TEST REPORT

DT&C Co., Ltd. 42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea Tel : 031-321-2664, Fax : 031-321-1664	Report No : DRTFCC1512-0269(1) Pages:(1) / (16) page	Dt&C

1. Customer
   - Name : RFTECH
   - Address : 60, Jugyangdaero 1763Beon-gil, Wonsam-myeon, Cheoin-gu, Yong-in-si, Gyeonggi-do, Korea
2. Use of Report : FCC Original Grant
3. Product Name (FCC ID): Wireless Charger & Power Bank (PPXRWT-0100)
4. Date of Test : 2015-12-07 ~ 2015-12-15
5. Test Method Used : FCC Part 15 Subpart C
6. Testing Environment : See appended test report
7. Test Result : ☒ Pass ☐ Fail

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.

Affirmation	Tested by Name : KwiCheol, Yeom (Signature)	Technical Manager Name : Geunki Son (Signature)

2016 . 01 . 13 .

DT&C Co., Ltd.

Test Report Version

Test Report No.	Date	Description
DRTFCC1512-0269	Dec. 23, 2015	Initial issue
DRTFCC1512-0269(1)	Jan 13, 2016	Update the Radiated Emissions data

CONTENTS

1. Equipment information 4
1.1 Equipment description 4
1.2 Support equipment 4
2. Information about test items 5
2.1 Test mode 5
2.2 Tested environment 5
2.5 EMI Suppression Device(s)/Modifications 5
3. Facilities and Accreditations 6
3.1 Facilities 6
3.2 Equipment 6
4. Test Report 7
4.1 Summary of tests 7
4.2 Transmitter requirements 8
4.2.1 20 dB Bandwidth 8
4.2.2 Radiated Emissions 9
4.2.3 AC Line Conducted Emissions 11
5. Antenna Requirements 14
APPENDIX I 15

1. Equipment information

1.1 Equipment description

FCC Equipment Class	Part 15 Low Power Transmitter Below 1705 kHz (DCD)
Equipment type	Wireless Charger & Power Bank
Equipment model name	RWT-0100
Equipment add model name	N/A
Equipment serial no.	Identical prototype
Hardware Version	1.0
Frequency	110 ~ 205 kHz
Output power	Max : 5 W
Power	AC 120V 60Hz DC 5 V
Antenna type	Coil Antenna(single coil)

1.2 Support equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
Power Adapter	EP-TA10EWE	RT2F222FS/B- E	SAMSUNG	-
Power Patch	EP-CN900IWU	RT1F214AS/6- E	SAMSUNG	-
-	-	-	-	-

Note: The above equipment was supported by manufacturer.

2. Information about test items

2.1 Test mode

This device has been tested with the below test modes and charging current conditions:

Charging Current	Support Equipment
300mA	Wireless Charging Cover
600mA	
1000mA(Max)	

2.2 Tested environment

Temperature	:	22 ~ 25 °C
Relative humidity content	:	35 ~ 43 % R.H.
Details of power supply	:	AC 120V 60Hz DC 5V

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing
→ None

3. Facilities and Accreditations

3.1 Facilities

The semi anechoic chamber and conducted measurement facility used to collect the radiated and conducted test data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935 The site is constructed in conformance with the requirements.

- Semi anechoic chamber registration Number: 165783

3.2 Equipment

Radiated emissions are measured with one or more of the following types of antennas: loop, tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide horn. Spectrum analyzers with pre-selectors and peak, quasi-peak detectors are used to perform radiated measurements.
Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

4. Test Report

4.1 Summary of tests

FCC Part Section(s)	RSS Section(s)	Parameter	Limit	Test Condition	Status Note 1
Test Items					
2.1049	N/A	20 dB Bandwidth	N/A	Radiated	**C**
15.209	RSS-Gen [8.5]	Radiated Emission	FCC 15.209 limits		**C** Note2
15.207	RSS-Gen [8.8]	AC Conducted Emissions	FCC 15.207 limits	AC Line Conducted	**C** Note3
15.203	RSS-Gen [6.7]	Antenna Requirements	FCC 15.203	-	**C**

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

Note 2: This test item was performed in each axis and the worst case data was reported.

