Global No.1 Testing Laboratory Universal Certification Solution

FCC TEST REPORT

Product name:	**Water Purifier & Ionizer**
Model(s):	**Ioncare 9000, Ioncare 7000, Ioncare 5000**
Standards:	**FCC CFR 47 PART 15 SUBPART B Section 15.101**
Applicant:	**Ioncares Co., Ltd.**
Test Report No.:	**UCSFC-1612-040**

UCS Co., Ltd.

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CBTL IEC IECEE

Test Report for FCC Class B Verification

Report Number		UCSFC-1612-040		
Applicant	Company Name	Ioncares Co., Ltd.		
	Address	#17876 23-15, Wolgokgil, Pyeongtack-si, Gyeonggi-do, REPUBLIC OF KOREA		
Product	Product Name	Water Purifier & Ionizer		
	Model Name	Ioncare 9000		
	Family Model Name	Ioncare 7000, Ioncare 5000		
	Manufacturer	Ioncares Co., Ltd.		
	Serial No.	-		
Other	Receipt Date	2016.09.27	Receipt Number	UCS-R-2016-0679
	Issued Date	2016.12.12	Tested Date	2016.12.07 ~ 2016.12.07
Standards		FCC CFR 47 PART 15 SUBPART B, Section 15.101		
Tested by		J. H. Lee (Sign)		
Approved by		Y. M. Choi (Sign)		

UCS Co., Ltd.

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Contents

Revision History

Issued Report No.	Issued Date	Revisions	Effect Section
UCSFC-1612-040	12-Dec-2016	Initial Issue	All

1. Applicant Information

Applicant Name : Ioncares Co., Ltd.
Address : #17876 23-15, Wolgokgil, Pyeongtaek-si, Gyeonggi-do, REPUBLIC OF KOREA

Manufacturer : Ioncares Co., Ltd.
Address : #17876 23-15, Wolgokgil, Pyeongtaek-si, Gyeonggi-do, REPUBLIC OF KOREA

2. EUT (Equipment under test) Information

Product Name : Water Purifier & Ionizer
Basic Model Name : Ioncare 9000
Family Model Name : Ioncare 7000, Ioncare 5000

* The family models (Ioncare 7000 and Ioncare 5000) is identical to basic model except for number of electrolytic cell.

Model name	Number of electrolytic cell	Tested
Ioncare 9000	9	■
Ioncare 7000	7	□
Ioncare 5000	5	□

* Applicant consigns only Ioncare 9000 model to test. Therefore this test report just guarantees the units, which have been tested.
* The Applicant/manufacturer is responsible for the compliance of all variants.

Main clock frequency : 18.432 MHz
Dimension of main unit : 340 mm x 340 mm x 147 mm
Weight : 6.0 kg (per unit)
Primary filter : 3,500 ℓ
Secondary filter : 3,500 ℓ
Water pressure : 1.5 kgf/cm^3 ~ 5.0 kgf/cm^3
Temperature : 5 °C ~ 40 °C
Water amount handling : 2.5 ℓ min (± 0.5 min)
Power consumption : 150 VA
Ratings : 120 V~, 60 Hz

* Product specification information described herein was obtained from product data sheet or user's manual.

3. Laboratory Information

Laboratory Name : UCS Co., Ltd.
Location : 35-13, Hwalcho-gil, 109beon-gil, Hwaseong-si, Gyeonggi-do, 18278 Korea

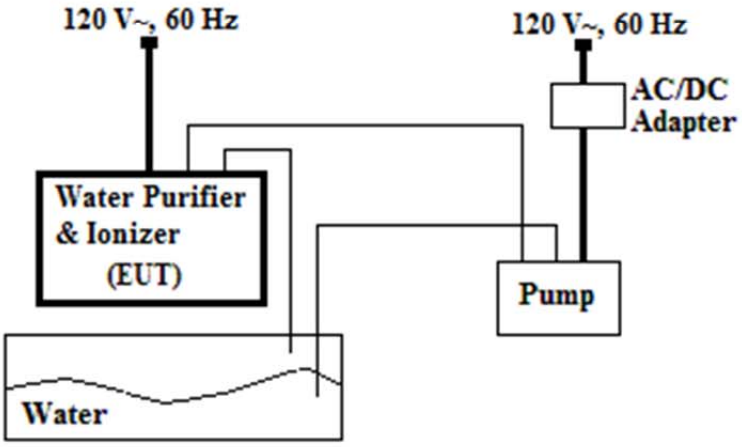
4. Test Configuration and Condition

4.1 EUT operating condition

- The EUT was operated with Alkali water mode and Acidic water mode and Pure water mode continuously during the test.

- Input power condition during the measurements was 120 V~, 60 Hz.

