

TEST REPORT

OF

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

FCC ID: A3LEPPN920

Equipment Under Test : WIRELESS CHARGER
 Model Name : EP-PN920
 Applicant : Samsung Electronics Co., Ltd.
 Manufacturer : Samsung Electronics Co., Ltd.
 Date of Test(s) : 2015.07.10 ~ 2015.07.22
 Date of Issue : 2015.07.22

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

Tested By:



Date:

2015.07.22

Jaeha Chung

Approved By:



Date:

2015.07.22

Hunchae You

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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, 435-837

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

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1.2. Details of applicant

Applicant : Samsung Electronics Co., Ltd.

Address : 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Republic of Korea

Contact Person : Kim, Kyung-Won

Phone No. : +82 31 301 0274

1.3. Description of EUT

Kind of Product	WIRELESS CHARGER
Model Name	EP-PN920
Power Supply	DC 5 V, DC 9 V (Used AC 100 V ~ 240 V adaptor)
Frequency Range	110 kHz ~ 190 kHz
Operating Conditions	-20 °C ~ 60 °C
Antenna Type	Inductive loop coil antenna

1.4. Declarations by the manufacturer

- Operation temperature : -20 °C ~ 60 °C

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1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal Date	Cal Interval	Cal Due.
Spectrum Analyzer	R&S	FSV30	103210	Dec. 29, 2014	Annual	Dec. 29, 2015
Loop Antenna	R&S	HFH2-Z2	100118	Jun. 04, 2015	Biennial	Jun. 04, 2017
E-Field Probe	ETS-LINDGREN	HI-6005	00047870	Mar. 11, 2015	Annual	Mar. 11, 2016
B-Field Probe	Narda	BN 2300/90.10	J-0025	Jan. 23, 2015	Annual	Jan. 23, 2016
Exposure Level Meter	Narda	ELT-400	J-0015	Jan. 23, 2015	Annual	Jan. 23, 2016
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.

1.6. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL008943	2015.07.20	Initial
1	F690501/RF-RTL008943-1	2015.07.22	Added data for the E-field and H-field at the bottom position

1.7. Worst case of test configurations

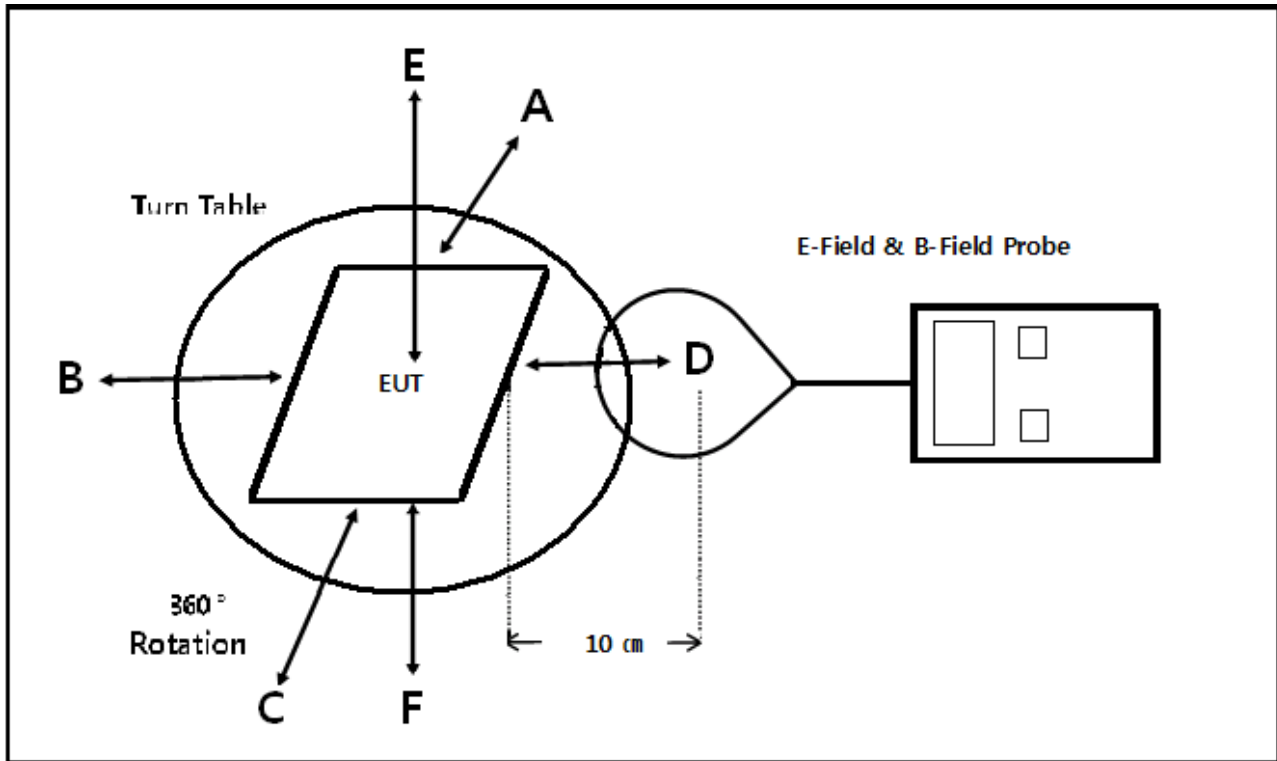
In order to check all kinds of possible configurations, EUT was evaluated with appropriate client and under each charging condition as below table.

