

TEST REPORT

Report Number : ETL090324.04 Report issue date: May 26, 2009

Model / Serial No. : JULIET-1 / NONE

Multiple Model Name : JULIET-2, JULIET-3, ROMEO-1, ROMEO-2, ROMEO-3

Product Type : Hot & Cold Water Purifier System

Brand Name : HYUNDAI, Purify

Applicant : HYUNDAI Wacor Tec Co., Ltd.

Address : 684-49, Gongreung-dong, Nowon-gu, Seoul, Korea

Manufacturer : HYUNDAI Wacor Tec Co., Ltd.

Address : 684-49, Gongreung-dong, Nowon-gu, Seoul, Korea

Test Standard(s) : J55014-1(H20)
CISPR14-1: 1993 + A1: 1996

Test Result : **Positive**

Total pages including Attachments : 37

Prepared by:

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(Test Engineer)



May 26, 2009

Reviewed by:

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(Chief Engineer)



May 26, 2009

ETL Inc.

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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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TEST STANDARD(S)

The emc tests were performed according to the following standards:

- J55014-1(H20)
- CISPR14-1: 1993 + A1: 1996

ADDRESS OF THE TEST LABORATORY

Seoul EMC Laboratory

#371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea

Hwaseong Open Area Test Site

#499-1, Sagot-ri, Seosin-myeon, Hwaseong-si, Gyeonggi-do, 445-882, Korea

ENVIRONMENTAL CONDITIONS

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

Temperature : 15 °C - 35 °C
Humidity : 30 %R.H. - 60 %R.H.
Atmospheric Pressure : 86 kPa - 106 kPa

POWER SUPPLY SYSTEM UTILIZED

Power supply system AC 100 V; 50 Hz/60 Hz; Max. 600 W

SHORT DESCRIPTION OF THE EQUIPMENT UNDER TEST (EUT)

Number of received / tested samples: 1 / 1

Serial Number: none

VOLTAGE RANGE TEST

Preliminary test has been performed with voltage conditions of from 90 V (50 Hz / 60 Hz) to 110 V (50 Hz / 60 Hz) at the frequencies of 160 kHz and 50 MHz to determine maximum disturbance voltage condition. A test at about 160 kHz and at about 50 MHz shall be 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. The frequencies of 160 kHz measurement result is maximum disturbance voltage condition. But the frequencies of 50 MHz measurement result is no maximum disturbance voltage condition. So conducted emissions test condition is AC 100 V, 50 Hz and AC 100 V, 60 Hz. And discontinuous disturbance emissions test condition is normal AC 100 V, 50 Hz and AC 100 V, 60 Hz

DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT

- The black square indicates that the listed condition, standard or equipment is applicable for this report.
- Blank box indicates that the listed condition, standard or equipment was not applicable for this report.

Discontinuous Disturbance Emissions Test

Discontinuous disturbance emissions from 148.5 kHz to 30 MHz were measured with a bandwidth of 9 kHz according to the methods defined in J55014-1(H20).

The EUT was placed on a nonmetallic stand in a shielded room, 0.8 m above the ground plane.

Test not applicable

■ Test area - shielded room

Used test instruments and test accessories please see Attachment B.

■ Pass

Fail

Remarks: Please refer to the test data in Attachment A.

Equipment Under Test (EUT) Test Operation Mode:

The equipment under test was operated under the following conditions during testing:

- During the test, EUT was the continuous cooling & heating mode hold down that the discharge water periodically

Configuration of the equipment under test:

- See constructional data form in Attachment D - Page D2
- See product information form(s) in Attachment D - Page D3

The following devices and interface cables were connected during the testing:

Peripheral devices

	Type	Model	Serial No.	Manufacturer
■	Water Pump	EC-101-50	0240105	E-CHEN
■	Adapter (for Water Pump)	N2401A	NONE	NONE

Type of Cables Used

Device from	Device to	Type of Cable(Port)	Length(m)	Type of shield
EUT	Power socket	AC Input	1.2	Unshielded
Water Pump	Adapter	AC Input	1.2	Unshielded

GENERAL REMARKS:

The Equipment Under Test (EUT) is the HYUNDAI Wacor Tec Co., Ltd. (model: JULIET-1)

The model JULIET-1 is basic model that was tested.

The multi models JULIET-2, JULIET-3, ROMEO-1, ROMEO-2 and ROMEO-3 are identical to basic model, except for external design and dimension.

Model	Dimension
JULIET-1 (Basic model)	370 mm (W) x 410 mm (D) x 1 300 mm (H)
JULIET-2	370 mm (W) x 410 mm (D) x 1 200 mm (H)
JULIET-3	370 mm (W) x 410 mm (D) x 510 mm (H)
ROMEO-1	370 mm (W) x 410 mm (D) x 1 300 mm (H)
ROMEO-2	370 mm (W) x 410 mm (D) x 1 200 mm (H)
ROMEO-3	370 mm (W) x 410 mm (D) x 510 mm (H)

SUMMARY:

All tests according to the regulations cited on page 3 were

- Performed
- Not Performed

The Equipment Under Test

- **Fulfills** the general approval requirements cited on page 3.
- **Does not** fulfill the general approval requirements cited on page 3.

