



FCC PART 15C

TEST REPORT

For

Ubio Labs, Inc.

2821 Northup Way, Suite 250, Bellevue, WA 98004, USA

FCC ID: 2ATGY-PWB1114

Report Type: Original Report	Product Type: Wireless Power Bank
Report Number: <u>RGMA200323004-00</u>	
Report Date: <u>2020-04-29</u>	
Jimmy Xiao 	
Reviewed By: RF Engineer	
Prepared By: Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn	

Note: This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government. This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk “★”.

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk **. Customer model name, addresses, names, trademarks etc. are not considered data.

This report cannot be reproduced except in full, without prior written approval of the Company. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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
JUSTIFICATION	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.....	8
TEST EQUIPMENT LIST	9
FCC §1.1310, §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	10
APPLICABLE STANDARD	10
BLOCK DIAGRAM OF TEST SETUP	11
TEST DATA	11
FCC§15.203 – ANTENNA REQUIREMENT.....	13
APPLICABLE STANDARD	13
ANTENNA CONNECTED CONSTRUCTION	13
FCC §15.207 – AC LINE CONDUCTED EMISSION.....	14
APPLICABLE STANDARD	14
EUT SETUP.....	14
EMI TEST RECEIVER SETUP.....	14
TEST PROCEDURE	14
CORRECTED FACTOR & MARGIN CALCULATION	15
TEST RESULTS SUMMARY	15
TEST DATA	15
FCC §15.205 & §15.209 - RADIATED EMISSIONS TEST	22
APPLICABLE STANDARD	22
EUT SETUP	22
EMI TEST RECEIVER SETUP.....	23
CORRECTED AMPLITUDE & MARGIN CALCULATION	23
TEST RESULTS SUMMARY	23
TEST DATA	23

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Product	Wireless Power Bank
Tested Model	PWB1114SG
Multiple Models	PWB1114AW, PWB1114XX (XX would be any Arabian number or English letter or blank)
Model Difference	Refer to the DoS letter
Frequency Range	110 kHz-205kHz
Antenna Specification	Coil
Voltage Range	DC 3.8V from battery and DC 5V from USB port
Date of Test	2020/03/31~2020/04/29
Sample serial number	RGMA200323004-RF-S1 (Assigned by BACL, Shenzhen)
Received date	2020/03/23
Sample/EUT Status	Good Condition

Objective

This report is prepared on behalf of *Ubio Labs, Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts A and C of the Federal Communications Commission's rules.

The objective is to determine the compliance of EUT with FCC rules, section 15.203, 15.205, 15.207 and 15.209.

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. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item	Uncertainty	
AC Power Line Conducted Emissions	±1.95 dB	
Radiated emission	9 kHz~30MHz	±4.52 dB
	30MHz~1 GHz	±5.81 dB
Occupied Bandwidth	±0.5 kHz	
Temperature	±3.0 °C	
Humidity	±6 %	

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. 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. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a test mode

The device is a wireless charger operation on frequency 110 kHz - 205 kHz.

EUT Exercise Software

No software used in test.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Unknown	Load	Unknown	159852
Apple	Watch	A1859	FH7RN027HDNC
Tianyin electronics co..ltd	Adapter	TPA-46050200UU	159268
HUAWEI	Mobile phone	Honor10	Cooe1156R1PS65

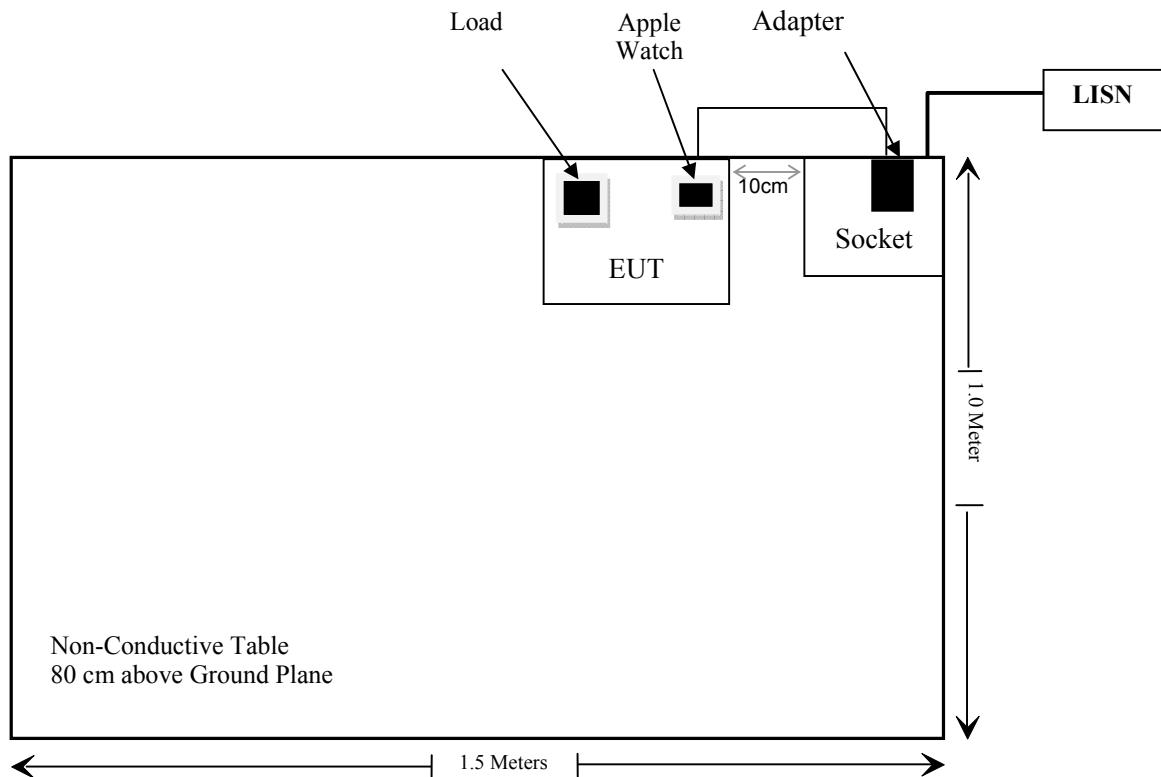
External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shield Detachable USB Cable	0.8	Adapter	EUT
Un-shield Detachable lightning Cable	0.4	EUT	Mobile phone

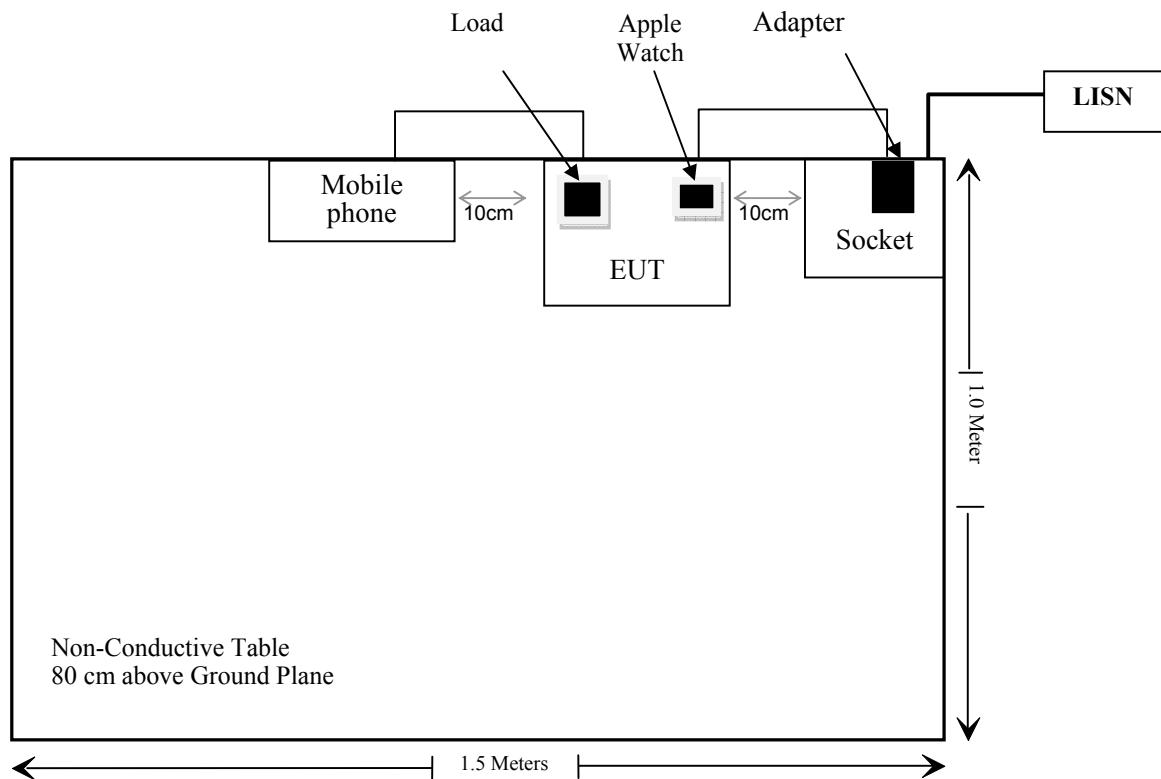
Block Diagram of Test Setup

For conducted emission:

Apple terminal charging & Type C Terminal Charging



Wireless Charging & charging for mobile phone with USB cable



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC§1.1310 & §2.1091	Maximum Permissible Exposure(MPE)	Compliance
FCC§15.203	Antenna Requirement	Compliance
FCC§15.207	AC Line Conducted Emission	Compliance
§15.209 §15.205	Radiated Emission Test	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
MPE					
Narda	Exposure Level Tester	ELT-400	N-0229	2019/11/15	2021/11/15
Narda	B Field Probe	ELT Probe 100cm ²	M-0666	2019/11/15	2021/11/15
ETS-Lindgreen	Isotropic Field Probe	HI-6005	69461	2018/9/28	2021/9/27
Conducted Emissions Test					
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2019/7/9	2020/7/8
Rohde & Schwarz	LISN	ENV216	101613	2020/1/22	2021/1/21
Rohde & Schwarz	Transient Limitor	ESH3Z2	DE25985	2019/11/29	2020/11/28
Unknown	CE Cable	CE Cable	UF A210B-1-0720-504504	2019/11/29	2020/11/28
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
RF Radiated test					
R&S	EMI Test Receiver	ESR3	102455	2019/7/9	2020/7/8
Sonoma instrument	Pre-amplifier	310 N	186238	2019/4/20	2020/4/20
Sonoma instrument	Pre-amplifier	310 N	186238	2020/4/20	2021/4/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
ETS	Passive Loop Antenna	6512	29604	2018/7/14	2021/7/13
Unknown	Cable	Chamber Cable 4	EC-007	2019/11/29	2020/11/28
Rohde & Schwarz	Auto test software	EMC 32	V9.10	NCR	NCR

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

FCC §1.1310, §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(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)
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;

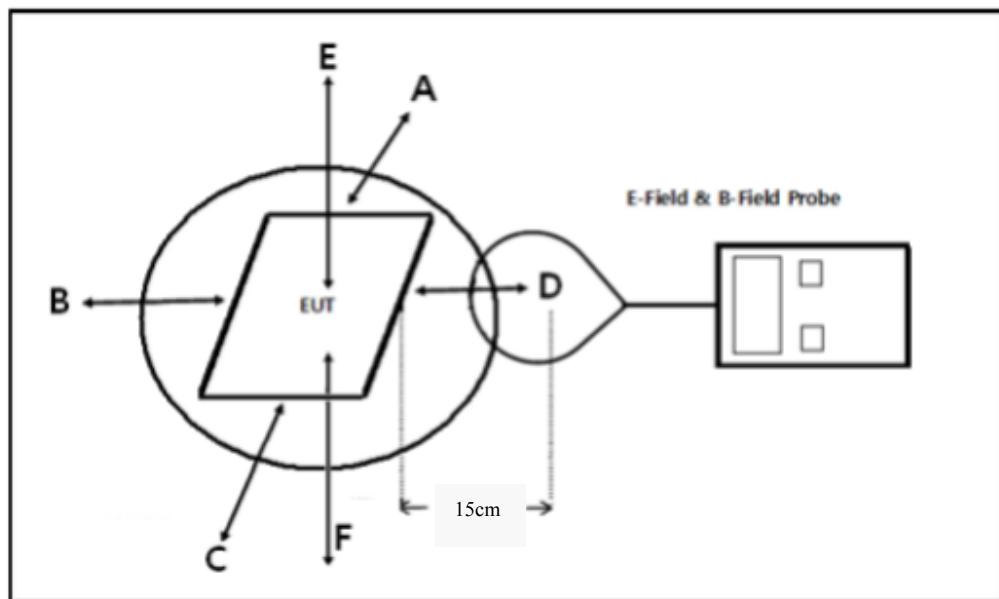
According with KDB 680106 D01 RF Exposure Wireless Charging Apps v03 clause 3 c)

- c) For devices designed for typical desktop applications, such a wireless charging pads, RF exposure evaluation should be conducted assuming a user separation distance of 15 cm. E and H field strength measurements or numerical modeling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m. A KDB inquiry is required to determine the applicable exposure limits below 100 kHz.

According to KDB 680106 D01 RF Exposure Wireless Charging App v03 clause 5 b)

- b) Inductive wireless power transfer applications with supporting field strength results and meeting all of the following requirements are not required to submit a KDB inquiry for devices approved using SDoC or a PAG for equipment approved using certification to address RF exposure compliance. However, the responsible party is required to keep a copy of the test report in accordance with KDB 865664 D02. A copy of the test report is to be submitted with the application if the device is approved using certification.
 - (1) Power transfer frequency is less than 1 MHz.
 - (2) Output power from each primary coil is less than or equal to 15 watts.
 - (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.
 - (4) Client device is placed directly in contact with the transmitter.
 - (5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).
 - (6) 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.

Block Diagram of Test Setup



Note: 20 cm for Top test.

Test Data

Environmental Conditions

Temperature:	25°C
Relative Humidity:	65 %
ATM Pressure:	101.0 kPa

The testing was performed by Black Chen on 2020-03-31.

Test mode: Transmitting & Charging (full load)

Type C Terminal Charging was the worst case:

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)	50% Limit (A/m)	Limit Test (A/m)
110-205	0.586	0.618	0.586	0.586	0.618	0.815	1.63

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)	50% Limit (V/m)	Limit Test (V/m)
110-205	1.547	1.486	1.528	1.664	1.425	307	614

Note: Test with 15cm distance from the center of the probe(s) to the edge of the device, 20cm for the top test.

Result: Compliance**Considerations of compliance 680106 D01 RF Exposure Wireless Charging App v03 clause 5 b:**

(1) Power transfer frequency is less than 1 MHz.

Yes, the operation frequency is 110-205 kHz.

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

Yes, the maximum output power of primary coil is 7.5Watts, less than 15 watts.

(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.



① Wireless charging area for mobile phone which include one coil.

② Wireless charging coil for apple watch which include one coil.

Note: The two wireless charging areas are independent. The coils and clients are able to detect and coupling only between individual pairs of coils.

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

Yes, client device is placed directly in contact with the transmitter

(5) Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).

Yes, mobile exposure conditions only

(6) 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.

Yes, the test result for H and E-filed strength less than 50% of the MPE limit.

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 Connected Construction

The EUT has two coils antenna arrangement, which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

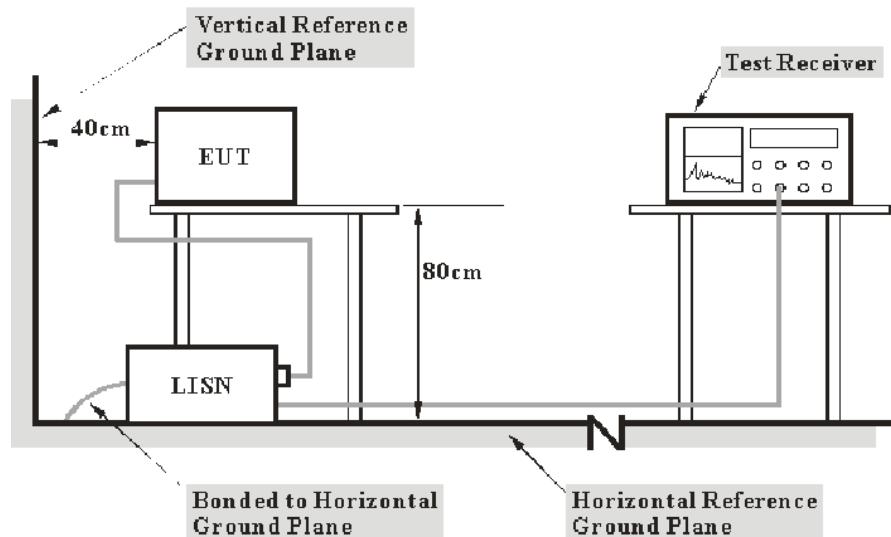
Result: Compliance.

