APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Qingping Technology (Beijing) Co., Ltd.

Qingping Door/Window Contact Sensor
Model No.: CGH1

FCC ID: 2AQ3F-CGH1

Prepared for	:	Qingping Technology (Beijing) Co., Ltd.
Address	:	Room 401, Block B, Fangheng Times Square, NO.10 Wangjing Street, Chaoyang District, Bejing, China
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
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Report No.	:	ATE20200083
Date of Test	:	February 18-19, 2020
Date of Report	:	February 19, 2020

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Description Page

Test Report Certification

Applicant	:	Qingping Technology (Beijing) Co., Ltd.
Manufacturer	:	Guangdong Creator & FlyAudio Electronic Technology Co., Ltd.
EUT Description	:	Qingping Door/Window Contact Sensor
Model No.	:	CGH1
Trade Mark	:	qingping

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10: 2013

The EUT was tested according to DTS test procedure of August 24, 2018 KDB558074 D01 DTS Meas Guidance v05 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by Shenzhen Accurate Technology 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 Section 15.247 limits. The measurement results are contained in this test report and Shenzhen Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Accurate Technology Co., Ltd.

Date of Test :	February 18-19, 2020
Date of Report :	February 19, 2020

Test Engineer : _____
(Bob Wang, Engineer)

Prepared by : _____
(Bob Wang, Engineer)

Approved & Authorized Signer : _____
(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

Model Number	:	CGH1
Bluetooth version	:	V5.0 (BLE 1Mbps+2Mbps)
Frequency Range	:	2402MHz-2480MHz
Number of Channels	:	40
Antenna Gain(Max)	:	0dBi
Antenna type	:	PCB Antenna
Modulation mode	:	GFSK
Power supply	:	DC 3V
Trade Mark	:	qingping
Applicant	:	Qingping Technology (Beijing) Co., Ltd.
Address	:	Room 401, Block B, Fangheng Times Square, NO.10 Wangjing Street, Chaoyang District, Bejing, China
Manufacturer	:	Guangdong Creator & FlyAudio Electronic Technology Co., Ltd.
Address	:	Floor 1&3&4, Building D1, The 3rd Industrial Zone, Banxianshan, Hengli Town, Dongguan, Guangdong, P.R.China

1.2.Carrier Frequency of Channels

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

1.3.Special Accessory and Auxiliary Equipment

N/A

1.4.Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISEDC) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd.
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.5.Measurement Uncertainty

Radiated emission expanded uncertainty (9kHz-30MHz)	:	U=2.66dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	:	U=4.28dB, k=2
Radiated emission expanded uncertainty (1G-18GHz)	:	U=4.98dB, k=2
Radiated emission expanded uncertainty (18G-26.5GHz)	:	U=5.06dB, k=2
Conduction Emission Expanded Uncertainty (Mains ports, 9kHz-30MHz)	:	U=2.72dB, k=2
Conduction Emission Expanded Uncertainty (Telecommunication ports, 150kHz-30MHz)	:	U=2.94dB, k=2
Power disturbance Expanded Uncertainty	:	U=2.92dB, k=2
Harmonic current expanded uncertainty	:	U=0.512%, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 04, 2020	One Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 04, 2020	One Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 04, 2020	One Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 04, 2020	One Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 04, 2020	One Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 04, 2020	One Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 04, 2020	One Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 04, 2020	One Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	RESENBERGER	N-12m	No.11	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	RESENBERGER	N-0.5m	No.12	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-2m	No.13	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-0.5m	No.15	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-2m	No.16	Jan. 04, 2020	One Year
RF Coaxial Cable (Radiated Emission)	RESENBERGER	N-6m	No.17	Jan. 04, 2020	One Year
Radiated Emission Measurement Software: EZ_EMC V1.1.4.2					

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: **Transmitting mode**

Low Channel: 2402MHz
Middle Channel: 2440MHz
High Channel: 2480MHz

Note: The equipment under test (EUT) was tested under new battery.
The Bluetooth has been tested under continuous transmission mode.
Its duty cycle setting is greater than 98%.

3.2.Configuration and peripherals

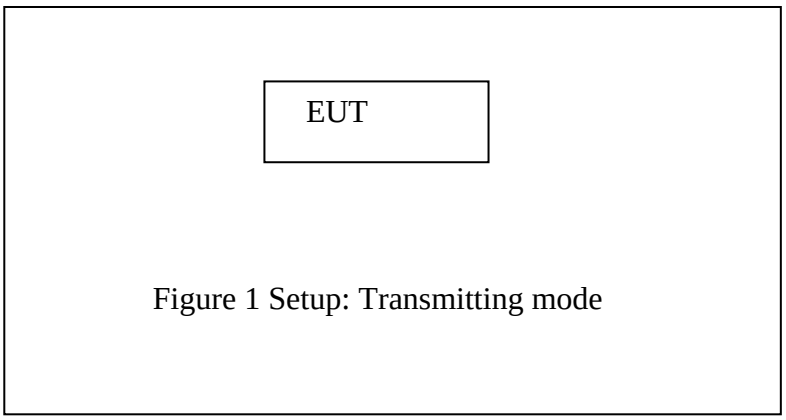


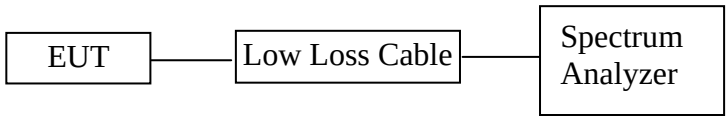
Figure 1 Setup: Transmitting mode

4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	N/A
Section 15.203	Antenna Requirement	Compliant

5. 6DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



5.2.The Requirement For Section 15.247(a)(2)

Section 15.247(a)(2): Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.3.EUT Configuration on Test

The equipment is installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

5.5.Test Procedure

5.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

5.5.3.The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

5.6.Test Result

Test Lab: Shielding room
Test Engineer: Bob

BLE 1Mbps

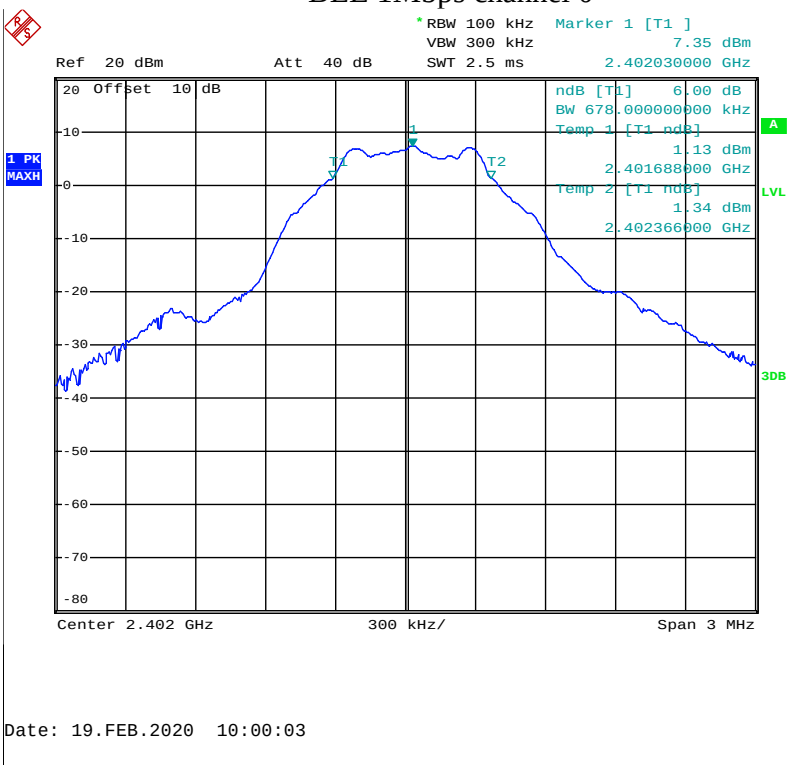
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit(MHz)	Result
0	2402	0.678	0.5	Pass
19	2440	0.678	0.5	Pass
39	2480	0.678	0.5	Pass

BLE 2Mbps

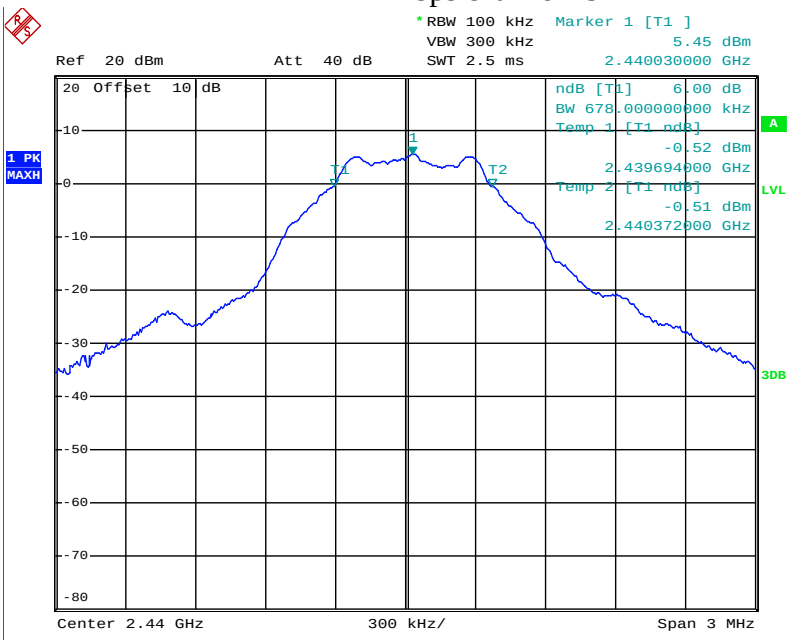
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit(MHz)	Result
0	2402	1.134	0.5	Pass
19	2440	1.146	0.5	Pass
39	2480	1.140	0.5	Pass

The spectrum analyzer plots are attached as below.

BLE 1Mbps channel 0

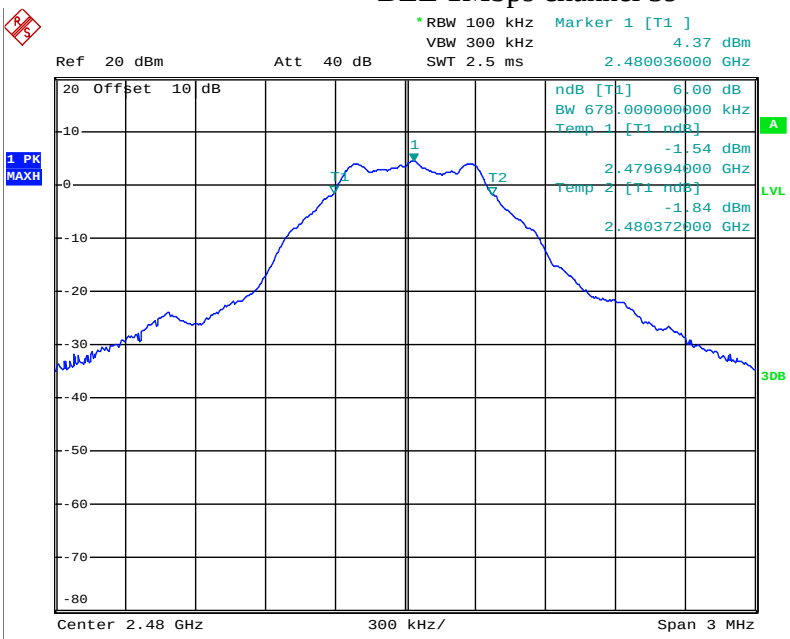


BLE 1Mbps channel 19



Date: 19.FEB.2020 10:00:52

BLE 1Mbps channel 39



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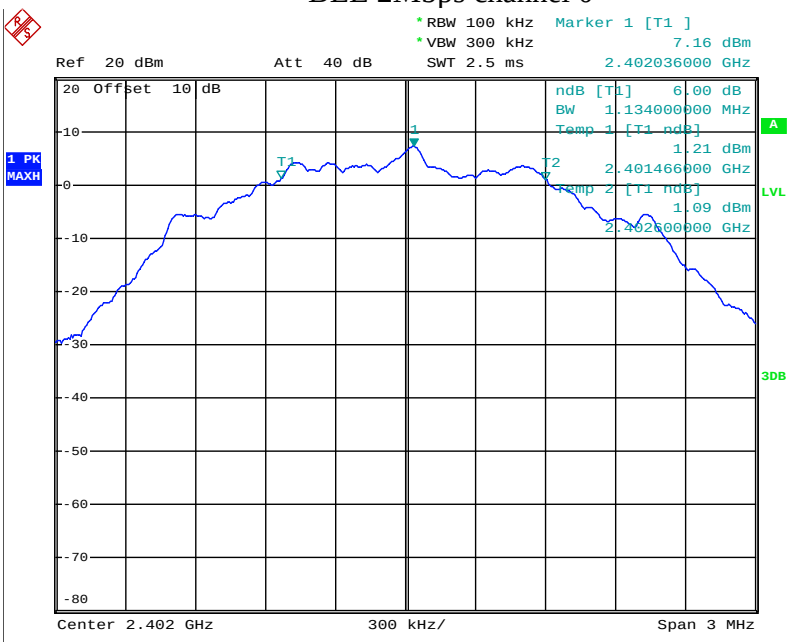
BLE 2Mbps channel 0



