TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 15C

TEST REPORT

For

LEADER ELECTRONICS CORP.

No.8 YUANSHAN RD, KUNSHAN, JIANGSU China

FCC ID: 2AR5U-DOCK-900

Report Type:	**Product Type:**
Original Report	Wireless Charger

Test Engineer: Max Min

Report Number: RKSB190104002-00B

Report Date: 2019-07-16

Reviewed By: Oscar Ye
EMC Manager

Prepared By:

Bay Area Compliance Laboratories Corp. (Kunshan)
No.248 Chenghu Road,Kunshan,Jiangsu province,China
Tel: +86-0512-86175000
Fax: +86-0512-88934268
www.baclcorp.com.cn

TABLE OF CONTENTS

GENERAL INFORMATION 3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 3
OBJECTIVE 3
RELATED SUBMITTAL(S)/GRANT(S) 3
TEST METHODOLOGY 3
MEASUREMENT UNCERTAINTY 4
TEST FACILITY 4
SYSTEM TEST CONFIGURATION 5
DESCRIPTION OF TEST CONFIGURATION 5
EQUIPMENT MODIFICATIONS 5
EUT EXERCISE SOFTWARE 5
SUPPORT EQUIPMENT LIST AND DETAILS 5
EXTERNAL I/O CABLE 5
BLOCK DIAGRAM OF TEST SETUP 6
SUMMARY OF TEST RESULTS 7
TEST EQUIPMENT LIST 8
FCC §1.1307& §1.1310 – RF EXPOSURE 9
APPLICABLE STANDARD 9
EUT SETUP 10
RESULT 10
TEST DATA 11
FCC §15.203 - ANTENNA REQUIREMENT 12
APPLICABLE STANDARD 12
ANTENNA CONNECTOR CONSTRUCTION 12
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS 13
APPLICABLE STANDARD 13
EUT SETUP 13
EMI TEST RECEIVER SETUP 13
TEST PROCEDURE 13
CORRECTED FACTOR & OVER LIMIT CALCULATION 14
TEST RESULTS SUMMARY 14
TEST DATA 14
FCC §15.209 & §15.205 - SPURIOUS EMISSIONS 17
APPLICABLE STANDARD 17
EUT SETUP 17
EMI TEST RECEIVER SETUP 17
TEST PROCEDURE 17
CORRECTED AMPLITUDE & MARGIN CALCULATION 18
TEST RESULTS SUMMARY 18
TEST DATA 18

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	LEADER ELECTRONICS CORP.
Tested Model	DOCK-900-B-QC-BK
Series Model	DOCK-900XXXXX (where the "X" can be 0-9,A-Z,a-z,-,\,/,+, or blank)
Model Difference	Model Name
Product Type	Wireless Charger
Power Supply	DC 5V/9V

**All measurement and test data in this report was gathered from production sample serial number: 20190104002. (Assigned by BACL, Kunshan). The EUT was received on 2019-01-04.*

Objective

This report is prepared on behalf of *LEADER ELECTRONICS CORP.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207 and 15.209 rules.

Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
Radiated emission	9kHz~30MHz	3.19dB
	30MHz~1GHz	6.11dB
Temperature		1.0℃
Humidity		6%

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user)

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

No Exercise Software was used.

