FCC TEST REPORT

FCC ID: 2ARBT-RC9030

On Behalf of

Shenzhen Keyson Cases & Bags Co., Ltd

LIGHTED MIRROR

Model No.: MR001, MR002, MR003, MR004, MR005, MR006, MR007, MR008, MR009, RC9030, RC9040, RC9050, RC9060, RC9070, RC9080

Prepared for	:	Shenzhen Keyson Cases & Bags Co., Ltd
Address	:	5th Floor, Building B, Feihuangda High-Tech Park,No.65,Hongyin Road,Liyuhe Industrict Area, Loucun, Gongming Town, Guangming New District, Shenzhen, Guangdong, China

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
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TEST REPORT DECLARATION

Applicant	:	Shenzhen Keyson Cases & Bags Co., Ltd
Address	:	5th Floor, Building B, Feihuangda High-Tech Park,No.65,Hongyin Road,Liyuhe Industrict Area, Loucun, Gongming Town, Guangming New District, Shenzhen, Guangdong, China
Manufacturer	:	Shenzhen Keyson Cases & Bags Co., Ltd
Address	:	5th Floor, Building B, Feihuangda High-Tech Park,No.65,Hongyin Road,Liyuhe Industrict Area, Loucun, Gongming Town, Guangming New District, Shenzhen, Guangdong, China
EUT Description	:	LIGHTED MIRROR
		(A) Model No. : MR001, MR002, MR003, MR004, MR005, MR006, MR007, MR008, MR009, RC9030, RC9040, RC9050, RC9060, RC9070, RC9080
		(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2017,

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).....…..:	Reak Yang Project Engineer	Reak Yang ……
Approved by (name + signature)…....:	Simple Guan Project Manager	……
Date of issue…… ……..:	November 28, 2018	

Revision History

Revision	Issue Date	Revisions	Revised By
00	November 28, 2018	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	:	LIGHTED MIRROR
Model Number	:	MR001, MR002, MR003, MR004, MR005, MR006, MR007, MR008, MR009, RC9030, RC9040, RC9050, RC9060, RC9070, RC9080
DIFF.	:	All models are the same, except the model name and light color, this report performs the RC9030 as the main model.
Trademark	:	N/A
Test Voltage	:	AC 120V/60Hz, DC 7.4V From Battery
Radio Technology	:	Bluetooth 4.2 EDR
Operation frequency	:	2402-2480MHz
Channel No.	:	79 Channels
Modulation type	:	GFSK, π /4 DQPSK, 8- DPSK
Antenna Type	:	PCB antenna, Maximum Gain is 0dBi for BT
Software version	:	V1
Hardware version	:	V1

2.2.Accessories of Device (EUT)

Accessories1 : N/A
Trademark : N/A
Model : N/A
Ratings : N/A

2.3.Tested Supporting System Details

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

2.4.Block Diagram of connection between EUT and simulators

EUT

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
8- DPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

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
3m Semi-Anechoic	ETS-LINDGREN	N/A	SEL0017	2018.09.21	1Year
Spectrum analyzer	Agilent	E4407B	MY46185649	2018.09.21	1Year
Receiver	R&S	ESCI	1166.5950K03-1011	2018.09.21	1Year
Receiver	R&S	ESCI	101202	2018.09.21	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2018.04.13	2Year
Horn Antenna	EMCO	3115	640201028-06	2018.04.13	2Year
Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	2018.04.13	2Year
Cable	Resenberger	N/A	No.1	2018.09.21	1Year
Cable	SCHWARZBECK	N/A	No.2	2018.09.21	1Year
Cable	SCHWARZBECK	N/A	No.3	2018.09.21	1Year
Pre-amplifier	Schwarzbeck	BBV9743	9743-019	2018.09.21	1Year
Pre-amplifier	R&S	AFS33-18002650-30-8P-44	SEL0080	2018.09.21	1Year
Temperature controller	Terchy	MHQ	120	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	SCHWARZBECK	BBHA 9170	BBHA 9170294	2018.04.13	2 Year
Power Meter	Agilent	E9300A	MY41496625	2018.09.21	1Year

3. MAXIMUM PEAK OUTPUT POWER

3.1.Limit

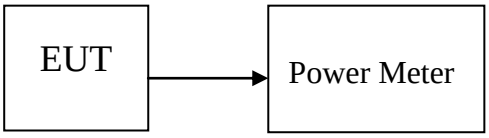
Please refer section15.247.

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	-2.507	0.56	30	Pass
	2441	-3.524	0.44	30	Pass
	2480	-4.483	0.36	30	Pass
π /4 DQPSK	2402	-0.650	0.86	21	Pass
	2441	-1.678	0.68	21	Pass
	2480	-2.775	0.53	21	Pass
8- DPSK	2402	**-0.393**	0.91	21	Pass
	2441	-1.519	0.70	21	Pass
	2480	-2.500	0.56	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 (KHz)	Conclusion
GFSK	2402	915.9	PASS
	2441	923.8	PASS
	2480	922.9	PASS
π /4 DQPSK	2402	1278.0	PASS
	2441	1281.0	PASS
	2480	1280.0	PASS
8- DPSK	2402	1270.0	PASS
	2441	1264.0	PASS
	2480	1267.0	PASS

Orginal Test data For 20dB bandwidth

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

8- DPSK	

Lowest channel

Middle 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 100kHz RBW and 300kHz VBW.

5.3.Test Result

Mode/Channel	Channel separation (MHz)	20dB Bandwidth (KHz)	Limit (KHz)	Conclusion
GFSK	1.002	863.9	575.93	PASS
π /4 DQPSK	0.999	1281.0	848.00	PASS
8- DPSK	1.002	1270.0	857.33	PASS

Orginal test data for channel separation

GFSK

π /4 DQPSK

8- DPSK

6. NUMBER OF HOPPING CHANNEL

6.1.Limit

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

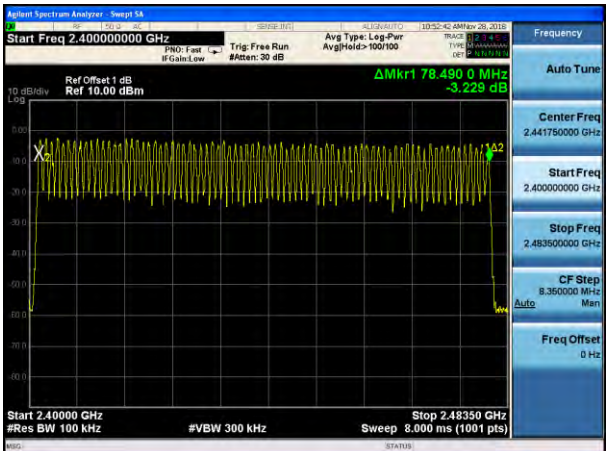
6.2.Test Procedure

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.

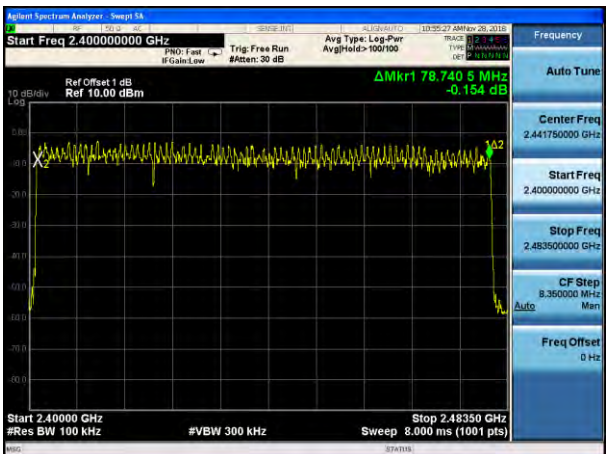
6.3.Test Result

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

Original test data for hopping channel number



GFSK



π /4 DQPSK

8- DPSK

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, 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	0.364	116.480	400	PASS
	DH3	2441	1.617	258.720		PASS
	DH5	2441	2.867	305.813		PASS
π /4 DQPSK	DH1	2441	0.383	122.560	400	PASS
	DH3	2441	1.633	261.280		PASS
	DH5	2441	2.883	307.520		PASS
8- DPSK	DH1	2441	0.375	120.000	400	PASS
	DH3	2441	1.633	261.280		PASS
	DH5	2441	2.875	306.667		PASS

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

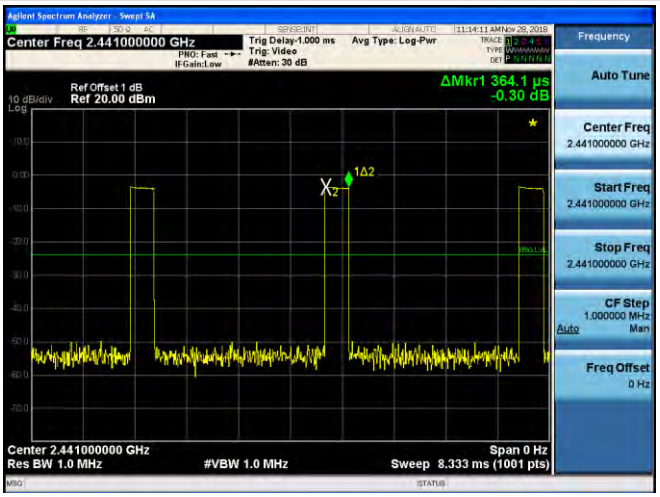
2 DH1 time slot = Pulse Duration * (1600/(2*79)) * A period time/1000

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

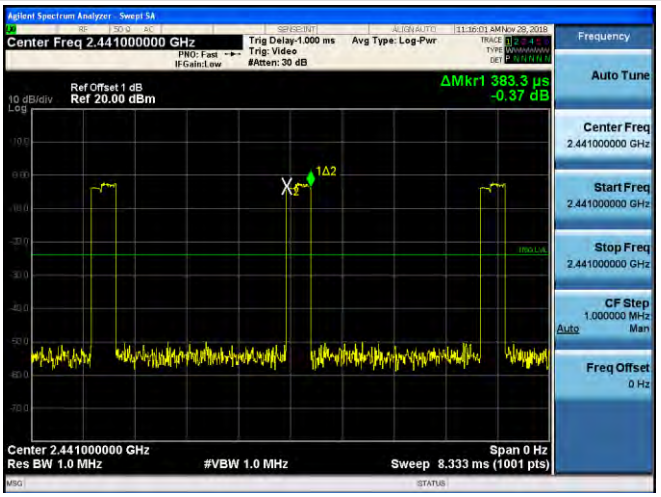
DH5 time slot = Pulse Duration * (1600/(6*79)) * A period time/1000

Dwell time

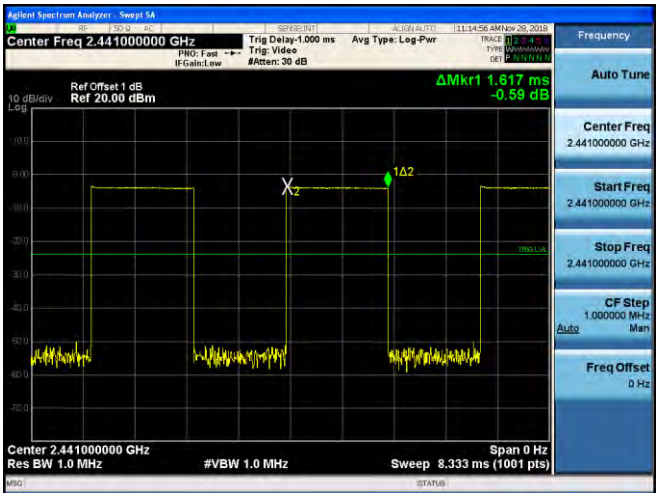
GFSK	*π/4-DQPSK*



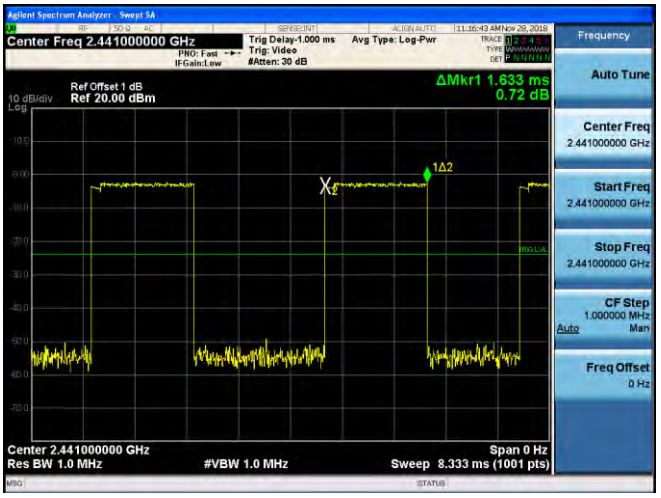
Middle Channel / 2441 MHz - DH1



Middle Channel / 2441 MHz - 2DH1

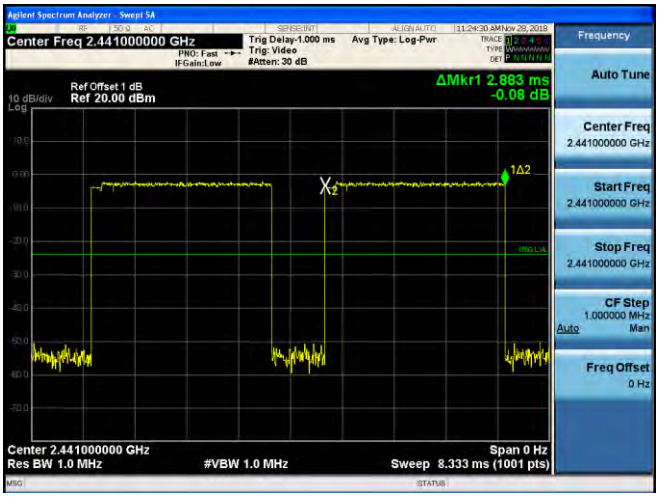


Middle Channel / 2441 MHz – DH3



Middle Channel / 2441 MHz - 2DH3

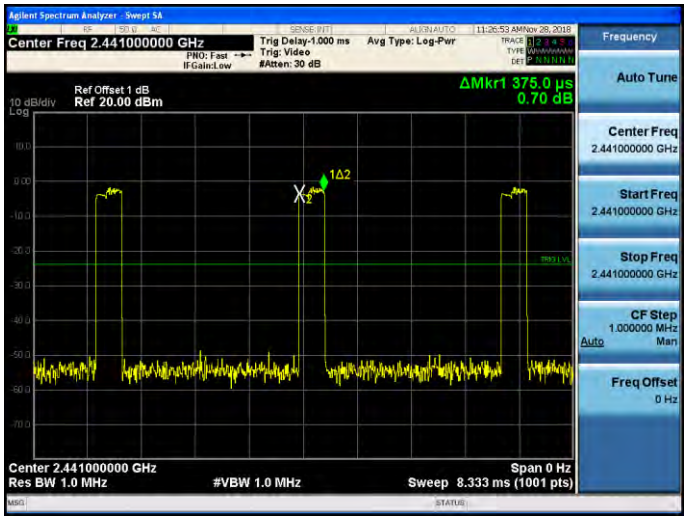
Middle Channel / 2441 MHz – DH5



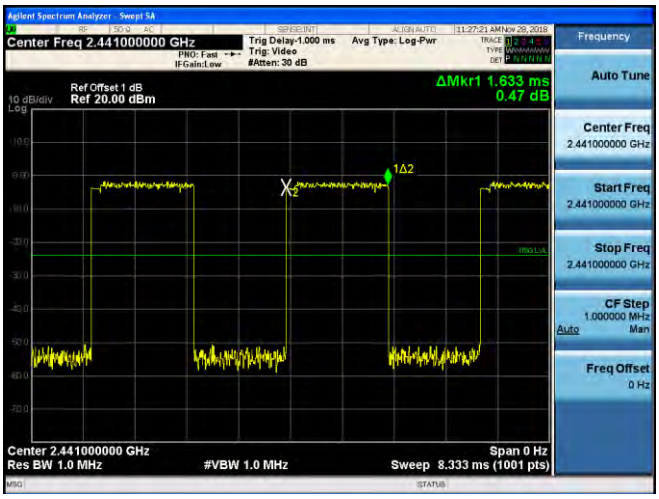
Middle Channel / 2441 MHz - 2DH5

Dwell time

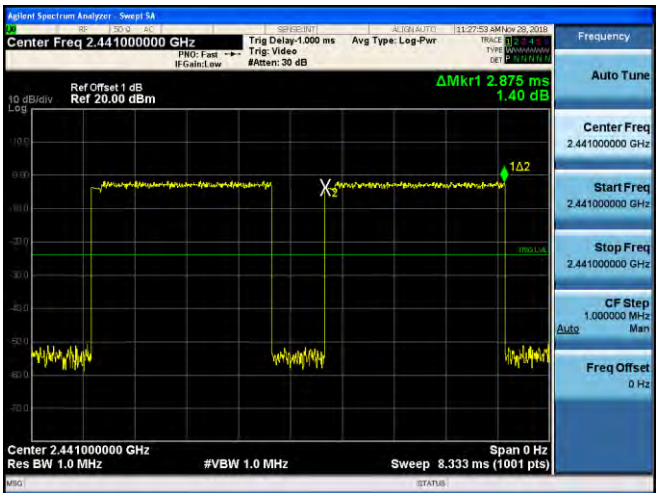
8DPSK



Middle Channel / 2441 MHz - 3DH1



Middle Channel / 2441 MHz - 3DH3



Middle Channel / 2441 MHz – 3DH5

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

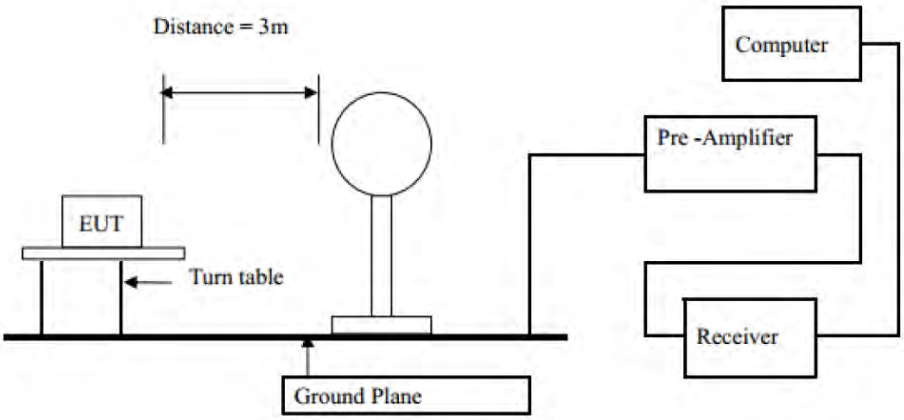
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 -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

