China

EMC EMISSION - TEST REPORT

Report Number	:	**64.772.17.04711.01 - (E)**	Date of Issue:	2017-09-26

Model	:	EA2KHD, EA3KHD, EA3.6KHD
Product Type	:	Hybrid Solar Inverter
Applicant	:	EAST Group Co., Ltd.
Manufacturer	:	EAST Group Co., Ltd.
License holder	:	EAST Group Co., Ltd.
Address	:	No.6 Northern Industry Road, Songshan Lake Sci. & Tech. Industry Park, 523808 DongGuan City, Guangdong Province, PEOPLE'S REPUBLIC OF CHINA
Test Result	:	■ **Positive** ☐ **Negative**
Total pages including Appendices	:	32

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV SÜD CERTIFICATION AND TESTING (CHINA) CO., LTD. GUANGZHOU BRANCH reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch issued reports.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

China

DIRECTORY - EMISSIONS

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to the following regulations:

■ - EMC - Directive 2014/30/EU and its amendments

■ - EN 61000-6-3:2007+A1:2011

☐ - CISPR 14-1:2005+A1:2008
■ - CISPR 22:2008
☐ - IEC 61000-3-2:2014
☐ - IEC 61000-3-3:2013

☐ - Household appliances and similar
☐ - Class A ■ - Class B

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Environmental Conditions In The Laboratory:

	Actual
Temperature:	: 26 °C
Relative Humidity:	: 56 %
Atmospheric Pressure:	: 1040mBar

Rated of EUT:

Refer to Appendix B of Emission report model: EA3.6KHD.

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error (please refer to each test item). Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Symbol Definitions:

■ - Applicable
☐ - Not Applicable

Test laboratory:

■ - EAST Group Co., Ltd. Test Center
Add: No.6 Northern Industry Road, Songshan Lake Sci. & Tech. Industry Park, 523808 DongGuan City, Guangdong Province, PEOPLE'S REPUBLIC OF CHINA

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)* measurements were performed at the following test location:

☐ **- Test not applicable**

■- Test Area- Shielded room : Bare shielded room

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. Due
■-	ESCI 7	R&S	EMI test receiver	100798	2018.11.11
■-	ENV4200	Schwarzbeck	LISN	100147	2018.11.11

Measurement Uncertainty:

TÜV SÜD Shenzhen: ±3.50dB
TÜV SÜD Guangzhou: ±2.48dB
EAST Group Co., Ltd. ±3.32dB

Remarks: All test equipment used are calibrated on a regular basis.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-6000 MHz, were tested in a horizontal and vertical polarization at the following test location :

☐ - Test not applicable

■ - Test Area - Shielded room : Bare shielded room

Testing was performed at a test distance of :

■ - 3 meters

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. Due
■-	ESCI 7	R&S	EMI test receiver	100798	2018.11.11
■ -	3142D	ETS-LINDGREN	Broadband antenna	00135455	2018.11.11

Measurement Uncertainty:

TÜV SÜD Shenzhen: Horizontal: ±4.83dB; Vertical:±4.91dB;
EAST Group Co., Ltd. Horizontal: ±4.24dB; Vertical:±4.63dB;

Remarks: All test equipment used are calibrated on a regular basis.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Emissions Test Conditions: CONDUCTED EMISSIONS (Harmonics and Flicker)

The *Harmonic Current Emissions and Voltage Fluctuations and Flicker* measurements were performed at the following test location :

■- Test not performed

☐ - Test Area (TÜV SÜD) - Laboratory open area

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. Due
☐-	PCR6000LA	Kikusui	Multi purpose power supply	MG002890	2017-03-12
☐-	PM6000-1	Voltech	Power anyalyser	100006700229	2017-03-12
☐-	IMP555	Voltech	Impedance network	1494	2017-03-12

Remarks: All test equipment used are calibrated on a regular basis.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Equipment Under Test (EUT) Test Operation Mode - Emissions Tests :

The equipment under test was operated under the following conditions during emissions testing:

☐ - Standby

☐ - Test Program (H - Pattern)

☐ - Test Program (Color Bar)

☐ - Test Program (Customer Specified)

■ - Normal Operating Mode

☐ - _____

_____

_____

Configuration of the equipment under test:

■ - See Constructional Data Form in Appendix B

■ - See Product Information Form(s) in Appendix B

The following peripheral devices and interface cables were connected during the testing:

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

■ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables TUVPS.No.: _____

☐ - customer specific cables

☐ - _____

☐ - _____

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

China

Emissions Test Results:

Conducted Emissions, 150kHz - 30 MHz

■ - PASS ☐ - FAIL ☐ - NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Radiated Emission(electric field) 30 MHz - 6000 MHz

■ - PASS ☐ - FAIL ☐- NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: The highest internal frequency of the EUT is less than 108 MHz, the measurement was made up to 1 GHz.

Harmonic Current Emissions and Voltage Changes and Flicker

☐ - PASS ☐ - FAIL ■ - NOT APPLICABLE

Harmonic measurement exceeding limit _____ Above at _____ Harmonic

Flicker measurement exceeding limit _____ Above the _____ Requirement

Remarks: _____

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

China

GENERAL REMARKS:

All models are identical in critical components, except for the software, which will not influence the emission performance. Tests have been applied on EA3.6KHD only.

SUMMARY:

All tests according to the regulations cited on page 3 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 3.

☐ - **Does not** fulfill the general approval requirements cited on page 3.

Testing Start Date: 2017-08-16

Testing End Date: 2017-08-16

- TÜV SÜD CERTIFICATION AND TESTING (CHINA) CO., LTD. GUANGZHOU BRANCH -

Reviewed by: Technical Certifier

Tony Liu

Prepared by:

Samuel Zhang

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch

5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Appendix A

Test Setup Photo(s)

and

Test Data Sheets

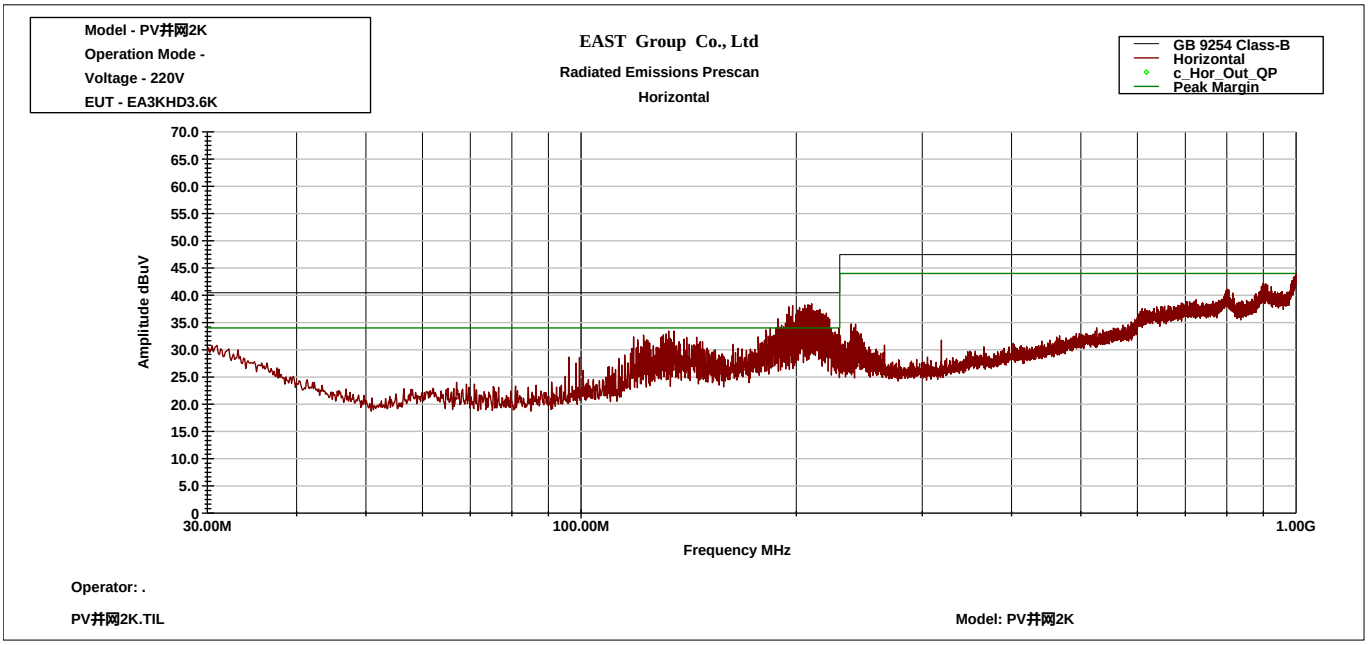
TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

☒ Test Setup: Conducted Emission

☒ Test Setup: Radiated Emission

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Radiated Emission



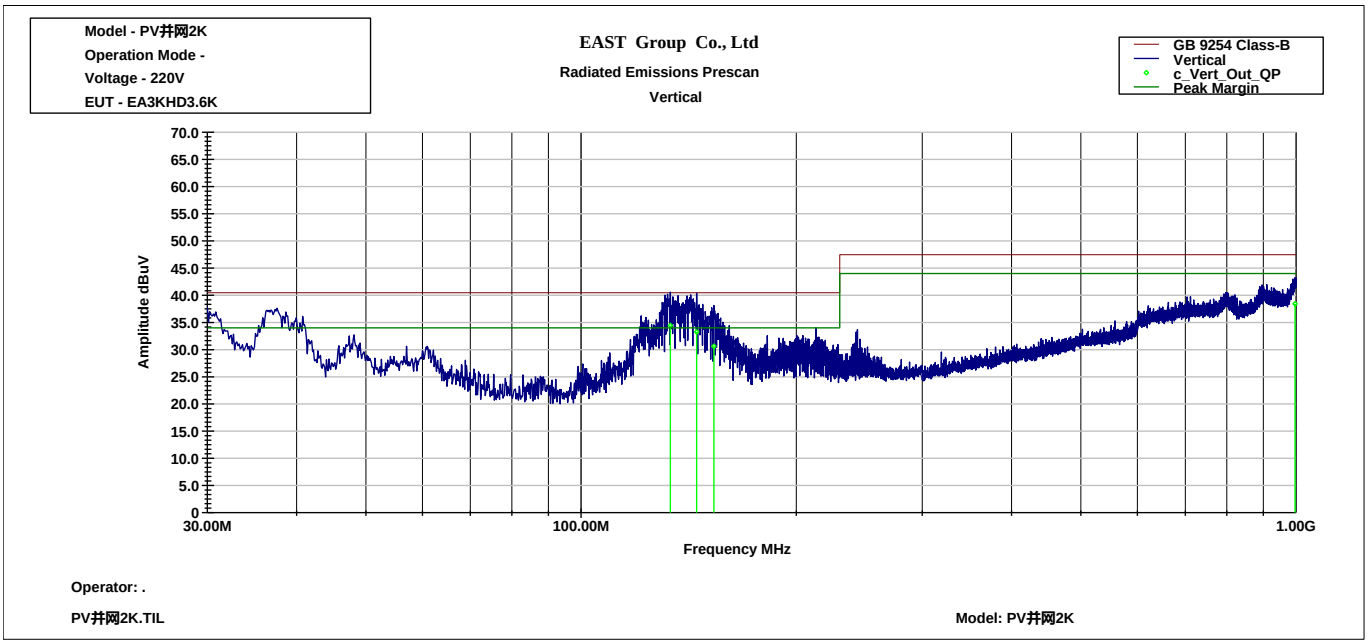
Final Result 1

Frequency(MHz)	QuasiPeak(dBμV/m)	Limit(dBμV/m)
216.200	34.62	40

Model : EA3.6KHD
Operating Mode : Full Load (PV Inverter to Power Grid)
Antenna polarization : Horizontal ☒ Vertical☐
Test By : Samuel Zhang
Test Date : 2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Radiated Emission



