



CE TEST REPORT

FOR

RECIPROCATING SAW

Model : RS130B

Trade Name: AGP

Issued to

Lee Yeong Industrial Co., Ltd.
NO. 29, FU HSINE RD., TOU LIU INDUSTRIAL ZONE, TOU LIU CITY, YUNLIN
HSIEN, TAIWAN

Issued by

Global Certification Corp.

EMC Test Site	Sijhih office and Lab	No. 146, Shiang Charng Rd., Sec. 2, Hsi Chih, Taipei Hsien 221, Taiwan, R.O.C.
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PHOTOS OF EUT



1. GENERAL INFORMATION

Applicant : Lee Yeong Industrial Co., Ltd.
Address : NO. 29, FU HSINE RD., TOU LIU INDUSTRIAL ZONE, TOU LIU CITY, YUNLIN HSIEN, TAIWAN
Manufacturer : Lee Yeong Industrial Co., Ltd.
Address : NO. 29, FU HSINE RD., TOU LIU INDUSTRIAL ZONE, TOU LIU CITY, YUNLIN HSIEN, TAIWAN
EUT : RECIPROCATING SAW
Model Name : RS130B
Model Differences : N/A

Measurement procedure used:

EMI :	EMS : Category II
EN55014-1:2000+A1:2001+A2:2002	EN55014-2:199+/A1:2001
EN61000-3-2:2006+A2:2009	IEC 61000-4-2: 2008
EN61000-3-3:2008	IEC 61000-4-3 : 2008
	IEC 61000-4-4: 2004
	IEC 61000-4-5: 2005
	IEC 61000-4-6: 2008
	IEC 61000-4-8 : 2009
	IEC 61000-4-11: 2004

The above equipment was tested by Global Certification Corp. for compliance with the requirements set forth in the EUROPEAN COUNCIL Directive 2004/108/EC and the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance.

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Tested By:

Reviewed by:

Jan. 11, 2011

Date

Jason Yeh / Vice Manager

Jan. 11, 2011

Date

Alex Chou / Manager



1.1 DESCRIPTION OF THE TESTED SAMPLES

EUT

EUT Type : Engineer Type
Condition when received : Good
EUT Name : RECIPROCATING SAW
Applicant : Lee Yeong Industrial Co., Ltd.
Manufacturer : Lee Yeong Industrial Co., Ltd.
Model Number : RS130B
Receipt Date : 01/04/2011
Used Power : AC POWER
Power Supply Type : Switching
Power Cord (Input) : AC 230 V 50 Hz 2 Pin 2.2 m Un-Shielded
Power Cord (Output) : N/A
Power From : AC Power Source
Test Power : AC POWER 230 V 50 Hz 2 Pin 2.2 m
The frequency of the EUT

1.2 I/O PORT OF THE EUT

I/O port type	Q'ty	Tested with
N/A		



1.3 TEST METHODOLOGY

EUT SYSTEM OPERATION

The EUT was configured according to **EN55014-1**. All I/O ports were connected to the appropriate peripherals. All peripherals and cables are listed below (including internal device)



1.4 DESCRIPTION OF THE SUPPORT EQUIPMENTS

Setup Diagram

See test photographs attached in appendix 1 for the actual connections between EUT and support equipment.

Support Equipment

Peripherals Devices:

OUTSIDE SUPPORT EQUIPMENT							
No.	Equipment	Model	Serial No.	FCC ID/ BSMI ID	Trade name	Data Cable	Power Cord
	N/A						

Note: All the above equipment /cable were placed in worse case position to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirement and conditions for the intended use.

1.5 FEATURES OF EUT: PLEASE REFER TO USER MANUAL OR PRODUCT SPECIFICATION.



2. INSTRUMENT AND CALIBRATION

2.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in the report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

2.2 TEST AND MEASUREMENT EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

TABLE 1 LIST OF TEST AND MEASUREMENT EQUIPMENT

Conducted Emission Measurement					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
EMC Test Receiver	R&S	ESCI	100438	Jun 09, 2011	
LISN	SCHAFFNER	NNB41	03/10015	Oct 13, 2011	For EUT
LISN	EMCO	3825/2	9001-1589	Nov 02, 2011	For Support Unit
RF Cable	Huber+Suhner	RG223/U	001	Nov 02, 2011	
50ohm Terminal	N/A	50Ω	QC-TM001	Sep 24, 2011	
Impedance Stabilization	Teseq GmbH	ISN T8	23334	Dec 20, 2011	
Radiated Emission Measurement					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
EMC Test Receiver	R&S	ESCI	100438	Jun 09, 2011	
Bilog Antenna	SUNOL	JB1	A052204	Nov 06, 2011	
Turn table	EMCO	2080	9508-1805	N/A	



Controller	EMCO	2090	9804-1328	N/A	
Preamplifier	WIRELESS	FPA6592G	60017	Sep 24, 2011	
Spectrum Analyzer	NEX	NS-265	5044006	May 11, 2011	
RF Cable	JTE BAO	RG214/U	28M-002	Nov 02, 2011	
Thermo-Hygro meter	WISEWIND	4-INU-1	050100378	Apr 08, 2011	
Power Harmonic Measurement and Voltage Fluctuations					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
5KV AC Power Source	SCHAFFNER	NSG1007	55869	Jul 19, 2011	
Signal Conditioning	SCHAFFNER	CCN1000-1	72281	Jul 19, 2011	
EMS					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Due Date	Note
IEC61000-4-2					
Thermo-Hygro meter	WISEWIND	N/A	N/A	Nov 02, 2011	
ESD Generator	TESEQ	NSG437	313	Jan 18, 2011	
IEC61000-4-3					
Power Meter	BOONTON	4231A	110602	Nov 13, 2011	
Signal Generator	R & S	S M300	101722	Jan 05, 2011	
Electric Field probe	ETS-LINDGREN	HI-6005	00029837	May 29, 2011	
Power Amplifier	SCHAFFNER	CBA9413B	4039	N/A	
Power Amplifier	TESEQ	CBA3G-050	T43752	N/A	
SWITCH NETWORK	TESEQ	RFB2000	26336	Jan 05, 2011	
IEC61000-4-4/ IEC61000-4-5/ IEC61000-4-8/ IEC61000-4-11					



EMC Immunity Test system	EMC PARTNERAG	TRA200IN6	739	Dec 29, 2011	
Conducted disturbances generator	FRANKONIA	CIT10/75	102D3233	Jun 01, 2011	
CDN	FRANKONIA	CON M2+M3	A3011055	Aug 02, 2011	
CDN	FRANKONIA	RJ45	60050134	Sep 15, 2011	
6dB Attenuator	FRANKONIA	75-A-FFN-06	102D3233	N/A	
Induction Coil Interface	SCHAFFNER	2141	6019	Sep 15, 2011	
EM Injection Clamp	FCC	F-203I-23MM	471	Sep 15, 2011	
TTIAXIAL ELF Magnetic Field Meter	SYPRIS	4090	4090070316	Sep 15, 2011	
IEC61000-4-6					
RF-Generator	FRANKONIA	NSG2070	NSG2070	Oct 22, 2011	
CDN	FRANKONIA	CON M2+M3	A3011055	Aug 02, 2011	
CDN	FRANKONIA	RJ45	60050134	Sep 15, 2011	
Clamp	FRANKONIA	KEMZ801	19806	Oct 24, 2011	

✧ Calibration interval of instruments listed above is one year

2.3 TEST PERFORMED

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver which resolution bandwidth is set at 9 KHz.

Radiated emissions were investigated over the frequency range from 30MHz to 1000MHz using a receiver which resolution bandwidth is set at 120KHz. Radiated measurement was performed at distance that from an antenna to EUT is 10meters.



2.4 APPENDIX

Appendix A: Measurement Procedure for Main Power Port Conducted Emissions

The measurements are performed in a Global lab room,.

The EUT was placed on non-conduction 1.0m x 1.5m table, which is 0.4 meters above an earth-grounded.

The EUT was placed 0.8 meter from the conducting wall of shielding room and kept at least 0.8 meter from any other grounded conducting surface and artificial main V-network (LINS).

Power to the EUT was provided through the LISN which has the Impedance (50ohm/50uH) vs. Frequency Characteristic in accordance with the standard. Power to the LISNs were filtered to eliminate ambient signal interference and these filters were bonded to the ground plane. Peripheral equipment required to provide a functional system (support equipment) for EUT testing was powered from the second LISN through a ganged, metal power outlet box which is bonded to the ground plane at the LISN.

If the EUT is supplied with a flexible power cord, the power cord length in excess of the distance separating the EUT from the LISN shall be folded back and forth at the center of the lead so as to form a bundle not exceeding 40cm in length. If the EUT is provided with a permanently coiled power cord, bundling of the cord is not required. If the EUT is supplied without a power cord, the EUT shall be connected to the LISN by a power cord of the type specified by the manufacturer which shall not be longer than 1 meter. The excess power cord shall be bundled as described above. If a non-flexible power cord is provided with the EUT, it shall be cut to the length necessary to attach the EUT to the LISN and shall not be bundled.

