

FCC PART 15.249

TEST REPORT

For

GODOX PHOTO EQUIPMENT CO.LTD

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518001, China

FCC ID: 2ABYNA1

Report Type: Original Report	Product Name: Godox A1 Flash
Report Number: RDG170815001-00C	
Report Date: 2017-09-11	
Reviewed By:	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)

The **GODOX PHOTO EQUIPMENT CO.LTD**'s product, model number: **A1(FCC ID: 2ABYNA1)** (the "EUT") in this report was a **Godox A1 Flash**, which was measured approximately: 8.0 cm (L) x 2.4 cm (W) x 6.5 cm (H), rated input voltage: DC3.8V from battery or DC 5V from USB port.

**All measurement and test data in this report was gathered from production sample serial number: 170815001 (Assigned by BACL,Dongguan). The EUT was received on 2017-08-15.*

Objective

This type approval report is prepared on behalf of **GODOX PHOTO EQUIPMENT CO.LTD** in accordance with Part 2-Subpart J, and Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Rules Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: 2ABYNA1.
FCC Part 15C DSC submissions with FCC ID: 2ABYNA1.

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 and Bay Area Compliance Laboratories Corp. (Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
Unwanted Emissions, radiated	30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical 1G~6GHz: 4.45 dB, 6G~26.5GHz: 5.23 dB
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.

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO 17025 by CNAS(Lab code: L5662). And accredited to ISO 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Dongguan) was registered with ISED Canada under ISED Canada Registration Number 3062D.

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

The device employs 32 channels as below list:

Channel Number	Frequency (GHz)	Channel Number	Frequency (GHz)
1	2.413	17	2.4395
2	2.4145	18	2.441
3	2.416	19	2.443
4	2.418	20	2.4445
5	2.4195	21	2.446
6	2.421	22	2.448
7	2.423	23	2.4495
8	2.4245	24	2.451
9	2.426	25	2.453
10	2.428	26	2.4545
11	2.4295	27	2.456
12	2.431	28	2.458
13	2.433	29	2.4595
14	2.4345	30	2.461
15	2.436	31	2.463
16	2.438	32	2.4645

EUT was tested with Channel 1, 16 and 32.

EUT Exercise Software

No software was used in test, the device was configured to engineer mode by manufacturer, test channel switched by keys.

Equipment Modifications

No modifications were made to the EUT.

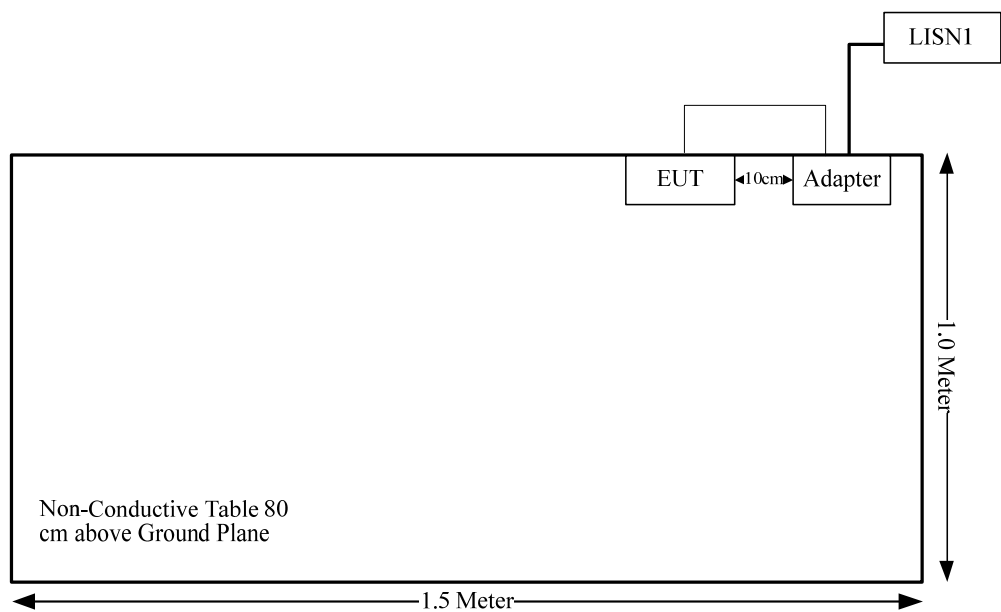
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HuaJin Electronics CO.LTD	Adapter	HJ-0501000B3-EU	03051216d003510

Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From	To
USB TYPE C Cable	yes	No	1.0	Adapter	EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	Conduction Emissions	Compliance
15.205, §15.209, §15.249	Radiated Emissions	Compliance
§15.215 (c)	20 dB Bandwidth	Compliance

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has one internal antenna arrangement, and the antenna gain is 0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

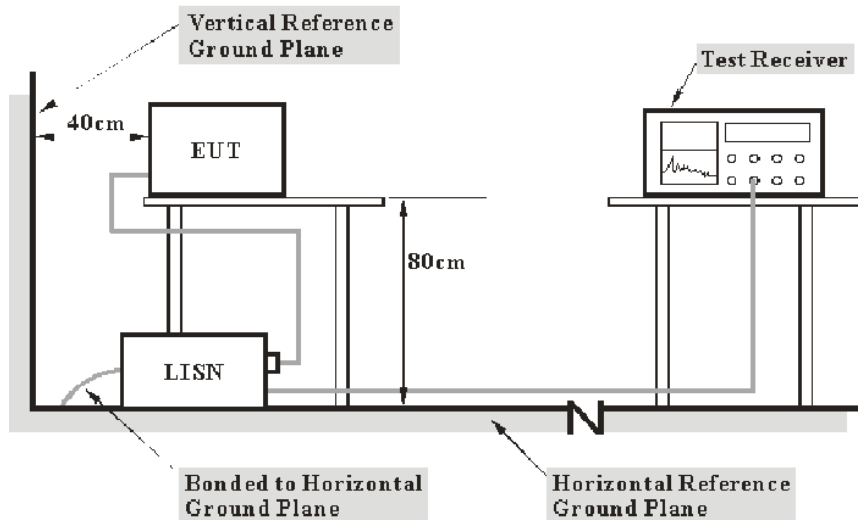
Result: Compliant.

FCC §15.207 (a)– AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207(a)

EUT Setup



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

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

The spacing between the peripherals was 10 cm.

The adapter was connected to the main LISN with a 120 V/60 Hz AC 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 Procedure

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

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

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

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

V_C (cord. Reading): corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN

C_f : Correction Factor

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2016-12-08	2017-12-08
R&S	L.I.S.N	ESH2-Z5	892107/021	2017-09-01	2018-09-01
R&S	Two-line V-network	ENV 216	3560.6550.12	2016-12-08	2017-12-08
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A
Unknown	Coaxial Cable	2m	C0200/01	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

