MEASUREMENT REPORT

FCC PART 15.249

FCC ID	:	2AMN5-77225
APPLICANT	:	MARKLYN CO. INC.
Application Type	:	Certification
Product	:	MotoLED RGB
Model No.	:	77225
Serial Model No.	:	71017, 77415, 77418, 77419
Brand Name	:	Alpena
FCC Classification	:	Low Power Communication Device Transmitter (DXX)
FCC Rule Part(s)	:	Part 15.249
Test Procedure(s)	:	ANSI C63.10 - 2013
Test Date	:	May 31 ~ June 06, 2018

Reviewed By : Kevin Guo
(Kevin Guo)

Approved By : Robin Wu
(Robin Wu)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.
The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1805RSU039-U1	Rev. 01	Initial report	06-07-2018	Valid

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§2.1033 General Information

Applicant:	MARKLYN CO. INC.
Applicant Address:	190 Bovaird Drive West, Unit 28, Brampton, Ontario, L7A 1A2, Canada
Manufacturer:	SHENZHEN SMILE LIGHTING CO., LTD
Manufacturer Address:	1st Bu Bohua Technology Industry Area Longhua New District, Shenzhen, China
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
FCC Registration No.:	893164
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**

1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.

2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	MotoLED RGB
Model No.	77225
Serial Model No.	71017, 77415, 77418, 77419
Frequency Range	2407 ~ 2477MHz
Channel Number	71
Channel Space	1MHz
Date Rate	250Kbps
Antenna Type	Dipole Antenna
Antenna Gain	2.3dBi

Note: The different of models only for marketing different client, the other were the same.

2.2. Operation Frequency and Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2407 MHz	02	2408 MHz	03	2409 MHz
04	2410 MHz	05	2411 MHz	06	2412 MHz
07	2413 MHz	08	2414 MHz	09	2415 MHz
10	2416 MHz	11	2417 MHz	12	2418 MHz
13	2419 MHz	14	2420 MHz	15	2421 MHz
16	2422 MHz	17	2423 MHz	18	2424 MHz
19	2425 MHz	20	2426 MHz	21	2427 MHz
22	2428 MHz	23	2429 MHz	24	2430 MHz
25	2431 MHz	26	2432 MHz	27	2433 MHz
28	2434 MHz	29	2435 MHz	30	2436 MHz
31	2437 MHz	32	2438 MHz	33	2439 MHz
34	2440 MHz	35	2441 MHz	36	2442 MHz
37	2443 MHz	38	2444 MHz	39	2445 MHz
40	2446 MHz	41	2447 MHz	42	2448 MHz
43	2449 MHz	44	2450 MHz	45	2451 MHz
46	2452 MHz	47	2453 MHz	48	2454 MHz
49	2455 MHz	50	2456 MHz	51	2457 MHz
52	2458 MHz	53	2459 MHz	54	2460 MHz
55	2461 MHz	56	2462 MHz	57	2463 MHz

58	2464 MHz	59	2465 MHz	60	2466 MHz
61	2467 MHz	62	2468 MHz	63	2469 MHz
64	2470 MHz	65	2471 MHz	66	2472 MHz
67	2473 MHz	68	2474 MHz	69	2475 MHz
70	2476 MHz	71	2477 MHz		

Note: The engineer test sample was provided by the manufacturer, it was configured into fixed frequency TX status by pressing the key.

2.3. Test Configuration

The EUT was tested as described in this report is in compliance with the requirements limits of FCC Rules Part 15.207,15.209, 15.215 and 15.249. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.4. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.5. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the requirements provided in FCC 15.207, 15.209, 15.215 and 15.249 were performed in the report of the EUT.

Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.
For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-25GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.
Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna of the EUT is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

This device complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2019/04/20
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2018/06/20
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2018/06/20
Temperature/Humidity Meter	testo	608-H1	MRTSUE06404	1 year	2018/08/14
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	N/A	N/A

Radiated Emission - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
MXE EMI Receiver	Agilent	N9038A	MRTSUE06125	1 year	2018/08/18
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2018/11/20
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2018/11/17
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2019/04/12
Broad Band Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2018/10/21
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2018/12/14
Amplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2018/06/14
Thermohygrometer	Testo	608-H1	MRTSUE06403	1 year	2018/08/14
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2019/05/02

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2019/04/20
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2018/09/13
Thermohygrometer	Testo	608-H1	MRTSUE06401	1 year	2018/08/14

Software	Version	Function
e3	V8.3.5	EMI Test Software

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB
20dB Spectrum Bandwidth - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

7. TEST RESULT

7.1. Summary

Company Name: **MARKLYN CO. INC.**

FCC ID: **2AMN5-77225**

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	N/A	Section 7.2
15.209 15.249	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 7.3 & 7.4
15.215(c)	20dB Spectrum Bandwidth	20 dB bandwidth of the emission in the specific band	Conducted	Pass	Section 7.5

Notes:

1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.

