

APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Golden Trees Technology Co.,Ltd.

music lamp

Model No.: JL-18-JL-210, JL-18-JL-211, JL-18-JL-212, JL-18-JL-213,
JL-18-JL-214, JL-18-JL-215, JL-18-JL-216, JL-18-JL-217, JL-18-JL-218,
JL-18-JL-219, JL-18-JL-220, JL-18-JL-221

FCC ID: 2AHXN-JL-L8-JL

Prepared for	:	Golden Trees Technology Co.,Ltd.
Address	:	No.3, Nan Tong Blvd, Bao Long Industrial Area, LongGang District, ShenZhen, China
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
Address	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

Tel: (0755) 26503290
Fax: (0755) 26503396

Report No.	:	ATE20182088
Date of Test	:	Dec. 7--Dec. 22, 2018
Date of Report	:	Dec. 24, 2018

shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China
Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com [Http://www.atc-lab.com](http://www.atc-lab.com)

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Test Report Certification

Applicant : Golden Trees Technology Co.,Ltd.
Address : No.3, Nan Tong Blvd, Bao Long Industrial Area, LongGang District, ShenZhen, China
Manufacturer : Golden Trees Technology Co.,Ltd.
Address : No.3, Nan Tong Blvd, Bao Long Industrial Area, LongGang District, ShenZhen, China
Product : music lamp
Trade Name : Goldentrees, JSL, ilavie, JinLF
Model No. : JL-l8-JL-210, JL-l8-JL-211, JL-l8-JL-212, JL-l8-JL-213, JL-l8-JL-214, JL-l8-JL-215, JL-l8-JL-216, JL-l8-JL-217, JL-l8-JL-218, JL-l8-JL-219, JL-l8-JL-220, JL-l8-JL-221

Measurement Procedure Used:

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

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 :
Date of Report :

Dec. 07, 2018-Dec. 22, 2018

Dec. 24, 2018

Prepared by :



Approved & Authorized Signer :

(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : music lamp

Model Number : JL-l8-JL-210, JL-l8-JL-211, JL-l8-JL-212, JL-l8-JL-213, JL-l8-JL-214, JL-l8-JL-215, JL-l8-JL-216, JL-l8-JL-217, JL-l8-JL-218, JL-l8-JL-219, JL-l8-JL-220, JL-l8-JL-221
(Note: We hereby state that these models are identical in interior structure, electrical circuits and components, Just model name is different, Therefore, only model JL-l8-JL-210 is tested for EMC tests.)

Bluetooth version : V5.0

Frequency Range : 2402MHz-2480MHz

Number of Channels : 79

Antenna Gain(Max) : -0.68dBi

Antenna type : PCB Antenna

Modulation mode : GFSK, $\pi/4$ DQPSK

Trade Name : Goldentrees, JSL, ilavie, JinLF

Rating : DC 3.7V (Powered by Lithium battery) or DC 5V (Powered by USB port)

Applicant : Golden Trees Technology Co.,Ltd.

Address : No.3, Nan Tong Blvd, Bao Long Industrial Area, LongGang District, ShenZhen, China

Manufacturer : Golden Trees Technology Co.,Ltd.

Address : No.3, Nan Tong Blvd, Bao Long Industrial Area, LongGang District, ShenZhen, China

Date of sample received : Dec. 06, 2018

Date of Test : Dec. 07, 2018-Dec. 22, 2018

1.2. Model difference declaration

JL-18-JL-210, JL-18-JL-211, JL-18-JL-212, JL-18-JL-213, JL-18-JL-214, JL-18-JL-215, JL-18-JL-216, JL-18-JL-217, JL-18-JL-218, JL-18-JL-219, JL-18-JL-220, JL-18-JL-221 are identical in PCB motherboard, driver IC, RF module and Enclosure except the model number is different.