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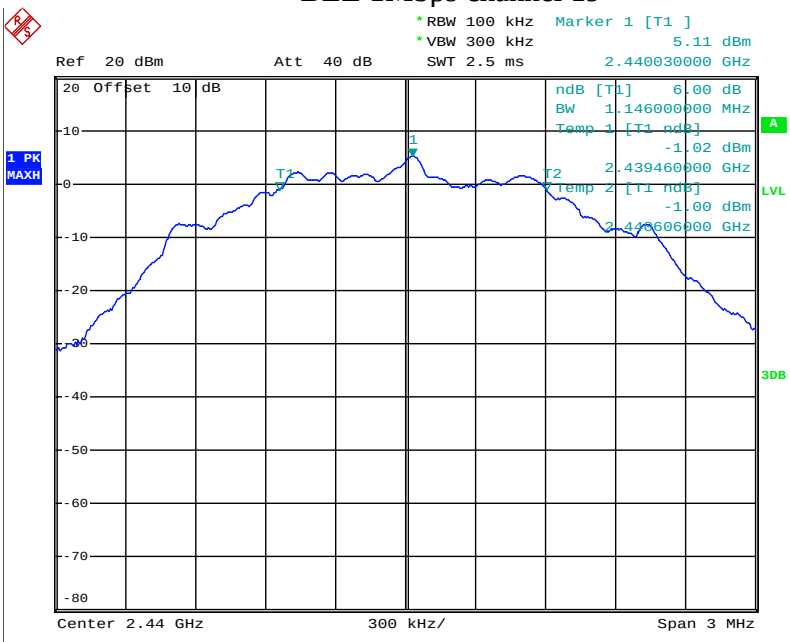
BLE 1Mbps channel 19



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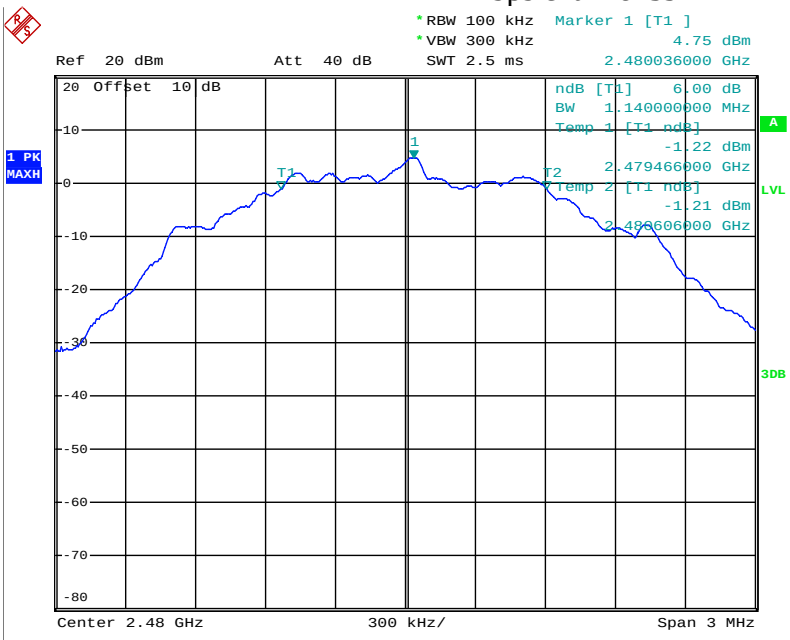
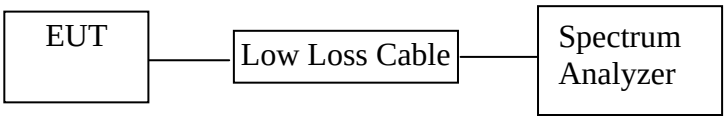
BLE 1Mbps channel 39



6. MAXIMUM PEAK OUTPUT POWER TEST

6.1.Block Diagram of Test Setup



6.2.The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

6.3.EUT Configuration on Test

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

6.5.Test Procedure

6.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2.Set RBW of spectrum analyzer to 3 MHz and VBW to 10MHz(BLE 1Mbps).

6.5.3.Set RBW of spectrum analyzer to 3 MHz and VBW to 10MHz(BLE 2MHz).

6.5.4.Measurement the maximum peak output power.

6.6.Test Result

Test Lab: Shielding room
Test Engineer: Bob
BLE 1Mbps

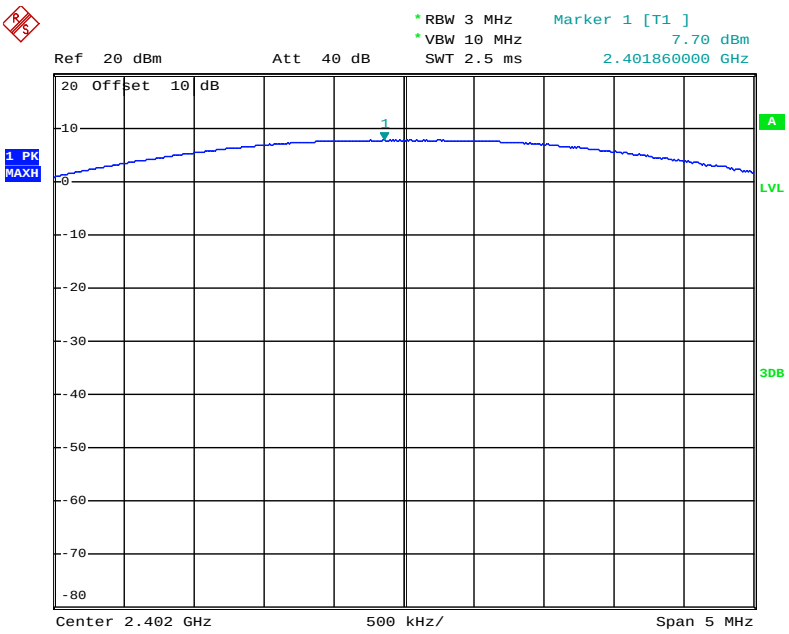
Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Result
0	2402	7.70	30	Pass
19	2440	5.78	30	Pass
39	2480	4.74	30	Pass

BLE 2Mbps

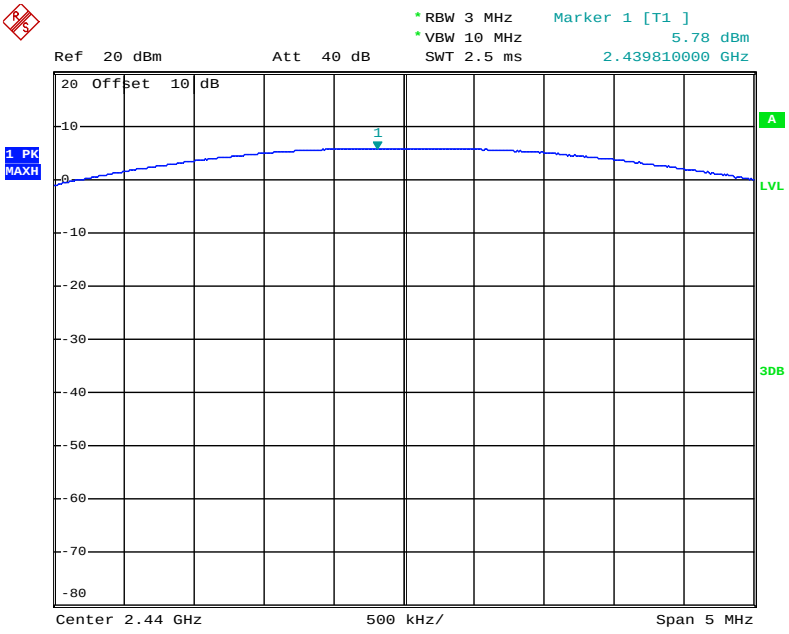
Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Result
0	2402	7.55	30	Pass
19	2440	5.50	30	Pass
39	2480	5.11	30	Pass

The spectrum analyzer plots are attached as below.

BLE 1Mbps channel 0

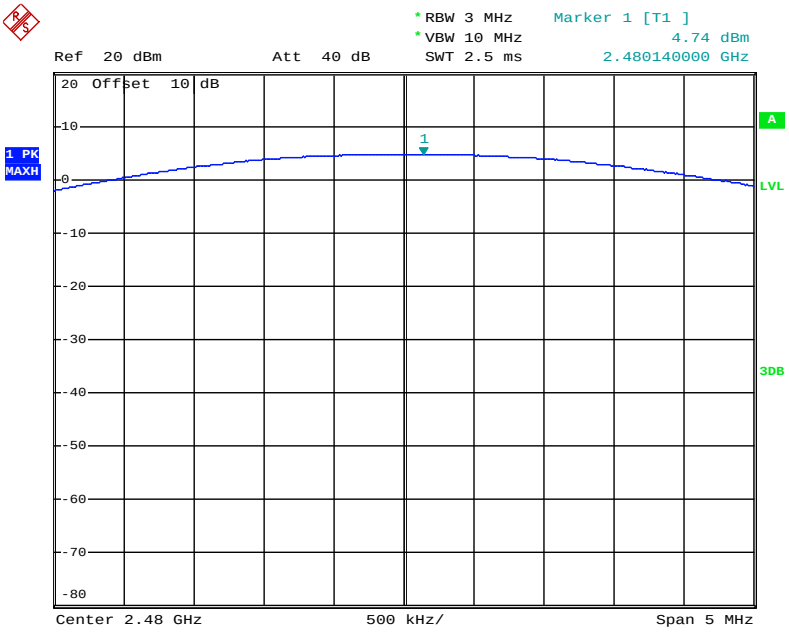


BLE 1Mbps channel 19



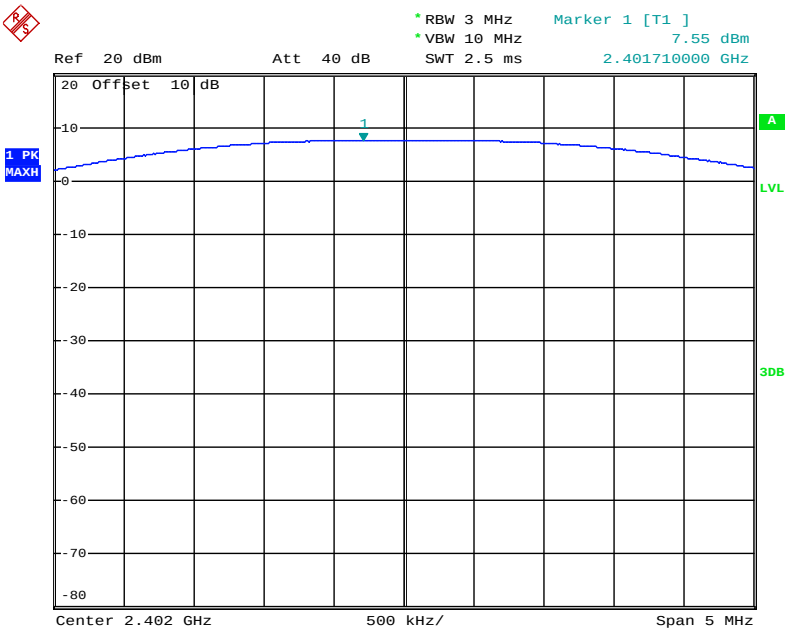
Date: 19.FEB.2020 10:07:41

BLE 1Mbps channel 39



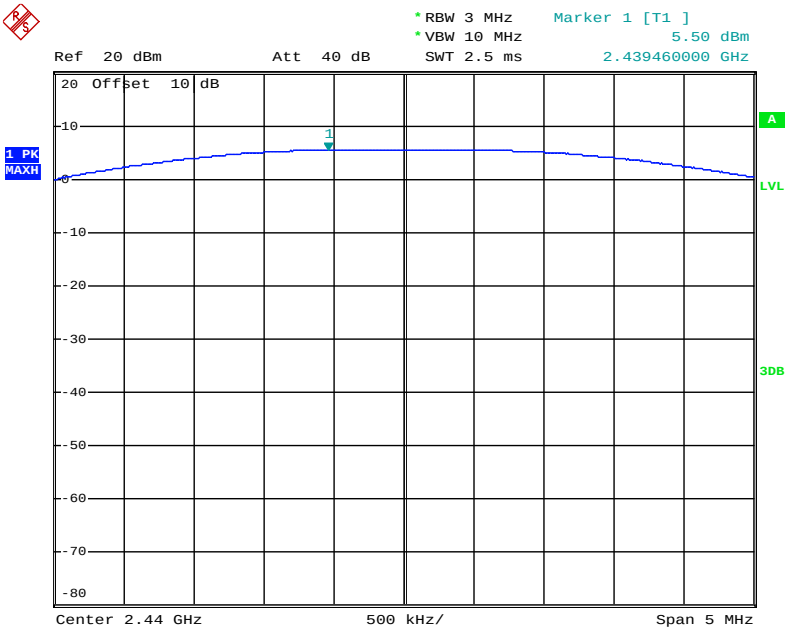
Date: 19.FEB.2020 10:07:15

BLE 2Mbps channel 0



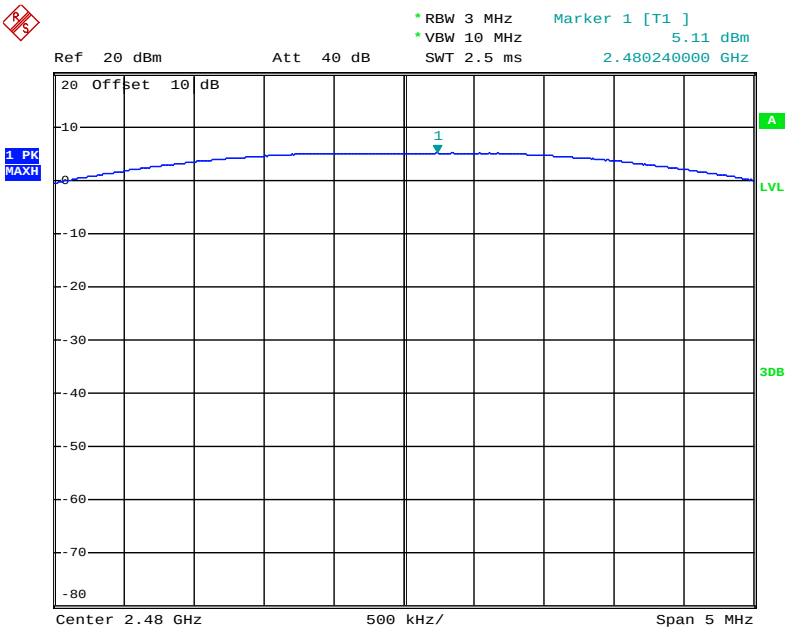
Date: 19.FEB.2020 11:51:00

BLE 2Mbps channel 19



Date: 19.FEB.2020 11:50:36

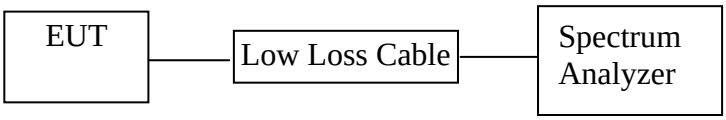
BLE 2Mbps channel 39



Date: 19.FEB.2020 11:50:11

7. POWER SPECTRAL DENSITY TEST

7.1.Block Diagram of Test Setup



7.2.The Requirement For Section 15.247(e)

Section 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.3.EUT Configuration on Test

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Measurement Procedure PKPSD:

7.5.3.This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3kHz) and repeat.

