

# CE EMC TEST REPORT

for

**UP Vision Plus X**

**MODEL: xUPCP-CR-VPXx (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.**

**No.163-1, Jhongsheng Rd., Xindian Dist.,  
New Taipei City, 23151 Taiwan.**

**TEL: 886-2-22170894**

**FAX: 886-2-22171029**

**Issued Date: May 28, 2019**

**Note:** This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, A2LA, NIST or any government agencies.

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.  
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部分複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at [www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm) and for electronic format documents, subject to Terms and Conditions for Electronic Documents at [www.sgs.com/terms\\_e-document.htm](http://www.sgs.com/terms_e-document.htm). Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	May 28, 2019	Initial Issue	ALL	Eva Fan

## TABLE OF CONTENTS

<b>1</b>	<b>TEST CERTIFICATION .....</b>	<b>4</b>
<b>2</b>	<b>TEST RESULT SUMMARY .....</b>	<b>5</b>
<b>3</b>	<b>EUT DESCRIPTION .....</b>	<b>6</b>
<b>4</b>	<b>TEST METHODOLOGY .....</b>	<b>7</b>
4.1.	DECISION OF FINAL TEST MODE.....	7
4.2.	EUT SYSTEM OPERATION .....	7
<b>5</b>	<b>SETUP OF EQUIPMENT UNDER TEST .....</b>	<b>8</b>
5.1.	DESCRIPTION OF SUPPORT UNITS.....	8
5.2.	CONFIGURATION OF SYSTEM UNDER TEST .....	9
<b>6</b>	<b>FACILITIES AND ACCREDITATIONS .....</b>	<b>10</b>
6.1.	FACILITIES .....	10
6.2.	ACCREDITATIONS .....	10
6.3.	MEASUREMENT UNCERTAINTY.....	10
<b>7</b>	<b>EMISSION TEST .....</b>	<b>11</b>
7.1.	CONDUCTED EMISSION MEASUREMENT AT AC MAINS PORT .....	11
7.2.	RADIATED EMISSION MEASUREMENT.....	16
7.3.	TEST INSTRUMENTS .....	17
7.4.	HARMONICS CURRENT MEASUREMENT.....	24
7.5.	VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT .....	29
<b>8</b>	<b>IMMUNITY TEST .....</b>	<b>31</b>
8.1.	GENERAL DESCRIPTION .....	32
8.2.	GENERAL PERFORMANCE CRITERIA DESCRIPTION.....	33
8.3.	ELECTROSTATIC DISCHARGE (ESD) .....	34
8.4.	RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD (RS) .....	38
8.5.	ELECTRICAL FAST TRANSIENT (EFT) .....	41
8.6.	SURGE IMMUNITY TEST .....	44
8.7.	CONDUCTED RADIO FREQUENCY DISTURBANCES (CS).....	46
8.8.	POWER FREQUENCY MAGNETIC FIELD .....	48
8.9.	VOLTAGE DIP & VOLTAGE INTERRUPTIONS.....	50
<b>9</b>	<b>PHOTOGRAPHS OF THE TEST CONFIGURATION.....</b>	<b>52</b>
<b>APPENDIX 1 - PHOTOGRAPHS OF EUT .....</b>		<b>A1-1</b>

Report No.: T190516D16-E

# 1 TEST CERTIFICATION

**Product:** UP Vision Plus X

**Model:** xUPCP-CR-VPXx (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:** May 22, 2019 & May 23, 2019

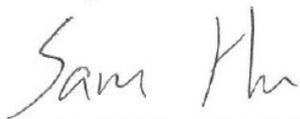
<b>Applicable Standards:</b>	<b>EN 55011: 2009 + A1: 2010 (Group 1, Class B)</b>	<b>EN 61000-6-1: 2007</b>
	<b>EN 61000-3-2: 2014</b>	IEC 61000-4-2: 2008
	<b>EN 61000-3-3: 2013</b>	IEC 61000-4-3: 2006 + A1: 2007 + A2: 2010
		IEC 61000-4-4: 2012
		IEC 61000-4-5: 2014 + A1: 2017
		IEC 61000-4-6: 2013
		IEC 61000-4-8: 2009
		IEC 61000-4-11: 2004 + A1: 2017

## 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 was tested by Compliance Certification Services Inc. for compliance with the requirements of technical standards specified above under the EMC Directive 2014/30/EU. 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: 2009 + A1: 2010 (Group 1, Class A)	Conducted	PASS	Meet Class B limit
	Radiated	PASS	Meet Class B limit
EN 61000-3-2: 2014	Harmonic current emissions	PASS	Meet Class A limit
EN 61000-3-3: 2013	Voltage fluctuations & flicker	PASS	Meets the requirements

IMMUNITY [ EN61000-6-1: 2007 ]			
Standard	Item	Result	Remarks
IEC 61000-4-2: 2008	ESD	PASS	Meets the requirements of Performance Criterion B
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	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 <b>Voltage Dips:</b> 1) 0% residual Performance Criterion A 2) 70% residual Performance Criterion A <b>Voltage Interruptions:</b> 1) 0% residual Performance Criterion C

Report No.: T190516D16-E

### 3 EUT DESCRIPTION

<b>Product</b>	UP Vision Plus X
<b>Brand Name</b>	AAEON
<b>Model</b>	xUPCP-CR-VPXx (x - where x may be any combination of alphanumeric characters or "-" or blank)
<b>Applicant</b>	AAEON Technology Inc.
<b>Housing material</b>	Metal Case
<b>Identify Number</b>	T190516D16
<b>Received Date</b>	May 16, 2019
<b>EUT Power Rating</b>	12VDC from AC Adaptor
<b>AC Power During Test</b>	230VAC / 50Hz to AC Adaptor
<b>AC Adaptor Manufacturer</b>	Powertron
<b>AC Adaptor Model</b>	PS1065-120IB500
<b>AC Adaptor Power Rating</b>	I/P: 100-240VAC~ 50-60Hz 1.8A; O/P: 12VDC, 5.0A
<b>DC Power Cable Type</b>	Unshielded, 1.0m (Non-detachable, with two cores)
<b>EUT I/O Cable Type</b>	Shielded, 0.2m (Detachable)

#### Model Differences

Model Name	Difference	Tested (Check)
UPCP-CR-VPX3-A10-001	Top + Bottom board	<input checked="" type="checkbox"/>
xUPCP-CR-VPXx	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. DP Port	1	1
2. USB 3.0 Port	4	4
3. LAN Port	1	1

**Note:** Client consigns only one model sample to test (Model Number: UPCP-CR-VPX3-A10-001).

Report No.: T190516D16-E

## 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	DP Mode, 1920X1200
2	DP Mode, 1600X1200
3	DP Mode, 1280X1024
4	DP Mode, 720X576

#### Radiation Modes:

1	DP Mode, 1920X1200
	DP Mode, 1920X1200 / 1-6GHz
2	DP Mode, 1600X1200
3	DP Mode, 1280X1024
4	DP Mode, 720X576

#### Worst:

Conduction: Mode 1

Radiation: Mode 1

### 4.2. EUT SYSTEM OPERATION

1. IOS system.
2. Press the start menu, select executive and type ping 192.168.1.10 -t (EUT), ping 192.168.1.100 -t (Server Notebook).

**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.

#### Host PC Devices:

No.	Equipment	Model No.	Brand Name
1	CPU (1.6GHz)	Intel(R) Atom(TM) Processor E3940	Intel

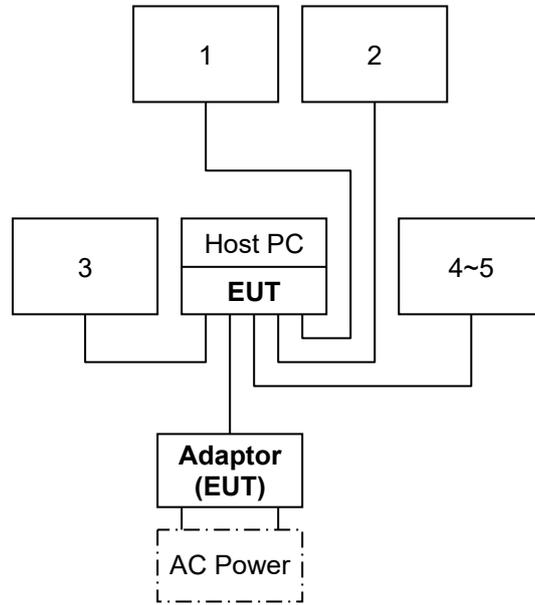
#### Peripherals Devices:

No.	Equipment	Model No.	Serial No.	FCC ID / BSMI ID	Brand Name	Data Cable	Power Cord
1	USB Mouse	M-U0026	N/A	DOC BSMI: T41126	Logitech	Shielded, 1.8m	N/A
2	USB Keyboard	Y-U0011	N/A	DOC BSMI: T51160	Logitech	Shielded, 2.0m	N/A
3	Monitor	PA248Q	N/A	DOC BSMI: R31018	ASUS	Shielded, 1.8m	Unshielded, 1.8m
4~5	USB HDD	TS1TSJ25MC	N/A	DOC BSMI: D33193	Transcend	Shielded, 0.5m	N/A
6	Server Notebook	TP00048X240	N/A	DOC BSMI: R33B65	Lenovo	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



Report No.: T190516D16-E

## 6 FACILITIES AND ACCREDITATIONS

### 6.1. FACILITIES

All measurement facilities used to collect the measurement data are located at Xindian Lab. at No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, 23151 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
USA	A2LA

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

Canada	Industry Canada
Japan	VCCI
Taiwan	BSMI
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

### 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	± 5.3
	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 3.6dB and 5.2dB 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.

Report No.: T190516D16-E

## 7 EMISSION TEST

### 7.1. CONDUCTED EMISSION MEASUREMENT AT AC MAINS PORT

#### 7.1.1. LIMITS

##### CLASS A

FREQUENCY (MHz)	Group 1 ≤ 20kV		Group 1 > 20kV / Group 2 ≤ 20kV		Group 2 > 20kV	
	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
BNC Cable	EMCI	CFD300-NL	BNC#B5	01/06/2020
EMI Test Receiver	R&S	ESCI	100234	05/06/2020
LISN	Schwarzbeck	NSLK 8127	8127526	05/07/2020
LISN(EUT)	Schwarzbeck	NSLK 8127	8127382	05/07/2020
Pulse Limiter	R&S	ESH3-Z2	100374	01/06/2020
Thermo-Hygro Meter	Wisewind	201A	SD-S017	09/26/2019
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.

