

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : W15DR-D012

AGR No : A15NA-011

Applicant : IGC Co., Ltd.

Address : Halla SigmaValley 6F-Room. 606, 1 gongdan-ro 212, Gumi-si, Gyeongsangbuk-do, 39376, Korea

Manufacturer : IGC Co., Ltd.

Address : Halla SigmaValley 6F-Room. 606, 1 gongdan-ro 212, Gumi-si, Gyeongsangbuk-do, 39376, Korea

Type of Equipment : Wireless Charger Wi-Pi

FCC ID. : 2AGOU-WIPL15B-A

Model Name : WIPL15B-A

Multiple Model Name : WIPL15B-C, WIPL15W-A

Serial number : N/A

Total page of Report : 19 pages (including this page)

Date of Incoming : November 18, 2015

Date of issue : December 18, 2015

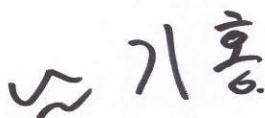
SUMMARY

The equipment complies with the regulation; **FCC CFR47 Part 15 Subpart C Section 15.207 and 15.209, 2.1049.**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Reviewed by:



Ki-Hong, Nam / Asst, Chief Engineer
ONETECH Corp.

Approved by:



Sung-Ik, Han/ Managing Director
ONETECH Corp.

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Revision History

Issue Report No.	Issued Date	Revisions	Effect Section
W15DR-D012	December 18, 2015	Initial Release	All

1. VERIFICATION OF COMPLIANCE

APPLICANT : IGC Co., Ltd.
 ADDRESS : Halla SigmaValley 6F-Room. 606, 1 gongdan-ro 212, Gumi-si, Gyeongsangbuk-do, 39376, Korea
 CONTACT PERSON : InKyu, Kim / Chief Executive Officer
 TELEPHONE NO : +82-70-8248-9198
 FCC ID : 2AGOU-WIPL15B-A
 MODEL NAME : WIPL15B-A
 BRAND NAME : N/A
 SERIAL NUMBER : N/A
 DATE : December 18, 2015

EQUIPMENT CLASS	DCD – Part 15 Low Power Transmitter Below 1 705 kHz
KIND OF EQUIPMENT	Wireless Charger Wi-Pi
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC CFR47 Part 15 Subpart C Section 15.207 and 15.209, 2.1049
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.209, 15.209(a)	Radiated emission, Spurious Emission and Field Strength of Fundamental	Met the Limit / PASS
2.1049	20 dB Bandwidth	Met the Limit / PASS
15.207	Transmitter AC Power Line Conducted Emission	N/A(Note 1)

* Note 1 : This test is not performed because the EUT is operated by DC 5 V.

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 2.1.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.10: 2013 at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 301-14, Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862 Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-4617/ G-666/ T-1842 IC (Industry Canada) – Registration No. Site# 3736-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

3. GENERAL INFORMATION

3.1 Product Description

The IGC Co., Ltd., Model: WIPL15B-A (referred to as the EUT in this report) is an Wireless Charger Wi-Pl. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Wireless Charger
OPERATING FREQUENCY	110 kHz ~ 205 kHz
RATED RF OUTPUT POWER	75.90 dBμV/m
ANTENNA TYPE	Coil Antenna
MODULATION	ASK
LIST OF EACH OSC. OR CRY. FREQ.(FREQ. >= 1 MHz)	110 kHz ~ 205 kHz
RATED SUPPLY VOLTAGE	DC 5.0 V

3.2 Model Differences

The following lists consist of the added model and their differences.

Model Name	Differences	Tested
WIPL15B-A	Basic Model (Black / Stand Type)	☒
WIPL15B-C	This model is identical to basic model except for stationary type and enclosure's color. (Black / CD Slot Type)	☐
WIPL15W-A	This model is identical to basic model except for stationary type and enclosure's color. (White / Stand Type)	☐

Note: 1. Applicant consigns only basic model to test, therefore this test report just guarantees the units which have been tested.

2. The Applicant/manufacture is responsible for the compliance of all variants.

4. EUT MODIFICATIONS

-. None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	N/A	FIT-WPT112M-IGC	N/A

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested: None

5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting is programmed.

