

	TEST REPORT
Report Number	: ZKT-2106102488E
Date of Test	. Jun. 04, 2021 to Jun 11, 2021
Date of issue	: Jun 11. 2021
Total number of pages	30
Test Result	: PASS
Testing Laboratory	: Shenzhen ZKT Technology Co., Ltd.
Address	. 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial [·] Avenue, Fuhai Street, Bao'an District, Shenzhen, China
Applicant's name	: Huazhou Hongsheng Technology Co. , Ltd.
Address	: Kwai Chung Village, Xiaguo District, Huazhou
Manufacturer's name	: HUAZHOU GUOXIN ELECTRONICS CO.,LTD
Address	. 10meters road, Jiangshan Trade City District, Jian Jiang District, Huagzhou,Guangdong, China
Test specification:	
Standard	EN 55032:2015+A11:2020, EN 55035:2017+A11:2020 EN IEC 61000-3-2:2019, EN 61000-3-3:2013+A1:2019 EN 61000-4-2:2009, EN 61000-4-3:2020, EN 61000-4-4:2012, EN 61000-4-5:2014+A1:2017, EN 61000-4-6:2014, EN 61000-4-8:2010, EN 61000-4-11:2020
Test procedure	:/ (//
Non-standard test method	: N/A
Test Report Form No	: TRF-EL-144_V0
Test Report Form(s) Originator	: ZKT Testing
Master TRF	Dated: 2020-01-06
This device described above has be test (EUT) is in compliance with the tested sample identified in the report	en tested by ZKT, and the test results show that the equipment under 2014/30/EU Directive requirements. And it is applicable only to the
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Product name	: Pure Sine Wave Inverter
Trademark	: N/A
Model/Type reference	: 3000W
	12V/24V/48V/60V/72V 100W/150W/200W/300W/500W/600W/800W/1000W/1200W/1500 W/1600W/2000W/2200W/2500W
Definere	Input: DC12-24V, 3000W
Ratings	Output: 100-240V~, 30A









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1. VERSION

Report No.	Version	Description	Approved
ZKT-2106102488E	Rev.01	Initial issue of report	Jun. 11, 2021





2. GENERAL INFORMATION

2.1 Description of Devi	.1 Description of Device (EUT)							
EUT :	Pure Sine Wave Inverter							
Trademark :	N/A							
Model Number :	3000W 12V/24V/48V/60V/72V 100W/150W/200W/300W/500W/600W/800W/1000W/1200W/1500W/1600W/2000 W/2200W/2500W							
Model								
Difference	N/A							
Power Supply	Input: DC12-24V, 3000W							
The highest frequency of the internal sources of the EUT is (less than 108)MHz:	 Output: 100-240V~, 30A ➢ less than 108 MHz, the measurement shall only be made up to 1 GHz. □ between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. □ between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. □ above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less. 							
Note: N/A								

2.2 Tested System Details

None.

2.3 Test Facility

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FCC Test Firm Registration Number: 692225 Designation Number: CN1299 IC Registered No.: 27033

2.4 MEASUREMENT UNCERTAINTY

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

Test item	Value (dB)		
Conducted Emission (150K-30MHZ)	3.20		
Radiated disturbance30MHz-1000MHz	4.80		
Radiated disturbance1000MHz-6000MHz	5.10		

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2.5 Test Instrument Used

Conducted emissions Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Sep. 22, 2020	Sep. 21, 2021
2	LISN	CYBERTEK	EM5040A	E185040014 9	Sep. 22, 2020	Sep. 21, 2021
3	Test Cable	N/A	C01	N/A	Sep. 22, 2020	Sep. 21, 2021
4	Test Cable	N/A	C02	N/A	Sep. 22, 2020	Sep. 21, 2021
5	EMI Test Receiver	R&S	ESRP3	101946	Sep. 22, 2020	Sep. 21, 2021
6	Absorbing Clamp	DZ	ZN23201	N/A	Sep. 22, 2020	Sep. 21, 2021

Radiated emissions Test (966 chamber)