Report No.: T190516D16-E

**7.1.3. TEST PROCEDURES** (please refer to measurement standard or CCS SOP PA-031)**Procedure of Preliminary Test**

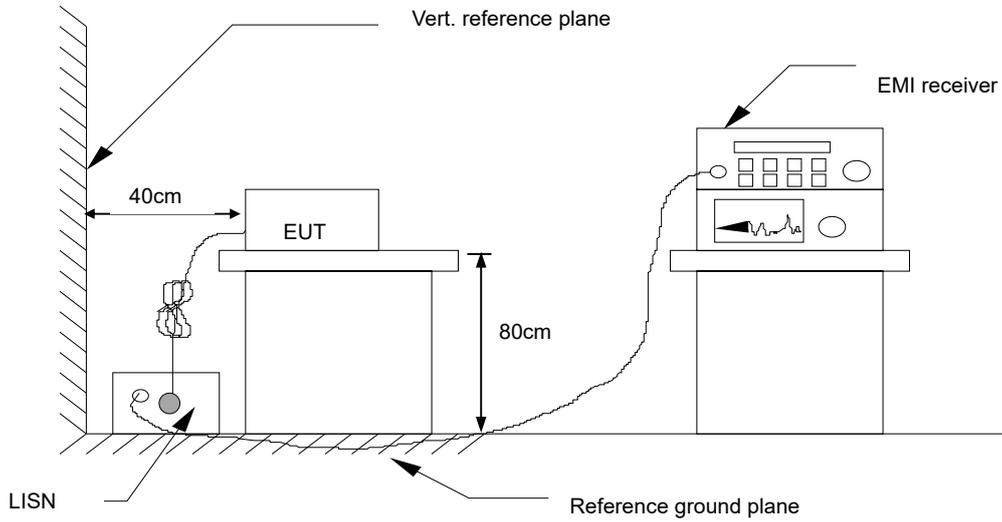
- The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN 55011 (see Test Facility for the dimensions 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.
- 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.

Report No.: T190516D16-E

### 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	56	-12.50	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

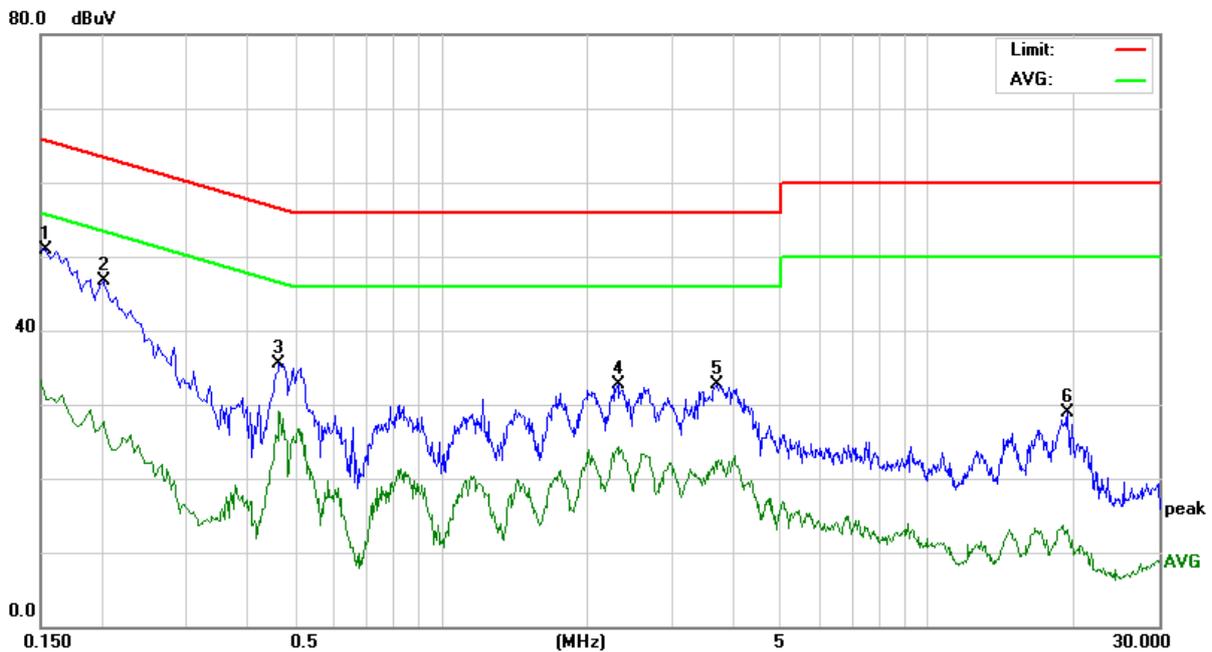
### Calculation Formula

$$\text{Margin (dB)} = \text{Result (dBuV)} - \text{Limit (dBuV)}$$

Report No.: T190516D16-E

### 7.1.6. TEST RESULTS

<b>Model No.</b>	UPCP-CR-VPX3-A10-001	<b>6dB Bandwidth</b>	9 kHz
<b>Environmental Conditions</b>	23°C, 62% RH	<b>Test Mode</b>	Mode 1
<b>Tested by</b>	Alee Shen	<b>Phase</b>	L1
<b>Standard</b>	EN 55011 GROUP 1 CLASS B		

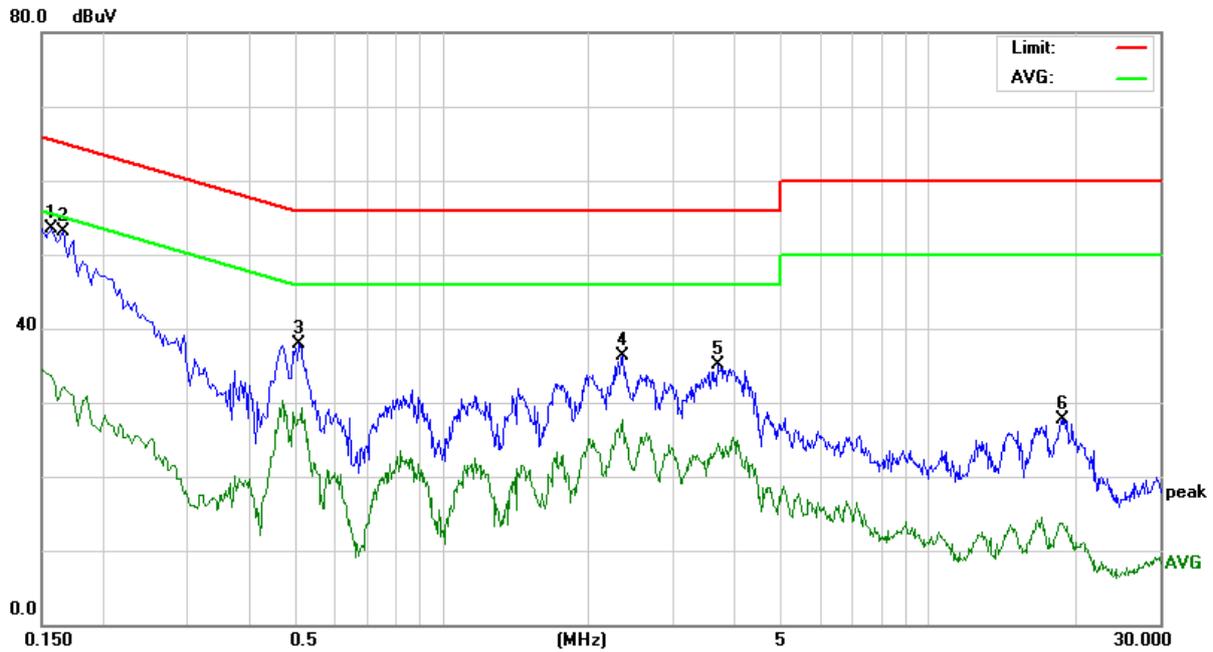


Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.1540	40.90	10.08	50.98	65.78	-14.80	P	L1
0.2020	36.72	10.05	46.77	63.52	-16.75	P	L1
0.4660	25.45	10.08	35.53	56.58	-21.05	P	L1
2.3100	22.37	10.26	32.63	56.00	-23.37	P	L1
3.7140	22.29	10.32	32.61	56.00	-23.39	P	L1
19.5100	18.13	10.76	28.89	60.00	-31.11	P	L1

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

Report No.: T190516D16-E

<b>Model No.</b>	UPCP-CR-VPX3-A10-001	<b>6dB Bandwidth</b>	9 kHz
<b>Environmental Conditions</b>	23°C, 62% RH	<b>Test Mode</b>	Mode 1
<b>Tested by</b>	Alee Shen	<b>Phase</b>	L2
<b>Standard</b>	EN 55011 GROUP 1 CLASS B		



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)
0.1580	43.50	10.05	53.55	65.56	-12.01	P	L2
0.1660	43.02	10.04	53.06	65.15	-12.09	P	L2
0.5100	27.91	10.06	37.97	56.00	-18.03	P	L2
2.3500	25.97	10.25	36.22	56.00	-19.78	P	L2
3.6820	24.75	10.31	35.06	56.00	-20.94	P	L2
18.9060	16.95	10.69	27.64	60.00	-32.36	P	L2

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

Report No.: T190516D16-E

## 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 / AC: 2016 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.

Report No.: T190516D16-E

### 7.3. TEST INSTRUMENTS

Open Area Test Site # H				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Bilog Antenna	Teseq	CBL 6112D	36995	06/25/2019
Cable	EMEC	CFD400NL-LW	N-Type#H11	08/15/2019
EMI Test Receiver	R&S	ESCI	101340	03/19/2020
Pre-Amplifier	HP	8447D	1937A01554	09/27/2019
Thermo-Hygro Meter	Wisewind	201A	No. 03	05/27/2019
Test S/W	EZ-EMC			
Above 1GHz Used				
Horn Antenna	ETS	3117	00139062	09/13/2019
K-Type Cable	Rosnol	K1K50-UP0264- K1k50-1000	170803-1	08/09/2019
Microflex Cable	EMEC	EM104-7M	SD-R051	08/27/2019
Pre-Amplifier	Com-Power	PAM-118A	551041	06/18/2019
Signal Analyzer	R&S	FSV40	101269	03/29/2020
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.

