

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. : SRV3KRI-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 / IEC 61000-3-3: 2013/ A1: 2017

Date of Receiver : June 08, 2021

Date of Test : June 08, 2021 to July 12, 2021

Date of Report : July 26, 2021

This Test Report is Issued Under the Authority of :

Prepared by



Chloe Wei / 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.

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Revision History of This Test Report

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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/ IEC 61000-3-3: 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.	: SRV3KRI-E
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: SRV3KRI-E Input: 220-240VAC, 16A Max, 50/60Hz, 1Ø+N Output: 220/230/240VAC, 13.6A Max, 50/60Hz, 1Ø+N Capacity: 3kVA/2.7kW Icc≤1kA
Test Voltage	: AC 230V/50Hz, Built-in battery 72V
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.
Remark	: None
Sample No.	: KA21061025EV00-001

3.2 Description of Support Device

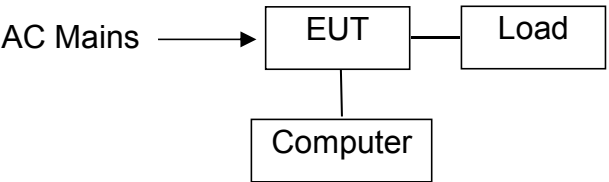
No.	Device Type	Manufacturer	Model	Series No.
1	Notebook computer	LENOVO	ThinkPad E455	---

Remark:
The above equipment is provided by the laboratory for testing purposes only.

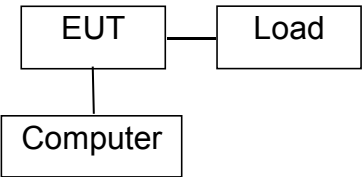
3.3 Block Diagram of Test Setup

Block diagram of connection between the E.U.T. and simulators

(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	EMI Full load
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 : 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 : RF Field Strength Susceptibility Test
Injected Currents Immunity Test

3.6 Abnormalities from Standard Conditions

Test Item	Test level	Limit
EFT	AC Input port: Level 4	±4KV
	AC Output port: Level 4	±4KV
Surge Immunity	AC Input port: Level *	±6KV CM ±6KV DM

Remark: The requirements of the following test items are more stringent than the requirements of the standard, so it is determined that the standard is met.

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 Measurement

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	Thurlby Thandar Instruments Ltd	HA-PC Link Plus v 3.01	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 Field Strength Susceptibility 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/AF5	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

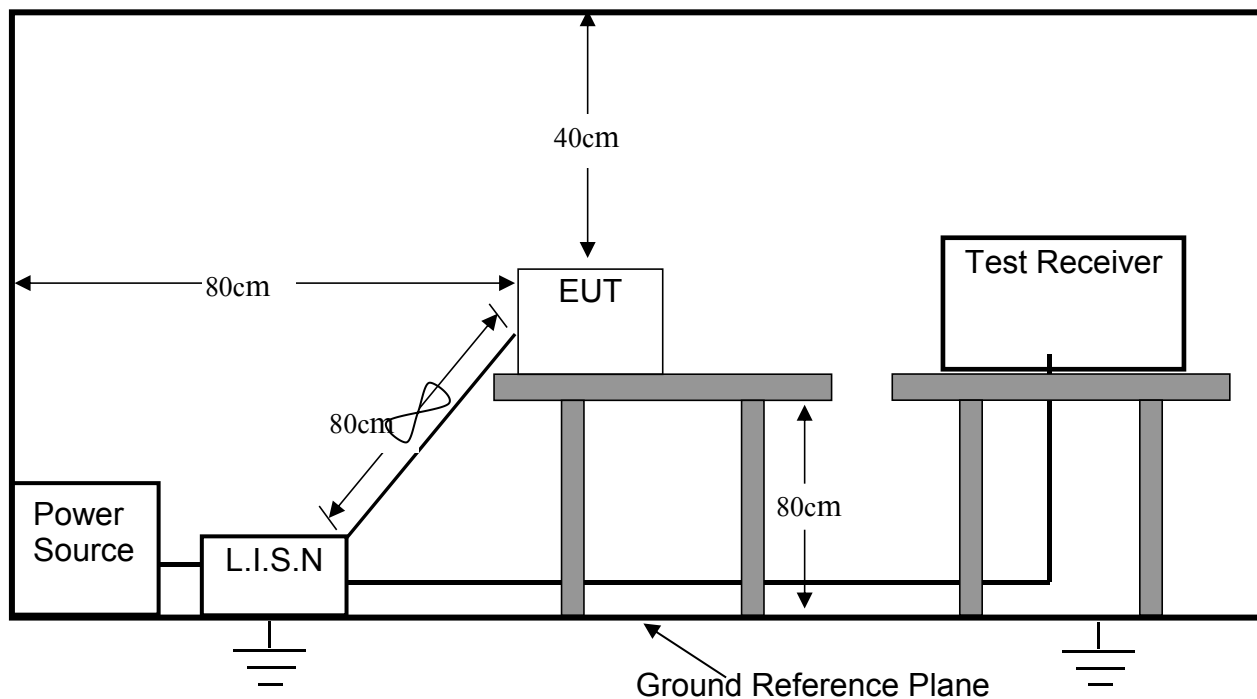
4.9 For Magnetic Field Immunity Measurement

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

5.1 Block Diagram of Test Setup



Test Standard: EN IEC 62040-2 Category 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 μ V)	
	Quasi-peak	Average
0.15 to 0.50 ^a	79	66
0.50 to 5 ^b	73	60
5 to 30	73	60

^a The limit decreases linearly with the logarithm of the frequency.

^b The lower limit shall apply at the transition frequency.

5.3 Test Procedure

The E.U.T. is put on the 0.8 m 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-3) 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.

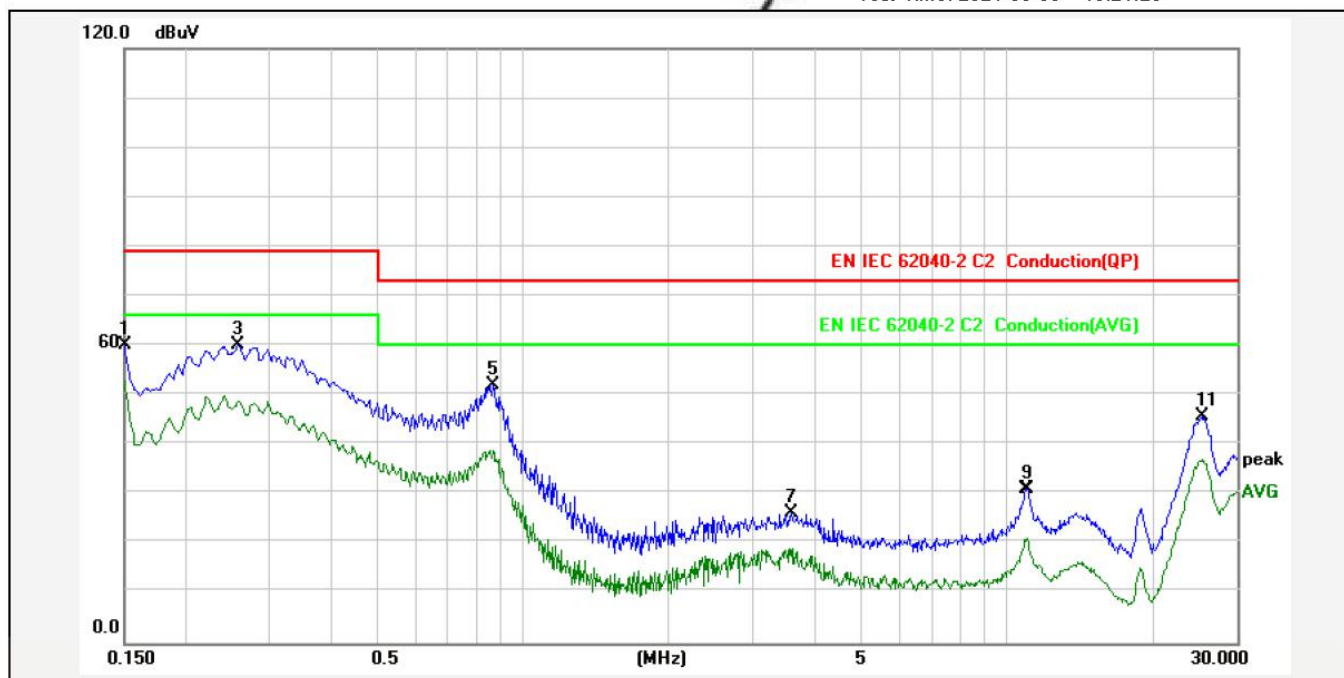
5.5 Test Results

PASS.

Please refer to the following pages.

E.U.T:	UPS	Model Name:	SRV3KRI-E
Temperature:	27.4°C	Relative Humidity:	49%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Normal operation mode	Phase:	Line
Remark:	Place horizontally		

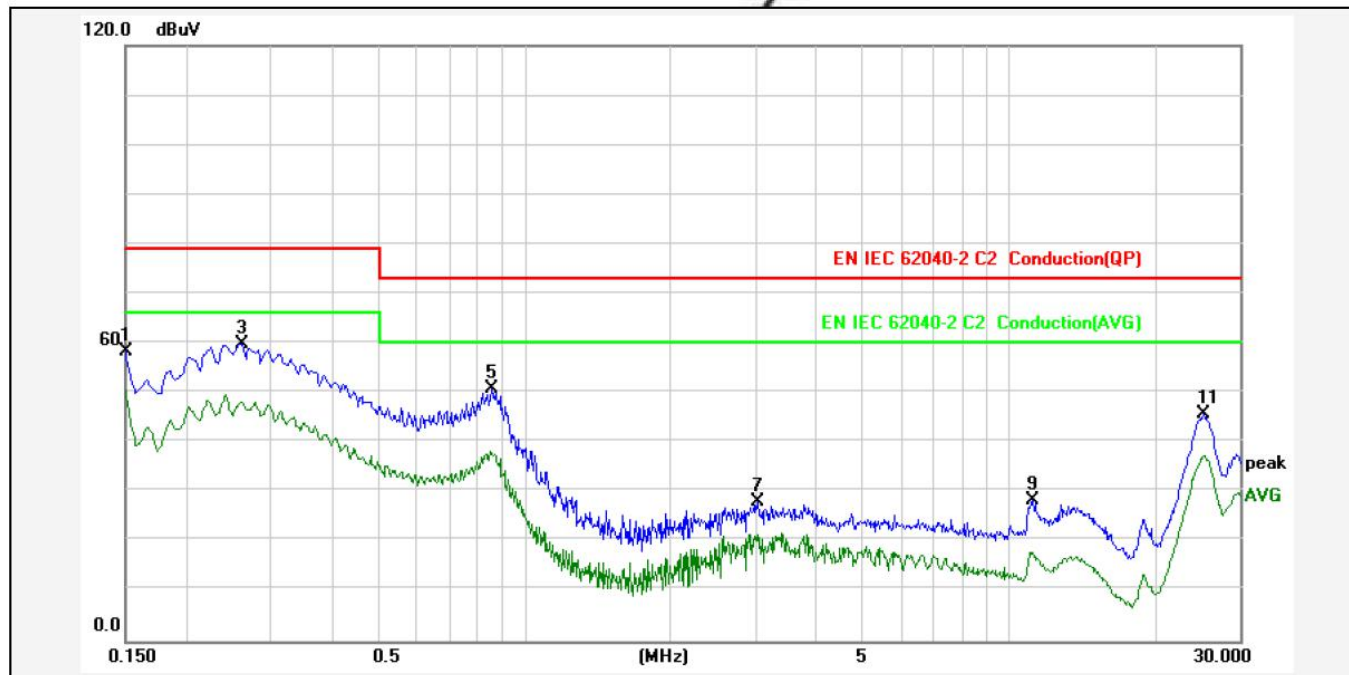
Test Time: 2021-06-08 10:24:29



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	10.61	49.61	60.22	79.00	-18.78	peak	P	
2	0.1500	10.61	42.41	53.02	66.00	-12.98	AVG	P	
3	0.2580	10.66	49.35	60.01	79.00	-18.99	peak	P	
4	0.2580	10.66	38.22	48.88	66.00	-17.12	AVG	P	
5	0.8700	10.50	41.66	52.16	73.00	-20.84	peak	P	
6	0.8700	10.50	28.48	38.98	60.00	-21.02	AVG	P	
7	3.5700	10.26	16.12	26.38	73.00	-46.62	peak	P	
8	3.5700	10.26	8.89	19.15	60.00	-40.85	AVG	P	
9	11.0459	10.07	21.11	31.18	73.00	-41.82	peak	P	
10	11.0459	10.07	11.09	21.16	60.00	-38.84	AVG	P	
11	25.4460	10.04	35.69	45.73	73.00	-27.27	peak	P	
12	25.4460	10.04	26.93	36.97	60.00	-23.03	AVG	P	

E.U.T:	UPS	Model Name:	SRV3KRI-E
Temperature:	27.4°C	Relative Humidity:	49%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Normal operation mode	Phase:	Neutral
Remark:	Place horizontally		

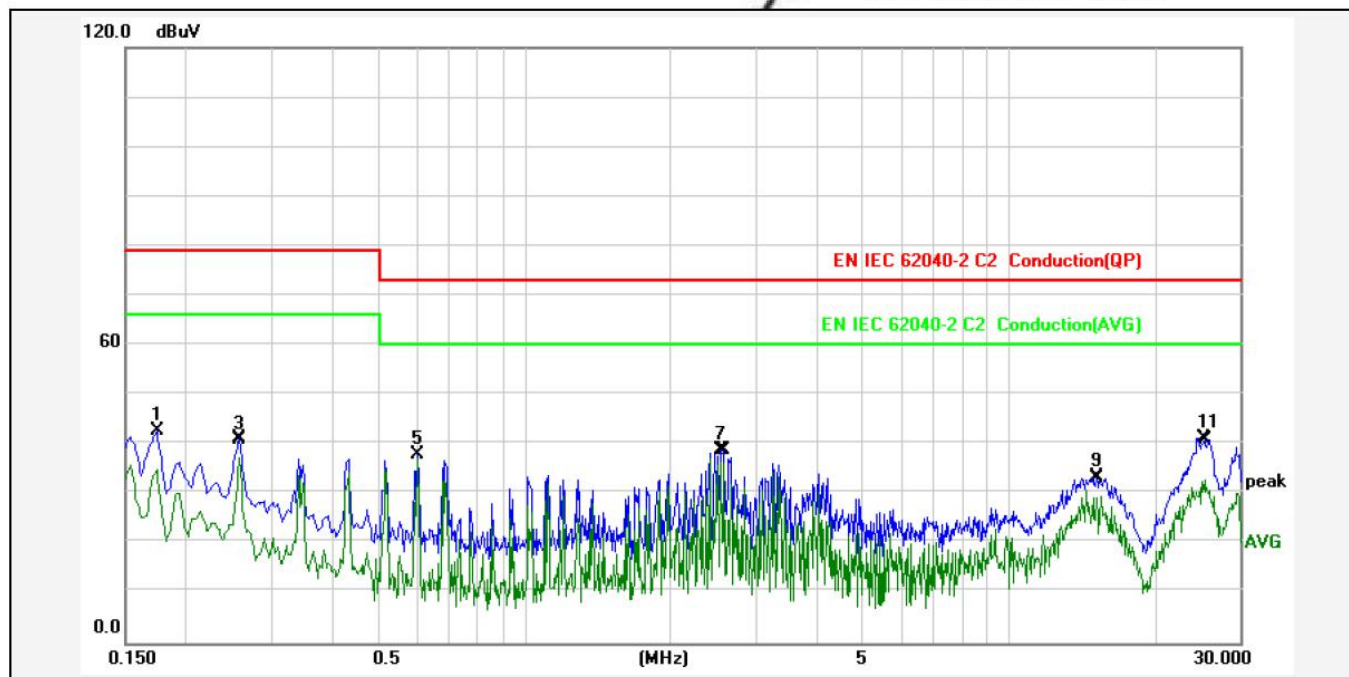
Test Time: 2021-06-08 10:22:37



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	10.61	47.62	58.23	79.00	-20.77	peak	P	
2	0.1500	10.61	40.06	50.67	66.00	-15.33	AVG	P	
3	0.2620	10.66	49.23	59.89	79.00	-19.11	peak	P	
4	0.2620	10.66	37.52	48.18	66.00	-17.82	AVG	P	
5	0.8500	10.52	40.30	50.82	73.00	-22.18	peak	P	
6	0.8500	10.52	27.79	38.31	60.00	-21.69	AVG	P	
7	3.0340	10.28	17.63	27.91	73.00	-45.09	peak	P	
8	3.0340	10.28	11.06	21.34	60.00	-38.66	AVG	P	
9	11.2139	10.07	18.30	28.37	73.00	-44.63	peak	P	
10	11.2139	10.07	7.88	17.95	60.00	-42.05	AVG	P	
11	25.2260	10.03	35.63	45.66	73.00	-27.34	peak	P	
12	25.2260	10.03	27.24	37.27	60.00	-22.73	AVG	P	

E.U.T:	UPS	Model Name:	SRV3KRI-E
Temperature:	27.4°C	Relative Humidity:	49%
Pressure:	1006 hPa	Test Voltage:	Built-in battery 72V
Test Mode:	Stored energy operation mode	Phase:	Neutral
Remark:	Place horizontally		