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Bilog Antenna	Schwarzbeck	VULB9168	00877	Sep. 22, 2020	Sep. 21, 2021
2	Loop Antenna	SCHWARZBECK	FMZB1519B	014	Sep. 22, 2020	Sep. 21, 2021
3	Test Cable	N/A	R-01	N/A	Sep. 22, 2020	Sep. 21, 2021
4	Test Cable	N/A	R-02	N/A	Sep. 22, 2020	Sep. 21, 2021
5	EMI Test Receiver	R&S	ESCI7	101169	Sep. 22, 2020	Sep. 21, 2021
6	Antenna Mast	EM	SC100_1	N/A	N/A	N/A
7	Turn Table	EM	SC100	N/A	N/A	N/A
8	Spectrum Analyzer	KEYSIGHT	9020A	MY5537083 5	Sep. 22, 2020	Sep. 21, 2021
9	Horn Antenna (1GHz-18GHz)	Schwarzbeck	BBHA9120D	1541	Sep. 22, 2020	Sep. 21, 2021
10	Horn Antenna (18GHz-40GHz)	A.H. System	SAS-574	588	Sep. 22, 2020	Sep. 21, 2021
11	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	N/A	Sep. 22, 2020	Sep. 21, 2021
12	Amplifier (1GHz-40GHz)	全聚达	DLE-161	097	Sep. 22, 2020	Sep. 21, 2021

Harmonic / Flicker Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Harmonic & Flicker	LAPLACE INSTRUMENTS	C2000A	311370	Sep. 22, 2020	Sep. 21, 2021
2	AC Power Source	LAPLACE INSTRUMENTS	C2000A	311370	Sep. 22, 2020	Sep. 21, 2021

Electrostatic discharge Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	ESD TEST GENERATOR	HTEC	HESD16	N/A	Sep. 22, 2020	Sep. 21, 2021









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Continuous RF electromagnetic field disturbances Test (SMQ --- site)

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Signal Generator	R&S	SMT 06	832080/007	Sep. 22, 2020	Sep. 21, 2021
2	Log-Bicon Antenna	Schwarzbeck	VULB9161	4022	Sep. 22, 2020	Sep. 21, 2021
3	Power Amplifier	AR	150W1000M 1	320946	Sep. 22, 2020	Sep. 21, 2021
4	Microwave Horn Antenna	AR	AT4002A	321467	Sep. 22, 2020	Sep. 21, 2021
5	Power Amplifier	AR	25S1G4A	308598	Sep. 22, 2020	Sep. 21, 2021

EFT and Surge and Voltage dips and interruptions Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Surge Generator	HTEC	HCOMPAC T5	202501	Sep. 22, 2020	Sep. 21, 2021
2	DIPS Generator	HTEC	HV1P16T	202101	Sep. 22, 2020	Sep. 21, 2021
3	EFT/B Generator	HTEC	HCOMPAC T5	202501	Sep. 22, 2020	Sep. 21, 2021
4	EFT/B Clamp	HTEC	H3C	N/A	Sep. 22, 2020	Sep. 21, 2021

For Magnetic Field Immunity Test

Ite	em	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
	1	Generator	HTEC	HFMG 100	202602	Sep. 22, 2020	Sep. 21, 2021



3. CONDUCTED EMISSIONS

3.1 Block Diagram Of Test Setup



3.2 Limit

Limits for Conducted emissions at the mains ports of Class B MME							
Frequency range	Limits dB(µV)						
(MHz)	Quasi-peak	Average					
0,15 to 0,50	66 to 56*	56 to 46*					
0,50 to 5	56	46					
5 to 30	60	50					

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

3.3 Test procedure

For mains ports:

a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

3.4 Test Result

The EUT is powered by DC only the test items is not applicable.



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4. RADIATED EMISSIONS TEST

- 4.1 Block Diagram Of Test Setup
- (A) Radiated Emission Test Set-UP Frequency 30MHz-1GHz



Limits for radiated disturbance of Class B MME						
Frequency (MHz)	Quasi-peak limits at 3m dB(μV/m)					
30-230	40					
230-1000	47					

	Class B (at 3m) dBuV/m				
	Peak	Avg			
1000-3000	70	50			
3000-6000	74	54			

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4.3 Test Procedure

30MHz ~ 1GHz:

a. The Product was placed on the nonconductive turntable 0.8 m above the ground in a semi anechoic chamber.

b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

Above 1GHz:

a. The Product was placed on the non-conductive turntable 0.8 m above the ground in a full anechoic chamber..

b. Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.

c. For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

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4.4 Test Results

the second se								
Radiated Emissions Test Data								
Temperature:	26° ℃	Relative Humidity:	60%					
Pressure:	1009hPa	Phase :	Horizontal					
Test Voltage :	DC 24V	Test Mode:	working					

80.0 dBu¥/m CE/CISPR/GB/BSMI/JP QP Margin -6 dB 40 1 6 5 Turn the 3 Antonional Ash. 0.0 30.000 40 50 60 70 80 (MHz) 300 400 600 700 1000.000 500

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1	*	101.2885	44.91	-16.40	28.51	40.00	-11.49	QP		~	
2		199.9856	26.62	-15.63	10.99	40.00	-29.01	QP			
3		344.3855	24.56	-10.57	13.99	47.00	-33.01	QP			
4		520.8882	23.57	-6.68	16.89	47.00	-30.11	QP			
5		631.6884	23.81	-4.12	19.69	47.00	-27.31	QP			
6		776.8778	23.49	-1.43	22.06	47.00	-24.94	QP			





Radiated Emissions Test Data									
Temperature:	26 ℃	Relative Humidity:	60%						
Pressure:	1009hPa	Phase :	Vertical						
Test Voltage :	DC 24V	Test Mode:	working						



No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector	cm	degree	Comment
1		103.8055	32.92	-16.24	16.68	40.00	-23.32	QP			
2	3	199 <mark>.</mark> 9856	25.62	-15.63	9.99	40.00	-30.01	QP			
3		257.4222	23.47	-13.49	9.98	47.00	-37.02	QP			
4		360.4476	24.33	-10.40	13.93	47.00	-33.07	QP			
5		580.7026	23.49	-5.18	18.31	47.00	-28.69	QP			
6	*	900.1474	24.36	0.70	25.06	47.00	-21.94	QP			





5.3 Operating Condition of EUT

5.3.1 Setup the EUT as shown in Section 6.1.

5.3.2 Turn on the power of all equipment.

5.3.3 Let the EUT work in test mode and test it.

5.4 Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

5.5 Test Results

The EUT is powered by DC only the test items is not applicable.

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6. VOLTAGE FLUCTUATIONS & FLICKER TEST6.1 Block Diagram of Test Setup

Same as Section 6.1.

6.2 Test Standard

EN 61000-3-3:2013+A1:2019

6.3 Operating Condition of EUT

Same as Section 5.3.. The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

Flicker Test Limit

Limits
1.0
3.3%
4.0%
Not exceed 3.3% for 500ms

6.4 Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

6.5 Test Results

The EUT is powered by DC only the test items is not applicable.



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7. IMMUNITY TEST OF GENERAL THE PERFORMANCE CRITERIA

Product Standard	EN 55035:2017+A11:2020 clause 5
CRITERION A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
	During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.
CRITERION B	After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.
	If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
CRITERION C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.
	Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

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8. ELECTROSTATIC DISCHARGE (ESD)

8.1 Test Specification

Test Port Discharge Impedance Discharge Mode Discharge Period

- Enclosure port 330 ohm / 150 pF
- : Single Discharge
- : one second between each discharge

8.2 Block Diagram of Test Setup



8.3 Test Procedure

a. Electrostatic discharges were applied only to those points and surfaces of the Product that are accessible to users during normal operation.

b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.

c. The time interval between two successive single discharges was at least 1 second.

d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the Product.

e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.

f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the Product as fast as possible (without causing mechanical damage) to touch the Product. After each discharge, the ESD generator was removed from the Product and re-triggered for a new single discharge. The test was repeated until all discharges were complete.

g. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the Product were completely illuminated. The VCP (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the Product.