1.3. Accessory and Auxiliary Equipment

AC/DC Power Adapter (provided by laboratory):	M/N: TEKA006-0501000UKU Input: 100-240V~50/60Hz 0.3A Output: DC 5V/1A
Notebook PC:	Manufacturer: Lenovo M/N: ThinkPad X240 S/N: 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 (ISED) 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 Site Location	: Shenzhen Accurate Technology Co., Ltd. : 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.5.Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty = 3.08dB, k=2
(9kHz-30MHz)

Radiated emission expanded uncertainty = 4.42dB, k=2
(30MHz-1000MHz)

Radiated emission expanded uncertainty = 4.06dB, k=2
(Above 1GHz)

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 06, 2018	Jan. 05, 2019
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 06, 2018	Jan. 05, 2019
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 06, 2018	Jan. 05, 2019
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 06, 2018	Jan. 05, 2019
Pre-Amplifier	Rohde&Schwarz	CBLU1183540 -01	3791	Jan. 06, 2018	Jan. 05, 2019
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 06, 2018	Jan. 05, 2019
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 06, 2018	Jan. 05, 2019
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 06, 2018	Jan. 05, 2019
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 06, 2018	Jan. 05, 2019
Open Switch and Control Unit	Rohde&Schwarz	OSP120 + OSP-B157	101244 + 100866	Jan. 06, 2018	Jan. 05, 2019
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 06, 2018	Jan. 05, 2019
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 06, 2018	Jan. 05, 2019
Highpass Filter	Wainwright Instruments	WHKX3.6/l8 G-10SS	N/A	Jan. 06, 2018	Jan. 05, 2019
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 06, 2018	Jan. 05, 2019

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode

Low Channel: 2402MHz
Middle Channel: 2441MHz
High Channel: 2480MHz
Hopping

3.2.Configuration and peripherals

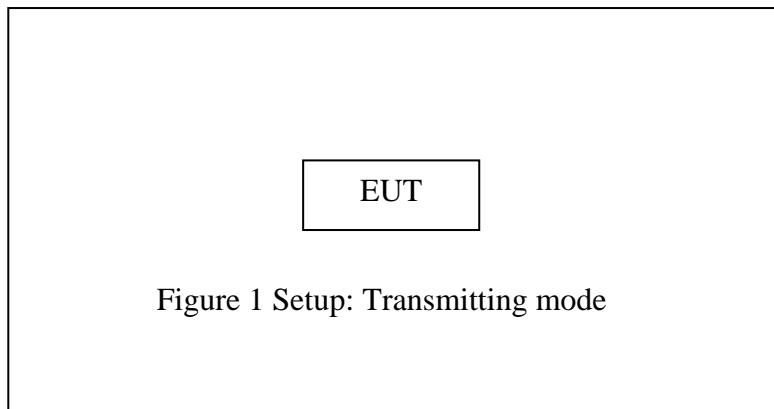


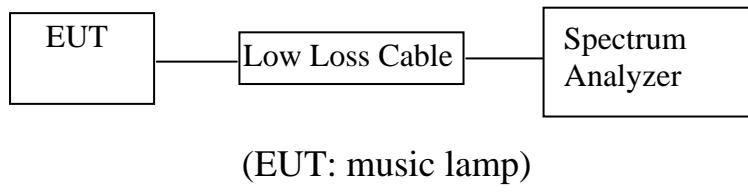
Figure 1 Setup: Transmitting mode

4. TEST PROCEDURES AND RESULTS

FCC&IC Rules	Description of Test	Result
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.247(a)(1)	20dB Bandwidth Test	Compliant
Section 15.247(a)(1)	Carrier Frequency Separation Test	Compliant
Section 15.247(a)(1)(iii)	Number Of Hopping Frequency Test	Compliant
Section 15.247(a)(1)(iii)	Dwell Time Test	Compliant
Section 15.247(b)(1)	Maximum Peak Output Power Test	Compliant
Section 15.247(d) Section 15.209	Radiated Emission Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 20DB BANDWIDTH TEST

5.1. Block Diagram of Test Setup



5.2. The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): 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.

5.3. EUT Configuration on Measurement

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.

