TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 15.249

TEST REPORT

For

Ugreen Group Limited

UGREEN Building, Longcheng Industrial Park, Longguanxi Road, Longhua, ShenZhen, China, 518000

FCC ID: 2AQI5-LP180

Report Type:	**Product Name:**
Original Report	Wireless Presenter

Report Number:	RDG190510010-00B
Report Date:	2019-06-19
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	Wireless Presenter
EUT Model:	LP180
Multiple Models	60327, 60795, 70579
Operation Frequency:	2402-2480 MHz
Modulation Type:	GFSK
Rated Input Voltage:	DC 1.5V for battery
External Dimension:	143 mm(L)* 28 mm(W)* 13 mm(H)
Serial Number:	190510010
EUT Received Date:	2019/5/13

Notes: *Model LP180 was selected for fully testing, the detailed information about the difference among 60327, 60795, 70579 and model LP180 can be referred to the declaration letter.*

Objective

This type approval report is prepared on behalf of ***Ugreen Group Limited*** 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, 15.209 and 15.249 rules.

Related Submittal(s)/Grant(s)

N/A.

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℃
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 lab has been recognized as the FCC accredited lab 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 lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

SYSTEM TEST CONFIGURATION

Justification

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

The device employs total 4 channels as below:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	3	2456
2	2430	4	2480

2402 MHz, 2430 MHz, 2480 MHz was selected for test.

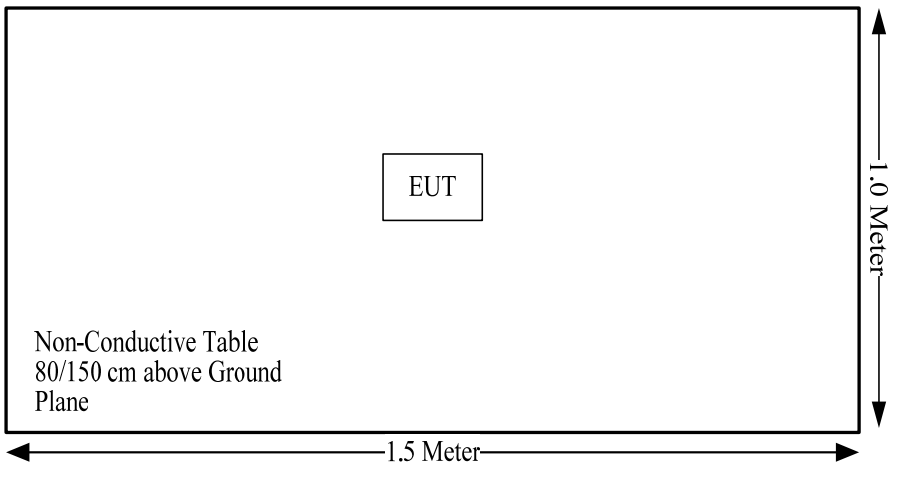
EUT Exercise Software

No software was used in test, the channels switched by keys.

Equipment Modifications

No modifications were made to the 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	Not Applicable
15.205, §15.209, §15.249	Radiated Emissions	Compliance
§15.215 (c)	20 dB Bandwidth	Compliance

Not Applicable: The EUT was powered by battery only.

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§15.205, §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:

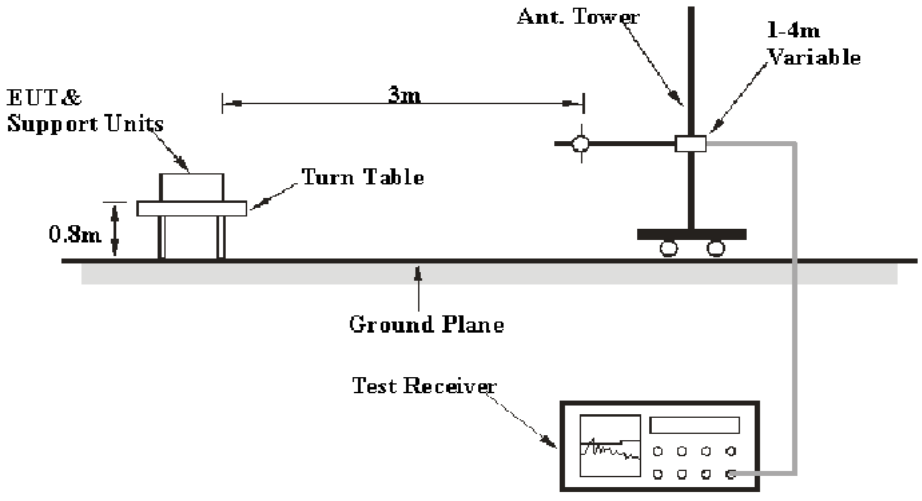
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

