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Test report No:
21B0640R-RF-US-P06V01

FCC & ISED TEST REPORT

Product Name	LED lamp
Trademark	PHILIPS
FCC ID	2AGBW9290031451X
IC	20812-31451X
Model and /or type reference	9290031451
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	Adma Lu/Project Assistant Adma Lu
Approved by (name / position & signature)	Jack Zhang/ Supervisor Jack Zhang
Date of issue	2021-12-06
Report template No	21B0640R-RF-US-P06V01

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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)	Nov. 17, 2021
Date (start test)	Nov. 18, 2021
Date (finish test)	Dec. 04, 2021

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
21B0640R-RF-US-P06V01	V1.0	Initial issue of report.	2021-12-06

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	2021.04.28	2022.04.29
Two-Line V-Network	R&S	ENV216	101190	2021.01.27	2022.02.26
Two-Line V-Network	R&S	ENV216	101044	2021.03.20	2022.03.19
Current Probe	R&S	EZ-17	100678	2021.01.27	2022.01.26
50ohm Termination	SHX	TF2	07081403	2021.09.04	2022.09.03
50ohm Coaxial Switch	Anritsu	MP59B	6200464462	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	TR1-TH	2021.07.09	2022.07.08
Coaxial Cable	Suhner	RG 223	TR1-C1	2021.07.09	2022.07.08
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	2021.07.11	2022.07.10
EXA Spectrum Analyzer	Keysight	N9010A	MY55370495	2021.07.11	2022.07.10
MXA Signal Anlyzer	Keysight	N9020A	MY56060147	2021.07.11	2022.07.10
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	2021.10.30	2022.10.29
Temperature/Humidity Meter	RTS	RTS-8S	AC2-TH	2021.10.08	2022.10.07
Coaxial Cable	Huber+Suhner	RG 214	AC2-C	2021.03.31	2022.03.30
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	2021.05.06	2022.05.05
DRG Horn	ETS-Lindgren	3117	00123988	2021.10.22	2022.10.21
Temperature/Humidity Meter	Zhichen	ZC1-2	AC5-TH	2021.07.09	2022.07.08
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC5-C2	2021.03.31	2022.03.30
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 complice 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	± 1.27dB
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. ..... :	9290031451
Trademark ..... :	PHILIPS
Manufacturer..... :	Signify (China) Investment Co., Ltd.
Manufacturer Address..... :	Building no.9, Lane 888, Tianlin Road, Minhang District, Shanghai, 200233, China

Wireless specifiction..... :	Bluetooth 5.0
Operating frequency range(s)	2400~2483.5MHz
Type of Modulation..... :	GFSK
Number of channel..... :	40
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
	☐	DC: 15~24Vdc
	☐	Battery: 3.7V
Mounting position.....:	☐	Table top equipment
	☒	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held equipment
	☐	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 is showed in the report with test items power and bandwidth; 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		
Antenna technology ..... :	☒	SISO		
	☐	MIMO	☐	CDD
			☐	Beam-forming
Antenna Type ..... :	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☐	PIFA
			☒	PCB
			☐	Ceramic Chip
			☐	Others……..
Antenna Gain..... :	-2 dBi			

1.3 Channel List

Bluetooth Working Frequency of Each Channel: (For V5.0)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz	03	2408 MHz
04	2410 MHz	05	2412 MHz	06	2414 MHz	07	2416 MHz
08	2418 MHz	09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz	15	2432 MHz
16	2434 MHz	17	2436 MHz	18	2438 MHz	19	2440 MHz
20	2442 MHz	21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz	27	2456 MHz
28	2458 MHz	29	2460 MHz	30	2462 MHz	31	2464 MHz
32	2466 MHz	33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz	39	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.

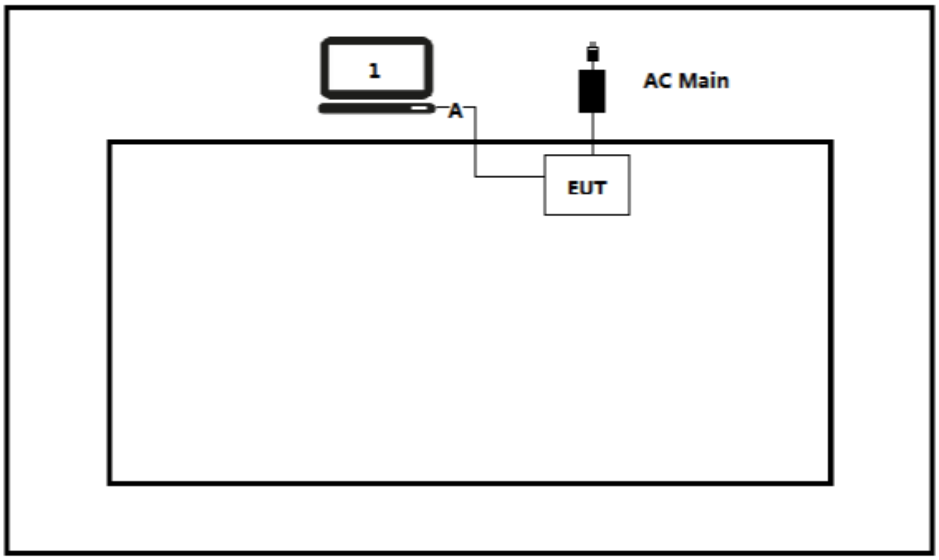
Test Mode For Bluetooth	Mode 1: Transmit by LE_1Mbps(GFSK_LE)
	Mode 2: Transmit by LE_2Mbps(GFSK_LE)
	Mode 3: Transmit by LE_Coded(S=2)(GFSK_LE)
	Mode 4: Transmit by LE_Coded(S=8)(GFSK_LE)

2.2 Auxiliary equipment / Test software for the EUT

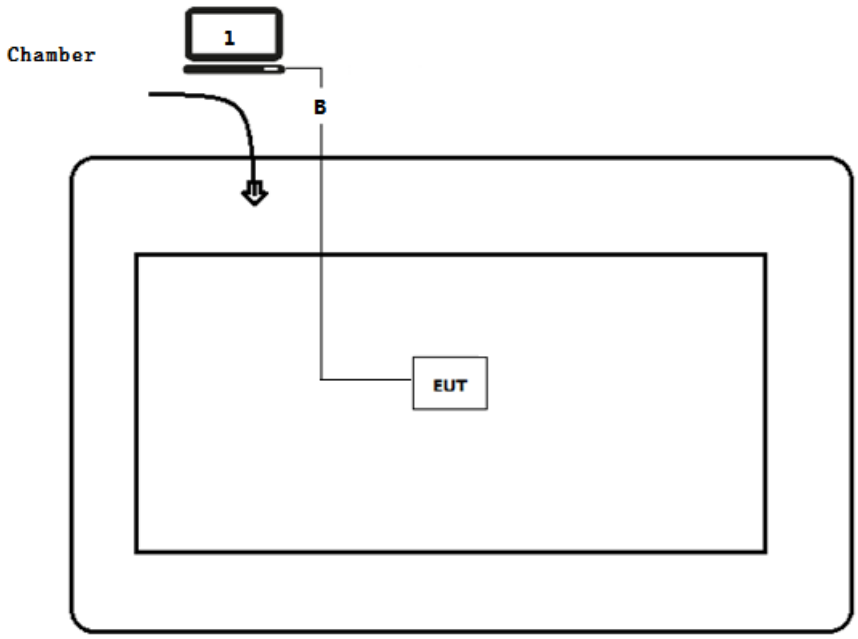
Auxiliary equipment	Type / Version	Manufacturer	Supplied by
Notebook	E470	Lenovo	N/A
software	Type / Version	Manufacturer	Supplied by
HueApprobationTool	1.1.00	Philips	N/A

2.3 Test Configuration / Block diagram used for tests

Test setup Diagram- AC Line Conducted Emission Test



Test setup Diagram- Radiated Emission



2.4 Testing process

1	Setup the EUT as shown in Section 2.4.
2	Execute the HueApprobationTool 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 D01 v05r02	2019	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

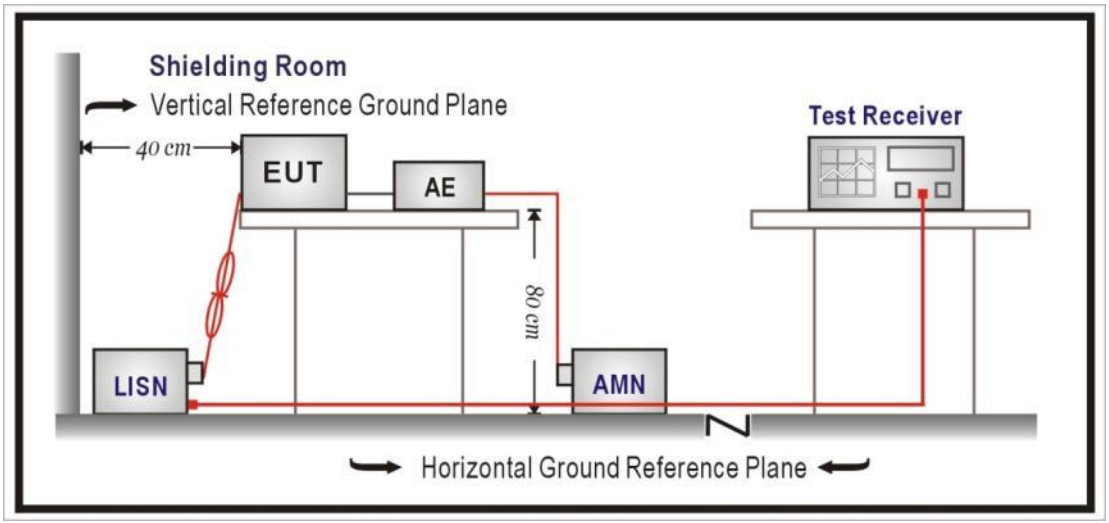
4.1 AC Power Line Conducted Emission	VERDICT: PASS

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

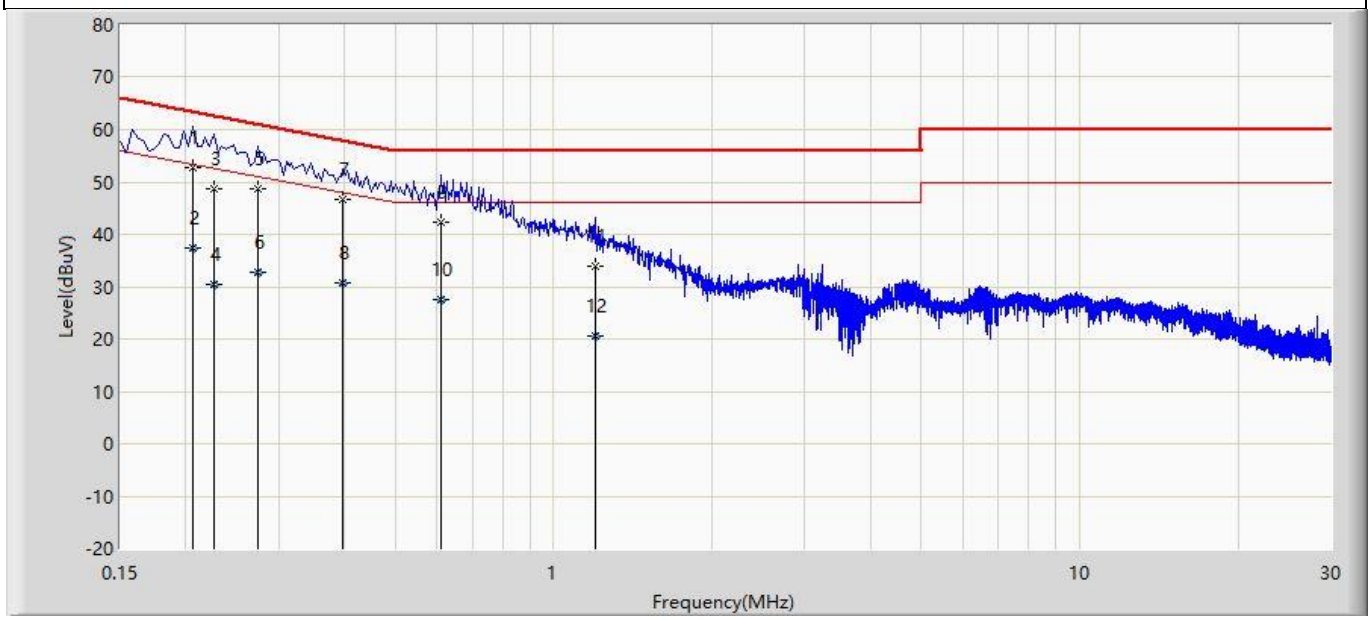


4.1.3 Test Procedure

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

4.1.4 Test Data

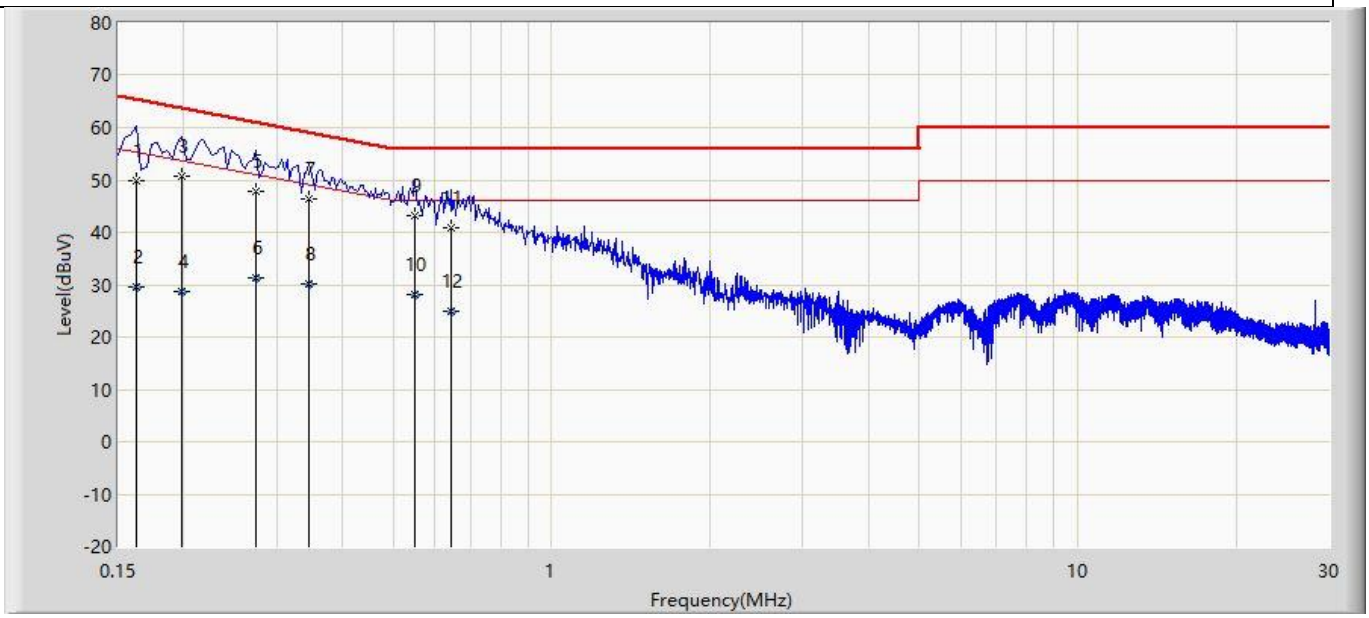
Profile: 21B0640R	Page No.: 1
Engineer: Carlosshen	
Site: TR1	Time: 2021/12/01 - 09:16
Limit: FCC_Part115.207_CE_AC Power_Class B	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Line
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Probe (dB)	Cable (dB)	Amp (dB)	Type
1	*	0.206	52.745	43.067	-10.620	63.365	9.649	0.029	0.000	QP
2		0.206	37.298	27.620	-16.067	53.365	9.649	0.029	0.000	AV
3		0.226	48.636	38.958	-13.959	62.595	9.649	0.029	0.000	QP
4		0.226	30.325	20.647	-22.270	52.595	9.649	0.029	0.000	AV
5		0.274	48.804	39.124	-12.192	60.996	9.647	0.033	0.000	QP
6		0.274	32.699	23.019	-18.297	50.996	9.647	0.033	0.000	AV
7		0.398	46.765	37.083	-11.130	57.895	9.643	0.039	0.000	QP
8		0.398	30.614	20.932	-17.281	47.895	9.643	0.039	0.000	AV
9		0.610	42.363	32.677	-13.637	56.000	9.640	0.045	0.000	QP
10		0.610	27.414	17.729	-18.586	46.000	9.640	0.045	0.000	AV
11		1.198	33.774	24.071	-22.226	56.000	9.640	0.063	0.000	QP
12		1.198	20.722	11.019	-25.278	46.000	9.640	0.063	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: 21B0640R	Page No.: 2
Engineer: Carlosshen	
Site: TR1	Time: 2021/12/01 - 09:21
Limit: FCC_Part115.207_CE_AC Power_Class B	Margin: 0
Probe: ENV216_101190(0.009-30MHz)	Polarity: Neutral
EUT: LED lamps	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		0.162	49.969	40.316	-15.392	65.361	9.627	0.025	0.000	QP
2		0.162	29.469	19.816	-25.892	55.361	9.627	0.025	0.000	AV
3		0.198	50.681	41.031	-13.014	63.694	9.621	0.028	0.000	QP
4		0.198	28.830	19.181	-24.864	53.694	9.621	0.028	0.000	AV
5		0.274	47.805	38.152	-13.191	60.996	9.620	0.033	0.000	QP
6		0.274	31.212	21.559	-19.784	50.996	9.620	0.033	0.000	AV
7	*	0.346	46.442	36.786	-12.616	59.058	9.620	0.035	0.000	QP
8		0.346	30.199	20.544	-18.859	49.058	9.620	0.035	0.000	AV
9		0.550	43.095	33.433	-12.905	56.000	9.620	0.042	0.000	QP
10		0.550	28.245	18.583	-17.755	46.000	9.620	0.042	0.000	AV
11		0.646	41.006	31.339	-14.994	56.000	9.620	0.047	0.000	QP
12		0.646	24.858	15.191	-21.142	46.000	9.620	0.047	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			

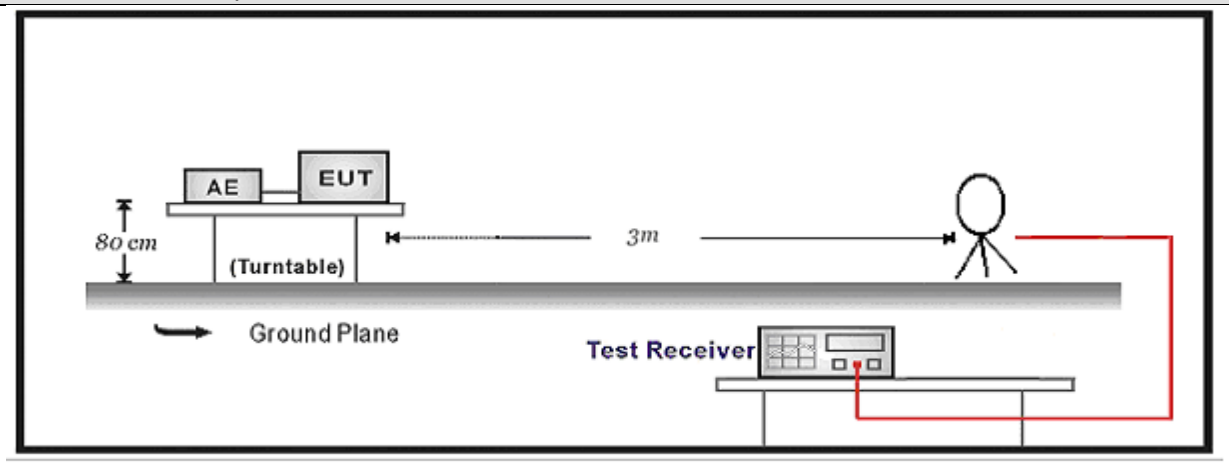
Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30(Note 1)
1.705 - 30	30	29.5	30(Note 1)
30 - 88	100	40	3(Note 2)
88 - 216	150	43.5	3(Note 2)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

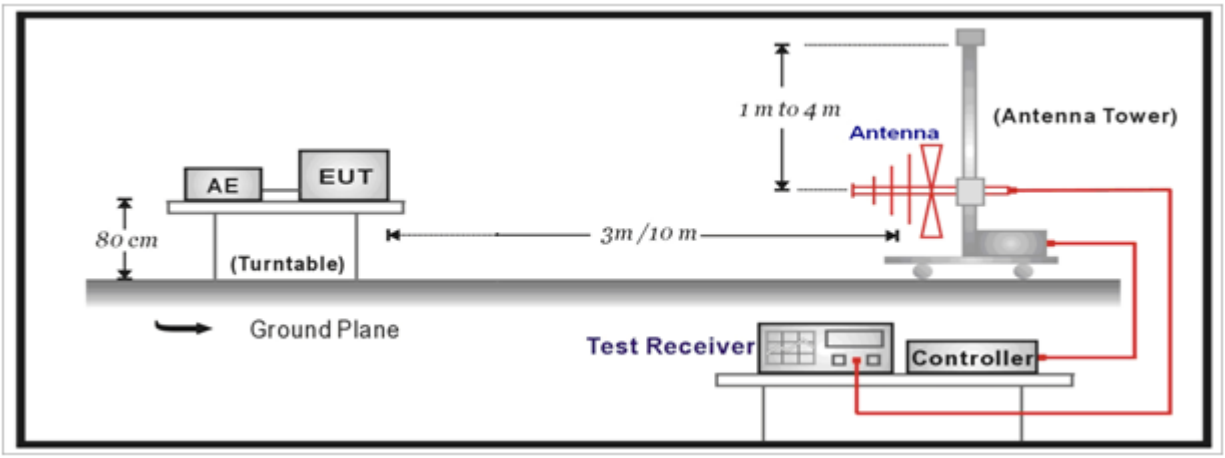
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated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

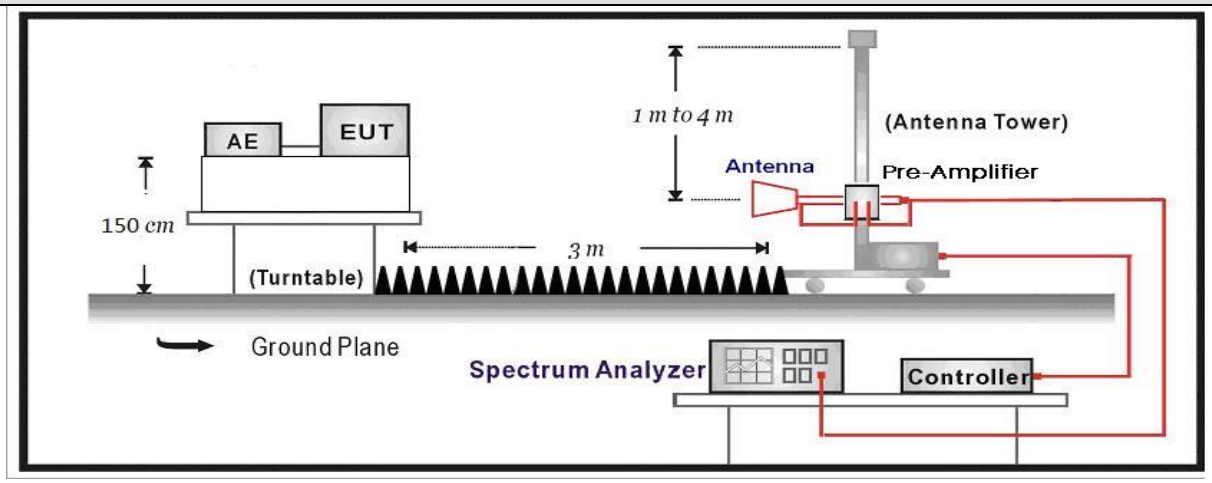
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:

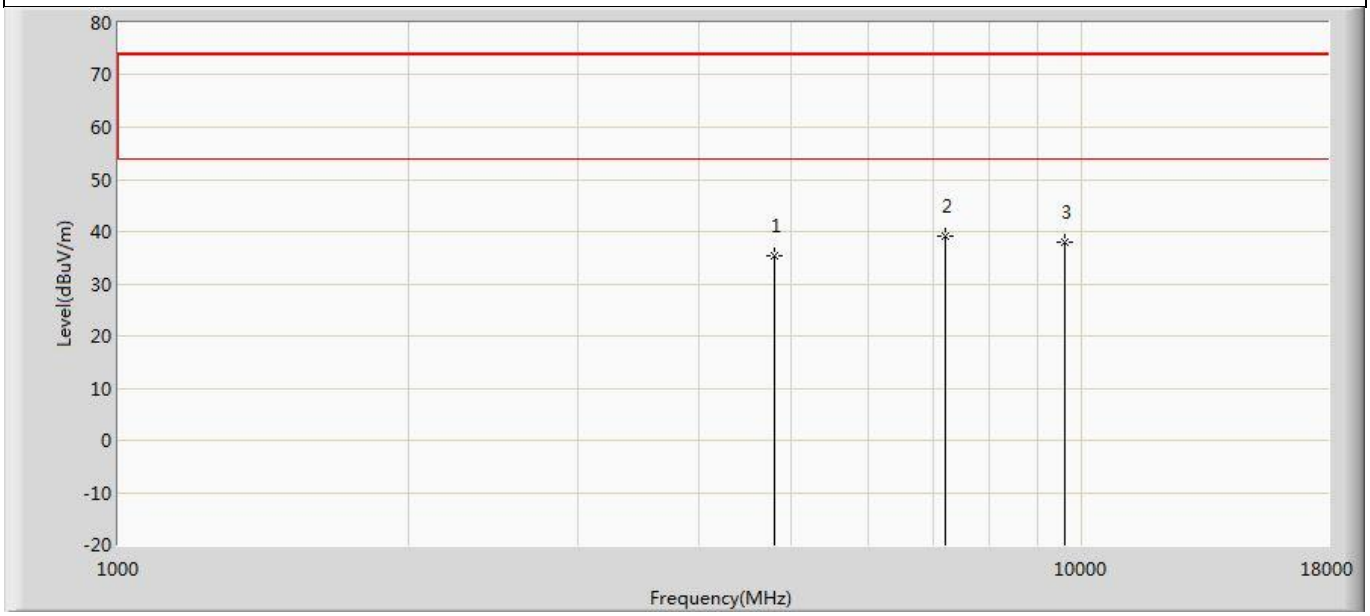


4.2.3 Test Procedure

	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

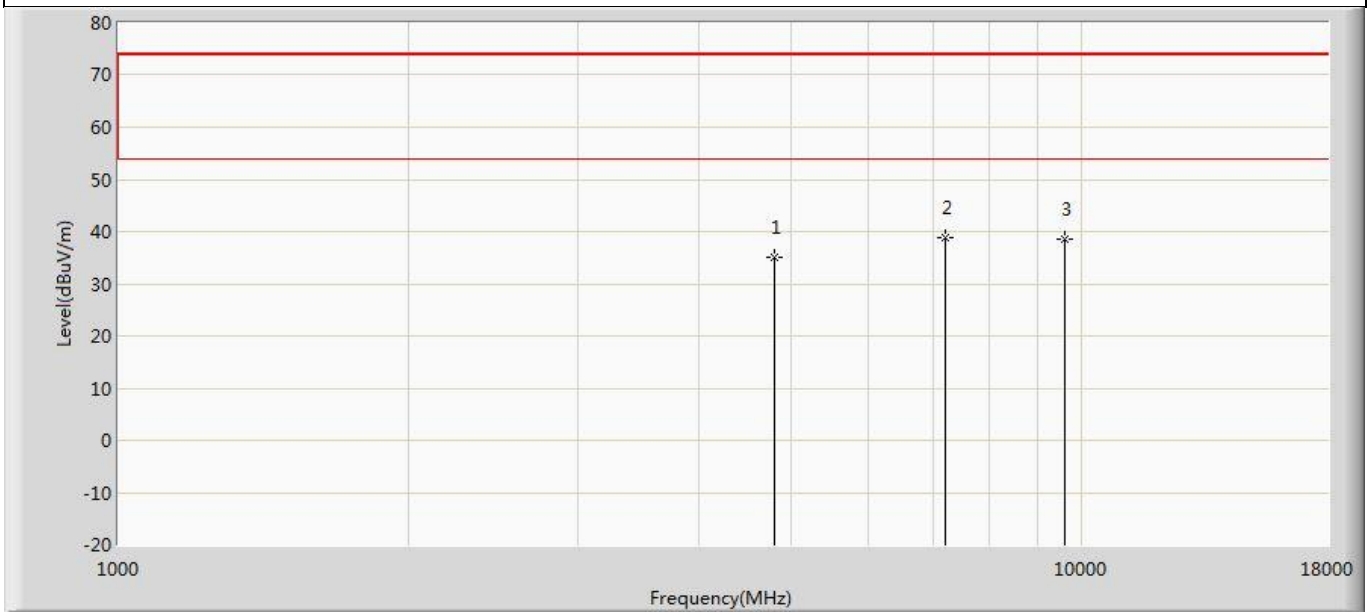
4.2.4 Test Data

Profile: 21B0640R	Page No.: 77
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by LE_1Mbps(GFSK_LE)	



