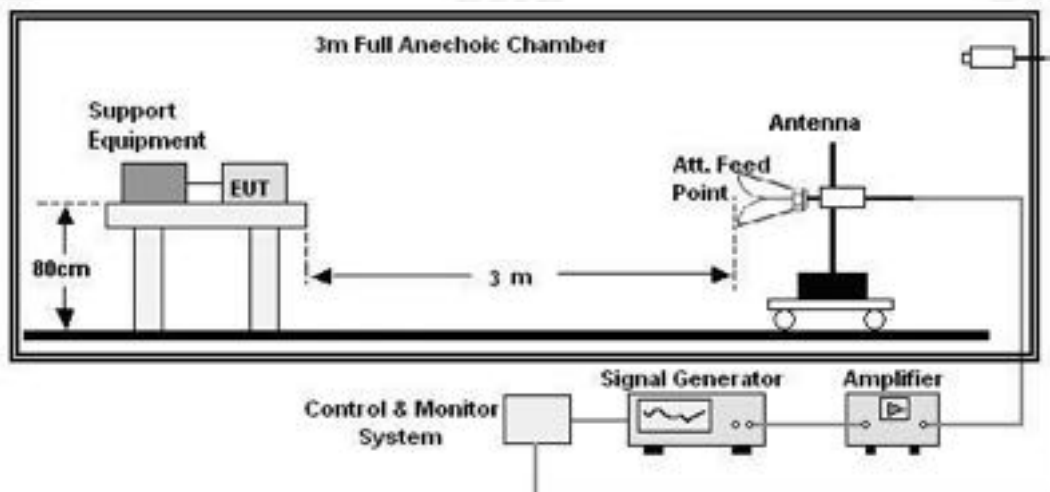
Test Port	:	Enclosure port
Step Size	:	1%
Modulation	:	1kHz, 80% AM
Dwell Time	:	1 second
Polarization	:	Horizontal & Vertical

9.2 Block Diagram of Test Setup

Below 1GHz:



Above 1GHz:





9.3 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.

9.4 Test Results

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

Note:The EUT is the testing item(s) was (were) fulfilled by subcontracted lab SHENZHEN HAIYUN TESTING CO.,LTD



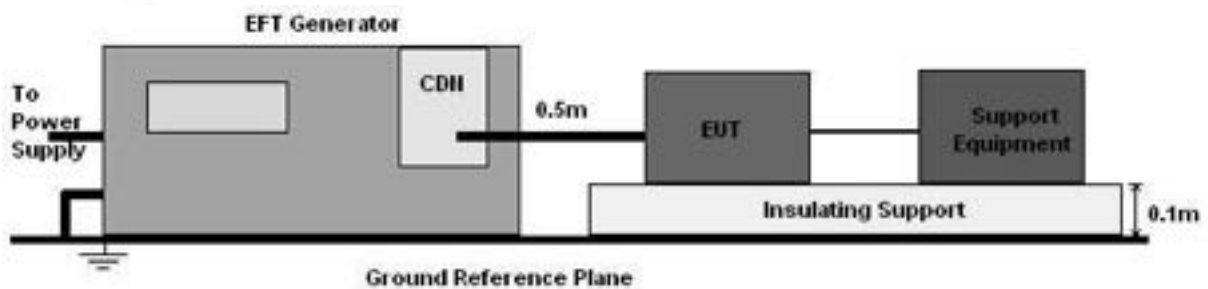
10. ELECTRICAL FAST TRANSIENTS/BURST (EFT)

10.1 Test Specification

Test Port	:	input a.c. 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

10.2 Block Diagram of EUT Test Setup

For input a.c. power port:



10.3 Test Procedure

- The Product and support units were located on a non-conductive table above ground reference plane.
- A 0.5m-long power cord was attached to Product during the test.