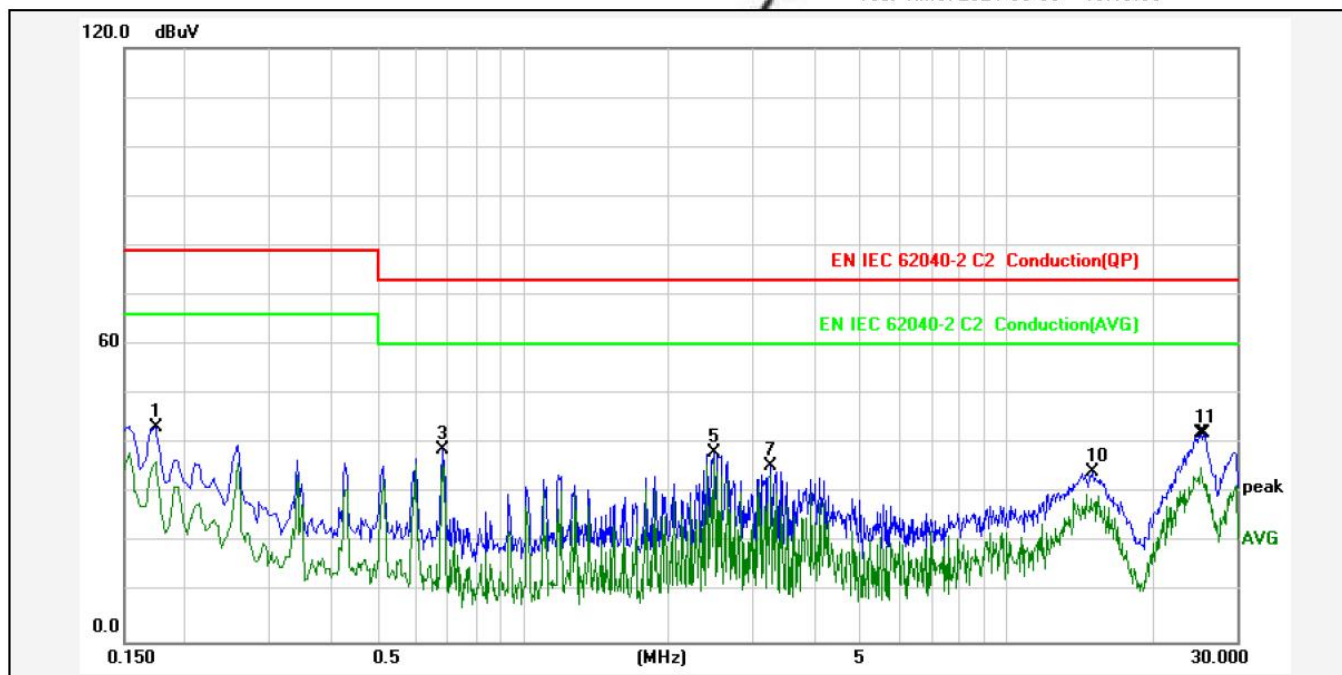
Test Time: 2021-06-08 10:19:27



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1739	10.62	32.16	42.78	79.00	-36.22	peak	P	
2	0.1739	10.62	24.25	34.87	66.00	-31.13	AVG	P	
3	0.2580	10.66	30.44	41.10	79.00	-37.90	peak	P	
4	0.2580	10.66	26.64	37.30	66.00	-28.70	AVG	P	
5	0.6019	10.68	27.36	38.04	73.00	-34.96	peak	P	
6	0.6019	10.68	26.32	37.00	60.00	-23.00	AVG	P	
7	2.5499	10.30	28.57	38.87	73.00	-34.13	peak	P	
8	2.5499	10.30	26.13	36.43	60.00	-23.57	AVG	P	
9	15.2218	9.98	23.56	33.54	73.00	-39.46	peak	P	
10	15.2218	9.98	19.38	29.36	60.00	-30.64	AVG	P	
11	25.1539	10.03	31.35	41.38	73.00	-31.62	peak	P	
12	25.1539	10.03	22.48	32.51	60.00	-27.49	AVG	P	

E.U.T:	UPS	Model Name:	SRV3KRI-E
Temperature:	27.4°C	Relative Humidity:	49%
Pressure:	1006 hPa	Test Voltage:	Built-in battery 72V
Test Mode:	Stored energy operation mode	Phase:	Line
Remark:	Place horizontally		

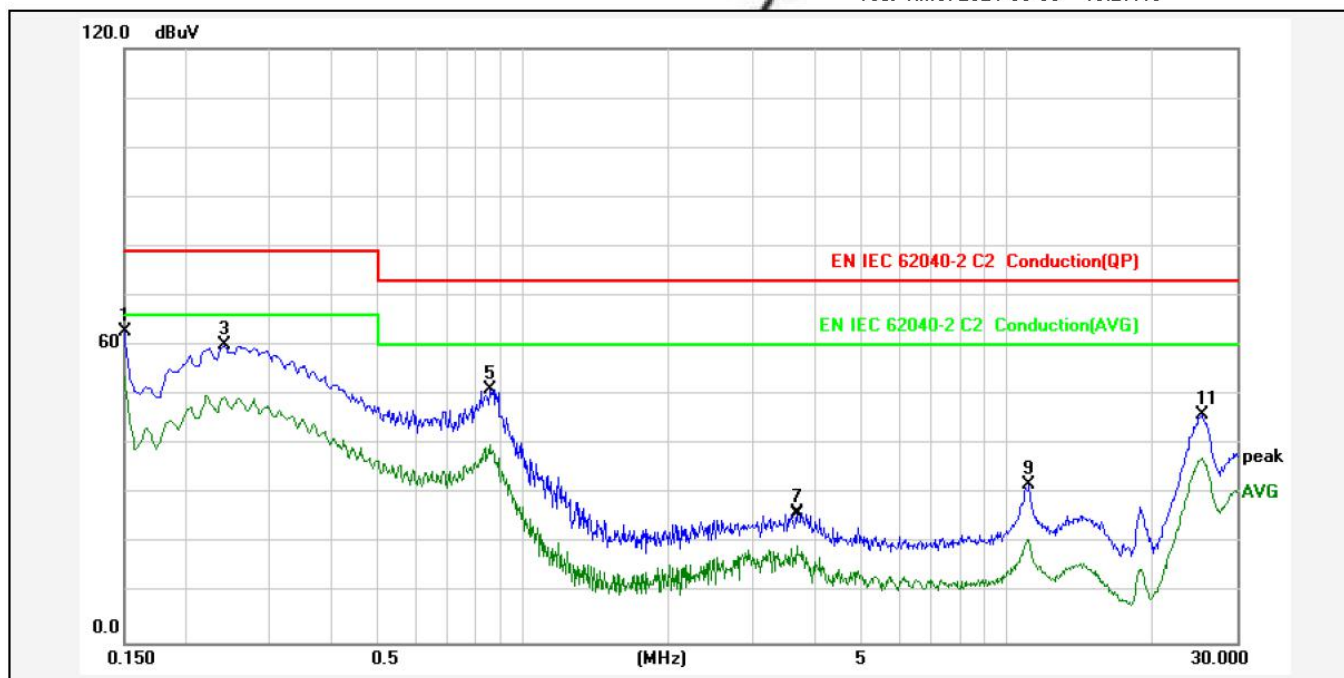
Test Time: 2021-06-08 10:18:33



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1740	10.62	32.82	43.44	79.00	-35.56	peak	P	
2	0.1740	10.62	25.93	36.55	66.00	-29.45	AVG	P	
3	0.6860	10.69	28.11	38.80	73.00	-34.20	peak	P	
4	0.6860	10.69	25.13	35.82	60.00	-24.18	AVG	P	
5	2.4900	10.31	27.96	38.27	73.00	-34.73	peak	P	
6	2.4900	10.31	26.54	36.85	60.00	-23.15	AVG	P	
7	3.2620	10.27	25.23	35.50	73.00	-37.50	peak	P	
8	3.2620	10.27	23.56	33.83	60.00	-26.17	AVG	P	
9	14.9099	9.97	19.03	29.00	60.00	-31.00	AVG	P	
10	15.0899	9.98	24.33	34.31	73.00	-38.69	peak	P	
11	25.2500	10.03	32.10	42.13	73.00	-30.87	peak	P	
12	25.2500	10.03	25.17	35.20	60.00	-24.80	AVG	P	

E.U.T:	UPS	Model Name:	SRV3KRI-E
Temperature:	27.4°C	Relative Humidity:	49%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Normal operation mode	Phase:	Line
Remark:	Place vertically		

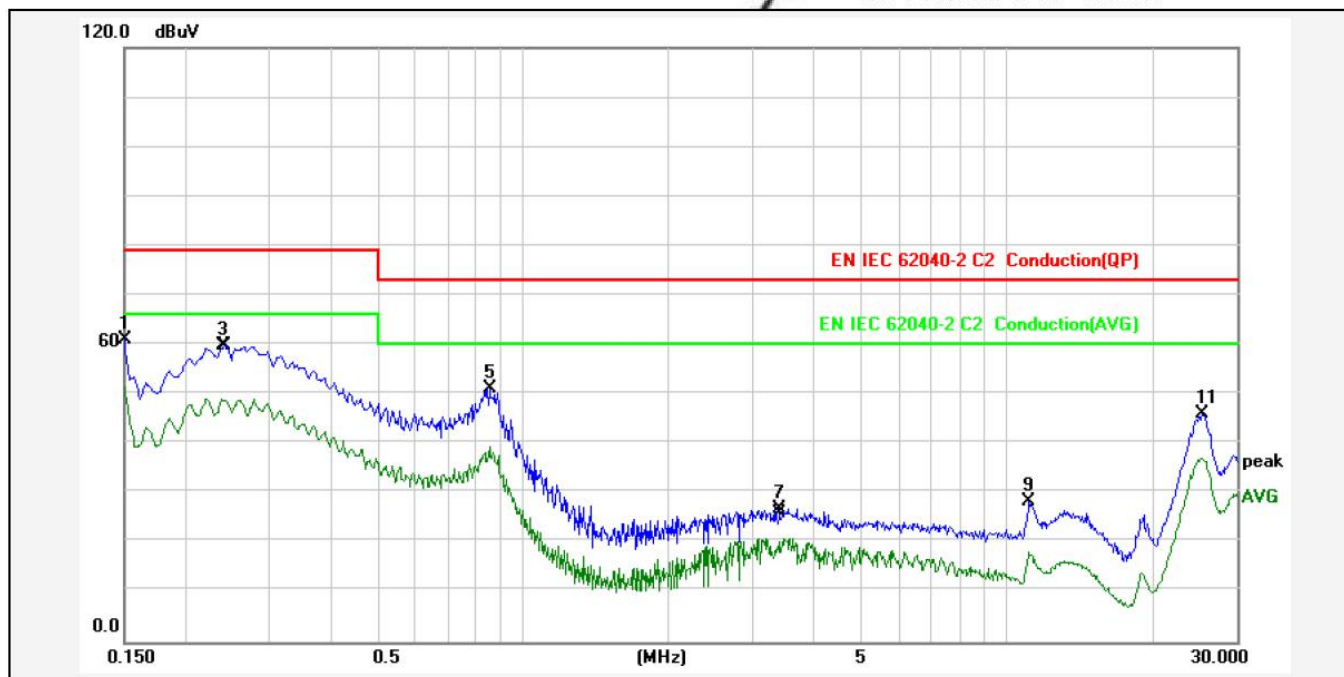
Test Time: 2021-06-08 10:27:48



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	10.61	52.29	62.90	79.00	-16.10	peak	P	
2	0.1500	10.61	43.27	53.88	66.00	-12.12	AVG	P	
3	0.2420	10.65	49.48	60.13	79.00	-18.87	peak	P	
4	0.2420	10.65	39.02	49.67	66.00	-16.33	AVG	P	
5	0.8540	10.52	40.76	51.28	73.00	-21.72	peak	P	
6	0.8540	10.52	29.52	40.04	60.00	-19.96	AVG	P	
7	3.6820	10.25	16.10	26.35	73.00	-46.65	peak	P	
8	3.6820	10.25	9.47	19.72	60.00	-40.28	AVG	P	
9	11.1379	10.07	21.99	32.06	73.00	-40.94	peak	P	
10	11.1379	10.07	10.92	20.99	60.00	-39.01	AVG	P	
11	25.4619	10.04	35.96	46.00	73.00	-27.00	peak	P	
12	25.4619	10.04	27.25	37.29	60.00	-22.71	AVG	P	

E.U.T:	UPS	Model Name:	SRV3KRI-E
Temperature:	27.4°C	Relative Humidity:	49%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Normal operation mode	Phase:	Neutral
Remark:	Place vertically		

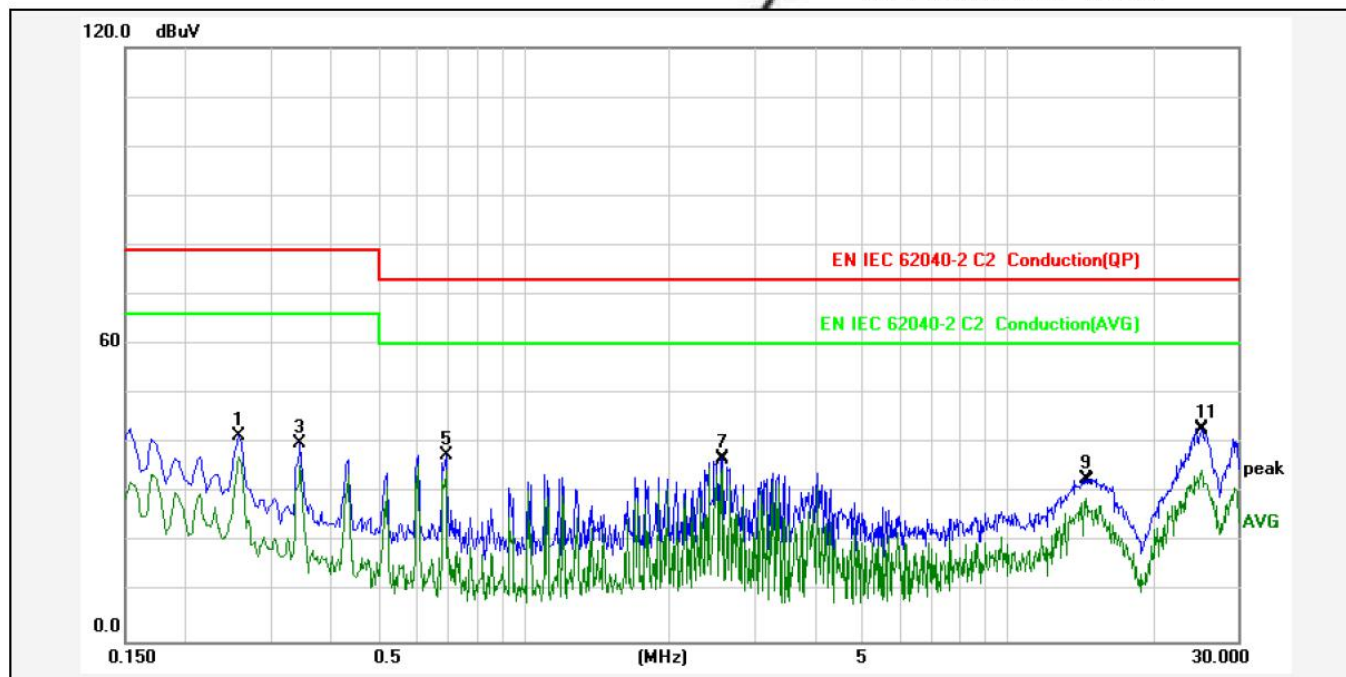
Test Time: 2021-06-08 10:29:34



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	10.61	50.40	61.01	79.00	-17.99	peak	P	
2	0.1500	10.61	40.89	51.50	66.00	-14.50	AVG	P	
3	0.2380	10.65	49.27	59.92	79.00	-19.08	peak	P	
4	0.2380	10.65	38.28	48.93	66.00	-17.07	AVG	P	
5	0.8540	10.52	40.71	51.23	73.00	-21.77	peak	P	
6	0.8540	10.52	29.04	39.56	60.00	-20.44	AVG	P	
7	3.4060	10.27	16.59	26.86	73.00	-46.14	peak	P	
8	3.4060	10.27	9.85	20.12	60.00	-39.88	AVG	P	
9	11.1739	10.07	18.28	28.35	73.00	-44.65	peak	P	
10	11.1739	10.07	8.13	18.20	60.00	-41.80	AVG	P	
11	25.3779	10.04	36.14	46.18	73.00	-26.82	peak	P	
12	25.3779	10.04	27.09	37.13	60.00	-22.87	AVG	P	

E.U.T:	UPS	Model Name:	SRV3KRI-E
Temperature:	27.4°C	Relative Humidity:	49%
Pressure:	1006 hPa	Test Voltage:	Built-in battery 72V
Test Mode:	Stored energy operation mode	Phase:	Neutral
Remark:	Place vertically		

