

EMC TEST REPORT

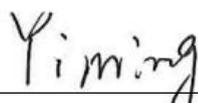
The device described below is tested by Shenzhen Nore Testing Center Co.,Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results are contained in this test report. Shenzhen Nore Testing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

Applicant : DESA GLOBAL ENDUSTRIYEL URUN. ITH. IHR. SAN. ve TIC. LTD. STI
Address : asagi yahyalar mahallesi 994 sokak 8-B yenimahalle - ANKARA, TURKEY
Manufacturer/ Factory : Foshan Unipower Electronic Co., Ltd.
Address : Block 7, No.115, 1st Zhangcha Road, Foshan, Guangdong Province, P.R. China
E.U.T. : UPS
Brand Name : DESA, SINAIDER, CLS
Model No. : D -1600VA, SINAIDER -1600VA, UPS -1600VA, DSUPS01,DSUPS02,DSUPS03
Measurement Standard : EN 62040-2: 2006+AC: 2006
EN 61000-3-2: 2014
(EN61000-4-2: 2009, EN61000-4-3:2006+A2: 2010, EN61000-4-4: 2012, EN 61000-4-5: 2014, EN 61000-4-6: 2014, EN 61000-4-8: 2010, EN 61000-2-2: 2002)
Date of Receiver : : October 17,2019
Date of Test : : October 18,2019 to November 13, 2019
Date of Report : : November 14, 2019

This Test Report is Issued Under the Authority of :

Prepared by

Approved & Authorized Signer



Yiming Cao / Engineer



Han Song / Authorized Signatory

This report shows that the E.U.T. is technically compliant with the EN 62040-2 and EN 61000-3-2,EN61000-3-3. 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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Appendix I (Photos of E.U.T.) (12 pages)

1. SUMMARY OF TEST RESULTS

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

EMISSION			
Standard	Test Type	Result	Remarks
EN 62040-2: 2006+AC: 2006	Mains Terminal Disturbance Voltage Test	PASS	Uncertainty: 2.7dB
	Radiated Emission Test	PASS	Uncertainty: 3.4dB
EN 61000-3-2: 2014	Harmonic current emission	PASS	Meets the Requirements.

IMMUNITY(EN 62040-2: 2006+AC: 2006)			
Standard	Test Type	Result	Remarks
EN 61000-2-2: 2002	Low frequency signals test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-2: 2009	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion B
EN61000-4-3: 2006+A2: 2010	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-4: 2012	Electrical fast transient/ burst immunity test	PASS	Meets the requirements of Performance Criterion B
EN 61000-4-5: 2014	Surge immunity test	PASS	Meets the requirements of Performance Criterion B
EN 61000-4-6: 2014	Injected Currents immunity test	PASS	Meets the requirements of Performance Criterion A
EN 61000-4-8: 2010	Magnetic Field immunity test	PASS	Meets the requirements of Performance Criterion A

2. GENERAL INFORMATION

2.1 Details of E.U.T.

E.U.T.	: UPS
Model No.	: D -1600VA, SINAIDER -1600VA, UPS -1600VA, DSUPS01,DSUPS02,DSUPS03, (We prepare D -1600VA,SINAIDER -1600VA for EMC test.)
E.U.T. Type	: Category C2
WARNING	: This is a category C2 Uninterruptible Power Supply 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	: N/A
Rating	: See the next page for details
Test Voltage	: AC 230V 50Hz, DC 24V (Internal Battery)
Cable	: N/A
Description of model difference	: Their products panels, screen printing brand, output socket, quantity, power is different
Remark	: N/A

Brand: DESA
Model No.: D -1600VA
Capacity: 1600VA/960W
AC Input: 220Vac~240Vac,50 /60Hz,10A,1 Φ ,
AC Output: 220Vac~240Vac,50 /60Hz, 1 Φ ,1600VA,960W
FOSHAN UNIPOWER ELECTRONIC CO., LTD



Brand: CLS
Model No.: UPS -1600VA
Capacity: 1600VA/960W
AC Input: 220Vac~240Vac,50 /60Hz,10A,1 Φ ,
AC Output: 220Vac~240Vac,50 /60Hz, 1 Φ ,1600VA,960W
FOSHAN UNIPOWER ELECTRONIC CO., LTD



Brand:SINAIDER
Model No.: SINAIDER-1600VA
Capacity: 1600VA/960W
AC Input: 220Vac~240Vac,50 /60Hz,10A,1 Φ ,
AC Output: 220Vac~240Vac,50 /60Hz, 1 Φ ,1600VA,960W
FOSHAN UNIPOWER ELECTRONIC CO., LTD



Brand: DESA
Model No.: DSUPS01
Capacity: 1600VA/960W
AC Input: 220Vac~240Vac,50 /60Hz,10A,1 Φ ,
AC Output: 220Vac~240Vac,50 /60Hz, 1 Φ ,1600VA,960W
FOSHAN UNIPOWER ELECTRONIC CO., LTD



Brand: DESA
Model No.: DSUPS02
Capacity: 1600VA/960W
AC Input: 220Vac~240Vac,50 /60Hz,10A,1 Φ ,
AC Output: 220Vac~240Vac,50 /60Hz, 1 Φ ,1600VA,960W
FOSHAN UNIPOWER ELECTRONIC CO., LTD



Brand: DESA
Model No.: DSUPS03
Capacity: 1600VA/960W
AC Input: 220Vac~240Vac,50 /60Hz,10A,1 Φ ,
AC Output: 220Vac~240Vac,50 /60Hz, 1 Φ ,1600VA,960W
FOSHAN UNIPOWER ELECTRONIC CO., LTD



2.2 Description of Support Device

None

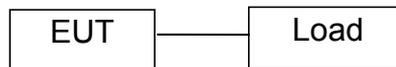
2.3 Block Diagram of Test Setup

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

(1)For Normal operation mode (Full Load)



(2)For Stored energy operation mode (Full Load)



2.4 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.
(Shenzhen NTC Co., Ltd.)

Site Location 1 : South, No. 1, Building 10, Maqueling Industrial
Zone, Nanshan Shenzhen, Guangdong, 518057,
China

2.5 Abnormalities from Standard Conditions

None

3. MEASURING DEVICES AND TEST EQUIPMENT

3.1 For Mains terminals Disturbance voltage Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 08, 2019	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 08, 2019	1 Year
3.	L.I.S.N	Schwarzbeck	NNLK8129	8129-212	Mar. 22, 2019	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 08, 2019	1 Year
5.	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-01 0-0022	Mar. 08, 2019	1 Year

3.2 For Radiated Emission Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 08, 2019	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 22, 2019	1 Year
3.	Positioning Controller	UC	UC 3000	N/A	N/A	N/A
4.	Color Monitor	SUNSP0	SP-140A	N/A	N/A	N/A
5.	Single Phase Power Line Filter	SAEMC	PF201A-32	110210	N/A	N/A
6.	3 Phase Power Line Filter	SAEMC	PF401A-200	110318	N/A	N/A
7.	DC Power Filter	SAEMC	PF301A-200	110245	N/A	N/A
8.	Cable	Huber+Suhner	CBL3-NN-9M	21490001	Mar. 08, 2019	1 Year
9.	Cable	Huber+Suhner	RG223U	N/A	Mar. 08, 2019	1 Year
10.	Power Amplifier	HP	HP 8447D	1145A00203	Mar. 08, 2019	1 Year

3.3 For Harmonic Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Frequency Test System	California Instruments	CTS	72846	Mar. 08, 2019	1 Year
2.	Software	California Instruments	CTS30	N/A	N/A	N/A

3.4 For Electrostatic Discharge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	TESEQ	NSG 437	432	Mar. 22, 2019	1 Year

3.5 For RF Electromagnetic Field Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	RF Power Meter	ESE	4242	13984	Mar. 08, 2019	1 Year
2.	Power Amplifier	TESEQ	CBA 1G-150	T44029	N/A	1 Year
3.	Signal Generator	Agilent	N5181A	MY50142 530	Mar. 08, 2019	1 Year
4.	Power Sensor	ESE	51011EMC	35716	Mar. 08, 2019	1 Year
5.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 08, 2019	1 Year

3.6 For Electrical Fast Transient /Burst Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	EM TEST	UCS 500N	V11041086 83	Mar. 08, 2019	1 Year
2.	Coupling Clamp	EM TEST	HFK	0311-94	Mar. 08, 2019	1 Year
3.	Test Soft	EM TEST	lec. control	N/A	N/A	

3.7 For Surge Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	EM TEST	UCS 500N	V1104108683	Mar. 08, 2019	1 Year
2.	Test Soft	EM TEST	lec. control	N/A	N/A	N/A
3.	CDN	EM TEST	CNV508	N/A	Mar. 08, 2019	1 Year

3.8 For Injected Currents Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	C/S Test System	HAEFELY	WinPAMP	NSEMC0 02	N/A	N/A
2.	CDN	FRANNOKIA	CDN-M2+M3	A2210150	Oct. 18, 2019	1 Year

3.9 For Magnetic Field Immunity Measurement

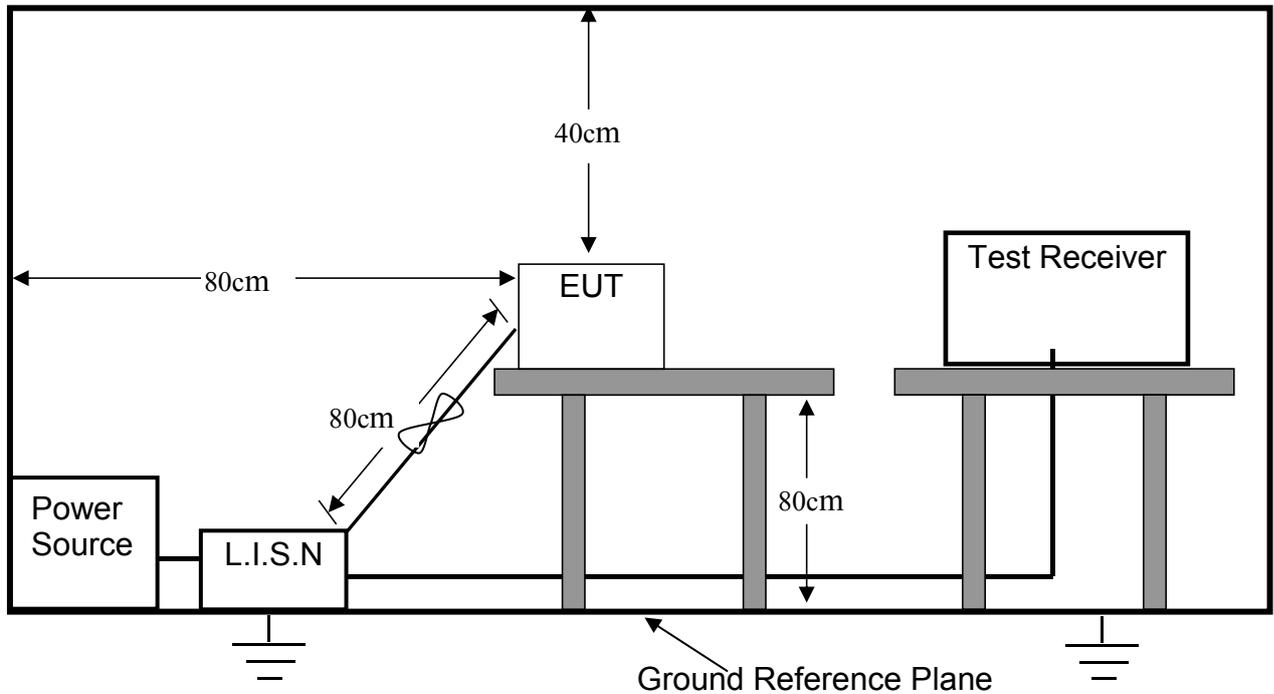
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Magnetic Field Tester	HAEFELY	MAG100.1	150579	Oct.18, 2019	1 Year
2.	Test Software	N/A	N/A	N/A	N/A	N/A

3.10 For Low Frequency Signal Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Programmable AC Source	CHROMA	6530	N/A	Sep. 01, 2019	1 Year

4. MAINS TERMINAL DISTURBANCE VOLTAGE MEASUREMENT

4.1. Block Diagram of Test Setup



4.2. Limit of Mains Terminal Disturbance voltage measurement

Test Standard: EN 62040-2 Category C2

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

Frequency range MHz	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	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.

4.3. 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 62040-2 regulations during conducted emission test.

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

4.4. Operating Condition of E.U.T.

4.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

4.4.2 Turn on the power of all equipments.

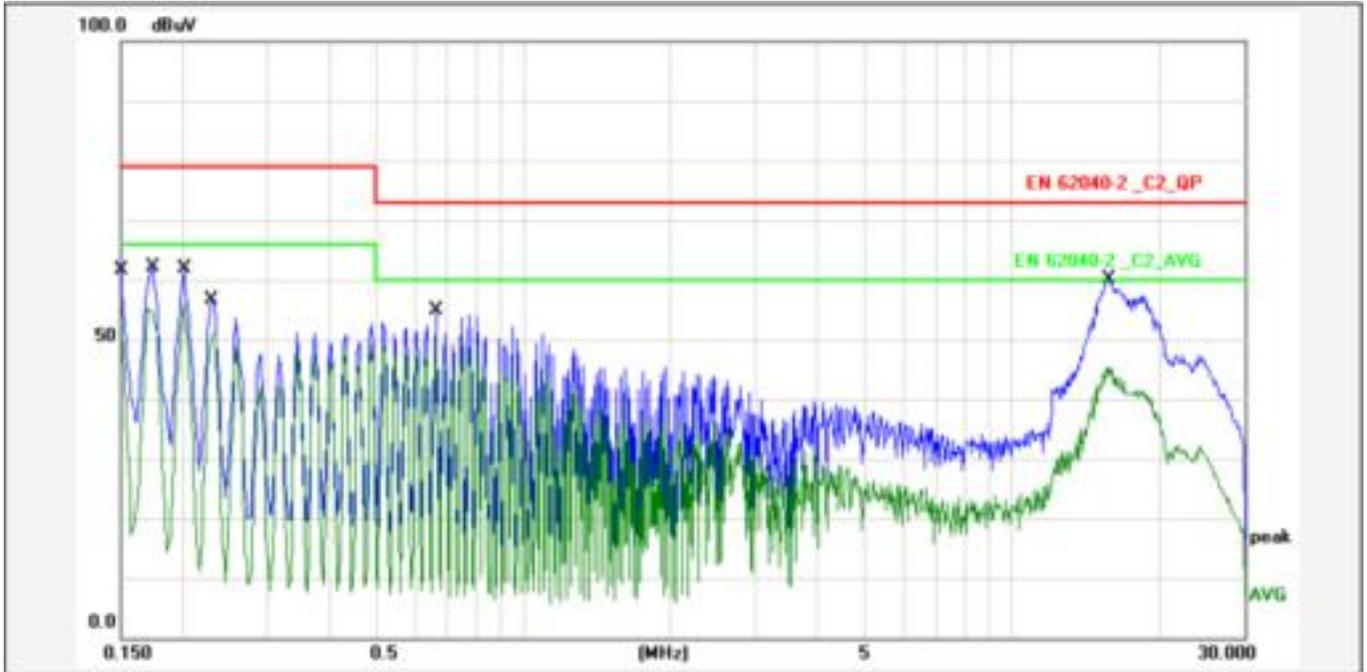
4.4.3 Let the E.U.T. work in test modes (Normal operation mode, Stored energy operation mode) and test it.

4.5. Mains Terminal Disturbance Voltage Test Results

PASS.