10.4 Test Results

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

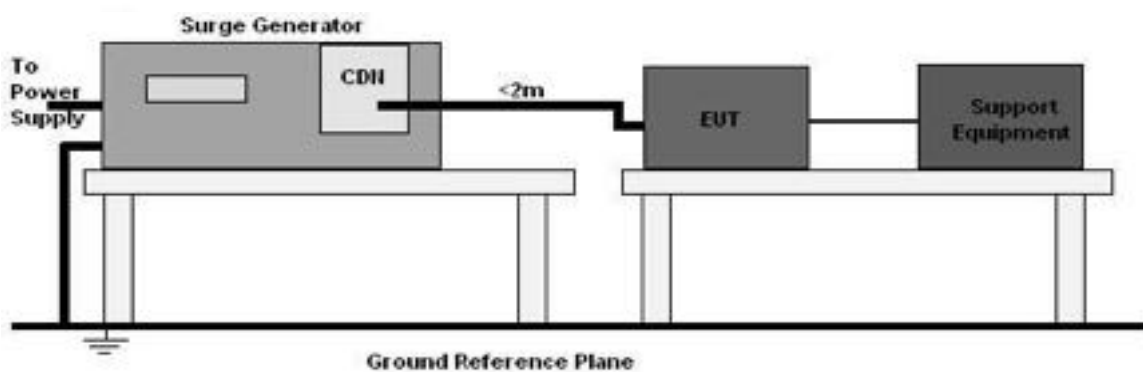


11. SURGES IMMUNITY TEST

11.1 Test Specification

Test Port	:	input a.c. 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

11.2 Block Diagram of EUT Test Setup



11.3 Test Procedure

- 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.
- 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).

11.4 Test Result

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



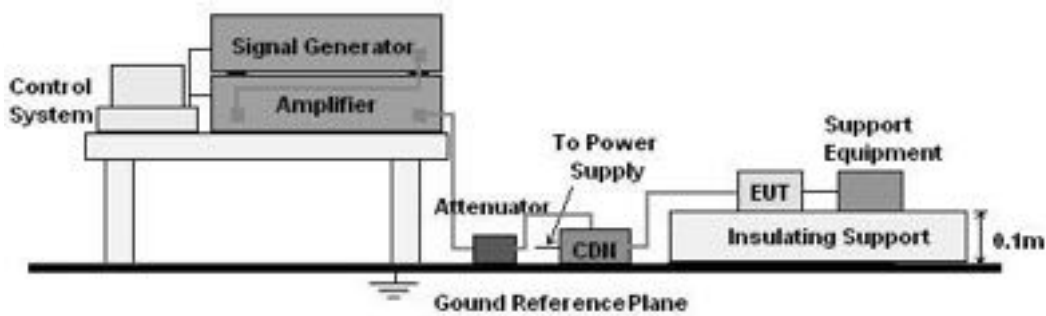
12. CONTINUOUS INDUCED RF DISTURBANCES (CS)

12.1 Test Specification

Test Port	:	input a.c. power port
Step Size	:	1%
Modulation	:	1kHz, 80% AM
Dwell Time	:	1 second

12.2 Block Diagram of EUT Test Setup

For input a.c. power port:



12.3 Test Procedure

For input a.c. power port:

- 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.
- 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.
- The dwell time at each frequency shall be not less than the time necessary for the Product to be able to respond.

12.4 Test Result

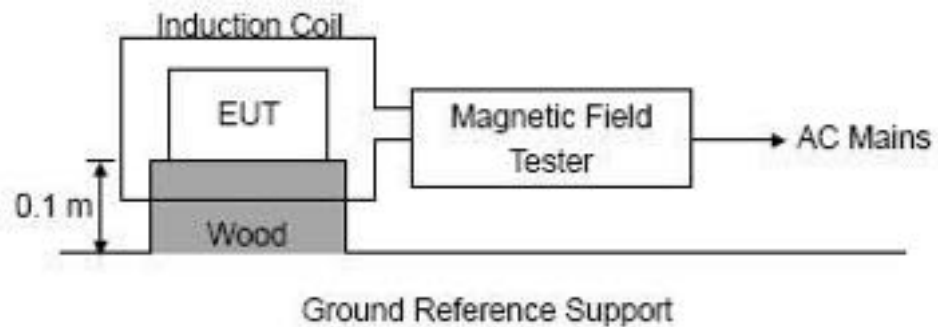
Inject Line	Frequency (MHz)	Voltage Level (V r.m.s.)	Required Level	Performance Criterion
a.c. port	0.15 - 10	3	A	A
	10 to 30	3 to 1	A	A
	30 to 80	1	A	A

Note: The EUT is the testing item(s) was (were) fulfilled by subcontracted lab SHENZHEN HAIYUN TESTING CO.,LTD



13. MAGNETIC FIELD IMMUNITY TEST

13.1 Block Diagram of Test Setup



13.2 Test Standard

EN 55035:2017+A11:2020, EN61000-4-8:2010
Severity Level 1 at 1A/m

13.3 Severity Levels and Performance Criterion

13.3.1 Severity level

Level	Magnetic Field Strength A/m
1.	1
2.	3
3.	10
4.	30
5.	100
X.	Special

13.3.2 Performance criterion: B

- A. 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 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.
- B. After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena 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. During the test, degradation of performance is allowed. However, no change of



operating state or stored data is allowed to persist after the test.
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.

- 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. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

13.4 EUT Configuration on Test

The configuration of EUT is listed in Section 2.9.