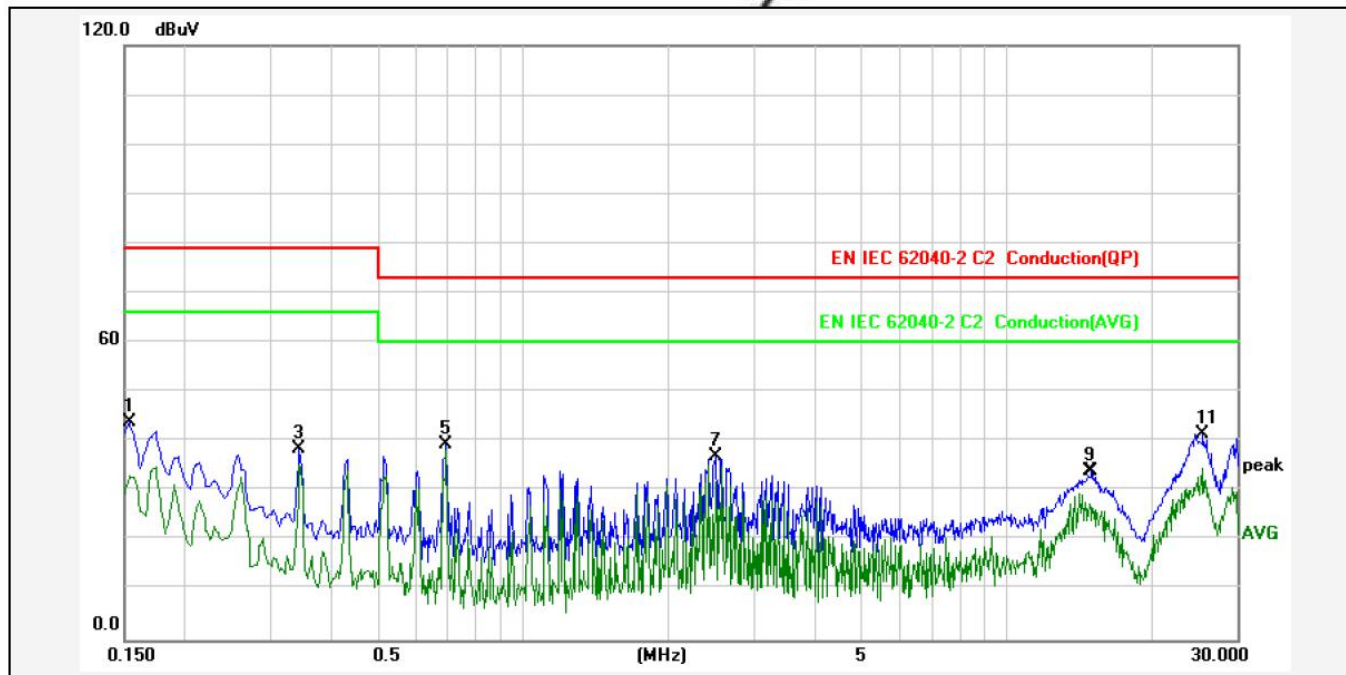
Test Time: 2021-06-08 10:30:53



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2580	10.66	30.92	41.58	79.00	-37.42	peak	P	
2	0.2580	10.66	26.56	37.22	66.00	-28.78	AVG	P	
3	0.3460	10.69	29.22	39.91	79.00	-39.09	peak	P	
4	0.3460	10.69	24.84	35.53	66.00	-30.47	AVG	P	
5	0.6900	10.69	27.03	37.72	73.00	-35.28	peak	P	
6	0.6900	10.69	23.92	34.61	60.00	-25.39	AVG	P	
7	2.5860	10.30	26.68	36.98	73.00	-36.02	peak	P	
8	2.5860	10.30	24.53	34.83	60.00	-25.17	AVG	P	
9	14.5459	9.98	22.92	32.90	73.00	-40.10	peak	P	
10	14.5459	9.98	19.07	29.05	60.00	-30.95	AVG	P	
11	25.2340	10.03	33.04	43.07	73.00	-29.93	peak	P	
12	25.2340	10.03	24.77	34.80	60.00	-25.20	AVG	P	

E.U.T:	UPS	Model Name:	SRV3KRI-E
Temperature:	27.4°C	Relative Humidity:	49%
Pressure:	1006 hPa	Test Voltage:	Built-in battery 72V
Test Mode:	Stored energy operation mode	Phase:	Line
Remark:	Place vertically		

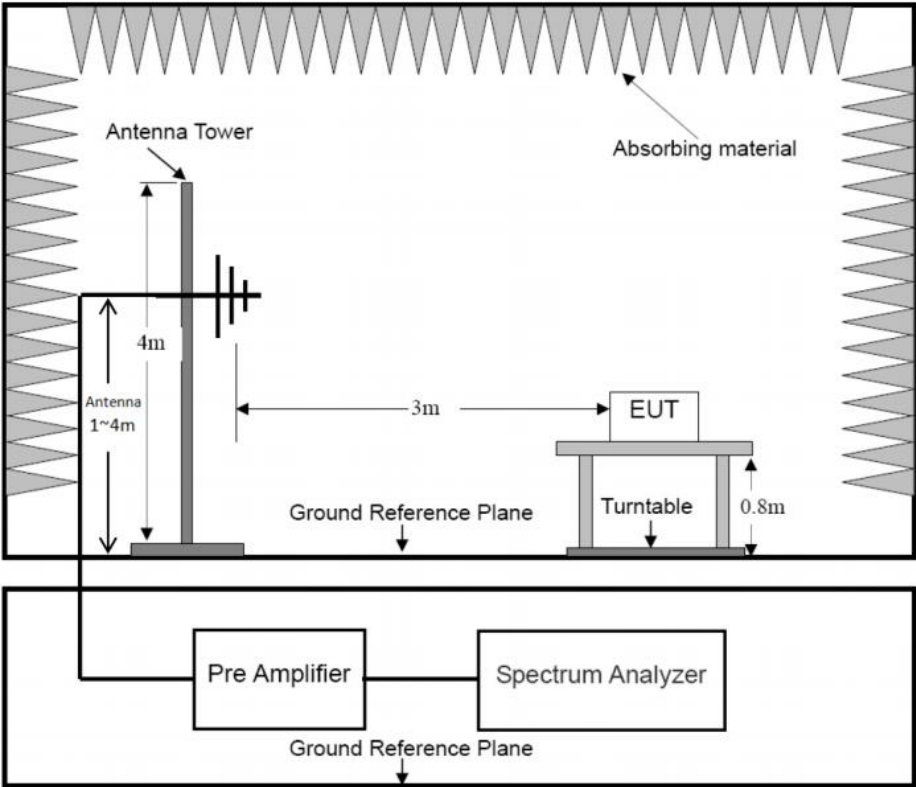
Test Time: 2021-06-08 10:31:42



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1539	10.61	33.44	44.05	79.00	-34.95	peak	P	
2	0.1539	10.61	22.47	33.08	66.00	-32.92	AVG	P	
3	0.3459	10.69	27.90	38.59	79.00	-40.41	peak	P	
4	0.3459	10.69	24.64	35.33	66.00	-30.67	AVG	P	
5	0.6939	10.69	28.85	39.54	73.00	-33.46	peak	P	
6	0.6939	10.69	27.43	38.12	60.00	-21.88	AVG	P	
7	2.5099	10.30	26.83	37.13	73.00	-35.87	peak	P	
8	2.5099	10.30	21.56	31.86	60.00	-28.14	AVG	P	
9	14.8459	9.97	23.95	33.92	73.00	-39.08	peak	P	
10	14.8459	9.97	17.39	27.36	60.00	-32.64	AVG	P	
11	25.5740	10.05	31.52	41.57	73.00	-31.43	peak	P	
12	25.5740	10.05	24.53	34.58	60.00	-25.42	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 Category 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 (R&S ESPI-7) 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.

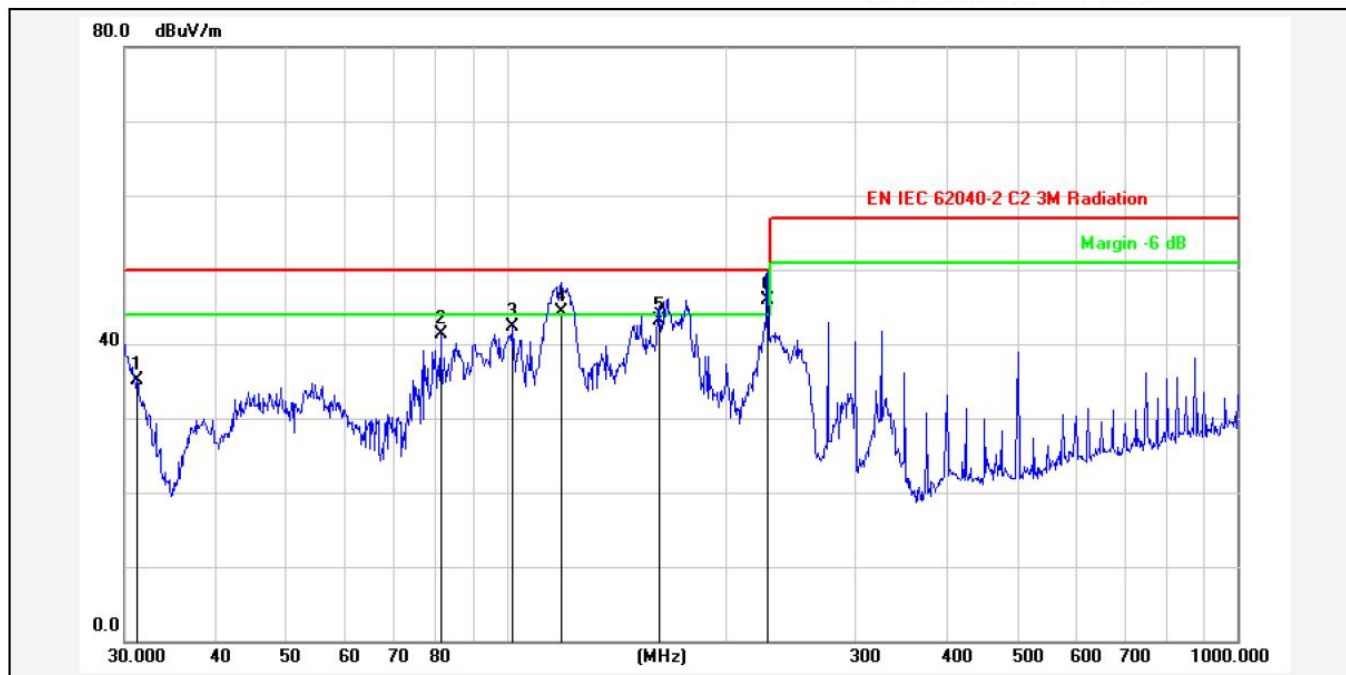
6.5 Test Results

PASS.

Please refer to the following pages.

E.U.T:	Uninterruptible Power Supply	Model Name:	SRV3KRI-E
Temperature:	28.2°C	Relative Humidity:	57%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Normal operation mode	Polarization:	Horizontal
Remark:	Place horizontally		

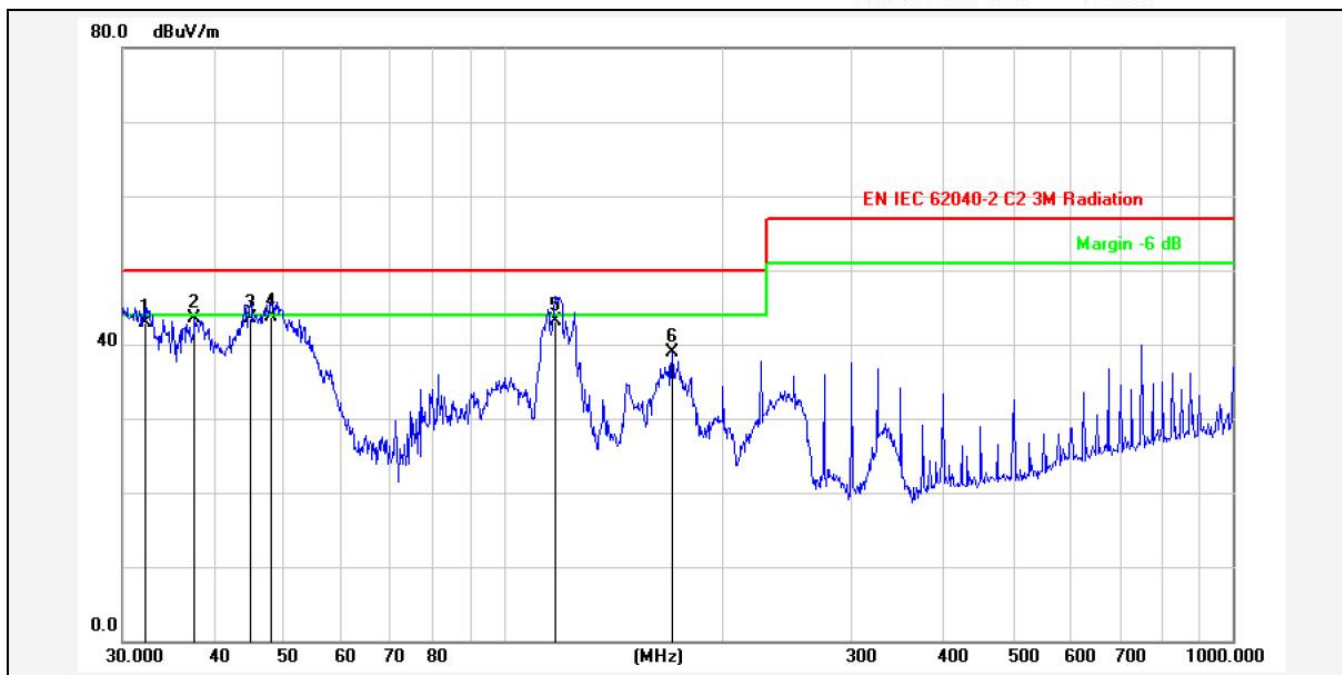
Test Time: 2021/6/9 14:36:37



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	31.1797	-8.71	43.88	35.17	50.00	-14.83	peak			P	
2	81.2117	-15.30	56.55	41.25	50.00	-8.75	peak			P	
3	102.0013	-11.32	53.66	42.34	50.00	-7.66	peak			P	
4	118.6014	-10.14	54.44	44.30	50.00	-5.70	QP			P	
5	161.4742	-11.59	54.69	43.10	50.00	-6.90	QP			P	
6	227.6904	-13.09	58.99	45.90	50.00	-4.10	QP			P	

E.U.T:	Uninterruptible Power Supply	Model Name:	SRV3KRI-E
Temperature:	28.2°C	Relative Humidity:	57%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Normal operation mode	Polarization:	Vertical
Remark:	Place horizontally		

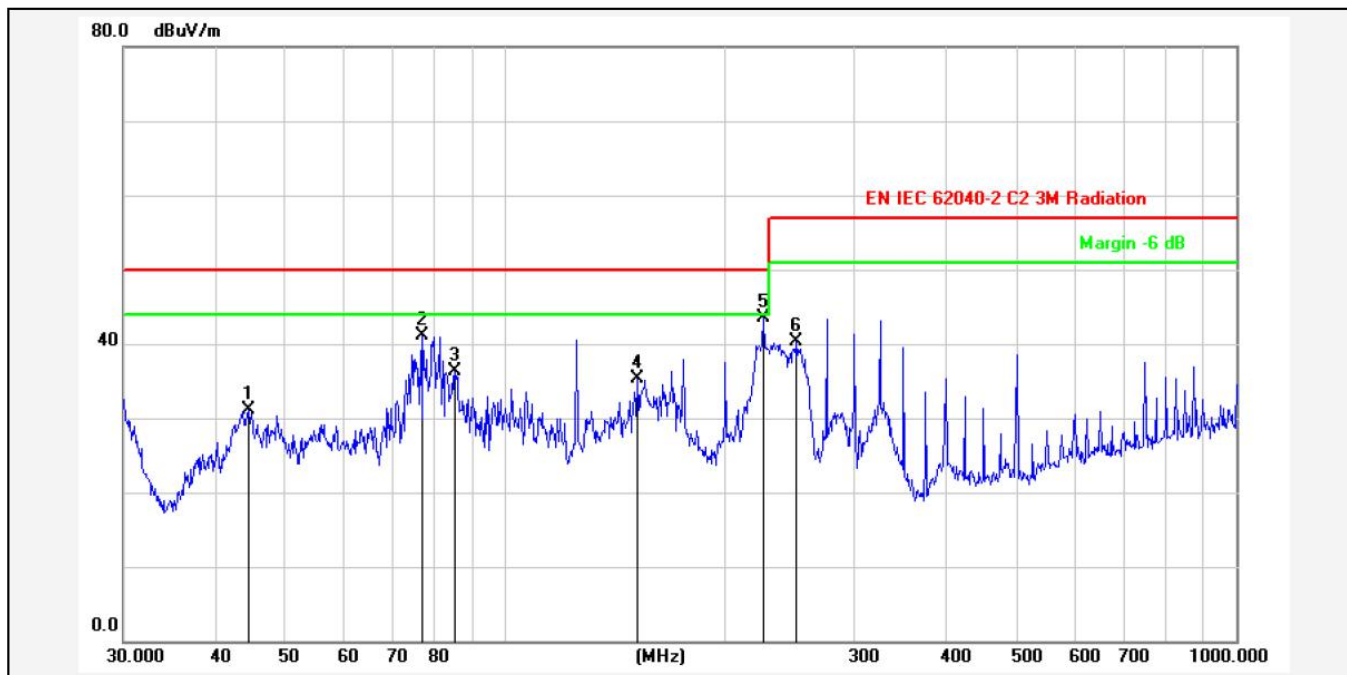
Test Time: 2021/6/9 14:40:21



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	32.1794	-9.69	52.59	42.90	50.00	-7.10	QP			P	
2	37.6797	-11.95	55.36	43.41	50.00	-6.59	peak			P	
3	44.9006	-14.35	57.95	43.60	50.00	-6.40	QP			P	
4	47.9940	-15.25	59.05	43.80	50.00	-6.20	QP			P	
5	117.7725	-10.02	53.22	43.20	50.00	-6.80	QP			P	
6	170.1947	-12.79	51.66	38.87	50.00	-11.13	peak			P	

