

# EMC TEST REPORT

The device described below is tested by Shenzhen Nore Testing Center Co.,Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results are contained in this test report. Shenzhen Nore Testing Center Co.,Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

Applicant : Schneider Electric Pvt. Ltd.  
Address : Beary's Global Research Triangle Sy.No 63/3B, Gorvigere Village, Whitefield  
Ashram Road, Bidarahalli Hobli, Bangalore. 560067 India

Manufacturer : Schneider Electric Pvt. Ltd.  
Address : Beary's Global Research Triangle Sy.No 63/3B, Gorvigere Village, Whitefield  
Ashram Road, Bidarahalli Hobli, Bangalore. 560067 India

E.U.T. : UPS

Brand Name : 

Model No. : SRV2KI-E

Measurement Standard : EN IEC 62040-2:2018/ IEC 62040-2: 2016  
EN IEC 61000-3-2:2019/ IEC 61000-3-2: 2018  
EN 61000-3-3:2013/A1:2019/ IEC61000-3-3: 2013/A1: 2017

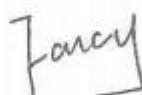
Date of Receiver : June 04, 2021

Date of Test : June 09 to July 12, 2021

Date of Report : July 26, 2021

This Test Report is Issued Under the Authority of :

Prepared by



Fancy Yang / Engineer

Approved & Authorized Signer



Evan Yang / Authorized Signatory

This report shows that the E.U.T. is technically compliant with the EN IEC 62040-2, EN IEC 61000-3-2 and EN 61000-3-3. This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Nore Testing Center Co.,Ltd.

## TABLE OF CONTENTS

<b>1. SUMMARY OF TEST RESULTS.....</b>	<b>5</b>
<b>2. TEST UNCERTAINTY.....</b>	<b>6</b>
<b>3. GENERAL INFORMATION.....</b>	<b>7</b>
3.1 Details of E.U.T.....	7
3.2 Description of Support Device.....	8
3.3 Block Diagram of Test Setup.....	8
3.4 Test mode.....	8
3.5 Test Facility.....	9
3.6 Abnormalities from Standard Conditions.....	9
<b>4. MEASURING DEVICES AND TEST EQUIPMENT.....</b>	<b>10</b>
4.1 For Mains terminals Disturbance voltage Test.....	10
4.2 For Radiated Emission Measurement.....	10
4.3 For Harmonic / Flicker Test.....	10
4.4 For Electrostatic Discharge Immunity Test.....	10
4.5 For RF Electromagnetic Field Immunity Test.....	11
4.6 For Electrical Fast Transient /Burst Immunity Test.....	11
4.7 For Surge Immunity Test.....	11
4.8 For Injected Currents Susceptibility Test.....	12
4.9 For Magnetic Field Immunity Measurement.....	12
4.10 For Low Frequency Signal Immunity Test.....	12
<b>5. MAINS TERMINAL DISTURBANCE VOLTAGE MEASUREMENT.....</b>	<b>13</b>
5.1 Block Diagram of Test Setup.....	13
5.2 Limit of Mains Terminal Disturbance voltage measurement.....	13
5.3 Test Procedure.....	14
5.4 Operating Condition of E.U.T.....	14
5.5 Test Results.....	14
<b>6. RADIATED EMISSION MEASUREMENT.....</b>	<b>19</b>
6.1 Block Diagram of Test.....	19
6.2 Limit of Radiated Emission Measurement.....	19
6.3 Test Procedure.....	20
6.4 Operating Condition of E.U.T.....	20
6.5 Test Results.....	20
<b>7.HARMONIC CURRENT EMISSION TEST.....</b>	<b>25</b>
7.1 Block Diagram of Test Setup.....	25
7.2 Limits of Harmonics current measurement.....	25
7.3 Test Procedure.....	26
7.4 Operating Condition of E.U.T.....	26
7.5 Test Results.....	26
<b>8. VOLTAGE FLUCTUATIONS&amp;FLICKER TEST.....</b>	<b>29</b>
8.1 Block Diagram of Test Setup.....	29
8.2 Limits of Voltage Fluctuations&Flicker Measurement.....	29
8.3 Test Procedure.....	30
8.4 Operating Condition of E.U.T.....	30
8.5 Test Results.....	30
<b>9. PERFORMANCE CRITERIA FOR IMMUNITY.....</b>	<b>32</b>
<b>10. LOW FREQUENCY SIGNALS TEST.....</b>	<b>33</b>
10.1 Block Diagram of Test Setup.....	33
10.2 Test Standard and Performance Criterion.....	33
10.3 Operating Condition of E.U.T.....	33
10.4 Test Results.....	33

<b>11. ELECTROSTATIC DISCHARGE TEST.....</b>	<b>35</b>
11.1 Block Diagram of Test Setup.....	35
11.2 Test Standard and Severity Levels.....	35
11.3 Test Procedure.....	36
11.4 Test Results.....	36
<b>12. RF FIELD STRENGTH SUSCEPTIBILITY TEST.....</b>	<b>38</b>
12.1 Block Diagram of Test Setup.....	38
12.2 Test Standard and Severity Levels.....	38
12.3 Test Procedure.....	39
12.4 Test Results.....	39
<b>13. ELECTRICAL FAST TRANSIENT/BURST TEST.....</b>	<b>41</b>
13.1 Block Diagram of Test Setup.....	41
13.2 Test Standard and Severity Levels.....	41
13.3 Test Procedure.....	42
13.4 Test Results.....	42
<b>14. SURGE IMMUNITY TEST.....</b>	<b>44</b>
14.1 Block Diagram of Test Setup.....	44
14.2 Test Standard and Severity Levels.....	44
14.3 Test Procedure.....	44
14.4 Test Results.....	44
<b>15. INJECTED CURRENTS SUSCEPTIBILITY TEST.....</b>	<b>46</b>
15.1 Block Diagram of Test Setup.....	46
15.2 Test Standard and Severity Levels.....	46
15.3 Test Procedure.....	47
15.4 Test Results.....	47
<b>16. MAGNETIC FIELD IMMUNITY TEST.....</b>	<b>49</b>
16.1 Block Diagram of Test Setup.....	49
16.2 Test Standard and Severity Levels.....	49
16.3 Test Procedure.....	50
16.4 Test Results.....	50
<b>APPENDIX I (PHOTOS OF TEST SETUP).....</b>	<b>52</b>
<b>APPENDIX II (PHOTOS OF E.U.T.).....</b>	<b>57</b>

Revision History of This Test Report

Report Number	Description	Issued Date
NTC2106625EV00	Initial Issue	2021-07-26

## 1. SUMMARY OF TEST RESULTS

The E.U.T. has been tested according to the following specifications:

EMISSION			
Standard	Test Type	Result	Remarks
EN IEC 62040-2:2018/ IEC 62040-2: 2016	Mains Terminal Disturbance Voltage Test	PASS	---
	Radiated Emission Test	PASS	---
EN IEC 61000-3-2:2019/ IEC 61000-3-2: 2018	Harmonic current emission	PASS	---
EN 61000-3-3:2013/ A1:2019/ IEC61000-3-3: 2013/A1: 2017	Voltage fluctuations&flicker	PASS	---

IMMUNITY(EN IEC 62040-2: 2018/IEC 62040-2: 2016)			
Standard	Test Type	Result	Remarks
IEC 61000-2-2:2002	Low frequency signals test	PASS	Performance Criterion A
IEC 61000-4-2:2008	Electrostatic discharge immunity test	PASS	Performance Criterion B
IEC 61000-4-3:2006	RF Field Strength Susceptibility Test	PASS	Performance Criterion A
IEC 61000-4-4:2012	Electrical fast transient/ burst immunity test	PASS	Performance Criterion B
IEC 61000-4-5:2014	Surge immunity test	PASS	Performance Criterion B
IEC 61000-4-6:2013	Injected Currents Susceptibility Test	PASS	Performance Criterion A
IEC 61000-4-8:2009	Magnetic Field immunity test	PASS	Performance Criterion A

## 2. TEST UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

Test item	Value
Conducted disturbance	2.7dB
Radiated Emission	3.4dB
Harmonic current emission	0.636%

### 3. GENERAL INFORMATION

#### 3.1 Details of E.U.T.

E.U.T. : UPS

Model No. : SRV2KI-E

E.U.T. Type : Category C2

**WARNING:** This is a category C2 UPS product. In a residential environment, this product may cause radio interference, in which case the user may be required to take additional measures.

Brand Name :



Rating :

Model: SRV2KI-E

Input: 220-240Vac, 10A max, 50/60Hz, 1Ø+N

Output: 220/230/240Vac, 50Hz/60Hz, 9.1A max, 1Ø+N

Capacity: 2KVA/1.8KW

Icc≤1kA

Test Voltage :

AC 230V/50Hz, Build-in battery 48V

Cable :

1. USB and RS232 ports are connected using an unshielded cable with two magnetic rings (SCUF-90B) to simulate the load test. Cable line shall not exceed 3m
  2. The RJ11 port of SNMP Card uses an unshielded cable with two magnetic rings (SCUF-90B) to connect to simulate the load test. Cable line shall not exceed 3m
  3. The RJ45 port of SNMP card uses a shielded cable with two magnetic rings (SCUF-90B) to connect to the computer for communication test. Cable line shall not exceed 3m
  4. The AC output is connected to the R load test using an unshielded cable. Cable line shall not exceed 3m
- The above all cable length shall be declared by the manufacturer, and the test cable shall be provided by the laboratory.

Sample No. : KA21061022EV00-001

Remark : None

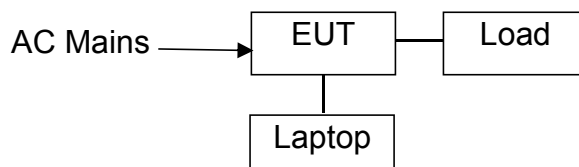
### 3.2 Description of Support Device

Description	Manufacturer	Model	S/N
Laptop	Lenovo	ThinkPad E455	N/A

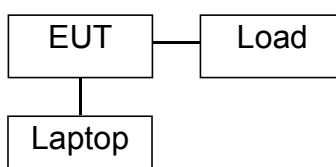
Remark : Laptop is provided by the laboratory for testing purpose

### 3.3 Block Diagram of Test Setup

(1) Normal operation mode



(2) Stored energy operation mode



### 3.4 Test mode

Test Item	Test mode	Remark
RE & CE	Normal operation mode(online mode)	EMI Full load
	Stored energy operation mode	
Harmonic&Flicker	Normal operation mode(online mode)	EMI Full load
All Immunity tests	Normal operation mode(online mode)	EMS Light load

Remark:

Green mode, it is similar to bypass mode. PFC and converter not working. It is not worst case(all section with full working, PFC, CHG, CON, INV all working) .

The worst Emission level was found When the Model :With max Configuration tested under Normal mode of operation (online mode)& Stored energy operation mode.



### 3.5 Test Facility

Site Description  
EMC Lab : Listed by CNAS,May 18, 2018  
The certificate is valid until May 17, 2024  
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01

The Certificate Registration Number is L11038.

Name of Firm 1 : Shenzhen Nore Testing Center Co.,Ltd.  
Site Location : South, No. 1, Building 10, Maqueling Industrial Zone, Nanshan Shenzhen, Guangdong, 518057, China

Subcontractor : Dongguan Nore Testing Center Co.,Ltd.  
(Dongguan NTC Co.,Ltd.)  
Site Location : Building D, Gaosheng Science&Technology Park, Zhouxi Longxi Road, Nancheng District, Dongguan City, Guangdong Province, China

Subcontracted Items : Injected Currents immunity test  
Radio-frequency electromagnetic field immunity test

### 3.6 Abnormalities from Standard Conditions

Test Type	Test level	Test requirement
Electrical fast transient/ burst immunity test	AC Input port: Level 4	$\pm 4K$
	AC Output port:Level 4	$\pm 4K$
Surge immunity test	AC Input port: Level *	Line To Line : $\pm 6.0KV$ Line To Earth: $\pm 6.0KV$

Remark:The above table is the grade and requirement specified by the customer and it is more stringent than the requirement of this standard, so it meets this standard.

## 4. MEASURING DEVICES AND TEST EQUIPMENT

### 4.1 For Mains terminals Disturbance voltage Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI-3	100120	Mar. 27, 2021	1 Year
2.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606-014	Mar. 27, 2021	1 Year
3.	L.I.S.N	SCHWARZBECK	NNLK8129	8129-212	Mar. 27, 2021	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	RSUM2009	N/A	1 Year
5.	Test Software	EZ	EZ-EMC (Ver. CT3A11)	N/A	N/A	N/A

### 4.2 For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESPI-7	100006	Mar. 27, 2021	1 Year
2.	Test Receiver	Rohde & Schwarz	ESCI-3	100120	Mar. 27, 2021	1 Year
3.	Loop Antenna	ZHINAN	ZN30900C	16036	Apr. 30, 2020	2 Year
4.	Composite logarithmic antenna	SCHAFFNER	CBL6112B	2625	May 17, 2020	2 Year
5.	Horn Antenna	SCHWARZBECK	BBHA 9120 D	01884	Apr. 29, 2020	2 Year
6.	Power Amplifier	HP	HP 8447D	2443A04646	Mar. 27, 2021	1 Year
7.	Power Amplifier	KSYET	PAM-118	443007	Mar. 27, 2021	1 Year
8.	Test Software	EZ	EZ-EMC (Ver. CT3A11)	N/A	N/A	N/A

### 4.3 For Harmonic / Flicker Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Test System	LAPLACE INSTRUMENTS LTD	AS 2000A	N/A	Mar. 27, 2021	1 Year
2.	Software	HTEC	Harmonic V1.2	N/A	N/A	N/A

### 4.4 For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	HAEFELY	ONYX16	1811981	Mar. 29, 2021	1 Year
2.	ESD Gun-1	HAEFELY	N/A	4700500/01	Mar. 29, 2021	1 Year
3.	ESD Gun-2	HAEFELY	N/A	4700525/00	Mar. 29, 2021	1 Year

#### 4.5 For RF Electromagnetic Field Immunity Test

(Dongguan Nore Testing Center Co., Ltd.)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Agilent	N5181A	MY47070160	Mar. 13, 2021	1 Year
2.	RF Switch	SKET	N/A	N/A	N/A	N/A
3.	Power Amplifier	SKET	HAP801000 M_250W	201804008	N/A	N/A
4.	Power Amplifier	SKET	HAP0103G_75W	201804009	N/A	N/A
5.	Power Amplifier	SKET	HAP0306G_50W	201804010	N/A	N/A
6.	Power Meter	Agilent	E4419B	GB40201469	Mar. 13, 2021	1 Year
7.	Power Sensor	Agilent	E9304A	MY41498919	Mar. 13, 2021	1 Year
8.	Power Sensor	Agilent	E9300A	US39211259	Mar. 13, 2021	1 Year
9.	E-Field Probe	Narda	EP-601	N/A	Mar. 23, 2021	1 Year
10.	Antenna	Schwarzbeck	STLP 9129	9129071	N/A	N/A
11.	Audio Analyzer	Rohde & Schwarz	UPV	100894	Mar. 13, 2021	1 Year
12.	Test Software	SKET	SKET_RS	N/A	N/A	N/A

#### 4.6 For Electrical Fast Transient /Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge EFT Simulator	HTEC	HCOMPACT 71	203601	Nov. 19, 2020	1 Year
2.	Three- phase Coupling CDN	HTEC	HCOUPLER 60E	204301	Nov. 19, 2020	1 Year

#### 4.7 For Surge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge EFT Simulator	HTEC	HCOMPACT 71	203601	Nov. 19, 2020	1 Year
2.	Three- phase Coupling CDN	HTEC	HCOUPLER 60S	204201	Nov. 19, 2020	1 Year

