





TEST REPORT

DIN V VDE V 0126-1-1

Automatic disconnecting facility between the grid-connected generator and the electric power grid

Report reference number	PVDE140506N039-1	
Date of issue	2014-09-09	
Total number of pages	126	
Testing laboratory name	Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch	
Address	No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China	
		
Applicant's name	VOLTRONIC POWER TECHNOLOGY CORP.	
Address	5F, No. 151, Xinhua 1st Road, Neihu District, Taipei, Taiwan, R.O.C.	
Test specification		
Standard	DIN V VDE V 0126-1-1:2006-02 DIN V VDE V 0126-1-1/A1:2012-02	
Certificate	Certificate of compliance	
Test report form number	VDE0126-1-1	
Master TRF	Bureau Veritas Consumer Products Services Germany GmbH	
Test item description	Grid connected photovoltaic inverter	
Trademark	N/A	
Model / Type	InfiniSolar 10k	
Ratings	InfiniSolar 10k	
MPPT DC voltage range [V]	400-800	
Input DC voltage range [V]	300-900	
Input AC current [A]	2x18,6	
Output AC voltage [V]	3/N/PE, 230/400, 50Hz	
Output AC current [A]	14,5	
Output power [W]	10000	

Testing Location	Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch		
Address	No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China		
Tested by (name and signature)	Darren Tang		
Approved by (name and signature)	Ted Wu		
Manufacturer's name	VOLTRONIC POWER TECHNOLOGY CORP.		
Factory address	1-4F, Building 5, YuSheng Industrial Park, No.467, Section Xixiang, National Highway 107, Xixiang, Bao An District, Shenzhen, China		

Document History			
Date	Internal reference	Modification / Change / Status	Revision
2014-09-09	Darren Tang	Initial report was written	0
Supplementary information:			

Test items particulars

Equipment mobility.....: Permanent connection
 Operating condition: Continuous
 Class of equipment: Class I
 Protection against ingress of water..: IP20 according to EN 60529
 Mass of equipment [kg].....: 45kg

Test case verdicts

Test case does not apply
 to the test object.....: N/A
 Test item does meet
 the requirement.....: P(ass)
 Test item does not meet
 the requirement.....: F(ail)

Testing

Date of receipt of test item: 2014-06-10
 Date(s) of performance of test: 2014-06-10 to 2014-08-29

General remarks:

The test result presented in this report relate only to the object(s) tested.
 This report must not be reproduced in part or in full without the written approval of the issuing testing laboratory.

"(see Annex #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

This Test Report consists of the following documents:


1. Test Results
2. Annex No. 1 – EMC Test Report
3. Annex No. 2 – Pictures of the unit
4. Annex No. 3 – Test equipment list

Routine testing:

Information for local utility interconnection testing (DIN V VDE V 0126-1-1:2006-02):

- Testing of the proper function of the voltage monitoring according to 6.2
- Testing of the proper function of the frequency monitoring according to 6.3
- Testing of the proper function of the residual current monitoring according to 6.6

Copy of marking plate:





Model No. : InfiniSolar 10k	
Serial No. :  96161406100001	
PV INPUT	Nominal operating voltage 720Vdc
	Vmax PV 900Vdc
	Isc PV 2*18.6A
	MPPT voltage range 400 ~ 800Vdc
GRID/AC OUTPUT	Nominal operating voltage 3/N/PE, 230/400 Vac
	Nominal output current 14.5A
	Nominal operating frequency 50Hz
	Maximum power 10000W
	Power factor range 0.9 lead-0.9lag
AC INPUT	Nominal operating voltage 3/N/PE, 230/400 Vac
	Maximum input current 25A
	Nominal operating frequency 50Hz
BATTERY	Battery voltage range 42~56Vdc
	Maximum battery current 275A





Ambient temperature:-10~+55°C

Enclosure:IP 20

Safety class I

VDE0126-1-1 VDE-AR-N 4105

5min

WARNING:FIRE HAZARD.

SUITABLE FOR MOUNTING ON CONCRETE OR OTHER
NON-COMBUSTIBLE SURFACE ONLY

VOLTRONIC POWER TECHNOLOGY (SHENZHEN) CORP.

General product information:

The Solar Inverter converts DC voltage into AC voltage.

The input and output are protected by Varistors to Earth. The unit is providing EMC filtering at the output toward mains. The unit does not provide galvanic separation from input to output (transformer). The output is switched off redundant by the high power switching bridge and a two relays. This assures that the opening of the output circuit will also operate in case of one error.

The internal control is redundant built. It consists of Microcontroller Master DSP(U3) and Slave DSP(U4).

The Master DSP control the relays by switching signals; measures the PV voltage, PV current, Bus voltage, Battery voltage, grid voltage, frequency, AC current with injected DC and the array insulation resistance to ground. In addition it tests the current sensors and the RCMU circuit before each start up.

The Slave DSP is measures the grid voltage, AC current, grid frequency and residual current, also can switch off the relays independently, and communicate with Master DSP each other.

The current is measured by a current sensor. The AC current signal and the injected DC current signal are sent to the Master DSP. The Master DSP tests and calibrates before each start up all current sensors.

The unit provides two relays in series in all output conductors. When single fault applied to one relay, alarm an error code in display panel, another redundant relay provides basic insulation maintained between the PV array and the mains. All the relays are tested before each start up.

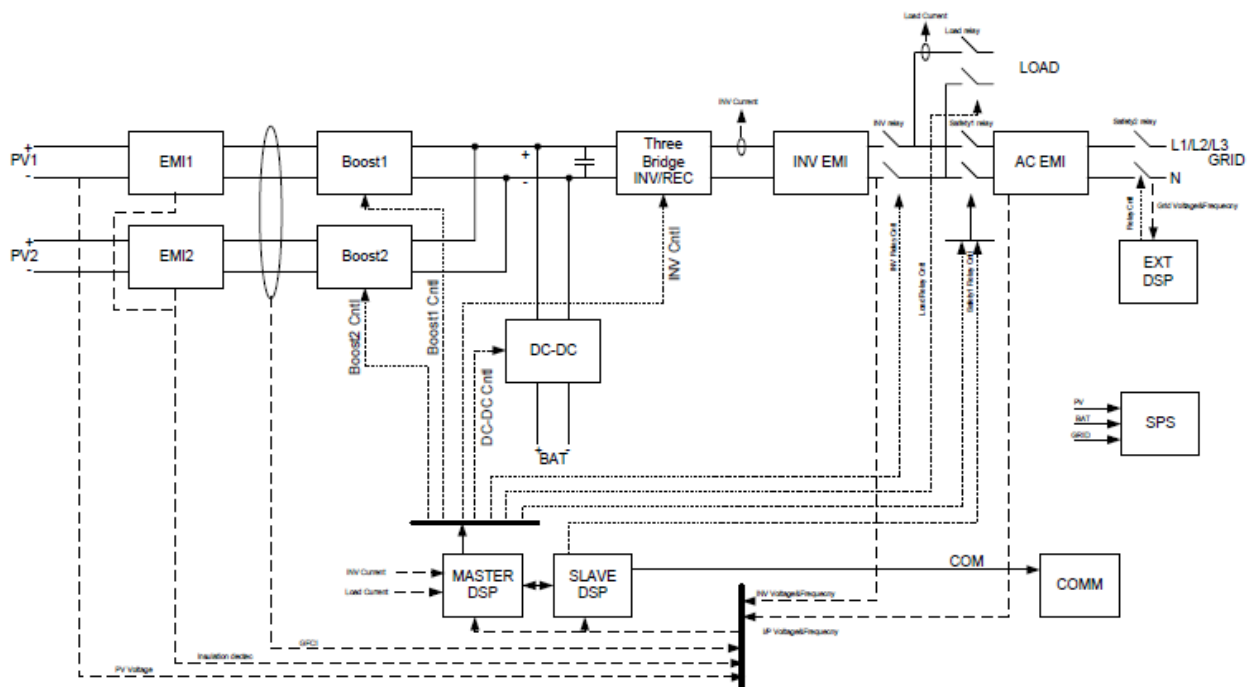


Figure 1 – Block diagram

The product was tested on
hardware version: 00G
software version: 00G

DIN V VDE V 0126-1-1(VDE V 0126-1-1):2006-02 DIN V VDE V 0126-1-1/A1:2012-02			
Clause/§	Requirement	Remark	Verdict
1	Scope (Automatic disconnecting facility for photovoltaic installations)		
2	Normative references DIN EN 50160:2003-03 DIN EN 50178 (VDE 0160):1998-04 DIN EN 60664-1 (VDE 0110-1) E DIN VDE 0664-100:2005-05 DIN EN 61000-6-2 DIN EN61000-6-3 DIN EN 61008-1 (VDE 0664-10):2000-09 DIN VDE 0105-100:2000-06		
4	Requirements: 1. Monitoring of voltage and frequency derivation 2. Monitoring of DC-Injection 3. Monitoring of accidental anti Islanding 4. Monitoring of intended anti Islanding 5. Residual Current Monitoring Unit –RCMU (only if no galvanic separation)		
4.1	Functional safety: Automatic disconnecting facility	Considered, see annex. The single fault safe system was reviewed. The theoretical investigation was verified by error simulation.	P
4.1.1	Single fault safety of the automatic disconnecting facility	Considered, see block diagram, functional explanation and table 6.1 below.	P
4.1.2	Disconnection device: At least two independent disconnection devices. At least one relay and one switch with overvoltage category 2. If without galvanic separation then two relays are necessary	Disconnection takes place redundant through two relays and the IGBT-full bridge in series. The relays and the IGBT-full bridge are able to switch the full current.	P
4.2	Monitoring of the voltage: Voltages $\leq 80\%$ and $\geq 115\%$ of V_{nom} cause a disconnection within 0,2s (reconnection after min. 5s if voltage fluctuation $\leq 3s$; min. 30s if voltage fluctuation $> 3s$). Test voltage steps should not be below 77% and above 118% of V_{nom} . Continuous over voltage above 110% up to 115% (adjustable, default setting 110%) causes disconnection after max. 10min. Re-connection after min. 30s.	Tested with a variable AC-Power supply at the output. Inverter disconnects within the limits, see table 6.2 below.	P

DIN V VDE V 0126-1-1(VDE V 0126-1-1):2006-02 DIN V VDE V 0126-1-1/A1:2012-02			
Clause/§	Requirement	Remark	Verdict
4.3	Monitoring of frequency: Frequencies $\leq 47,5\text{Hz}$ and $\geq 51,5\text{Hz}$ cause a disconnection within 0,2s (frequency derivation 1Hz/s) (reconnection after min. 5s if fluctuation $\leq 3\text{s}$, min. 30s if fluctuation $> 3\text{s}$)	Tested with an AC-Source at the output. See table 6.3 below.	P
4.4	Monitoring of DC-Injection: DC error or DC-Currents $\geq 1\text{A}$ cause disconnection within 0,2s (positive and negative polarity)	See table 6.4 below.	P
4.5	Detection of anti islanding: anti islanding causes disconnection within 5s (for multiple installations 0,2s if triggered external). For the detection of anti-islanding is only one of the following methods necessary: -6.5.1 Measurement of impedance or -6.5.2 Resonant circuit test or -6.5.3 3-phase grid-voltage monitoring	See table 6.5.2 below.	P
4.6	Marking: In case of an automatic disconnecting facility there is a note at the type plate necessary	Marking provided on the type label.	P
4.7	Special requirements:		
4.7.1	Photovoltaic's: If without galvanic separation then a RCMU is necessary. Insulation resistance $> 1\text{k}\Omega/\text{V}$, at least $500\text{k}\Omega$. Slowly increasing DC-Leaking currents up to 300mA cause disconnection within 0,3s / Surge dc-leakage currents should lead to a disconnection of: -30mA within 0,3s -60mA within 0,15s -150mA within 0,04s Before every connection to the grid, the d.c. array ground insulation has to be checked. (see 6.6.2.2.4).	For Residual Current Monitoring see table 6.6 below.	P
5	General requirements:		
	Electromagnetic compatibility (EMC)		
	Emitted interference <i>DIN EN 61000-6-3 (VDE 0839-6-3)</i>	Covered by EMC report	P
	Interference resistance <i>DIN EN 61000-6-2 (VDE 0839-6-2)</i>	Covered by EMC report	P
6	Type test :	See following test report	
7.	Routine test:	Routine testing described above	P
8	Specification of installation:		P

DIN V VDE V 0126-1-1(VDE V 0126-1-1):2006-02 DIN V VDE V 0126-1-1/A1:2012-02			
Clause/§	Requirement	Remark	Verdict
A1	Frequency monitoring Power frequencies below 47.5 Hz and 51.5 Hz shall cause a disconnection within 0.2 s. The characteristic structural analyzes and limits for the frequency, the automatic disconnection from the grid and require reconnection to the network, are in the application rule VDE-AR-N 4105 "Technical minimum requirements for the connection to and parallel operation with low-voltage distribution networks" set.		P
Annex			
A.1	Additional Methods of monitoring anti islanding:	Additional Methods can be added	N/A
A.2	Frequency limits:	Power reserve: Power plant: 51,5 Hz Local producer: 50,2 Hz Deficiency: Local producer: 47,5 Hz	P
A.3	Operating of emergency power systems	For service and maintenance the power plants will increase the frequency up to 50,3 Hz which leads to the disconnection of the local producers. Reconnection time after service (decreasing to $\leq 50,2\text{Hz}$) should be min 30s	P
A.4	Disconnection for a short period	If frequency fluctuation of $\leq 3\text{s}$ occur, the reconnection after min. 5s is permitted.	P

DIN V VDE V 0126-1-1(VDE V 0126-1-1):2006-02 DIN V VDE V 0126-1-1/A1:2012-02		
Clause	Test	Result
6	Type test:	
6.1 (4.1)	Functional safety	P
6.2 (4.2)	Monitoring of voltage	N/A
6.3 (4.3)	Monitoring of frequency	P
6.4 (4.4)	Monitoring of DC-Injection	P
6.5 (4.5)	Detection of anti-islanding (only one method is necessary!)	
	6.5.1 Measurement of impedance	N/A
	6.5.2 Resonant circuit test	P
	6.5.3 3-phase grid-voltage monitoring	P
6.6 (4.7)	Residual Current Monitoring	P
A1	Frequency monitoring	P

Test Results

6.1 Functional safety - fault condition tests								P
	ambient temperature [°C] :	24°C						—
	model/type of power supply :	DC: 62150H-1000S AC: AFC-33045T						—
	manufacturer of power supply :	DC: Chroma AC: APC						—
	rated markings of power supply :	DC: 0-1000V, 15A AC: 0-300V, 45KW						—
component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-000293-00G Output current sensor defect CT3(Pin8)	Open	230V 43A	800V 2x6,2 5A	2min	--	230V 0,01A	800V 0.05A	Error message:"05 ERROR" (Inverter current exceed the upper limit); Inverter was disconnect from grid immediately.
71-000293-00G Output current sensor defect CT2(Pin9)	Open	230V 43A	800V 2x6,2 5A	2min	--	230V 0,01A	800V 0.05A	Error message:"05 ERROR" (Inverter current exceed the upper limit); Inverter was disconnect from grid immediately.
71-000293-00G Relay defect RY7(Pin3&Pin 4)	Short before start up	230V 0,01 A	800V 0,02 A	10min	--	230V 0,01A	800V 0,02A	Error message:"07 ERROR" (relay work abnormal)', Inverter does not start up.
71-000293-00G Relay defect RY5(Pin3&Pin 4)	Short before start up	230V 0,01 A	800V 0,02 A	10min	--	230V 0,01A	800V 0,02A	Error message:"07 ERROR" (relay work abnormal)', Inverter does not start up.
71-000293-00G Relay defect RY2(Pin3&Pin 4)	Short before start up	230V 0,01 A	800V 0,02 A	10min	--	230V 0,01A	800V 0,02A	Error message:"07 ERROR" (relay work abnormal)', Inverter does not start up.
71-000293-00G Relay defect RY1(Pin3&Pin 4)	Short before start up	230V 0,01 A	800V 0,02 A	10min	--	230V 0,01A	800V 0,02A	Error message:"07 ERROR" (relay work abnormal)', Inverter does not start up.
71-000293-00G Relay defect RY9(Pin3&Pin 4)	Short before start up	230V 0,01 A	800V 0,02 A	10min	--	230V 0,01A	800V 0,02A	Error message:"07 ERROR" (relay work abnormal)', Inverter does not start up.

component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-000293-00G Relay defect RY8(Pin3&Pin 4)	Short before start up	230V 0,01 A	800V 0,02 A	10min	--	230V 0,01A	800V 0,02A	Error message:"07 ERROR" (relay work abnormal)', Inverter does not start up.
71-000293-00G Relay defect RY6(Pin3&Pin 4)	Short before start up	230V 0,01 A	800V 0,02 A	10min	--	230V 0,01A	800V 0,02A	Error message:"07 ERROR" (relay work abnormal)', Inverter does not start up.
71-000293-00G Relay defect RY4(Pin3&Pin 4)	Short before start up	230V 0,01 A	800V 0,02 A	10min	--	230V 0,01A	800V 0,02A	Error message:"07 ERROR" (relay work abnormal)', Inverter does not start up.
71-000293-00G Grid voltage monitoring R93	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R89	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R13	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R17	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R8	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R4	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R92	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R88	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.

component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-000293-00G Grid voltage monitoring R18	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R16	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R7	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000293-00G Grid voltage monitoring R3	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000297-00G Isolation monitoring defect R56	Open before start up	230V 0,01 A	800V 0,02 A	2min	--	230V 0,01A	800V 0,02A	Error message:"13 ERROR" (insulation resistance); Inverter does not start up.
71-000297-00G Isolation monitoring R68	Open before start up	230V 0,01 A	800V 0,02 A	2min	--	230V 0,01A	800V 0,02A	Error message:"13 ERROR" (insulation resistance); Inverter does not start up.
71-000297-00G Isolation monitoring defect R82	Open before start up	230V 0,01 A	800V 0,02 A	2min	--	230V 0,01A	800V 0,02A	Error message:"13 ERROR" (insulation resistance); Inverter does not start up.
71-000297-00G Isolation monitoring defect R89	Open before start up	230V 0,01 A	800V 0,02 A	2min	--	230V 0,01A	800V 0,02A	Error message:"13 ERROR" (insulation resistance); Inverter does not start up.
71-000297-00G Isolation monitoring defect R158	Open before start up	230V 0,01 A	800V 0,02 A	2min	--	230V 0,01A	800V 0,02A	Error message:"13 ERROR" (insulation resistance); Inverter does not start up.

component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-000368-00G Grid voltage monitoring defect R1	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R 5	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R9	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R13	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R17	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R21	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G RELAY Board R25	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R29	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R33	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.

component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-000368-00G Grid voltage monitoring defect R37	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R41	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R45	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R2	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R6	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R10	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R14	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R18	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R22	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.

component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-000368-00G Grid voltage monitoring defect R26	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R30	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R34	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R38	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R42	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G Grid voltage monitoring defect R46	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR" (Line voltage is different)'; PV inverter was disconnected from grid immediately.
71-000368-00G DSP lost of control C73	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Inverter was shut down immediately.
71-500375-00G DSP lost of control XL1	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Shutdown immediately, No breakdown
71-500375-00G DSP lost of control C12	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Shutdown immediately, No breakdown

component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-500375-00G DSP lost of control C72	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Shutdown immediately, No breakdown
71-500375-00G DSP lost of control XL3	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Shutdown immediately, No breakdown
71-500375-00G DSPs communication defect R528	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "17 ERROR" (Communication loss between master CPU and slave CPU)', PV inverter was disconnected from grid immediately.
71-500375-00G DSPs communication defect R527	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "17 ERROR" (Communication loss between master CPU and slave CPU)', PV inverter was disconnected from grid immediately.
71-500375-00G Inverter voltage monitoring defect U10(Pin5&Pin 6)	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR(Line voltage is different), PV inverter was disconnected from grid immediately.
71-500375-00G Inverter voltage monitoring defect R75	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR(Line voltage is different), PV inverter was disconnected from grid immediately.
71-500375-00G Inverter voltage monitoring defect U10(Pin9&Pin 10)	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR(Line voltage is different), PV inverter was disconnected from grid immediately.
71-500375-00G Inverter voltage monitoring defect R84	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR(Line voltage is different), PV inverter was disconnected from grid immediately.

component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-500375-00G Grid frequency monitoring defect R93	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "04 warning" (Line frequency LOW)', PV inverter was disconnected from grid immediately.
71-500375-00G Grid frequency monitoring defect U4(Pin8&Pin9)	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "04 warning" (Line frequency LOW)', PV inverter was disconnected from grid immediately.
71-500375-00G Grid voltage monitoring defect U11(Pin2&Pin3)	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR(Line voltage is different), PV inverter was disconnected from grid immediately.
71-500375-00G Grid voltage monitoring defect R101	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR(Line voltage is different), PV inverter was disconnected from grid immediately.
71-500375-00G Grid voltage monitoring defect U11(Pin5&Pin6)	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR(Line voltage is different), PV inverter was disconnected from grid immediately.
71-500375-00G Grid voltage monitoring defect R106	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"36 ERROR(Line voltage is different), PV inverter was disconnected from grid immediately.
71-500375-00G Grid frequency monitoring defect U81(Pin5&Pin6)	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "04 warning" (Line frequency LOW)', PV inverter was disconnected from grid immediately.

component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-500375-00G Grid frequency monitoring defect R119	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "04 warning" (Line frequency LOW)', PV inverter was disconnected from grid immediately.
71-500375-00G Grid frequency monitoring defect U81(Pin2&Pin 3)	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "04 warning" (Line frequency LOW)', PV inverter was disconnected from grid immediately.
71-500375-00G Grid frequency monitoring defect R126	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "04 warning" (Line frequency LOW)', PV inverter was disconnected from grid immediately.
71-500375-00G Isolation detection defect U14(Pin9&Pin 10)	Short before start-up	230V 0A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"13 ERROR" (Solar insulation resistance too low)', PV inverter was disconnected from grid immediately.
71-500375-00G Isolation detection defect R182	Open before start-up	230V 0A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"13 ERROR" (Solar insulation resistance too low)', PV inverter was disconnected from grid immediately.
71-500375-00G Isolation detection defect U14(Pin12&Pi n13)	Short before start-up	230V 0A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"13 ERROR" (Solar insulation resistance too low)', PV inverter was disconnected from grid immediately.
71-500375-00G Isolation detection defect R187	Open before start-up	230V 0A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message:"13 ERROR" (Solar insulation resistance too low)', PV inverter was disconnected from grid immediately.
71-500375-00G Residual current monitoring defect R25	Open	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "16 ERROR" (GFCI Over), No hazard, PV inverter was disconnected from grid immediately.

component No.	fault	test condition		test time	fuse No.	fault condition		result
		AC	DC			AC	DC	
71-500375-00G Residual current monitoring defect C52	Short	230V 43A	800V 2x6.2 5A	2min	--	230V 0,01A	800V 0,02A	Error message: "16 ERROR" (GFCI Over), No hazard, PV inverter was disconnected from grid immediately.
The errors in the control circuit simulate that the safety is even ensured during single fault.								

6.2 (4.2) Voltage monitoring							N/A	
Test conditions:	Output power: Frequency: 50Hz							
	Under Voltage				Over Voltage			
Parameter	Voltage	Time [ms]			Voltage	Time [ms]		
Limit	184,0V	<= 200ms			264,5V	<= 200 ms		
Trip value	--				--			
Disconnection time	188V to 178V	--	--	--	260V to 270V	--	--	--
	230V to 178V	--	--	--	230V to 270V	--	--	--
Reconnection time (fluctuation <=3s):	>= 5s	--			>= 5s	--		
Reconnection time (fluctuation >3s):	>= 30s	--			>= 30s	--		
Note: Lower and upper threshold voltage shall not fall or rise below or above 3% of the threshold voltage itself (min. 177,1V; max. 270,9V). The measurement shall take place at nominal frequency and any power.								

6.2 (4.2.3) Overvoltage protection according to DIN EN 50160:2000-03, 2.3			P
Limit:	From 253V to 264,5V	within 10min	
Trip value L1	253,2V	6min01sec	
Trip value L2	253,2V	6min15sec	
Trip value L3	253,2V	6min17sec	
Note:			

6.3 (4.3) Frequency monitoring

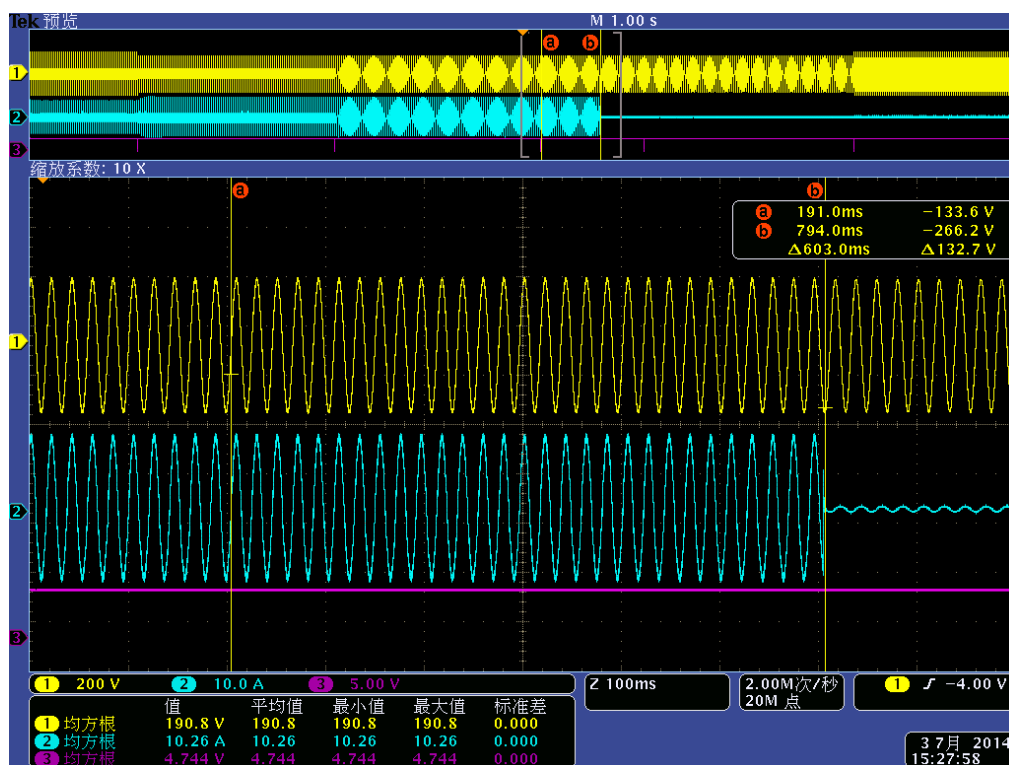
P

Test conditions:	Output power:6,0kW							
	Under frequency				Over frequency			
Parameter	Frequency [Hz]	Time [ms]			Frequency [Hz]	Time [ms]		
Output Voltage		80%U _N	U _N	115%U _N		80%U _N	U _N	115%U _N
Limit	47,5Hz	200ms	200ms	200ms	51,5Hz	200ms	200ms	200ms
Trip value		47,51	47,50	47,50		51,50	51,50	51,50
Disconnection time (ms)	48,00Hz to 47,00Hz	65	67	66	51,00Hz to 52,00Hz	41	55	42
		93	66	82		61	67	67
Reconnection time (fluctuation <=3s):	>= 5s	N/A			>= 5s	N/A		
Reconnection time (fluctuation >3s):	>= 30s	73 s			>= 30s	90 s		

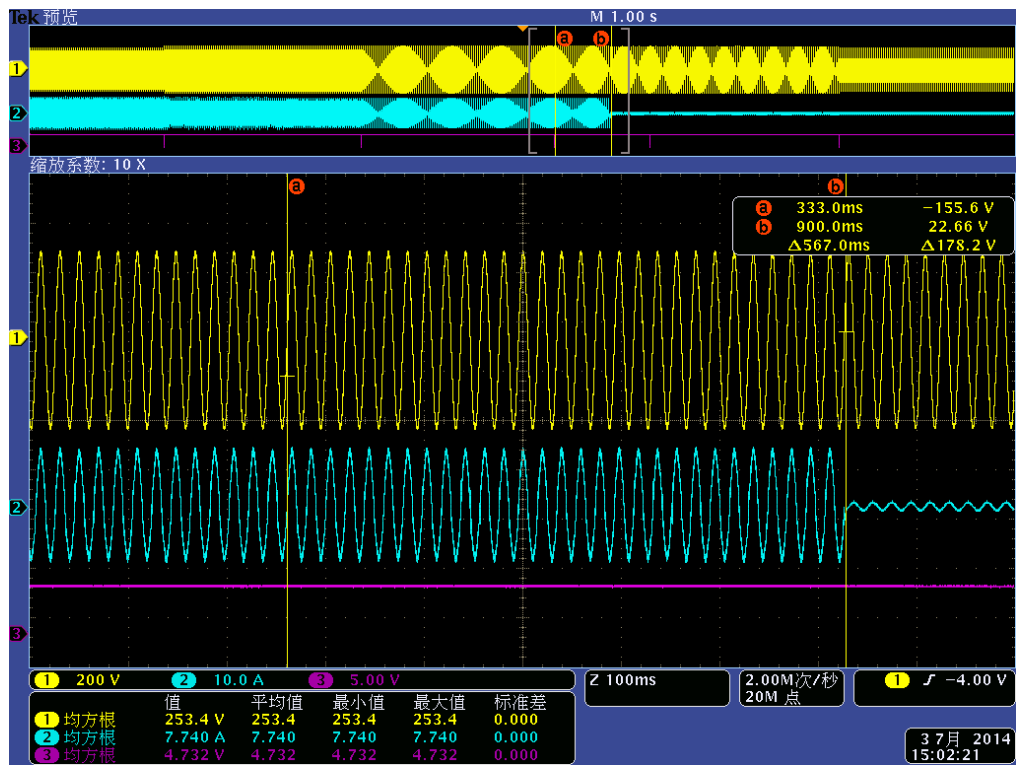
Note:

It was measured at a continuous change of frequency of 1Hz/s at lower, nominal and upper U_N and arbitrary output power. The trip value was determined manually by reducing the frequency in 10mHz steps. When the trip value is known (e.g. 47,50Hz), the ac-source is programmed to run from e.g. 48,00Hz to 47,00Hz with 1Hz/s. The disconnection time is calculated by the measured time minus the 500ms from 48,00Hz to 47,50Hz.