Note 3: Power Adapter has been used in the test.

The sample was tested according to the following specification:
ANSI C-63.4 2014

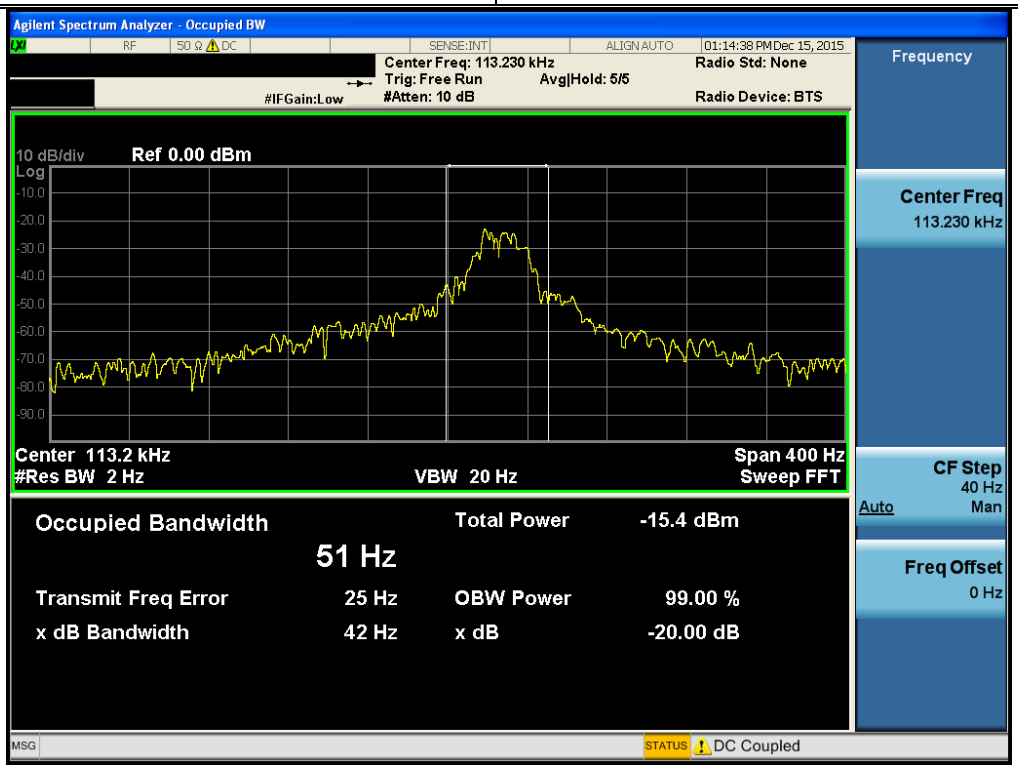
4.2 Transmitter requirements

4.2.1 20 dB Bandwidth

- Procedure:

The 20 dB bandwidth is measured with a spectrum analyzer connected via a receiving antenna placed near the EUT while the EUT is operating.

Tested Frequency(kHz)	Test Results(kHz)
113.230	0.042



4.2.2 Radiated Emissions

- Limit: FCC Part 15.209(a) & RSS-GEN 8.5

Frequency [MHz]	Field Strength [uV/m]	Measurement Distance [Meters]
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

** Except as provided in 15.209(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. 15.231 and 15.241.

- Procedure: ANSI C63.4 2014

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 ㎓, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 ㎓, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. In order to find out the highest emission, the relative positions of this EUT was rotated through three orthogonal axes.
5. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
6. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 10 ㎤ lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 ㎤ margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- Measurement Data: Comply (refer to the next page)

- Measurement Data:

Measurement Distance : **3 Meters**

Tested Frequency	Note.1	Freq. [MHz]	Det. Mode	ANT Pol.	Reading [dBuV]	T.F [dB/m]	D.C.F.	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
Lowest	S	0.050	PK	F	46.40	19.30	80	-14.30	33.62	47.92
	F	0.113	PK	F	65.60	19.30	80	4.90	26.54	21.64
	S	0.562	PK	F	34.60	19.10	40	13.70	32.61	18.91
	S	1.920	PK	F	14.00	19.30	40	-6.70	29.54	36.24
	S	41.761	PK	V	46.60	-17.10	0	29.50	40.00	10.50
	S	173.557	PK	H	46.50	-15.20	0	31.30	43.50	12.20
	S	447.643	PK	H	40.10	-8.80	0	31.30	46.00	14.70
	S	978.022	PK	V	26.10	0.90	0	27.00	54.00	27.00
	F	0.113	PK	T	64.40	19.30	80	3.70	26.54	22.84
	S	0.562	PK	T	33.20	19.10	40	12.30	32.61	20.31
	S	6.020	PK	T	27.40	19.90	40	7.30	29.54	22.24
Middle	S	0.050	PK	F	45.60	19.30	80	-15.10	33.62	48.72
	F	0.147	PK	F	56.40	19.30	80	-4.30	24.26	28.56
	S	0.732	PK	F	28.80	19.20	40	8.00	30.31	22.31
	S	1.911	PK	F	13.00	19.30	40	-7.70	29.54	37.24
	S	42.004	PK	V	45.10	-17.10	0	28.00	40.00	12.00
	S	173.193	PK	H	47.20	-15.10	0	32.10	43.50	11.40
	S	476.794	PK	H	39.90	-8.80	0	31.10	46.00	14.90
	S	993.910	PK	V	26.00	1.10	0	27.10	54.00	26.90
	F	0.148	PK	T	53.50	19.30	80	-7.20	24.20	31.40
	S	0.737	PK	T	26.40	19.20	40	5.60	30.25	24.65
	S	5.580	PK	T	26.60	19.80	40	6.40	29.54	23.14
Highest	S	0.050	PK	F	45.80	19.30	80	-14.90	33.62	48.52
	F	0.179	PK	F	51.80	19.30	80	-8.90	22.55	31.45
	S	0.543	PK	F	32.90	19.10	40	12.00	32.91	20.91
	S	1.993	PK	F	13.00	19.30	40	-7.70	29.54	37.24
	S	41.761	PK	V	46.20	-17.10	0	29.10	40.00	10.90
	S	177.922	PK	H	47.70	-15.50	0	32.20	43.50	11.30
	S	481.886	PK	H	40.00	-8.70	0	31.30	46.00	14.70
	S	978.022	PK	V	26.10	0.90	0	27.00	54.00	27.00
	F	0.174	PK	T	46.80	19.30	80	-13.90	22.79	36.69
	S	0.533	PK	T	29.60	19.10	40	8.70	33.07	24.37
	S	5.525	PK	T	27.50	19.80	40	7.30	29.54	22.24

Note 1. The worst case data were reported.
And no other spurious and harmonic emissions were reported greater than listed emissions above table.

Note 2. "F" = Fundamental / "S" = Spurious / "*" = Noise Floor

Note 3. All measurements were recorded using a spectrum analyzer employing a peak detector for blew 30MHz and a peak detector for above 30MHz.

Note 4. Distance Correction Factor(D.C.F.)
For 300m: 40*log(300/3) = 80 dB & For 30m: 40*log(30/3) = 40 dB

Note 5. Sample calculation
T.F = AF + CL – AG / Field Strength = Reading + T.F - D.C.F.
Margin = Limit – Field Strength
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain
D.C.F = Distance Correction Factor

Note 6. F = Facing the antenna / T = antenna shifted / turned 90s degrees

4.2.3 AC Line Conducted Emissions

- Minimum Standard: FCC Part 15.207 & RSS-GEN 8.8

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

- Procedure: ANSI C63.4 2014

1. The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

- Measurement Data: Comply (refer to the next page)