For final testing, the EUT was set at Max. load (110 kHz), Mid. load (158 kHz), and Min. load (205 kHz). To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

Mode	Charging current	Description
Charging Mode With load	1 000 mA	Using Max. load
	500 mA	Using Mid. load
	100 mA	Using Min. load

5.4 Configuration of Test System

Line Conducted Test : It is not need to test this requirement, because the EUT shall be operated by DC battery.

Radiated Emission Test : Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.5 Antenna Requirement

According to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The antenna of the EUT is a Coil Antenna on the main board in the EUT, so no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
It is not need to test this requirement, because the power of the EUT is supplied by battery.	

6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

7. 20 dB BANDWIDTH

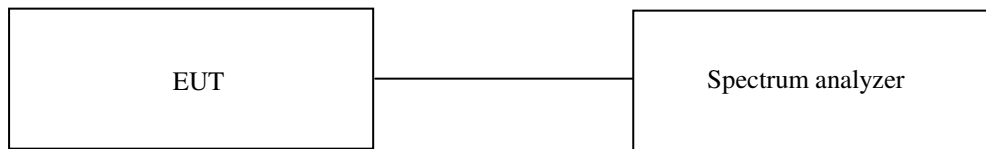
7.1 Operating environment

Temperature : 21.1 °C
Relative humidity : 48.2 % R.H.

7.2 Test set-up

- Span = approximately 2 to 3 times the 20 dB bandwidth, RBW = greater than 1 % of the 20 dB bandwidth, VBW = RBW, Sweep = auto, Detector = peak, Trace = max hold.
- The marker-to-peak function to set the mark to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level.

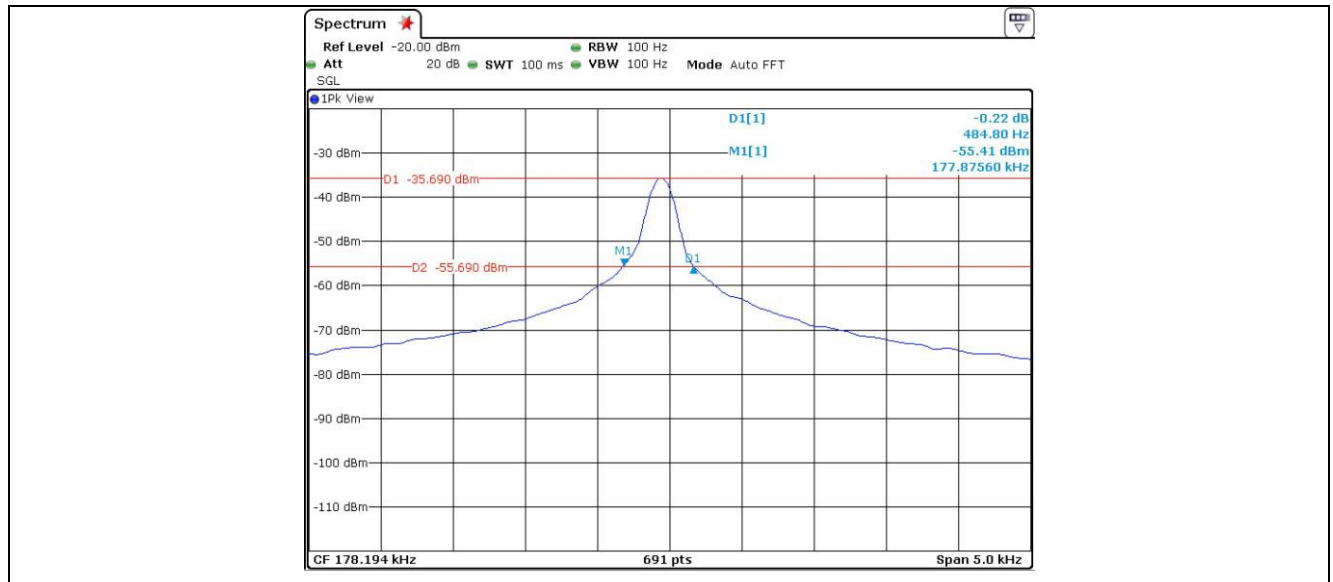
The marker-delta reading at this point is 20 dB bandwidth of the emission.



