



TESTING LABORATORY  
CERTIFICATE #4820.01



# FCC PART 15C

## RSS-GEN ISSUE 4, NOVEMBER 2014

## RSS-210, ISSUE 9, AUGUST 2016

### TEST REPORT

For

### Fujian LANDI Commercial Equipment Co., Ltd.

Building 17, Section A, Software Park, No. 89 Software Road, Gulou District, Fuzhou Municipality, Fujian Province, P.R. China.

**FCC ID: 2AG6NAPOSA8LEWF**  
**IC: 23725-APOSA8LEWF**

<b>Report Type:</b> Original Report	<b>Product Name:</b> APOS A8
<b>Report Number:</b> RXM171225059-00D	
<b>Report Date:</b> Reviewed By:	2018-04-03 Jerry Zhang EMC Manager
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).  
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## GENERAL INFORMATION

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

<b>EUT Name:</b>		APOS A8
<b>EUT Model:</b>		APOS A8
<b>FCC ID:</b>		2AG6NAPOSA8LEWF
<b>IC:</b>		23725-APOSA8LEWF
<b>Rated Input Voltage:</b>		DC 7.2V from battery or DC 5V from adapter
<b>Adapter #1 Information</b>	<b>Model:</b>	HKC0115021-2D
	<b>Input:</b>	AC 100-240V~50/60Hz, 0.5A
	<b>Output:</b>	DC 5V, 2A
<b>Adapter #2 Information</b>	<b>Model:</b>	A8A-050200U-US1
	<b>Input:</b>	AC 100-240V~50/60Hz, 0.35A
	<b>Output:</b>	DC 5V, 2A
<b>External Dimension:</b>		Length (183mm)*Width (84mm)*High (64mm)
<b>Serial Number:</b>		171225059
<b>EUT Received Date:</b>		2017.12.25

### Objective

This type approval report is prepared on behalf of *Fujian Landi Commercial Equipment Co., Ltd.* in accordance with Part 2, Subpart J, and Part 15, Subparts A and C of the Federal Communications Commission's rules and RSS-210, Issue 9, August 2016 of the Innovation, Science and Economic Development Canada.

The objective is to determine the compliance of the EUT with FCC rules, sec 15.203, 15.205, 15.207, 15.209 and 15.225, and RSS-Gen, Issue 4, November 2014, General Requirements for Compliance of Radio Apparatus.

### Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: 2AG6NAPOSA8LEWF.

FCC Part 15C DSS submissions with FCC ID: 2AG6NAPOSA8LEWF.

FCC Part 22H,24E,27,90 PCB submissions with FCC ID: 2AG6NAPOSA8LEWF.

RSS-247 DSSs, RSS-247 DTSs, RSS-132, RSS-133, RSS-139, RSS-199, RSS-130, submissions with IC: 23725-APOSA8LEWF

### Test Methodology

All measurements detailed in this Test Report were performed in accordance with ANSI C63.10-2013 "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices", and the RSS-210, Issue 9, August 2016. Applicable Standard: Licence-Exempt Radio Apparatus: Category I Equipment. And RSS-Gen, Issue 4, November 2014, General Requirements for Compliance of Radio Apparatus.

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

## Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
radiated Emissions	9kHz~30MHz: 4.12dB 30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	3.12 dB (150 kHz to 30 MHz)

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, 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. : 897218, the FCC Designation No. : CN1220.

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

## SYSTEM TEST CONFIGURATION

### Justification

The system was configured for testing in a test mode.

### Special Accessories

Manufacturer	Description	Model	Serial Number
Shenzhen Mbell Electronics Co.,Ltd	Battery#1	LD18650D	MBPD12716032800145
Fuzhou SCUD Commercial Equipment Co.,Ltd.	Battery#2	LD18650D	PC02000080,01,171123

Note: all tests were performed with battery#1, except AC line test and Radiation test with both batteries.

### EUT Exercise Software

No software used in test.

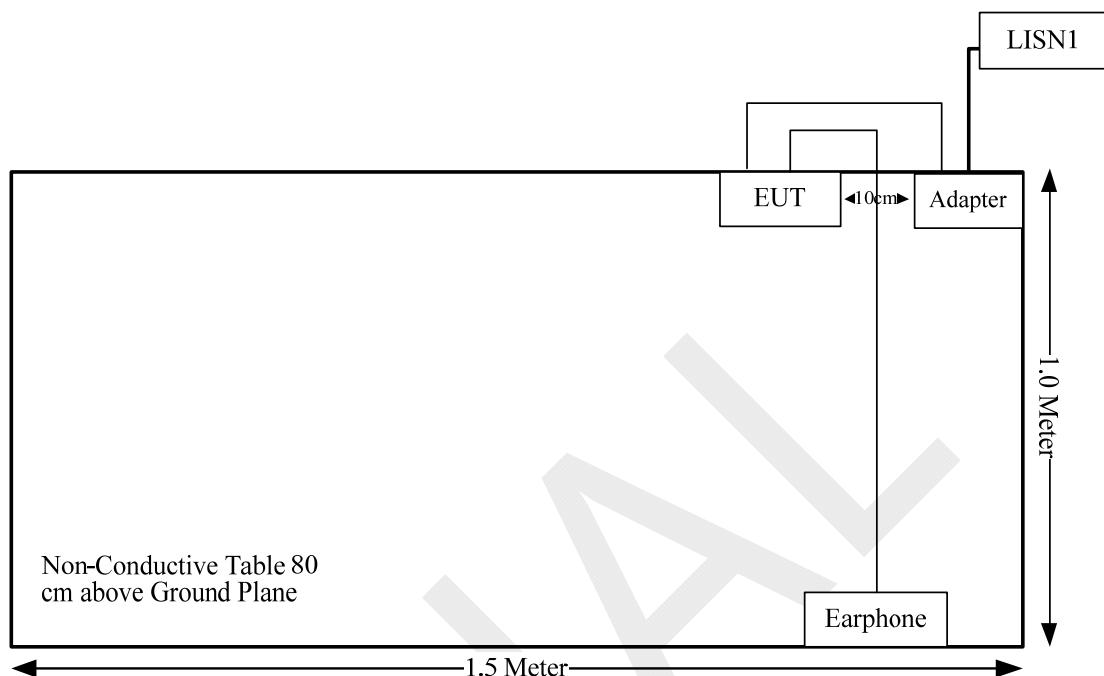
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HUAWEI	Earphone	/	/

### Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
USB cable	yes	No	1.5	Adapter	EUT

### Block Diagram of Test Setup



## SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203 RSS-Gen§8.3	Antenna Requirement	Compliance
§15.207 RSS-Gen Clause 8.8	AC Line Conducted Emission	Compliance
§15.225 §15.209 §15.205 RSS-210 Clause B.6 RSS-Gen Clause 8.9	Radiated Emission Test	Compliance
§15.225(e) RSS-210 Clause B.6	Frequency Stability	Compliance
§15.215(c) RSS- Gen§6.6	20 dB Bandwidth 99% Occupied Bandwidth	Compliance

## **FCC §15.203 & RSS-GEN§8.3 - ANTENNA REQUIREMENT**

### **Applicable Standard**

According to FCC § 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. 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

According to RSS-Gen §8.3, The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

User manuals for transmitters equipped with detachable antennas shall also contain the following notice in a conspicuous location:

This radio transmitter (identify the device by certification number or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Immediately following the above notice, the manufacturer shall provide a list of all antenna types approved for use with the transmitter, indicating the maximum permissible antenna gain (in dBi).

