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Test report No:
19A2159R-RF-US-P06V02

FCC TEST REPORT & ISED TEST REPORT

Product Name	LED lamp
Trademark	PHILIPS
Model and /or type reference	9290022941
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 Kitty Li
Tested by (name / position & signature)	Frank He/ Technical Supervisor Frank He
Approved by (name / position & signature)	Jack Zhang/ Supervisor Jack Zhang
Date of issue	2019-11-28
Report template No	19A2159R-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.

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GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Oct. 29, 2019
Date (start test)	Nov. 08, 2019
Date (finish test)	Nov. 28, 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
19A2159R-RF-US-P06V02	V1.0	Initial issue of report.	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	2020.03.11
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	2019.09.27	2020.09.26
Coaxial Cable	Suhner	RG 223	TR1-C2	2018.04.26	N/A
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 Anlyzer	Keysight	N9020A	MY56060147	2019.08.30	2020.08.29
Wideband Peak Power Meter	Anritsu	ML2495A	0905006	2019.10.14	2020.10.13
Power Sensor	Anritsu	MA2411B	0846014	2019.10.28	2020.10.27
Coaxial Cable	Woken	SFL402	F02-150410-044	2019.06.13	N/A
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	2019.09.23	2020.09.22
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 / AC5(1GHz-40GHz)(Chamber details)

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2019.09.28	2020.09.27
Preamplifier	Miteq	NSP1800-25	1364185	N/A	N/A
Preamplifier	QuieTek	AP-040G	CHM-0906001	N/A	N/A
DRG Horn	ETS-Lindgren	3117	00123988	2019.09.25	2020.09.24
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2019.09.02	2020.09.01
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C1	N/A	N/A
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2019.04.13	2020.04.12
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	AC5-C3	N/A	N/A
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%

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	± 1.27dB
Radiated Emission Band Edge	± 3.9 dB
DTS Bandwidth	±150Hz
Occupied Bandwidth	±1kHz
Power Density	±1.27dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name ..... :	LED lamp
Model No. ..... :	9290022941
Trademark ..... :	PHILIPS
FCC ID ..... :	2AGBW9290022941X
IC ..... :	20812-2941X
Manufacturer ..... :	Signify (China) Investment Co., Ltd.
Manufacturer Address ..... :	Building no.9, Lane 888, Tianlin Road, Minhang District, Shanghai, 200233, China

Wireless specifiction ..... :	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	
	☐	AC: 220 – 240 V, 50/60 Hz
	☒	AC: 110 – 130 V, 50/60 Hz, 5.8W
	☐	DC: 15~24Vdc
	☐	Battery: 3.7V
Mounting position ..... :	☒	Table top equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held equipment
	☐	Other: Wearable equipment

Note 1: LED lamp 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, Conducted Emission and band-edge were tested for different crystal oscillator, the test data of worse mode is showed with other test items.

1.2 Antenna Information

Antenna model / type number.....:	N/A			
Antenna serial number.....:	N/A			
Antenna Delivery .....:	☒	1TX + 1RX		
	☐	2TX + 2RX		
	☐	Others:……		
Antenna technology .....:	☒	SISO		
	☐	MIMO	☐	CDD
			☐	Beam-forming
Antenna Type.....:	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☐	PIFA
			☒	PCB
			☐	Ceramic Chip
			☐	Others……..
Antenna Gain .....:	0.5 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.

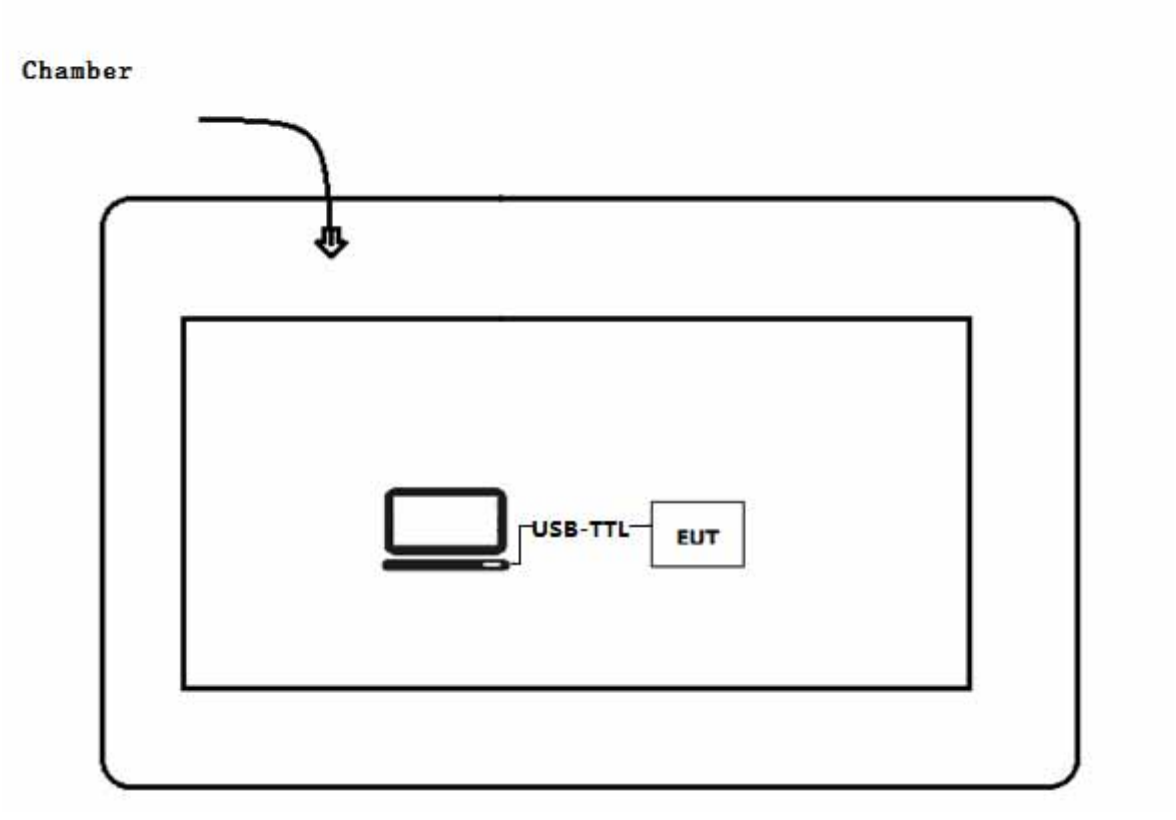
Test Mode	Mode 1: Transmit by Zigbee
	Mode 2: Normal Operation

2.2 Auxiliary equipment / Test software for the EUT

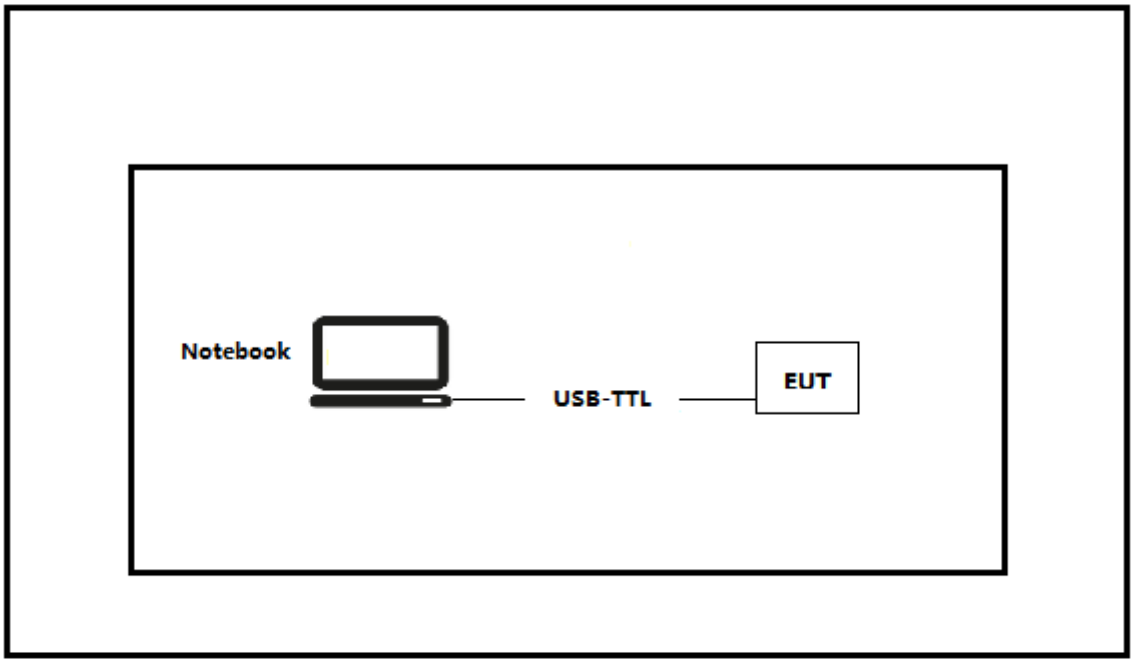
Auxiliary equipment	Type / Version	Manufacturer	Supplied by
Notebook	E470	Lenovo	N/A
software	Type / Version	Manufacturer	Supplied by
HueApprobationTool	1.1.00	Philips	N/A

2.3 Test Configuration / Block diagram used for tests

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Conducted test



2.4 Testing process

1	Setup the EUT as shown in Section 2.4.
2	Execute the nRFgo Studio 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	PASS	---
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	PASS	---
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

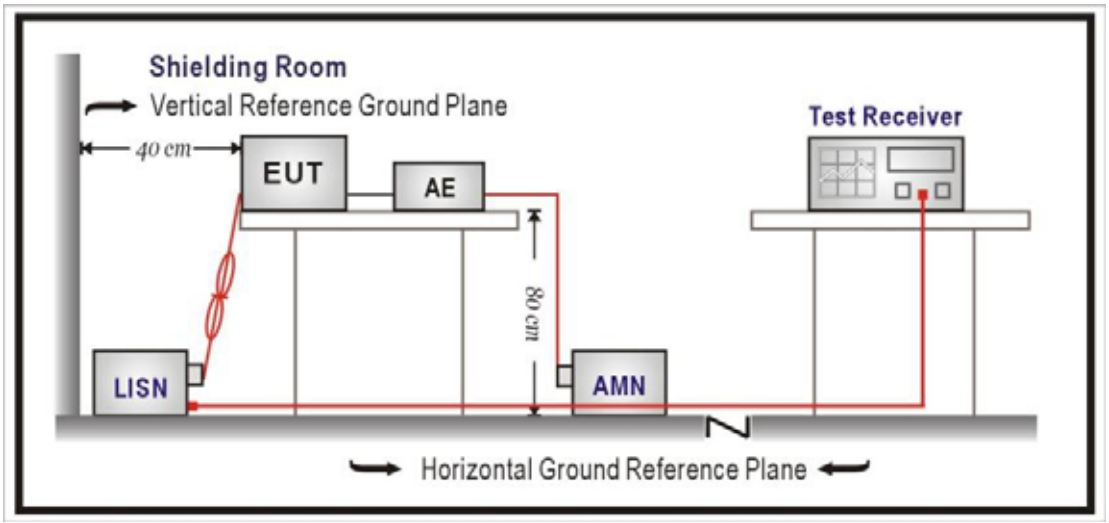
4.1 AC Power Line Conducted Emission	VERDICT: PASS

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

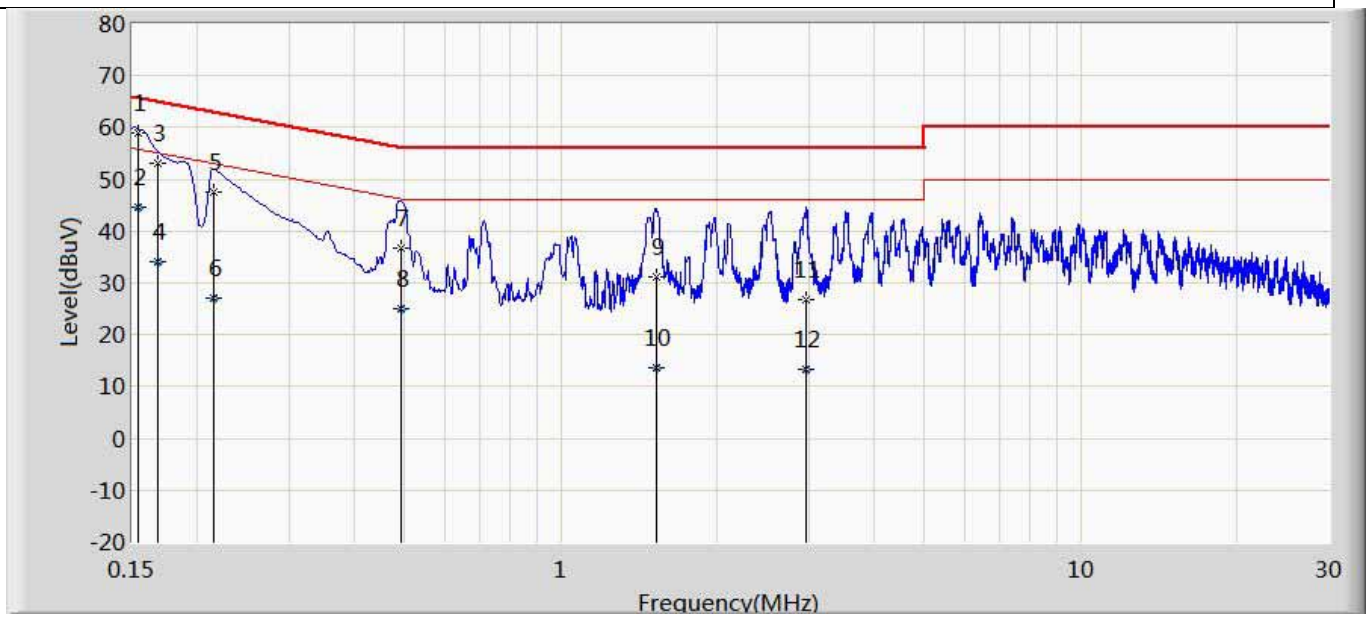


4.1.3 Test Procedure

	References Rule	Chapter	Item
☒	ANSI C63.10-2013	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.1.4 Test Data

Engineer: lynee	
Site: TR1	Time: 2019/11/08
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101189(0.009-30MHz)	Polarity: Line
EUT: LED lamp	Power: AC 120V/60Hz
Note: Mode 1	

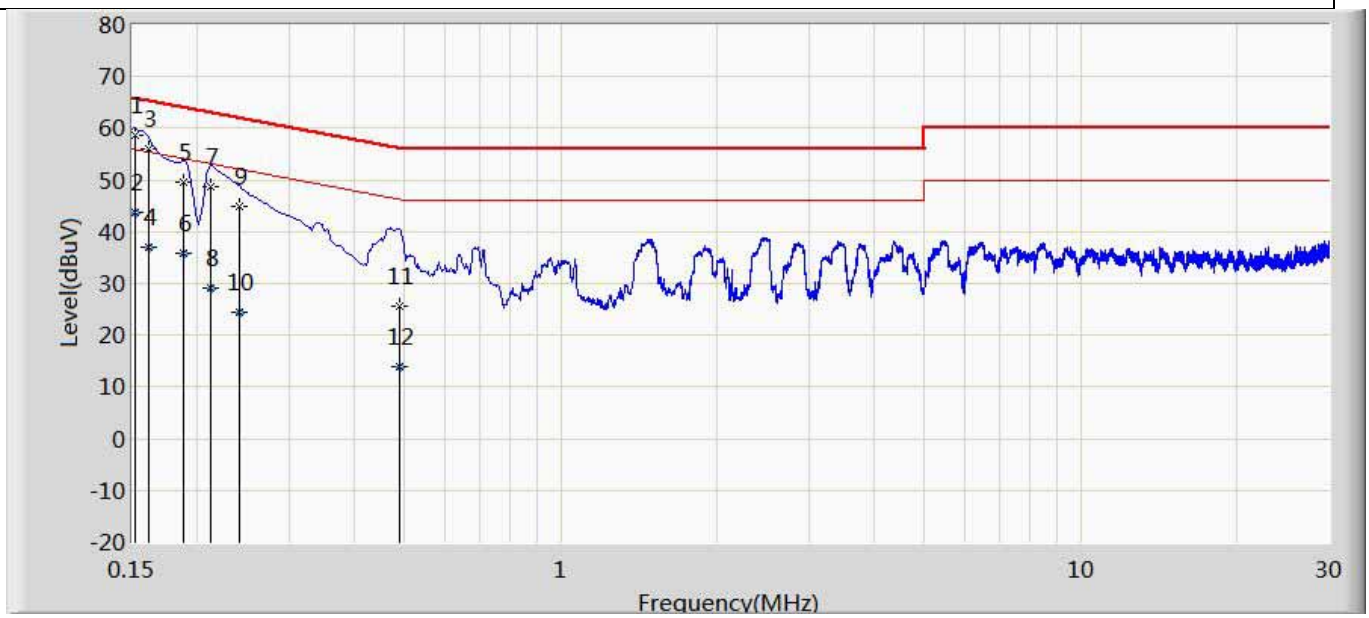


No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1	*	0.154	59.027	49.147	-6.766	65.793	9.851	0.029	0.000	QP
2		0.154	44.578	34.698	-11.216	55.793	9.851	0.029	0.000	AV
3		0.168	53.207	43.325	-11.852	65.059	9.854	0.028	0.000	QP
4		0.168	33.983	24.101	-21.076	55.059	9.854	0.028	0.000	AV
5		0.215	47.622	37.732	-15.379	63.000	9.861	0.029	0.000	QP
6		0.215	26.938	17.049	-26.062	53.000	9.861	0.029	0.000	AV
7		0.494	36.581	26.668	-19.515	56.096	9.870	0.043	0.000	QP
8		0.494	24.959	15.046	-21.137	46.096	9.870	0.043	0.000	AV
9		1.525	31.051	21.190	-24.949	56.000	9.786	0.075	0.000	QP
10		1.525	13.661	3.800	-32.339	46.000	9.786	0.075	0.000	AV
11		2.962	26.713	16.818	-29.287	56.000	9.788	0.108	0.000	QP
12		2.962	13.476	3.581	-32.524	46.000	9.788	0.108	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).