Date of receipt of test sample: March 24, 2009

Test start date: May 11, 2009

Test end date: May 13, 2009

Photograph of test setup: Conducted emissions 150 kHz - 30 MHz



Photograph of test setup: Disturbance Power



Photograph of test setup: Discontinuous Disturbance



Attachment A

Test Data
and
Test Setup Drawing(s)

Conducted Emissions Measurement

EUT	Hot & Cold Water Purifier System / JULIET-1 (S/N: N/A)
Limit apply to	J55014-1(H20)
Test Date	May 11, 2009
Operating Condition	During the test, EUT was the continuous cooling & heating mode hold down that the discharge water periodically
Operating Spec.	100 V, 50 Hz
Result	Passed by 4.68 dB

Conducted Emission Test Data

The following table shows the highest levels of conducted emissions on both polarizations of hot and neutral line.
 Detector mode: CISPR Quasi-Peak mode (6 dB Bandwidth: 9 kHz)

Frequency [MHz]	Result [dB μ V]		Phase (*H/**N)	Limit [dB μ V]		Margin [dB]	
	Quasi-peak	Average		Quasi-peak	Average	Quasi-peak	Average
0.155	35.12	13.24	N	65.73	58.65	30.61	45.41
0.265	31.13	3.96	N	61.27	52.86	30.14	48.90
0.370	29.93	2.55	N	58.50	49.25	28.57	46.70
4.440	24.71	13.32	H	56.00	46.00	31.29	32.68
5.655	32.42	20.12	H	60.00	50.00	27.58	29.88
6.780	47.92	32.24	H	60.00	50.00	12.08	17.76
22.120	36.00	34.93	H	60.00	50.00	24.00	15.07
29.490	45.58	45.32	N	60.00	50.00	14.42	4.68

NOTES:

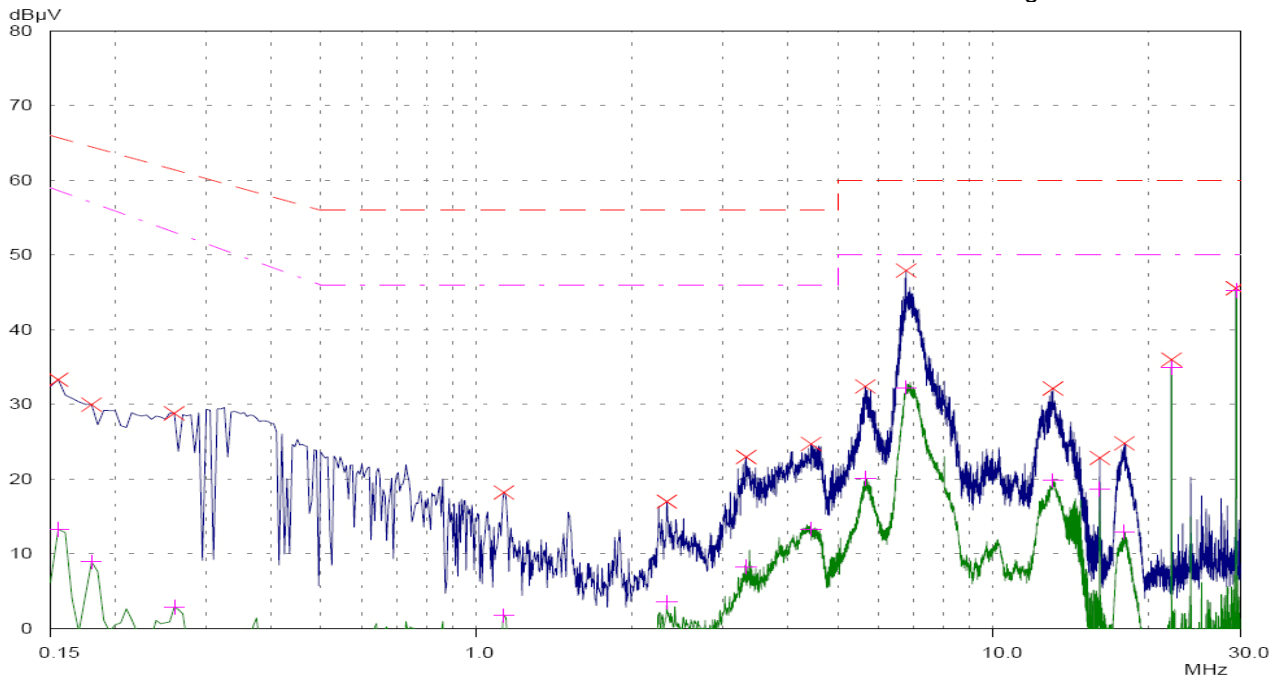
- * H : HOT Line , **N : Neutral Line
- Margin value = Limit – Result
- All conditions were investigated and the worst-case emissions are reported.
- If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.