The interconnecting cables were arranged and moved to get the maximum measurement. Both the line of power cord, hot and neutral, were measured.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

Appendix B: Test Procedure for Radiated Emissions

Measurements on the CLAMP EMISSION TEST

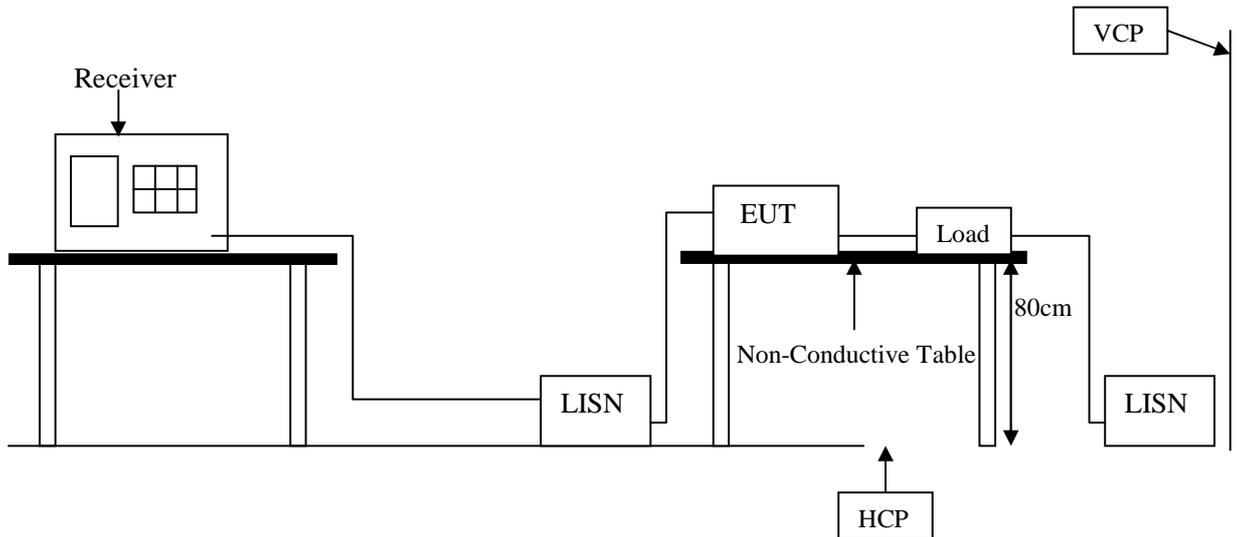
The disturbance power test was performed at Global Certification Lab's CLAMP Test Site.

The frequency range from 30 MHz to 300 MHz, the measurement were made with absorbing clamp.

The EUT were investigated with Power cable, and the worst case of test data were shown in this test report.

3. CONDUCTED EMISSION MEASUREMENT

3.1 TEST SET-UP



3.2 LIMIT

Household appliances and equipment causing similar disturbances and regulating controls incorporating semiconductor devices :

Frequency range (MHz)	At mains terminals		At load terminals and additional terminals	
	QP dB(uV)	Average dB(uV)	QP dB(uV)	Average dB(uV)
0.15-0.5	66-56	59-46	80	70
0.5-5.0	56	46	74	64
5.0-30.0	60	50	74	64

Mains terminals of tools :

Frequency range (MHz)	Rated motor power not exceeding 700W		Rated motor power above 700W and not exceeding 1000W		Rated motor power above 1000W	
	QP dB(uV)	Average dB(uV)	QP dB(uV)	Average dB(uV)	QP dB(uV)	Average dB(uV)
0.15-0.35	66-59	59-49	70-63	63-53	76-69	69-59
0.35-5	59	49	63	53	69	59
5-30	64	54	68	58	74	64



3.3 TEST PROCEDURE

The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). It provides a 50 ohm / 50 μ H coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm / 50 μ H coupling impedance with 50 ohm termination. (Please refers to the block diagram of the test setup and photograph.)

Both sides of AC line are checked for the maximum conducted emission interference. In order to find the maximum emissions, the relating positions of equipment and all of the interference cables must be changed according to EN 55014-1 regulation: The measurement procedure on conducted emission interference.

The resolution bandwidth of the field strength meter is set at 9 KHz

3.4 TEST SPECIFICATION

According to the EN55014-1:2000/A1:2001/A2:2002

3.5 RESULT: PASSED

EMI Receiver/Spectrum Analyzer Configuration (for the frequencies tested)

Frequency Range:	150KHz--30MHz
Detector Function:	Quasi-Peak / Average Mode
Resolution Bandwidth:	9KHz

3.6 TEST DATA:

Please refer to appendix 2.



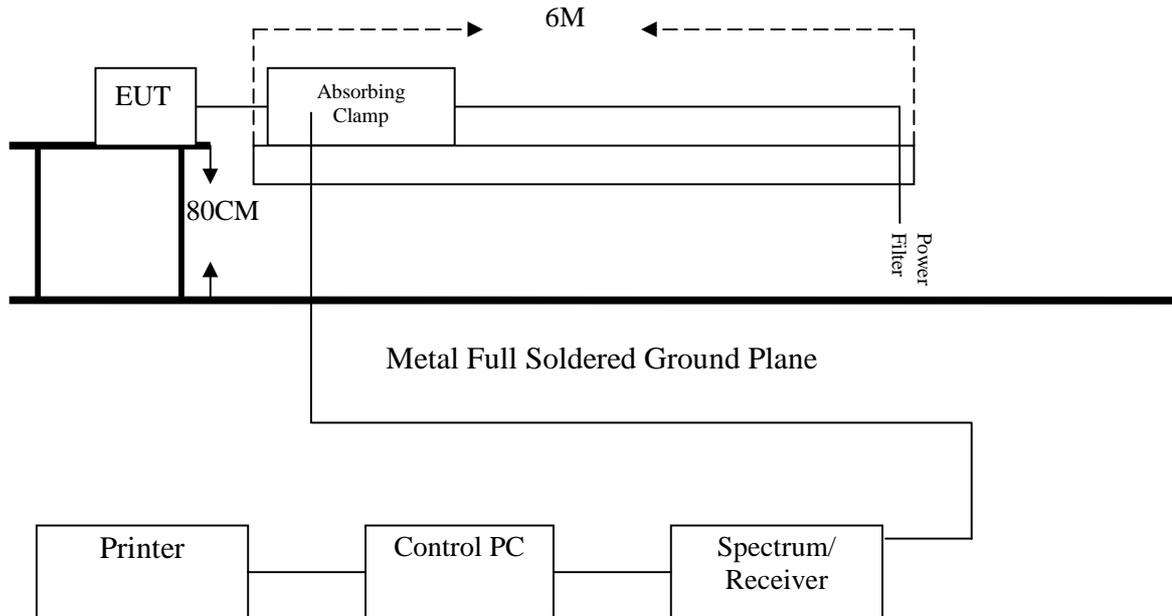
3.7 RESULT OF DISCONTINUOUS DISTURBANCE

There is no click after 40 movement of Switch.



4. CLAMP EMISSION MEASUREMENT

4.1 TEST SETUP



4.2 LIMIT

1	Household and similar appliances		Tools					
	2	3	4	5	6	7	8	9
Frequency range			Rated motor power not exceeding 700 W		Rated motor power above 700 W and not exceeding 1 000 W		Rated motor power above 1 000 W	
(MHz)	dB (pW) Quasi-peak	dB (pW) Average*	dB (pW) Quasi-peak	dB (pW) Average*	dB (pW) Quasi-peak	dB (pW) Average*	dB (pW) Quasi-peak	dB (pW) Average*
30 to 300	Increasing linearly with the frequency from:							
	45 to 55	35 to 45	45 to 55	35 to 45	49 to 59	39 to 49	55 to 65	45 to 55
* If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.								

NOTE The limits for the measurement with the average detector are tentative and may be modified after a period of experience.



4.3 TEST PROCEDURE

The disturbance power test was performed at Global Certification Lab's CLAMP Test Site.

The frequency range from 30 MHz to 300 MHz, the measurement were made with absorbing clamp.

The EUT were investigated with Power cable, and the worst case of test data were shown in this test report.

4.4 TEST SPECIFICATION

According to the EN55014-1:2000/A1:2001/A2:2002

4.5 RESULT: PASSED

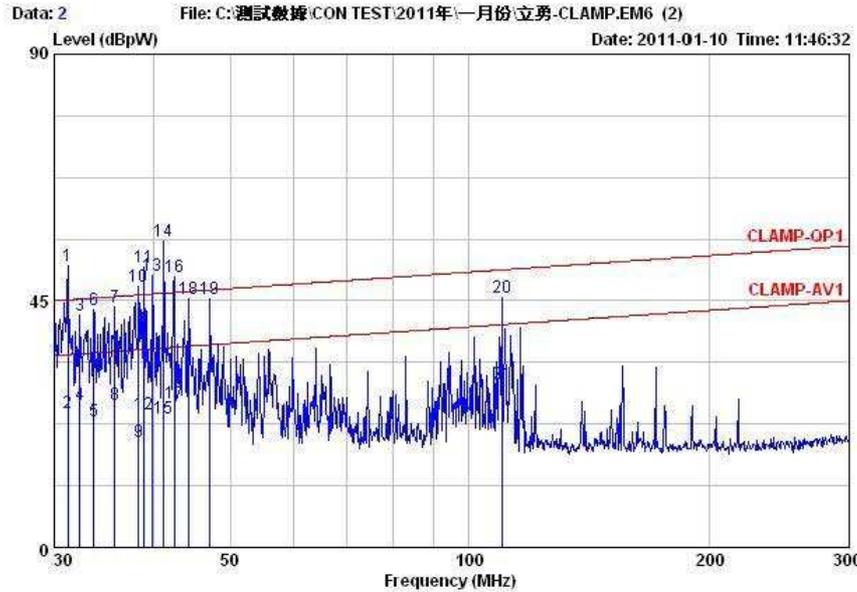


4.6 TEST DATA:



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WebSite: http://www.gcc.tw



Site : Conducted
Condition : CLAMP-OP1
: RBW:120KHz VBW:300KHz SWT:Auto
EUT : Please refer to page 1 of report
MODEL : Please refer to page 1 of report
MEMO : 230V

