

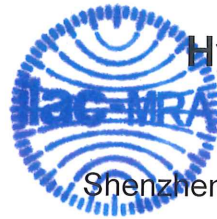
EMC

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd



FOR



Hybrid Inverter

ISSUED TO

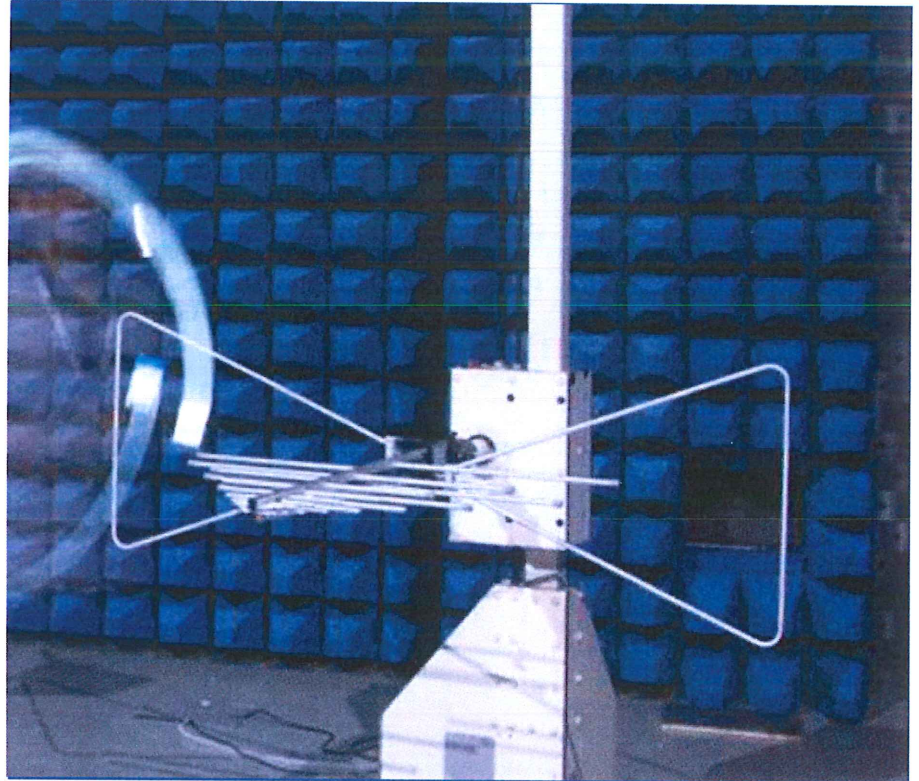
Shenzhen SOFAR SOLAR Co., Ltd



中国认可
国际互认
检测

TESTING
CNAS L6791

401, Building 4, AnTongDa Industrial Park, District 68,
XingDong Community, XinAn Street, BaoAn District, Shenzhen,
China.



Tested by: Chen Yongqing
Chen Yongqing
(Engineer)

Date Jul. 09, 2020

Approved by: Qi Hao
Qi Hao
(Technical Director)

Date Jul. 09, 2020

Report No.: BL-DG2060517-401

EUT Name: Hybrid Inverter

Model Name: HYD 20KTL-3PH

Brand Name:



Test Standard: NRS 097-2-1:2017 (Contents 4.1.13)

Test conclusion: Pass

Test Date: Jun. 17, 2020 ~ Jun. 21, 2020

Date of Issue: Jul. 09, 2020

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Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Jul. 09, 2020</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1 GENERAL INFORMATION.....	4
1.1 Identification of the Testing Laboratory.....	4
1.2 Identification of the Responsible Testing Location.....	4
1.3 Laboratory Condition.....	4
1.4 Announce.....	4
2 PRODUCT INFORMATION.....	5
2.1 Applicant Information.....	5
2.2 Manufacturer Information.....	5
2.3 Factory Information.....	5
2.4 General Description for Equipment under Test (EUT).....	5
2.5 Ancillary Equipment.....	9
2.6 Technical Information.....	9
3 SUMMARY OF TEST RESULTS.....	10
3.1 Test Standards.....	10
3.2 Verdict.....	11
3.3 Test Uncertainty.....	12
4 GENERAL TEST CONFIGURATIONS.....	13
4.1 Test Environments.....	13
4.2 Test Equipment List.....	13
4.3 Test Enclosure list.....	14
4.4 Test Configurations.....	14
4.5 Description of Test Setup.....	15
4.6 Test Conditions.....	17
5 TEST ITEMS.....	18
5.1 Emission Tests.....	18
ANNEX A TEST RESULTS.....	21
A.1 Radiated Emission.....	21

A.2 Conducted Emission..... 23

ANNEX B TEST SETUP PHOTOS..... 31

 B.1 Radiated Emission..... 31

 B.2 Conducted Emission..... 32

ANNEX C EUT EXTERNAL PHOTOS..... 33

ANNEX D EUT INTERNAL PHOTOS..... 35

1 GENERAL INFORMATION

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd
Address	Room 104, 204, 205, Building 1, No. 6, Industrial South Road, Songshan Lake District, Dongguan, Guangdong Province, P. R. China 523808
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd
Address	Room 104, 204, 205, Building 1, No. 6, Industrial South Road, Songshan Lake District, Dongguan, Guangdong Province, P. R. China 523808
Accreditation Certificate	The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Room 104, 204, 205, Building 1, No. 6, Industrial South Road, Songshan Lake District, Dongguan, Guangdong Province, P. R. China 523808

1.3 Laboratory Condition

Ambient Temperature	20°C to 25°C
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v1.1.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Shenzhen SOFAR SOLAR Co., Ltd.
Address	401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China.

2.2 Manufacturer Information

Manufacturer	Shenzhen SOFAR SOLAR Co., Ltd.
Address	401, Building 4, AnTongDa Industrial Park, District 68, XingDong Community, XinAn Street, BaoAn District, Shenzhen, China.

2.3 Factory Information

Factory	Dongguan SOFAR SOLAR Co., Ltd.
Address	1F - 6F, Building E, No. 1 JinQi Road, Bihu Industrial Park, Wulian Village, Fenggang Town, Dongguan City.

2.4 General Description for Equipment under Test (EUT)

EUT Name	Hybrid Inverter
Mode Name Under Test	HYD 20KTL-3PH
Series Model Name	HYD 5KTL-3PH, HYD 6KTL-3PH, HYD 8KTL-3PH, HYD 10KTL-3PH, HYD 15KTL-3PH, HYD 20KTL-3PH
Description of Model name differentiation	The models of HYD 5KTL-3PH, HYD 6KTL-3PH, HYD 8KTL-3PH, HYD 10KTL-3PH, HYD 15KTL-3PH and HYD 20KTL-3PH are identical on topological schematic circuit diagram and control solution codes. The difference between each other as parameters table and labels.
Hardware Version	N/A
Software Version	N/A

Parameters table:

Model Parameter	HYD 20KTL-3PH	HYD 15KTL-3PH	HYD 10KTL-3PH	HYD 8KTL-3PH	HYD 6KTL-3PH	HYD 5KTL-3PH
Recommended Max.PV Power	30000Wp (15000Wp/1 5000Wp)	22500Wp (11250Wp/112 50Wp)	15000Wp (7500Wp/75 00Wp)	12000Wp (6600Wp/66 00Wp)	9000Wp (6600Wp/6600 Wp)	7500Wp (6000Wp/60 00Wp)
Full power MPPT voltage range	450V~850V	350V~850V	220V~850V	360V~850V	320V~850V	250V~850V
No. of battery input	2			1		
Battery Voltage Range for Full Load	400V~800V	300V~800V	200V~800V	320V~800V	240V~800V	200V~800V
Nominal charging/discharg ing power	20000W	15000W	10000W	8000W	6000W	5000W
Nominal AC Power	20000W	15000W	10000W	8000W	6000W	5000W
Max. AC Power Output to Utility Grid	22000VA	16500VA	11000VA	8800VA	6600VA	5500VA
Max. AC Power from Utility Grid	40000VA	30000VA	20000VA	16000VA	12000VA	10000VA
Max. AC Current Output to Utility Grid	32A	24A	16A	13A	10A	8A
Max. AC Current from Utility Grid	58A	44A	29A	24A	17A	15A
Max. output power	22000VA	16500VA	11000VA	8800VA	6600VA	5500VA
Inverter inductance	0.876 mH		1.12 mH		1.5mH	
Boost inductor	0.915 mH			1.8 mH		
Cooling method	External fan			No external fan		
Total Weight	37 kg			33 kg		

Labels:

SOFAR SOLAR
Hybrid Inverter

Model No: HYD 5KTL-3PH

Max.DC Voltage	1000V
MPPT Voltage Range	180~960V
Max. Input Current	12.5/12.5A
Max.PV Isc	15/15A
Battery Type	Li-Ion
Battery Voltage Range	180~800V
Battery Max. Charging Current	25A
Battery Max. Discharging Current	25A
Nominal Grid/Back-up Voltage	3/N/PE, 380/400V
Nominal Grid/Back-up Frequency	50/60Hz
Max. Current Output to Grid	8A
Max. Power Output to Grid	5500VA
Max. Current from Grid	15A
Max. Power from Grid	10000VA
Back-up Max. Output Current	8A
Back-up Max. Output Power	5500VA
Power Factor	1(adjustable+/-0.8)
Operating Temperature Range	-30~+60°C
Ingress Protection	IP65
Protective Class	Class I
Inverter Topology	Non-isolated
Flicker Impedance	Z=0.4+j0.25Ω
Overvoltage Category	AC III,DC II

Manufacturer : Shenzhen SOFAR SOLAR Co.,Ltd.
Address : 401, Building 4, AnTongDa Industrial Park,
District 68, XingDong Community,XinAn Street,
BaoAn District, Shenzhen, China
SAA VDE0126-1-1,VDE-AR-N4105
G98,G99,EN50438,AS4777,UTE C15-712-1

SOFAR SOLAR
Hybrid Inverter

Model No: HYD 6KTL-3PH

Max.DC Voltage	1000V
MPPT Voltage Range	180~960V
Max. Input Current	12.5/12.5A
Max.PV Isc	15/15A
Battery Type	Li-Ion
Battery Voltage Range	180~800V
Battery Max. Charging Current	25A
Battery Max. Discharging Current	25A
Nominal Grid/Back-up Voltage	3/N/PE, 380/400V
Nominal Grid/Back-up Frequency	50/60Hz
Max. Current Output to Grid	10A
Max. Power Output to Grid	6600VA
Max. Current from Grid	17A
Max. Power from Grid	12000VA
Back-up Max. Output Current	10A
Back-up Max. Output Power	6600VA
Power Factor	1(adjustable+/-0.8)
Operating Temperature Range	-30~+60°C
Ingress Protection	IP65
Protective Class	Class I
Inverter Topology	Non-isolated
Flicker Impedance	Z=0.4+j0.25Ω
Overvoltage Category	AC III,DC II

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SOFAR SOLAR
Hybrid Inverter

Model No: HYD 8KTL-3PH

Max.DC Voltage	1000V
MPPT Voltage Range	180~960V
Max. Input Current	12.5/12.5A
Max.PV Isc	15/15A
Battery Type	Li-Ion
Battery Voltage Range	180~800V
Battery Max. Charging Current	25A
Battery Max. Discharging Current	25A
Nominal Grid/Back-up Voltage	3/N/PE, 380/400V
Nominal Grid/Back-up Frequency	50/60Hz
Max. Current Output to Grid	13A
Max. Power Output to Grid	8800VA
Max. Current from Grid	24A
Max. Power from Grid	16000VA
Back-up Max. Output Current	13A
Back-up Max. Output Power	8800VA
Power Factor	1(adjustable+/-0.8)
Operating Temperature Range	-30~+60°C
Ingress Protection	IP65
Protective Class	Class I
Inverter Topology	Non-isolated
Flicker Impedance	Z=0.4+j0.25Ω
Overvoltage Category	AC III,DC II

