TEST REPORT

Report Number	:	ETLE090324.03	Report issue date:	May 26, 2009

Model / Serial No.	:	W2-360 / NONE
Multiple Model Name	:	W2-340, W2-360H, W2-310H
Product Type	:	Hot & Cold Water Purifier System
Brand Name	:	HYUNDAI, Purifiy
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:	Reviewed by:
Yoon Seop, Kim (Test Engineer)	Yo Han, Park (Chief Engineer)
	
May 26, 2009	May 26, 2009

ETL Inc.
371-51, Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea
Tel : 82-2-858-0786 Fax : 82-2-858-0788

DIRECTORY

Head Office : # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788

TEST STANDARD(S)

The emc tests were performed according to the following standards:

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

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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. 530 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.

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Conducted Emission (Interference Voltage) Test

Conducted emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz on the 100 V AC power and return leads of the EUT according to the methods defined in J55014-1(H20).
The EUT was floor-standing arrangement. The EUT was placed on the horizontal ground reference plane, orientated for normal use, but separated from metallic contact with the ground reference plane of insulation.

☐ **Test not applicable**

■ Test area - shielded room
☐ Anechoic chamber
☐ Full compact chamber

Used test instruments and test accessories please see Attachment B.

Type	Frequency Range (MHz)	Quasi-Peak limit (dBμV)	Average limit (dBμV)
Mains terminals	0.15 to 0.5	66 to 56	59 to 46
	0.5 to 5	56	46
	5 to 30	60	50

■ **Pass** ☐ **Fail**

Minimum limit margin	13.74	dB	at	6.790	MHz
Maximum limit exceeding		dB	at		MHz

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

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Disturbance Power Emissions Test

Disturbance power emissions form 30 MHz to 300 MHz were measured with a bandwidth of 120 kHz according to the methods defines in J55014-1(H20).

The EUT was floor-standing arrangement. The EUT was placed on the horizontal ground reference plane, orientated for normal use, but separated from metallic contact with the ground reference plane of insulation.

☐ **Test not applicable**

■ Test area - compact chamber

Used test instruments and test accessories please see Attachment B.

Type	Frequency Range (MHz)	Quasi-Peak limit (dBpW)	Average limit (dBpW)
Household	30 - 300	45 - 55	35 - 45

■ **Pass** ☐ **Fail**

Minimum limit margin	4.49	dB	at	33.36	MHz
Maximum limit exceeding		dB	at		MHz

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

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Discontinuous Disturbance Emissions Test

Discontinuous disturbance emissions form 148.5 kHz to 30 MHz were measured with a bandwidth of 9 kHz according to the methods defines 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.

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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

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GENERAL REMARKS:

The Equipment Under Test (EUT) is the HYUNDAI Wacor Tec Co., Ltd. (model: W2-360)

The model W2-360 is basic model that was tested.

The multi models W2-340, W2-360H and W2-310H are identical to basic model, except for external design and dimension.

Model	Dimension
W2-360 (Basic model)	360 mm (W) x 420 mm (D) x 1 240 mm (H)
W2-340	340 mm (W) x 420 mm (D) x 1 240 mm (H)
W2-360H	360 mm (W) x 420 mm (D) x 520 mm (H)
W2-310H	300 mm (W) x 310 mm (D) x 970 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

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

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Photograph of test setup: Disturbance Power

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Photograph of test setup: Discontinuous Disturbance

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Attachment A

Test Data

and

Test Setup Drawing(s)

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Conducted Emissions Measurement

EUT	Hot & Cold Water Purifier System / W2-360 (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 13.74 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
0.150	33.17	-	N	66.00	59.00	32.83	-
0.390	28.24	-	N	58.06	48.68	29.82	-
4.520	29.75	-	N	56.00	46.00	26.25	-
6.115	33.84	-	N	60.00	50.00	26.16	-
6.790	46.26	-	N	60.00	50.00	13.74	-
22.120	40.91	-	N	60.00	50.00	19.09	-
27.650	29.56	-	N	60.00	50.00	30.44	-

NOTES:

1. *** H : HOT Line , **N : Neutral Line**
2. **Margin value = Limit – Result**
3. **All conditions were investigated and the worst-case emissions are reported.**
4. **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.**

