Standards EN 62040-2:2006

TEST REPORT

For

INVT POWER SYSTEM(SHENZHEN) CO., LTD

Uninterruptible Power Systems

Model Number: HT3110XL, HT3108XL, HT3106XL, HT3110XS, HT3108XS, HT3106XS

Prepared for	:	INVT POWER SYSTEM(SHENZHEN) CO., LTD
Address	:	5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China
Prepared by	:	EMTEK (SHENZHEN) CO., LTD.
Address	:	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzen, Guangdong, China Tel: (0755) 26954280 Fax: (0755) 26954282

Report Number	:	ES180408103E
Date of Test	:	April 11, 2018 to May 07, 2018
Date of Report	:	May 07, 2018

TABLE OF CONTENT

Description

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TEST REPORT VERIFICATION

Applicant	:	INVT POWER SYSTEM(SHENZHEN) CO., LTD
Manufacturer	:	INVT POWER SYSTEM(SHENZHEN) CO., LTD
Trademark	:	INVT
EUT	:	Uninterruptible Power Systems
Model Number	:	HT3110XL, HT3108XL, HT3106XL, HT3110XS, HT3108XS, HT3106XS
Power Supply	:	Please see the page 8

Measurement Procedure Used:

EN 62040-2:2006,
EN 61000-3-12: 2011
(EN 61000-4-2:2009, EN 61000-4-3:2006+A1:2008+A2:2010, EN 61000-4-4:2012,
EN 61000-4-5:2014, EN 61000-4-6:2014+AC:2015, EN 61000-4-8:2010, EN 61000-4-11:2004,
EN 61000-2-2:2002)
The device described above is tested by EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (SHENZHEN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN 62040-2 requirements.
In this report the model and configuration chosen for each test is representative for all models or configurations (defined in the user manual) by using The “Worst Case” approach of the Guide for the EMC Directive 2014/30/EU.

This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (SHENZHEN) CO., LTD.

Date of Test	:	April 11, 2018 to May 07, 2018
Prepared by	:	Bunny Zhang/Editor
Reviewer	:	Jessie Hu/Supervisor
Approved & Authorized Signer	:	Lisa Wang/Manager

Modified Information

Version	Report No.	Revision Date	Summary
Ver.1.0	ES180408103E	/	Original Report

1. SUMMARY OF TEST RESULTS

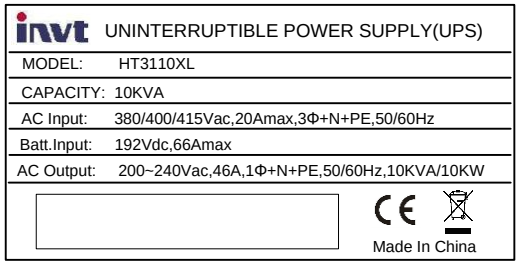
EMISSION			
Description of test item	Standard	Limits	Results
Conducted disturbance at mains terminals	EN 62040-2:2006	C3	Pass
Radiated Disturbance	EN 62040-2:2006	C3	Pass
Harmonic Current Emissions	EN 61000-3-12: 2011	Class A	Pass
Voltage Fluctuation and Flicker	EN 61000-3-11: 2000	Section 5	N/A
Immunity			
Description of test item	Basic Standard	Performance Criteria	Results
Electrostatic Discharge (ESD)	EN 61000-4-2:2009	B	Pass
Radio-frequency, Continuous radiated disturbance	EN 61000-4-3:2006+A1:2008+A2:2010	A	Pass
EFT/B Immunity	EN 61000-4-4:2012	B	Pass
Surge Immunity	EN 61000-4-5:2014	B	Pass
Conducted RF Immunity	EN 61000-4-6:2014+AC:2015	A	Pass
Power frequency magnetic field	EN 61000-4-8:2010	A	Pass
Voltage dips and Voltage interruptions	EN 61000-4-11:2004	B	Pass
Low Frequency signals	EN 61000-2-2:2002	A	Pass
Power Line Unbalance (Three-Phase Ups Systems Only)	EN 62040-2:2006	A	Pass
Note: /			

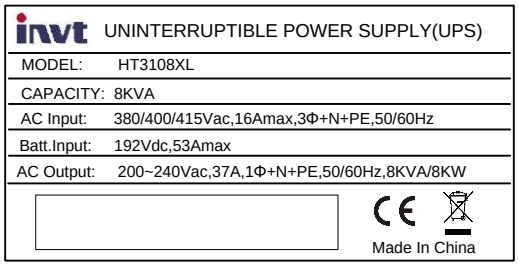
2. GENERAL INFORMATION

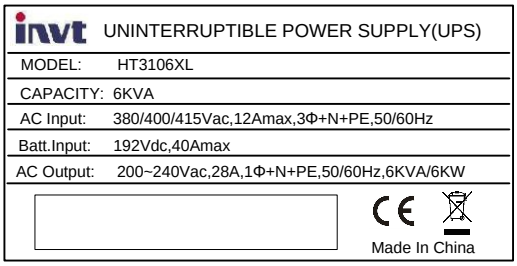
2.1. Description of Device (EUT)

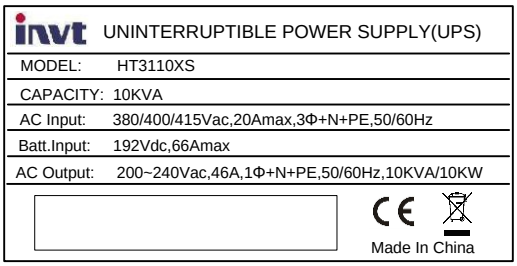
EUT	:	Uninterruptible Power Systems
Model Number	:	HT3110XL, HT3108XL, HT3106XL, HT3110XS, HT3108XS, HT3106XS (Note: These models are identical in circuitry and electrical, mechanical and physical construction; the only differences are the rating and model number. for trading purpose. We prepare HT3110XL for test.)
Test voltage	:	AC 380V/50Hz or DC 192V

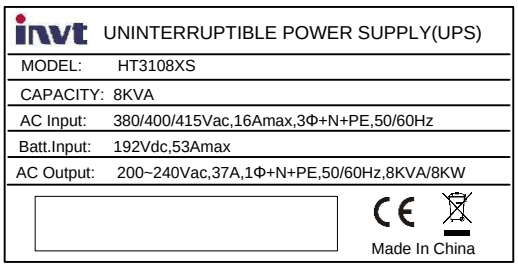
Rating :

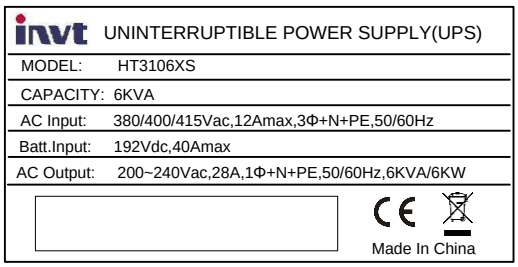












Applicant : INVT POWER SYSTEM(SHENZHEN) CO., LTD

Address : 5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China

Manufacturer : INVT POWER SYSTEM(SHENZHEN) CO., LTD

Address	:	5th Floor, 1#Building, Gaofa Industrial Park, LongJing, Nanshan District, Shenzhen, China
Date of receiver	:	April 11, 2018
Date of Test	:	April 11, 2018 to May 07, 2018

2.2. Independent Operation Modes

A. On
1. Line mode
2. Bat mode
B. Stand-By
C. Off

2.3. Test Manner

Test Items	Test Voltage	Operation Modes	Worst case
Conducted disturbance at mains Terminals	AC 380V/50Hz DC 192V	Mode A	Mode A
Radiated emissions at frequencies up to 1 GHz	AC 380V/50Hz DC 192V	Mode A	Mode A
EMS	AC 380V/50Hz DC 192V	Mode A	/

2.4. Description of Support Device

N/A

2.5. Description of Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2016.10.24
The certificate is valid until 2022.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006 (identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291.

Accredited by TUV Rheinland Shenzhen 2016.5.19
The Laboratory has been assessed according to the requirements ISO/IEC 17025.

Accredited by FCC
Designation Number: CN1204
Test Firm Registration Number: 882943

Accredited by Industry Canada, November 24, 2015
The Certificate Registration Number. is 4480A.

Name of Firm : EMTEK(SHENZHEN) CO., LTD.
Site Location : Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzen, Guangdong, China

2.6. Measurement Uncertainty

Test Item		Uncertainty
Conducted Emission Uncertainty	:	3.16dB(9k~150kHz Conduction 2#) 2.90dB(150k-30MHz Conduction 2#)
Radiated Emission Uncertainty (3m Chamber)	:	3.78dB (30M~1GHz Polarize: H) 4.27dB (30M~1GHz Polarize: V)
Uncertainty for C/S Test	:	1.45(Using CDN Test)
Uncertainty for R/S Test	:	2.10dB(80MHz-200MHz) 1.76dB(200MHz-1000MHz)
Uncertainty for test site temperature and humidity	:	0.6℃ 4%

3. MEASURING DEVICE AND TEST EQUIPMENT

3.1. For Conducted Emission Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Test Receiver	Rohde & Schwarz	ESCS30	828985/018	May 21, 2017	1 Year
☑	L.I.S.N.	ROHDE & SCHWARZ	ESH3-Z5	100191	May 20, 2017	1 Year
☑	50Ω Coaxial Switch	Anritsu	MP59B	M20531	May 21, 2017	1 Year
☑	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	May 20, 2017	1 Year

3.2. For Radiated Emission Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	EMI Test Receiver	Rohde & Schwarz	ESCI	101414	May 20, 2017	1 Year
☑	Pre-Amplifier	LUNAR-EM	LNA30M3G-25	J10100000071	May 20, 2017	1 Year
☑	Bilog Antenna	Schwarzbeck	VULB9163	660	May 21, 2017	1 Year
☑	Cable	H+B	NmSm-05-C15052	N/A	May 21, 2017	1 Year
☑	Cable	H+B	NmSm-2-C15201	N/A	May 21, 2017	1 Year
☑	Cable	H+B	NmNm-7-C15702	N/A	May 21, 2017	1 Year

3.3. For Harmonic Current Measurement

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 20, 2017	1 Year
☑	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 20, 2017	1 Year
☑	Three phase impedance network	Teseq/Germany	INA2197/37A	1305A02873	May 20, 2017	1 Year
☑	Three phase impedance network	Teseq/Germany	INA 2196/75A	1305A02874	May 20, 2017	1 Year
☐	Profline 2100 AC Switching Unit	Teseq/Germany	NSG2200-3	A22714	May 20, 2017	1 Year

3.4. For Electrostatic Discharge Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	ESD Tester	TESEQ AG	NSG 438A	130	May 21, 2017	1 Year
☑	Impulse Module	TESEQ AG	IN NSG 438A A 4380-150pF/330Ohm	403-550/1712	May 21, 2017	1 Year

3.5. For RF Strength Susceptibility Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Signal Generator	Agilent	N5181A	MY50145187	May 20, 2017	1 Year
☑	RF Power Meter. Dual Channel	BOONTON	4232A	10539	May 21, 2017	1 Year
☑	50ohm Diode Power Sensor	BOONTON	51011EMC	34236/34238	May 21, 2017	1 Year
☑	Field Strength Meter	DARE	RSS1006A	10I00037SO 22	May 21, 2017	1 Year
☑	50ohm Diode Power Sensor	BOONTON	51011EMC	36164	May 21, 2017	1 Year
☑	Power Amplifier	MILMEGA	80RF1000-175	1059345	May 20, 2017	1 Year
☐	Power Amplifier	MILMEGA	AS0102-55	1018770	May 20, 2017	1 Year
☑	Power Amplifier	MILMEGA	AS1860-50	1059346	May 20, 2017	1 Year
☑	Log.-Per. Antenna	SCHWARZBECK	VULP 9118E	811	May 21, 2017	1 Year
☐	Broad-Band Horn Antenna	SCHWARZBECK	STLP 9149	9149-227	May 21, 2017	1 Year
☑	Multi-function interface system	DARE	CTR1009B	12I00250SN O72	N/A	N/A
☑	Automatic switch group	DARE	RSW1004A	N/A	N/A	N/A

3.6. For Electrical Fast Transient/Burst Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Burst Tester	HAEFELY	PEFT4010	080981-16	May 21, 2017	1Year
☑	Coupling Clamp	HAEFELY	IP-4A	147147	May 21, 2017	1Year
☑	Three phase CDN	Teseq	CDN 163	202	May 21, 2017	1 Year

3.7. For Surge Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Surge Controller	HAEFELY	Psurge 8000	174031	May 21, 2017	1Year
☑	Impulse Module	HAEFELY	PIM 100	174124	May 21, 2017	1Year
☑	Coupling Decoupling Filter	HAEFELY	PCD 130	172181	May 21, 2017	1Year
☑	Coupling Module	HAEFELY	PCD122	174354	May 21, 2017	1Year
☑	Surge Impulse Module	HAEFELY	PIM 120	174435	May 21, 2017	1Year
☑	Coupling Module	HAEFELY	PCD 126A	174387	May 21, 2017	1Year
☑	Impulse Module	HAEFELY	PIM 110	174391	May 21, 2017	1Year
☑	Impulse Module	HAEFELY	PIM 150	178707	May 21, 2017	1Year

3.8. For Injected Current Susceptibility Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Simulator	EMTEST	CWS500C	0900-12	May 21, 2017	1Year
☐	CDN	EMTEST	CDN-M2	5100100100	May 21, 2017	1Year
☑	CDN	EMTEST	CDN-M3	0900-11	May 21, 2017	1Year
☑	Injection Clamp	EMTEST	F-2031-23MM	368	May 21, 2017	1Year
☑	Attenuator	EMTEST	ATT6	0010222A	May 21, 2017	1Year
☑	Three phase CDN	Teseq	CDN M332S	32655	May 21, 2017	1 Year

3.9. For Magnetic Field Immunity Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Magnetic Field Tester	HAEFELY	MAG100	250040.1	May 20, 2017	1Year

3.10. For Voltage Dips and Interruptions Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	45KVA AC Power source	Teseq	NSG 1007-45/45KVA	1305A02873	May 20, 2017	1 Year
☐	Signal conditioning Unit	Teseq	CCN 1000-3	1305A02873	May 20, 2017	1 Year
☐	Three phase impedance network	Teseq/Germany	INA2197/37A	1305A02873	May 20, 2017	1 Year
☐	Three phase impedance network	Teseq/Germany	INA 2196/75A	1305A02874	May 20, 2017	1 Year
☑	Profline 2100 AC Switching Unit	Teseq/Germany	NSG2200-3	A22714	May 20, 2017	1 Year

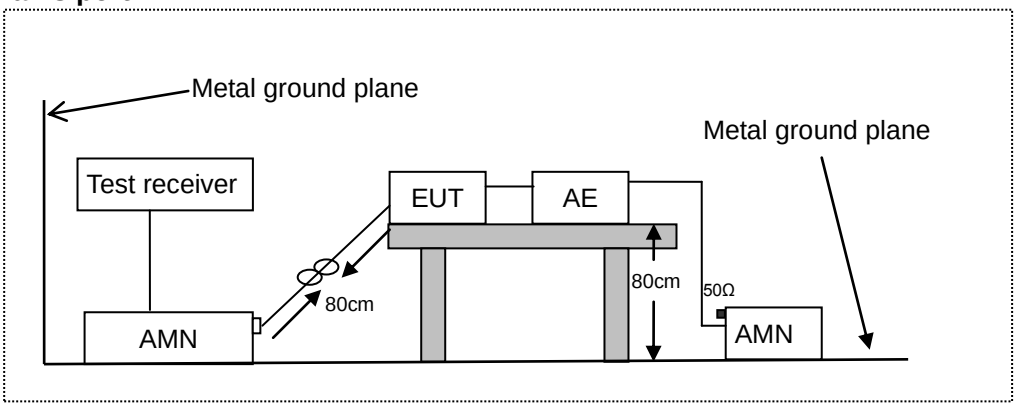
3.11. Low Frequency Signals and Power Line Unbalance Test

Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
☑	Programmable AC Source	CHROMA	6530	/	May 21, 2017	1Year

4. CONDUCTED EMISSION MEASUREMENT

4.1. Block Diagram of Test Setup

For mains port



AMN: Artificial Mains Network
AE: Associated equipment
EUT: Equipment under test

4.2. Limits

Table 1 – Limits of mains terminal and network port disturbance voltage for category C1 and category C2 UPS in the frequency range 0,15 MHz to 30 MHz

Frequency range MHz	Limits dB (μV)							
	Category C1 UPS				Category C2 UPS			
	Mains terminal		Network port		Mains terminal		Network port	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
0,15 to 0,50[b]	66 to 56[a]	56 to 46[a]	84 to 74[a]	74 to 64[a]	79	66	97 to 87[a]	84 to 74[a]
0,50 to 5[b]	56	46	74	64	73	60	87	74
5 to 30	60	50			73	60		

[a] The limit decreases linearly with the logarithm of the frequency.

[b] The lower limit shall apply at the transition frequency.

Table 2 – Limits of mains terminal and network port disturbance voltage for category C3 UPS in the frequency range 0,15 MHz to 30 MHz

UPS rated output current	Frequency range	Limits dB (μV)			
		Mains terminal		Network port	
A	MHz	Quasi-peak	Average	Quasi-peak	Average
> 16 to 100	0,15 to 0,50[b]	100	90	110 to 100[a]	94 to 84[a]
	0,50 to 5,0[b]	86	76	100	84
	5,0 to 30,0	90 to 73[a]	80 to 60[a]		
> 100	0,15 to 0,50[b]	130	120	110 to 100[a]	94 to 84[a]
	0,50 to 5,0[b]	125	115	100	84
	5,0 to 30,0	115	105		

[a] The limits decrease linearly with the logarithm of the frequency.

[b] The lower limit shall apply at the transition frequency.

4.3. Test Procedure

For mains port:

The EUT was placed on a plank 0.1 m height from the metal ground plane and 0.4 m from the conducting wall of the shielding room and it was kept at least 0.8 m from any other grounded conducting surface.

All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units.

Connect EUT to the power mains through a artificial mains network (AMN). Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

All the support units are connecting to the other AMN.

The AMN provides 50 ohm coupling impedance for the measuring instrument.

The CISPR states that the AMN with 50 ohm and 50 microhenry should be used.

Both sides of AC line were checked for maximum conducted interference.

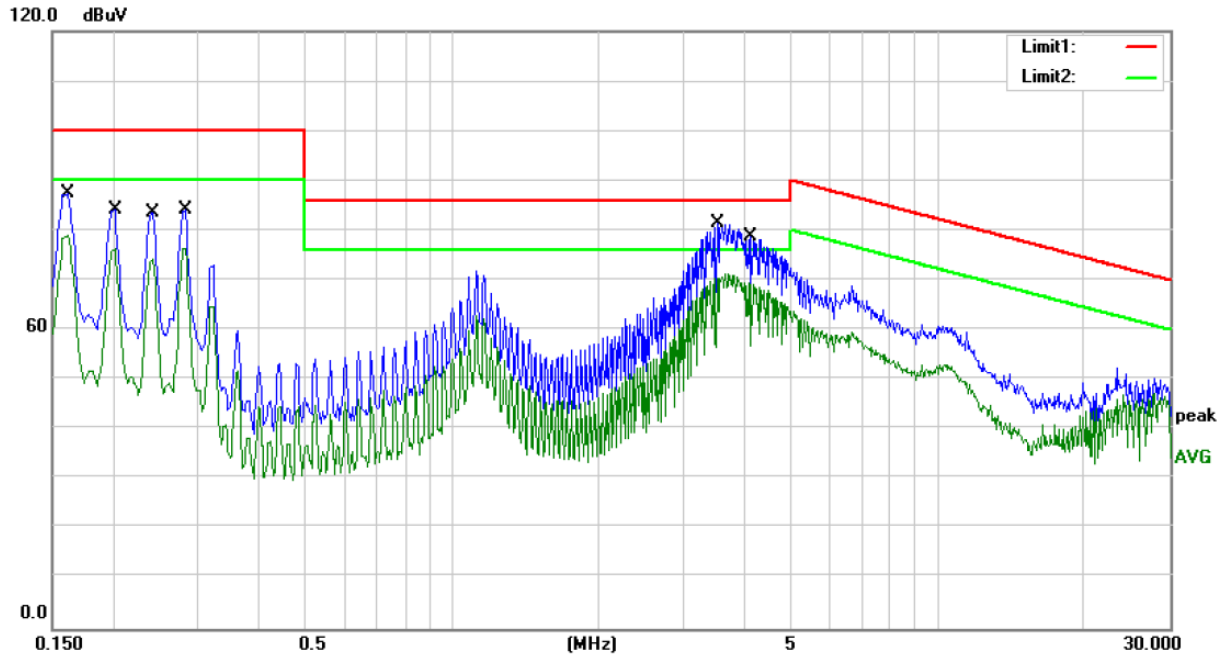
Test results were obtained from the following equation:
Emission Level (dBμV) = AMN Factor (dB) + Cable Loss (dB) + Reading (dBμV)
Margin (dB) = Emission Level (dBμV) - Limit (dBμV)

4.4. Measuring Results

PASS.