Underfrequency:



Overfrequency:



6.4 (4.4) Monitoring of DC-Injection

P

Test conditions:

$U_N = 230V$
 $U_{input} = 800V$
 Rated Power: 5,0kW

DC Injection [A]

Limits

Trip Time [ms]

+1,055A

$I_{DC} > 1A$ than disconnection
within 0,2 sec

27

39

40

-1,156A

$I_{DC} > 1A$ than disconnection
within 0,2 sec

50

55

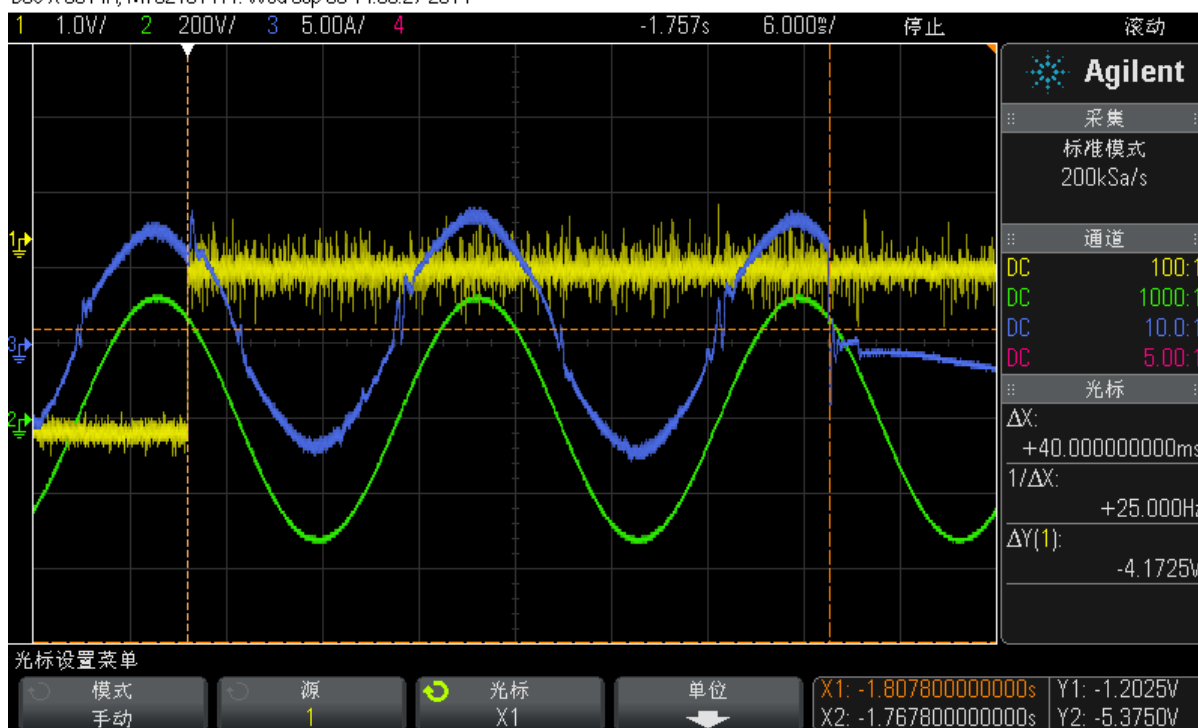
47

Note:

A dc-current of 1A is injected, disconnection time of max. 0,2s

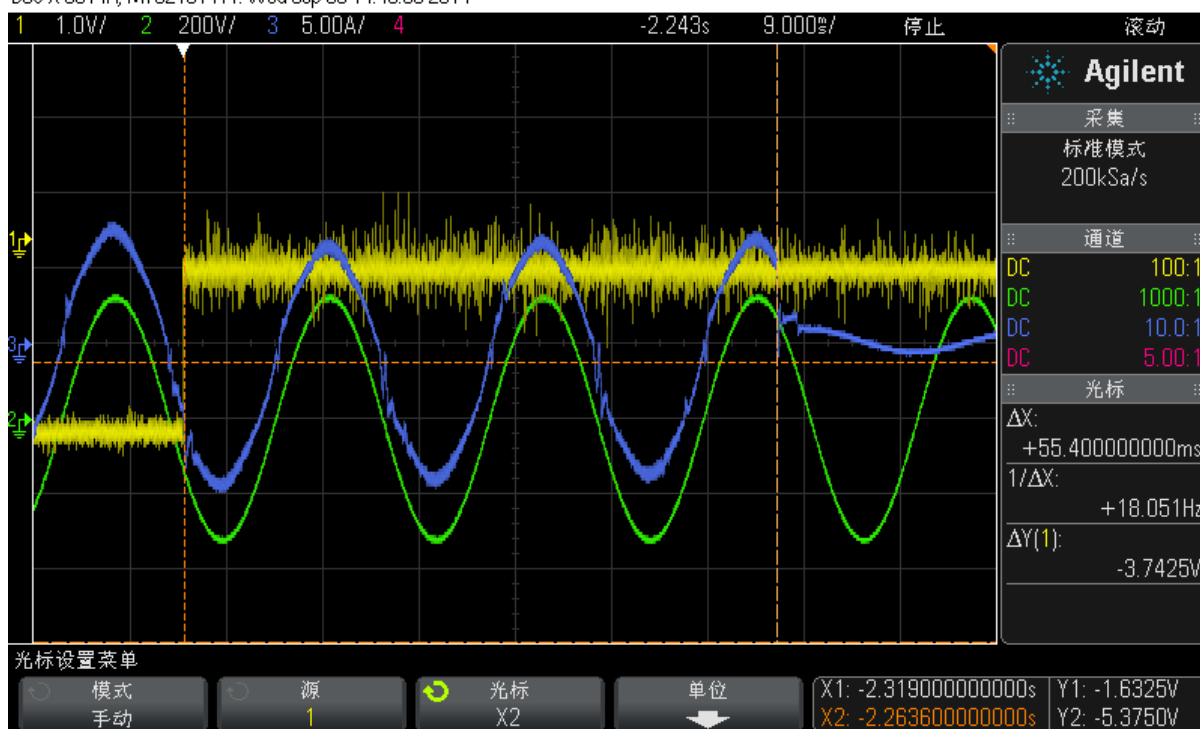
Positive DC-Injection:

DSO-X 3014A, MY52161411: Wed Sep 03 14:33:27 2014



Negative DC-Injection:

DSO-X 3014A, MY52161411: Wed Sep 03 14:43:53 2014



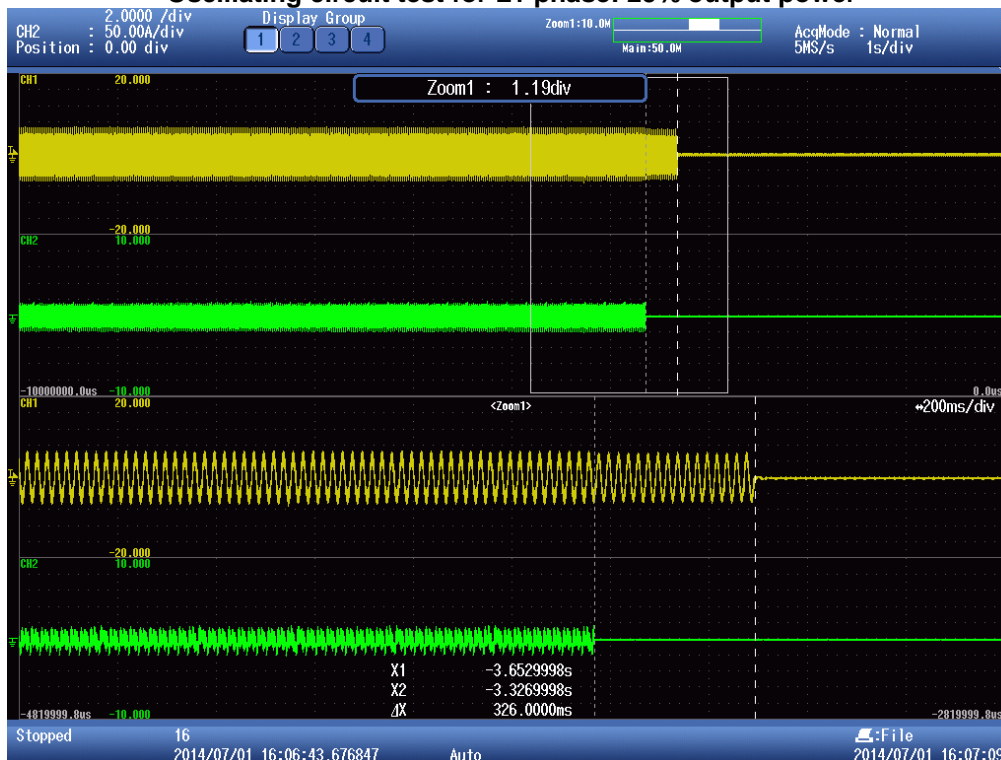
6.5 (4.5) Detection of Anti-Islanding

6.5.1 Measurement of impedance		N/A
Test conditions:	Output power: Frequency: $U_N =$ Apparent power to the grid <5%	
Disconnection time limit:	5s	
$Z_N (R_2 + L_2)$	Trip value T_1	Trip value T_2
0,00 Ohm	--	--
0,25 Ohm	--	--
0,50 Ohm	--	--
0,75 Ohm	--	--
1,00 Ohm	--	--
0,25 Ohm + j0,17 Ohm	--	--
0,25 Ohm + j0,33 Ohm	--	--
0,25 Ohm + j0,50 Ohm	--	--
Note:		

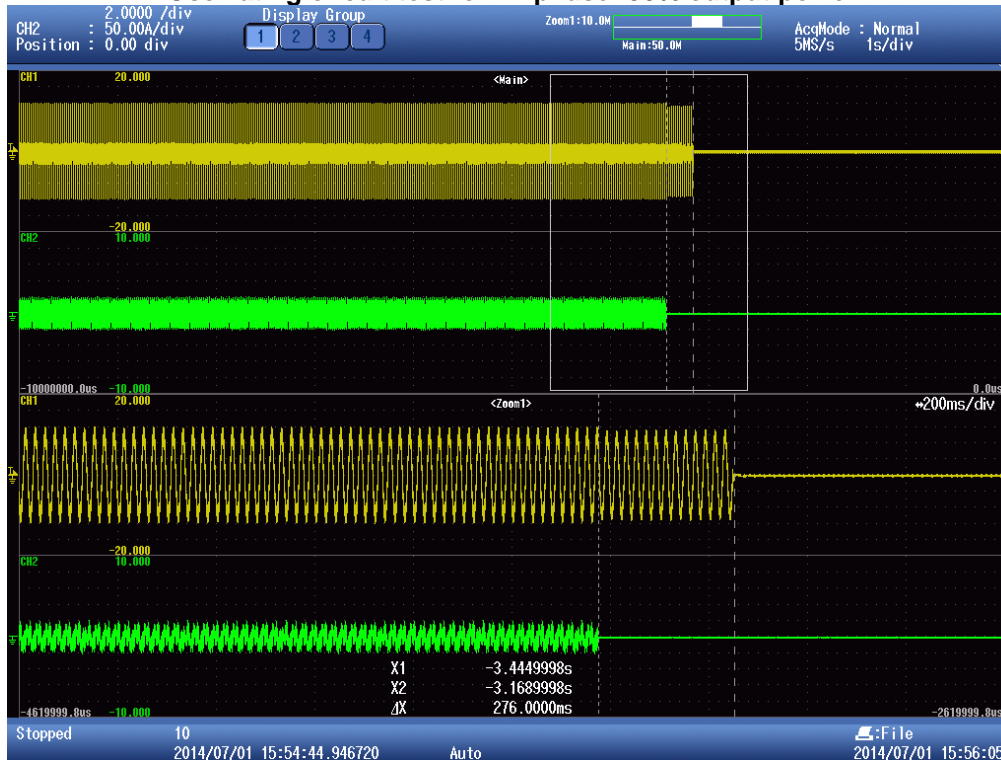
6.5.2 Resonant circuit test			P
Test conditions:	Frequency: 50+/-0,2Hz U _N =230+/-3Vac RLC consumes inverter real power within +/-3% Distortion factor of chokes <3% Quality Q>2		
Disconnection limit:	5s		
L1 Phase			
Output power: Osc. Parameter	25%	50%	100%
- 5%	0,260	0,258	0,191
- 4%	0,279	0,276	0,274
- 3%	0,285	0,244	0,146
- 2%	0,123	0,257	0,209
- 1%	0,132	0,136	0,145
0 %	0,174	0,263	0,242
+1 %	0,270	0,119	0,290
+2 %	0,221	0,234	0,112
+3 %	0,136	0,273	0,208
+4 %	0,326	0,231	0,205
+5 %	0,215	0,243	0,256
Parameter at 0%	L= 101,93 mH R= 64,99 Ω C= 98,32 uF	L= 49,92 mH R= 31,89 Ω C= 201,09 uF	L= 24,56 mH R= 15,68 Ω C= 410,07 uF
L2 Phase			
Output power: Osc. Parameter	25%	50%	100%
- 5%	0,053	0,047	0,049
- 4%	0,060	0,058	0,058
- 3%	0,065	0,064	0,073
- 2%	0,093	0,131	0,090
- 1%	0,202	0,134	0,136
0 %	0,188	0,292	0,294
+1 %	0,132	0,173	0,155
+2 %	0,098	0,105	0,078
+3 %	0,071	0,057	0,061
+4 %	0,064	0,047	0,056
+5 %	0,041	0,046	0,045
Parameter at 0%	L= 102,86 mH R= 65,80 Ω	L= 49,89 mH R= 31,89 Ω	L= 24,32 mH R= 15,85 Ω

	C= 97,48 uF	C= 200,55 uF	C= 411,34 uF
L3 Phase			
Output power:	25%	50%	100%
Osc. Parameter			
- 5%	0,232	0,182	0,153
- 4%	0,260	0,181	0,148
- 3%	0,123	0,148	0,209
- 2%	0,292	0,214	0,232
- 1%	0,301	0,202	0,276
0 %	0,153	0,248	0,214
+1 %	0,186	0,189	0,265
+2 %	0,233	0,236	0,291
+3 %	0,245	0,119	0,202
+4 %	0,270	0,200	0,136
+5 %	0,170	0,165	0,116
Parameter at 0%	L= 100,89 mH R= 64,83 Ω C= 100,31 uF	L= 50,04 mH R= 31,79 Ω C= 201,03 uF	L= 24,92 mH R= 15,92 Ω C= 405,26 uF
Note: The capacitors and the Chokes of the resonant circuit were adjusted in order to reach a quality of >2. $P_{QC}+P_{QL}=P_{Q,WR}$. The resistors of the resonant circuit consumed the real power of the inverter (P_{WR}) within +/- 3%.			

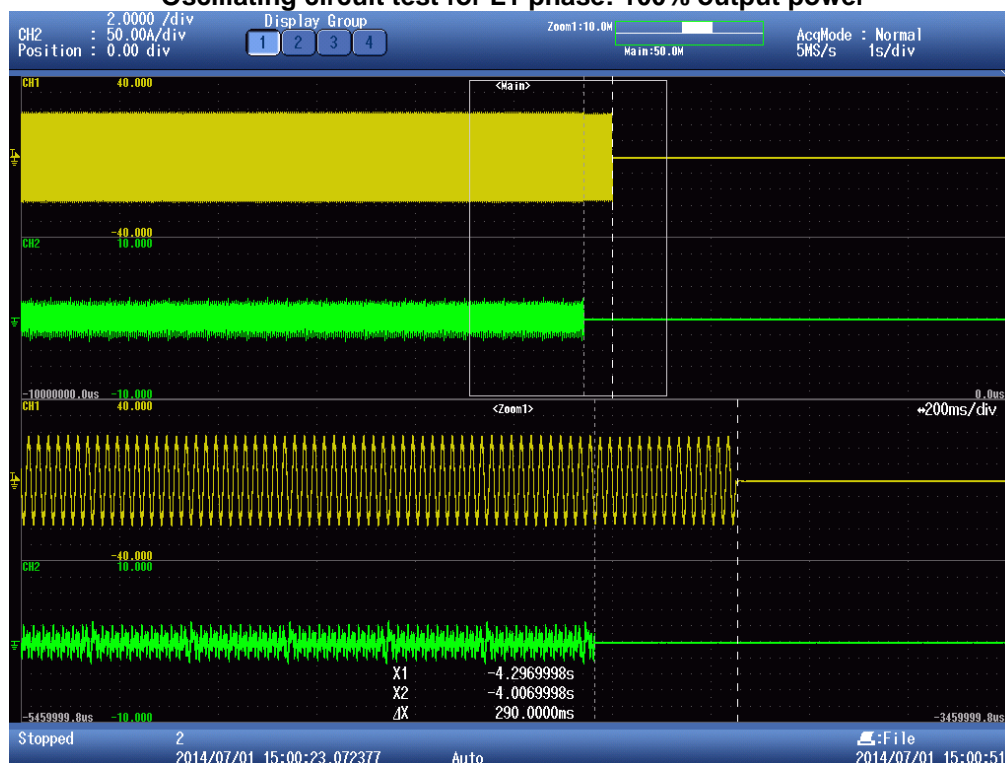
Oscillating circuit test for L1 phase: 25% output power



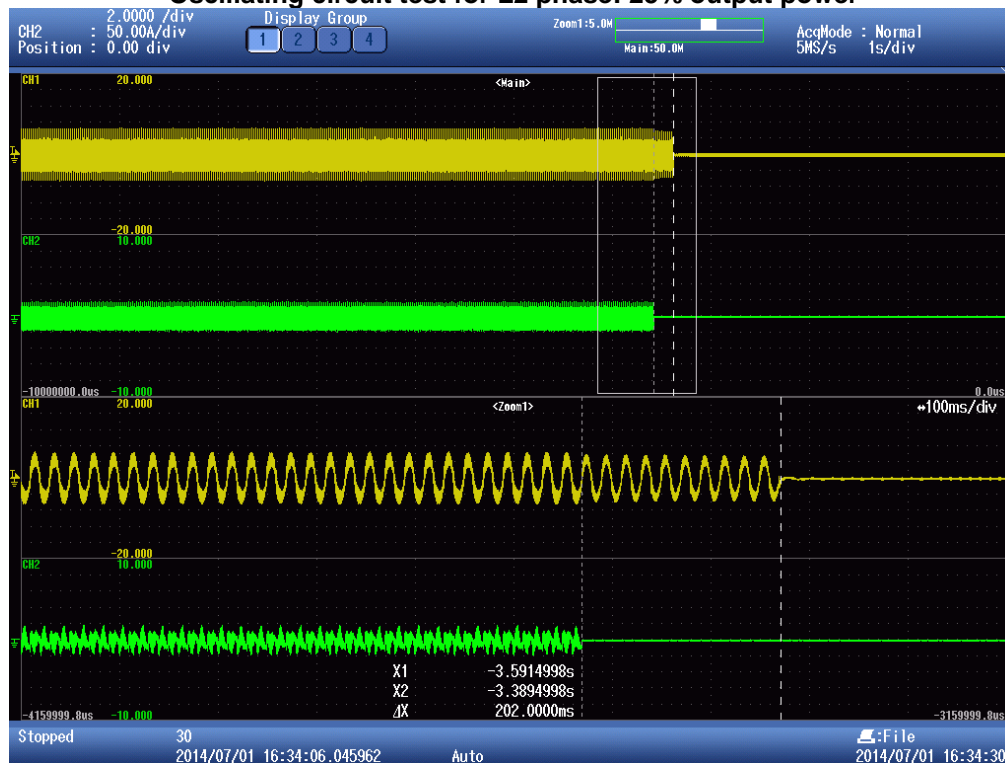
Oscillating circuit test for L1 phase: 50% output power



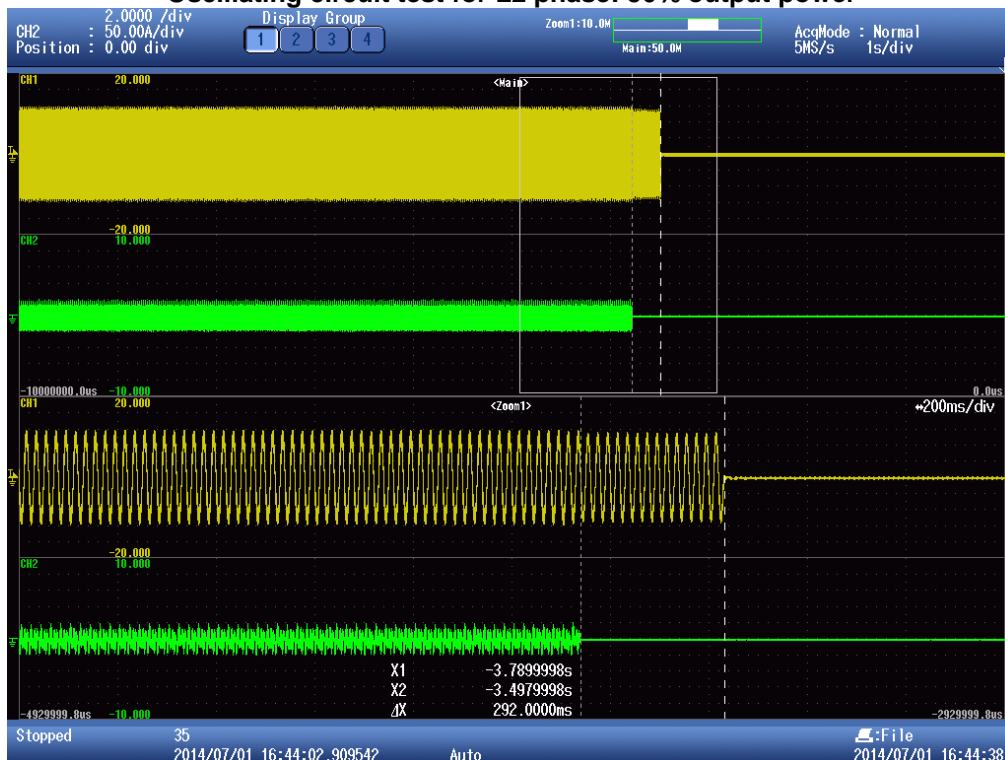
Oscillating circuit test for L1 phase: 100% output power



Oscillating circuit test for L2 phase: 25% output power



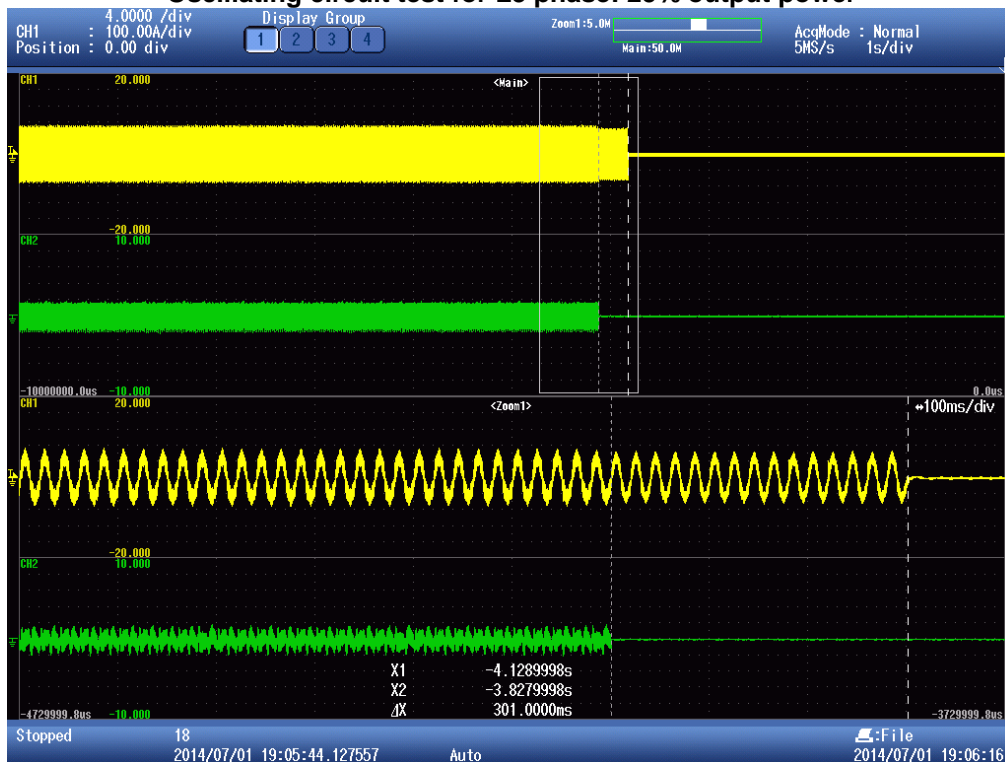
Oscillating circuit test for L2 phase: 50% output power



Oscillating circuit test for L2 phase: 100% output power



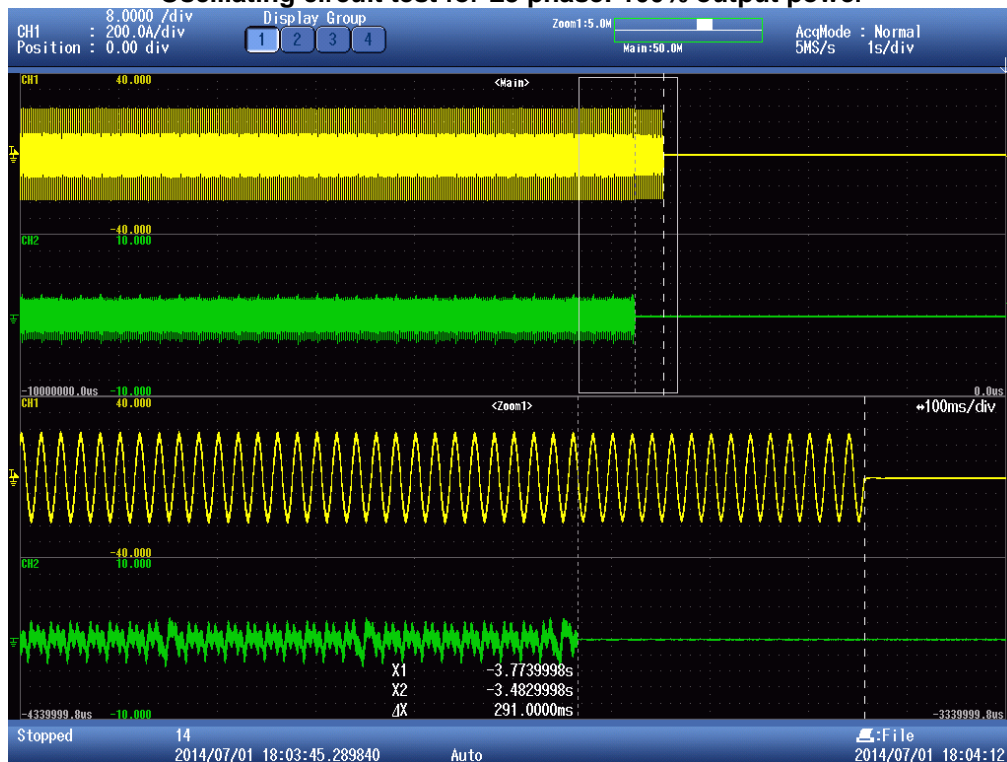
Oscillating circuit test for L3 phase: 25% output power



Oscillating circuit test for L3 phase: 50% output power

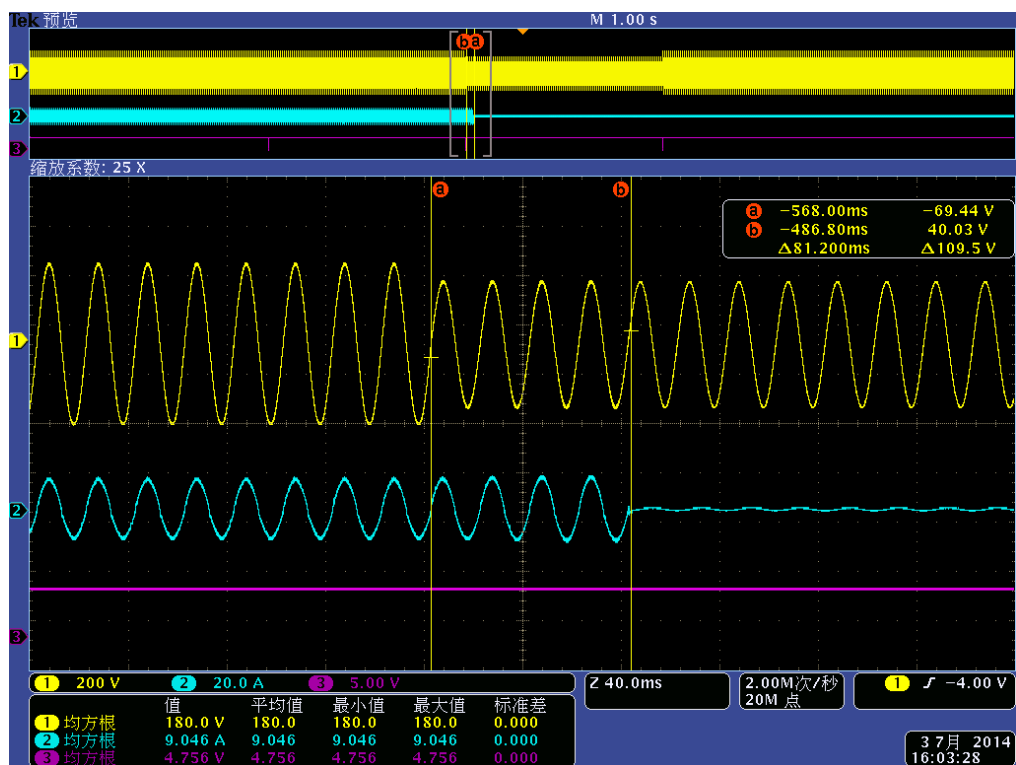


Oscillating circuit test for L3 phase: 100% output power

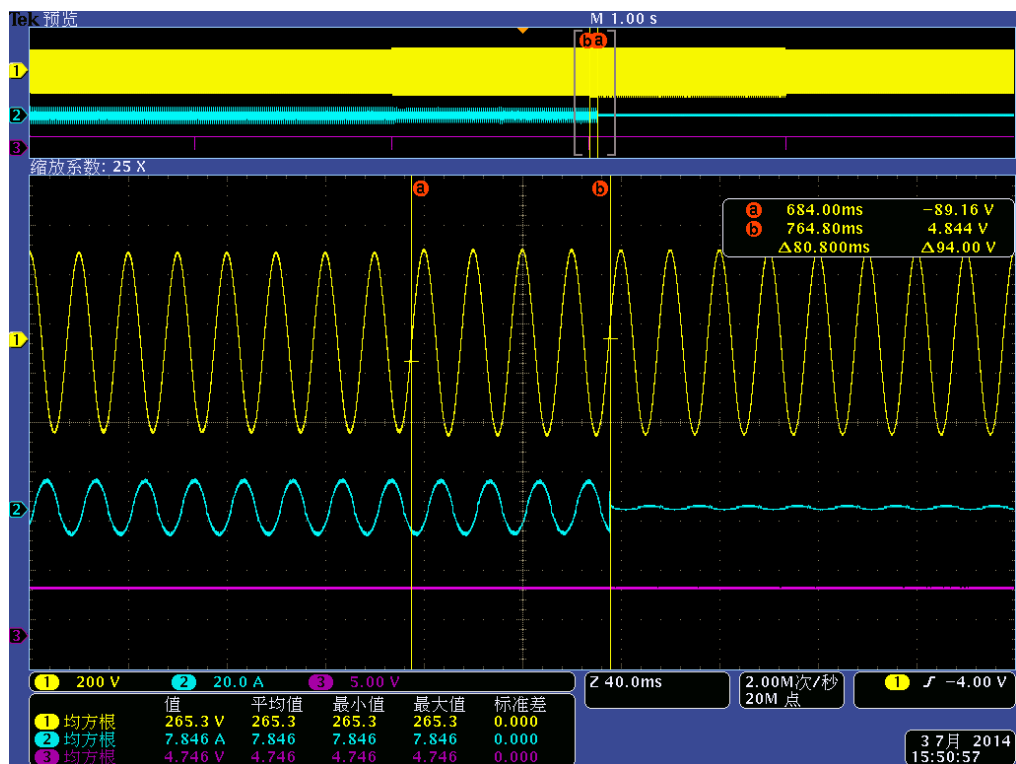


6.5.3 3-phase grid-voltage monitoring							P
Test Condition:			Frequency: 50+/-0,2Hz U _N =230Vac				
Phase	Limit:	Voltage step: (to min. 177,1 or max. 270,9)	Trip value [V]:	Reconnecti on time if ≤3s [s]:	Reconnecti on time if >3s [s]:	Disconnect ion time [ms]:	Limit [ms]:
L1	80% of Un	<u>188V</u> ->182V	185,2	N/A	82 s	81	200
		230V->175V				81	
	115% of Un	<u>260V</u> ->266V	262,9	N/A	82 s	81	200
		230V->270V				80	
L2	80% of Un	<u>188V</u> ->182V	185,0	N/A	82 s	68	200
		230V->175V				68	
	115% of Un	<u>260V</u> ->266V	262,6	N/A	82 s	68	200
		230V->270V				68	
L3	80% of Un	<u>188V</u> ->182V	185,6	N/A	82 s	74	200
		230V->175V				74	
	115% of Un	<u>260V</u> ->266V	262,9	N/A	82 s	74	200
		230V->270V				76	
Note: Lower and upper threshold voltage shall not fall or rise below or above 3% of the threshold voltage itself (min. 177,1V; max. 270,9V). The measurement shall take place at nominal frequency and any power.							

