



## *EMC COMPLIANCE TEST REPORT*

### **The product**

<b>Equipment Under Test</b>	: Uninterruptible Power Supply
<b>Model Number</b>	: BX1400UI
<b>Product Series</b>	: BX1400Uxxxxxxxx (x = 0-9, A-Z, -, or nil)
<b>Report Number</b>	: HA200290-CE
<b>Issue Date</b>	: 18-May-2020

is produced by

**American Power Conversion Holdings Inc., Taiwan Branch**  
**5F., No. 189, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 11494, Taiwan**



**HongAn TECHNOLOGY CO., LTD.**  
**HongAn TECHNOLOGY EMC Laboratory**

NO.15-1, CWEISHUH KENG, CWEIPIN VILLAGE, LINKOU DIST, NEW TAIPEI CITY, TAIWAN, R. O. C.

**TEL:** +886-2-26030362 **FAX:** +886-2-26019259 **E-mail:** hatlab@ms19.hinet.net

### **Caution :**

This report sets forth our findings solely with respect to the test sample. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment. Please note that the measurement uncertainty are provided for informational purpose only and are not used in determining the Pass/Fail results. This test report shall not be reproduced without written approval of HongAn TECHNOLOGY EMC Laboratory.

The relevant information of the content of this test report is provided by the customer. For the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error, which will affect the validity of the results of this test report, the laboratory will not be liable for related responsibilities.



# Contents

<b>1</b>	<b>General Description</b>	<b>8</b>
1.1	Description of EUT	8
1.2	Test Facility	9
1.3	Test Instruments	9
1.4	Test Methodolgy	11
1.5	Auxiliary Equipments	11
1.6	Block Diagram	12
1.7	Identifying the Final Test Mode	12
1.8	Final Test Mode	12
1.9	Condition of Power Supply	12
1.10	EUT Configuration	12
1.11	Performance criteria for immunity tests	13
<b>2</b>	<b>Conducted Emission Test</b>	<b>14</b>
2.1	Test Instruments	14
2.2	Test Arrangement and Procedure	14
2.3	Conducted Limit	15
2.4	Test Result	15
<b>3</b>	<b>Radiated Emission Test</b>	<b>20</b>
3.1	Test Instruments	20
3.2	Test Arrangement and Procedure	20
3.3	Radiated Limit	21
3.4	Test Result	21
<b>4</b>	<b>Harmonic Current Emission Measurement</b>	<b>26</b>
4.1	Test Instruments	26
4.2	Test Configuration and Procedure	26
4.3	EUT Operation Condition	27
4.4	Test Limit	27
4.5	Test Result	27
<b>5</b>	<b>Electrostatic Discharge Immunity Test</b>	<b>30</b>
5.1	Test Instruments	30
5.2	Test Configuration and Procedure	30
5.3	Test Result	31
<b>6</b>	<b>Radio-frequency, Electromagnetic Field Immunity Test</b>	<b>32</b>
6.1	Test Instruments	32
6.2	Test Configuration and Procedure	32



6.3	Test Result	33
<b>7</b>	<b>Electrical Fast Transient Test</b>	<b>34</b>
7.1	Test Instrument	34
7.2	Test Configuration and Procedure	34
7.3	Test Result	35
<b>8</b>	<b>Surge Immunity Test</b>	<b>36</b>
8.1	Test Instrument	36
8.2	Test Configuration and Procedure	36
8.3	Test Result	37
<b>9</b>	<b>Radio-frequency, Conducted Disturbances Immunity Test</b>	<b>38</b>
9.1	Test Instruments	38
9.2	Test Configuration and Procedure	38
9.3	Test Result	39
<b>10</b>	<b>Power Frequency Magnetic Field Immunity Test</b>	<b>40</b>
10.1	Test Instruments	40
10.2	Test Configuration and Procedure	40
10.3	Test Result	41
<b>11</b>	<b>Low Frequency Signals Immunity Test</b>	<b>42</b>
11.1	Test Instrument	42
11.2	Test Configuration and Procedure	42
11.3	Test Result	42
<b>12</b>	<b>Photographs of Test</b>	<b>43</b>
12.1	Power Line Conducted Test	43
12.2	Radiated Emission Test	44
12.3	Harmonic Current Measurement	45
12.4	Electrostatic Discharge Immunity Test	45
12.5	Radio-frequency, Electromagnetic Field Immunity Test	46
12.6	Electrical Fast Transient / Burst Immunity Test	46
12.7	Surge Immunity Test	47
12.8	Radio-frequency, Conducted Disturbances Immunity Test	47
12.9	Power Frequency Magnetic Field Immunity Test	48
<b>13</b>	<b>Photographs of EUT</b>	<b>49</b>
<b>14</b>	<b>Photographs of ESD Test Points</b>	<b>57</b>



## Release control Record

Report Version	Description	Issued Date
V00	Original release.	18-May-2020



# Verification

**Applicant** : American Power Conversion Holdings Inc., Taiwan Branch

**Manufacturer** : American Power Conversion Holdings Inc., Taiwan Branch

**Equipment Under Test** : Uninterruptible Power Supply

**Model Number** : BX1400UI

**Product Series** : BX1400Uxxxxxxxx (x = 0-9, A-Z, -, or nil)

**Sample Received Date** : 21-Apr-2020

**Test Result** : Complied

**Test Standard** :

Emission:	Immunity:
<input checked="" type="checkbox"/> EN IEC 62040-2:2018 Environment : First Classification of EUT : Category C1	<input checked="" type="checkbox"/> EN IEC 62040-2:2018 Environment : First Classification of EUT : Category C1
<input checked="" type="checkbox"/> IEC 61000-3-2:2014	<input checked="" type="checkbox"/> IEC 61000-4-2:2008
	<input checked="" type="checkbox"/> IEC 61000-4-3:2006+A1:2007+A2:2010
	<input checked="" type="checkbox"/> IEC 61000-4-4:2012
	<input checked="" type="checkbox"/> IEC 61000-4-5:2014
	<input checked="" type="checkbox"/> IEC 61000-4-6:2013
	<input checked="" type="checkbox"/> IEC 61000-4-8:2009
	<input checked="" type="checkbox"/> IEC 61000-2-2:2002

## Remark:

This report details the results of the test carried out on one sample. This report shows the EUT is technically compliant with the EN IEC 62040-2 official requirements. This report applies to the above sample only and shall not be reproduced in part without written approval of HongAn Technology Co., Ltd.

**Documented by:** Mindy Liu **Date:** 18-May-2020  
Mindy Liu

**Tested by:** Ziv Hsu **Date:** 08-May-2020  
Ziv Hsu

**Approved by:** Adam Yang **Date:** 18-May-2020  
Adam Yang



## Summary of Test Result - Emission

Emission			
Test Standard	Test Item	Test Result	Remark
EN IEC 62040-2 Category C1	Conducted Emission	Pass	Highest Emission-(LINE mode) L: 0.279MHz, A.V.41.58dBuV, Margin -9.27dB N: 1.000MHz, A.V.39.10dBuV, Margin -6.90 dB
			Highest Emission-(Battery mode) L: 17.661MHz, Q.P.47.97dBuV, Margin -12.03dB N: 0.277MHz, Q.P.49.92dBuV, Margin -10.98 dB
EN IEC 62040-2 Category C1	Radiated Emission	Pass	Highest Emission-(LINE mode) H: 266.268MHz, 28.05dBuV, Margin -8.95dB Antenna Height 342 cm, Turntable Angle 130° V: 85.481MHz, 21.75dBuV, Margin-8.25 dB Antenna Height 100 cm, Turntable Angle 130°
			Highest Emission-(Battery mode) H: 148.340MHz, 19.63dBuV, Margin -10.37dB Antenna Height 381 cm, Turntable Angle 83° V: 112.130MHz, 21.10dBuV, Margin-8.90 dB Antenna Height 100 cm, Turntable Angle 125°
IEC 61000-3-2	Harmonic	Pass	Refer to Page 28~29

## Measurement Uncertainty

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

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Test Item	Expanded Uncertainty (±)	Maximum allowable uncertainty (±)
Conducted emission at AC mains power using a V-AMN, 150kHz - 30MHz	3.04dB	3.4dB ( $U_{\text{Cispr}}$ )
Conducted emission at telecommunication port using AAN, 150kHz - 30MHz	4.71dB	5.0dB ( $U_{\text{Cispr}}$ )
Radiated emission, 30MHz-1GHz	5.04dB	6.3dB ( $U_{\text{Cispr}}$ )

This reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of  $k = 2$ , providing a level of confidence of approximately 95%.



## Summary of Test Result – Immunity

Immunity (Environment : First or / Classification of EUT : Category C1)				
Test Standard	Test Item	Performance Criteria	Observed Result Class	Test Result
IEC 61000-4-2	Electrostatic Discharge	B	A	Pass
IEC 61000-4-3	Radiated Susceptibility	A	A	Pass
IEC 61000-4-4	Electrical Fast Transient	B	A	Pass
IEC 61000-4-5	Surge	B	A	Pass
IEC 61000-4-6	Conducted Susceptibility	A	A	Pass
IEC 61000-4-8	Magnetic Field	B	A	Pass
IEC 61000-2-2	Low Frequency Signals Immunity Test	A	A	Pass



# 1 General Description

## 1.1 Description of EUT

<b>Equipment Under Test</b>	:	Uninterruptible Power Supply
<b>Model Number</b>	:	BX1400UI
<b>Product Series</b>	:	BX1400Uxxxxxxxx (x = 0-9, A-Z, -, or nil)
<b>Applicant</b>	:	American Power Conversion Holdings Inc., Taiwan Branch
<b>Address of Applicant</b>	:	5F., No. 189, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 11494, Taiwan
<b>Manufacturer</b>	:	American Power Conversion Holdings Inc., Taiwan Branch
<b>Address of Manufacturer</b>	:	5F., No. 189, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 11494, Taiwan
<b>Power Supply</b>	:	Input: AC220-240V, 6.1A, 50/60Hz, 1 $\phi$ <input type="checkbox"/> Shielded <input checked="" type="checkbox"/> Non-Shielded <input checked="" type="checkbox"/> Detachable, 1.8m <input type="checkbox"/> Un-Detachable <input type="checkbox"/> w Ferrite Core <input checked="" type="checkbox"/> w/o Ferrite Core Output: AC220-240V, 6.1A, 50/60Hz, 1400VA, 700W, 1 $\phi$ <input type="checkbox"/> Shielded <input checked="" type="checkbox"/> Non-Shielded <input checked="" type="checkbox"/> Detachable, 1.5m <input type="checkbox"/> Un-Detachable <input type="checkbox"/> w Ferrite Core <input checked="" type="checkbox"/> w/o Ferrite Core
<b>I/O Port</b>	:	Battery Backup +Surge Protection Port*6, INPUT Port*1, DSL/Modem/Fax/Phone Port*2, Power Chute USB Port*1,
<b>Data Cable</b>	:	N/A
<b>Description of EUT</b>	:	<b>Dimensions</b> : 21.5 cm (L) X 13 cm (W) X 33.6 cm (H) <b>Position</b> : <input checked="" type="checkbox"/> Table-top / <input type="checkbox"/> Floor-standing <b>Environment</b> : <input checked="" type="checkbox"/> First environment / <input type="checkbox"/> Second environment <b>Category of Equipment</b> : <input checked="" type="checkbox"/> C1 <input type="checkbox"/> C2 <input type="checkbox"/> C3 <input type="checkbox"/> C4 <b>Intended Function</b> : The EUT is a Uninterruptible Power Supply. <b>Product Variance</b> : The manufacturer declares that the series products are identical to the main test sample. The difference in product series model is the type of input plug and marking of language. BK500XXXXXXXXXX(" X "can be 0-9, A-Z , " - "or blank )





## 1.2 Test Facility

All the Conducted and Radiated Emission Tests and Immunity Tests are performed at No. 15-1, Cweishuh Keng, Cweipin Village, Linkou, New Taipei City, Taiwan, R.O.C.

## 1.3 Test Instruments

### 1.3.1 Instruments Used for Emission Measurement

Instrument Name	Manufacture	Model Number	Serial Number	Last Cal. Date	Next Cal. Date
LISN	EMCO	3810/2NM	9702-1819	11-Jul-2019	10-Jul-2020
LISN	Rolf Heine Hochfrequenz- technik	NNB-4/32T	00001	10-Jan-2020	09-Jan-2021
RF Current Probe	FCC	F-33-4	53	16-May-2019	15-May-2020
Impedance Stabilization Network (ISN)	TESEQ	ISN T800	49426	06-Sep-2019	05-Sep-2020
Impedance Stabilization Network (ISN)	TESEQ	ISN T8-Cait6	50581	06-Sep-2019	05-Sep-2020
EMI Receiver	R&S	ESR	101970	19-Sep-2019	18-Sep-2020
EMI Receiver	R&S	ESCI 7	100931	08-Aug-2019	07-Aug-2020
Preamplifier	CHASE	CPA 9231A	0405	30-Dec-2019	29-Dec-2020
Bilog Antenna	TESEQ	CBL6111D	25769	11-Feb-2020	10-Feb-2021
Bilog Antenna	TESEQ	CBL6111D	38521	26-Sep-2019	25-Sep-2020
Cable	HongAn	RG 223/U	HA2-CE	23-Aug-2019	22-Aug-2020
Cable	HongAn	8D-FB	HA2-10MSite	23-Aug-2019	22-Aug-2020
Cable	EMCI	EMC104-SM-NM- 1000	191104	28-Nov-2019	27-Nov-2020
Cable	EMCI	EMC104-SM-NM- 8000	191103	28-Nov-2019	27-Nov-2020
Software	Audix	e3	N/A	N/A	N/A
Signal conditioning unit	TESEQ	CCN 1000-1	1918A03073	08-Jul-2019	07-Jul-2020
AC Power Source	TESEQ	NSG 1007	1919A00280	08-Jul-2019	07-Jul-2020
Software	TESEQ	Win2100V4 (Version 4.23.0)	N/A	N/A	N/A

※ The test equipments used are calibrated and can be traced to National ITRI and International Standards.



## 1.3.2 Instruments Used for Immunity Measurement

Instrument Name	Manufacture	Model Number	Serial Number	Last Cal. Date	Next Cal. Date
Electrostatic Discharge Simulator	Noiseken	ESS-B3011	ESS1632985	16-May-2019	15-May-2019
Discharge Gun	Noiseken	GT-30R	ESS1632993	16-May-2019	15-May-2019
Power Generator, Mains Coupler/ Decoupler	ThermoFisher	EMC Pro PLUS	1507189	08-Jul-2019	07-Jul-2020
Capacitor Clamp	ThermoFisher	CCL	1507182	08-Jul-2019	07-Jul-2020
Magnetic Field Immunity Loop	FCC	F-1000-4-819/1 0-L-1M	9953	24-May-2019	23-May-2020
Signal Generator	R&S	SMB100A	110549	18-Sep-2019	17-Sep-2020
Wide Band Amplifier	ifi	CMX50	D019-0200	N/A	N/A
RF Power Amplifier	ar	150W1000	0343919	N/A	N/A
RF Amplifier	ar	15S1G3	306578	N/A	N/A
Double-Ridged Waveguide Horn	EMCO	3115	9912-5992	15-May-2019	14-May-2020
Bilog Antenna	TESEQ	CBL6111D	47016	08-Jul-2019	07-Jul-2020
Broadband Field Meter	Narda	NBM-520	D-0519	25-Oct-2019	24-Oct-2020
Probe	Narda	EF-0691	D-0102	25-Oct-2019	24-Oct-2020
CDN	FCC	FCC-801-M3-3 2A	2019	22-Jan-2020	21-Jan-2021
CDN	FCC	FCC-801-M3-3 2A	20116	14-Feb-2020	13-Feb-2021
Power Sensor	TESEQ	PM6003	074395	01-Aug-2019	31-Jul-2020
Power Sensor	TESEQ	PM6003	074396	01-Aug-2019	31-Jul-2020
Software	Audix	i2	N/A	N/A	N/A
Software	KeyTek	KeyTek- CEWare32	N/A	N/A	N/A

※ The test equipments used are calibrated and can be traced to National ITRI and International Standards.