		Read		Limit	Over	
	Freq	Level	Factor	Level	Line	Limit Remark
	MHz	dBpW	dB	dBpW	dBpW	dB
1 X	31.20	35.67	15.76	51.43	45.18	6.25 Peak
2	31.20	8.69	15.76	24.45	35.18	-10.73 Average
3	32.29	26.52	15.73	42.25	45.33	-3.08 Peak
4	32.29	10.38	15.73	26.11	35.33	-9.22 Average
5	33.66	7.39	15.68	23.07	35.51	-12.44 Average
6	33.66	27.75	15.68	43.43	45.51	-2.08 Peak
7	35.74	28.26	15.62	43.88	45.77	-1.89 Peak
8	35.74	10.37	15.62	25.99	35.77	-9.78 Average
9	38.29	3.78	15.54	19.32	36.07	-16.75 Average
10 X	38.29	32.16	15.54	47.70	46.07	1.63 Peak
11 X	38.83	35.50	15.53	51.03	46.13	4.90 Peak
12	38.83	8.79	15.53	24.32	36.13	-11.81 Average
13 X	39.91	34.19	15.50	49.69	46.25	3.44 Peak
14 X	41.22	40.40	15.44	55.84	46.39	9.45 Peak
15	41.22	8.15	15.44	23.59	36.39	-12.80 Average
16 X	42.47	33.93	15.40	49.33	46.52	2.81 Peak
17	42.47	10.92	15.40	26.32	36.52	-10.20 Average
18	44.37	30.13	15.32	45.45	46.71	-1.26 Peak



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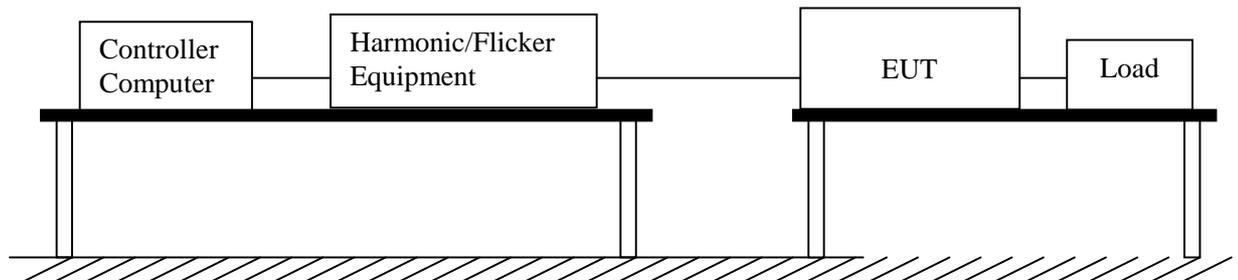
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WebSite: <http://www.gcc.tw>

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBpW	dB	dBpW	dBpW	dB	
19	47.11	30.20	15.20	45.40	46.97	-1.57	Peak
20	109.93	31.51	14.04	45.55	50.65	-5.10	Peak
21	109.93	15.81	14.04	29.85	40.65	-10.80	Average



5. POWER HARMONIC MEASUREMENT

5.1 TEST SETUP



5.2 LIMIT OF HARMONIC CURRENT

Limit of Harmonic Currents

Harmonic Order	Maximum Harmonic (Ampere)	Permissible Current	Harmonic Order	Maximum Harmonic (Ampere)	Permissible Current (Ampere)
Odd Harmonic			Even Harmonic		
3	2.30		2	1.08	
5	1.14		4	0.43	
7	0.77		6	0.30	
9	0.40		8 ≤ n ≤ 40	0.23 x 8/n	
11	0.33				
13	0.21				
15 ≤ n (39	0.15 x 15/n				

5.3 TEST PROCEDURE

The EUT is supplied in series with power analyzer from a power source has the same normal voltage and frequency as the rated supply voltage and the equipment under test. The rated voltage at the supply voltage of EUT of 0.94 times and 1.06 times shall be performed.

5.4 TEST SPECIFICATION

According to EN 61000-3-2/2000 Class D

5.5 RESULT: PASSED

5.6 TEST DATA:



Harmonics – Class-A per Ed. 3.0 (2005-11)(Run time)

EUT: Please refer to page 1 of report

Tested by: JACKO

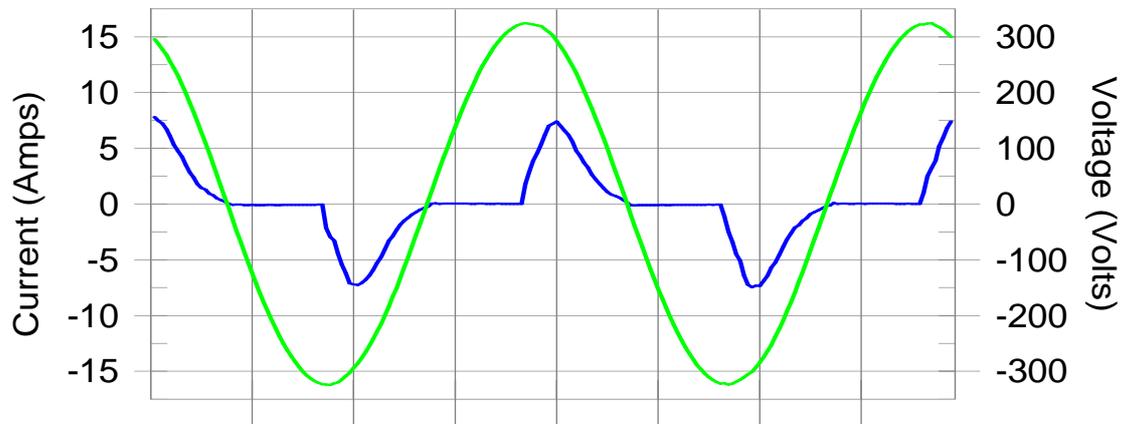
Test category: Class-A per Ed. 3.0 (2005-11) (European limits) Test Margin: 100

Comment: Please refer to page 1 of report

Customer: 1110406

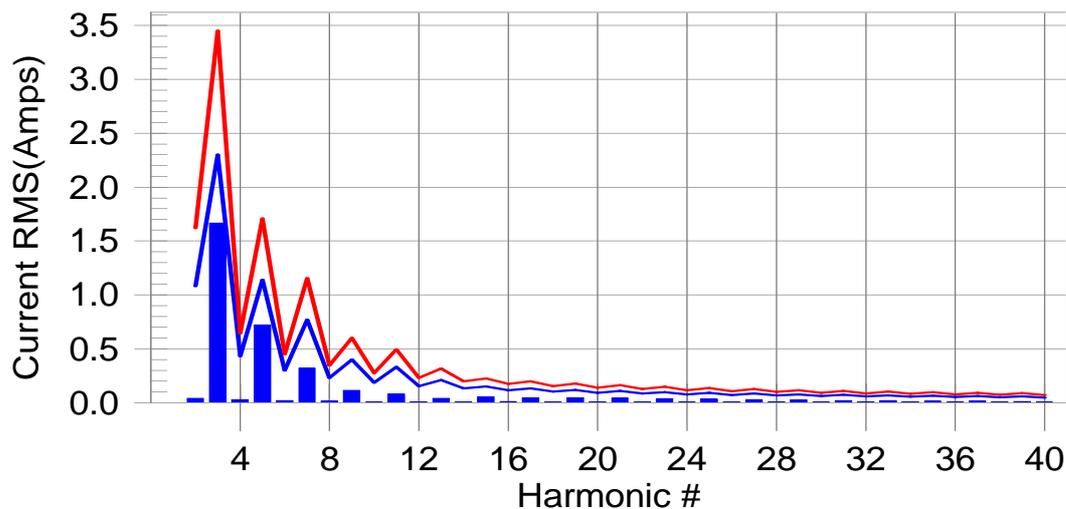
Test Result: Pass Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass Worst harmonic was #3 with 48.31% of the limit.



Current Test Result Summary (Run time)

EUT: Please refer to page 1 of report
Test category: Class-A per Ed. 3.0 (2005-11) (European limits) Test Margin: 100
Comment: Please refer to page 1 of report
Customer: 1110406

Tested by: JACKO

Test Result: Pass Source qualification: Normal
THC(A): 1.80 I-THD(%): 71.59 POHC(A): 0.078 POHC Limit(A): 0.251

Highest parameter values during test:

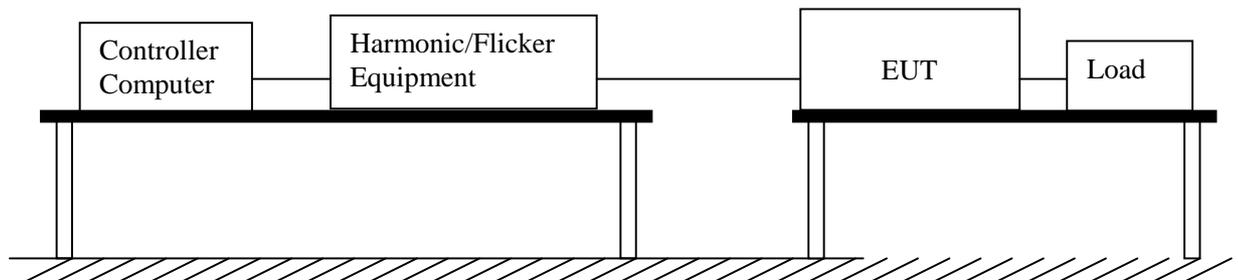
V_RMS (Volts): 229.40 Frequency(Hz): 50.00
I_Peak (Amps): 8.210 I_RMS (Amps): 3.240
I_Fund (Amps): 2.624 Crest Factor: 2.620
Power (Watts): 516.0 Power Factor: 0.696