Please refer to the following pages.

All the modes were tested and the data of the worsted mode(Line mode)are attached in the following pages.



Site Conduction #2 Phase: *L1* Temperature: 24.9

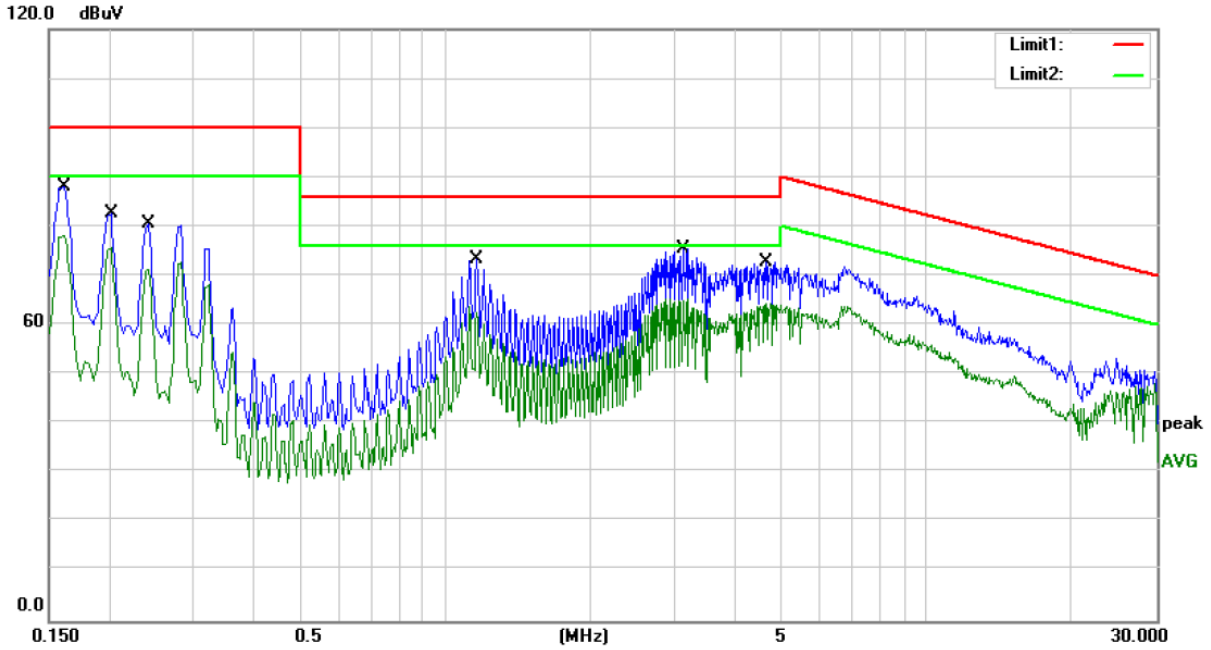
Limit: (CE)EN62040-2 C3_QP Power: AC 380V/50Hz Humidity: 54 %

Mode: Line mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	77.42	9.89	87.31	100.00	-12.69	QP	
2		0.1620	69.08	9.89	78.97	90.00	-11.03	AVG	
3		0.2020	74.31	9.90	84.21	100.00	-15.79	QP	
4		0.2020	66.47	9.90	76.37	90.00	-13.63	AVG	
5		0.2420	73.75	9.90	83.65	100.00	-16.35	QP	
6		0.2420	64.36	9.90	74.26	90.00	-15.74	AVG	
7		0.2820	74.27	9.90	84.17	100.00	-15.83	QP	
8		0.2820	66.55	9.90	76.45	90.00	-13.55	AVG	
9	*	3.5220	71.35	9.99	81.34	86.00	-4.66	QP	
10		3.5220	61.28	9.99	71.27	76.00	-4.73	AVG	
11		4.1220	68.67	10.00	78.67	86.00	-7.33	QP	
12		4.1220	59.35	10.00	69.35	76.00	-6.65	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan



Site Conduction #2 Phase: L2 Temperature: 24.9

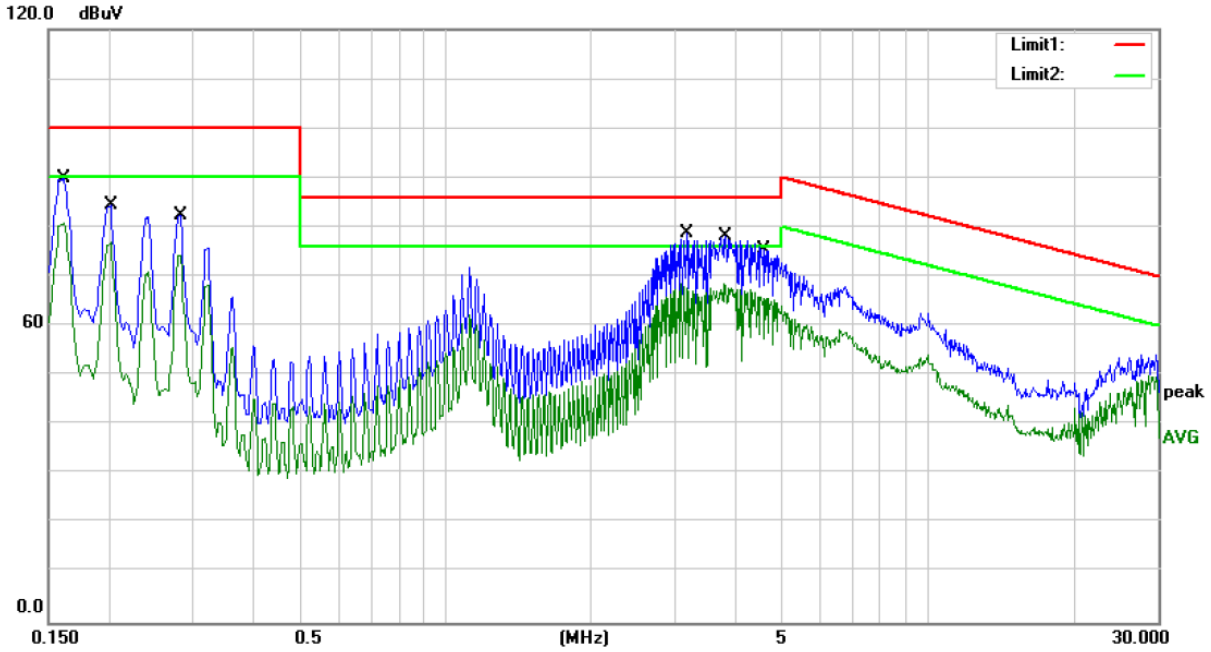
Limit: (CE)EN62040-2 C3_QP Power: AC 380V/50Hz Humidity: 54 %

Mode: Line mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	78.24	9.89	88.13	100.00	-11.87	QP	
2		0.1620	68.40	9.89	78.29	90.00	-11.71	AVG	
3		0.2020	72.63	9.90	82.53	100.00	-17.47	QP	
4		0.2020	65.84	9.90	75.74	90.00	-14.26	AVG	
5		0.2420	70.64	9.90	80.54	100.00	-19.46	QP	
6		0.2420	61.47	9.90	71.37	90.00	-18.63	AVG	
7		1.1620	63.53	9.96	73.49	86.00	-12.51	QP	
8		1.1620	53.78	9.96	63.74	76.00	-12.26	AVG	
9	*	3.1220	65.58	9.98	75.56	86.00	-10.44	QP	
10		3.1220	55.30	9.98	65.28	76.00	-10.72	AVG	
11		4.6420	62.69	10.00	72.69	86.00	-13.31	QP	
12		4.6420	54.41	10.00	64.41	76.00	-11.59	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan



Site Conduction #2 Phase: *L3* Temperature: 24.9

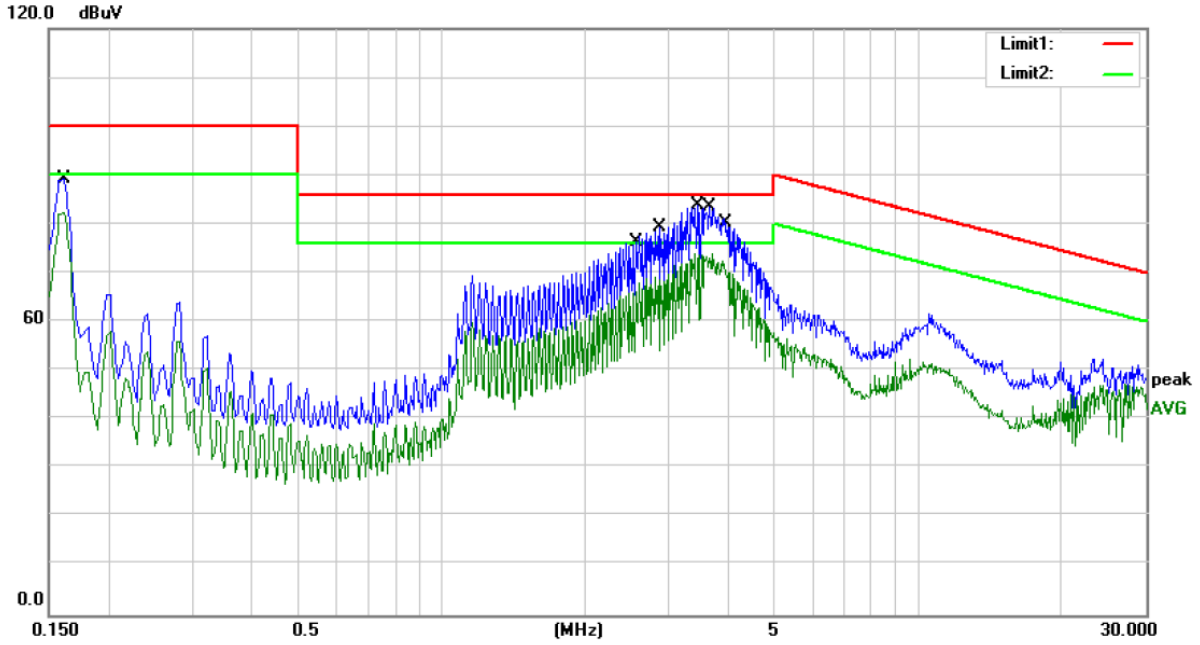
Limit: (CE)EN62040-2 C3_QP Power: AC 380V/50Hz Humidity: 54 %

Mode: Line mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	79.93	9.89	89.82	100.00	-10.18	QP	
2		0.1620	70.85	9.89	80.74	90.00	-9.26	AVG	
3		0.2020	74.48	9.90	84.38	100.00	-15.62	QP	
4		0.2020	66.92	9.90	76.82	90.00	-13.18	AVG	
5		0.2820	72.43	9.90	82.33	100.00	-17.67	QP	
6		0.2820	64.24	9.90	74.14	90.00	-15.86	AVG	
7	*	3.1620	68.83	9.98	78.81	86.00	-7.19	QP	
8		3.1620	58.53	9.98	68.51	76.00	-7.49	AVG	
9		3.8020	68.27	9.99	78.26	86.00	-7.74	QP	
10		3.8020	58.47	9.99	68.46	76.00	-7.54	AVG	
11		4.5620	65.44	10.00	75.44	86.00	-10.56	QP	
12		4.5620	56.49	10.00	66.49	76.00	-9.51	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan



Site Conduction #2 Phase: *N* Temperature: 24.9

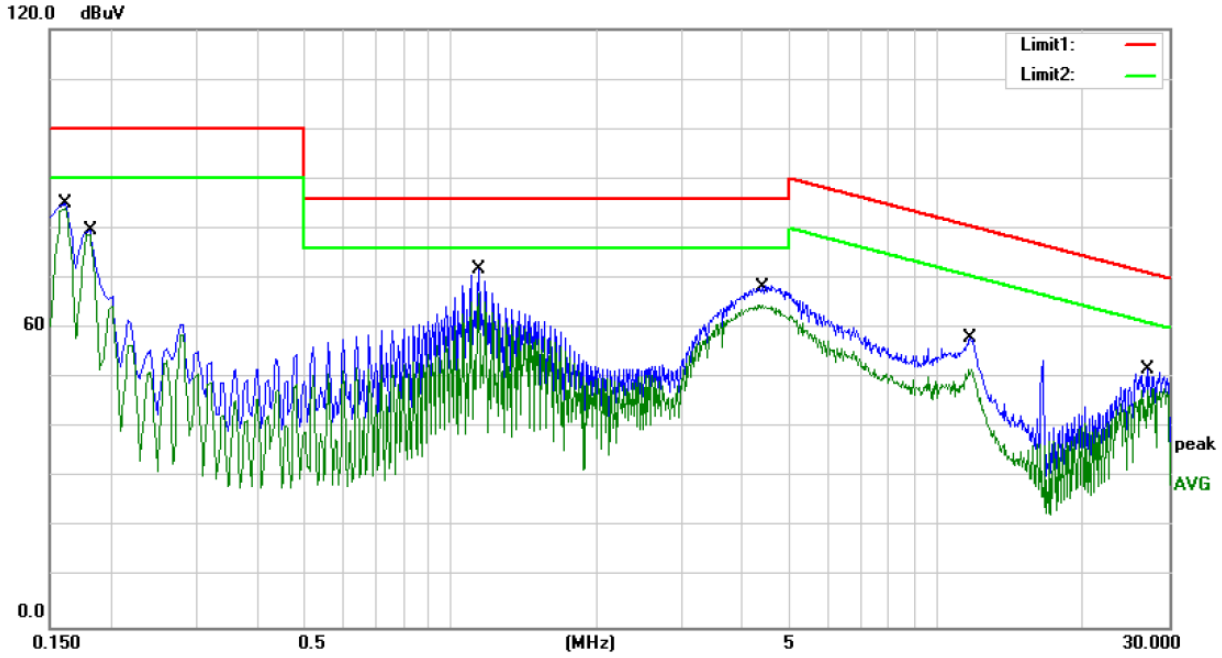
Limit: (CE)EN62040-2 C3_QP Power: AC 380V/50Hz Humidity: 54 %

Mode: Line mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	79.39	9.89	89.28	100.00	-10.72	QP	
2		0.1620	72.58	9.89	82.47	90.00	-7.53	AVG	
3		2.5620	66.28	9.98	76.26	86.00	-9.74	QP	
4		2.5620	57.99	9.98	67.97	76.00	-8.03	AVG	
5		2.8820	69.26	9.98	79.24	86.00	-6.76	QP	
6	*	2.8820	64.02	9.98	74.00	76.00	-2.00	AVG	
7		3.4420	69.71	9.99	79.70	86.00	-6.30	QP	
8		3.4420	64.01	9.99	74.00	76.00	-2.00	AVG	
9		3.6420	70.01	9.99	80.00	86.00	-6.00	QP	
10		3.6420	63.85	9.99	73.84	76.00	-2.16	AVG	
11		4.0020	69.47	10.00	79.47	86.00	-6.53	QP	
12		4.0020	61.61	10.00	71.61	76.00	-4.39	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan



Site Conduction #2 Phase: *L1* Temperature: 24.9

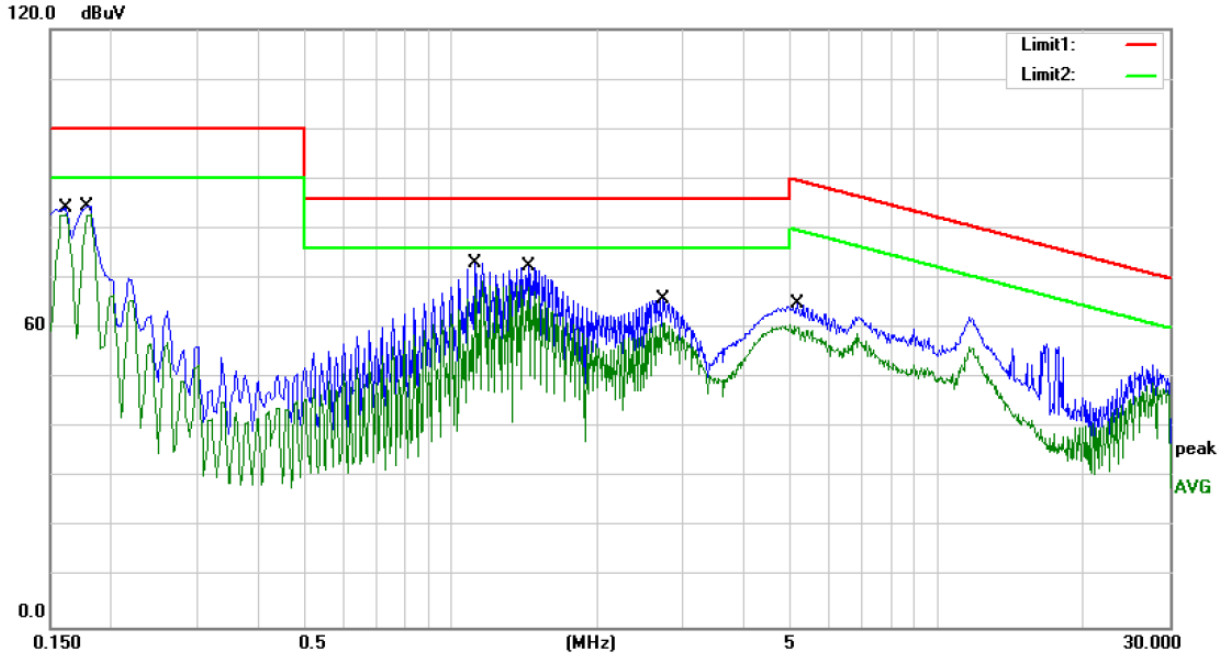
Limit: (CE)EN62040-2 C3_QP Power: DC 192V Humidity: 54 %

Mode: Bat mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	75.18	9.89	85.07	100.00	-14.93	QP	
2	*	0.1620	74.22	9.89	84.11	90.00	-5.89	AVG	
3		0.1820	69.63	9.89	79.52	100.00	-20.48	QP	
4		0.1820	68.89	9.89	78.78	90.00	-11.22	AVG	
5		1.1420	61.94	9.96	71.90	86.00	-14.10	QP	
6		1.1420	57.15	9.96	67.11	76.00	-8.89	AVG	
7		4.3620	58.29	10.00	68.29	86.00	-17.71	QP	
8		4.3620	54.65	10.00	64.65	76.00	-11.35	AVG	
9		11.7060	47.99	10.08	58.07	80.50	-22.43	QP	
10		11.7060	41.82	10.08	51.90	70.50	-18.60	AVG	
11		26.9860	41.48	10.27	51.75	71.18	-19.43	QP	
12		26.9860	37.64	10.27	47.91	61.18	-13.27	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan



