FCC TEST REPORT

FCC ID: 2ATD5LM-1907

On Behalf of

SHENZHEN XINHAI CHUANGDA TECHNOLOGY INDUSTRIAL CO.LTD

LED MIRROR

Model No.: LM-1907, LM-1908, LM-1909, LM-1910, LM-1911, LM-1912

Prepared for	:	SHENZHEN XINHAI CHUANGDA TECHNOLOGY INDUSTRIAL CO.LTD
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Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
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TEST REPORT DECLARATION

Applicant	:	SHENZHEN XINHAI CHUANGDA TECHNOLOGY INDUSTRIAL CO.LTD
Address	:	319, 3/F, JIANGNAN BUILDING, NO. 2 YONGXIANG ROAD, BANTIAN STREET, LONGGANG, SHENZHEN, CHINA
Manufacturer	:	SHENZHEN XINHAI CHUANGDA TECHNOLOGY INDUSTRIAL CO.LTD
Address	:	319, 3/F, JIANGNAN BUILDING, NO. 2 YONGXIANG ROAD, BANTIAN STREET, LONGGANG, SHENZHEN, CHINA
EUT Description	:	LED MIRROR
		(A) Model No. : LM-1907, LM-1908, LM-1909, LM-1910, LM-1911, LM-1912
		(B) Trademark : ILUMAY

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....…..:	Ella Liang Project Engineer	Ella Liang
Approved by (name + signature)…....:	Simple Guan Project Manager	
Date of issue…… ……..:	June 10, 2019	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	June 10, 2019	Initial released Issue	Simple Guan

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Standards Paragraph	Result
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.10 :2013	P
Bandwidth	FCC Part 15: 15.215 ANSI C63.10 :2013	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.10 :2013	P
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10 :2013	P
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10 :2013	P
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.10 :2013	P
Antenna requirement	FCC Part 15: 15.203	P
Note:	1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable.	

2. GENERAL INFORMATION

2.1.Description of Device (EUT)

Description	:	LED MIRROR
Trademark	:	ILUMAY
Model Number	:	LM-1907, LM-1908, LM-1909, LM-1910, LM-1911, LM-1912
DIFF.	:	There is no difference between all the models, except the model name, this report performs the model LM-1907.
Test Voltage	:	AC 100-240V, 50/60Hz, 1.5A
BT		
Radio Technology	:	Bluetooth V4.2+EDR
Operation frequency	:	2402-2480MHz
Channel No.	:	79 Channels
Modulation type	:	GFSK, π /4 DQPSK
Antenna Type	:	PCB Antenna, max gain 0dBi.
Software version	:	V1.0
Hardware version	:	LD-03-K.PCB

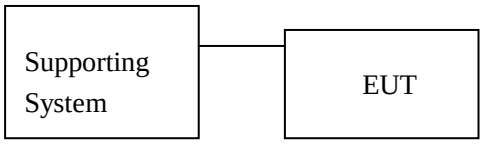
2.2.Accessories of Device (EUT)

Accessories1 : /
Manufacturer : /
Model : /
Ratings : /

2.3.Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1.	Notebook	ACER	ZQT	N/A	DOC

2.4.Block Diagram of connection between EUT and simulators



2.5.Test Mode Description

Tested mode, channel, and data rate information		
Mode	**Channel**	**Frequency (MHz)**
GFSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480
π /4 DQPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

Note: Test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found the worst case is under normal voltage (120V/60Hz), and only report that result.

2.6.Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	27℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7.Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

July 25, 2017 Certificated by IC
Registration Number: 12135A

2.8.Measurement Uncertainty

(95% confidence levels, k=2)

Item	**Uncertainty**
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.16dB(Polarize: H)
	4.13dB(Polarize: V)
Uncertainty for radio frequency	5.4×10-8
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.9.Test Equipment List

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2018.09.21	1Year
Spectrum analyzer	ROHDE&SCHWARZ	FSU	1166.1660.26	2018.09.21	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2018.09.21	1Year
Receiver	R&S	ESCI	101165	2018.09.21	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2018.04.13	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2018.04.13	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2018.09.26	2Year
Cable	Resenberger	N/A	No.1	2018.09.21	1Year
Cable	Resenberger	N/A	No.2	2018.09.21	1Year
Cable	Resenberger	N/A	No.3	2018.09.21	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2018.09.21	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2018.09.21	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2018.09.21	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2018.09.21	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2018.09.21	1 Year
Horn Antenna	A-INFOMW	LB-180100-KF	J211020657	2018.09.21	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2018.09.21	1 Year
Power Meter	Agilent	E9300A	MY41496625	2018.09.21	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2018.9.11	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2018.09.11	1 Year

3. MAXIMUM PEAK OUTPUT POWER

3.1.Limit

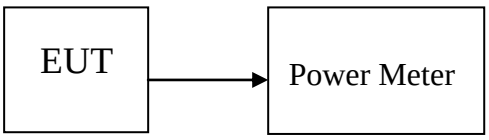
Please refer section15.247.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

3.2.Test Procedure

The transmitter output is connected to the RF Power Meter. The RF Power Meter is set to the peak power detection.

3.3.Test Setup



3.4.Test Result

Mode	Freq (MHz)	PK Output Power (dBm)	PK Output Power (mW)	Limit (dBm)	Result
GFSK	2402	-2.813	0.523	30	Pass
	2441	-2.751	0.531	30	Pass
	2480	-2.785	0.527	30	Pass
π /4 DQPSK	2402	-1.718	0.673	21	Pass
	2441	-1.729	0.672	21	Pass
	2480	**-1.717**	0.673	21	Pass
Conclusion: PASS					

4. BANDWIDTH

4.1.Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

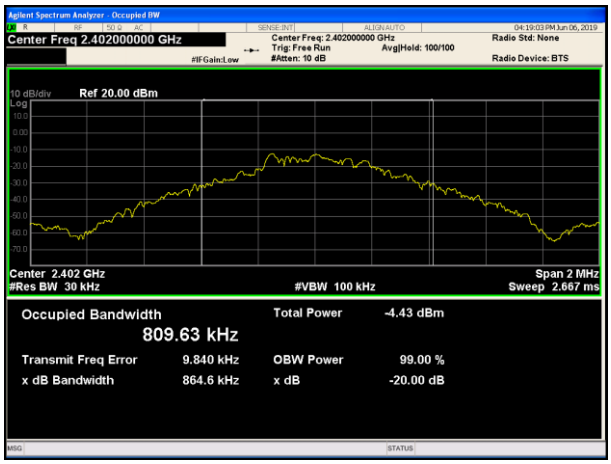
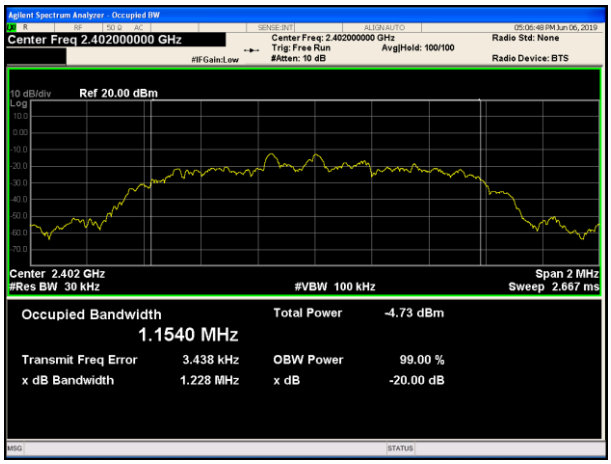
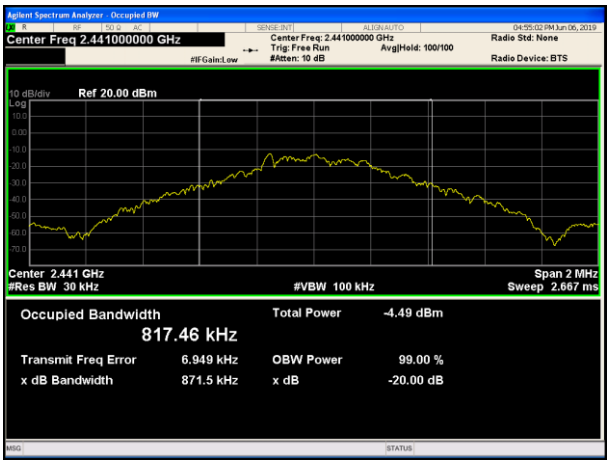
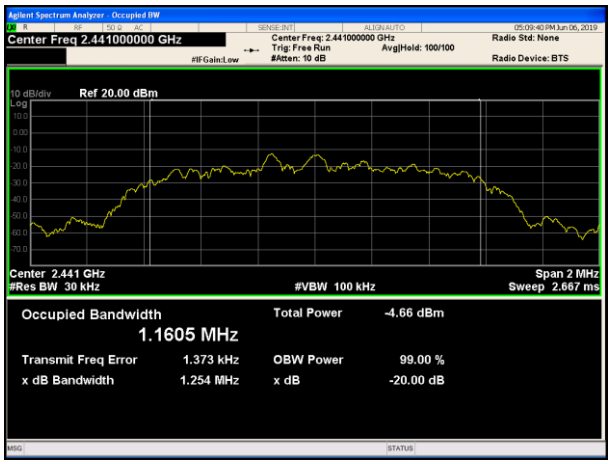
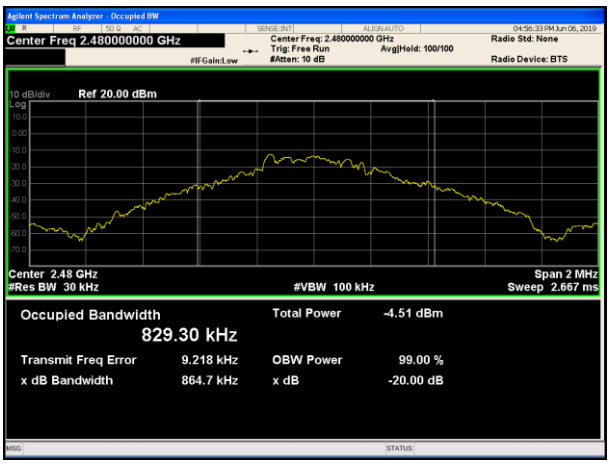
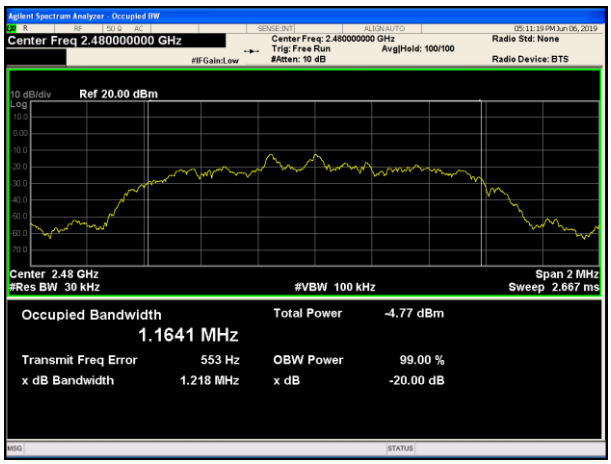
4.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.3.Test Result

Mode	Freq (MHz)	20dB Bandwidth (MHz)	Conclusion
GFSK	2402	0.8646	PASS
	2441	0.8715	PASS
	2480	0.8647	PASS
π /4 DQPSK	2402	1.2279	PASS
	2441	1.2535	PASS
	2480	1.2179	PASS

Original Test data For 20dB bandwidth

GFSK mode	π /4 DQPSK
	
Lowest channel	Lowest channel
	
Middle channel	Middle channel
	
Highest channel	Highest channel

5. CARRIER FREQUENCY SEPARATION

5.1.Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

5.2.Test Procedure

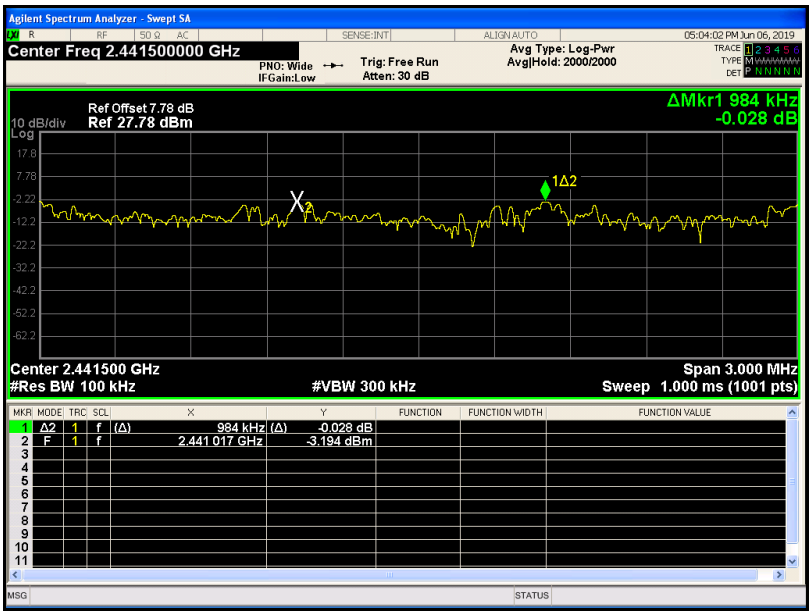
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The carrier frequency was measured by spectrum analyzer with 20kHz RBW and 62kHz VBW.

5.3.Test Result

Mode/Channel	Channel separation (MHz)	20dB Bandwidth (MHz)	Limit (KHz)	Conclusion
GFSK	1.314	0.8715	581.000	PASS
π /4 DQPSK	1.984	1.2535	835.667	PASS

Orginal test data for channel separation

GFSK



π /4 DQPSK

6. NUMBER OF HOPPING CHANNEL

6.1.Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

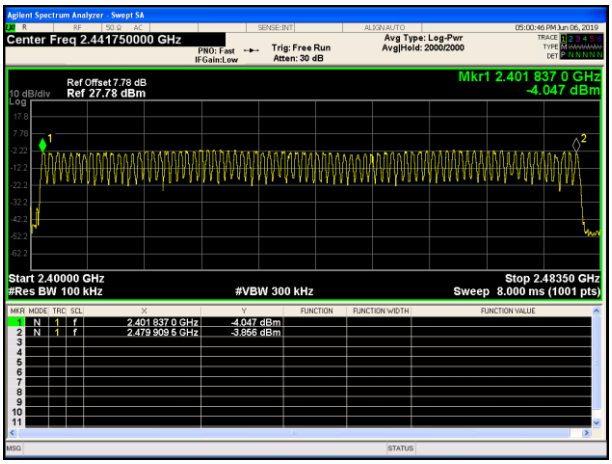
6.2.Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW.

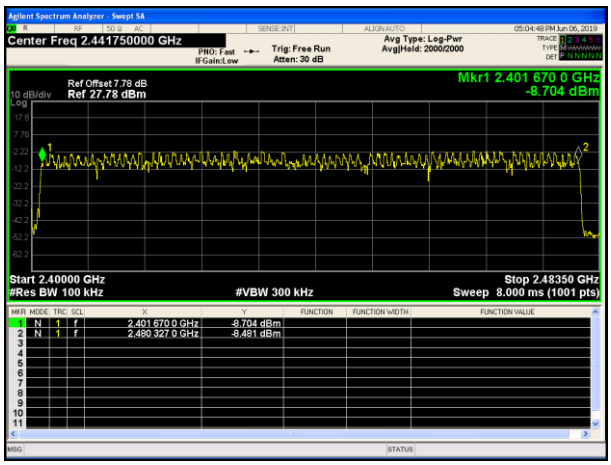
6.3.Test Result

Mode	Number of hopping channel	Limit	Conclusion
GFSK	79	>15	PASS
π /4 DQPSK	79	>15	PASS

Original test data for hopping channel number



GFSK



π /4 DQPSK

7. DWELL TIME

7.1. Test limit

Please refer section15.247

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz. The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 sec- onds multiplied by the number of hopping channel employed.