### **Antenna Connected Construction**

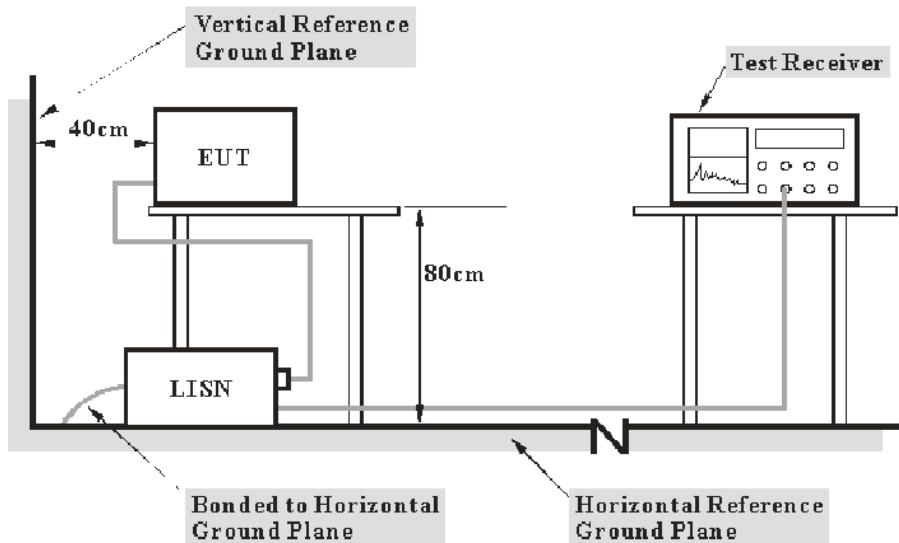
The EUT has one integral antenna arrangement, which was permanently attached and fulfill the requirement of this section. Please refer to the EUT photos.

**Result:** Compliance.

## FCC §15.207 (a) & RSS-Gen §8.8– AC LINE CONDUCTED EMISSIONS

### EUT Setup

FCC§15.207(a) and RSS-Gen§8.8



**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 and RSS-Gen limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to the main lisn with an AC 120V/60Hz power source.

### 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
R&S	EMI Test Receiver	ESCS 30	830245/006	2017-12-11	2018-12-11
R&S	Two-line V-network	ENV 216	101614	2017-12-08	2018-12-08
N/A	Coaxial Cable	C-NJNJ-50	C-0200-01	2017-09-05	2018-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) 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 data was recorded in the Quasi-peak and average detection mode.

According FCC publication number 174176, for a device with a permanent antenna operating at or below 30 MHz, the measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) perform the AC line conducted tests with the permanent antenna to determine compliance with the Section 15.207 limits outside the transmitter's fundamental emission band; (2) retest with a dummy load in lieu of the permanent antenna to determine compliance with the Section 15.207 limits within the transmitter's fundamental emission band.

## Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_c + VDF$$

Herein,

$V_C$ : corrected voltage amplitude

$V_R$ : reading voltage amplitude

$A_c$ : attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The “Margin” column of the following data tables indicates the degree of compliance within 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:

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

## Test Results Summary

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

## Test Data

### Environmental Conditions

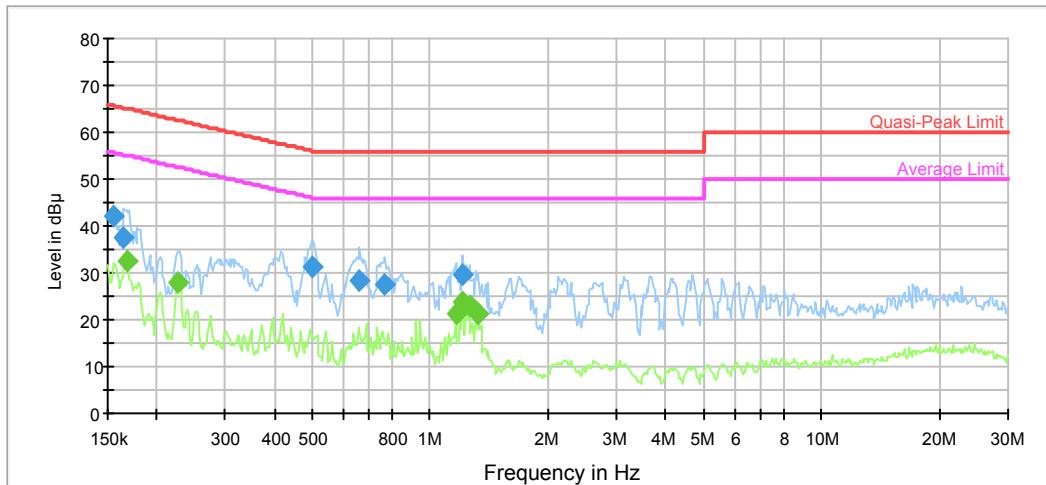
Temperature:	24.3 °C
Relative Humidity:	42 %
ATM Pressure:	101.2kPa