Site Conduction #2 Phase: *L2* Temperature: 24.9

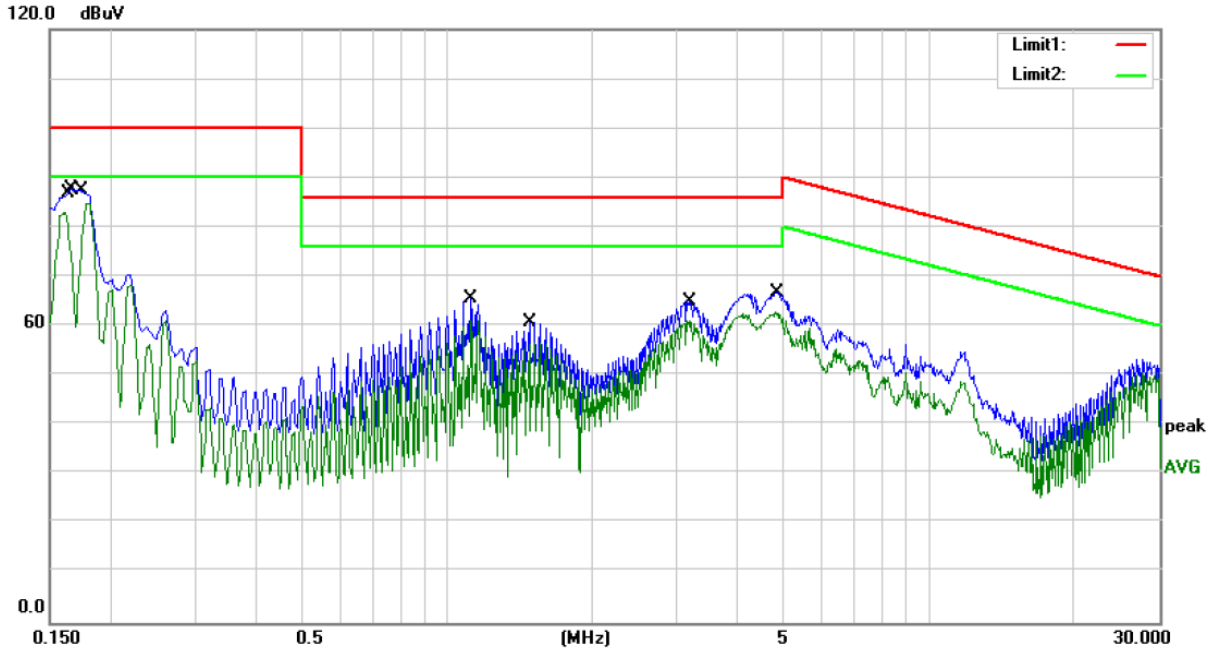
Limit: (CE)EN62040-2 C3_QP Power: DC 192V Humidity: 54 %

Mode: Bat mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	74.30	9.89	84.19	100.00	-15.81	QP	
2		0.1620	73.01	9.89	82.90	90.00	-7.10	AVG	
3		0.1780	74.67	9.89	84.56	100.00	-15.44	QP	
4		0.1780	72.91	9.89	82.80	90.00	-7.20	AVG	
5		1.1220	63.18	9.96	73.14	86.00	-12.86	QP	
6	*	1.1220	59.41	9.96	69.37	76.00	-6.63	AVG	
7		1.4420	62.35	9.96	72.31	86.00	-13.69	QP	
8		1.4420	58.51	9.96	68.47	76.00	-7.53	AVG	
9		2.7220	55.74	9.98	65.72	86.00	-20.28	QP	
10		2.7220	51.03	9.98	61.01	76.00	-14.99	AVG	
11		5.1420	55.09	10.01	65.10	89.69	-24.59	QP	
12		5.1420	50.65	10.01	60.66	79.69	-19.03	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan



Site Conduction #2 Phase: *L3* Temperature: 24.9

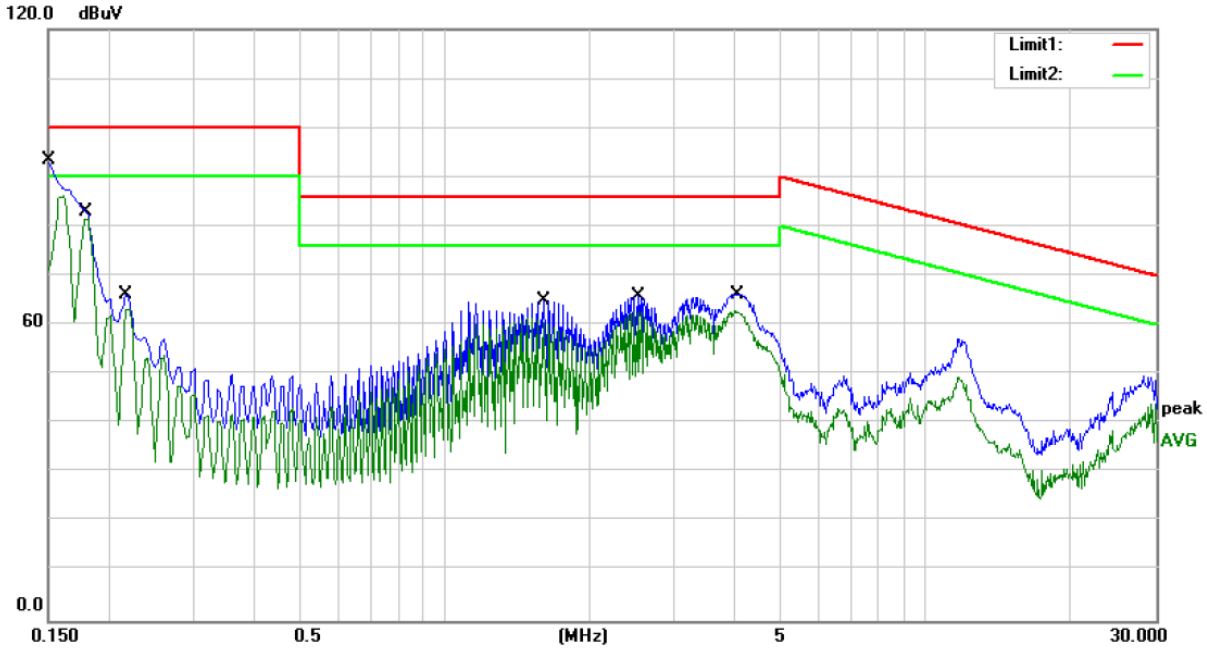
Limit: (CE)EN62040-2 C3_QP Power: DC 192V Humidity: 54 %

Mode: Bat mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1620	73.13	9.89	83.02	90.00	-6.98	AVG	
2		0.1660	77.84	9.89	87.73	100.00	-12.27	QP	
3		0.1740	77.52	9.89	87.41	100.00	-12.59	QP	
4	*	0.1740	74.80	9.89	84.69	90.00	-5.31	AVG	
5		1.1220	55.54	9.96	65.50	86.00	-20.50	QP	
6		1.1220	51.17	9.96	61.13	76.00	-14.87	AVG	
7		1.4820	50.84	9.96	60.80	86.00	-25.20	QP	
8		1.4820	46.53	9.96	56.49	76.00	-19.51	AVG	
9		3.1420	54.96	9.98	64.94	86.00	-21.06	QP	
10		3.1420	51.15	9.98	61.13	76.00	-14.87	AVG	
11		4.8420	56.87	10.01	66.88	86.00	-19.12	QP	
12		4.8420	51.13	10.01	61.14	76.00	-14.86	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan



Site Conduction #2 Phase: *N* Temperature: 24.9

Limit: (CE)EN62040-2 C3_QP Power: DC 192V Humidity: 54 %

Mode: Bat mode

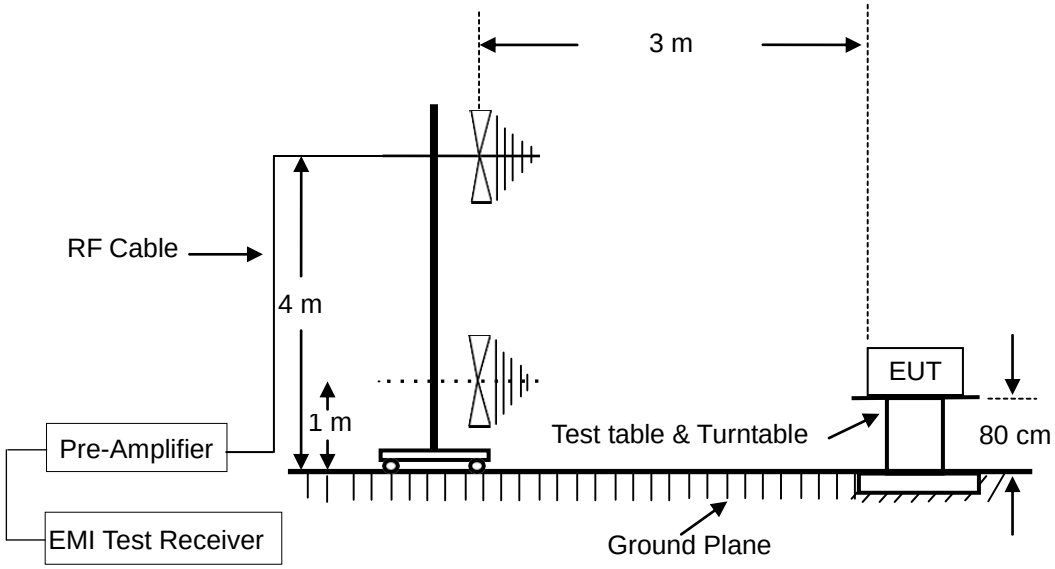
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	83.58	9.89	93.47	100.00	-6.53	QP	
2	*	0.1500	76.23	9.89	86.12	90.00	-3.88	AVG	
3		0.1820	74.11	9.89	84.00	100.00	-16.00	QP	
4		0.1820	71.62	9.89	81.51	90.00	-8.49	AVG	
5		0.2180	56.16	9.90	66.06	100.00	-33.94	QP	
6		0.2180	53.38	9.90	63.28	90.00	-26.72	AVG	
7		1.6020	54.98	9.97	64.95	86.00	-21.05	QP	
8		1.6020	51.29	9.97	61.26	76.00	-14.74	AVG	
9		2.5220	55.93	9.98	65.91	86.00	-20.09	QP	
10		2.5220	52.65	9.98	62.63	76.00	-13.37	AVG	
11		4.0620	56.29	10.00	66.29	86.00	-19.71	QP	
12		4.0620	52.75	10.00	62.75	76.00	-13.25	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Stan

5. RADIATED EMISSION MEASUREMENT

5.1. Block Diagram of Test



5.2. Radiated Limit

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dBμV/m)
30 ~ 230	3	60
230 ~ 1000	3	70

5.3. Test Procedure

The EUT was placed on a non-conductive plank whose total height equaled 80cm. All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units.

The EUT was set 3 meters (or 10 meters) away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.

The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

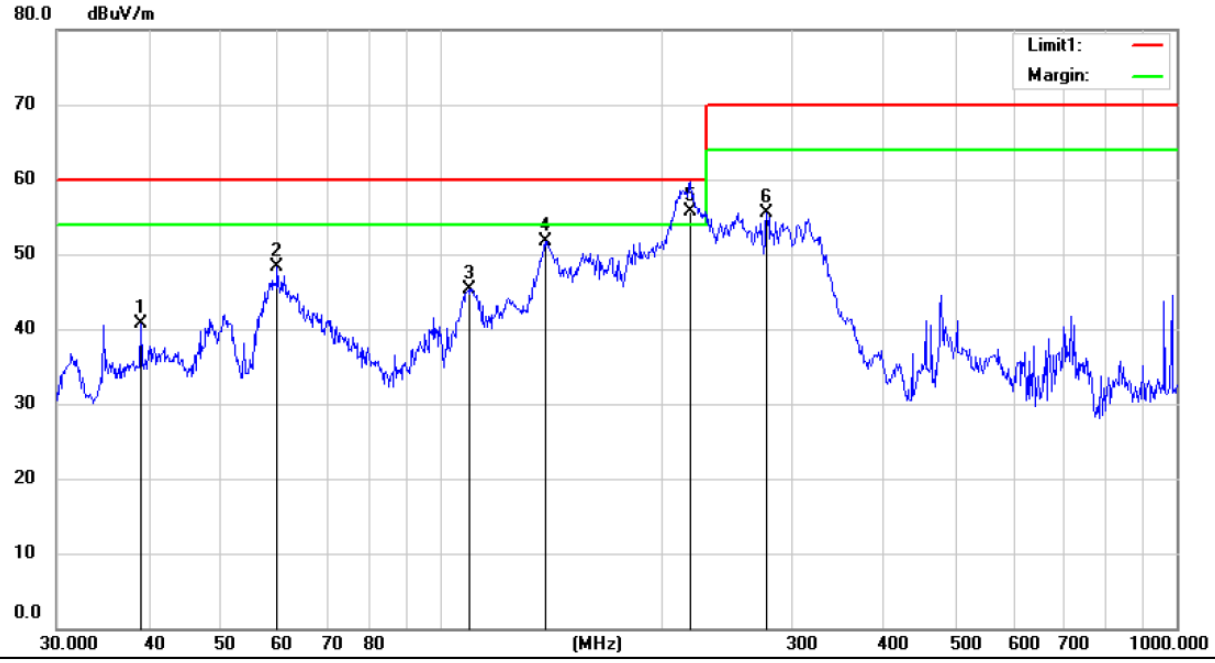
The bandwidth of the Receiver is set at 120 kHz.

Test results were obtained from the following equation:
Emission level (dBμV/m) = Antenna Factor -Amp Factor +Cable Loss + Reading
Margin (dB) = Emission Level (dBμV/m) - Limit (dBμV/m)

5.4. Measuring Results

PASS.

All the modes were tested and the data of the worst modes are attached the following pages.



Site 3m Chamber #3 Polarization: *Horizontal* Temperature: 23 C

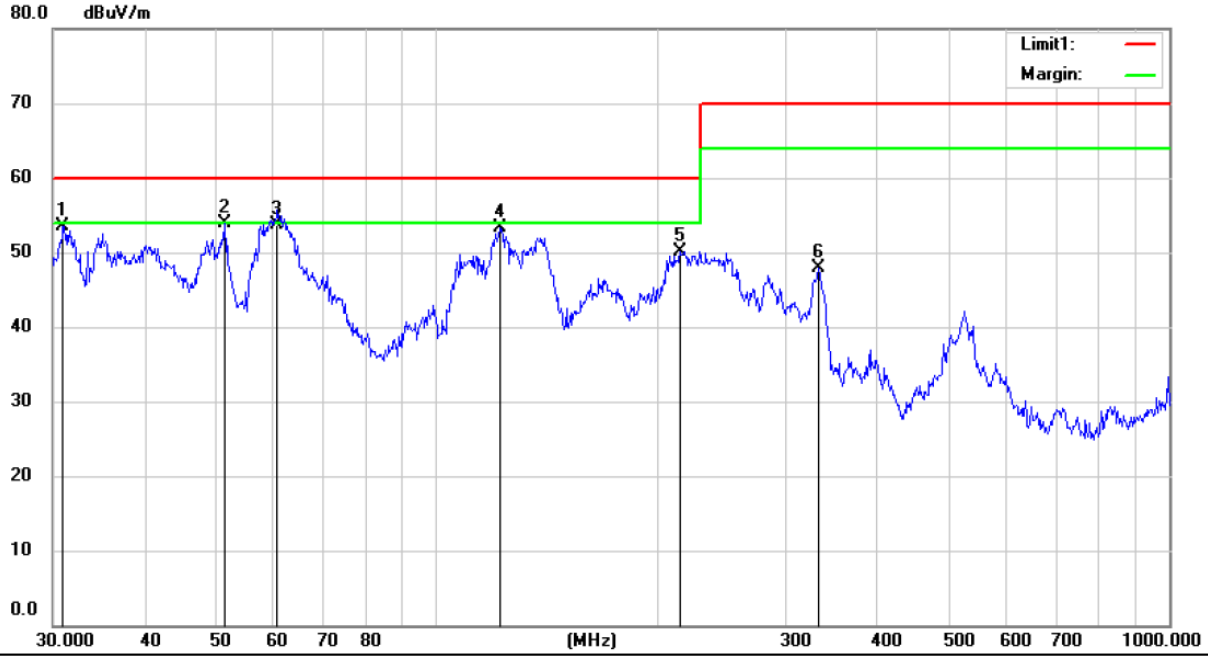
Limit: (RE)EN62040-2_C3 Power: AC 380V/50Hz Humidity: 51 %

Mode: LINE MODE

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		39.0244	55.96	-15.34	40.62	60.00	-19.38	QP			
2		59.8588	63.85	-15.63	48.22	60.00	-11.78	QP			
3		109.0286	60.94	-15.58	45.36	60.00	-14.64	QP			
4		138.3873	70.94	-19.20	51.74	60.00	-8.26	QP			
5	*	218.3085	70.88	-15.18	55.70	60.00	-4.30	QP			
6		277.0935	68.32	-12.91	55.41	70.00	-14.59	QP			

*:Maximum data x:Over limit !:over margin Operator:



Site 3m Chamber #3 Polarization: *Vertical* Temperature: 23 C

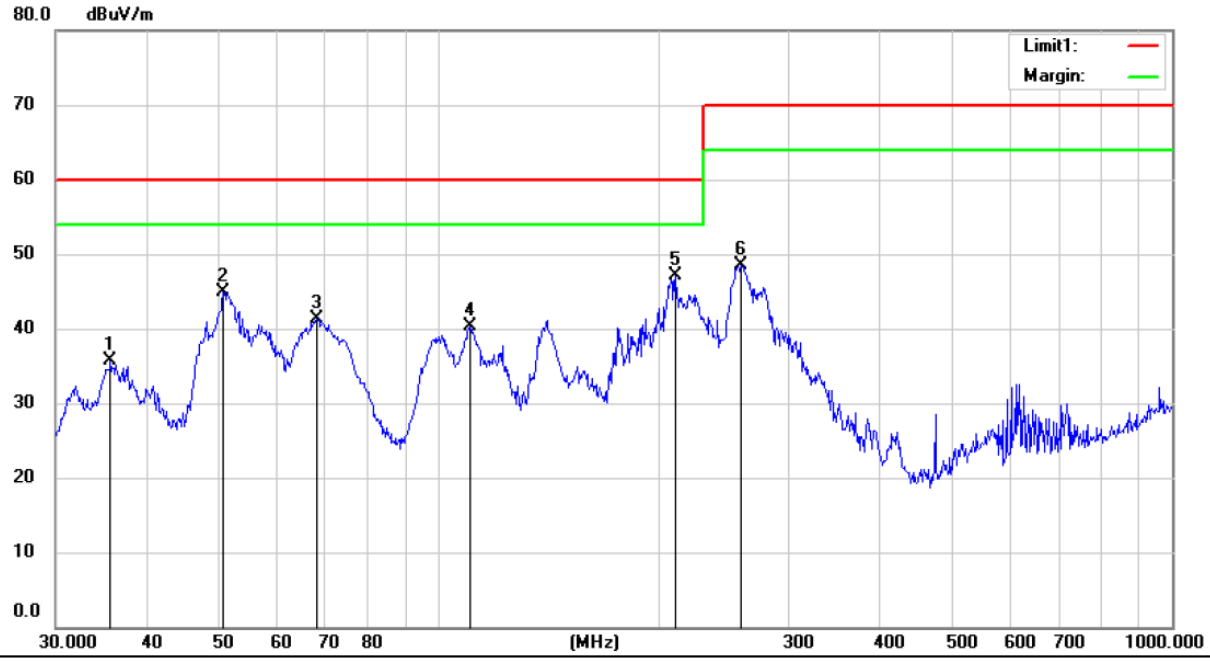
Limit: (RE)EN62040-2_C3 Power: AC 380V/50Hz Humidity: 51 %

Mode: LINE MODE

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		30.9618	70.50	-16.95	53.55	60.00	-6.45	QP			
2	*	51.4807	67.98	-14.08	53.90	60.00	-6.10	QP			
3		60.7044	69.52	-15.72	53.80	60.00	-6.20	QP			
4		122.4040	71.16	-17.87	53.29	60.00	-6.71	QP			
5		215.2678	65.56	-15.43	50.13	60.00	-9.87	QP			
6		332.5187	59.17	-11.25	47.92	70.00	-22.08	QP			

*:Maximum data x:Over limit !:over margin Operator:



Site 3m Chamber #3 Polarization: *Horizontal* Temperature: 23 C

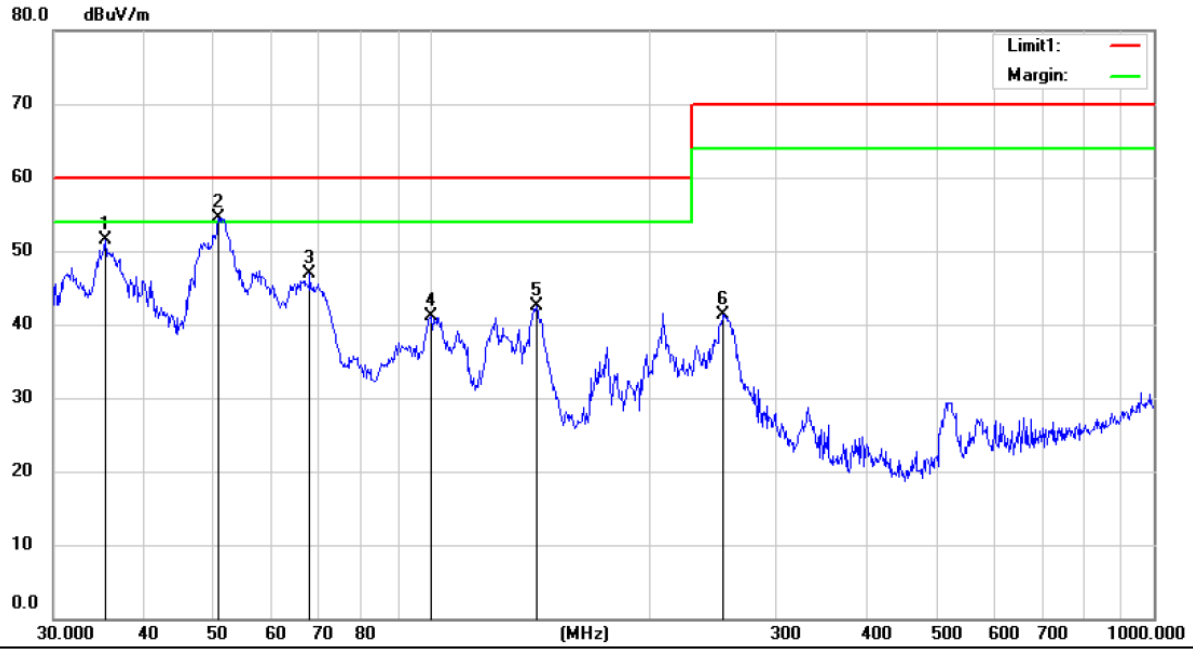
Limit: (RE)EN62040-2_C3 Power: DC 192V Humidity: 51 %

Mode: BAT MODE

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		35.6240	52.29	-16.63	35.66	60.00	-24.34	QP			
2		50.7637	59.10	-14.12	44.98	60.00	-15.02	QP			
3		68.1514	58.93	-17.56	41.37	60.00	-18.63	QP			
4		110.1816	55.87	-15.63	40.24	60.00	-19.76	QP			
5	*	210.0481	62.71	-15.69	47.02	60.00	-12.98	QP			
6		258.3264	62.02	-13.49	48.53	70.00	-21.47	QP			

*:Maximum data x:Over limit !:over margin Operator:



Site 3m Chamber #3 Polarization: *Vertical* Temperature: 23 C

Limit: (RE)EN62040-2_C3 Power: DC 192V Humidity: 51 %

Mode: BAT MODE

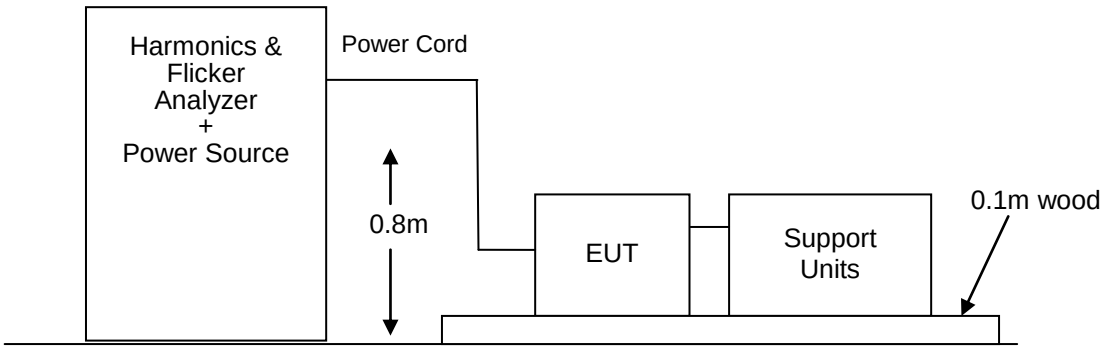
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		35.3750	68.11	-16.70	51.41	60.00	-8.59	QP			
2	*	50.7637	68.63	-14.12	54.51	60.00	-5.49	QP			
3		67.9128	64.32	-17.45	46.87	60.00	-13.13	QP			
4		99.8777	57.01	-15.98	41.03	60.00	-18.97	QP			
5		139.8508	61.67	-19.16	42.51	60.00	-17.49	QP			
6		253.8366	54.91	-13.58	41.33	70.00	-28.67	QP			

*:Maximum data x:Over limit !:over margin Operator:

6. HARMONIC CURRENT EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Standard Limits

EN 61000-3-12, CLASS A,

6.3. Test Procedure

The measurement of harmonic currents shall be performed as follows: i. For each harmonic order, measure the 1.5 s smoothed r.m.s. harmonic current in each DFT time window as defined in EN / IEC 61000-4-7:2009. ii. Calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period Short cyclic (T cycle≤2.5 min). Because of synchronisation to meet the requirements for repeatability in 5%.

6.4. Test Results

Pass.

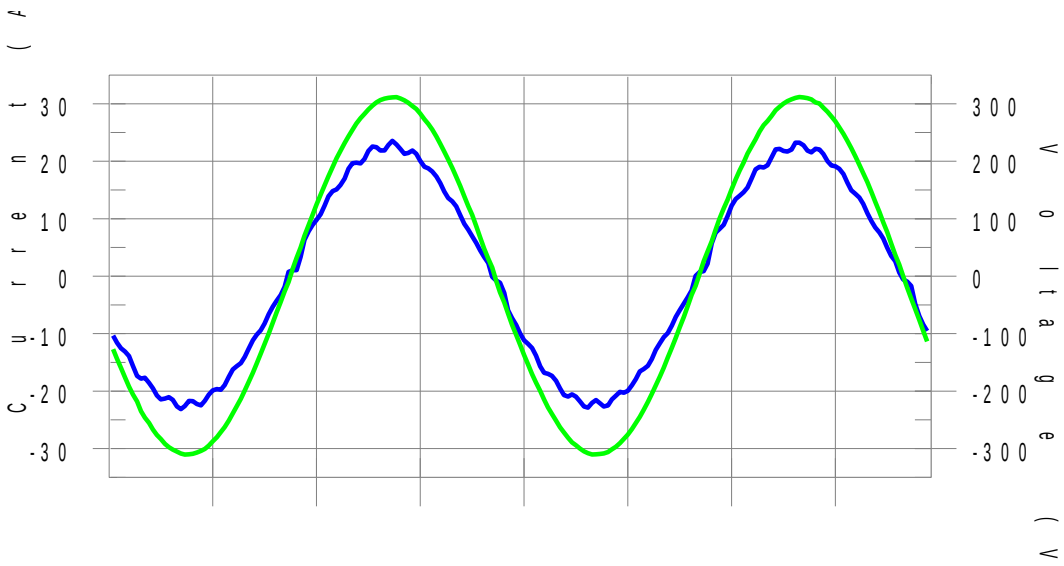
Please refer to the following pages.

Harmonics – Per EN/IEC61000-3-12(Phase A-Run time)

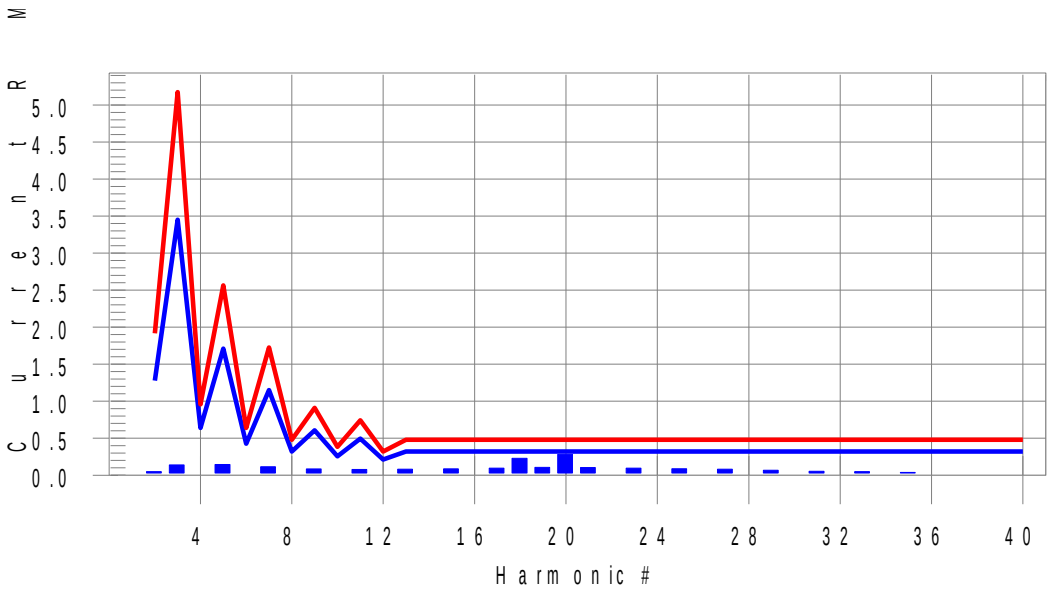
EUT: Uninterruptible Power Systems **Tested by: LQZ**
Test category: Table:2, Rsce=33, Inter-Harm, Test Margin: 100
Test date: 2018/4/25 **Start time: 15:13:53** **End time: 15:16:46**
Test duration (min): 2.5 **Data file name: WIN2106_H-000311.cts_data**
Comment: LINE MODE
Customer: INVT

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class 2 limit line **European Limits**



Test result: Pass **Worst harmonic was #13 with 25.67 % of the limit.**

Current Test Result Summary (Phase A-Run time)

EUT: Uninterruptible Power Systems **Tested by: LQZ**
Test category: Table:2, Rsce=33, Inter-Harm, **Test Margin: 100**
Test date: 2018/4/25 **Start time: 15:13:53** **End time: 15:16:46**
Test duration (min): 2.5 **Data file name: WIN2106_H-000311.cts_data**
Comment: LINE MODE
Customer: INVT

Test Result: Pass **Measured I-ref: 15.961 Amp rms** **Source: Normal**
I-THC(%): 3.3 **Limit(%): 23.0** **PWHC(%): 12.9** **PWHC Limit(%): 23.0**

Highest parameter values during test:

V_RMS (Volts):	**219.85**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**23.823**	**I_RMS (Amps):**	**15.983**
I_Fund (Amps):	**15.961**	**Crest Factor:**	**1.491**
Power (Watts):	**3511**	**Power Factor:**	**0.999**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.048	1.278	3.8	0.054	1.916	2.8	Pass
3	0.140	3.449	4.1	0.151	5.174	2.9	Pass
4	0.020	0.639	3.1	0.023	0.958	2.4	Pass
5	0.146	1.709	8.5	0.151	2.563	5.9	Pass
6	0.009	0.426	2.2	0.010	0.639	1.6	Pass
7	0.114	1.150	9.9	0.119	1.725	6.9	Pass
8	0.009	0.319	2.8	0.010	0.479	2.2	Pass
9	0.084	0.607	13.9	0.087	0.910	9.6	Pass
10	0.010	0.256	3.9	0.011	0.383	3.0	Pass
11	0.078	0.495	15.8	0.081	0.743	10.9	Pass
12	0.010	0.213	4.7	0.013	0.319	4.0	Pass
13	0.082	0.319	25.7	0.084	0.479	17.5	Pass
14	0.013	N/A	N/A	0.015	N/A	N/A	N/A
15	0.086	N/A	N/A	0.089	N/A	N/A	N/A
16	0.029	N/A	N/A	0.031	N/A	N/A	N/A
17	0.095	N/A	N/A	0.097	N/A	N/A	N/A
18	0.228	N/A	N/A	0.230	N/A	N/A	N/A
19	0.106	N/A	N/A	0.110	N/A	N/A	N/A
20	0.283	N/A	N/A	0.286	N/A	N/A	N/A
21	0.103	N/A	N/A	0.106	N/A	N/A	N/A
22	0.020	N/A	N/A	0.023	N/A	N/A	N/A
23	0.095	N/A	N/A	0.097	N/A	N/A	N/A
24	0.014	N/A	N/A	0.016	N/A	N/A	N/A
25	0.088	N/A	N/A	0.091	N/A	N/A	N/A
26	0.012	N/A	N/A	0.013	N/A	N/A	N/A
27	0.081	N/A	N/A	0.084	N/A	N/A	N/A
28	0.013	N/A	N/A	0.015	N/A	N/A	N/A
29	0.069	N/A	N/A	0.072	N/A	N/A	N/A
30	0.010	N/A	N/A	0.013	N/A	N/A	N/A
31	0.056	N/A	N/A	0.058	N/A	N/A	N/A
32	0.011	N/A	N/A	0.014	N/A	N/A	N/A
33	0.049	N/A	N/A	0.052	N/A	N/A	N/A
34	0.012	N/A	N/A	0.016	N/A	N/A	N/A
35	0.038	N/A	N/A	0.041	N/A	N/A	N/A
36	0.013	N/A	N/A	0.018	N/A	N/A	N/A
37	0.025	N/A	N/A	0.027	N/A	N/A	N/A
38	0.011	N/A	N/A	0.016	N/A	N/A	N/A
39	0.017	N/A	N/A	0.019	N/A	N/A	N/A
40	0.008	N/A	N/A	0.013	N/A	N/A	N/A

Note: Measured I-ref was applied for this test.

Voltage Source Verification Data (Phase A-Run time)

EUT: Uninterruptible Power Systems **Tested by: LQZ**
Test category: Table:2, Rsce=33, Inter-Harm, **Test Margin: 100**
Test date: 2018/4/25 **Start time: 15:13:53** **End time: 15:16:46**
Test duration (min): 2.5 **Data file name: WIN2106_H-000311.cts_data**
Comment: LINE MODE
Customer: INVT

Test Result: Pass **Source qualification: Normal**
Measured source distortion is within the requirements of the standards
Measurements are compliant with IEC/EN61000-3-12 Ed.2 (2011) & IEC/EN61000-4-7

Highest parameter values during test:

Voltage (Vrms):	**219.85**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**23.823**	**I_RMS (Amps):**	**15.983**
I_Fund (Amps):	**15.961**	**Crest Factor:**	**1.491**
Power (Watts):	**3511**	**Power Factor:**	**0.999**

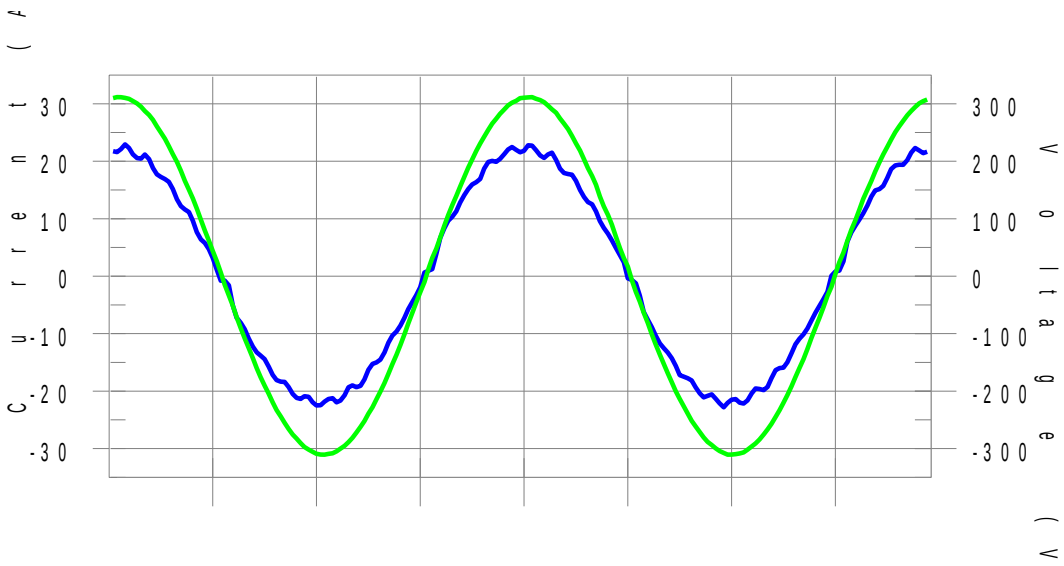
Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.306	0.879	34.76	OK
3	0.186	2.748	6.78	OK
4	0.041	0.879	4.69	OK
5	0.123	3.297	3.74	OK
6	0.027	0.879	3.05	OK
7	0.143	2.748	5.21	OK
8	0.024	0.879	2.75	OK
9	0.132	1.319	10.04	OK
10	0.027	0.879	3.03	OK
11	0.114	1.539	7.42	OK
12	0.020	0.659	3.10	OK
13	0.081	1.319	6.10	OK
14	0.025	0.659	3.79	OK
15	0.093	0.659	14.17	OK
16	0.024	0.659	3.70	OK
17	0.099	0.659	14.96	OK
18	0.030	0.659	4.55	OK
19	0.117	0.659	17.77	OK
20	0.041	0.659	6.17	OK
21	0.152	0.659	23.09	OK
22	0.024	0.659	3.65	OK
23	0.149	0.659	22.61	OK
24	0.022	0.659	3.30	OK
25	0.155	0.659	23.50	OK
26	0.020	0.659	3.10	OK
27	0.173	0.659	26.31	OK
28	0.022	0.659	3.29	OK
29	0.154	0.659	23.40	OK
30	0.025	0.659	3.72	OK
31	0.145	0.660	21.93	OK
32	0.024	0.659	3.64	OK
33	0.144	0.659	21.90	OK
34	0.025	0.659	3.78	OK
35	0.123	0.660	18.65	OK
36	0.027	0.659	4.13	OK
37	0.109	0.659	16.47	OK
38	0.025	0.659	3.83	OK
39	0.092	0.660	13.97	OK
40	0.026	0.660	4.02	OK

Harmonics – Per EN/IEC61000-3-12(Phase B-Run time)

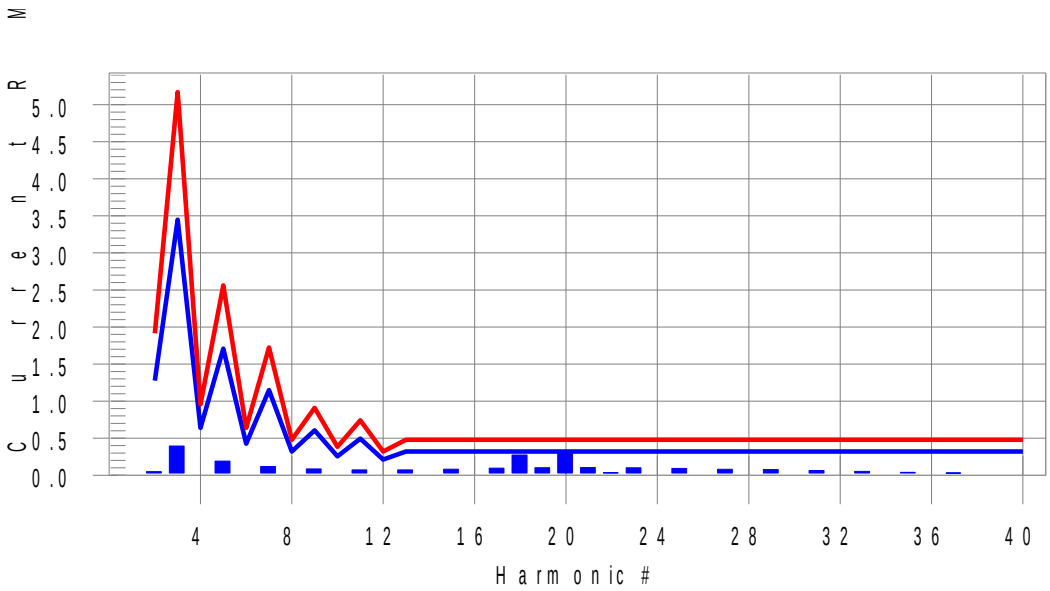
EUT: Uninterruptible Power Systems **Tested by: LQZ**
Test category: Table:2, Rsce=33, Inter-Harm, **Test Margin: 100**
Test date: 2018/4/25 **Start time: 15:13:53** **End time: 15:16:46**
Test duration (min): 2.5 **Data file name: WIN2106_H-000311.cts_data**
Comment: LINE MODE
Customer: INVT