7.2. Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

7.2.3. Set center frequency of spectrum analyzer = operating frequency.

7.2.4. Set the spectrum analyzer as RBW=1MHz, VBW=1MHz, Span = 0Hz, Sweep = auto.

7.2.5. Repeat above procedures until all frequency measured were complete.

7.3. Test Result

PASS.

Detailed information please see the following page.

Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (ms)	Limit (ms)	Conclusion
GFSK	DH1	2441	0.380	121.600	400	PASS
	DH3	2441	1.636	261.760		PASS
	DH5	2441	2.884	307.627		PASS
π /4 DQPSK	DH1	2441	0.389	124.480	400	PASS
	DH3	2441	1.641	262.560		PASS
	DH5	2441	2.890	308.267		PASS

Note: 1 A period time = 0.4 (s) * 79 = 31.6(s)

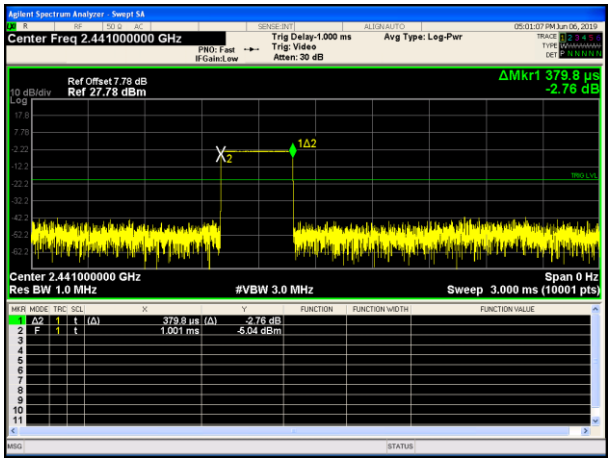
2 DH1 time slot = Pulse Duration * (1600/(2*79)) * A period time/1000

DH3 time slot = Pulse Duration * (1600/(4*79)) * A period time/1000

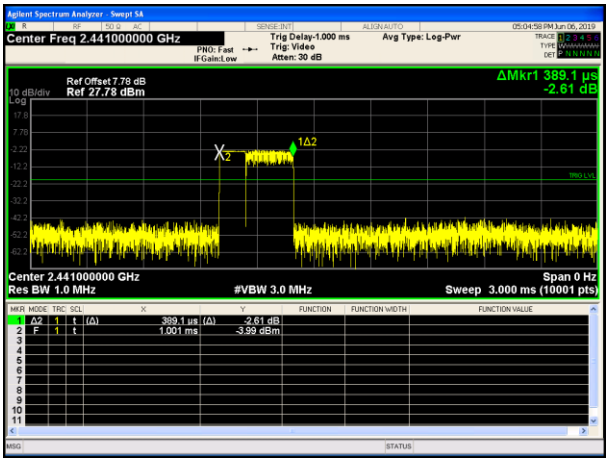
DH5 time slot = Pulse Duration * (1600/(6*79)) * A period time/1000

Dwell time

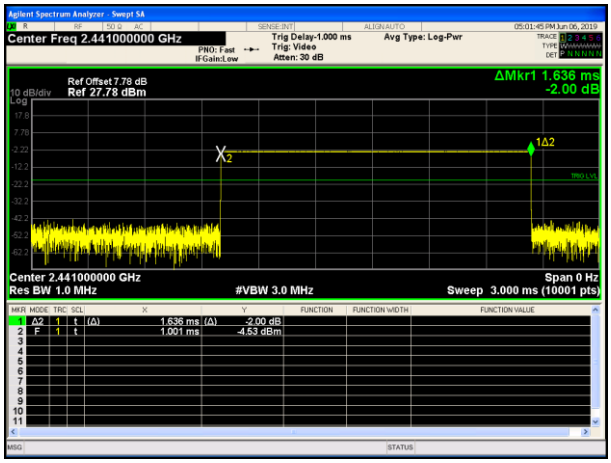
GFSK | *π/4-DQPSK*



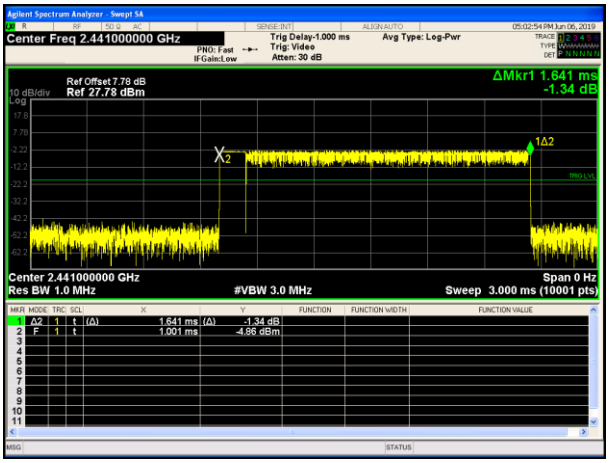
Channel 39 / 2441 MHz - DH1



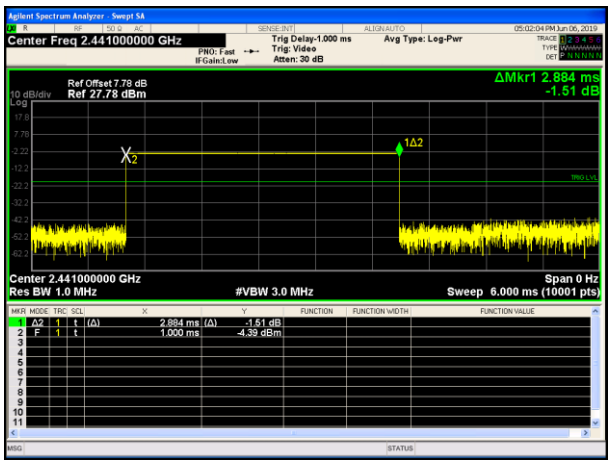
Channel 39 / 2441 MHz - 2DH1



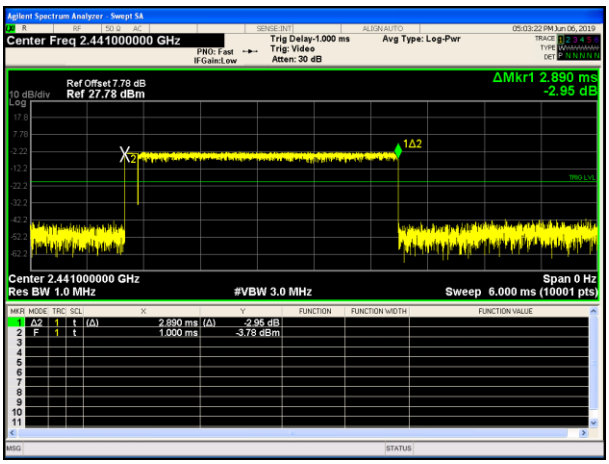
Channel 39 / 2441 MHz – DH3



Channel 39 / 2441 MHz - 2DH3



Channel 39 / 2441 MHz – DH5



Channel 39 / 2441 MHz - 2DH5

8. RADIATED EMISSIONS

8.1.Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

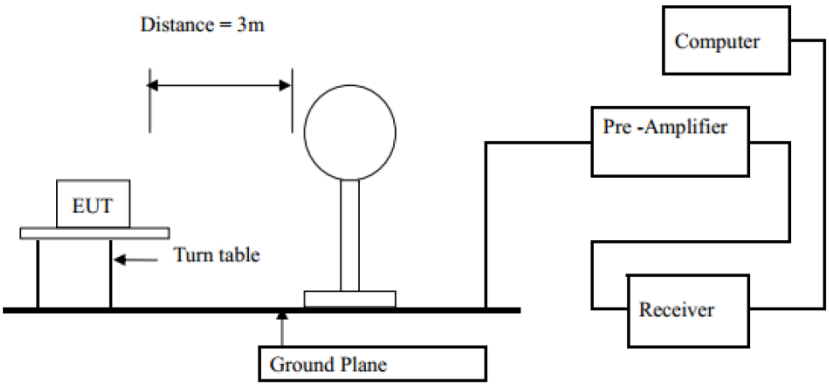
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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
8.41425 - 8.41475	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	([2])

15.209 Limit

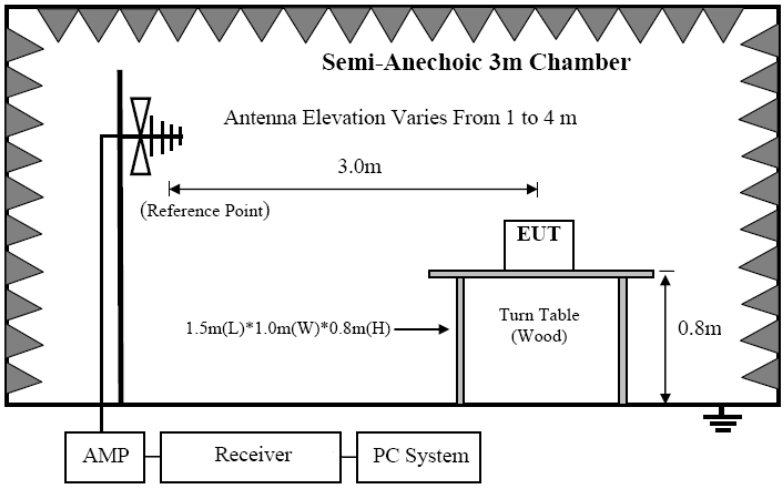
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2.Block Diagram of Test setup

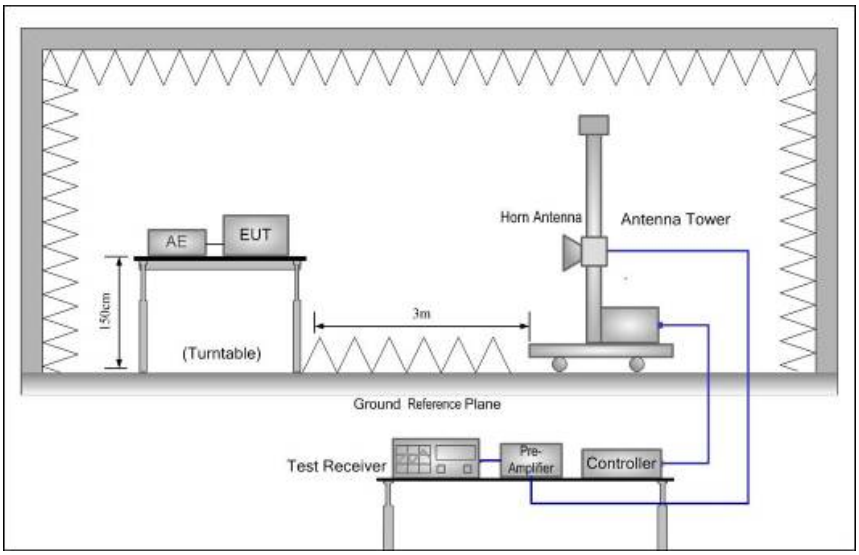
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



8.2.2 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

8.3.Test Procedure

(1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
(2) Setup EUT and simulator as shown in section 1.4 and 6.1
(3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
(a) Change work frequency or channel of device if practicable.
(b) Change modulation type of device if practicable.
(c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
(4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
(5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 :2013on Radiated Emission test.
(6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

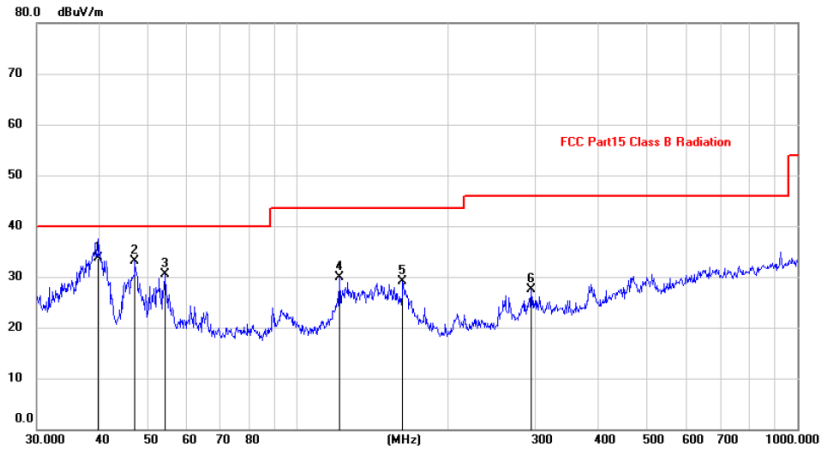
8.4.Test Result

We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency..
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

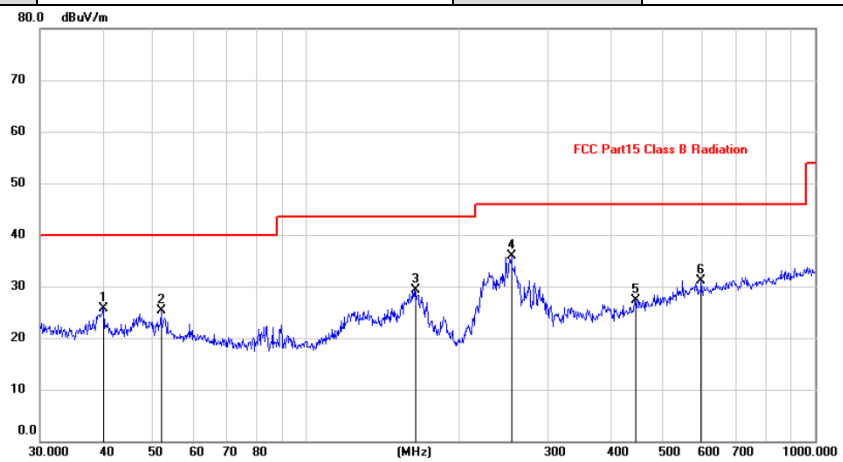
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

EUT Description	LED MIRROR	Model No.	HM-1901
Temperature	24℃	Humidity	56%
Pol	Vertical	Test date	2019/5/21
Test Voltage	AC 120V/60Hz	Test mode	GFSK (2480MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	39.8086	19.49	14.23	33.72	40.00	-6.28	QP			
2		47.1599	19.50	13.68	33.18	40.00	-6.82	peak			
3		54.4515	17.08	13.35	30.43	40.00	-9.57	peak			
4		121.1231	17.23	12.67	29.90	43.50	-13.60	peak			
5		162.6106	14.66	14.37	29.03	43.50	-14.47	peak			
6		293.0842	14.22	13.24	27.46	46.00	-18.54	peak			

Pol	Horizontal	Test date	2019/5/21



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		39.9942	11.47	14.24	25.71	40.00	-14.29	peak			
2		51.8430	11.61	13.62	25.23	40.00	-14.77	peak			
3		163.7550	15.11	14.28	29.39	43.50	-14.11	peak			
4	*	253.8367	23.73	12.16	35.89	46.00	-10.11	peak			
5		443.2943	10.50	16.73	27.23	46.00	-18.77	peak			
6		597.2234	11.93	19.24	31.17	46.00	-14.83	peak			

