

TEST REPORT

of

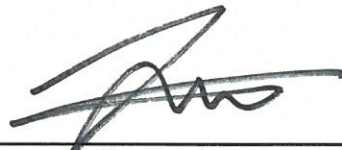
FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID: A3LEPN5105

Equipment Under Test : WIRELESS CHARGER
Model Name : EP-N5105
Applicant : Samsung Electronics Co., Ltd.
Manufacturer : Samsung Electronics Co., Ltd.
Date of Receipt : 2019.07.19
Date of Test(s) : 2019.07.24 ~ 2019.08.05
Date of Issue : 2019.08.06

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

Tested By:

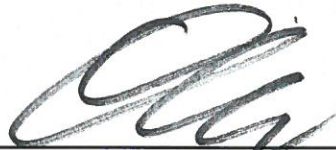


Nancy Park

Date:

2019.08.06

Technical
Manager:



Hyunchoe You

Date:

2019.08.06

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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 : Samsung Electronics Co., Ltd.
 Address : 19 Chapin Rd., Building D, Pine Brook, New Jersey, United States, 07058
 Contact Person : Chun, Jenni
 Phone No. : +1 973 808 6375

1.3. Details of Manufacturer

Company : Samsung Electronics Co., Ltd.
 Address : Yen Phong 1 Industrial park, Yen Phong District Ninh Province VIETNAM

1.4. Description of EUT

| | | |
|------------------------|--|--|
| Kind of Product | WIRELESS CHARGER | |
| Model Name | EP-N5105 | |
| Power Supply | DC 9.0 V | |
| Operation Mode | 5 W | 9 W |
| Frequency Range | Ant. 1: 120.5 kHz, 126.7 ~ 128.7 kHz Ant. 2: 120.5 kHz, 126.7 ~ 128.7 kHz | Ant. 1: 126.7 ~ 128.7 kHz Ant. 2: 126.7 ~ 128.7 kHz |
| Antenna Type | Loop Coil Antenna | |

1.5. Declaration by the Manufacturer

- The EUT has 2 loop coil antennas, and only one antenna can transmit at once.
- The EUT operates at 120.5 kHz only in specific models(SM-N970U, SM-N971U).

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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 | Jun. 21, 2019 | Annual | Jun. 21, 2020 |
| Magnetic Field Sensor | HIOKI | 1087-C1 | 3471 | Aug 31, 2018 | Annual | Aug. 31, 2019 |
| Magnetic Field Hitester | HIOKI | FT3470-50 | 171129500 | Aug 31, 2018 | Annual | Aug 31, 2019 |
| Anechoic Chamber | SY Corporation | L x W x H (9.6 m x 6.4 m x 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-G973U | A3LSMG973U |

1.7. Test Report Revision

| Revision | Report Number | Date of Issue | Description |
|----------|----------------------|---------------|-------------|
| 0 | F690501/RF-RTL014181 | 2019.08.06 | Initial |

1.8. 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.

| Charging mode with client device | Mode | | Description |
|---------------------------------------|----------------------|----------------------|--|
| Model: SM-G973U FCC ID: A3LSMG973U | 5 W | 9 W | 1 % of battery 50 % of battery 99 % of battery |
| | (Ant. 1) (Ant. 2) | (Ant. 1) (Ant. 2) | |

Note;

