EMC TEST REPORT

Reference No. : **G-44-2015-02975**

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

Equipment Under Test (EUT) :

Product Name : Hot&Cold Water Purifier System

Model Name : W2-170P

Alt Model Name : Refer the 6 Page

Applied Standards : **EN 55014-1:2006/A1:2009/A2 :2011**
EN 55014-2:1997/A1:2001/A2:2008(Category Ⅱ)
EN 61000-3-2 :2014, EN 61000-3-3 :2013

Date of Receipt : **September 22, 2015**

Date of Test : **November 10, 2015 ~ November 18, 2015**

Date of Issue : **December 04, 2015**

Test Results : **Complied**

Tested by : **Clark Lee**

Reviewed by : **Paul Kang**

Remarks :

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1. General Information

1.1 Client Information

Applicant	: HYUNDAI Wacortec Co., Ltd.
Address of Applicant	: A-301, Hagye Technotown,10, Nowon-ro 15-gil, Nowon-gu, Seoul, 01788, Republic of Korea
Manufacturer	: HYUNDAI Wacor tec Co., Ltd.
Address of Manufacturer	: A-301, Hagye Technotown,10,Nowon-ro 15-gil, Nowon-gu, Seoul, 01788, Republic of Korea

1.2 Test Laboratory

Name and Address	: SGS Korea Co., Ltd.
Giheung 1 Laboratory	: 35, Giheungdanji-ro 121beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
Giheung 2 Laboratory	: 23, Giheungdanji-ro 24beon-gil, Giheung-gu,Yongin-si, Gyeonggi-do, Republic of Korea
Gunpo Laboratory	: 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, 435-040 Republic of Korea
Phone	: + 82 31 428 5700
Fax	: + 82 31 427 2370
e-mail	: paul.kang@sgs.com

1.3 General Information of E.U.T.

Product Name	Hot&Cold Water Purifier System
Model Name	W2-170P
Alt Model Name	Refer the 6 Page
Model Different	Refer the 6 Page
Internal clock Frequency	Less than 15 ㎒
Serial No.	-
Rated Voltage	100 – 240 V~, 50 / 60 ㎐
Test Voltage	230 V~, 50 ㎐
Category	Ⅱ
EUT Description	Hot&Cold Water Purifier System

● **Model Different**

General product information:

- Model W2-170P, W2-150, W2-150P, W2-160, W2-160P and W2-170 are floor standing type hot and cold water purifier having a compressor and a heater.
- Model W2-170S and W2-170SP is counter-top or table-top type hot and cold water purifier.
- The same critical components including a compressor and heater provided for the each model.
- The differences of each prior models are:

Model	Dimension (mm)	Weight (kg)	Watt (w)	Rated capacity (Litres)		
				Reservoir	Cold	Hot
W2-170P	310 x 400 x 1135	20	450 – 520	2	3	2
W2-150	310 x 300 x 970	19	450 – 520	1.5	1.5	2
W2-150P	310 x 400 x 970	19	450 - 520	2	3	2
W2-160	340 x 335 x 1000	18	450 – 520	1.5	1.5	2
W2-160P	340 x 335 x 1000	18	450 – 520	2	3	2
W2-170	310 x 300 x 1135	20	450 – 520	1.5	1.5	2
W2-170S	310 x 300 x 562	18	320 – 380	1.5	1.5	1.5
W2-170SP	310 x 400 x 532	18	320 – 380	1.5	1.5	1.5

1.4 Operating Modes and Conditions

Operating mode	Operating condition
Operating Mode	Hot&Cold Operating Mode

1.4.1 Monitoring Method

- Check any Error by eyes.

1.5 Auxiliary Equipments

Description	Model	Serial No.	Manufacturer
-	-	-	-

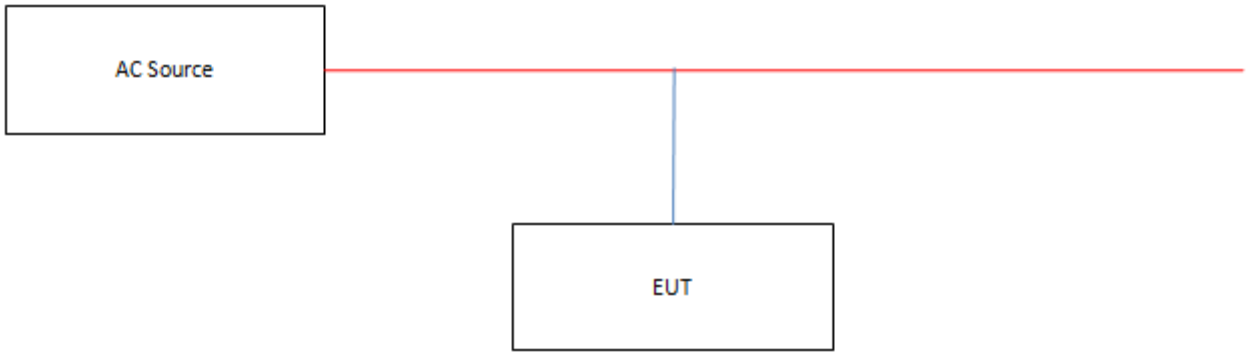
1.6 Cable List

Start		END		Cable Spec.	
Name	I/O Port	Name	I/O Port	Length	Shield
EUT	AC IN	AC SOURCE	-	1.2	Unshield

1.7 System Configurations

Description	Model	Serial No.	Manufacturer
Front Board	-	-	-
AC Power Filter	-	-	-

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	Applicable	No Deviation
EN 61000-3-2:2014	Applicable	No Deviation
EN 61000-3-3:2013	Applicable	No Deviation
EN 61000-4-2:2009	Applicable	No Deviation
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 61000-3-2:2014	Complied
Flicker	EN 61000-3-3:2013	Complied
Electrostatic Discharge	EN 61000-4-2:2009	Complied
Fast Transient	EN 61000-4-4:2004/A1:2010	Complied
Surge	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 ㎑	-
Disturbance Power	30 ㎒ ~ 300 ㎒	120 ㎑	-

2.2.2 Test Limits

-Conducted Emission Limits

Frequency Range	Limits(dB(㎶))	
	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

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 EMC32(Version V9.12.00 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	Cal. Due Date
Two-Line V-Network	ENV216	R & S	100190	2015.12.25
Test Receiver	ESCI 7	R & S	100911	2015.12.24
Click Meter	AFJ CL55C	AFJ INSTRUMENTS	55041008129	2016.10.08

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

Temperature: 23.5 ℃ ~ 23.8℃

Humidity: 35.0%R.H. ~ 37.0 %R.H.