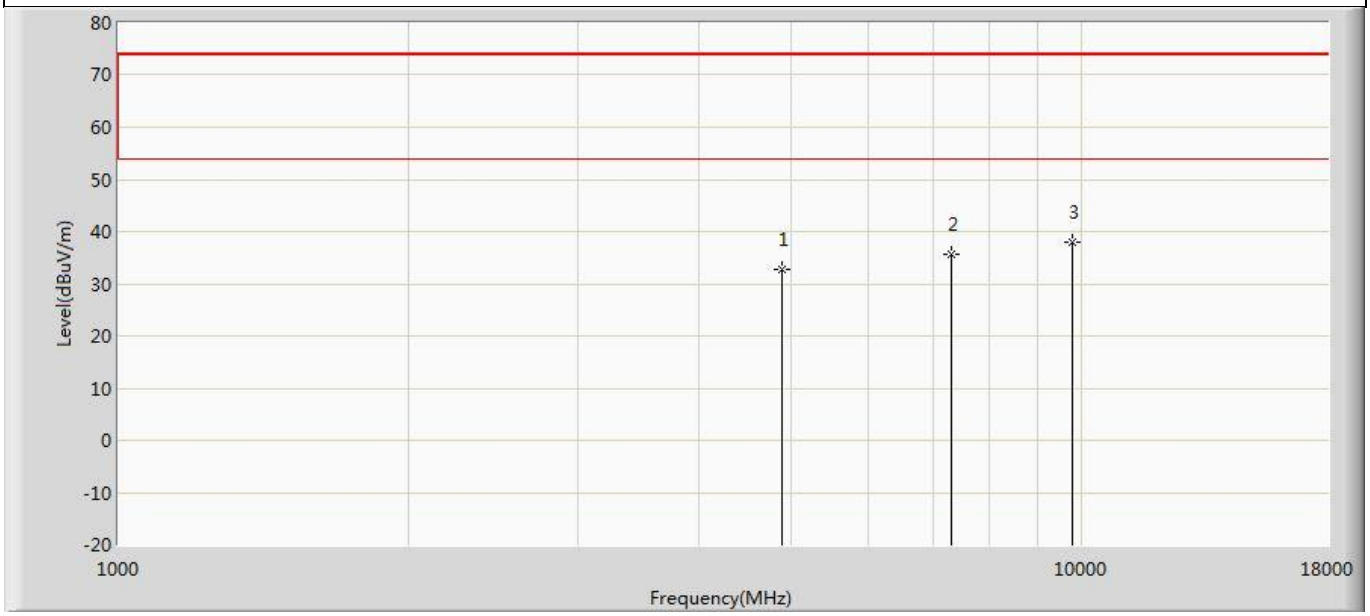
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	35.409	40.452	-38.591	74.000	-5.044	PK
2	*	7206.000	39.154	40.200	-34.846	74.000	-1.046	PK
3		9608.000	38.003	35.173	-35.997	74.000	2.830	PK

Profile: 21B0640R	Page No.: 78
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by LE_1Mbps(GFSK_LE)	



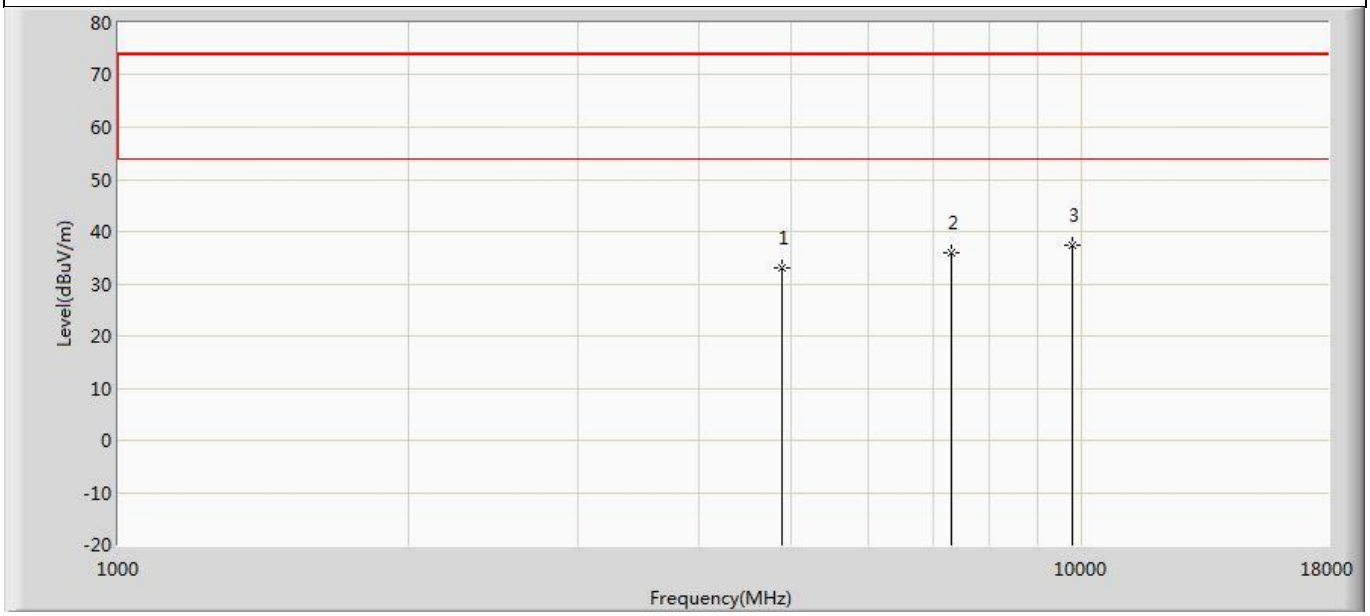
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	34.948	39.991	-39.052	74.000	-5.044	PK
2	*	7206.000	38.896	39.942	-35.104	74.000	-1.046	PK
3		9608.000	38.521	35.691	-35.479	74.000	2.830	PK

Profile: 21B0640R	Page No.: 85
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440MHz by LE_1Mbps(GFSK_LE)	



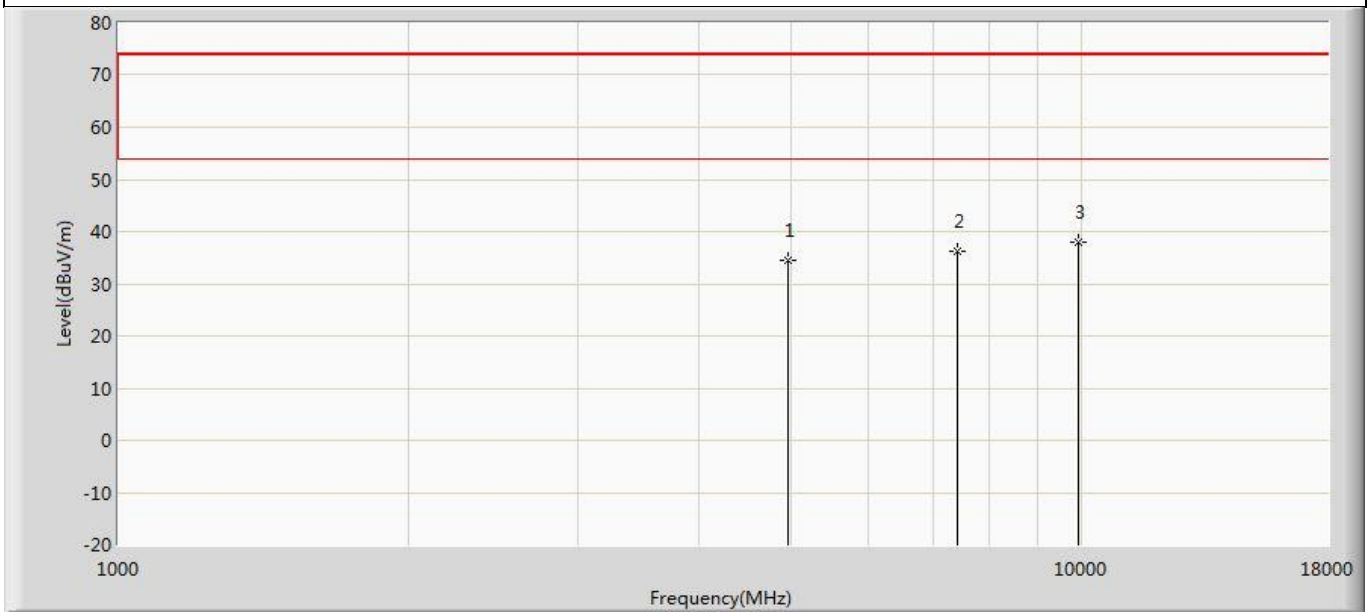
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	32.887	37.714	-41.113	74.000	-4.827	PK
2		7320.000	35.676	36.569	-38.324	74.000	-0.893	PK
3	*	9760.000	37.860	34.862	-36.140	74.000	2.998	PK

Profile: 21B0640R	Page No.: 86
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2440MHz by LE_1Mbps(GFSK_LE)	



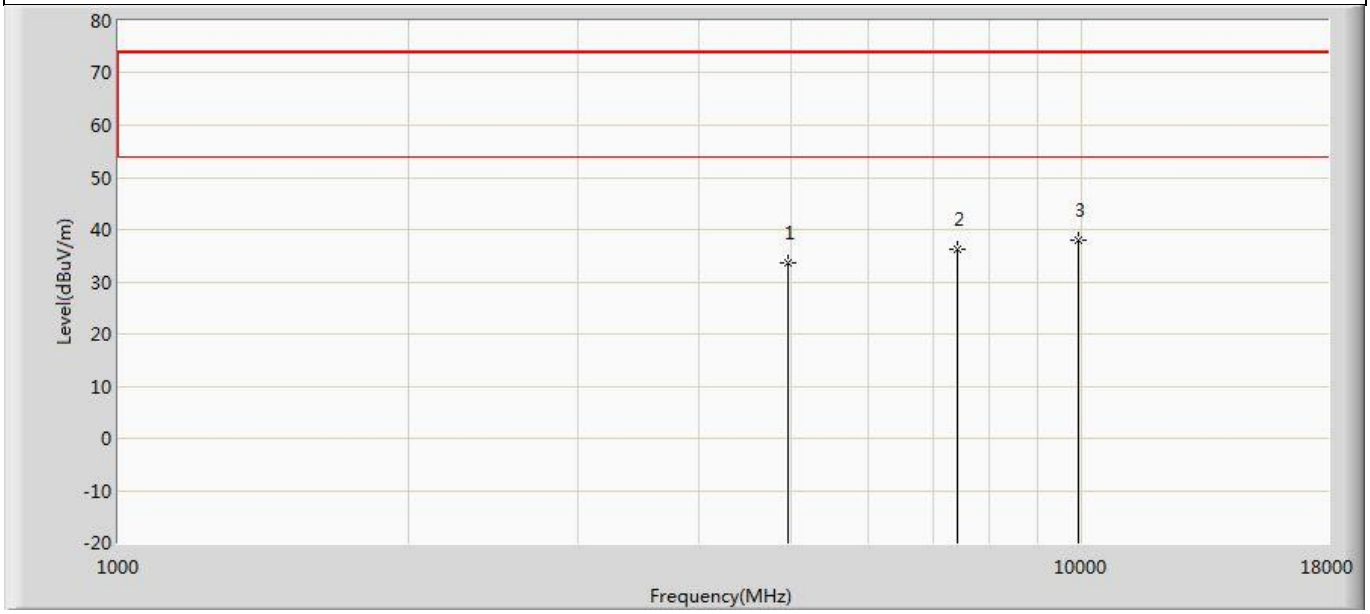
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	33.050	37.877	-40.950	74.000	-4.827	PK
2		7320.000	35.896	36.789	-38.104	74.000	-0.893	PK
3	*	9760.000	37.402	34.404	-36.598	74.000	2.998	PK

Profile: 21B0640R	Page No.: 93
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by LE_1Mbps(GFSK_LE)	



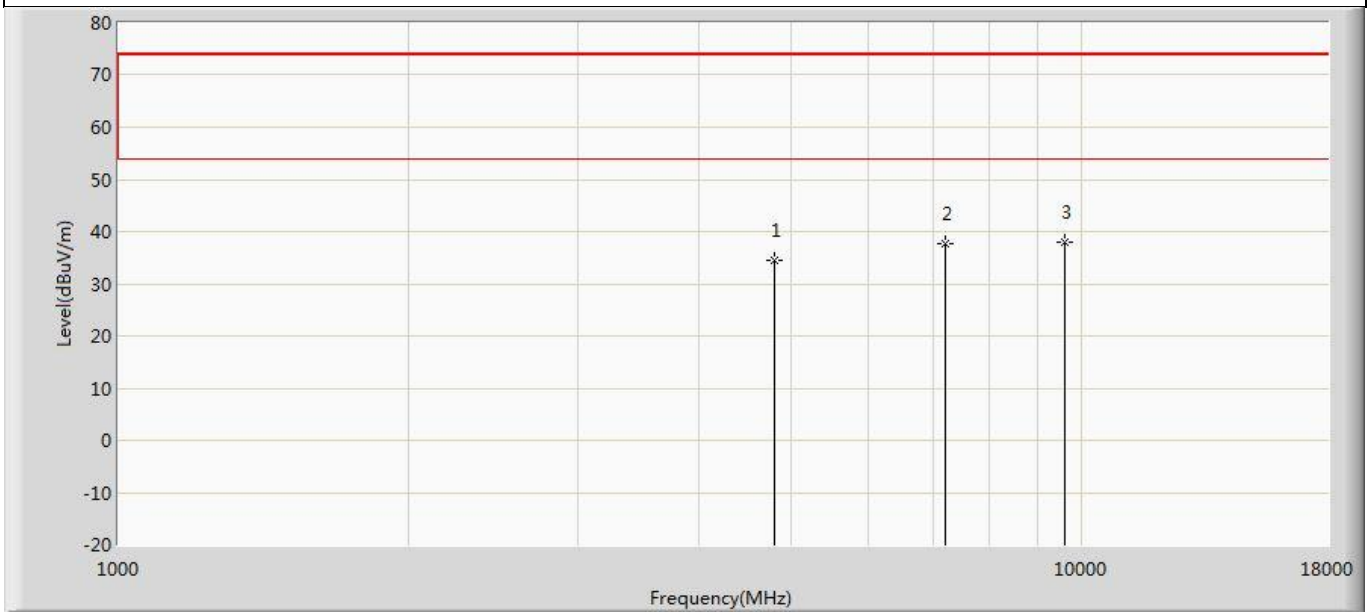
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	34.575	39.237	-39.425	74.000	-4.662	PK
2		7440.000	36.151	37.194	-37.849	74.000	-1.043	PK
3	*	9920.000	37.839	34.792	-36.161	74.000	3.047	PK

Profile: 21B0640R	Page No.: 94
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by LE_1Mbps(GFSK_LE)	



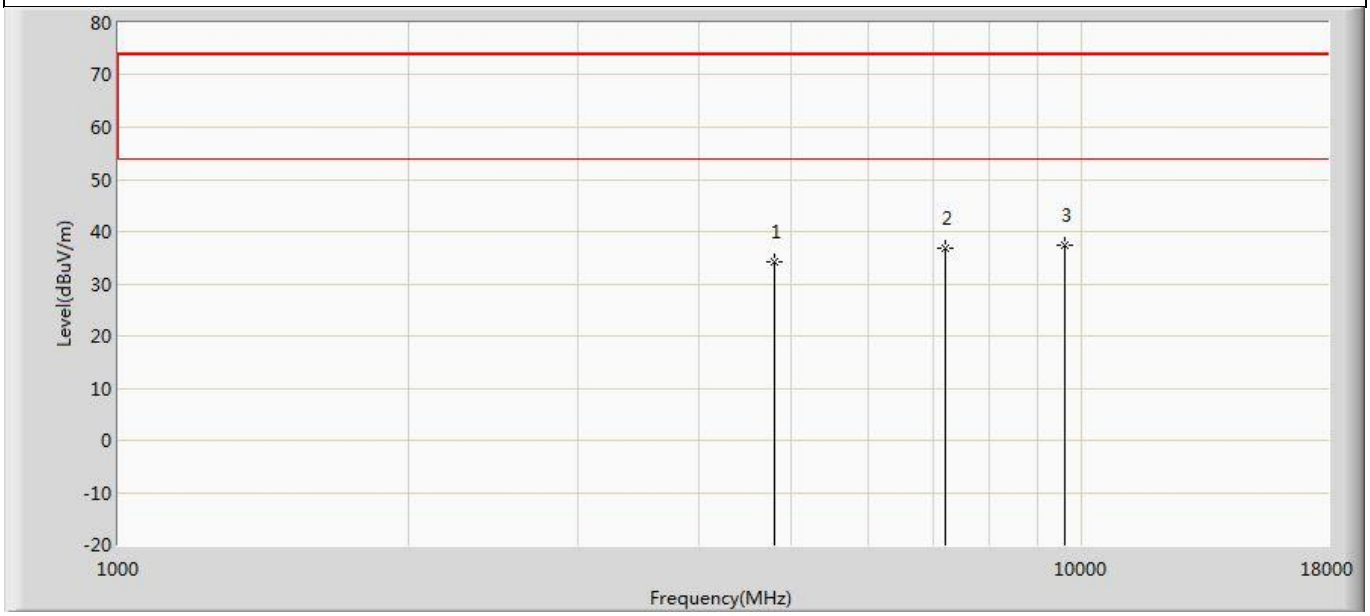
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	33.676	38.338	-40.324	74.000	-4.662	PK
2		7440.000	36.286	37.329	-37.714	74.000	-1.043	PK
3	*	9920.000	38.007	34.960	-35.993	74.000	3.047	PK

Profile: 21B0640R	Page No.: 79
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2402MHz by LE_2Mbps(GFSK_LE)	



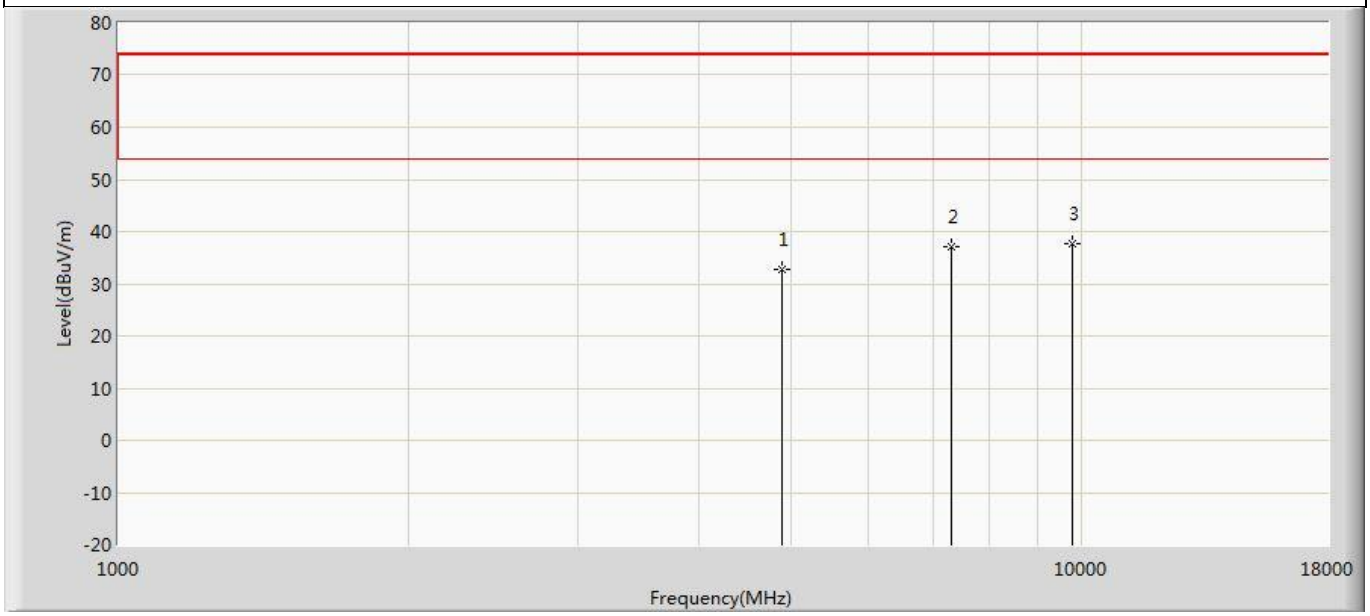
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	34.369	39.412	-39.631	74.000	-5.044	PK
2		7206.000	37.806	38.852	-36.194	74.000	-1.046	PK
3	*	9608.000	37.841	35.011	-36.159	74.000	2.830	PK

Profile: 21B0640R	Page No.: 80
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2402MHz by LE_2Mbps(GFSK_LE)	



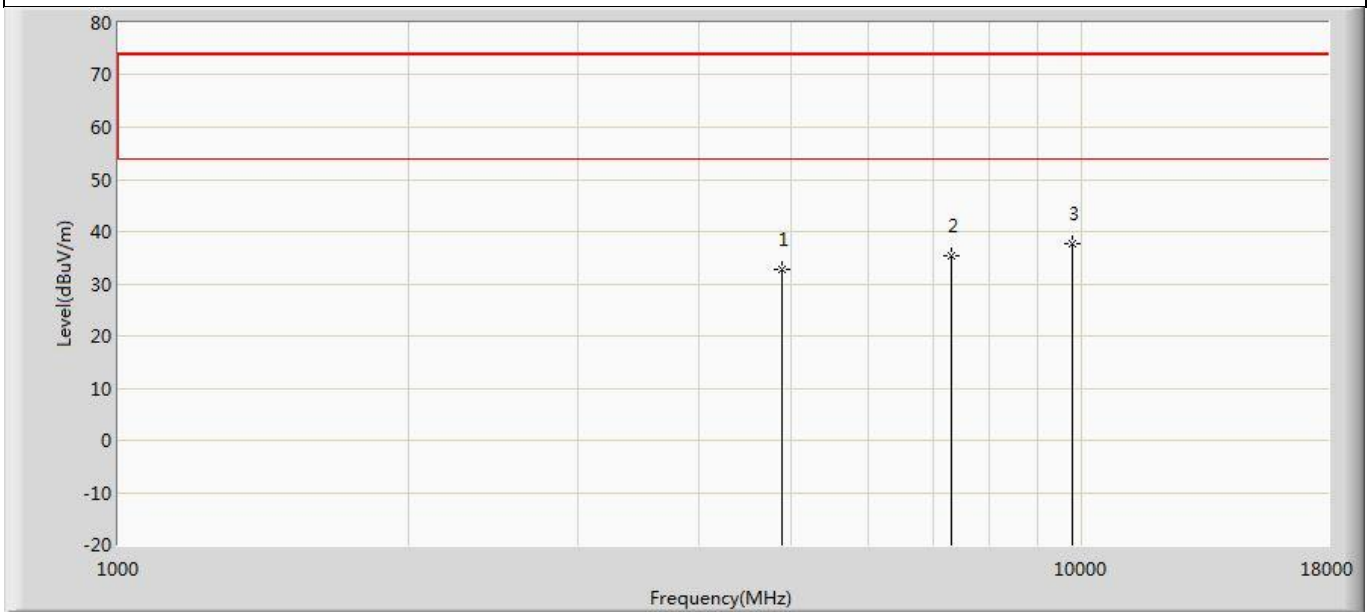
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	34.327	39.370	-39.673	74.000	-5.044	PK
2		7206.000	36.916	37.962	-37.084	74.000	-1.046	PK
3	*	9608.000	37.473	34.643	-36.527	74.000	2.830	PK

Profile: 21B0640R	Page No.: 87
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2440MHz by LE_2Mbps(GFSK_LE)	



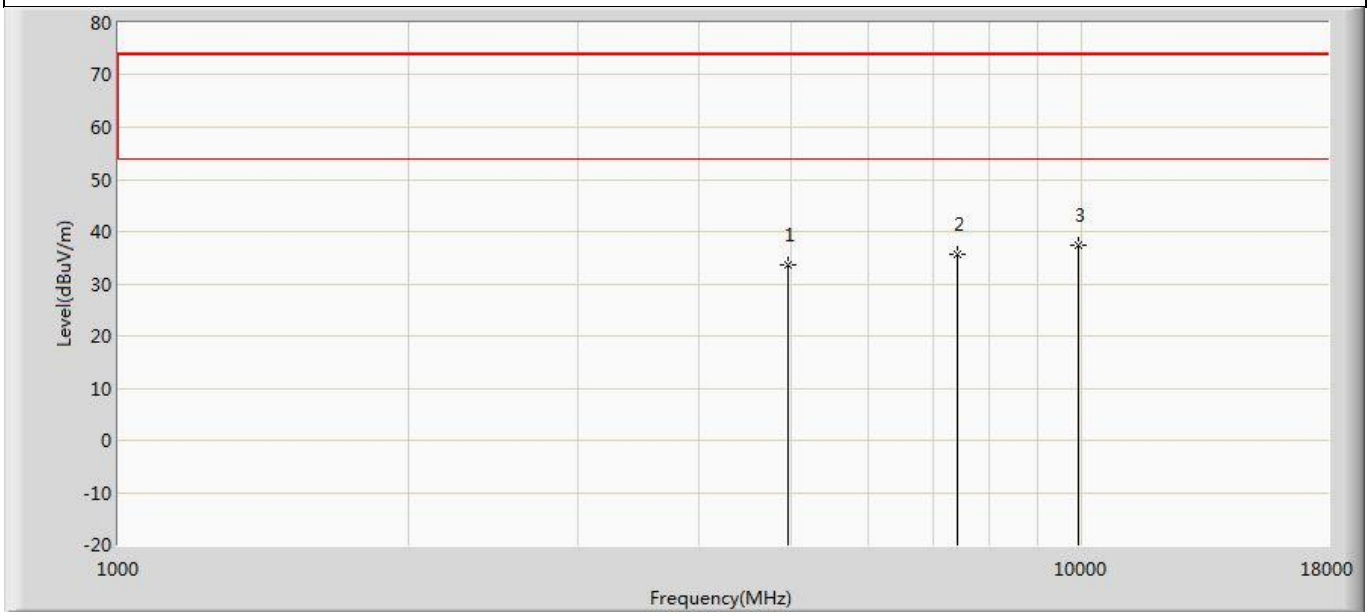
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	32.815	37.642	-41.185	74.000	-4.827	PK
2		7320.000	36.972	37.865	-37.028	74.000	-0.893	PK
3	*	9760.000	37.549	34.551	-36.451	74.000	2.998	PK

Profile: 21B0640R	Page No.: 88
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2440MHz by LE_2Mbps(GFSK_LE)	



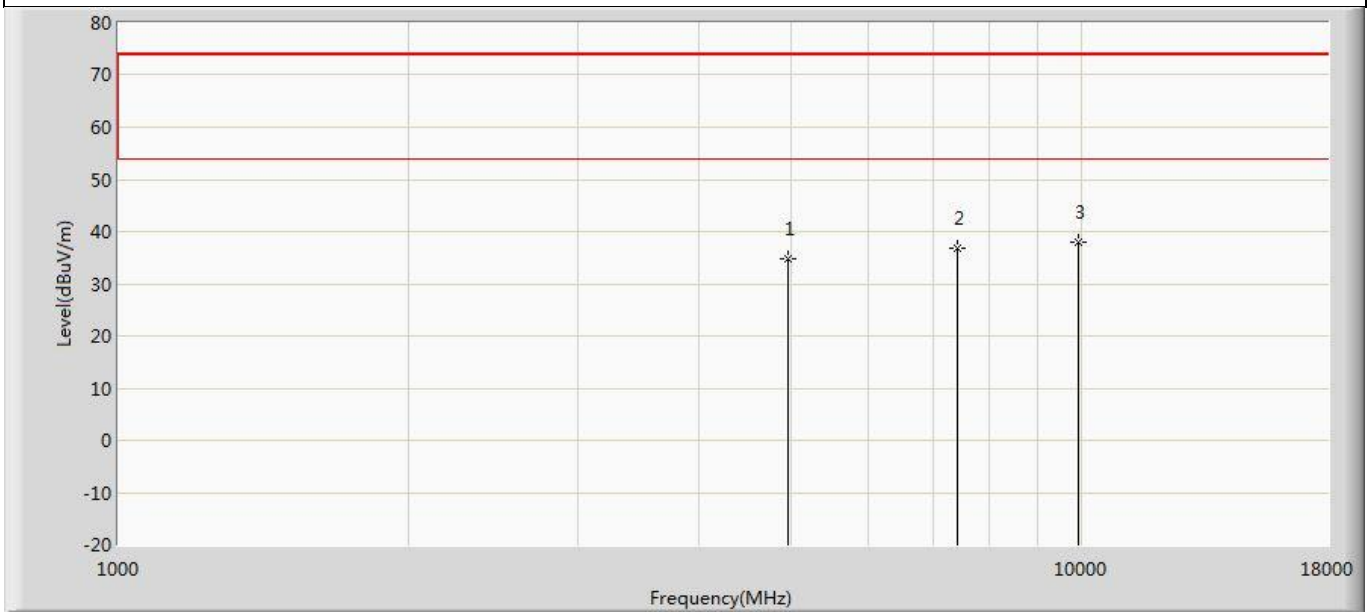
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	32.622	37.449	-41.378	74.000	-4.827	PK
2		7320.000	35.471	36.364	-38.529	74.000	-0.893	PK
3	*	9760.000	37.584	34.586	-36.416	74.000	2.998	PK

Profile: 21B0640R	Page No.: 95
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2480MHz by LE_2Mbps(GFSK_LE)	