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Test Engineer

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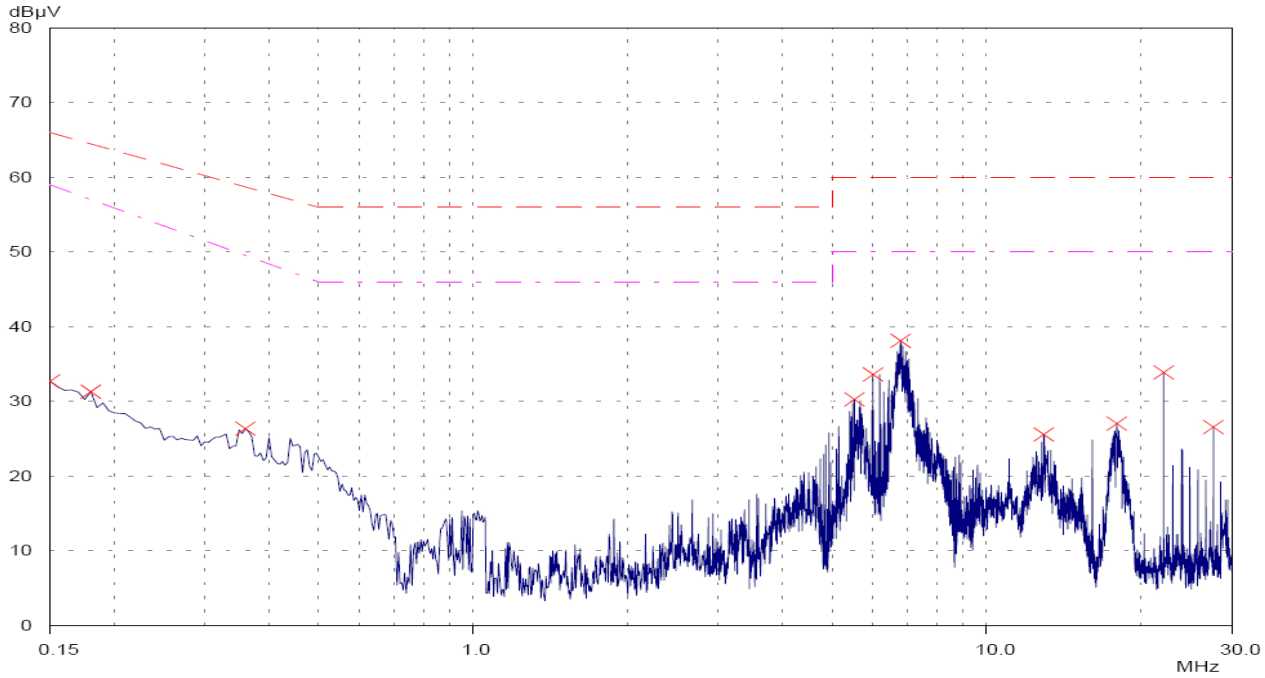
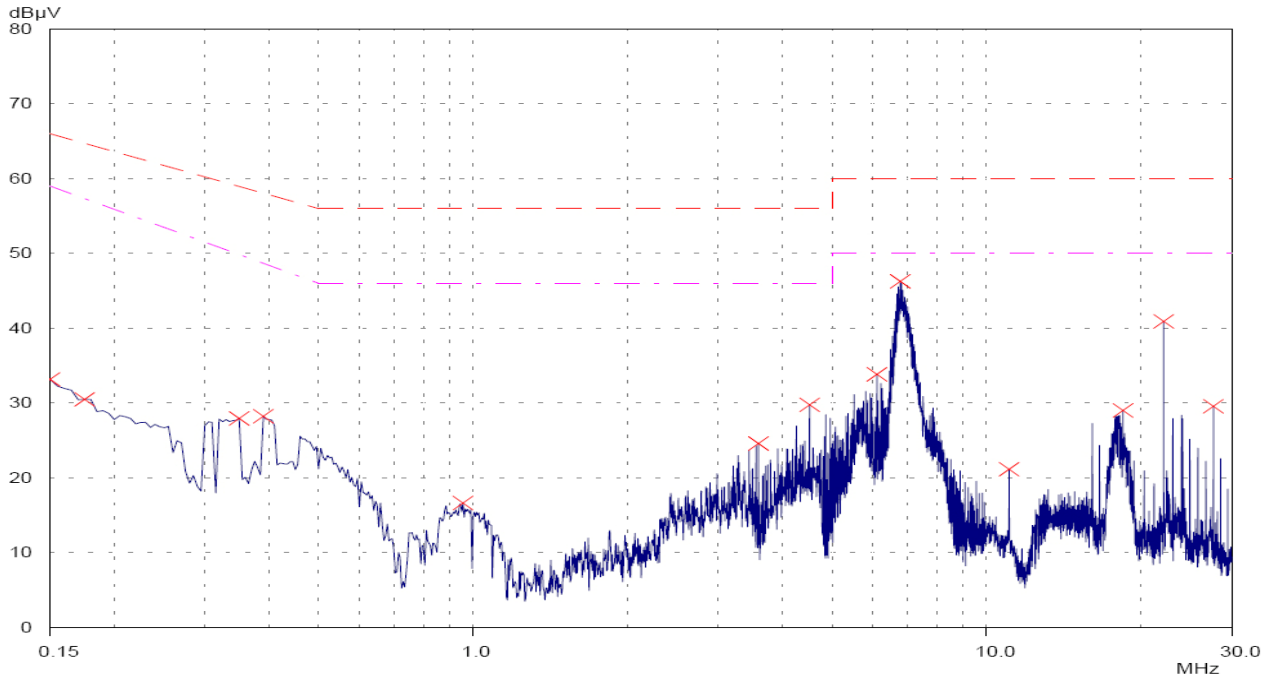
Line Polarity : Hot

