

TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID : 2ANS4-KWA-01

Equipment Under Test : Kabis Wireless Charger
Model Name : KWA-01
Applicant : BOO YOUNG INDUSTRY CO.
Manufacturer : BOO YOUNG INDUSTRY CO.
Date of Receipt : 2017.06.13
Date of Test(s) : 2017.09.06 ~ 2018.01.22
Date of Issue : 2018.01.22

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

Tested By:



Date:

2018.01.22

Jinhyoung Cho

Technical
Manager:



Date:

2018.01.22

Harim Lee

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

Table of contents

1. General information -----	3
2. Test Result -----	5

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

1. General information

1.1. Testing laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

Phone No. : +82 31 688 0901

Fax No. : +82 31 688 0921

1.2. Details of applicant

Applicant : BOO YOUNG INDUSTRY CO.

Address : Gasan-myeon, 1266-10, Hoguk-ro, Chilgok-gun, Gyeongsangbuk-do, Korea

Contact Person : Lee Young-Kwon

Phone No. : +82 54 972 5500

1.3. Details of manufacturer

Applicant : BOO YOUNG INDUSTRY CO.

Address : Gasan-myeon, 1266-10, Hoguk-ro, Chilgok-gun, Gyeongsangbuk-do, Korea

1.4. Description of EUT

Kind of Product	Kabis Wireless Charger
Model Name	KWA-01
Power Supply	DC 12 V
Frequency Range	137 kHz ~ 183 kHz
Antenna Type	Inductive loop coil antenna
H/W Version	FWTKA11C_Rev0.5C

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

1.5. Test Equipment List

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Interval	Cal. Due
E-Field Probe	D.A.R.E!! Instruments	RadiSense 4	13I00444SNO04	Jun. 22, 2017	Annual	Jun. 22, 2018
Magnetic Field Sensor	HIOKI	0850-C1	3472	Jun. 26, 2017	Annual	Jun. 26, 2018
Magnetic Field Hitester	HIOKI	FT3470-50	140430999	Jun. 12, 2017	Annual	Jun. 12, 2018
DC Power Supply	Agilent	U8002A	MY50020026	Dec. 07, 2017	Annual	Dec. 07, 2018
Anechoic Chamber	SY Corporation	L x W x H (9.6 m x 6.4 m x 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-G930V	A3LSMG930US

1.6. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL011867	2017.10.11	Initial
1	F690501/RF-RTL011867-1	2018.01.18	Added test result for each distance
2	F690501/RF-RTL011867-2	2018.01.22	Added retest result for 99% battery status

1.7. Worst case of test configurations

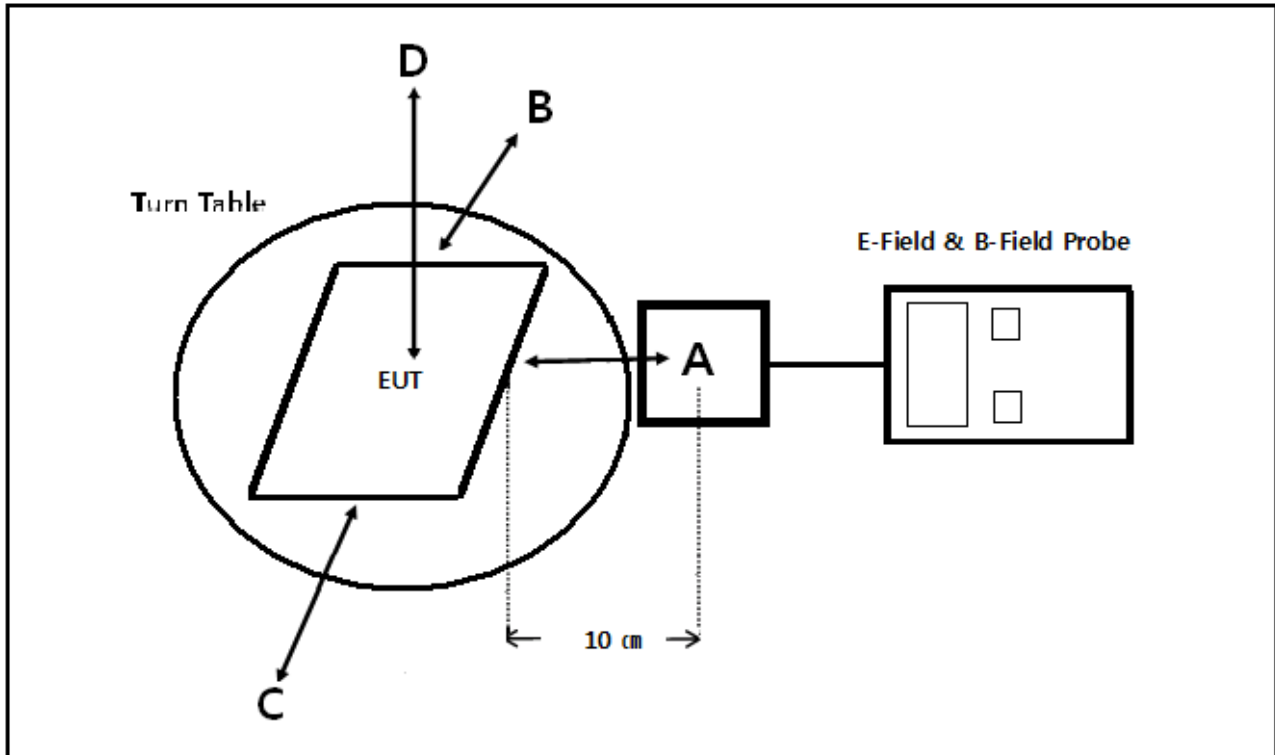
In order to check all kinds of possible configurations, EUT was evaluated with appropriate client and under each charging condition as below table.

