FCC Maximum Permissible Exposure(MPE) Estimation Report

For

Solytech Enterprise Corporation
1-3F, No.18, WuQuan 7 Road, WuGu District, 24890 New Taipei City, Taiwan

Model:
WS01,WS01-X(X="0-9","A-Z" for marketing purpose)

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Modified History

REV.	Modification Description	Issued Date	Remark
REV.1.0	Initial Test Report Relesse	Nov. 12, 2018	Wang Fengbing

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1. General information

1.1. Notes

The test results of this test report relate exclusively to the test item specified in this test report. World Standardization Certification & Testing Group Co., Ltd does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report is not to be reproduced or published in full without the prior written permission.

1.2. Application details

Date of receipt of test item: 2018-07-23

Start of test: 2018-11-08

End of test: 2018-11-08

1.3. EUT Description

Device Information:	
DUT Name:	WS01,WS01-X(X="0-9","A-Z" for marketing **purpose)**
Trade Mark:	SOLY TECH, Apexgaming
Applicant:	**Solytech Enterprise Corporation**
Manufacturer:	**1-3F, No.18, WuQuan 7 Road, WuGu District, 24890 New Taipei City, Taiwan**
Device Type :	Wireless Fast Charger
Exposure Category:	Uncontrolled environment/general population
Hardware Version :	N/A
Software Version :	N/A
Antenna Type :	Integral Antenna, Coil Antenna
Device Operating Configurations:	
Operating Frequency	110-205kHz

1.4. Equipment List

Equipment	Manufacturer	Type(Model)	Serial number	calibration	
				Last Cal.	Last Cal.
E-Field Probe	Narda	EF0391	D-1443	08/19/2018	08/18/2019
H-Field Probe	Narda	HF3061	D-0589	08/19/2018	08/18/2019
Meter	Narda	NBM-520	D-1561	08/19/2018	08/18/2019

2. Maximum Permissible Exposure

2.1. Test Methodology

In this report, we try to prove the safety of radiation harmfulness to the human body for our product. FCC part 2.1091 and OET Bulletin 65 is followed. Maximum power transfer efficiency is assumed as worst case for this assessment.

2.2. Power Density Calculation

An estimation of MPE in this application for product is used to ensure if it complies to the rules of the standard in the regulation list above.

Maximum permissible exposure (MPE) refers to the RF energy that is acceptable for human exposure. It is broken down into two categories, Occupational/controlled and General population/uncontrolled.

Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

We analysis if it comply with the limits for General population/uncontrolled exposure. The FCC's MPE limits for field strength and power density are given in 47CFR 1.1310(Table below).These limits are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP), and also partly based on guidelines recommended by the American National Standards Institute (ANSI) in Section 4.1 of ANSI/IEEE C95.1.

Table: Limits For Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/controlled Exposure				
Frequency Range(MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength(H)(A/m)	Power Density (S)(mW/cm^2)	Averaging Time (minute)$\|E\|^2$,$\|H\|^2$ or S
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				
Frequency Range(MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength(H)(A/m)	Power Density (S)(mW/cm^2)	Averaging Time (minute)$\|E\|^2$,$\|H\|^2$ or S
0.3-1.34	614	1.63	(100)*	30
1.34-30	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	

Per the guidance of KDB 680106, the E-field and H-field limits shown in the table above are extended down to 100kHz.

