
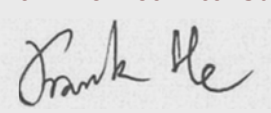
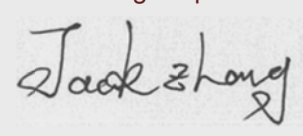




Test report No:
1992171R-RF-US-P06V02

FCC & ISED TEST REPORT

Product Name	Hue light strip
Trademark	PHILIPS
FCC ID	2AGBW9290022691X
IC	20812-2691X
Model and /or type reference	9290022691, 9290022692
Applicant's name / address	Signify (China) Investment Co., Ltd Building no.9, Lane 888, Tianlin Road, Minhang District, Shanghai, 200233, China
Test method requested, standard	FCC CFR Title 47 Part 15 Subpart C Section 15.247 ANSI C63.10: 2013 KD558074 D01 15.247 Meas Guidance v05r02 RSS-Gen Issue 5 / RSS-247 Issue 2
Verdict Summary	IN COMPLIANCE
Documented By	Kitty Li/Project Assistant 
Tested by (name / position & signature)	Frank He/ Technical Supervisor 
Approved by (name / position & signature)	Jack Zhang/ Supervisor 
Date of issue	2019-11-28
Report template No	1992171R-RF-US-P06V02

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Sep. 25, 2019
Date (start test)	Oct. 08, 2019
Date (finish test)	Nov. 04, 2019

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	: Equipment Under Test
QP	: Quasi-Peak
CAV	: CISPR Average
AV	: Average
CDN	: Coupling Decoupling Network
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
BW	: Bandwidth
AM	: Amplitude Modulation
PM	: Pulse Modulation
HCP	: Horizontal Coupling Plane
VCP	: Vertical Coupling Plane
U_N	: Nominal voltage
T_x	: Transmitter
R_x	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
1992171R-RF-US-P06V02	V1.0	Initial issue of report.	2019-11-07
1992171R-RF-US-P06V02	V1.1	Modified Clerical error.	2019-11-28

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with Part 15 Subpart C Paragraph 15.247, RSS-Gen Issue 5, RSS-247 Issue 2.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result, unless the specification, standard or customer have special requirements.
4. The test results presented in this report relate only to the object tested.
5. The test results relate only to the samples tested.
6. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
7. This report will not be used for social proof function in China market.

USED EQUIPMENT

AC Power Line Conducted Emission / TR1

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMI Test Receiver	R&S	ESCI	100906	2019.04.20	2020.04.19
Two-Line V-Network	R&S	ENV216	101190	2019.05.25	2020.05.24
Two-Line V-Network	R&S	ENV216	101044	2019.05.25	2020.05.24
Current Probe	R&S	EZ-17	100678	2019.03.12	2020.04.11
50ohm Termination	SHX	TF2	07081402	2019.09.02	2020.09.01
50ohm Termination	SHX	TF2	07081403	2019.09.02	2020.09.01
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	TR1-TH	2019.08.21	2020.08.20
Coaxial Cable	Suhner	RG 223	TR1-C1	2019.08.25	2020.08.24
Coaxial Cable	Suhner	RG 223	TR1-C2	2019.08.25	2020.08.24
Dekra test software	Dekra	-	-	-	-

Emissions in non-restricted frequency bands/ Occupied Bandwidth/ Fundamental emission output power Power Spectral Density / TR8

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2019.09.28	2020.09.27
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2019.04.17	2020.04.16
MXA Signal Analyzer	Keysight	N9020A	MY56060147	2019.08.30	2020.08.29
Wideband Peak Power Meter	Anritsu	ML2495A	0905006	2019.07.14	2020.07.13
Power Sensor	Anritsu	MA2411B	0846014	2019.08.12	2020.08.11
Coaxial Cable	Woken	SFL402	F02-150410-044	2019.01.01	2019.12.31
Dekra test software	Dekra	-	-	-	-

Radiated Emission(30MHz-1GHz) / AC3

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
EMI Test Receiver	R&S	ESCI	100573	2019.03.03	2020.03.02
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2019.05.25	2020.05.24
Temperature/Humidity Meter	RTS	RTS-8S	AC2-TH	2019.09.02	2020.09.01
Coaxial Cable	Huber+Suhner	RG 214	AC2-C	2019.04.13	2020.04.12
Dekra test software	Dekra	-	-	-	-

Radiated Emission (1GHz-40GHz)/ AC5

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2019.05.08	2020.05.07
Preamplifier	Miteq	NSP1800-25	1364185	2019.05.06	2020.05.05
Preamplifier	QuieTek	AP-040G	CHM-0906001	2019.05.06	2020.05.05
DRG Horn	ETS-Lindgren	3117	00123988	2019.01.22	2020.01.21
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2019.09.02	2020.09.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	2019.04.13	2020.04.12
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2019.04.13	2020.04.12
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	2019.04.13	2020.04.12
Dekra test software	Dekra	-	-	-	-

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%. The Uncertainties is comply with standard required as below.

Test item	Uncertainty
AC Power Line Conducted Emission	9kHz~150kHz: 2.80dB 150kHz~30MHz: 2.40dB
Peak Power Output	± 1.27 dB
Radiated Emission(30MHz~1GHz)	Horizontal: 30MHz~200MHz: 3.50 dB 300MHz~1GHz: 3.60 dB Vertical: 30MHz~200MHz: 3.60 dB 300MHz~1GHz: 3.50 dB
Radiated Emission(1GHz~26.5GHz)	Horizontal: 1GHz~18GHz: 5.00 dB Vertical: 1GHz~18GHz: 4.80 dB
RF antenna conducted test	± 1.27 dB
Radiated Emission Band Edge	± 3.9 dB
DTS Bandwidth	± 150 Hz
Occupied Bandwidth	± 1 kHz
Power Density	± 1.27 dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name	Hue light strip
Model No.	9290022691, 9290022692
Trademark	PHILIPS
Manufacturer	Signify (China) Investment Co., Ltd.
Manufacturer Address	Building no.9, Lane 888, Tianlin Road, Minhang District, Shanghai, 200233, China

Wireless specification	Zigbee
Operating frequency range(s)	2400~2483.5MHz
Type of Modulation	DSSS-OQPSK
Number of channel	16
Operating Temperature Range	-20 ~ 45

Rated power supply	Voltage and Frequency	
	<input type="checkbox"/>	AC: 220 – 240 V, 50/60 Hz
	<input checked="" type="checkbox"/>	AC: 100 – 240 V, 50/60 Hz
	<input type="checkbox"/>	DC: 15~24Vdc
	<input type="checkbox"/>	Battery: 3.7V
Mounting position	<input checked="" type="checkbox"/>	Table top equipment
	<input type="checkbox"/>	Wall/Ceiling mounted equipment
	<input type="checkbox"/>	Floor standing equipment
	<input type="checkbox"/>	Hand-held equipment
	<input type="checkbox"/>	Other: Wearable equipment

Note1: We have evaluated both modes of LE 1M, LE 2M and LE coded, the power of LE 1M mode is higher than other mode, the test data of both modes is showed in the report with test items power, bandwidth and RSE/ Bandedge; the test data of worse mode is showed with other test items.

Note 2: Hue light strip supports two kinds of Crystal oscillator (Murata/ KDS), there is not any change in RF design, circuitry or construction for this device, including RF parameters (antenna, software, firmware and hardware versions, power, frequency ranges, etc.), so only power, spurious emission and band-edge were tested for different crystal oscillator, the test data of worse mode is showed with other test items.

Note 3: Model 9290022691 is the initial 2m light strip with PSU adaptor and model 9290022692 is 1m light strip that can be attached to 2m light strip. The maximum length of this product is 10m.

1.2 Antenna Information

Antenna model / type number	PIFA antenna		
Antenna serial number	N/A		
Antenna Delivery	<input checked="" type="checkbox"/>	1TX + 1RX	
	<input type="checkbox"/>	2TX + 2RX	
	<input type="checkbox"/>	Others:.....	
Antenna technology	<input checked="" type="checkbox"/>	SISO	
	<input type="checkbox"/>	MIMO	<input type="checkbox"/> CDD <input type="checkbox"/> Beam-forming
	<input type="checkbox"/>	External	<input type="checkbox"/> Dipole <input type="checkbox"/> Sectorized
Antenna Type	<input checked="" type="checkbox"/>	Internal	<input type="checkbox"/> PIFA <input checked="" type="checkbox"/> PCB <input type="checkbox"/> Ceramic Chip <input type="checkbox"/> Others.....
Antenna Gain	2.78 dBi		

1.3 Channel List

Working Frequency of Each Channel: (For Zigbee)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
11	2405 MHz	12	2410 MHz	13	2415 MHz	14	2420 MHz
15	2425 MHz	16	2430 MHz	17	2435 MHz	18	2440 MHz
19	2445 MHz	20	2450 MHz	21	2455 MHz	22	2460 MHz
23	2465 MHz	24	2470 MHz	25	2475 MHz	26	2480 MHz

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

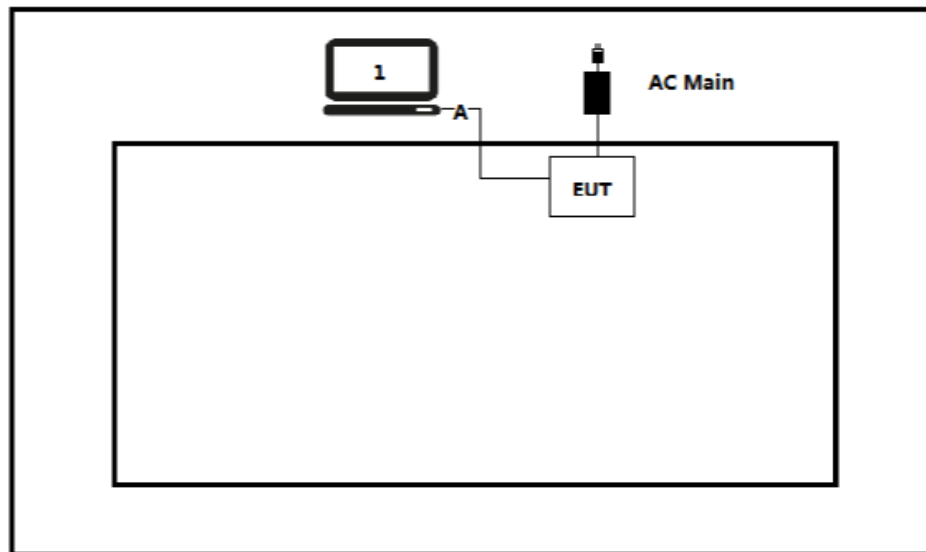
Test Mode	Mode 1: Transmit by Zigbee
-----------	----------------------------

2.2 Auxiliary equipment / Test software for the EUT

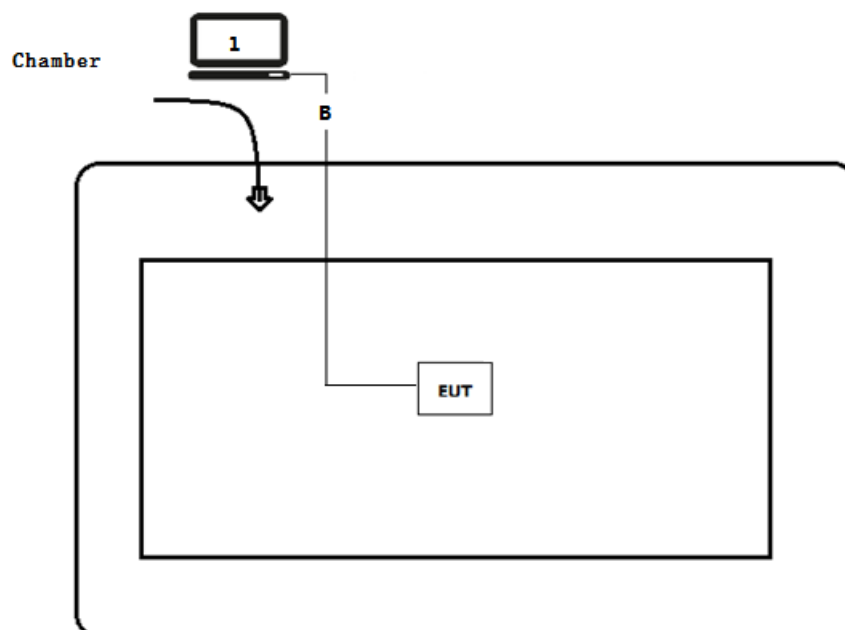
Auxiliary equipment	Type / Version	Manufacturer	Supplied by
Notebook	E470	Lenovo	N/A
software	Type / Version	Manufacturer	Supplied by
HueApprobationTool	1.1.00	Philips	N/A

2.3 Test Configuration / Block diagram used for tests

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated test



2.4 Testing process

1	Setup the EUT as shown in Section 2.4.
2	Execute the HueApprobatonTool on the EUT
3	Configure the test mode, the test channel, and the data rate.
4	Press “Start Test” to start the continuous Transmitter.
5	Verify that the EUT works properly.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
FCC CFR Title 47 Part 15 Subpart C Section 15.247	2019	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
KDB 558074 D01V05	2017	Guidance for performing compliance measurements on Digital Transmission System (DTS) operating under section 15.247
RSS-Gen Issue 5 Amendment 1	2019	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 2	2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

(Please define the deviations from the standard(s) if applicable)

3.3 Overview of results

For FCC

Requirement – Test case	Basic standard(s)	Verdict	Remark
AC Power Line Conducted Emission	FCC 15.207	PASS	---
Emissions in restricted frequency bands	FCC 15.247(b)(3)	PASS	---
Duty cycle	ANSI C63.10:2013	N/A	---
Emissions in non-restricted frequency bands	FCC 15.247(d), FCC 15.209	PASS	---
Radiated Emission Band Edge	FCC 15.247(d)	PASS	---
Fundamental emission output power	FCC 15.247(d), FCC 15.209	PASS	---
DTS Bandwidth	FCC 15.247(a)(2)	PASS	---
Power Spectral Density	FCC 15.247(e)	PASS	---
Antenna Requirement	FCC 15.203	PASS	---

For ISED

Requirement – Test case	Basic standard(s)	Verdict	Remark
AC Power Line Conducted Emission	RSS-Gen Issue 5 Section 8.8	PASS	---
Emissions in restricted frequency bands	RSS-Gen Issue 5 Section 8.9	PASS	---
Duty cycle	ANSI C63.10:2013	N/A	---
Emissions in non-restricted frequency bands	RSS-247 Issue 2 Section 5.5	PASS	---
Radiated Emission Band Edge	RSS-Gen Issue 5 Section 8.10	PASS	---
Fundamental emission output power	RSS-247 Issue 2 Section 5.4(d)	PASS	---
DTS Bandwidth	RSS-Gen Issue 5 Section 6.7	PASS	---
Power Spectral Density	RSS-247 Issue 2 Section 5.2(b)	PASS	---
Antenna Requirement	RSS-Gen Issue 5 Section 6.8	PASS	---

3.4 Test Facility

USA	:	FCC Designation Number: CN1199
CA	:	ISED CAB identifier: CN0040

4 TEST RESULTS

4.1 AC Power Line Conducted Emission

VERDICT: PASS

4.1.1 Limit

Standard

FCC Part 15 Subpart C Paragraph 15.207

Frequency range [MHz]	Limit: QP [dB(μV) ¹⁾]	Limit: AV [dB(μV) ¹⁾]
0,15 - 0,50	66 - 56 ²⁾	56 - 46 ²⁾
0,50 - 5,0	56	46
5,0 - 30	60	50

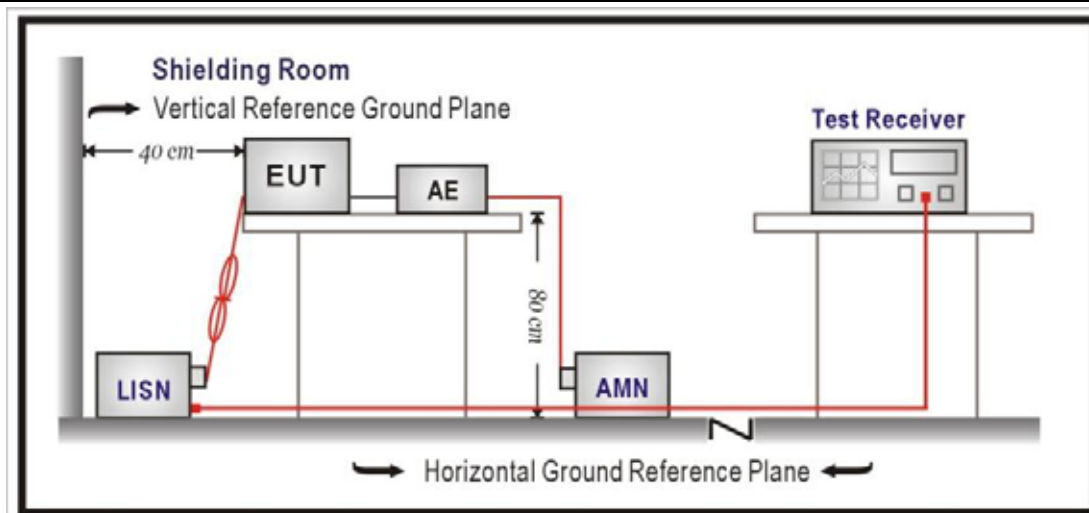
¹⁾ At the transition frequency, the lower limit applies.

²⁾ The limit decreases linearly with the logarithm of the frequency.

NOTE 1: The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.