*The testing was performed by Jim Zhang on 2018-01-26*

*Test Mode: Transmitting*

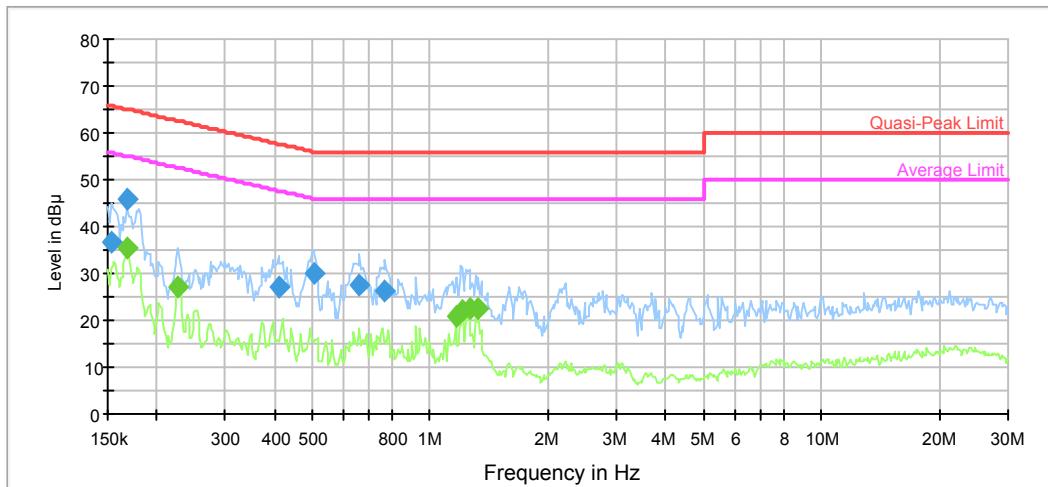
**Battery #1 & Adapter #1:**

**AC120 V, 60 Hz, Line:**



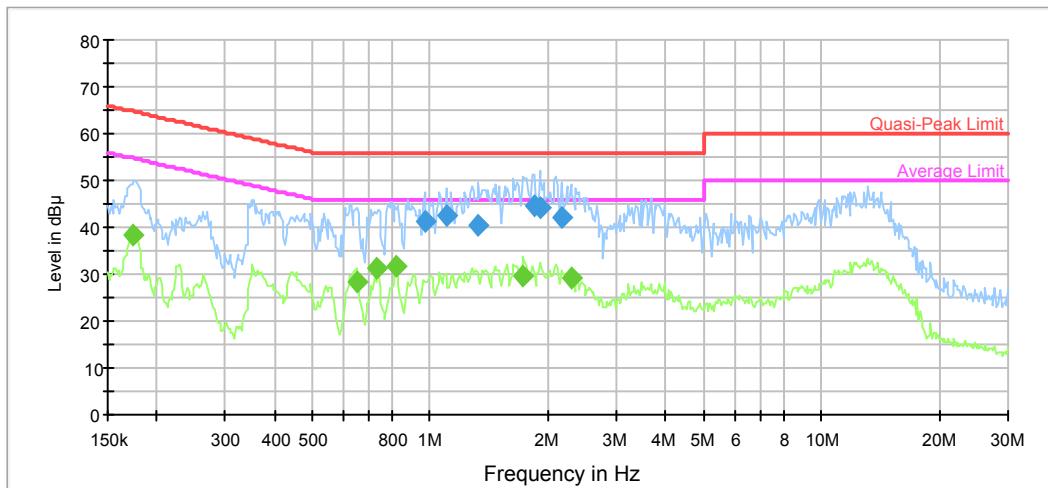
Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.154858	42.1	9.000	L1	11.1	23.7	65.7	Compliance
0.165051	37.3	9.000	L1	11.0	27.9	65.2	Compliance
0.499611	31.3	9.000	L1	9.9	24.7	56.0	Compliance
0.660314	28.5	9.000	L1	9.8	27.5	56.0	Compliance
0.768247	27.4	9.000	L1	9.8	28.6	56.0	Compliance
1.209904	29.4	9.000	L1	9.8	26.6	56.0	Compliance

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.167702	32.5	9.000	L1	10.9	22.6	55.1	Compliance
0.227007	27.9	9.000	L1	10.5	24.7	52.6	Compliance
1.162648	21.4	9.000	L1	9.8	24.6	46.0	Compliance
1.209904	23.9	9.000	L1	9.8	22.1	46.0	Compliance
1.259081	22.8	9.000	L1	9.8	23.2	46.0	Compliance
1.331304	21.4	9.000	L1	9.7	24.6	46.0	Compliance

**AC120 V, 60 Hz, Neutral:**

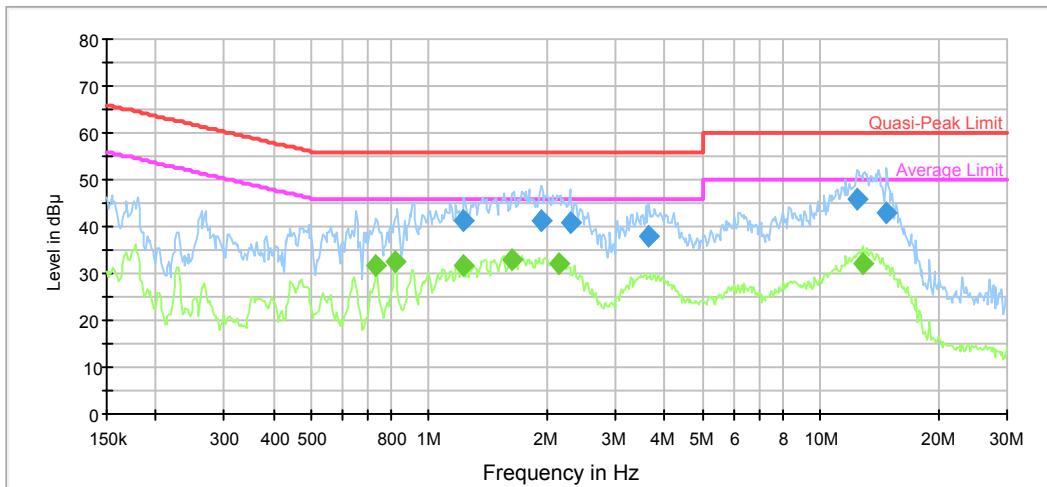
Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.153629	36.5	9.000	N	11.1	29.3	65.8	Compliance
0.167702	46.0	9.000	N	10.9	19.0	65.1	Compliance
0.409372	27.1	9.000	N	10.0	30.6	57.7	Compliance
0.503608	29.9	9.000	N	9.9	26.1	56.0	Compliance
0.660314	27.6	9.000	N	9.8	28.4	56.0	Compliance
0.768247	26.3	9.000	N	9.8	29.7	56.0	Compliance

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.169044	35.5	9.000	N	10.9	19.5	55.0	Compliance
0.227007	27.3	9.000	N	10.5	25.3	52.6	Compliance
1.162648	20.8	9.000	N	9.8	25.2	46.0	Compliance
1.209904	22.1	9.000	N	9.8	23.9	46.0	Compliance
1.259081	22.7	9.000	N	9.8	23.3	46.0	Compliance
1.331304	22.6	9.000	N	9.7	23.4	46.0	Compliance