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class 2 limit line **European Limits**



Test result: Pass **Worst harmonic was #13 with 23.26 % of the limit.**

Current Test Result Summary (Phase B-Run time)

EUT: Uninterruptible Power Systems **Tested by: LQZ**
Test category: Table:2, Rsce=33, Inter-Harm, **Test Margin: 100**
Test date: 2018/4/25 **Start time: 15:13:53** **End time: 15:16:46**
Test duration (min): 2.5 **Data file name: WIN2106_H-000311.cts_data**
Comment: LINE MODE
Customer: INVT

Test Result: Pass **Measured I-ref: 15.943 Amp rms** **Source: Normal**
I-THC(%): 4.3 **Limit(%): 23.0** **PWHC(%): 13.9** **PWHC Limit(%): 23.0**

Highest parameter values during test:

V_RMS (Volts):	**220.02**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**23.614**	**I_RMS (Amps):**	**15.974**
I_Fund (Amps):	**15.943**	**Crest Factor:**	**1.480**
Power (Watts):	**3509**	**Power Factor:**	**0.999**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.048	1.277	3.8	0.053	1.915	2.8	Pass
3	0.394	3.447	11.4	0.405	5.170	7.8	Pass
4	0.012	0.638	1.9	0.014	0.957	1.4	Pass
5	0.190	1.707	11.1	0.194	2.561	7.6	Pass
6	0.014	0.426	3.2	0.016	0.638	2.5	Pass
7	0.119	1.149	10.3	0.121	1.723	7.0	Pass
8	0.011	0.319	3.5	0.012	0.479	2.6	Pass
9	0.084	0.606	13.8	0.086	0.910	9.4	Pass
10	0.012	0.255	4.8	0.014	0.383	3.5	Pass
11	0.072	0.495	14.5	0.077	0.742	10.4	Pass
12	0.012	0.213	5.8	0.014	0.319	4.3	Pass
13	0.073	0.319	23.0	0.075	0.479	15.7	Pass
14	0.016	N/A	N/A	0.019	N/A	N/A	N/A
15	0.082	N/A	N/A	0.086	N/A	N/A	N/A
16	0.024	N/A	N/A	0.026	N/A	N/A	N/A
17	0.095	N/A	N/A	0.099	N/A	N/A	N/A
18	0.273	N/A	N/A	0.274	N/A	N/A	N/A
19	0.102	N/A	N/A	0.106	N/A	N/A	N/A
20	0.293	N/A	N/A	0.295	N/A	N/A	N/A
21	0.103	N/A	N/A	0.106	N/A	N/A	N/A
22	0.035	N/A	N/A	0.037	N/A	N/A	N/A
23	0.100	N/A	N/A	0.102	N/A	N/A	N/A
24	0.017	N/A	N/A	0.019	N/A	N/A	N/A
25	0.092	N/A	N/A	0.094	N/A	N/A	N/A
26	0.014	N/A	N/A	0.016	N/A	N/A	N/A
27	0.080	N/A	N/A	0.083	N/A	N/A	N/A
28	0.013	N/A	N/A	0.016	N/A	N/A	N/A
29	0.076	N/A	N/A	0.079	N/A	N/A	N/A
30	0.011	N/A	N/A	0.013	N/A	N/A	N/A
31	0.065	N/A	N/A	0.067	N/A	N/A	N/A
32	0.011	N/A	N/A	0.014	N/A	N/A	N/A
33	0.052	N/A	N/A	0.055	N/A	N/A	N/A
34	0.012	N/A	N/A	0.015	N/A	N/A	N/A
35	0.040	N/A	N/A	0.042	N/A	N/A	N/A
36	0.013	N/A	N/A	0.018	N/A	N/A	N/A
37	0.030	N/A	N/A	0.033	N/A	N/A	N/A
38	0.011	N/A	N/A	0.017	N/A	N/A	N/A
39	0.021	N/A	N/A	0.026	N/A	N/A	N/A
40	0.009	N/A	N/A	0.015	N/A	N/A	N/A

Note: Measured I-ref was applied for this test.

Voltage Source Verification Data (Phase B-Run time)

EUT: Uninterruptible Power Systems **Tested by: LQZ**
Test category: Table:2, Rsce=33, Inter-Harm, **Test Margin: 100**
Test date: 2018/4/25 **Start time: 15:13:53** **End time: 15:16:46**
Test duration (min): 2.5 **Data file name: WIN2106_H-000311.cts_data**
Comment: LINE MODE
Customer: INVT

Test Result: Pass **Source qualification: Normal**
Measured source distortion is within the requirements of the standards
Measurements are compliant with IEC/EN61000-3-12 Ed.2 (2011) & IEC/EN61000-4-7

Highest parameter values during test:

Voltage (Vrms):	**220.02**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**23.614**	**I_RMS (Amps):**	**15.974**
I_Fund (Amps):	**15.943**	**Crest Factor:**	**1.480**
Power (Watts):	**3509**	**Power Factor:**	**0.999**

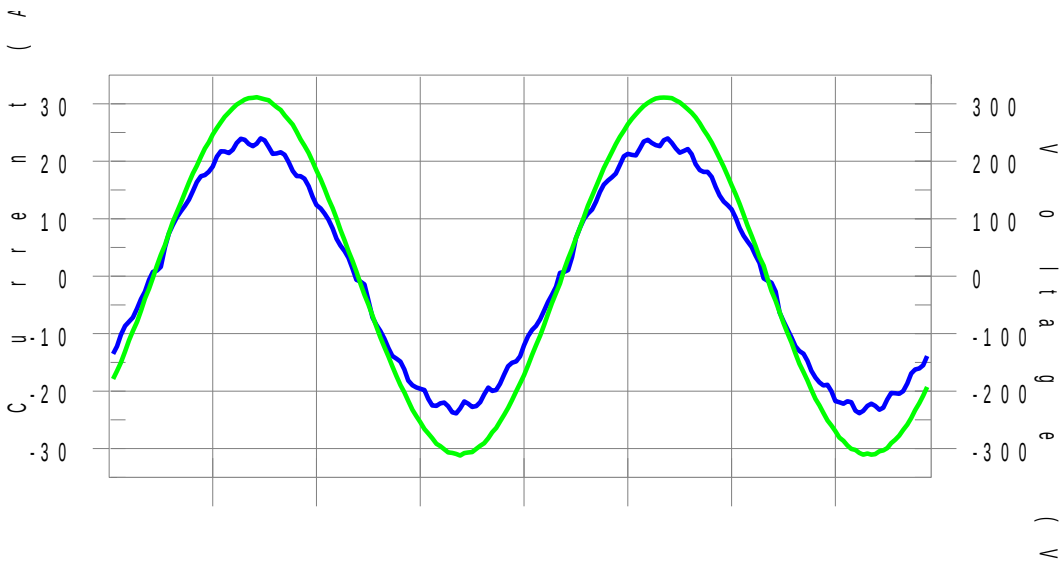
Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.307	0.880	34.90	OK
3	0.180	2.749	6.56	OK
4	0.044	0.880	4.96	OK
5	0.142	3.299	4.30	OK
6	0.029	0.880	3.31	OK
7	0.154	2.749	5.60	OK
8	0.035	0.880	4.00	OK
9	0.153	1.320	11.58	OK
10	0.029	0.880	3.32	OK
11	0.127	1.540	8.27	OK
12	0.033	0.660	4.97	OK
13	0.102	1.320	7.74	OK
14	0.025	0.660	3.79	OK
15	0.098	0.660	14.89	OK
16	0.031	0.660	4.71	OK
17	0.087	0.660	13.24	OK
18	0.037	0.660	5.62	OK
19	0.117	0.660	17.76	OK
20	0.041	0.660	6.21	OK
21	0.147	0.660	22.25	OK
22	0.033	0.660	5.06	OK
23	0.143	0.660	21.70	OK
24	0.026	0.660	3.98	OK
25	0.149	0.660	22.61	OK
26	0.031	0.660	4.70	OK
27	0.163	0.660	24.69	OK
28	0.029	0.660	4.35	OK
29	0.163	0.660	24.77	OK
30	0.030	0.660	4.62	OK
31	0.153	0.660	23.17	OK
32	0.026	0.660	3.98	OK
33	0.148	0.660	22.38	OK
34	0.033	0.660	5.02	OK
35	0.123	0.660	18.63	OK
36	0.033	0.660	5.06	OK
37	0.121	0.660	18.27	OK
38	0.030	0.660	4.50	OK
39	0.109	0.660	16.50	OK
40	0.040	0.660	6.09	OK

Harmonics – Per EN/IEC61000-3-12(Phase C-Run time)

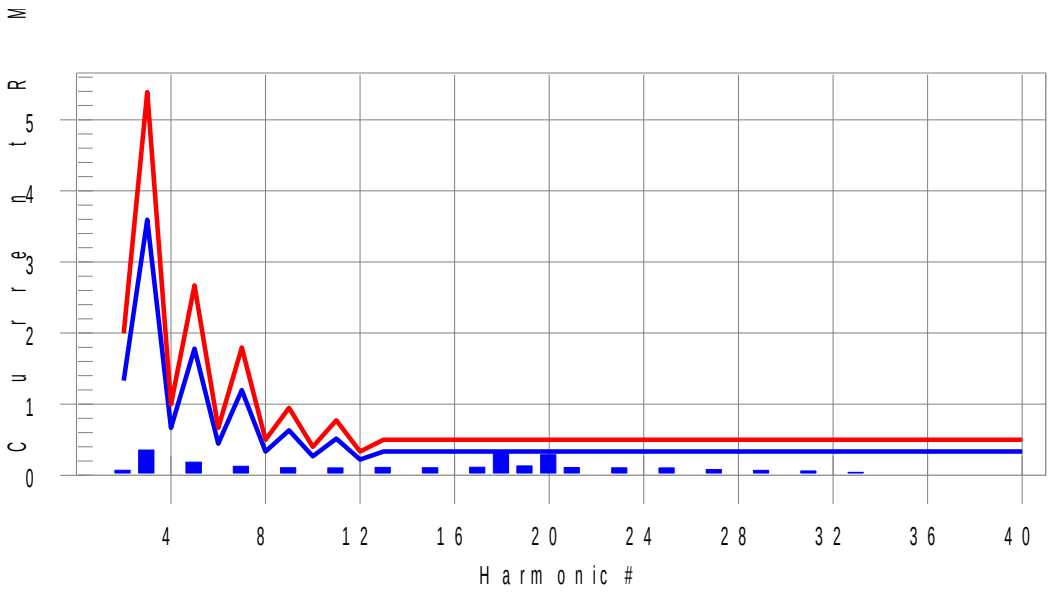
EUT: Uninterruptible Power Systems **Tested by: LQZ**
Test category: Table:2, Rsce=33, Inter-Harm, **Test Margin: 100**
Test date: 2018/4/25 **Start time: 15:13:53** **End time: 15:16:46**
Test duration (min): 2.5 **Data file name: WIN2106_H-000311.cts_data**
Comment: LINE MODE
Customer: INVT

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class 2 limit line **European Limits**



Test result: Pass **Worst harmonic was #13 with 33.76 % of the limit.**

Current Test Result Summary (Phase C-Run time)

EUT: Uninterruptible Power Systems **Tested by: LQZ**
Test category: Table:2, Rsce=33, Inter-Harm, **Test Margin: 100**
Test date: 2018/4/25 **Start time: 15:13:53** **End time: 15:16:46**
Test duration (min): 2.5 **Data file name: WIN2106_H-000311.cts_data**
Comment: LINE MODE
Customer: INVT

Test Result: Pass **Measured I-ref: 16.618 Amp rms** **Source: Normal**
I-THC(%): 4.3 **Limit(%): 23.0** **PWHC(%): 14.4** **PWHC Limit(%): 23.0**

Highest parameter values during test:

V_RMS (Volts):	**219.92**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**24.686**	**I_RMS (Amps):**	**16.657**
I_Fund (Amps):	**16.618**	**Crest Factor:**	**1.485**
Power (Watts):	**3657**	**Power Factor:**	**0.998**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.071	1.331	5.3	0.075	1.996	3.8	Pass
3	0.355	3.593	9.9	0.366	5.389	6.8	Pass
4	0.019	0.665	2.9	0.021	0.998	2.1	Pass
5	0.184	1.780	10.3	0.187	2.670	7.0	Pass
6	0.010	0.444	2.2	0.011	0.665	1.6	Pass
7	0.128	1.198	10.7	0.130	1.796	7.2	Pass
8	0.008	0.333	2.3	0.009	0.499	1.7	Pass
9	0.107	0.632	17.0	0.110	0.948	11.6	Pass
10	0.008	0.266	3.1	0.010	0.399	2.4	Pass
11	0.103	0.516	19.9	0.106	0.773	13.7	Pass
12	0.009	0.222	4.0	0.010	0.333	3.0	Pass
13	0.111	0.333	33.3	0.112	0.499	22.5	Pass
14	0.014	N/A	N/A	0.016	N/A	N/A	N/A
15	0.107	N/A	N/A	0.109	N/A	N/A	N/A
16	0.016	N/A	N/A	0.019	N/A	N/A	N/A
17	0.113	N/A	N/A	0.115	N/A	N/A	N/A
18	0.338	N/A	N/A	0.339	N/A	N/A	N/A
19	0.132	N/A	N/A	0.136	N/A	N/A	N/A
20	0.288	N/A	N/A	0.289	N/A	N/A	N/A
21	0.110	N/A	N/A	0.113	N/A	N/A	N/A
22	0.022	N/A	N/A	0.026	N/A	N/A	N/A
23	0.104	N/A	N/A	0.106	N/A	N/A	N/A
24	0.016	N/A	N/A	0.019	N/A	N/A	N/A
25	0.101	N/A	N/A	0.103	N/A	N/A	N/A
26	0.011	N/A	N/A	0.015	N/A	N/A	N/A
27	0.079	N/A	N/A	0.081	N/A	N/A	N/A
28	0.012	N/A	N/A	0.014	N/A	N/A	N/A
29	0.069	N/A	N/A	0.072	N/A	N/A	N/A
30	0.010	N/A	N/A	0.012	N/A	N/A	N/A
31	0.061	N/A	N/A	0.064	N/A	N/A	N/A
32	0.010	N/A	N/A	0.014	N/A	N/A	N/A
33	0.042	N/A	N/A	0.045	N/A	N/A	N/A
34	0.011	N/A	N/A	0.015	N/A	N/A	N/A
35	0.028	N/A	N/A	0.031	N/A	N/A	N/A
36	0.011	N/A	N/A	0.016	N/A	N/A	N/A
37	0.020	N/A	N/A	0.026	N/A	N/A	N/A
38	0.010	N/A	N/A	0.017	N/A	N/A	N/A
39	0.013	N/A	N/A	0.018	N/A	N/A	N/A
40	0.008	N/A	N/A	0.011	N/A	N/A	N/A

Note: Measured I-ref was applied for this test.

Voltage Source Verification Data (Phase C-Run time)

EUT: Uninterruptible Power Systems **Tested by: LQZ**
Test category: Table:2, Rsce=33, Inter-Harm, **Test Margin: 100**
Test date: 2018/4/25 **Start time: 15:13:53** **End time: 15:16:46**
Test duration (min): 2.5 **Data file name: WIN2106_H-000311.cts_data**
Comment: LINE MODE
Customer: INVT

Test Result: Pass **Source qualification: Normal**
Measured source distortion is within the requirements of the standards
Measurements are compliant with IEC/EN61000-3-12 Ed.2 (2011) & IEC/EN61000-4-7

Highest parameter values during test:

Voltage (Vrms):	**219.92**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**24.686**	**I_RMS (Amps):**	**16.657**
I_Fund (Amps):	**16.618**	**Crest Factor:**	**1.485**
Power (Watts):	**3657**	**Power Factor:**	**0.998**

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.275	0.880	31.23	OK
3	0.163	2.749	5.93	OK
4	0.043	0.880	4.85	OK
5	0.122	3.298	3.69	OK
6	0.025	0.880	2.80	OK
7	0.146	2.749	5.31	OK
8	0.025	0.880	2.85	OK
9	0.141	1.319	10.66	OK
10	0.023	0.880	2.58	OK
11	0.110	1.539	7.12	OK
12	0.021	0.660	3.23	OK
13	0.075	1.319	5.68	OK
14	0.024	0.660	3.71	OK
15	0.100	0.660	15.09	OK
16	0.026	0.660	3.97	OK
17	0.114	0.660	17.27	OK
18	0.040	0.660	6.11	OK
19	0.137	0.660	20.84	OK
20	0.038	0.660	5.77	OK
21	0.165	0.660	25.01	OK
22	0.024	0.660	3.69	OK
23	0.160	0.660	24.28	OK
24	0.022	0.660	3.41	OK
25	0.176	0.660	26.61	OK
26	0.022	0.660	3.35	OK
27	0.175	0.660	26.56	OK
28	0.026	0.660	3.90	OK
29	0.164	0.660	24.86	OK
30	0.028	0.660	4.19	OK
31	0.155	0.660	23.52	OK
32	0.027	0.660	4.03	OK
33	0.140	0.660	21.18	OK
34	0.025	0.660	3.81	OK
35	0.122	0.660	18.52	OK
36	0.031	0.660	4.69	OK
37	0.105	0.660	15.99	OK
38	0.023	0.660	3.55	OK
39	0.090	0.660	13.71	OK
40	0.030	0.660	4.49	OK

5th Harmonic Phase Angle and Magnitude for Phase A :
H-5_min_phase : 294.3 Degree (Leading)
H-5_max_phase : 299.5 Degree (Leading)
H-5_ave_phase : 297.0 Degree (Leading)

H-5_ave_vector_magnitude : 0.183 Amp
H-5_standard_ave_magnitude : 0.146 Amp
H-5_standard_max_magnitude : 0.187 Amp
Ratio of H-5_ave_vector / H-5_standard_ave : 0.993

Phase A = 56.297% of tested Rsce = 33.000, Rsce = 18.578
Phase B = 60.422% of tested Rsce = 33.000, Rsce = 19.939
Phase C = 62.760% of tested Rsce = 33.000, Rsce = 20.711
Minimum Rsce required: Rsce = 20.711

7. IMMUNITY PERFORMANCE CRITERIA DESCRIPTION

Performance Level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level by its manufacturer or the requestor of the test, or the agreed between the manufacturer and the purchaser of the product.

