

Technical Compliance Statement

EMC Test Report

For the following information**Ref. File No.: C1S1802078**

Product : Knife Sharpener

Model Number : (1)KE-500 (2)KE-500-A (3)KE-500-B (4)KE-500-C
(5)KE-500-D (6)KE-500-E (7)KE-500-F (8)KE-500-G
(9)KE-500-H (10)KE-500-I (11)KE-500-J (12)KE-500-K
(13)KE-500-L (14)KE-500-M (15)KE-500-N (16)KE-500-O
(17)KE-500-P (18)KE-500-Q (19)KE-500-R (20)KE-500-S
(21)KE-500-T (22)KE-500-U (23)KE-500-V (24)KE-500-W
(25)KE-500-X (26)KE-500-Y (27)KE-500-Z

Brand Name : Nirey

Applicant : Nirey Manufacturer Co., Ltd.

Manufacturer : Nirey Manufacturer Co., Ltd.

Standards :
EN 55014-1:2017
EN 61000-3-2:2014 and EN 61000-3-3:2013
EN 55014-2:1997 +A1:2001 +A2:2008 Category I

We hereby certify that the above product has been tested by us with the listed standards and found in compliance with the council EMC directive 2014/30/EU. The test data and results are issued on the EMC test report no. **EM-E180078**.

Signature


Alex Deng/Deputy Manager
Date: 2018. 03. 07

Test Laboratory:
Audix Technology Corporation, EMC Department
TAF Accreditation No.: 1724
Web Site: www.audixtech.com

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.

TEST REPORT

Knife Sharpener

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(25)KE-500-X (26)KE-500-Y (27)KE-500-Z

Brand: Nirey

Applicant for:

Nirey Manufacturer Co., Ltd.
No 488, Sec. 3, Zhongqing Rd.,
Xitun Dist., Taichung 407, Taiwan

Prepared by:

Audix Technology Corporation, EMC Department
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan



File No. : C1S1802078
Report No. : EM-E180078
Date of Report : 2018. 03. 07

The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, TAF, or any government agencies.

Test Report

Applicant : Nirey Manufacturer Co., Ltd.
Manufacturer : Nirey Manufacturer Co., Ltd.
EUT Description
(1) Product : Knife Sharpener
(2) Model Number : (1)KE-500 (2)KE-500-A (3)KE-500-B (4)KE-500-C
(5)KE-500-D (6)KE-500-E (7)KE-500-F (8)KE-500-G
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(25)KE-500-X (26)KE-500-Y (27)KE-500-Z
(3) Brand : Nirey
(4) Power Rating : AC 230V, 50Hz

Applicable Standards:

EN 55014-1:2017

EN 61000-3-2:2014 and EN 61000-3-3:2013

EN 55014-2:1997 +A1:2001 +A2:2008 Category I

The device described above was tested by Audix Technology Corporation to determine the maximum emission levels emanating from the device, its ensured severity levels, and performance criterion. All of the tests were requested by the applicant and the results thereof based upon the information that the applicant provided to us. We, Audix Technology Corporation assumes full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT is technically compliance with the requirements of EN 55014-1、EN 61000-3-2, -3 and EN 55014-2 standards.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Audix Technology Corporation.

Date of Report: 2018. 03. 07

Reviewed by:



(Patty Yu/Administrator)

Approved by:



(Alex Deng/Deputy Manager)

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APPENDIX (Photos of EUT)

1. Revision of Test Report

Issued Date	Revision Summary	Report Number
2018. 03. 07	Original Report.	EM-E180078

2. Summary of Test Result

2.1. Test Result

Emissions			
Test Item	Referred Standard	Limit	Result
Continuous disturbance voltage at mains terminals	EN 55014-1:2017	Section 4.1	Pass
			Margin 0.65dB at 5.968MHz
Discontinuous disturbance voltage, Click	EN 55014-1:2017	Section 4.2	N/A
Disturbance power of tools	EN 55014-1:2017	Section 4.1	Pass
			Margin 27.75dB at 75.704MHz
Radiated disturbance	EN 55014-1:2017	Class B	N/A
Harmonic current emissions	EN 61000-3-2:2014	Class A	Pass
Voltage fluctuations & flicker	EN 61000-3-3:2013	Section 5	Pass
Note : 1. N/A is an abbreviation for Not Applicable 2. Special measures : None 3. Decision and justification not to measure: None 4. Category I apparatus is deemed to fulfil the relevant immunity requirements without testing.			

2.2. Description of Test Firm

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099301 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP (USA) NVLAP Lab Code 200077-0 (2) TAF (Taiwan) No. 1724
Test Facilities	(1) No. 8 Shielding Room (2) No. 2 EMS Test Room

3. General Information

3.1. Description of Application

Applicant	Nirey Manufacturer Co., Ltd. No 488, Sec. 3, Zhongqing Rd., Xitun Dist., Taichung 407, Taiwan
Manufacturer	Nirey Manufacturer Co., Ltd. No 488, Sec. 3, Zhongqing Rd., Xitun Dist., Taichung 407, Taiwan
Product	Knife Sharpener
Brand	Nirey
Model Number	(1)KE-500 (2)KE-500-A (3)KE-500-B (4)KE-500-C (5)KE-500-D (6)KE-500-E (7)KE-500-F (8)KE-500-G (9)KE-500-H (10)KE-500-I (11)KE-500-J (12)KE-500-K (13)KE-500-L (14)KE-500-M (15)KE-500-N (16)KE-500-O (17)KE-500-P (18)KE-500-Q (19)KE-500-R (20)KE-500-S (21)KE-500-T (22)KE-500-U (23)KE-500-V (24)KE-500-W (25)KE-500-X (26)KE-500-Y (27)KE-500-Z The difference of above models is in sales marketing.

3.2. Description of the EUT

Test Model	KE-500
Serial Number	N/A
Power Rating	AC 230V, 50Hz
Firmware Version	N/A
Sample Status	Production
Date of Receipt	2018. 02. 09
Date of Test	2018. 02. 22 ~ 03. 05
I/O Ports List	None
Accessories Supplied	AC Power Cord (3C) (AC Power Cord: Unshielded, Undetachable, 1.5m)

3.3. Highest Frequency within EUT

The highest frequency is less than 108MHz of EUT.

3.4. List of Key Components of EUT

None

3.5. Determination of Worse Case Operating Modes

This EUT was only one combination, there is no pre-scan mode.

3.6. Final Test Configuration Mode

The worst showed as following configuration was recorded in this report.

Test Item	Test Mode
Continuous disturbance voltage at mains terminals	Operating
Disturbance power of tools	Operating
Harmonic current emissions	Operating
Voltage fluctuations & flicker	Operating

4. Measurement Arrangement

4.1. Equipment and cables arrangement

- Connection Diagram of EUT and Peripheral Devices



4.2. Method of Exercising EUT

- The methods for exercising the EUT during the measurement specified in EN 55014-1, -2 were used.