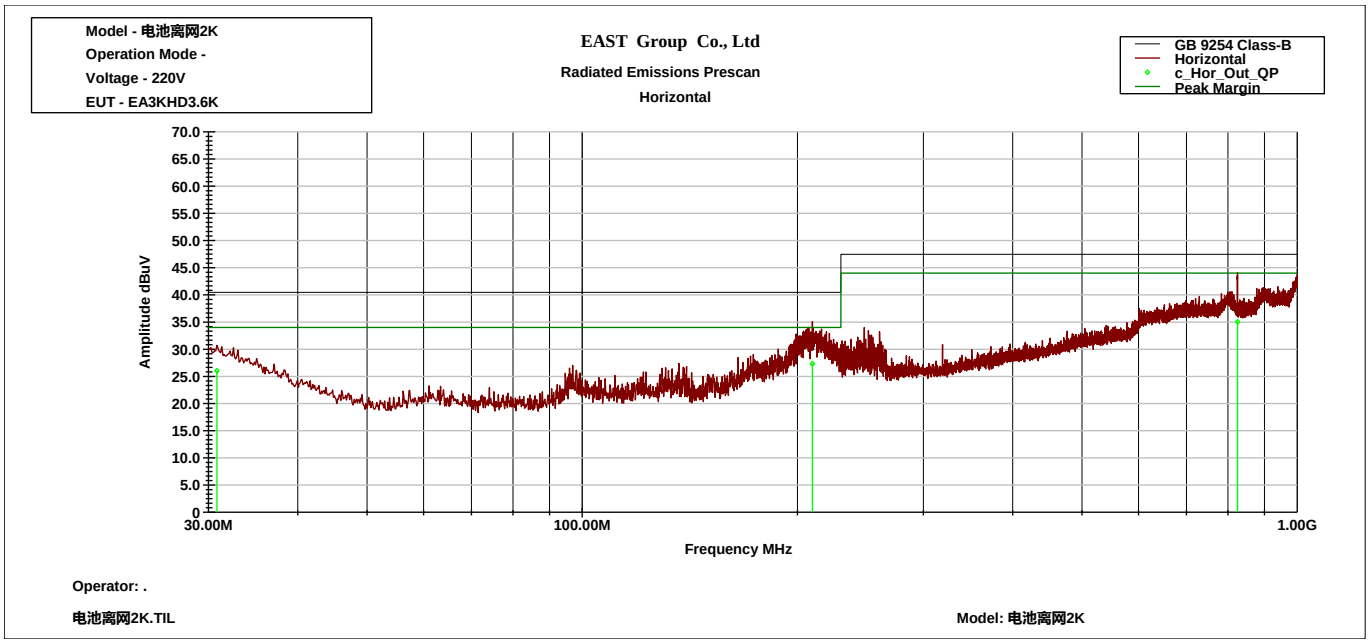
Final Result 1

Frequency(MHz)	QuasiPeak(dBμV/m)	Limit(dBμV/m)
133.32	34.43	40.00
145.08	33.26	40.00
153.36	30.60	40.00

Model : EA3.6KHD
Operating Mode : Full Load (PV Inverter to Power Grid)
Antenna polarization : Horizontal ☐ Vertical☒
Test By : Samuel Zhang
Test Date : 2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Radiated Emission



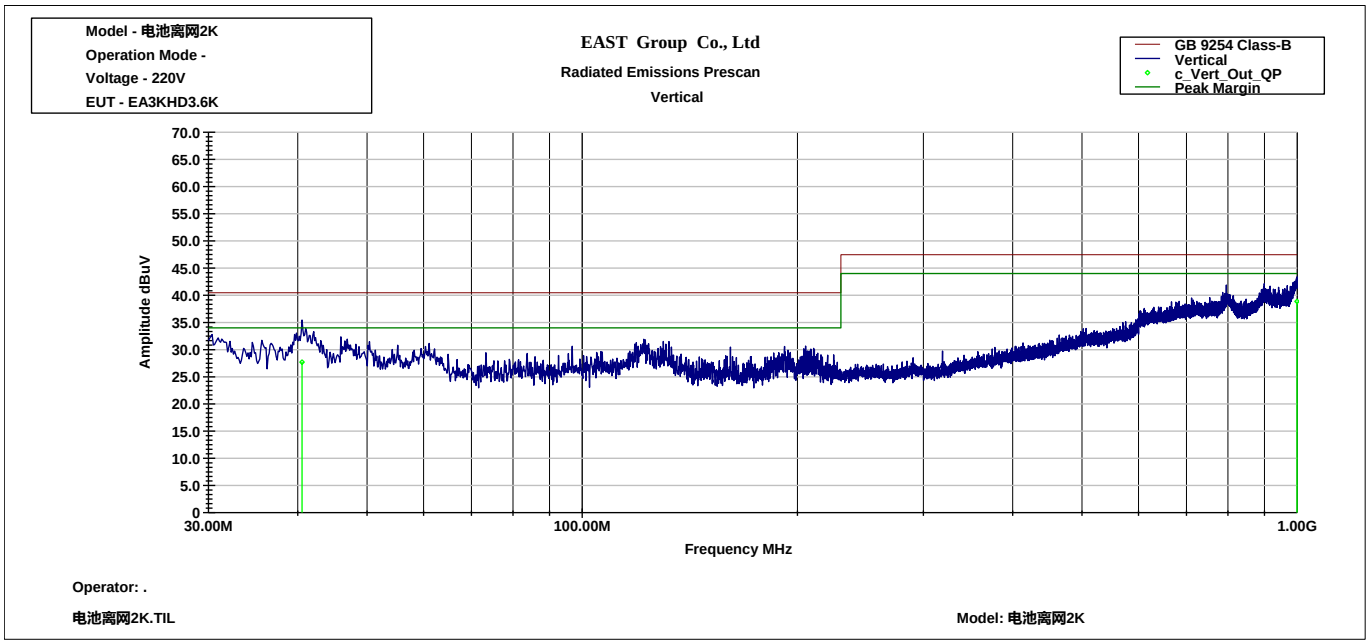
Final Result 1

Frequency(MHz)	QuasiPeak(dBμV/m)	Limit(dBμV/m)
209.88 MHz	27.32	40
30.84 MHz	26.02	40

Model : EA3.6KHD
Operating Mode : Full Load (Battery to discharging)
Antenna polarization : Horizontal ☒ Vertical☐
Test By : Samuel Zhang
Test Date : 2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Radiated Emission



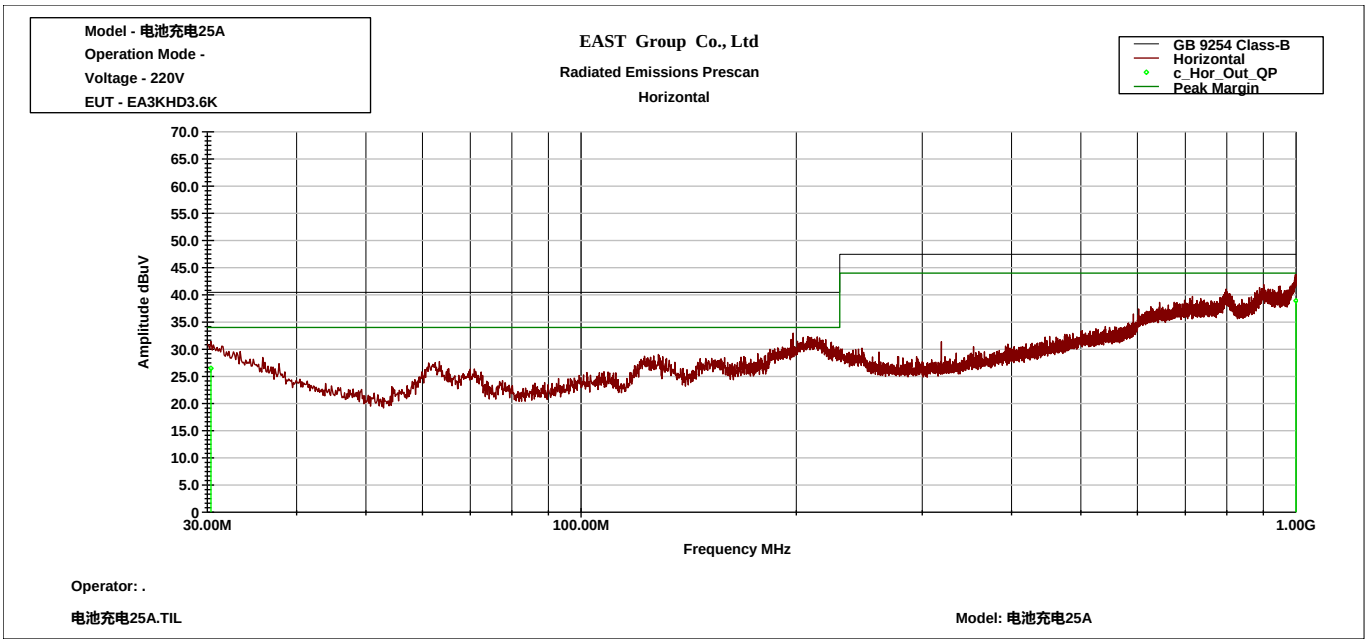
Final Result 1

Frequency(MHz)	QuasiPeak(dBμV/m)	Limit(dBμV/m)
40.56	27.68	40

Model : EA3.6KHD
Operating Mode : Full Load (Battery to discharging)
Antenna polarization : Horizontal ☐ Vertical☒
Test By : Samuel Zhang
Test Date : 2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Radiated Emission