Report No.: T190516D16-E

**7.3.1. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-031)**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.
- All I/O cables were positioned to simulate typical usage as per 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. 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.

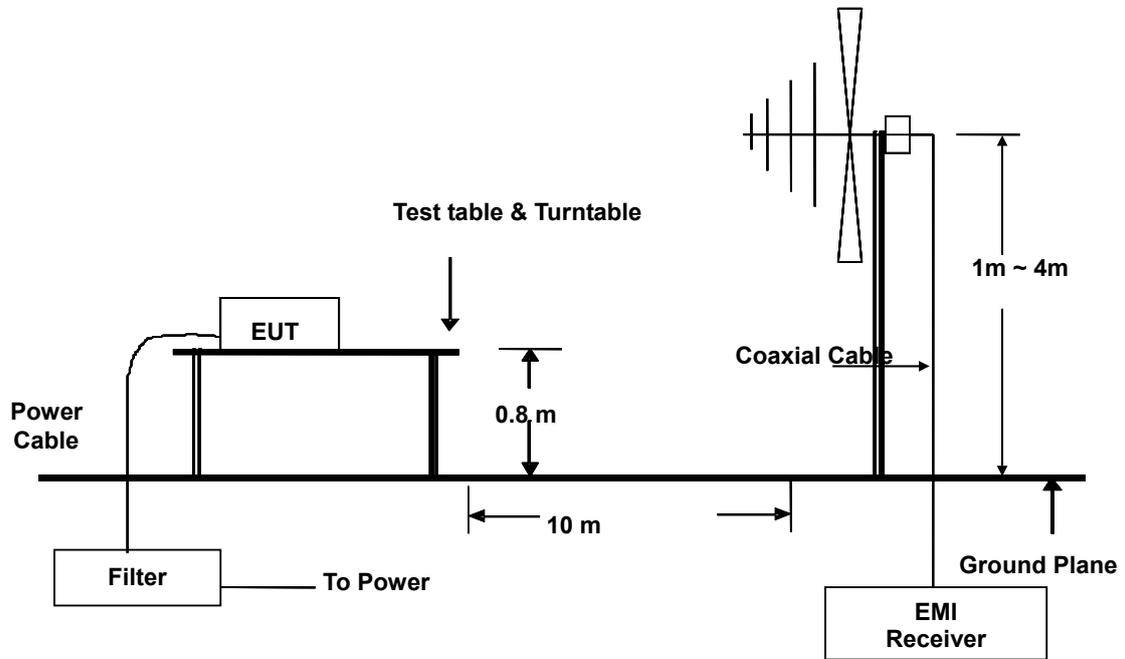
**Procedure of Final Test**

- 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.

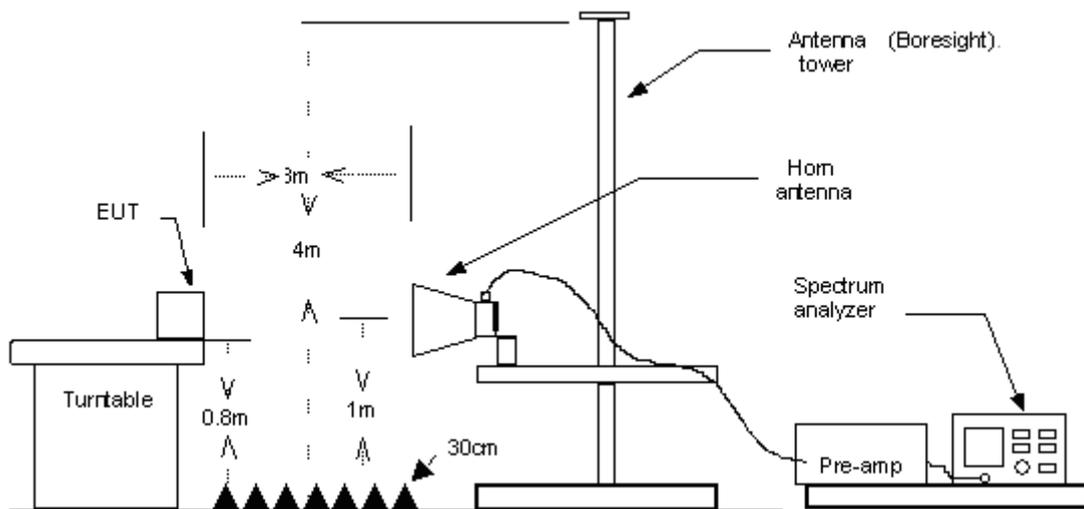
Report No.: T190516D16-E

## 7.3.2. TEST SETUP

### Below 1GHz



### Above 1GHz



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

Report No.: T190516D16-E

### 7.3.3. 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	30	-3.8	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	54	-10.50	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

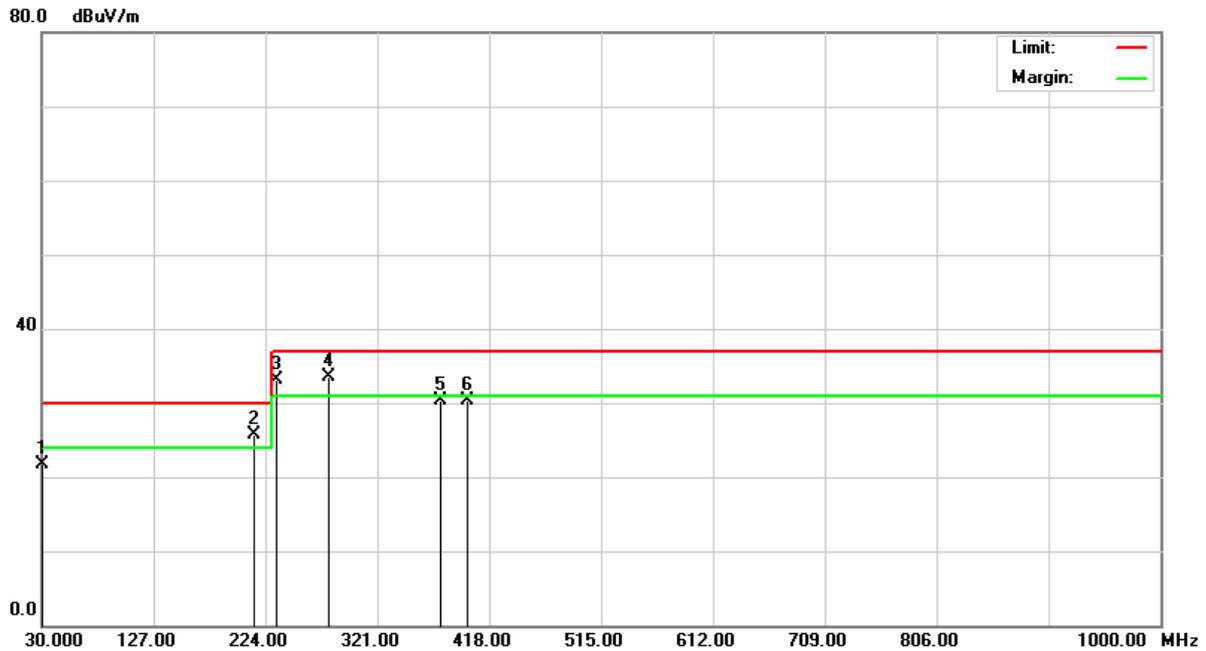
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)

Report No.: T190516D16-E

### 7.3.4. TEST RESULTS

#### Below 1GHz

<b>Model No.</b>	UPCP-CR-VPX3-A10-001	<b>Test Mode</b>	Mode 1
<b>Environmental Conditions</b>	26°C, 60% RH	<b>6dB Bandwidth</b>	120 kHz
<b>Antenna Pole</b>	Vertical	<b>Antenna Distance</b>	10m
<b>Detector Function</b>	Quasi-peak.	<b>Tested by</b>	Alee Shen
<b>Standard</b>	EN 55011 GROUP 1 CLASS B		

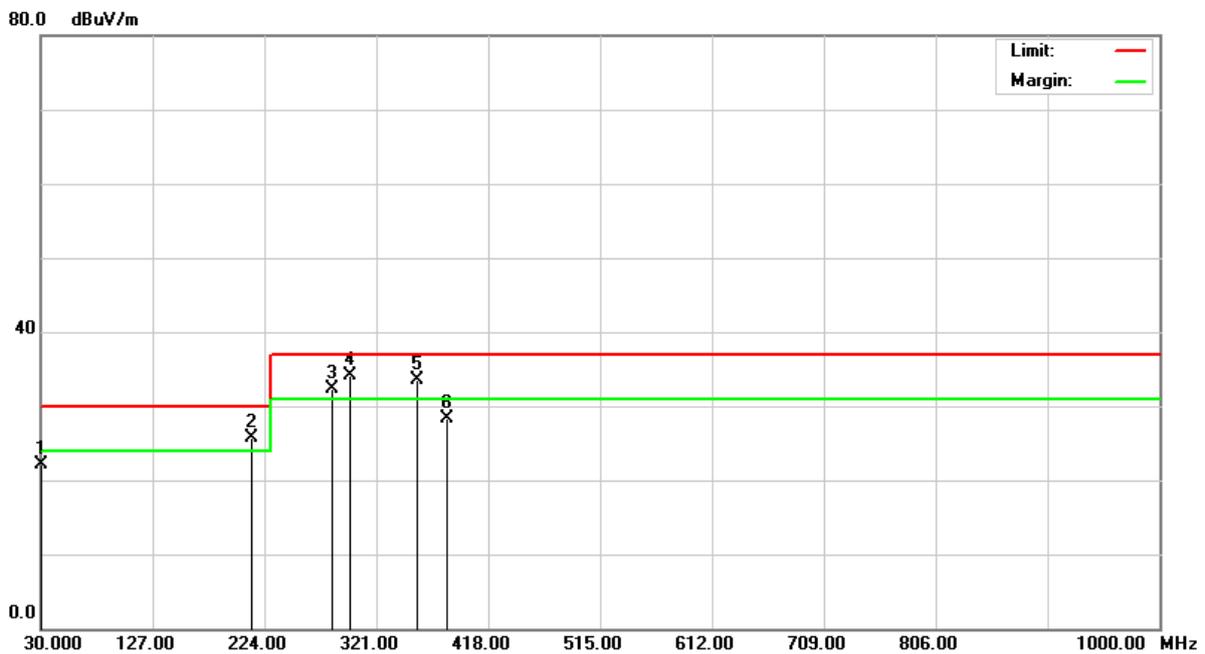


Radiated Emission Readings									
Frequency Range Investigated				30 MHz to 1000 MHz at 10m					
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
31.1150	24.00	-2.26	21.74	30.00	-8.26	100	165	Q	V
214.2930	36.00	-10.22	25.78	30.00	-4.22	100	232	Q	V
233.5190	41.90	-8.70	33.20	37.00	-3.80	100	250	Q	V
279.3140	39.90	-6.31	33.59	37.00	-3.41	100	54	Q	V
375.5600	34.30	-3.91	30.39	37.00	-6.61	100	87	Q	V
399.3680	32.80	-2.51	30.29	37.00	-6.71	100	166	Q	V