**Battery #1& Adapter #2:****AC120 V, 60 Hz, Line:**

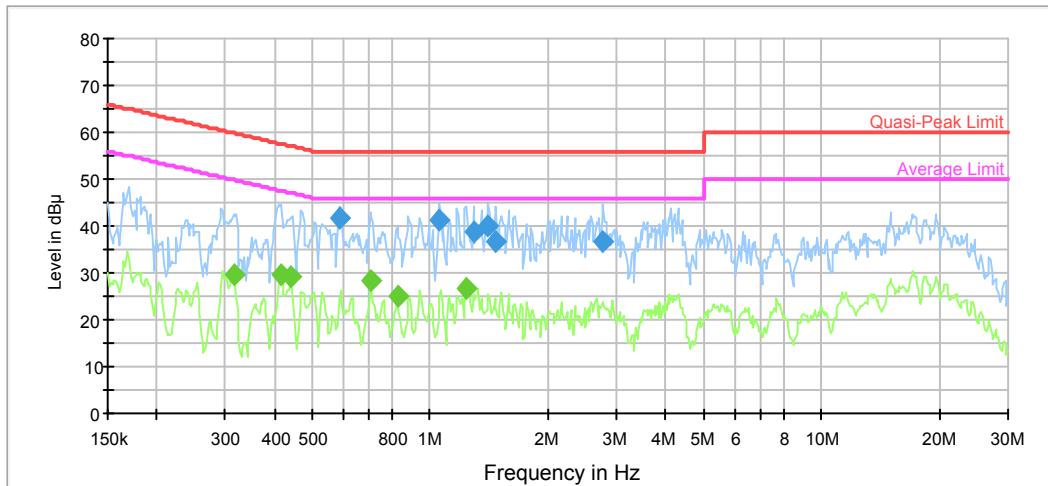
Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.967957	41.1	9.000	L1	9.8	14.9	56.0	Compliance
1.099574	42.5	9.000	L1	9.8	13.5	56.0	Compliance
1.331304	40.6	9.000	L1	9.7	15.4	56.0	Compliance
1.845692	44.8	9.000	L1	9.7	11.2	56.0	Compliance
1.905466	44.3	9.000	L1	9.7	11.7	56.0	Compliance
2.164561	42.0	9.000	L1	9.7	14.0	56.0	Compliance

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.174519	38.5	9.000	L1	10.9	16.2	54.7	Compliance
0.649874	28.5	9.000	L1	9.8	17.5	46.0	Compliance
0.732382	31.3	9.000	L1	9.8	14.7	46.0	Compliance
0.818813	31.7	9.000	L1	9.8	14.3	46.0	Compliance
1.731709	29.7	9.000	L1	9.7	16.3	46.0	Compliance
2.307034	29.0	9.000	L1	9.8	17.0	46.0	Compliance

**AC120 V, 60 Hz, Neutral:**

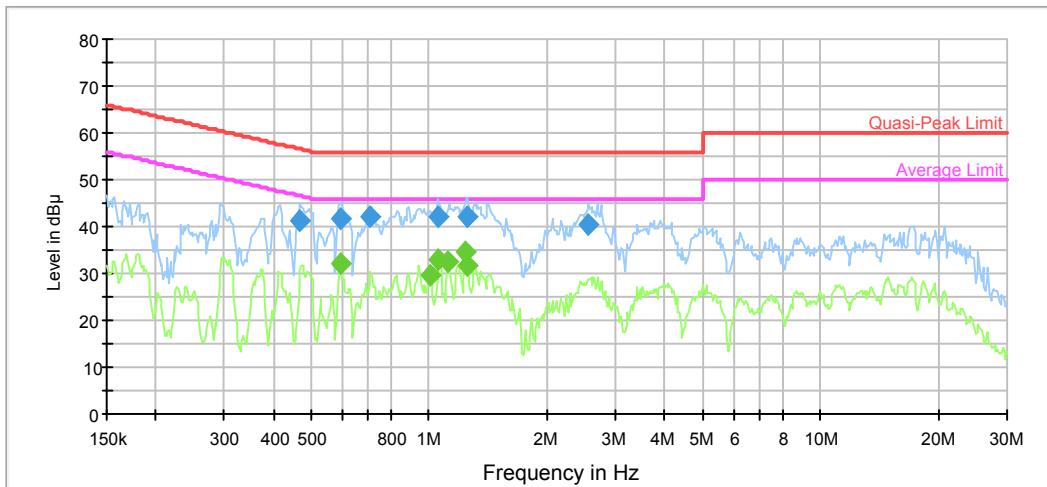
Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
1.229340	41.3	9.000	N	9.8	14.7	56.0	Compliance
1.936076	41.3	9.000	N	9.7	14.7	56.0	Compliance
2.288725	40.9	9.000	N	9.8	15.1	56.0	Compliance
3.633326	38.0	9.000	N	9.8	18.0	56.0	Compliance
12.394424	45.9	9.000	N	9.9	14.1	60.0	Compliance
14.769236	43.1	9.000	N	9.9	17.0	60.0	Compliance

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.732382	31.6	9.000	N	9.8	14.4	46.0	Compliance
0.818813	32.4	9.000	N	9.8	13.6	46.0	Compliance
1.229340	31.5	9.000	N	9.8	14.5	46.0	Compliance
1.624765	32.8	9.000	N	9.7	13.2	46.0	Compliance
2.147382	32.2	9.000	N	9.8	13.8	46.0	Compliance
12.795830	32.2	9.000	N	9.9	17.8	50.0	Compliance