Limit : Quasi-Peak
Average



Line Polarity : Neutral



Peak

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EUT	Hot & Cold Water Purifier System / W2-360 (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 15.42 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	36.55	-	N	65.73	58.65	29.18	-
0.360	29.70	-	N	58.73	49.55	29.03	-
6.015	33.90	-	N	60.00	50.00	26.10	-
6.775	44.58	-	N	60.00	50.00	15.42	-
22.120	41.73	-	N	60.00	50.00	18.27	-
27.650	30.92	-	N	60.00	50.00	29.08	-

NOTES:

1. *** H : HOT Line , **N : Neutral Line**
2. **Margin value = Limit – Result**
3. **All conditions were investigated and the worst-case emissions are reported.**
4. **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.**

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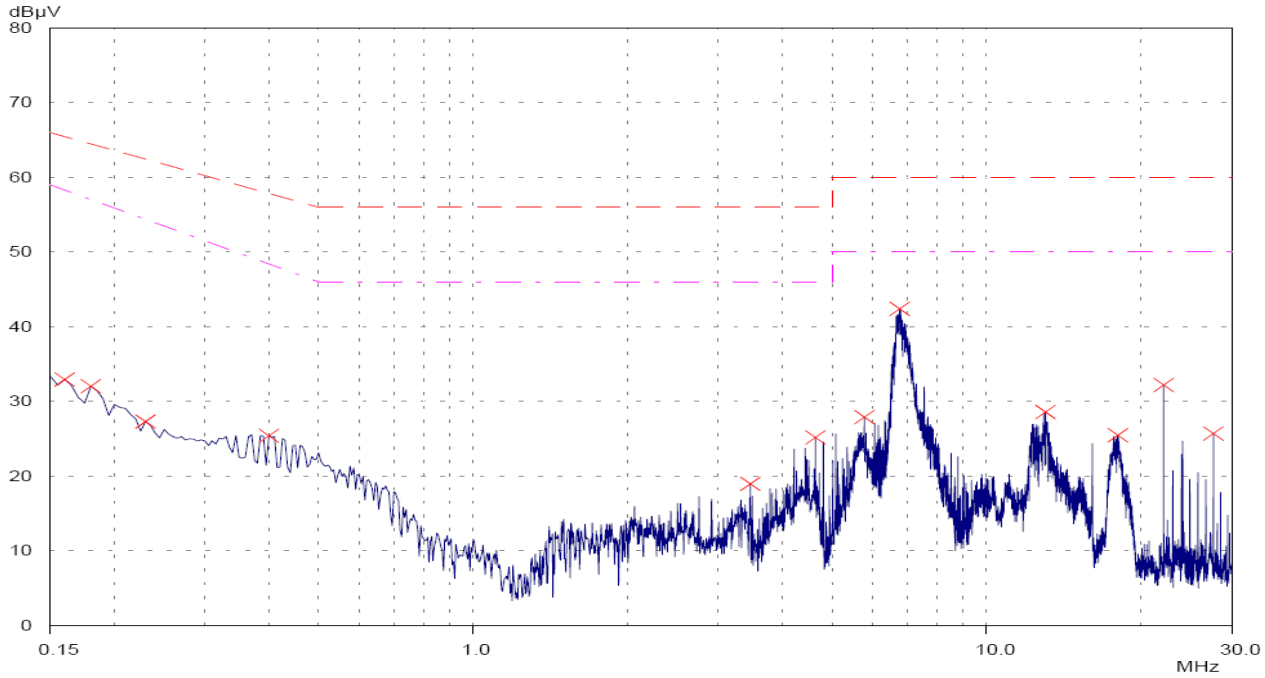
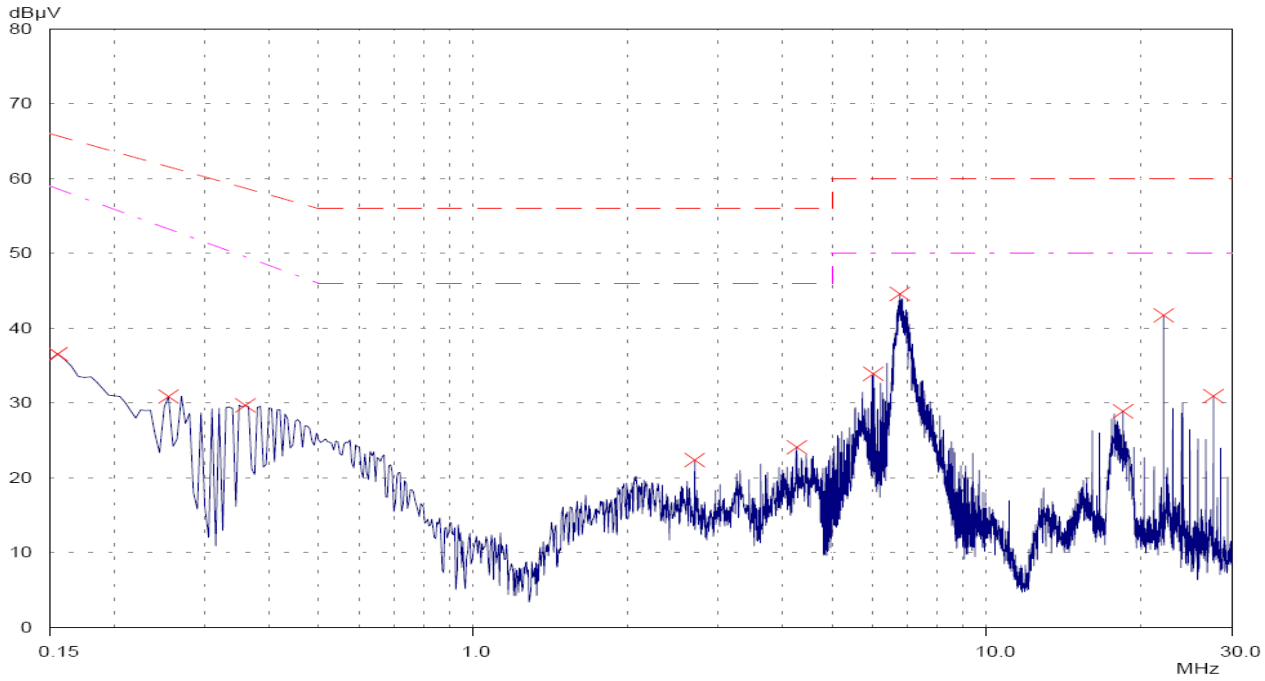
Line Polarity : Hot

Limit : Quasi-Peak
Average



Line Polarity : Neutral



Peak

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Disturbance Power Measurement

EUT	Hot & Cold Water Purifier System / W2-360 (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 4.49 dB