7.5.4.Measurement the maximum power spectral density.

7.6.Test Result

Test Lab: Shielding room
Test Engineer: Bob

BLE 1Mbps

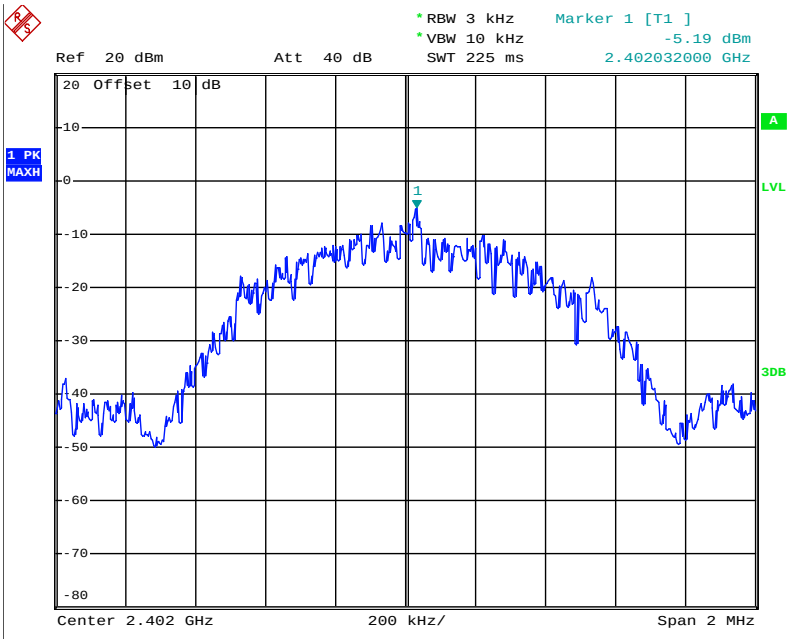
Channel	Frequency (MHz)	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
0	2402	-5.19	8	Pass
19	2440	-7.10	8	Pass
39	2480	-8.27	8	Pass

BLE 2Mbps

Channel	Frequency (MHz)	PSD (dBm/3KHz)	Limit (dBm/3KHz)	Result
0	2402	-9.52	8	Pass
19	2440	-11.30	8	Pass
39	2480	-12.04	8	Pass

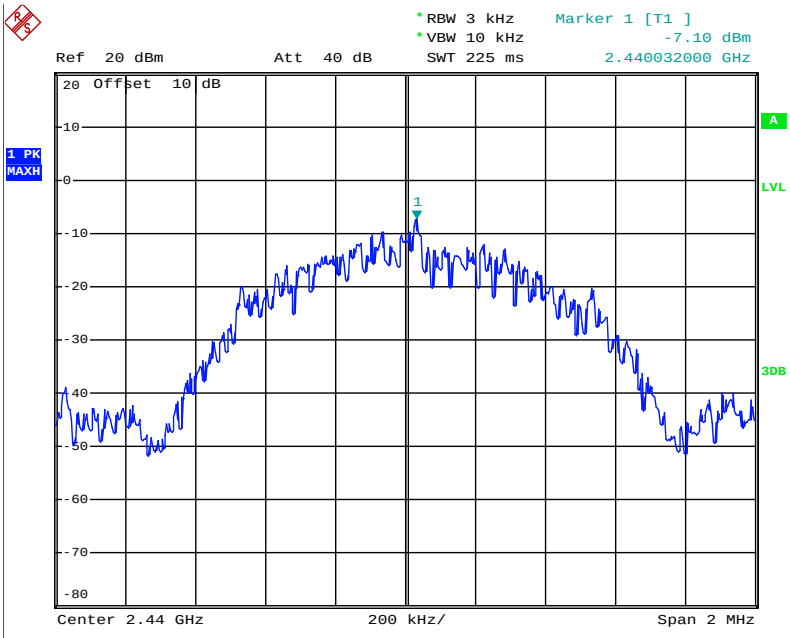
The spectrum analyzer plots are attached as below.

BLE 1Mbps channel 0



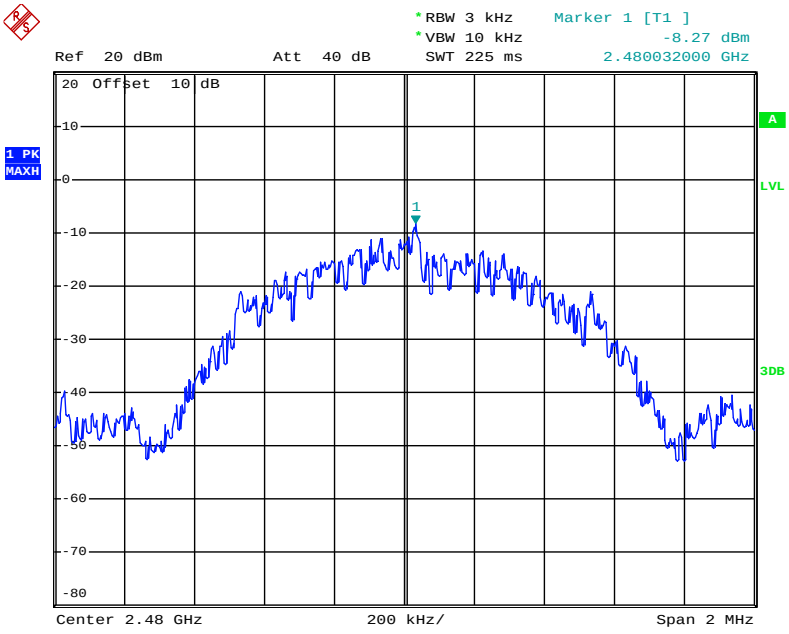
Date: 19.FEB.2020 10:08:45

BLE 1Mbps channel 19



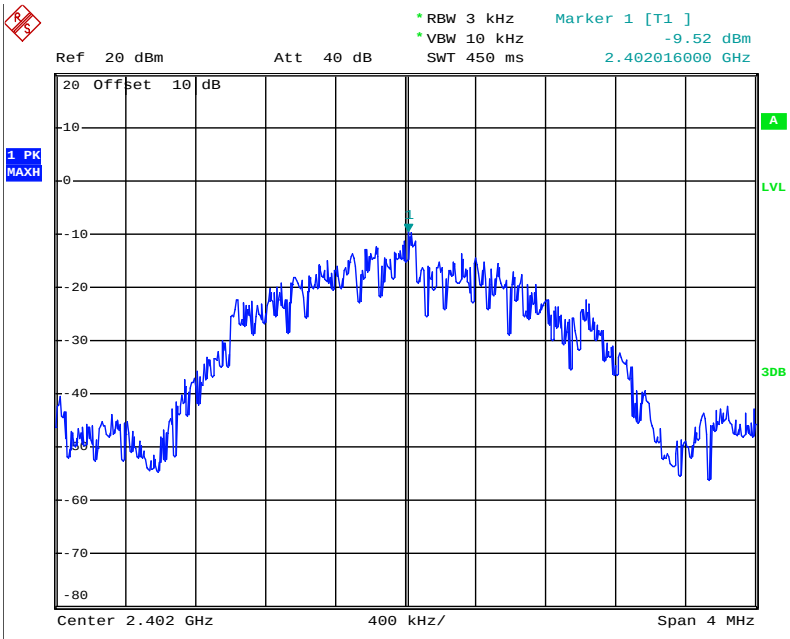
Date: 19.FEB.2020 10:09:15

BLE 1Mbps channel 39



Date: 19.FEB.2020 10:09:52

BLE 2Mbps channel 0



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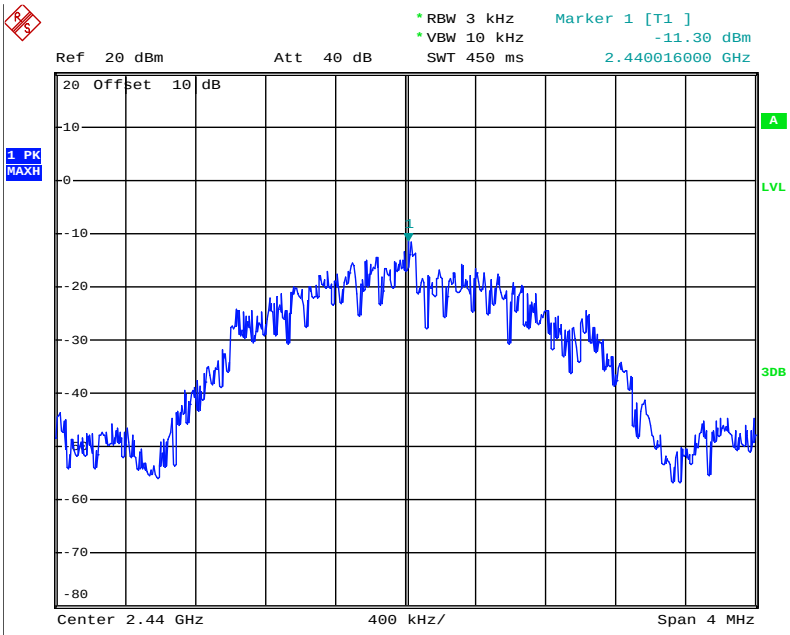
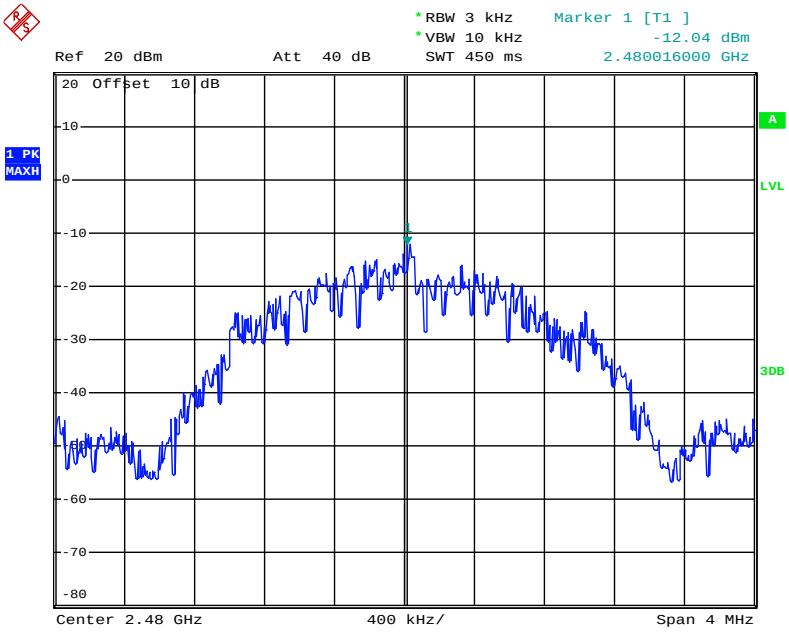
BLE 2Mbps channel 19



Date: 19.FEB.2020 11:52:43

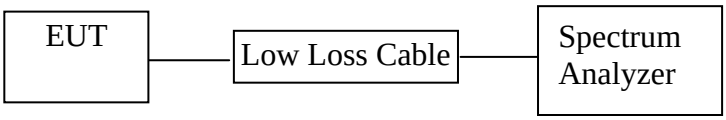
BLE 2Mbps channel 39



Date: 19.FEB.2020 11:53:20

8. BAND EDGE COMPLIANCE TEST

8.1.Block Diagram of Test Setup



8.2.The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

8.3.EUT Configuration on Test

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

8.5.Test Procedure

Conducted Band Edge:

8.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

8.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

Radiate Band Edge:

8.5.3.The EUT is placed on a turntable, which is 0.1m above the ground plane and worked at highest radiated power.

8.5.4.The turntable was rotated for 360 degrees to determine the position of maximum emission level.

8.5.5.EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

8.5.6.Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

8.5.7.RBW=1MHz, VBW=1MHz

8.5.8.The band edges was measured and recorded.

Note: All modes of operation were investigated and the worst case (GFSK (BLE 1Mbps)) emissions are reported.