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

From 1G-25GHz

Test Mode: GFSK TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	46.64	V	33.95	10.18	34.26	56.51	74	17.49	PK
4804	37.17	V	33.95	10.18	34.26	47.04	54	6.96	AV
7206	/								
9608	/								
4824	48.10	H	33.95	10.18	34.26	57.97	74	16.03	PK
4824	36.53	H	33.95	10.18	34.26	46.40	54	7.60	AV
7206									
9608									
Test Mode: GFSK TX Mid									
4882	44.80	V	33.93	10.2	34.29	54.64	74	19.36	PK
4882	37.51	V	33.93	10.2	34.29	47.35	54	6.65	AV
7323	/								
9764	/								
4882	45.61	H	33.93	10.2	34.29	55.45	74	18.55	PK
4882	37.40	H	33.93	10.2	34.29	47.24	54	6.76	AV
7323									
9764									
Test Mode: GFSK TX High									
4960	44.82	V	33.98	10.22	34.25	54.77	74	19.23	PK
4960	35.41	V	33.98	10.22	34.25	45.36	54	8.64	AV
7440	/								
9920	/								
4960	46.70	H	33.98	10.22	34.25	56.65	74	17.35	PK
4960	36.36	H	33.98	10.22	34.25	46.31	54	7.69	AV
7440	/								
9920	/								

Note:
1, Result = Read level + Antenna factor + cable loss-Amp factor
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

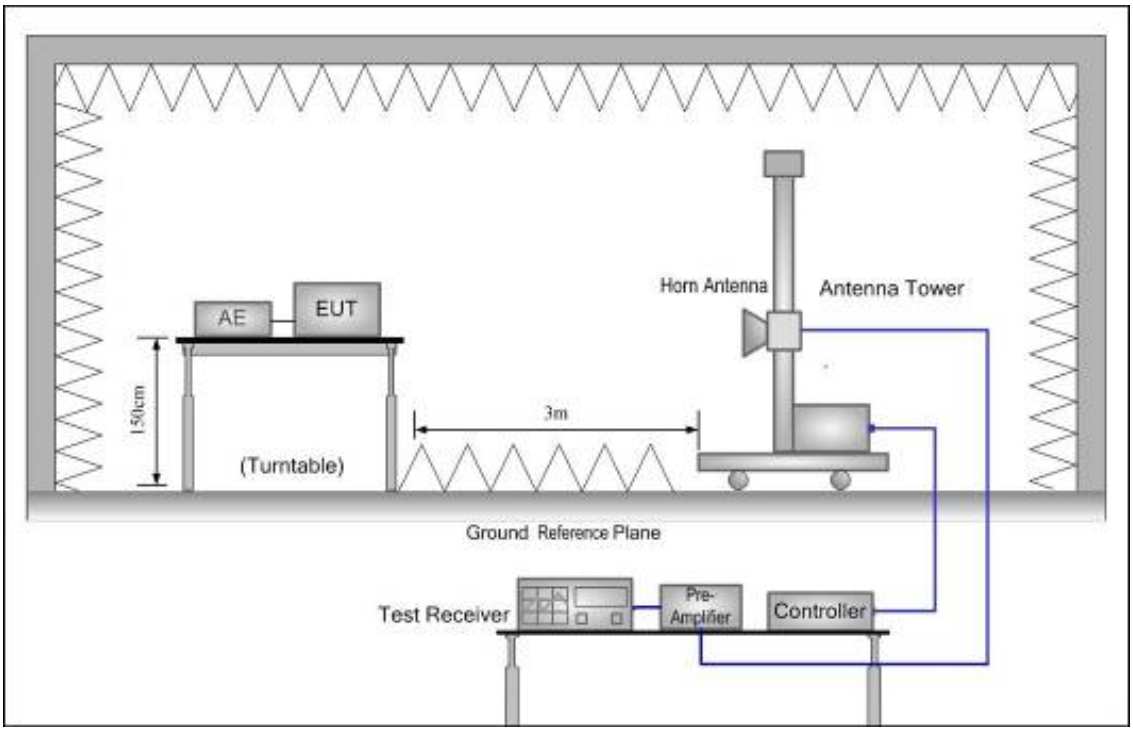
From 1G-25GHz

Test Mode: π /4 DQPSK TX Low									
Freq (MHz)	Read Level (dBuV/m)	Polar (H/V)	Antenna Factor (dB/m)	Cable loss(dB)	Amp Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4804	46.08	V	33.95	10.18	34.26	55.95	74	18.05	PK
4804	36.43	V	33.95	10.18	34.26	46.30	54	7.70	AV
7206	/		/						
9608	/		/						
4824	46.57	H	33.95	10.18	34.26	56.44	74	17.56	PK
4824	37.38	H	33.95	10.18	34.26	47.25	54	6.75	AV
7206									
9608									
Test Mode: π /4 DQPSK TX Mid									
4882	46.61	V	33.93	10.2	34.29	56.45	74	17.55	PK
4882	35.01	V	33.93	10.2	34.29	44.85	54	9.15	AV
7323	/								
9764	/								
4882	46.64	H	33.93	10.2	34.29	56.48	74	17.52	PK
4882	37.16	H	33.93	10.2	34.29	47.00	54	7.00	AV
7323									
9764									
Test Mode: π /4 DQPSK TX High									
4960	45.81	V	33.98	10.22	34.25	55.76	74	18.24	PK
4960	34.98	V	33.98	10.22	34.25	44.93	54	9.07	AV
7440	/								
9920	/								
4960	46.95	H	33.98	10.22	34.25	56.90	74	17.10	PK
4960	35.47	H	33.98	10.22	34.25	45.42	54	8.58	AV
7440	/								
9920	/								

Note:
1, Result = Read level + Antenna factor + cable loss-Amp factor
2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

9. BAND EDGE COMPLIANCE

9.1.Block Diagram of Test Setup



9.2.Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

9.3.Test Procedure

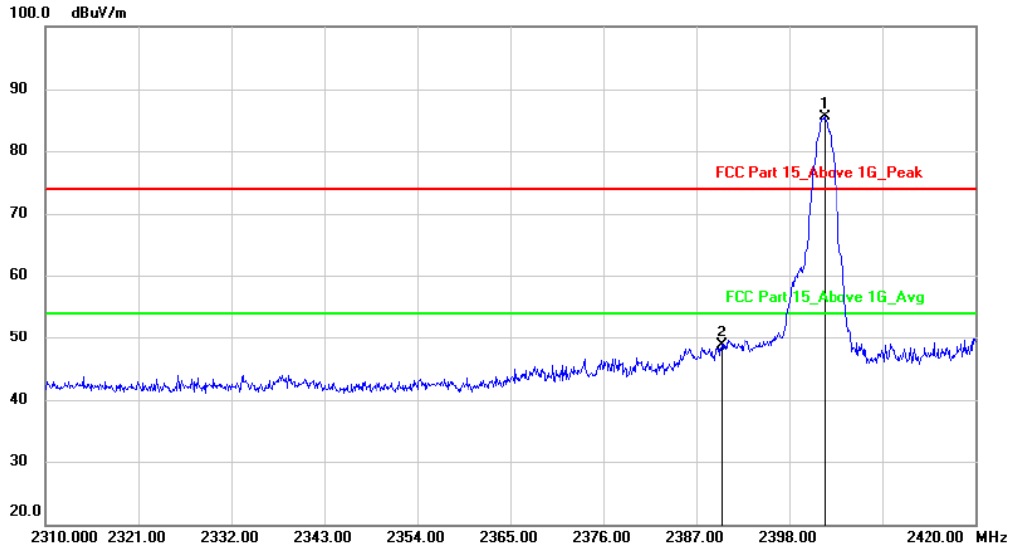
All restriction band and non- restriction band have been tested， only worse case is reported.

9.4.Test Result

PASS. (See below detailed test data)

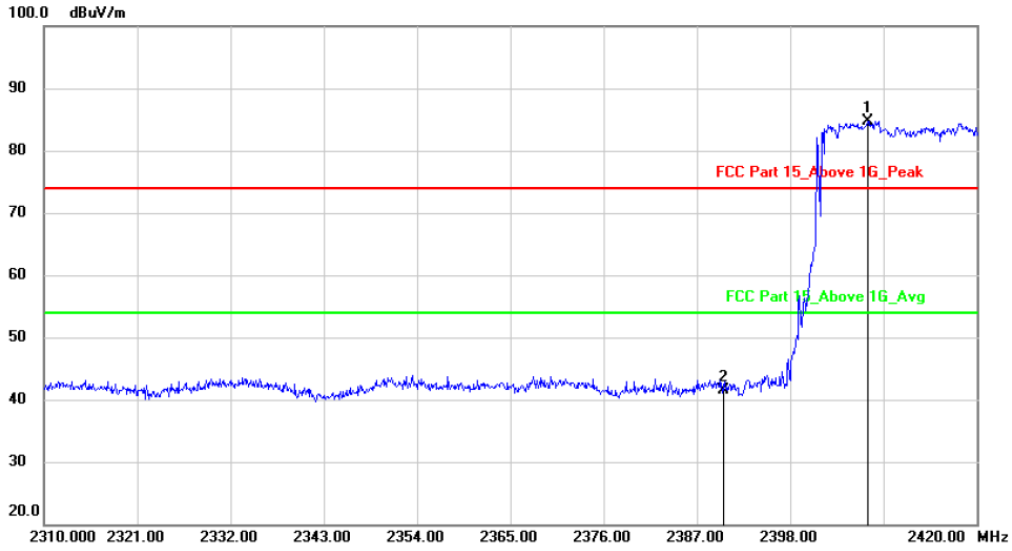
Radiated Method:

Polarization: Vertical Test Mode: GFSK-Low



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2402.180	89.01	-3.41	85.60	74.00	11.60	peak			
2		2390.000	52.01	-3.40	48.61	74.00	-25.39	peak			

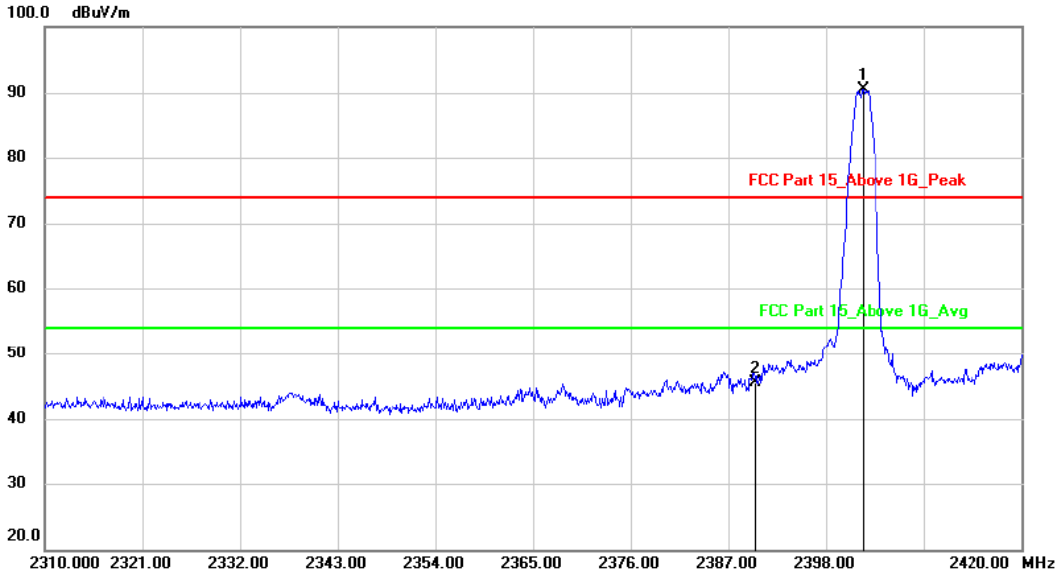
hopping-off



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2407.130	88.10	-3.41	84.69	74.00	10.69	peak			
2		2390.000	44.97	-3.40	41.57	74.00	-32.43	peak			

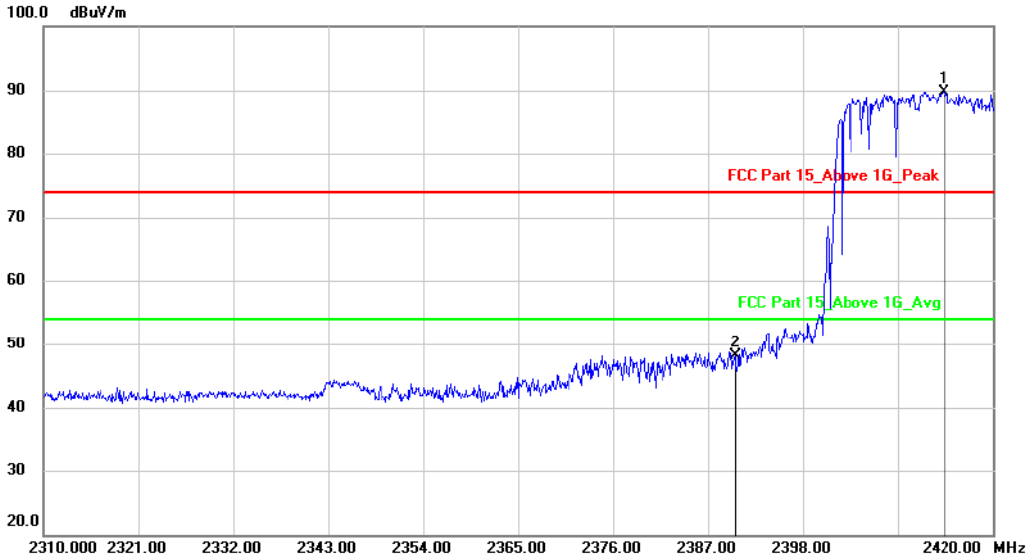
hopping-on

Polarization: Horizontal: Test Mode: GFSK-Low



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2402.180	93.93	-3.41	90.52	74.00	16.52	peak			
2		2390.000	48.95	-3.40	45.55	74.00	-28.45	peak			

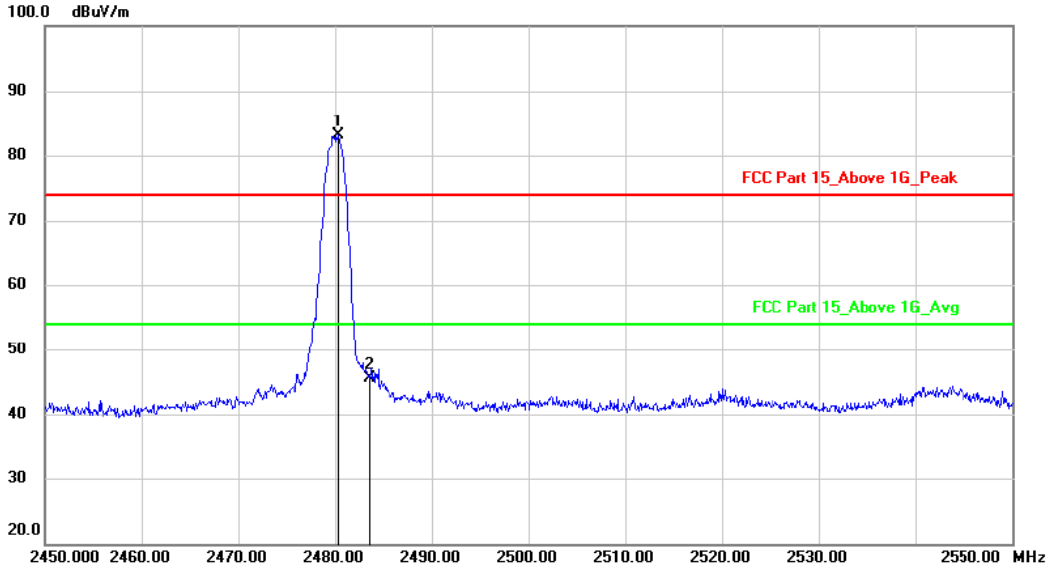
hopping-off



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2414.280	93.21	-3.41	89.80	74.00	15.80	peak			
2		2390.000	51.46	-3.40	48.06	74.00	-25.94	peak			