## 1.4 Test Methodolgy

All Emission Tests were performed according to the procedures specified in EN IEC 62040-2.

All Immunity Tests were performed according to the procedures specified in EN IEC 62040-2.

Deviations from the test standards as below description:

The test configuration is based on customer requirements.

## 1.5 Auxiliary Equipments

### 1.5.1 Provided by HongAn Technology Co., Ltd.

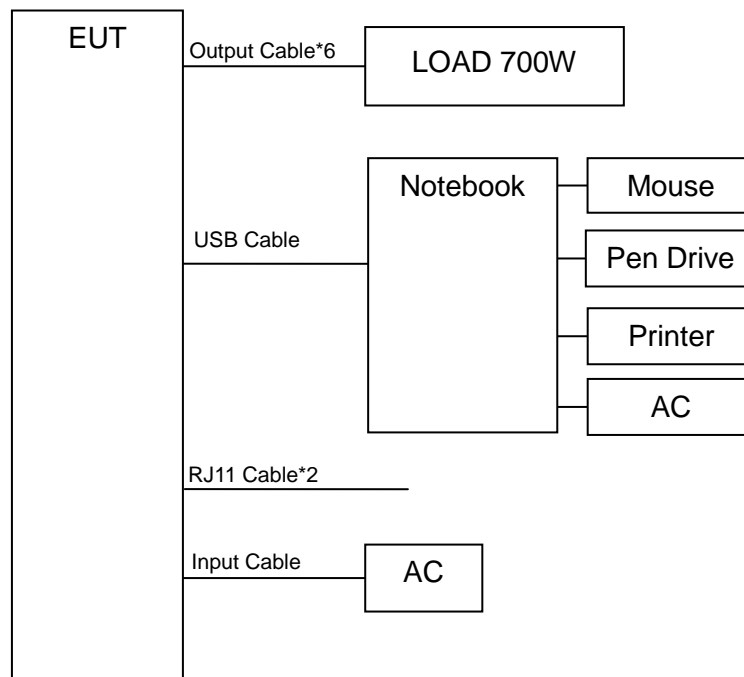
No.	Equipment	Model No.	Serial No.	EMC Approved	Brand	Description	
						Data Cable	Power Cable
1	Notebook	X542U	HBN0CV11S78 3465	CE Mark, FCC DoC, BSMI ID R31018	ASUS	N/A	Adapter to Notebook Input : AC 100-240V~50/60Hz 1.6A Output : 19V, 3.42A Non-shielded, Un-detachable, 2.2m, W/O Core
2	Mouse	MO96UOB	96NO35688	CE Mark, FCC DoC, BSMI ID R41108	ASUS	Shielded(Foil) *1.8m	N/A
3	Printer	C6464A	TH14QEBBC4	CE Mark, FCC DoC	Hewlett Packard	Shielded(Briad) *1.8m with EMI core*2	AC to Adapter Unshielded *1.8m, Adapter to Printer Unshielded *1.8m
4	Pen Drive	8G-Micro USB+USB 2.0	N/A	CE Mark	Transcend	Shielded *1.0m	N/A
5	USB Cable	N/A	N/A	N/A	N/A	Shielded, Detachable, 1m, W/O core	N/A
6	RJ11 Cable*2	N/A	N/A	N/A	N/A	Non-Shielded, Detachable, 1m, W/O core	N/A
7	LAMP	200W	N/A	N/A	N/A	N/A	N/A
8	LAMP*5	100W	N/A	N/A	N/A	N/A	N/A

### 1.5.2 Provided by the Manufacturer

No.	Equipment	Model No.	Serial No.	EMC Approved	Brand	Description	
						Data Cable	Power Cable
1	Input Cable	N/A	N/A	N/A	N/A	N/A	Non-Shielded, Detachable, 1.8m, W/O core
2	Output Cable*4	N/A	N/A	N/A	N/A	N/A	Non-Shielded, Detachable, 1.5m, W/O core



## 1.6 Block Diagram



## 1.7 Identifying the Final Test Mode

1. LINE mode (Full load).
2. Battery mode (Full load).

Note: The additional power cords do not increase the disturbance level by 2dB. Therefore the final EMC assessment was performed for the Line mode and Battery mode.

## 1.8 Final Test Mode

1. For Conducted Emission: choosing LINE Mode (Full load) and Battery Mode (Full load).
2. For Radiated Emission: choosing LINE Mode (Full load) and Battery Mode (Full load).
3. For Immunity test: choosing LINE Mode.

## 1.9 Condition of Power Supply

AC 230 V; 50 Hz

## 1.10 EUT Configuration

1. Setup the EUT as shown in Sec.1.4 Block Diagram.
2. Turn on the power of all equipments.
3. Activate the selected Final Test Mode.



## 1.11 Performance criteria for immunity tests

	Criterion A	Criterion B
External and internal indications and metering	Change only during test	Change only during test
Control signals to external devices	No change	Change only temporarily in consistence with the actual UPS mode of operation
Mode of operation <sup>a</sup>	No change	Change only temporarily
<sup>a</sup> At all times, the UPS shall remain within the performance classification as declared by the UPS manufacturer (see IEC 62040-3:2011).		

### 1.11.1 Test Methodology

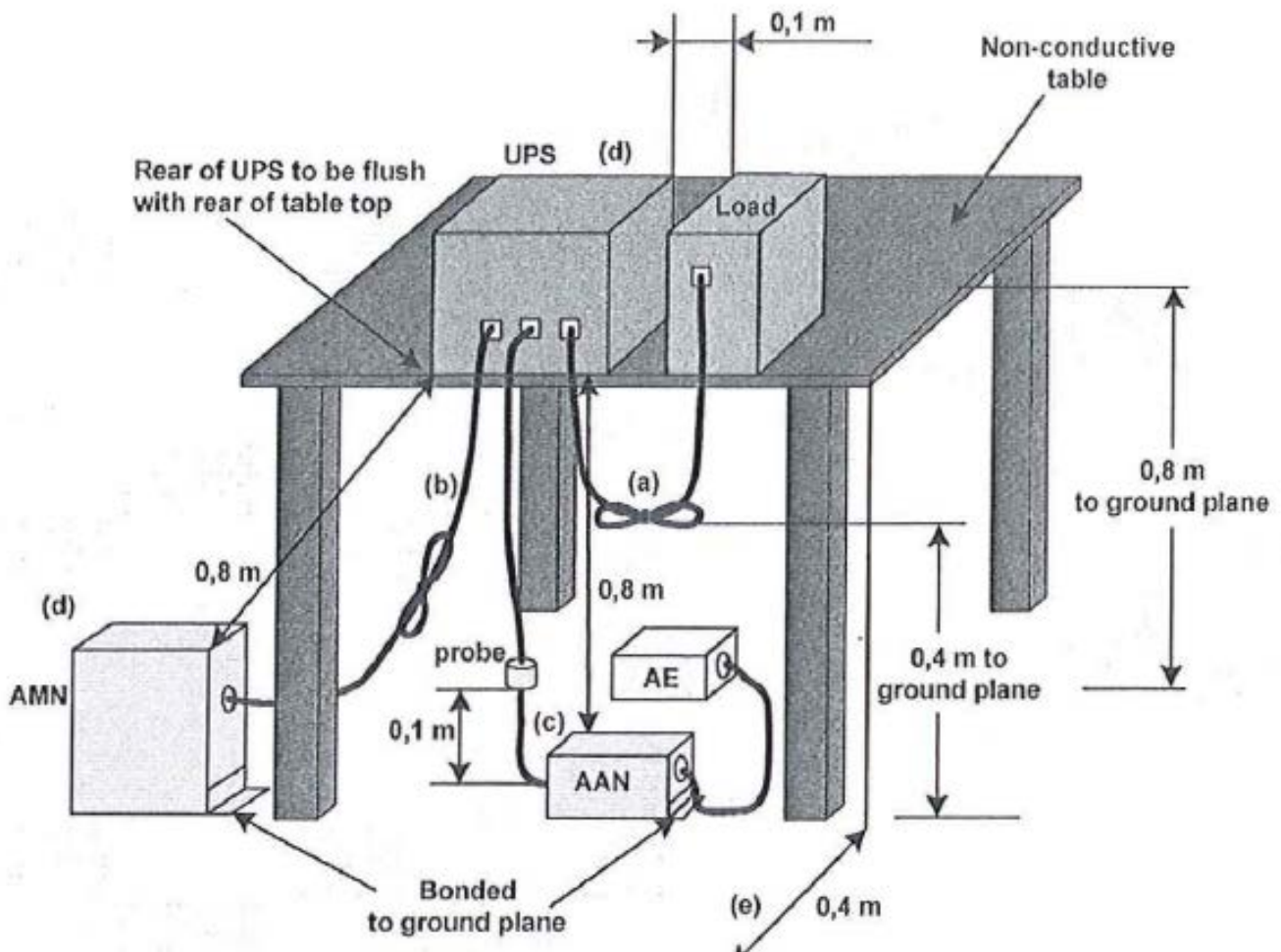
All Emission Tests were performed according to the procedures specified in EN IEC 62040-2. Radiated Emission Test was performed at 10 m distance from antenna to EUT. All Immunity Tests were performed according to the procedures specified in EN IEC 62040-2.

## 2 Conducted Emission Test

### 2.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 2.2 Test Arrangement and Procedure



#### Table-top Equipment

- The EUT was placed on a non-conductive table which was 80 cm above the horizontal coupling plane. The rear of the EUT was 40 cm from the vertical coupling plane.
- The excess interface cables were folded at the cable center into a bundle no longer than 40 cm, so that the bundles were on the table.
- The EUT was connected to the main power through a L.I.S.N. This set up provided 50 ohm / 50  $\mu$ H coupling impedance for the measuring equipment.
- All auxiliary equipment received power from a second L.I.S.N.
- The conducted emissions were measured between the Line Phase and the PE ground and between the Neutral Phase and the PE ground using an EMI Receiver.
- The values were recorded.



## 2.3 Conducted Limit

EN IEC 62040-2

Limits of mains terminal and network port disturbance voltage for category C1 and category C2 UPS in the range 0.15 MHz to 30 MHz

Frequency Range (MHz)	Limits dB( $\mu$ V)							
	<input checked="" type="checkbox"/> Category C1 UPS				<input type="checkbox"/> Category C2 UPS			
	Mains terminal		Network port		Mains terminal		Network port	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.15 to 0.50 <sup>b</sup>	66 to 56 <sup>a</sup>	56 to 46 <sup>a</sup>	84 to 74 <sup>a</sup>	74 to 64 <sup>a</sup>	79	66	97 to 87 <sup>a</sup>	84 to 74 <sup>a</sup>
0.50 to 5 <sup>b</sup>	56	46	74	64	73	60	87	74
5 to 30	60	50			73	60		
a The limit decreases linearly with the logarithm of the frequency.								
b The lower limit shall apply at the transition frequency.								

Limits of mains terminal and network port disturbance voltage for category C3 UPS in the frequency range 0.15 MHz to 30 MHz

UPS rated output current A	Frequency range (MHz)	Limits dB(μ V)			
		Mains terminal		Network port	
		Quasi-Peak	Average	Quasi-Peak	Average
>16 - 100	0.15 to 0.50 <sup>b</sup>	100	90	110 to 100 <sup>a</sup>	94 to 84 <sup>a</sup>
	0.50 to 5.0 <sup>b</sup>	86	76	100	84
	5.0 to 30.0	90 to 73 <sup>a</sup>	80 to 60 <sup>a</sup>		
>100	0.15 to 0.50 <sup>b</sup>	130	120	110 to 100 <sup>a</sup>	94 to 84 <sup>a</sup>
	0.50 to 5.0 <sup>b</sup>	125	115	100	84
	5.0 to 30.0	115	105		
a The limit decreases linearly with the logarithm of the frequency.					
b The lower limit shall apply at the transition frequency.					

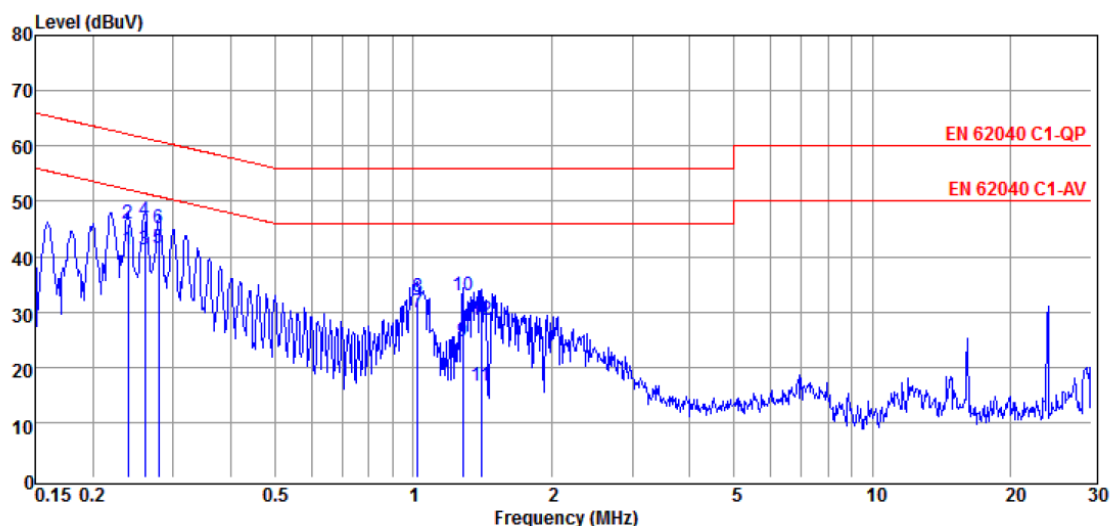
## 2.4 Test Result

**PASS**

The final test data are shown on the following page(s).