4.2 EUT test configuration diagram



4.3 Peripheral equipments list for test

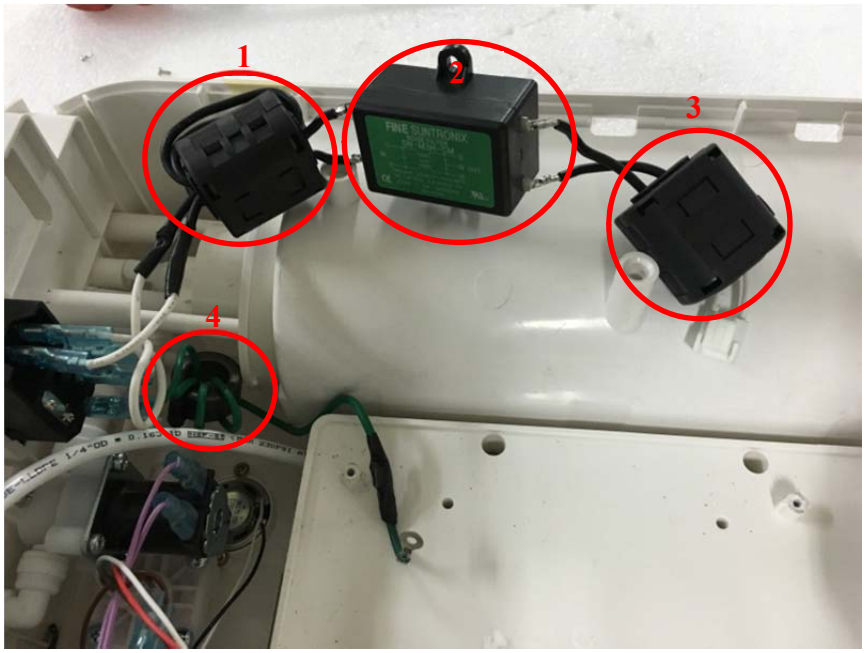
Equipment Name	Model	Serial Number	Manufacturer
Water Purifier & Ionizer (EUT)	Ioncare 9000	-	Ioncares Co., Ltd.
Pump	R-2205	R.13 02-8090	KOTEC
AC/DC Adapter	JMW1150	-	AULT KOREA CORP.

4.4 Cable connections

Start		End		Cable	
Name	I/O Port	Name	I/O Port	Length (m)	Spec.
Water Purifier & Ionizer (EUT)	Water in	Pump	Water out	2.0	-
	AC in	AC power outlet	-	1.8	Unshielded
Pump	DC in	AC/DC Adapter	DC out	1.1	Unshielded
	Water in	Water	-	2.0	-

4.5 EUT modifications

1. The ferrite core was added to the the inner AC power input line. (Model name: HT3329T, Manufacturer: TODAISU)
2. The noise filter was added to the the inner AC power input line.
   (Model name: SN-M3H-CM, Manufacturer: FINE SUNTRONIX)
3. The ferrite core was added on the inner grounding cable. (Model name: TR2512J100, Manufacturer: TAEJIN INT)
4. The ferrite core was added on the output cable of noise filter. (Model name: HT3329T, Manufacturer: TODAISU)



5. Summary of Test Results and Measurement Procedures

5.1 Summary of test results

Standard	Test Item	Results
FCC Part 15 Subpart B	Conducted Emission	Met Class B / Pass
FCC Part 15 Subpart B	Radiated Emission	Met Class B / Pass

5.2 Preliminary testing

It is often valuable to performing preliminary radiated measurements at a closer distance than specified for compliance to determine the emission characteristics of the EUT. At close-in distance, it is easier to determine the spectrum signature of EUT, and if applicable, the EUT configuration that emanate the maximum level of emissions. The data may not be precisely correlatable results.

5.3 Shielded enclosure

To search the Radiated frequency outline of an EUT a shielded screen room may be used. If the shielded room is used for radiated data, the data page will state that the EUT was in a shielded enclosure. All data collected ina screen room for emission data, radiated emissions is for frequency outline only. If an EUT is placed in screen room for AC Powerline Conducted the data page will show that a screen room was used and data frequencies and levels will be correct and used for test data.

5.4 Data reporting format

The measurement results expressed in accordance with C63.4 and specified limits where applicable arepresented in tabular or graphical form, or alternatively as recorder charts or photographs of a spectrum analyzer display, showing the level vs. frequency.

5.5 AC powerlineconductedemissiontest

The EUT was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4:2014 7.3.3 to determine the worse operating conditions.

5.6 Radiated emission test

Preliminary radiated emission test was conducted using the procedure in ANSI C63.4:2014 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at open area test site.

6. Test Results

6.1 Conductedemission

Test Standard	FCC CFR 47 PART 15 SUBPART B, SECTION 15.107 (a)		
Tested Date	2016.12.07		
Input Ratings	120 V~, 60 Hz		
Temperature	(16.1 ± 0.4) °C	**Humidity**	(28.35 ± 0.35) % R.H.
Test result	Met Class B / Pass		

6.1.1 Limit

Frequency	**Class B [dBµV]**		**Class A [dBµV]**	
[MHz]	**Quasi-Peak**	**Quasi-Peak**	**Quasi-Peak**	**Average**
0.15 ~ 0.5	66 ~ 56*	56 ~ 46*	79	66
0.5 ~ 5	56	46	73	60
5 ~ 30	60	50	73	60

*Decreases with the logarithm of the frequency.

6.1.2 Test set-up and procedure

The mains terminal disturbance voltage was measured with the equipment under test (EUT) in a shield room.
The EUT was connected to an artificial mains network (LISN) placed on the floor.
The EUT was placed on non-metallic table 0.8 m above the metallic, grounded floor.
Amplitude measurements were performed with a quasi-peak detector and an average detector.

6.1.3 Measurement uncertainty

Conducted emission, quasi-peak detection: 1.8 dB
Conducted emission, average detection: 1.8 dB
The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k = 2$.