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.033	1.080	3.0	0.039	1.620	2.42	Pass
3	1.621	2.300	70.5	1.667	3.450	48.31	Pass
4	0.021	0.430	4.9	0.028	0.645	4.32	Pass
5	0.707	1.140	62.0	0.722	1.710	42.22	Pass
6	0.015	0.300	4.9	0.020	0.450	4.53	Pass
7	0.309	0.770	40.1	0.321	1.155	27.77	Pass
8	0.010	0.230	4.2	0.014	0.345	4.01	Pass
9	0.101	0.400	25.3	0.114	0.600	18.97	Pass
10	0.006	0.184	3.3	0.009	0.276	3.31	Pass
11	0.067	0.330	20.3	0.079	0.495	15.95	Pass
12	0.005	0.153	3.0	0.008	0.230	3.28	Pass
13	0.033	0.210	15.9	0.041	0.315	13.11	Pass
14	0.005	0.131	3.8	0.009	0.197	4.36	Pass
15	0.045	0.150	30.0	0.055	0.225	24.31	Pass
16	0.006	0.115	5.0	0.009	0.173	5.43	Pass
17	0.042	0.132	31.9	0.047	0.199	23.52	Pass
18	0.006	0.102	5.9	0.008	0.153	5.46	Pass
19	0.041	0.118	34.7	0.047	0.178	26.65	Pass
20	0.006	0.092	6.6	0.008	0.138	5.99	Pass
21	0.040	0.107	37.5	0.042	0.161	26.40	Pass
22	0.006	0.084	7.3	0.008	0.125	6.56	Pass
23	0.034	0.098	34.4	0.038	0.147	25.90	Pass
24	0.006	0.077	7.6	0.008	0.115	6.91	Pass
25	0.031	0.090	35.0	0.033	0.135	24.55	Pass
26	0.006	0.071	7.8	0.008	0.106	7.36	Pass
27	0.025	0.083	30.2	0.028	0.125	22.33	Pass
28	0.005	0.066	7.9	0.008	0.099	7.68	Pass
29	0.024	0.078	30.5	0.025	0.116	21.70	Pass
30	0.005	0.061	7.8	0.007	0.092	7.30	Pass
31	0.018	0.073	25.3	0.020	0.109	18.60	Pass
32	0.004	0.058	7.8	0.007	0.086	7.88	Pass
33	0.017	0.068	25.6	0.019	0.102	18.59	Pass
34	0.004	0.054	7.9	0.006	0.081	7.94	Pass
35	0.014	0.064	21.0	0.015	0.096	15.54	Pass
36	0.004	0.051	7.7	0.006	0.077	7.24	Pass
37	0.013	0.061	21.8	0.015	0.091	16.27	Pass
38	0.004	0.048	7.5	0.006	0.073	7.73	Pass
39	0.011	0.058	18.7	0.012	0.087	13.92	Pass



6. VOLTAGE FLUCTUATIONS

6.1 TEST SETUP



6.2 VOLTAGE FLUCTUATIONS TEST

Port:	AC mains
Basic Standard:	EN61000-3-3/AS/ AS/NZS 61000.3.3 (Details referred to Sec 2.2)
Test Procedure	Refer to GCC
Observation period:	For Pst 10min
	For Plt 2 hours

6.3 TEST PROCEDURE

The EUT is supplied in series with reference impedance from a power source with the voltage and frequency as the nominal supply voltage and frequency of the EUT.

6.4 TEST SPECIFICATION

EN 61000-3-3/1995+A1:2001

6.5 RESULT: PASSED

Performance of EUT complies with the given specification.

6.6 TEST DATA:



Flicker Test Summary per EN/IEC61000-3-3 (Run time)

EUT: Please refer to page 1 of report
Test category: All parameters (European limits)
Comment: Please refer to page 1 of report
Customer: 1110406

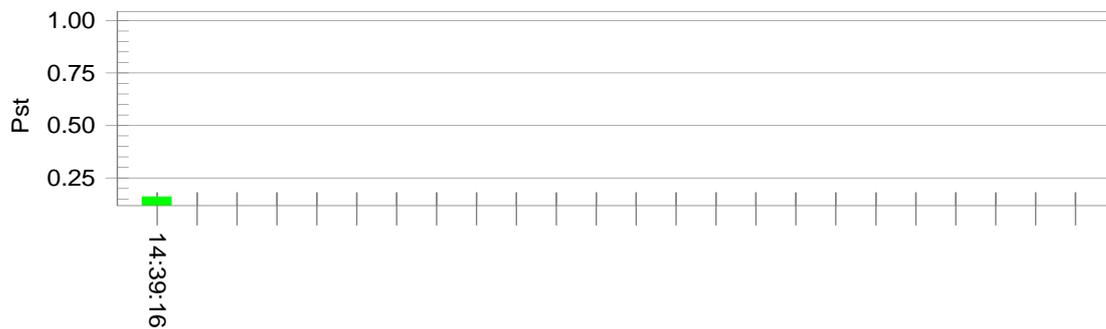
Tested by: JACKO
Test Margin: 100

Test Result: Pass

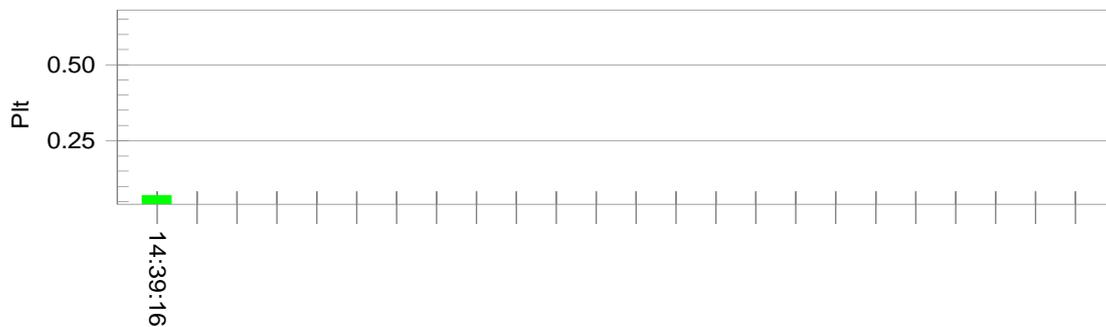
Status: Test Completed

Pst_i and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	228.28		
Highest dt (%):	0.21	Test limit (%):	3.30 Pass
Time(mS) > dt:	0.0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	0.19	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.160	Test limit:	1.000 Pass
Highest Plt (2 hr. period):	0.070	Test limit:	0.650 Pass

7. ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

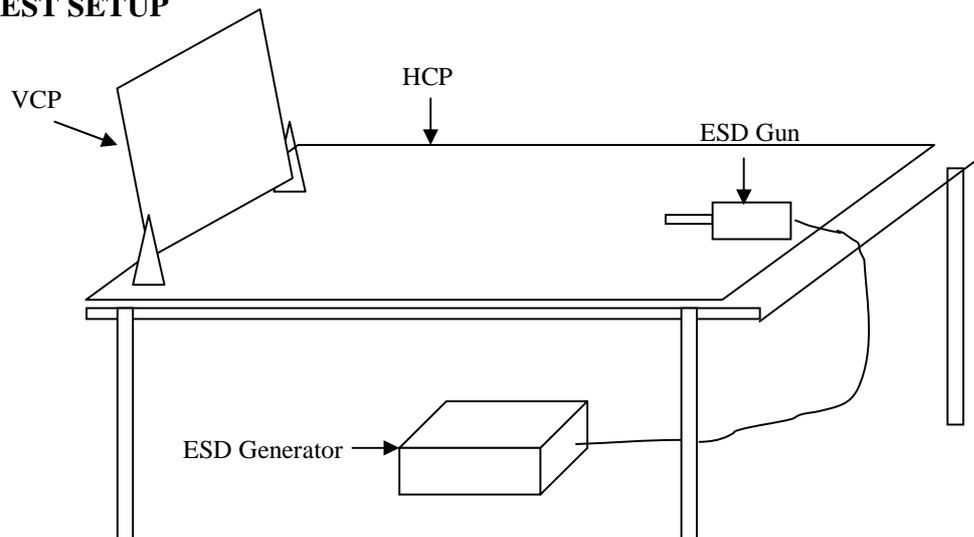
7.1 TEST PROCEDURE

According To IEC 61000-4-2

According To EN55014-2:1997/A1:2001

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

7.2 TEST SETUP



7.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Enclosure Room	±2, 4, 8KV (Air Discharge)	KV (Charge Voltage)	B
Electrostatic Discharge	±2,4KV(Contact Discharge)		
Time between test	<u>1</u> sec		

Number of test : 10 Discharges / Test point / Polarity / Level

Particular requirements : at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points.

When the measurement was taken, The ESD discharger was performed in single discharge. For the single discharge time between successive single discharges will keep on one second. It was at least ten single discharges with positive and negative at the same selected pointed. The selected pointed, which was performed with electrostatic discharge, was marked on the red label on the EUT

Indirect applicant of discharge to the EUT

Vertical Coupling Plane (VCP)

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to , and positioned at a distance 0.1m from, the EUT, with the discharge electrode touching the coupling plane.



The four faces of the EUT will be performed with electrostatic discharge. It was at least ten singles discharges with positive and negative at the same selected point.

Horizontal Coupling Plane (HCP)

The coupling plane is placed under the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the discharge electrode touching the coupling.

The four faces of the EUT will be performed with electrostatic discharge. It was at least ten single discharges with positive and negative at the same selected pointed.

7.4 TEST RESULT.

Model: RS130B

Temperature: 16°C , Humidity: 52 % RH

Test Point	Air Discharge	Contact Discharge	Performance Criteria	Result
HCP	----	±2, 4KV	A	PASSED
VCP	----	±2, 4KV	A	PASSED

Test Points please refer below photos.