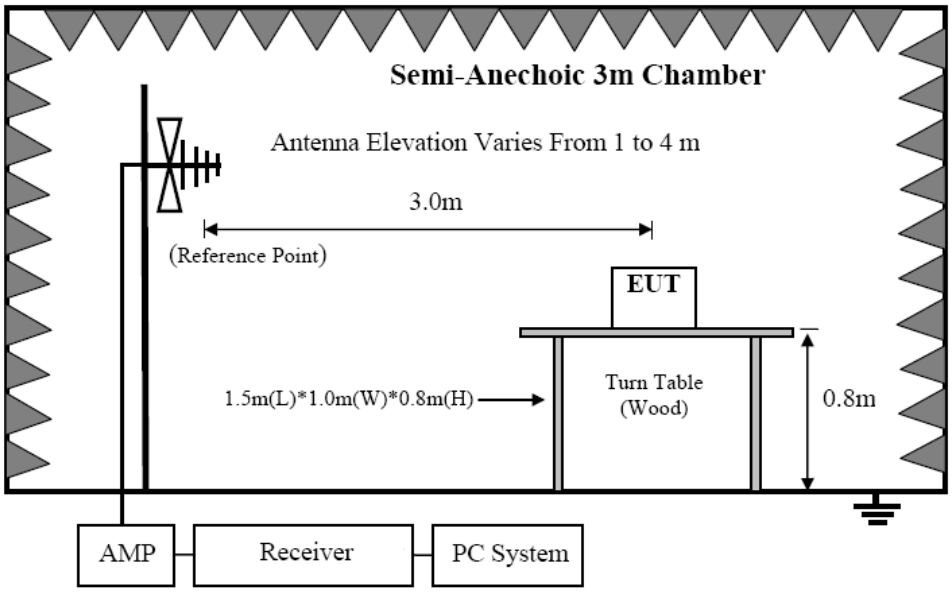
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2.Block Diagram of Test setup

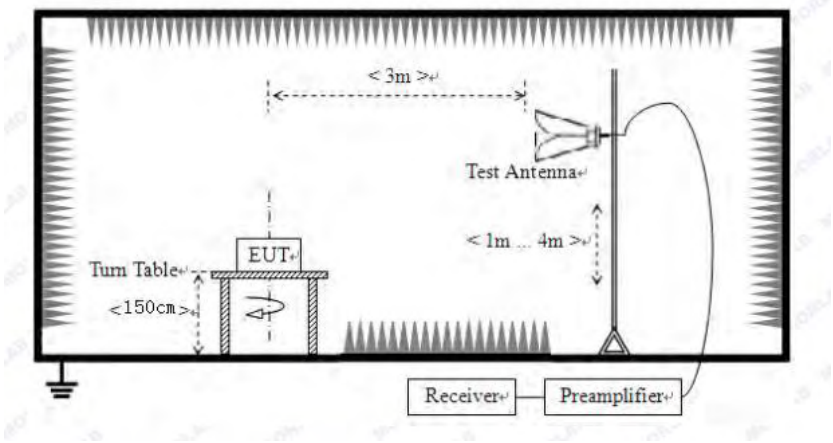
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



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

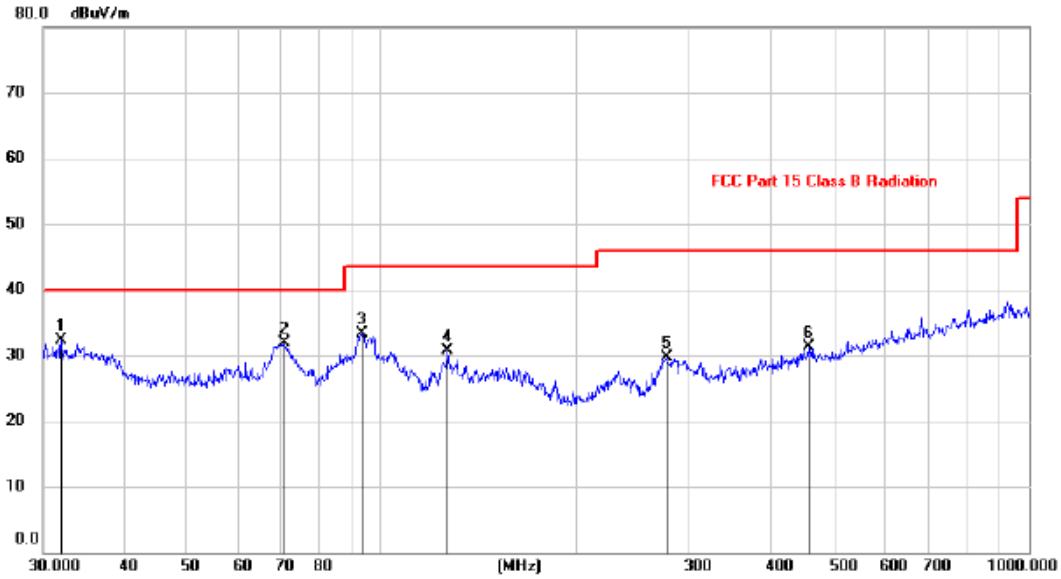
We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency..
Detailed information please see the following page.

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.

From 30MHz to 1000MHz: Conclusion: PASS

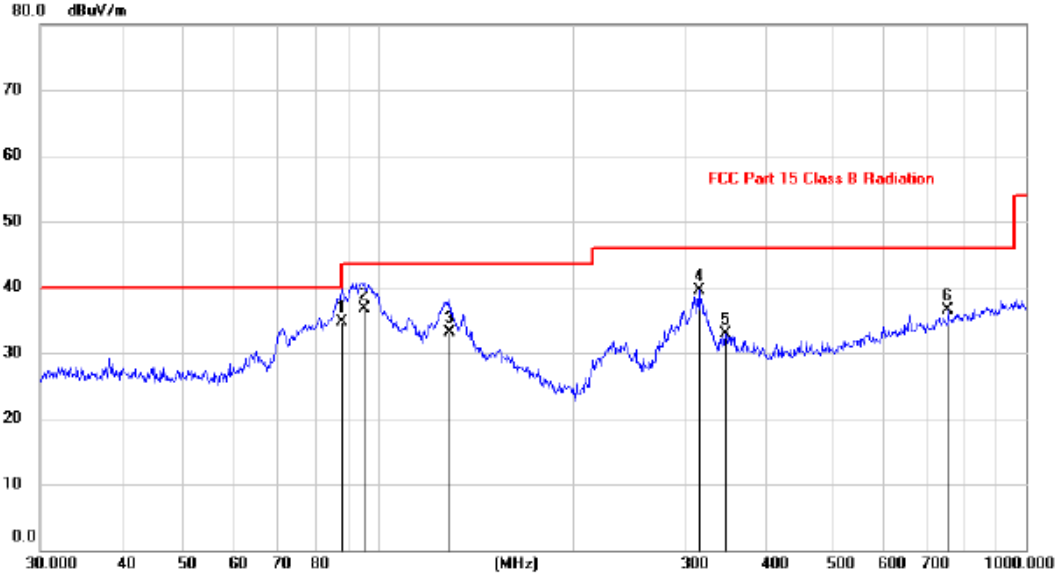
Vertical:



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	*	31.9546	18.85	13.39	32.24	40.00	-7.76	peak			
2		70.5836	21.09	10.84	31.93	40.00	-8.07	peak			
3		93.1132	23.23	10.00	33.23	43.50	-10.27	peak			
4		126.3286	17.77	13.00	30.77	43.50	-12.73	peak			
5		275.1570	16.88	12.87	29.75	46.00	-16.25	peak			
6		455.9058	14.24	17.07	31.31	46.00	-14.69	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Horizontal:



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	*	87.7248	24.95	9.73	34.68	40.00	-5.32	QP			
2		95.0930	26.39	10.23	36.62	43.50	-6.88	QP			
3		129.0146	19.90	13.17	33.07	43.50	-10.43	QP			
4		312.1794	25.88	13.69	39.57	46.00	-6.43	peak			
5		343.1800	18.50	14.43	32.93	46.00	-13.07	peak			
6		760.7035	14.73	21.83	36.56	46.00	-9.44	peak			

Note:1. *:Maximum data; x:Over limit; !:over margin.
2.Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Remark: All modes have been tested, and only worst data of 8-DPSK mode, Channel 2402MHz was listed in this report.

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	44.13	V	33.95	10.18	34.26	54.00	74	20.00	PK
4804	34.07	V	33.95	10.18	34.26	43.94	54	10.06	AV
7206	/		/						
9608	/		/						
4824	43.65	H	33.95	10.18	34.26	53.52	74	20.48	PK
4824	33.82	H	33.95	10.18	34.26	43.69	54	10.31	AV
7206									
9608									
Test Mode: GFSK TX Mid									
4882	41.55	V	33.93	10.2	34.29	51.39	74	22.61	PK
4882	32.79	V	33.93	10.2	34.29	42.63	54	11.37	AV
7323	/								
9764	/								
4882	42.41	H	33.93	10.2	34.29	52.25	74	21.75	PK
4882	32.22	H	33.93	10.2	34.29	42.06	54	11.94	AV
7323									
9764									
Test Mode: GFSK TX High									
4960	42.71	V	33.98	10.22	34.25	52.66	74	21.34	PK
4960	32.68	V	33.98	10.22	34.25	42.63	54	11.37	AV
7440	/								
9920	/								
4960	42.63	H	33.98	10.22	34.25	52.58	74	21.42	PK
4960	31.39	H	33.98	10.22	34.25	41.34	54	12.66	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	42.93	V	33.95	10.18	34.26	52.80	74	21.20	PK
4804	31.46	V	33.95	10.18	34.26	41.33	54	12.67	AV
7206	/		/						
9608	/		/						
4824	44.01	H	33.95	10.18	34.26	53.88	74	20.12	PK
4824	31.95	H	33.95	10.18	34.26	41.82	54	12.18	AV
7206									
9608									
Test Mode: π /4 DQPSK TX Mid									
4882	43.46	V	33.93	10.2	34.25	53.34	74	20.66	PK
4882	30.93	V	33.93	10.2	34.25	40.81	54	13.19	AV
7323	/								
9764	/								
4882	43.26	H	33.93	10.2	34.29	53.10	74	20.90	PK
4882	33.48	H	33.93	10.2	34.29	43.32	54	10.68	AV
7323									
9764									
Test Mode: π /4 DQPSK TX High									
4960	42.21	V	33.98	10.22	34.25	52.16	74	21.84	PK
4960	32.64	V	33.98	10.22	34.25	42.59	54	11.41	AV
7440	/								
9920	/								
4960	42.87	H	33.98	10.22	34.25	52.82	74	21.18	PK
4960	31.88	H	33.98	10.22	34.25	41.83	54	12.17	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.

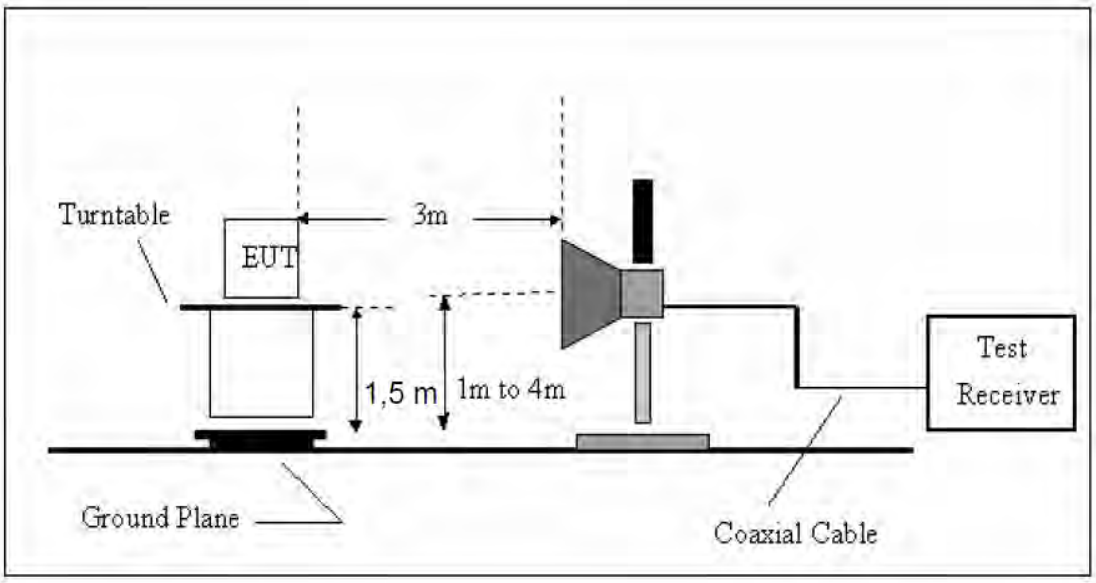
From 1G-25GHz

Test Mode: 8- 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	41.30	V	33.95	10.18	34.26	51.17	74	22.83	PK
4804	31.80	V	33.95	10.18	34.26	41.67	54	12.33	AV
7206	/		/						
9608	/		/						
4824	40.61	H	33.95	10.18	34.26	50.48	74	23.52	PK
4824	32.31	H	33.95	10.18	34.26	42.18	54	11.82	AV
7206									
9608									
Test Mode: 8- DQPSK TX Mid									
4882	42.30	V	33.93	10.2	34.29	52.14	74	21.86	PK
4882	32.14	V	33.93	10.2	34.29	41.98	54	12.02	AV
7323	/								
9764	/								
4882	42.77	H	33.93	10.2	34.29	52.61	74	21.39	PK
4882	33.04	H	33.93	10.2	34.29	42.88	54	11.12	AV
7323									
9764									
Test Mode: 8- DQPSK TX High									
4960	42.22	V	33.98	10.22	34.25	52.17	74	21.83	PK
4960	32.58	V	33.98	10.22	34.25	42.53	54	11.47	AV
7440	/								
9920	/								
4960	41.65	H	33.98	10.22	34.25	51.60	74	22.40	PK
4960	32.95	H	33.98	10.22	34.25	42.90	54	11.10	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

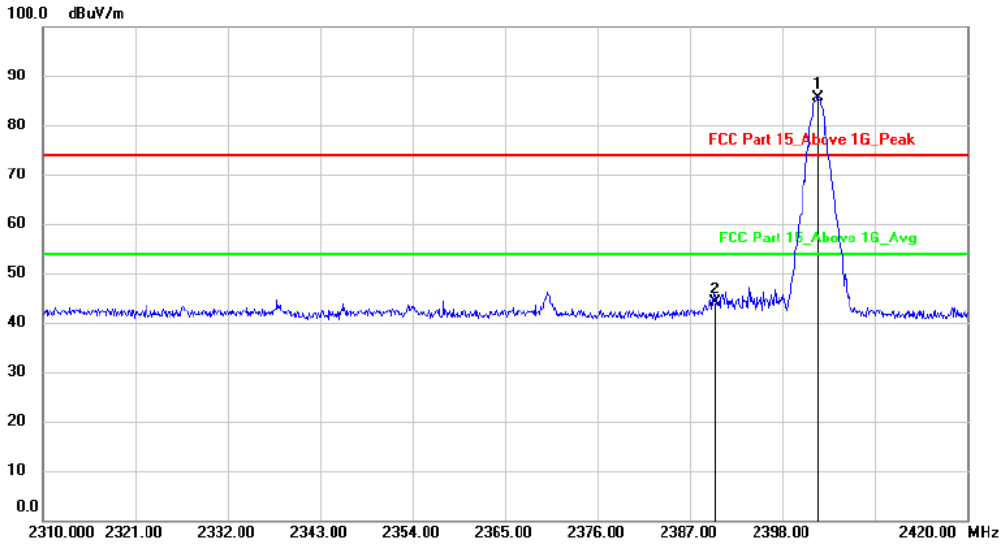
All restriction band and non- restriction band have been tested , only worse case is reported.

9.4.Test Result

PASS. (See below detailed test data)

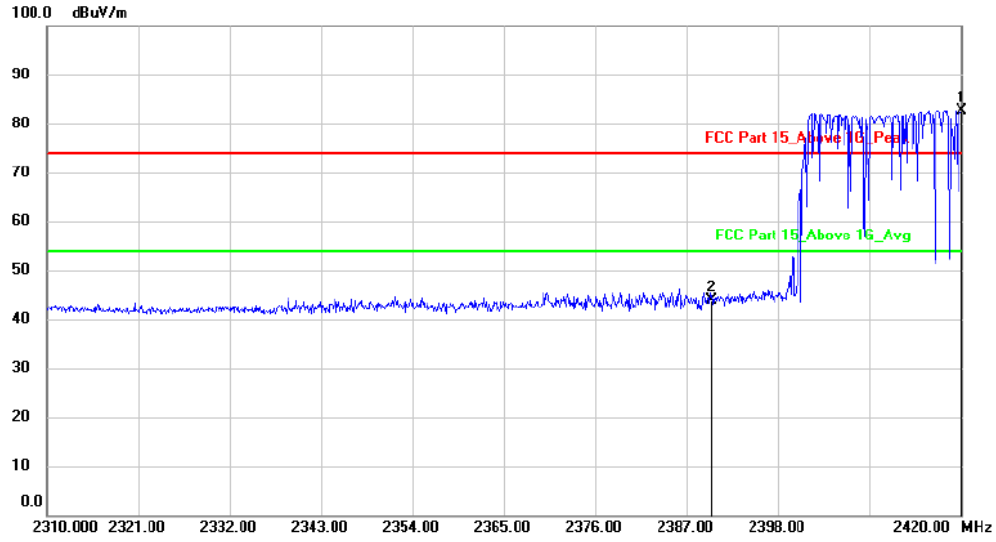
Radiated Method:

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	88.78	-3.41	85.37	74.00	11.37	peak			
2		2390.000	47.72	-3.40	44.32	74.00	-29.68	peak			

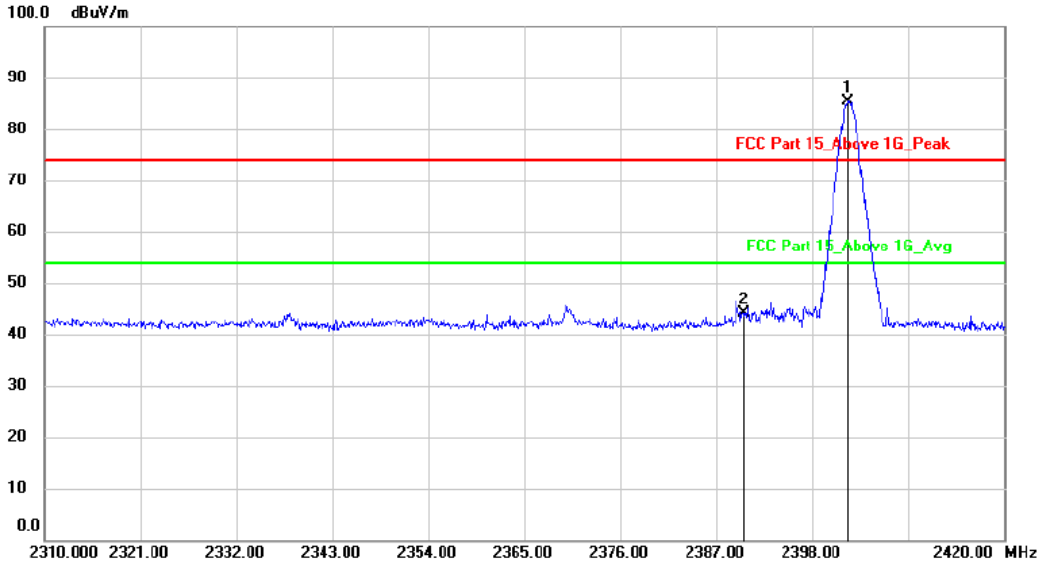
hopping-off



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	*	2420.000	86.16	-3.41	82.75	74.00	8.75	peak			
2		2390.000	47.52	-3.40	44.12	74.00	-29.88	peak			