Manufacturer : Shenzhen SOFAR SOLAR Co.,Ltd.
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SAA VDE0126-1-1,VDE-AR-N4105
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SOFAR SOLAR
Hybrid Inverter

Model No: HYD 10KTL-3PH

Max.DC Voltage	1000V
MPPT Voltage Range	180~960V
Max. Input Current	25/25A
Max.PV Isc	30/30A
Battery Type	Li-Ion
Battery Voltage Range	180~800V
Battery Max. Charging Current	25/25A
Battery Max. Discharging Current	25/25A
Nominal Grid/Back-up Voltage	3/N/PE, 380/400V
Nominal Grid/Back-up Frequency	50/60Hz
Max. Current Output to Grid	16A
Max. Power Output to Grid	11000VA
Max. Current from Grid	29A
Max. Power from Grid	20000VA
Back-up Max. Output Current	16A
Back-up Max. Output Power	11000VA
Power Factor	1(adjustable+/-0.8)
Operating Temperature Range	-30~+60°C
Ingress Protection	IP65
Protective Class	Class I
Inverter Topology	Non-isolated
Flicker Impedance	Z=0.4+j0.25Ω
Overvoltage Category	AC III,DC II

Manufacturer : Shenzhen SOFAR SOLAR Co.,Ltd.
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G98,G99,EN50438,AS4777,UTE C15-712-1



Hybrid Inverter

Model No: HYD 15KTL-3PH

Max.DC Voltage	1000V
MPPT Voltage Range	180~960V
Max. Input Current	25/25A
Max.PV Isc	30/30A
Battery Type	Li-Ion
Battery Voltage Range	180~800V
Battery Max. Charging Current	25/25A
Battery Max. Discharging Current	25/25A
Nominal Grid/Back-up Voltage	3/N/PE, 380/400V
Nominal Grid/Back-up Frequency	50/60Hz
Max. Current Output to Grid	24A
Max. Power Output to Grid	16500VA
Max. Current from Grid	44A
Max. Power from Grid	30000VA
Back-up Max. Output Current	24A
Back-up Max. Output Power	16500VA
Power Factor	1 (adjustable +/- 0.8)
Operating Temperature Range	-30~+60°C
Ingress Protection	IP65
Protective Class	Class I
Inverter Topology	Non-isolated
Flicker Impedance	Z=0.4+j0.25Ω
Overvoltage Category	AC III, DC II

Manufacturer : Shenzhen SOFAR SOLAR Co.,Ltd.
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 G98,G99,EN50438,AS4777,UTE C15-712-1



Hybrid Inverter

Model No: HYD 20KTL-3PH

Max.DC Voltage	1000V
MPPT Voltage Range	180~960V
Max. Input Current	25/25A
Max.PV Isc	30/30A
Battery Type	Li-Ion
Battery Voltage Range	180~800V
Battery Max. Charging Current	25/25A
Battery Max. Discharging Current	25/25A
Nominal Grid/Back-up Voltage	3/N/PE, 380/400V
Nominal Grid/Back-up Frequency	50/60Hz
Max. Current Output to Grid	32A
Max. Power Output to Grid	22000VA
Max. Current from Grid	58A
Max. Power from Grid	40000VA
Back-up Max. Output Current	32A
Back-up Max. Output Power	22000VA
Power Factor	1 (adjustable +/- 0.8)
Operating Temperature Range	-30~+60°C
Ingress Protection	IP65
Protective Class	Class I
Inverter Topology	Non-isolated
Flicker Impedance	Z=0.4+j0.25Ω
Overvoltage Category	AC III, DC II

Manufacturer : Shenzhen SOFAR SOLAR Co.,Ltd.
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 G98,G99,EN50438,AS4777,UTE C15-712-1



2.5 Ancillary Equipment

Note: not applicable.

2.6 Technical Information

Interfaces present on the EUT	AC Ports	From mains to AC port.
	DC Ports	From power supply to EUT. From battery to EUT.
	Telecom Port	No Telecom Ports.
	Signal Ports	RS485, which cable length does not exceed 3m.
About the Product	The equipment is Hybrid Inverter, the above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.	

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

The objective of the report is to perform testing according to following standards:

Identity	Document Title
NRS 097-2-1:2017	Grid interconnection of embedded generation Part 2: Small-Scale embedded generation Section 1: Utility interface

3.2 Verdict

No.	Base Standard	Description	Test Verdict	Result	Remark	
Emission						
1	NRS 097-2-1	Radiated Emission	Below 1 GHz	P	Annex A.1	
			Above 1 GHz	N		Note 1
2	NRS 097-2-1	Conducted Emission	AC Ports	P	Annex A.2	
			DC Ports	N		Note 2
			Telecom Ports	N		Note 3

Note 1: The highest internal frequency of the EUT is less than 108MHz, the measurement shall only be made up to 1GHz.

Note 2: There is no need for Conducted Emission DC Ports test to be performed on this product with the cable shorter than 30m. The DC port cable length of EUT is less than 2m.

Note 3: Telecommunications/network port is a point of connection for voice, data and signaling transfers intended to interconnect widely dispersed systems via such means as direct connection to multi-user telecommunications networks, local area networks and similar networks. A port generally intended for interconnection of components of an ITE system under test and used in accordance with its functional specifications, is not considered to be a telecommunication port. The EUT does not have telecommunication port according to above definition.

This report judges the test conclusions:

- Not applicable for this test product N
- Meet requirements P
- Does not meet the requirements F

3.3 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT 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 $k=2$.

Measurement	Value
Conducted emissions (mains port)	3.77 dB
Conducted emissions (Telecom port)	4.54 dB
Radiated emissions (30 MHz-1 GHz)	4.81 dB
Radiated emissions (1 GHz-18 GHz)	5.41 dB

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

Environment Parameter	Selected Values During Tests			
	Temperature	Voltage	Relative Humidity	Ambient Pressure
Normal Temperature, Normal Voltage (NTNV)	23°C ~ 25°C	AC 400V DC 180V~960V	50% ~ 55%	100kPa ~ 102kPa

4.2 Test Equipment List

Radiated Emission Test For Frequency Below 1 GHz					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Receiver	Keysight	N9038A	MY55330115	2020.03.16	2021.03.15
Test Antenna- Bi-Log	SCHWARZBECK	VULB 9163	9163-1202	2018.12.20	2021.12.19
Anechoic Chamber	YIHENG ELECTRONIC	12.0m*7.0m* 7.5m	N/A	2019.03.05	2022.03.04

Conducted Emission					
Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EMI Receiver	Keysight	N9038A	MY55330115	2020.03.16	2021.03.15
LISN	SCHWARZBECK	NNLK 8129	8129-462	2019.10.29	2020.10.28
Anechoic Chamber	YIHENG ELECTRONIC	12.0m*7.0m* 7.5m	N/A	2019.03.05	2022.03.04

4.3 Test Enclosure list

Name	Manufacturer	Model	Serial No.	Length	Description
DC Source 1	WKDY	WLPA-150KW	W20180626011	N/A	N/A
DC Source 2	DC Source	Chorma	62150H-1000S	6215EF01558	N/A

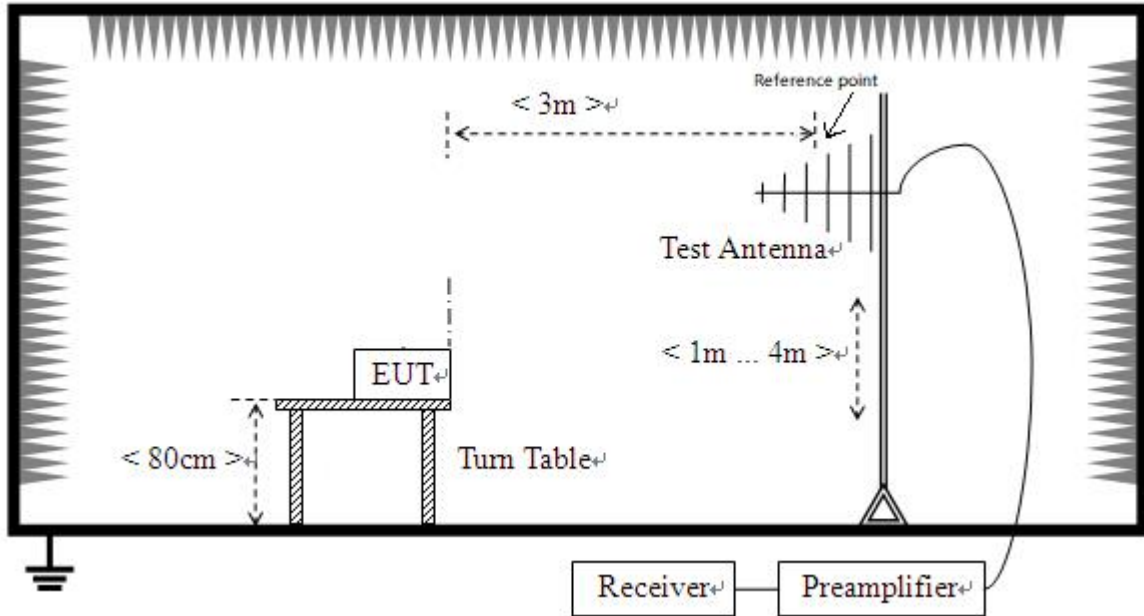
4.4 Test Configurations

Test Configurations (TC) No.	Description
TC01	<u>The Grid-connected Test mode (Full Load)</u> <u>EUT+ DC Source 1+AC Grid+ DC Source 2</u>
TC02	<u>The Standby Test mode</u> <u>EUT+ DC Source 1+AC Grid+ DC Source 2</u>

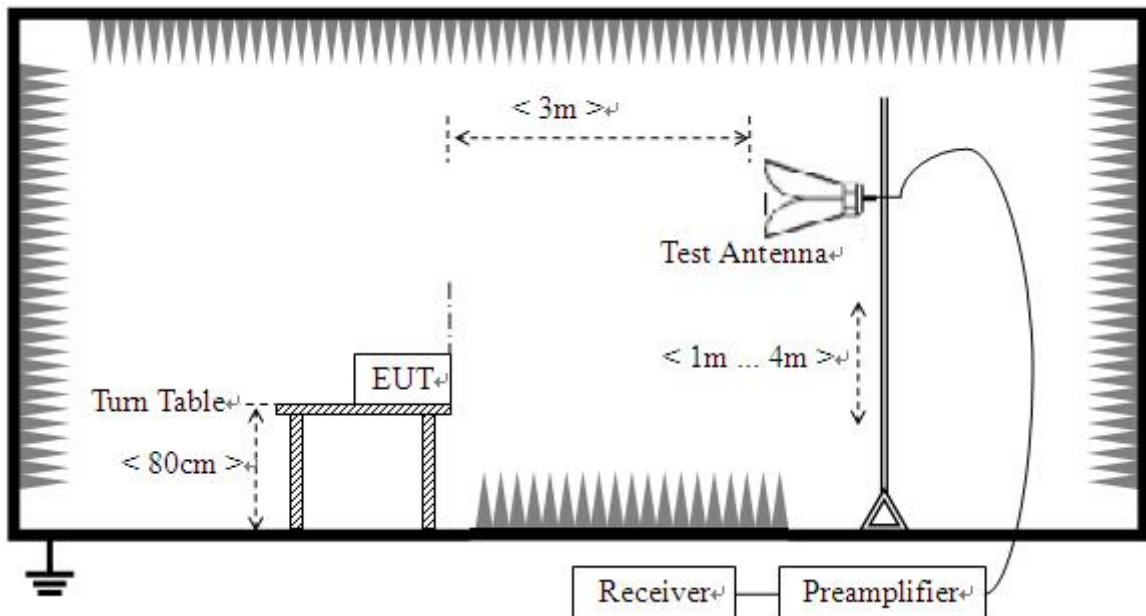
4.5 Description of Test Setup

Test Setup 1

For Radiated Emission Test (30 MHz-1 GHz)

