EMC TEST REPORT

Reference No. : **G-44-2013-03648**

Applicant : **HYUNDAI Wacortec. Co., Ltd.**

Equipment Under Test (EUT) :

Product Name : Direct Connect Water Cooler

Model Name : HWJ-110

Added Model Name : HWJ-110S, EOS 710, EOS 710S

Applied Standards : **EN 55014-1:2006/A1:2009/A2:2011**

EN 55014-2:1997/A1:2001/A2:2008 (Category Ⅱ)

EN 61000-3-2:2006/A1:2009/A2:2009

EN 61000-3-3:2008

Date of Receipt : **December 09, 2013**

Date of Test : **December 12, 2013 ~ December 20, 2013**

Date of Issue : **January 20, 2014**

Test Results : **Complied**

Tested by : **Jerry Jeong**

Reviewed by : **Julia Choi**

Remarks :

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Contents

1. General Information

1.1 Client Information

Applicant : HYUNDAI Wacortec. Co., Ltd.
Address of Applicant : A-301, Hagye Technotown, Hagye-Dong, 10, Nowon-Ro, 15 Gil, Nowon-Gu, Seoul, Korea

Manufacturer : HYUNDAI Wacortec. Co., Ltd.
Address of Manufacturer : A-301, Hagye Technotown, Hagye-Dong, 10, Nowon-Ro, 15 Gil, Nowon-Gu, Seoul, Korea

1.2 Test Laboratory

Name and Address : SGS Korea Co., Ltd. (Gunpo Laboratory)
4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea
Phone : + 82 31 428 5700
Fax : + 82 31 427 2370
e-mail : julia.choi@sgs.com

1.3 General Information of E.U.T.

Product Name	Direct Connect Water Cooler
Basic Model Name	HWJ-110
Added Model Names	HWJ-110S, EOS 710, EOS 710S
Serial No.	-
Rated Voltage	Input : 230 Va.c., 50 Hz
Test Voltage	230 Va.c., 50 Hz
Category	Category Ⅱ
Model Difference	1. Change of Exterior : HWJ series and EOE series have the same internal structure and apply the same electric part. The difference is only exterior as development. 2. Change of Size : The difference between stand type (HWJ-110) and desk type (HWJ-110S) is the height difference only and all electric parts are the same.

1.4 Operating Modes and Conditions

Operating mode	Operating condition
Operating Mode	Continuously flowed water

1.4.1 Monitoring Method

- Observe any errors the supplied and drained water.

1.5 Auxiliary Equipments

Description	Model	Serial No.	Manufacturer
-	-	-	-

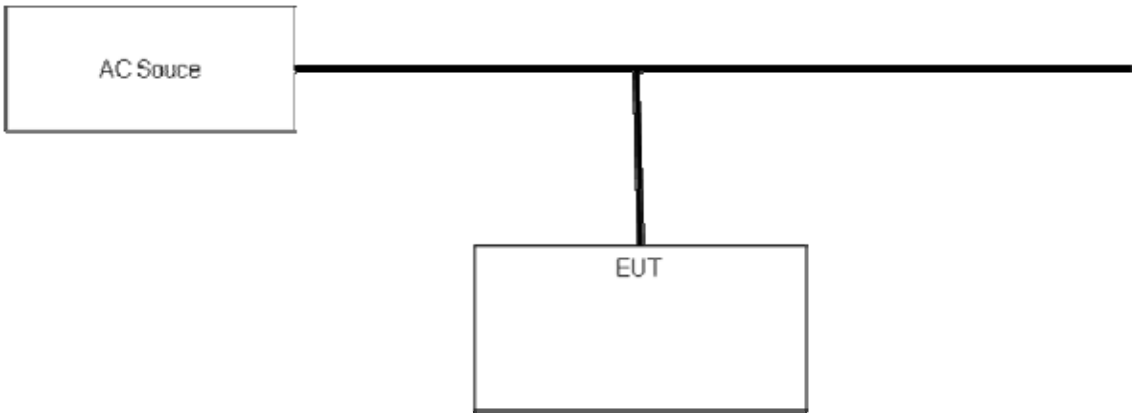
1.6 Cable List

Start		END		Cable Spec.	
Name	I/O Port	Name	I/O Port	Length	Shield
EUT	AC IN	AC Source	-	1.0	Unshield

1.7 System Configurations

Description	Model	Serial No.	Manufacturer
Main Board	HD-310	-	-
Pump	WX30LHS5W-K	D1352200226	DAEWOO ELECTRONICS Corp.
Thermostat	PFN-135M-04C	-	PACIFICCONTROLS
Thermostat	GNF-135SCW	-	SHINHAN ELECTRO

1.8 Test System Layout



1.9 Modifications

There was no modified item during the test.

1.10 Applicable Standards for Testing

Standards	Status	Deviation
EN 55014-1:2006/A1:2009/A2:2011	Applicable	No Deviation
EN 55014-2:1997/A1:2001/A2:2008 (Category Ⅱ)	Applicable	No Deviation
EN 61000-3-2:2006/A1:2009/A2:2009	Applicable	No Deviation
EN 61000-3-3:2008	Applicable	No Deviation
EN 61000-4-2:2009	Applicable	No Deviation
EN 61000-4-3:2006/A1:2008/A2:2010	N/A	N/A
EN 61000-4-4:2004/A1:2010	Applicable	No Deviation
EN 61000-4-5:2006	Applicable	No Deviation
EN 61000-4-6:2009	Applicable	No Deviation
EN 61000-4-11:2004	Applicable	No Deviation

1.11 Summary of Test Results

Test Item	Basic Standards	Results
Conducted Emission	EN 55014-1:2006/A1:2009/A2:2011	Complied
Disturbance Power	EN 55014-1:2006/A1:2009/A2:2011	Complied
Harmonics	EN 61000-3-2:2006/A1:2009/A2:2009	Complied
Flicker	EN 61000-3-3:2008	Complied
Electrostatic Discharge	EN 61000-4-2:2009	Complied
Radiated Immunity	EN 61000-4-3:2006/A1:2008/A2:2010	N/A
Fast Transients	EN 61000-4-4:2004/A1:2010	Complied
Surges	EN 61000-4-5:2006	Complied
Conducted Immunity	EN 61000-4-6:2009	Complied
Voltage dips and Interruptions	EN 61000-4-11:2004	Complied

Note ：Test methods of all test items are performed according to the basic standards in this table.

EMISSION

2.1 Test Results

Test Items	Basic Standards	Test Results
Conducted Emission	EN 55014-1:2006/A1:2009/A2:2011	**Complied**
Disturbance Power	EN 55014-1:2006/A1:2009/A2:2011	**Complied**

2.2 Test Method and Limits

2.2.1 Test Method

Test Items	Measuring Frequency Range	RBW	Measuring Distance
Conducted Emission	0.15 ㎒ ~ 30 ㎒	9 ㎑	N/A
Disturbance Power	30 ㎒ ~ 300 ㎒	120 ㎑	N/A

2.2.2 Test Limits

-Conducted Emission Limits

Frequency Range	Limits(dB(μV))	
	Quasi-peak	Average
0.15 ㎒ ~ 0.5 ㎒	66 to 56	56 to 46
0.5 ㎒ ~ 5 ㎒	56	46
5 ㎒ ~ 30 ㎒	60	50

Note : The lower limit shall apply at the transition frequencies. The limit decreases linearly with the logarithm of the frequency in the range 0.15 ㎒ to 0.5 ㎒.

- Disturbance Power Limits.