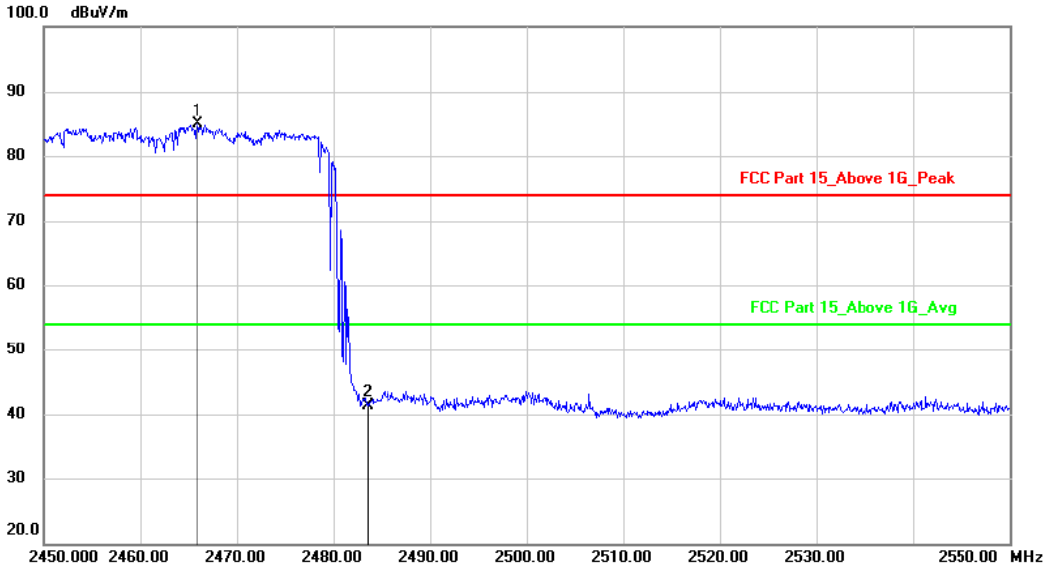
hopping-on

Polarization: Vertical Test Mode: GFSK-High



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2480.300	86.49	-3.38	83.11	74.00	9.11	peak			
2		2483.500	48.86	-3.38	45.48	74.00	-28.52	peak			

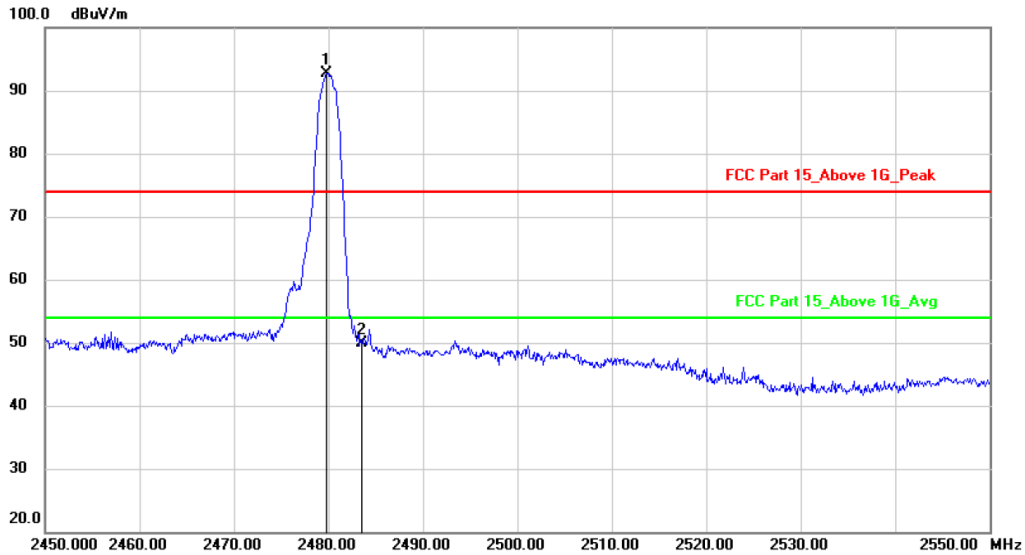
hopping-off



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2465.900	88.26	-3.39	84.87	74.00	10.87	peak			
2		2483.500	44.76	-3.38	41.38	74.00	-32.62	peak			

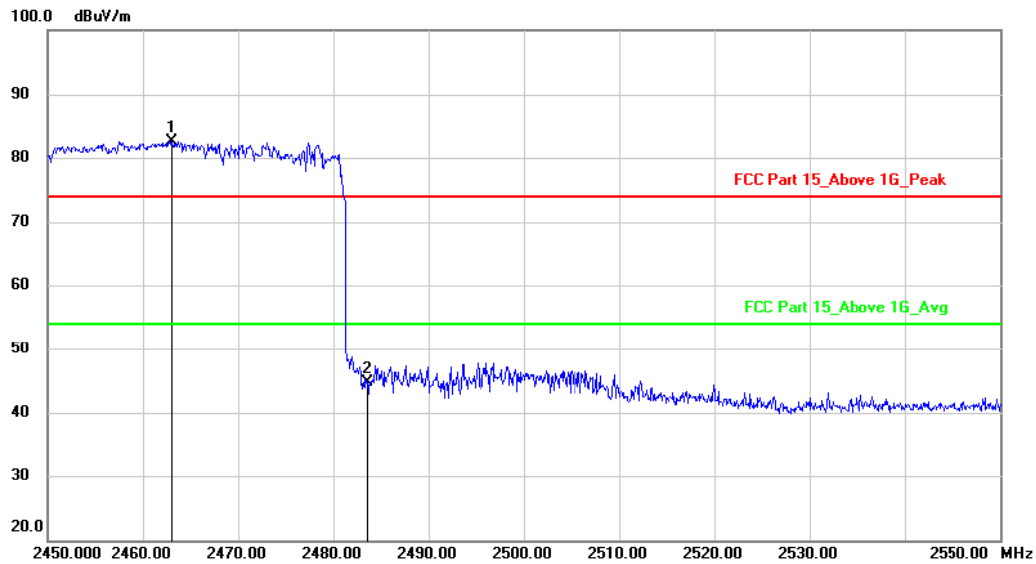
hopping-on

Polarization: Horizontal Test Mode: GFSK-High



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2479.800	96.16	-3.38	92.78	74.00	18.78	peak			
2		2483.500	53.32	-3.38	49.94	74.00	-24.06	peak			

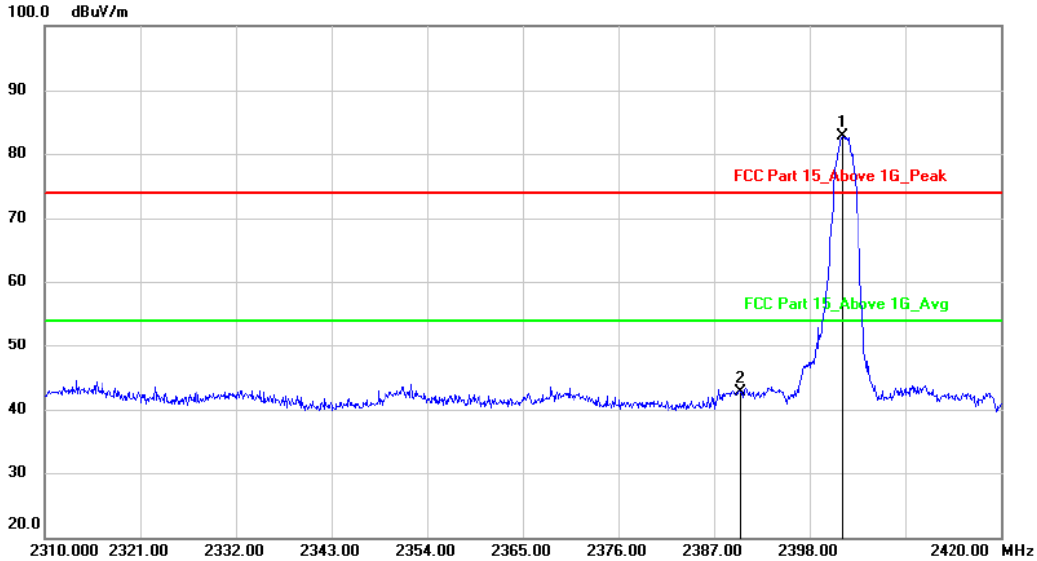
hopping-off



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2463.000	85.98	-3.40	82.58	74.00	8.58	peak			
2		2483.500	48.17	-3.38	44.79	74.00	-29.21	peak			

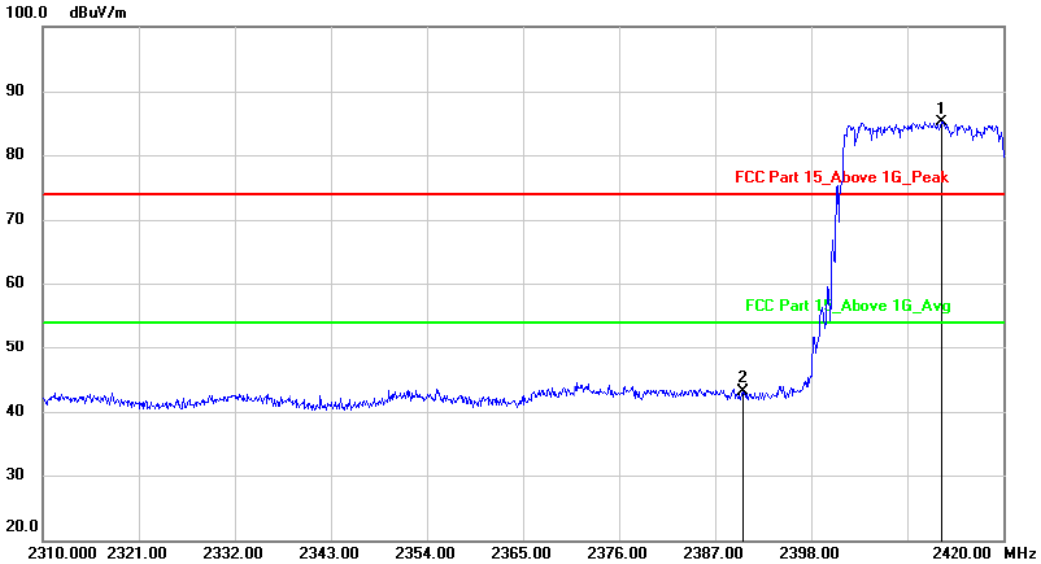
hopping-on

Polarization: Vertical Test Mode: π /4 DQPSK-Low



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2401.740	86.07	-3.41	82.66	74.00	8.66	peak			
2		2390.000	46.11	-3.40	42.71	74.00	-31.29	peak			

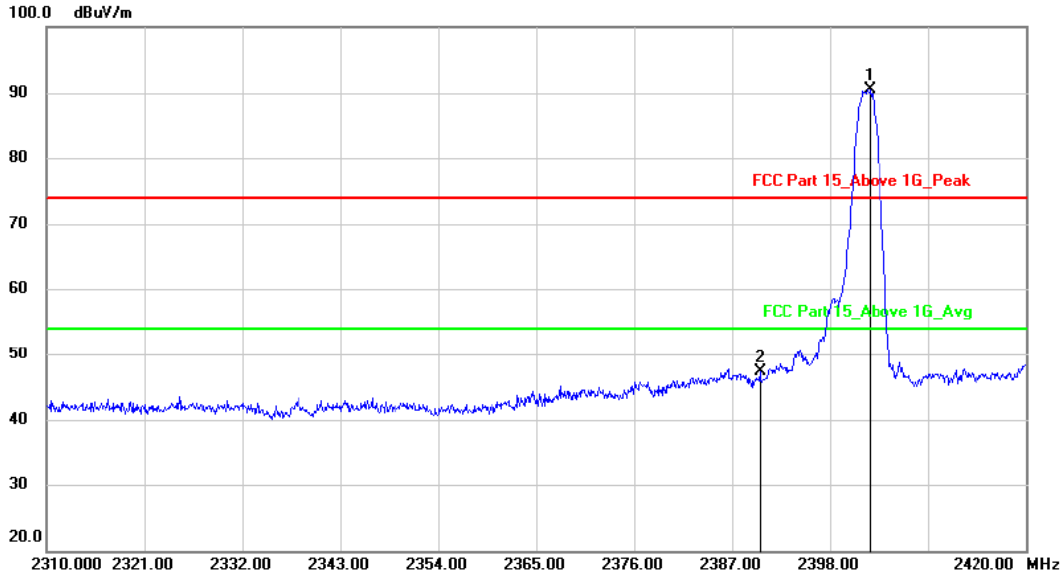
hopping-off



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2412.850	88.58	-3.41	85.17	74.00	11.17	peak			
2		2390.000	46.57	-3.40	43.17	74.00	-30.83	peak			

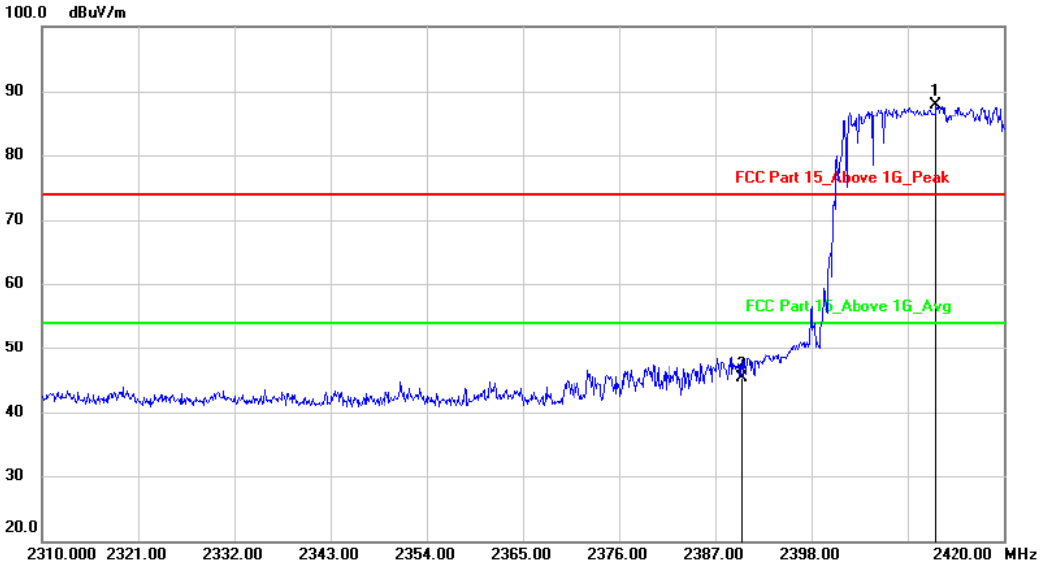
hopping-on

Polarization: Horizontal Test Mode: π /4 DQPSK-Low



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2402.510	93.98	-3.41	90.57	74.00	16.57	peak			
2		2390.000	50.68	-3.40	47.28	74.00	-26.72	peak			