E.U.T:	Uninterruptible Power Supply	Model Name:	SRV3KRI-E
Temperature:	28.2°C	Relative Humidity:	57%
Pressure:	1006 hPa	Test Voltage:	Built-in battery 72V
Test Mode:	Stored energy operation mode	Polarization:	Horizontal
Remark:	Place horizontally		

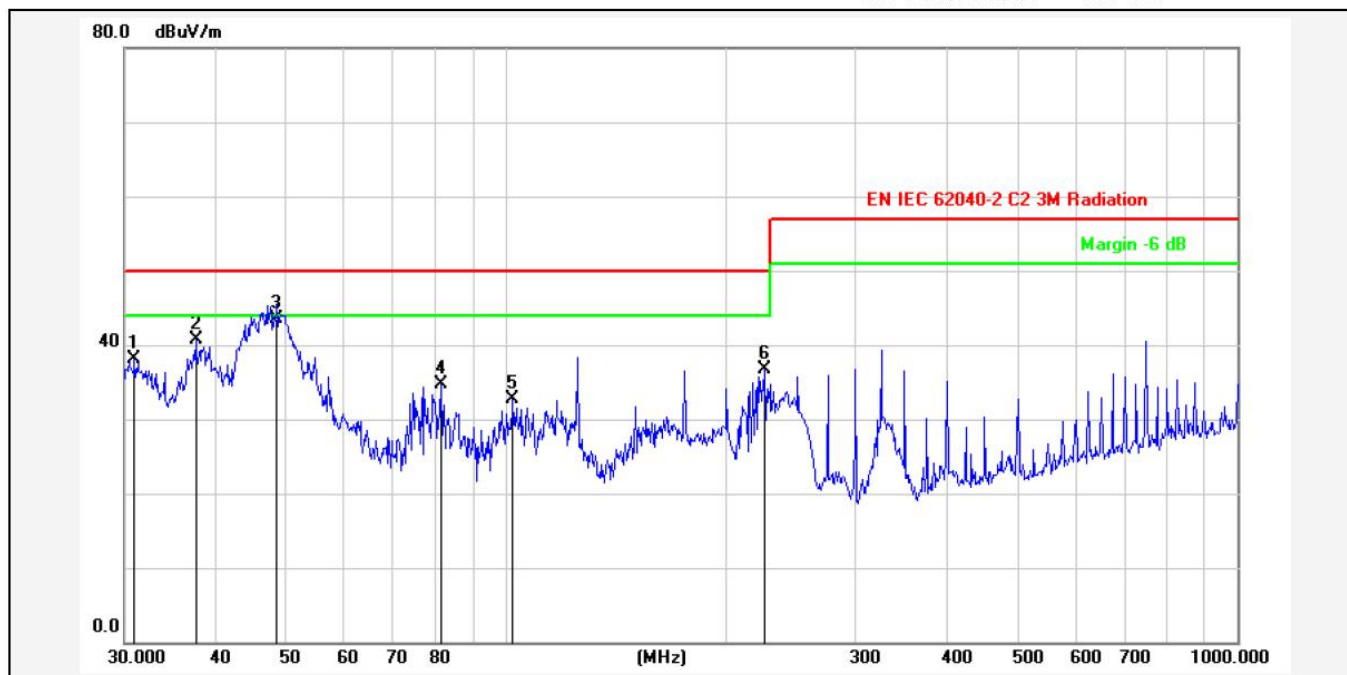
Test Time: 2021/6/9 14:32:24



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	44.5868	-14.04	45.05	31.01	50.00	-18.99	peak			P	
2	77.0505	-15.91	57.07	41.16	50.00	-8.84	peak			P	
3	85.2980	-14.69	51.09	36.40	50.00	-13.60	peak			P	
4	151.5972	-11.20	46.44	35.24	50.00	-14.76	peak			P	
5	225.3079	-13.26	56.83	43.57	50.00	-6.43	peak			P	
6	250.3011	-11.45	51.72	40.27	57.00	-16.73	peak			P	

E.U.T:	Uninterruptible Power Supply	Model Name:	SRV3KRI-E
Temperature:	28.2°C	Relative Humidity:	57%
Pressure:	1006 hPa	Test Voltage:	Built-in battery 72V
Test Mode:	Stored energy operation mode	Polarization:	Vertical
Remark:	Place horizontally		

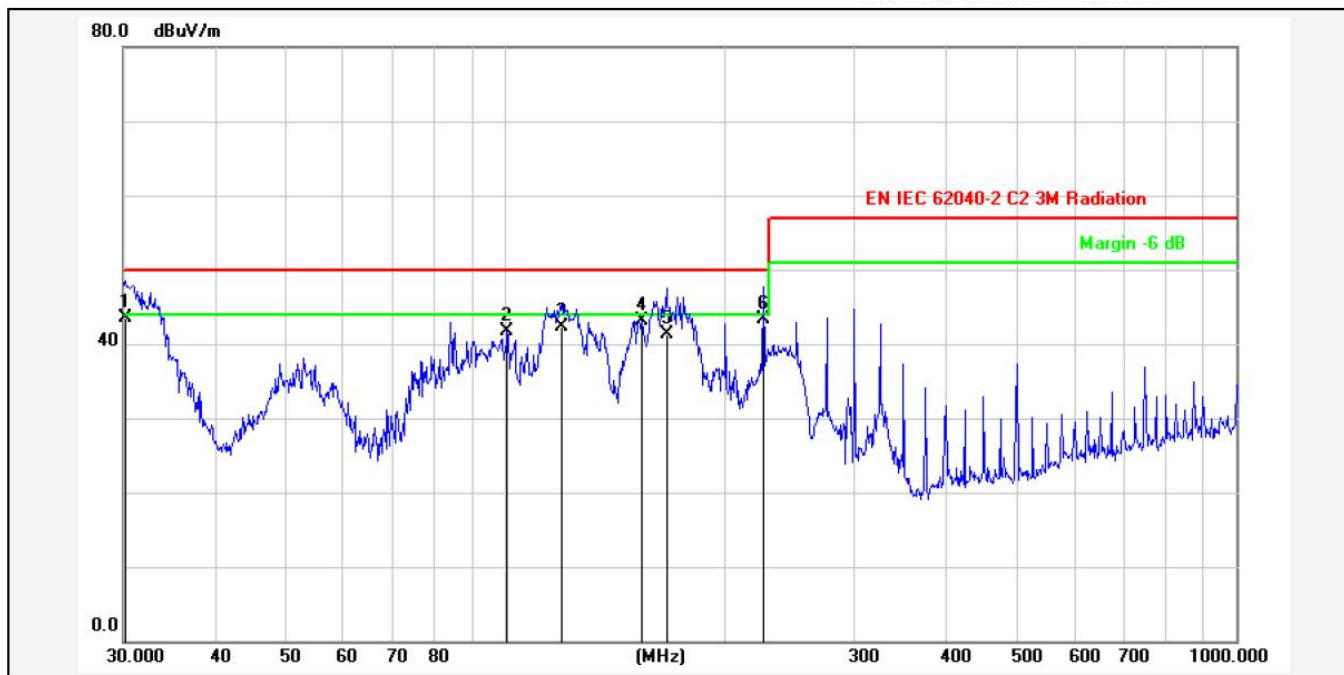
Test Time: 2021/6/9 14:31:12



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	30.9618	-9.20	47.31	38.11	50.00	-11.89	peak			P	
2	37.5478	-11.90	52.60	40.70	50.00	-9.30	peak			P	
3	48.5015	-15.40	58.90	43.50	50.00	-6.50	QP			P	
4	81.2117	-15.13	49.86	34.73	50.00	-15.27	peak			P	
5	102.0013	-11.62	44.34	32.72	50.00	-17.28	peak			P	
6	225.3079	-13.46	50.17	36.71	50.00	-13.29	peak			P	

E.U.T:	Uninterruptible Power Supply	Model Name:	SRV3KRI-E
Temperature:	28.2°C	Relative Humidity:	57%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Normal operation mode	Polarization:	Horizontal
Remark:	Place vertically		

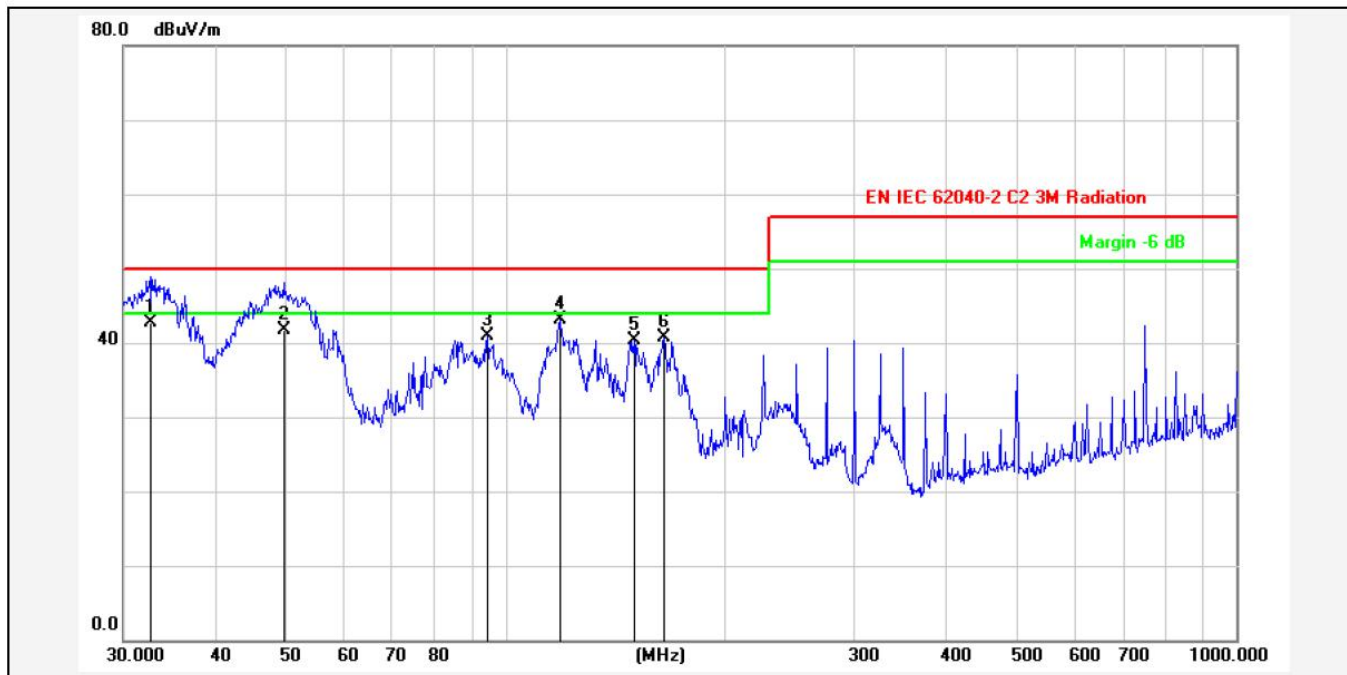
Test Time: 2021/6/24 15:13:22



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	30.2111	-8.29	51.89	43.60	50.00	-6.40	QP			P	
2	100.5806	-11.47	53.10	41.63	50.00	-8.37	peak			P	
3	119.4361	-10.10	52.40	42.30	50.00	-7.70	QP			P	
4	153.7385	-11.26	54.42	43.16	50.00	-6.84	peak			P	
5	166.0680	-12.02	53.42	41.40	50.00	-8.60	QP			P	
6	225.3079	-13.26	56.66	43.40	50.00	-6.60	QP			P	

E.U.T:	Uninterruptible Power Supply	Model Name:	SRV3KRI-E
Temperature:	28.2°C	Relative Humidity:	57%
Pressure:	1006 hPa	Test Voltage:	AC 230V/50Hz
Test Mode:	Normal operation mode	Polarization:	Vertical
Remark:	Place vertically		

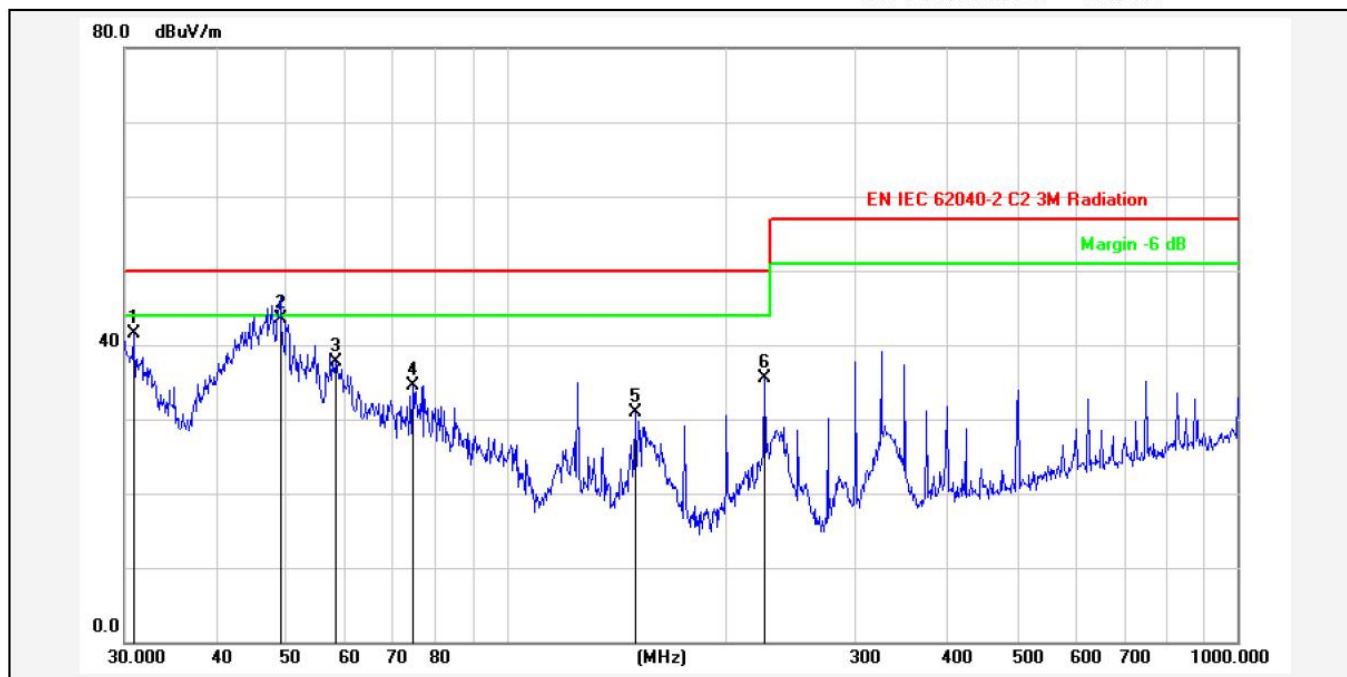
Test Time: 2021/6/24 15:07:36



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	32.6340	-9.88	52.68	42.80	50.00	-7.20	QP			P	
2	49.7068	-15.75	57.55	41.80	50.00	-8.20	QP			P	
3	94.4284	-13.09	54.03	40.94	50.00	-9.06	peak			P	
4	118.6014	-9.93	52.95	43.02	50.00	-6.98	peak			P	
5	150.0108	-11.35	51.74	40.39	50.00	-9.61	peak			P	
6	164.9075	-12.05	52.72	40.67	50.00	-9.33	peak			P	

E.U.T:	Uninterruptible Power Supply	Model Name:	SRV3KRI-E
Temperature:	28.2°C	Relative Humidity:	57%
Pressure:	1006 hPa	Test Voltage:	Built-in battery 72V
Test Mode:	Stored energy operation mode	Polarization:	Vertical
Remark:	Place vertically		