- | |
|--|
| 1. Turn on the power of all equipments. |
| 2. The EUT (Knife Sharpener) was operating during the test. |

4.3. List of Supported Units under Test

None

4.4. List of Used Cables under Test

None

5.3. Applicable Limits

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

Frequency range (MHz)	At mains terminals		At load terminals and at additional terminals	
	dB(μ V) Quasi-peak	dB(μ V) Average*	dB(μ V) Quasi-peak	dB(μ V) Average*
0.15 to 0.50	Decreasing linearly with the logarithm of the frequency from: 66 to 56		80	70
0.50 to 5	56	46	74	64
5 to 30	60	50	74	64

* 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 to be carried out.

5.4. Measurement Procedure

For AC mains power port

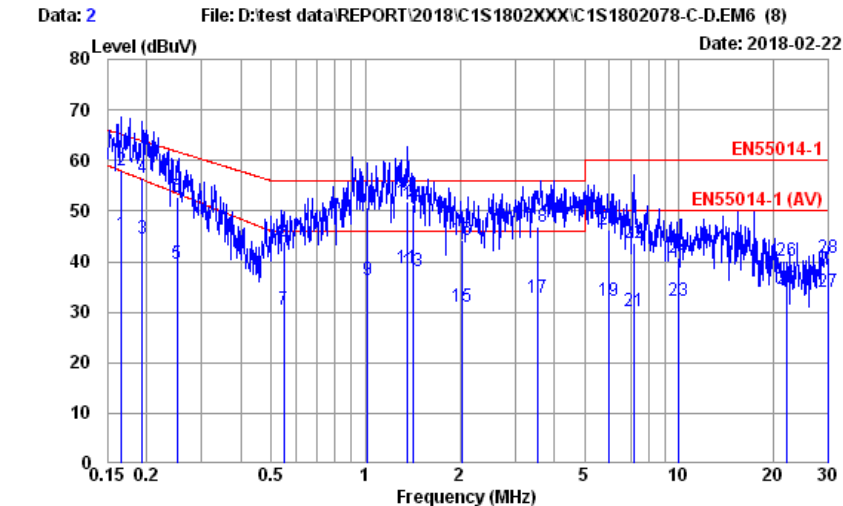
The measurement procedure specified in EN 55014-1 was used.

- Setup the EUT and associated equipment described as clause 4.1, and they were located 40cm from the vertical conducting plane.
- Connect the EUT power cord to the main A.M.N and associated equipment to the second A.M.N. All ports of the A.M.N not connecting to the measuring equipment was terminated into 50 ohm resistive load.
- Setup the resolution bandwidth of the test receiver at 9kHz (while testing within 0.15 to 30MHz).
- Operate the EUT system as described in clause 4.2.
- For the exploratory measurement, determine the highest emission amplitude relative to the limit on each of the EUT power cord with the peak detector by each of the EUT operation over the specified frequency range and record it, and then
- For final measurement, select the EUT operation mode that produced the highest amplitude in the exploratory measurement to determine the highest emissions with each specified detector and record it. All of the current-carrying conductors of each of the EUT power cords, except the ground conductor, must be measured over the specified frequency range.
- The measurement result was calculated by following formula :
- Emission Level = Reading (Receiver) + Factor (A.M.N) + Insertion Loss (Pulse Limiter) + Cable Loss
- If the average limit is met when using a Quasi-Peak detector receiver, the EUT is deemed to meet both limits and measurement with the average detector is unnecessary.

5.5. Measurement Result

The following data are the worst emissions based on the prescan measurement result.

Test Date	2018. 02. 22	Environment	21°C, 58%
Input Power	AC 253V, 50Hz	Test Phase	Neutral
Tested By	Nick Du	Test Result	Pass
Test Mode	Operating		

