



# FCC PART 15C

## TEST REPORT

For

### Shenzhen Ronghua Electronic Co. Ltd.

Block1,2-3 Floor,Luowuwei Second Industrial Park, Dalang Street, Longhua District,  
Shenzhen,PRC

**FCC ID: QQ7EGUARDM6069**

<b>Report Type:</b> Original Report	<b>Product Type:</b> AM SYSTEMS
<b>Report Number:</b> <u>RSZ181102011-00</u>	
<b>Report Date:</b> <u>2018-12-12</u>	
<b>Reviewed By:</b> <u>RF Engineer</u>	<i>Rocky Kang</i>
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**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 “\*”.

**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 .....7**

**FCC§15.203 – ANTENNA REQUIREMENT .....8**

    APPLICABLE STANDARD .....8

    ANTENNA CONNECTED CONSTRUCTION .....8

**FCC §15.207 – AC LINE CONDUCTED EMISSION .....9**

    APPLICABLE STANDARD .....9

    EUT SETUP .....9

    EMI TEST RECEIVER SETUP.....9

    TEST EQUIPMENT LIST AND DETAILS.....10

    TEST PROCEDURE .....10

    CORRECTED FACTOR & MARGIN CALCULATION .....10

    TEST RESULTS SUMMARY .....10

    TEST DATA .....11

**FCC §15.205 & §15.209 - RADIATED EMISSIONS TEST .....14**

    APPLICABLE STANDARD .....14

    EUT SETUP .....14

    EMI TEST RECEIVER SETUP.....15

    CORRECTED AMPLITUDE & MARGIN CALCULATION .....15

    TEST EQUIPMENT LIST AND DETAILS.....15

    TEST RESULTS SUMMARY .....16

    TEST DATA .....16

## GENERAL INFORMATION

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### Product Description for Equipment Under Test (EUT)

The *Shenzhen Ronghua Electronic Co. Ltd.*'s product, model number: *M6069* (FCC ID: *QQ7EGUARDM6069*) in this report is *AM SYSTEMS*, which was measured approximately: 41.0 cm (L) \* 9.3 cm (W) \* 155.0 cm (H), rated with input voltage: DC 35V.

Power Supply:  
Model: EG105  
Input: AC 110V, 50/60Hz, 80mA  
Output: DC 35V, 600mA

*Note: This series products model: M6069 and M 6090/M 6088(D)/M 6088S(D)/M 6080/M6310(D) /M6320(D)/M6089/M6090(RP)/ M6000D are electrically identical, Model M6069 was selected for fully testing, the detailed information can be referred to the declaration which was stated and guaranteed by the applicant.*

*\* All measurement and test data in this report was gathered from production sample serial number: 181102011 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-11-02.*

### Objective

This report is prepared on behalf of *Shenzhen Ronghua Electronic Co. Ltd.* 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).

### 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	±4.75 dB
Occupied Bandwidth		±0.5 kHz
Temperature		±3.0 °C
Humidity		±6 %

**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

Operation frequency: 58 kHz.

### EUT Exercise Software

No software used in test.

### Support Equipment List and Details

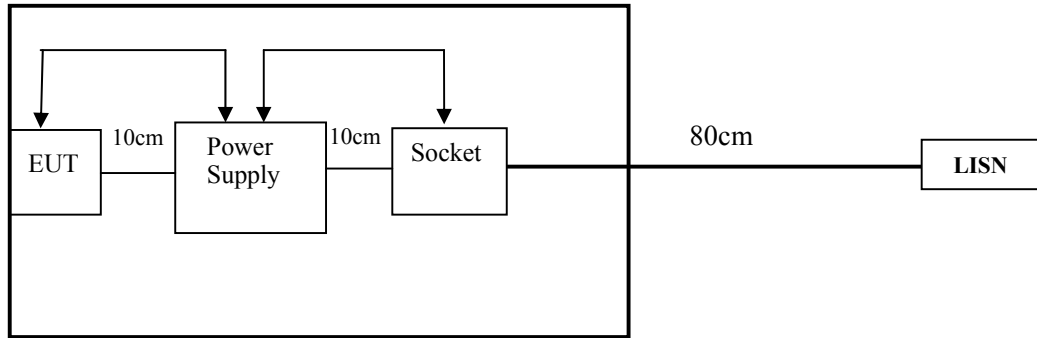
Manufacturer	Description	Model	Serial Number
/	/	/	/

