



**SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch**

No. 1 Workshop, M-10, Middle Section, Science & Technology Park,
Shenzhen, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

Report No.: SZEM180900844002

Page: 1 of 13

Human Exposure Report

Application No.: SZEM1809008440CR
Applicant: Spigen Korea Co., Ltd.
Address of Applicant: Spigen HQ-A, 446, Bongeunsa-ro, Gangnam-gu, Seoul, 06153, South Korea

Manufacturer: Same as Applicant
Address of Manufacturer: Same as Applicant
Factory: Shenzhen Fang Xin Technology Co., Ltd.
Address of Factory: Rm 2406, 24F, Tower A, Xinghe World, No.1, Yabao Rd, Bantian St, Longgang Dist, Shenzhen, China

Equipment Under Test (EUT):
EUT Name: Fast Wireless Car Charger
Model No.: X35W
Trade Mark: Spigen
FCC ID: 2AFKNX35W
Standards: 47 CFR PART 1, Subpart I, Section 1.1310
Date of Receipt: 2018-09-19
Date of Test: 2018-09-27 to 2018-10-16
Date of Issue: 2018-10-16

Test Result :	Pass*
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* In the configuration tested, the EUT complied with the standards specified above



Keny Xu
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

Report No.: SZEM180900844002
Page: 2 of 13

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-10-16		Original

Authorized for issue by:				
				
		<hr/> Moon Zhang /Project Engineer		
				
		<hr/> Eric Fu /Reviewer		



1 Contents

	Page
1 COVER PAGE	1
1 CONTENTS	3
2 GENERAL INFORMATION	4
2.1 DETAILS OF E.U.T.	4
2.2 DESCRIPTION OF SUPPORT UNITS	4
2.3 TEST LOCATION	5
2.4 TEST FACILITY	5
2.5 DEVIATION FROM STANDARDS	5
2.6 ABNORMALITIES FROM STANDARD CONDITIONS	5
3 EQUIPMENTS USED DURING TEST	6
4 TEST RESULTS	7
4.1 RF EXPOSURE TEST	7
4.1.1 E.U.T. Operation	7
4.1.2 Measurement Data	8
5 PHOTOGRAPHS	14



2 General Information

2.1 Details of E.U.T.

Power supply:	CAR CHARGER: INPUT: DC 12-24V OUTPUT: DC 3.6V~12V 18W For wireless charger: Input: DC 5V/2A, 9V/1.67A, 12V/1.5A Output: 5W/7.5W/10W
Cable:	USB CABLE:100CM UNSHIELDED
Operation frequency:	109.3-147.3kHz
Antenna type:	Inductive Loop Coil Antenna
Modulation type:	Load modulation
Remark:	Tests were conducted for both DC 12V and DC 24V power supplies and only the worst case (DC 12V) was reported for Radiated Emissions.

2.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
iPhone 8	Apple	A1863	F4GVQ656JC6D
Mobile Phone	SAMSUNG	SM-G9500	R28J9140LPB
E-loading	provided by SGS	N/A	N/A



2.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

2.4 Test Facility

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

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Innovation, Science and Economic Development Canada

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

2.5 Deviation from Standards

None.

2.6 Abnormalities from Standard Conditions

None.



3 Equipments Used during Test

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Due date (yyyy-mm-dd)
1	Shielding Room	SAEMC	MSR733	SEM001-09	2020-05-09
2	Electric and Magnetic Field Analyzer	Narda	EHP-50F	EMC092	2019-02-06



4 Test Results

4.1 RF Exposure test

Test Requirement: 47 CFR PART 1, Subpart I, Section 1.1310

Measurement Distance: 0/2/4/6/8/10cm

Limit:

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 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
300-1500	/	/	f/300	6
1500-100,000	/	/	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
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30
F=frequency in MHz *=Plane-wave equivalent power density RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).				

4.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.0 °C

Humidity: 51 % RH

Atmospheric Pressure: 1015 mbar

EUT Operation:

This device has been tested the worst status of full load and the device has been tested with mobile phone at zero charge, intermediate charge, and full charge.