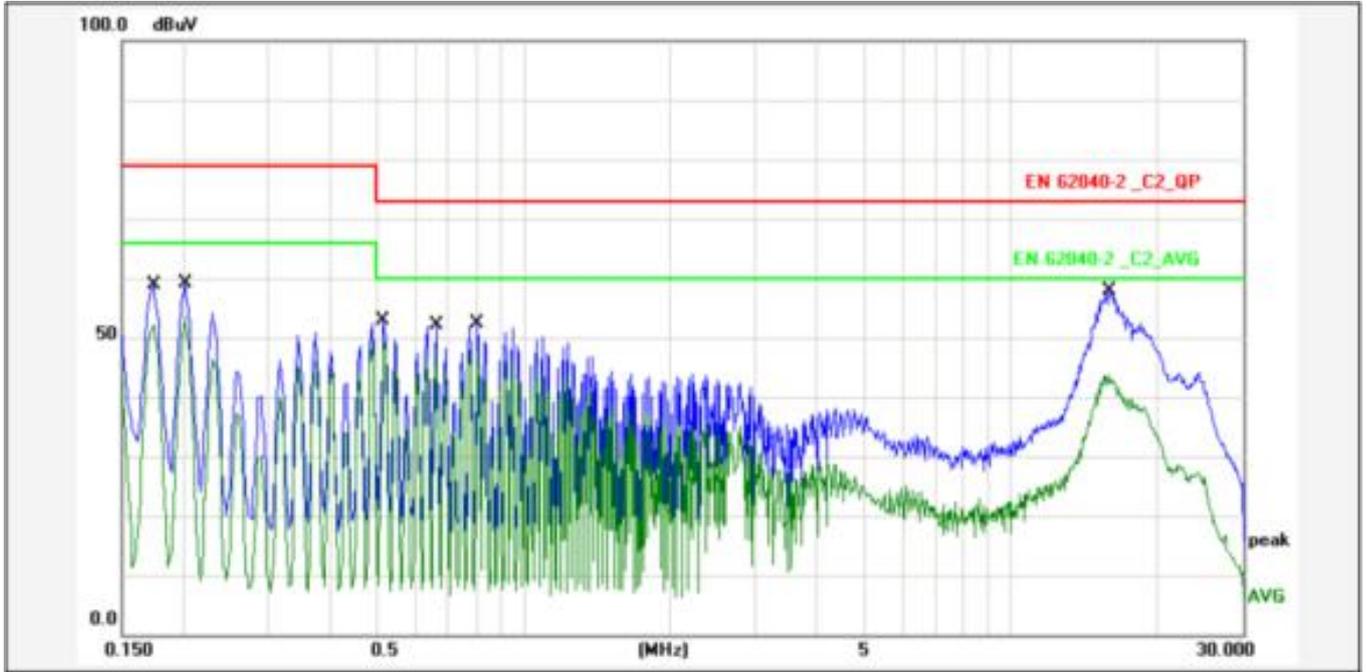
Please refer to the following pages.

E.U.T :	UPS	Model Name :	D-1600VA
Temperature :	26°C	Relative Humidity :	55 %
Pressure :	1006 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	Normal operation mode	Phase:	Line



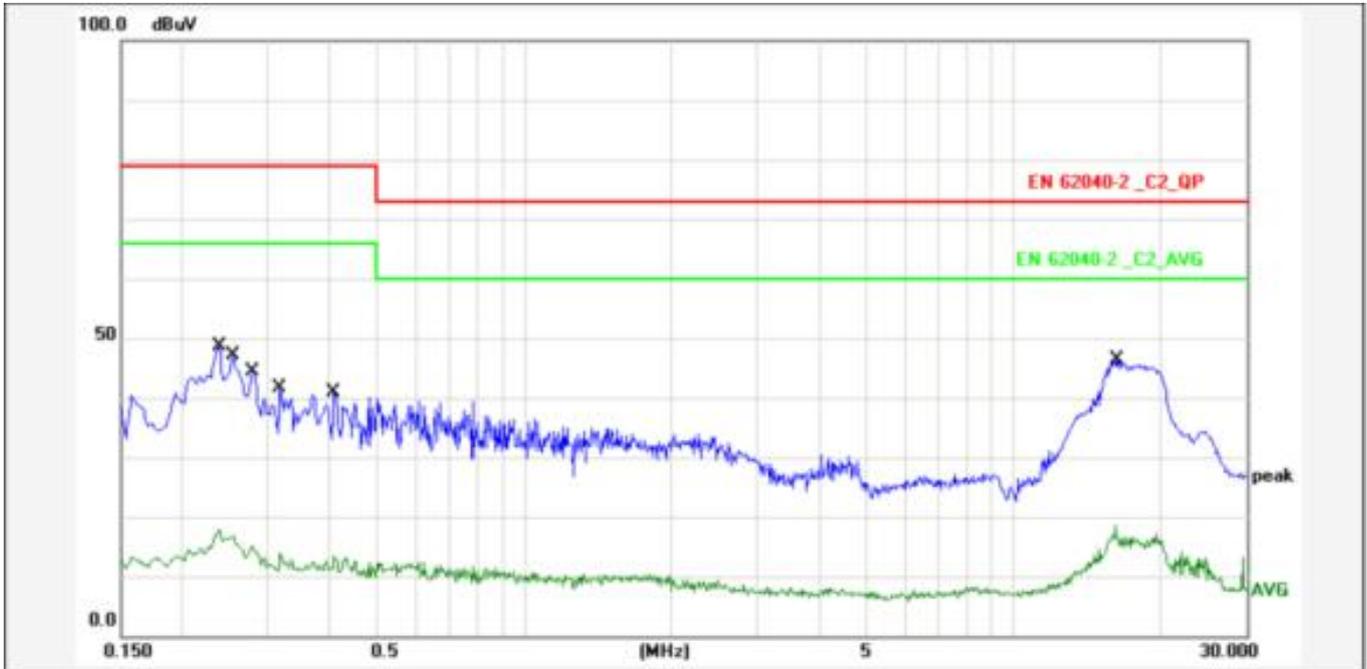
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	10.80	47.70	58.50	79.00	-20.50	QP	P	
2	0.1500	10.80	41.60	52.40	66.00	-13.60	AVG	P	
3	0.1740	10.80	48.60	59.40	79.00	-19.60	QP	P	
4	0.1740	10.80	41.50	52.30	66.00	-13.70	AVG	P	
5	0.2020	10.80	47.80	58.60	79.00	-20.40	QP	P	
6	0.2020	10.80	43.70	54.50	66.00	-11.50	AVG	P	
7	0.2300	10.80	42.80	53.60	79.00	-25.40	QP	P	
8	0.2300	10.80	38.70	49.50	66.00	-16.50	AVG	P	
9	0.6620	10.80	40.70	51.50	73.00	-21.50	QP	P	
10	0.6620	10.80	37.80	48.60	60.00	-11.40	AVG	P	
11	15.8700	10.80	47.60	58.40	73.00	-14.60	QP	P	
12	15.8700	10.80	32.60	43.40	60.00	-16.60	AVG	P	

E.U.T :	UPS	Model Name :	D-1600VA
Temperature :	26°C	Relative Humidity :	55 %
Pressure :	1006 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	Normal operation mode	Phase:	Neutral



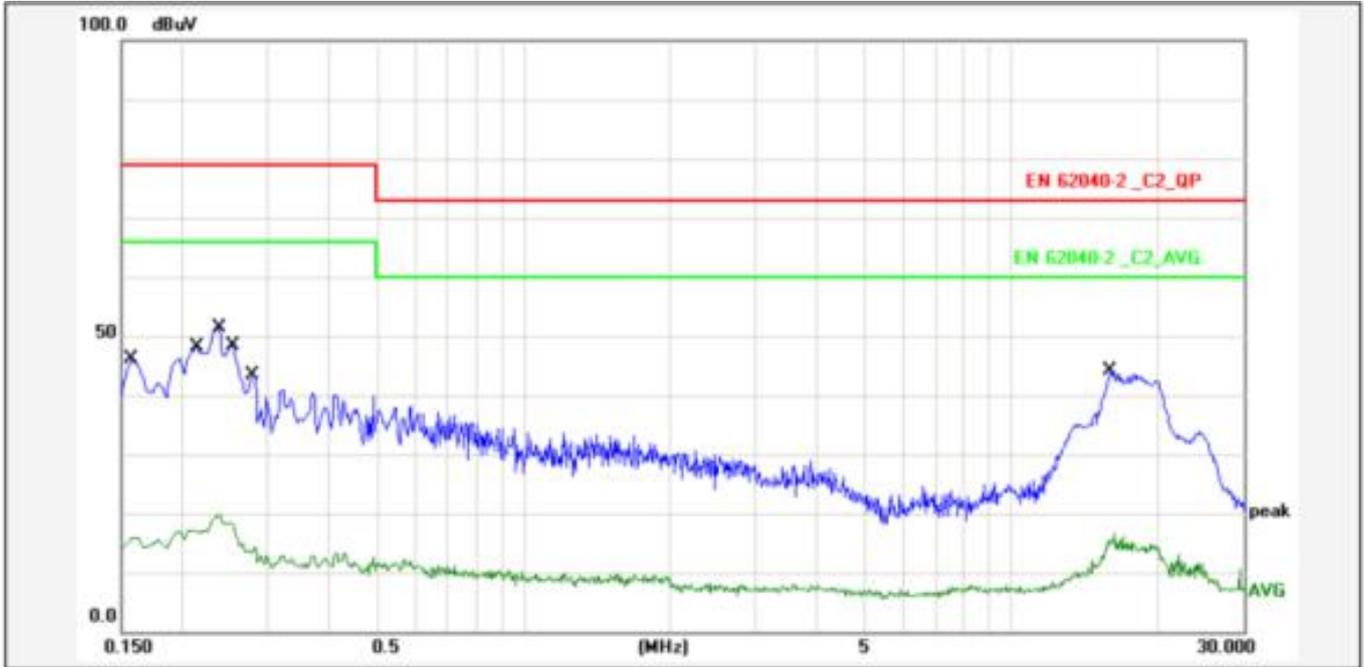
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1740	10.80	44.60	55.40	79.00	-23.60	QP	P	
2	0.1740	10.80	38.70	49.50	66.00	-16.50	AVG	P	
3	0.2020	10.80	45.70	56.50	79.00	-22.50	QP	P	
4	0.2020	10.80	39.60	50.40	66.00	-15.60	AVG	P	
5	0.5180	10.80	39.00	49.80	73.00	-23.20	QP	P	
6	0.5180	10.80	35.70	46.50	60.00	-13.50	AVG	P	
7	0.6620	10.80	39.60	50.40	73.00	-22.60	QP	P	
8	0.6620	10.80	34.80	45.60	60.00	-14.40	AVG	P	
9	0.8059	10.80	38.70	49.50	73.00	-23.50	QP	P	
10	0.8059	10.80	33.70	44.50	60.00	-15.50	AVG	P	
11	16.0419	10.80	44.00	54.80	73.00	-18.20	QP	P	
12	16.0419	10.80	29.70	40.50	60.00	-19.50	AVG	P	

E.U.T :	UPS	Model Name :	D-1600VA
Temperature :	26°C	Relative Humidity :	55 %
Pressure :	1006 hPa	Test Voltage :	DC 24V
Test Mode :	Stored energy mode	Phase:	Line



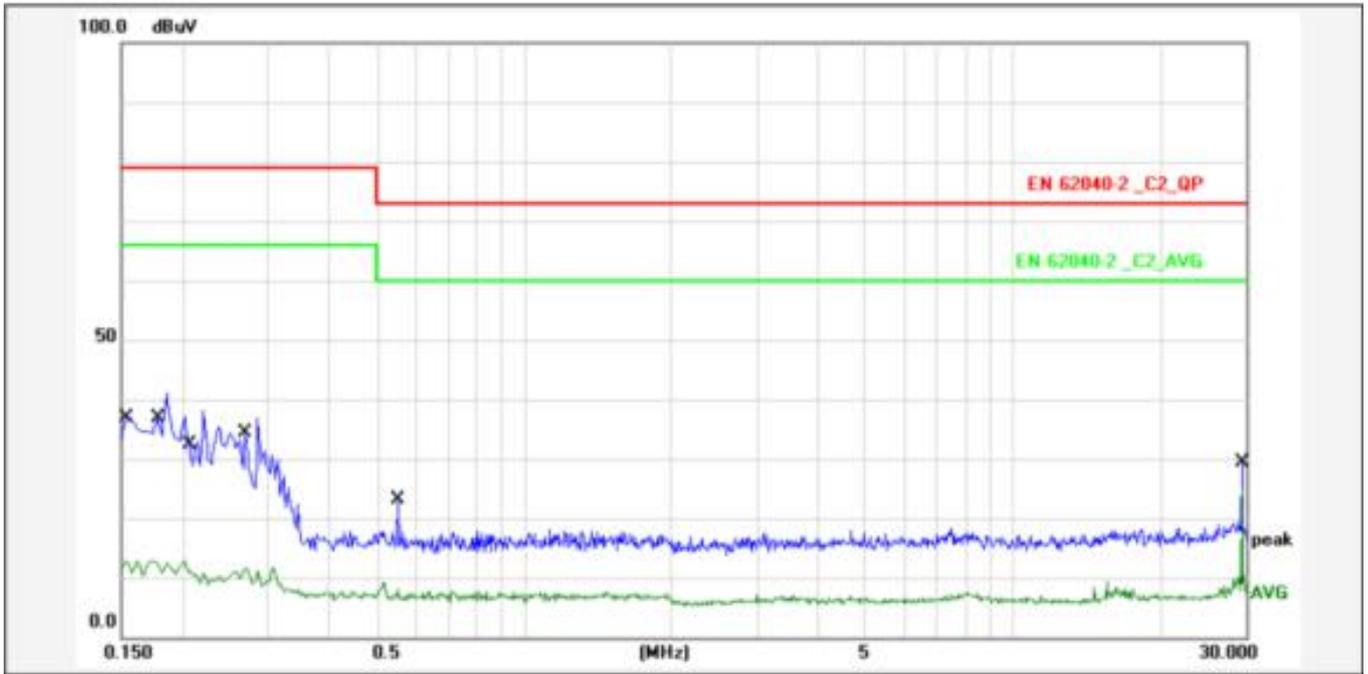
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.2380	10.80	34.70	45.50	79.00	-33.50	QP	P	
2	0.2380	10.80	4.00	14.80	66.00	-51.20	AVG	P	
3	0.2540	10.80	33.70	44.50	79.00	-34.50	QP	P	
4	0.2540	10.80	2.70	13.50	66.00	-52.50	AVG	P	
5	0.2779	10.80	30.70	41.50	79.00	-37.50	QP	P	
6	0.2779	10.80	31.70	42.50	66.00	-23.50	AVG	P	
7	0.3180	10.80	27.60	38.40	79.00	-40.60	QP	P	
8	0.3180	10.80	-0.30	10.50	66.00	-55.50	AVG	P	
9	0.4100	10.80	26.80	37.60	79.00	-41.40	QP	P	
10	0.4100	10.80	-0.20	10.60	66.00	-55.40	AVG	P	
11	16.2698	10.80	32.70	43.50	73.00	-29.50	QP	P	
12	16.2698	10.80	4.80	15.60	60.00	-44.40	AVG	P	

E.U.T :	UPS	Model Name :	D-1600VA
Temperature :	26°C	Relative Humidity :	55 %
Pressure :	1006 hPa	Test Voltage :	DC 24V
Test Mode :	Stored energy mode	Phase:	Neutral