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

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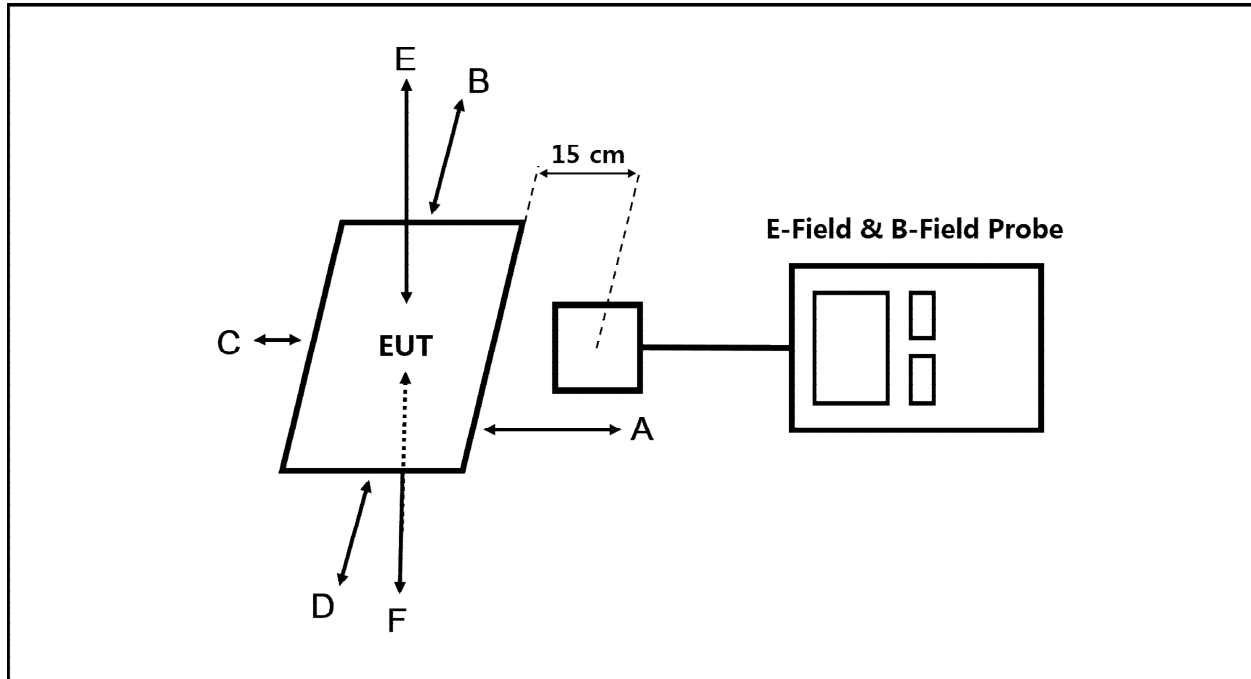
RTT5041-19(2019.04.24)(1)

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A4(210 mm x 297 mm)

2. Test Result

2.1. Test Setup



2.2. Measurement procedure

- a) The RF exposure test was performed in anechoic chamber.
- b) The measurement probe was placed at test distance (15 cm) which is between the edge of the charger and the geometric center of probe.
- c) 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.
- d) The EUT was measured according to the dictates of KDB 680106 D01 v03.

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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 120.5 kHz and 126.7 ~ 128.7 kHz.
- (2) Output power from each primary coil is less than or equal to 15 watts.
 - Output power from primary coil: 9 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 one primary coils is 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
 0.215 A/m (Max. at 15 cm) < 0.815 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 | | | | |
| 0.3-1.34 | 614 | 1.63 | *(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

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

| Frequency Range (kHz) | Antenna | 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) |
|-----------------------|---------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|--------------|
| 120.5 | 1 | 5.06 | 5.58 | 7.84 | 5.69 | 5.89 | 5.78 | 614 |
| | 2 | 5.37 | 6.31 | 6.76 | 7.03 | 6.24 | 7.11 | |
| 126.7 ~ 128.7 | 1 | 4.71 | 5.82 | 7.89 | 6.37 | 6.01 | 5.88 | |
| | 2 | 5.08 | 6.26 | 6.76 | 6.36 | 5.84 | 5.17 | |

Test Condition: 9 W Operating mode with client device (1 % battery status of client device)

| Frequency Range (kHz) | Antenna | 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) |
|-----------------------|---------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|--------------|
| 126.7 ~ 128.7 | 1 | 5.15 | 6.19 | 7.56 | 5.91 | 5.88 | 6.26 | 614 |
| | 2 | 5.58 | 6.96 | 6.84 | 6.78 | 6.16 | 5.99 | |

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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 Range (kHz) | Antenna | 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) |
|-----------------------|---------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|--------------|
| 120.5 | 1 | 0.077 | 0.090 | 0.143 | 0.090 | 0.105 | 0.083 | 1.63 |
| | 2 | 0.086 | 0.062 | 0.099 | 0.084 | 0.094 | 0.076 | |
| 126.7 ~ 128.7 | 1 | 0.090 | 0.077 | 0.170 | 0.091 | 0.097 | 0.060 | |
| | 2 | 0.090 | 0.070 | 0.078 | 0.097 | 0.076 | 0.082 | |

Test Condition: 9 W Operating mode with client device (1 % battery status of client device)

| Frequency Range (kHz) | Antenna | 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) |
|-----------------------|---------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|--------------|
| 126.7 ~ 128.7 | 1 | 0.113 | 0.086 | 0.215 | 0.103 | 0.130 | 0.071 | 1.63 |
| | 2 | 0.143 | 0.114 | 0.089 | 0.114 | 0.085 | 0.104 | |

Remark;

- H-field strength (A/m) = B-field (μT) / 1.25

- End of the Test Report -

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