Definition related to the performance level:
1. Based on the used product standard
2. Based on the declaration of the manufacturer, requestor or purchaser

EN 62040-2:

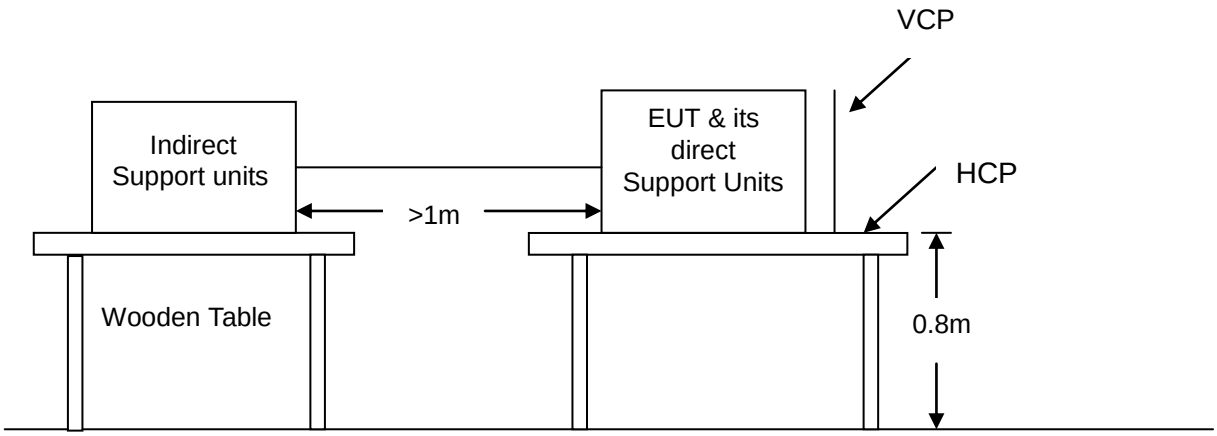
	Criterion A	**Criterion B**
External and internal indications and metering	Change only during test	Change only during test
Control signals to external devices	No change	Change only temporarily in consistency with the actual UPS mode of operation
Mode of operation [a]	No change	Change only temporarily
a At all times, the UPS shall remain within the performance classification as declared by the UPS manufacturer		

8. ELECTROSTATIC DISCHARGE

8.1. Test Specification

Test Standard	:	EN 62040-2
Basic Standard	:	EN 61000-4-2
Performance criterion	:	B
Test level	:	±8.0kV (Air discharge) ±4.0kV (Contact discharge)

8.2. Block Diagram of Test Setup



Ground Reference Plane

8.3. Test Procedure

a. In the case of air discharge testing, the climatic conditions shall be within the following ranges:
- ambient temperature: 15°C to 35°C;
- relative humidity : 30% to 60%;
- atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar)

b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.

c. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

d. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted : - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate. - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge. - The contact discharge test shall not be applied to such surfaces.

e. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

f. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final test level should not exceed the product specification value in order to avoid damage to the equipment.

g. The test shall be performed with both air discharge and contact discharge. According to the CE severity level on pre-selected points, at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge and at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge. For the time interval between successive single discharges, an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
h. Ensure that the applied charge on the EUT has been dis-charged before next ESD pulse.

8.4. Test Results

PASS

Temperature	:	22 °C
Humidity	:	53%
Atmospheric Pressure	:	101kpa
Test Engineer	:	ZCJ
Test Date	:	2018-04-19

Air Discharge:

Amount of discharge	Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
Mini 10 /Point	±2, 4, 8 kV	Slot, Screen	A	B	Pass

Contact Discharge

Amount of discharge	Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
Mini 25 /Point	±2; 4kV	Metal, Screw	A	B	Pass

Indirect Discharge

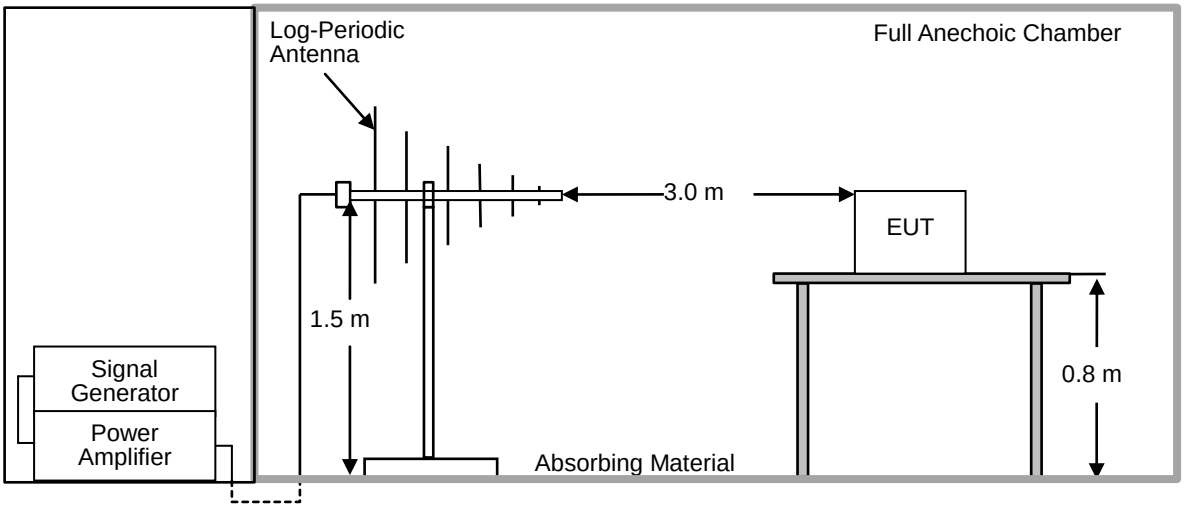
Amount of discharge	Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
Mini 10 /Point	±2; 4kV	VCP	A	B	Pass

9. RF FIELD STRENGTH SUSCEPTIBILITY TEST

9.1. Test Specification

Test Standard	:	EN 62040-2
Basic Standard	:	EN 61000-4-3
Performance criterion	:	A
Test level	:	10V/m
Frequency Range		80M-1000MHz
Modulation		AM 80%, 1kHz sine-wave

9.2. Block Diagram of Test Setup



9.3. Test procedure

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semi-anechoic chamber.

a. The antenna which is enabling the complete frequency range of 80-1000 MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the antenna.
b. The test is performed with the antenna facing the front and back sides of the EUT with. Both vertical and horizontal polarizations from antenna are tested.

9.4. Test results

PASS

Temperature	:	22 °C
Humidity	:	53%
Atmospheric Pressure	:	101kpa
Test Engineer	:	ZCJ
Test Date	:	2018-04-19

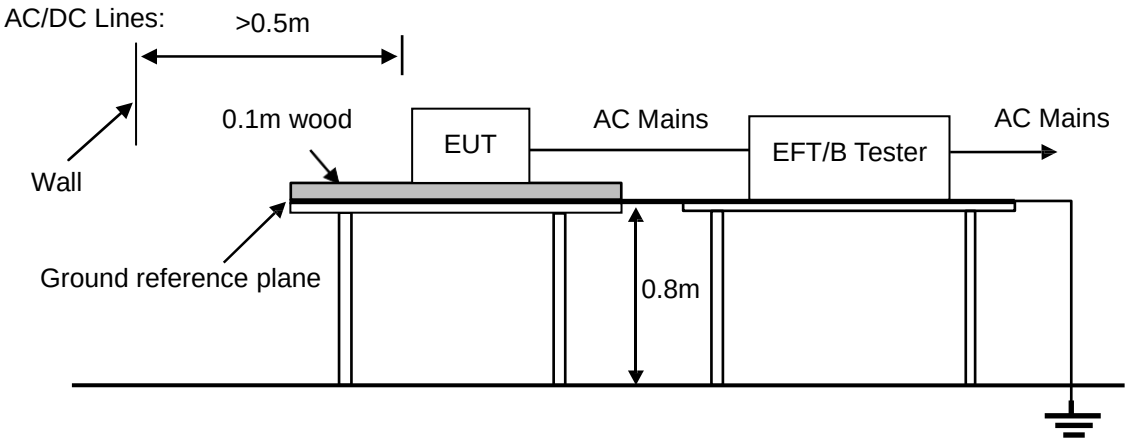
Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80-1000	10V/m	AM	H / V	Front	A	A	Pass
80-1000	10V/m	AM	H / V	Right	A	A	Pass
80-1000	10V/m	AM	H / V	Back	A	A	Pass
80-1000	10V/m	AM	H / V	Left	A	A	Pass

10. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

10.1. Test Specification

Test Standard	:	EN 62040-2
Basic Standard	:	EN 61000-4-4
Performance criterion	:	B
Test level	:	☒2kV, AC input power ports
		☒2kV, AC output power ports
		☐2kV, DC port
		☐2KV, DC interface
		☐2kV, Network port
Repetition frequency	:	☒ 5kHz, ☐100kHz
Tr/Th:	:	5/50ns
Burst Period	:	300ms
Test Time :	:	120s

10.2. Block Diagram of Test Setup



10.3. Test Procedure

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

10.4.Test Results

PASS

Temperature	:	22 °C
Humidity	:	53%
Atmospheric Pressure	:	101kpa
Test Engineer	:	ZCJ
Test Date	:	2018-04-19

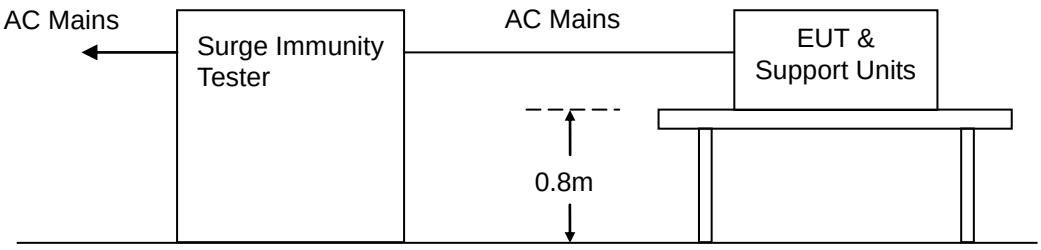
Injection Line	Voltage (kV)	Injected Method	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ AC input power ports	± 2	☒ CDN ☐ Direct injection ☐ Capacitive coupling clamp	A	B	Pass
☒ AC output power ports	± 2	☒ CDN ☐ Direct injection ☐ Capacitive coupling clamp	A	B	Pass
☐ DC port	± 2	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A
☐ DC interface	± 2	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A
☐ Network port	± 2	☐ CDN ☐ Direct injection ☐ Capacitive coupling clamp	N/A	N/A	N/A

11. SURGE IMMUNITY TEST

11.1. Test Specification

Test Standard	:	EN 62040-2
Basic Standard	:	EN 61000-4-5
Test level	:	☒1.0kV, Line - Line, AC input power ports, Criterion B
		☒2.0kV, Line - Earth, AC input power ports, Criterion B
		☒1.0kV, Line - Line, AC output power ports, Criterion B
		☒2.0kV, Line - Earth, AC output power ports, Criterion B
		☐1.0kV, Line - Line, DC port, Criterion B
		☐2.0kV, Line - Earth, DC port, Criterion B
		☐1.0kV, Network ports, Criterion B
Number of surges	:	5 (for each combination of parameters)
Repetition rate	:	1 minute / time
Polarity:	:	Positive / Negative
Phase angle:	:	0^o, 90^o, 180^o, 270^o

11.2. Block Diagram of Test Setup



11.3. Test Procedure

This test simulates a lightning event by inducing transients onto the AC/DC power supply lines in common mode (Line to Ground) and differential mode (Line to Line). Each device was tested in a total of two surge configurations: Line to Ground (L-G): Combination Wave, Line to Protective Earth with 9uF and 10Ohm and Neutral to Protective Earth with 9uF and 10Ohm, common mode, generator earthed.
Line to Line (L-L): Combination Wave,
Line to Neutral with 18uF, differential mode, generator floated.
2 ohm : the source impedance of the low-voltage power supply network.
12 ohm : the source impedance of the low-voltage power supply network and ground.
a. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).
b. The surges have to be applied line to line and line to earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.
c. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan. All lower levels including the selected test level shall be satisfied.
d. For testing the secondary protection, the output voltage of the generator shall be increased up to the worst-case voltage breakdown level (let-through level) of the primary protection.
e. Testing shall be performed according to a Test Plan, which shall be included in the test report.

f. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied.

11.4. Test results

PASS

Temperature	:	22 °C
Humidity	:	53%
Atmospheric Pressure	:	101kpa
Test Engineer	:	ZCJ
Test Date	:	2018-04-19

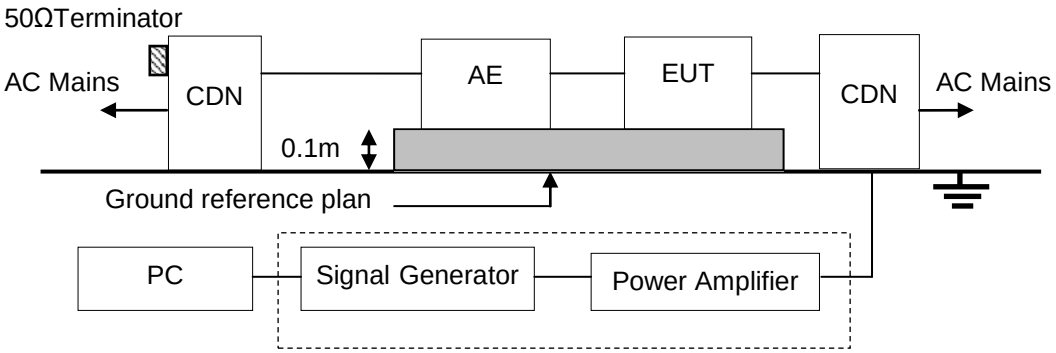
Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ AC input power ports (Line to line)	0.5, 1	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass
☒ AC input power ports (Line to earth)	0.5, 1, 2	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass
☒ AC output power ports (Line to line)	0.5, 1	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass
☒ AC output power ports (Line to earth)	0.5, 1, 2	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass
☐ DC port (Line to line)	0.5, 1	1.2/50 (8/20)	Pos./ Neg.	N/A	B	N/A
☐ DC port (Line to earth)	0.5, 1, 2	1.2/50 (8/20)	Pos./ Neg.	N/A	B	N/A
☐ Network Ports	0.5, 1	1.2/50 (8/20)	Pos./ Neg.	N/A	B	N/A

12. INJECTED CURRENTS SUSCEPTIBILITY TEST

12.1. Test Specification

Test Standard	:	EN 62040-2
Basic Standard	:	EN 61000-4-6
Performance criterion	:	A
Test level	:	10V
Frequency Range	:	0.15M-80MHz
Modulation	:	AM 80%, 1kHz sine-wave
Frequency Step	:	1% of fundamental

12.2. Block Diagram of Test Setup



12.3. Test Procedure

a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
b. The EUT is placed on a 0.1m high test table, and a well grounded cable is connected to metallic plane above the test table.
c. All cables/wires must be laid out on test plate (3cm in thickness),and the EUT is set up on test plate (10 cm in thickness) as shown in test setup photo, and the cables/wires must not be in mid-air, they should be touching the surface of test plate. Ensure that the EUT is properly connected to the accessory equipment. d. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
e. The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed 1.5 x 10-3 decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
f. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency (ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
g. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility
h. Testing shall be performed according to a Test Plan, which shall be included in the test report.

12.4. Test results

PASS

Temperature : 22 °C
Humidity : 53%
Atmospheric Pressure : 101kpa
Test Engineer : ZCJ
Test Date : 2018-04-19

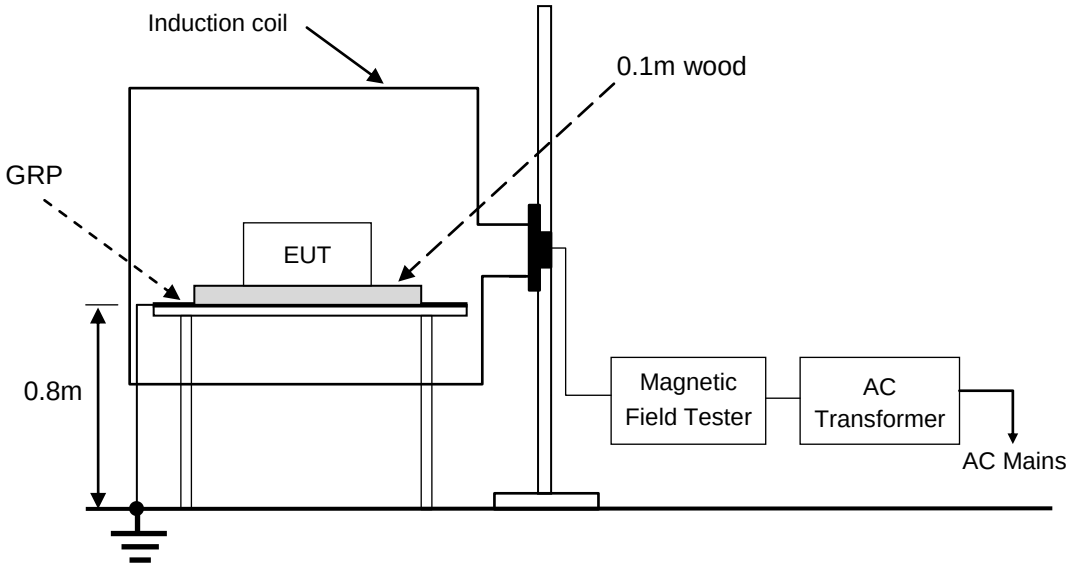
Range (MHz)	Levers	Injection port	Coupling type	Actual criterion	Required performance criterion	Result (Pass/Fail)
0.15-80	10V	☒ AC input power ports ☒ AC output power ports ☐ DC port ☐ Network port	☒ CDN ☐ EM Clamp ☐ Current Clamp ☐ Direct injection	A	A	Pass
0.15-80	10V	☐ AC input power ports ☐ AC output power ports ☐ DC port ☐ Network port	☐ CDN ☐ EM Clamp ☐ Current Clamp ☐ Direct injection	N/A	A	N/A

13. MAGNETIC FIELD SUSCEPTIBILITY TEST

13.1. Test Specification

Test Standard	:	EN 62040-2
Basic Standard	:	EN 61000-4-8
Performance criterion	:	A
Test level	:	30A/m

13.2. Block Diagram of Test Setup



GRP: Ground reference plane
EUT: Equipment under test

13.3. Test Procedure

The EUT is placed in the middle of a induction coil (1*1m), under which is a 1*1*0.1m (high) wood, this small table is also placed on a larger table, 0.8 m above the ground. Both horizontal and vertical polarization of the induction coil is set on test, so that each side of the EUT is affected by the magnetic field. Also can reach the same aim by change the position of the EUT.

13.4. Test Results

PASS

Temperature : 22 °C
Humidity : 53%
Atmospheric Pressure : 101kpa
Test Engineer : ZCJ
Test Date : 2018-04-19

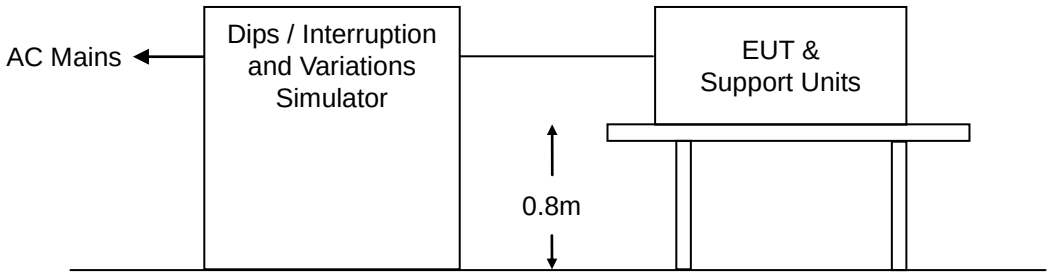
Test Level (A/m)	Frequency	Testing Duration	Coil Orientation	Actual criterion	Required performance criterion	Result (Pass/Fail)
30	☒ 50Hz ☒ 60Hz	5 mins	☒ x-axis ☒ y-axis ☒ z-axis	A	A	Pass

14. VOLTAGE DIPS AND INTERRUPTIONS TEST

14.1. Test Specification

Test Standard	:	EN 62040-2
Basic Standard	:	EN 61000-4-11

14.2. Block Diagram of Test Setup



14.3. Test Procedure

a. Where the equipment has a rated voltage the following shall apply - If the voltage range does not exceed 20% of the lower voltage specified for the rated voltage range, a single voltage within that range may be specified as a basis for test level specification.
- In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.
b. Test Conditions
- Select operated voltage and frequency of EUT - Test of interval : 10 sec.
- Level and duration : Sequence of 3 dips/interrupts.
- Voltage rise (and fall) time : 1.5 μs.

14.4. Test results

PASS

Temperature : 22 °C
Humidity : 53%
Atmospheric Pressure : 101kpa
Test Engineer : ZCJ
Test Date : 2018-04-19

	Test Level (% UT)	Phase angle (°)	Reduction (%)	Duration (periods)	Actual criterion	Required performance criterion	Result (Pass/Fail)
Voltage Dips	0%	0^o, 180^o	100%	0.5	A	B	Pass
	70%	0^o, 180^o	30%	25	A	C	Pass
Voltage Interruption	0%	0^o, 180^o	100%	250	C	C	Pass

Immunity to voltage dips, short interruptions and voltage variations characterize intrinsic UPS performance, and no specific EMC tests are required.