- Measurement Data (Graph): Charging Current 1000 mA

Results of Conducted Emission

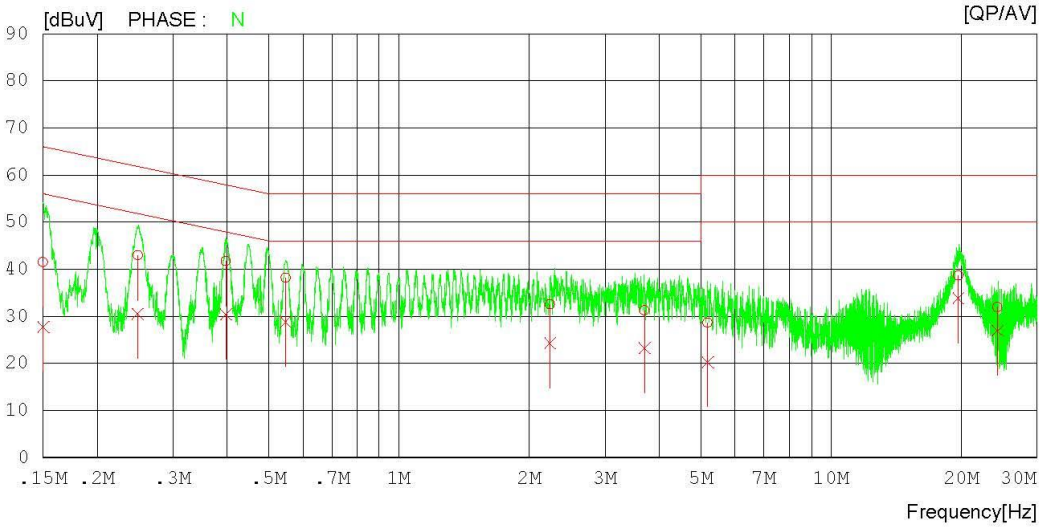
DTNC

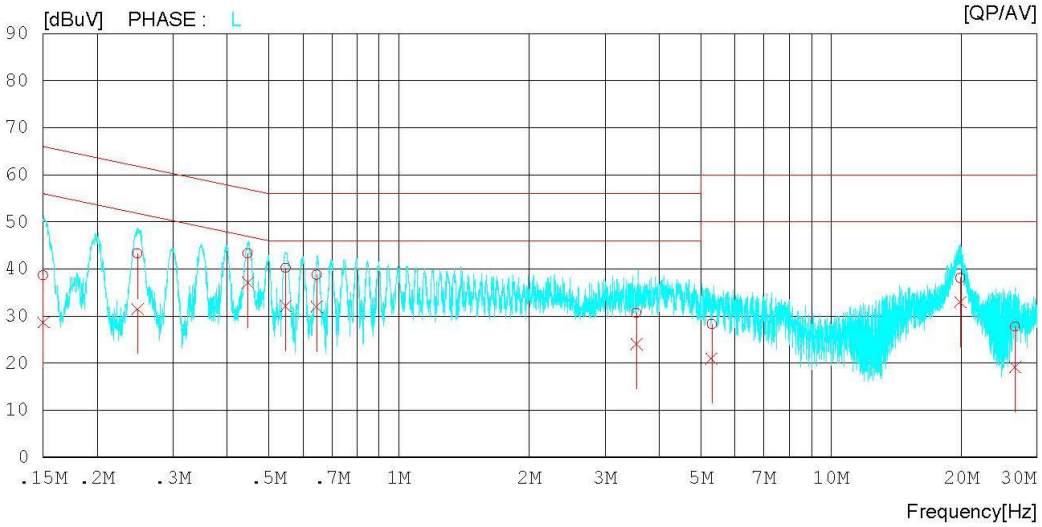
Date : 2015-12-07

Order No.	:	DTNC1511-05916	Referrence No.	:	
Model No.	:	RWT-0100	Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi.	:	22 'C 43 % R.H.
Test Condition	:		Operator	:	K.C.YEOM

Memo :