**Battery #2& Adapter #1:****AC120 V, 60 Hz, Line:**

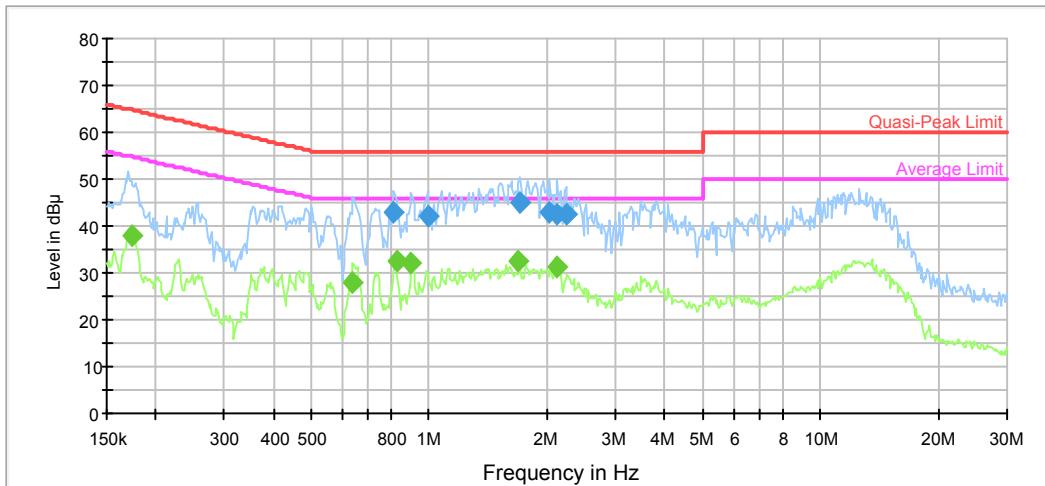
Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.585926	41.6	9.000	L1	9.8	14.4	56.0	Compliance
1.056628	41.4	9.000	L1	9.8	14.6	56.0	Compliance
1.289541	38.9	9.000	L1	9.8	17.1	56.0	Compliance
1.407671	40.1	9.000	L1	9.7	15.9	56.0	Compliance
1.476605	36.5	9.000	L1	9.7	19.5	56.0	Compliance
2.771062	36.5	9.000	L1	9.8	19.5	56.0	Compliance

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.314718	29.6	9.000	L1	10.1	20.3	49.8	Compliance
0.415949	29.5	9.000	L1	10.0	18.0	47.5	Compliance
0.443327	29.1	9.000	L1	9.9	17.9	47.0	Compliance
0.709407	28.3	9.000	L1	9.8	17.7	46.0	Compliance
0.825364	25.1	9.000	L1	9.8	20.9	46.0	Compliance
1.239175	26.6	9.000	L1	9.8	19.4	46.0	Compliance

**AC120 V, 60 Hz, Neutral:**

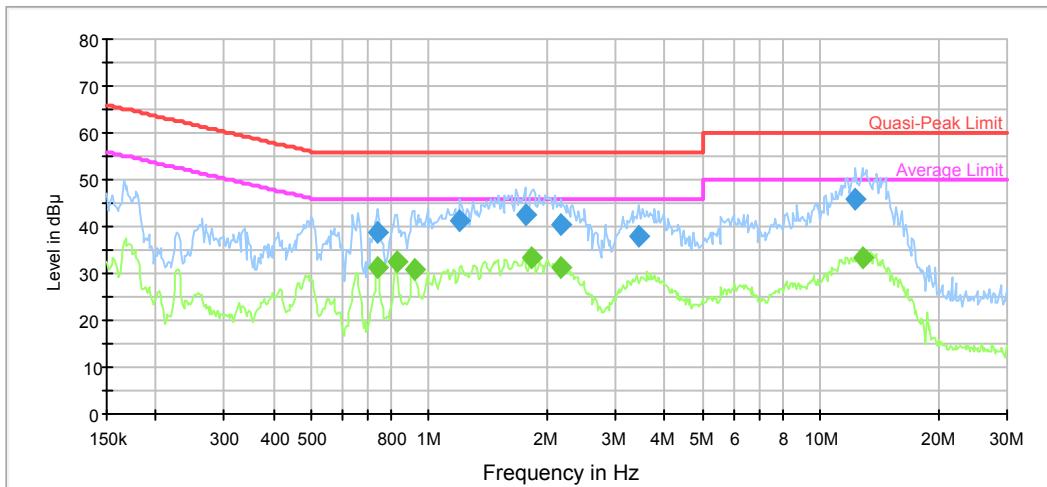
Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.468757	41.2	9.000	N	9.9	15.3	56.5	Compliance
0.595338	41.6	9.000	N	9.8	14.4	56.0	Compliance
0.709407	41.9	9.000	N	9.8	14.1	56.0	Compliance
1.048242	42.2	9.000	N	9.8	13.8	56.0	Compliance
1.249088	42.1	9.000	N	9.8	13.9	56.0	Compliance
2.558827	40.4	9.000	N	9.8	15.6	56.0	Compliance

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.590613	32.2	9.000	N	9.8	13.8	46.0	Compliance
1.007300	29.6	9.000	N	9.8	16.4	46.0	Compliance
1.056628	32.9	9.000	N	9.8	13.1	46.0	Compliance
1.117238	32.3	9.000	N	9.8	13.7	46.0	Compliance
1.239175	34.4	9.000	N	9.8	11.6	46.0	Compliance
1.249088	31.7	9.000	N	9.8	14.3	46.0	Compliance

**Battery #2& Adapter #2:****AC120 V, 60 Hz, Line:**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.812315	42.8	9.000	L1	9.8	13.2	56.0	Compliance
0.991374	42.2	9.000	L1	9.8	13.8	56.0	Compliance
1.704331	45.0	9.000	L1	9.7	11.0	56.0	Compliance
2.030886	43.0	9.000	L1	9.7	13.0	56.0	Compliance
2.130339	42.5	9.000	L1	9.7	13.5	56.0	Compliance
2.234662	42.5	9.000	L1	9.7	13.5	56.0	Compliance

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.173134	38.0	9.000	L1	10.9	16.8	54.8	Compliance
0.639600	28.1	9.000	L1	9.8	17.9	46.0	Compliance
0.825364	32.3	9.000	L1	9.8	13.7	46.0	Compliance
0.900972	32.2	9.000	L1	9.8	13.8	46.0	Compliance
1.690804	32.6	9.000	L1	9.7	13.5	46.0	Compliance
2.130339	31.1	9.000	L1	9.7	14.9	46.0	Compliance

**AC120 V, 60 Hz, Neutral:**

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.738241	38.8	9.000	N	9.8	17.2	56.0	Compliance
1.200302	41.1	9.000	N	9.8	14.9	56.0	Compliance
1.759527	42.6	9.000	N	9.7	13.4	56.0	Compliance
2.181877	40.3	9.000	N	9.8	15.7	56.0	Compliance
3.436218	38.1	9.000	N	9.8	17.9	56.0	Compliance
12.296055	45.7	9.000	N	9.9	14.3	60.0	Compliance

Frequency (MHz)	Average (dB $\mu$ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)	Comment
0.738241	31.2	9.000	N	9.8	14.8	46.0	Compliance
0.825364	32.5	9.000	N	9.8	13.5	46.0	Compliance
0.915445	30.7	9.000	N	9.8	15.3	46.0	Compliance
1.831043	33.5	9.000	N	9.7	12.5	46.0	Compliance
2.181877	31.1	9.000	N	9.8	14.9	46.0	Compliance
12.898197	33.1	9.000	N	9.9	16.9	50.0	Compliance