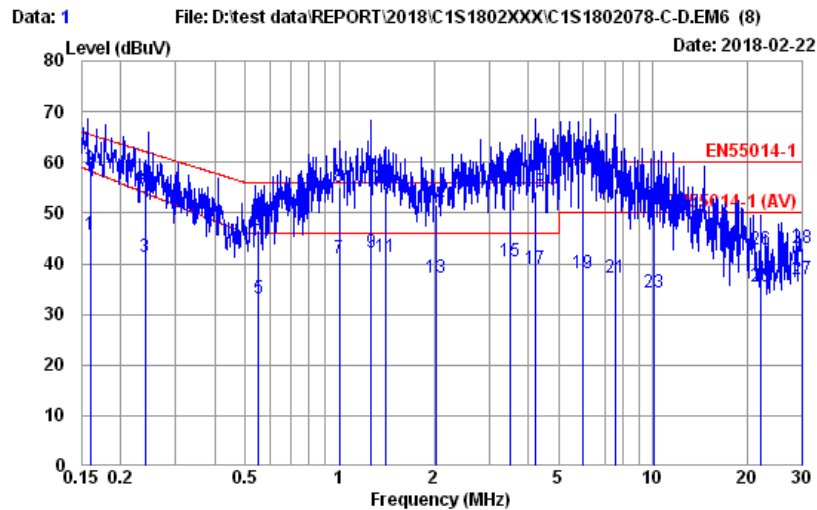


Site no. : No.8 Shielded Room Data no. : 2
Condition : ENV4200 100169 L1SN Phase : NEUTRAL
Limit : EN55014-1
Env. / Ins. : 21°C / 58% ESR3 (1774) Engineer : Nick Du
EUT : KE-500
Power Rating : 253Vac/50Hz
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.167	10.55	0.03	9.86	24.85	45.29	57.85	12.56	Average
2	0.167	10.55	0.03	9.86	37.50	57.94	65.12	7.18	QP
3	0.193	10.53	0.03	9.86	24.10	44.52	56.25	11.73	Average
4	0.193	10.53	0.03	9.86	36.19	56.61	63.89	7.28	QP
5	0.250	10.49	0.03	9.86	19.07	39.45	53.50	14.05	Average
6	0.250	10.49	0.03	9.86	32.46	52.84	61.77	8.93	QP
7	0.549	10.43	0.05	9.86	10.24	30.58	46.00	15.42	Average
8	0.549	10.43	0.05	9.86	23.72	44.06	56.00	11.94	QP
9	1.015	10.42	0.06	9.86	16.14	36.48	46.00	9.52	Average
10	1.015	10.42	0.06	9.86	30.26	50.60	56.00	5.40	QP
11	1.359	10.44	0.06	9.86	18.43	38.79	46.00	7.21	Average
12	1.359	10.44	0.06	9.86	31.65	52.01	56.00	3.99	QP
13	1.420	10.44	0.06	9.86	17.80	38.16	46.00	7.84	Average
14	1.420	10.44	0.06	9.86	30.97	51.33	56.00	4.67	QP
15	2.028	10.46	0.08	9.86	10.52	30.92	46.00	15.08	Average
16	2.028	10.46	0.08	9.86	23.98	44.38	56.00	11.62	QP
17	3.528	10.57	0.10	9.87	12.41	32.95	46.00	13.05	Average
18	3.528	10.57	0.10	9.87	26.36	46.90	56.00	9.10	QP
19	5.987	10.90	0.14	9.87	11.37	32.28	50.00	17.72	Average
20	5.987	10.90	0.14	9.87	25.27	46.18	60.00	13.82	QP
21	7.213	11.05	0.16	9.88	9.24	30.33	50.00	19.67	Average
22	7.213	11.05	0.16	9.88	22.45	43.54	60.00	16.46	QP
23	9.986	11.30	0.19	9.89	10.82	32.20	50.00	17.80	Average
24	9.986	11.30	0.19	9.89	19.33	40.71	60.00	19.29	QP
25	22.045	14.18	0.28	9.95	10.07	34.48	50.00	15.52	Average
26	22.045	14.18	0.28	9.95	15.61	40.02	60.00	19.98	QP
27	29.962	16.26	0.34	10.01	7.41	34.02	50.00	15.98	Average
28	29.962	16.26	0.34	10.01	14.09	40.70	60.00	19.30	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Test Date	2018. 02. 22	Environment	21°C, 58%
Input Power	AC 253V, 50Hz	Test Phase	Line
Tested By	Nick Du	Test Result	Pass
Test Mode	Operating		



Site no. : No.8 Shielded Room Data no. : 1
Condition : ENV4200 100169 LISN Phase : LINE
Limit : EN55014-1
Env. / Ins. : 21°C / 58% ESR3 (1774) Engineer : Nick Du
EUT : KE-500
Power Rating : 253Vac/50Hz
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.160	10.61	0.03	9.86	25.21	45.71	58.29	12.58	Average
2	0.160	10.61	0.03	9.86	37.99	58.49	65.46	6.97	QP
3	0.240	10.53	0.03	9.86	20.84	41.26	53.92	12.66	Average
4	0.240	10.53	0.03	9.86	34.60	55.02	62.09	7.07	QP
5	0.550	10.45	0.05	9.86	12.61	32.97	46.00	13.03	Average
6	0.550	10.45	0.05	9.86	26.37	46.73	56.00	9.27	QP
7	1.000	10.44	0.06	9.86	20.58	40.94	46.00	5.06	Average
8	1.000	10.44	0.06	9.86	34.60	54.96	56.00	1.04	QP
9	1.262	10.45	0.06	9.86	21.74	42.11	46.00	3.89	Average
10	1.262	10.45	0.06	9.86	34.35	54.72	56.00	1.28	QP
11	1.400	10.45	0.06	9.86	21.00	41.37	46.00	4.63	Average
12	1.400	10.45	0.06	9.86	34.63	55.00	56.00	1.00	QP
13	2.023	10.47	0.08	9.86	16.67	37.08	46.00	8.92	Average
14	2.023	10.47	0.08	9.86	31.07	51.48	56.00	4.52	QP
15	3.483	10.57	0.10	9.87	19.78	40.32	46.00	5.68	Average
16	3.483	10.57	0.10	9.87	34.29	54.83	56.00	1.17	QP
17	4.224	10.63	0.11	9.87	18.27	38.88	46.00	7.12	Average
18	4.224	10.63	0.11	9.87	33.54	54.15	56.00	1.85	QP
19	5.968	10.90	0.14	9.87	17.24	38.15	50.00	11.85	Average
20	5.968	10.90	0.14	9.87	38.44	59.35	60.00	0.65	QP
21	7.606	11.09	0.16	9.88	16.12	37.25	50.00	12.75	Average
22	7.606	11.09	0.16	9.88	33.73	54.86	60.00	5.14	QP
23	10.061	11.32	0.19	9.89	13.02	34.42	50.00	15.58	Average
24	10.061	11.32	0.19	9.89	30.10	51.50	60.00	8.50	QP
25	21.958	14.20	0.28	9.95	11.00	35.43	50.00	14.57	Average
26	21.958	14.20	0.28	9.95	18.26	42.69	60.00	17.31	QP
27	29.962	16.35	0.34	10.01	10.32	37.02	50.00	12.98	Average
28	29.962	16.35	0.34	10.01	16.48	43.18	60.00	16.82	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

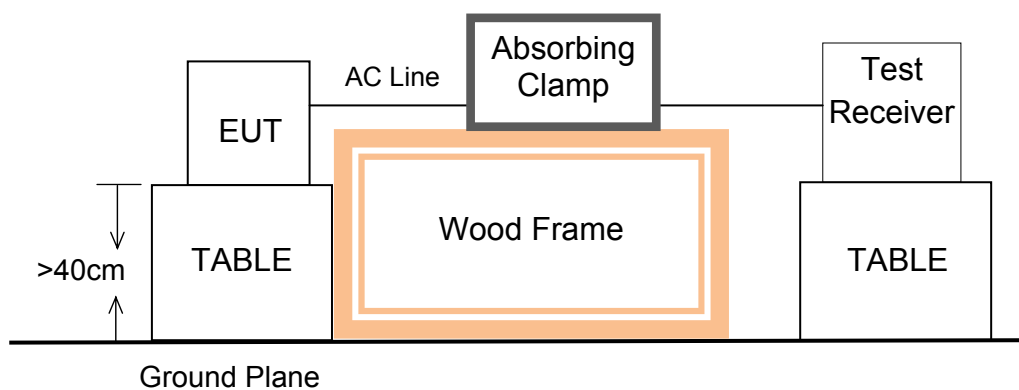
6. Disturbance Power Measurement

6.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Test Receiver	R&S	ESR3	101774	2018. 01. 24	1 Year
2	Absorbing Clamp	R&S	MDS-21	100029	2017. 03. 24	1 Year
3	Digital Ther-mo-Hygro Me-ter	iMax	HTC-1	No.8 S/R	2017. 04. 21	1 Year

6.2. Test Setup

The EUTs and test equipment were configured in accordance with the requirement of EN 55014-1:



6.3. Applicable Limits

- Disturbance power measurement in the frequency range 30 MHz to 300 MHz

The limits of the disturbance power are given in Table 2a. Disturbance power is measured in accordance with Clause 6, at all terminals.

Frequency MHz	Interference Power Limits dB (pW)	
	Household and Similar appliances	
	Quasi-Peak dB (pW)	Average dB (pW)
30 ~ 300	Increasing linearly with frequency from 45 to 55	Increasing linearly with frequency from 35 to 45
* 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 with the receiver with 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.

