



Project No.: TM-2206000658P
Report No.: TMXD2206003113DE

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Rev.: 00

CE EMC TEST REPORT

for

UP 4000 Board; UP 4000 Edge

MODEL: xUPxAPL03x (x - Where x may be any combination of alphanumeric characters or "-" or blank.); xUPxEDGEExAPL03x (x - Where x may be any combination of alphanumeric characters or "-" or blank.)

Issued to:

AAEON Technology Inc.

**5F, No.135, Lane 235, Pao Chiao Rd, Hsin-Tien Dist.,
New Taipei City, Taiwan, R.O.C.**

Issued by:

Compliance Certification Services Inc.

Xindian Lab.

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Issued Date: August 15, 2022

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		August 15, 2022		Initial Issue	ALL	Linda Wu

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1 TEST CERTIFICATION

Product: UP 4000 Board; UP 4000 Edge

Model: xUPxAPL03x (x - Where x may be any combination of alphanumeric characters or "-" or blank.); xUPxEDGE xAPL03x (x - Where x may be any combination of alphanumeric characters or "-" or blank.)

Brand: AAEON

Applicant: **AAEON Technology Inc.**
5F, No.135, Lane 235, Pao Chiao Rd, Hsin-Tien Dist.,
New Taipei City, Taiwan, R.O.C.

Manufacturer: **AAEON Technology Inc.**
5F, No.135, Lane 235, Pao Chiao Rd, Hsin-Tien Dist.,
New Taipei City, Taiwan, R.O.C.

Tested: July 16, 2022 ~ August 4, 2022

Applicable Standards:	EN 55011: 2016 + A11: 2020 (Group 1, Class A)	EN IEC 61000-6-1: 2019
	BS EN 55011: 2016 + A11: 2020	BS EN IEC 61000-6-1: 2019
	EN IEC 61000-3-2: 2019	IEC 61000-4-2: 2008
	BS EN IEC 61000-3-2: 2019	IEC 61000-4-3: 2006 + A1: 2007 + A2: 2010
	EN 61000-3-3: 2013 + A1: 2019	IEC 61000-4-4: 2012
	BS EN 61000-3-3: 2013 + A1: 2019	IEC 61000-4-5: 2014 + A1: 2017
		IEC 61000-4-6: 2013 + COR1: 2015
		IEC 61000-4-8: 2009
		IEC 61000-4-11: 2004 + A1: 2017

Note

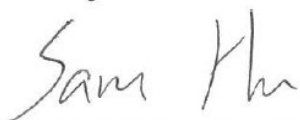
This test report can be used for CE and UKCA marking application which is based on equivalent requirements between UK and EU. It is appropriate using designated standards to provide presumption of conformity with GB law.

Statements of Conformity

Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:



Sam Hu
Assistant Manager

Reviewed by:



Eva Fan
Supervisor of report document dept.

2 TEST RESULT SUMMARY

EMISSION			
Standard	Item	Result	Remarks
EN 55011: 2016 + A11: 2020 (Group 1, Class A) BS EN 55011: 2016 + A11: 2020	Conducted	PASS	Meet Class A limit
	Radiated	PASS	Meet Class A limit
EN IEC 61000-3-2: 2019 BS EN IEC 61000-3-2: 2019	Harmonic current emissions	PASS	Meet Class A limit
EN 61000-3-3: 2013 + A1: 2019 BS EN 61000-3-3: 2013 + A1: 2019	Voltage fluctuations & flicker	PASS	Meets the requirements

IMMUNITY 【 EN IEC 61000-6-1: 2019 / BS EN IEC 61000-6-1: 2019 】			
Standard	Item	Result	Remarks
IEC 61000-4-2: 2008	ESD	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-3: 2006 + A1: 2007 + A2: 2010	RS	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4: 2012	EFT	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-5: 2014 + A1: 2017	Surge	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-6: 2013 + COR1: 2015	CS	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-8: 2009	PFMF	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-11: 2004 + A1: 2017	Voltage dips & voltage variations	PASS	Meets the requirements of Voltage Dips: 1) 0% residual Performance Criterion A 2) 70% residual Performance Criterion A Voltage Interruptions: 1) 0% residual Performance Criterion C

3 EUT DESCRIPTION

Product	UP 4000 Board; UP 4000 Edge
Brand Name	AAEON
Model	xUPxAPL03x (x - Where x may be any combination of alphanumeric characters or "-" or blank.); xUPxEDGEAPL03x (x - Where x may be any combination of alphanumeric characters or "-" or blank.)
Applicant	AAEON Technology Inc.
Housing material	UP 4000 Board: N/A UP 4000 Edge: Metal case
Received Date	June 30, 2022
EUT Power Rating	12VDC from Adaptor
AC Power During Test	230VAC / 50Hz to Adaptor
AC Adaptor Manufacturer	Powertron Electronic Corp.
AC Adaptor Model Number	PS1065-120IB500
AC Adaptor Power Rating	I/P: 100-240VAC~50-60Hz, 1.8A O/P: 12VDC, 5.0A 60W
DC Power Cable Type	Unshielded, 1.0m (Non-detachable, with two cores)

Model Differences

Model	Difference		Tested (Checked)
UP-APL03	EUT 1	UP 4000 Board	<input checked="" type="checkbox"/>
	EUT 2	Power Button Difference	<input checked="" type="checkbox"/>
UP-EDGE-APL03	EUT 1	UP 4000 Edge	<input checked="" type="checkbox"/>
	EUT 2	Power Button Difference	<input checked="" type="checkbox"/>
xUPxAPL03x; xUPxEDGEAPL03x	1. x - Where x may be any combination of alphanumeric characters or "-" or blank. 2. For marketing purpose only.		<input type="checkbox"/>

I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
1. HDMI Port	1	1
2. Earphone Port	1	1
3. Microphone Port	1	1
4. USB 3.0 Port	3	3
5. USB Type-C Port	1	1
6. LAN Port	1	1

Note: Client consigns only one model sample to test (Model Number: UP-APL03; UP-EDGE-APL03).

4 TEST METHODOLOGY**4.1. DECISION OF FINAL TEST MODE**

The EUT was tested together with the below additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The test configuration modes are as the following:

Conduction Modes:

1	EUT 1	HDMI 3840*2160, 30Hz
---	-------	----------------------

Radiation Modes:

1	EUT 1	HDMI 3840*2160, 30Hz
		HDMI 3840*2160, 30Hz / 1-6GHz
2	EUT 2	HDMI 3840*2160, 30Hz

Worst:

Conduction: Mode 1

Radiation: Mode 1

4.2. EUT SYSTEM OPERATION

1. Windows 10 boots system.
2. Run Burnintest.exe to activate all peripherals and display "H" pattern on monitor screen.
3. Run Lantest20.exe to ping 192.168.1.149 -t (EUT), ping 192.168.1.99 -t (Server PC).

Note: Test program is self-repeating throughout the test.

5 SETUP OF EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

EUT Devices:

No.	Equipment	Model No.	Brand Name
1	CPU (2.5GHz)	CPU.Apollo Lake.Pentium	Intel
2	Memory (2GB LPDDR4) *4	MT53D512M32D2DS-053	Micron
3	Power Adapter	PS1065-120IB500	Powertron
4	eMMC (64GB)	SDINBDA4-64G-V	Sandisk

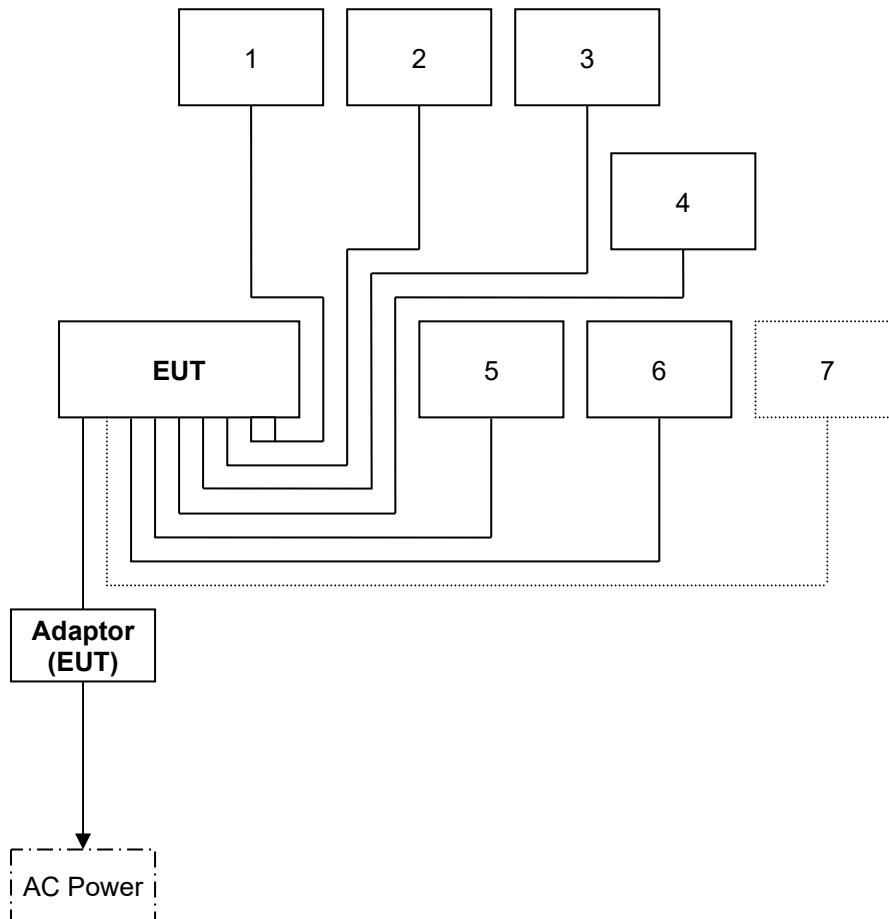
Peripherals Devices:

No.	Equipment	Model No.	Serial No.	FCC ID / BSMI ID	Brand Name	Data Cable	Power Cord
1	Earphone & Microphone	X710	N/A	N/A	HAWK	Unshielded, 1.8m	N/A
2	USB Mouse	M-U0026	N/A	BSMI: T41126	LOGITECH	Shielded, 1.8m	N/A
3	USB Keyboard	Y-U0011	1804SY04FP48	BSMI: D51160	LOGITECH	Shielded, 1.8m	N/A
4	USB HDD	SE730	110420099649	D33A23	ADATA	Shielded, 0.3m	N/A
5	USB HDD	TS1TSJ25MC	N/A	BSMI: D33193	Transcend	Shielded, 0.3m	N/A
6	Monitor	PA248Q	G5LMQS071288	BSMI: R31018	ASUS	Shielded, 1.8m	Unshielded, 1.8m
7	Server PC	T3610	57TT032	BSMI: R33002	DELL	Unshielded, 20m	Unshielded, 1.8m

Note:

- 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.

5.2. CONFIGURATION OF SYSTEM UNDER TEST



6 FACILITIES AND ACCREDITATIONS

6.1. FACILITIES

All measurement facilities used to collect the measurement data are located at CCSrf Taiwan Xindian Lab. at No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4 and CISPR 16-1-5.

6.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada Industry Canada
Japan VCCI
Taiwan BSMI
USA FCC

6.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Uncertainty
Conducted emissions	0.15MHz ~ 30MHz	± 2.8
Radiated emissions	30MHz ~ 1000MHz	± 5.1
	1000MHz ~ 6000MHz	± 4.6

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

Consistent with industry standard (e.g. CISPR 22: 2005, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.8dB(AMN); 5.2dB(OATS) and 5.5dB(1-6GHz) respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

7 EMISSION TEST

7.1. CONDUCTED EMISSION MEASUREMENT AT AC MAINS PORT

7.1.1. LIMITS

CLASS A

FREQUENCY (MHz)	Group 1 $\leq 20\text{kV}$		Group 1 $> 20\text{kV}$ / Group 2 $\leq 20\text{kV}$		Group 2 $> 20\text{kV}$	
	Quasi-peak (dBuV)	Average (dBuV)	Quasi-peak (dBuV)	Average (dBuV)	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.5	79	66	100	90	130	120
0.50 - 5.0	73	60	86	76	125	115
5.0 - 30.0	73	60	90 Decreasing linearly with logarithm of frequency to 73	80 60	115	105

Note: The lower limit shall apply at the transition frequencies. Care should be taken to comply with leakage current requirements.

CLASS B

FREQUENCY (MHz)	Group 1 & 2	
	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.5	66 Decreasing linearly with logarithm of frequency to 56	56 Decreasing linearly with logarithm of frequency to 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: The lower limit shall apply at the transition frequencies. Care should be taken to comply with leakage current requirements.

7.1.2. TEST INSTRUMENTS

Conducted Emission room # B				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Attenuator	MCL	HAT-10	SD-C012	03/21/2023
BNC Cable	EMEC	CFD300-NL	SD-C020	01/03/2023
EMI Test Receiver	R&S	ESR3	102166	03/27/2023
LISN	Schwarzbeck	NSLK 8127	8127382	04/05/2023
LISN(EUT)	Schwarzbeck	NSLK 8127	8127526	04/05/2023
Thermo-Hygro Meter	Wisewind	N/A	SD-S017	09/01/2022
Test S/W	EZ-EMC			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R = No Calibration Request.

7.1.3. TEST PROCEDURES

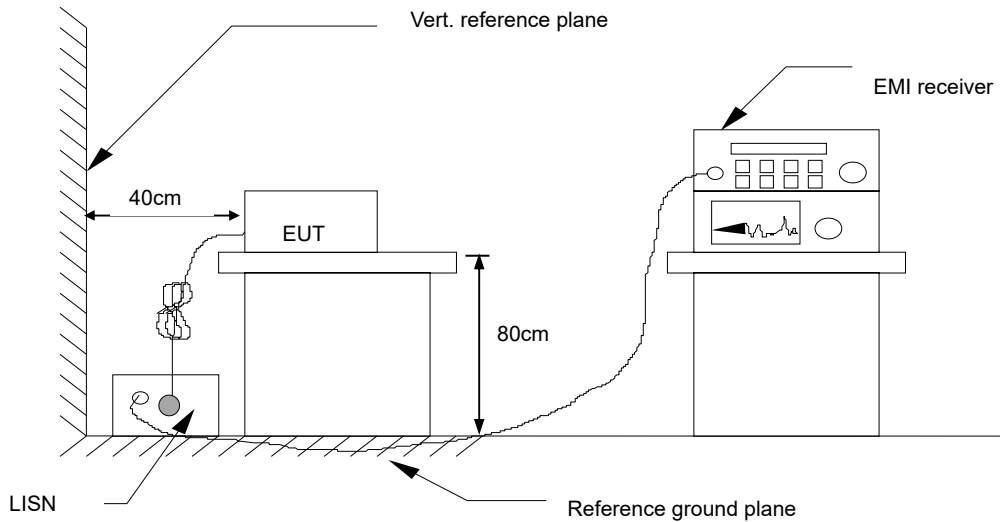
Procedure of Preliminary Test

- The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN 55011 / BS EN 55011 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 15 cm non-conductive covering to insulate the EUT from the ground plane.
- All I/O cables were positioned to simulate typical actual usage as per EN 55011 / BS EN 55011.
- The test equipment EUT installed received AC main power, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.
- All support equipment power received from a second LISN.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 4.1 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 4.1 producing the highest emission level.
- The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- The test data of the worst-case condition(s) was recorded.

