

FCC PART 15C

TEST REPORT

For

KYOCERA Corporation

Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku Yokohama-shi, Kanagawa, Japan

Model Number: JA32

Report Type: Original Report	Product Name: Smart Phone
Report Number:	RDG181026006-00E
Report Date:	2018-12-15 Jerry Zhang
Reviewed By:	EMC Manager <i>Jerry Zhang</i>
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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 “*”

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

EUT Name:	Smart Phone
EUT Model:	JA32
Grant:	JOY
FCC ID:	JOYJA32
Hardware Version:	JA32
SW version:	Sdm660_64-userdebug 9
Serial Number:	JA32125479850089K0180
EUT Received Date:	2018.10.26

Objective

This type approval report is prepared on behalf of *KYOCERA Corporation* 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 the EUT with FCC rules, sec 15.203, 15.205, 15.207, 15.209, 15.215 and 15.225.

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".

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	$\pm 5\%$
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	$\pm 1^{\circ}\text{C}$
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 0.4\%$
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

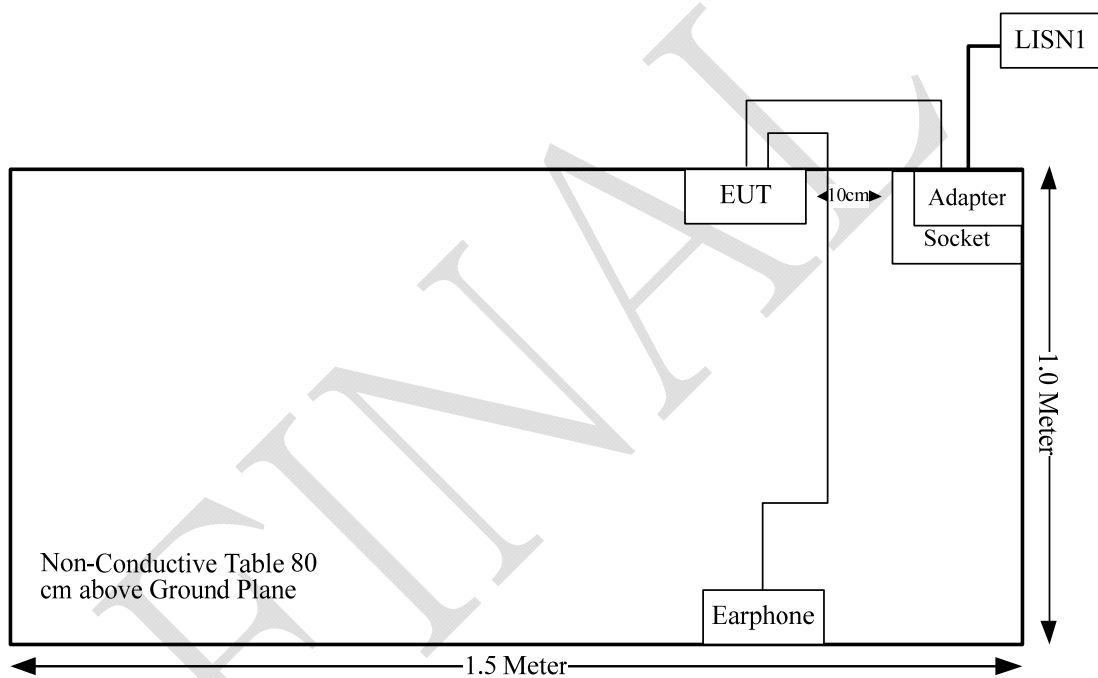
Justification

The system was configured for testing in a test mode.