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

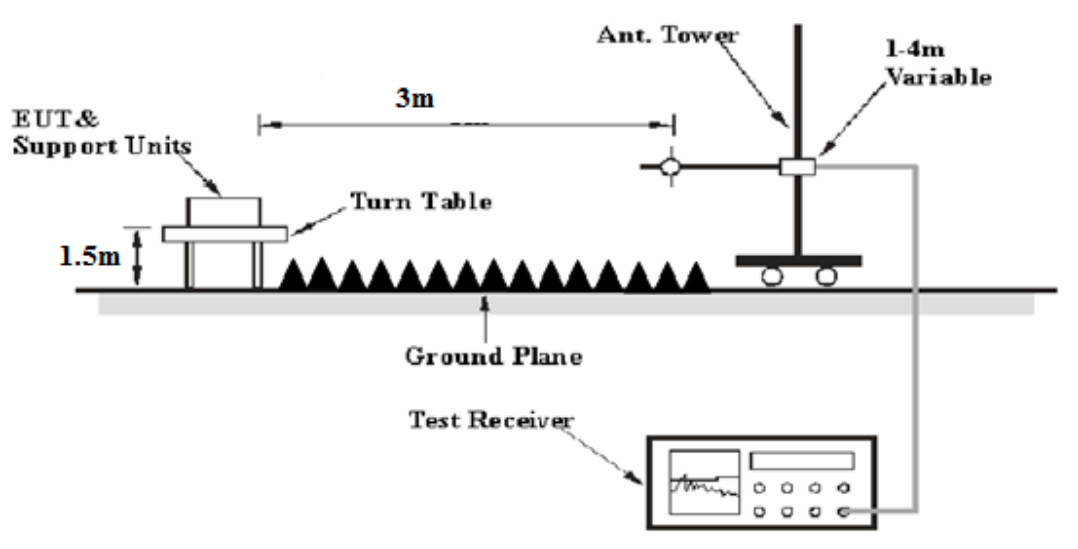
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

EUT Setup

Below 1 GHz:



Above 1 GHz:



The radiated emission below 1GHz tests were performed in the 10 meters chamber test site, above 1GHz tests were performed in the 3 meters chamber test site A, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, 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	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	AV

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

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:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit –Corrected Amplitude

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
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Sunol Sciences	Antenna	JB3	A060611-3	2017-07-21	2019-07-21
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2018-09-24	2019-09-24
Sonoma	Amplifier	310N	185914	2018-10-13	2019-10-13
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
MICRO-COAX	Coaxial Cable	UFA147-1-2362-100100	64639 231029-001	2019-02-24	2020-02-24
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2018-09-05	2019-09-05
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
E-Microwave	Band-stop Filters	OBSF-2400-2483.5-S	OE01601525	2018-06-16	2019-06-16
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2018-06-16	2019-06-16