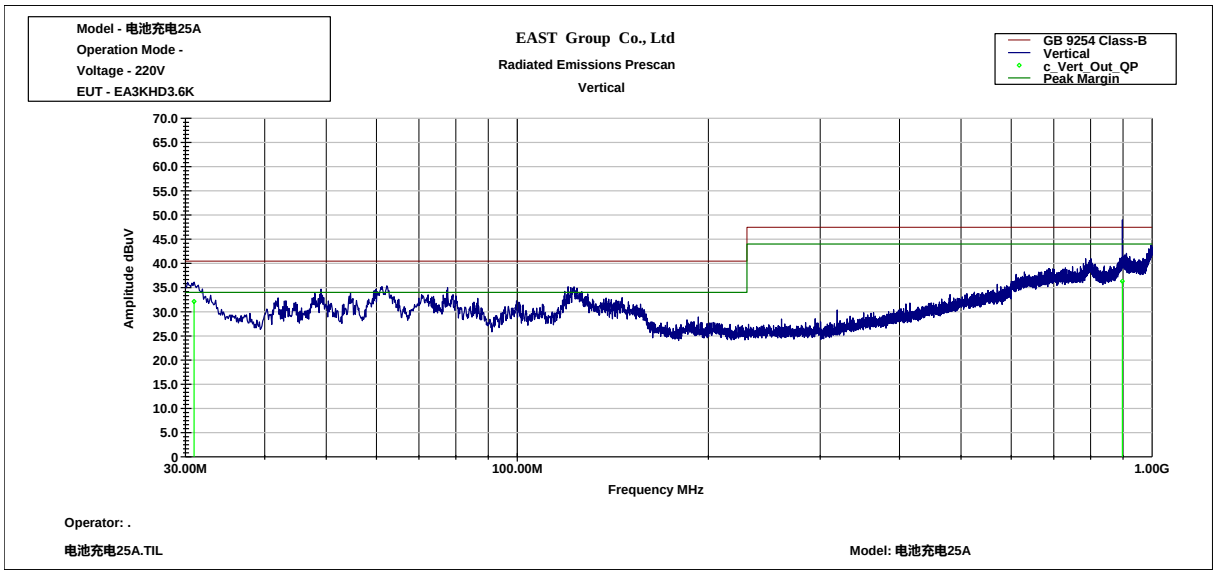
Final Result 1

Frequency(MHz)	QuasiPeak(dBμV/m)	Limit(dBμV/m)
30.36	26.46	40

Model : EA3.6KHD
Operating Mode : Battery charging (PV to battery)
Antenna polarization : Horizontal ☒ Vertical☐
Test By : Samuel Zhang
Test Date : 2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Radiated Emission



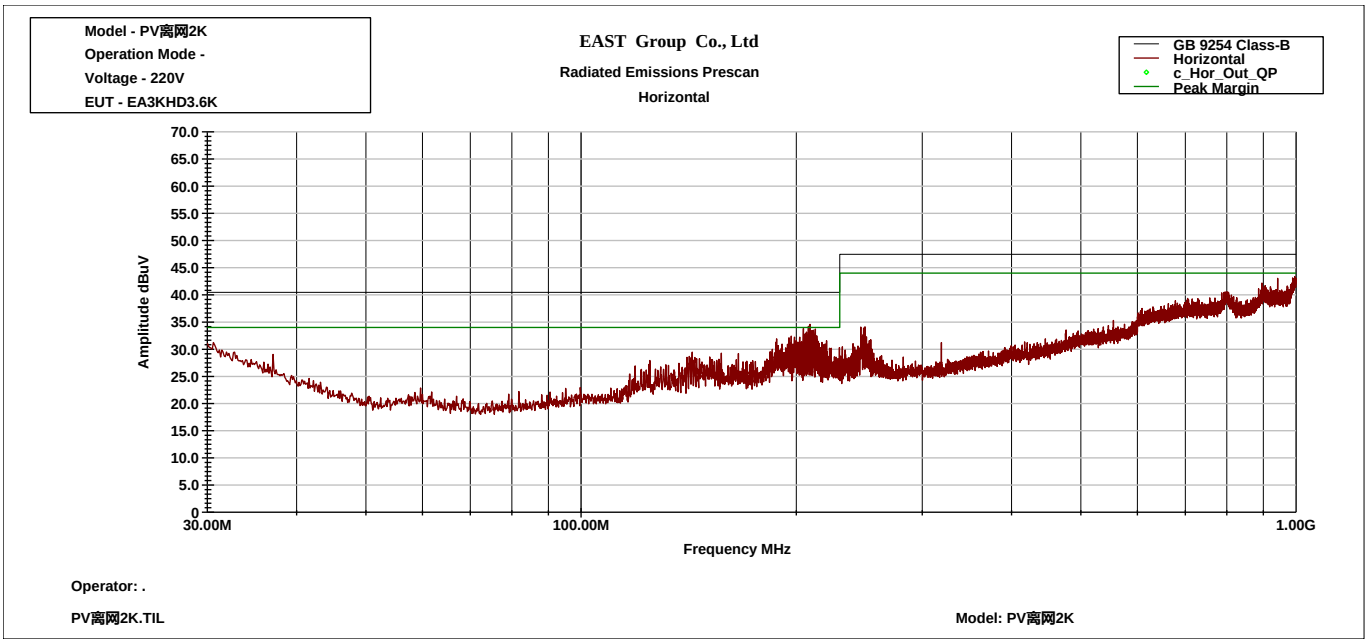
Final Result 1

Frequency(MHz)	QuasiPeak(dBμV/m)	Limit(dBμV/m)
30.96	32.13	40
897.96	36.30	40

Model : EA3.6KHD
Operating Mode : Battery charging (PV to battery)
Antenna polarization : Horizontal ☐ Vertical☒
Test By : Samuel Zhang
Test Date : 2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Radiated Emission



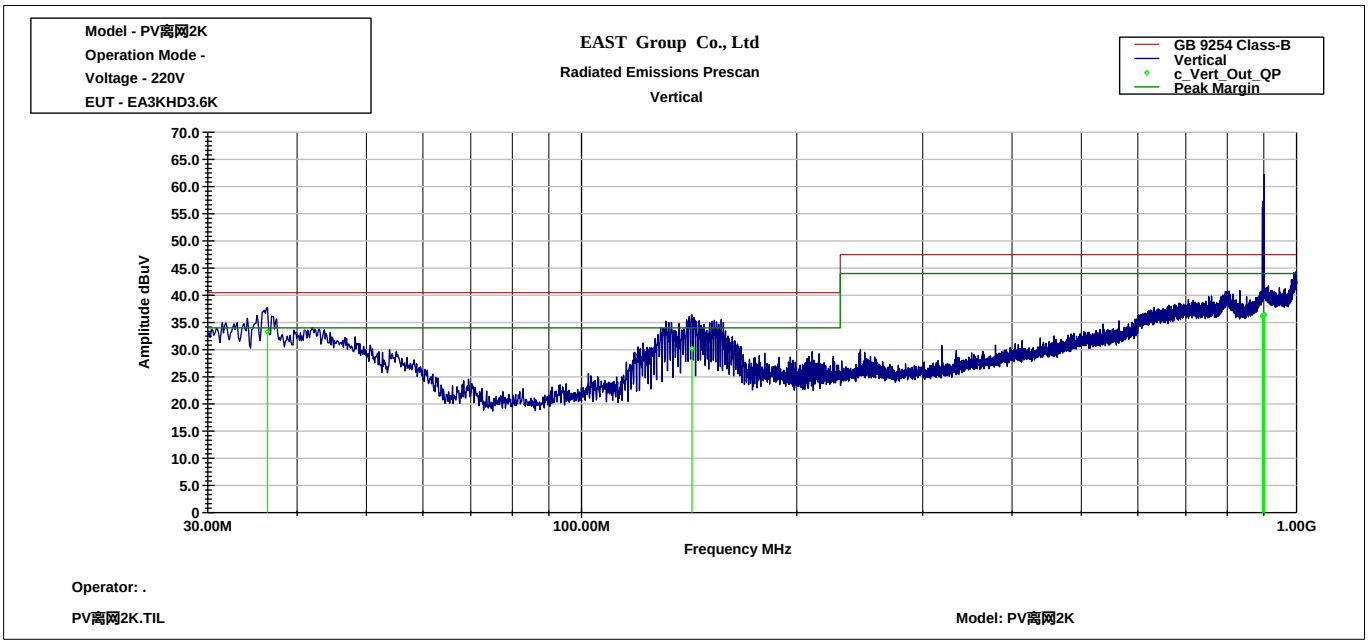
Final Result 1

Frequency(MHz)	QuasiPeak(dBμV/m)	Limit(dBμV/m)
212.36	32.52	40

Model : EA3.6KHD
Operating Mode : Battery to Inverter
Antenna polarization : Horizontal ☒ Vertical☐
Test By : Samuel Zhang
Test Date : 2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Radiated Emission



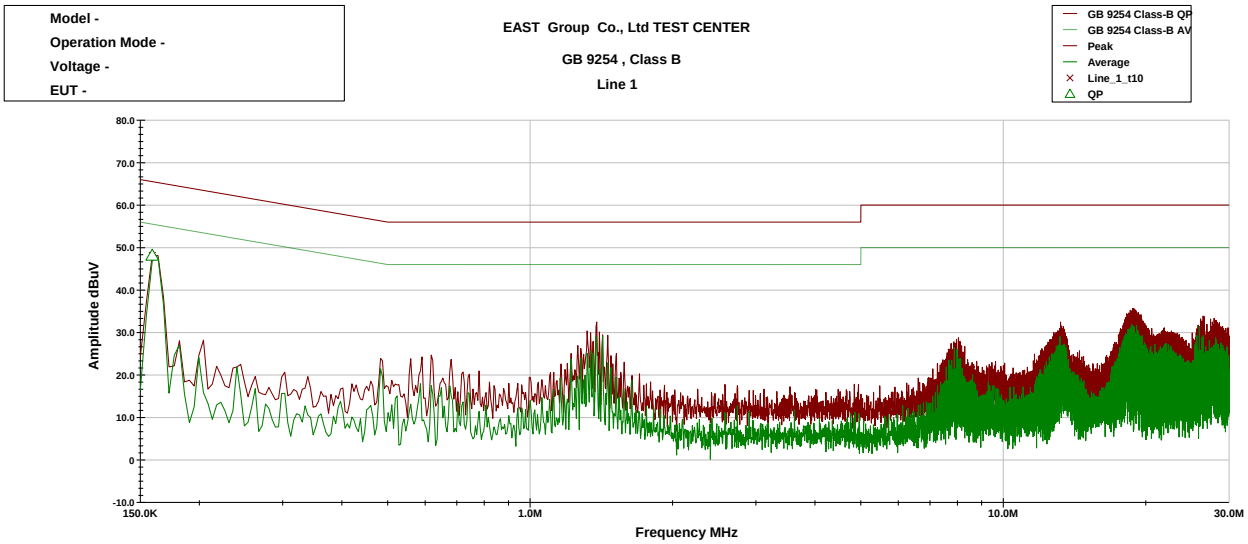
Final Result 1

Frequency(MHz)	QuasiPeak(dBμV/m)	Limit(dBμV/m)
36.36	33.26	40
142.68	30.18	40

Model : EA3.6KHD
Operating Mode : Battery to Inverter
Antenna polarization : Horizontal ☐ Vertical☒
Test By : Samuel Zhang
Test Date : 2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Conducted Emissions 150 kHz-30 MHz