13.5 Operating Condition of EUT

Same as conducted emission test, which is listed in Section 2.9 except the test set up replaced as Section 12.1.

13.6 Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 10.1. The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

13.7 Test Results

PASS
Please refer to the following page.

MS Test Data					
Temperature:	24.5°C		Humidity:	53%	
Power Supply:	AC230V/50Hz		Test Mode:	On	
Environmental Phenomena	Test specification	Units	Coil Orientation	Performance Criterion	Result
Magnetic Field	1	A/m	X	A	PASS
			Y	A	PASS
			Z	A	PASS
Note: N/A					

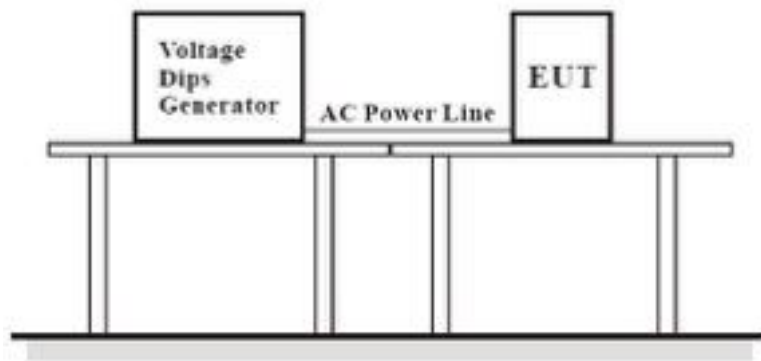


14. VOLTAGE DIPS AND INTERRUPTIONS (DIPS)

14.1 Test Specification

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

14.2 Block Diagram of EUT Test Setup



14.3 Test Procedure

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

14.4 Test Result