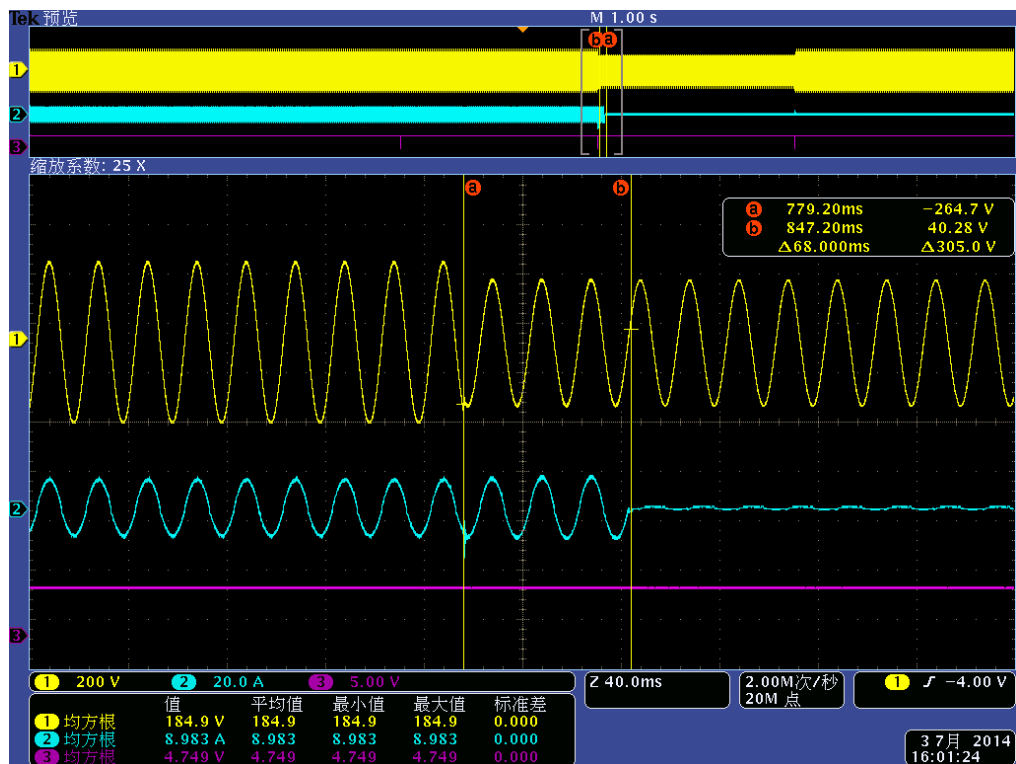
Under voltage: L1 phase



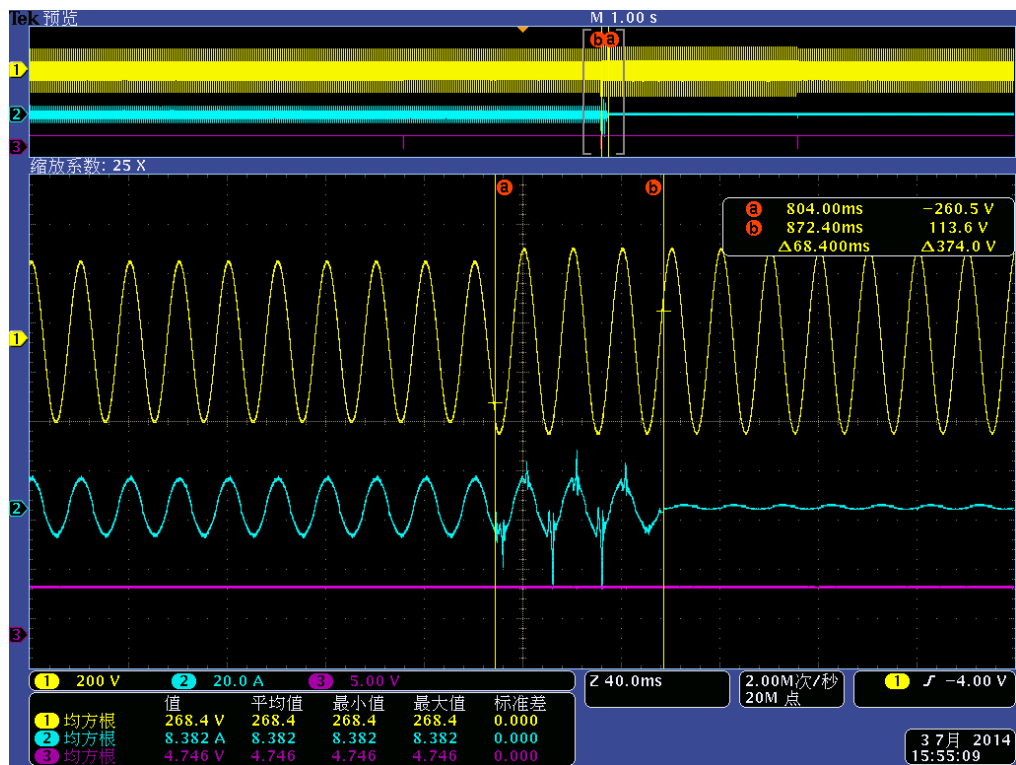
Over voltage: L1 phase



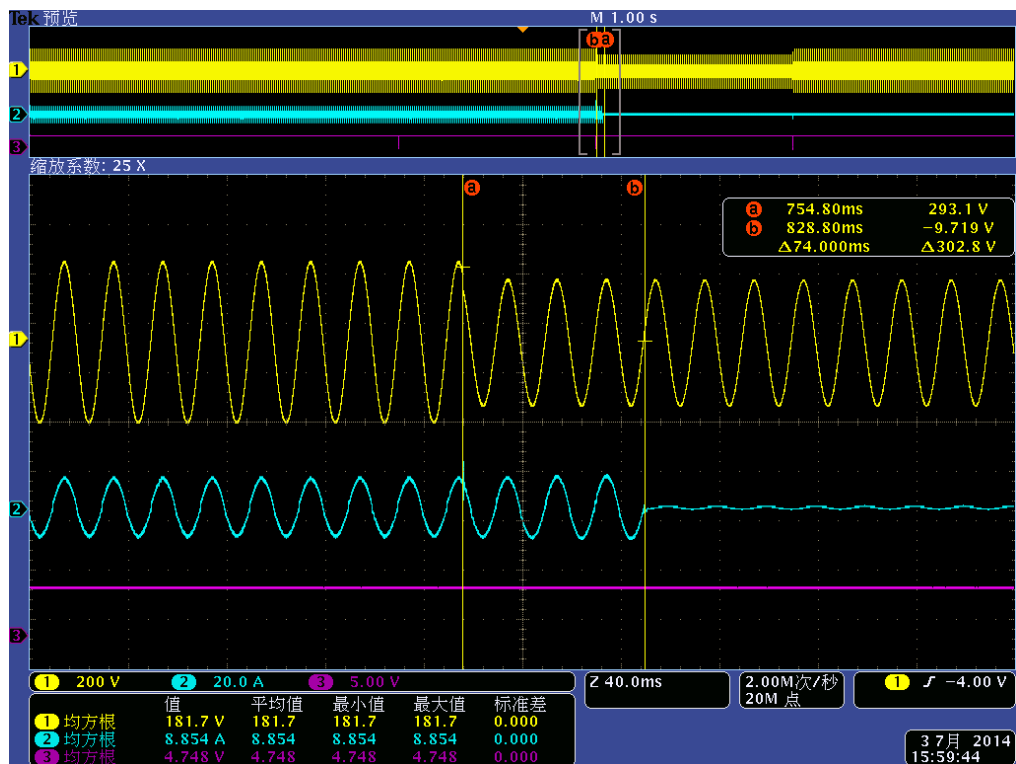
Under voltage: L2 phase



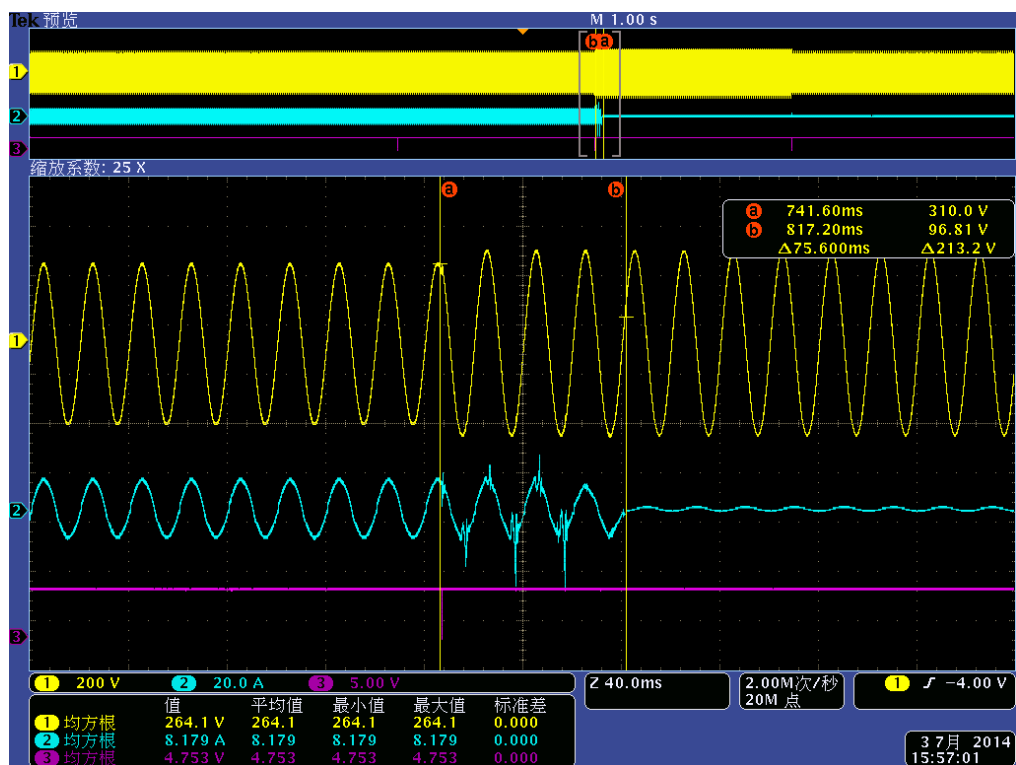
Over voltage: L2 phase



Under voltage: L3 phase



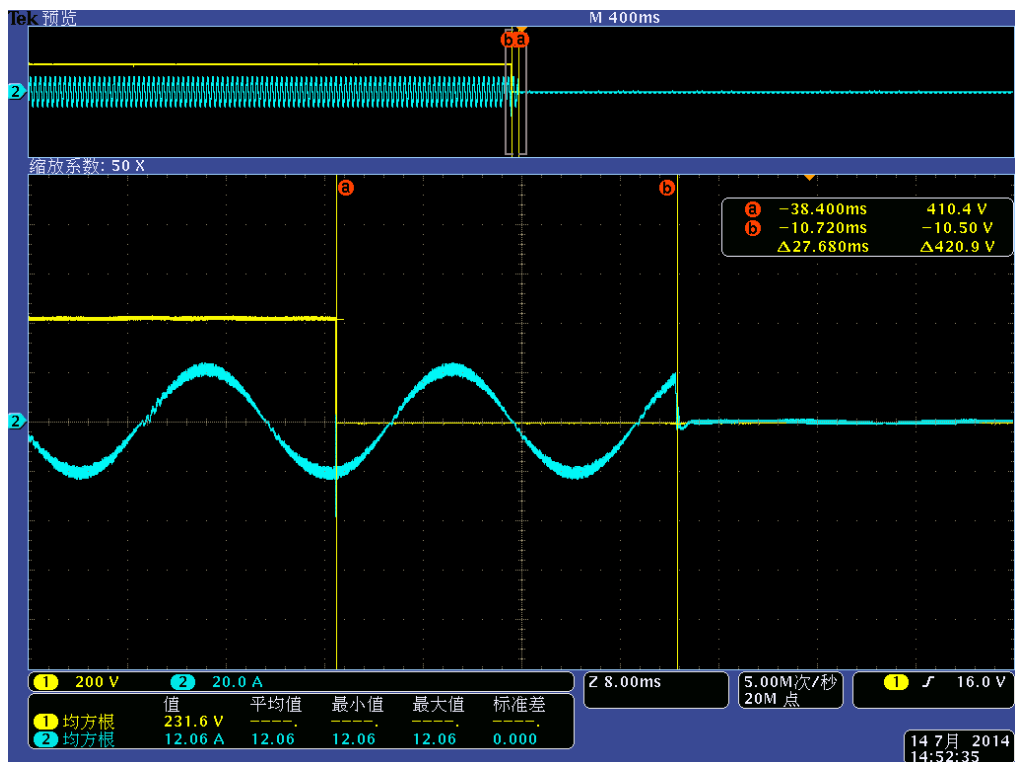
Over voltage: L3 phase



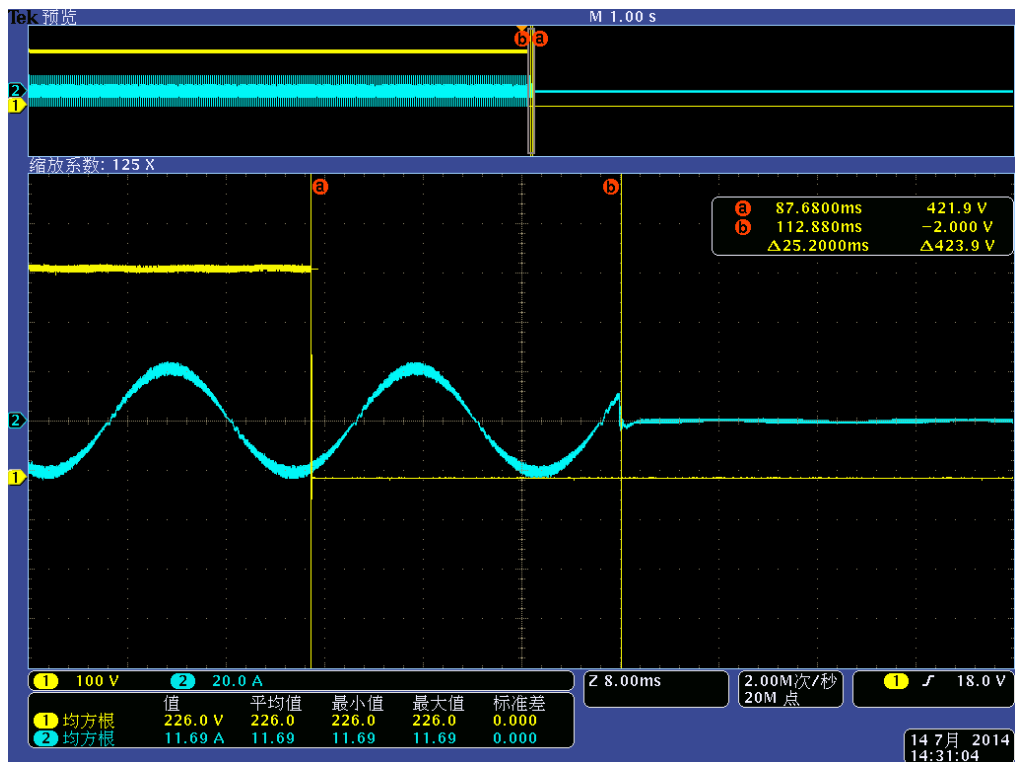
6.6 (4.7) Residual Current Monitoring			P
Test conditions:	Output power: 10,047kW V_{DC} : 800V Frequency: 50Hz Current measuring devices: min. class 0,5		
6.6.2.2.2 Test for correct disconnection in case of a continuously rising residual current			P
+ PV to N:			
	Fault Current (mA)		
Limit (mA)	$\sim 0,85U_N$	U_N	$\sim 1,15U_N$
≤ 300	135	136	142
≤ 300	136	138	139
≤ 300	141	141	140
≤ 300	138	146	138
≤ 300	138	140	139
- PV to N:			
	Fault Current (mA)		
Limit (mA)	$\sim 0,85U_N$	U_N	$\sim 1,15U_N$
≤ 300	144	138	142
≤ 300	139	138	140
≤ 300	137	138	141
≤ 300	139	136	143
≤ 300	136	144	140
Note: Comparing test circuit at 6.6.2.1, pic. 4. Fault current will rise up to 300mA within 30s. 5 values will be measured and listed.			

6.6.2.2.2 Test for correct disconnection in case of an abrupt appearing residual current >300mA				P
+ PV to N:				
Fault Current > 300mA				
Limit (ms)	$\sim 0,85U_N$	U_N	$\sim 1,15U_N$	
300	26	28	22	
- PV to N:				
Fault Current > 300mA				
Limit (ms)	$\sim 0,85U_N$	U_N	$\sim 1,10U_N$	
300	25	14	24	
Note: To test the trip time, the test resistance is then adjusted to set the residual current to a value approximately 10 mA below the actual trip level. A second external resistance, adjusted to cause approximately 20 mA of residual current to flow, is connected through a switch from ground to the same PV input terminal as the first resistance. The switch is closed, increasing the residual current to a level above the trip level determined above. The time shall be measured from the moment the second resistance is connected until the moment the inverter disconnects from the mains, as determined by observing the inverter output current and measuring the time until the current drops to zero.				

Scope picture: + PV to N

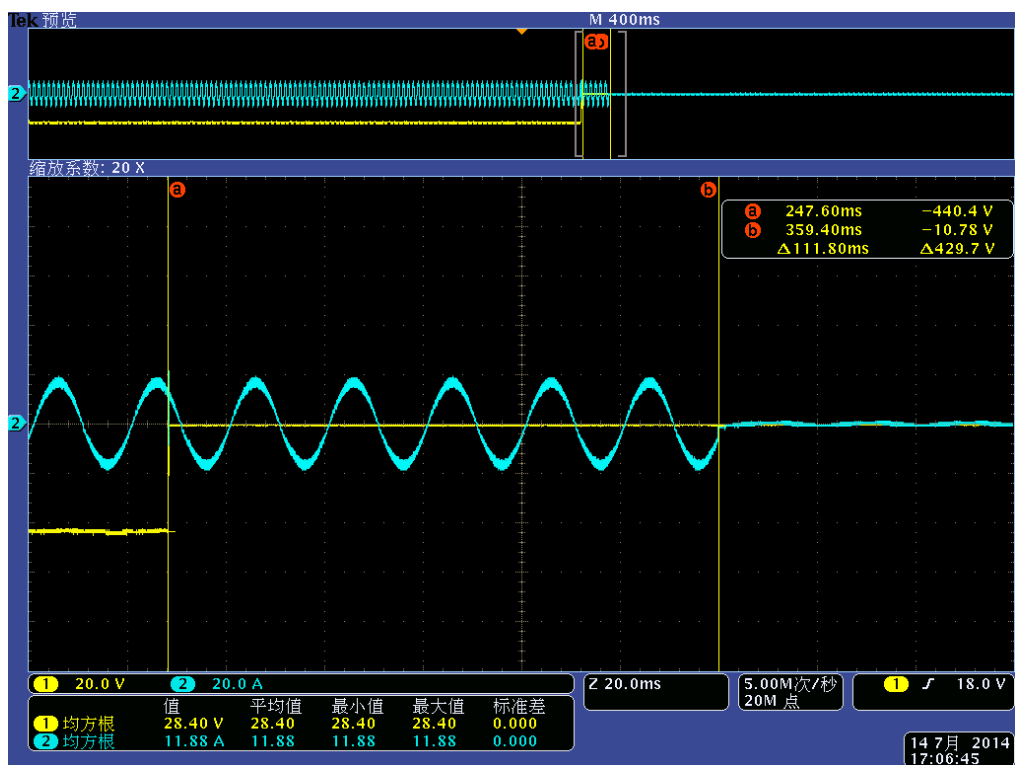


Scope picture: - PV to N

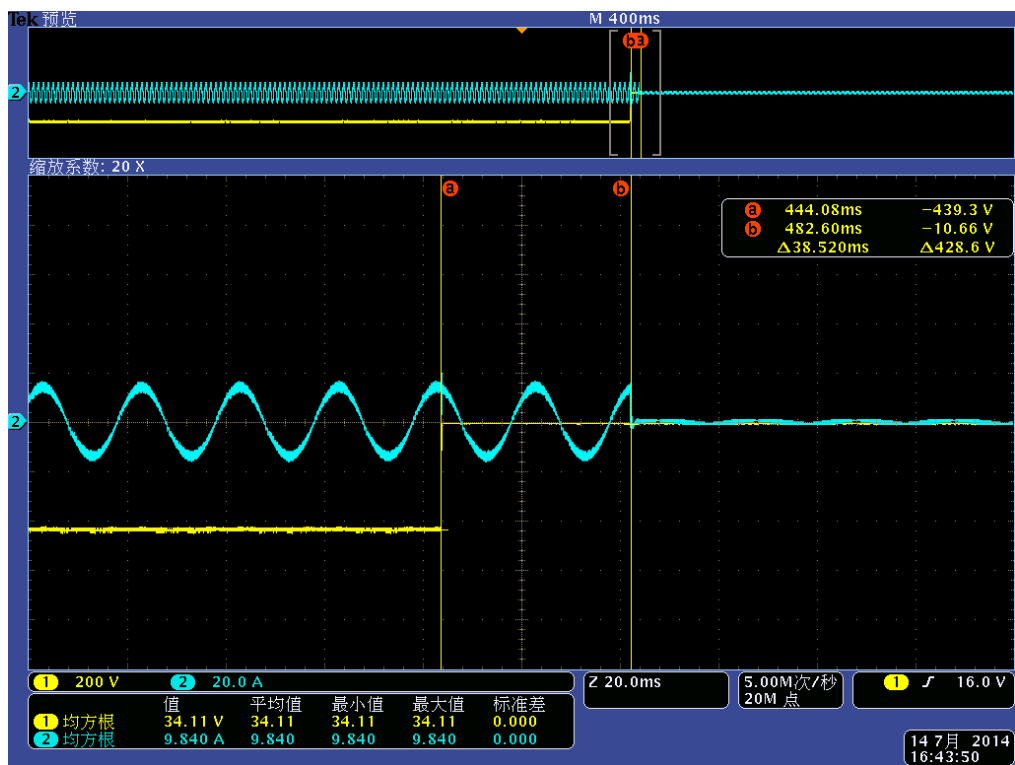


6.6.2.2.3 Test for correct disconnection in case of a suddenly occurring residual current				P
+PV to N				
Limit (mA)	$\sim 0,85U_N$ Disconnection time (ms)	U_N Disconnection time (ms)	$\sim 1,15U_N$ Disconnection time (ms)	Limit (ms)
30	77	114	82	300
30	87	110	82	300
30	64	97	85	300
30	99	56	112	300
30	107	61	111	300
60	28	27	34	150
60	28	37	32	150
60	29	27	32	150
60	36	32	39	150
60	32	34	31	150
150	15	13	17	40
150	23	8	19	40
150	19	21	23	40
150	8	13	19	40
150	17	15	12	40
-PV to N				
Limit (mA)	$\sim 0,85U_N$ Disconnection time (ms)	U_N Disconnection time (ms)	$\sim 1,15U_N$ Disconnection time (ms)	Limit (ms)
30	110	115	100	300
30	70	94	111	300
30	78	85	59	300
30	117	83	102	300
30	111	92	62	300
60	34	34	35	150
60	35	23	29	150
60	33	31	21	150
60	25	32	36	150
60	27	35	23	150
150	9	21	12	40
150	10	24	18	40
150	21	25	8	40
150	27	9	15	40
150	31	12	16	40
Note: The capacitive current is risen until disconnection. Test condition: $I_c + 30/60/150\text{mA} \leq I_{c\text{max}}$. R_1 is set that 30/60/150mA Flow and switch S is closed.				

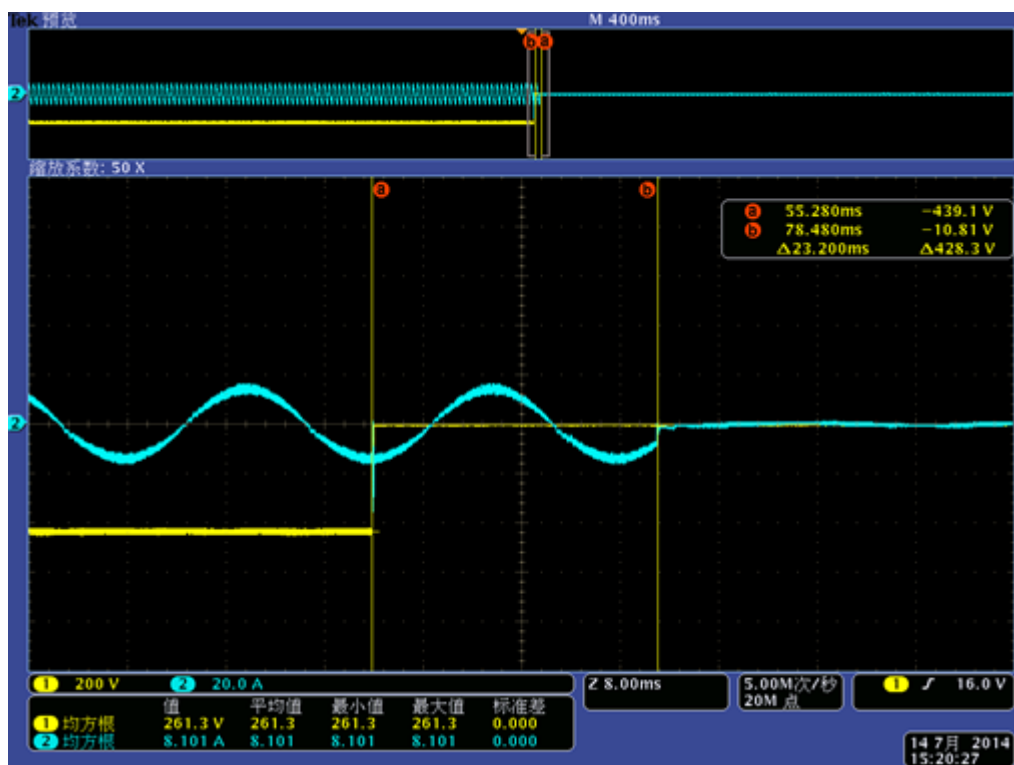
Scope picture: + PV to N; 115%U_N; 30mA



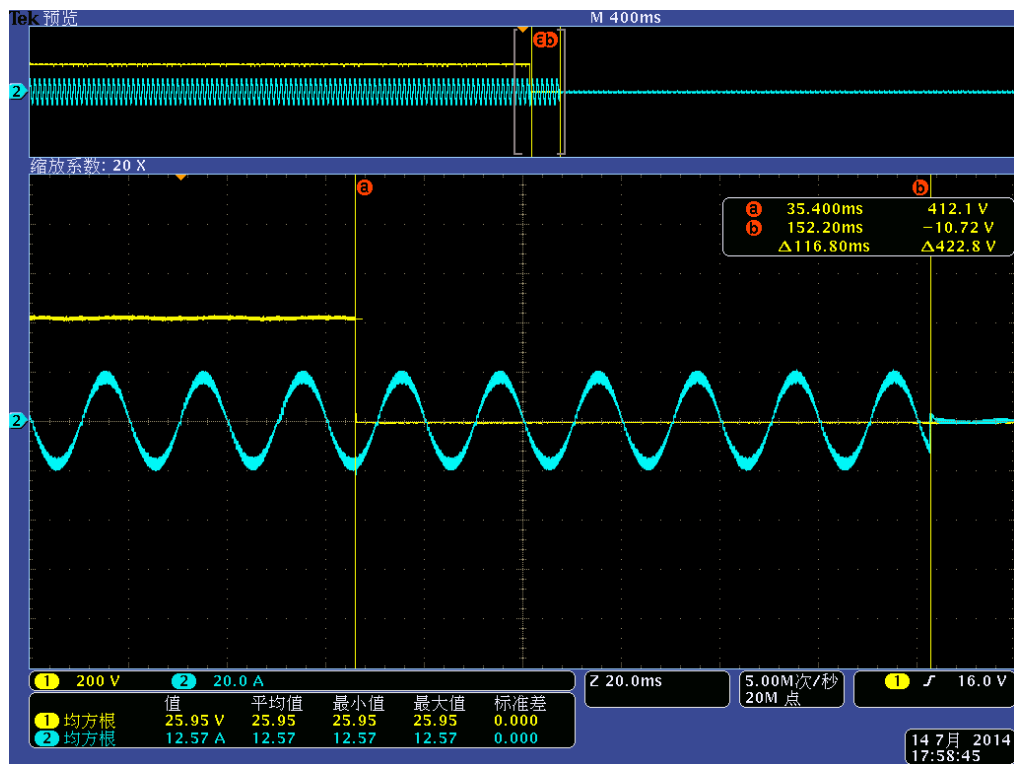
Scope picture: + PV to N; 115%U_N; 60mA



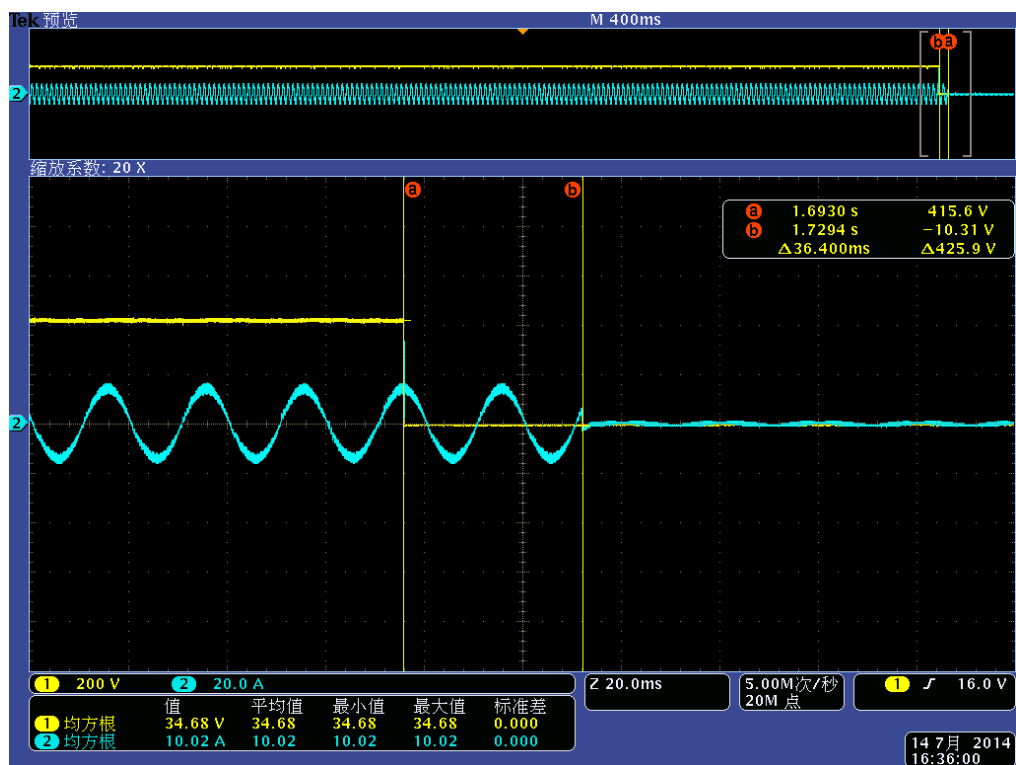
Scope picture: + PV to N; 115%U_N; 150mA