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 (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 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. The RBW should be 1%~5% of OBW.

5.5.3. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

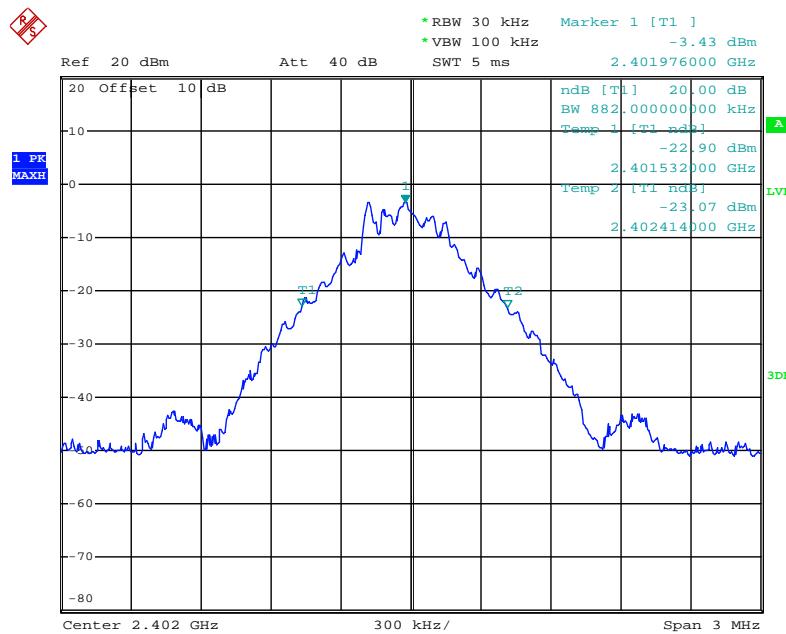
5.6. Test Result

Channel	Frequency (MHz)	GFSK mode 20dB Bandwidth (MHz)	$\pi/4$ DQPSK mode 20dB Bandwidth (MHz)	Result
Low	2402	0.882	1.224	Pass
Middle	2441	0.870	1.272	Pass
High	2480	0.882	1.242	Pass

The spectrum analyzer plots are attached as below.