2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

7.2. Conducted Emission

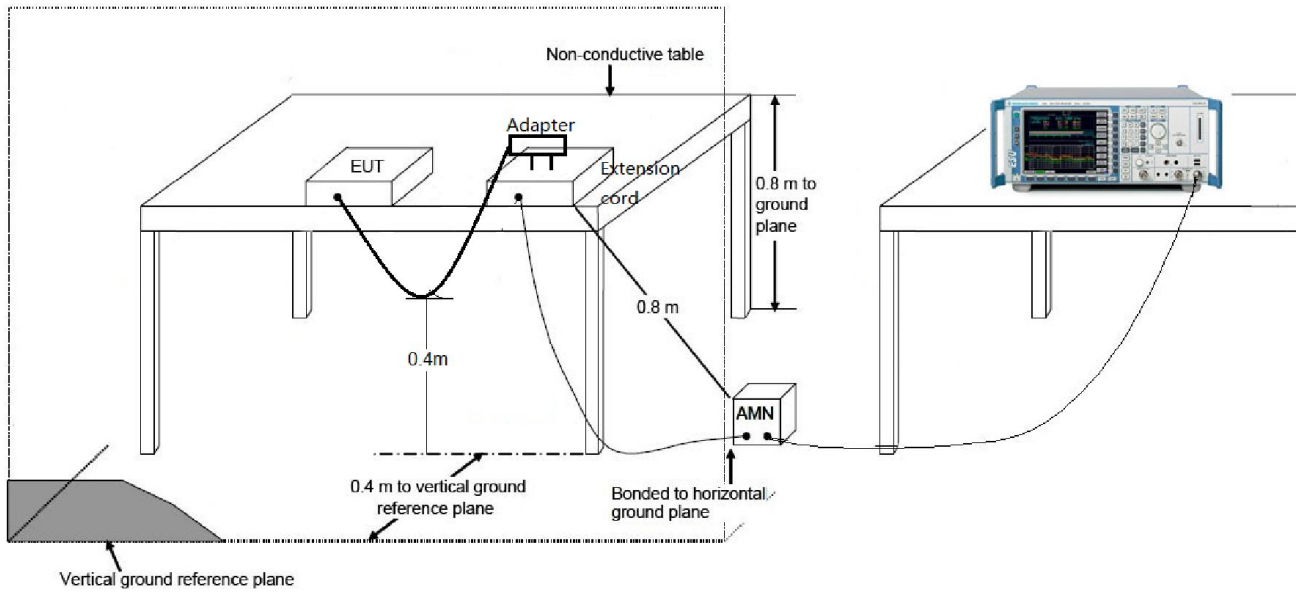
7.2.1.Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

7.2.2.Test Setup



7.2.3.Test Result

The EUT is powered by battery, so this requirement does not apply.

7.3. Radiated Emission

7.3.1.Test Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (uV/m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-80	100**	3
80-216	150**	3
216-960	200**	3
Above 960	500	3

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

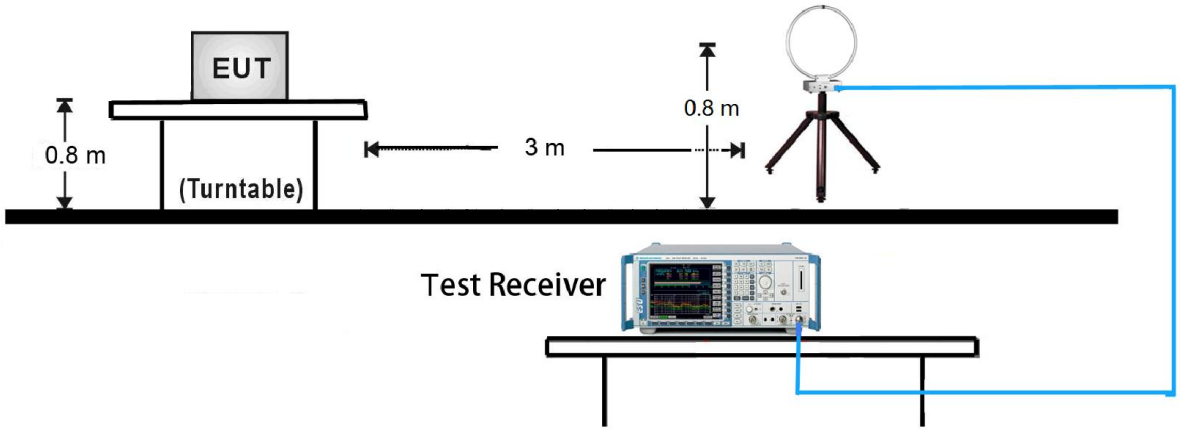
Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m).