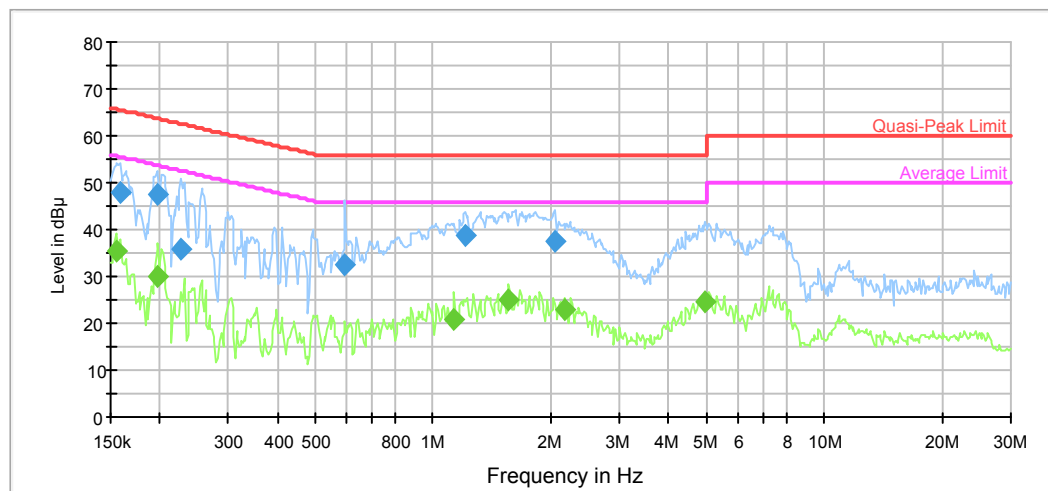
Environmental Conditions

Temperature:	27.4 °C
Relative Humidity:	47 %
ATM Pressure:	100.2 kPa

The testing was performed by Gaochao Gong on 2017-09-06.

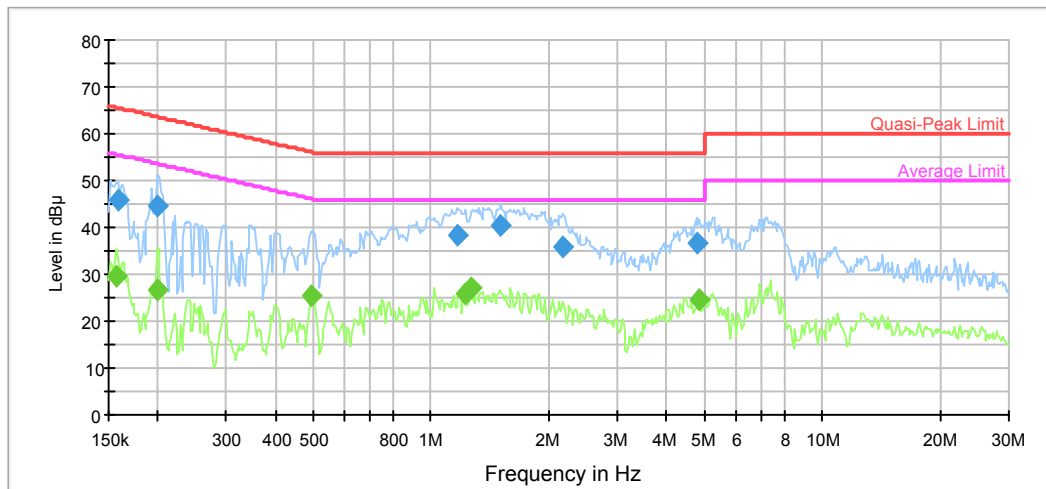
Test Mode: Transmitting

AC120V, 60 Hz, Line:



Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.158604	48.1	9.000	L1	11.1	17.4	65.5	Compliance
0.198249	47.7	9.000	L1	10.6	16.0	63.7	Compliance
0.227007	35.7	9.000	L1	10.5	26.9	62.6	Compliance
0.595338	32.6	9.000	L1	9.8	23.4	56.0	Compliance
1.209904	38.7	9.000	L1	9.8	17.3	56.0	Compliance
2.047133	37.7	9.000	L1	9.7	18.3	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.154858	35.6	9.000	L1	11.1	20.1	55.7	Compliance
0.198249	29.9	9.000	L1	10.6	23.8	53.7	Compliance
1.135185	21.0	9.000	L1	9.8	25.0	46.0	Compliance
1.561306	25.1	9.000	L1	9.7	20.9	46.0	Compliance
2.164561	23.0	9.000	L1	9.7	23.0	46.0	Compliance
4.957528	24.6	9.000	L1	9.8	21.4	46.0	Compliance

AC120V, 60 Hz, Neutral:

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.158604	45.8	9.000	N	11.1	19.7	65.5	Compliance
0.199835	44.6	9.000	N	10.6	19.0	63.6	Compliance
1.162648	38.2	9.000	N	9.8	17.8	56.0	Compliance
1.512328	40.4	9.000	N	9.7	15.6	56.0	Compliance
2.164561	35.8	9.000	N	9.8	20.2	56.0	Compliance
4.763898	36.6	9.000	N	9.8	19.4	56.0	Compliance