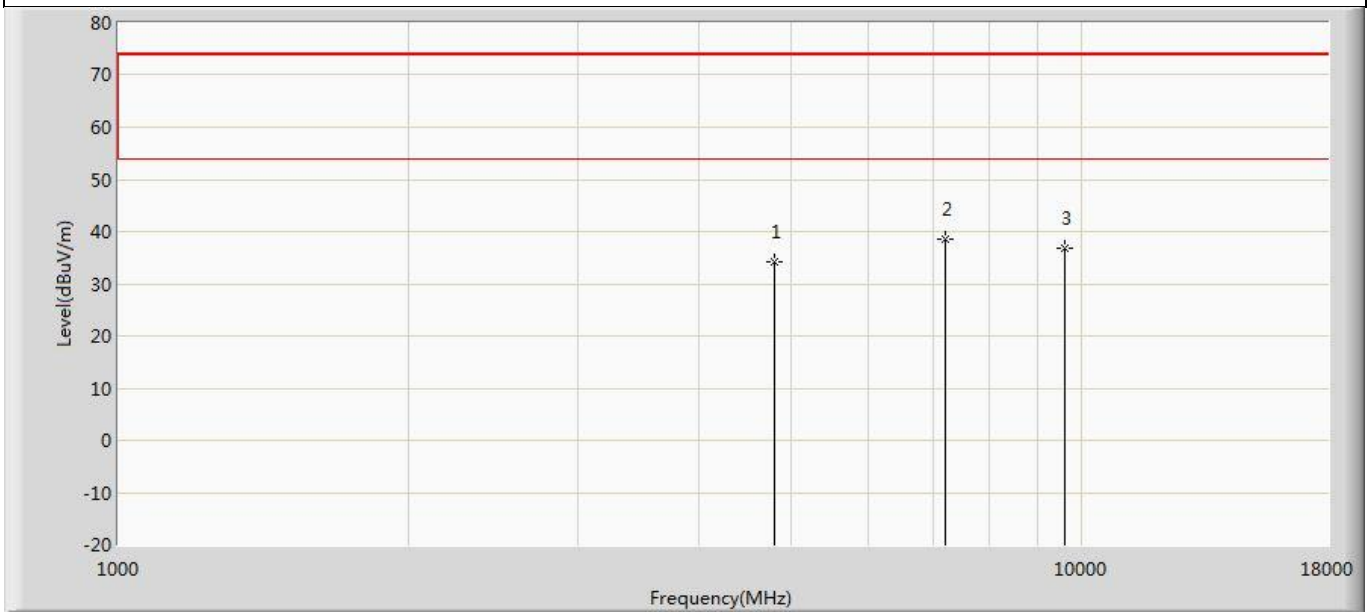
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	33.643	38.305	-40.357	74.000	-4.662	PK
2		7440.000	35.599	36.642	-38.401	74.000	-1.043	PK
3	*	9920.000	37.497	34.450	-36.503	74.000	3.047	PK

Profile: 21B0640R	Page No.: 96
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2480MHz by LE_2Mbps(GFSK_LE)	



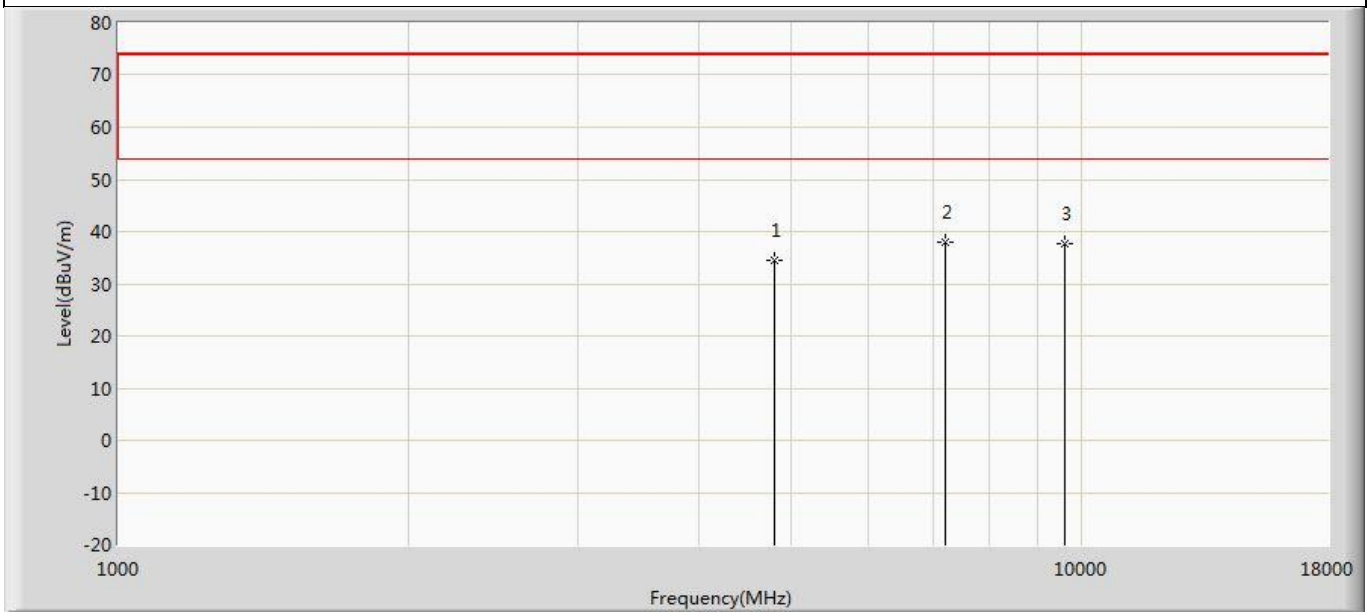
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	34.919	39.581	-39.081	74.000	-4.662	PK
2		7440.000	36.807	37.850	-37.193	74.000	-1.043	PK
3	*	9920.000	38.002	34.955	-35.998	74.000	3.047	PK

Profile: 21B0640R	Page No.: 83
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2402MHz by LE_Coded(S=2)(GFSK_LE)	



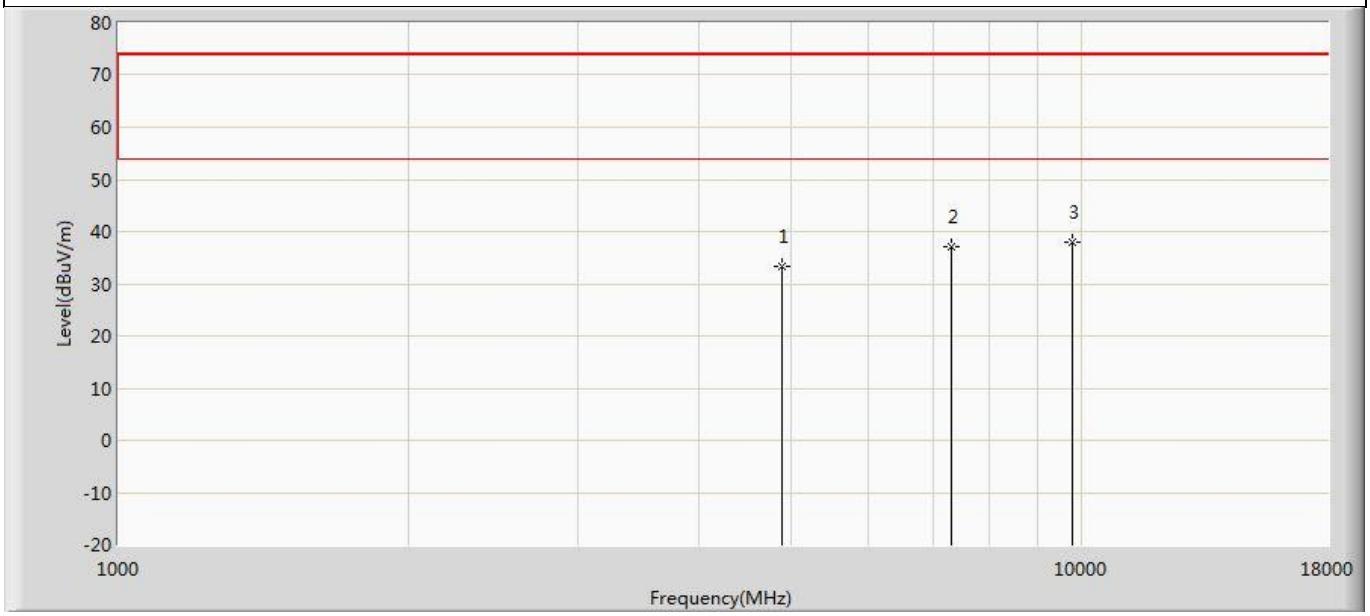
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	34.275	39.318	-39.725	74.000	-5.044	PK
2	*	7206.000	38.647	39.693	-35.353	74.000	-1.046	PK
3		9608.000	36.707	33.877	-37.293	74.000	2.830	PK

Profile: 21B0640R	Page No.: 84
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2402MHz by LE_Coded(S=2)(GFSK_LE)	



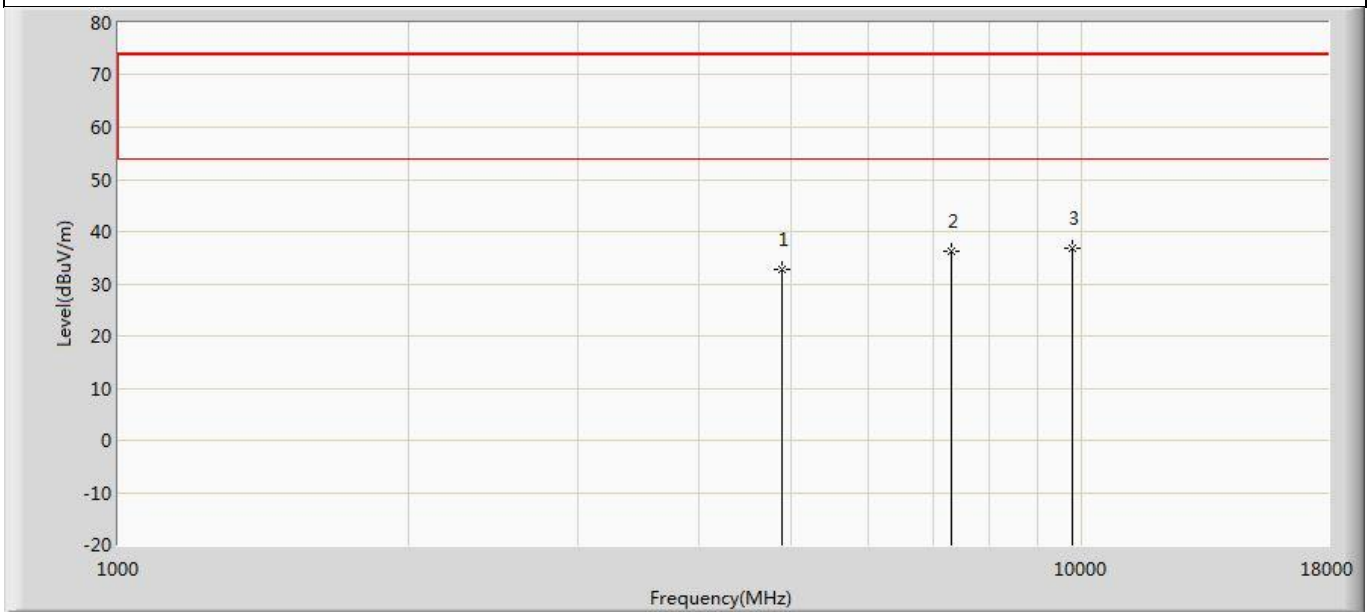
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	34.504	39.547	-39.496	74.000	-5.044	PK
2	*	7206.000	37.949	38.995	-36.051	74.000	-1.046	PK
3		9608.000	37.819	34.989	-36.181	74.000	2.830	PK

Profile: 21B0640R	Page No.: 91
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2440MHz by LE_Coded(S=2)(GFSK_LE)	



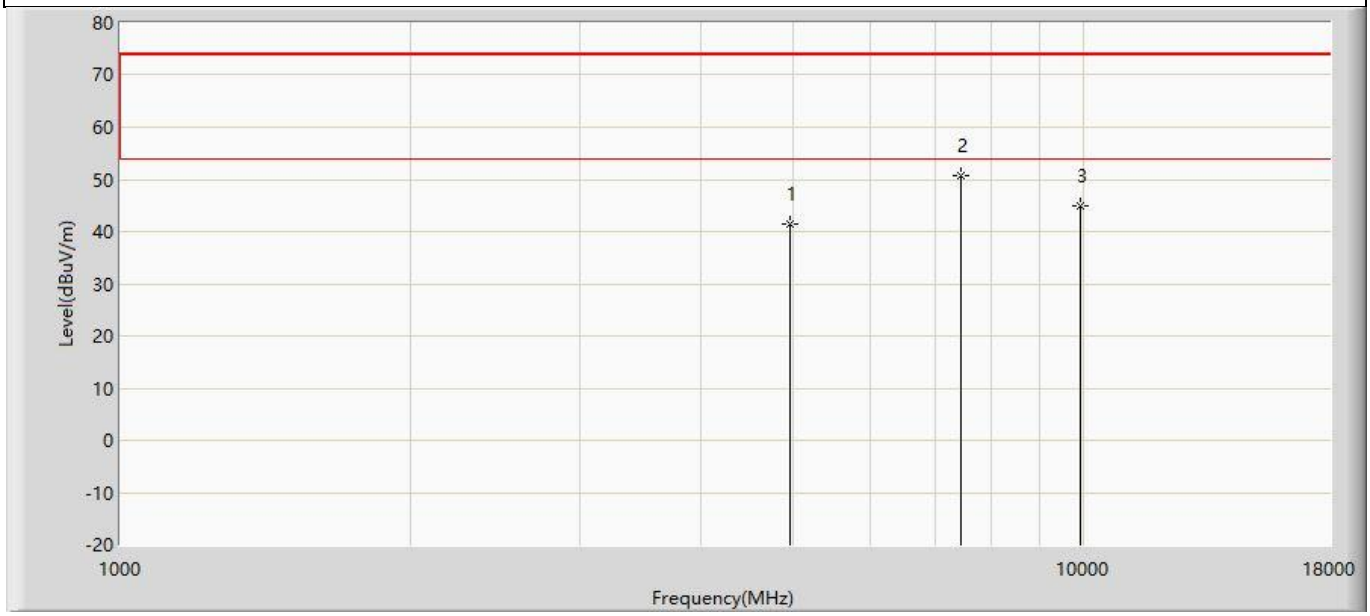
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	33.198	38.025	-40.802	74.000	-4.827	PK
2		7320.000	37.173	38.066	-36.827	74.000	-0.893	PK
3	*	9760.000	37.852	34.854	-36.148	74.000	2.998	PK

Profile: 21B0640R	Page No.: 92
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2440MHz by LE_Coded(S=2)(GFSK_LE)	



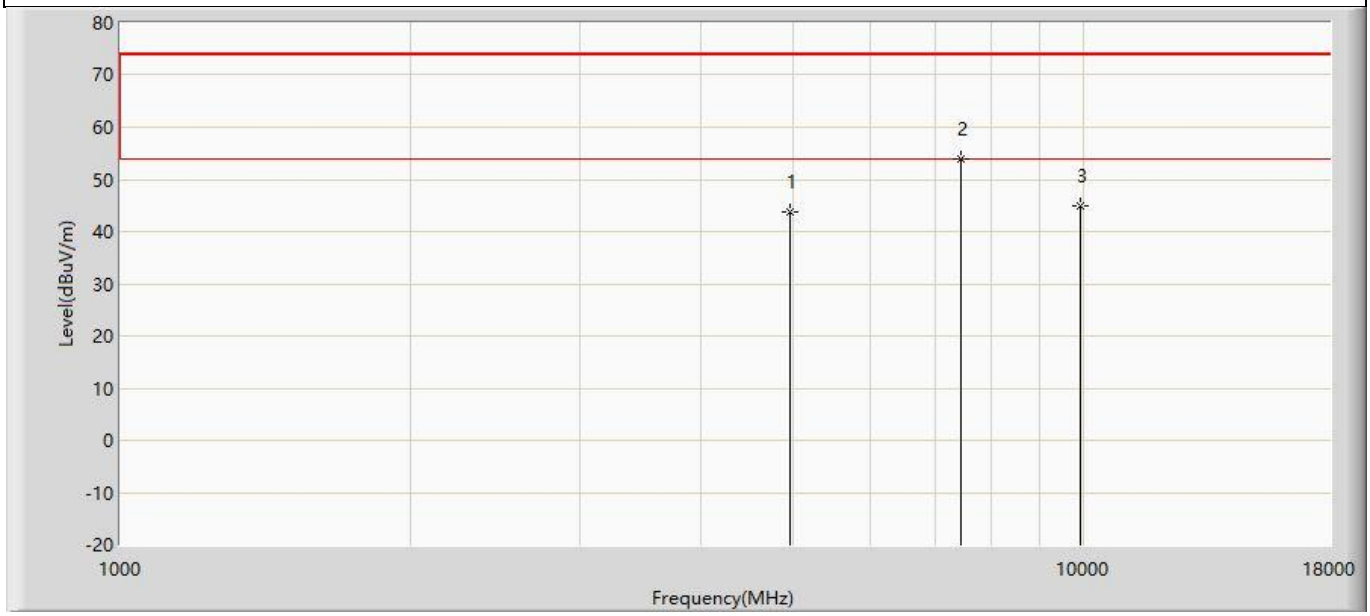
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	32.665	37.492	-41.335	74.000	-4.827	PK
2		7320.000	36.210	37.103	-37.790	74.000	-0.893	PK
3	*	9760.000	36.770	33.772	-37.230	74.000	2.998	PK

Profile: 21B0640R	Page No.: 99
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2480MHz by LE_Coded(S=2)(GFSK_LE)	



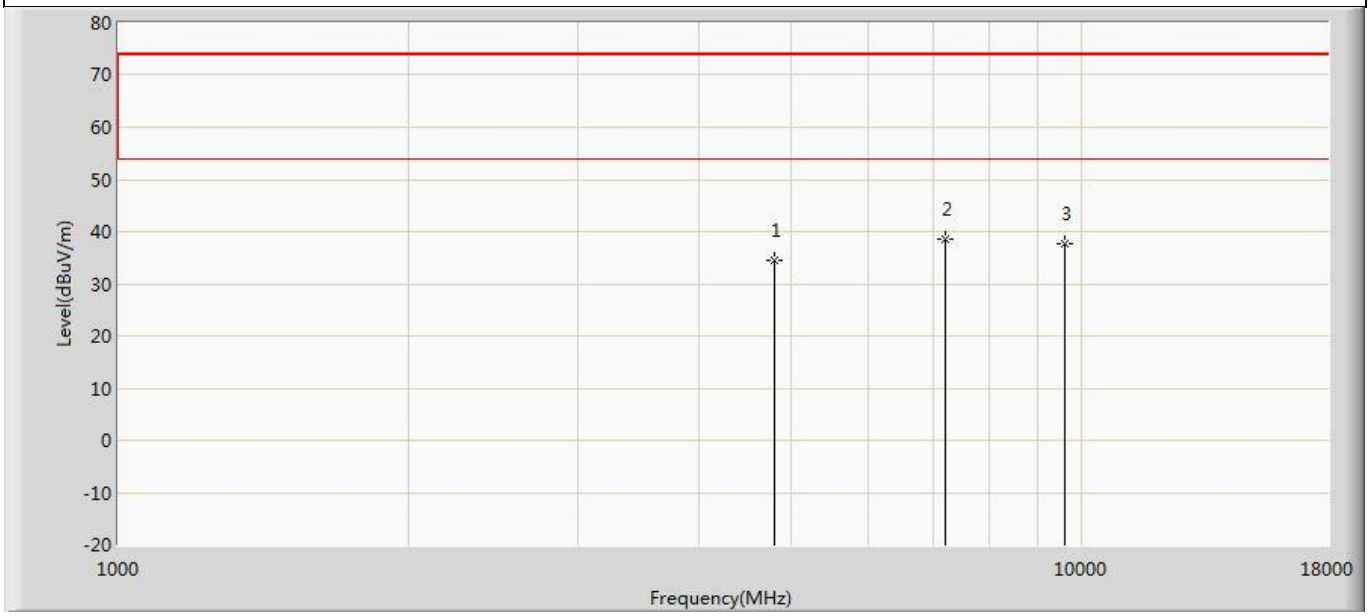
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	41.342	36.557	-32.658	74.000	4.784	PK
2	*	7443.000	50.772	42.681	-23.228	74.000	8.090	PK
3		9920.000	45.066	35.171	-28.934	74.000	9.894	PK

Profile: 21B0640R	Page No.: 100
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2480MHz by LE_Coded(S=2)(GFSK_LE)	



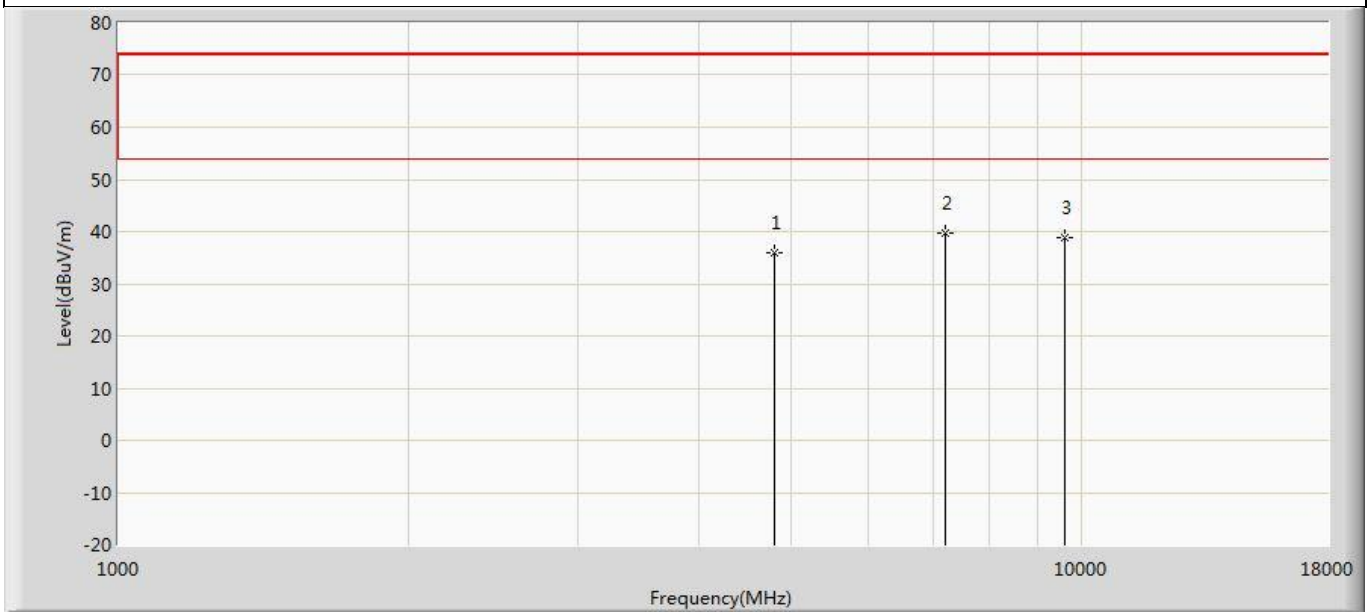
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	43.797	39.012	-30.203	74.000	4.784	PK
2	*	7443.000	53.896	45.805	-20.104	74.000	8.090	PK
3		9920.000	44.825	34.930	-29.175	74.000	9.894	PK

Profile: 21B0640R	Page No.: 81
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2402MHz by LE_Coded(S=8)(GFSK_LE)	



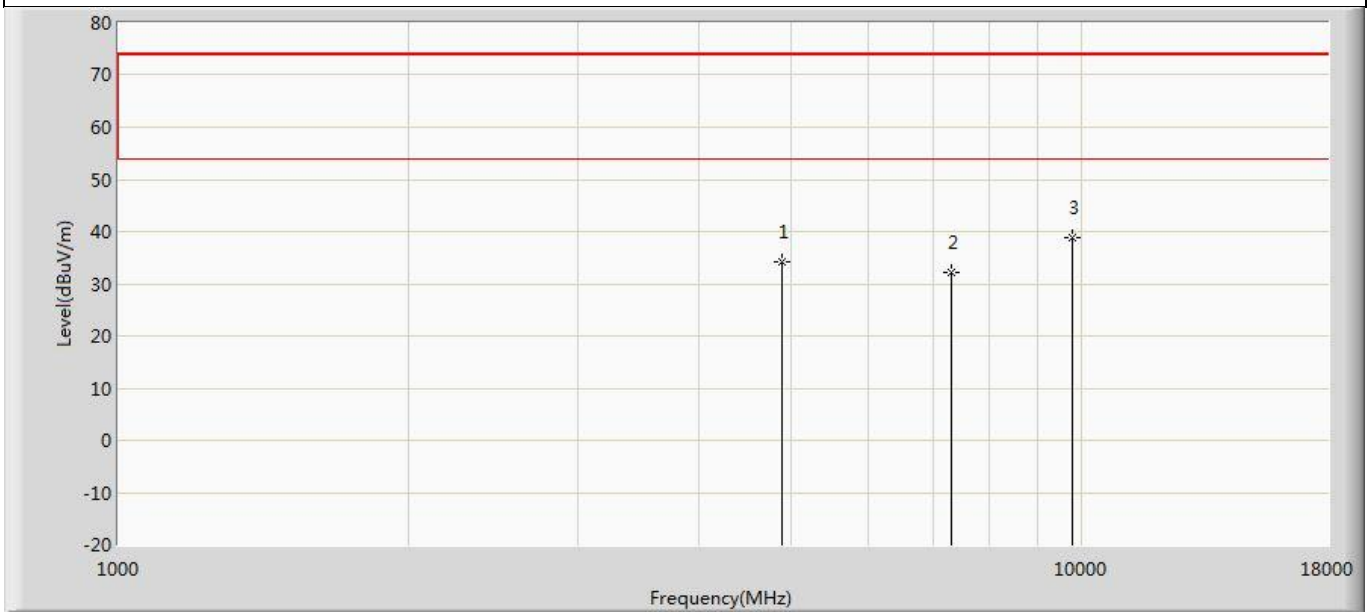
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	34.635	39.678	-39.365	74.000	-5.044	PK
2	*	7206.000	38.418	39.464	-35.582	74.000	-1.046	PK
3		9608.000	37.572	34.742	-36.428	74.000	2.830	PK

Profile: 21B0640R	Page No.: 82
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2402MHz by LE_Coded(S=8)(GFSK_LE)	



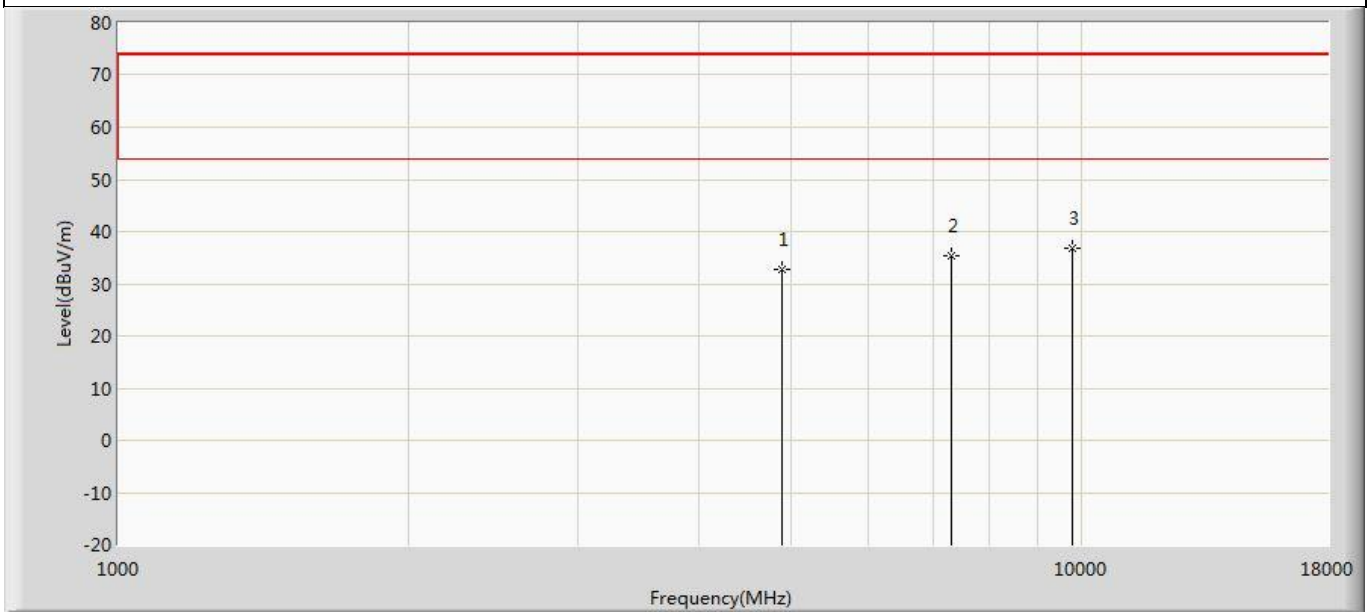
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4804.000	35.984	41.027	-38.016	74.000	-5.044	PK
2	*	7206.000	39.713	40.759	-34.287	74.000	-1.046	PK
3		9608.000	38.877	36.047	-35.123	74.000	2.830	PK

Profile: 21B0640R	Page No.: 89
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2440MHz by LE_Coded(S=8)(GFSK_LE)	