8.6.Test Result

Conducted Band Edge Result

Test Lab: Shielding room

Test Engineer: Bob

BLE 1Mbps

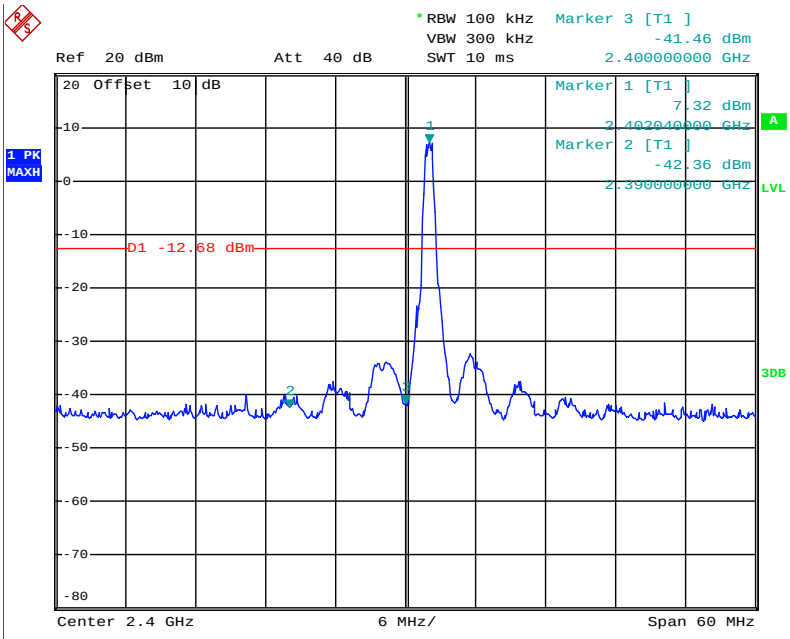
Channel	Frequency	Delta peak to band emission	Limit(dBc)	Result
0	2.402GHz	34.14	＞20	Pass
39	2.480GHz	30.04	＞20	Pass

BLE 2Mbps

Channel	Frequency	Delta peak to band emission	Limit(dBc)	Result
0	2.402GHz	21.06	＞20	Pass
39	2.480GHz	29.26	＞20	Pass

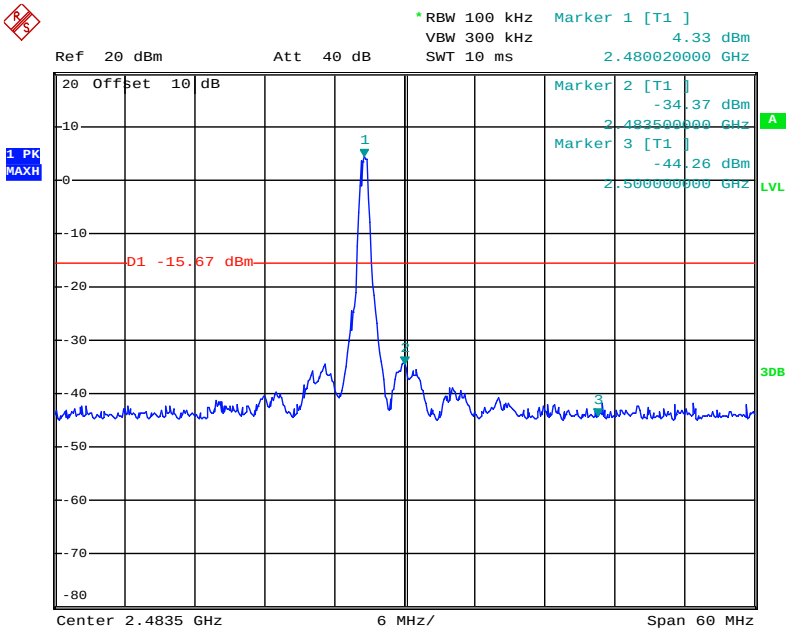
The spectrum analyzer plots are attached as below.

BLE 1Mbps channel 0



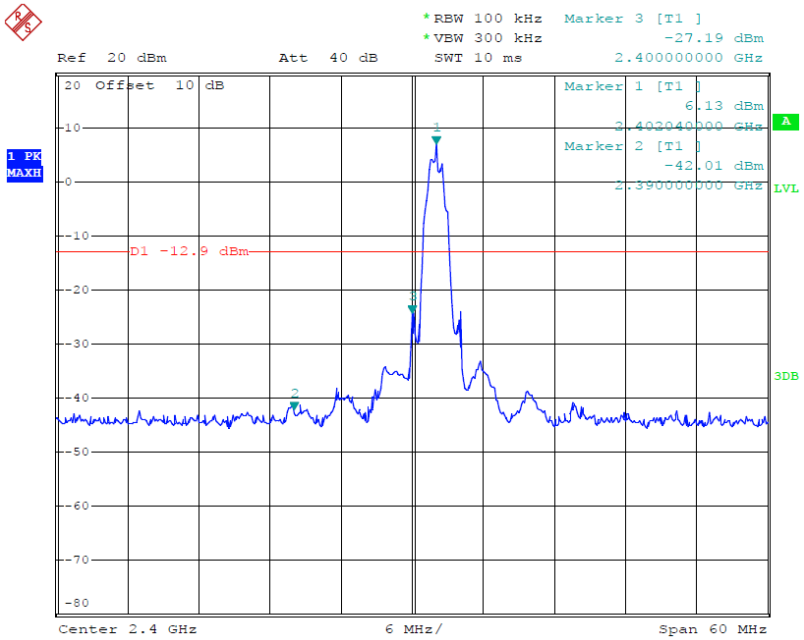
Date: 19.FEB.2020 10:04:53

BLE 1Mbps channel 39



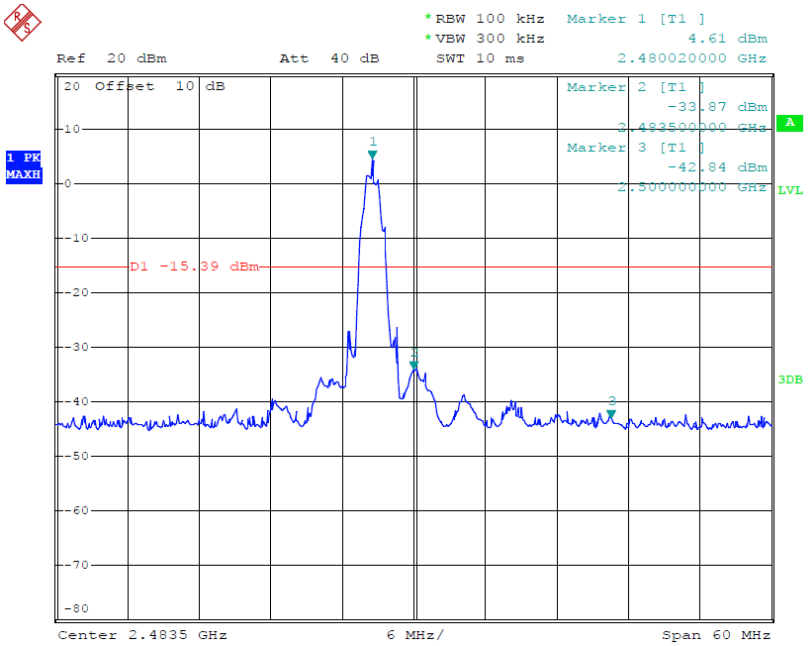
Date: 19.FEB.2020 10:06:21

BLE 2Mbps channel 0



Date: 19.FEB.2020 11:47:54

BLE 2Mbps channel 39



Date: 19.FEB.2020 11:48:54

Radiated Band Edge Result (BLE 1Mbps)

Test Lab: 3m Anechoic chamber
Test Engineer: Bob

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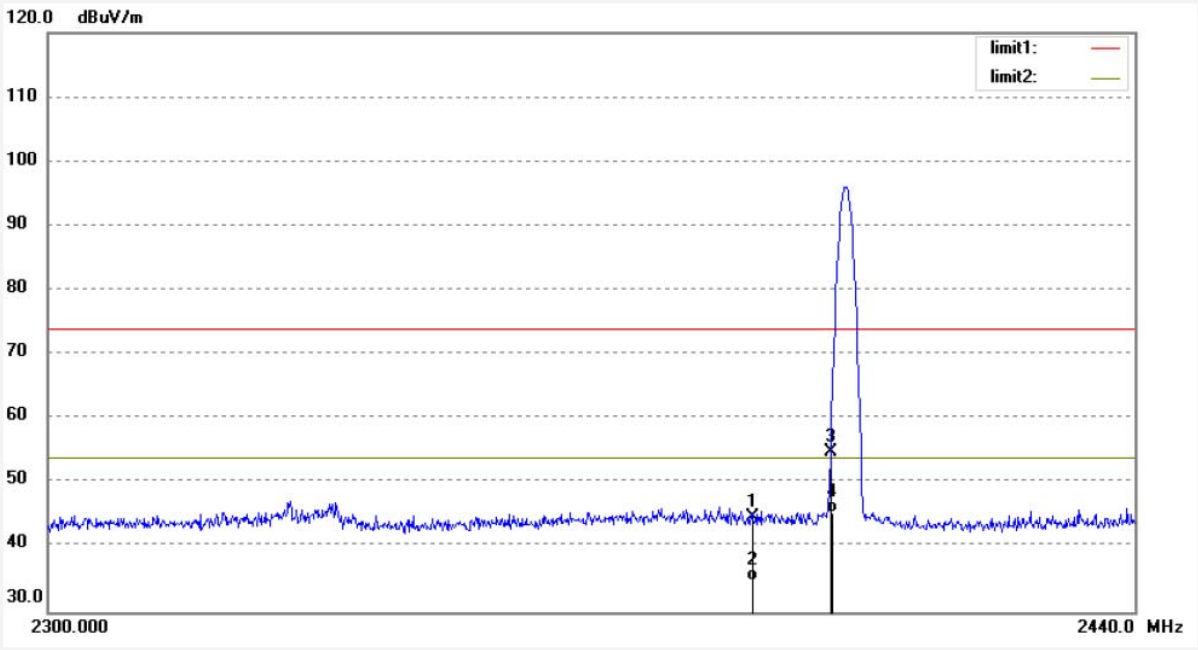
Fax:+86-0755-26503396

Job No.: 2020 #48	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 20/02/19/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/21/56
EUT: qingping Door/Window Contact Sensor	Engineer Signature: Bob
Mode: TX2402MHz	Distance: 3m
Model: CGH1	
Manufacturer: Guangdong Creator	

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	43.93	0.79	44.72	74.00	-29.28	peak	150	63	
2	2390.000	34.12	0.79	34.91	54.00	-19.09	AVG	150	221	
3	2400.000	53.90	0.88	54.78	74.00	-19.22	peak	150	93	
4	2400.000	44.54	0.88	45.42	54.00	-8.58	AVG	150	148	

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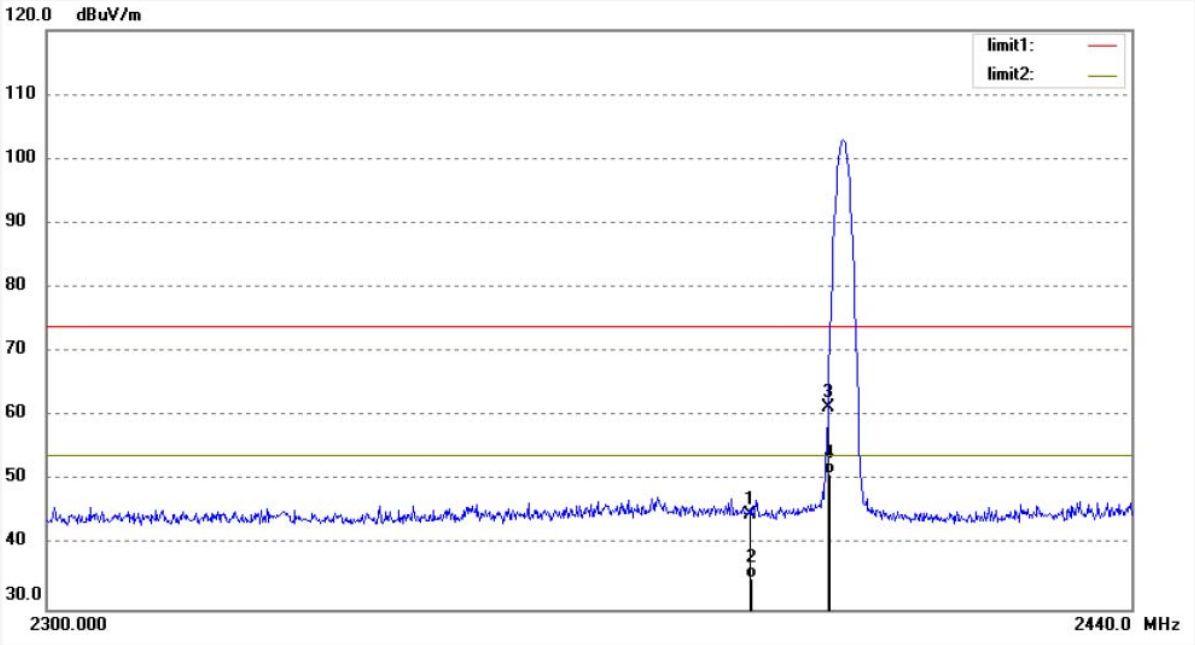
Job No.: 2020 #47
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2402MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Horizontal
Power Source: DC 3V
Date: 20/02/19/
Time: 9/21/23
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	44.05	0.79	44.84	74.00	-29.16	peak	250	196	
2	2390.000	34.15	0.79	34.94	54.00	-19.06	AVG	200	32	
3	2400.000	60.53	0.88	61.41	74.00	-12.59	peak	250	63	
4	2400.000	50.12	0.88	51.00	54.00	-3.00	AVG	200	115	