7.1.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.1.5. DATA SAMPLE

Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
x.xx	42.95	0.55	43.50	73	-29.50	Q	L1

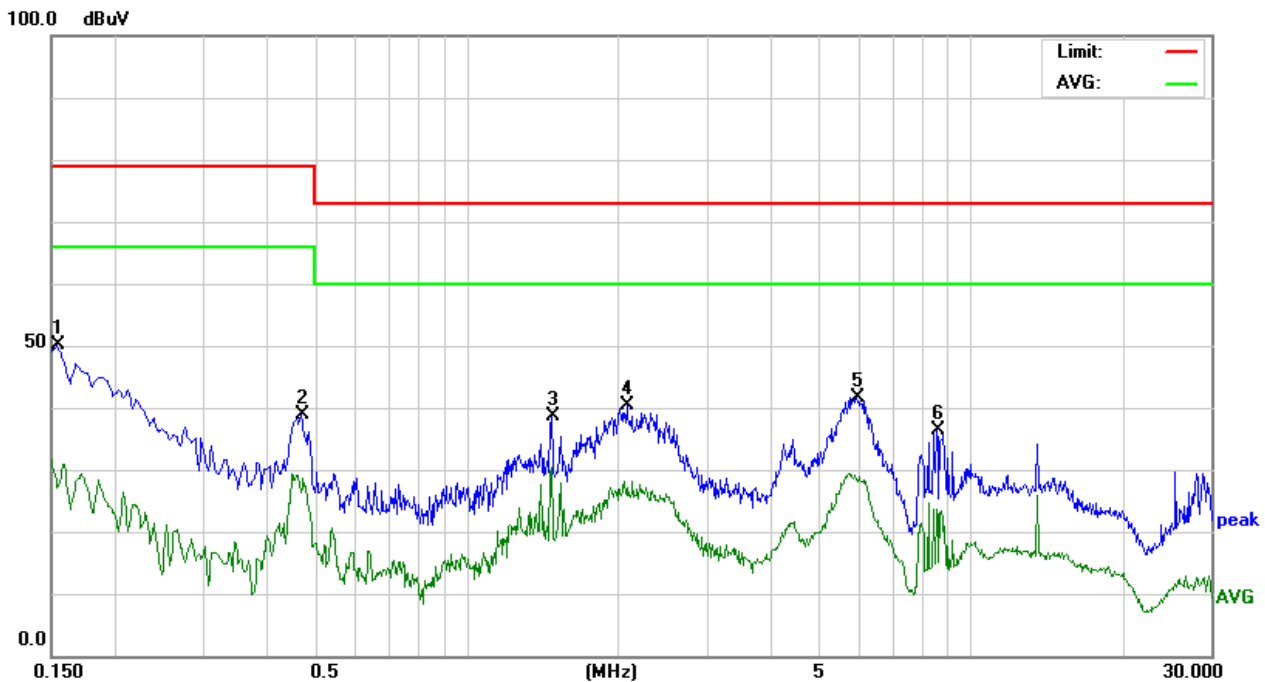
Freq. = Emission frequency in MHz
 Reading = Uncorrected Analyzer/Receiver reading
 Factor = Insertion loss of LISN + Cable Loss + Pulse Limit
 Result = Read Level + Factor
 Limit = Limit stated in standard
 Margin = Reading in reference to limit
 P = Peak Reading
 Q = Quasi-peak Reading
 A = Average Reading
 L1 = Hot side
 L2 = Neutral side

Calculation Formula

Margin (dB) = Result (dBuV) – Limit (dBuV)

7.1.6. TEST RESULTS

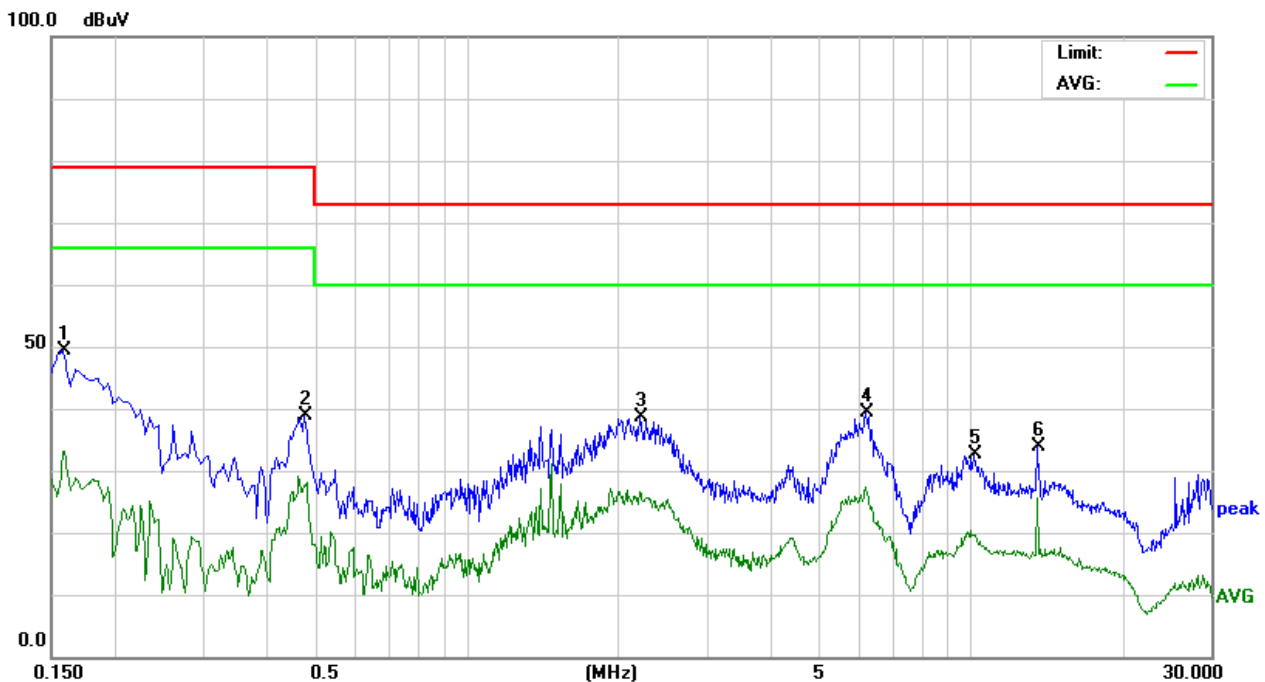
Model No.	UP-APL03; UP-EDGE-APL03	6dB Bandwidth	9 kHz
Environmental Conditions	23.9°C, 58% RH	Test Mode	Mode 1
Tested by	Alee Shen	Phase	L1
Standard	EN 55011 GROUP 1 CLASS A		



Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.1545	40.04	10.08	50.12	79.00	-28.88	P	L1
0.4695	28.73	10.11	38.84	79.00	-40.16	P	L1
1.4730	28.39	10.24	38.63	73.00	-34.37	P	L1
2.0805	30.14	10.29	40.43	73.00	-32.57	P	L1
5.9325	31.17	10.41	41.58	73.00	-31.42	P	L1
8.5875	26.02	10.46	36.48	73.00	-36.52	P	L1

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Model No.	UP-APL03; UP-EDGE-APL03	6dB Bandwidth	9 kHz
Environmental Conditions	23.9°C, 58% RH	Test Mode	Mode 1
Tested by	Alee Shen	Phase	L2
Standard	EN 55011 GROUP 1 CLASS A		



Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.1590	39.34	10.09	49.43	79.00	-29.57	P	L2
0.4785	28.65	10.13	38.78	79.00	-40.22	P	L2
2.2110	28.43	10.27	38.70	73.00	-34.30	P	L2
6.2025	28.89	10.38	39.27	73.00	-33.73	P	L2
10.1670	22.08	10.46	32.54	73.00	-40.46	P	L2
13.5645	23.22	10.56	33.78	73.00	-39.22	P	L2

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

7.2. RADIATED EMISSION MEASUREMENT

7.2.1. LIMITS

Below 1GHz

FREQUENCY (MHz)	Measured on a test site		
	Group 1, class A $\leq 20\text{kV}$	Group 1, class A $> 20\text{kV}$	Group 1, class B
	Quasi-peak (dBuV/m)	Quasi-peak (dBuV/m)	Quasi-peak (dBuV/m)
0.15 - 30	Under consideration	Under consideration	Under consideration
30 - 230	40	50	30
230 - 1000	47	57	37

Note: The lower limit shall apply at the transition frequencies.

Above 1GHz

Frequency (MHz)	Class A (dBuV/m) (At 3m)		Class B (dBuV/m) (At 3m)	
	Average	Peak	Average	Peak
1000 ~ 3000	56	76	50	70
3000 ~ 6000	60	80	54	74

Note: The lower limit shall apply at the transition frequencies.

According to EN 55032: 2015 + A11: 2020 / BS EN 55032: 2015 + A11: 2020 Table 1 the measurement frequency range shown in the following table:

Table 1 – Required highest frequency for radiated measurement

Highest internal frequency (F_x)	Highest internal frequency
$F_x \leq 108\text{ MHz}$	1 GHz
$108\text{ MHz} < F_x \leq 500\text{ MHz}$	2 GHz
$500\text{ MHz} < F_x \leq 1\text{ GHz}$	5 GHz
$F_x > 1\text{ GHz}$	$5 \times F_x$ up to a maximum of 6 GHz
NOTE 1 For FM and TV broadcast receivers, F_x is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.	
NOTE 2 F_x is defined in 3.1.19.	

Where F_x is unknown, the radiated emission measurements shall be performed up to 6 GHz.

7.2.2. TEST INSTRUMENTS

Open Area Test Site # H				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Bilog Antenna	Teseq	CBL 6112D	40529	09/22/2022
Cable	EMEC	CFD400E-LW	SD-R074	08/11/2022
EMI Test Receiver	R&S	ESCI	101340	02/10/2023
Pre-Amplifier	HP	8447D	1937A01554	09/23/2022
Thermo-Hygro Meter	Wisewind	201A	No. 03	05/17/2023
Test S/W	EZ-EMC			
Chamber # E (Above 1GHz Used)				
Horn Antenna	ETS	3117	00078732	10/24/2022
K-Type Cable x 1m (1-40GHz)	EMCI	EMC101G-KM-KM-1000	SD-R069	10/25/2022
Microflex Cable x 7m	EMCI	EMC106-SM-NM-7000	SD-R056	10/25/2022
Pre-Amplifier	HP	8449B	3008A01266	10/25/2022
Signal Analyzer	Agilent	N9010A	MY53440125	10/25/2022
Thermo-Hygro Meter	Wisewind	201A	SD-R046	08/09/2022
Test S/W	EZ-EMC			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R = No Calibration Request.

7.2.3. TEST PROCEDURE

Procedure of Preliminary Test

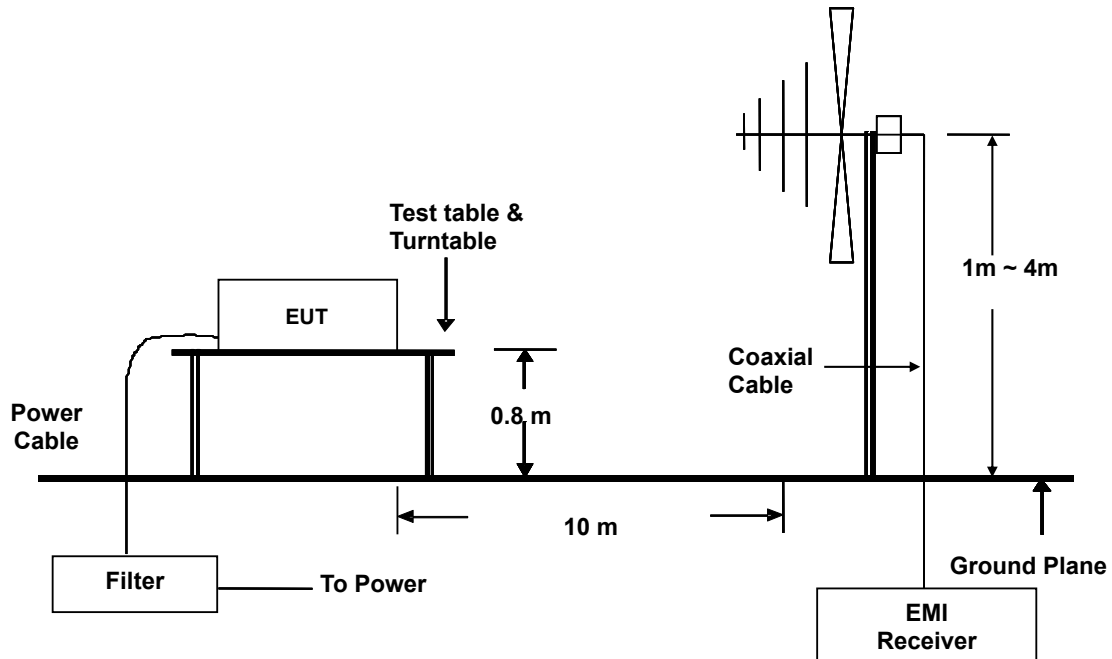
- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 15 cm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per EN 55011 / BS EN 55011.
- All I/O cables were positioned to simulate typical usage as per EN 55011 / BS EN 55011.
- The EUT received AC power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.
- The antenna was placed at 3 or 10 meter away from the EUT as stated in EN 55011 / BS EN 55011. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 6000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 4.1 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 4.1 producing the highest emission level.
- The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

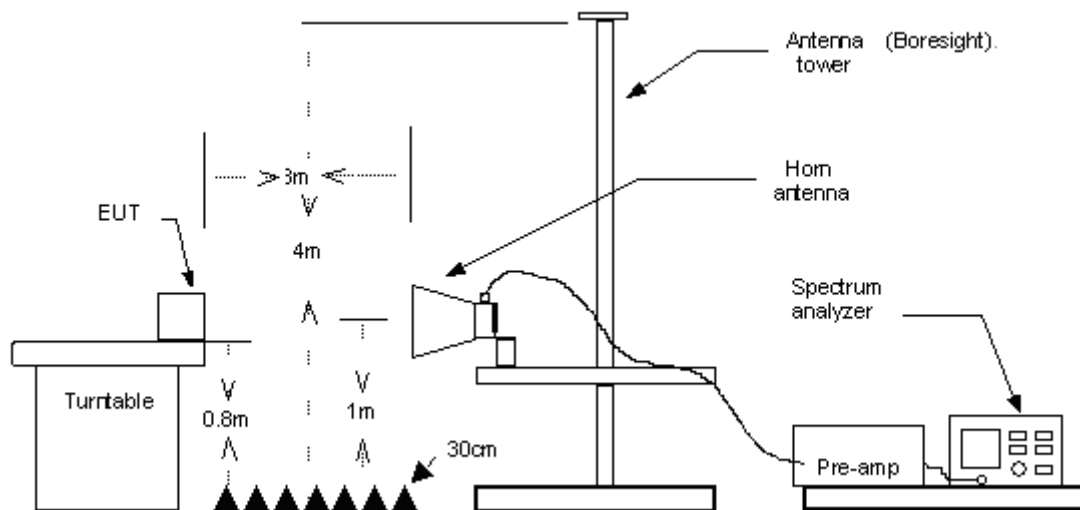
- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 6000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recording at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. Below 1GHz the Q.P. reading and above 1GHz the Peak and Average reading are presented.
- The test data of the worst-case condition(s) was recorded.

7.2.4. TEST SETUP

Below 1GHz



Above 1GHz



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.2.5. DATA SAMPLE**Below 1GHz**

Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/Q)	Pol. (H/V)
x.xx	14.0	12.2	26.2	40	-13.8	Q	H

Above 1GHz

Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
x.xx	42.95	0.55	43.50	60	-16.50	A	H

Freq. = Emission frequency in MHz
 Reading = Uncorrected Analyzer/Receiver reading
 Factor = Antenna Factor + Cable Loss - Amplifier Gain
 Result = Reading + Factor
 Limit = Limit stated in standard
 Margin = Reading in reference to limit
 P = Peak Reading
 Q = Quasi-peak Reading
 A = Average Reading
 H = Antenna Polarization: Horizontal
 V = Antenna Polarization: Vertical

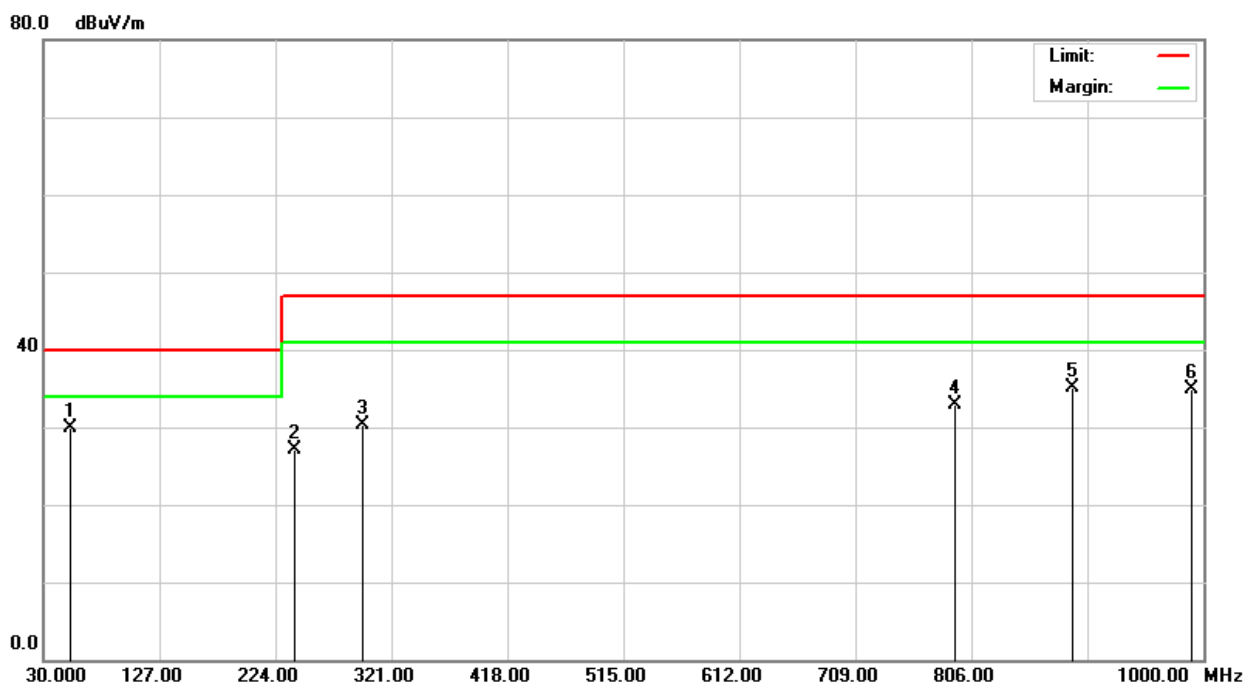
Calculation Formula

Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)

7.2.6. TEST RESULTS

Below 1GHz

Model No.	UP-APL03; UP-EDGE-APL03	Test Mode	Mode 1
Environmental Conditions	31°C, 58% RH	6dB Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Alee Shen
Standard	EN 55011 GROUP 1 CLASS A		



Radiated Emission Readings									
Frequency Range Investigated					30 MHz to 1000 MHz at 10m				
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
52.1800	43.60	-13.62	29.98	40.00	-10.02	100	15	Q	V
240.0200	35.20	-8.19	27.01	47.00	-19.99	100	232	Q	V
297.4400	36.40	-6.09	30.31	47.00	-16.69	100	120	Q	V
792.1800	29.90	2.94	32.84	47.00	-14.16	400	154	Q	V
890.2620	31.20	3.96	35.16	47.00	-11.84	400	229	Q	V
990.2410	30.00	4.95	34.95	47.00	-12.05	400	227	Q	V

Note: 1. P= Peak Reading; Q= Quasi-peak Reading.