Atmospheric Pressure: 102.3 kPa

Test Date: November 10, 2015

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
6.57	N	16.31	11.21	0.19	9.70	26.20	21.10	60.00	50.00	33.80	28.90
7.67	N	21.67	16.37	0.11	9.72	31.50	26.20	60.00	50.00	28.50	23.80
7.73	H	19.60	14.10	0.10	9.70	29.40	23.90	60.00	50.00	30.60	26.10
9.13	H	21.17	16.47	0.03	9.70	30.90	26.20	60.00	50.00	29.10	23.80
9.16	N	17.40	13.20	0.03	9.77	27.20	23.00	60.00	50.00	32.80	27.00
13.84	H	13.49	8.39	0.01	9.70	23.20	18.10	60.00	50.00	36.80	31.90

Measurement Uncertainty : ± 3.24 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 (Conducted Emission)

-Discontinuous Conducted Emission

Temperature : 23.6 ℃ ~ 24.7 ℃

Humidity : 34.0 %R.H. ~ 36.0 %R.H.

Atmospheric Pressure : 102.6 kPa

Test Date : November 16, 2015

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 : ± 3.34 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	Cal. Due Date
Absorbing Clamp	MDS-21	R & S	100375	2015.12.04
Amplifier	8447F	HP	2944A03909	2016.08.27
Test Receiver (KOLAS)	ESU26	R & S	100109	2016.03.03

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 : 22.7 ℃ ~ 23.2 ℃
Humidity : 31.0 %R.H. ~ 33.0 %R.H.
Atmospheric Pressure : 102.3 kPa

Test Date : November 10, 2015

Freq. (㎒)	Level(dB㎶)		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
93.06	47.80	46.80	7.11	1.20	27.80	28.31	27.31	47.34	37.34	19.03	10.03
93.93	42.80	41.30	7.11	1.21	27.80	23.32	21.82	47.37	37.37	24.05	15.55
101.93	40.60	39.20	7.14	1.28	27.58	21.44	20.04	47.66	37.66	26.22	17.62
104.52	43.70	41.00	7.15	1.31	27.55	24.61	21.91	47.76	37.76	23.15	15.85
107.72	41.20	40.80	7.16	1.34	27.52	22.18	21.78	47.88	37.88	25.70	16.10
126.44	22.40	15.50	7.20	1.40	27.34	3.66	(3.24)	48.57	38.57	44.91	41.81

Measurement Uncertainty : ± 3.70 dB (The confidential level is about 95%, *k*=2)

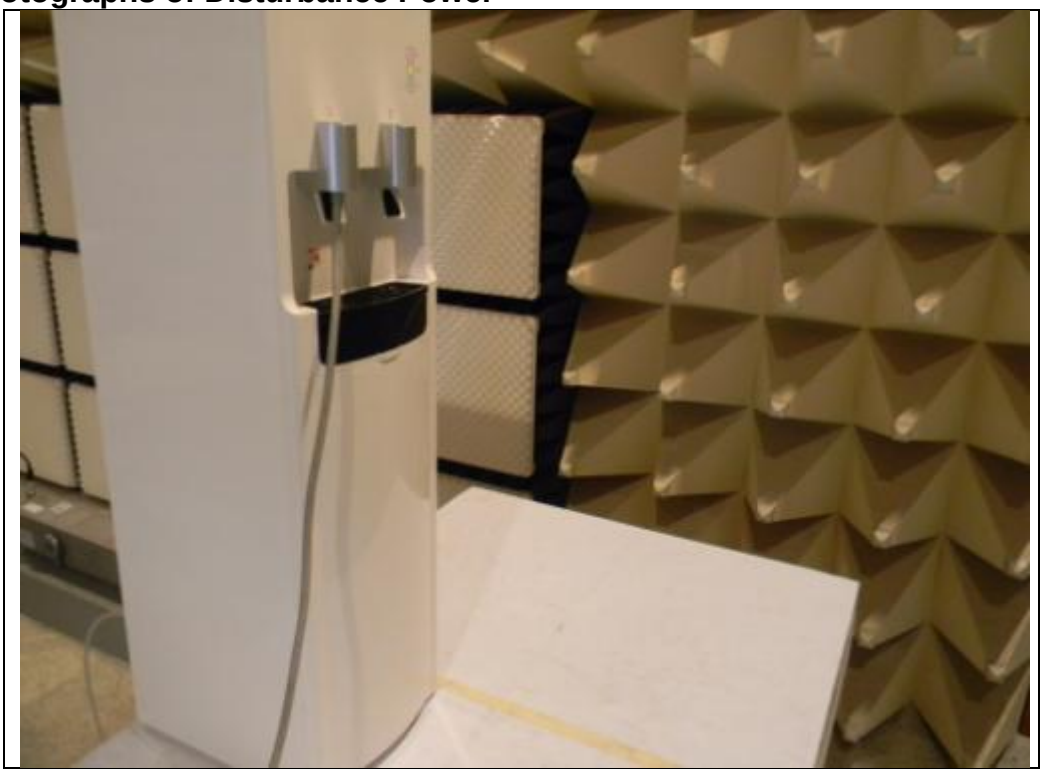
Note : • Margin = Limit – Result • CF : Clamp Factor • Amp : Amplifier Gain
• CL : Cable Loss • Result = Level + CF + CL – Amp

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	Basic Standards	Test Results
Harmonics	EN61000-3-2:2014	**Complied**
Flicker	EN61000-3-3:2013	**Complied**

3.2 Test Equipments

Equipment	Model	Manufacturer	S/N	Cal. Due Date
H/F Analyzer	DPA 500	EM TEST	V0508100155	2016.05.18
AC Source	ACS 500	EM TEST	V0508100156	2016.05.18

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

Temperature 21.5 ℃ ~ 21.6 ℃
Humidity : 26.0 %R.H. ~ 26.0 %R.H.
Atmospheric Pressure : 102.2 kPa

Test Date : November 11, 2015

.