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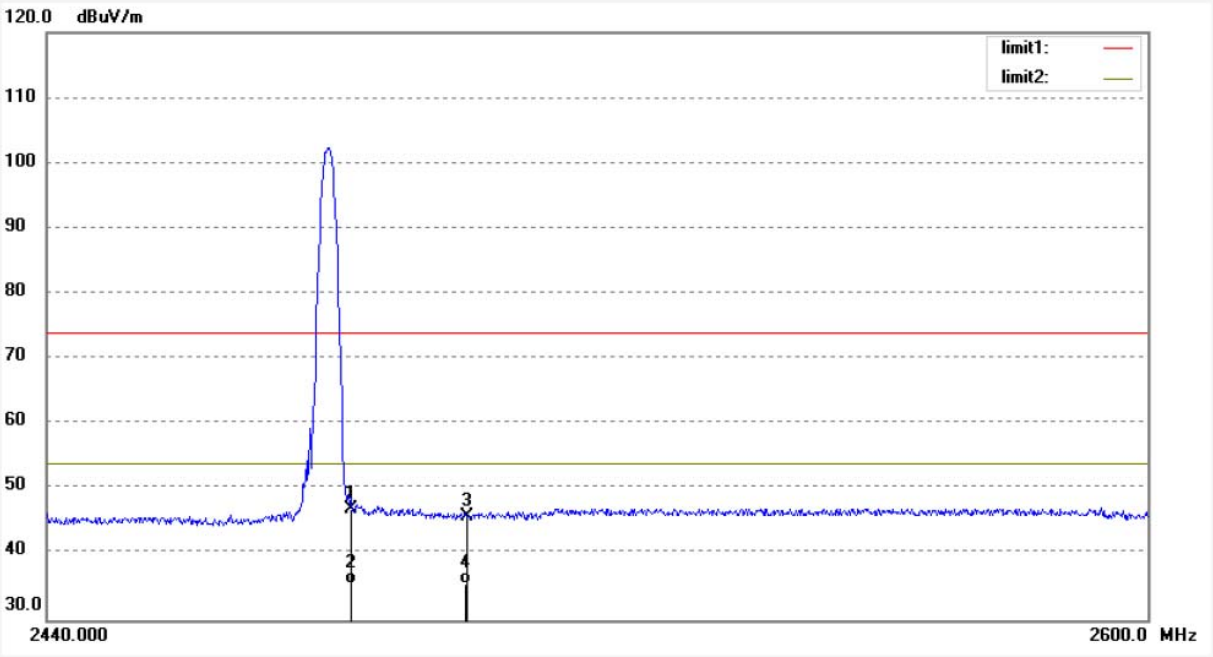
Job No.: 2020 #46
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2480MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Horizontal
Power Source: DC 3V
Date: 20/02/19/
Time: 9/17/03
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	45.92	1.10	47.02	74.00	-26.98	peak	250	182	
2	2483.500	34.42	1.10	35.52	54.00	-18.48	AVG	200	51	
3	2500.000	44.75	1.10	45.85	74.00	-28.15	peak	250	156	
4	2500.000	34.42	1.10	35.52	54.00	-18.48	AVG	200	63	

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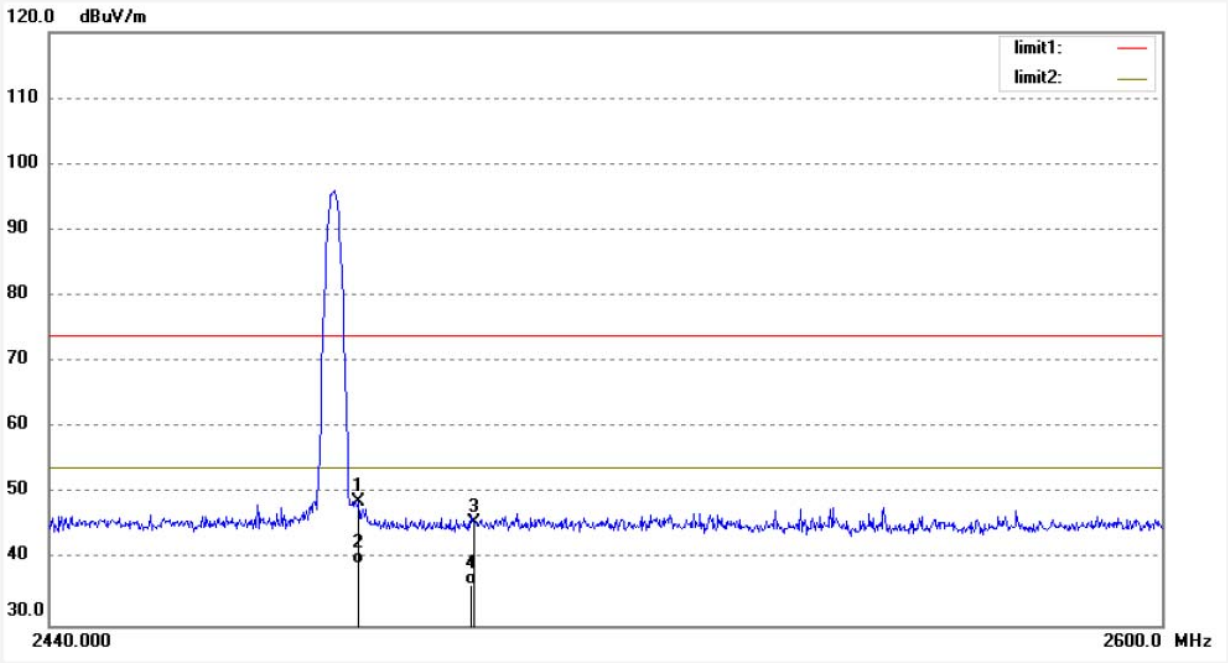
Job No.: 2020 #45	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 20/02/19/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/16/12
EUT: qingping Door/Window Contact Sensor	Engineer Signature: Bob
Mode: TX2480MHz	Distance: 3m
Model: CGH1	
Manufacturer: Guangdong Creator	

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	47.77	1.10	48.87	74.00	-25.13	peak	150	186	
2	2483.500	38.16	1.10	39.26	54.00	-14.74	AVG	150	63	
3	2500.000	44.61	1.10	45.71	74.00	-28.29	peak	150	218	
4	2500.000	35.15	1.10	36.25	54.00	-17.75	AVG	150	82	

Note:

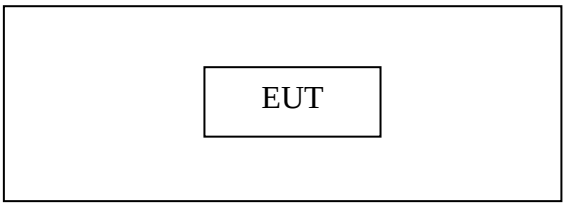
1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

   Result = Reading + Corrected Factor

9. RADIATED SPURIOUS EMISSION TEST

9.1.Block Diagram of Test Setup

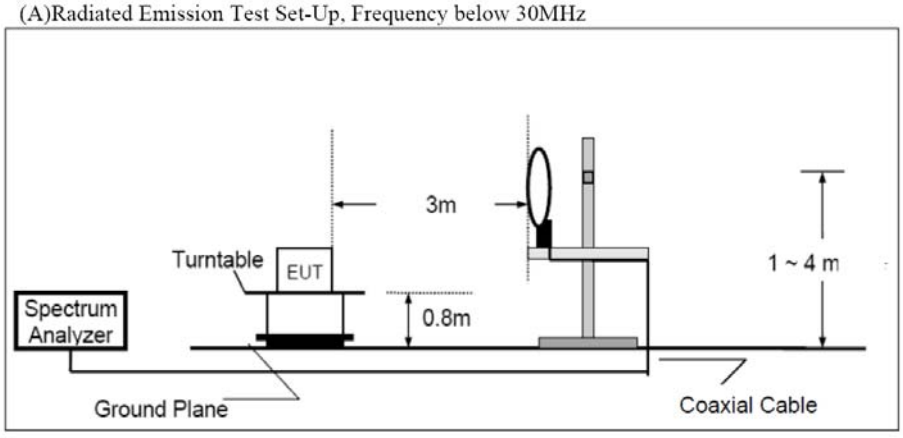
9.1.1.Block diagram of connection between the EUT and peripherals



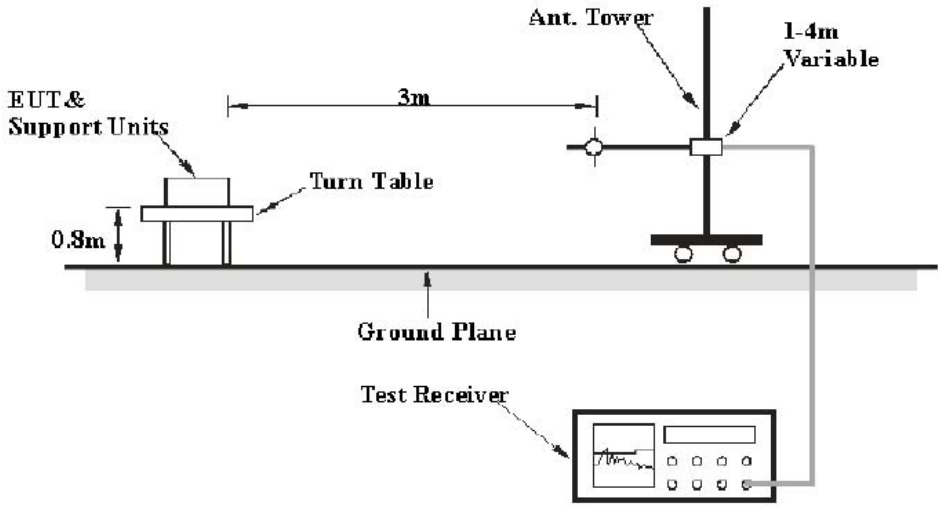
Setup: Transmitting mode

9.1.2.Semi-Anechoic Chamber Test Setup Diagram

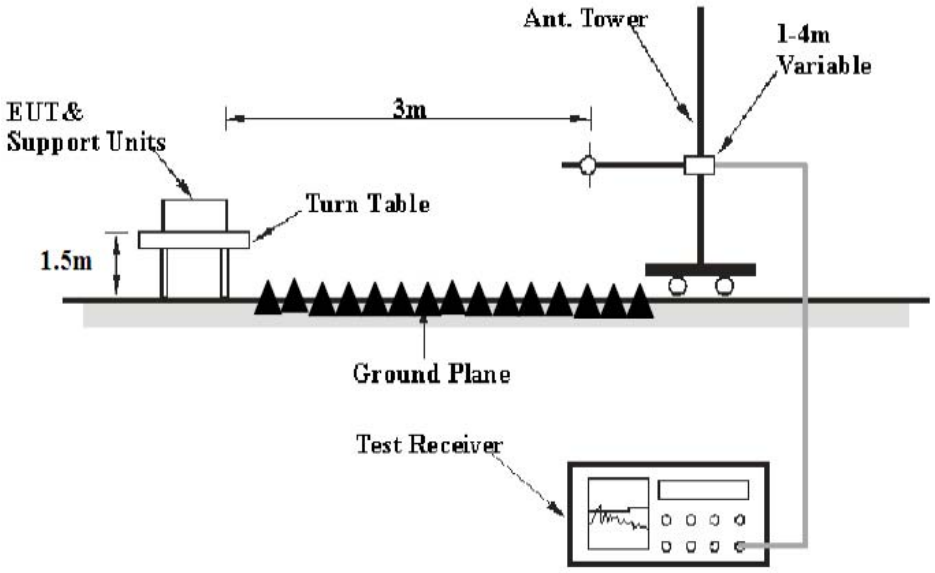
(A)Radiated Emission Test Set-Up, Frequency below 30MHz



(B)Radiated Emission Test Set-Up, Frequency 30MHz-1GHz



(C) Radiated Emission Test Set-Up, Frequency above 1GHz



9.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

9.3. Restricted bands of operation

9.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

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])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

9.4.Configuration of EUT on Test

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.5. Operating Condition of EUT

9.5.1.Setup the EUT and simulator as shown as Section 9.1.

9.5.2.Turn on the power of all equipment.

9.5.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

9.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 1.5 meter high above ground(Above 1GHz). The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bi-log antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. This EUT was tested in 3 orthogonal positions and the worst case position data was reported.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading.

9.7.Data Sample

Frequency (MHz)	Reading (dBμv)	Factor (dB/m)	Result (dBμv/m)	Limit (dBμv/m)	Margin (dB)	Remark
X.XX	43.85	-22.22	21.63	43.5	-21.87	QP

Frequency(MHz) = Emission frequency in MHz
Reading(dBμv) = Uncorrected Analyzer/Receiver reading
Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain
Result(dBμv/m) = Reading(dBμv) + Factor(dB/m)
Limit (dBμv/m) = Limit stated in standard
Margin (dB) = Result(dBμv/m) - Limit (dBμv/m)
QP = Quasi-peak Reading

Calculation Formula:
Margin(dB) = Result (dBμV/m)–Limit(dBμV/m)
Result(dBμV/m)= Reading(dBμV)+ Factor(dB/m)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

9.8.Test Result

Pass.

Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The measurements greater than 20dB below the limit from 9kHz to 30MHz and 18 to 26.5GHz.

The spectrum analyzer plots are attached as below.

Note: All modes of operation were investigated and the worst case (GFSK (BLE 1Mbps)) emissions are reported.