*** 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

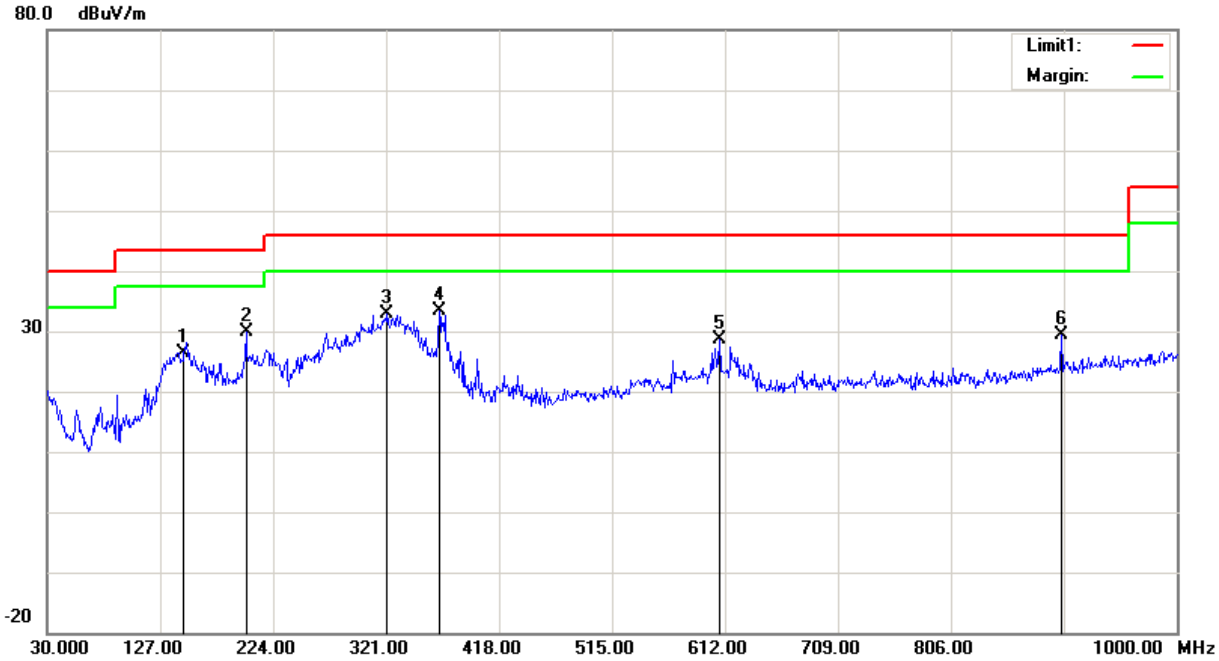
Temperature:	26.1 °C
Relative Humidity:	52%
ATM Pressure:	100.5 kPa

The testing was performed by Tyler Pan on 2019-05-28.

Test Mode: Transmitting(Per pre-test X,Y,Z Axis, the wost is Y Axis and reported)

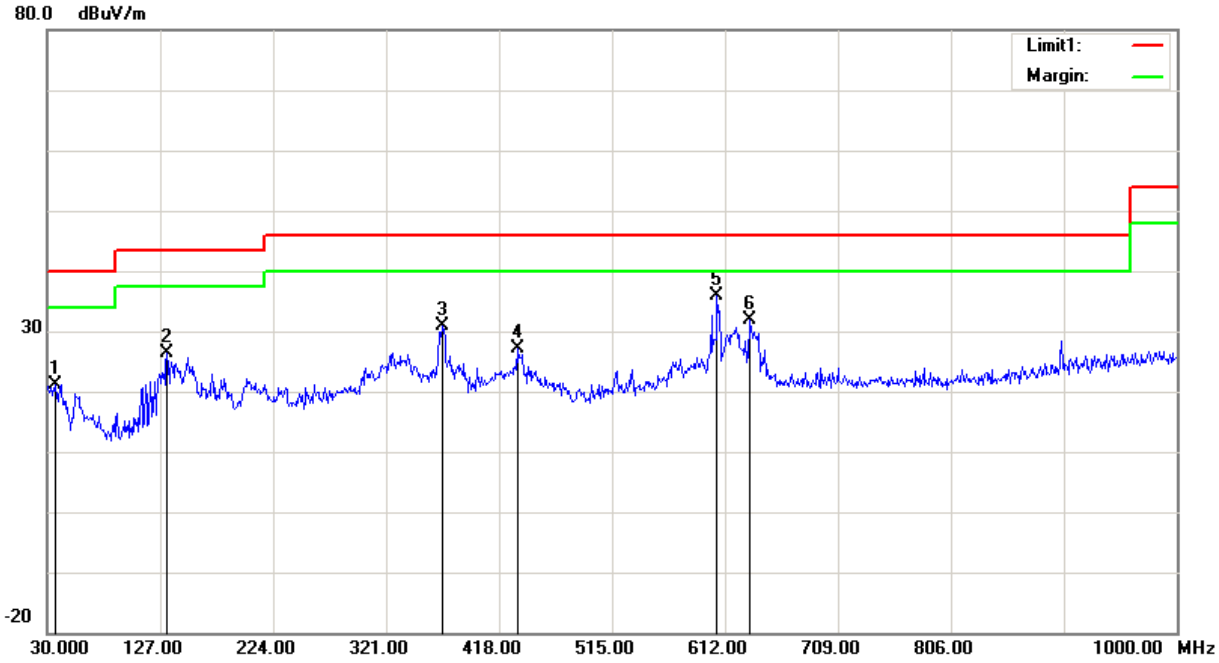
1) 30MHz-1GHz*(High channel was the worst)***:**