Support Equipment List and Details

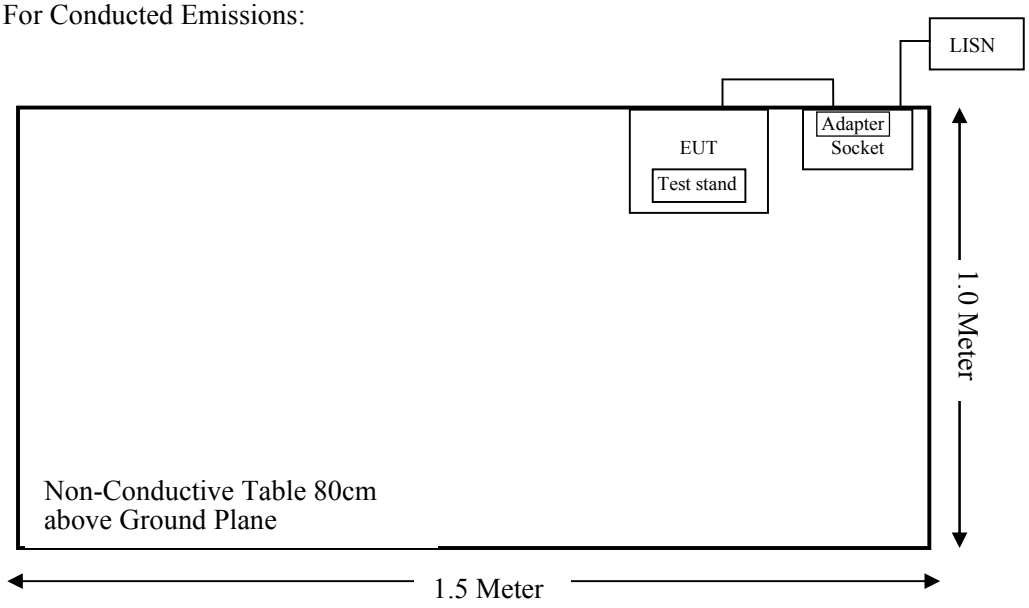
Manufacturer	Description	Model	Serial Number
LEADER ELECTRONICS CORP.	Adapter	ABT030050 (Input:100~240V,50/60Hz Output:5V,2A/9V,1.75A)	/
Eeson	Full function wireless charging aging test stand	/	/

External I/O Cable

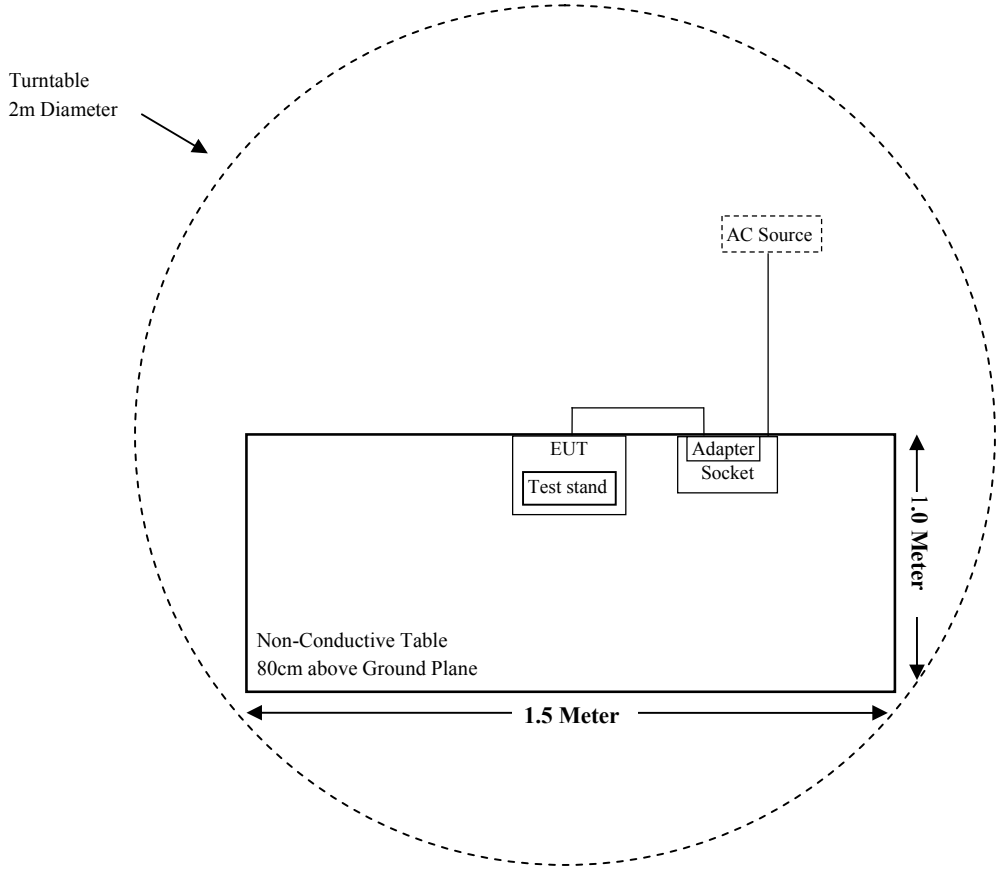
Cable Description	Length (m)	From Port	To
Power Cable	1.0	EUT	Adapter