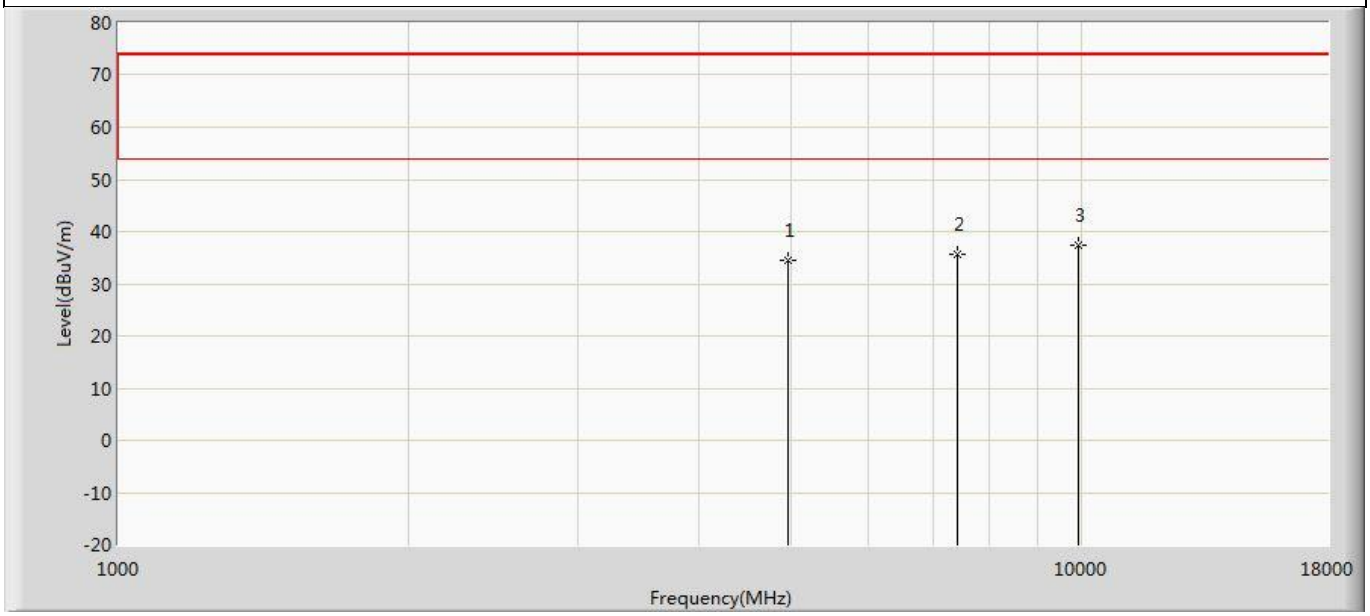
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	34.275	39.102	-39.725	74.000	-4.827	PK
2		7320.000	32.269	33.162	-41.731	74.000	-0.893	PK
3	*	9760.000	38.724	35.726	-35.276	74.000	2.998	PK

Profile: 21B0640R	Page No.: 90
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:38
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2440MHz by LE_Coded(S=8)(GFSK_LE)	



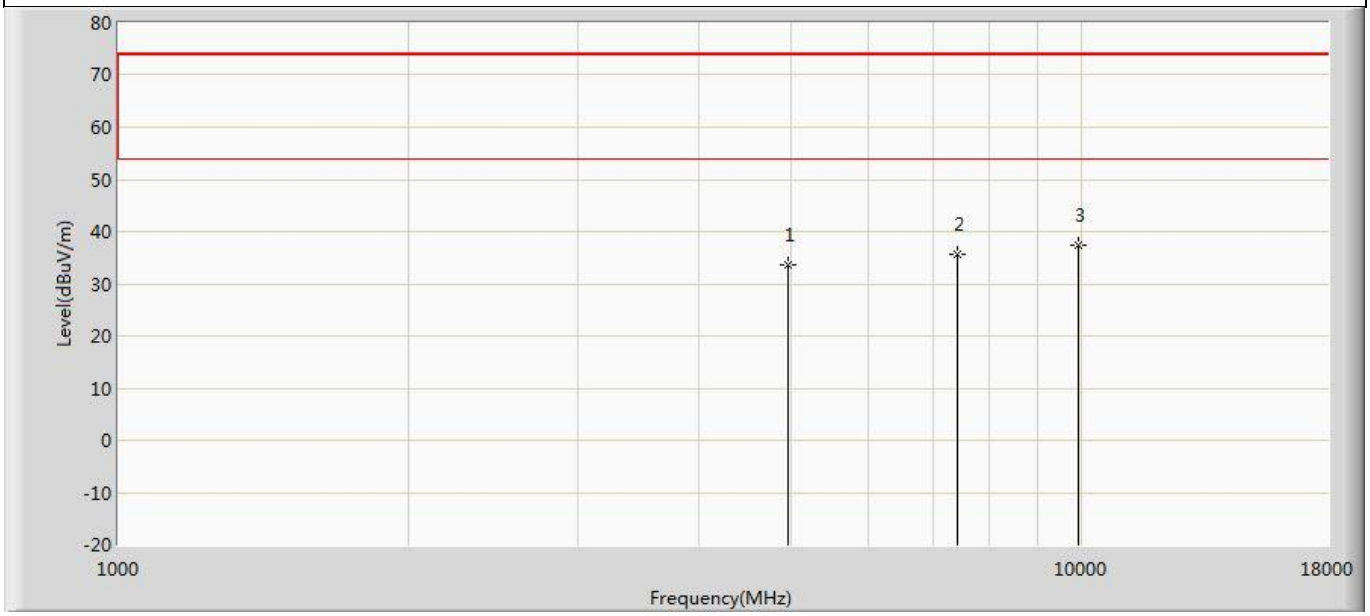
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4880.000	32.855	37.682	-41.145	74.000	-4.827	PK
2		7320.000	35.353	36.246	-38.647	74.000	-0.893	PK
3	*	9760.000	36.939	33.941	-37.061	74.000	2.998	PK

Profile: 21B0640R	Page No.: 97
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2480MHz by LE_Coded(S=8)(GFSK_LE)	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	34.615	39.277	-39.385	74.000	-4.662	PK
2		7440.000	35.636	36.679	-38.364	74.000	-1.043	PK
3	*	9920.000	37.261	34.214	-36.739	74.000	3.047	PK

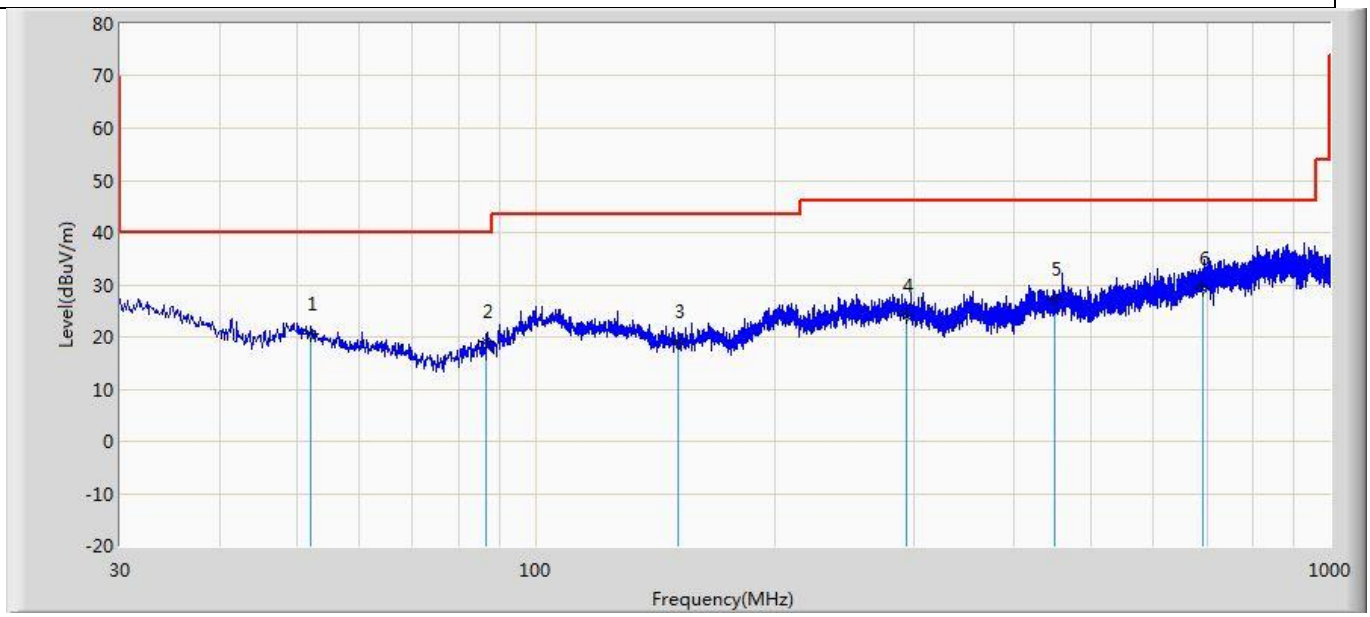
Profile: 21B0640R	Page No.: 98
Engineer: Carlosshen	
Site: AC5	Time: 2021/11/27 - 09:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2480MHz by LE_Coded(S=8)(GFSK_LE)	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		4960.000	33.738	38.400	-40.262	74.000	-4.662	PK
2		7440.000	35.660	36.703	-38.340	74.000	-1.043	PK
3	*	9920.000	37.474	34.427	-36.526	74.000	3.047	PK

The worst case of Radiated Emission below 1GHz:

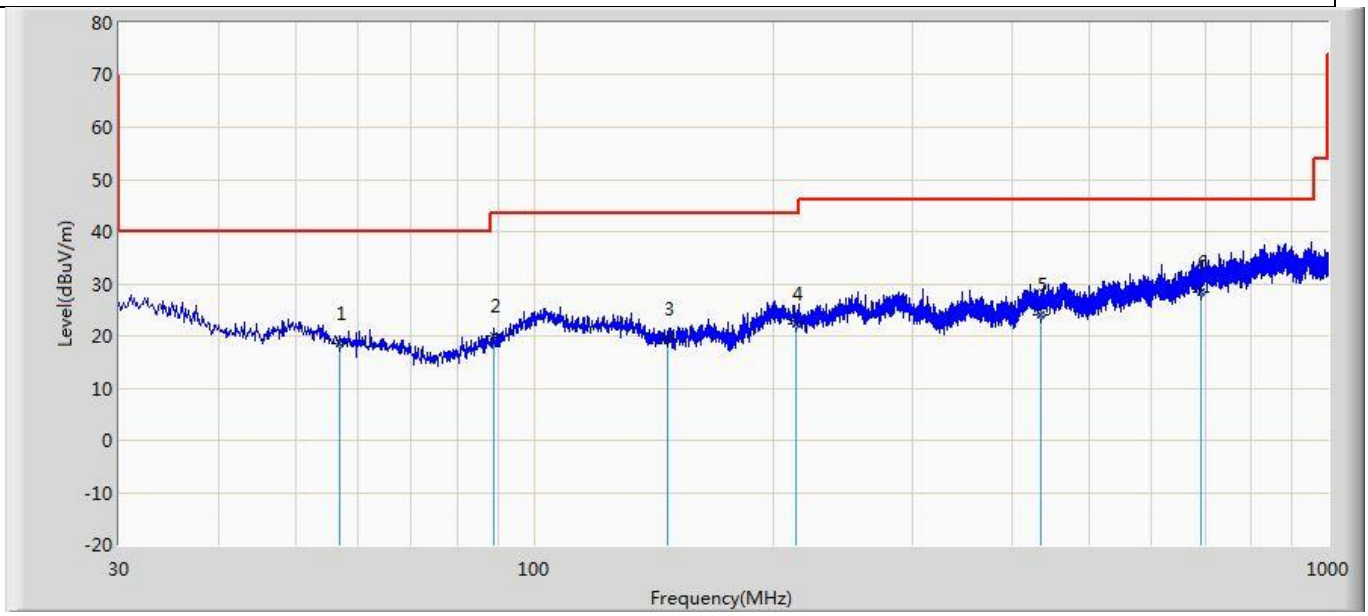
Profile: 21B0640R	Page No.: 1
Engineer: Carlosshen	
Site: AC2	Time: 2021/12/01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		52.189	20.546	1.923	-19.454	40.000	18.624	QP
2		86.624	19.032	2.500	-20.968	40.000	16.532	QP
3		151.129	19.206	1.282	-24.294	43.500	17.924	QP
4		293.355	24.122	-0.064	-21.878	46.000	24.186	QP
5		450.010	27.334	1.294	-18.666	46.000	26.040	QP
6	*	692.025	29.301	-0.923	-16.699	46.000	30.223	QP

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

Profile: 21B0640R	Page No.: 2
Engineer: Carlosshen	
Site: AC2	Time: 2021/12/01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: AC2_3M(30-1000M)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		56.796	18.524	1.609	-21.476	40.000	16.915	QP
2		88.927	20.125	3.404	-23.375	43.500	16.720	QP
3		147.249	19.364	1.577	-24.136	43.500	17.788	QP
4		213.815	22.345	0.001	-21.155	43.500	22.343	QP
5		434.247	24.166	-1.919	-21.834	46.000	26.084	QP
6	*	691.055	28.416	-1.697	-17.584	46.000	30.112	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

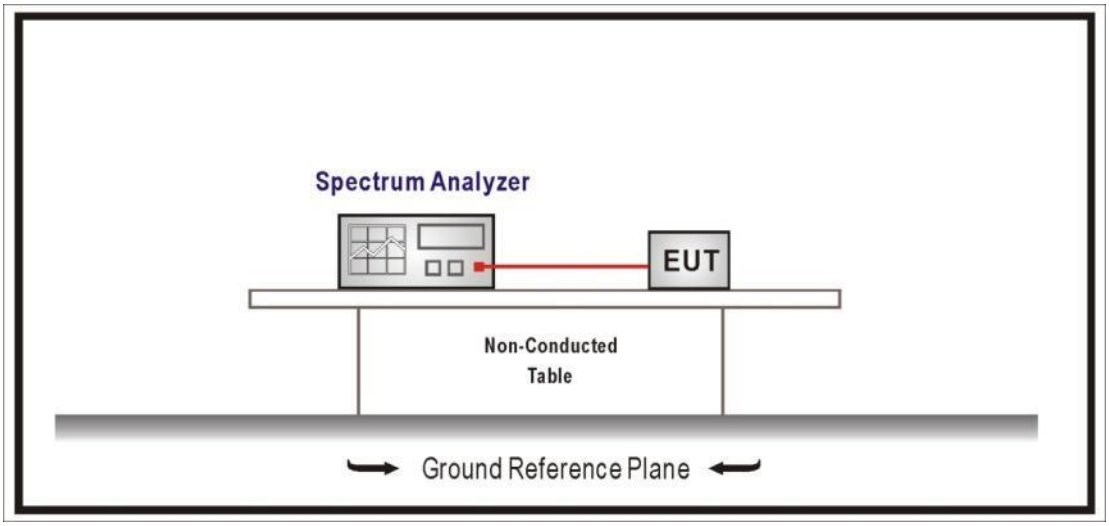
4.3.1 Limit

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

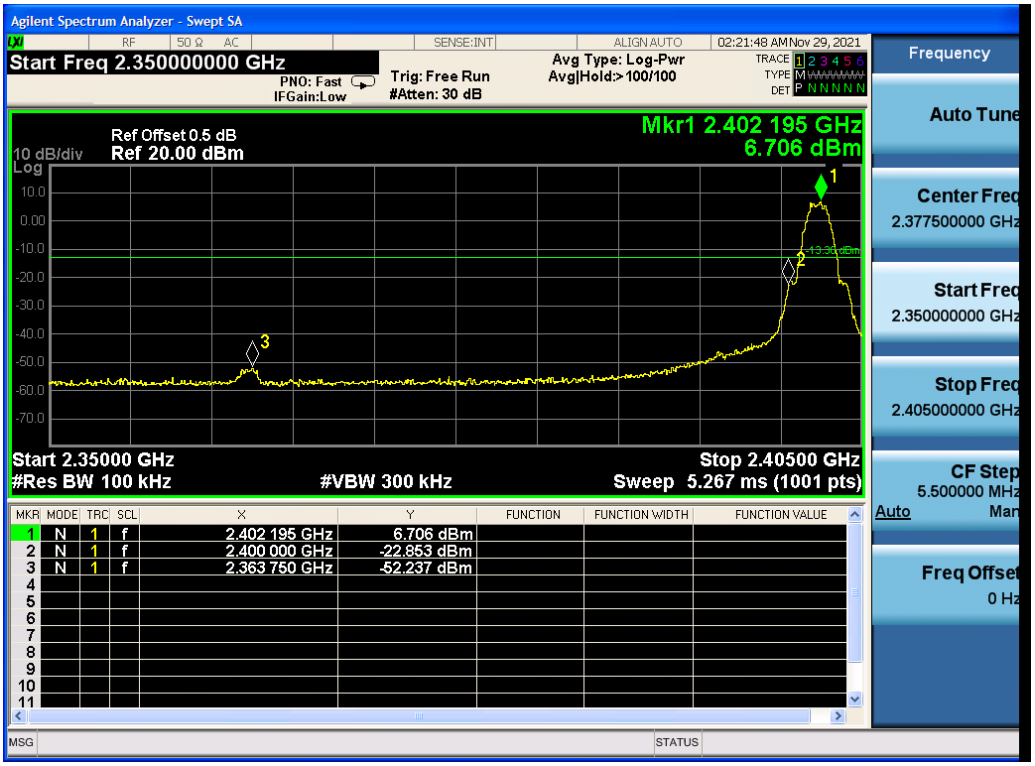
References Rule			Chapter	Description
☒	ANSI C63.10		11.11	Emissions in non-restricted frequency bands
	☒	ANSI C63.10	11.11.1	General
	☒	ANSI C63.10	11.11.2	Reference level measurement
	☒	ANSI C63.10	11.11.3	Emission level measurement

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
1	00	2402	8.768	2400	-40.754	49.522	>20	Pass
	39	2480	9.215	2500	-55.663	64.878	>20	Pass
2	00	2402	6.706	2400	-22.853	29.559	>20	Pass
	39	2480	7.238	2500	-55.651	62.889	>20	Pass
3	00	2402	6.047	2400	-41.710	47.757	>20	Pass
	39	2480	6.395	2500	-56.445	62.840	>20	Pass
4	00	2402	8.723	2400	-42.424	51.147	>20	Pass
	39	2480	9.095	2500	-56.874	65.969	>20	Pass

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

Mode 2 CH00(2402MHz)

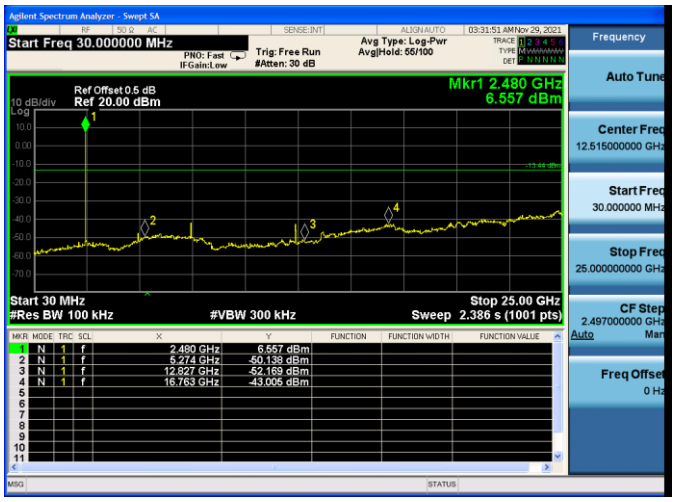


Mode 1 CH00 (2402MHz)

Mode 1 CH39 (2480MHz)

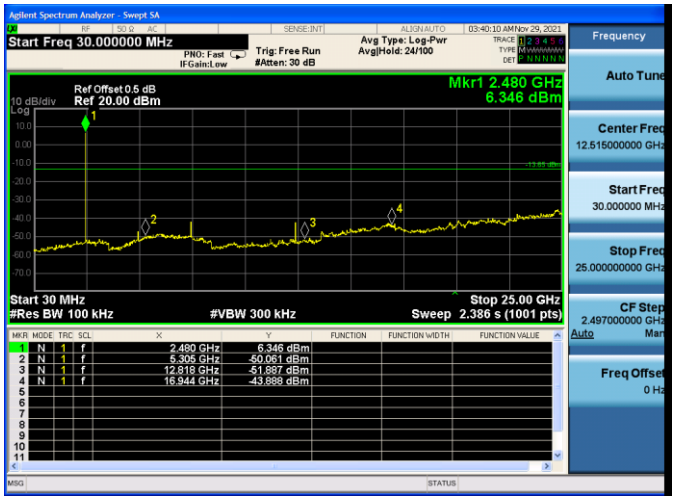
Mode 2 CH00 (2402MHz)

Mode 2 CH39 (2480MHz)



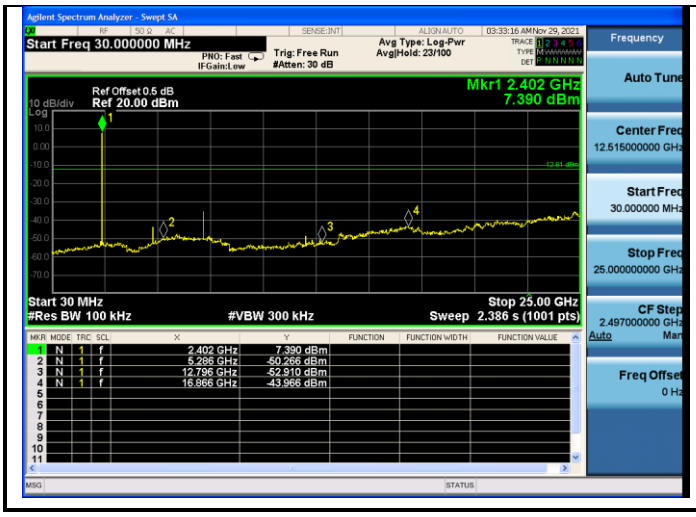
Mode 3 CH00 (2402MHz)

Mode 3 CH39 (2480MHz)



Mode 4 CH00 (2402MHz)

Mode 4 CH39 (2480MHz)


Agilent Spectrum Analyzer - Swept SA
Start Freq 30.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 23/100
03:33:16 AM Nov 29, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.402 GHz
7.390 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.386 s (1001 pts)
1 N 1 f 2.402 GHz 7.390 dBm
2 N 1 f 5.286 GHz -50.266 dBm
3 N 1 f 12.796 GHz -52.910 dBm
4 N 1 f 16.866 GHz -43.966 dBm
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz

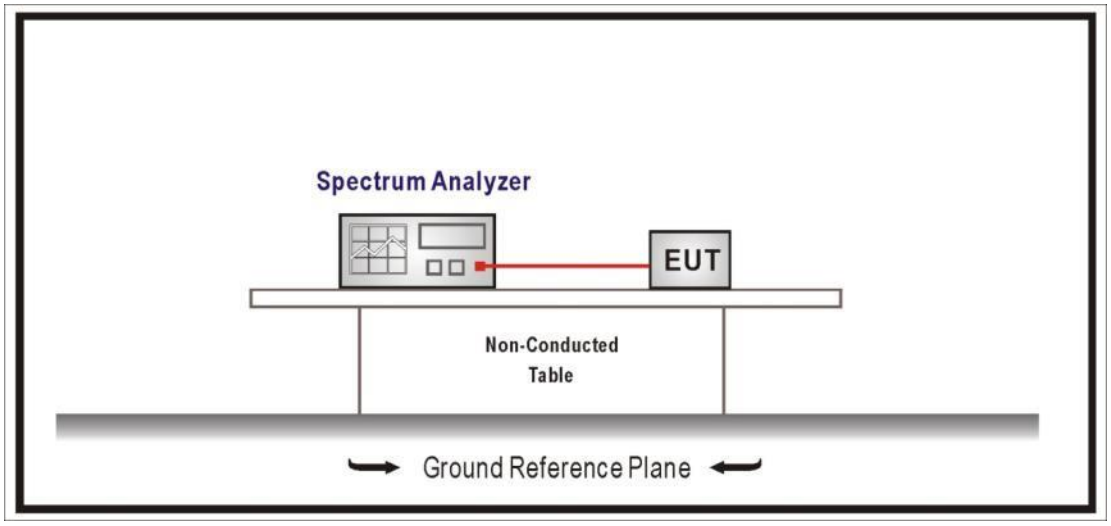
Agilent Spectrum Analyzer - Swept SA
Start Freq 30.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 20/100
03:35:47 AM Nov 29, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.480 GHz
8.859 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.386 s (1001 pts)
1 N 1 f 2.480 GHz 8.859 dBm
2 N 1 f 5.283 GHz -50.563 dBm
3 N 1 f 12.824 GHz -52.470 dBm
4 N 1 f 16.916 GHz -42.810 dBm
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz

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

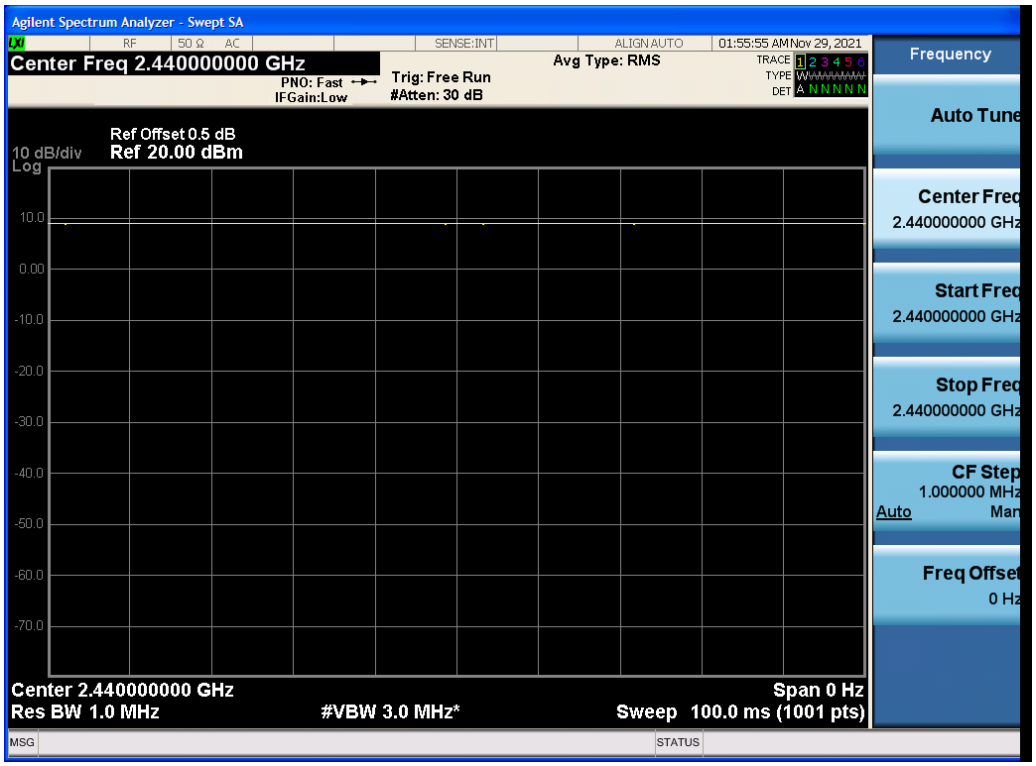
4.4.4 Test Data

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%
Mode 2	N/A	N/A	10	N/A	100%
Mode 3	N/A	N/A	10	N/A	100%
Mode 4	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



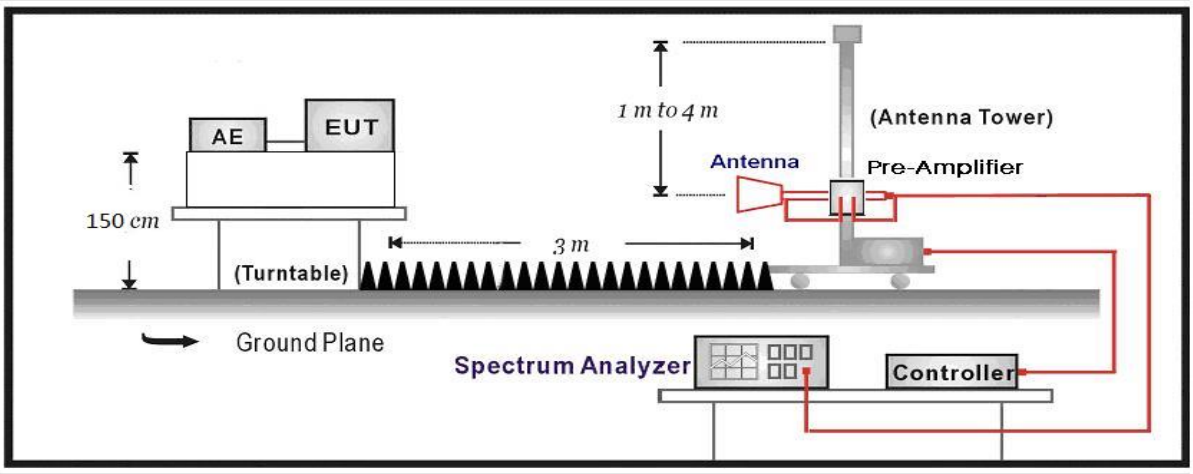
4.5 Radiated Emission Band Edge — VERDICT: PASS

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:

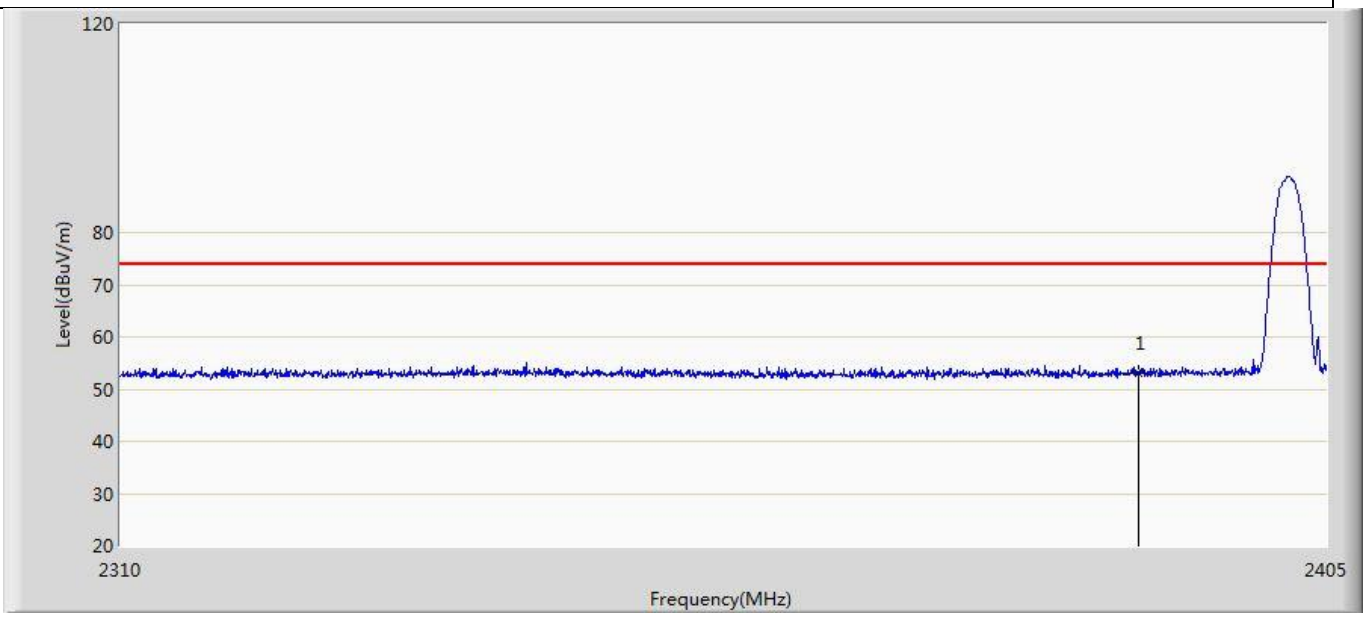


4.5.3 4.5.3 Test Procedure

	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

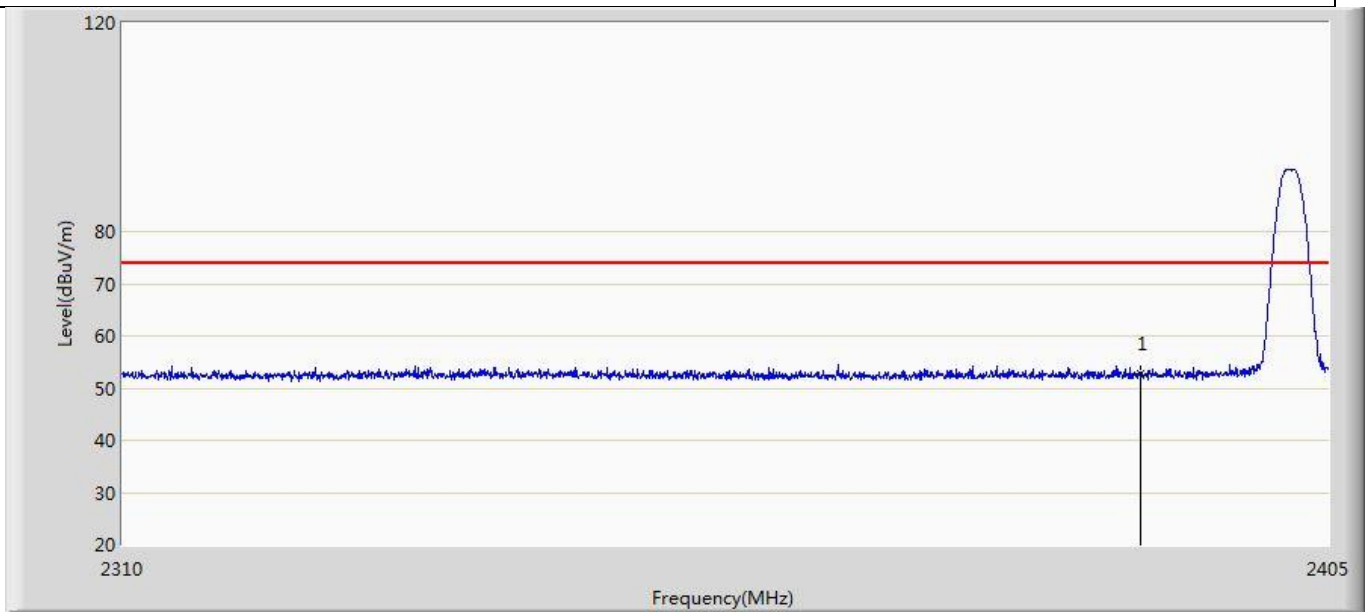
4.5.4 Test Data

Profile: 21B0640R	Page No.: 9
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:18
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by LE_1Mbps(GFSK_LE)	



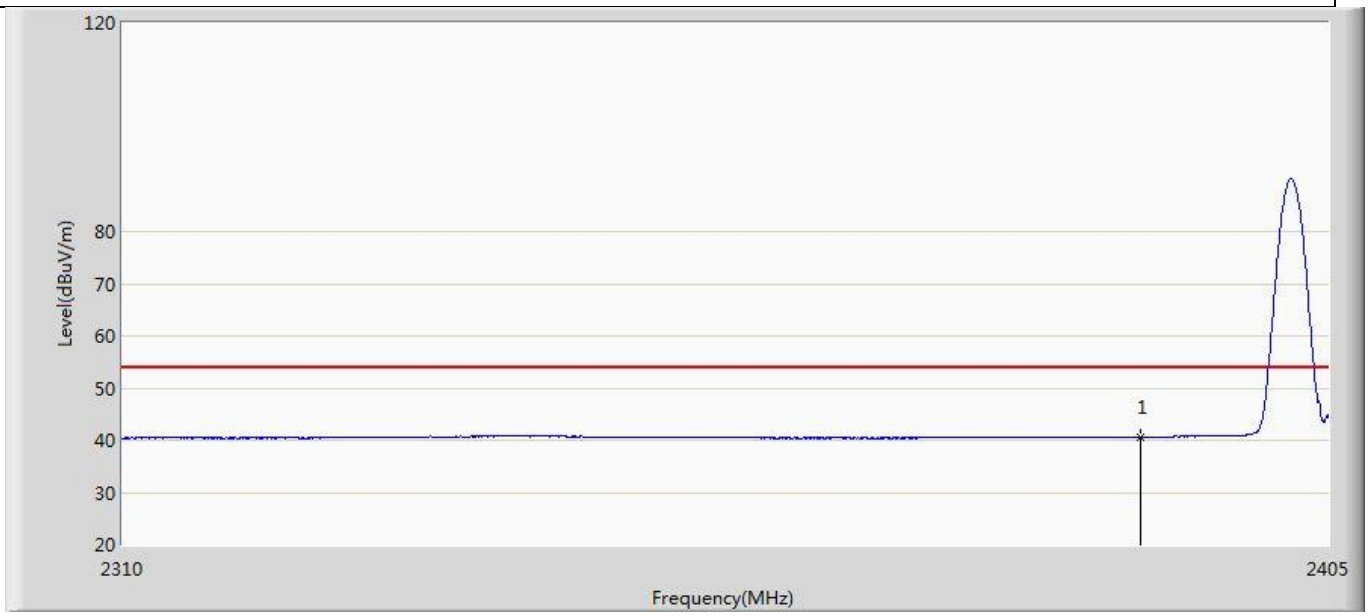
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	53.183	17.724	-20.817	74.000	35.459	PK

Profile: 21B0640R	Page No.: 10
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:23
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by LE_1Mbps(GFSK_LE)	



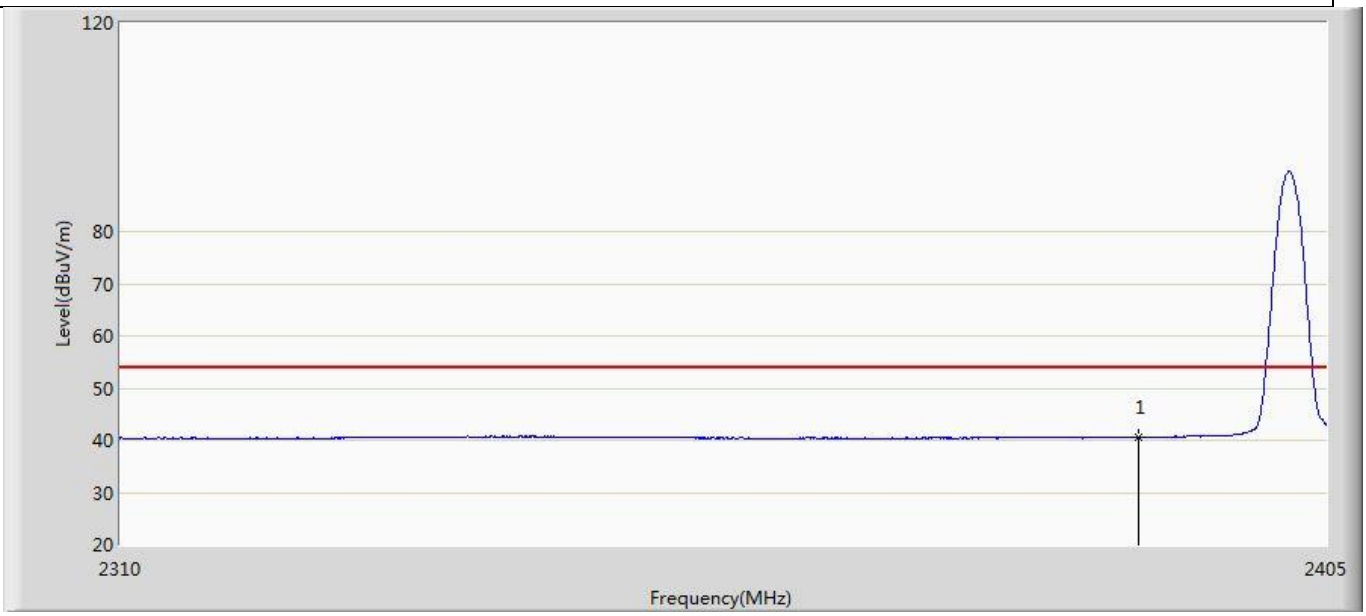
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	52.765	17.306	-21.235	74.000	35.459	PK

Profile: 21B0640R	Page No.: 11
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:25
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by LE_1Mbps(GFSK_LE)	



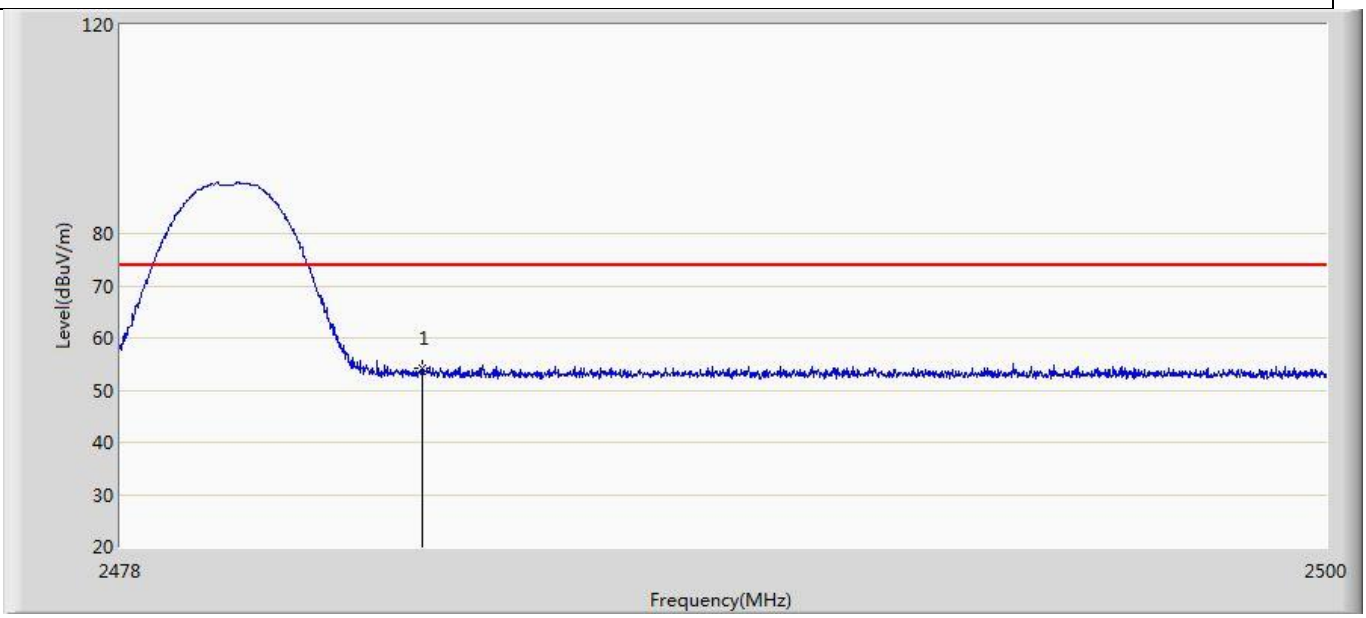
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	40.634	5.175	-13.366	54.000	35.459	AV

Profile: 21B0640R	Page No.: 12
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:27
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2402MHz by LE_1Mbps(GFSK_LE)	



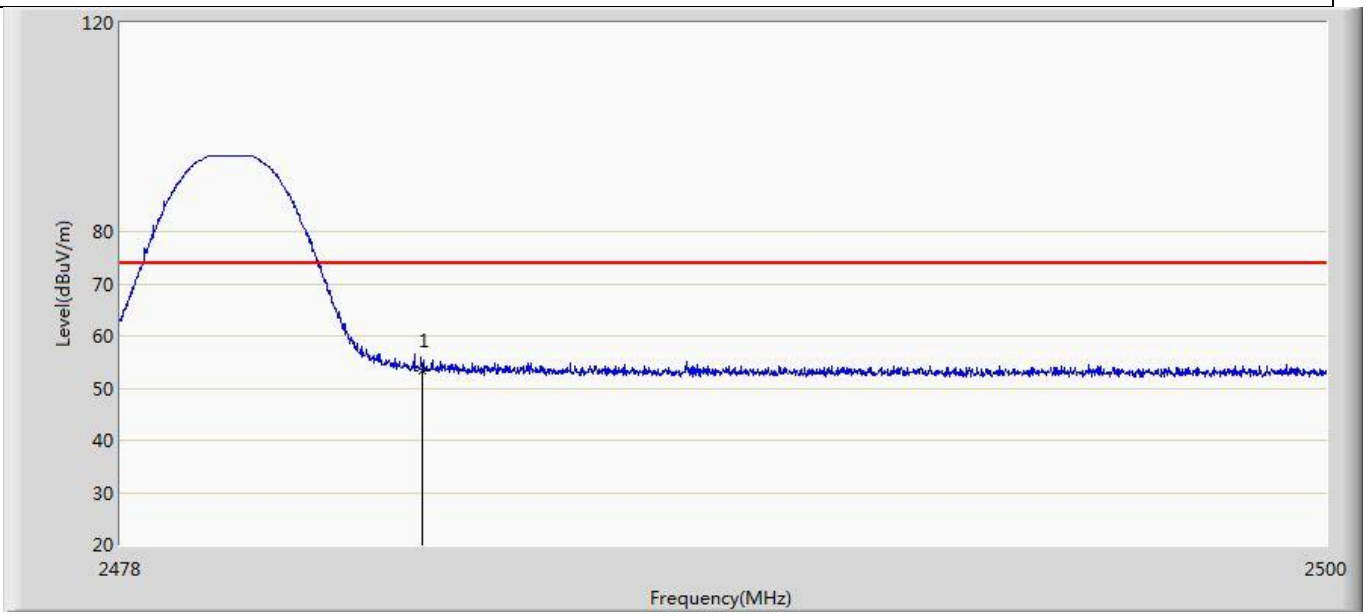
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	40.567	5.108	-13.433	54.000	35.459	AV

Profile: 21B0640R	Page No.: 25
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:52
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by LE_1Mbps(GFSK_LE)	



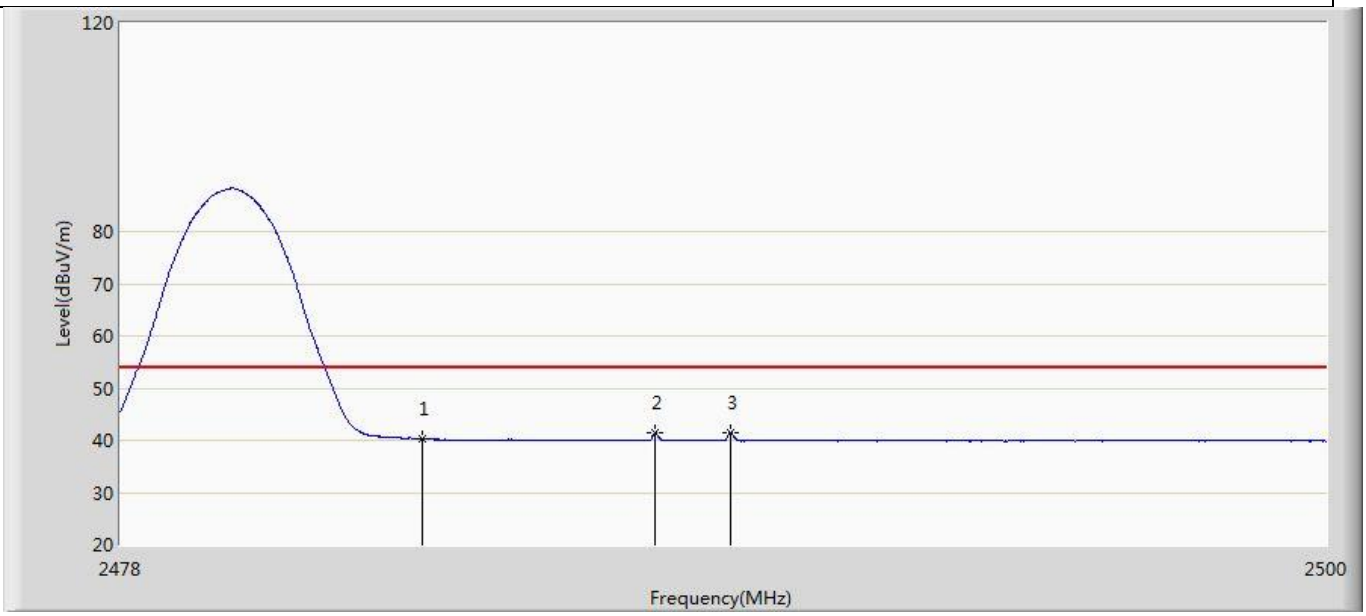
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	54.330	18.655	-19.670	74.000	35.675	PK

Profile: 21B0640R	Page No.: 26
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:55
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by LE_1Mbps(GFSK_LE)	



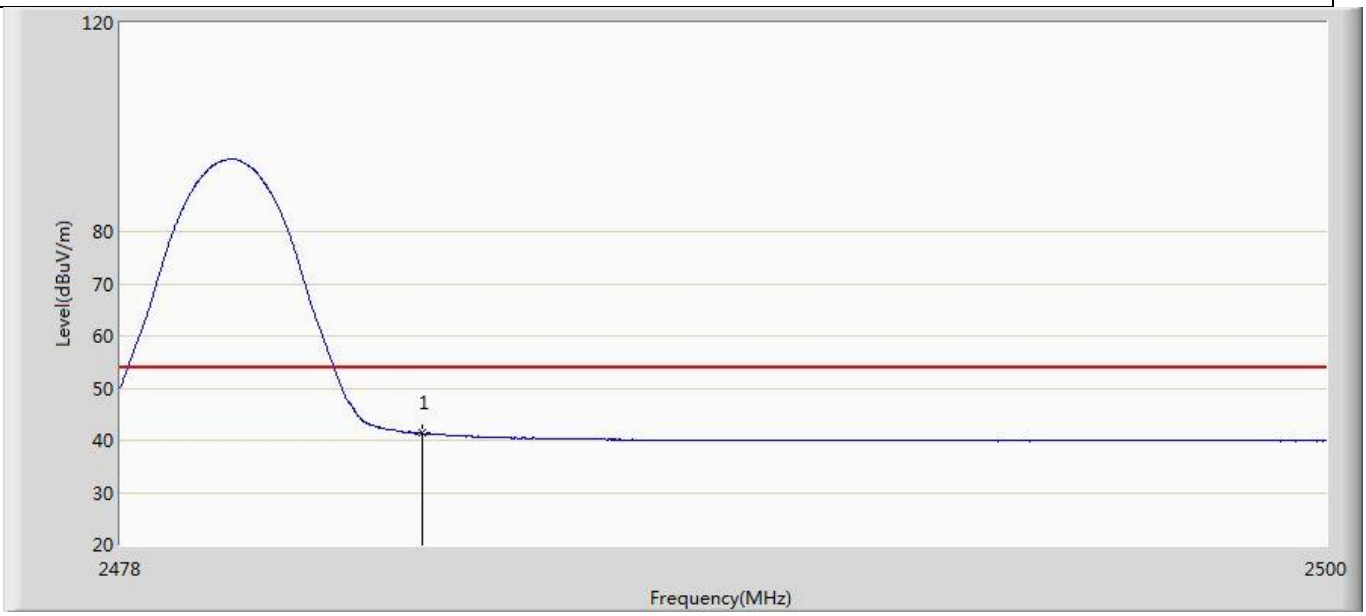
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	53.459	17.784	-20.541	74.000	35.675	PK

Profile: 21B0640R	Page No.: 27
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:56
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by LE_1Mbps(GFSK_LE)	



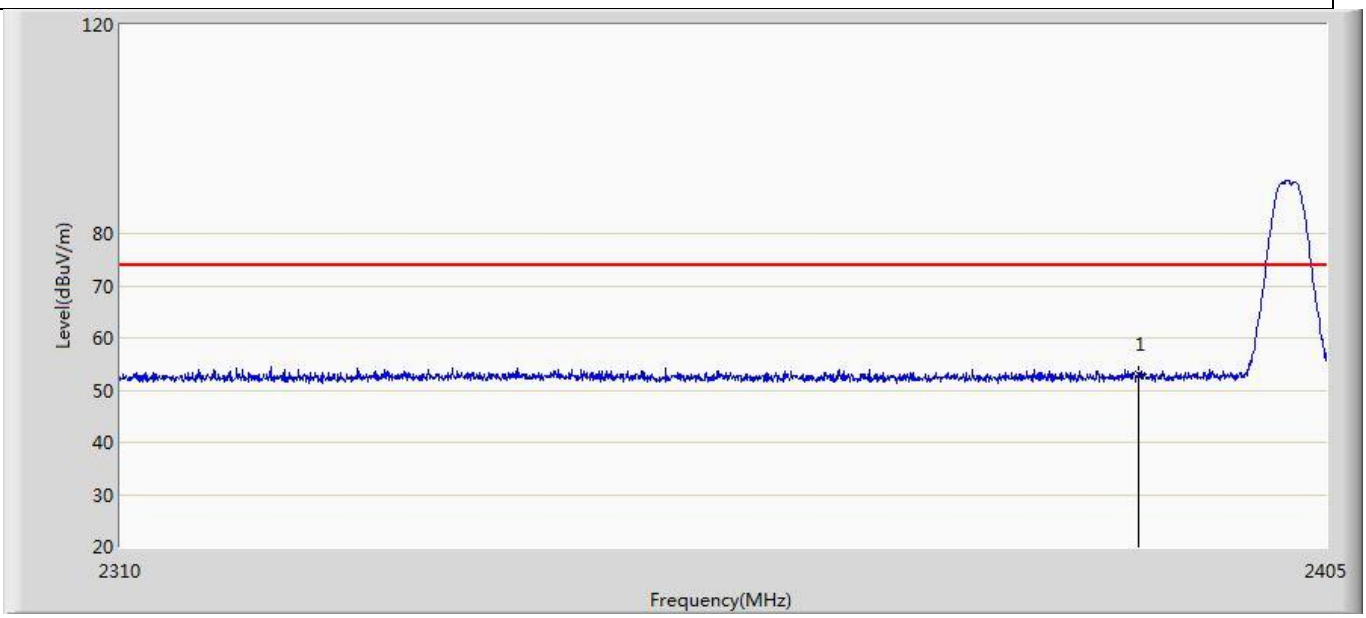
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		2483.500	40.268	4.593	-13.732	54.000	35.675	AV
2	*	2487.746	41.469	5.786	-12.531	54.000	35.683	AV
3		2489.121	41.443	5.757	-12.557	54.000	35.686	AV

Profile: 21B0640R	Page No.: 28
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:58
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 1:Transmit at 2480MHz by LE_1Mbps(GFSK_LE)	



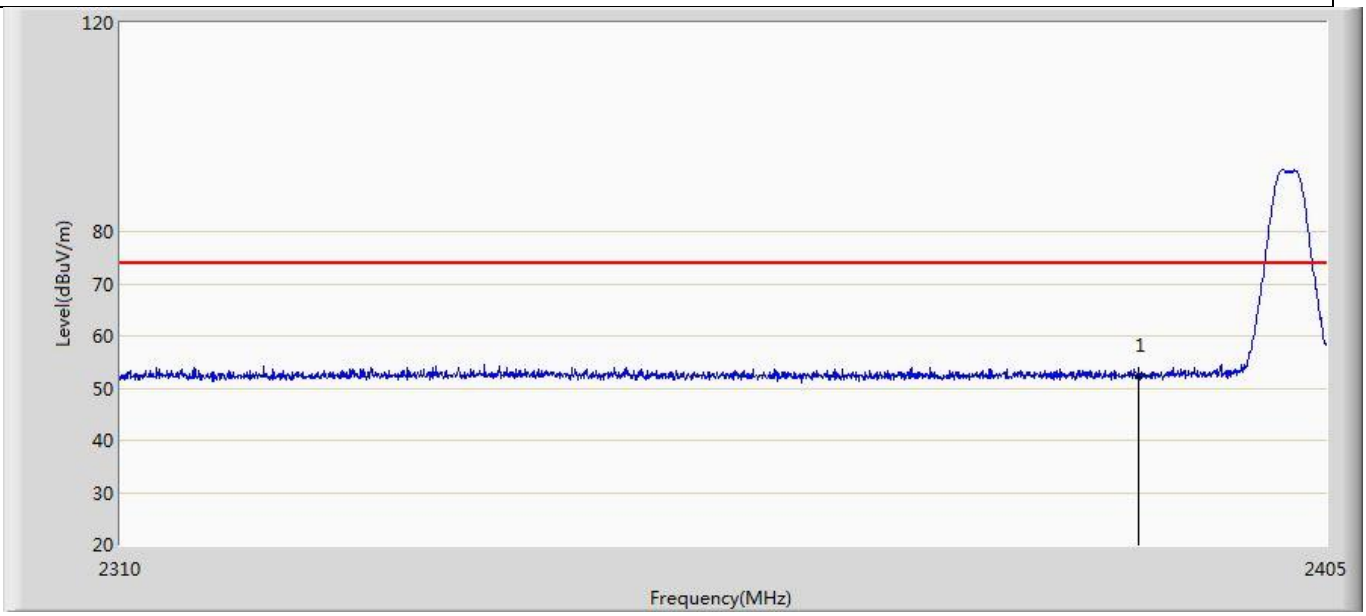
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	41.335	5.660	-12.665	54.000	35.675	AV

Profile: 21B0640R	Page No.: 13
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:30
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2402MHz by LE_2Mbps(GFSK_LE)	



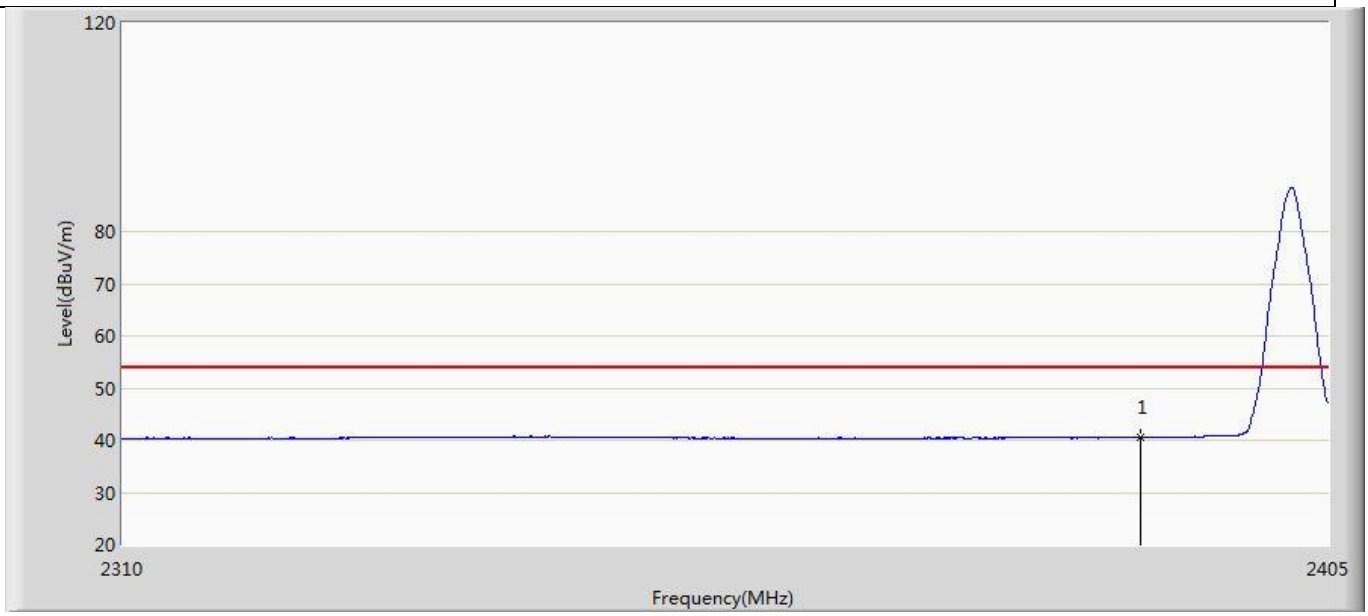
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	53.116	17.657	-20.884	74.000	35.459	PK