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

Report No.: T190516D16-E

<b>Model No.</b>	UPCP-CR-VPX3-A10-001	<b>Test Mode</b>	Mode 1
<b>Environmental Conditions</b>	26°C, 60% RH	<b>6dB Bandwidth</b>	120 kHz
<b>Antenna Pole</b>	Horizontal	<b>Antenna Distance</b>	10m
<b>Detector Function</b>	Quasi-peak.	<b>Tested by</b>	Alee Shen
<b>Standard</b>	EN 55011 GROUP 1 CLASS B		



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)
31.1100	24.30	-2.26	22.04	30.00	-7.96	400	99	Q	H
212.9880	35.80	-10.19	25.61	30.00	-4.39	400	123	Q	H
282.3599	38.60	-6.23	32.37	37.00	-4.63	400	150	Q	H
298.6000	40.00	-5.95	34.05	37.00	-2.95	400	113	Q	H
356.8730	38.10	-4.65	33.45	37.00	-3.55	400	205	Q	H
382.8500	32.00	-3.60	28.40	37.00	-8.60	400	116	Q	H

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

Report No.: T190516D16-E

**Above 1GHz**

<b>Model No.</b>	UPCP-CR-VPX3-A10-001	<b>Test Mode</b>	Mode 1
<b>Environmental Conditions</b>	26°C, 60% RH	<b>6dB Bandwidth</b>	1 MHz
<b>Antenna Pole</b>	Vertical / Horizontal	<b>Antenna Distance</b>	3m
<b>Highest frequency generated or used</b>	1600MHz	<b>Upper frequency</b>	6000MHz
<b>Detector Function</b>	Peak and average.	<b>Tested by</b>	Alee Shen
<b>Standard</b>	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)
1020.000	55.49	-8.62	46.87	70.00	-23.13	P	V
1245.000	56.68	-7.80	48.88	70.00	-21.12	P	V
1710.000	52.64	-6.54	46.10	70.00	-23.90	P	V
2435.000	51.03	-3.70	47.33	70.00	-22.67	P	V
2995.000	51.66	-3.26	48.40	70.00	-21.60	P	V
6000.000	49.17	1.39	50.56	74.00	-23.44	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)
1045.000	56.74	-8.75	47.99	70.00	-22.01	P	H
1245.000	55.11	-7.80	47.31	70.00	-22.69	P	H
1370.000	56.21	-7.40	48.81	70.00	-21.19	P	H
2490.000	52.78	-3.56	49.22	70.00	-20.78	P	H
2995.000	52.57	-3.26	49.31	70.00	-20.69	P	H
6000.000	48.70	1.39	50.09	74.00	-23.91	P	H

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

Report No.: T190516D16-E

## 7.4. HARMONICS CURRENT MEASUREMENT

### 7.4.1. 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 7.4.3.

2. According to section 7 of EN 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.

### 7.4.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Signal Conditioning Unit	Teseq	NSG 1000-1	1846A01831	12/19/2019
5kVA Power Source	Teseq	NSG 1007-5	1537A01296	12/19/2019
Software	CTS 4 Ver. 4.2			

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

Report No.: T190516D16-E

**7.4.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-029)

- 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 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.

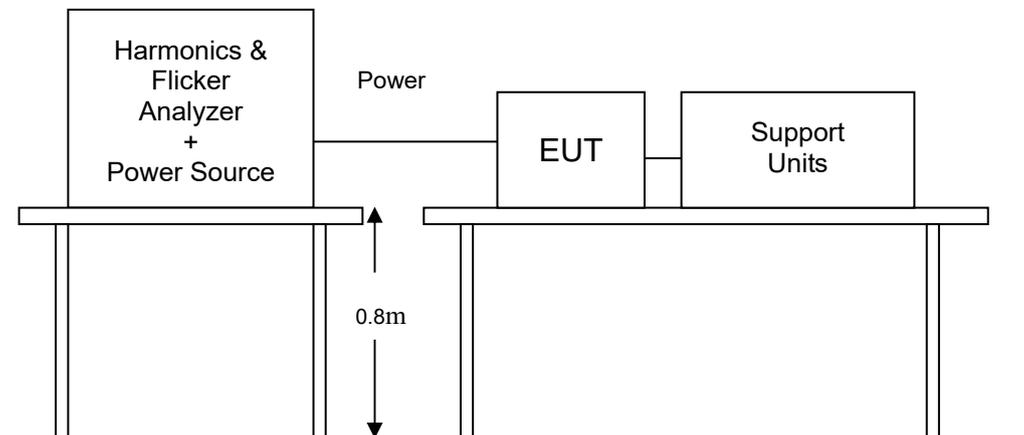
Class B: Portable tools; Arc welding equipment which is not professional equipment.

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.

**7.4.4. TEST SETUP**



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

**7.4.5. TEST RESULTS**

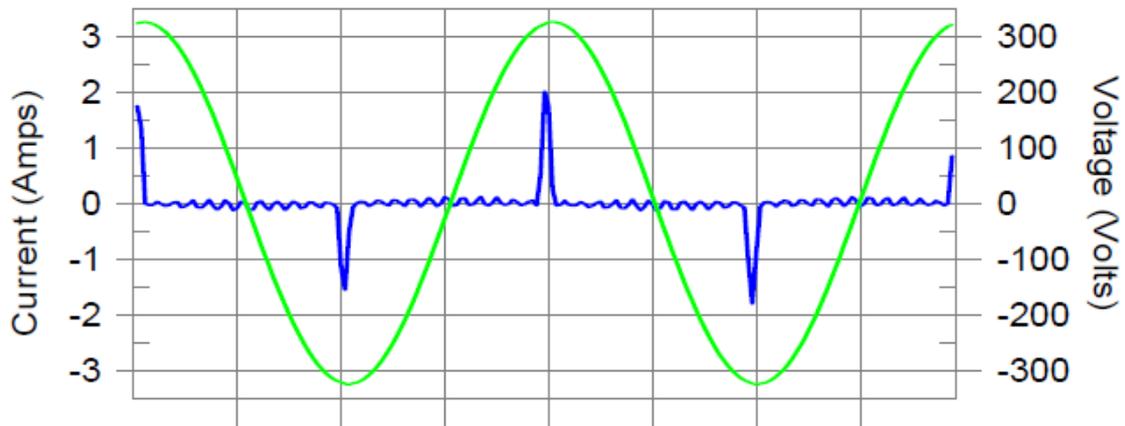
<b>Power Consumption</b>	22.7W	<b>Test Results</b>	PASS
<b>Environmental Conditions</b>	22°C, 57% RH, 1002mbar	<b>Limits</b>	Class <input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
<b>Test Mode</b>	Operating	<b>Tested by</b>	Leon Yu

**NOTE:** Limits classified according to item 7.4.1.

## Test result of EN 61000-3-2

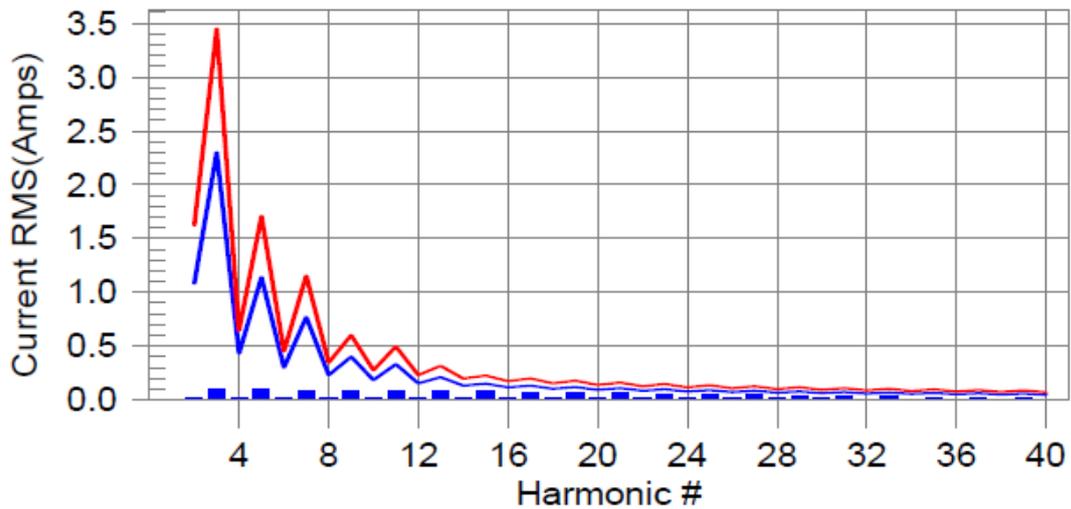
Test Result: Pass      Source qualification: Normal

### Current & voltage waveforms



### Harmonics and Class A limit line

### European Limits



Test result: Pass      Worst harmonics H21-38.7% of 150% limit, H21-55.1% of 100% limit

Report No.: T190516D16-E

Test Result: Pass      Source qualification: Normal  
THC(A): 0.277      I-THD(%): 266.5      POHC(A): 0.121      POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts):	229.88	Frequency(Hz):	50.00
I_Peak (Amps):	2.197	I_RMS (Amps):	0.328
I_Fund (Amps):	0.104	Crest Factor:	7.201
Power (Watts):	22.7	Power Factor:	0.319