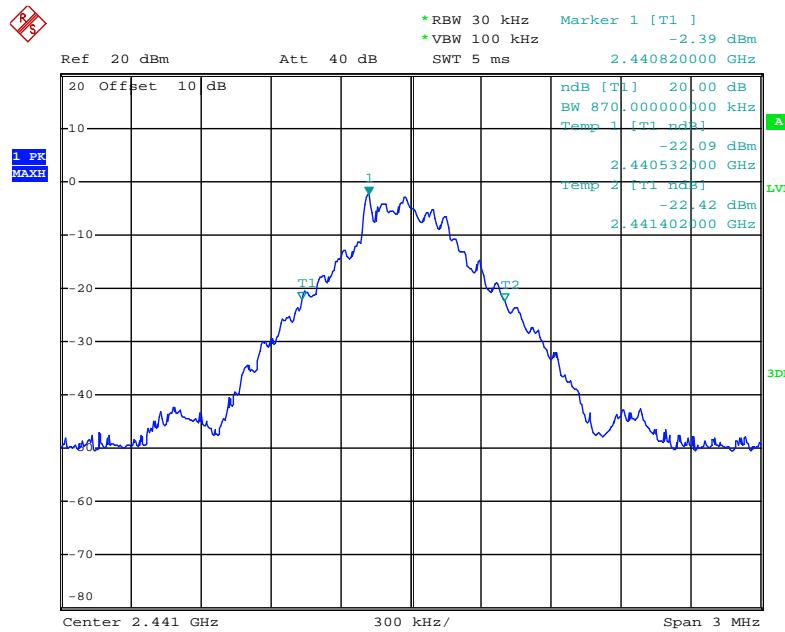
GFSK Mode

Low channel



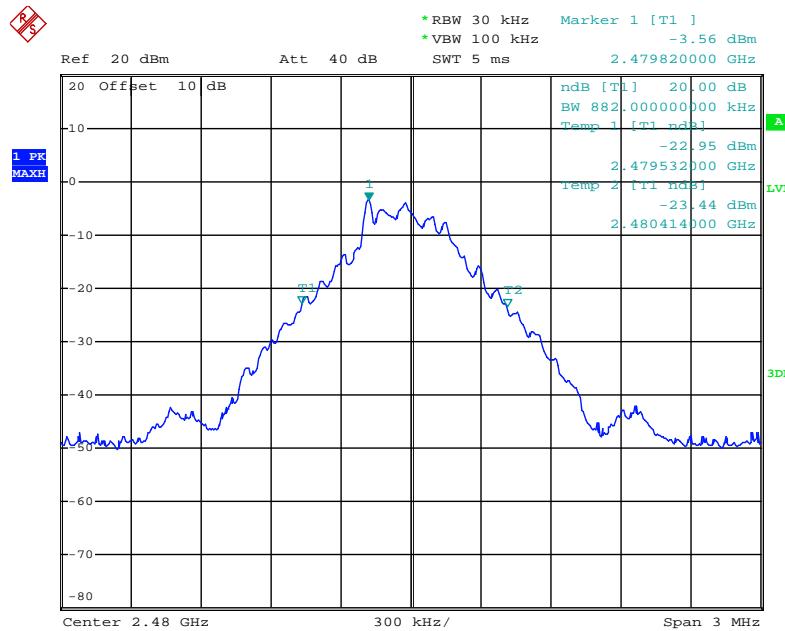
Date: 21.DEC.2018 14:31:02

Middle channel



Date: 21.DEC.2018 14:30:34

High channel



Date: 21.DEC.2018 14:29:49

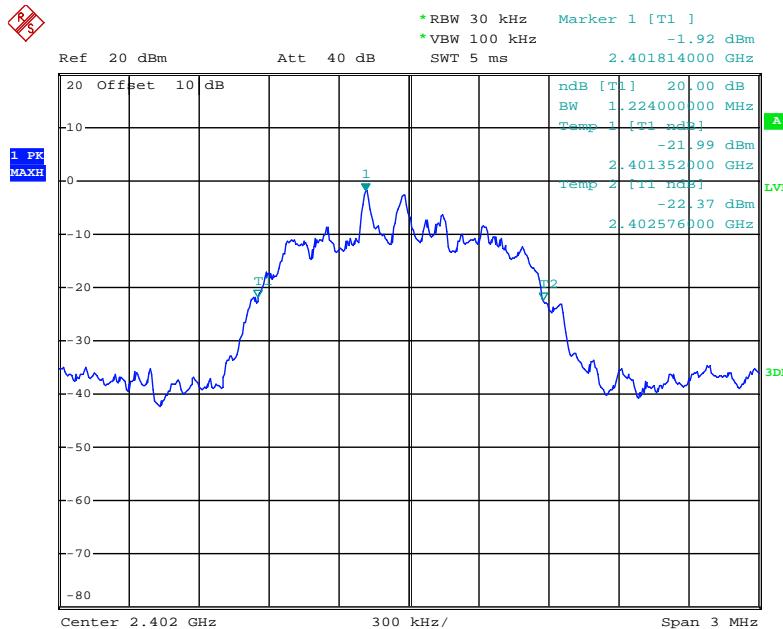
shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

