



EMC TEST REPORT

Report No.: SET2018-03482

Product: PV Grid Inverter

Model No: OG-30K-TM, OG-36K-TM

Applicant: Magnizon Power Systems FZE

Address: LOB11, Office 132, Jebel Ali Free Zone,
Dubai, United Arab Emirates

Issued by: CCIC Southern Electronic Product Testing (Shenzhen)CO., Ltd.

Lab location: Electronic Testing Building, Shahe Road, Xili, Nanshan
District, Shenzhen, 518055, P. R. China

Tel: 86 755 26627338 **Fax:** 86 755 26627238



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Report

Product.....: PV Grid Inverter
Model No.: OG-30K-TM, OG-36K-TM
Brand Name.....: ----
Applicant.....: Magnizon Power Systems FZE
Applicant Address.....: LOB11, Office 132, Jebel Ali Free Zone,
Dubai, United Arab Emirates
Manufacturer.....: Magnizon Power Systems FZE
Manufacturer Address.....: LOB11, Office 132, Jebel Ali Free Zone,
Dubai, United Arab Emirates
Test Standards.....: EN 61000-6-1-2007 Electromagnetic compatibility (EMC) -
Part 6-1: Generic standards - Immunity for residential,
commercial and light-industrial environments
EN 61000-6-2:2005 Electromagnetic compatibility (EMC) --
Part 6-2: Generic standards - Immunity for industrial
environments
EN 61000-6-3:2007+A1:2011 Electromagnetic compatibility
(EMC) - Part 6-3: Generic standards - Emission standard for
residential, commercial and light-industrial environments
EN 61000-6-4-2007+A1:2011 Electromagnetic compatibility
(EMC) - Part 6-4: Generic standards - Emission standard for
industrial environments

Test Result.....: PASS

Tested by

Jiang Haibiao

Mar. 30, 2018

Signature, Date

Reviewed by.....:

Lu - Tongzhou

Mar. 30, 2018

Signature, Date

Approved by.....:

Smartli

Mar. 30, 2018

Signature, Date



Table of Contents

Report.....	2
1 General Information.....	5
1.1 Description of EUT.....	5
1.2 Objective.....	5
2 Test Facilities and Configuration.....	5
2.1 Environmental Conditions.....	5
2.2 Measurement Uncertainty.....	5
3 Emission Test.....	8
3.1 EUT Setup and Operating Conditions.....	8
3.2 Mains Terminal Disturbance Voltage Measurement.....	8
3.2.1 Limits of Mains Terminal Disturbance Voltage.....	8
3.2.2 Test Setup.....	8
3.2.3 Test Result.....	9
3.3 Radiated Disturbance Measurement.....	12
3.3.1 Limits of Radiated Disturbance.....	12
3.3.2 Test Setup.....	12
3.4 Harmonic Current Measurement.....	14
3.4.1 Limits of Harmonic Current.....	14
3.4.2 Test Setup.....	14
3.4.3 Test Result.....	15
3.5 Voltage Fluctuation and Flick Measurement.....	18
3.5.1 Limits of Voltage Fluctuation and Flick.....	18
3.5.2 Test Result.....	18
4 Immunity Test.....	19
4.1 EUT Setup and Operating Conditions.....	19
4.2 Performance Criteria.....	19



4.3 Electrostatic Discharge Immunity Test	19
4.3.1 Test Specification	19
4.3.2 Test Setup	20
4.3.3 Test Result	20
4.4 Radiated, Radio Frequency Electromagnetic Field Immunity Test	21
4.4.1 Test Specification	21
4.4.2 Test Setup	21
4.4.3 Test Result	22
4.5 Electrical Fast Transient/Burst Immunity Test	22
4.5.1 Test Specification	22
4.5.2 Test Setup	22
4.5.3 Test Result	23
4.6 Surge Immunity Test	23
4.6.1 Test Specification	23
4.6.2 Test Setup	23
4.6.3 Test Result	23
4.7 Immunity to Conducted Disturbances Induced by RF Fields	24
4.7.1 Test Specification	24
4.7.2 Test Setup	24
4.7.3 Test Result	24
4.8 Power Frequency Magnetic Field Immunity Test	25
4.8.1 Test Specification	25
4.8.2 Test Setup	25
4.8.3 Test Result	25
Appendix I: Photographs of the EUT	26
Appendix II: Photographs of EMC Test Configuration	30

1 General Information

1.1 Description of EUT

Product: PV Grid inverter
Model No.: OG-36K-TM
Brand Name: ----
Serial No.: /
DC Input: PV - voltage range: 200-950 d.c.V
PV current: 23*3 d.c. A max
Rating: AC Output: 480 a.c.V,50/60Hz
AC Current: 48 a.c. A ,Max.
Power :36 kW.
Accessories: /

NOTE:

1. The highest internal frequency of the EUT is less than 108 M Hz. For more detailed features description about the EUT, please refer to User's Manual.
2. OG-30K-TM and OG-36K-TM structure completely consistent, difference only lies in the rated output voltage and rated output power is different. According to the differences, all tests were performed on model OG-36K-TM and the test results should also represent the other models.

1.2 Objective

Perform Electro Magnetic Interference (EMI) and Electro Magnetic Susceptibility (EMS) tests for CE Marking.

2 Test Facilities and Configuration

2.1 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

2.2 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in Measurement" (GUM) published by ISO.

- Uncertainty of Conducted Emission, $U_c = \pm 3.6\text{dB}$
- Uncertainty of Radiated Emission, $U_c = \pm 5.0\text{dB}$



2.3 Test Standards and Results

The EUT has been tested according to the following specifications:

EMISSION		
Standard	Test Type	Result
EN 61000-6-3:2007+A1:2011	Mains terminal disturbance voltage	PASS
EN 61000-6-4:2007+A1:2011	Radiated disturbance	PASS
IEC61000-3-12	Harmonic Current Measurement	PASS
IEC61000-3-11	Voltage Fluctuation and Flick Measurement	PASS
IMMUNITY (EN 61000-6-1-2007, EN61000-6-2:2005)		
Basic Standard	Test Type	Result
IEC 61000-4-2	Electrostatic discharge immunity	PASS
IEC 61000-4-3	Radiated, radio frequency electromagnetic field immunity	PASS
IEC 61000-4-4	Electrical fast transient/burst immunity	PASS
IEC 61000-4-5	Surge immunity	PASS
IEC 61000-4-6	Immunity to conducted disturbances induced by RF fields	PASS
IEC 61000-4-8	Power frequency magnetic field immunity	PASS
IEC 61000-4-11	Voltage dips and short interruptions immunity	N/A

NOTE: The latest versions of basic standards are applied.



2.4 List of Equipment Used

Description	Manufacturer	Model No.	Calibration Due Date	Serial No.
Test Receiver	ROHDE&SCHWARZ	ESCI	Jun.05, 2018	A130901474
LISN	SCHWARZBECK	NNLK8130	Jun.05, 2018	A131001541
Broadband Ant.	SCHWARZBECK	VULB 09160	May.25,2019	A0805560
ESD Test System	EM TEST	ESD30C	Jun.12, 2018	A0712513
EFT/Surge Test System	EM TEST	UCS500N7.7	Nov.02, 2018	A130201094
	EM TEST	CNI503B9.3	Nov.02, 2018	A130201095
Signal Generator	ROHDE&SCHWARZ	SMB100A	Nov.02, 2018	A141002004
EMS Antenna	Amplifier Research	BBHA 9120 J	Mar.09, 2019	A160322002
EMS Antenna	Amplifier Research	AM 9144	Jan.20, 2019	A151002436
Power Amplifier	MILMEGA	80RF1000-1000	Mar 39, 2019	A140101634
Power Amplifier	MILMEGA	AS0104R-800/400	Mar 29, 2019	A160322001
Power Meter	Amplifier Research	E4417A	Nov.02, 2018	A140701873
Capacitive clamp	ROHDE&SCHWARZ	F2301	Aug 05, 2018	A0304258
Power Amplifier	TESEQ	NSG4070	Mar.29, 2019	A160602544
Anechoic Chamber	Albatross	EMC 19.6×11.8×8.55 (m)	Jun.28,2019	A0802520
Magnetic Field Tester	HAEFELY	MAG 100.1	Jun.04, 2018	A0103109
AC Power source	Chroma	Chroma 61860	Jan.20, 2019	A150202185
3 Phases Harmonic Analyzer	EM TEST	DPA503N	Jan.03, 2019	A150202183
3 Phases Flicker Impedance	EM TEST	AIF 503N75	Jan.03, 2019	A150202184

NOTE: Equipment above has been calibrated and is in the period of validation.