See Appendix D (Harmonics on AC Mains)

3.5 Flicker Test Data

Temperature 21.6 ℃ ~ 22.4 ℃
Humidity : 26.0 %R.H. ~ 29.0 %R.H.
Atmospheric Pressure : 102.2 kPa

Test Date : November 11, 2015

See Appendix E (Flicker on AC Mains)

3.6 Photograph of Harmonics & Flicker

IMMUNITY

4.1 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**

4.2 Performance Criteria

Performance criterion A - The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B - The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance)specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

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

4.3 Electrostatic Discharge

4.3.1 Test Equipments

Description	Model	Manufacturer	S/N	Cal. Due Date
ESD Simulator	ESS-2000	NoiseKen	ESS0746780	2015.12.29
VCP	-	-	-	-

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: 21.7 ℃ ~ 21.9 ℃
Humidity: 36.0 %R.H. ~ 38.0 %R.H.
Atmospheric Pressure: 101.7 kPa

Test Date: November 10, 2015

4.3.4 Performance Criterion : B

4.3.5 Test Points

No.	Test Points	No.	Test Points
1	VCP	4	Push Water
2	Screw, Metal Enclosure	5	Power Switch
3	LED, Non Metal Enclosure	6	AC IN

4.3.6 Test Results

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

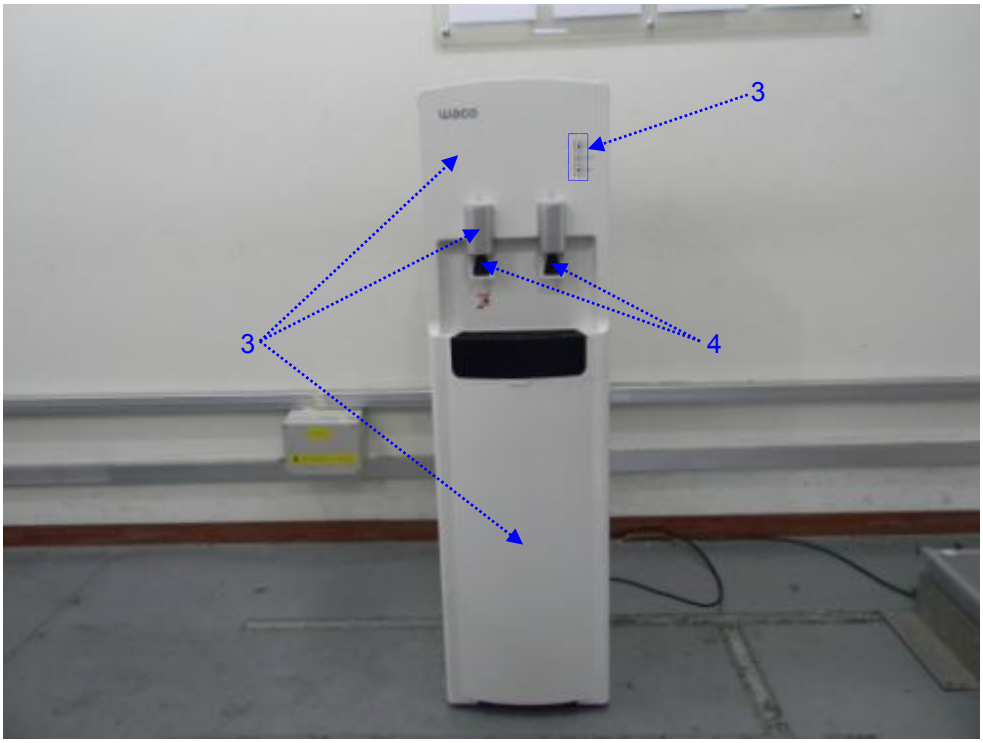
Performance Criteria A, the EUT normally operates during and after the test.

4.3.7 Test Points

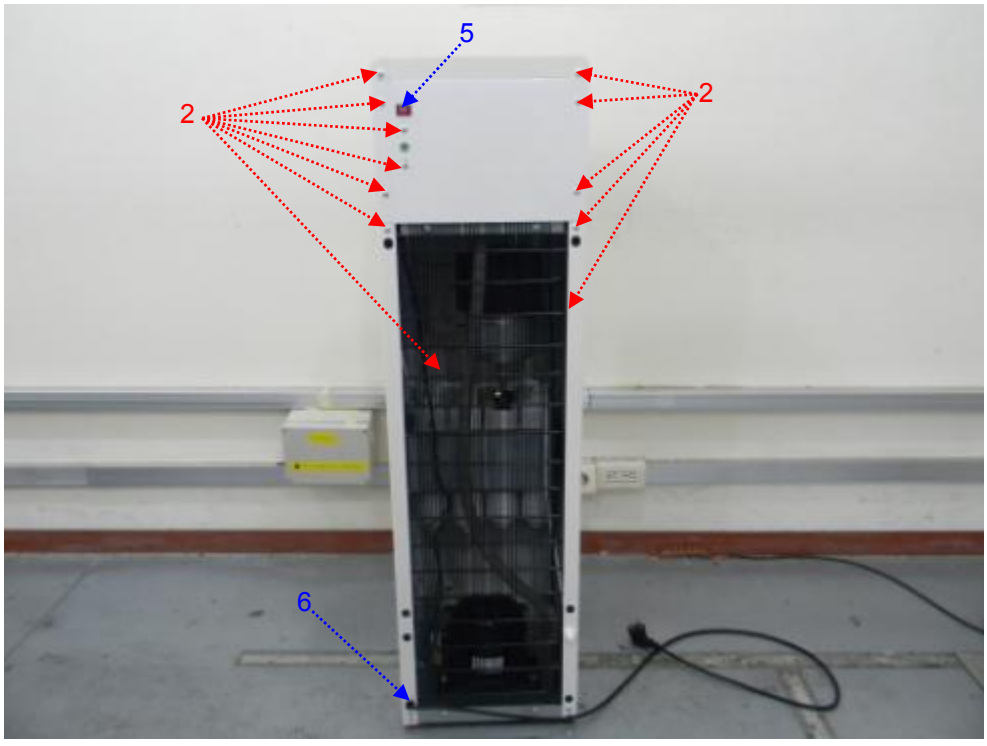
Contact

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	Cal. Due Date
Motion Driven AC Source	MV2616	EM TEST	V0508100161	2016.06.08
Ultra-Compact Simulator	UCS 500-M	EM TEST	V0508100159	2016.06.08

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 : 20.6 ℃ ~ 20.8 ℃
Humidity: 29. 0%R.H.
Atmospheric Pressure: 101.8 ㎪

Test Date: November 13, 2015

4.4.4 Performance Criterion : B

4.4.5 Test Results

Test Point	Polarity	Coupling	Repetition	Pulse (㎱)	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	Cal. Due Date
Motion Driven AC Source	MV2616	EM TEST	V0508100161	2016.06.08
Ultra-Compact Simulator	UCS 500-M	EM TEST	V0508100159	2016.06.08

