



EMC TEST REPORT

For

Dongguan Lia New Energy Manufacturing Co. , Ltd.

Inverter

Test Model: AL-RCM486000

Additional Model No.: Please Refer To Page 9

Prepared for : Dongguan Lia New Energy Manufacturing Co. , Ltd.
6th Floor, Building B, Guancheng Sanliang Industrial
Address : Zone, Xingguang Village, Huangjiang Town, Dongguan,
China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
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Date of receipt of test sample : May 29, 2026
Number of tested samples : 1
Serial number : Prototype
Date of Test : May 29, 2026-June 04, 2026
Date of Report : June 05, 2026



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**TEST REPORT****Report No.** : LCSA05126067E**Date of Issue** : June 05, 2026**Testing Laboratory Name** : Shenzhen LCS Compliance Testing Laboratory Ltd.**Address** : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China**Testing Location/ Procedure** : Full application of Harmonised standards ☒
Partial application of Harmonised standards ☐
Other standard testing method ☐**Applicant's Name** : Dongguan Lia New Energy Manufacturing Co. , Ltd.**Address** : 6th Floor, Building B, Guancheng Sanliang Industrial Zone, Xingguang Village, Huangjiang Town, Dongguan, China**Test Specification****Standard** : EN IEC 61000-6-3:2021
EN IEC 61000-6-1:2019**Test Report Form No** : TRF-4-E-001 A/0**TRF Originator** : Shenzhen LCS Compliance Testing Laboratory Ltd.**Master TRF** : Dated 2011-03**Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved.**

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Test Item Description : Inverter**Trade Mark** : N/A**Test Model** : AL-RCM486000**Result** : Pass**Compiled by:****Supervised by:****Approved by:**

Emma Wang / File Administrator

Jelly Li / Technique principal

Gavin Liang / Manager



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TEST REPORT

Test Report No.: LCSA05126067E	<u>June 05, 2026</u> Date of issue
---------------------------------------	---------------------------------------

Test Model.....	: AL-RCM486000
EUT.....	: Inverter
Applicant.....	: Dongguan Lia New Energy Manufacturing Co. , Ltd.
Address.....	: 6th Floor, Building B, Guancheng Sanliang Industrial Zone, Xingguang Village, Huangjiang Town, Dongguan, China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	: Dongguan Lia New Energy Manufacturing Co. , Ltd.
Address.....	: 6th Floor, Building B, Guancheng Sanliang Industrial Zone, Xingguang Village, Huangjiang Town, Dongguan, China
Telephone.....	: /
Fax.....	: /
Factory.....	: Dongguan Lia New Energy Manufacturing Co. , Ltd.
Address.....	: 6th Floor, Building B, Guancheng Sanliang Industrial Zone, Xingguang Village, Huangjiang Town, Dongguan, China
Telephone.....	: /
Fax.....	: /

Test Result	Pass
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.





Revision History

Report Version	Issue Date	Revision Content	Revised By
000	June 05, 2026	Initial Issue	/





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1. TEST STANDARDS

EN IEC 61000-6-3:2021:Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential environments

EN IEC 61000-6-1:2019:Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity standard for residential, commercial and light-industrial environments





2. SUMMARY OF STANDARDS AND RESULTS

2.1 Description of Standards and Results

EMISSION (EMI)			
Description of Test Item	Standard	Result	Memo
AC/DC Power Port Conducted Emission	EN IEC 61000-6-3:2021	PASS	/
Radiated Emissions(30-1000MHz)	EN IEC 61000-6-3:2021	PASS	/
Harmonic Current Emissions Test	EN IEC 61000-6-3:2021	PASS	/
Voltage Fluctuations& Flicker Test	EN IEC 61000-6-3:2021	PASS	/
IMMUNITY(EMS)			
Description of Test Item	Standard	Result	Memo
Electrostatic Discharge Test	EN IEC 61000-6-1:2019	PASS	/
Continuous Radio Frequency Disturbances Test	EN IEC 61000-6-1:2019	PASS	/
Electrical Fast Transients(EFT) Test	EN IEC 61000-6-1:2019	PASS	/
Surge Test	EN IEC 61000-6-1:2019	PASS	/
Continuous Conducted Disturbances Test	EN IEC 61000-6-1:2019	PASS	/
Power-Frequency Magnetic Fields	EN IEC 61000-6-1:2019	N/A	Applicable only to equipment containing devices intrinsically susceptible to magnetic fields
Voltage Dips and Interruptions Test	EN IEC 61000-6-1:2019	PASS	/





2.2 Description of Test Modes

No	Title	Description
Mode 1	AC IN+AC OUT(AC 230V/50Hz)	/
Mode 2	DC IN+AC OUT(DC 48V)	/
Mode 3	PV IN+AC OUT(DC 360V)	/

2.3 Description of Performance Criteria

Performance Criteria

Performance criterion A

The apparatus shall continue to operate as intended during the test.

No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. 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 from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B

The apparatus shall continue to operate as intended after the test.

No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however no change of actual operating state or stored data is allowed to persist after the test. 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 from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B/C

B: The apparatus shall continue to operate as intended after the test.

No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however no change of actual operating state or stored data is allowed to persist after the test. 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 from what the user may reasonably expect from the apparatus if used as intended.

C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

Performance criterion C may be applied to toys not using score or data entered by the user.

Performance criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.





3. GENERAL INFORMATION

3.1 Description of Device (EUT)

EUT : Inverter
Test Model : AL-RCM486000

Power Supply

:

Import	
Uniphase	L+N+PE
Rated input voltage	220/230/240VAC
Voltage range	90-280 VAC $\pm$ 3V(normal mode);170-280 VAC $\pm$ 3V
Frequency range	50/60 Hz(Adaptive)
Output	
Output rating	6000W
Output voltage	220/230/240VAC $\pm$ 5%
Output frequency	50/60Hz $\pm$ 0.1%
Wave form	Pure sine wave
Switching period	10 ms (typical)
Peak power	12400VA
Overload capacity	10.5s at 110%-150%load;5.5s at 150%-200%load;200 ms at>200%load
Peak Efficiency	>94%
Cell	
Rated voltage	48Vdc
Constant-voltage charging voltage	56.4Vdc
Floating Charging Voltage	54Vdc
Charger	
Photovoltaic Charging Methods	MPPT
Maximum input power of PV	6000W
MPPT Input Voltage Range	120~500Vdc
The optimal operating range of VMP	300~400Vdc
Maximum PV input voltage	500Vdc
Maximum PV input current	20A





Maximum AC charging current	100A
Maximum AC input current	80A
Maximum Charging Current	100A

Highest Internal Frequency : $\leq 108\text{MHz}$

Classification of Equipment : /

Additional Model : AL-RCM121500, AL-RCM243600, AL-RCM488000, AL-RCM4810000, AL-RCM4811000, AL-RCM4812000, AL-RCM4815000, AL-RCM4820000, AL-RCM4825000

Model Declaration : PCB board, structure and internal of these model(s) are the same, So no additional models were tested.

3.2 Support equipment List

Equipment	Manufacturer	Model	Serial Number	Description
/	/	/	/	/

3.3 Description of Test Facility

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. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. 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.

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

3.4 Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Emission (9kHz to 150kHz)	$\pm 2.63\text{ dB}$
Conducted Emission (150kHz to 30MHz)	$\pm 2.35\text{ dB}$
Power Disturbance (30MHz to 300MHz)	$\pm 2.90\text{ dB}$
Voltage Fluctuations & Flicker	$\pm 0.510\%$
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.	





4. MEASURING DEVICES AND TEST EQUIPMENT

AC/DC Power Port Conducted Emission

Equipment	Manufacturer	Model No	Serial No.	Due Date
EMI Test Software	Farad	EZ	/	/
EMI Test Receiver	R&S	ESR3	102312	2026-12-21
DC AMN	SCHWARZBECK	PVDC 8301	8301-00112	2026-12-21
Three-phase artificial power supply network	SCHWARZBECK	NNLK 8129	8129-00407	2026-12-21
Pulse Limiter	R&S	ESH3-Z2	102750-NB	2027-05-05
Gigabit network impedance-stabilized network	SCHWARZBECK	NTFM 8158	00510	2026-12-21

Radiated Emissions(30-1000MHz)

Equipment	Manufacturer	Model No	Serial No.	Due Date
EMI Test Software	Farad	EZ	/	/
EMI Test Software	AUDIX	E3	/	/
By-log Antenna	SchwarzBECK	VULB9163	01565	2027-07-12
Horn Antenna	ETS	3117	EABF-018	2027-04-10
EMI Test Receiver	R&S	ESR3	102311	2027-05-05
Broadband Preamplifier	/	BBV9745	00317	2026-11-06
EMI Test Receiver	R&S	ESC17	101173	2026-10-10
By-log Antenna	SchwarzBECK	VULB9163	01143	2027-07-19

Harmonic Current Emissions Test

Equipment	Manufacturer	Model No	Serial No.	Due Date
Harmonic scintillation analyzer	Schlöder	LMG 641 (Zes Zimmer)	/	2026-12-21
Three-phase scintillation impedance device	HTEC	FI-75L	235210	2026-12-21
Three phase programmable purification power supply	Chroma	61860	618603800687	2026-12-21

Voltage Fluctuations& Flicker Test

Equipment	Manufacturer	Model No	Serial No.	Due Date
HARMONICS&FLICKER MEASUREMENT SYSTEM	EVERFINE	HFM-3000	P630850CD1411116	2026-12-21
HARMONICS&FLICKER TESTING POWER SOURCE	EVERFINE	HFM-4000	P624486CD1411124	2026-12-21



**Electrostatic Discharge Test**

Equipment	Manufacturer	Model No	Serial No.	Due Date
ESD Simulator	emtest	ESD NX30.1	111969	2027-05-18

Continuous Radio Frequency Disturbances Test

Equipment	Manufacturer	Model No	Serial No.	Due Date
Vector signal generator	Agilent	N5181A	MY50143169	2026-09-26
RF POWER AMPLIFIER	OPHIR	5225R	1052	2027-05-05
RF POWER AMPLIFIER	YEAH TECH	YEAH TECH	25090001	2026-09-26
Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	2026-07-13
Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-482	2027-07-19
RS Electric field probe	narda	EP 601	611WX80208	2027-05-05
Power Sensor	Agilent	E9301H	MY41495234	2026-09-26
Power Sensor	Agilent	E9301H	MY41495616	2026-09-26
Power Meter	Agilent	E4419B	MY45104493	2026-09-26

Electrical Fast Transients(EFT) Test

Equipment	Manufacturer	Model No	Serial No.	Due Date
Electric fast pulse group generator	HTEC	HEFT 51	234401	2026-12-21
Three-phase coupled decoupling network	HTEC	HCOUPLER 200E	234712	2026-12-21

Surge Test

Equipment	Manufacturer	Model No	Serial No.	Due Date
Combination wave lightning surge generator	HTEC	HOV 10K	234803	2026-12-21
Combination wave lightning surge generator	HTEC	H2M 450	234804	2026-12-21
Three-phase coupled decoupling network	HTEC	HCOUPLER 200S	234709	2026-12-21



**Continuous Conducted Disturbances Test**

Equipment	Manufacturer	Model No	Serial No.	Due Date
Integrated anti-interference machine	HTEC	HCS 75	234403	2026-12-21
Single phase coupled decoupling network (AC 32A)	HTEC	HCDN M2+M3-32	234716	2026-12-21
Three phase coupled decoupling network	Schloeder	CDN M4-100A HV	12229-1	2026-12-21
Three phase coupled decoupling network	Schloeder	CDN-M5-100A-HV	12230-1	2026-12-21
Independent ground wire CDN	SCHLODER	CDN-L1	12227-1	2026-12-21
Coaxial attenuator	/	CDG 7006-100W	220308040	2026-12-21
High voltage DC coupling decoupling network (200A)	FCC	FCC-801-M2-200A-1	199364	2026-12-21

Voltage Dips and Interruptions Test

Equipment	Manufacturer	Model No	Serial No.	Due Date
Three phase power supply fault simulator	HTEC	HPFS 2003P	234711	2027-01-05
Programmable AC fault power supply	HTEC	HV3P200T	234710	2027-01-05





5. EMISSION TEST RESULTS (EMI)

5.1 AC/DC Power Port Conducted Emission

5.1.1 Limits

AC		
Frequency	Quasi-Peak Level dB(mV)	Average Level dB(mV)
150 kHz ~ 500 kHz	66 ~ 56*	56 ~ 46*
500 kHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50
DC		
Frequency	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150 kHz ~ 500 kHz	79	73
500 kHz ~ 5 MHz	66	60
Notes: 1. * Decreasing linearly with logarithm of frequency. 2. The lower limit shall apply at the transition frequencies.		

5.1.2 Test procedure

- (1) The EUT placement requires reference to the test block diagram and is placed on a non-metallic table.
- (2) Setup the EUT and assistant equipment as shown above block diagram and equipment list.
- (3) The EUT's power was connected to the power mains through a line impedance stabilization network (L.I.S.N). which this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted disturbance. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to EN IEC 61000-6-3:2021 on conducted disturbance emission test.
- (4) The bandwidth of test receiver is set at 9 kHz.
- (5) The frequency range from 150 kHz to 30 MHz is checked.