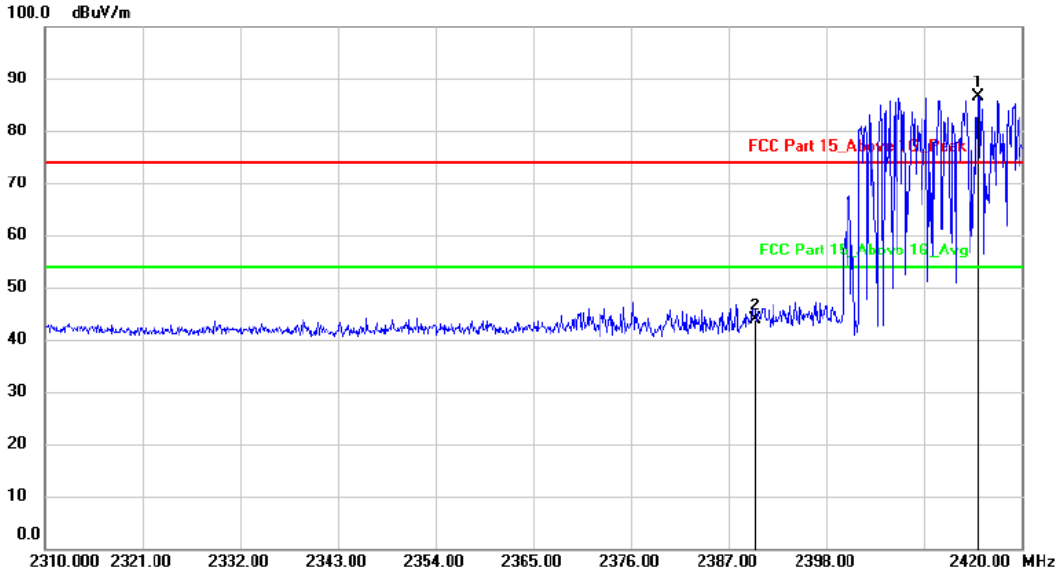
hopping-on

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	*	2401.960	88.95	-3.41	85.54	74.00	11.54	peak			
2		2390.000	47.72	-3.40	44.32	74.00	-29.68	peak			

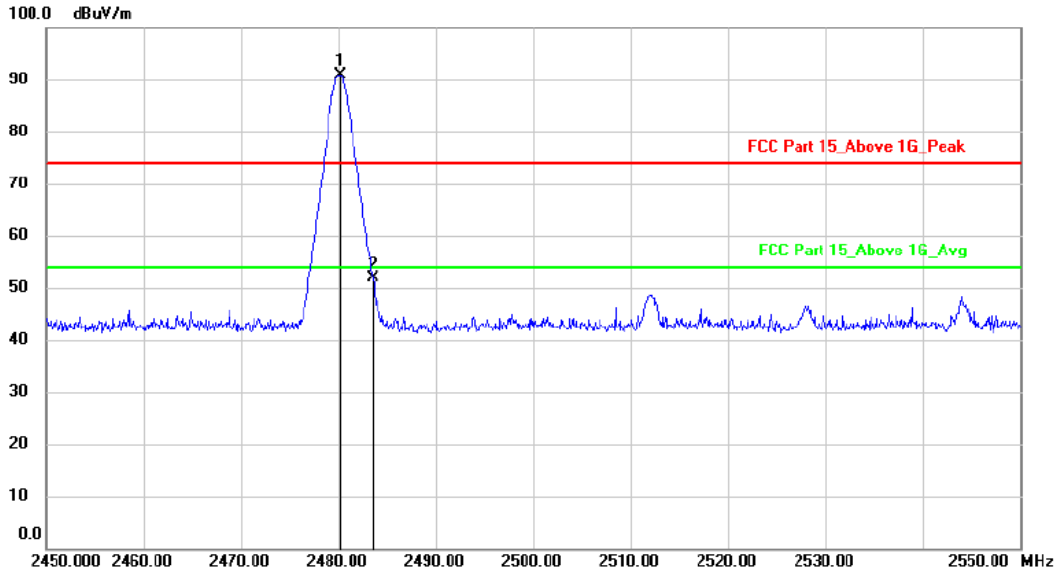
hopping-off



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	*	2415.050	90.08	-3.41	86.67	74.00	12.67	peak			
2		2390.000	47.40	-3.40	44.00	74.00	-30.00	peak			

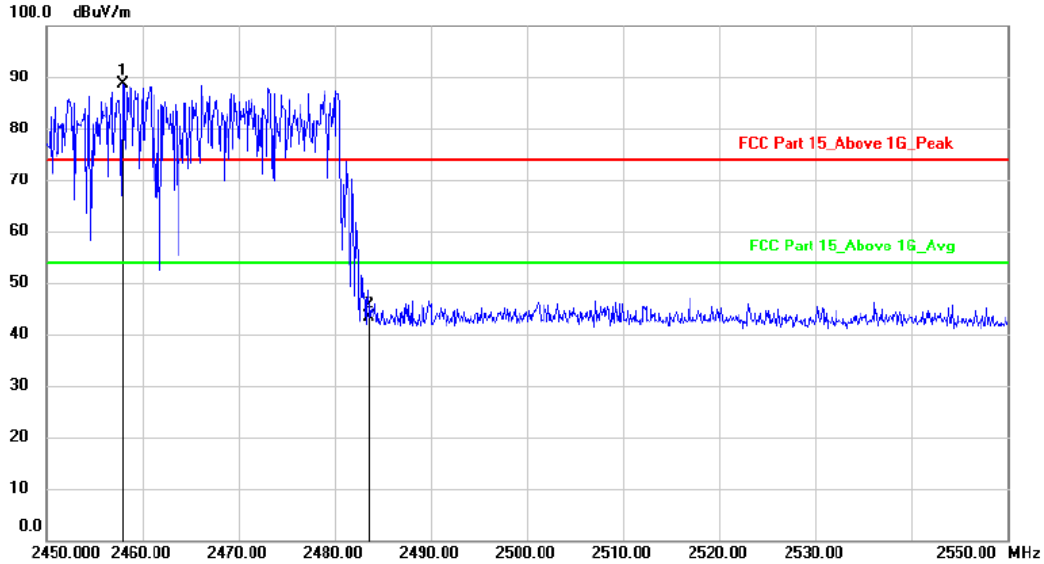
hopping-on

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	*	2480.200	94.15	-3.38	90.77	74.00	16.77	peak			
2		2483.500	54.71	-3.38	51.33	74.00	-22.67	peak			

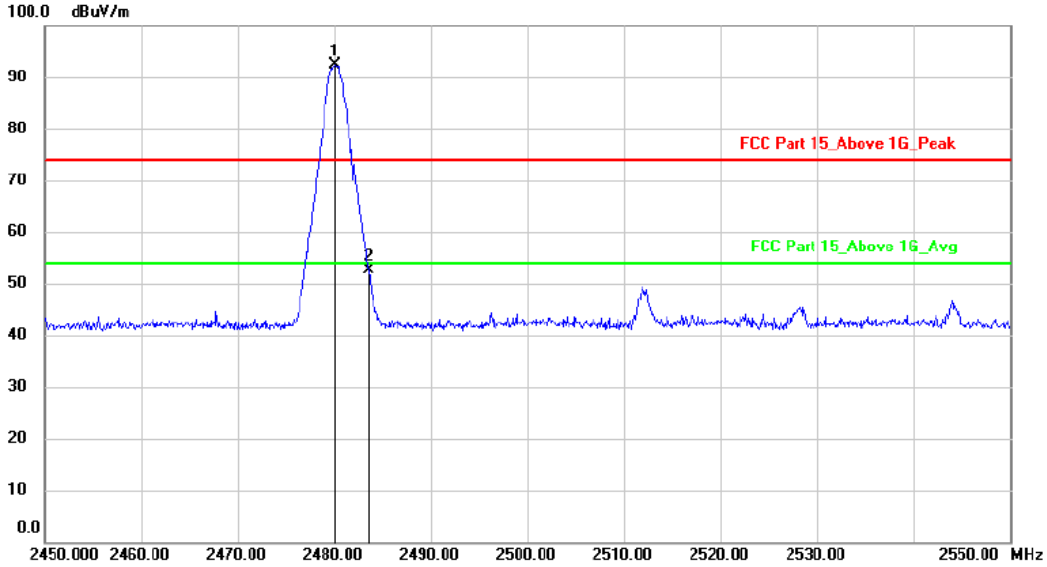
hopping-off



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	*	2457.900	92.40	-3.39	89.01	74.00	15.01	peak			
2		2483.500	46.95	-3.38	43.57	74.00	-30.83	peak			

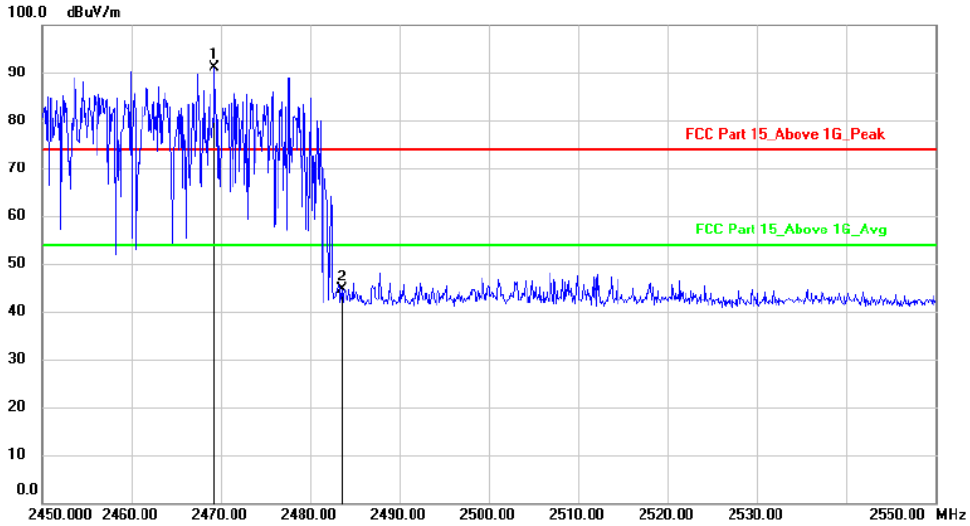
hopping-on

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	*	2480.000	96.06	-3.38	92.68	74.00	18.68	peak			
2		2483.500	55.57	-3.38	52.19	74.00	-21.81	peak			

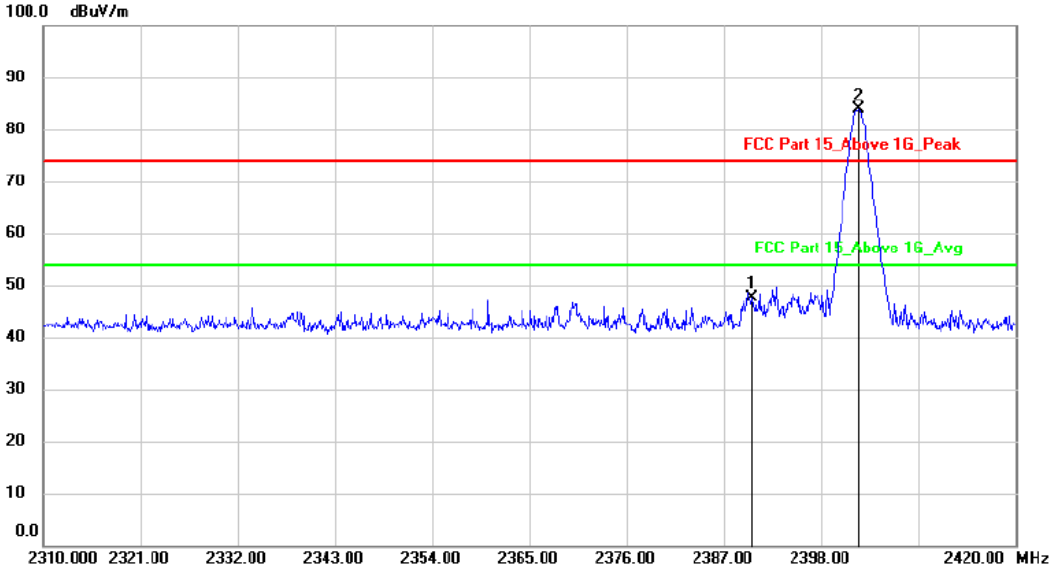
hopping-off



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	*	2469.300	94.72	-3.39	91.33	74.00	17.33	peak			
2		2483.500	47.93	-3.38	44.55	74.00	-29.45	peak			

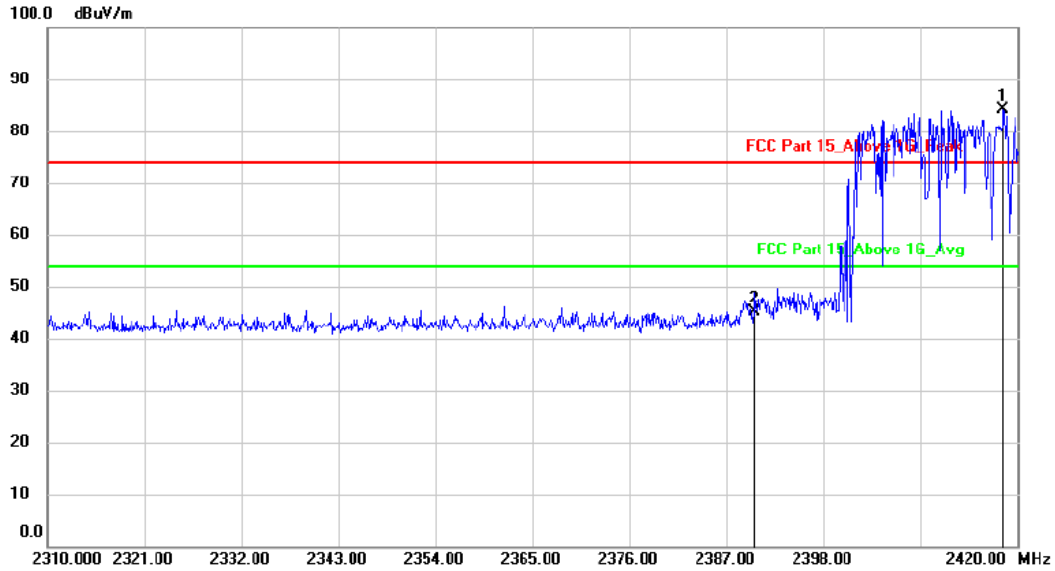
hopping-on

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		2390.000	50.93	-3.40	47.53	74.00	-26.47	peak			
2	*	2402.180	87.53	-3.41	84.12	74.00	10.12	peak			

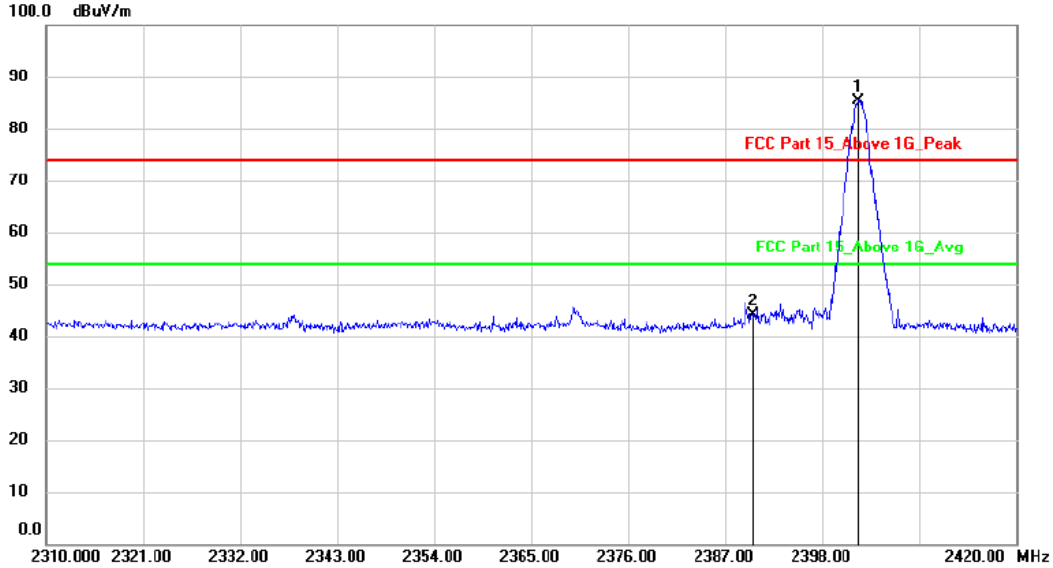
hopping-off



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	*	2418.350	88.58	-3.41	85.17	74.00	11.17	peak			
2		2390.000	48.80	-3.40	45.40	74.00	-28.60	peak			

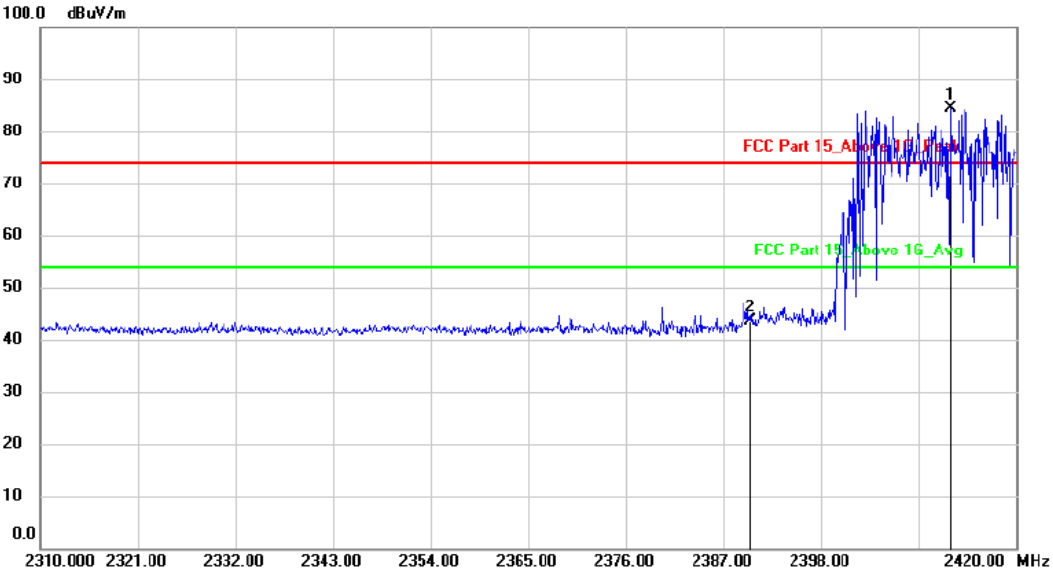
hopping-on

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	*	2401.960	88.95	-3.41	85.54	74.00	11.54	peak			
2		2390.000	47.72	-3.40	44.32	74.00	-29.68	peak			