Operator: zl

CE-并网满载 Class B.TIL

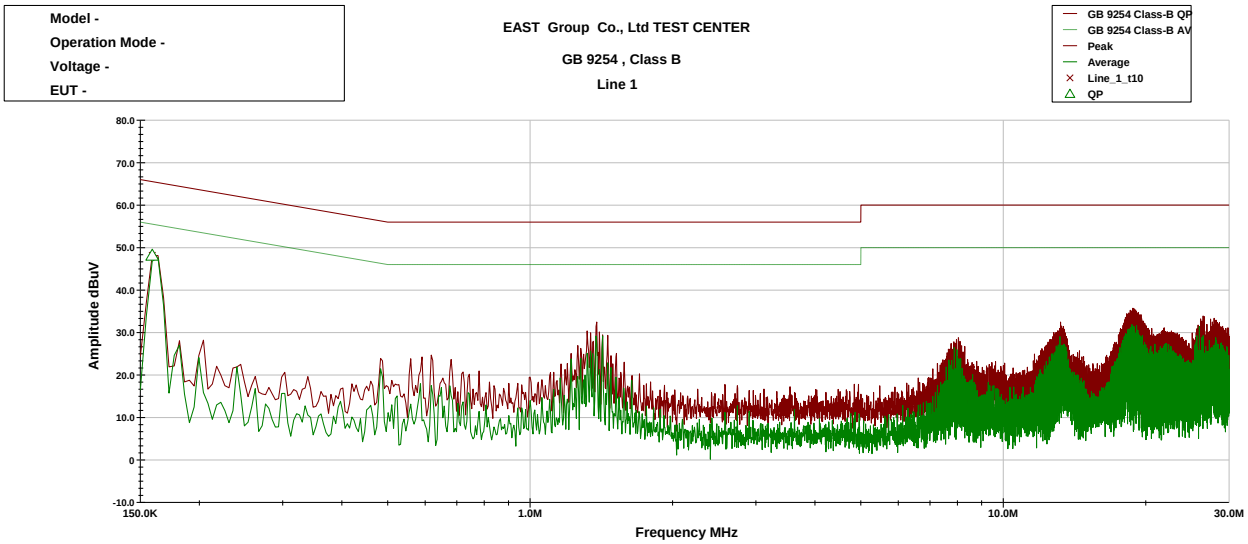
Model:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Average Peak (dBµV)	Limit (dBµV)
159.0	48.11	65.52	46.82	55.52

Model	:	EA3.6KHD
Operating Mode	:	Full Load(PV mode)
Conduct Line/Port	:	☒L ☐N
Test By	:	Samuel Zhang
Test Date	:	2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Conducted Emissions 150 kHz-30 MHz



Operator: zl

CE-并网满载 Class B.TIL

Model:

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Average Peak (dBµV)	Limit (dBµV)
159.0	48.11	65.52	46.82	55.52

Model	:	EA3.6KHD
Operating Mode	:	Full Load(PV mode)
Conduct Line/Port	:	☐L ☒N
Test By	:	Samuel Zhang
Test Date	:	2017-08-16

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Appendix B

Constructional Data Form

and

Product Information Form(s)

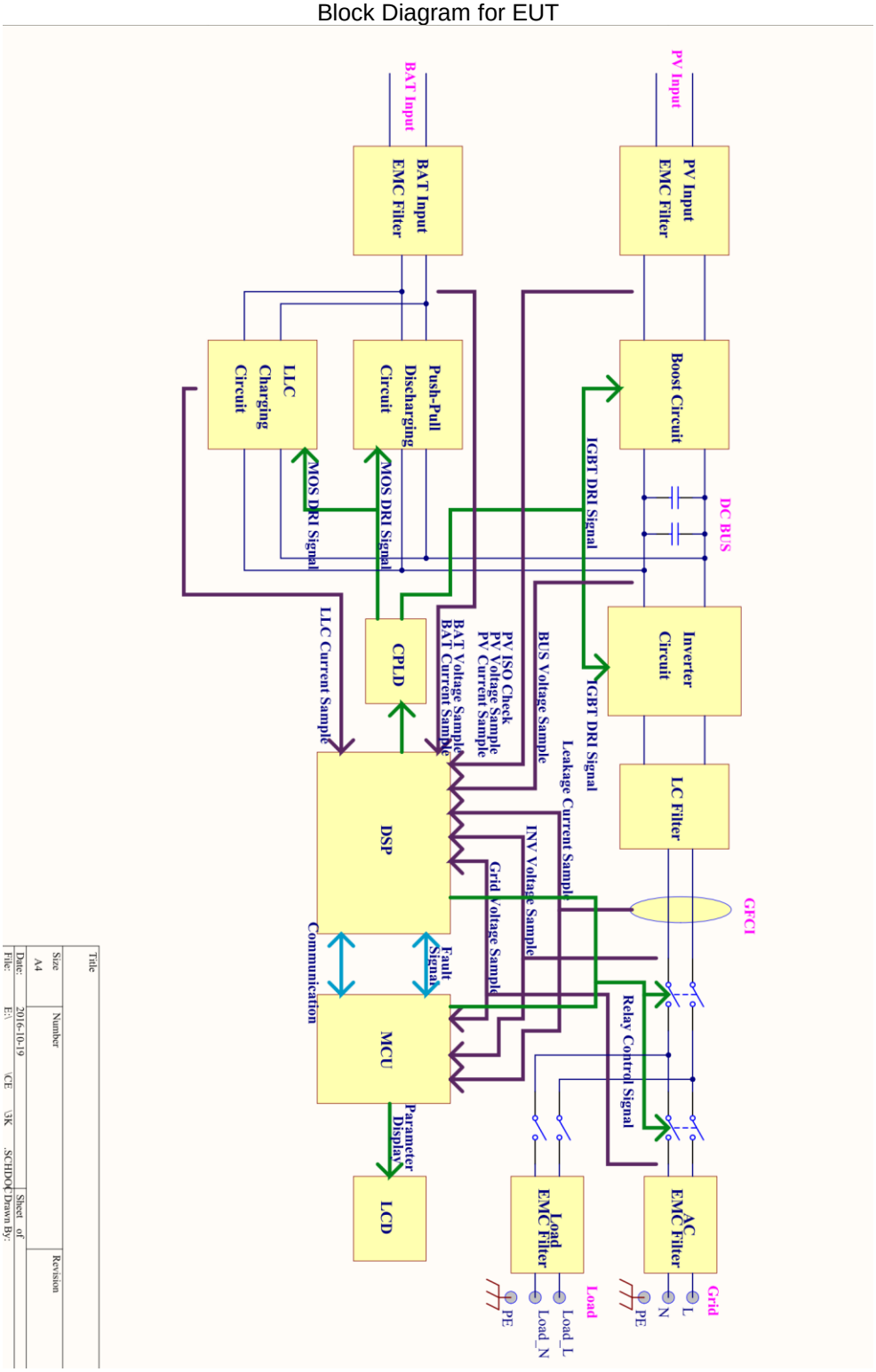
Any safety relevant information or constructional aspect concerning the sample or equipment under test as submitted by the applicant / report holder / certificate holder or any authorized agent is deemed to have no adverse effect on the electromagnetic compatibility (EMC) performance. Insofar as safety or compliance with Low Voltage Directive (LVD) or any relevant directive is concerned, the applicant / report holder / certificate holder or any authorized agent is required, by virtue of the relevant EU Directive provisions, to have satisfied that the product concerned (for which a sample was tested) meets with LVD or other relevant directives before placing it on the market.

Where applicable, changes or modifications made to the original sample submitted for testing are documented herein. The applicant or manufacturer shall ensure that such changes or modifications are applied to the production units. Any further changes or modifications made to the production units may void the validity of this test report unless such changes or modifications have been formally assessed by TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch through technical evaluations or other means as appropriate and it has been confirmed that the EMC performance of such units is not adversely affected.

The enclosed, if any, circuit diagram / parts list / printed circuit board diagram / component layout / user manual are strictly for reference only. TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch shall not be held responsible for any error or omission in such documents. It is the manufacturer's responsibility to ensure that production units conform to the tested sample.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Block Diagram for EUT



TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Specification all both models

Model	EA2KHD	EA3KHD	EA3.6KHD
PV input rating			
Max. input power	4500 W	4500 W	4500 W
Rated input voltage	360 Vd.c.	360 Vd.c.	360 Vd.c.
Max. input voltage	500 Vd.c.	500 Vd.c.	500 Vd.c.
Start-up voltage	115 Vd.c.	115 Vd.c.	115 Vd.c.
Initial feeding voltage	150 Vd.c.	150 Vd.c.	150 Vd.c.
MPPT voltage range	250 Vd.c. – 450 Vd.c.	250 Vd.c. – 450 Vd.c.	250 Vd.c. – 450 Vd.c.
Max. input current	18 Ad.c.	18 Ad.c.	18 Ad.c.
PV short circuit current	18 Ad.c.	18 Ad.c.	18 Ad.c.
Battery input/output rating			
Battery type	Lithium / Lead-acid	Lithium / Lead-acid	Lithium / Lead-acid
Rated voltage (Lithium)	51.2 Vd.c.	51.2 Vd.c.	51.2 Vd.c.
Battery voltage range(Lithium)	46.4 Vd.c. - 57.6 Vd.c.	46.4 Vd.c. - 57.6 Vd.c.	46.4 Vd.c. - 57.6 Vd.c.
Rated voltage(Lead-acid)	48.0 Vd.c.	48.0 Vd.c.	48.0 Vd.c.
Battery voltage range(Lead-acid)	40.0 Vd.c. - 58.0 Vd.c.	40.0 Vd.c. - 58.0 Vd.c.	40.0 Vd.c. - 58.0 Vd.c.
Max. charging power	1500 W	1500 W	1500 W
Max. charging current	25 Ad.c.	25 Ad.c.	25 Ad.c.
Rated discharging power	3000W	3000W	2000 W
Max. discharging current	100 Ad.c	100 Ad.c	100 Ad.c
Grid input rating			
Rated input voltage	230 Va.c.	230 Va.c.	230 Va.c.
Rated grid frequency	50 Hz	50 Hz	50 Hz
Rated input apparent power	2000 VA	3000 VA	2000 VA
Rated input active power	2000 W	3000 W	2000 W
Rated input current	8.7 Aa.c.	13.0 Aa.c.	8.7 Aa.c.
Grid output rating			
Rated output apparent power	2000 VA	3000 VA	3600 VA
Rated output active power	2000 W	3000 W	3600 W
Rated output voltage	230 Va.c.	230 Va.c.	230 Va.c.
Rated output current	8.7 Aa.c	13.0 Aa.c	15.6 Aa.c
Rated output frequency	50 Hz	50 Hz	50 Hz
Power factor	0.9 leading - 0.9 lagging	0.9 leading - 0.9 lagging	0.9 leading - 0.9 lagging
AC load output rating			
Rated output apparent power	2000 VA	3000 VA	2000 VA
Rated output active power	2000 W	3000 W	2000 W
Rated output voltage	230 Va.c.	230 Va.c.	230 Va.c.
Rated output current	8.7 Aa.c.	13.0 Aa.c.	8.7 Aa.c.
Rated output frequency	50 Hz	50 Hz	50 Hz