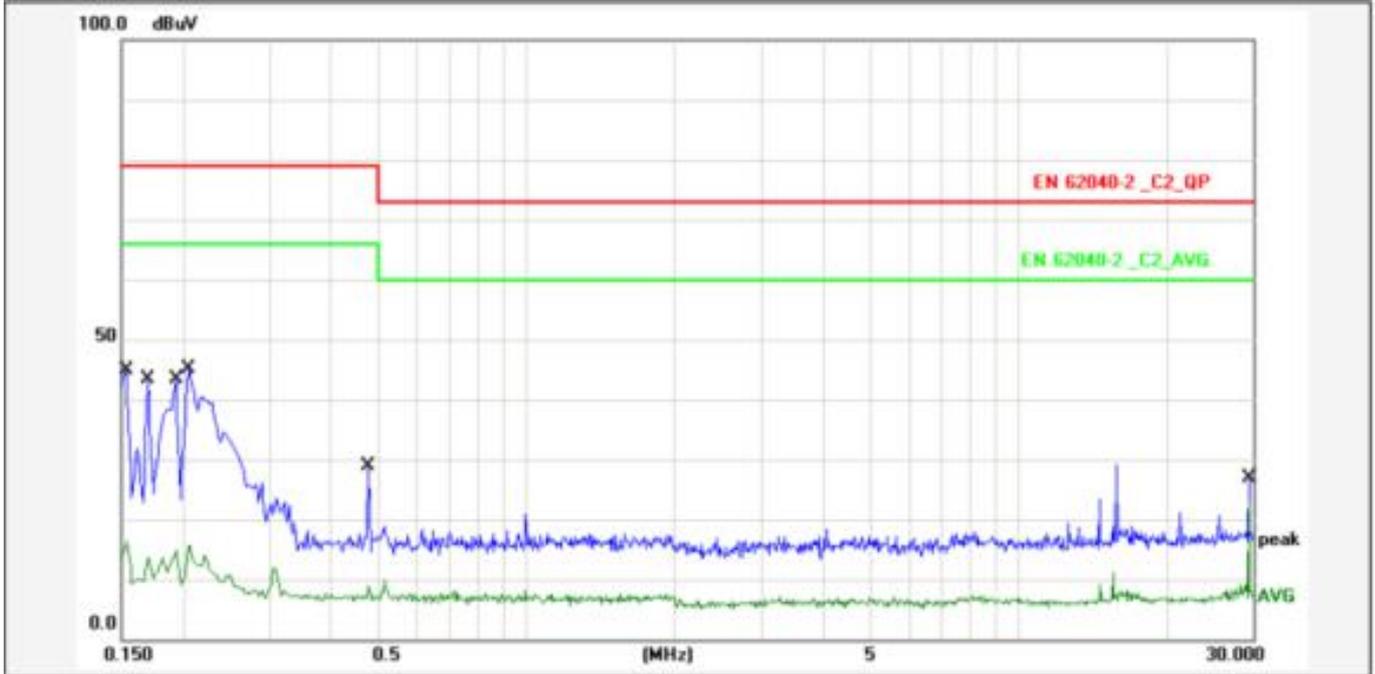
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1580	10.80	32.70	43.50	79.00	-35.50	QP	P	
2	0.1580	10.80	1.70	12.50	66.00	-53.50	AVG	P	
3	0.2140	10.80	35.00	45.80	79.00	-33.20	QP	P	
4	0.2140	10.80	3.70	14.50	66.00	-51.50	AVG	P	
5	0.2380	10.80	37.70	48.50	79.00	-30.50	QP	P	
6	0.2380	10.80	6.10	16.90	66.00	-49.10	AVG	P	
7	0.2540	10.80	34.80	45.60	79.00	-33.40	QP	P	
8	0.2540	10.80	5.00	15.80	66.00	-50.20	AVG	P	
9	0.2779	10.80	29.70	40.50	79.00	-38.50	QP	P	
10	0.2779	10.80	0.70	11.50	66.00	-54.50	AVG	P	
11	15.9699	10.80	30.70	41.50	73.00	-31.50	QP	P	
12	15.9699	10.80	2.70	13.50	60.00	-46.50	AVG	P	

E.U.T :	UPS	Model Name :	SINAIDER -1600VA
Temperature :	26°C	Relative Humidity :	55 %
Pressure :	1006 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	Normal operation mode	Phase:	Line



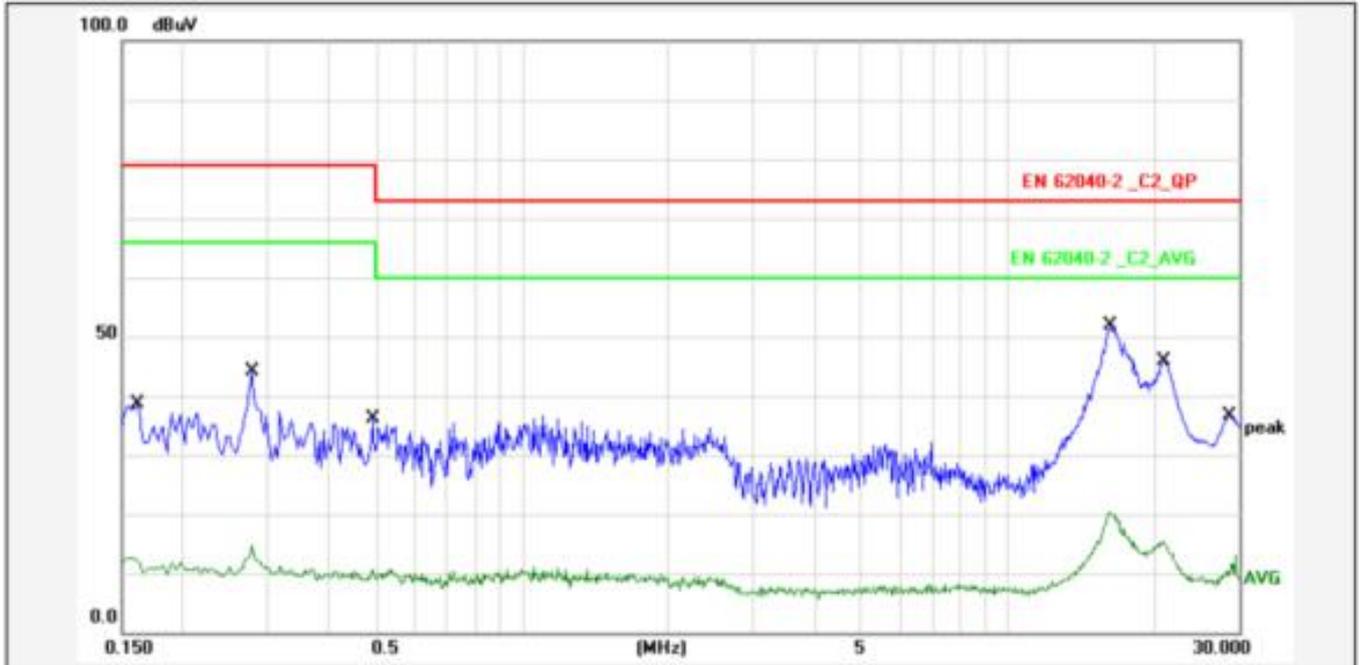
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1539	10.80	23.10	33.90	79.00	-45.10	QP	P	
2	0.1539	10.80	-0.90	9.90	66.00	-56.10	AVG	P	
3	0.1758	10.80	27.30	38.10	79.00	-40.90	QP	P	
4	0.1758	10.80	-1.20	9.60	66.00	-56.40	AVG	P	
5	0.2083	10.80	24.30	35.10	79.00	-43.90	QP	P	
6	0.2083	10.80	-3.10	7.70	66.00	-58.30	AVG	P	
7	0.2700	10.80	22.90	33.70	79.00	-45.30	QP	P	
8	0.2700	10.80	-2.30	8.50	66.00	-57.50	AVG	P	
9	0.5540	10.80	9.90	20.70	73.00	-52.30	QP	P	
10	0.5540	10.80	-5.70	5.10	60.00	-54.90	AVG	P	
11	29.4900	10.80	15.40	26.20	73.00	-46.80	QP	P	
12	29.4900	10.80	11.10	21.90	60.00	-38.10	AVG	P	

E.U.T :	UPS	Model Name :	SINAIDER -1600VA
Temperature :	26°C	Relative Humidity :	55 %
Pressure :	1006 hPa	Test Voltage :	AC 230V/50Hz
Test Mode :	Normal operation mode	Phase:	Neutral



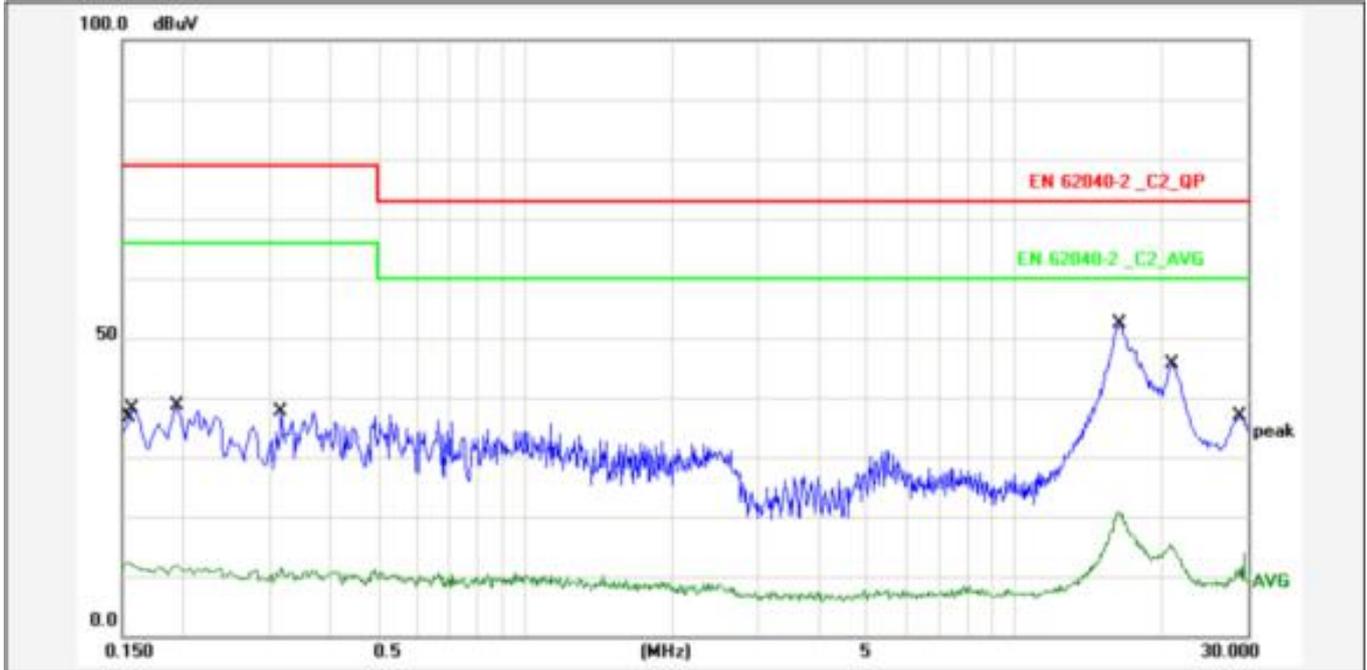
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1539	10.80	31.10	41.90	79.00	-37.10	QP	P	
2	0.1539	10.80	2.50	13.30	66.00	-52.70	AVG	P	
3	0.1700	10.80	29.50	40.30	79.00	-38.70	QP	P	
4	0.1700	10.80	-0.10	10.70	66.00	-55.30	AVG	P	
5	0.1940	10.80	29.40	40.20	79.00	-38.80	QP	P	
6	0.1940	10.80	1.00	11.80	66.00	-54.20	AVG	P	
7	0.2060	10.80	31.40	42.20	79.00	-36.80	QP	P	
8	0.2060	10.80	1.80	12.60	66.00	-53.40	AVG	P	
9	0.4780	10.80	15.20	26.00	79.00	-53.00	QP	P	
10	0.4780	10.80	-5.10	5.70	66.00	-60.30	AVG	P	
11	29.4939	10.80	12.90	23.70	73.00	-49.30	QP	P	
12	29.4939	10.80	8.80	19.60	60.00	-40.40	AVG	P	

E.U.T :	UPS	Model Name :	SINAIDER -1600VA
Temperature :	26°C	Relative Humidity :	55 %
Pressure :	1006 hPa	Test Voltage :	DC 24V
Test Mode :	Stored energy mode	Phase:	Line



No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1620	10.80	24.70	35.50	79.00	-43.50	QP	P	
2	0.1620	10.80	-1.40	9.40	66.00	-56.60	AVG	P	
3	0.2779	10.80	30.30	41.10	79.00	-37.90	QP	P	
4	0.2779	10.80	1.00	11.80	66.00	-54.20	AVG	P	
5	0.4940	10.80	22.30	33.10	79.00	-45.90	QP	P	
6	0.4940	10.80	-3.10	7.70	66.00	-58.30	AVG	P	
7	16.3978	10.80	37.90	48.70	73.00	-24.30	QP	P	
8	16.3978	10.80	6.60	17.40	60.00	-42.60	AVG	P	
9	21.0899	10.80	32.00	42.80	73.00	-30.20	QP	P	
10	21.0899	10.80	1.50	12.30	60.00	-47.70	AVG	P	
11	28.6580	10.80	22.80	33.60	73.00	-39.40	QP	P	
12	28.6580	10.80	-0.70	10.10	60.00	-49.90	AVG	P	

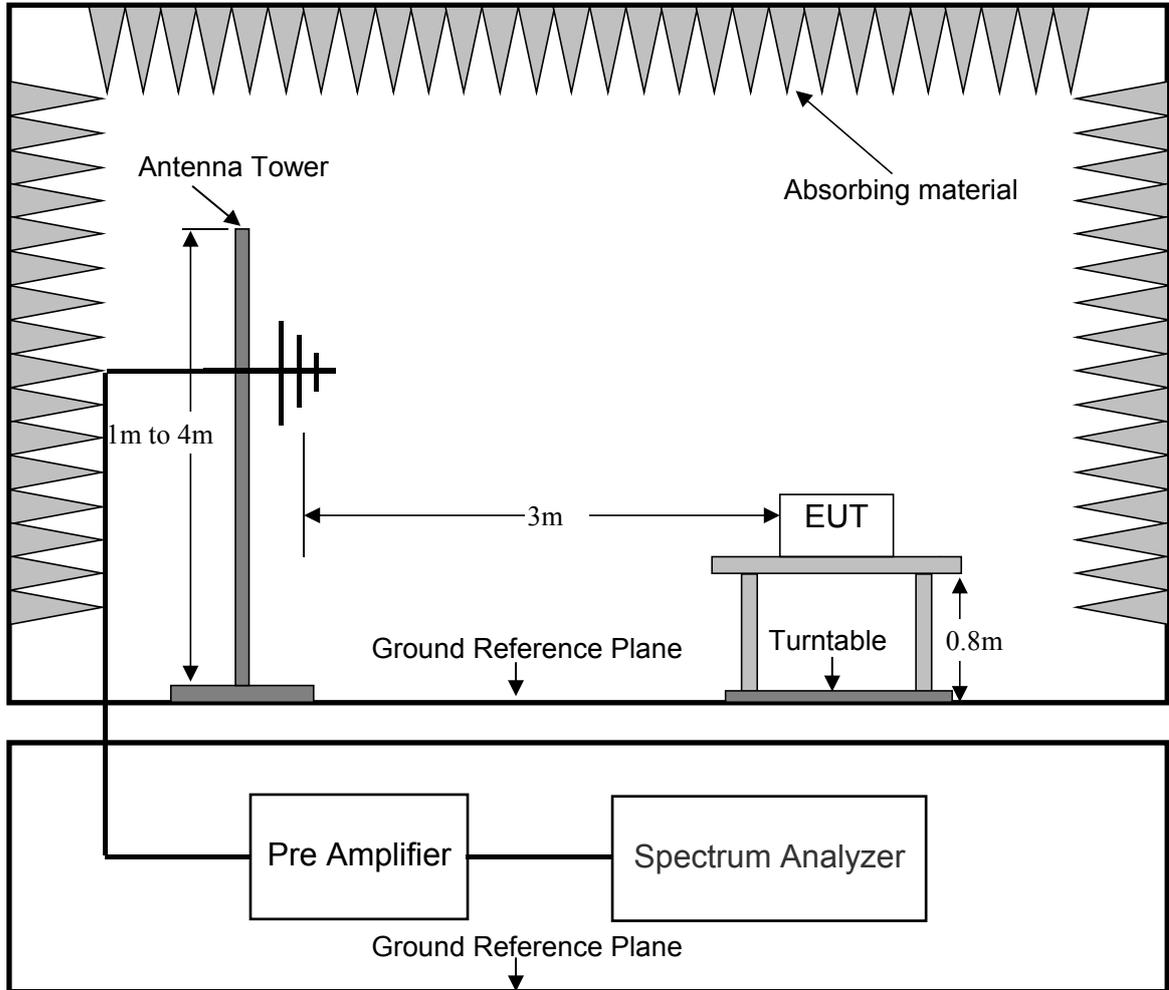
E.U.T :	UPS	Model Name :	SINAIDER -1600VA
Temperature :	26°C	Relative Humidity :	55 %
Pressure :	1006 hPa	Test Voltage :	DC 24V
Test Mode :	Stored energy mode	Phase:	Neutral



No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1539	10.80	-1.40	9.40	66.00	-56.60	AVG	P	
2	0.1580	10.80	24.30	35.10	79.00	-43.90	QP	P	
3	0.1940	10.80	24.90	35.70	79.00	-43.30	QP	P	
4	0.1940	10.80	-1.90	8.90	66.00	-57.10	AVG	P	
5	0.3180	10.80	23.80	34.60	79.00	-44.40	QP	P	
6	0.3180	10.80	-2.40	8.40	66.00	-57.60	AVG	P	
7	16.4220	10.80	38.40	49.20	73.00	-23.80	QP	P	
8	16.4220	10.80	7.20	18.00	60.00	-42.00	AVG	P	
9	21.0980	10.80	31.80	42.60	73.00	-30.40	QP	P	
10	21.0980	10.80	1.60	12.40	60.00	-47.60	AVG	P	
11	28.7780	10.80	23.00	33.80	73.00	-39.20	QP	P	
12	28.7780	10.80	0.10	10.90	60.00	-49.10	AVG	P	

5. RADIATED EMISSION MEASUREMENT

5.1 Block Diagram of Test



5.2 Limit of Radiated Emission Measurement

Test Standard: EN 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.