Disturbance Power Test Data

Frequency [MHz]	Result [dBpW]		Limit [dBpW]		Margin [dB]	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
33.36	31.36	30.63	45.12	35.12	13.76	4.49
111.80	30.04	17.08	48.03	38.03	17.99	20.95
140.40	29.99	17.92	49.09	39.09	19.10	21.17
167.92	29.28	26.67	50.11	40.11	20.83	13.44
180.70	29.24	28.52	50.58	40.58	21.34	12.06
208.28	30.85	29.82	51.60	41.60	20.75	11.78

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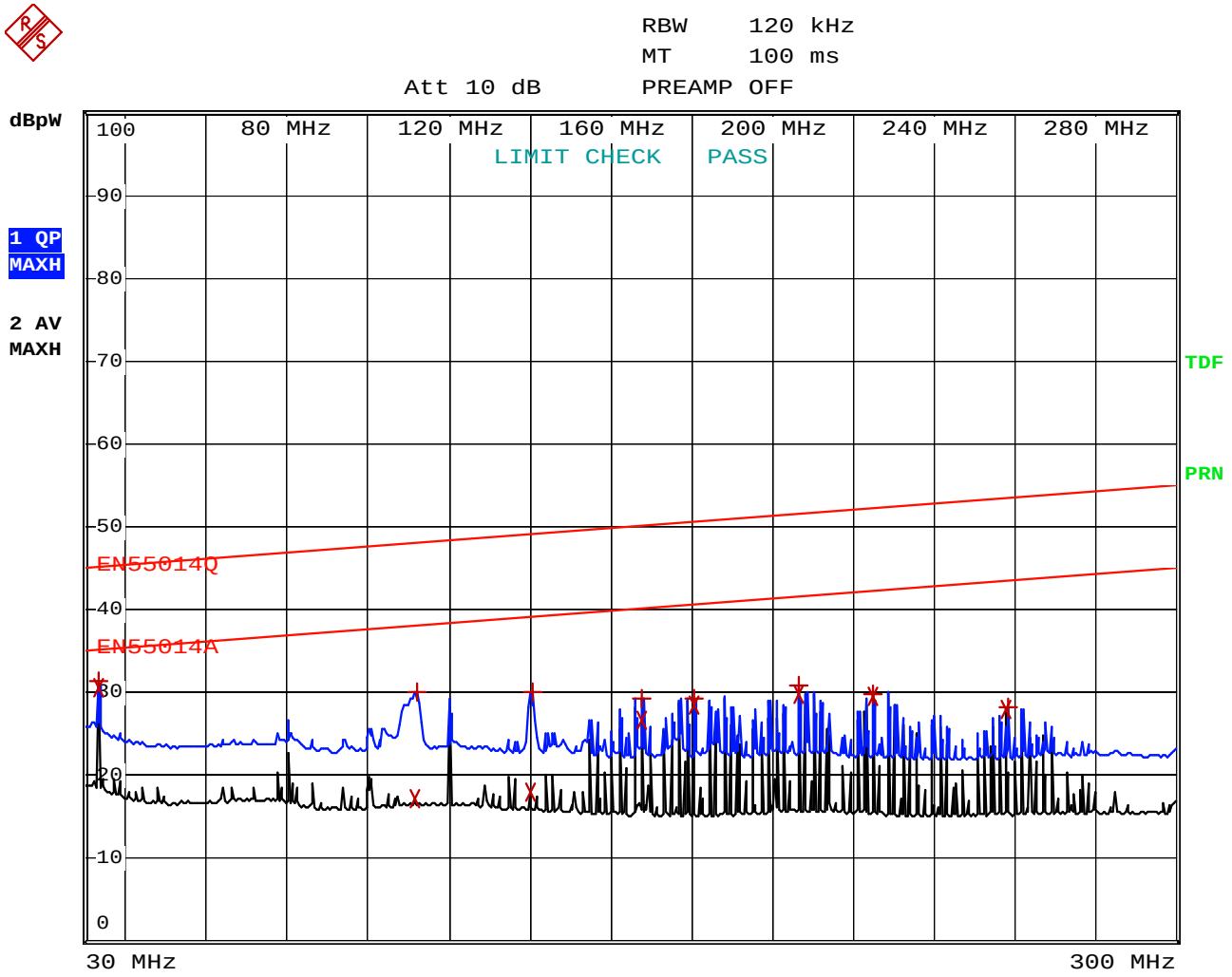