NOTE 2: Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

4.1.2 Test Setup

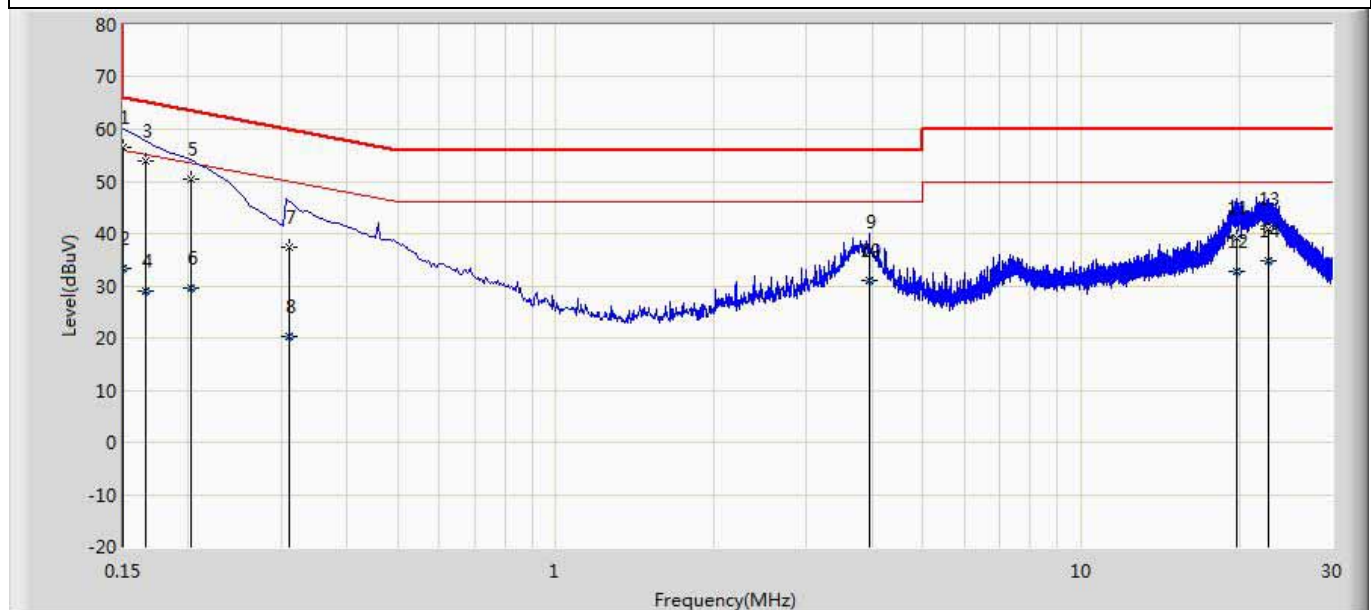


4.1.3 Test Procedure

	References Rule	Chapter	Item
<input checked="" type="checkbox"/>	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.1.4 Test Data

Profile: 1992171R	Page No.: 1
Engineer: Pawn	
Site: TR1	Time: 2019/10/10 - 09:16
Limit: FCC_Part115.207_CE_AC Power_Class B	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1 Transmit by Zigbee	

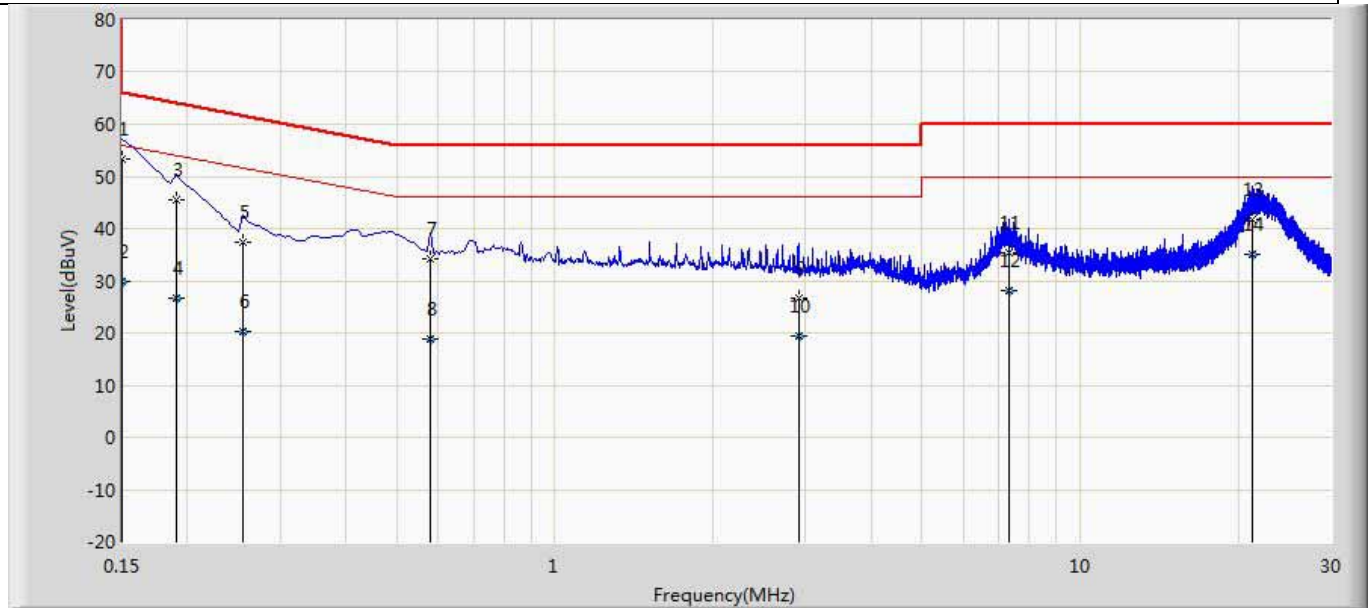


No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1	*	0.150	56.379	46.744	-9.621	66.000	9.610	0.025	0.000	QP
2		0.150	33.256	23.621	-22.744	56.000	9.610	0.025	0.000	AV
3		0.166	53.882	44.249	-11.276	65.158	9.607	0.027	0.000	QP
4		0.166	28.909	19.276	-26.249	55.158	9.607	0.027	0.000	AV
5		0.202	50.379	40.749	-13.149	63.528	9.601	0.029	0.000	QP
6		0.202	29.435	19.805	-24.093	53.528	9.601	0.029	0.000	AV
7		0.310	37.524	27.890	-22.446	59.970	9.600	0.034	0.000	QP
8		0.310	20.380	10.746	-29.591	49.970	9.600	0.034	0.000	AV
9		3.958	36.609	26.839	-19.391	56.000	9.643	0.127	0.000	QP
10		3.958	30.941	21.172	-15.059	46.000	9.643	0.127	0.000	AV
11		19.810	39.189	28.771	-20.811	60.000	10.131	0.287	0.000	QP
12		19.810	32.647	22.229	-17.353	50.000	10.131	0.287	0.000	AV
13		22.706	40.796	30.168	-19.204	60.000	10.319	0.309	0.000	QP
14		22.706	34.645	24.018	-15.355	50.000	10.319	0.309	0.000	AV

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Profile: 1992171R	Page No.: 2
Engineer: Pawn	
Site: TR1	Time: 2019/10/10 - 09:21
Limit: FCC_Part115.207_CE_AC Power_Class B	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Neutral
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1 Transmit by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1	*	0.150	53.277	43.659	-12.723	66.000	9.594	0.025	0.000	QP
2		0.150	29.795	20.176	-26.205	56.000	9.594	0.025	0.000	AV
3		0.190	45.406	35.780	-18.630	64.037	9.598	0.028	0.000	QP
4		0.190	26.597	16.971	-27.440	54.037	9.598	0.028	0.000	AV
5		0.254	37.265	27.636	-24.360	61.625	9.598	0.031	0.000	QP
6		0.254	20.191	10.562	-31.434	51.625	9.598	0.031	0.000	AV
7		0.578	34.327	24.692	-21.673	56.000	9.590	0.045	0.000	QP
8		0.578	18.762	9.126	-27.238	46.000	9.590	0.045	0.000	AV
9		2.906	26.776	17.048	-29.224	56.000	9.622	0.106	0.000	QP
10		2.906	19.538	9.810	-26.462	46.000	9.622	0.106	0.000	AV
11		7.326	35.262	25.379	-24.738	60.000	9.710	0.172	0.000	QP
12		7.326	28.041	18.158	-21.959	50.000	9.710	0.172	0.000	AV
13		21.326	41.659	31.053	-18.341	60.000	10.307	0.298	0.000	QP
14		21.326	35.105	24.499	-14.895	50.000	10.307	0.298	0.000	AV

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

4.2 Emissions in restricted frequency bands**VERDICT: PASS****4.2.1 Limit**

Standard		FCC Part 15 Subpart C Paragraph 15.207	
Restricted Bands of operation			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 –16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975–12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675–12.57725	322 – 335.4	3600 – 4400	
13.36 – 13.41			

Restricted Band Emissions Limit

Frequency (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 _(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 _(Note 1)
1.705 - 30	30	29.5	30 _(Note 1)
30 - 88	100	40	3 _(Note 2)
88 - 216	150	43.5	3 _(Note 2)
216 - 960	200	46	3 _(Note 2)
Above 960	500	54	3 _(Note 2)

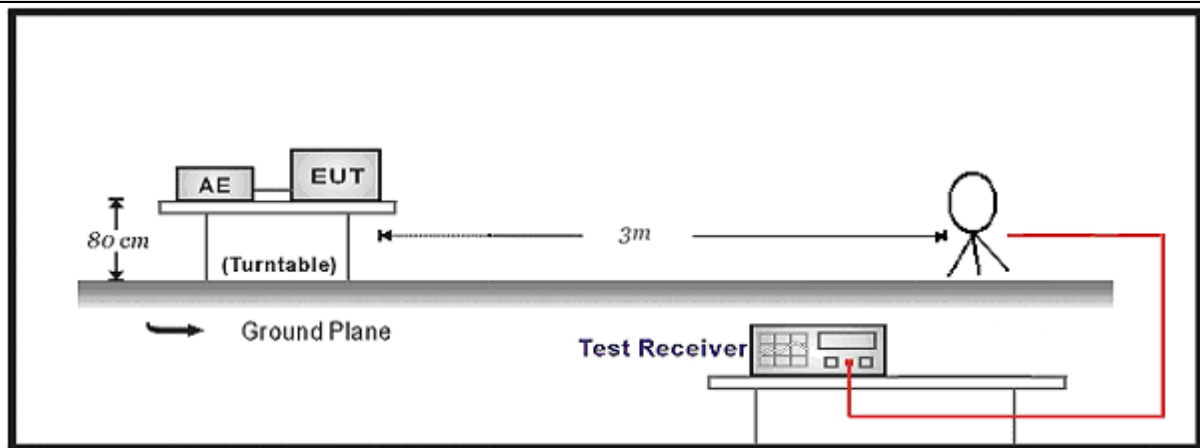
Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment.

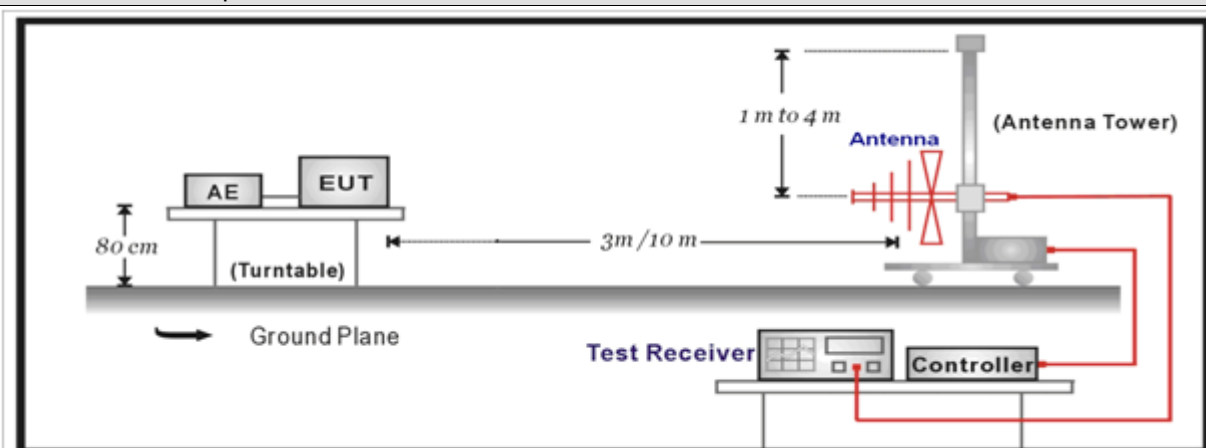
Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.2.2 Test Setup

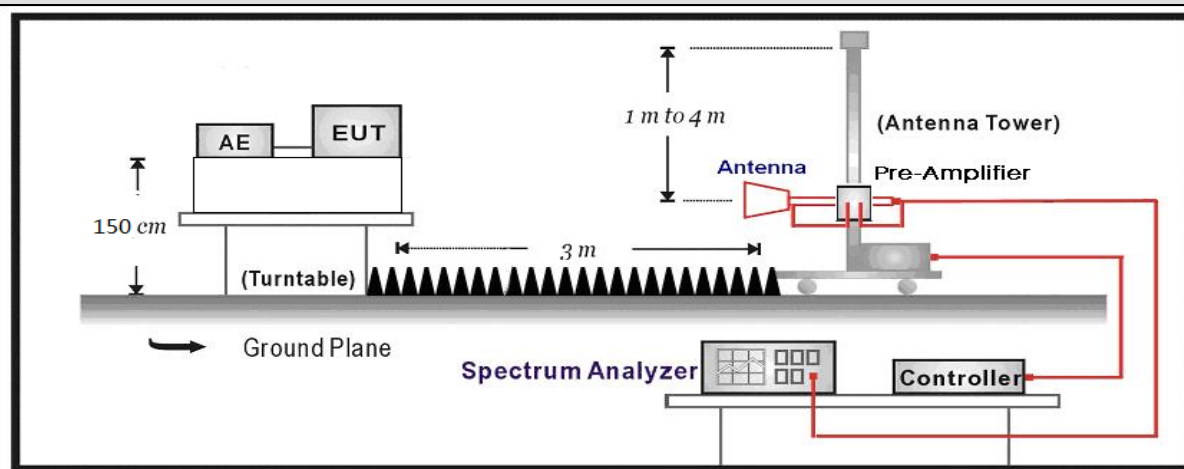
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



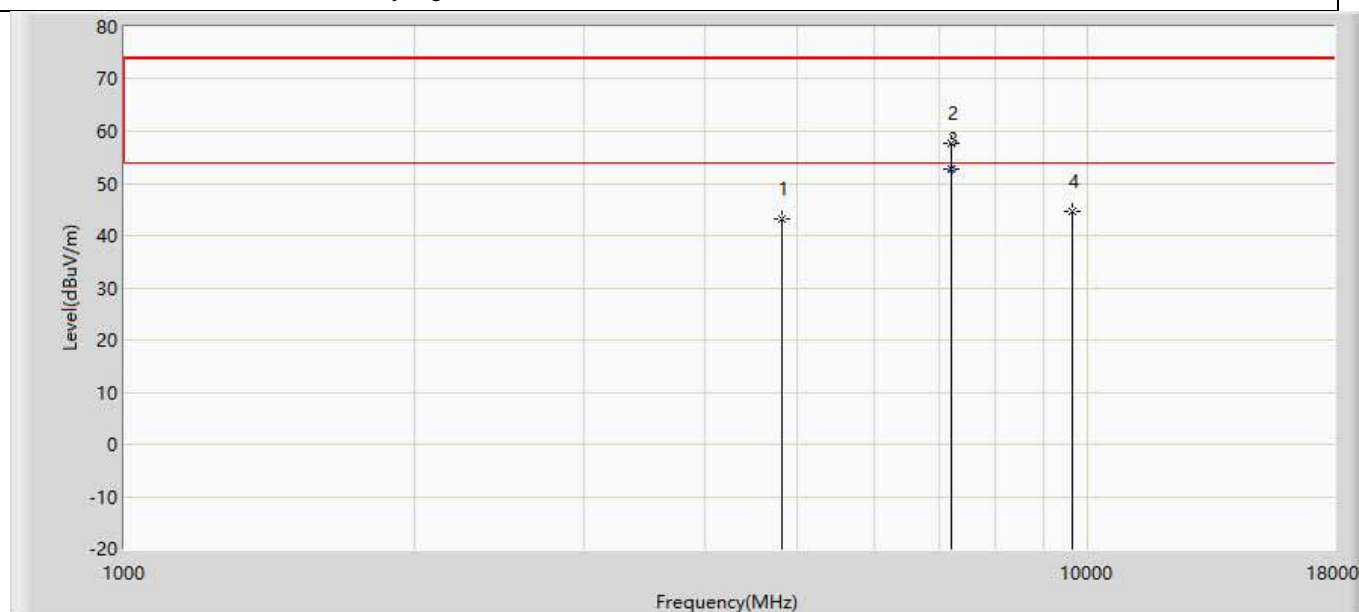
4.2.3 Test Procedure

	References Rule		Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10		11.12	Emissions in restricted frequency bands
	<input checked="" type="checkbox"/>	ANSI C63.10	11.12.1	Radiated emission measurements
	<input checked="" type="checkbox"/>	ANSI C63.10	11.12.2.7	Radiated spurious emission test
	<input checked="" type="checkbox"/>	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
	<input checked="" type="checkbox"/>	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
	<input checked="" type="checkbox"/>	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.2.4 Test Data

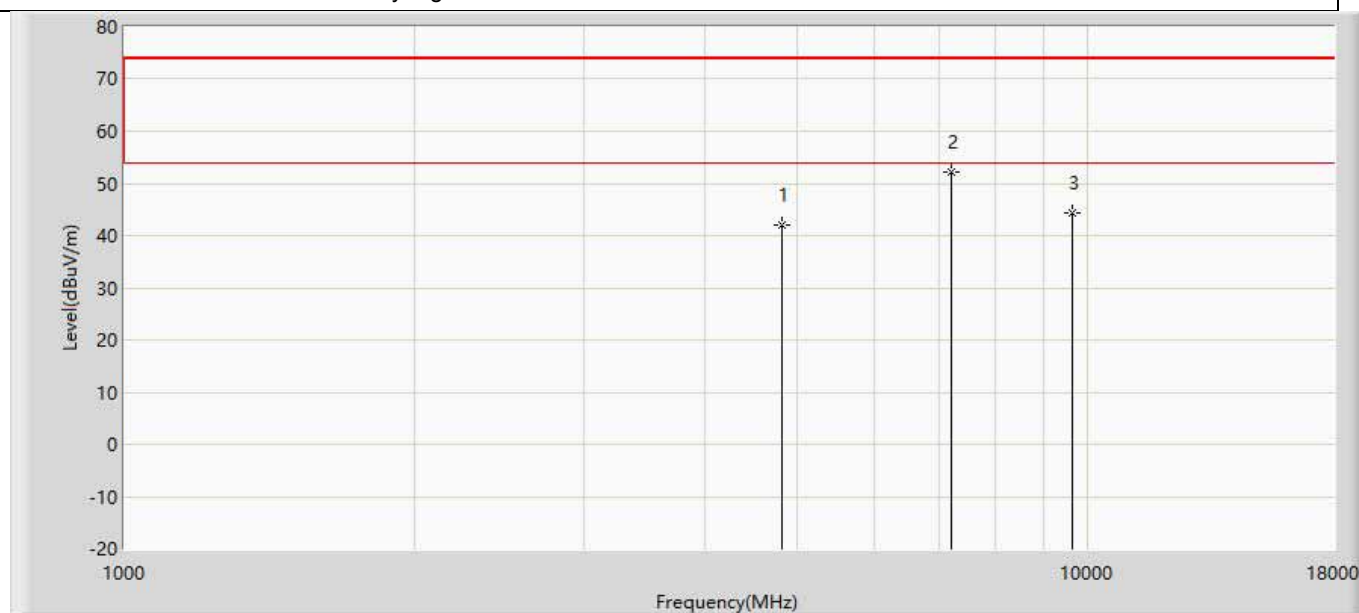
Murata:

Profile: 1992171R	Page No.: 71
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 09:36
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by Zigbee	