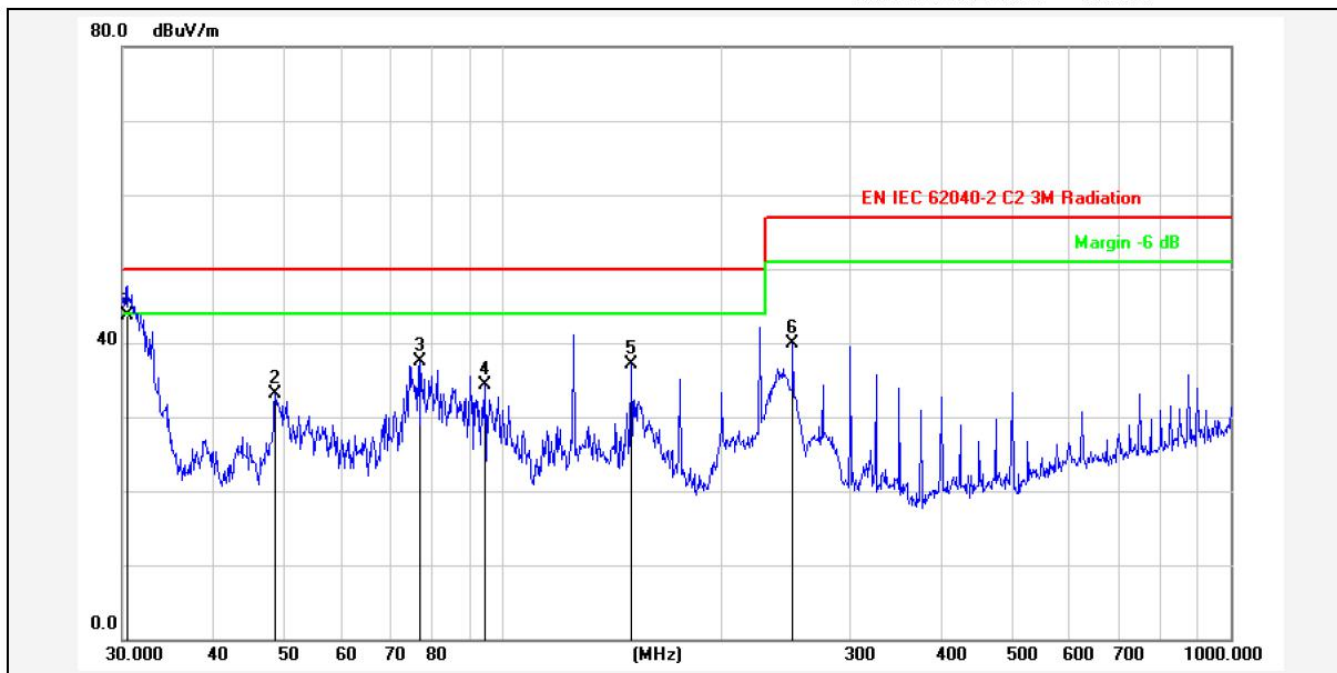
Test Time: 2021/6/24 15:21:40



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	30.8534	-9.15	50.73	41.58	50.00	-8.42	peak			P	
2	49.0144	-15.55	59.05	43.50	50.00	-6.50	QP			P	
3	58.4074	-17.86	55.52	37.66	50.00	-12.34	peak			P	
4	74.3955	-16.33	50.90	34.57	50.00	-15.43	peak			P	
5	150.0108	-11.35	42.26	30.91	50.00	-19.09	peak			P	
6	225.3079	-13.46	48.88	35.42	50.00	-14.58	peak			P	

E.U.T:	Uninterruptible Power Supply	Model Name:	SRV3KRI-E
Temperature:	28.2°C	Relative Humidity:	57%
Pressure:	1006 hPa	Test Voltage:	Built-in battery 72V
Test Mode:	Stored energy operation mode	Polarization:	Horizontal
Remark:	Place vertically		

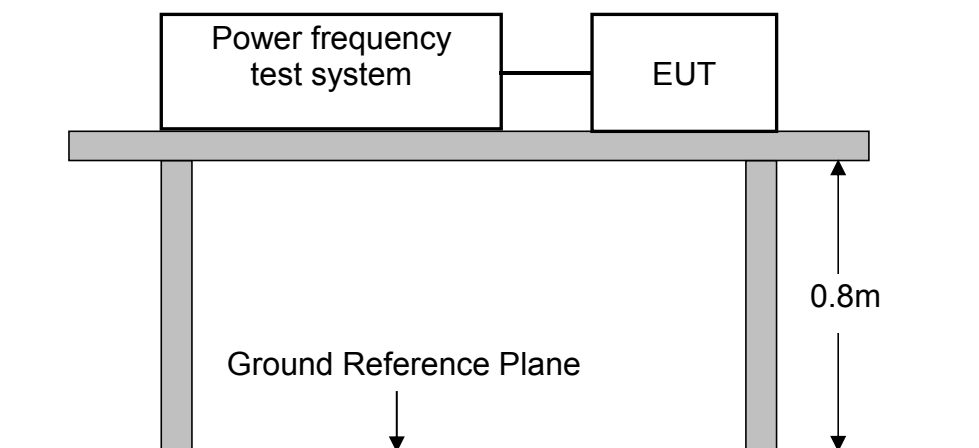
Test Time: 2021/6/24 15:23:15



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	30.4238	-8.38	52.08	43.70	50.00	-6.30	QP			P	
2	48.6719	-15.33	48.49	33.16	50.00	-16.84	peak			P	
3	77.0505	-15.91	53.33	37.42	50.00	-12.58	peak			P	
4	94.4283	-12.90	47.12	34.22	50.00	-15.78	peak			P	
5	150.0108	-11.15	48.21	37.06	50.00	-12.94	peak			P	
6	250.3011	-11.45	51.26	39.81	57.00	-17.19	peak			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.

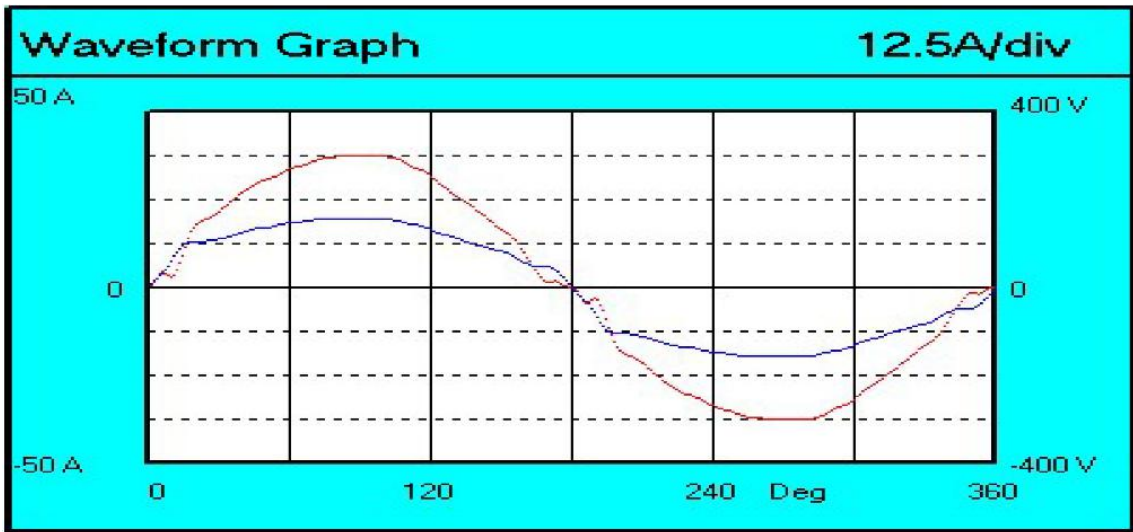
7.5 Test Results

PASS.

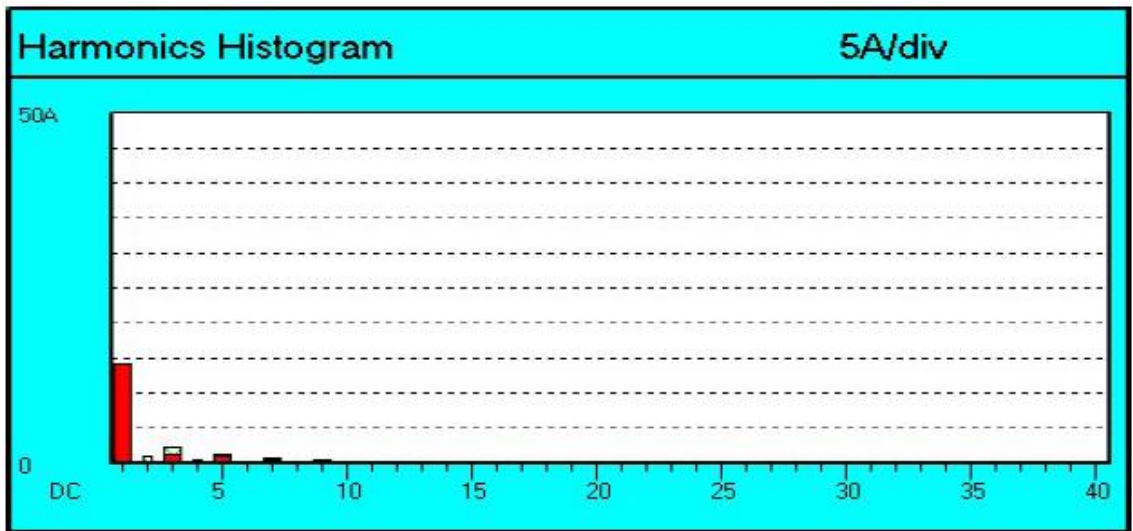
Please refer to the following pages.

Harmonics – Class-A (Run time)

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Current Test Result Summary (Run time)

Report Number : NTC2106638EV00
Tested On : 17 June 2021 10:05 for 150 Seconds.
Equipment Under Test : UPS
Serial Number : SRV3KRI-E
Tested by : Talon

Supply Voltage : 226.3 to 228.0 Vrms 322.1 Vpk Frequency : 50.00 Hz
Supply Meets EN Requirements

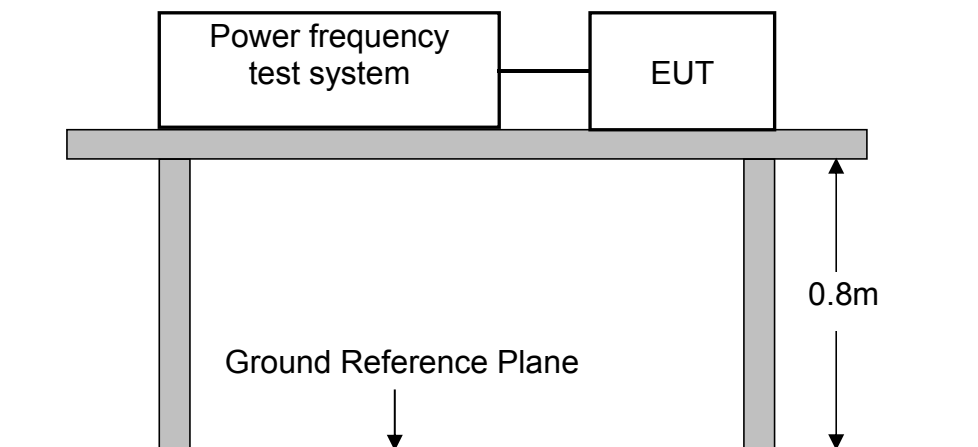
Load Power : 2.987 to 3.328 kW 3.358 kVA Power Factor 0.991
Load Current : 13.2 to 14.6 Arms 19.3 Apk Crest Factor 1.322

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 :		14.425				
2 :	1.080	0.107	9.9	0.125	11.6	Pass
3 :	2.300	1.218	53.0	1.233	53.6	Pass
4 :	0.430	0.038	8.8	0.043	10.0	Pass
5 :	1.140	0.285	25.0	0.294	25.8	Pass
6 :	0.300	0.026	8.7	0.031	10.3	Pass
7 :	0.770	0.052	6.8	0.058	7.5	Pass
8 :	0.230	0.025	10.9	0.030	13.0	Pass
9 :	0.400	0.092	23.0	0.099	24.8	Pass
10 :	0.184	0.021	11.4	0.025	13.6	Pass
11 :	0.330	0.035	10.6	0.038	11.5	Pass
12 :	0.153	0.016	10.5	0.018	11.8	Pass
13 :	0.210	0.034	16.2	0.036	17.1	Pass
14 :	0.131	0.014	10.7	0.015	11.5	Pass
15 :	0.150	0.030	20.0	0.033	22.0	Pass
16 :	0.115	0.016	13.9	0.017	14.8	Pass
17 :	0.132	0.014	10.6	0.015	11.4	Pass
18 :	0.102	0.016	15.7	0.017	16.7	Pass
19 :	0.118	0.038	32.2	0.040	33.9	Pass
20 :	0.092	0.013	14.1	0.015	16.3	Pass
21 :	0.107	0.041	38.3	0.043	40.2	Pass
22 :	0.084	0.011	13.1	0.012	14.3	Pass
23 :	0.098	0.040	40.8	0.041	41.8	Pass
24 :	0.077	0.010	13.0	0.010	13.0	Pass
25 :	0.090	0.033	36.7	0.035	38.9	Pass
26 :	0.071	0.009	12.7	0.010	14.1	Pass
27 :	0.083	0.014	16.9	0.015	18.1	Pass
28 :	0.066	0.009	13.6	0.010	15.2	Pass
29 :	0.078	0.011	14.1	0.012	15.4	Pass
30 :	0.061	0.009	14.8	0.010	16.4	Pass
31 :	0.073	0.019	26.0	0.020	27.4	Pass
32 :	0.057	0.009	15.8	0.010	17.5	Pass
33 :	0.068	0.012	17.6	0.013	19.1	Pass
34 :	0.054	0.009	16.7	0.010	18.5	Pass
35 :	0.064	0.010	15.6	0.010	15.6	Pass
36 :	0.051	0.009	17.6	0.010	19.6	Pass
37 :	0.061	0.021	34.4	0.023	37.7	Pass
38 :	0.048	0.009	18.7	0.009	18.7	Pass
39 :	0.058	0.021	36.2	0.022	37.9	Pass
40 :	0.046	0.009	19.6	0.010	21.7	Pass
21 - 39 :	0.251	0.079	31.5	0.080	31.9	-

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 : NTC2106638EV00
Tested On : 17 June 2021 10:39 for 600 Seconds.
Equipment Under Test : UPS
Serial Number : SRV3KRI-E
Tested by : Talon

Load Power : 3.135 kW 3.141 kVA Power Factor 0.988
Load Current : 13.9 Arms 18.8 Apk Crest Factor 1.351

EN 61000-3-3 - Voltage reduction is positive

Voltage Variations

Nominal Voltage: 230 Vrms
Highest Half-cycle level: +2.08%
Lowest Half-cycle level: +2.61%

d(max): +0.22% Limit: 4% PASS
t(max): 0.00seconds Limit: 500ms PASS

Steady State definition: >1000ms within +/- 0.2%
Largest d(c) change down: +0.18%
Largest d(c) change up: -0.16%
Largest d(c) change: +0.18% Limit: 3.3% PASS

Flicker

Short Term Flicker Pst: 0.13 Limit: 1.00 PASS
Long Term Flicker Plt: 0.00 Limit: 0.65 PASS

Pst Classifier		Plt Calculation	
Duration	Flicker	Interval	Pst
0.7%	0.05	1:	0.13
1.0%	0.05	2:	0.00
1.5%	0.04	3:	0.00
2.2%	0.04	4:	0.00
3%	0.04	5:	0.00
4%	0.03	6:	0.00
6%	0.03	7:	0.00
8%	0.03	8:	0.00
10%	0.03	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%	0.02	Plt =	0.00
80%	0.01		

9. PERFORMANCE CRITERIA FOR IMMUNITY

Table 4 – 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 consistency with the actual UPS mode of operation
Mode of operation ^a	No change	Change only temporarily
^a At all times, the UPS shall remain within the performance classification as declared by the UPS manufacturer (see IEC 62040-3:2011).		

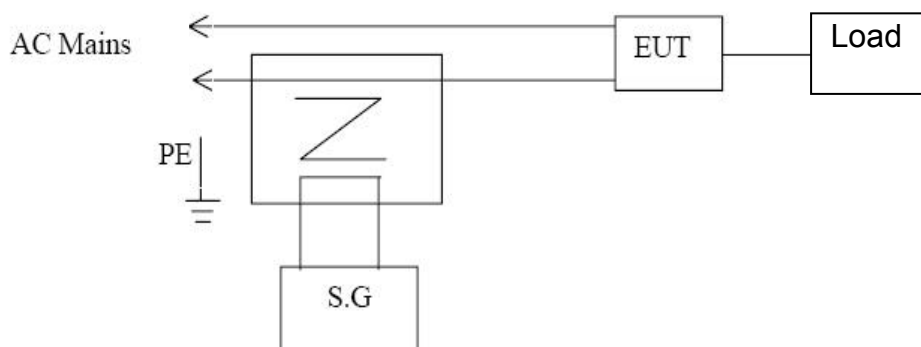
The tests shall be made with the UPS in the following conditions:

- 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 Category C2
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.

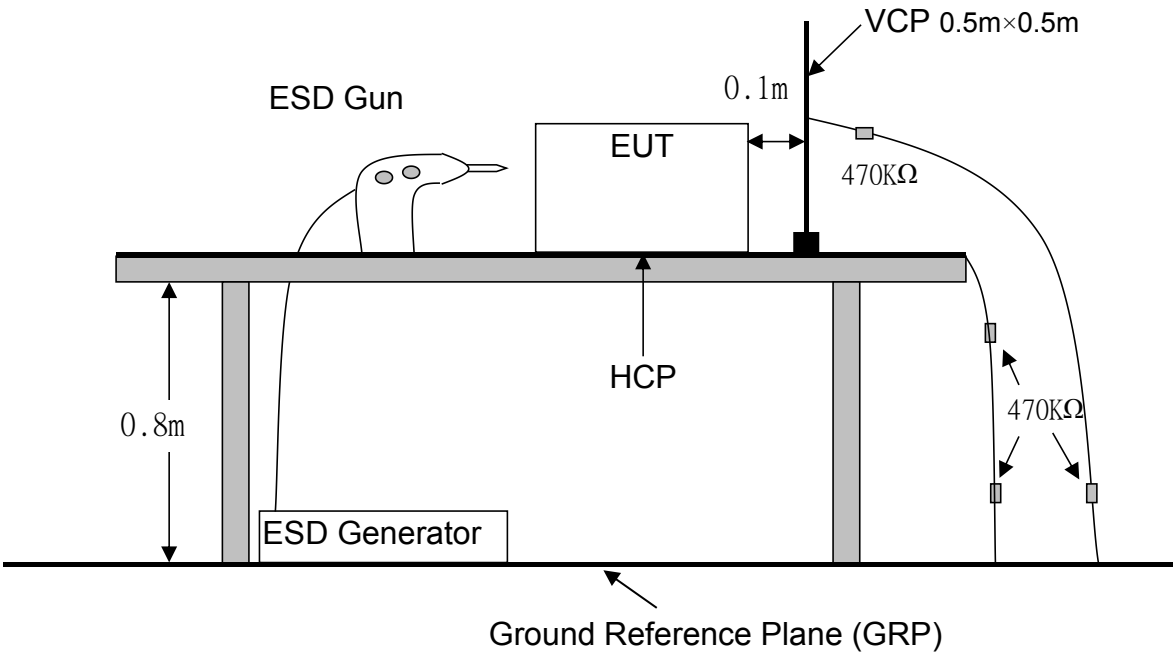
Please refer to following page.