Frequency (MHz)	Average (dBμV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.157346	29.5	9.000	N	11.1	26.1	55.6	Compliance
0.199835	26.8	9.000	N	10.6	26.8	53.6	Compliance
0.491712	25.6	9.000	N	9.9	20.5	46.1	Compliance
1.219583	25.8	9.000	N	9.8	20.2	46.0	Compliance
1.269154	27.1	9.000	N	9.8	18.9	46.0	Compliance
4.840426	24.5	9.000	N	9.8	21.5	46.0	Compliance

FCC§15.205, §15.209&§15.249- RADIATED EMISSIONS**Applicable Standard**

As per FCC§15.249 (a), except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

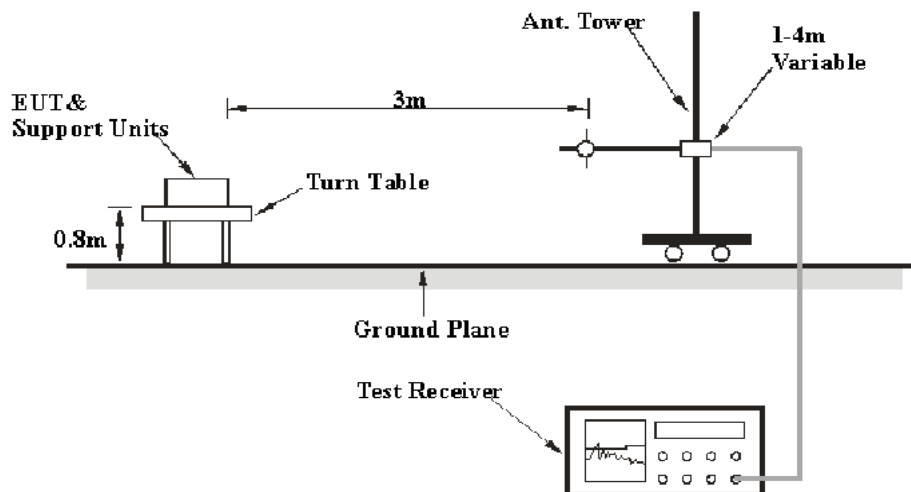
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

As per FCC§15.249 (c), Field strength limits are specified at a distance of 3 meters.

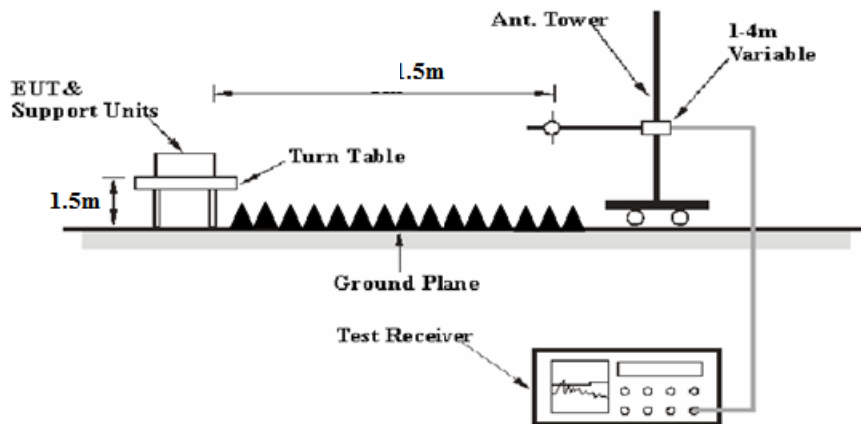
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission tests were performed in the 3 meters distance, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209/15.205 and FCC 15.249 limits.

Test Equipment Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	AV

Test Procedure

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

All data was recorded in the Quasi-peak detection mode from 30 MHz to 1GHz, peak and average detection mode above 1 GHz.

Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

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:

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2018-09-01
Sunol Sciences	Antenna	JB3	A060611-1	2014-11-06	2017-11-06
HP	Amplifier	8447D	2727A05902	2016-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2016-12-08	2017-12-08
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2017-06-27	2018-06-27
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
Unknown	Coaxial Cable	Chamber A-1	4m	2017-09-01	2018-09-01
Unknown	Coaxial Cable	Chamber B-1	0.75m	2017-09-01	2018-09-01
Unknown	Coaxial Cable	Chamber A-2	10m	2017-09-01	2018-09-01
Unknown	Coaxial Cable	Chamber B-2	8m	2017-09-01	2018-09-01
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 Data

Environmental Conditions

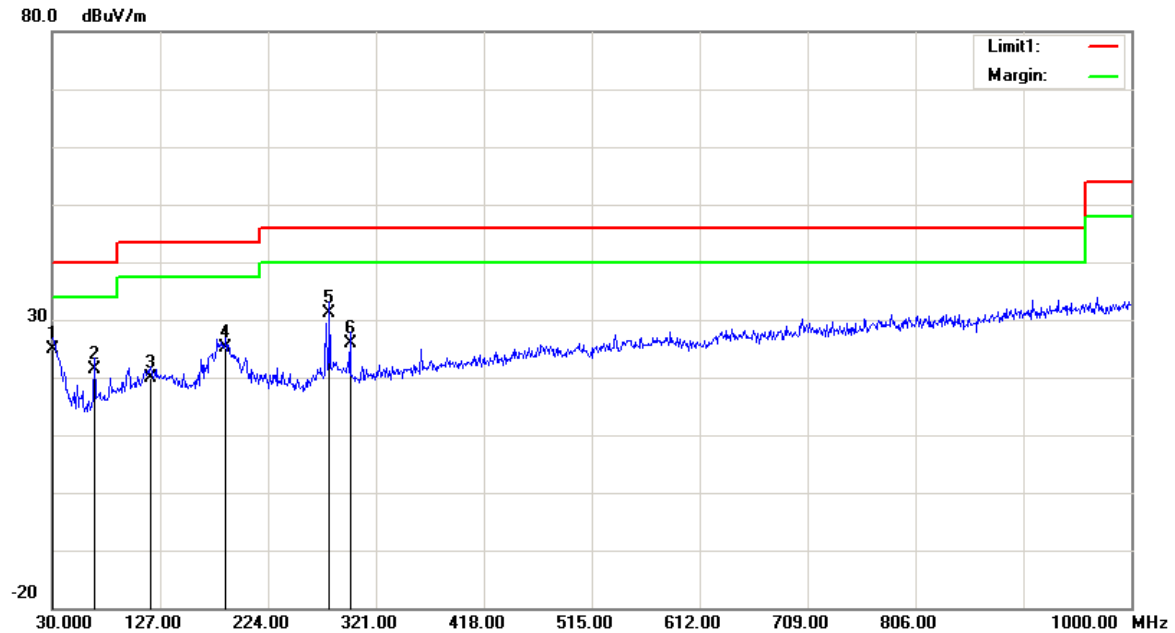
Temperature:	26.3 °C
Relative Humidity:	34 %
ATM Pressure:	100.2 kPa

The testing was performed by Blake Yang on 2017-09-07.