3 Emission Test

3.1 EUT Setup and Operating Conditions

The EUT was powered by 680V DC mains and continuously operated.

Environment Condition:

Temperature: 24°C; Relative Humidity: 55%; Pressure: 101kPa

Test Date: 2017-07-12 to 2017-07-25

Test Engineer: Jiang Haibiao

Test Site: EMC Lab

3.2 Mains Terminal Disturbance Voltage Measurement

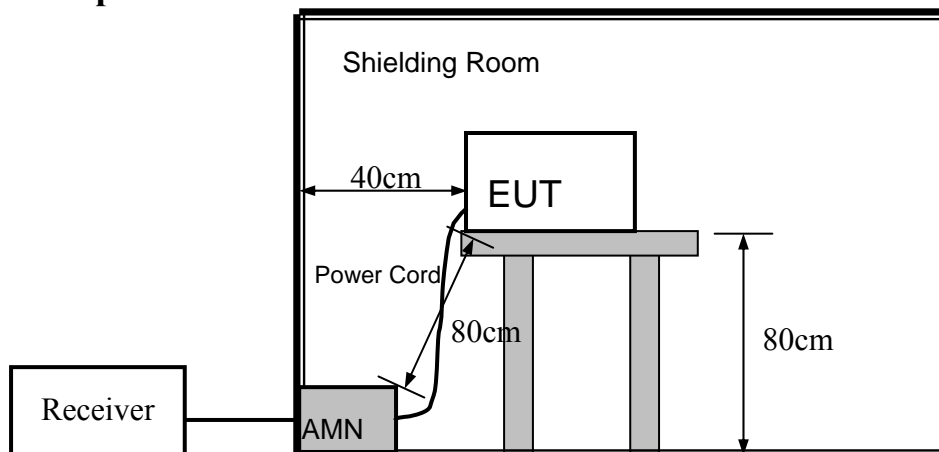
3.2.1 Limits of Mains Terminal Disturbance Voltage

Frequency range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66-56	56-46
0.5 - 5	56	46
5-30	60	50

NOTE:

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

3.2.2 Test Setup





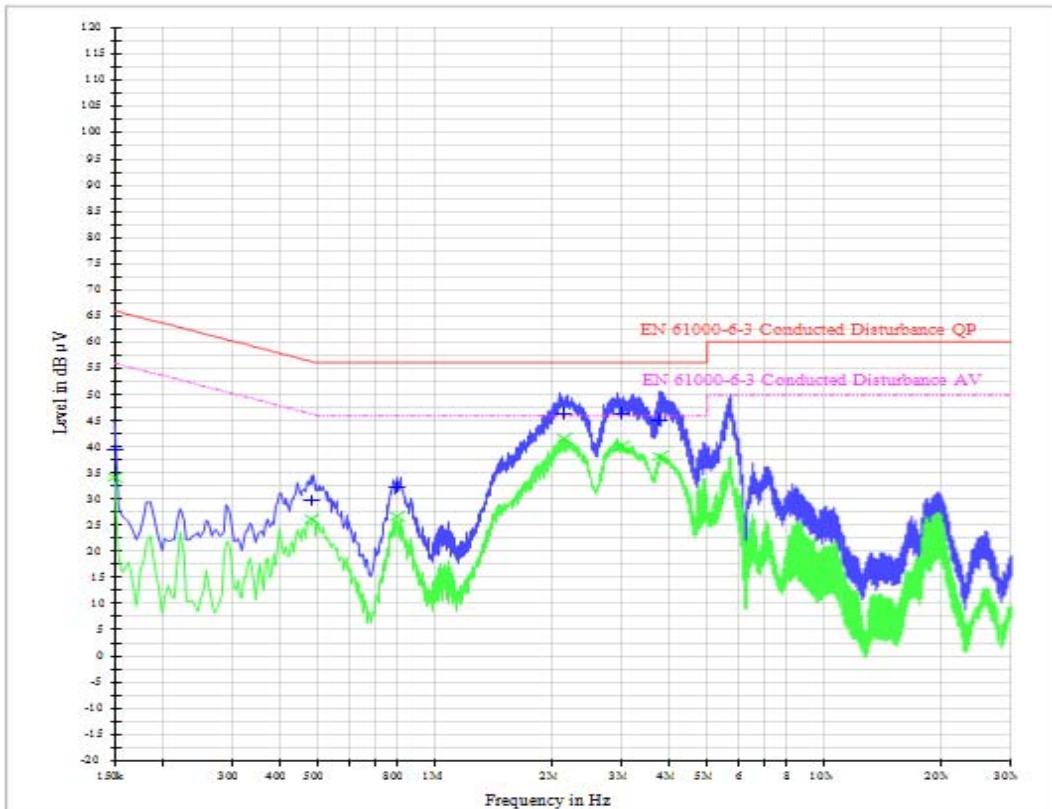
3.2.3 Test Result

No.	Freq. (MHz)	Limit Value (dB μ V)		Emission Level (dB μ V)	
		QP	AV	QP	AV
1	0.1500	66	56	39.5	34.2
2	0.4820	56.3	46.3	31.9	26.4
3	0.7940	56	46	35.6	29.8
4	2.1340	56	46	46.5	41.6
5	2.8220	56	46	49.3	44.0
6	3.8060	56	46	47.7	41.8

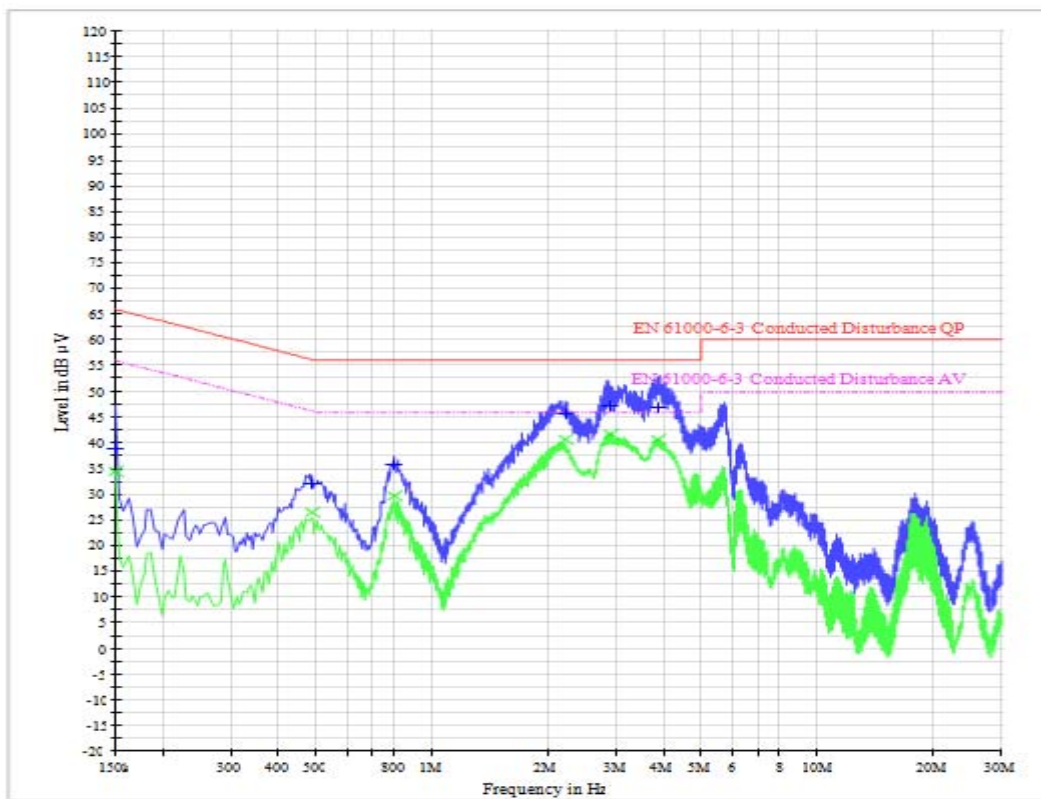
NOTE:

1. QP and AV are abbreviations of the quasi-peak and average individually.
2. If the emission levels measured with QP detector are lower than AV limits, there is unnecessary to measure with AV detector.
3. The emission levels recorded above is the larger ones of each phase.