Engineer: lynee	
Site: TR1	Time: 2019/11/08
Limit: FCC_Part15.107_CE_AC Power_ClassB	Margin: 0
Probe: ENV216_101189(0.009-30MHz)	Polarity: Neutral
EUT: LED lamp	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1	*	0.152	58.771	48.898	-7.106	65.876	9.843	0.029	0.000	QP
2		0.152	43.828	33.955	-12.049	55.876	9.843	0.029	0.000	AV
3		0.161	55.999	46.128	-9.400	65.399	9.842	0.029	0.000	QP
4		0.161	37.105	27.234	-18.294	55.399	9.842	0.029	0.000	AV
5		0.188	49.566	39.690	-14.548	64.113	9.848	0.028	0.000	QP
6		0.188	35.974	26.098	-18.139	54.113	9.848	0.028	0.000	AV
7		0.213	48.692	38.813	-14.395	63.088	9.850	0.029	0.000	QP
8		0.213	29.054	19.175	-24.033	53.088	9.850	0.029	0.000	AV
9		0.242	44.861	34.979	-17.158	62.019	9.852	0.030	0.000	QP
10		0.242	24.305	14.423	-27.714	52.019	9.852	0.030	0.000	AV
11		0.490	25.566	15.662	-30.606	56.172	9.862	0.043	0.000	QP
12		0.490	13.955	4.050	-32.217	46.172	9.862	0.043	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			

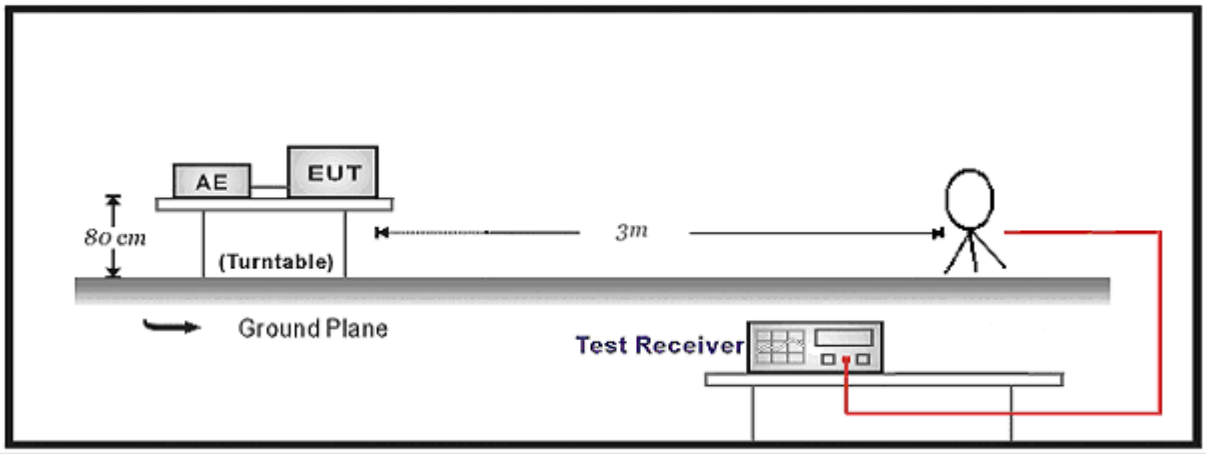
Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)
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).

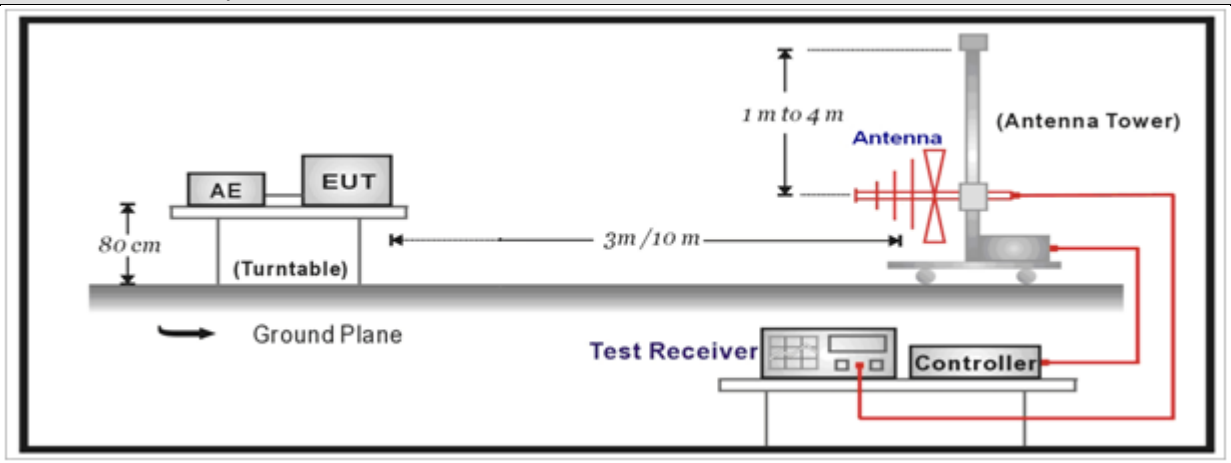
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated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

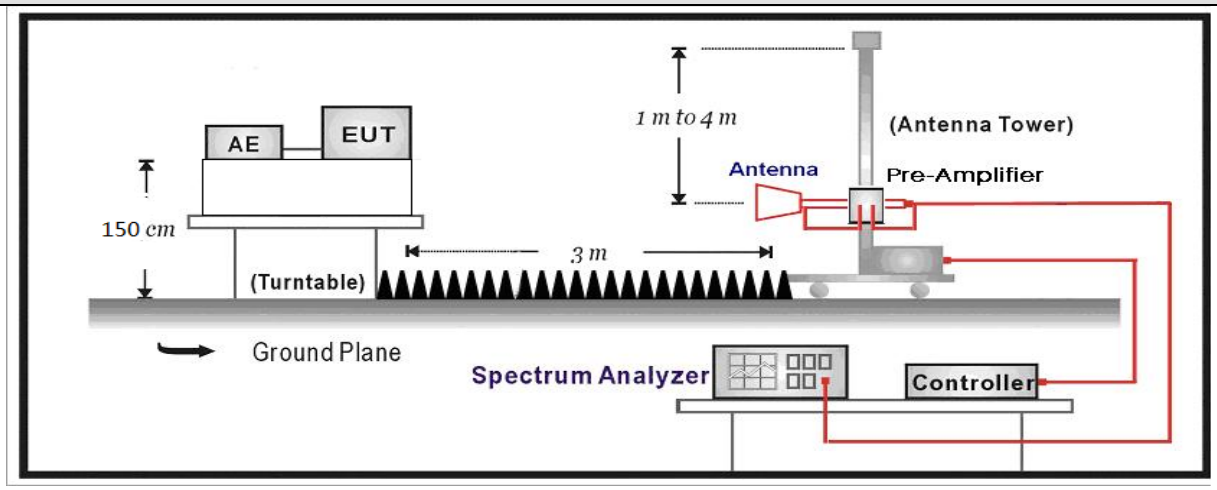
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:

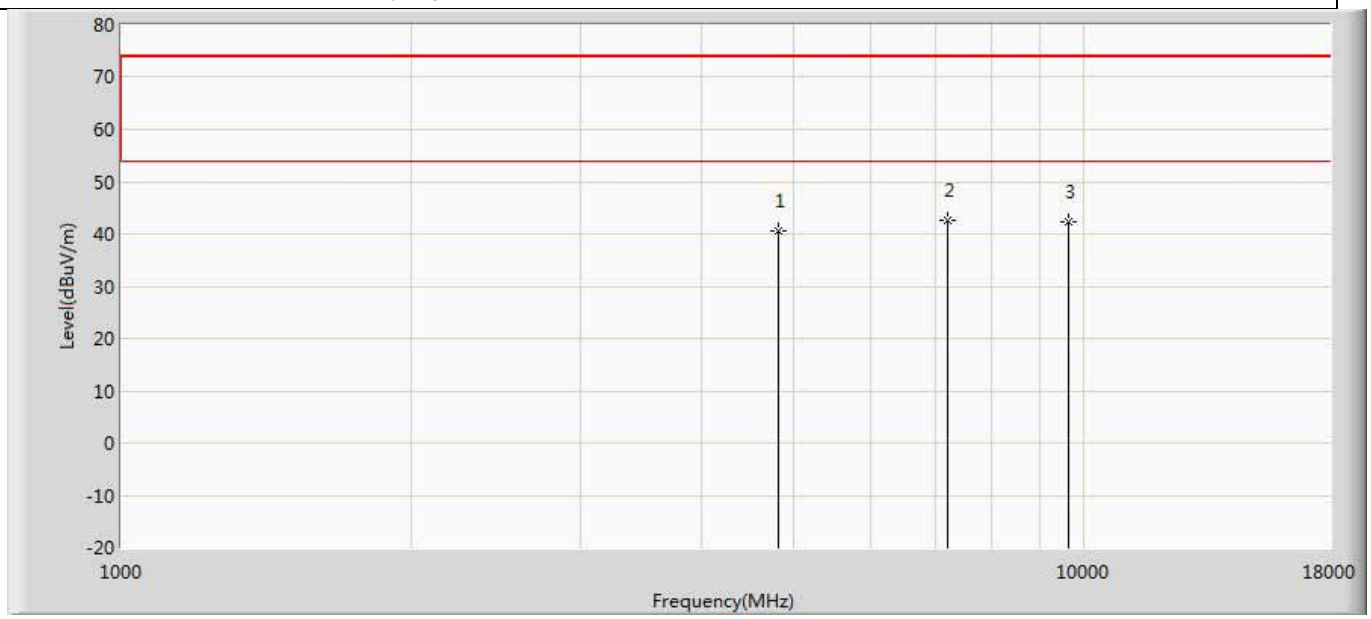


4.2.3 **Test Procedure**					
	References Rule			Chapter	Description
☒	ANSI C63.10			11.12	Emissions in restricted frequency bands
	☒	ANSI C63.10		11.12.1	Radiated emission measurements
	☒	ANSI C63.10		11.12.2.7	Radiated spurious emission test
		☒	ANSI C63.10	6.4	Radiated emissions from unlicensed wireless devices below 30 MHz
		☒	ANSI C63.10	6.5	Radiated emissions from unlicensed wireless devices in the frequency range of 30 MHz to 1000 MHz
		☒	ANSI C63.10	6.6	Radiated emissions from unlicensed wireless devices above 1 GHz

4.2.4 Test Data

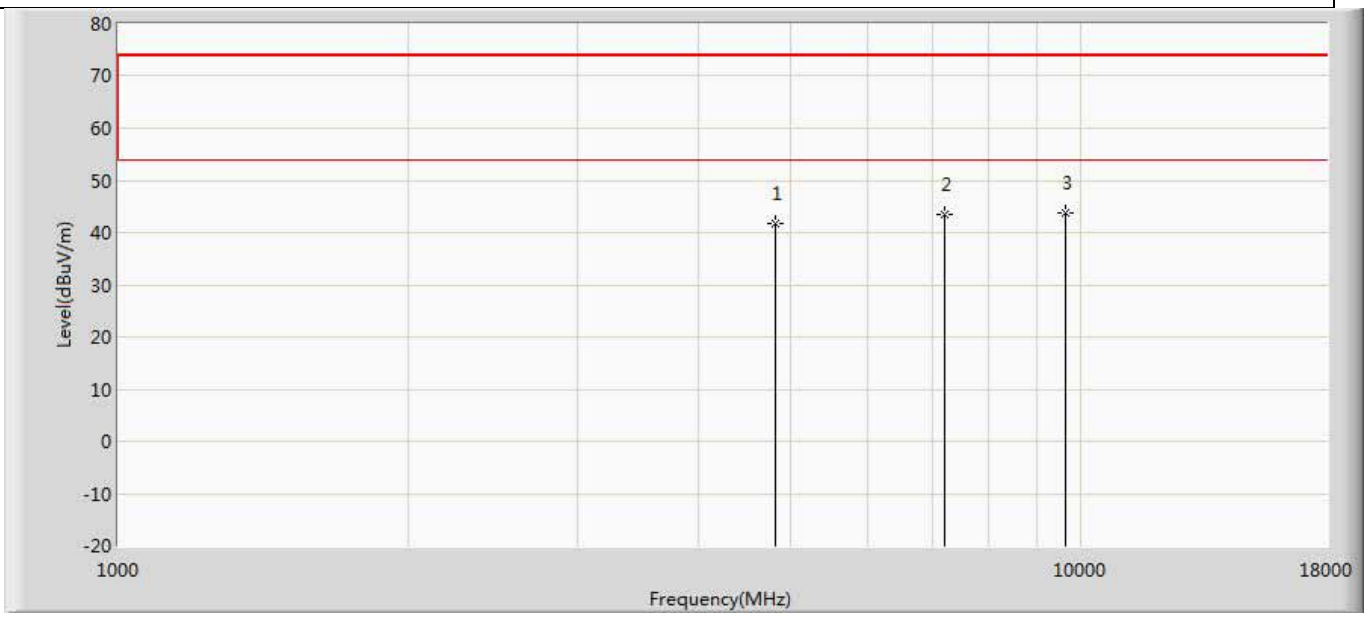
Murata:

Profile: 19A2159R	Page No.: 71
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 10:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



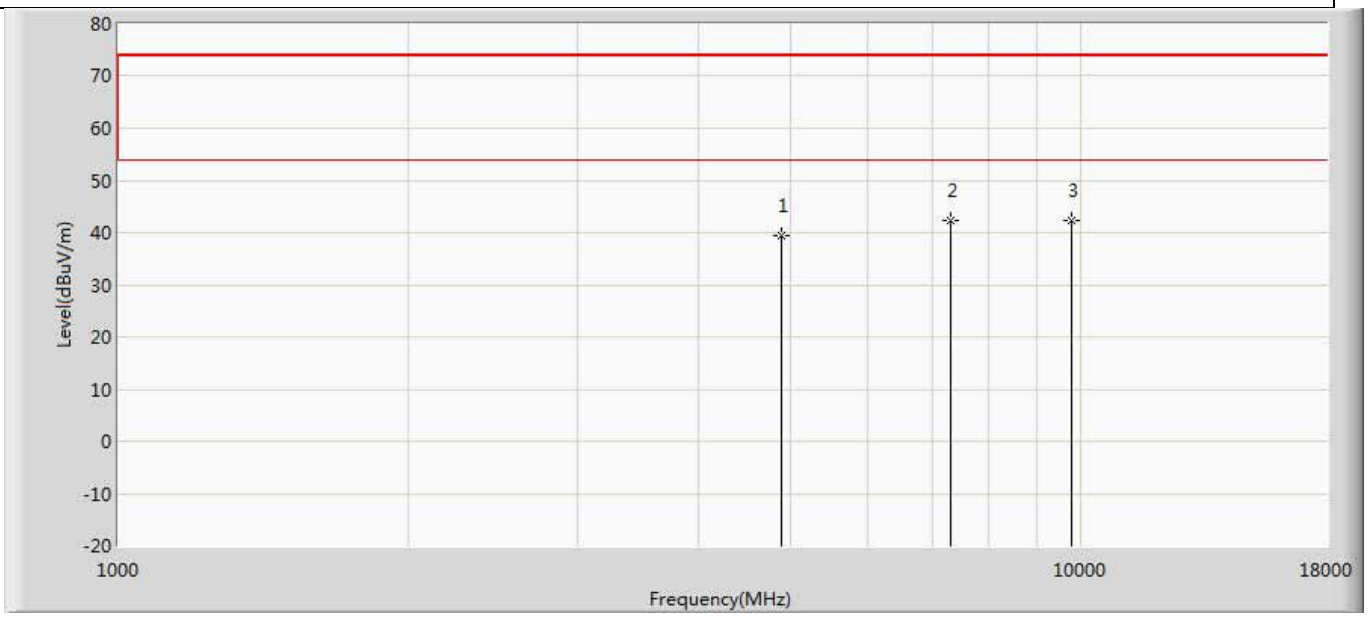
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4810.000	40.509	35.900	-33.491	74.000	4.609	PK
2	*	7215.000	42.598	34.569	-31.402	74.000	8.028	PK
3		9620.000	42.442	33.075	-31.558	74.000	9.367	PK