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Appendix C

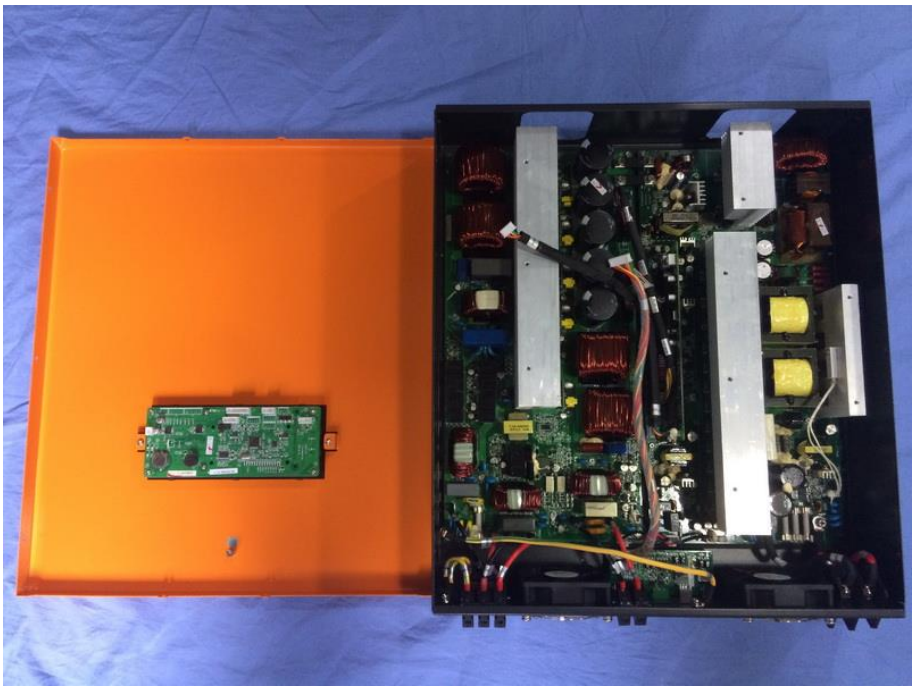
Constructional Photographs
of

Equipment under test (EUT)

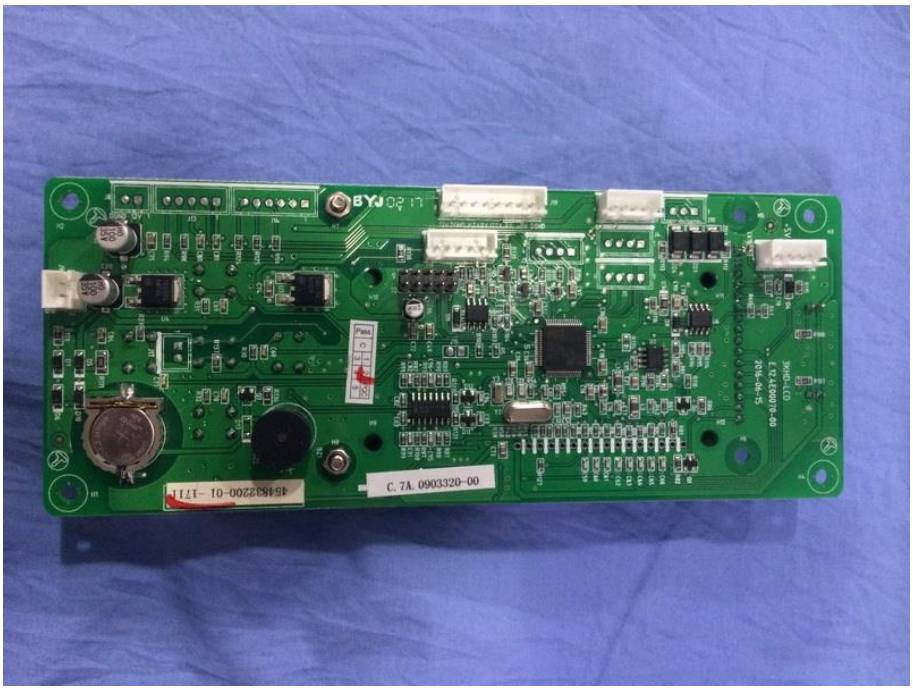
Any safety relevant information or constructional aspect concerning the sample or equipment under test as submitted by the applicant / report holder / certificate holder or any authorized agent is deemed to have no adverse effect on the electromagnetic compatibility (EMC) performance. Insofar as safety or compliance with Low Voltage Directive (LVD) or any relevant directive is concerned, the applicant / report holder / certificate holder or any authorized agent is required, by virtue of the relevant EU Directive provisions, to have satisfied that the product concerned (for which a sample was tested) meets with LVD or other relevant directives before placing it on the market.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

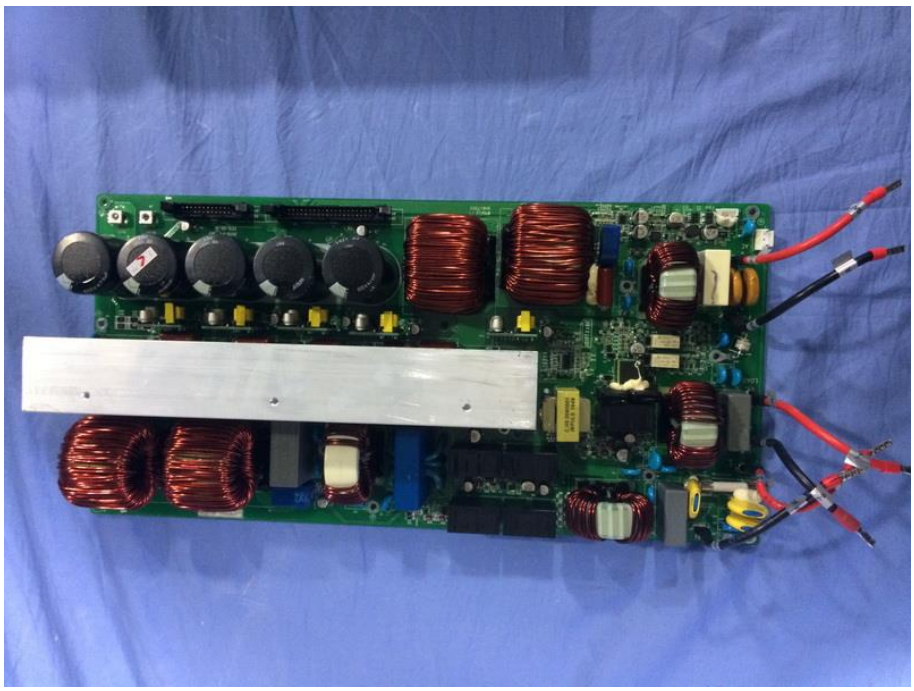
Constructional Photographs

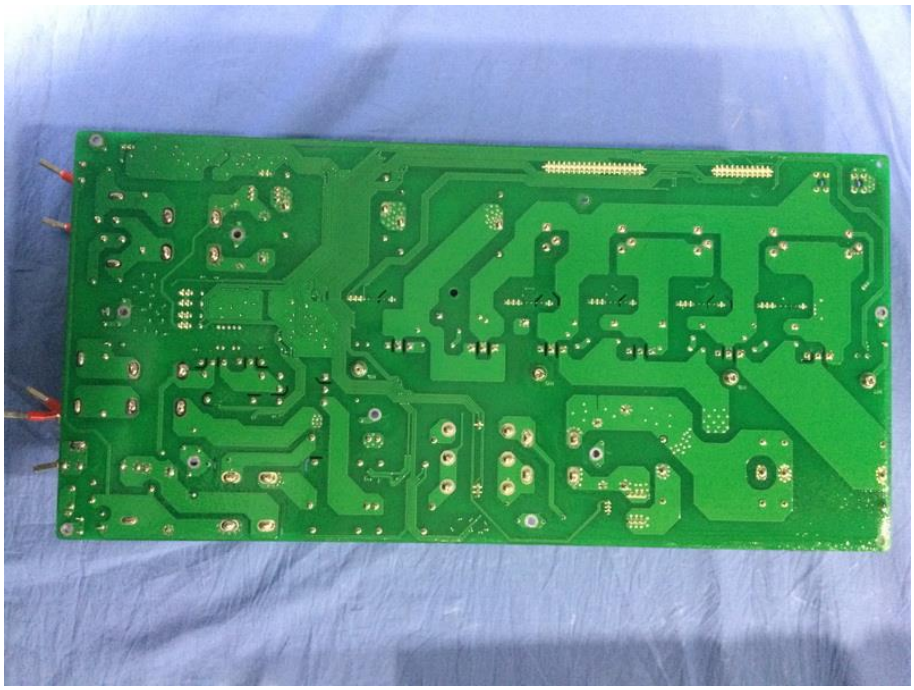


TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

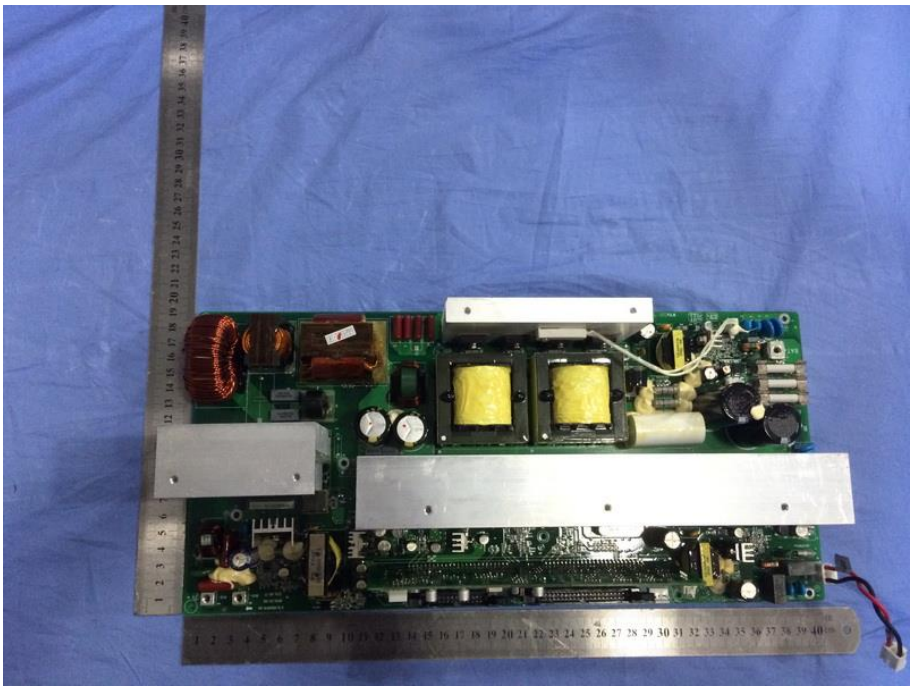


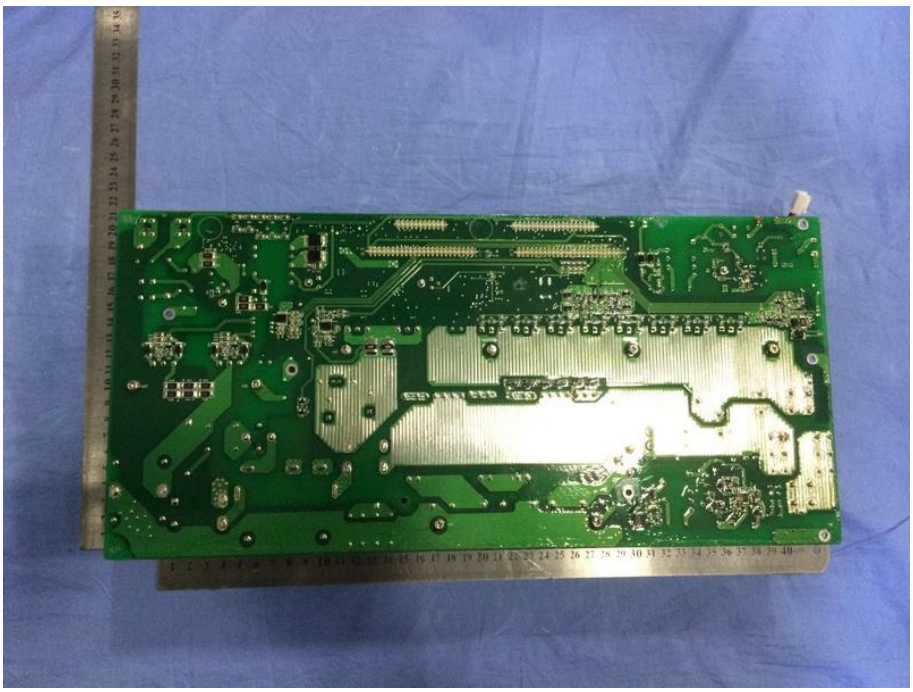
TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478