FCC Part 15 Subpart C Paragraph 15.249		
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

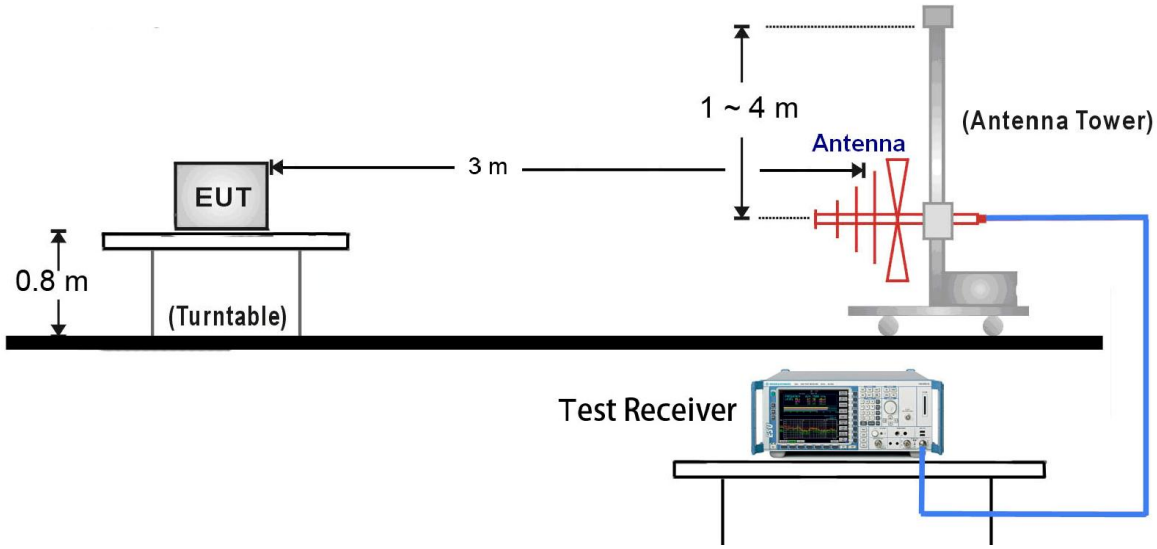
FCC Part 15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

7.3.2.Test Setup

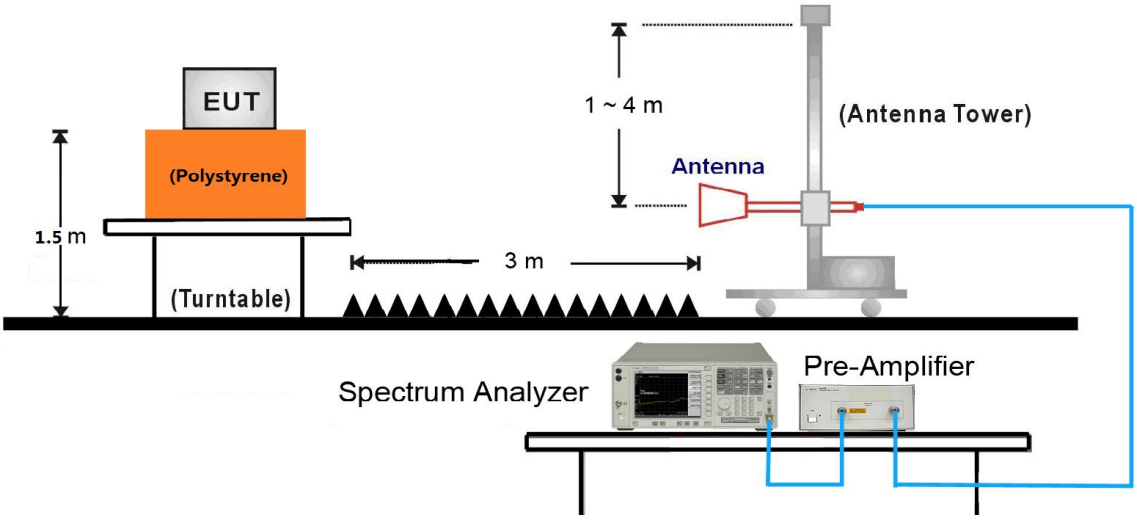
9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