#### 4.8 For Injected Currents Susceptibility Test

(Dongguan Nore Testing Center Co., Ltd.)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal generator	IFR	2023A	2023051280	Mar. 13, 2021	1 Year
2.	Power Amplifier	SCHAFFNER	CBA9425	1022	Mar. 13, 2021	1 Year
3.	6dB 50Watt Attenuator	SCHAFFNER	ATN6025	N/A	Mar. 13, 2021	1 Year
4.	CDN	Lioncel	CDN-M3-16	0170703	Mar. 13, 2021	1 Year
5.	CDN	Lioncel	CDN-M2-16	0170708	Mar. 13, 2021	1 Year
6.	CDN	CDSI	ADN-M5/AF 5	8105001	Mar. 13, 2021	1 Year
7.	EM Clamp	CDSI	EMCL-22	8192007	Mar. 13, 2021	1 Year
8.	Directional Coupler	SCHAFFNER	255	19184	Mar. 13, 2021	1 Year
9.	Audio Analyzer	Rohde & Schwarz	UPV	100894	Mar. 13, 2021	1 Year
10.	Test Software	EZ	EZ_CS	N/A	N/A	N/A

#### 4.9 For Magnetic Field Immunity Measurement

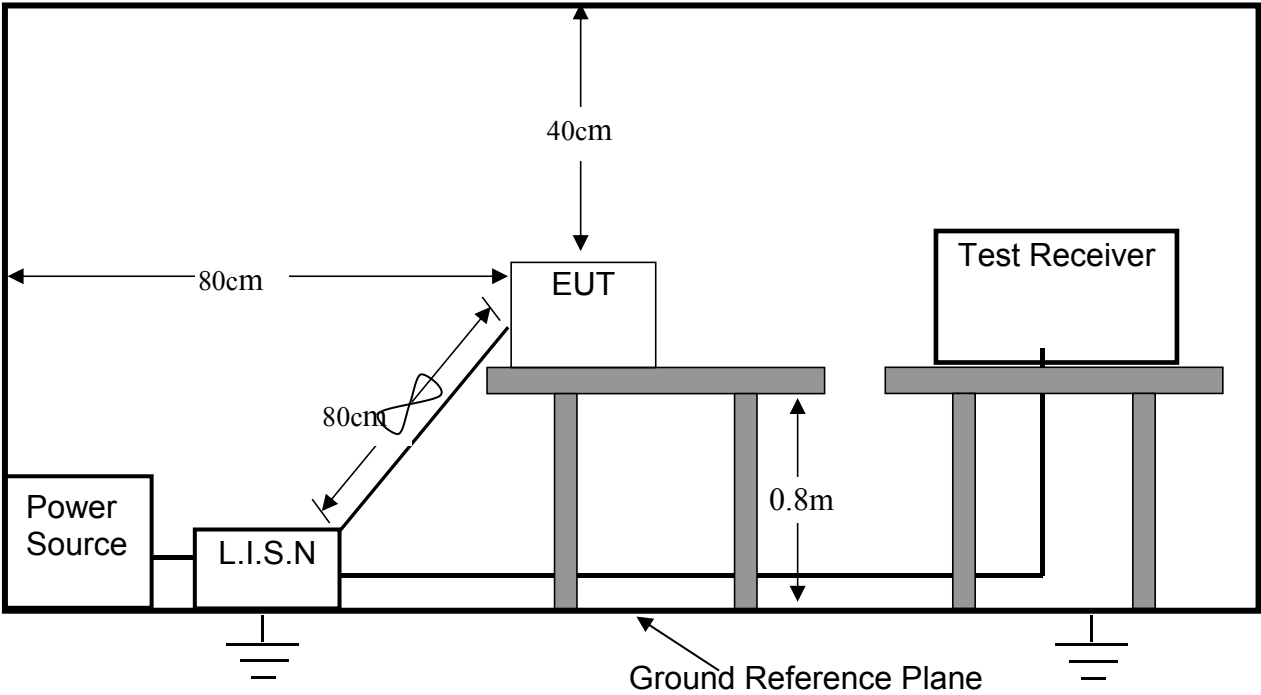
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Magnetic Field Tester	N/A	MS-8000	N/A	Mar. 27, 2021	1 Year
2.	Test Software	N/A	N/A	N/A	N/A	N/A

#### 4.10 For Low Frequency Signal Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Low Frequency Signal Tester	N/A	HHF 5010	N/A	Mar. 27, 2021	1 Year

5. MAINS TERMINAL DISTURBANCE VOLTAGE  
MEASUREMENT

5.1 Block Diagram of Test Setup



5.2 Limit of Mains Terminal Disturbance voltage measurement

Test Standard: EN IEC 62040-2 C2

Limits of mains terminal interference voltage frequency range 0.15 MHz to 30 MHz for Category C2 UPS equipment.

Frequency range  MHz	Limits dB (μV)							
	Category C1 UPS				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>a</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		
<sup>a</sup> The limit decreases linearly with the logarithm of the frequency.								
<sup>b</sup> The lower limit shall apply at the transition frequency.								

### 5.3 Test Procedure

The E.U.T. is put on the 0.8m high table and connected to the AC mains through a Artificial Mains Network (AMN). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission levels according to the EN IEC 62040-2 regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESCI) is set at 9 KHz.

Sample of data calculate:

Level=Reading + Factor

Margin= Level-Limit

Factor=LF+CF+SWF

Where LF= L.I.S.N attenuation factor in dB  
(L.I.S.N contain 10dB attenuator)

CF= Cable attenuation factor in dB

SWF= RF Switching Unit attenuation factor in dB

### 5.4 Operating Condition of E.U.T.

5.4.1 Setup the E.U.T. and simulators as shown in Section 5.3.

5.4.2 Turn on the power of all equipments.

5.4.3 Let the E.U.T. work in test modes and test it.

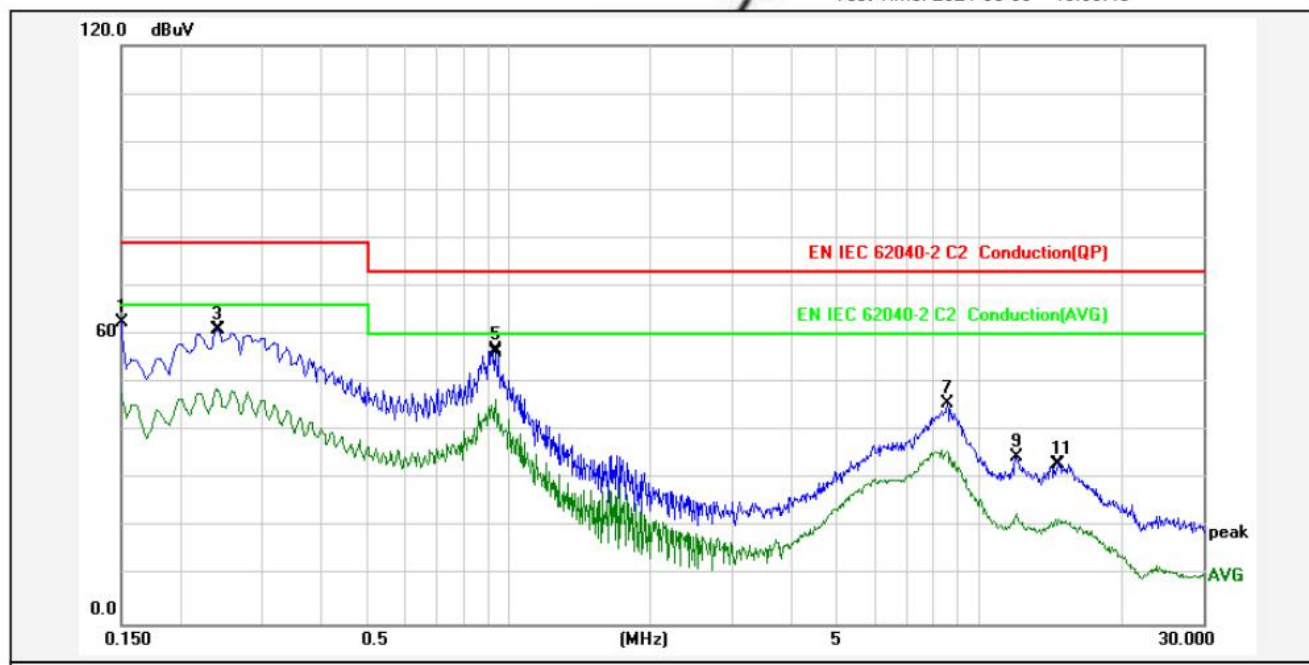
### 5.5 Test Results

**PASS.**

Please refer to the following pages.

E.U.T :	UPS	Model Name :	SRV2KI-E
Temperature :	27.4° C	Relative Humidity :	49 %
Pressure :	1006 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	Normal operation mode	Phase:	Neutral

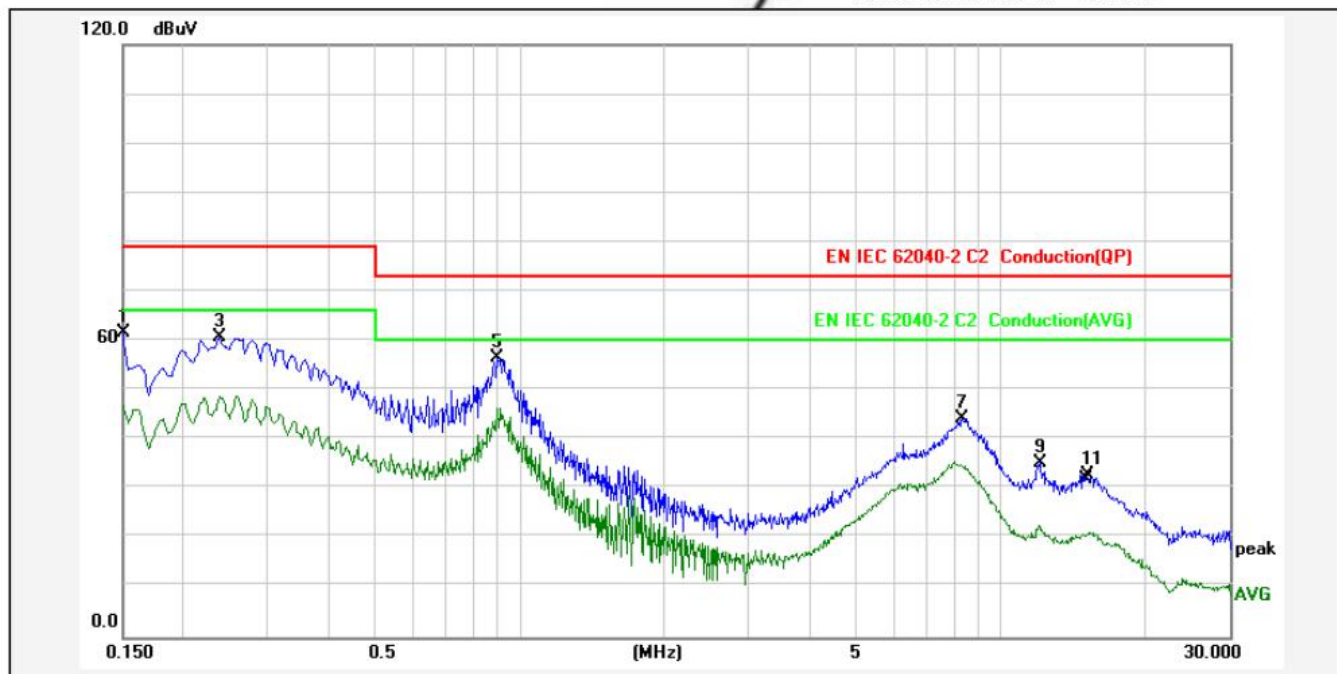
Test Time: 2021-06-09 10:09:48





E.U.T :	UPS	Model Name :	SRV2KI-E
Temperature :	27.4° C	Relative Humidity :	49 %
Pressure :	1006 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	Normal operation mode	Phase:	Line

Test Time: 2021-06-09 10:08:13

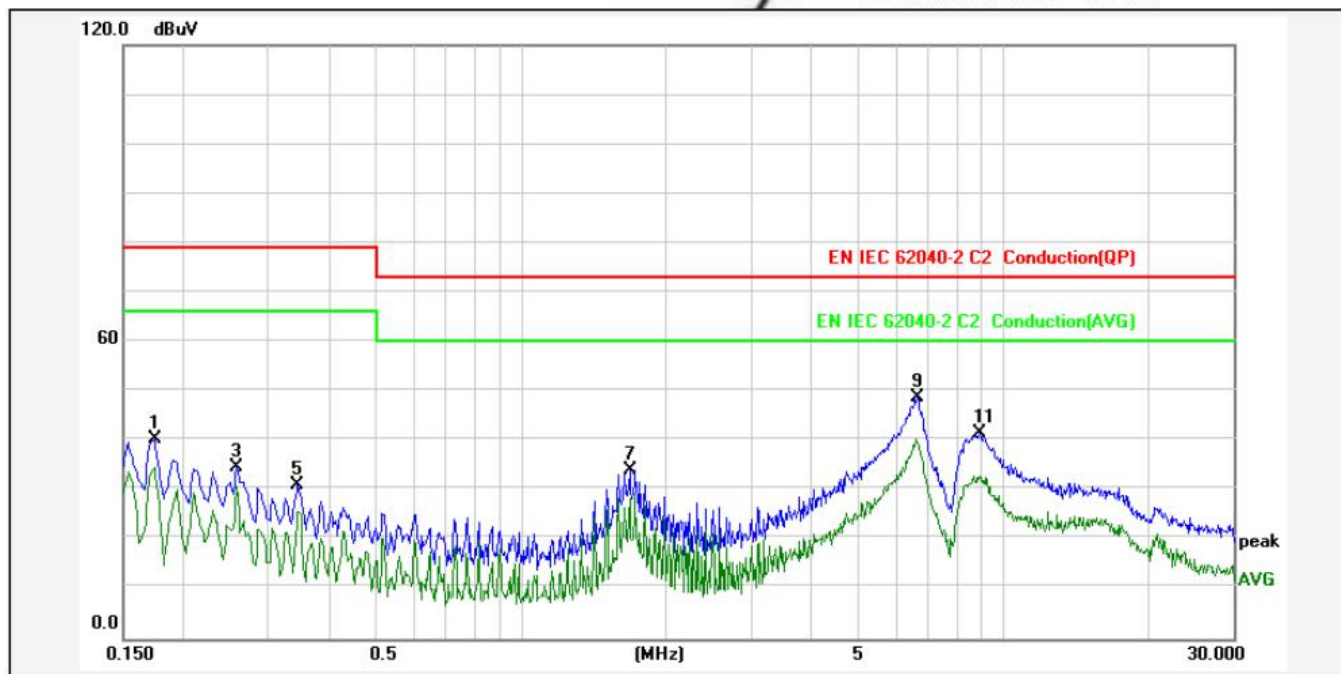


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	11.53	50.15	61.68	79.00	-17.32	peak	P	
2	0.1500	11.53	35.43	46.96	66.00	-19.04	AVG	P	
3	0.2380	11.57	49.22	60.79	79.00	-18.21	peak	P	
4	0.2380	11.57	37.03	48.60	66.00	-17.40	AVG	P	
5	0.9020	11.70	44.83	56.53	73.00	-16.47	peak	P	
6	0.9020	11.70	34.69	46.39	60.00	-13.61	AVG	P	
7	8.3139	11.59	32.80	44.39	73.00	-28.61	peak	P	
8	8.3139	11.59	23.40	34.99	60.00	-25.01	AVG	P	
9	12.0059	11.58	23.81	35.39	73.00	-37.61	peak	P	
10	12.0059	11.58	11.01	22.59	60.00	-37.41	AVG	P	
11	15.2179	11.57	21.41	32.98	73.00	-40.02	peak	P	
12	15.2179	11.57	9.40	20.97	60.00	-39.03	AVG	P	



E.U.T :	UPS	Model Name :	SRV2KI-E
Temperature :	27.4° C	Relative Humidity :	49 %
Pressure :	1006 hPa	Test Voltage :	Build-in battery 48V
Test Mode :	Stored energy operation mode	Phase:	Neutral