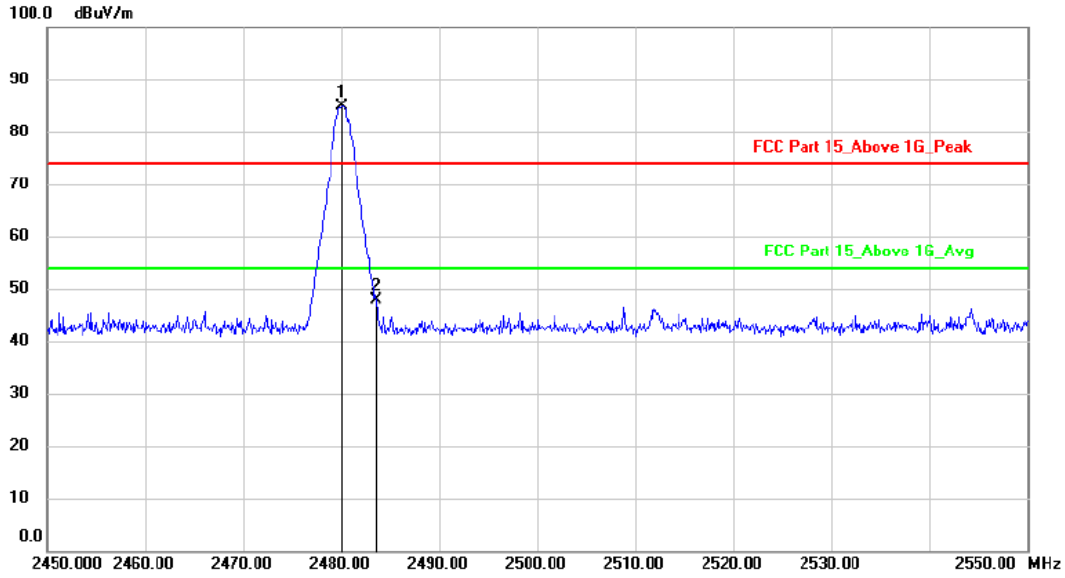
hopping-off



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	*	2412.520	87.86	-3.41	84.45	74.00	10.45	peak			
2		2390.000	47.22	-3.40	43.82	74.00	-30.18	peak			

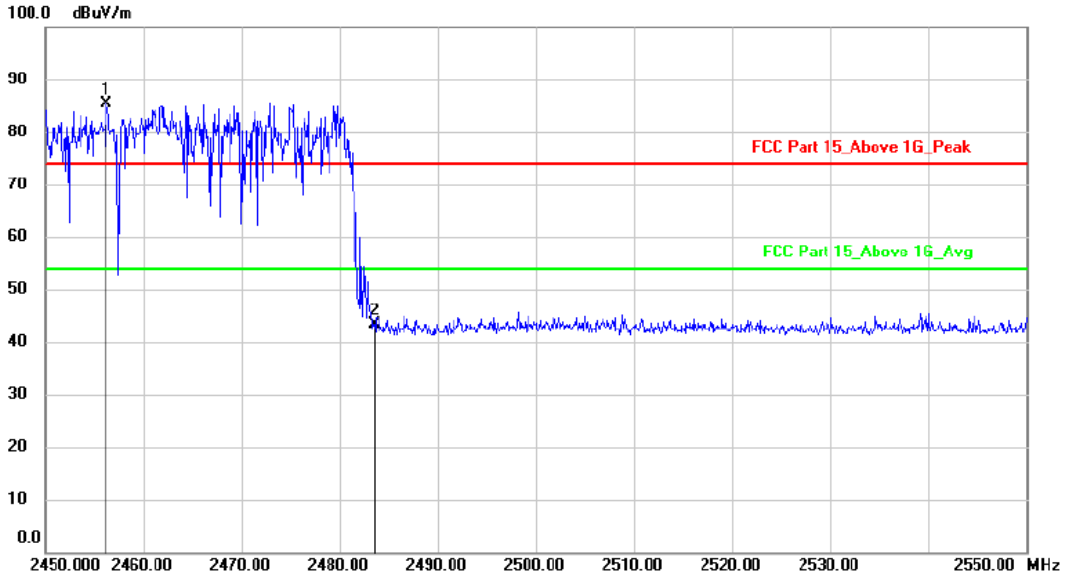
hopping-on

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	*	2480.100	88.16	-3.38	84.78	74.00	10.78	peak			
2		2483.500	50.92	-3.38	47.54	74.00	-26.46	peak			

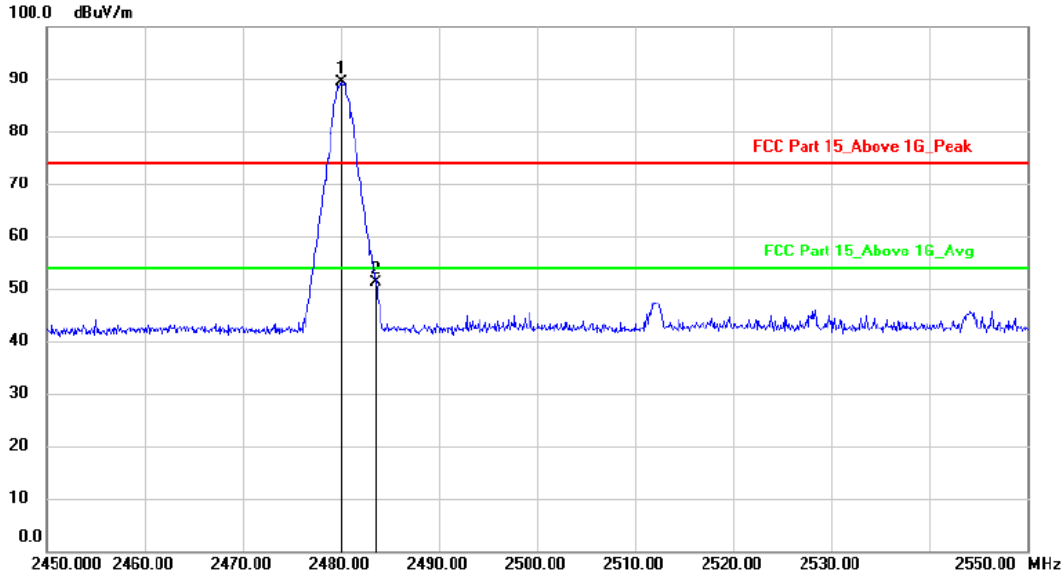
hopping-off



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	*	2456.200	89.04	-3.39	85.65	74.00	11.65	peak			
2		2483.500	46.42	-3.38	43.04	74.00	-30.96	peak			

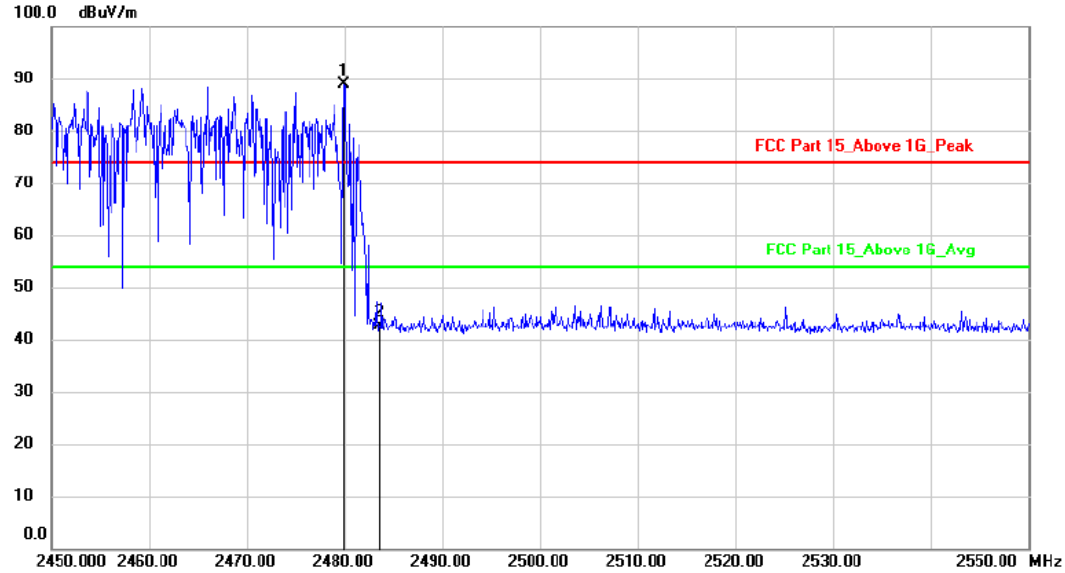
hopping-on

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	92.99	-3.38	89.61	74.00	15.61	peak			
2		2483.500	54.70	-3.38	51.32	74.00	-22.68	peak			

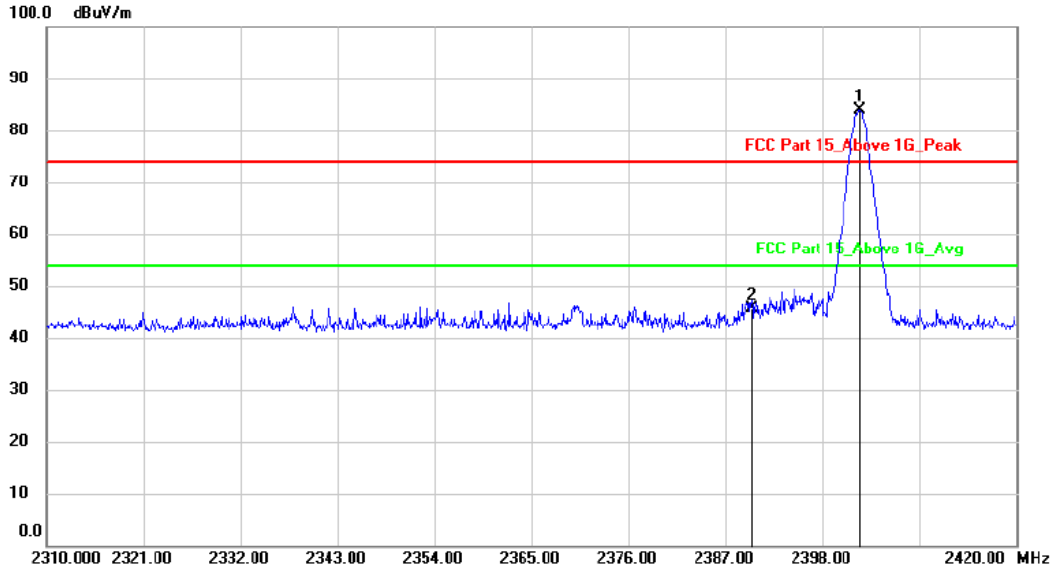
hopping-off



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	*	2479.900	92.54	-3.38	89.16	74.00	15.16	peak			
2		2483.500	45.41	-3.38	42.03	74.00	-31.97	peak			

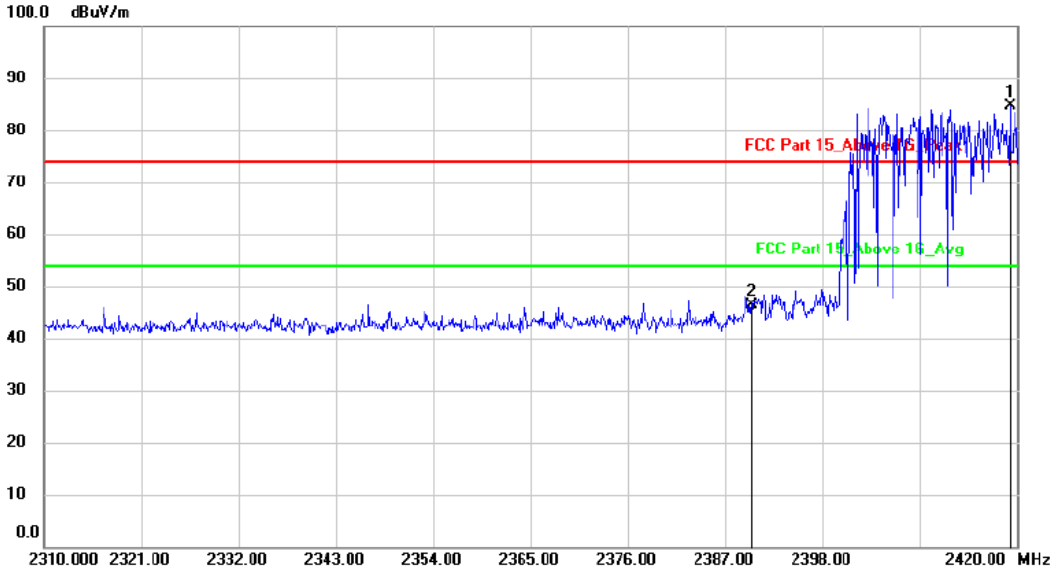
hopping-on

Polarization: Vertical Test Mode: 8DPSK-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	86.77	-3.41	83.36	74.00	9.36	peak			
2		2390.000	49.51	-3.40	46.11	74.00	-28.91	peak			

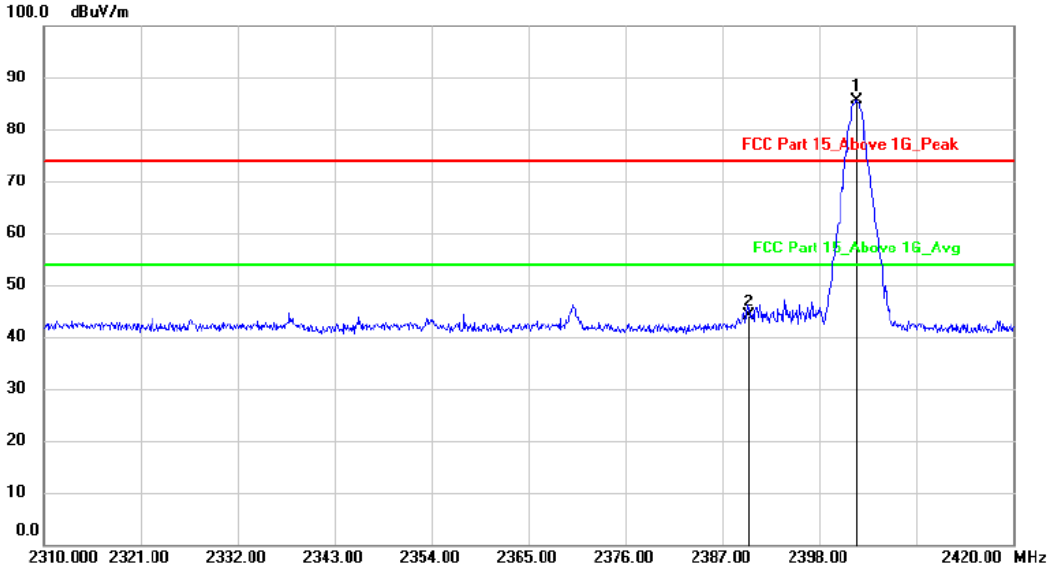
hopping-off



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	*	2419.120	88.35	-3.41	84.94	74.00	10.94	peak			
2		2390.000	49.77	-3.40	46.37	74.00	-27.63	peak			

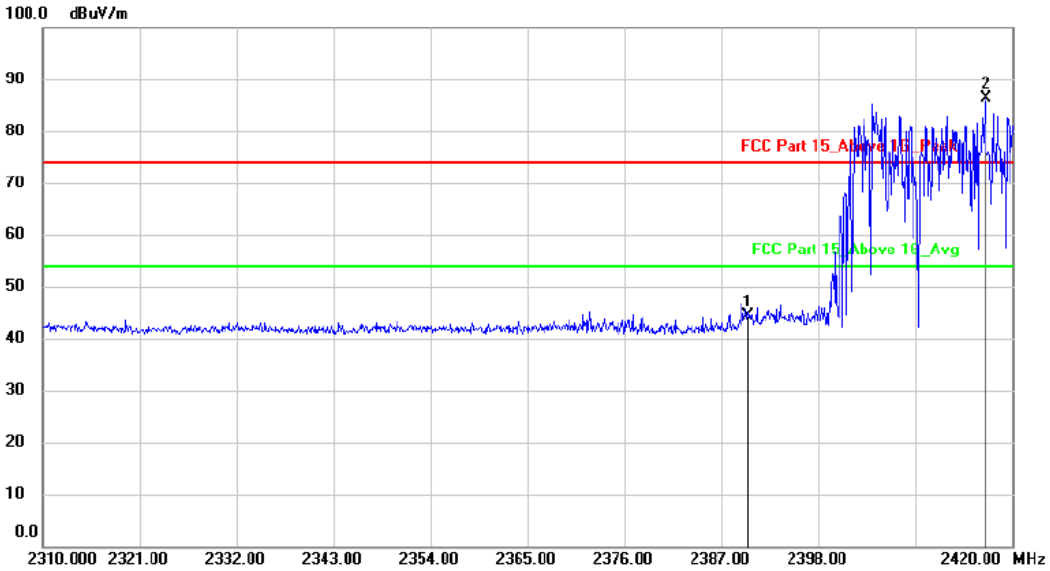
hopping-on

Polarization: Horizontal Test Mode: 8DPSK-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	88.78	-3.41	85.37	74.00	11.37	peak			
2		2390.000	47.72	-3.40	44.32	74.00	-29.68	peak			

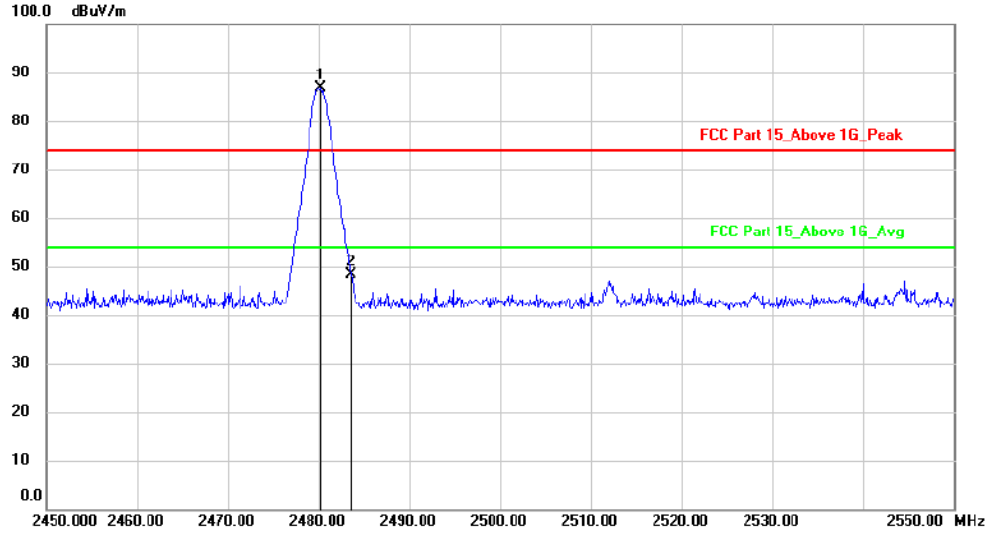
hopping-off



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		2390.000	47.55	-3.40	44.15	74.00	-29.85	peak			
2	*	2416.920	89.88	-3.41	86.47	74.00	12.47	peak			