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 : 20.8 ℃ ~ 21.0 ℃
Humidity: 29.0 %R.H. ~ 30.0 %R.H.
Atmospheric Pressure: 101.8 kPa

Test Date: November 13, 2015

4.5.4 Performance Criterion : B

4.5.5 Test Results

Test Point	Polarity	Coupling	Pulse (㎲)	Number of Surges	Repetition	Phase Angle(°)	Test Level (kV)	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	Cal. Due Date
Power Line Coupling Decoupling Network	FCC-801-M3-16A	Fisher Custom Communication Inc.	04002	2016.09.24
Amplifier	150A250	AR	312201	2016.01.06
Dual Directional Coupler	DC2600M2	AR	311978	2015.11.27
Signal Generator	SML03	R & S	102135	2016.01.22
Voltage Sensor	URV5-Z2	R & S	100234, 100235	2015.12.26
Milli voltmeter	URV5	R & S	100240	2015.12.26
Attenuator	300-A-FFN-06	BIRD Electronics Corporation	0433	2015.12.17

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: 23.2 ℃ ~ 24.1 ℃
Humidity: 30.0 %R.H. ~ 32.0 %R.H.
Atmospheric Pressure: 101.9 ㎪

Test Date: November 18, 2015

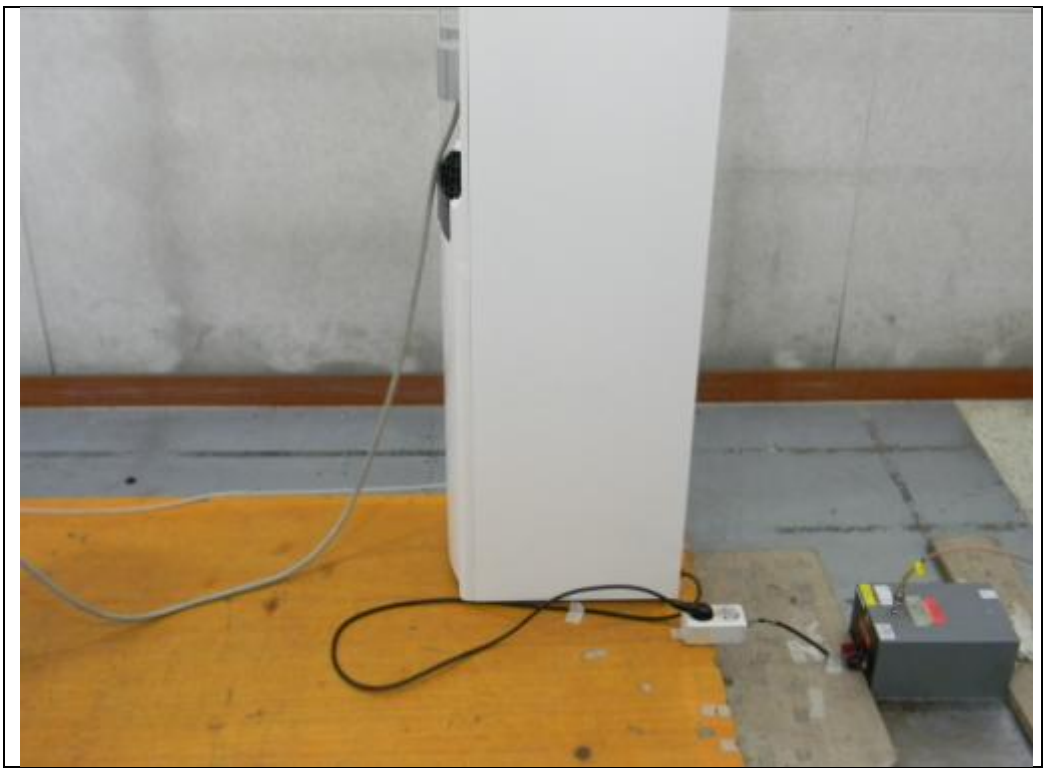
4.6.4 Performance Criterion : A

4.6.5 Test Results

Frequency (㎒)	Test Point	Coupling	Voltage Level	Modulation	Frequency Step	Dwell Time	Results
0.15 ~ 230	AC IN	CDN (M3)	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	Cal. Due Date
Motion Driven AC Source	MV2616	EM TEST	V0508100161	2016.06.08
Ultra-Compact Simulator	UCS 500-M	EM TEST	V0508100159	2016.06.08

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: 21.0 ℃
Humidity: 30.0 %R.H.
Atmospheric Pressure: 101.8 kPa

Test Date: November 13, 2015

4.7.4 Performance Criterion : C

4.7.5 Test Results

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

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

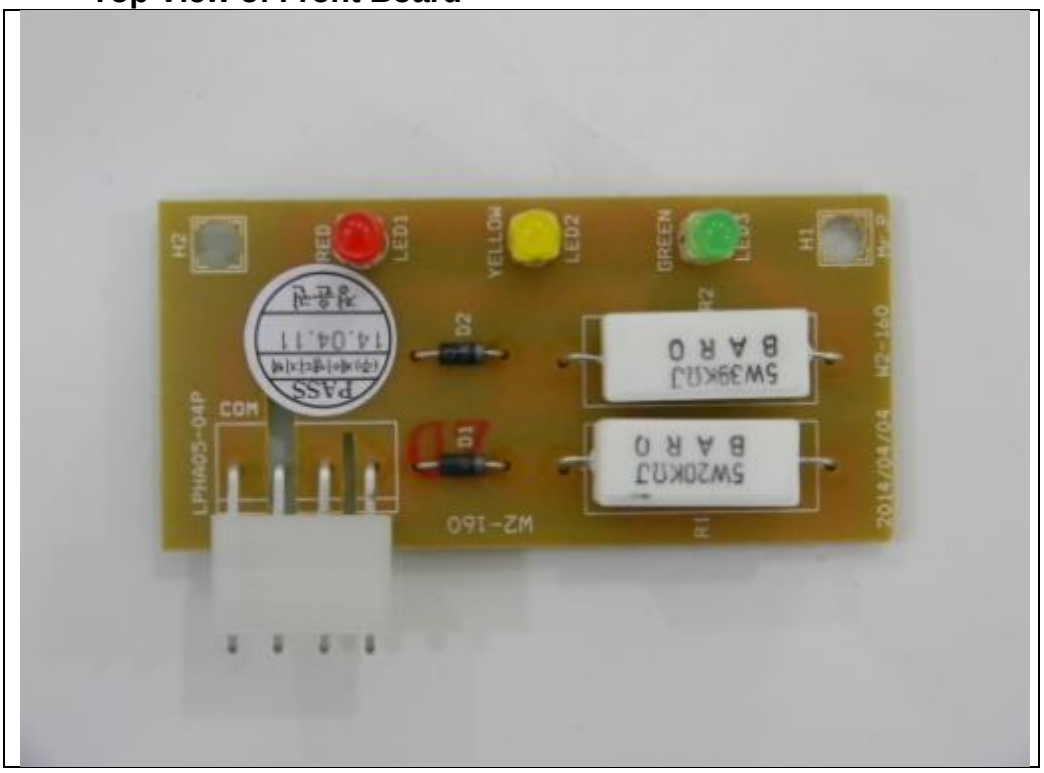
4.7.6 Photograph of Voltage Dips and Interruptions