7.3 Test data

-. Test Date : December 03, 2015

20 dB Bandwidth : 484.8 Hz




Tested by: Tae-Ho, Kim / Senior Engineer

8. Spurious Emission Test

8.1 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency [MHz]	Field strength [μ V/m]	Field strength [dBμ V/m]	Measurement distance [m]
0.009 ~ 0.490	2 400 / F (kHz)		300
0.490 ~ 1.705	24 000 / F (kHz)		30
1.705 ~ 30	30	29.50	30
30 ~ 88	*100	40.00	3
88 ~ 216	*150	43.52	3
216 ~ 960	*200	46.02	3
Above 960	500	53.98	3

*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 ~ 72 MHz, 76 ~ 88 MHz, 174 ~ 216 MHz or 470 ~ 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

8.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 kHz to 1 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 ms in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

8.3 Test data for Using Max load (1 000 mA)

8.3.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48.2 % R.H.

Temperature: 21.1 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : Wireless Charger Wi-Pi

Date: December 03, 2015

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
0.016	36.5	H	20.10	0.1	56.70	123.52	-66.82
0.035	36.2	V	18.50	0.1	54.80	116.72	-61.92
0.097	26.3	V	18.20	0.1	44.60	107.87	-63.27
*0.121	57.7	H	18.10	0.1	75.90	105.95	-30.05
0.389	26.7	H	18.10	0.1	44.90	95.81	-50.91
27.702	44.2	V	21.70	0.8	66.70	70.00	-3.30

-. Remark: "H" Horizontal, "V" Vertical

-. "*" Means Fundamental frequency

-. Emission Level [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBμV/m] – Limit [dBμV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz



Tested by: Tae-Ho, Kim / Senior Engineer

8.3.2 Spurious Radiated Emission below 1 GHz

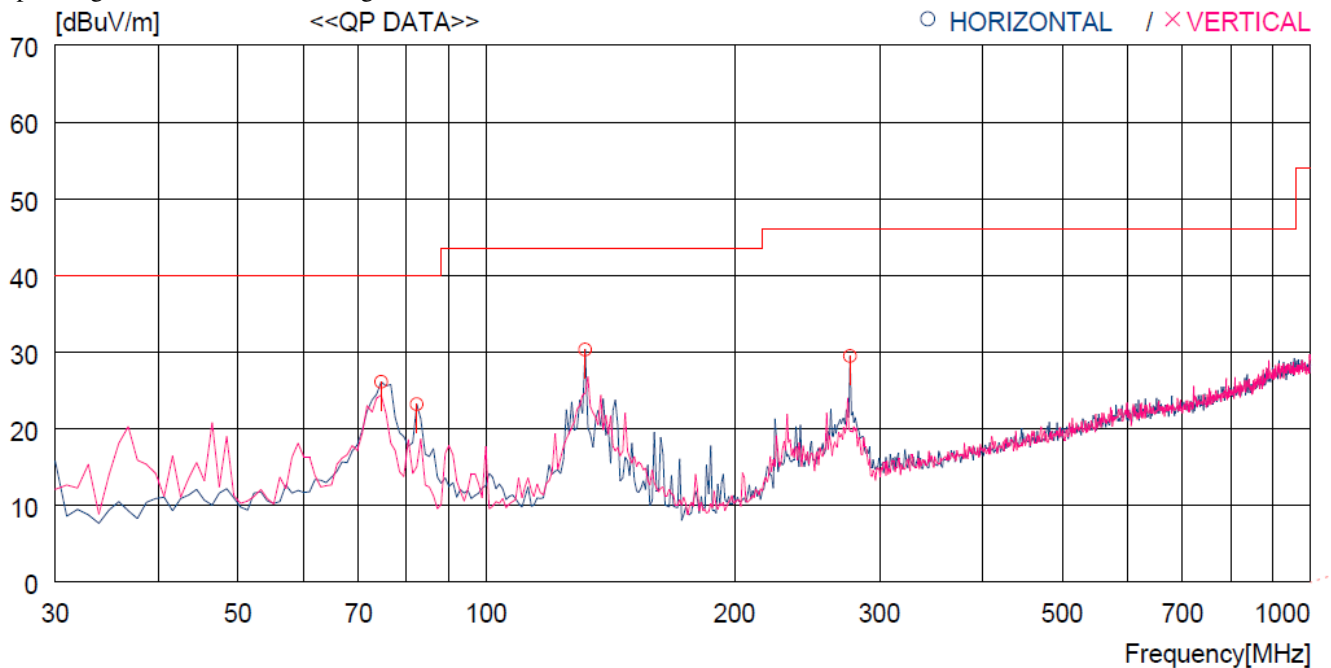
The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48.2 % R.H. Temperature: 21.1 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209
 Frequency range : 30 MHz ~ 1 000 MHz
 Result : PASSED