***Note: 1) Pre-scan all modes and recorded the worst case results in this report.

2) Margin= Reading level + Correct factor-Limit

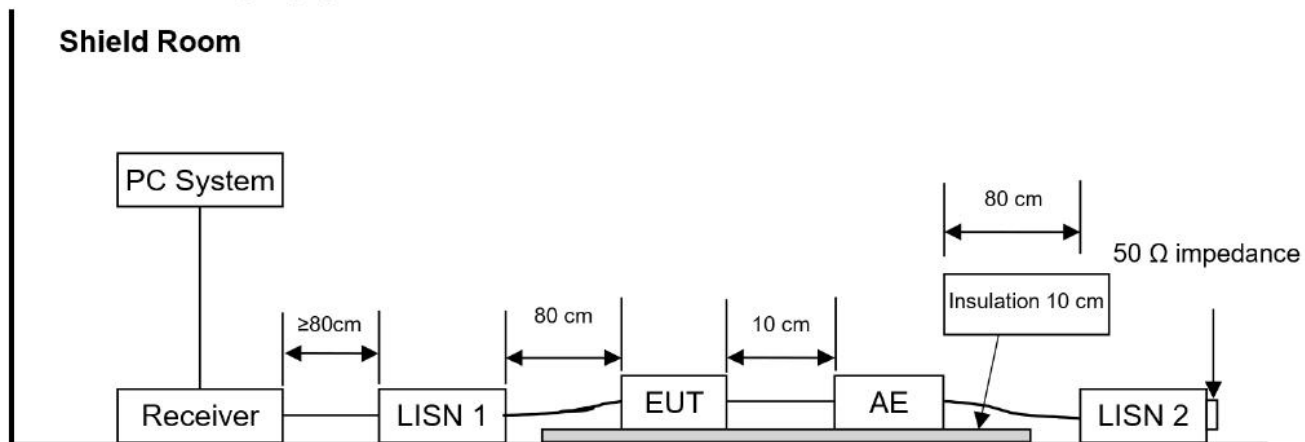
Correct Factor=Lisn Factor+Cable Factor+Insertion loss of Pulse Limiter





5.1.3 Test Setup Diagram

For floor standing equipment





5.1.4 E.U.T. Operation

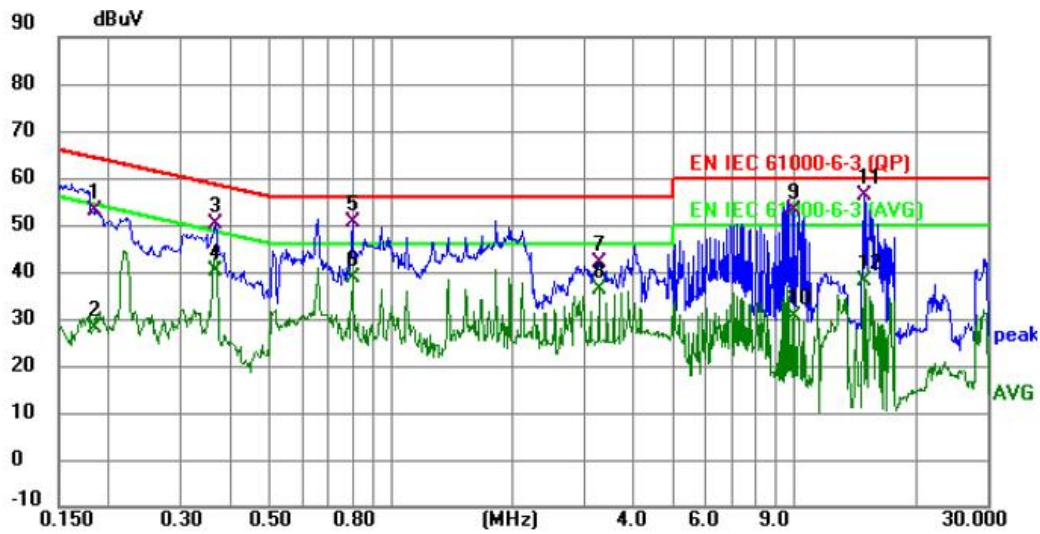
Operating Environment:			
Temperature:	24.2° C	Humidity:	54.9%RH
Test Engineer	Xing Jin Mo		
Mode 1	AC IN+AC OUT	Voltage	AC 230V/50Hz
Mode 2	DC IN+AC OUT	Voltage	DC 48V
Mode 3	PV IN+AC OUT	Voltage	DC 360V





5.1.5 Test data

Mode 1 / Line: Line

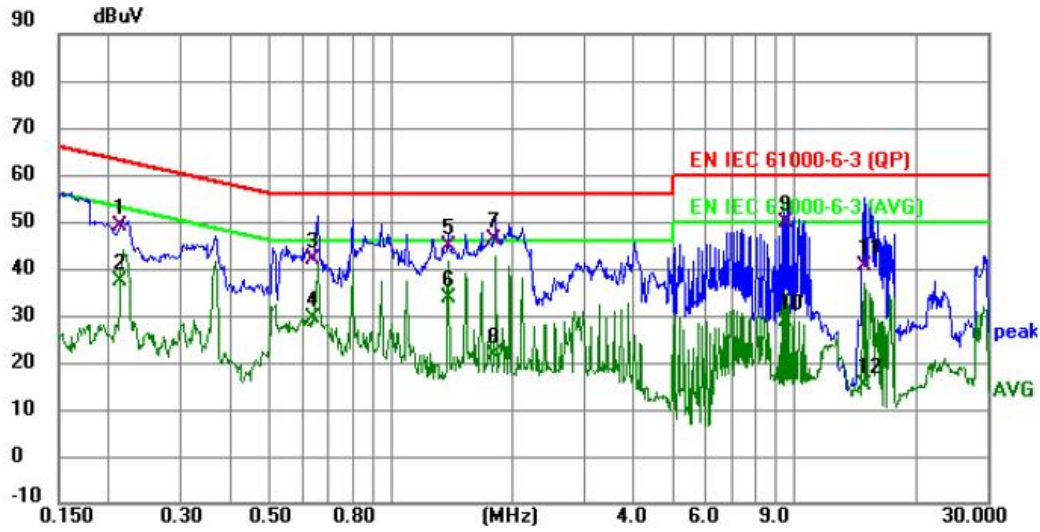


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1844	43.04	10.08	53.12	64.29	-11.17	QP	
2	0.1844	17.80	10.08	27.88	54.29	-26.41	AVG	
3	0.3653	40.13	9.92	50.05	58.61	-8.56	QP	
4	0.3653	30.21	9.92	40.13	48.61	-8.48	AVG	
5	0.8024	40.43	10.00	50.43	56.00	-5.57	QP	
6	0.8024	28.65	10.00	38.65	46.00	-7.35	AVG	
7	3.2820	31.94	10.00	41.94	56.00	-14.06	QP	
8	3.2820	26.30	10.00	36.30	46.00	-9.70	AVG	
9	9.9915	43.07	9.98	53.05	60.00	-6.95	QP	
10	9.9915	20.63	9.98	30.61	50.00	-19.39	AVG	
11 *	14.9504	46.10	10.08	56.18	60.00	-3.82	QP	
12	14.9504	27.91	10.08	37.99	50.00	-12.01	AVG	





Mode 1 / Line: Neutral

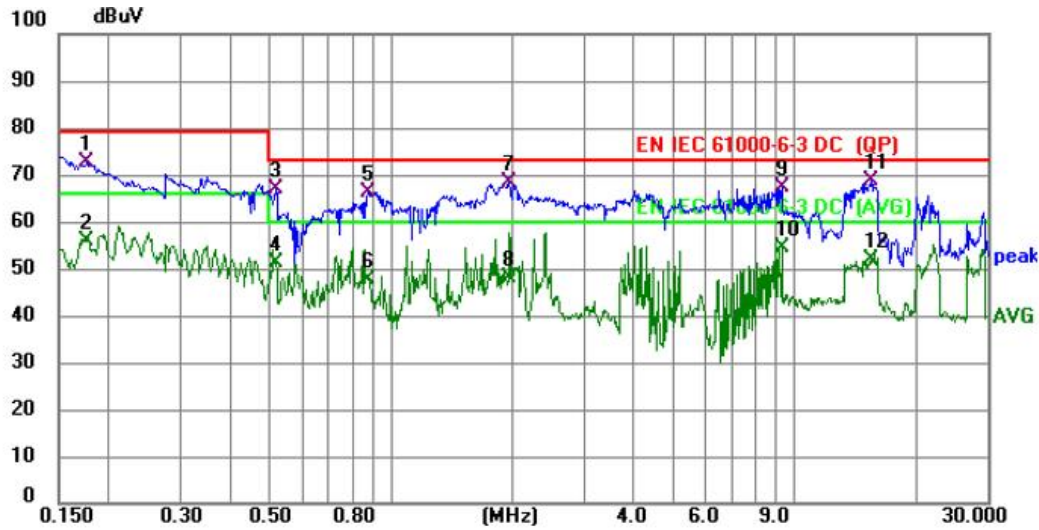


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.2130	39.17	10.07	49.24	63.09	-13.85	QP	
2	0.2130	27.18	10.07	37.25	53.09	-15.84	AVG	
3	0.6403	32.21	9.89	42.10	56.00	-13.90	QP	
4	0.6403	19.48	9.89	29.37	46.00	-16.63	AVG	
5	1.3920	34.97	9.98	44.95	56.00	-11.05	QP	
6	1.3920	23.72	9.98	33.70	46.00	-12.30	AVG	
7 *	1.8015	36.31	9.99	46.30	56.00	-9.70	QP	
8	1.8015	11.71	9.99	21.70	46.00	-24.30	AVG	
9	9.5503	39.75	9.98	49.73	60.00	-10.27	QP	
10	9.5503	18.86	9.98	28.84	50.00	-21.16	AVG	
11	14.8785	30.57	10.08	40.65	60.00	-19.35	QP	
12	14.8785	5.22	10.08	15.30	50.00	-34.70	AVG	





Mode 2 / Line: +

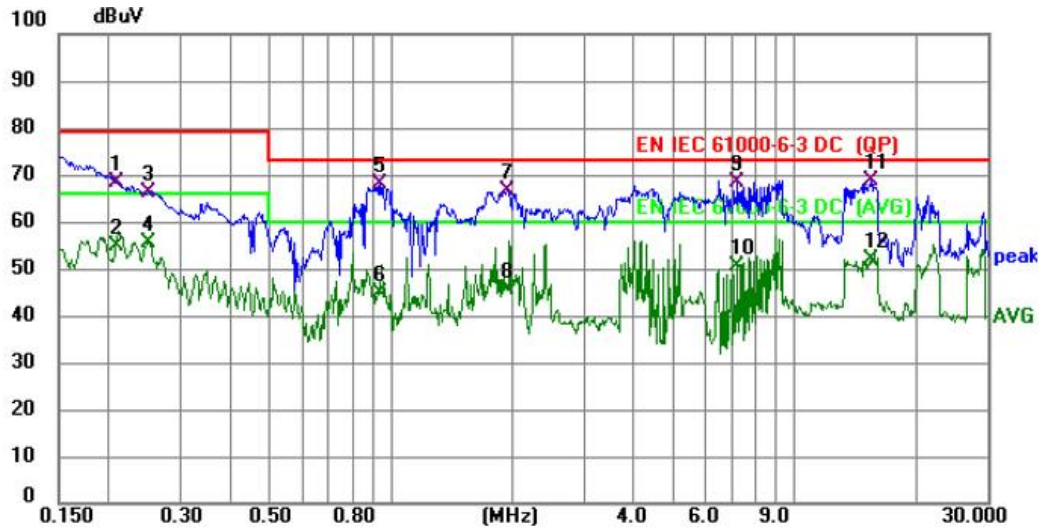


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1758	42.26	30.28	72.54	79.00	-6.46	QP	
2	0.1758	25.77	30.28	56.05	66.00	-9.95	AVG	
3	0.5141	36.53	30.34	66.87	73.00	-6.13	QP	
4	0.5141	21.07	30.34	51.41	60.00	-8.59	AVG	
5	0.8790	35.89	30.44	66.33	73.00	-6.67	QP	
6	0.8790	17.22	30.44	47.66	60.00	-12.34	AVG	
7	1.9500	37.32	31.09	68.41	73.00	-4.59	QP	
8	1.9500	16.77	31.09	47.86	60.00	-12.14	AVG	
9	9.2621	35.36	31.91	67.27	73.00	-5.73	QP	
10	9.2621	22.62	31.91	54.53	60.00	-5.47	AVG	
11 *	15.5355	36.61	31.98	68.59	73.00	-4.41	QP	
12	15.5355	19.84	31.98	51.82	60.00	-8.18	AVG	





Mode 2 / Line: -



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.2083	37.97	30.41	68.38	79.00	-10.62	QP	
2	0.2083	24.25	30.41	54.66	66.00	-11.34	AVG	
3	0.2490	35.90	30.46	66.36	79.00	-12.64	QP	
4	0.2490	25.02	30.46	55.48	66.00	-10.52	AVG	
5	0.9420	37.44	30.46	67.90	73.00	-5.10	QP	
6	0.9420	14.54	30.46	45.00	60.00	-15.00	AVG	
7	1.9410	35.48	31.09	66.57	73.00	-6.43	QP	
8	1.9410	14.43	31.09	45.52	60.00	-14.48	AVG	
9	7.2195	36.61	31.88	68.49	73.00	-4.51	QP	
10	7.2195	18.48	31.88	50.36	60.00	-9.64	AVG	
11 *	15.5355	36.61	31.98	68.59	73.00	-4.41	QP	
12	15.5355	19.84	31.98	51.82	60.00	-8.18	AVG	



Shenzhen LCS Compliance Testing Laboratory Ltd.