Profile: 19A2159R	Page No.: 72
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 10:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



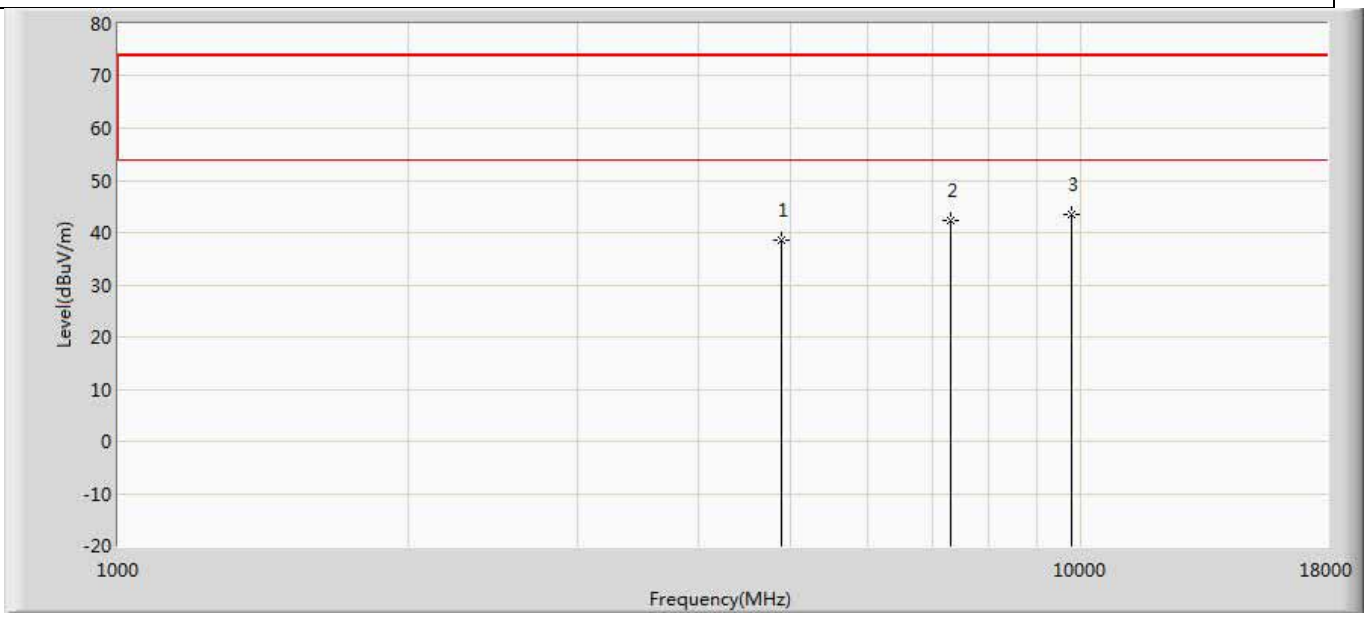
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4810.000	41.617	37.008	-32.383	74.000	4.609	PK
2		7215.000	43.585	35.556	-30.415	74.000	8.028	PK
3	*	9620.000	43.861	34.494	-30.139	74.000	9.367	PK

Profile: 19A2159R	Page No.: 73
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 10:42
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440MHz by Zigbee	



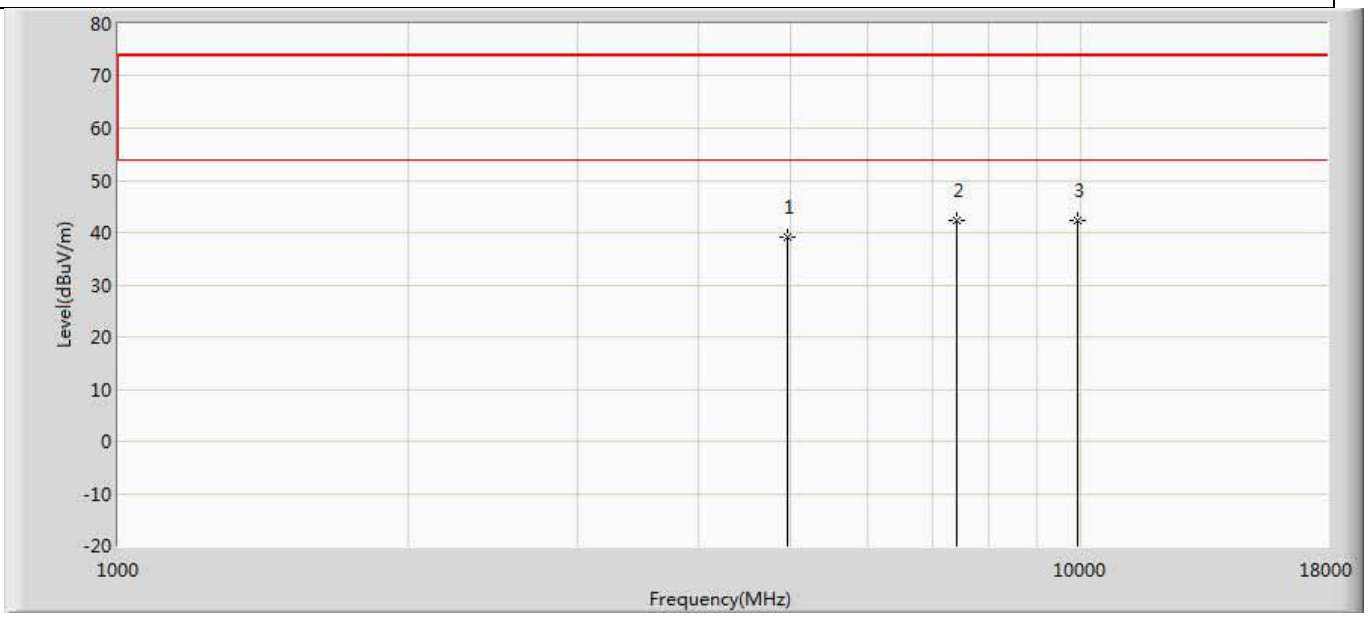
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	39.546	34.767	-34.454	74.000	4.778	PK
2	*	7320.000	42.459	34.389	-31.541	74.000	8.071	PK
3		9760.000	42.412	32.508	-31.588	74.000	9.904	PK

Profile: 19A2159R	Page No.: 74
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 10:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440MHz by Zigbee	



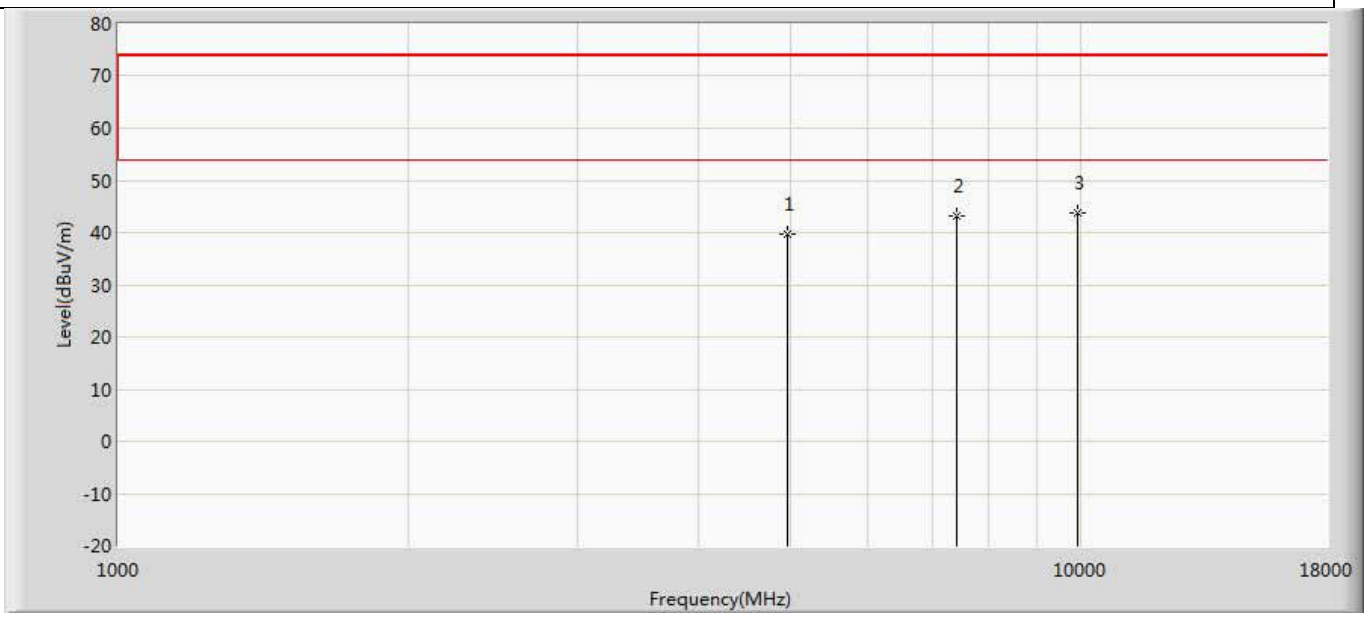
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	38.459	33.680	-35.541	74.000	4.778	PK
2		7320.000	42.200	34.130	-31.800	74.000	8.071	PK
3	*	9760.000	43.409	33.505	-30.591	74.000	9.904	PK

Profile: 19A2159R	Page No.: 75
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 10:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	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	39.255	34.470	-34.745	74.000	4.784	PK
2	*	7440.000	42.361	34.310	-31.639	74.000	8.051	PK
3		9920.000	42.309	32.414	-31.691	74.000	9.894	PK

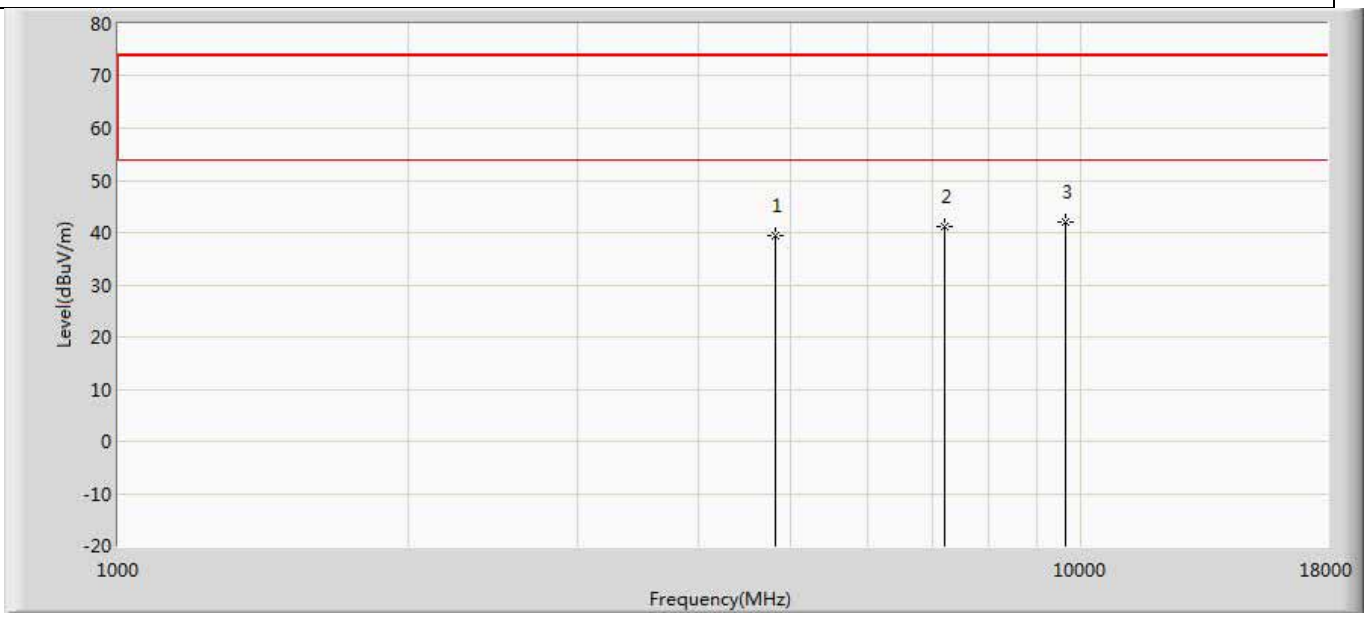
Profile: 19A2159R	Page No.: 76
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 10:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	39.821	35.036	-34.179	74.000	4.784	PK
2		7440.000	43.318	35.267	-30.682	74.000	8.051	PK
3	*	9920.000	43.715	33.820	-30.285	74.000	9.894	PK

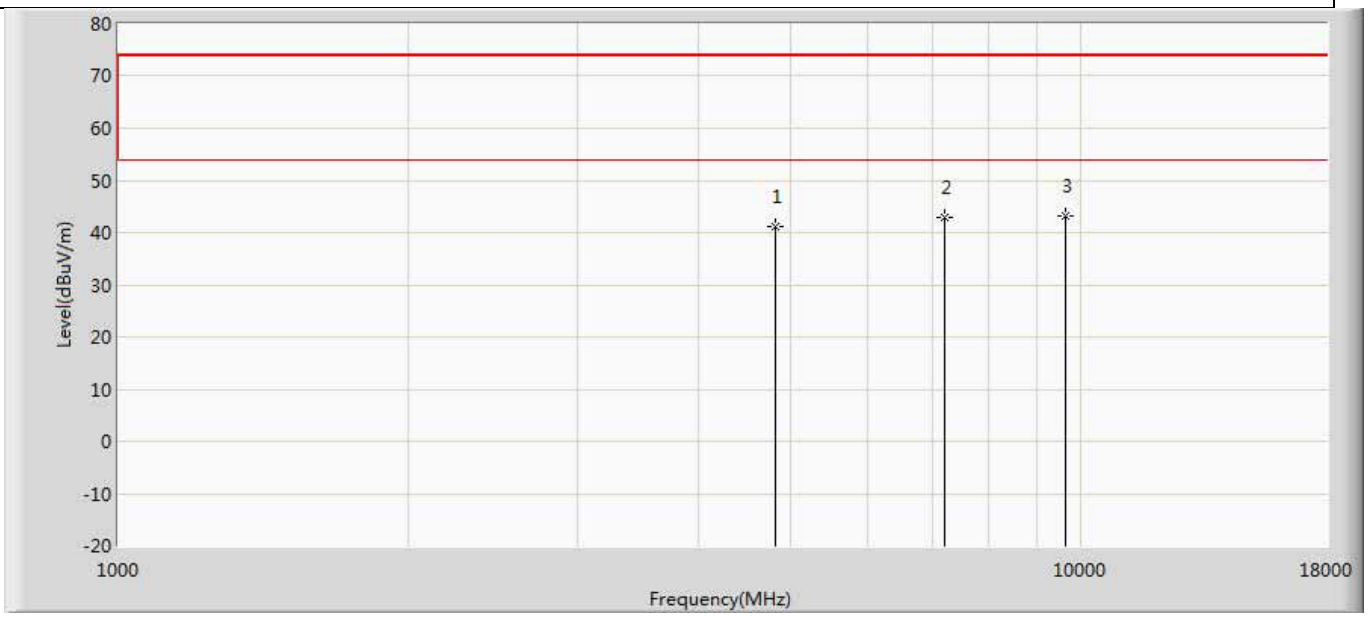
KDS:

Profile: 191A2159R	Page No.: 31
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 20:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405 by Zigbee	