Profile: 21B0640R	Page No.: 14
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:31
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2402MHz by LE_2Mbps(GFSK_LE)	



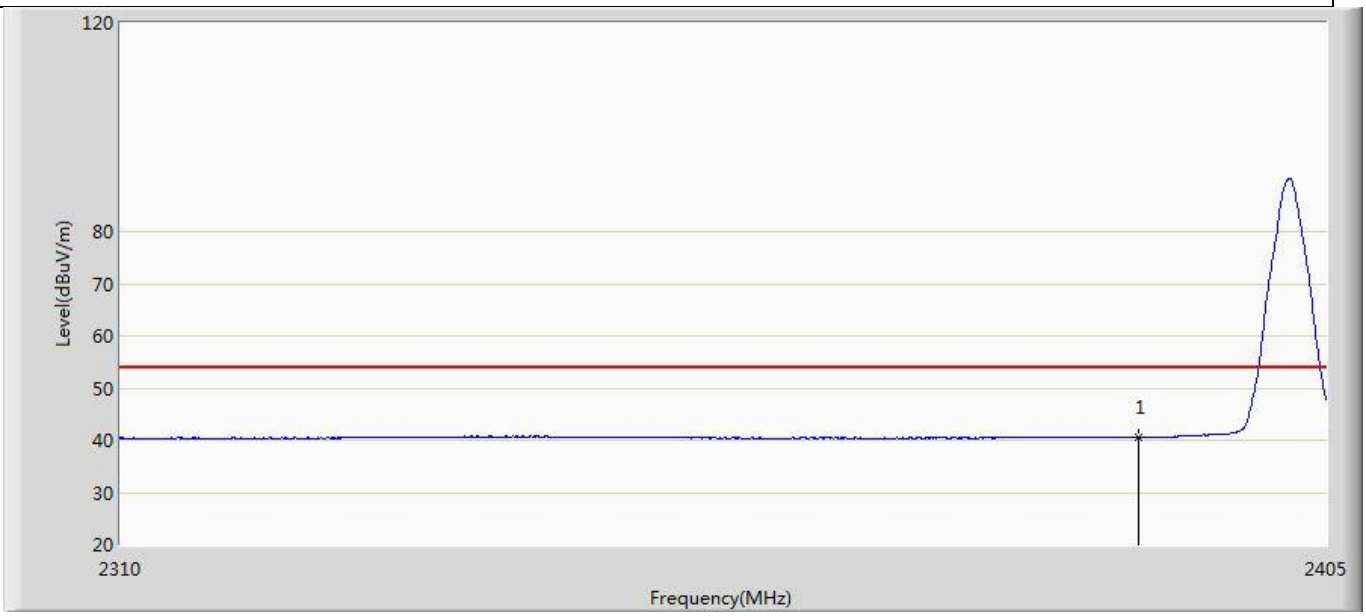
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	52.498	17.039	-21.502	74.000	35.459	PK

Profile: 21B0640R	Page No.: 15
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:33
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2402MHz by LE_2Mbps(GFSK_LE)	



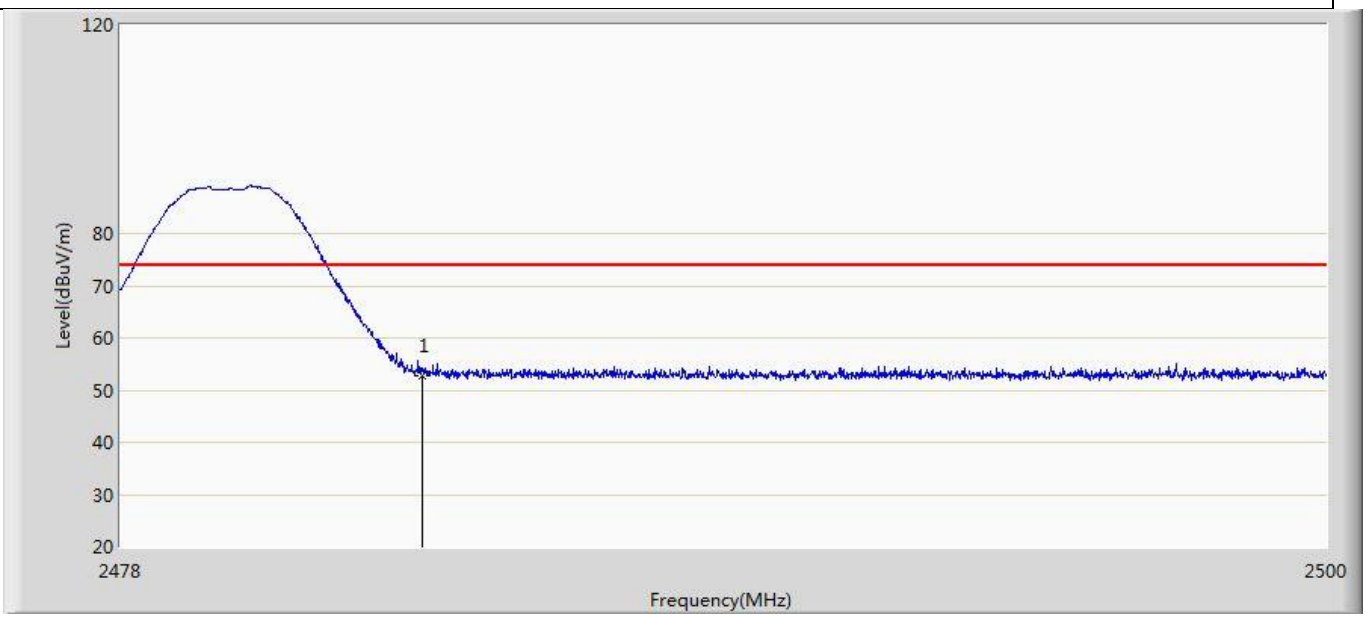
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	40.529	5.070	-13.471	54.000	35.459	AV

Profile: 21B0640R	Page No.: 16
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:35
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2402MHz by LE_2Mbps(GFSK_LE)	



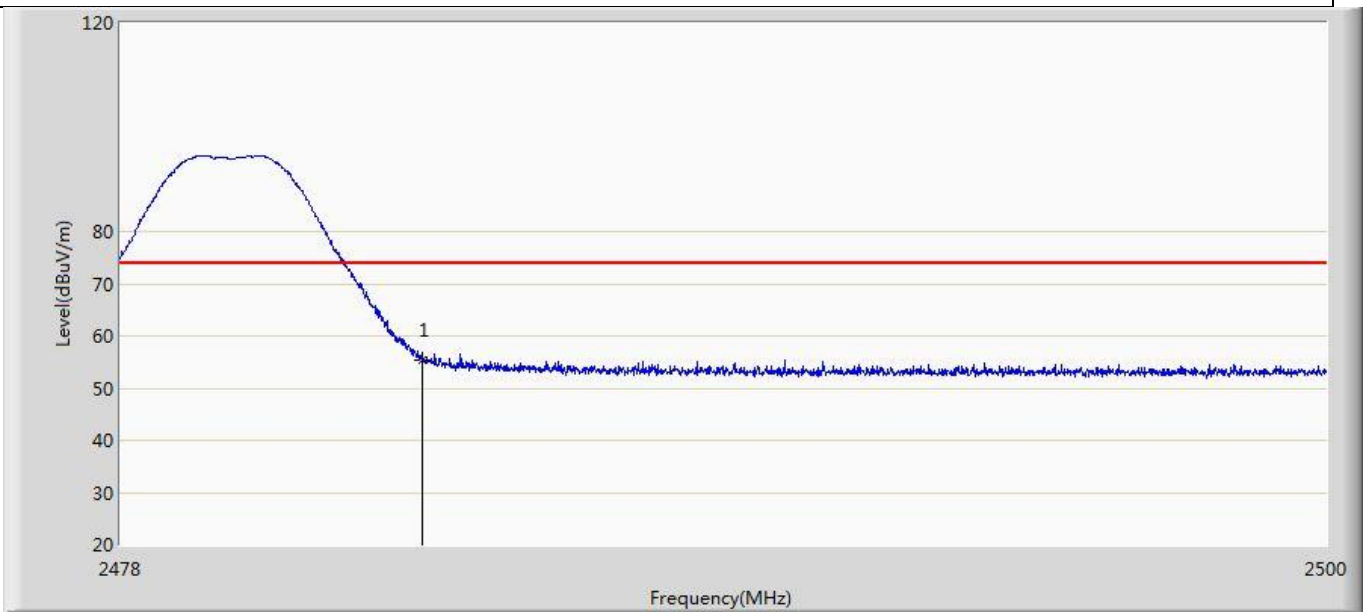
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	40.596	5.137	-13.404	54.000	35.459	AV

Profile: 21B0640R	Page No.: 29
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2480MHz by LE_2Mbps(GFSK_LE)	



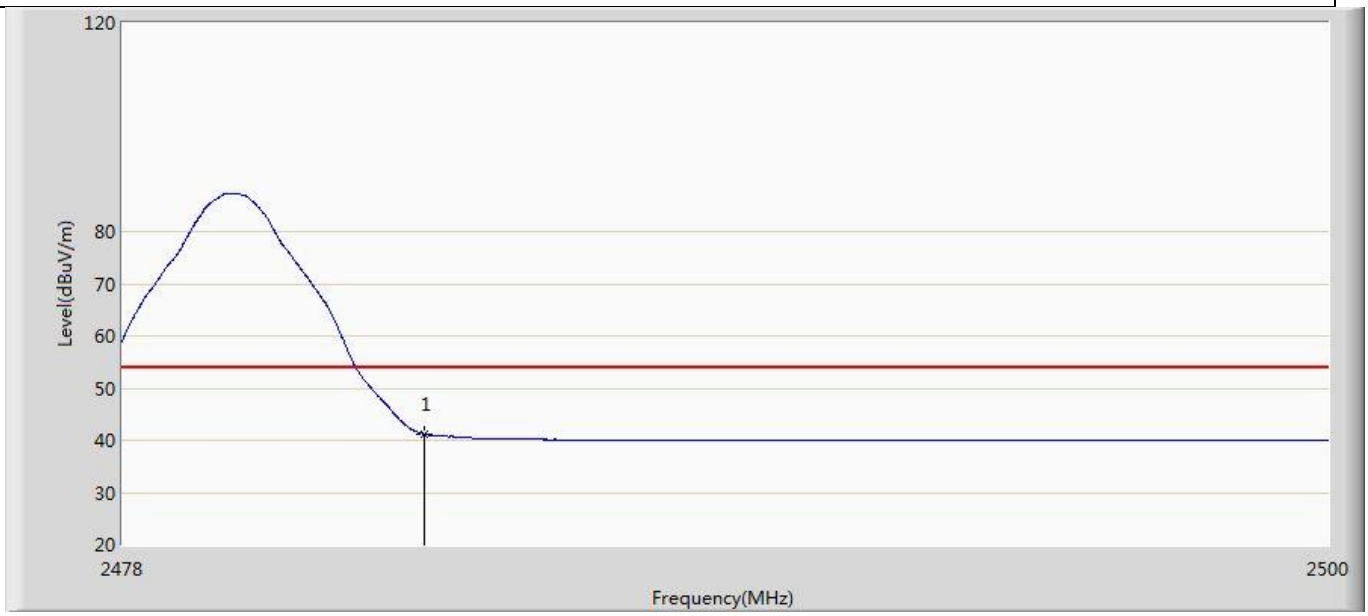
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	52.875	17.200	-21.125	74.000	35.675	PK

Profile: 21B0640R	Page No.: 30
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2480MHz by LE_2Mbps(GFSK_LE)	



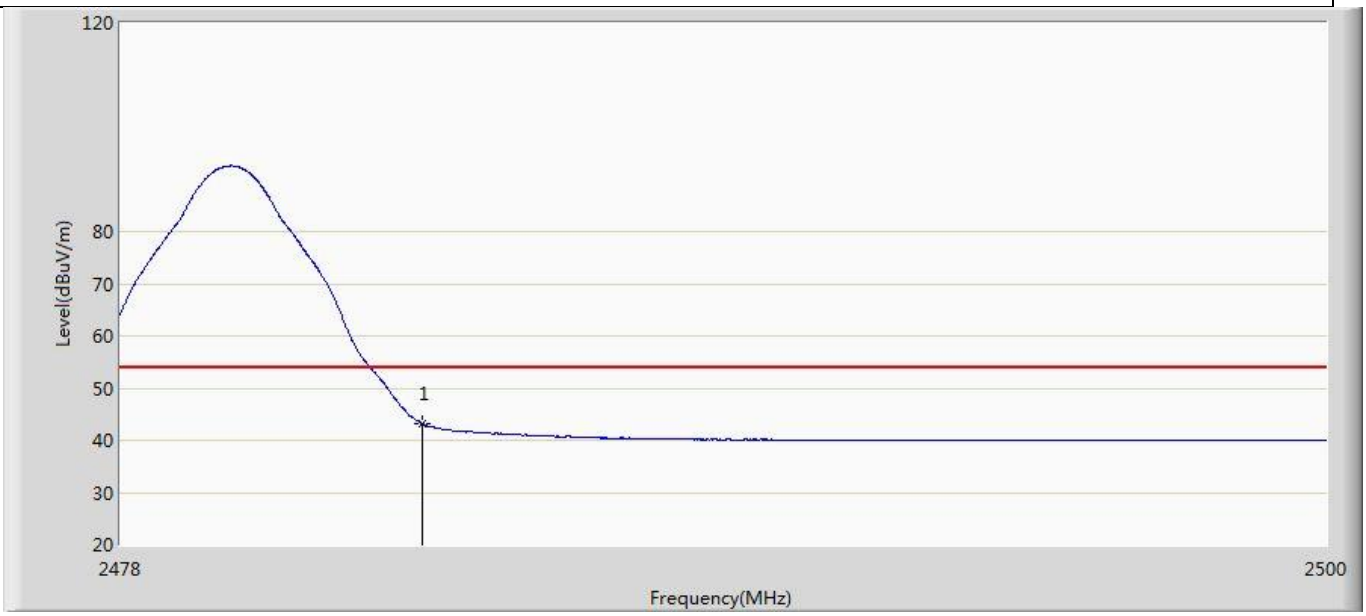
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	55.494	19.819	-18.506	74.000	35.675	PK

Profile: 21B0640R	Page No.: 31
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2480MHz by LE_2Mbps(GFSK_LE)	



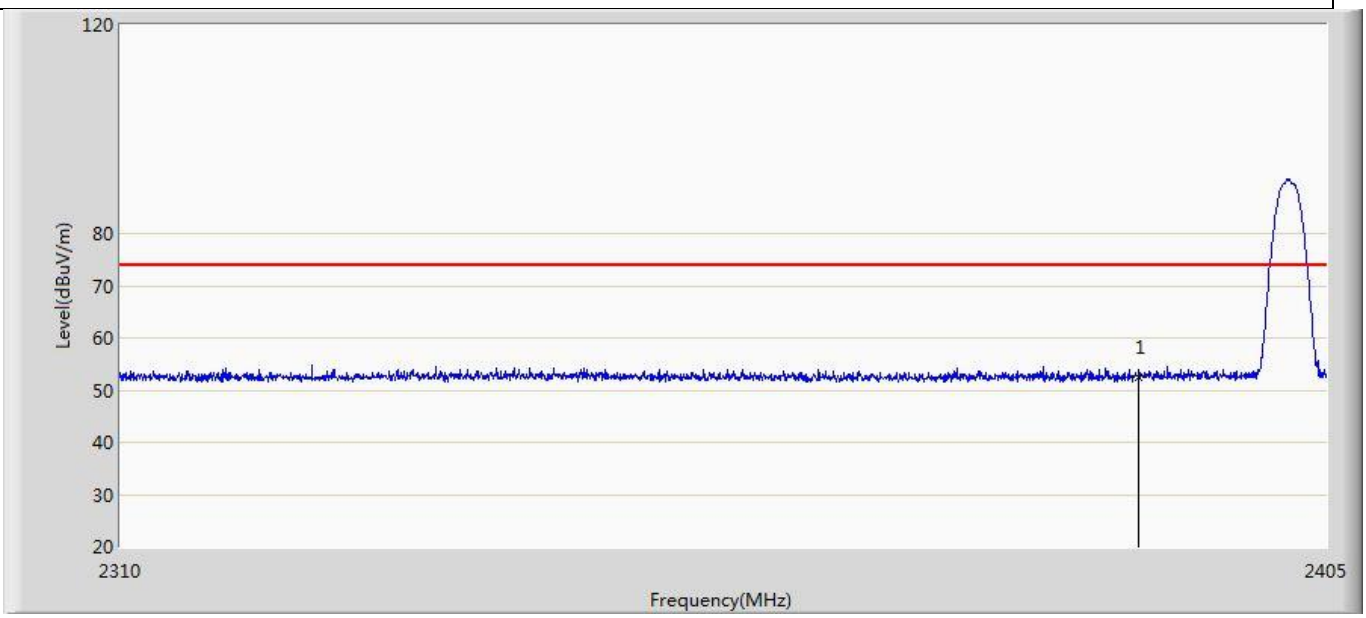
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	41.117	5.442	-12.883	54.000	35.675	AV

Profile: 21B0640R	Page No.: 32
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:06
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 2:Transmit at 2480MHz by LE_2Mbps(GFSK_LE)	



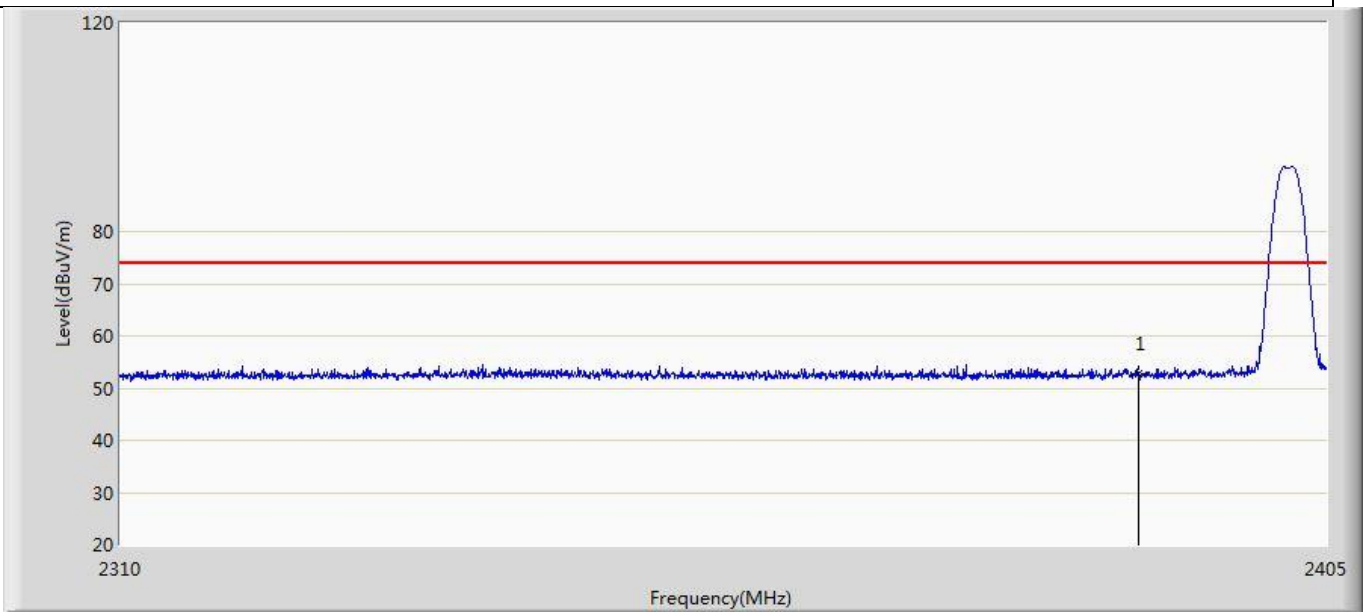
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	43.203	7.528	-10.797	54.000	35.675	AV

Profile: 21B0640R	Page No.: 21
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:45
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2402MHz by LE_Coded(S=2)(GFSK_LE)	



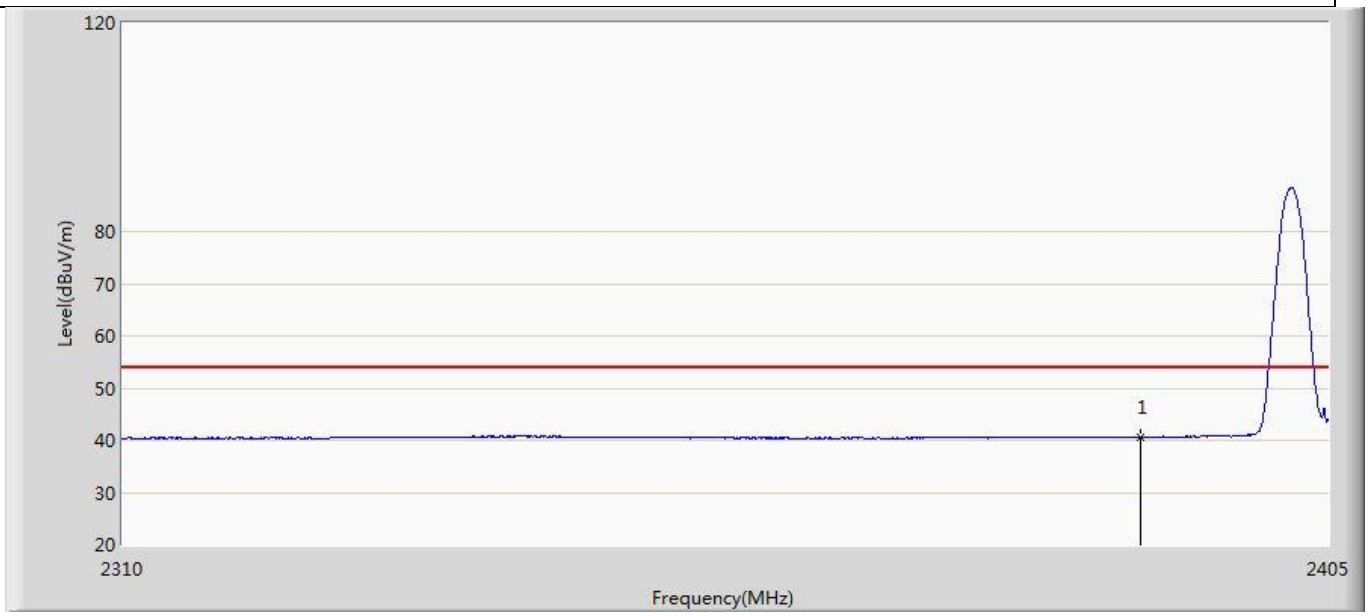
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	52.403	16.944	-21.597	74.000	35.459	PK

Profile: 21B0640R	Page No.: 22
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:47
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2402MHz by LE_Coded(S=2)(GFSK_LE)	



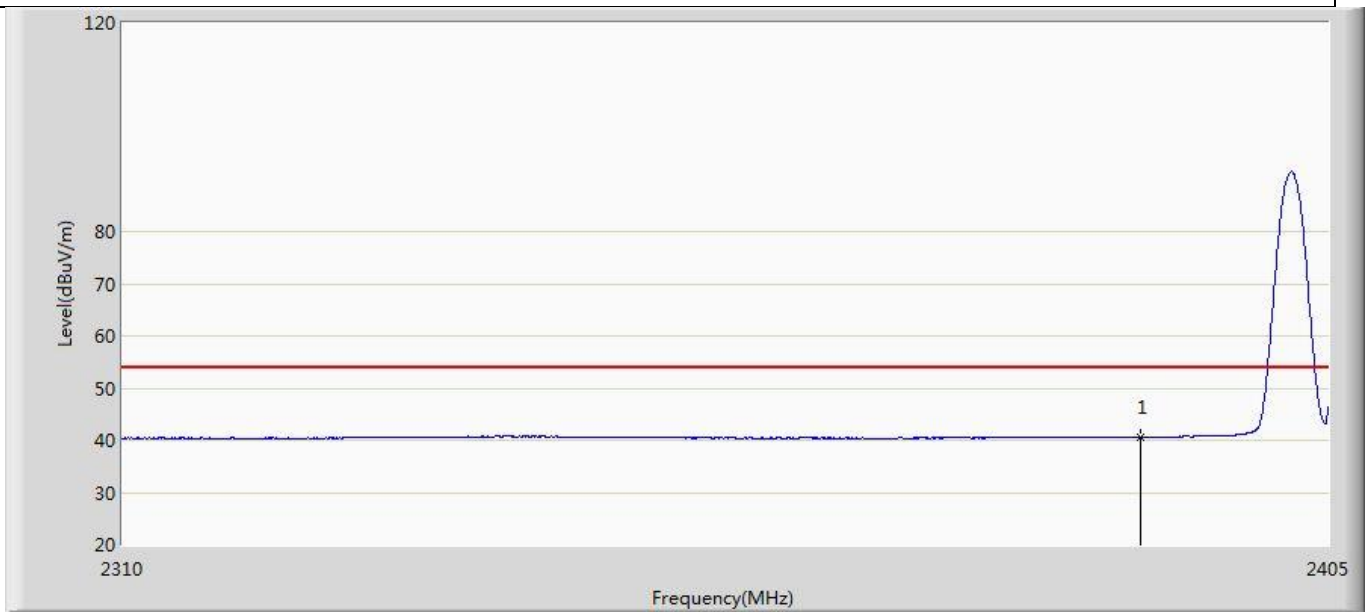
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	52.774	17.315	-21.226	74.000	35.459	PK

Profile: 21B0640R	Page No.: 23
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:48
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2402MHz by LE_Coded(S=2)(GFSK_LE)	



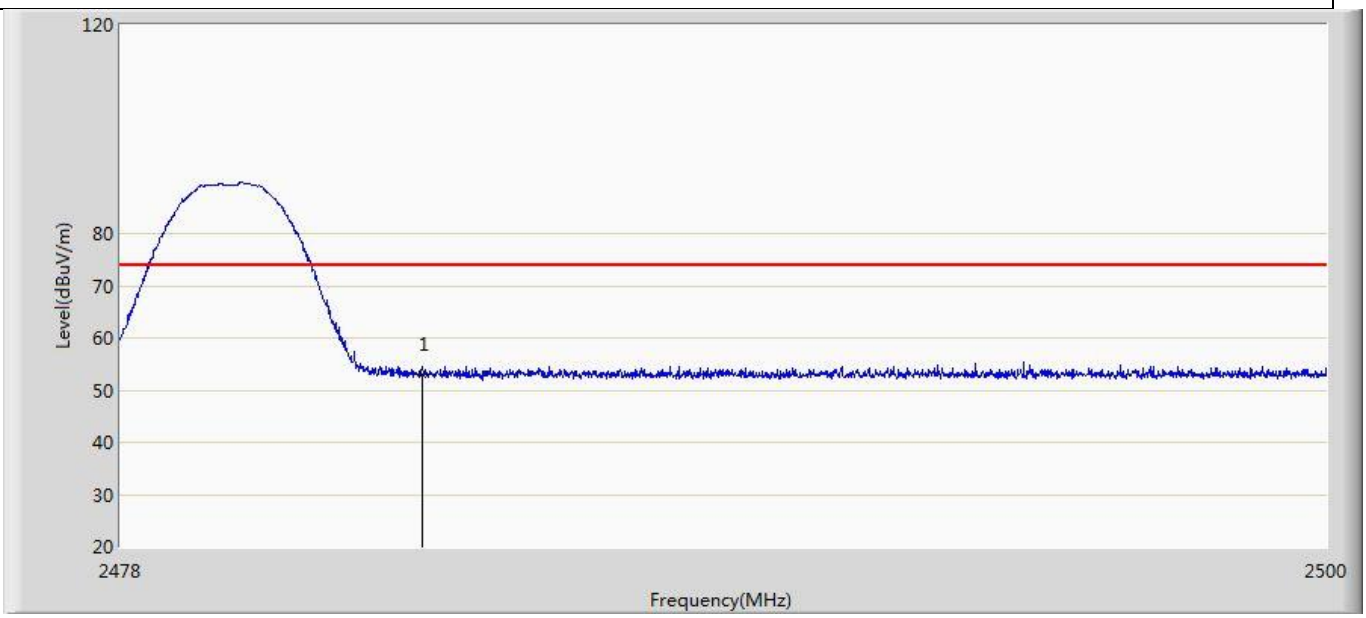
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	40.598	5.139	-13.402	54.000	35.459	AV

Profile: 21B0640R	Page No.: 24
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:50
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2402MHz by LE_Coded(S=2)(GFSK_LE)	