EUT configuration	Description
Charging Mode with client device	Less than 1 % of battery
	Less than 50 % of battery
	100 % full charging of battery

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2. Test Result

2.1. Test Setup



2.2. Measurement procedure

- The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- The measurement probe was placed at test distance (10 cm) which is between the edge of the charger and the geometric center of probe.
- The turn table was rotated 360 degree to search of highest strength
- 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 were measured according to the dictates of KDB 680106 D01v02.

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2.3. Equipment Approval Considerations.

The EUT does comply with item 5.2 of KDB 680106 D01v02.

a) Power transfer frequency is less than 1 MHz.

- The device operates in the frequency range from 110 kHz to 190 kHz.

b) Output power from each primary coil is less than 5 watts.

- DC 5 V condition → Output power from each primary coil : 5 W (Max.)
- DC 9 V condition → Output power from each primary coil : 9 W (Max.)

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 includes only single primary and secondary coils. Refer to a photo in the Internal photos.

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:

- The EUT coupling surface area : $10.2 \text{ cm(W)} \times 10.2 \text{ cm(D)} = 104.04 \text{ cm}^2$,
 $60 \text{ cm}^2 < 104.04 \text{ cm}^2 < 400 \text{ cm}^2$.

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 field strength levels < (30 % × MPE limit 1.63 A/m).

0.461 A/m (Max.) < 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 : (24 ± 1) °C
Relative humidity : 47 % R.H.

2.5.1. E-Field Strength at 10 cm from the edges surrounding the EUT

Test Mode : Charging mode with client device (DC 5 V)

Test condition: Charging mode with client (less than 1 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	3.55	4.87	4.63	3.69	7.48	7.53	614.00

Test condition: Charging mode with client (less than 50 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	4.64	4.82	3.61	3.55	7.87	7.75	614.00

Test condition: Charging mode with client (100 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	3.53	3.43	3.37	4.57	8.13	8.22	614.00

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Test Mode : Charging mode with client device (DC 9 V)

Test condition: Charging mode with client (less than 1 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	3.87	3.63	3.62	3.49	4.92	4.93	614.00

Test condition: Charging mode with client (less than 50 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	3.72	3.53	4.12	3.64	4.31	4.41	614.00

Test condition: Charging mode with client (100 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	3.57	3.93	3.35	3.50	4.97	4.86	614.00

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2.5.2. H-Field Strength at 10 cm from the edges surrounding the EUT

Test Mode : Charging mode with client device (DC 5 V)

Test condition: Charging mode with client (less than 1 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	0.304	0.352	0.336	0.312	0.360	0.461	1.63

Test condition: Charging mode with client (less than 50 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	0.240	0.272	0.288	0.304	0.312	0.403	1.63

Test condition: Charging mode with client (100 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	0.280	0.224	0.272	0.248	0.344	0.410	1.63

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Test Mode : Charging mode with client device (DC 9 V)

Test condition: Charging mode with client (less than 1 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	0.296	0.304	0.352	0.272	0.376	0.456	1.63

Test condition: Charging mode with client (less than 50 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	0.320	0.320	0.272	0.280	0.352	0.432	1.63

Test condition: Charging mode with client (100 % battery status)

Frequency Range (kHz)	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)
110 ~ 190	0.272	0.312	0.272	0.312	0.368	0.433	1.63

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