5. Photographs of EUT

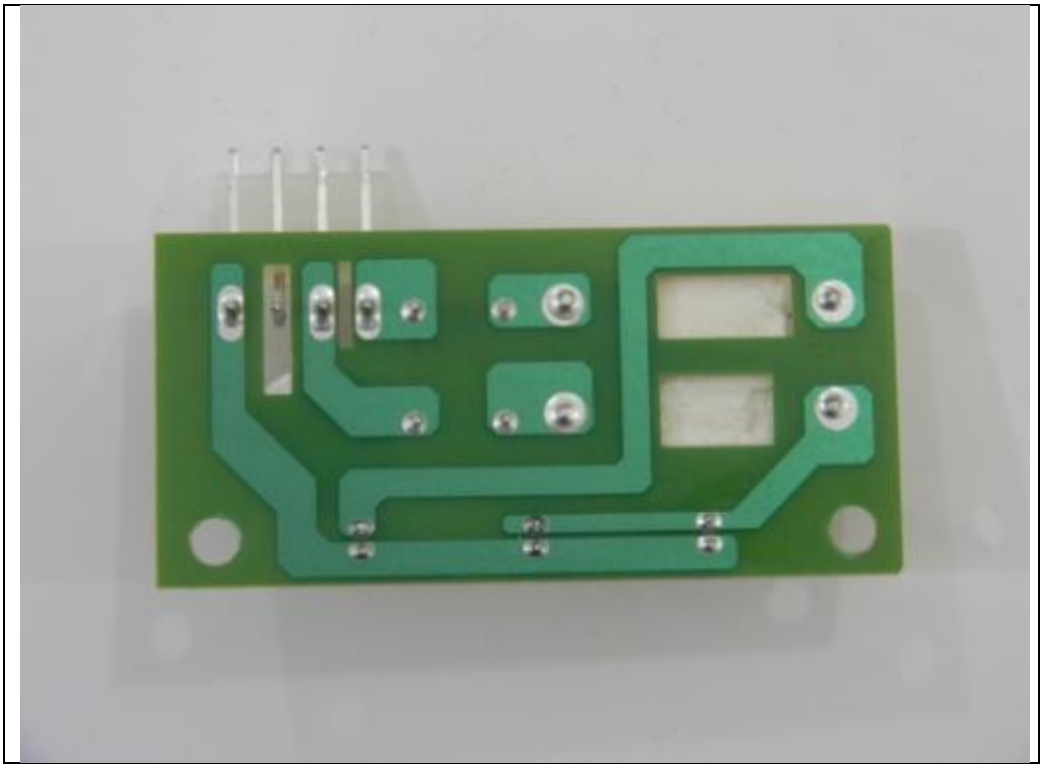
- **Front View**

- **Rear View**

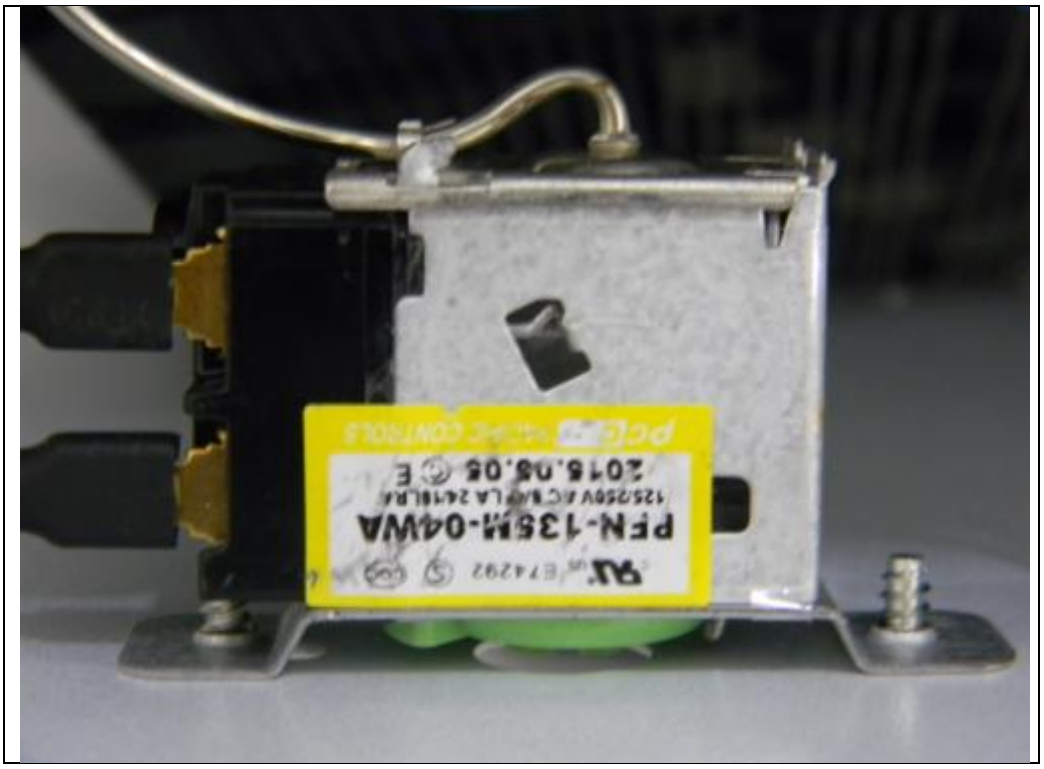
- **Top View of Front Board**



- **Bottom View of Front Board**

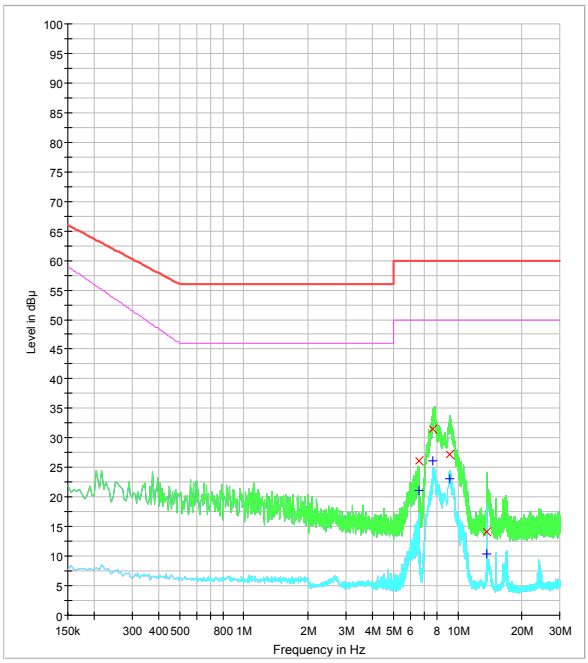


- **AC Power Filter**

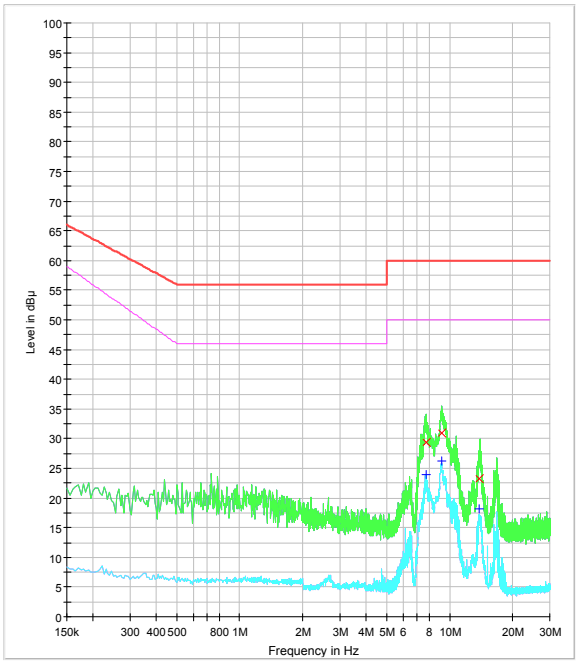


- **Inside**

Appendix A : Conducted Emission