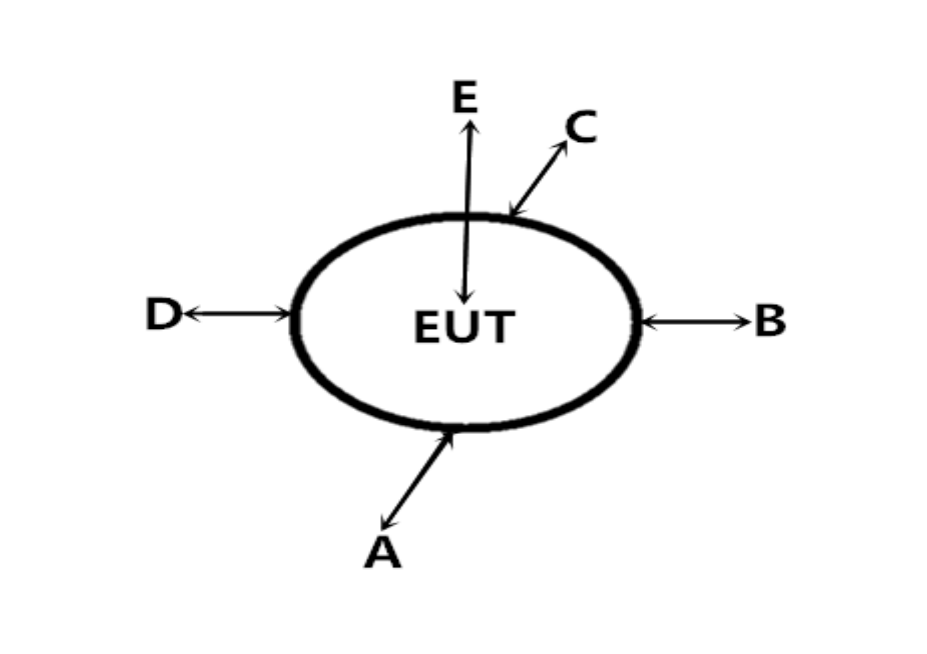
2.3. E-Field and H-Field Measurements

An alternative to calculating the power density is to measure the E-Field and H-Field. A broadband E-field and H-field probe is used to measure the field around the EUT when it is transmitting at maximum power. Each side of the EUT is measured to find the worst case emissions. Measurements are performed on a non-conducting table in a fully anechoic chamber.

The measured E- and H-fields are compared to the MPE limits in FCC part 1.1310.

3. RF Exposure Evaluation

3.1. Test Set-up



3.2. 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.

EUT Mode	Description
5 V Charging Mode with Client device	Less than 1 % of Battery
	Less than 50 % of Battery
	100 % full charging of Battery
9 V Fast Charging Mode with Client device	Less than 1 % of Battery
	Less than 50 % of Battery
	100 % full charging of Battery

Note:The above EUT information was declared by the manufacturer.

3.3. Measurement procedure

a) The RF exprosure test was performed on the table in anechoic chamber.

b) The measurement was investigated between the edge of the charger and center of the field probe in the closest state.

c) Maximum E-field and H-field measurements were made on each of five sides of the EUT that could come in contact with a user. Five sides are defined as follows: Right (B), Top (E), Left (D), Rear (C) and Front (A). Refer to the test position diagram above.

d) According to the guidance of KDB 680106 D01 v03 test distance was 15 cm on the surrounding sides from the EUT.

e) Equipment approval considerations item 5.b) of KDB 680106 D01 v03

(1) The device operates at frequency ranges as bleow.

- DC 5 V, DC 9 V : 110 kHz ~ 205 kHz

(2) Output power from each primary coil is less than or equal to 15 watts.

- DC 5 V : 5 W, DC 9 V : 9 W

(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 includes only single primary and secondary coils.

(4) Client device is placed directly in contact with the transmitter.

- Client device is placed directly in contact with the transmitter.

(5) 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 worst test result (For more detail, please refer to section 3.4)

1) The worst E-Field Strength levels at 15 cm < 50 % of the MPE E-Field Strength limit 614 V/m

9 V Less than 1 % of Battery : 1.857 V/m < 307 V/m

2) The worst H-Field Strength levels at 15 cm < 50 % of the MPE E-Field Strength limit 1.63 A/m

9 V Less than 1 % of Battery : 0.089 A/m < 0.815 A/m

3.4. E-Field and H-Field test Result

The following E-field and H-field values are the max peak measured.