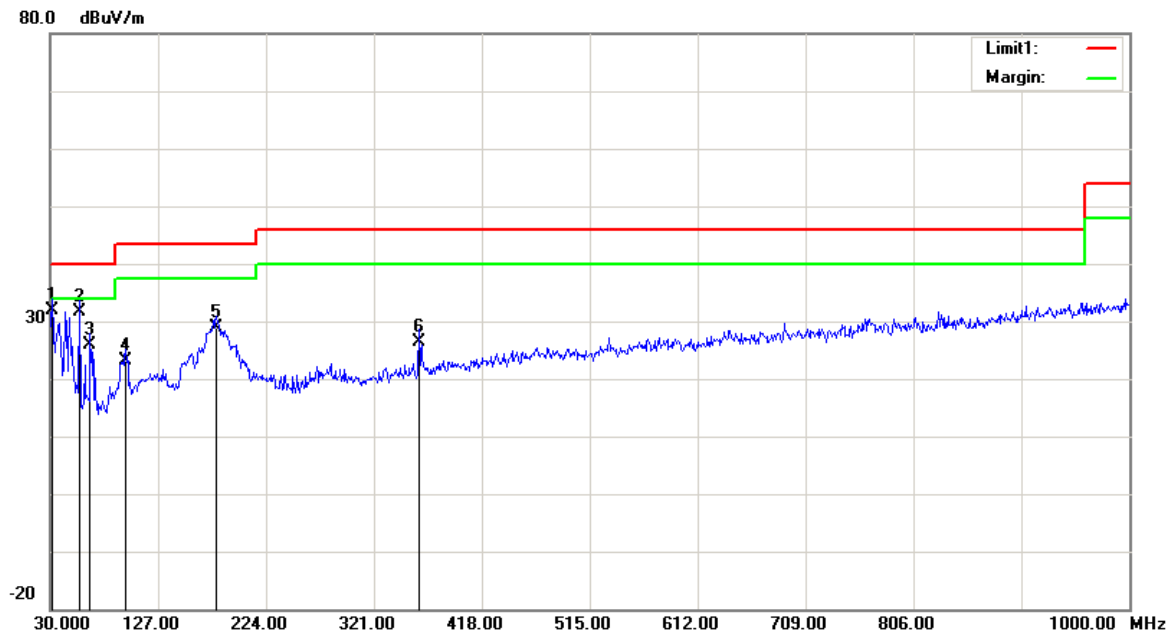
Test Mode: Transmitting

1) 30MHz-1GHz(Middle channel was the worst):

Horizontal:



Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
30.0000	23.83	QP	1.07	24.90	40.00	15.10
67.8300	33.18	QP	-11.68	21.50	40.00	18.50
118.2700	24.70	QP	-4.90	19.80	43.50	23.70
186.1700	32.92	QP	-7.82	25.10	43.50	18.40
279.2900	34.90	QP	-3.80	31.10	46.00	14.90
297.7200	30.10	QP	-4.30	25.80	46.00	20.20

Vertical:

Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
31.9400	32.25	QP	-0.35	31.90	40.00	8.10
56.1900	44.15	QP	-12.45	31.70	40.00	8.30
65.8900	37.87	QP	-11.87	26.00	40.00	14.00
97.9000	32.23	QP	-9.13	23.10	43.50	20.40
179.3800	36.50	QP	-7.70	28.80	43.50	14.70
361.7400	29.56	QP	-3.06	26.50	46.00	19.50