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EUT	Hot & Cold Water Purifier System / W2-360 (S/N: N/A)
Limit apply to	J55014-1(H20)
Test Date	May 12, 2009
Operating Condition	During the test, EUT was the continuous cooling & heating mode hold down that the discharge water periodically
Operating Spec.	100 V, 60 Hz
Result	Passed by 4.62 dB

Disturbance Power Test Data

Frequency [MHz]	Result [dBpW]		Limit [dBpW]		Margin [dB]	
	Quasi-peak	Average	Quasi-peak	Average	Quasi-peak	Average
33.28	32.21	30.50	45.12	35.12	12.91	4.62
120.08	30.32	27.81	48.34	38.34	18.02	10.53
140.52	30.95	18.03	49.09	39.09	18.14	21.06
167.84	30.24	26.71	50.11	40.11	19.87	13.40
188.08	31.11	29.85	50.85	40.85	19.74	11.00
210.20	31.85	30.74	51.67	41.67	19.82	10.93

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Test Engineer

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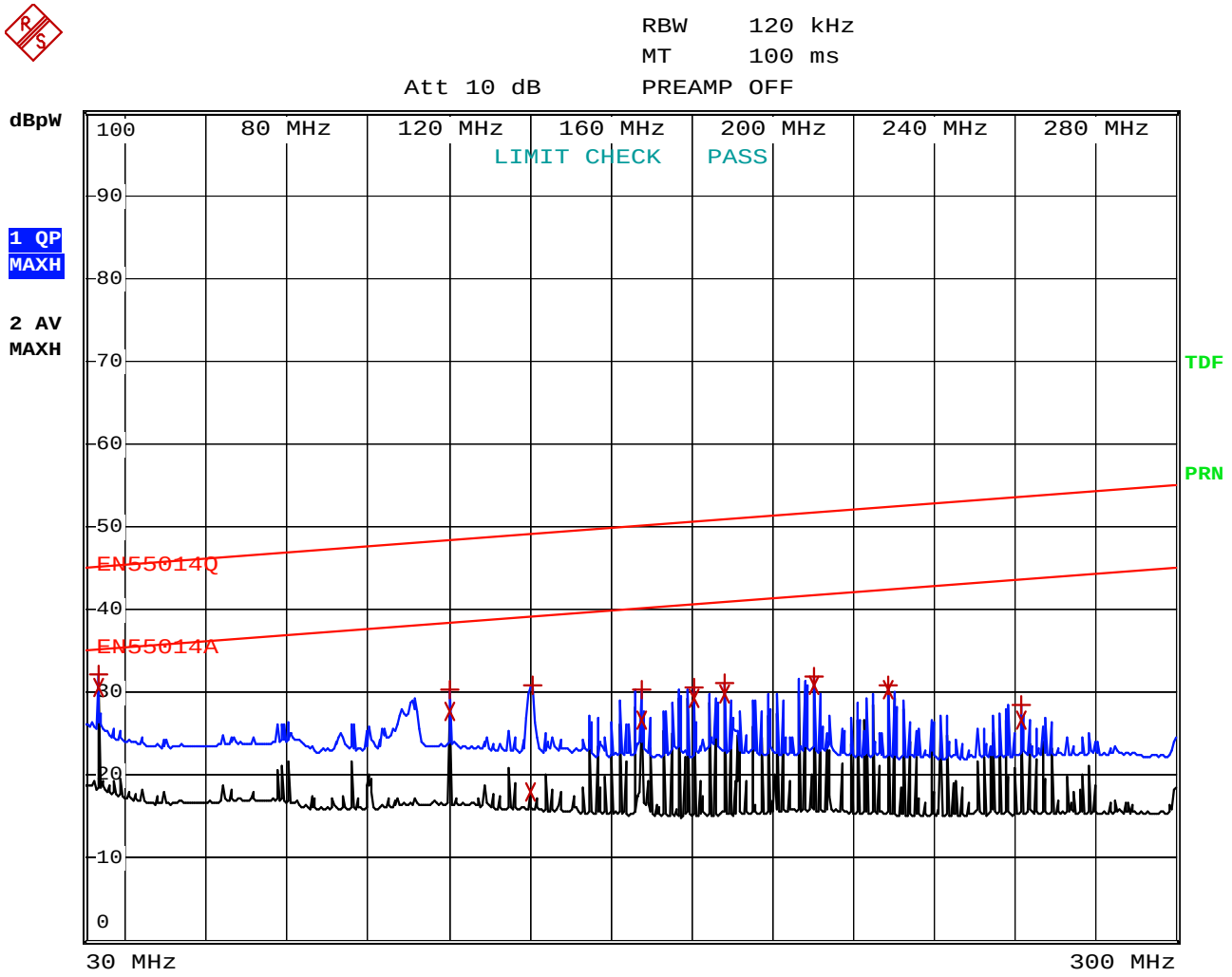