Test Lab: 3m Anechoic chamber
Test Engineer: Bob

Below 1GHz

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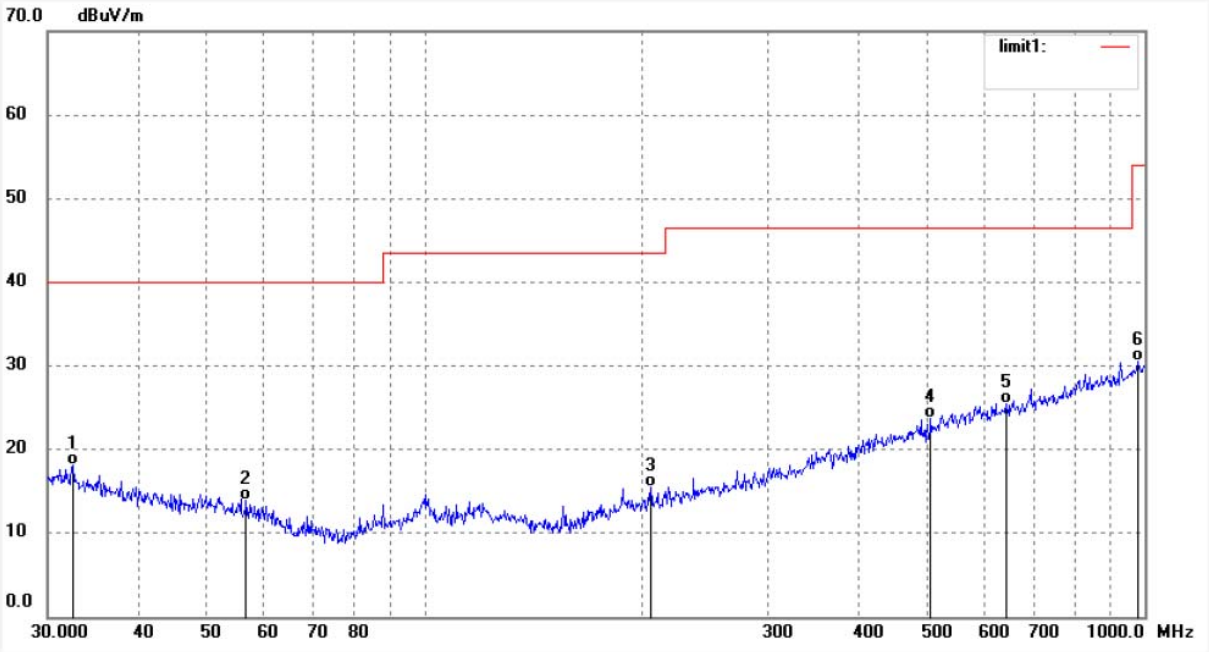
Job No.: 2020 #33
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2402MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Vertical
Power Source: DC 3V
Date: 20/02/18/
Time: 11/18/18
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.5197	28.79	-10.68	18.11	40.00	-21.89	QP	100	86	
2	56.5929	28.17	-14.28	13.89	40.00	-26.11	QP	100	117	
3	206.3976	28.72	-13.27	15.45	43.50	-28.05	QP	100	52	
4	504.7062	29.40	-5.68	23.72	46.50	-22.78	QP	100	215	
5	642.8613	29.00	-3.52	25.48	46.50	-21.02	QP	100	62	
6	979.1803	28.89	1.59	30.48	54.00	-23.52	QP	100	103	

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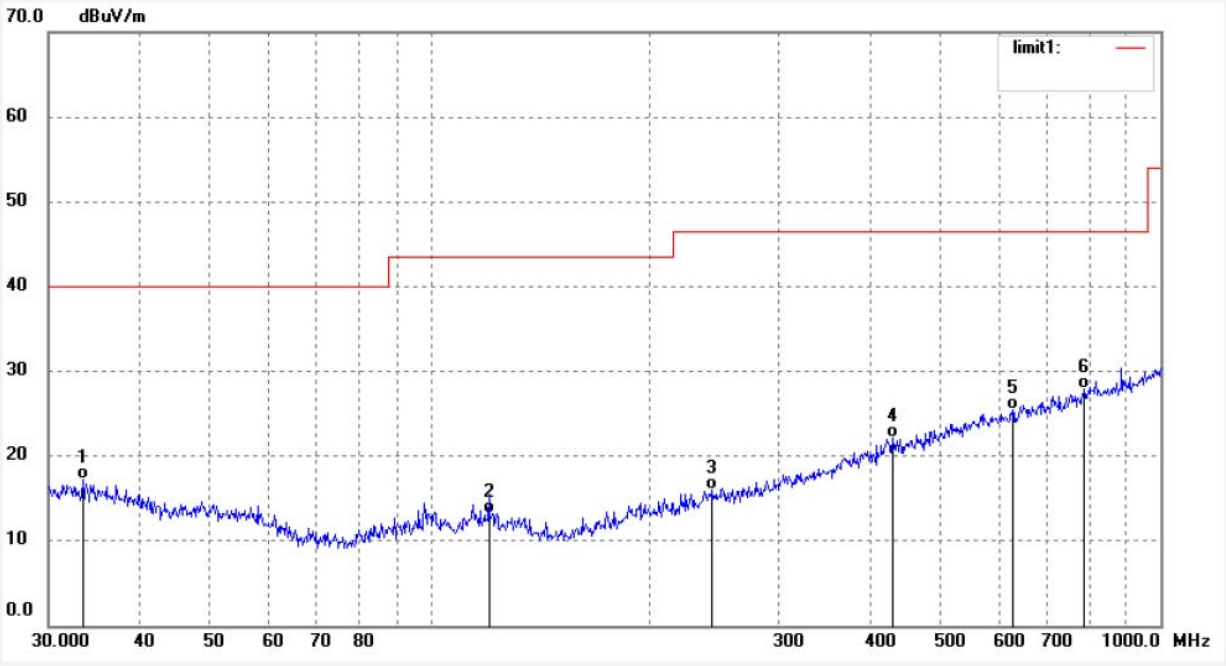
Job No.: 2020 #34	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 20/02/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 11/19/36
EUT: qingping Door/Window Contact Sensor	Engineer Signature: Bob
Mode: TX2402MHz	Distance: 3m
Model: CGH1	
Manufacturer: Guangdong Creator	

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	33.4448	28.48	-11.26	17.22	40.00	-22.78	QP	200	154	
2	120.2766	27.45	-14.18	13.27	43.50	-30.23	QP	200	159	
3	243.3771	27.86	-11.82	16.04	46.50	-30.46	QP	200	82	
4	429.5228	29.15	-7.05	22.10	46.50	-24.40	QP	200	115	
5	627.2738	29.11	-3.61	25.50	46.50	-21.00	QP	200	320	
6	785.0934	29.23	-1.32	27.91	46.50	-18.59	QP	200	116	

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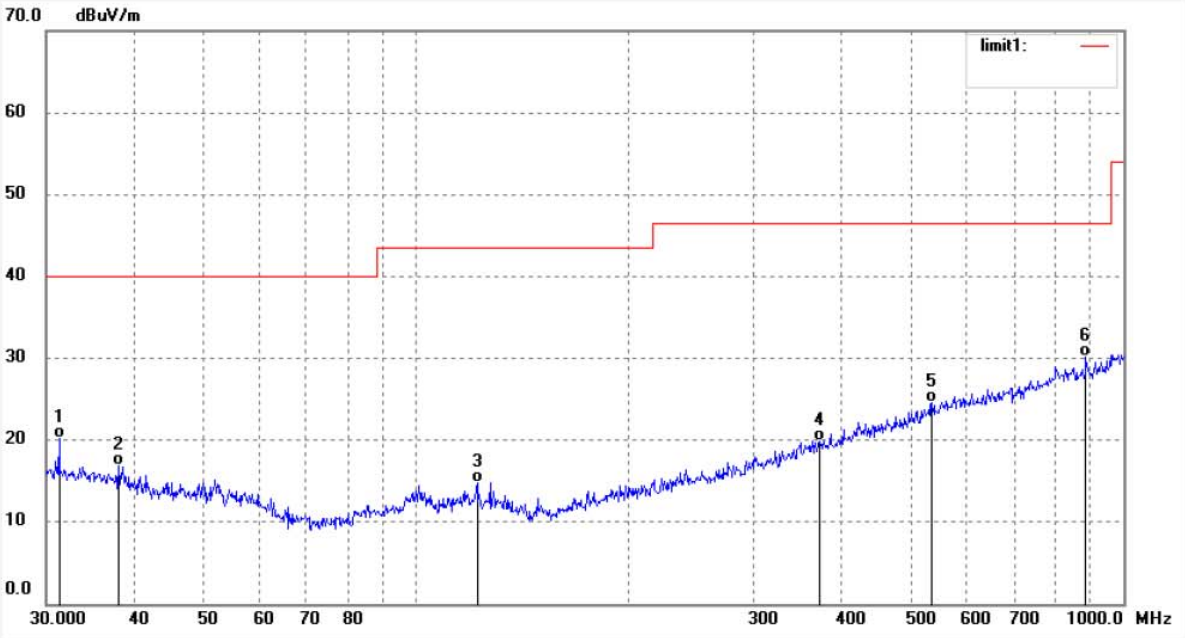
Job No.: 2020 #35
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2440MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Horizontal
Power Source: DC 3V
Date: 20/02/18/
Time: 11/21/15
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.2893	31.25	-11.05	20.20	40.00	-19.80	QP	200	106	
2	37.9450	28.98	-12.08	16.90	40.00	-23.10	QP	200	320	
3	121.9753	29.23	-14.38	14.85	43.50	-28.65	QP	200	112	
4	372.0045	28.43	-8.48	19.95	46.50	-26.55	QP	200	52	
5	535.7073	29.56	-4.92	24.64	46.50	-21.86	QP	200	101	
6	884.5027	29.92	0.20	30.12	46.50	-16.38	QP	200	201	

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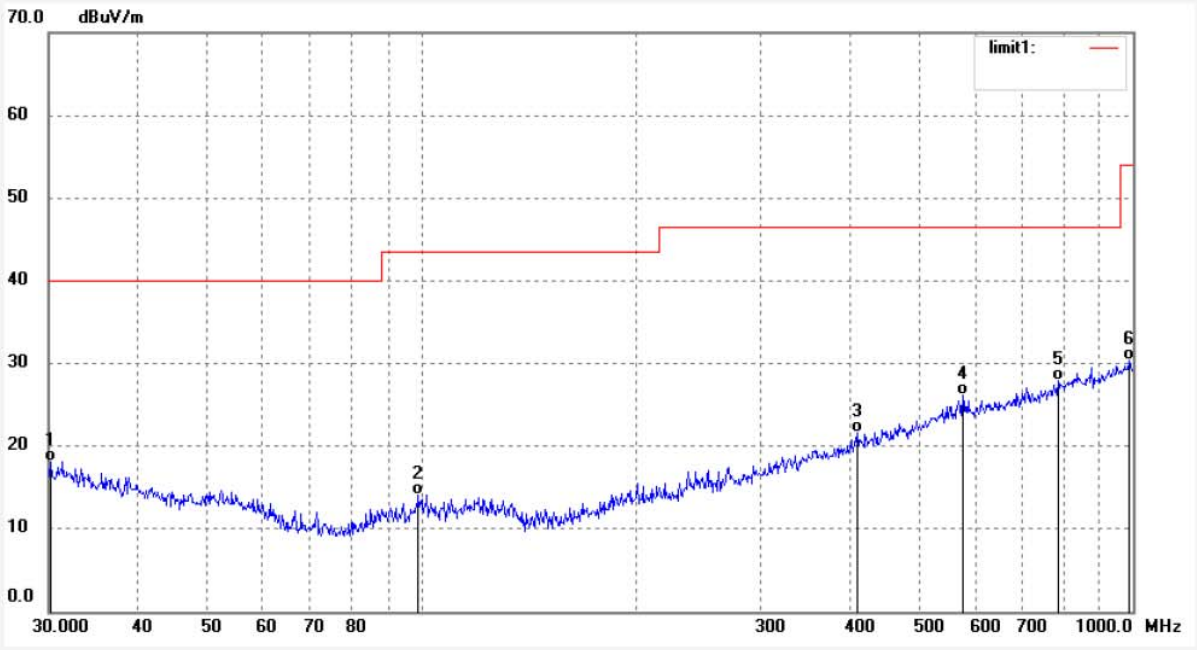
Fax:+86-0755-26503396

Job No.: 2020 #36	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 20/02/18/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 11/22/42
EUT: qingping Door/Window Contact Sensor	Engineer Signature: Bob
Mode: TX2440MHz	Distance: 3m
Model: CGH1	
Manufacturer: Guangdong Creator	

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	30.2109	28.13	-9.99	18.14	40.00	-21.86	QP	100	163	
2	99.1795	28.45	-14.40	14.05	43.50	-29.45	QP	100	201	
3	410.3824	29.13	-7.55	21.58	46.50	-24.92	QP	100	128	
4	576.6443	30.40	-4.16	26.24	46.50	-20.26	QP	100	93	
5	785.0933	29.15	-1.32	27.83	46.50	-18.67	QP	100	214	
6	989.5353	28.72	1.69	30.41	54.00	-23.59	QP	100	152	

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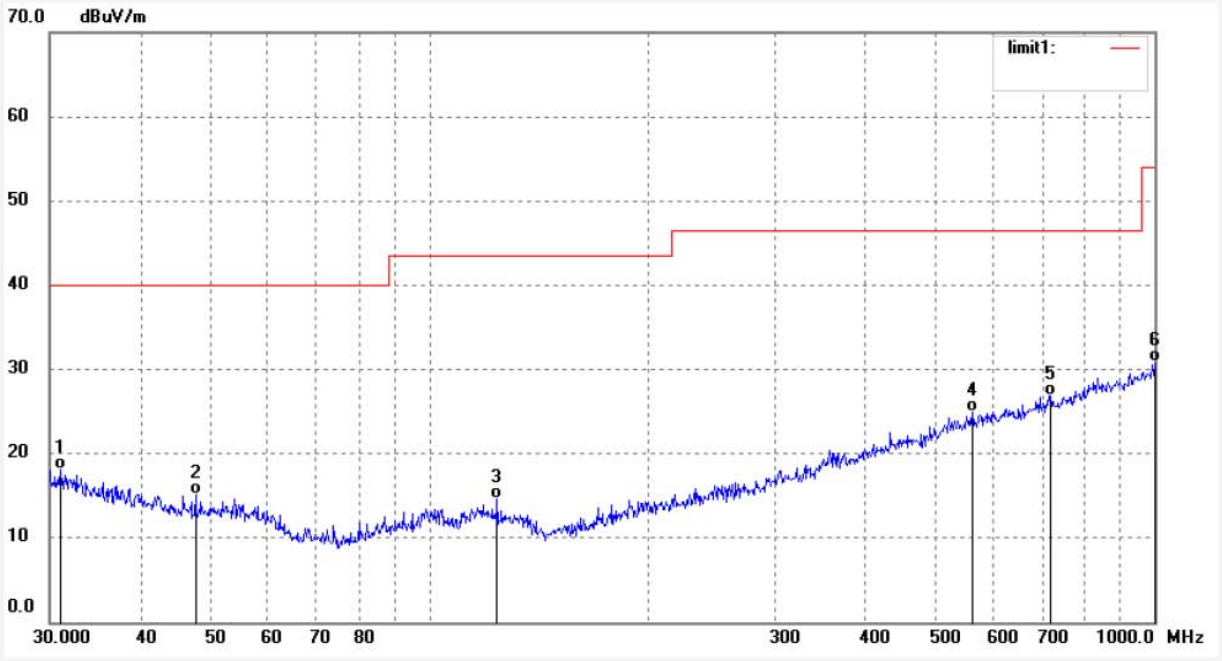
Job No.: 2020 #37
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2480MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Vertical
Power Source: DC 3V
Date: 20/02/18/
Time: 11/23/50
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.0705	28.36	-10.25	18.11	40.00	-21.89	QP	100	106	
2	47.6584	28.78	-13.62	15.16	40.00	-24.84	QP	100	302	
3	124.1329	29.32	-14.64	14.68	43.50	-28.82	QP	100	159	
4	560.6928	29.42	-4.45	24.97	46.50	-21.53	QP	100	215	
5	719.1994	29.45	-2.51	26.94	46.50	-19.56	QP	100	213	
6	1000.0000	29.07	1.84	30.91	54.00	-23.09	QP	100	69	