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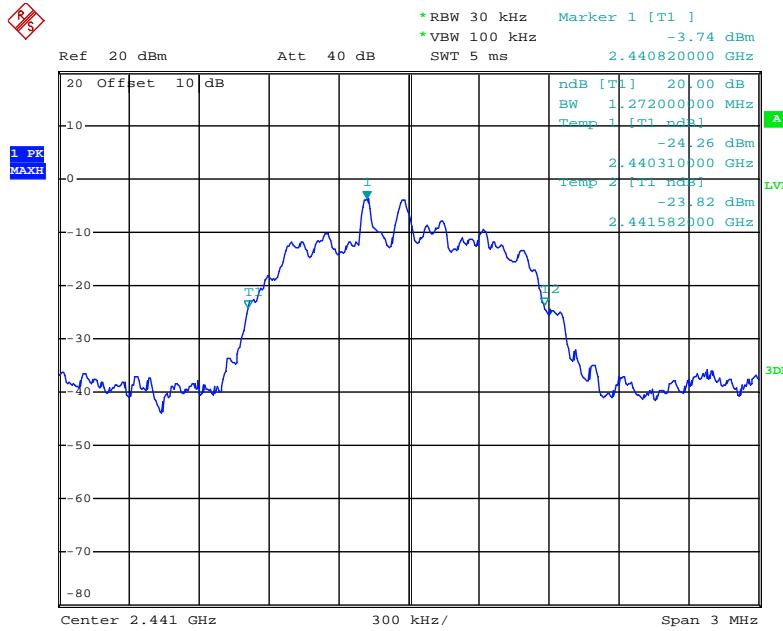
$\pi/4$ DQPSK Mode

Low channel

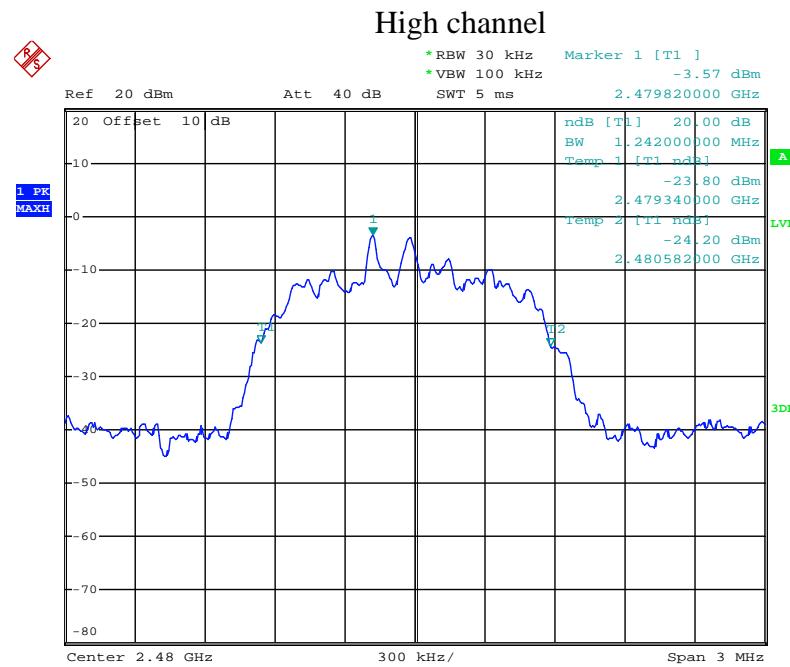


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Middle channel



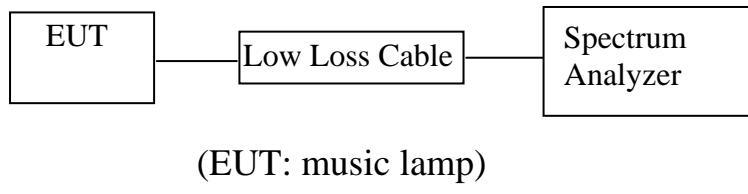
Date: 21.DEC.2018 14:32:50



Date: 21.DEC.2018 14:33:23

6. CARRIER FREQUENCY SEPARATION TEST

6.1. Block Diagram of Test Setup



6.2. The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

6.3. EUT Configuration on Measurement

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 (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 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 100 kHz and VBW to 300 kHz. Adjust Span to 3MHz.
- 6.5.3. Set the adjacent channel of the EUT Maxhold another trace.
- 6.5.4. Measurement the channel separation