**Conducted Emission Test Data (at Mains Terminal)**

Test Site : HA2  
 Model Number : BX1400UI  
 Power phase : LINE  
 Test Voltage : 230V/50Hz  
 Description : LINE mode  
 Test Date : 05-May-2020  
 Temperature : 25°C  
 Humidity : 58%RH  
 Test by : Ziv Hsu



No.	Freq MHz	Reading dBuV	C.F dB	Result dBuV	Limit dBuV	Margin dB	Power Line	Remark
1	0.239	41.24	0.07	41.31	52.13	-10.82	LINE	Average
2	0.239	45.89	0.07	45.96	62.13	-16.17	LINE	QP
3	0.260	41.26	0.08	41.34	51.42	-10.08	LINE	Average
4	0.260	46.43	0.08	46.51	61.42	-14.91	LINE	QP
5	0.279	41.50	0.08	41.58	50.85	-9.27	LINE	Average
6	0.279	45.00	0.08	45.08	60.85	-15.77	LINE	QP
7	1.021	29.74	0.16	29.90	46.00	-16.10	LINE	Average
8	1.021	32.54	0.16	32.70	56.00	-23.30	LINE	QP
9	1.282	24.47	0.18	24.65	46.00	-21.35	LINE	Average
10	1.282	32.73	0.18	32.91	56.00	-23.09	LINE	QP
11	1.403	16.37	0.18	16.55	46.00	-29.45	LINE	Average
12	1.403	28.45	0.18	28.63	56.00	-27.37	LINE	QP

Remark : 1. All readings are Quasi-Peak and Average values.

2. Result = Reading + C.F

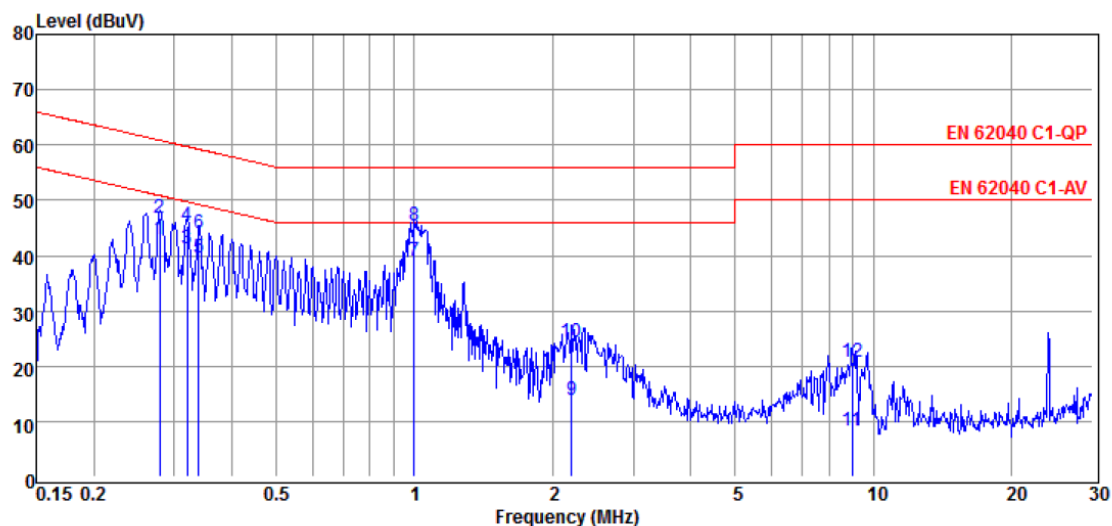
3. Margin = Result – Limit



**Conducted Emission Test Data (at Mains Terminal)**

Test Site : HA2  
Model Number : BX1400UI  
Power phase : NEUTRAL  
Test Voltage : 230V/50Hz  
Description : LINE mode

Test Date : 05-May-2020  
Temperature : 25°C  
Humidity : 58%RH  
Test by : Ziv Hsu



No.	Freq MHz	Reading dB $\mu$ V	C.F dB	Result dB $\mu$ V	Limit dB $\mu$ V	Margin dB	Power Line	Remark
1	0.279	42.77	0.12	42.89	50.85	-7.96	NEUTRAL	Average
2	0.279	46.60	0.12	46.72	60.85	-14.13	NEUTRAL	QP
3	0.320	41.00	0.13	41.13	49.71	-8.58	NEUTRAL	Average
4	0.320	45.17	0.13	45.30	59.71	-14.41	NEUTRAL	QP
5	0.339	39.52	0.13	39.65	49.22	-9.57	NEUTRAL	Average
6	0.339	43.94	0.13	44.07	59.22	-15.15	NEUTRAL	QP
7	1.000	38.91	0.19	39.10	46.00	-6.90	NEUTRAL	Average
8	1.000	45.19	0.19	45.38	56.00	-10.62	NEUTRAL	QP
9	2.201	13.56	0.26	13.82	46.00	-32.18	NEUTRAL	Average
10	2.201	24.00	0.26	24.26	56.00	-31.74	NEUTRAL	QP
11	9.001	7.51	0.73	8.24	50.00	-41.76	NEUTRAL	Average
12	9.001	19.93	0.73	20.66	60.00	-39.34	NEUTRAL	QP

Remark : 1. All readings are Quasi-Peak and Average values.

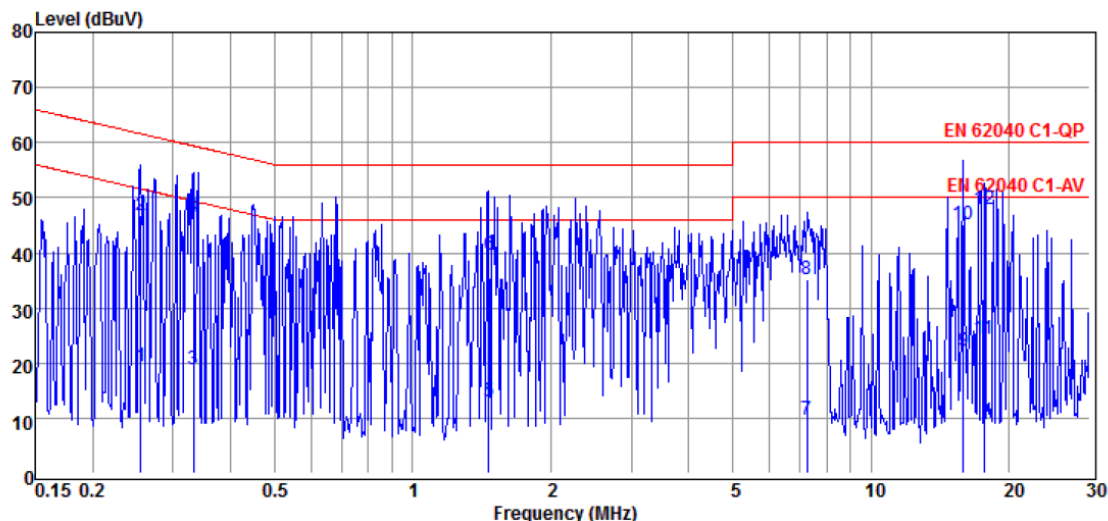
2. Result = Reading + C.F

3. Margin = Result – Limit

**Conducted Emission Test Data (at Mains Terminal)**

Test Site : HA2  
Model Number : BX1400UI  
Power phase : LINE  
Test Voltage : 0V  
Description : Battery mode

Test Date : 05-May-2020  
Temperature : 25°C  
Humidity : 58%RH  
Test by : Ziv Hsu



No.	Freq MHz	Reading dBμV	C.F dB	Result dBμV	Limit dBμV	Margin dB	Power Line	Remark
1	0.255	19.35	0.08	19.43	51.60	-32.17	LINE	Average
2	0.255	46.75	0.08	46.83	61.60	-14.77	LINE	QP
3	0.332	18.70	0.08	18.78	49.40	-30.62	LINE	Average
4	0.332	46.55	0.08	46.63	59.40	-12.77	LINE	QP
5	1.464	12.69	0.19	12.88	46.00	-33.12	LINE	Average
6	1.464	39.44	0.19	39.63	56.00	-16.37	LINE	QP
7	7.252	9.10	0.63	9.73	50.00	-40.27	LINE	Average
8	7.252	34.60	0.63	35.23	60.00	-24.77	LINE	QP
9	15.885	21.11	1.01	22.12	50.00	-27.88	LINE	Average
10	15.885	44.25	1.01	45.26	60.00	-14.74	LINE	QP
11	17.661	23.21	1.08	24.29	50.00	-25.71	LINE	Average
12	17.661	46.89	1.08	47.97	60.00	-12.03	LINE	QP

Remark : 1. All readings are Quasi-Peak and Average values.

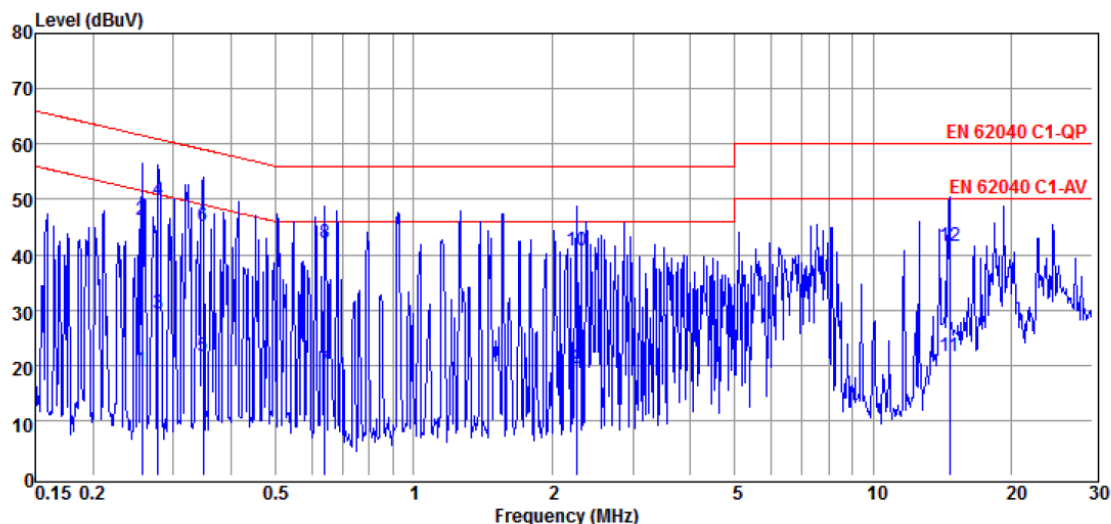
2. Result = Reading + C.F

3. Margin = Result – Limit

**Conducted Emission Test Data (at Mains Terminal)**

Test Site : HA2  
 Model Number : BX1400UI  
 Power phase : NEUTRAL  
 Test Voltage : 0V  
 Description : Battery mode

Test Date : 05-May-2020  
 Temperature : 25°C  
 Humidity : 58%RH  
 Test by : Ziv Hsu



No.	Freq MHz	Reading dBuV	C.F dB	Result dBuV	Limit dBuV	Margin dB	Power Line	Remark
1	0.256	18.92	0.12	19.04	51.56	-32.52	NEUTRAL	Average
2	0.256	46.24	0.12	46.36	61.56	-15.20	NEUTRAL	QP
3	0.277	29.28	0.12	29.40	50.90	-21.50	NEUTRAL	Average
4	0.277	49.80	0.12	49.92	60.90	-10.98	NEUTRAL	QP
5	0.348	21.41	0.14	21.55	49.00	-27.45	NEUTRAL	Average
6	0.348	45.04	0.14	45.18	59.00	-13.82	NEUTRAL	QP
7	0.641	19.07	0.16	19.23	46.00	-26.77	NEUTRAL	Average
8	0.641	41.80	0.16	41.96	56.00	-14.04	NEUTRAL	QP
9	2.273	19.21	0.26	19.47	46.00	-26.53	NEUTRAL	Average
10	2.273	40.41	0.26	40.67	56.00	-15.33	NEUTRAL	QP
11	14.672	20.73	0.92	21.65	50.00	-28.35	NEUTRAL	Average
12	14.672	40.68	0.92	41.60	60.00	-18.40	NEUTRAL	QP

Remark : 1. All readings are Quasi-Peak and Average values.

2. Result = Reading + C.F

3. Margin = Result – Limit

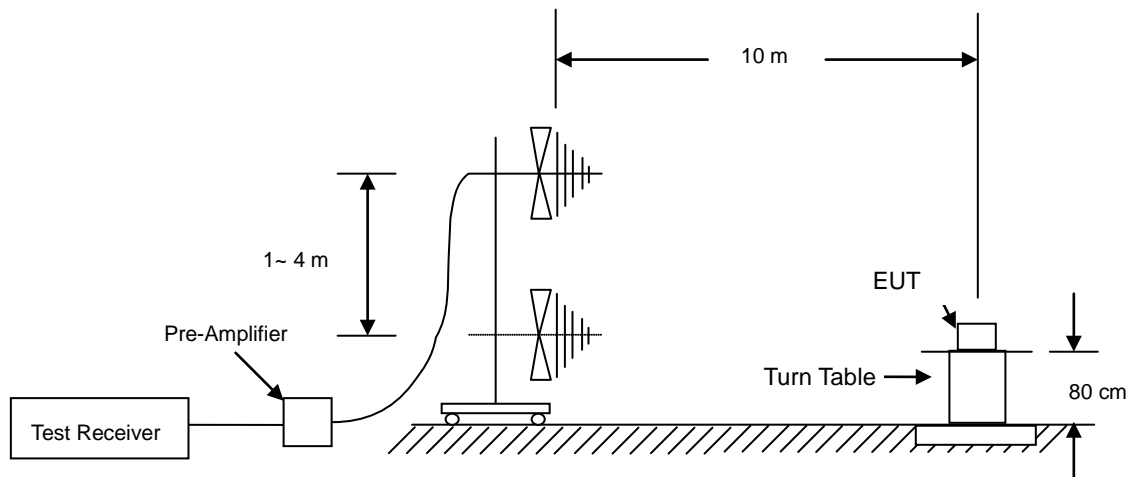


### 3 Radiated Emission Test

#### 3.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

#### 3.2 Test Arrangement and Procedure



##### Table-top Equipment

- The EUT was placed on a non-conductive turntable which was 80 cm above the horizontal ground plane. The EUT was set 10 m away from the receiving antenna that was mounted on a non-conductive mast.
- Main cables draped to the ground plane and were routed to the mains power outlet. The mains power outlet was bonded to and did not protrude above the ground plane.
- The antenna was adjusted between 1 m and 4 m in height above the ground plane and the Antenna-to-EUT azimuth was also varied during the measurements to find the top 6 maximum meter readings within the frequency range limit as indicated in Sec 3.3.
- The radiated emissions were measured when the Antenna-to-EUT polarization was set horizontally and vertically.
- The values were recorded.



### 3.3 Radiated Limit

☒ EN IEC 62040-2

Frequency Range (MHz)	Quasi-Peak dB( $\mu$ V/m)		
	<input checked="" type="checkbox"/> Category C1 UPS	<input type="checkbox"/> Category C2 UPS	<input type="checkbox"/> Category C3 UPS
30 to 230 <sup>a</sup>	30	40	50
230 to 1000	37	47	60
<sup>a</sup> The lower limit shall apply at the transition frequency.			