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	C*
Note: N/A				

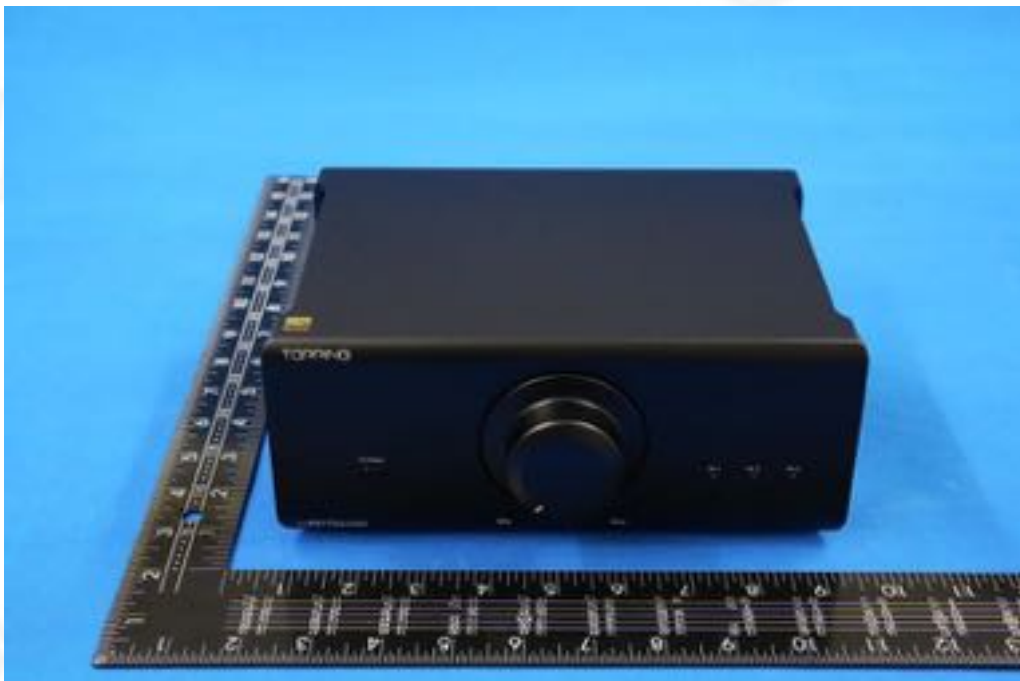


15. EUT PHOTOGRAPHS

EUT Photo 1



EUT Photo 2





EUT Photo 3



EUT Photo 4





EUT Photo 5

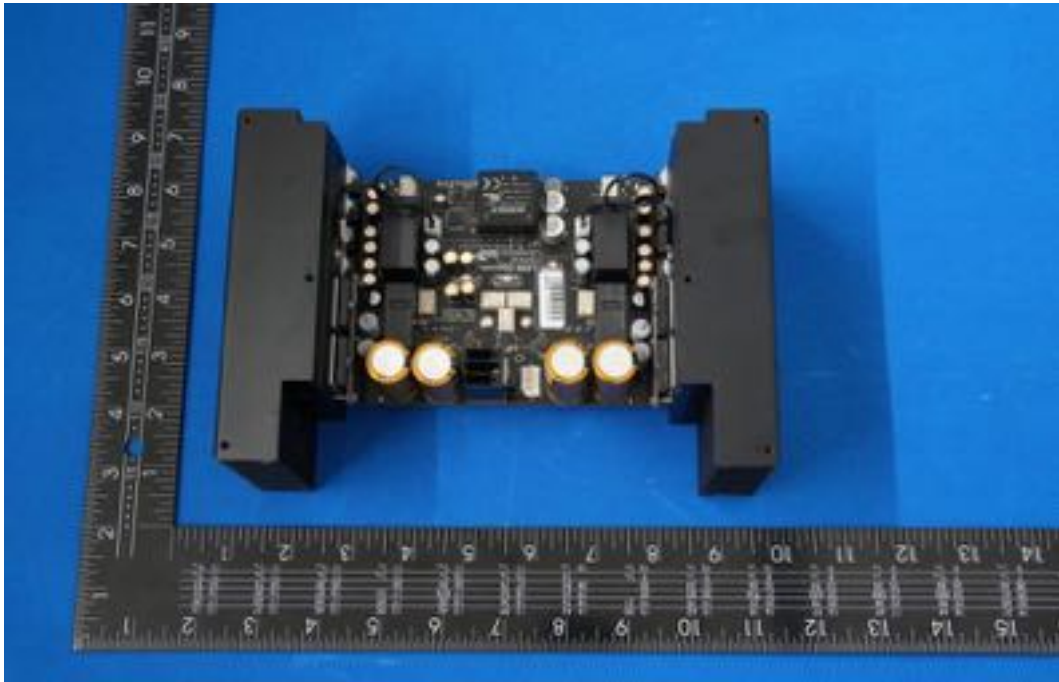


EUT Photo 6

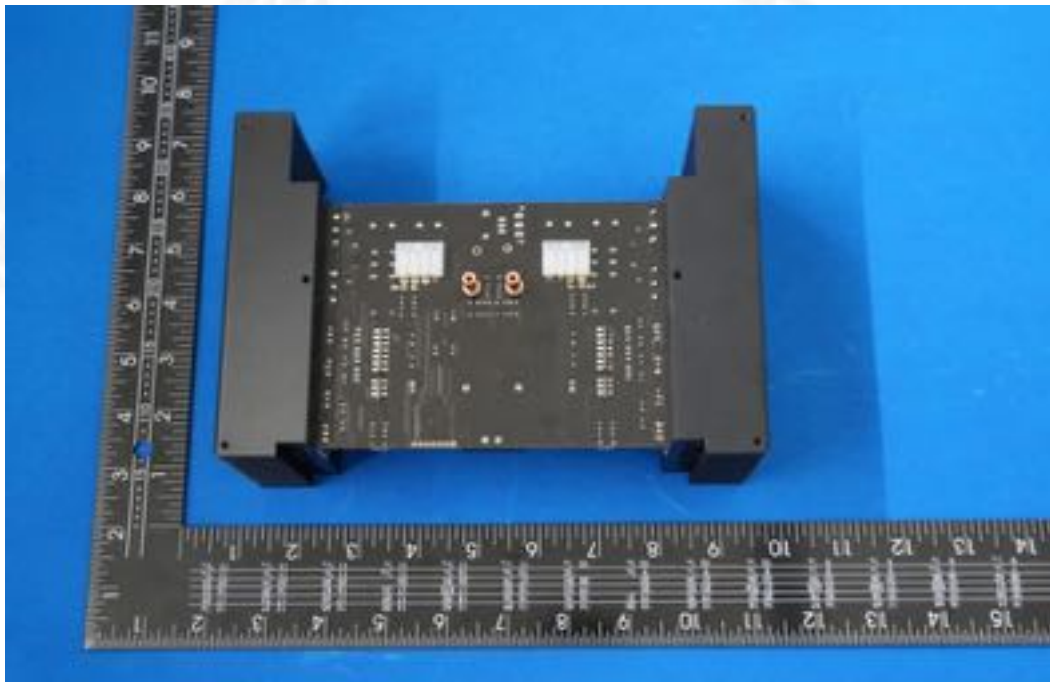




EUT Photo 7