Model No.	UP-APL03; UP-EDGE-APL03	Test Mode	Mode 1
Environmental Conditions	31°C, 58% RH	6dB Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Alee Shen
Standard	EN 55011 GROUP 1 CLASS A		



Radiated Emission Readings									
Frequency Range Investigated					30 MHz to 1000 MHz at 10m				
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
35.0090	34.10	-4.91	29.19	40.00	-10.81	400	116	Q	H
56.1320	38.50	-14.43	24.07	40.00	-15.93	400	239	Q	H
297.1419	38.60	-6.09	32.51	47.00	-14.49	400	258	Q	H
890.3390	28.10	3.97	32.07	47.00	-14.93	100	163	Q	H
950.0100	28.20	4.54	32.74	47.00	-14.26	100	205	Q	H
990.2850	27.60	4.95	32.55	47.00	-14.45	100	118	Q	H

Note: 1. P= Peak Reading; Q= Quasi-peak Reading.

Above 1GHz

Model No.	UP-APL03; UP-EDGE-APL03	Test Mode	Mode 1
Environmental Conditions	25.6°C, 62% RH	6dB Bandwidth	1 MHz
Antenna Pole	Vertical / Horizontal	Antenna Distance	3m
Highest frequency generated or used	2500MHz	Upper frequency	6000MHz
Detector Function	Peak and average.	Tested by	Alee Shen
Standard	Above 1GHz test is Applicable EN 55032 standard.		

Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
1045.000	56.07	-8.17	47.90	76.00	-28.10	P	V
1480.000	59.14	-8.68	50.46	76.00	-25.54	P	V
1780.000	55.21	-6.11	49.10	76.00	-26.90	P	V
1975.000	51.14	-4.64	46.50	76.00	-29.50	P	V
2075.000	50.76	-5.09	45.67	76.00	-30.33	P	V
2500.000	50.05	-4.03	46.02	76.00	-29.98	P	V

Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
1420.000	52.44	-8.17	44.27	76.00	-31.73	P	H
1580.000	56.51	-8.45	48.06	76.00	-27.94	P	H
1780.000	52.52	-6.11	46.41	76.00	-29.59	P	H
2075.000	47.60	-5.09	42.51	76.00	-33.49	P	H
2400.000	49.58	-4.22	45.36	76.00	-30.64	P	H
2570.000	48.19	-4.05	44.14	76.00	-31.86	P	H

Note: 1. P= Peak Reading; A= Average Reading.

7.3. HARMONICS CURRENT MEASUREMENT

7.3.1. LIMITS OF HARMONICS CURRENT MEASUREMENT

Limits for Class A equipment		Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15<=n<=39	0.15x15/n	15<=n<=39	3.85/n	0.15x15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23x8/n			

NOTE: 1. Class A and Class D are classified according to item 7.3.3.
2. According to section 7 of EN IEC 61000-3-2 / BS EN IEC 61000-3-2 the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

7.3.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
5kVA Power Source	Teseq	NSG 1007-5	1537A01296	03/10/2023
Signal Conditioning Unit	Teseq	NSG 1000-1	1846A01831	03/10/2023
Software	WIN2100V4 Ver. 4.22			

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

7.3.3. TEST PROCEDURE

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- The classification of EUT is according to section 5 of EN IEC 61000-3-2 / BS EN IEC 61000-3-2.

- The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

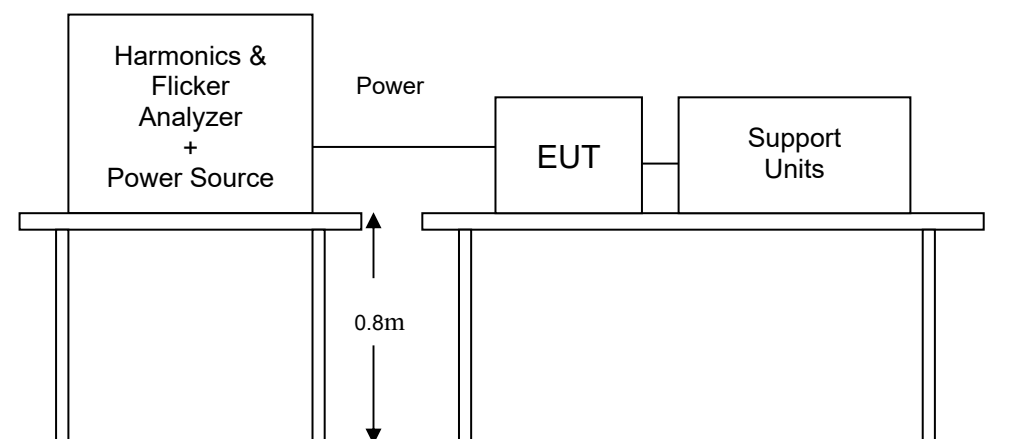
Class B: Portable tools; Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors; television receivers and refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).

- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

7.3.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

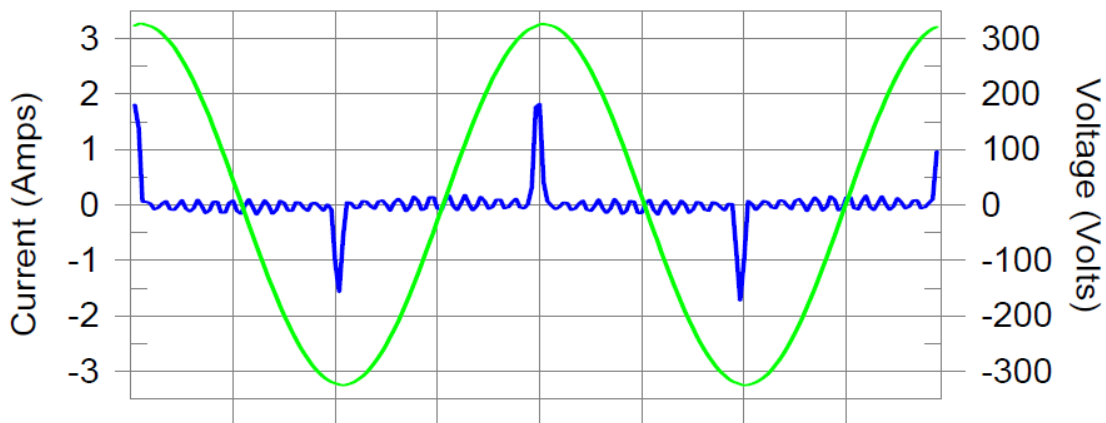
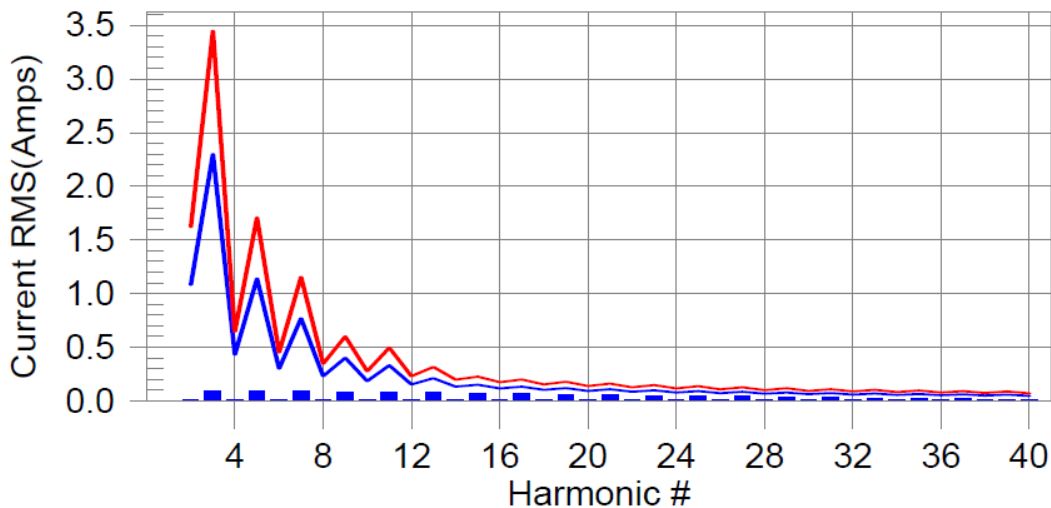
7.3.5. TEST RESULTS

Power Consumption	23.0W	Test Results	PASS
Environmental Conditions	24°C, 54% RH, 1010mbar	Limits	Class <input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Test Mode	Operating	Tested by	Alee Shen

NOTE: Limits classified according to item 7.3.1.

Test result of EN IEC 61000-3-2

Test Result: Pass Source qualification: Normal

Current & voltage waveformsHarmonics and Class A limit lineEuropean LimitsTest result: Pass Worst harmonics H21-38.2% of 150% limit, H21-52% of 100% limit

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Test Result: Pass Source qualification: Normal
 THC(A): 0.265 I-THD(%): 251.7 POHC(A): 0.113 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts):	229.82	Frequency(Hz):	50.00
I_Peak (Amps):	2.077	I_RMS (Amps):	0.334
I_Fund (Amps):	0.105	Crest Factor:	7.311
Power (Watts):	23.0	Power Factor:	0.315

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.012	1.080	1.1	0.013	1.620	0.8	Pass
3	0.089	2.300	3.9	0.100	3.450	2.9	Pass
4	0.012	0.430	2.7	0.013	0.645	2.1	Pass
5	0.087	1.140	7.7	0.098	1.710	5.7	Pass
6	0.012	0.300	4.0	0.014	0.450	3.0	Pass
7	0.085	0.770	11.1	0.095	1.155	8.3	Pass
8	0.012	0.230	5.4	0.014	0.345	4.0	Pass
9	0.082	0.400	20.6	0.092	0.600	15.3	Pass
10	0.013	0.184	7.0	0.014	0.276	5.2	Pass
11	0.079	0.330	23.9	0.088	0.495	17.8	Pass
12	0.013	0.153	8.6	0.015	0.230	6.4	Pass
13	0.075	0.210	35.8	0.084	0.315	26.5	Pass
14	0.014	0.131	10.3	0.015	0.197	7.6	Pass
15	0.071	0.150	47.1	0.079	0.225	34.9	Pass
16	0.014	0.115	11.9	0.015	0.173	8.8	Pass
17	0.066	0.132	50.0	0.073	0.198	37.0	Pass
18	0.014	0.102	13.4	0.015	0.153	10.0	Pass
19	0.061	0.118	51.5	0.067	0.178	37.9	Pass
20	0.014	0.092	14.8	0.015	0.138	11.0	Pass
21	0.056	0.107	52.0	0.061	0.161	38.2	Pass
22	0.013	0.084	15.9	0.015	0.125	11.8	Pass
23	0.050	0.098	51.5	0.055	0.147	37.7	Pass
24	0.013	0.077	16.7	0.014	0.115	12.5	Pass
25	0.045	0.090	50.0	0.049	0.135	36.4	Pass
26	0.012	0.071	17.2	0.014	0.107	12.9	Pass
27	0.040	0.083	47.7	0.043	0.125	34.6	Pass
28	0.012	0.066	17.4	0.013	0.099	13.2	Pass
29	0.035	0.078	44.5	0.037	0.116	32.1	Pass
30	0.011	0.061	17.3	0.012	0.092	13.2	Pass
31	0.030	0.073	40.7	0.032	0.109	29.2	Pass
32	0.010	0.058	16.8	0.011	0.086	12.8	Pass
33	0.025	0.068	36.5	0.027	0.102	26.0	Pass
34	0.009	0.054	15.9	0.010	0.081	12.3	Pass
35	0.020	0.064	31.9	0.022	0.096	22.6	Pass
36	0.007	0.051	14.6	0.009	0.077	11.4	Pass
37	0.016	0.061	27.1	0.017	0.091	19.1	Pass
38	0.006	0.048	13.1	0.008	0.073	10.3	Pass
39	0.013	0.058	22.2	0.013	0.087	15.4	Pass
40	0.005	0.046	11.4	0.006	0.069	9.1	Pass

Test Result: Pass Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	229.82	Frequency(Hz):	50.00
I_Peak (Amps):	2.077	I_RMS (Amps):	0.334
I_Fund (Amps):	0.105	Crest Factor:	7.311
Power (Watts):	23.0	Power Factor:	0.315

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.029	0.460	6.28	OK
3	0.292	2.068	14.13	OK
4	0.021	0.460	4.51	OK
5	0.083	0.919	9.08	OK
6	0.029	0.460	6.24	OK
7	0.039	0.689	5.60	OK
8	0.007	0.460	1.54	OK
9	0.045	0.460	9.84	OK
10	0.013	0.460	2.74	OK
11	0.043	0.230	18.58	OK
12	0.020	0.230	8.62	OK
13	0.046	0.230	19.87	OK
14	0.009	0.230	3.78	OK
15	0.040	0.230	17.43	OK
16	0.008	0.230	3.60	OK
17	0.048	0.230	21.05	OK
18	0.019	0.230	8.24	OK
19	0.052	0.230	22.45	OK
20	0.031	0.230	13.30	OK
21	0.055	0.230	23.92	OK
22	0.015	0.230	6.33	OK
23	0.053	0.230	22.98	OK
24	0.015	0.230	6.55	OK
25	0.050	0.230	21.82	OK
26	0.015	0.230	6.33	OK
27	0.041	0.230	17.94	OK
28	0.015	0.230	6.63	OK
29	0.046	0.230	20.07	OK
30	0.015	0.230	6.61	OK
31	0.039	0.230	17.02	OK
32	0.015	0.230	6.40	OK
33	0.036	0.230	15.61	OK
34	0.014	0.230	5.89	OK
35	0.032	0.230	13.74	OK
36	0.013	0.230	5.68	OK
37	0.027	0.230	11.80	OK
38	0.012	0.230	5.11	OK
39	0.023	0.230	10.07	OK
40	0.021	0.230	9.18	OK

7.4. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

7.4.1. LIMITS OF VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

TEST ITEM	LIMIT	REMARK
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that dt exceeds 3 %.
d_{max} (%)	4%	d_{max} means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

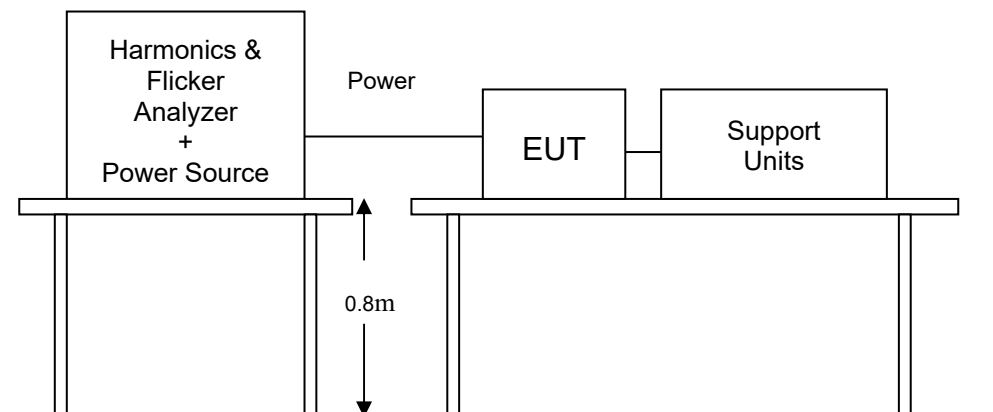
7.4.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
5kVA Power Source	Teseq	NSG 1007-5	1537A01296	03/10/2023
Signal Conditioning Unit	Teseq	NSG 1000-1	1846A01831	03/10/2023
Software	WIN2100V4 Ver. 4.22			

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

7.4.3. 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 operating conditions.
- During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT 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.