EUT Exercise Software

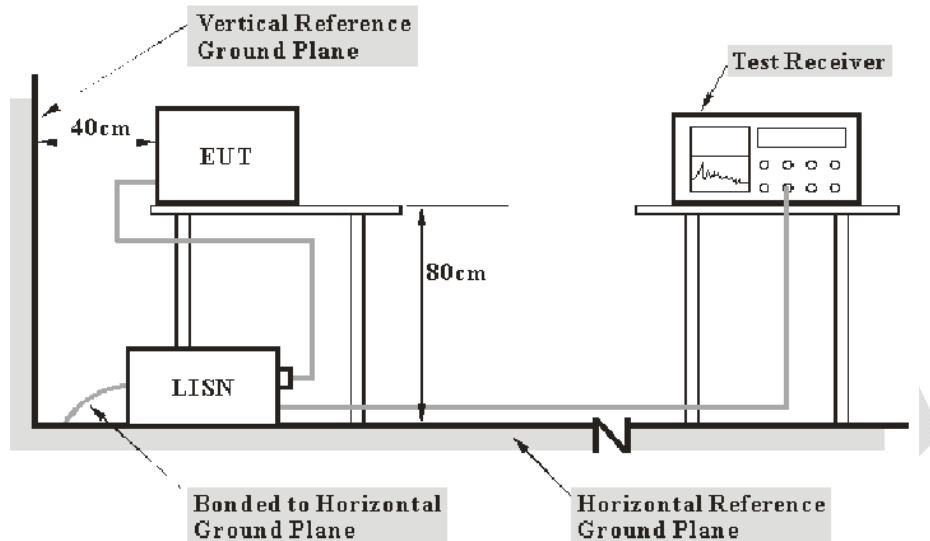
No software used in test.

Block Diagram of Test Setup



FCC §15.207– AC LINE CONDUCTED EMISSIONS

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.

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	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-01	2018-09-05	2019-09-05
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
R&S	Two-line V-network	ENV 216	101614	2018-12-10	2019-12-10

* **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

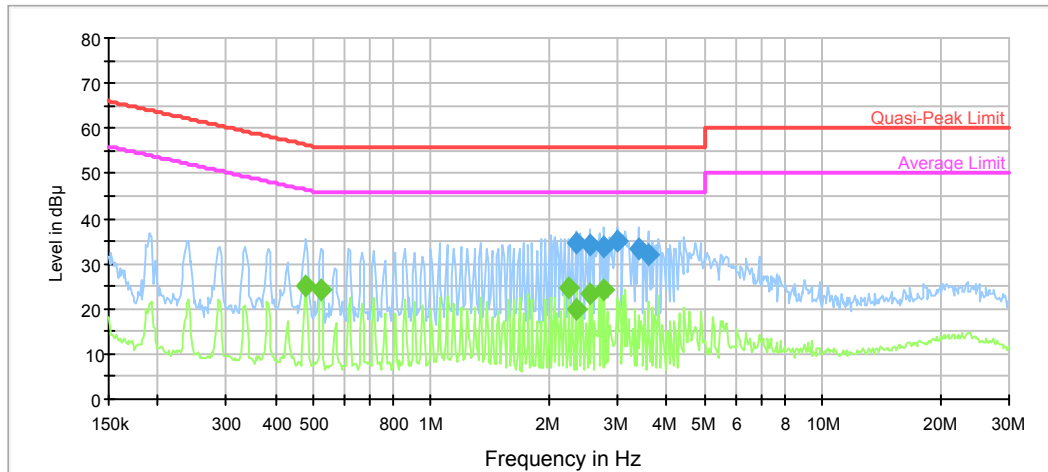
Temperature:	23.2 °C
Relative Humidity:	35 %
ATM Pressure:	99.9 kPa

The testing was performed by Lily Xie on 2018-12-14.

Test Result: Pass

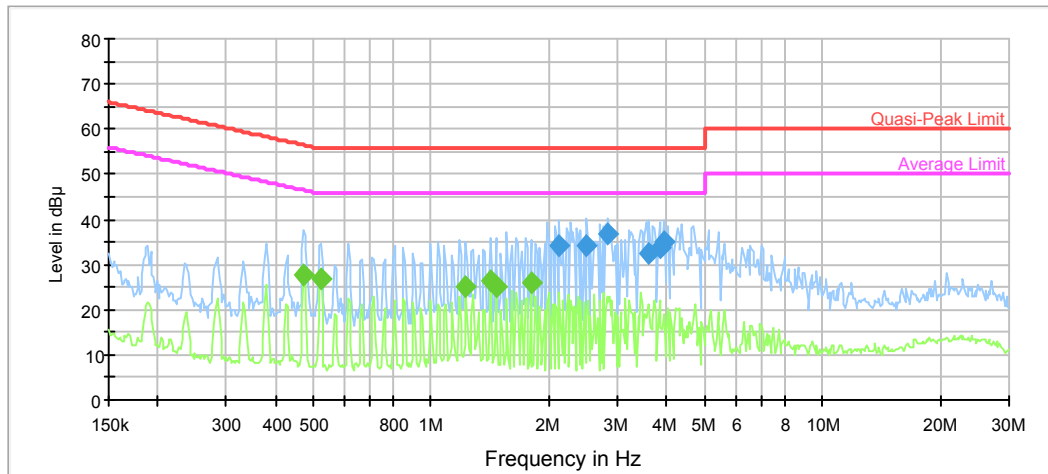
Test mode: Transmitting (NFC)