**FCC§15.225, §15.205 & §15.209&RSS-210§B.6, RSS-Gen§8.9- RADIATED EMISSIONS****Applicable Standard**

As per FCC Part 15.225

- (a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- (b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- (c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- (d) The field strength of any emissions appearing outside of the 13.110–14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

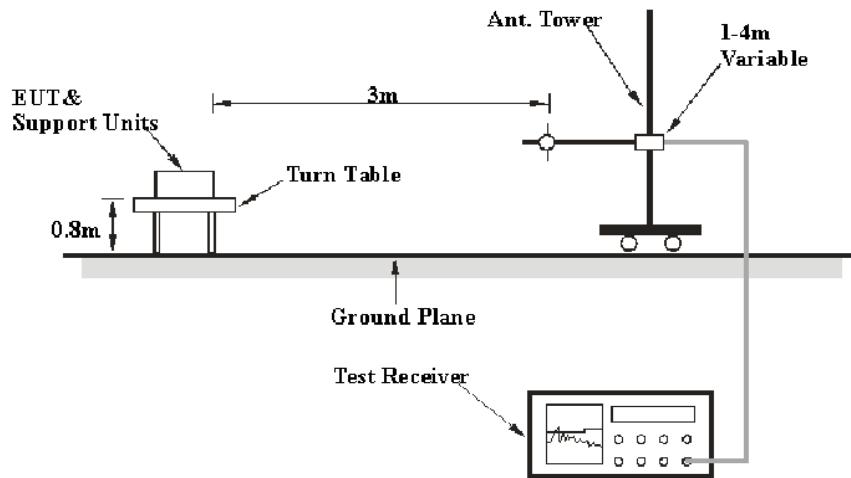
According to RSS-210 §4.1,4.3 & B.6:

B.6 Band 13.110-14.010 MHz

The field strength of any emission shall not exceed the following limits:

- a. 15.848 mV/m (84 dB $\mu$ V/m) at 30 m, within the band 13.553-13.567 MHz;
- b. 334  $\mu$ V/m (50.5 dB $\mu$ V/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz;
- c. 106  $\mu$ V/m (40.5 dB $\mu$ V/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz; and
- d. RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz.

## 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 and RSS-Gen. The specification used was the FCC Part Subpart C and the RSS-210 and RSS-Gen 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	Detector
9 kHz – 150 kHz	200 Hz	1 kHz	QP
150 kHz – 30 MHz	9 kHz	30 kHz	QP
30 MHz – 1000 MHz	120 kHz	300 kHz	QP

If the maximized peak measured value complies with the limit, then it is unnecessary to perform an QP 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
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
SONOMA	Amplifier	310	US43180214	2017-09-05	2018-09-05
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
EMCO	Passive Loop	6512	9706-1206	2017-03-05	2020-03-04
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A

**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) 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&15.225,RSS-210 and RSS-Gen.

## Test Data

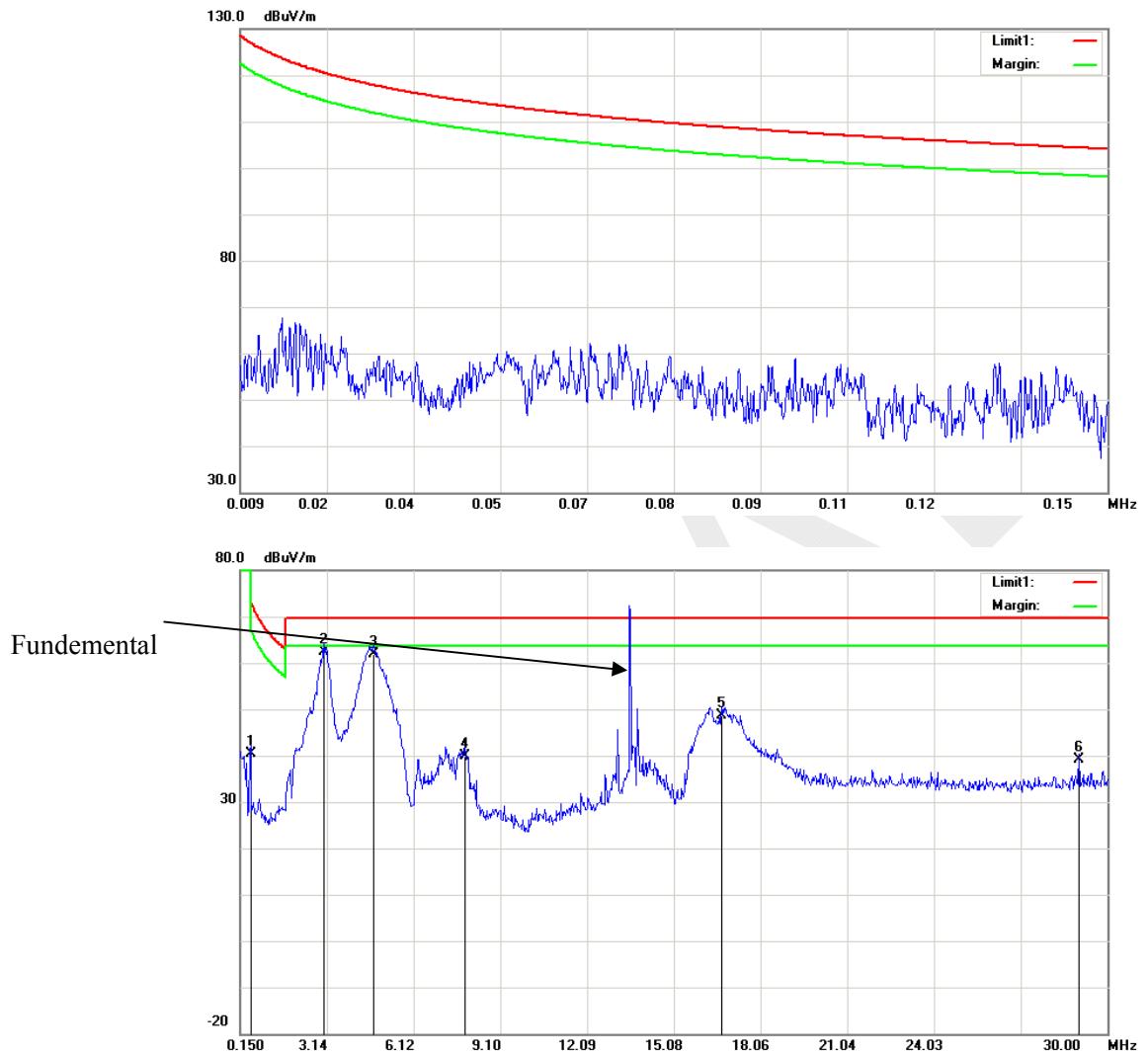
### Environmental Conditions

Temperature:	16.4 °C
Relative Humidity:	37 %
ATM Pressure:	102.1 kPa

\* The testing was performed by Blake Yang on 2018-02-06.