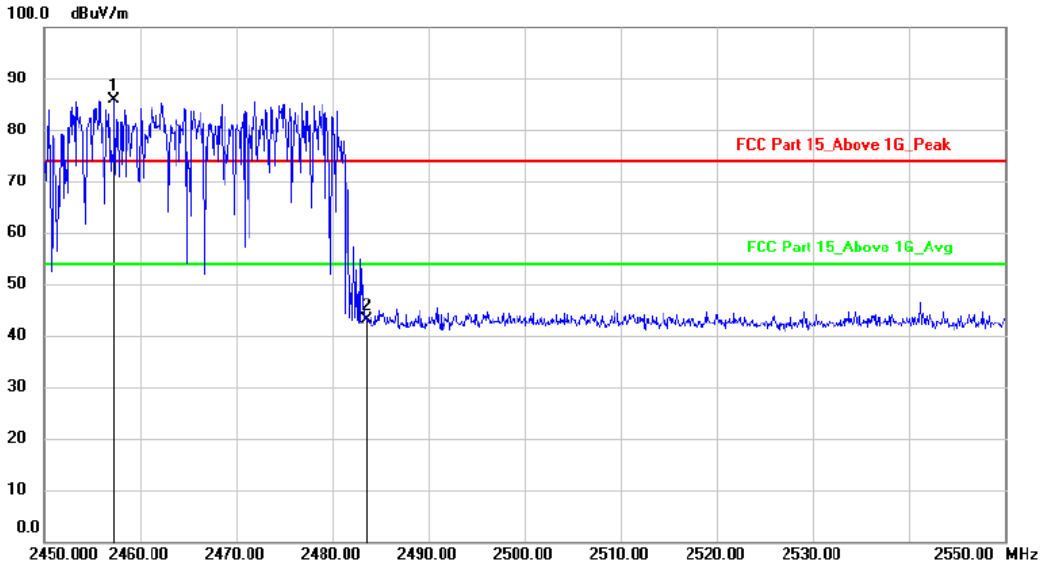
hopping-on

Polarization: Vertical Test Mode: 8DPSK-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	*	2480.200	90.69	-3.38	87.31	74.00	13.31	peak			
2		2483.500	51.45	-3.38	48.07	74.00	-25.93	peak			

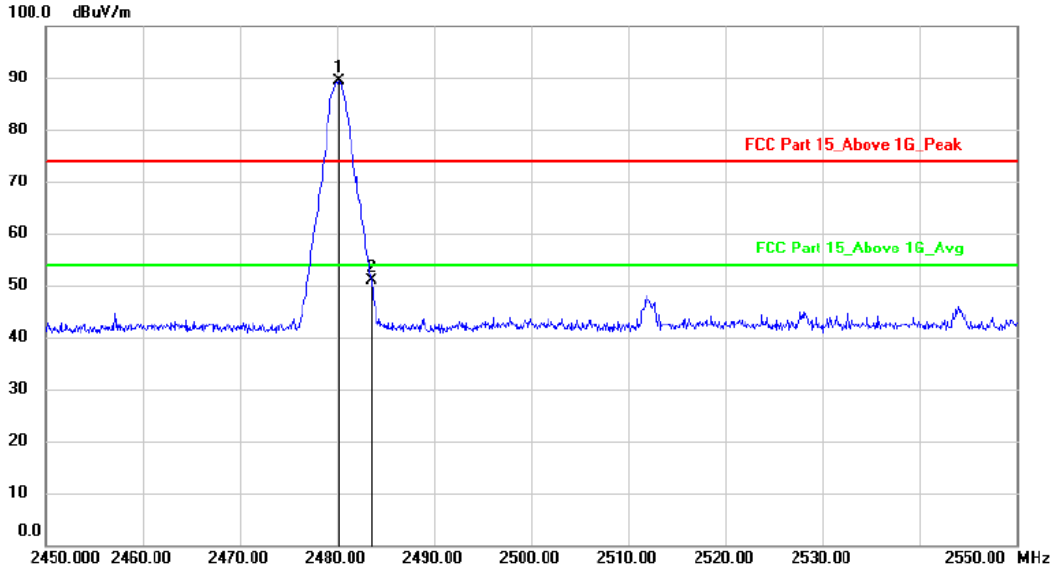
hopping-off



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	*	2457.300	89.31	-3.39	85.92	74.00	11.92	peak			
2		2483.500	46.50	-3.38	43.12	74.00	-30.88	peak			

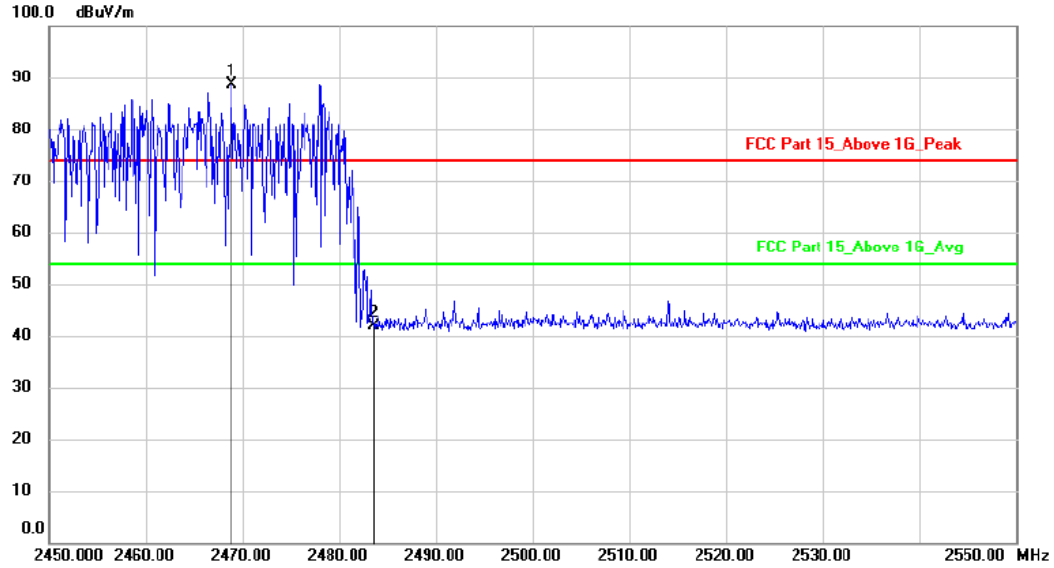
hopping-on

Polarization: Horizontal Test Mode: 8DPSK-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	*	2480.200	92.74	-3.38	89.36	74.00	15.36	peak			
2		2483.500	54.02	-3.38	50.64	74.00	-23.36	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	*	2468.800	92.56	-3.39	89.17	74.00	15.17	peak			
2		2483.500	45.36	-3.38	41.98	74.00	-32.02	peak			

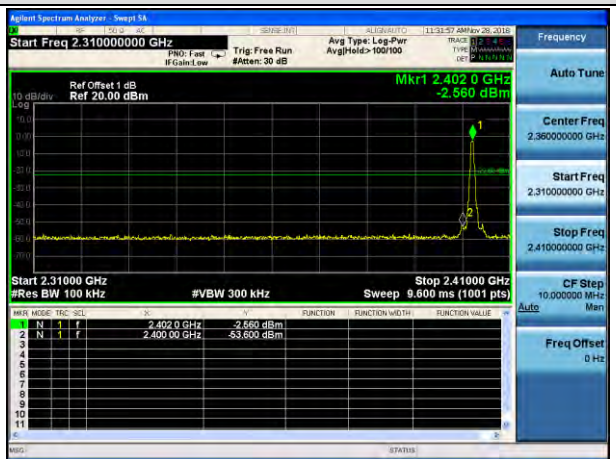
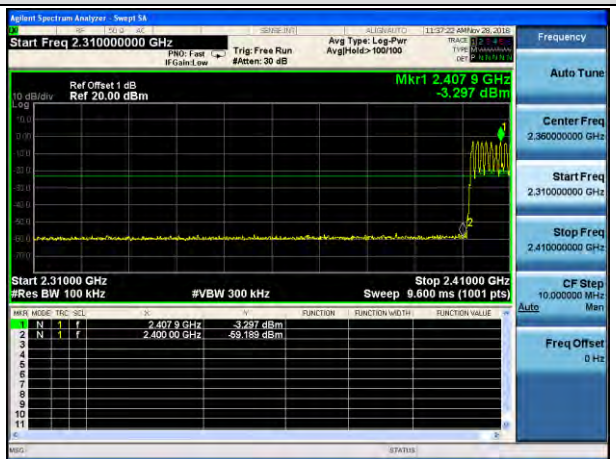
hopping-on

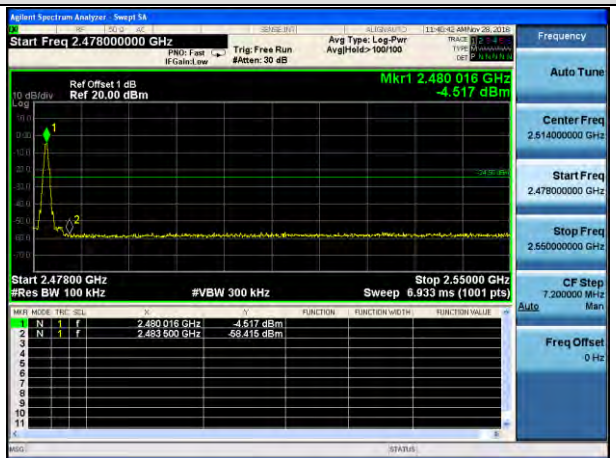
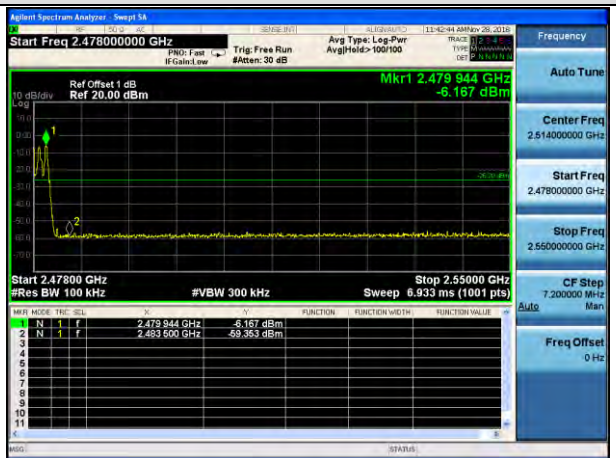
Note: 1. *:Maximum data; x:Over limit; !:over margin.

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

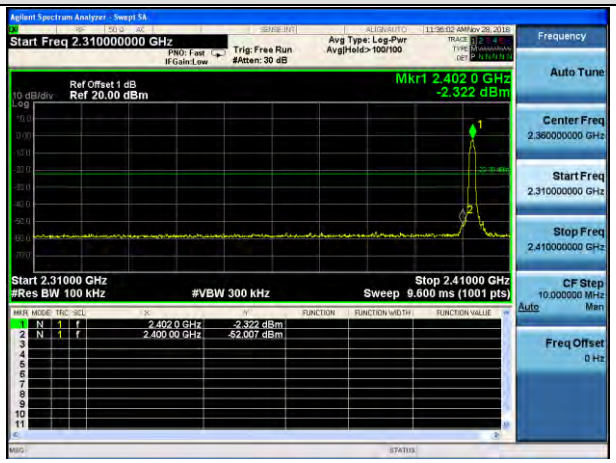
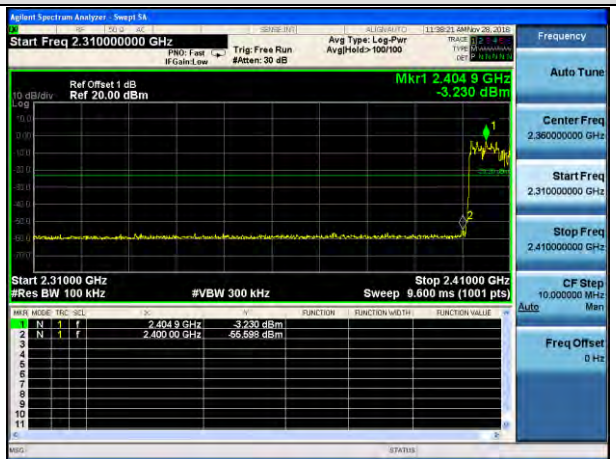
Conducted Method

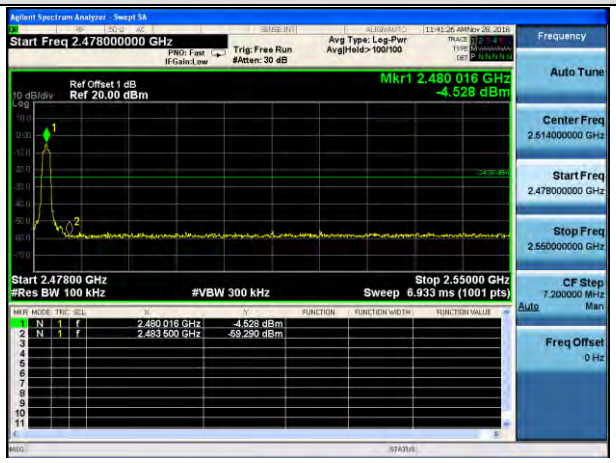
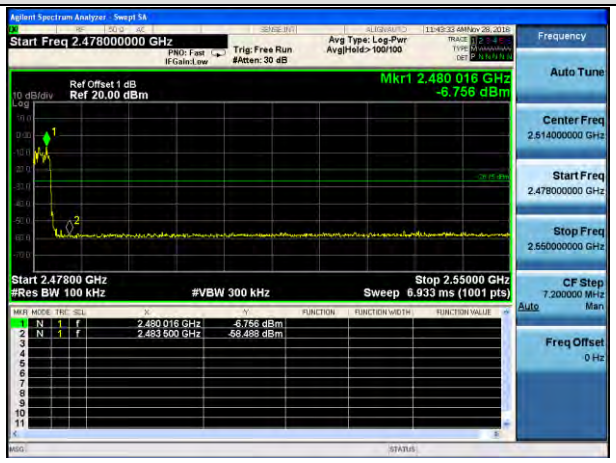
GFSK Mode:

Test channel:	Lowest channel
	
No-hopping mode	Hopping mode

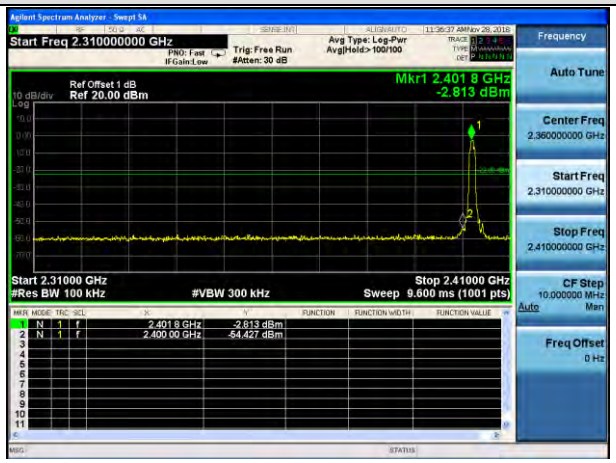
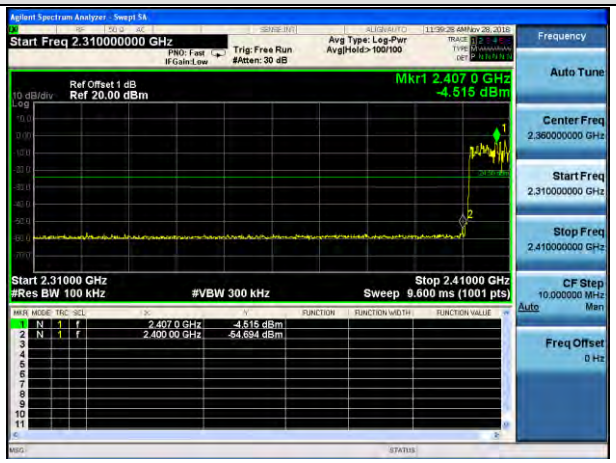
Test channel:	Highest channel
	
No-hopping mode	Hopping mode

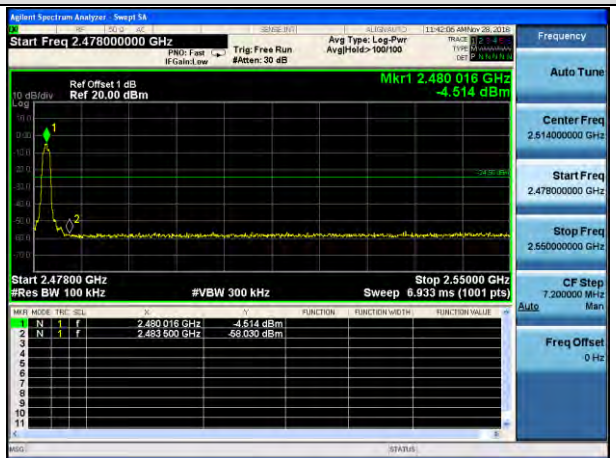
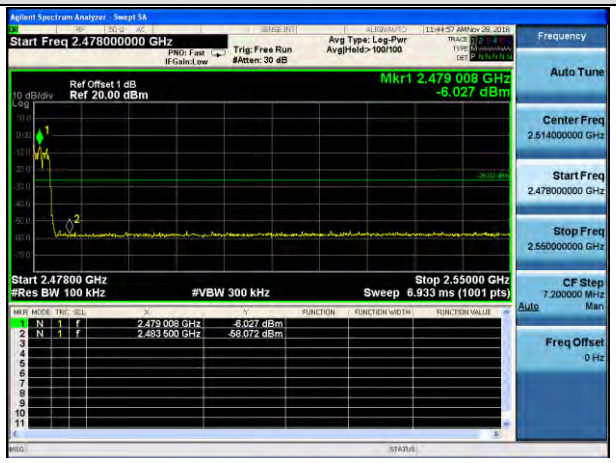
Pi/4QPSK Mode:

Test channel:	Lowest channel
	
No-hopping mode	Hopping mode

Test channel:	Highest channel
	
No-hopping mode	Hopping mode

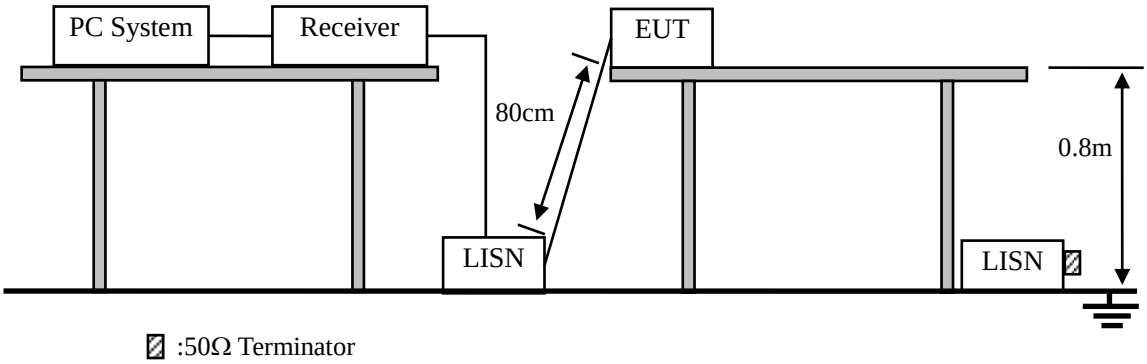
8DPSK Mode:

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.

