

TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID : OSLOKA-210W

Equipment Under Test : UNIT ASSY - WIRELESS CHARGING
Model Name : OKA-210W
Applicant : Omron Automotive Electronics Korea Co., Ltd.
Manufacturer : Omron Automotive Electronics Korea Co., Ltd.
Date of Receipt : 2017.11.27
Date of Test(s) : 2018.01.24 ~ 2018.02.05
Date of Issue : 2018.02.12

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Nancy Park

Date:

2018.02.12

Technical
Manager:



Hyunchoe You

Date:

2018.02.12

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RTT5041-19(2017.07.10)(0)

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A4(210 mm x 297 mm)

Table of contents

1. General information -----	3
2. Test Result -----	5

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1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807

- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

Phone No. : +82 31 688 0901

Fax No. : +82 31 688 0921

1.2. Details of applicant

Applicant : Omron Automotive Electronics Korea Co., Ltd.

Address : 790-12, Bogaewonsam-ro, Bogae-myeon, Anseong-si, Gyeonggi-do, Korea

Contact Person : Nam, Sang-Il

Phone No. : +82 2 850 5789

1.3. Details of manufacturer

Company : Same as applicant

Address : Same as applicant

1.4. Description of EUT

Kind of Product	UNIT ASSY - WIRELESS CHARGING
Model Name	OKA-210W
Power Supply	DC 12.0 V
Frequency Range	111 kHz
Antenna Type	Inductive loop coil antenna

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1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
E-Field Probe	D.A.R.E!! Instruments	RadiSense 4	13I00444SNO04	Jun. 22, 2017	Annual	Jun. 22, 2018
Magnetic Field Sensor	HIOKI	0850-C1	3472	Jun. 26, 2017	Annual	Jun. 26, 2018
Magnetic Field Hitester	HIOKI	FT3470-50	140430999	Jun. 12, 2017	Annual	Jun. 12, 2018
DC Power Supply	R&S	HMP2020	019922876	Apr. 26, 2017	Annual	Apr. 26, 2018
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	N/A	N.C.R.	N/A	N.C.R.

► Support equipment

Description	Manufacturer	Model	FCC ID
Samsung Mobile Phone	Samsung Electronics Co., Ltd.	SM-G900L	A3LSMG900S

1.6. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL012364	2018.02.12	Initial

1.7. Worst case of test configurations

In order to check all kinds of possible configurations, EUT was evaluated with appropriate client and under each charging condition as below table.

EUT configuration	Description
Charging Mode with client device (Model: SM-G900L, FCC ID: A3LSMG900S)	1 % of battery
	50 % of battery
	99 % of battery

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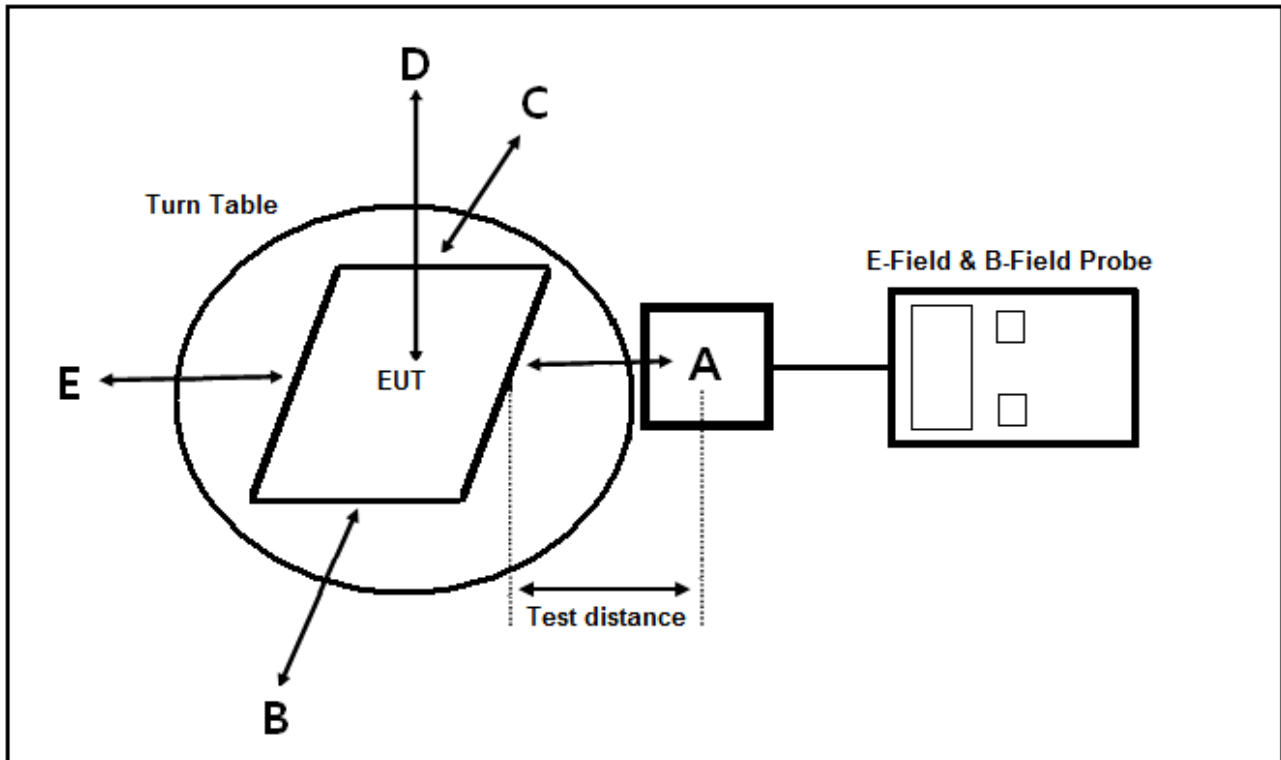
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2. Test Result

2.1. Test Setup



2.2. Measurement procedure

- The RF exposure test was performed in anechoic chamber.
- The minimum separation distance to user is 4 cm. Thus, the measurement probe was placed at test distance (4, 6, 8, 10 cm) which is between the edge of the charger and the geometric center of probe.
- The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.
- The EUT was measured according to the dictates of KDB 680106 D01 v02.