AC 120V, 60 Hz, Line:



Frequency (MHz)	Quasi Peak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
2.344095	34.5	9.000	L1	9.8	21.5	56.0	Compliance
2.538519	34.0	9.000	L1	9.8	22.0	56.0	Compliance
2.771062	33.7	9.000	L1	9.8	22.3	56.0	Compliance
2.977084	34.9	9.000	L1	9.8	21.1	56.0	Compliance
3.381891	33.5	9.000	L1	9.8	22.5	56.0	Compliance
3.575883	32.1	9.000	L1	9.8	23.9	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.476287	25.1	9.000	L1	9.9	21.3	46.4	Compliance
0.524077	24.1	9.000	L1	9.9	21.9	46.0	Compliance
2.252540	24.6	9.000	L1	9.8	21.4	46.0	Compliance
2.344095	19.8	9.000	L1	9.8	26.2	46.0	Compliance
2.538519	23.4	9.000	L1	9.8	22.6	46.0	Compliance
2.771062	24.1	9.000	L1	9.8	21.9	46.0	Compliance

AC120 V, 60 Hz, Neutral:

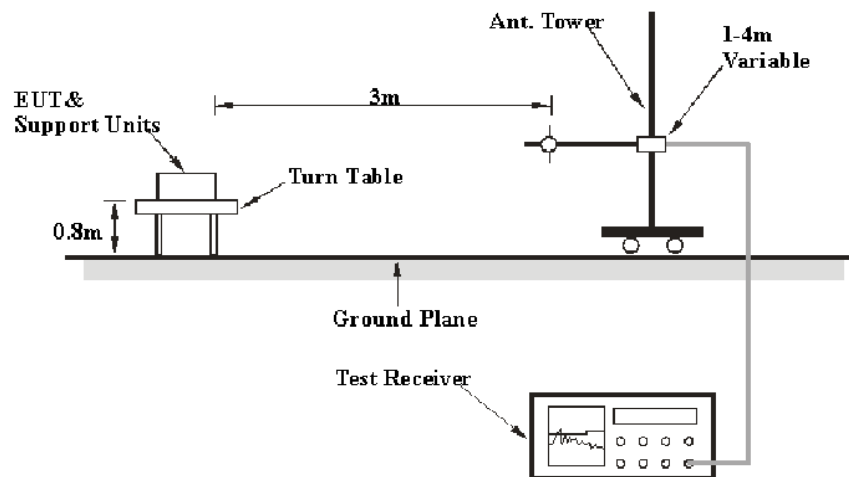
Frequency (MHz)	Quasi Peak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
2.130339	34.0	9.000	N	9.8	22.0	56.0	Compliance
2.498385	34.3	9.000	N	9.8	21.7	56.0	Compliance
2.838101	36.9	9.000	N	9.8	19.1	56.0	Compliance
3.604490	32.5	9.000	N	9.8	23.5	56.0	Compliance
3.841741	33.7	9.000	N	9.8	22.3	56.0	Compliance
3.934683	35.2	9.000	N	9.8	20.8	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.472507	27.6	9.000	N	9.9	18.9	46.5	Compliance
0.524077	26.8	9.000	N	9.9	19.2	46.0	Compliance
1.229340	25.3	9.000	N	9.8	20.7	46.0	Compliance
1.418932	26.3	9.000	N	9.8	19.7	46.0	Compliance
1.464886	25.2	9.000	N	9.8	20.8	46.0	Compliance
1.802095	26.1	9.000	N	9.8	19.9	46.0	Compliance

FCC§15.225, §15.205 & §15.209- 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.

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 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
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
R&S	EMI Test Receiver	ESCI	100224	2018-12-10	2019-12-10
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
EMCO	Passive Loop	6512	9706-1206	2017-03-05	2020-03-04
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
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.