7.4.4. TEST SETUP

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7.4.5. TEST RESULTS

Observation Period (Tp)	10mins	Test Mode	Operating
Environmental Conditions	24°C, 54% RH, 1010mbar	Tested by	Alee Shen

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	REMARK
P _{st}	0.064	1.0	PASS
P _{lt}	0.028	0.65	PASS
T _{dt} (ms)	0	500	PASS
d _{max} (%)	0	4%	PASS
dc (%)	0	3.3%	PASS

NOTE: None.



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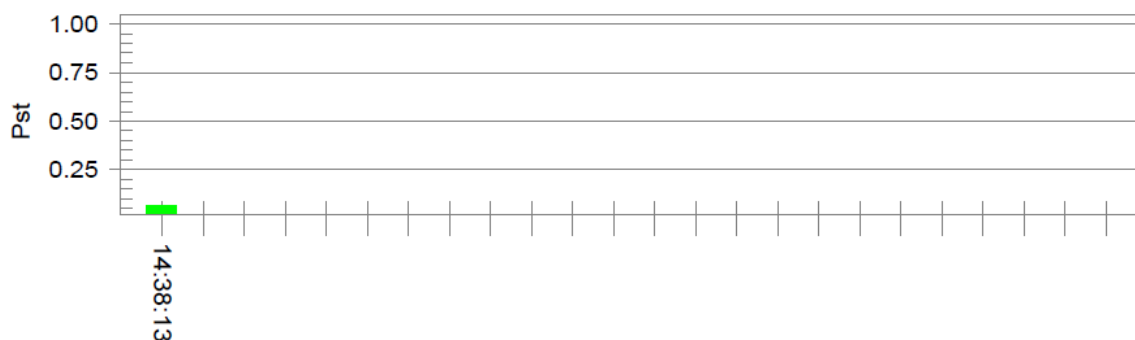
Test result of EN 61000-3-3

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): 229.77

Highest dt (%):

T-max (mS): 0

Highest dc (%): 0.00

Highest dmax (%): 0.00

Highest Pst (10 min. period): 0.064

Highest Plt (2 hr. period): 0.028

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

8 IMMUNITY TEST

8.1. GENERAL DESCRIPTION

Product Standard	EN IEC 61000-6-1: 2019 / BS EN IEC 61000-6-1: 2019	
	Test Type	Minimum Requirement
Basic Standard, Specification, and Performance Criterion required	IEC 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80 ~1000 MHz, 3V/m, 80% AM (1kHz) 1400 ~ 6000 MHz, 3V/m, 80% AM (1kHz) Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, AC Power Port: 1kV DC Power Port: 0.5kV Signal Port: 0.5kV Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 μ s Open Circuit Voltage, 8 /20 μ s Short Circuit Current, AC Power Port ~ line to line: 1kV, line to earth: 2kV DC Power Port ~ line to line: 0.5kV, line to earth: 1kV Signal port ~ line to earth: 1kV Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: AC Power Port, DC Power Port, Signal Port: 0.15~80MHz, 3Vrms, 80% AM, 1kHz Performance Criterion A
	IEC 61000-4-8	Power frequency magnetic field immunity test 50/60Hz, 3A/m Performance Criterion A
	IEC 61000-4-11	Voltage Dips: i) 0% residual for 0.5 Cycle at 50Hz 0% residual for 1 Cycle at 50Hz Performance Criterion B ii) 70% residual for 25/30 Cycles at 50/60Hz Performance Criterion C Voltage Interruptions: 0% residual for 250/300 Cycles at 50/60Hz Performance Criterion C

8.2. GENERAL PERFORMANCE CRITERIA DESCRIPTION

Criteria A:	The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus 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, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criteria B:	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.
Criteria C:	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

8.3. ELECTROSTATIC DISCHARGE (ESD)

8.3.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: 2 ; 4 ; 8 kV (Direct) Contact Discharge: 2 ; 4 kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point
Discharge Mode:	Single Discharge 1 second minimum

8.3.2. TEST INSTRUMENT

IMMUNITY SHIELDED ROOM				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Aneroid Barometer	SATO	7610-20	89090	08/12/2022
ESD Simulator	Teseq	NSG 438	1581	12/08/2022
Thermo-Hygro Meter	Wisewind	201A	SD-S041	01/04/2023

NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

8.3.3. TEST PROCEDURE

The discharges shall be applied in two ways:

a) Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 20 discharges, 10 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 10 indirect discharges to the center of the front edge of the Horizontal Coupling Plane (HCP). The remaining three test points shall each receive at least 10 direct contact discharges. If no direct contact test points are available, then at least 20 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

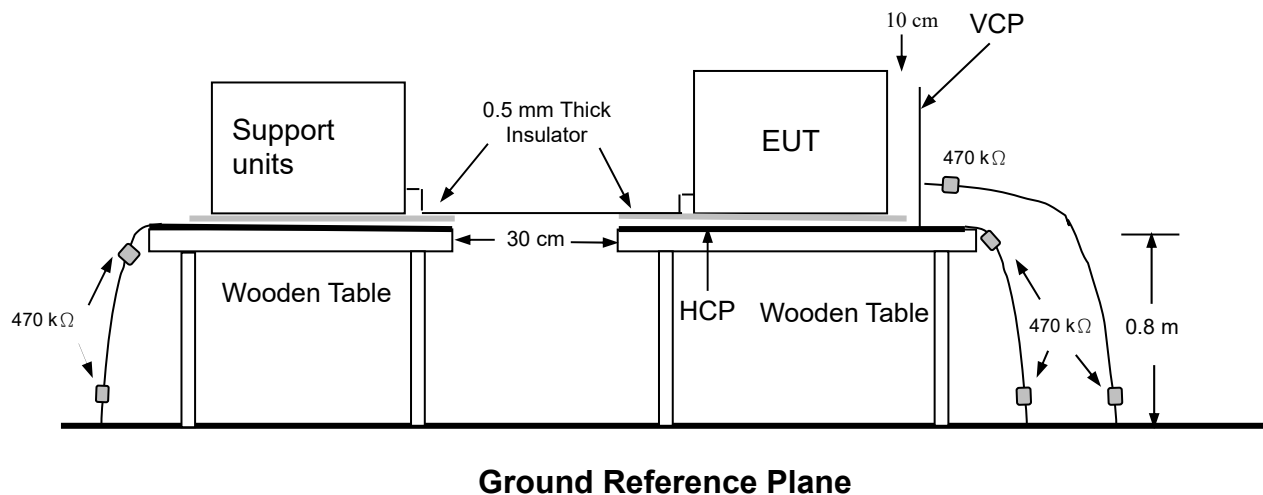
b) Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

The basic test procedure was in accordance with IEC 61000-4-2:

- a) The EUT was located 0.1 m minimum from all side of the HCP (dimensions 1.6m x 0.8m).
- b) The support units were located another table 30 cm away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10 cm with EUT.
- c) The time interval between two successive single discharges was at least 1 second.
- d) Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- e) Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- f) At least ten single discharges (in the most sensitive polarity) were applied at the front edge of each HCP opposite the center point of each unit of the EUT and 0.1 meters from the front of the EUT. The long axis of the discharge electrode was in the plane of the HCP and perpendicular to its front edge during the discharge.
- 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 (VCP) in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

8.3.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k ohm total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

8.3.5. TEST RESULTS

EUT 1

Temperature	20°C	Humidity	49% RH
Pressure	1010mbar	Tested By	Alee Shen
Required Passing Performance		Criterion B	

Air Discharge							
Test Points	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2

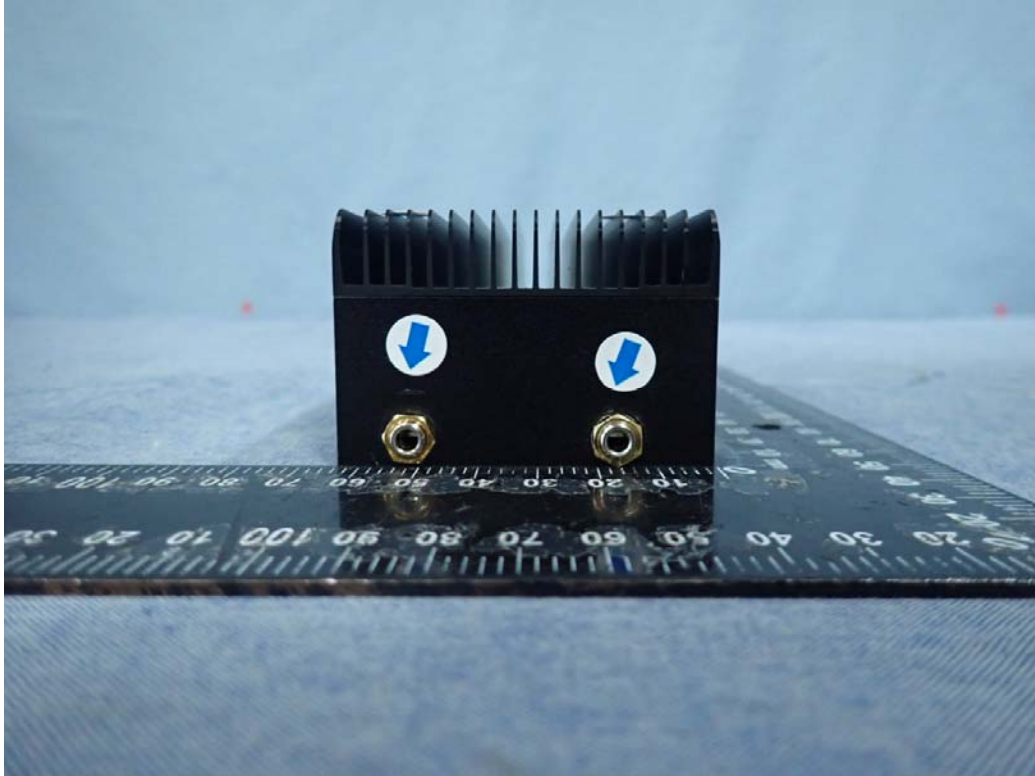
Contact Discharge							
Test Points	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Top	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Bottom	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2

Discharge To Horizontal Coupling Plane							
Side of EUT	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2

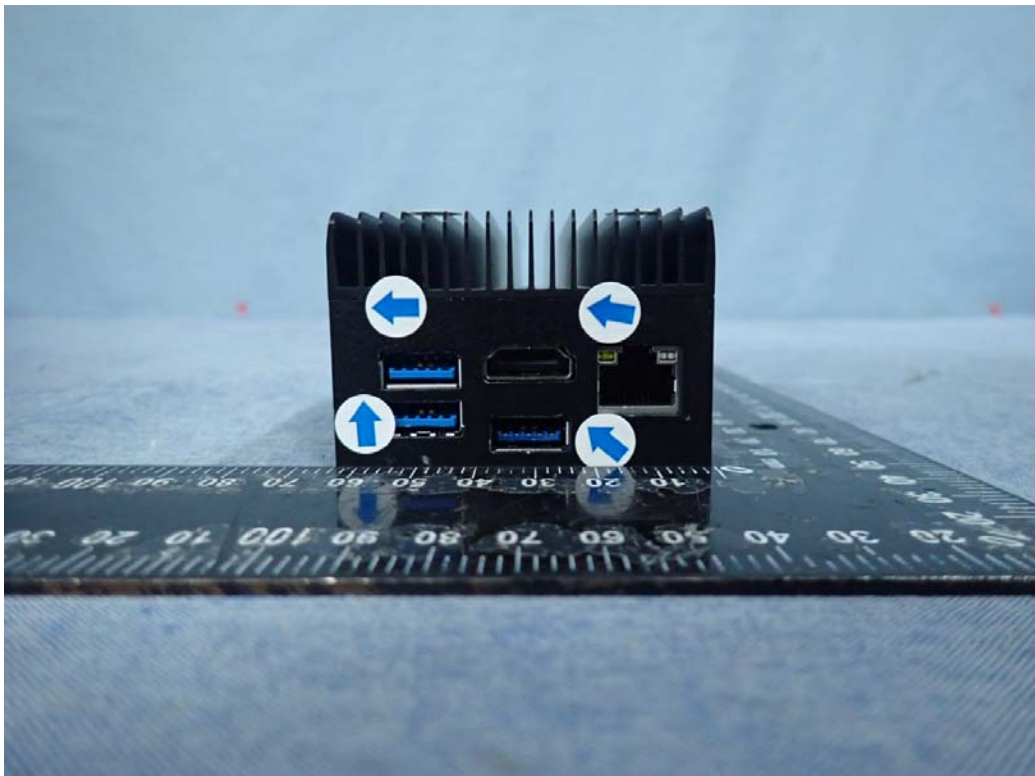
Discharge To Vertical Coupling Plane							
Side of EUT	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2

NOTE: 1. There was no change compared with initial operation during the test.