FCC §15.207 – AC LINE CONDUCTED EMISSION

Applicable Standard

FCC§15.207

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.

The spacing between the peripherals was 10 cm.

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

Corrected Factor & Margin 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:

$$\text{Correction Factor} = \text{LISN VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

The “**Margin**” 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 below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

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

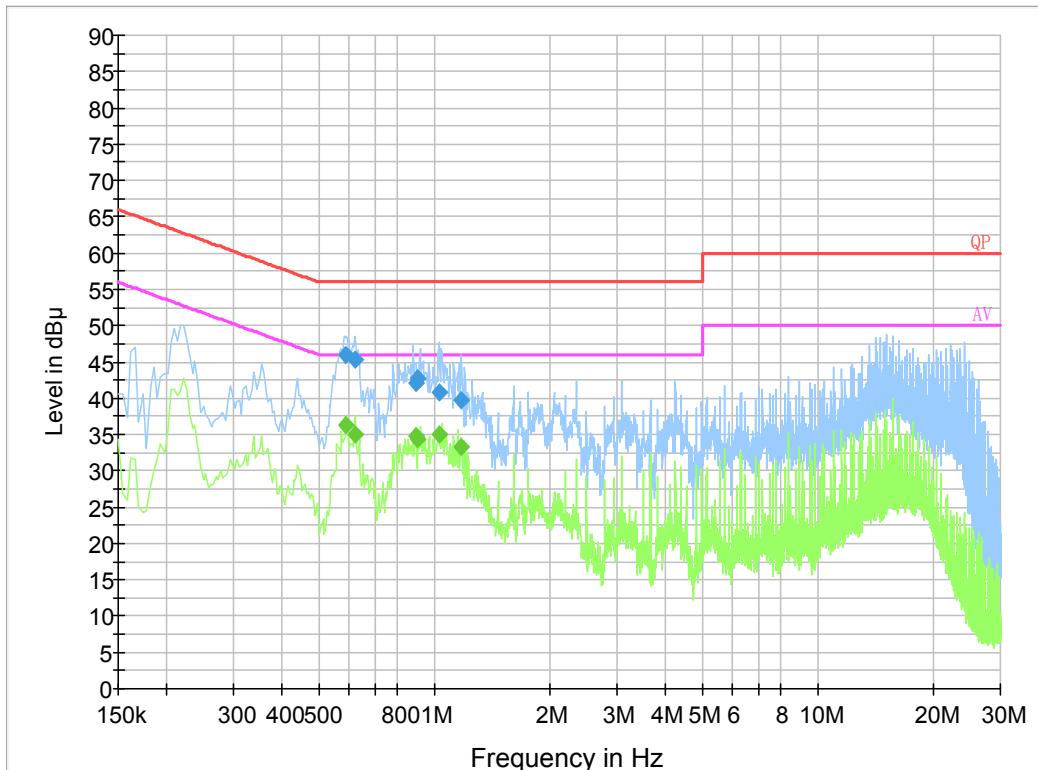
Test Data

Environmental Conditions

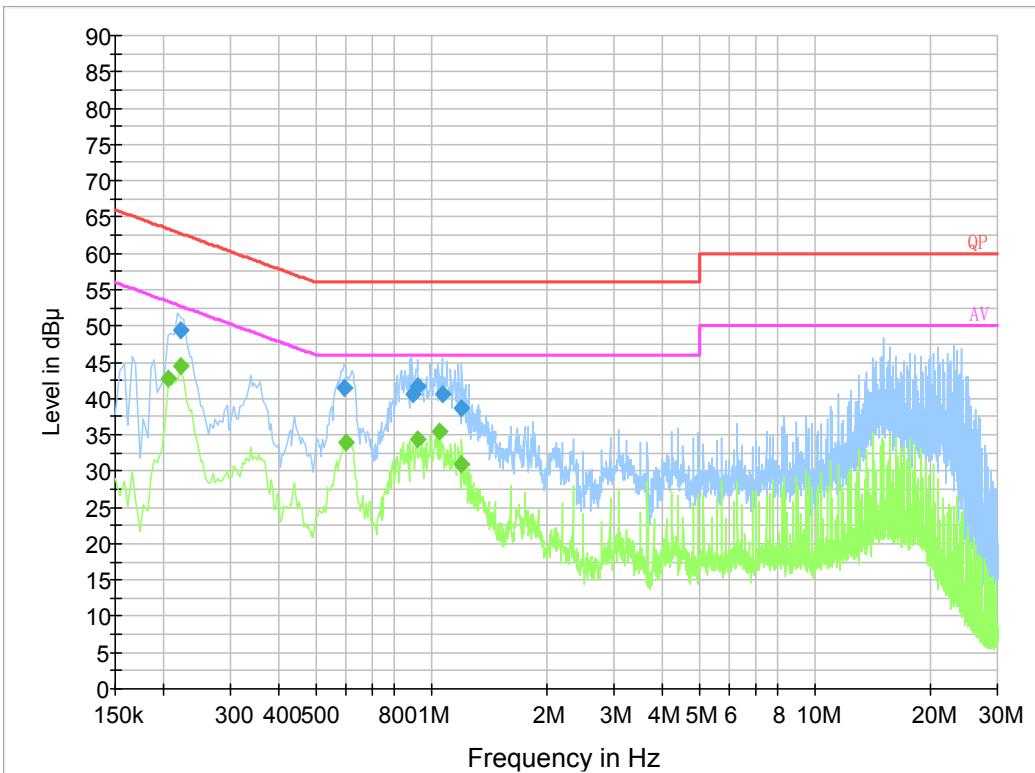
Temperature:	23~25 °C
Relative Humidity:	52~65 %
ATM Pressure:	101.0 kPa

The testing was performed by Haiguo Li from 2020-04-01 to 2020-04-27.

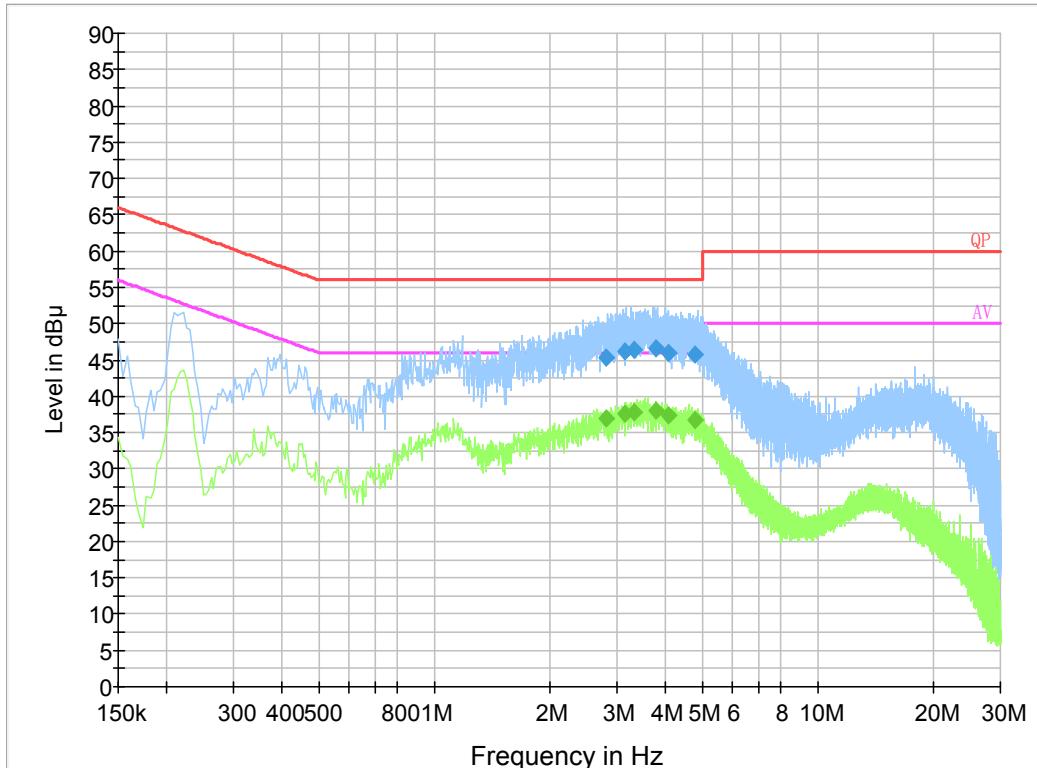
Test Mode: Transmitting & Charging (Full load)