EUT : Wireless Charger Wi-Pi

Date: December 03, 2015

Operating Condition : Transmitting Mode



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	74.620	48.1	8.7	2.5	33.2	26.1	40.0	13.9	300	359
2	82.380	45.7	8.1	2.6	33.2	23.2	40.0	16.8	200	149
3	131.850	51.1	9.0	3.3	33.1	30.3	43.5	13.2	200	0
4	276.380	44.4	13.0	4.8	32.7	29.5	46.0	16.5	100	124

Tested by: Tae-Ho, Kim / Senior Engineer

8.4 Test data for Using Mid. load (500 mA)**8.4.1 Spurious Radiated Emission Below 30 MHz**Humidity Level : 48.2 % R.H.Temperature: 21.1 °CLimits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : Wireless Charger Wi-Pi

Date: December 03, 2015

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
0.016	34.3	H	20.10	0.1	54.50	123.52	-69.02
0.031	33.9	H	18.60	0.1	52.60	117.78	-65.18
*0.159	53.2	H	18.10	0.1	71.40	103.58	-32.18
0.419	36	H	18.10	0.1	54.20	95.16	-40.96
0.687	27.2	H	18.10	0.1	45.40	70.87	-25.47
27.731	44.3	V	21.70	0.8	66.80	70.00	-3.20

-. Remark: "H" Horizontal, "V" Vertical

-. "*" Means Fundamental frequency

-. Emission Level [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBμV/m] – Limit [dBμV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz



Tested by: Tae-Ho, Kim / Senior Engineer

8.4.2 Spurious Radiated Emission below 1 GHz

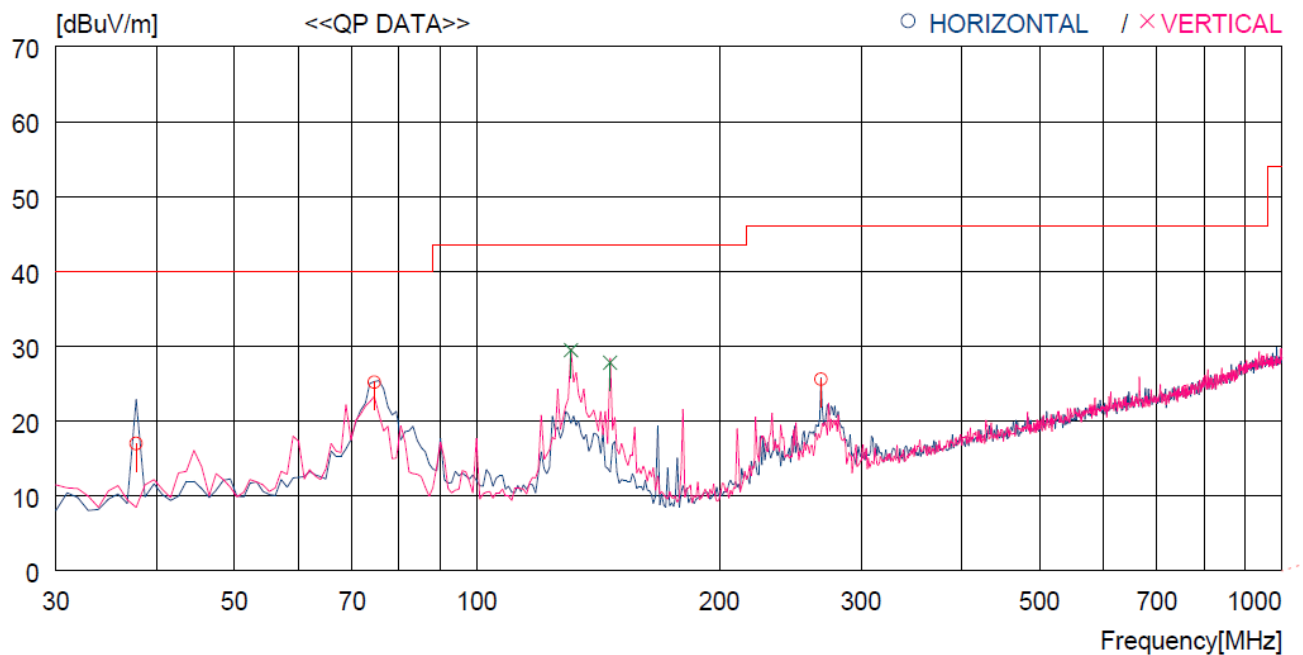
The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48.2 % R.H. Temperature: 21.1 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209
 Frequency range : 30 MHz ~ 1 000 MHz
 Result : PASSED