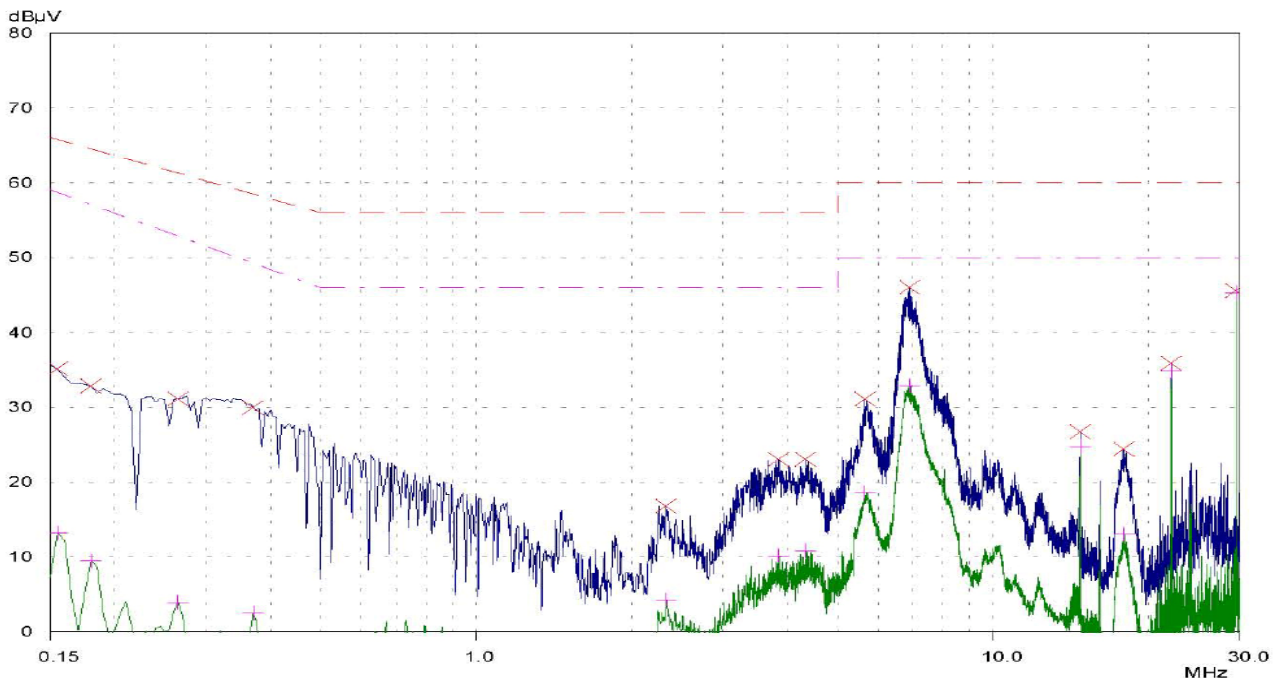
Yoon Seop, Kim
 Test Engineer

Line Polarity : Hot

Limit : - - - Quasi-Peak
- - - Average



Line Polarity : Neutral



Quasi-peak x
↑
Average +
↑

EUT	Hot & Cold Water Purifier System / JULIET-1 (S/N: N/A)
Limit apply to	J55014-1(H20)
Test Date	May 11, 2009
Operating Condition	During the test, EUT was the continuous cooling & heating mode hold down that the discharge water periodically
Operating Spec.	100 V, 60 Hz
Result	Passed by 3.03 dB

Conducted Emission Test Data

The following table shows the highest levels of conducted emissions on both polarizations of hot and neutral line.
 Detector mode: CISPR Quasi-Peak mode (6 dB Bandwidth: 9 kHz)

Frequency [MHz]	Result [dB μV]		Phase (*H/**N)	Limit [dB μV]		Margin [dB]	
	Quasi-peak	Average		Quasi-peak	Average	Quasi-peak	Average
0.155	33.92	13.10	N	65.73	58.65	31.81	45.55
0.375	29.95	3.42	N	58.39	49.11	28.44	45.69
3.405	23.90	9.72	H	56.00	46.00	32.10	36.28
4.305	25.44	11.70	H	56.00	46.00	30.56	34.30
5.745	30.77	18.69	H	60.00	50.00	29.23	31.31
6.790	44.56	31.87	H	60.00	50.00	15.44	18.13
22.120	43.69	42.96	N	60.00	50.00	16.31	7.04
29.490	47.40	46.97	N	60.00	50.00	12.60	3.03

NOTES:

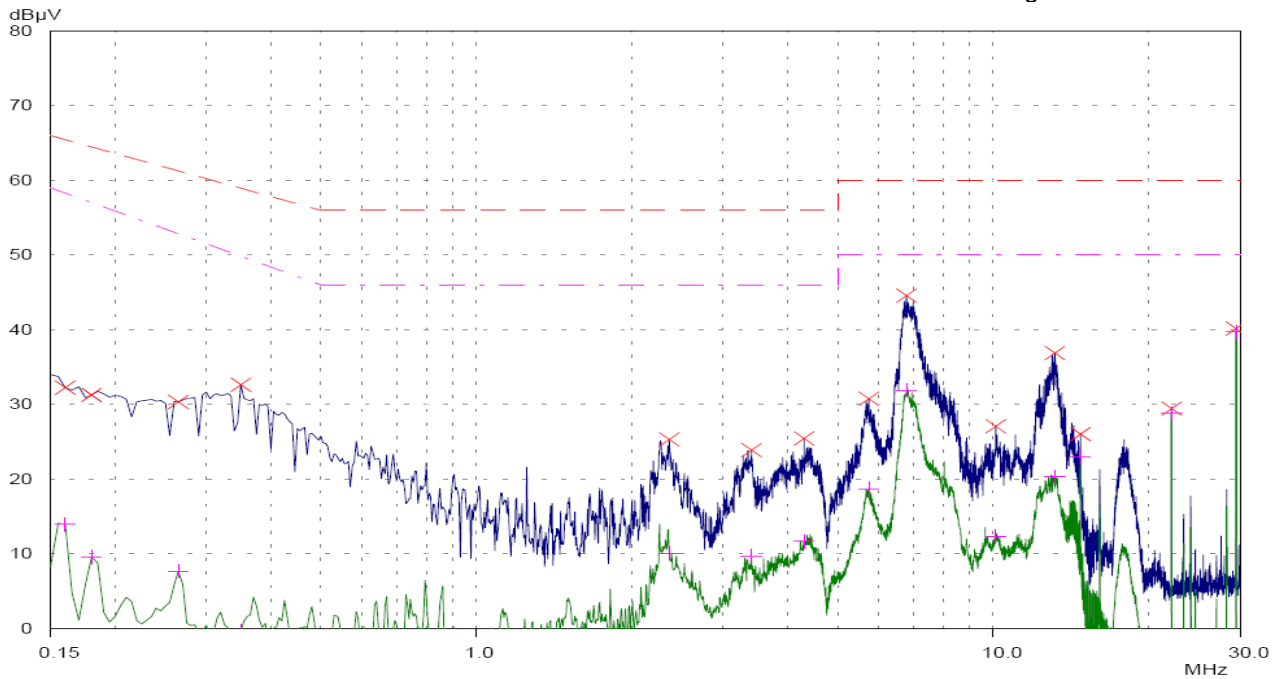
- * H : HOT Line , **N : Neutral Line
- Margin value = Limit – Result
- All conditions were investigated and the worst-case emissions are reported.
- If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.