5.3 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 62040-2 on radiated emission measurement.

The bandwidth of the EMI test receiver (R&S ESCI7) is set at 120 KHz.

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

5.4 Operating Condition of E.U.T.

5.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

5.4.2 Turn on the power of all equipments.

5.4.3 Let the E.U.T. work in test modes (Normal operation mode, Stored energy operation mode) and test it.

5.5 Radiated Emission Measurement Result

PASS.

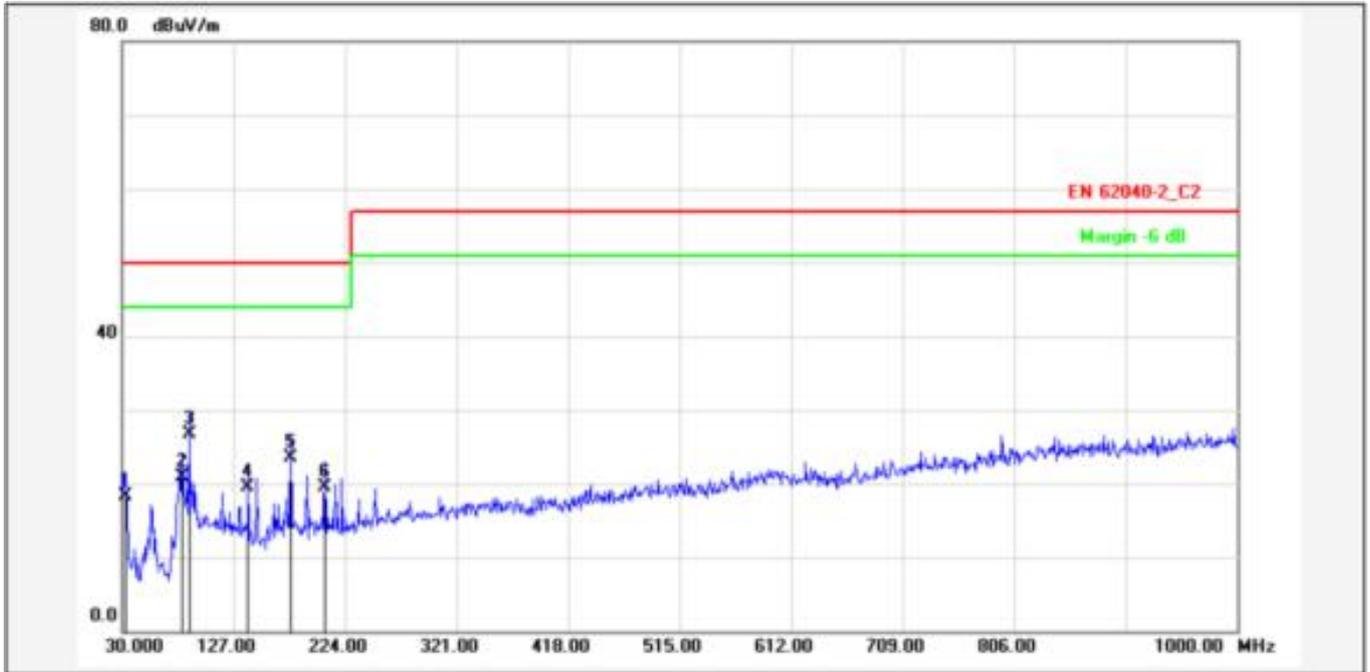
Please refer to the following pages.

E.U.T :	UPS	Model Name :	D -1600VA
Temperature :	25°C	Relative Humidity :	60 %
Pressure :	1006 hPa	Test Voltage :	DC 24V
Test Mode :	Stored energy mode	Polarization:	Vertical



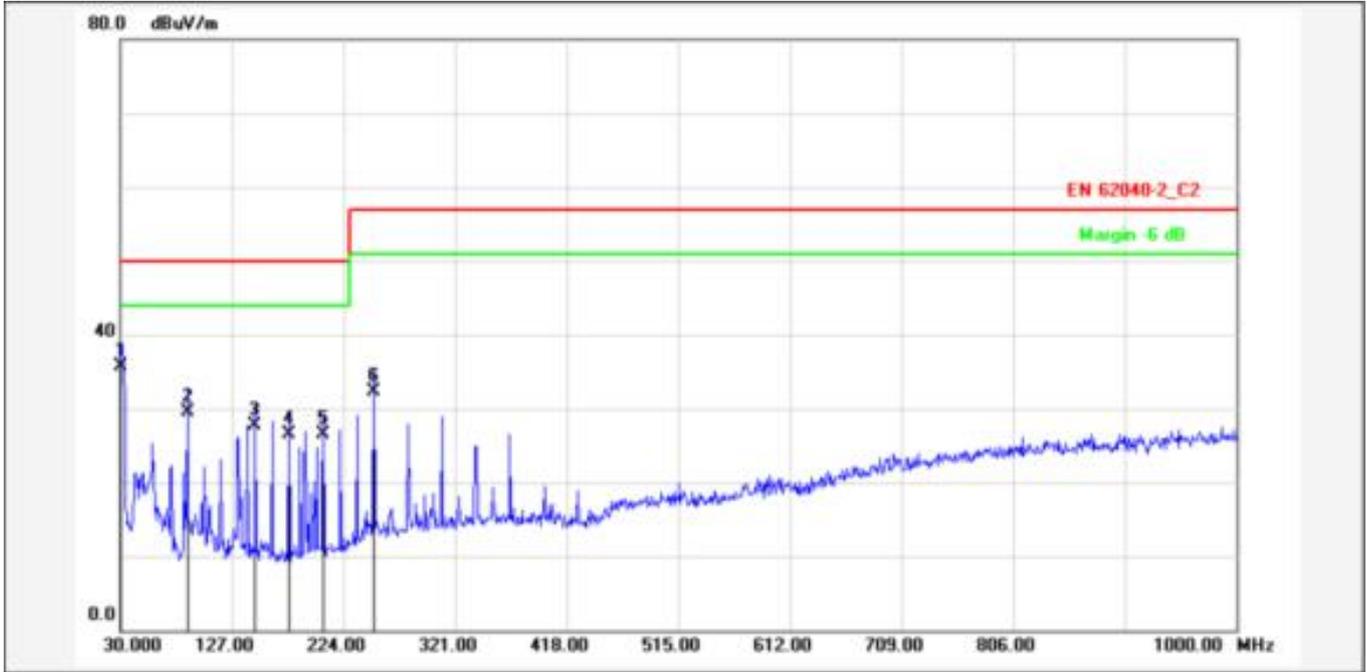
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	31.9400	-15.77	55.17	39.40	50.00	-10.60	QP			P	
2	55.2199	-13.72	39.32	25.60	50.00	-24.40	QP			P	
3	88.2000	-17.38	51.08	33.70	50.00	-16.30	QP			P	
4	112.4500	-16.08	56.88	40.80	50.00	-9.20	QP			P	
5	135.7299	-18.40	47.90	29.50	50.00	-20.50	QP			P	
6	194.9000	-16.42	40.92	24.50	50.00	-25.50	QP			P	

E.U.T :	UPS	Model Name :	D -1600VA
Temperature :	25°C	Relative Humidity :	60 %
Pressure :	1006 hPa	Test Voltage :	DC 24V
Test Mode :	Stored energy mode	Polarization:	Horizontal



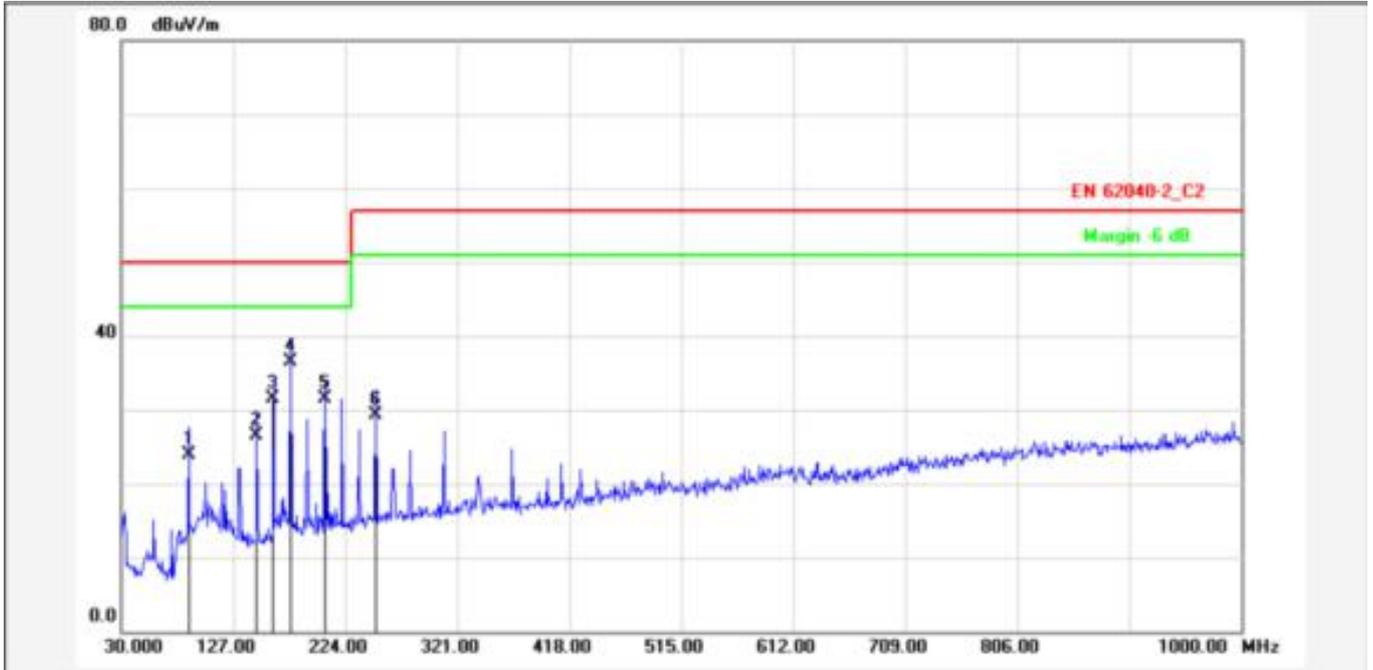
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	32.9099	-18.39	36.79	18.40	50.00	-31.60	QP			P	
2	82.3799	-15.68	36.68	21.00	50.00	-29.00	QP			P	
3	88.2000	-14.38	41.18	26.80	50.00	-23.20	QP			P	
4	139.6100	-15.57	35.07	19.50	50.00	-30.50	QP			P	
5	176.4699	-14.40	37.90	23.50	50.00	-26.50	QP			P	
6	206.5399	-13.32	32.82	19.50	50.00	-30.50	QP			P	

E.U.T :	UPS	Model Name :	D -1600VA
Temperature :	25°C	Relative Humidity :	60 %
Pressure :	1006 hPa	Test Voltage :	AC 230V 50Hz
Test Mode :	Normal operation mode	Polarization:	Vertical



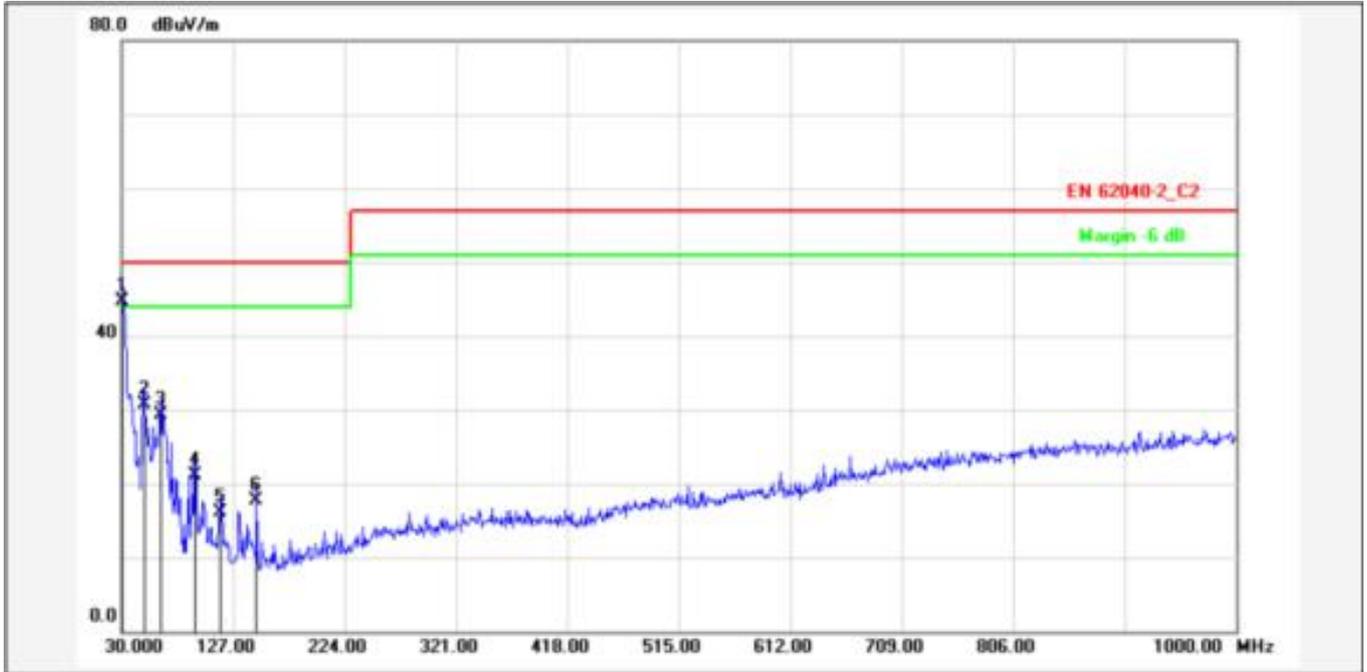
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	30.9699	-15.83	51.53	35.70	50.00	-14.30	QP			P	
2	88.2000	-17.38	46.88	29.50	50.00	-20.50	QP			P	
3	147.3700	-18.55	46.35	27.80	50.00	-22.20	QP			P	
4	176.4699	-17.40	43.90	26.50	50.00	-23.50	QP			P	
5	206.5399	-16.32	42.82	26.50	50.00	-23.50	QP			P	
6	250.1899	-13.69	46.09	32.40	57.00	-24.60	QP			P	

E.U.T :	UPS	Model Name :	D -1600VA
Temperature :	25°C	Relative Humidity :	60 %
Pressure :	1006 hPa	Test Voltage :	AC 230V 50Hz
Test Mode :	Normal operation mode	Polarization:	Horizontal