6.1.4 Test equipment used

Equipment	**Model**	**Serial No.**	**Vendor**	**Next Cal. Date**	**Use**
Test Receiver	ESPI3	101171	ROHDE & SCHWARZ	2017.08.03	□
Test Receiver	ESR7	101120	ROHDE & SCHWARZ	2017.08.03	■
LISN	NSLK 8127	8127518	SCHWARZBECK	2017.08.03	■
Two-Line V-Network	ENV216	3560.6550.12-101874-Rq	ROHDE & SCHWARZ	2017.08.03	■
LISN	L3-32	1220X20311	PMM	2017.08.03	□
ISN	ISN T800	30813	TESEQ	2017.02.05	□
ISN	ISN T8-Cat6	29709	TESEQ	2017.02.05	□

6.1.5 Test data

- Frequency range : 150 kHz ~ 30 MHz
- Bandwidth : 9 kHz

[Acidic water mode]

[Quasi-Peak]

Frequency [MHz]	LISN [dB]	Cable Loss [dB]	Line [H/N]	Reading [dBµV]	Results [dBµV]	Limit [dBµV]	Margin [dB]
0.33	9.71	0.25	H	28.72	38.68	59.45	-20.77
0.46	9.81	0.08	H	28.30	38.19	56.69	-18.50
0.65	9.79	0.04	N	31.15	40.98	56.00	-15.02
0.91	9.71	0.05	H	29.47	39.23	56.00	-16.77
1.44	9.64	0.06	H	28.04	37.74	56.00	-18.26
1.89	9.61	0.07	N	27.38	37.06	56.00	-18.94
5.29	9.62	0.14	H	15.09	24.85	60.00	-35.15
6.62	9.63	0.17	N	14.86	24.66	60.00	-35.34
19.97	9.69	0.30	H	23.53	33.52	60.00	-26.48
23.62	9.73	0.34	N	23.51	33.58	60.00	-26.42
29.07	9.72	0.42	H	22.82	32.96	60.00	-27.04

[Average]

Frequency [MHz]	LISN [dB]	Cable Loss [dB]	Line [H/N]	Reading [dBµV]	Results [dBµV]	Limit [dBµV]	Margin [dB]
* Average mode was not recorded, because Quasi-Peak values were under the Average limit.							

* Remark: “H” Hot Line, “N” Neutral Line

* **Results [dBµV]** = Reading [dBµV] + LISN [dB] + Cable Loss [dB]
* **Margin [dB]** = Results [dBµV] – Limit [dBµV]

[Alkali water mode]

[Quasi-Peak]

Frequency [MHz]	LISN [dB]	Cable Loss [dB]	Line [H/N]	Reading [dBμV]	Results [dBμV]	Limit [dBμV]	Margin [dB]
0.33	9.71	0.25	H	28.28	38.24	59.45	-21.21
0.39	9.79	0.17	H	29.54	39.50	58.06	-18.56
0.52	9.82	0.03	N	28.88	38.73	56.00	-17.27
1.43	9.64	0.06	N	27.81	37.51	56.00	-18.49
1.63	9.62	0.07	H	27.74	37.43	56.00	-18.57
19.90	9.69	0.30	H	23.13	33.12	60.00	-26.88
22.31	9.73	0.32	N	21.54	31.59	60.00	-28.41
23.61	9.73	0.34	N	25.61	35.68	60.00	-24.32

[Average]

Frequency [MHz]	LISN [dB]	Cable Loss [dB]	Line [H/N]	Reading [dBμV]	Results [dBμV]	Limit [dBμV]	Margin [dB]
* Average mode was not recorded, because Quasi-Peak values were under the Average limit.							

* Remark: “H” Hot Line, “N” Neutral Line

* **Results [dBμV]** = Reading [dBμV] + LISN [dB] + Cable Loss [dB]
* **Margin [dB]** = Results [dBμV] – Limit [dBμV]

[Pure water mode]

[Quasi-Peak]

Frequency [MHz]	LISN [dB]	Cable Loss [dB]	Line [H/N]	Reading [dBμV]	Results [dBμV]	Limit [dBμV]	Margin [dB]
0.33	9.71	0.25	H	28.26	38.22	59.45	-21.23
0.39	9.79	0.17	N	28.61	38.57	58.06	-19.49
0.46	9.81	0.08	H	27.83	37.72	56.69	-18.97
0.52	9.82	0.03	N	28.36	38.21	56.00	-17.79
0.91	9.71	0.05	N	28.08	37.84	56.00	-18.16
0.98	9.69	0.06	H	27.74	37.49	56.00	-18.51
1.50	9.63	0.07	N	27.60	37.30	56.00	-18.70
1.57	9.63	0.07	H	27.56	37.26	56.00	-18.74
4.31	9.61	0.12	H	21.36	31.09	56.00	-24.91
19.95	9.73	0.30	N	23.53	33.56	60.00	-26.44
23.31	9.70	0.33	H	21.85	31.88	60.00	-28.12
26.95	9.71	0.39	H	17.81	27.91	60.00	-32.09

[Average]

Frequency [MHz]	LISN [dB]	Cable Loss [dB]	Line [H/N]	Reading [dBμV]	Results [dBμV]	Limit [dBμV]	Margin [dB]
* Average mode was not recorded, because Quasi-Peak values were under the Average limit.							

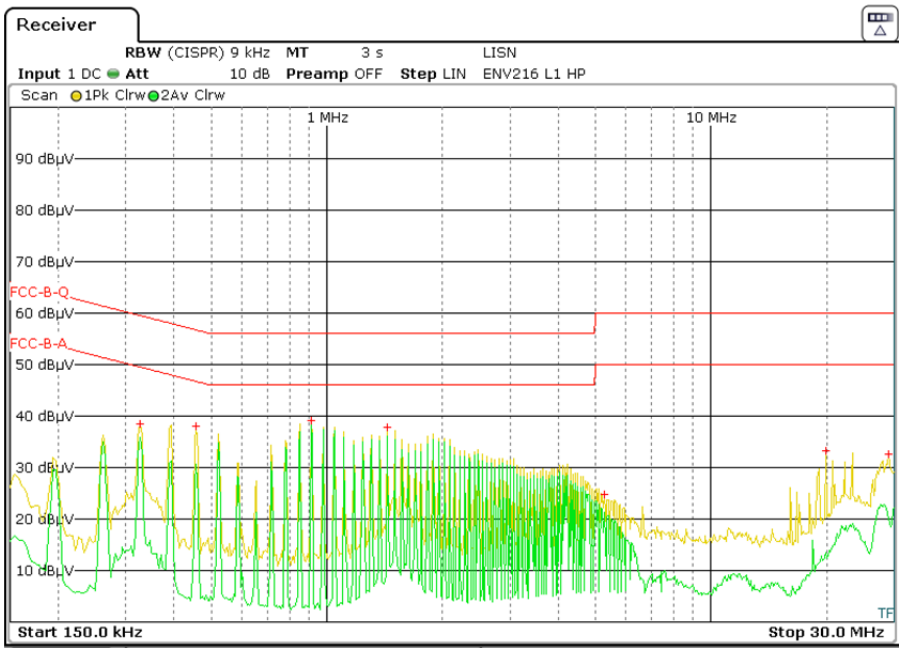
* Remark: “H” Hot Line, “N” Neutral Line