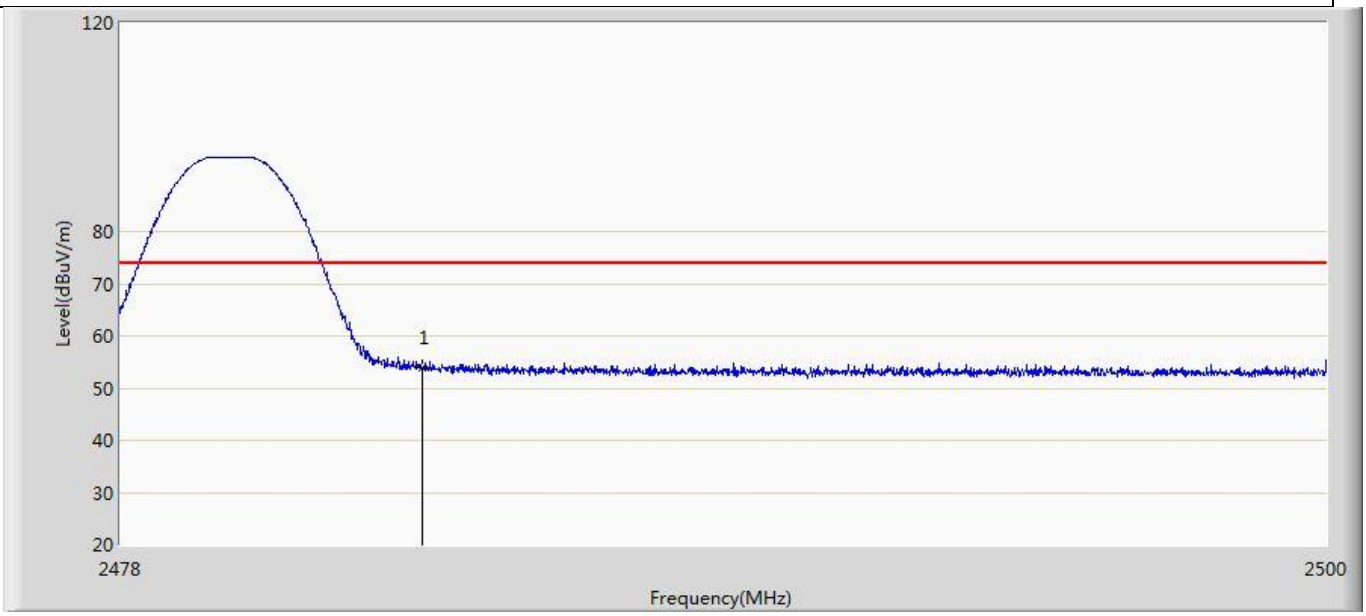
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	40.594	5.135	-13.406	54.000	35.459	AV

Profile: 21B0640R	Page No.: 37
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2480MHz by LE_Coded(S=2)(GFSK_LE)	



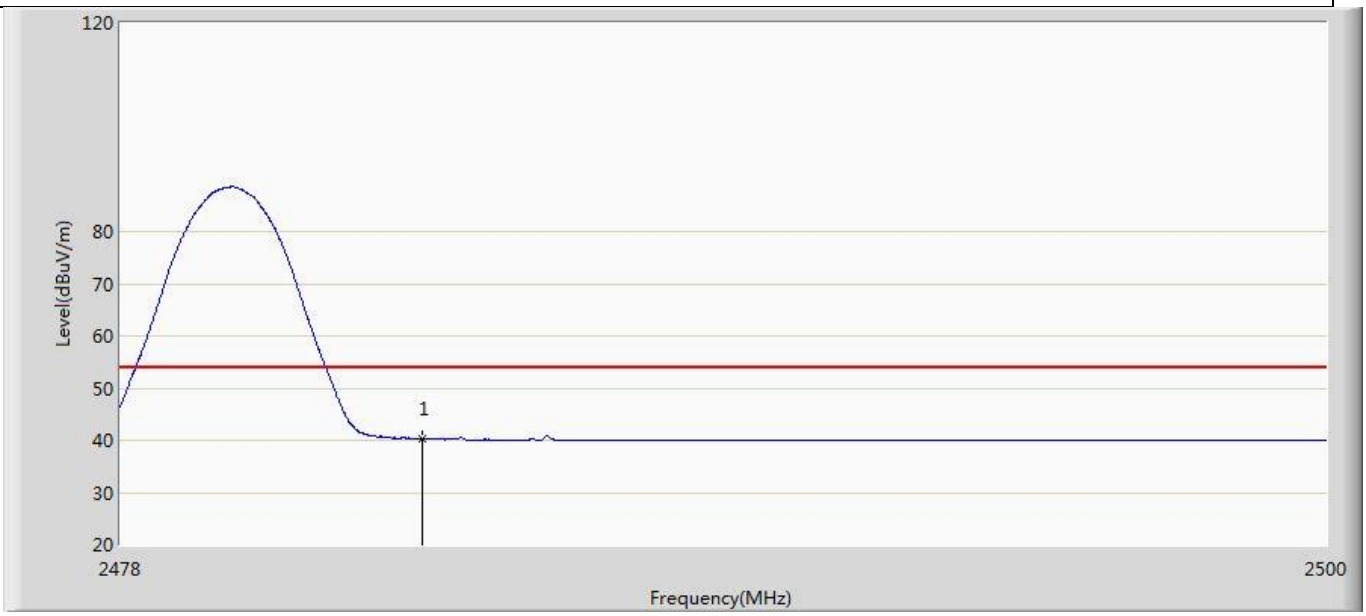
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	53.082	17.407	-20.918	74.000	35.675	PK

Profile: 21B0640R	Page No.: 38
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:20
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2480MHz by LE_Coded(S=2)(GFSK_LE)	



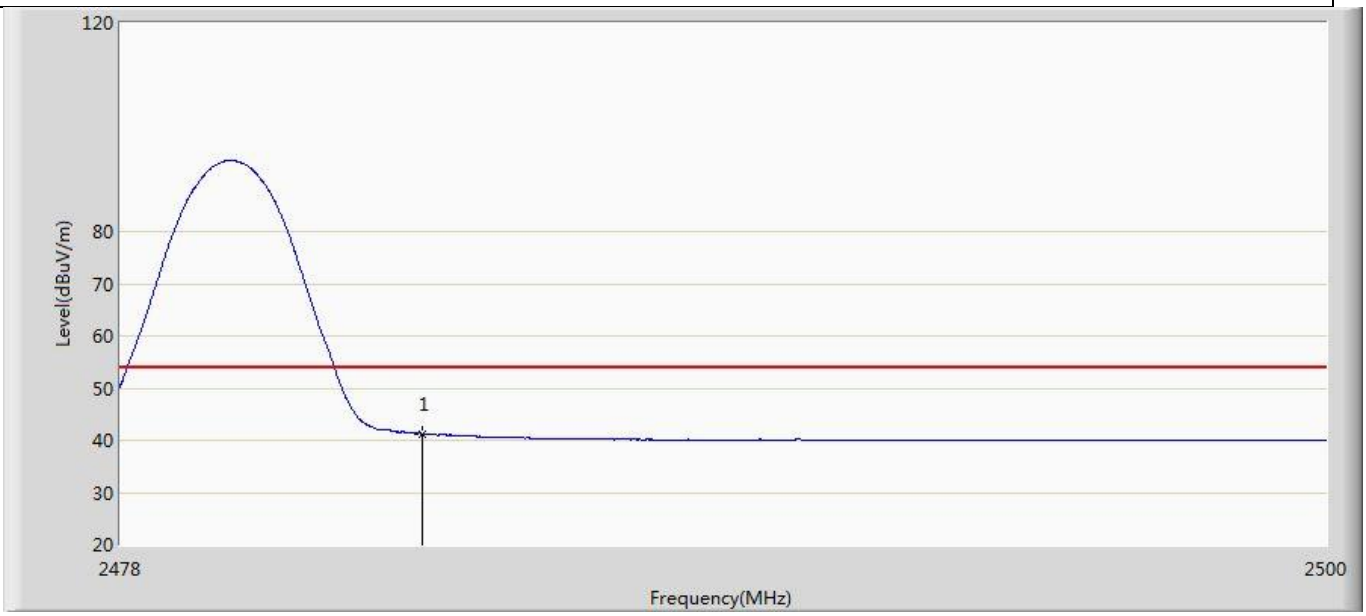
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	53.933	18.258	-20.067	74.000	35.675	PK

Profile: 21B0640R	Page No.: 39
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:21
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2480MHz by LE_Coded(S=2)(GFSK_LE)	



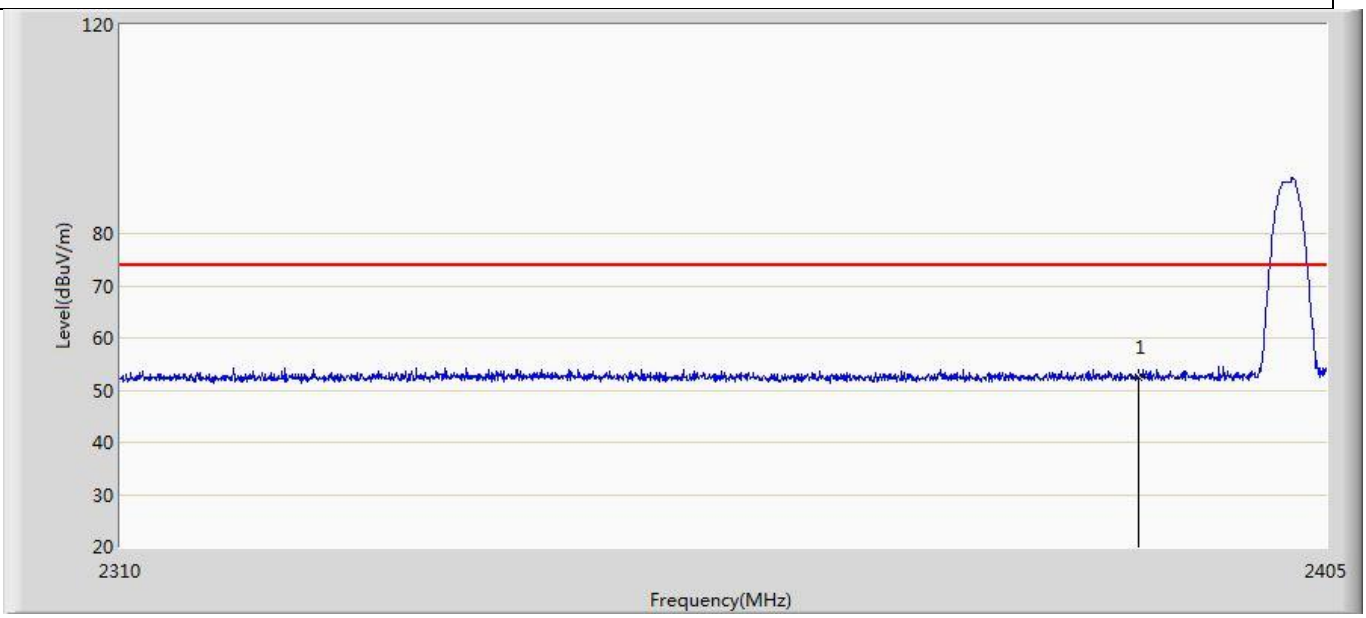
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	40.262	4.587	-13.738	54.000	35.675	AV

Profile: 21B0640R	Page No.: 40
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:23
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 3:Transmit at 2480MHz by LE_Coded(S=2)(GFSK_LE)	



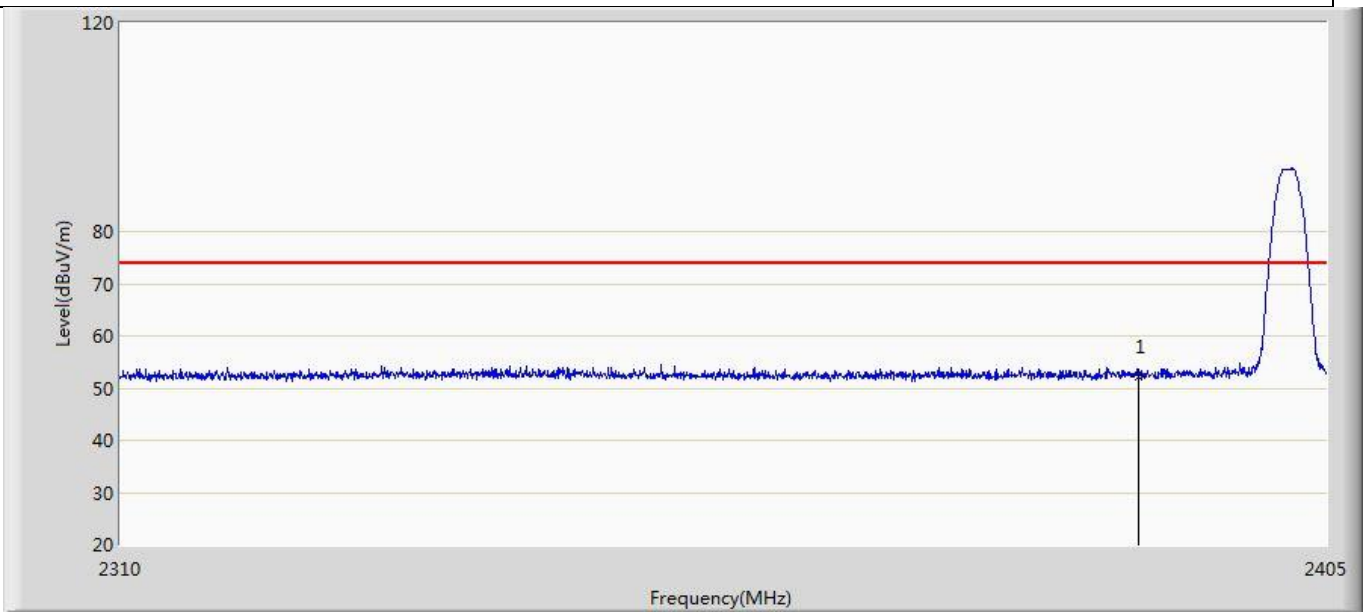
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	41.285	5.610	-12.715	54.000	35.675	AV

Profile: 21B0640R	Page No.: 17
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:37
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2402MHz by LE_Coded(S=8)(GFSK_LE)	



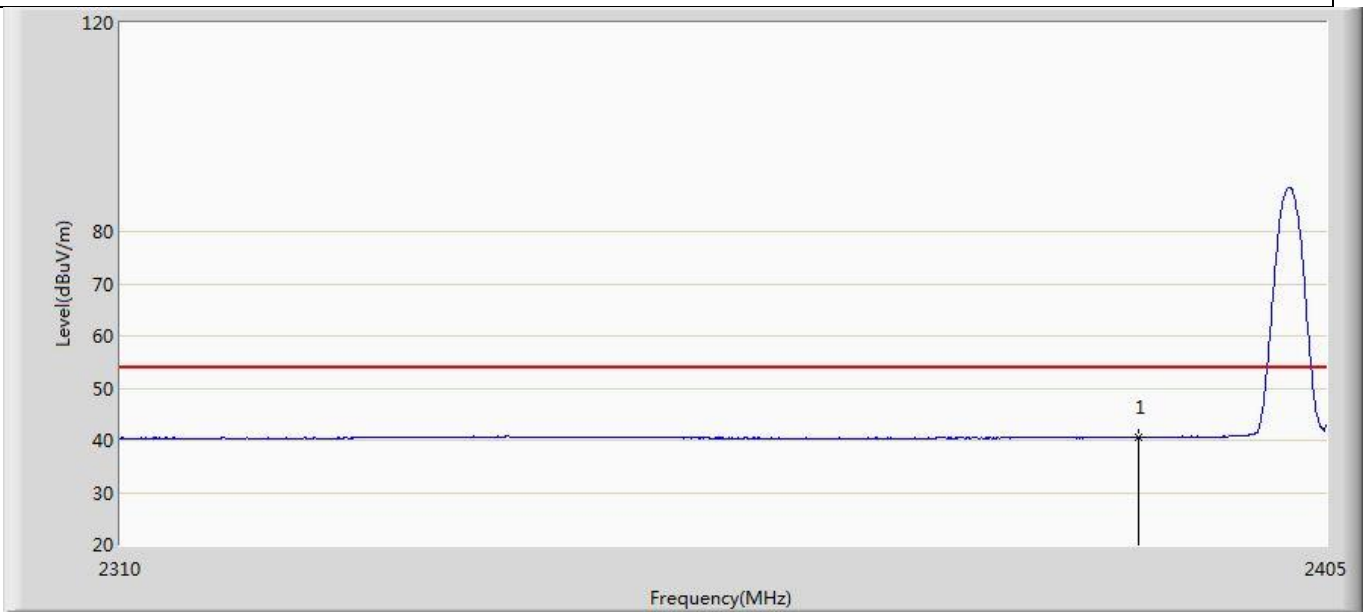
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	52.360	16.901	-21.640	74.000	35.459	PK

Profile: 21B0640R	Page No.: 18
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2402MHz by LE_Coded(S=8)(GFSK_LE)	



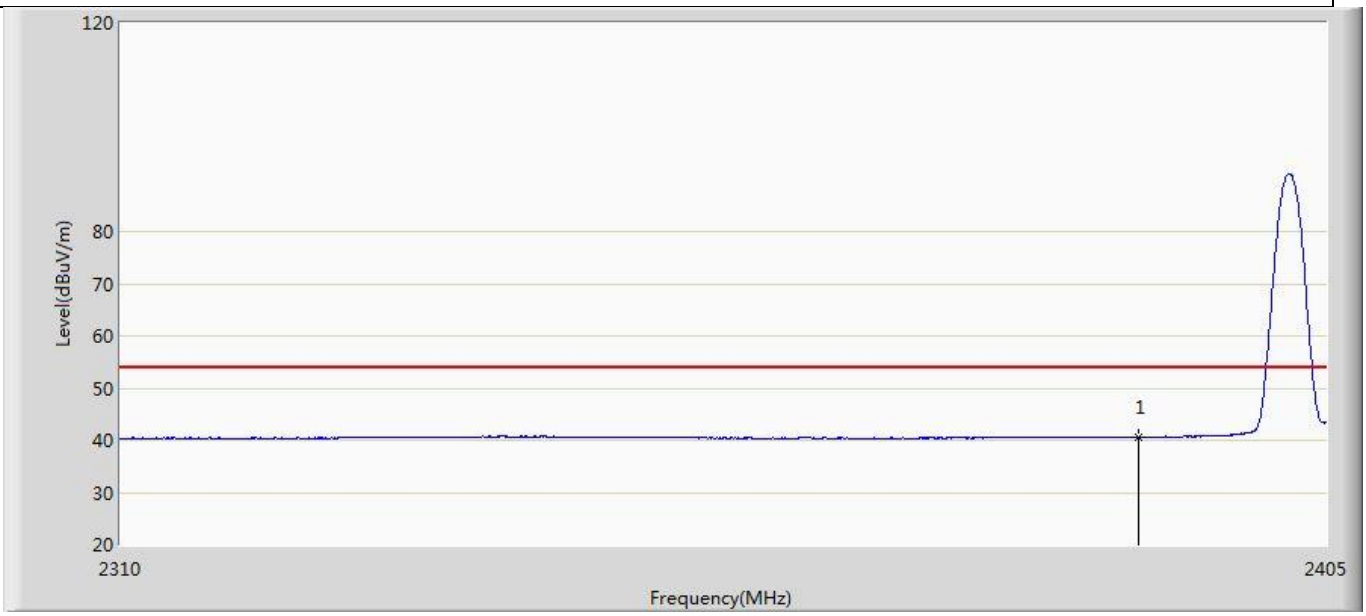
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	52.127	16.668	-21.873	74.000	35.459	PK

Profile: 21B0640R	Page No.: 19
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:41
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2402MHz by LE_Coded(S=8)(GFSK_LE)	



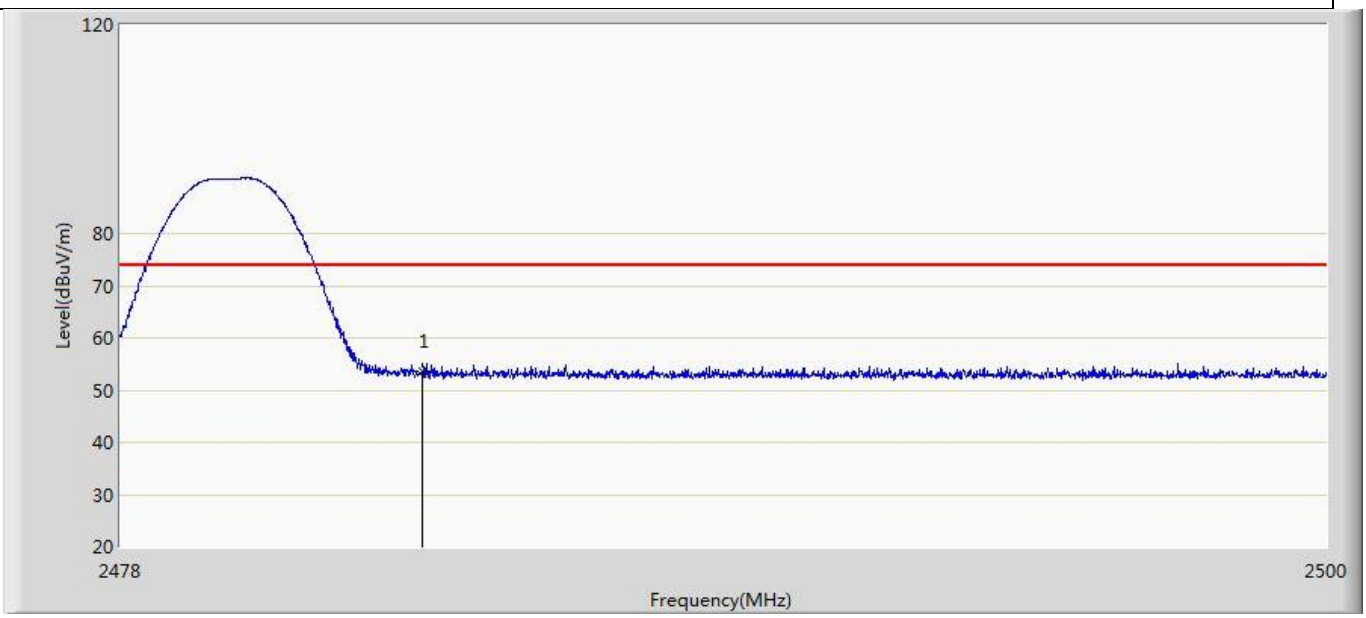
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	40.570	5.111	-13.430	54.000	35.459	AV

Profile: 21B0640R	Page No.: 20
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 19:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2402MHz by code 125k	



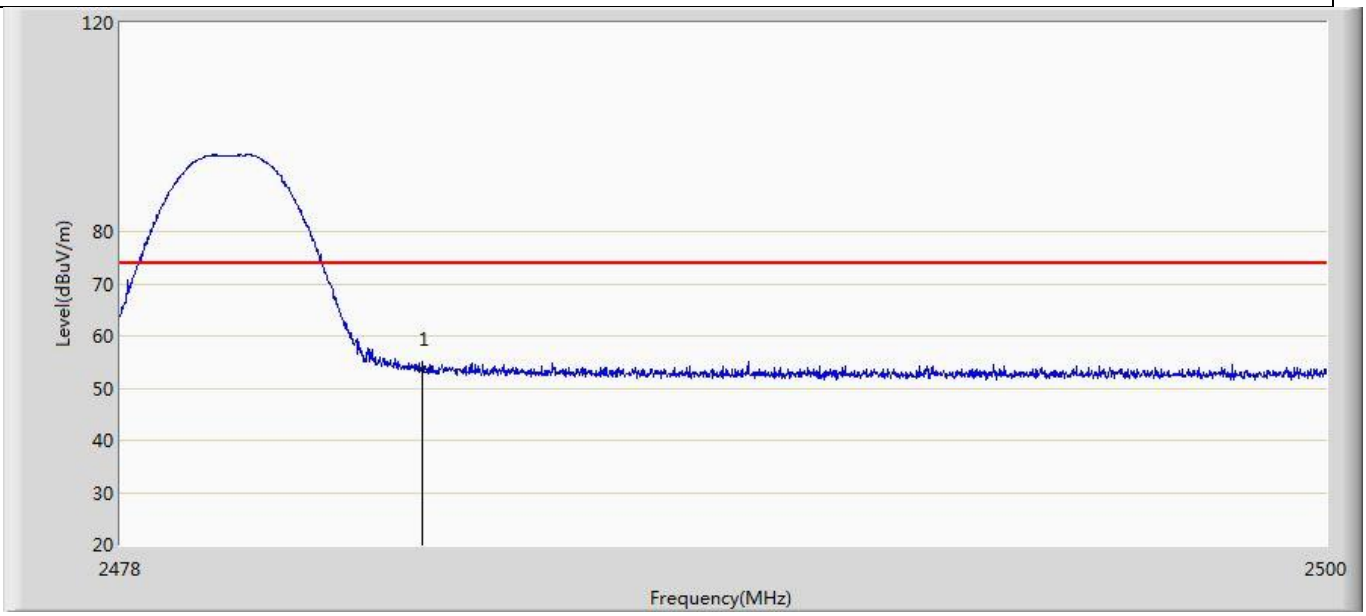
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2390.000	40.571	5.112	-13.429	54.000	35.459	AV

Profile: 21B0640R	Page No.: 33
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:10
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2480MHz by LE_Coded(S=8)(GFSK_LE)	



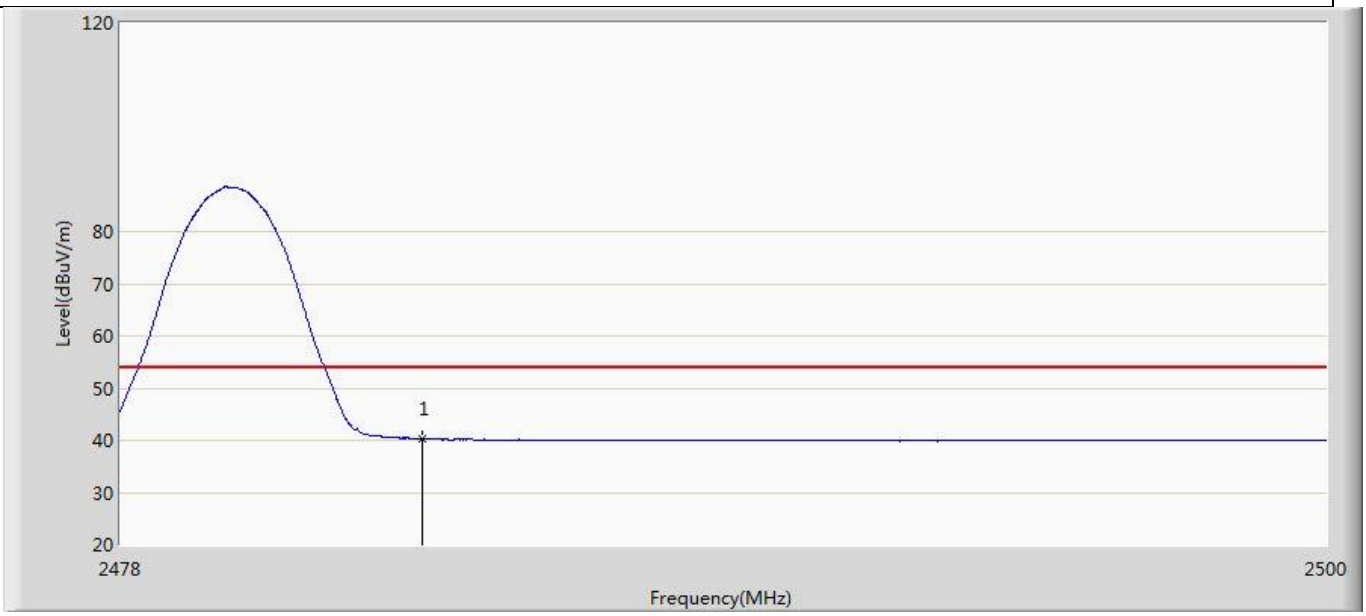
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	53.679	18.004	-20.321	74.000	35.675	PK

Profile: 21B0640R	Page No.: 34
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:12
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2480MHz by LE_Coded(S=8)(GFSK_LE)	



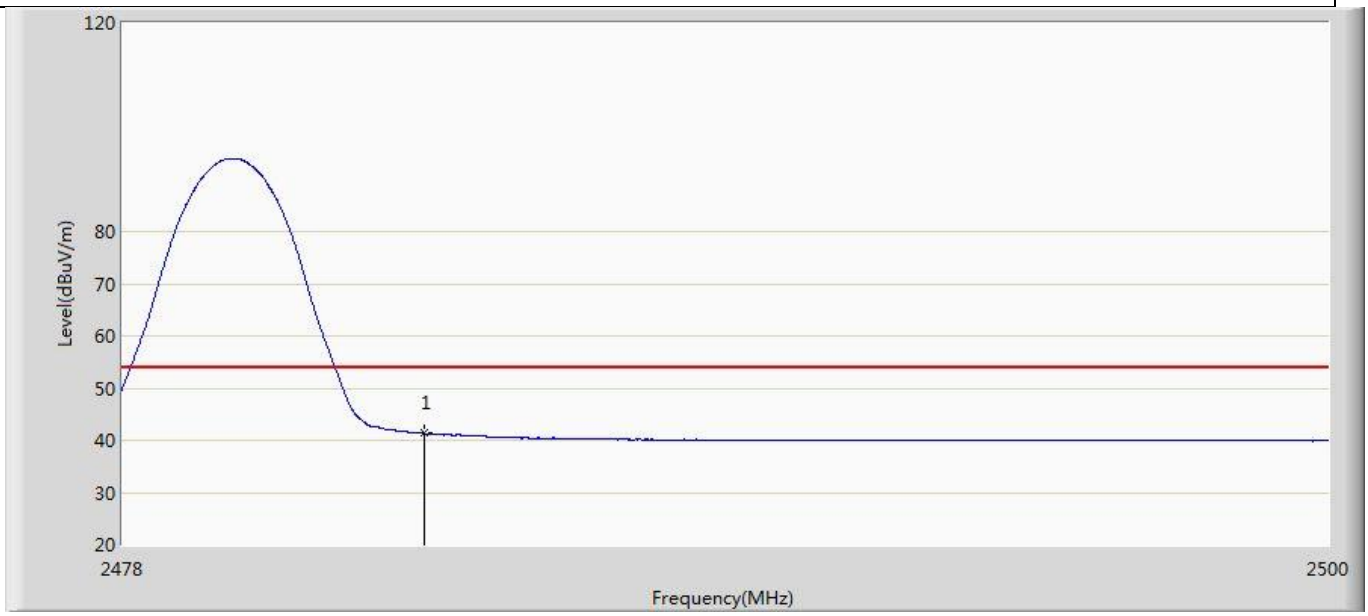
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	53.708	18.033	-20.292	74.000	35.675	PK