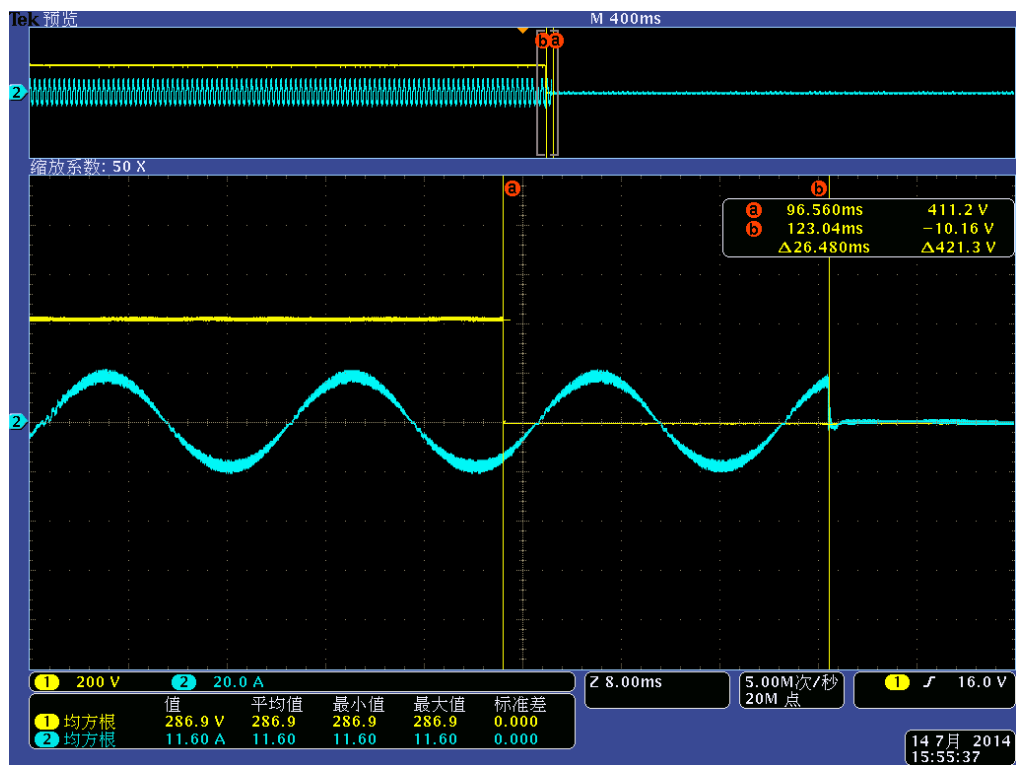
Scope picture: - PV to N; 85%U_N; 30mA



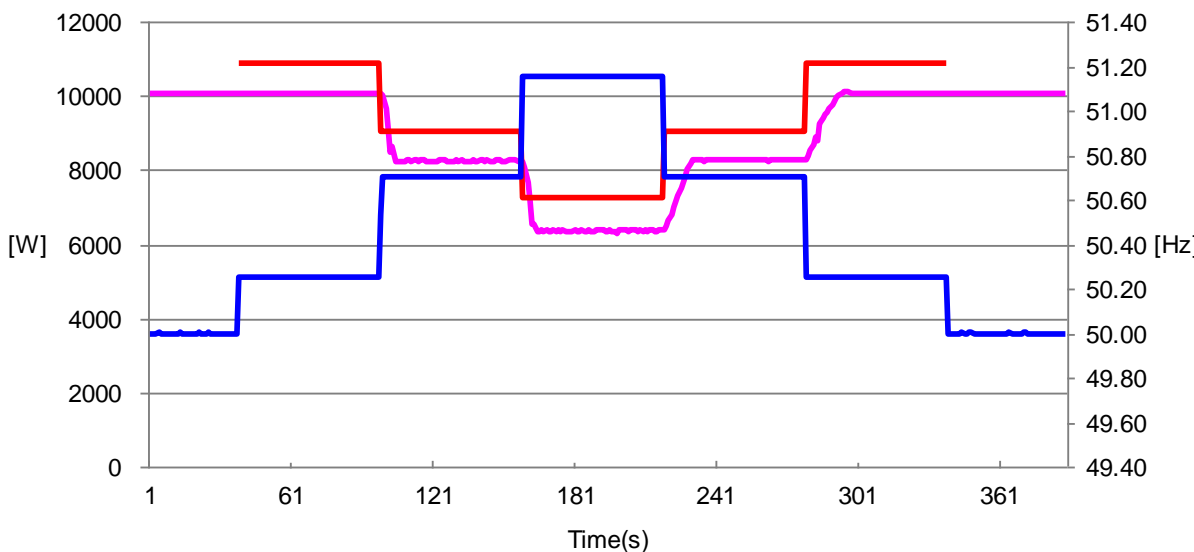
Scope picture: - PV to N; 115%U_N; 60mA



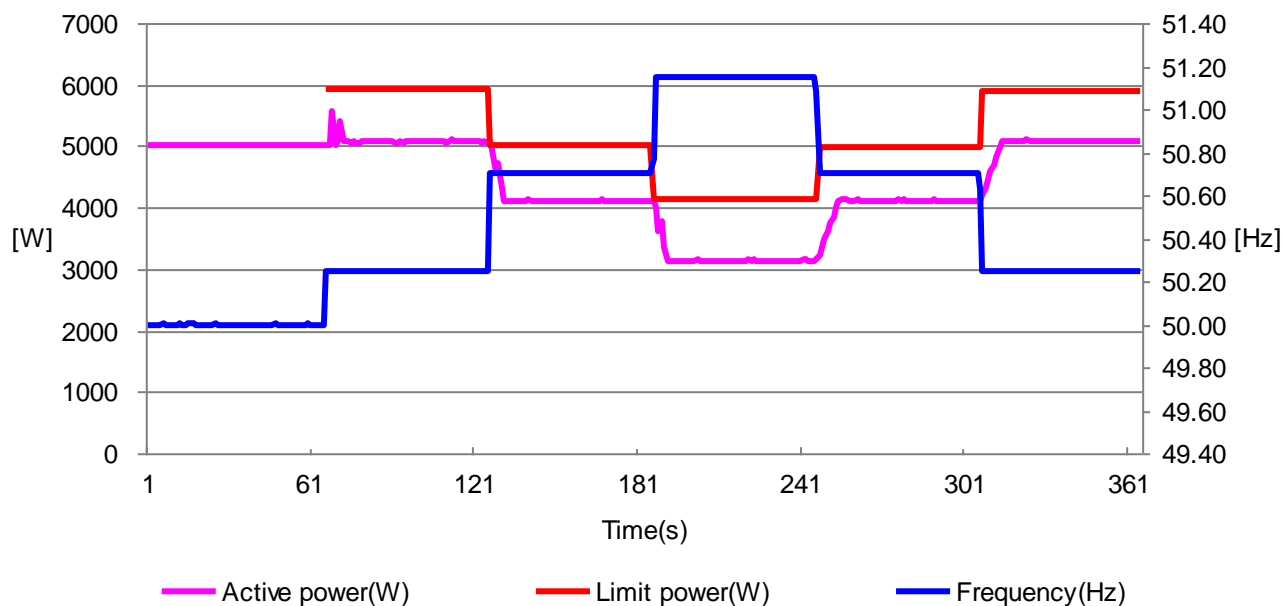
Scope picture: - PV to N; 85%U_N; 150mA



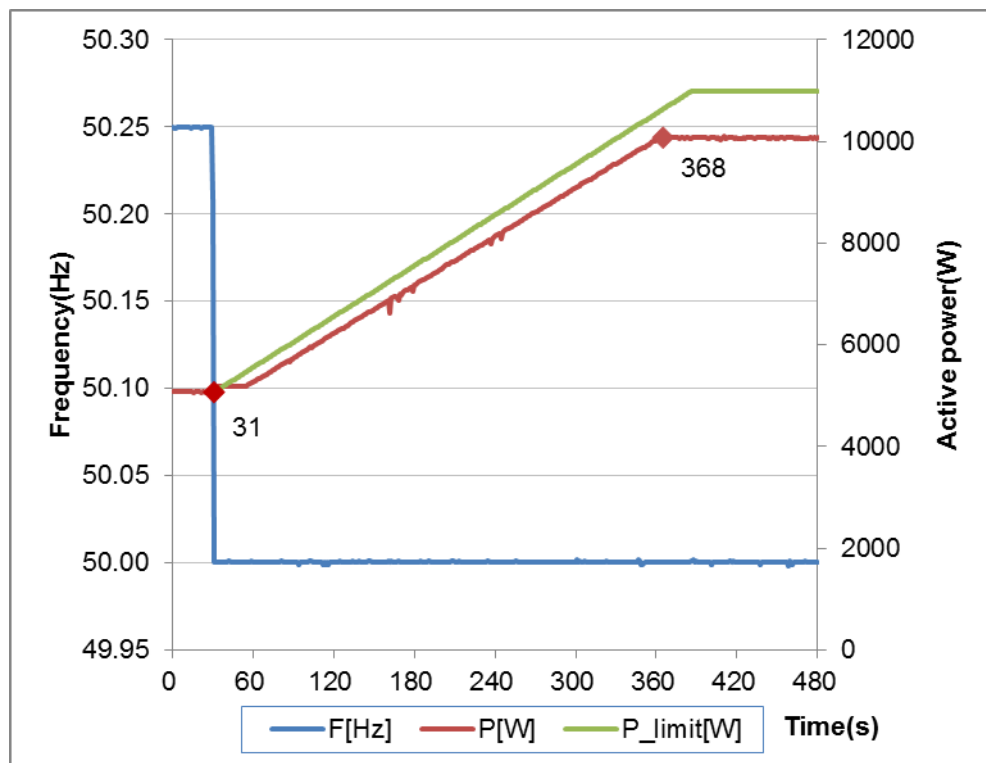
6.6.2.2.4 Isolation measurement before feeding in				P
Condition	DC Voltage (V)	Required Insulation resistance (kOhm)	Result	
DC+				
<i>V+</i> , the higher array voltage	900	900	The unit does not start-up. Error message: “13 ERROR” (PV ISO fault)	
<i>Vcritical</i> , the voltage level analyzed to be difficult to detect	800			
<i>Varbitrary</i> , any voltage within the range V- V+	400			
<i>V-</i> , the lower array voltage	330			
DC-				
<i>V+</i> , the higher array voltage	900	900	The unit does not start-up. Error message: “13 ERROR” (PV ISO fault)	
<i>Vcritical</i> , the voltage level analyzed to be difficult to detect	800			
<i>Varbitrary</i> , any voltage within the range V- V+	400			
<i>V-</i> , the lower array voltage	330			
Note: The array insulation resistance to ground shall be not less than 1 kΩ/V with respect to the maximum dc input voltage as specified by the manufacturer. with a minimum of 500 kΩ				

A1 Frequency monitoring								P
Test:								
1-min mean value	a) 50,00 Hz	b) 50,25 Hz	c) 50,70 Hz	d) 51,15 Hz	e) 50,70 Hz	f) 50,25 Hz	g) 50,00 Hz	
1. Measurement a) to g): Active power output > 80% P _{E_{max}}								
Frequency [Hz]:	50,00	50,25	50,70	51,15	50,70	50,25	50,00	
P _{setpoint} [kW]:	N/A	9,855	8,056	6,235	8,045	9,856	N/A	
P _{E60} [kW]:	10,056	10,056	8,352	6,456	8,051	9,857	10,060	
ΔP _{E60} /P _{Setpoint} [%]:	N/A	2,01	2,96	2,21	0,06	0,01	N/A	
2, Measurement a) to g): Active power output 40% and 60% after freezing > 80% P _{E_{max}}								
Frequency [Hz]:	50,00	50,25	50,70	51,15	50,70	50,25	N/A	
P _{setpoint} [kW]:	N/A	4,912	4,009	3,120	3,997	4,899	N/A	
P _{E60} [kW]:	5,012	5,079	4,162	3,191	4,037	5,001	N/A	
ΔP _{E60} /P _{Setpoint} [%]:	N/A	1,67	1,53	0,71	0,40	1,02	N/A	
Limit ΔP _{E60} /P _{Setpoint} :	+ 10 % of P _{E_{max}}							
Graph of Measurement 1.: Active power output > 80% P _{E_{max}}								
<div><div>Active power_[W] Limit power_[W] Frequency_[Hz]</div></div>								

Graph of Measurement 2.:Active power output 40% and 60% after freezing > 80% P_{Emax}



Graph of power gradient:



Annex 1

EMC Test Report

Dongguan NTC Co., Ltd.
Building D, Gaosheng Science and Technology park,
Hongtu road, Nancheng district, Dongguan city, Guangdong province, China
www.ntc-c.com Tel: +86-769-2202 2444 Fax: +86-769-2202 2799



CERTIFICATE OF CONFORMITY

EC Council Directive 2004/108/EC
Electromagnetic Compatibility
Registration No.: NTC1408090E

Applicant : VOLTRONIC POWER TECHNOLOGY CORP.
Address : 5F, No. 151, Xinhua 1st Road, Neihu District, Taipei, Taiwan, R.O.C.

Manufacturer : VOLTRONIC POWER TECHNOLOGY CORP.
Address : 5F, No. 151, Xinhua 1st Road, Neihu District, Taipei, Taiwan, R.O.C.

Factory : VOLTRONIC POWER TECHNOLOGY (SHENZHEN) CORP.
Address : 1-4F, Building 5, YuSheng Industrial Park, No.467, Section Xixiang,
National Highway 107, Xixiang, Bao An District, Shenzhen, China

E.U.T. : 3P 10K Hybrid Inverter

Brand Name : VOLTRONIC POWER

Model No. : InfiniSolar 10k

Standard : EN 61000-6-3: 2007+A1: 2011+AC: 2012
EN 61000-6-2: 2005+AC: 2005



检测
CNAS L5795



August 27, 2014

The certificate of conformity is based on an evaluation of a sample of the above mentioned product. Technical report and documentation are at the applicant's disposal. This is to certify that the tested sample is in conformity with all provisions of Annex I of Council Directive 2004/108/EC, in its latest amended version, referred to EMC Directive. The certificate does not imply assessment of the production and does not permit the use of Lab's logo.

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



EMC TEST REPORT

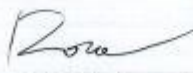
The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results are contained in this test report. Dongguan Nore Testing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

Applicant/Manufacturer : VOLTRONIC POWER TECHNOLOGY CORP.
Address : 5F, No. 151, Xinhua 1st Road, Neihu District, Taipei, Taiwan, R.O.C.
Factory : VOLTRONIC POWER TECHNOLOGY (SHENZHEN) CORP.
Address : 1-4F, Building 5, YuSheng Industrial Park, No.467, Section Xixiang, National Highway 107, Xixiang, Bao An District, Shenzhen, China
E.U.T. : 3P 10K Hybrid Inverter
Brand Name : VOLTRONIC POWER
Model No. : InfiniSolar 10k
Measurement Standard : EN 61000-6-3: 2007+A1: 2011+AC: 2012
EN 61000-6-2: 2005+AC: 2005
(EN 61000-4-2: 2009, EN 61000-4-3: 2006+A2: 2010,
EN 61000-4-4: 2012, EN 61000-4-5: 2006,
EN 61000-4-6:2014, EN 61000-4-8: 2010, EN 61000-4-11: 2004)

Date of Receiver : August 10, 2014
Date of Test : August 10, 2014 to August 22, 2014
Date of Report : August 22, 2014

This Test Report is Issued Under the Authority of :

Prepared by



Rose Hu / Engineer



Approved & Authorized Signer



This report shows that the E.U.T. is technically compliant with the EN 61000-6-3 and EN 61000-6-2. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

TEL: +86-769-22022444 FAX: +86-769-22022799 Web: www.ntc-c.com
Address: Building D, Gaosheng Science & Technology Park, Zhouxi Longxi Road, Nancheng District,
Dongguan City, Guangdong, China

Page 1 of 76

TABLE OF CONTENTS

1. SUMMARY OF TEST RESULTS.....	4
2. GENERAL INFORMATION	5
2.1 Details of E.U.T.	5
2.2 Description of Support Device.....	6
2.3 Block Diagram of Test Setup	6
2.4 Test Facility	7
2.5 Abnormalities from Standard Conditions.....	7
3. MEASURING DEVICES AND TEST EQUIPMENT	8
3.1. For Mains terminals Disturbance voltage Test.....	8
3.2. For Radiated Emission Measurement.....	8
3.3. For RF Electromagnetic Field Immunity Test.....	8
3.4. For Electrical Fast Transient /Burst Immunity Test	9
3.5. For Surge Immunity Test.....	9
3.6. For Injected Currents Immunity Measurement.....	9
3.7. For Magnetic Field Immunity Measurement.....	9
3.8. For Voltage Dips and Interruptions Measurement	9
4. MAINS TERMINAL DISTURBANCE VOLTAGE MEASUREMENT	10
4.1 Block Diagram of Test Setup	10
4.2 Limit of Mains Terminal Disturbance voltage measurement	10
4.3 Test Procedure.....	11
4.4 Operating Condition of E.U.T.	11
4.5 Mains Terminal Disturbance Voltage Test Results	11
5. RADIATED EMISSION MEASUREMENT	28
5.1 Block Diagram of Test	28
5.2 Limit of Radiated Emission Measurement.....	28
5.3 Test Procedure.....	29
5.4 Operating Condition of E.U.T.	29
5.5 Radiated Emission Measurement Result	29
6. PERFORMANCE CRITERIA FOR IMMUNITY	38
7. ELECTROSTATIC DISCHARGE TEST	39
7.1 Block Diagram of Test Setup	39
7.2 Test Standard and Severity Levels	39
7.3 Test Procedure.....	40
7.4 Test Results	40
8. RF FIELD STRENGTH SUSCEPTIBILITY TEST	42
8.1 Block Diagram of Test Setup	42
8.2 Test Standard and Severity Levels	42
8.3 Test Procedure.....	43
8.4 Test Results	43
9. ELECTRICAL FAST TRANSIENT/BURST TEST	45
9.1 Block Diagram of Test Setup	45
9.2 Test Standard and Severity Levels	45
9.3 Test Procedure.....	46
9.4 Test Result	46
10. SURGE IMMUNITY TEST	48
10.1 Block Diagram of Test Setup	48
10.2 Test Standard and Severity Levels	48
10.3 Test Procedure.....	48
10.4 Test Result	49

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



11. INJECTED CURRENTS SUSCEPTIBILITY TEST	51
11.1 Block Diagram of Test Setup	51
11.2 Test Standard and Severity Levels	51
11.3 Test Procedure.....	52
11.4 Test Result	52
12. MAGNETIC FIELD IMMUNITY TEST	54
12.1 Block Diagram of Test Setup	54
12.2 Test Standard and Severity Levels	54
12.3 Test Procedure.....	54
12.4 Test Result	55
13. VOLTAGE DIPS AND INTERRUPTIONS TEST	57
13.1 Block Diagram of Test Setup	57
13.2 Test Standard and Severity Levels	57
13.3 Test Procedure.....	57
13.4 Test Result	58
14. PHOTOGRAPH	60
14.1 Photo of Conducted Emission Measurement.....	60
14.2 Photo of Radiation Emission Measurement	60
14.3 Photo of Electrostatic Discharge Test	61
14.4 Photo of RF Field Strength susceptibility Test	61
14.5 Photo of Electrical Fast Transient /Surge /Magnetic field /Voltage Dips immunity Test...	62

Appendix I (Photos of E.U.T.) (13 pages)

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



1. SUMMARY OF TEST RESULTS

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

EMISSION			
Standard	Test Type	Result	Remarks
EN 61000-6-3: 2007+A1: 2011+AC: 2012	Mains Terminal Disturbance Voltage Test	PASS	Uncertainty: 2.7dB
	Radiated Emission Test	PASS	Uncertainty: 3.6dB

IMMUNITY(EN 61000-6-2: 2005+AC: 2005)			
Standard	Test Type	Result	Remarks
EN 61000-4-2: 2009	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion B
EN 61000-4-3: 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: 2006	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
EN 61000-4-11: 2004	Voltage Dips and Interruptions	PASS	Meets the requirements of Performance Criterion B&C

Page 4 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



2. GENERAL INFORMATION

2.1 Details of E.U.T.

E.U.T. : 3P 10K Hybrid Inverter

Model No. : InfiniSolar 10k

Brand Name : VOLTRONIC POWER

Rating : PV INPUT:
Nominal operating voltage 720Vdc
Vmax PV 900Vdc
Isc PV 2*18.6A
MPPT voltage range 400 ~ 800Vdc

GRID/AC OUTPUT
Nominal operating voltage 3/N/PE, 230/400Vac
Nominal output current 14.5A
Nominal operating frequency 50Hz
Maximum power 10000W
Power factor range 0.9 lead -0.9lag

AC INPUT:
Nominal operating voltage 3/N/PE, 230/400 Vac
Maximum input current 25A
Nominal operating frequency 50Hz

BATTERY
Battery voltage range 42-56Vdc
Maximum battery current 275A

Operation Frequency : 20KHz (Declaration by applicant)

Test Voltage : AC 380V 50Hz, DC 48V External Battery,
DC 800V+AC 380V 50Hz, DC 800V+DC 48V

Cable : None

Description of model difference : None

Remark : The signal control port USB, RS232 and DC port
(battery) external cable are shorter than 3m.

Page 5 of 76

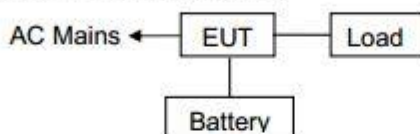
2.2 Description of Support Device

None

2.3 Block Diagram of Test Setup

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

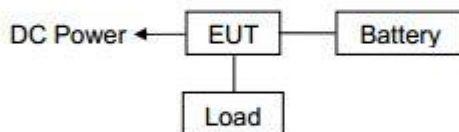
(1) For Normal Operation Mode,



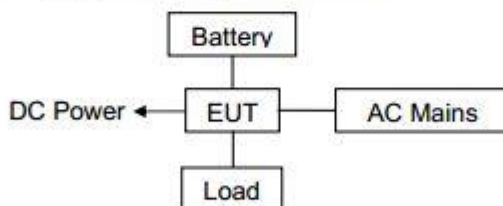
(2) Stored Energy Operation Mode



(3) PV Charging Operation Mode



(4) PV Charging+Normal Operation Mode



Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



2.4 Test Facility

Site Description
EMC Lab

: Listed by CNAS, August 16, 2012
The certificate is valid until August 15, 2015
The Laboratory has been assessed and proved to
be in compliance with CNAS/CL01
The Certificate Registration Number is L5795.

Listed by FCC, August. 02, 2011
The Certificate Number is 665078.

Listed by Industry Canada, July 01, 2011
The Certificate Registration Number. Is 46405-9743

Name of Firm 1 : Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)
Site Location 1 : Building D, Gaosheng Science & Technology Park,
Zhouxi Longxi Road, Nancheng District,
Dongguan City, Guangdong Province, China
Name of Firm 2 : GUANGZHOU GRG METROLOGY & TEST CO.,
LTD.
Site Location 2 : No. 163, Pingyun Rd, West of Huangpu Ave,
Guangzhou 510656, P.O.Box. 1411, China

2.5 Abnormalities from Standard Conditions

None

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



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, 2014	1 Year
2.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 08, 2014	1 Year
3.	L.I.S.N	Schwarzbeck	NNLK8129	8129-212	Mar. 22, 2014	1 Year
4.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 08, 2014	1 Year
5.	Pulse Limiter	MTS-systemtechnik	MTS-IMP-136	261115-01 0-0022	Mar. 08, 2014	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, 2014	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 22, 2014	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, 2014	1 Year
9.	Cable	Huber+Suhner	CIL02	N/A	Mar. 08, 2014	1 Year
10.	Power Amplifier	HP	HP 8447D	1145A00203	Mar. 08, 2014	1 Year

3.3. For RF Electromagnetic Field Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Signal Generator	Agilent	N5181A	MY501425 30	Nov. 01, 2013	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 22, 2014	N/A
3.	RF Power Meter	ESE	4242	13984	Nov. 04, 2013	1 Year
4.	Power Amplifier	TESEQ	CBA 1G-150	T44029	N/A	N/A
5.	Power Sensor	ESE	51011EMC	35716	Nov. 04, 2013	1 Year

Page 8 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



3.4. For Electrical Fast Transient /Burst Immunity Test

(GUANGZHOU GRG METROLOGY & TEST CO., LTD.)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Burst Tester	EMC PARTNER	TRA2000	853	Jun. 1, 2014	1 Year
2.	CDN	EMC PARTNER	CDN 2000-06-32	110	Jun. 1, 2014	1 Year

3.5. For Surge Immunity Test

(GUANGZHOU GRG METROLOGY & TEST CO., LTD.)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Surge Tester	EMC PARTNER	TRA2000	853	Jun. 1, 2014	1 Year
2.	CDN	EMC PARTNER	CDN 2000-06-32	110	Jun. 1, 2014	1 Year

3.6. For Injected Currents Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	CDN	Luthi	L-801M2/M3	2015	Oct.18, 2013	1 Year
2.	C/S Test System	HAEFELY	WinPAMP	NSEMC002	N/A	N/A

3.7. For Magnetic Field Immunity Measurement

(GUANGZHOU GRG METROLOGY & TEST CO., LTD.)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Magnetic Field Tester	EMC PARTNER	TRA2000	853	Jun. 1, 2014	1 Year
2.	Variac Module	EMC PARTNER	VAR-EXT1000	041	Apr. 16, 2014	1 Year
3.	Induction Coil	EMC PARTNER	MF1000-1	150	Apr. 16, 2014	1 Year

3.8. For Voltage Dips and Interruptions Measurement

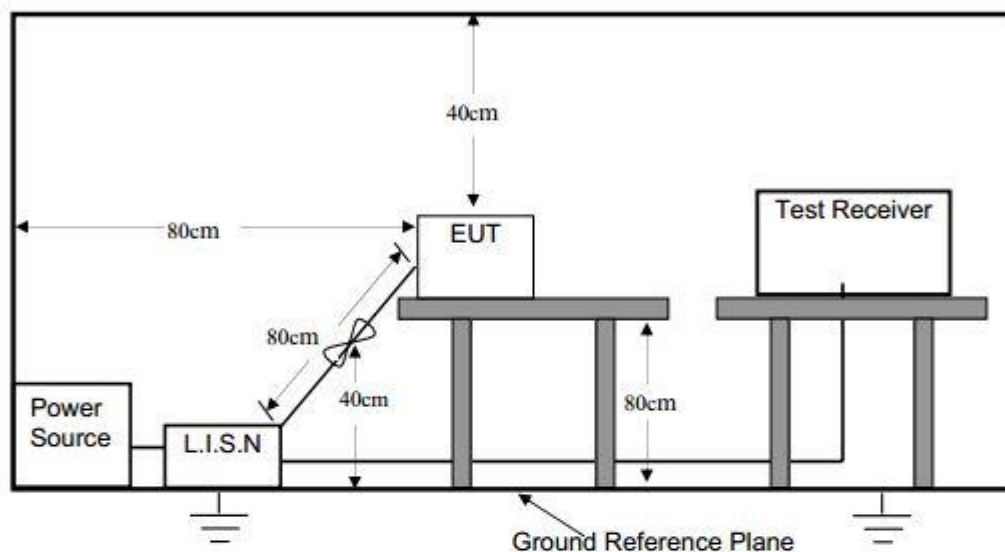
(GUANGZHOU GRG METROLOGY & TEST CO., LTD.)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Dips Tester	EMC PARTNER	TRA2000	853	Jun. 1, 2014	1 Year
2.	CDN	EMC PARTNER	CDN 2000-06-32	110	Jun. 1, 2014	1 Year
3.	Variac Module	EMC PARTNER	VAR-EXT1000	041	Apr. 16, 2014	1 Year
4.	PFS	EMC PARTNER	PFS32	015	Apr. 16, 2014	1 Year

Page 9 of 76

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 61000-6-3

Limits for conducted disturbance at the mains port.

Frequency range (MHz)	Limits (Db(Uv))	
	Quasi-peak	Average
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

- Note:
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

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 61000-6-3 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, PV Charging Operation Mode, PV Charging+Normal Operation Mode) and test it.

4.5 Mains Terminal Disturbance Voltage Test Results

PASS.

Please refer to the following pages.