6.6. Test Result

GFSK mode

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit	Result
Low	2402	1.002	25KHz or 0.588 MHz	PASS
	2403			
Middle	2440	1.002	25KHz or 0.580 MHz	PASS
	2441			
High	2479	1.008	25KHz or 0.588 MHz	PASS
	2480			

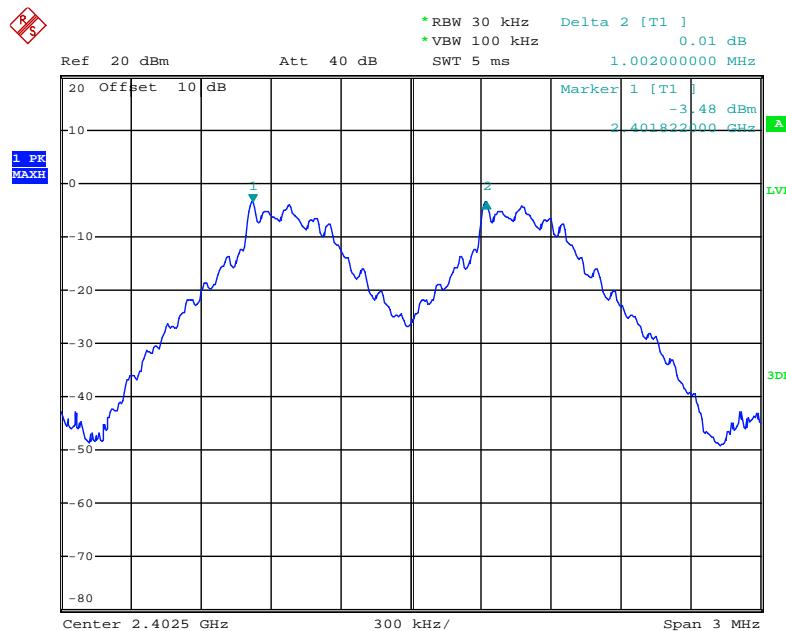
$\pi/4$ DQPSK mode

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit	Result
Low	2402	1.008	25KHz or 0.816 MHz	PASS
	2403			
Middle	2440	1.008	25KHz or 0.848 MHz	PASS
	2441			
High	2479	1.008	25KHz or 0.828 MHz	PASS
	2480			

The spectrum analyzer plots are attached as below.