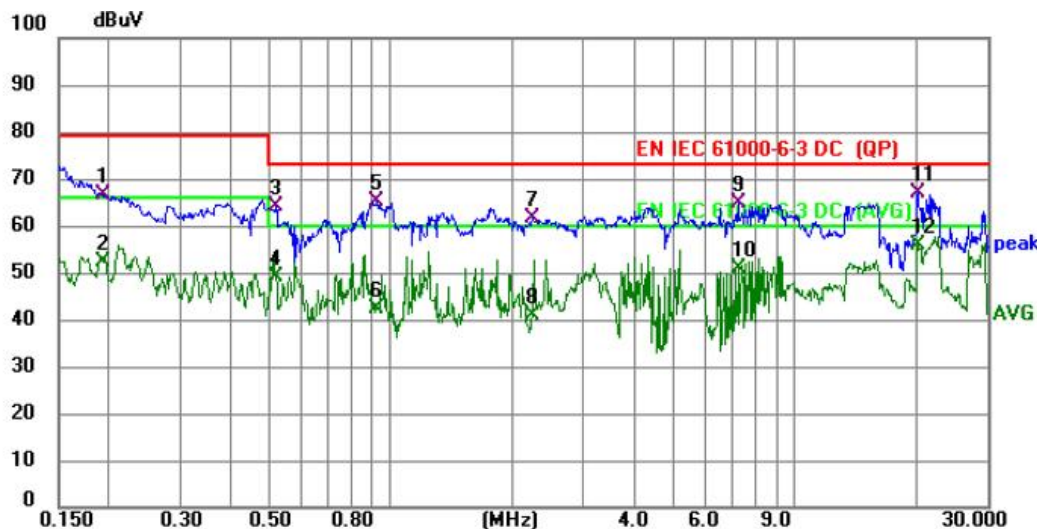
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Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

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Mode 3 / Line: +



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1932	37.43	29.13	66.56	79.00	-12.44	QP	
2	0.1932	23.11	29.13	52.24	66.00	-13.76	AVG	
3	0.5161	35.53	28.52	64.05	73.00	-8.95	QP	
4	0.5161	20.61	28.52	49.13	60.00	-10.87	AVG	
5	0.9201	36.29	28.76	65.05	73.00	-7.95	QP	
6	0.9201	13.63	28.76	42.39	60.00	-17.61	AVG	
7	2.2309	32.91	28.80	61.71	73.00	-11.29	QP	
8	2.2309	12.12	28.80	40.92	60.00	-19.08	AVG	
9	7.2415	35.61	29.05	64.66	73.00	-8.34	QP	
10	7.2415	21.98	29.05	51.03	60.00	-8.97	AVG	
11	20.1545	35.98	30.84	66.82	73.00	-6.18	QP	
12 *	20.1545	25.00	30.84	55.84	60.00	-4.16	AVG	



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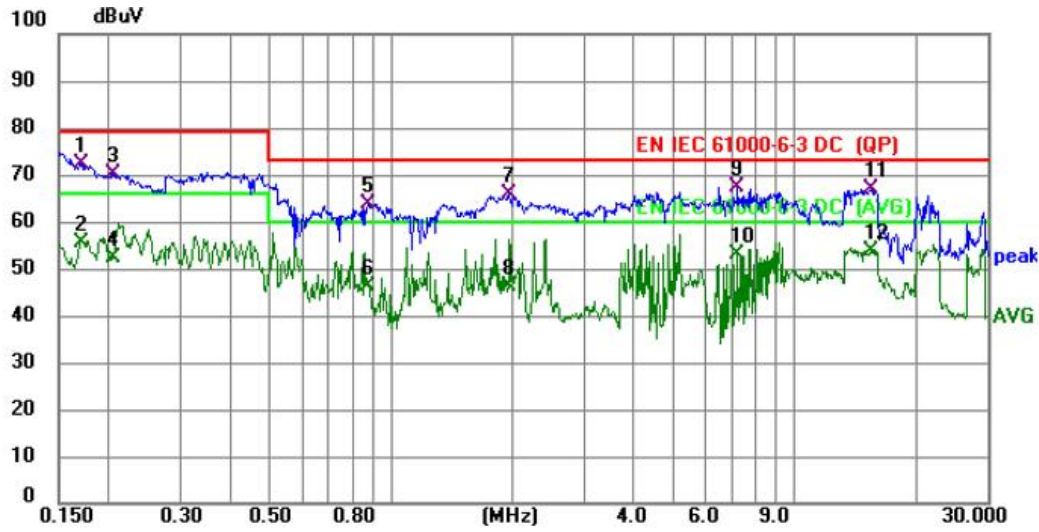
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Mode 3 / Line:-



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.1703	42.00	30.25	72.25	79.00	-6.75	QP	
2	0.1703	25.22	30.25	55.47	66.00	-10.53	AVG	
3	0.2040	39.62	30.40	70.02	79.00	-8.98	QP	
4	0.2040	22.07	30.40	52.47	66.00	-13.53	AVG	
5	0.8790	33.39	30.44	63.83	73.00	-9.17	QP	
6	0.8790	15.72	30.44	46.16	60.00	-13.84	AVG	
7	1.9500	34.82	31.09	65.91	73.00	-7.09	QP	
8	1.9500	15.27	31.09	46.36	60.00	-13.64	AVG	
9 *	7.2195	35.61	31.88	67.49	73.00	-5.51	QP	
10	7.2195	20.98	31.88	52.86	60.00	-7.14	AVG	
11	15.5355	35.11	31.98	67.09	73.00	-5.91	QP	
12	15.5355	21.84	31.98	53.82	60.00	-6.18	AVG	





5.2 Radiated Emissions(30-1000MHz)

5.2.1 Limits

Frequency	Field Strengths Limits at 10m measuring distance dB(μV)/m	Field Strengths Limits at 3m measuring distance dB(μV)/m
30 MHz to 230 MHz	30	40
230 MHz to 1 GHz	37	47
30 MHz to 1 GHz	Fundamental 50	Fundamental 60
30 MHz to 300 MHz	Harmonics 42	Harmonics 52
300 MHz to 1 GHz	Harmonics 46	Harmonics 56
Note: (1) The smaller limit shall apply at the cross point between two frequency bands. (2) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.		

5.2.2 Test procedure

- (1) The EUT was placed on a non-metallic table (Refer to the 'Block diagram of test setup'). above the ground plane inside an anechoic chamber.
- (2) Test antenna center was located 3m or 10m from the EUT and assistant equipment boundary (imaginary circular periphery) on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to EN IEC 61000-6-3 on radiated emission test.
- (3) Spectrum frequency from 30 MHz to 1 GHz was investigated.
- (4) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to EN IEC 61000-6-3 on Radiated Emission test.
- (5) For emissions from 30 MHz to 1 GHz, Quasi-Peak values were measured with EMI Receiver and the bandwidth of Receiver is 120 kHz.

Note:1).Pre-Scan all mode, Thus record worse case mode result in this report.

2) Margin= Reading level + Correct factor – Limit

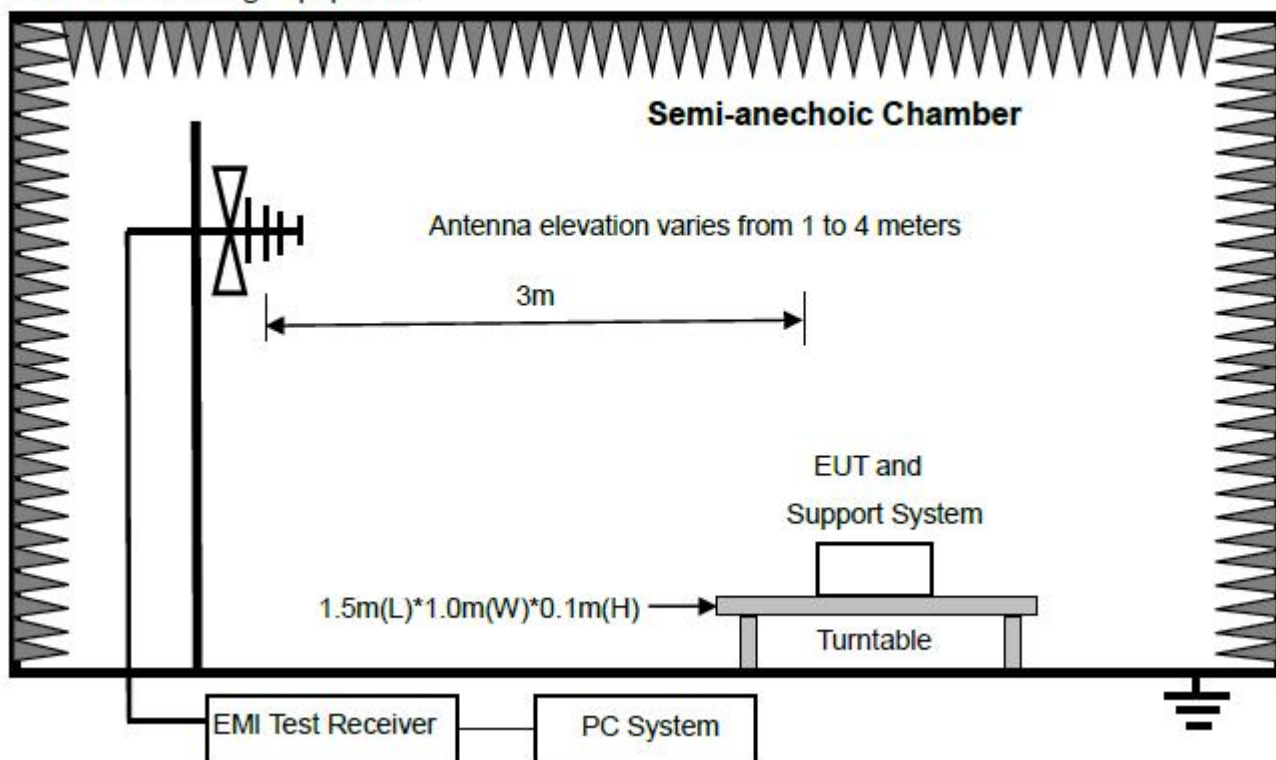
Correct Factor=Antenna Factor+Cable Factor- Pre-amplifier Factor





5.2.3 Test Setup Diagram

For floor standing equipment





5.2.4 E.U.T. Operation

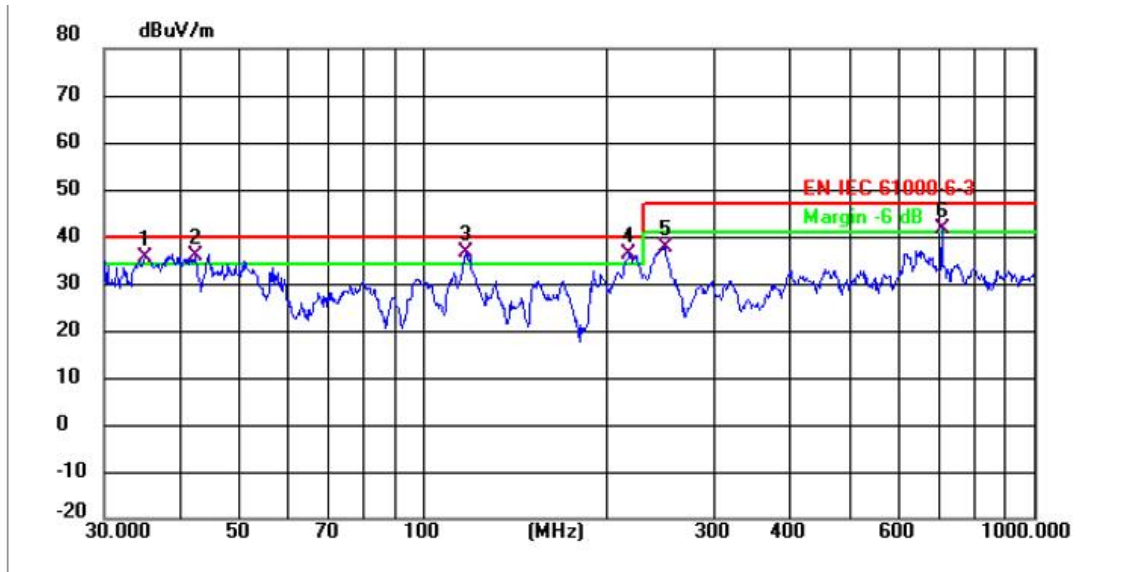
Operating Environment:			
Temperature:	26° C	Humidity:	54%RH
Test Engineer	Xing Jin Mo		
Mode 1	AC IN+AC OUT	Voltage	AC 230V/50Hz
Mode 2	DC IN+AC OUT	Voltage	DC 48V
Mode 3	PV IN+AC OUT	Voltage	DC 360V





5.2.5 Test data

Mode 1 / Polarization: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 !	35.1276	54.09	-18.38	35.71	40.00	-4.29	QP	P	
2 !	42.3021	52.97	-17.13	35.84	40.00	-4.16	QP	P	
3 *	117.3602	55.56	-18.90	36.66	40.00	-3.34	QP	P	
4 !	216.7828	54.59	-18.29	36.30	40.00	-3.70	QP	P	
5	248.5520	55.13	-17.29	37.84	47.00	-9.16	QP	P	
6 !	706.6997	51.49	-9.71	41.78	47.00	-5.22	QP	P	