Frequency Range	Limits dB(pW)	
	Quasi-peak	Average
30 ㎒ ~ 300 ㎒	45 to 55	35 to 45

Note : The limit increases linearly.

- Margin when performing disturbance power measurement in the frequency range 30 ㎒ to 300 ㎒.

Frequency Range	Limits dB(pW)	
	Quasi-peak	Average
200 ㎒ ~ 300 ㎒	0 to 10	-

2.3 Conducted Emission

The initial preliminary exploratory scans were performed over the measuring frequency range(0.15 ㎒ to 30 ㎒) using a max hold mode incorporating a Peak detector and Average detector and using the software of ES-K1(Version V1.71 from R&S). The final test data was measured using a Quasi-Peak detector and Average detector.

2.3.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Last Cal. Date
Two-Line V-Network	ENV216	R & S	100190	2013.01.04
Test Receiver	ESHS10	R & S	863365/018	2013.06.27
Click Meter	AFJ CL55C	AFJ INSTRUMENTS	55041008129	2013.09.23

Note : The calibration period of every equipment is 1 year.

2.3.2 Test Site

Shield Room in Gunpo Laboratory

2.3.3 Environment Conditions and data

-Continuous Conducted Emission

Temperature : 22.0 ℃ ~ 22.2 ℃
Humidity : 31.0 %R.H. ~ 32.0 %R.H.
Atmospheric Pressure : 102.2 ㎪

Test Date : December 13, 2013

Freq.	Line	Level (dBμV)		CL	LISN	Result (dBμV)		Limit (dBμV)		Margin (dB)	
(MHz)	(H/N)	Q/P	A/V	(dB)	(dB)	Q/P	A/V	Q/P	A/V	Q/P	A/V
0.16	N	6.40	3.50	0.00	9.65	16.05	13.15	65.46	58.30	49.41	45.15
0.24	N	5.10	3.30	0.00	9.65	14.75	12.95	62.10	53.93	47.35	40.98
0.54	H	12.10	3.50	0.00	9.57	21.67	13.07	56.00	46.00	34.33	32.93
0.55	H	5.00	2.50	0.00	9.57	14.57	12.07	56.00	46.00	41.43	33.93
0.59	N	11.20	3.50	0.00	9.65	20.85	13.15	56.00	46.00	35.15	32.85
0.99	H	6.90	3.00	0.01	9.57	16.48	12.58	56.00	46.00	39.52	33.42
1.00	H	4.80	2.40	0.01	9.57	14.38	11.98	56.00	46.00	41.62	34.02
1.12	N	7.80	3.00	0.01	9.65	17.46	12.66	56.00	46.00	38.54	33.34
1.40	H	4.50	2.50	0.02	9.57	14.09	12.09	56.00	46.00	41.91	33.91
2.00	H	4.20	2.20	0.03	9.58	13.81	11.81	56.00	46.00	42.19	34.19
3.50	N	4.50	3.00	0.05	9.66	14.21	12.71	56.00	46.00	41.79	33.29
6.00	N	7.50	5.60	0.07	9.68	17.25	15.35	60.00	50.00	42.75	34.65
10.00	H	15.80	9.80	0.11	9.66	25.57	19.57	60.00	50.00	34.43	30.43
13.56	H	27.10	23.70	0.13	9.68	36.91	33.51	60.00	50.00	23.09	16.49
22.00	N	13.50	8.00	0.17	9.88	23.55	18.05	60.00	50.00	36.45	31.95
30.00	N	7.40	4.50	0.20	10.06	17.66	14.76	60.00	50.00	42.34	35.24

Measurement Uncertainty : ± 4.27 dB (The confidential level is about 95%, *k*=2)

Note : • Line (H) : Hot • Line (N) : Neutral
• CL: Cable Loss • LISN : LISN Factor
• Result = Level + CL + LISN • Margin = Limit – Result

See Appendix A (Continuous Conducted Emission)

-Discontinuous Conducted Emission

Temperature : 22.4 ℃ ~ 22.6 ℃

Humidity : 34.0 %R.H. ~ 35.0 %R.H.

Atmospheric Pressure : 102.2 kPa

Test Date : December 13, 2013

Frequency (MHz)	Count (1) Click*(f)/Min	N (2)	Click Limit Lq=L+i	Clicks (3)	Limit of (4) Count Click	Result
0.15	0 * / 120	0.00	66 + 44 = 110	0	0	**Complied**
0.5	0 * / 120	0.00	56 + 44 = 100	0	0	**Complied**
1.4	0 * / 120	0.00	56 + 44 = 100	0	0	**Complied**
30	0 * / 120	0.00	60 + 44 = 104	0	0	**Complied**

Measurement Uncertainty : ± 3.31 dB(The confidential level is about 95%, *k*=2)

Note : i = 44 dB (N<0.2), 20log(30/N) dB (0.2<N<30), 0 dB (N>30)

(1) First Time Test,(f)Factor (2) N = Click Rate (3) Allowed number of clicks(1/4)

(4) Are the clicks above click limit (Second Test)

See Appendix B (Discontinuous Conducted Emission)

2.4 Disturbance Power

The initial preliminary exploratory scans were performed over the measuring frequency range(30 ㎒ to 300 ㎒) using a max hold mode incorporating a Peak detector and using the software of EP5RE(Version Ver3.10.20 from TOYO) with the absorbing clamp positioning at the nearest of the EUT. The final test data was measured using a Quasi-Peak detector and Average detector with the absorbing clamp moving from the EUT to the end of the clamp test table to find the maximum emitting point for each frequency.

2.4.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Last Cal. Date
Absorbing Clamp	MDS-21	R & S	100375	2013.11.11
Amplifier	8447F	HP	2944A03909	2013.06.28
Test Receiver	ESU26	R & S	100109	2013.02.28

Note : The calibration period of every equipment is 1 year.

2.4.2 Test Site

3 m Semi-Anechoic Chamber in Gunpo Laboratory

2.4.3 Environment Conditions and data

Temperature : 21.3 ℃ ~ 22.0 ℃
Humidity : 27.0 %R.H. ~ 28.0 %R.H.
Atmospheric Pressure : 101.8 kPa