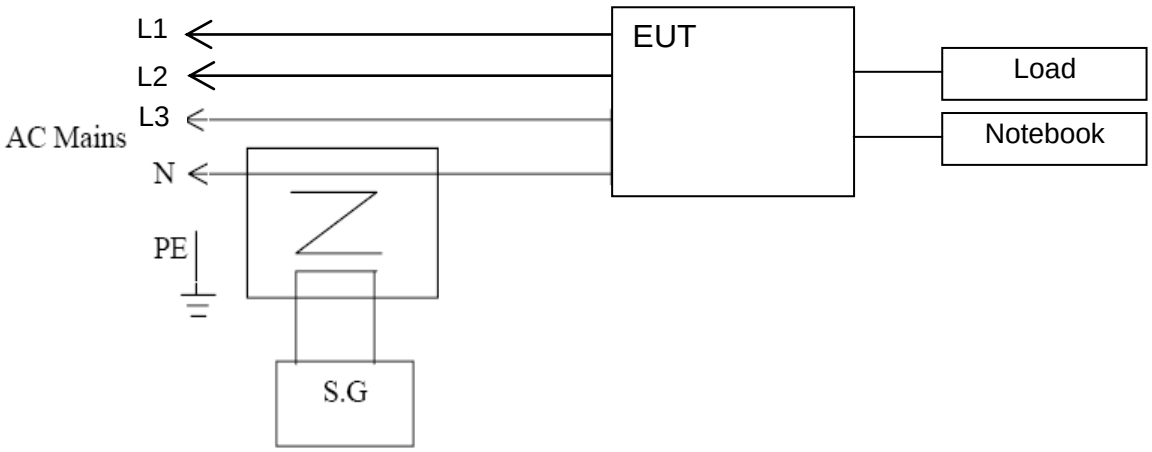
Note: Above is referenced to the customer request。

15. LOW FREQUENCY SIGNALS TEST

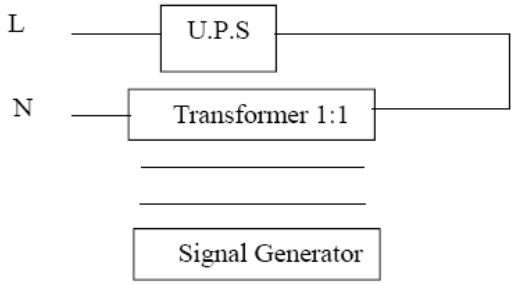
15.1. Test Specification

Test Standard	:	EN 62040-2
Basic Standard	:	EN 61000-2-2
Performance criterion	:	A
Test frequency	:	140-360Hz
Test level	:	10V(rms)Sinusoidal

15.2. Block Diagram of Test Setup



Isolation transformer
Primary: Secondary=1:1



15.3. Test Procedure

1) Set up the EUT and test generator as shown on Block diagram.
2) Add the 10V (rms) Sinusoidal interference signal and the interference signal frequency from 140Hz ~ 360Hz to L terminal.
3) Repeat the second step at the N-terminus.

15.4.Test Results

PASS.

Temperature	:	22 °C
Humidity	:	53%
Atmospheric Pressure	:	101kpa
Test Engineer	:	ZCJ
Test Date	:	2018-04-19

Frequency Range (Hz)	Step (Hz)	Position	Strength	Result	Note
140	10	L,N	10V(rms) Sinusoidal	P	A
160				P	A
200				P	A
240				P	A
280				P	A
320				P	A
360				P	A

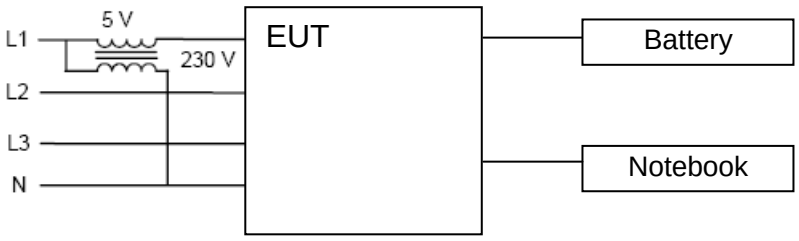
16. POWER LINE UNBALANCE (THREE-PHASE UPS SYSTEMS ONLY)

16.1. Test Specification

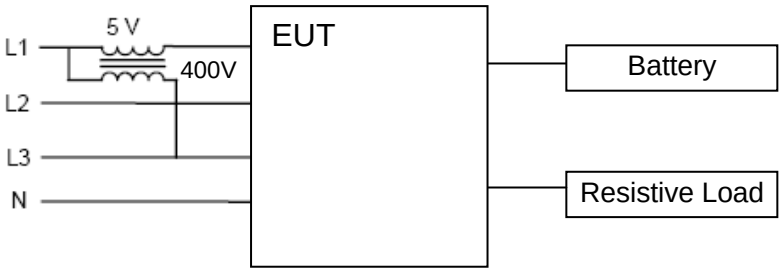
Test Standard	:	EN 62040-2
Performance criterion	:	A
Test frequency	:	50Hz
Test level	:	5V(rms)Sinusoidal

16.2. Block Diagram of Test Setup

For Amplitude unbalance:



For Phase unbalance:



16.3.Test Results

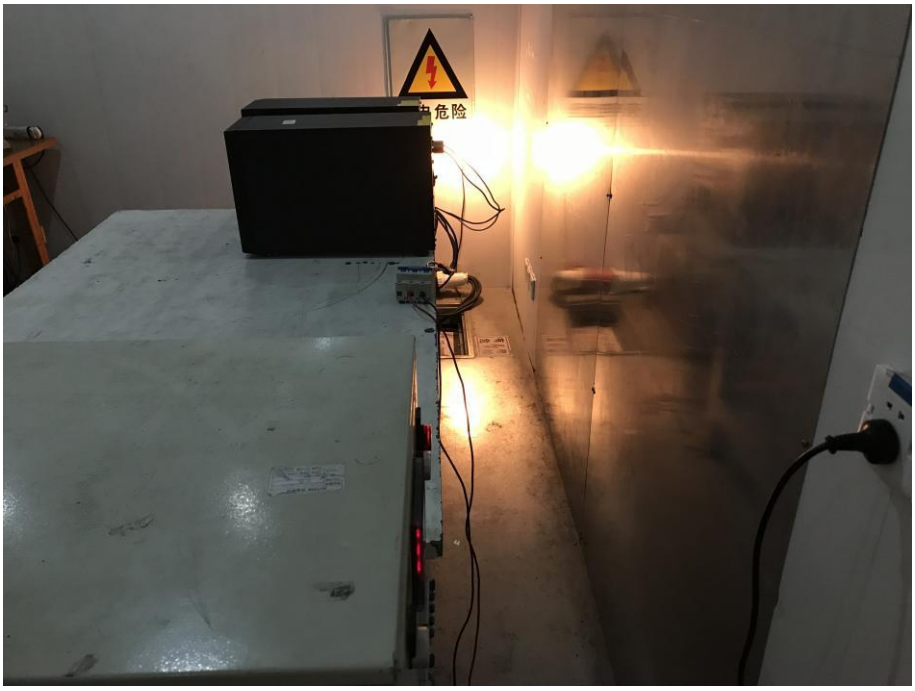
PASS.

Temperature	:	22 °C
Humidity	:	53%
Atmospheric Pressure	:	101kpa
Test Engineer	:	ZCJ
Test Date	:	2018-04-19

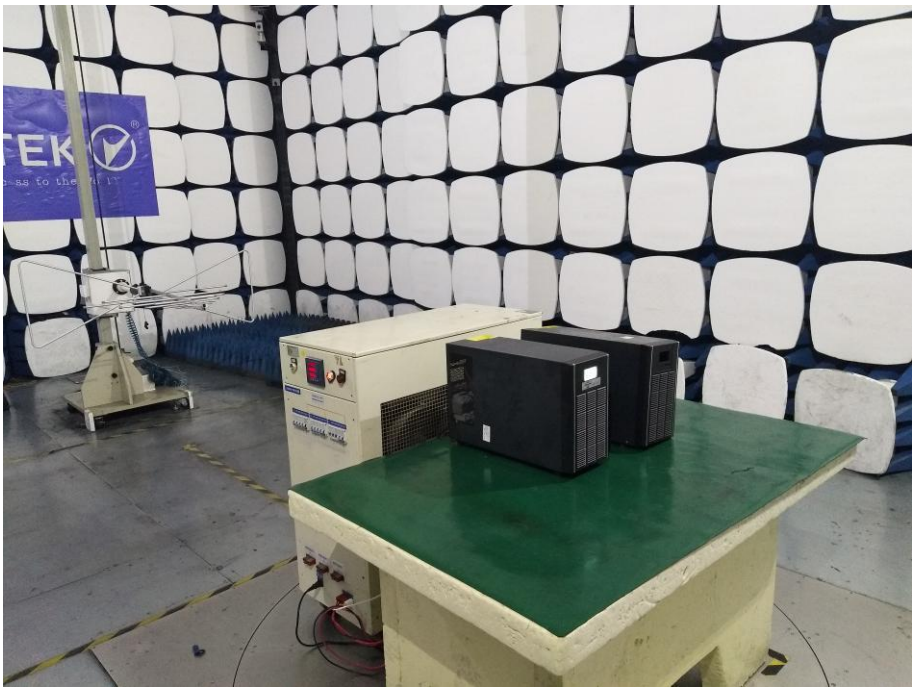
Frequency Range (Hz)	Position	Strength	Result	Note
50	L1,L2.L3, N	5V(rms) Sinusoidal	A	N/A

17. TEST PHOTOGRAPHS

17.1.Photos of Conducted Emission Measurement



17.2.Photos of Radiation Emission Measurement



17.3.Photo of Harmonic Measurement

17.4.Photo of Electrostatic Discharge Test

17.5.Photo of RF Field Strength susceptibility Test

17.6.Photo of Electrical Fast Transient/Burst Test

17.7.Photo of Surge Test

17.8.Photo of Injected Currents Susceptibility Test

17.9.Photo of Magnetic Field Immunity Test

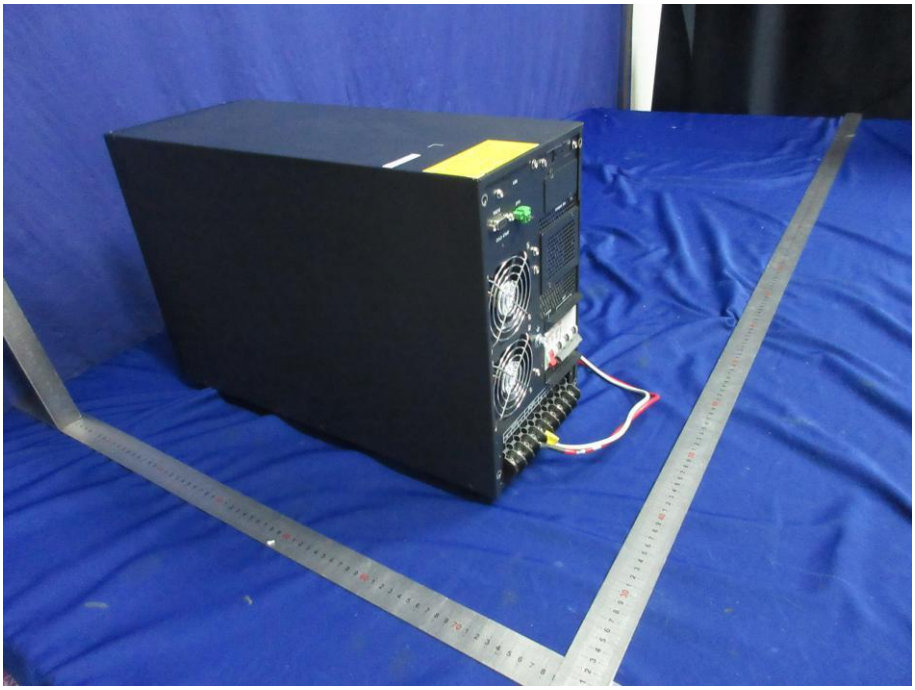
17.10.Photo of Voltage dips and interruption Test

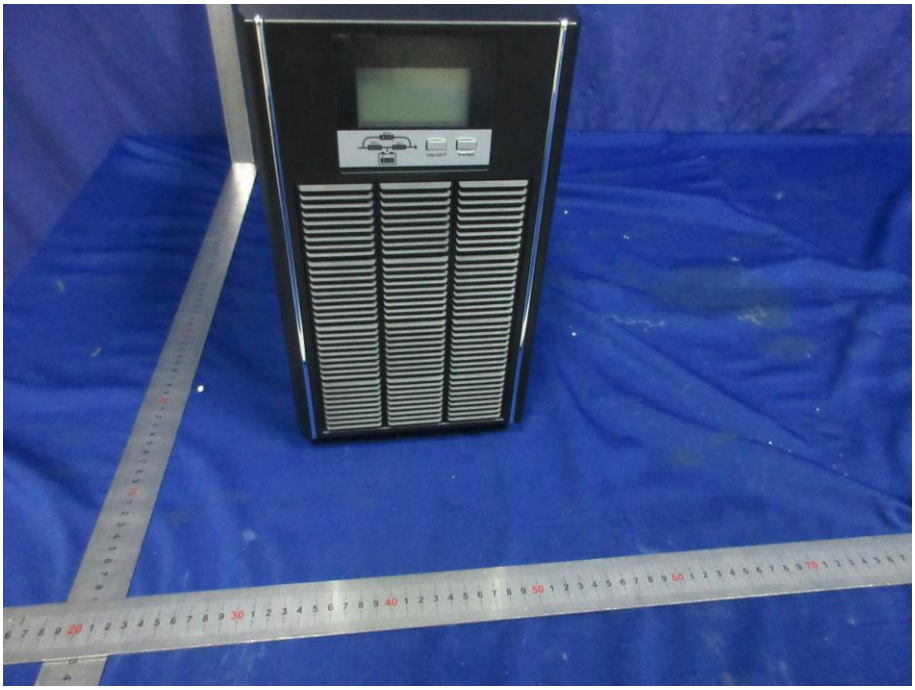
17.11.Photo of Low Frequency Signals and Power Line Unbalance Test

APPENDIX
(Photos of EUT)