### External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielded Un-detachable AC power cable	0.5	Socket	Power supply
Un-shielded Un-detachable DC power cable	1.5	Power supply	EUT

### Block Diagram of Test Setup

For Conducted Emissions:



12mm above Ground Reference Plane

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## **SUMMARY OF TEST RESULTS**

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<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
FCC§15.203	Antenna Requirement	Compliance
FCC§15.207	AC Line Conducted Emission	Compliance
§15.209 §15.205	Radiated Emission Test	Compliance

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## **FCC§15.203 – ANTENNA REQUIREMENT**

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### **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 a internal antenna arrangement, which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

**Result:** Compliance.

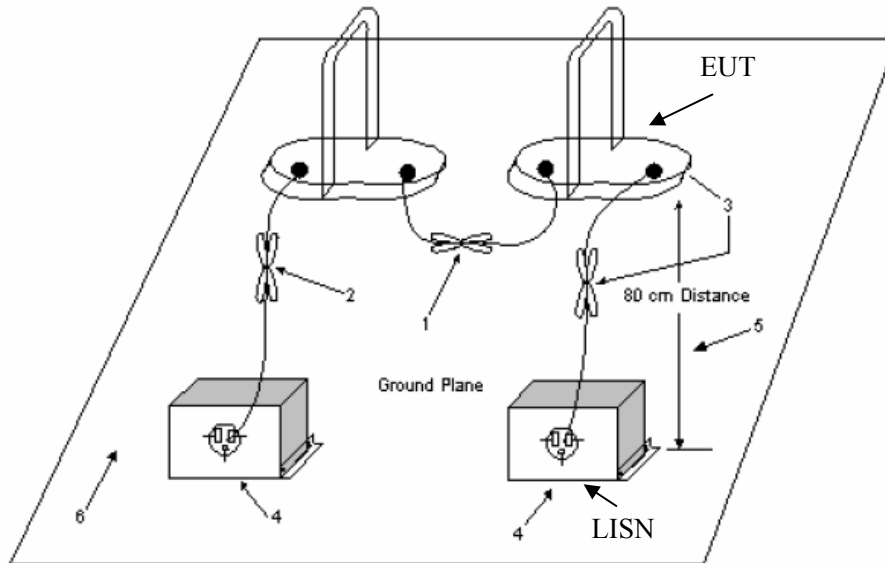


## FCC §15.207 – AC LINE CONDUCTED EMISSION

### Applicable Standard

FCC§15.207

### EUT Setup



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.

EUT and all cables shall be insulated, if required, from the ground plane by up to 12 mm of insulating material.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2018-07-11	2019-07-11
Rohde & Schwarz	LISN	ENV216	3560.6650.12-101613-Yb	2017-12-21	2018-12-21
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2018-11-12	2019-11-12
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR
Unknown	Conducted Emission Cable	78652	UF A210B-1-0720-504504	2018-11-12	2019-05-12

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

### 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,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_m + U_{(L_m)} \leq L_{\text{lim}} + U_{\text{cispr}}$$

In BACL,  $U_{(L_m)}$  is less than  $U_{\text{cispr}}$ , if  $L_m$  is less than  $L_{\text{lim}}$ , it implies that the EUT complies with the limit.

