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RF EXPOSURE REPORT

Report Reference No.....: **CTL1903153021-MPE**

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Applicant's name.....: **Spigen Korea Co., Ltd**

Address.....: Spigen HQ-A, 446, Bongeunsa-ro, Gangnam-gu, Seoul, 06153, South Korea

Testing Laboratory Name: **Shenzhen CTL Testing Technology Co., Ltd.**

Address.....: Floor 1-A, Baisha Technology Park, No. 3011, Shahehexi Road, Nanshan, Shenzhen 518055 China.

Test specification :

Standard: **FCC CFR 47 part1, 1.1307(b), 1.1310**

TRF Originator.....: Shenzhen CTL Testing Technology Co., Ltd.

Master TRF.....: Dated 2011-01

Test item description : Wireless Charging Dock

FCC ID.....: 2AFKNF309W

Trade Mark: Spigen

Model/Type reference.....: F309W

Transmit Frequency.....: 115~205 KHz

Antenna type: Loop antenna

Date of receipt of test item.....: Jul. 01, 2019

Date of sampling.....: Jul. 01, 2019

Date of Test Date: Jul. 01, 2019–Jul. 16, 2019

Data of Issue: Jul. 17, 2019

Result.....: **Pass**

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TEST REPORT

Test Report No. :	CTL1903153021-MPE	Jul. 17, 2019
		Date of issue

Equipment under Test : Wireless Charging Dock

Type / Model(s) : F309W

Applicant : **Spigen Korea Co., Ltd**

Address : Spigen HQ-A, 446, Bongeunsa-ro, Gangnam-gu, Seoul, 06153, South Korea

Manufacturer : **Shenzhen Cheng Hui Da Electronics Co., Ltd**

Address : 7th building, Fuqiao 5th industrial area, Qiaotou community, Fuyong town, Shenzhen China 518103

Test Result	PASS
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The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

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1. SUMMARY

1.1. EUT configuration

Kind of Product	Wireless Charging Dock
Model Name	F309W
Frequency Range	115~205 KHz
Antenna Type	Loop Antenna
FCC ID	2AFKNF309W

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

Shenzhen CTL Testing Technology Co., Ltd.

Floor 1-A, Baisha Technology Park, No.3011, Shahehexi Road, Nanshan District, Shenzhen, China 518055

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 (2013) and CISPR Publication 32.

2.2. Test Facility

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

CNAS-Lab Code: L7497

Shenzhen CTL Testing Technology Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No. 4343.01

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

IC Registration No.: 9518B

CAB identifier: CN0041

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements with Registration No.: 9518B on Jan. 22, 2019.

FCC-Registration No.: 399832

Designation No.: CN1216

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832, December 08, 2017.

2.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

2.4. Statement of the measurement uncertainty

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

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
total RF power, conducted	$\pm 1,5$ dB
RF power density, conducted	± 3 dB
spurious emissions, conducted	± 3 dB
all emissions, radiated	± 6 dB
temperature	$\pm 1^\circ\text{C}$
humidity	± 5 %
DC and low frequency voltages	± 3 %

3. Method of measurement

3.1. Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

According KDB 680106 D01 RF Exposure Wireless Charging Pad App v03

3.2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

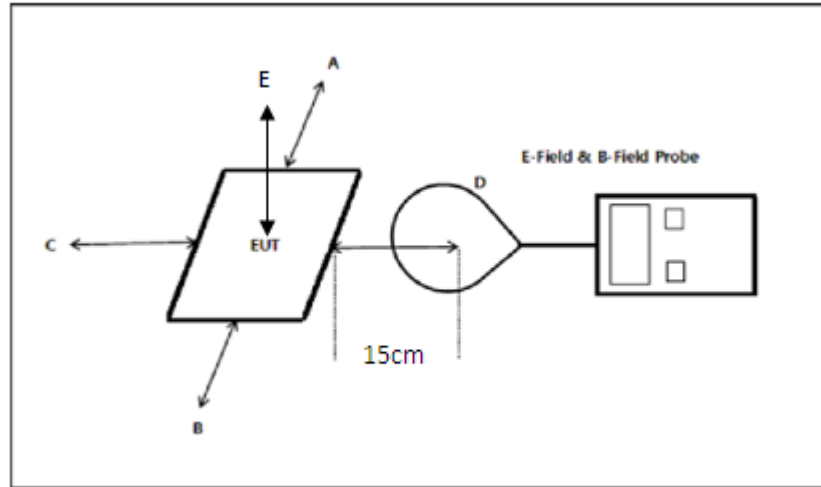
Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density

4. Test Result

4.1. Test Setup



Note: A, B, C, D, E, F for six surfaces of the product.