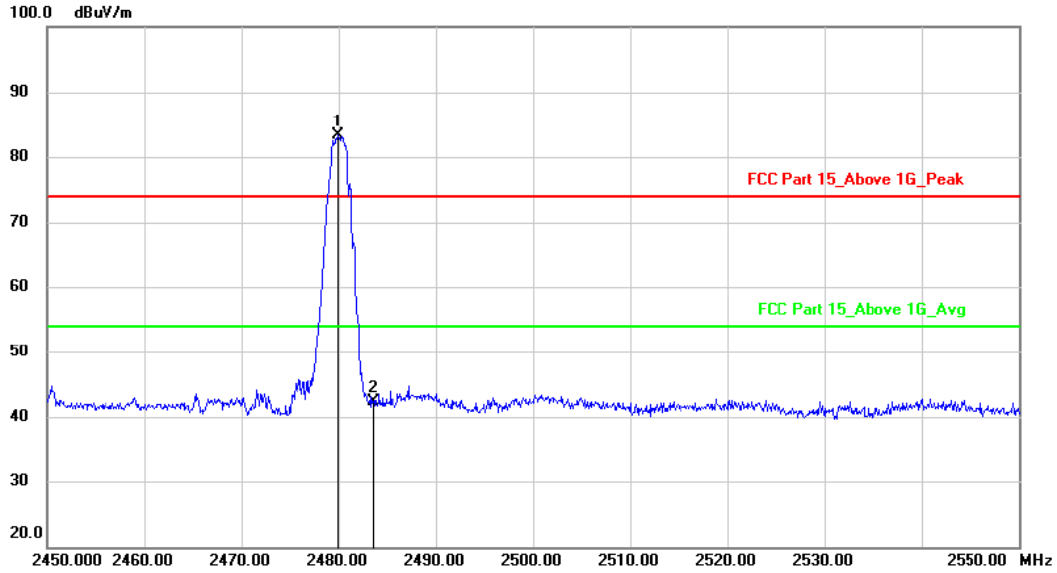
hopping-off



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2412.190	91.26	-3.40	87.86	74.00	13.86	peak			
2		2390.000	48.79	-3.40	45.39	74.00	-28.61	peak			

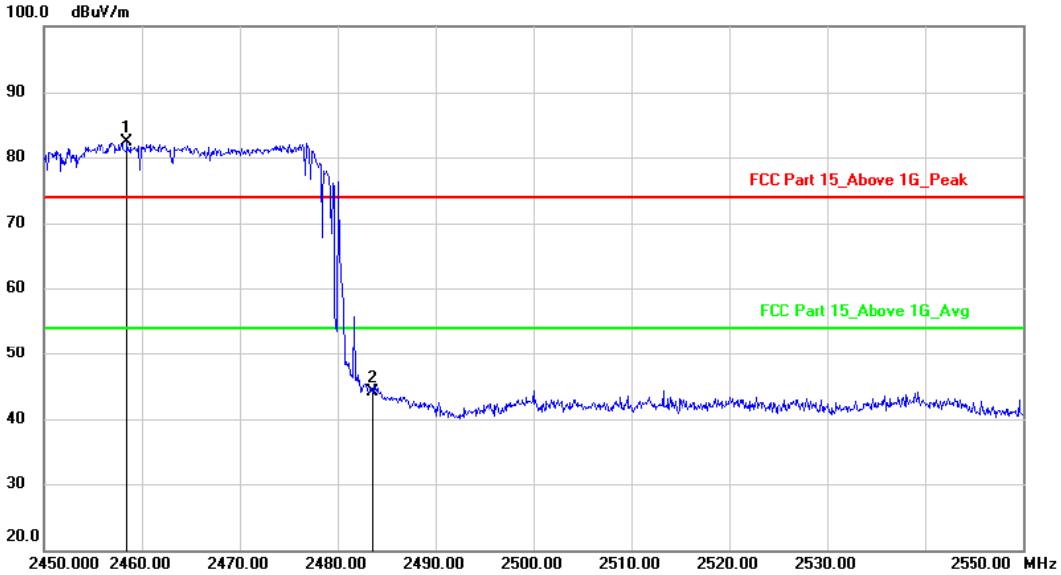
hopping-on

Polarization: Vertical Test Mode: π /4 DQPSK-High



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2479.900	86.69	-3.38	83.31	74.00	9.31	peak			
2		2483.500	45.71	-3.38	42.33	74.00	-31.67	peak			

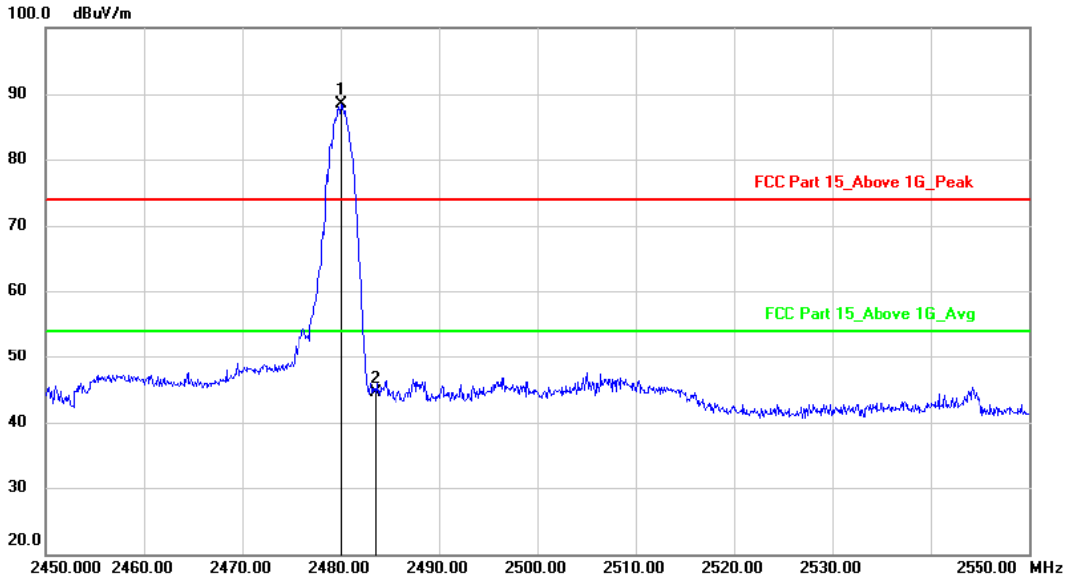
hopping-off



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2458.500	85.74	-3.39	82.35	74.00	8.35	peak			
2		2483.500	47.42	-3.38	44.04	74.00	-29.96	peak			

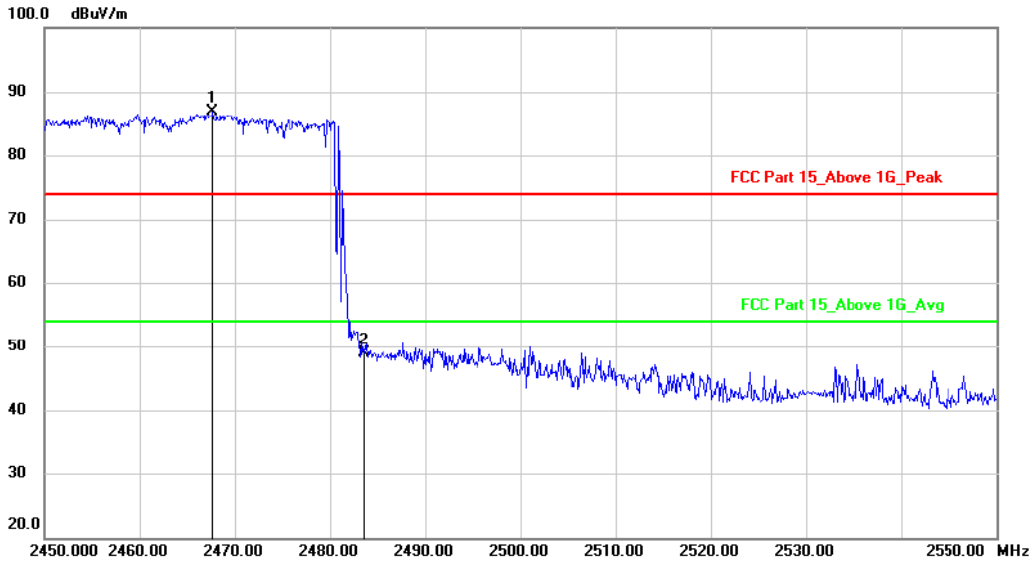
hopping-on

Polarization: Horizontal Test Mode: π /4 DQPSK-High



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2480.000	91.82	-3.38	88.44	74.00	14.44	peak			
2		2483.500	47.86	-3.38	44.48	74.00	-29.52	peak			

hopping-off



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	2467.700	90.26	-3.39	86.87	74.00	12.87	peak			
2		2483.500	52.24	-3.38	48.86	74.00	-25.14	peak			

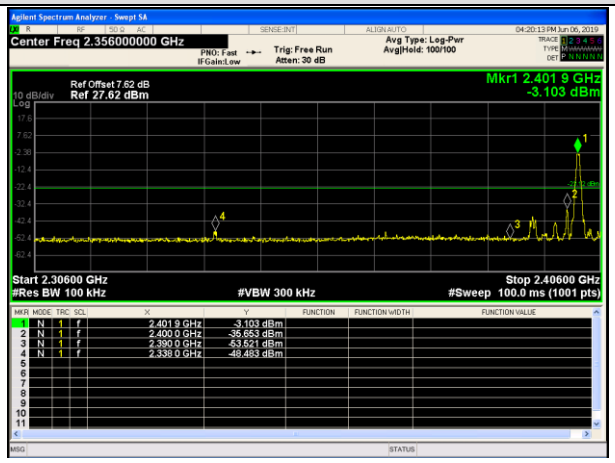
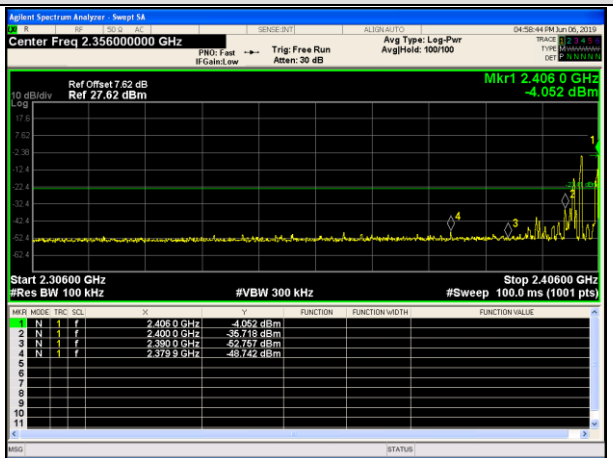
hopping-on

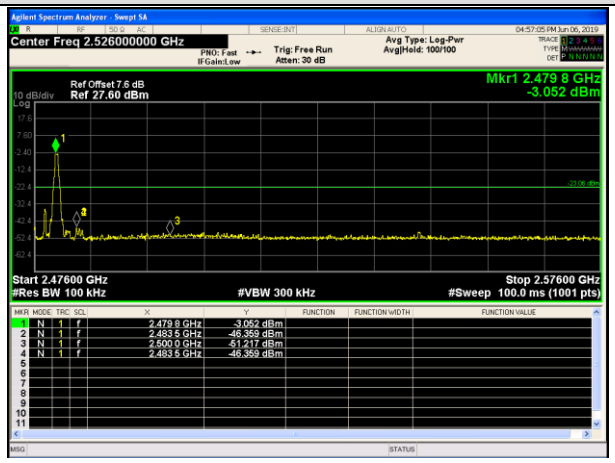
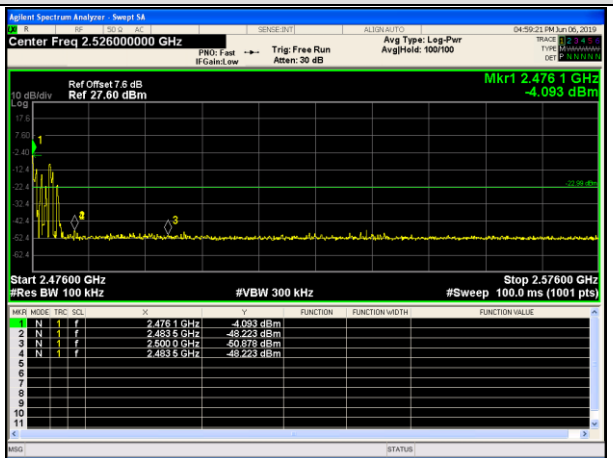
Note: 1. *:Maximum data; x:Over limit; !:over margin.

2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

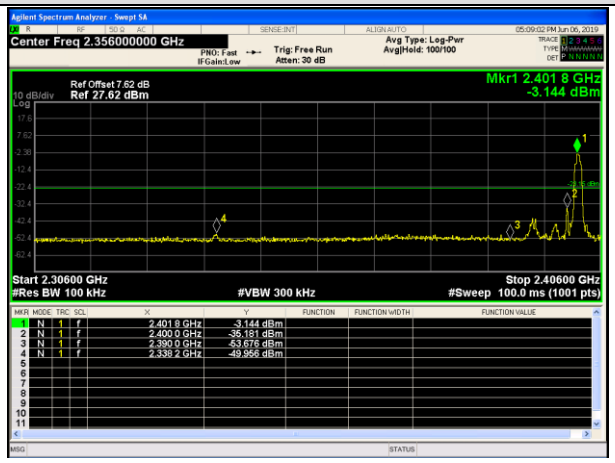
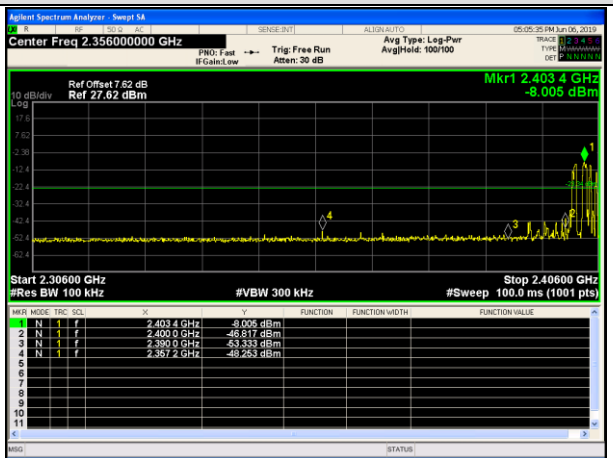
Conducted Method

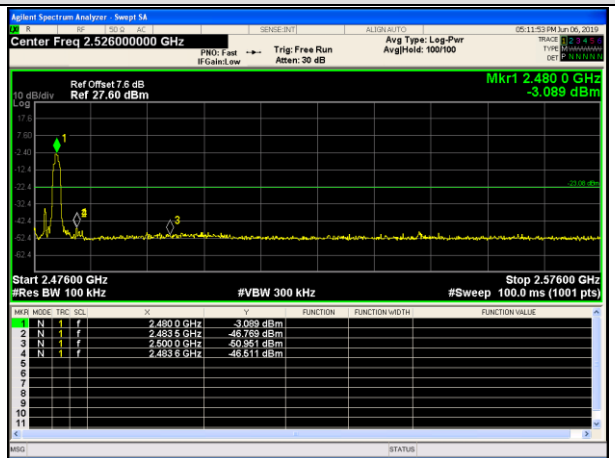
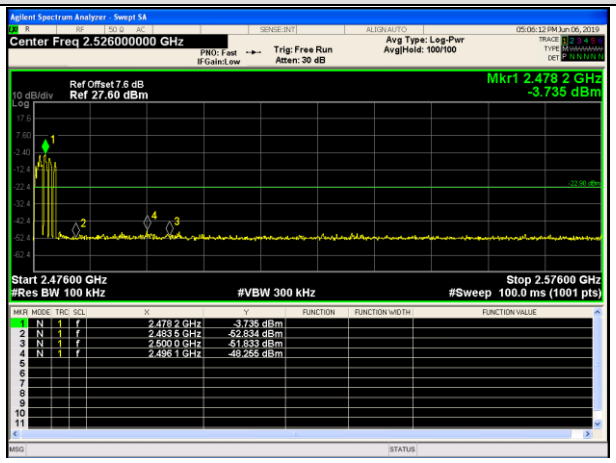
GFSK Mode:

Test channel:	Lowest channel
	
No-hopping mode	Hopping mode

Test channel:	Highest channel
	
No-hopping mode	Hopping mode

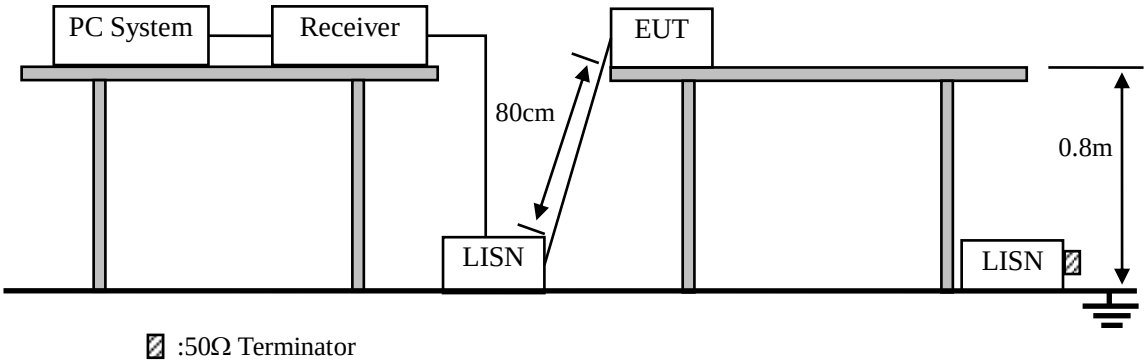
Pi/4QPSK Mode:

Test channel:	Lowest channel
	
No-hopping mode	Hopping mode

Test channel:	Highest channel
	
No-hopping mode	Hopping mode

10. POWER LINE CONDUCTED EMISSIONS

10.1. Block Diagram of Test Setup



10.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

10.3. Test Procedure

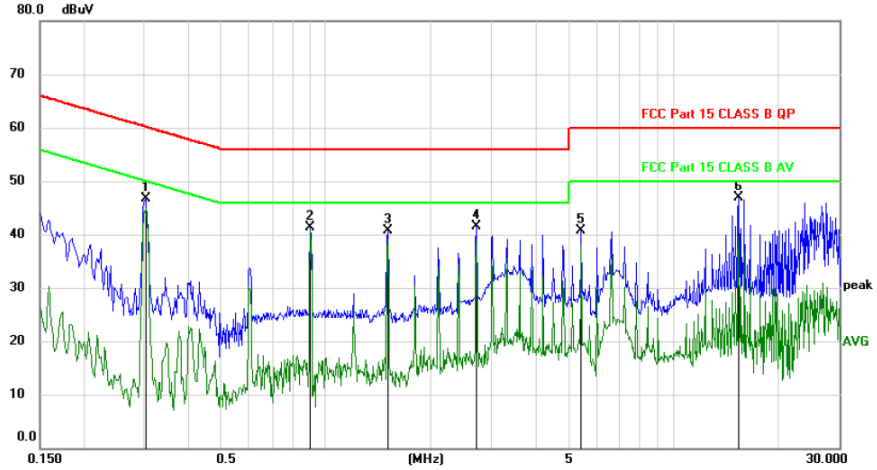
(1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
(2) Setup the EUT and simulator as shown in 10.1
(3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10 :2013on conducted Emission test.
(4) The bandwidth of test receiver is set at 10KHz.
(5) The frequency range from 150 KHz to 30MHz is checked.

10.4. Test Result

PASS. (See below detailed test data)

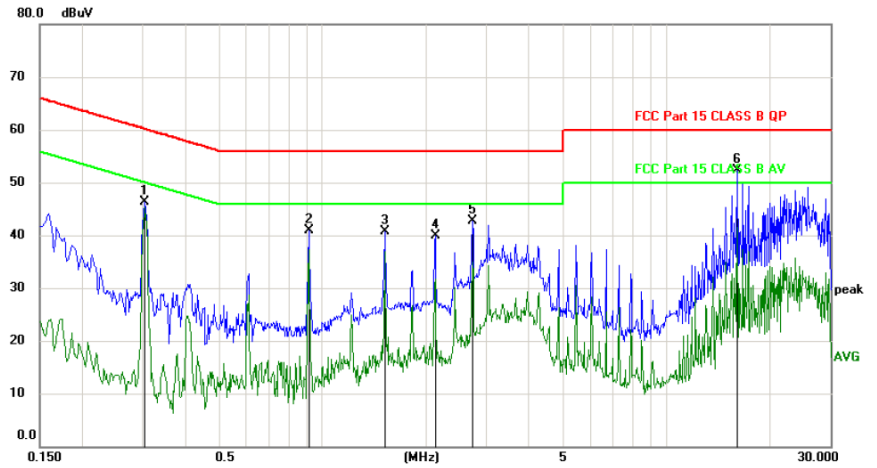
Note: If peak Result comply with AV limit, QP and AV Result is deemed to comply with AV limit

EUT Description	LED MIRROR	Model No.	HM-1901
Temperature	24℃	Humidity	56%
Pol	Line	Test date	2019/5/22
Test Voltage	AC 120V/60Hz	Test mode	GFSK (2480MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3029	36.97	9.66	46.63	60.16	-13.53	peak	
2		0.9030	31.68	9.72	41.40	56.00	-14.60	peak	
3		1.5059	30.96	9.77	40.73	56.00	-15.27	peak	
4		2.7088	31.58	9.90	41.48	56.00	-14.52	peak	
5		5.4240	30.70	10.08	40.78	60.00	-19.22	peak	
6	*	15.3930	36.72	10.17	46.89	60.00	-13.11	peak	

Pol	Neutral	Test date	2019/5/22



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.3029	36.60	9.66	46.26	60.16	-13.90	peak	
2		0.9090	31.17	9.72	40.89	56.00	-15.11	peak	
3		1.5179	30.99	9.78	40.77	56.00	-15.23	peak	
4		2.1238	30.08	9.83	39.91	56.00	-16.09	peak	
5		2.7300	32.73	9.90	42.63	56.00	-13.37	peak	
6	*	16.0945	42.20	10.19	52.39	60.00	-7.61	peak	

*:Maximum data x:Over limit !:over margin

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

11. ANTENNA REQUIREMENTS

11.1. Limit

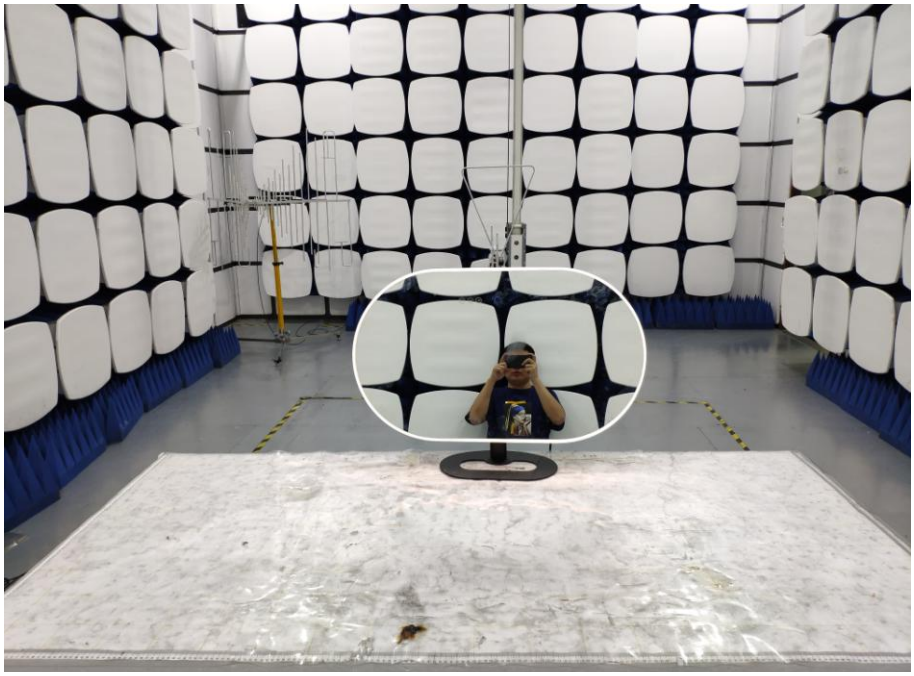
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

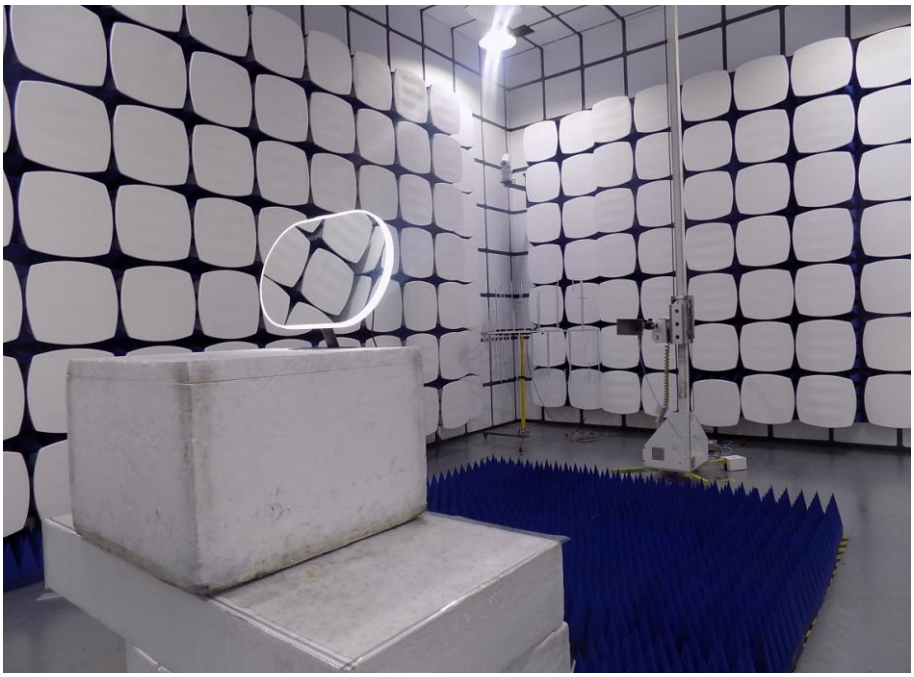
11.2. Result

The EUT antenna is PCB Antenna. It complies with the standard requirement.