### 3.4 Test Result

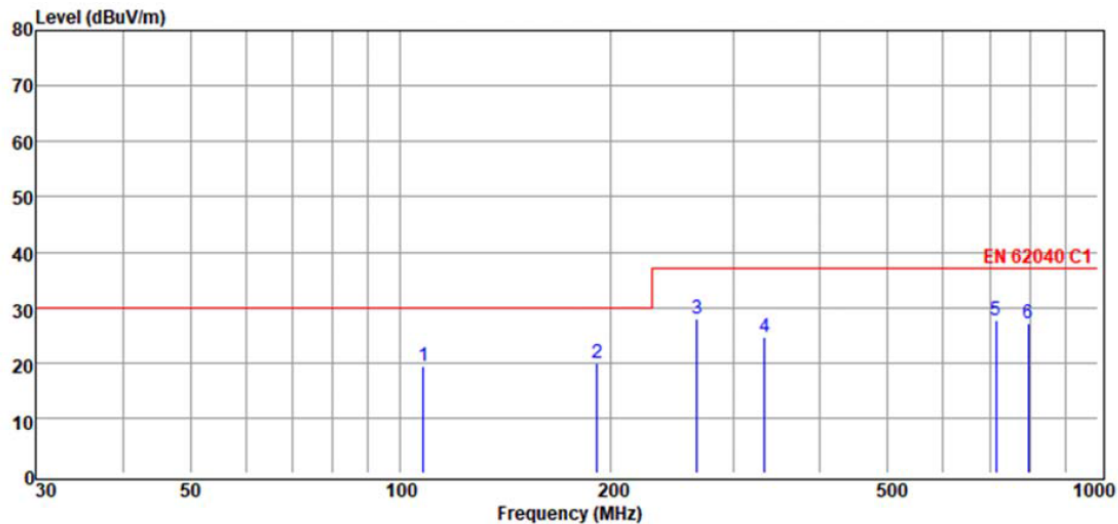
**PASS**

The final test data are shown on the following page(s).

**Radiated Emission Test Data**

Test Site : HA2 10m  
Model Number : BX1400UI  
Polarization : Horizontal  
Test Voltage : 230V/50Hz  
Description : LINE mode

Test Date : 06-May-2020  
Temperature : 25°C  
Humidity : 56%RH  
Test by : Ziv Hsu



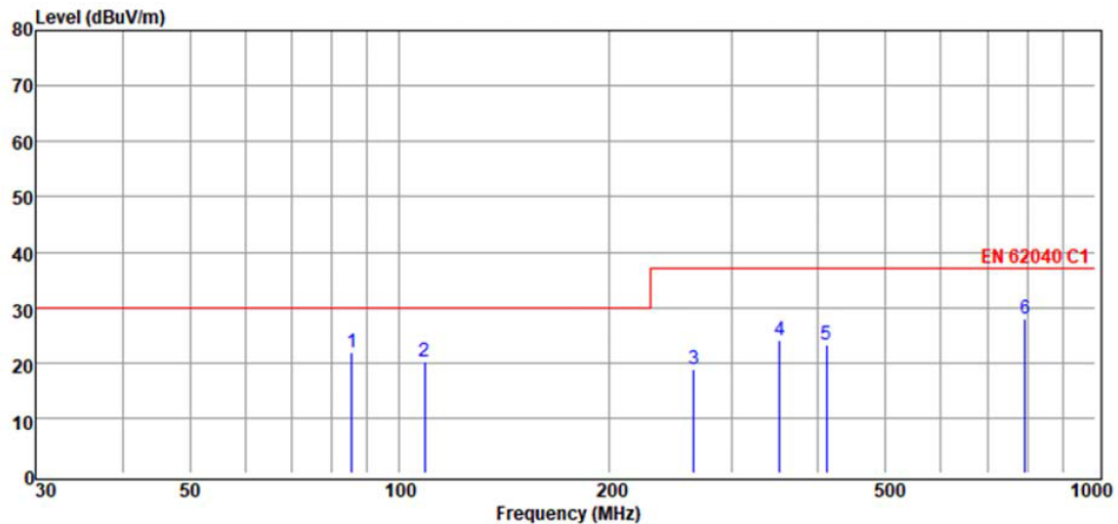
No.	Freq MHz	Reading dBμV	C.F dB/m	Result dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Antenna Pol.	Remark
1	108.041	32.21	-12.82	19.39	30.00	-10.61	400	86	HORIZONTAL	QP
2	191.704	34.21	-14.15	20.06	30.00	-9.94	373	88	HORIZONTAL	QP
3	266.268	36.97	-8.92	28.05	37.00	-8.95	342	130	HORIZONTAL	QP
4	333.280	32.96	-8.41	24.55	37.00	-12.45	290	117	HORIZONTAL	QP
5	714.949	27.12	0.59	27.71	37.00	-9.29	165	137	HORIZONTAL	QP
6	794.989	24.47	2.68	27.15	37.00	-9.85	146	135	HORIZONTAL	QP

Remark : 1. All readings are Quasi-Peak values.  
2. Result = Reading + C.F  
3. Margin = Result – Limit

**Radiated Emission Test Data**

Test Site : HA2 10m  
Model Number : BX1400UI  
Polarization : Vertical  
Test Voltage : 230V/50Hz  
Description : LINE mode

Test Date : 06-May-2020  
Temperature : 25°C  
Humidity : 56%RH  
Test by : Ziv Hsu



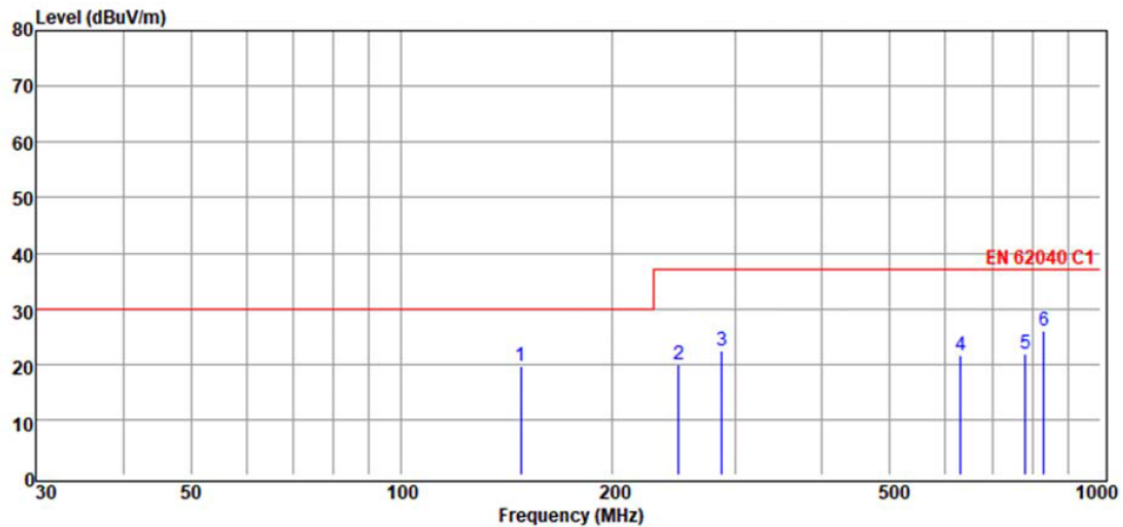
No.	Freq MHz	Reading dBμV	C.F dB/m	Result dBμV/m	Limit dBμV/m	Margin dB	Height cm	Angle deg	Antenna Pol.	Remark
1	85.481	37.29	-15.54	21.75	30.00	-8.25	100	130	VERTICAL	QP
2	108.819	32.95	-12.67	20.28	30.00	-9.72	100	117	VERTICAL	QP
3	264.879	27.44	-8.71	18.73	37.00	-18.27	100	135	VERTICAL	QP
4	351.825	31.86	-7.70	24.16	37.00	-12.84	100	86	VERTICAL	QP
5	411.411	28.77	-5.55	23.22	37.00	-13.78	100	162	VERTICAL	QP
6	791.942	25.34	2.72	28.06	37.00	-8.94	100	193	VERTICAL	QP

Remark : 1. All readings are Quasi-Peak values.  
2. Result = Reading + C.F  
3. Margin = Result – Limit

**Radiated Emission Test Data**

Test Site : HA2 10m  
Model Number : BX1400UI  
Polarization : Horizontal  
Test Voltage : 0V  
Description : Battery mode

Test Date : 06-May-2020  
Temperature : 25°C  
Humidity : 56%RH  
Test by : Ziv Hsu



No.	Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Antenna Pol.	Remark
1	148.340	31.20	-11.57	19.63	30.00	-10.37	381	83	HORIZONTAL	Peak
2	249.220	30.16	-10.16	20.00	37.00	-17.00	368	85	HORIZONTAL	Peak
3	287.050	31.95	-9.52	22.43	37.00	-14.57	351	126	HORIZONTAL	Peak
4	631.400	22.03	-0.50	21.53	37.00	-15.47	177	162	HORIZONTAL	Peak
5	781.750	19.24	2.62	21.86	37.00	-15.14	149	148	HORIZONTAL	Peak
6	829.280	22.79	3.25	26.04	37.00	-10.96	126	152	HORIZONTAL	Peak

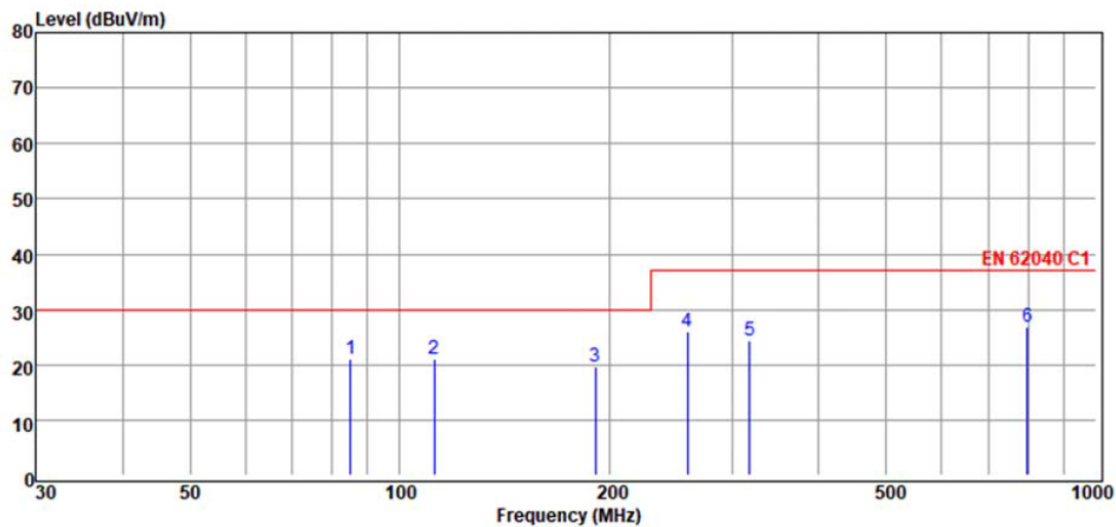
Remark : 1. All readings are Quasi-Peak values.  
2. Result = Reading + C.F  
3. Margin = Result – Limit



**Radiated Emission Test Data**

Test Site : HA2 10m  
Model Number : BX1400UI  
Polarization : Vertical  
Test Voltage : 0V  
Description : Battery mode

Test Date : 06-May-2020  
Temperature : 25°C  
Humidity : 56%RH  
Test by : Ziv Hsu



No.	Freq MHz	Reading dBuV	C.F dB/m	Result dBuV/m	Limit dBuV/m	Margin dB	Height cm	Angle deg	Antenna Pol.	Remark
1	84.999	36.52	-15.54	20.98	30.00	-9.02	100	138	VERTICAL	QP
2	112.130	33.50	-12.40	21.10	30.00	-8.90	100	125	VERTICAL	QP
3	191.074	33.69	-14.16	19.53	30.00	-10.47	100	133	VERTICAL	QP
4	259.234	34.68	-8.76	25.92	37.00	-11.08	100	89	VERTICAL	QP
5	317.701	33.07	-8.83	24.24	37.00	-12.76	100	152	VERTICAL	QP
6	796.183	24.13	2.70	26.83	37.00	-10.17	100	211	VERTICAL	QP

Remark : 1. All readings are Quasi-Peak values.  
2. Result = Reading + C.F  
3. Margin = Result – Limit

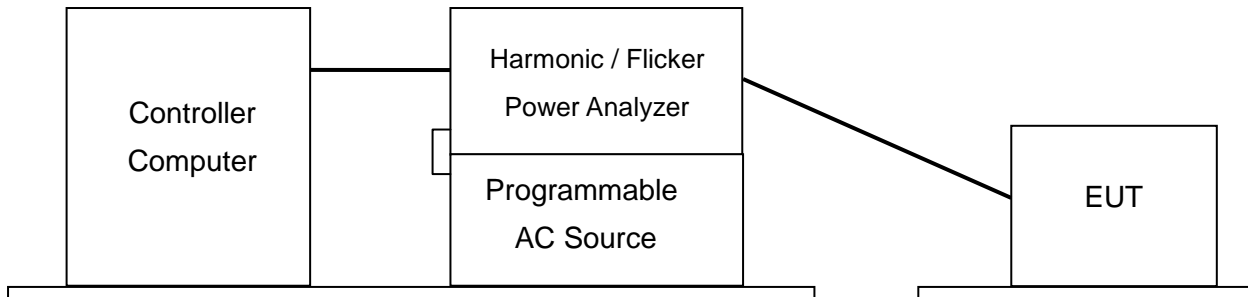


## 4 Harmonic Current Emission Measurement

### 4.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 4.2 Test Configuration and Procedure



- The EUT was set in series with the Power Analyzer through an Impedance Network for the measurement of harmonic currents.
- The supply voltage and frequency setting on the Programmable AC Source was programmed as the rated voltage and frequency of the EUT.
- Classify the EUT class in accordance with the IEC 61000-3-2 for the purpose of harmonic current limitation. The measurement was automatically performed by test software. The test result was collected and analyzed by the computer.



### 4.3 EUT Operation Condition

#### Environment Condition

Test Site	Test Date	Temperature	Humidity	Atmospheric Pressure
HA3	07-May-2020	26°C	55%RH	999mbar

### 4.4 Test Limit

#### Class A Equipment

Harmonic Order (n)	Maximum permissible harmonic current (A)
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 * 15 / n$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 * 8 / n$

### 4.5 Test Result

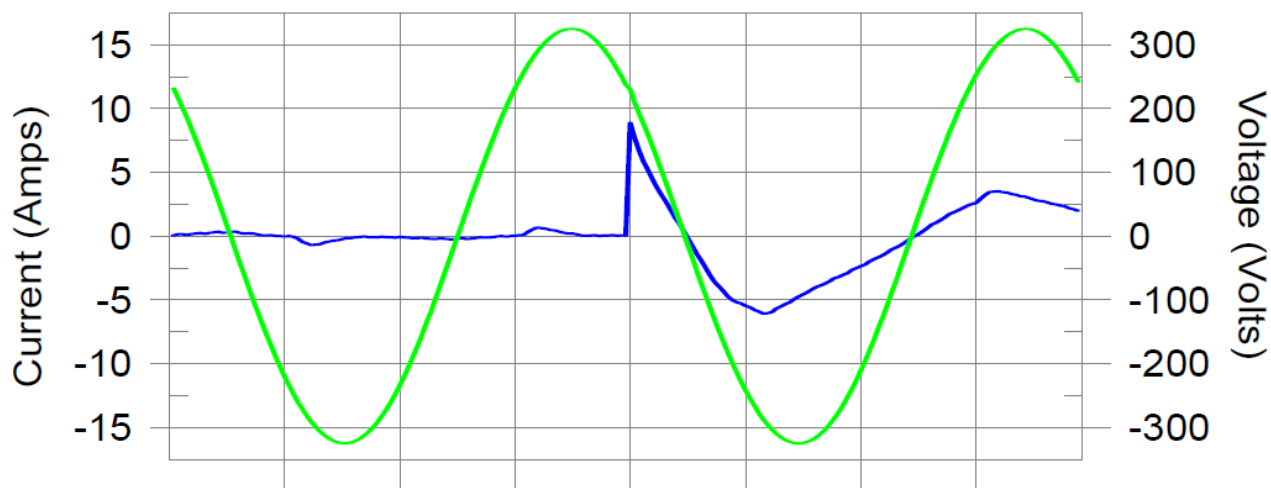
#### PASS

The measured result is shown on the following page(s).