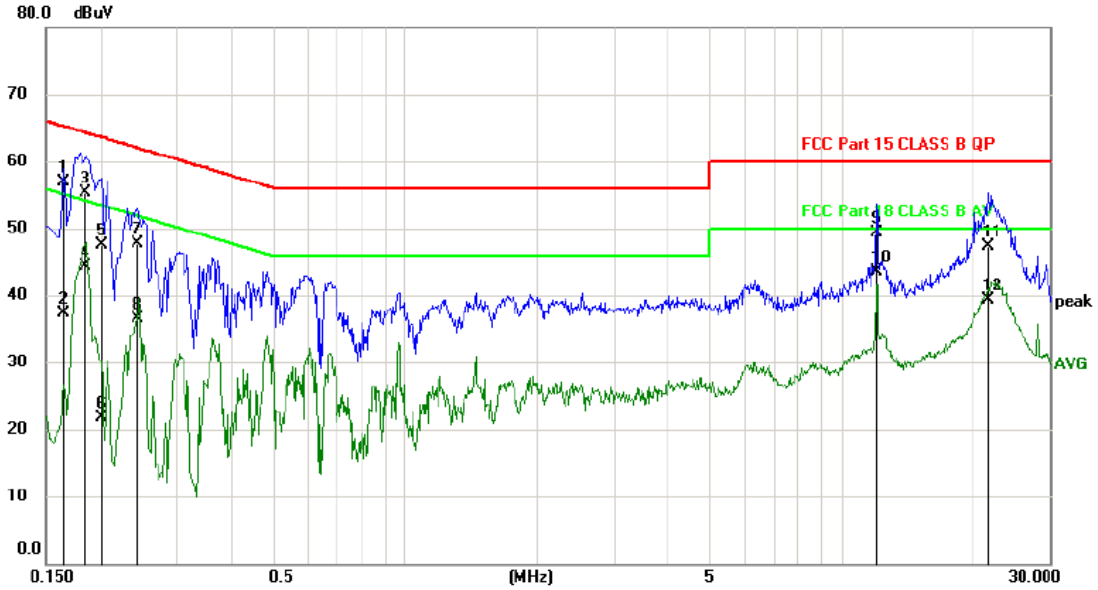
10.4. Test Result

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

Test Voltage： AC 120V/60Hz

Line:



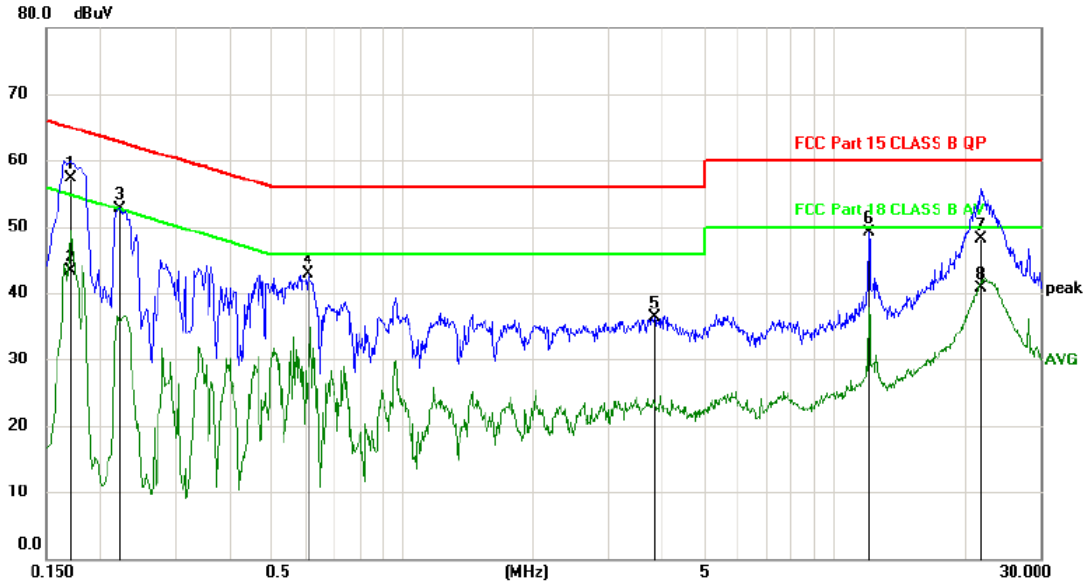
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1650	47.10	9.73	56.83	65.21	-8.38	QP	
2		0.1650	27.65	9.73	37.38	55.21	-17.83	AVG	
3		0.1835	45.52	9.74	55.26	64.33	-9.07	QP	
4		0.1835	34.62	9.74	44.36	54.33	-9.97	AVG	
5		0.2010	37.67	9.74	47.41	63.57	-16.16	QP	
6		0.2010	12.03	9.74	21.77	53.57	-31.80	AVG	
7		0.2430	37.92	9.75	47.67	61.99	-14.32	QP	
8		0.2430	26.70	9.75	36.45	51.99	-15.54	AVG	
9		12.0540	38.90	10.34	49.24	60.00	-10.76	QP	
10	*	12.0540	33.07	10.34	43.41	50.00	-6.59	AVG	
11		21.6780	36.72	10.57	47.29	60.00	-12.71	QP	
12		21.6780	28.82	10.57	39.39	50.00	-10.61	AVG	

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

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

Test Voltage： AC 120V/60Hz

Neutral:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1710	47.58	9.73	57.31	64.91	-7.60	QP	
2		0.1710	33.58	9.73	43.31	54.91	-11.60	AVG	
3		0.2220	42.90	9.75	52.65	62.74	-10.09	peak	
4		0.6060	33.14	9.79	42.93	56.00	-13.07	peak	
5		3.8370	26.26	10.11	36.37	56.00	-19.63	peak	
6		12.0540	38.69	10.34	49.03	60.00	-10.97	peak	
7		21.8160	37.48	10.59	48.07	60.00	-11.93	QP	
8		21.8160	30.06	10.59	40.65	50.00	-9.35	AVG	

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

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

Remark: All modes have been tested, and only worst data of BT Link and Lighting was listed in this report.

11. ANTENNA REQUIREMENTS

11.1. Limit

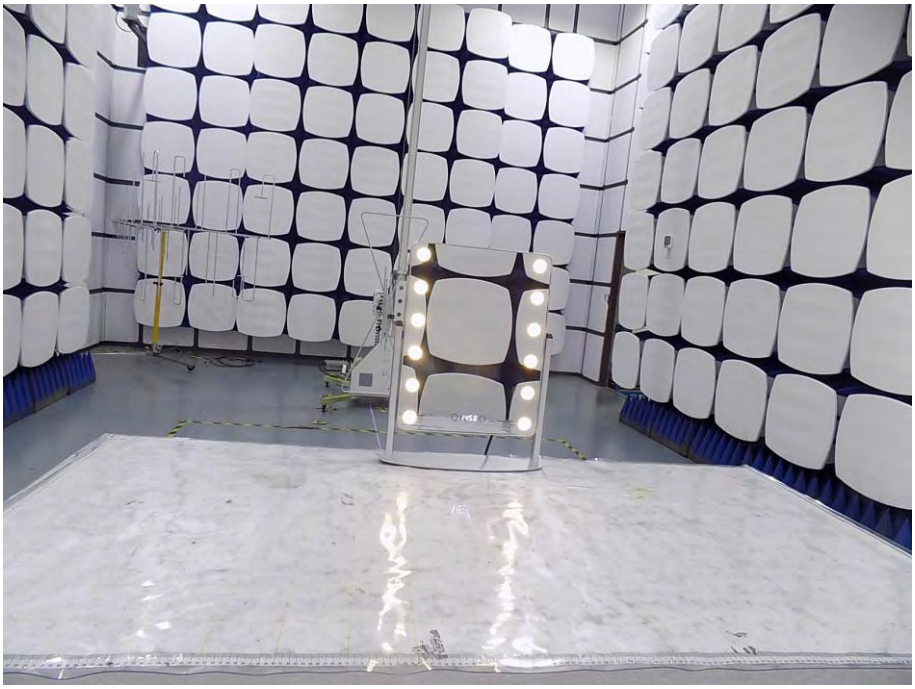
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional 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.