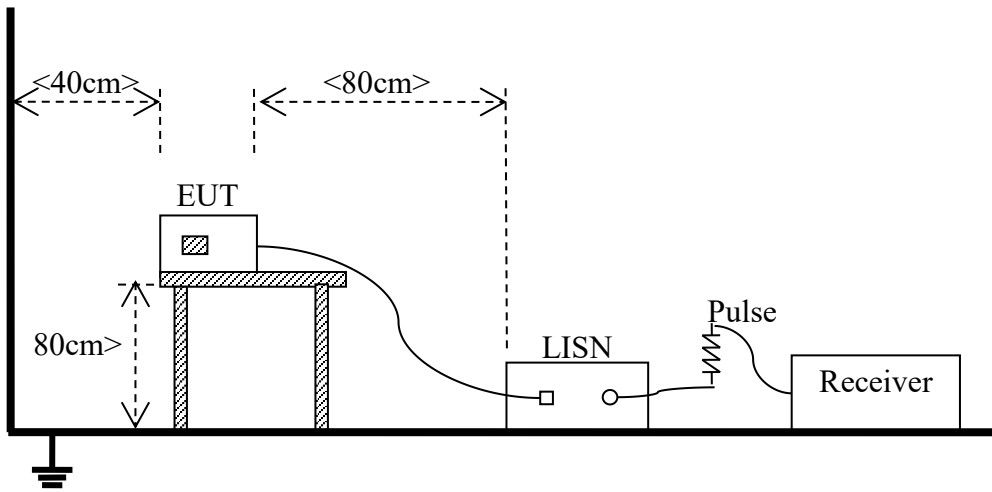


For Radiated Emission Test (above 1 GHz)

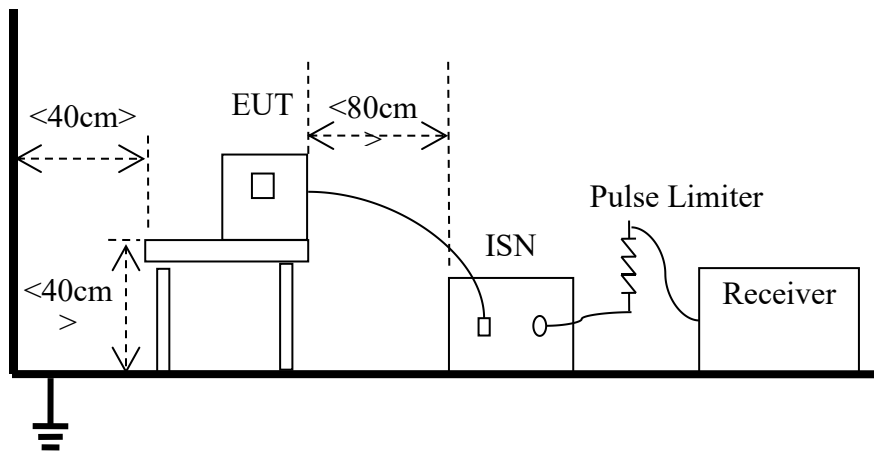


Test Setup 2

For Conducted disturbance voltage at mains terminals Test



For Conducted disturbance for asymmetric mode Test



4.6 Test Conditions

Test Case	Test Conditions	
Radiated Emission	Test Env.	NTNV
	Test Setup	Test Setup 1
	Test Configuration	TC01, TC02
Conducted Emission	Test Env.	NTNV
	Test Setup	Test Setup 2
	Test Configuration	TC01, TC02

Note: Based on client request, all normal using modes of the normal function were tested but only the worst test data of the worst mode is reported by this report. The Grid-connected Test mode (Full Load) is the worst test mode in this report.

5 TEST ITEMS

5.1 Emission Tests

5.1.1 Radiated Emission

5.1.1.1 Limit

Frequency range (MHz)	Distance (at 3 m)	Distance (at 10 m)
	Quasi-Peak Limit (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)
30 - 230	40	30
230 - 1000	47	37

Frequency range (MHz)	Distance (at 3 m)	
	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)
1000-3000	70	50
3000-6000	74	54

NOTE:

- 1) For apparatus containing devices operating at frequencies less than 9kHz measurements only need to be performed up to 230MHz.
- 2) If the highest internal frequency of the EUT is less than 108MHz, the measurement shall only be made up to 1GHz; If the highest internal frequency of the EUT is between 108MHz and 500MHz, the measurement shall only be made up to 2GHz; If the highest internal frequency of the EUT is between 500MHz and 1GHz, the measurement shall only be made up to 5GHz; If the highest internal frequency of the EUT is above 1GHz, the measurement shall be made up to 6GHz; Where the highest internal frequency is not known, tests shall be performed up to 6GHz.
- 3) At transitional frequencies the lower limit applies.

5.1.1.2 Test Procedure

All Radiated Emission tests were performed in the azimuth plane. And test data and plots are recorded in this test report.

An initial pre-scan was performed in the chamber using the EMI Receiver in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bi-Log antenna with 2 orthogonal polarities.

5.1.2 Conducted Emission

5.1.2.1 Test Limit

AC Port

Frequency range (MHz)	Peak (dBuV)	Quasi-peak (dBuV)
0.003 - 0.009	128	--
0.009 - 0.095	--	128 to 114
0.0950-0.1485	--	116

Frequency range (MHz)	Class B	
	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) The limit decreases linearly with the logarithm for the frequency in the range 0.009-0.095MHz and 0.15 - 0.50 MHz.
- 3) It is tested under the low voltage which is for the distribution of AC electric power, the upper limit is generally accepted to be 1000 V.

DC Port

Frequency range (MHz)	Class B	
	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.50	79	66
0.50 - 30	73	60

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) Applicable only to ports intended for connection to a local DC power network or a local battery by a connecting cable exceeding a length of 30 m.

Telecom Port

Frequency (MHz)	Class B	
	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.50	84-74	74-64
0.50 - 30	74	64

NOTE:

- 1) The lower limit shall apply at the band edges.
- 2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.
- 3) The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to telecommunication port under test.

5.1.2.2 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50 Ω /50 μ H of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Telecommunication port was checked to find out the maximum conducted emission.

ANNEX A TEST RESULTS

A.1 Radiated Emission

Note 1: The symbol of "--" in the table which means not application.

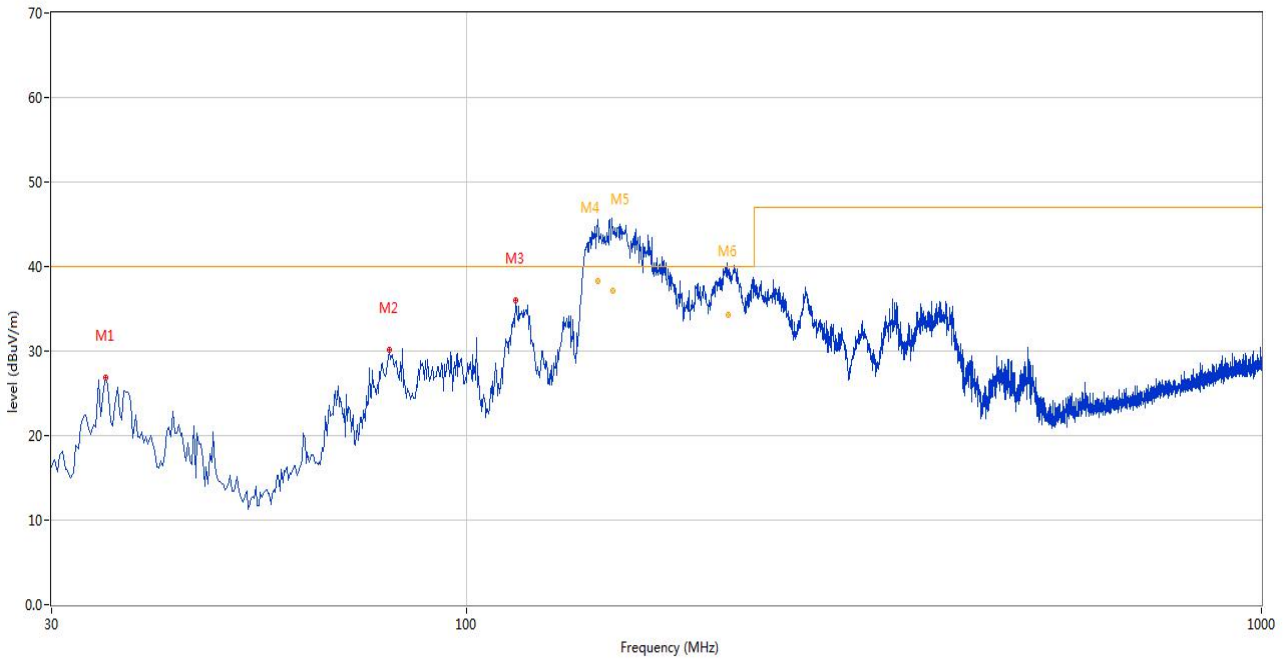
Note 2: Measurements shall be made with a quasi-peak measuring receiver in the frequency range 30 MHz to 1000 MHz. To reduce the testing time, a peak measuring receiver may be used instead of a quasi-peak measuring receiver. In case of dispute, measurement with a quasi-peak measuring receiver will take precedence.