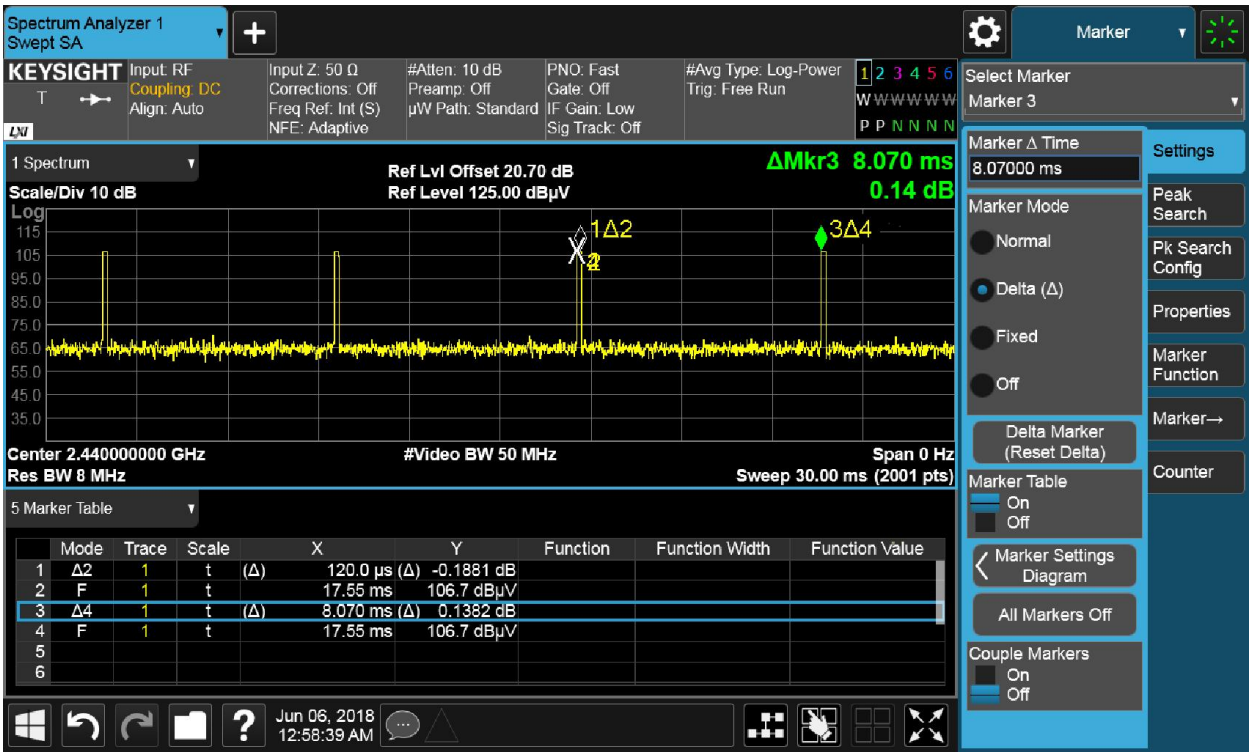
1GHz ~ 25GHz Test Setup:



7.3.3.Test Result

Time On (ms)	One Period (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
0.12	8.07	1.49	-36.54

Note: Duty Cycle Factor = 20*Log (Duty Cycle)



Test Mode:	Transmission	Test Site:	AC1
Remark:	**Fundamental** Radiated Emission	Test Engineer:	Snake Ni

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
2407	64.6	32.3	N/A	96.9	114.0	-17.1	PK	Horizontal
	64.6	32.3	-36.5	60.4	94.0	-33.6	AV	Horizontal
	54.2	32.3	N/A	86.5	114.0	-27.5	PK	Vertical
	54.2	32.3	-36.5	50.0	94.0	-44.0	AV	Vertical
2440	64.2	32.3	N/A	96.5	114.0	-17.5	PK	Horizontal
	64.2	32.3	-36.5	60.0	94.0	-34.0	AV	Horizontal
	54.8	32.3	N/A	87.1	114.0	-26.9	PK	Vertical
	54.8	32.3	-36.5	50.6	94.0	-43.4	AV	Vertical
2477	63.3	32.3	N/A	95.6	114.0	-18.4	PK	Horizontal
	63.3	32.3	-36.5	59.1	94.0	-34.9	AV	Horizontal
	55.6	32.3	N/A	87.9	114.0	-26.1	PK	Vertical
	55.6	32.3	-36.5	51.4	94.0	-42.6	AV	Vertical

Note 1: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: All readings below 1GHz are peak, above 1GHz are performed with peak and/or average measurements as necessary.

Test Mode:	Transmission	Test Site:	AC1
Frequency	2407MHz	Test Engineer:	Snake Ni
Remark:	**Radiated Spurious Emission**		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
547.0	3.4	19.5	N/A	22.9	46.9 (Note 4)	-24.0	QP	Horizontal
803.1	4.1	23.3	N/A	27.4	46.9 (Note 4)	-19.5	QP	Horizontal
594.1	4.5	20.5	N/A	25.0	46.9 (Note 4)	-21.9	QP	Vertical
934.5	4.6	24.9	N/A	29.5	46.9 (Note 4)	-17.4	QP	Vertical
4814.0	49.0	5.9	N/A	54.9	74.0 (Note 2)	-19.1	PK	Horizontal
4814.0	49.0	5.9	-36.5	18.4	74.0 (Note 2)	-35.6	PK	Horizontal
7221.0	53.0	12.7	N/A	65.7	74.0	-8.3	PK	Horizontal
7221.0	53.0	12.7	-36.5	29.2	54.0	-24.8	AV	Horizontal
9194.0	35.4	14.3	N/A	49.7	74.0 (Note 2)	-24.3	PK	Horizontal
10979.0	34.2	18.2	N/A	52.4	74.0 (Note 2)	-21.6	PK	Horizontal
4814.0	45.0	5.9	N/A	50.9	74.0 (Note 2)	-23.1	PK	Vertical
7221.0	51.1	12.7	N/A	63.8	74.0	-10.2	PK	Vertical
7221.0	51.1	12.7	-36.5	27.3	54.0	-26.7	AV	Vertical
8250.5	37.5	12.9	N/A	50.4	74.0 (Note 2)	-23.6	PK	Vertical
10894.0	34.8	18.1	N/A	52.9	74.0 (Note 2)	-21.1	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

Note 2: Average measurement was not performed when the peak level lower than average limit.