EUT : Wireless Charger Wi-Pi

Date: December 03, 2015

Operating Condition : Transmitting Mode



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
		[dBuV]	[dB]							
----- Horizontal -----										
1	37.760	35.4	12.7	1.8	32.9	17.0	40.0	23.0	200	0
2	74.620	47.2	8.7	2.5	33.2	25.2	40.0	14.8	400	0
3	267.650	40.8	12.8	4.8	32.8	25.6	46.0	20.4	100	359
----- Vertical -----										
4	130.880	50.2	9.1	3.3	33.1	29.5	43.5	14.0	100	0
5	146.400	49.0	8.3	3.5	33.0	27.8	43.5	15.7	100	165

Tested by: Tae-Ho, Kim / Senior Engineer

8.5 Test data for Using Min. load (100 mA)

8.5.1 Spurious Radiated Emission Below 30 MHz

Humidity Level : 48.2 % R.H.

Temperature: 21.1 °C

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209

Frequency Range : 9 kHz ~ 30 MHz

Result : PASSED

EUT : Wireless Charger Wi-Pi

Date: December 03, 2015

Operating Condition : Transmitting Mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
0.015	36.9	H	20.30	0.1	57.30	124.08	-66.78
0.031	32.7	H	18.60	0.1	51.40	117.78	-66.38
0.063	26.3	V	18.30	0.1	44.70	111.62	-66.92
*0.201	57.2	H	18.10	0.1	75.40	101.54	-26.14
0.419	36	H	18.10	0.1	54.20	95.16	-40.96
27.731	44.3	V	21.70	0.8	66.80	70.00	-3.20

-. Remark: "H" Horizontal, "V" Vertical

-. "*" Means Fundamental frequency

-. Emission Level [dB μ V/m] = Reading [dBμV] + Ant. Factor [dB/m] + Cable Loss [dB]

-. Margin [dB] = Emission Level [dBμV/m] – Limit [dBμV/m]

-. Limit calculation: Limit at specified distance + 40log (300/3) = Limit + 80 dB for up to 0.49 MHz

Limit at specified distance + 40log (30/3) = Limit + 40 dB for above 0.49 MHz, Below 30 MHz