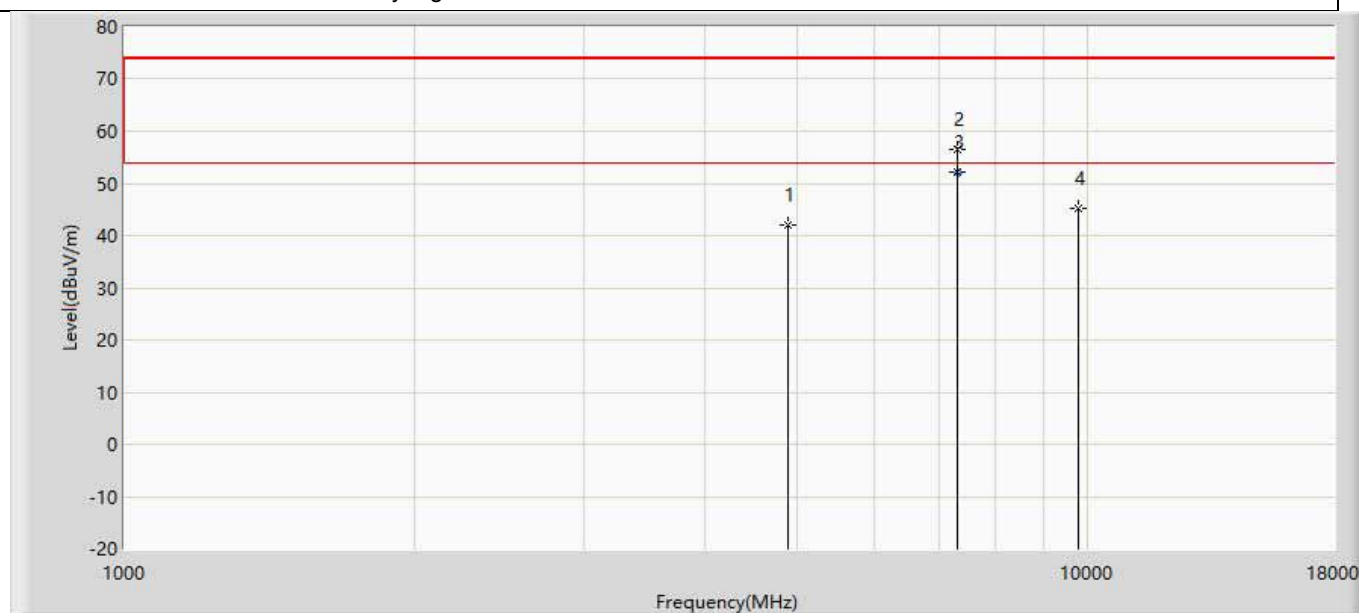
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4810.000	43.294	38.685	-30.706	74.000	4.609	PK
2		7213.500	57.594	49.566	-16.406	74.000	8.029	PK
3	*	7216.545	52.892	44.862	-1.108	54.000	8.029	AV
4		9620.000	44.526	35.159	-29.474	74.000	9.367	PK

Profile: 1992171R	Page No.: 72
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 09:36
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by Zigbee	



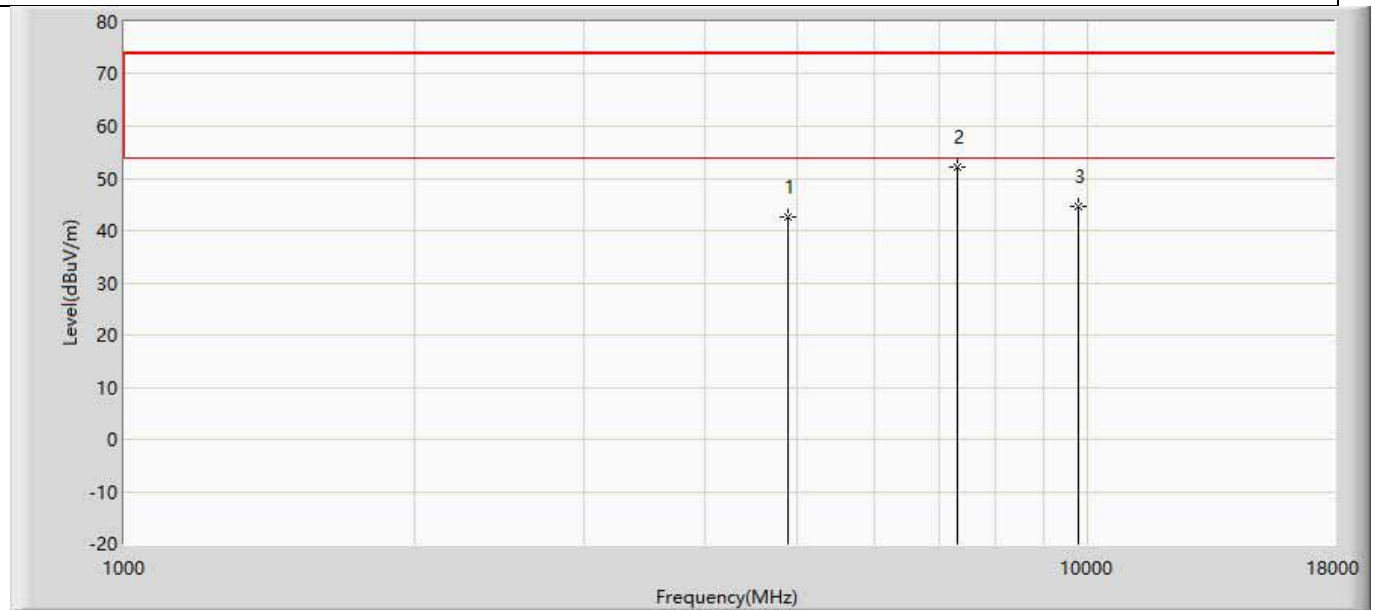
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4810.000	42.109	37.500	-31.891	74.000	4.609	PK
2	*	7213.500	52.192	44.164	-21.808	74.000	8.029	PK
3		9620.000	44.464	35.097	-29.536	74.000	9.367	PK

Profile: 1992171R	Page No.: 73
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 09:36
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440MHz by Zigbee	



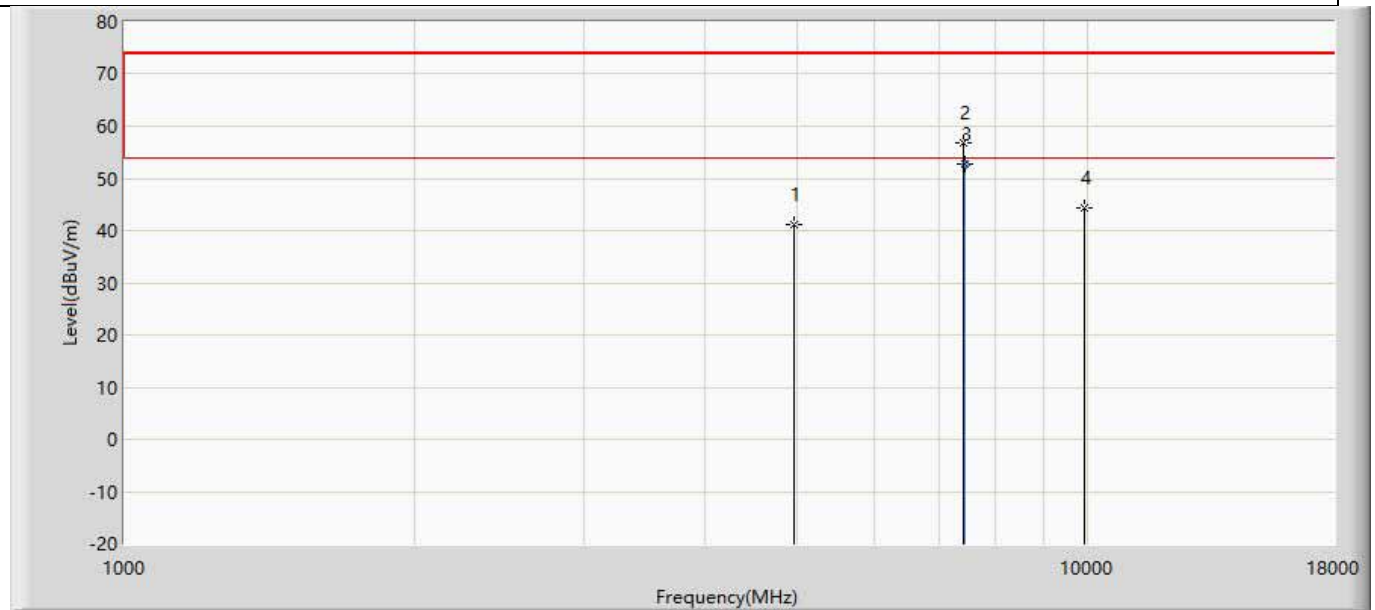
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	41.968	37.189	-32.032	74.000	4.778	PK
2		7315.500	56.561	48.531	-17.439	74.000	8.031	PK
3	*	7321.560	52.156	44.073	-1.844	54.000	8.083	AV
4		9760.000	45.093	35.189	-28.907	74.000	9.904	PK

Profile: 1992171R	Page No.: 74
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 09:36
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440MHz by Zigbee	



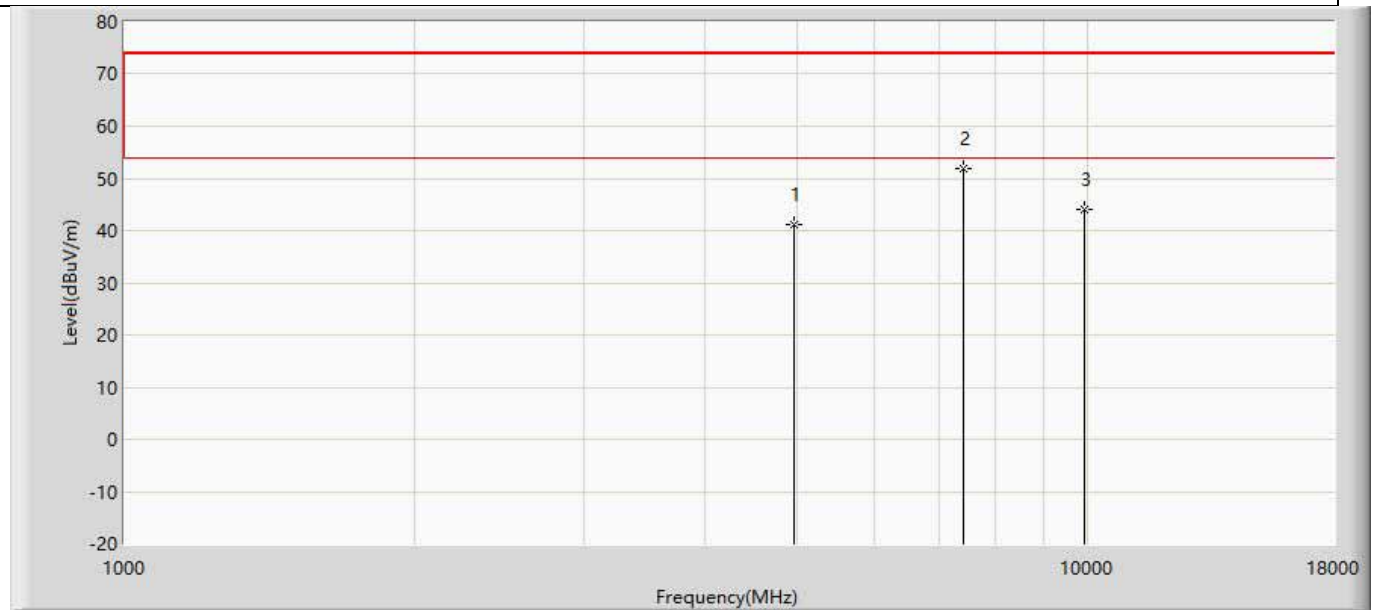
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	42.533	37.754	-31.467	74.000	4.778	PK
2	*	7315.500	52.204	44.174	-21.796	74.000	8.031	PK
3		9760.000	44.672	34.768	-29.328	74.000	9.904	PK

Profile: 1992171R	Page No.: 75
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 09:36
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	41.142	36.357	-32.858	74.000	4.784	PK
2		7434.500	56.915	48.938	-17.085	74.000	7.978	PK
3	*	7441.490	52.824	44.753	-1.176	54.000	8.071	AV
4		9920.000	44.442	34.547	-29.558	74.000	9.894	PK

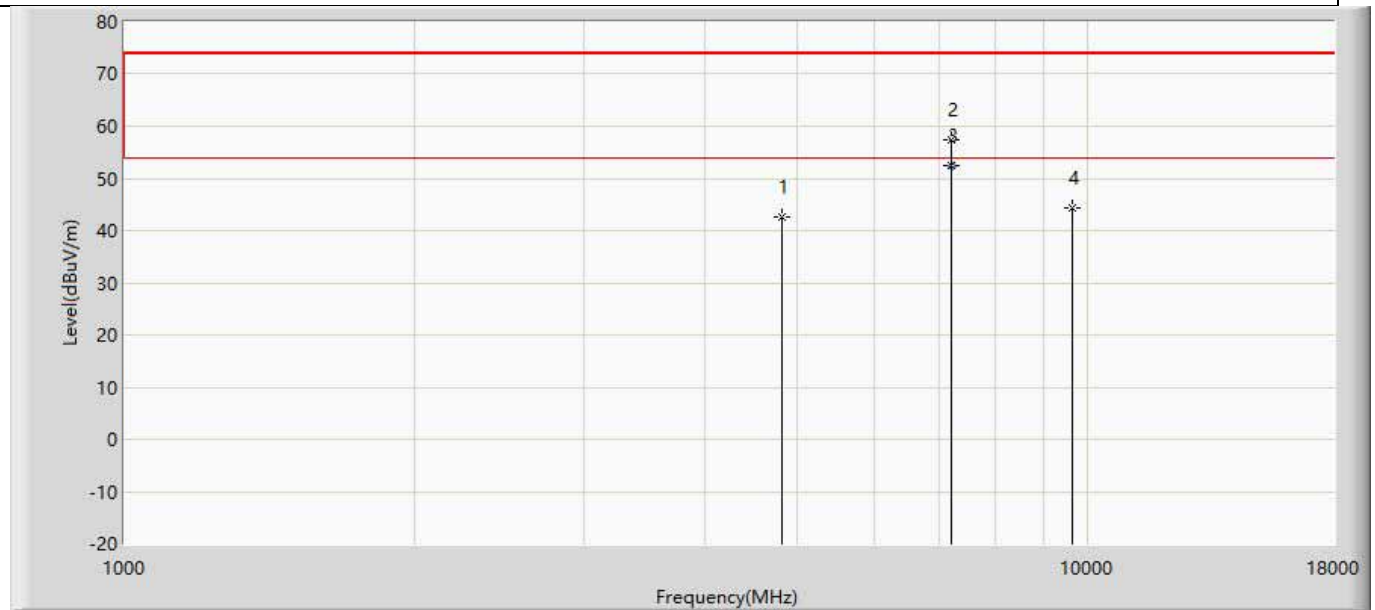
Profile: 1992171R	Page No.: 76
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	41.189	36.404	-32.811	74.000	4.784	PK
2	*	7434.500	51.854	43.877	-22.146	74.000	7.978	PK
3		9920.000	44.087	34.192	-29.913	74.000	9.894	PK

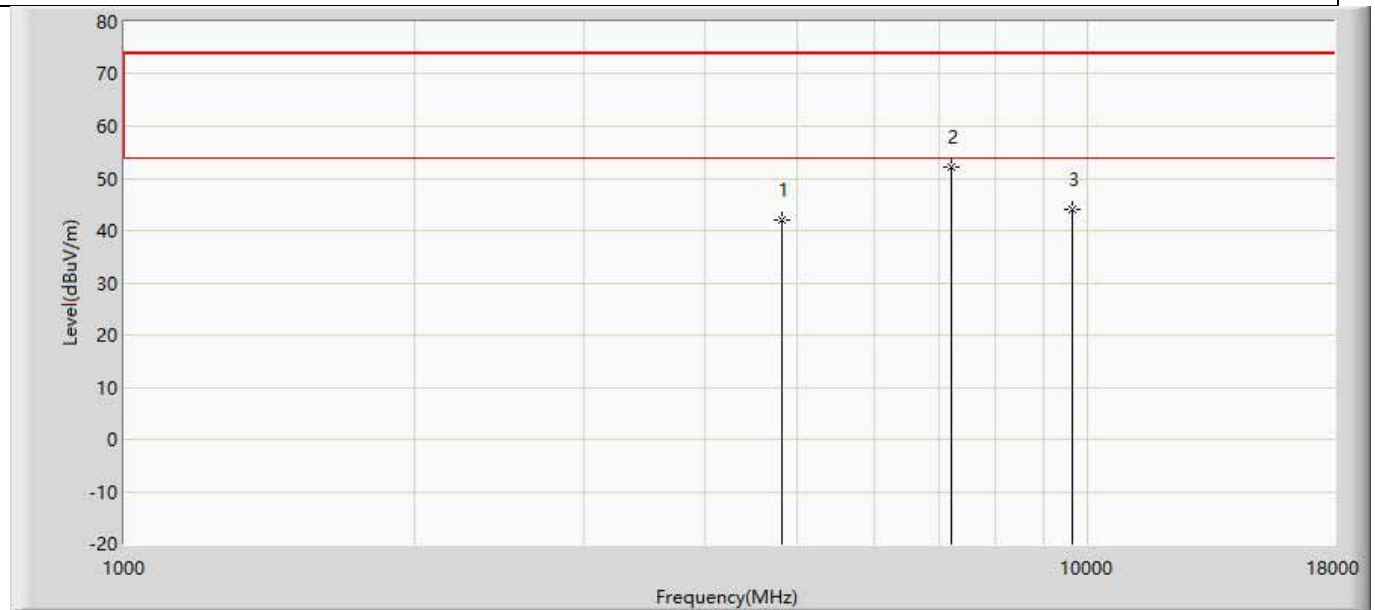
KDS:

Profile: 1992171R	Page No.: 41
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 23:30
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2402MHz by Zigbee	



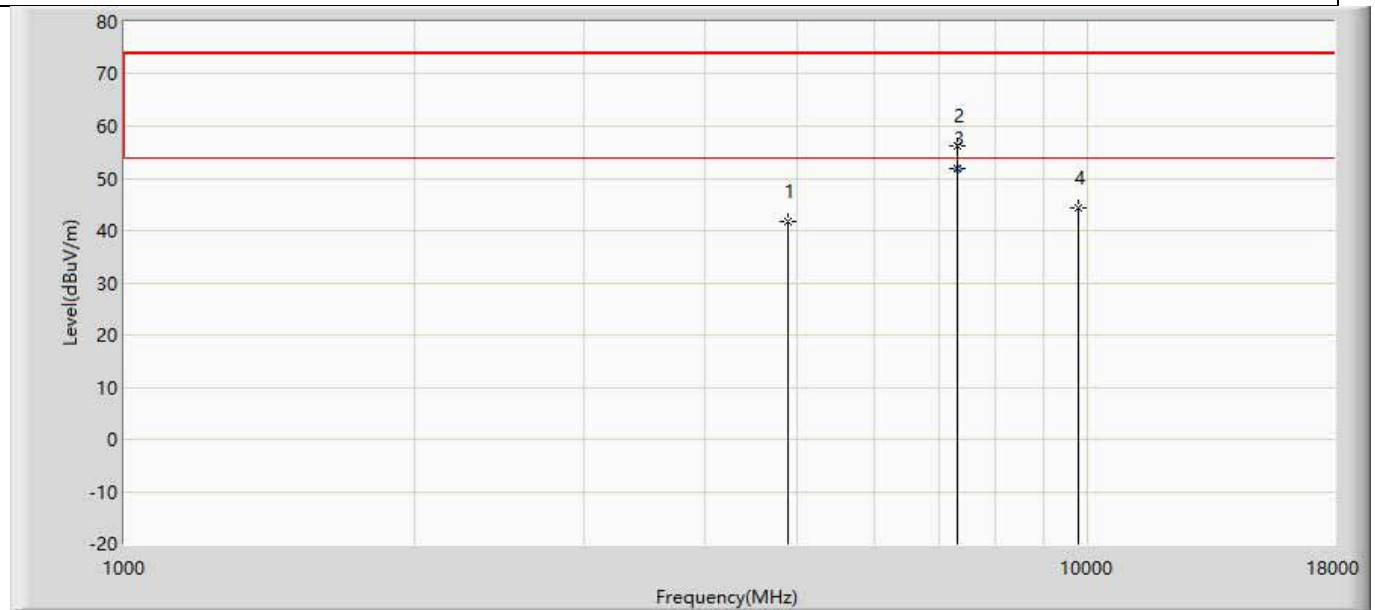
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4810.000	42.598	37.989	-31.402	74.000	4.609	PK
2		7213.480	57.262	49.234	-16.738	74.000	8.029	PK
3	*	7216.990	52.519	44.489	-1.481	54.000	8.030	AV
4		9620.000	44.385	35.018	-29.615	74.000	9.367	PK