Note 3: The test trace is same as the ambient noise (the test frequency range: 9 kHz ~ 30 MHz and 18 GHz ~ 25 GHz), therefore no data appear in the report.

Note 4: 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 (96.9dBμV/m) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test Mode:	Transmission	Test Site:	AC1
Frequency	2440MHz	Test Engineer:	Snake Ni
Remark:	**General Radiated Emission**		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
547.0	3.4	19.5	N/A	22.9	46.5 (Note 4)	-23.6	QP	Horizontal
821.5	3.8	23.5	N/A	27.3	46.5 (Note 4)	-19.2	QP	Horizontal
668.3	3.4	21.7	N/A	25.1	46.5 (Note 4)	-21.4	QP	Vertical
885.1	3.6	24.2	N/A	27.8	46.5 (Note 4)	-18.7	QP	Vertical
4880.0	43.9	6.0	N/A	49.9	74.0 (Note 2)	-24.1	PK	Horizontal
7320.0	49.9	12.6	N/A	62.5	74.0	-11.5	PK	Horizontal
7320.0	49.9	12.6	-36.5	26.0	54.0	-28.0	AV	Horizontal
8888.0	35.8	13.2	N/A	49.0	74.0 (Note 2)	-25.0	PK	Horizontal
10545.5	34.5	17.7	N/A	52.2	74.0 (Note 2)	-21.8	PK	Horizontal
4880.0	40.0	6.0	N/A	46.0	74.0 (Note 2)	-28.0	PK	Horizontal
7320.0	50.3	12.6	N/A	62.9	74.0	-11.1	PK	Vertical
7320.0	50.3	12.6	-36.5	26.4	54.0	-27.6	AV	Vertical
9712.5	35.6	15.6	N/A	51.2	74.0 (Note 2)	-22.8	PK	Vertical
11854.5	34.0	17.2	N/A	51.2	74.0 (Note 2)	-22.8	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

Note 2: Average measurement was not performed when the peak level lower than average limit.

Note 3: The test trace is same as the ambient noise (the test frequency range: 9 kHz ~ 30 MHz and 18 GHz ~ 25 GHz), therefore no data appear in the report.

Note 4: 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 (96.5dBμV/m) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Test Mode:	Transmission	Test Site:	AC1
Frequency	2477MHz	Test Engineer:	Snake Ni
Remark:	**General Radiated Emission**		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Duty Cycle Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
598.4	3.6	20.5	N/A	24.1	46.0 (Note 4)	-21.9	QP	Horizontal
853.5	3.6	23.8	N/A	27.4	46.0 (Note 4)	-18.6	QP	Horizontal
631.4	3.5	21.2	N/A	24.7	46.0 (Note 4)	-21.3	QP	Vertical
837.0	3.8	23.6	N/A	27.4	46.0 (Note 4)	-18.6	QP	Vertical
4954.0	42.0	6.1	N/A	48.1	74.0 (Note 2)	-25.9	PK	Horizontal
7431.0	49.9	12.8	N/A	62.7	74.0	-11.3	PK	Horizontal
7431.0	49.9	12.8	-36.5	26.2	54.0	-27.8	AV	Horizontal
9840.0	34.8	16.7	N/A	51.5	74.0 (Note 2)	-22.5	PK	Horizontal
12109.5	34.1	17.5	N/A	51.6	74.0 (Note 2)	-22.4	PK	Horizontal
4954.0	38.8	6.1	N/A	44.9	74.0 (Note 2)	-29.1	PK	Horizontal
7431.0	50.4	12.8	N/A	63.2	74.0	-10.8	PK	Vertical
7431.0	50.4	12.8	-36.5	26.7	54.0	-27.3	AV	Vertical
8259.0	36.0	12.9	N/A	48.9	74.0 (Note 2)	-25.1	PK	Vertical
9823.0	33.6	16.5	N/A	50.1	74.0 (Note 2)	-23.9	PK	Vertical

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre Amplifier Gain (dB)

Note 2: Average measurement was not performed when the peak level lower than average limit.