Block Diagram of Test Setup

For Conducted Emissions:



For Radiated Emissions(Below & Above 30MHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 & §1.1310	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209	Spurious Emissions	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test（Chamber 1#）					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2018-11-30	2019-11-29
Sunol Sciences	Broadband Antenna	JB3	A040914-2	2019-01-09	2020-01-08
Sonoma Instrunent	Pre-amplifier	310N	171205	2018-08-14	2019-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-8	008	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2018-08-15	2019-08-14
Radiated Emission Test（Chamber 2#）					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2018-08-27	2019-08-26
ETS-LINDGREN	PASSIVE LOOP	6512	108100	2019-04-25	2022-04-24
Sonoma Instrument	Pre-amplifier	310N	185700	2018-08-14	2019-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2018-08-15	2019-08-14
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2019-07-11	2020-07-10
Rohde & Schwarz	LISN	ESH3-Z5	862770/011	2018-11-30	2019-11-29
Audix	Test Software	e3	V9	--	--
Narda	Attenuator/6dB	10690812-2	26850-6	2019-01-10	2020-01-09
MICRO-COAX	Coaxial Cable	Cable-15	015	2018-08-15	2019-08-14
RF Exposure					
Narda	Exposure Level Tester	ELT-400	N-0229	2017-11-15	2019-11-15
Narda	B Field Probe	ELT Probe 100cm2	M-0666	2017-11-15	2019-11-15
Amplifier Research	Isotropic Field Probe	FP5000	301825	2018-11-22	2021-11-22

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307& §1.1310 – RF EXPOSURE

Applicable Standard

FCC §1.1307 & 1.1310

According to the item 5.2 of KDB 680106 D01 RF Exposure Wireless Charging Apps v03: Inductive wireless power transfer applications that meet all of the following requirements are excluded from submitting an RF evaluation.

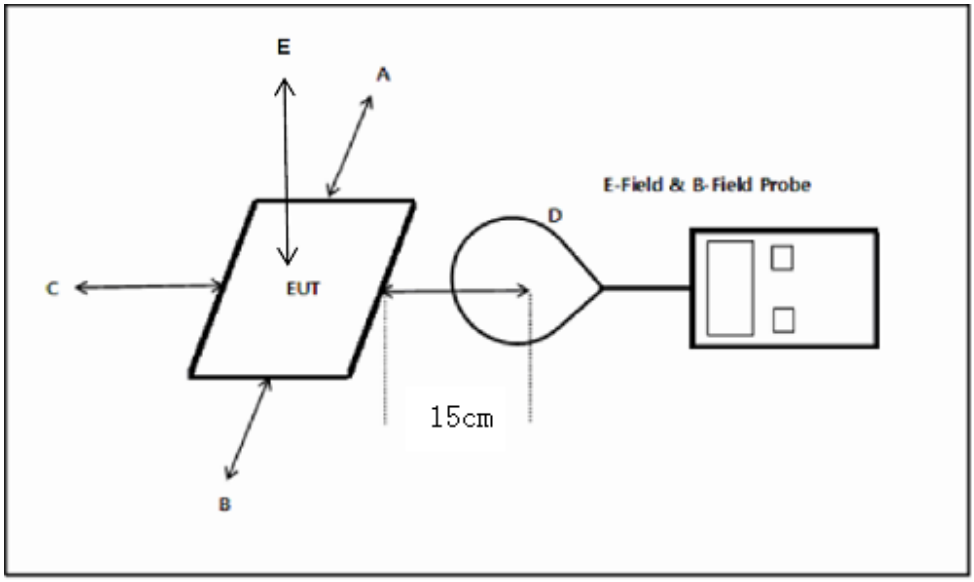
a) Power transfer frequency is less that 1 MHz.
b) Output power from each primary coil is less than or equal to 15 watts.
c) The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.
d) Client device is placed directly in contact with the transmitter.
e) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).
f) 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.