Low Frequency Signals Test Result

Ambient Condition:	Temp.: 27.8 °C	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 Category C2
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..

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.

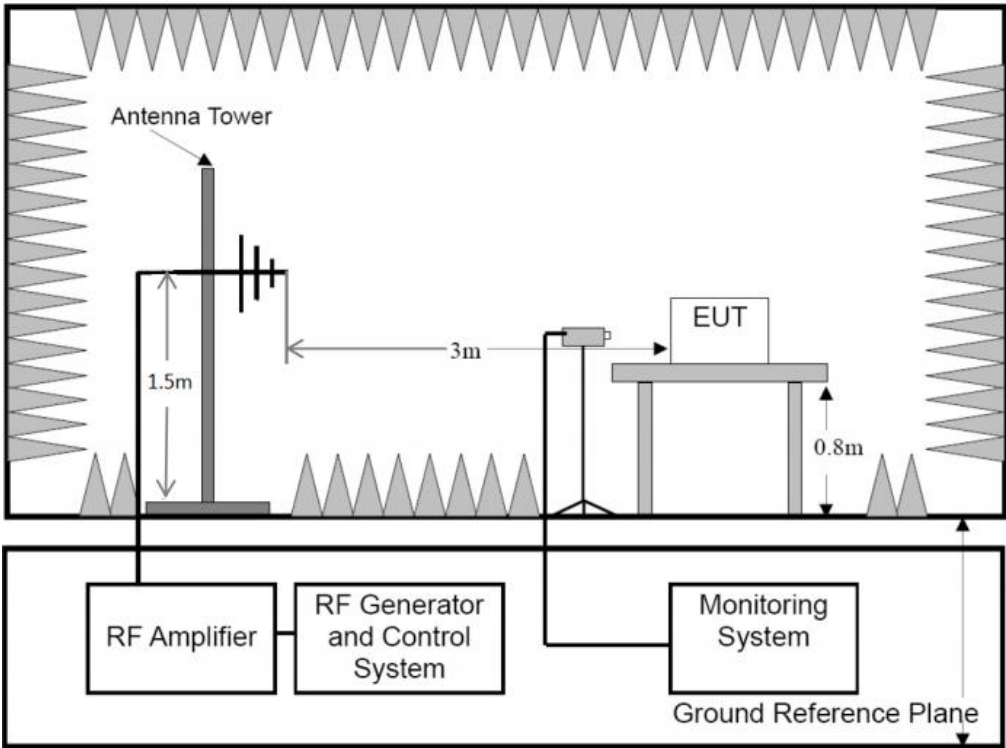
Please refer to the following page.

Electrostatic Discharge Test Results

Ambient Condition:	Temp.: 27.5 °C	R.H.: 54 %	Air Pressure: 101.3 kPa
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/ LAN Port		A	A
Screw		C	A
Metal		C	A
USB Port		C	A
RS232 Port		C	A
Indirect Discharge(HCP)		C	A
Indirect Discharge(VCP)		C	A
Note:The test showed no abnormal phenomena.			
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 Category C2
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.

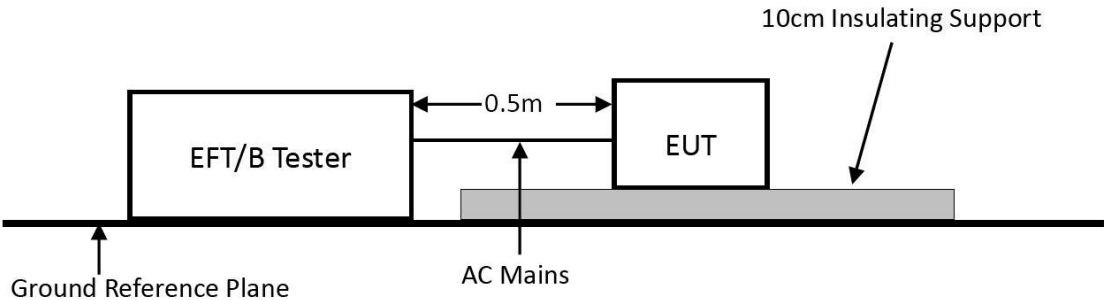
Please refer to the following page.

RF Field Strength Susceptibility Test Results

Ambient Condition:	Temp.: 25 °C	R.H.: 60 %	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			
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 phenomena.				
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 Category C2
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
<p>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.</p> <p>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.</p> <p>Note 3 “X” is an open level. The level has to be specified in the dedicated equipment specification.</p>				

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 minutes.

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.

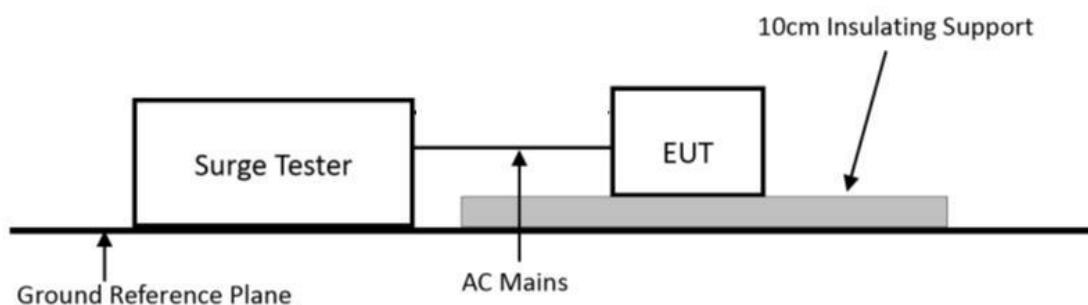
Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Ambient Condition:	Temp.: 27.8 °C	R.H.: 57 %	Air Pressure: 101.3 kPa
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			
Line (AC power input and output ports)	Test Voltage	Result (Performance Criterion)	
L	±4KV	A	
N	±4KV	A	
PE	±4KV	A	
L、N	±4KV	A	
L、PE	±4KV	A	
N、PE	±4KV	A	
L、N、PE	±4KV	A	
Signal line	----	----	
DC line	----	----	
Note : The test showed no abnormal phenomena.			
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 Category C2
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.s elected 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 Result

PASS.

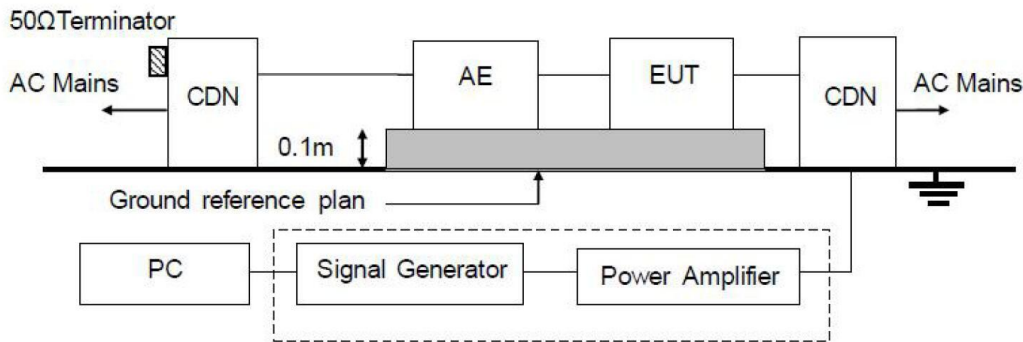
Please refer to the following page.

Surge Immunity Test Results

Ambient Condition:	Temp.: 27.8℃	R.H.: 57 %	Air Pressure: 101.3 kPa
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	A
L-PE	0°, 90°, 180°, 270°	±6.0KV	A
N-PE	0°, 90°, 180°, 270°	±6.0KV	A
Signal line	----	----	----
DC line	----	----	----
Note : The test showed no abnormal phenomena.			
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 Category C2
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 ^a	Special	
^a "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 1.5×10^{-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.

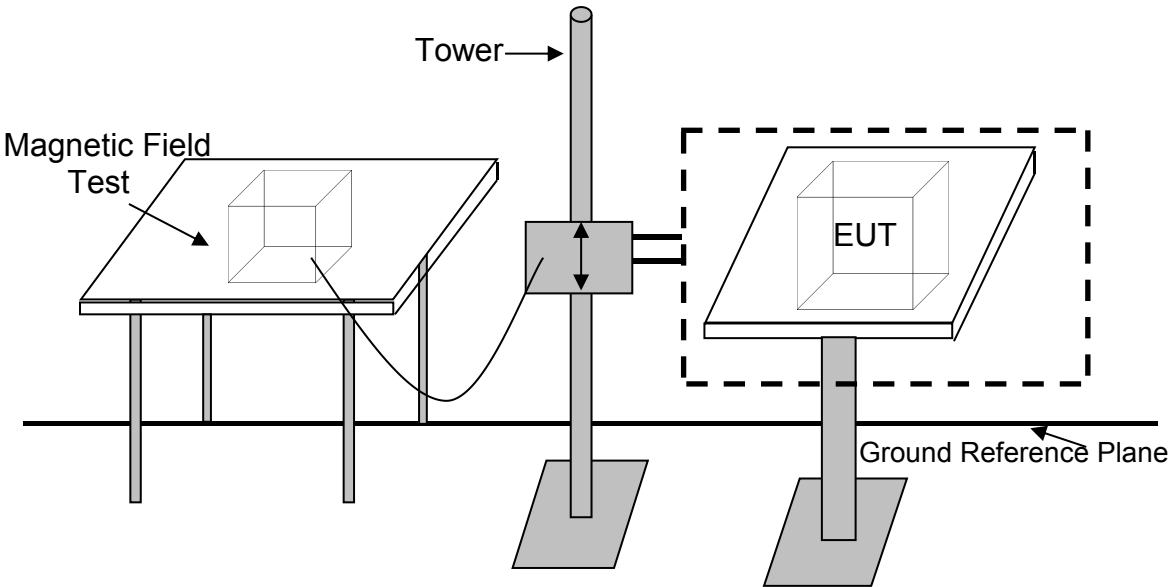
Please refer to the following page.

Injected Currents Susceptibility Test Results

Ambient Condition:	Temp.: 25 °C	R.H.: 60 %	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		
Test Port	Frequency (MHz)	Level(V)	Result (Performance Criterion)
AC Mains	0.15~80	10	A
Note : The test showed no abnormal phenomena.			
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 Category C2
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 0.8m (high)table. X, Y and Z polarization of the induction coil are set on test, so that each side 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 Result

PASS.

Please refer to the following page.

Magnetic Field Immunity Test Results

Ambient Condition:	Temp.: 27.5 °C	R.H.: 54 %	Air Pressure: 101.3 kPa
Power Supply:	AC 230V/50Hz	Required Performance Criterion: A	
Test Specifications:	30A/m		
Test mode:	Normal operation mode		
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

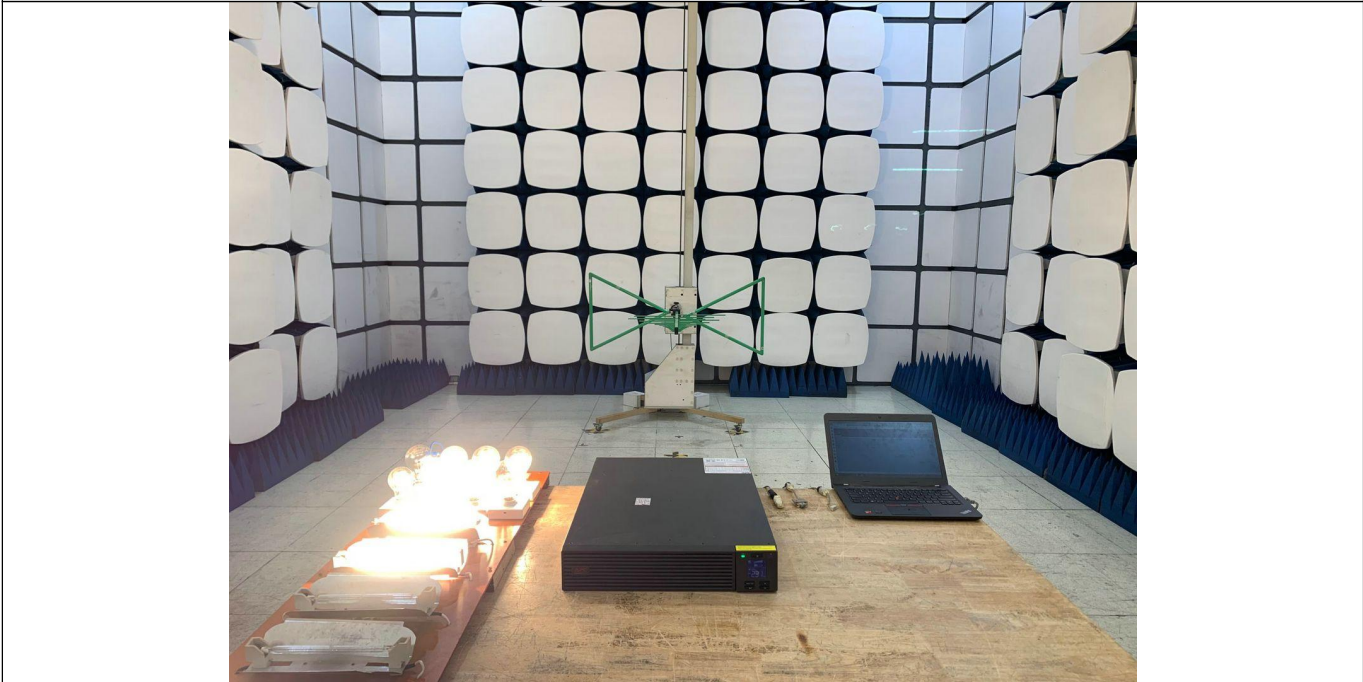
Set-up for Conducted Emission
(Place horizontally.)



Set-up for Conducted Emission
(Place vertically.)