Test Data and Plots

The worst test mode: The Grid-connected Test mode (Full Load)

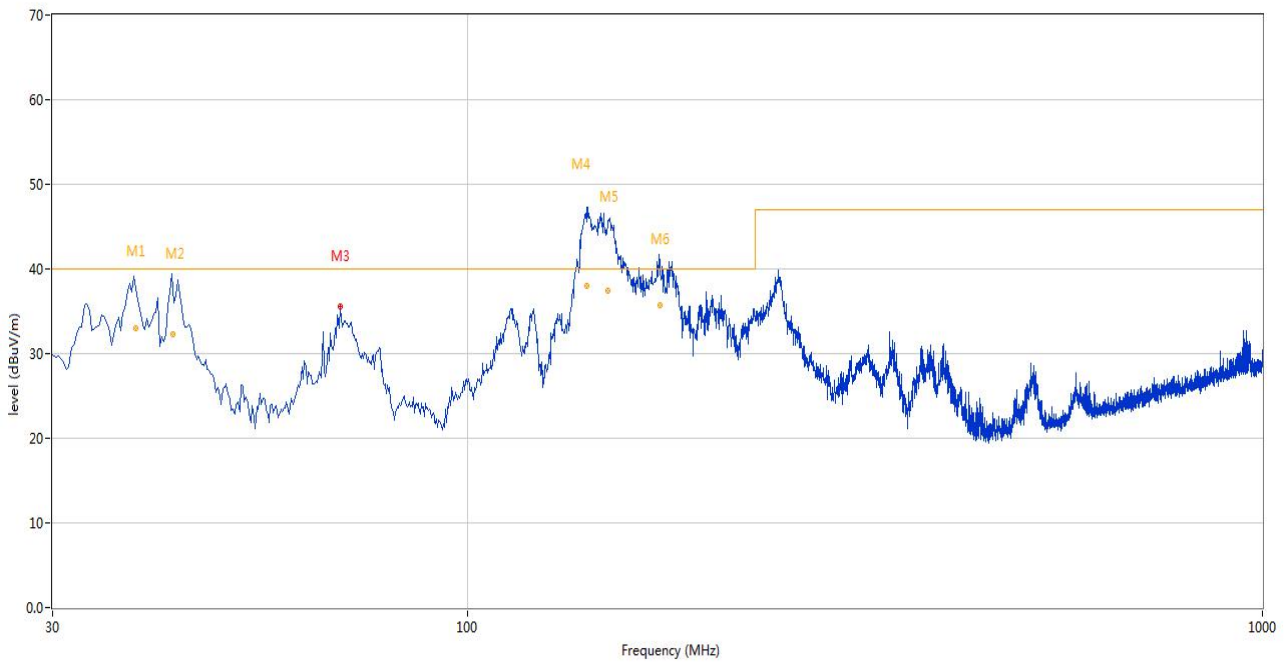
30 MHz – 1 GHz

Test Antenna Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	35.093	26.81	-24.41	40.0	-13.19	Peak	360.00	100	Horizontal	P
2	79.955	30.16	-27.17	40.0	-9.84	Peak	265.00	200	Horizontal	P
3	115.118	36.00	-23.98	40.0	-4.00	Peak	146.00	200	Horizontal	P
4	146.130	44.65	-26.62	40.0	4.65	Peak	127.00	254	Horizontal	N
4*	146.130	38.30	-26.62	40.0	-1.70	QP	127.00	254	Horizontal	P
5	152.444	45.57	-26.33	40.0	5.57	Peak	127.00	321	Horizontal	N
5*	152.444	37.20	-26.33	40.0	-2.80	QP	127.00	321	Horizontal	P
6	212.893	40.12	-22.94	40.0	0.12	Peak	360.00	260	Horizontal	N
6*	212.893	34.34	-22.94	40.0	-5.66	QP	360.00	260	Horizontal	P

Test Antenna Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	38.181	38.55	-23.17	40.0	-1.45	Peak	2.00	102	Vertical	N
1*	38.181	33.00	-23.17	40.0	-7.00	QP	2.00	102	Vertical	P
2	42.501	38.01	-21.88	40.0	-1.99	Peak	0.00	108	Vertical	N
2*	42.501	32.29	-21.88	40.0	-7.71	QP	0.00	108	Vertical	P
3	69.043	35.59	-24.97	40.0	-4.41	Peak	354.00	200	Vertical	P
4	141.272	47.41	-26.64	40.0	7.41	Peak	50.00	100	Vertical	N
4*	141.272	37.99	-26.64	40.0	-2.01	QP	50.00	100	Vertical	P
5	150.932	46.82	-26.39	40.0	6.82	Peak	233.00	109	Vertical	N
5*	150.932	36.60	-26.39	40.0	-3.40	QP	233.00	109	Vertical	P
6	174.270	41.56	-25.13	40.0	1.56	Peak	234.00	109	Vertical	N
6*	174.270	35.73	-25.13	40.0	-4.27	QP	234.00	109	Vertical	P

A.2 Conducted Emission

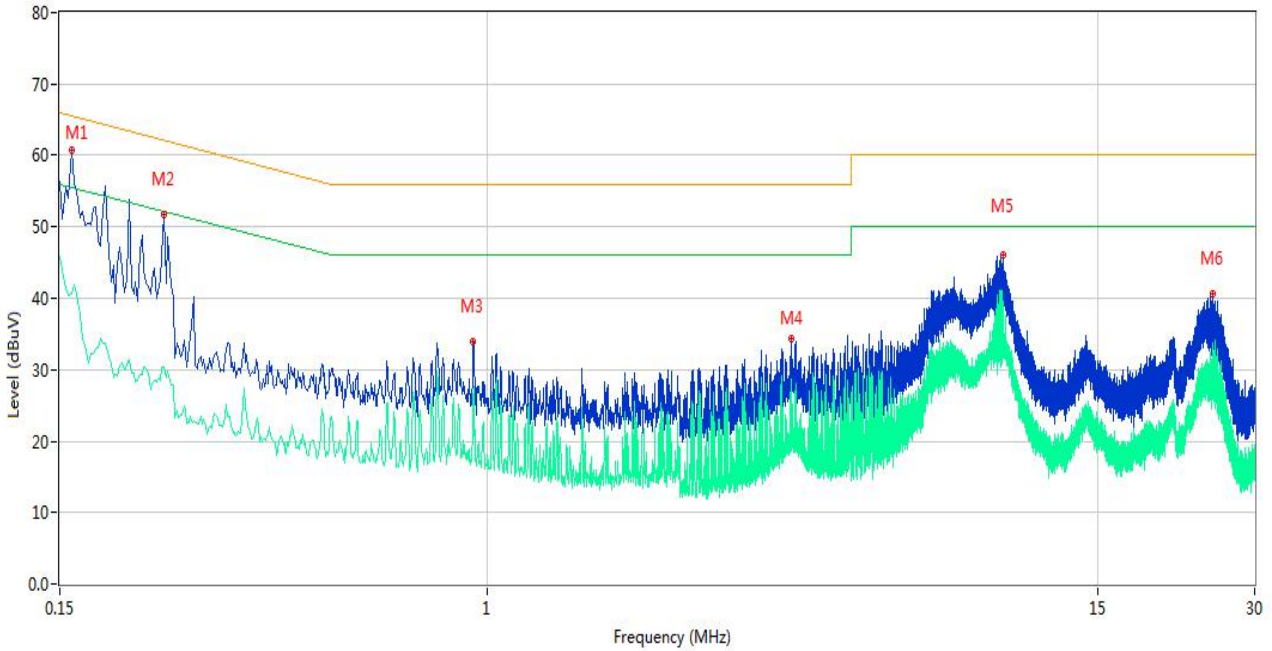
AC Port

Test Data and Plots

The worst test mode: The Grid-connected Test mode (Full Load)

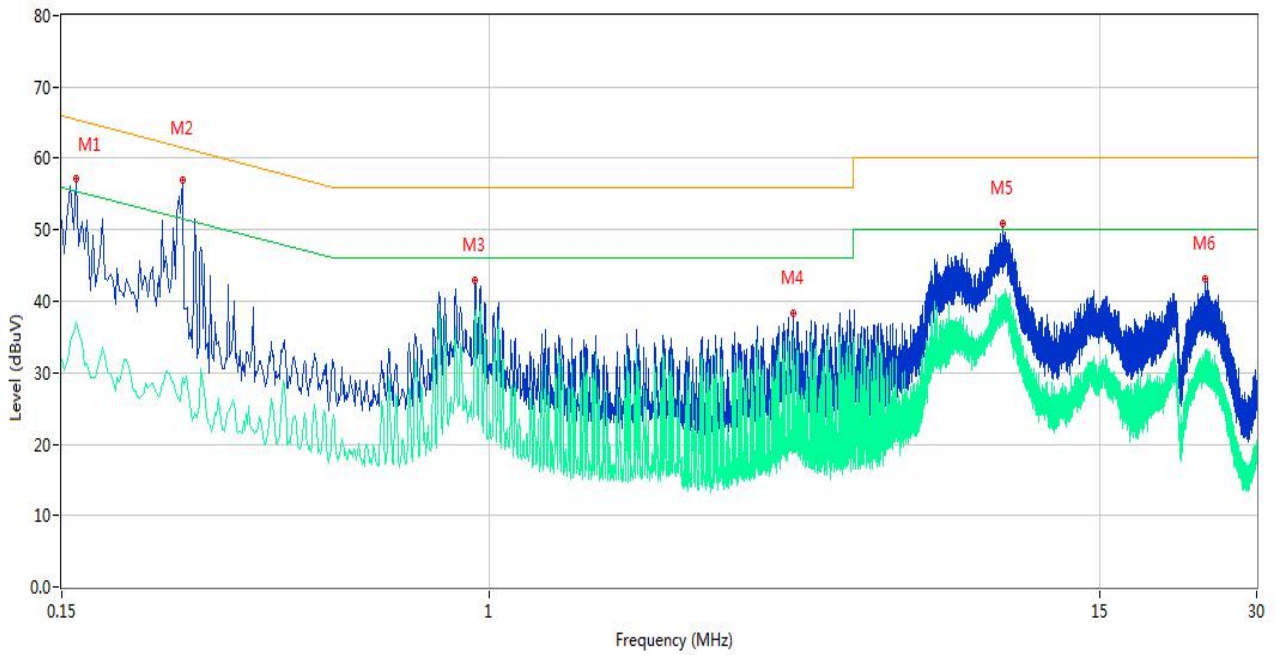
0.15MHz - 30MHz

L3 Phase



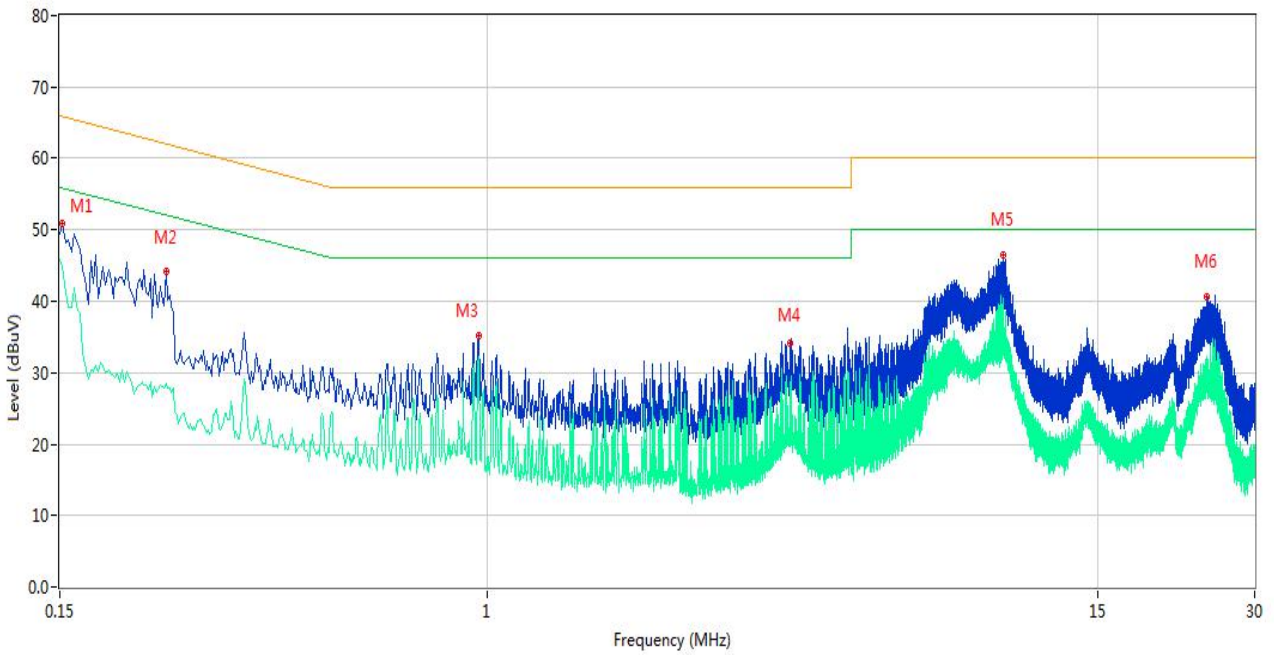
No.	Frequency(MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit(dB)	Detector	Line	Verdict
1	0.158	60.65	10.02	65.57	-4.92	Peak	L3	P
1**	0.158	40.70	10.02	55.57	-14.87	AV	L3	P
2	0.238	51.81	10.02	62.17	-10.36	Peak	L3	P
2**	0.238	30.44	10.02	52.17	-21.73	AV	L3	P
3	0.938	33.87	10.03	56.00	-22.13	Peak	L3	P
3**	0.938	25.62	10.03	46.00	-20.38	AV	L3	P
4	3.840	34.42	10.05	56.00	-21.58	Peak	L3	P
4**	3.840	28.68	10.05	46.00	-17.32	AV	L3	P
5	9.860	46.11	9.91	60.00	-13.89	Peak	L3	P
5**	9.860	39.52	9.91	50.00	-10.48	AV	L3	P
6	24.880	40.56	9.87	60.00	-19.44	Peak	L3	P
6**	24.880	33.76	9.87	50.00	-16.24	AV	L3	P