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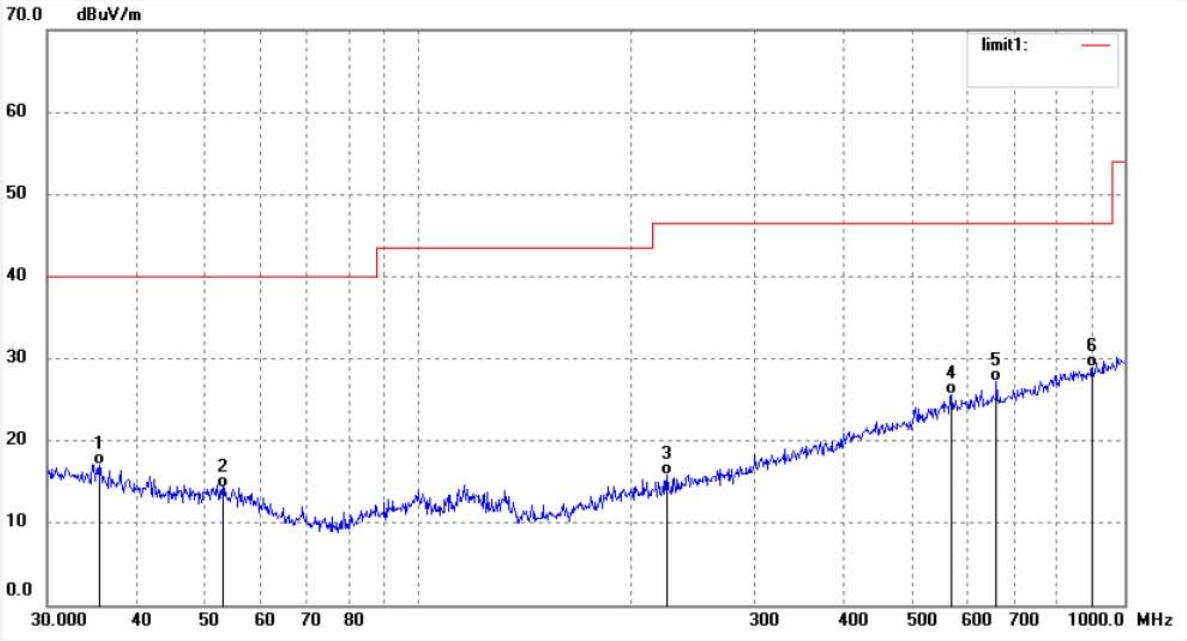
Job No.: 2020 #38
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2480MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Horizontal
Power Source: DC 3V
Date: 20/02/18/
Time: 11/25/27
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	35.6240	28.67	-11.56	17.11	40.00	-22.89	QP	200	63	
2	53.5052	28.21	-13.87	14.34	40.00	-25.66	QP	200	215	
3	225.3079	28.23	-12.43	15.80	46.50	-30.70	QP	200	45	
4	568.6127	29.95	-4.34	25.61	46.50	-20.89	QP	200	102	
5	658.8361	30.53	-3.27	27.26	46.50	-19.24	QP	200	320	
6	900.1473	28.76	0.28	29.04	46.50	-17.46	QP	200	106	

Above 1GHz

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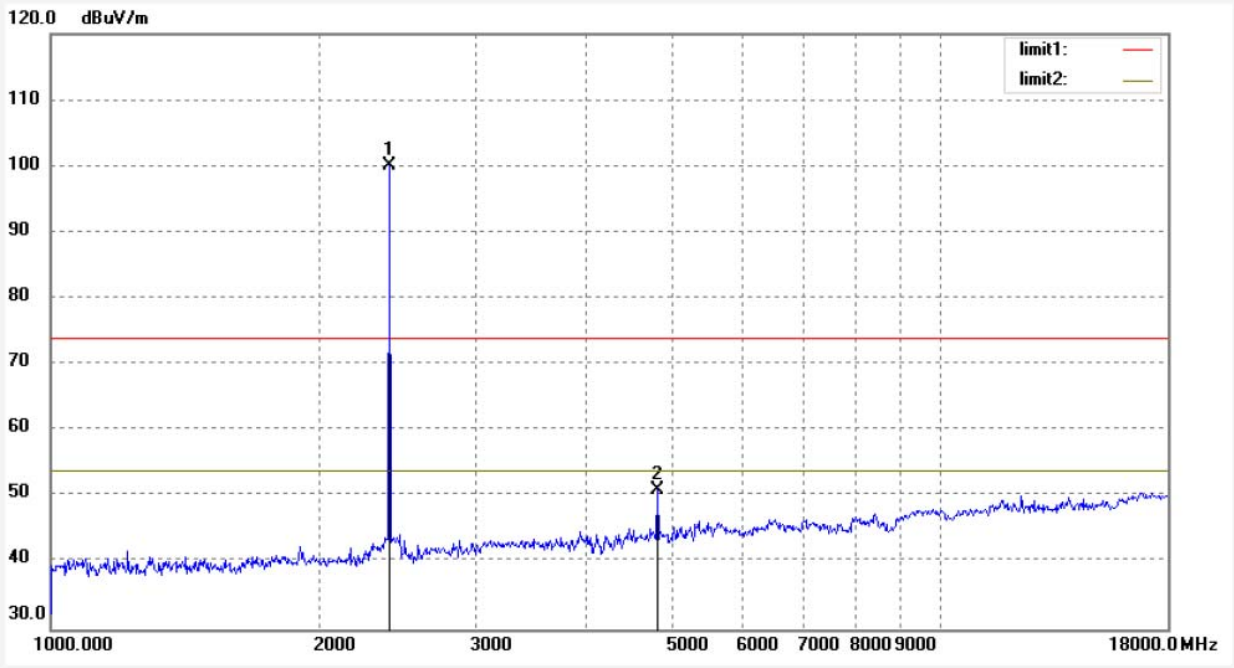
Job No.: 2020 #39
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2402MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Horizontal
Power Source: DC 3V
Date: 20/02/19/
Time: 8/51/57
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	99.17	0.88	100.05			peak	200	93	
2	4804.000	43.64	7.40	51.04	74.00	-22.96	peak	200	116	

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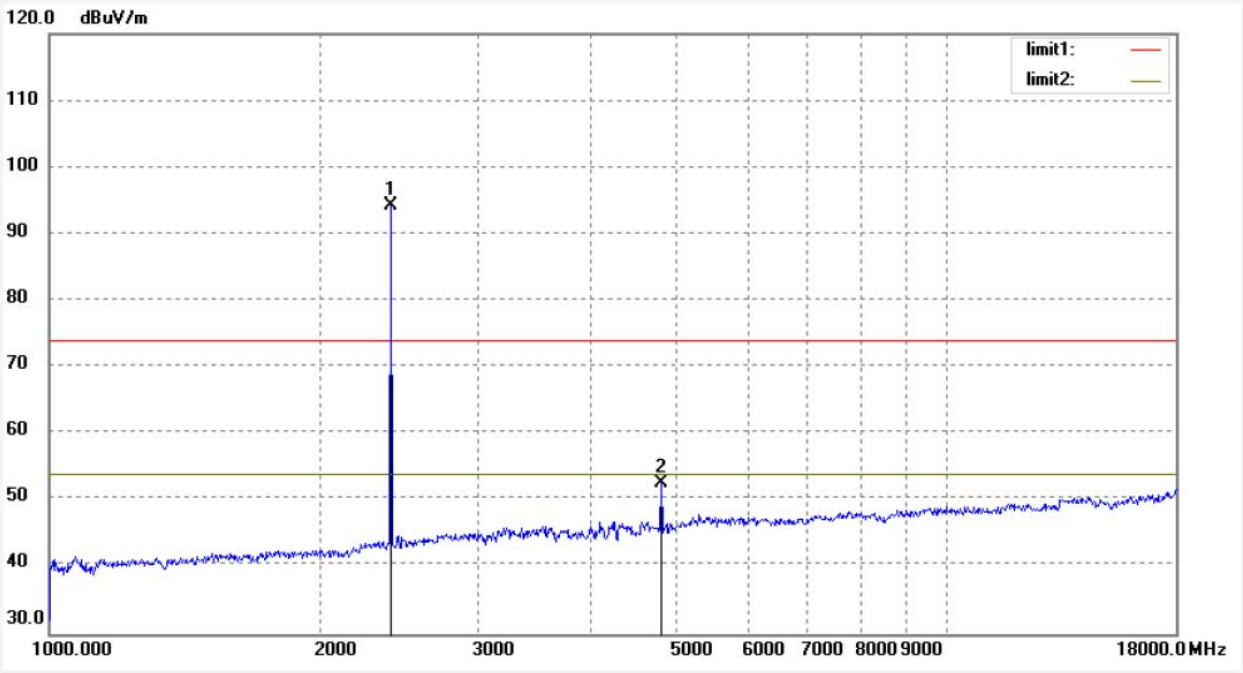
Job No.: 2020 #40
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2402MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Vertical
Power Source: DC 3V
Date: 20/02/19/
Time: 8/53/45
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	93.38	0.88	94.26			peak	150	93	
2	4804.000	45.22	7.40	52.62	74.00	-21.38	peak	150	175	

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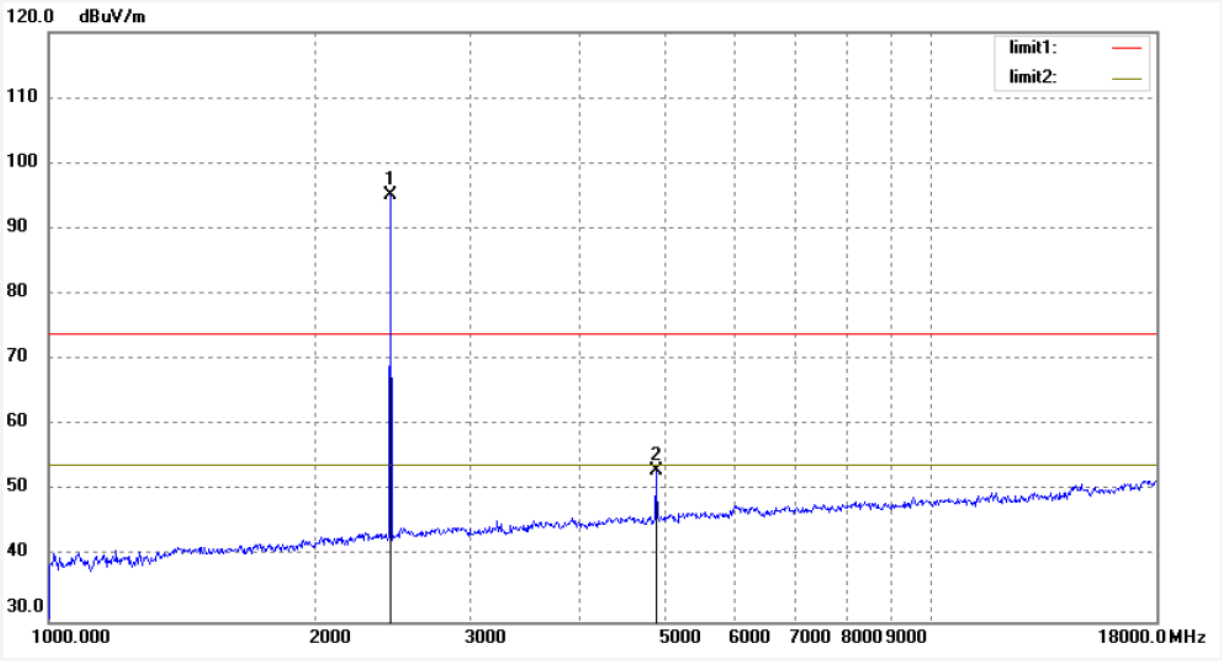
Job No.: 2020 #41
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2440MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Vertical
Power Source: DC 3V
Date: 20/02/19/
Time: 9/02/36
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.000	94.19	1.03	95.22			peak	150	93	
2	4880.000	44.91	8.04	52.95	74.00	-21.05	peak	150	148	