* **Results [dBμV]** = Reading [dBμV] + LISN [dB] + Cable Loss [dB]
* **Margin [dB]** = Results [dBμV] – Limit [dBμV]

6.1.6 Test graph

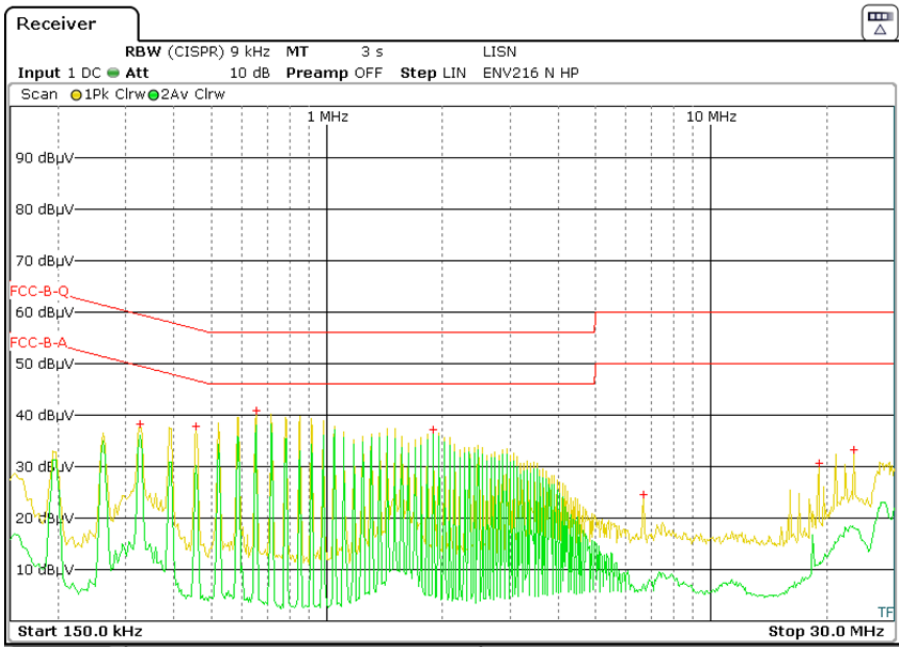
[Acidic water mode]

[Hot Line]



* ——— : Quasi-Peak, ——— : Average

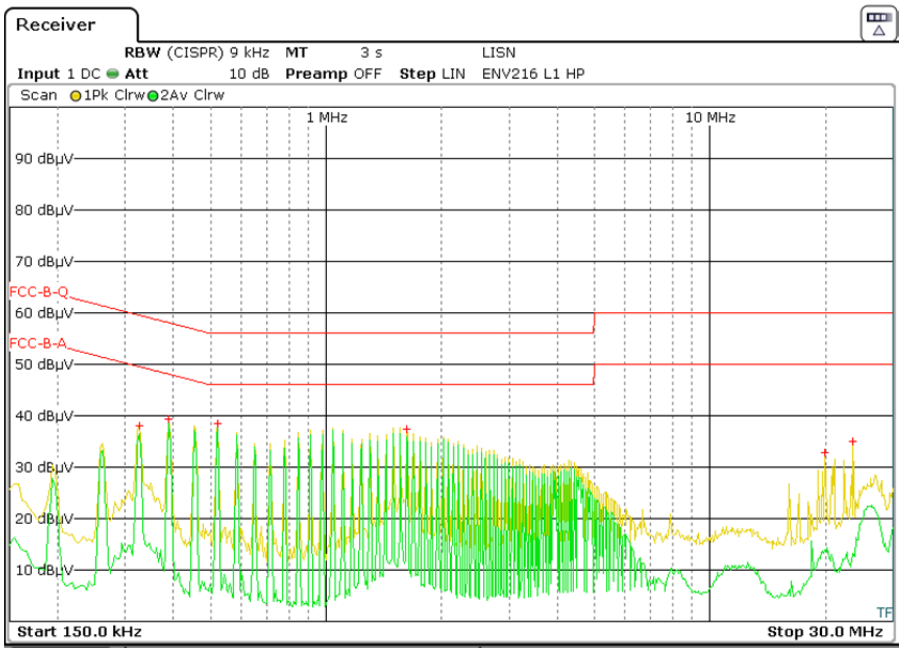
[Neutral Line]