Profile: 1992171R	Page No.: 42
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 10:52
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2402MHz by Zigbee	



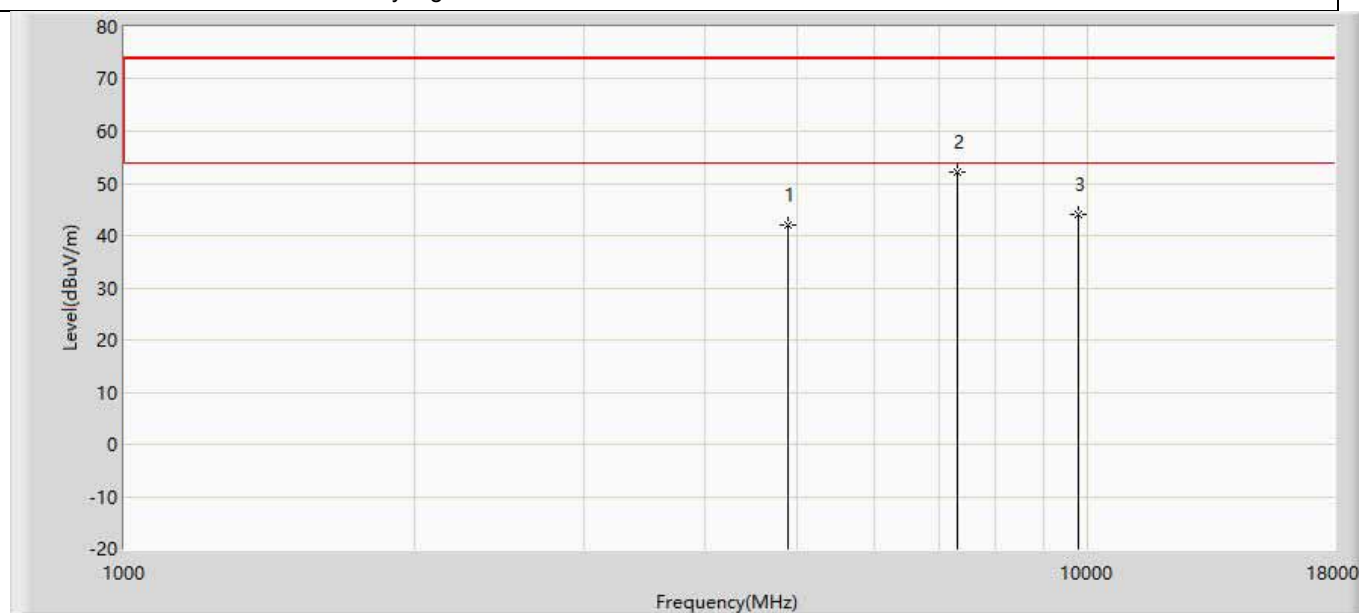
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4810.000	41.999	37.390	-32.001	74.000	4.609	PK
2	*	7213.870	52.110	44.082	-21.890	74.000	8.027	PK
3		9620.000	44.158	34.791	-29.842	74.000	9.367	PK

Profile: 1992171R	Page No.: 43
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 10:53
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440MHz by Zigbee	



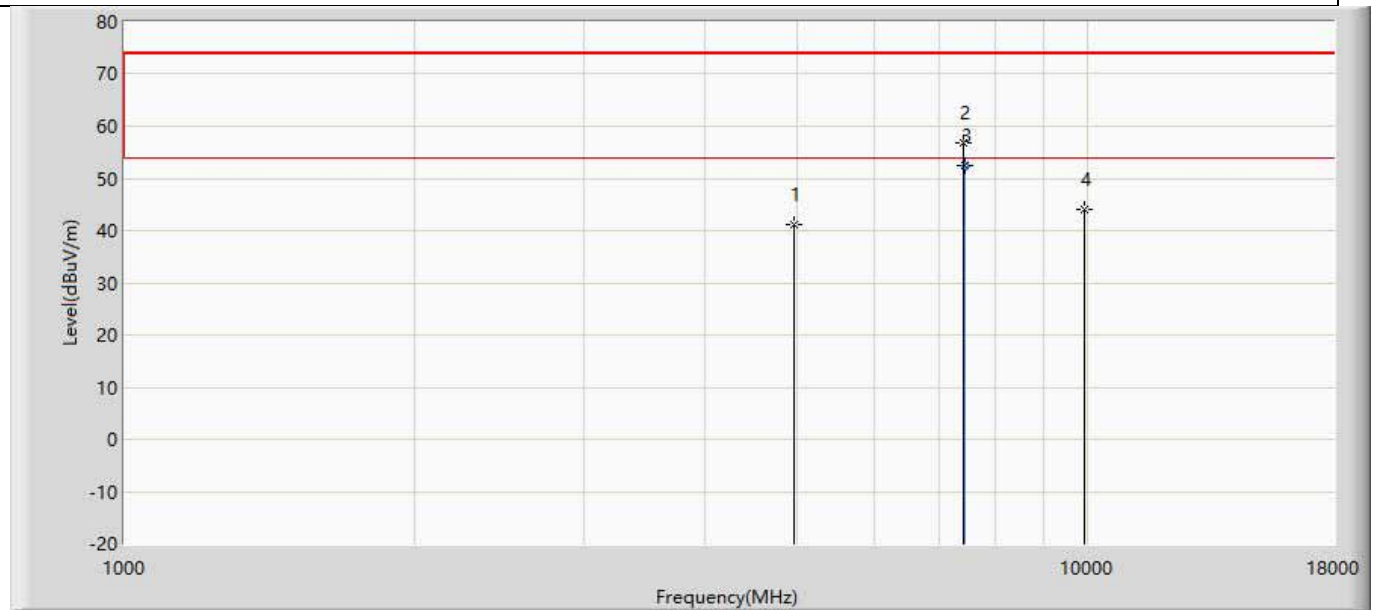
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	41.825	37.046	-32.175	74.000	4.778	PK
2		7315.500	56.344	48.314	-17.656	74.000	8.031	PK
3	*	7320.870	51.789	43.712	-2.211	54.000	8.077	AV
4		9760.000	44.370	34.466	-29.630	74.000	9.904	PK

Profile: 1992171R	Page No.: 44
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 10:54
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440MHz by Zigbee	



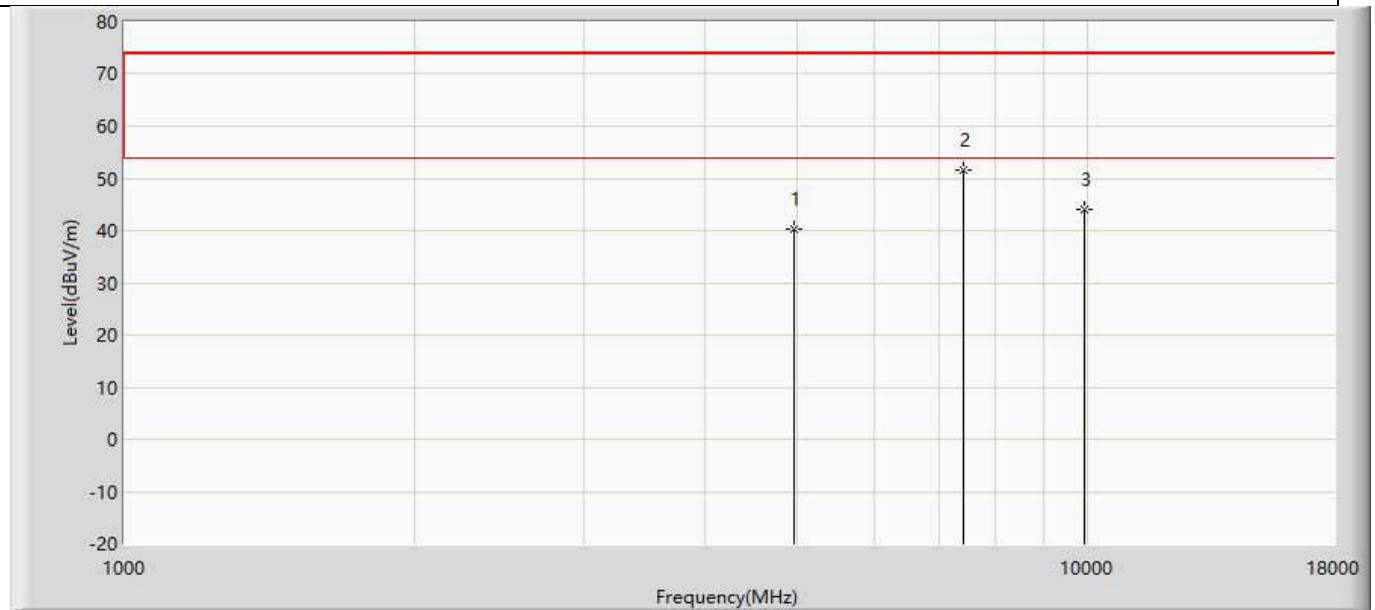
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	42.045	37.266	-31.955	74.000	4.778	PK
2	*	7315.500	52.088	44.058	-21.912	74.000	8.031	PK
3		9760.000	44.160	34.256	-29.840	74.000	9.904	PK

Profile: 1992171R	Page No.: 45
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 10:55
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	41.033	36.248	-32.967	74.000	4.784	PK
2		7434.500	56.715	48.738	-17.285	74.000	7.978	PK
3	*	7441.890	52.556	44.480	-1.444	54.000	8.075	AV
4		9920.000	44.113	34.218	-29.887	74.000	9.894	PK

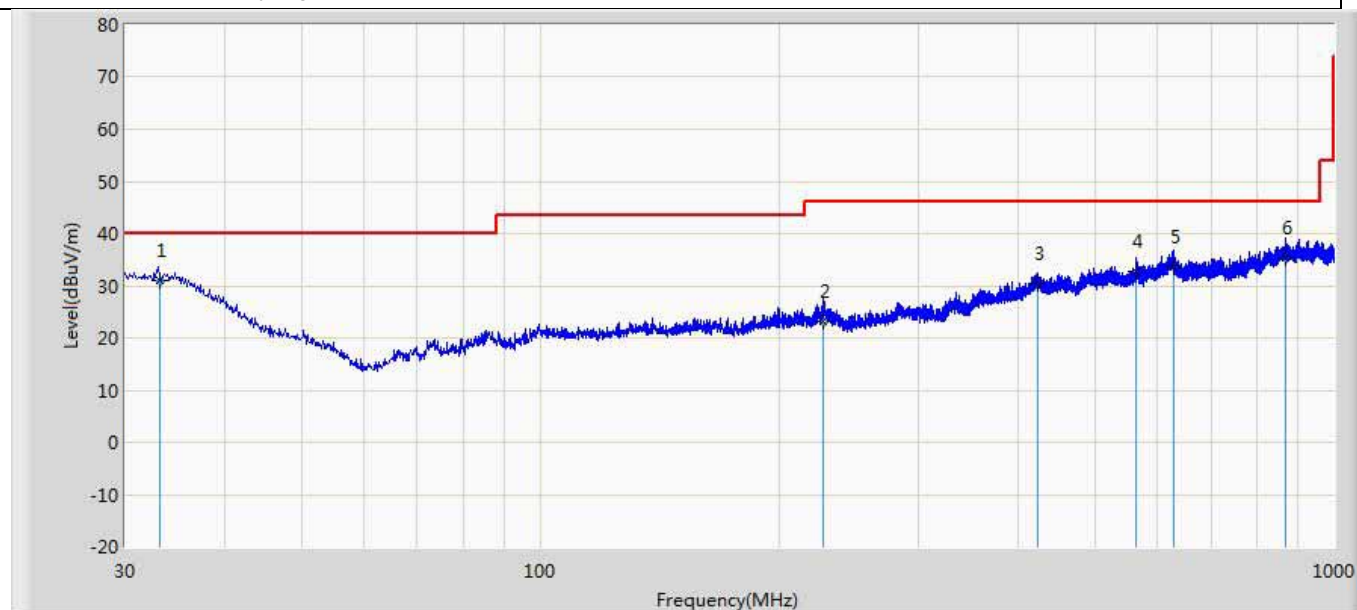
Profile: 1992171R	Page No.: 46
Engineer: Pawn	
Site: AC5	Time: 2019/10/11 - 11:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	40.201	35.416	-33.799	74.000	4.784	PK
2	*	7434.500	51.666	43.689	-22.334	74.000	7.978	PK
3		9920.000	43.917	34.022	-30.083	74.000	9.894	PK

The worst case of Radiated Emission below 1GHz:

Profile: 1992171R	Page No.: 1
Engineer: Pawn	
Site: AC2	Time: 2019/10/10
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1 Transmit by Zigbee	

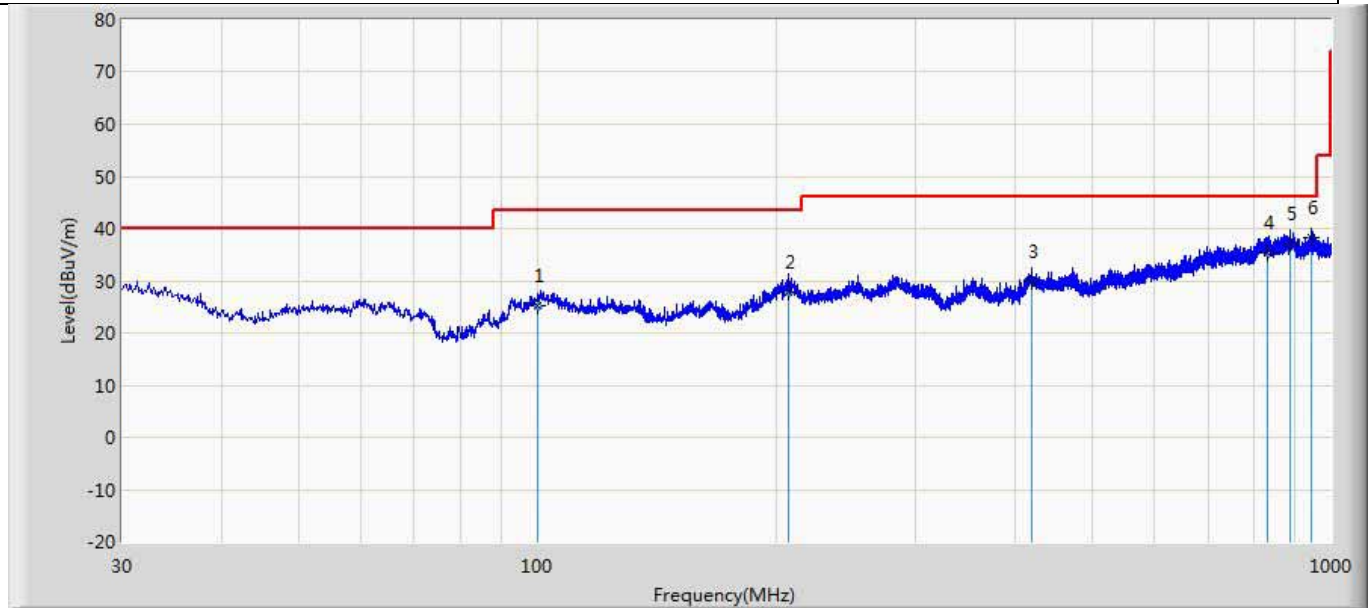


No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1	*	33.214	30.966	3.600	-9.034	40.000	20.713	6.653	0.000	100	141	QP
2		227.358	23.095	4.900	-22.905	46.000	10.729	7.466	0.000	100	228	QP
3		423.325	30.360	3.100	-15.640	46.000	19.289	7.970	0.000	100	48	QP
4		562.352	32.773	4.100	-13.227	46.000	20.342	8.331	0.000	100	114	QP
5		628.258	33.672	3.200	-12.328	46.000	21.895	8.577	0.000	100	185	QP
6		870.256	35.320	2.300	-10.680	46.000	23.841	9.178	0.000	100	214	QP

Note:

1. " * ", means this data is the worst emission level.
2. Measurement Level = Reading Level + Factor(Probe+Cable-Amp).

Profile: 1992171R	Page No.: 2
Engineer: Pawn	
Site: AC2	Time: 2019/10/10
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1 Transmit by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Amp (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1		100.258	25.220	3.200	-18.280	43.500	15.147	6.873	0.000	100	149	QP
2		207.541	27.693	4.200	-15.807	43.500	16.118	7.375	0.000	100	211	QP
3		419.584	29.853	3.100	-16.147	46.000	18.786	7.967	0.000	100	18	QP
4		830.254	35.437	2.600	-10.563	46.000	23.755	9.082	0.000	100	141	QP
5		889.325	37.001	3.600	-8.999	46.000	24.177	9.224	0.000	100	174	QP
6	*	943.251	38.226	4.200	-7.774	46.000	24.690	9.336	0.000	100	188	QP

Note:

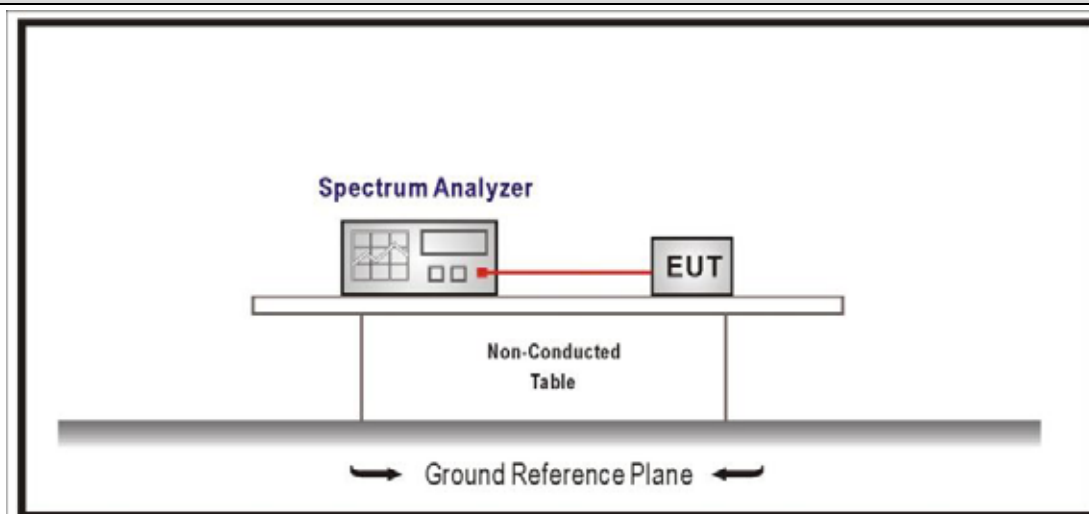
1. Measured Level = Reading Level + Factor.
2. The test frequency range, 9kHz~30MHz, 18GHz~26GHz, both of the worst case are at least 20dB below the limits, therefore no data appear in the report.
3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
4. As the radiated emission was performed, so conducted emission was not tested.