4.1.2 Measurement Data

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

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)	50% Limit (A/m)
134.2 kHz	0	Side 1	0.0083	0.815
		Side 2	0.0095	0.815
		Side 3	0.0084	0.815
		Side 4	0.0073	0.815
		Top	0.0121	0.815

Mobile phone has been charge at 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)
			zero charge	intermediate charge	full charge	
134.2 kHz	0	Side 1	0.0086	0.0087	0.0083	0.815
		Side 2	0.0099	0.0093	0.0090	0.815
		Side 3	0.0082	0.0085	0.0081	0.815
		Side 4	0.0082	0.0078	0.0078	0.815
		Top	0.0126	0.0118	0.0105	0.815



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

Report No.: SZEM180900844002
Page: 9 of 13

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

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)	50% Limit (A/m)
134.2 kHz	2	Side 1	0.0085	0.815
		Side 2	0.0092	0.815
		Side 3	0.0081	0.815
		Side 4	0.0074	0.815
		Top	0.0120	0.815

Mobile phone has been charge at 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)
			zero charge	intermediate charge	full charge	
134.2 kHz	2	Side 1	0.0087	0.0085	0.0087	0.815
		Side 2	0.0079	0.0091	0.0085	0.815
		Side 3	0.0085	0.0086	0.0079	0.815
		Side 4	0.0081	0.0086	0.0081	0.815
		Top	0.0121	0.0118	0.0104	0.815



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

Report No.: SZEM180900844002
Page: 10 of 13

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

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)	50% Limit (A/m)
134.2 kHz	4	Side 1	0.0082	0.815
		Side 2	0.0089	0.815
		Side 3	0.0081	0.815
		Side 4	0.0071	0.815
		Top	0.0193	0.815

Mobile phone has been charge at 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)
			zero charge	intermediate charge	full charge	
134.2 kHz	4	Side 1	0.0085	0.0085	0.0084	0.815
		Side 2	0.0089	0.0092	0.0085	0.815
		Side 3	0.0079	0.0084	0.0078	0.815
		Side 4	0.0079	0.0094	0.0098	0.815
		Top	0.0119	0.0108	0.0112	0.815



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

Report No.: SZEM180900844002
Page: 11 of 13

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

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)	50% Limit (A/m)
134.2 kHz	6	Side 1	0.0078	0.815
		Side 2	0.0097	0.815
		Side 3	0.0078	0.815
		Side 4	0.0069	0.815
		Top	0.0107	0.815

Mobile phone has been charge at 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)
			zero charge	intermediate charge	full charge	
134.2 kHz	6	Side 1	0.0078	0.0085	0.0082	0.815
		Side 2	0.0095	0.0086	0.0078	0.815
		Side 3	0.0079	0.0074	0.0090	0.815
		Side 4	0.0075	0.0089	0.0076	0.815
		Top	0.0109	0.0118	0.0107	0.815



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

Report No.: SZEM180900844002
Page: 12 of 13

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

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)	50% Limit (A/m)
134.2 kHz	8	Side 1	0.0078	0.815
		Side 2	0.0085	0.815
		Side 3	0.0090	0.815
		Side 4	0.0079	0.815
		Top	0.0109	0.815

Mobile phone has been charge at 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)
			zero charge	intermediate charge	full charge	
134.2 kHz	8	Side 1	0.0072	0.0078	0.0067	0.815
		Side 2	0.0056	0.0072	0.0074	0.815
		Side 3	0.0054	0.0073	0.0069	0.815
		Side 4	0.0056	0.0071	0.0067	0.815
		Top	0.0101	0.0104	0.0107	0.815



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

Report No.: SZEM180900844002
Page: 13 of 13

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

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)	50% Limit (A/m)
134.2 kHz	10	Side 1	0.0069	0.815
		Side 2	0.0072	0.815
		Side 3	0.0067	0.815
		Side 4	0.0059	0.815
		Top	0.0102	0.815

Mobile phone has been charge at 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)
			zero charge	intermediate charge	full charge	
134.2 kHz	10	Side 1	0.0057	0.0047	0.0049	0.815
		Side 2	0.0054	0.0054	0.0061	0.815
		Side 3	0.0061	0.0059	0.0059	0.815
		Side 4	0.0064	0.0061	0.0071	0.815
		Top	0.0094	0.0097	0.0104	0.815



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

Magnetic Field Emissions

Operation frequency	Test Distance (cm)	Test Position	Probe Measure Result (A/m)	50% Limit (A/m)
134.2 kHz	15	Side 1	0.0058	0.815
		Side 2	0.0064	0.815
		Side 3	0.0058	0.815
		Side 4	0.0047	0.815
		Top	0.0091	0.815

Mobile phone has been charge at 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)
			zero charge	intermediate charge	full charge	
134.2 kHz	15	Side 1	0.0048	0.0039	0.0041	0.815
		Side 2	0.0049	0.0048	0.0050	0.815
		Side 3	0.0056	0.0047	0.0048	0.815
		Side 4	0.0058	0.0057	0.0067	0.815
		Top	0.0085	0.0086	0.0092	0.815

5 Photographs

Refer to Setup Photos

- End of the Report -