* ——— : Quasi-Peak, ——— : Average

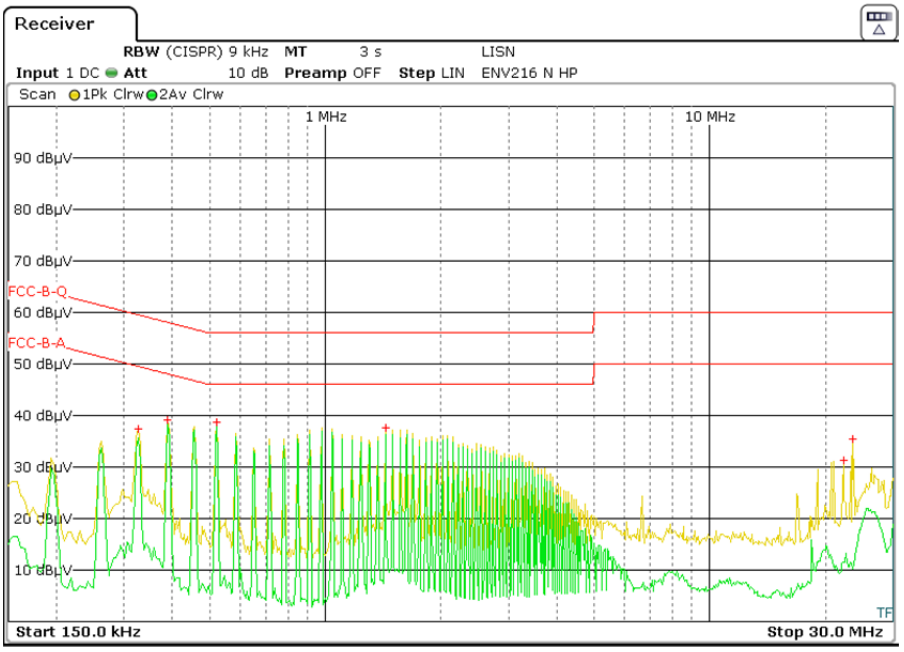
[Alkali water mode]

[Hot Line]



* ——— : Quasi-Peak, ——— : Average

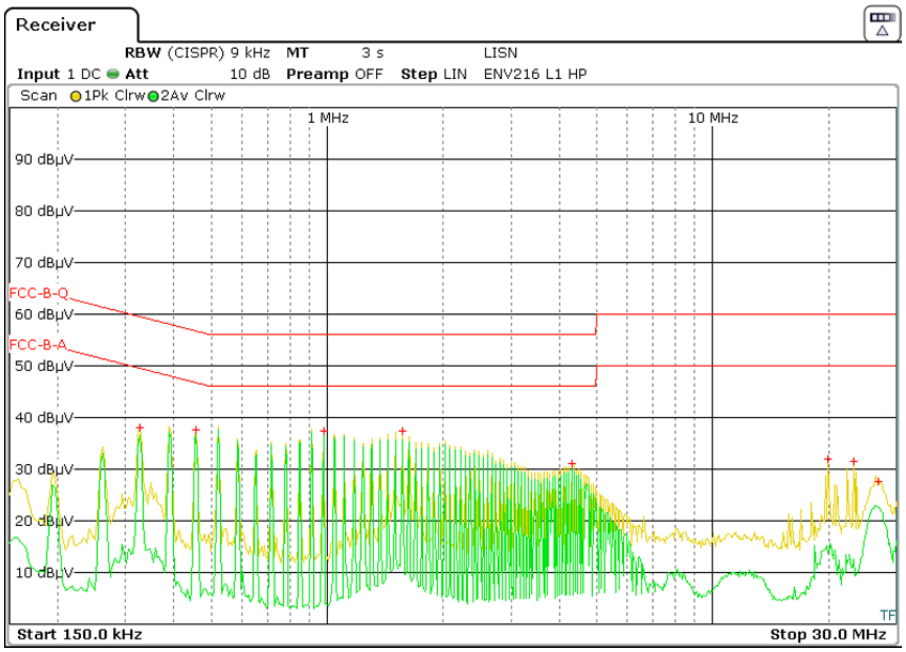
[Neutral Line]



* ——— : Quasi-Peak, ——— : Average

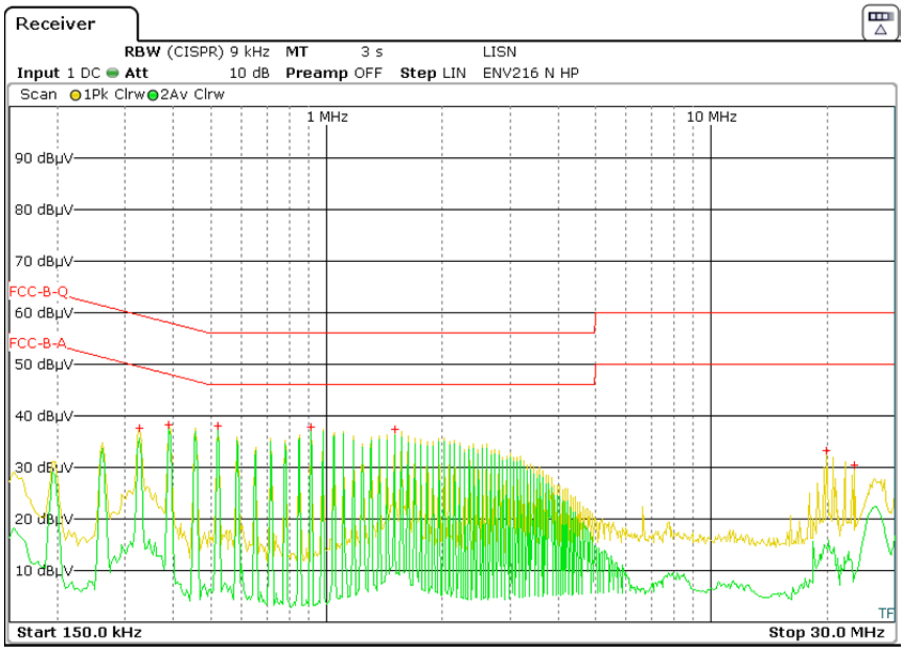
[Pure water mode]