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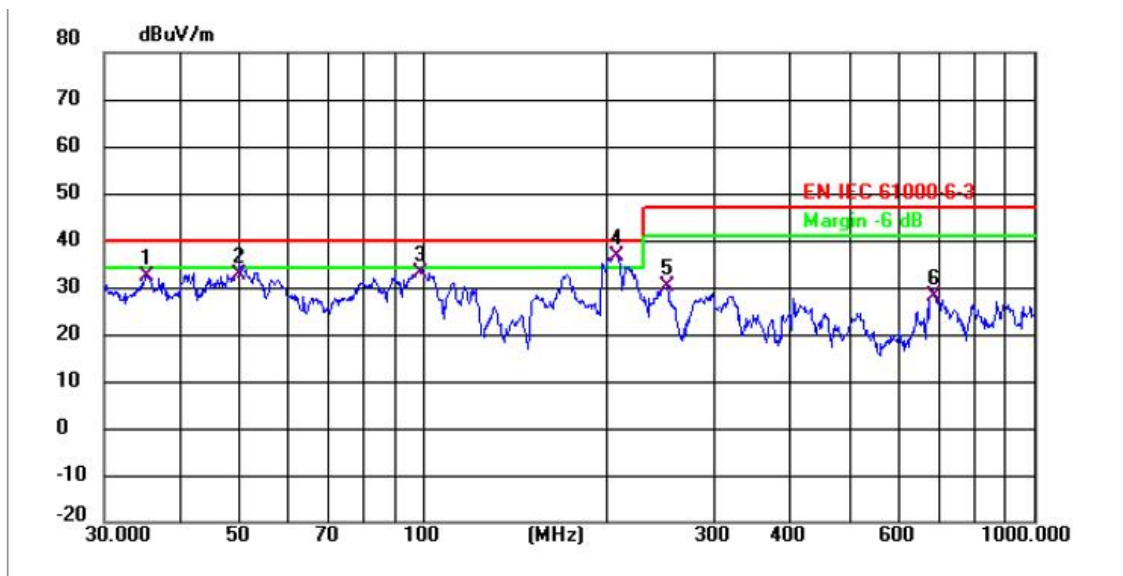
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Mode 1 / Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1	35.2511	50.69	-18.36	32.33	40.00	-7.67	QP	P	
2	49.8813	49.02	-16.47	32.55	40.00	-7.45	QP	P	
3	99.1795	51.13	-18.04	33.09	40.00	-6.91	QP	P	
4 *	207.8500	55.65	-18.97	36.68	40.00	-3.32	QP	P	
5	250.3010	47.27	-17.24	30.03	47.00	-16.97	QP	P	
6	684.7453	38.02	-10.02	28.00	47.00	-19.00	QP	P	



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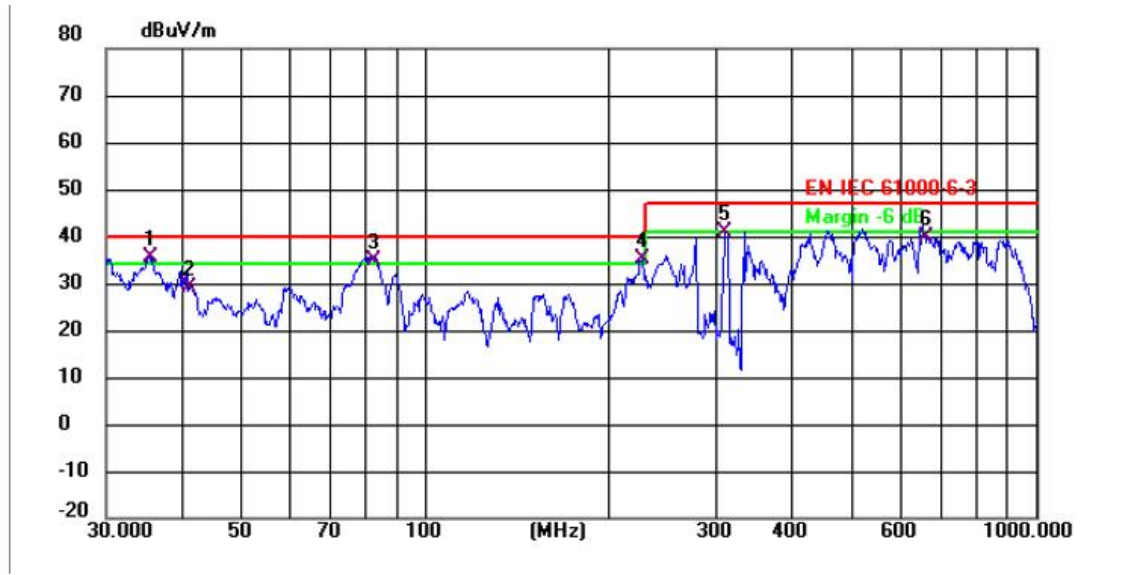
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Mode 2 / Polarization: Vertical

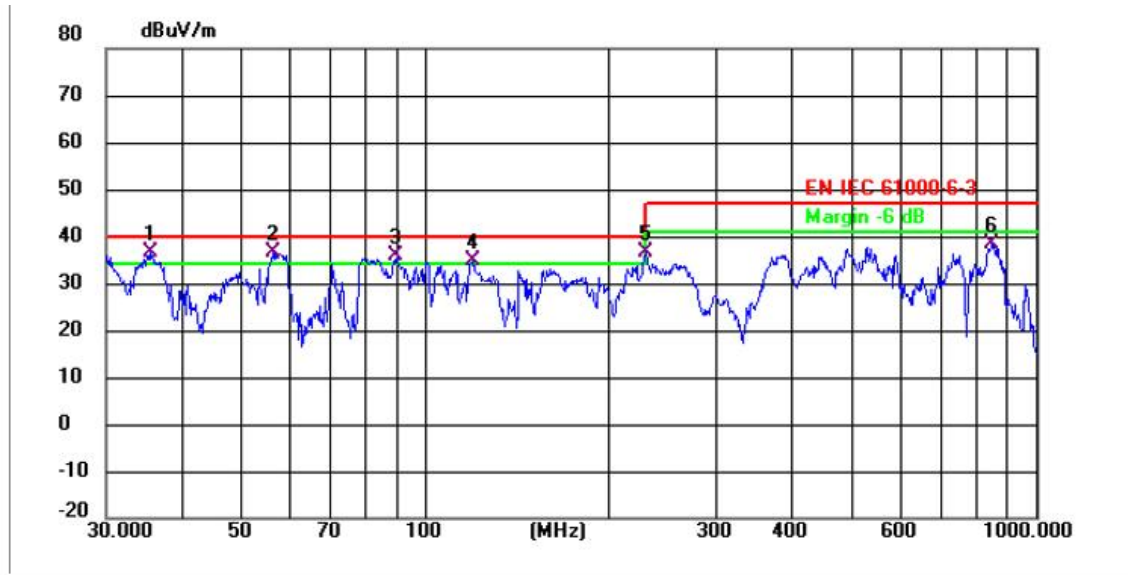


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	35.3750	34.93	0.44	35.37	40.00	-4.63	QP	P	
2	41.1320	28.71	0.48	29.19	40.00	-10.81	QP	P	
3 !	82.3588	34.33	0.66	34.99	40.00	-5.01	QP	P	
4 !	226.8934	34.09	1.08	35.17	40.00	-4.83	QP	P	
5	309.9977	39.45	1.30	40.75	47.00	-6.25	QP	P	
6	656.5300	37.98	1.85	39.83	47.00	-7.17	QP	P	





Mode 2 / Polarization: Horizontal

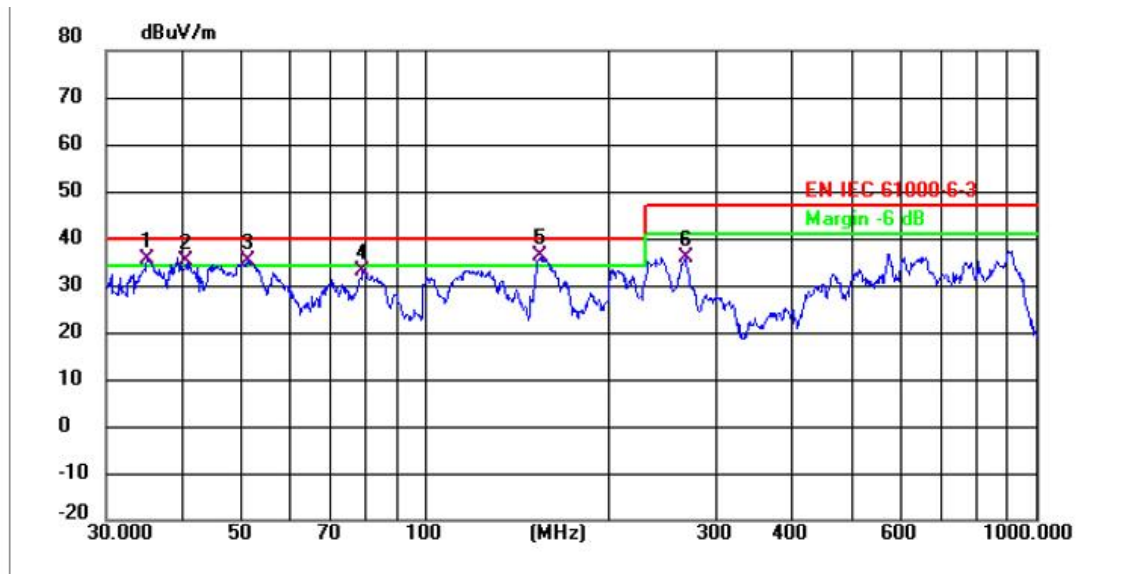


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 !	35.3750	36.15	0.44	36.59	40.00	-3.41	QP	P	
2 !	56.3947	36.05	0.57	36.62	40.00	-3.38	QP	P	
3 !	89.5899	35.17	0.69	35.86	40.00	-4.14	QP	P	
4 !	119.4360	34.09	0.78	34.87	40.00	-5.13	QP	P	
5 *	229.2930	35.69	1.09	36.78	40.00	-3.22	QP	P	
6	848.0561	36.12	2.10	38.22	47.00	-8.78	QP	P	





Mode 3 / Polarization: Vertical

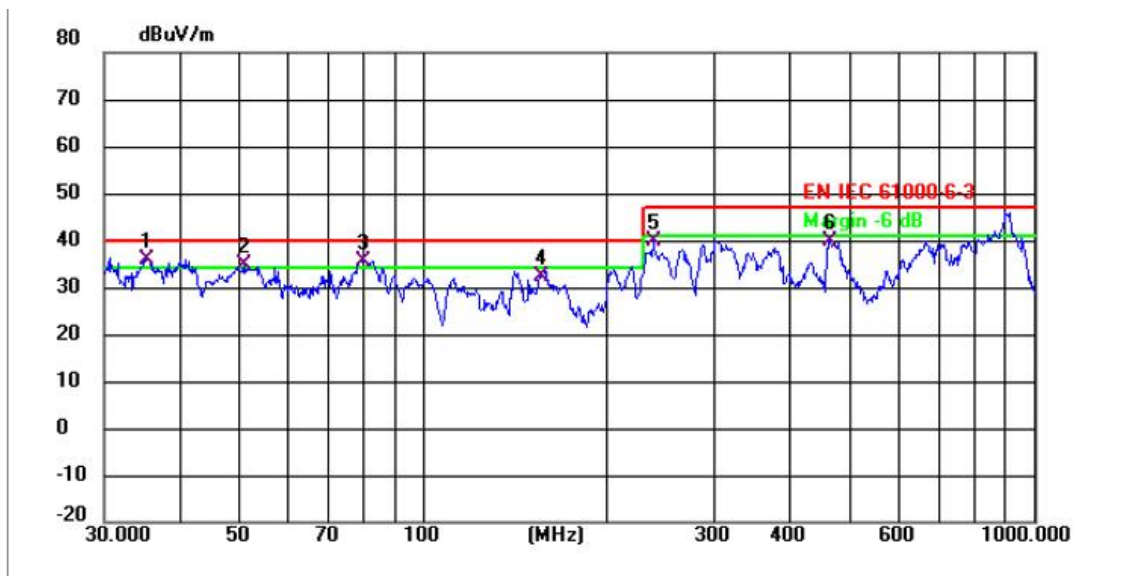


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 !	35.1276	35.16	0.44	35.60	40.00	-4.40	QP	P	
2 !	40.7014	34.84	0.48	35.32	40.00	-4.68	QP	P	
3 !	51.1210	34.71	0.53	35.24	40.00	-4.76	QP	P	
4	78.9651	32.38	0.66	33.04	40.00	-6.96	QP	P	
5 *	154.8204	35.29	0.88	36.17	40.00	-3.83	QP	P	
6	266.6090	34.64	1.19	35.83	47.00	-11.17	QP	P	





Mode 3 / Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F	Remark
1 *	35.2511	35.28	0.44	35.72	40.00	-4.28	QP	P	
2 !	50.5860	34.16	0.53	34.69	40.00	-5.31	QP	P	
3 !	79.8002	34.97	0.66	35.63	40.00	-4.37	QP	P	
4	156.4576	31.61	0.89	32.50	40.00	-7.50	QP	P	
5	237.4760	38.78	1.11	39.89	47.00	-7.11	QP	P	
6	463.9696	38.45	1.54	39.99	47.00	-7.01	QP	P	



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5.3 Harmonic Current Emissions Test

5.3.1 Limits

Limit for Class A equipment		
Harmonic order(h)	Maximum permissible harmonic current (A)	
Odd harmonics		
3	2.30	
5	1.14	
7	0.77	
9	0.40	
11	0.33	
13	0.21	
15≤h≤39	0.15*15/h	
Even harmonics		
2	1.08	
4	0.43	
6	0.30	
8≤h≤40	0.23*8/h	
Limit for Class B equipment		
The harmonics of the input current shall not exceed the values given in Class A limits multiplied by a factor of 1,5.		
Limit for Class C equipment		
Harmonic order(h)	Maximum permissible harmonic current expressed as a percentage of the input current at the fundamental frequency %	
2	2	
3	27	
5	10	
7	7	
9	5	
11≤h≤39 (odd harmonic only)	3	
Limit for Class D equipment		
Harmonic order(h)	Maximum permissible harmonic current per watt (mA/W)	Maximum permissible harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33





