

TEST REPORT

of

FCC CFR 47 part1, 1.1307(b), 1.1310

FCC ID: A3LEP-N5200

Equipment Under Test : WIRELESS CHARGER
 Model Name : EP-N5200
 Variant Model Name(s) : -
 Applicant : Samsung Electronics Co., Ltd.
 Manufacturer : Samsung Electronics Co., Ltd.
 Date of Receipt : 2021.04.22
 Date of Test(s) : 2021.05.03~ 2021.05.13
 Date of Issue : 2021.05.14

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

- 1) The results of this test report are effective only to the items tested.
- 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:



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SGS Korea Co., Ltd. Gunpo Laboratory



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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

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- Designation Number: KR0150

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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 Bac Ninh Province, VIETNAM

1.4. Description of EUT

Kind of Product	WIRELESS CHARGER
Model Name	EP-N5200
Power Supply	DC 9.0 V
Operation Mode	4.5 W, 7.5 W, 15 W
Frequency Range	120.5 kHz, 126.7 ~ 128.7 kHz
Antenna Type	Loop Coil Antenna
Antenna Serial Number	CW-20S903AA
H/W Version	1.2
S/W Version_MCU	0427
S/W Version_Tx IC	0504

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
Electric and Magnetic field Probe analyzer	NARDA	EHP 200AC	170WX91017	Nov. 16, 2020	Annual	Nov. 16, 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
Samsung Mobile Phone	Samsung Electronics Co., Ltd.	SM-N970U	A3LSMN970U
Samsung Mobile Phone	Samsung Electronics Co., Ltd.	SM-G981U	A3LSMG981U
C type USB Cable	RFTECH Co., Ltd.	EP-DG977	-
Travel Adaptor	HAEM VINA CO., LTD	EP-TA800	-

1.6. Worst Case of Test Configurations

Charging mode with client device	Mode				Description
Model: SM-N970U FCC ID: A3LSMN970U Model: SM-G981U FCC ID: A3LSMG981U	4.5 W		7.5 W	15 W	1 % of battery 50 % of battery 99 % of battery
	(Ant. 1) (Ant. 2) 120.5 kHz	(Ant. 1) (Ant. 2) 126.7 ~ 128.7 kHz	(Ant. 1) (Ant. 2) 126.7 ~ 128.7 kHz	(Ant. 1) (Ant. 2) 126.7 ~ 128.7 kHz	
	SM-N970U (Normal)	SM-N970U (Normal)	SM-N970U (Fast)	SM-G981U (Fast)	

Note;

- The 4.5 W and 7.5 W modes are controlled by the software on the client device.
- EUT was investigated with client device under normal charging condition as above then worst value was only reported.

1.7. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty	
Electric Field	$\pm 21.24 \%$	
Magnetic Field	Mode A	$\pm 18.66 \%$
	Mode B	$\pm 21.76 \%$

All measurement uncertainty values are shown with a coverage factor $k=2$ to indicate a 95 % level of confidence.

1.8. Test Report Revision

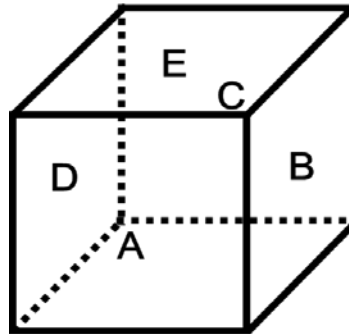
Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL002125	2021.05.14	Initial

2. Test Result

2.1. Test Setup

2.1.1. Isotropic Probe Test Setup

The measurement probe (EHP-200AC) is a regular hexahedron and supports 3-axis isotropic probe.



A: Front of measurement probe
 B: Right of measurement probe
 C: Rear of measurement probe
 D: Left of measurement probe
 E: Top of measurement probe

*Bottom of measurement probe is not used to measure RF exposure condition owing to connection with a stick.

In order to demonstrate the probe perturbation is not affecting the measurements,

- For one of the sides of EUT several measurements be made at various distances, starting further away and then moving closer.