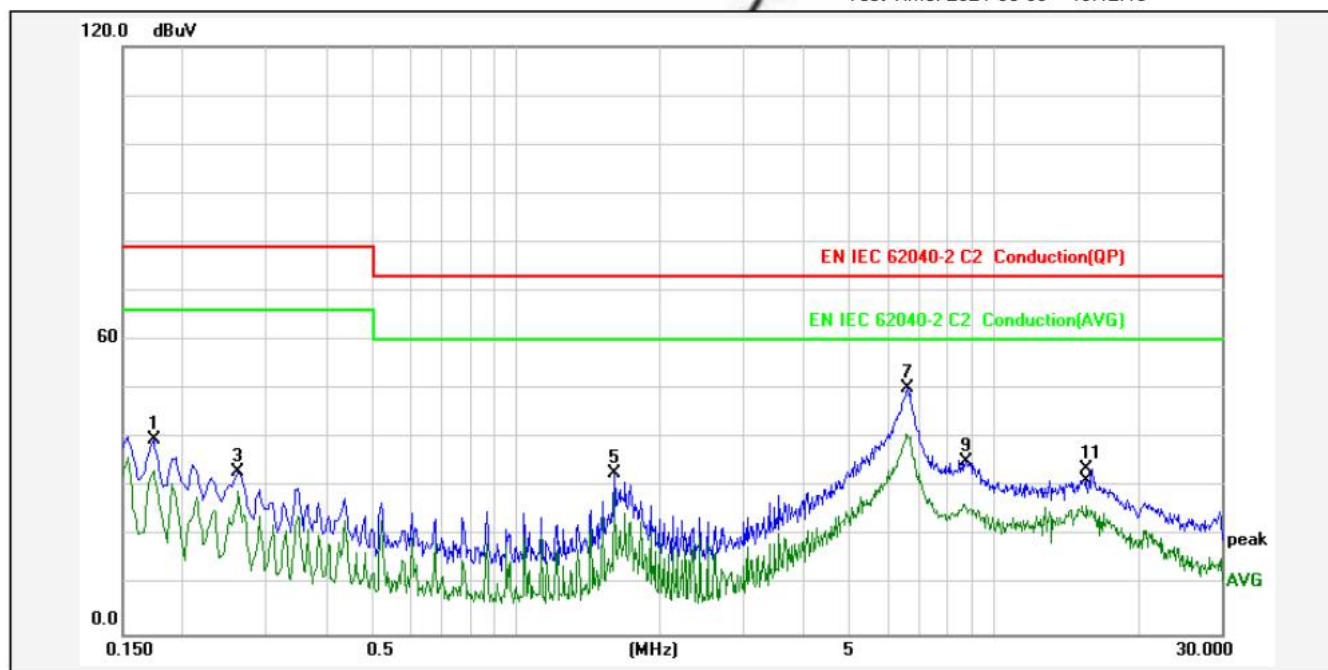
Test Time: 2021-06-09 10:11:21



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1739	11.54	28.89	40.43	79.00	-38.57	peak	P	
2	0.1739	11.54	23.21	34.75	66.00	-31.25	AVG	P	
3	0.2580	11.58	23.10	34.68	79.00	-44.32	peak	P	
4	0.2580	11.58	19.23	30.81	66.00	-35.19	AVG	P	
5	0.3459	11.60	19.44	31.04	79.00	-47.96	peak	P	
6	0.3459	11.60	14.08	25.68	66.00	-40.32	AVG	P	
7	1.6819	11.60	22.49	34.09	73.00	-38.91	peak	P	
8	1.6819	11.60	16.69	28.29	60.00	-31.71	AVG	P	
9	6.5979	11.62	37.17	48.79	73.00	-24.21	peak	P	
10	6.5979	11.62	28.60	40.22	60.00	-19.78	AVG	P	
11	8.9419	11.59	30.01	41.60	73.00	-31.40	peak	P	
12	8.9419	11.59	21.29	32.88	60.00	-27.12	AVG	P	

E.U.T :	UPS	Model Name :	SRV2KI-E
Temperature :	27.4° C	Relative Humidity :	49 %
Pressure :	1006 hPa	Test Voltage :	Build-in battery 48V
Test Mode :	Stored energy operation mode	Phase:	Line

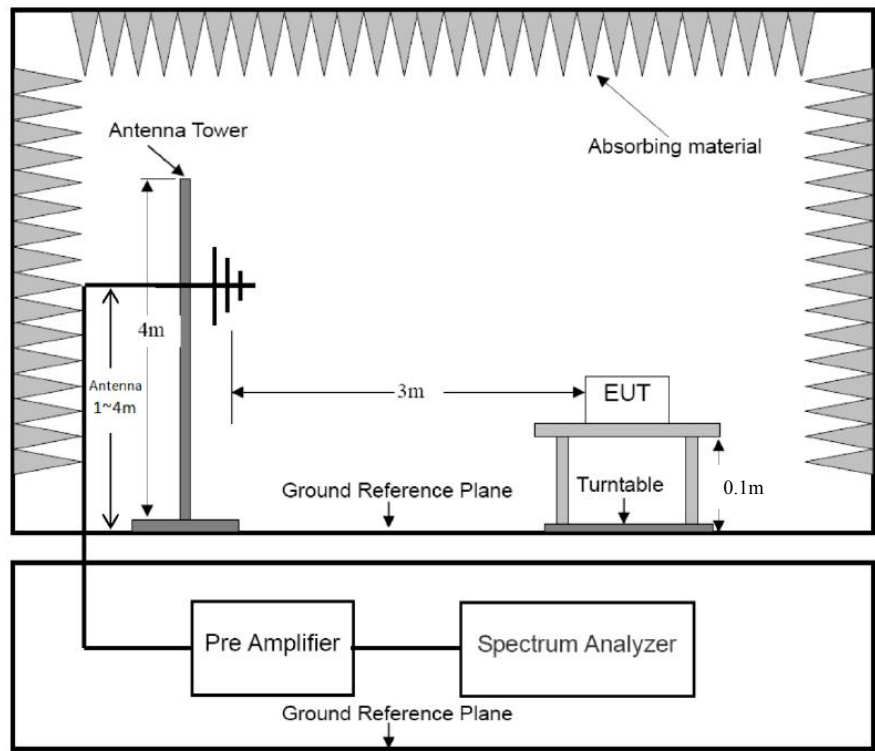
Test Time: 2021-06-09 10:12:13



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1739	11.54	28.27	39.81	79.00	-39.19	peak	P	
2	0.1739	11.54	22.01	33.55	66.00	-32.45	AVG	P	
3	0.2620	11.58	21.71	33.29	79.00	-45.71	peak	P	
4	0.2620	11.58	17.60	29.18	66.00	-36.82	AVG	P	
5	1.6060	11.62	21.31	32.93	73.00	-40.07	peak	P	
6	1.6060	11.62	17.48	29.10	60.00	-30.90	AVG	P	
7	6.5618	11.62	38.63	50.25	73.00	-22.75	peak	P	
8	6.5618	11.62	29.27	40.89	60.00	-19.11	AVG	P	
9	8.6859	11.59	23.57	35.16	73.00	-37.84	peak	P	
10	8.6859	11.59	14.84	26.43	60.00	-33.57	AVG	P	
11	15.6379	11.60	22.11	33.71	73.00	-39.29	peak	P	
12	15.6379	11.60	14.67	26.27	60.00	-33.73	AVG	P	

6. RADIATED EMISSION MEASUREMENT

6.1 Block Diagram of Test



6.2 Limit of Radiated Emission Measurement

Test Standard: EN IEC 62040-2 C2

Limits for radiated disturbance at a measuring distance of 3m

Frequency range MHz	Quasi-peak limits dB(uV/m)		
	Category C1	Category C2	Category C3
30 to 230	40	50	60
230 to 1000	47	57	70

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

## 6.3 Test Procedure

E.U.T. and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. E.U.T. is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to EN IEC 62040-2 on radiated emission measurement.

The bandwidth of the EMI test receiver is set at 120 KHz.

The frequency range from 30 MHz to 1000 MHz is checked.

Sample of data calculate:

Level=Reading + Factor; Margin= Level-Limit

Factor=CF+AF+AG

Where CF=Cable attenuation factor in dB

AF= Antenna factor in dB

AG=Amplifier Gain in dB

## 6.4 Operating Condition of E.U.T.

6.4.1 Setup the E.U.T. and simulators as shown in Section 6.3.

6.4.2 Turn on the power of all equipments.

6.4.3 Let the E.U.T. work in test modes and test it.

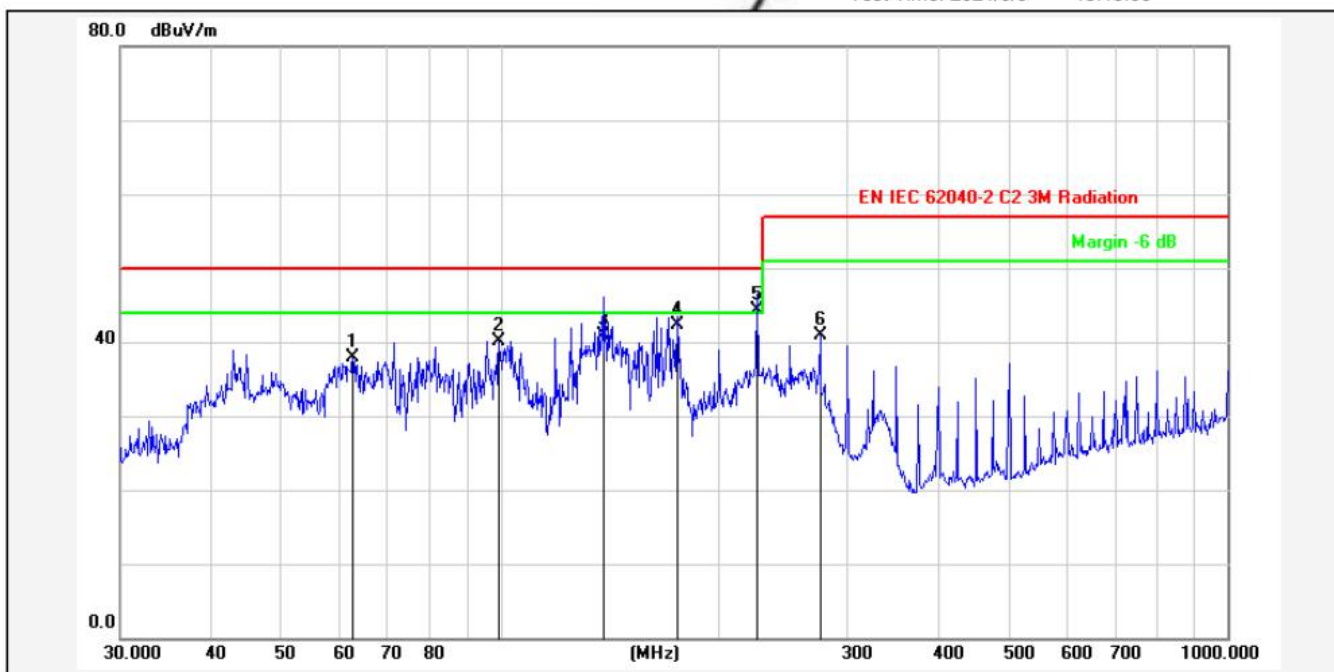
## 6.5 Test Results

**PASS.**

Please refer to the following pages.

E.U.T :	UPS	Model Name :	SRV2KI-E
Temperature :	27.8° C	Relative Humidity :	50 %
Pressure :	1006 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	Normal operation mode	Polarization:	Horizontal

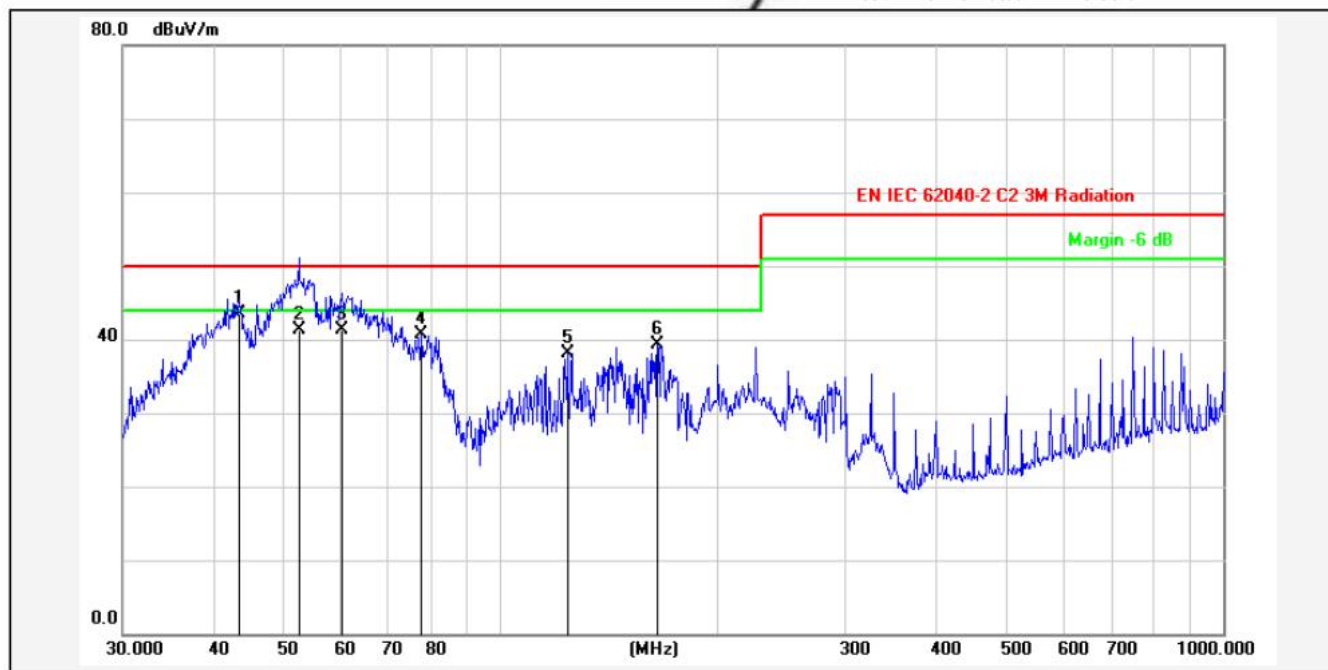
Test Time: 2021/6/9 15:13:06



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	62.6507	-17.91	55.75	37.84	50.00	-12.16	QP			P	
2	99.5281	-11.64	51.76	40.12	50.00	-9.88	QP			P	
3	138.3873	-10.36	51.26	40.90	50.00	-9.10	QP			P	
4	175.0368	-13.03	55.43	42.40	50.00	-7.60	QP			P	
5	225.3078	-13.26	57.66	44.40	50.00	-5.60	QP			P	
6	275.1569	-10.67	51.64	40.97	57.00	-16.03	QP			P	

E.U.T :	UPS	Model Name :	SRV2KI-E
Temperature :	27.8° C	Relative Humidity :	50 %
Pressure :	1006 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	Normal operation mode	Polarization:	Vertical