Horizontal:



Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
147.3700	39.28	peak	-12.78	26.50	43.50	17.00
200.7200	42.82	peak	-12.90	29.92	43.50	13.58
321.9700	43.03	peak	-10.20	32.83	46.00	13.17
366.5900	42.36	peak	-8.93	33.43	46.00	12.57
607.1500	31.85	peak	-3.26	28.59	46.00	17.41
901.0600	28.31	peak	1.15	29.46	46.00	16.54

Vertical:



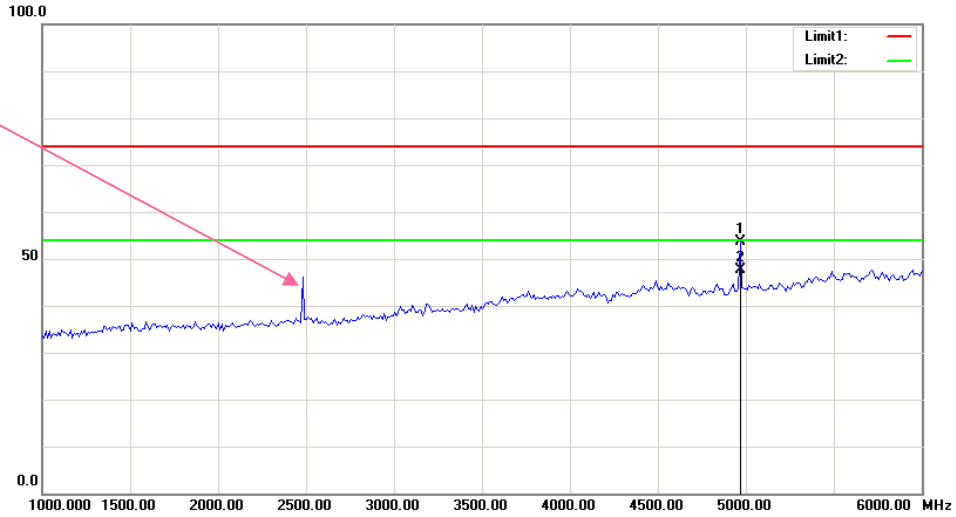
Frequency (MHz)	Receiver Reading (dBuV)	Detector	Correction Factor (dB/m)	Cord. Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.7900	32.40	peak	-11.29	21.11	40.00	18.89
132.8200	39.47	peak	-13.17	26.30	43.50	17.20
369.5000	39.74	peak	-8.81	30.93	46.00	15.07
433.5200	35.00	peak	-7.75	27.25	46.00	18.75
605.2100	39.20	peak	-3.31	35.89	46.00	10.11
633.3400	34.78	peak	-3.00	31.78	46.00	14.22