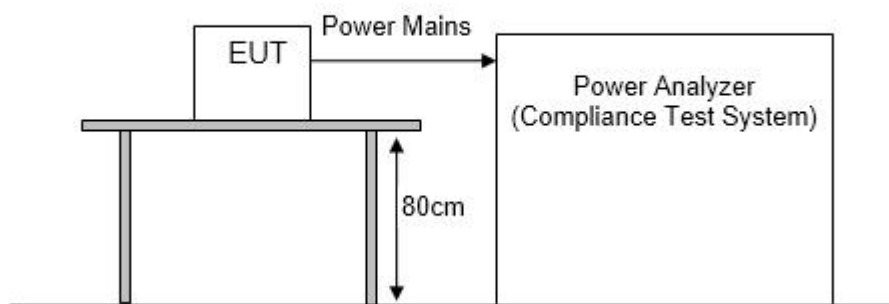
$13 \leq h \leq 39$ (odd harmonic only)	$3.85/h$	$0.15 \cdot 15/h$
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5.3.2 Test procedure

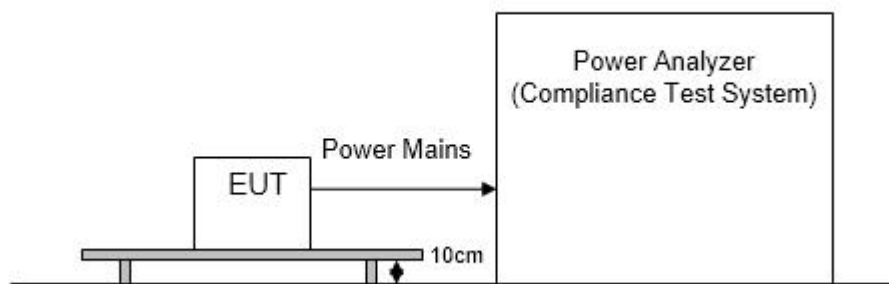
The EUT is placed on top of a wooden table (according to the standard height requirements, refer to the test layout) the maximum, harmonic components under normal operating conditions for each successive harmonic component in turn. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

5.3.3 Test Setup Diagram

Table-top device



Floor-standing device





5.3.4 E.U.T. Operation

Operating Environment:			
Temperature:	21.5° C	Humidity:	52.9%RH
Test Engineer	Xing Jin Mo		
Mode 1	AC IN+AC OUT	Voltage	AC 230V/50Hz





5.3.5 Test data

Result Overview

Ha	Result	100% Avg	150% Smo
2	OK	0.1 % 1.484 A ≤ 998.602 A	0.1 % 1.399 A ≤ 1497.903 A
3	OK	1.2 % 32.280 A ≤ 2696.226 A	0.8 % 32.727 A ≤ 4044.339 A
4	OK	0.3 % 1.387 A ≤ 499.301 A	0.2 % 1.375 A ≤ 748.952 A
5	OK	1.0 % 12.689 A ≤ 1335.630 A	0.6 % 12.776 A ≤ 2003.446 A
6	OK	0.2 % 0.749 A ≤ 332.867 A	0.2 % 0.724 A ≤ 499.301 A
7	OK	0.8 % 7.487 A ≤ 898.742 A	0.6 % 7.524 A ≤ 1348.113 A
8	OK	0.2 % 0.501 A ≤ 249.651 A	0.1 % 0.509 A ≤ 374.476 A
9	OK	2.2 % 8.333 A ≤ 374.476 A	1.5 % 8.347 A ≤ 561.714 A
10	OK	0.4 % 0.758 A ≤ 199.720 A	0.3 % 0.735 A ≤ 299.581 A
11	OK	2.4 % 9.386 A ≤ 386.958 A	1.6 % 9.447 A ≤ 580.438 A
12	OK	0.3 % 0.503 A ≤ 166.434 A	0.2 % 0.511 A ≤ 249.651 A
13	OK	3.4 % 8.492 A ≤ 249.651 A	2.3 % 8.575 A ≤ 374.476 A





Result Details

Test Name	Test Result	Limit Usage	Info
Supply Frequency Test (61000-3-12) [L1]	OK		50.00 Hz (50.00 Hz $\pm$ 0.5 %)
Supply Utrms Test (61000-3-12) [L1]	OK		224.337 V < 225.400 V
Supply Voltage Harmonic Distortion Test (61000-3-12) [L1]	OK		
Frequency groups up to 9 kHz (61000-4-7) [L1]	OK		
Iref within 10 % Test (61000-3-12) [L1]	Warning		12482.527 A $\geq$ 5.500 A - Measured Iref = 12482.53 A is used for limits
Table 2 Harmonic Current Test (61000-3-12) [L1]	OK		
Rsce Min Test	OK		Rsce min 33, EUT connectable at any point in supply system.
Rsce Test	OK		Rsce 33.00 $\geq$ Rsce min limit 33
H2 Test	OK		
100 % Average Test	OK	0.1 %	1.484 A $\leq$ 998.602 A
150 % Smoothed Test	OK	0.1 %	1.399 A $\leq$ 1497.903 A
H3 Test	OK		
100 % Average Test	OK	1.2 %	32.280 A $\leq$ 2696.226 A
150 % Smoothed Test	OK	0.8 %	32.727 A $\leq$ 4044.339 A
H4 Test	OK		
100 % Average Test	OK	0.3 %	1.387 A $\leq$ 499.301 A
150 % Smoothed Test	OK	0.2 %	1.375 A $\leq$ 748.952 A
H5 Test	OK		
100 % Average Test	OK	1.0 %	12.689 A $\leq$ 1335.630 A
150 % Smoothed Test	OK	0.6 %	12.776 A $\leq$ 2003.446 A
H6 Test	OK		
100 % Average Test	OK	0.2 %	0.749 A $\leq$ 332.867 A
150 % Smoothed Test	OK	0.2 %	0.724 A $\leq$ 499.301 A
H7 Test	OK		
100 % Average Test	OK	0.8 %	7.487 A $\leq$ 898.742 A
150 % Smoothed Test	OK	0.6 %	7.524 A $\leq$ 1348.113 A
H8 Test	OK		
100 % Average Test	OK	0.2 %	0.501 A $\leq$ 249.651 A
150 % Smoothed Test	OK	0.1 %	0.509 A $\leq$ 374.476 A
H9 Test	OK		
100 % Average Test	OK	2.2 %	8.333 A $\leq$ 374.476 A
150 % Smoothed Test	OK	1.5 %	8.347 A $\leq$ 561.714 A
H10 Test	OK		
100 % Average Test	OK	0.4 %	0.758 A $\leq$ 199.720 A
150 % Smoothed Test	OK	0.3 %	0.735 A $\leq$ 299.581 A
H11 Test	OK		
100 % Average Test	OK	2.4 %	9.386 A $\leq$ 386.958 A
150 % Smoothed Test	OK	1.6 %	9.447 A $\leq$ 580.438 A
H12 Test	OK		





100 % Average Test	OK	0.3 %	0.503 A $\leq$ 166.434 A
150 % Smoothed Test	OK	0.2 %	0.511 A $\leq$ 249.651 A
H13 Test	OK		
100 % Average Test	OK	3.4 %	8.492 A $\leq$ 249.651 A
150 % Smoothed Test	OK	2.3 %	8.575 A $\leq$ 374.476 A
THC Test	OK	1.4 %	THC ok (40.598 A $\leq$ 2870.981 A)
PWHC Test	OK	1.9 %	PWHC ok (55.188 A $\leq$ 2870.981 A)





5.4 Voltage Fluctuations & Flicker Test

5.4.1 Limits

Voltage fluctuations & flicker Limit

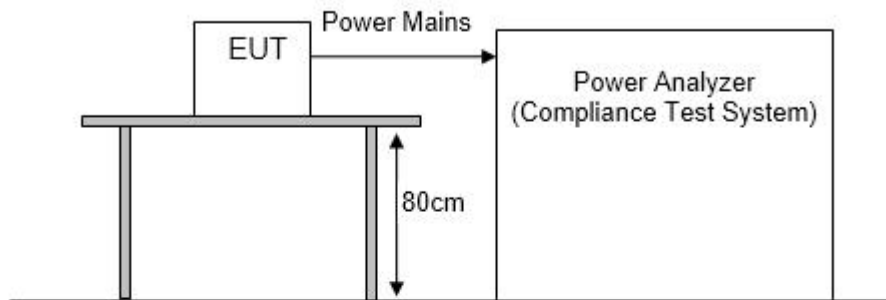
Test Item	Limit	Note
Pst	1.0	Pst means Short-term flicker indicator
Plt	0.65	Plt means long-term flicker indicator
Tdt	0.5	Tdt means maximum time that dt exceeds 3.3%
dmax (%)	4%	dmax means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change.

5.4.2 Test procedure

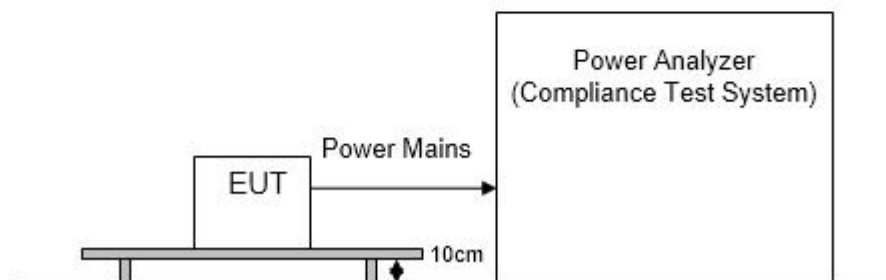
The EUT is placed on top of a wooden table (according to the standard height requirements, refer to the test layout), the most unfavorable sequence of voltage changes under normal conditions during the flick measurement; the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

5.4.3 Test Setup Diagram

Table-top device



Floor-standing device





5.4.4 E.U.T. Operation

Operating Environment:			
Temperature:	25.6° C	Humidity:	55.3%RH
Test Engineer	Xing Jin Mo		
Mode 1	AC IN+AC OUT	Voltage	AC 230V/50Hz





5.4.5 Test data

Result Overview

Interval	Result	Pst	dc	Ztest	dmax	Tmax
1	OK	4.6 % $0.046 \leq 1.000$	1.4 % $0.05 \% \leq$ 3.30 %	color=0xc118 $24 > 155.8 \%$ $0.05 \% <$ 2.00% >	1.2 % $0.05 \% \leq$ 4.00 %	0.0 % $0.0 \text{ ms} \leq$ 500.0 ms





Result Details

Test Name	Test Result	Limit Usage	Info
Interval 1 Test [L1]	OK		
Pst Test [L1]	OK	4.6 %	$0.046 \leq 1.000$
dc Test [L1]	OK	1.4 %	$0.05 \% \leq 3.30 \%$
dmax Test [L1]	OK	1.2 %	$0.05 \% \leq 4.00 \%$
tmax Test [L1]	OK	0.0 %	$0.0 \text{ ms} \leq 500.0 \text{ ms}$
Plt Test [L1]	OK	7.0 %	$0.046 \leq 0.650$





6. IMMUNITY TEST RESULTS (EMS)

6.1 Electrostatic Discharge Test

6.1.1 Limits

Test Level		Performance Criteria
Air Discharge	±2kV, ±4kV and ±8kV	B
Contact Discharge	±4kV	
Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT 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 EUT is used as intended.		

6.1.2 Test procedure

Air Discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed.

Contact Discharge:

All the procedure was same as air discharge. Except that the generator was re-triggered for a new single discharge. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

Indirect discharge for horizontal coupling plane:

At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane:

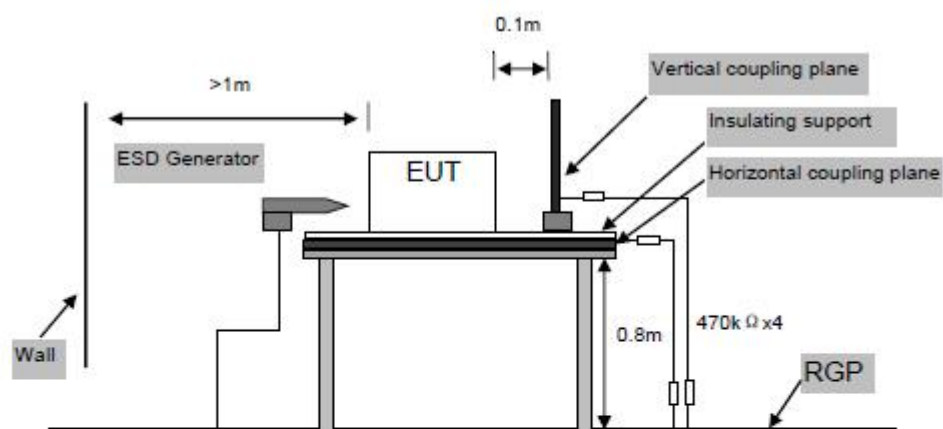
At least 20 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.