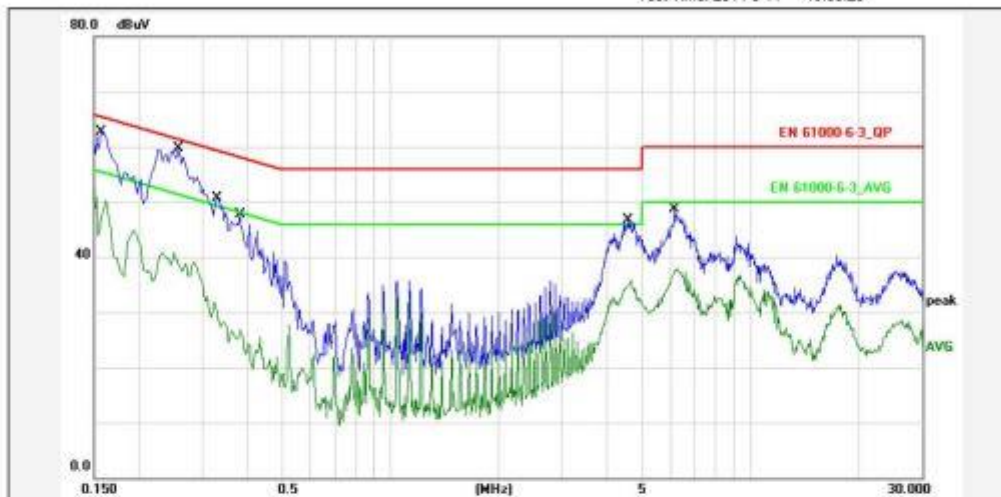
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:00:20



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: L3

Temp.()/Hum.(%): 25(C) / 56 %

Power Rating: PV 800V

Test Engineer: Stan

Test Mode: PV Charging+Load+Normal

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1580	10.80	48.90	59.70	65.56	-5.86	QP	P	
2	0.1580	10.80	38.10	48.90	55.56	-6.66	AVG	P	
3	0.2580	10.80	42.10	52.90	61.49	-8.59	QP	P	
4	0.2580	10.80	27.50	38.30	51.49	-13.19	AVG	P	
5	0.3300	10.80	36.80	47.60	59.45	-11.85	QP	P	
6	0.3300	10.80	18.90	29.70	49.45	-19.75	AVG	P	
7	0.3820	10.80	33.90	44.70	58.23	-13.53	QP	P	
8	0.3820	10.80	14.10	24.90	48.23	-23.33	AVG	P	
9	4.5858	10.80	32.90	43.70	56.00	-12.30	QP	P	
10	4.5858	10.80	22.90	33.70	46.00	-12.30	AVG	P	
11	6.1619	10.80	34.90	45.70	60.00	-14.30	QP	P	
12	6.1619	10.80	25.10	35.90	50.00	-14.10	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 12 of 76

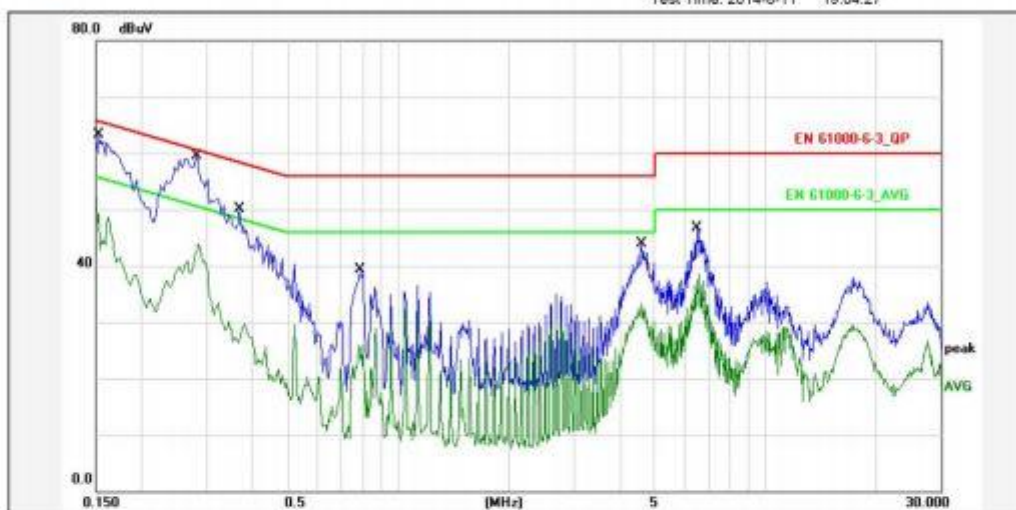
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:04:27



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: L2
Temp.()/Hum.(%): 25(C) / 56 %
Power Rating: PV 800V
Test Engineer: Stan

Test Mode: PV Charging+Load+Normal

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1524	10.80	49.50	60.30	65.86	-5.56	QP	P	
2	0.1524	10.80	39.40	50.20	55.86	-5.66	AVG	P	
3	0.2819	10.80	41.40	52.20	60.76	-8.56	QP	P	
4	0.2819	10.80	31.90	42.70	50.76	-8.06	AVG	P	
5	0.3699	10.80	36.40	47.20	58.50	-11.30	QP	P	
6	0.3699	10.80	17.00	27.80	48.50	-20.70	AVG	P	
7	0.7860	10.80	25.40	36.20	56.00	-19.80	QP	P	
8	0.7860	10.80	16.80	27.60	46.00	-18.40	AVG	P	
9	4.6059	10.80	30.10	40.90	56.00	-15.10	QP	P	
10	4.6059	10.80	20.50	31.30	46.00	-14.70	AVG	P	
11	6.5179	10.80	32.90	43.70	60.00	-16.30	QP	P	
12	6.5179	10.80	25.70	36.50	50.00	-13.50	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 13 of 76

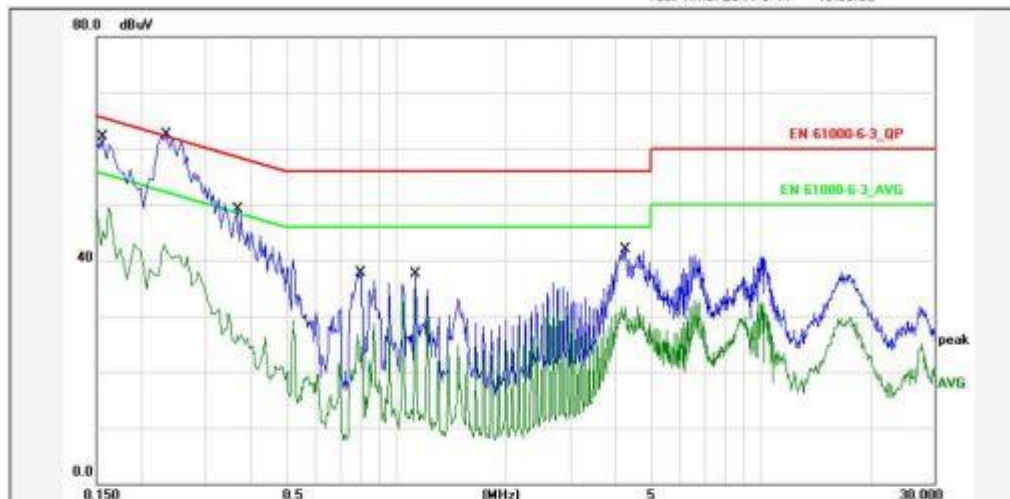
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:08:05



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test Item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: L1

Temp.()/Hum.(%): 25(C) / 56 %

Power Rating: PV 800V

Test Engineer: Stan

Test Mode: PV Charging+Load+Normal

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1556	10.80	48.40	59.20	65.69	-6.49	QP	P	
2	0.1556	10.80	36.40	47.20	55.69	-8.49	AVG	P	
3	0.2340	10.80	45.80	56.60	62.30	-5.70	QP	P	
4	0.2340	10.80	31.70	42.50	52.30	-9.80	AVG	P	
5	0.3659	10.80	35.30	46.10	58.59	-12.49	QP	P	
6	0.3659	10.80	17.60	28.40	48.59	-20.19	AVG	P	
7	0.7980	10.80	23.80	34.60	56.00	-21.40	QP	P	
8	0.7980	10.80	13.90	24.70	46.00	-21.30	AVG	P	
9	1.1300	10.80	23.70	34.50	56.00	-21.50	QP	P	
10	1.1300	10.80	20.40	31.20	46.00	-14.80	AVG	P	
11	4.2579	10.80	28.00	38.80	56.00	-17.20	QP	P	
12	4.2579	10.80	18.90	29.70	46.00	-16.30	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 14 of 76

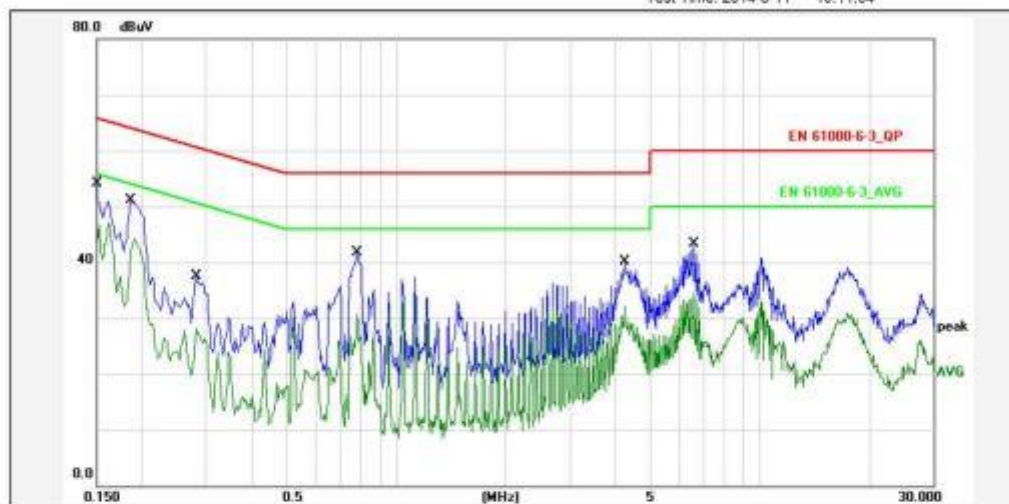
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:11:54



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: N

Temp./Hum.(%): 25(C) / 56 %

Power Rating: PV 800V

Test Engineer: Stan

Test Mode: PV Charging+Load+Normal

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	10.80	40.40	51.20	65.99	-14.79	QP	P	
2	0.1500	10.80	34.40	45.20	55.99	-10.79	AVG	P	
3	0.1859	10.80	37.30	48.10	64.21	-16.11	QP	P	
4	0.1859	10.80	31.40	42.20	54.21	-12.01	AVG	P	
5	0.2819	10.80	23.30	34.10	60.76	-26.66	QP	P	
6	0.2819	10.80	15.30	26.10	50.76	-24.66	AVG	P	
7	0.7820	10.80	27.80	38.60	56.00	-17.40	QP	P	
8	0.7820	10.80	17.80	28.60	46.00	-17.40	AVG	P	
9	4.2579	10.80	27.30	38.10	56.00	-17.90	QP	P	
10	4.2579	10.80	19.30	30.10	46.00	-15.90	AVG	P	
11	6.6020	10.80	30.40	41.20	60.00	-18.80	QP	P	
12	6.6020	10.80	21.80	32.60	50.00	-17.40	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 15 of 76

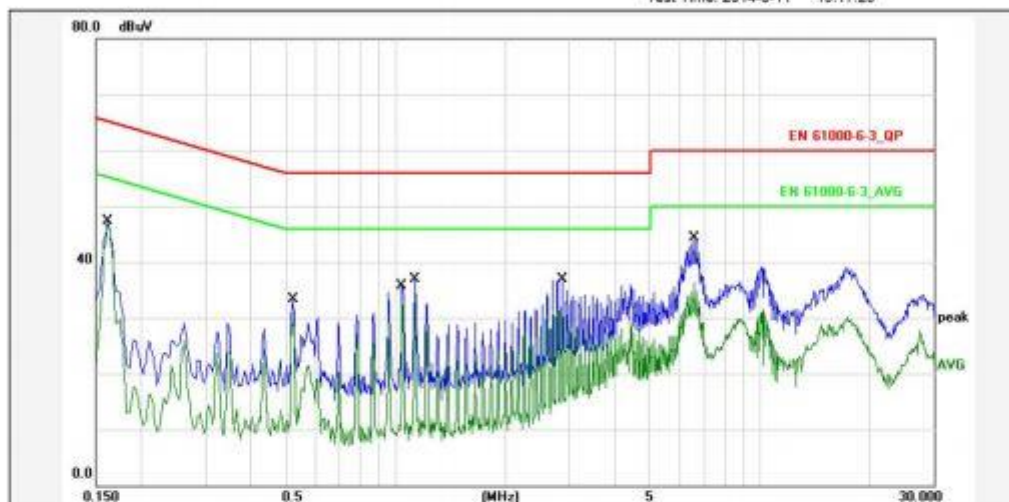
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:17:29



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test Item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: N

Temp.(J/Hum.): 25(C) / 56 %

Power Rating: PV 800V

Test Engineer: Stan

Test Mode: PV Charging+Load

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1620	10.80	33.40	44.20	65.36	-21.16	QP	P	
2	0.1620	10.80	33.00	43.80	55.36	-11.56	AVG	P	
3	0.5220	10.80	19.40	30.20	56.00	-25.80	QP	P	
4	0.5220	10.80	18.10	28.90	46.00	-17.10	AVG	P	
5	1.0420	10.80	21.90	32.70	56.00	-23.30	QP	P	
6	1.0420	10.80	20.00	30.80	46.00	-15.20	AVG	P	
7	1.1300	10.80	23.00	33.80	56.00	-22.20	QP	P	
8	1.1300	10.80	21.00	31.80	46.00	-14.20	AVG	P	
9	2.8660	10.80	23.00	33.80	56.00	-22.20	QP	P	
10	2.8660	10.80	19.00	29.80	46.00	-16.20	AVG	P	
11	6.6060	10.80	31.40	42.20	60.00	-17.80	QP	P	
12	6.6060	10.80	23.40	34.20	50.00	-15.80	AVG	P	

Note: Level=Reading*Factor.

Margin=Limit-Level.

Page 16 of 76

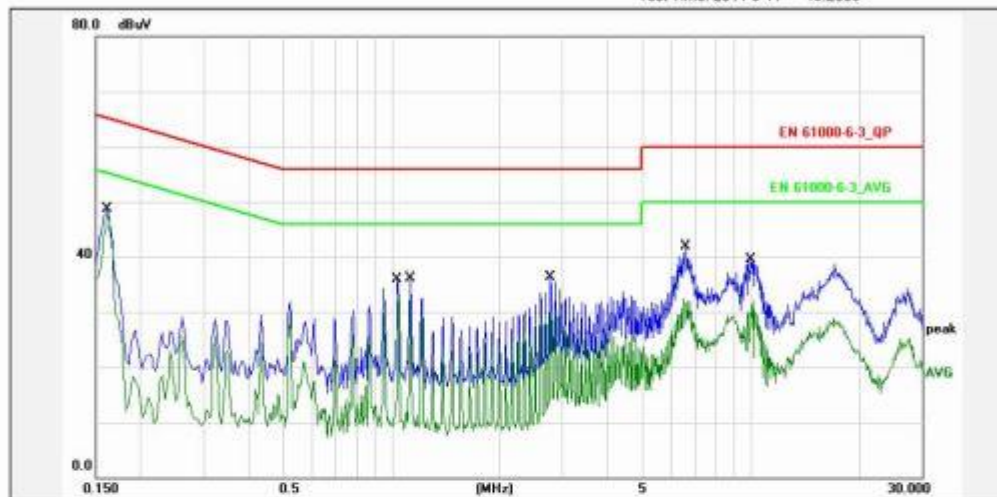
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:2003



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test Item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: L1

Temp.()/Hum.(%): 25(C) / 56 %

Power Rating: PV 800V

Test Engineer: Stan

Test Mode: PV Charging+Load

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1620	10.80	34.90	45.70	65.36	-19.66	QP	P	
2	0.1620	10.80	34.50	45.30	55.36	-10.06	AVG	P	
3	1.0420	10.80	22.00	32.80	56.00	-23.20	QP	P	
4	1.0420	10.80	20.40	31.20	46.00	-14.80	AVG	P	
5	1.1300	10.80	22.40	33.20	56.00	-22.80	QP	P	
6	1.1300	10.80	20.00	30.80	46.00	-15.20	AVG	P	
7	2.7780	10.80	22.60	33.40	56.00	-22.60	QP	P	
8	2.7780	10.80	17.40	28.20	46.00	-17.80	AVG	P	
9	6.6020	10.80	28.00	38.80	60.00	-21.20	QP	P	
10	6.6020	10.80	19.50	30.30	50.00	-19.70	AVG	P	
11	9.9938	10.80	25.70	36.50	60.00	-23.50	QP	P	
12	9.9938	10.80	19.30	30.10	50.00	-19.90	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 17 of 76

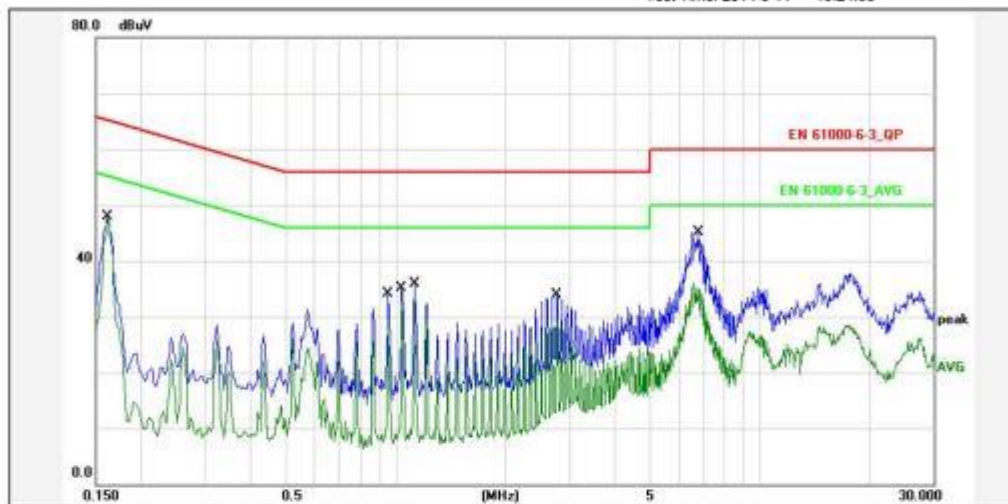
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:24:38



Report No.: InfiniSolar 10K
Test Standard: EN 61000-6-3_QP
Test Item: Conducted Emission
Applicant: VOLTRONIC POWER
Product: 3P 10K Hybrid Inverter
Model No.: InfiniSolar 10K

Phase: L2
Temp.(J)/Hum.(%): 25(C) / 56 %
Power Rating: PV 800V
Test Engineer: Stan

Test Mode: PV Charging+Load
Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1620	10.80	34.10	44.90	65.36	-20.46	QP	P	
2	0.1620	10.80	33.50	44.30	55.36	-11.06	AVG	P	
3	0.9580	10.80	20.30	31.10	56.00	-24.90	QP	P	
4	0.9580	10.80	16.40	27.20	46.00	-18.80	AVG	P	
5	1.0420	10.80	22.00	32.80	56.00	-23.20	QP	P	
6	1.0420	10.80	19.20	30.00	46.00	-16.00	AVG	P	
7	1.1300	10.80	22.00	32.80	56.00	-23.20	QP	P	
8	1.1300	10.80	19.70	30.50	46.00	-15.50	AVG	P	
9	2.7780	10.80	20.10	30.90	56.00	-25.10	QP	P	
10	2.7780	10.80	16.60	27.40	46.00	-18.60	AVG	P	
11	6.7780	10.80	31.30	42.10	60.00	-17.90	QP	P	
12	6.7780	10.80	23.30	34.10	50.00	-15.90	AVG	P	

Note: Level=Reading+Factor.
Margin=Limit-Level.

Page 18 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

Site: Conduction

Test Time: 2014-8-11 19:28:13



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: L3

Temp.()/Hum.(%): 25(C) / 56 %

Power Rating: PV 800V

Test Engineer: Stan

Test Mode: PV Charging+Load

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1620	10.80	35.70	46.50	65.36	-18.86	QP	P	
2	0.1620	10.80	35.40	46.20	55.36	-9.16	AVG	P	
3	0.9580	10.80	21.60	32.40	56.00	-23.60	QP	P	
4	0.9580	10.80	16.60	27.40	46.00	-18.60	AVG	P	
5	1.0420	10.80	22.00	32.80	56.00	-23.20	QP	P	
6	1.0420	10.80	19.40	30.20	46.00	-15.80	AVG	P	
7	1.1300	10.80	22.30	33.10	56.00	-22.90	QP	P	
8	1.1300	10.80	19.40	30.20	46.00	-15.80	AVG	P	
9	2.7780	10.80	23.00	33.80	56.00	-22.20	QP	P	
10	2.7780	10.80	17.10	27.90	46.00	-18.10	AVG	P	
11	6.6060	10.80	33.40	44.20	60.00	-15.80	QP	P	
12	6.6060	10.80	25.00	35.80	50.00	-14.20	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 19 of 76

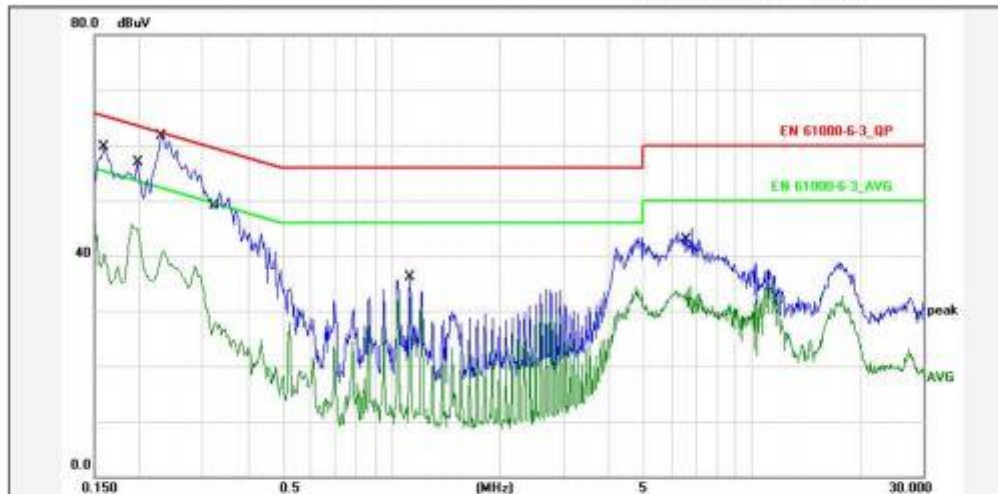
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:31:12



Report No.: InfiniSolar 10K
Test Standard: EN 61000-6-3_QP
Test item: Conducted Emission
Applicant: VOLTRONIC POWER
Product: 3P 10K Hybrid Inverter
Model No.: InfiniSolar 10K

Phase: L3
Temp.()/Hum.(%): 25(C) / 56 %
Power Rating: AC 380V/50Hz
Test Engineer: Stan

Test Mode: Normal+Load
Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1590	10.80	45.90	56.70	65.51	-8.81	QP	P	
2	0.1590	10.80	27.40	38.20	55.51	-17.31	AVG	P	
3	0.1980	10.80	43.00	53.80	63.69	-9.89	QP	P	
4	0.1980	10.80	35.00	45.80	53.69	-7.89	AVG	P	
5	0.2300	10.80	46.20	57.00	62.45	-5.45	QP	P	
6	0.2300	10.80	29.50	40.30	52.45	-12.15	AVG	P	
7	0.3260	10.80	37.80	48.60	59.55	-10.95	QP	P	
8	0.3260	10.80	15.10	25.90	49.55	-23.65	AVG	P	
9	1.1300	10.80	22.40	33.20	56.00	-22.80	QP	P	
10	1.1300	10.80	19.70	30.50	46.00	-15.50	AVG	P	
11	6.6899	10.80	30.50	41.30	60.00	-18.70	QP	P	
12	6.6899	10.80	21.40	32.20	50.00	-17.80	AVG	P	

Note: Level=Reading+Factor.
Margin=Limit-Level.

Page 20 of 76

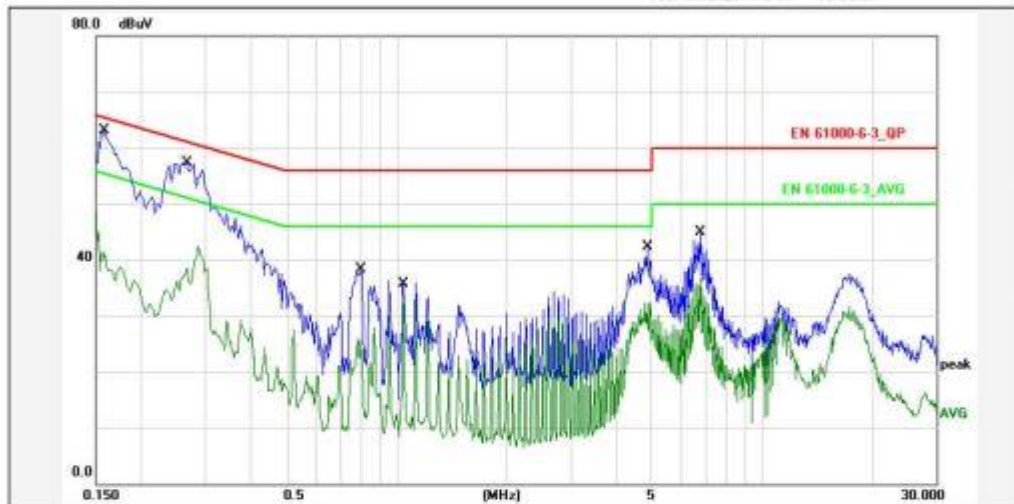
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:36:37



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test Item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: L2

Temp.()/Hum.(%): 25(C) / 56 %

Power Rating: AC 380V/50Hz

Test Engineer: Stan

Test Mode: Normal+Load

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1581	10.80	49.40	60.20	65.56	-5.36	QP	P	
2	0.1581	10.80	35.50	46.30	55.56	-9.26	AVG	P	
3	0.2660	10.80	42.20	53.00	61.24	-8.24	QP	P	
4	0.2660	10.80	26.60	37.40	51.24	-13.84	AVG	P	
5	0.7980	10.80	25.60	36.40	56.00	-19.60	QP	P	
6	0.7980	10.80	15.00	25.80	46.00	-20.20	AVG	P	
7	1.0460	10.80	21.90	32.70	56.00	-23.30	QP	P	
8	1.0460	10.80	20.40	31.20	46.00	-14.80	AVG	P	
9	4.8619	10.80	28.60	39.40	56.00	-16.60	QP	P	
10	4.8619	10.80	19.50	30.30	46.00	-15.70	AVG	P	
11	6.7739	10.80	31.00	41.80	60.00	-18.20	QP	P	
12	6.7739	10.80	23.90	34.70	50.00	-15.30	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 21 of 76

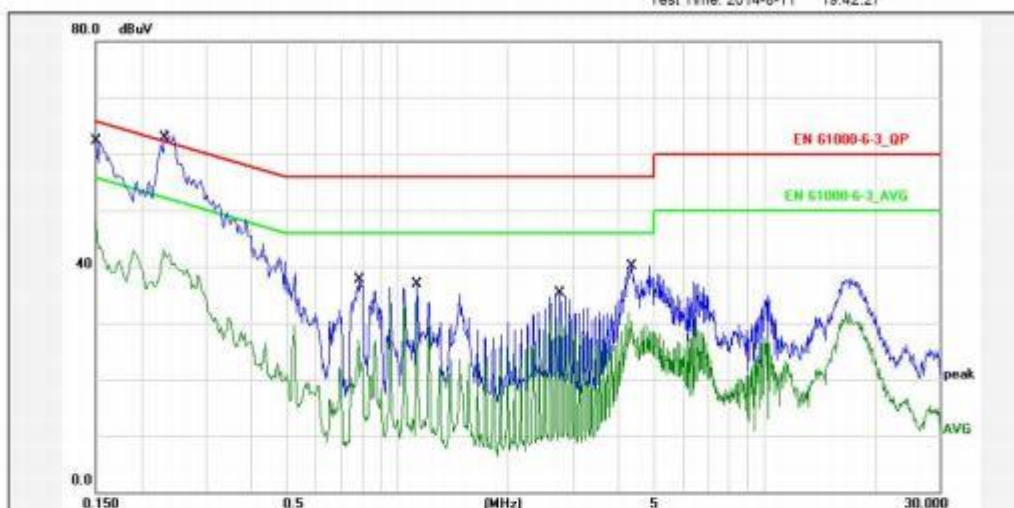
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:42:27



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: L1

Temp.()/Hum.(%): 25(C) / 56 %

Power Rating: AC 380V/50Hz

Test Engineer: Stan

Test Mode: Normal+Load

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1507	10.80	48.50	59.30	65.96	-6.66	QP	P	
2	0.1507	10.80	35.30	46.10	55.96	-9.86	AVG	P	
3	0.2300	10.80	47.60	58.40	62.45	-4.05	QP	P	
4	0.2300	10.80	32.20	43.00	52.45	-9.45	AVG	P	
5	0.7860	10.80	23.90	34.70	56.00	-21.30	QP	P	
6	0.7860	10.80	14.00	24.80	46.00	-21.20	AVG	P	
7	1.1300	10.80	23.00	33.80	56.00	-22.20	QP	P	
8	1.1300	10.80	21.00	31.80	46.00	-14.20	AVG	P	
9	2.7780	10.80	21.60	32.40	56.00	-23.60	QP	P	
10	2.7780	10.80	18.10	28.90	46.00	-17.10	AVG	P	
11	4.3418	10.80	26.40	37.20	56.00	-18.80	QP	P	
12	4.3418	10.80	19.30	30.10	46.00	-15.90	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 22 of 76

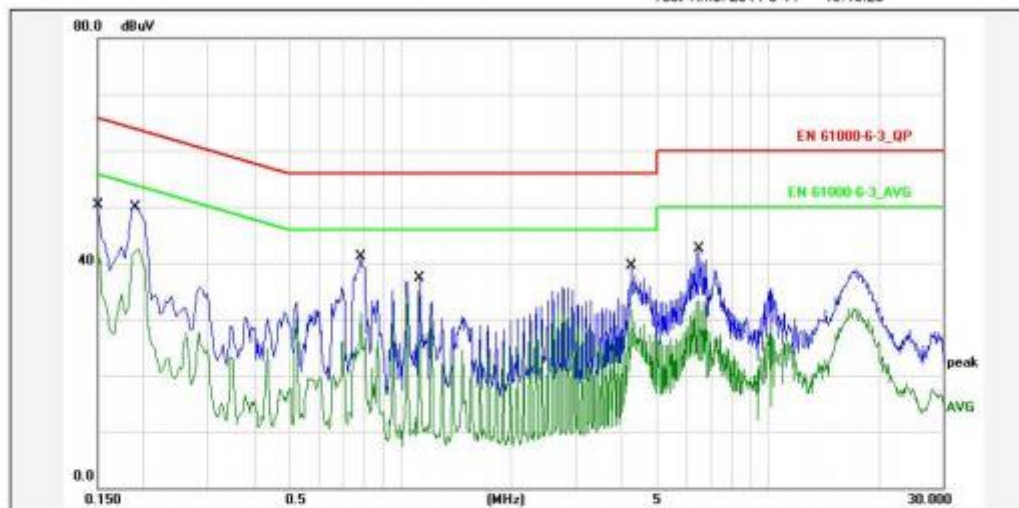
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:48:28



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: N

Temp./ Hum. (%): 25(C) / 56 %

Power Rating: AC 380V/50Hz

Test Engineer: Stan

Test Mode: Normal+Load

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1507	10.80	36.40	47.20	65.96	-18.76	QP	P	
2	0.1507	10.80	29.30	40.10	55.96	-15.86	AVG	P	
3	0.1900	10.80	36.10	46.90	64.03	-17.13	QP	P	
4	0.1900	10.80	29.70	40.50	54.03	-13.53	AVG	P	
5	0.7820	10.80	27.30	38.10	56.00	-17.90	QP	P	
6	0.7820	10.80	18.30	29.10	46.00	-16.90	AVG	P	
7	1.1300	10.80	23.50	34.30	56.00	-21.70	QP	P	
8	1.1300	10.80	21.40	32.20	46.00	-13.80	AVG	P	
9	4.2579	10.80	25.70	36.50	56.00	-19.50	QP	P	
10	4.2579	10.80	18.90	29.70	46.00	-16.30	AVG	P	
11	6.5139	10.80	29.70	40.50	60.00	-19.50	QP	P	
12	6.5139	10.80	20.40	31.20	50.00	-18.80	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 23 of 76

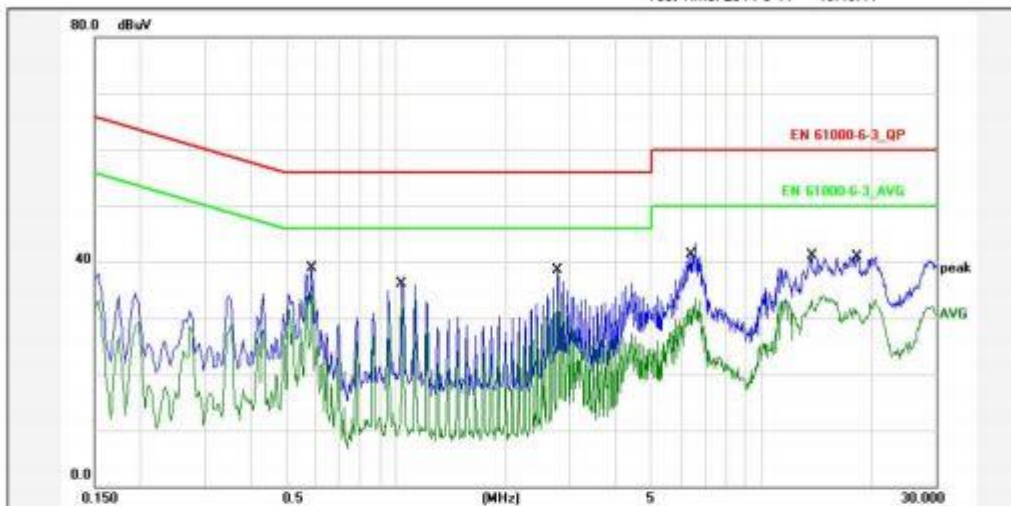
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:49:11



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test Item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: N

Temp.()/Hum.(%): 25(C) / 56 %

Power Rating: DC 48V

Test Engineer: Stan

Test Mode: Stored Energy+Load

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.5899	10.80	25.10	35.90	56.00	-20.10	QP	P	
2	0.5899	10.80	22.80	33.60	46.00	-12.40	AVG	P	
3	1.0420	10.80	22.40	33.20	56.00	-22.80	QP	P	
4	1.0420	10.80	20.10	30.90	46.00	-15.10	AVG	P	
5	2.7780	10.80	25.00	35.80	56.00	-20.20	QP	P	
6	2.7780	10.80	20.50	31.30	46.00	-14.70	AVG	P	
7	6.4299	10.80	27.40	38.20	60.00	-21.80	QP	P	
8	6.4299	10.80	20.60	31.40	50.00	-18.60	AVG	P	
9	13.7019	10.80	27.30	38.10	60.00	-21.90	QP	P	
10	13.7019	10.80	20.80	31.60	50.00	-18.40	AVG	P	
11	18.2339	10.80	27.00	37.80	60.00	-22.20	QP	P	
12	18.2339	10.80	19.80	30.60	50.00	-19.40	AVG	P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 24 of 76

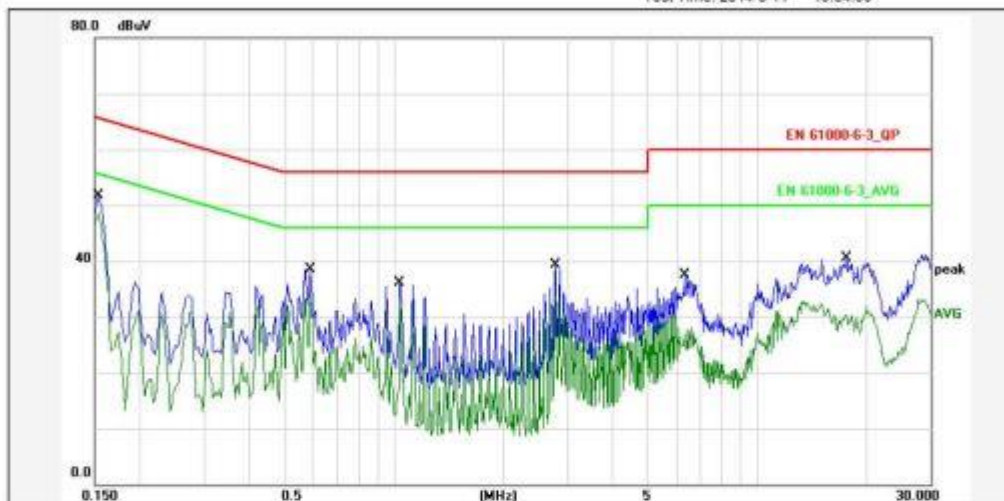
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:54:36



Report No.: InfiniSolar 10K
Test Standard: EN 61000-6-3_QP
Test item: Conducted Emission
Applicant: VOLTRONIC POWER
Product: 3P 10K Hybrid Inverter
Model No.: InfiniSolar 10K

Phase: L1
Temp.()/Hum.(%): 25(C) / 56 %
Power Rating: DC 48V
Test Engineer: Stan

Test Mode: Stored Energy+Load

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1539	10.80	37.80	48.60	65.78	-17.18	QP	P	
2	0.1539	10.80	35.70	46.50	55.78	-9.28	AVG	P	
3	0.5899	10.80	24.40	35.20	56.00	-20.80	QP	P	
4	0.5899	10.80	21.60	32.40	46.00	-13.60	AVG	P	
5	1.0420	10.80	22.40	33.20	56.00	-22.80	QP	P	
6	1.0420	10.80	19.90	30.70	46.00	-15.30	AVG	P	
7	2.7820	10.80	25.40	36.20	56.00	-19.80	QP	P	
8	2.7820	10.80	20.80	31.60	46.00	-14.40	AVG	P	
9	6.3379	10.80	23.70	34.50	60.00	-25.50	QP	P	
10	6.3379	10.80	17.60	28.40	50.00	-21.60	AVG	P	
11	17.6097	10.80	26.40	37.20	60.00	-22.80	QP	P	
12	17.6097	10.80	17.60	28.40	50.00	-21.60	AVG	P	

Note: Level=Reading+Factor.
Margin=Limit-Level.