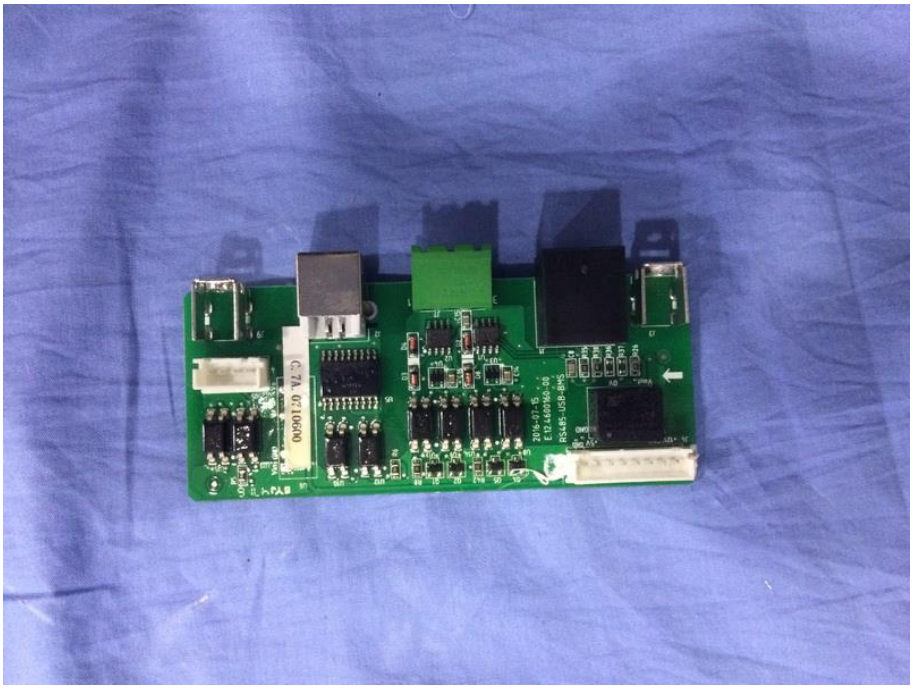


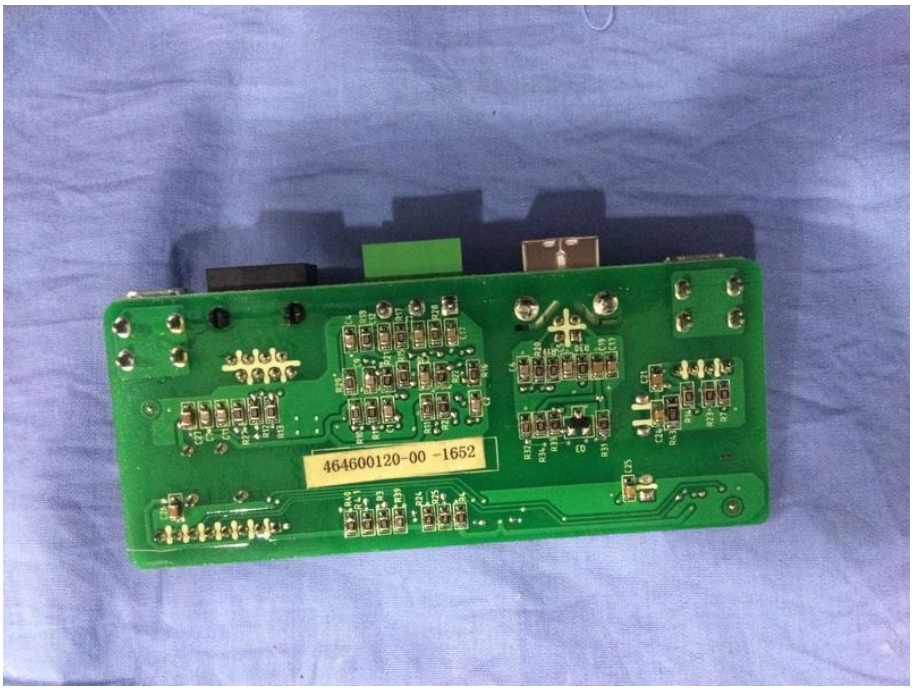
TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478



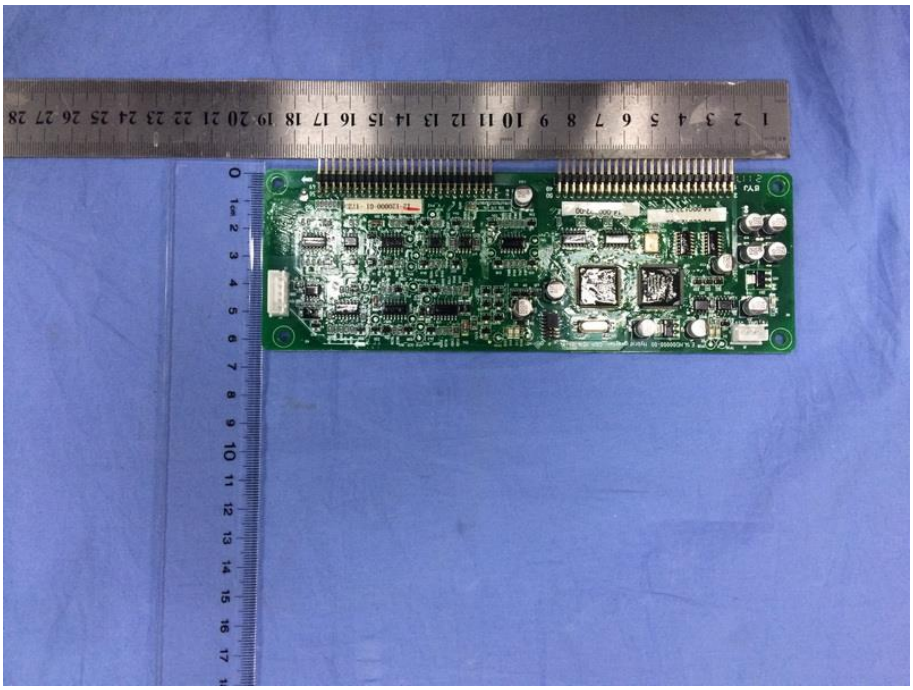


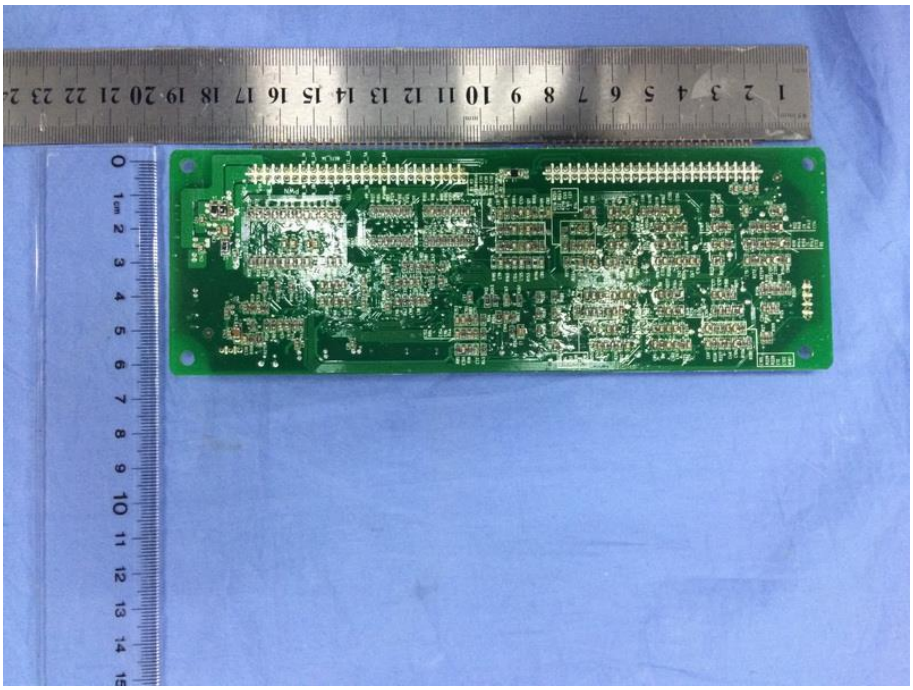
TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478





TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478





TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

China

EMC IMMUNITY - TEST REPORT

Report Number	:	**64.772.17.04711.01-(I)**	Date of Issue:	2017-09-26

Model / Serial No.	:	EA2KHD, EA3KHD, EA3.6KHD
Product Type	:	Hybrid Solar Inverter
Applicant	:	EAST Group Co., Ltd.
Manufacturer	:	EAST Group Co., Ltd.
License holder	:	EAST Group Co., Ltd.
Address	:	No.6 Northern Industry Road, Songshan Lake Sci. & Tech. Industry Park, 523808 DongGuan City, Guangdong Province, PEOPLE'S REPUBLIC OF CHINA
Test Result	:	■ **Positive** ☐ **Negative**
Total pages including Appendices	:	20

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV SÜD CERTIFICATION AND TESTING (CHINA) CO., LTD. GUANGZHOU BRANCH reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance with the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch issued reports.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

China

DIRECTORY - IMMUNITY

Remark: Constructional Data Form and Product Information Form(s) and Constructional Photographs of EUT refer to emission test report.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

IMMUNITY TEST REGULATIONS :

The immunity tests were performed according to the following regulations :

■ - EMC - Directive 2014/30/EU and its amendments

■ - EN 61000-6-2:2017

■ - IEC 61000-4-2:2008
■ - IEC 61000-4-3:2006+A1:2007+A2 :2010
■ - IEC 61000-4-4:2012
■ - IEC 61000-4-5:2014
■ - IEC 61000-4-6:2013
■ - IEC 61000-4-8:2009
■ - IEC 61000-4-11:2004

Note: For undated references, the latest edition of the publication at the time of testing (including amendments) was applied.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Environmental Conditions In The laboratory :

	Actual
Temperature	: 22°C
Relative Humidity	: 45%
Atmospheric Pressure	:1010mBar

Rated of EUT:

Refer to Appendix B of Emission report model:

STATEMENT OF MEASUREMENT UNCERTAINTY

The tolerances for each tests are reduced by the uncertainty reported on the calibration certificate for the measurement, all the parameters are within the tolerances required by the relevant standard, reduced by the uncertainty reported on the calibration certificate, so the laboratory has confidence that all the tests compliant with the relevant standards with a 95% confidence level.
Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Symbol Definitions:

■ - Applicable
☐ - Not Applicable

Test laboratory:

■ - TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch

Add: Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen 518052, P.R. China

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Immunity Test Conditions: ELECTROSTATIC DISCHARGE (ESD)

The immunity against *ELECTROSTATIC DISCHARGE (ESD)* events was performed in the following location:

☐ **- Test not applicable**

☐- Test Area (TÜV SÜD Guangzhou) – Laboratory open area
■ - Test Area (TÜV SÜD Shenzhen) – Laboratory open area

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. due date
☐ -	NSG435	Teseq	ESD tester	6155	2016-11-05
☐ -	---	TÜV SÜD Guangzhou	H/V Coupling Plane	(TÜV SÜD)	
■ -	ESS-2002	Noiseken	Electrostatic Discharge Simulator	ESS0615075	2018-07-31
■ -	---	TÜV SÜD Shenzhen	H/V Coupling Plane	/	/

Remarks: All test equipment used are calibrated on a regular basis.

