

TEST REPORT

of

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

FCC ID: 2AV76-NMOK-100W

Equipment Under Test : WIRELESS POWER CHARGING SYSTEM
Model Name : NMOK-100W
Variant Model Name(s) : (-)
Applicant : NIDEC MOBILITY KOREA CORPORATION
Manufacturer : NIDEC MOBILITY KOREA CORPORATION
Date of Receipt : 2020.03.06
Date of Test(s) : 2020.03.20 ~ 2021.01.05
Date of Issue : 2021.01.22

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

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- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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Tested by:



Jinhyoung Cho

Technical
Manager:



Hyunchae You

SGS Korea Co., Ltd. Gunpo Laboratory



<u>Table of Contents</u>	Page
1. General Information -----	3
2. Test Result -----	5

1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

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Phone No. : +82 31 688 0901

Fax No. : +82 31 688 0921

1.2. Details of Applicant

Applicant : NIDEC MOBILITY KOREA CORPORATION

Address : 790-12, Bogaewonsam-ro, Bogae-myeon, Anseong-si, Gyeonggi-do, South Korea, 17507

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	WIRELESS POWER CHARGING SYSTEM	
Model Name	NMOK-100W	
Power Supply	DC 13.5 V	
Frequency Range	5 W	Ant. 1: 120 kHz Ant. 2: 120 kHz Ant. 3: 120 kHz
	10 W	Ant. 1: 120 kHz Ant. 2: 120 kHz Ant. 3: 120 kHz
Antenna Type	Inductive loop coil antenna	

1.5. Declaration by the Manufacturer

- The EUT has 3 loop coil antennas with one amplifier, and only one antenna can transmit at once.

1.6. 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	Jul. 03, 2020	Annual	Jul. 03, 2021
Magnetic Field Sensor	HIOKI	1087-B1	3471	Aug. 05, 2020	Annual	Aug. 05, 2021
Magnetic Field Hitester	HIOKI	FT3470-50	140430999	Aug. 05, 2020	Annual	Aug. 05, 2021
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
Mobile Phone	Samsung Electronics Co., Ltd.	SM-G900L	A3LSMG900S
	LG Electronics Co., Ltd.	LM-G900UM	ZNFG900UM

1.7. Worst Case of Test Configurations

Charging mode with client device	Mode		Description
Model: SM-G900L FCC ID: A3LSMG900S	5 W	10 W	1 % of battery 50 % of battery 99 % of battery
Model: LM-G900UM FCC ID: ZNFG900UM	Ant. 1 Ant. 2 Ant. 3	Ant. 1 Ant. 2 Ant. 3	

Note;

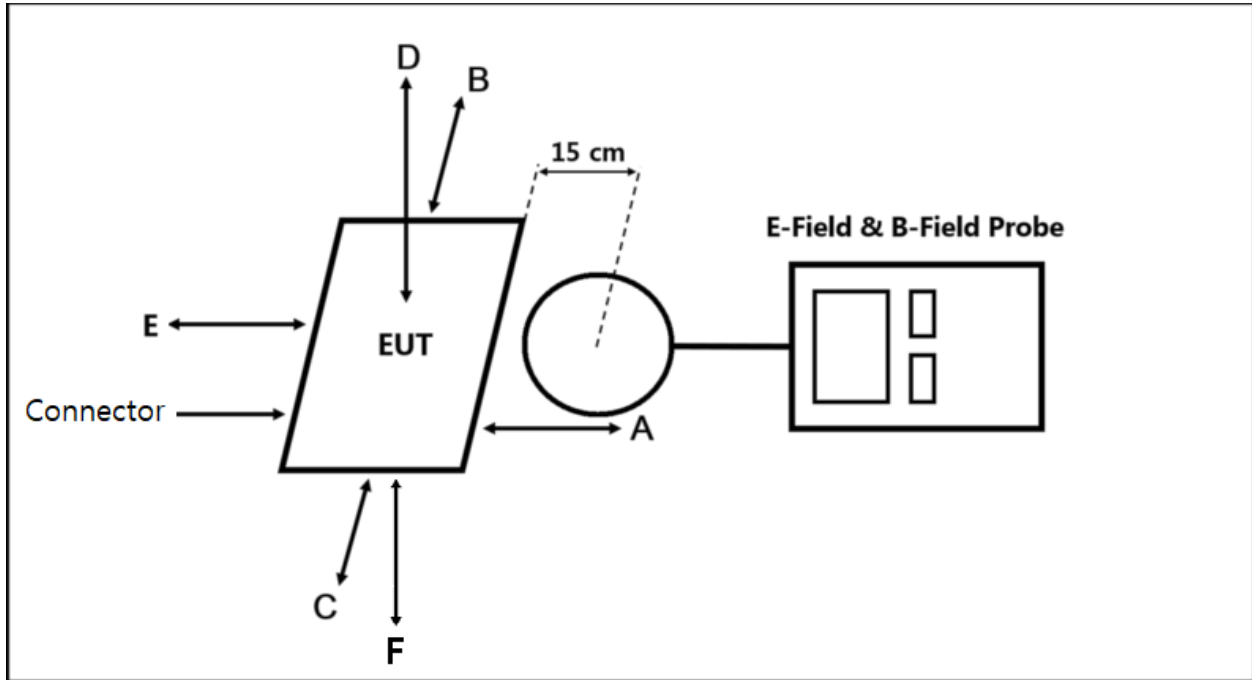
EUT was investigated with client device under normal charging condition as above then worst value was only reported.