Apple terminal charging**AC 120 V/60 Hz, Line:**

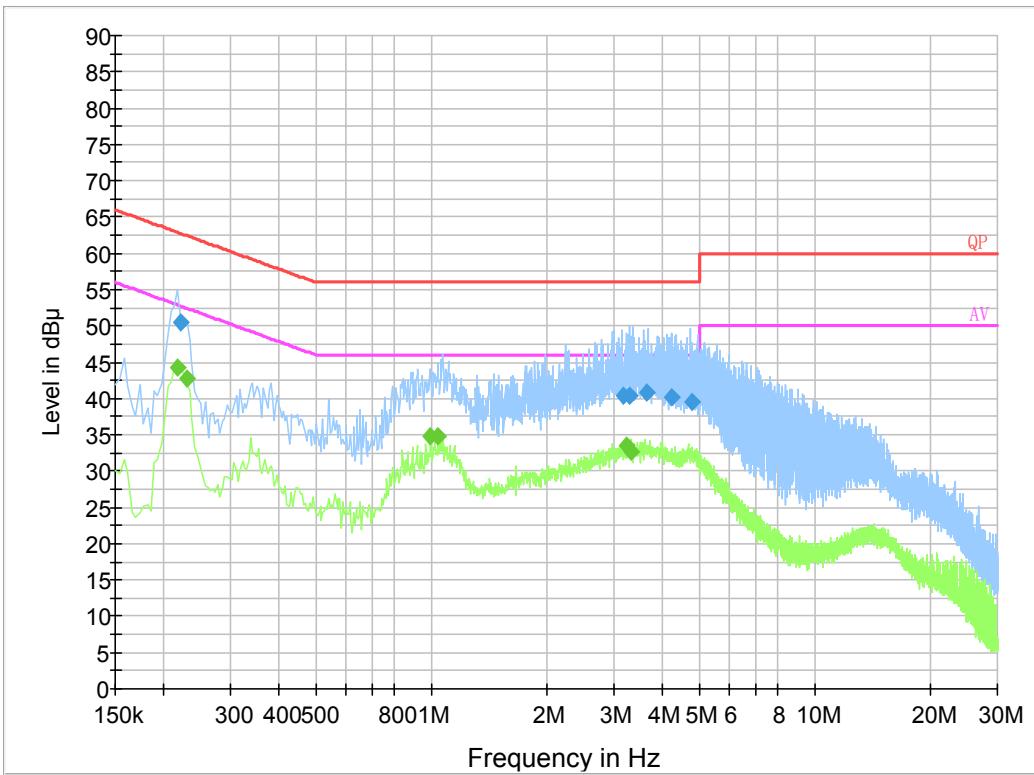
Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/Ave./QP)
0.589270	45.9	19.8	56.0	10.1	QP
0.624670	45.4	19.8	56.0	10.6	QP
0.895230	42.0	19.8	56.0	14.0	QP
0.908230	42.8	19.8	56.0	13.2	QP
1.030550	40.9	19.9	56.0	15.1	QP
1.172330	39.8	19.8	56.0	16.2	QP
0.589270	36.2	19.8	46.0	9.8	Ave.
0.624670	35.0	19.8	46.0	11.0	Ave.
0.895230	34.8	19.8	46.0	11.2	Ave.
0.908230	34.5	19.8	46.0	11.5	Ave.
1.030550	35.0	19.9	46.0	11.0	Ave.
1.172330	33.3	19.8	46.0	12.7	Ave.

AC 120V/ 60 Hz, Neutral:

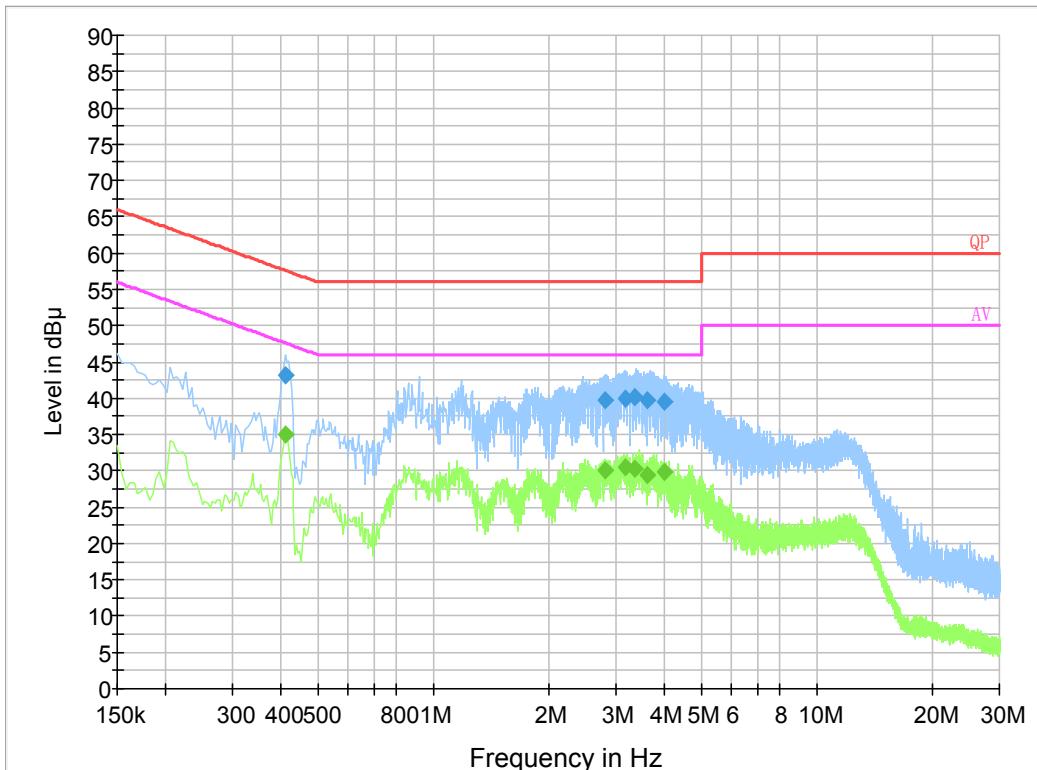
Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/Ave./QP)
0.222500	49.5	19.8	62.7	13.2	QP
0.593090	41.4	19.8	56.0	14.6	QP
0.892650	40.7	19.7	56.0	15.3	QP
0.920170	41.7	19.8	56.0	14.3	QP
1.069950	40.6	19.8	56.0	15.4	QP
1.199970	38.6	19.8	56.0	17.4	QP
0.206000	42.7	19.8	53.4	10.7	Ave.
0.222000	44.4	19.8	52.7	8.3	Ave.
0.598000	34.0	19.8	46.0	12.0	Ave.
0.922000	34.3	19.8	46.0	11.7	Ave.
1.050000	35.4	19.8	46.0	10.6	Ave.
1.202000	30.9	19.8	46.0	15.1	Ave.