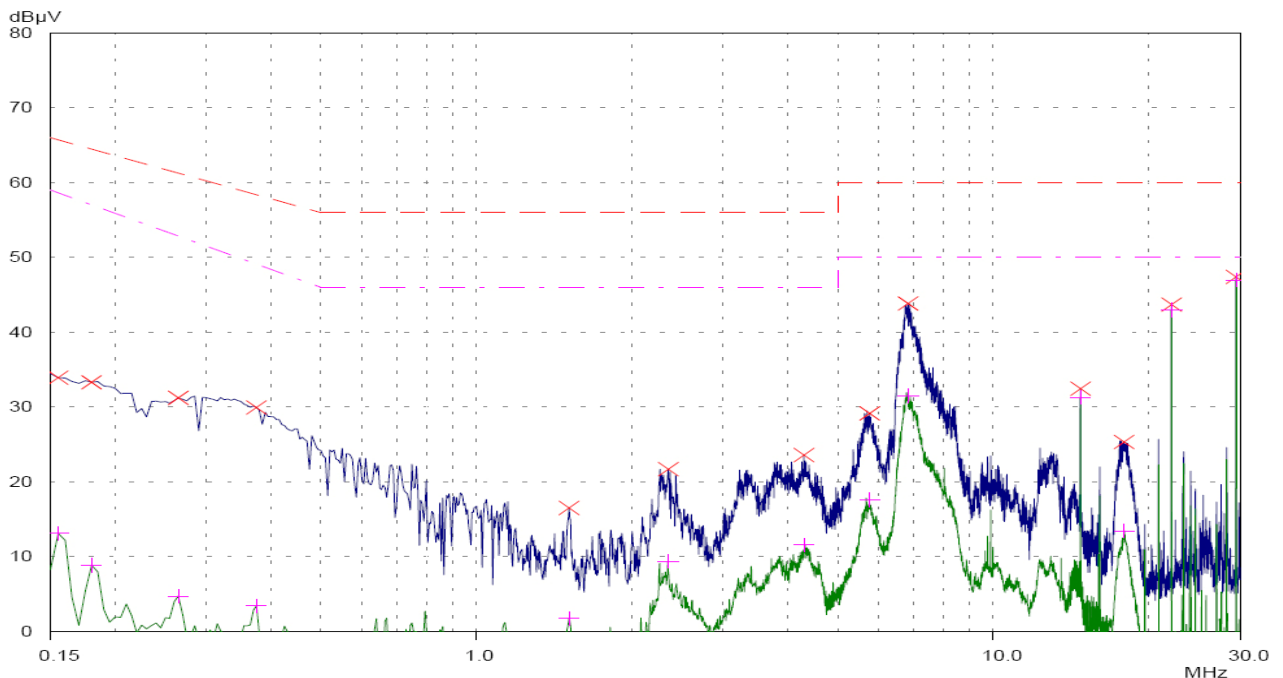
Yoon Seop, Kim
 Test Engineer

Line Polarity : Hot

Limit : - - - Quasi-Peak
- - - Average



Line Polarity : Neutral



Quasi-peak x
↑
Average +
↑

Disturbance Power Measurement

EUT	Hot & Cold Water Purifier System / JULIET-1 (S/N: N/A)
Limit apply to	J55014-1(H20)
Test Date	May 12, 2009
Operating Condition	During the test, EUT was the continuous cooling & heating mode hold down that the discharge water periodically
Operating Spec.	100 V, 50 Hz
Result	Passed by 5.73 dB

Disturbance Power Test Data

Frequency [MHz]	Result [dBpW]		Limit [dBpW]		Margin [dB]	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
36.96	31.13	29.53	45.26	35.26	14.13	5.73
80.08	34.20	19.87	46.85	36.85	12.65	16.98
110.68	28.96	27.11	47.99	37.99	19.03	10.88
125.44	27.76	24.86	48.53	38.53	20.77	13.67
177.04	26.59	23.83	50.45	40.45	23.86	16.62



Yoon Seop, Kim
Test Engineer

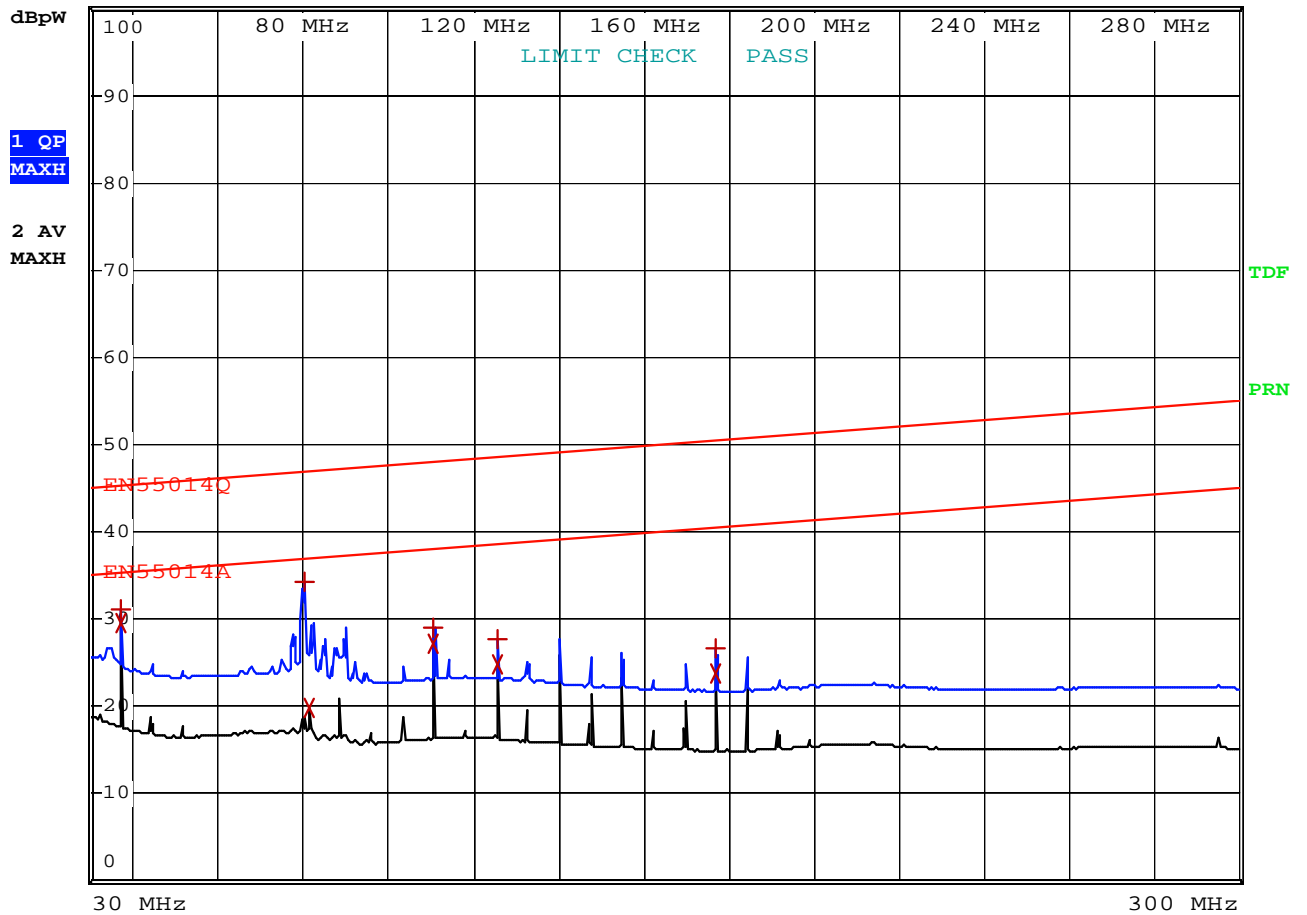


RBW 120 kHz

MT 100 ms

Att 10 dB

PREAMP OFF



EUT	Hot & Cold Water Purifier System / JULIET-1 (S/N: N/A)
Limit apply to	J55014-1(H2O)
Test Date	May 12, 2009
Operating Condition	During the test, EUT was the continuous cooling & heating mode hold down that the discharge water periodically
Operating Spec.	100 V, 60 Hz
Result	Passed by 6.53 dB