[Hot Line]



* ——— : Quasi-Peak, ——— : Average

[Neutral Line]



* ——— : Quasi-Peak, ——— : Average

6.2 Radiatedemission

Test Standard	FCC CFR 47 PART 15 SUBPART B, SECTION 15.109 (a)		
Tested Date	2016.12.07		
Input Ratings	120 V~, 60 Hz		
Temperature	(13.85 ± 0.35) °C	Humidity	(49.45 ± 0.45) % R.H.
Test result	Met Class B / Pass		

6.2.1 Limit

Frequency [MHz]	Class B @ 3 m	Class A @ 10 m
30 ~ 88	100 μV/m (40.00 dBμV/m)	90 μV/m (39.08 dBμV/m)
88 ~ 216	150 μV/m (43.52 dBμV/m)	150 μV/m (43.52 dBμV/m)
216 ~960	200 μV/m (46.02 dBμV/m)	210 μV/m (46.44 dBμV/m)
Above 960	500 μV/m (53.98 dBμV/m)	300 μV/m (49.54 dBμV/m)

6.2.2 Test set-up and procedure

A pretest was performed at 3 m distance in a semi-anechoic chamber for searching correct frequency. The final test was done at a 3 m and 10 m open area test site with a quasi-peak detector. EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane. Cables were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane. Cables connected to EUT were fixed to cause maximum emission. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

6.2.3 Measurement uncertainty

Radiated emission electric field intensity, 30 MHz ~ 1 000 MHz: 4.0 dB
The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k = 2$.

6.2.4 Test equipment used

Equipment	Model	Serial No.	Vendor	Next Cal. Date	Use
Test Receiver	ESPI3	101171	ROHDE & SCHWARZ	2017.08.03	■
Test Receiver	ESR7	101120	ROHDE & SCHWARZ	2017.08.03	□
BI-LOG ANT	VULB 9163	691	SCHWARZBECK	2018.03.11	■
HORN ANTENNA	BBHA 9120D	769	Schwarzbeck	2017.10.29	□
Loop Antenna	6502/1	9801-3191	EMCO	2018.02.04	□
Antenna Master	act-a400	20090812002	AudixCoporation	-	■
Turn Table	act-t450	2009814072	AudixCoporation	-	■
AMPLIFIER	310N	291723	SONOMA	2017.08.03	■
Microwave Preamplifier	8449B	3008A02014	Agilent	2017.02.05	□
Controller	act	CT-0131	AudixCoporation	-	■

6.2.5 Test data

- Frequency range : 30 MHz ~ 1 000 MHz
- Bandwidth : 120 kHz
- Distance : 3 m

[Acidic water mode]

Frequency [MHz]	Reading [dBµV]	Antenna Polarity [H/V]	Height [m]	Antenna Factor [dB/m]	Cable Loss [dB]	Amp. Gain [dB]	Results [dBµV/m]	Limit [dBµV/m]	Margin [dB]
45.87	51.32	V	1.00	13.28	2.28	31.65	35.23	40.00	-4.77
54.61	50.10	V	1.00	12.58	2.53	31.64	33.57	40.00	-6.43
71.83	55.60	V	1.00	8.44	2.99	31.61	35.42	40.00	-4.58
134.45	47.50	V	1.00	8.74	4.24	31.55	28.93	43.52	-14.59
623.80	36.40	V	1.00	19.81	10.73	31.80	35.14	46.02	-10.88
647.76	38.90	V	1.10	19.98	11.01	31.81	38.08	46.02	-7.94
719.70	36.30	H	4.00	20.55	11.66	31.81	36.70	46.02	-9.32
Other frequencies up to 1 GHz were not observed during the test.									

* Radiated emissions tabulated data
* Remark: “H” Horizontal, “V” Vertical

* The highest frequency of the internal sources of the EUT is less than 108 MHz.

[Alkali water mode]

Frequency [MHz]	Reading [dBµV]	Antenna Polarity [H/V]	Height [m]	Antenna Factor [dB/m]	Cable Loss [dB]	Amp. Gain [dB]	Results [dBµV/m]	Limit [dBµV/m]	Margin [dB]
36.02	54.90	V	1.00	10.96	1.98	31.67	36.17	40.00	-3.83
64.48	54.43	V	1.00	10.41	2.79	31.63	36.00	40.00	-4.00
82.38	52.10	V	1.00	7.50	3.24	31.60	31.24	40.00	-8.76
132.28	48.30	V	1.00	8.93	4.20	31.55	29.88	43.52	-13.64
615.08	38.30	H	4.00	19.75	10.64	31.79	36.90	46.02	-9.12
719.77	36.10	H	4.00	20.55	11.66	31.81	36.50	46.02	-9.52
Other frequencies up to 1 GHz were not observed during the test.									

* Radiated emissions tabulated data
* Remark: “H” Horizontal, “V” Vertical

* The highest frequency of the internal sources of the EUT is less than 108 MHz.

[Pure water mode]

Frequency [MHz]	Reading [dBμV]	Antenna Polarity [H/V]	Height [m]	Antenna Factor [dB/m]	Cable Loss [dB]	Amp. Gain [dB]	Results [dBμV/m]	Limit [dBμV/m]	Margin [dB]
46.05	52.40	V	1.00	13.28	2.29	31.65	36.32	40.00	-3.68
67.33	53.10	V	1.00	9.59	2.87	31.62	33.94	40.00	-6.06
86.31	50.90	V	1.00	8.74	3.31	31.59	31.36	40.00	-8.64
129.47	52.10	V	1.00	9.18	4.16	31.56	33.88	43.52	-9.64
623.30	35.70	V	1.00	19.81	10.72	31.80	34.43	46.02	-11.59
673.76	39.40	V	1.00	20.17	11.26	31.81	39.02	46.02	-7.00
719.76	36.80	H	4.00	20.55	11.66	31.81	37.20	46.02	-8.82
Other frequencies up to 1 GHz were not observed during the test.									