The Photo for Discharge Points of EUT Front

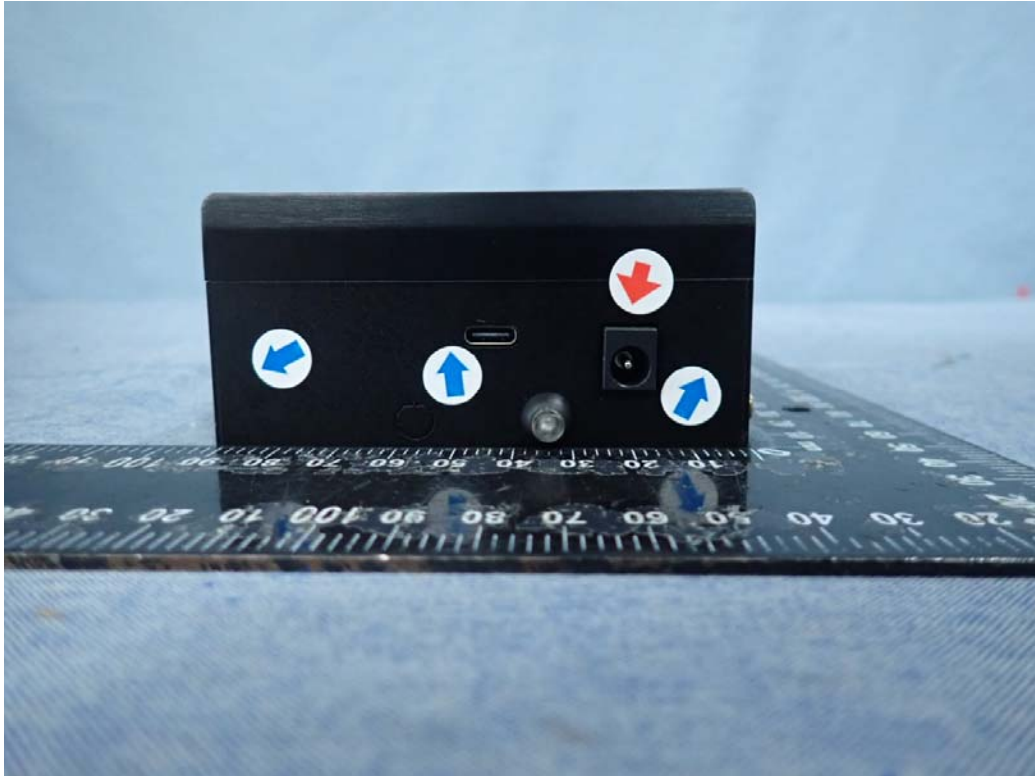


Back

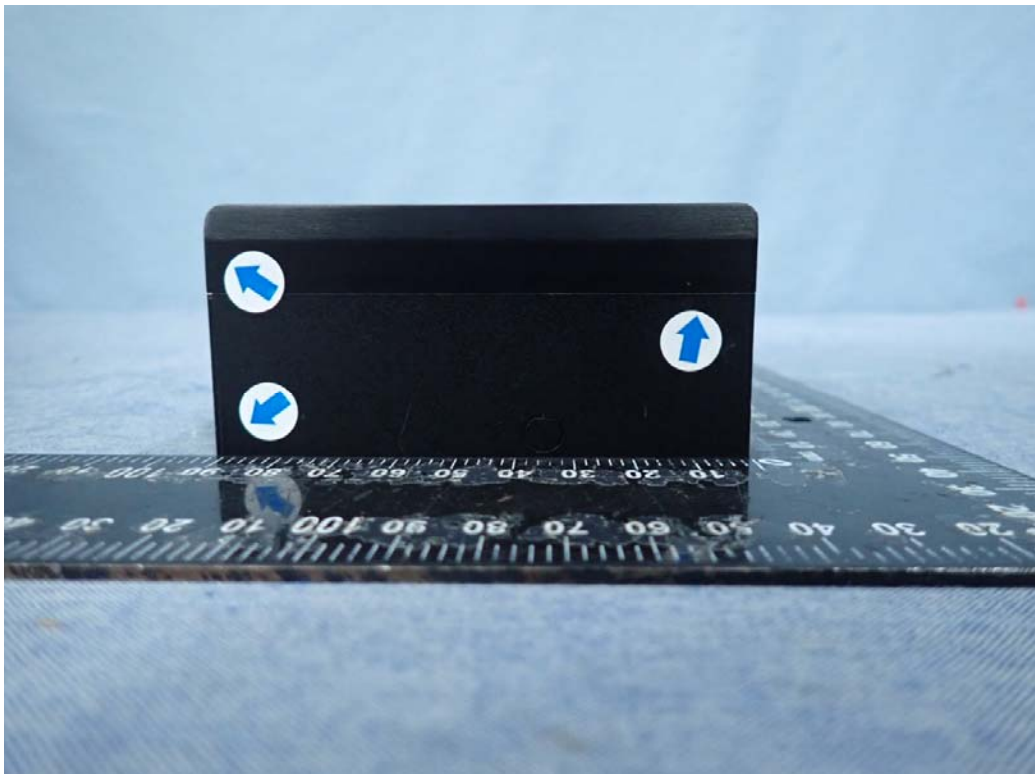


Red Dot —Air Discharged
Blue Dot —Contact Discharged

Left

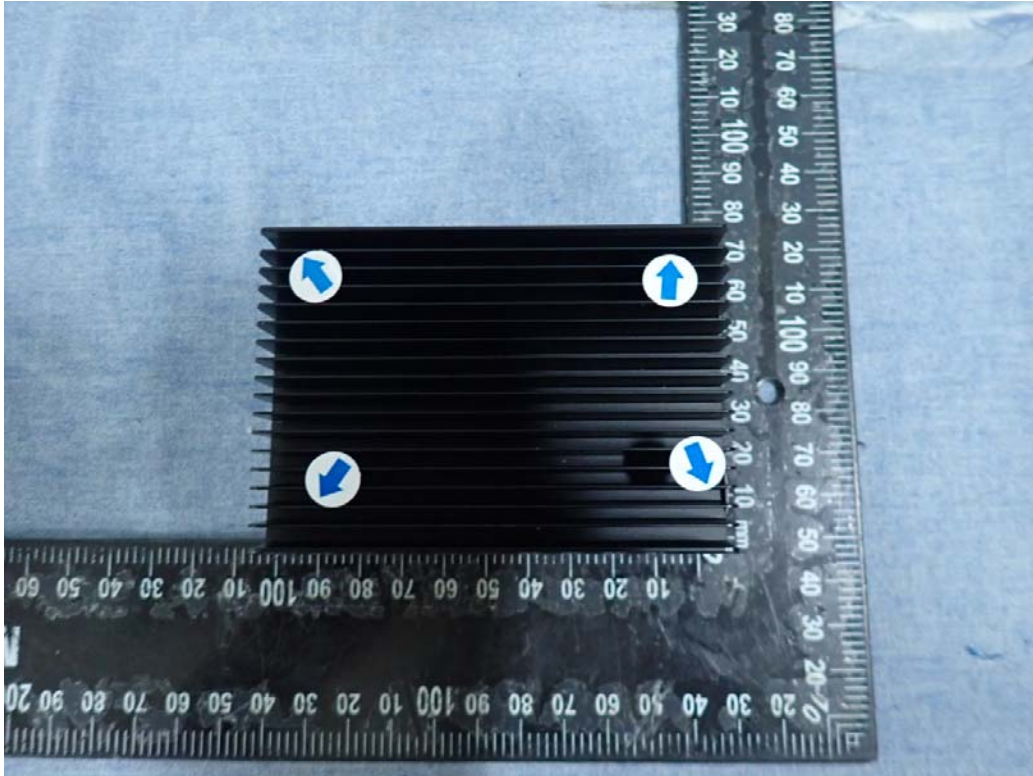


Right

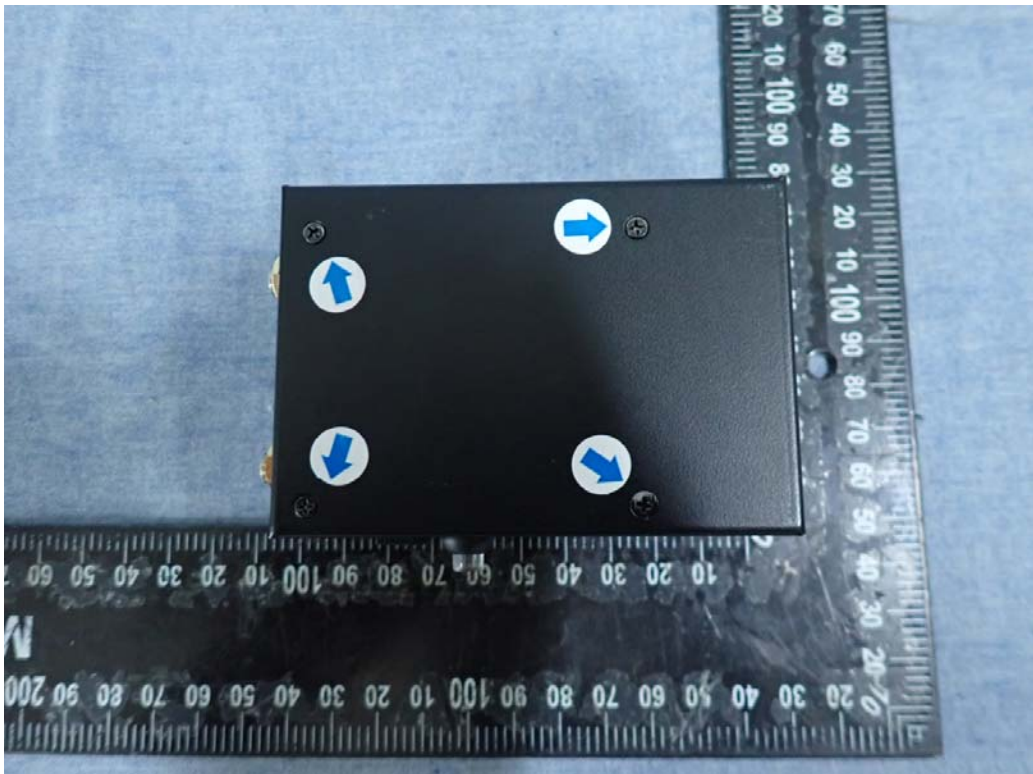


Red Dot —Air Discharged
Blue Dot —Contact Discharged

Top



Bottom



Red Dot —Air Discharged
Blue Dot —Contact Discharged

EUT 2

Temperature	23.6°C	Humidity	48% RH
Pressure	1006mbar	Tested By	Angus Chen
Required Passing Performance		Criterion B	

Air Discharge							
Test Points	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2

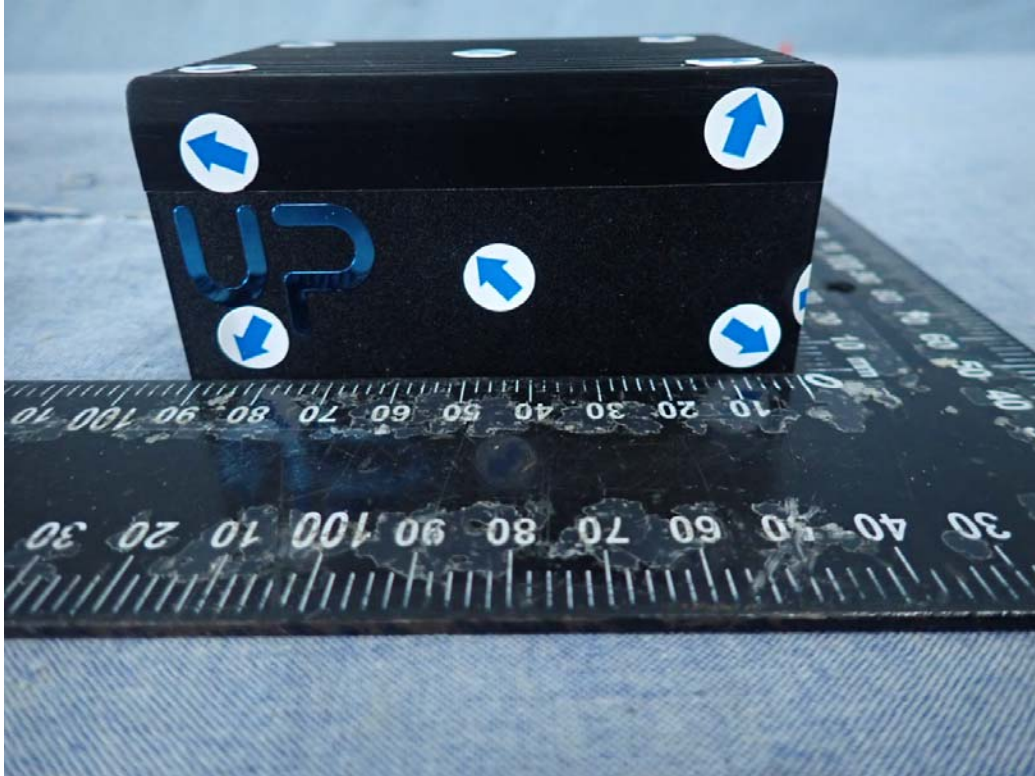
Contact Discharge							
Test Points	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Top	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Bottom	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2

Discharge To Horizontal Coupling Plane							
Side of EUT	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2

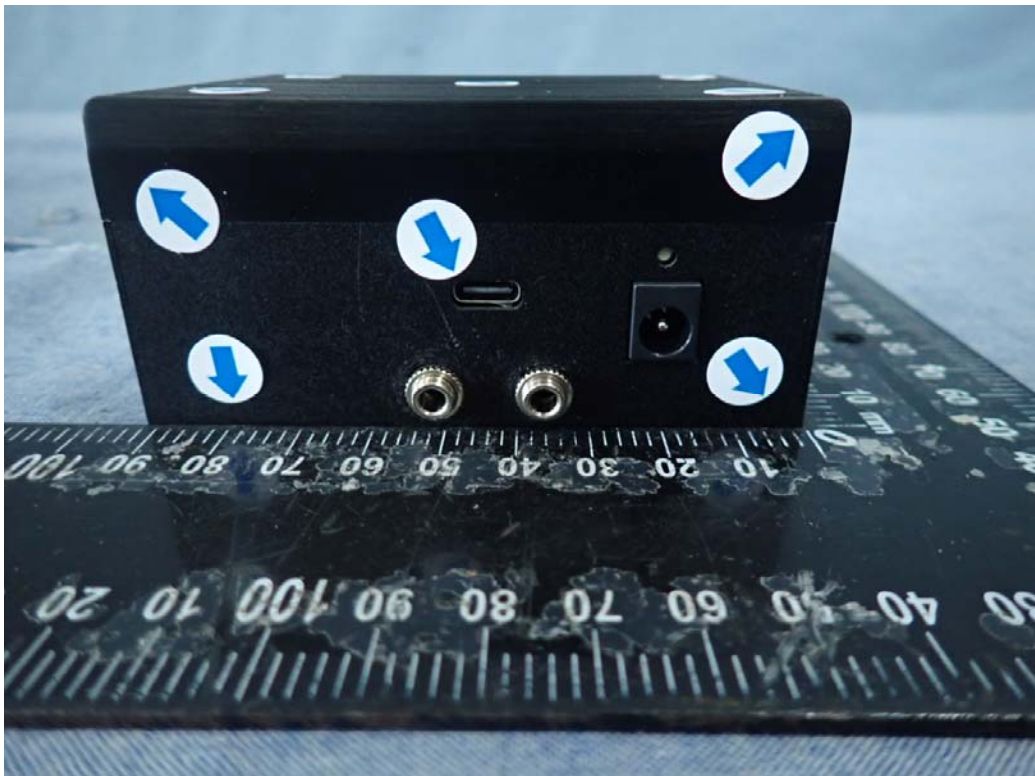
Discharge To Vertical Coupling Plane							
Side of EUT	Test Levels			Results			
	± 2 kV	± 4 kV	± 8 kV	Pass	Fail	Performance Criterion	Observation
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2

NOTE: 1. There was no change compared with initial operation during the test.
2. No discharge point.