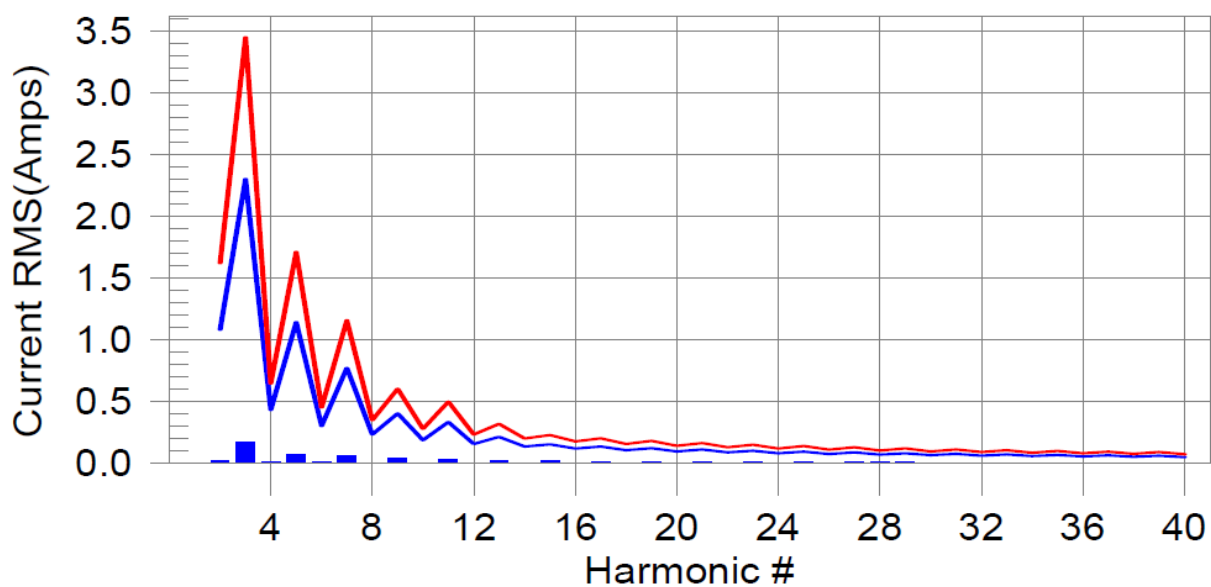
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonics H9-7.1% of 150% limit, H9-8.5% of 100% limit



Test Result: Pass Source qualification: Normal  
 THC(A): 0.192 I-THD(%): 5.8 POHC(A): 0.008 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts): 229.82	Frequency(Hz): 50.00
I_Peak (Amps): 9.983	I_RMS (Amps): 3.336
I_Fund (Amps): 3.281	Crest Factor: 6.399
Power (Watts): 753.8	Power Factor: 0.999

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.019	1.080	N/A	0.053	1.620	N/A	Pass
3	0.163	2.300	7.1	0.179	3.450	5.2	Pass
4	0.007	0.430	N/A	0.035	0.645	N/A	Pass
5	0.065	1.140	5.7	0.078	1.710	4.6	Pass
6	0.002	0.300	N/A	0.019	0.450	N/A	Pass
7	0.055	0.770	7.1	0.063	1.155	5.4	Pass
8	0.002	0.230	N/A	0.015	0.345	N/A	Pass
9	0.034	0.400	8.5	0.043	0.600	7.1	Pass
10	0.001	0.184	N/A	0.012	0.276	N/A	Pass
11	0.023	0.330	6.9	0.030	0.495	6.1	Pass
12	0.001	0.153	N/A	0.010	0.230	N/A	Pass
13	0.020	0.210	N/A	0.026	0.315	N/A	Pass
14	0.001	0.131	N/A	0.009	0.197	N/A	Pass
15	0.015	0.150	N/A	0.021	0.225	N/A	Pass
16	0.001	0.115	N/A	0.008	0.173	N/A	Pass
17	0.009	0.132	N/A	0.015	0.198	N/A	Pass
18	0.001	0.102	N/A	0.007	0.153	N/A	Pass
19	0.006	0.118	N/A	0.012	0.178	N/A	Pass
20	0.000	0.092	N/A	0.006	0.138	N/A	Pass
21	0.005	0.107	N/A	0.010	0.161	N/A	Pass
22	0.001	0.084	N/A	0.006	0.125	N/A	Pass
23	0.004	0.098	N/A	0.009	0.147	N/A	Pass
24	0.000	0.077	N/A	0.005	0.115	N/A	Pass
25	0.002	0.090	N/A	0.007	0.135	N/A	Pass
26	0.001	0.071	N/A	0.005	0.107	N/A	Pass
27	0.002	0.083	N/A	0.006	0.125	N/A	Pass
28	0.002	0.066	N/A	0.006	0.099	N/A	Pass
29	0.002	0.078	N/A	0.006	0.116	N/A	Pass
30	0.001	0.061	N/A	0.005	0.092	N/A	Pass
31	0.002	0.073	N/A	0.006	0.109	N/A	Pass
32	0.002	0.058	N/A	0.006	0.086	N/A	Pass
33	0.001	0.068	N/A	0.005	0.102	N/A	Pass
34	0.001	0.054	N/A	0.004	0.081	N/A	Pass
35	0.001	0.064	N/A	0.004	0.096	N/A	Pass
36	0.000	0.051	N/A	0.004	0.077	N/A	Pass
37	0.001	0.061	N/A	0.004	0.091	N/A	Pass
38	0.000	0.048	N/A	0.003	0.073	N/A	Pass
39	0.001	0.058	N/A	0.004	0.087	N/A	Pass
40	0.000	0.046	N/A	0.003	0.069	N/A	Pass

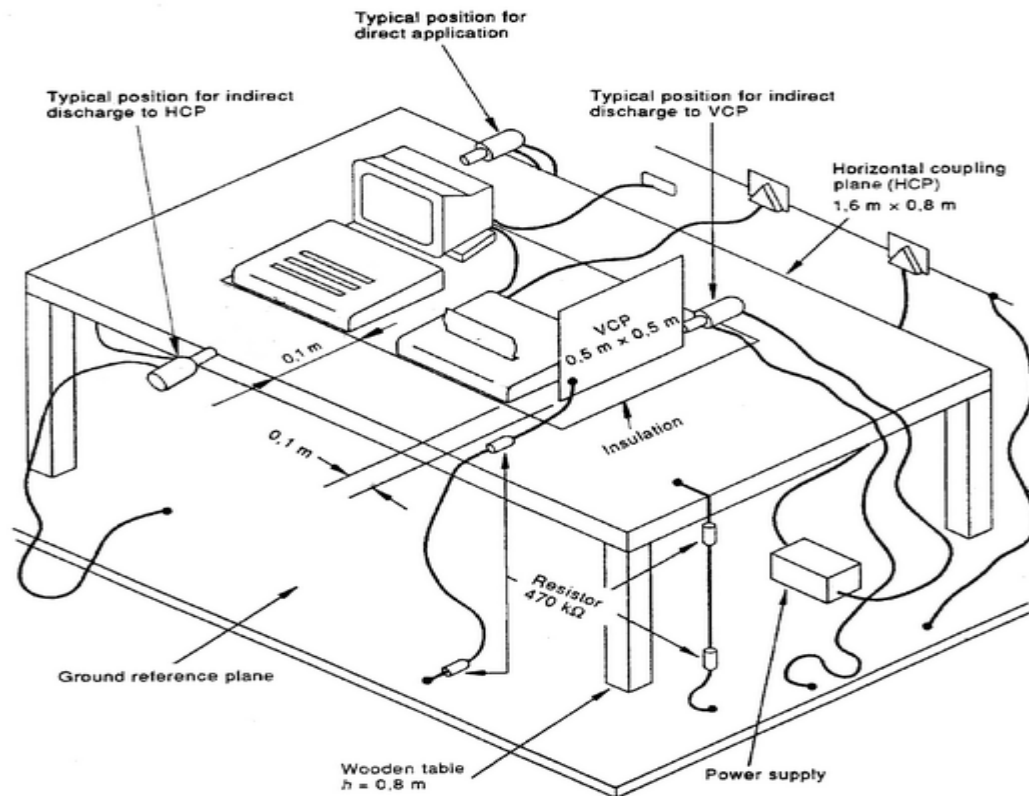
※Harmonic currents less than 0,6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

## 5 Electrostatic Discharge Immunity Test

### 5.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 5.2 Test Configuration and Procedure



#### Table-top Equipment

- The EUT was located on a 0.8 m high wooden table standing on the ground reference plane with a 1.6 \* 0.8 m horizontal coupling plane on the top. The EUT and cables were isolated from the coupling plane by an insulating support 0.5 mm thick.
- In Contact Discharge, the EUT was exposed to minimum 200 discharges, 100 each at negative and positive polarity on the selected test points (the selected test points were marked with red labels on the EUT).
- In Air Discharge, the EUT was exposed to a minimum of 10 single discharges on the selected test points.
- The result was observed and analyzed.



## 5.3 Test Result

### 5.3.1 Environment Condition

Test Site	Test Date	Temperature	Humidity	Atmospheric Pressure
HA3	07-May-2020	26°C	55%RH	999mbar

### 5.3.2 Observation of Direct Discharge

Test Points: 1. Surface of Case. 2. Junction of Case. 3. I/O Port. 4. Screw holes.

Type of Discharge	Test Specifications				Performance Required by EN IEC 62040-2	Observed Result	Verdict
	Test Level	Polarity	Test Point	Number of Discharge			
Air Discharge	2,4,8 (kV)	±	1~3	10/ per point	B	A	Pass <sup>1</sup>
Contact Discharge	2,4 (kV)	±	3	10/ per point	B	A	Pass <sup>1</sup>
Remarks	1. No temporary degradation or loss of function has been observed throughout the entire time interval of air discharge.						

The Performance Requirement Class Criterion is defined in Sec. 1.11.

### 5.3.3 Observation of Indirect Discharge

Test Points: 1. Front Side. 2. Rear Side. 3. Left Side. 4. Right Side.

Type of Discharge	Test Specifications				Performance Required by EN IEC 62040-2	Observed Result	Verdict
	Test Level	Polarity	Test Point	Number of Discharge			
HCP Application	2,4 (kV)	±	1~4	10/ per point	B	A	Pass <sup>1</sup>
VCP Application	2,4 (kV)	±	1~4	10/ per point	B	A	Pass <sup>1</sup>
Remarks	1. No temporary degradation or loss of function has been observed throughout the entire time interval of HCP application.						

The Performance Requirement Class Criterion is defined in Sec. 1.11.

## PASS

The test result shows that the EUT is in compliance with the test performance criteria specified in EN IEC 62040-2.

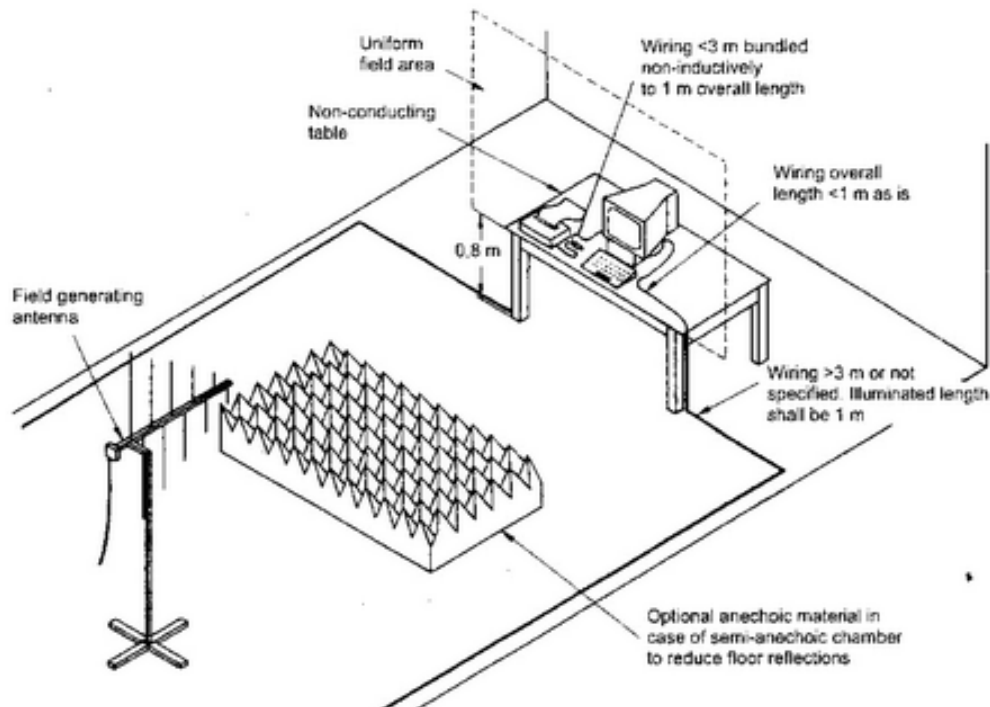


## 6 Radio-frequency, Electromagnetic Field Immunity Test

### 6.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 6.2 Test Configuration and Procedure



#### Table-top Equipment

- The field calibration was executed to create a uniform field area (UFA), 3 m away from the antenna, to ensure the validity of the test results.
- The EUT was placed on a non-conductive table 0.8 m high in the UFA.
- The EUT was then connected to power and signal wires according to relevant installation instruction.
- The EUT was positioned so that the four sides of the EUT were exposed to the electromagnetic field in sequence. In each position, the performance of the EUT was investigated and monitored by a CCD camera.





### 6.3 Test Result

#### 6.3.1 Environment Condition

Test Site	Test Date	Temperature	Humidity	Atmospheric Pressure
HA3	07-May-2020	26°C	55%RH	999mbar

#### 6.3.2 Observation of Test

Type of Modulation	Test Specifications				Performance Required by EN IEC 62040-2	Observed Result	Verdict
	Field Strength	Frequency Range	Modulated	Polarity			
Amplitude Modulation	3 V/m	80 to 1000MHz	1kHz, 80% AM, Sine wave	V&H	A	A	Pass <sup>1</sup>
Remark	1. No temporary degradation or loss of function has been observed throughout the entire test.						
Note	The applied 0°, 90°, 180°, 270° relative to the position to the equipment under test.						

The Performance Requirement Class Criterion is defined in Sec. 1.11.