Test Date : December 16, 2013

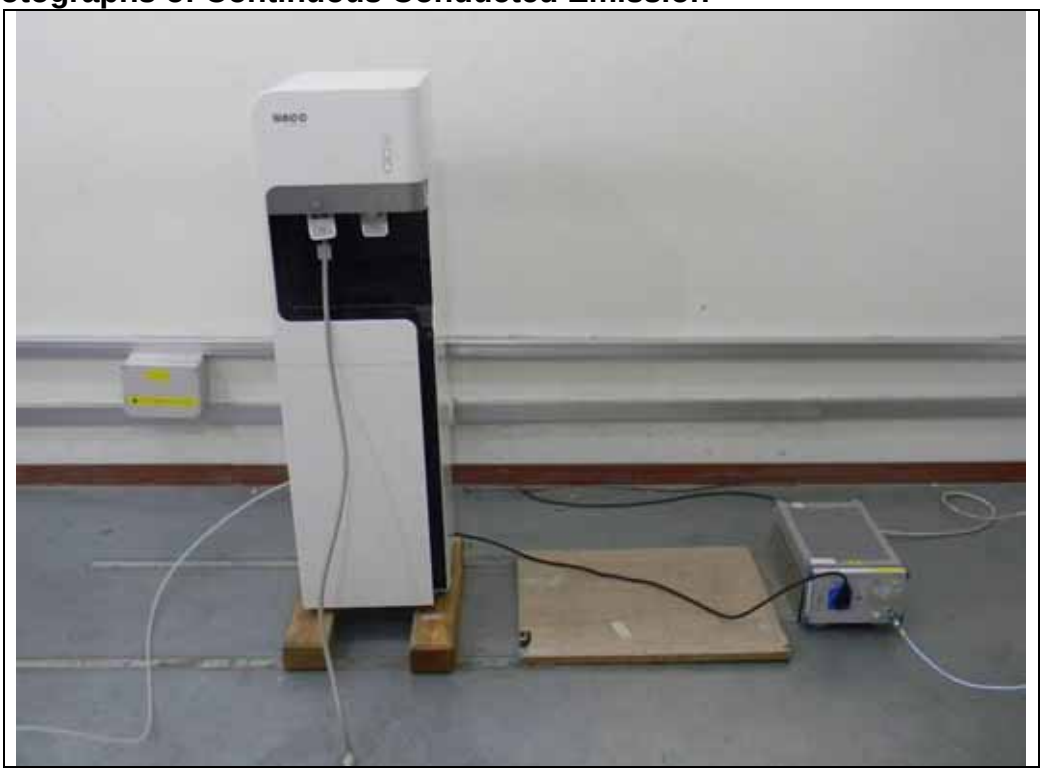
Freq. (MHz)	Level(dBμV)		CF (dB)	CL (dB)	Amp (dB)	Result(dBpW)		Limit(dBpW)		Margin(dB)	
	Q/P	A/V				Q/P	A/V	Q/P	A/V	Q/P	A/V
30.00	32.80	29.30	9.20	0.69	27.70	14.99	11.49	45.00	35.00	30.01	23.51
45.00	32.40	28.70	7.70	0.83	27.63	13.31	9.61	45.56	35.56	32.25	25.95
65.00	31.70	29.30	7.05	1.02	27.57	12.20	9.80	46.30	36.30	34.10	26.50
90.00	33.10	30.80	5.90	1.19	27.52	12.67	10.37	47.22	37.22	34.55	26.85
95.88	33.80	31.40	6.08	1.23	27.51	13.60	11.20	47.44	37.44	33.84	26.24
101.87	34.50	31.20	6.26	1.26	27.49	14.53	11.23	47.66	37.66	33.13	26.43
104.50	37.30	36.30	6.34	1.28	27.48	17.44	16.44	47.76	37.76	30.32	21.32
107.72	39.00	37.20	6.43	1.30	27.47	19.26	17.46	47.88	37.88	28.62	20.42
150.00	32.90	27.60	6.40	1.54	27.30	13.54	8.24	49.44	39.44	35.90	31.20
180.00	31.70	28.50	5.10	1.70	27.18	11.32	8.12	50.56	40.56	39.24	32.44
220.00	34.20	32.70	5.57	1.87	27.06	14.58	13.08	52.04	42.04	37.46	28.96
300.00	33.80	29.40	6.40	2.18	26.90	15.48	11.08	55.00	45.00	39.52	33.92

Measurement Uncertainty : ± 2.59 dB (The confidential level is about 95%, *k*=2)

Note : • Margin = Limit – Result • CF : Clamp Factor • Amp : Amplifier Gain
• CL : Cable Loss • Result = Level + CF + CL – Amp

See Appendix C (Disturbance Power)

2.5 Photographs of Continuous Conducted Emission



2.6 Photographs of Discontinuous Conducted Emission

2.7 Photographs of Disturbance Power

Harmonics & Flicker

3.1 Test Results

Test Items	Standards	Test Results
Harmonics	EN 61000-3-2 :2006/A1:2009/A2:2009	**Complied**
Flicker	EN 61000-3-3 :2008	**Complied**

3.2 Test Equipments

Equipment	Model	Manufacturer	S/N	Last Cal. Date
H/F Analyzer	DPA 500	EM TEST	V0508100155	2013.04.11
AC Source	ACS 500	EM TEST	V0508100156	2013.04.11

Note : The calibration period of every equipment is 1 year.

3.3 Test Site

Harmonics & Flicker Site in Gunpo Laboratory

3.4 Harmonics Test Data

The measurement was conducted with an automatic harmonics analyzing system, Measured were all harmonics up to order 40.

Temperature 22.3 ℃ ~ 22.4 ℃
Humidity : 25.0 %R.H.
Atmospheric Pressure : 101.8 ㎪

Test Date : December 12, 2013

See Appendix C (Harmonics on AC Mains)

3.5 Flicker Test Data

The measurement was conducted with an automatic flicker system, Measured were all Flicker up to order 12.

Temperature 22.4 ℃ ~ 23.5 ℃
Humidity : 25.0 %R.H. ~ 28.0 %R.H.
Atmospheric Pressure : 101.8 kPa

Test Date : December 12, 2013

See Appendix D (Flicker on AC Mains)

3.6 Photograph of Harmonics and Flicker

IMMUNITY

3.1 Test Results

Test Items	Basic Standards	Test Results
Electrostatic Discharge	EN 61000-4-2:2009	**Complied**
Fast Transients/Burst	EN 61000-4-4:2004/A1:2010	**Complied**
Surges	EN 61000-4-5:2006	**Complied**
Conducted Immunity	EN 61000-4-6:2009	**Complied**
Voltage dips and Interruptions	EN 61000-4-11:2004	**Complied**

3.2 Performance Criteria

Criterion A - The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended.

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

Criterion C - Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

4.3 Electrostatic Discharge

4.3.1 Test Equipments

Description	Model	Manufacturer	S/N	Last Cal. Date
ESD Simulator	ESS-2000	NoiseKen	ESS0746780	2013.01.28
VCP	N/A	-	-	-

Note : The calibration period of every equipment is 1 year.

4.3.2 Test Site

Shield Room in Gunpo Laboratory

4.3.3 Environment Conditions

Temperature : 22.0 ℃ ~ 22.1 ℃
Humidity : 34.0 %R.H. ~ 35.0 %R.H.
Atmospheric Pressure : 101.6 ㎪

Test Date : December 20, 2013

4.3.4 Performance Criterion : B

4.3.5 Test Points

No.	Test Points	No.	Test Points
1	Screw	5	Lever
2	Enclosure	6	Switch
3	Enclosure	7	VCP
4	LED		

4.3.6 Test Results

Direct Application										
No.	Discharge Method	Number of Discharge	Level(kV)							Results
			+2	-2	+4	-4	+6	-6	+8	-8	
1	Contact	≥ 10 times	-	-	A	A	-	-	-	-	**Complied**
2	Contact	≥ 10 times	-	-	A	A	-	-	-	-	**Complied**
3	Air	≥ 10 times	-	-	-	-	-	-	A	A	**Complied**
4	Air	≥ 10 times	-	-	-	-	-	-	A	A	**Complied**
5	Air	≥ 10 times	-	-	-	-	-	-	A	A	**Complied**
6	Air	≥ 10 times	-	-	-	-	-	-	A	A	**Complied**
Indirect Application										
No.	Discharge Method	Number of Discharge	Level(kV)							Results
			+2	-2	+4	-4	+6	-6	+8	-8	
7	Contact	≥ 10 times	-	-	A	A	-	-	-	-	**Complied**

Performance Criteria A, the EUT normally operates during and after the test.