Blue Dot: Air



Blue Dot: Air

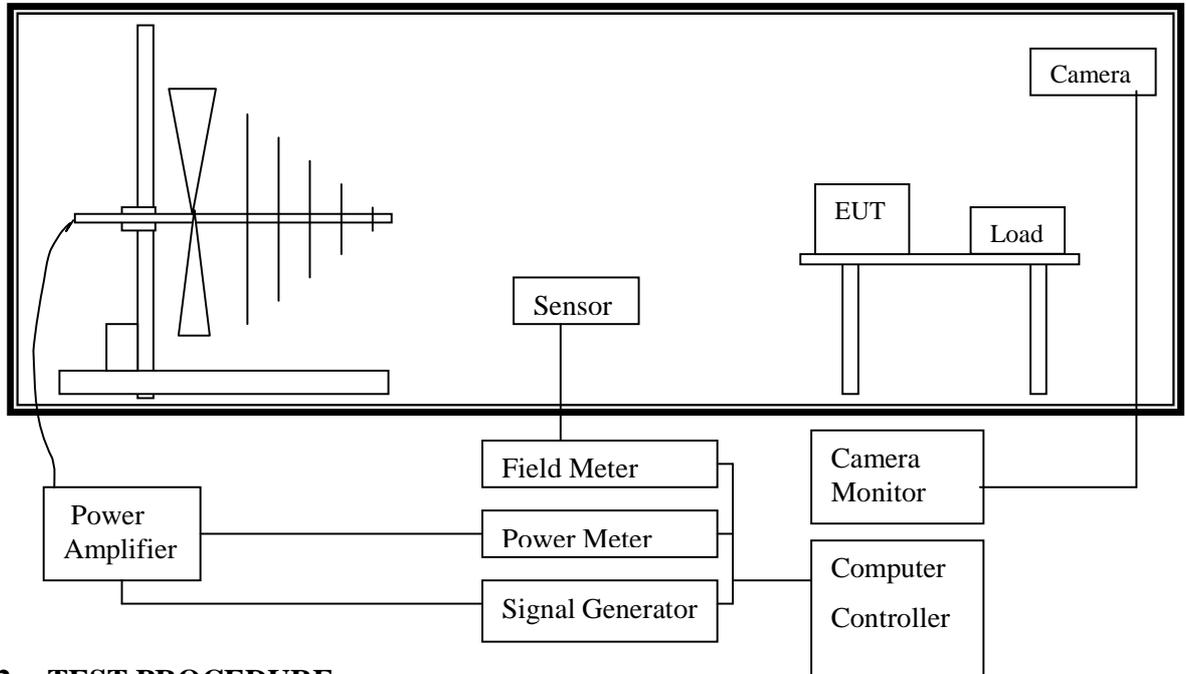
Final Result: **PASSED**

Remark:

Photos of test configuration please refer to appendix 1.

8. RADIATED EMISSION MEASUREMENT (RS)

8.1 TEST SETUP



8.2 TEST PROCEDURE

According To IEC 61000-4-3

According To EN55014-2:1997/A1:2001

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

8.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Radio -Frequency	80~1000	MHz	A
Electromagnetic Field	3	V/m (unmodulated, rms)	
Amplitude Modulated	80	%AM (1KHz)	



8.4 TEST PROCEDURE

The EUT and load, which are placed on a wooden table whose height is 0.8 meter above ground, are placed with one coincident with the calibration plane such that the distance from antenna to the EUT is 3 meters.

Both horizontal and vertical polarization of the antenna position and four sides of the EUT are set on measurement. In order to judge the EUT performance, a CCD camera is used to monitor the situation of EUT.

All the scanning conditions are as follows:

Condition of Test	Remarks
1. Field Strength	3 V/m; Level 2
2. Radiated Signal	AM 80% modulated with 1KHz
3. Scanning Frequencies	80MHz ~ 1000MHz
4. Dwell Time	3 seconds
5. Frequency step size	1%
6. The rate of swept of frequency	1.5×10^{-3} decades/s
7. Antenna Polarity	HORIZONTAL & VERTICAL
8. The four sides of EUT are tested	FRONT, REAR, RIGHT, LEFT

8.5 TEST RESULT

Model: RS130B

Temperature: 16°C , Humidity: 52 % RH

ANT SIDE	3V HORIZONTAL	3V VERTICAL	RESULT
FRONT	A	A	PASSED
REAR	A	A	PASSED
RIGHT	A	A	PASSED
LEFT	A	A	PASSED

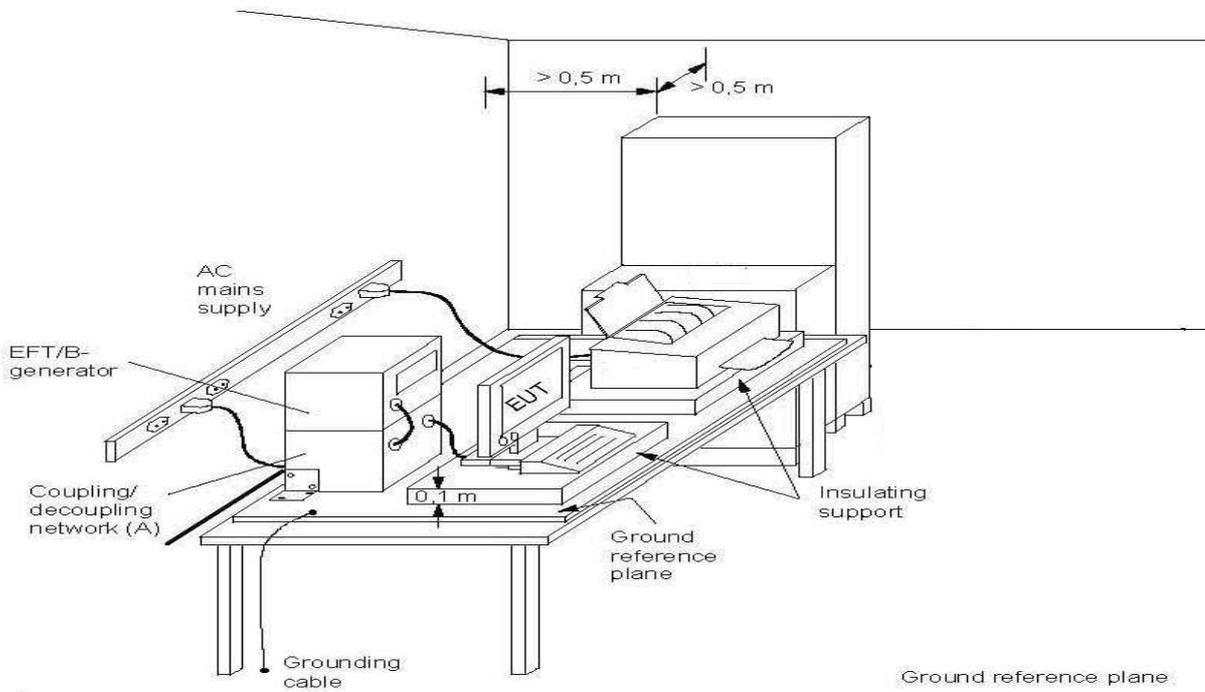
Final Result: **PASSED**

Remark:

Photos of test configuration please refer to appendix 1.

9. ELECTRICAL FAST TRANSIENT/BURST (EFT)

9.1 TEST SETUP



9.2 TEST PROCEDURE

According To IEC 61000-4-4 (2004)

According To EN55014-2:1997/A1:2001

9.3 TEST PROCEDURE

The EUT and load are placed on a wooden table that is 0.8meter height above a metal ground plane dimension is 1m x 1m and thickness is at least 0.2mm. It also projected beyond the EUT by at lease 0.1meter on all sides.

For Input and Output AC power or DC Input and DC Output Power Ports:

The EUT is connected with the power mains through a coupling device that directly couples the EFT interference signal.

Each of the line and nature conductors is impressed with burst noise for 1 minute.

For Functional Earth Port:

The EUT is connected to the power mains through a coupling device that directly couples the EFT interference signal.The protective earth line (PE) is impressed with burst noise for 1 minute.

The length of power cord between the coupling device and the EUT shall be 1 meter.

For signal Lines and Control Lines Test:

The EFT interference signal is through a coupling clamp device couples to the signal and control lines of the EUT with burst noise for 1 minute.



9.4 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Test Voltage	±0.5, ±1	KV (Peak)	B
Pulse Rise time & Duration	5/50	Tr/Ts (ns)	
Pulse Repetition	5	Rep. Frequency (KHz)	
Coupling of power line	L, N, L+N		

9.5 TEST RESULT

Model: RS130B

Temperature: 16°C , Humidity: 52 % RH

Power Line			
TEST VOLTAGE	L	N	L+N
±0.5KV	A	A	A
±1KV	A	A	A

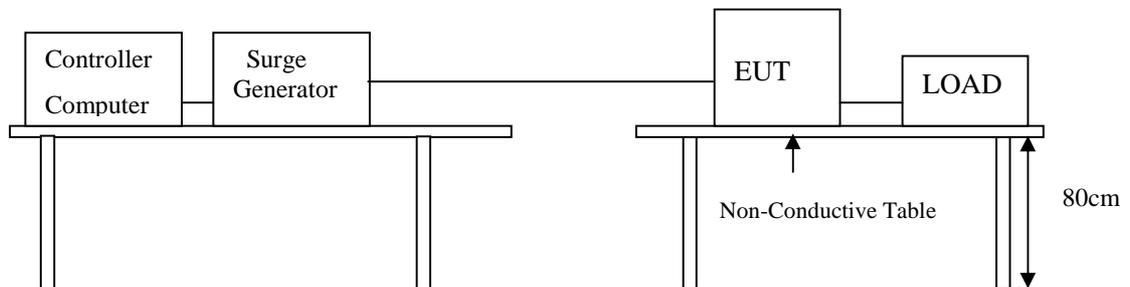
Final Result : **PASSED**

Remark :

Photos of test configuration please refer to appendix 1.

10. SURGE

10.1 TEST SETUP



10.2 TEST PROCEDURE

According To IEC 61000-4-5 (2001)
According To EN55014-2:1997/A1:2001

10.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Dc Input and DC Output Power Ports			
Surge	1.2/50(8/20)	Tr/Ts ((s)	B
Line to Ground	±0.5	KV	
Line to Line	±0.5	KV	
AC Input and AC Output Power Ports			
Surge	1.2/50(8/20)	Tr/Ts ((s)	B
Line to Ground	±2	KV	
Line to Line	±1	KV	
Polarity	POSITIVE / NEGATIVE		
Phase shifting in a range between 0° to 360°			

10.4 TEST PROCEDURE

The EUT and its load are placed on a table which is 0.8 meter height above a metal ground plane dimension is 1 meter x 1 meter and the thickness is 0.5 mm. It's also projected beyond the EUT at least 0.1 meter on all sides. The length of power cord between the coupling device and the EUT shall be 2meter or less.

For Input and Output AC Power or DC Input and Dc Output Power Ports:

The EUT is connected to the power mains through a coupling device that directly couples the Surge interference signal.



The Surge noise shall be applied synchronized to the voltage phase at 0(, 90(, 180(, 270(and the peak value of the AC voltage wave. (Positive and Negative)

Each of line-earth and line-line is impressed with a sequence of five surge voltages with interval of 1 minute.