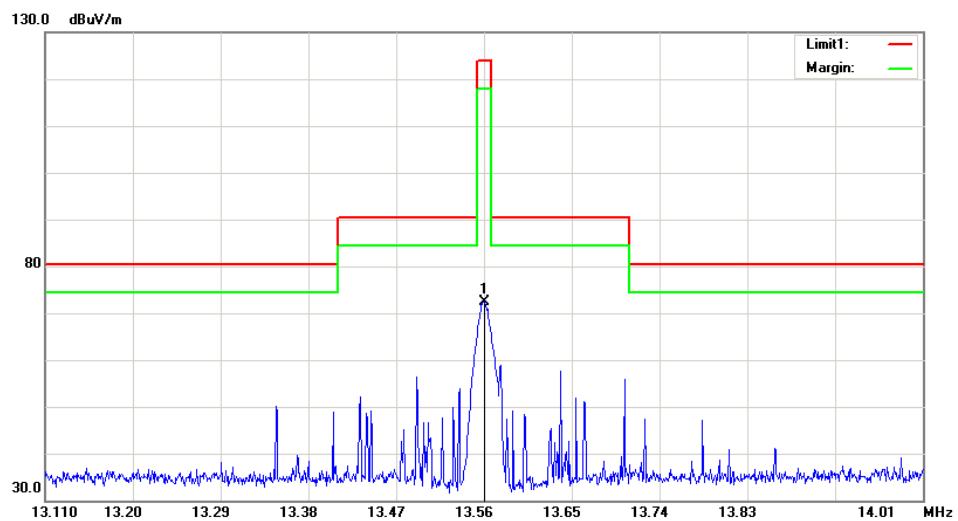
Test mode: Transmitting(Battery #1& Adapter#1 was the worst)

## 1) 9 kHz~30 MHz:



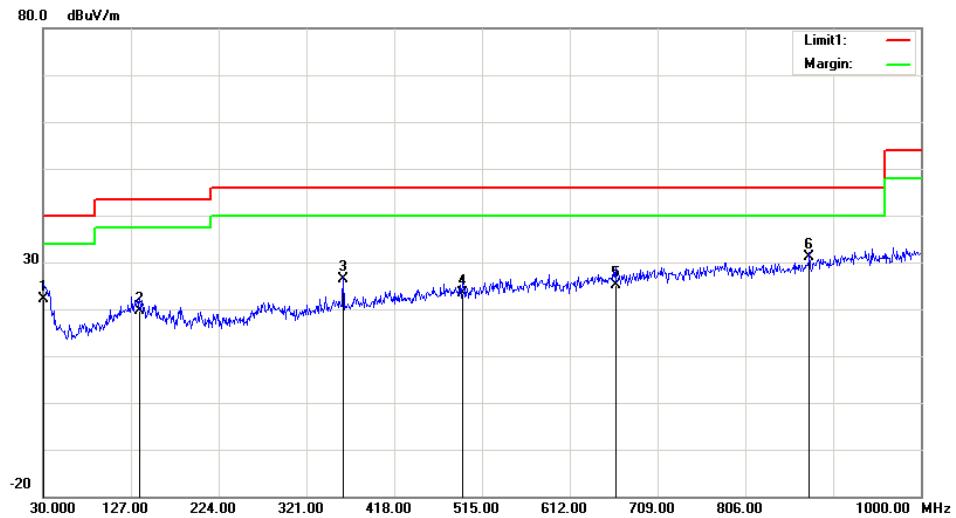
No.	Frequency (MHz)	Receiver Reading (dB $\mu$ V)	Detector	Correction Factor (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
1	0.5080	20.69	peak	19.61	40.30	73.49	33.19
2	3.0156	42.25	peak	20.05	62.30	69.54	7.24
3	4.7470	42.16	peak	19.64	61.80	69.54	7.74
4	7.8810	19.64	peak	20.26	39.90	69.54	29.64
5	16.7166	28.80	peak	19.80	48.60	69.54	20.94
6	29.0150	19.30	peak	19.90	39.20	69.54	30.34

Fundamental:

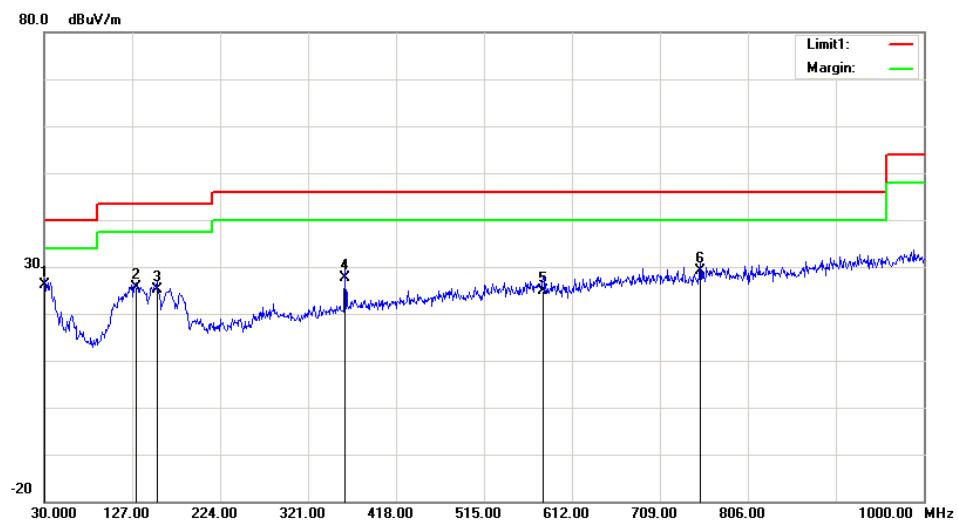


No.	Frequency (MHz)	Receiver Reading (dB $\mu$ V)	Detector	Correction Factor (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
1	13.5610	40.41	peak	32.08	72.49	124.00	51.51

30MHz-1GHz

**Horizontal**

No.	Frequency (MHz)	Receiver Reading (dB $\mu$ V)	Detector	Correction Factor (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
1	30.9700	21.75	QP	0.35	22.10	40.00	17.90
2	136.7000	25.30	QP	-5.70	19.60	43.50	23.90
3	361.7400	29.20	QP	-2.90	26.30	46.00	19.70
4	493.6600	24.73	QP	-1.23	23.50	46.00	22.50
5	662.4400	23.56	QP	1.54	25.10	46.00	20.90
6	876.8100	26.10	QP	5.10	31.20	46.00	14.80