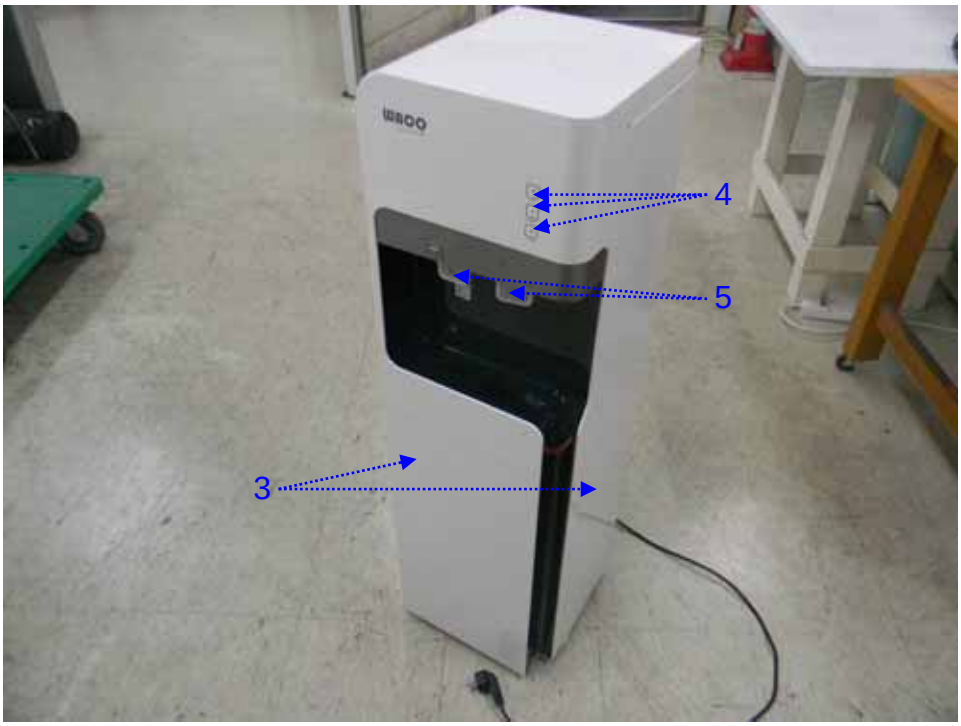
Note : This product was tested for VCP only.

4.3.7 Test Points

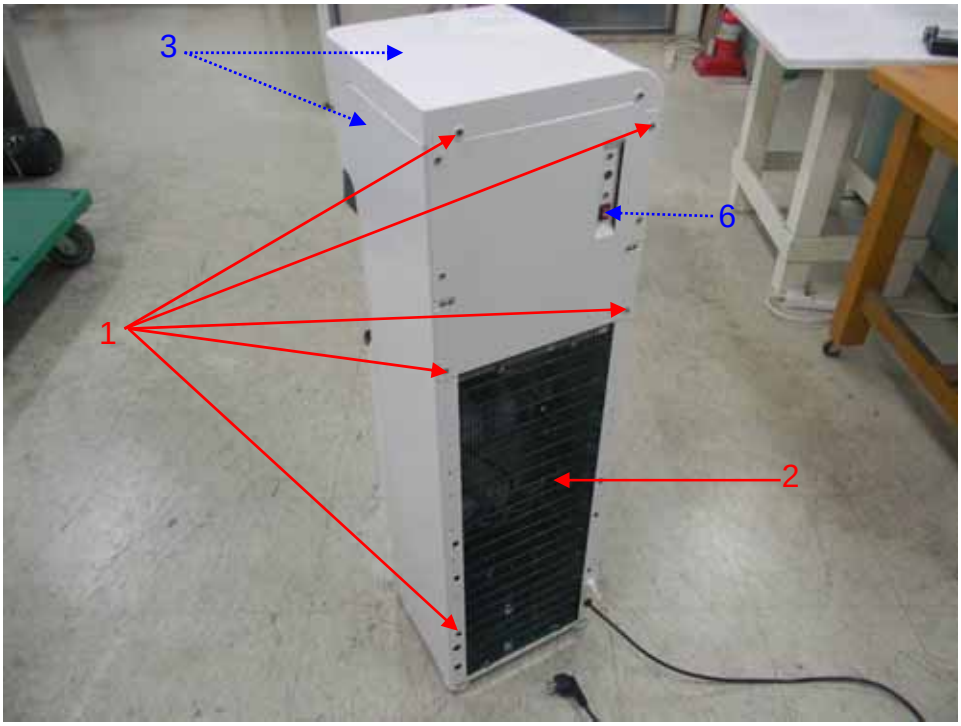
Contact

Air

- Front View



- Rear View



4.3.8 Photograph of Electrostatic Discharge

4.4 Fast Transients/Burst

4.4.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Last Cal. Date
Motion Driven AC Source	MV2616	EM TEST	V0508100161	2013.06.17
Ultra-Compact Simulator	UCS 500-M	EM TEST	V0508100159	2013.06.17

Note : The calibration period of every equipment is 1 year.

4.4.2 Test Site

Immunity Test Site in Gunpo Laboratory

4.4.3 Environment Conditions

Temperature : 21.1 ℃ ~ 21.2 ℃
Humidity : 27.0 %R.H. ~ 28.0 %R.H.
Atmospheric Pressure : 101.8 ㎪

Test Date : December 18, 2013

4.4.4 Performance Criterion : B

4.4.5 Test Results

Test Point	Polarity	Coupling	Repetition	Pulse (ns)	Duration	Test Level (㎸)	Results
L1+L2+PE	+/-	Direct	5 ㎑	5/50	≥ 2 min	1.0	**Complied**

Performance Criteria A, the EUT normally operates during and after the test.

4.4.6 Photograph of Fast Transients/Burst

4.5 Surges

4.5.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Last Cal. Date
Motion Driven AC Source	MV2616	EM TEST	V0508100161	2013.06.17
Ultra-Compact Simulator	UCS 500-M	EM TEST	V0508100159	2013.06.17

Note : The calibration period of every equipment is 1 year.

4.5.2 Test Site

Immunity Test Site in Gunpo Laboratory

4.5.3 Environment Conditions

Temperature : 21.2 ℃ ~ 21.5 ℃
Humidity : 28.0 %R.H. ~ 29.0 %R.H.
Atmospheric Pressure : 101.8 ㎪

Test Date : December 18, 2013

4.5.4 Performance Criterion : B

4.5.5 Test Results

Test Point	Polarity	Coupling	Pulse (μs)	Number of Surges	Repetition	Phase Angle(°)	Test Level (㎸)	Results
L1+L2	+/-	Direct	1.2/50	5	≤ 60 s	90, 270	1.0	**Complied**
L1+PE	+/-	Direct	1.2/50	5	≤ 60 s	90, 270	2.0	**Complied**
L2+PE	+/-	Direct	1.2/50	5	≤ 60 s	90, 270	2.0	**Complied**

Performance Criteria A, the EUT normally operates during and after the test.

4.5.6 Photograph of Surges

4.6 Conducted Immunity Test

4.6.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Last Cal. Date
CDN	FCC-801-M3-16A	FCC	04002	2013.09.26
Amplifier	150A250	AR	312201	2013.01.06
Dual Directional Coupler	DC2600M2	AR	311978	2013.01.06
Signal Generator	SML03	R & S	102135	2013.01.03
Voltage Sensor	URV5-Z2	R & S	100234, 100235	2013.01.04
Milli voltmeter	URV5	R & S	100240	2013.01.04
Attenuator	300-A-FFN-06	BIRD Electronics Corporation	0433	2013.01.06

Note : The calibration period of every equipment is 1 year.