LIMIT : FCC P15.207 QP
FCC P15.207 AV





- Measurement Data (List): Charging Current 1000 mA

Results of Conducted Emission

DTNC

Date : 2015-12-07

Order No.	:	DTNC1511-05916	Referrence No.	:	
Model No.	:	RWT-0100	Power Supply	:	120 V 60 Hz
Serial No.	:		Temp/Humi.	:	22 'C 43 % R.H.
Test Condition	:		Operator	:	K.C.YEOM

Memo :

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.15014	31.4	17.7	10.1	41.5	27.8	66.0	56.0	24.5	28.2	N
2	0.24859	32.8	20.4	10.1	42.9	30.5	61.8	51.8	18.9	21.3	N
3	0.39790	31.6	20.3	10.1	41.7	30.4	57.9	47.9	16.2	17.5	N
4	0.54678	28.1	18.7	10.1	38.2	28.8	56.0	46.0	17.8	17.2	N
5	2.23720	22.3	14.0	10.2	32.5	24.2	56.0	46.0	23.5	21.8	N
6	3.69960	21.0	13.0	10.2	31.2	23.2	56.0	46.0	24.8	22.8	N
7	5.18140	18.3	10.0	10.3	28.6	20.3	60.0	50.0	31.4	29.7	N
8	19.70400	28.0	23.1	10.7	38.7	33.8	60.0	50.0	21.3	16.2	N
9	24.29780	21.1	16.0	10.9	32.0	26.9	60.0	50.0	28.0	23.1	N
10	0.15005	28.6	18.5	10.1	38.7	28.6	66.0	56.0	27.3	27.4	L
11	0.24835	33.1	21.3	10.1	43.2	31.4	61.8	51.8	18.6	20.4	L
12	0.44702	33.1	27.0	10.1	43.2	37.1	56.9	46.9	13.7	9.8	L
13	0.54705	30.1	21.9	10.1	40.2	32.0	56.0	46.0	15.8	14.0	L
14	0.64531	28.6	21.8	10.1	38.7	31.9	56.0	46.0	17.3	14.1	L
15	3.54320	20.4	13.8	10.2	30.6	24.0	56.0	46.0	25.4	22.0	L
16	5.29580	17.8	10.5	10.4	28.2	20.9	60.0	50.0	31.8	29.1	L
17	19.93880	27.3	22.1	10.8	38.1	32.9	60.0	50.0	21.9	17.1	L
18	26.67060	16.5	7.9	11.2	27.7	19.1	60.0	50.0	32.3	30.9	L

5. Antenna Requirements

▣ **According to FCC 47 CFR §15.203 & RSS-Gen [6.7]**

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

The antenna of this E.U.T is Coil Antenna type. Therefore the antenna is permanently attached.
Please refer to the internal photo. Therefore this E.U.T Complies with the requirement of §15.203

APPENDIX I

TEST EQUIPMENT FOR TESTS

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
Multimeter	Agilent Technologies	34401A	15/01/06	16/01/06	US36099541
Thermohygrometer	BODYCOM	BJ5478	15/05/08	16/05/08	120612-2
Vector Signal Generator	Rohde Schwarz	SMJ100A	15/01/06	16/01/06	100148
MXA Signal Analyzer	Agilent Technologies	N9020A	15/02/26	16/02/26	MY50200816
LOOP Antenna	Schwarzbeck	FMZB1513	14/04/29	16/04/29	1513-128
DC Power Supply	SM techno	SDP30-5D	15/01/06	16/01/06	305DLJ204
BILOG ANTENNA	SCHWARZBECK	VULB 9160	14/07/31	16/07/31	3362
Low Noise Pre Amplifier	tsj	MLA-010K01-B01-27	15/04/09	16/04/09	1844538
EMI TEST RECEIVER	R&S	ESR7	15/02/25	16/02/25	101061
EMI TEST RECEIVER	R&S	ESCI	15/02/25	16/02/25	100364
SINGLE-PHASE MASTER	NF	4420	15/09/09	16/09/09	3049354420023
ARTIFICIAL MAINS NETWORK	Narda S.T.S. / PMM	PMM L2-16B	15/06/26	16/06/26	000WX20305