EUT configuration	Description
Charging Mode with client device (Model : SM-G930V, FCC ID : A3LSMG930US)	1 % of battery
	50 % of battery
	99 % of battery

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

2. Test Result

2.1. Test Setup



2.2. Measurement procedure

- The RF exposure test was performed in anechoic chamber.
- The measurement probe was placed at test distance (0, 2, 4, 6, 8, 10 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) were completed.
- The EUT was measured according to the dictates of KDB 680106 D01 v02.

Note;

- Rear and bottom of EUT shall be connected into the vehicle. So these parts are not considered from MPE measurement.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

2.3. Equipment Approval Considerations item 5.2 of KDB 680106 D01 v02.

- a) Power transfer frequency is less than 1 MHz.
 - The device operates at a frequency of 137 kHz to 183 kHz.
- b) Output power from each primary coil is less than 5 watts
 - Output power from primary coil : 9 watts.
- c) 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.
- d) Client device is inserted in or placed directly in contact with the transmitter.
 - Client device is placed directly in contact with the transmitter.
- e) The maximum coupling surface area of the transmit (charging) device is between 60 cm² and 400 cm².
 - The EUT coupling surface area : 14.7 cm (W) × 7.2 cm (H) = 105.84 cm²,
 60 cm² < 105.84 cm² < 400 cm²
- f) Aggregate leakage fields at 10 cm surrounding the device from all simultaneous transmitting coils are demonstrated to be less than 30 % of the MPE limit.
 - Refer to following test results.
The EUT E-Field Strength levels at 0 cm < 30 % of the MPE E-Field Strength limit 614 V/m
 28.80 V/m (Max. at 0 cm) < 184.20 V/m

The EUT H-Field Strength levels at 0 cm < 30 % of the MPE H-Field Strength limit 1.63 A/m
 1.48 A/m (Max. at 0 cm) > 0.489 A/m

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

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				
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/1 500	30
1 500 – 100 000			1.0	30

f = frequency in MHz

* = Plane wave equivalent power density

Note 1 to Table 1: 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.

Note 2 to Table 1: 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.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

2.5. E and H field strength

Ambient temperature : (23 ± 1) °C
 Relative humidity : 47 % R.H.

2.5.1. E-Field Strength from the edges surrounding the EUT

Test condition: Charging mode (1 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (V/m)	Probe Position B (V/m)	Probe Position C (V/m)	Probe Position D (V/m)	Limits (V/m)
137 ~ 183	10	4.79	5.17	5.64	8.35	614.00
	8	5.05	6.65	6.54	11.70	
	6	7.03	10.80	9.20	17.30	
	4	9.06	11.60	11.30	18.60	
	0(closest)	14.50	17.20	15.30	28.20	

Test condition: Charging mode (50 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (V/m)	Probe Position B (V/m)	Probe Position C (V/m)	Probe Position D (V/m)	Limits (V/m)
137 ~ 183	10	4.73	5.10	5.55	8.21	614.00
	8	5.09	6.70	6.63	11.80	
	6	7.09	10.76	9.18	17.20	
	4	9.04	11.80	11.00	18.80	
	0(closest)	14.30	17.00	15.50	28.80	

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

Test condition: Charging mode (99 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (V/m)	Probe Position B (V/m)	Probe Position C (V/m)	Probe Position D (V/m)	Limits (V/m)
137 ~ 183	10	4.60	5.38	5.73	8.28	614.00
	8	5.03	6.63	6.70	11.61	
	6	6.98	10.88	9.26	17.48	
	4	9.11	11.43	11.70	18.64	
	0(closest)	14.30	17.10	15.86	28.50	

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

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

Test condition: Charging mode (1 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (A/m)	Probe Position B (A/m)	Probe Position C (A/m)	Probe Position D (A/m)	Limits (A/m)
137 ~ 183	10	0.18	0.15	0.22	0.35	1.63
	8	0.17	0.14	0.20	0.33	
	6	0.19	0.17	0.22	0.45	
	4	0.23	0.18	0.27	0.57	
	2	0.42	0.20	0.34	0.89	
	0(closest)	0.60	0.30	0.49	1.45	

Test condition: Charging mode (50 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (A/m)	Probe Position B (A/m)	Probe Position C (A/m)	Probe Position D (A/m)	Limits (A/m)
137 ~ 183	10	0.16	0.12	0.21	0.30	1.63
	8	0.17	0.14	0.21	0.34	
	6	0.19	0.18	0.22	0.46	
	4	0.23	0.18	0.28	0.57	
	2	0.42	0.20	0.35	0.89	
	0(closest)	0.60	0.30	0.49	1.41	

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

Test condition: Charging mode (99 % battery status of client device)

Frequency Range (kHz)	Distance (cm)	Probe Position A (A/m)	Probe Position B (A/m)	Probe Position C (A/m)	Probe Position D (A/m)	Limits (A/m)
137 ~ 183	10	0.17	0.15	0.22	0.34	1.63
	8	0.17	0.15	0.20	0.33	
	6	0.20	0.17	0.22	0.45	
	4	0.22	0.18	0.28	0.56	
	2	0.40	0.20	0.34	0.88	
	0(closest)	0.61	0.29	0.49	1.48	

Remark;

 1. H-field strength (A/m) = B-field (μ T) / 1.25

- End of the Test Report -

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.