Test Specification:

Discharge Voltage (Air): ■ - 2 kV ■ - 8 kV ☐ - 6 kV
■ - 4 kV ☐ - 15 kV ☐ - _ kV

Discharge Voltage (Contact): ■ - 2 kV ☐ - 6 kV ☐ - _ kV
■ - 4 kV ☐ - 8 kV

Discharge Impedance: ■ - 330 Ω / 150 pF ☐ - 150 Ω / 150 pF

Discharge Repetition Rate: ■ - ≥ 1 sec.

Number of Discharges: ■ - ≥ 10 at all locations

Kind of Discharges: ■ - Air discharge ■ - Conducted discharge (relay)
■ - Direct ■ - Indirect

Polarity: ■ - Positive ■ - Negative

Location of Discharge:
■ - Each location on the surface touchable by hand
■ - HCP & VCP

Result :

■ - No degradation of function - Met Criterion A
☐ - Distortion of function - Met Criterion B
☐ - Error of function - Met Criterion C
☐ - Loss of function - Unrecoverable Failure

Remarks: _____

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Immunity Test Conditions: RADIATED ELECTROMAGNETIC FIELDS

The immunity against *RADIATED ELECTROMAGNETIC FIELDS* exposure was performed in the following location:

☐ **- Test not applicable**

■ - Test Area (TÜV SÜD Shenzhen) – Anechoic ferrite lined shielded room

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. Due
■ -	BBA100	Rohde & Schwarz	Power Amplifier	101238	2018-07-15
☐ -	BBA150	Rohde & Schwarz	Power Amplifier	101671	2018-07-15
■ -	HL046E	Rohde & Schwarz	Log-Periodic Antenna	100160	2018-07-15
■ -	SMB100A	Rohde & Schwarz	Signal Generator	177600	2018-07-15
■ -	NRP2	Rohde & Schwarz	Power Meter	103497	2018-07-15
■ -	8X4X4	TDK	Full Anechoic Chamber	(TÜV SÜD)	2019-05-29

Remarks: All test equipment used are calibrated on a regular basis.

Test Specification:

Frequency Range/ Field Strength: ■ - 3 V/m (1.4 GHz – 6 GHz)
■ - 3 V/m (80 MHz - 1000 MHz)

Distance Antenna - EUT: ■ - 3 m

Modulation: ■ - AM : 80% 1kHz
☐ - FM : __ kHz dev. __ kHz
■ - sine wave:
☐ - unmodulated
☐ - Pulse ON/OFF Duty Cycle: __ %

Step: ■ - 1%

Polarization of Antenna: ■ - Horizontal ■ - Vertical

Result :

■- No degradation of function - Met Criterion A
☐ - Distortion of function - Met Criterion B
☐ - Error of function - Met Criterion C
☐ - Loss of function - Unrecoverable Failure

Remarks: _____

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Immunity Test Conditions: FAST TRANSIENTS (BURST)

The immunity against *FAST TRANSIENTS (BURST)* events was performed in the following test location:

☐ - Test not applicable

■ - Test Area (TÜV SÜD Shenzhen) – Laboratory open area

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. due date
■ -	UCS 500N7	EMTEST	Immunity simulator	P1313116005	2018-07-15
☐ -	CNI 503B5	EMTEST	7kV Coupling network 3-phase	P1425134991	2018-07-15
■ -	HFK	EMTEST	Capacitive Coupling Clamp	P1426135389	2018-07-24

Remarks: All test equipment used are calibrated on a regular basis.

Test Specification:

Pulse Amplitude - AC Power Port: ☐ - 1,0 kV ■ - 2,0 kV
☐ - 4,0 kV ☐ - ___ kV

Pulse Amplitude - DC Power Port: ☐ - 1,0 kV ■ - 2,0 kV
☐ - 4,0 kV ☐- ___ kV

Pulse Amplitude - Signal Port: ☐ - 1,0 kV ☐ - 2,0 kV
☐ - 4,0 kV ☐- ___ kV

Burst Frequency: ■ - 5,0 kHz

Time of Coupling: ■ - 120 seconds ☐ - ___ seconds

Coupling Method: ☐ - Coupling/decoupling network ■ - Coupling clamp

Polarity: ■ - Positive ■ - Negative

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Location of Coupling:

name of lines:	AC Power Cord		
type of lines:		☐ - shielded	■ - unshielded
status of lines:		☐ - Passive	■ - active
kind of transmission:		■ - analog	☐ - digital
length of lines:			
name of lines:	DC Power Cord		
type of lines:		☐ - shielded	■ - unshielded
status of lines:		☐- Passive	■ - active
kind of transmission:		■- analog	☐ - digital
length of lines:			
name of lines:			
type of lines:		☐ - shielded	☐ - unshielded
status of lines:		☐ - Passive	☐ - active
kind of transmission:		☐ - analog	☐ - digital
length of lines:			

Result :

■ - No degradation of function	- Met Criterion A
☐ - Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks:

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Immunity Test Conditions: SURGE TRANSIENTS

The immunity against *SURGE TRANSIENTS* events was performed in the following test location:

☐ **- Test not applicable**

■ - Test Area (TÜV SÜD Shenzhen) – Laboratory open area

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. due date
☐ -	MODULA6150	Teseq	Immunity test system	34595	2018-11-02
■ -	UCS 500N7	EMTEST	Immunity simulator	P1313116005	2018-07-15
■ -	CNV 504 N1	EMTEST	4kV coupling/decoupling network	P1420124192	2018-07-24

Remarks: All test equipment used are calibrated on a regular basis.

Test Specification:

Pulse Amplitude - AC Power Port:	■ - 1,0 kV	■ - 2,0 kV
	☐ - 4,0 kV	☐ - ___ kV
Source Impedance:	■ - 2 Ω + 18 µF	■ - 12 Ω + 9 µF
	☐ - 42 Ω + 0,1 µF	☐ - 42 Ω + 0,5 µF
Number of Surges:	■ - 5 surges/angle	☐ - ___ surges /angle
Angle:	■ - 0 °	■ - 90 °
	■ - 180 °	■ - 270 °
Repetition Rate:	■ - 60 sec.	☐ - ___ sec.
Polarity:	■ - Positive	■ - Negative

Location of Coupling:

name of lines:	AC Power Cord	
type of lines:	☐ - shielded	■ - unshielded
status of lines:	☐ - passive	■ - active
kind of transmission:	■ - analog	☐ - digital
length of lines:		

Result:

■- No degradation of function	- Met Criterion A
☐- Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks: _____

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Immunity Test Conditions: CONDUCTED DISTURBANCE

The immunity against *CONDUCTED DISTURBANCE* events, induced by radio frequency fields above 9 kHz, was performed in the following test location:

☐ - Test not applicable

■ - Test Area (TÜV SÜD Shenzhen) – Laboratory open area

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. due date
■ -	CWS 500N1	EMTEST	Continuous Wave Simulator	P1420134224	2018-07-15
■ -	ATT6/80	EMTEST	Attenuator	P1402129090	2018-07-15
■ -	CDN-M2/M3	EMTEST	CDN	P1420134163	2018-07-15
☐ -	CDN-M4	EMTEST	CDN	P1346125919	2018-07-24
■ -	EM101	EMTEST	Electromagnetic Injection Clamp	P1411132453	2018-07-24

Remarks: All test equipment used are calibrated on a regular basis.

Test Specification:

Frequency Range:	■ - 0,15 MHz - 80 MHz		☐ - 0,15 MHz - 80 MHz
Voltage Level (EMF):	☐ - 1 V	☐ - 3 V	
	■ - 10 V	☐ - __ V	
Modulation:	■ - AM :	80 %	1 kHz
	☐ - FM :	__ kHz dev.	___ kHz
	■ - sine wave:		
	☐ - unmodulated		
	☐ - Pulse	ON/OFF	Duty Cycle: __ %
Step/Dwell time:	■ -<1%/s		

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Location of Coupling:

name of lines:	AC Power Cord	
type of lines:	☐ - shielded	■ - unshielded
status of lines:	☐ - Passive	■ - active
kind of transmission:	■ - analog	☐ - digital
length of lines:		

name of lines:	Power Cord	
type of lines:	☐ - shielded	■ - unshielded
status of lines:	☐ - Passive	■ - active
kind of transmission:	■ - analog	☐ - digital
length of lines:		

name of lines:		
type of lines:	☐ - shielded	☐ - unshielded
status of lines:	☐ - Passive	☐ - active
kind of transmission:	☐ - analog	☐ - digital
length of lines:		

Result :

■ - No degradation of function	- Met Criterion A
☐ - Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks:

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Immunity Test Conditions: Power FREQUENCY MAGNETIC FIELD

The immunity against *POWER FREQUENCY MAGNETIC FIELD* exposure, induced by radio frequency fields above 9 kHz, was performed in the following test location:

☐ **- Test not applicable**

■ - Open area

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number
■ -	NS61000-8K	SANKI	MAGNETIC Generator	090391E
■ -	------	SANKI	Coil	-----

Remarks: All test equipment used are calibrated on a regular basis.

Test Specification:

Frequency Range:	■ - 50 Hz	■ - 60 Hz	☐ - 400 Hz
Field level (EMF):	■ - 30 A/m		
Short Field (1-3 sec):	☐ - 300 A/m	☐ - 1000 A/m	☐ - ___ A/m
Duration:	■ - 120 seconds		
Axis of Orientation:	■ - X-axis	■ - Y-axis	■ - Z-axis

Result :

■ - No degradation of function	- Met Criterion A
☐ - Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks: _____

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Immunity Test Conditions: VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS

The immunity against *VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS* events, was performed in the following test location:

☐ **- Test not applicable**

■ - Test Area (TÜV SÜD Shenzhen) –Laboratory open area

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. due date
■ -	UCS 500N7	EMTEST	Immunity simulator	P1313116005	2018-07-14
■ -	MV2616	EMTEST	Motorized Variac	P1401128623	2018-07-14
■ -	PFLS 32N1	EMTEST	Switch-Box fo phase by phase	P1251107106	2018-07-14

Remarks: All test equipment used are calibrated on a regular basis.