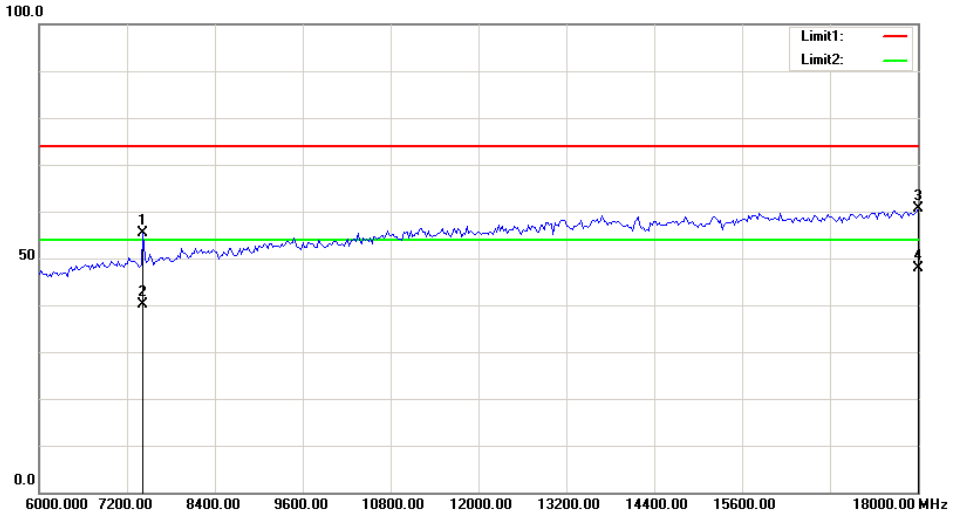
2) 1GHz-25GHz

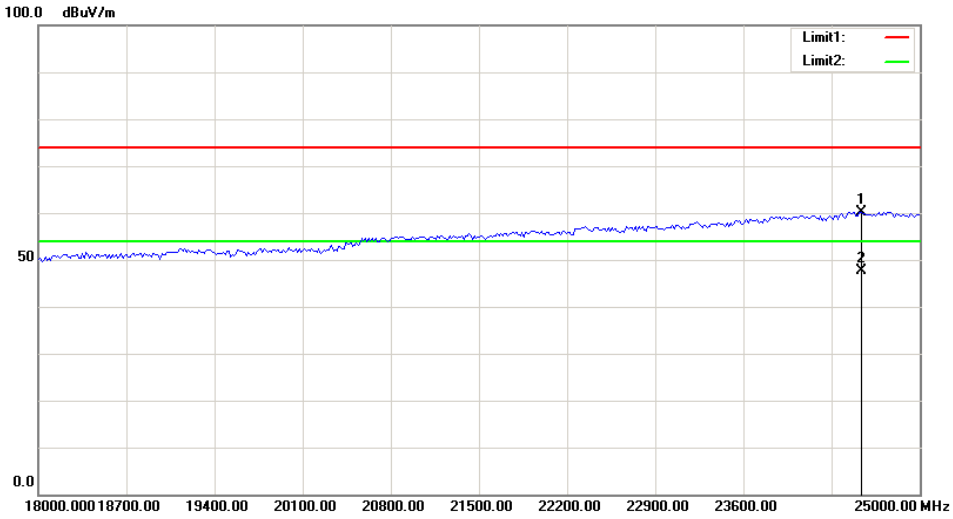
Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector	Polar (H/V)	Factor (dB/m)					
Low Channel: 2402 MHz									
2402.00	59.53	PK	H	24.82	3.34	0.00	87.69	113.98	26.29
2402.00	40.24	AV	H	24.82	3.34	0.00	68.40	93.98	25.58
2402.00	59.65	PK	V	24.82	3.34	0.00	87.81	113.98	26.17
2402.00	40.33	AV	V	24.82	3.34	0.00	68.49	93.98	25.49
2400.00	42.87	PK	V	24.82	3.34	0.00	71.03	74.00	2.97
2400.00	18.86	AV	V	24.82	3.34	0.00	47.02	54.00	6.98
4804.00	46.26	PK	V	29.71	4.58	27.36	53.19	74.00	20.81
4804.00	40.24	AV	V	29.71	4.58	27.36	47.17	54.00	6.83
7206.00	43.39	PK	V	33.93	5.59	27.19	55.72	74.00	18.28
7206.00	28.13	AV	V	33.93	5.59	27.19	40.46	54.00	13.54
Middle Channel: 2430 MHz									
2430.00	62.32	PK	H	24.87	3.36	0.00	90.55	113.98	23.43
2430.00	42.18	AV	H	24.87	3.36	0.00	70.41	93.98	23.57
2430.00	64.14	PK	V	24.87	3.36	0.00	92.37	113.98	21.61
2430.00	44.63	AV	V	24.87	3.36	0.00	72.86	93.98	21.12
4860.00	55.04	PK	V	29.82	4.57	27.50	61.93	74.00	12.07
4860.00	41.62	AV	V	29.82	4.57	27.50	48.51	54.00	5.49
7290.00	44.66	PK	V	34.06	5.66	27.28	57.10	74.00	16.90
7290.00	29.40	AV	V	34.06	5.66	27.28	41.84	54.00	12.16
High Channel: 2480 MHz									
2480.00	62.89	PK	H	24.96	3.38	0.00	91.23	113.98	22.75
2480.00	43.80	AV	H	24.96	3.38	0.00	72.14	93.98	21.84
2480.00	63.98	PK	V	24.96	3.38	0.00	92.32	113.98	21.66
2480.00	44.72	AV	V	24.96	3.38	0.00	73.06	93.98	20.92
2483.50	42.36	PK	V	24.97	3.38	0.00	70.71	74.00	3.29
2483.50	14.63	AV	V	24.97	3.38	0.00	42.98	54.00	11.02
4960.00	47.44	PK	V	30.02	4.58	27.37	54.67	74.00	19.33
4960.00	41.41	AV	V	30.02	4.58	27.37	48.64	54.00	5.36
7440.00	44.72	PK	V	34.30	5.79	27.22	57.59	74.00	16.41
7440.00	29.34	AV	V	34.30	5.79	27.22	42.21	54.00	11.79