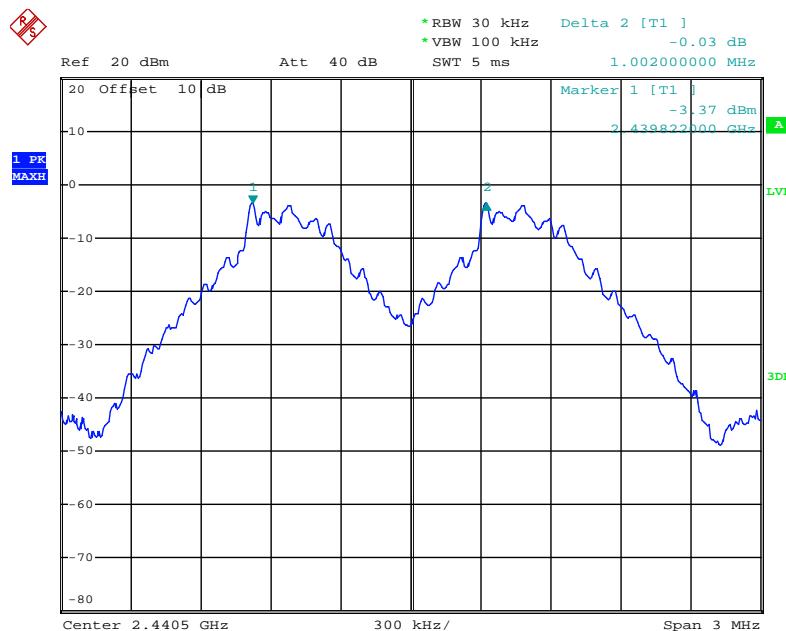
GFSK Mode

Low channel



Date: 21.DEC.2018 14:13:56

Middle channel



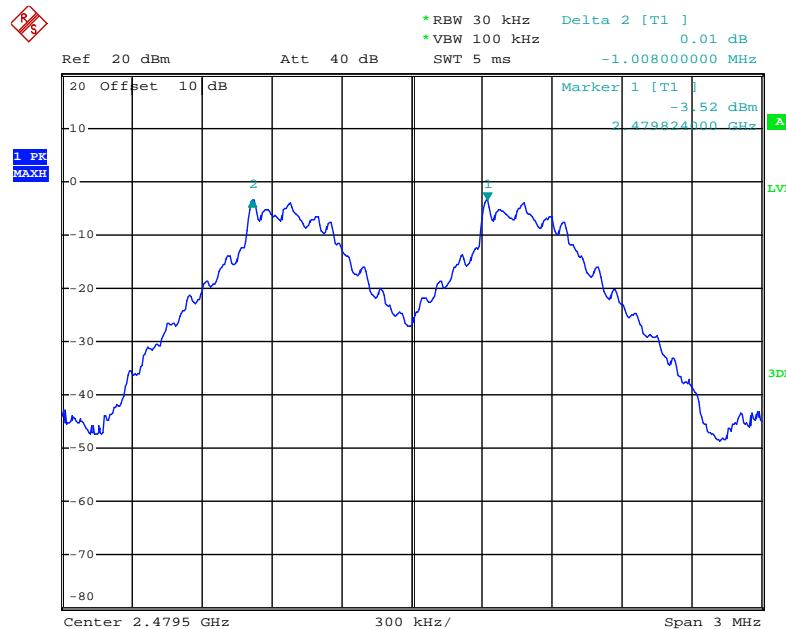
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shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com [Http://www.atc-lab.com](http://www.atc-lab.com)