Disturbance Power Test Data

Frequency [MHz]	Result [dBpW]		Limit [dBpW]		Margin [dB]	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
36.96	31.13	28.73	45.26	35.26	14.13	6.53
110.68	28.96	28.84	47.99	37.99	19.03	9.15
125.32	27.76	24.64	48.53	38.53	20.77	13.89
140.16	29.28	26.71	49.08	39.08	19.80	12.37
176.96	26.50	26.39	50.44	40.44	23.94	14.05



Yoon Seop, Kim
Test Engineer

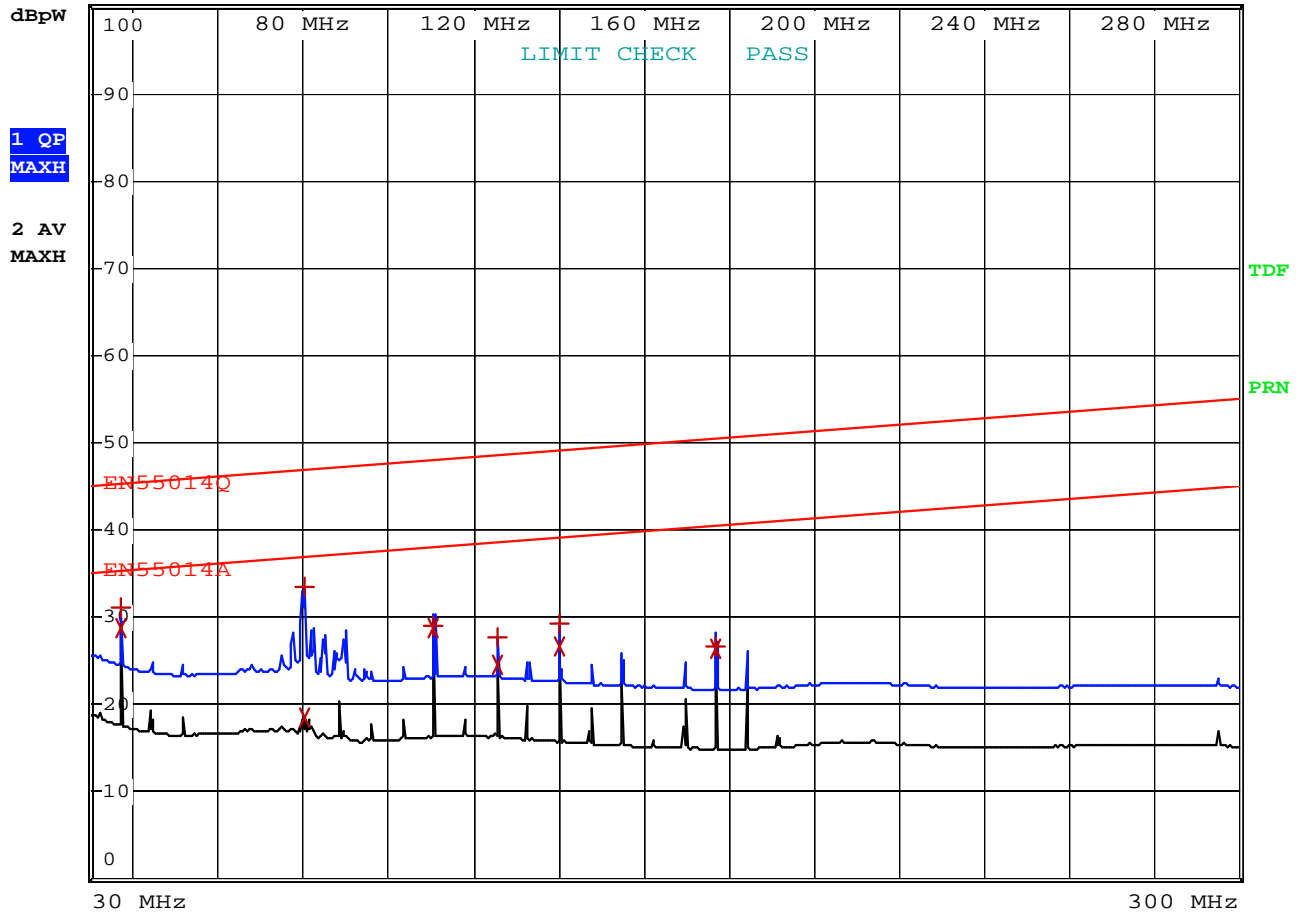


RBW 120 kHz

MT 100 ms

Att 10 dB

PREAMP OFF



Discontinuous Disturbance Measurement

EUT	Hot & Cold Water Purifier System / JULIET-1 (S/N: N/A)
Limit apply to	J55014-1(H20)
Test Date	May 11, 2009
Operating Condition	During the test, EUT was the continuous cooling & heating mode hold down that the discharge water periodically
Result	Passed