4.3 Emissions in non-restricted frequency band**VERDICT: PASS****4.3.1 Limit**

Standard	FCC Part 15 Subpart C Paragraph 15.247(d)
RF Output power (Detection methods)	Limit(dB)
RF Output power(Average detector)	30dBc(Note1)
RF Output power(PK detector)	20dBc(Note2)

Note 1: If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

Note 2: If the maximum peak conducted output power procedure was used, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

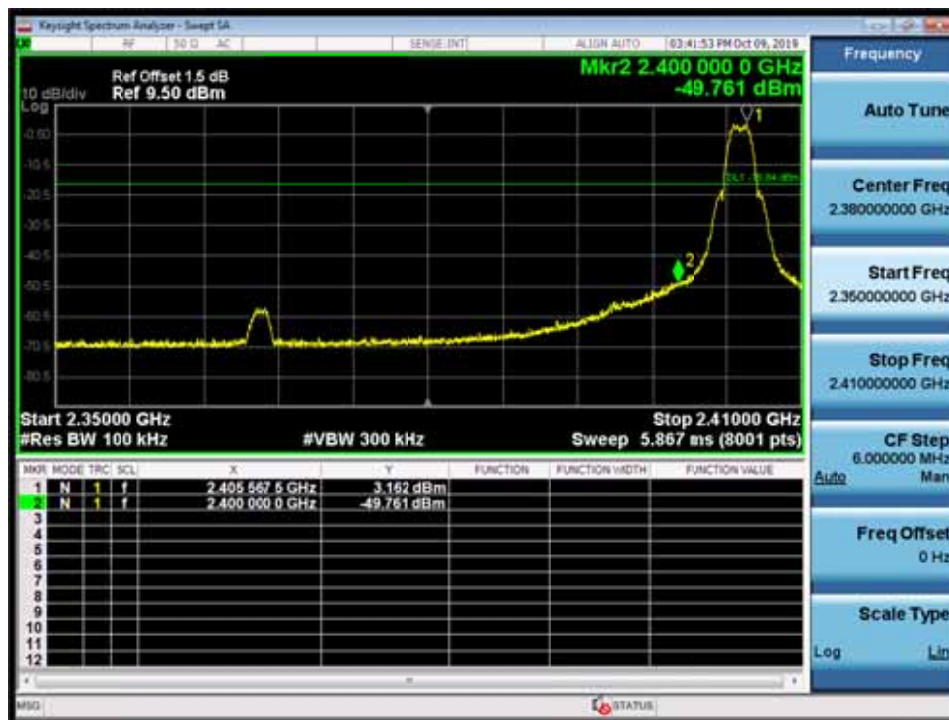
4.3.2 Test Setup**4.3.3 Test Procedure**

References Rule	Chapter	Description
<input checked="" type="checkbox"/> ANSI C63.10	11.11	Emissions in non-restricted frequency bands
<input checked="" type="checkbox"/> ANSI C63.10	11.11.1	General
<input checked="" type="checkbox"/> ANSI C63.10	11.11.2	Reference level measurement
<input checked="" type="checkbox"/> ANSI C63.10	11.11.3	Emission level measurement

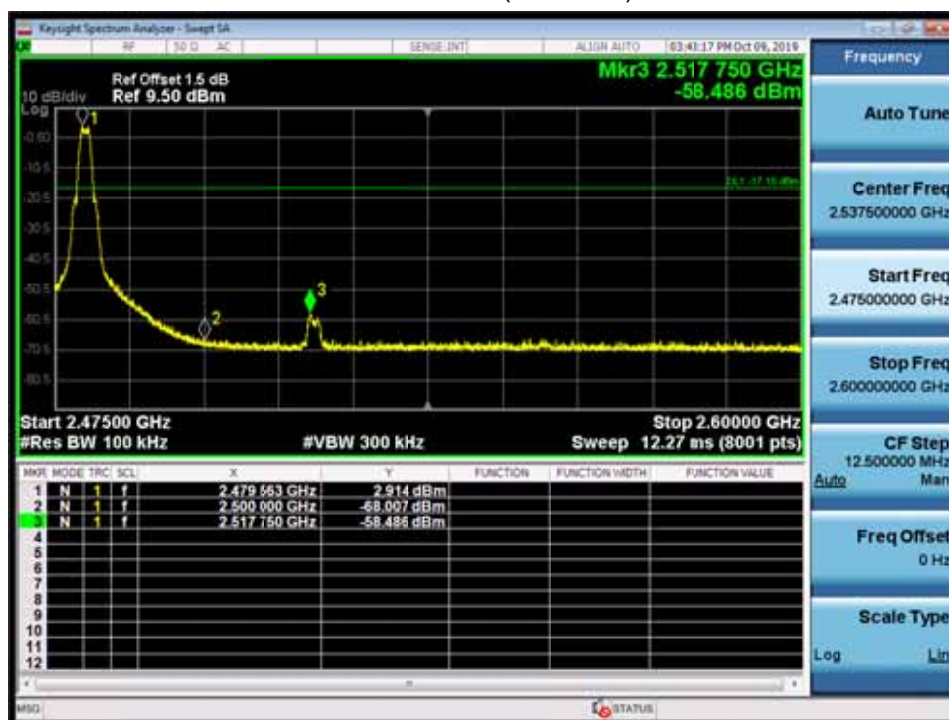
4.3.4 Test Data

Mode	Channel	Test Frequency (MHz)	Maximum In-Band PSD[a] (dBm/100kHz)	Frequency (MHz)	Out-Band PSD[b] (dBm/100kHz)	[a]-[b] (dB)	Limit (dB)	Result
Mode 1	11	2405	3.162	2400	-49.761	52.923	>20	Pass
	26	2480	2.914	2517.75	-58.486	61.4	>20	Pass

Mode 1 CH11(2405MHz)



Mode 1 CH26(2480MHz)



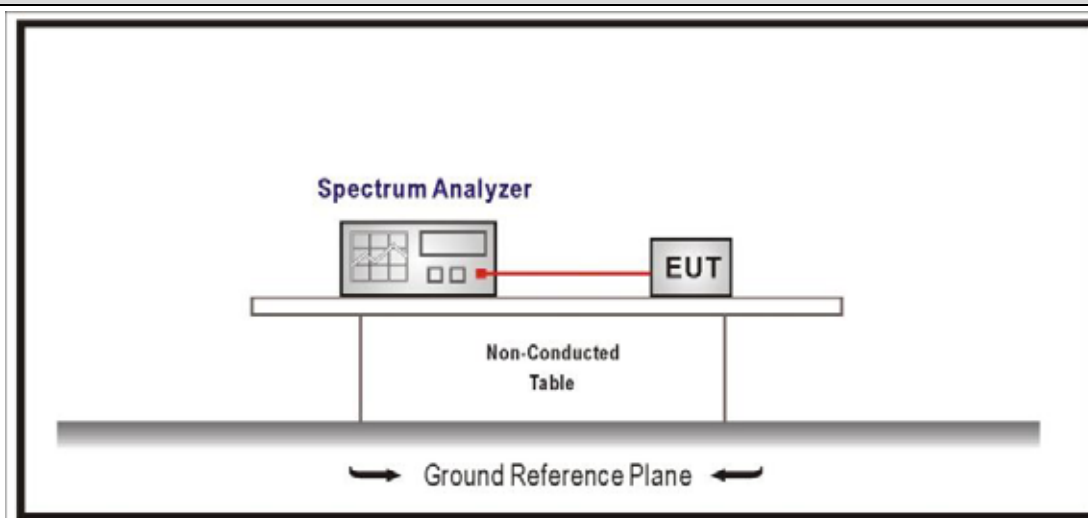
4.4 Duty cycle

VERDICT: PASS

4.4.1 Limit

N/A

4.4.2 Test Setup



4.4.3 Test Procedure

References Rule	Chapter	Description
<input checked="" type="checkbox"/> ANSI C63.10	11.6	Duty cycle (D), transmission duration (T), and maximum power control level

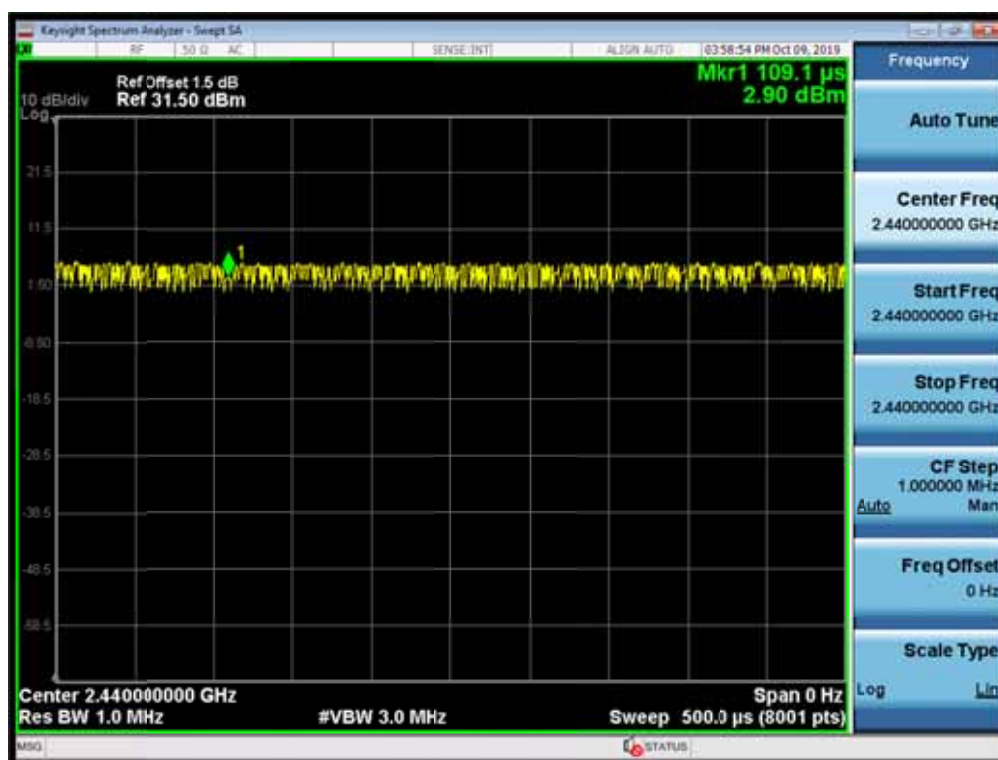
4.4.4 Test Data

Test Mode	Tx On (ms)	Tx Off (ms)	VBW	Tx On + Tx Off (ms)	Duty Cycle
Mode 1	N/A	N/A	10	N/A	100%

Note 1: T means the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Note 2: According to KDB 558074, when test for Radiated Emission Band Edge and Radiated Emission, for average detector set: VBW 1/T will be used.

Mode 1



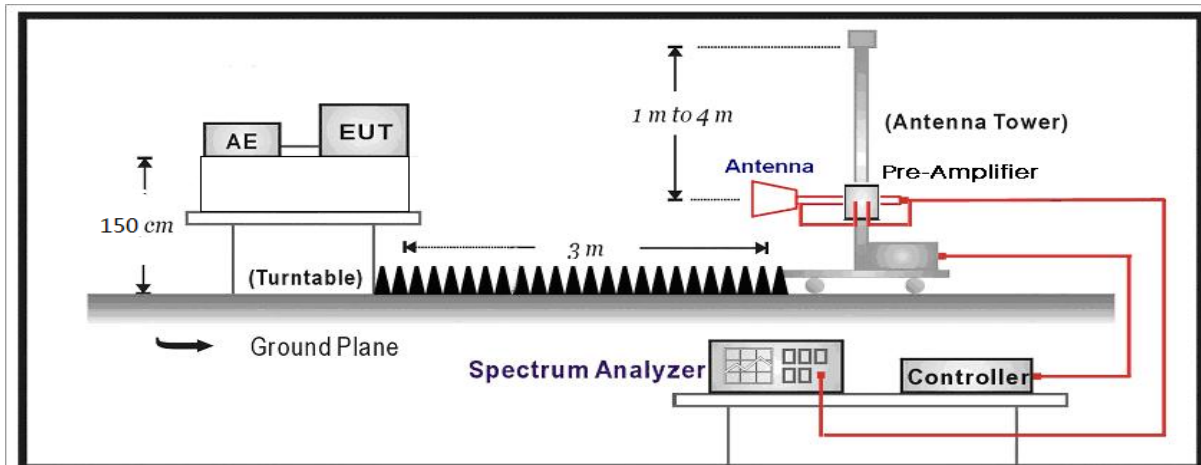
4.5 Radiated Emission Band Edge**VERDICT: PASS****4.5.1 Limit**

Standard		FCC Part 15 Subpart C Paragraph 15.247(d) , 15.209		
Frequency bands (MHz)	Detector	Limit (dB μ V/m)	RBW (MHz)	Distance (m)
2310-2390	PK	74	1	3
2483.5-2500	AV	54	1	3

Note: The field strength of emissions appearing within these frequency bands shall not exceed the limits.

4.5.2 Test Setup

Above 1GHz Test Setup:

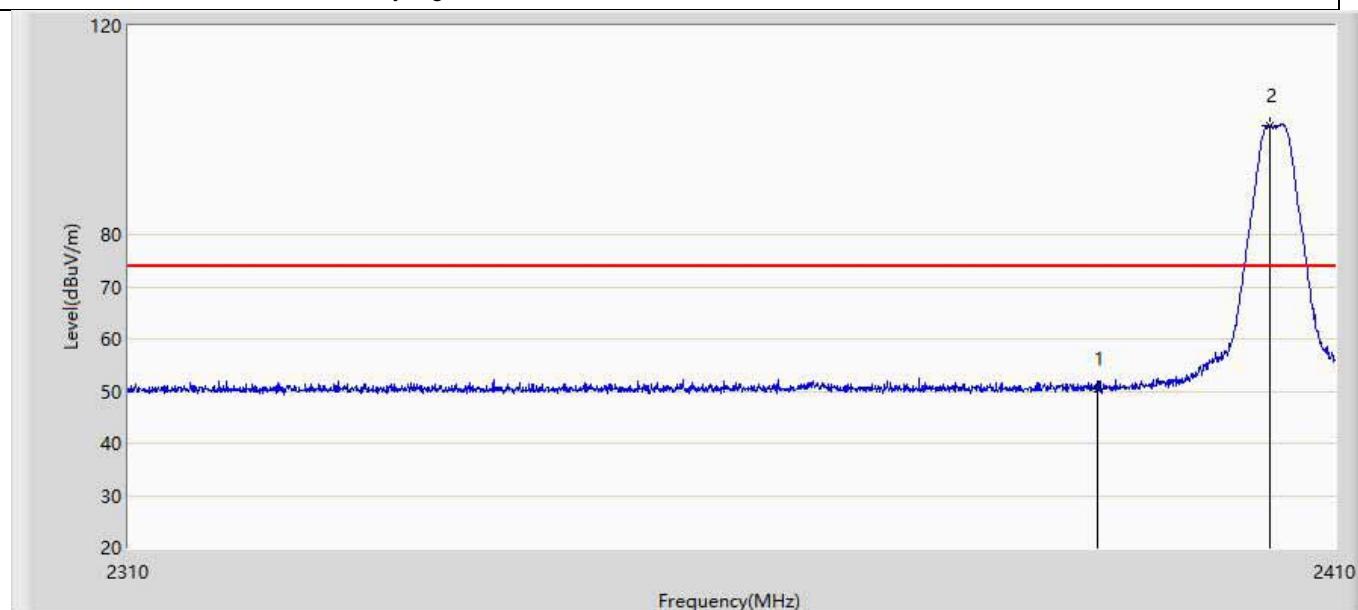
**4.5.3 Test Procedure**

	References Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	6.10	Band-edge testing
<input checked="" type="checkbox"/>	ANSI C63.10	6.10.5	Restricted-band band-edge measurements
<input type="checkbox"/>	ANSI C63.10	6.10.6	Marker-delta method
<input checked="" type="checkbox"/>	ANSI C63.10	11.12	Emissions in restricted frequency bands
<input checked="" type="checkbox"/>	ANSI C63.10	11.12.1	Radiated emission measurements
<input checked="" type="checkbox"/>	ANSI C63.10	11.12.2.7	Radiated spurious emission test
<input type="checkbox"/>	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
<input type="checkbox"/>	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
<input checked="" type="checkbox"/>	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.5.4 Test Data

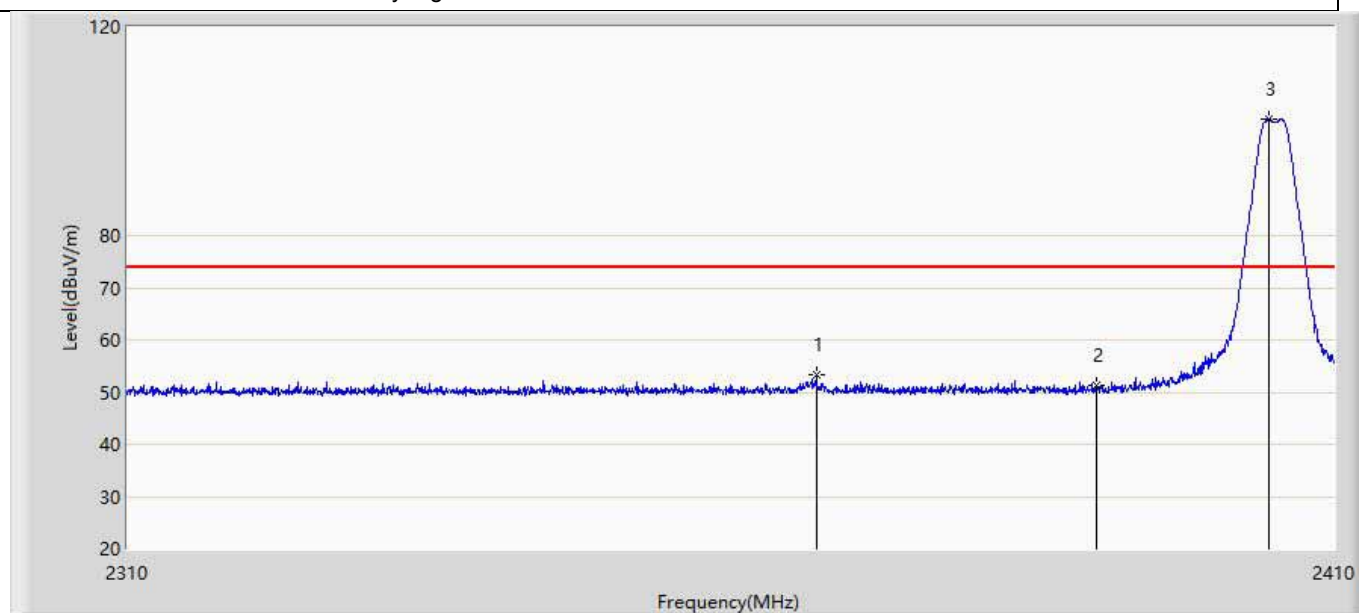
Murata:

Profile: 1992171R	Page No.: 1
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 18:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2405MHz by Zigbee	



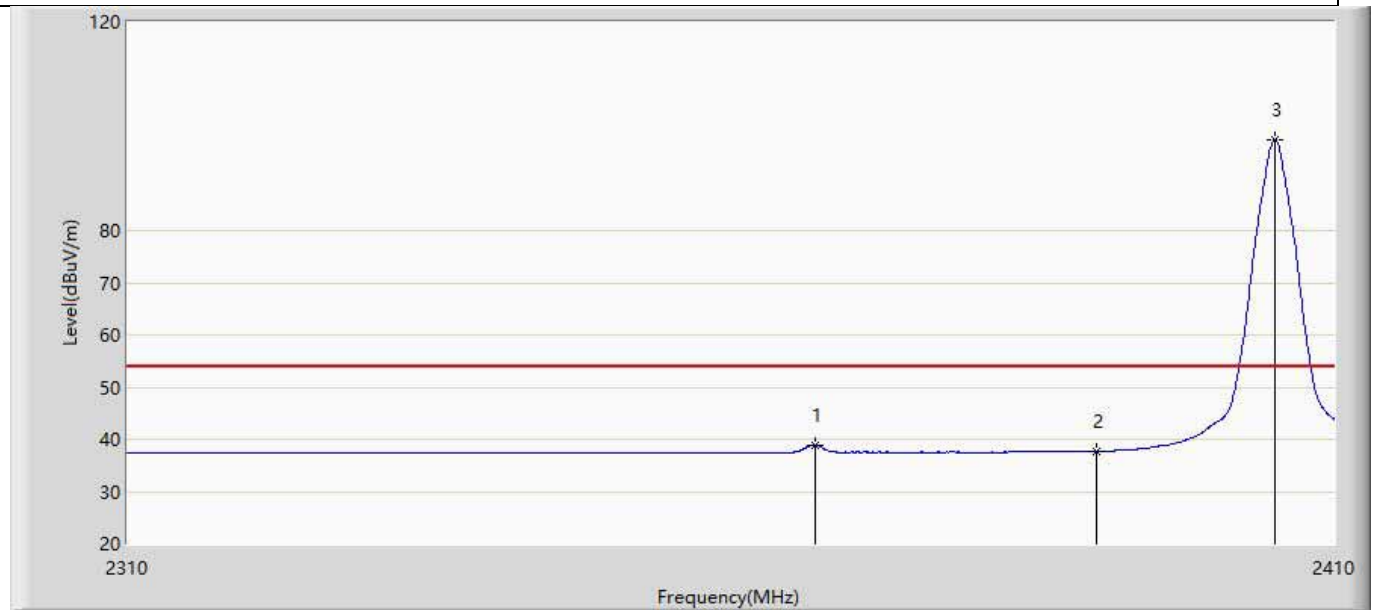
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	50.401	14.944	-23.599	74.000	35.458	PK
2	*	2404.500	101.001	65.529	N/A	N/A	35.472	PK

Profile: 1992171R	Page No.: 2
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 19:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2405MHz by Zigbee	



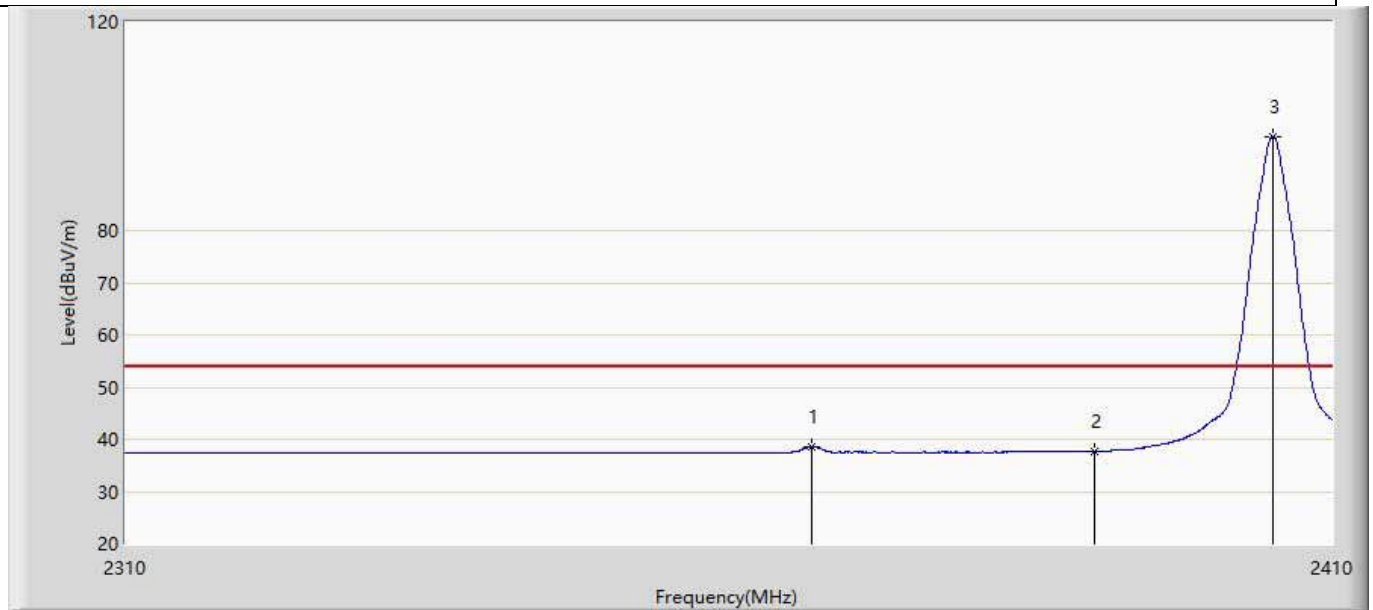
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2366.600	53.329	17.887	-20.671	74.000	35.442	PK
2		2390.000	51.190	15.733	-22.810	74.000	35.458	PK
3	*	2404.500	102.327	66.855	N/A	N/A	35.472	PK

Profile: 1992171R	Page No.: 3
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 19:06
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



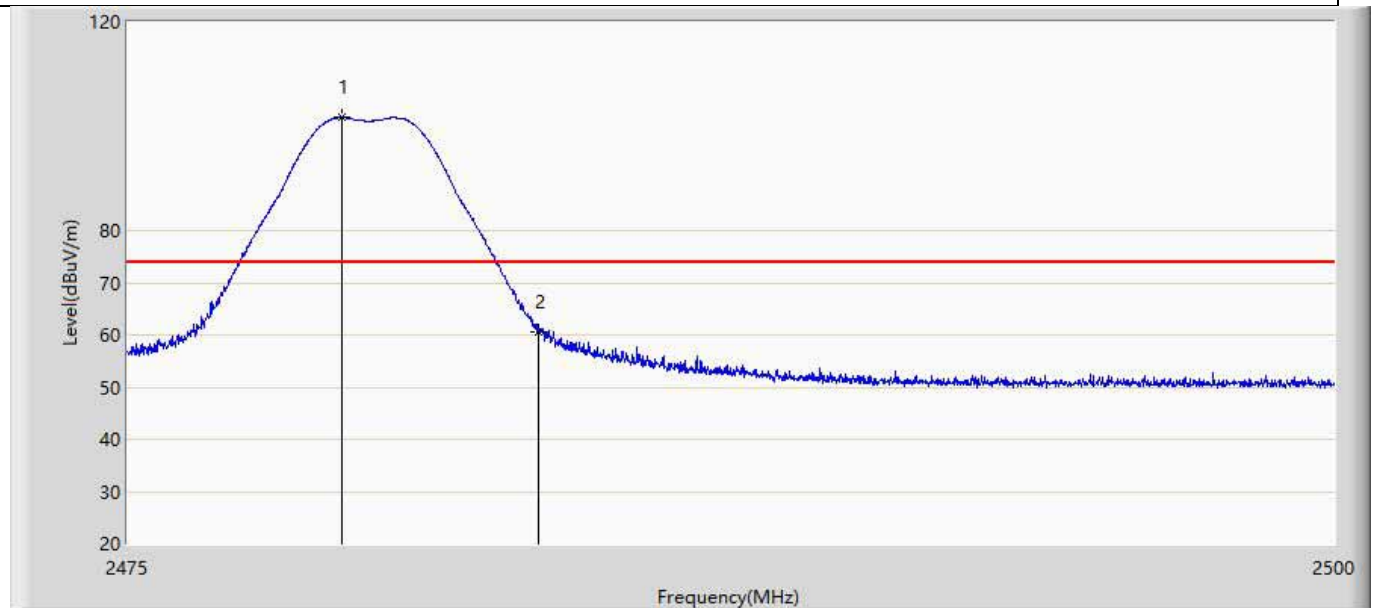
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2366.550	38.841	3.399	-15.159	54.000	35.442	AV
2		2390.000	37.750	2.293	-16.250	54.000	35.458	AV
3	*	2405.000	97.372	61.899	N/A	N/A	35.473	AV

Profile: 1992171R	Page No.: 4
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 19:07
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



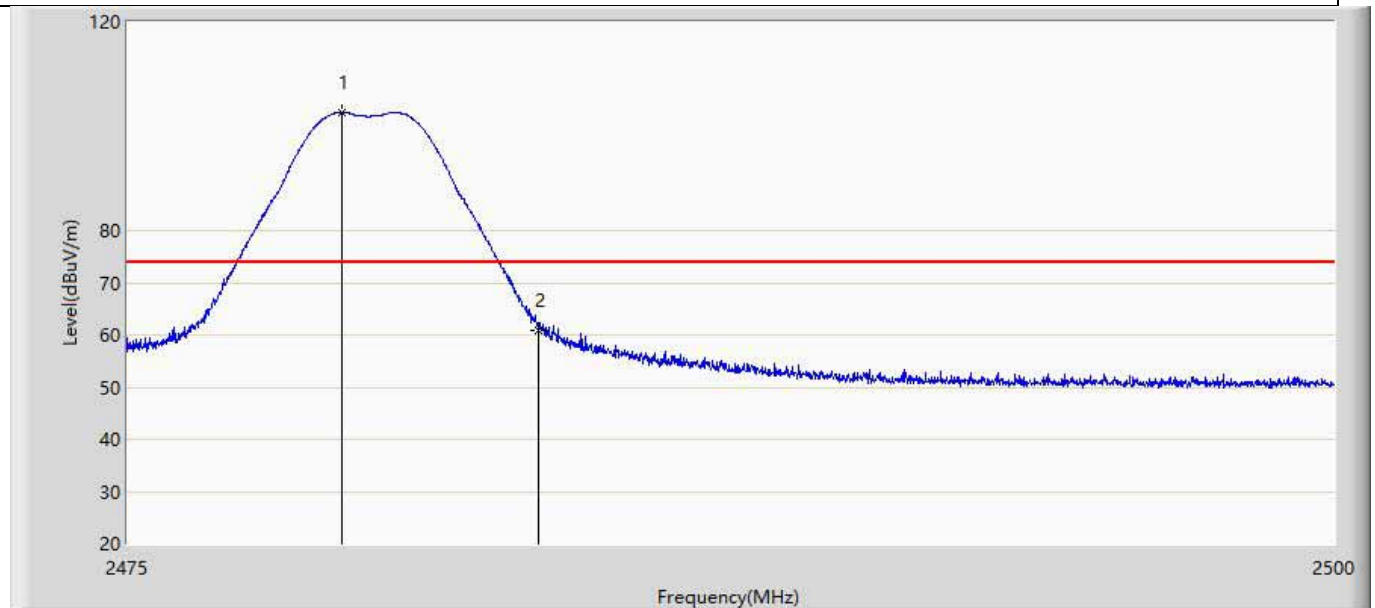
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2366.400	38.554	3.112	-15.446	54.000	35.442	AV
2		2390.000	37.720	2.263	-16.280	54.000	35.458	AV
3	*	2405.000	98.115	62.642	N/A	N/A	35.473	AV

Profile: 1992171R	Page No.: 5
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 19:09
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



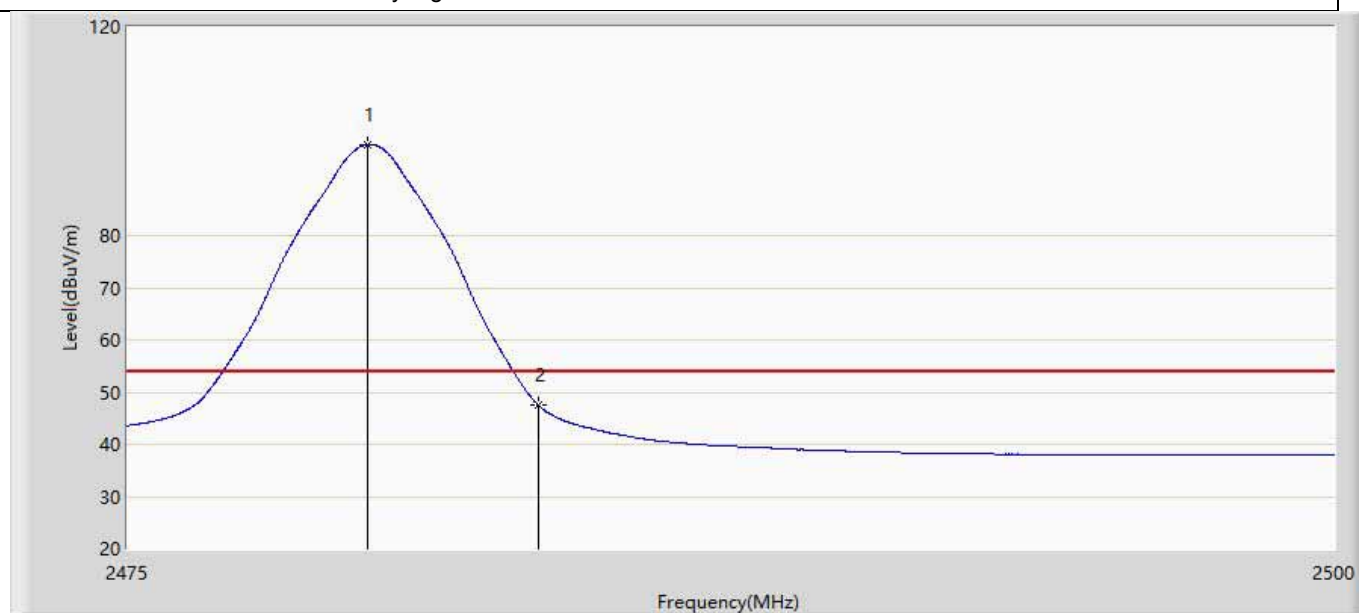
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.425	101.609	66.114	N/A	N/A	35.495	PK
2		2483.500	60.724	25.206	-13.276	74.000	35.517	PK

Profile: 1992171R	Page No.: 6
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 19:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



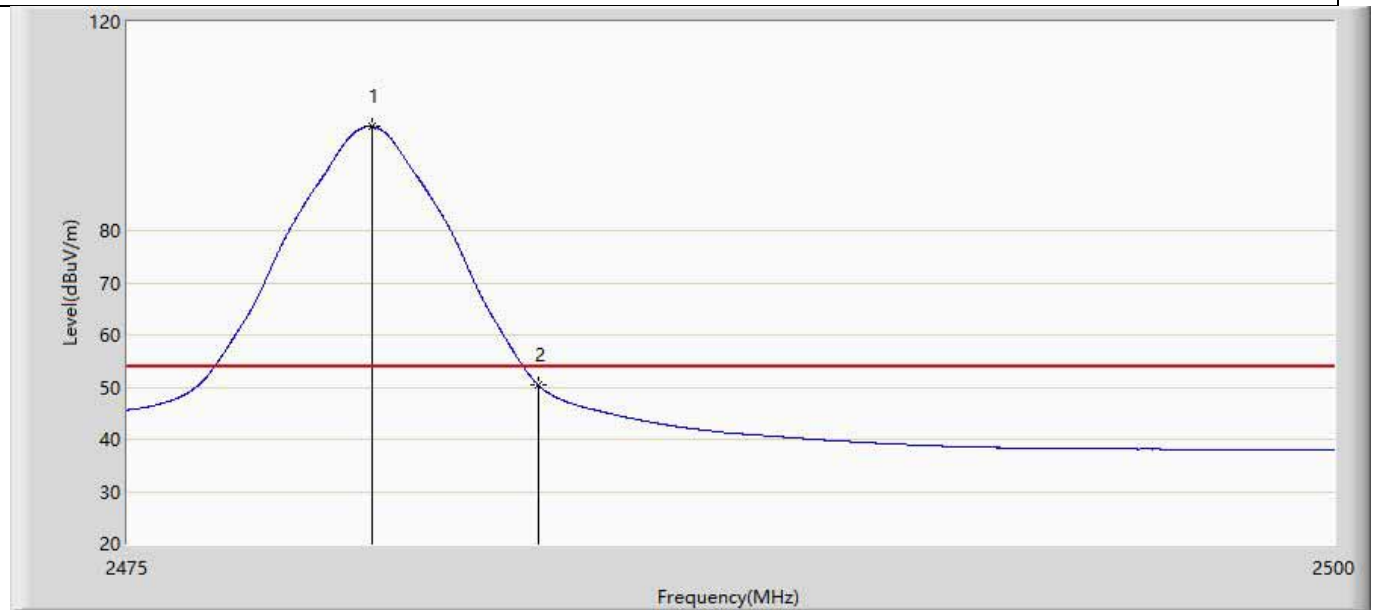
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.425	102.549	67.054	N/A	N/A	35.495	PK
2		2483.500	60.871	25.353	-13.129	74.000	35.517	PK

Profile: 1992171R	Page No.: 7
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 19:15
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.975	97.472	61.974	N/A	N/A	35.498	AV
2		2483.500	47.405	11.887	-6.595	54.000	35.517	AV