Limits for Maximum Permissible Exposure (MPE)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
(A) Limits for Occupational/Controlled Exposure				
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/Uncontrolled Exposure				
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
300-1500			f/1500	30
1500-100,000			1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

EUT Setup



Result

a) Power transfer frequency is less that 1 MHz.
Yes, the device operates in the frequency 110 kHz-205 kHz.

b) Output power from each primary coil is less than or equal to 15 watts.
Yes, the maximum output power of the primary coil is 10W<15W.

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..
Yes, the transfer system includes a charging system with three coils are able to detect and allow only between individual of coils.

d) Client device is inserted in or placed directly in contact with the transmitter.
Yes, client device is placed directly in contact with the transmitter.

e) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).
Yes, this is a mobile device.

f) 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.
The EUT H-field Strength levels at 15cm surrounding the device and 20 cm above the top surface are less than 50% the MPE limit.

Test Data

Environmental Conditions

Temperature:	24.2℃
Relative Humidity:	51 %
ATM Pressure:	101.2 kPa

The testing was performed by Max Min on 2019-07-20.

H-Filed Strength

Frequency Range (kHz)	Position A (A/m)	Position B (A/m)	Position C (A/m)	Position D (A/m)	Position E (A/m)	Limit Test (A/m)	50%Limit (V/m)
110-205	0.220	0.242	0.225	0.243	0.269	1.63	0.815

E-Filed Strength

Frequency Range (kHz)	Position A (V/m)	Position B (V/m)	Position C (V/m)	Position D (V/m)	Position E (V/m)	Limit Test (V/m)	50%Limit (V/m)
110-205	3.50	2.50	3.60	3.337	5.60	614	307

Note:

1: According with KDB 680106 D01 RF Exposure Wireless Charging Apps v03, Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614V/m and 1.63 A/m.

2: The distance for position A, B, C, D are 15cm, the distance for position E is 20cm.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

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. 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.

Antenna Connector Construction

The EUT has three integrated loop antennas arrangement, which the antenna gain is 0dBi, fulfill the requirement of this section. Please refer to the EUT photos.

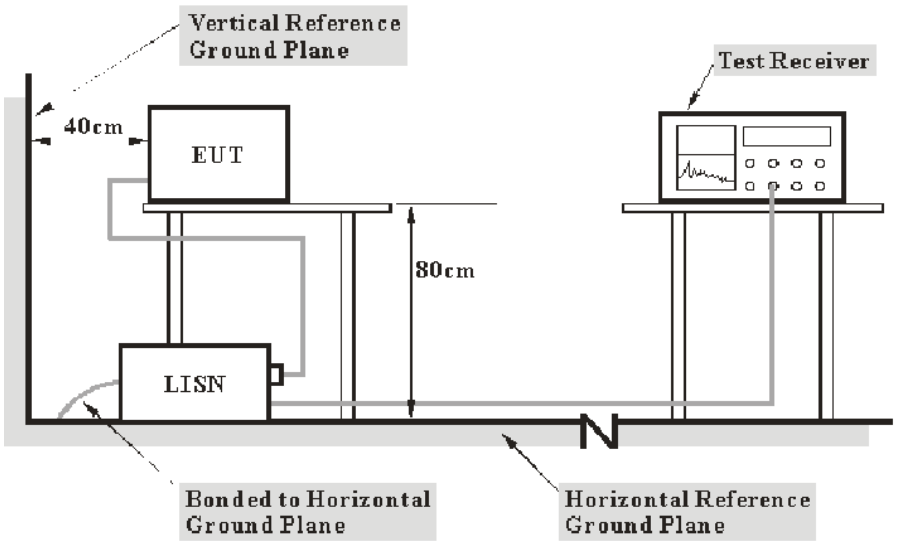
Result: Compliant.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Factor & Over Limit Calculation