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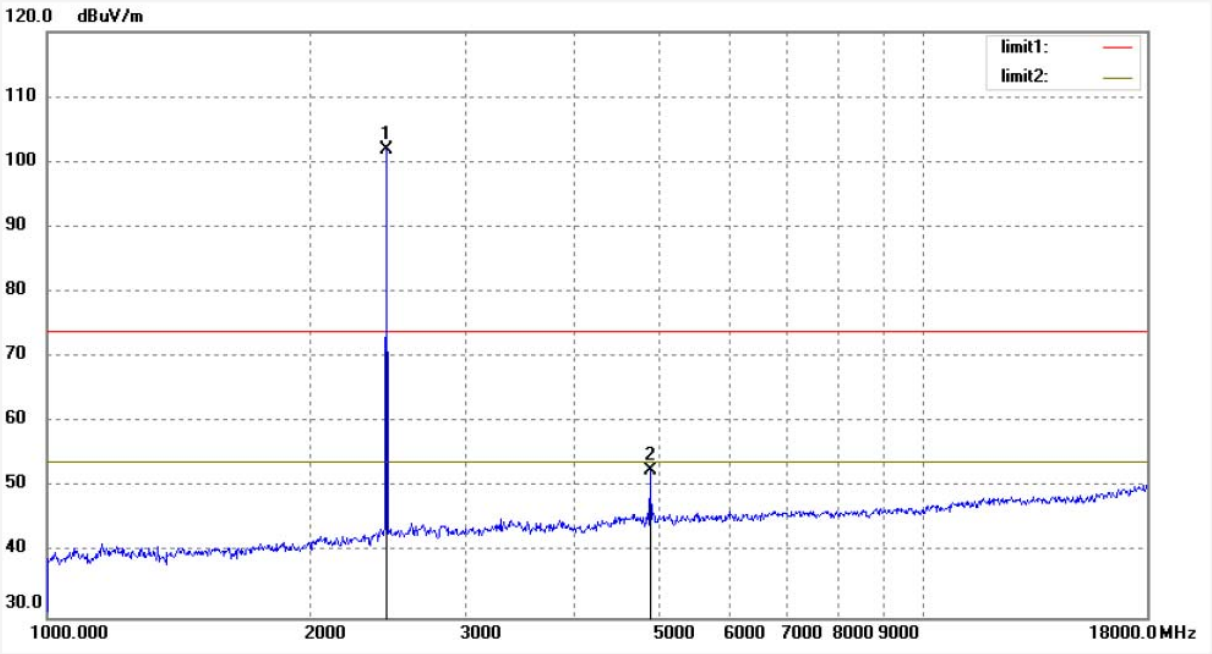
Job No.: 2020 #42
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: qingping Door/Window Contact Sensor
Mode: TX2440MHz
Model: CGH1
Manufacturer: Guangdong Creator

Polarization: Horizontal
Power Source: DC 3V
Date: 20/02/19/
Time: 9/05/42
Engineer Signature: Bob
Distance: 3m

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.000	100.76	1.03	101.79			peak	250	146	
2	4880.000	44.50	8.04	52.54	74.00	-21.46	peak	250	320	

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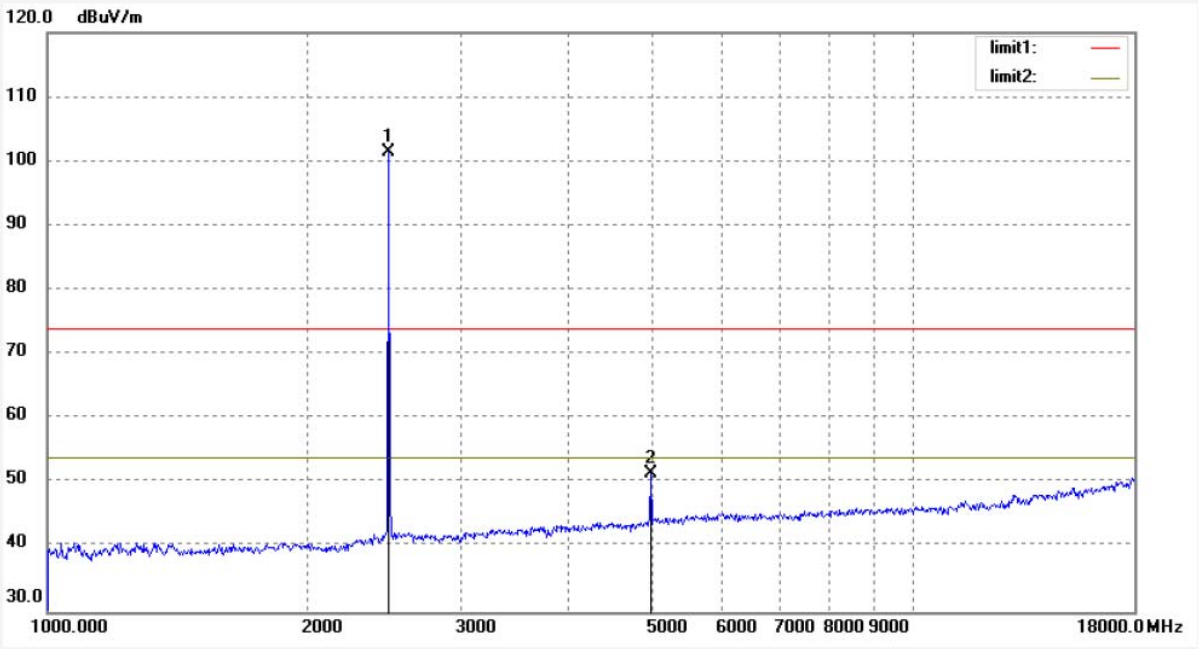
Job No.: 2020 #43	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 20/02/19/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/11/17
EUT: qingping Door/Window Contact Sensor	Engineer Signature: Bob
Mode: TX2480MHz	Distance: 3m
Model: CGH1	
Manufacturer: Guangdong Creator	

Note: Report NO.:ATE20200083



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	100.25	1.09	101.34			peak	250	93	
2	4960.000	42.83	8.66	51.49	74.00	-22.51	peak	250	146	

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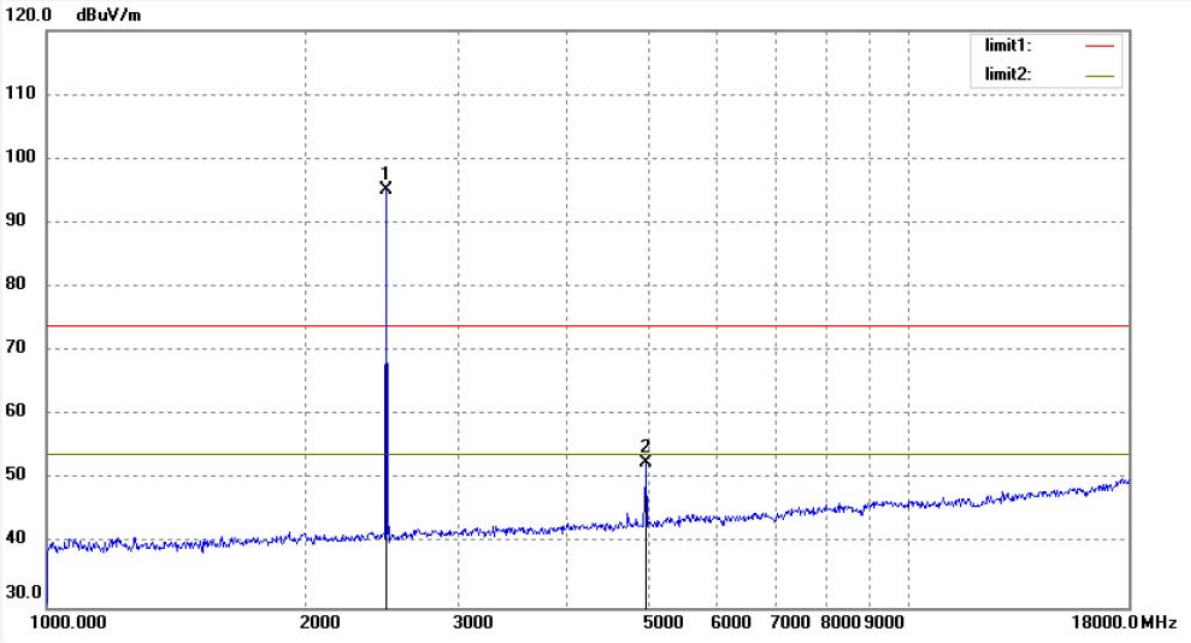
Job No.: 2020 #44	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 20/02/19/
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 9/13/43
EUT: qingping Door/Window Contact Sensor	Engineer Signature: Bob
Mode: TX2480MHz	Distance: 3m
Model: CGH1	
Manufacturer: Guangdong Creator	

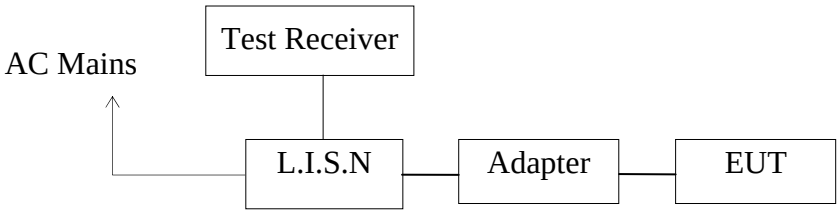
Note: Report NO.:ATE20200083



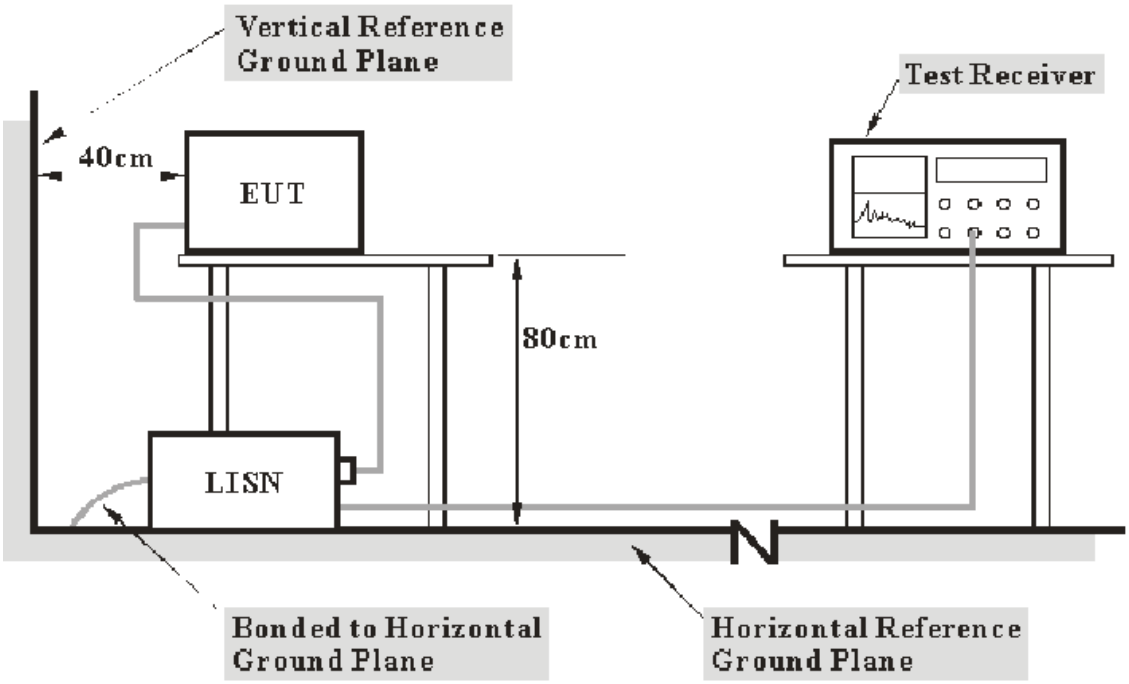
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	93.94	1.10	95.04			peak	150	52	
2	4960.000	44.12	8.58	52.70	74.00	-21.30	peak	150	187	

10.POWER LINE CONDUCTED EMISSION TEST

10.1.Block Diagram of Test Setup



10.2.Test System Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

10.3.Test Limits

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies. NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

10.4.Configuration of EUT on Test

The equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

10.5.Operating Condition of EUT

10.5.1.Setup the EUT and simulator as shown as Section 10.1.

10.5.2.Turn on the power of all equipment.

10.5.3.Let the EUT work in test mode and measure it.

10.6.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Measurement.

The bandwidth of test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

10.7.Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dBμV)	Average Level (dBμV)	QuasiPeak Limit (dBμV)	Average Limit (dBμV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	10.5	51.1	34.2	56.0	46.0	4.9	11.8	Pass

Frequency(MHz) = Emission frequency in MHz
Transducer value(dB) = Insertion loss of LISN + Cable Loss
Level(dBμV) = Quasi-peak Reading/Average Reading + Transducer value
Limit (dBμV) = Limit stated in standard

Calculation Formula:
Margin = Limit (dBμV) - Level (dBμV)

10.8.Result:

N/A

Note: The EUT is powered by battery(DC 3V). Therefore, the test is not applicable and skipped.

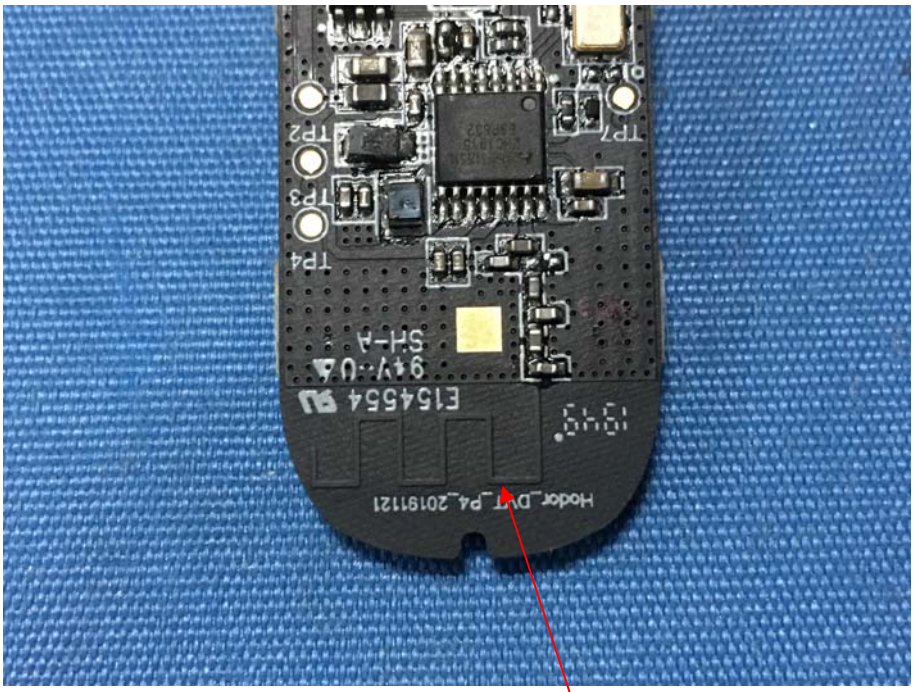
11. ANTENNA REQUIREMENT

11.1. The Requirement

According to 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.

11.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Max Antenna gain of EUT is 0dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



******* End of Test Report *******