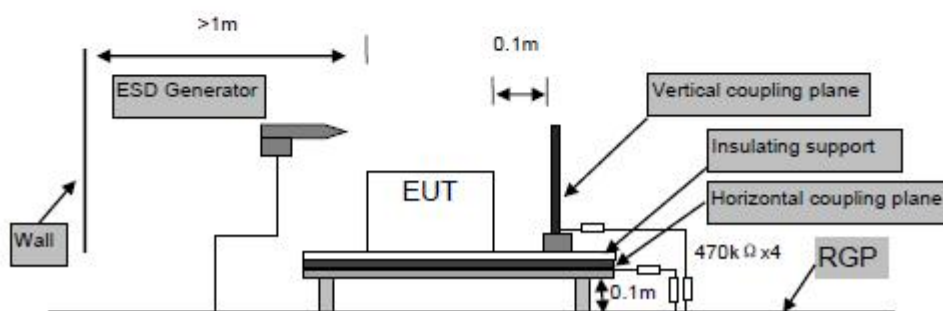


6.1.3 Test Setup Diagram

Table-top equipment



Floor-standing equipment



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Scan code to check authenticity



6.1.4 Test data

Operating Environment:					
Test Site:	ELECTROSTATIC DISCHARGE IMMUNITY TEST (0KV-30KV)		Test Engineer	Xing Jin Mo	
Temperature:	23.6° C		Humidity:	52.2%RH	
Memo:	/				
Sample No.: A260512103003			Mode 1: AC IN+AC OUT		
Test voltage: AC 230V/50Hz			Memo:		
Measure parameters: 20 times at each point for contact discharge; 20 times at each point for air discharge. 1 second interval for each discharge.					
Type of discharge	Test level	Test point	Required	Observation	Result
Contact to EUT	±4kV	Front, Back, Left, Right, Top, Bottom	B	A	Pass
Contact to coupling planes	±4kV	Coupling planes	B	A	Pass
Air	±2 kV /±4 kV /±8kV	Front, Back, Left, Right, Top, Bottom	B	A	Pass
Observation description: A: Normal performance within limits specified by the manufacturer requestor or purchaser. B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention.					
Sample No.: A260512103003			Mode 2: DC IN+AC OUT		
Test voltage: DC 48V			Memo:		
Measure parameters: 20 times at each point for contact discharge; 20 times at each point for air discharge. 1 second interval for each discharge.					
Type of discharge	Test level	Test point	Required	Observation	Result
Contact to EUT	±4kV	Front, Back, Left, Right, Top, Bottom	B	A	Pass
Contact to coupling planes	±4kV	Coupling planes	B	A	Pass
Air	±2 kV /±4 kV /±8kV	Front, Back, Left, Right, Top, Bottom	B	A	Pass
Observation description: A: Normal performance within limits specified by the manufacturer requestor or purchaser. B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention.					





Sample No.: A260512103003			Mode 3: PV IN+AC OUT		
Test voltage: DC 360V			Memo:		
Measure parameters: 20 times at each point for contact discharge; 20 times at each point for air discharge. 1 second interval for each discharge.					
Type of discharge	Test level	Test point	Required	Observation	Result
Contact to EUT	±4kV	Front, Back, Left Right, Top, Bottom	B	A	Pass
Contact to coupling planes	±4kV	Coupling planes	B	A	Pass
Air	±2 kV /±4 kV /±8kV	Front, Back, Left Right, Top, Bottom	B	A	Pass
Observation description: A: Normal performance within limits specified by the manufacturer requestor or purchaser. B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention.					





6.2 Continuous Radio Frequency Disturbances Test

6.2.1 Limits

Swept frequency test		Performance Criteria
Frequency (MHz)	80 to 1000; 1400 to 6000	A
Field Strength	3V/m rms voltage level of the unmodulated signal	
Modulation	AM modulated to a depth of 80% by a sine wave of ± 1 kHz	
Step Size	1% increments	
Dwell time	1 Sec.	
Performance criteria A description for other devices: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.		

6.2.2 Test procedure

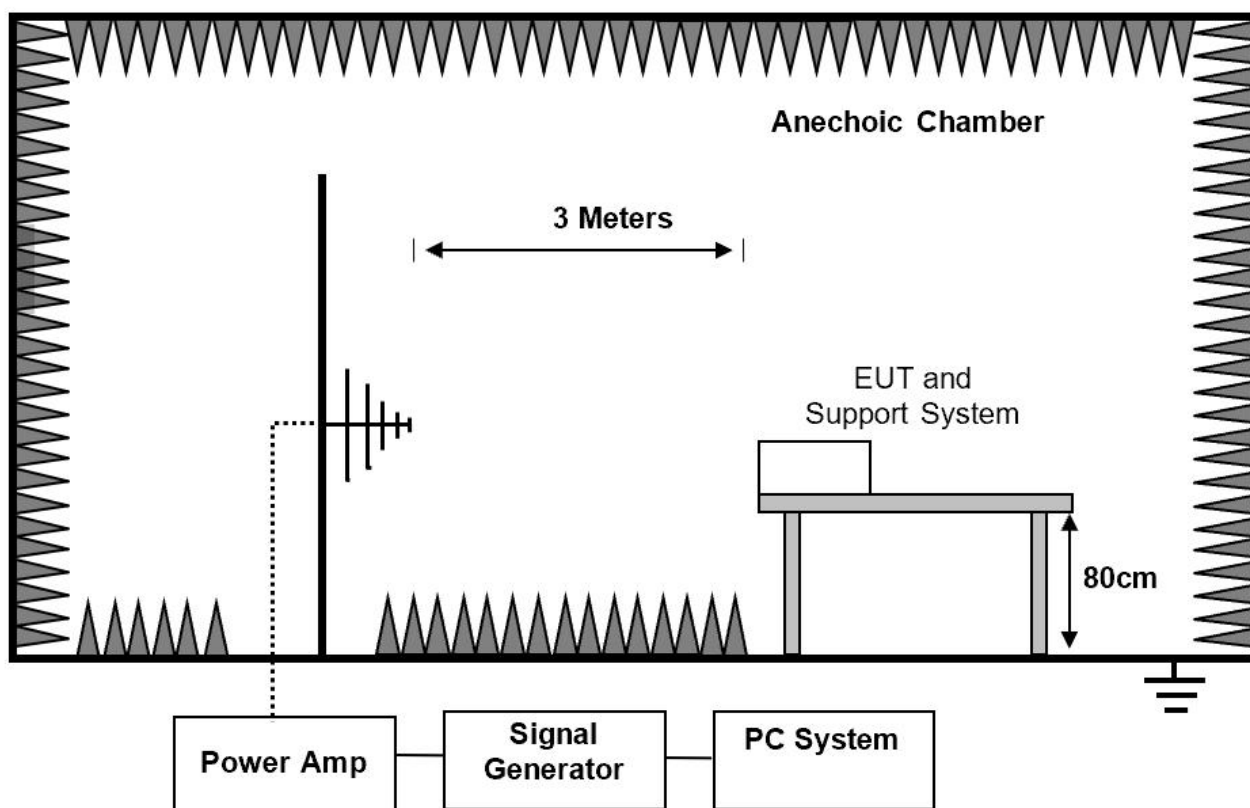
The field sensor is placed on the EUT table (Ground clearance height reference "block diagram of test setup") which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength around the EUT table from frequency range specified and records the signal generator's output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator's output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.





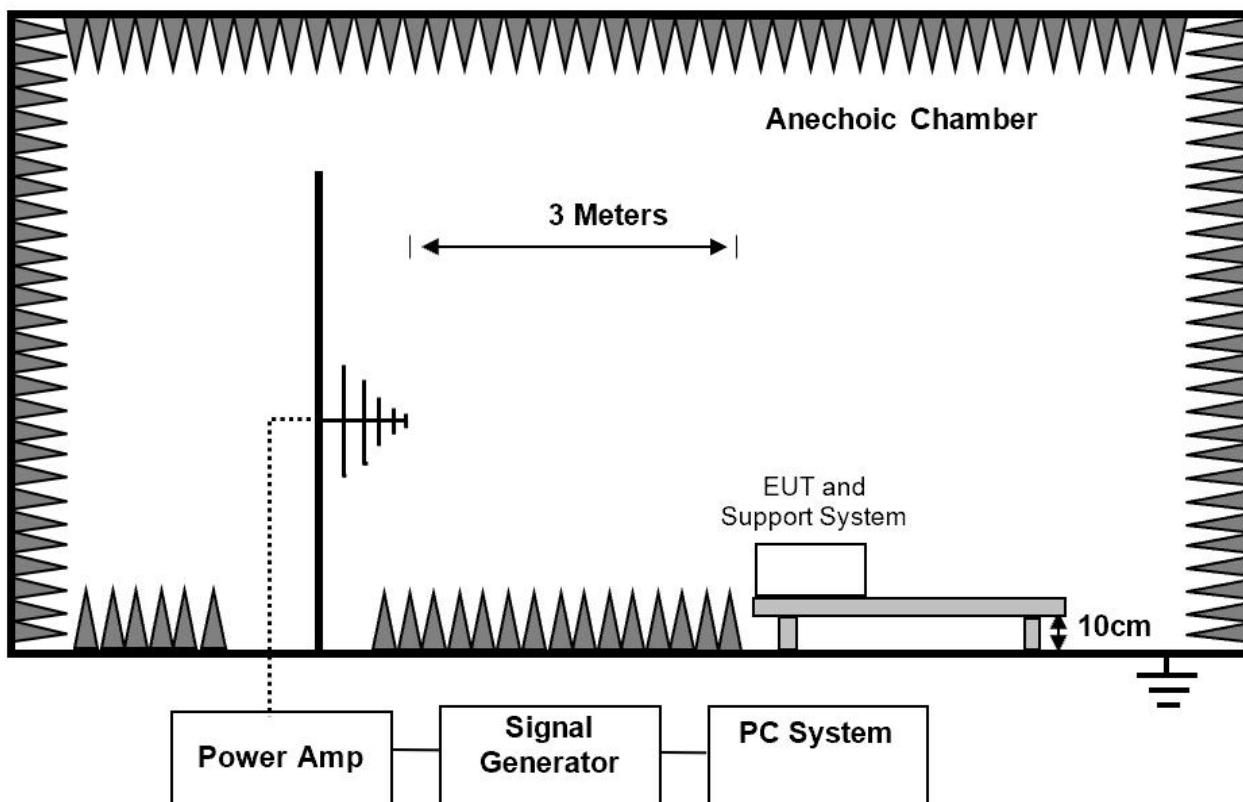
6.2.3 Test Setup Diagram

Table-top device





Floor-standing device





6.2.4 Test data

Operating Environment:						
Test Site:	RF FIELD STRENGTH SUSCEPTIBILITY TEST (UP TO 10V/m)			Test Engineer	Xing Jin Mo	
Temperature:	24.3° C			Humidity:	56.1%RH	
Memo:	/					
Sample No.: A260512103003				Mode 1: AC IN+AC OUT		
Test voltage: AC 230V/50Hz				Memo:		
Test steps: 1%, Dwell time 1s, 1kHz 80% AM modulation						
Test frequency	Level	EUT position	Antenna polarization	Required	Observation	Result
80MHz to 1000MHz	3V/m	Front	H	A	A	Pass
			V	A	A	Pass
		Left	H	A	A	Pass
			V	A	A	Pass
		Rear	H	A	A	Pass
			V	A	A	Pass
		Right	H	A	A	Pass
			V	A	A	Pass
1.4GHz to 6GHz	3V/m	Front	H	A	A	Pass
			V	A	A	Pass
		Left	H	A	A	Pass
			V	A	A	Pass
		Rear	H	A	A	Pass
			V	A	A	Pass
		Right	H	A	A	Pass
			V	A	A	Pass
Observation description:						
A: Normal performance within limits specified by the manufacturer requestor or purchaser.						
Sample No.: A260512103003				Mode 2: DC IN+AC OUT		
Test voltage: DC 48V				Memo:		
Test steps: 1%, Dwell time 1s, 1kHz 80% AM modulation						
Test frequency	Level	EUT position	Antenna polarization	Required	Observation	Result
80MHz to 1000MHz	3V/m	Front	H	A	A	Pass
			V	A	A	Pass
		Left	H	A	A	Pass
			V	A	A	Pass
		Rear	H	A	A	Pass





1.4GHz to 6GHz	3V/m	Right	V	A	A	Pass
			H	A	A	Pass
		Front	V	A	A	Pass
			H	A	A	Pass
		Left	V	A	A	Pass
			H	A	A	Pass
		Rear	V	A	A	Pass
			H	A	A	Pass
		Right	V	A	A	Pass
			H	A	A	Pass
			V	A	A	Pass
			H	A	A	Pass

Observation description:

A: Normal performance within limits specified by the manufacturer requestor or purchaser.

Sample No.: A260512103003				Mode 3: PV IN+AC OUT		
Test voltage: DC 360V				Memo:		
Test steps: 1%, Dwell time 1s, 1kHz 80% AM modulation						
Test frequency	Level	EUT position	Antenna polarization	Required	Observation	Result
80MHz to 1000MHz	3V/m	Front	H	A	A	Pass
			V	A	A	Pass
		Left	H	A	A	Pass
			V	A	A	Pass
		Rear	H	A	A	Pass
			V	A	A	Pass
		Right	H	A	A	Pass
			V	A	A	Pass
1.4GHz to 6GHz	3V/m	Front	H	A	A	Pass
			V	A	A	Pass
		Left	H	A	A	Pass
			V	A	A	Pass
		Rear	H	A	A	Pass
			V	A	A	Pass
		Right	H	A	A	Pass
			V	A	A	Pass
Observation description:						
A: Normal performance within limits specified by the manufacturer requestor or purchaser.						

Observation description:

A: Normal performance within limits specified by the manufacturer requestor or purchaser.





6.3 Electrical Fast Transients(EFT) Test

6.3.1 Limits

Test Level			Performance Criteria
Test voltage	±1kVfor AC mains port	±0.5kV for dc input or signal port	B
Repetition Frequency	5kHz	5kHz	
Burst Duration	15ms	15ms	
Burst Period	300ms	300ms	
Inject Time(s)	120s	120s	
Inject Method	Direct for AC mains port	Capacitive coupling clamp or CDN	
Inject Line	AC mains	Analogue/digital data ports, and DC network power ports	
Note: This test shall be additionally performed on analogue/digital data ports, and DC network power ports, of radio equipment and associated ancillary equipment, if the cables may be longer than 3 m.			
Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT 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 EUT is used as intended.			