L2 Phase



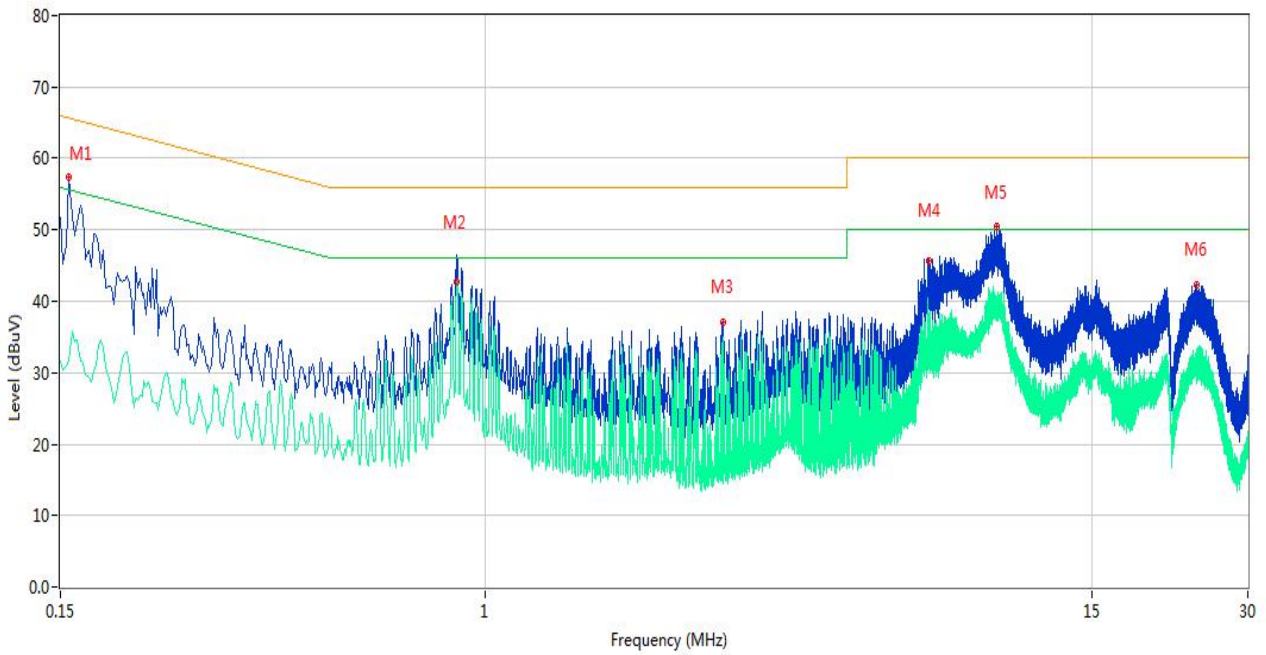
No.	Frequency(MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.160	57.16	9.98	65.46	-8.30	Peak	L2	P
1**	0.160	37.17	9.98	55.46	-18.29	AV	L2	P
2	0.256	56.87	10.04	61.56	-4.69	Peak	L2	P
2**	0.256	29.26	10.04	51.56	-22.30	AV	L2	P
3	0.938	42.86	10.03	56.00	-13.14	Peak	L2	P
3**	0.938	37.22	10.03	46.00	-8.78	AV	L2	P
4	3.838	38.31	10.04	56.00	-17.69	Peak	L2	P
4**	3.838	33.77	10.04	46.00	-12.23	AV	L2	P
5	9.720	50.84	9.93	60.00	-9.16	Peak	L2	P
5**	9.720	40.80	9.93	50.00	-9.20	AV	L2	P
6	23.920	43.23	9.87	60.00	-16.77	Peak	L2	P
6**	23.920	32.65	9.87	50.00	-17.35	AV	L2	P

L1 Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.152	50.98	10.00	65.89	-14.91	Peak	L1	P
1**	0.152	44.84	10.00	55.89	-11.05	AV	L1	P
2	0.240	44.11	10.01	62.10	-17.99	Peak	L1	P
2**	0.240	28.42	10.01	52.10	-23.68	AV	L1	P
3	0.960	35.14	10.04	56.00	-20.86	Peak	L1	P
3**	0.960	32.31	10.04	46.00	-13.69	AV	L1	P
4	3.822	34.09	10.11	56.00	-21.91	Peak	L1	P
4**	3.822	27.90	10.11	46.00	-18.10	AV	L1	P
5	9.840	46.57	9.91	60.00	-13.43	Peak	L1	P
5**	9.840	40.44	9.91	50.00	-9.56	AV	L1	P
6	24.300	40.53	9.88	60.00	-19.47	Peak	L1	P
6**	24.300	30.12	9.88	50.00	-19.88	AV	L1	P

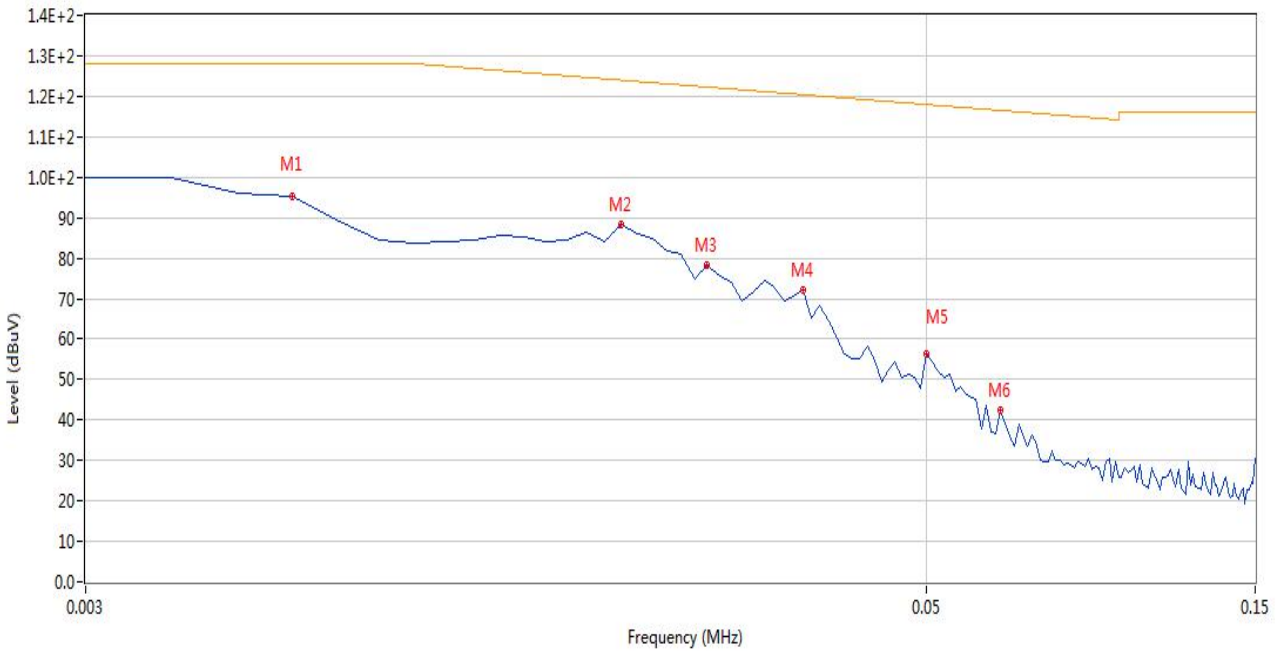
N Phase



No.	Frequency (MHz)	Results(dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.156	57.40	10.07	65.67	-8.27	Peak	N	P
1**	0.156	31.68	10.07	55.67	-23.99	AV	N	P
2	0.878	45.89	10.00	56.00	-10.11	Peak	N	P
2**	0.878	42.71	10.00	46.00	-3.29	AV	N	P
3	2.880	37.16	10.07	56.00	-18.84	Peak	N	P
3**	2.880	35.05	10.07	46.00	-10.95	AV	N	P
4	7.232	45.70	9.94	60.00	-14.30	Peak	N	P
4**	7.232	38.30	9.94	50.00	-11.70	AV	N	P
5	9.762	50.39	9.91	60.00	-9.61	Peak	N	P
5**	9.762	40.43	9.91	50.00	-9.57	AV	N	P
6	23.920	42.39	9.87	60.00	-17.61	Peak	N	P
6**	23.920	30.78	9.87	50.00	-19.22	AV	N	P