4.6.2 Test Site

Immunity Test Site in Gunpo Laboratory

4.6.3 Environment Conditions

Temperature : 21.4 ℃ ~ 21.6 ℃
Humidity : 26.0 %R.H. ~ 27.0 %R.H.
Atmospheric Pressure : 100.2 ㎪

Test Date : December 19, 2013

4.6.4 Performance Criterion : A

4.6.5 Test Results

Frequency (㎒)	Test Point	Coupling	Voltage Level	Modulation	Frequency Step	Dwell Time	Results
0.15 ~ 230	AC IN	CDN	3 V	80% AM(1 ㎑)	1 %	3 s	**Complied**

Performance Criteria A, the EUT normally operates during and after the test.

4.6.6 Photograph of Conducted Immunity

4.7 Voltage Dips and Interruptions

4.7.1 Test Equipments

Description	Model No.	Manufacturer	S/N	Last Cal. Date
Motion Driven AC Source	MV2616	EM TEST	V0508100161	2013.06.17
Ultra-Compact Simulator	UCS 500-M	EM TEST	V0508100159	2013.06.17

Note : The calibration period of every equipment is 1 year.

4.7.2 Test Site

Immunity Test Site in Gunpo Laboratory

4.7.3 Environment Conditions

Temperature : 22.0 ℃ ~ 22.1 ℃
Humidity : 28.0 %R.H.
Atmospheric Pressure : 101.8 ㎪

Test Date : December 18, 2013

4.7.4 Performance Criterion : B & C

4.7.5 Test Results

Test Level % U_T	Voltage Dip/Int. % U_T	Duration ㎳/Cycle	Results
0 %	100 %	0.5Cycle	**Complied**
40 %	60 %	10 Cycle (50 ㎐), 12 Cycle (60 ㎐)	**Complied**
70 %	30 %	25 Cycle (50 ㎐), 30 Cycle (60 ㎐)	**Complied**

Performance Criteria A, the LED of EUT flickered during the test. But after the test, the EUT normally operated.

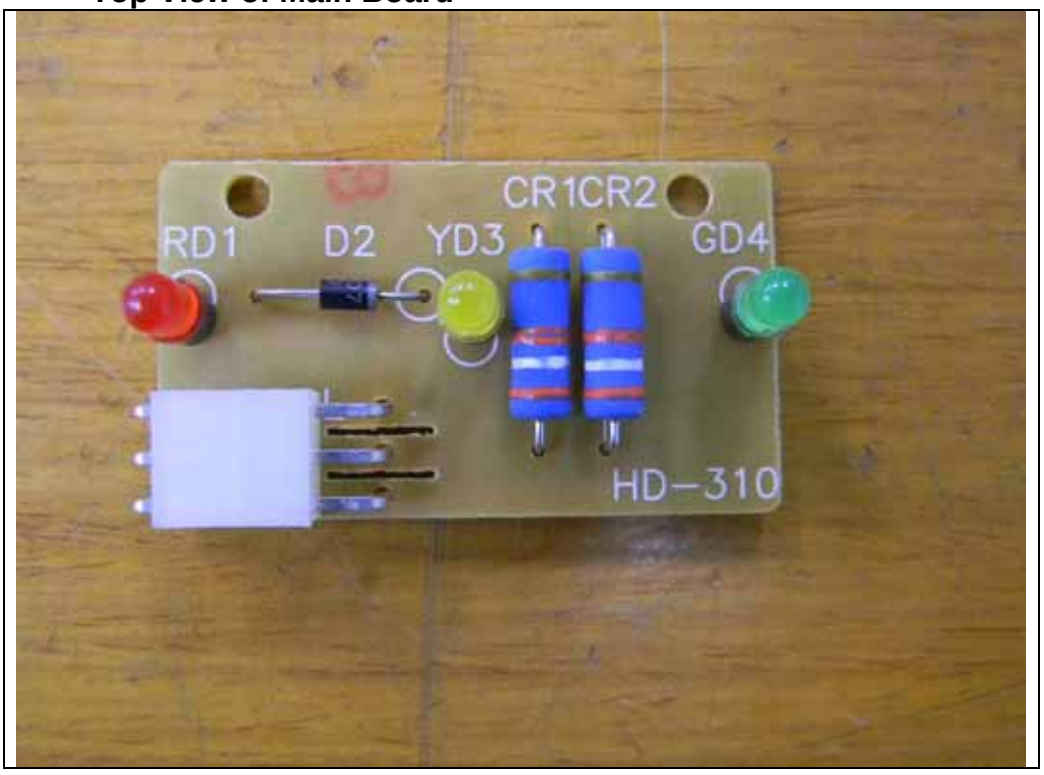
4.7.6 Photograph of Voltage Dips and Interruptions