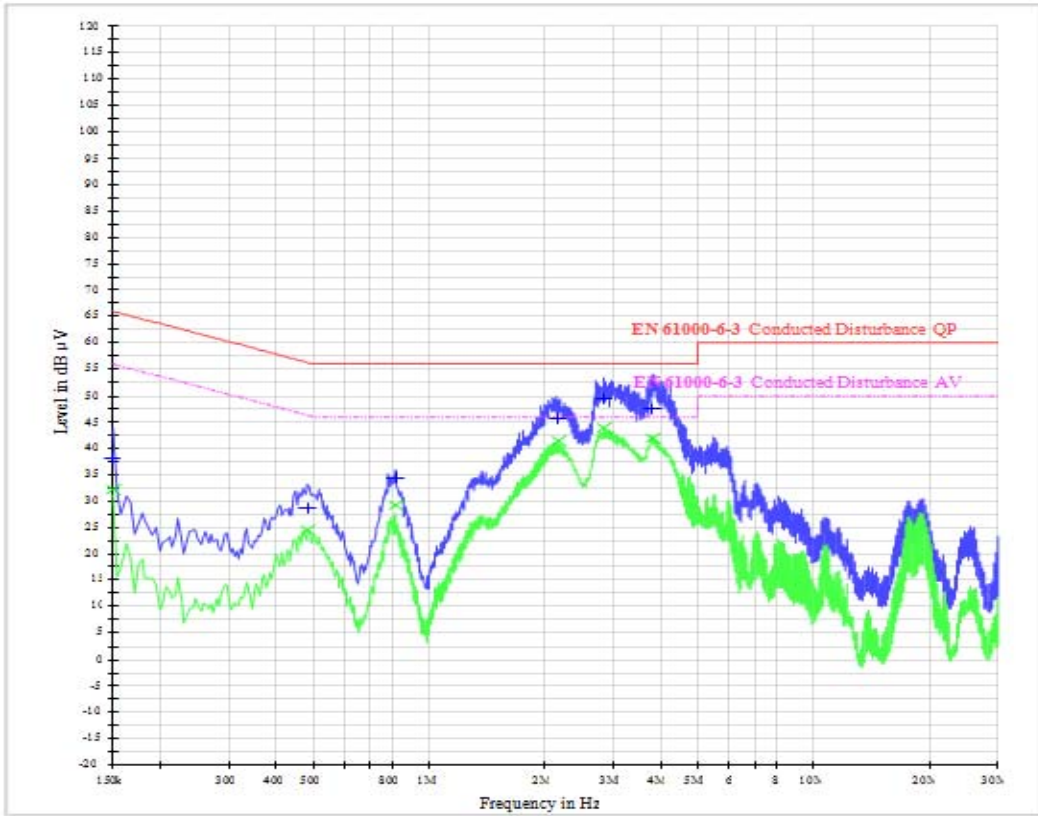
Mains terminal disturbance voltage, L1 phase



Mains terminal disturbance voltage, L2 phase



Mains terminal disturbance voltage, L3 phase



3.3 Radiated Disturbance Measurement

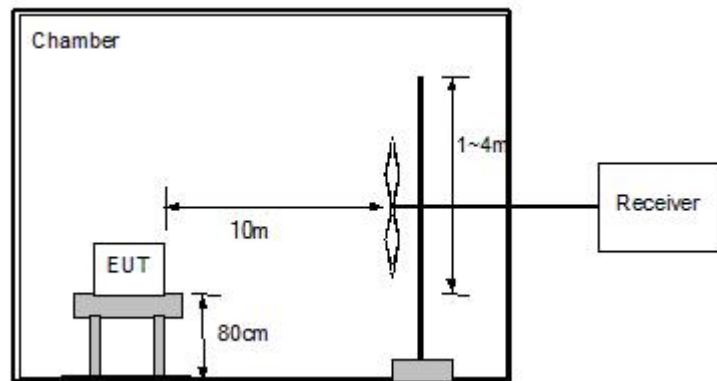
3.3.1 Limits of Radiated Disturbance

Frequency range (MHz)	Quasi peak limits(dB μ V/m), at 10m measurement distance
30 – 230	30
230 - 1000	37

Notes:

- (1) The lower limit shall apply at the transition frequency.
- (2) Additional provisions may be required for cases where interference occurs.

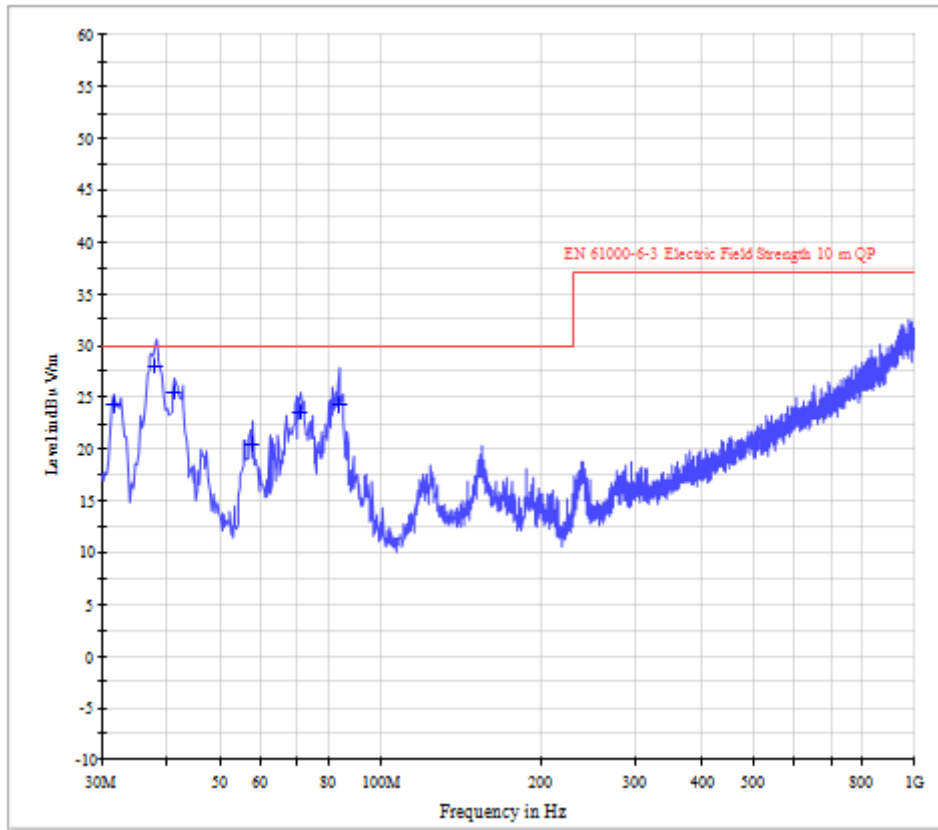
3.3.2 Test Setup



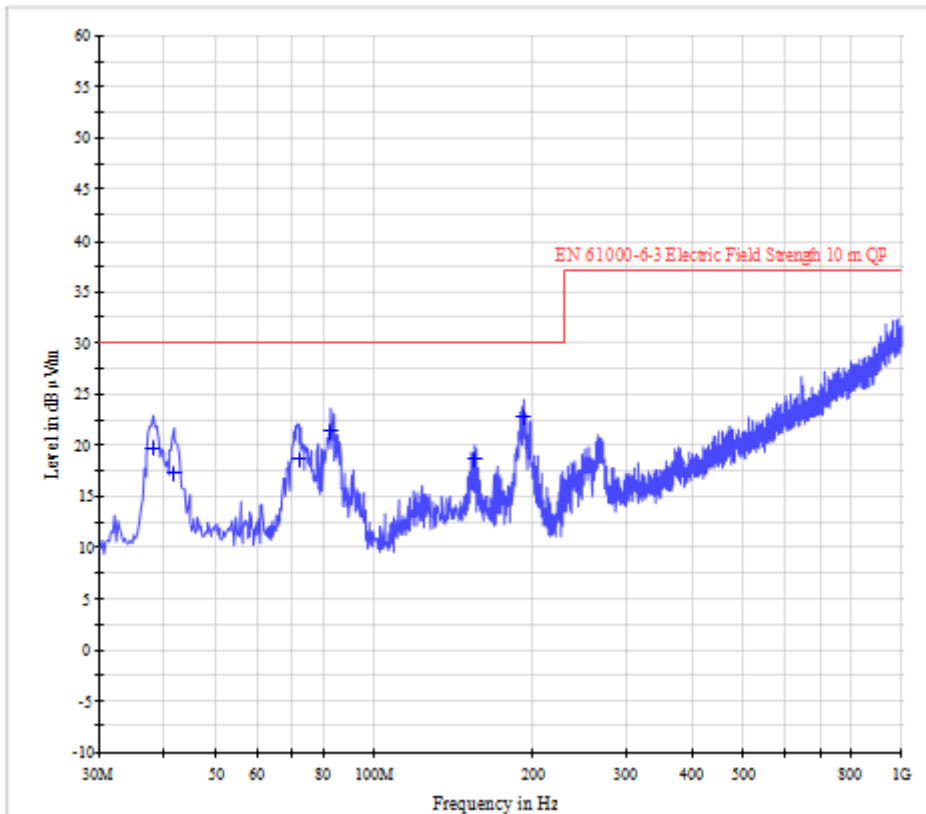
3.3.3 Test Result

No.	Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Table Angle (Degree)	QP Limits (dB μ V/m)	Emission Level (dB μ V/m)
1	82.88	H	400	0	30	21.4
2	192.24	H	400	0	30	22.7
3	31.68	V	100	0	30	24.3
4	37.80	V	100	0	30	28.1
5	41.16	V	100	0	30	25.6
6	83.60	V	100	0	30	24.3