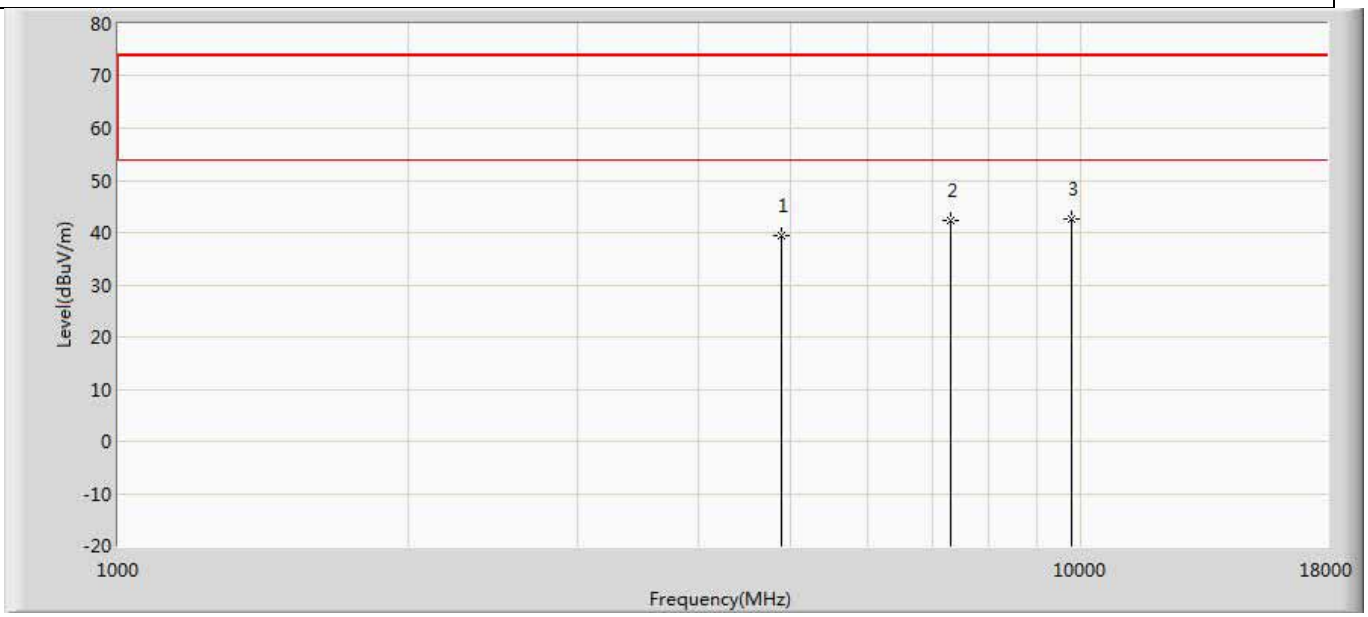
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4810.000	39.381	34.772	-34.619	74.000	4.609	PK
2		7215.000	41.112	33.083	-32.888	74.000	8.028	PK
3	*	9620.000	42.069	32.702	-31.931	74.000	9.367	PK

Profile: 191A2159R	Page No.: 32
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 20:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405 by Zigbee	



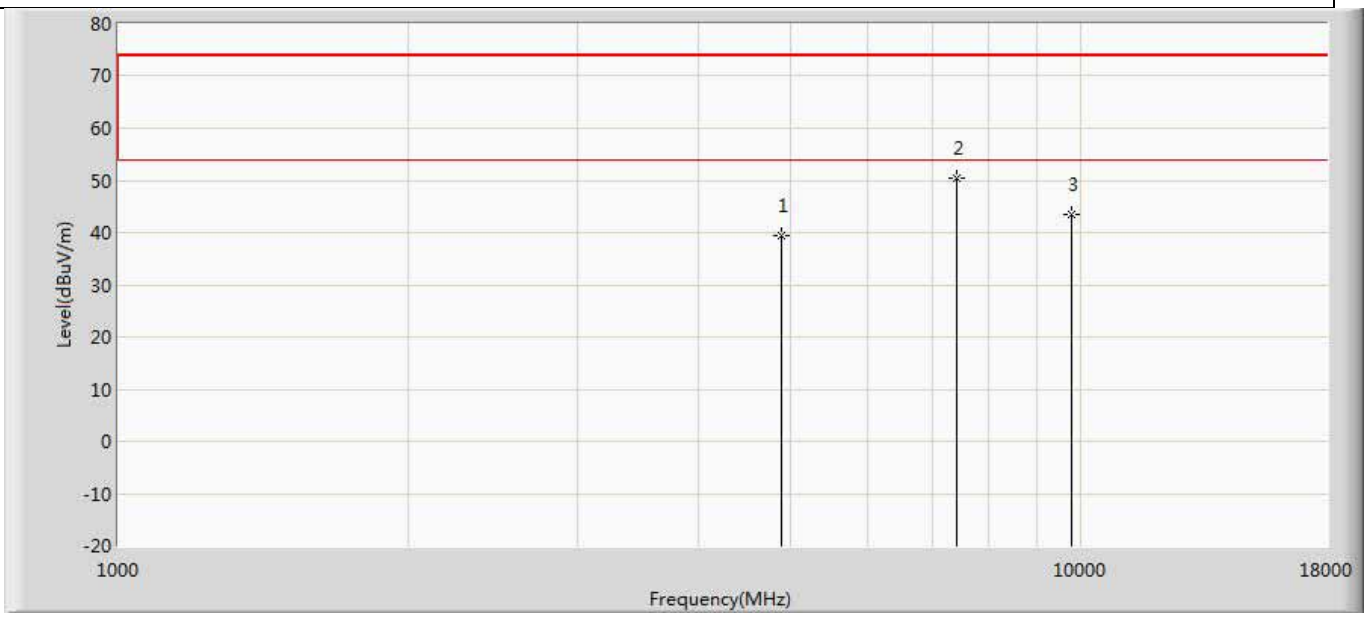
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4810.000	41.073	36.464	-32.927	74.000	4.609	PK
2		7215.000	42.984	34.955	-31.016	74.000	8.028	PK
3	*	9620.000	43.233	33.866	-30.767	74.000	9.367	PK

Profile: 191A2159R	Page No.: 33
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 20:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440 by Zigbee	



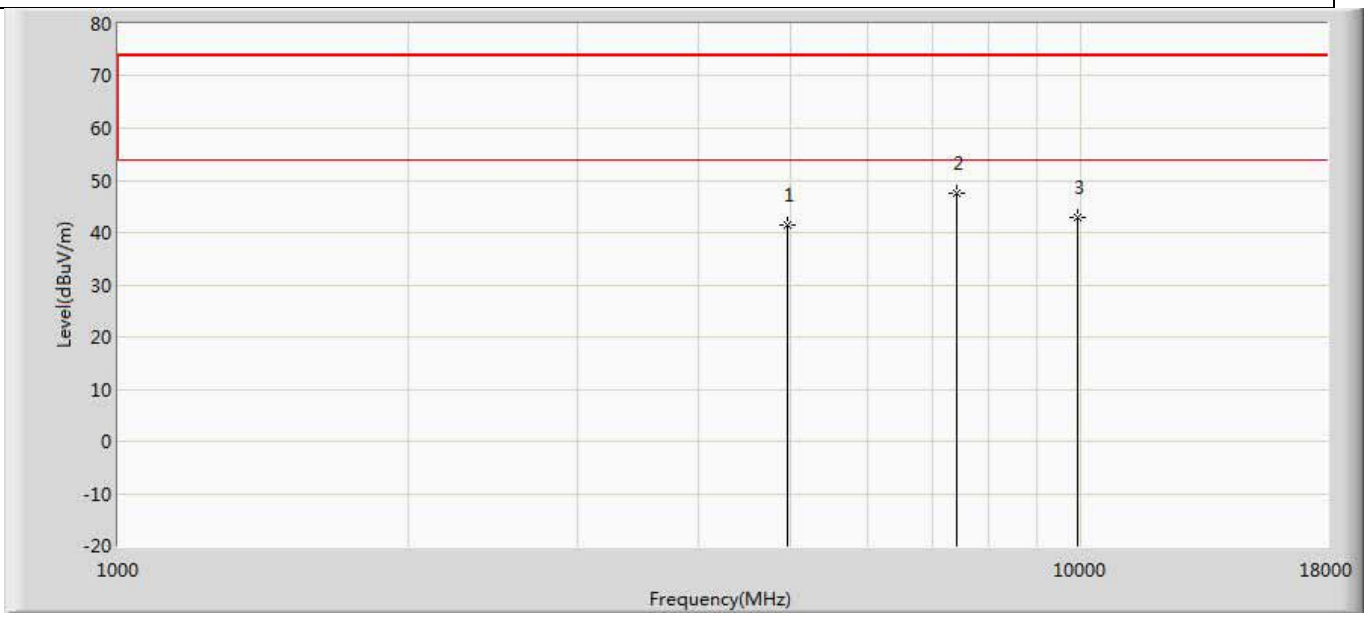
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	39.335	34.556	-34.665	74.000	4.778	PK
2		7320.000	42.344	34.274	-31.656	74.000	8.071	PK
3	*	9760.000	42.537	32.633	-31.463	74.000	9.904	PK

Profile: 191A2159R	Page No.: 34
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 20:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440 by Zigbee	



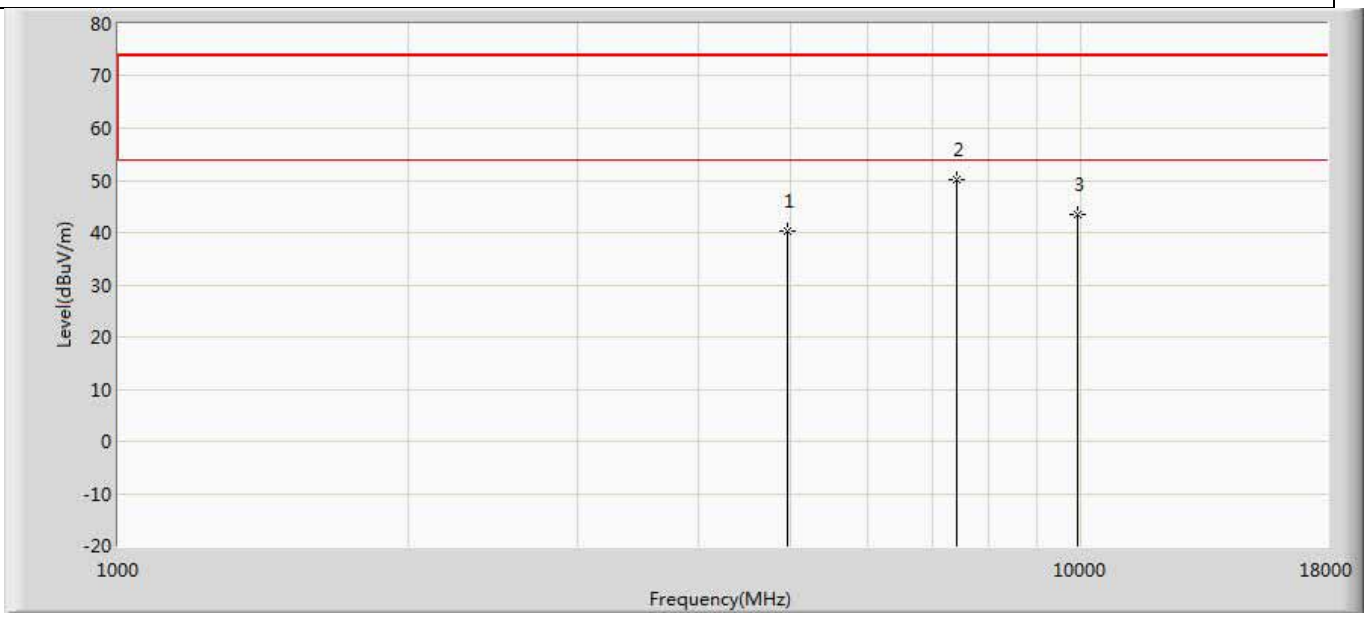
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	39.344	34.565	-34.656	74.000	4.778	PK
2	*	7434.500	50.311	42.334	-23.689	74.000	7.978	PK
3		9760.000	43.418	33.514	-30.582	74.000	9.904	PK

Profile: 191A2159R	Page No.: 35
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 20:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480 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	41.524	36.739	-32.476	74.000	4.784	PK
2	*	7434.500	47.476	39.499	-26.524	74.000	7.978	PK
3		9920.000	42.791	32.896	-31.209	74.000	9.894	PK

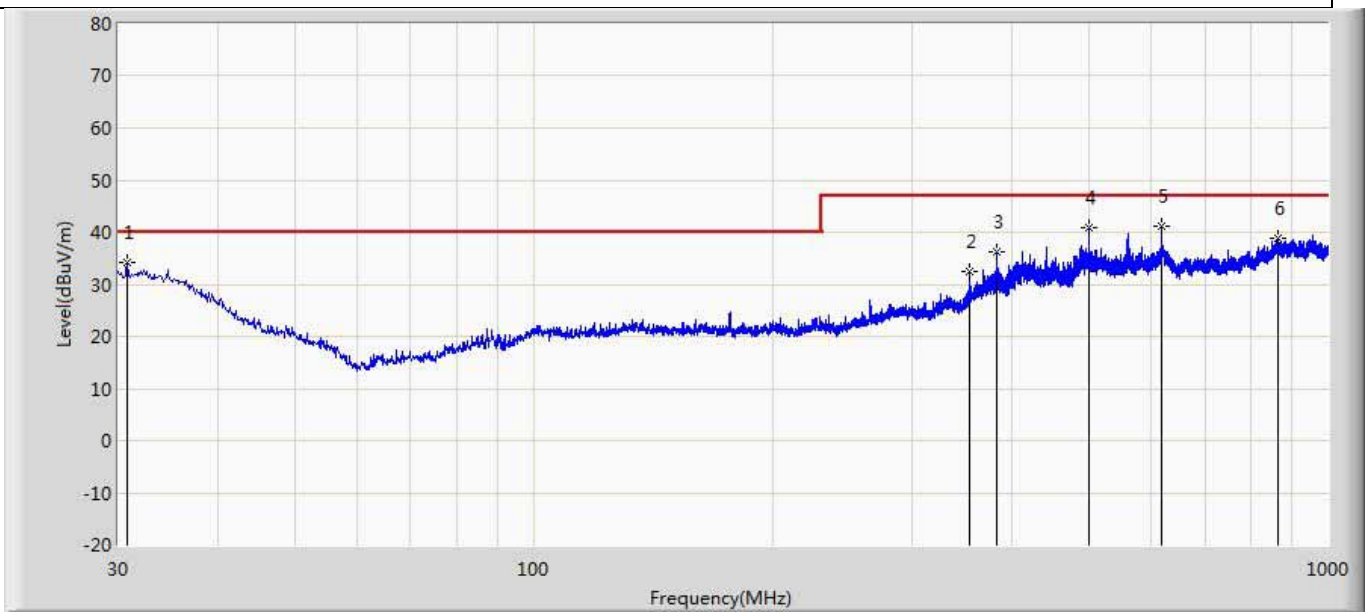
Profile: 191A2159R	Page No.: 36
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 20:08
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480 by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	40.182	35.397	-33.818	74.000	4.784	PK
2	*	7440.000	50.124	42.073	-23.876	74.000	8.051	PK
3		9920.000	43.465	33.570	-30.535	74.000	9.894	PK

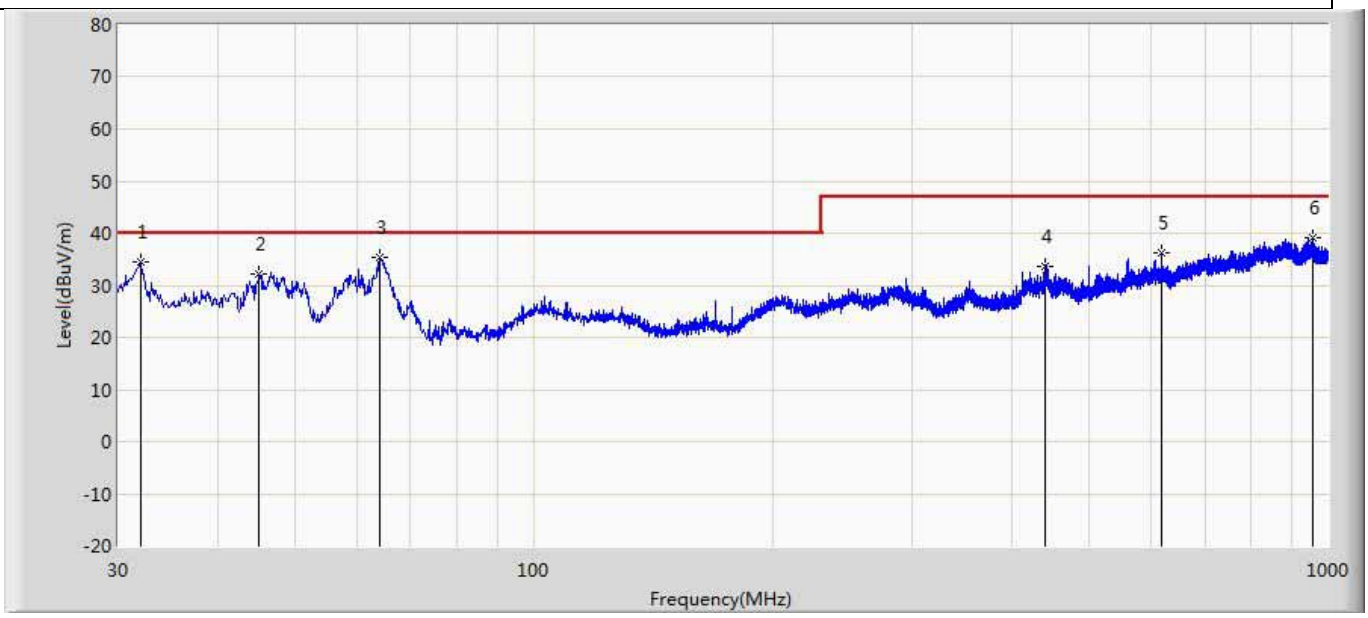
The worst case of Radiated Emission below 1GHz:

Profile: 19A2159E	Page No.: 26
Engineer: Kang	
Site: AC2	Time: 2019/11/06 - 10:06
Limit: CISPR15_RE(3m) 1G	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: LED lamp	Power: AC 230V/50Hz
Note: Mode 1:Transmit at 2480 by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Type
1	*	30.849	34.110	6.836	-5.890	40.000	20.935	6.339	PK
2		353.374	32.414	8.963	-14.586	47.000	15.719	7.732	PK
3		382.837	36.362	11.698	-10.638	47.000	16.840	7.824	PK
4		500.693	40.967	13.317	-6.033	47.000	19.475	8.175	PK
5		618.062	41.038	10.601	-5.962	47.000	21.951	8.486	PK
6		865.170	38.728	5.823	-8.272	47.000	23.813	9.092	PK

Profile: 19A2159E	Page No.: 27
Engineer: Kang	
Site: AC2	Time: 2019/11/06 - 10:16
Limit: CISPR15_RE(3m) 1G	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: LED lamp	Power: AC 230V/50Hz
Note: Mode 1:Transmit at 2480 by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Probe (dB/m)	Cable (dB)	Type
1		32.061	34.527	11.212	-5.473	40.000	16.976	6.339	PK
2		45.156	32.228	14.324	-7.772	40.000	11.447	6.457	PK
3	*	64.071	35.458	19.514	-4.542	40.000	9.367	6.577	PK
4		441.280	33.647	7.543	-13.353	47.000	18.105	7.999	PK
5		618.426	36.194	8.200	-10.806	47.000	19.507	8.487	PK
6		959.018	39.173	6.092	-7.827	47.000	23.771	9.311	PK

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

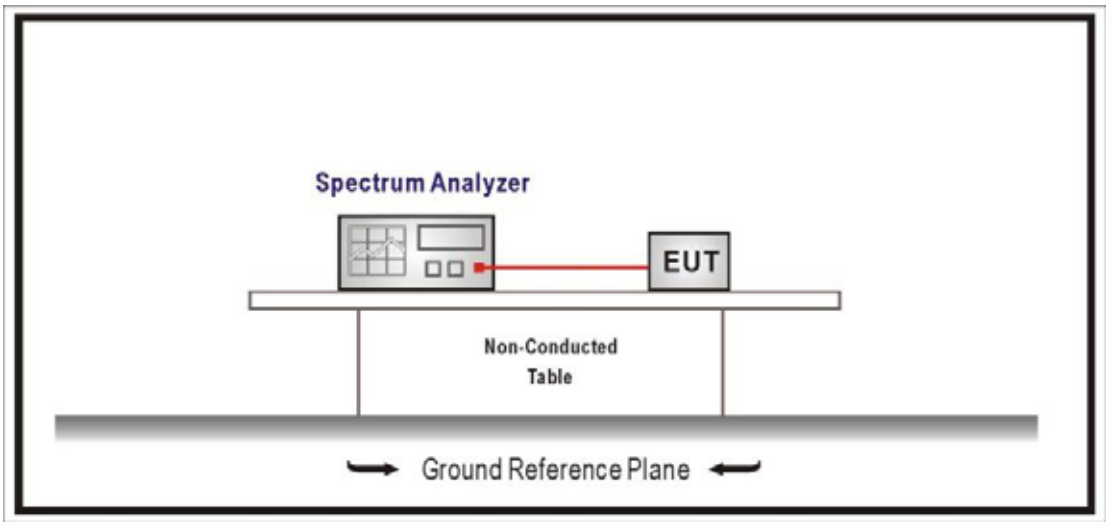
4.3.1 Limit

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
☒	ANSI C63.10		11.11	Emissions in non-restricted frequency bands
	☒	ANSI C63.10	11.11.1	General
	☒	ANSI C63.10	11.11.2	Reference level measurement
	☒	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	6.072	2400	-44.558	50.630	>20	Pass
	26	2480	6.128	2500	-60.486	66.614	>20	Pass

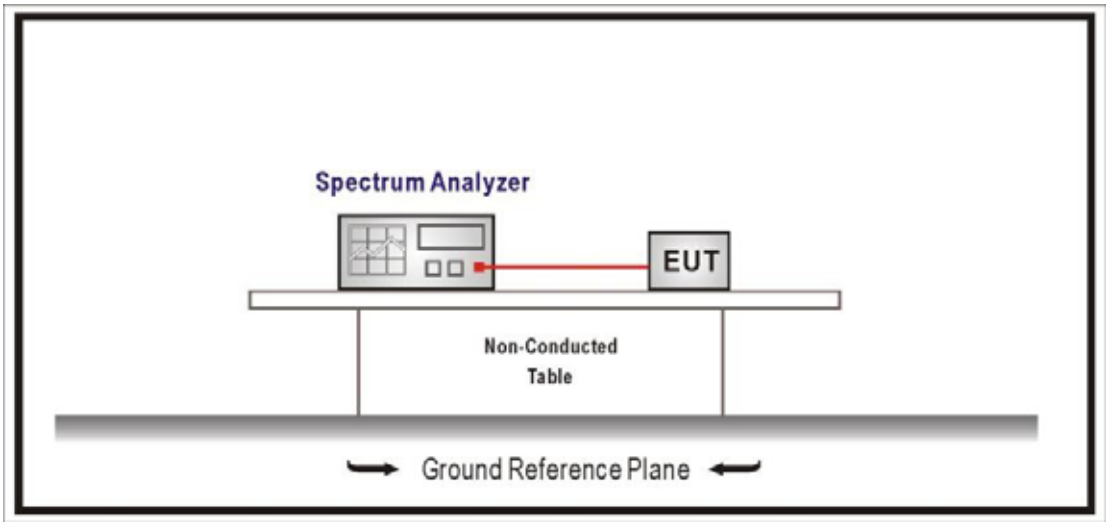
Mode 1 CH11(2405MHz)

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
☒	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

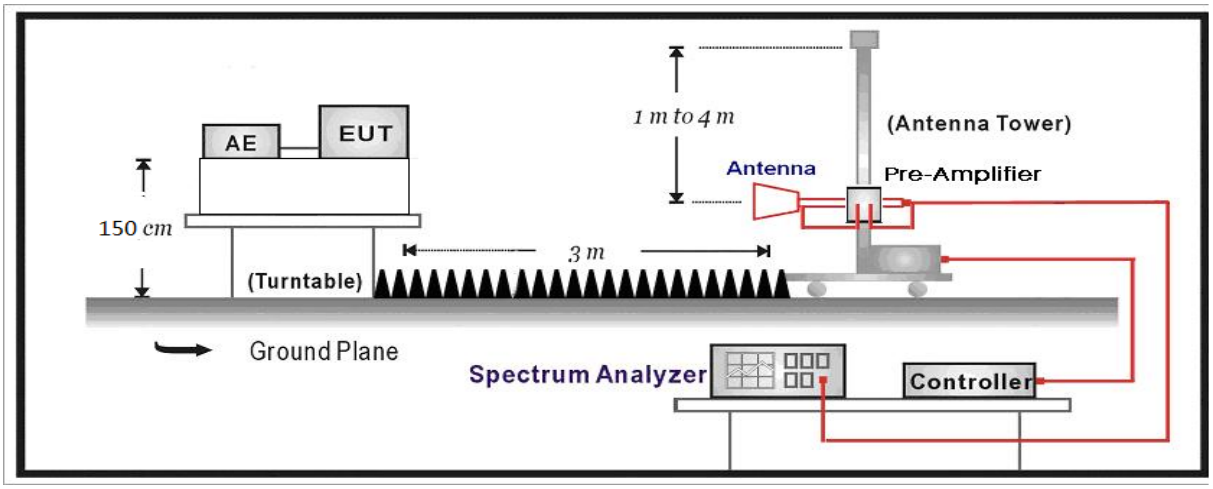
4.5 Radiated Emission Band Edge — VERDICT: PASS

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 2483.5-2500	PK	74	1	3
	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:



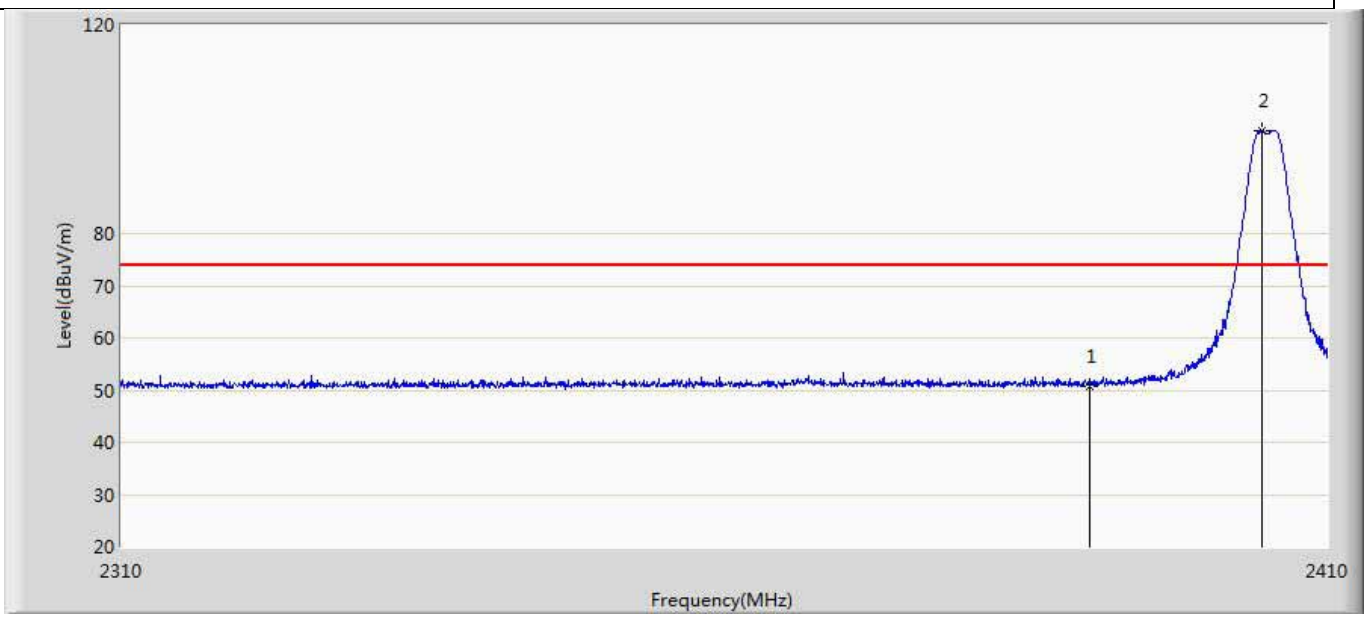
4.5.3 Test Procedure

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

4.5.4 Test Data

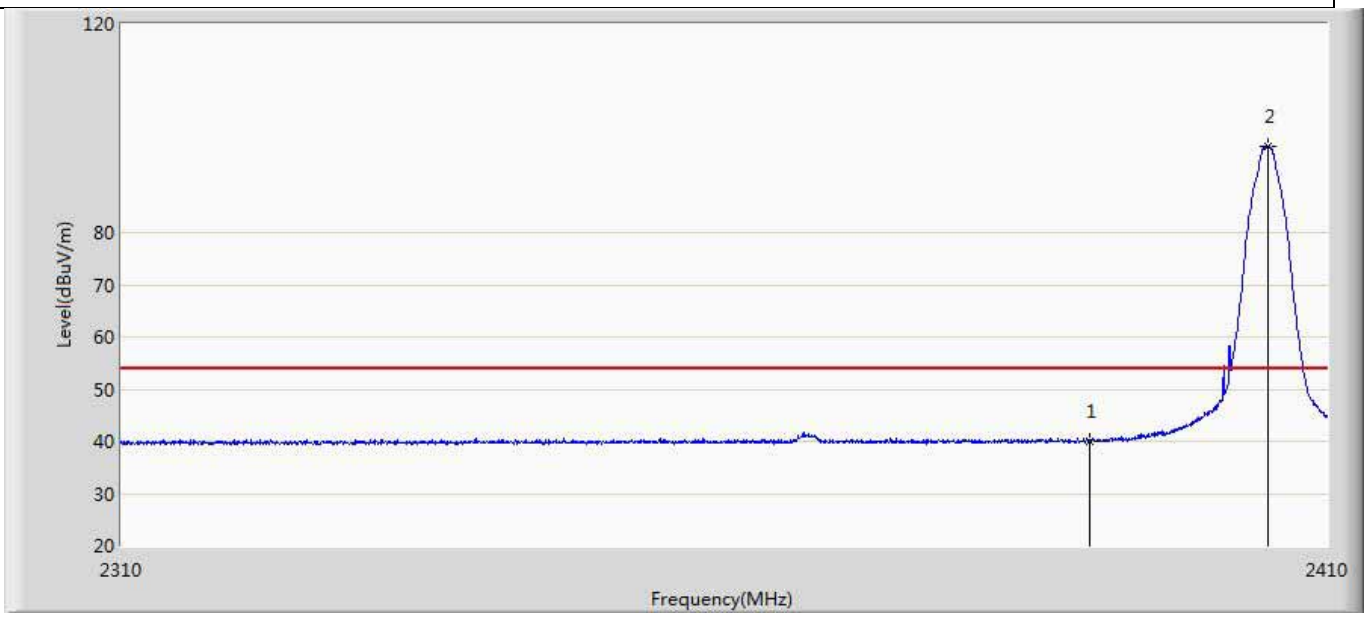
Murata:

Profile: 19A2159R	Page No.: 1
Engineer: Neil	
Site: AC5	Time: 2019/11/12 - 18:26
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



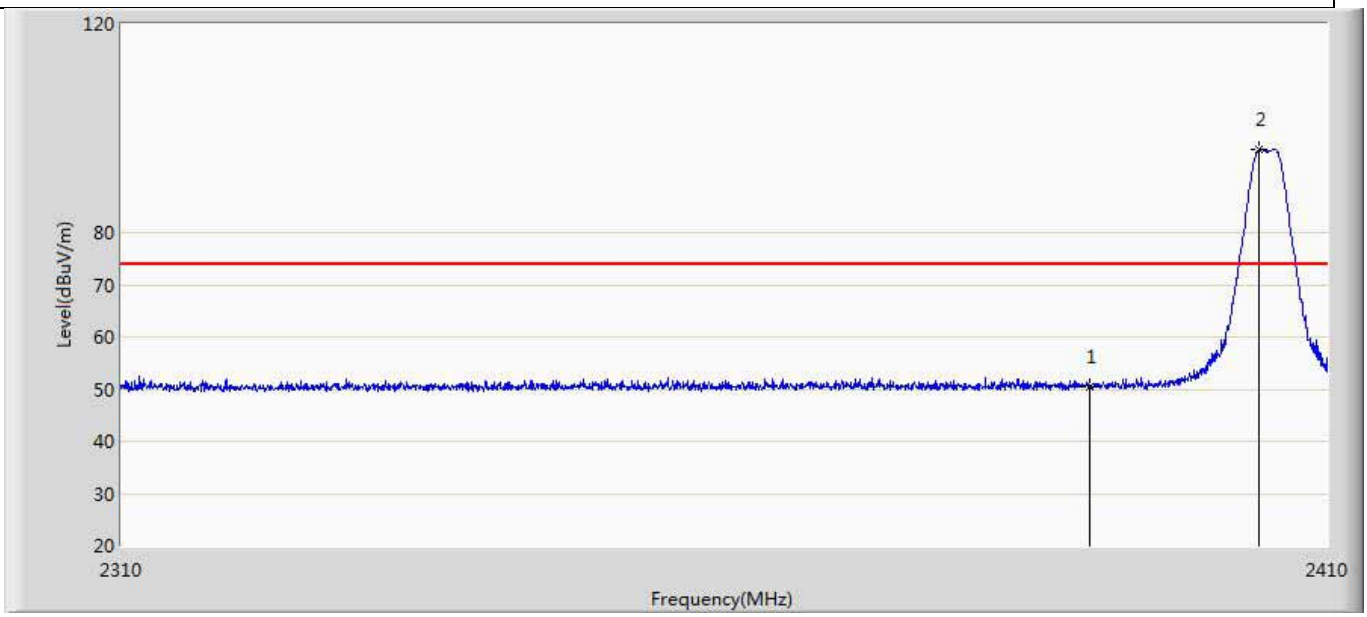
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	50.747	15.290	-23.253	74.000	35.458	PK
2	*	2404.500	99.713	64.241	N/A	N/A	35.472	PK