**Test Data**

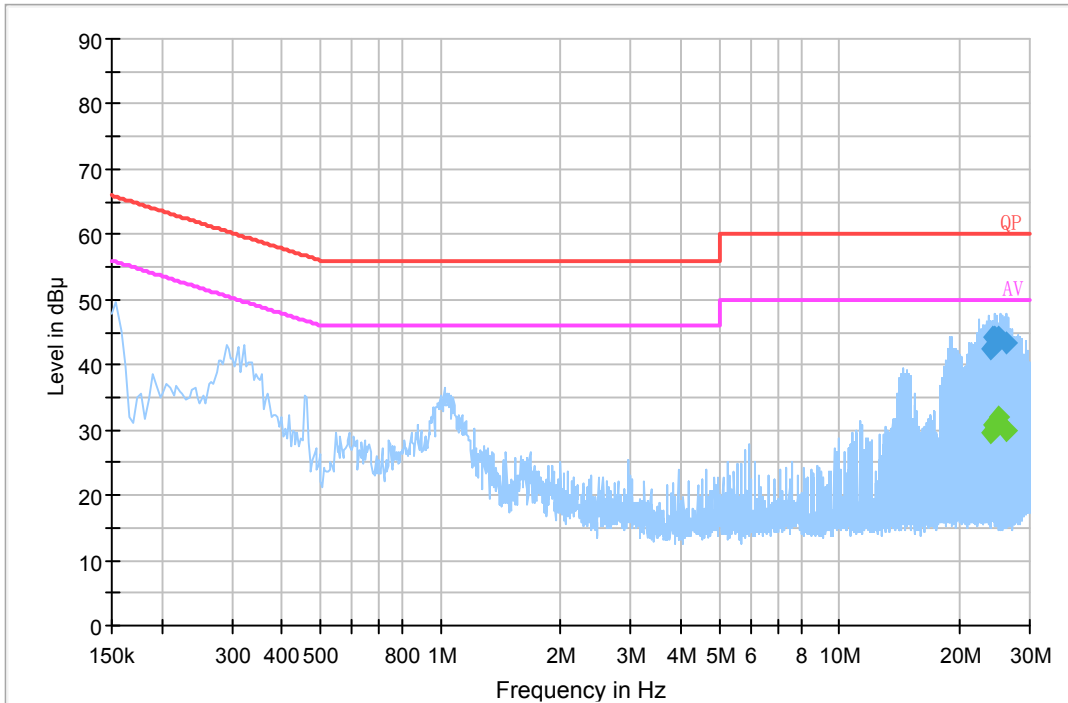
**Environmental Conditions**

<b>Temperature:</b>	24°C
<b>Relative Humidity:</b>	57 %
<b>ATM Pressure:</b>	100.4 kPa