Test Time: 2021/6/9 15:05:31

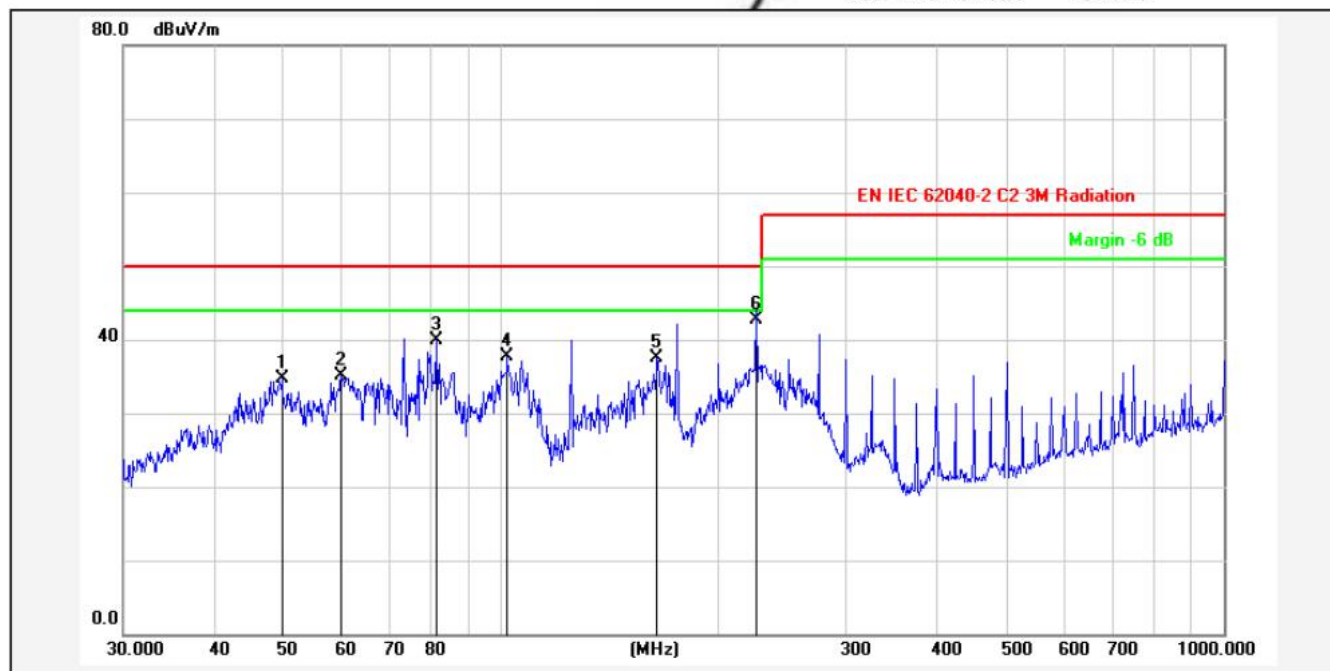


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	43.5057	-13.93	57.43	43.50	50.00	-6.50	QP			P	
2	52.5753	-16.46	57.76	41.30	50.00	-8.70	QP			P	
3	60.2801	-18.22	59.52	41.30	50.00	-8.70	QP			P	
4	77.5926	-15.73	56.47	40.74	50.00	-9.26	QP			P	
5	123.6984	-10.00	48.01	38.01	50.00	-11.99	QP			P	
6	164.9071	-12.05	51.28	39.23	50.00	-10.77	QP			P	



E.U.T :	UPS	Model Name :	SRV2KI-E
Temperature :	27.8° C	Relative Humidity :	50 %
Pressure :	1006 hPa	Test Voltage :	Build- in battery 48V
Test Mode :	Stored energy operation mode	Polarization:	Horizontal

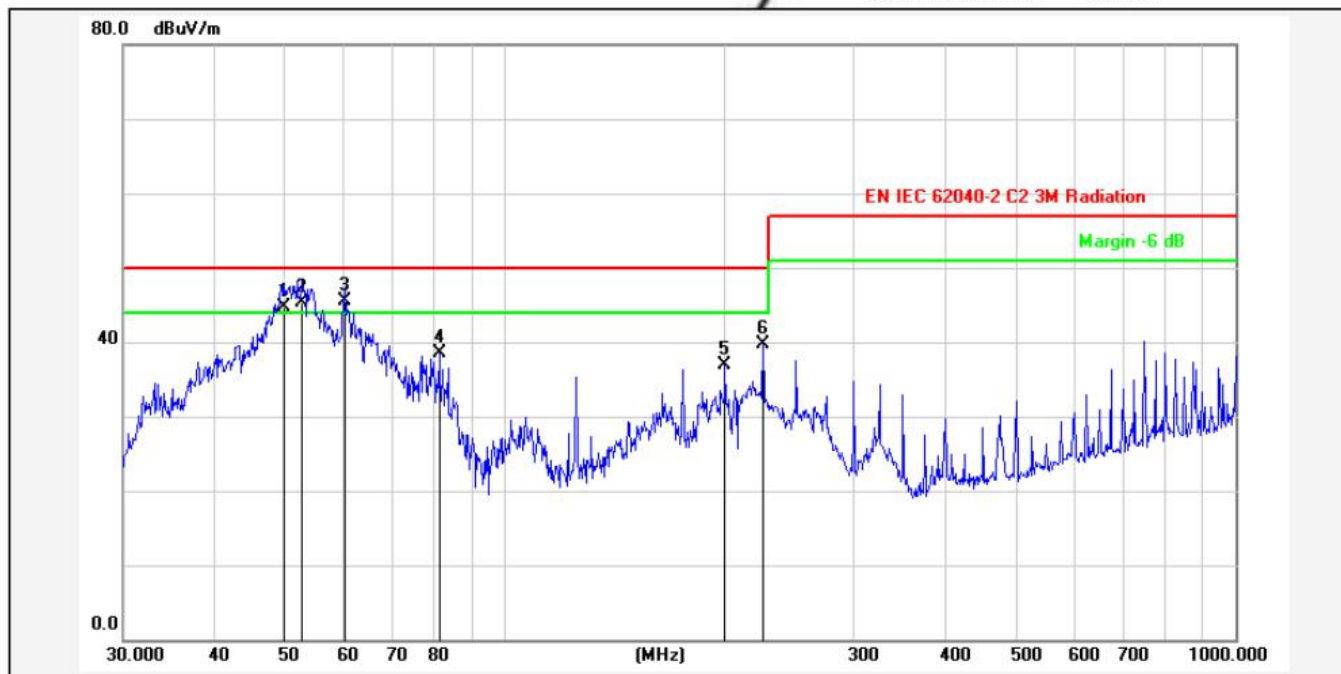
Test Time: 2021/6/9 15:18:26



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	49.7066	-15.64	50.35	34.71	50.00	-15.29	QP			P	
2	60.0691	-18.23	53.40	35.17	50.00	-14.83	QP			P	
3	81.2117	-15.30	55.30	40.00	50.00	-10.00	QP			P	
4	102.0013	-11.32	49.10	37.78	50.00	-12.22	QP			P	
5	164.3301	-11.85	49.31	37.46	50.00	-12.54	QP			P	
6	225.3079	-13.26	55.96	42.70	50.00	-7.30	QP			P	

E.U.T :	UPS	Model Name :	SRV2KI-E
Temperature :	27.8° C	Relative Humidity :	50 %
Pressure :	1006 hPa	Test Voltage :	Build- in battery 48V
Test Mode :	Stored energy operation mode	Polarization:	Vertical

Test Time: 2021/6/9 15:00:27

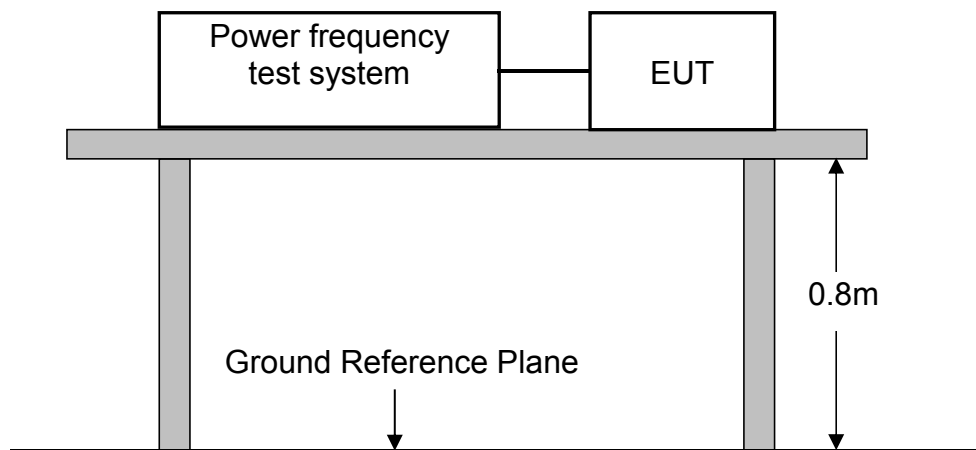


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	49.8814	-15.81	60.61	44.80	50.00	-5.20	QP			P	
2	52.7600	-16.50	61.80	45.30	50.00	-4.70	QP			P	
3	60.2801	-18.22	63.82	45.60	50.00	-4.40	QP			P	
4	81.2116	-15.13	53.70	38.57	50.00	-11.43	QP			P	
5	199.9855	-13.41	50.33	36.92	50.00	-13.08	QP			P	
6	225.3077	-13.46	53.23	39.77	50.00	-10.23	QP			P	



## 7.HARMONIC CURRENT EMISSION TEST

### 7.1 Block Diagram of Test Setup



### 7.2 Limits of Harmonics current measurement

Test Standard: EN IEC 61000-3-2

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				
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	0.15×15/n	15<=n<=39	3.85/n	0.15×15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23×8/n			

For the following categories of equipment limits are not specified in this edition of the standard.

Note 1: Equipment with a rated power of 75W or less, other than lighting equipment.

### 7.3 Test Procedure

The E.U.T. was put on the top of a wooden table 0.8m above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

The E.U.T. 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 600W of the following types: Personal computers and personal computer monitors and television receivers.

### 7.4 Operating Condition of E.U.T.

7.4.1 Setup the E.U.T. and simulators as shown in Section 7.3.

7.4.2 Turn on the power of all equipments.

7.4.3 Let the E.U.T. work in test mode and test it.

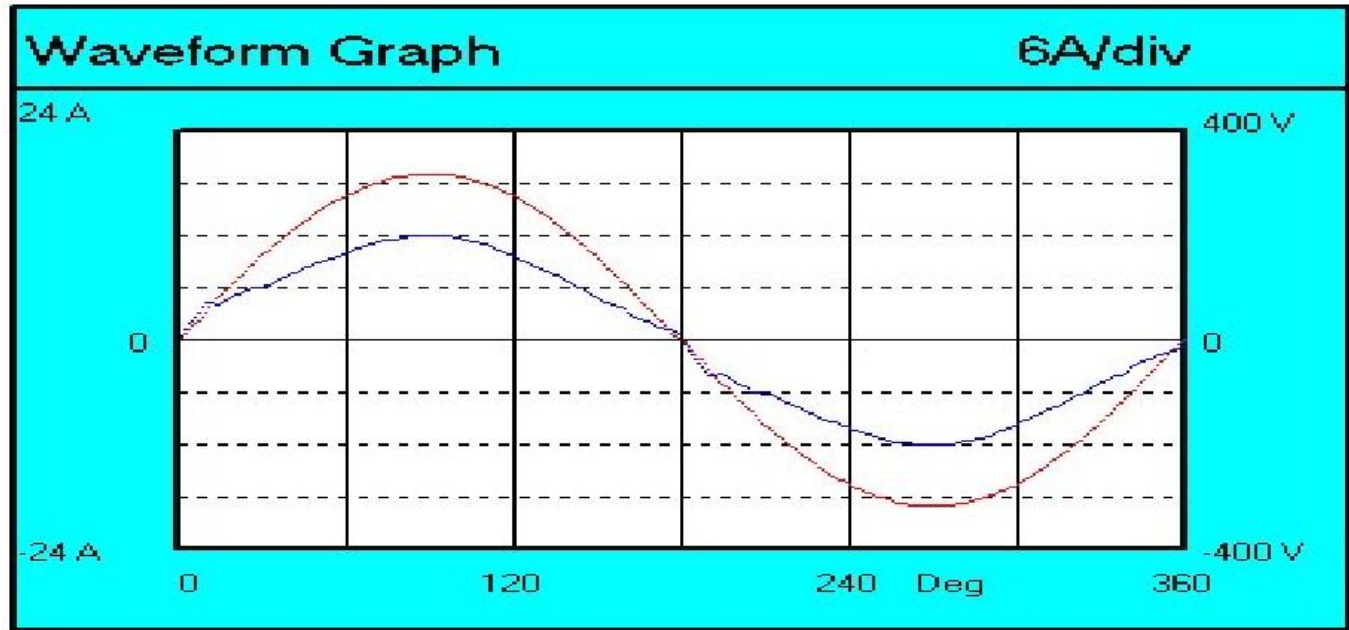
### 7.5 Test Results

**PASS.**

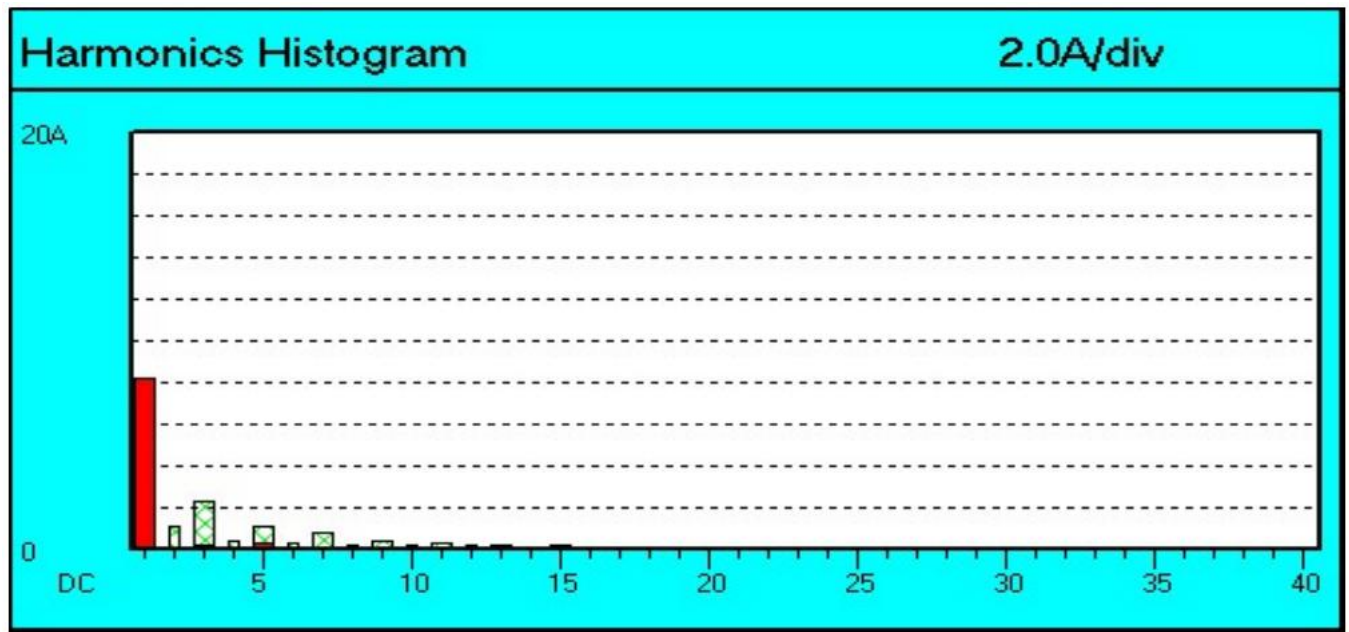
Please refer to the following pages.

Harmonics – Class-A per (Run time)

Current & voltage waveforms



Harmonics and Class A limit line European Limits



## Current Test Result Summary (Run time)

Report Number : NTC2106625EV00  
Tested On : 16 June 2021 20:24 for 150 Seconds.  
Equipment Under Test : UPS  
Serial Number : SRV2KI-E  
Tested by : Talon

Supply Voltage : 226.5 Vrms @ 319.9 Vpk Frequency : 49.98 to 50.00 Hz  
Supply Meets EN Requirements

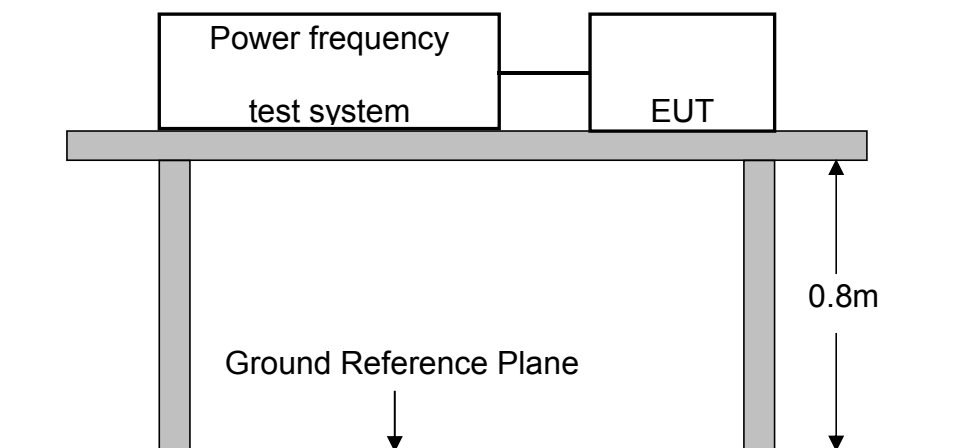
Load Power : 1.862 kW 1.853 kVA Power Factor 0.997  
Load Current : 8.3 Arms 12.1 Apk Crest Factor 1.470

Measurement Standard : EN61000-4-7:2002+A1:2009  
Limits Applied : EN IEC 61000-3-2 Class A Limits Apply.