Test plots(High Channel was the worst)
Horizontal

Fundamental test with Filter

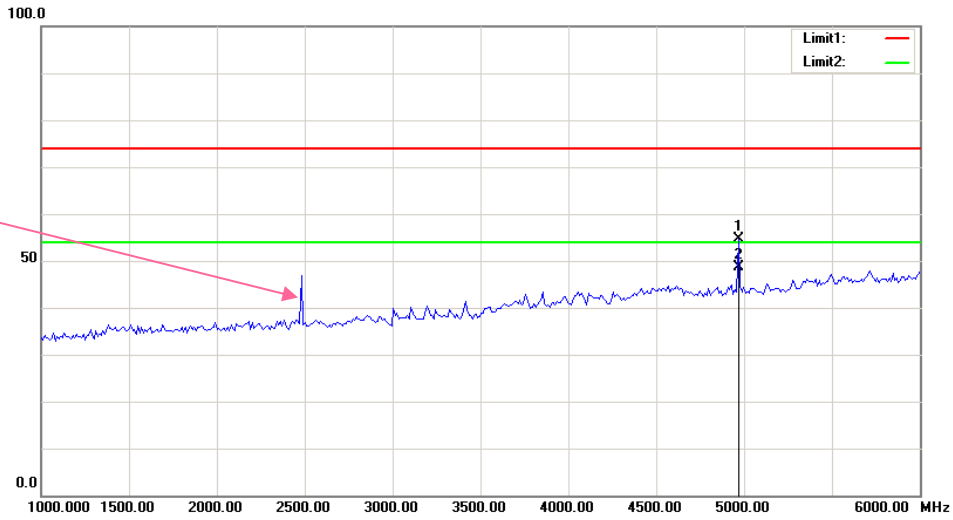


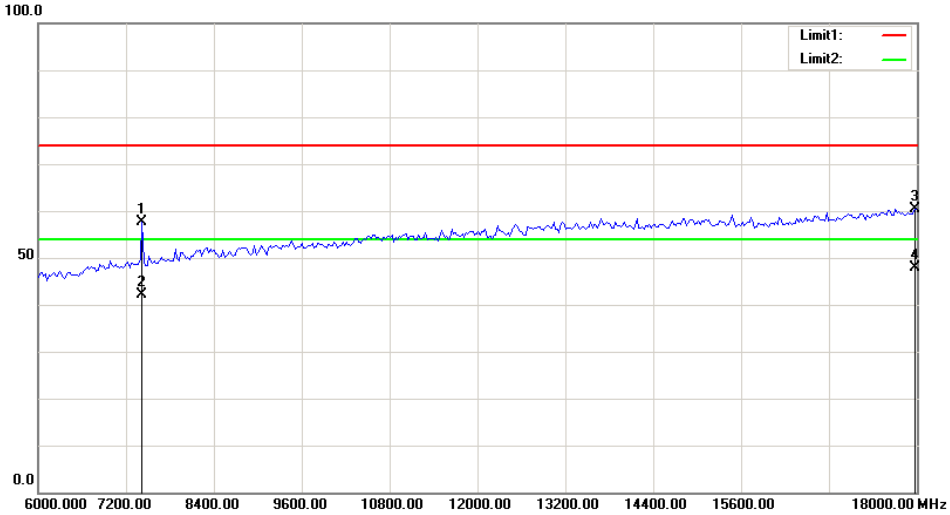


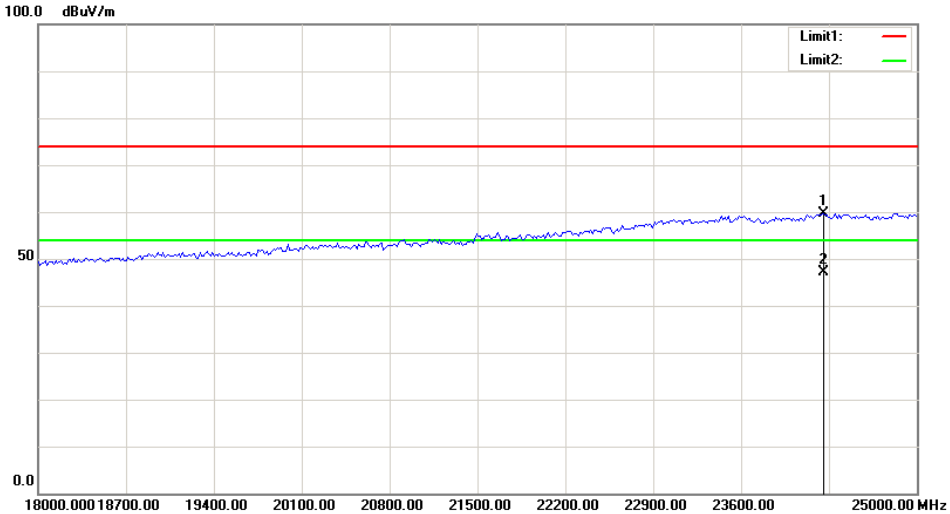


Vertical

Fundamental test with Filter







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	FSV40	101474	