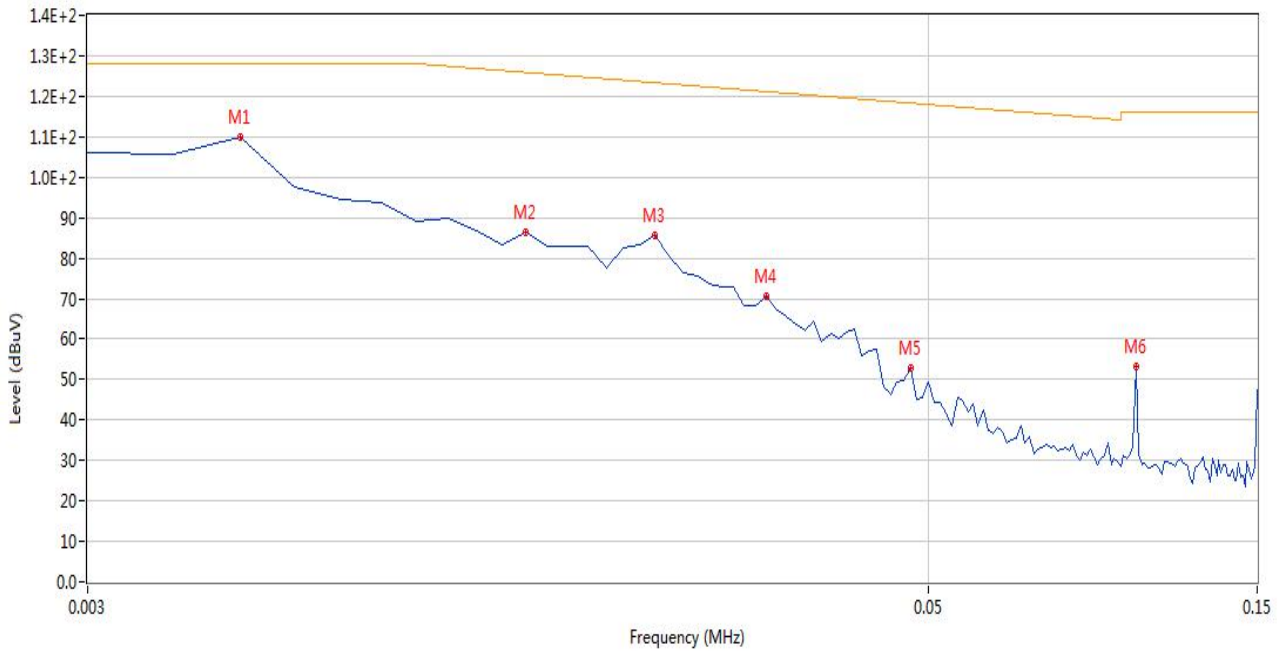
3 kHz - 148.5 kHz

N Phase



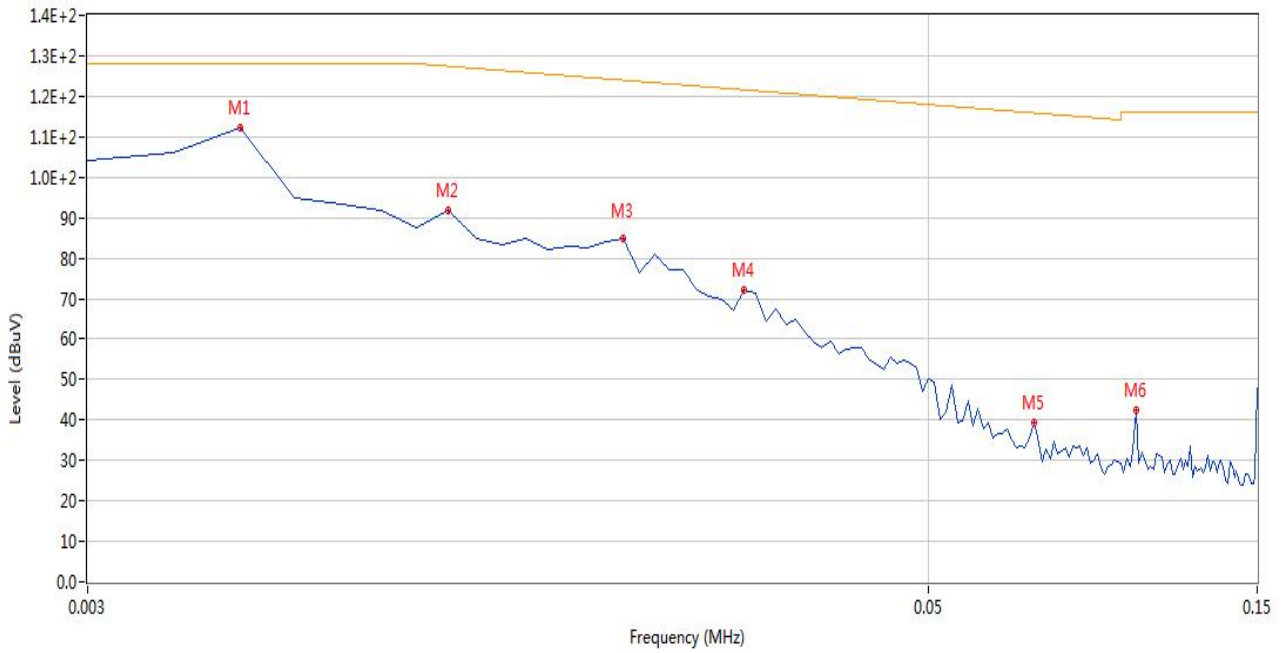
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Polarity	Verdict
1	0.006	95.16	10.03	128.00	-32.84	Peak	N	P
2	0.018	88.23	10.01	123.88	-35.65	Peak	N	P
3	0.024	78.42	10.06	122.17	-43.75	Peak	N	P
4	0.033	72.30	10.00	120.28	-47.98	Peak	N	P
5	0.050	56.31	9.97	117.81	-61.50	Peak	N	P
6	0.064	42.36	10.12	116.35	-73.99	Peak	N	P

L1 Phase



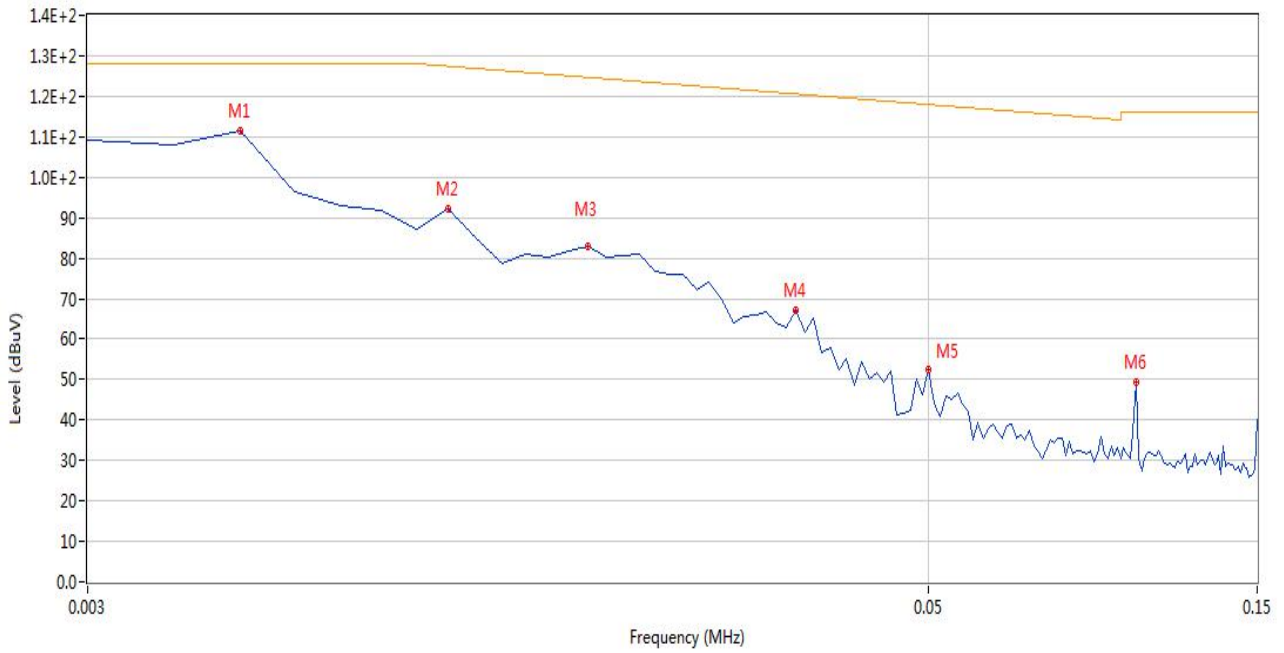
No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB)	Limit (dBUV/m)	Over Limit (dB)	Detector	Polarity	Verdict
1	0.005	109.90	10.03	128.00	-18.10	Peak	L1	P
2	0.013	86.21	10.02	125.82	-39.61	Peak	L1	P
3	0.020	85.54	10.02	123.26	-37.72	Peak	L1	P
4	0.029	70.43	10.03	121.05	-50.62	Peak	L1	P
5	0.047	52.69	9.96	118.18	-65.49	Peak	L1	P
6	0.100	53.10	10.03	116.00	-62.90	Peak	L1	P

L2 Phase



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Polarity	Verdict
1	0.005	112.28	10.03	128.00	-15.72	Peak	L2	P
2	0.010	91.76	10.03	127.37	-35.61	Peak	L2	P
3	0.018	84.74	10.01	123.88	-39.14	Peak	L2	P
4	0.027	72.14	10.04	121.47	-49.33	Peak	L2	P
5	0.071	39.28	9.99	115.73	-76.45	Peak	L2	P
6	0.100	42.32	10.03	116.00	-73.68	Peak	L2	P

L3 Phase

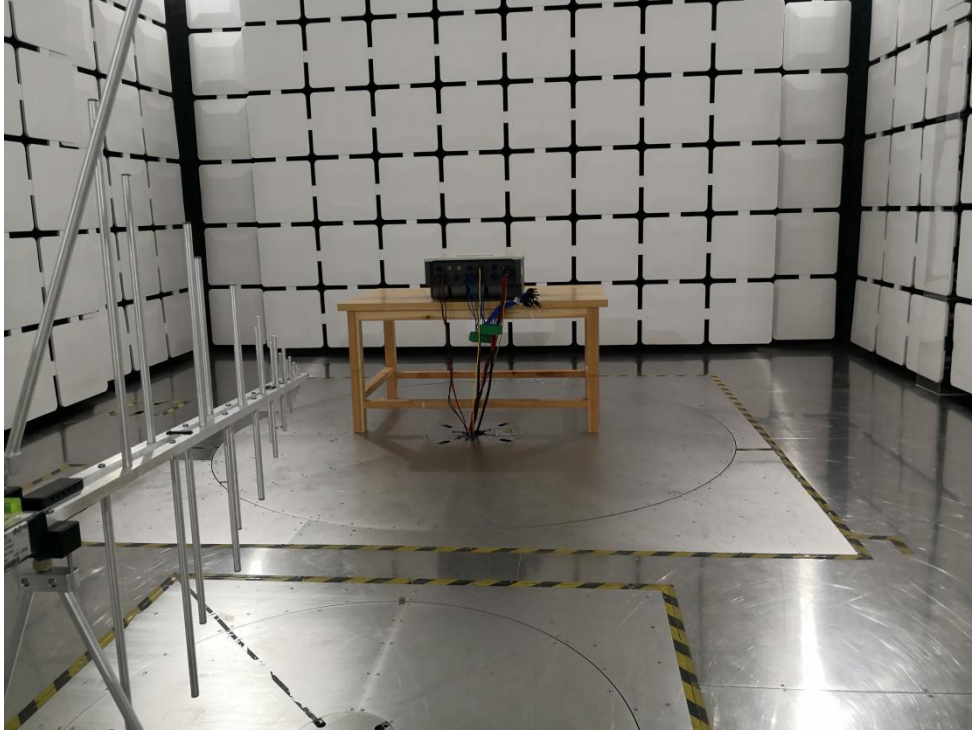


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Polarity	Verdict
1	0.005	111.53	10.03	128.00	-16.47	Peak	L3	P
2	0.010	92.32	10.03	127.37	-35.05	Peak	L3	P
3	0.016	82.99	10.00	124.58	-41.59	Peak	L3	P
4	0.032	66.92	10.01	120.46	-53.54	Peak	L3	P
5	0.050	52.43	9.97	117.81	-65.38	Peak	L3	P
6	0.100	49.20	10.03	116.00	-66.80	Peak	L3	P