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Discontinuous Disturbance Measurement

EUT	Hot & Cold Water Purifier System / W2-360 (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㎶)

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

Lc = 20 log (30/N) =
N = Click / min
Click = 10 ms < C time < 200 ms
(Industry machine + 10 dB)
Measurement Relay Time; 5 min

N < 0.2 (5min) + 44 dB
0.2 < N < 30 + Lc
N > 30 (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 Lc	44	44	44	44
L = Lc + Lst	110	100	100	104
Number of Click	0	0	0	0
Number over limit	0	0	0	0
Passed	PASS	PASS	PASS	PASS

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Phase : Neutral(dB㎶)

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

Lc = 20log (30/N) =
N = Click / min
Click = 10ms < C time < 200ms
(Industry machine + 10㏈)
Measurement Relay Time; 5 min

N < 0.2 (5min) + 44㏈
0.2 < N < 30 + Lc
N > 30 (2sec) + 0㏈

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 Lc	44	44	44	44
L = Lc + Lst	110	100	100	104
Number of Click	0	0	0	0
Numer over limit	0	0	0	0
Passed	PASS	PASS	PASS	PASS

REMARKS:

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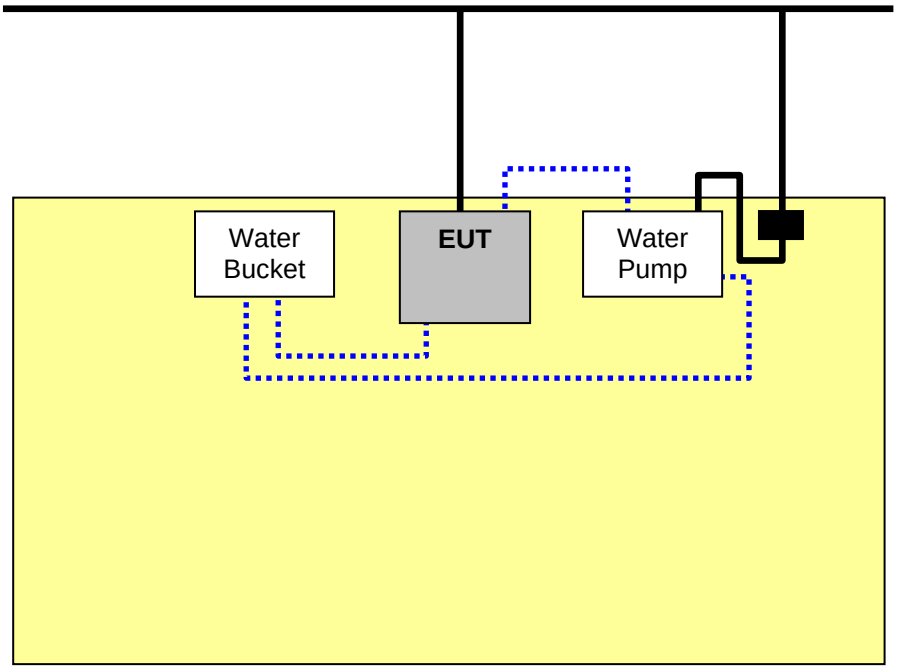
The setup drawing(s)



: Data Line

: Hose

: Power Line

: Adapter

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Attachment B

List of Test Equipment

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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

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Attachment C

Constructional Photographs

of

Equipment Under Test (EUT)