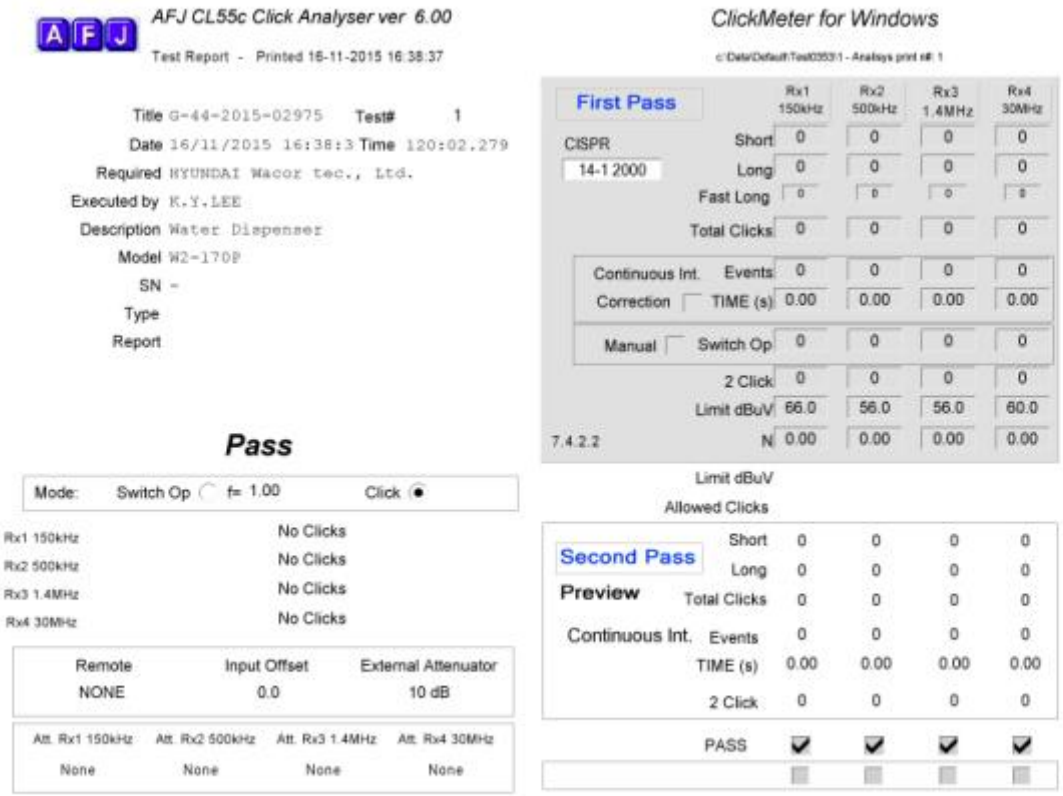


<N>



<H>

Appendix B : Discontinuous Conducted Emission



AFJ CL55c Click Analyser ver 6.00

Test Report - Printed 16-11-2015 16:38:37

Title G-44-2015-02975 Test# 1
Date 16/11/2015 16:38:3 Time 120:02.279
Required HYUNDAI Wacor tec., Ltd.
Executed by K.Y.LEE
Description Water Dispenser
Model W2-170P
SN -
Type
Report