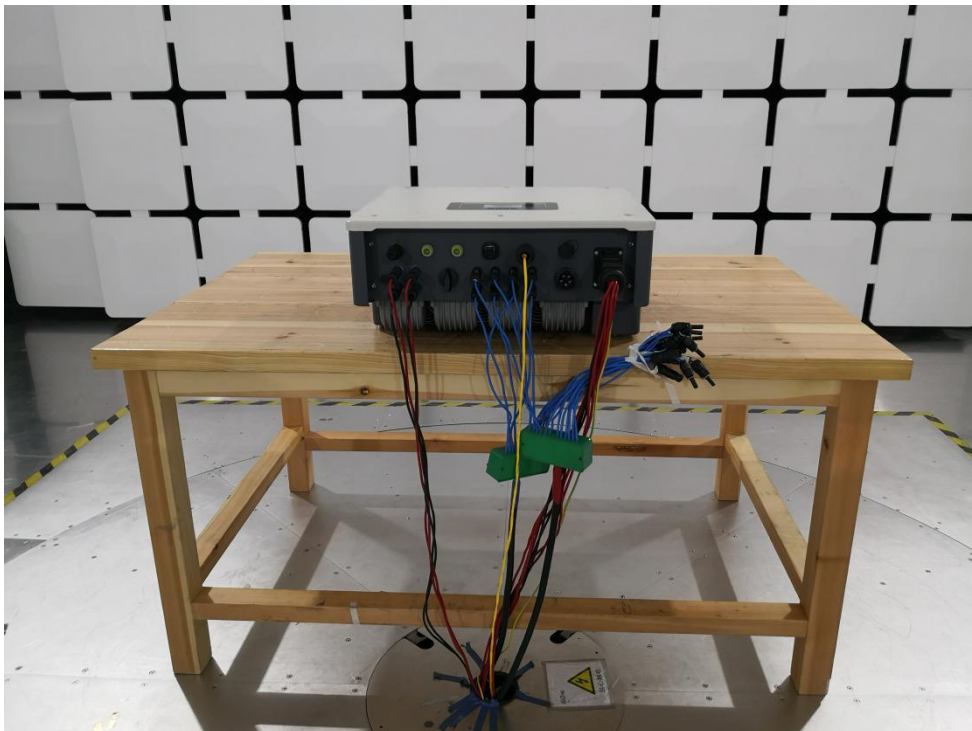
ANNEX B TEST SETUP PHOTOS

B.1 Radiated Emission

30MHz~1000MHz

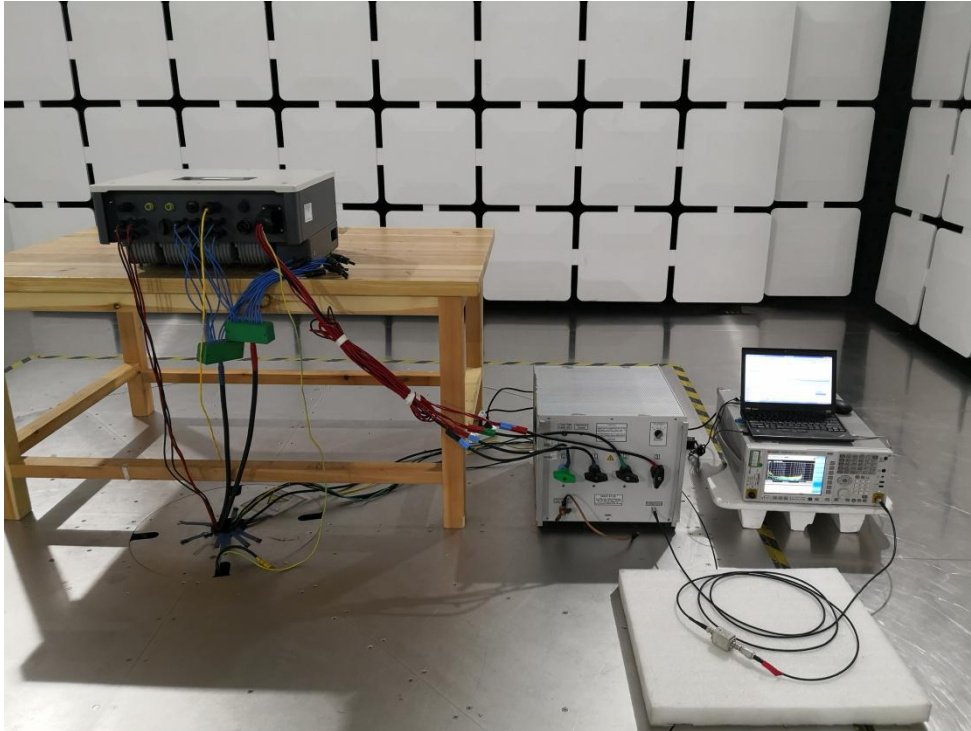


Close-up photo



B.2 Conducted Emission

AC Port



ANNEX C EUT EXTERNAL PHOTOS

Front



Back



Input and output interface

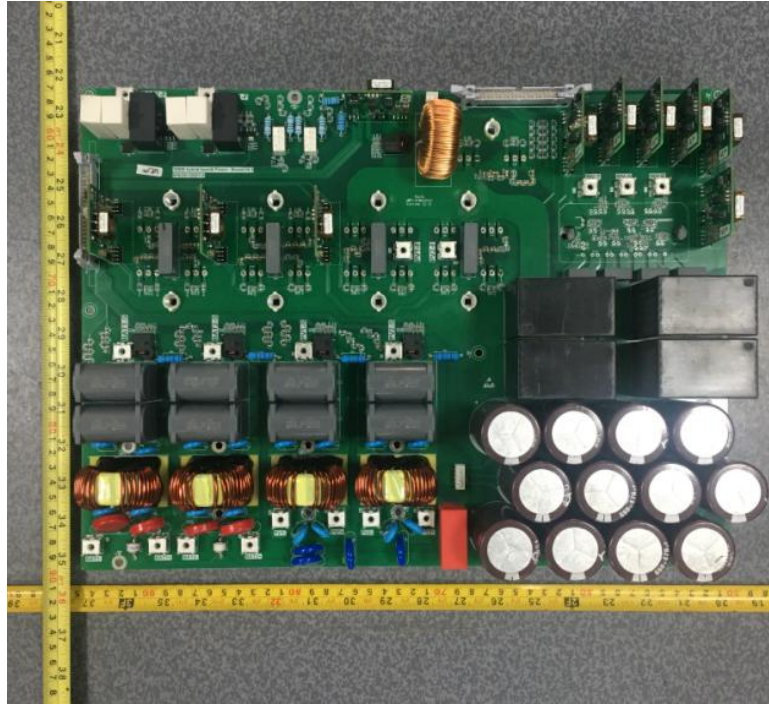


Overall height of the machine

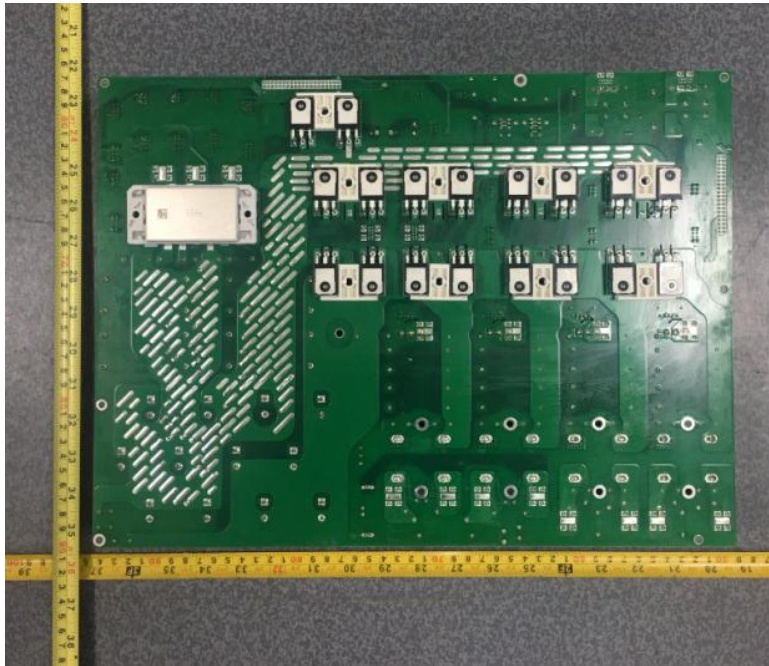


ANNEX D EUT INTERNAL PHOTOS

Power board front



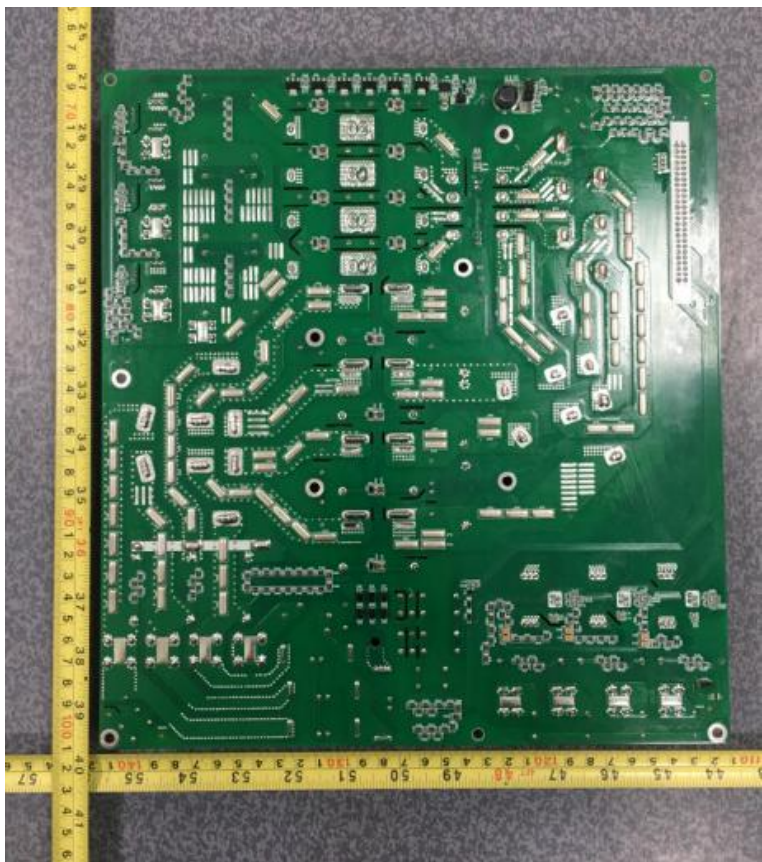