1. Electromagnetic radiation disturbances, max peak detector, antenna polarization: Vertical



2. Electromagnetic radiation disturbances, max peak detector, antenna polarization: Horizontal



3.4 Harmonic Current Measurement

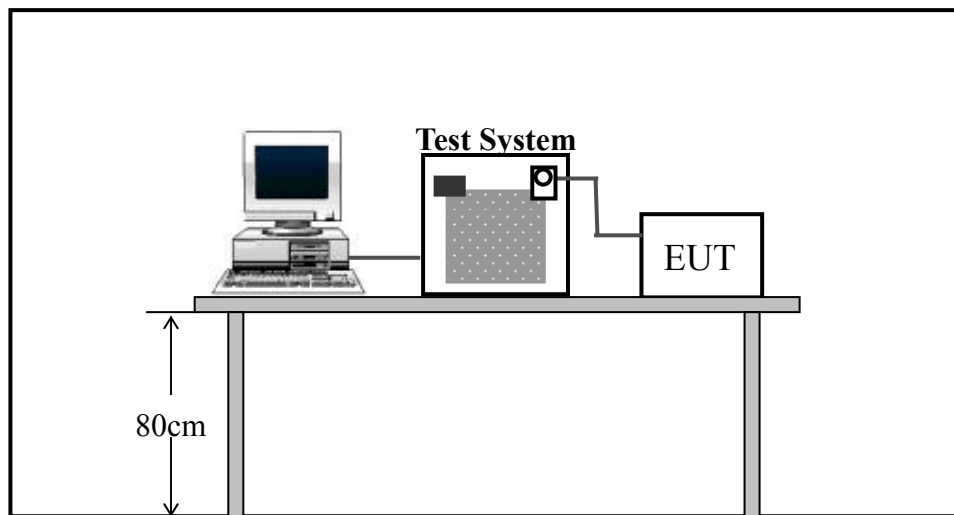
3.4.1 Limits of Harmonic Current

Minimum R_{scc}	Admissible individual harmonic current I_h / I_{ref} ^a				Admissible harmonic parameters %	
	I_5	I_7	I_{11}	I_{13}	THC/ I_{ref}	PWHC/ I_{ref}
33	10.7	7.2	3.1	2	13	22
66	14	9	5	3	16	25
120	19	12	7	4	22	28
250	31	20	12	7	37	38
≥ 350	40	25	15	1	48	46

The relative values of even harmonics up to order 12 shall not exceed 16/h%. Even harmonics above order 12 are taken into account in THC and PWHC in the same way as odd order harmonics.
Linear interpolation between successive R_{scc} values is permitted

^a I_{ref} = reference current ; I_h = harmonic current component.

3.4.2 Test Setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



3.4.3 Test Result

Test Specification

Test Frequency:	50Hz	Test Voltage:	380Vac	
Professional equipment:	<input type="checkbox"/> Yes		<input checked="" type="checkbox"/> No	
Limits	<input type="checkbox"/> Table 2	<input checked="" type="checkbox"/> Table 3	<input type="checkbox"/> Table 4	<input type="checkbox"/> Table 5
Reference current I_{ref}	<input checked="" type="checkbox"/> Measured average value			L1:24.67A
	<input type="checkbox"/> Specified by the manufacturer			L2:24.61A L3:24.63A
Verdict	<input checked="" type="checkbox"/> Pass		<input type="checkbox"/> Fail	

Test Result:

Average harmonic current results - Phase 1				
Hn	I_{eff} [A]	I_{eff} [%]	Limit [%]	Result
1	24.676	100.000		
2	98.646E-3	0.400	8.00	PASS
3	33.978E-3	0.138		PASS
4	88.360E-3	0.358	4.00	PASS
5	355.654E-3	1.441	10.70	PASS
6	97.000E-3	0.393	2.67	PASS
7	397.941E-3	1.613	7.20	PASS
8	87.136E-3	0.353	2.00	PASS
9	109.373E-3	0.443		PASS
10	63.688E-3	0.258	1.60	PASS
11	197.232E-3	0.799	3.10	PASS
12	27.332E-3	0.111	1.33	PASS
13	127.310E-3	0.516	2.00	PASS
14	11.789E-3	0.048		PASS
15	12.414E-3	0.050		PASS
16	14.033E-3	0.057		PASS
17	103.628E-3	0.420		PASS
18	48.022E-3	0.195		PASS
19	89.961E-3	0.365		PASS
20	49.759E-3	0.202		PASS
21	10.446E-3	0.042		PASS
22	7.757E-3	0.031		PASS
23	40.212E-3	0.163		PASS
24	6.703E-3	0.027		PASS
25	36.147E-3	0.146		PASS
26	6.272E-3	0.025		PASS
27	6.968E-3	0.028		PASS
28	5.913E-3	0.024		PASS
29	28.832E-3	0.117		PASS
30	6.178E-3	0.025		PASS
31	26.618E-3	0.108		PASS
32	5.964E-3	0.024		PASS
33	6.461E-3	0.026		PASS
34	4.909E-3	0.020		PASS
35	21.211E-3	0.086		PASS
36	4.908E-3	0.020		PASS
37	21.665E-3	0.088		PASS
38	4.957E-3	0.020		PASS
39	6.930E-3	0.028		PASS
40	5.116E-3	0.021		PASS



Average harmonic current results - Phase 2				
Hn	I _{eff} [A]	I _{eff} [%]	Limit [%]	Result
1	24.617	100.000		
2	74.377E-3	0.302	8.00	PASS
3	43.314E-3	0.176		PASS
4	84.310E-3	0.342	4.00	PASS
5	372.342E-3	1.513	10.70	PASS
6	194.481E-3	0.790	2.67	PASS
7	492.338E-3	2.000	7.20	PASS
8	83.486E-3	0.339	2.00	PASS
9	108.519E-3	0.441		PASS
10	65.301E-3	0.265	1.60	PASS
11	229.632E-3	0.933	3.10	PASS
12	40.510E-3	0.165	1.33	PASS
13	129.904E-3	0.528	2.00	PASS
14	11.117E-3	0.045		PASS
15	14.573E-3	0.059		PASS
16	12.980E-3	0.053		PASS
17	102.718E-3	0.417		PASS
18	49.716E-3	0.202		PASS
19	91.929E-3	0.373		PASS
20	50.385E-3	0.205		PASS
21	9.060E-3	0.037		PASS
22	6.599E-3	0.027		PASS
23	40.644E-3	0.165		PASS
24	6.049E-3	0.025		PASS
25	36.056E-3	0.146		PASS
26	6.181E-3	0.025		PASS
27	6.799E-3	0.028		PASS
28	5.729E-3	0.023		PASS
29	28.845E-3	0.117		PASS
30	6.389E-3	0.026		PASS
31	26.131E-3	0.106		PASS
32	5.937E-3	0.024		PASS
33	5.877E-3	0.024		PASS
34	4.696E-3	0.019		PASS
35	21.971E-3	0.089		PASS
36	4.526E-3	0.018		PASS
37	21.209E-3	0.086		PASS
38	4.828E-3	0.020		PASS
39	8.043E-3	0.033		PASS
40	5.117E-3	0.021		PASS