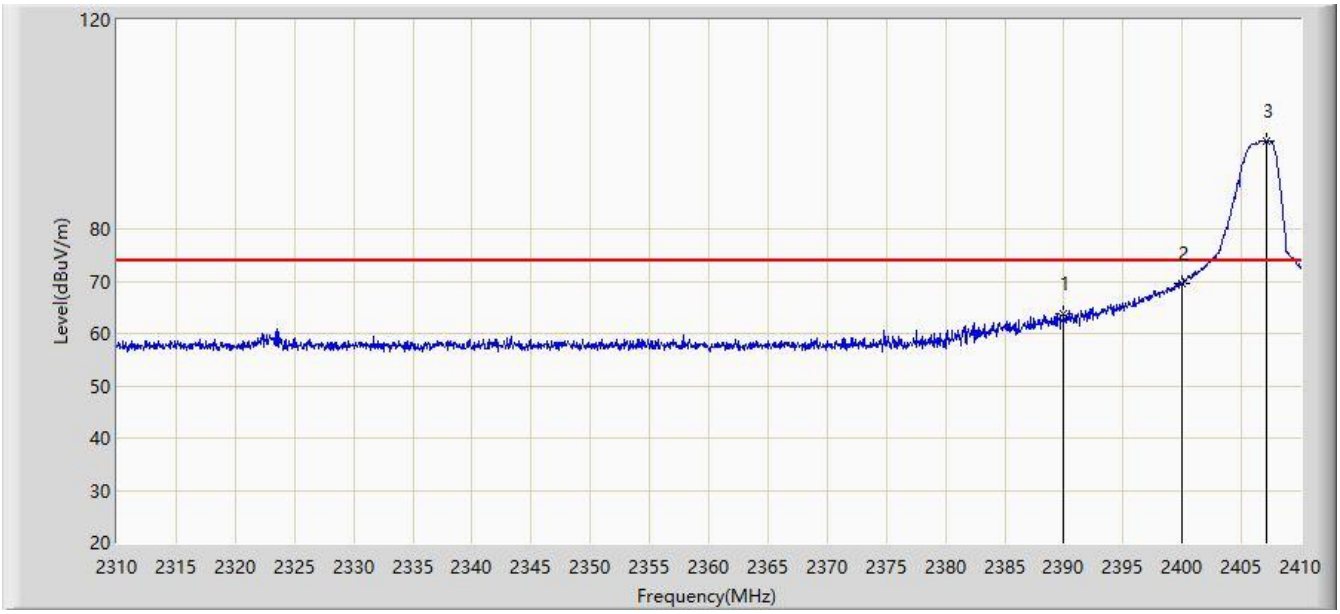
Note 3: The test trace is same as the ambient noise (the test frequency range: 9 kHz ~ 30 MHz and 18 GHz ~ 25 GHz), therefore no data appear in the report.

Note 4: 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 (95.6dBμV/m) or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

7.4. Radiated Restricted Band Edge Measurement

7.4.1.Test Result

Site: AC1	Time: 2018/06/05 - 23:02
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: MotoLED RGB	Power: DC 12V
Test Mode: Transmit at channel 2407MHz	



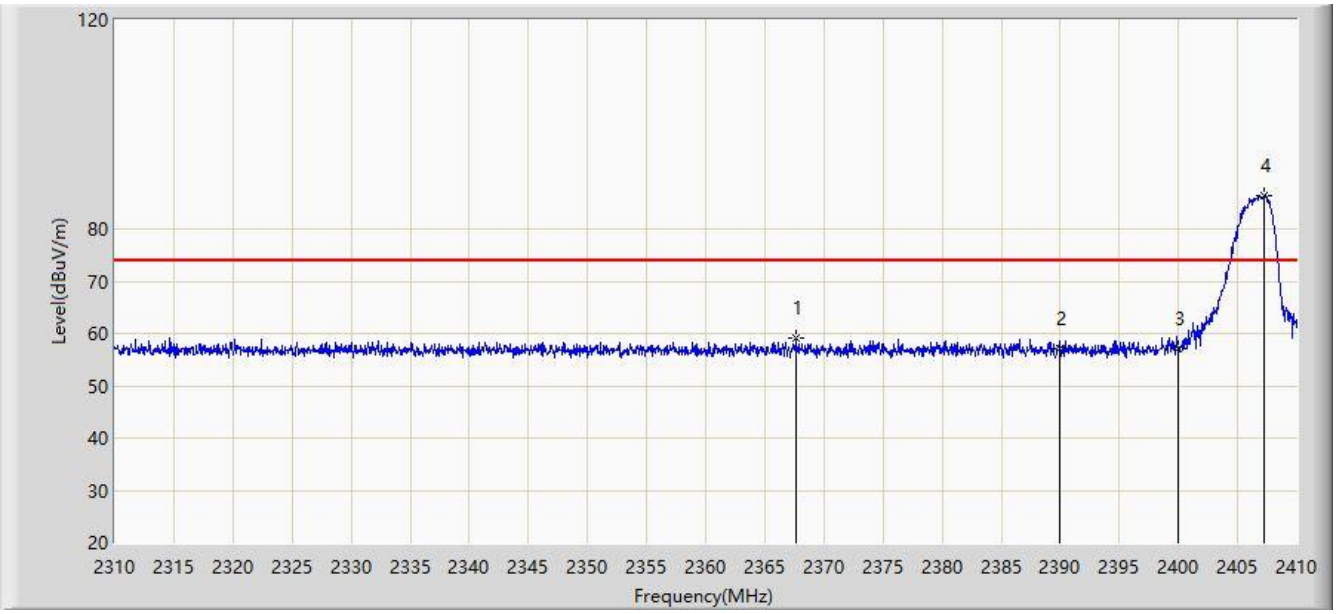
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Duty Cycle Factor (dB)	Type
1			2390.000	63.861	31.534	-10.139	74.000	32.327	N/A	PK
			2390.000	27.361	31.534	-26.639	54.000	32.327	-36.5	AV
2			2400.000	69.440	37.131	-4.560	74.000	32.309	N/A	PK
			2400.000	32.940	37.131	-21.060	54.000	32.309	-36.5	AV
3		*	2407.150	96.887	64.594	N/A	N/A	32.294	N/A	PK