5. Photographs of EUT

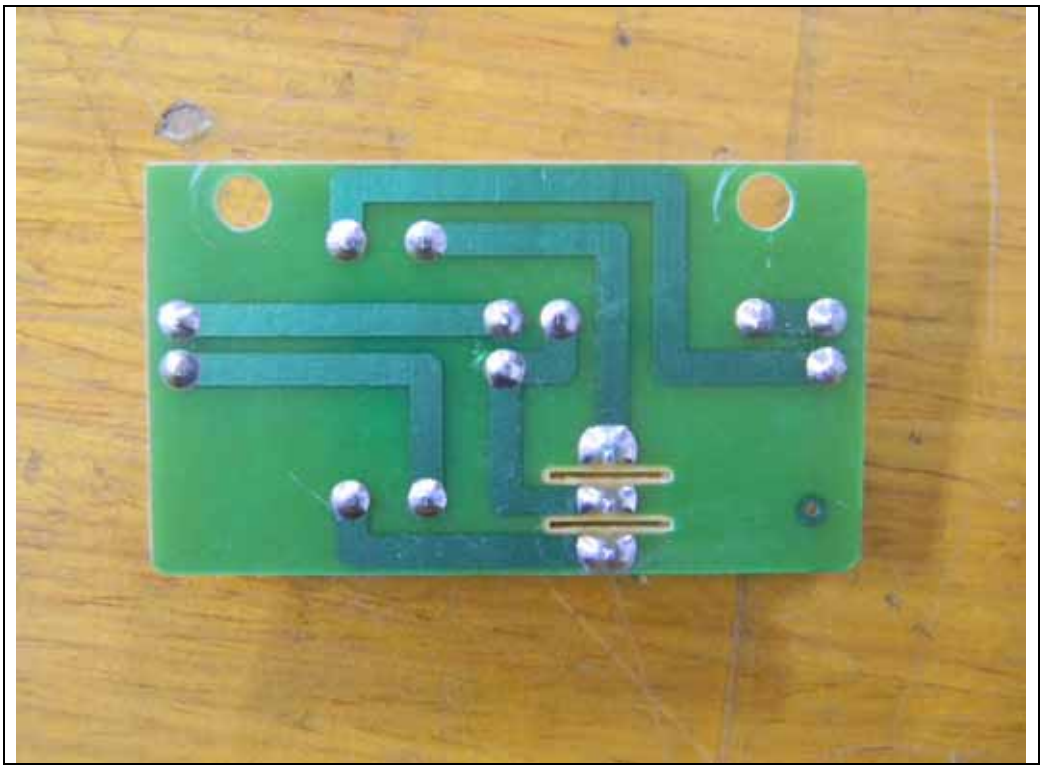
- **Front View**

- **Rear View**

- **Top View of Main Board**



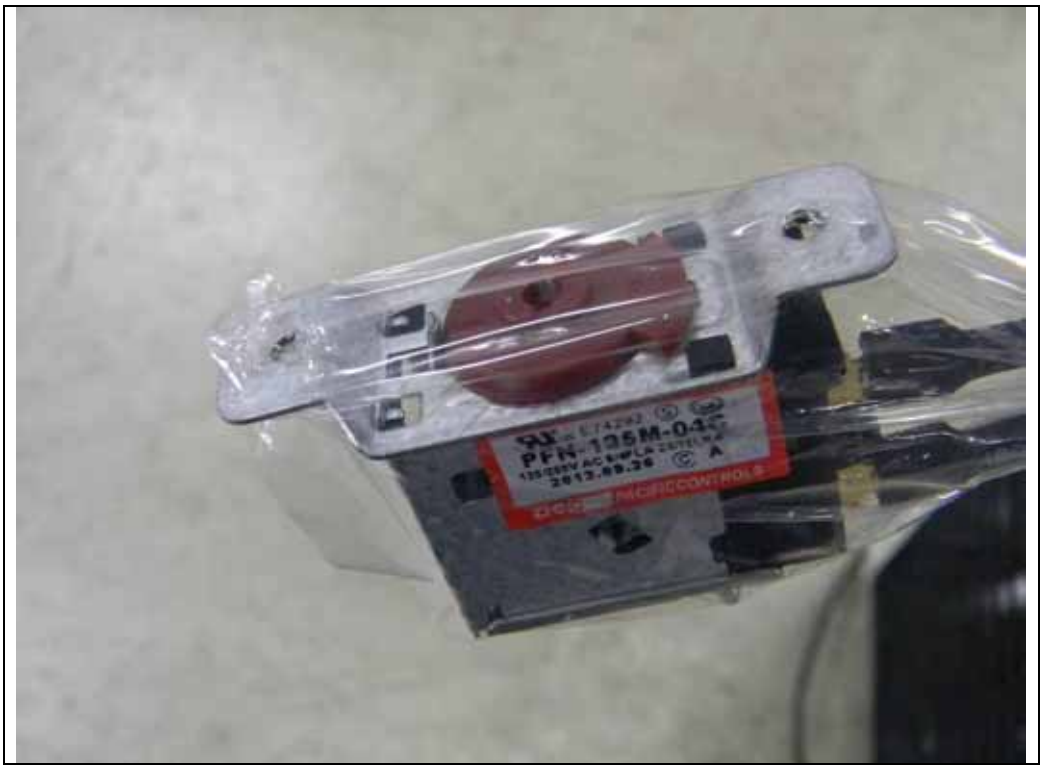
- **Bottom View of Main Board**



- **Pump**

- **Pump Label**

- **Thermostat**

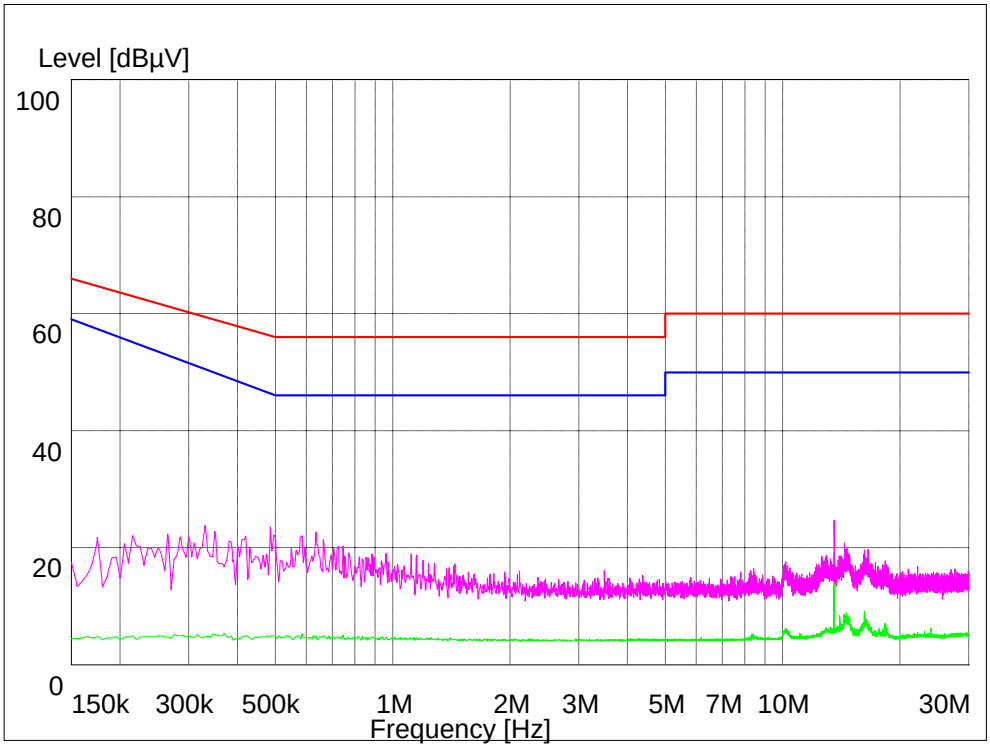


- **Thermostat Label**

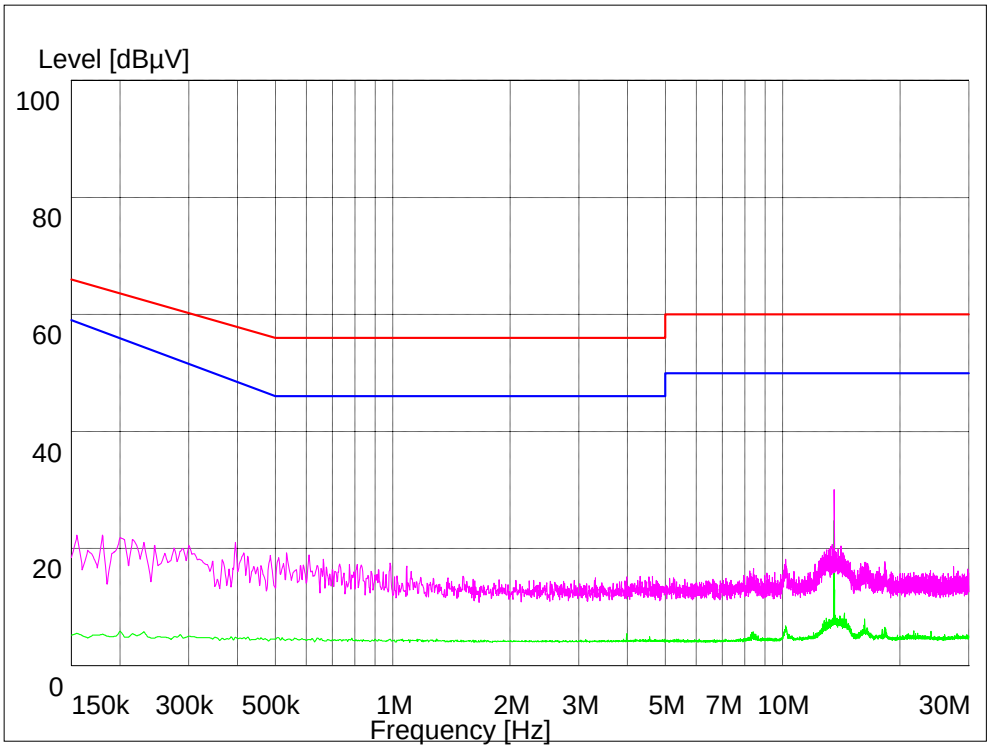
- **Inside**

Appendix A : Continuous Conducted Emission

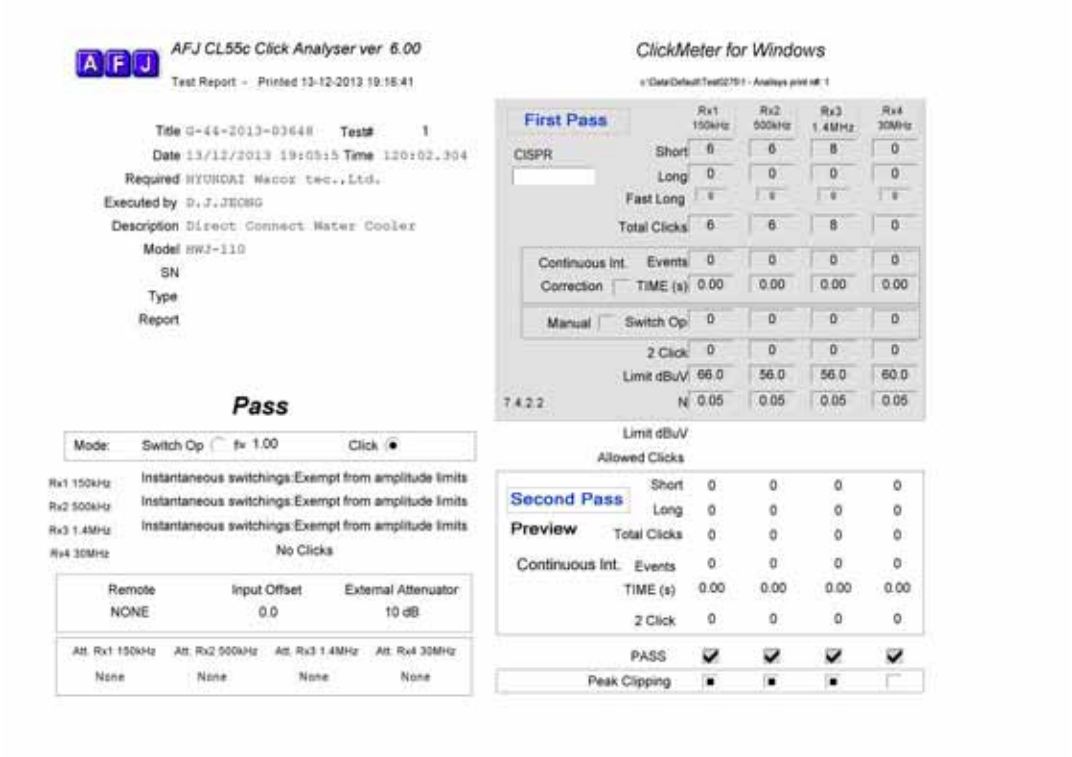
Neutral



Hot



Appendix B : Discontinuous Conducted Emission



AFJ CL55c Click Analyser ver 6.00

Test Report - Printed 13-12-2013 19:18:41

Title G-44-2013-03648 Test# 1
Date 13/12/2013 19:05:5 Time 120:02.304
Required HYUNDAI Macor tec.,Ltd.
Executed by D.J.JEONG
Description Direct Connect Water Cooler
Model HWJ-110
SN
Type
Report

Pass

Mode: Switch Op fv 1.00 Click

Rx1 150kHz Instantaneous switchings:Exempt from amplitude limits
Rx2 500kHz Instantaneous switchings:Exempt from amplitude limits
Rx3 1.4MHz Instantaneous switchings:Exempt from amplitude limits
Rx4 30MHz No Clicks

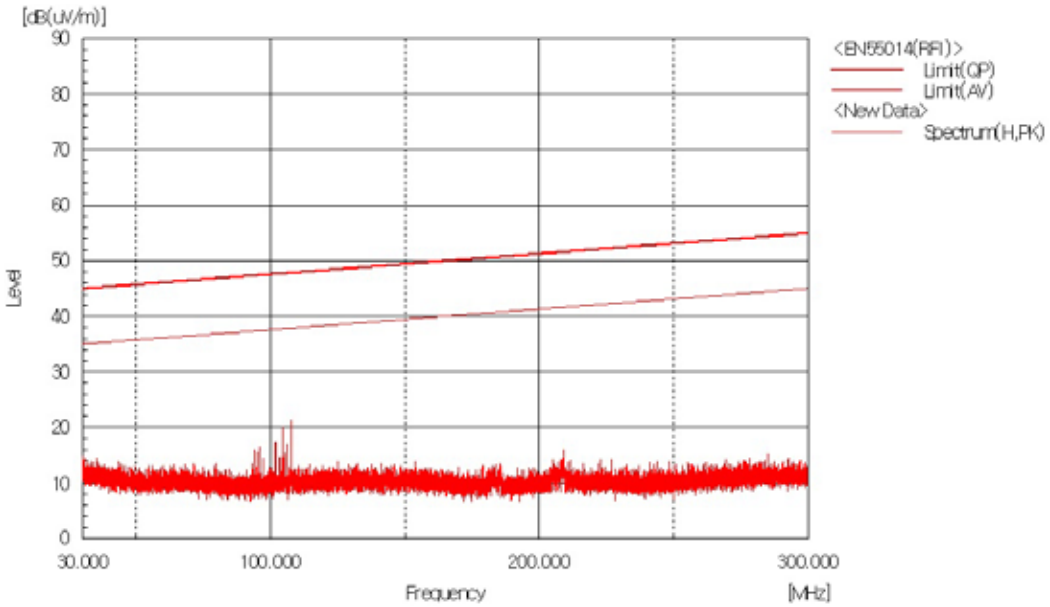
Remote	Input Offset	External Attenuator
NONE	0.0	10 dB

Att. Rx1 150kHz	Att. Rx2 500kHz	Att. Rx3 1.4MHz	Att. Rx4 30MHz