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.010	1.080	0.9	0.012	1.620	0.7	Pass
3	0.093	2.300	4.0	0.097	3.450	2.8	Pass
4	0.010	0.430	2.3	0.012	0.645	1.8	Pass
5	0.091	1.140	8.0	0.097	1.710	5.6	Pass
6	0.010	0.300	3.5	0.012	0.450	2.6	Pass
7	0.089	0.770	11.6	0.094	1.155	8.1	Pass
8	0.011	0.230	4.7	0.012	0.345	3.5	Pass
9	0.086	0.400	21.6	0.091	0.600	15.2	Pass
10	0.011	0.184	6.2	0.013	0.276	4.6	Pass
11	0.083	0.330	25.1	0.088	0.495	17.7	Pass
12	0.012	0.153	7.7	0.013	0.230	5.6	Pass
13	0.079	0.210	37.6	0.083	0.315	26.4	Pass
14	0.012	0.131	9.3	0.013	0.197	6.9	Pass
15	0.074	0.150	49.6	0.079	0.225	34.9	Pass
16	0.012	0.115	10.7	0.014	0.173	8.0	Pass
17	0.070	0.132	52.7	0.073	0.198	37.1	Pass
18	0.012	0.102	12.2	0.014	0.153	9.0	Pass
19	0.064	0.118	54.4	0.068	0.178	38.2	Pass
20	0.012	0.092	13.5	0.014	0.138	10.1	Pass
21	0.059	0.107	55.1	0.062	0.161	38.7	Pass
22	0.012	0.084	14.7	0.014	0.125	10.9	Pass
23	0.054	0.098	54.7	0.056	0.147	38.4	Pass
24	0.012	0.077	15.5	0.013	0.115	11.5	Pass
25	0.048	0.090	53.2	0.050	0.135	37.3	Pass
26	0.011	0.071	16.0	0.013	0.107	11.9	Pass
27	0.042	0.083	50.9	0.045	0.125	35.6	Pass
28	0.011	0.066	16.2	0.012	0.099	12.3	Pass
29	0.037	0.078	47.7	0.039	0.116	33.3	Pass
30	0.010	0.061	16.1	0.011	0.092	12.2	Pass
31	0.032	0.073	43.8	0.033	0.109	30.5	Pass
32	0.009	0.058	15.8	0.010	0.086	12.0	Pass
33	0.027	0.068	39.3	0.028	0.102	27.4	Pass
34	0.008	0.054	14.9	0.009	0.081	11.4	Pass
35	0.022	0.064	34.4	0.023	0.096	23.9	Pass
36	0.007	0.051	13.8	0.008	0.077	10.6	Pass
37	0.018	0.061	29.3	0.019	0.091	20.4	Pass
38	0.006	0.048	12.5	0.007	0.073	9.7	Pass
39	0.014	0.058	24.1	0.015	0.087	16.8	Pass
40	0.005	0.046	N/A	0.006	0.069	N/A	Pass

Report No.: T190516D16-E

Test Result: Pass      Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	229.88	Frequency(Hz):	50.00
I_Peak (Amps):	2.197	I_RMS (Amps):	0.328
I_Fund (Amps):	0.104	Crest Factor:	7.201
Power (Watts):	22.7	Power Factor:	0.319

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.082	0.460	17.74	OK
3	0.375	2.069	18.15	OK
4	0.050	0.460	10.83	OK
5	0.092	0.919	10.01	OK
6	0.020	0.460	4.44	OK
7	0.052	0.689	7.57	OK
8	0.009	0.460	1.90	OK
9	0.049	0.460	10.63	OK
10	0.019	0.459	4.06	OK
11	0.044	0.230	19.14	OK
12	0.018	0.230	7.76	OK
13	0.048	0.230	21.06	OK
14	0.010	0.230	4.53	OK
15	0.042	0.230	18.47	OK
16	0.009	0.230	3.98	OK
17	0.048	0.230	21.01	OK
18	0.017	0.230	7.53	OK
19	0.052	0.230	22.59	OK
20	0.030	0.230	13.25	OK
21	0.056	0.230	24.50	OK
22	0.012	0.230	5.16	OK
23	0.057	0.230	24.87	OK
24	0.016	0.230	7.16	OK
25	0.050	0.230	21.58	OK
26	0.014	0.230	6.19	OK
27	0.039	0.230	16.75	OK
28	0.012	0.230	5.39	OK
29	0.051	0.230	22.06	OK
30	0.016	0.230	6.77	OK
31	0.044	0.230	19.24	OK
32	0.014	0.230	6.19	OK
33	0.036	0.230	15.59	OK
34	0.013	0.230	5.83	OK
35	0.035	0.230	15.02	OK
36	0.012	0.230	5.32	OK
37	0.033	0.230	14.17	OK
38	0.011	0.230	4.81	OK
39	0.024	0.230	10.43	OK
40	0.021	0.230	9.08	OK

## 7.5. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

### 7.5.1. 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

### 7.5.2. TEST INSTRUMENTS

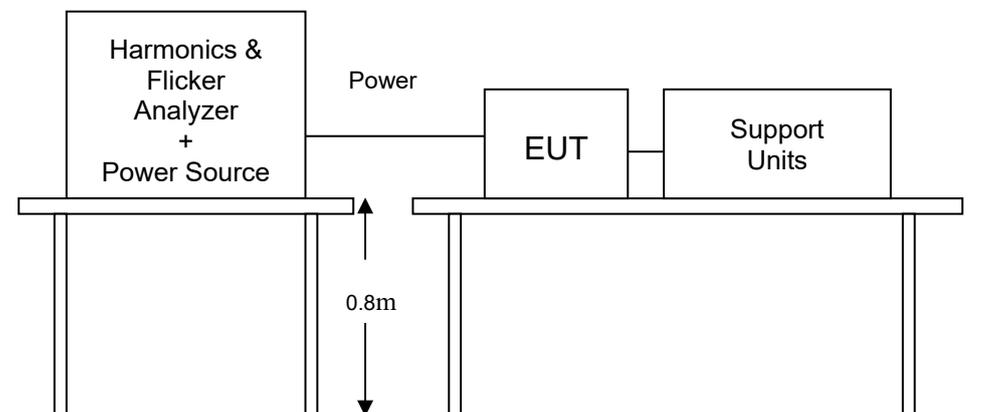
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Signal Conditioning Unit	Teseq	NSG 1000-1	1846A01831	12/19/2019
5kVA Power Source	Teseq	NSG 1007-5	1537A01296	12/19/2019
Software	CTS 4 Ver. 4.2			

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

### 7.5.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-030)

- 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.

### 7.5.4. TEST SETUP



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

Report No.: T190516D16-E

### 7.5.5. TEST RESULTS

<b>Observation Period (Tp)</b>	10mins	<b>Test Mode</b>	Operating
<b>Environmental Conditions</b>	22°C, 57% RH, 1002mbar	<b>Tested by</b>	Leon Yu

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	REMARK
P <sub>st</sub>	0.064	1.0	PASS
P <sub>lt</sub>	0.028	0.65	PASS
T <sub>dt</sub> (ms)	0	500	PASS
d <sub>max</sub> (%)	0	4%	PASS
dc (%)	0	3.3%	PASS

**Note:** None.

Report No.: T190516D16-E

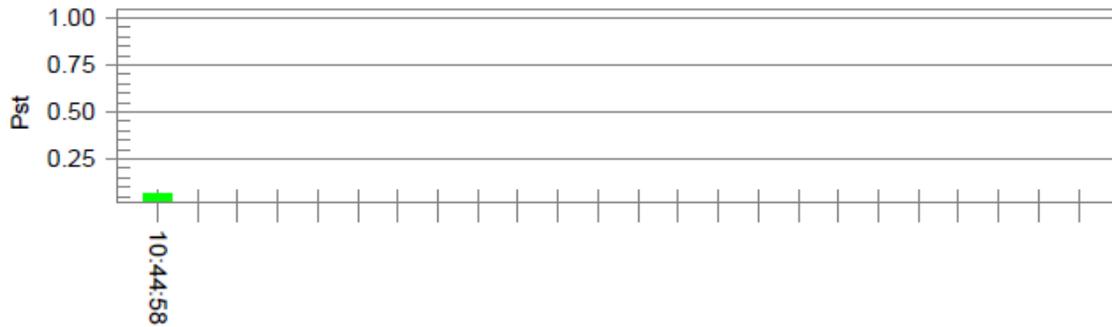
### Test result of EN 61000-3-3

Test Result: Pass

Status: Test Completed

Pst<sub>i</sub> and limit line

European Limits



Plt and limit line



**Parameter values recorded during the test:**

Vrms at the end of test (Volt):	229.81		
T-max (mS):	0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.00	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.064	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.028	Test limit:	0.650 Pass

Report No.: T190516D16-E

## 8 IMMUNITY TEST

### 8.1. GENERAL DESCRIPTION

Product Standard	EN 61000-6-1: 2007	
	Test Type	Minimum Requirement
<b>Basic Standard, Specification, and Performance Criterion required</b>	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 with 80% AM. 1kHz Modulation 1400 ~ 2000 MHz, 3V/m with 80% AM. 1kHz Modulation 2000 ~ 2700 MHz, 1V/m with 80% AM. 1kHz Modulation 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 $\mu$ s Open Circuit Voltage, 8 /20 $\mu$ s Short Circuit Current, AC Power Port ~ line to line: 1kV, line to earth: 2kV DC Power Port ~ line to line and line to earth: 0.5kV Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test - CS: AC Power Port; DC Power Port; Signal Ports and Telecommunication Ports: 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	<b>Voltage Dips:</b> i) 0% residual for 0.5 at 50Hz cycle 0% residual for 1 at 50Hz cycle Performance Criterion B ii) 70% residual for 25/30 at 50/60Hz cycles Performance Criterion C <b>Voltage Interruptions:</b> 0% residual for 250/300 at 50/60Hz cycles Performance Criterion C

## 8.2. GENERAL PERFORMANCE CRITERIA DESCRIPTION

<p><b>Criteria A:</b></p>	<p>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.</p>
<p><b>Criteria B:</b></p>	<p>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.</p>
<p><b>Criteria C:</b></p>	<p>Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.</p>

Report No.: T190516D16-E

### 8.3. ELECTROSTATIC DISCHARGE (ESD)

#### 8.3.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-2
<b>Discharge Impedance:</b>	330 ohm / 150 pF
<b>Discharge Voltage:</b>	Air Discharge: 2 ; 4 ; 8 kV (Direct) Contact Discharge: 2 ; 4 kV (Direct/Indirect)
<b>Polarity:</b>	Positive & Negative
<b>Number of Discharge:</b>	Minimum 10 times at each test point
<b>Discharge Mode:</b>	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	09/19/2019
ESD Simulator	Teseq	NSG 438	1581	01/27/2020
Thermo-Hygro Meter	Wisewind	N/A	SD-S017	09/26/2019

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

Report No.: T190516D16-E

**8.3.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-022)

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.