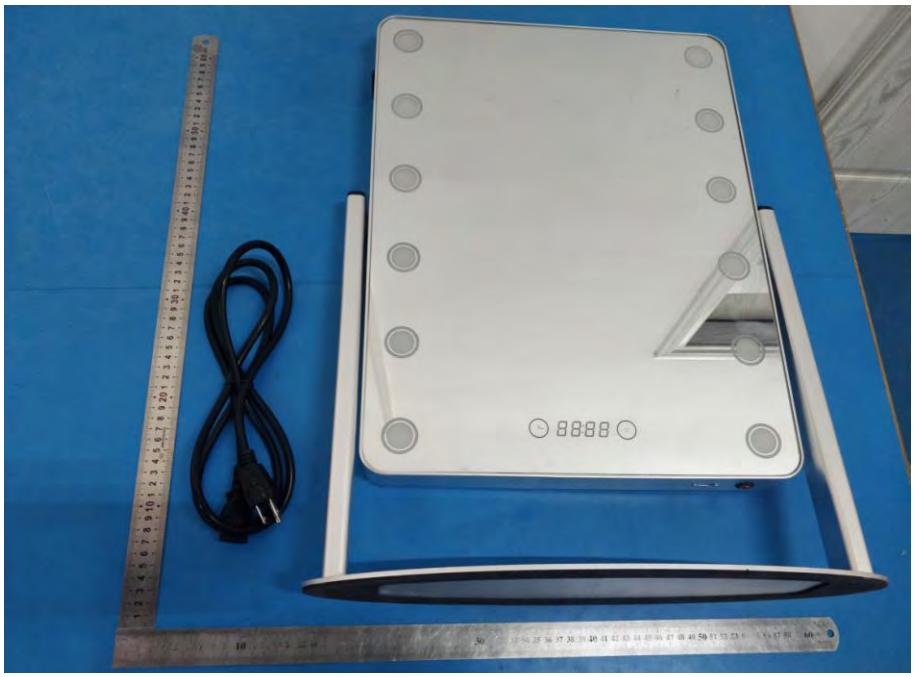
12. TEST SETUP PHOTO

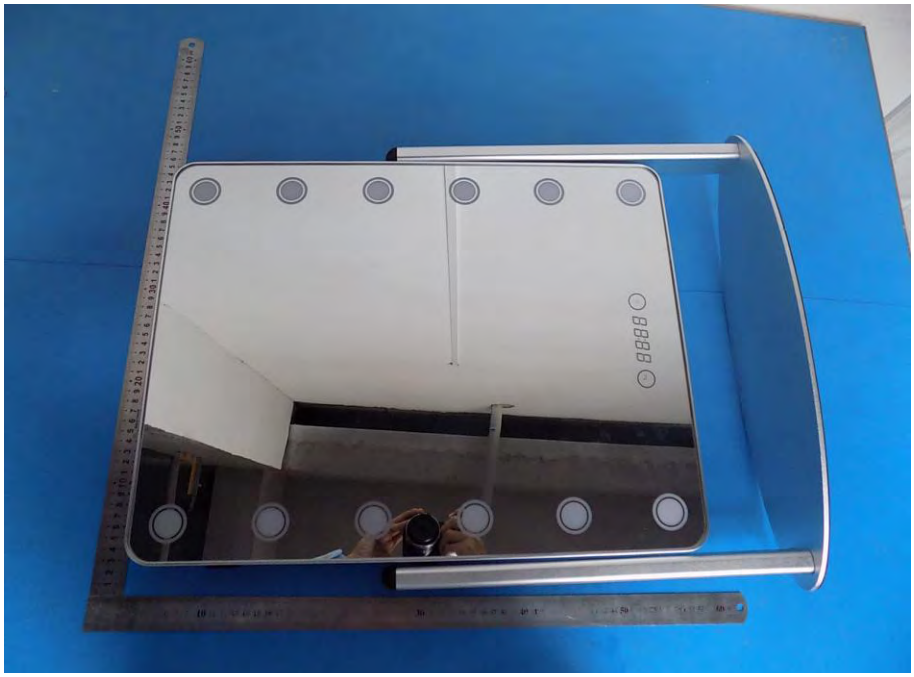
12.1. Photos of Radiated emission

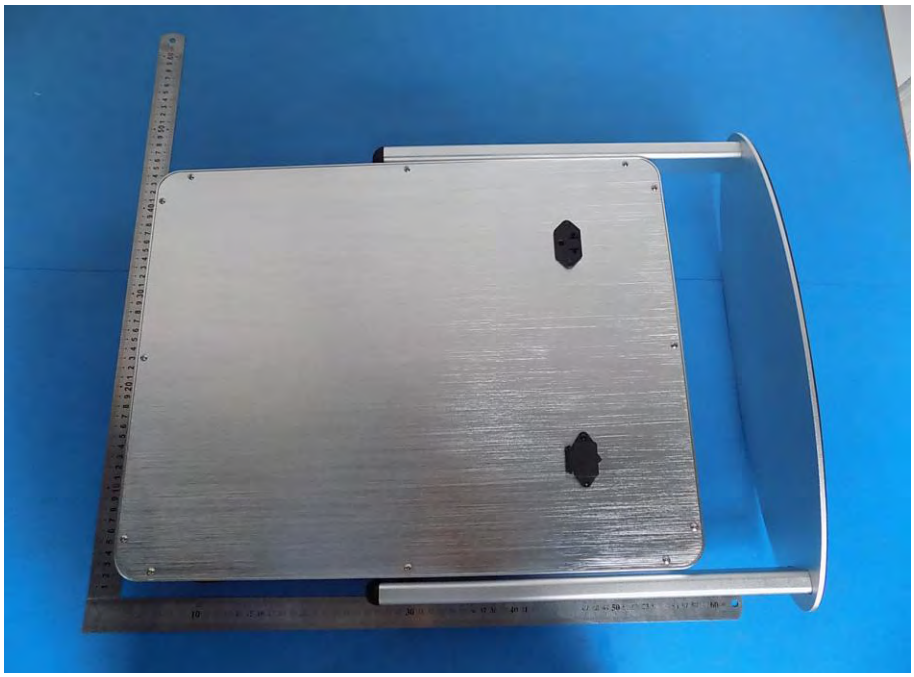


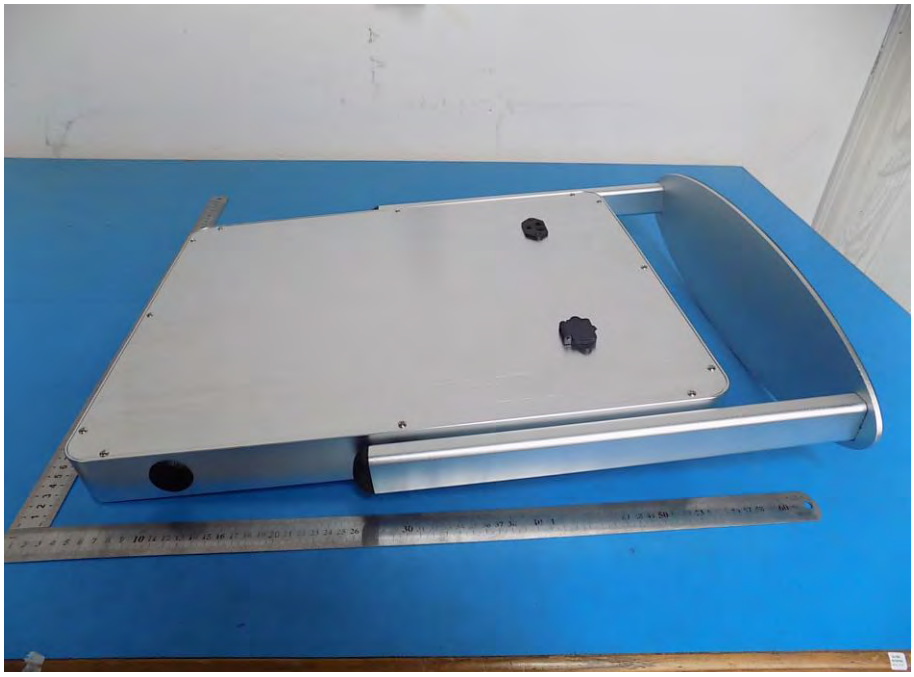
12.2.Photos of Conducted Emission test

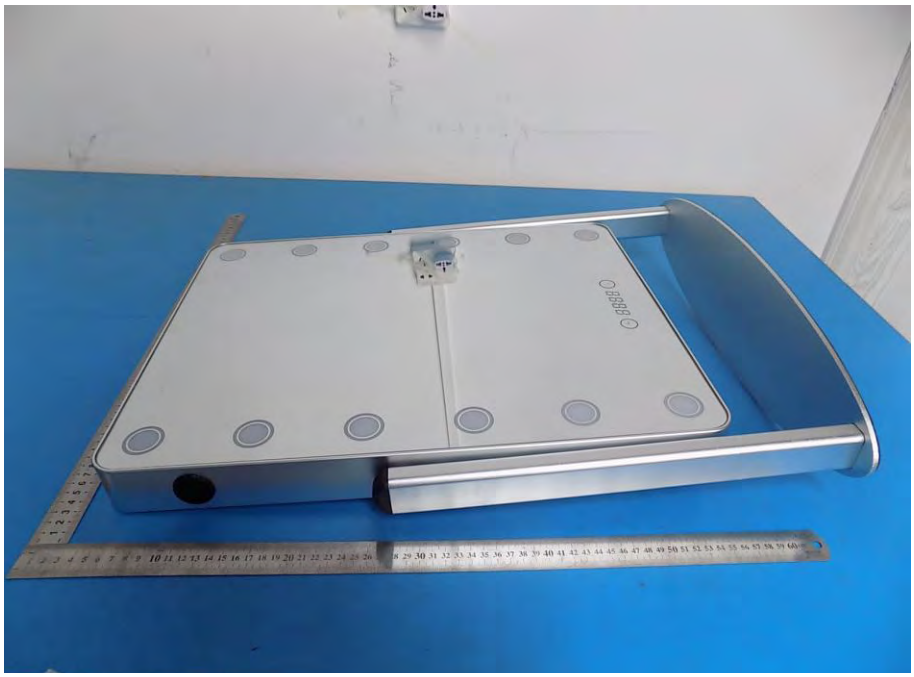
13. PHOTOS OF EUT

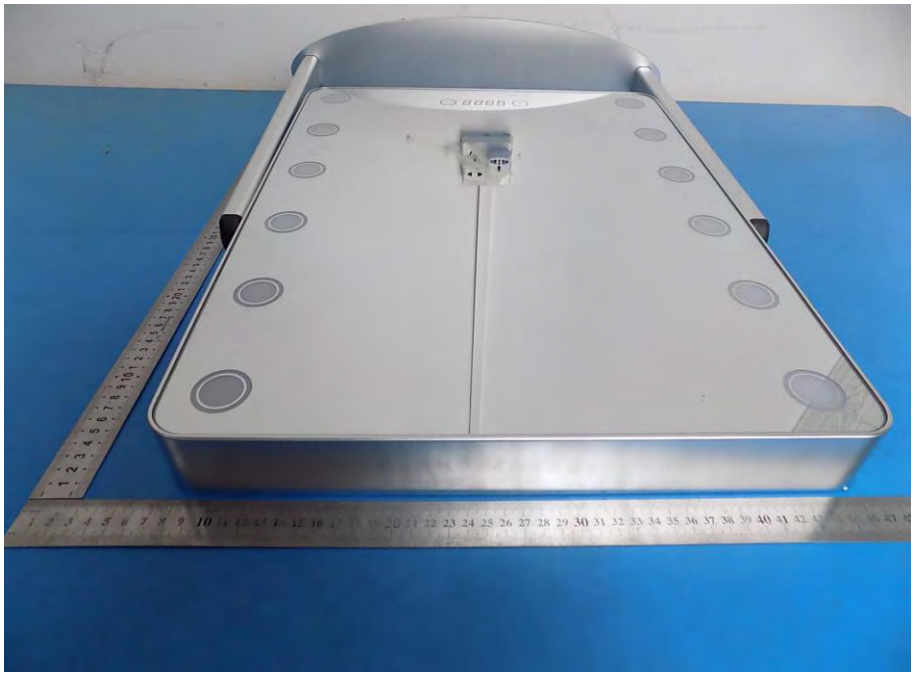


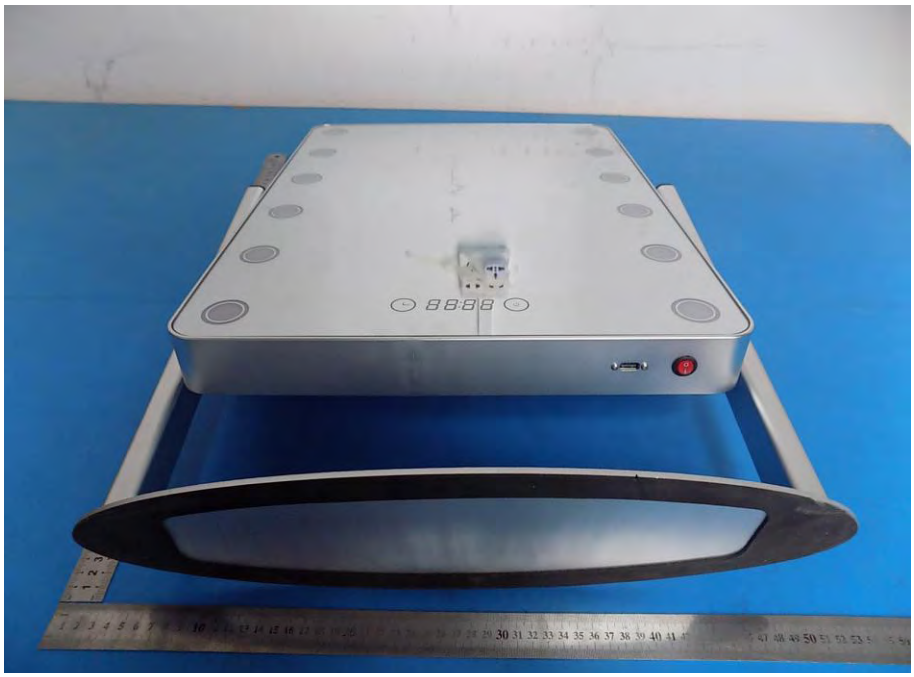


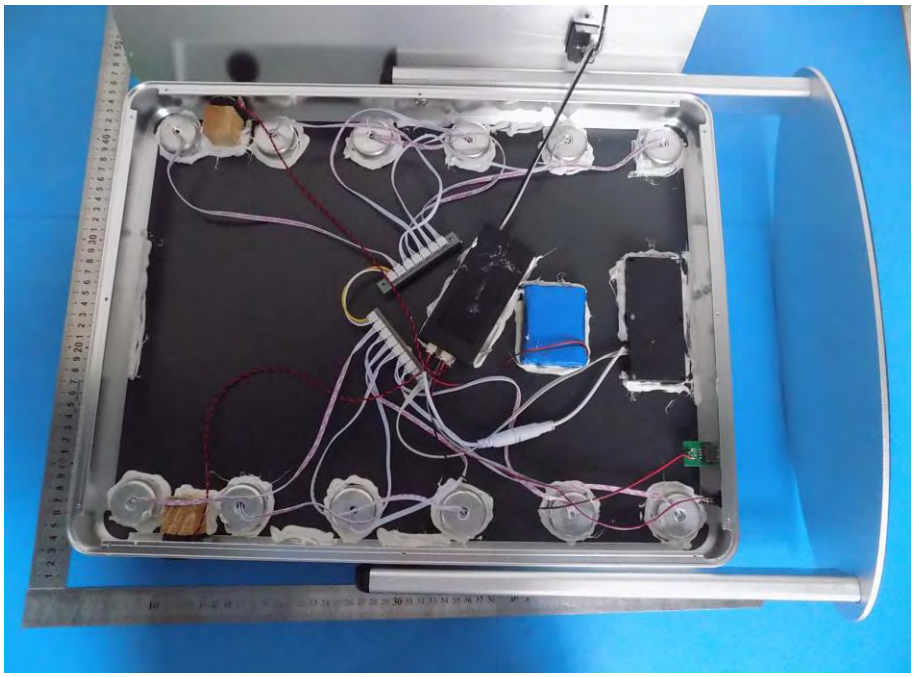


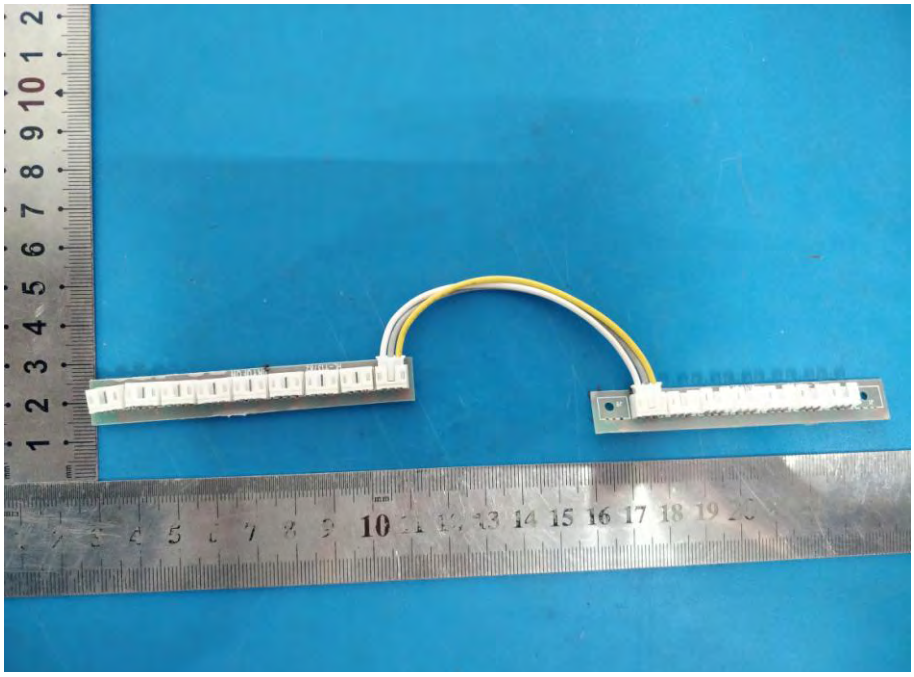


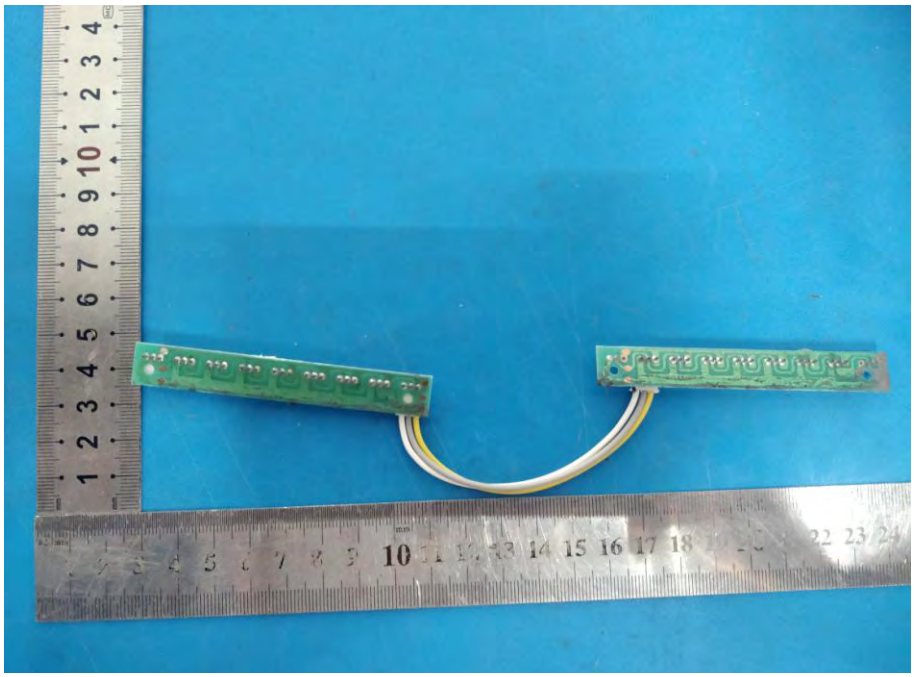


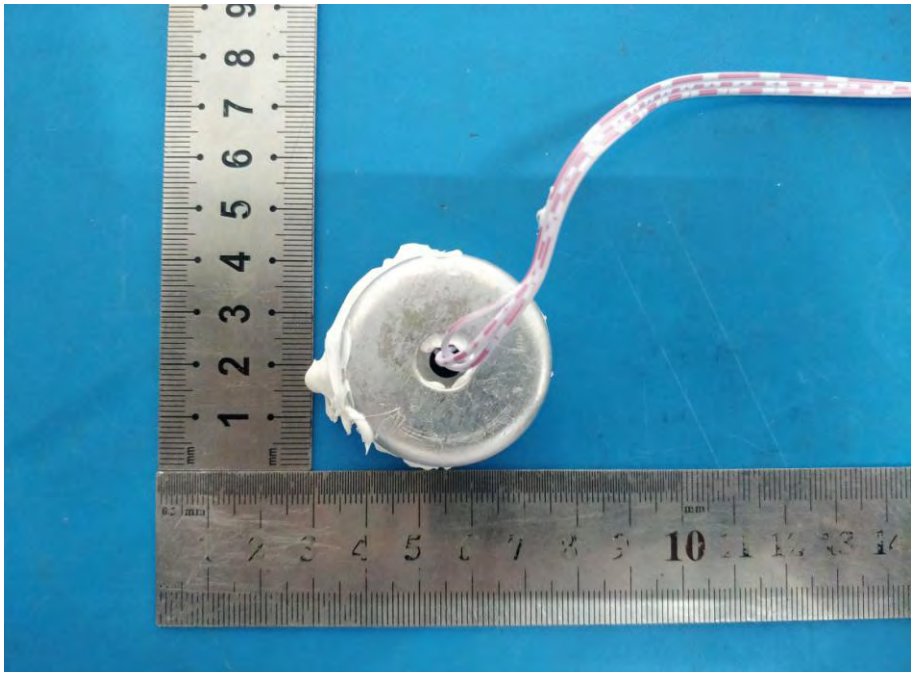




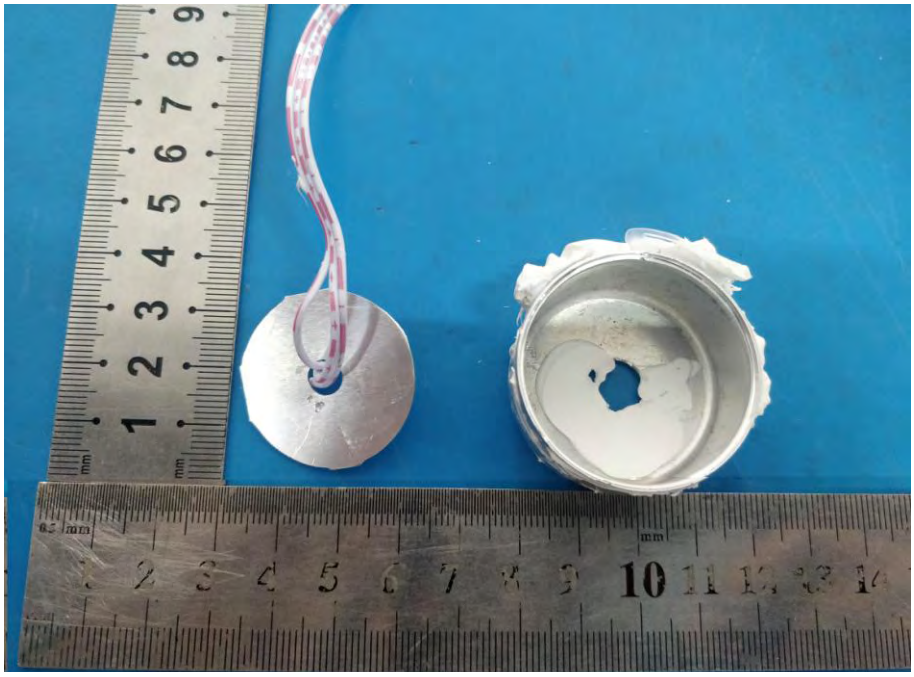


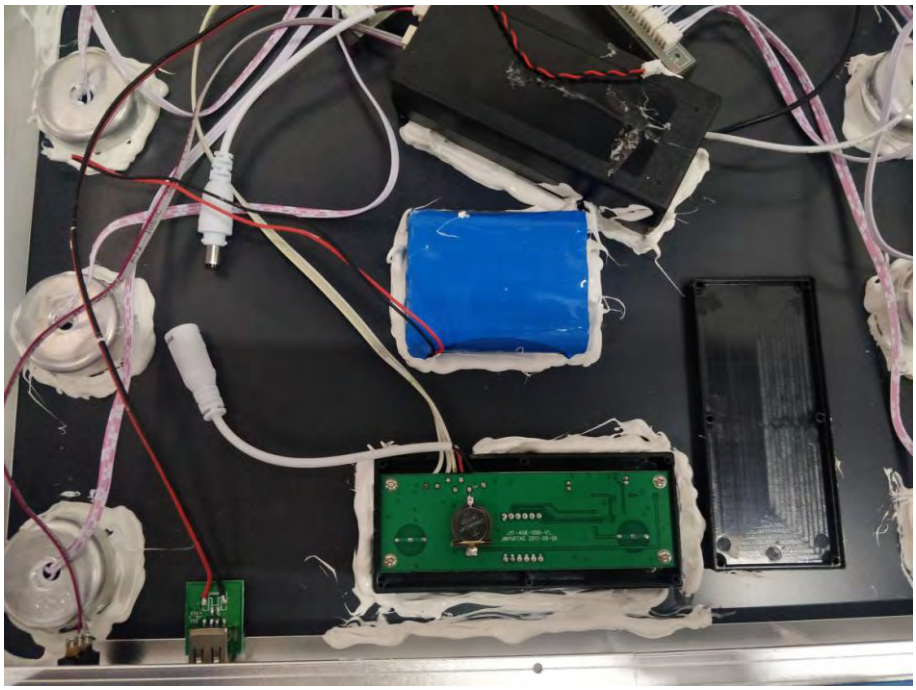


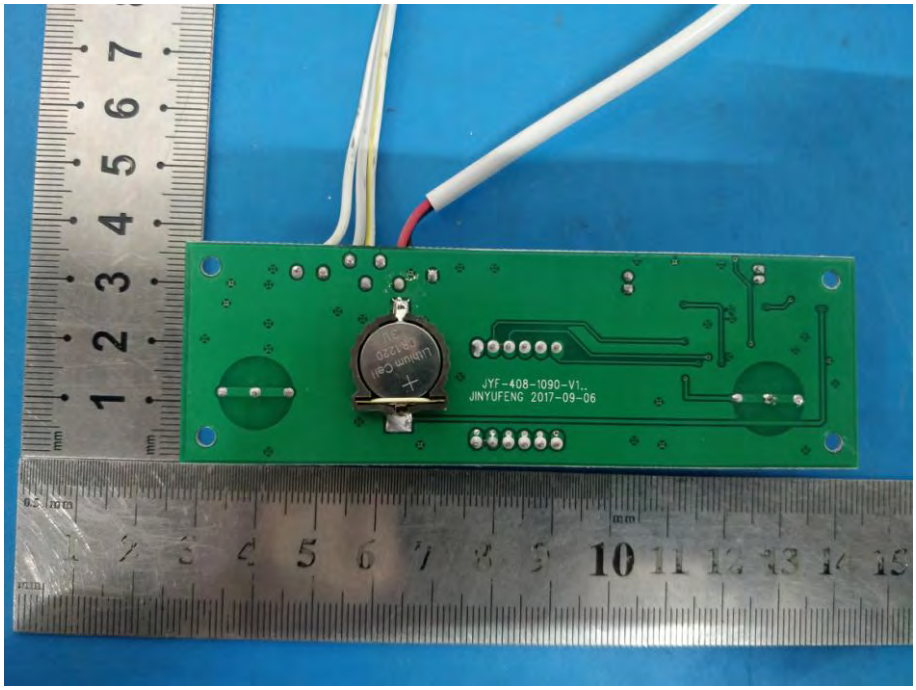




12V



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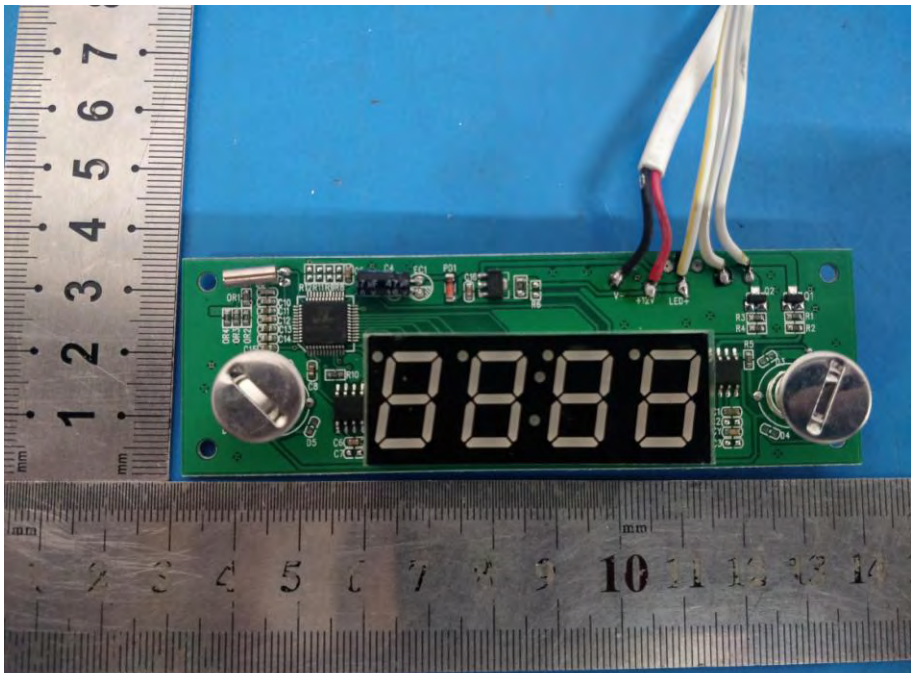