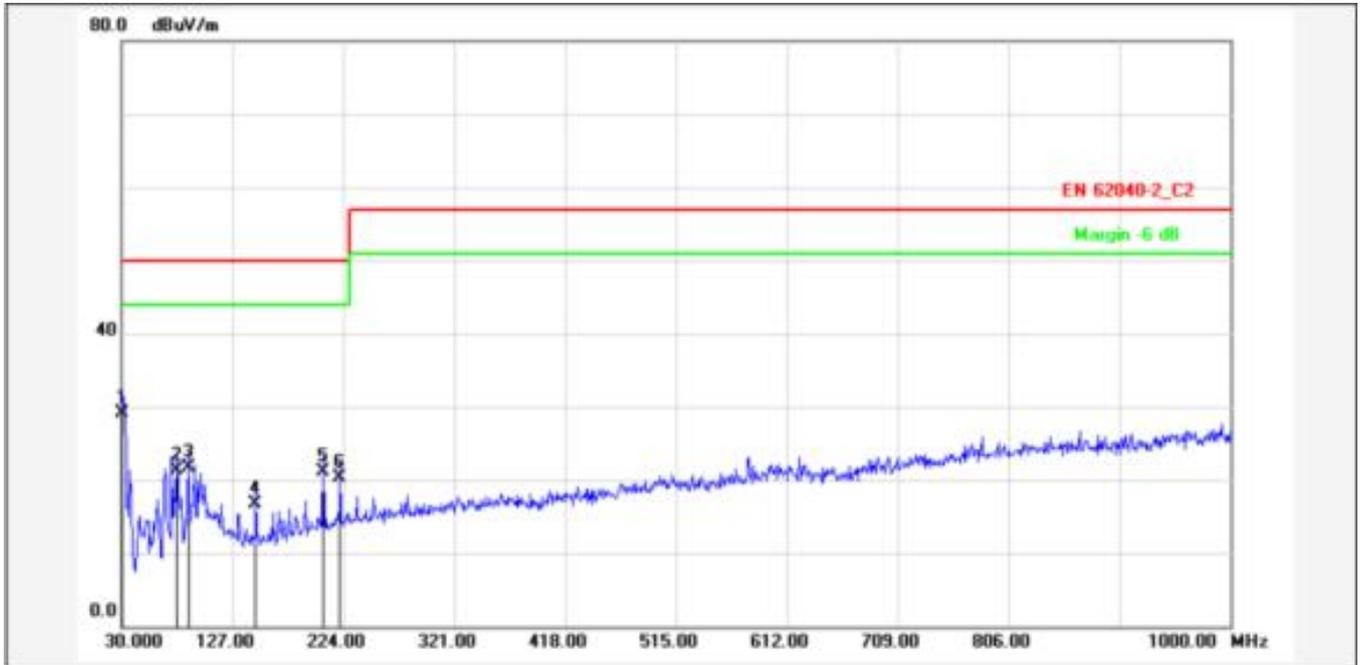
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	88.2000	-14.38	38.38	24.00	50.00	-26.00	QP			P	
2	147.3700	-15.55	42.05	26.50	50.00	-23.50	QP			P	
3	161.9199	-15.08	46.58	31.50	50.00	-18.50	QP			P	
4	176.4699	-14.40	50.90	36.50	50.00	-13.50	QP			P	
5	206.5399	-13.32	44.82	31.50	50.00	-18.50	QP			P	
6	250.1899	-11.69	41.09	29.40	57.00	-27.60	QP			P	

E.U.T :	UPS	Model Name :	SINAIDER -1600VA
Temperature :	25°C	Relative Humidity :	60 %
Pressure :	1006 hPa	Test Voltage :	DC 24V
Test Mode :	Stored energy mode	Polarization:	Vertical



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	30.0000	-15.90	60.60	44.70	50.00	-5.30	QP			P	
2	49.4000	-13.39	44.09	30.70	50.00	-19.30	QP			P	
3	63.9500	-15.30	44.60	29.30	50.00	-20.70	QP			P	
4	94.0199	-16.01	37.11	21.10	50.00	-28.90	QP			P	
5	116.3300	-16.25	32.45	16.20	50.00	-33.80	QP			P	
6	147.3700	-18.55	36.35	17.80	50.00	-32.20	QP			P	

E.U.T :	UPS	Model Name :	SINAIDER -1600VA
Temperature :	25°C	Relative Humidity :	60 %
Pressure :	1006 hPa	Test Voltage :	DC 24V
Test Mode :	Stored energy mode	Polarization:	Horizontal



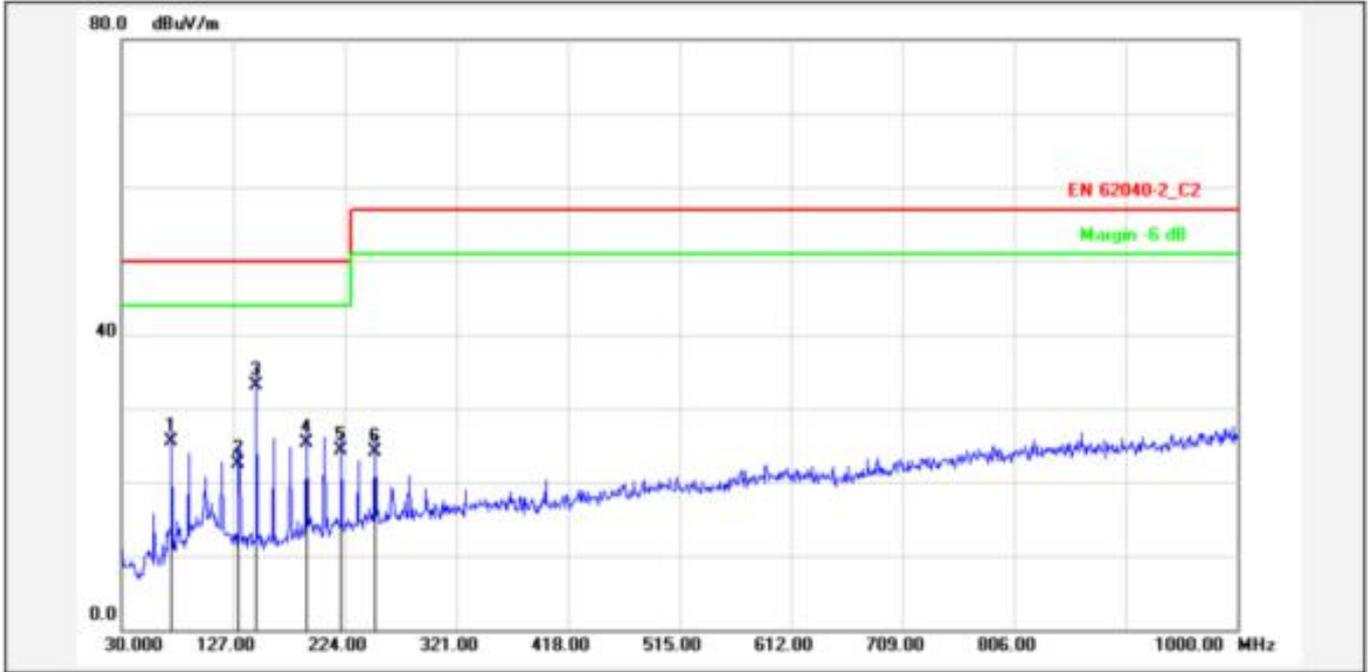
No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	30.0000	-16.57	45.77	29.20	50.00	-20.80	QP			P	
2	78.5000	-17.59	38.89	21.30	50.00	-28.70	QP			P	
3	88.2000	-14.38	36.08	21.70	50.00	-28.30	QP			P	
4	147.3700	-15.55	32.35	16.80	50.00	-33.20	QP			P	
5	206.5399	-13.32	34.42	21.10	50.00	-28.90	QP			P	
6	221.0900	-12.91	33.21	20.30	50.00	-29.70	QP			P	

E.U.T :	UPS	Model Name :	SINAIDER -1600VA
Temperature :	25°C	Relative Humidity :	60 %
Pressure :	1006 hPa	Test Voltage :	AC 230V 50Hz
Test Mode :	Normal operation mode	Polarization:	Vertical



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	31.9400	-15.77	31.97	16.20	50.00	-33.80	QP			P	
2	58.1300	-14.11	39.51	25.40	50.00	-24.60	QP			P	
3	73.6500	-18.58	44.78	26.20	50.00	-23.80	QP			P	
4	88.2000	-17.38	37.48	20.10	50.00	-29.90	QP			P	
5	147.3700	-18.55	47.45	28.90	50.00	-21.10	QP			P	
6	161.9199	-18.08	36.78	18.70	50.00	-31.30	QP			P	

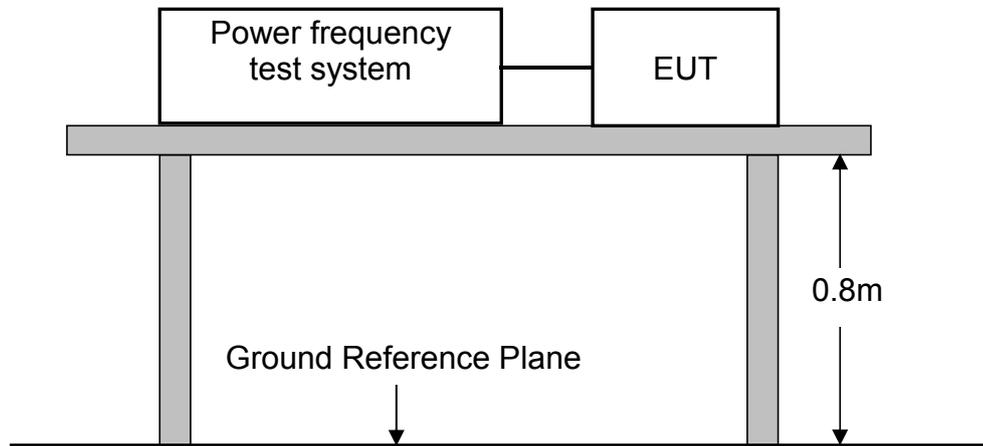
E.U.T :	UPS	Model Name :	SINAIDER -1600VA
Temperature :	25°C	Relative Humidity :	60 %
Pressure :	1006 hPa	Test Voltage :	AC 230V 50Hz
Test Mode :	Normal operation mode	Polarization:	Horizontal



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	73.6500	-20.85	46.45	25.60	50.00	-24.40	QP			P	
2	131.8500	-15.24	37.74	22.50	50.00	-27.50	QP			P	
3	147.3700	-15.55	48.75	33.20	50.00	-16.80	QP			P	
4	191.0200	-13.53	38.93	25.40	50.00	-24.60	QP			P	
5	221.0900	-12.91	37.31	24.40	50.00	-25.60	QP			P	
6	250.1900	-11.69	35.89	24.20	57.00	-32.80	QP			P	

6. HARMONIC CURRENT EMISSION TEST

6.1 Block Diagram of Test Setup



6.2 Limits of Harmonics current measurement

Test Standard: EN 61000-3-2: 2014

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.

6.3 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.

6.4 Operating Condition of E.U.T.

6.4.1 Setup the E.U.T. and simulators as shown in Section 2.3.

6.4.2 Turn on the power of all equipments.

6.4.3 Let the E.U.T. work in test mode (Normal operation mode) and test it.

6.5 Test Results

PASS.

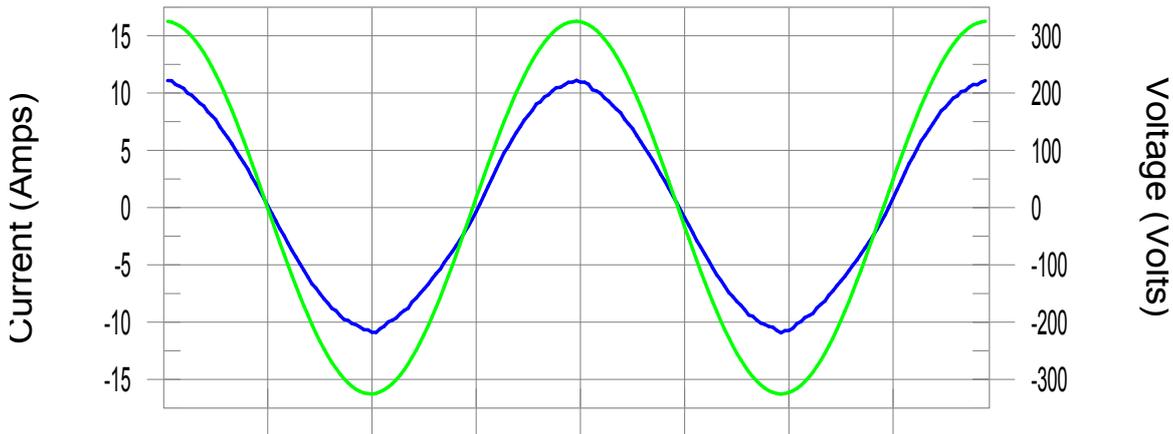
Please refer to the following pages.

Harmonics – Class-A per Ed. 3.2 (2009)(Run time)

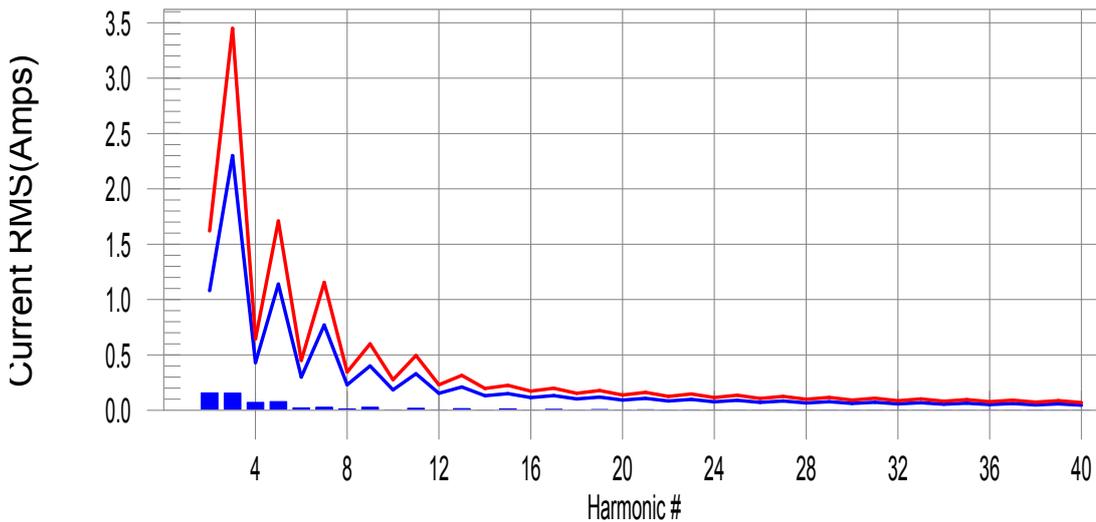
EUT: UPS
Test category: Class-A per Ed. 3.2 (2009) (European limits)
Test date: 2019-11-09 Start time: 13:21:05
Test duration (min): 2.5 Data file name: H-000753.cts_data
Comment: Normal operation mode
Customer: FOSHAN UNIPOWER
Mode: SINAIDER -1600VA
Test Result: Pass Source qualification: Normal

Tested by: Jason
Test Margin: 100
End time: 13:23:56

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonic was #4 with 15.38% of the limit.

Current Test Result Summary (Run time)

EUT: UPS
 Test category: Class-A per Ed. 3.2 (2009) (European limits) Tested by: Jason
 Test date: 2019-11-09 Start time: 13:21:05 Test Margin: 100
 Test duration (min): 2.5 Data file name: H-000753.cts_data End time: 13:23:56
 Comment: Normal operation mode
 Customer: FOSHAN UNIPOWER
 Mode: SINAIDER -1600VA
 Test Result: Pass Source qualification: Normal
 THC(A): 0.23 I-THD(%): 3.11 POHC(A): 0.000 POHC Limit(A): 0.320
 Highest parameter values during test:
 V_RMS (Volts): 230.13 Frequency(Hz): 50.00
 I_Peak (Amps): 11.249 I_RMS (Amps): 7.549
 I_Fund (Amps): 7.534 Crest Factor: 1.490
 Power (Watts): 1733.1 Power Factor: 0.999

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.152	1.080	14.1	0.157	1.620	9.69	Pass
3	0.150	2.300	6.5	0.155	3.450	4.50	Pass
4	0.066	0.430	15.4	0.071	0.645	10.97	Pass
5	0.066	1.140	5.8	0.078	1.710	4.56	Pass
6	0.021	0.300	0.0	0.022	0.450	4.88	Pass
7	0.022	0.770	0.0	0.028	1.155	2.40	Pass
8	0.011	0.230	0.0	0.012	0.345	3.41	Pass
9	0.019	0.400	0.0	0.027	0.600	4.51	Pass
10	0.003	0.184	0.0	0.004	0.276	1.43	Pass
11	0.012	0.330	0.0	0.018	0.495	3.73	Pass
12	0.003	0.153	0.0	0.004	0.230	1.55	Pass
13	0.011	0.210	0.0	0.015	0.315	4.92	Pass
14	0.001	0.131	0.0	0.001	0.197	0.49	Pass
15	0.009	0.150	0.0	0.012	0.225	5.55	Pass
16	0.001	0.115	0.0	0.002	0.173	0.90	Pass
17	0.007	0.132	0.0	0.009	0.199	4.48	Pass
18	0.001	0.102	0.0	0.001	0.153	0.57	Pass
19	0.005	0.118	0.0	0.006	0.178	3.64	Pass
20	0.001	0.092	0.0	0.001	0.138	0.93	Pass
21	0.004	0.107	0.0	0.005	0.161	3.02	Pass
22	0.000	0.084	0.0	0.000	0.125	0.22	Pass
23	0.003	0.098	0.0	0.003	0.147	2.36	Pass
24	0.000	0.077	0.0	0.000	0.115	0.42	Pass
25	0.002	0.090	0.0	0.003	0.135	1.97	Pass
26	0.000	0.071	0.0	0.000	0.106	0.47	Pass
27	0.001	0.083	0.0	0.002	0.125	1.78	Pass
28	0.000	0.066	0.0	0.000	0.099	0.44	Pass
29	0.001	0.078	0.0	0.002	0.116	1.64	Pass
30	0.000	0.061	0.0	0.001	0.092	0.63	Pass
31	0.001	0.073	0.0	0.002	0.109	1.86	Pass
32	0.000	0.058	0.0	0.000	0.086	0.52	Pass
33	0.001	0.068	0.0	0.002	0.102	1.99	Pass
34	0.000	0.054	0.0	0.001	0.081	0.74	Pass
35	0.001	0.064	0.0	0.002	0.096	1.81	Pass
36	0.001	0.051	0.0	0.001	0.077	1.29	Pass
37	0.002	0.061	0.0	0.002	0.091	2.33	Pass
38	0.001	0.048	0.0	0.002	0.073	2.18	Pass
39	0.002	0.058	0.0	0.002	0.087	2.36	Pass
40	0.001	0.046	0.0	0.002	0.069	2.33	Pass