Test Data**Environmental Conditions**

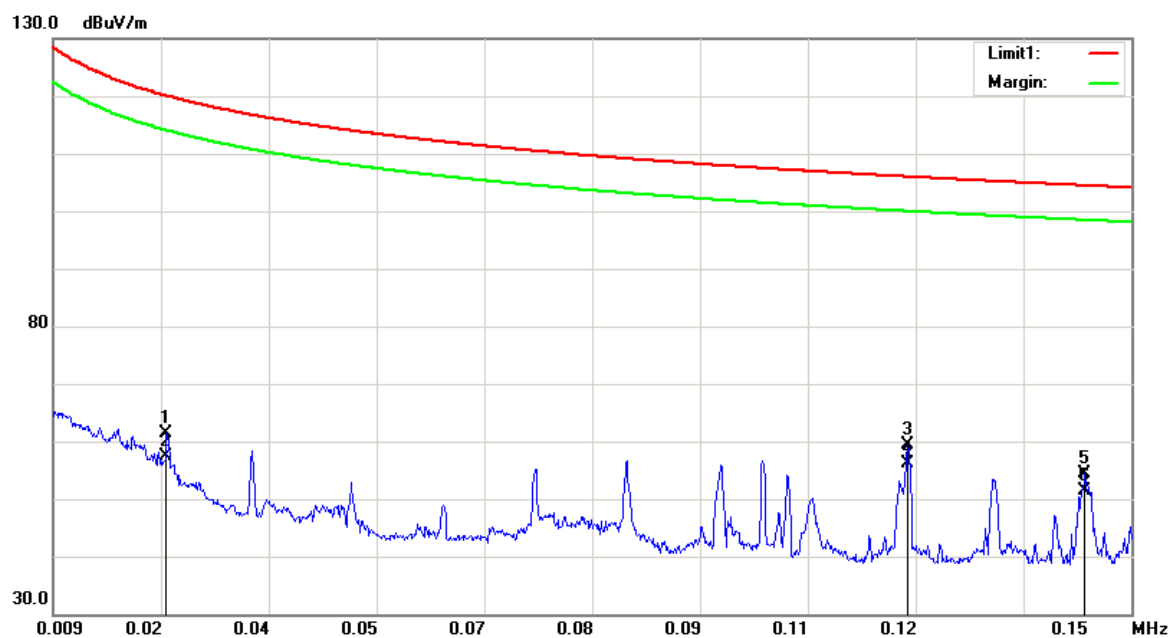
Temperature:	22.3 °C
Relative Humidity:	33 %
ATM Pressure:	99.5 kPa

** The testing was performed by Vern Shen on 2018-12-11.*

Test Result: Pass

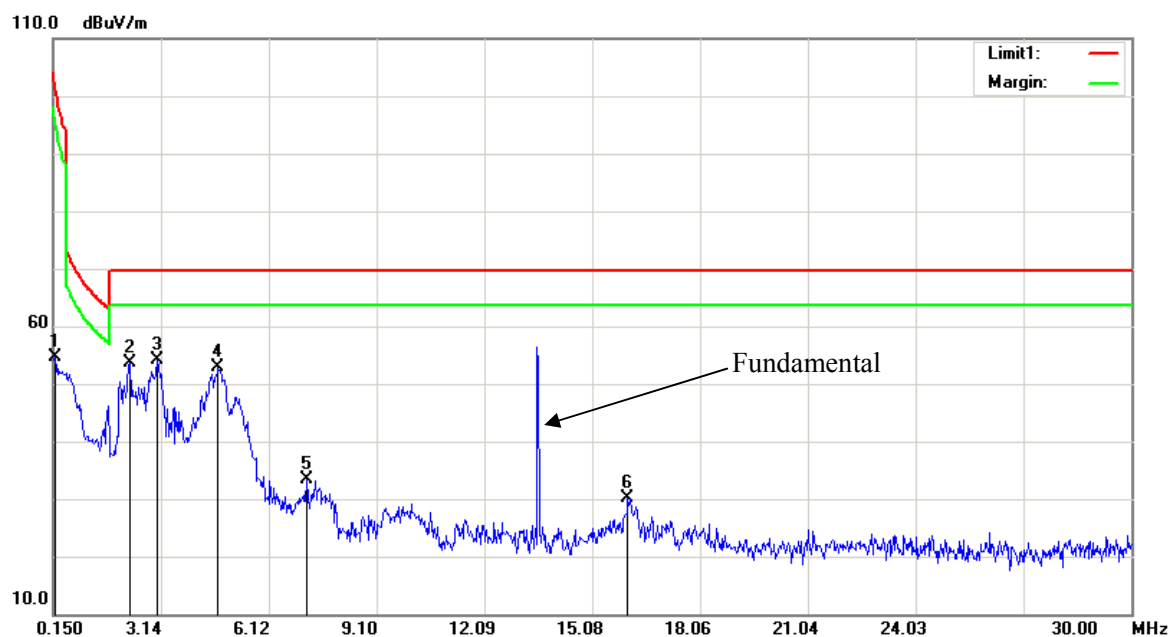
Test mode: Transmitting

9 kHz~150 kHz:



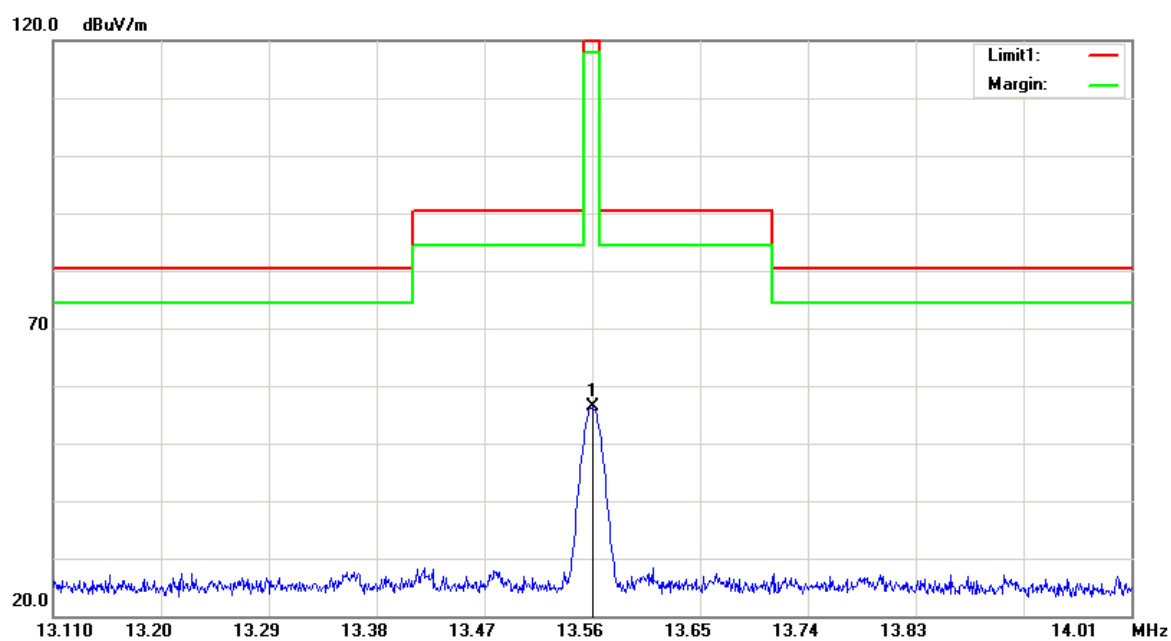
Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
0.0238	-17.76	peak	79.09	61.33	120.07	58.74
0.0238	-21.79	AVG	79.09	57.30	120.07	62.77
0.1207	-6.37	peak	65.63	59.26	105.97	46.71
0.1207	-9.43	AVG	65.63	56.20	105.97	49.77
0.1440	-9.83	peak	64.30	54.47	104.43	49.96
0.1440	-12.90	AVG	64.30	51.40	104.43	53.03

150kHz~30 MHz:



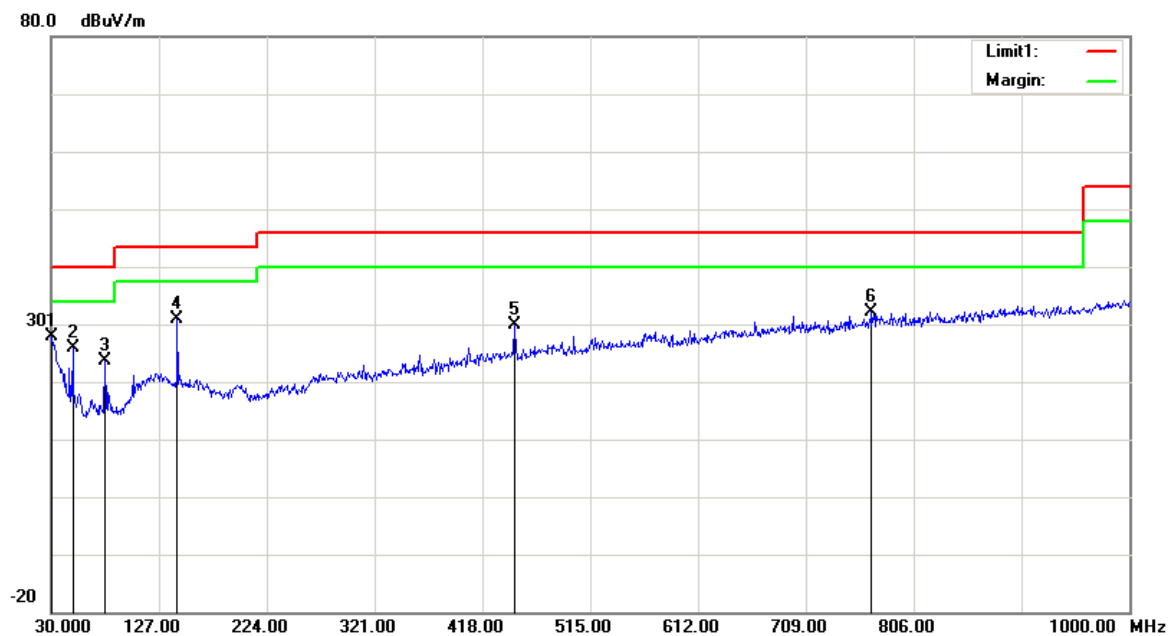
Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
0.2096	19.97	peak	34.74	54.71	101.17	46.46
2.2694	38.07	peak	15.51	53.58	69.54	15.96
3.0156	40.72	peak	13.40	54.12	69.54	15.42
4.7171	41.86	peak	11.01	52.87	69.54	16.67
7.1646	23.13	peak	10.16	33.29	69.54	36.25
16.0600	20.89	peak	9.26	30.15	69.54	39.39

Fundamental:

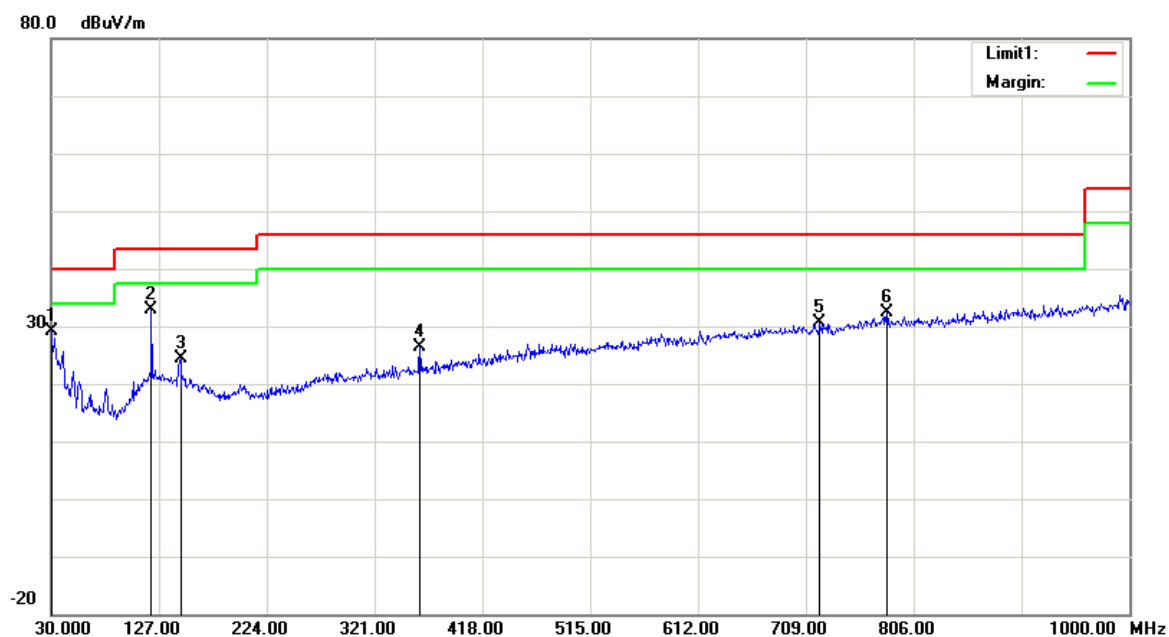


Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
13.5610	46.91	peak	9.36	56.27	124.00	67.73