The Photo for Discharge Points of EUT Front

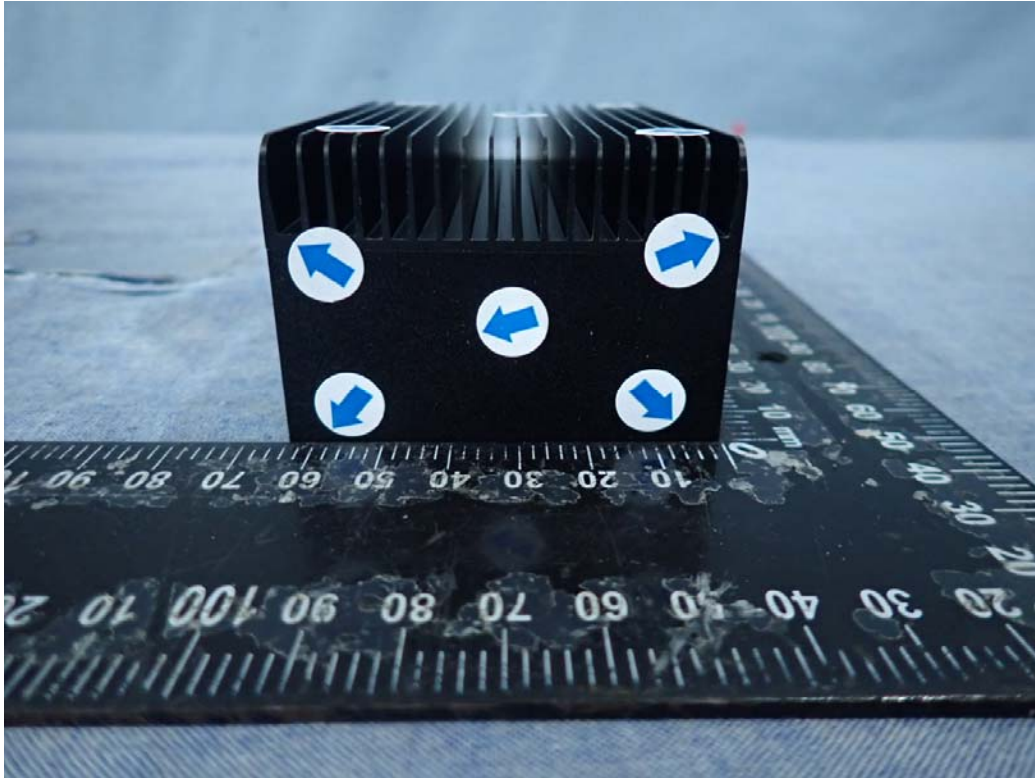


Back



Red Dot —Air Discharged
Blue Dot —Contact Discharged

Left

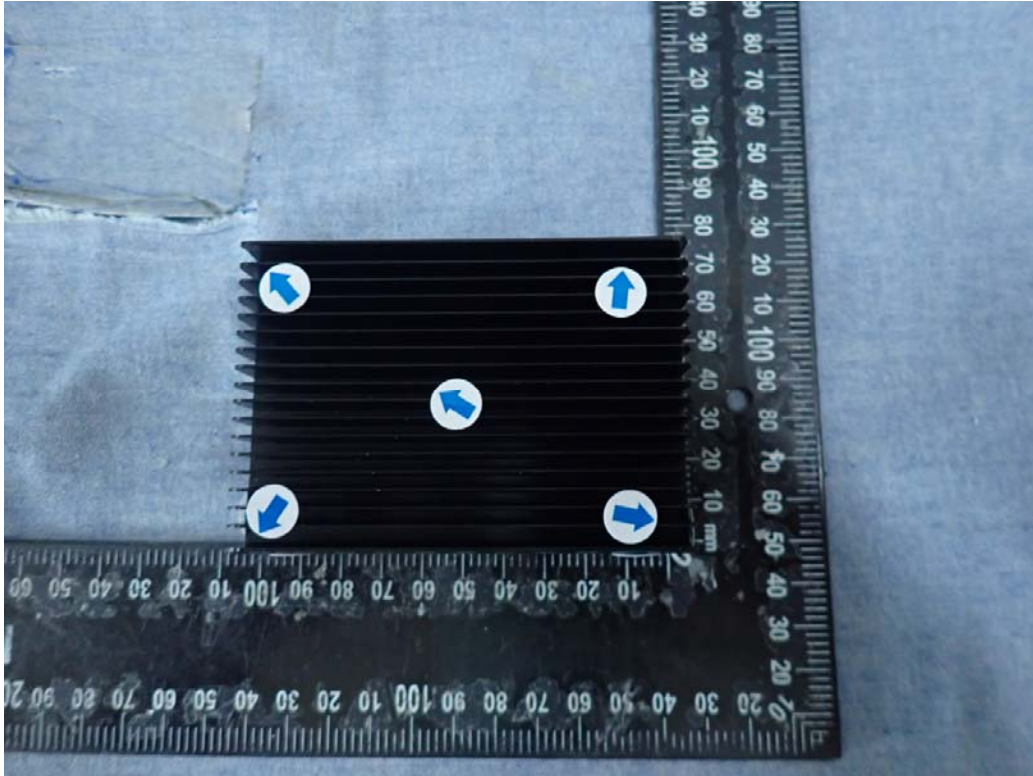


Right

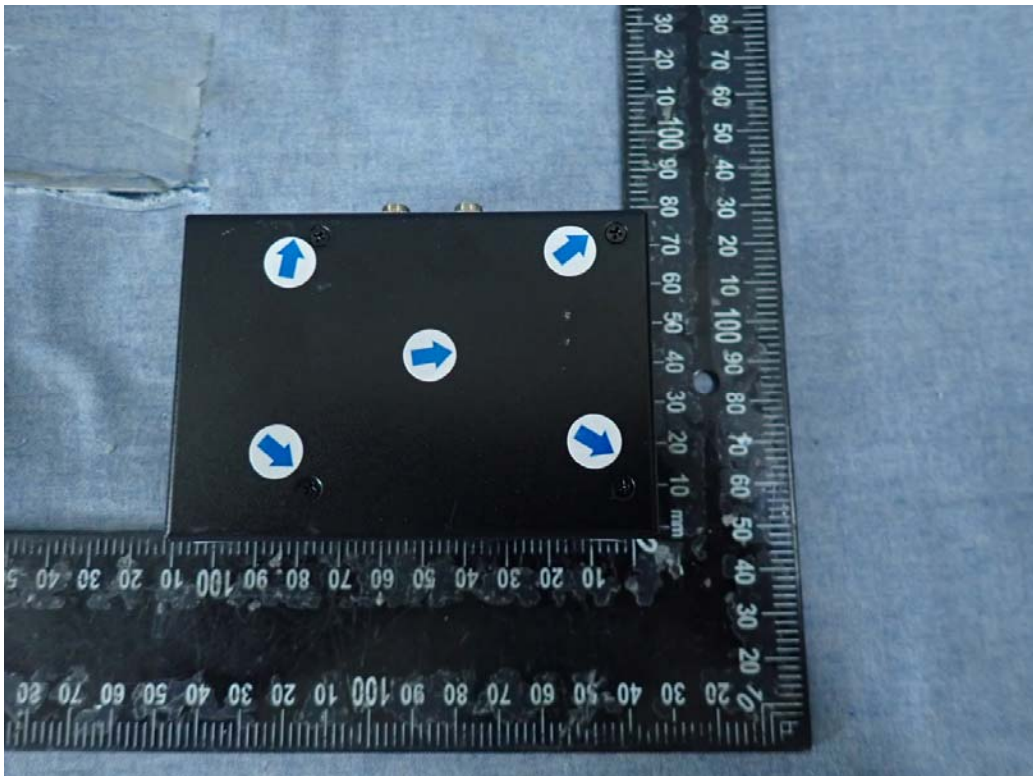


Red Dot —Air Discharged
Blue Dot —Contact Discharged

Top



Bottom



Red Dot —Air Discharged
Blue Dot —Contact Discharged

8.4. RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD (RS)**8.4.1. TEST SPECIFICATION**

Basic Standard:	IEC 61000-4-3
Frequency Range:	80 MHz ~ 1000 MHz, 1400 MHz ~ 6000 MHz
Field Strength:	3V/m, 3V/m
Modulation:	1kHz sine Wave, 80%, AM Modulation.
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5m

8.4.2. TEST INSTRUMENT

844 RS Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Electric Field Probe	AR	FL7006	0356656	10/15/2022
Field of Calibration	CCS	Chamber#RS	80-1000MHz	02/24/2023
RF Power Meter	Boonton	4242	17419	03/06/2023
Power Sensor	Boonton	51011A-EMC	36833	03/06/2023
Power Sensor	Boonton	51011A-EMC	36834	03/06/2023
Thermo-Hygro Meter	Wisewind	N/A	SD-S019	10/04/2022
Broadband Antenna	Schwarzbeck	VUSLP 9111E	D-69250	N.C.R
Power Amplifier	Milmega	80RF1000-600	1079361	N.C.R
Signal Generator	Agilent	N5181A	MY47421336	09/13/2022
Field of Calibration	CCS	Chamber#RS	1000-6000M	02/22/2023
Direction Coupler	AR	DC7144A	306217	N.C.R
Microwave Antenna	Schwarzbeck	STLP 9149	767	N.C.R
Power Amplifier	AR	60S1G3	302728	N.C.R
Power Amplifier	Milmega	AS1860-100	1075832	N.C.R
Power Amplifier	Teseq	CBA6G-100D	1087370	N.C.R
Software	EmcwareVer. 2.6.0.16			

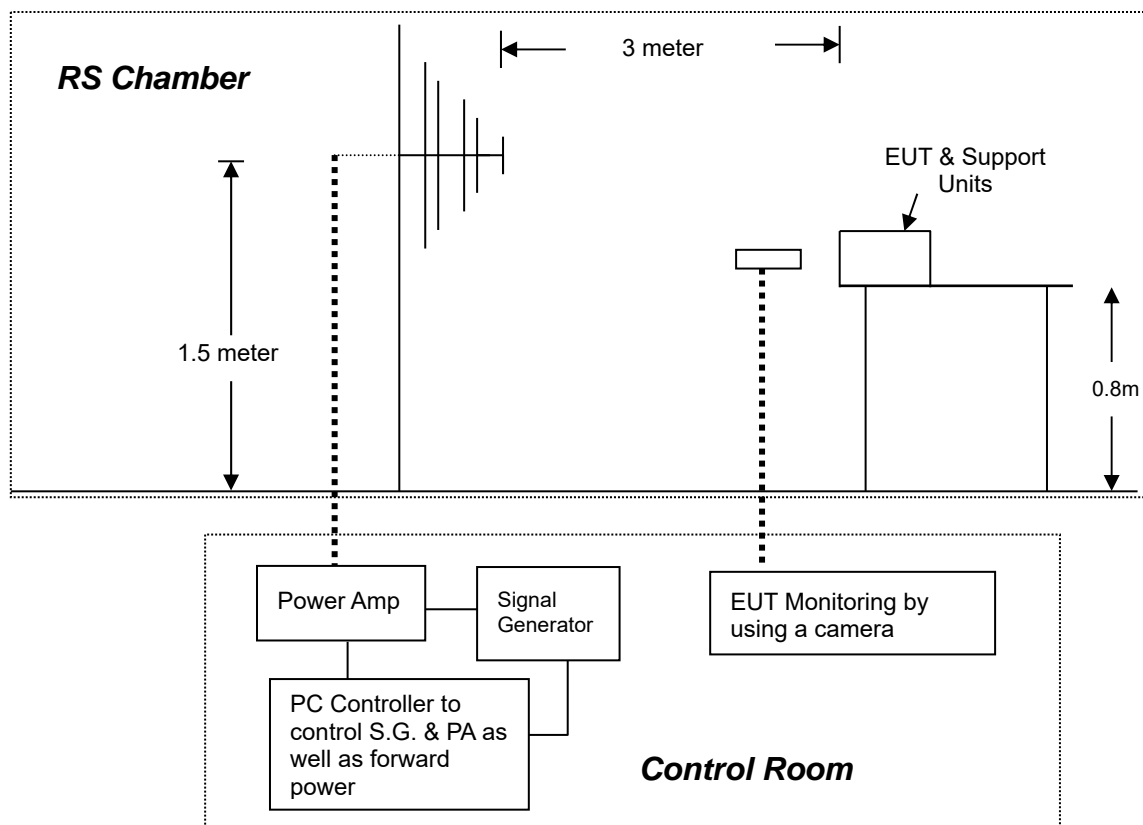
NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R.= No Calibration required.

8.4.3. TEST PROCEDURE

The test procedure was in accordance with IEC 61000-4-3

- The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- The frequency range is swept from 80 MHz ~ 1000 MHz, 1400 MHz ~ 6000 MHz with the signal 80% amplitude modulated with a 1kHz sine-wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s, where the frequency range is swept incrementally, the step size was 1% of preceding frequency value.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

8.4.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:**TABLETOP EQUIPMENT**

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

8.4.5. TEST RESULTS

Temperature	25°C	Humidity	56% RH
Pressure	1010mbar	Dwell Time	3 sec.
Tested By	Alee Shen	Required Passing Performance	Criterion A

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Performance Criterion	Observation	Result
80-1000	V&H	0	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
80-1000	V&H	90	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
80-1000	V&H	180	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
80-1000	V&H	270	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
1400 ~ 6000	V&H	0	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
1400 ~ 6000	V&H	90	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
1400 ~ 6000	V&H	180	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
1400 ~ 6000	V&H	270	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS

NOTE: 1. There was no change compared with the initial operation during the test.

8.5. ELECTRICAL FAST TRANSIENT (EFT)

8.5.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-4
Test Voltage:	AC Power Port: 1kV Signal Port: 0.5kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave-shape:	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min.

8.5.2. TEST INSTRUMENT

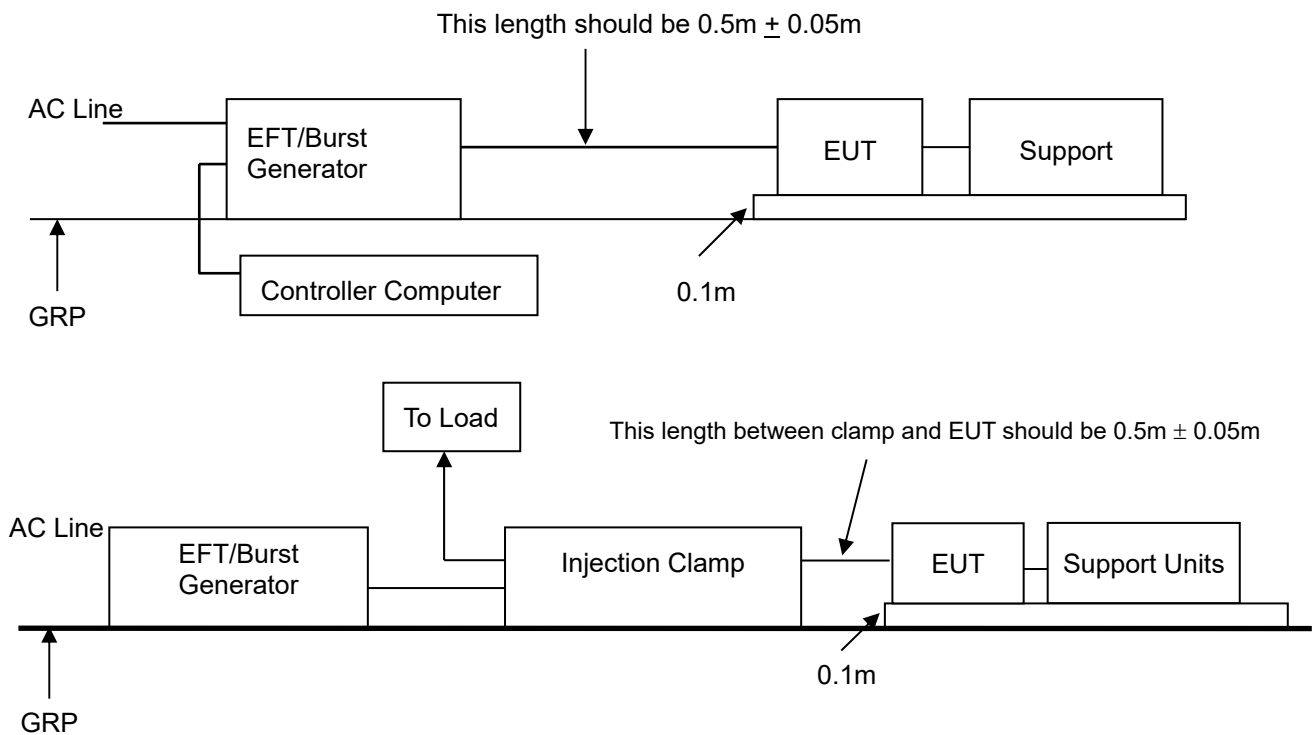
Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Capacitive Clamp	EMC-Partner	CN-EFT1000	589	03/29/2023
EMC Immunity Tester	EMC Partner	TRANSINT 2000	1117	02/22/2023
Software	GenecsVer. 3.27			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. N.C.R.= No Calibration required.

8.5.3. TEST PROCEDURE

- All types of cables, including their length, and the interface port of the EUT to which they were connected.
- Both positive and negative polarity discharges were applied.
- The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 0.5 meter.
- The duration time of each test sequential was 1 minute.
- The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

8.5.4. TEST SETUP

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:**TABLETOP EQUIPMENT**

The configuration consisted of a wooden table (0.1m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

8.5.5. TEST RESULTS

Temperature	21°C	Humidity	53% RH
Pressure	1010mbar	Tested By	Alee Shen
Required Passing Performance		Criterion B	

Test Point	Polarity	Test Level (kV)	Performance Criterion	Observation	Result
L	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
N	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
L - N	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
RJ45	+/-	0.5	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS

NOTE: 1. There was no change compared with initial operation during the test.

8.6. SURGE IMMUNITY TEST

8.6.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 μ s Open Circuit Voltage 8/20 μ s Short Circuit Current
Test Voltage:	AC Power Port ~ line to line: 1kV Signal port ~ line to earth: 1kV
Surge Input/Output:	Power Line: L-N Signal Line: L-G
Generator Source Impedance:	2 ohm between networks 12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0° / 90° / 180° / 270°
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

8.6.2. TEST INSTRUMENT

Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
CDN	EMC-Partner	CDN-UTP8	1502	02/23/2023
EMC Immunity Tester	EMC Partner	TRANSINT 2000	1117	02/22/2023
Software	GenecsVer. 3.27			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R.= No Calibration required.

Report No.: TMXD2206003113DE

8.6.3. TEST PROCEDURE

a) For EUT power supply:

The surge is applied to the EUT 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 EUT and the coupling/decoupling networks was shorter than 2 meters in length.

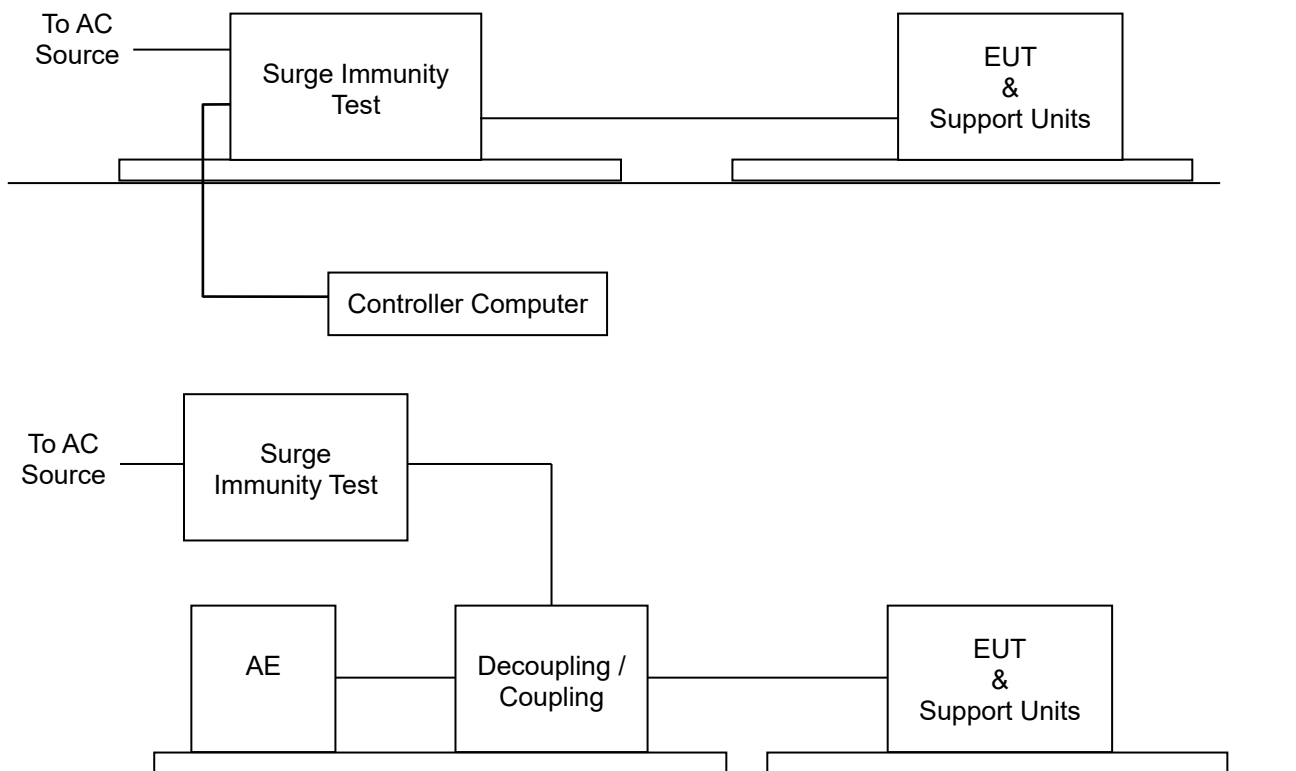
b) For test applied to unshielded un-symmetrically operated interconnection lines of EUT:

The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

c) For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor were not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

8.6.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

8.6.5. TEST RESULTS

Temperature	21°C	Humidity	53% RH
Pressure	1010mbar	Tested By	Alee Shen
Required Passing Performance		Criterion B	

Test Point	Polarity	Test Level (kV)	Performance Criterion	Observation	Result
L - N	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
RJ45	+/-	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS

NOTE: 1. There was no change compared with initial operation during the test.