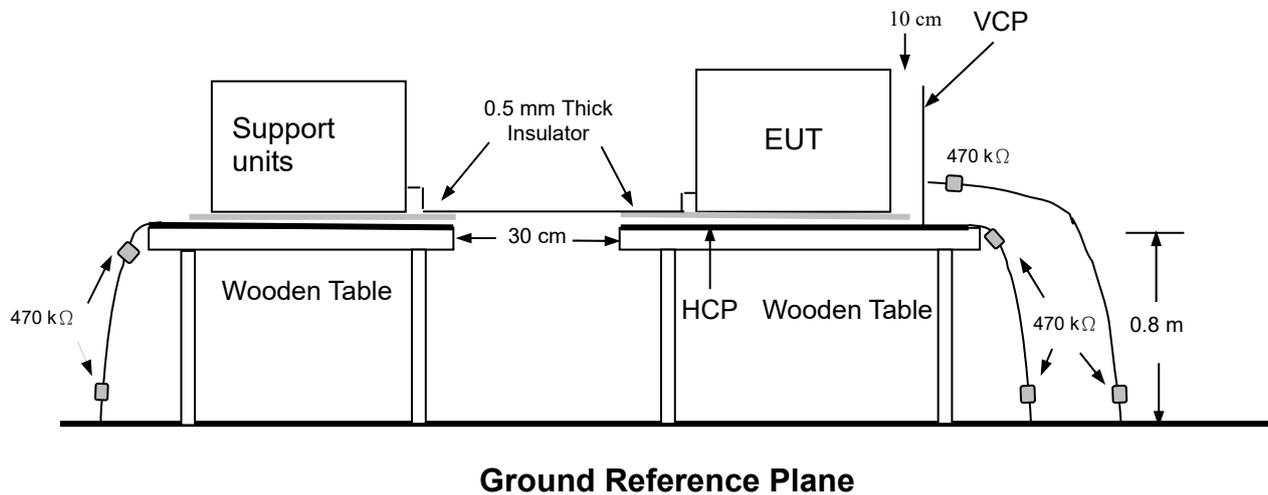
## b) Air discharges at slots and apertures and insulating surfaces:

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.

Report No.: T190516D16-E

### 8.3.5. TEST RESULTS

Temperature	18°C	Humidity	57% RH
Pressure	1009mbar	Tested By	Stanley Cheng
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 <input type="checkbox"/> 3

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 type="checkbox"/> A <input checked="" type="checkbox"/> B	Note <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	Note <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	Note <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	Note <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3
Top	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	Note <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3
Bottom	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> A <input checked="" type="checkbox"/> B	Note <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> 3

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 <input type="checkbox"/> 3
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 <input type="checkbox"/> 3
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 <input type="checkbox"/> 3
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 <input type="checkbox"/> 3

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 <input type="checkbox"/> 3
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 <input type="checkbox"/> 3
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 <input type="checkbox"/> 3
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 <input type="checkbox"/> 3

- NOTE:**
1. There was no change compared with initial operation during the test.
  2. No discharge point.
  3. As ±4kV contact discharge test, there were generated flickers on the display and data accessing via LAN was paused. It could become normal after test stop.

Report No.: T190516D16-E

## 8.4. RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD (RS)

### 8.4.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-3
<b>Frequency Range:</b>	80-1000MHz, 1400-2000MHz, 2000-2700MHz
<b>Field Strength:</b>	3V/m, 3V/m, 1V/m
<b>Modulation:</b>	1kHz sine Wave, 80%, AM Modulation.
<b>Frequency Step:</b>	1 % of preceding frequency value
<b>Polarity of Antenna:</b>	Horizontal and Vertical
<b>Test Distance:</b>	3 m
<b>Antenna Height:</b>	1.5 m

### 8.4.2. TEST INSTRUMENT

844 RS Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Electric Field Probe	AR	FL7006	0338955	05/06/2020
Field of Calibration	CCS	Chamber#RS	80-1000MHz	04/23/2020
Power Sensor	Boonton	51013-4E	35812	01/28/2020
Power Sensor	Boonton	51013-4E	2972	01/28/2020
RF Power Meter	Boonton	4242-01-02	14357	01/28/2020
Thermo-Hygro Meter	Wisewind	N/A	SD-S019	10/28/2019
Broadband Antenna	AR	AT1080	311819	N.C.R
Power Amplifier	Milmega	80RF1000-600	1079361	N.C.R
Signal Generator	Agilent	N5181A	MY47421336	11/18/2019
Field of Calibration	CCS	Chamber#RS	1-3GHz	03/06/2020
Direction Coupler	AR	DC7200	0343647	N.C.R
Horn Antenna	EMCO	3115	5761	N.C.R
Power Amplifier	AR	60S1G3	302728	N.C.R
Software	SW1005 Relrase 1.4.exe			

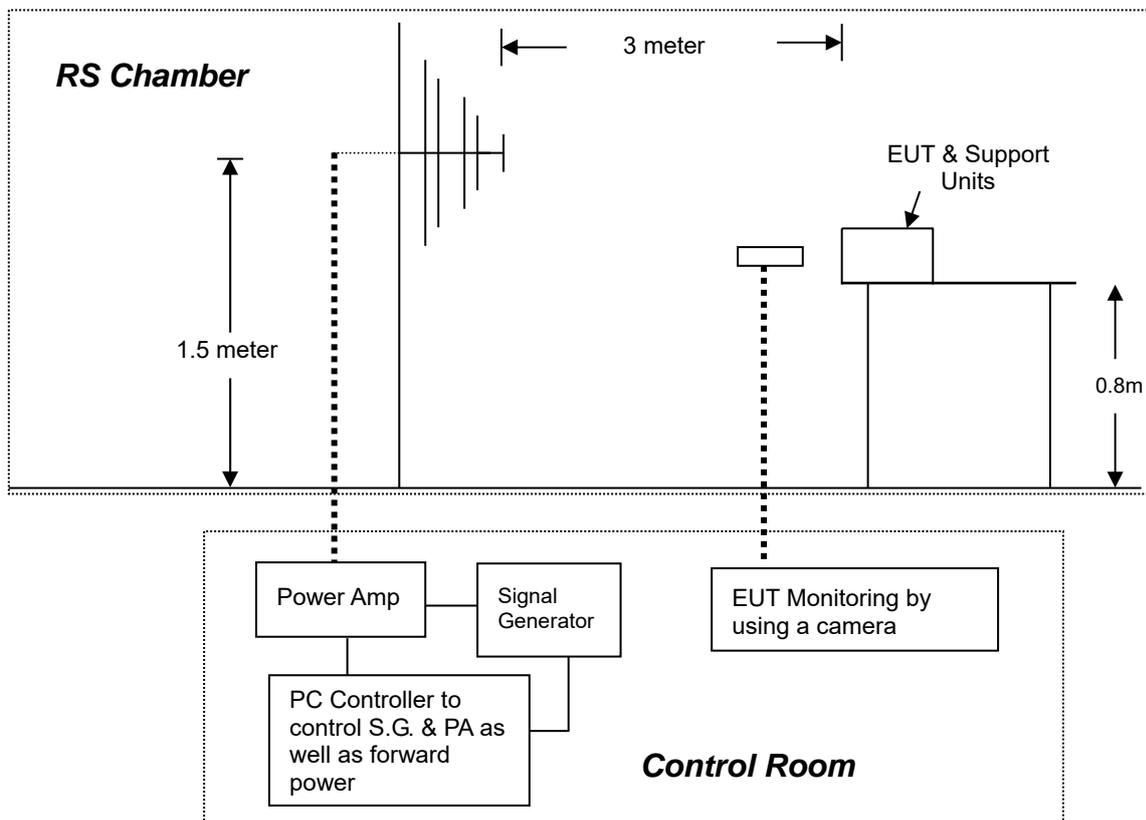
- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. N.C.R.= No Calibration required.

Report No.: T190516D16-E

**8.4.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-023)

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 to 2700 MHz, with the signal 80% amplitude modulated with a 1kHz sine-wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  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.

Report No.: T190516D16-E

### 8.4.5. TEST RESULTS

<b>Temperature</b>	25°C	<b>Humidity</b>	53% RH
<b>Pressure</b>	1007mbar	<b>Dwell Time</b>	3 sec.
<b>Tested By</b>	Leon Yu	<b>Required Passing Performance</b>	<b>Criterion A</b>

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 ~ 2000	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 ~ 2000	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 ~ 2000	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 ~ 2000	V&H	270	3	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
2000 ~ 2700	V&H	0	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
2000 ~ 2700	V&H	90	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
2000 ~ 2700	V&H	180	1	<input checked="" type="checkbox"/> A <input type="checkbox"/> B	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
2000 ~ 2700	V&H	270	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 the initial operation during the test.