2019-01-09	2020-01-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	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:	26.1 °C
Relative Humidity:	52 %
ATM Pressure:	100.5 kPa

The testing was performed by Carrie He on 2019-05-29 and 2019-06-12

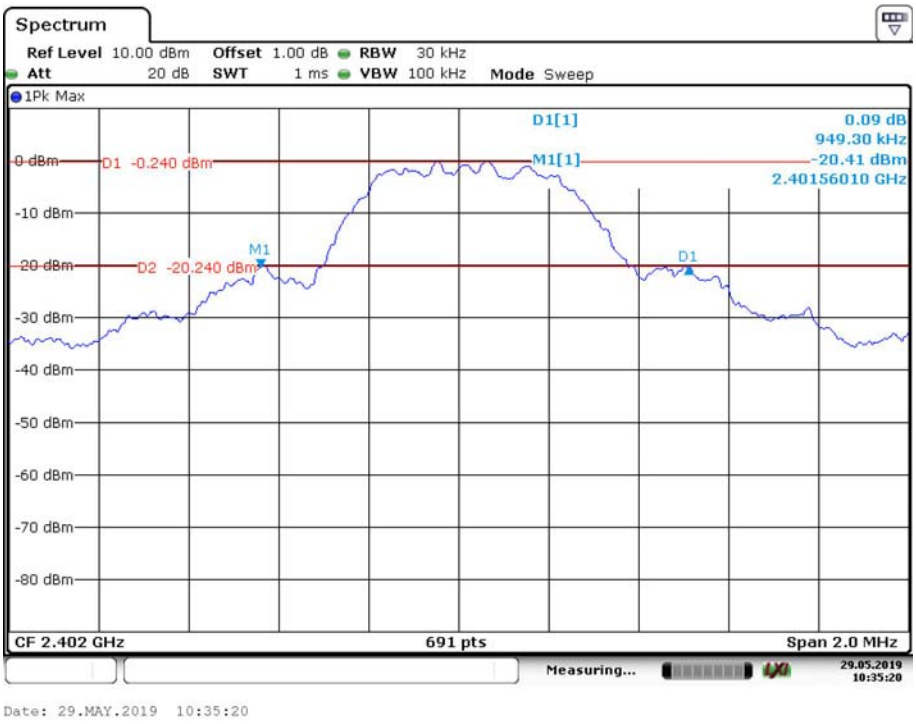
Test Result: Compliant.