10.5 TEST RESULT

Model: RS130B

Temperature: 16°C , Humidity: 52 % RH

Environmental Phenomena	Test Specification	Units	Performance
Line to Line	±1	KV (Charge Voltage)	A
Line to Earth	±2	KV (Charge Voltage)	A

Final Result: **PASSED**

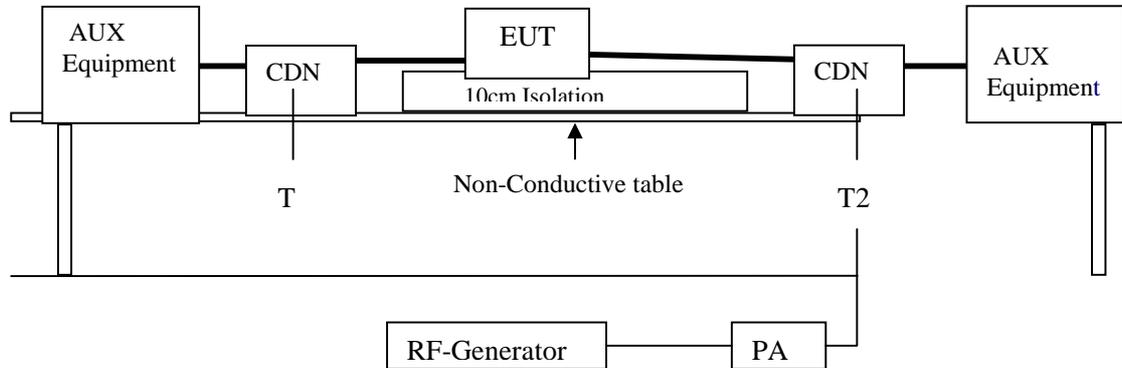
Remark:

Photos of test configuration please refer to appendix 1.



11. IMMUNITY TEST TO CS CONDUCTED DISTURBANCE (CS)

11.1 TEST SETUP



11.2 TEST PROCEDURE

According To IEC 61000-4-6 (2003) + A1 (2004)

According To EN55014-2:1997/A1:2001

11.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Ports for Signal Lines			
Radio-Frequency	0.15 ~ 80	MHz	A
Common Mode	3	V (rms, Unmodulated)	
Amplitude Modulated	80	% AM (1KHz)	
	150	Source Impedance	
Ac Input and AC Output and DC Input and DC output Ports and Functional Earth Ports			
Radio-Frequency	0.15 ~ 80	MHz	
Common Mode	3	V (rms, Unmodulated)	A
Amplitude Modulated	80	% AM (1KHz)	
	150	Source Impedance	

11.4 TEST PROCEDURE

The EUT are placed on a table which is 0.8meter height and a ground reference plane on the table, the EUT are placed upon table and use a 10cm insulation between the EUT and ground reference plane.

For AC Input and AC Output Power or DC Input and DC Output Power Ports

The EUT is connected to the power mains through a coupling and decoupling networks for power supply lines. It also directly couples the disturbance signal into EUT.

Use CDN-M2 for two wires or CDN-3 for three wires.

For Signal Lines Lines and Control Lines Test:



The disturbance signal is through a coupling and decoupling networks (CDN) or EM-clamp device couples to the signal and control lines of the EUT.
All scanning frequencies conditions are as following:

Condition of Test	Remarks
IEC 61000-4-6:1996+A1:2000	
1. Field Strength	3 V; Level 2
2. Radiated Signal	AM 80% modulated with 1KHz
3. Scanning Frequencies	0.15MHz ~ 80MHz
4. Dwell Time	3 seconds
5. Frequency step size Δf	1%
6. The rate of swept of frequency	1.5×10^{-3} decades/s

11.5 TEST RESULT

Model: RS130B

Temperature: 16°C , Humidity: 52 % RH

TEST Specification	Unit	Performance Criteria
0.15 - 80	MHz	A
3	V	
80	% AM (1KHz)	

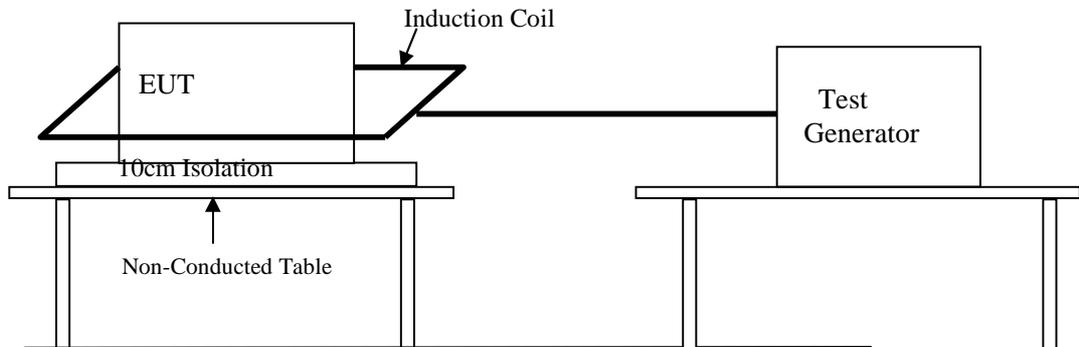
Final Result: **PASSED**

Remark:

Photos of test configuration please refer to appendix 1.

12. POWER FREQUENCY MAGNETIC FIELD (MAGNETIC)

12.1 TEST SETUP



12.2 TEST STANDARD

According To IEC 61000-4-8

According To EN55014-2:1997/A1:2001

(Please refer to Page 4 for dated references which are related to the standard as mentioned above)

12.3 TEST LEVEL

Item	Test Specification	Unit	Performance Criteria
Power-Frequency	50	Hz	A
Magnetic Field	1	A/m	

12.4 TEST PROCEDURE

The EUT and its load are placed on a table that is 0.8 meter above the metal ground plane dimension is at least 1 meter x 1 meter. The test magnetic field shall be placed at least than 3 meter distance from the induction coil.

The test magnetic field shall be applied by the immersion method to the EUT. The induction coil shall be rotated by 90° in order to expose the EUT to the test field with different orientation (X, Y, Z orientation).



12.5 TEST RESULT

Model: RS130B

Temperature: 16°C , Humidity: 52 % RH

Environmental Phenomena	Test Specification	Units	Performance Criteria
Magnetic Field	1	A/m	A

Final Result: **PASSED**

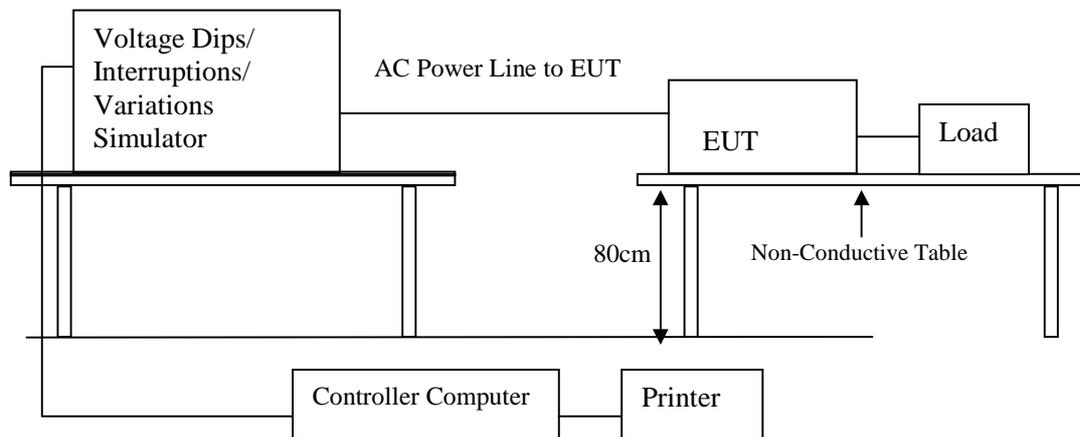
Remark:

Photos of test configuration please refer to appendix 1.



13. VOLTAGE DIPS AND INTERRUPTION MEASUREMENT

13.1 TEST SETUP



13.2 TEST PROCEDURE

According To IEC 61000-4-11 (2004)
According To EN55014-2:1997/A1:2001



13.3 TEST LEVEL

Class ^a	Test level and durations for voltage dips				
Class 1	Case-by-case according to the equipment requirements				
Class 2	0 % during 1/2 cycle	0 % during 1 cycle	70 % during 25/30 ^c cycles		
Class 3	0 % during 1/2 cycle	0 % during 1 cycle	40 % during 10/12 ^c cycles	70 % during 25/30 ^c cycles	80 % during 250/300 ^c cycles
Class X ^b	X	X	X	X	X

a: Classes as per IEC 61000-2-4.
b: To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.
c: “25/30 cycles” means “25 cycles for 50 Hz test” and “30 cycles for 60 Hz test”.

Class ^a	Test level and durations for short interruptions (t _s) (50Hz / 60Hz)
Class 1	Case-by-case according to the equipment requirements
Class 2	0 % during 250/300 ^c cycles
Class 3	0 % during 250/300 ^c cycles
Class X ^b	X

a: Classes as per IEC 61000-2-4.
b: To be defined by product committee. For equipment connected directly or indirectly to the public network, the levels must not be less severe than Class 2.
c: “250/300 cycles” means “250 cycles for 50 Hz test” and “300 cycles for 60 Hz test”.

13.4 TEST PROCEDURE

The EUT and its load are placed on a wooden table which is 0.8 meter above a metal ground plane which dimension is 1 meter x 1 meter, the thickness is 0.65mm. It projected beyond the EUT by at least 0.1 meter on all sides. The power cord shall be used the shortest power cord as specified by the manufacturer.

For Voltage Dips / Interruption Test:

The EUT is connected to the power mains through a coupling device that directly couples to the Voltage Dips and Interruption Generator.