Note: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/06/05 - 23:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: MotoLED RGB	Power: DC 12V
Test Mode: Transmit at channel 2407MHz	



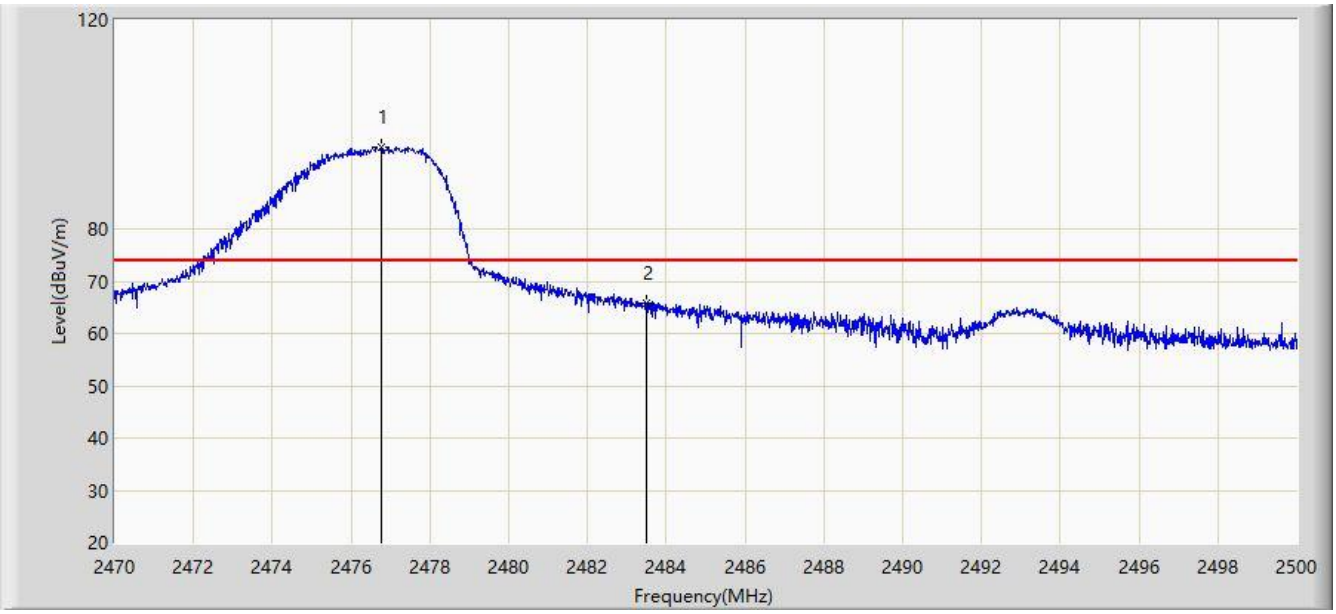
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Duty Cycle Factor (dB)	Type
1			2367.650	59.169	26.807	-14.831	74.000	32.362	N/A	PK
			2367.650	22.669	26.807	-31.331	54.000	32.362	-36.5	AV
2			2390.000	57.063	24.736	-16.937	74.000	32.327	N/A	PK
			2390.000	20.563	24.736	-33.437	54.000	32.327	-36.5	AV
3			2400.000	57.184	24.875	-16.816	74.000	32.309	N/A	PK
			2400.000	20.684	24.875	-33.316	54.000	32.309	-36.5	AV
4		*	2407.300	86.489	54.196	N/A	N/A	32.293	N/A	PK

Note: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/06/05 - 23:27
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: MotoLED RGB	Power: DC 12V
Test Mode: Transmit at channel 2477MHz	