Average harmonic current results - Phase 3				
Hn	I _{eff} [A]	I _{eff} [%]	Limit [%]	Result
1	24.634	100.000		
2	39.920E-3	0.162	8.00	PASS
3	54.646E-3	0.222		PASS
4	84.715E-3	0.344	4.00	PASS
5	362.342E-3	1.471	10.70	PASS
6	111.094E-3	0.451	2.67	PASS
7	471.706E-3	1.915	7.20	PASS
8	91.830E-3	0.373	2.00	PASS
9	88.089E-3	0.358		PASS
10	64.759E-3	0.263	1.60	PASS
11	197.556E-3	0.802	3.10	PASS
12	27.708E-3	0.112	1.33	PASS
13	132.415E-3	0.538	2.00	PASS
14	10.848E-3	0.044		PASS
15	10.981E-3	0.045		PASS
16	11.976E-3	0.049		PASS
17	100.786E-3	0.409		PASS
18	48.603E-3	0.197		PASS
19	90.325E-3	0.367		PASS
20	50.172E-3	0.204		PASS
21	8.824E-3	0.036		PASS
22	6.549E-3	0.027		PASS
23	39.813E-3	0.162		PASS
24	5.989E-3	0.024		PASS
25	36.556E-3	0.148		PASS
26	5.772E-3	0.023		PASS
27	6.646E-3	0.027		PASS
28	5.635E-3	0.023		PASS
29	27.581E-3	0.112		PASS
30	6.242E-3	0.025		PASS
31	27.020E-3	0.110		PASS
32	5.741E-3	0.023		PASS
33	5.888E-3	0.024		PASS
34	4.568E-3	0.019		PASS
35	20.733E-3	0.084		PASS
36	4.388E-3	0.018		PASS
37	21.807E-3	0.089		PASS
38	4.731E-3	0.019		PASS
39	6.335E-3	0.026		PASS
40	4.987E-3	0.020		PASS



3.5 Voltage Fluctuation and Flick Measurement

3.5.1 Limits of Voltage Fluctuation and Flick

Test Item	Limit	Note
P_{st}	1.0	P_{st} means Short-term flicker indicator
P_{lt}	0.65	P_{lt} means long-term flicker indicator
T_{dt}	0.5	T_{dt} means maximum time that d_t exceeds 3%
$d_{max}(\%)$	4%	d_{max} means maximum relative voltage change.
$d_c(\%)$	3.3%	d_c means relative steady-state voltage change.

3.5.2 Test Result

Test Specification

Test Frequency:	50Hz	Test Voltage:	480Vac
Waveform:	Sine	Test Time:	10 minutes(P_{st}); 2 hours (P_{lt})

Test Parameter	Measurement Value			Limit	Remarks
	L1	L2	L3		
P_{st}	0.238	0.229	0.258	1.0	Pass
P_{lt}	0.205	0.202	0.220	0.65	Pass
$T_{dt(s)}$	0.169	0.189	0.141	0.5	Pass
$d_{max}(\%)$	0.568	0.695	0.605	4	Pass
$d_c(\%)$	0.000	0.000	0.000	3.3	Pass



4 Immunity Test

4.1 EUT Setup and Operating Conditions

The EUT was powered by 680V DC mains and continuously operated.

Environment Condition:

Temperature: 24°C; Relative Humidity: 55%; Pressure: 101kPa

Test Date: 2017-07-05~2017-07-06

Test Engineer: Jiang Haibiao

Test Site: EMC Lab

4.2 Performance Criteria

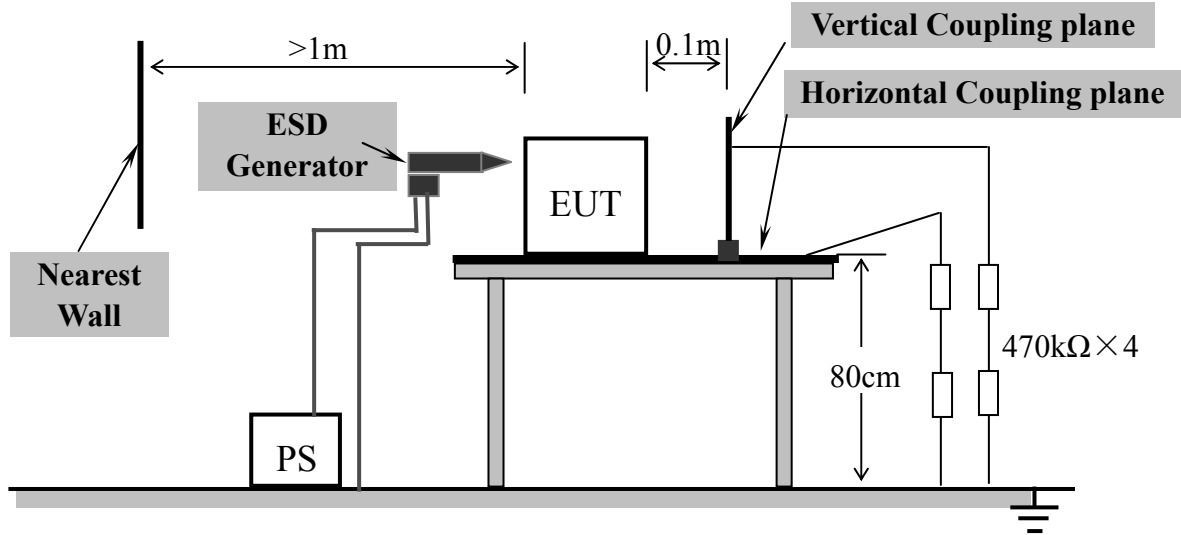
Criterion A	The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
Criterion B	The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
Criterion C	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

4.3 Electrostatic Discharge Immunity Test

4.3.1 Test Specification

Basic Standard:	IEC 61000-4-2
Discharge Impedance	330 Ω / 150 pF
Discharge Voltage:	Air Discharge : 8 kV Contact Discharge : 6kV
Polarity:	Positive / Negative
Number of Discharge:	Minimum 20 times at each test point
Discharge Mode:	Single discharge
Discharge Period:	1-second minimum
Criterion:	B

4.3.2 Test Setup



For the actual test configuration, please refer to Appendix II: Photographs of the Test Configuration.

4.3.3 Test Result

Test Points	Discharge Level (kV)	Discharge Mode	Observation	Comply with Criterion
Aperture of the cover	±8	Air	Note(1)	A
Screen	±8	Air	Note(1)	A
Button	±8	Air	Note(1)	A
Metallic shell	±6	Contact	Note(1)	A
HCP	±6	Contact	Note(1)	A
VCP	±6	Contact	Note(1)	A

NOTE:

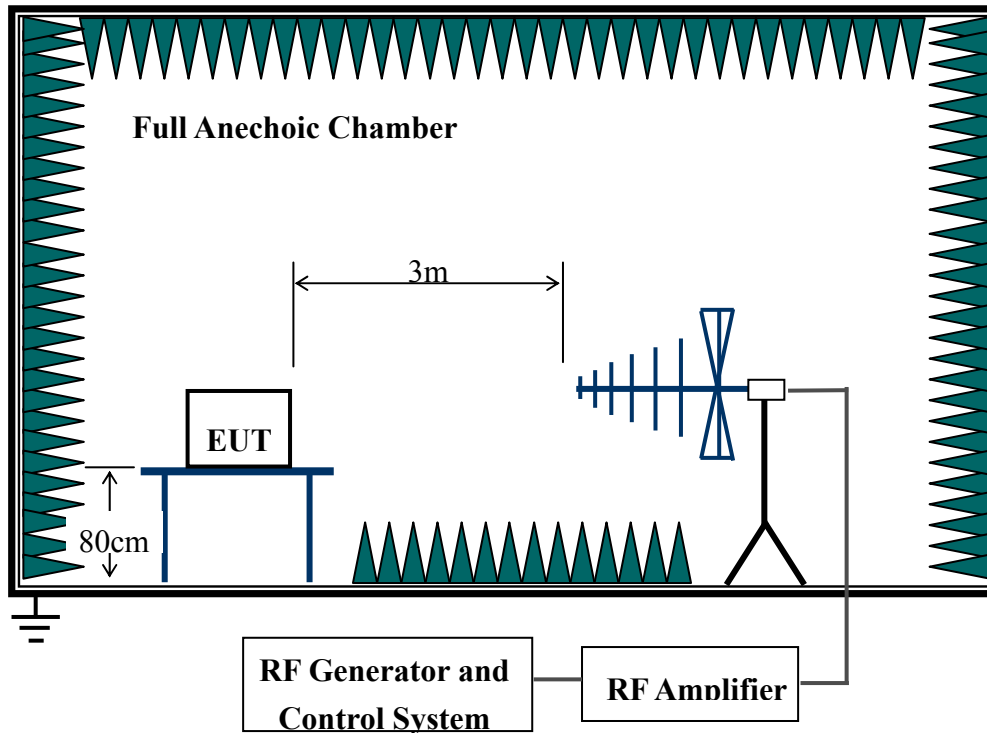
(1). The EUT continued to operate as intended. No degradation of performance was observed.