Type C Terminal Charging**AC 120 V/60 Hz, Line:**

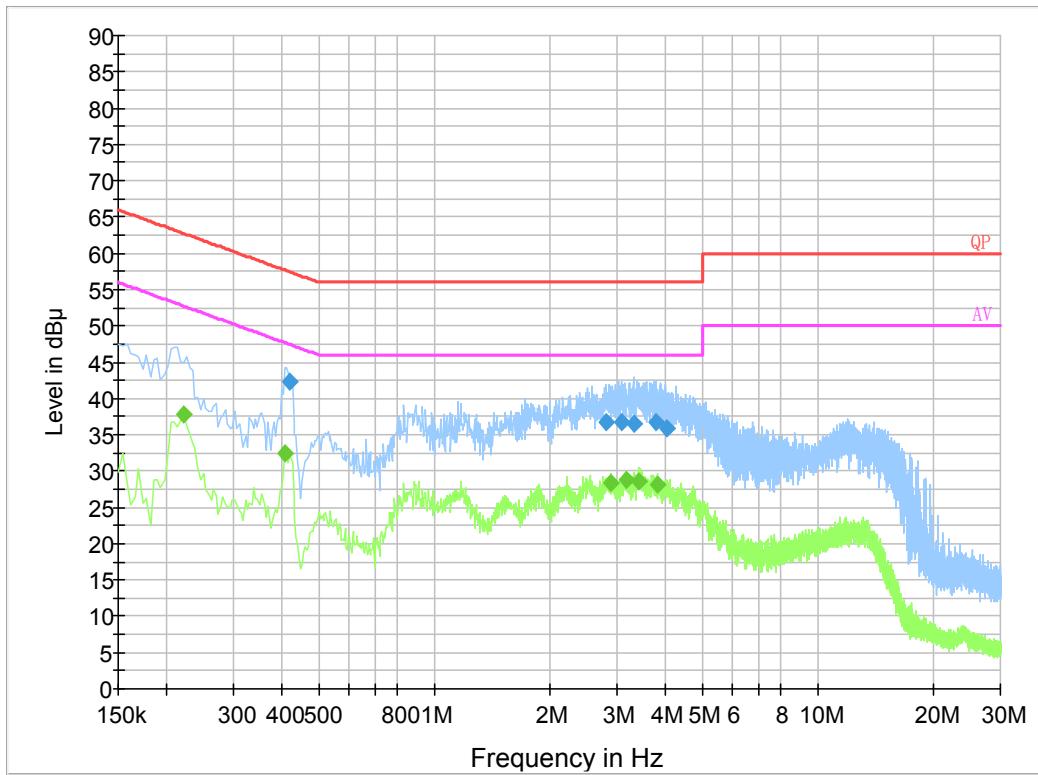
Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/Ave./QP)
2.815490	45.3	19.9	56.0	10.7	QP
3.138390	46.2	19.9	56.0	9.8	QP
3.310930	46.4	19.9	56.0	9.6	QP
3.772730	46.6	19.9	56.0	9.4	QP
4.088590	46.1	19.9	56.0	9.9	QP
4.808770	45.7	19.9	56.0	10.3	QP
2.815490	36.9	19.9	46.0	9.1	Ave.
3.138390	37.6	19.9	46.0	8.4	Ave.
3.310930	37.8	19.9	46.0	8.2	Ave.
3.772730	38.0	19.9	46.0	8.0	Ave.
4.088590	37.3	19.9	46.0	8.7	Ave.
4.808770	36.7	19.9	46.0	9.3	Ave.

AC 120V/ 60 Hz, Neutral:

Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/Ave./QP)
0.221500	50.4	19.8	62.8	12.4	QP
3.186870	40.4	19.9	56.0	15.6	QP
3.300590	40.5	19.9	56.0	15.5	QP
3.634710	40.7	19.9	56.0	15.3	QP
4.222370	40.2	19.9	56.0	15.8	QP
4.802630	39.5	19.9	56.0	16.5	QP
0.218000	44.3	19.8	52.9	8.6	Ave.
0.230000	42.7	19.8	52.4	9.7	Ave.
0.998000	34.8	19.8	46.0	11.2	Ave.
1.046000	34.7	19.8	46.0	11.3	Ave.
3.222000	33.5	19.9	46.0	12.5	Ave.
3.334000	32.7	19.9	46.0	13.3	Ave.

Wireless Charging & charging for mobile phone with USB cable**AC 120 V/60 Hz, Line:**

Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/Ave./QP)
0.411790	43.3	19.9	57.6	14.3	QP
2.819670	39.7	19.9	56.0	16.3	QP
3.166450	40.0	19.9	56.0	16.0	QP
3.347030	40.1	19.9	56.0	15.9	QP
3.630950	39.7	19.9	56.0	16.4	QP
4.017730	39.6	19.9	56.0	16.4	QP
0.411790	35.0	19.9	47.6	12.6	Ave.
2.819670	30.1	19.9	46.0	15.9	Ave.
3.166450	30.4	19.9	46.0	15.6	Ave.
3.347030	30.2	19.9	46.0	15.8	Ave.
3.630950	29.3	19.9	46.0	16.7	Ave.
4.017730	29.8	19.9	46.0	16.2	Ave.

AC 120V/ 60 Hz, Neutral:

Frequency (MHz)	Corrected Amplitude (dB μ V)	Correction Factor (dB)	Limit (dB μ V)	Margin (dB)	Detector (PK/Ave./QP)
0.420210	42.3	19.8	57.4	15.1	QP
2.803850	36.7	19.9	56.0	19.3	QP
3.095590	36.7	19.9	56.0	19.3	QP
3.312350	36.6	19.9	56.0	19.4	QP
3.773210	36.8	19.9	56.0	19.2	QP
4.037670	35.8	19.9	56.0	20.2	QP
0.222000	37.8	19.8	52.7	15.0	Ave.
0.410000	32.4	19.8	47.6	15.3	Ave.
2.882000	28.4	19.9	46.0	17.6	Ave.
3.186000	28.7	19.9	46.0	17.3	Ave.
3.406000	28.6	19.9	46.0	17.4	Ave.
3.826000	28.1	19.9	46.0	17.9	Ave.

Note:

- 1) Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
- 2) Corrected Amplitude = Reading + Correction Factor
- 3) Margin = Limit – Corrected Amplitude

FCC §15.205 & §15.209 - RADIATED EMISSIONS TEST

Applicable Standard

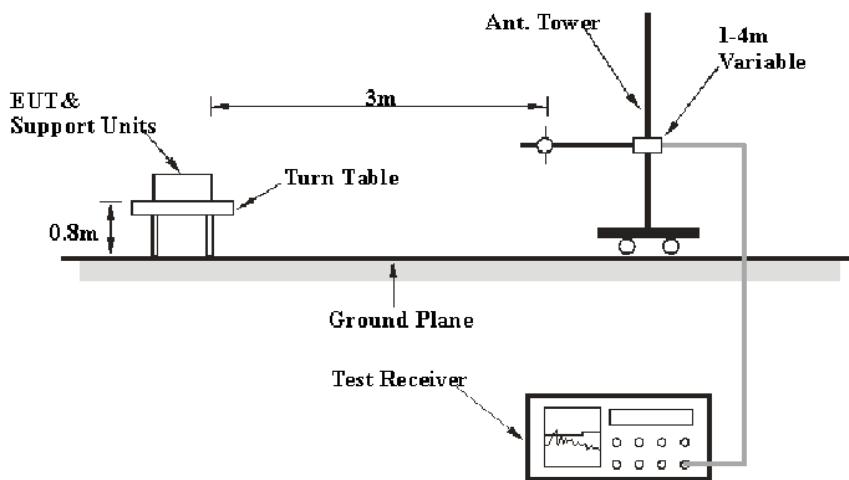
As per FCC Part 15.209

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	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., §§15.231 and 15.241.

EUT Setup



The radiated emission tests were performed in the 3-meter chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part Subpart C limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 1 GHz.

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

Frequency Range	RBW	Video B/W	Measurement
9 kHz – 150 kHz	300 Hz	1 kHz	PK
150 kHz – 30 MHz	10 kHz	30 kHz	PK
30 MHz – 1000 MHz	120 kHz	300 kHz	QP

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

If the maximized peak measured value complies with the limit, then it is unnecessary to perform an QP/Average measurement

Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Limit} - \text{Corr. Ampl.}$$

Test Results Summary

According to the data in the following table, the EUT complied with the [FCC Part 15.209&15.205](#).

Test Data

Environmental Conditions

Temperature:	23~25 °C
Relative Humidity:	52~65 %
ATM Pressure:	101.0 kPa

The testing was performed by Holland Yang from 2020-04-02 to 2020-04-29.