Power board back



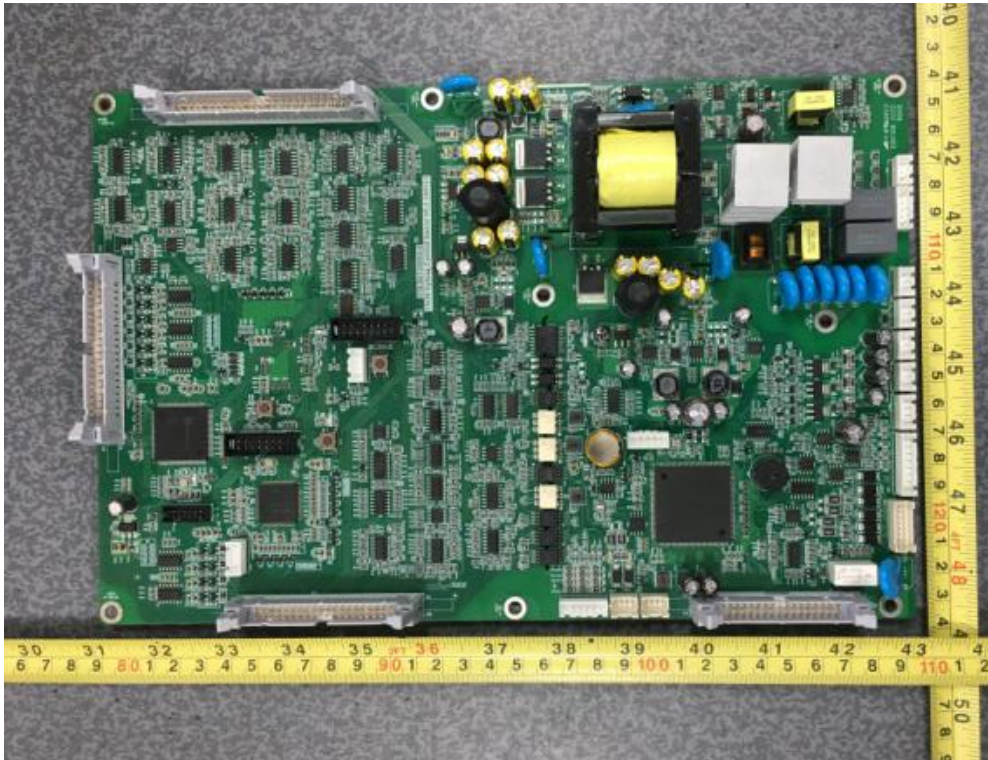
Output board front



Output board back



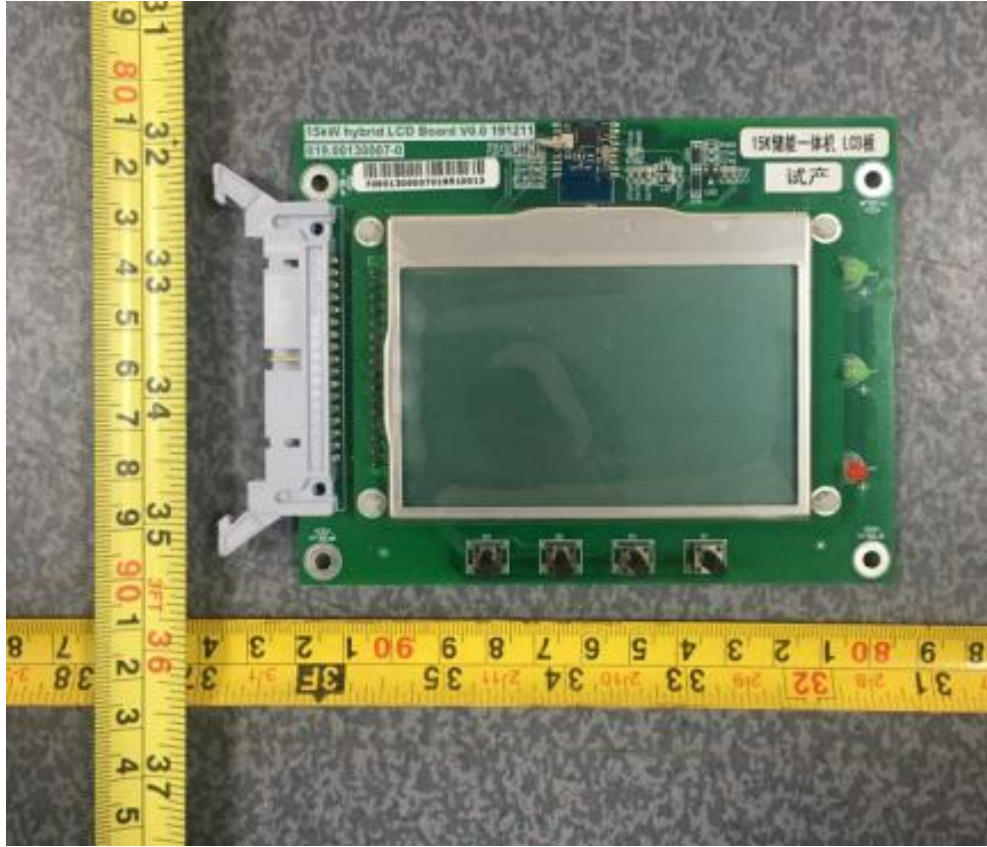
Front of the control board



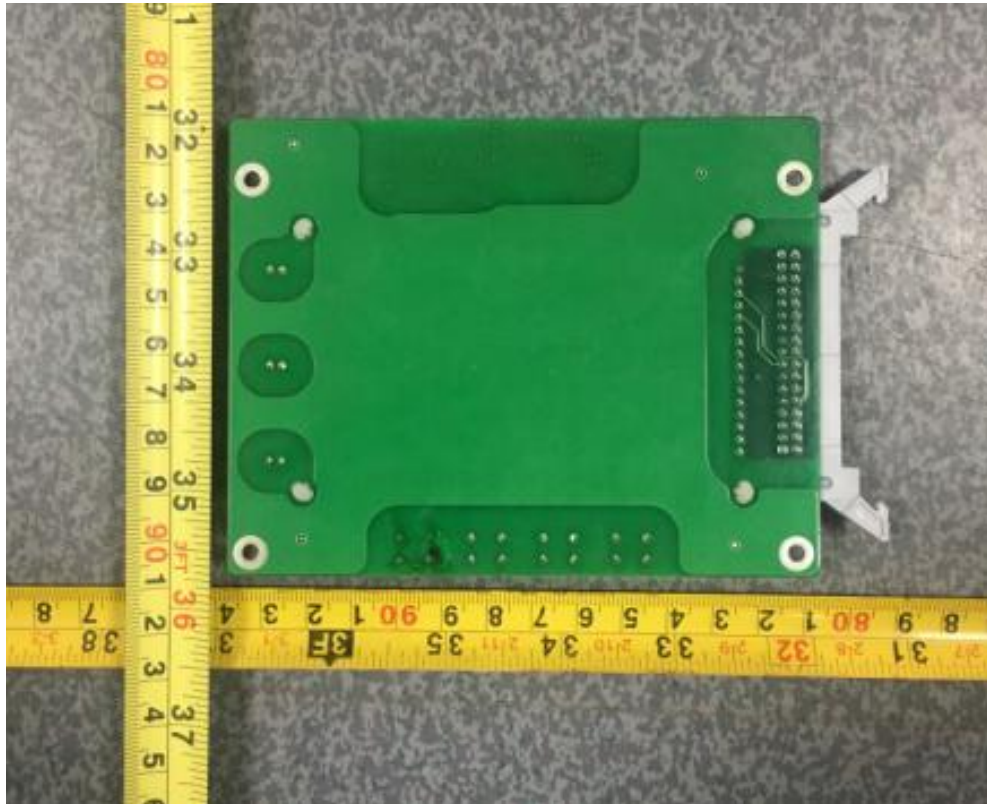
Control board back



Front of the display



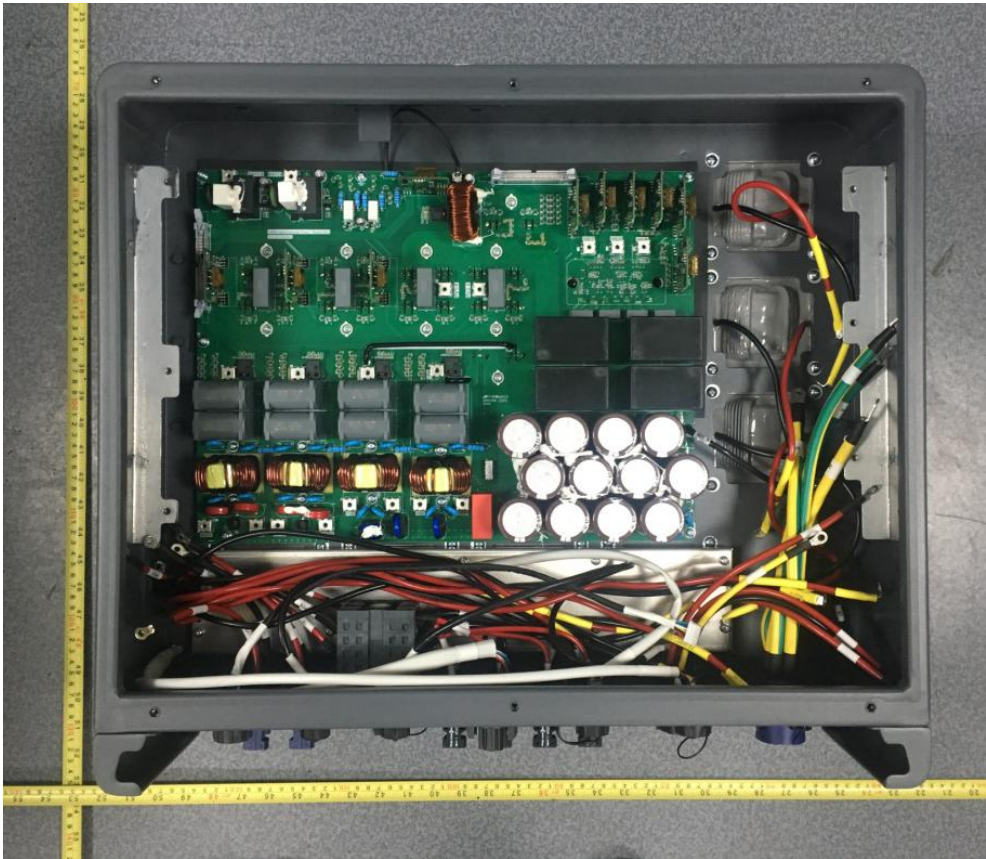
Back of the display



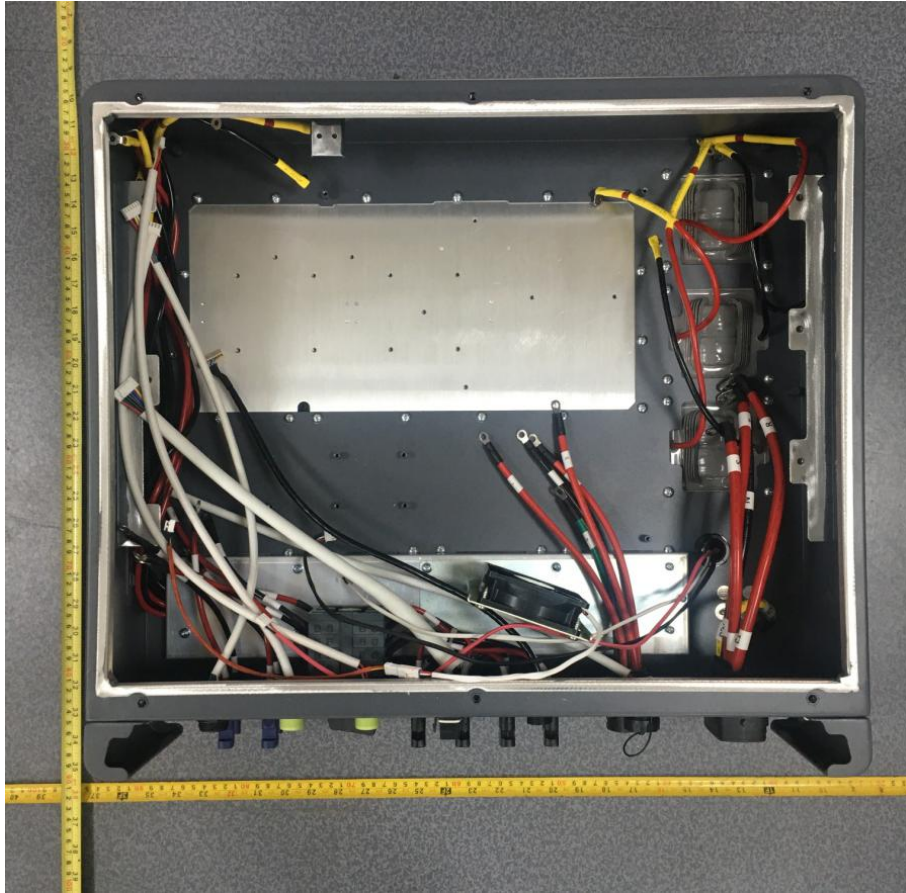
Ground wire



Empty case



Bottom of the machine



Machine upper part



--END OF REPORT--