Voltage Source Verification Data (Run time)

EUT: UPS
 Test category: Class-A per Ed. 3.2 (2009) (European limits)
 Test date: 2019-11-09
 Test duration (min): 2.5
 Comment: Normal operation mode
 Customer: FOSHAN UNIPOWER
 Mode: SINAIDER -1600VA
 Test Result: Pass

Tested by: Jason
 Test Margin: 100
 Start time: 13:21:05
 End time: 13:23:56
 Data file name: H-000753.cts_data
 Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	230.13	Frequency(Hz):	50.00
I_Peak (Amps):	11.249	I_RMS (Amps):	7.549
I_Fund (Amps):	7.534	Crest Factor:	1.490
Power (Watts):	1733.1	Power Factor:	0.999

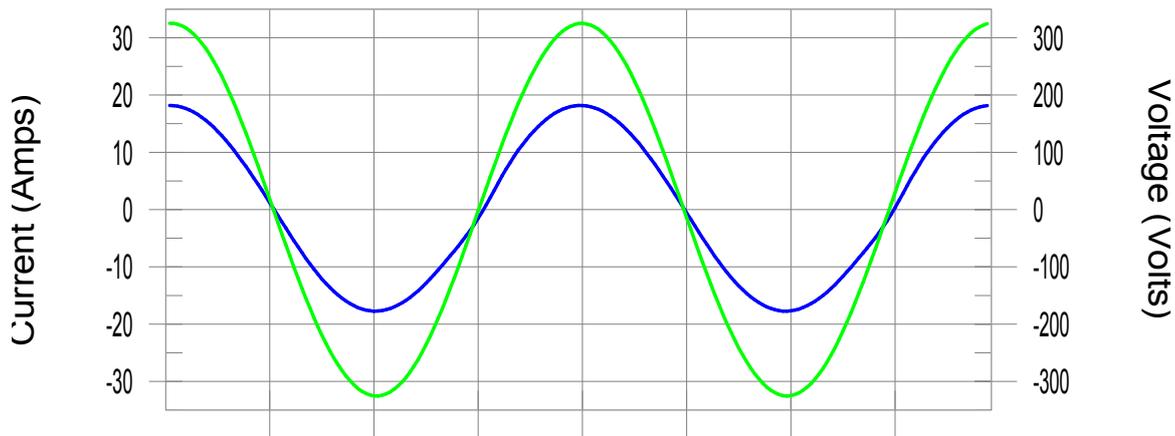
Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.090	0.460	19.61	OK
3	0.559	2.071	26.99	OK
4	0.082	0.460	17.91	OK
5	0.081	0.920	8.84	OK
6	0.049	0.460	10.64	OK
7	0.043	0.690	6.17	OK
8	0.024	0.460	5.22	OK
9	0.033	0.460	7.19	OK
10	0.030	0.460	6.42	OK
11	0.020	0.230	8.77	OK
12	0.021	0.230	9.26	OK
13	0.009	0.230	4.08	OK
14	0.012	0.230	5.29	OK
15	0.025	0.230	11.02	OK
16	0.013	0.230	5.51	OK
17	0.008	0.230	3.69	OK
18	0.015	0.230	6.72	OK
19	0.015	0.230	6.48	OK
20	0.027	0.230	11.73	OK
21	0.011	0.230	4.86	OK
22	0.005	0.230	2.01	OK
23	0.008	0.230	3.42	OK
24	0.006	0.230	2.51	OK
25	0.011	0.230	4.69	OK
26	0.005	0.230	2.34	OK
27	0.012	0.230	5.37	OK
28	0.004	0.230	1.66	OK
29	0.010	0.230	4.30	OK
30	0.004	0.230	1.65	OK
31	0.007	0.230	2.88	OK
32	0.005	0.230	2.10	OK
33	0.005	0.230	2.11	OK
34	0.004	0.230	1.64	OK
35	0.005	0.230	2.18	OK
36	0.003	0.230	1.15	OK
37	0.007	0.230	3.17	OK
38	0.003	0.230	1.46	OK
39	0.007	0.230	2.93	OK
40	0.013	0.230	5.52	OK

Harmonics – Class-A per Ed. 3.2 (2009)(Run time)

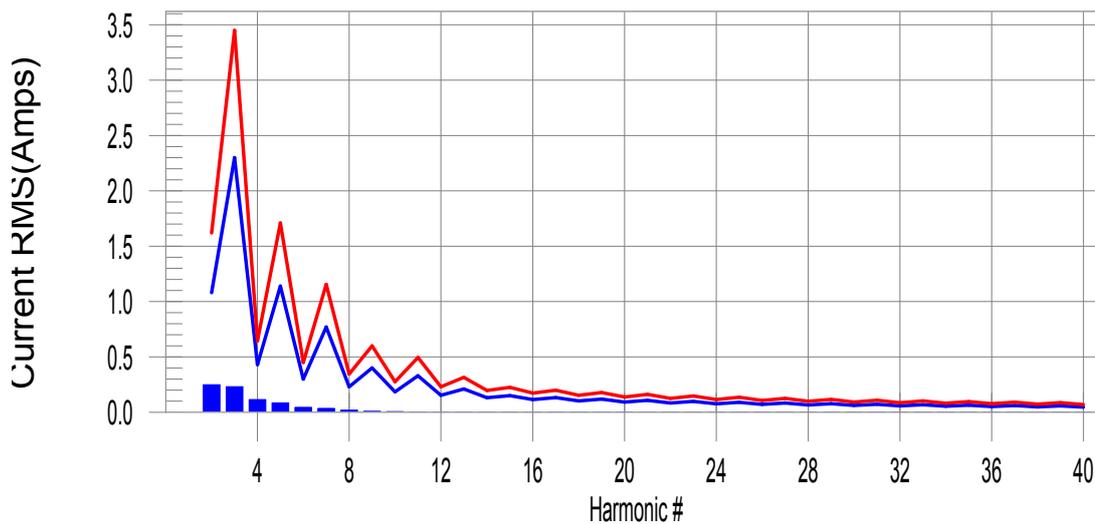
EUT: UPS
 Test category: Class-A per Ed. 3.2 (2009) (European limits)
 Test date: 2019-11-09 Start time: 13:29:47
 Test duration (min): 2.5 Data file name: H-000754.cts_data
 Comment: Normal operation mode
 Customer: FOSHAN UNIPOWER
 Mode:D -1600VA
 Test Result: Pass Source qualification: Normal

Tested by: Jason
 Test Margin: 100
 End time: 13:32:38

Current & voltage waveforms



Harmonics and Class A limit line European Limits



Test result: Pass Worst harmonic was #4 with 25.78% of the limit.

Current Test Result Summary (Run time)

EUT: UPS Tested by: Jason
 Test category: Class-A per Ed. 3.2 (2009) (European limits) Test Margin: 100
 Test date: 2019-11-09 Start time: 13:29:47 End time: 13:32:38
 Test duration (min): 2.5 Data file name: H-000754.cts_data
 Comment: Normal operation mode
 Customer: FOSHAN UNIPOWER
 Mode:D -1600VA
 Test Result: Pass Source qualification: Normal
 THC(A): 0.36 I-THD(%): 2.83 POHC(A): 0.000 POHC Limit(A): 0.320
 Highest parameter values during test:
 V_RMS (Volts): 230.11 Frequency(Hz): 50.00
 I_Peak (Amps): 18.212 I_RMS (Amps): 12.734
 I_Fund (Amps): 12.727 Crest Factor: 1.431
 Power (Watts): 2928.4 Power Factor: 1.000

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.243	1.080	22.5	0.249	1.620	15.35	Pass
3	0.226	2.300	9.8	0.231	3.450	6.69	Pass
4	0.111	0.430	25.8	0.115	0.645	17.79	Pass
5	0.084	1.140	7.3	0.085	1.710	4.97	Pass
6	0.043	0.300	0.0	0.044	0.450	9.82	Pass
7	0.033	0.770	0.0	0.035	1.155	3.00	Pass
8	0.018	0.230	0.0	0.019	0.345	5.43	Pass
9	0.008	0.400	0.0	0.009	0.600	1.55	Pass
10	0.005	0.184	0.0	0.005	0.276	1.98	Pass
11	0.001	0.330	0.0	0.002	0.495	0.41	Pass
12	0.001	0.153	0.0	0.002	0.230	0.79	Pass
13	0.001	0.210	0.0	0.001	0.315	0.45	Pass
14	0.001	0.131	0.0	0.001	0.197	0.36	Pass
15	0.001	0.150	0.0	0.001	0.225	0.43	Pass
16	0.001	0.115	0.0	0.002	0.173	0.96	Pass
17	0.000	0.132	0.0	0.001	0.199	0.34	Pass
18	0.001	0.102	0.0	0.001	0.153	0.98	Pass
19	0.001	0.118	0.0	0.001	0.178	0.77	Pass
20	0.001	0.092	0.0	0.002	0.138	1.22	Pass
21	0.000	0.107	0.0	0.001	0.161	0.37	Pass
22	0.000	0.084	0.0	0.000	0.125	0.34	Pass
23	0.000	0.098	0.0	0.001	0.147	0.44	Pass
24	0.000	0.077	0.0	0.001	0.115	0.45	Pass
25	0.000	0.090	0.0	0.001	0.135	0.56	Pass
26	0.000	0.071	0.0	0.001	0.106	0.50	Pass
27	0.001	0.083	0.0	0.001	0.125	1.07	Pass
28	0.000	0.066	0.0	0.000	0.099	0.41	Pass
29	0.001	0.078	0.0	0.002	0.116	1.42	Pass
30	0.000	0.061	0.0	0.001	0.092	0.57	Pass
31	0.001	0.073	0.0	0.002	0.109	1.47	Pass
32	0.000	0.058	0.0	0.001	0.086	0.63	Pass
33	0.001	0.068	0.0	0.001	0.102	1.14	Pass
34	0.000	0.054	0.0	0.000	0.081	0.60	Pass
35	0.000	0.064	0.0	0.001	0.096	0.55	Pass
36	0.000	0.051	0.0	0.000	0.077	0.43	Pass
37	0.000	0.061	0.0	0.000	0.091	0.35	Pass
38	0.000	0.048	0.0	0.000	0.073	0.56	Pass
39	0.000	0.058	0.0	0.000	0.087	0.35	Pass
40	0.001	0.046	0.0	0.001	0.069	1.06	Pass

Voltage Source Verification Data (Run time)

EUT: UPS
 Test category: Class-A per Ed. 3.2 (2009) (European limits)
 Test date: 2019-11-09
 Test duration (min): 2.5
 Comment: Normal operation mode
 Customer: FOSHAN UNIPOWER
 Mode:D -1600VA
 Test Result: Pass

Tested by: Jason
 Test Margin: 100
 End time: 13:32:38
 Start time: 13:29:47
 Data file name: H-000754.cts_data
 Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms):	230.11	Frequency(Hz):	50.00
I_Peak (Amps):	18.212	I_RMS (Amps):	12.734
I_Fund (Amps):	12.727	Crest Factor:	1.431
Power (Watts):	2928.4	Power Factor:	1.000

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.094	0.460	20.40	OK
3	0.548	2.070	26.46	OK
4	0.088	0.460	19.02	OK
5	0.042	0.920	4.55	OK
6	0.048	0.460	10.51	OK
7	0.046	0.690	6.65	OK
8	0.027	0.460	5.77	OK
9	0.062	0.460	13.50	OK
10	0.035	0.460	7.58	OK
11	0.040	0.230	17.49	OK
12	0.023	0.230	10.18	OK
13	0.012	0.230	5.15	OK
14	0.017	0.230	7.21	OK
15	0.013	0.230	5.65	OK
16	0.019	0.230	8.14	OK
17	0.010	0.230	4.33	OK
18	0.018	0.230	7.99	OK
19	0.011	0.230	4.96	OK
20	0.028	0.230	12.20	OK
21	0.010	0.230	4.20	OK
22	0.005	0.230	2.06	OK
23	0.009	0.230	4.01	OK
24	0.009	0.230	3.96	OK
25	0.009	0.230	3.71	OK
26	0.011	0.230	4.61	OK
27	0.008	0.230	3.40	OK
28	0.004	0.230	1.55	OK
29	0.009	0.230	3.84	OK
30	0.005	0.230	2.02	OK
31	0.006	0.230	2.66	OK
32	0.005	0.230	2.20	OK
33	0.004	0.230	1.91	OK
34	0.004	0.230	1.66	OK
35	0.005	0.230	2.26	OK
36	0.002	0.230	0.97	OK
37	0.004	0.230	1.84	OK
38	0.003	0.230	1.41	OK
39	0.005	0.230	2.06	OK
40	0.012	0.230	5.16	OK

7. PERFORMANCE CRITERIA FOR IMMUNITY

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

Performance criteria for immunity tests

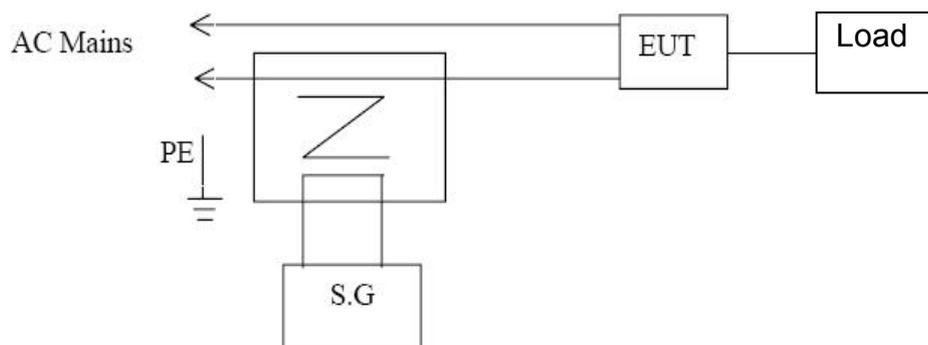
	Criterion A	Criterion B
Output characteristics	Voltage permitted to vary only within the steady-state characteristics applicable(100m sec limits in Figures 1,2 or 3 of IEC62040-3)	Voltage permitted to vary within the inverse time characteristics applicable (<100 m sec limits in Figures 1, 2 or 3 of IEC 62040-3)
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 Uninterruptible Power Supply mode of operation
Mode of operation	No change	Change only temporarily

The tests shall be made with the Uninterruptible Power Supply in the following conditions:

- rated input voltage;
- normal mode of operation;
- linear load at rated active output power or at light load according to IEC62040-3.

8. LOW FREQUENCY SIGNALS TEST

8.1 Block Diagram of Test Setup



8.2 Test Standard and Performance Criterion

EN 62040-2: 2006+AC: 2006 Category C2
(EN 61000-2-2: 2002)

Performance criterion: **A**

8.3 Operating Condition of E.U.T.

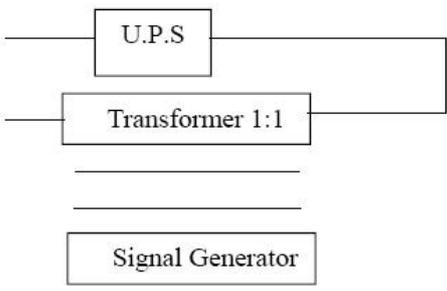
- 8.3.1 Setup the E.U.T. and simulators as shown in Section 2.3.
- 8.3.2 Turn on the power of all equipments.
- 8.3.3 Let the E.U.T. work in test mode (Normal operation mode) and test it.