Profile: 21B0640R	Page No.: 35
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:14
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Horizontal
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2480MHz by LE_Coded(S=8)(GFSK_LE)	



No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	40.280	4.605	-13.720	54.000	35.675	AV

Profile: 21B0640R	Page No.: 36
Engineer: Carlosshen	
Site: AC5	Time: 2021/12/01 - 20:16
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: Horn_3117_00167055(1-18GHz)	Polarity: Vertical
EUT: LED lamps	Power: AC 120V/60Hz
Note: Mode 4:Transmit at 2480MHz by LE_Coded(S=8)(GFSK_LE)	



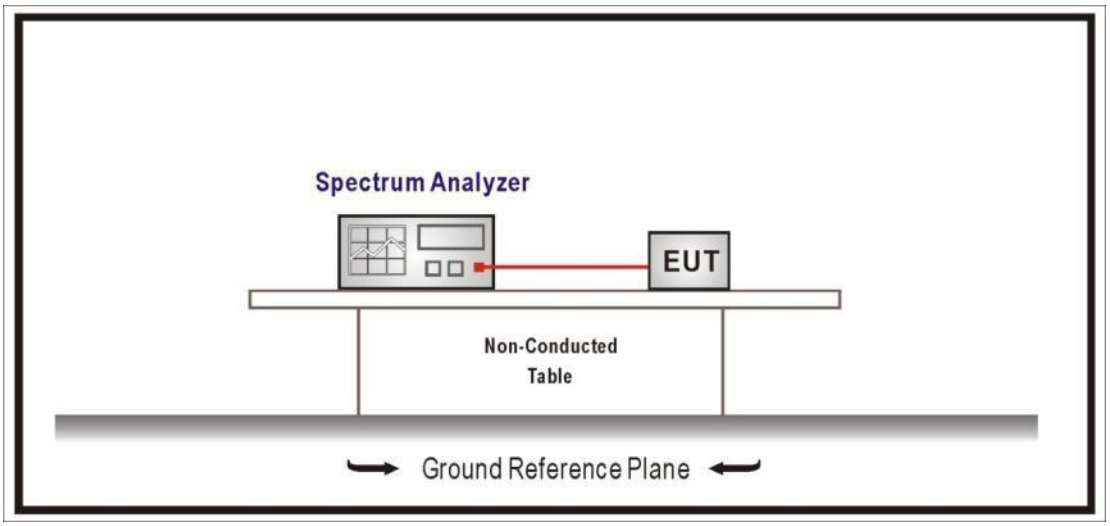
No	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*	2483.500	41.325	5.650	-12.675	54.000	35.675	AV

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

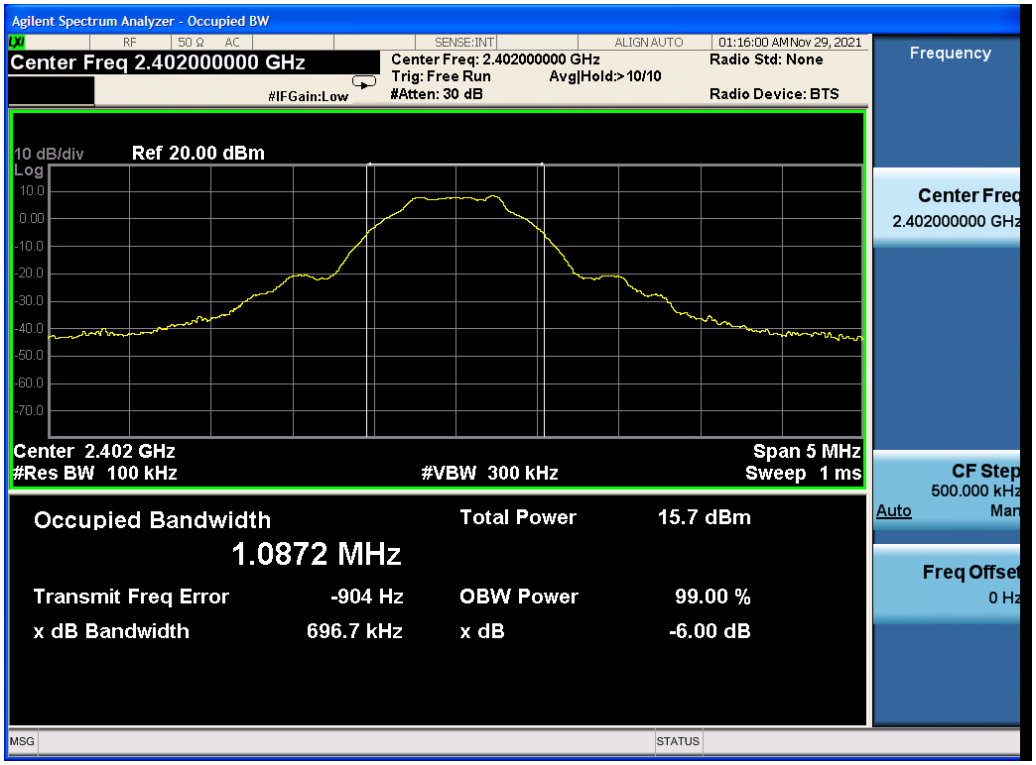
	Reference Rule		Chapter	Description
☒	ANSI C63.10		11.8	DTS bandwidth
	☐	ANSI C63.10	11.8.1	Option 1
	☒	ANSI C63.10	11.8.2	Option 2

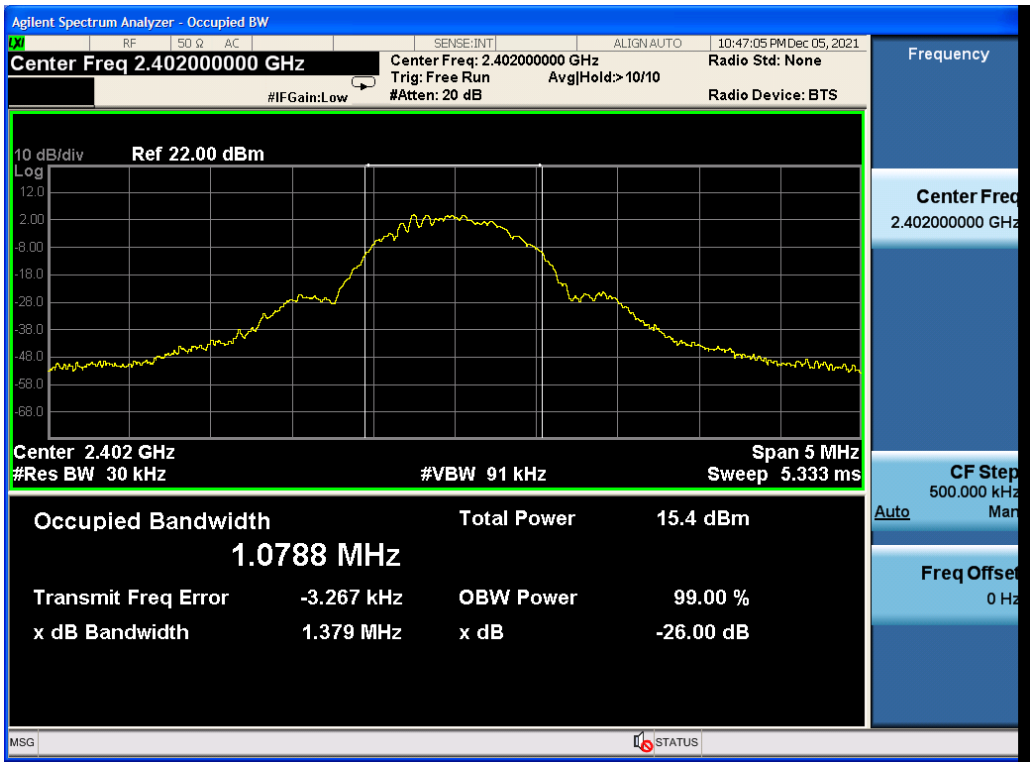
4.6.4 Test Data

Mode	CH.	Test Freq. (MHz)	99% Occupied Bandwidth (MHz)	6dB Occupied Bandwidth (MHz)	Limit (kHz)	Result
1	00	2402	1.0788	0.6967	>500	Pass
	19	2440	1.0763	0.6886	>500	Pass
	39	2480	1.0768	0.6889	>500	Pass
2	00	2402	2.1796	1.385	>500	Pass
	19	2440	2.1806	1.382	>500	Pass
	39	2480	2.1830	1.379	>500	Pass
3	00	2402	1.1443	0.7342	>500	Pass
	19	2440	1.1383	0.7332	>500	Pass
	39	2480	1.1360	0.7341	>500	Pass
4	00	2402	1.1537	0.7887	>500	Pass
	19	2440	1.1486	0.7853	>500	Pass
	39	2480	1.1443	0.7831	>500	Pass

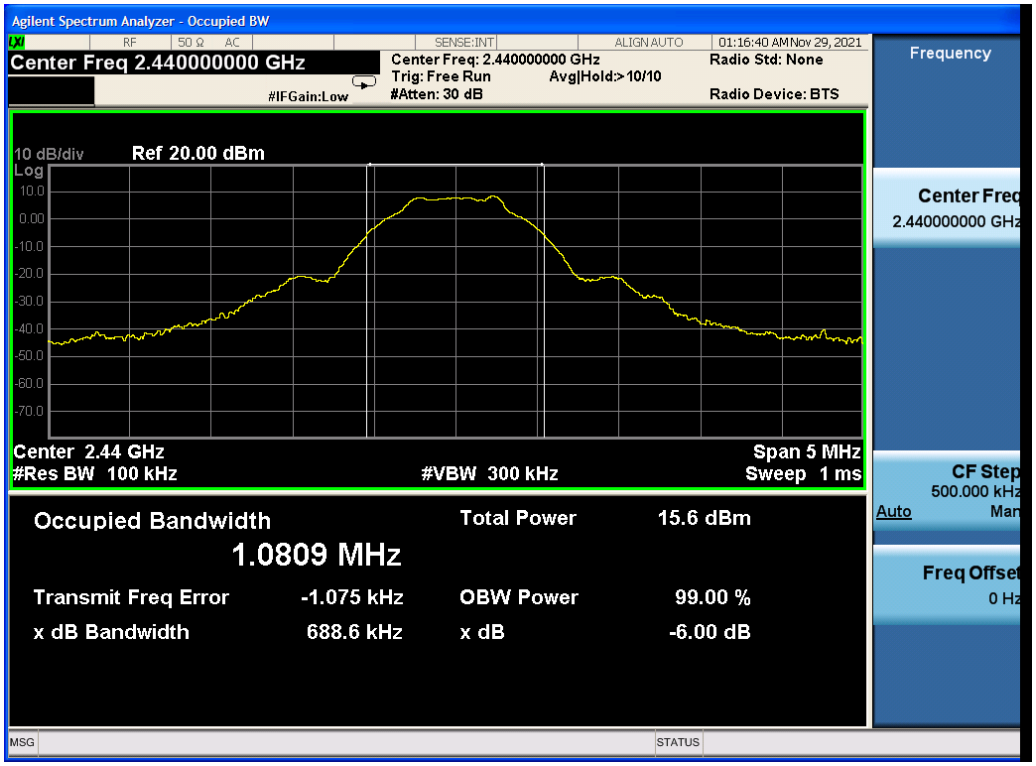
Note : We evaluated all test modes, shown in the report is the worst data.

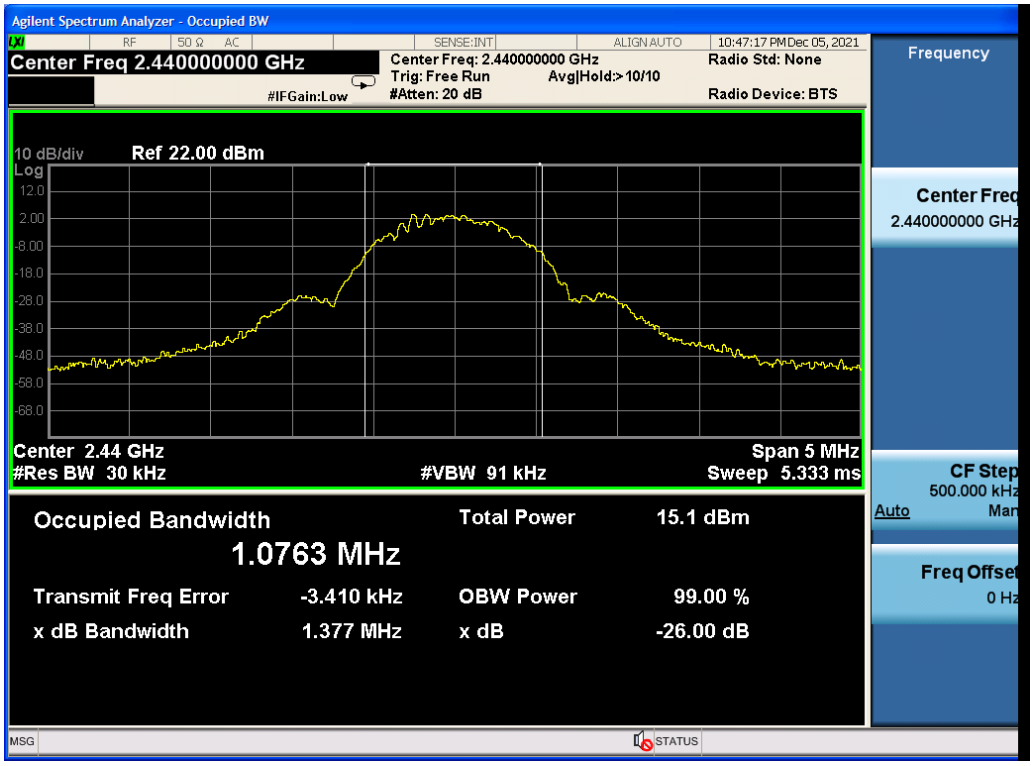
Mode 1 CH00 (2402MHz)



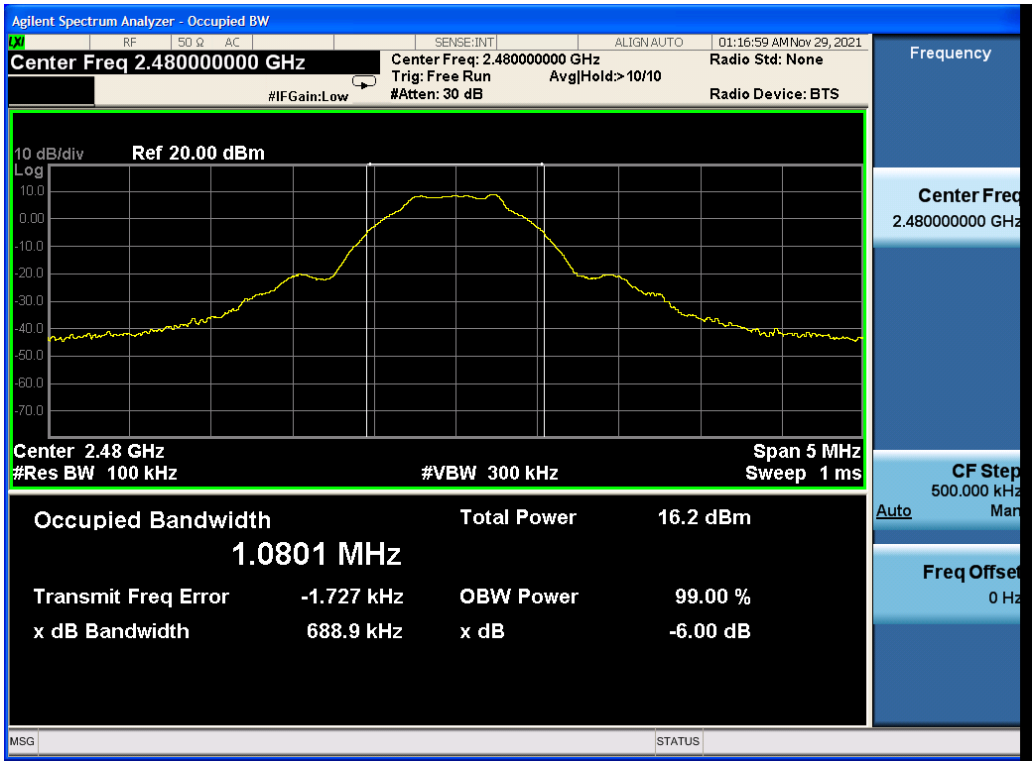


Mode 1 CH19 (2440MHz)





Mode 1 CH39 (2480MHz)



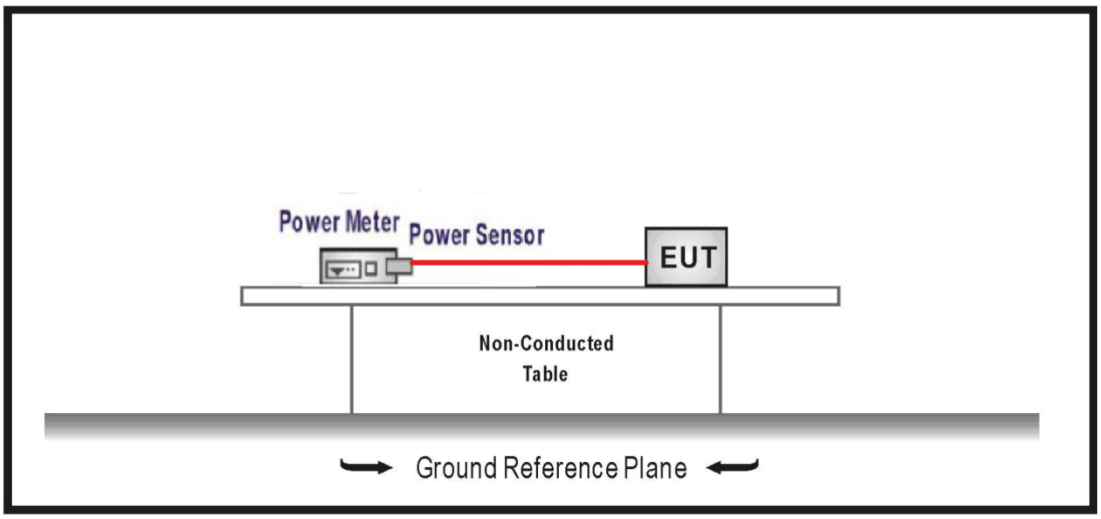
4.7 Fundamental emission output power — VERDICT: PASS

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

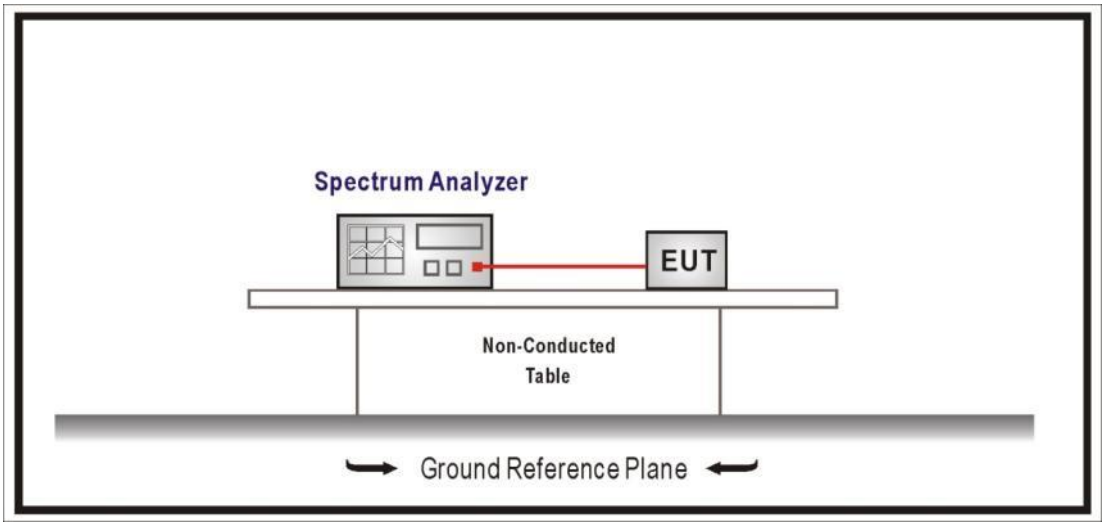
4.7.4 Test Data

Mode	Channel	Test Frequency (MHz)	Power Output (dBm)	Limit (dBm)	Result
Mode 1	00	2402	9.19	≤30	Pass
	19	2440	9.22	≤30	Pass
	39	2480	9.31	≤30	Pass
Mode 2	00	2402	9.21	≤30	Pass
	19	2440	9.26	≤30	Pass
	39	2480	9.33	≤30	Pass
Mode 3	00	2402	9.22	≤30	Pass
	19	2440	9.27	≤30	Pass
	39	2480	9.31	≤30	Pass
Mode 4	00	2402	9.24	≤30	Pass
	19	2440	9.27	≤30	Pass
	39	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

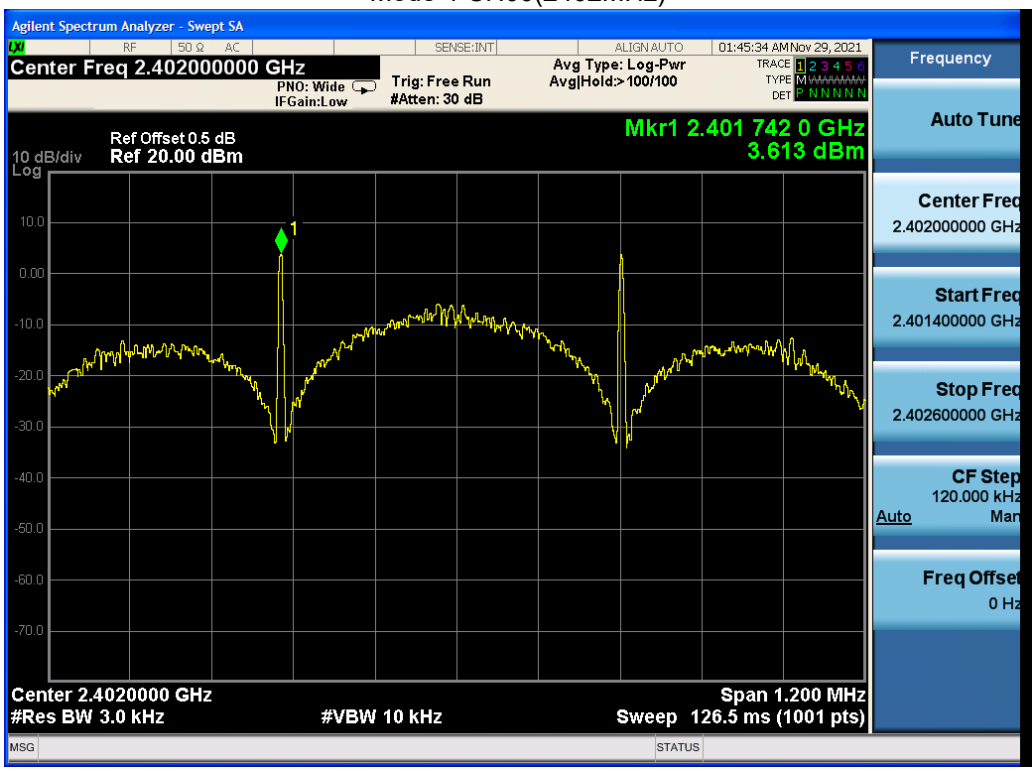
	References Rule		Chapter	Description
☒	ANSI C63.10		11.10	Maximum power spectral density level in the fundamental emission
	☒	ANSI C63.10	11.10.2	Method PKPSD (peak PSD)
	☐	ANSI C63.10	11.10.3	Method AVGPSD-1(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.4	Method AVGPSD-1A(Duty cycle≥98%)
	☐	ANSI C63.10	11.10.5	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

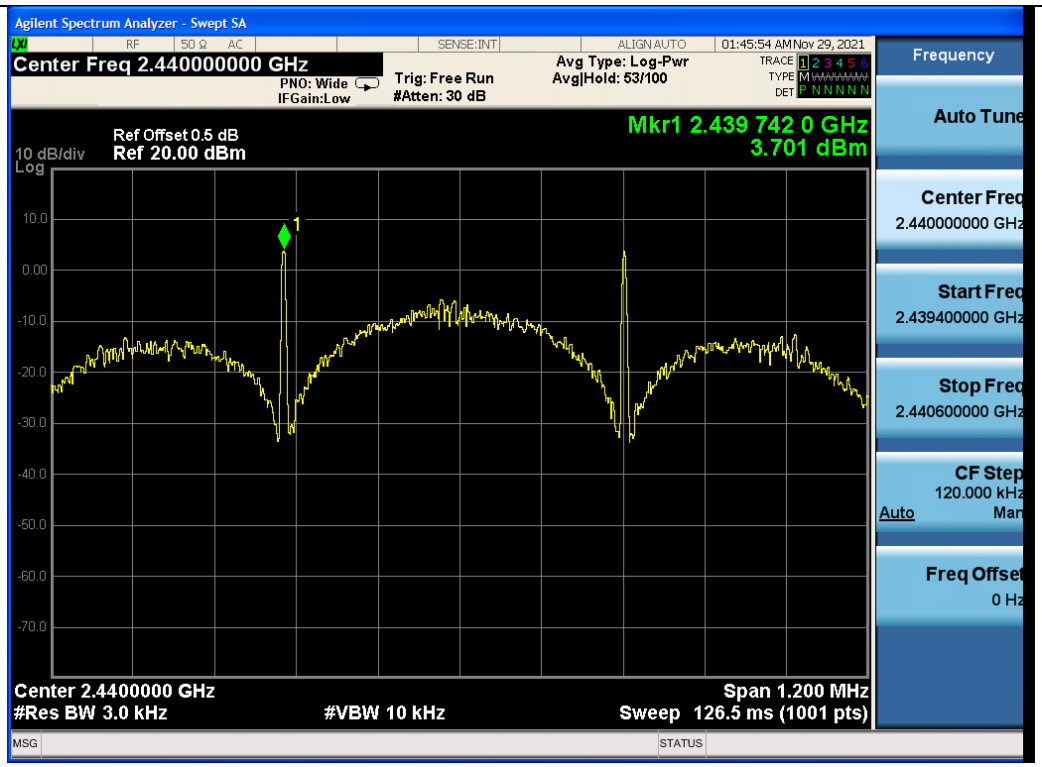
Mode	Channel	Test Frequency (MHz)	Measurement PSD (dBm/3kHz)	Total Measurement PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
Mode 1	00	2402	-5.991	-5.991	≤8	Pass
	19	2440	-5.636	-5.636	≤8	Pass
	39	2480	-5.369	-5.369	≤8	Pass
Mode 2	00	2402	-8.811	-8.811	≤8	Pass
	19	2440	-8.483	-8.483	≤8	Pass
	39	2480	-8.351	-8.232	≤8	Pass
Mode 3	00	2402	-8.498	-8.498	≤8	Pass
	19	2440	-8.209	-8.209	≤8	Pass
	39	2480	-8.351	-8.351	≤8	Pass
Mode 4	00	2402	3.613	3.613	≤8	Pass
	19	2440	3.701	3.701	≤8	Pass
	39	2480	3.958	3.958	≤8	Pass

Remark: The worst data as below:

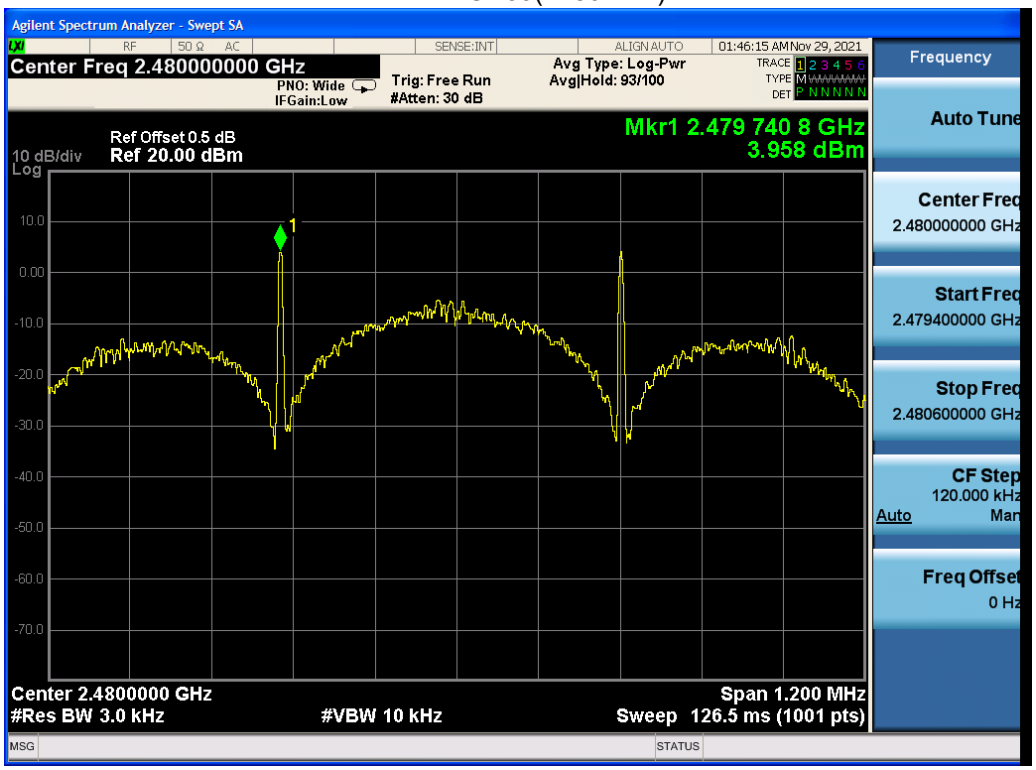
Mode 4 CH00(2402MHz)



Mode 4 CH19(2440MHz)



Mode 4 CH39(2480MHz)



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