* Radiated emissions tabulated data
* Remark: “H” Horizontal, “V” Vertical

* The highest frequency of the internal sources of the EUT is less than 108 MHz.

6.2.6 Field strength calculation

* **Results [dBμV/m] =** Reading [dBμV] + Antenna Factor [dB/m] + Cable Loss [dB] – Amp. Gain [dB]
* **Margin [dB] =** Results [dBμV/m] – Limit [dBμV/m]

7. Appendix-A: Test Setup Photographs

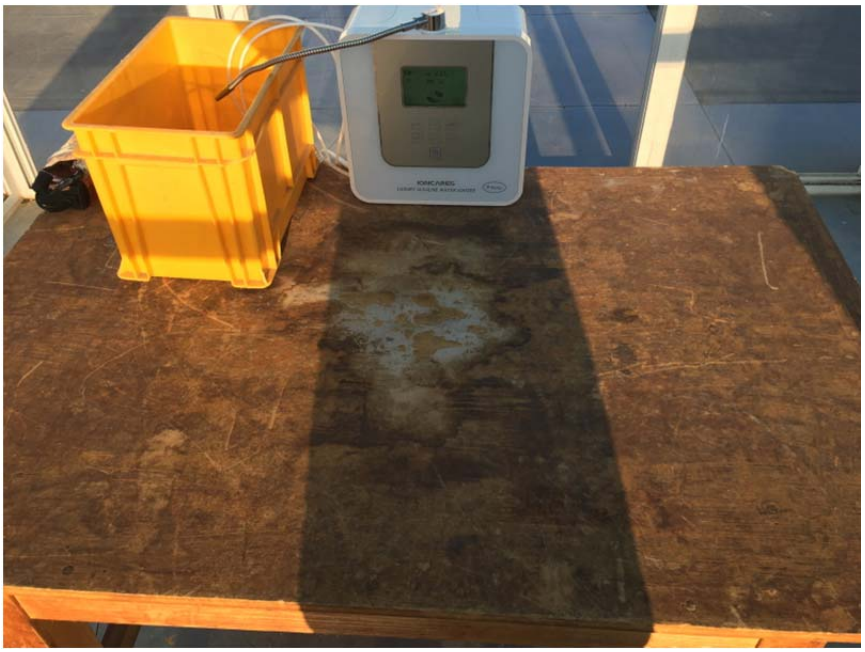
7.1 Conducted emission test set-up photos

[Front view]

[Rear view]

7.2 Radiated emission test set-up photos

[Front view]



[Rear view]

8. Appendix-B: External Photographs of EUT

[Front view]

[Rear view]