## PASS

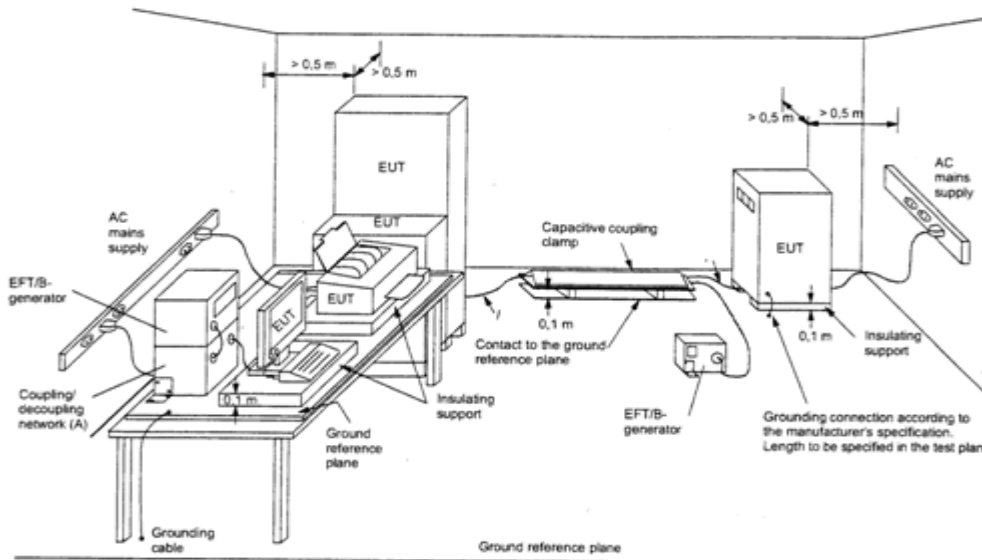
The test result shows that the EUT is in compliance with the test performance criteria specified in EN IEC 62040-2.

## 7 Electrical Fast Transient Test

### 7.1 Test Instrument

Refer to Sec. 1.2 Test Instruments.

### 7.2 Test Configuration and Procedure



#### Table-top Equipment

- The EUT was placed on a table of 0.8 m height above the 1 \* 1 m metallic ground reference plane, which projected beyond the EUT by at least 0.1 m on all sides.
- The ground plane was connected to the protective earth.
- The distance between the EUT and all other conductive structures, except the ground plane beneath the EUT was more than 0.5 m.
- The length of the signal and power lines between the coupling device and the EUT was 0.5 m.
- All cables to the EUT were placed on the insulation support 0.1 m above the ground reference plane.
- The EUT was connected to the power mains through a coupling device that directly coupled the EFT interference signal. Each of the Line, Neutral and Protective Earth conductors was injected with burst for 1 minute. The test time was broken down into six 10 s bursts separated by a 10 s pause for avoiding synchronization. Both voltage polarities were applied for each test level.
- Operating condition was shown on the monitor and observed.



## 7.3 Test Result

### 7.3.1 Environment Condition

Test Site	Test Date	Temperature	Humidity	Atmospheric Pressure
HA3	07-May-2020	26°C	55%RH	999mbar

### 7.3.2 Observation of Power Supply Port

Coupling Selection	Test Specifications				Performance Required by EN IEC 62040-2	Observed Result	Verdict
	Voltage (kV)	Test Duration (Sec)	Repetition Frequency (kHz)	Tr/ Th (nS)			
L	±1	60	5	5/50	B	A	Pass <sup>1</sup>
N	±1	60	5	5/50	B	A	Pass <sup>1</sup>
PE	±1	60	5	5/50	B	A	Pass <sup>1</sup>
L + N	±1	60	5	5/50	B	A	Pass <sup>1</sup>
L + PE	±1	60	5	5/50	B	A	Pass <sup>1</sup>
N + PE	±1	60	5	5/50	B	A	Pass <sup>1</sup>
L + N +PE	±1	60	5	5/50	B	A	Pass <sup>1</sup>
Remark	1. No temporary degradation or loss of function has been observed throughout the entire test.						

The Performance Requirement Class Criterion is defined in Sec. 1.11.

## PASS

The test result shows that the EUT is in compliance with the test performance criteria specified in EN IEC 62040-2.

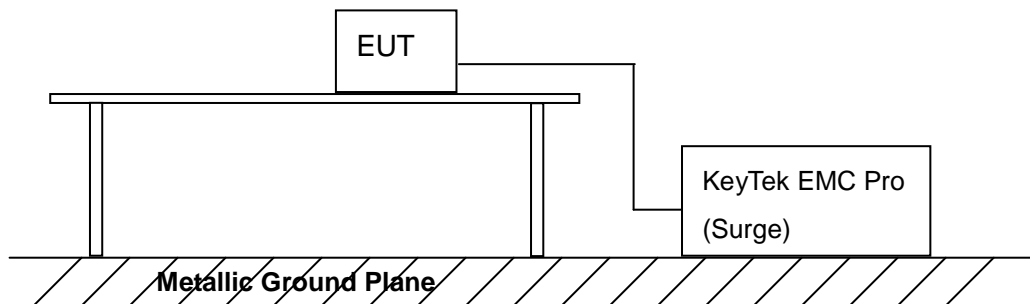


## 8 Surge Immunity Test

### 8.1 Test Instrument

Refer to Sec. 1.2 Test Instruments.

### 8.2 Test Configuration and Procedure



#### Table-top Equipment

- The EUT was placed on a table of 0.8 m height above the 1 \* 1 m metallic ground reference plane, which projected beyond the EUT by at least 0.1 m on all sides.
- The ground plane was connected to the protective earth.
- The length of power cord between the coupling device and the EUT is less than 2 m (provided by the manufacturer).
- The EUT was connected to the power mains through a coupling device that directly couples the Surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).
- The surges were applied line to line and line(s) to earth. When testing line to earth the test voltage was applied successively between each of the lines and earth. Steps up to the test level specified increased the test voltage. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.
- Operating condition was shown on the monitor and observed.



### 8.3 Test Result

#### 8.3.1 Environment Condition

Test Site	Test Date	Temperature	Humidity	Atmospheric Pressure
HA3	07-May-2020	26°C	55%RH	999mbar

#### 8.3.2 Observation of Power Supply Port

Coupling Selection	Test Specifications			Performance Required by EN IEC 62040-2	Observed Result	Verdict
	Voltage (kV)	Min. of Surge at Each Polarity	Repetition Rate (per min)			
L ► N	±0.5, 1	5	1	B	A	Pass <sup>1</sup>
L ► PE	±0.5, 1,2	5	1	B	A	Pass <sup>1</sup>
N ► PE	±0.5, 1,2	5	1	B	A	Pass <sup>1</sup>
Remark	1. No temporary degradation or loss of function has been observed throughout the entire test.					

The Performance Requirement Class Criterion is defined in Sec. 1.11.

#### 8.3.3 Observation of other supply/ signal lines: (Applicable only to ports which according to the manufacturer's specification may connect directly to outdoor cables)

N/A

**PASS**

**The test result shows that the EUT is in compliance with the test performance criteria specified in EN IEC 62040-2.**

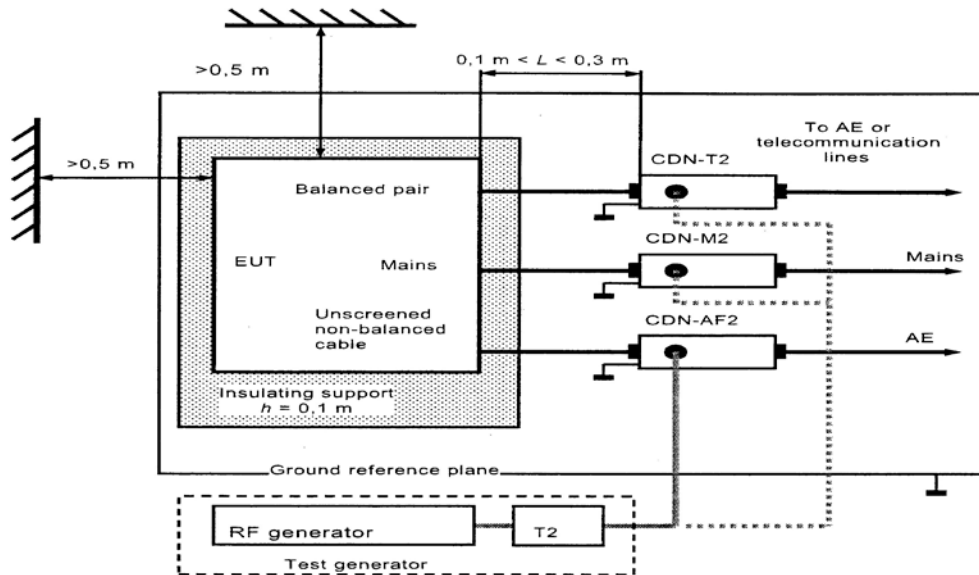


## 9 Radio-frequency, Conducted Disturbances Immunity Test

### 9.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 9.2 Test Configuration and Procedure



- The EUT was placed on an insulating support of 0.1 m height above a ground reference plane. All cables exiting the EUT was supported at a height of 30 mm above the ground reference plane.
- The EUT was connected to the power mains through a Coupling and Decoupling Networks (CDN).
- The CDN was located 0.3 m from the EUT as indicated in the diagram above.
- The test was performed with the test generator connected to each of the CDN in turn while the other non-excited RF input ports of the coupling devices were terminated by a  $50 \Omega$  terminator.
- The conducted disturbance was applied on the EUT from 150 kHz to 80 MHz using the signal levels established during the setting process. .
- Operating condition was shown on the monitor and observed.



### 9.3 Test Result

#### 9.3.1 Environment Condition

Test Site	Test Date	Temperature	Humidity	Atmospheric Pressure
HA3	07-May-2020	26°C	55%RH	999mbar

#### 9.3.2 Observation of Test

Type of Modulation	Test Specifications			Performance Required by EN IEC 62040-2	Observed Result	Verdict
	Voltage Level	Frequency Range	Modulation			
Amplitude Modulation	3 V	0.15 to 80MHz	80%, 1kHz, sinusoidal	A	A	Pass <sup>1</sup>
Remark	1. No temporary degradation or loss of function has been observed throughout the entire test.					

The Performance Requirement Class Criterion is defined in Sec. 1.11.

## PASS

The test result shows that the EUT is in compliance with the test performance criteria specified in EN IEC 62040-2.

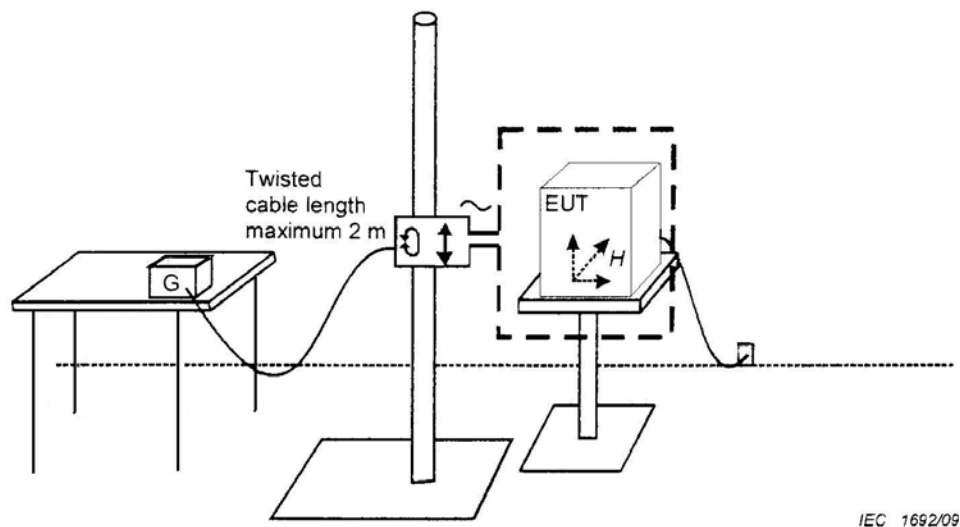


## 10 Power Frequency Magnetic Field Immunity Test

### 10.1 Test Instruments

Refer to Sec. 1.2 Test Instruments.

### 10.2 Test Configuration and Procedure



#### Table-top Equipment

- The EUT was placed on a non-magnetic metal ground plane of 0.25 mm thickness with the interposition of a 0.1 m thickness insulating support. The ground plane was connected to the protected earth.
- The EUT was placed at the center of the 1 \* 1 m induction coil with the test generator placed within 3 m distance.
- The test was operated by moving and shifting the induction coil to expose to the test field.
- The operation condition was observed and analyzed.
- The induction coil was then rotated by 90° to expose the EUT to the test field with different orientations and the same procedure.





### 10.3 Test Result

#### 10.3.1 Environment Condition

Test Site	Test Date	Temperature	Humidity	Atmospheric Pressure
HA3	07-May-2020	26°C	55%RH	999mbar

#### 10.3.2 Observation of Test

Level (A/m)	Frequency (Hz)	Performance Required by EN IEC 62040-2	Observed Result	Verdict
3	50	B	A	Pass <sup>1</sup>
Remark:	1. No temporary degradation or loss of function has been observed throughout the entire test.			

The Performance Requirement Class Criterion is defined in Sec. 1.11.

### PASS

The test result shows that the EUT is in compliance with the test performance criteria specified in EN IEC 62040-2.

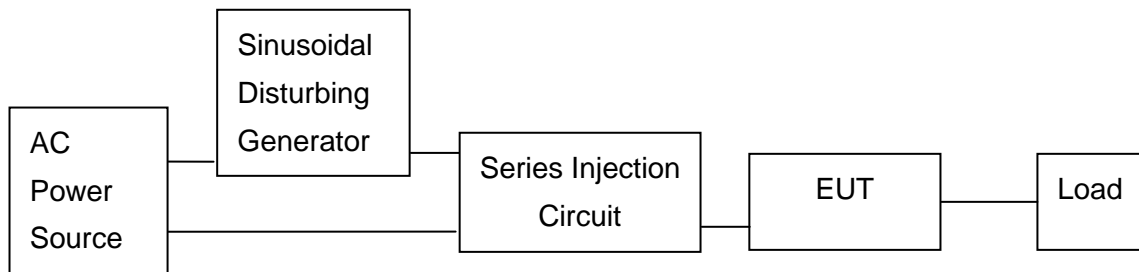


## 11 Low Frequency Signals Immunity Test

### 11.1 Test Instrument

Refer to Sec. 1.2 Test Instruments.

### 11.2 Test Configuration and Procedure



- Let U.P.S. to be under charging and line status
- Adjust programmable AC source to output a 10Vrms (sine wave from 140 to 360Hz) that can be induced 10Vrms to link between AC source and UPS (through the isolation transformer).
- The induced signals shall mixed in normal AC source and U.P.S. shall withstand it and no performances shall be reduced

### 11.3 Test Result

#### 11.3.1 Environment Condition

Test Site	Test Date	Temperature	Humidity	Atmospheric Pressure
HA3	07-May-2020	26°C	55%RH	999mbar

#### 11.3.2 Observation

Frequency Range (Hz)	Strength	Required by EN IEC 62040-2	Observed Result	Verdict
140 to 360	10V (rms) Sinusoidal	A	A	Pass <sup>1</sup>
Remark: 1. No temporary degradation or loss of function has been observed throughout the entire test.				

The Performance Requirement Class Criterion is defined in Sec. 1.11.