- 5 V Charging Mode (Less than 1 % of Battery)

E-field

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Limit (V/m)
15	1.785	1.692	1.766	1.823	1.658	614.00
20					1.256	614.00

H-field

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Limit (A/m)
15	0.065	0.058	0.069	0.088	0.073	1.63
20					0.059	1.63

- 5 V Charging Mode (Less than 50 % of Battery)

E-field

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Limit (V/m)
15	1.689	1.512	1.622	1.734	1.662	614.00
20					1.291	614.00

H-field

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Limit (A/m)
15	0.071	0.068	0.072	0.085	0.075	1.63
20					0.061	1.63

- 5 V Charging Mode (100 % full charging of Battery)

E-field

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Limit (V/m)
15	1.636	1.681	1.610	1.698	1.592	614.00
20					1.168	614.00

H-field

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Limit (A/m)
15	0.070	0.075	0.068	0.081	0.069	1.63
20					0.052	1.63

Note: The data above show that 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.

- 9 V Fast Charging Mode (Less than 1 % of Battery)

E-field

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Limit (V/m)
15	1.823	1.712	1.815	**1.857**	1.686	614.00
20					1.221	614.00

H-field

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Limit (A/m)
15	0.072	0.066	0.070	**0.089**	0.076	1.63
20					0.051	1.63

- 9 V Fast Charging Mode (Less than 50 % of Battery)

E-field

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Limit (V/m)
15	1.736	1.710	1.728	1.811	1.668	614.00
20					1.129	614.00

H-field

Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Limit (A/m)
15	0.067	0.066	0.069	0.081	0.072	1.63
20					0.060	1.63

- 9 V Fast Charging Mode (100 % full charging of Battery)

E-field

Distance (cm)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Limit (V/m)
15	1.687	1.675	1.692	1.725	1.620	614.00
20					1.112	614.00

H-field

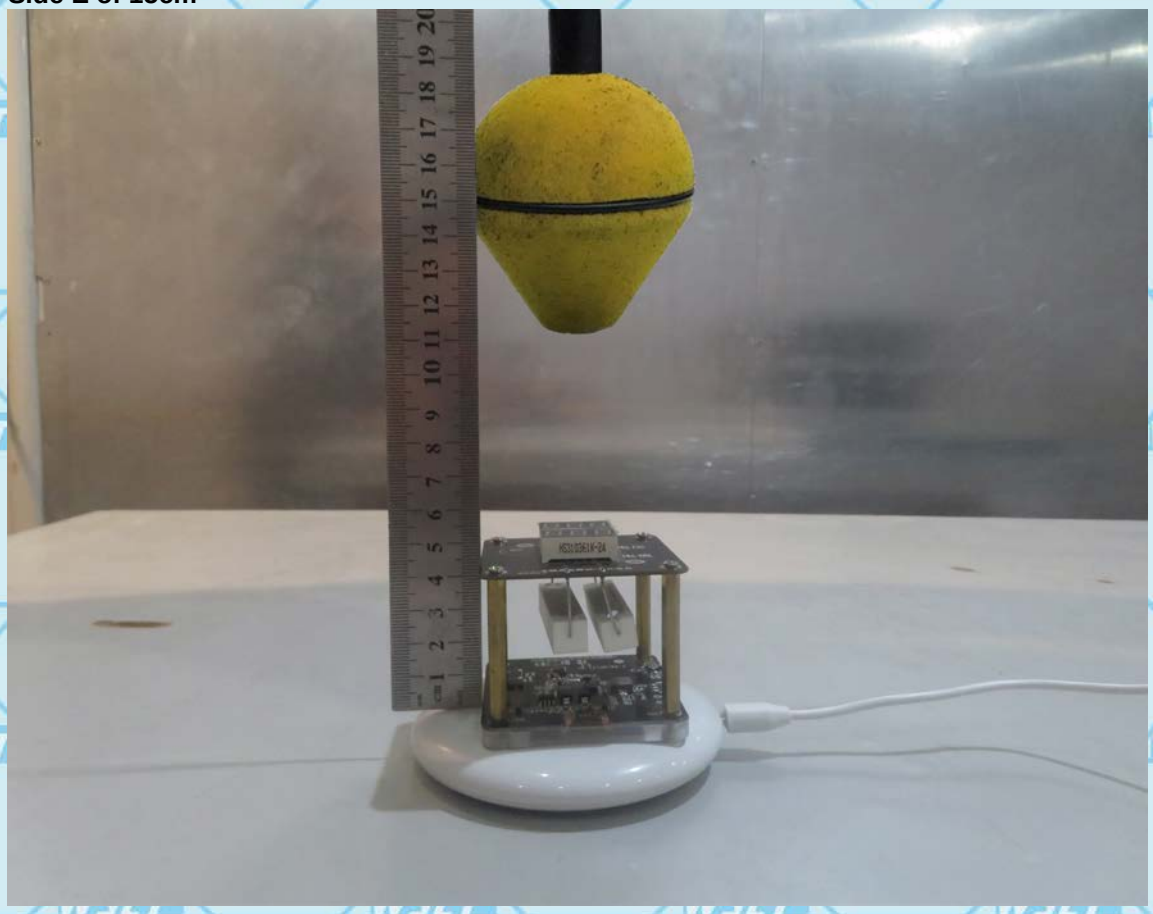
Distance (cm)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Limit (A/m)
15	0.072	0.070	0.071	0.078	0.069	1.63
20					0.050	1.63