None	None	None	None

ClickMeter for Windows

First Pass		Rx1 150kHz	Rx2 500kHz	Rx3 1.4MHz	Rx4 30MHz
CISPR	Short	6	6	8	0
	Long	0	0	0	0
	Fast Long	0	0	0	0
	Total Clicks	6	6	8	0
Continuous Int.	Events	0	0	0	0
Correction	TIME (s)	0.00	0.00	0.00	0.00
Manual	Switch Op	0	0	0	0
	2 Click	0	0	0	0
	Limit dBuV	66.0	56.0	56.0	60.0
7.4.2.2	N	0.05	0.05	0.05	0.05
	Limit dBuV				
	Allowed Clicks				
Second Pass	Short	0	0	0	0
	Long	0	0	0	0
Preview	Total Clicks	0	0	0	0
Continuous Int.	Events	0	0	0	0
	TIME (s)	0.00	0.00	0.00	0.00
	2 Click	0	0	0	0
	PASS	✓	✓	✓	✓
	Peak Clipping	■	■	■	

Appendix C : Disturbance Power



Appendix D : Harmonics on AC Mains

Standard used:	EN/IEC 61000-3-2 Ed.3 Quasi-stationary Equipment class A <= 150% of the limit
Observation time:	150s

Test Result	
E. U. T.:	PASS
Power Source:	PASS

E. U. T. Result

Check harmonics 2..40 [exception odd 21..39]:

Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 100%:	
Order (n):	None

Check odd harmonics 21..39:

All Partial Odd Harmonics below partial limits.	
Harmonic(s) > 150%:	
Order (n):	None
Harmonic(s) with average > 150%:	
Order (n):	None

Power Source Result

First dataset out of limit:	
DS (time):	None
Harmonic(s) out of limit:	
Order (n):	None