**Set-up for Radiated Emission
(Place horizontally.)**



**Set-up for Radiated Emission
(Place vertically.)**



Set-up for Harmonic / Flicker



Set-up for Electrostatic Discharge



Set-up for EFT / Surge Immunity



Set-up for Low Frequency Signals



Set-up for Magnetic Field Immunity



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

Photos of the EUT

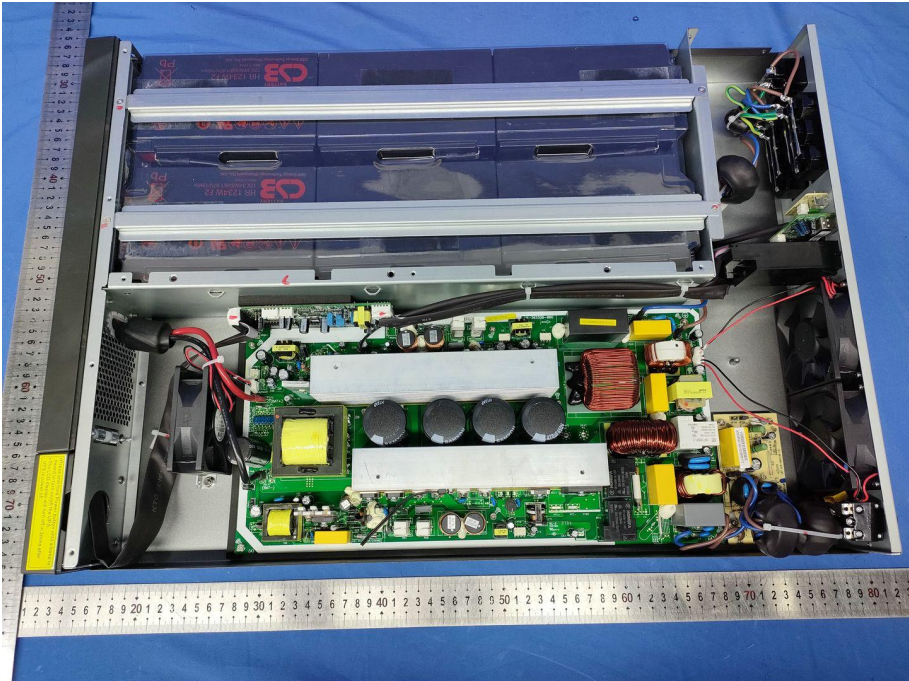
Over view -1



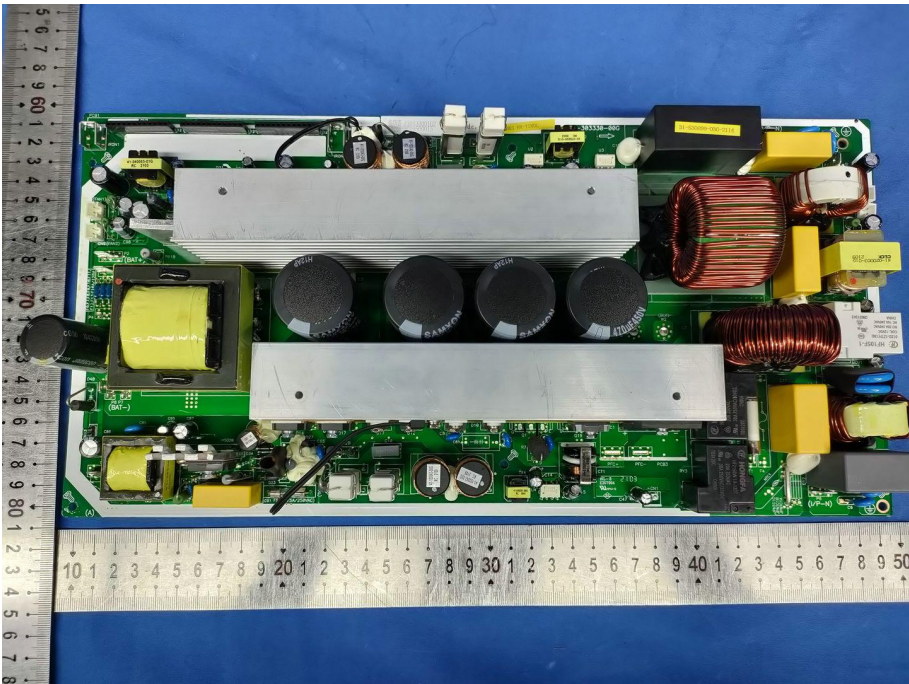
Over view -2



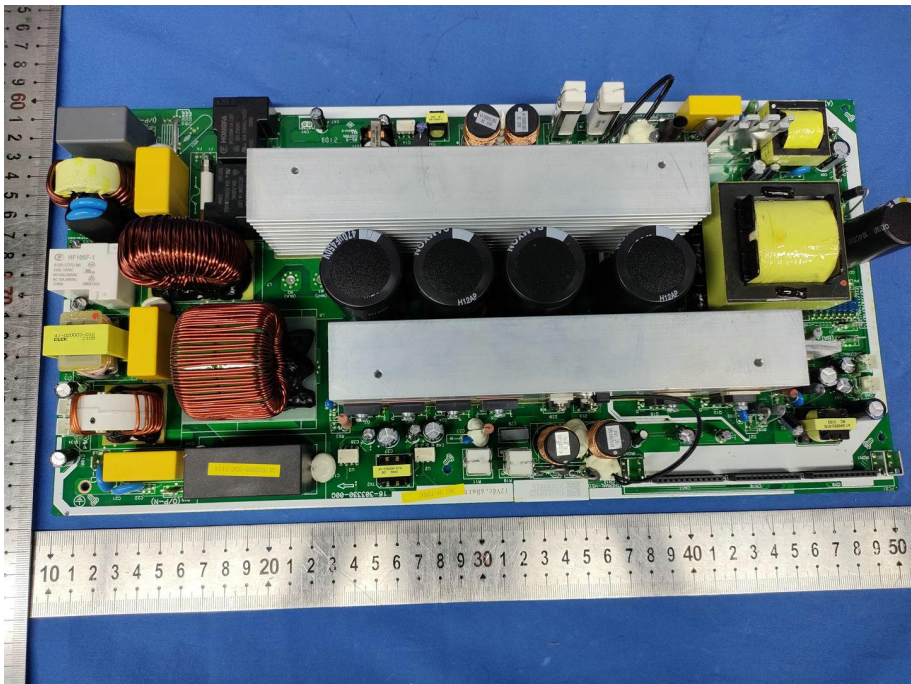
Internal View -1



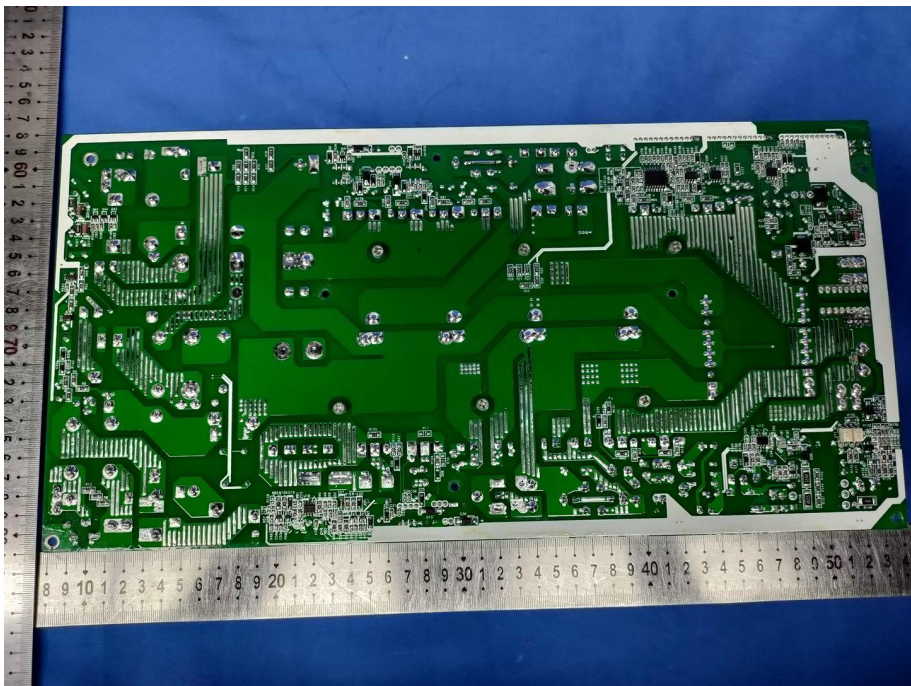
PCB View -1



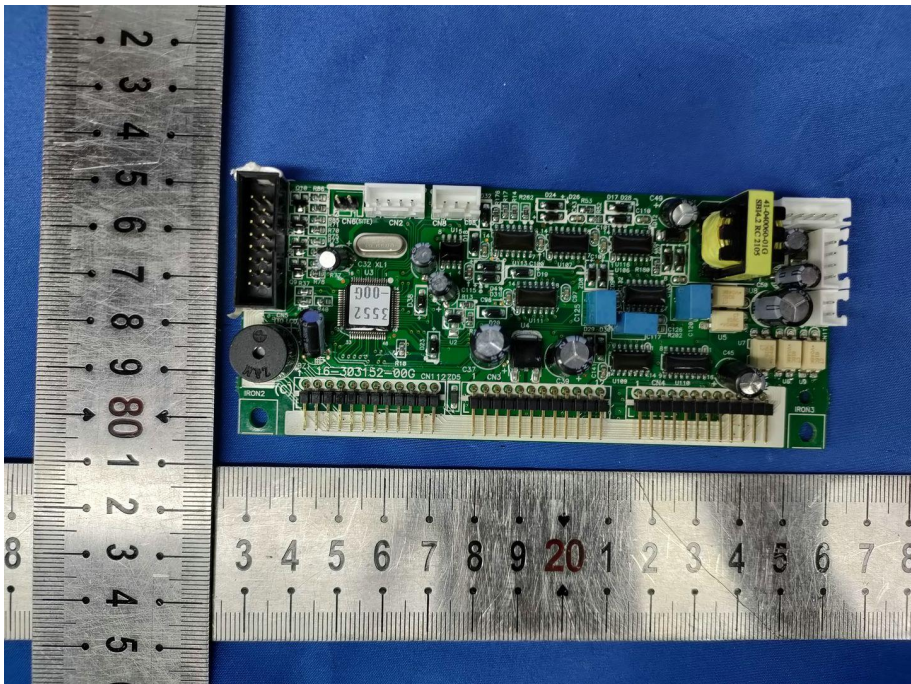
PCB View -2