Harmonic Number	Limit Current Amp	Average (filtered) Amp	% Limit	max. Value (Filtered) Amp	% Limit	Assessment
Fundamental :		8.165				
2 :	1.080	0.061	5.6	0.074	6.9	Pass
3 :	2.300	0.219	9.5	0.229	10.0	Pass
4 :	0.430	0.040	9.3	0.051	11.9	Pass
5 :	1.140	0.259	22.7	0.267	23.4	Pass
6 :	0.300	0.028	9.3	0.033	11.0	Pass
7 :	0.770	0.148	19.2	0.151	19.6	Pass
8 :	0.230	0.022	9.6	0.025	10.9	Pass
9 :	0.400	0.129	32.2	0.133	33.3	Pass
10 :	0.184	0.019	10.3	0.023	12.5	Pass
11 :	0.330	0.114	34.5	0.117	35.5	Pass
12 :	0.153	0.016	10.5	0.019	12.4	Pass
13 :	0.210	0.062	29.5	0.064	30.5	Pass
14 :	0.131	0.014	10.7	0.015	11.5	Pass
15 :	0.150	0.059	39.3	0.061	40.7	Pass
16 :	0.115	0.012	10.4	0.014	12.2	Pass
17 :	0.132	0.092	69.7	0.094	71.2	Pass
18 :	0.102	0.012	11.8	0.012	11.8	Pass
19 :	0.118	0.068	57.6	0.069	58.5	Pass
20 :	0.092	0.011	12.0	0.012	13.0	Pass
21 :	0.107	0.056	52.3	0.057	53.3	Pass
22 :	0.084	0.011	13.1	0.012	14.3	Pass
23 :	0.098	0.045	45.9	0.046	46.9	Pass
24 :	0.077	0.011	14.3	0.011	14.3	Pass
25 :	0.090	0.020	22.2	0.022	24.4	Pass
26 :	0.071	0.009	12.7	0.010	14.1	Pass
27 :	0.083	0.019	22.9	0.020	24.1	Pass
28 :	0.066	0.009	13.6	0.010	15.2	Pass
29 :	0.078	0.013	16.7	0.015	19.2	Pass
30 :	0.061	0.010	16.4	0.010	16.4	Pass
31 :	0.073	0.022	30.1	0.024	32.9	Pass
32 :	0.057	0.010	17.5	0.010	17.5	Pass
33 :	0.068	0.022	32.4	0.023	33.8	Pass
34 :	0.054	0.010	18.5	0.011	20.4	Pass
35 :	0.064	0.012	18.8	0.013	20.3	Pass
36 :	0.051	0.010	19.6	0.011	21.6	Pass
37 :	0.061	0.013	21.3	0.014	23.0	Pass
38 :	0.048	0.010	20.8	0.010	20.8	Pass
39 :	0.058	0.017	29.3	0.018	31.0	Pass
40 :	0.046	0.010	21.7	0.011	23.9	Pass
21 - 39 :	0.251	0.087	34.7	0.089	35.5	-

## 8. VOLTAGE FLUCTUATIONS&FLICKER TEST

### 8.1 Block Diagram of Test Setup



### 8.2 Limits of Voltage Fluctuations&Flicker Measurement

Test Standard: EN 61000-3-3

Test Item	Limit
$P_{st}$ (Short-term flicker indicator.)	1.0
$P_{lt}$ (Long-term flicker indicator.)	0.65
$T_{d(t)}$ (ms)(Maximum time that $d(t)$ exceeds 3.3%)	500
$d_{max}$ (%)(Maximum relative voltage change.)	4
Built-in battery(%)(Relative steady-state voltage change)	3.3

### 8.3 Test Procedure

The E.U.T.was put on the top of a wooden table 0.8m above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

### 8.4 Operating Condition of E.U.T.

8.4.1 Setup the E.U.T.and simulators as shown in Section 8.3.

8.4.2 Turn on the power of all equipments.

8.4.3 Let the E.U.T.work in test modes and test it.

### 8.5 Test Results

PASS.

Please refer to the following pages.

## Flicker Test Summary per EN61000-3-3 (Run time)

Report Number : NTC2106625EV00  
 Tested On : 16 June 2021 19:52 for 600 Seconds.  
 Equipment Under Test : UPS  
 Serial Number : SRV2KI-E  
 Tested by : Talon

Load Power : 1.849 kW 1.855 kVA Power Factor 0.997  
 Load Current : 8.2 Arms 12.1 Apk Crest Factor 1.463

EN 61000-3-3 - Voltage reduction is positive

### Voltage Variations

Nominal Voltage: 230 Vrms  
 Highest Half-cycle level: +2.04%  
 Lowest Half-cycle level: +2.37%

d(max): +0.11% Limit: 4% PASS  
 t(max): 0.00seconds Limit: 500ms PASS

Steady State definition: >1000ms within +/- 0.2%  
 Largest d(c) change down: +0.15%  
 Largest d(c) change up: -0.05%  
 Largest d(c) change: +0.15% Limit: 3.3% PASS

### Flicker

Short Term Flicker Pst: 0.10 Limit: 1.00 PASS  
 Long Term Flicker Plt: 0.00 Limit: 0.65 PASS

Pst Classifier		Plt Calculation	
Duration	Flicker	Interval	Pst
0.7%	0.03	1:	0.10
1.0%	0.03	2:	0.00
1.5%	0.03	3:	0.00
2.2%	0.02	4:	0.00
3%	0.02	5:	0.00
4%	0.02	6:	0.00
6%	0.02	7:	0.00
8%	0.02	8:	0.00
10%	0.02	9:	0.00
13%	0.02	10:	0.00
17%	0.02	11:	0.00
30%	0.02	12:	0.00
30%	0.02		
50%	0.01	Plt =	0.00
80%	0.01		

## 9. PERFORMANCE CRITERIA FOR IMMUNITY

The performance criteria are referred to the test standard: EN IEC 62040-2

Performance criteria for immunity tests

**Table 4 – Performance criteria for immunity tests**

	<b>Criterion A</b>	<b>Criterion B</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 consistency 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).		

The tests shall be made with the UPS in the following conditions:

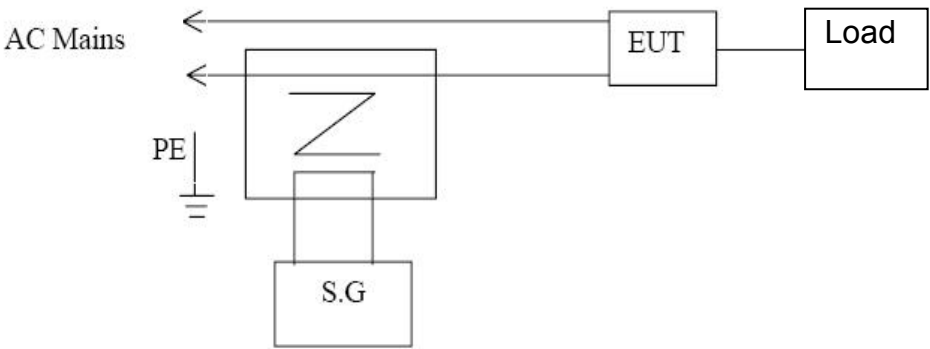
- a) rated input voltage;
- b) normal mode(s) of operation;
- c) linear load at rated active output power or at light load according to IEC 62040-3:2011.

The UPS shall be specified with the proper level in case of different levels of performance criteria.



## 10. LOW FREQUENCY SIGNALS TEST

### 10.1 Block Diagram of Test Setup



### 10.2 Test Standard and Performance Criterion

Product standard	EN IEC 62040-2
Basic standard	IEC 61000-2-2
Performance criterion	A

### 10.3 Operating Condition of E.U.T.

- 10.3.1 Setup the E.U.T. and simulators as shown in Section 10.1.
- 10.3.2 Turn on the power of all equipments.
- 10.3.3 Let the E.U.T. work in test mode and test it.

### 10.4 Test Results

**PASS.**

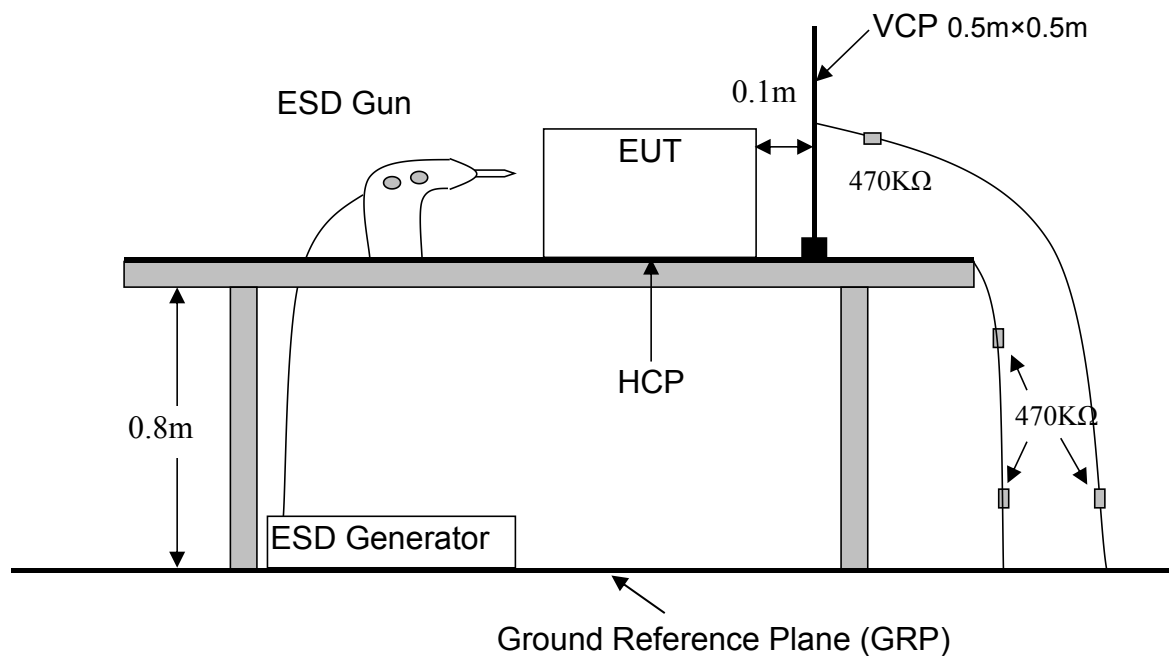
Please refer to following page.

## Low Frequency Signals Test Result

Ambient Condition:	Temp.: 27.8℃	R.H.: 57 %	Air Pressure: 101.3 kPa
Power Supply:	AC 230V/50Hz	Required Performance Criterion: A	
Tested mode:	Normal operation mode		
Frequency Range (Hz)	Strength	Result (Performance Criterion)	
140 to 360	10V(rms) Sinusoidal	A	
Note: The test showed no abnormal phenomena.		Test Engineer : Talon	
<div><div>U.P.S</div><div>Transformer 1:1</div><div></div><div>Signal Generator</div></div>			

## 11. ELECTROSTATIC DISCHARGE TEST

### 11.1 Block Diagram of Test Setup



### 11.2 Test Standard and Severity Levels

#### 11.2.1 Test Standard:

Product standard	EN IEC 62040-2
Basic standard	IEC 61000-4-2
Performance criterion	B

#### 11.2.2 Severity Levels:

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

## 11.3 Test Procedure

### 11.3.1 Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the E.U.T.. After each discharge, the discharge electrode shall be removed from the E.U.T.. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

### 11.3.2 Contact Discharge:

All the procedure shall be same as Section 11.3.1. except that the tip of the discharge electrode shall touch the E.U.T. before the discharge switch is operated.

### 11.3.3 Indirect discharge for horizontal coupling plane

At least 10 single discharges(in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit(if applicable) of the E.U.T. and 0.1m from the front of the E.U.T.. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

### 11.3.4 Indirect discharge for vertical coupling plane

At least 10 single discharge (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the E.U.T.. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the E.U.T. are completely illuminated.

## 11.4 Test Results

**PASS.**

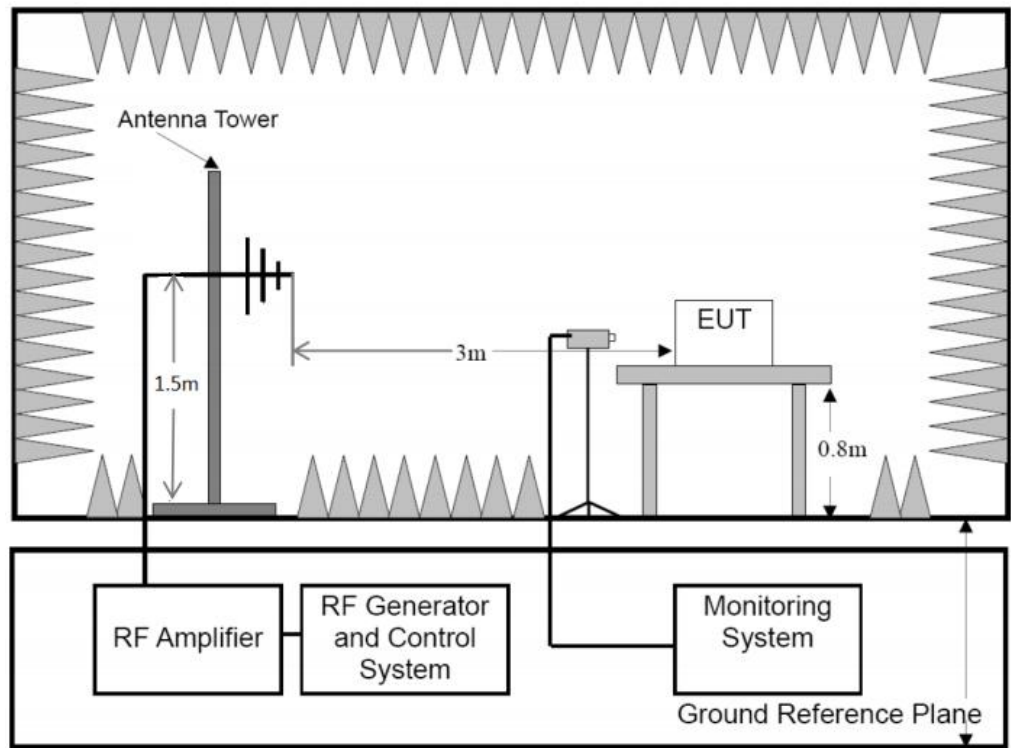
Please refer to the following page.

## Electrostatic Discharge Test Results

Ambient Condition:	Temp.: 27.5℃	R.H.: 54%	Air Pressure: 101.3kPa
Power Supply:	AC 230V/50Hz	Required Performance Criterion: B	
Test Specifications:	±4 kV Contact Discharge; ±8 kV Air Discharge. For each point positive 10 times and negative 10 times.		
Tested mode:	Normal operation mode		
Test Point		Kind A-Air Discharge C-Contact Discharge	Result (Performance Criterion)
Slot of EUT		A	A
Screen		A	A
Button		A	A
LED		A	A
LAN Port		A	A
Screw		C	A
USB / RS232 Port		C	A
Metal		C	A
Indirect Discharge(HCP)		C	A
Indirect Discharge(VCP)		C	A
Note: The test showed no abnormal phenomenon			
Test Engineer : Talon			

12. RF FIELD STRENGTH SUSCEPTIBILITY TEST

12.1 Block Diagram of Test Setup



12.2 Test Standard and Severity Levels

12.2.1 Test Standard

Product standard	EN IEC 62040-2
Basic standard	IEC 61000-4-3
Performance criterion	A

12.2.2 Severity Levels

Level	Field Strength V/m
1.	1
2.	3
3.	10
X	Special

### 12.3 Test Procedure

The E.U.T. and its simulators are placed on a turn table which is 0.8 meter above ground. E.U.T. is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of E.U.T. must be faced this transmitting antenna and measured individually.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Fielded Strength	10 V/m (Severity Level 3)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 1000 MHz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	1 Sec.