Note: The data above show that 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.

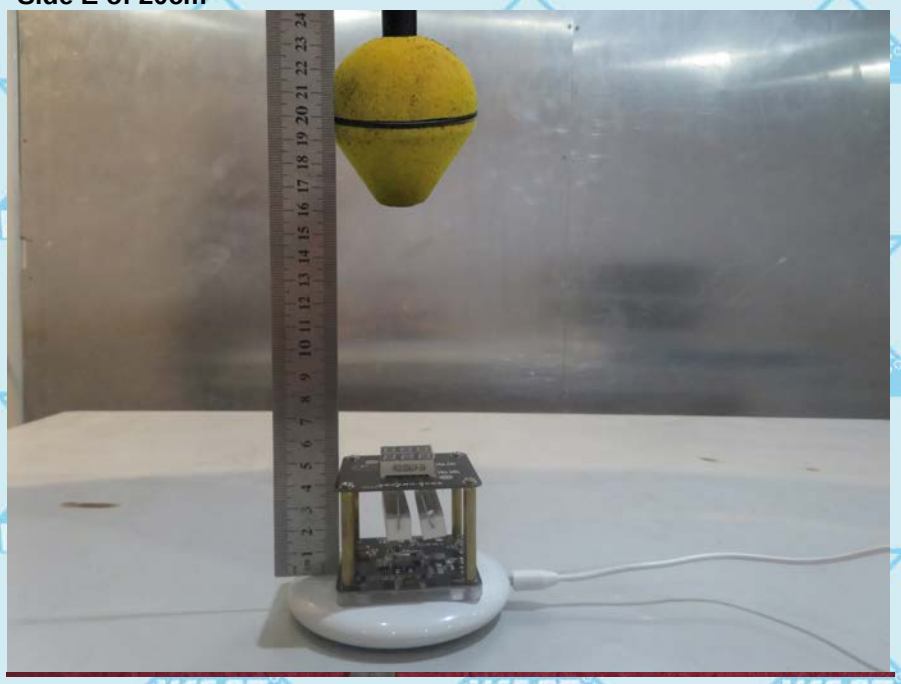
4. PHOTOGRAPHS

4.1 Test photos

Side E of 15cm



Side E of 20cm



Side C