Pass

Mode: Switch Op f= 1.00 Click

Rx1 150kHz	No Clicks
Rx2 500kHz	No Clicks
Rx3 1.4MHz	No Clicks
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

c:\Data\Default\Test0353\1 - Analisys print n#: 1

First Pass

CISPR 14-1 2000

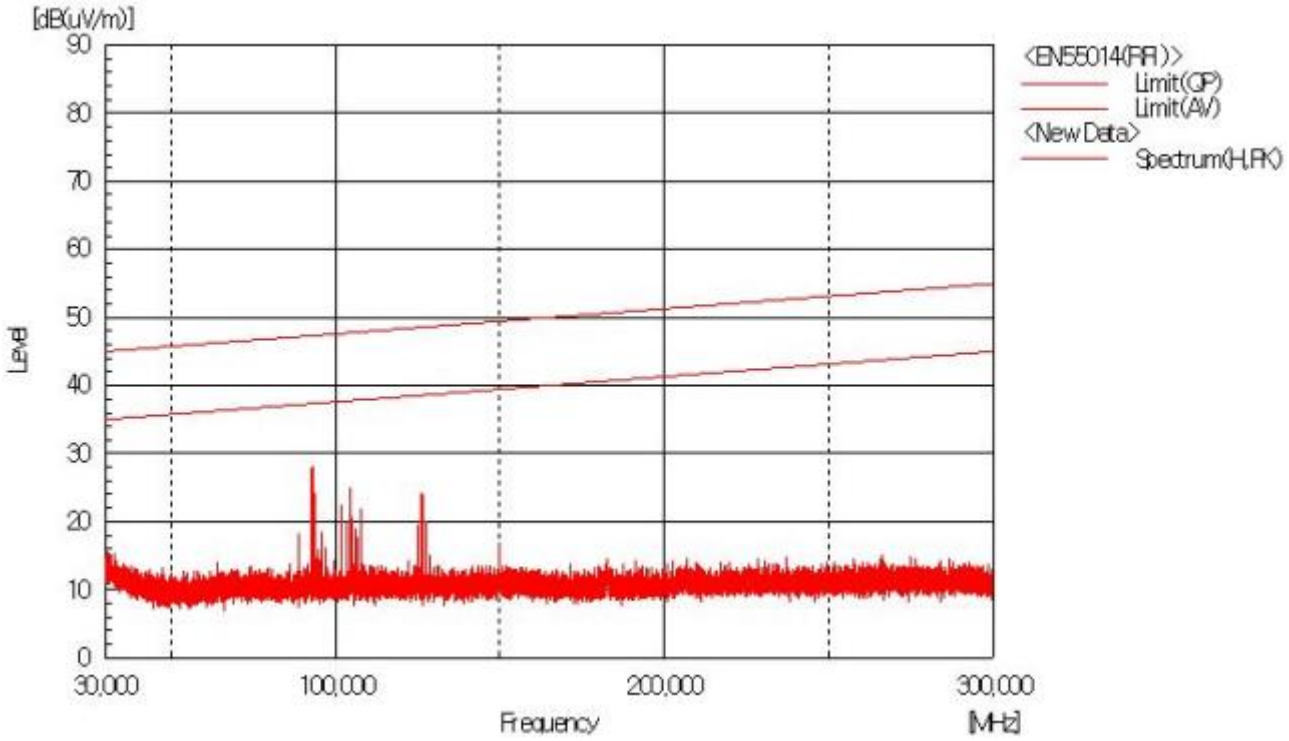
	Rx1 150kHz	Rx2 500kHz	Rx3 1.4MHz	Rx4 30MHz
Short	0	0	0	0
Long	0	0	0	0
Fast Long	0	0	0	0
Total Clicks	0	0	0	0
Continuous Int. Events	0	0	0	0
Correction TIME (s)	0.00	0.00	0.00	0.00
Manual Switch Op	0	0	0	0
2 Click	0	0	0	0
Limit dBuV	66.0	56.0	56.0	60.0
7.4.2.2 N	0.00	0.00	0.00	0.00

Limit dBuV
Allowed Clicks

Second Pass
Preview

Short	0	0	0	0
Long	0	0	0	0
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	✔	✔	✔	✔

Appendix C : Disturbance Power



Appendix D : Harmonics on AC Mains

Report title:	G-44-2015-02975
Company Name:	SGS Korea Co., Ltd.
Date of test:	14:06 11.Nov 2015
Measurement file name:	Harmonics_Hyundai Water.rsd
Tester:	K.Y.LEE
Standard used:	EN/IEC 61000-3-2 Ed.4 Quasi-stationary Equipment class A <= 150% of the limit
Observation time:	150s
Windows width:	10 periods - (EN/IEC 61000-4-7 Edition 2002 + A1:2008)
Customer:	HYUNDAI Wacortec Co., Ltd.
E. U. T.:	Water Dispenser(W2-170P)
Temperature :	(21.5-21.6) ℃
Humidity :	(26.0~26.0) % R.H.
Atmosphere :	(102.2)kPa

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	873.238E-3			
2	15.081E-3	1.396	1.08	PASS
3	28.318E-3	1.231	2.30	PASS
4	4.023E-3			PASS
5	16.084E-3	1.411	1.14	PASS
6	1.571E-3			PASS
7	5.549E-3	0.721	770.00E-3	PASS
8	1.040E-3			PASS
9	3.371E-3			PASS
10	914.524E-6			PASS
11	1.877E-3			PASS
12	843.293E-6			PASS
13	1.257E-3			PASS
14	1.197E-3			PASS
15	1.025E-3			PASS
16	800.273E-6			PASS
17	992.651E-6			PASS
18	1.132E-3			PASS
19	811.362E-6			PASS
20	789.162E-6			PASS
21	803.472E-6			PASS
22	834.926E-6			PASS
23	1.076E-3			PASS
24	813.501E-6			PASS
25	803.466E-6			PASS
26	984.438E-6			PASS
27	1.068E-3			PASS
28	1.310E-3			PASS
29	854.544E-6			PASS
30	995.046E-6			PASS
31	809.888E-6			PASS
32	1.039E-3			PASS
33	799.398E-6			PASS
34	797.995E-6			PASS
35	788.743E-6			PASS
36	952.917E-6			PASS
37	805.730E-6			PASS
38	794.914E-6			PASS
39	791.109E-6			PASS
40	803.363E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