- Table 2b-Margin when performing disturbance power measurement in the frequency range 30 MHz to 300 MHz

Frequency MHz	Interference Power Limits dB (pW)	
	Household and Similar appliances	
	Quasi-Peak dB (pW)	Average dB (pW)
200 ~ 300	Increasing linearly with the frequency from: 0 to 10 dB	-
NOTE 1 This table only applies if specified in 4.1.2.3.2.		
NOTE 2 The measured result at a particular frequency shall be less than the relevant limit minus the corresponding margin (at that frequency).		

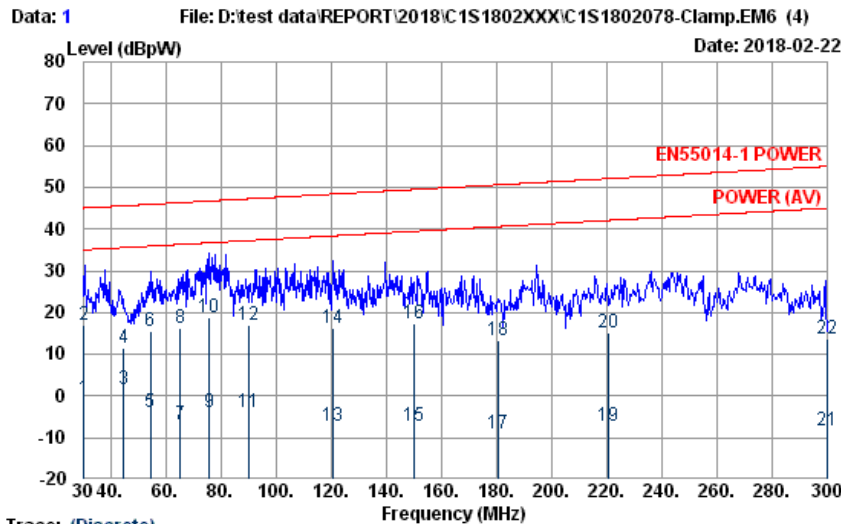
6.4. Measurement Procedure

The measurement procedure specified in EN 55014-1 was used.

- Setup the EUT and associated equipment described as clause 4.1, and they were located 40cm from the vertical conducting plane.
- The EUT was placed on a non-metallic table and kept 0.4m away from any other metallic objects. For the mains lead test, the length of power cord must be extended up to 6m and then pass through an absorbing clamp to connect to the power mains to perform the compliance test. For other leads test, the length of all the leads must be extended up to 12m and then pass through absorbing clamp to perform the compliance test.
- The absorbing clamp was used to find out the maximum emission generated from the leads at each test frequency. For each test frequency, the clamp was moved along with the leads back and forth to find the maximum emission value on a position which is about half-wavelength distance of test frequency away from EUT.
- According to the section 7.1.4 of EN 55014-1, a test at about 160kHz was made over a range of 0.9 to 1.1 times the rated voltage in order to check whether the level of disturbance varies considerably with the supply voltage; in which case, the measurements are to be made at the voltage that causes maximum disturbance.
- The bandwidth of the test receiver was set at 120kHz.
- The frequency range from 30MHz to 300MHz was pre-scanned with a peak detector. The all final readings from test receiver were measured with Quasi-Peak detector and Average detector
- The measurement result was calculated by following formula :
- $\text{Emission Level} = \text{Reading (Receiver)} + \text{Factor (A.M.N)} + \text{Insertion Loss (Pulse Limiter)} + \text{Cable Loss}$
- If the average limit is met when using a Quasi-Peak detector receiver, the EUT is deemed to meet both limits and measurement with the average detector is unnecessary.

6.5. Measurement Result

Test Date	2018. 02. 22	Environment	23°C, 51%
Input Power	AC 253V, 50Hz	Test Result	Pass
Test Mode	Operating	Tested By	Nick Du



Trace: (Discrete)
 Site no. : No.8 Shielded Room Data no. : 1
 Condition : CLAMP MDS-21 100029 LISN Phase :
 Limit : EN55014-1 POWER
 Env. / Ins. : 23°C / 51% ESR3 (1774) Engineer : Nick Du
 EUT : KE-500
 Power Rating : 253Vac / 50Hz
 Test Mode : Operating

	Freq. (MHz)	Clamp Factor (dB)	Cable Loss (dB)	Reading (dBpW)	Emission Level (dBpW)	Limits (dBpW)	Margin (dB)	Remark
1	30.241	4.16	0.57	-5.20	-0.47	35.02	35.49	Average
2	30.241	4.16	0.57	12.14	16.87	45.02	28.15	QP
3	44.793	1.99	0.73	-1.15	1.57	35.56	33.99	Average
4	44.793	1.99	0.73	8.77	11.49	45.56	34.07	QP
5	54.340	1.35	0.80	-5.93	-3.78	35.91	39.69	Average
6	54.340	1.35	0.80	13.48	15.63	45.91	30.28	QP
7	65.318	0.46	0.88	-8.11	-6.77	36.32	43.09	Average
8	65.318	0.46	0.88	14.99	16.33	46.32	29.99	QP
9	75.704	-0.42	0.94	-4.40	-3.88	36.70	40.58	Average
10	75.704	-0.42	0.94	18.43	18.95	46.70	27.75	QP
11	90.216	0.01	1.02	-4.85	-3.82	37.24	41.06	Average
12	90.216	0.01	1.02	16.07	17.10	47.24	30.14	QP
13	120.537	-0.42	1.17	-7.76	-7.01	38.36	45.37	Average
14	120.537	-0.42	1.17	15.52	16.27	48.36	32.09	QP
15	149.765	-1.25	1.30	-7.10	-7.05	39.45	46.50	Average
16	149.765	-1.25	1.30	17.31	17.36	49.45	32.09	QP
17	180.428	-2.20	1.43	-8.06	-8.83	40.58	49.41	Average
18	180.428	-2.20	1.43	14.01	13.24	50.58	37.34	QP
19	220.220	-2.29	1.59	-6.39	-7.09	42.06	49.15	Average
20	220.220	-2.29	1.59	16.01	15.31	52.06	36.75	QP
21	299.813	-3.20	1.87	-6.84	-8.17	45.00	53.17	Average
22	299.813	-3.20	1.87	14.94	13.61	55.00	41.39	QP

Remarks: 1. Emission Level= Clamp Factor + Cable Loss + Reading.
 2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