Report No.: T190516D16-E

## 8.5. ELECTRICAL FAST TRANSIENT (EFT)

### 8.5.1. TEST SPECIFICATION

**Basic Standard:** IEC 61000-4-4

**Test Voltage:** AC Power Line: 1kV  
Signal Ports and Telecommunication Ports: 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	07/08/2019
EMC Test System	Teseq	NSG 3060	1718	11/12/2019
Software	WIN 3000Ver. 1.3.2			

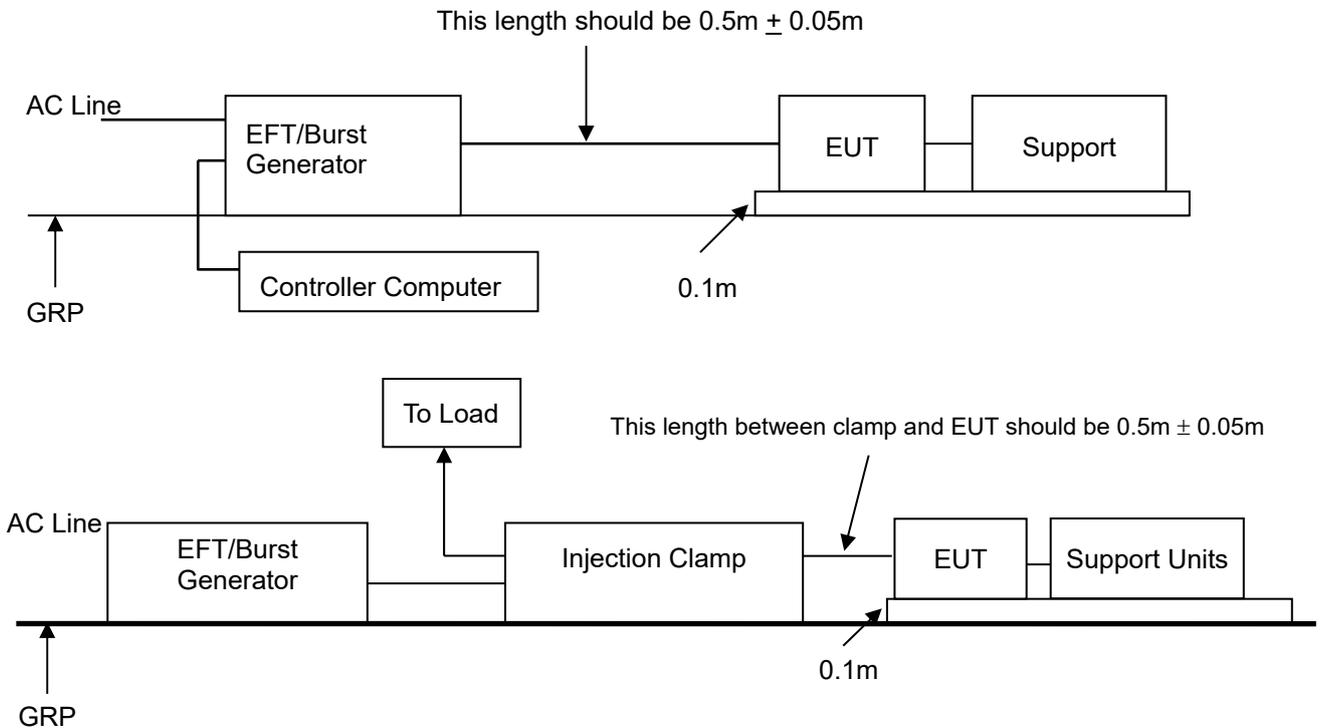
**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. N.C.R.= No Calibration required.

### 8.5.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-024)

- 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.

Report No.: T190516D16-E

### 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.

Report No.: T190516D16-E

### 8.5.5. TEST RESULTS

<b>Temperature</b>	22°C	<b>Humidity</b>	52% RH
<b>Pressure</b>	1007mbar	<b>Tested By</b>	Leon Yu
<b>Required Passing Performance</b>		<b>Criterion B</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.

Report No.: T190516D16-E

## 8.6. SURGE IMMUNITY TEST

### 8.6.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-5
<b>Wave-Shape:</b>	Combination Wave 1.2/50 $\mu$ s Open Circuit Voltage 8/20 $\mu$ s Short Circuit Current
<b>Test Voltage:</b>	AC Power Port~ line to line: 1kV, line to ground: 2kV
<b>Surge Input/Output:</b>	AC Power Line: L-N / L-PE / N-PE
<b>Generator Source Impedance:</b>	2 ohm between networks 12 ohm between network and ground
<b>Polarity:</b>	Positive/Negative
<b>Phase Angle:</b>	0° / 90° / 180° / 270°
<b>Pulse Repetition Rate:</b>	1 time / min. (maximum)
<b>Number of Tests:</b>	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	1505	01/29/2020
EMC Test System	Teseq	NSG 3060	1718	11/12/2019
Software	WIN 3000Ver. 1.3.2			

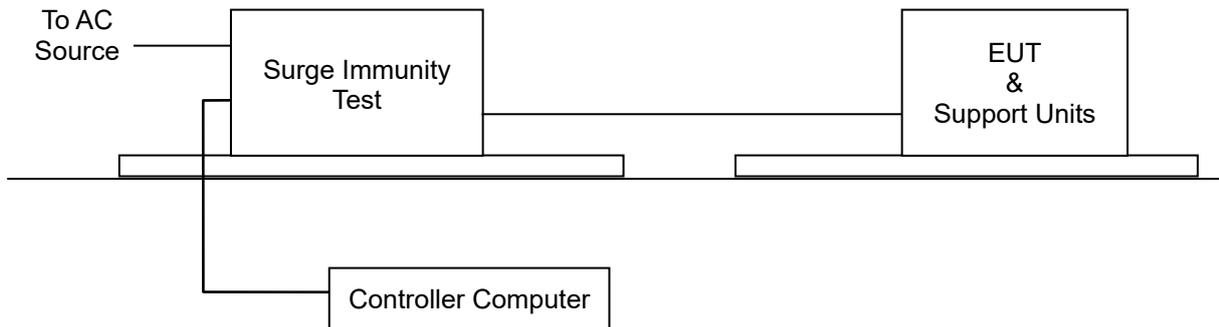
**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. N.C.R.= No Calibration required.

Report No.: T190516D16-E

**8.6.3. TEST PROCEDURE** (please refer to measurement standard or CCS SOP PA-025)

- 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**

<b>Temperature</b>	22°C	<b>Humidity</b>	53% RH
<b>Pressure</b>	1004mbar	<b>Tested By</b>	Leon Yu
<b>Required Passing Performance</b>		<b>Criterion B</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

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

Report No.: T190516D16-E

## 8.7. CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

### 8.7.1. TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-6
<b>Frequency Range:</b>	0.15 MHz - 80 MHz
<b>Field Strength:</b>	3 Vrms
<b>Modulation:</b>	1kHz Sine Wave, 80%, AM Modulation
<b>Frequency Step:</b>	1 % of preceding frequency value
<b>Coupled cable:</b>	Power Mains, Unshielded; RJ45 Line, Unshielded
<b>Coupling device:</b>	CDN-M2 (2 wires); CDN-T8

### 8.7.2. TEST INSTRUMENT

CS Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
CDN	SCHAFFNER	CDN M225	16500	12/03/2019
CDN	TESEQ	CDN T400A	28547	12/03/2019
CDN	TESEQ	CDN S751A	37469	06/19/2019
CDN	TESEQ	CDN T8-10	40378	12/02/2019
CDN	Teseq	CDN M016	35821	01/14/2020
CDN	FCC	FCC-801-M3-25A	9973	12/02/2019
Immunity Test System	TESEQ	NSG 4070	39581	12/04/2019
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 (please refer to measurement standard or CCS SOP PA-026)

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.

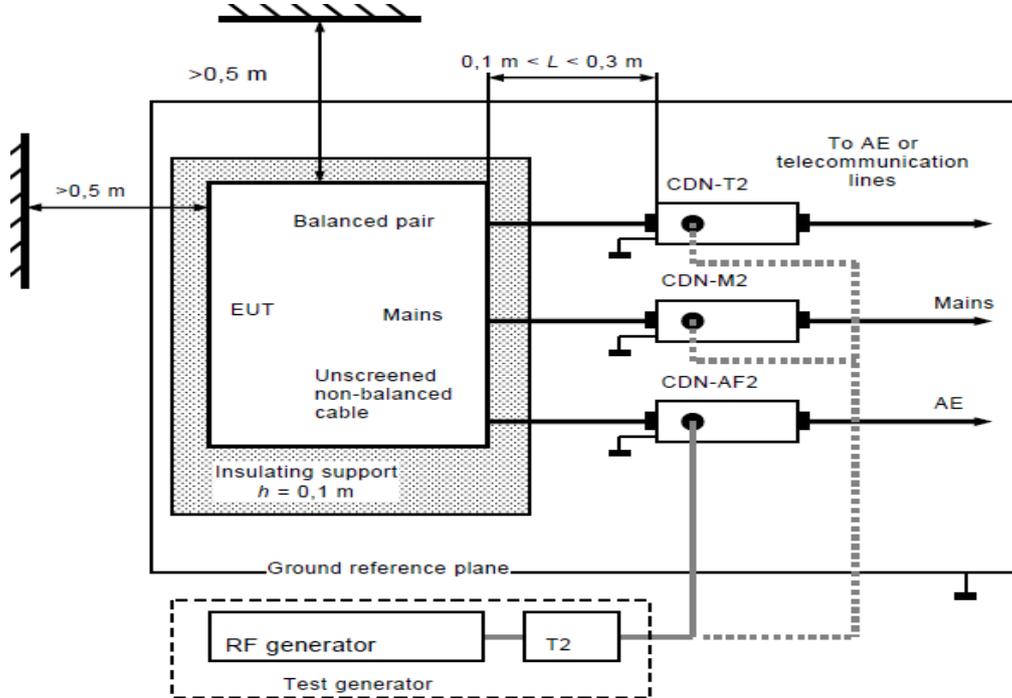
The frequency range was swept from 150 kHz to 80MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal was modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate was  $1.5 \times 10^{-3}$  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.

Report No.: T190516D16-E

### 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	20°C	Humidity	59% RH
Pressure	1009mbar	Dwell Time	3 sec.
Tested By	Stanley Cheng	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.