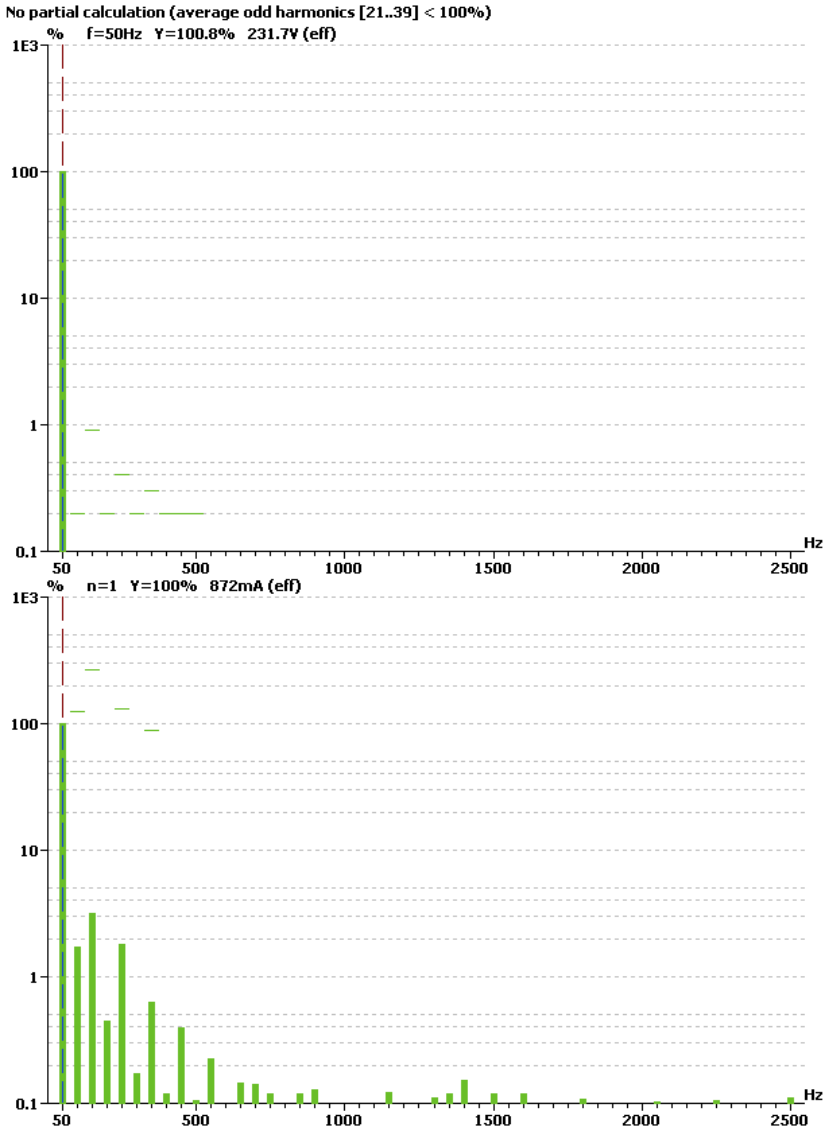
Maximum harmonic current results

Hn	Ieff [A]	% of Limit	Limit [A]	Result
1	875.094E-3			
2	15.309E-3	0.945	1.62	PASS
3	29.155E-3	0.845	3.45	PASS
4	4.307E-3			PASS
5	16.664E-3	0.975	1.71	PASS
6	1.703E-3			PASS
7	5.891E-3	0.510	1.15	PASS
8	1.154E-3			PASS
9	3.604E-3			PASS
10	1.004E-3			PASS
11	1.998E-3			PASS
12	921.700E-6			PASS
13	1.404E-3			PASS
14	1.303E-3			PASS
15	1.162E-3			PASS
16	903.350E-6			PASS
17	1.105E-3			PASS
18	1.237E-3			PASS
19	881.496E-6			PASS
20	900.425E-6			PASS
21	917.522E-6			PASS
22	927.383E-6			PASS
23	1.186E-3			PASS
24	879.231E-6			PASS
25	893.714E-6			PASS
26	1.084E-3			PASS
27	1.189E-3			PASS
28	1.428E-3			PASS
29	943.083E-6			PASS
30	1.097E-3			PASS
31	904.453E-6			PASS
32	1.135E-3			PASS
33	872.335E-6			PASS
34	865.167E-6			PASS
35	875.343E-6			PASS
36	1.052E-3			PASS
37	900.894E-6			PASS
38	877.428E-6			PASS
39	891.093E-6			PASS
40	895.871E-6			PASS

Harmonic currents less than 0.6% of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	231.74	100.758		
2	82.96E-3	0.036	0.2	PASS
3	106.74E-3	0.046	0.9	PASS
4	18.85E-3	0.008	0.2	PASS
5	38.31E-3	0.017	0.4	PASS
6	12.72E-3	0.006	0.2	PASS
7	47.31E-3	0.021	0.3	PASS
8	19.32E-3	0.008	0.2	PASS
9	71.09E-3	0.031	0.2	PASS
10	28.35E-3	0.012	0.2	PASS
11	25.75E-3	0.011	0.1	PASS
12	24.50E-3	0.011	0.1	PASS
13	49.25E-3	0.021	0.1	PASS
14	11.20E-3	0.005	0.1	PASS
15	70.61E-3	0.031	0.1	PASS
16	23.78E-3	0.010	0.1	PASS
17	53.43E-3	0.023	0.1	PASS
18	20.52E-3	0.009	0.1	PASS
19	35.09E-3	0.015	0.1	PASS
20	21.91E-3	0.010	0.1	PASS
21	71.62E-3	0.031	0.1	PASS
22	20.66E-3	0.009	0.1	PASS
23	53.18E-3	0.023	0.1	PASS
24	21.08E-3	0.009	0.1	PASS
25	33.00E-3	0.014	0.1	PASS
26	20.51E-3	0.009	0.1	PASS
27	67.00E-3	0.029	0.1	PASS
28	22.11E-3	0.010	0.1	PASS
29	44.87E-3	0.020	0.1	PASS
30	17.98E-3	0.008	0.1	PASS
31	34.97E-3	0.015	0.1	PASS
32	16.52E-3	0.007	0.1	PASS
33	49.73E-3	0.022	0.1	PASS
34	16.65E-3	0.007	0.1	PASS
35	33.87E-3	0.015	0.1	PASS
36	16.44E-3	0.007	0.1	PASS
37	32.23E-3	0.014	0.1	PASS
38	16.30E-3	0.007	0.1	PASS
39	38.99E-3	0.017	0.1	PASS
40	15.15E-3	0.007	0.1	PASS


No partial calculation (average odd harmonics [21..39] < 100%)
% f=50Hz Y=100.8% 231.7V (eff)
1E3
100
10
1
0.1
50
500
1000
1500
2000
2500
Hz
% n=1 Y=100% 872mA (eff)
1E3
100
10
1
0.1
50
500
1000
1500
2000
2500
Hz

Appendix E : Flickers on AC Mains

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.038	4.00	PASS
dt [s]	0.000	0.50	PASS

Detail Flicker data

Flicker measurement 1	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 2	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 3	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.036	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 4	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 5	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 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	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.037	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 8	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 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 [%]	0.036	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 [%]	0.038	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 [%]	0.037	4.00	PASS
dt [s]	0.000	0.50	PASS