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8.4 Test Results



Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Required Level	Performance Criterion			
	Conductive Surfaces	4	10	В	А			
Contact Discharge	Indirect Discharge HCP	4	10	В	А			
	Indirect Discharge VCP	4	10	В	А			
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	В	А			
Note: N/A								











9. CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES(RS)

- 9.1 Test Specification
 - **Test Port**
 - Step Size
 - Modulation
 - **Dwell Time** Polarization

- **Enclosure** port ż 1%
 - 1kHz, 80% AM
 - 1 second
 - Horizontal & Vertical

9.2 Block Diagram of Test Setup

Below 1GHz:







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9.3 Test Procedure

a. The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the Product.

b. The frequency range is swept from 80MHz to 1000MHz, 1800MHz, 2600MHz, 3500MHz,
5000MHz,with the signal 80% amplitude modulated with a 1 kHz sine wave, and the step size was 1%.

c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond, but should not exceed 5 s at each of the frequencies during the scan.

d. The test was performed with the Product exposed to both vertically and horizontally polarized fields on each of the four sides.

e. For Broadcast reception function: Group 2 not apply in this test.

9.4 Test Results

Frequency	Position	Field Strength (V/m)	Required Level	Performance Criterion
80 - 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz	Front, Right, Back, Left	3	A	A
Note: N/A		22		





10. ELECTRICAL FAST TRANSIENTS/BURST (EFT)



10.1 Test Specification

Test Port	:	input a.c. power port
Impulse Frequency	:	5 kHz
Impulse Wave-shape	:	5/50 ns
Burst Duration	:	15 ms
Burst Period	:	300 ms
Test Duration		2 minutes per polarity

10.2 Block Diagram of EUT Test Setup





10.3 Test Procedure

a. The Product and support units were located on a non-conductive table above ground reference plane.

b. A 0.5m-long power cord was attached to Product during the test.

10.4 Test Results

The EUT is powered by DC only the test items is not applicable.

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11. SURGES IMMUNITY TEST

11.1 Test Specification		
Test Port	: input a.c. power port	
Wave-Shape	: Open Circuit Voltage - 1.2 / 50 us Short Circuit Current - 8 / 20 us	
Pulse Repetition Rate	: 1 pulse / min.	
Phase Angle	: 0° / 90° / 180° / 270°	
Test Events	: 5 pulses (positive & negative) for each polarity	

11.2 Block Diagram of EUT Test Setup



11.3 Test Procedure

a. The surge is to be applied to the Product power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave.

b. The power cord between the Product and the coupling/decoupling networks shall be 2 meters in length (or shorter). Interconnection line between the Product and the coupling/decoupling networks shall be 2 meters in length (or shorter).

11.4 Test Result

The EUT is powered by DC only the test items is not applicable.

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12.3 Test Procedure

For input a.c. power port:

a. The Product and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.

b. The frequency range is swept from 150 kHz to 10MHz, 10MHz to 30MHz, 30MHz to 80MHz with the signal 80% amplitude modulated with a 1 kHz sine wave, and the step size was 1% of fundamental.

c. The dwell time at each frequency shall be not less than the time necessary for the Product to be able to respond.

12.4 Test Result

The EUT is powered by DC only the test items is not applicable.





13. MAGNETIC FIELD IMMUNITY TEST13.1 Block Diagram of Test Setup





13.2 Test Standard

EN 55035:2017+A11:2020, EN61000-4-8:2010 Severity Level 1 at 1A/m

13.3 Severity Levels and Performance Criterion

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

13.3.2 Performance criterion: B

- A. The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
- B. After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaces by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not

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specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably except from the equipment if used as intended.

C. Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

13.4 EUT Configuration on Test

The configuration of EUT is listed in Section 2.9.

13.5 Operating Condition of EUT

Same as conducted emission test, which is listed in Section 2.9 except the test set up replaced as Section 12.1.

13.6 Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 10.1. The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

13.7 Test Results

The EUT is powered by DC only the test items is not applicable.



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14. VOLTAGE DIPS AND INTERRUPTIONS (DIPS)

13.1 Test Specification

Test Port	: input a.c. power port
Phase Angle Test cycle	: 0°, 180° : 3 times

13.2 Block Diagram of EUT Test Setup



13.3 Test Procedure

a. The Product and support units were located on a non-conductive table above ground floor.

- b. Set the parameter of tests and then perform the test software of test simulator.
- c. Conditions changes to occur at 0 degree crossover point of the voltage waveform.

13.4 Test Result

The EUT is powered by DC only the test items is not applicable.



15. EUT PHOTOGRAPHS



EUT Photo 1















EUT Photo 3



EUT Photo 4







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16. EUT TEST PHOTOGRAPHS





***** END OF REPORT *****