Profile: 19A2159R	Page No.: 2
Engineer: Neil	
Site: AC5	Time: 2019/11/12 - 18:51
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



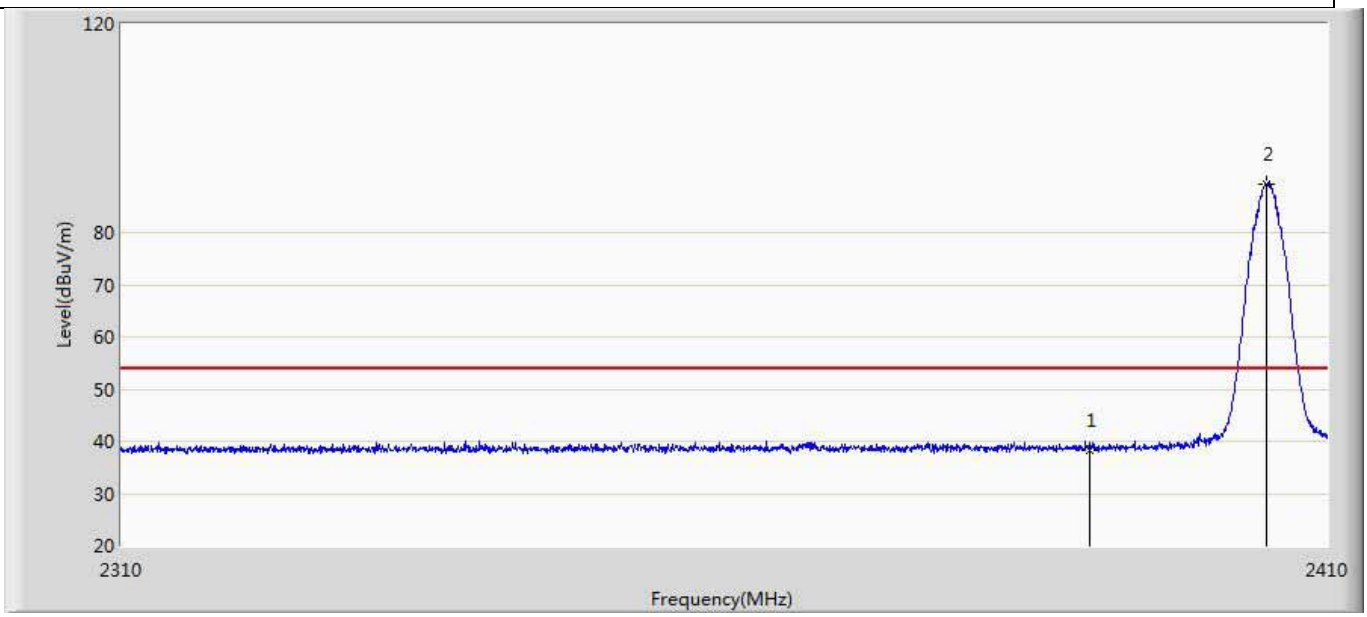
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	40.045	4.588	-13.955	54.000	35.458	AV
2	*	2405.000	96.563	61.090	N/A	N/A	35.473	AV

Profile: 19A2159R	Page No.: 3
Engineer: Neil	
Site: AC5	Time: 2019/11/12 - 18:56
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



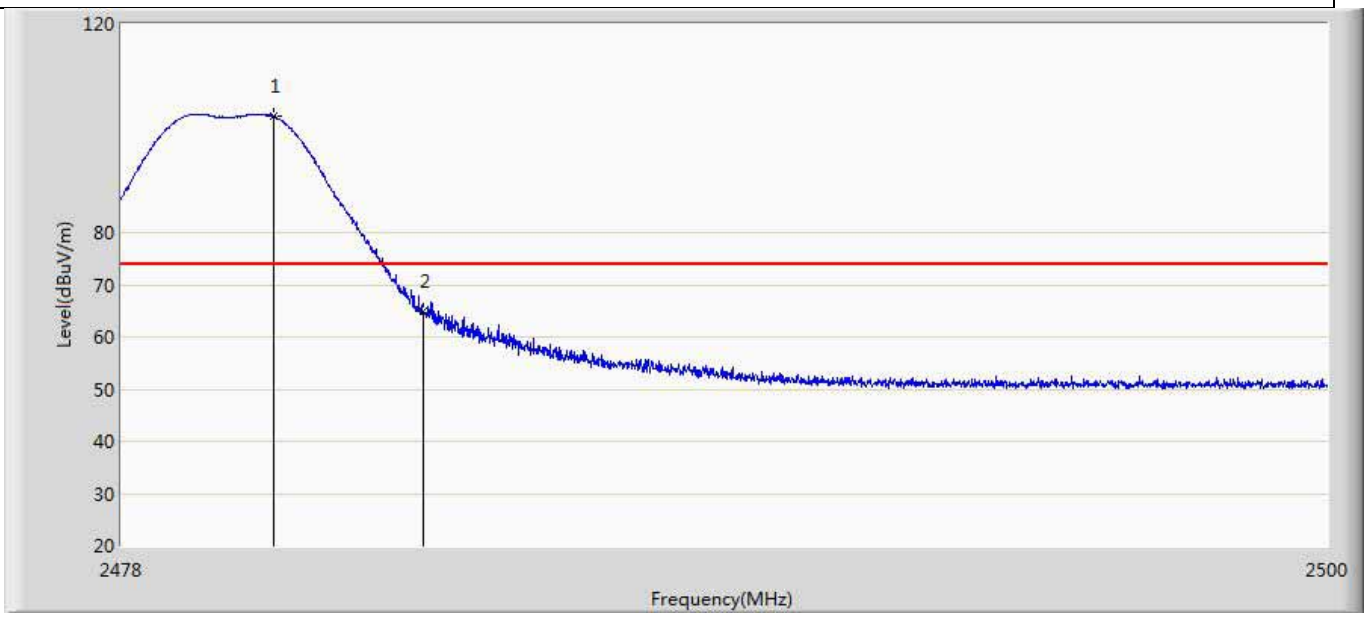
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	50.571	15.114	-23.429	74.000	35.458	PK
2	*	2404.250	95.938	60.466	N/A	N/A	35.472	PK

Profile: 19A2159R	Page No.: 4
Engineer: Neil	
Site: AC5	Time: 2019/11/12 - 18:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



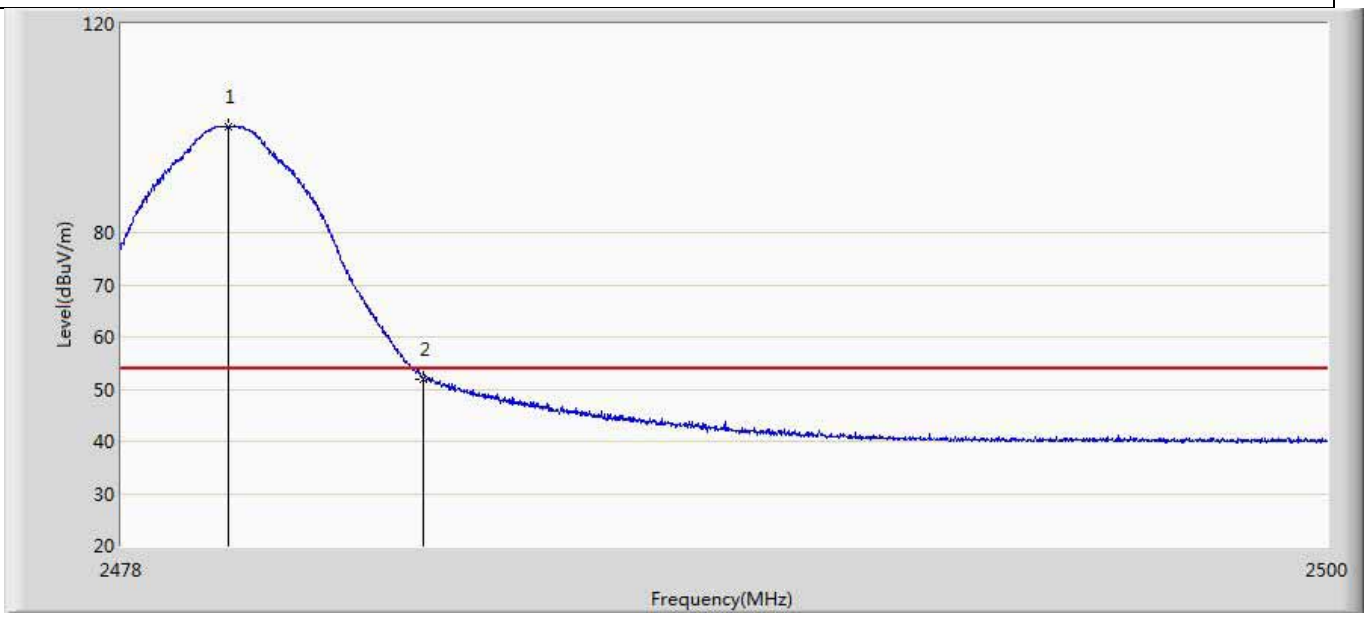
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	38.300	2.843	-15.700	54.000	35.458	AV
2	*	2404.850	89.260	53.787	N/A	N/A	35.473	AV

Profile: 19A2159R	Page No.: 5
Engineer: Neil	
Site: AC5	Time: 2019/11/12 - 19:10
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



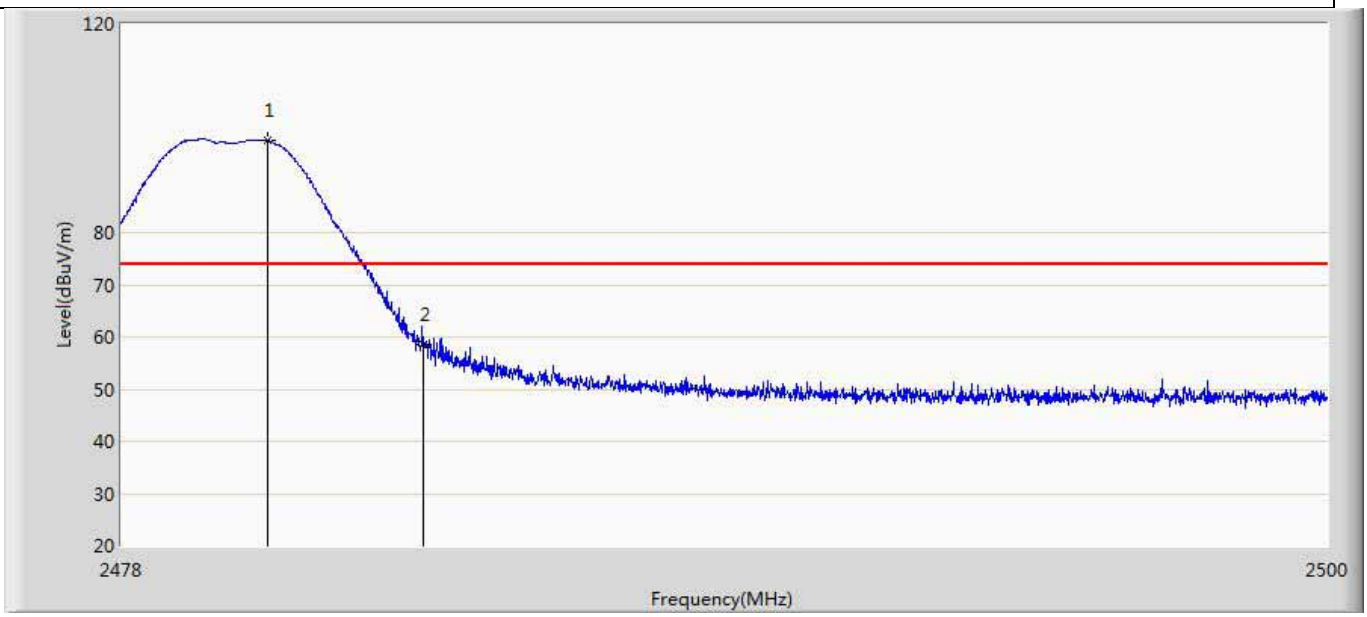
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.761	102.323	66.821	N/A	N/A	35.502	PK
2		2483.500	64.953	29.435	-9.047	74.000	35.517	PK

Profile: 19A2159R	Page No.: 6
Engineer: Neil	
Site: AC5	Time: 2019/11/12 - 19:13
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



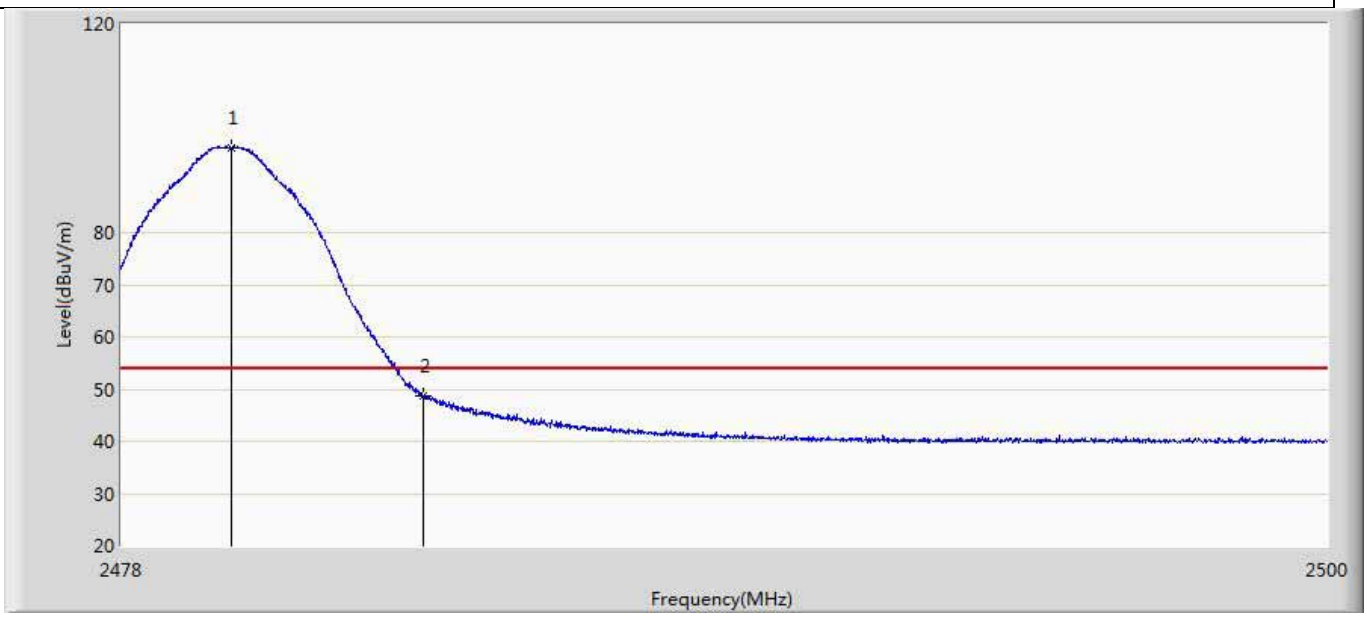
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2479.947	100.260	64.762	N/A	N/A	35.498	AV
2		2483.500	52.028	16.510	-1.972	54.000	35.517	AV

Profile: 19A2159R	Page No.: 7
Engineer: Neil	
Site: AC5	Time: 2019/11/12 - 19:15
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	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	*	2480.662	97.603	62.101	N/A	N/A	35.501	PK
2		2483.500	58.610	23.092	-15.390	74.000	35.517	PK