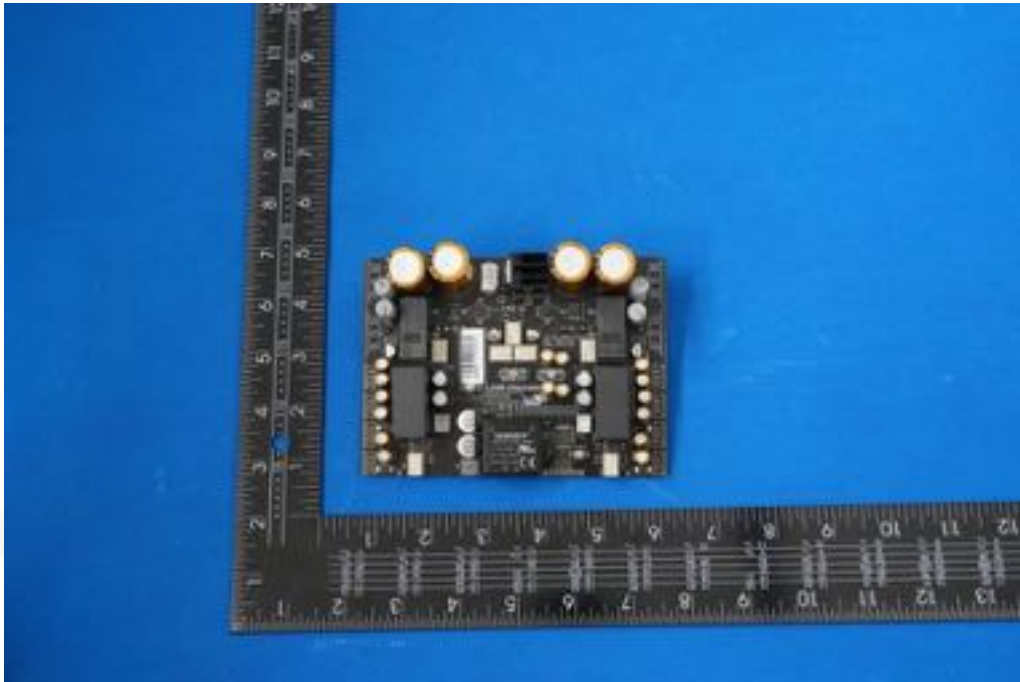


EUT Photo 8

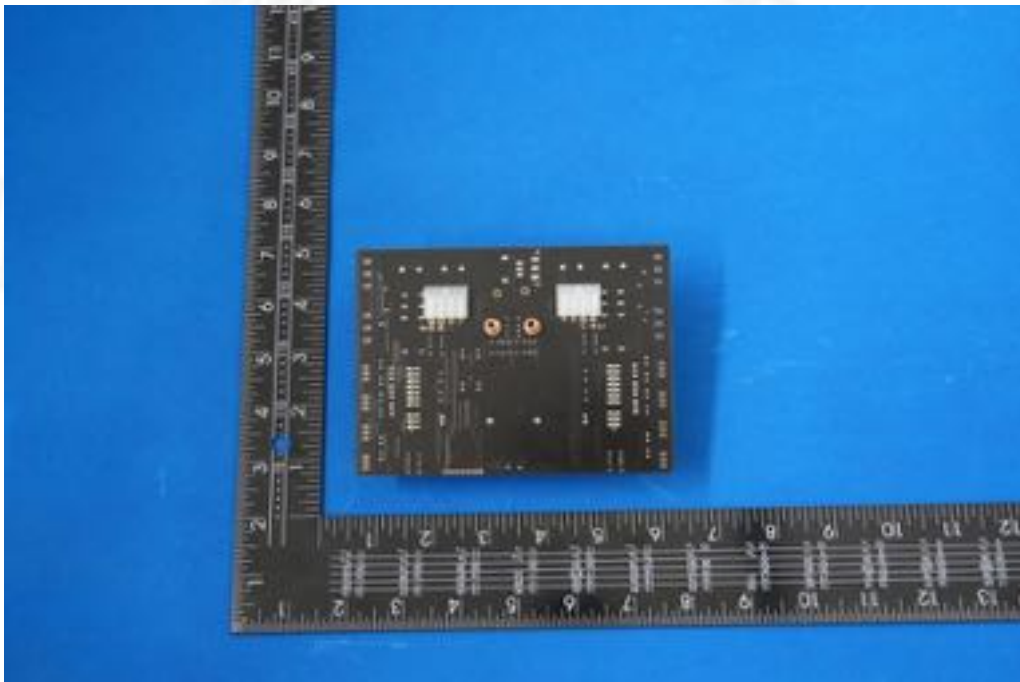




EUT Photo 9

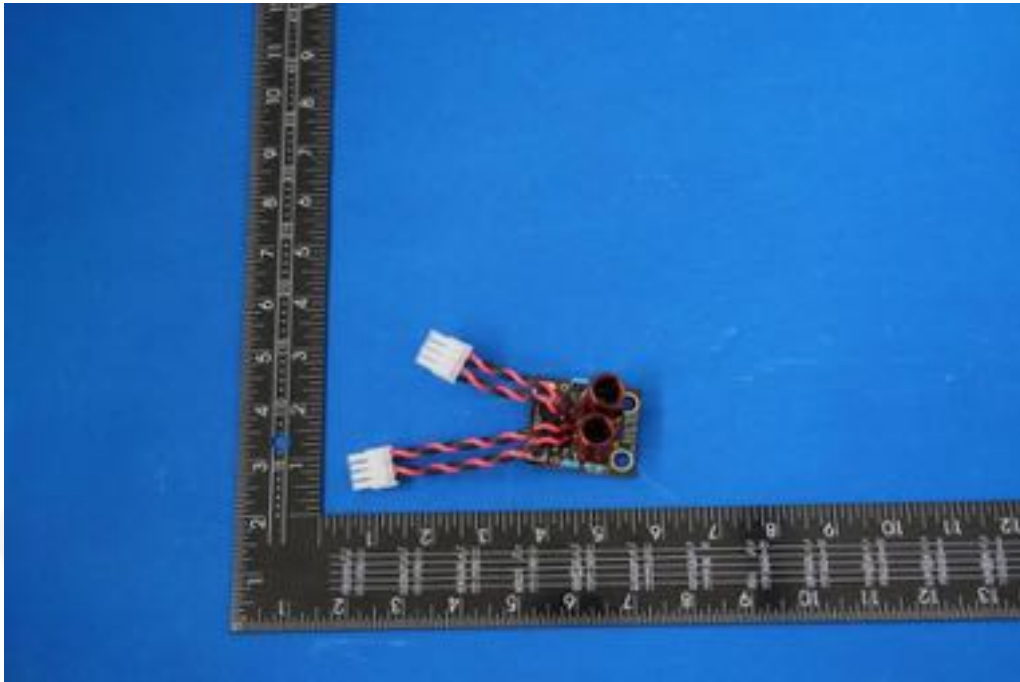


EUT Photo 10

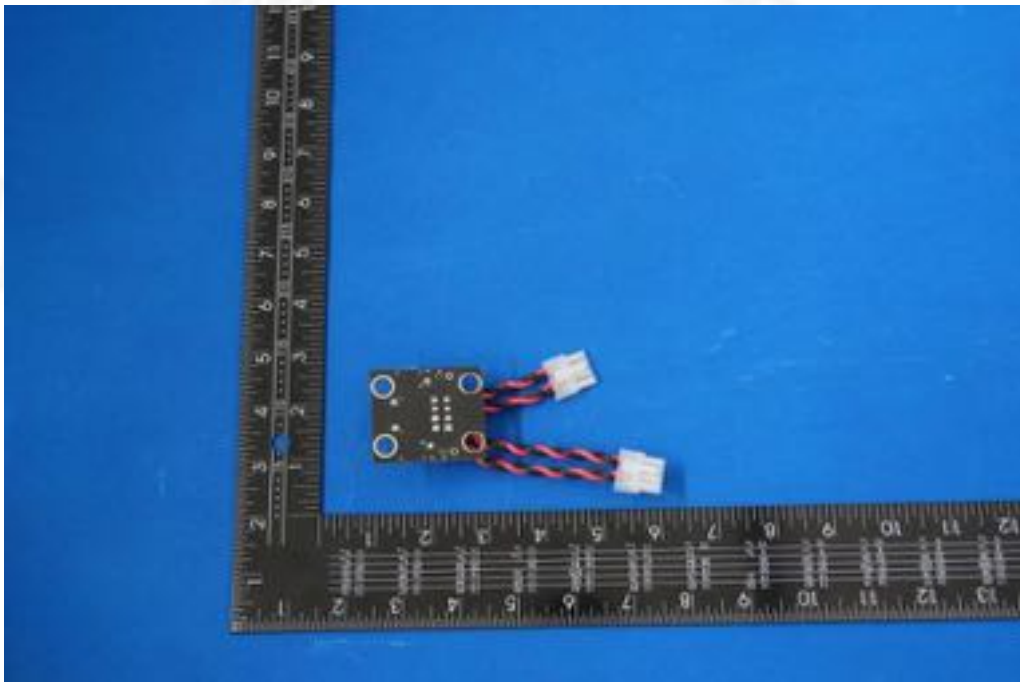




EUT Photo 11

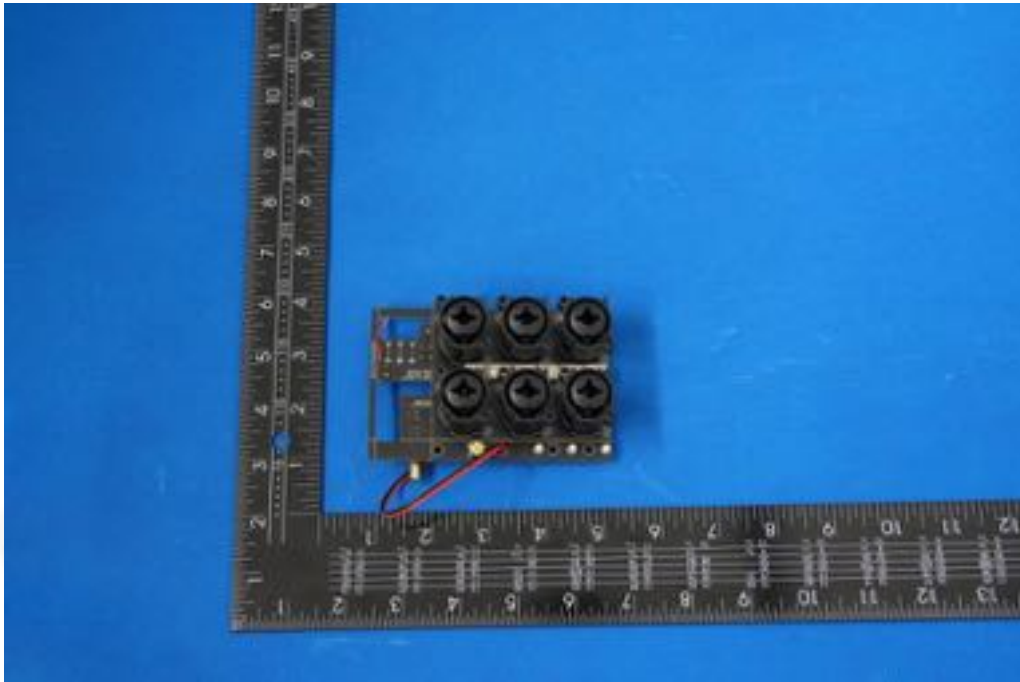


EUT Photo 12