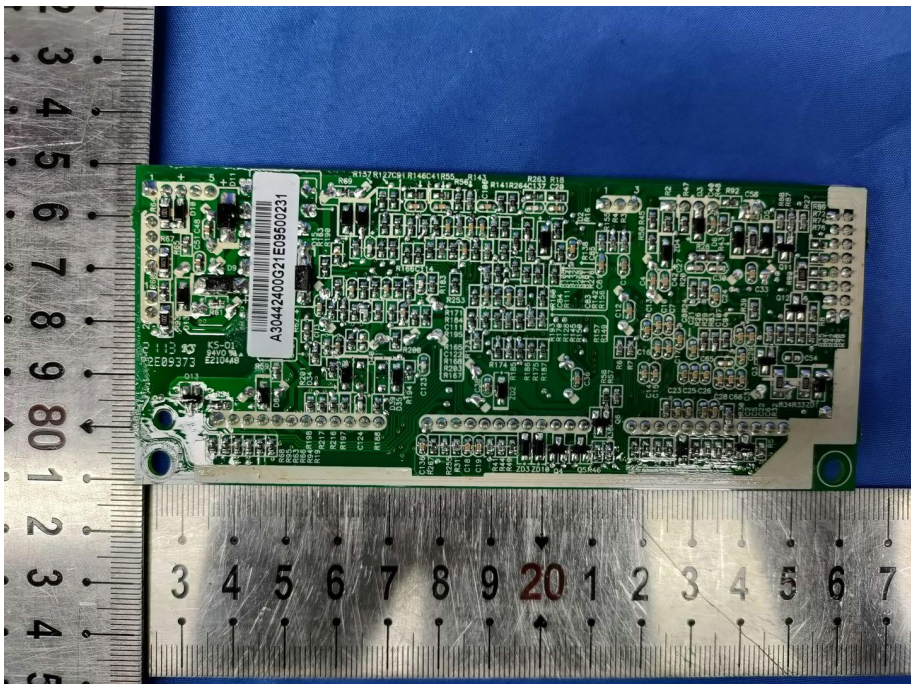
PCB View -3



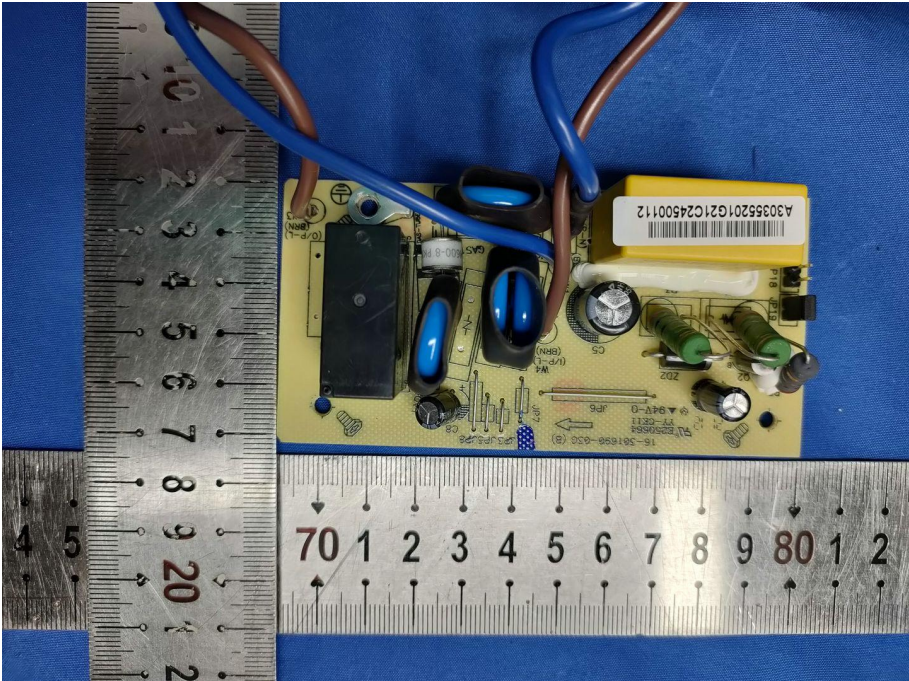
PCB View -4



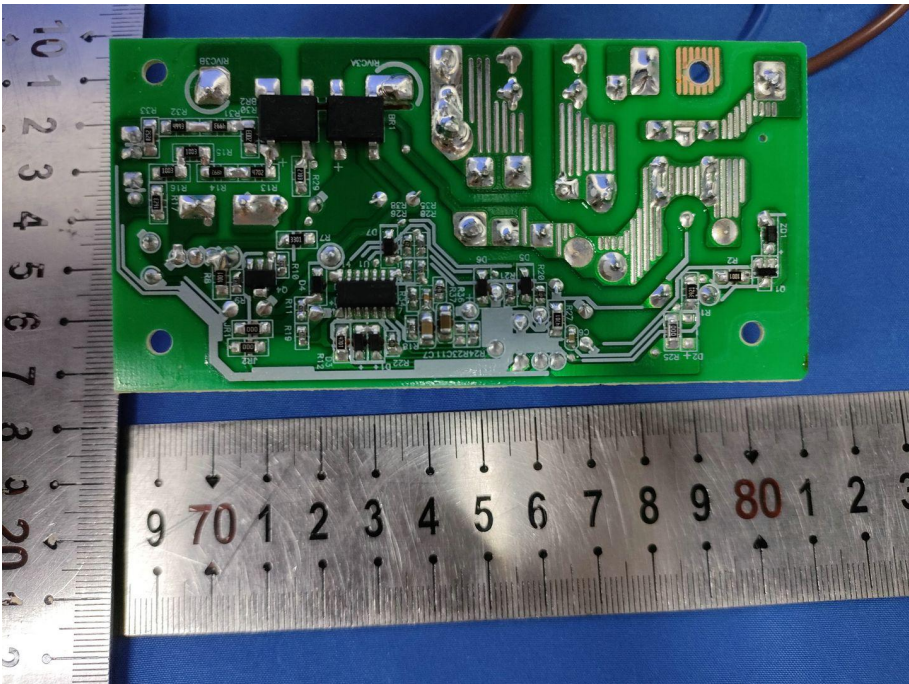
PCB View -5



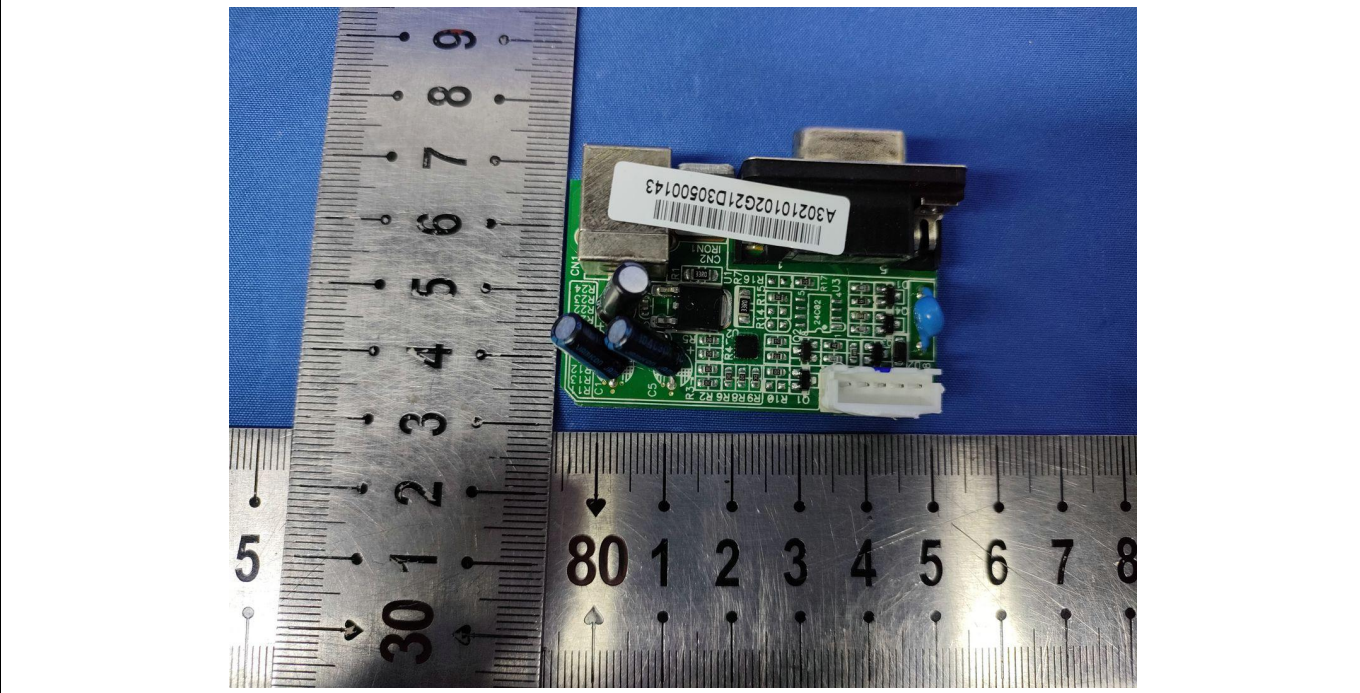
PCB View -6



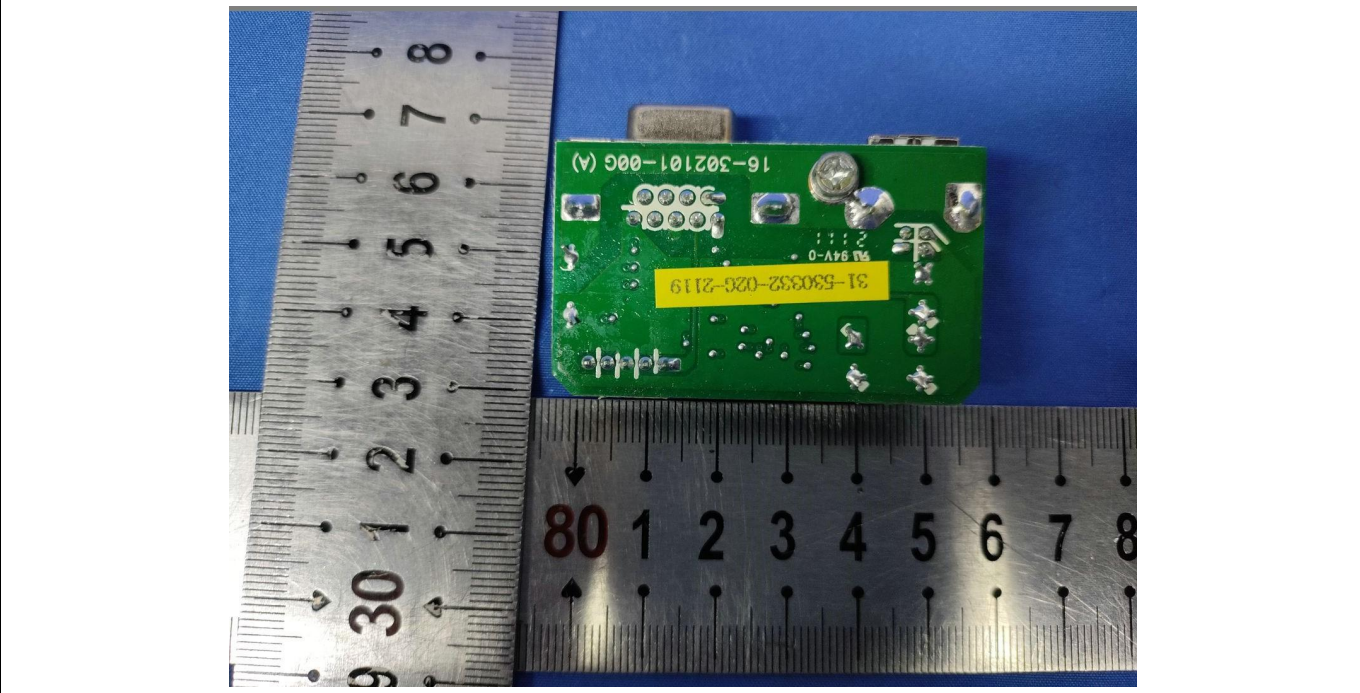
PCB View -7



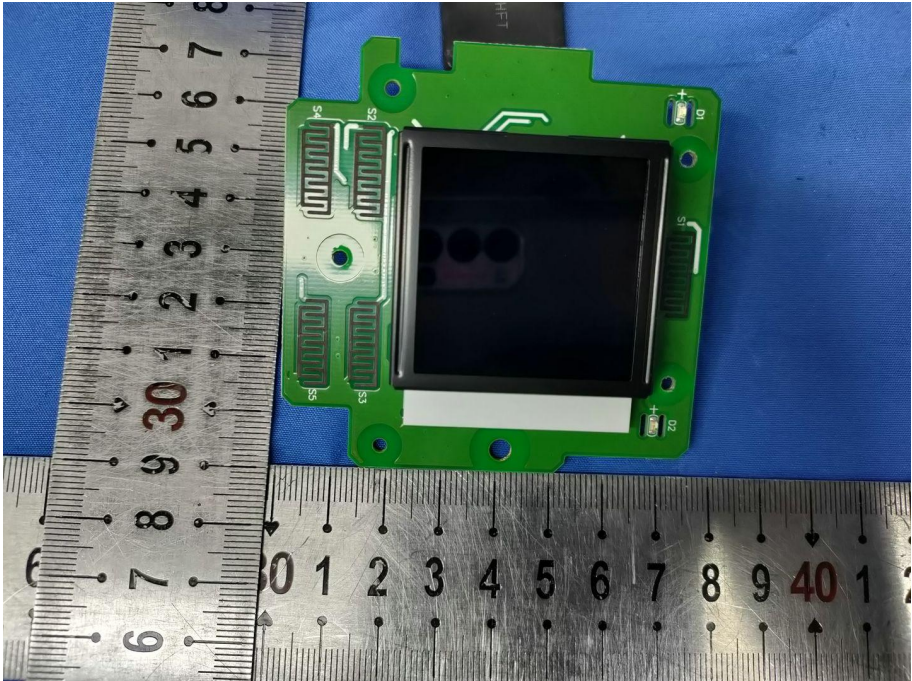
PCB View -8



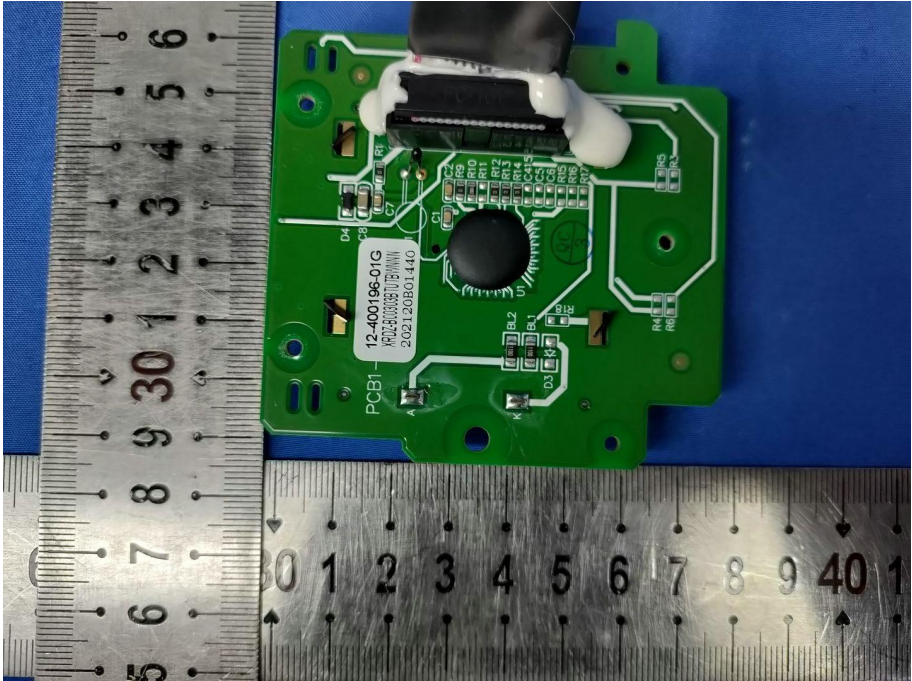
PCB View -9



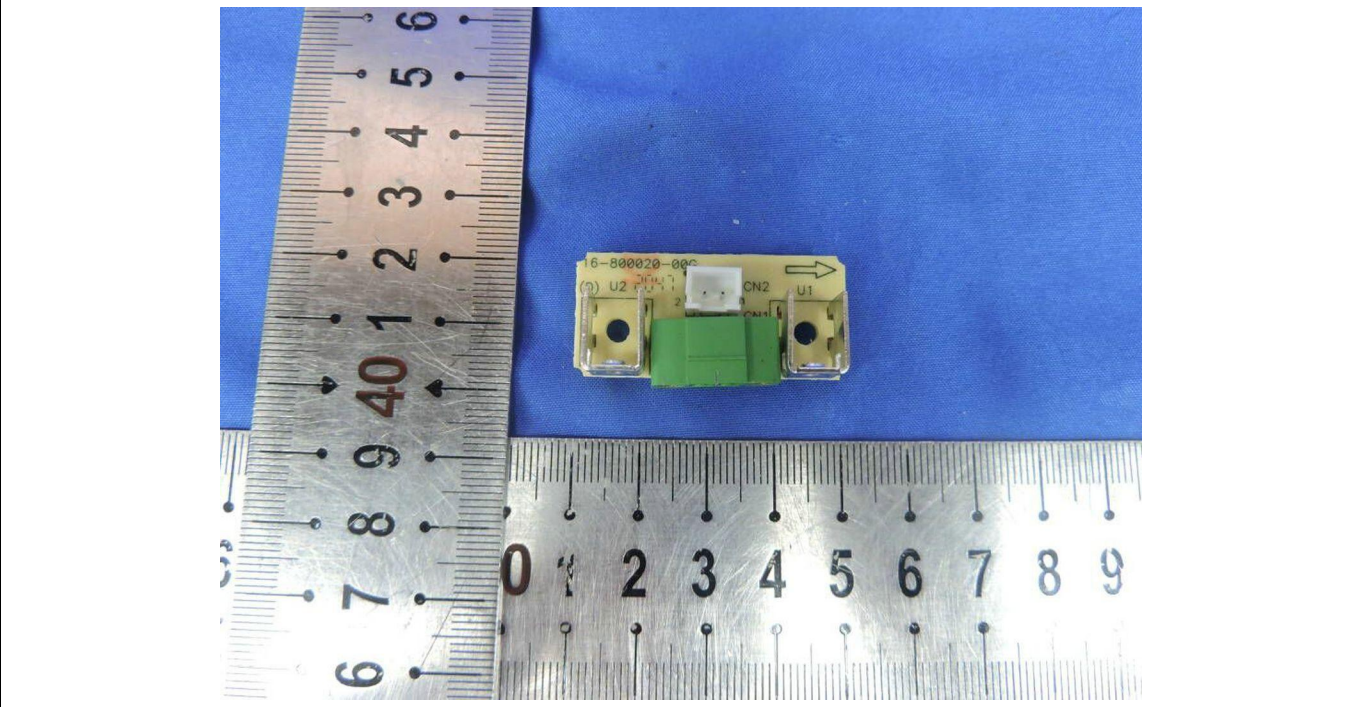
PCB View -10



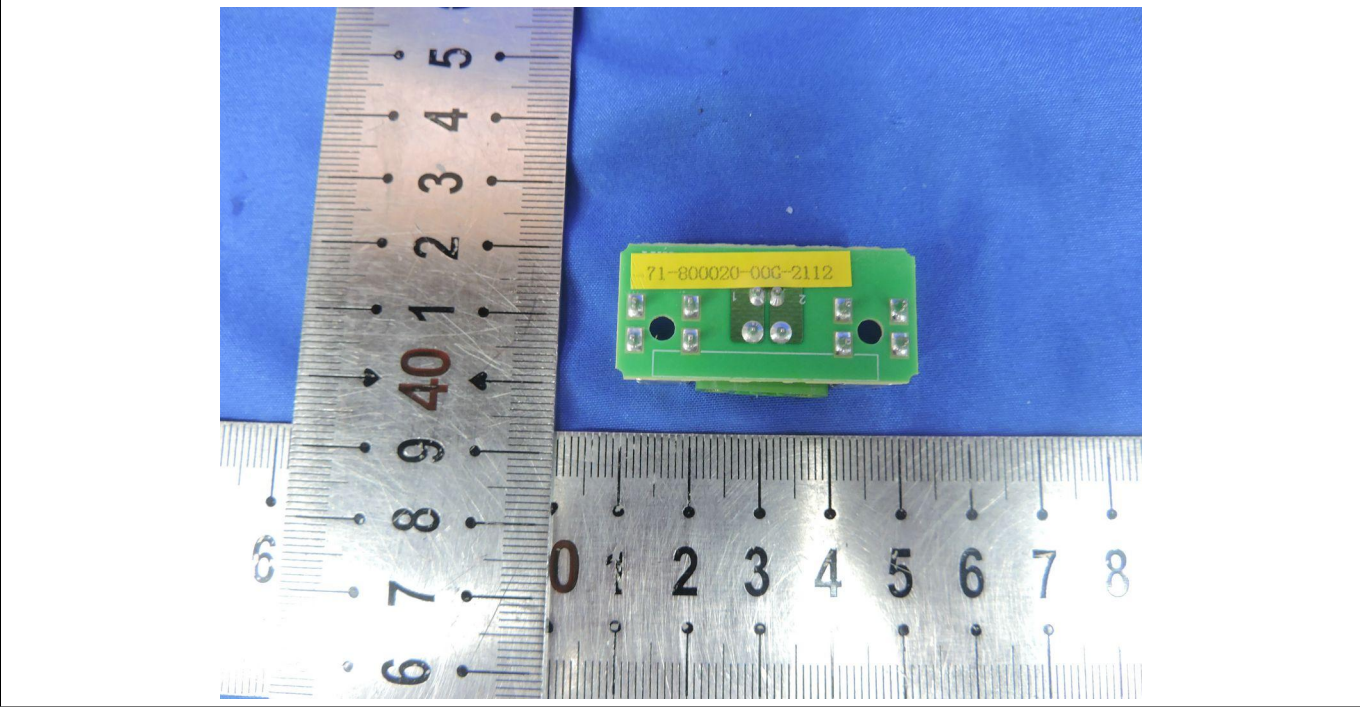
PCB View -11



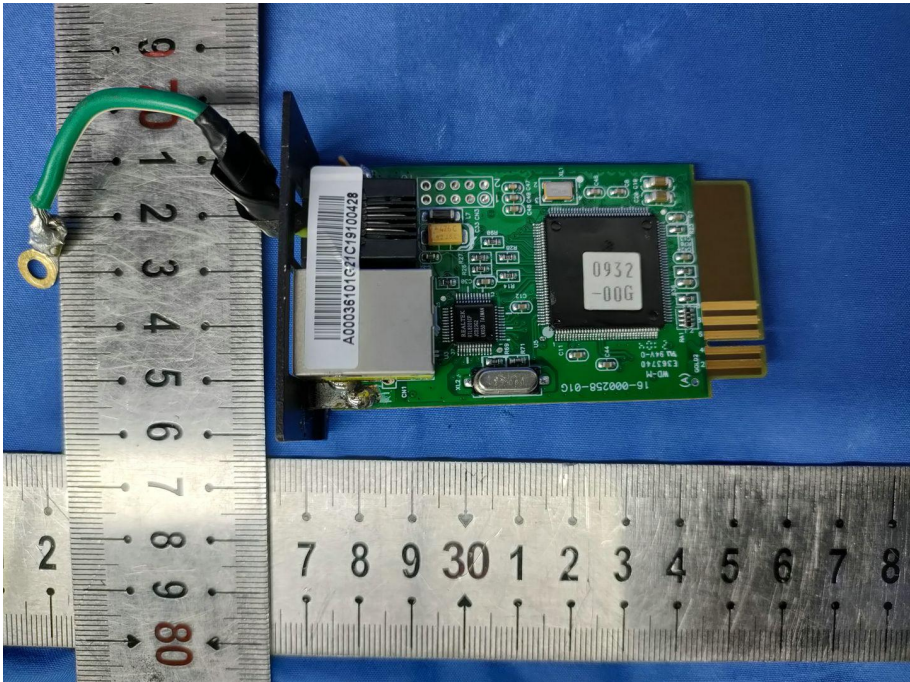
PCB View -12



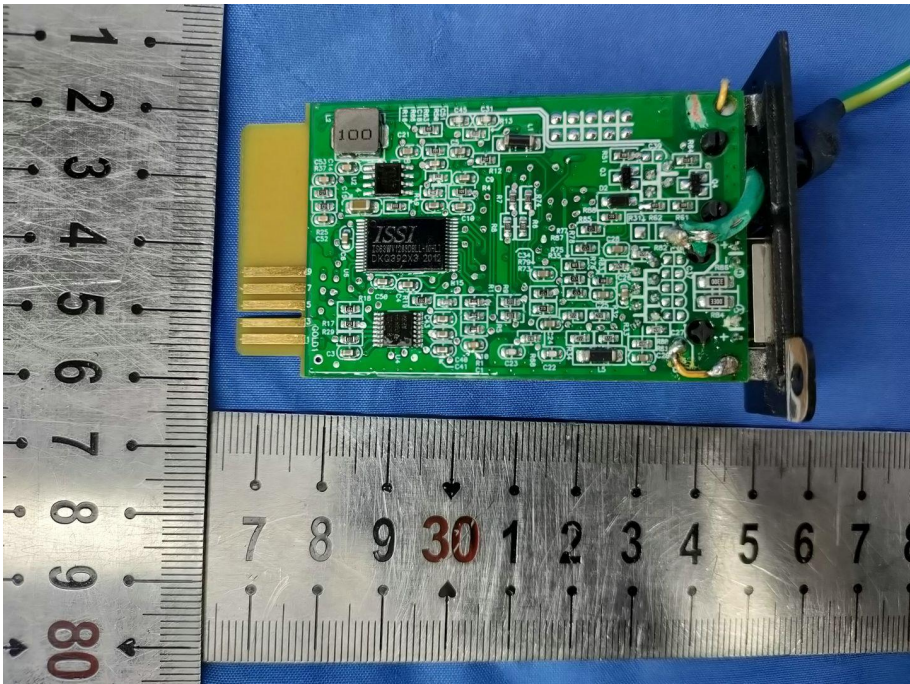
PCB View -13



PCB View -14



PCB View -15



--- End of the report ---