**Vertical**

No.	Frequency (MHz)	Receiver Reading (dB $\mu$ V)	Detector	Correction Factor (dB)	Cord. Amp. (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
1	30.0000	25.02	QP	1.08	26.10	40.00	13.90
2	131.8500	30.94	QP	-5.24	25.70	43.50	17.80
3	154.1600	31.72	QP	-6.52	25.20	43.50	18.30
4	361.7400	30.50	QP	-2.90	27.60	46.00	18.40
5	579.9900	24.07	QP	0.73	24.80	46.00	21.20
6	753.6200	25.68	QP	3.42	29.10	46.00	16.90

## FCC§15.225(e)&RSS-210 Clause B.6 - FREQUENCY STABILITY

### Applicable Standard

As per FCC Part 15.225:

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from  $85\%$  to  $115\%$  of the rated supply voltage at a temperature of  $20$  degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

According to RSS-210§B.6:

Carrier frequency stability shall be maintained to  $\pm 0.01\%$  ( $\pm 100$  ppm).

### Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power.

The EUT was placed inside the temperature chamber.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to the end point of the battery. The output frequency was recorded for each voltage.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
EMCO	Passive Loop	6512	9706-1206	2017-03-05	2020-03-04
UNI-T	Multimeter	UT39A	M130199938	2017-05-09	2018-05-09
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-08-28	2018-08-28
Pro instrument	DC Power Supply	pps3300	N/A	N/A	N/A
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05

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

## Test Data

### Environmental Conditions

Temperature:	16.4 °C
Relative Humidity:	37 %
ATM Pressure:	102.1 kPa

\* The testing was performed by Blake Yang on 2018-02-06.

Test Mode: Transmitting

Test Result: Pass

$f_0 = 13.56 \text{ MHz}$				
Temperature	Voltage	Measured frequency	Frequency Error	Limit
°C	V <sub>DC</sub>	MHz	Hz	Hz
-20	7.2	13.5605	500	±1356
-10		13.5603	300	±1356
0		13.5606	600	±1356
10		13.5604	400	±1356
20		13.5608	800	±1356
25		13.5606	600	±1356
30		13.5602	200	±1356
40		13.5605	500	±1356
50		13.5608	800	±1356
25	6.6	13.5607	700	±1356
25	8.4	13.5601	100	±1356

## FCC §15.215(c) &RSS-GEN §6.6– 20 dB BANDWIDTH TESTING AND 99% OCCUPIED BANDWIDTH

### Applicable Standard

Per FCC §15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through § 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

As per RSS-Gen§6.6

The emission bandwidth (x dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated x dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

**Note:** Video averaging is not permitted.

A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

The difference between the two recorded frequencies is the 99% occupied bandwidth.

## Test Procedure

Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

## Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
EMCO	Passive Loop	6512	9706-1206	2017-03-05	2020-03-04
N/A	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
N/A	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05

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

## Test Data

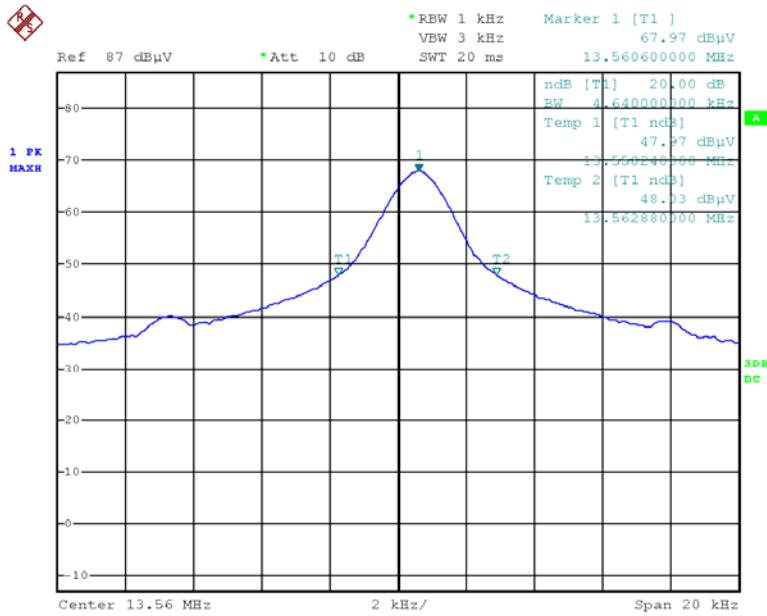
### Environmental Conditions

Temperature:	16.4~26 °C
Relative Humidity:	37~56 %
ATM Pressure:	100.6~102.1 kPa

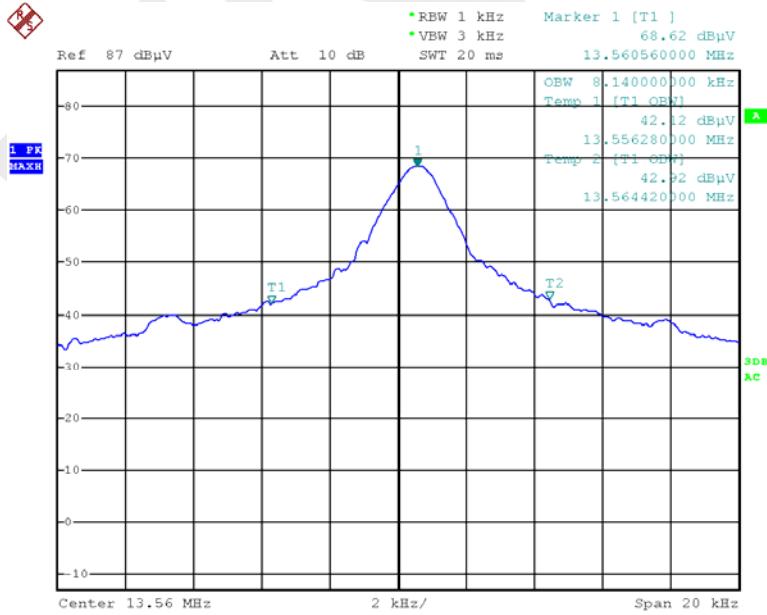
\* The testing was performed by Blake Yang on 2018-02-06 and 2018-03-19.

Test Mode: Transmitting

Frequency (MHz)	20 dB Bandwidth (KHz)	99% Occupied Bandwidth (kHz)
13.56	4.640	8.140

**20 dB Bandwidth**

Date: 6.FEB.2018 15:59:17

**99% Occupied Bandwidth**

Date: 19.MAR.2018 15:48:09

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