### 12.4 Test Results

**PASS.**

Please refer to the following page.

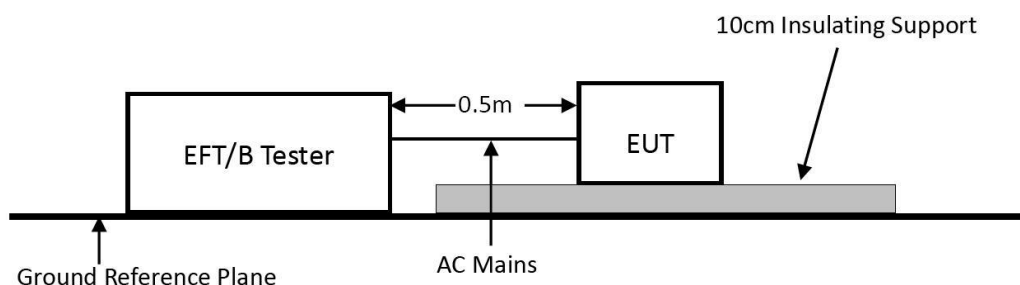
## RF Field Strength Susceptibility Test Results

Ambient Condition:	Temp.: 26℃	R.H.: 50%	Air Pressure: 101 kPa	
Power Supply:	AC 230V/50Hz	Required Performance Criterion: A		
Test Specifications:	Modulation: 1kHz, 80%AM; Step Size: 1%; Dwell Time: 3s			
Tested mode:	Normal operation mode			
Frequency (MHz)	Level (V/m)	Antenna polarity	Side	Result (Performance Criterion)
80-1000	10	Horizontal	Front	A
			Left	A
			Right	A
			Back	A
		Vertical	Front	A
			Left	A
			Right	A
			Back	A
Note:The test showed no abnormal phenomenon				
Test Engineer :Alvin				



## 13. ELECTRICAL FAST TRANSIENT/BURST TEST

### 13.1 Block Diagram of Test Setup



### 13.2 Test Standard and Severity Levels

#### 13.2.1 Test Standard

Product standard	EN IEC 62040-2
Basic standard	IEC 61000-4-4
Performance criterion	B

#### 13.2.2 Severity level

Open circuit output test voltage and repetition rate of the impulses				
Level	On power port, PE		On I/O (Input/Output) Signal data and control ports	
	Voltage peak KV	Repetition rate KHz	Voltage peak KV	Repetition rate KHz
1.	0.5	5 or 100	0.25	5 or 100
2.	1.0	5 or 100	0.5	5 or 100
3.	2.0	5 or 100	1.0	5 or 100
4.	4.0	5 or 100	2.0	5 or 100
X	Special	Special	Special	Special
Note 1	Use of 5 KHz repetition rates is traditional; however, 100 KHz is closer to reality. Product committees should determine which frequencies are relevant for specific products or product types.			
Note 2	With some products, there may be no clear distinction, between power ports and I/O ports, in which case it is up to product committees to make this determination for test purposes.			
Note 3	"X" is an open level. The level has to be specified in the dedicated equipment specification.			

### 13.3 Test Procedure

The E.U.T. is put on the table which is 0.1 meter high above the ground. This reference ground plane shall project beyond the E.U.T. by at least 0.1m on all sides and the minimum distance between E.U.T. and all other conductive structure, except the ground plane beneath the E.U.T., shall be more than 0.5m.

#### 13.3.1 For input and output AC power ports:

The E.U.T. is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minus.

#### 13.3.2 For signal lines ports:

It's unnecessary to test.

#### 13.3.3 For DC ports:

It's unnecessary to test.

### 13.4 Test Results

**PASS.**

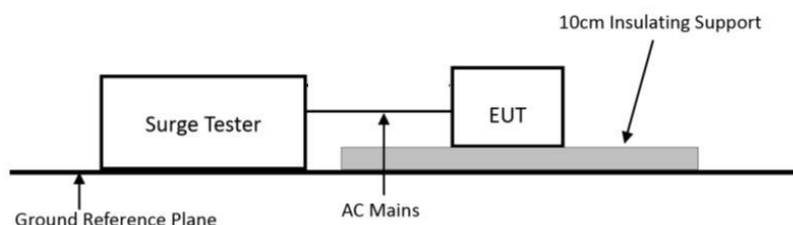
Please refer to the following page.

## Electrical Fast Transient/Burst Test Results

Ambient Condition:	Temp.: 27.8℃	R.H.: 57%	Air Pressure: 101.3kPa
Power Supply:	AC 230V/50Hz	Required Performance Criterion: B	
Test Specifications:	Repetition Frequency: 5kHz; Duration: 15ms; Period: 300ms		
Test mode:	Normal operation mode		
Line : <input checked="" type="checkbox"/> AC Mains <input type="checkbox"/> Signal line <input type="checkbox"/> DC line Coupling : <input checked="" type="checkbox"/> Direct <input type="checkbox"/> Capacitive			
<b>Line</b> (AC Input and AC Output )	<b>Test Voltage</b>	<b>Result</b> (Performance Criterion)	
L1	±4KV	A	
N	±4KV	A	
PE	±4KV	A	
L、N	±4KV	A	
L、PE	±4KV	A	
PE、N	±4KV	A	
L、N、PE	±4KV	A	
Signal line	---	---	
DC line	---	---	
Note : The test showed no abnormal phenomenon			
Test Engineer :Talon			

## 14. SURGE IMMUNITY TEST

### 14.1 Block Diagram of Test Setup



### 14.2 Test Standard and Severity Levels

#### 14.2.1 Test Standard

Product standard	EN IEC 62040-2
Basic standard	IEC 61000-4-5
Performance criterion	B

#### 14.2.2 Severity level

Severity Level	Open-Circuit Test Voltage KV
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

### 14.3 Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 14.1.
2. For line to line coupling mode, provide a 6.0KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to E.U.T. selected points.  
For line to earth coupling mode, provide a 6.0KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to E.U.T. selected points.
3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
4. Different phase angles are done individually.
5. Record the E.U.T. operating situation during compliance test and decide the E.U.T. immunity criterion for above each test.

### 14.4 Test Results

**PASS.**

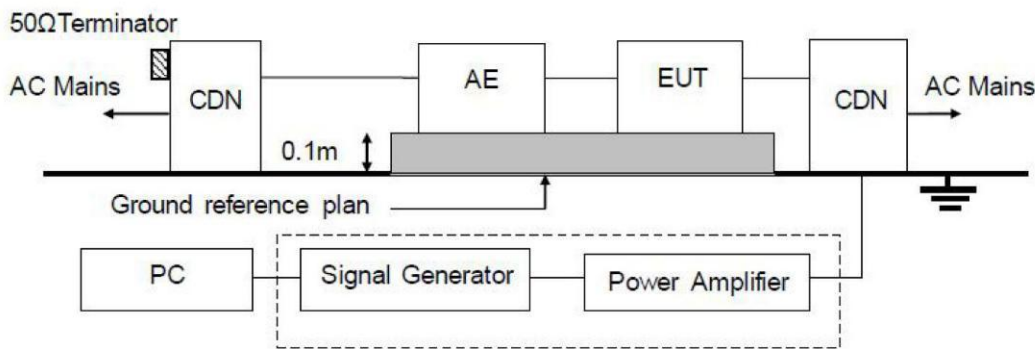
Please refer to the following page.

## Surge Immunity Test Results

Ambient Condition:	Temp.: 27.8℃	R.H.: 57%	Air Pressure: 101.3kPa
Power Supply:	AC 230V/50Hz	Required Performance Criterion: B	
Test Specifications:	Voltage surge 1.2/50 us ; Current surge 8/20 us ; Five positive and five negative pulses each at 0°, 90°, 180° and 270°		
Test mode:	Normal operation mode		
Line	Phase Angle	Test Voltage	Result (Performance Criterion)
L-N	0°, 90°, 180°, 270°	±6.0KV	B
L-PE	0°, 90°, 180°, 270°	±6.0KV	A
N-PE	0°, 90°, 180°, 270°	±6.0KV	A
DC line	---	---	---
Note : When L-N is Surged with ±6kV, the EUT mode sends a change and then resumes.			
Test Engineer : Talon			

15. INJECTED CURRENTS SUSCEPTIBILITY TEST

15.1 Block Diagram of Test Setup



15.2 Test Standard and Severity Levels

15.2.1 Test Standard

Product standard	EN IEC 62040-2
Basic standard	IEC 61000-4-6
Performance criterion	A

15.2.2 Severity level

Frequency range 150 kHz to 80 MHz		
Level	Voltage level (e.m.f.)	
	$U_0$ V	$U_0$ dB(μV)
1	1	120
2	3	129,5
3	10	140
X <sup>a</sup>	Special	
<sup>a</sup> "X" can be any level, above, below or in between the others. The level has to be specified in the dedicated equipment specification.		

### 15.3 Test Procedure

1. Set up the E.U.T., CDN and test generators as shown on Section 15.1.
2. Let the E.U.T. work in test mode and measure it.
3. The E.U.T. are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from E.U.T.. Cables between CDN and E.U.T. are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
4. The disturbance signal described below is injected to E.U.T. through CDN.
5. The E.U.T. operates within its operational mode(s) under intended climatic conditions after power on.
6. The frequency range is swept from 150 KHz to 80 MHz using 10V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.
7. The rate of sweep shall not exceed  $1.5 \times 10^{-3}$  decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.
8. Recording the E.U.T. operating situation during compliance testing and decide the E.U.T. immunity criterion.

### 15.4 Test Results

**PASS.**

Please refer to the following page.

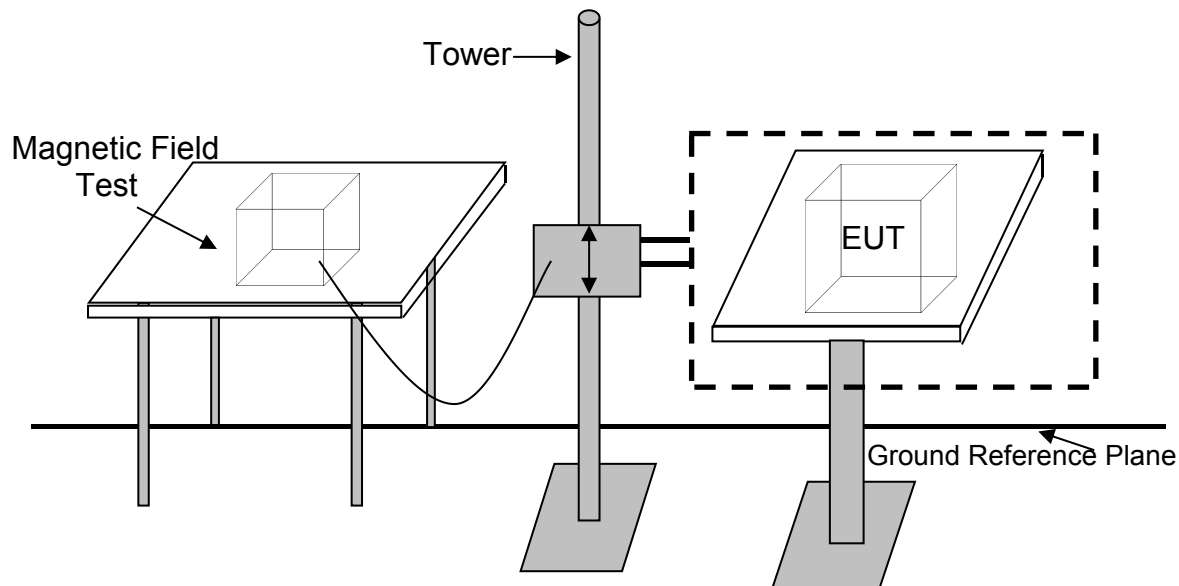
## Injected Currents Susceptibility Test Results

Ambient Condition:	Temp.: 26℃	R.H.: 50%	Air Pressure: 101 kPa
Power Supply:	AC 230V/50Hz	Required Performance Criterion: A	
Test Specifications:	Modulation : 1KHz, 80%AM, Step Size : 1%, Dwell Time : 1s		
Test mode:	Normal operation mode		
Model :	SRV2KI-E		
Test Port	Frequency (MHz)	Level(V)	Result (Performance Criterion)
AC Input Power Port	0.15~80	10	A
Note : The test showed no abnormal phenomenon			
Test Engineer : Alvin			



## 16. MAGNETIC FIELD IMMUNITY TEST

### 16.1 Block Diagram of Test Setup



### 16.2 Test Standard and Severity Levels

#### 16.2.1 Test Standard

Product standard	EN IEC 62040-2
Basic standard	IEC 61000-4-8
Performance criterion	A

#### 16.2.2 Severity level

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

### 16.3 Test Procedure

The E.U.T. is placed in the middle of a induction coil (1\*1m), under which is a 0.8 m (high)table. X, Y and Z polarization of the induction coil are set on test, so that each s ide of the E.U.T. is affected by the magnetic field. Also can reach the same aim by change the position of the E.U.T..

### 16.4 Test Results

**PASS.**

Please refer to the following page.

## Magnetic Field Immunity Test Results

Ambient Condition:	Temp.: 27.5℃	R.H.: 54 %	Air Pressure: 101.3kPa
Power Supply:	AC 230V/50Hz	Required Performance Criterion: A	
Test Specifications:	30A/m		
Test mode:	Normal operation mode		
Model :	SRV2KI-E		
Test Level	Testing Duration	Coil Orientation	Result (Performance Criterion)
30A/m	5 mins	X	A
30A/m	5 mins	Y	A
30A/m	5 mins	Z	A
Note : The test showed no abnormal phenomena			
Test Engineer : Talon			

# APPENDIX I (PHOTOS OF TEST SETUP)

## Photos of Test Setup

### Set-up for Conducted Emission



### Set-up for Radiated Emission



Set-up for Harmonic / Flicker

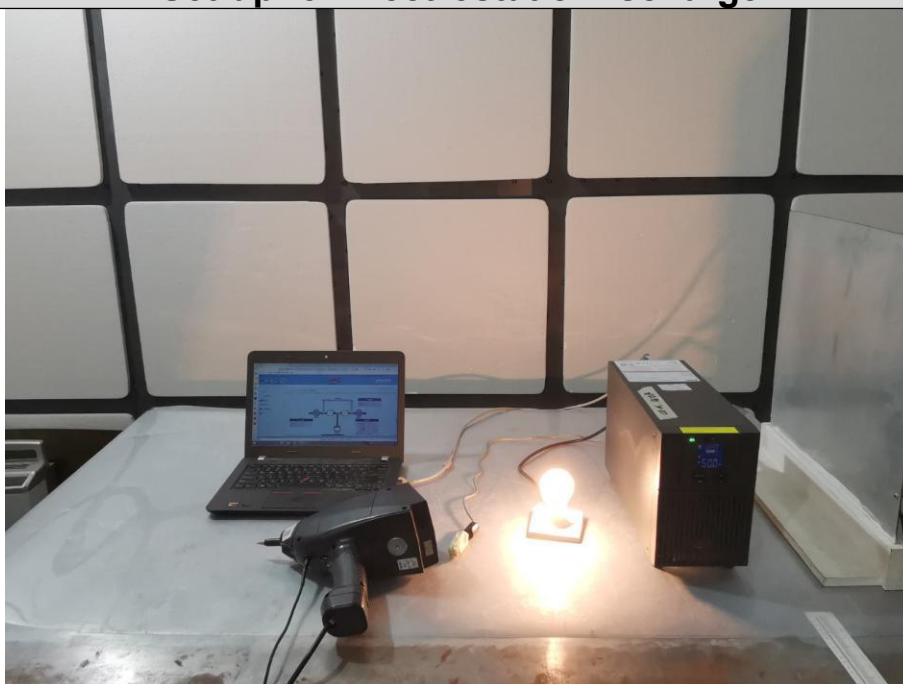


Set-up for Low Frequency Signals





### Set-up for Electrostatic Discharge



### Set-up for Magnetic Field immunity



### Set-up for EFT/Surge Immunity





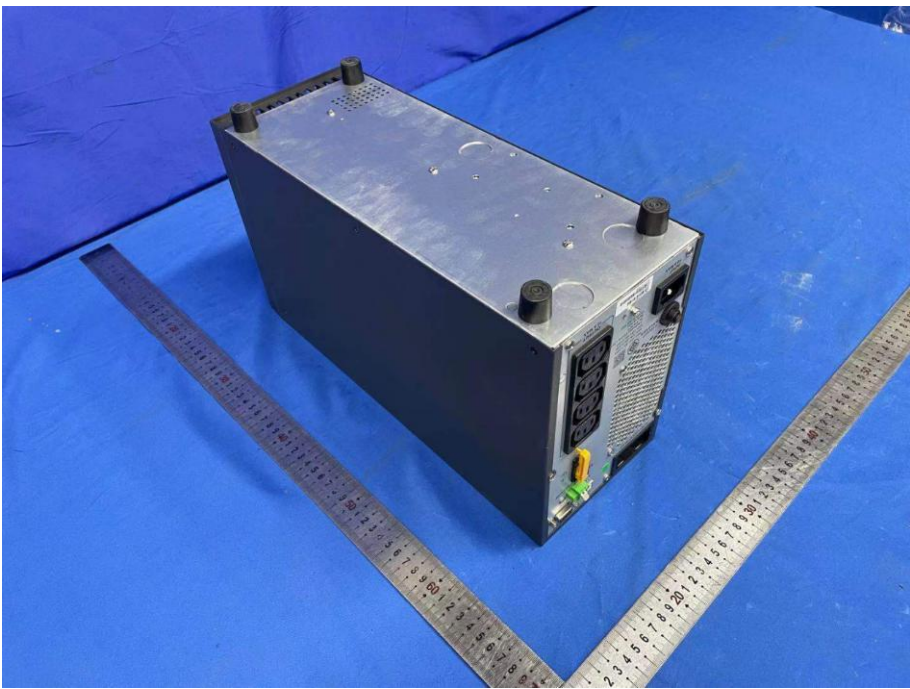
## APPENDIX II (PHOTOS OF E.U.T.)