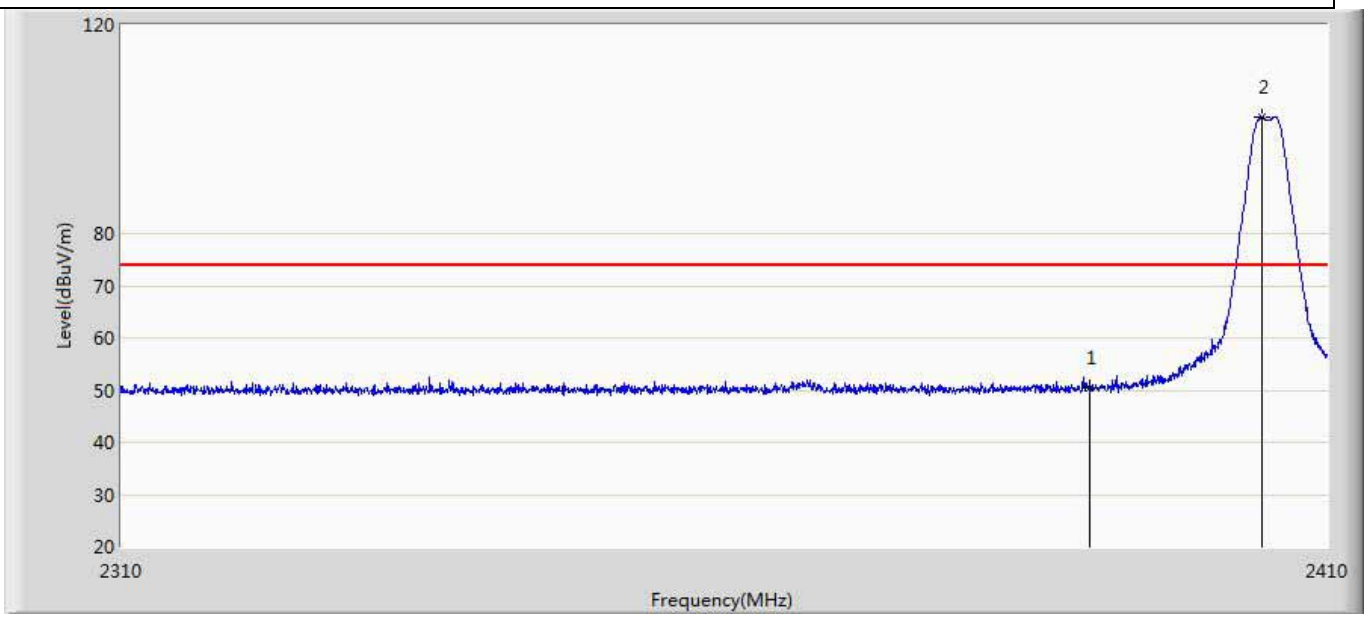
Profile: 19A2159R	Page No.: 8
Engineer: Neil	
Site: AC5	Time: 2019/11/12 - 19:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.013	96.291	60.793	N/A	N/A	35.498	AV
2		2483.500	48.554	13.036	-5.446	54.000	35.517	AV

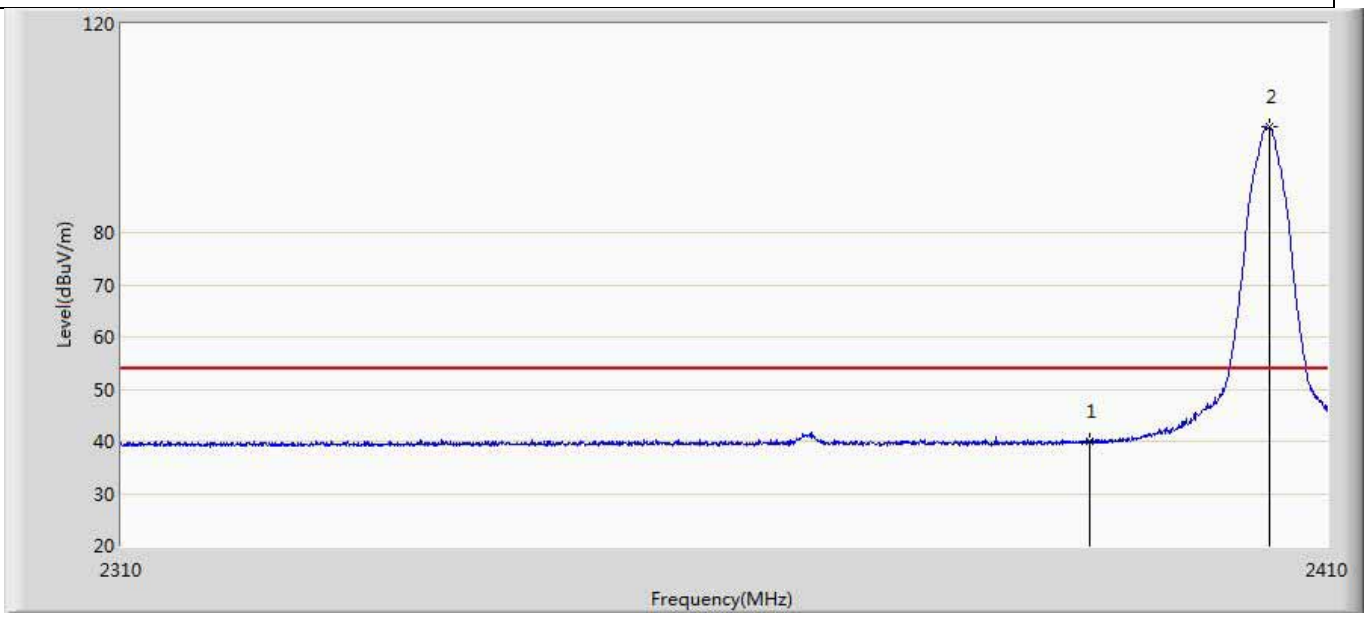
KDS:

Profile: 19A2159R	Page No.: 1
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 19:19
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



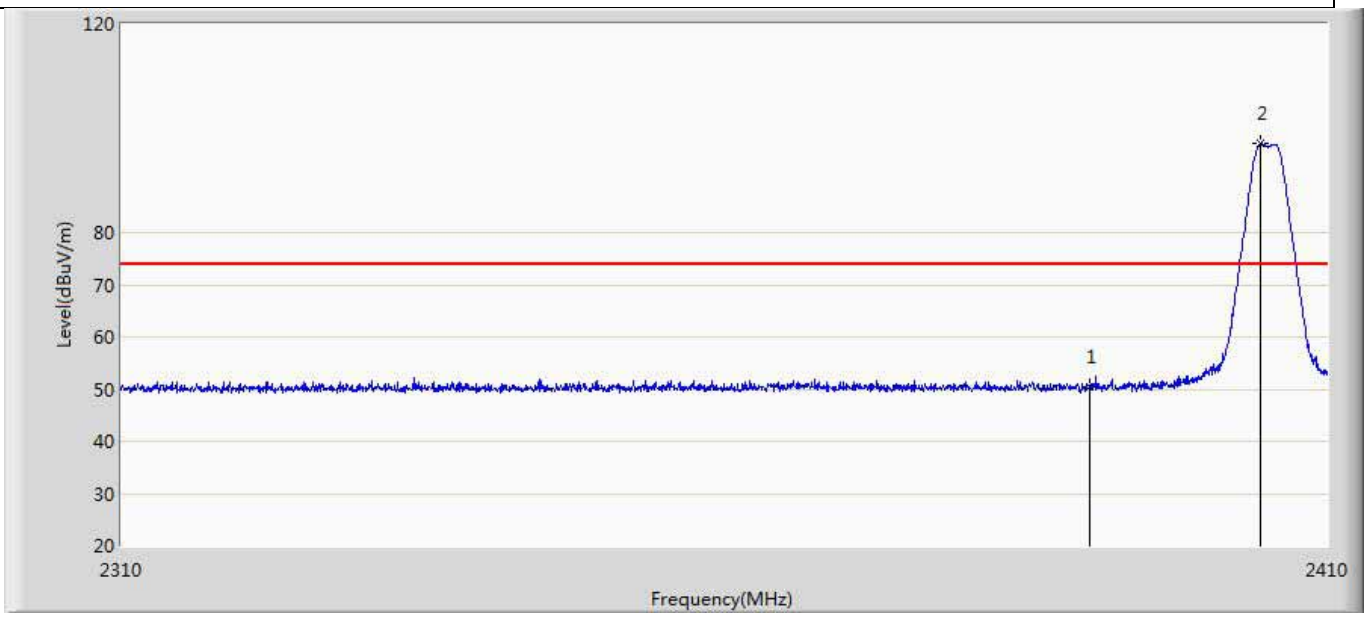
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	50.384	14.927	-23.616	74.000	35.458	PK
2	*	2404.500	102.386	66.914	N/A	N/A	35.472	PK

Profile: 19A2159R	Page No.: 2
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 19:22
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



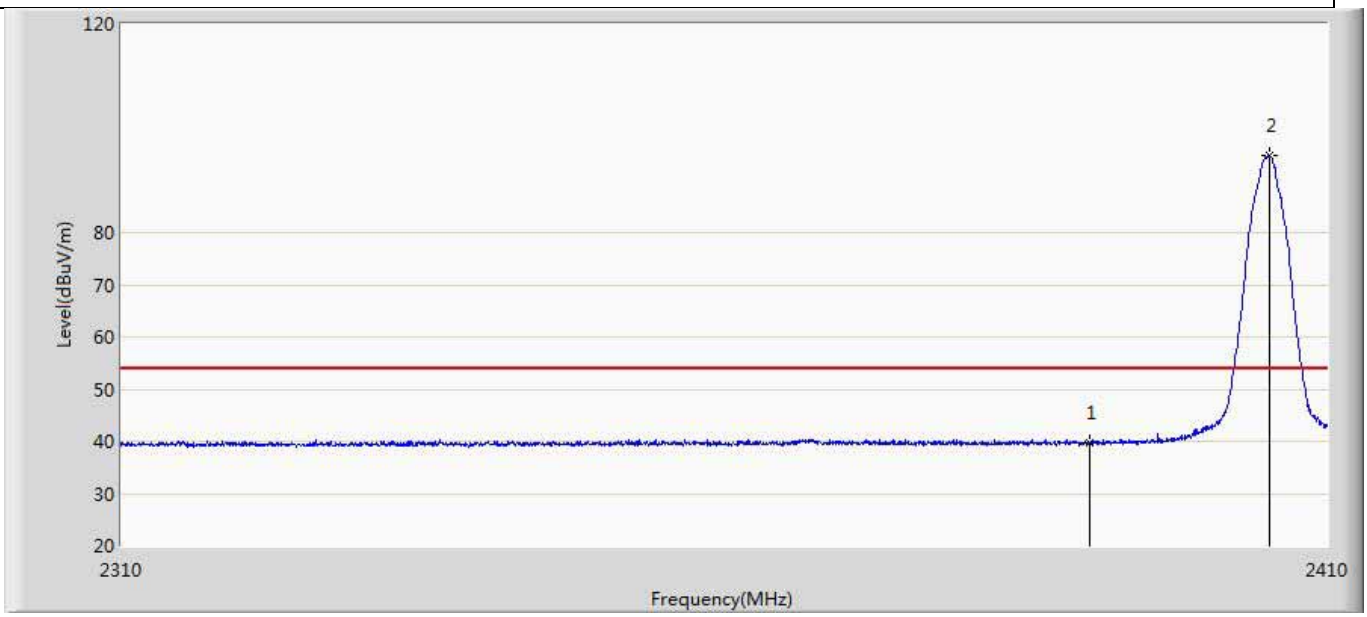
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	39.961	4.504	-14.039	54.000	35.458	AV
2	*	2405.150	100.260	64.787	N/A	N/A	35.473	AV

Profile: 19A2159R	Page No.: 3
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 19:23
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



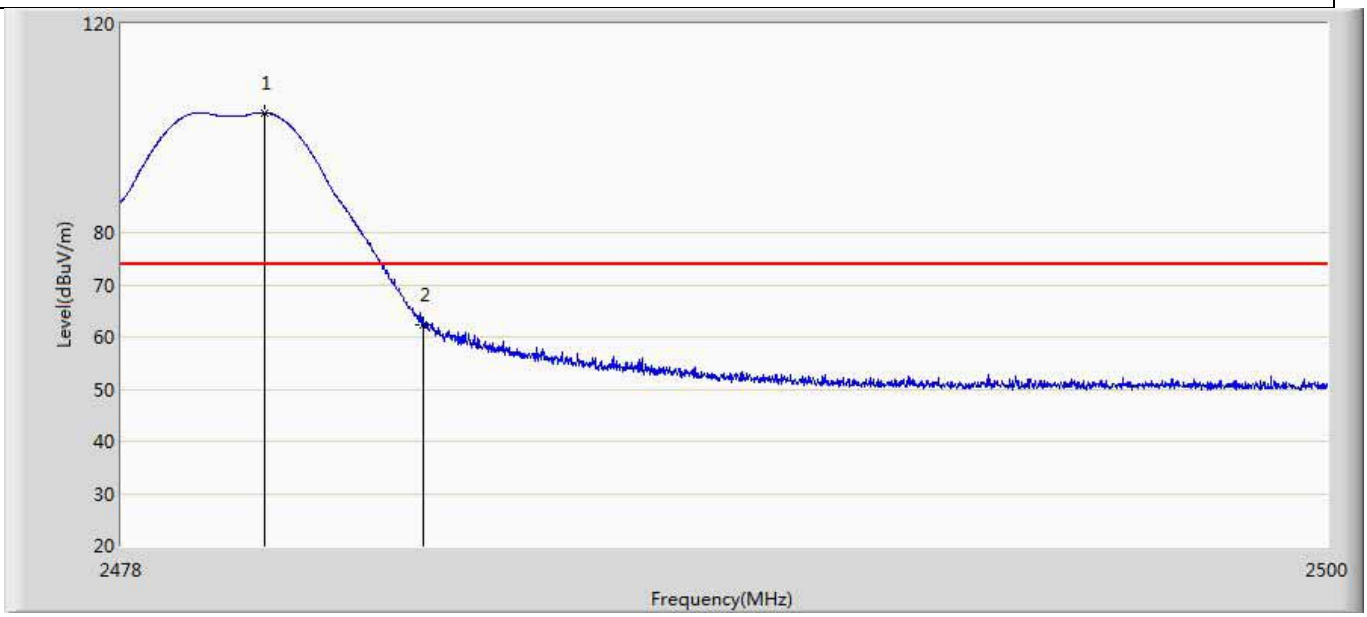
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	50.439	14.982	-23.561	74.000	35.458	PK
2	*	2404.400	96.971	61.499	N/A	N/A	35.472	PK

Profile: 19A2159R	Page No.: 4
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 19:27
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2405MHz by Zigbee	



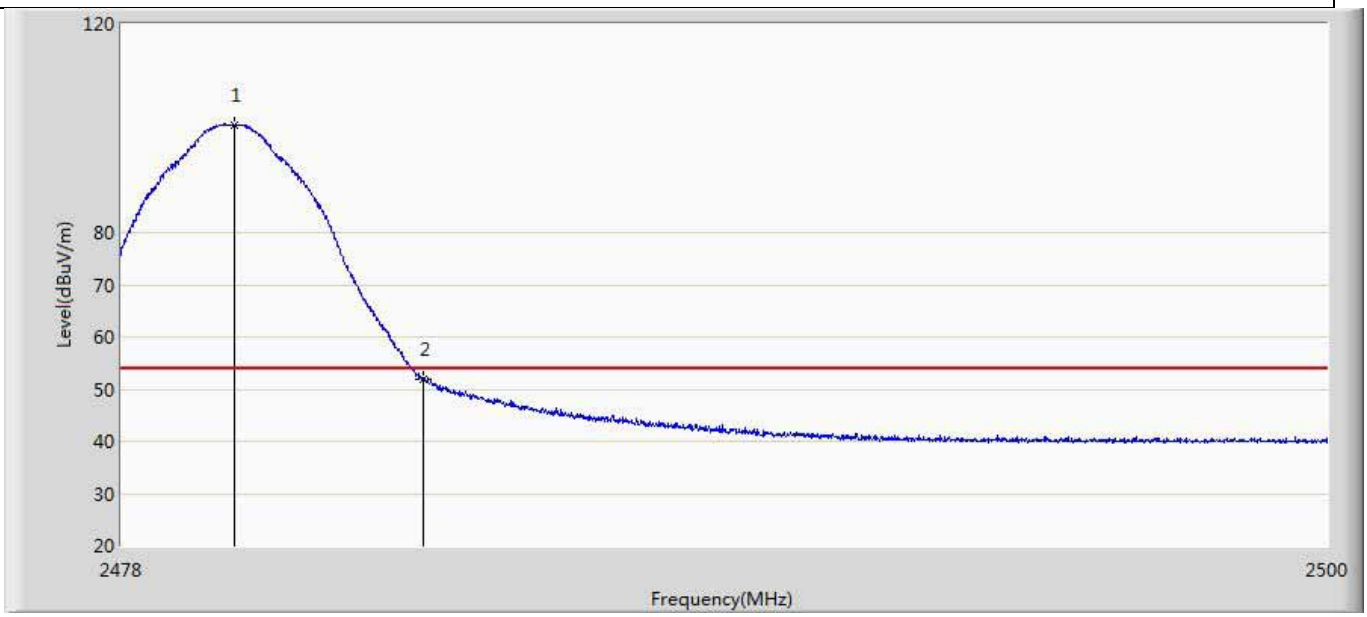
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2390.000	39.773	4.316	-14.227	54.000	35.458	AV
2	*	2405.150	94.707	59.234	N/A	N/A	35.473	AV