Please refer to following tables and plots

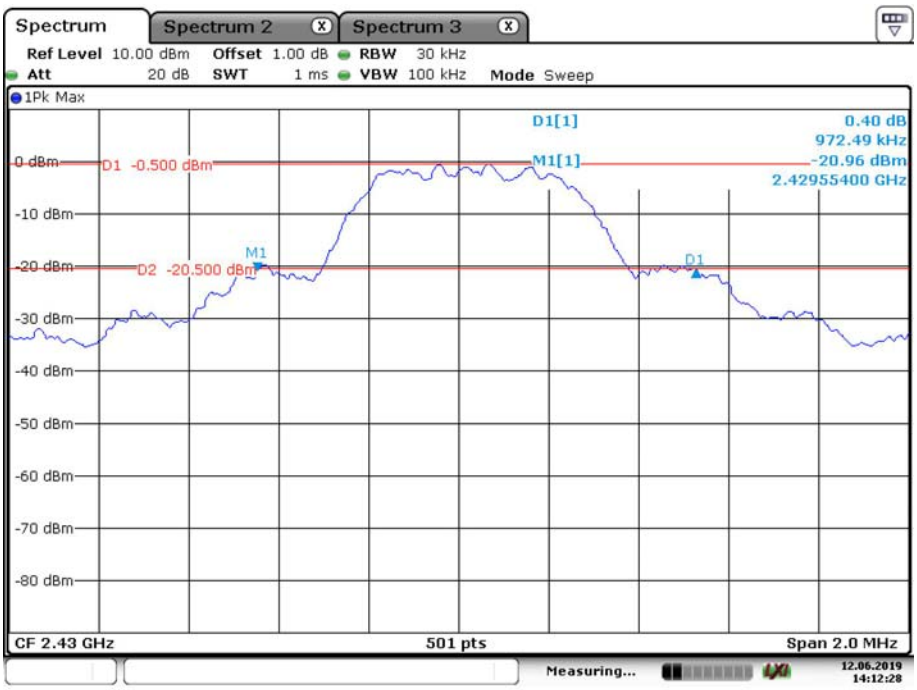
Test Mode: Transmitting

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)
Low	2402	0.949
Middle	2430	0.972
High	2480	0.984

Low Channel



Middle Channel



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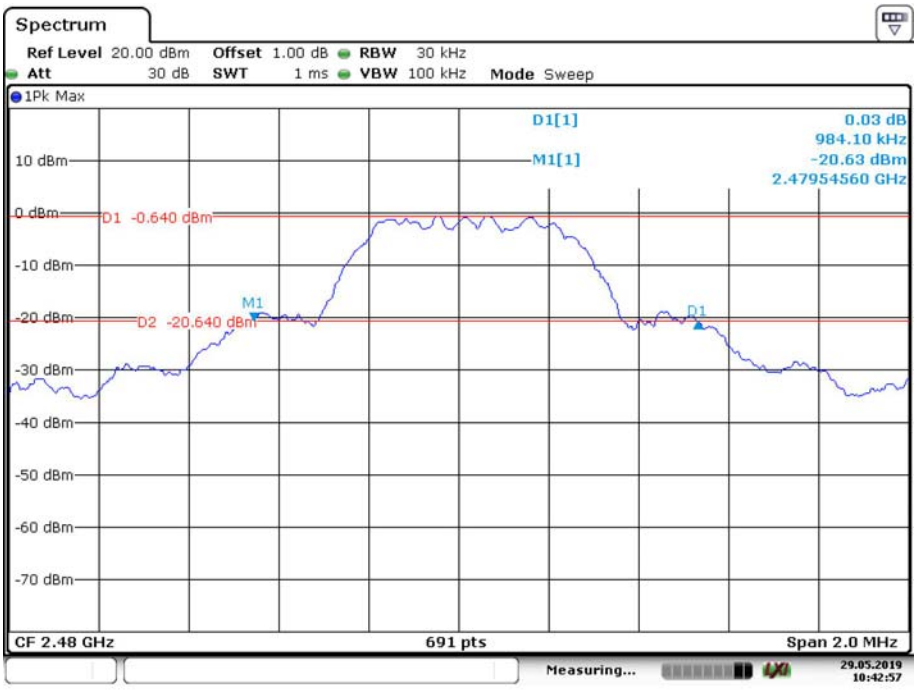
High Channel



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