Test Specification:

Nominal Mains Voltage (V_{NOM}): ■ - 230 Vac ☐ -___ Vac ☐ - ___ Vdc

Level of Reduction (dip):
- ■ - 1 cycles at 0% of V_{NOM}
- ■ - 10 cycles at 40% of V_{NOM} (50Hz)
- ■ - 12cycles at 40% of V_{NOM} (60Hz)
- ■ - 25 cycles at 70% of V_{NOM} (50Hz)
- ■ - 30ycles at 70% of V_{NOM}(60Hz)

Duration of Interruption (>.95*V_{NOM}):
- ■ - 200 cycles at 70% of V_{NOM} (50Hz)
- ■ - 300ycles at 70% of V_{NOM}(60Hz)

Result :

☐ - No degradation of function	- Met Criterion A
■- Distortion of function	- Met Criterion B
☐ - Error of function	- Met Criterion C
☐ - Loss of function	- Unrecoverable Failure

Remarks: EUT will stop working when voltage interruption interference have been applied on it, and recovery to the previous operating condition by itself after interference been removed.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Equipment Under Test (EUT) Test Operation Mode - Immunity Tests:

The equipment under test was operated under the following conditions during immunity testing :

☐ - Standby

☐ - Test Program (H - Pattern)

☐ - Test Program (Color Bar)

☐ - Test Program (Customer Specified)

■ - Normal Operating Mode

☐ - _____

_____

Configuration of the equipment under test:

☐ - See Constructional Data Form in Appendix B - Page B2

☐ - See Product Information Form(s) in Appendix B - Page B2

The following peripheral devices and interface cables were connected during the testing:

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

■ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables TÜVPS. No.: _____

☐ - customer specific cables

☐ - _____

☐ - _____

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

China

GENERAL REMARKS:

All models are identical in critical components, except for the software, which will not influence the immunity performance. Tests have been applied on EA3.6KHD only.

SUMMARY:

All tests according to the regulations cited on page 3 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 3.

☐ - **Does not** fulfill the general approval requirements cited on page 3.

Testing Start Date:	2017-08-29
Testing End Date:	2017-08-30

- TÜV SÜD CERTIFICATION AND TESTING (CHINA) CO., LTD. GUANGZHOU BRANCH -

Reviewed by: Technical Certifier

Tony Liu

Prepared by:

Samuel Zhang

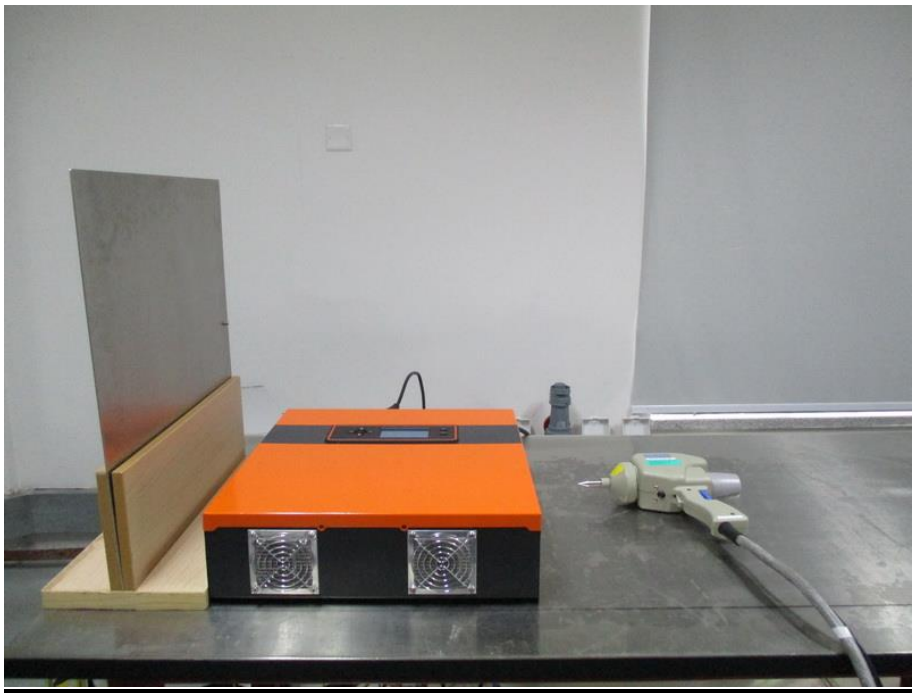
TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

Appendix A

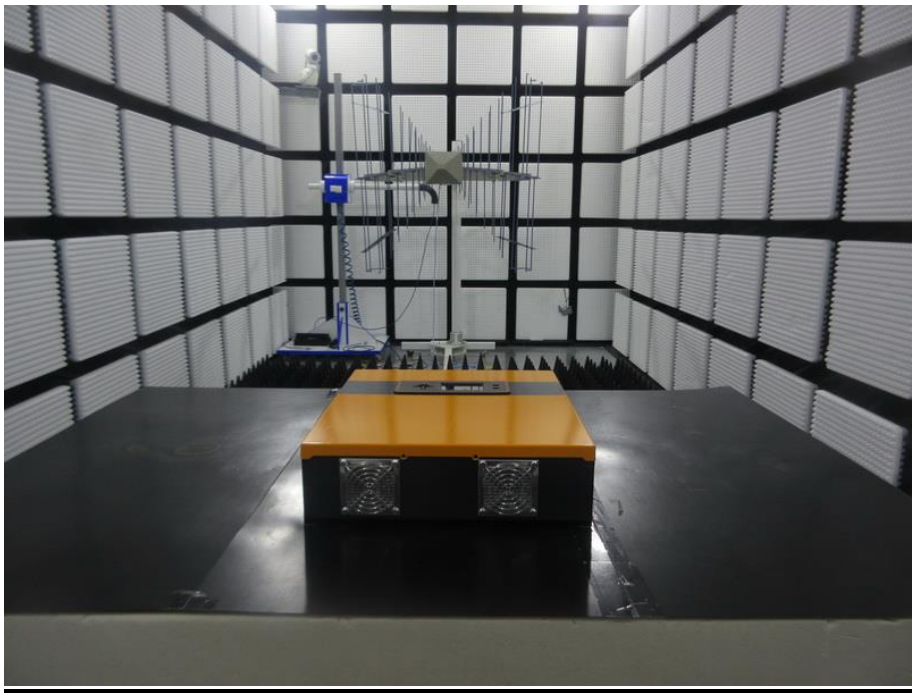
Test Setup photos,

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

☒ **Test Setup: Electrostatic Discharge (ESD)**

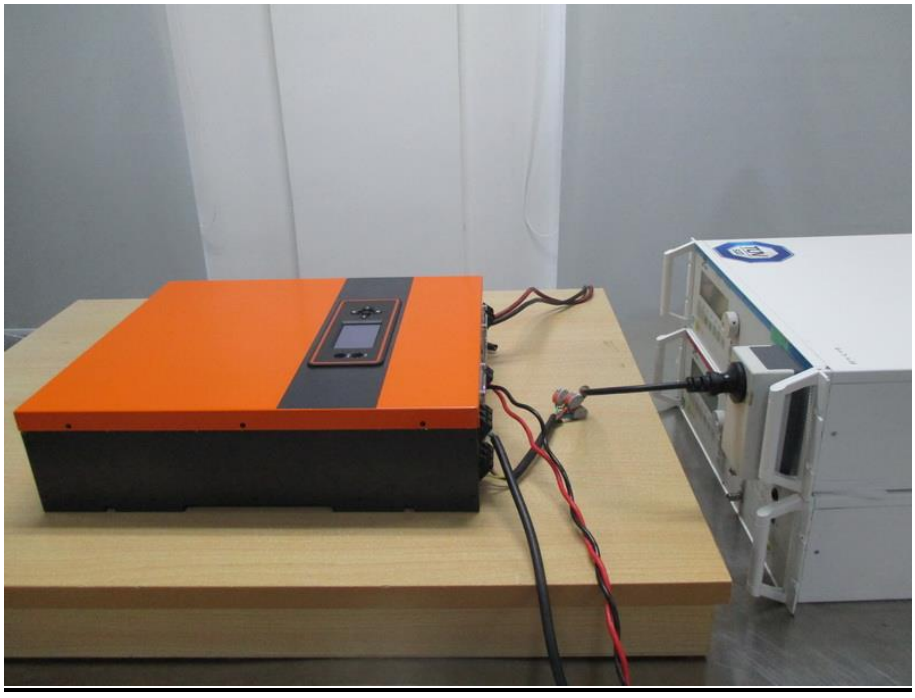


☒**Test-setup: Radiated Immunity**



TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

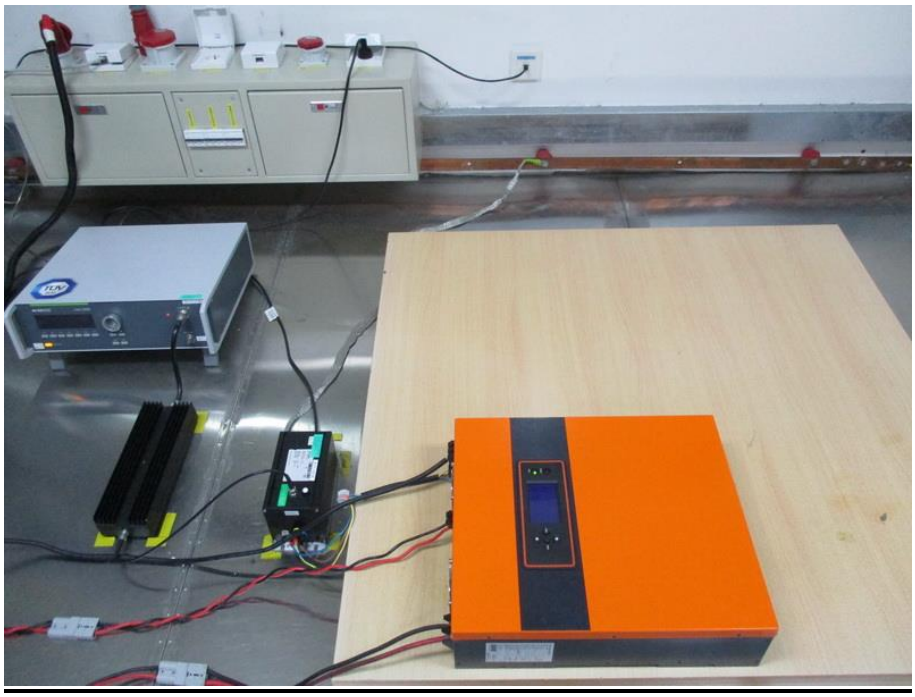
☒ **Test-setup: <u>Fast Transients (Burst) Surges tests</u>**



TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

☒ **Test-setup: PMF**

☒ **Test-setup: <u>Conducted Immunity</u>**



TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

☒ **Test-setup: <u>Voltage dips</u>**

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
5F, Communication Building, 163 Pingyun Rd. Guangzhou 510656 P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478