8.4 Test Results

PASS.

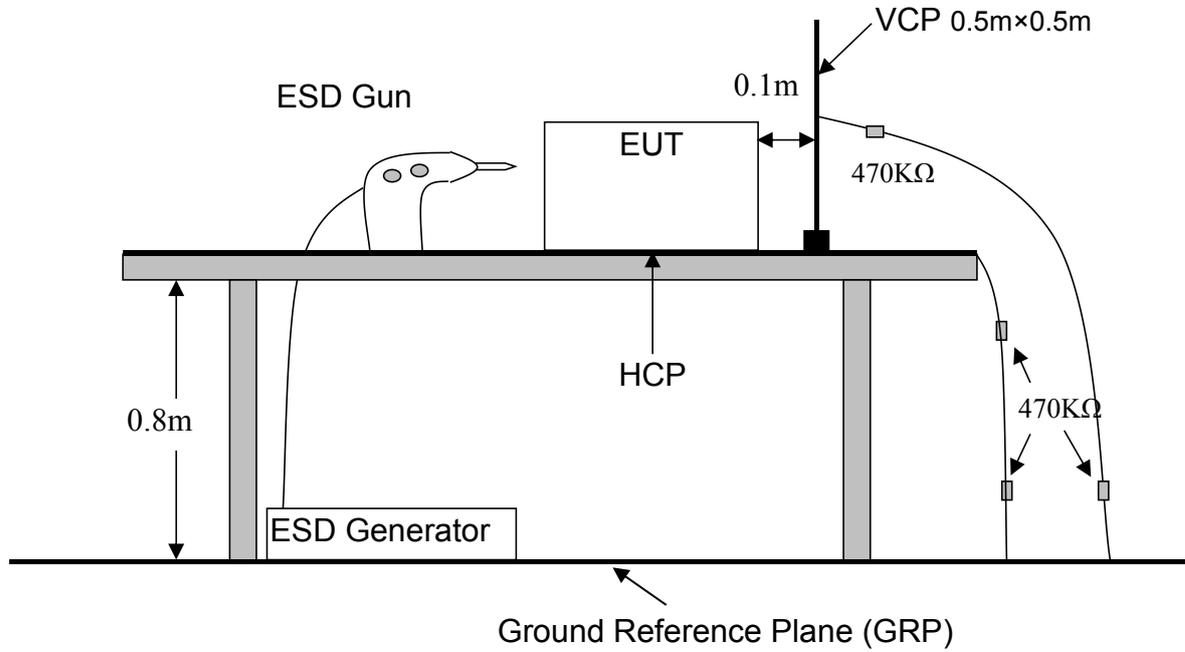
Please refer to following page.

Low Frequency Signals Test Result

Ambient Condition:	Temp.: 20°C	R.H.: 54%	Air Pressure: 101 kPa
Power Supply:	AC 230V 50Hz	Required Performance Criterion: A	
Tested mode:	Normal operation mode		
Frequency Range (Hz)	Position	Strength	Result (Performance Criterion)
140	See Fig.1	10V(rms) Sinusoidal	A
160			A
200			A
240			A
280			A
320			A
360			A
Note: <div style="margin-left: 40px;">  <pre> graph LR U.P.S. --- Transformer[Transformer 1:1] Transformer --- Signal[Signal Generator] </pre> </div>			Test Equipment: 1. Programmable AC Source: 6530(CHROMA) Test Engineer : Steven

9. ELECTROSTATIC DISCHARGE TEST

9.1 Block Diagram of Test Setup



9.2 Test Standard and Severity Levels

9.2.1 Test Standard:

EN 62040-2: 2006+AC: 2006 Category C2
 (EN 61000-4-2: 2009 Air Discharge: Severity Level: 3, ± 8 KV;
 Contact Discharge: Level: 2, ± 4 KV)

9.2.2 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

Performance criterion: **B**

9.3 Test Procedure

9.3.1 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

9.3.2 Contact Discharge:

All the procedure shall be same as Section 9.3.1. except that the tip of the discharge electrode shall touch the E.U.T. before the discharge switch is operated.

9.3.3 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.

9.3.4 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.

9.4 Test Results

PASS.

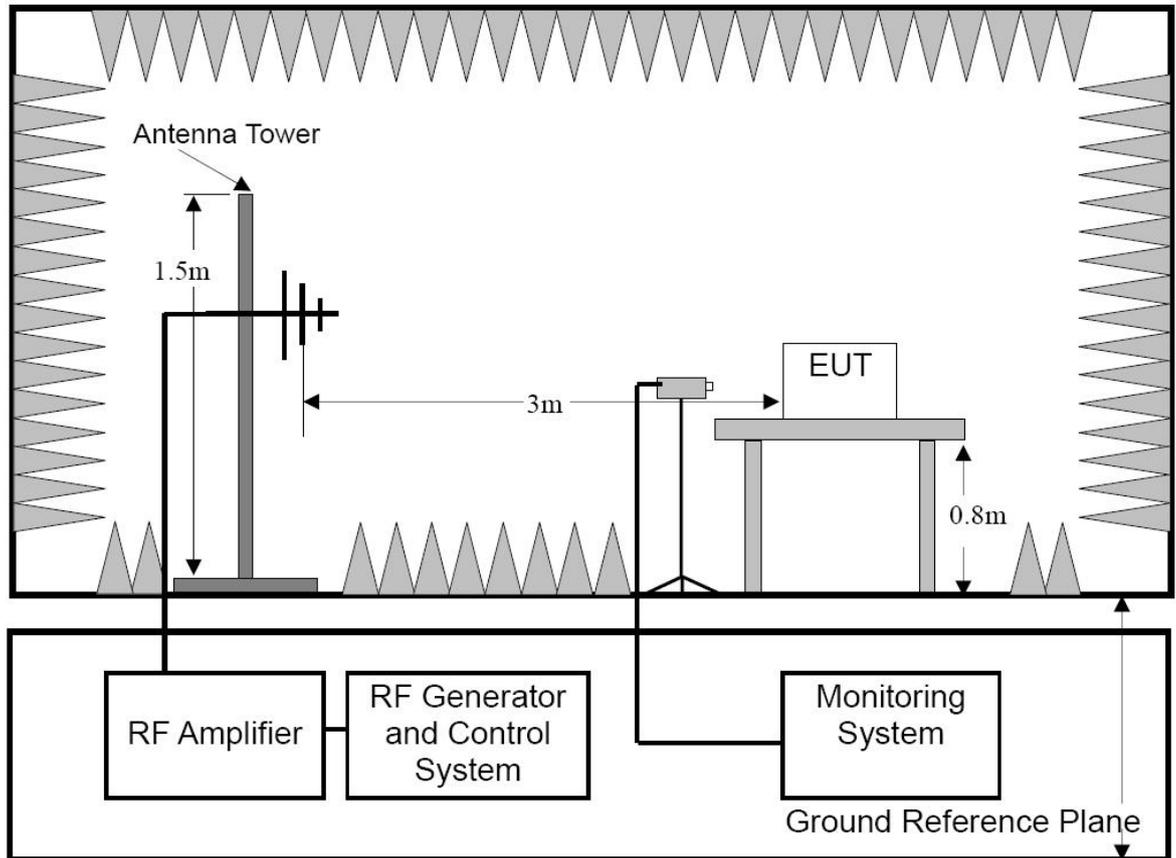
Please refer to the following page.

Electrostatic Discharge Test Results

Ambient Condition:	Temp.: 20°C	R.H.: 54%	Air Pressure: 101 kPa
Power Supply:	AC 230V 50Hz, DC 24V	Required Performance Criterion: B	
Test Specifications:	±2, 4 kV Contact Discharge; ±2, 4, 8 kV Air Discharge For each point positive 10 times and negative 10 times		
Tested mode:	Normal operation mode, Stored energy operation mode		
Test Point	Kind A-Air Discharge C-Contact Discharge	Result (Performance Criterion)	
Screen	A	A	
Metal	C	A	
Indirect Discharge (HCP)	C	A	
Indirect Discharge (VCP)	C	A	
Note:			
Test Equipment : ESD Tester (TESEQ, NSG 437)		Test Engineer : Steven	

10.RF FIELD STRENGTH SUSCEPTIBILITY TEST

10.1 Block Diagram of Test Setup



10.2 Test Standard and Severity Levels

10.2.1 Test Standard

EN 62040-2: 2006+AC: 2006 Category C2
 (EN 61000-4-3: 2006+A2: 2010, Severity Level: 3, 10V / m)

10.2.2 Severity Levels

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

Performance Criterion : **A**

10.3 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.

10.4 Test Results

PASS.

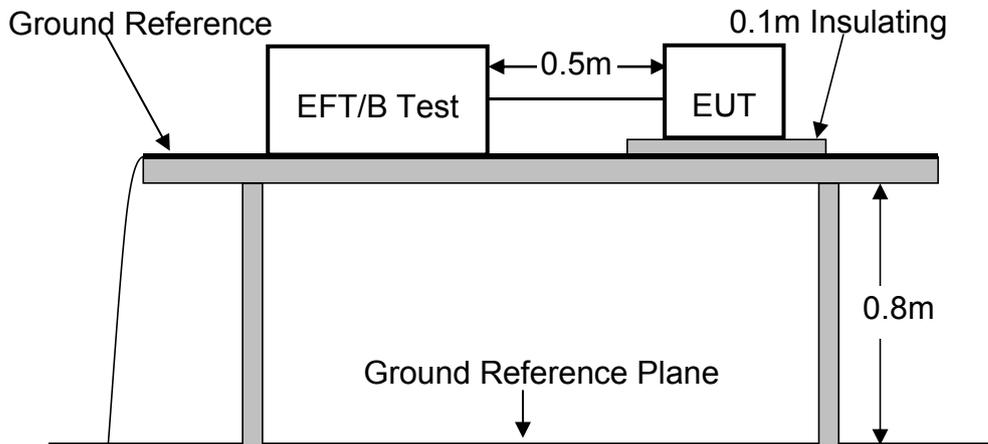
Please refer to the following page.

RF Field Strength Susceptibility Test Results

Ambient Condition:	Temp.: 20℃	R.H.: 54%	Air Pressure: 101 kPa	
Power Supply:	AC 230V 50Hz, DC 24V	Required Performance Criterion: A		
Test Specifications:	Modulation: 1kHz, 80%AM; Step Size: 1%; Dwell Time: 1s			
Tested mode:	Normal operation mode, Stored energy 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:				
<p>Test Equipment :</p> <ol style="list-style-type: none"> 1. RF Power Meter : (ESE, 4242) 2. Power Amplifier : (TESEQ, CBA 1G-150) 3. Signal Generator : (Agilent, N5181A) 4. Power Sensor : (ESE, 51011EMC) 5. Antenna (Schwarzbeck, VULB9162) <div style="text-align: right; margin-top: 10px;">Test Engineer : Steven</div>				

11.ELECTRICAL FAST TRANSIENT/BURST TEST

11.1 Block Diagram of Test Setup



11.2 Test Standard and Severity Levels

11.2.1 Test Standard

EN 62040-2: 2006+AC: 2006 Category C2
 (EN 61000-4-4: 2012, Severity Level, Level 3: 2KV)

11.2.2 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.

Performance Criterion : **B**

11.3 Test Procedure

The E.U.T. is put on the table which is 0.8 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.

11.3.1 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.

11.3.2 For signal lines ports:

It's unnecessary to test.

11.3.3 For DC ports:

It's unnecessary to test.

11.4 Test Result

PASS.

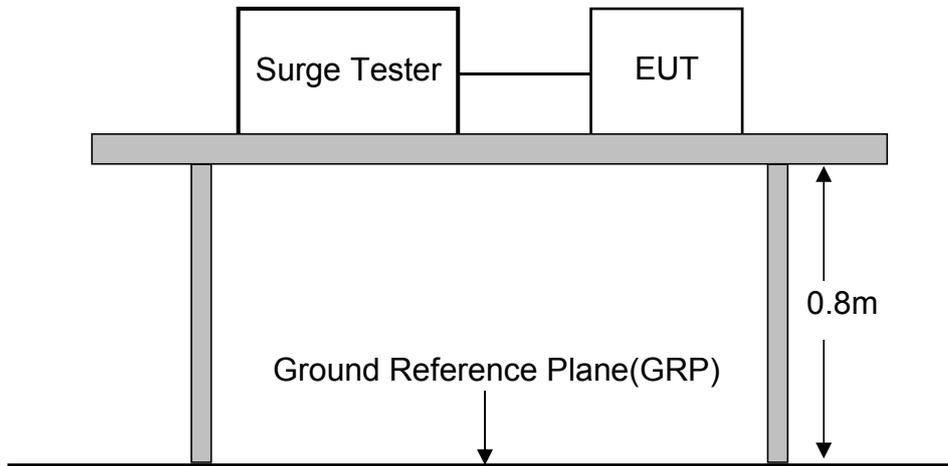
Please refer to the following page.

Electrical Fast Transient/Burst Test Results

Ambient Condition:	Temp.: 20°C	R.H.: 54%	Air Pressure: 101 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	Test Voltage	Result (Performance Criterion)	
L	±2KV	A	
N	±2KV	A	
PE	±2KV	A	
L、N	±2KV	A	
L、PE	±2KV	A	
N、PE	±2KV	A	
L、N、PE	±2KV	A	
Signal line			
DC line			
Note :			
Test Equipment : Burst Tester(EM TEST, UCS500N)		Test Engineer : Steven	

12. SURGE IMMUNITY TEST

12.1 Block Diagram of Test Setup



12.2 Test Standard and Severity Levels

12.2.1 Test Standard

EN 62040-2: 2006+AC: 2006 Category C2

(EN 61000-4-5: 2014, Severity Level: Line To Line, Level 2: 1.0KV;
Line To Earth, Level 3: 2.0KV)

12.2.2 Severity level

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

Performance Criterion : **B**

12.3 Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 12.1.
2. For line to line coupling mode, provide a 1.0KV 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.

12.4 Test Result

PASS.

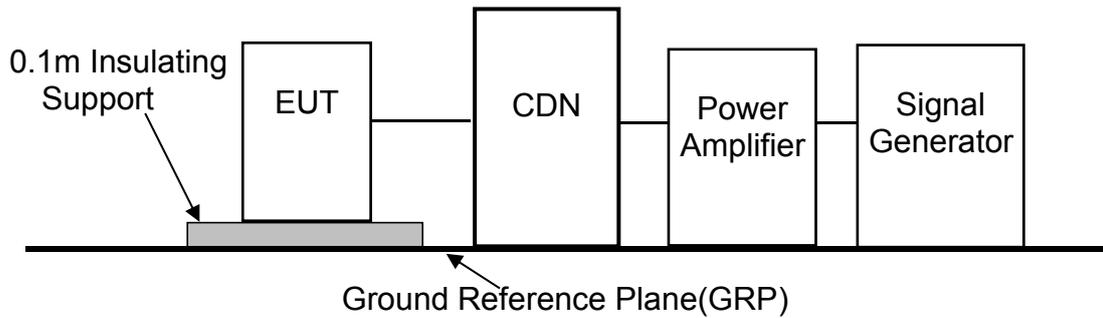
Please refer to the following page.

Surge Immunity Test Results

Ambient Condition:	Temp.: 20°C	R.H.: 54%	Air Pressure: 101 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(AC Input)	Phase Angle	Test Voltage	Result (Performance Criterion)
L-N	0°, 90°, 180°, 270°	±1.0KV	A
L-PE	0°, 90°, 180°, 270°	±2.0KV	A
N-PE	0°, 90°, 180°, 270°	±2.0KV	A
Signal line			
DC line			
Line(Output)	Phase Angle	Test Voltage	Result (Performance Criterion)
L-N	0°, 90°, 180°, 270°	±1.0KV	A
L-PE	0°, 90°, 180°, 270°	±2.0KV	A
N-PE	0°, 90°, 180°, 270°	±2.0KV	A
Signal line			
DC line			
Note :			
Test Equipment : Burst Tester(EM TEST, UCS500N)		Test Engineer : Steven	

13. INJECTED CURRENTS SUSCEPTIBILITY TEST

13.1 Block Diagram of Test Setup



13.2 Test Standard and Severity Levels

13.2.1 Test Standard

EN 62040-2: 2006+AC: 2006 Category C2
(EN 61000-4-6: 2014, Severity Level 3: 10V (rms), 0.15MHz ~ 80MHz)

13.2.2 Severity level

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

Performance Criterion : **A**

13.3 Test Procedure

1. Set up the E.U.T., CDN and test generators as shown on Section 13.1.
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.