The Corrected Factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB above the limit. The equation for margin calculation is as follows:

Over Limit (dB) = Read level (dBμV) + Factor (dB) - Limit (dBμV)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data

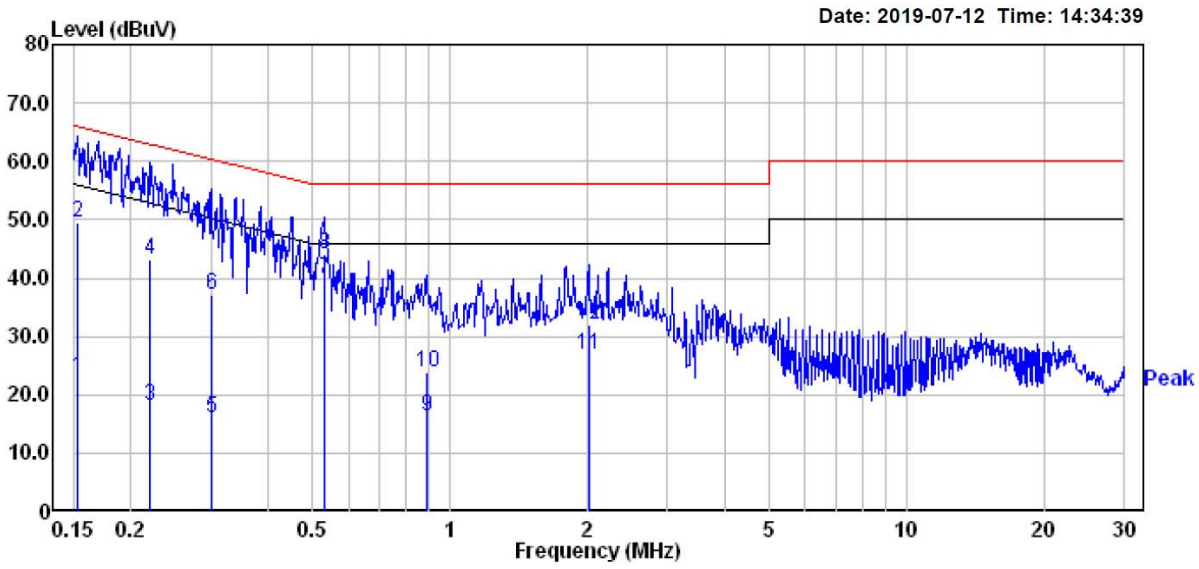
Environmental Conditions

Temperature:	24.2℃
Relative Humidity:	51 %
ATM Pressure:	101.2 kPa

The testing was performed by Max Min on 2019-07-12.