9. Appendix-C: Internal Photographs of EUT

9.1 Internal view

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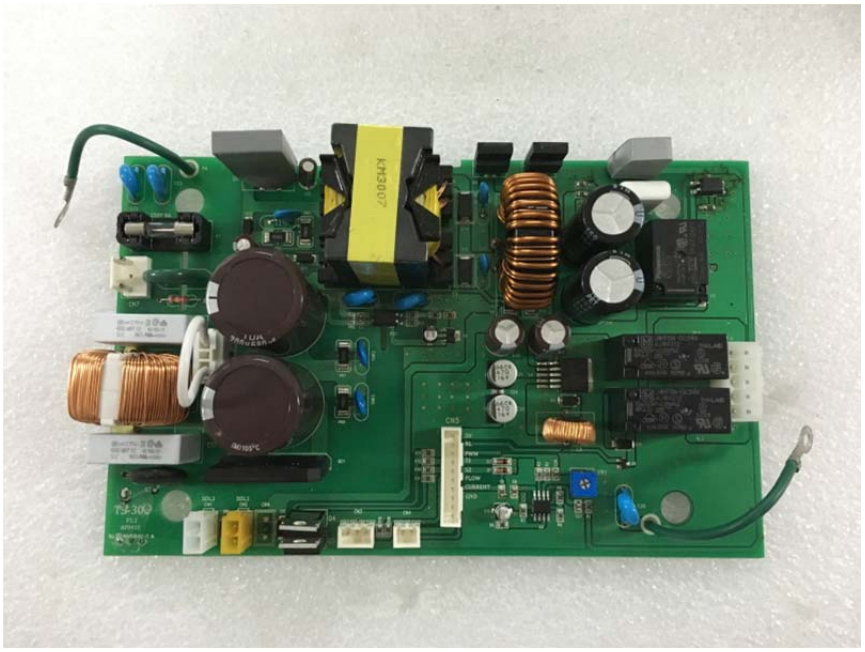
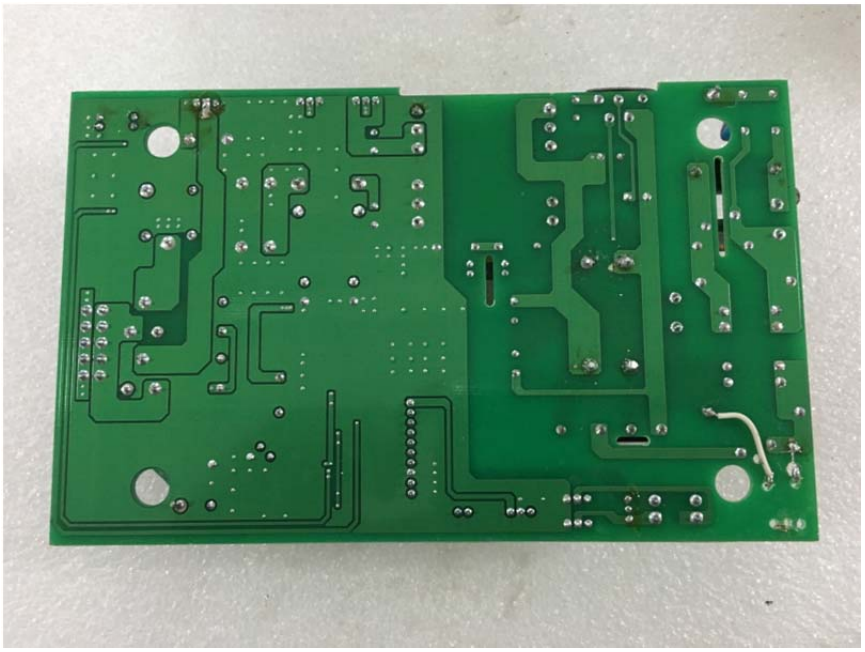
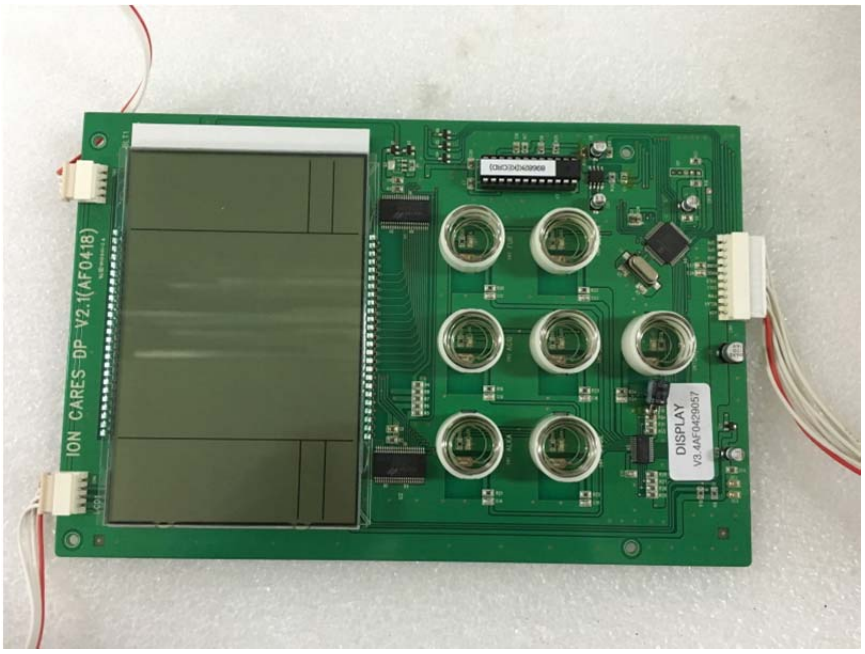
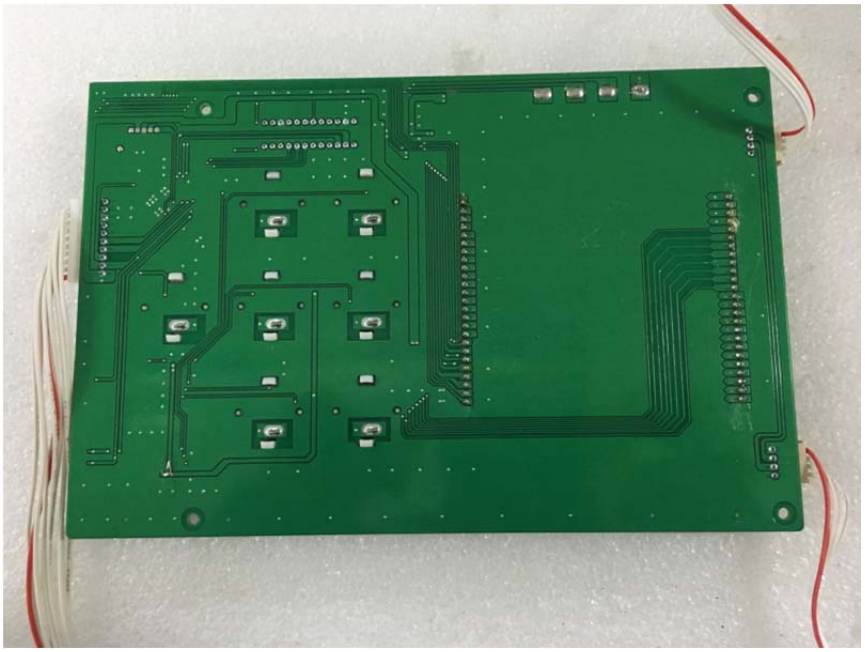
9.2 Internal board view






ION CARES-DP V2.1(AF0418)
DISPLAY



10. Appendix-D: Label and Manual information

Proposed FCC (Part 15, Section 15.19)

The label included following statement will be attached on product or the compliance statement can be observed in a prominent location in the instruction manual.

Model name: Ioncare 9000

Ioncares Co., Ltd

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operations.

Made in Korea

Information to the user in user's manual

The instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

INFORMATION TO THE USER

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one more of the following measures:
-. Reorient or relocate the receiving antenna.
-. Increase the separation between the equipment and receiver.
-. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-. Consult the dealer or an experienced radio/TV technician for help.

WARNING

Any changes or modifications not expressly approved by the manufacturer could void the user’s authority to operate the equipment