Phase : Hot(dB μ V)

Click	150 kHz	500 kHz	1.4 MHz	30 MHz
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0

Click	150 kHz	500 kHz	1.4 MHz	30 MHz
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0

$L_c = 20 \log(30/N) =$

$N = \text{Click} / \text{min}$

Click = 10 ms < C time < 200 ms

(Industry machine + 10 dB)

Measurement Relay Time; 5 min

$N < 0.2$

$0.2 < N < 30$

$N > 30$

(5min) + 44 dB

+ L_c

(2sec) + 0 dB

Click Frequency	150 kHz	500 kHz	1.4 MHz	30 MHz
Contin.Limit L st	66	56	56	60
Click Rate	0	0	0	0
Click level L_c	44	44	44	44
$L = L_c + L_{st}$	110	100	100	104
Number of Click	0	0	0	0
Numer over limit	0	0	0	0
Passed	PASS	PASS	PASS	PASS

REMARKS:

Phase : Neutral(dB μ V)

Click	150 kHz	500 kHz	1.4 MHz	30 MHz
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0

Click	150 kHz	500 kHz	1.4 MHz	30 MHz
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0

$L_c = 20\log(30/N) =$

$N = \text{Click} / \text{min}$

Click = 10ms < C time < 200ms

(Industry machine + 10dB)

Measurement Relay Time; 5 min

$N < 0.2$

$0.2 < N < 30$

$N > 30$

(5min) + 44dB

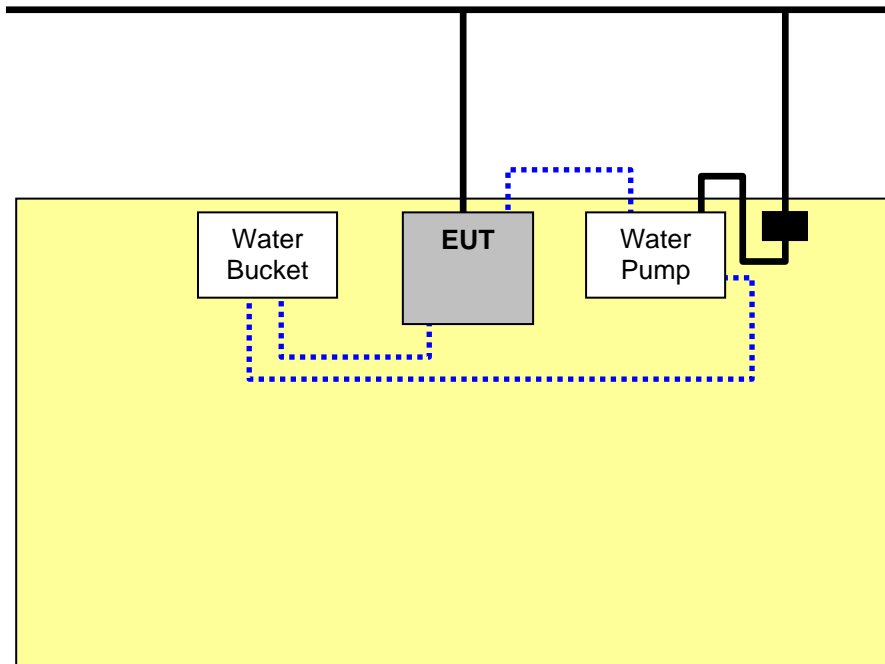
+ L_c

(2sec) + 0dB

Click Frequency	150 kHz	500 kHz	1.4 MHz	30 MHz
Contin.Limit L st	66	56	56	60
Click Rate	0	0	0	0
Click level L_c	44	44	44	44
$L = L_c + L_{st}$	110	100	100	104
Number of Click	0	0	0	0
Numer over limit	0	0	0	0
Passed	PASS	PASS	PASS	PASS

REMARKS:

The setup drawing(s)



- : Data Line
- : Hose
- : Power Line
- : Adapter

Attachment B

List of Test Equipment

Emission Test Equipments

	Description	Model Number	Manufacturer	Serial Number	Cal Due Date
■	EMI TEST Receiver	ESHS 30	R & S	840190/002	10.03.30
■	EMI TEST Receiver	ESPI3	R & S	100478	09.10.02
■	LISN	3825/2	EMCO	9208-1995	09.10.01
■	LISN	3816-2	EMCO	1002	09.10.01
■	Absorbing Clamp	MDS-21	R & S	100157	10.03.30

Attachment C

Constructional Photographs
of
Equipment Under Test (EUT)