Report No.: T190516D16-E

## 8.8. POWER FREQUENCY MAGNETIC FIELD

### 8.8.1. TEST SPECIFICATION

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

### 8.8.2. TEST INSTRUMENT

Immunity Shield Room				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
AC/DC Clamp Meter	Fluke	353	33360025	07/03/2019
Magnetic Field Coil	Teseq	INA 703 W/ 2141	1976 / 1413	03/31/2020
Magnetic Field Meter	Sypris	4080	0247	11/01/2019
5kVA Power Source	Teseq	5001IX-208-TSQ	1207A03643	03/31/2020
Software	Win2120Ver. 5.0			

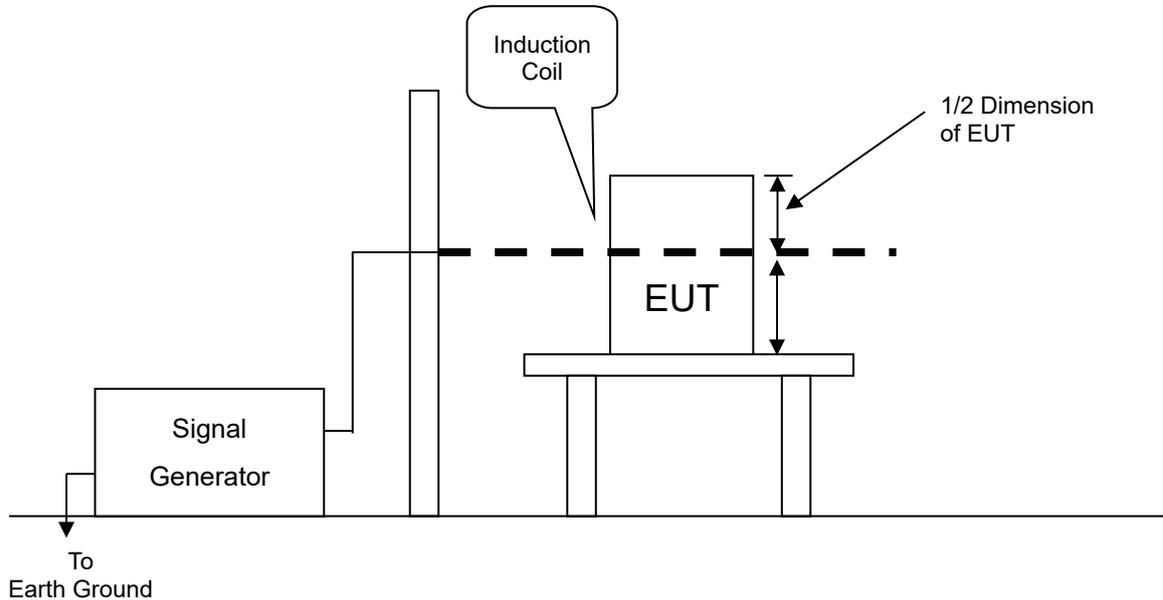
**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. N.C.R.= No Calibration required.

### 8.8.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-027)

- 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.

Report No.: T190516D16-E

### 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	23°C	Humidity	55% RH
Pressure	1001mbar	Tested By	Leon Yu
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.

Report No.: T190516D16-E

## 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	05/14/2020
EMC Test System	Teseq	NSG 3060	1718	11/12/2019
Software	WIN 3000Ver. 1.3.2			

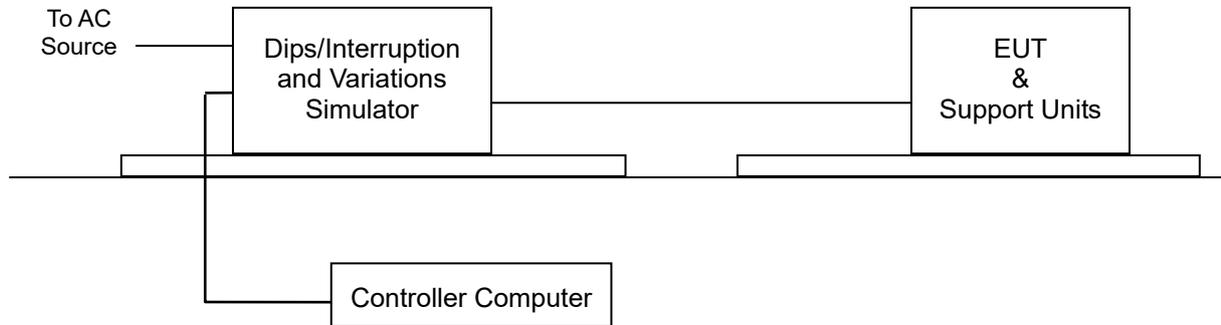
**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. N.C.R.= No Calibration required.

### 8.9.3. TEST PROCEDURE (please refer to measurement standard or CCS SOP PA-028)

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.

Report No.: T190516D16-E

### 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	51% RH
Pressure	1004mbar	Tested By	Leon Yu
Required Passing Performance	<b>Criterion B: i) 0% residual 0.5 Cycle at 50Hz</b> <b>0% residual 1 Cycle at 50Hz</b> <b>Criterion C: ii) 70% residual 25/30 Cycles at 50/60Hz</b> <b>iii) 0% residual for 250/300 Cycles at 50/60Hz</b>		

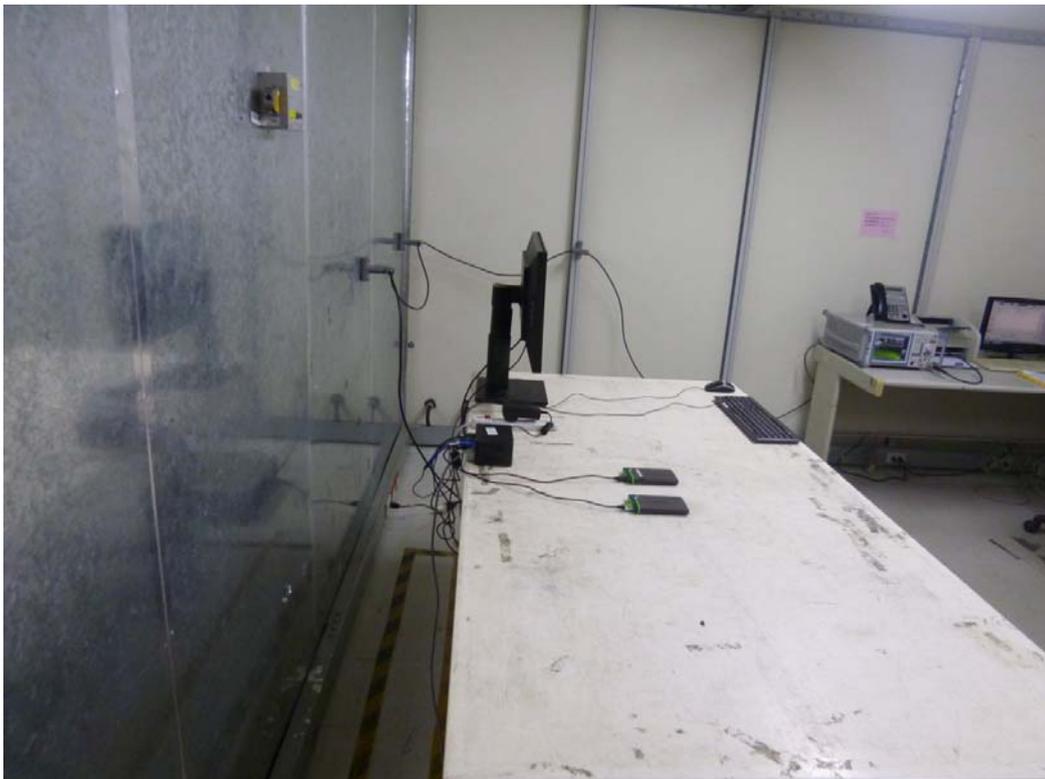
Test Power: 230Vac, 50Hz				
Voltage (% Residual)	Duration (Cycle)	Performance Criterion	Observation	Test Result
0	0.5	<input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C	Note <input checked="" type="checkbox"/> 1 <input type="checkbox"/> 2	PASS
0	1	<input checked=""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



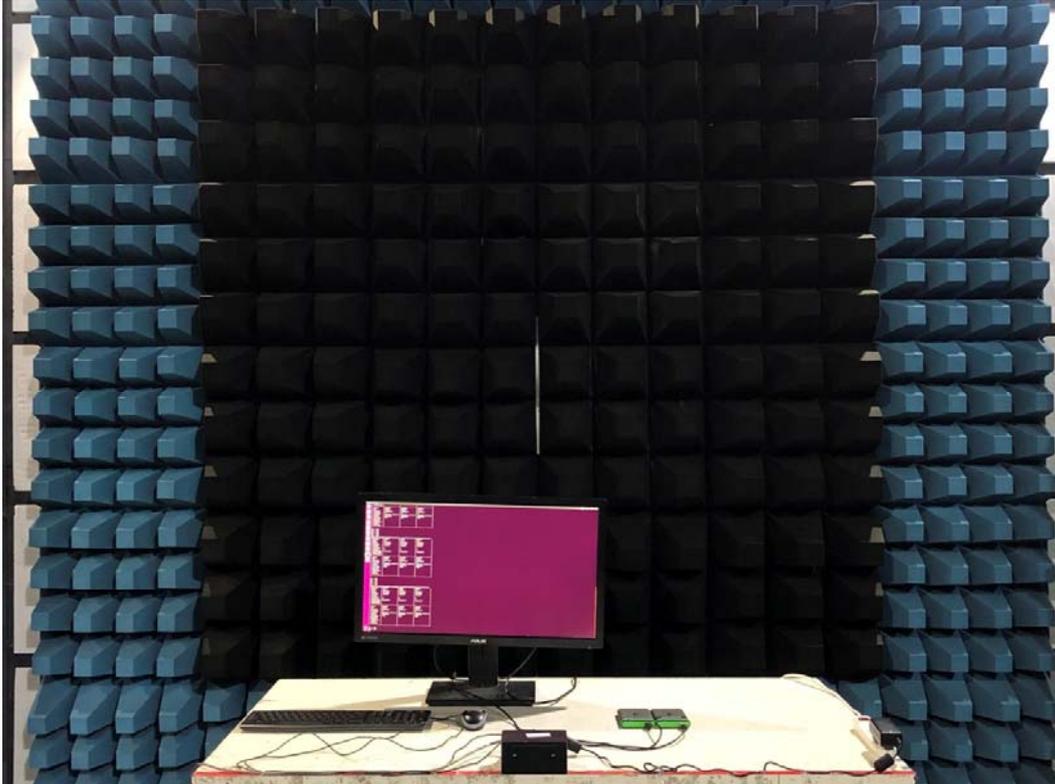
## Harmonic & Flicker Test



## ESD Test



## RS Test



## EFT Test



## EFT For I/O Test



## Surge Test



Report No.: T190516D16-E

## CS Test



## CS For I/O Test



## PFMF Test



## Voltage Dips / Interruptions Test