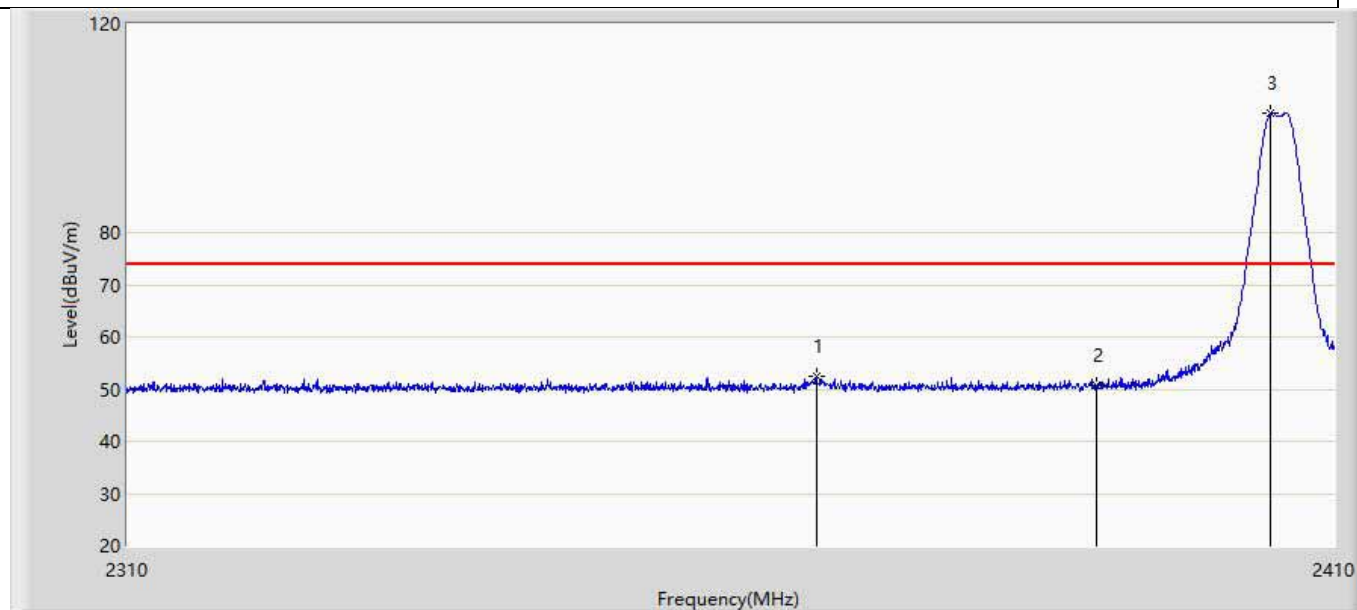
Profile: 1992171R	Page No.: 8
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 19:16
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.050	99.917	64.419	N/A	N/A	35.498	AV
2		2483.500	50.324	14.806	-3.676	54.000	35.517	AV

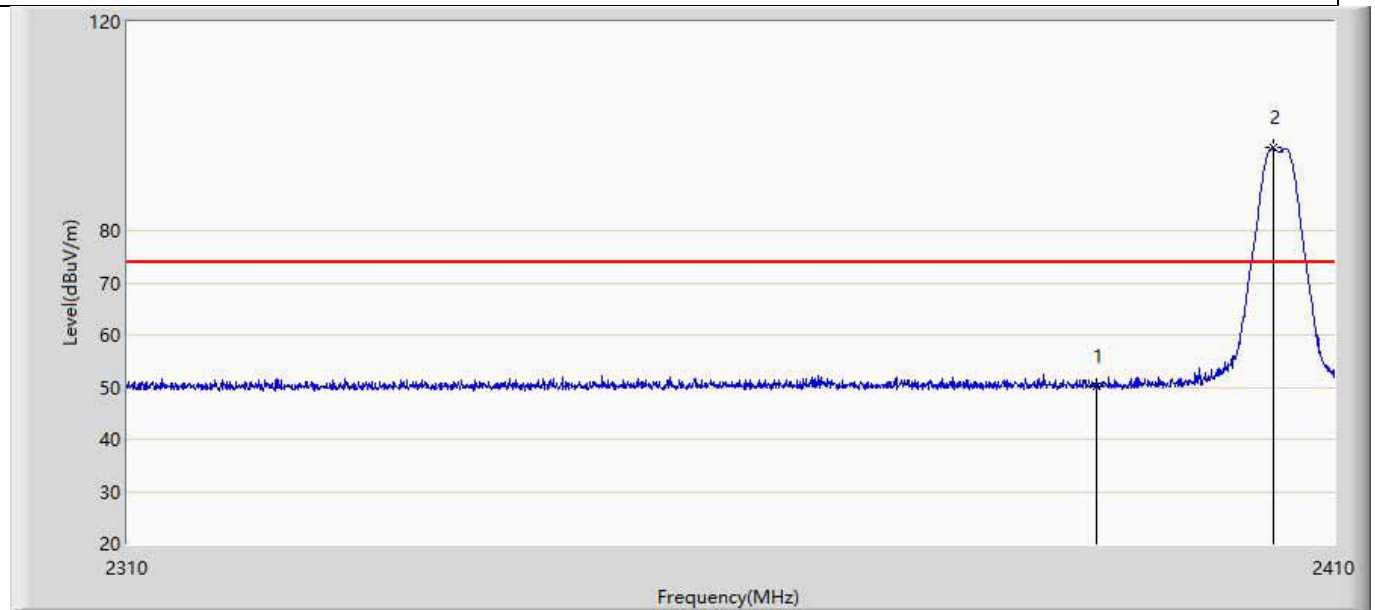
KDS:

Profile: 1992171R	Page No.: 1
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 20:26
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



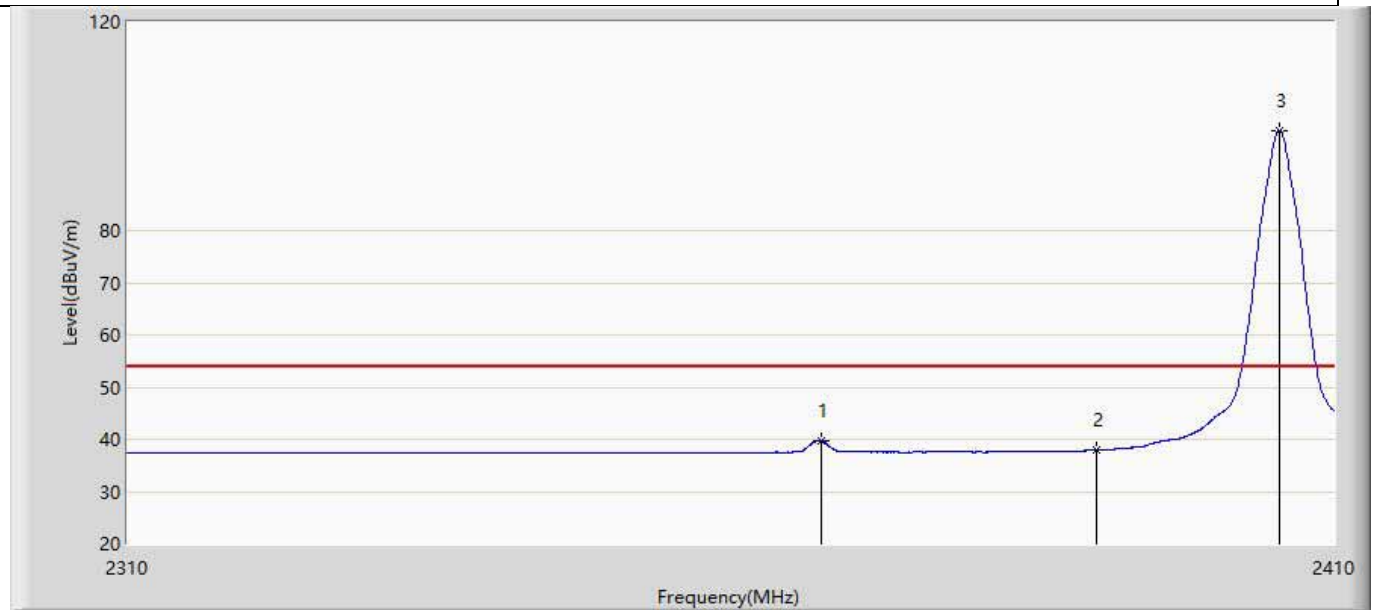
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2366.600	52.368	16.926	-21.632	74.000	35.442	PK
2		2390.000	50.671	15.214	-23.329	74.000	35.458	PK
3	*	2404.650	102.856	67.383	N/A	N/A	35.472	PK

Profile: 1992171R	Page No.: 2
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 20:31
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



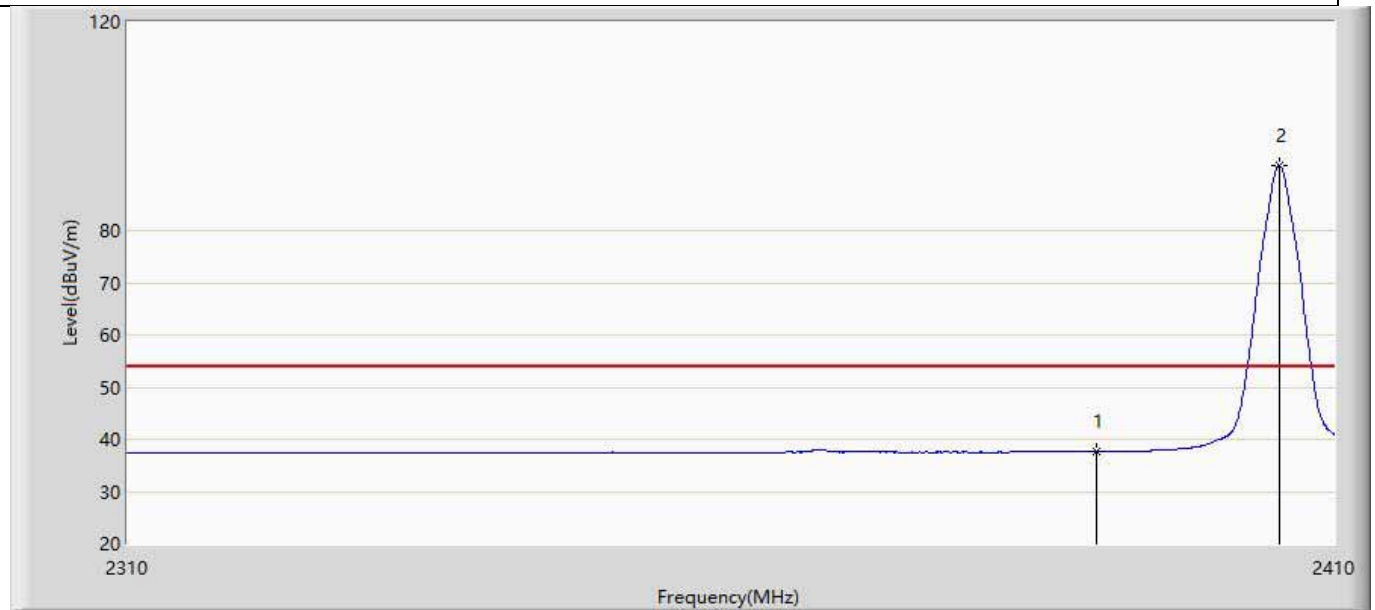
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	50.172	14.715	-23.828	74.000	35.458	PK
2	*	2404.850	95.810	60.337	N/A	N/A	35.473	PK

Profile: 1992171R	Page No.: 3
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 20:32
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



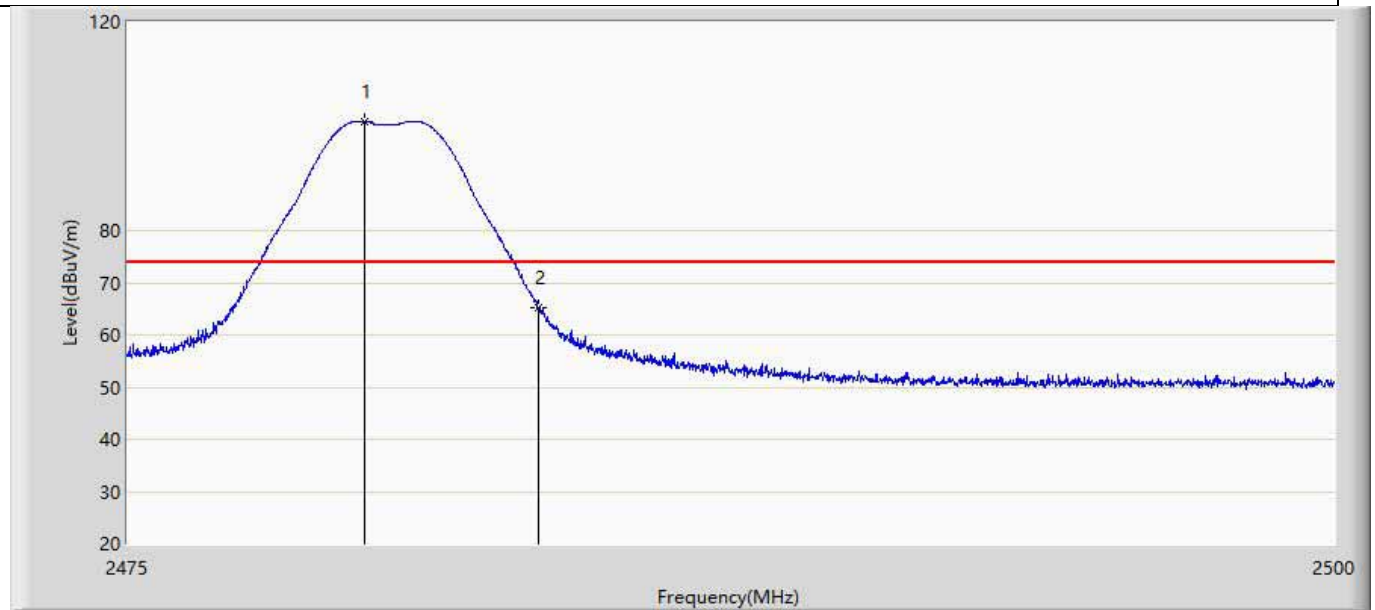
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2367.000	39.745	4.302	-14.255	54.000	35.442	AV
2		2390.000	37.902	2.445	-16.098	54.000	35.458	AV
3	*	2405.450	99.139	63.665	N/A	N/A	35.474	AV

Profile: 1992171R	Page No.: 4
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 20:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



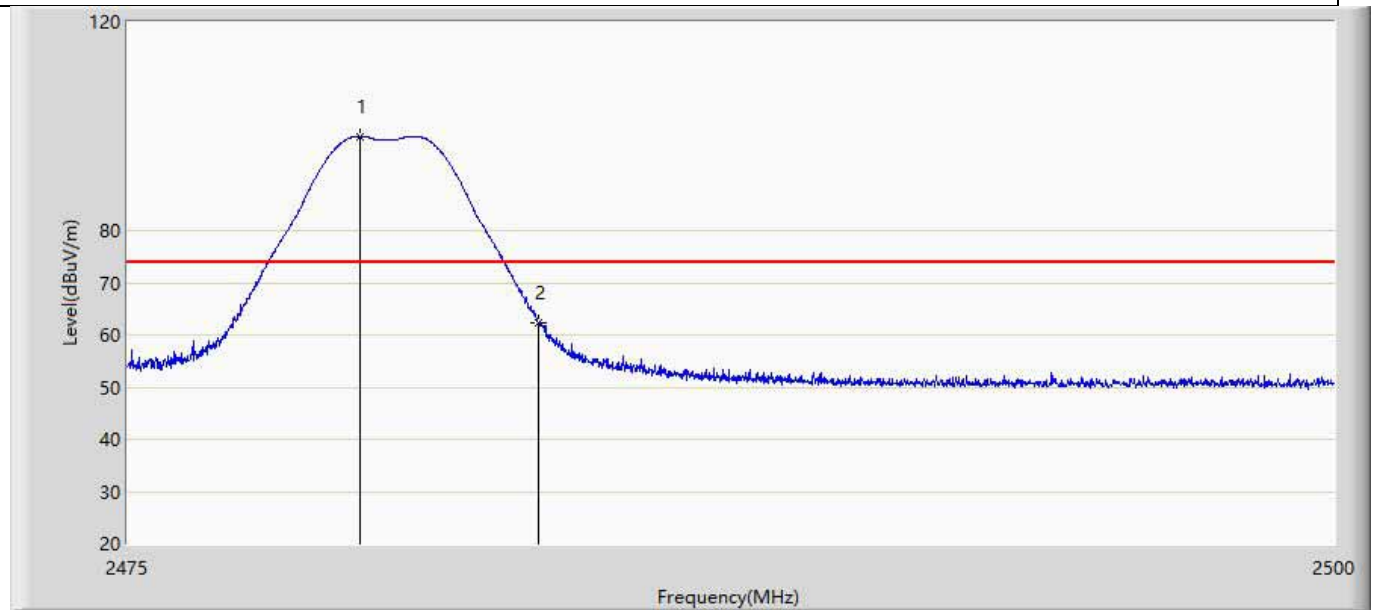
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	37.601	2.144	-16.399	54.000	35.458	AV
2	*	2405.450	92.387	56.913	N/A	N/A	35.474	AV

Profile: 1992171R	Page No.: 5
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 20:36
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1: Transmit at 2480MHz by Zigbee	



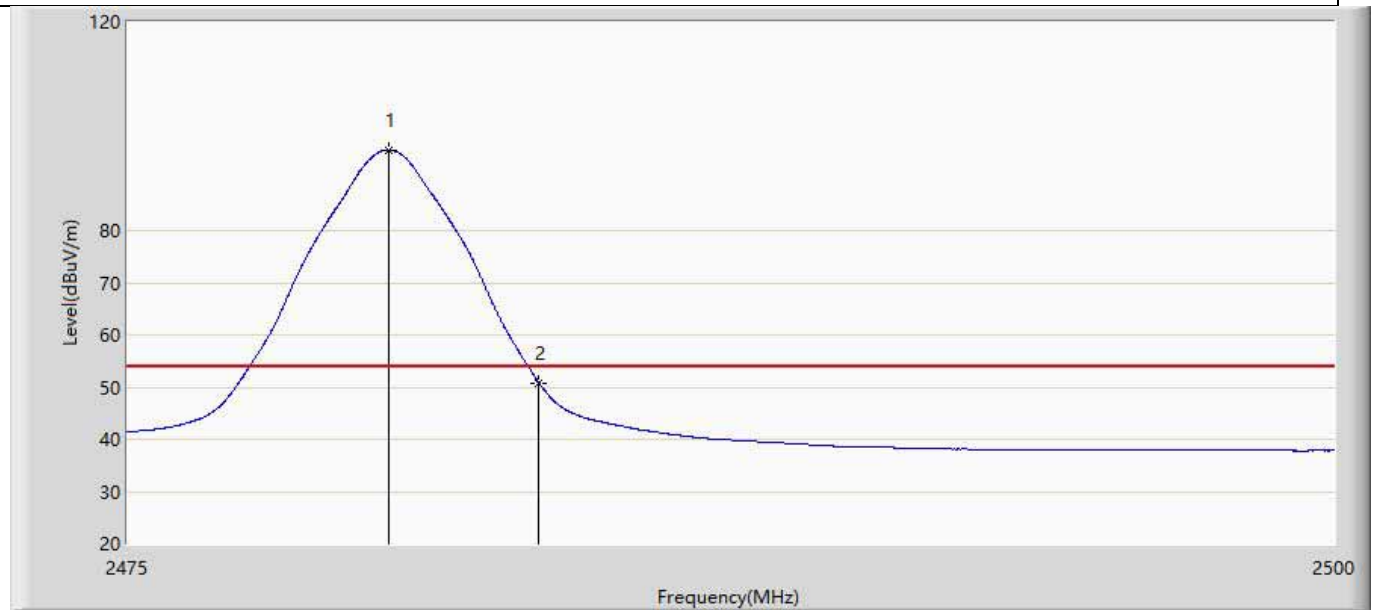
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.900	100.912	65.415	N/A	N/A	35.498	PK
2		2483.500	65.338	29.820	-8.662	74.000	35.517	PK

Profile: 1992171R	Page No.: 6
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 20:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