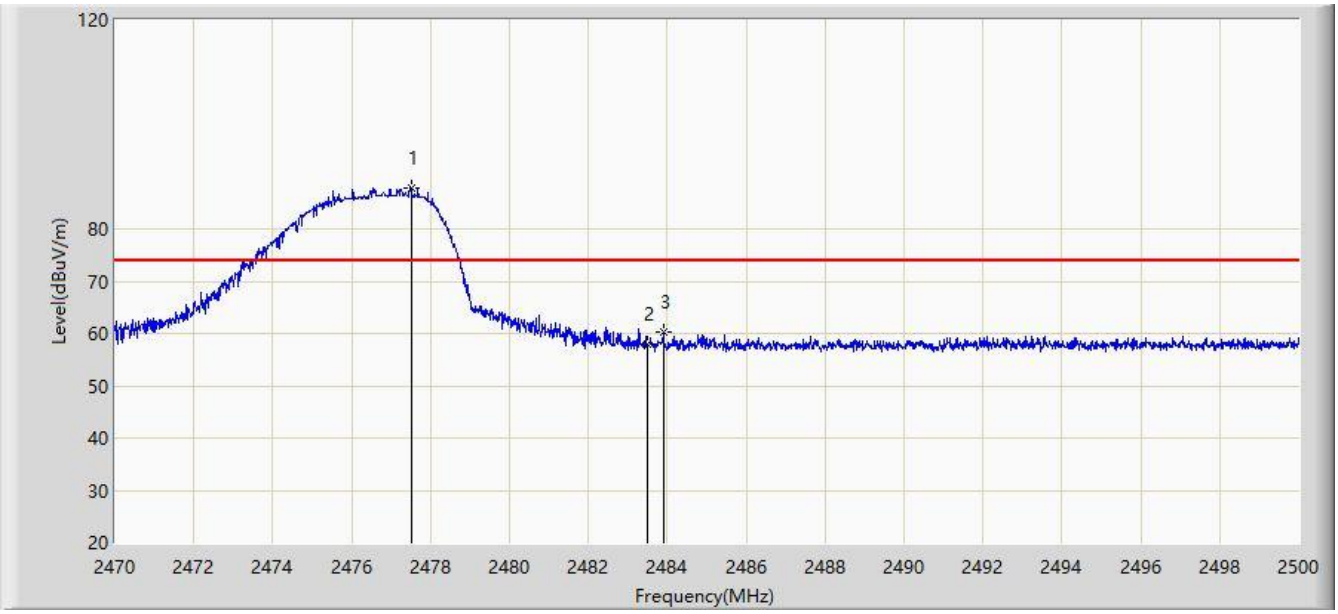
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Duty Cycle Factor (dB)	Type
1		*	2476.780	95.571	63.255	N/A	N/A	32.315	N/A	PK
2			2483.500	65.899	33.560	-8.101	74.000	32.340	N/A	PK
			2483.500	29.399	33.560	-24.601	54.000	32.340	-36.5	AV

Note: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/06/05 - 23:35
Limit: FCC_Part15.209_RE(3m)	Engineer: Bruce Wang
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: MotoLED RGB	Power: DC 12V
Test Mode: Transmit at channel 2477MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Duty Cycle Factor (dB)	Type
1		*	2477.500	87.944	55.626	N/A	N/A	32.318	N/A	PK
2			2483.500	57.981	25.642	-16.019	74.000	32.340	N/A	PK
			2483.500	21.481	25.642	-32.519	54.000	32.340	-36.5	AV
3			2483.905	60.345	28.004	-13.655	74.000	32.340	N/A	PK
			2483.905	23.845	28.004	-30.155	54.000	32.340	-36.5	AV

Note: Peak Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Average Measure Level = Peak Measure Level + Duty Cycle Factor

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

7.5. 20dB Spectrum Bandwidth Measurement

7.5.1.Test Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission in the specific band (2407 ~ 2477).

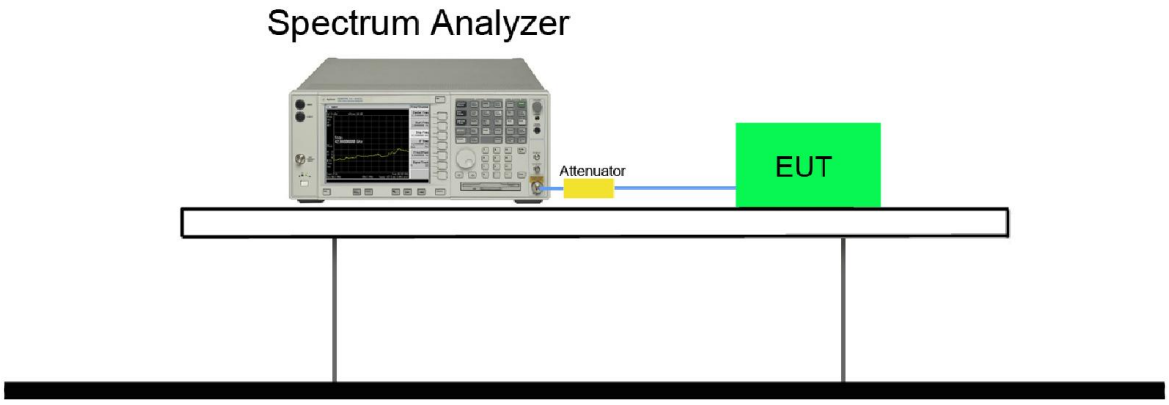
7.5.2.Test Procedure used

ANSI C63.10 Clause 6.9.2

7.5.3.Test Setting

1. Set the spectrum span range to overlap the nominal center frequency
2. Set RBW = 100 kHz
3. VBW ≥ 3 × RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace was allowed to stabilize and marker the highest level.
8. Determine the display level (the highest level - 20dB) and place two markers, one at the lowest frequency and the other at the highest frequency.

7.5.4.Test Setup



7.5.5.Test Result

Product	MotoLED RGB	Temperature	25°C
Test Engineer	Hunk Li	Relative Humidity	52%
Test Site	TR3	Test Date	2018/06/06

Frequency (MHz)	Frequency Range (MHz)	Frequency Range (MHz)	Result
2407	2405.575	---	Pass
2477	---	2477.935	Pass

20dB Spectrum Bandwidth	
2407 MHz	2477 MHz
	

8. CONCLUSION

The data collected relate only the item(s) tested and show that the device is in compliance with Part 15C of the FCC Rules.

The End