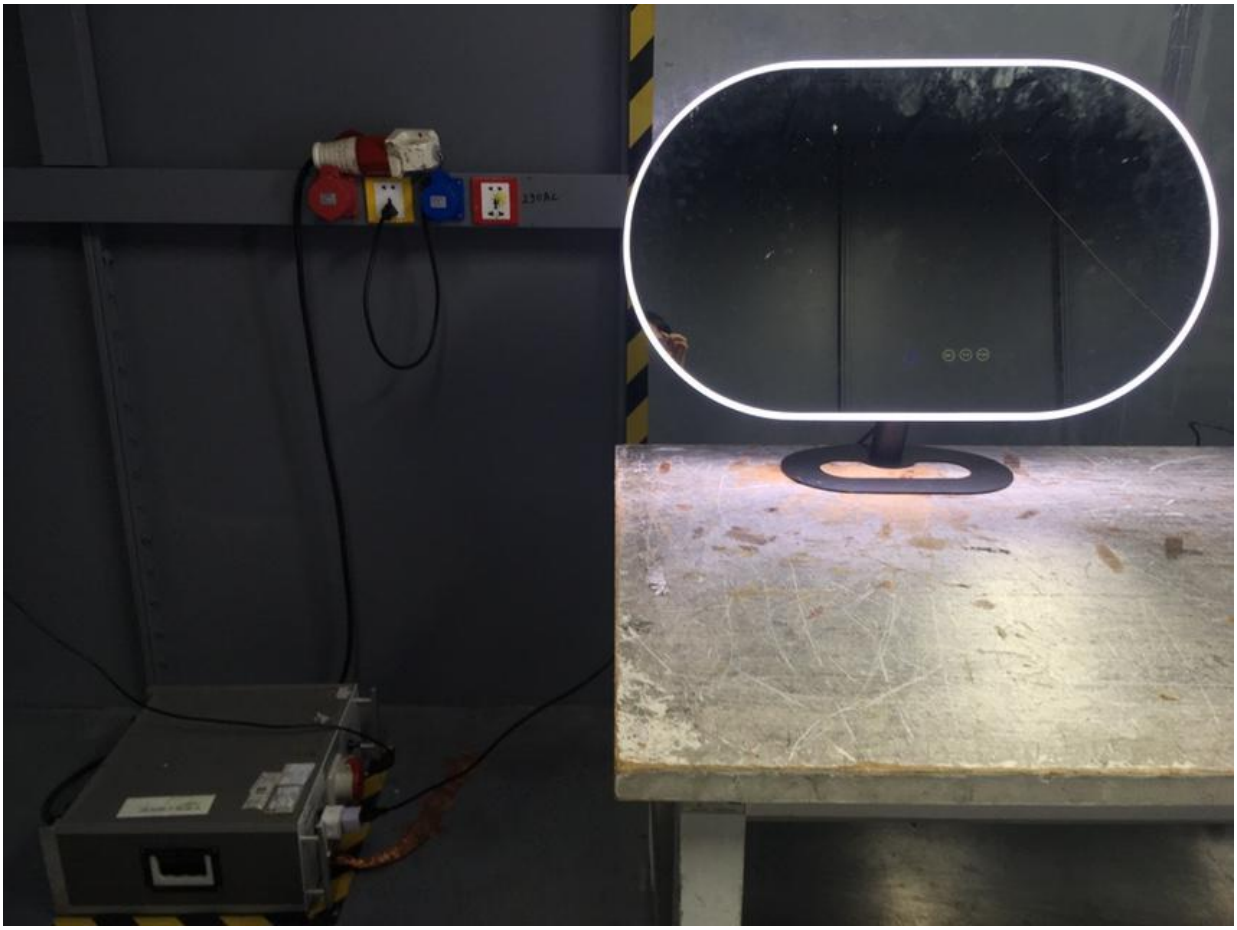
12. TEST SETUP PHOTO

12.1. Photos of Radiated emission

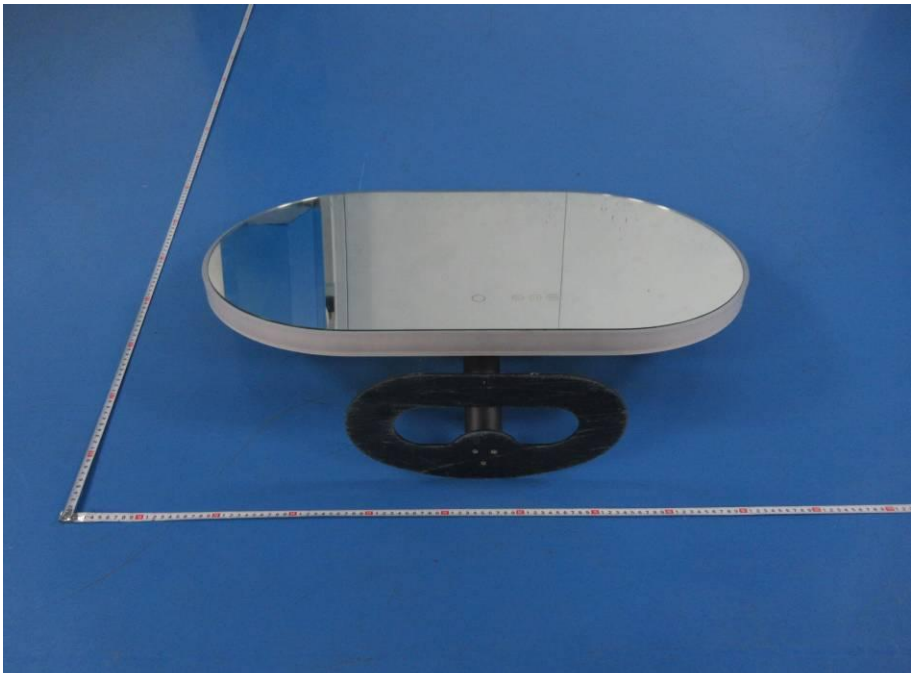


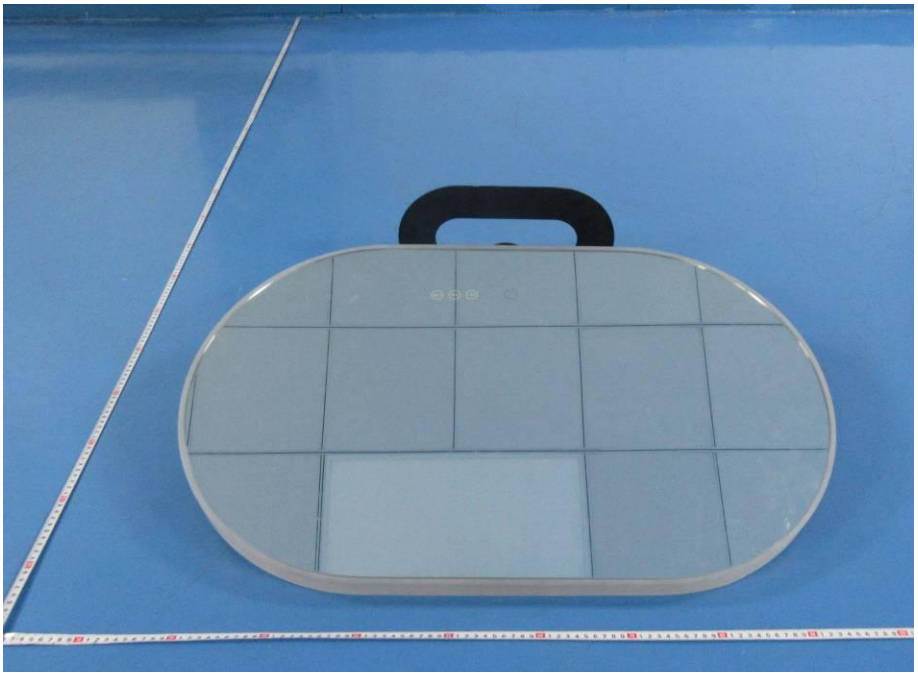


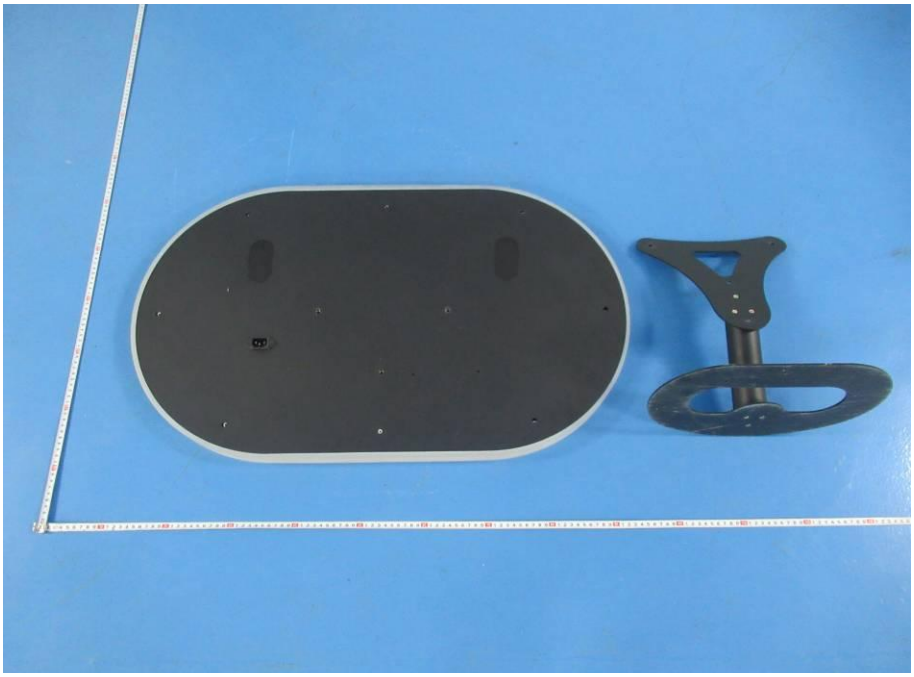
12.2.Photos of Conducted Emission test

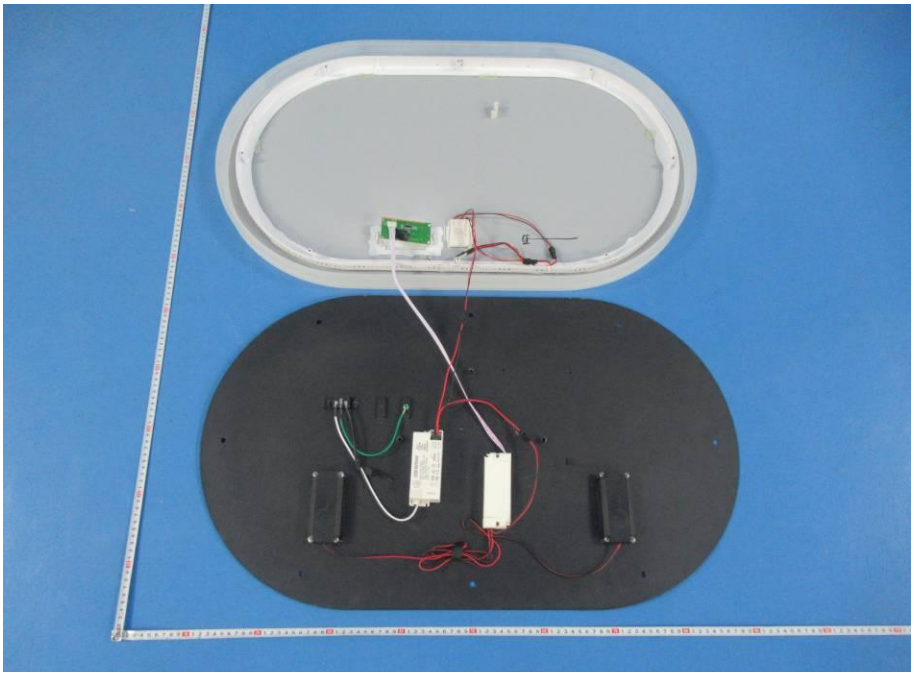


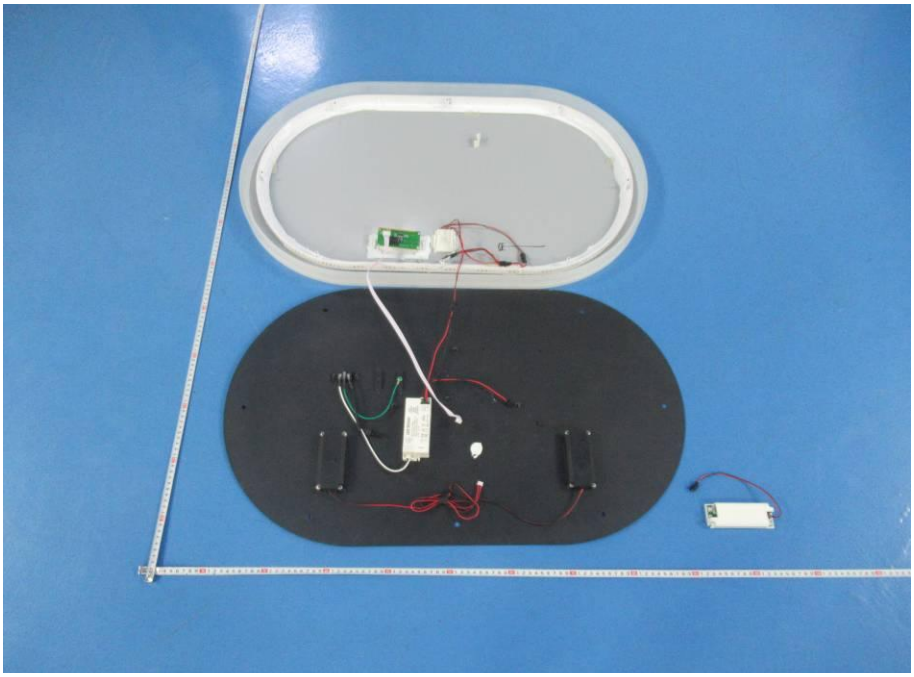
13. PHOTOS OF EUT

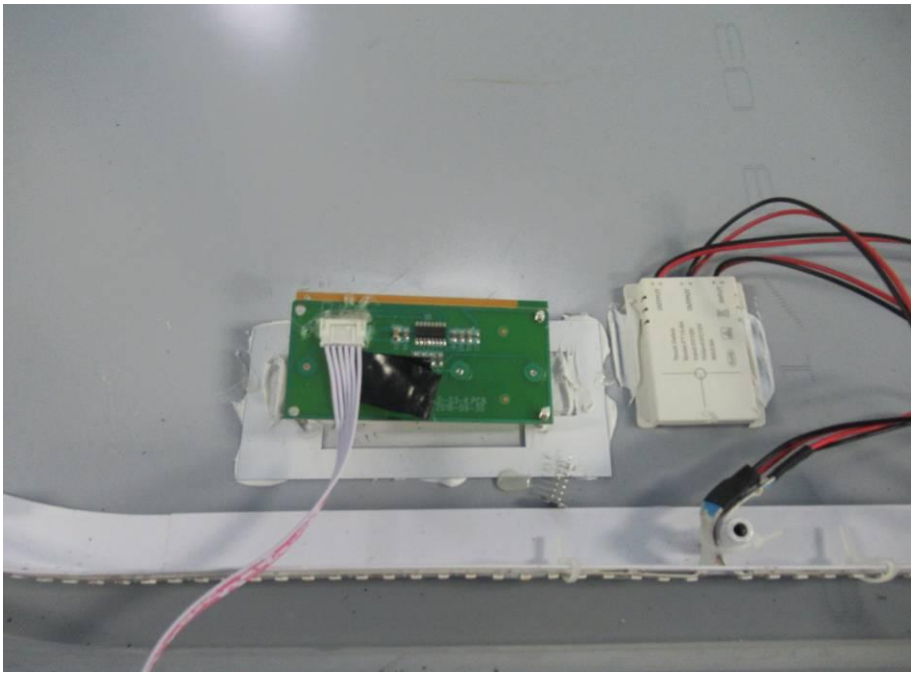


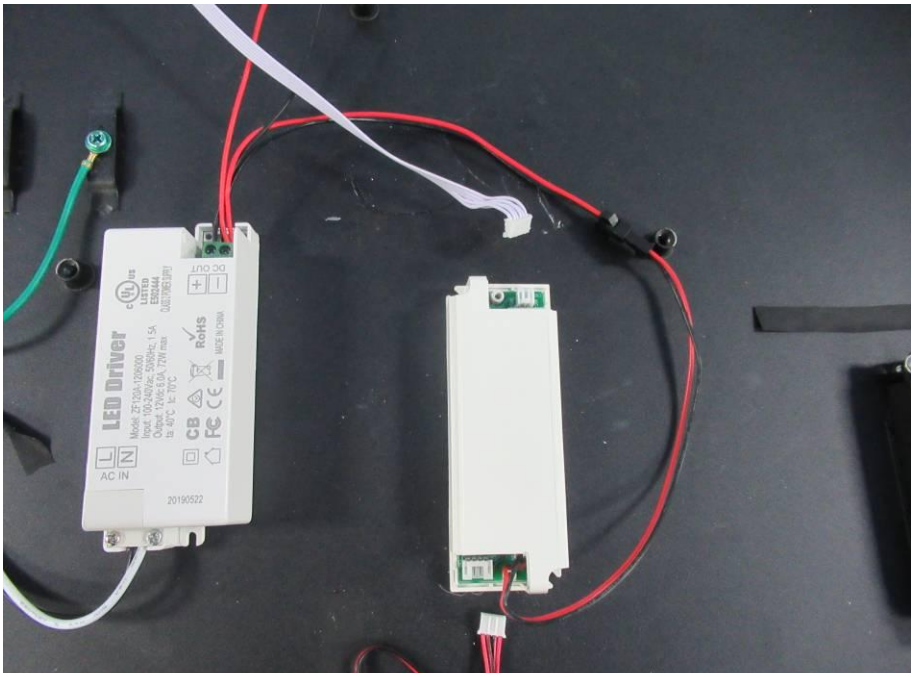


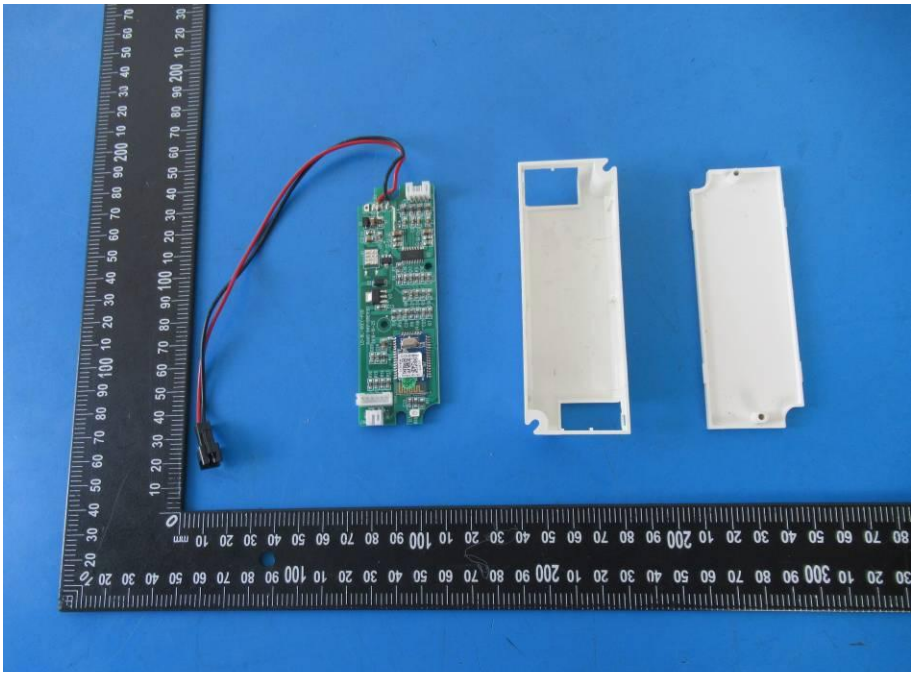


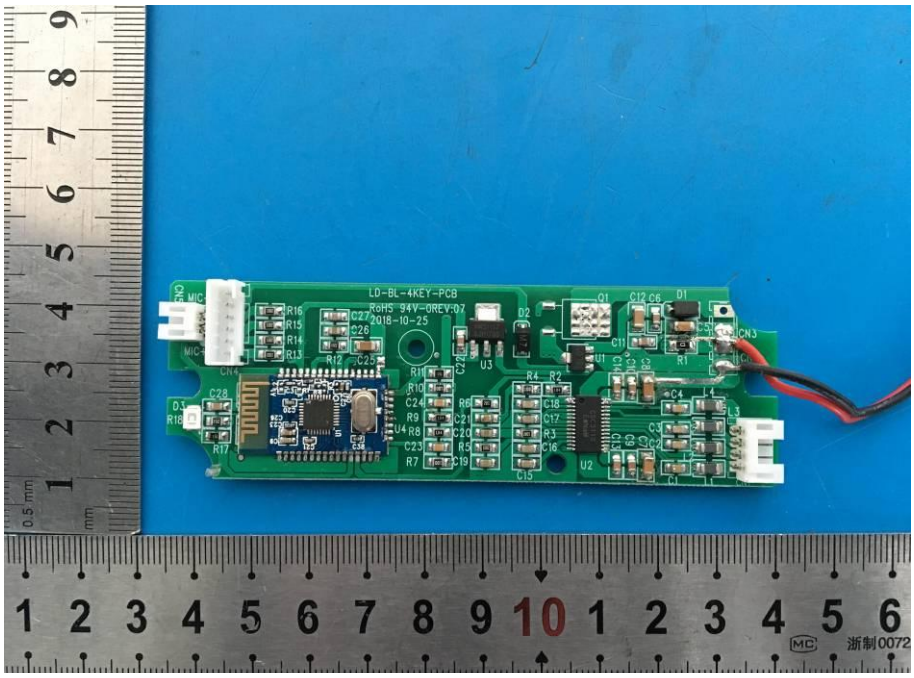


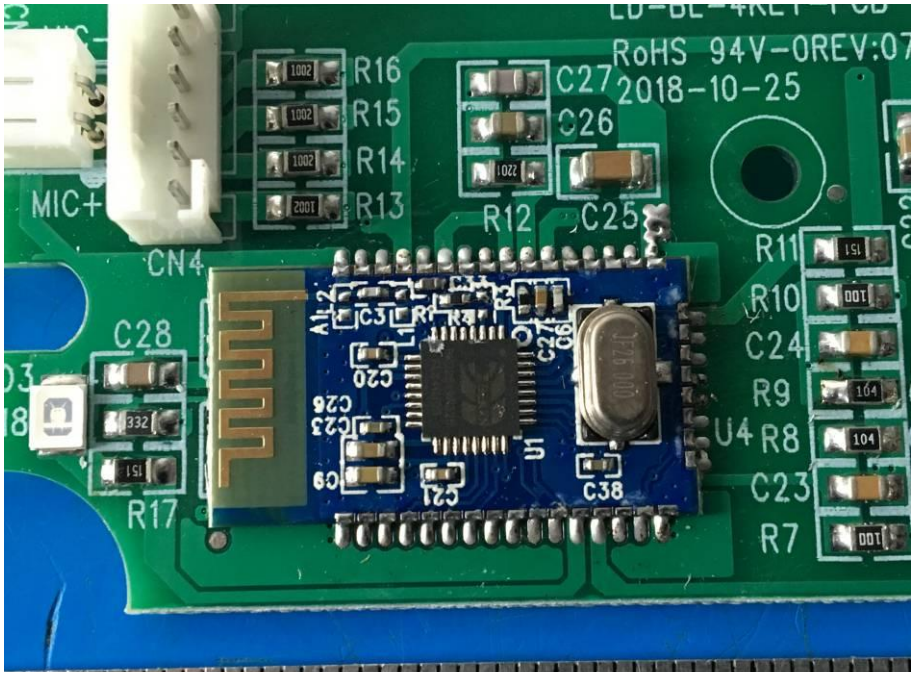


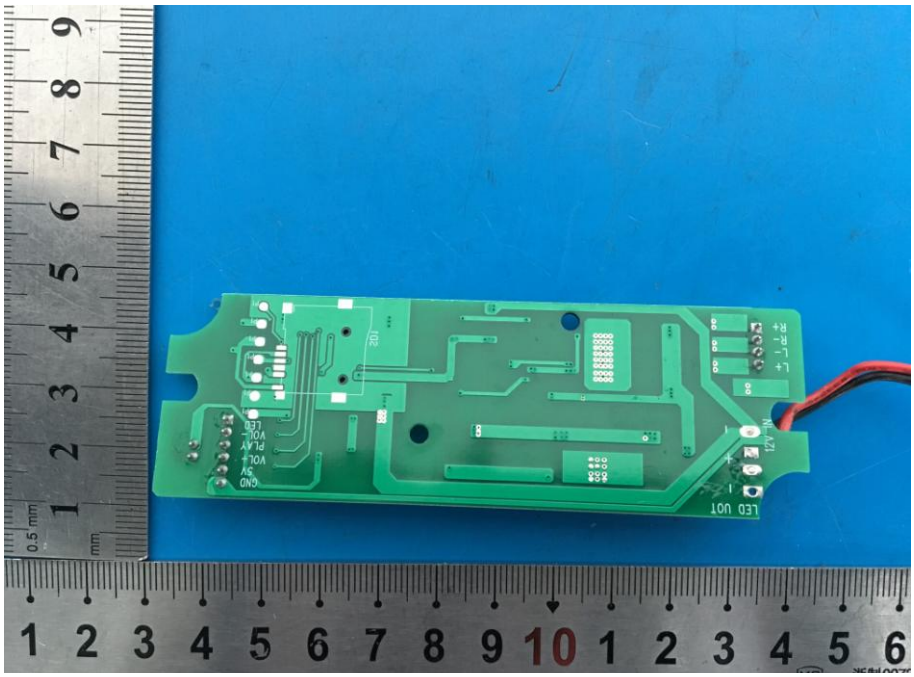


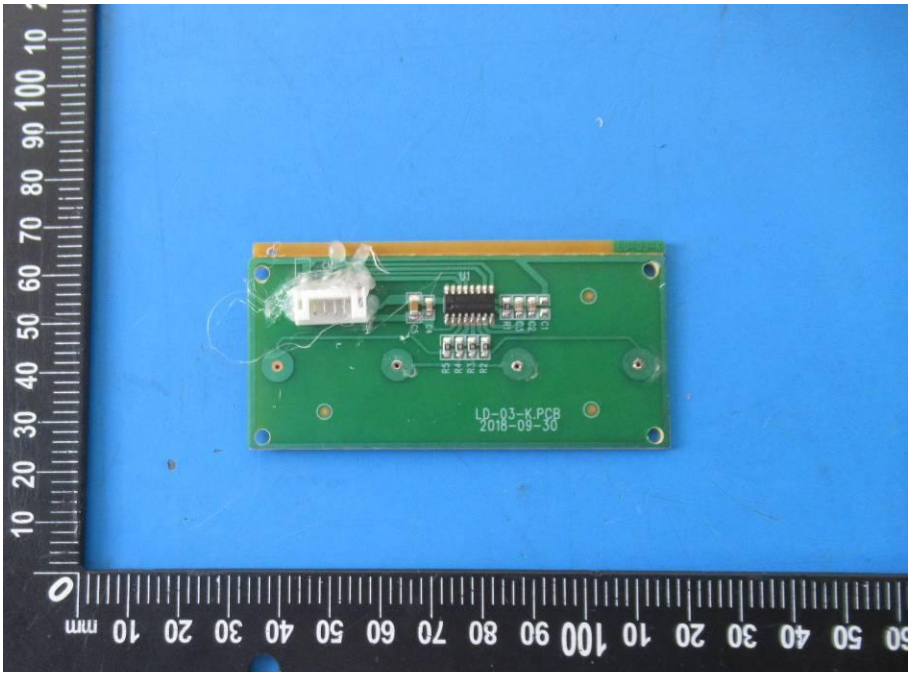

LED Driver
AC IN
DC OUT
20190522