2) 1GHz-25GHz

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB(1/m))					
Low Channel: 2413 MHz									
2413	63.67	PK	H	28.13	3.11	0.00	94.91	114.00	19.09
2413	42.42	AV	H	28.13	3.11	0.00	73.66	94.00	20.34
2413	64.06	PK	V	28.13	3.11	0.00	95.30	114.00	18.70
2413	42.62	AV	V	28.13	3.11	0.00	73.86	94.00	20.14
2390	29.55	PK	V	28.08	3.10	0.00	60.73	74.00	13.27
2390	11.99	AV	V	28.08	3.10	0.00	43.17	54.00	10.83
4826	51.56	PK	V	32.95	4.33	35.49	53.35	74.00	20.65
4826	37.05	AV	V	32.95	4.33	35.49	38.84	54.00	15.16
7239	45.51	PK	V	35.82	5.47	35.97	50.83	74.00	23.17
7239	32.63	AV	V	35.82	5.47	35.97	37.95	54.00	16.05
2625	45.59	PK	V	28.75	3.13	35.42	42.05	74.00	31.95
2625	32.65	AV	V	28.75	3.13	35.42	29.11	54.00	24.89
Middle Channel: 2438 MHz									
2438	62.11	PK	H	28.18	3.11	0.00	93.40	114.00	20.60
2438	41.09	AV	H	28.18	3.11	0.00	72.38	94.00	21.62
2438	64.35	PK	V	28.18	3.11	0.00	95.64	114.00	18.36
2438	42.83	AV	V	28.18	3.11	0.00	74.12	94.00	19.88
4876	52.34	PK	V	33.05	4.39	35.53	54.25	74.00	19.75
4876	36.29	AV	V	33.05	4.39	35.53	38.20	54.00	15.80
7314	45.28	PK	V	36.02	5.52	35.98	50.84	74.00	23.16
7314	32.36	AV	V	36.02	5.52	35.98	37.92	54.00	16.08
2585	45.38	PK	V	28.61	3.10	35.43	41.66	74.00	32.34
2585	32.62	AV	V	28.61	3.10	35.43	28.90	54.00	25.10
3214	45.59	PK	V	30.61	3.55	35.19	44.56	74.00	29.44
3214	32.64	AV	V	30.61	3.55	35.19	31.61	54.00	22.39
High Channel: 2464.5 MHz									
2464.5	61.57	PK	H	28.23	3.10	0.00	92.90	114.00	21.10
2464.5	40.79	AV	H	28.23	3.10	0.00	72.12	94.00	21.88
2464.5	62.91	PK	V	28.23	3.10	0.00	94.24	114.00	19.76
2464.5	41.78	AV	V	28.23	3.10	0.00	73.11	94.00	20.89
2483.5	27.01	PK	V	28.27	3.10	0.00	58.38	74.00	15.62
2483.5	12.69	AV	V	28.27	3.10	0.00	44.06	54.00	9.94
4929	52.19	PK	V	33.16	4.42	35.57	54.20	74.00	19.80
4929	36.81	AV	V	33.16	4.42	35.57	38.82	54.00	15.18
7393.5	45.28	PK	V	36.22	5.57	35.98	51.09	74.00	22.91
7393.5	32.17	AV	V	36.22	5.57	35.98	37.98	54.00	16.02
2568	45.61	PK	V	28.54	3.10	35.44	41.81	74.00	32.19
2568	32.29	AV	V	28.54	3.10	35.44	28.49	54.00	25.51

FCC §15.215(c) – 20 dB BANDWIDTH TESTING

Applicable Standard

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.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
3. Repeat above procedures until all frequencies measured were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/

* **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:	27.3 °C
Relative Humidity:	60 %
ATM Pressure:	100.2 kPa

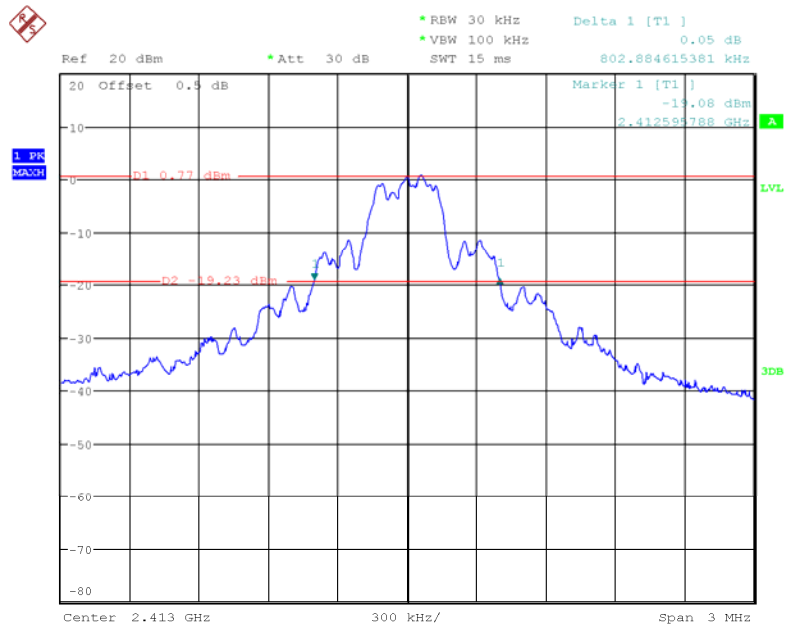
The testing was performed by Rick Chen on 2017-09-06.