8.7. CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

8.7.1. TEST SPECIFICATION

Basic Standard: IEC 61000-4-6

Frequency Range: 0.15 MHz - 80 MHz

Field Strength: 3 Vrms

Modulation: 1kHz Sine Wave, 80%, AM Modulation

Frequency Step: 1 % of preceding frequency value

Coupled cable: Power Mains, Unshielded; RJ45 Line, Unshielded

Coupling device: CDN-M2 (2 wires); CDN-T8

8.7.2. TEST INSTRUMENT

CS Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
CDN	Teseq	CDN S751A	46649	11/02/2022
CDN	Teseq	CDN M016	35821	11/02/2022
CDN	TESEQ	CDN T400A	28547	11/02/2022
CDN	FCC	FCC-801-M3-25A	9973	11/02/2022
CDN	Teseq	CDN T8A-10	57182	05/30/2023
Compact Immunity Test System	TESEQ	NSG 4070B-35	39581	11/03/2022
Software	NSG 4070 Control Program V1.2.0			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. N.C.R.= No Calibration required.

8.7.3. TEST PROCEDURE

The EUT shall be tested within its intended operating and climatic conditions.

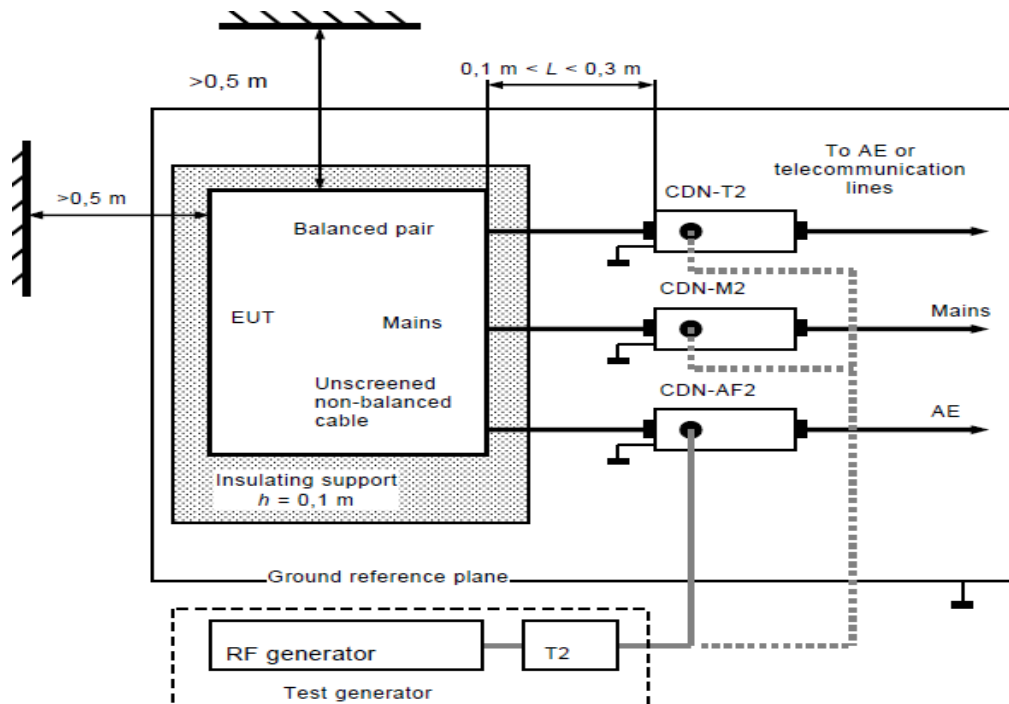
The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

The frequency range was swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was 1.5×10^{-3} decades/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value from 150 kHz to 80 MHz.

The dwell time at each frequency was less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, was analyzed separately.

Attempts were made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

8.7.4. TEST SETUP



Note: 1. The CDNs and / or EM clamp used for real test depends on ports and cables configuration of EUT.
2. The EUT clearance from any metallic obstacles shall be at least 0.5m

- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:**TABLE-TOP AND FLOOR-STANDING EQUIPMENT**

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

8.7.5. TEST RESULTS

Temperature	24°C	Humidity	54% RH
Pressure	1010mbar	Dwell Time	3 sec.
Tested By	Alee Shen	Required Passing Performance	Criterion A

Frequency Band (MHz)	Field Strength (Vrms)	Cable	Injection Method	Performance Criterion	Observation	Result
0.15 ~ 80	3	AC Power Line (0.3m)	CDN-M2	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
0.15 ~ 80	3	RJ45 Line (0.3m)	CDN-T8	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS

NOTE: 1. There was no change compared with initial operation during the test.

8.8. POWER FREQUENCY MAGNETIC FIELD

8.8.1. TEST SPECIFICATION

Basic Standard:	IEC 61000-4-8
Frequency Range:	50Hz / 60Hz
Field Strength:	3A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

8.8.2. TEST INSTRUMENT

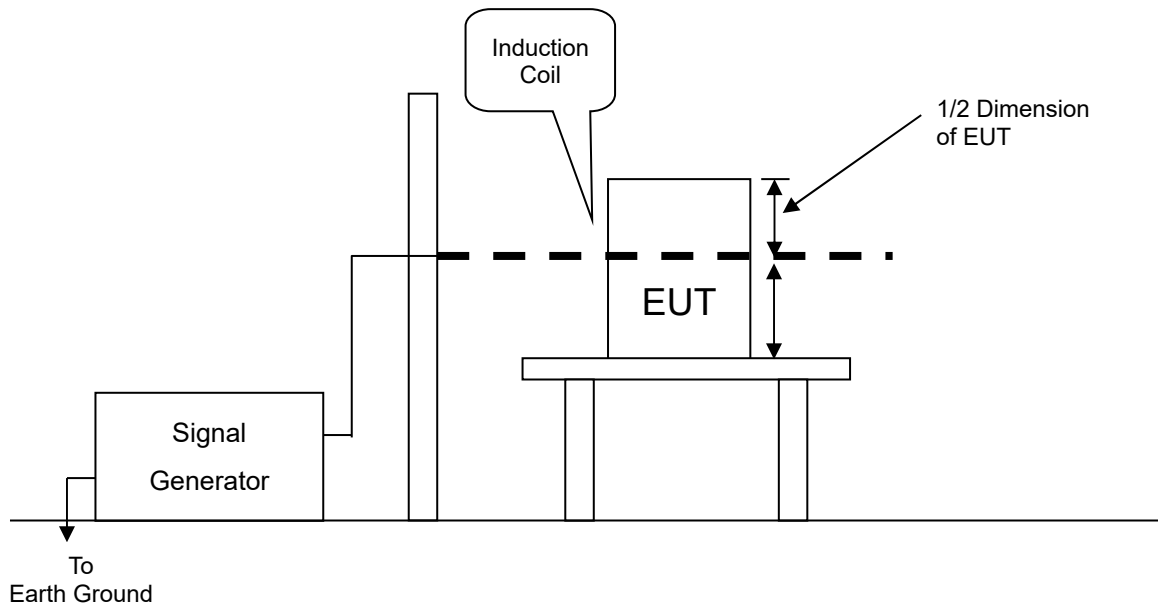
Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
5kVA Power Source	Teseq	5001IX-208-SCH	1207A03643	09/28/2022
AC/DC Clamp Meter	Fluke	353	33360025	06/27/2023
Magnetic Field Coil	Teseq	INA 703 W/ 2141	1976 / 1413	02/22/2023
Magnetic Field Meter	Sypris	4080	0247	11/03/2022
Software	Win2120 Ver. 5.0			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R.= No Calibration required.

8.8.3. TEST PROCEDURE

- The equipment is configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m-thick insulating support.
- The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

8.8.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:**TABLETOP EQUIPMENT**

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

8.8.5. TEST RESULTS

Temperature	25°C	Humidity	53% RH
Pressure	1010mbar	Tested By	Alee Shen
Required Passing Performance		Criterion A	

Direction	Field Strength (A/m)	Performance Criterion	Observation	Results
X	3	A	Note	PASS
Y	3	A	Note	PASS
Z	3	A	Note	PASS

NOTE: There was no change compared with the initial operation during the test.

8.9. VOLTAGE DIP & VOLTAGE INTERRUPTIONS

8.9.1. TEST SPECIFICATION

Basic Standard: IEC 61000-4-11

Test duration time: Minimum three test events in sequence

Interval between event: Minimum 10 seconds

Phase Angle: 0° / 180°

Test cycle: 3 times

8.9.2. TEST INSTRUMENT

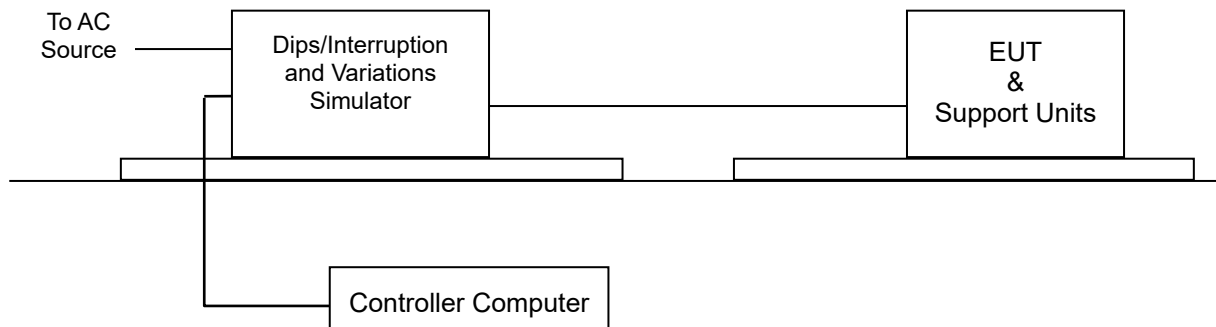
Immunity shielded room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
AC/DC Clamp Meter	Lutron	CM-9930R	I.200121	04/17/2023
EMC Immunity Tester	EMC Partner	TRANSINT 2000	1117	02/22/2023
Software	GenecsVer. 3.27			

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. N.C.R.= No Calibration required.

8.9.3. TEST PROCEDURE

1. The EUT and support units were located on a wooden table, 0.8 m away from ground floor.
2. Setting the parameter of tests and then perform the test software of test simulator.
3. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
4. Recording the test result in test record form.

8.9.4. TEST SETUP



- For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

8.9.5. TEST RESULTS

Temperature	22°C	Humidity	52% RH
Pressure	1010mbar	Tested By	Alee Shen
Required Passing Performance	Criterion B: i) 0% residual 0.5 Cycle at 50Hz 0% residual 1 Cycle at 50Hz Criterion C: ii) 70% residual 25/30 Cycles at 50/60Hz iii) 0% residual for 250/300 Cycles at 50/60Hz		

Test Power: 230Vac, 50Hz				
Voltage (% Residual)	Duration (Cycle)	Performance Criterion	Observation	Test Result
0	0.5	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
0	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
70	25	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
0	250	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2	PASS

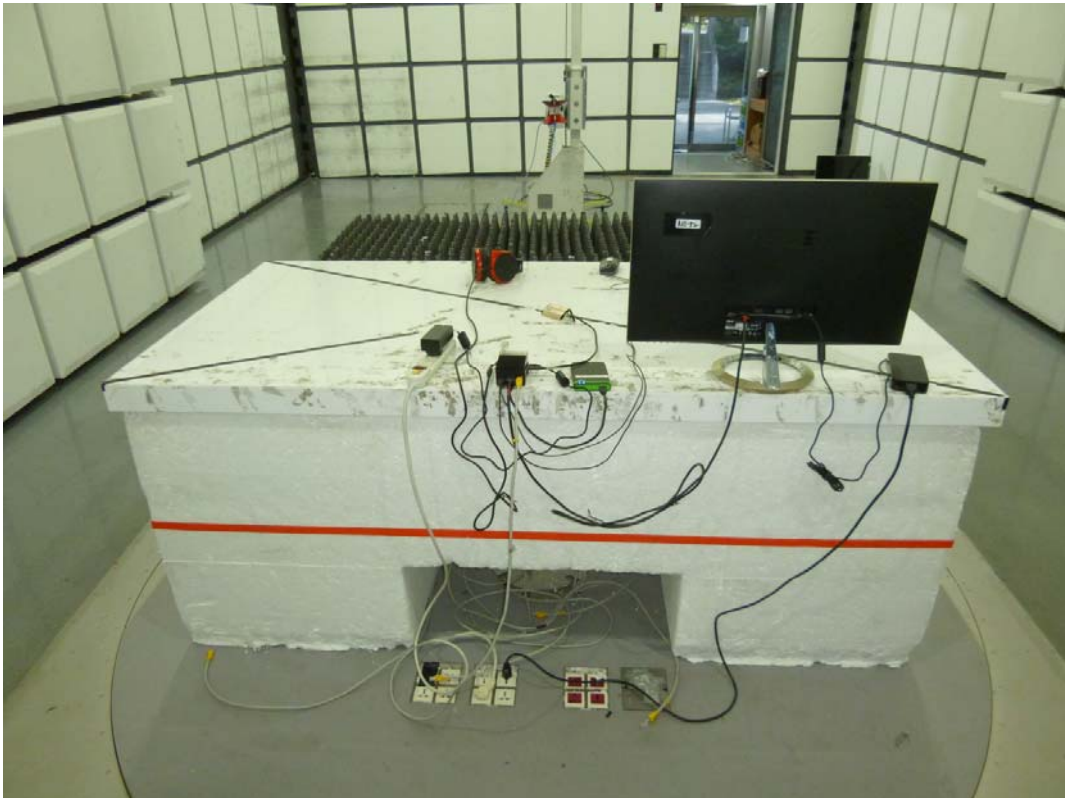
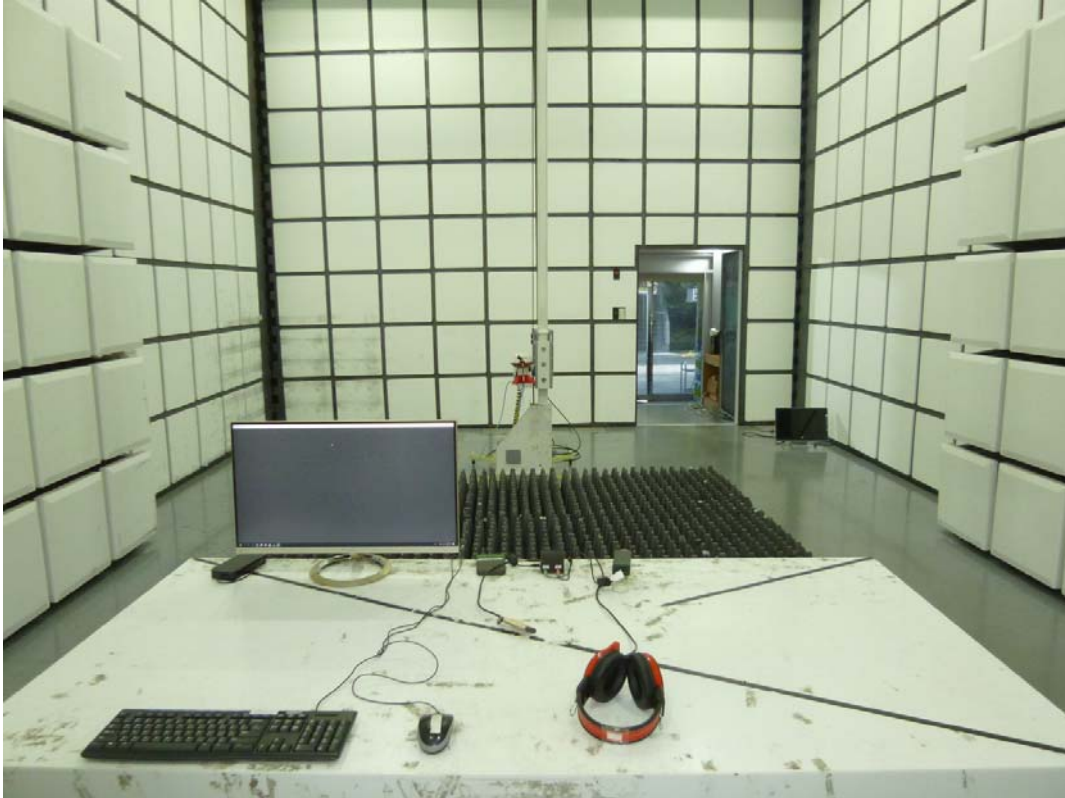
Test Power: 230Vac, 60Hz				
Voltage (% Residual)	Duration (Cycle)	Performance Criterion	Observation	Test Result
70	30	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
0	300	<input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C	Note <input type="checkbox"/> 1 <input checked="" type="checkbox"/> 2	PASS

- NOTE:** 1. There was no change compared with initial operation during and after the test. No unintentional response was found during the test.
2. EUT shut down, it could not become normal except reinstalled by operator.