Photos of the EUT

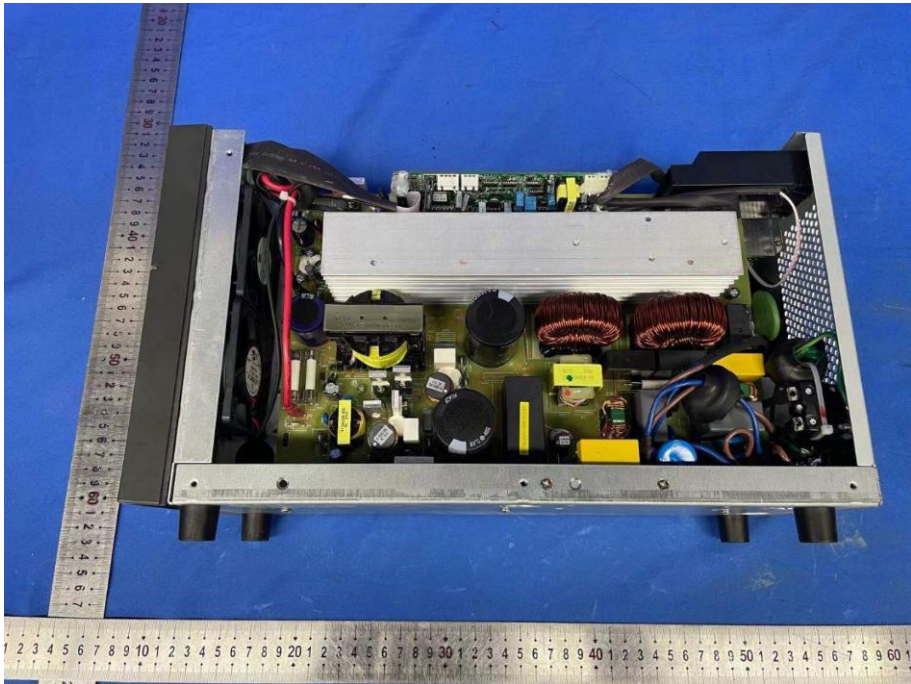
Over view -1



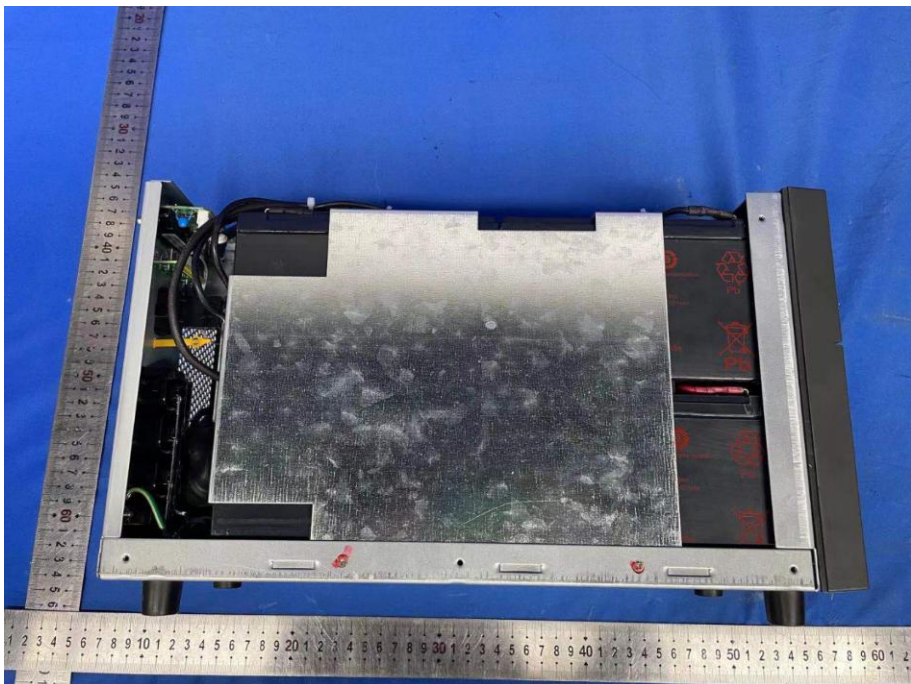
Over view -2



Internal View -1

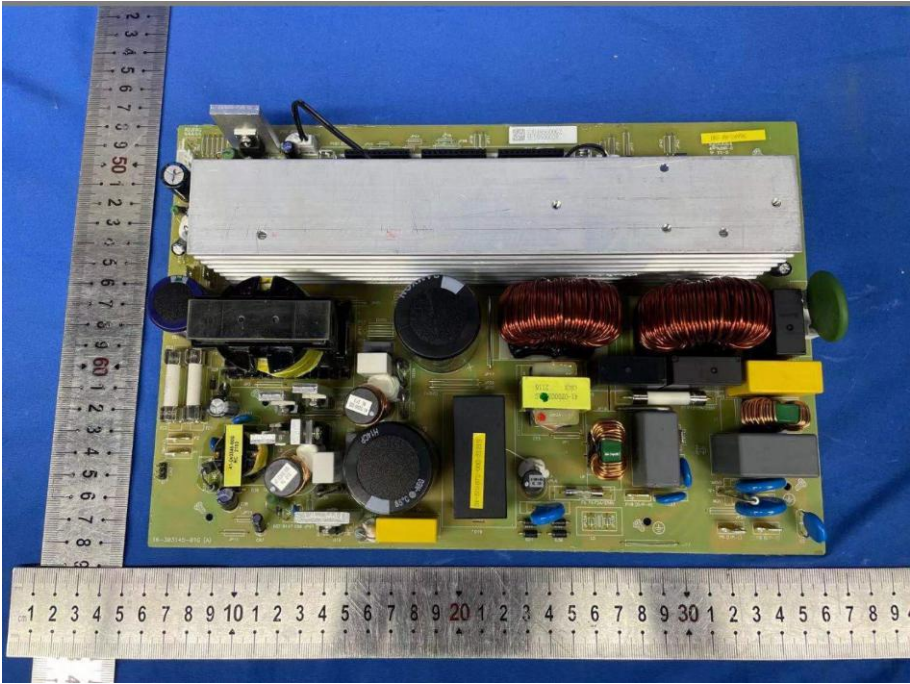


Internal View -2

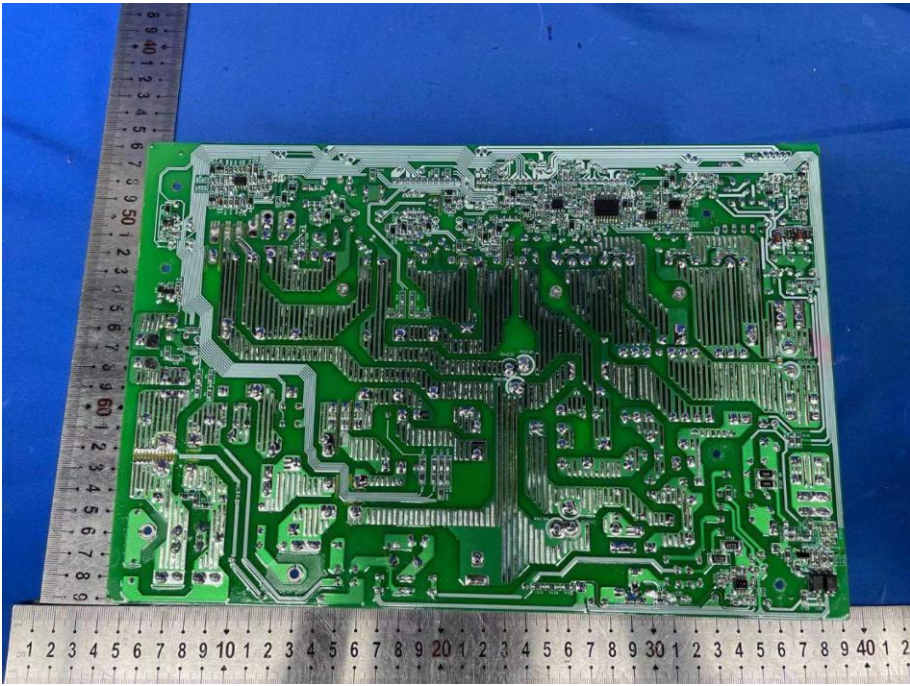




PCB View -1

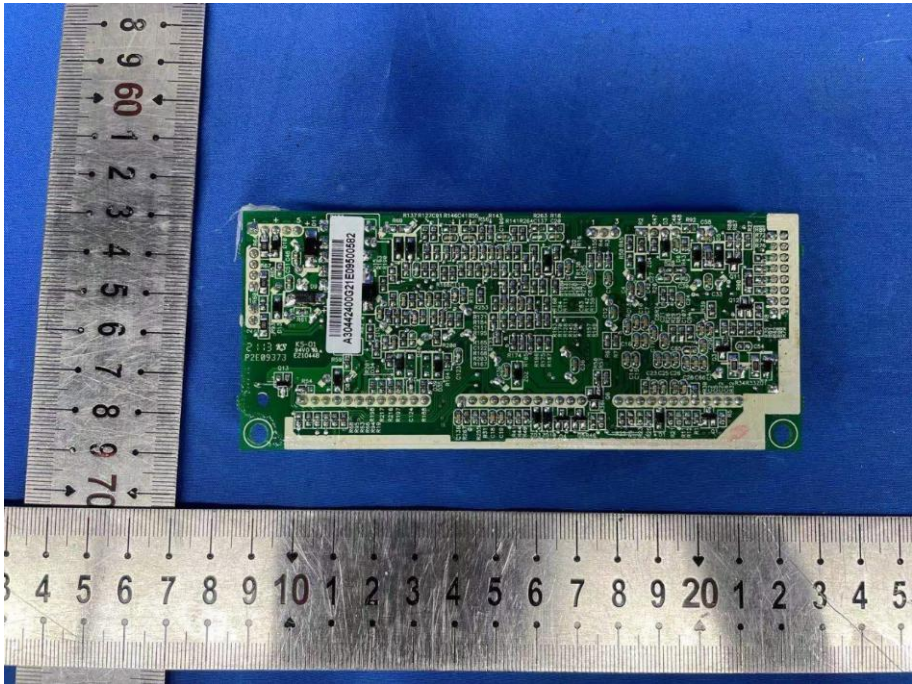


PCB View -2

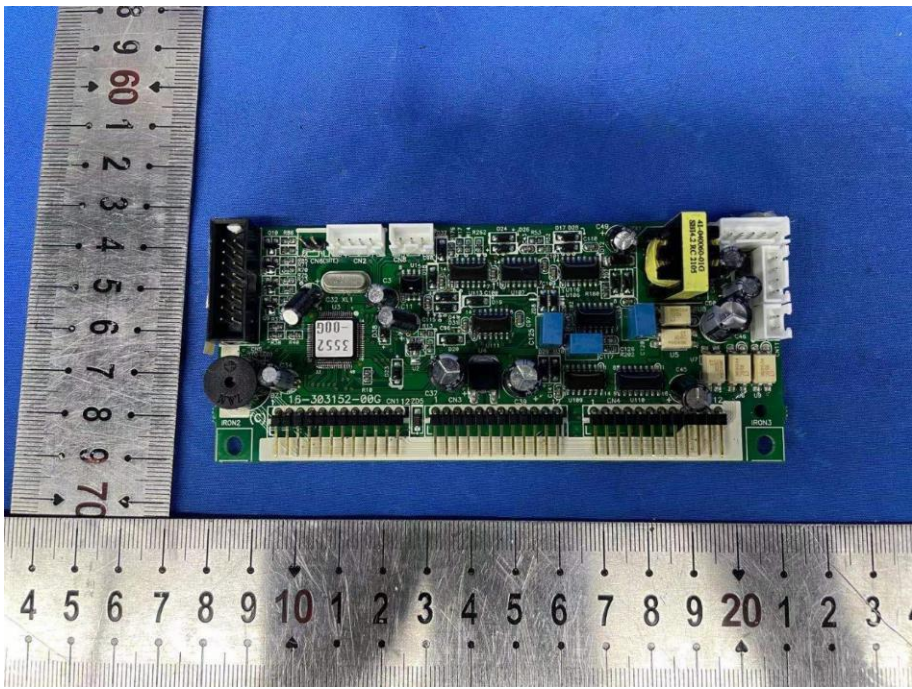




PCB View -3

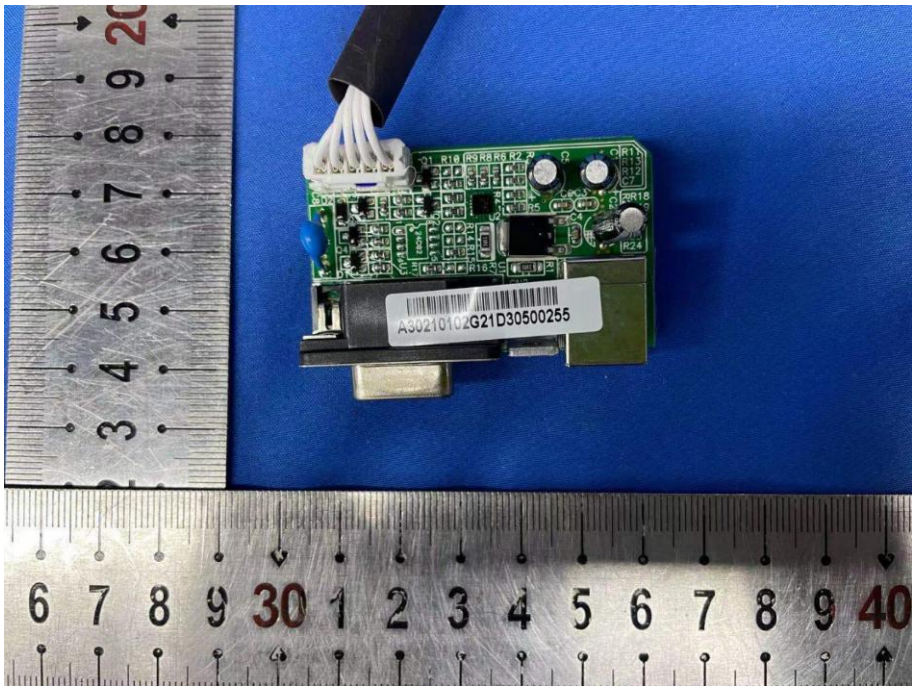


PCB View -4