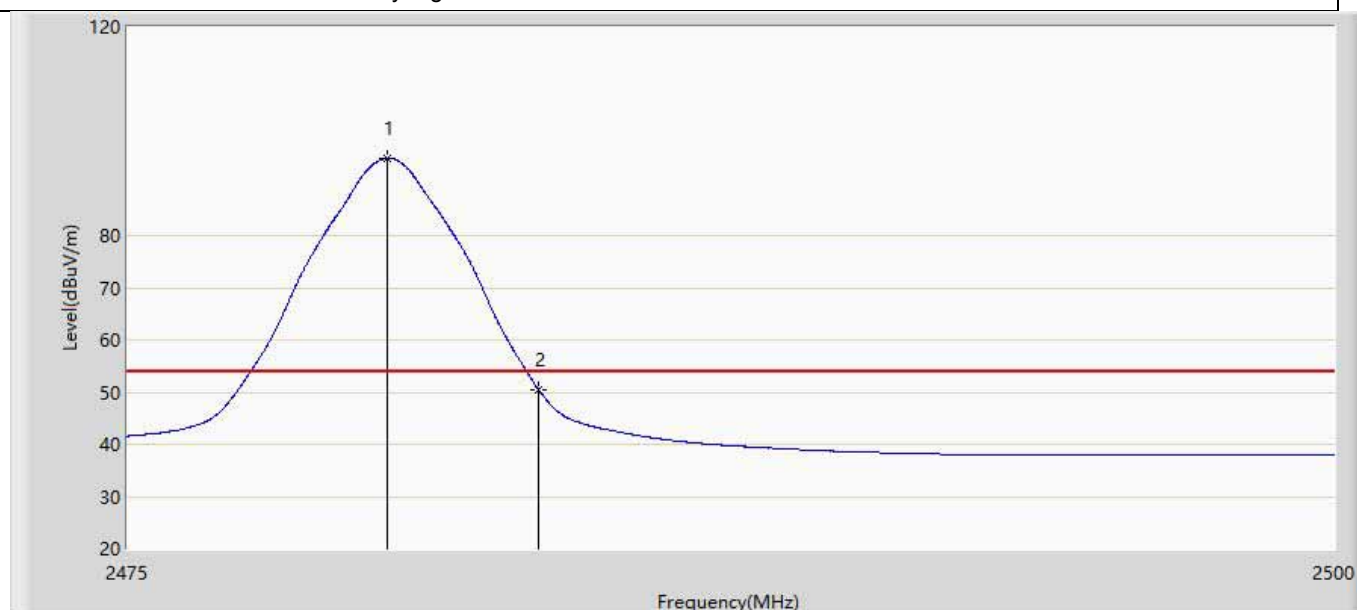
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.812	98.001	62.504	N/A	N/A	35.497	PK
2		2483.500	62.300	26.782	-11.700	74.000	35.517	PK

Profile: 1992171R	Page No.: 7
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 20:40
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.400	95.442	59.942	N/A	N/A	35.501	AV
2		2483.500	50.858	15.340	-3.142	54.000	35.517	AV

Profile: 1992171R	Page No.: 8
Engineer: Pawn	
Site: AC5	Time: 2019/10/10 - 20:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: Hue light strip	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.363	94.777	59.277	N/A	N/A	35.500	AV
2		2483.500	50.427	14.909	-3.573	54.000	35.517	AV

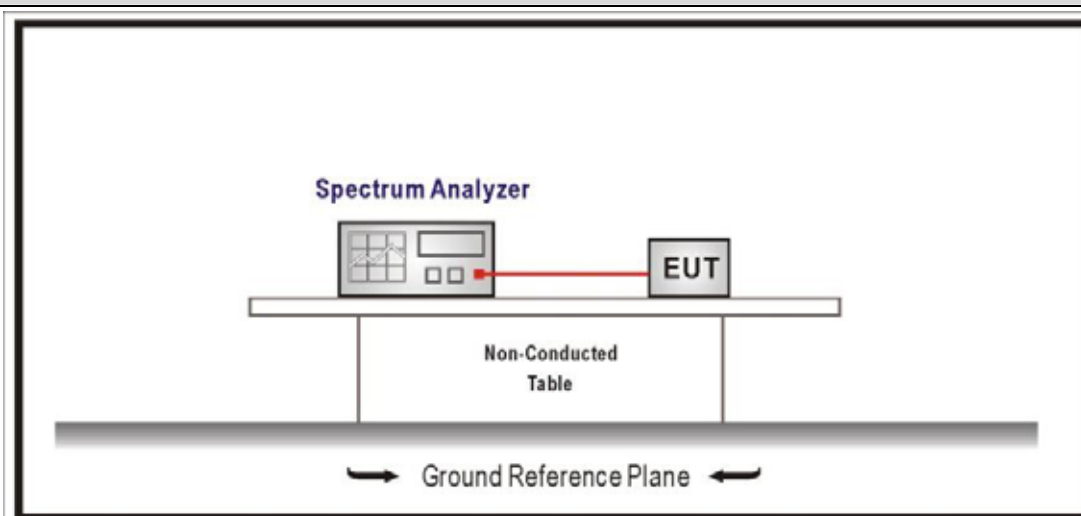
Note:

1. Measured Level = Reading Level + Factor.
2. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.
3. As the radiated emission was performed, so conducted emission was not tested.

4.6 DTS Bandwidth**VERDICT: PASS****4.6.1 Limit**

Standard	FCC Part 15 Subpart C Paragraph 15.247 (a)(2)
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Systems using digital modulation techniques operate in the 2400-2483.5 MHz. The minimum 6 dB bandwidth shall be at least 500 kHz

4.6.2 Test Setup**4.6.3 Test Procedure**

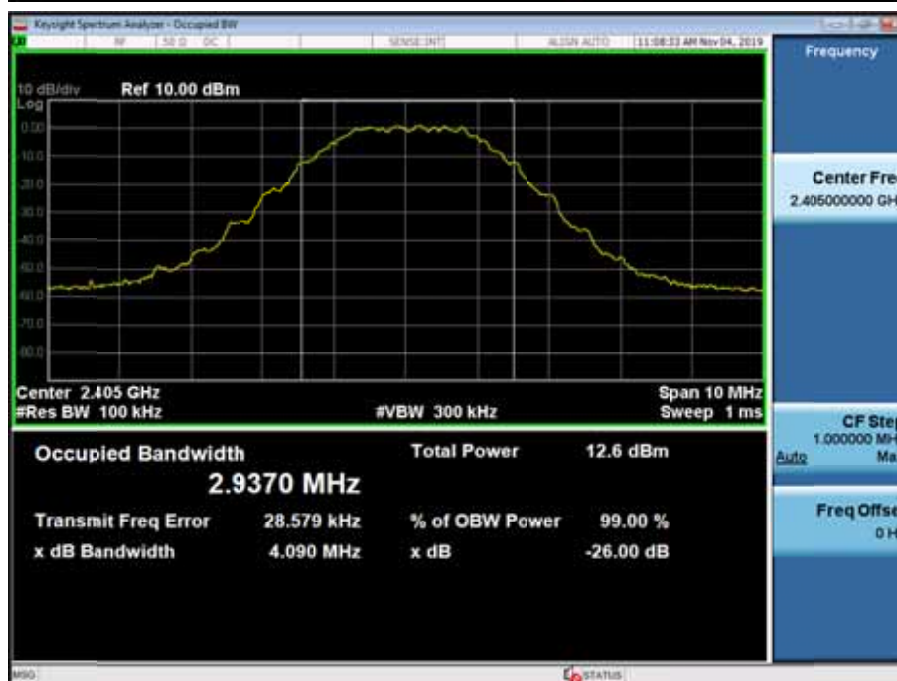
	Reference Rule	Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10	11.8	DTS bandwidth
<input type="checkbox"/>	ANSI C63.10	11.8.1	Option 1
<input checked="" type="checkbox"/>	ANSI C63.10	11.8.2	Option 2

4.6.4 Test Data

Mode	CH.	Test Freq. (MHz)	99% Occupied Bandwidth (MHz)	6dB Occupied Bandwidth (MHz)	Limit (kHz)	Result
Mode 1	11	2405	2.9370	1.678	>500	Pass
	18	2440	2.9318	1.842	>500	Pass
	26	2480	2.9337	1.663	>500	Pass

Note : We evaluated all test modes, shown in the report is the worst data.

Mode 1 CH11 (2405MHz)

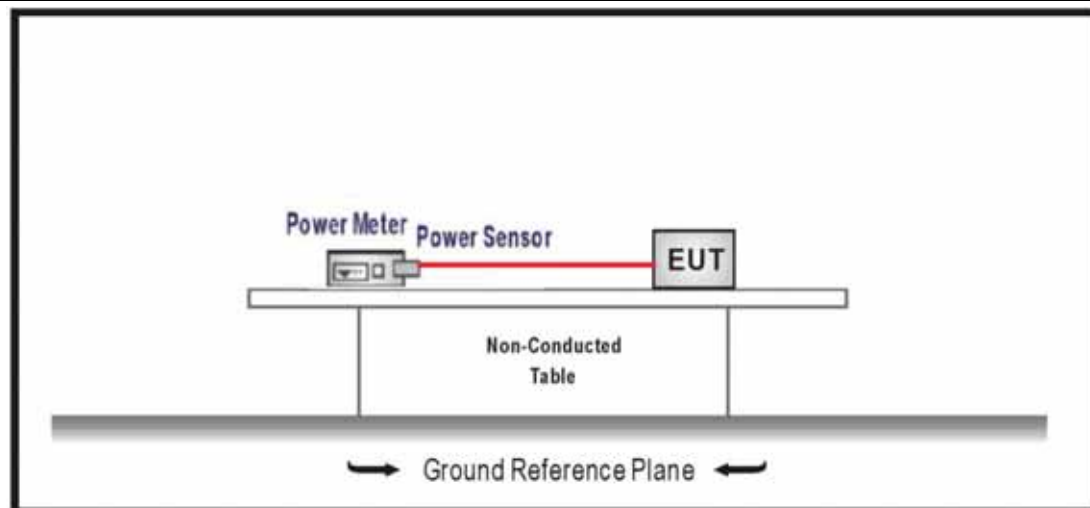


4.7 Fundamental emission output power**VERDICT: PASS****4.7.1 Limit**

Standard		FCC Part 15 Subpart C Paragraph 15.247 (b)(3)
<input checked="" type="checkbox"/>	GTX < 6dBi	Pout 30dBm
<input type="checkbox"/>	GTX > 6dBi	
<input type="checkbox"/>	Non-Fix point-point	Pout 30-(GTX -6)
<input type="checkbox"/>	Fix point-point	Pout 30-[(GTX-6)]/3
<input type="checkbox"/>	Point-to-multipoint	Pout 30-(GTX-6)
<input type="checkbox"/>	Overlap Beams	Pout 30-[(GTX-6)]/3
<input type="checkbox"/>	Aggregate power transmitted simultaneously on all beams	Pout 30-[(GTX-6)]/3
<input type="checkbox"/>	single directional beam	Pout 30-[(GTX-6)]/3+8dB

Note 1 : GTX directional gain of transmitting antennas.

Note 2 : Pout is maximum peak conducted output power .

4.7.2 Test Setup

4.7.3 Test Procedure

	References Rule			Chapter	Description		
<input checked="" type="checkbox"/>	ANSI C63.10			11.9	Fundamental emission output power		
	<input checked="" type="checkbox"/>	ANSI C63.10			11.9.1	Maximum peak conducted output power	
	<input type="checkbox"/>	<input type="checkbox"/>	ANSI C63.10	11.9.1.1	RBW ≥ DTS bandwidth		
		<input type="checkbox"/>	ANSI C63.10	11.9.1.2	Integrated band power method		
		<input type="checkbox"/>	ANSI C63.10	11.9.1.3	PKPM1 Peak power meter method		
	<input type="checkbox"/>	ANSI C63.10			11.9.2	Maximum conducted (average) output power	
	<input type="checkbox"/>	<input type="checkbox"/>	ANSI C63.10			11.9.2.2	Measurement using a spectrum analyzer (SA)
		<input type="checkbox"/>	<input type="checkbox"/>	ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle 98%)	
			<input type="checkbox"/>	ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle 98%)	
			<input type="checkbox"/>	ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle 98%)	
			<input type="checkbox"/>	ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle 98%)	
			<input type="checkbox"/>	ANSI C63.10	11.9.2.2.4	Method AVGSA-3	
			<input type="checkbox"/>	ANSI C63.10	11.9.2.2.5	Method AVGSA-3A	
		<input checked="" type="checkbox"/>	ANSI C63.10			11.9.2.3	Measurement using a power meter (PM)
		<input type="checkbox"/>	<input checked="" type="checkbox"/>	ANSI C63.10	11.9.2.3.1	Method AVGPM	
			<input type="checkbox"/>	ANSI C63.10	11.9.2.3.2	Method AVGPM-G	

4.7.4 Test Data

Murata:

Mode	Channel	Test Frequency (MHz)	Power Output (dBm)	Limit (dBm)	Result
Mode 1	11	2405	9.75	30	Pass
	18	2440	9.48	30	Pass
	26	2480	9.68	30	Pass

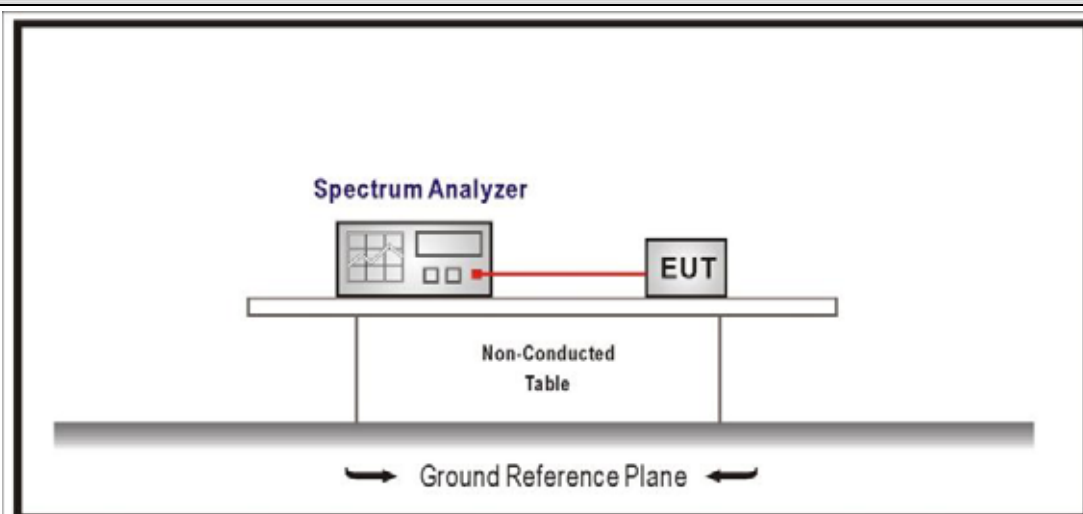
KDS:

Mode	Channel	Test Frequency (MHz)	Power Output (dBm)	Limit (dBm)	Result
Mode 1	11	2405	9.44	30	Pass
	18	2440	9.15	30	Pass
	26	2480	9.33	30	Pass

4.8 Power Density**VERDICT: PASS****4.8.1 Limit:**

Standard	FCC Part 15 Subpart C Paragraph 15.247 (b)(3)
-----------------	---

Power Spectral Density	8dBm/3kHz
------------------------	-----------

4.8.2 Test Setup**4.8.3 Test Procedure**

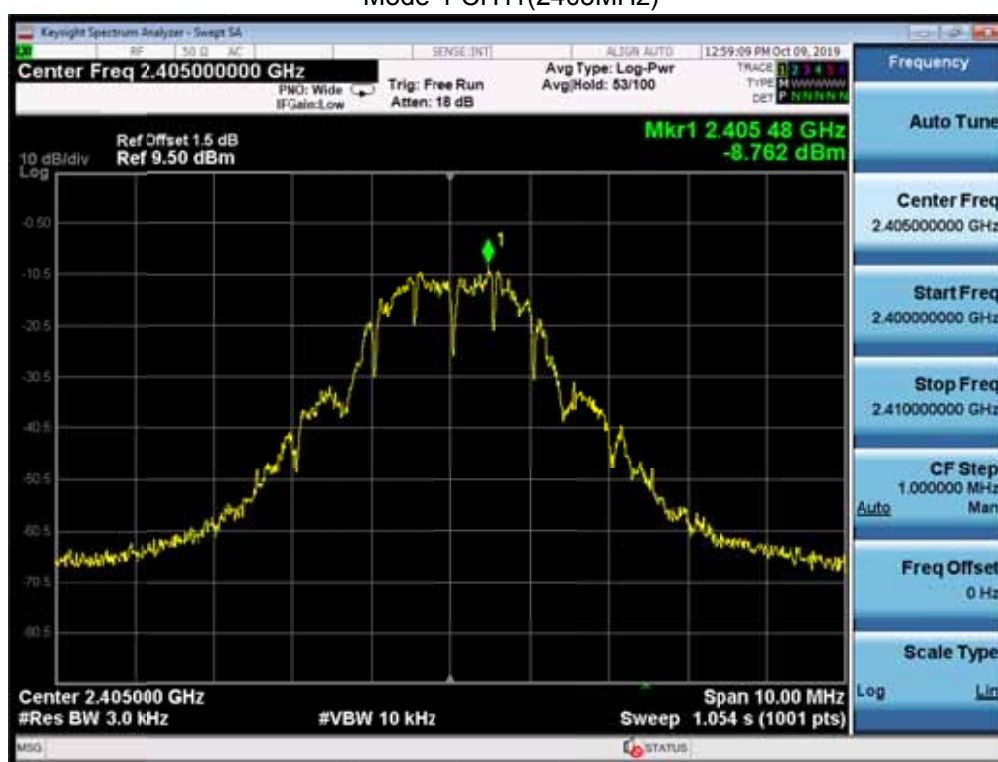
	References Rule		Chapter	Description
<input checked="" type="checkbox"/>	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	<input checked="" type="checkbox"/>	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	<input type="checkbox"/>	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle 98%)
	<input type="checkbox"/>	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle 98%)
	<input type="checkbox"/>	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle < 98%)
	<input type="checkbox"/>	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle < 98%)
	<input type="checkbox"/>	ANSI C63.10	11.10.7	Method AVGPSD-3
	<input type="checkbox"/>	ANSI C63.10	11.10.8	Method AVGPSD-3A

4.8.4 Test Data

Mode	Channel	Test Frequency (MHz)	Measurement PSD (dBm/3kHz)	Total Measurement PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
Mode 1	11	2405	-8.762	-8.762	8	Pass
	18	2440	-10.427	-10.427	8	Pass
	26	2480	-9.583	-9.583	8	Pass

Remark: The worst data as below:

Mode 1 CH11(2405MHz)



4.9 Antenna Requirement**VERDICT: PASS****4.9.1 Limit:**

Standard	FCC Part 15 Subpart C Paragraph 15.203
<p>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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.</p>	

4.9.2 Antenna Connector Construction:

- | | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | The use of a permanently attached antenna |
| <input type="checkbox"/> | The antenna use of a unique coupling to the intentional radiator |
| <input type="checkbox"/> | The use of a nonstandard antenna jack or electrical connector |

Please refer to the attached document "Internal Photograph" to show the antenna connector.

4.10 Test setup photo and EUT Photo
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VERDICT: PASS

Remark: The test setup photo and EUT Photo please see appendix.

_____ The End _____