Test mode: Transmitting & Charging (full load is worst case)

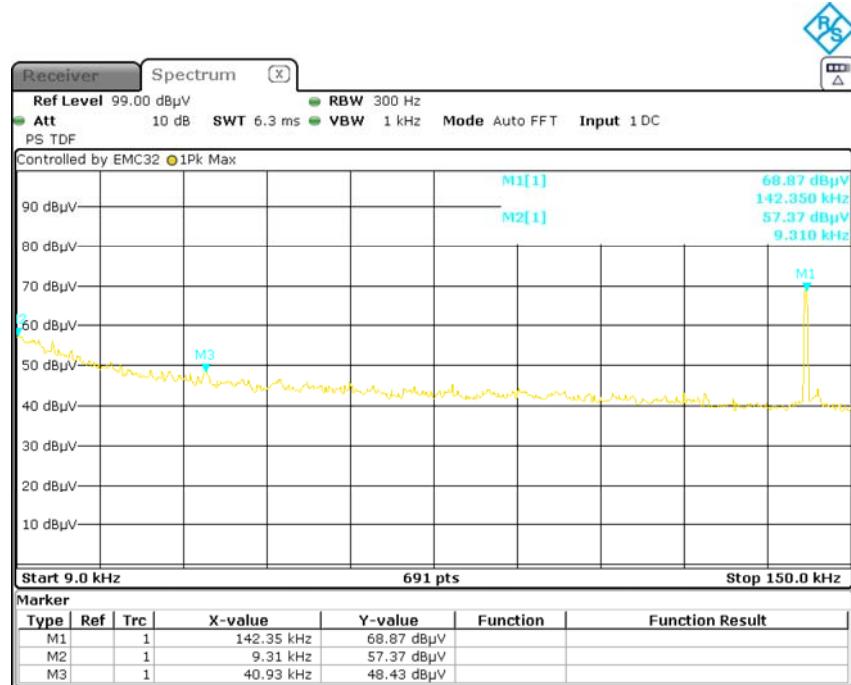
Apple terminal charging

1) 9 kHz~30MHz:

Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Detector (PK/QP/AV)	Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	FCC Part 15.205&15.209		Remark
				Height (m)	Polar		Limit (dB μ V/m)	Margin (dB)	
0.00931	57.37	PK	125	1.0	H	86.8	128.23	74.86	Spurious emission
0.04093	48.43	PK	82	1.0	H	65.7	115.36	66.93	
0.431	55.17	PK	210	1.0	H	55.8	94.91	39.74	
16.371	47.20	PK	151	1.0	H	31.8	69.54	22.34	
22.851	49.16	PK	69	1.0	H	30.9	69.54	20.38	
0.14235	68.87	PK	24	1.0	H	66.1	104.54	35.67	Fundamental

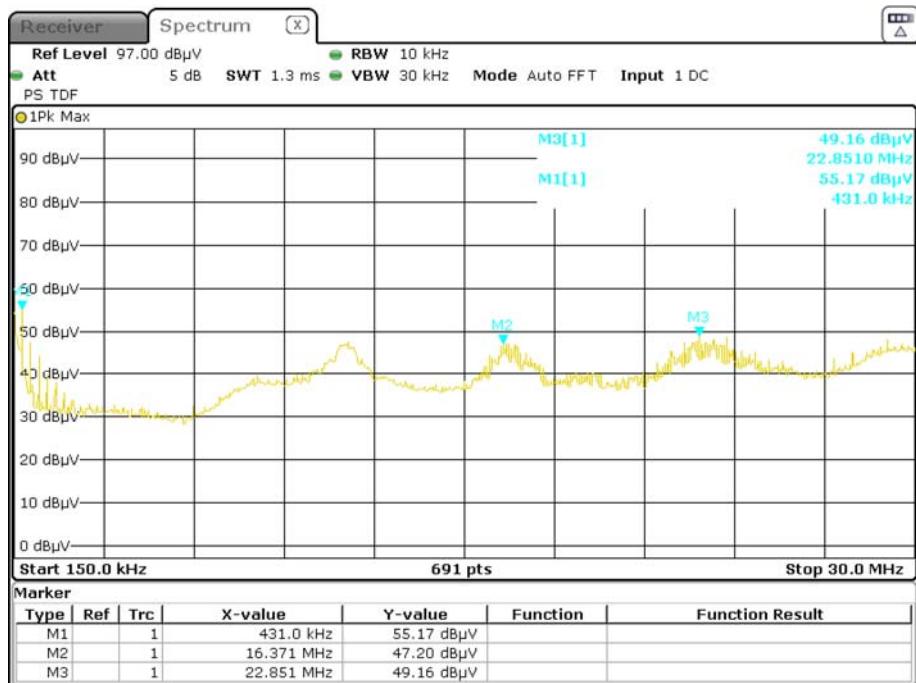
Note: PK detector data compliance with average detector limit.

9 kHz-150 kHz



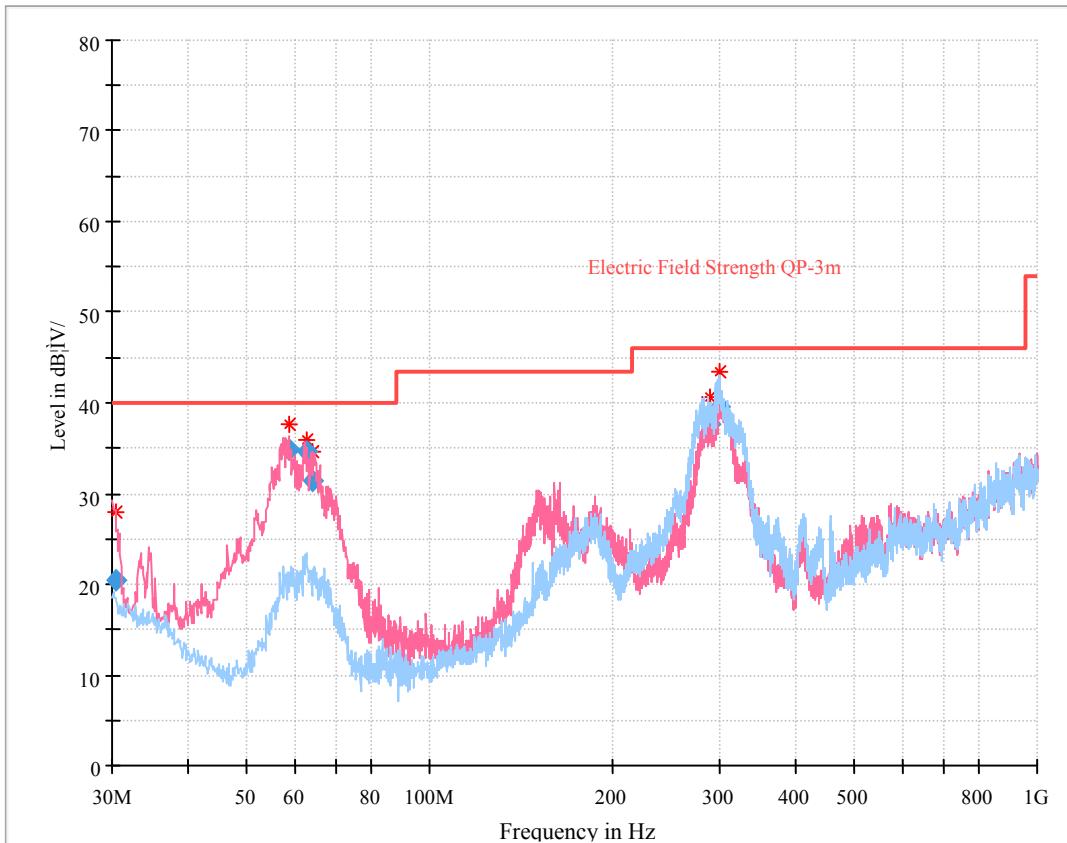
Date: 8.APR.2020 21:28:04

150 kHz-30 MHz



Date: 8.APR.2020 21:39:56

2) 30 MHz ~ 1GHz



Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
30.374000	20.49	102.0	V	353.0	-7.9	40.00	19.51
58.568375	34.78	102.0	V	161.0	-20.1	40.00	5.22
62.627375	34.72	103.0	V	224.0	-20.3	40.00	5.28
64.112750	31.42	123.0	V	155.0	-20.4	40.00	8.58
288.311250	37.61	122.0	H	94.0	-11.4	46.00	8.39
300.715250	39.53	108.0	H	104.0	-10.6	46.00	6.47

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor = Antenna factor (RX) + cable loss - amplifier factor