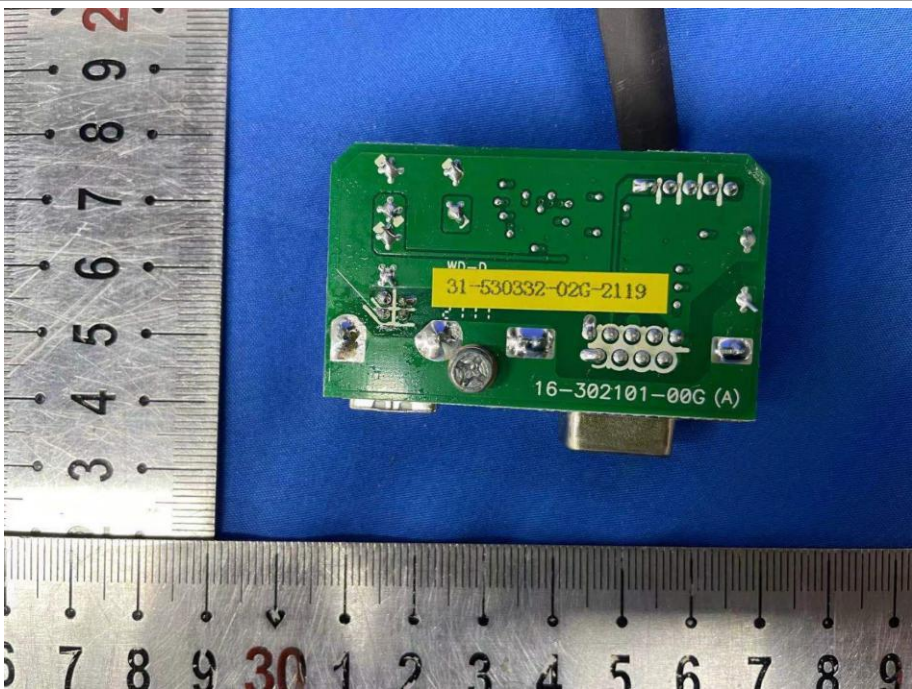




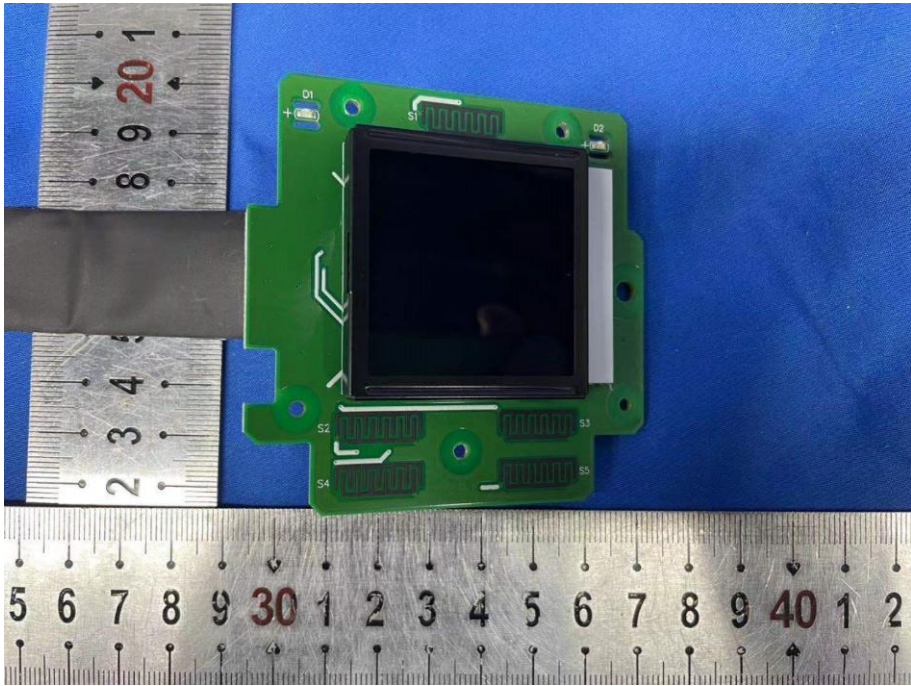
PCB View -5



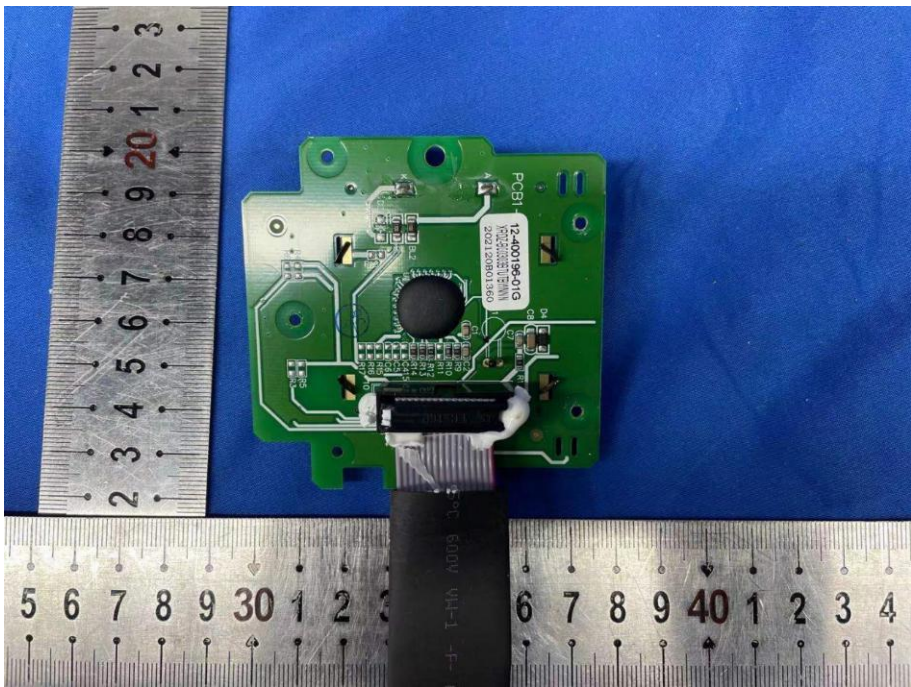
PCB View -6



PCB View -7

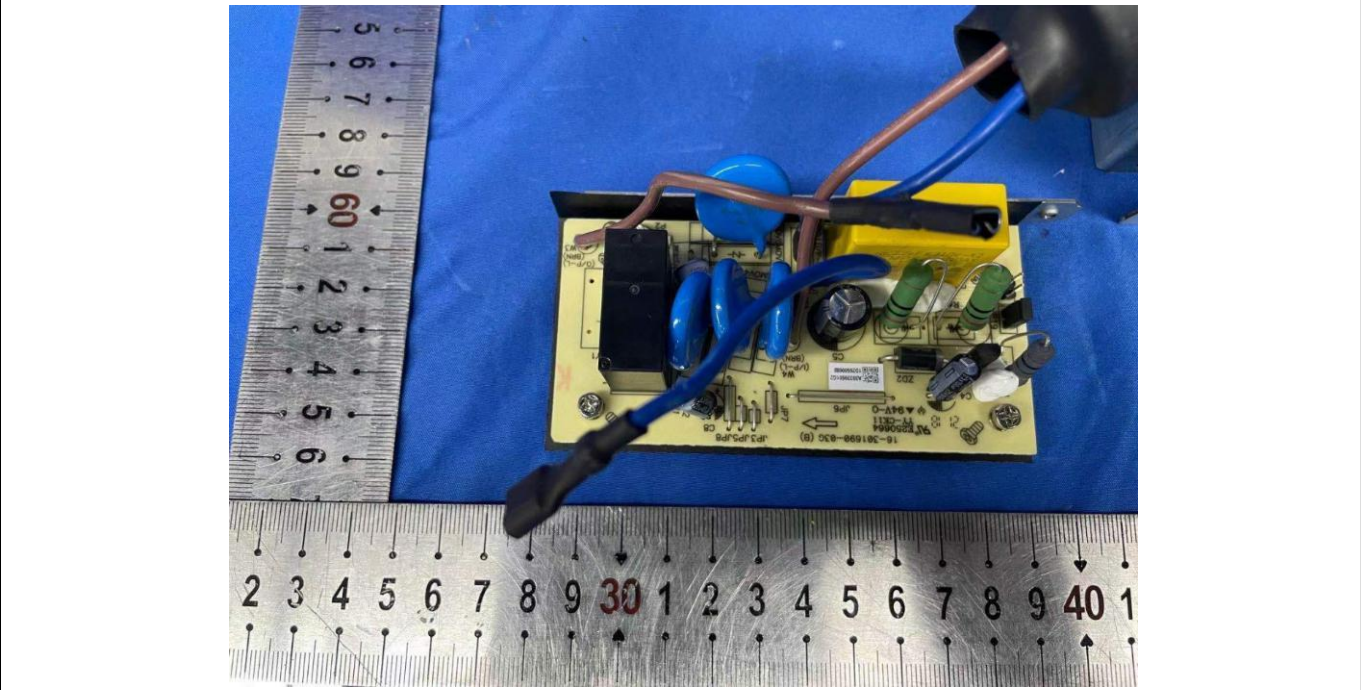


PCB View -8

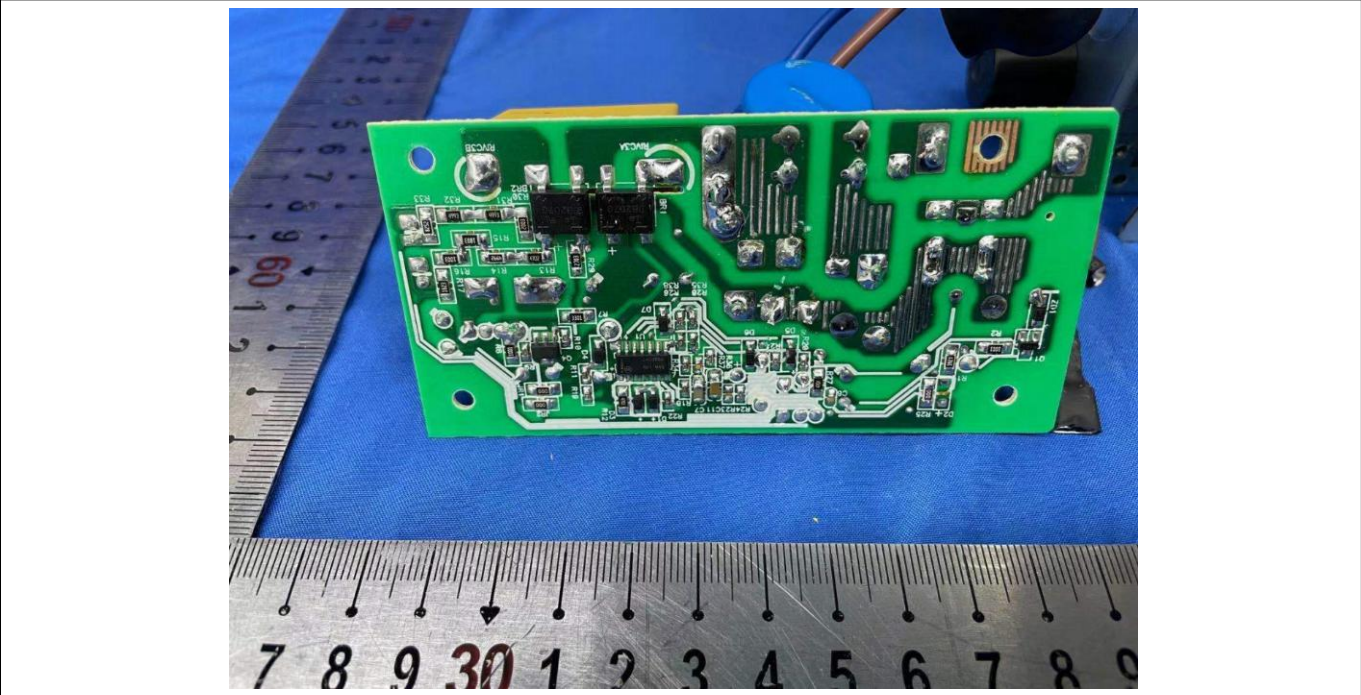




PCB View -9

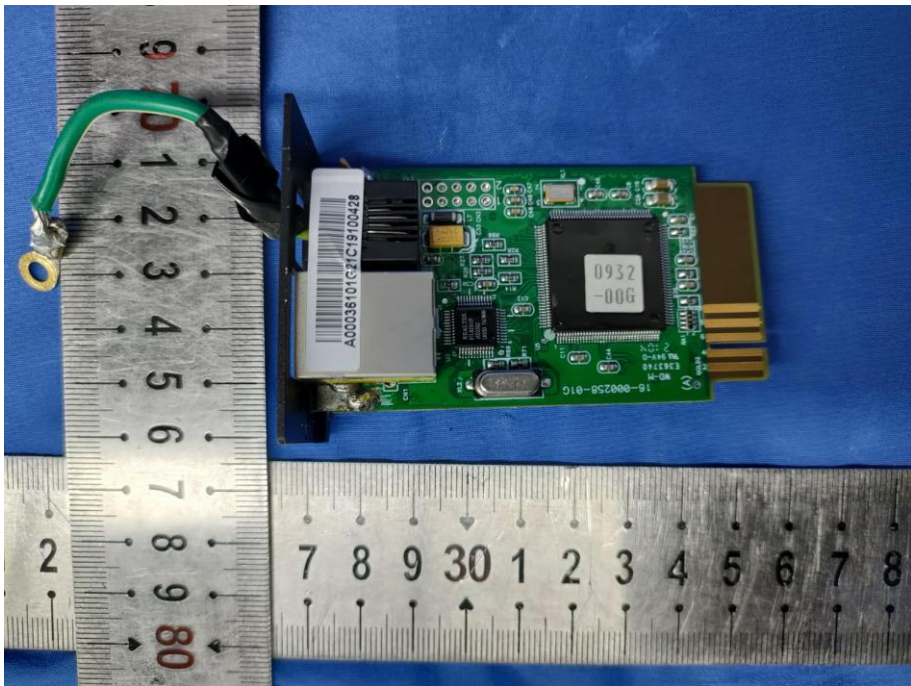


PCB View -10

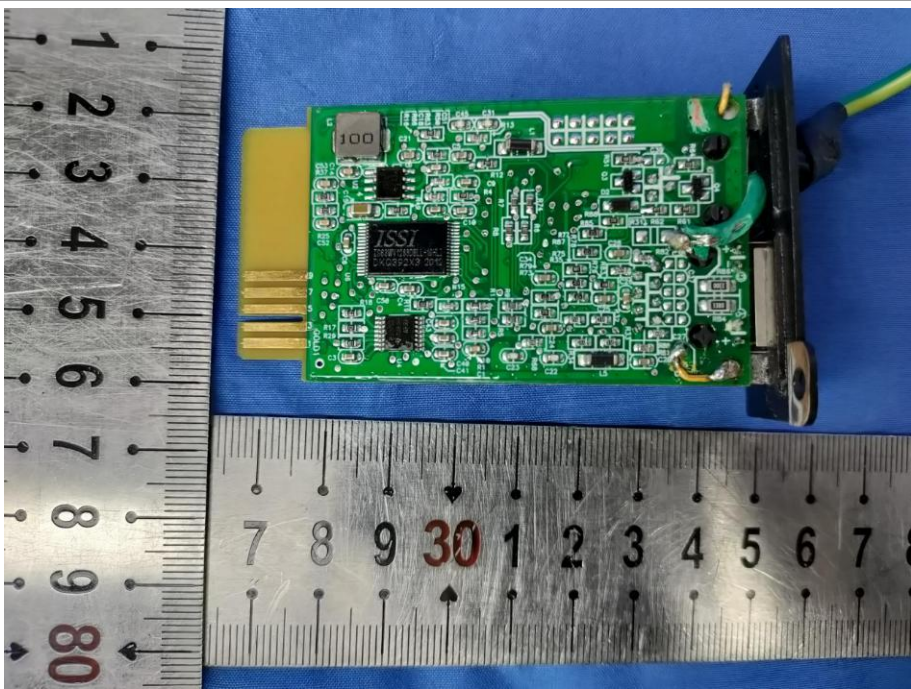




PCB View -11



PCB View -12



--- End ---