4.4 Radiated, Radio Frequency Electromagnetic Field Immunity Test

4.4.1 Test Specification

Basic Standard:	IEC 61000-4-3		
Frequency Range:	80 MHz – 1000MHz	1.4GHz – 2.0GHz	2.0GHz – 2.7GHz
Field Strength:	10V/m	3V/m	1V/m
Modulation:	1kHz sine wave, 80%, AM modulation		
Frequency Step:	1% of fundamental		
Polarity of Antenna	Horizontal and Vertical		
Test Distance:	3m		
Antenna Height:	1.5m		
Dwell Time:	3 seconds		
Criterion:	A		

4.4.2 Test Setup



4.4.3 Test Result

Frequency	Polarity	Azimuth	Field Strength (V/m)	Observation	Comply with Criterion
80-1000 MHz	V&H	0,90,180, 270	10	Note(1)	A
1.4-2.0GHz	V&H	0,90,180, 270	3	Note(1)	A
2.0-2.7GHz	V&H	0,90,180, 270	1	Note(1)	A

NOTE:

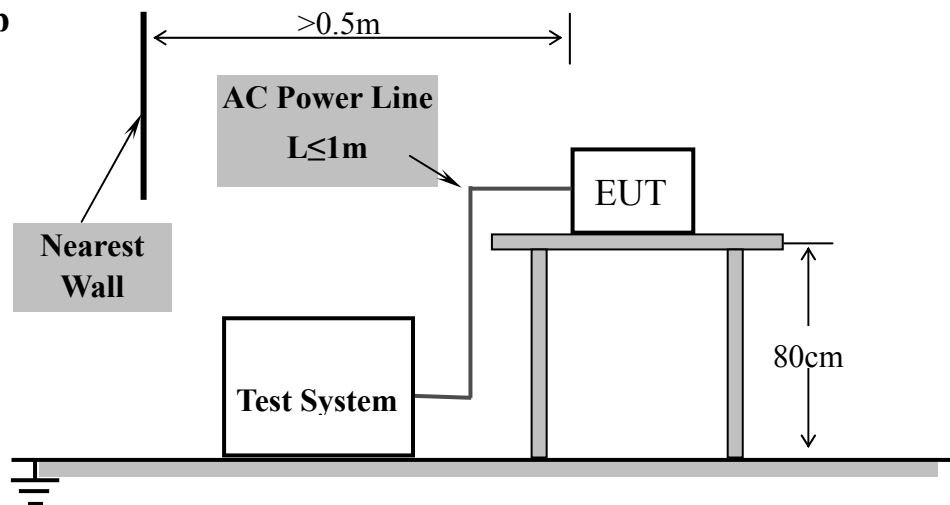
(1). The EUT continued to operate as intended. No degradation of performance was observed.

4.5 Electrical Fast Transient/Burst Immunity Test

4.5.1 Test Specification

Basic Standard:	IEC 61000-4-4
Test Voltage:	d.c. output port:2 kV
Polarity:	Positive/Negative
Impulse Frequency:	5kHz
Impulse wave shape:	5/50ns
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	Not less than 1 min.
Criterion:	B

4.5.2 Test Setup



4.5.3 Test Result

Test Point	Polarity	Test Level (kV)	Observation	Comply with Criterion
AC Power Port	+/-	2	Note (1)	A

NOTE:

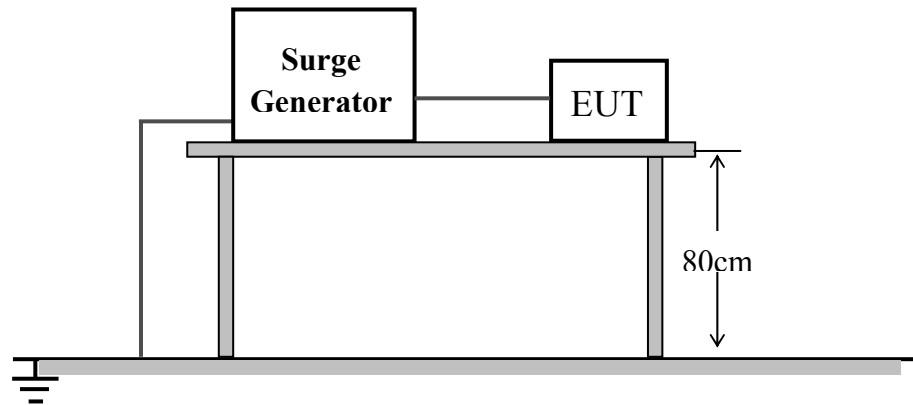
(1). The EUT continued to operate as intended. No degradation of performance was observed.

4.6 Surge Immunity Test

4.6.1 Test Specification

Basic Standard:	IEC 61000-4-5
Waveform:	Voltage 1.2/50 μ s; Current 8/20 μ s
Test Voltage:	a.c. power port, line to line 1kV, line to earth 2kV
Polarity:	Positive/Negative
Phase Angle:	0° , 90° , 180° , 270°
Repetition Rate:	60sec
Times:	5 time/each condition.
Criterion:	B

4.6.2 Test Setup



4.6.3 Test Result

Coupling Line	Polarity	Voltage (kV)	Observation	Comply with Criterion
AC power, Line-Line	+/-	1	Note (1)	A
AC power, Line-Earth	+/-	2	Note (1)	A

NOTE:

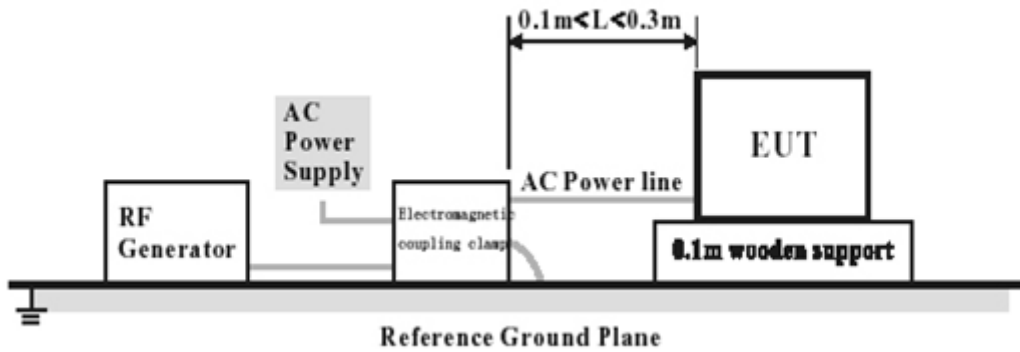
(1). The EUT continued to operate as intended. No degradation of performance was observed.

4.7 Immunity to Conducted Disturbances Induced by RF Fields

4.7.1 Test Specification

Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz – 80 MHz
Field Strength:	10V
Modulation:	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1% of fundamental
Coupled Cable:	AC. power line
Coupling Device:	Electromagnetic coupling clamp
Criterion:	A

4.7.2 Test Setup



4.7.3 Test Result

Test Point	Frequency	Field Strength (Vrms)	Observation	Comply with criterion
AC power line	0.15 – 80 MHz	10	Note(1)	A

NOTE:

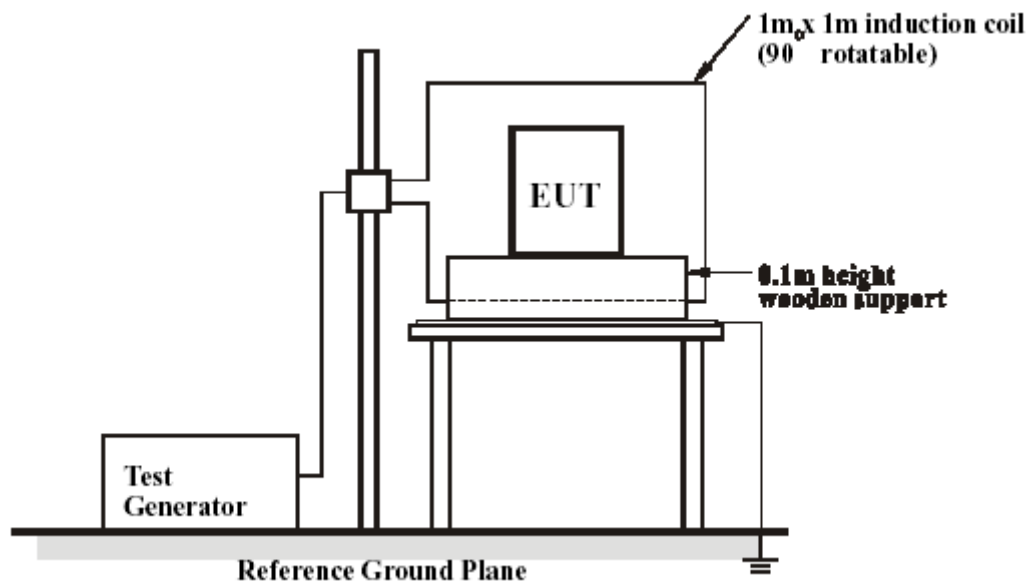
(1). The EUT continued to operate as intended. No degradation of performance was observed.