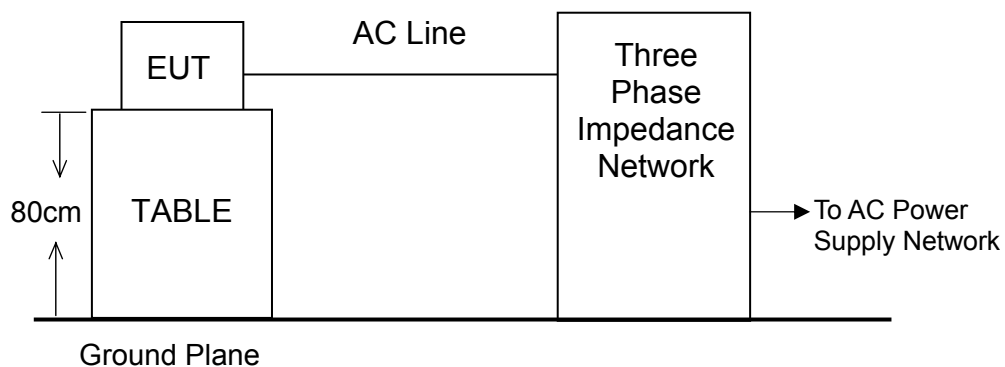
7. Measurement of Harmonics Current Emissions

7.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	AC Power Source	TESEQ	NSG 1007-45	1248A04038	2017. 11. 28	2 Years
2	Signal Conditioning Unit	TESEQ	CCN 1000-3	1234A03680	2017. 11. 28	2 Years
3	Three Phase Impedance Network	TESEQ	INA 2197	1234A03681	2017. 11. 28	2 Years
4	Profling AC Switching Unit	TESEQ	NSG 2200-3	EK 22713	2017. 11. 28	2 Years
5	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 Harmon-ics Room	2017. 04. 21	1 Year

7.2. Test Setup

The EUT and test equipment were configured in accordance with the requirement of EN 61000-3-2.



7.3. Applicable Standard and Limits

Limits for Class A Equipment

Class A is classified according to section 5 of EN 61000-3-2

Harmonic order n	Maximum permissible harmonic current A
Odd Harmonics Only	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \times 15/n$
Even Harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \times 8/n$

Note:

According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

Limits for Class D Equipment

Class D is classified according to section 5 of EN 61000-3-2

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
Odd Harmonics Only		
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	0.30	0.21
$15 \leq n \leq 39$	$3.85/n$	$0.15 \times 15/n$

Note:

According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

7.4. Measurement Procedure

The measurement procedure specified in EN 61000-3-2 clause 6.2 was used.

- Setup the EUT and associated equipment described as clause 4.1.
- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- Apply a 230V/50Hz rated test voltage which shall be maintained within $\pm 2.0\%$ and the frequency within $\pm 0.5\%$ of the nominal value to EUT.
- Let EUT work as stated and through three phase impedance network to measure the EUT to get the harmonic current for Odd & Even harmonics up to 40th.

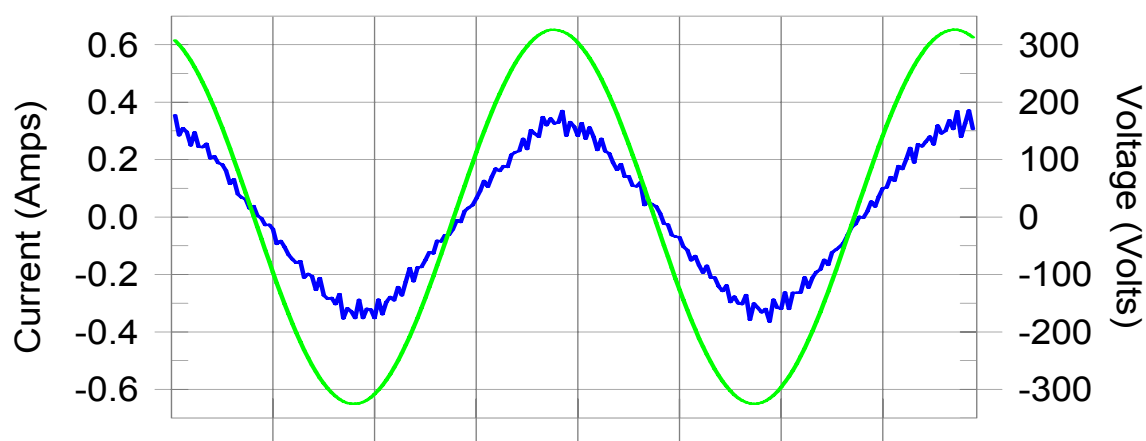
7.5. Measurement Result

Test Date	2018. 03. 05	Environment	20°C, 47%
Input Power	AC 230V, 50Hz	Result	Pass (Class A)
Test Mode	Operating	Tested By	Jacky Chen

Test Result: N/L

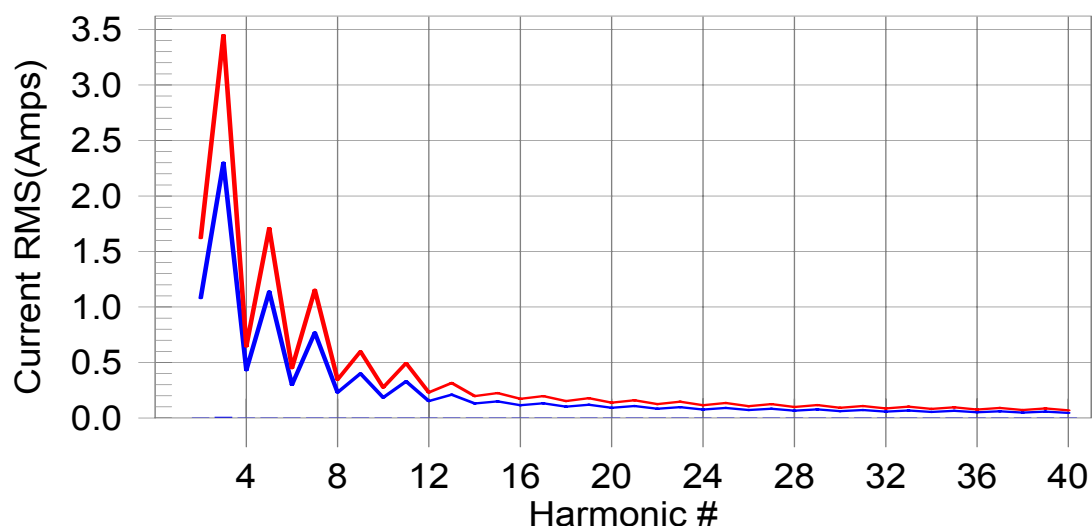
Source qualification: Normal

Current & voltage waveforms



Harmonics and Class A limit line

European Limits



Test result: Pass **Worst harmonic was #3 with 0.3% of the limit.**

Test Result: Pass Source qualification: Normal
 THC(A): 0.009 I-THD(%): 4.3 POHC(A): 0.000 POHC Limit(A): 0.251

Highest parameter values during test:

V_RMS (Volts):	230.388	Frequency(Hz):	50.00
I_Peak (Amps):	0.408	I_RMS (Amps):	0.224
I_Fund (Amps):	0.223	Crest Factor:	1.835
Power (Watts):	51.1	Power Factor:	0.991

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.000	1.080	N/A	0.000	1.620	N/A	Pass
3	0.009	2.300	0.4	0.009	3.450	0.3	Pass
4	0.000	0.430	N/A	0.000	0.645	N/A	Pass
5	0.002	1.140	N/A	0.002	1.710	N/A	Pass
6	0.000	0.300	N/A	0.000	0.450	N/A	Pass
7	0.000	0.770	N/A	0.000	1.155	N/A	Pass
8	0.000	0.230	N/A	0.000	0.345	N/A	Pass
9	0.000	0.400	N/A	0.000	0.600	N/A	Pass
10	0.000	0.184	N/A	0.000	0.276	N/A	Pass
11	0.000	0.330	N/A	0.001	0.495	N/A	Pass
12	0.000	0.153	N/A	0.000	0.230	N/A	Pass
13	0.000	0.210	N/A	0.001	0.315	N/A	Pass
14	0.000	0.131	N/A	0.001	0.197	N/A	Pass
15	0.000	0.150	N/A	0.001	0.225	N/A	Pass
16	0.000	0.115	N/A	0.001	0.173	N/A	Pass
17	0.000	0.132	N/A	0.000	0.198	N/A	Pass
18	0.000	0.102	N/A	0.001	0.153	N/A	Pass
19	0.000	0.118	N/A	0.000	0.178	N/A	Pass
20	0.000	0.092	N/A	0.000	0.138	N/A	Pass
21	0.000	0.107	N/A	0.000	0.161	N/A	Pass
22	0.000	0.084	N/A	0.000	0.125	N/A	Pass
23	0.000	0.098	N/A	0.000	0.147	N/A	Pass
24	0.000	0.077	N/A	0.001	0.115	N/A	Pass
25	0.000	0.090	N/A	0.000	0.135	N/A	Pass
26	0.001	0.071	N/A	0.002	0.107	N/A	Pass
27	0.000	0.083	N/A	0.000	0.125	N/A	Pass
28	0.000	0.066	N/A	0.001	0.099	N/A	Pass
29	0.000	0.078	N/A	0.000	0.116	N/A	Pass
30	0.001	0.061	N/A	0.001	0.092	N/A	Pass
31	0.000	0.073	N/A	0.000	0.109	N/A	Pass
32	0.001	0.058	N/A	0.002	0.086	N/A	Pass
33	0.000	0.068	N/A	0.000	0.102	N/A	Pass
34	0.000	0.054	N/A	0.001	0.081	N/A	Pass
35	0.000	0.064	N/A	0.000	0.096	N/A	Pass
36	0.000	0.051	N/A	0.000	0.077	N/A	Pass
37	0.000	0.061	N/A	0.000	0.091	N/A	Pass
38	0.000	0.048	N/A	0.000	0.073	N/A	Pass
39	0.000	0.058	N/A	0.000	0.087	N/A	Pass
40	0.000	0.046	N/A	0.000	0.069	N/A	Pass

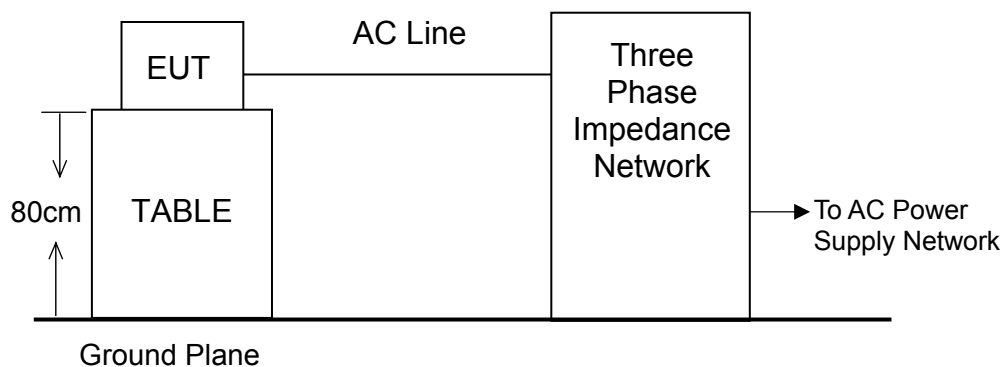
8. Measurement of Voltage Fluctuations and Flicker Emissions

8.1. List of Test Instruments

Item	Equipment	Manufacture	Model No.	Serial No.	Cal. Date	Cal. Interval
1	AC Power Source	TESEQ	NSG 1007-45	1248A04038	2017. 11. 28	2 Years
2	Signal Conditioning Unit	TESEQ	CCN 1000-3	1234A03680	2017. 11. 28	2 Years
3	Three Phase Impedance Network	TESEQ	INA 2197	1234A03681	2017. 11. 28	2 Years
4	Proflin AC Switching Unit	TESEQ	NSG 2200-3	EK 22713	2017. 11. 28	2 Years
5	Digital Ther-mo-Hygro Meter	iMax	HTC-1	No.2 Harmon-ics Room	2017. 04. 21	1 Year

8.2. Test Setup

The EUT and test equipment were configured in accordance with the requirement of EN 61000-3-3.



8.3. Applicable Standard and Limits

(1) Limits is according to section 5 of EN 61000-3-3

Tested Items	Description	Limit
P_{st}	Short-term Flicker Indicator	≤ 1.0
P_{lt}	Long-term Flicker Indicator	≤ 0.65
$d_{(t)}$	Voltage change more than 500ms	$\leq 3.3\%$
T_{max}	Maximum time duration during the observation period that the voltage deviation $d_{(t)}$ exceeds the limit for d_c	500ms
d_c	Relative steady-state voltage change	$\leq 3.3\%$
d_{max}	Maximum relative voltage change	$\leq 4\%$
	Maximum relative voltage change	$\leq 6\%$
	Maximum relative voltage change	$\leq 7\%$

8.4. Measurement Procedure

The measurement procedure specified in EN 61000-3-3 clause 6 was used.

- Setup the EUTs and associated equipment described as clause 4.1.
- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.
- Apply a 230V/50Hz rated test voltage which shall be maintained within $\pm 2.0\%$ and the frequency within $\pm 0.5\%$ of the nominal value to EUT.