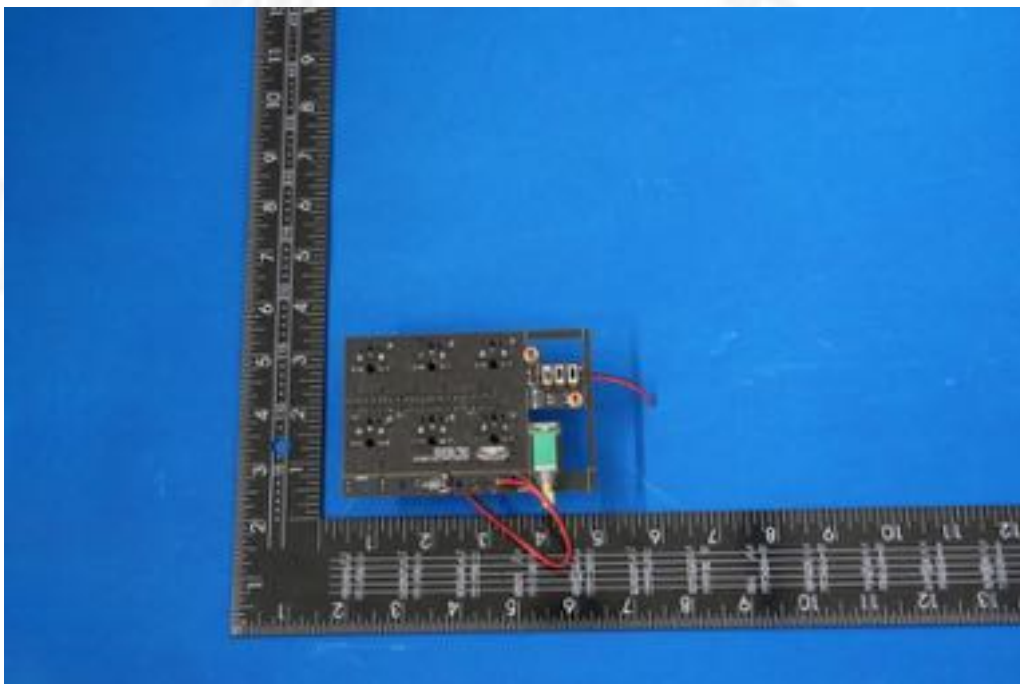




EUT Photo 13



EUT Photo 14





EUT Photo 15

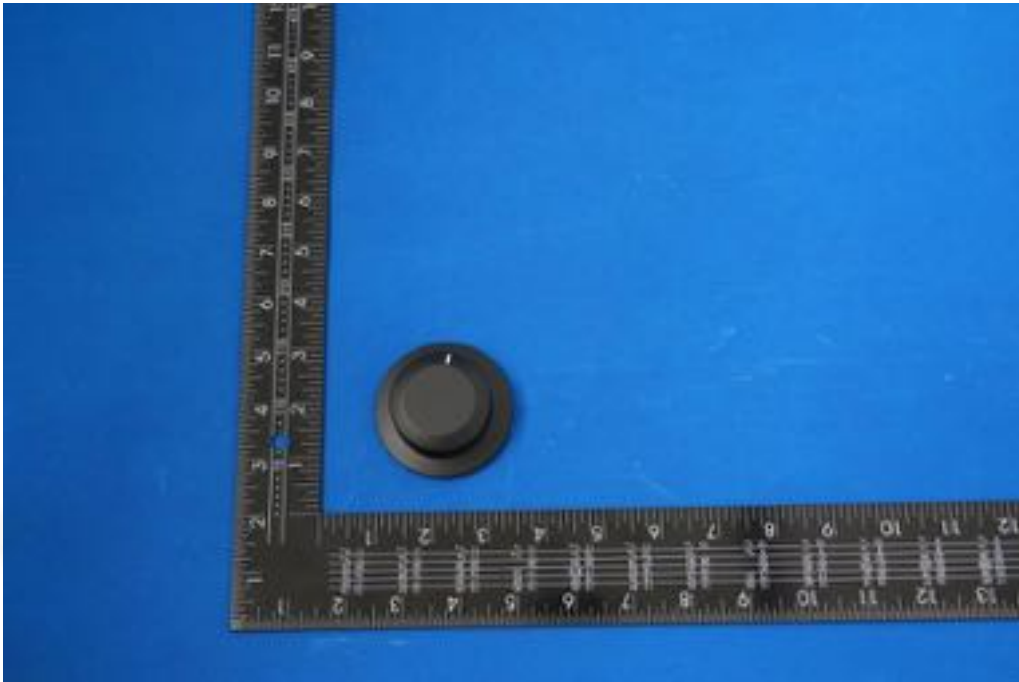


EUT Photo 16





EUT Photo 17



EUT Photo 18





EUT Photo 19



EUT Photo 20



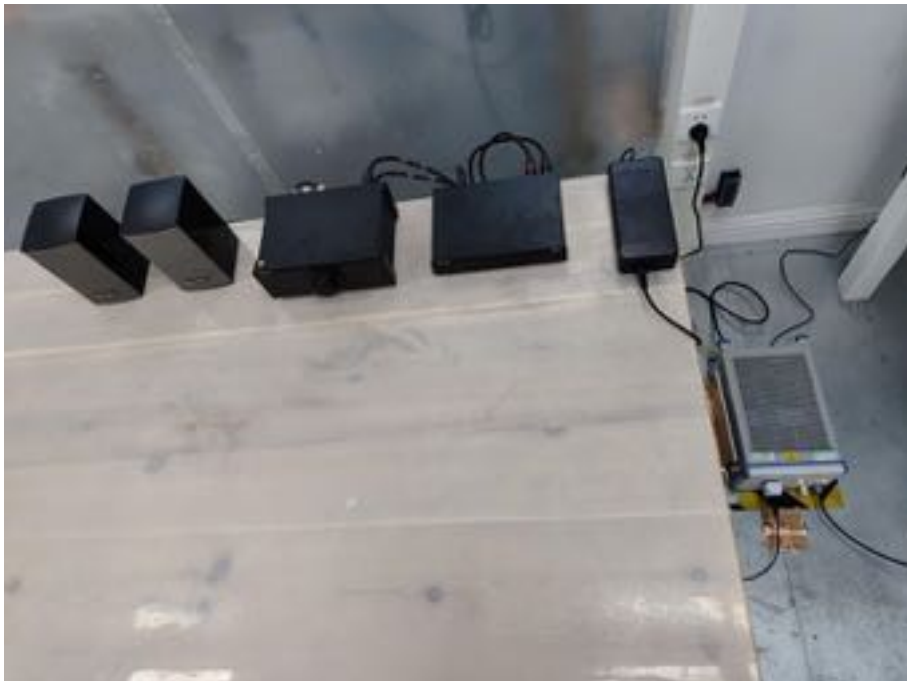


16. EUT TEST PHOTOGRAPHS

RE



CE



***** END OF REPORT *****