View of front



View of rear



View of side



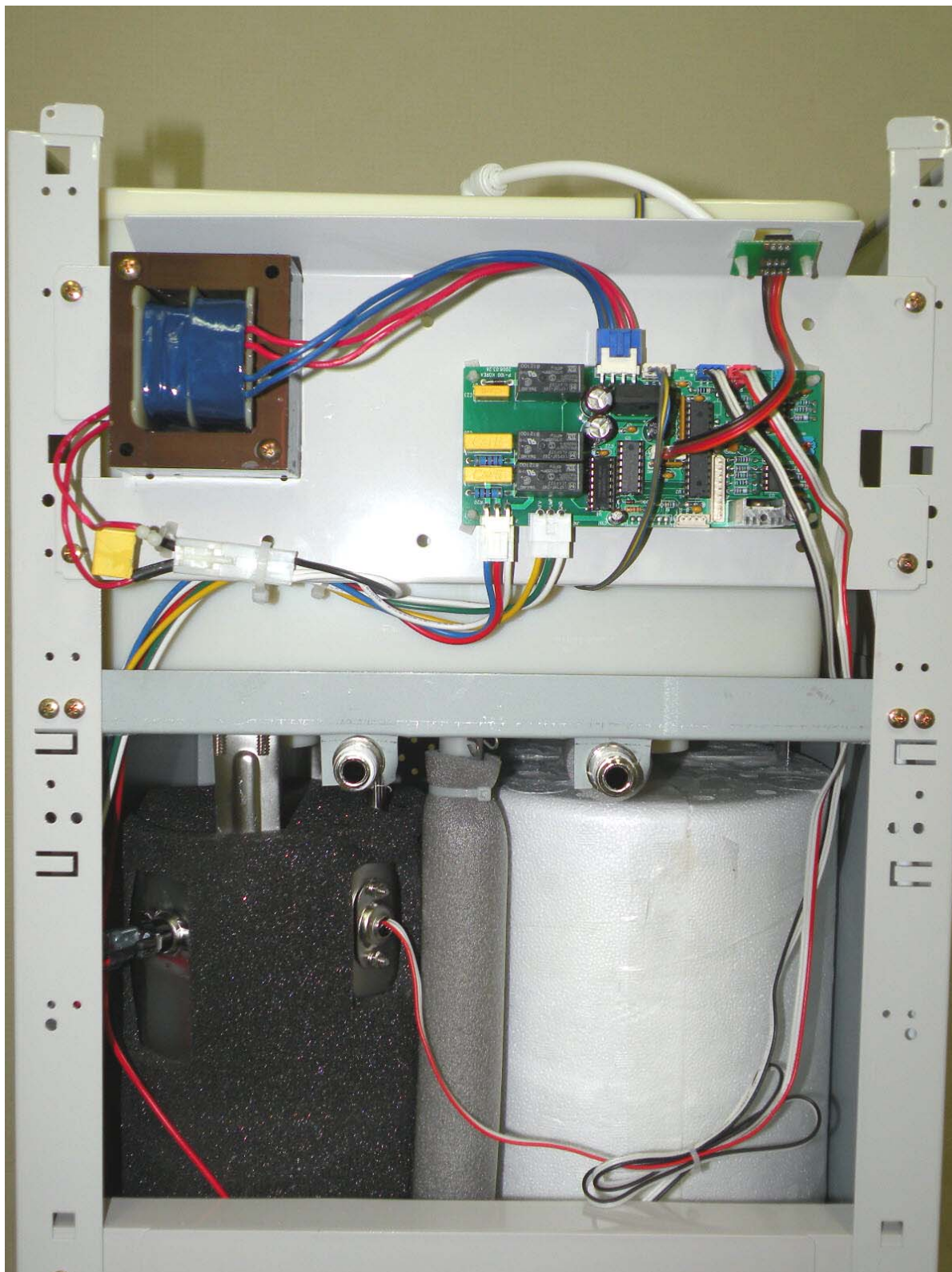
View of side



View of inside



View of inside



View of inside



View of inside



Attachment D

Constructional Data Form

and

Product Information Form(s)

CONSTRUCTION DATAFORM FOR EMC – TESTING

Applicant : HYUNDAI Wacor Tec Co., Ltd.
Address : 684-49, Gongreung-dong, Nowon-gu, Seoul, Korea
Factory : HYUNDAI Wacor Tec Co., Ltd.
Address : 684-49, Gongreung-dong, Nowon-gu, Seoul, Korea

Type	: Hot & Cold Water Purifier System	Rated voltage	: AC 100 V; 50 Hz/60 Hz
Serial No.	: NONE	Rated input power	: Max. 600 W
Protection type	:	Protection class	:

Configuration of equipment:

_____	Rev.	:
_____	Rev.	:
_____	Rev.	:

Source of interference : _____
Internal frequency : _____
Noise suppression components : _____
Measures for electromagnetic shielding : _____

_____	_____	_____
Place of issue	date	Seal and signature of applicant

If applicable, if necessary complete overleaf

End of test report