8.5. Measurement Result

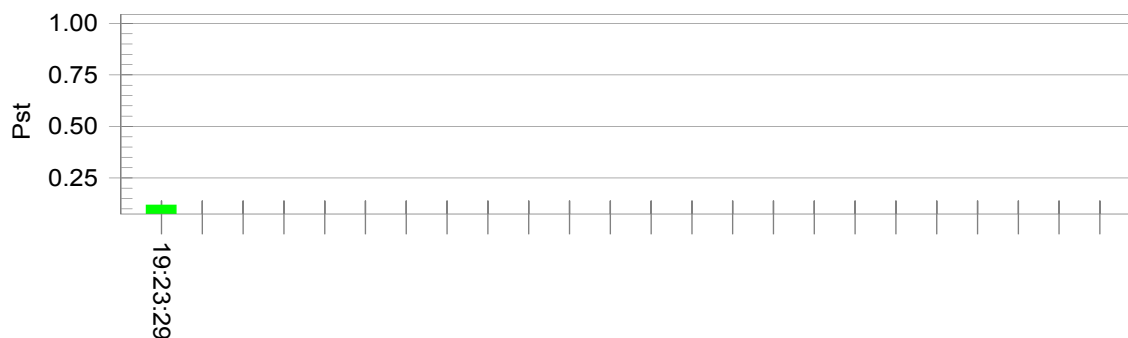
Test Date	2018. 03. 05	Environment	20°C, 47%
Input Power	AC 230V, 50Hz	Result	Pass
Test Mode	Operating	Tested By	Jacky Chen

Test Result: Pass

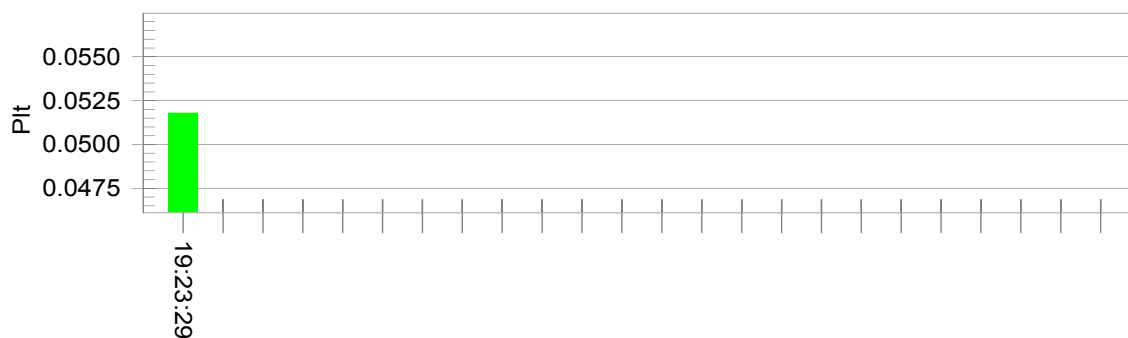
Status: Test Completed

Pst and limit line

European Limits



Plt and limit line



Parameter values recorded during the test:

Vrms at the end of test (Volt):	230.23		
Highest dt (%):	0.00	Test limit (%):	N/A N/A
T-max (mS):	0.0	Test limit (mS):	500.0 Pass
Highest dc (%):	0.00	Test limit (%):	3.30 Pass
Highest dmax (%):	-0.04	Test limit (%):	4.00 Pass
Highest Pst (10 min. period):	0.119	Test limit:	1.000 Pass

Status: Test Completed

Vrms at the end of test (Volt): **230.31**

InRush Current(Amps-rms): 1.256 **Test limit:** < 20A

9. Measurement Uncertainty List

The measurement uncertainty was estimated for test on the EUT according to CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage of K=2.

The uncertainties value is not used in determining the PASS/FAIL results.

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Conducted emissions at AC mains power port	9kHz-150kHz	±3.7dB
	150kHz-30MHz	±3.5dB
Conducted emissions at wired network port	150kHz-30MHz	±3.5dB
Conducted emissions at broadcast receiver tuner port	150kHz-30MHz	±3.5dB
Conducted emissions Power Clamp	30MHz-300MHz	±4.4dB
Radiated electromagnetic	9kHz-30MHz	±0.5dB
Radiated emissions (10m Chamber)	30MHz-200MHz, 3m, Horizontal	±4.3dB
	200MHz-1000MHz, 3m, Horizontal	±4.3dB
	30MHz-200MHz, 3m, Vertical	±4.4dB
	200MHz-1000MHz, 3m, Vertical	±3.9dB
	30MHz-200MHz, 10m, Horizontal	±4.3dB
	200MHz-1000MHz, 10m, Horizontal	±4.1dB
	30MHz-200MHz, 10m, Vertical	±4.3dB
	200MHz-1000MHz, 10m, Vertical	±3.8dB
	1GHz-6GHz, 3m	±5.5dB
	6GHz-18GHz, 3m	±4.8dB
Radiated emissions (No.1 3m Chamber)	30MHz-200MHz, 3m, Horizontal	±3.9dB
	200MHz-1000MHz, 3m, Horizontal	±4.3dB
	30MHz-200MHz, 3m, Vertical	±4.5dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
	1GHz-6GHz, 3m	±5.1dB
	6GHz-18GHz, 3m	±5.5dB
Radiated emissions (No.2 3m Chamber)	30MHz-200MHz, 3m, Horizontal	±4.3dB
	200MHz-1000MHz, 3m, Horizontal	±4.3dB
	30MHz-200MHz, 3m, Vertical	±4.4dB
	200MHz-1000MHz, 3m, Vertical	±3.9dB
	1GHz-6GHz, 3m	±5.2dB
	6GHz-18GHz, 3m	±5.2dB
Radiated emissions (No.3 3m Chamber)	30MHz-200MHz, 3m, Horizontal	±4.7dB
	200MHz-1000MHz, 3m, Horizontal	±4.5dB
	30MHz-200MHz, 3m, Vertical	±4.3dB
	200MHz-1000MHz, 3m, Vertical	±4.1dB
Radiated emissions (No.4 3m Chamber)	30MHz-200MHz, 3m, Horizontal	±4.1dB
	200MHz-1000MHz, 3m, Horizontal	±4.4dB
	30MHz-200MHz, 3m, Vertical	±4.2dB
	200MHz-1000MHz, 3m, Vertical	±5.0dB
	1GHz-6GHz, 3m	±4.4dB
	6GHz-18GHz, 3m	±4.1dB