The EUT shall be tested for 30% voltage dips of supplied voltage and duration time is 10ms, for 60% voltage dips of supplied voltage and duration time is 100ms with a sequence of three voltage dips with intervals of 10 seconds, and for 95% voltage interruption of supplied voltage and the duration time is 5000ms with a sequence of three voltage interruptions with intervals of 10 seconds.

Voltage phase shifting are shall occur at 0(, 45(, 90(, 135, 180(, 225(, 270(, 315(of the voltage.



13.5 TEST RESULT

Model: RS130B

Temperature: 16°C , Humidity: 52 % RH

Voltage Dips	Test Level % U _T	Reduction (%)	Duration	Performance Criteria
	<5	>95	0.5 (periods)	B
	70	30	25 (periods)	C

Voltage Dips	Test Level % U _T	Reduction (%)	Duration	Performance Criteria
	70	30	10ms	B
	40	60	100 and 1000ms	C

Voltage Dips	Test Level % U _T	Reduction (%)	Duration	Performance Criteria
	<5	>95	250(periods) 5000ms	C

Final Result: **PASSED**

Remark:

Photos of test configuration please refer to appendix 1.



14. PERFORMANCE CRITERIA

- A. The apparatus shall continue to operate as intended during and 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.
- 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. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.



15. MODIFICATION LIST FOR EMC COMPLYING TEST

The modification is solely made by the applicant.

Appendix

Appendix A: Summary of Test Result

**** EMC Test Result: The EUT has been passed the all measurements. ****

The uncertainty is calculated in accordance with CISPR16-4-2, the total uncertainty for this test is as follows:

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Receiver reading	Normal (k=2)	±0.3
Cable loss	Normal (k=2)	±0.2
AMN insertion loss	Rectangular	±0.3
RCV/SPA specification	Rectangular	±0.1
combined standard uncertainty $U_e(y)$	normal	±0.5
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±1.0

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	30MHz~1GHz
Receiver reading	Normal (k=2)	±0.3
Cable loss calibration	Normal (k=2)	±0.3
Antenna factor calibration	Rectangular	±0.9
Pre Amplifier Gain calibration	Rectangular	±0.3
RCV/SPA specification	Rectangular	±0.2
combined standard uncertainty $U_e(y)$	normal	±1.0
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±2.0



Global Certification Corp.

Appendix 1

PHOTOS OF TEST CONFIGURATION



CONDUCTED POWER LINE TEST



Front View



Rear View



RADIATED EMISSION TEST



Front View



Rear View



Global Certification Corp.

Report No. : E1110406

HARMONICS & VOLTAGE FLUCTUATIONS TEST

SURGE IMMUNITY TEST

VOLTAGE DIPS, SHORT INTERRUPTIONS IMMUNITY TEST

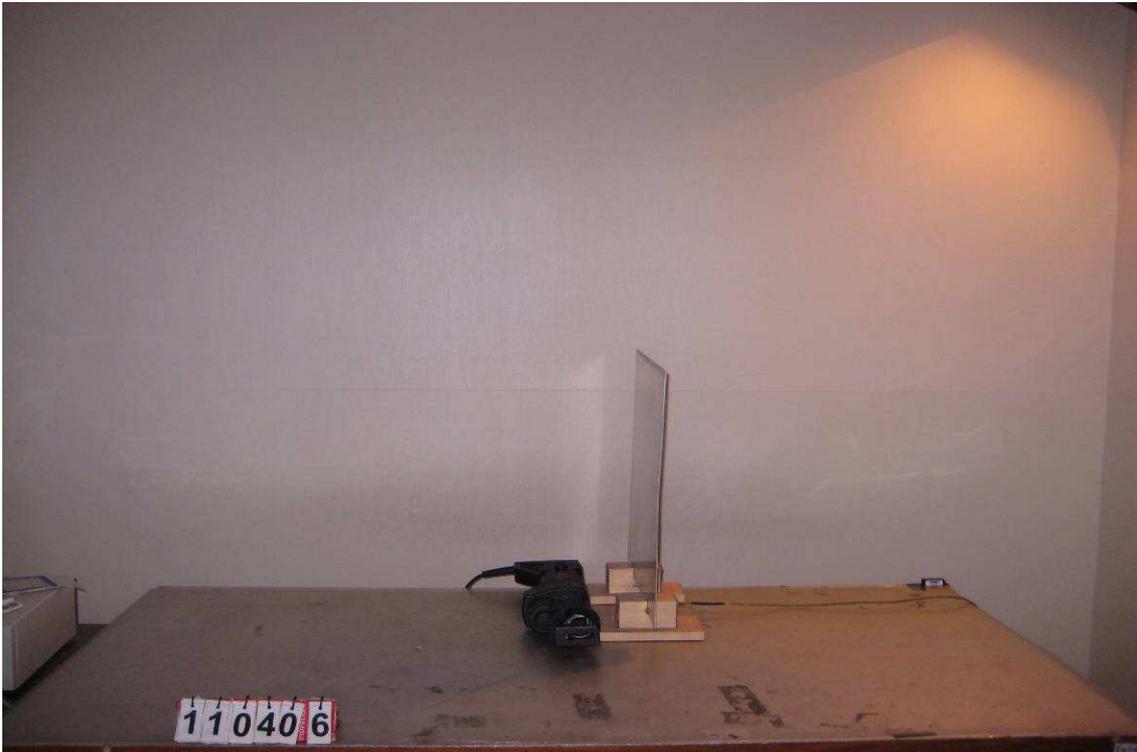


ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST





ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

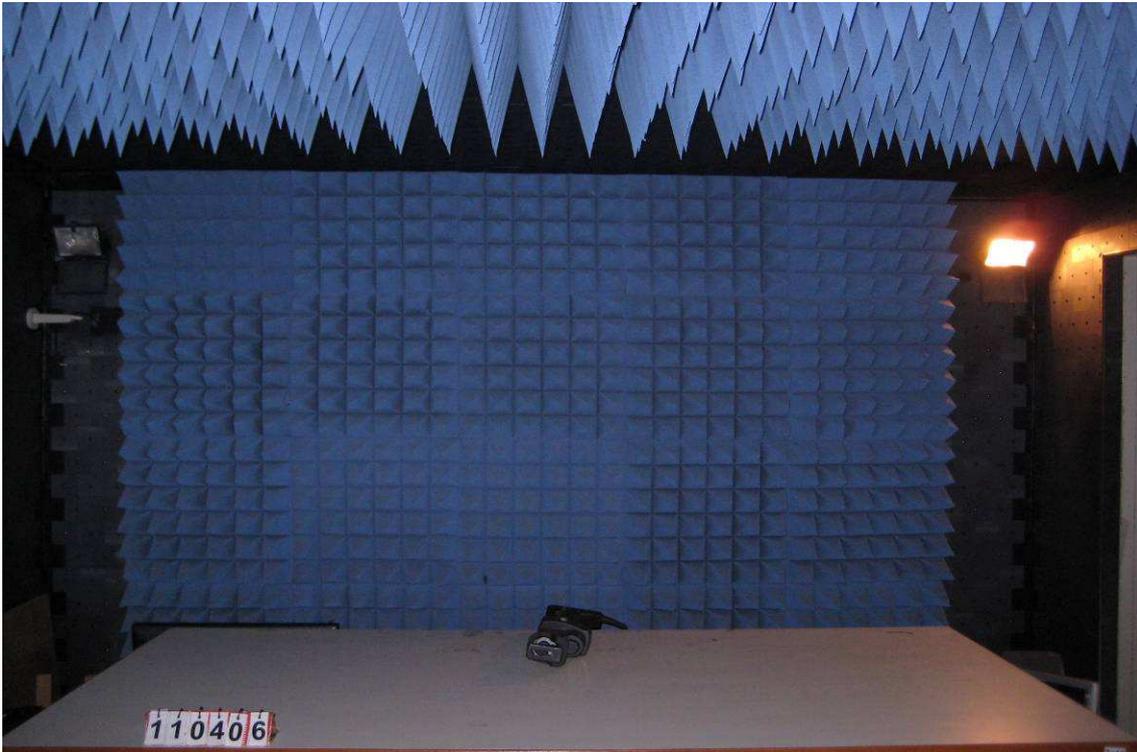


POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST





RADIO FREQUENCY ELECTROMAGNETIC FILE IMMUNITY TEST (RS)



CS CONDUCTED DISTURBANCE IMMUNITY TEST





Global Certification Corp.

Appendix 2

TEST DATA

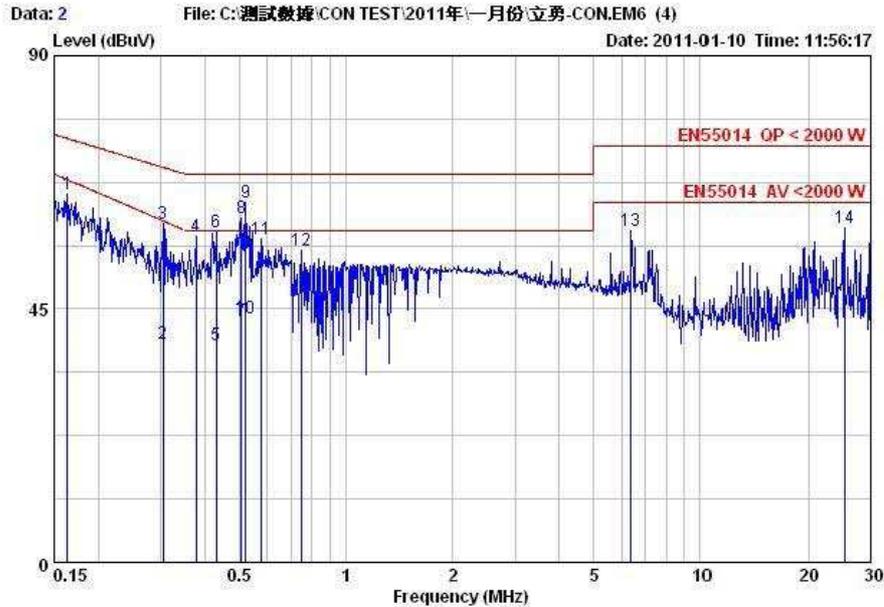


Test Data Of Conducted Emission Measurement (LINE)



環球認證有限公司
Global Certification Corp.