Page 25 of 76

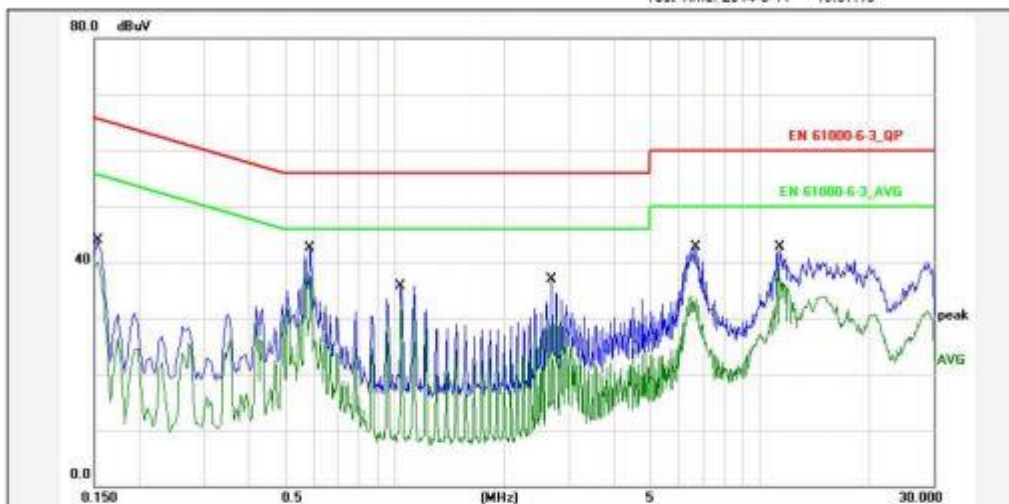
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Conduction

Test Time: 2014-8-11 19:57:15



Report No.: InfiniSolar 10K

Test Standard: EN 61000-6-3_QP

Test Item: Conducted Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Phase: L2

Temp./Hum. (%): 25(C) / 56 %

Power Rating: DC 48V

Test Engineer: Stan

Test Mode: Stored Energy+Load

Remark:

No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1539	10.80	30.00	40.80	65.78	-24.98	QP	P	
2	0.1539	10.80	27.40	38.20	55.78	-17.58	AVG	P	
3	0.5860	10.80	28.60	39.40	56.00	-16.60	QP	P	
4	0.5860	10.80	24.70	35.50	46.00	-10.50	AVG	P	
5	1.0420	10.80	22.90	33.70	56.00	-22.30	QP	P	
6	1.0420	10.80	19.40	30.20	46.00	-15.80	AVG	P	
7	2.6939	10.80	23.10	33.90	56.00	-22.10	QP	P	
8	2.6939	10.80	17.90	28.70	46.00	-17.30	AVG	P	
9	6.6900	10.80	28.80	39.60	60.00	-20.40	QP	P	
10	6.6900	10.80	21.00	31.80	50.00	-18.20	AVG	P	
11	11.3219	10.80	28.80	39.60	60.00	-20.40	QP	P	
12	11.3219	10.80	26.10	36.90	50.00	-13.10	AVG	P	

Note: Level=Reading*Factor.

Margin=Limit-Level.

Page 26 of 76

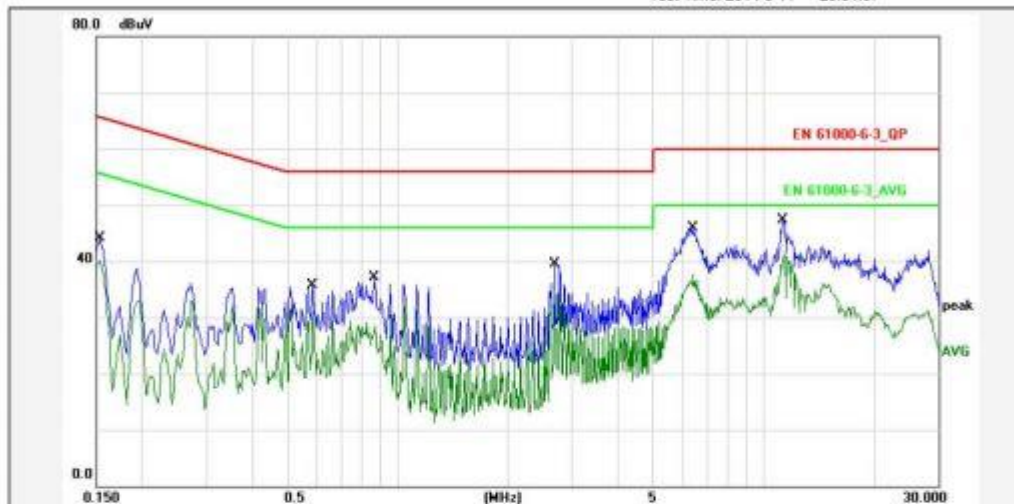
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

Site: Conduction

Test Time: 2014-8-11 20:01:57



Report No.: InfiniSolar 10K
Test Standard: EN 61000-6-3_QP
Test Item: Conducted Emission
Applicant: VOLTRONIC POWER
Product: 3P 10K Hybrid Inverter
Model No.: InfiniSolar 10K
Test Mode: Stored Energy+Load
Remark:

Phase: L3
Temp./Humidity: 25(C) / 56 %
Power Rating: DC 48V
Test Engineer: Stan

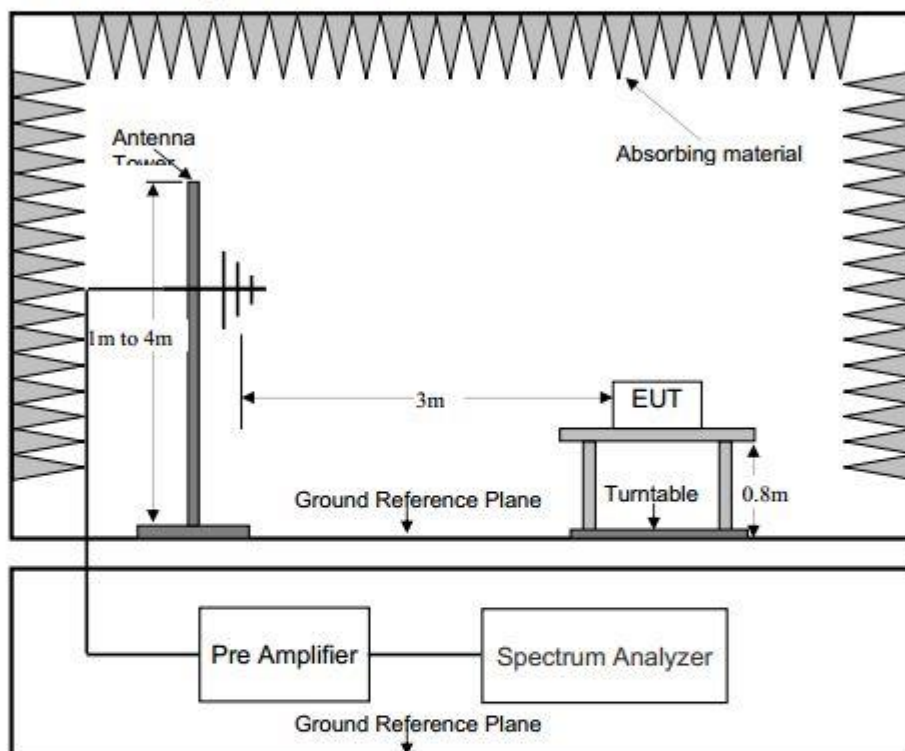
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1539	10.80	30.40	41.20	65.78	-24.58	QP	P	
2	0.1539	10.80	27.40	38.20	55.78	-17.58	AVG	P	
3	0.5860	10.80	22.00	32.80	56.00	-23.20	QP	P	
4	0.5860	10.80	18.30	29.10	46.00	-16.90	AVG	P	
5	0.8659	10.80	23.40	34.20	56.00	-21.80	QP	P	
6	0.8659	10.80	17.80	28.60	46.00	-17.40	AVG	P	
7	2.7019	10.80	25.60	36.40	56.00	-19.60	QP	P	
8	2.7019	10.80	21.90	32.70	46.00	-13.30	AVG	P	
9	6.4019	10.80	32.10	42.90	60.00	-17.10	QP	P	
10	6.4019	10.80	24.90	35.70	50.00	-14.30	AVG	P	
11	11.2579	10.80	33.50	44.30	60.00	-15.70	QP	P	
12	11.2579	10.80	28.50	39.30	50.00	-10.70	AVG	P	

Note: Level=Reading+Factor.
Margin=Limit-Level.

Page 27 of 76

5. RADIATED EMISSION MEASUREMENT

5.1 Block Diagram of Test



5.2 Limit of Radiated Emission Measurement

Test Standard: EN 61000-6-3

Limits for radiated disturbance at a measuring distance of 3m

Frequency range MHz	Quasi-peak limits Db(Uv/m)
30 to 230	40
230 to 1000	47

Note 1 The lower limit shall apply at the transition frequency.
Note 2 If the internal emission source is operating at a frequency below 9KHz, then measurements need only to be performed up to 230MHz

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



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 61000-6-3 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, PV Charging Operation Mode, PV Charging+Normal Operation Mode Operation Mode) and test it.

5.5 Radiated Emission Measurement Result

PASS.

Please refer to the following pages.

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Radiation

Test Time: 2014-8-11 20:50:33



Report No.: InfiniSolar 10K

Test Standard: EN61000-6-3_3M

Test item: Radiation Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Test Distance:

Ant. Polarization: Horizontal

Temp.()/Hum.(%): 21(C) / 46 %

Power Rating: PV 800V

Test Engineer: Stan

Test Mode: PV Charging+Load+Normal

Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth ()	P/F	Remark
1	36.7899	-18.29	43.39	25.10	40.00	-14.90	QP			P	
2	73.6500	-20.85	54.35	33.50	40.00	-6.50	QP			P	
3	86.7500	-14.74	51.14	36.40	40.00	-3.60	QP			P	
4	101.7800	-12.06	43.86	31.80	40.00	-8.20	QP			P	
5	126.0300	-14.73	45.33	30.60	40.00	-9.40	QP			P	
6	138.6399	-15.53	47.73	32.20	40.00	-7.80	QP			P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 30 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Radiation

Test Time: 2014-8-11 20:55:38



Report No.: InfiniSolar 10K

Test Standard: EN61000-6-3_3M

Test Item: Radiation Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Test Distance:

Ant. Polarization: Vertical

Temp.()/Hum.(%): 21(C) / 46 %

Power Rating: PV 800V

Test Engineer: Stan

Test Mode: PV Charging+Load+Normal

Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth ()	P/F	Remark
1	31.3800	-15.80	50.50	34.70	40.00	-5.30	QP			P	
2	50.3699	-13.41	43.01	29.60	40.00	-10.40	QP			P	
3	62.9799	-15.07	42.17	27.10	40.00	-12.90	QP			P	
4	85.2900	-18.11	50.41	32.30	40.00	-7.70	QP			P	
5	127.0000	-17.83	38.03	20.20	40.00	-19.80	QP			P	
6	146.4000	-18.58	38.88	20.30	40.00	-19.70	QP			P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 31 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Radiation

Test Time: 2014-8-11 20:59:59



Report No.: InfiniSolar 10K
Test Standard: EN61000-6-3_3M
Test Item: Radiation Emission
Applicant: VOLTRONIC POWER
Product: 3P 10K Hybrid Inverter
Model No.: InfiniSolar 10K

Test Distance:
Ant. Polarization: Vertical
Temp.(%Hum. (%): 21(C) / 46 %
Power Rating: AC 380V/50Hz
Test Engineer: Stan

Test Mode: Normal+Load
Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth ()	P/F	Remark
1	37.8400	-16.42	47.92	31.50	40.00	-8.50	QP			P	
2	56.1899	-13.85	42.55	28.70	40.00	-11.30	QP			P	
3	63.9500	-15.30	43.60	28.30	40.00	-11.70	QP			P	
4	84.3200	-18.31	50.81	32.50	40.00	-7.50	QP			P	
5	127.0000	-17.83	37.23	19.40	40.00	-20.60	QP			P	
6	149.3100	-18.52	37.92	19.40	40.00	-20.60	QP			P	

Note: Level=Reading+Factor.
Margin=Limit-Level.

Page 32 of 76

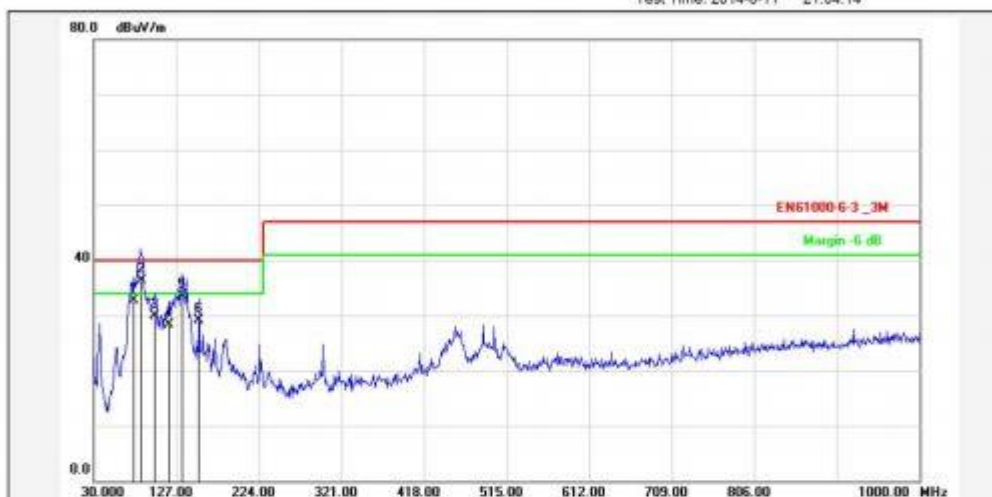
Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Radiation

Test Time: 2014-8-11 21:04:14



Report No.: InfiniSolar 10K

Test Standard: EN61000-6-3_3M

Test item: Radiation Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Test Distance:

Ant. Polarization: Horizontal

Temp.()/Hum.(%): 21(C) / 46 %

Power Rating: AC 380V/50Hz

Test Engineer: Stan

Test Mode: Normal+Load

Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth ()	P/F	Remark
1	76.5600	-19.49	52.29	32.80	40.00	-7.20	QP			P	
2	86.3100	-14.86	51.16	36.30	40.00	-3.70	QP			P	
3	101.7800	-12.06	41.96	29.90	40.00	-10.10	QP			P	
4	118.2699	-13.68	42.08	28.40	40.00	-11.60	QP			P	
5	133.7899	-15.32	48.82	33.50	40.00	-6.50	QP			P	
6	154.1599	-15.38	44.48	29.10	40.00	-10.90	QP			P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 33 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Radiation

Test Time: 2014-8-12 16:54:19



Report No.: InfiniSolar 10K
Test Standard: EN61000-6-3_3M
Test item: Radiation Emission
Applicant: VOLTRONIC POWER
Product: 3P 10K Hybrid Inverter
Model No.: InfiniSolar 10K

Test Distance:
Ant. Polarization: Vertical
Temp.()/Hum.(%): 21(C) / 55 %
Power Rating: DC 48V
Test Engineer: Stan

Test Mode: Stored Energy+Load
Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F	Remark
1	38.3200	-16.29	52.69	36.40	40.00	-3.60	QP			P	
2	38.4199	-16.26	50.76	34.50	40.00	-5.50	QP			P	
3	75.5899	-19.03	55.13	36.10	40.00	-3.90	QP			P	
4	115.3600	-16.04	50.84	34.80	40.00	-5.20	QP			P	
5	132.8199	-18.28	52.98	34.70	40.00	-5.30	QP			P	
6	143.4900	-18.59	51.09	32.50	40.00	-7.50	QP			P	

Note: Level=Reading+Factor.
Margin=Limit-Level.

Page 34 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: [Http://www.ntc-c.com](http://www.ntc-c.com)

Site: Radiation

Test Time: 2014-8-12 16:58:31



Report No.: InfiniSolar 10K
Test Standard: EN61000-6-3_3M
Test item: Radiation Emission
Applicant: VOLTRONIC POWER
Product: 3P 10K Hybrid Inverter
Model No.: InfiniSolar 10K

Test Distance:
Ant. Polarization: Horizontal
Temp.()/Hum.(%): 21(C) / 55 %
Power Rating: DC 48V
Test Engineer: Stan

Test Mode: Stored Energy+Load
Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth ()	P/F	Remark
1	37.7599	-18.30	50.40	32.10	40.00	-7.90	QP			P	
2	83.3499	-15.50	50.70	35.20	40.00	-4.80	QP			P	
3	100.8100	-12.11	48.01	35.90	40.00	-4.10	QP			P	
4	115.5000	-13.07	48.27	35.20	40.00	-4.80	QP			P	
5	134.7599	-15.36	50.66	35.30	40.00	-4.70	QP			P	
6	141.5500	-15.59	48.89	33.30	40.00	-6.70	QP			P	

Note: Level=Reading*Factor.
Margin=Limit-Level.

Page 35 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Radiation

Test Time: 2014-8-12 17:12:25



Report No.: InfiniSolar 10K
Test Standard: EN61000-6-3_3M
Test item: Radiation Emission
Applicant: VOLTRONIC POWER
Product: 3P 10K Hybrid Inverter
Model No.: InfiniSolar 10K

Test Distance:
Ant. Polarization: Vertical
Temp.()/Hum.(%): 21(C) / 55 %
Power Rating: PV 800V
Test Engineer: Stan

Test Mode: PV Charging+Load
Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth ()	P/F	Remark
1	30.6500	-15.86	50.76	34.90	40.00	-5.10	QP			P	
2	80.4399	-19.04	49.24	30.20	40.00	-9.80	QP			P	
3	101.7800	-16.06	50.76	34.70	40.00	-5.30	QP			P	
4	115.6100	-16.10	49.70	33.60	40.00	-6.40	QP			P	
5	123.1200	-17.40	51.50	34.10	40.00	-5.90	QP			P	
6	133.7899	-18.32	50.62	32.30	40.00	-7.70	QP			P	

Note: Level=Reading+Factor.
Margin=Limit-Level.

Page 36 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Dongguan NTC Co., Ltd.
Tel: +86-769-22022444 Fax: +86-769-22022799
Web: <http://www.ntc-c.com>

Site: Radiation

Test Time: 2014-8-12 17:17:58



Report No.: InfiniSolar 10K

Test Standard: EN61000-6-3_3M

Test Item: Radiation Emission

Applicant: VOLTRONIC POWER

Product: 3P 10K Hybrid Inverter

Model No.: InfiniSolar 10K

Test Distance:

Ant. Polarization: Horizontal

Temp.()/Hum.(%): 21(C) / 55 %

Power Rating: PV 800V

Test Engineer: Stan

Test Mode: PV Charging+Load

Remark:

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth ()	P/F	Remark
1	37.7599	-18.30	47.40	29.10	40.00	-10.90	QP			P	
2	84.3300	-15.31	49.41	34.10	40.00	-5.90	QP			P	
3	101.9700	-12.05	48.55	36.50	40.00	-3.50	QP			P	
4	109.5400	-12.15	47.55	35.40	40.00	-4.60	QP			P	
5	123.1200	-14.40	49.80	35.40	40.00	-4.60	QP			P	
6	142.5200	-15.60	48.00	32.40	40.00	-7.60	QP			P	

Note: Level=Reading+Factor.

Margin=Limit-Level.

Page 37 of 76

6. PERFORMANCE CRITERIA FOR IMMUNITY

The performance criteria are referred to the test standard: EN 61000-6-2

The variety and the diversity of the apparatus within the scope of this standard makes it difficult to define precise criteria for the evaluation of the immunity test results.

If, as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe, the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance criteria, during or as a consequence of the EMC testing, shall be provided by the manufacturer and noted in the test report.

Performance Criterion A:

The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance Criterion B:

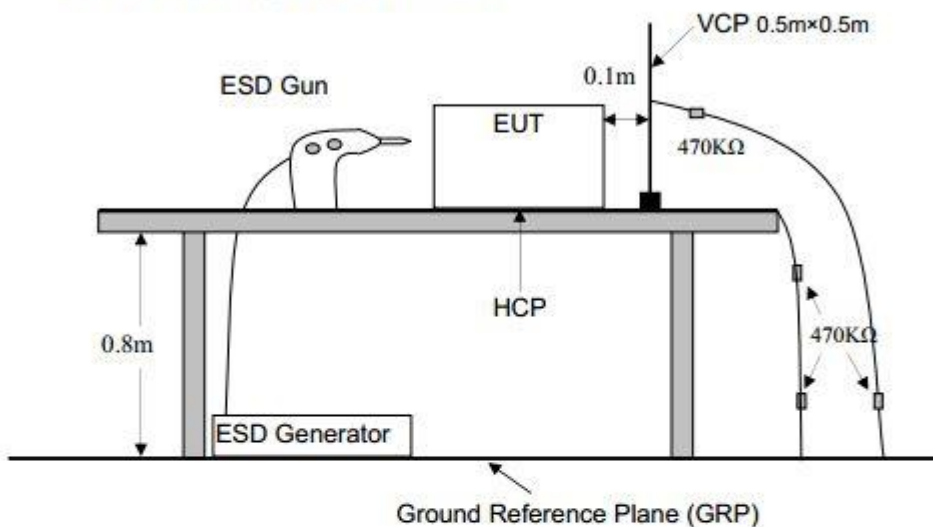
The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operation state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance Criteria C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

7. ELECTROSTATIC DISCHARGE TEST

7.1 Block Diagram of Test Setup



7.2 Test Standard and Severity Levels

7.2.1 Test Standard:

EN 61000-6-2

(EN 61000-4-2: 2009 Air Discharge: Severity Level: 3, ± 8 KV;

Contact Discharge: Level: 2, ± 4 KV)

7.2.2 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

7.3 Test Procedure

7.3.1 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

7.3.2 Contact Discharge:

All the procedure shall be same as Section 7.3.1. except that the tip of the discharge electrode shall touch the E.U.T..

7.3.3 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.

7.3.4 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.

7.4 Test Results

PASS.

Please refer to the following page.

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E

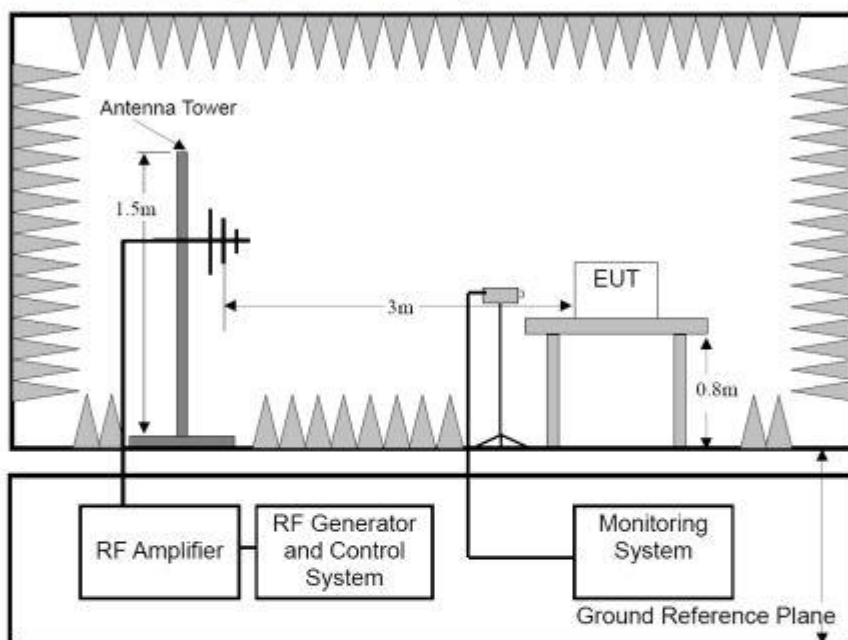


Electrostatic Discharge Test Results

Ambient Condition :	Temp. : 23 °C	R.H. : 55 %	Air Pressure : 101 kPa
Power Supply:	AC 380V 50Hz DC 48V, DC 800V+DC 48V, DC 800V+AC 380V 50Hz 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, PV Charging Operation Mode, PV Charging+Normal Operation Mode Operation Mode		
Test Point	Kind A-Air Discharge C-Contact Discharge	Result (Performance Criterion)	
Screw	C	A	
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 : Sance	

8. RF FIELD STRENGTH SUSCEPTIBILITY TEST

8.1 Block Diagram of Test Setup



8.2 Test Standard and Severity Levels

8.2.1 Test Standard

EN 61000-6-2

(EN 61000-4-3: 2006+A2: 2010,
80 to 1000MHz Severity Level: 3, 10V/m;
1.4 to 2.0GHz Severity Level: 2, 3V/m;
2.0 to 2.7GHz Severity Level: 1, 1V/m)

8.2.2 Severity Levels

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

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



8.3 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	80 to 1000MHz Severity Level: 3, 10V/m; 1.4 to 2.0GHz Severity Level: 2, 3V/m; 2.0 to 2.7GHz Severity Level: 1, 1V/m
2. Radiated Signal	Modulated
3. Dwell time of radiated	0.0015 decade/s
4. Waiting Time	1 Sec.

8.4 Test Results

PASS.

Please refer to the following page.

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E

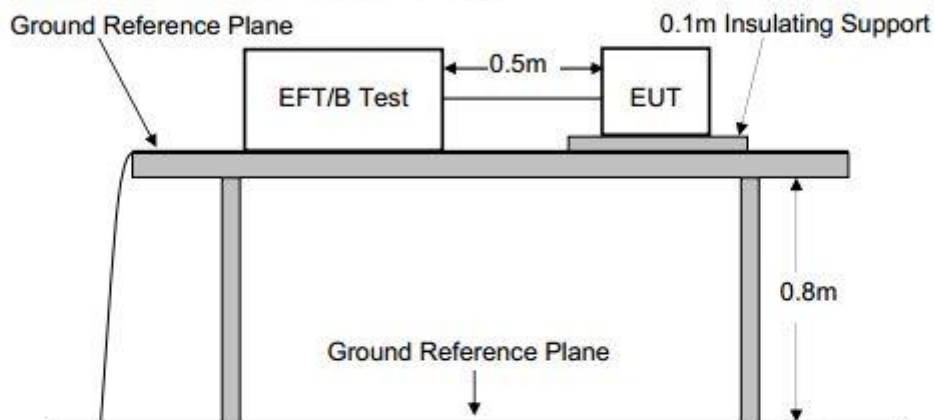


RF Field Strength Susceptibility Test Results

Ambient Condition:	Temp.: 23 ℃	R.H.: 55 %	Air Pressure: 101 kPa	
Power Supply:	AC 380V 50Hz DC 48V, DC 800V+DC 48V, DC 800V+AC 380V 50Hz	Required Performance Criterion: A		
Test Specifications:	Modulation: 1kHz, 80%AM; Step Size: 1%; Dwell Time: 3s			
Tested mode:	Normal Operation Mode, Stored Energy Operation Mode, PV Charging Operation Mode, PV Charging+Normal Operation Mode Operation Mode			
Frequency (MHz)	Level (V/m)	Antenna polarity	Side	Result (Performance Criterion)
80-1000	10	Horizontal/ Vertical	Front/ Left/ Right/ Back	A
1400-2000	3			A
2000-2700	1			A
Note:				
Test Equipment : 1. RF Power Meter : 4242 (ESE) 2. Power Amplifier : CBA 1G-150 (TESEQ) 3. Power Sensor: 51011EMC (ESE) 4. Antenna Log-Periodic: VULB9162 (Schwarzbeck)				
				Test Engineer : Sance

9. ELECTRICAL FAST TRANSIENT/BURST TEST

9.1 Block Diagram of Test Setup



9.2 Test Standard and Severity Levels

9.2.1 Test Standard

EN 61000-6-2

(EN 61000-4-4: 2012, Severity Level, Level 3: 2KV)

9.2.2 Severity level

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

Page 45 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



9.3 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.

9.3.1 For input and output AC power ports:

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

9.3.2 For signal lines ports:

It's unnecessary to test.

9.3.3 For DC ports:

It's unnecessary to test.

9.4 Test Result

PASS.

Please refer to the following page.