6.3.2 Test procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support $0.1\text{m} \pm 0.01\text{m}$ thick. The ground reference plane was $1\text{m} \times 1\text{m}$ metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m . All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

For DC input and AC power ports:

The EUT was connected to the power mains by using a coupling device that couples the EFT interference signal to AC or DC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 2mins.

For analogue/digital data ports:

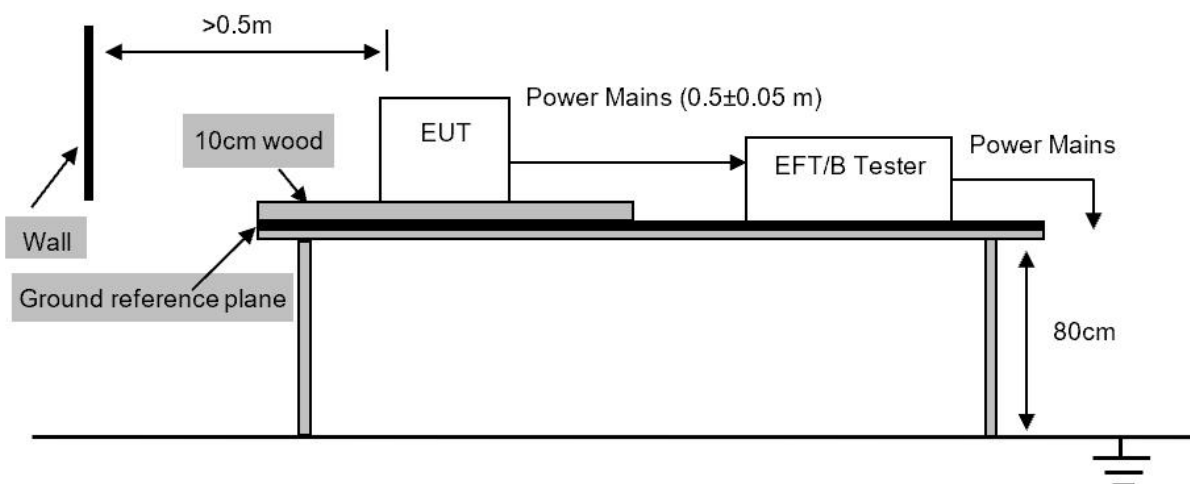
The capacitive coupling clamp was connected to the power by using a coupling device that couples the EFT interference signal to capacitive coupling clamp. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 2mins.



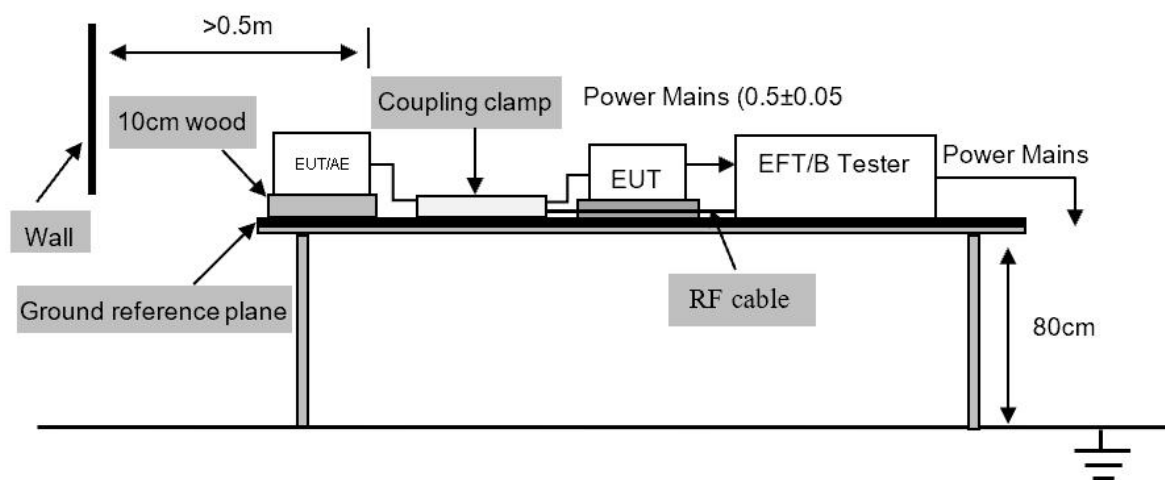


6.3.3 Test Setup Diagram

For power port (Note: if the DC network power cable may be lengths greater than 3 m, the requirement is applicable).



For analogue/digital data ports, if the cables may be longer than 3 m.





6.3.4 Test data

Operating Environment:							
Test Site:	High Power ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (UP TO 4KV)			Test Engineer	Xing Jin Mo		
Temperature:	22.3° C			Humidity:	52.3%RH		
Memo:	/						
Sample No.: A260512103003				Mode 1: AC IN+AC OUT			
Test voltage: AC 230V/50Hz				Memo:			
Test burst parameters: Burst period 300ms, Durations 15ms, Repetition frequency 5kHz							
Port/Coupling	Line	Test voltage	Test time(s)	Required	Observation	Result	
AC Mains/ Direct	L	+1kV	120	B	B	Pass	
		-1kV	120	B	B	Pass	
	N	+1kV	120	B	B	Pass	
		-1kV	120	B	B	Pass	
	PE	+1kV	120	B	B	Pass	
		-1kV	120	B	B	Pass	
	L-N	+1kV	120	B	B	Pass	
		-1kV	120	B	B	Pass	
	L-PE	+1kV	120	B	B	Pass	
		-1kV	120	B	B	Pass	
	N-PE	+1kV	120	B	B	Pass	
		-1kV	120	B	B	Pass	
	L-N-PE	+1kV	120	B	B	Pass	
		-1kV	120	B	B	Pass	
	Observation description: B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention.						





6.4 Surge Test

6.4.1 Limits

Test level for AC mains ports		Performance Criterion
Line to Line	1 kV 1.2/50(8/20) μ s	B
Line to Ground	2 kV 1.2/50(8/20) μ s	B
Note: In telecommunications centre 1 kV line to ground and 0,5 kV line to line shall be used.		
Wired network port (outdoor)		Performance Criterion
Line to Ground	1 kV 10/700(5/320) μ s (symmetrically)	B
Line to Ground or Shield to Ground	1 kV 1.2/50(8/20) μ s (non-symmetrically)	B
Line to Line	0.5 kV 1.2/50(8/20) μ s (non-symmetrically)	B
Wired network port (indoor)		Performance Criterion
Line to Ground or Shield to Ground	0.5 kV 1.2/50(8/20) μ s (longer than 30m)	B
Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT 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 EUT is used as intended.		

6.4.2 Test procedure

For line-to- nature coupling mode, provide a 1 kV 1.2/50 us voltage surge (at pen-circuit condition) and 8/20 us current surge to EUT selected points.

For line-to- ground coupling mode, provide a 2 kV 1.2/50 us voltage surge (at pen-circuit condition) and 8/20 us current surge to EUT selected points.

At least 5 positive and 5 negative (polarity) tests with a maximum 1-minute repetition rate are applied during test.

Different phase angles are done individually.

For other surge test, each line of internet port to ground coupling mode, provide a combination wave specified above table.

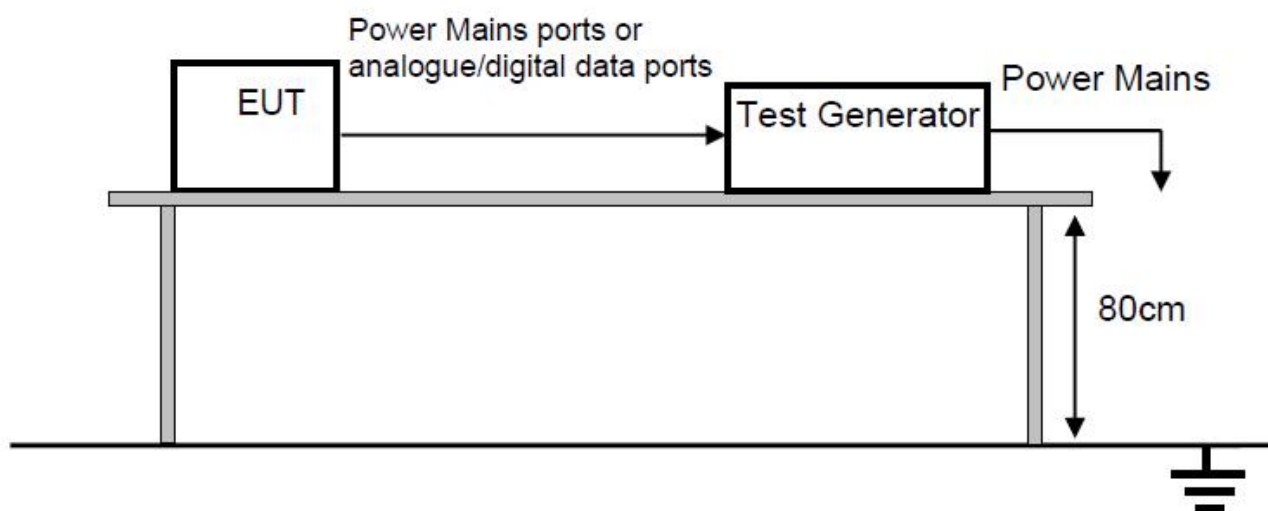
At least 5 positive and 5 negative (polarity) tests with a maximum 1-minute repetition rate are applied during test.

Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.





6.4.3 Test Setup Diagram





6.4.4 Test data

Operating Environment:					
Test Site:	High Power Surges IMMUNITY TEST		Test Engineer	Xing Jin Mo	
Temperature:	23.3° C		Humidity:	52.3%RH	
Memo:	/				
Sample No.: A260512103003			Mode 1: AC IN+AC OUT		
Test voltage: AC 230V/50Hz			Memo:		
Test wave parameters: Wave type: 1.2/50us-8/20us; Voltage phase: 0°, 90°, 180°, 270°; Pulse times: 5 times at each polarity; Pulse interval: 60s					
Line/Port	Internal impedance	Test voltage	Required	Observation	Result
L-N	2Ω	+0.5kV	B	B	Pass
	2Ω	-0.5kV	B	B	Pass
L-N	2Ω	+1kV	B	B	Pass
	2Ω	-1kV	B	B	Pass
L-PE	12Ω	+0.5kV	B	B	Pass
	12Ω	-0.5kV	B	B	Pass
N-PE	12Ω	+0.5kV	B	B	Pass
	12Ω	-0.5kV	B	B	Pass
L-PE	12Ω	+1kV	B	B	Pass
	12Ω	-1kV	B	B	Pass
N-PE	12Ω	+1kV	B	B	Pass
	12Ω	-1kV	B	B	Pass
L-PE	12Ω	+2kV	B	B	Pass
	12Ω	-2kV	B	B	Pass
N-PE	12Ω	+2kV	B	B	Pass
	12Ω	-2kV	B	B	Pass
Observation description: B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention.					





6.5 Continuous Conducted Disturbances Test

6.5.1 Limits

Test Level		Performance Criteria
Frequency	0.15MHz to 80MHz	A
Field Strength	3V measured unmodulated	
Modulation	AM modulated to a depth of 80% by a sinusoidal audio signal of ☒ 1 kHz / ☐ 400 Hz (see note1)	
Step Size	1% increments	
Dwell time	>0.5 Sec.	
Note 1: If the wanted signal is modulated at 1 kHz, then the test signal of 400 Hz shall be used. Note 2: This test shall be additionally performed on signal ports, wired network ports, control ports, and DC power ports, of radio equipment and associated ancillary equipment, if the cables may be longer than 3 m. Note 3: Performance criteria A description: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended.		

6.5.2 Test procedure

The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

The disturbance signal described below is injected to EUT through CDN.

The EUT operates within its operational mode(s) under intended climatic conditions after power on.

Use the frequency range specified by the standard, interference signal level, and interference signal for testing.

The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

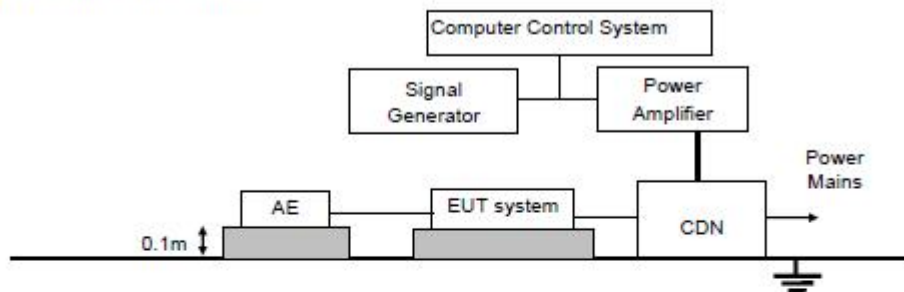
Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.