Global Certification Corp.
No.146,Shiang Charng Rd., Sec. 2,
Hsi Chih, Taipei Hsien 221, Taiwan, R.O.C.
TEL:886-2-26426992 FAX:886-2-26487450
WebSite: http://www.gcc.tw



Site : Conducted
Condition : EN55014 OP < 2000 W CON-LISN-99 LINE
: RBW:9KHz VBW:300KHz SWT:Auto
EUT : Please refer to page 1 of report
MODEL : Please refer to page 1 of report
MEMO : 230V

	Freq MHz	Read		Level dBUV	Limit Line dBUV	Over Limit dB	Remark
		Level dBUV	Factor dB				
1	0.16	55.15	10.25	65.40	75.30	-9.90	Peak
2	0.31	28.69	10.25	38.94	60.62	-21.68	Average
3	0.31	50.02	10.25	60.27	70.13	-9.86	Peak
4	0.38	47.59	10.25	57.84	69.00	-11.16	Peak
5	0.43	28.42	10.25	38.67	59.00	-20.33	Average
6	0.43	48.30	10.25	58.55	69.00	-10.45	Peak
7	0.51	32.66	10.25	42.91	59.00	-16.09	Average
8	0.51	50.84	10.25	61.09	69.00	-7.91	Peak
9	0.52	53.58	10.25	63.83	69.00	-5.17	Peak
10	0.52	33.21	10.25	43.46	59.00	-15.54	Average
11	0.58	47.14	10.25	57.39	69.00	-11.61	Peak
12	0.75	45.14	10.25	55.39	69.00	-13.61	Peak
13	6.39	48.58	10.25	58.83	74.00	-15.17	Peak
14	25.32	49.16	10.20	59.36	74.00	-14.64	Peak

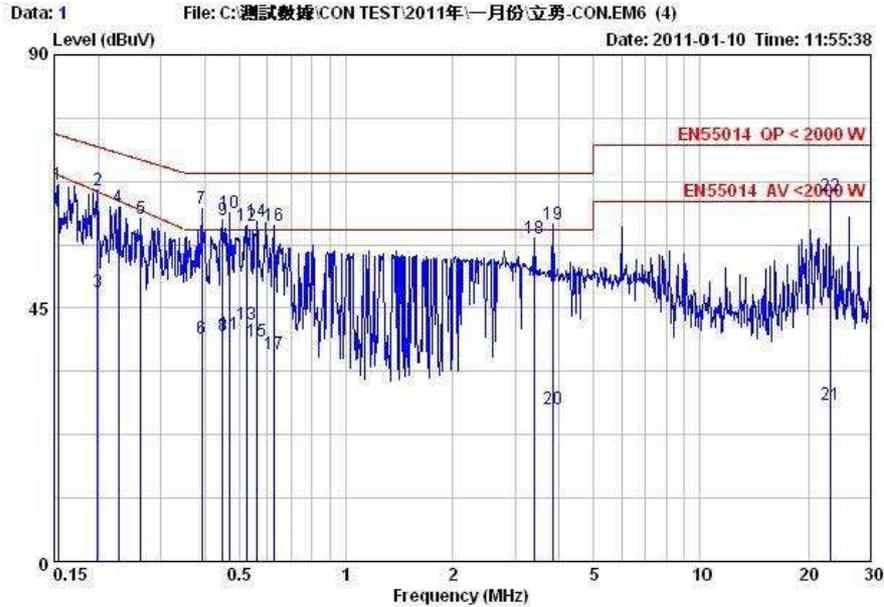


Test Data Of Conducted Emission Measurement (NEUTRAL)



環球認證有限公司
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Hsi Chih, Taipei Hsien 221, Taiwan, R.O.C.
TEL:886-2-26426992 FAX:886-2-26487450
WebSite: http://www.gcc.tw



Site : Conducted
Condition : EN55014 QP < 2000 W CON-LISN-99 NEUTRAL
: RBW:9KHz VBW:300KHz SWT:Auto
EUT : Please refer to page 1 of report
MODEL : Please refer to page 1 of report
MEMO : 230V

	Read Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.15	55.79	11.15	66.94	75.78	-8.84	Peak
2	0.20	54.84	11.14	65.98	73.68	-7.70	Peak
3	0.20	36.64	11.14	47.78	65.69	-17.91	Average
4	0.23	51.88	11.14	63.02	72.54	-9.52	Peak
5	0.26	49.89	11.14	61.03	71.36	-10.33	Peak
6	0.39	28.39	11.13	39.52	59.00	-19.48	Average
7	0.39	51.45	11.13	62.58	69.00	-6.42	Peak
8	0.45	28.92	11.13	40.05	59.00	-18.95	Average
9	0.45	49.48	11.13	60.61	69.00	-8.39	Peak
10	0.47	50.76	11.13	61.89	69.00	-7.11	Peak
11	0.47	29.32	11.13	40.45	59.00	-18.55	Average
12	0.52	48.45	11.13	59.58	69.00	-9.42	Peak
13	0.52	31.02	11.13	42.15	59.00	-16.85	Average
14	0.56	49.21	11.13	60.34	69.00	-8.66	Peak
15	0.56	27.88	11.13	39.01	59.00	-19.99	Average
16	0.62	48.58	11.13	59.71	69.00	-9.29	Peak
17	0.62	25.67	11.13	36.80	59.00	-22.20	Average
18	3.40	46.31	11.12	57.43	69.00	-11.57	Peak



Global Certification Corp.

Report No. : E1110406



環球認證有限公司
Global Certification Corp.

Global Certification Corp.
No.146, Shiang Charng Rd., Sec. 2,
Hsi Chih, Taipei Hsien 221, Taiwan, R.O.C.
TEL:886-2-26426992 FAX:886-2-26487450
WebSite: <http://www.gcc.tw>

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
19	3.84	48.91	11.11	60.02	69.00	-8.98	Peak
20	3.84	15.84	11.11	26.95	59.00	-32.05	Average
21	23.02	16.83	10.97	27.80	64.00	-36.20	Average
22	23.02	53.87	10.97	64.84	74.00	-9.16	Peak

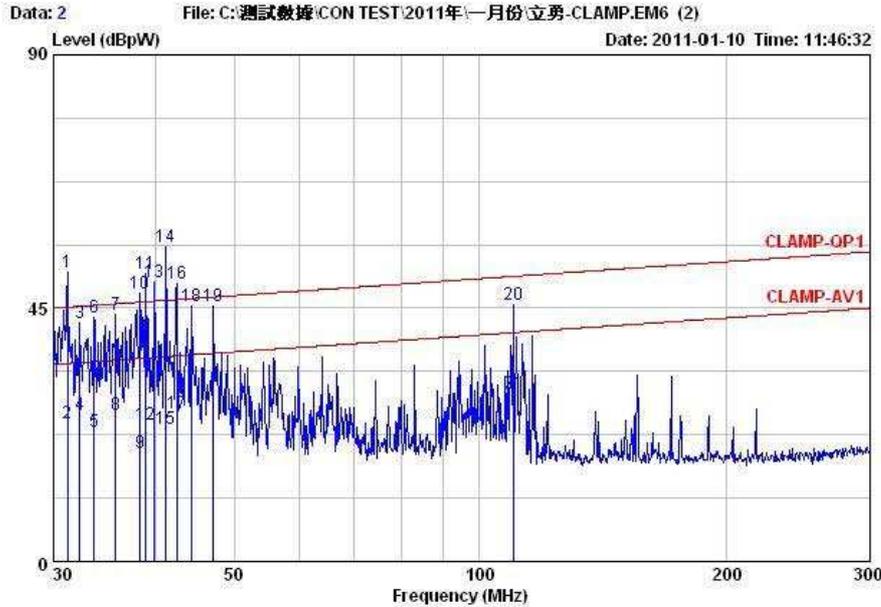


Test Data Of Radiated Emission Measurement (Horizontal)



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Site : Conducted
Condition : CLAMP-OP1
: RBW:120KHz VBW:300KHz SWT:Auto
EUT : Please refer to page 1 of report
MODEL : Please refer to page 1 of report
MEMO : 230V

	Freq	Read	Factor	Level	Limit	Over	Remark
	MHz	dBpW	dB	dBpW	dBpW	dB	
1 X	31.20	35.67	15.76	51.43	45.18	6.25	Peak
2	31.20	8.69	15.76	24.45	35.18	-10.73	Average
3	32.29	26.52	15.73	42.25	45.33	-3.08	Peak
4	32.29	10.38	15.73	26.11	35.33	-9.22	Average
5	33.66	7.39	15.68	23.07	35.51	-12.44	Average
6	33.66	27.75	15.68	43.43	45.51	-2.08	Peak
7	35.74	28.26	15.62	43.88	45.77	-1.89	Peak
8	35.74	10.37	15.62	25.99	35.77	-9.78	Average
9	38.29	3.78	15.54	19.32	36.07	-16.75	Average
10 X	38.29	32.16	15.54	47.70	46.07	1.63	Peak
11 X	38.83	35.50	15.53	51.03	46.13	4.90	Peak
12	38.83	8.79	15.53	24.32	36.13	-11.81	Average
13 X	39.91	34.19	15.50	49.69	46.25	3.44	Peak
14 X	41.22	40.40	15.44	55.84	46.39	9.45	Peak
15	41.22	8.15	15.44	23.59	36.39	-12.80	Average
16 X	42.47	33.93	15.40	49.33	46.52	2.81	Peak
17	42.47	10.92	15.40	26.32	36.52	-10.20	Average
18	44.37	30.13	15.32	45.45	46.71	-1.26	Peak



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	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBpW	dB	dBpW	dBpW	dB	
19	47.11	30.20	15.20	45.40	46.97	-1.57	Peak
20	109.93	31.51	14.04	45.55	50.65	-5.10	Peak
21	109.93	15.81	14.04	29.85	40.65	-10.80	Average