4.2. Test Equipment

Equipment	Manufacturer	Model	Serial no.	Calibrated date	Calibrated until
E-Field Probe	HOLADAY	HI3637	00052130	2019.5.24	2020.5.23
H-Field Probe	HOLADAY	HI3637	00052130	2019.5.24	2020.5.23

4.3. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

○ USB Cable

Manufacturer: Shenzhen Cheng Hui Da Electronics Co., Ltd

Length.: 1.5m

● Notebook PC

Manufacturer: DELL

Model: Inspiron 3180

● Mobile phone

Manufacturer: SAMSUNG

Model: S7 edge

Manufacturer: Apple Inc.

Model: iPhone XR

4.4. EUT operation mode

The charger support DC 5V/2A and DC 9V/2A input modes, this 2 modes all have been tested, only worse case was reported. worse case is DC 5V/2A input with iPhone mobile mode.

4.5. Measurement Procedure

- a) The RF exposure test was performed on 360 degree turn table in anechoic chamber.
- b) The measurement probe was placed at test distance (15cm) which is between the edge of the charger and the geometric centre of probe.
- c) The turn table was rotated 360d degree to search of highest strength.

- d) The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.
- e) The EUT were measured according to the dictates of KDB 680106 D01 RF Exposure Wireless Charging Pad App v03.

4.6. Equipment Approval Considerations

The EUT does comply with KDB 680106 D01 RF Exposure Wireless Charging Pad App v03.

- (1) Power transfer frequency is less than 1 MHz..
- (2) Output power from each primary coil is less than or equal to 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.
- (4) Client device is placed directly in contact with the transmitter.
- (5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).
- (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.

Remark: Meet all the above requirements.

4.7. E and H field Strength

Test mode for wireless charger: Normal Operation (Charging mode)

E-Filed Strength at 15 cm from the edges surrounding the EUT

Frequency Range (MHz)	Test Position A	Test Position B	Test Position C	Test Position D	Limits (V/m)
0.133	2.61	2.39	2.56	2.34	614.0

E-Filed Strength at 20 cm from the top of the EUT (V/m)

Frequency Range (MHz)	Test Position E	Limits (V/m)
0.133	1.35	614.0

H-Filed Strength at 15 cm from the edges surrounding the EUT

Frequency Range (MHz)	Test Position A	Test Position B	Test Position C	Test Position D	Limits (A/m)
0.133	0.363	0.337	0.354	0.329	1.63

H-Filed Strength at 20 cm from the top of the EUT (V/m)

Frequency Range (MHz)	Test Position E	Limits (A/m)
0.133	0.244	1.63

Test mode for wireless charger: Normal Operation (No load mode)

E-Filed Strength at 15 cm from the edges surrounding the EUT

Frequency Range (MHz)	Test Position A	Test Position B	Test Position C	Test Position D	Limits (V/m)
0.133	0.41	0.36	0.38	0.31	614.0

E-Filed Strength at 20 cm from the top of the EUT (V/m)

Frequency Range (MHz)	Test Position E	Limits (V/m)
0.133	0.19	614.0

H-Filed Strength at 15 cm from the edges surrounding the EUT

Frequency Range (MHz)	Test Position A	Test Position B	Test Position C	Test Position D	Limits (A/m)
0.133	0.131	0.120	0.128	0.106	1.63

H-Filed Strength at 20 cm from the top of the EUT (V/m)

Frequency Range (MHz)	Test Position E	Limits (A/m)
0.133	0.076	1.63

5. Test Setup Photo





.....End of Report.....