TEST REPORT

Application No.:	GZCR2108020793AT
Applicant:	Samsung Electronics Co., Ltd.
Address of Applicant:	19 Chapin Rd., Building D Pine Brook, NJ 07058
Manufacturer:	Jiangxi Lineprinting Co., Ltd
Address of Manufacturer:	No.268, Nantang Road, Jinggangshan Economic Development Zone, Ji'an, China
Factory:	Jiangxi Lineprinting Co., Ltd
Address of Factory:	No.268, Nantang Road, Jinggangshan Economic Development Zone, Ji'an, China
Equipment Under Test (EUT):	
EUT Name:	Wireless Car Charger
Model No.:	EP-H5300
Trade Mark:	samsung
Standard(s) :	47 CFR Part 1.1310
	47 CFR Part 1.1307
	KDB 680106 D01
Date of Receipt:	2021-08-20
Date of Test:	2021-09-06
Date of Issue:	2021-09-07
Test Result:	**Pass***

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

Kobe Jian
EMC Laboratory Manager

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		*2021-09-07*		*Original*

Authorized for issue by:				
		Kevin Zhang **Kevin Zhang/Project Engineer**		
		Ricky Liu **Ricky Liu/Reviewer**		

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2 Test Summary

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
RF Exposure Evaluation	47 CFR Part 1.1310	KDB 680106 D01	47 CFR Part 1.1310 & KDB 680106 D01	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	DC 5V, 2A/9V, 1.67 A powered by car charger as below: Model: EP-L5300 Input: DC 12V-24V Output: (PDO) DC 5.0 V, 3.0A/DC 9.0 V, 3.0 A/DC 15.0 V/DC 20.0 V, 2.25A (PPS) DC 3.3-20.0 V, 2.25A (USBA) DC 5.0 V, 2.0A/DC 9.0 V, 1.67 A
Cable(s):	Type C input ports
Test Voltage:	AC 120 V, 60 Hz powered by DC power adapter to section 4.2
Operation Frequency:	120kHz to 130 kHz
Modulation Type:	Load modulation
Antenna Type:	Loop antenna
Number of Antenna:	2 but only 1 antenna is enabling during changing
Software Version:	SV01
Hardware Version:	TAM5-TX-PCB-REV.A2
Sample NO.:	A1
Power Setting:	Default can not changed by user
Function:	Wireless Car Charger for vehicle use

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Resistor with changing loop antenna	Offered by applicant	/	/
Mobile Phone	SAMSUNG	GT-I9500	RV1D82X8W9X
DC Power Supply	GWINSTEK	GPS-3030DD (Input: AC100-240V, 50/60Hz;Output: DC Max.30V, 3A)	EMC0008

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
RF Exposure Evaluation	MF:U=0.13dB,EF:U=0.4dB

4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,

198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

RF Exposure Evaluation					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
743 Compact 3m Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	EMC0525	2019-10-20	2022-10-19
Electric and Magnetic Field Analyzer	Narada	NBM-550	EMC2143	2020-01-07	2022-01-06
Probe	Narada	EHP-50F	EMC2143	2020-01-07	2022-01-06

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DMM	Fluke	73	EMC0006	2021-07-05	2022-07-05
DMM	Fluke	73	EMC0007	2021-07-05	2022-07-05

6 Radio Spectrum Matter Test Results

6.1 RF Exposure Evaluation

Test Requirement 47 CFR Part 1.1310 & KDB 680106 D01

Test Method: KDB 680106 D01

Limit:

According to FCC Part1.1310: 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 Part1.1307(b)

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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
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/Uncontrolled Exposure				
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/1500	30
1,500-100,000			1.0	30
f = frequency in MHz * = Plane-wave equivalent power density				

According to IEEE C95.3:2002 section 5.5.1.1, The power density S at a point on the axis at a distance d from a transmitting antenna is given by the Friis free-space transmission formula

$$S = \frac{PG}{4\pi d^2}$$

S = power density (mW/cm^2)
P = the net power delivered to the antenna (mW)
G = gain of the antenna in linear scale
d = distance between observation point and center of the radiator (cm)

6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 24 °C Humidity: 56 % RH Atmospheric Pressure: 1008 mbar

6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	02	This device has been tested the artificial load of full load, half load & unload, and the device has been tested with mobile phone at zero charge, intermediate charge, and full charge.

Remark: Changing will take place when the charger is in contact with a phone only, no space is reserved/ designed for air because the structure of the EUT will automatically fix the device being charged closely.

6.1.3 Measurement Procedure and Data

This device has been tested the worst status of full load and horizontal placement, vertical placement had been tested and only the worst vertical placement had been recorded in the report. The device has been tested with mobile phone at zero charge, intermediate charge, and full charge and all transmitters, including those not used for wireless power transfer, have been active simultaneously and at maximum power.