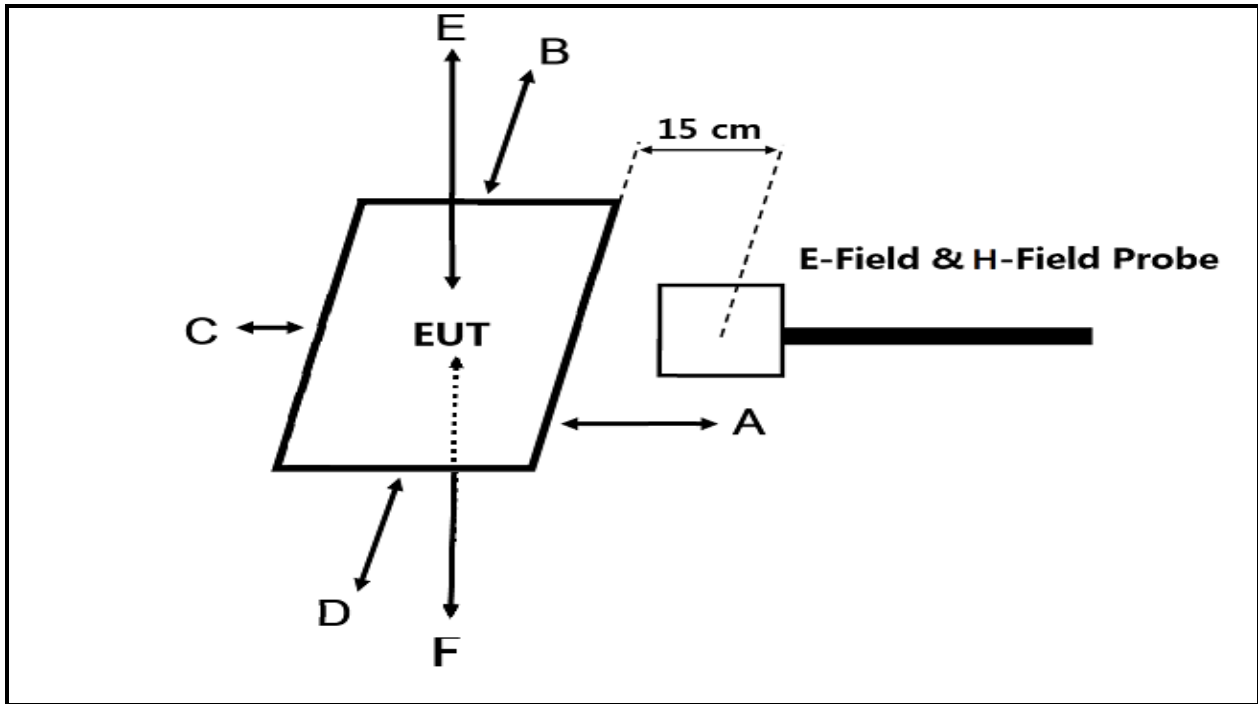
- ✓ Further away: measurement distance of EUT was confirmed until isotropic probe could not read fundamental level anymore (Not detected level).
- ✓ Moving closer: measurement isotropic probe directly contacts with sides of EUT (0 cm)
- ✓ When the worst level of EUT's sides is found out, several measurements should be checked through various distance (1 cm step).

- At 0 cm distance, measurement isotropic probe was investigated by rotating the probe through various angles for one of the EUT's sides as below.

Measurement Point	A	B	C	D	E
Direction	Front	Right	Rear	Left	Top
Measurement Point	A to B	B to C	C to D	D to A	N/A
Direction	Front to Right	Right to Rear	Rear to Left	Left to Front	-
Measurement Point	A to E	B to E	C to E	D to E	N/A
Direction	Front to Top	Right to Top	Rear to Top	Left to Top	-

- When the worst angle among all angles was found, RF exposure measurement should be adjusted from worst angle.

2.1.2. EUT Test Setup



2.2. Measurement procedure

- The RF exposure test was performed in anechoic chamber.
- The measurement probe was placed at test distance (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 RF Exposure Wireless Charging Apps v03r01.

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: 15 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
0.673 A/m (Max. at 15 cm) < 0.815 A/m

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: 4.5 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	1.53	1.39	0.82	1.28	2.10	0.47	614
126.7 ~ 128.7		1.44	1.39	0.84	1.17	2.19	0.65	
120.5	2	0.39	1.61	0.39	0.85	0.60	0.59	
126.7 ~ 128.7		0.38	1.18	0.39	0.92	0.73	0.39	

Test Condition: 7.5 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)
126.7 ~ 128.7	1	1.45	1.23	0.88	1.19	2.15	0.52	614
126.7 ~ 128.7	2	0.47	1.59	0.39	0.94	0.61	0.48	

Test Condition: 15 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	3.19	2.72	1.66	2.26	<u>5.49</u>	0.69	614
126.7 ~ 128.7	2	0.54	1.00	0.38	0.70	0.54	0.77	

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

Test Condition: 4.5 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	0.174	0.169	0.172	0.174	0.180	0.174	1.63
126.7 ~ 128.7		0.174	0.174	0.180	0.174	0.180	0.174	
120.5	2	0.335	0.567	0.246	0.448	0.239	0.320	
126.7 ~ 128.7		0.347	0.499	0.268	0.432	0.271	0.287	

Test Condition: 7.5 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)
126.7 ~ 128.7	1	0.174	0.180	0.180	0.174	0.174	0.167	1.63
126.7 ~ 128.7	2	0.354	0.414	0.251	0.392	0.288	0.397	

Test Condition: 15 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	<u>0.673</u>	0.343	0.202	0.226	0.278	0.181	1.63
126.7 ~ 128.7	2	0.315	0.395	0.268	0.370	0.365	0.333	

- End of the Test Report -