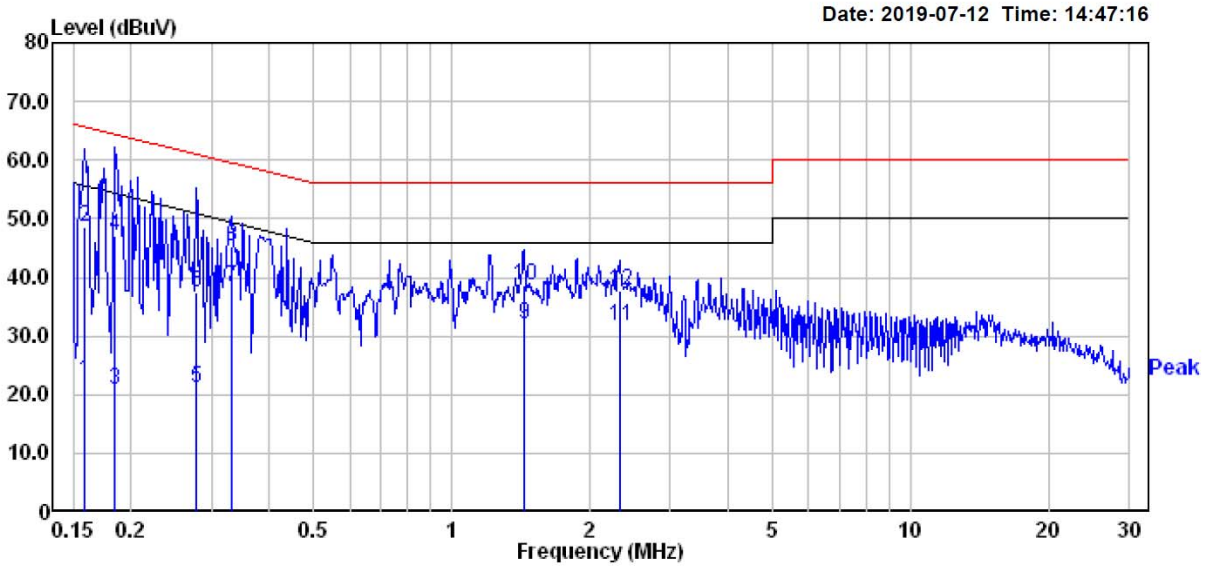
EUT operation mode: charging and communication

AC 120V/60 Hz, Line



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.152	3.20	19.82	23.02	55.87	-32.85	Average
2	0.152	29.80	19.82	49.62	65.87	-16.25	QP
3	0.221	-1.60	19.82	18.22	52.79	-34.57	Average
4	0.221	23.40	19.82	43.22	62.79	-19.57	QP
5	0.300	-3.70	19.83	16.13	50.24	-34.11	Average
6	0.300	17.30	19.83	37.13	60.24	-23.11	QP
7	0.529	20.11	19.75	39.86	46.00	-6.14	Average
8	0.529	24.21	19.75	43.96	56.00	-12.04	QP
9	0.890	-3.31	19.73	16.42	46.00	-29.58	Average
10	0.890	4.09	19.73	23.82	56.00	-32.18	QP
11	2.012	7.00	19.82	26.82	46.00	-19.18	Average
12	2.012	12.20	19.82	32.02	56.00	-23.98	QP

AC 120V/60 Hz, Neutral



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.159	2.50	19.82	22.32	55.52	-33.20	Average
2	0.159	28.90	19.82	48.72	65.52	-16.80	QP
3	0.184	0.91	19.82	20.73	54.28	-33.55	Average
4	0.184	27.31	19.82	47.13	64.28	-17.15	QP
5	0.277	1.40	19.82	21.22	50.90	-29.68	Average
6	0.277	17.50	19.82	37.32	60.90	-23.58	QP
7	0.330	18.39	19.82	38.21	49.44	-11.23	Average
8	0.330	25.59	19.82	45.41	59.44	-14.03	QP
9	1.440	12.11	19.83	31.94	46.00	-14.06	Average
10	1.440	18.81	19.83	38.64	56.00	-17.36	QP
11	2.321	12.10	19.59	31.69	46.00	-14.31	Average
12	2.321	18.10	19.59	37.69	56.00	-18.31	QP

Note:

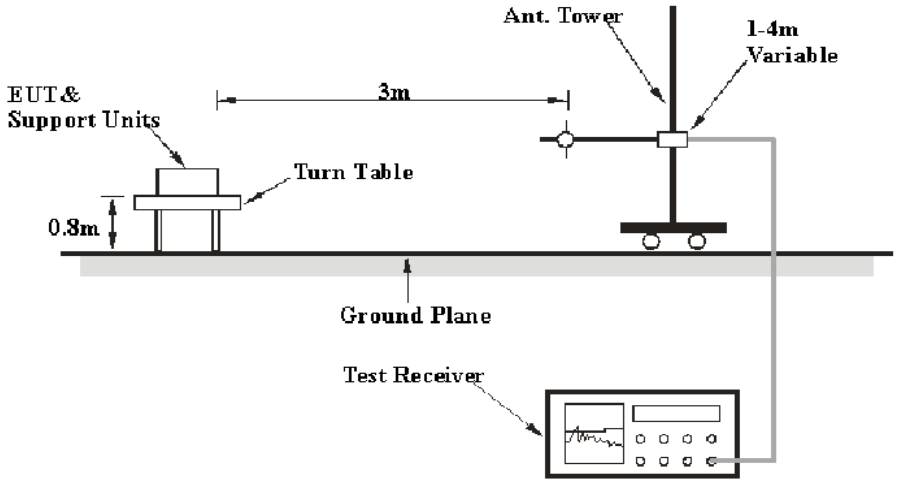
1) Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
2) Over Limit (dB) = Read level (dBµV) + Factor (dB) - Limit (dBµV)