9 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST



RADIATED EMISSION TEST (Below 1GHz)

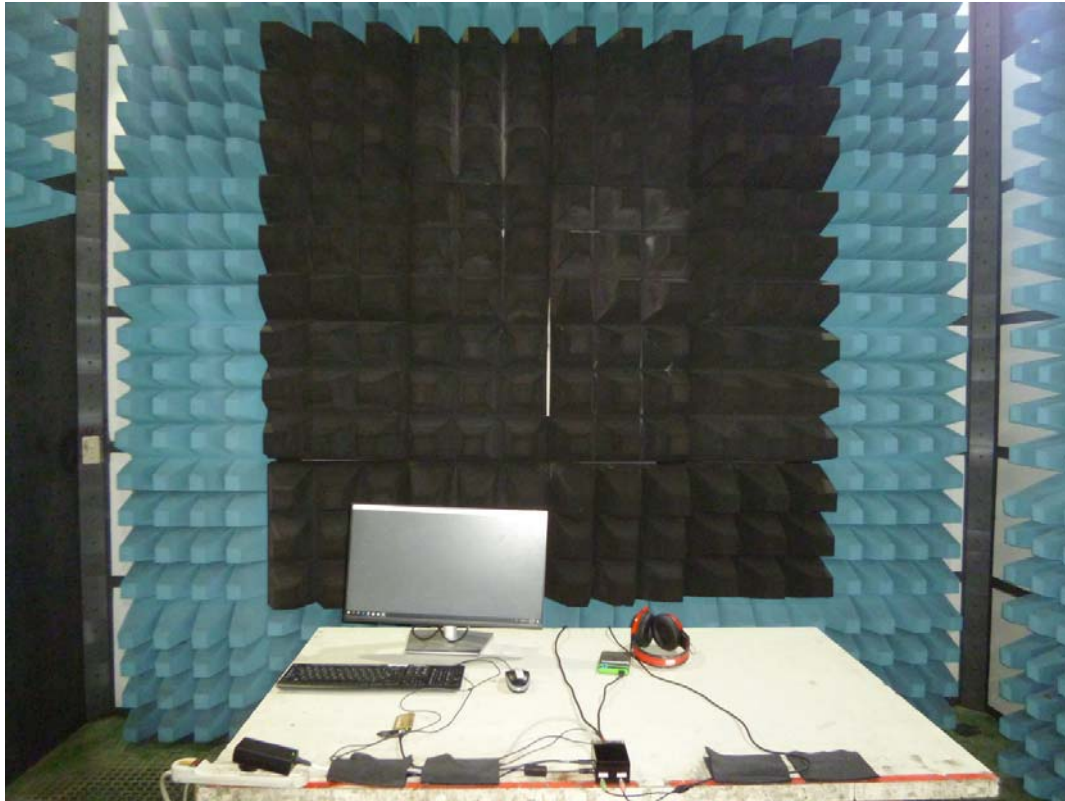
RADIATED EMISSION TEST (Above 1GHz)

Harmonic & Flicker Test



ESD Test



RS Test**EFT Test**

EFT For RJ45 Test**Surge Test**

Surge For RJ45 Test



CS Test



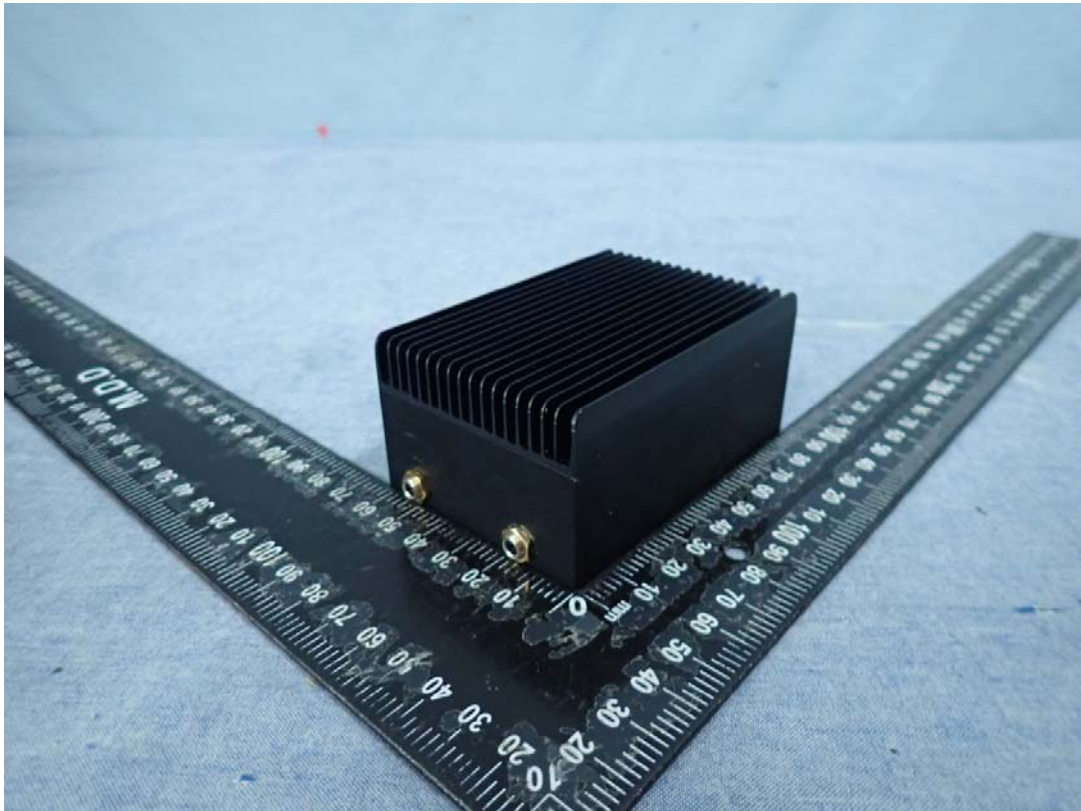
CS For RJ45 Test

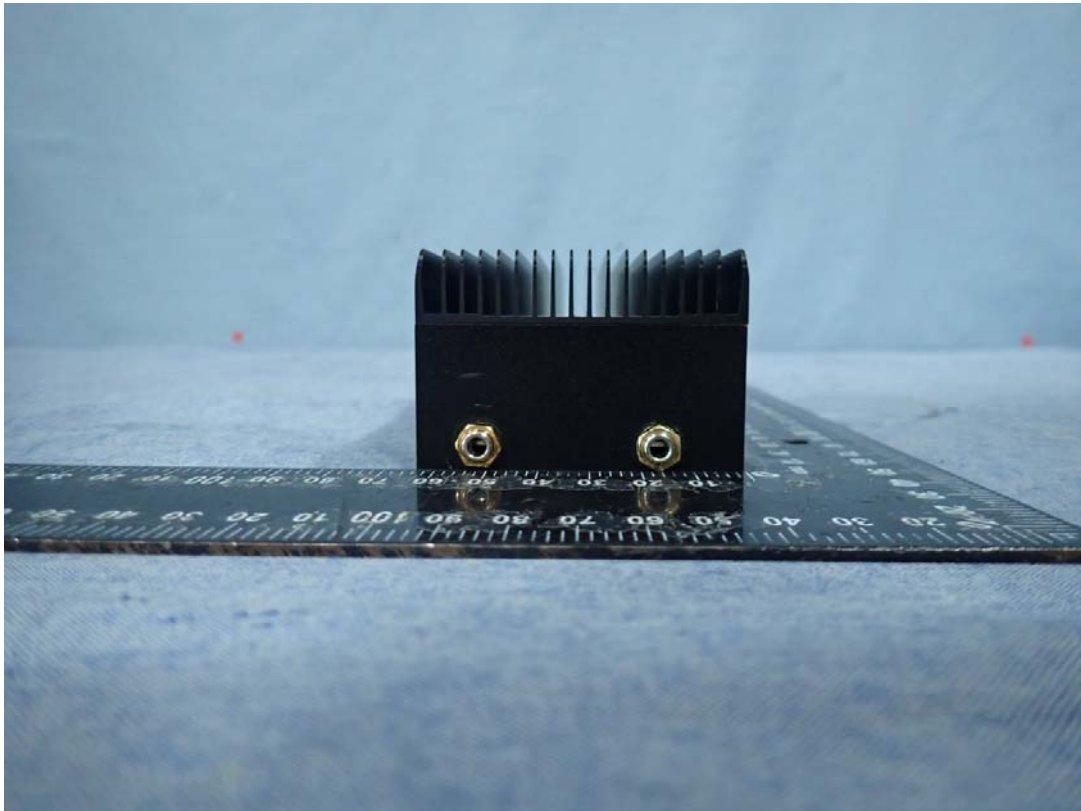


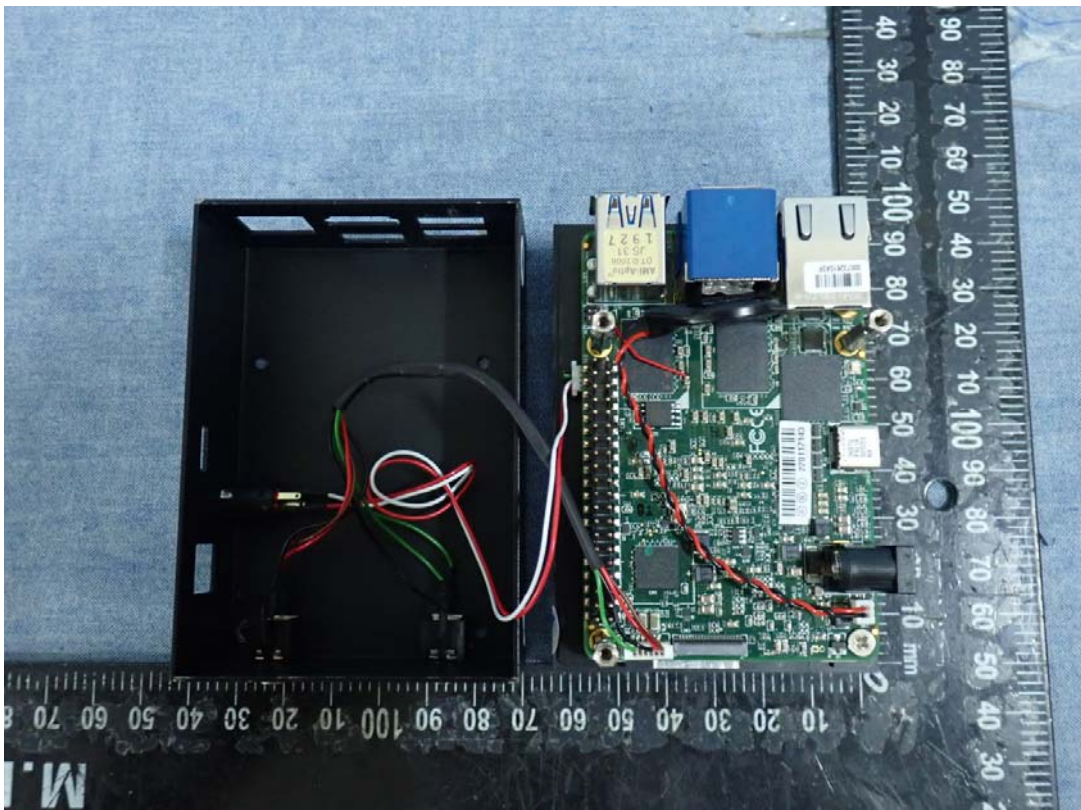
PFMF Test



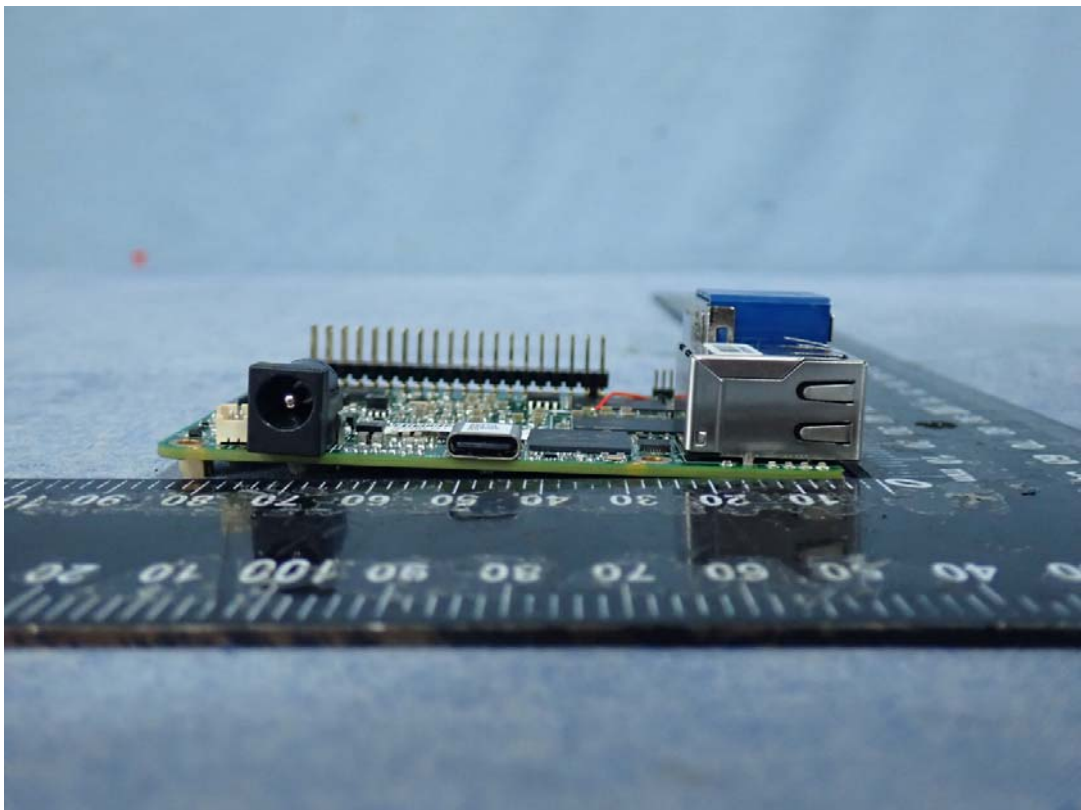
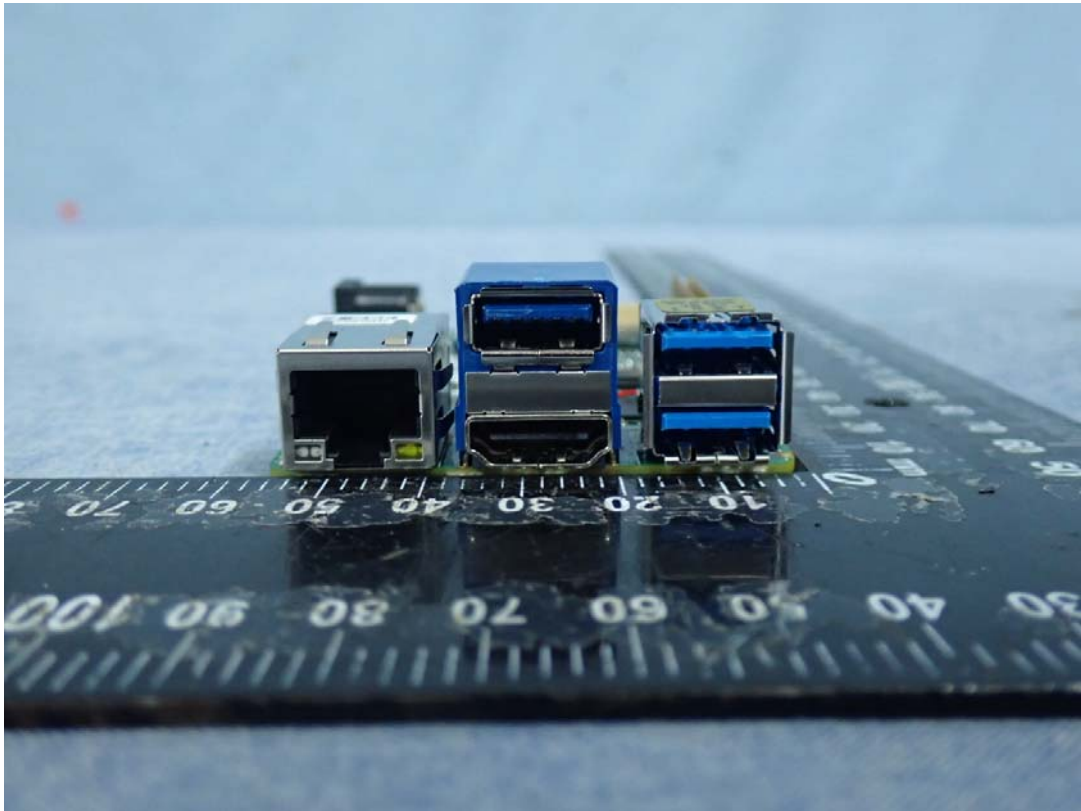
Voltage Dips / Interruptions Test

APPENDIX 1 - PHOTOGRAPHS OF EUT**EUT 1**









EUT 2