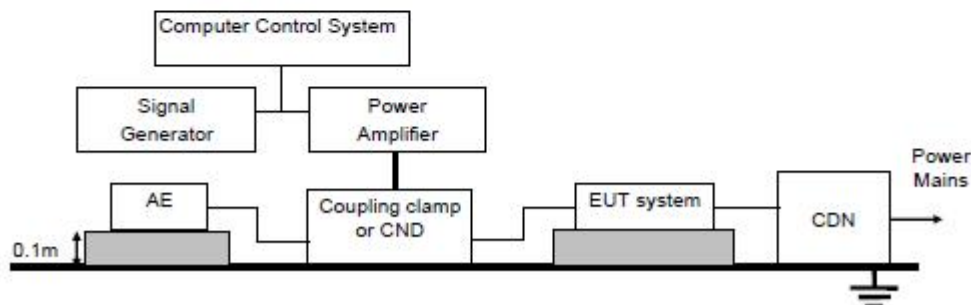


6.5.3 Test Setup Diagram

For power port (Note: if the DC network power cable may be lengths greater than 3 m, the requirement is applicable).



For analogue/digital data ports, if the cables may be longer than 3 m.





6.5.4 Test data

Operating Environment:					
Test Site:	High Power INJECTED CURRENTS SUSCEPTIBILITY TEST (150kHz-230MHz)		Test Engineer	Xing Jin Mo	
Temperature:	23.3° C		Humidity:	52.3%RH	
Memo:	/				
Sample No.: A260512103003			Mode 1: AC IN+AC OUT		
Test voltage: AC 230V/50Hz			Memo:		
Test steps: 1%, Dwell time 1s, 1kHz 80% AM modulation					
Test frequency	Injected Position	Strength	Required	Observation	Result
0.15MHz to 80MHz	AC Port	3V	A	A	Pass
Observation Description: A: Normal performance within limits specified by the manufacturer requestor or purchaser.					





6.6 Voltage Dips and Interruptions Test

6.6.1 Limits

Test Level %UT	Duration (in period)	Performance Criterion
0	0.5	B
0	1	B
70	25 for 50Hz/30 for 60Hz	C
0	250 for 50Hz/300 for 60Hz	C

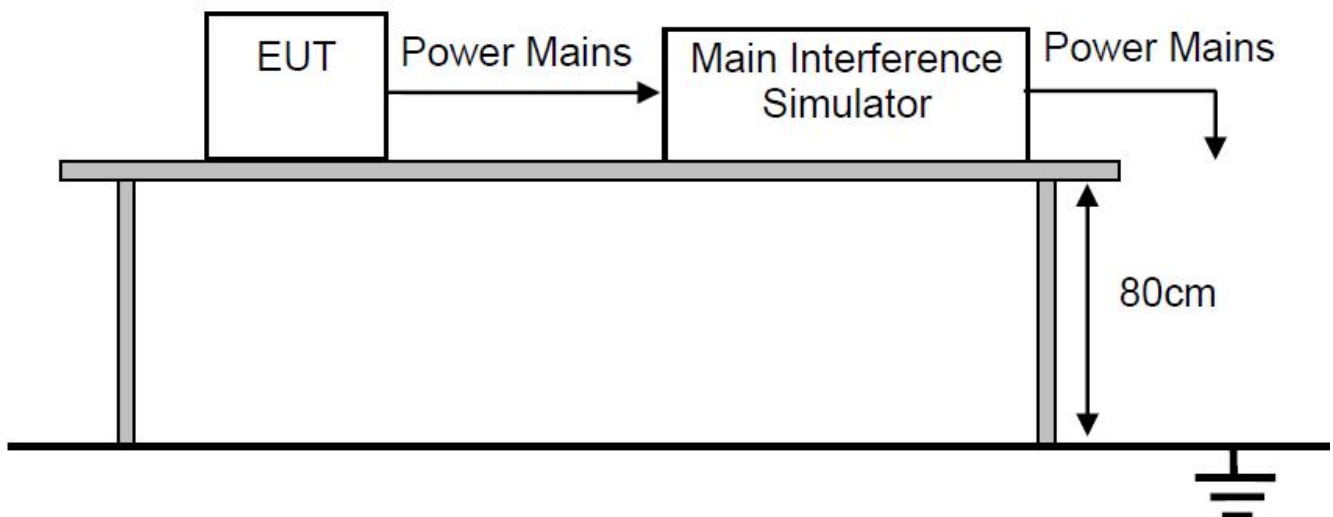
Performance criteria B description: During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended.

Performance criteria C description: During and after testing, a temporary loss of function is allowed, provided the function is self recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT 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.

6.6.2 Test procedure

The EUT and test generator were setup as shown. The interruptions are introduced at selected phase angles with specified duration. Record any degradation of performance.

6.6.3 Test Setup Diagram





6.6.4 Test data

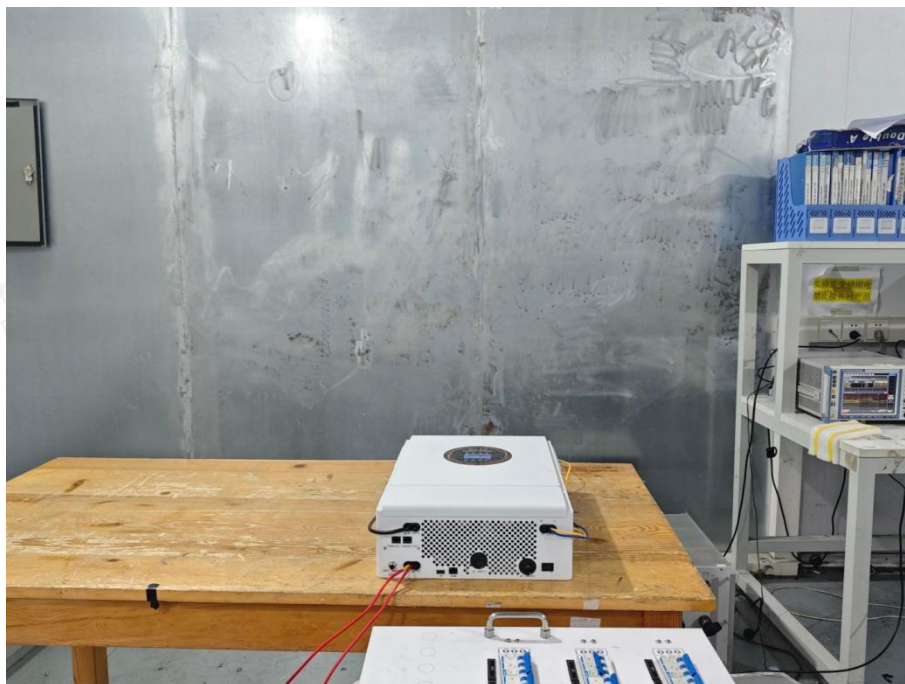
Operating Environment:					
Test Site:	VOLTAGE DIPS AND INTERRUPTIONS TEST		Test Engineer	Xing Jin Mo	
Temperature:	23.6° C		Humidity:	52.2%RH	
Memo:	/				
Sample No.: A260512103003			Mode 1: AC IN+AC OUT		
Test voltage: AC 230V/50Hz			Memo:		
Voltage Dips & Short Interruptions %U _T	Duration (in period)	Phase Angle	Required	Observation	Result
0	0.5P	0° to 360°	B	B	Pass
0	1P	0° to 360°	B	B	Pass
70	25P	0° to 360°	C	C	Pass
0	250P	0° to 360°	C	C	Pass
Observation description: B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention. C: Temporary loss of function or degradation of performance, the correction of which requires operator intervention.					





7. TEST SETUP PHOTOS

AC/DC Power Port Conducted Emission



Radiated Emissions(30-1000MHz)





Harmonic Current Emissions Test

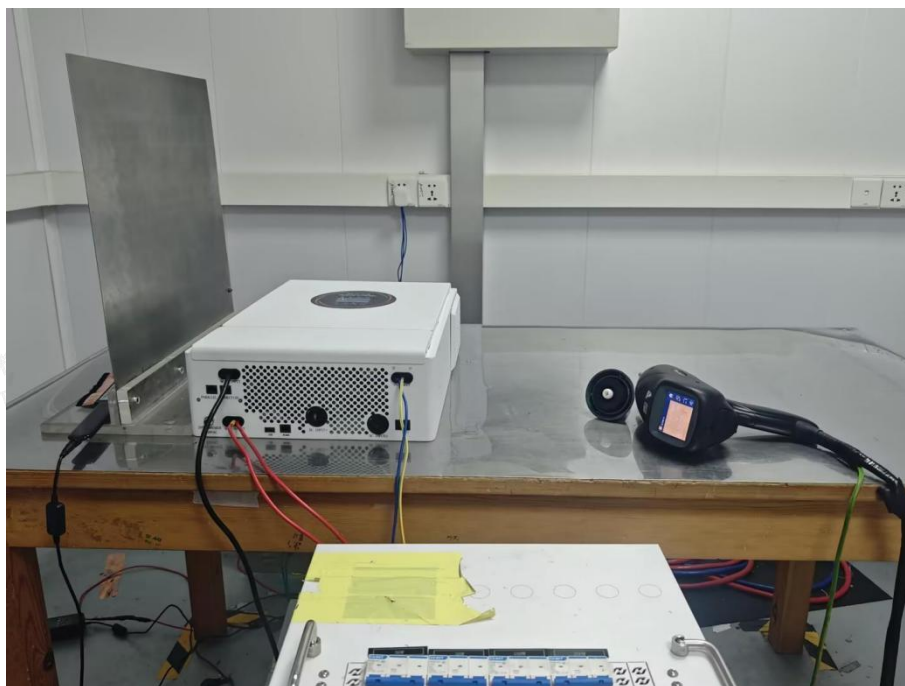


Voltage Fluctuations& Flicker Test





Electrostatic Discharge Test



Continuous Radio Frequency Disturbances Test

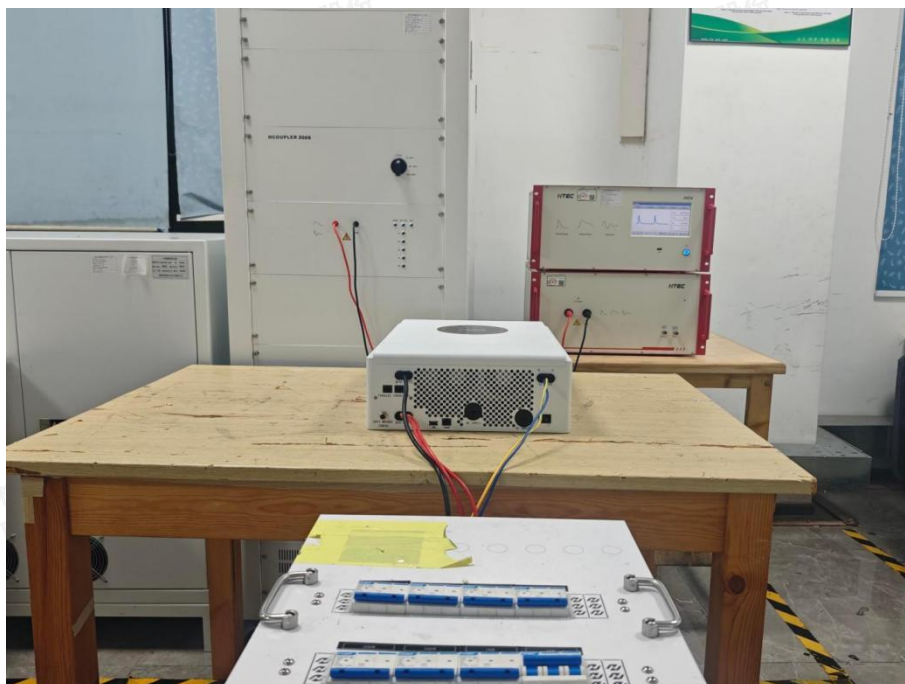




Electrical Fast Transients(EFT) Test

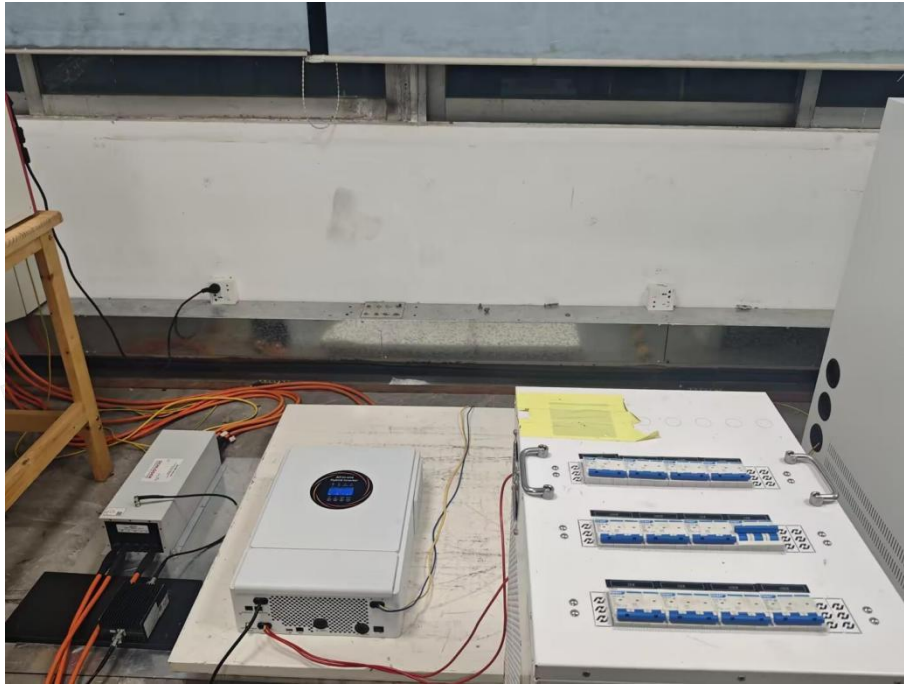


Surge Test





Continuous Conducted Disturbances Test



Voltage Dips and Interruptions Test





8. EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS)



Fig. 1



Fig. 2





Fig. 3



Fig. 4

-----End Report-----