13.4 Test Result

PASS.

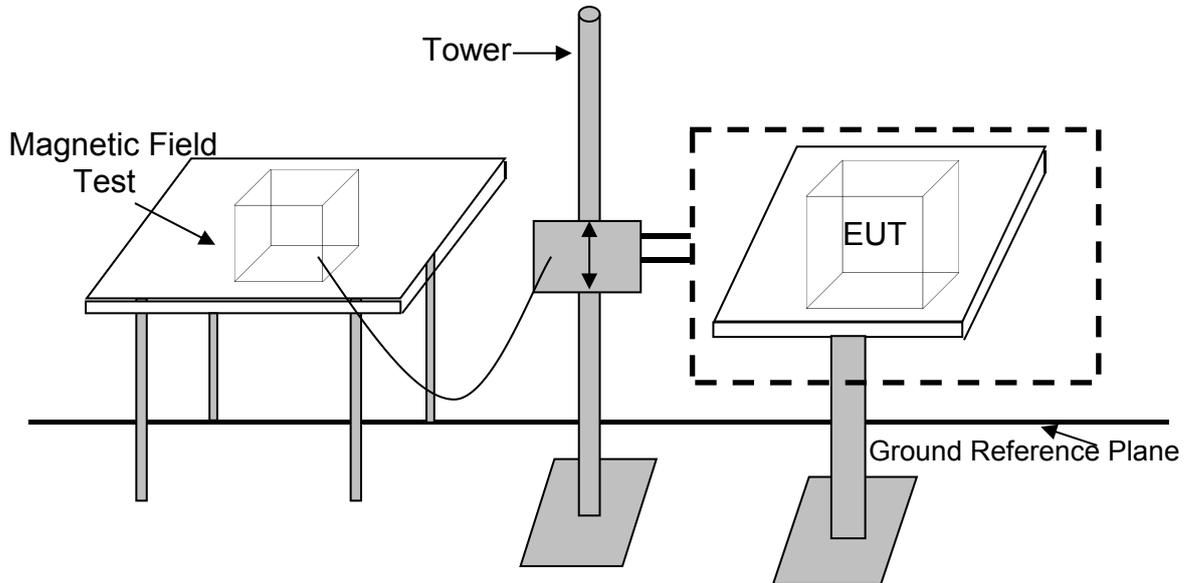
Please refer to the following page.

Injected Currents Susceptibility Test Results

Ambient Condition:	Temp.: 20°C	R.H.: 54%	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 (Input)	0.15~80	10	A
Note :			
Test Equipment : FRANNOKIA, CDN-M2+M3 HAEFELY, WinPAMP		Test Engineer : Steven	

14.MAGNETIC FIELD IMMUNITY TEST

14.1 Block Diagram of Test Setup



14.2 Test Standard and Severity Levels

14.2.1 Test Standard

EN 62040-2: 2006+AC: 2006 Category C2
 (EN 61000-4-8: 2010, Severity Level 4: 30A/m)

14.2.2 Severity level

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

Performance Criterion : **B**

14.3 Test Procedure

The E.U.T. is placed in the middle of a induction coil (1*1m), under which is a 1*1*0.8m (high)table, this small table is also placed on a larger table, 0.1 m above the ground. 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..

14.4 Test Result

PASS.

Please refer to the following page.

Magnetic Field Immunity Test Results

Ambient Condition:	Temp.: 20°C	R.H.: 50%	Air Pressure: 101 kPa
Power Supply:	AC 230V 50Hz, DC 24V	Required Performance Criterion: B	
Test Specifications:	30A/m		
Test mode:	Normal operation mode, Stored energy 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 :			
Test Equipment : Magnetic field test(HAEFELY, MAG100.1)		Test Engineer : Steven	

15.PHOTOGRAPH

15.1 Photo of Conducted Emission Measurement



15.2 Photo of Radiation Emission Measurement



15.3 Photo of Harmonic Measurement



15.4 Photo of Electrostatic Discharge Test



15.5 Photo of RF Field Strength susceptibility Test



15.6 Photo of Electrical Fast Transient /Surge Test



APPENDIX I (Photos of E.U.T.)

Photo 1

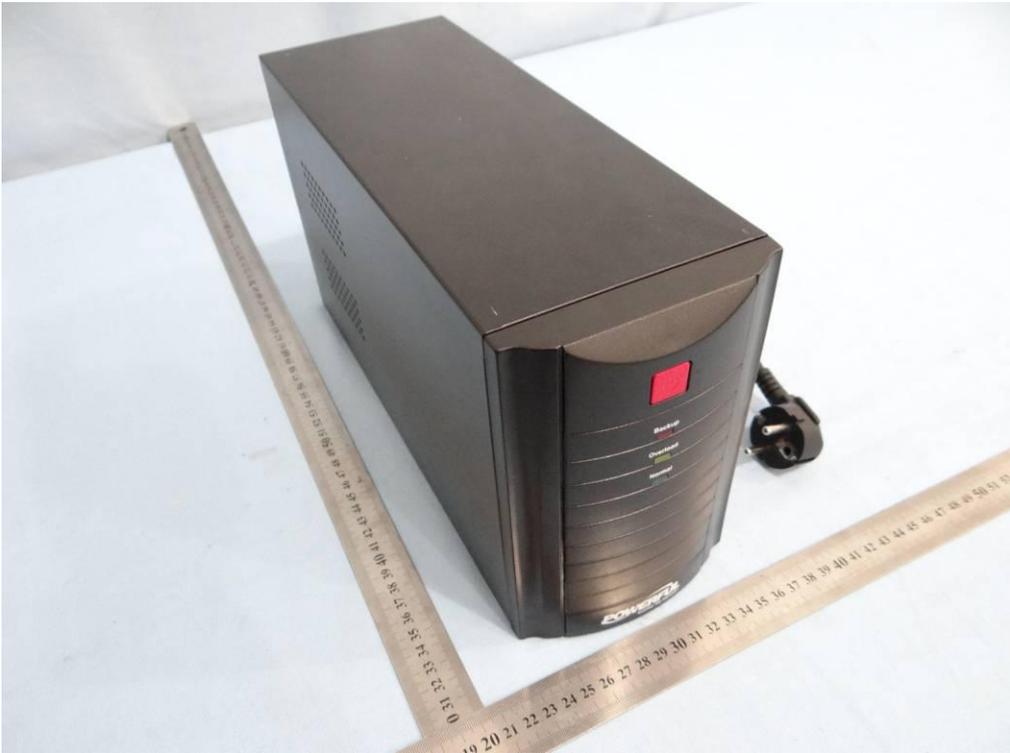


Photo 2

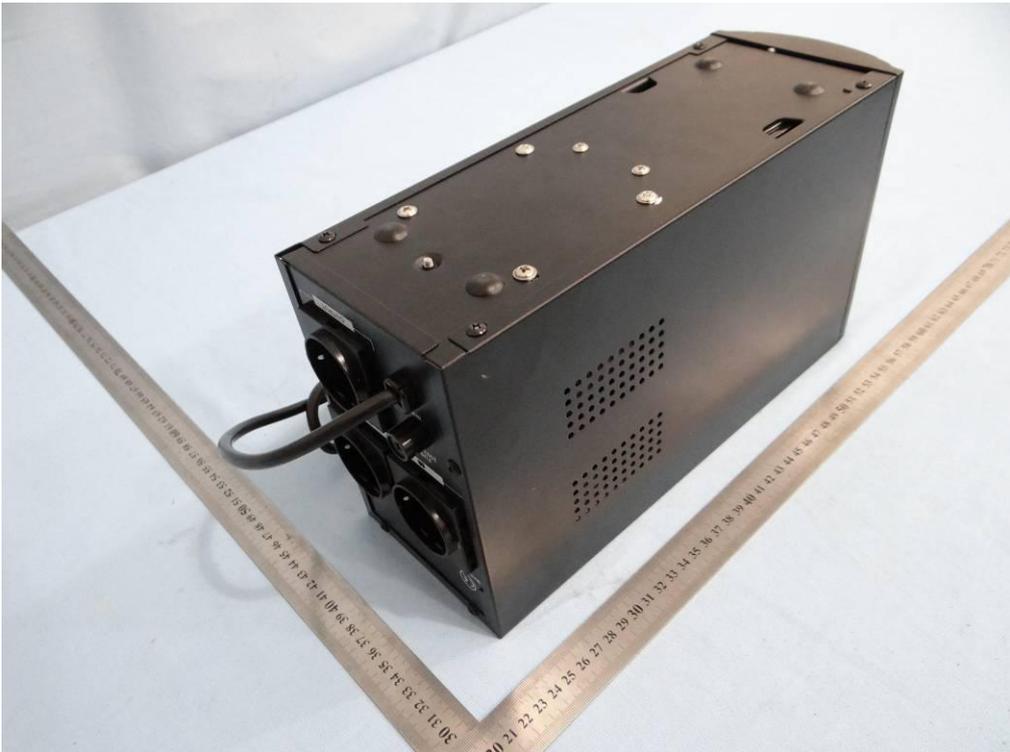


Photo 3

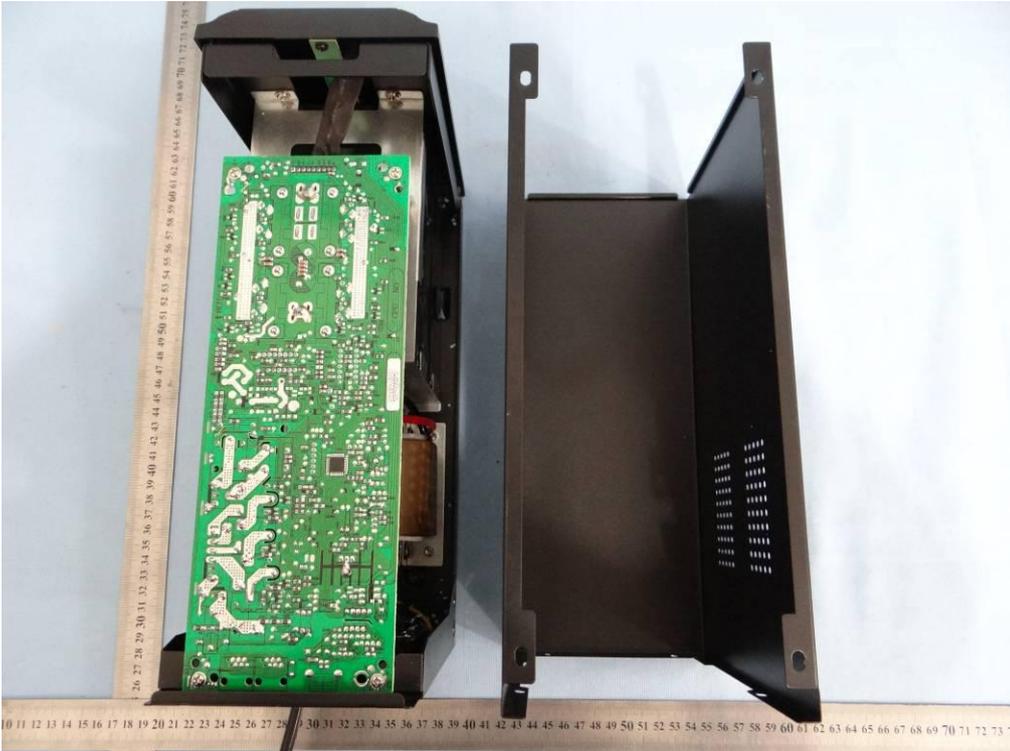


Photo 4

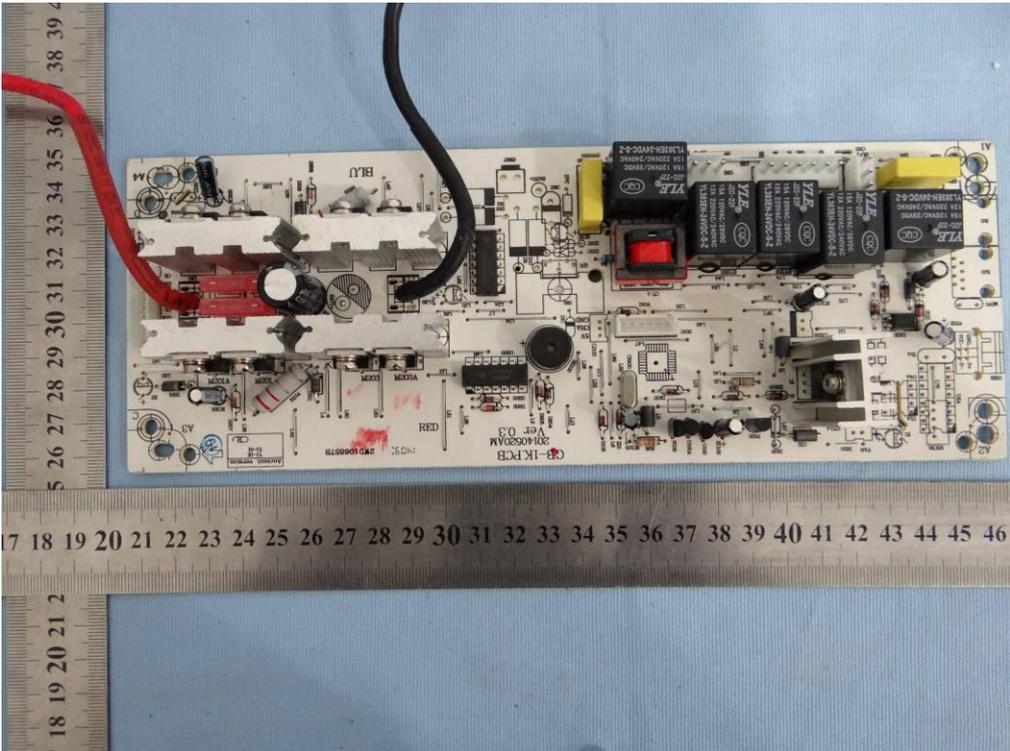
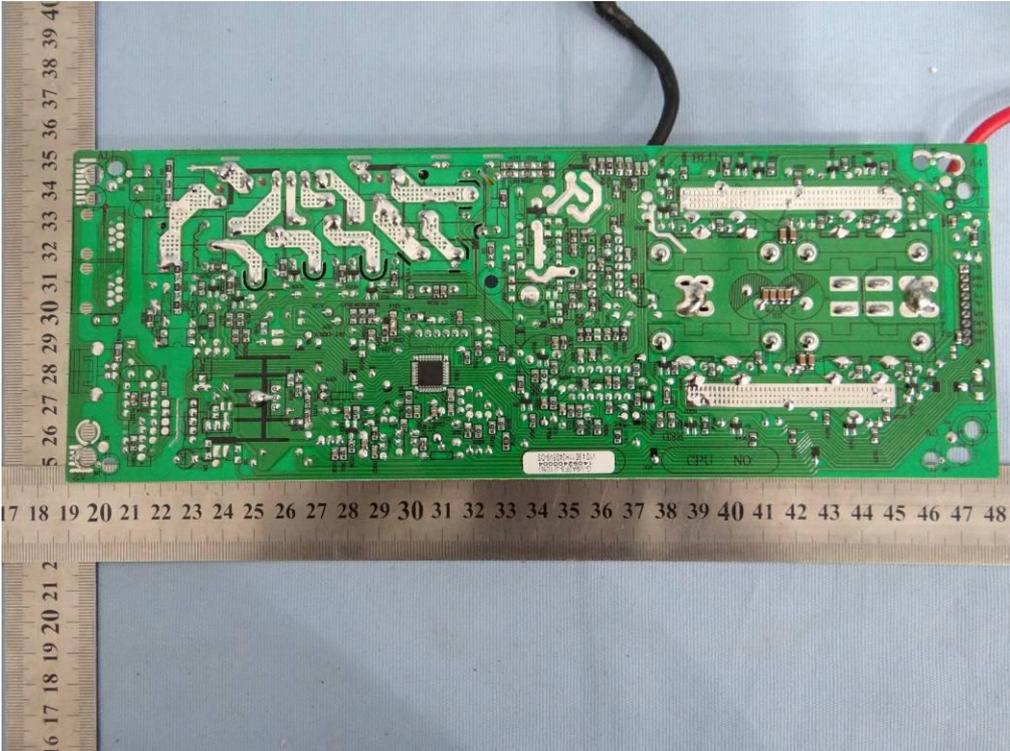


Photo 5



---End of report---