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Radiated emissions (No.3 OATS)	30MHz-200MHz, 3m, Horizontal	$\pm 4.5\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.4\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.4\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.0\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 4.5\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.2\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.3\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.0\text{dB}$
Radiated emissions (No.5 OATS)	30MHz-200MHz, 3m, Horizontal	$\pm 4.2\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.7\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.4\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.4\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 4.2\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.6\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.4\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.4\text{dB}$
Radiated emissions (No.6 OATS)	30MHz-200MHz, 3m, Horizontal	$\pm 4.3\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.4\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.5\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.1\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 4.3\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.2\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.4\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.1\text{dB}$
Radiated emissions (No.7 OATS)	30MHz-200MHz, 3m, Horizontal	$\pm 3.9\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.5\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.6\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.5\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 3.9\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.3\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.6\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.5\text{dB}$
Radiated emissions (No.8 OATS)	30MHz-200MHz, 3m, Horizontal	$\pm 4.5\text{dB}$
	200MHz-1000MHz, 3m, Horizontal	$\pm 4.3\text{dB}$
	30MHz-200MHz, 3m, Vertical	$\pm 4.6\text{dB}$
	200MHz-1000MHz, 3m, Vertical	$\pm 4.1\text{dB}$
	30MHz-200MHz, 10m, Horizontal	$\pm 4.7\text{dB}$
	200MHz-1000MHz, 10m, Horizontal	$\pm 4.2\text{dB}$
	30MHz-200MHz, 10m, Vertical	$\pm 4.6\text{dB}$
	200MHz-1000MHz, 10m, Vertical	$\pm 4.0\text{dB}$

Test Items/Facilities	Frequency/Equipment/Unit	Uncertainty
Harmonic current	NSG 1007-45	±0.7%
Voltage fluctuations & flicker	NSG 1007-45	±0.2%
Electrostatic discharge (ESD)	NSG 437	Ucurrent= 7.3% Uvoltage= 1.0% Utime = 9.0%
	Ditto	Ucurrent = 4.0% Uvoltage = 2.0% Utime = 3.0%
	MZ-15/EC	Ucurrent = 10.0% Uvoltage = 1.8% Utime = 20.0%
Radio-frequency electromagnetic field, Continuous radiated disturbances (RS)	80MHz-200MHz	±1.7dB
	200MHz-1000MHz	±1.8dB
	1GHz-6GHz	±1.7dB
Electrical fast transient/burst (EFT)	AC power port	Uvoltage = 1.0% Utime = 4.0%
	Signal port	Uvoltage = 4.0% Utime = 3.0%
Surge	Open-circuit output voltage 0.5kV-6kV (1.2us/50us)	Uvoltage = 4.0%
	Open-circuit output voltage 0.5kV-6kV (10us/700us)	Uvoltage = 4.0%
	Rise time (30%-90%) x 1.67: 0.5kV-6kV (1.2us/50us)	Utime = 3.0%
	Rise time (30%-90%) x 1.67: 0.5kV-6kV (10us/700us)	Utime = 3.0%
	Duration time: 0.5kV-6kV (1.2us/50us)	Utime = 3.0%
	Duration time: 0.5kV-6kV (10us/700us)	Utime = 3.0%
	Short-circuit output current 0.25KA-3KA (8us / 20us)	Ucurrent = 3.0%
	Rise time (10%-90%) x 1.25: (8us/20us)	Utime = 3.0%
	Duration time: (8us/20us)	Utime = 3.0%
Radio-frequency, continuous conducted disturbances (CS)	CDN (AC power port)	1.5 dB
	EM-Clamp (Signal port)	3.3 dB
Power-frequency magnetic field (PFMF)	MAG100.1	4%
	PMM1008	2%
Voltage dips	TESEQ	Uvoltage = 0.1% Ucurrent = 0.2%

10. Photographs

10.1. Conducted Emissions Measurement



Front View of Radiated Measurement



Back View of Radiated Measurement

10.2.Disturbance Power Measurement



10.3. Harmonics Current Measurement



10.4. Voltage Fluctuation and Flicks Measurement



APPENDIX

(Photos of EUT)

Figure 1
General Appearance (Front & Side View)



Figure 2
General Appearance (Back & Side View)



Figure 3
General Appearance (Front View)



Figure 4
General Appearance (Bottom View)



Figure 5
Internal View (Remove Cover)

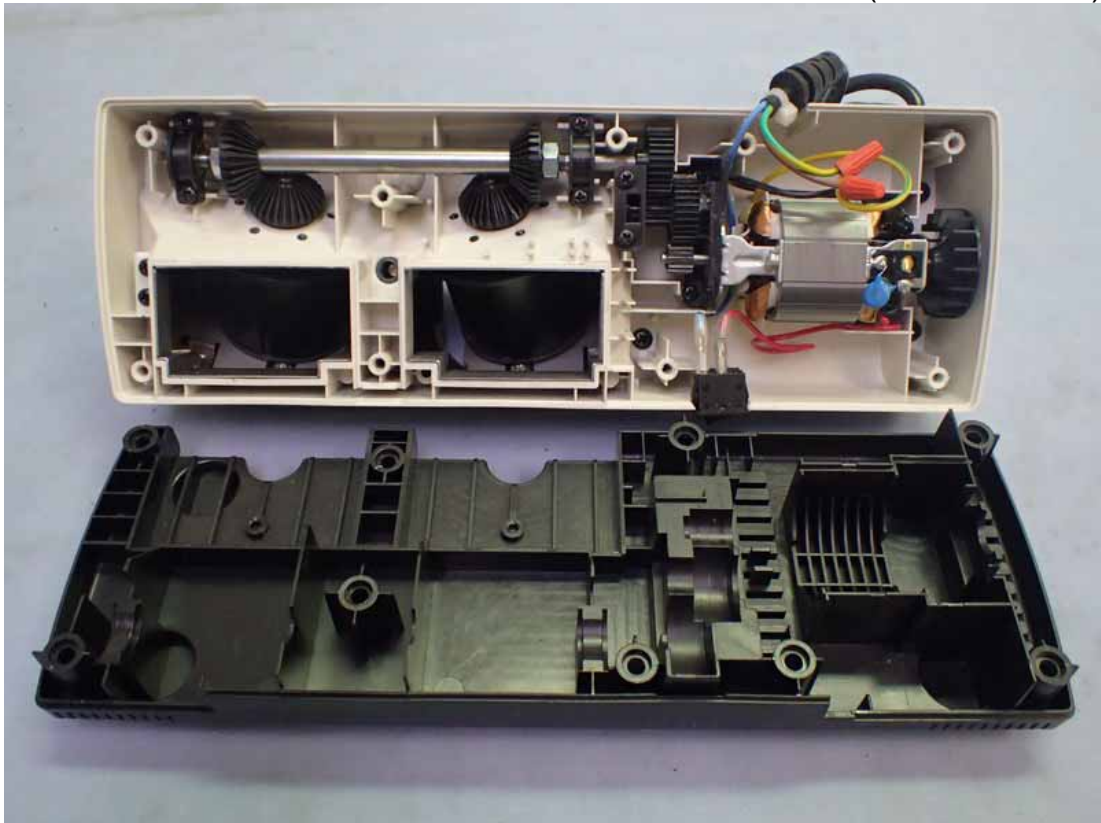


Figure 6
Internal View (Motor View)