4.8 Power Frequency Magnetic Field Immunity Test

4.8.1 Test Specification

Basic Standard:	IEC 61000-4-8
Frequency Range:	50Hz
Field Strength:	30A/m
Observation Time:	2 minute
Inductance Coil:	Rectangular type, 1m×1m

4.8.2 Test Setup



4.8.3 Test Result

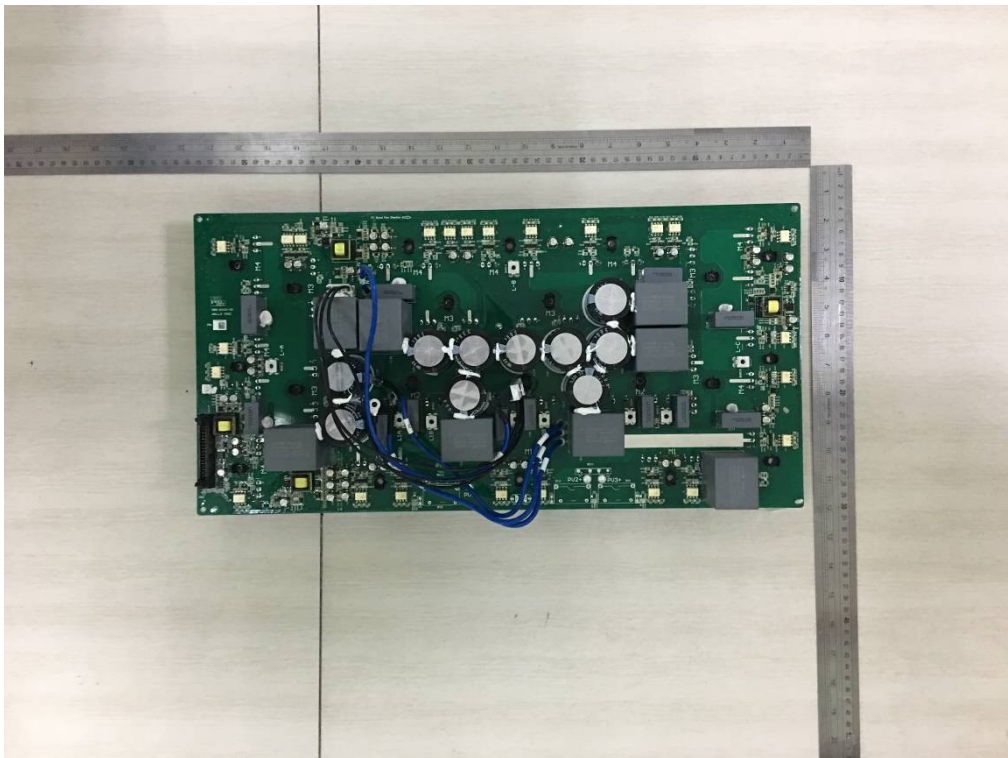
Direction	Field Strength(A/m)	Observation	Comply with Criterion
X	30	Note(1)	A
Y	30	Note(1)	A
Z	30	Note(1)	A

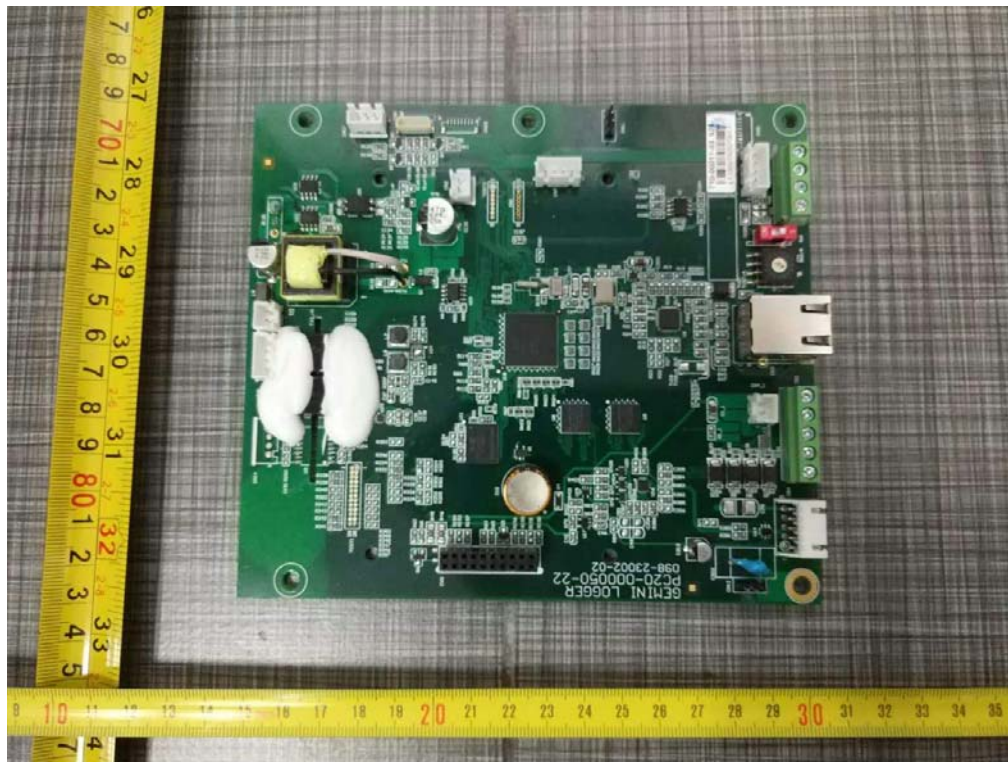
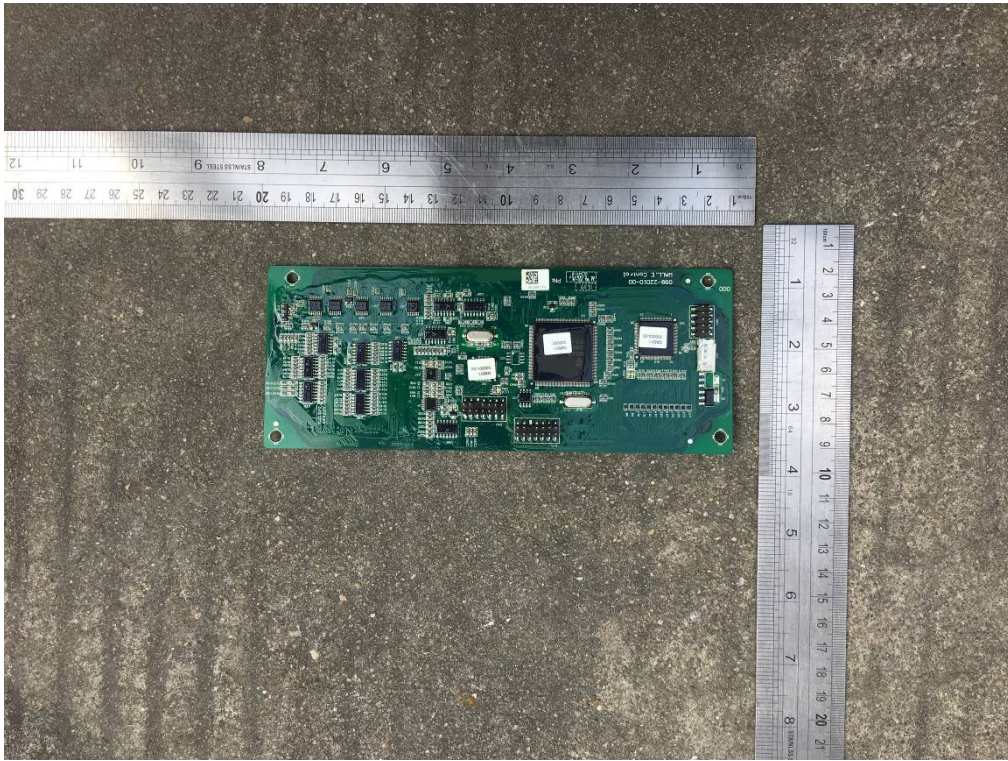
NOTE:

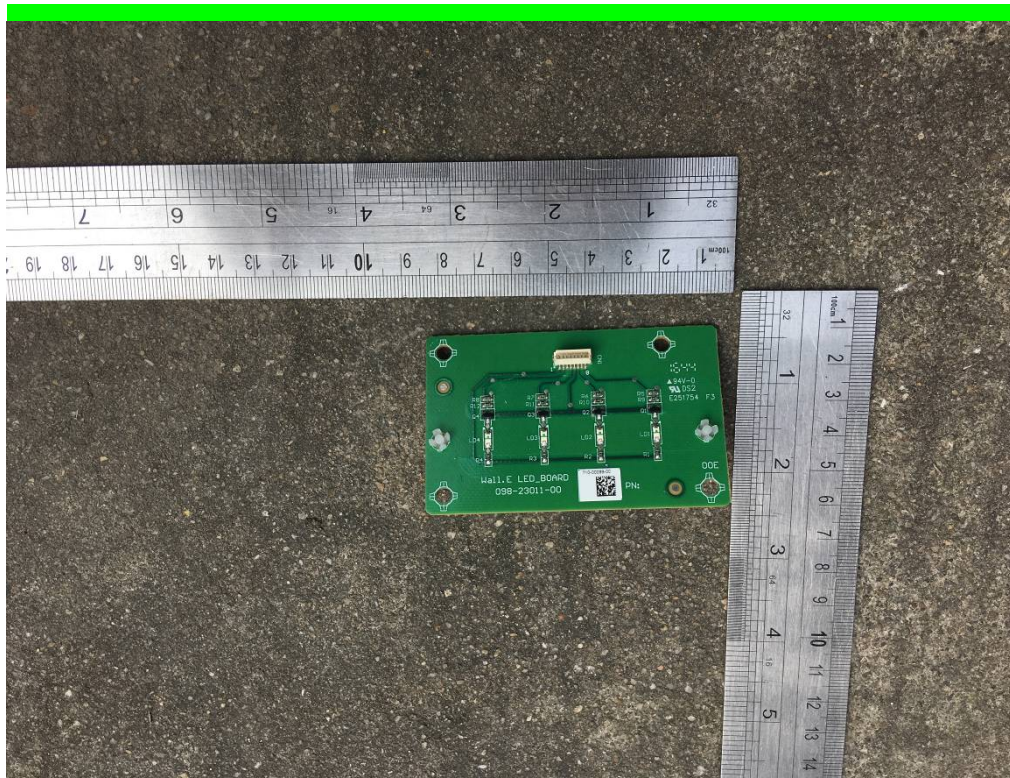
(1). The EUT continued to operate as intended. No degradation of performance was observed

Appendix I: Photographs of the EUT









Appendix II: Photographs of EMC Test Configuration

1. Mains Terminal Disturbance Voltage Measurement



2. Radiated Field Strength Measurement



3. Harmonic Current Measurement



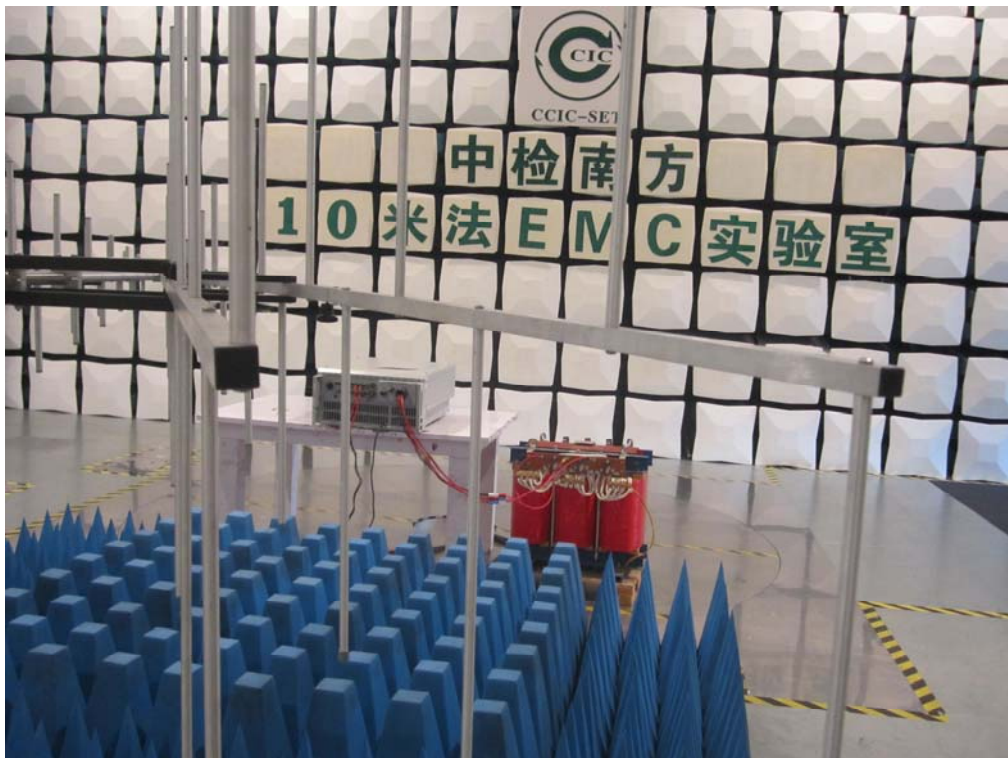
4. Voltage Fluctuation and Flick Measurement



5. Electrostatic Discharge Immunity Test



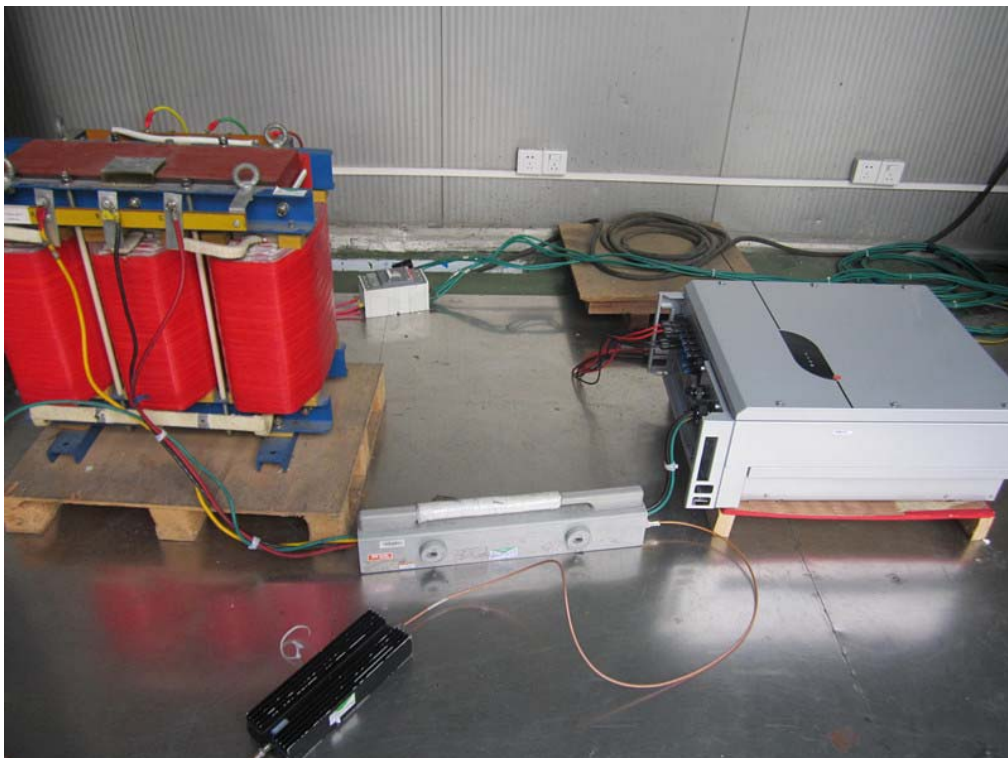
6. Radiated, Radio Frequency Electromagnetic Field Immunity Test



7. Electrical Fast Transient/Burst Immunity Test, Surge Immunity Test



8. Immunity to Conducted Disturbances Induced by RF Fields



9. Power Frequency magnetic Field Immunity





STATEMENT

- 1. The test report is invalid without stamp of laboratory.**
- 2. The test report is invalid without signature of person(s) testing and authorizing.**
- 3. The test report is invalid if erased and corrected.**
- 4. Test results of the report are valid to the test samples if sampling by client.**
- 5. “☆” item to be outside the scope of authorized by CNAS and CMA.**
- 6. The test report shall not be reproduced except in full, without written approval of the laboratory.**
- 7. If there is any objection to report, the client should inform issuing laboratory within 15 days from the date of receiving test report.**

Address: Electronic Testing Building, No. 43 Shahe Road, Xili Jiedao, Nanshan District, Shenzhen, Guangdong, China

P.C.: 518055

TEL: 0755-26628093、26627338

FAX: 0755-26627238

Internet: <http://www.ccic-set.com>

E-Mail: manager@ccic-set.com