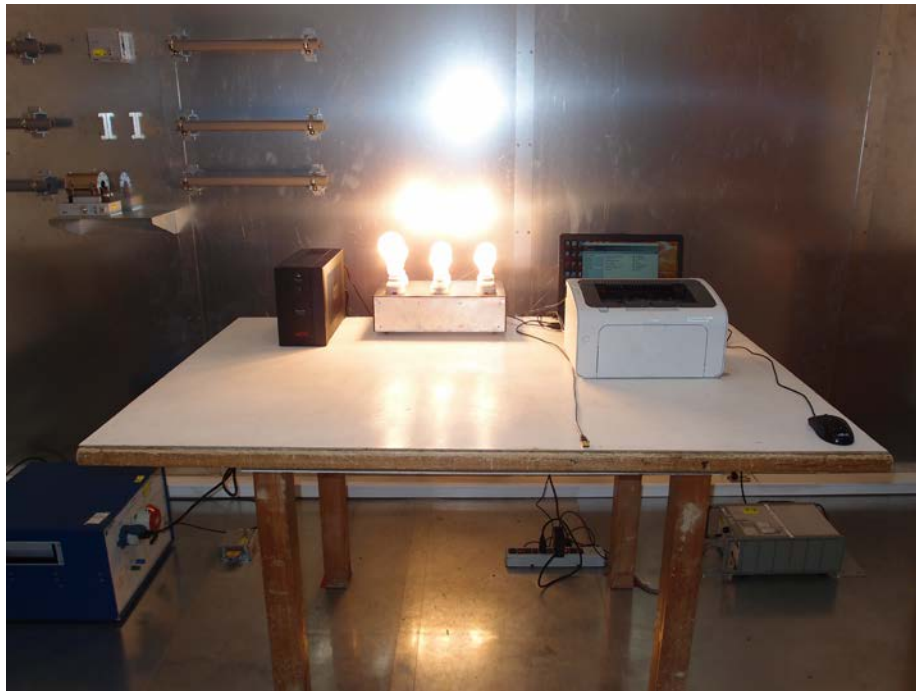
## PASS

The test result shows that the EUT is in compliance with the test performance criteria specified in EN IEC 62040-2.

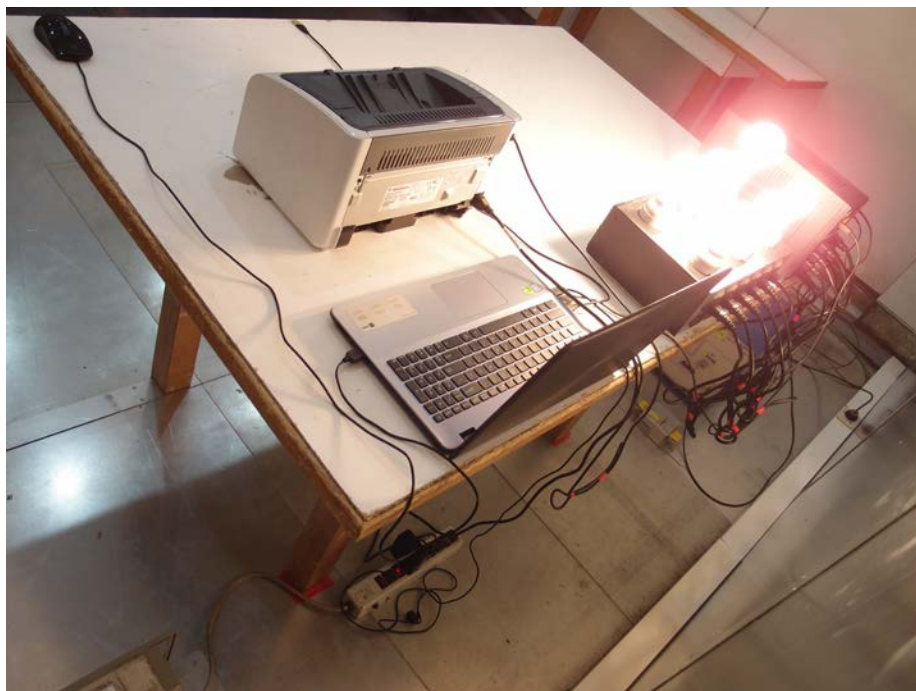


## 12 Photographs of Test

### 12.1 Power Line Conducted Test



Front View



Rear View



## 12.2 Radiated Emission Test



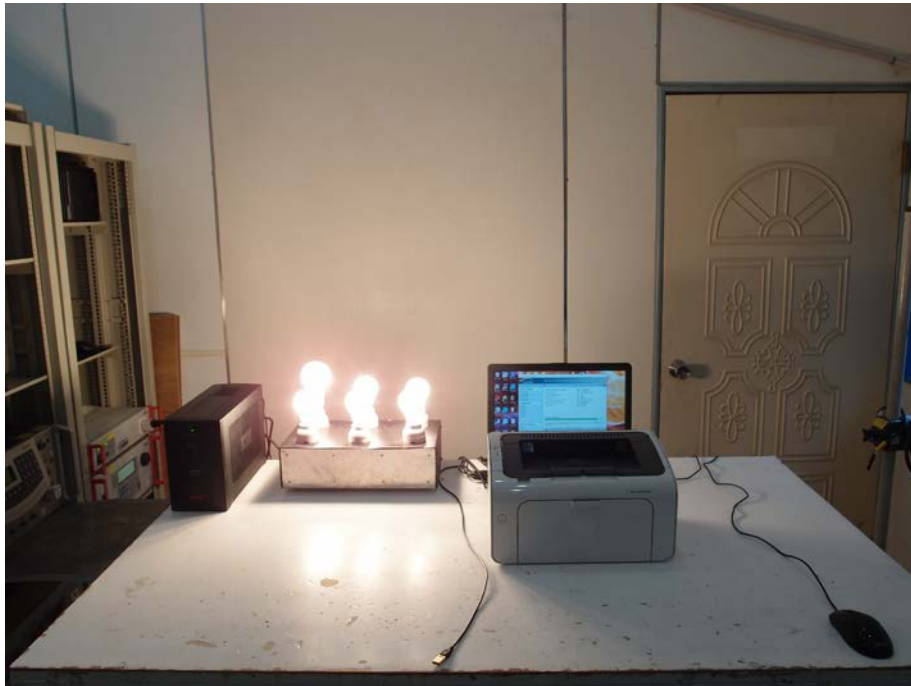
Front View



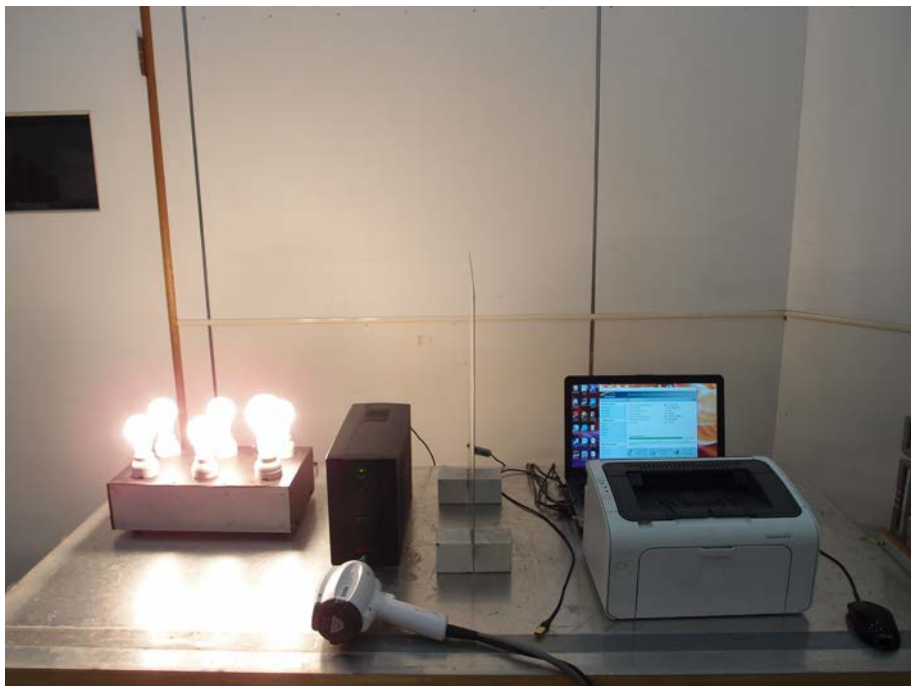
Rear View



### 12.3 Harmonic Current Measurement



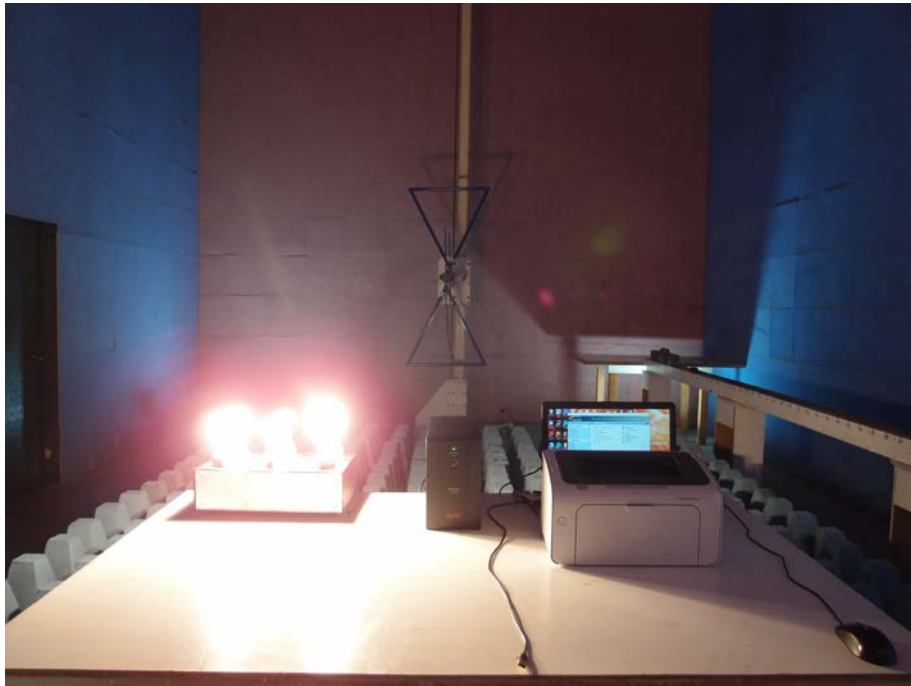
### 12.4 Electrostatic Discharge Immunity Test