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E

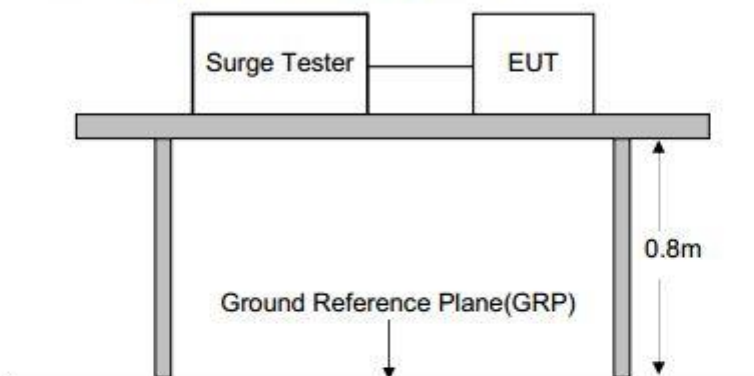


Electrical Fast Transient/Burst Test Results

Ambient Condition:	Temp.: 21 °C	R.H.: 54 %	Air Pressure: 101 kPa
Power Supply:	AC 380V 50Hz	Required Performance Criterion: B	
Test Specifications:	Repetition Frequency: 5kHz; Duration: 15ms; Period: 300ms		
Test mode:	Normal Operation Mode		
Line :	<input checked="" type="checkbox"/> AC Mains <input type="checkbox"/> Signal line <input type="checkbox"/> DC line Coupling : <input checked="" type="checkbox"/> Direct <input type="checkbox"/> Capacitive		
Line (AC Input and Output)	Test Voltage	Result (Performance Criterion)	
L1, L2, L3, N, PE	±2KV	A	
L1-L2, L1-L3, L1-N, L1-PE, L2-L3, L2-N, L2-PE, L3-N, L3-PE, N-PE	±2KV	A	
L1-L2-L3, L1-L2-N, L1-L2-PE, L2-L3-N, L2-L3-PE, L3-N-PE	±2KV	A	
L1-L2-L3-N, L2-L3-N-PE, L1-L2-L3-PE	±2KV	A	
L1-L2-L3-N-PE	±2KV	A	
L1, L2, L3, N, PE	±2KV	A	
Signal line			
DC line			
Note :			
Test Equipment : Burst Tester(EMC PARTNER , TRA 2000)		Test Engineer : Sance	

10. SURGE IMMUNITY TEST

10.1 Block Diagram of Test Setup



10.2 Test Standard and Severity Levels

10.2.1 Test Standard

EN 61000-6-2

(EN 61000-4-5: 2006, Severity Level: Line To Line, Level 2: 1.0KV;
Line To Earth, Level 3: 2.0KV)

10.2.2 Severity level

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

10.3 Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 10.1.
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.

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



10.4 Test Result

PASS.

Please refer to the following page.

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E

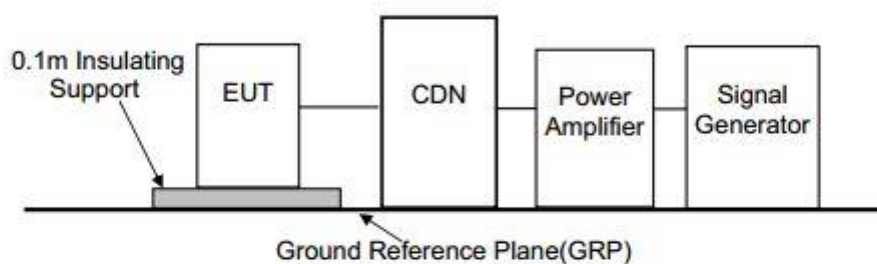


Surge Immunity Test Results

Ambient Condition:	Temp.: 21 ℃	R.H.: 54 %	Air Pressure: 101 kPa
Power Supply:	AC 380V 50Hz	Required Performance Criterion: B	
Test Specifications:	Voltage surge 1.2/50 us ; Current surge 8/20 us		
Test mode:	Normal Operation Mode		
Line (AC Input and Output)	Phase Angle	Test Voltage	Result (Performance Criterion)
L1-L2, L1-L3, L1-N, L2-L3, L2-N, L3-N	0°, 90°, 180°, 270°	±1KV	A
L1-PE, L2-PE, L3-PE, N-PE	0°, 90°, 180°, 270°	±2KV	A
Signal line			
DC line			
Note :			
Test Equipment : Surge Tester(EMC PARTNER , TRA 2000) Test Engineer : Sance			

11. INJECTED CURRENTS SUSCEPTIBILITY TEST

11.1 Block Diagram of Test Setup



11.2 Test Standard and Severity Levels

11.2.1 Test Standard

EN 61000-6-2

(EN 61000-4-6: 2014, Severity Level 3: 10V (rms), 0.15MHz ~ 80MHz)

11.2.2 Severity level

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

11.3 Test Procedure

1. Set up the E.U.T., CDN and test generators as shown on Section 11.1.
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.

11.4 Test Result

PASS.

Please refer to the following page.

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E

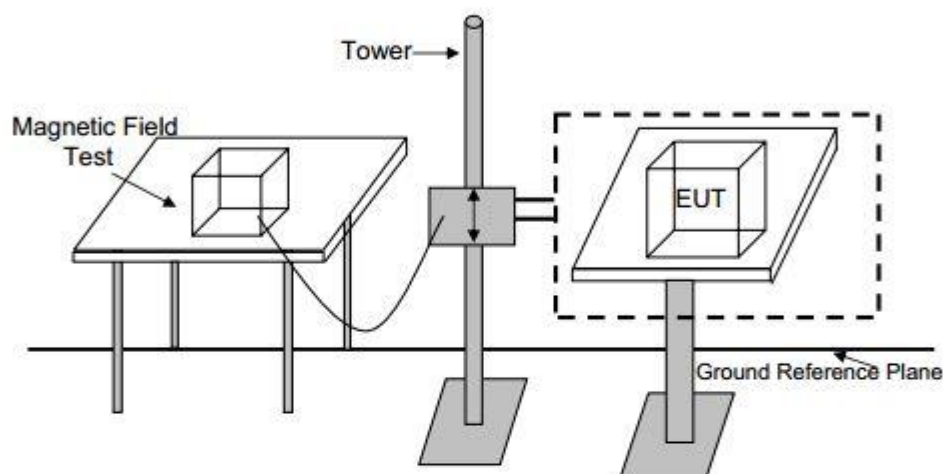


Injected Currents Susceptibility Test Results

Ambient Condition:	Temp.: 23 °C	R.H.: 55 %	Air Pressure: 101 kPa
Power Supply:	AC 380V 50Hz	Required Performance Criterion: A	
Test Specifications:	Modulation : 1KHz, 80%AM, Step Size : 1%, Dwell Time : 3s		
Test mode:	Normal Operation Mode		
Test Port (AC Input and Output)	Frequency (MHz)	Level(V)	Result (Performance Criterion)
AC Mains	0.15~80	10	A
Note :			
Test Equipment : CDN(Luthi, L-801M2/M3)		Test Engineer :Sance	

12. MAGNETIC FIELD IMMUNITY TEST

12.1 Block Diagram of Test Setup



12.2 Test Standard and Severity Levels

12.2.1 Test Standard

EN 61000-6-2

(EN 61000-4-8: 2010, Severity Level 4: 30A/m)

12.2.2 Severity level

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

12.3 Test Procedure

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

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



12.4 Test Result

PASS.

Please refer to the following page.

Page 55 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E

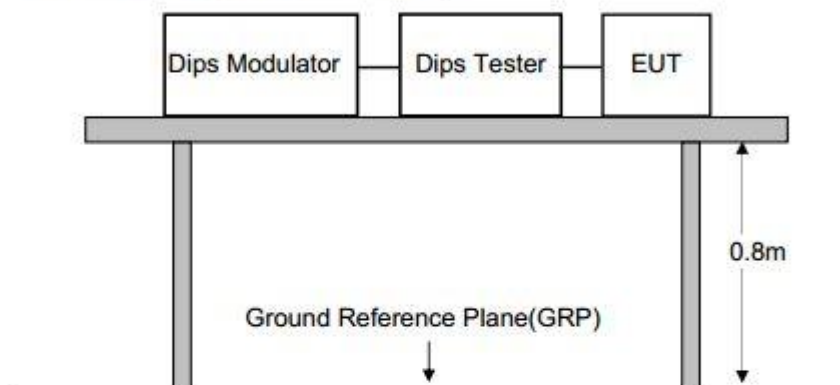


Magnetic Field Immunity Test Results

Ambient Condition:	Temp.: 21 ℃	R.H.: 54 %	Air Pressure: 101 kPa
Power Supply:	AC 380V 50Hz DC 48V, DC 800V+DC 48V, DC 800V+AC 380V 50Hz	Required Performance Criterion: A	
Test Specifications:	30A/m 50/60Hz		
Test mode:	Normal Operation Mode, Stored Energy Operation Mode, PV Charging Operation Mode, PV Charging+Normal Operation Mode 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 Tester(EMC PARTNER , TRA 2000) TestEngineer : Sance			

13. VOLTAGE DIPS AND INTERRUPTIONS TEST

13.1 Block Diagram of Test Setup



13.2 Test Standard and Severity Levels

13.2.1 Test Standard
EN 61000-6-2
(EN 61000-4-11: 2004)

13.2.2 Severity level

Test Level %U _T	Voltage dip and short interruptions %U _T	Duration (in period)
0	100	0.5
40	60	1
		5
70	30	10
		25
		50
		*

13.3 Test Procedure

1. Set up the E.U.T. and test generator as shown on Section 13.1.
2. The interruptions is introduced at selected phase angles with specified duration.
3. Record any degradation of performance.

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



13.4 Test Result

PASS.

Please refer to the following page.

Page 58 of 76

Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



Voltage Dips And Interruptions Test Results

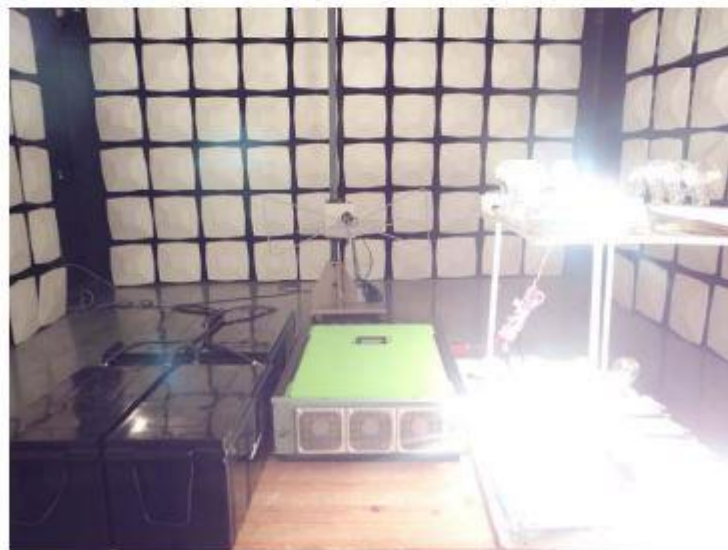
Ambient Condition:	Temp.: 23 °C	R.H.: 55 %	Air Pressure: 101 kPa
Power Supply:	AC 380V 50Hz	Required Performance Criterion: B & C	
Test Specifications:	0%U _T , 1Cycle; 40%U _T , 10/12Cycles at 50/60Hz; 70%U _T , 25/30Cycles at 50/60Hz; 0%U _T , 250/300Cycles at 50/60Hz;		
Test mode:	Normal Operation Mode		
Test Level % UT	Duration (in period)		Result (Performance Criterion)
	50Hz	60Hz	
0	1	N/A	A
40	10	N/A	B
70	25	N/A	B
0	250	N/A	B
Note : The normal operation mode changes to stored energy operation mode during the test, but it can be resumed by itself after test.			
Test Equipment : Dips Tester: (EMC PARTNER , TRA 2000)		Test Engineer : Sance	

14.PHOTOGRAPH

14.1 Photo of Conducted Emission Measurement



14.2 Photo of Radiation Emission Measurement



14.3 Photo of Electrostatic Discharge Test



14.4 Photo of RF Field Strength susceptibility Test



Dongguan Nore Testing Center Co., Ltd.
Report No.: NTC1408090E



14.5 Photo of Electrical Fast Transient /Surge /Magnetic field /Voltage

Dips immunity Test



Annex 2

Pictures of the unit

Enclosure front view:



Enclosure rear view:



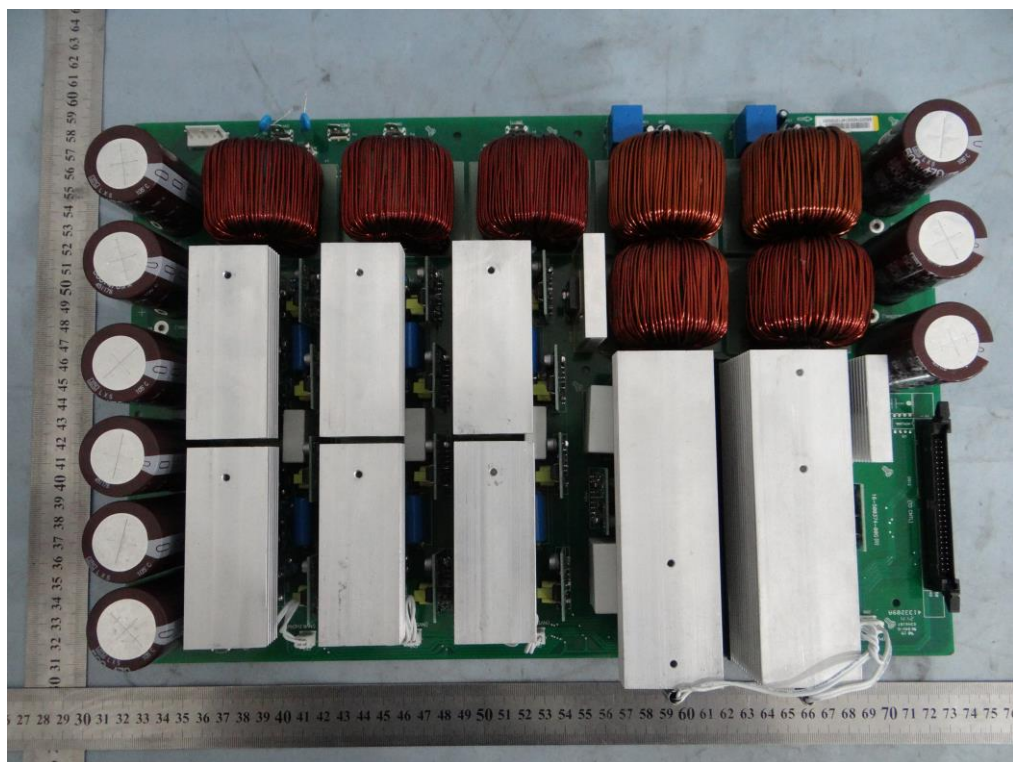
Enclosure bottom view:



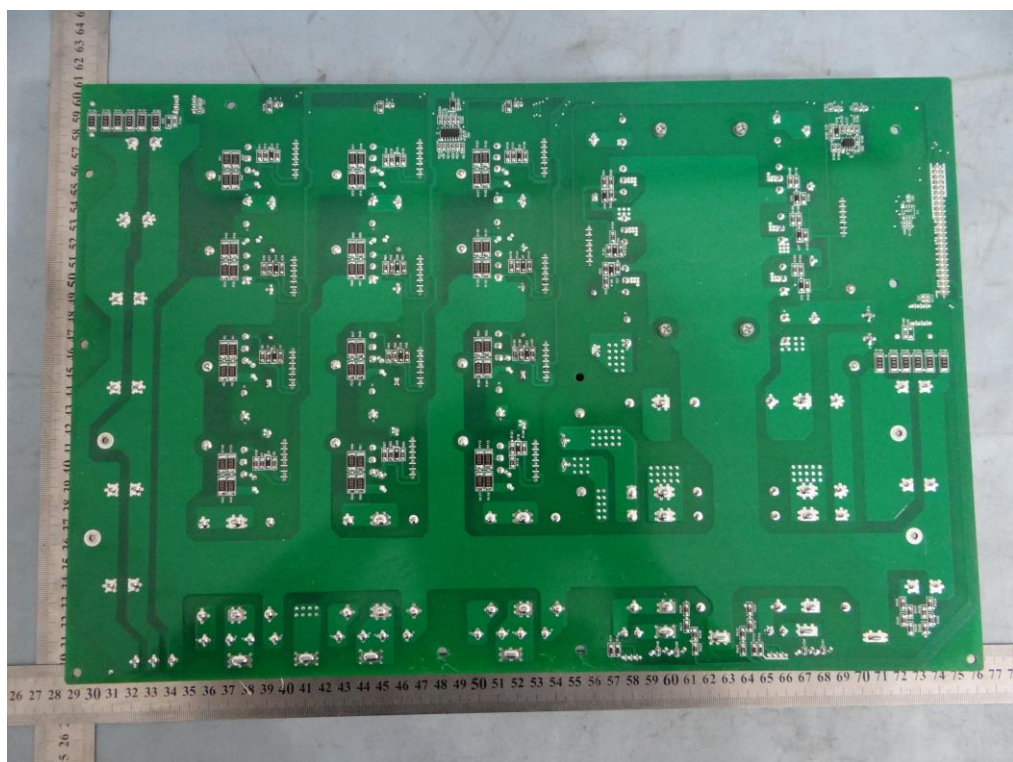
Internal view:



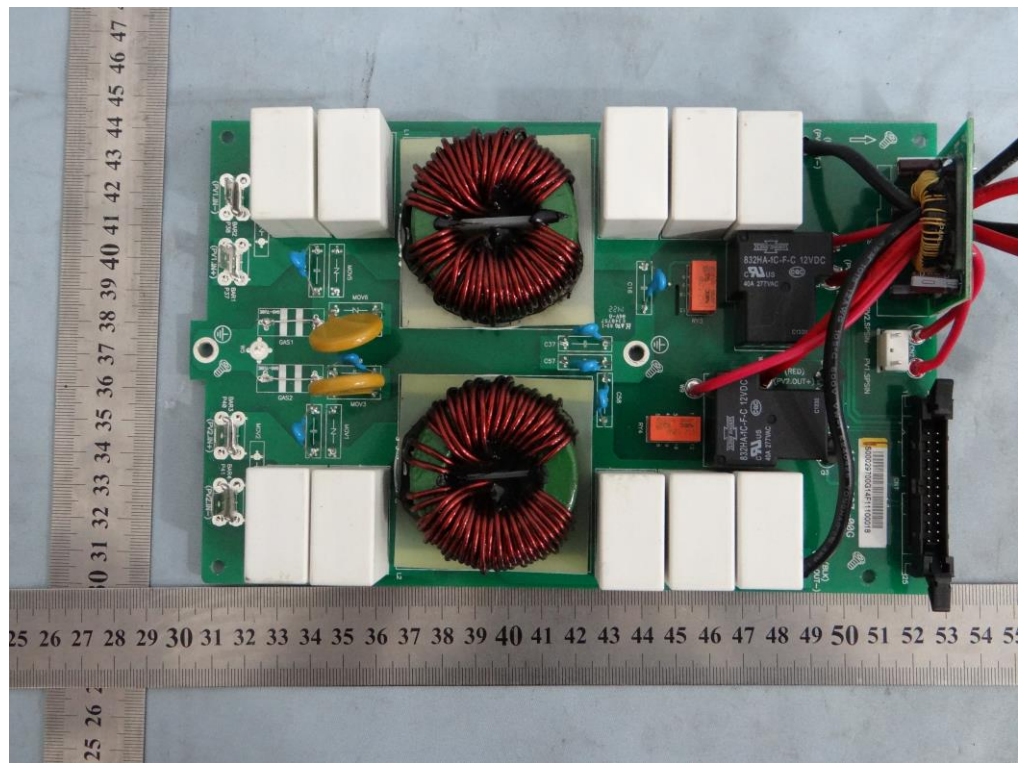
Inverter board - component side view:



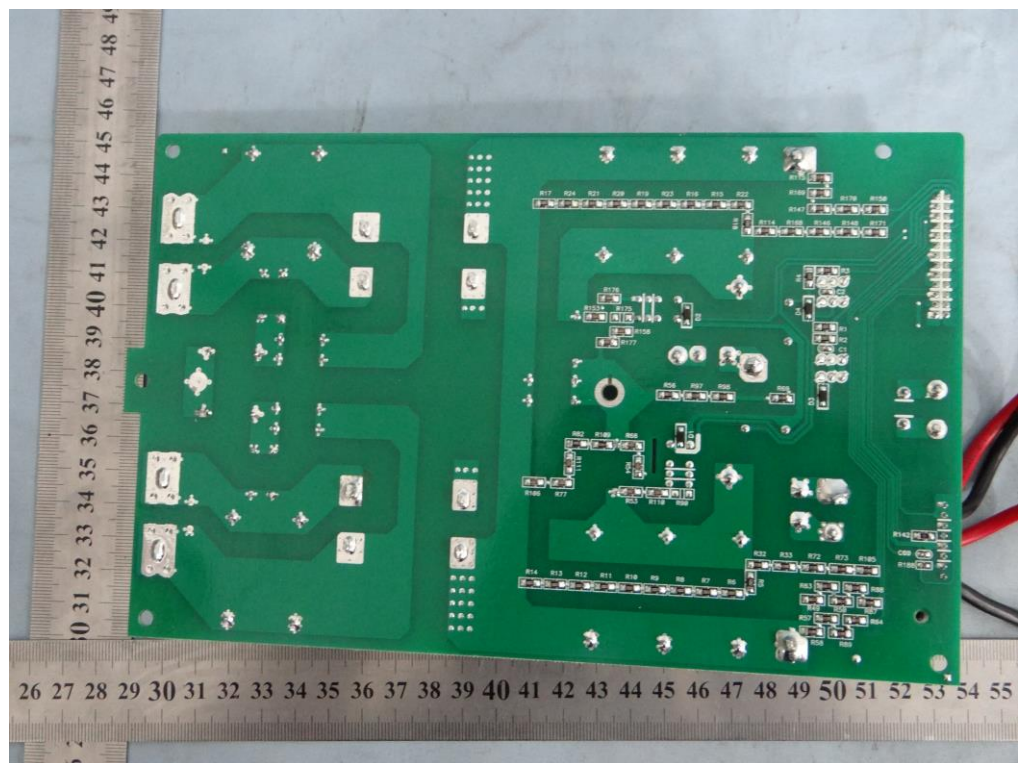
Inverter board - solder side view:



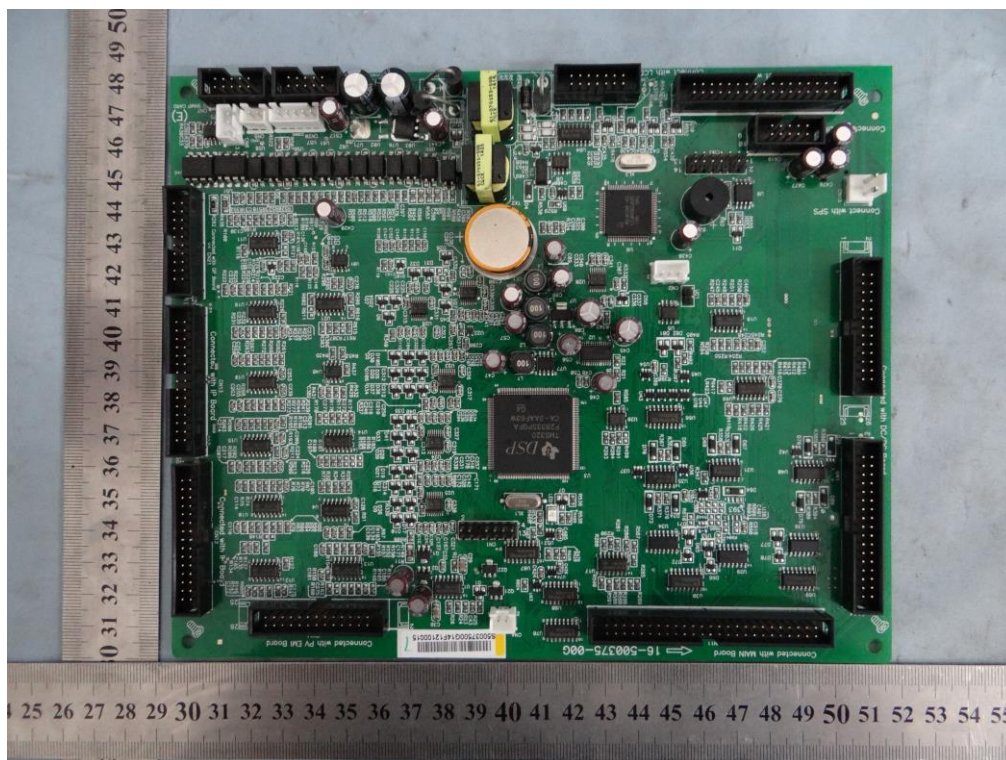
PV side EMI board - component side view:



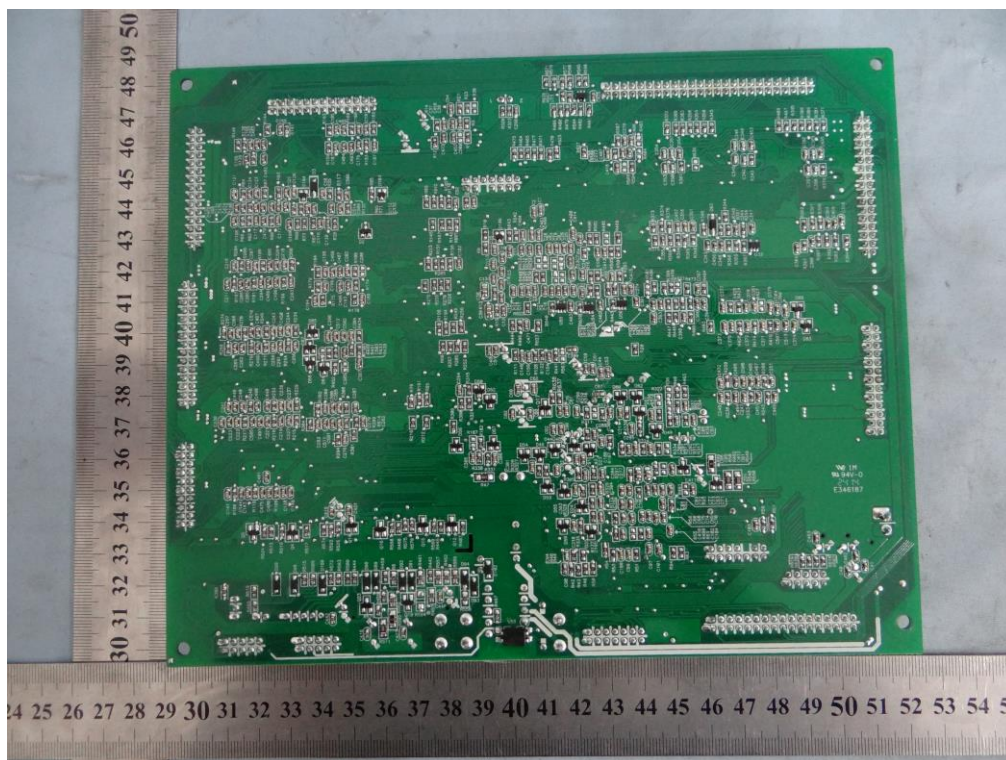
PV side EMI board - solder side view:



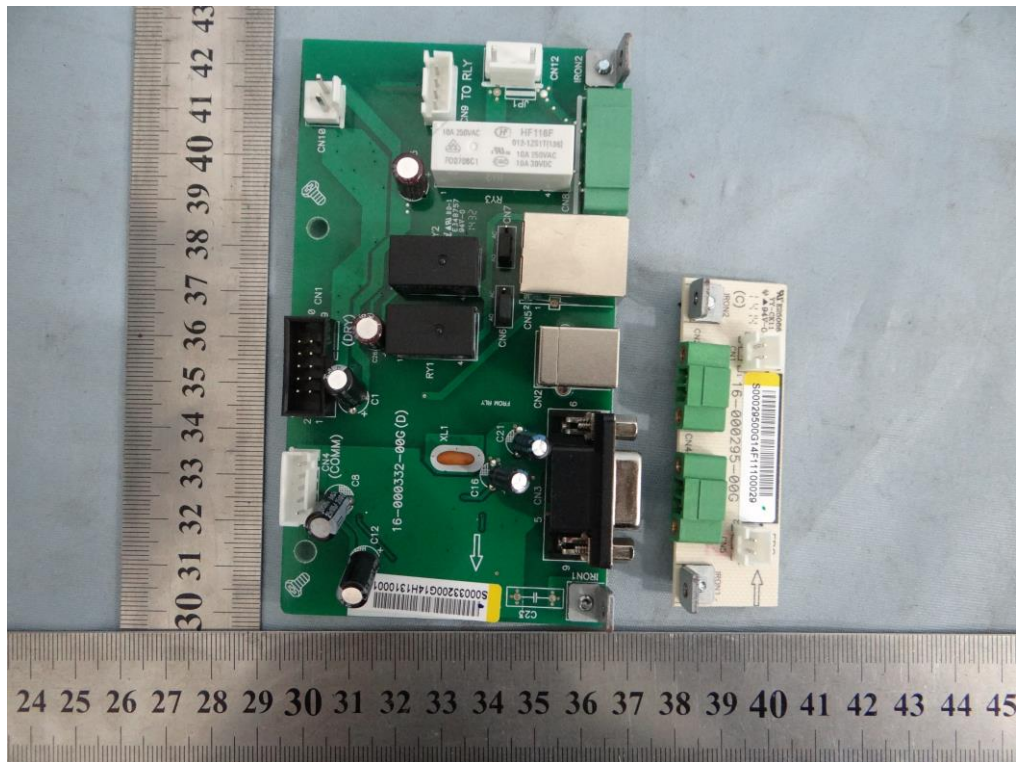
Control board - component side view:



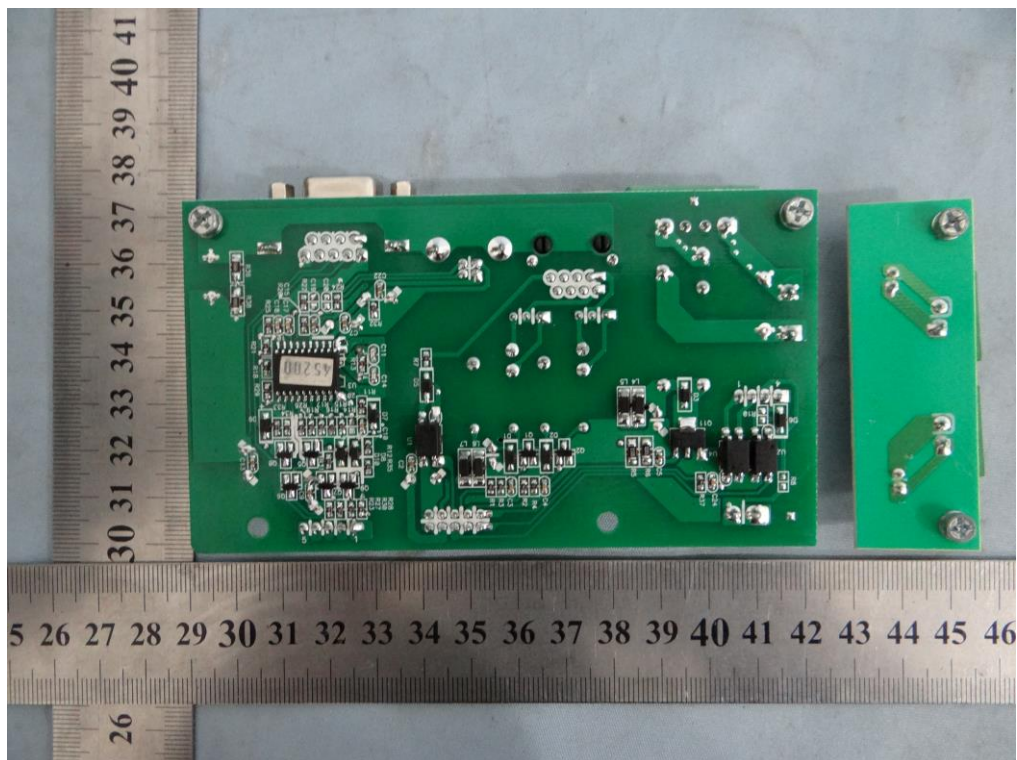
Control board - solder side view:



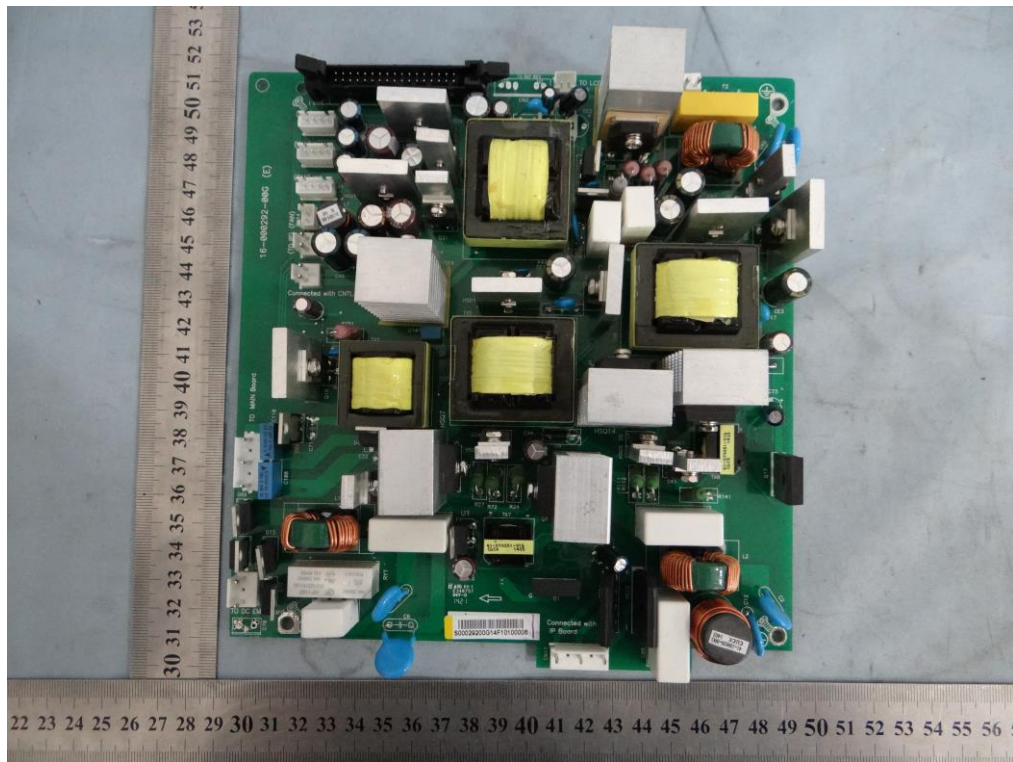
COM board - component side view:



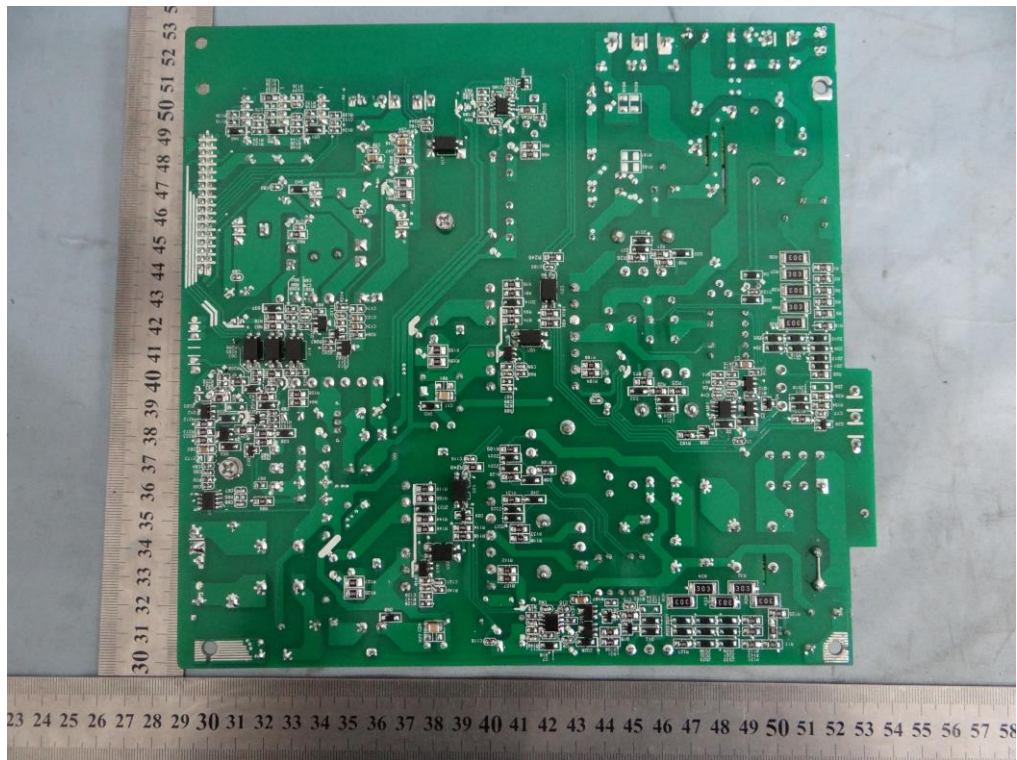
COM board - solder side view:



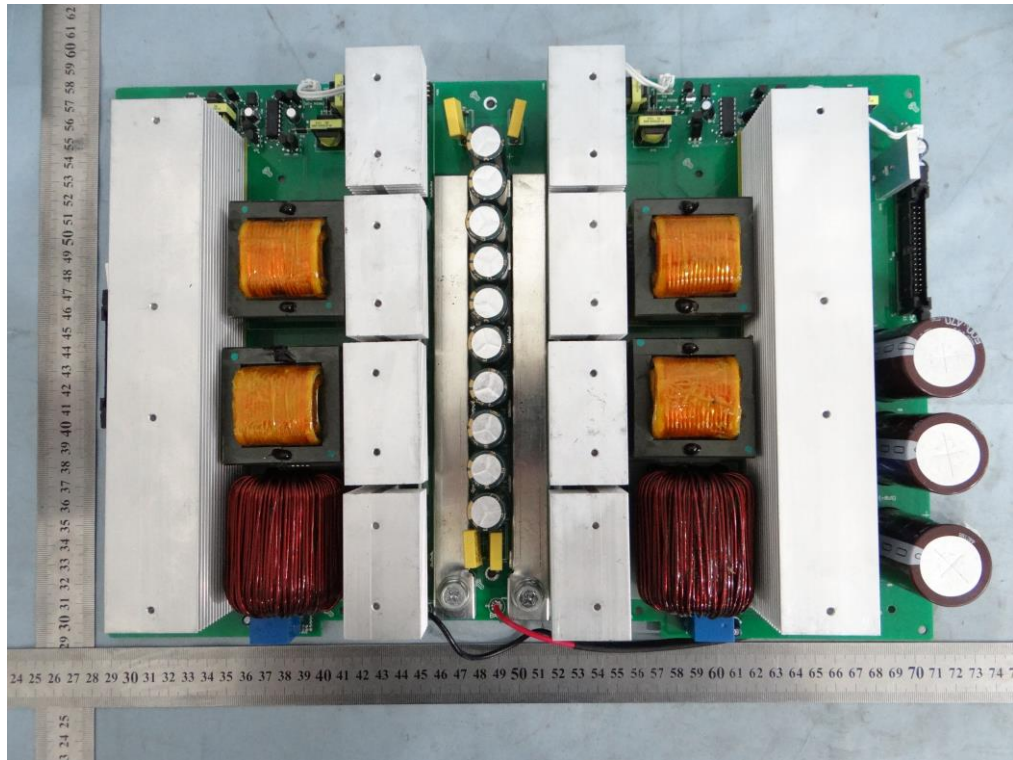
SPS board - component side view:



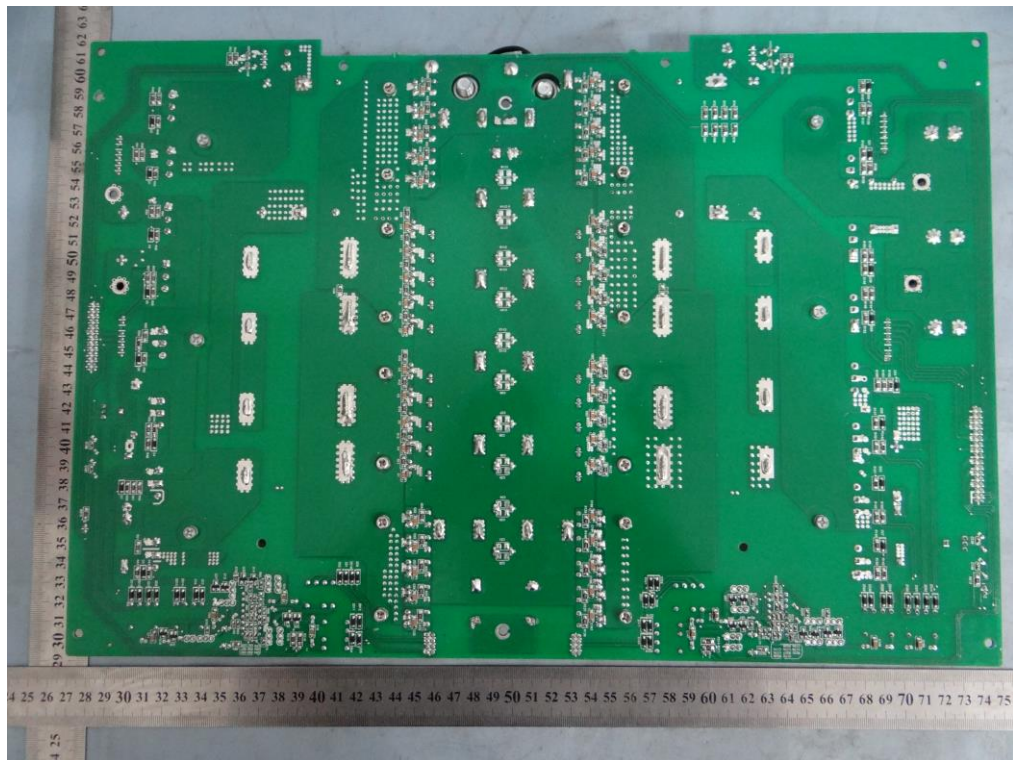
SPS board - solder side view:



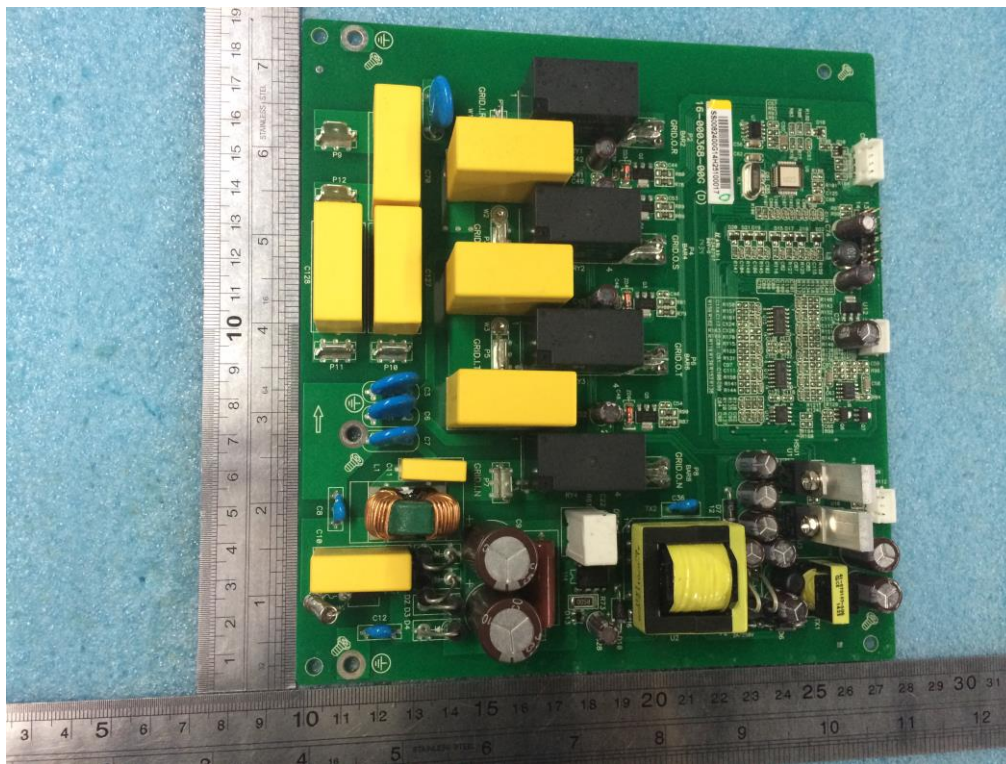
DC-DC board - component side view:



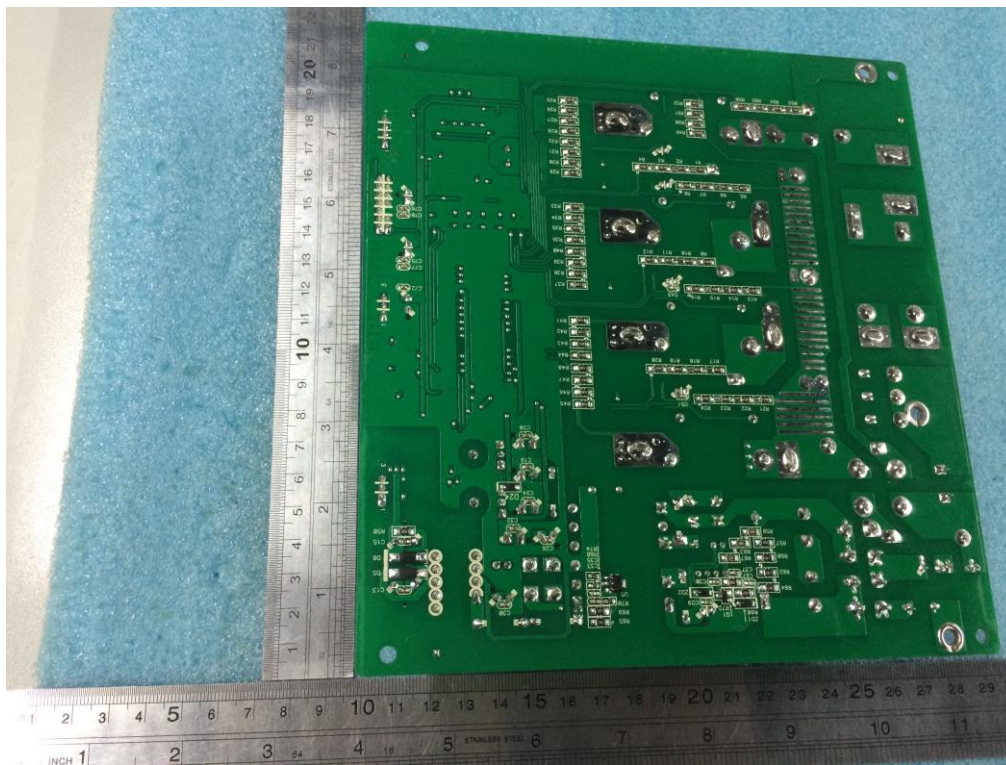
DC-DC board - solder side view:



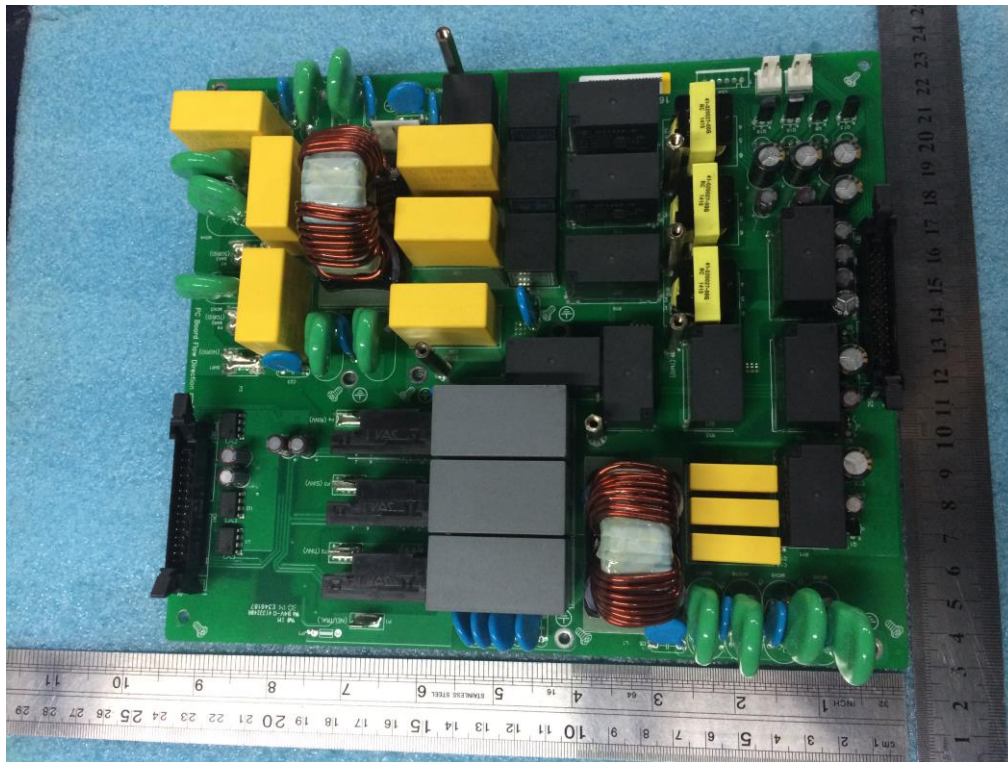
Relay board - component side view:



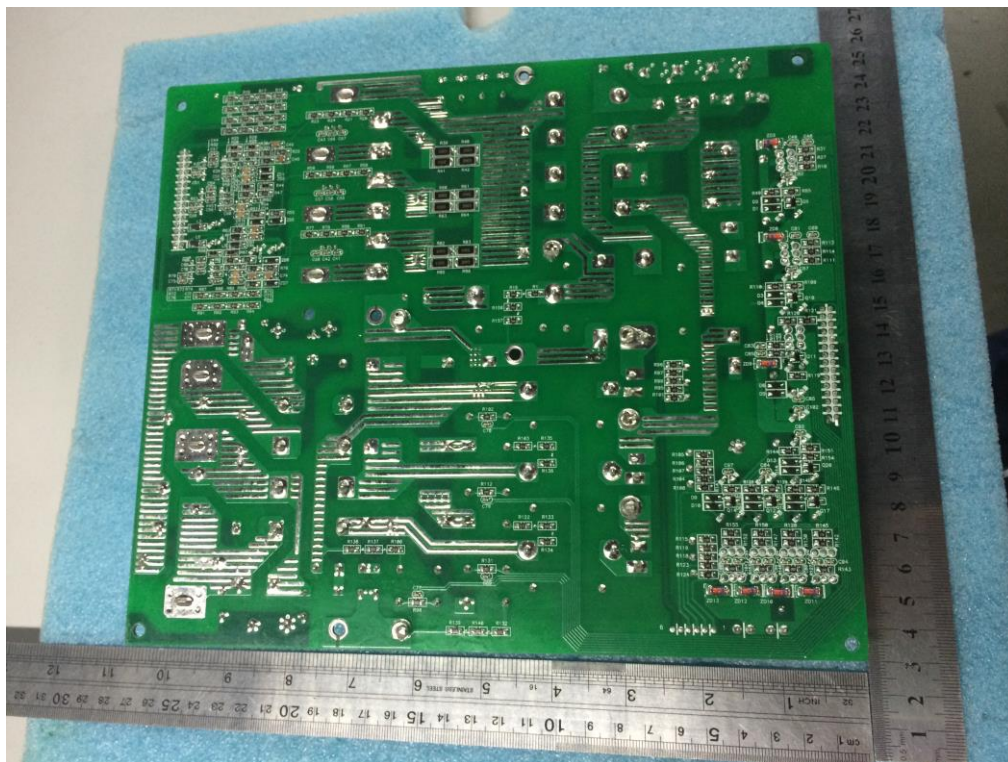
Relay board - solder side view:



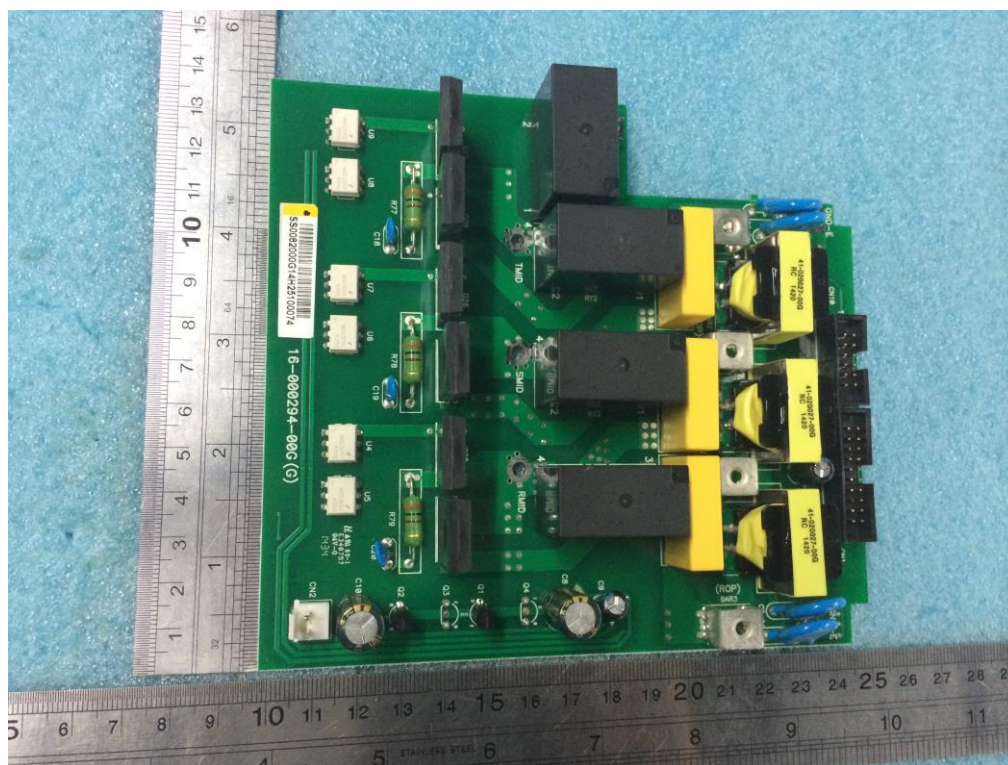
Grid board - component side view:



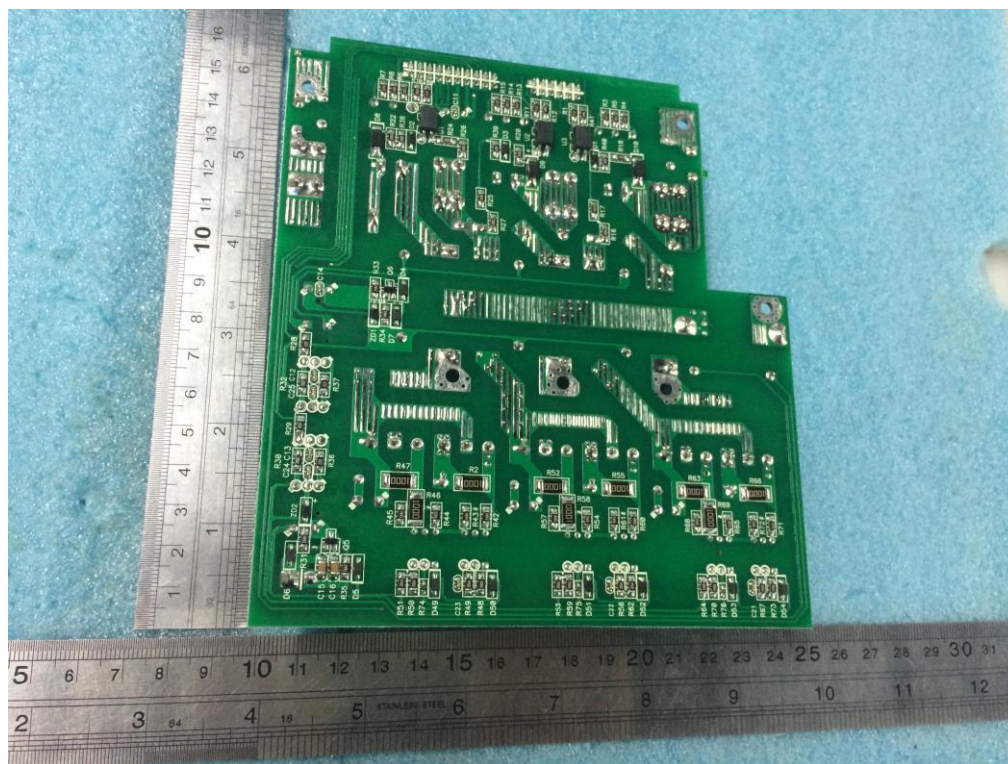
Grid board - solder side view:



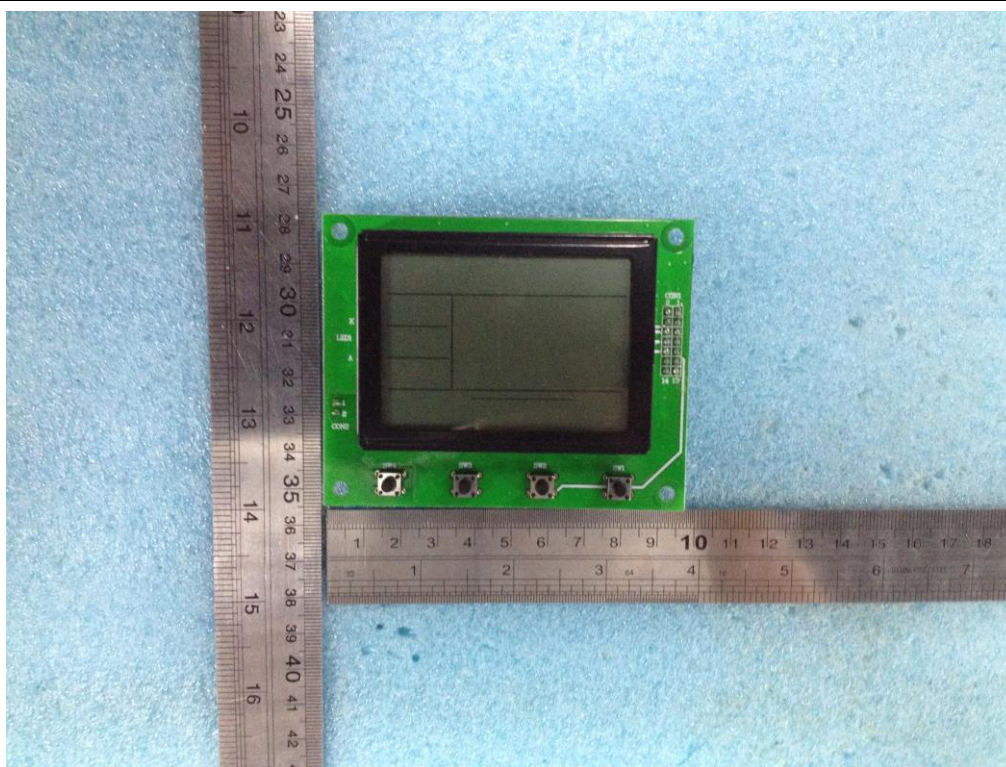
OP board - component side view:



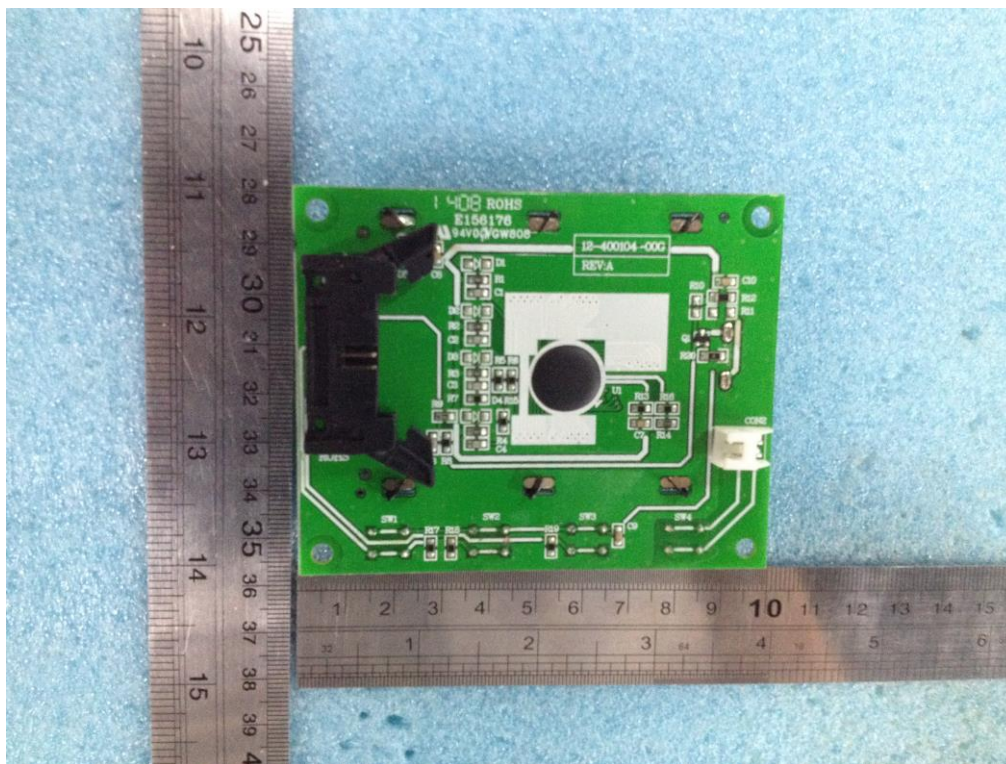
OP board - solder side view:



LCD board - component side view:



LCD board - solder side view:



Annex 3

Test equipment list

Equipment	Internal No.	Manufacturer	Type	Serial No.	Last Calibration
Power Analyzer	A4080002DG	YOKOGAWA	WT3000	91M210852	Mar 12, 2014
AC Source	A7040019DG	Chroma	61512	61512000439	Monitored by Power Analyzer
AC Source	A7040020DG	Chroma	61512	61512000438	Monitored by Power Analyzer
DC Simulation Power Supply	A7040015DG	Chroma	62150H-1000S	62150EF00488	Monitored by Power Analyzer
DC Simulation Power Supply	A7040016DG	Chroma	62150H-1000S	62150EF00490	Monitored by Power Analyzer
Four Channel Digital Phosphor Oscilloscope	A4089003DG	Tektronix	DPO4104B	C010624	Oct 17, 2013
Current transducer	A1060007DG	YOKOGAWA	CT200	1130700012	Jan 20, 2014
Current transducer	A1060008DG	YOKOGAWA	CT200	1130700017	Nov 26, 2013
Current transducer	A1060009DG	YOKOGAWA	CT200	1130700019	Nov 26, 2013
Current transducer	A1060010DG	YOKOGAWA	CT200	1130700016	Dec 02, 2013
Current transducer	A1060011DG	YOKOGAWA	CT200	1130700011	Dec 02, 2013
Current transducer	A1060012DG	YOKOGAWA	CT200	1130700018	Nov 26, 2013
RLC Load	A7150027DG	Qunling	ACLT-3803H	93VOO2869	Monitored by Power Analyzer
Oscilloscope probel	A4089008DG	Tektronix	TPP1000	C008230	Dec 20, 2013
Oscilloscope probel	A4089009DG	Tektronix	TPP1000	C008231	Dec 20, 2013
Oscilloscope probel	A4089010DG	Tektronix	TPP1000	C008228	Dec 20, 2013
Oscilloscope probel	A4089011DG	Tektronix	TPP1000	C008229	Dec 20, 2013
LCR Hitester	A1060006DG	HIOKI	3535	120112505	Mar 06, 2014