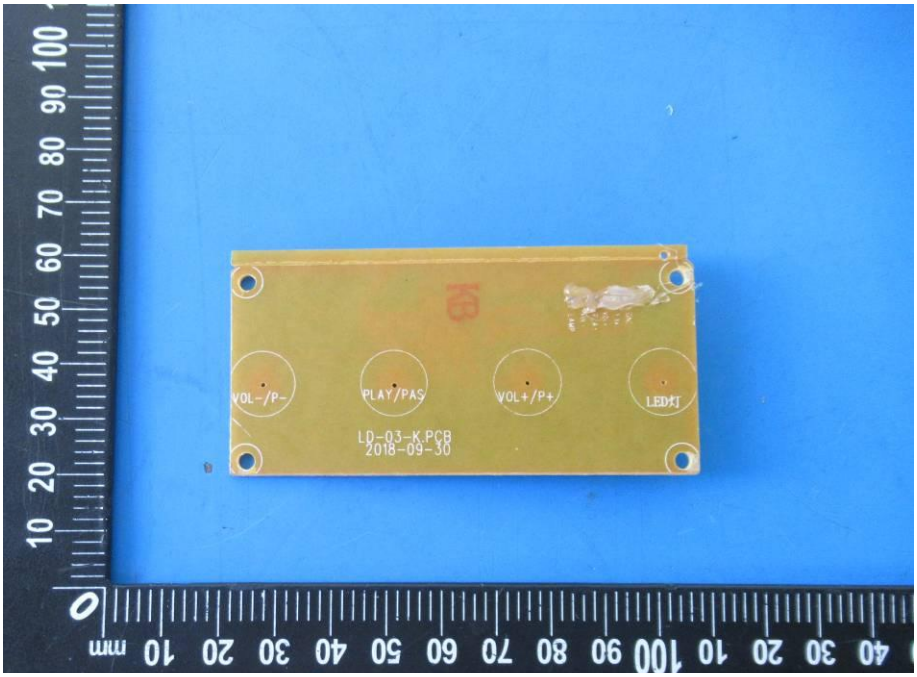



LD-BL-4KEY-PCB
RoHS 94V-0REV:07
2018-10-25

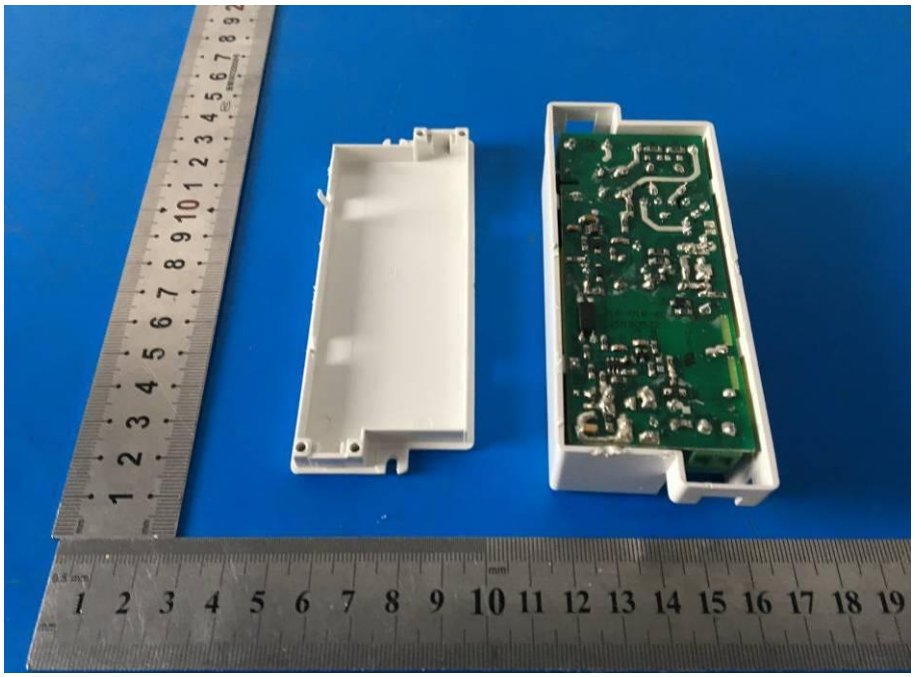

RoHS 94V-0REV:07
2018-10-25
R16
R15
R14
R13
C27
C26
R12
C25
MIC+
CN4
C28
R17
R11
R10
C24
R9
U4
R8
C23
R7
C38
U1

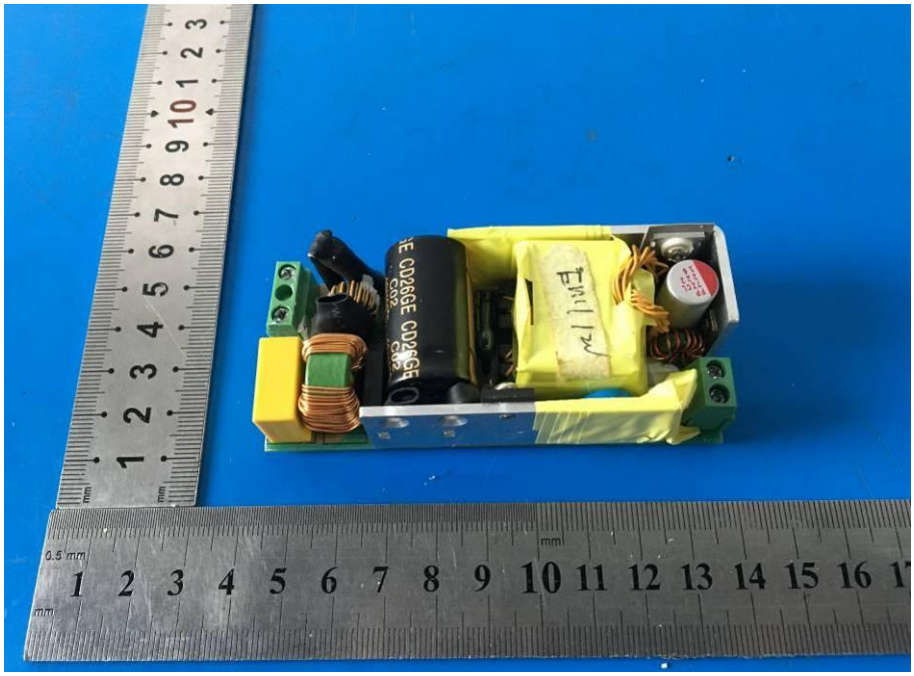

GND
5V
VOL+
PLAY
VOL-
LED
LED OUT
12V IN
L+
L-
R-
R+

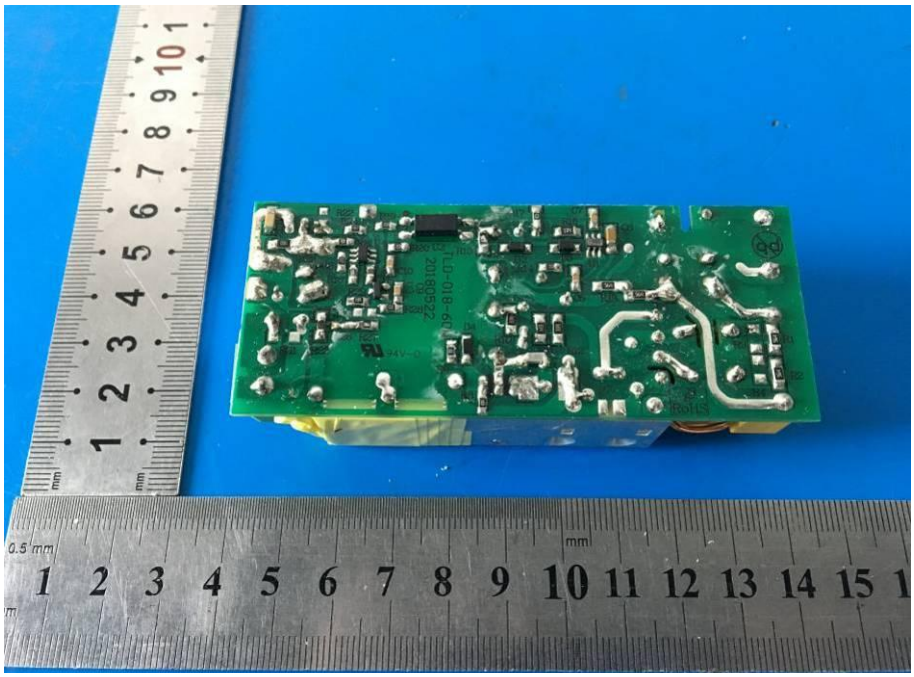

LD-03-K.PCB
2018-09-30


VOL-/P-
PLAY/PAS
VOL+/P+
LED-IT
LD-03-K PCB
2018-09-30

LED Driver
AC IN
L
N
Model: ZF120A-1206000
Input: 100-240Vac, 50/60Hz, 1.5A
Output: 12Vdc 6.0A, 72W max
ta: 40°C tc: 70°C
LISTED
E502444
CLASS 2 POWER SUPPLY
20190522
CB
RoHS
MADE IN CHINA
DC OUT







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