Margin = Limit - Corr. Amplitude

Result: Compliance

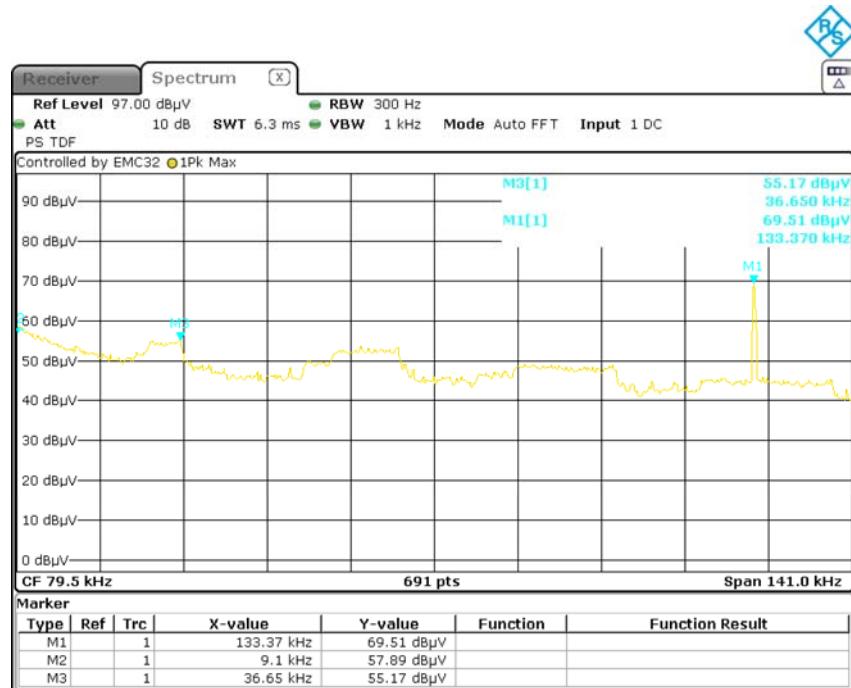
Type C Terminal Charging

1) 9 kHz~30MHz:

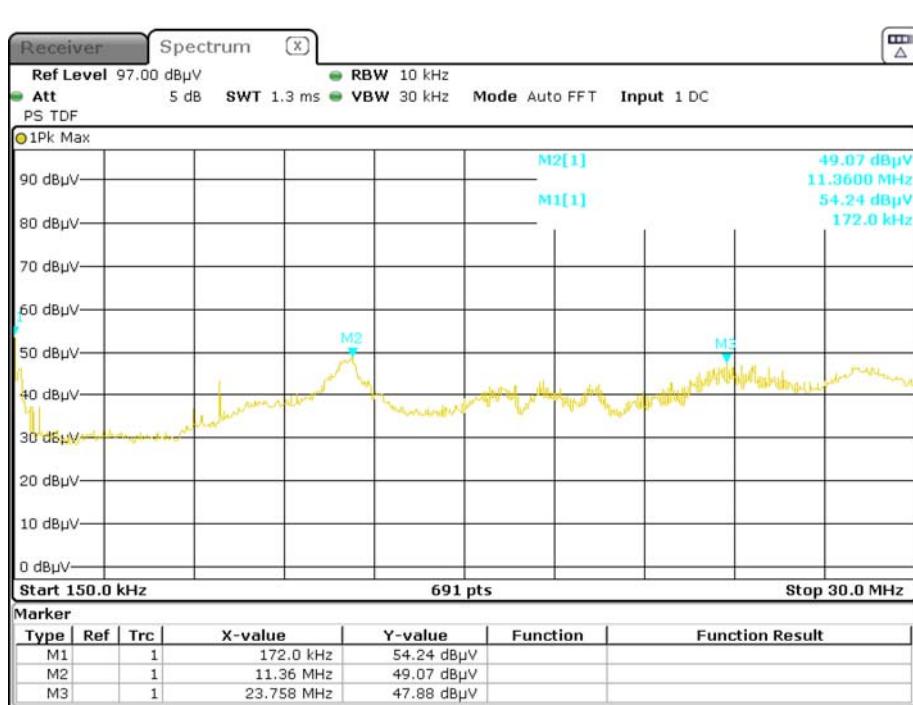
Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Detector (PK/QP/AV)	Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	FCC Part 15.205&15.209		Remark
				Height (m)	Polar		Limit (dB μ V/m)	Margin (dB)	
0.0091	57.89	PK	125	1.0	H	87.9	128.42	70.53	Spurious emission
0.03665	55.17	PK	82	1.0	H	76.1	116.32	61.15	
0.172	54.24	PK	59	1.0	H	52.8	102.89	48.65	
11.36	49.07	PK	210	1.0	H	56.4	69.54	20.47	
23.758	47.88	PK	151	1.0	H	32.2	69.54	21.66	
0.13337	69.51	PK	24	1.0	H	64.2	106.09	36.58	Fundamental

Note: PK detector data compliance with average detector limit.

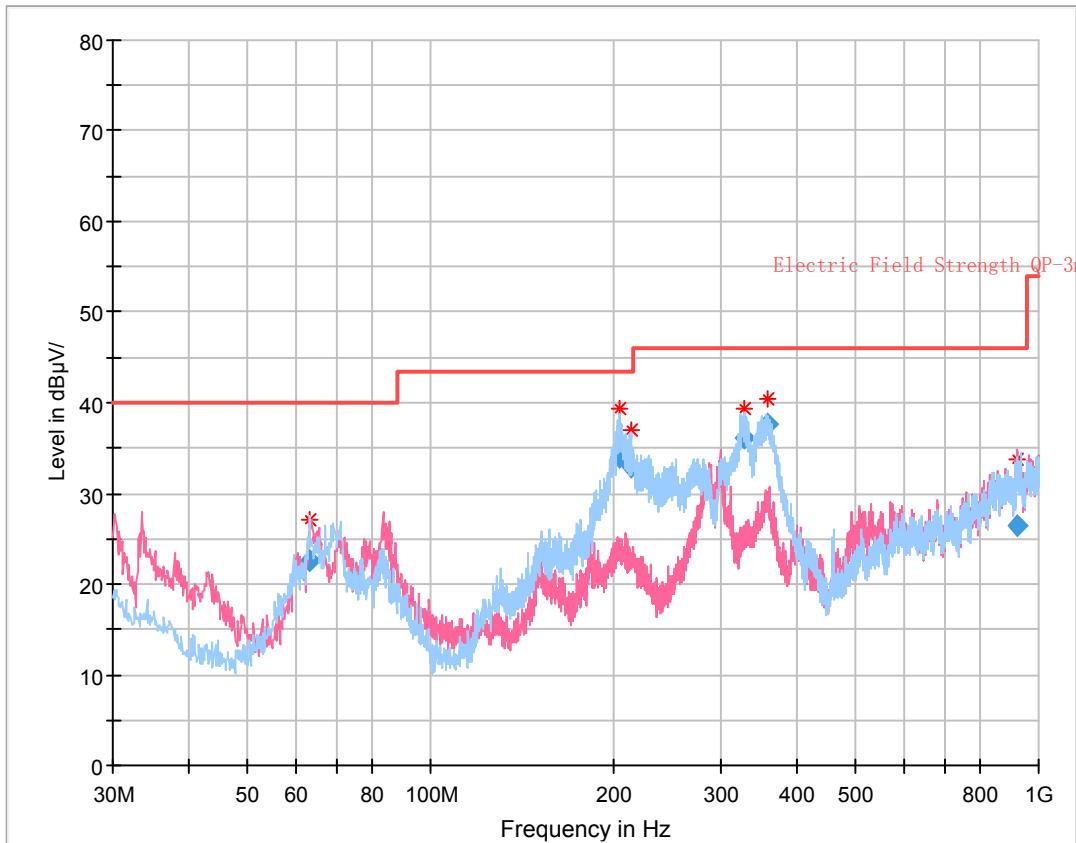
9 kHz-150 kHz



150 kHz-30 MHz



2) 30 MHz ~ 1GHz



Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
63.213000	22.61	336.0	H	304.0	-20.3	40.00	17.39
204.118250	33.96	173.0	H	117.0	-13.8	43.50	9.54
213.100000	33.01	111.0	H	119.0	-13.9	43.50	10.49
327.487375	36.13	107.0	H	80.0	-10.7	46.00	9.87
357.143875	37.62	101.0	H	105.0	-10.8	46.00	8.38
921.364625	26.52	251.0	V	49.0	4.6	46.00	19.48

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor = Antenna factor (RX) + cable loss - amplifier factor