Output Voltage= DC 5 V; The max output power = 10 W; Calculation of resistor value=2.5 Ω

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)			50 % Limit (A/m)	10 % Limit (A/m)
			unload	Half load	full load		
129.26kHz which is the worst case within the operation frequency range	6*	Side 1	0.359	0.556	0.618	0.815	0.163
		Side 2	0.340	0.546	0.609		
		Side 3	0.361	0.559	0.622		
		Side 4	0.348	0.541	0.618		
		Top	0.304	0.544	0.598		

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)			50 % Limit (A/m)	10 % Limit (A/m)
			unload	Half load	full load		
129.26kHz which is the worst case within the operation frequency range	8	Side 1	0.324	0.472	0.594	0.815	0.163
		Side 2	0.248	0.469	0.562		
		Side 3	0.328	0.478	0.597		
		Side 4	0.242	0.470	0.553		
		Top	0.245	0.421	0.536		

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)			50 % Limit (A/m)	10 % Limit (A/m)
			unload	Half load	full load		
129.26kHz which is the worst case within the operation frequency range	10	Side 1	0.304	0.453	0.528	0.815	0.163
		Side 2	0.226	0.425	0.509		
		Side 3	0.308	0.449	0.525		
		Side 4	0.224	0.403	0.505		
		Top	0.213	0.398	0.464		

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)			50 % Limit (A/m)	10 % Limit (A/m)
			unload	Half load	full load		
129.26kHz which is the worst case within the operation frequency range	15	Side 1	0.258	0.392	0.487	0.815	0.163
		Side 2	0.194	0.363	0.428		
		Side 3	0.261	0.378	0.475		
		Side 4	0.197	0.357	0.405		
		Top	0.158	0.315	0.376		

Mobile phone has been charge zero charge, intermediate charge and full charge.

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50 % Limit (A/m)	10 % Limit (A/m)
			zero charge	intermediate charge	full charge		
129.26kHz which is the worst case within the operation frequency range	6	Side 1	0.662	0.643	0.589	0.815	0.163
		Side 2	0.586	0.577	0.537		
		Side 3	0.658	0.644	0.593		
		Side 4	0.576	0.566	0.527		
		Top	0.450	0.438	0.426		

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50 % Limit (A/m)	10 % Limit (A/m)
			zero charge	intermediate charge	full charge		
129.26kHz which is the worst case within the operation frequency range	8	Side 1	0.621	0.615	0.575	0.815	0.163
		Side 2	0.547	0.532	0.514		
		Side 3	0.615	0.609	0.566		
		Side 4	0.555	0.523	0.516		
		Top	0.425	0.407	0.396		

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50 % Limit (A/m)	10 % Limit (A/m)
			zero charge	intermediate charge	full charge		
129.26kHz which is the worst case within the operation frequency range	10	Side 1	0.591	0.580	0.569	0.815	0.163
		Side 2	0.526	0.503	0.491		
		Side 3	0.584	0.572	0.558		
		Side 4	0.510	0.495	0.479		
		Top	0.402	0.384	0.371		

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result(A/m)			50 % Limit (A/m)	10 % Limit (A/m)
			zero charge	intermediate charge	full charge		
129.26kHz which is the worst case within the operation frequency range	15	Side 1	0.364	0.347	0.327	0.815	0.163
		Side 2	0.350	0.339	0.318		
		Side 3	0.362	0.349	0.322		
		Side 4	0.349	0.335	0.314		
		Top	0.294	0.272	0.258		

Verifying the probe angles effect to the result:

Magnetic Field Emissions for the worst case of above for different measurement distance of probe isotropy and rotating the probe through various angles

Operation frequency	Test Position	Test Distance (cm)	Test angles	Probe Measure Result (A/m)			50 % Limit (A/m)	10 % Limit (A/m)
				zero charge	intermediate charge	full charge		
129.26kHz which is the worst case within the operation frequency range	Side 1	15	0°	0.364	0.347	0.327	0.815	0.163
		10	0°	**0.591**	0.580	0.569		
			+45° -H	0.553	0.541	0.531		
			-45° -H	0.555	0.548	0.537		
			+45° -V	0.554	0.546	0.536		
			-45° -V	0.553	0.544	0.531		
			+45° -R	0.542	0.543	0.534		
			-45° -R	0.547	0.546	0.532		
		8	0°	**0.621**	0.615	0.575		
			+45° -H	0.619	0.597	0.467		
			-45° -H	0.618	0.598	0.461		
			+45° -V	0.609	0.596	0.451		
			-45° -V	0.619	0.586	0.465		
			+45° -R	0.610	0.593	0.471		
			-45° -R	0.617	0.590	0.469		
		6*	0°	**0.662**	0.643	0.589		
			+45° -H	0.654	0.632	0.562		
			-45° -H	0.659	0.631	0.567		
			+45° -V	0.654	0.619	0.562		
			-45° -V	0.656	0.618	0.569		
			+45° -R	0.652	0.624	0.575		
			-45° -R	0.657	0.622	0.571		

Remark: H: Horizontal; V: Vertical; R: Rotating with the axis of the probe.

*** Remark: 6cm is the least distance between the center of the probe and the edge of EUT.**

7 Test Setup Photo

Refer to Appendix - Test Setup Photos for GZCR210802079303

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8 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2108020793AT

- End of the Report -

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