FCC §15.209 & §15.205 - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.209; §15.205;

EUT Setup



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.205 limits.

EMI Test Receiver Setup

The system was investigated from 9 kHz to1GHz.

During the radiated emission test, the EMI test receiver setup was set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
9 kHz – 150 kHz	200 Hz	1 kHz	QP
150 kHz – 30MHz	9kHz	30kHz	QP
30 MHz – 1000 MHz	120 kHz	300 kHz	QP

Note: For the frequency bands 9-90 kHz and 110-490 kHz, the test was based on average detector.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude (dBμV /m) = Meter Reading (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205 and 15.209.

Test Data

Environmental Conditions

Temperature:	24.2℃
Relative Humidity:	51 %
ATM Pressure:	101.2 kPa

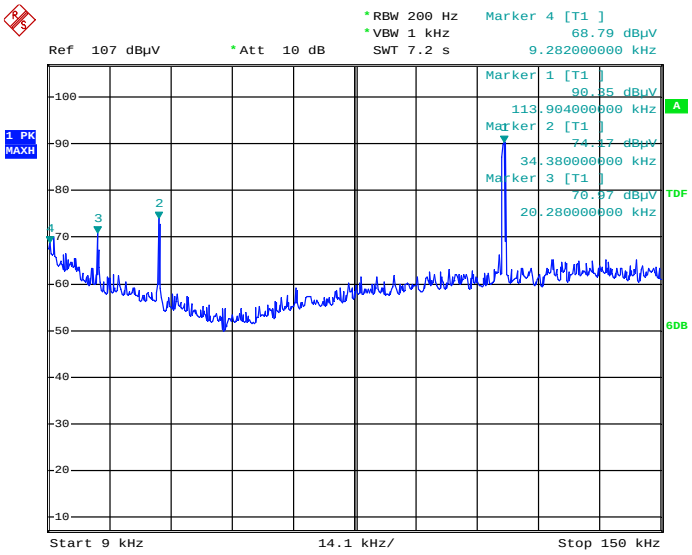
The testing was performed by Max Min on 2019-07-13.

EUT operation mode: charging and communication

9kHz-30MHz:

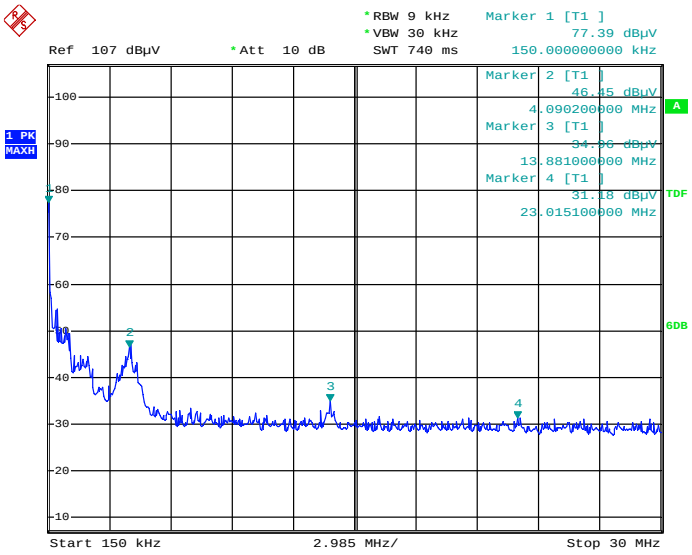
*(Pre-scan in the X,Y and Z axes of orientation, the worst case **in X-axis of orientation** was recorded)*