Margin = Limit - Corr. Amplitude

Result: Compliance

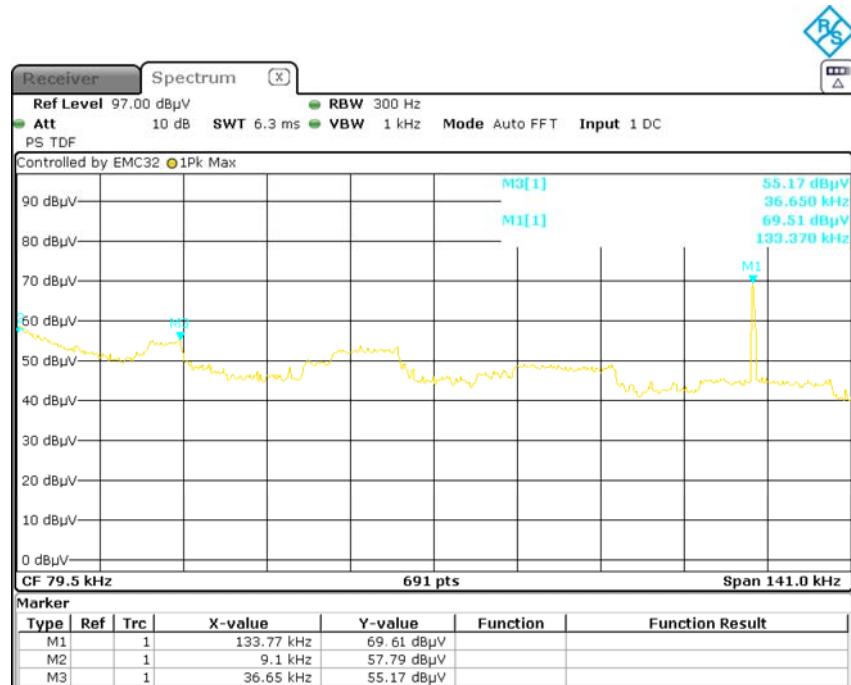
Wireless Charging & charging for mobile phone with USB cable

1) 9 kHz~30MHz:

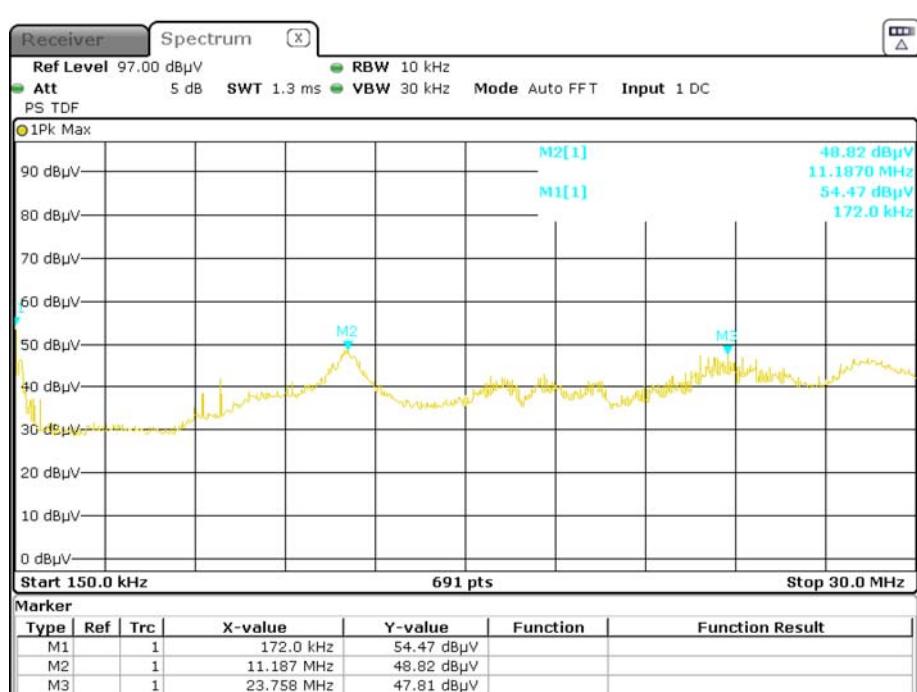
Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Detector (PK/QP/AV)	Turntable Degree	Rx Antenna		Corrected Factor (dB/m)	FCC Part 15.205&15.209		Remark
				Height (m)	Polar		Limit (dB μ V/m)	Margin (dB)	
0.0091	57.79	PK	125	1.0	H	87.9	128.43	70.64	Spurious emission
0.03665	55.17	PK	82	1.0	H	64.2	116.32	61.15	
0.172	54.47	PK	59	1.0	H	57.8	102.89	48.42	
11.187	48.82	PK	210	1.0	H	56.4	69.54	20.72	
23.758	47.81	PK	151	1.0	H	32.2	69.54	21.73	
0.133.77	69.61	PK	24	1.0	H	64.3	105.08	35.47	Fundamental

Note: PK detector data compliance with average detector limit.

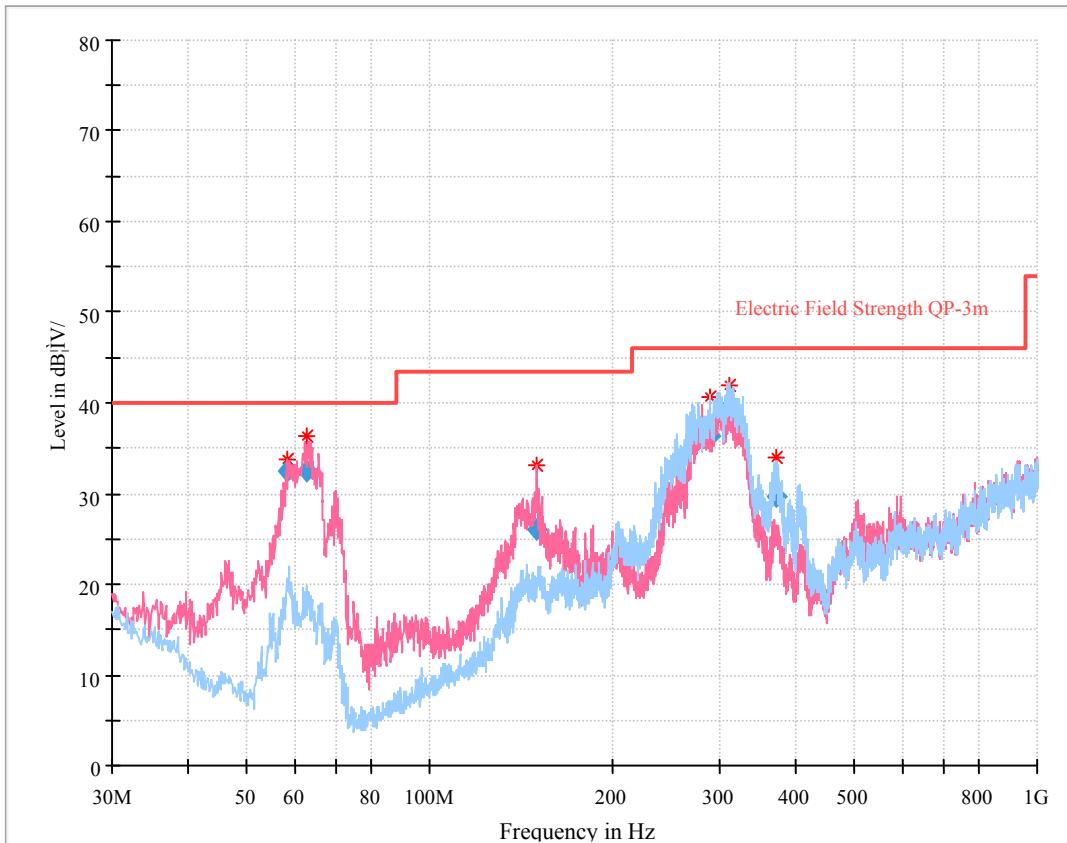
9 kHz-150 kHz



150 kHz-30 MHz



2) 30 MHz ~ 1GHz



Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dB μ V/m)	Margin (dB)
58.195375	32.52	112.0	V	86.0	-20.1	40.00	7.48
62.866375	32.57	122.0	V	91.0	-20.3	40.00	7.43
149.971750	25.98	102.0	V	106.0	-14.2	43.50	17.52
288.749875	36.28	110.0	H	95.0	-11.4	46.00	9.72
310.374750	39.52	109.0	H	82.0	-10.7	46.00	6.48
371.911750	29.72	109.0	H	62.0	-10.6	46.00	16.28

Note:

Corrected Amplitude = Corrected Factor + Reading

Corrected Factor = Antenna factor (RX) + cable loss - amplifier factor

Margin = Limit - Corr. Amplitude

Result: Compliance******* END OF REPORT *******