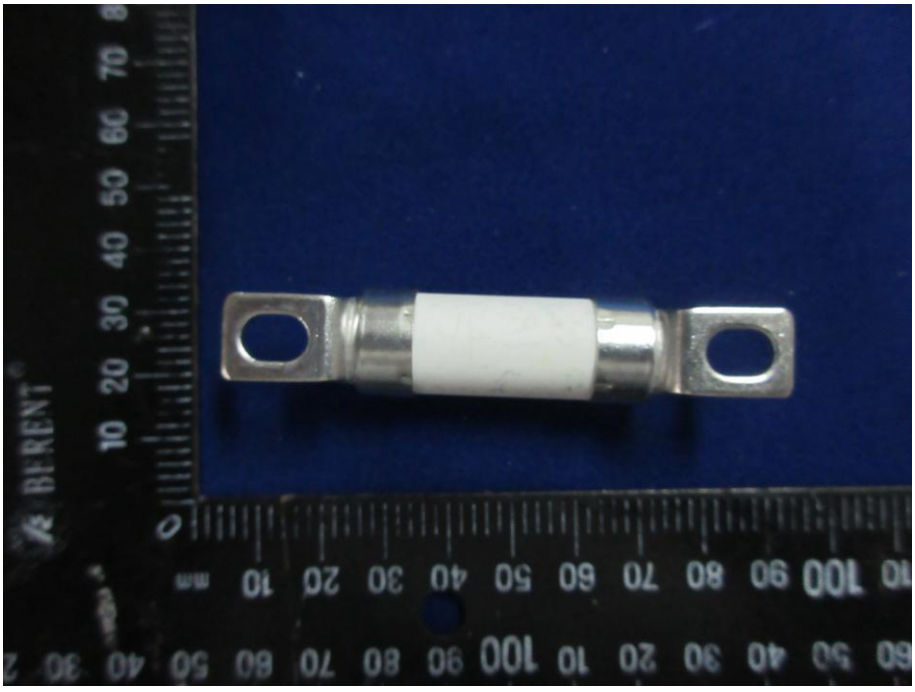

USB
RS232
EPO
COLD START

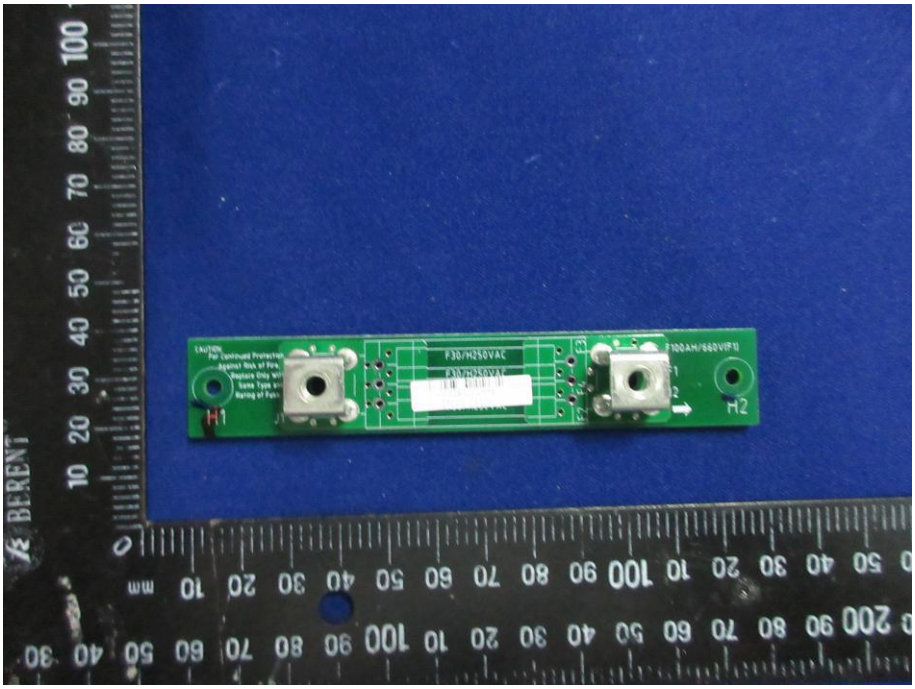

BYPASS
INPUT
DELIXI
ELECTRIC
C63
BK63N
OUTPUT
BATTERY
PE
L
N
+
-
PE

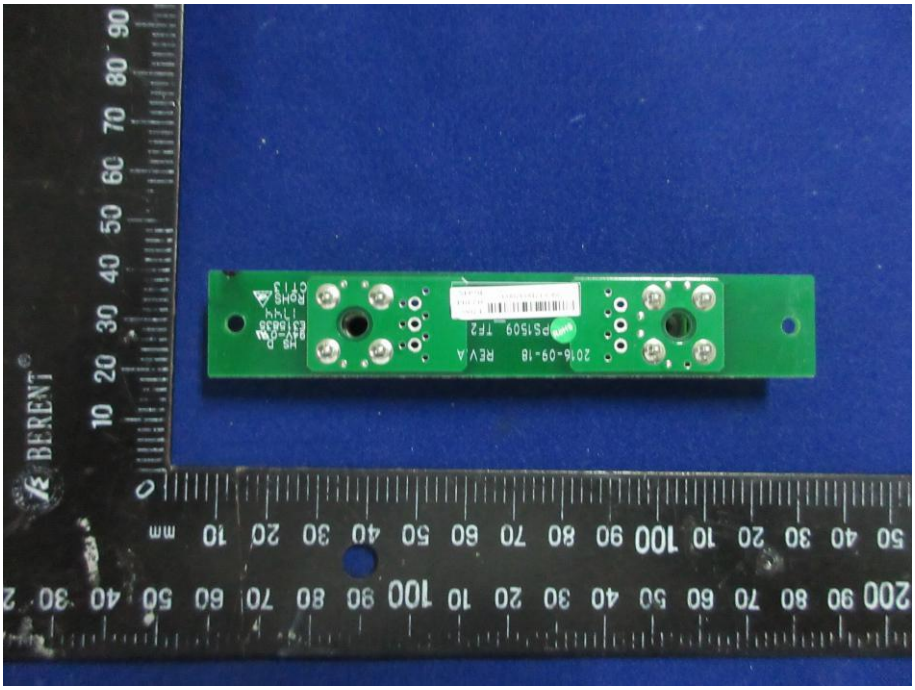


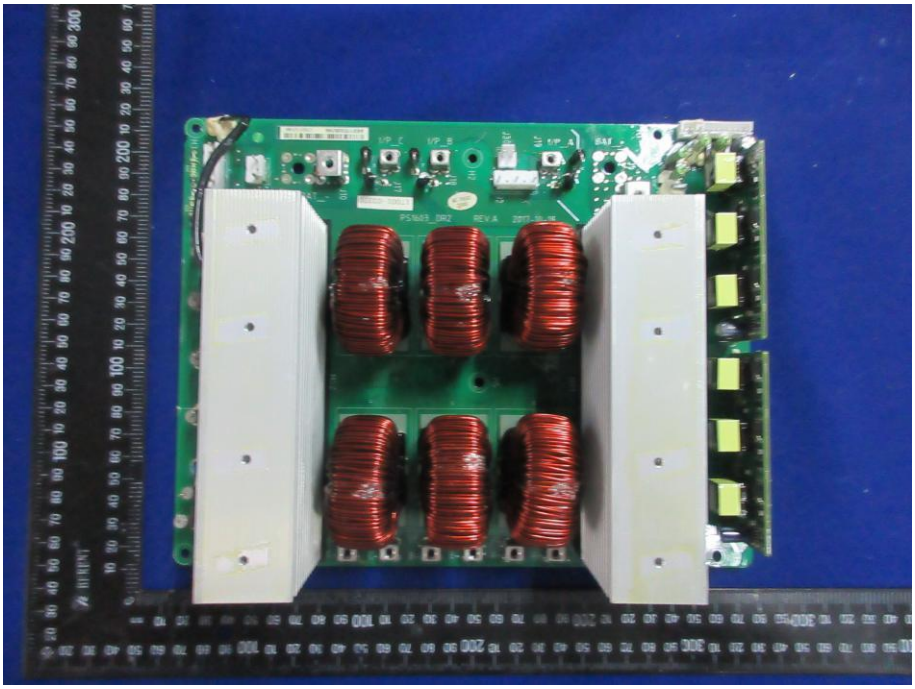


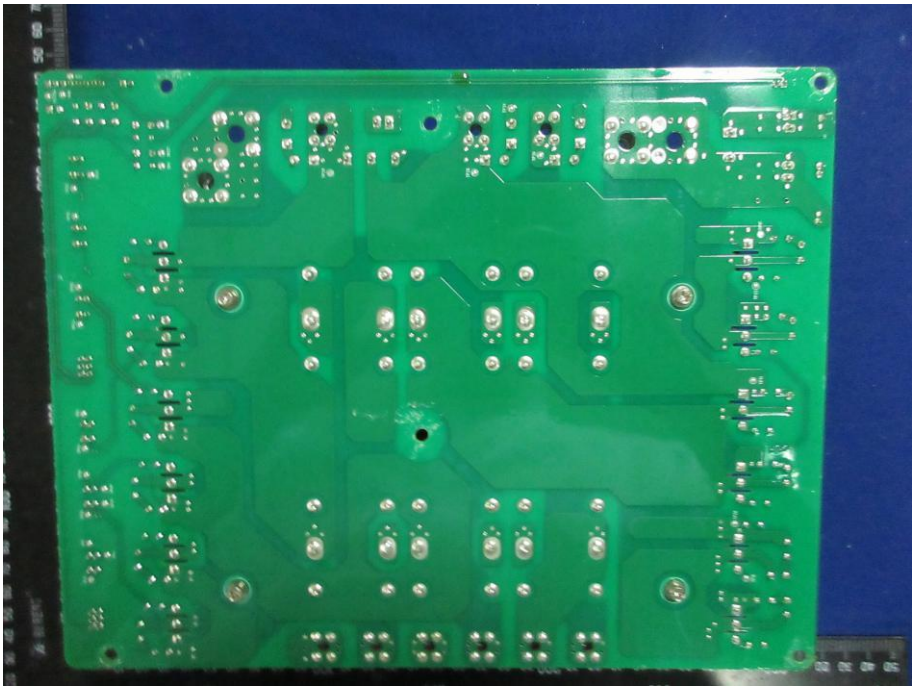

MERSEN
RGS4
100A aR
690V~ 50kA
CB

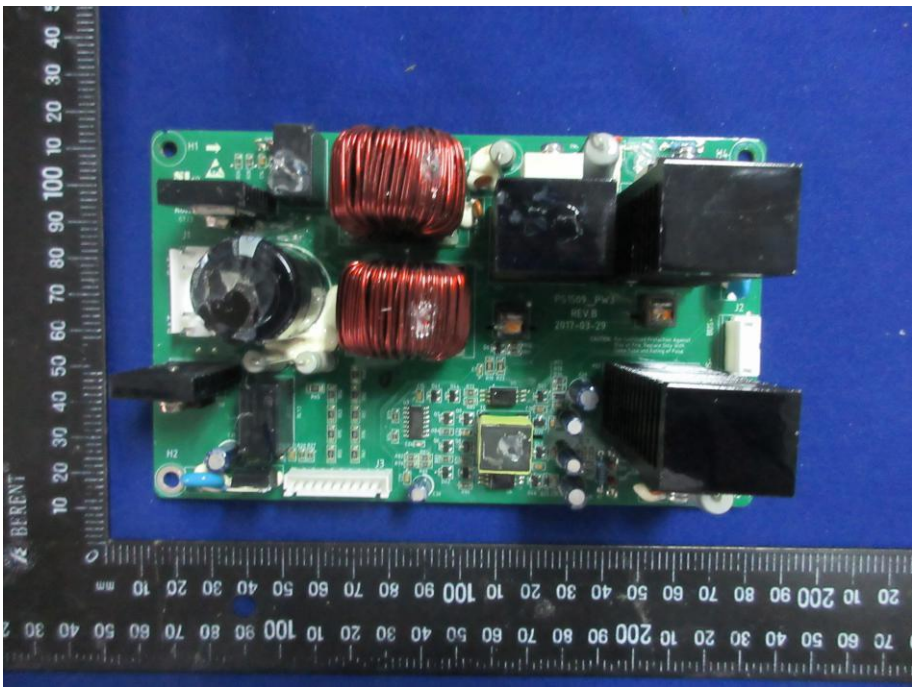


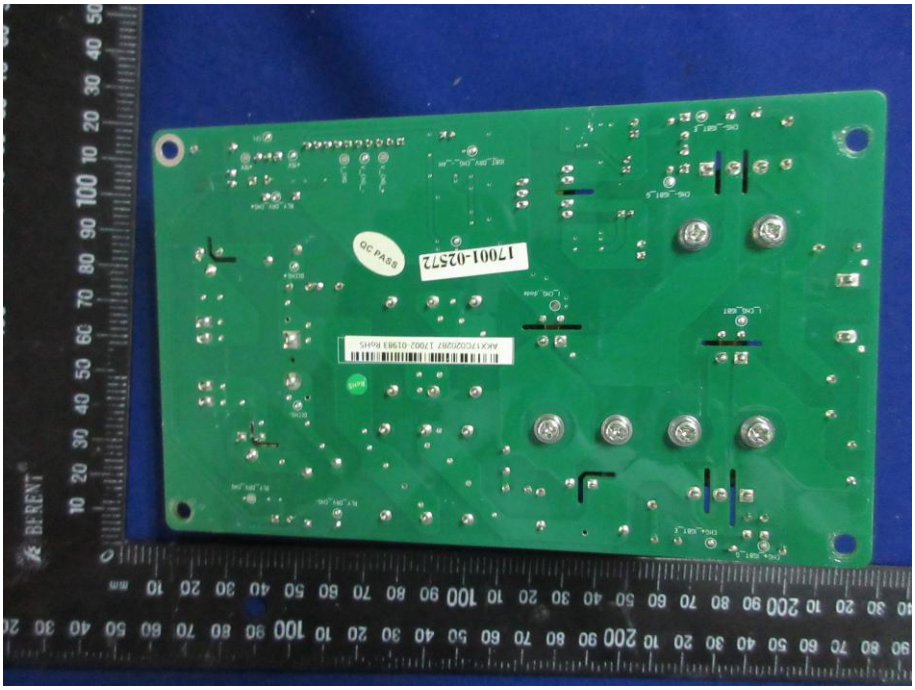

F30/H250VAC
H1
H2
BERENT

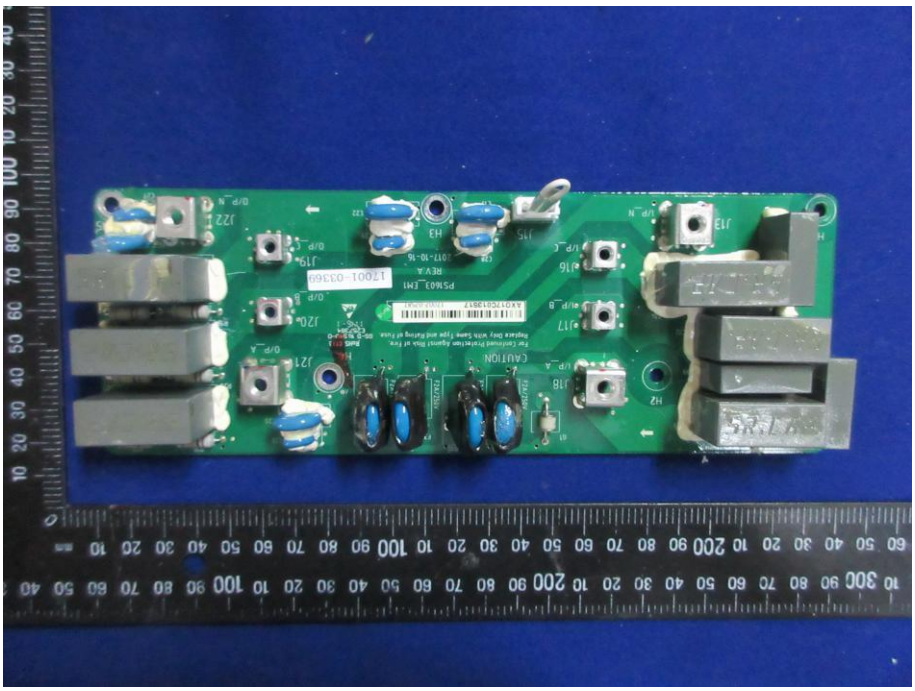

BERENT

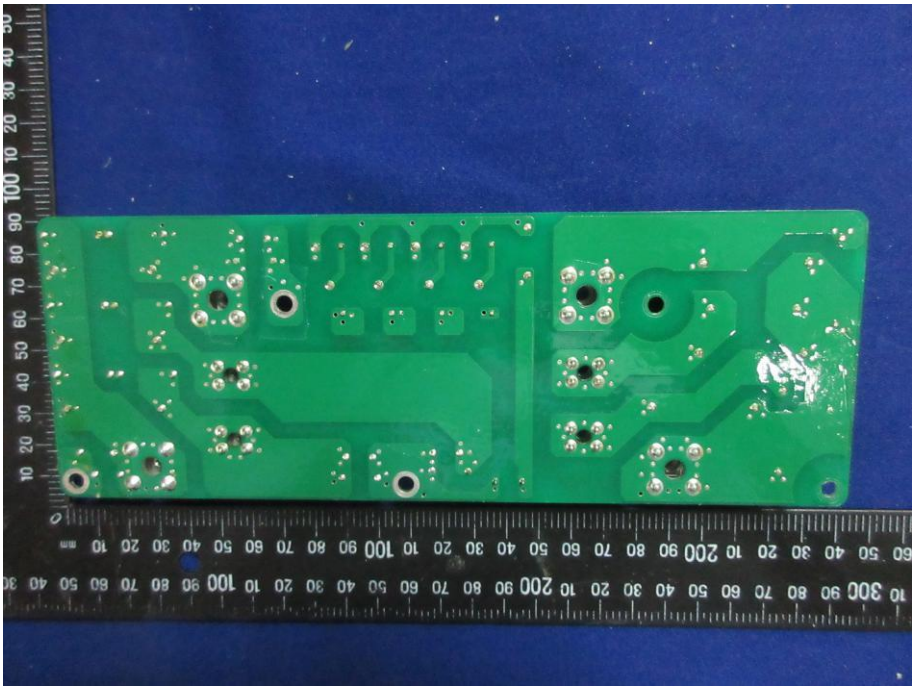


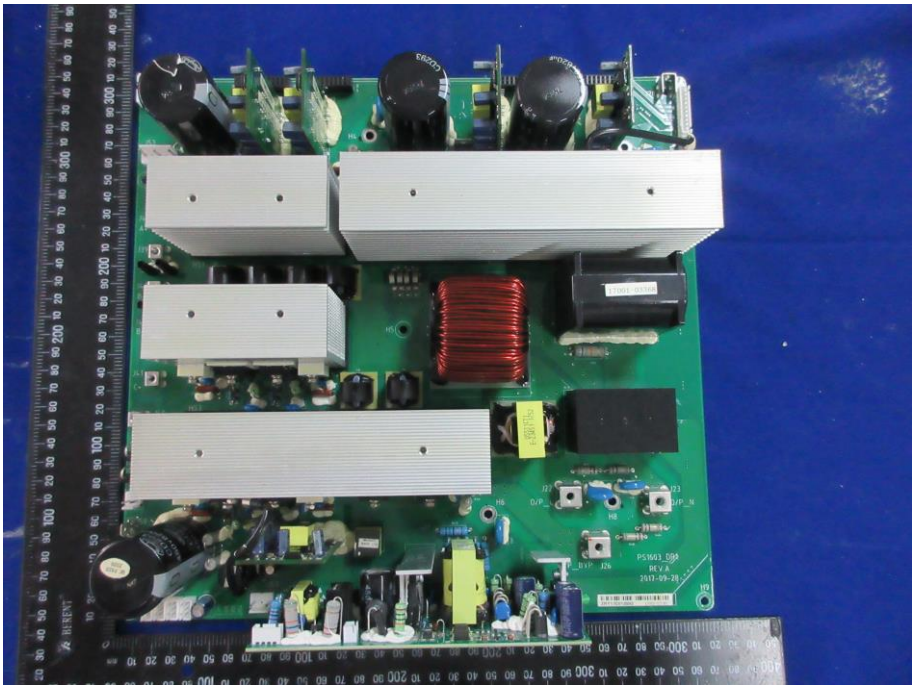


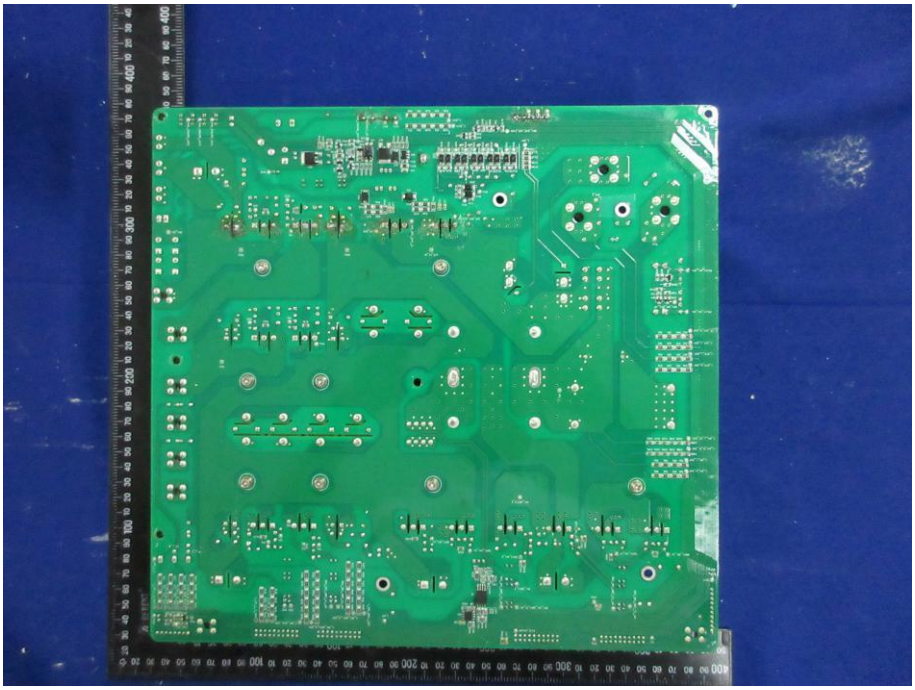


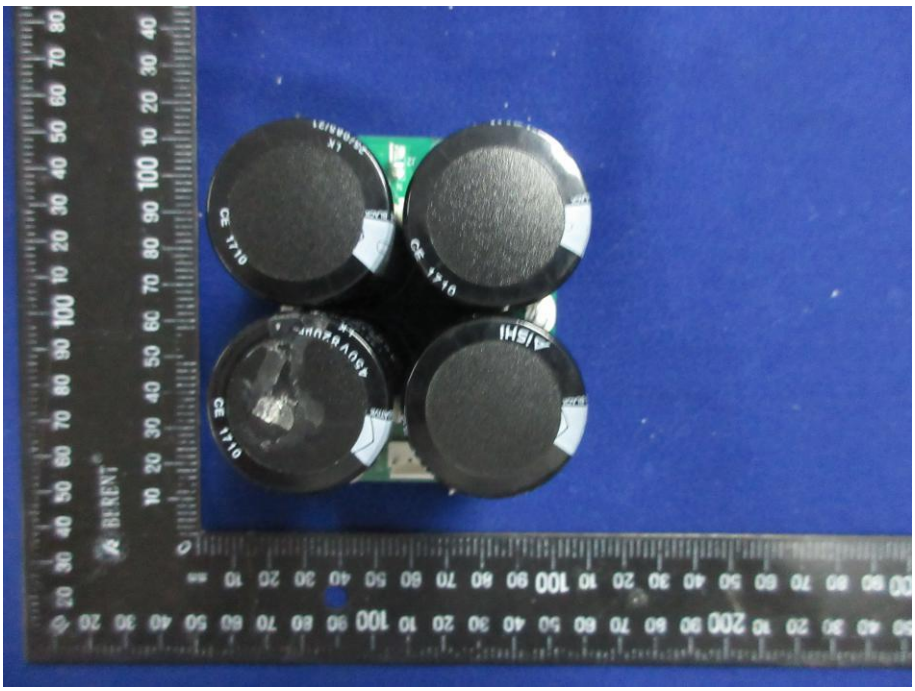


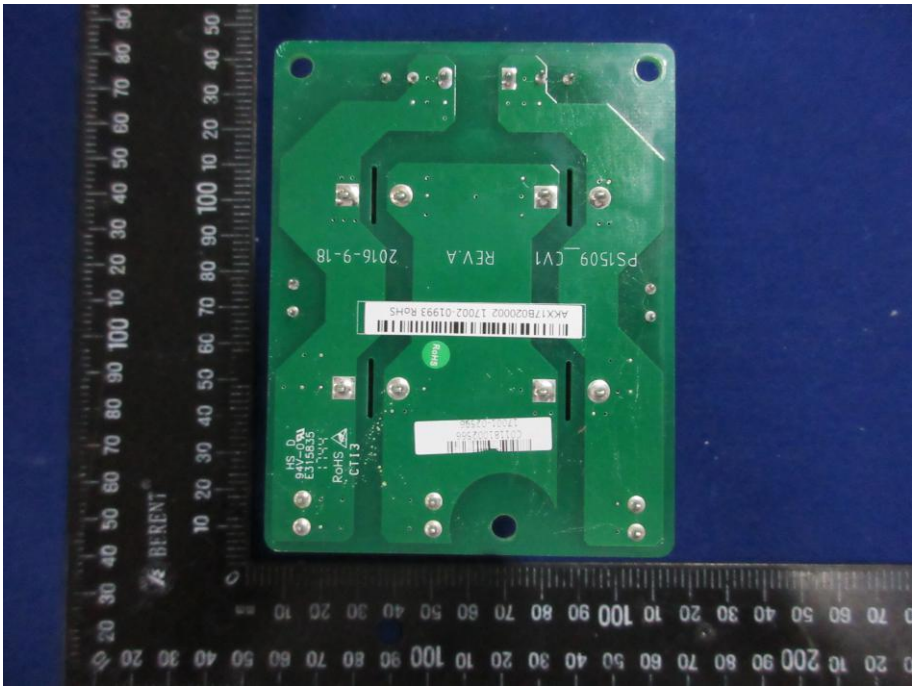












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