9kHz-150kHz (PK)



Date: 13.JUL.2019 19:43:37

150kHz-30MHz (PK)



Date: 13.JUL.2019 19:46:38

9kHz-490kHz：

Indicated		PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.209		
Frequency (kHz)	Corrected Amplitude (dBμV/m) @3m			Limit (dBμV/m) @3m	Limit (dBμV/m) @300m	Margin (dB)
9.28	68.79	PK	56.82	128.25	48.25	59.46
20.28	70.97	PK	49.92	121.46	41.46	50.49
34.38	74.17	PK	46.06	116.88	36.88	42.71
113.90	90.85	PK	50.40	106.47	26.47	15.62
150.00	77.39	PK	50.90	104.08	24.08	26.69

Note: The average emissions which fall into frequencies 9-90 kHz, 110-490 kHz was not recorded, because the peak emissions are below the average limit.

490kHz-30MHz:

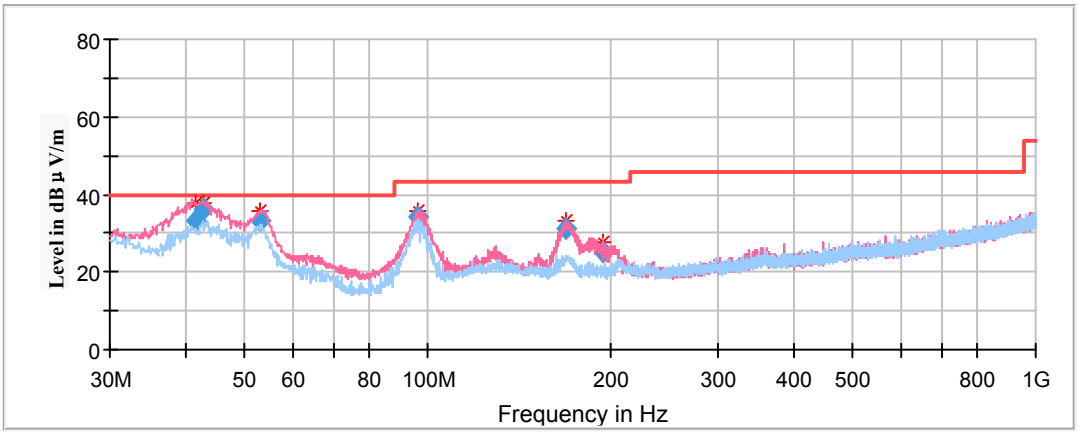
Indicated		PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.209		
Frequency (MHz)	Corrected Amplitude (dBμV/m) @3m			Limit (dBμV/m) @3m	Limit (dBμV/m) @30m	Margin (dB)
4.09	46.45	PK	18.04	69.54	29.54	23.09
13.88	34.86	PK	6.09	69.54	29.54	34.68
23.02	31.18	PK	5.54	69.54	29.54	38.36

Note: The average emissions which fall into frequencies 9-90 kHz, 110-490 kHz was not recorded, because the peak emissions are below the average limit.

Note:
Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
Corrected Amplitude (dBμV /m) = Corrected Factor (dB/m) + Reading (dBμV)
Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

30MHz-1GHz

*(Pre-scan in the X,Y and Z axes of orientation, the worst case **in X-axis of orientation** was recorded)*



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
41.599800	33.38	101.0	V	108.0	-11.8	40.00	6.62
42.857550	36.11	101.0	V	108.0	-12.7	40.00	3.89
52.993300	33.24	101.0	V	88.0	-17.6	40.00	6.76
96.582000	34.24	101.0	V	317.0	-15.8	43.50	9.26
168.407850	31.23	101.0	V	327.0	-13.1	43.50	12.27
193.774500	25.28	101.0	V	13.0	-12.7	43.50	18.22

Note:
Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)
Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)
Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

******* END OF REPORT *******