Profile: 19A2159R	Page No.: 5
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 19:31
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



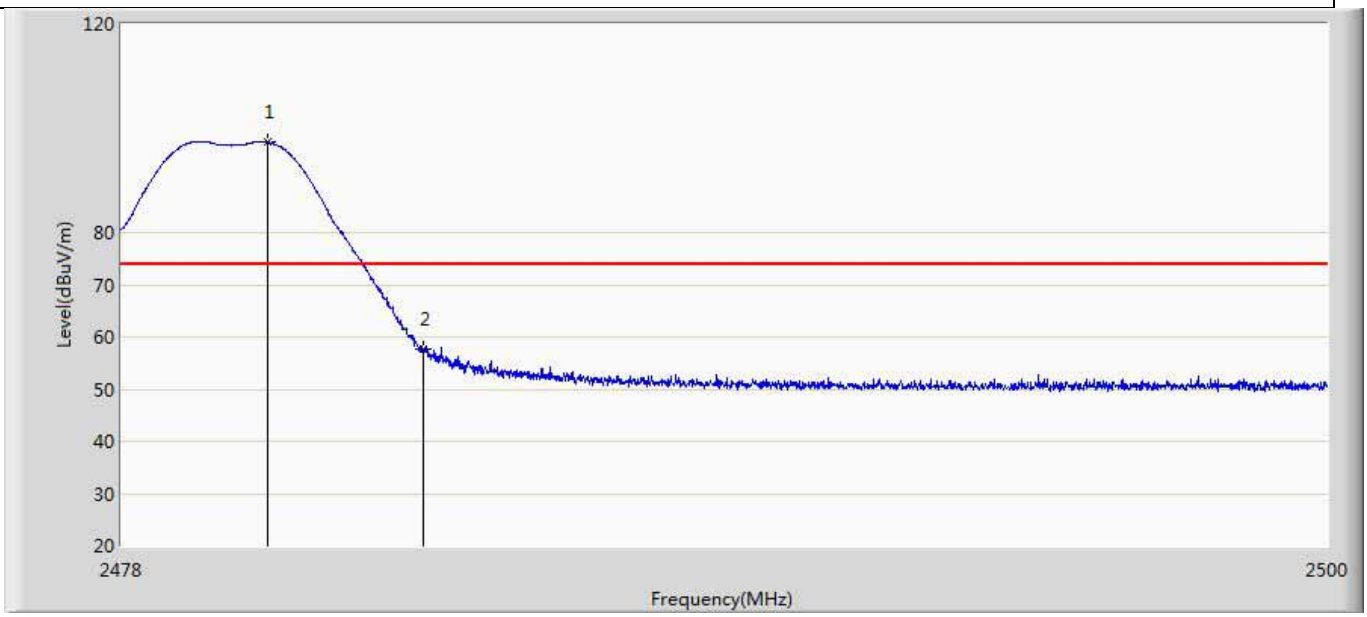
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.596	102.857	67.356	N/A	N/A	35.501	PK
2		2483.500	62.317	26.799	-11.683	74.000	35.517	PK

Profile: 19A2159R	Page No.: 6
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 19:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamp 9290022941	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by Zigbee	



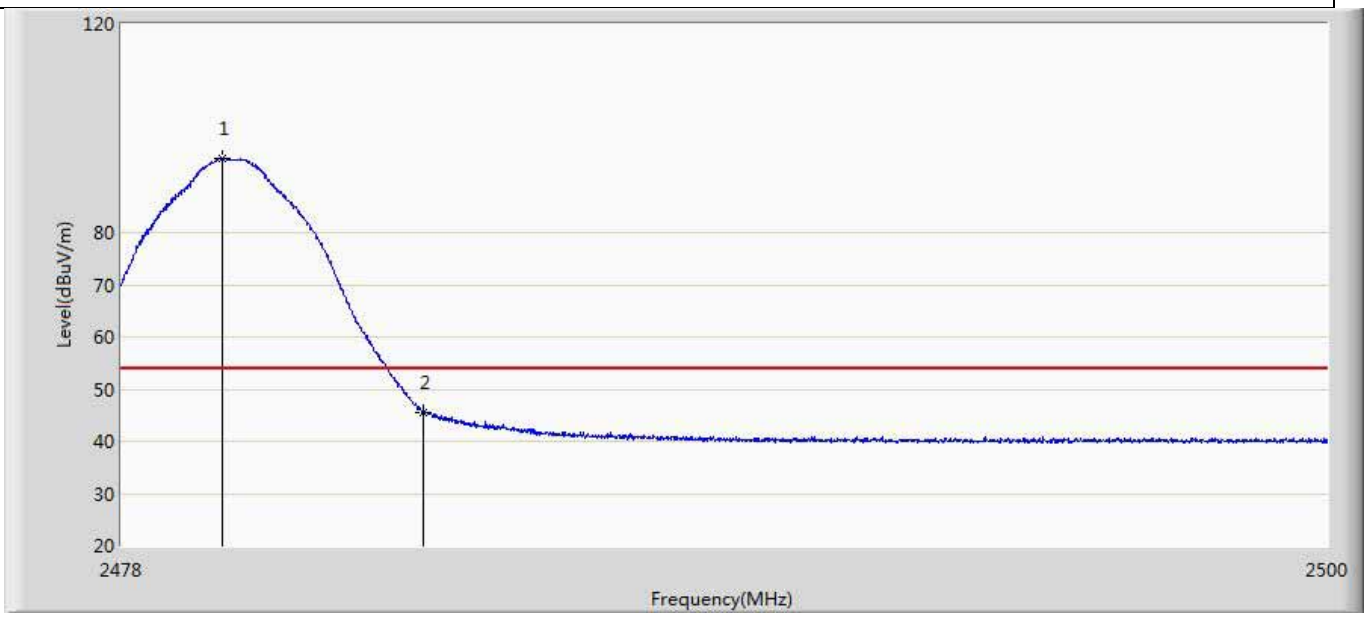
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2480.046	100.594	65.096	N/A	N/A	35.498	AV
2		2483.500	51.778	16.260	-2.222	54.000	35.517	AV

Profile: 19A2159R	Page No.: 7
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 19:34
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	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	*	2480.662	97.307	61.805	N/A	N/A	35.501	PK
2		2483.500	57.810	22.292	-16.190	74.000	35.517	PK

Profile: 19A2159R	Page No.: 8
Engineer: Neil	
Site: AC5	Time: 2019/11/14 - 19:35
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamp 9290022941	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	*	2479.837	94.086	58.589	N/A	N/A	35.497	AV
2		2483.500	45.563	10.045	-8.437	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.

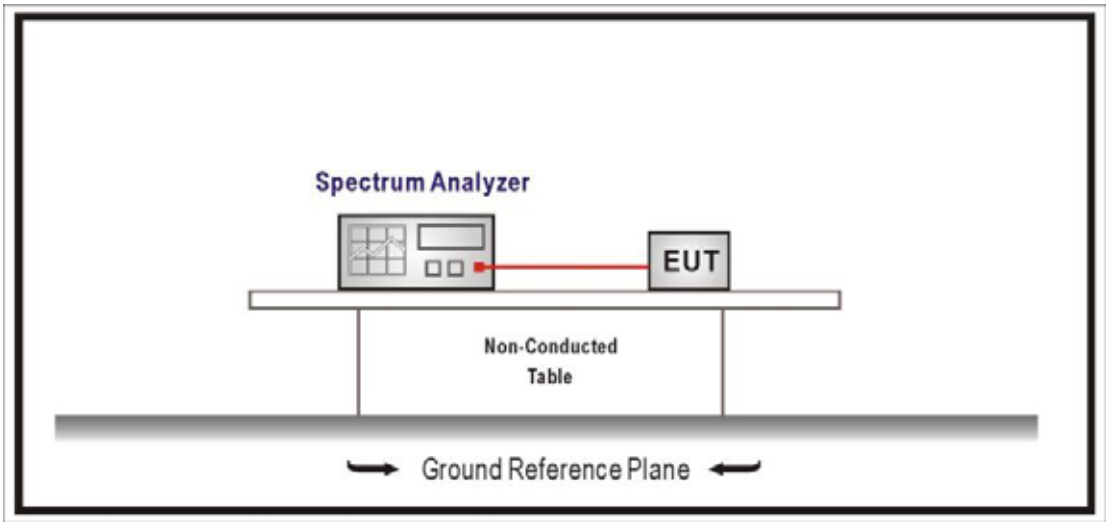
4.6 DTS Bandwidth — VERDICT: PASS

4.6.1 Limit

Standard	FCC Part 15 Subpart C Paragraph 15.247 (a)(2)

Systems using digital modulation techniques operate in the2400-2483.5 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
☒	ANSI C63.10		11.8	DTS bandwidth
	☐	ANSI C63.10	11.8.1	Option 1
	☒	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	2.3391	1.835	>500	Pass
	18	2440	2.3282	1.832	>500	Pass
	26	2480	2.3525	1.829	>500	Pass

Note : The worst case of Occupied Bandwidth as below in next page:

Mode 1 CH26 (2480MHz)

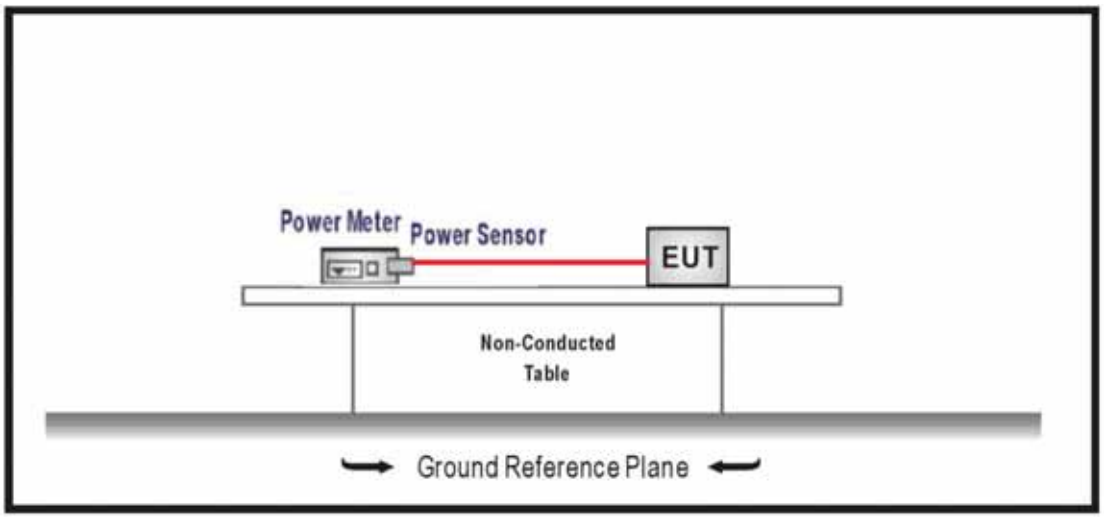
4.7 Fundamental emission output power — VERDICT: PASS

4.7.1 Limit

Standard			FCC Part 15 Subpart C Paragraph 15.247 (b)(3)
☒	GTX ＜6dBi		Pout≤30dBm
☐	GTX ＞6dBi		
	☐	Non-Fix point-point	Pout≤30-(GTX -6)
	☐	Fix point-point	Pout≤30-[(GTX-6)]/3
	☐	Point-to-multipoint	Pout≤30-(GTX-6)
	☐	Overlap Beams	Pout≤30-[(GTX-6)]/3
	☐	Aggregate power transmitted simultaneously on all beams	Pout≤30-[(GTX-6)]/3
	☐	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
☒	ANSI C63.10				11.9	Fundamental emission output power
	☒	ANSI C63.10			11.9.1	Maximum peak conducted output power
		☐	ANSI C63.10		11.9.1.1	RBW ≥ DTS bandwidth
		☐	ANSI C63.10		11.9.1.2	Integrated band power method
		☐	ANSI C63.10		11.9.1.3	PKPM1 Peak power meter method
	☐	ANSI C63.10			11.9.2	Maximum conducted (average) output power
		☐	ANSI C63.10		11.9.2.2	Measurement using a spectrum analyzer (SA)
			☐	ANSI C63.10	11.9.2.2.2	Method AVGSA-1(Duty cycle≥98%)
			☐	ANSI C63.10	11.9.2.2.3	Method AVGSA-1A(Duty cycle≥98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-2(Duty cycle≤98%)
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-2A(Duty cycle≤98%)
			☐	ANSI C63.10	11.9.2.2.4	Method AVGSA-3
			☐	ANSI C63.10	11.9.2.2.5	Method AVGSA-3A
		☒	ANSI C63.10		11.9.2.3	Measurement using a power meter (PM)
			☒	ANSI C63.10	11.9.2.3.1	Method AVGPM
			☐	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	11.87	≤30	Pass
	18	2440	11.79	≤30	Pass
	26	2480	11.65	≤30	Pass

KDS:

Mode	Channel	Test Frequency (MHz)	Power Output (dBm)	Limit (dBm)	Result
Mode 1	11	2405	11.69	≤30	Pass
	18	2440	11.71	≤30	Pass
	26	2480	11.62	≤30	Pass

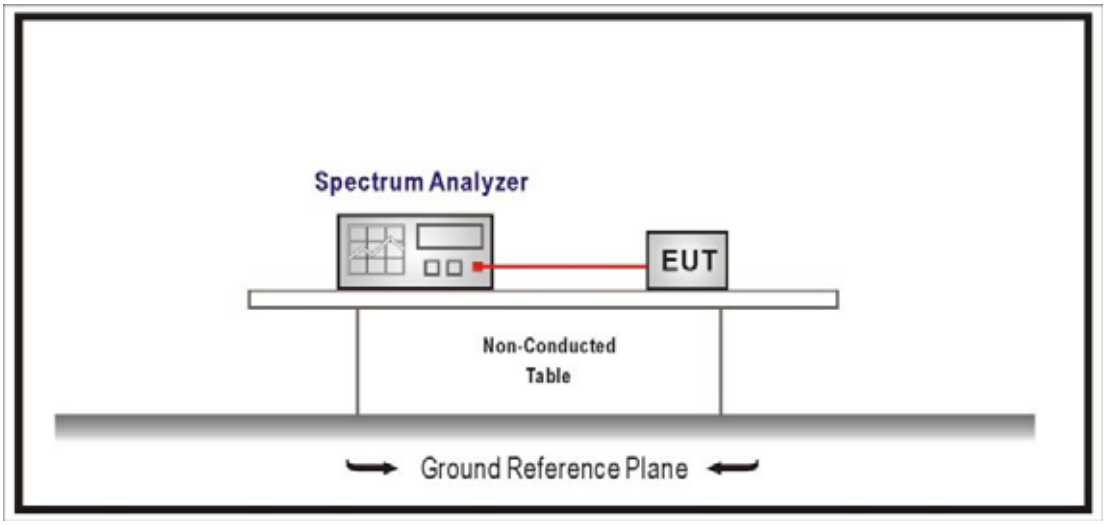
4.8 Power Density — VERDICT: PASS

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
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☒	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.5	Method AVGPSD-2(Duty cycle<98%)
	☐	ANSI C63.10	11.10.6	Method AVGPSD-2A(Duty cycle<98%)
	☐	ANSI C63.10	11.10.7	Method AVGPSD-3
	☐	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	-8.103	-8.103	≤8	Pass
	18	2440	-6.825	-6.825	≤8	Pass
	26	2480	-7.822	-7.822	≤8	Pass

Remark: The worst data as below:

Mode 1 CH18(2440MHz)

4.9 Antenna Requirement	VERDICT: PASS

4.9.1 **Limit:**	
Standard	FCC Part 15 Subpart C Paragraph 15.203

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.

4.9.2 **Antenna Connector Construction:**	
☒	The use of a permanently attached antenna
☐	The antenna use of a unique coupling to the intentional radiator
☐	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	VERDICT: PASS

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

The End