1.8. Test report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL000574	2020.04.22	Initial
1	F690501-RF-RTL000574-1	2020.06.03	Added MPE measurement results from 0cm.
2	F690501-RF-RTL000574-2	2020.10.13	Added MPE measurement results for bottom side
3	F690501-RF-RTL000574-3	2021.01.05	MPE measurement Retested
4	F690501-RF-RTL000574-4	2021.01.20	Correct H-field measurement distance
5	F690501-RF-RTL000574-5	2021.01.22	Correct H-field measurement distance

2. Test Result

2.1. Test Setup



2.2. Measurement Procedure

- The RF exposure test was performed in anechoic chamber.
- The measurement probe was placed at test distance (4, 6, 8, 10, 15 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, F) were completed.
- The EUT was measured according to the dictates of KDB 680106 D01 v03.

Note;

- Because of measurement probe antenna size, minimum distance between charger and probe is 4 cm for E-Field and 6 cm for H-Field.

2.3. Equipment Approval Considerations item 5 b) of KDB 680106 D01 v03.

- (1) Power transfer frequency is less than 1 MHz.
- The device operates at a frequency 120 kHz.
- (2) Output power from each primary coil is less than or equal to 15 watts.
- Output power from primary coil: 10 watts.
- (3) 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 multiple primary coils are to detect and allow only between individual pairs of coils.
- (4) Client device is placed directly in contact with the transmitter.
- Client device is placed directly in contact with the transmitter.
- (5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).
- Mobile exposure conditions only.
- (6) The aggregate H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50 % of the MPE limit.
- Refer to following test results.
The EUT H-Field Strength levels at 15 cm < 50 % of the MPE H-Field Strength limit 1.63 A/m
0.216 A/m (Max. at 15 cm) < 0.815 A/m

Remark:

According to TCB workshop 2020, If the measured H-field values are below 100 % of the applicable limit in 47 CFR §1.1310, no additional testing is necessary.

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

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: 5 W Operating mode with client device (1 % battery status of client device)

Frequency (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)	Probe Position F (V/m)	Limits (V/m)
120	15	10.80	11.10	15.20	17.20	10.30	14.85	614
	10	21.30	28.10	18.10	33.40	21.10	20.05	
	8	42.70	60.35	24.70	50.80	43.70	44.10	
	6	55.20	110.10	41.30	75.80	52.50	53.10	
	Contact, 4	140.50	140.20	100.80	201.80	140.00	130.05	

Test Condition: 10 W Operating mode with client device (1 % battery status of client device)

Frequency (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)	Probe Position F (V/m)	Limits (V/m)
120	15	14.10	10.10	16.20	20.30	14.80	12.70	614
	10	30.70	20.80	53.30	48.30	31.20	25.80	
	8	48.10	35.20	101.30	70.30	46.10	40.05	
	6	73.10	55.40	163.70	130.10	76.20	75.80	
	Contact, 4	140.20	118.20	195.80	218.10	150.00	163.10	

2.5.2. H-Field Strength at from The Edges Surrounding the EUT

Test Condition: 5 W Operating mode with client device (1 % battery status of client device)

Frequency (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)	Probe Position F (A/m)	Limits (A/m)
120	15	0.118	0.097	0.108	0.215	0.139	0.089	1.63
	10	0.186	0.110	0.174	0.470	0.204	0.181	
	8	0.458	0.147	0.287	0.857	0.241	0.229	
	Contact, 6	0.606	0.236	0.458	1.150	0.563	0.551	

Test Condition: 10 W Operating mode with client device (1 % battery status of client device)

Frequency (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)	Probe Position F (A/m)	Limits (A/m)
120	15	0.120	0.109	0.106	0.216	0.140	0.096	1.63
	10	0.186	0.112	0.176	0.448	0.214	0.169	
	8	0.440	0.170	0.329	0.884	0.228	0.232	
	Contact, 6	0.550	0.240	0.451	1.212	0.568	0.552	

Remark:

1. H-field strength (A/m) = B-field (μT) / 1.25
2. Each antenna was tested. As worst condition 5 W Ant. 3 and 10W Ant. 1 is reported.

- End of the Test Report -