*The testing was performed by Haiguo Li on 2018-12-07.*

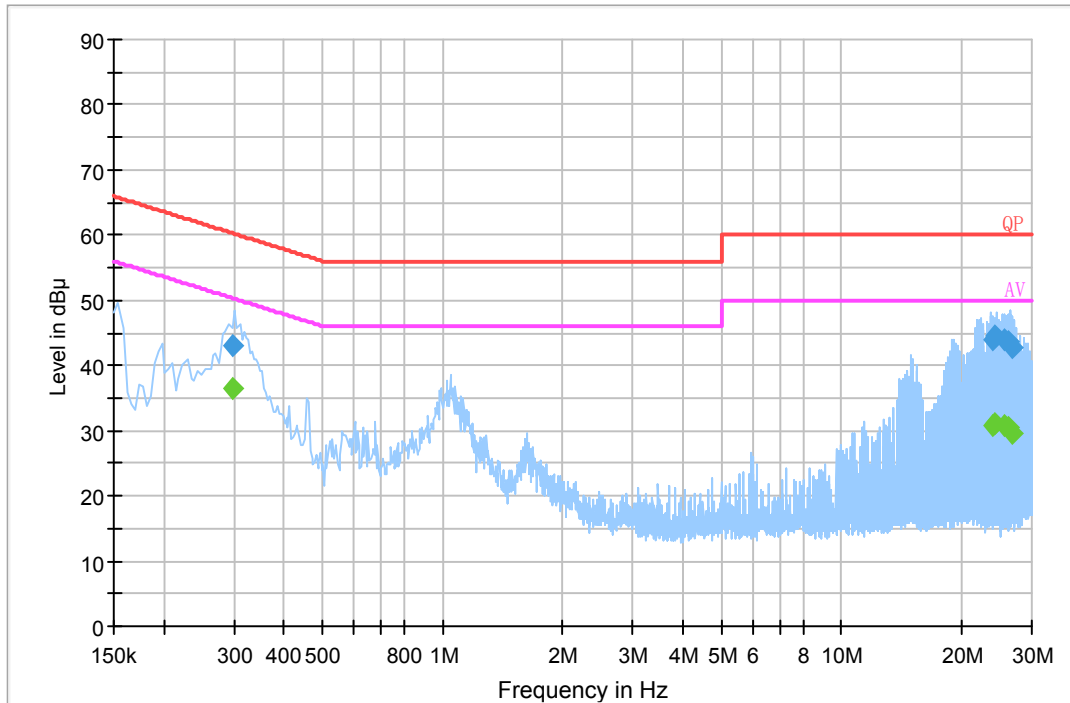
*Test Mode: Transmitting*

**AC 120 V/60 Hz, Line:**



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
24.070110	42.5	20.4	60.0	17.5	QP
24.189930	44.1	20.4	60.0	15.9	QP
24.420190	44.3	20.4	60.0	15.7	QP
24.999490	43.9	20.4	60.0	16.1	QP
25.116010	44.2	20.4	60.0	15.8	QP
26.275830	43.5	20.4	60.0	16.5	QP
24.070110	29.7	20.4	50.0	20.3	Ave.
24.189930	30.9	20.4	50.0	19.1	Ave.
24.420190	30.6	20.4	50.0	19.4	Ave.
24.999490	32.0	20.4	50.0	18.0	Ave.
25.116010	31.1	20.4	50.0	18.9	Ave.
26.275830	29.9	20.4	50.0	20.1	Ave.

**AC 120V/ 60 Hz, Neutral:**



Frequency (MHz)	Corrected Amplitude (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/Ave./QP)
0.297470	42.9	19.8	60.3	17.4	QP
23.842110	44.1	20.3	60.0	15.9	QP
24.189930	44.5	20.4	60.0	15.5	QP
25.580010	43.9	20.4	60.0	16.1	QP
26.277570	43.8	20.4	60.0	16.2	QP
26.742090	42.9	20.4	60.0	17.1	QP
0.297470	36.5	19.8	50.3	13.8	Ave.
23.842110	30.9	20.3	50.0	19.1	Ave.
24.189930	31.2	20.4	50.0	18.8	Ave.
25.580010	30.7	20.4	50.0	19.3	Ave.
26.277570	30.4	20.4	50.0	19.6	Ave.
26.742090	29.7	20.4	50.0	20.3	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