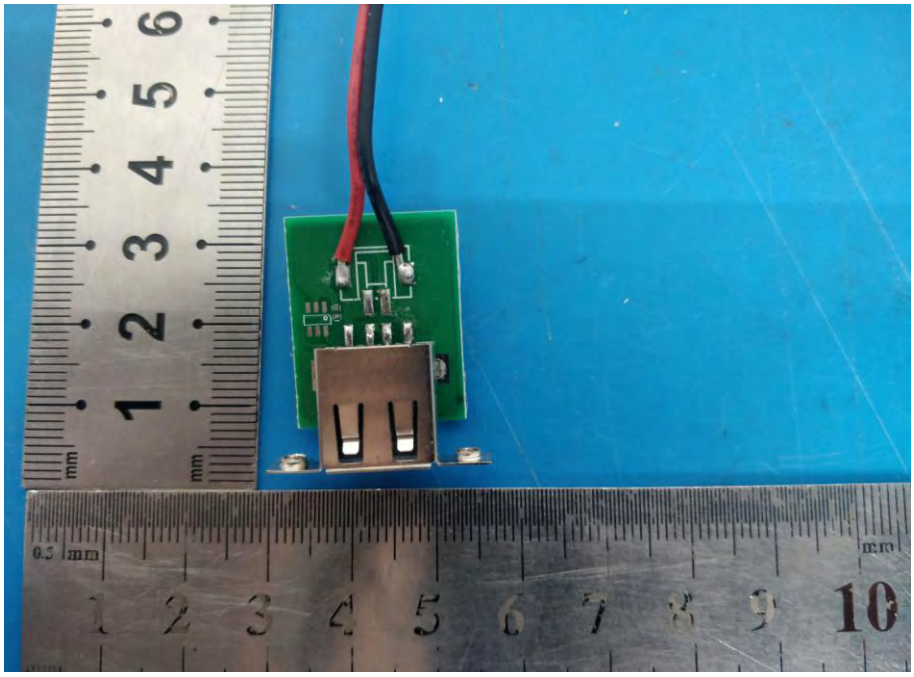

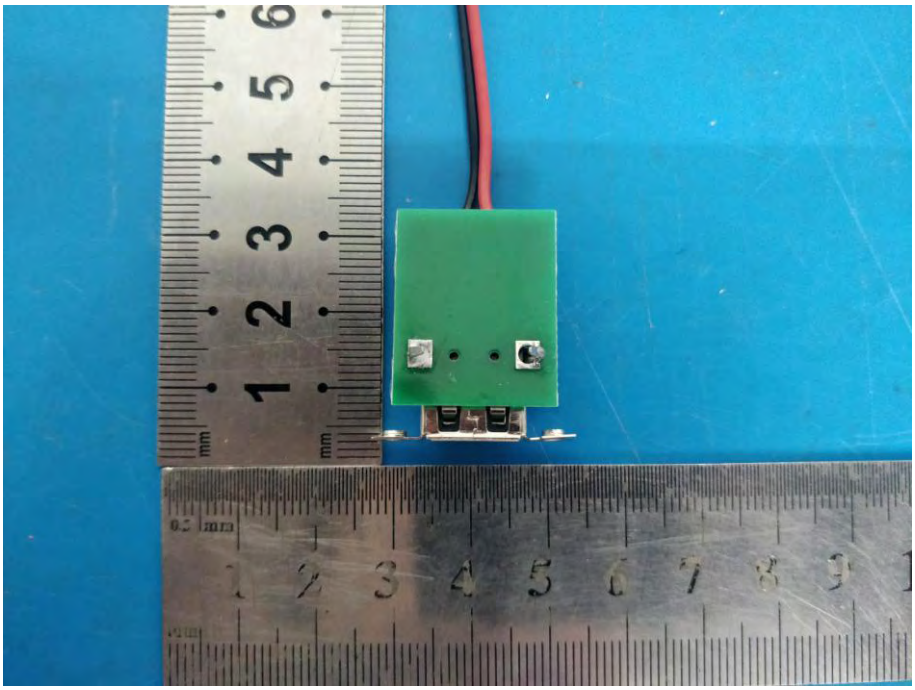

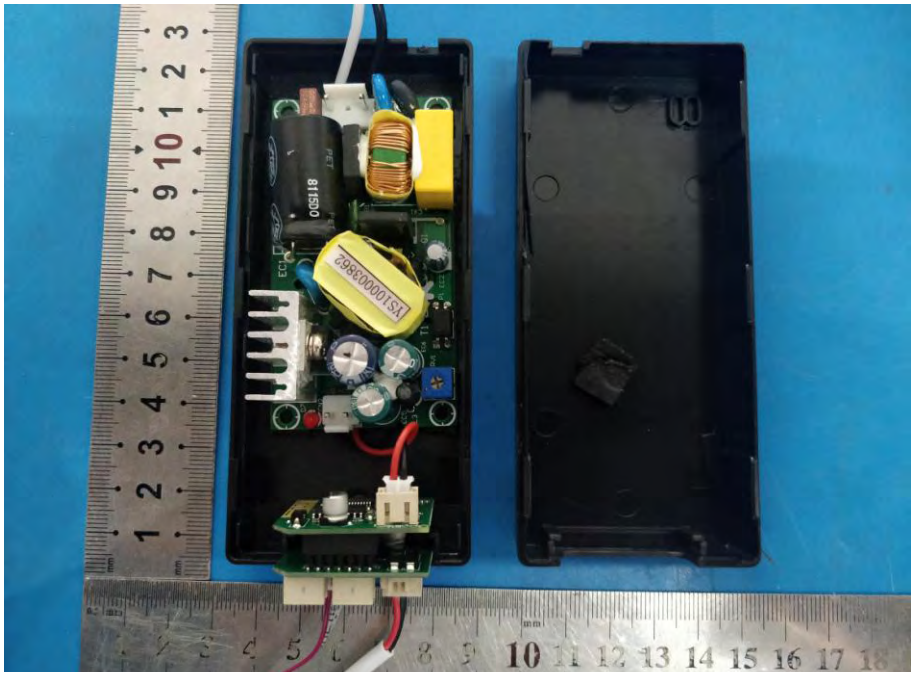

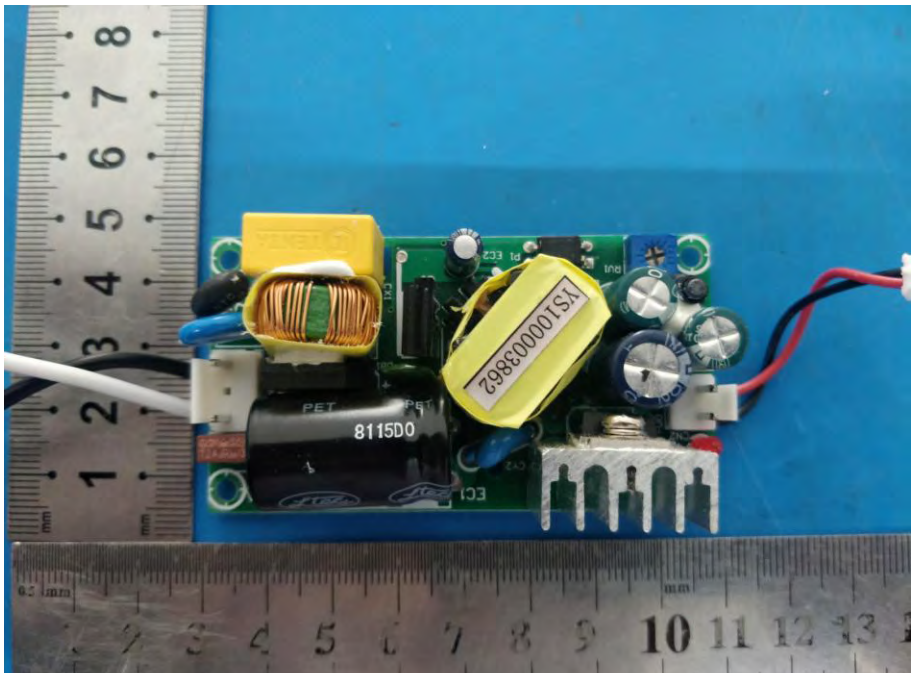
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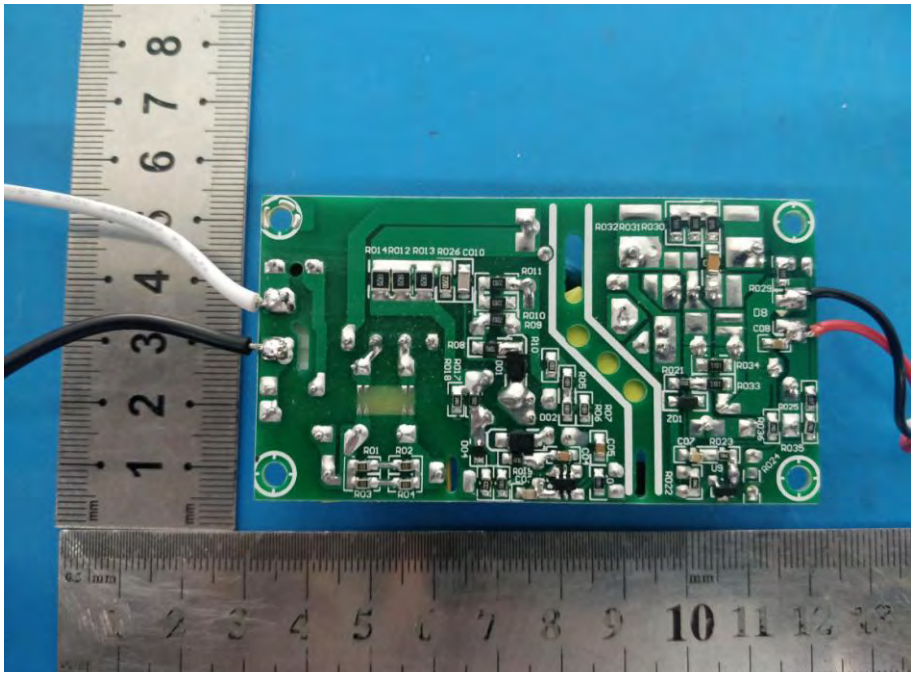

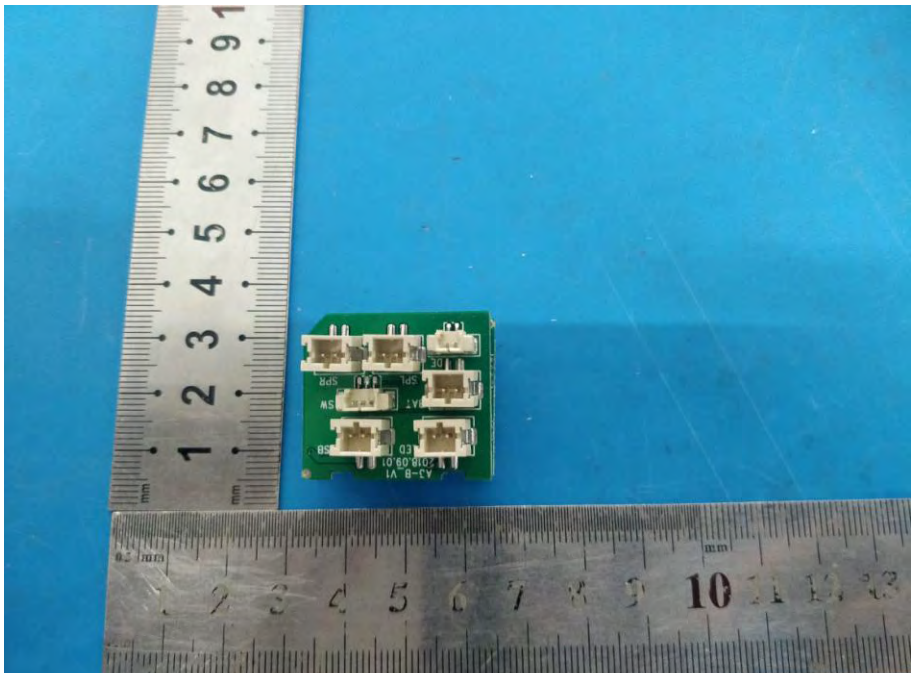
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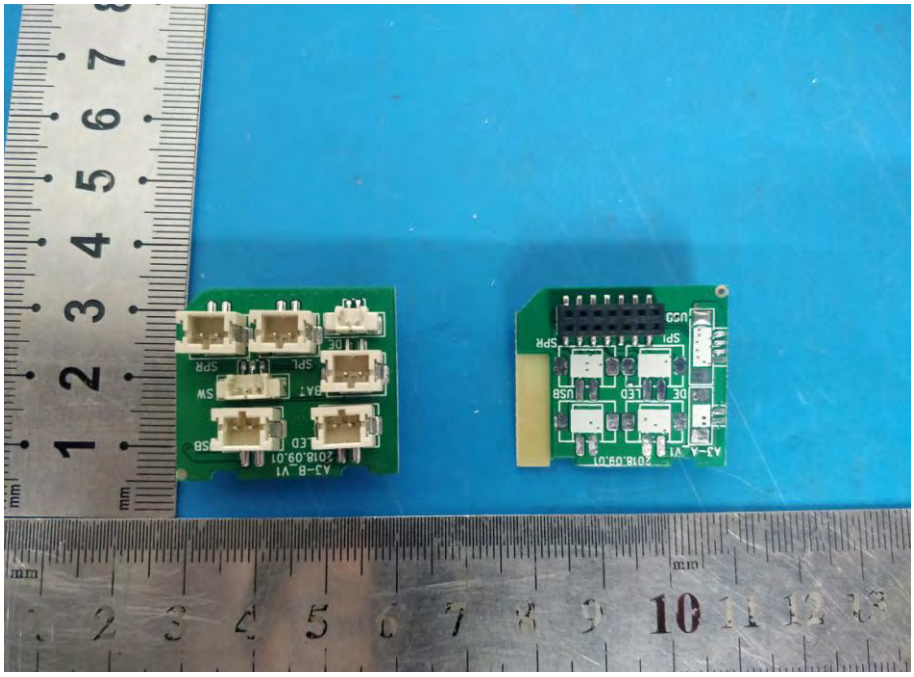
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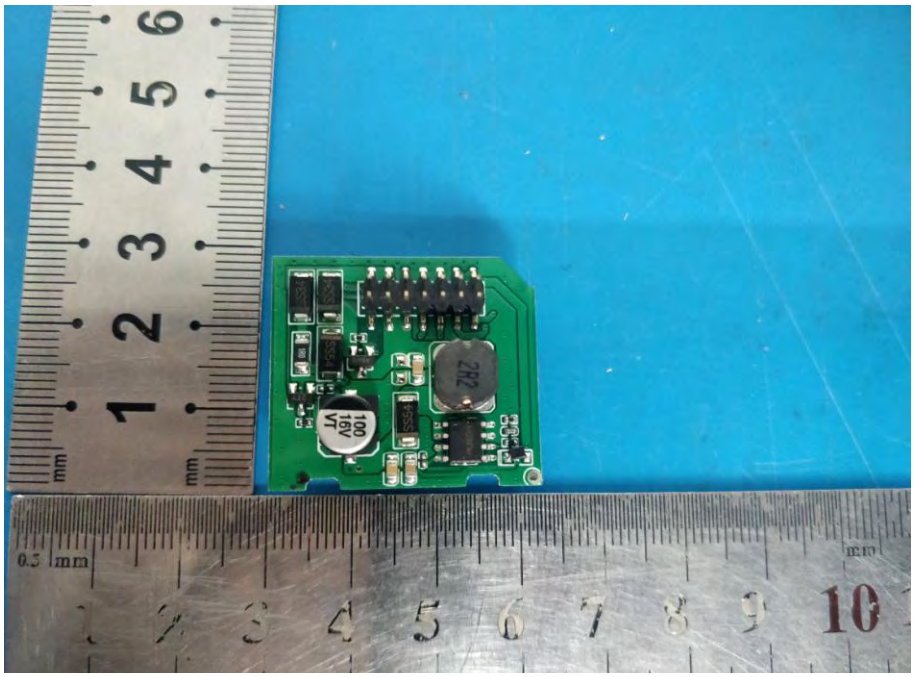
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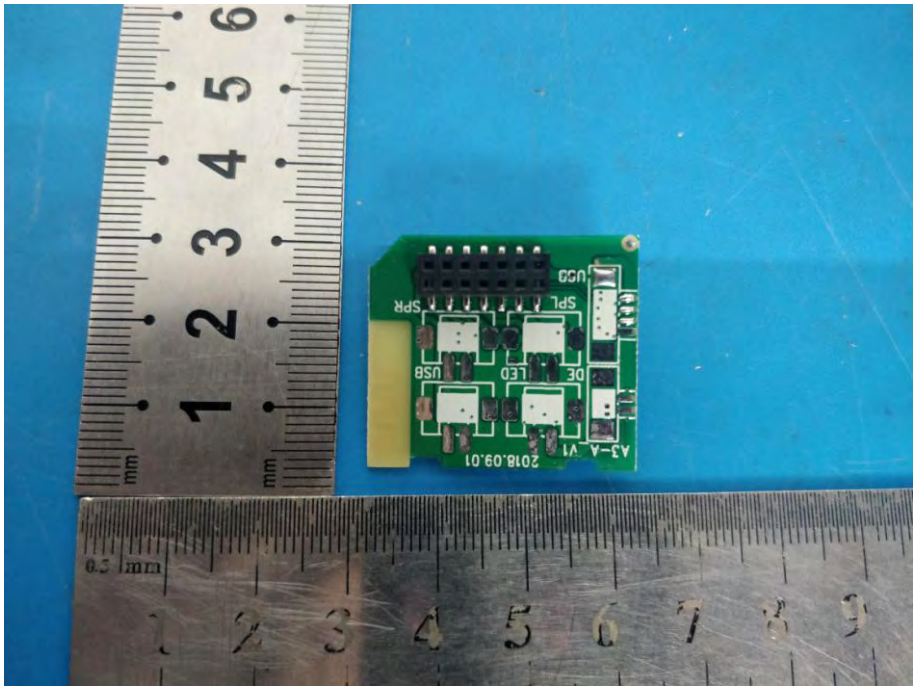
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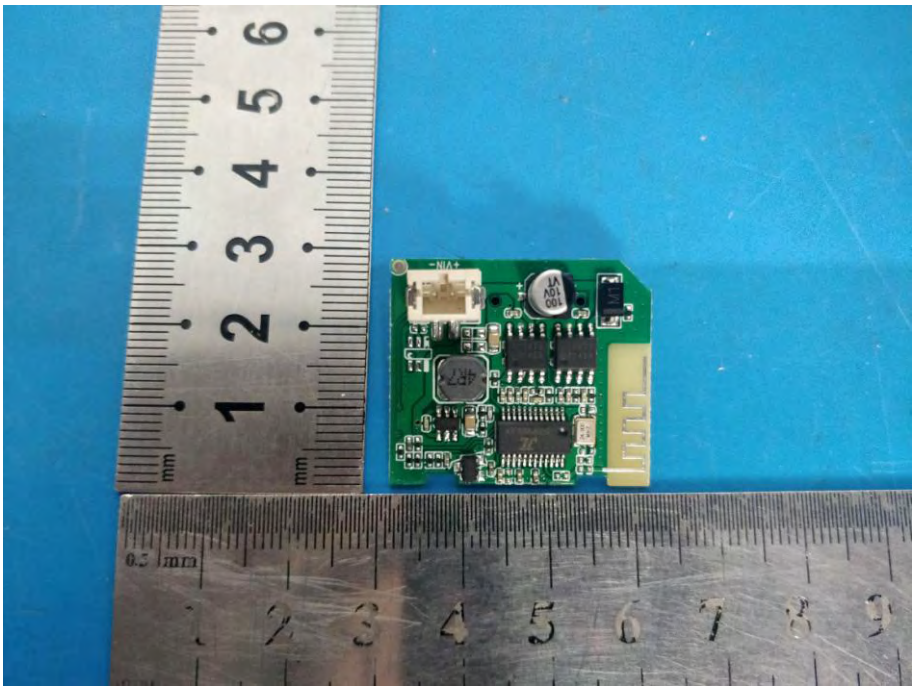

---------THE END OF REPORT-------