30MHz-1GHz

Horizontal

Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	26.22	peak	1.76	27.98	40.00	12.02
49.4000	36.87	peak	-10.97	25.90	40.00	14.10
78.5000	34.75	peak	-11.13	23.62	40.00	16.38
143.4900	36.84	peak	-5.94	30.90	43.50	12.60
447.1000	30.98	peak	-1.14	29.84	46.00	16.16
768.1700	27.77	peak	4.29	32.06	46.00	13.94

Vertical

Frequency (MHz)	Receiver Reading (dBμV)	Detector	Correction Factor (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
30.0000	27.25	peak	1.76	29.01	40.00	10.99
120.2100	37.78	peak	-4.82	32.96	43.50	10.54
146.4000	30.41	peak	-6.00	24.41	43.50	19.09
361.7400	29.06	peak	-2.79	26.27	46.00	19.73
721.6100	27.21	peak	3.33	30.54	46.00	15.46
781.7500	27.88	peak	4.44	32.32	46.00	13.68

FCC§15.225(e) - 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.

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	2018-12-10	2019-12-10
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
EMCO	Passive Loop	6512	9706-1206	2017-03-05	2020-03-04
UNI-T	Multimeter	UT39A	M130199938	2018-07-24	2019-07-24
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2018-03-26	2019-03-26
Pro instrument	DC Power Supply	pps3300	3300012	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05

* **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:	22.3 °C
Relative Humidity:	33 %
ATM Pressure:	99.5 kPa

* The testing was performed by Vern Shen on 2018-12-11.

Test Mode: Transmitting

Test Result: Pass

f₀ = 13.56 MHz				
Temperature	Voltage	Measured frequency	Frequency Error	Limit
°C	V_{DC}	MHz	Hz	Hz
-20	3.85	13.55984	-160	±1356
-10		13.55984	-160	±1356
0		13.55984	-160	±1356
10		13.55990	-100	±1356
20		13.55997	-30	±1356
25		13.55997	-33	±1356
30		13.55995	-50	±1356
40		13.55995	-50	±1356
50		13.55996	-40	±1356
25	3.5	13.55989	-110	±1356
25	4.2	13.56002	15	±1356

FCC §15.215(c)– 20 dB BANDWIDTH TESTING

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.

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	2018-12-10	2019-12-10
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
EMCO	Passive Loop	6512	9706-1206	2017-03-05	2020-03-04
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05

* **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:	22.3 °C
Relative Humidity:	33 %
ATM Pressure:	99.5 kPa

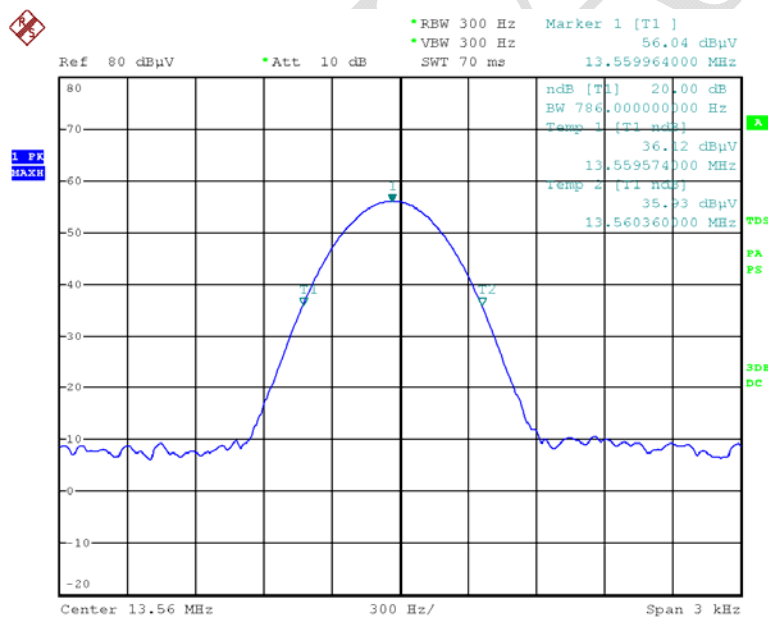
* The testing was performed by Vern Shen on 2018-12-11.

Test Result: Pass

Test Mode: Transmitting

Frequency (MHz)	20 dB Bandwidth (KHz)
13.56	0.786

20 dB Bandwidth



Date: 11.DEC.2018 14:47:51

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