Tested by: Tae-Ho, Kim / Senior Engineer

8.5.2 Spurious Radiated Emission below 1 GHz

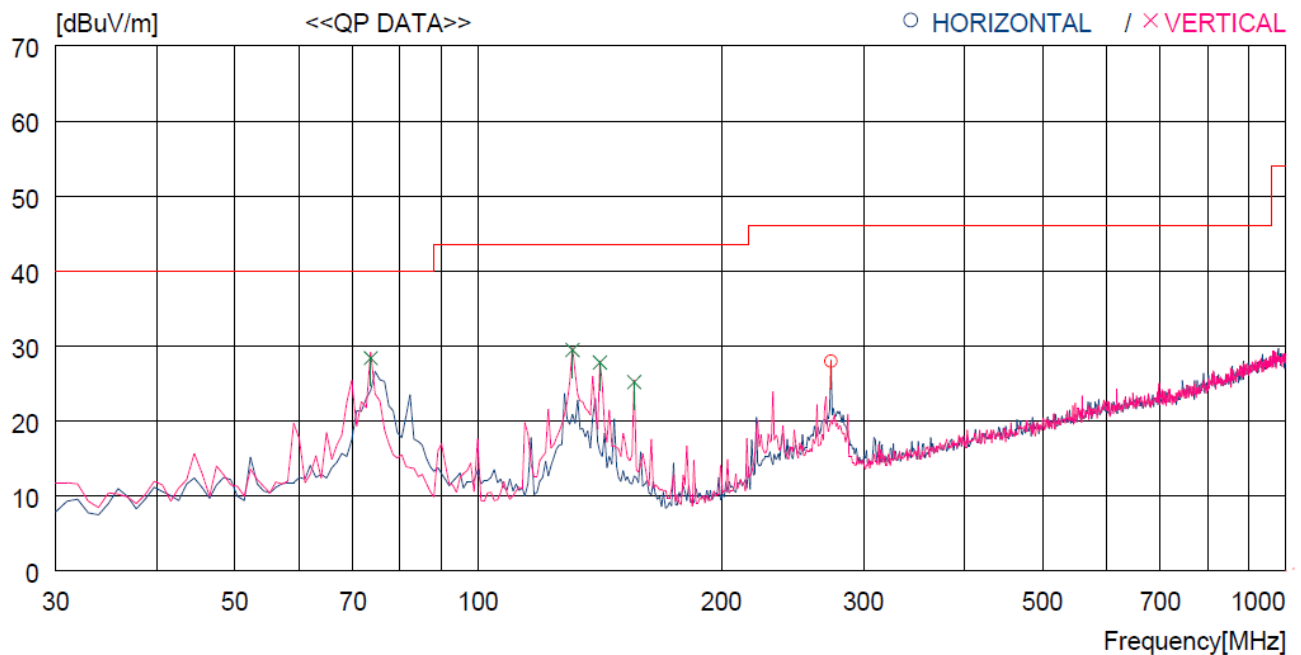
The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 48.2 % R.H. Temperature: 21.1 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209
 Frequency range : 30 MHz ~ 1 000 MHz
 Result : PASSED

EUT : Wireless Charger Wi-Pi

Date: December 03, 2015

Operating Condition : Transmitting Mode



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
		[dBuV]	[dB]							
----- Horizontal -----										
1	273.470	43.0	13.0	4.8	32.8	28.0	46.0	18.0	100	359
----- Vertical -----										
2	73.650	50.1	8.9	2.5	33.1	28.4	40.0	11.6	200	187
3	130.880	50.2	9.1	3.3	33.1	29.5	43.5	14.0	100	138
4	141.550	49.4	8.1	3.4	33.1	27.8	43.5	15.7	200	359
5	156.100	46.1	8.5	3.6	33.0	25.2	43.5	18.3	200	359

Tested by: Tae-Ho, Kim / Senior Engineer

9. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESCI	101012	Nov. 02, 2015	One Year	■
2.		R/S	ESU	100261	Apr. 29, 2015	One Year	■
3.		R/S	ESPI	101278	Nov. 02, 2015	One Year	■
4.	Spectrum analyzer	R/S	FSV30	101372	April 29, 2015	One Year	■
5.	Amplifier	Sonoma Instrument	310N	312544	Apr. 29, 2015	One Year	■
6.	Amplifier	Sonoma Instrument	310N	312545	Apr. 29, 2015	One Year	■
7.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-255	May 02, 2014	Two Year	■
8.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-421	Jul. 10, 2014	Two Year	■
9.	Controller	Innco System	CO2000	619/27030611/L	N/A	N/A	■
10.	LISN	EMCO	3825/2	9109-1867	Apr. 29, 2015	One Year	■
				9109-1869	Apr. 29, 2015	One Year	-
		Schwarzbeck	NSLK8126	8126-404	Apr. 29, 2015	One Year	-
		Schwarzbeck	NSLK8128	8128-216	Apr. 06, 2015	One Year	■
11.	Turn Table	Innco System	DT3000	930611	N/A	N/A	■
12.	Antenna Master	Innco System	MA4000-EP	MA4000/332	N/A	N/A	■
13.	Antenna Master	Innco System	MA4000-EP	MA4000/335	N/A	N/A	■
14.	Loop Antenna	R/S	HFH2-Z2	879285/26	Dec. 09, 2014	Two Year	■
15.	Frequency Counter	HP	53152A	US39270295	Oct. 07, 2015	One Year	■
16.	Chamber	Sam Kun	SSE-43CI-A	060712	May 15, 2015	One Year	■
17.	DC Power Supply	Digital Electronics	DRP-305DN	4030195	Sep. 03, 2015	One Year	■