Head Office : # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788

View of front

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View of rear

Head Office : # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788

View of side

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View of side

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View of inside

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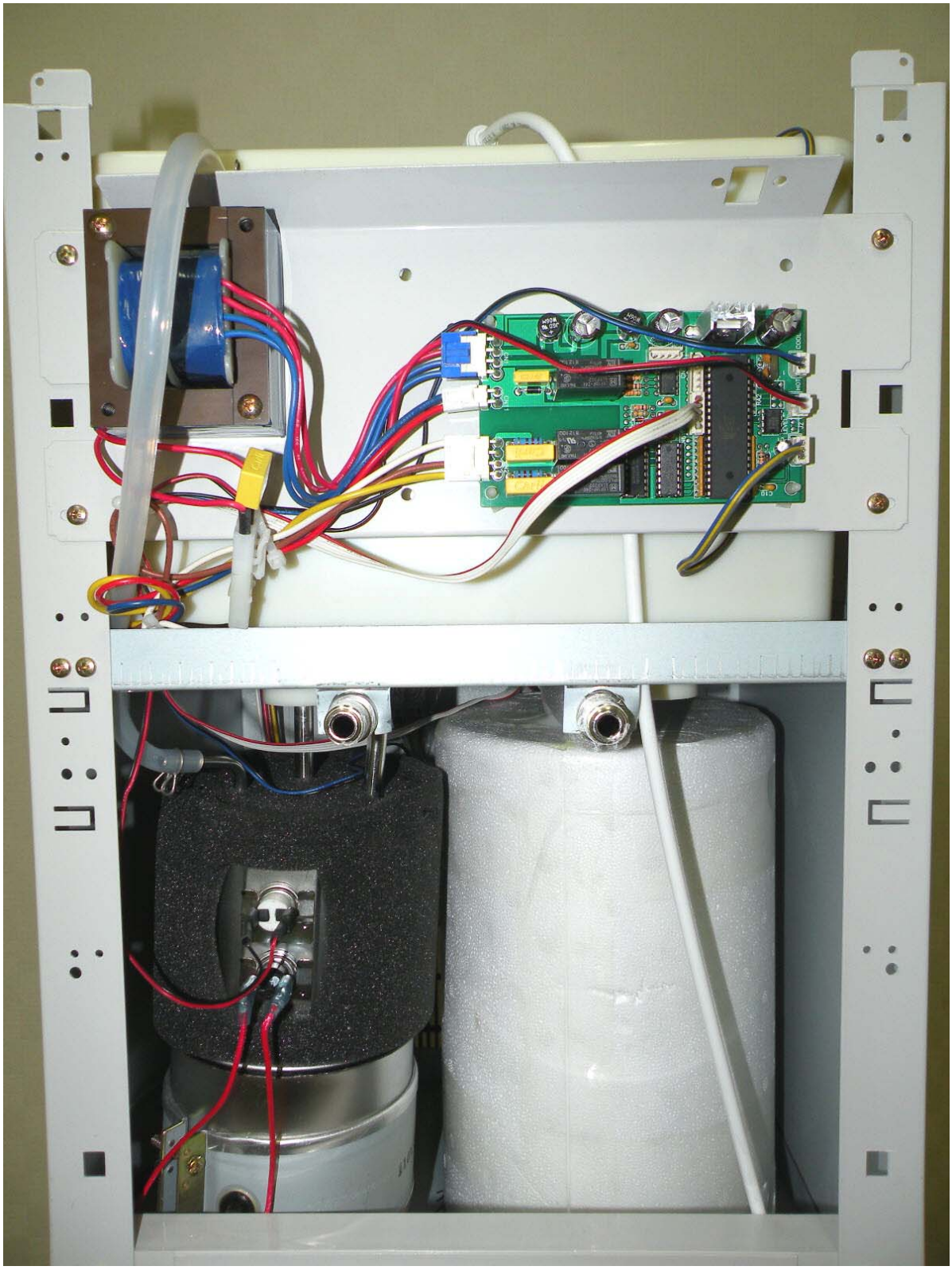
View of inside



Head Office : # 371-51 Gasan-dong, Geumcheon-gu, Seoul, 153-803, Korea Tel : 82-2-858-0786 Fax : 82-2-858-0788

View of inside

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View of inside

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Attachment D

Constructional Data Form

and

Product Information Form(s)

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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. 530 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

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