Note;

- Bottom of EUT shall be connected into the vehicle.
So these parts are not considered from MPE measurement.

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2.3. Equipment Approval Considerations item 5.2 of KDB 680106 D01 v02.

- a) Power transfer frequency is less than 1 MHz.
- The device operates at a frequency 111 kHz.
- b) Output power from each primary coil is less than 5 watts.
- Output power from primary coil: 5 watts.
- c) The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.
- The transfer system including a charging system with one primary coils is to detect and allow only between individual pairs of coils.
- d) Client device is inserted in or placed directly in contact with the transmitter.
- Client device is placed directly in contact with the transmitter.
- e) The maximum coupling surface area of the transmit (charging) device is between 60 cm^2 and 400 cm^2 .
- The EUT coupling surface area: $13.398 \text{ cm (W)} \times 7.725 \text{ cm (H)} = 103.500 \text{ cm}^2$,
 $60 \text{ cm}^2 < 103.500 \text{ cm}^2 < 400 \text{ cm}^2$
- f) Aggregate leakage fields at 10 cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 30 % of the MPE limit.
- Refer to following test results.
The EUT E-Field Strength levels at 4 cm < 30 % of the MPE E-Field Strength limit 614 V/m
59.20 V/m (Max. at 4 cm) < 184.20 V/m

The EUT H-Field Strength levels at 4 cm < 30 % of the MPE H-Field Strength limit 1.63 A/m
1.530 A/m (Max. at 4 cm) > 0.489 A/m

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2.4. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

§1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of FCC part 2.1093 of this chapter

TABLE 1 - LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time (minutes)
(A) Limits for Occupational /Control Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f ²)	6
30-300	61.4	0.163	1.0	6
300-1 500			f/300	6
1 500-100 000			5	6
(B) Limits for General Population / Uncontrol Exposures				
<u>0.3-1.34</u>	<u>614</u>	<u>1.63</u>	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1 500			f/1 500	30
1 500-100 000			1.0	30

f = frequency in MHz

* = Plane wave equivalent power density

Note 1 to Table 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2 to Table 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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2.5. E and H field strength

Ambient temperature : (23 ± 1) °C
Relative humidity : 47 % R.H.

2.5.1. E-Field Strength at from the edges surrounding the EUT

Test condition: Ant. 3

Test condition: Charging mode (1 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (V/m)	Probe Position B (V/m)	Probe Position C (V/m)	Probe Position D (V/m)	Probe Position E (V/m)	Limits (V/m)
111.00	10	11.10	9.65	9.47	10.80	16.20	614.00
	8	16.60	13.80	13.10	13.40	18.40	
	6	28.20	23.20	20.70	21.40	27.60	
	4	41.30	43.50	38.00	32.20	54.40	

Test condition: Charging mode (50 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (V/m)	Probe Position B (V/m)	Probe Position C (V/m)	Probe Position D (V/m)	Probe Position E (V/m)	Limits (V/m)
111.00	10	12.00	9.02	10.12	13.06	17.11	614.00
	8	17.36	15.10	15.20	15.40	20.20	
	6	29.10	25.80	21.30	18.90	29.30	
	4	43.20	45.70	39.30	35.20	51.10	

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Test condition: Charging mode (99 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (V/m)	Probe Position B (V/m)	Probe Position C (V/m)	Probe Position D (V/m)	Probe Position E (V/m)	Limits (V/m)
111.00	10	9.35	8.75	8.44	12.50	15.70	614.00
	8	18.20	15.20	13.50	14.60	22.60	
	6	29.90	26.00	22.10	19.70	30.50	
	4	42.80	43.80	37.20	39.10	59.20	

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2.5.2. H-Field Strength at from the edges surrounding the EUT

Test condition: Ant. 3

Test condition: Charging mode (1 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (A/m)	Probe Position B (A/m)	Probe Position C (A/m)	Probe Position D (A/m)	Probe Position E (A/m)	Limits (A/m)
111.00	10	0.21	0.19	0.11	0.13	0.20	1.63
	8	0.37	0.29	0.12	0.18	0.26	
	6	0.58	0.53	0.16	0.28	0.41	
	4	1.53	0.95	0.26	0.50	0.60	

Test condition: Charging mode (50 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (A/m)	Probe Position B (A/m)	Probe Position C (A/m)	Probe Position D (A/m)	Probe Position E (A/m)	Limits (A/m)
111.00	10	0.26	0.19	0.14	0.19	0.22	1.63
	8	0.34	0.30	0.15	0.18	0.30	
	6	0.49	0.44	0.20	0.27	0.47	
	4	1.34	1.28	0.41	0.58	0.78	

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Test condition: Charging mode (99 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (A/m)	Probe Position B (A/m)	Probe Position C (A/m)	Probe Position D (A/m)	Probe Position E (A/m)	Limits (A/m)
111.00	10	0.19	0.26	0.15	0.23	0.10	1.63
	8	0.39	0.35	0.16	0.22	0.38	
	6	0.42	0.52	0.21	0.30	0.44	
	4	1.35	1.42	0.42	0.78	1.02	

Remark;

1. H-field strength (A/m) = B-field (μ T) / 1.25
2. Each antenna was tested. As worst condition, Ant. 3 is reported.

- End of the Test Report -

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