Test Result: Compliant.

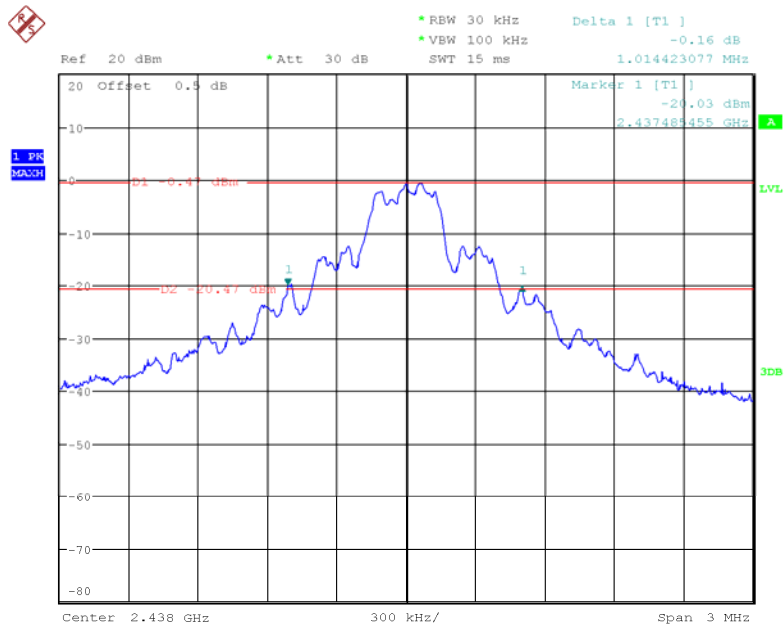
Please refer to following tables and plots

Test Mode: Transmitting

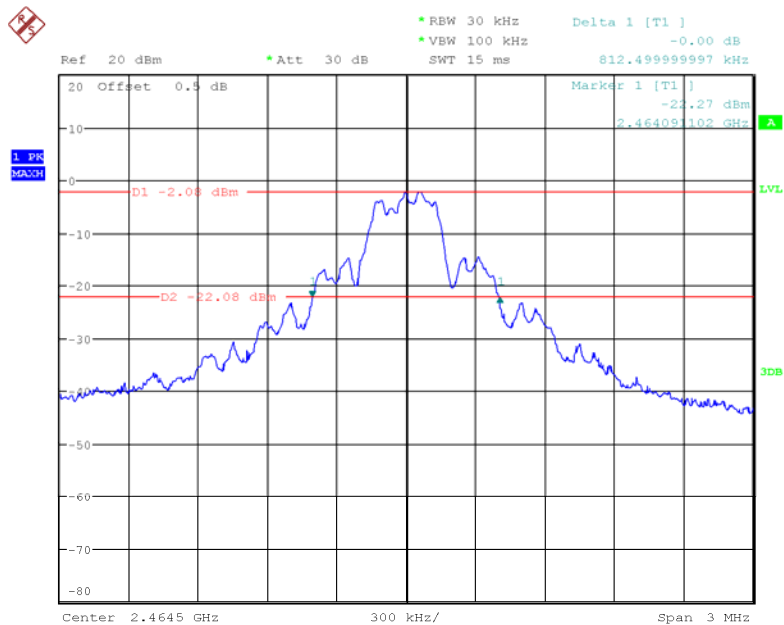
Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2413	0.803
Middle	2438	1.014
High	2464.5	0.812

Low Channel

Date: 6.SEP.2017 00:20:06

Middle Channel

Date: 6.SEP.2017 00:27:58

High Channel

Date: 6.SEP.2017 00:31:12

******* End of Report *******