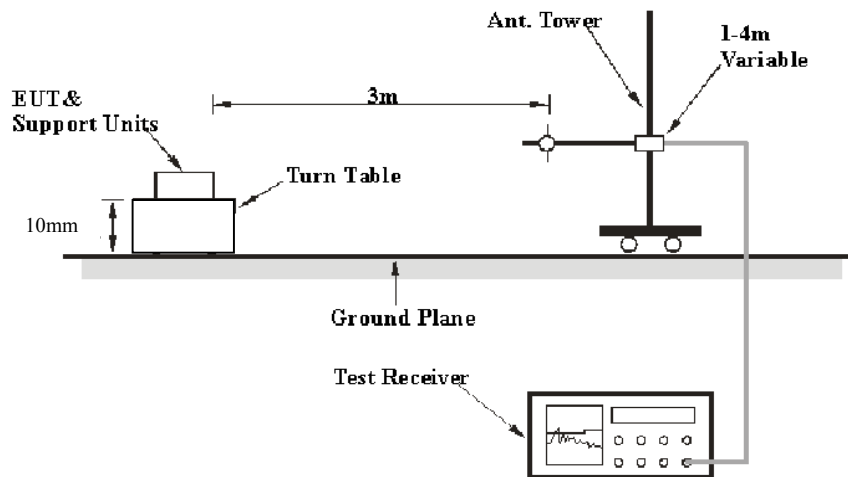
As per FCC Part 15.209

(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	200 Hz	1 kHz	QP/Average
150 kHz – 30 MHz	9 kHz	30 kHz	QP/Average
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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma instrument	Amplifier	310 N	186238	2018-11-12	2019-05-12
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2018-01-11	2019-01-11
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
ETS	Passive Loop Antenna	6512	29604	2018-03-07	2021-03-06
TDK	Chamber	Chamber A	2#	2016-12-05	2019-12-05
UTiFLEX MICRO-C0AX	RF Cable	UFA147A- 2362-100100	MFR64639 231029-003	2018-08-01	2019-02-01
Ducommun technologies	RF Cable	104PEA	218124002	2017-05-21	2018-11-21

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

## 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

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	57 %
<b>ATM Pressure:</b>	100.7 kPa

*The testing was performed by Andy Yu on 2018-11-17.*

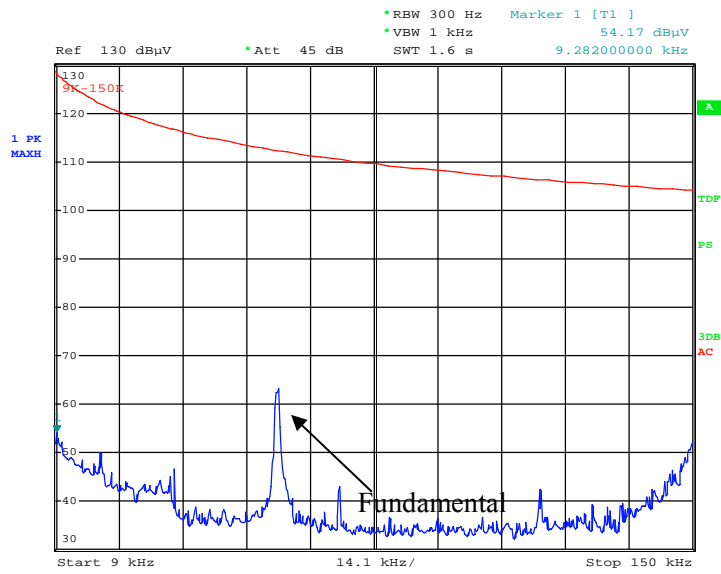
*Test mode: Transmitting*

1) 9 kHz~30MHz:

Frequency (MHz)	Corrected Amplitude (dB $\mu$ 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 $\mu$ V/m)	Margin (dB)	
0.058	63.28	PK	87	1	H	73.2	112.3	39.1	Fundamental
0.009	54.17	PK	87	1	H	66.6	128.5	74.33	Spurious emission
0.15	54.54	PK	87	1	H	65.7	104	49.46	