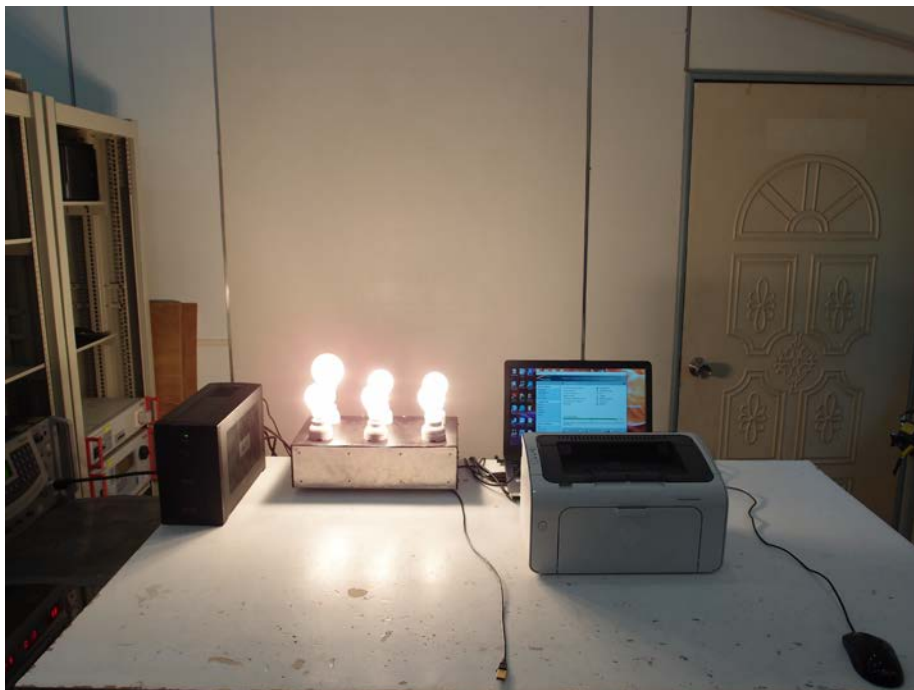




## 12.5 Radio-frequency, Electromagnetic Field Immunity Test

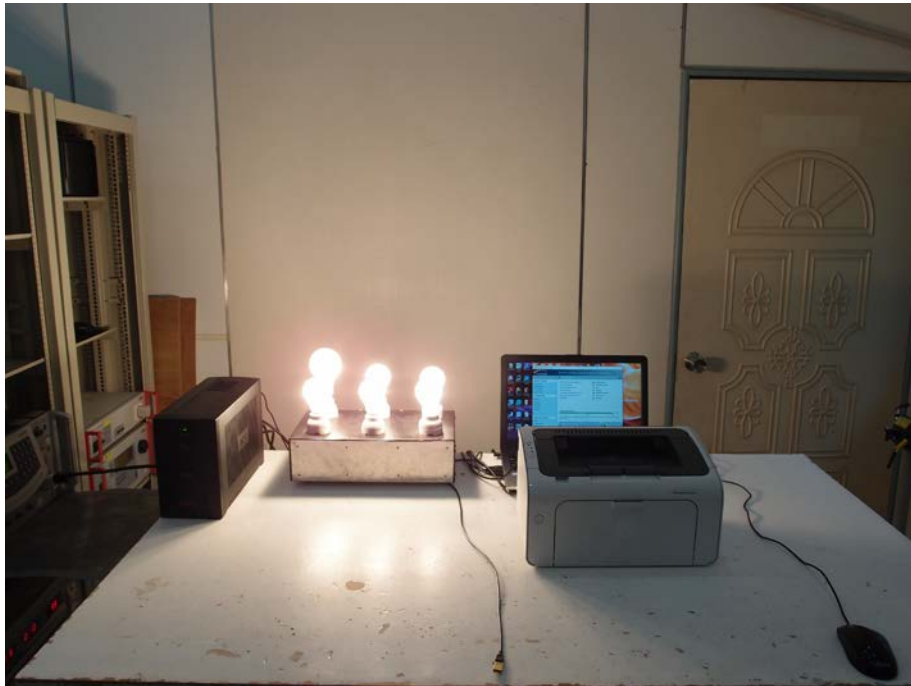


## 12.6 Electrical Fast Transient / Burst Immunity Test





## 12.7 Surge Immunity Test

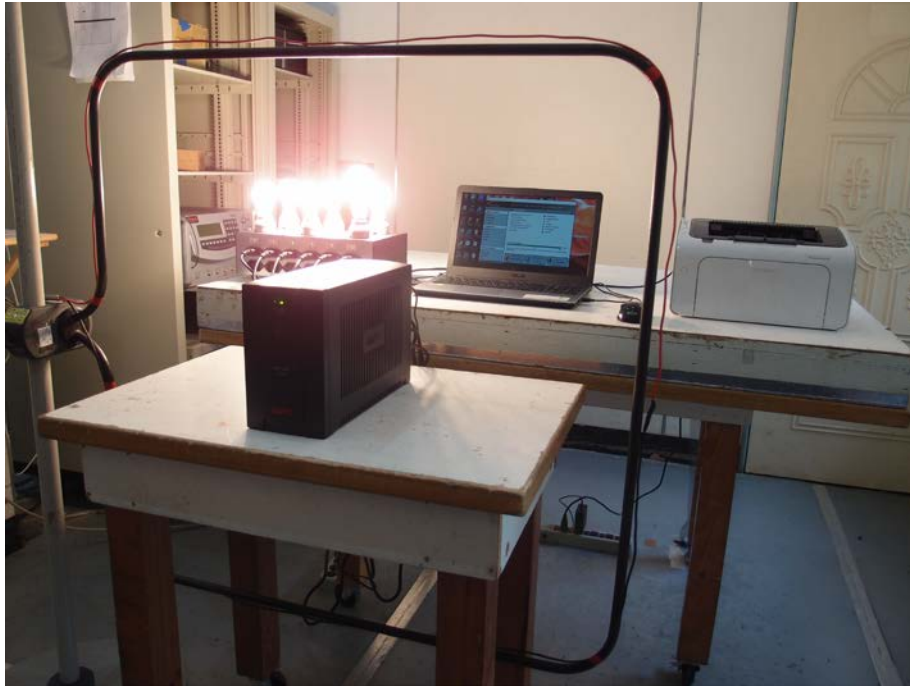


## 12.8 Radio-frequency, Conducted Disturbances Immunity Test





## 12.9 Power Frequency Magnetic Field Immunity Test







## 13 Photographs of EUT



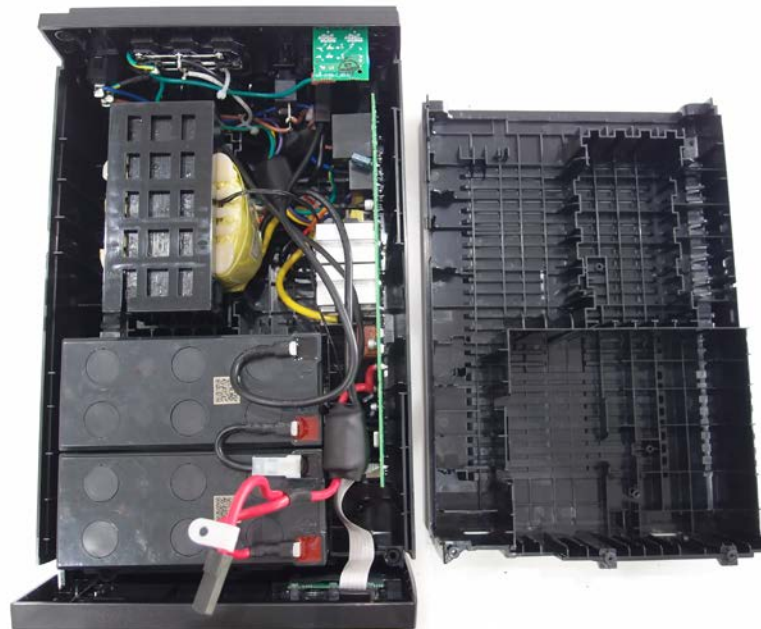
Front View of the EUT



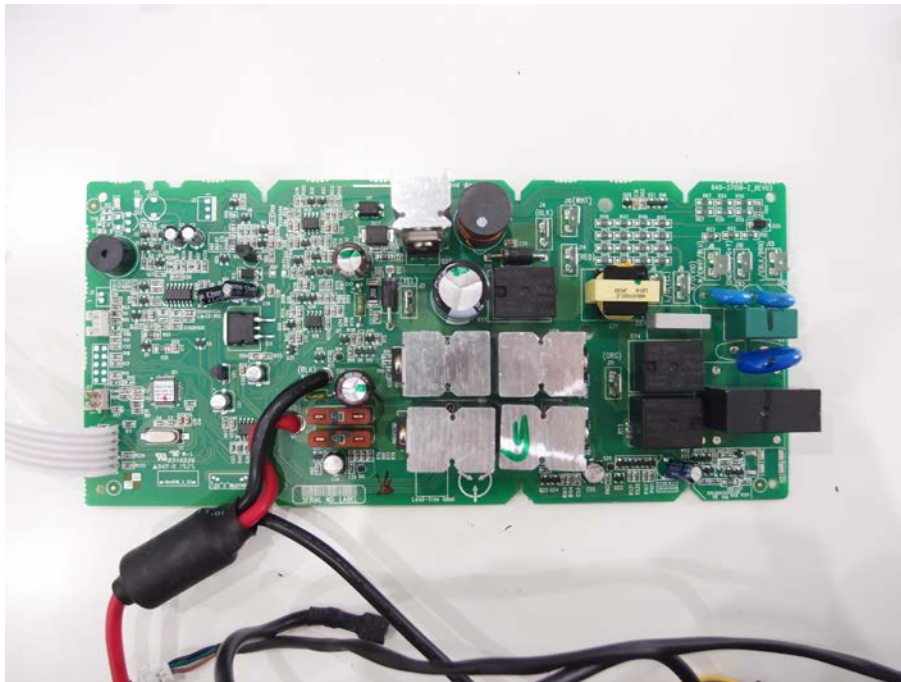
Rear View of the EUT



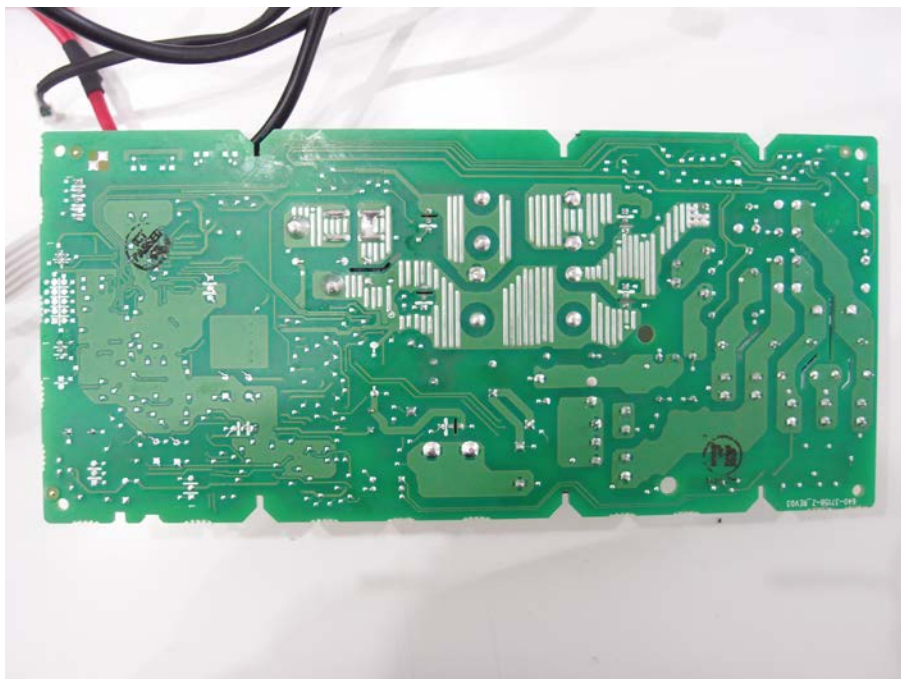
View of the I/O PORT



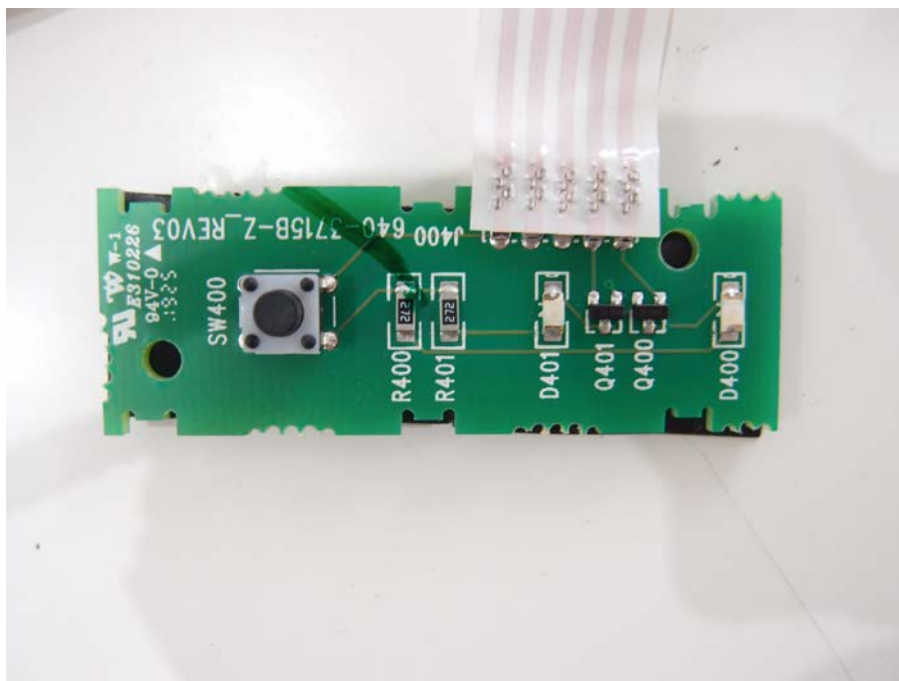
Inside View of the EUT



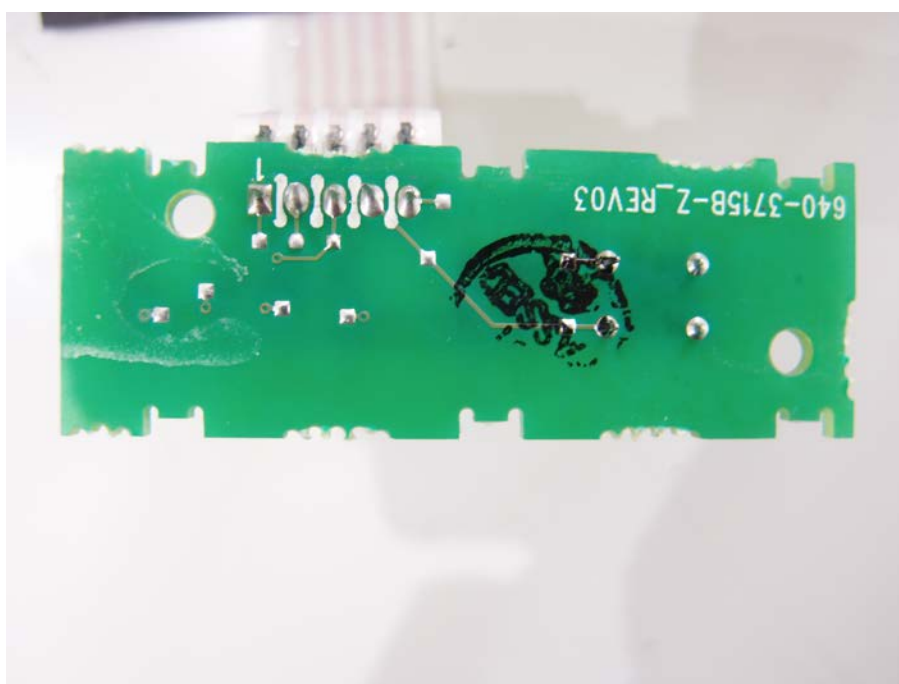
Front View of the PCB 1



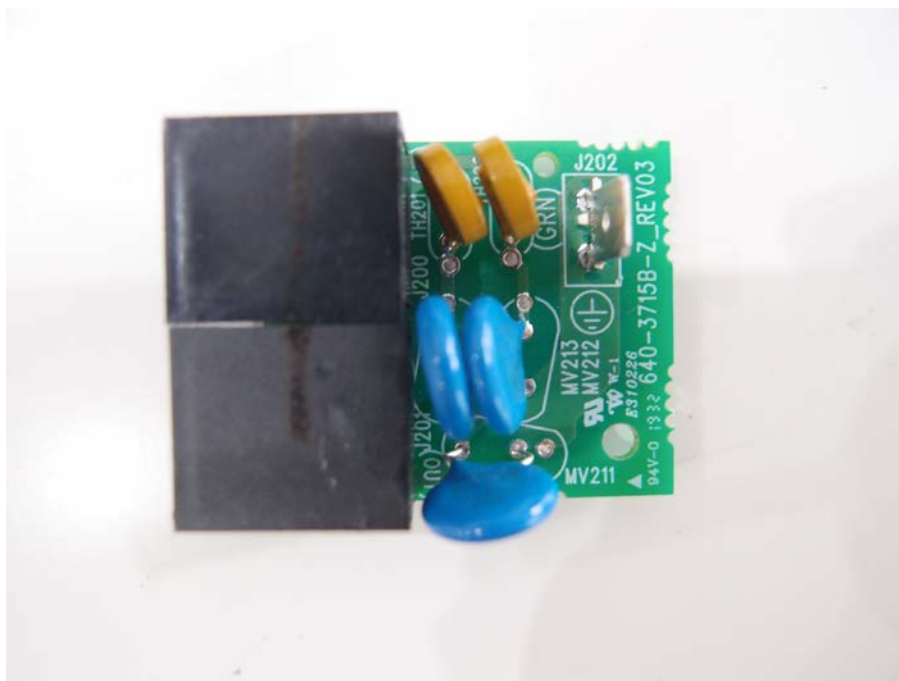
Rear View of the PCB 1



Front View of the PCB 2



Rear View of the PCB 2



Front View of the PCB 3

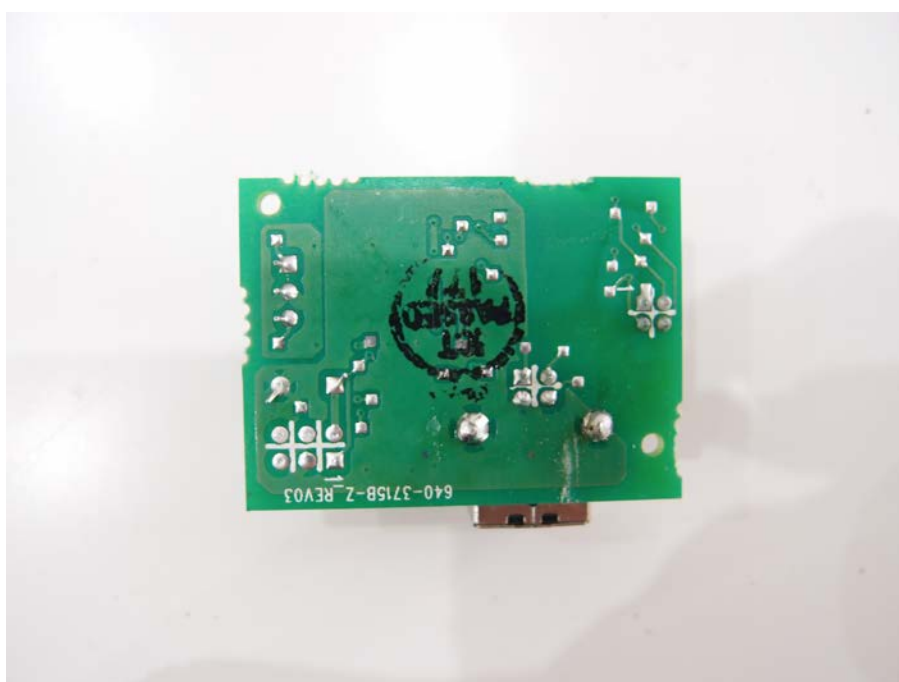


Rear View of the PCB 3





Front View of the PCB 4



Rear View of the PCB 4



View of the voltage changer



View of the EUT Battery



View of the Input Cable



View of the Output Cable





## 14 Photographs of ESD Test Points



View of ESD Test Points



View of ESD Test Points