Average harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	2.669			
2	13.428E-3	1.243	1.08	PASS
3	25.682E-3	1.117	2.30	PASS
4	3.726E-3	0.866	430.00E-3	PASS
5	15.664E-3	1.374	1.14	PASS
6	1.433E-3	0.478	300.00E-3	PASS
7	5.090E-3	0.661	770.00E-3	PASS
8	1.011E-3	0.440	230.00E-3	PASS
9	3.423E-3	0.856	400.00E-3	PASS
10	932.190E-6	0.507	184.00E-3	PASS
11	1.779E-3	0.539	330.00E-3	PASS
12	843.506E-6	0.550	153.33E-3	PASS
13	1.193E-3	0.568	210.00E-3	PASS
14	1.127E-3	0.858	131.43E-3	PASS
15	877.938E-6	0.585	150.00E-3	PASS
16	801.782E-6	0.697	115.00E-3	PASS
17	1.269E-3	0.959	132.35E-3	PASS
18	1.152E-3	1.127	102.22E-3	PASS
19	934.606E-6	0.789	118.42E-3	PASS
20	798.803E-6	0.868	92.00E-3	PASS
21	967.859E-6	0.602	160.71E-3	PASS
22	980.327E-6	1.172	83.64E-3	PASS
23	1.063E-3	0.724	146.74E-3	PASS
24	854.396E-6	1.115	76.66E-3	PASS
25	901.711E-6	0.668	135.00E-3	PASS
26	967.712E-6	1.367	70.77E-3	PASS
27	1.081E-3	0.865	124.99E-3	PASS
28	1.168E-3	1.777	65.71E-3	PASS
29	1.033E-3	0.887	116.39E-3	PASS
30	1.005E-3	1.639	61.33E-3	PASS
31	968.981E-6	0.890	108.87E-3	PASS
32	946.985E-6	1.647	57.50E-3	PASS
33	917.857E-6	0.897	102.27E-3	PASS
34	802.614E-6	1.483	54.12E-3	PASS
35	814.030E-6	0.844	96.44E-3	PASS
36	930.899E-6	1.821	51.11E-3	PASS
37	986.613E-6	1.082	91.21E-3	PASS
38	798.625E-6	1.649	48.42E-3	PASS
39	785.859E-6	0.908	86.53E-3	PASS
40	818.931E-6	1.780	46.00E-3	PASS

Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	2.671			
2	13.612E-3	0.840	1.62	PASS
3	26.284E-3	0.762	3.45	PASS
4	4.057E-3	0.629	645.00E-3	PASS
5	16.084E-3	0.941	1.71	PASS
6	1.542E-3	0.343	450.00E-3	PASS
7	5.325E-3	0.461	1.15	PASS
8	1.114E-3	0.323	345.00E-3	PASS
9	3.899E-3	0.650	600.00E-3	PASS
10	1.025E-3	0.371	276.00E-3	PASS
11	1.916E-3	0.387	495.00E-3	PASS
12	935.194E-6	0.407	229.99E-3	PASS
13	1.485E-3	0.471	315.00E-3	PASS
14	1.321E-3	0.670	197.15E-3	PASS
15	969.982E-6	0.431	225.00E-3	PASS
16	882.413E-6	0.512	172.50E-3	PASS
17	1.367E-3	0.689	198.52E-3	PASS
18	1.281E-3	0.836	153.33E-3	PASS
19	1.041E-3	0.586	177.63E-3	PASS
20	906.459E-6	0.657	138.00E-3	PASS
21	1.074E-3	0.668	160.71E-3	PASS
22	1.171E-3	0.934	125.46E-3	PASS
23	1.254E-3	0.854	146.74E-3	PASS
24	926.256E-6	0.806	114.99E-3	PASS
25	996.142E-6	0.738	135.00E-3	PASS
26	1.083E-3	1.020	106.16E-3	PASS
27	1.199E-3	0.959	124.99E-3	PASS
28	1.328E-3	1.347	98.57E-3	PASS
29	1.122E-3	0.964	116.39E-3	PASS
30	1.093E-3	1.188	92.00E-3	PASS
31	1.141E-3	1.048	108.87E-3	PASS
32	1.080E-3	1.252	86.25E-3	PASS
33	1.004E-3	0.982	102.27E-3	PASS
34	893.101E-6	1.100	81.18E-3	PASS
35	889.798E-6	0.923	96.44E-3	PASS
36	1.057E-3	1.379	76.66E-3	PASS
37	1.126E-3	1.234	91.21E-3	PASS
38	893.770E-6	1.231	72.63E-3	PASS
39	871.942E-6	1.008	86.53E-3	PASS
40	932.809E-6	1.352	69.00E-3	PASS

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.52	100.663		
2	76.02E-3	0.033	0.2	PASS
3	94.47E-3	0.041	0.9	PASS
4	22.04E-3	0.010	0.2	PASS
5	52.85E-3	0.023	0.4	PASS
6	14.61E-3	0.006	0.2	PASS
7	49.28E-3	0.021	0.3	PASS
8	18.72E-3	0.008	0.2	PASS
9	66.15E-3	0.029	0.2	PASS
10	31.88E-3	0.014	0.2	PASS
11	61.02E-3	0.027	0.1	PASS
12	21.93E-3	0.010	0.1	PASS
13	73.93E-3	0.032	0.1	PASS
14	25.99E-3	0.011	0.1	PASS
15	60.15E-3	0.026	0.1	PASS
16	18.71E-3	0.008	0.1	PASS
17	73.44E-3	0.032	0.1	PASS
18	26.32E-3	0.011	0.1	PASS
19	56.01E-3	0.024	0.1	PASS
20	21.04E-3	0.009	0.1	PASS
21	72.40E-3	0.031	0.1	PASS
22	24.61E-3	0.011	0.1	PASS
23	54.06E-3	0.024	0.1	PASS
24	23.58E-3	0.010	0.1	PASS
25	69.27E-3	0.030	0.1	PASS
26	28.76E-3	0.013	0.1	PASS
27	48.11E-3	0.021	0.1	PASS
28	17.84E-3	0.008	0.1	PASS
29	73.46E-3	0.032	0.1	PASS
30	30.99E-3	0.013	0.1	PASS
31	43.85E-3	0.019	0.1	PASS
32	18.44E-3	0.008	0.1	PASS
33	70.77E-3	0.031	0.1	PASS
34	25.80E-3	0.011	0.1	PASS
35	34.10E-3	0.015	0.1	PASS
36	21.72E-3	0.009	0.1	PASS
37	68.67E-3	0.030	0.1	PASS
38	21.56E-3	0.009	0.1	PASS
39	22.93E-3	0.010	0.1	PASS
40	20.23E-3	0.009	0.1	PASS

Appendix E : Flickers on AC Mains

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.273	1.00	PASS
Plt	0.122	0.65	PASS
dc [%]	0.411	3.30	PASS
dmax [%]	1.590	4.00	PASS
dt [s]	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	EUT values	Limit	Result
Pst	0.066	1.00	PASS
dc [%]	0.409	3.30	PASS
dmax [%]	0.440	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 2	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.035	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 3	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.040	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 4	EUT values	Limit	Result
Pst	0.096	1.00	PASS
dc [%]	0.411	3.30	PASS
dmax [%]	0.448	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 5	EUT values	Limit	Result
Pst	0.273	1.00	PASS
dc [%]	0.407	3.30	PASS
dmax [%]	1.590	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 6	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.038	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 7	EUT values	Limit	Result
Pst	0.037	1.00	PASS
dc [%]	0.158	3.30	PASS
dmax [%]	0.198	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 8	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.037	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 9	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.038	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 10	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.035	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 11	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.034	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 12	**EUT values**	**Limit**	**Result**
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.034	4.00	PASS
dt [s]	0.000	0.50	PASS