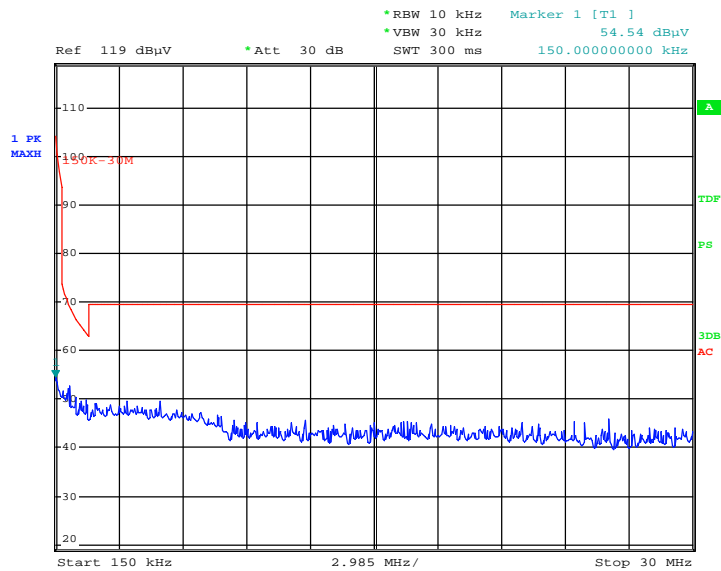


9 kHz-150 kHz



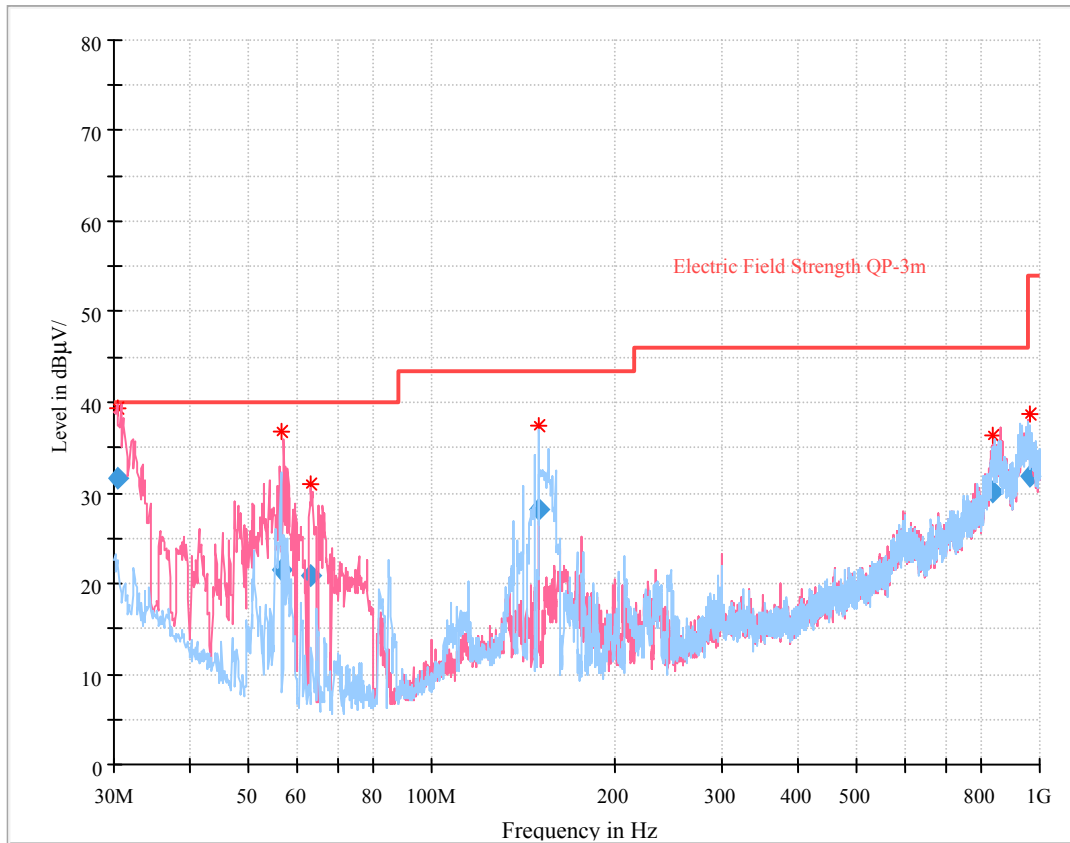
EUT  
Date: 17.NOV.2018 17:01:30

150 kHz-30 MHz



EUT  
Date: 17.NOV.2018 17:18:29

2) 30 MHz ~ 1GHz



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna height (cm)	Antenna Polarity	Turntable position (degree)	Correction Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
30.538250	31.63	107.0	V	125.0	-8.0	40.00	8.37
56.781125	21.59	100.0	V	259.0	-20.0	40.00	18.41
63.381375	20.78	180.0	V	0.0	-20.3	40.00	19.22
149.749250	28.08	135.0	H	84.0	-14.2	43.50	15.42
838.645500	30.04	262.0	V	162.0	5.8	46.00	15.96
960.219875	31.74	293.0	V	288.0	9.2	53.90	22.16

**Note:**

Corrected Amplitude = Corrected Factor + Reading

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

Margin = Limit- Corr. Amplitude

**Result:** Compliance

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