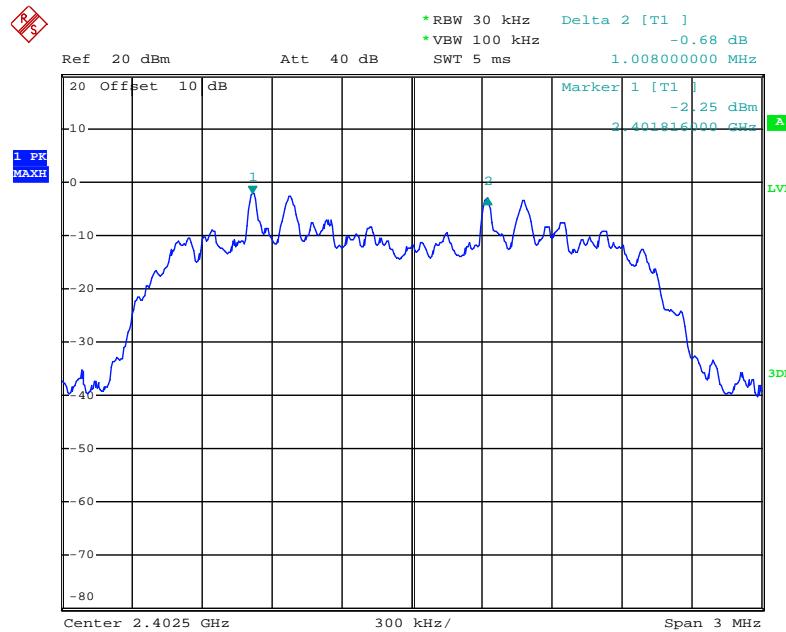
High channel



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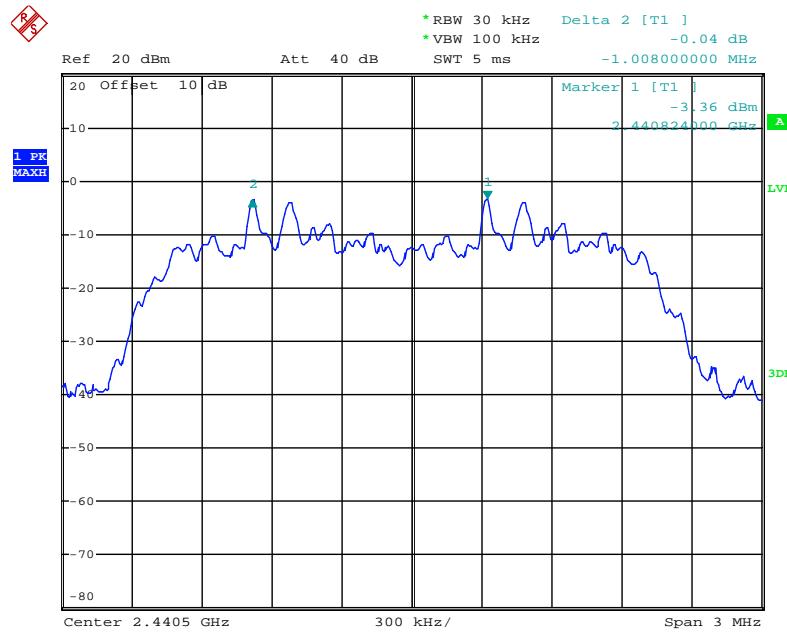
 $\pi/4$ DQPSK Mode

Low channel



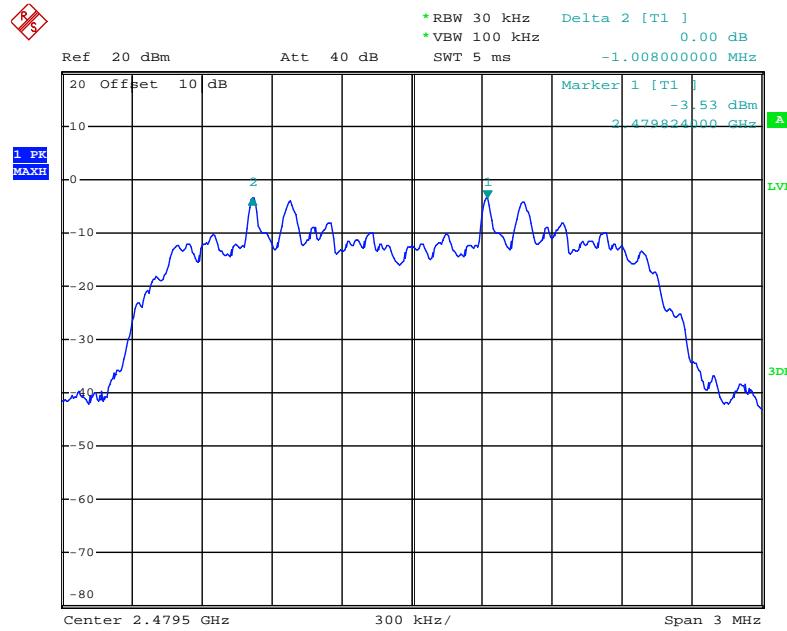
Date: 21.DEC.2018 14:19:26

Middle channel



Date: 21.DEC.2018 14:18:08

High channel



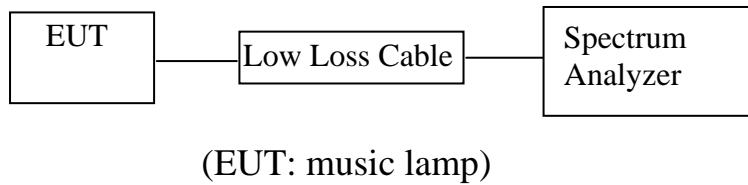
Date: 21.DEC.2018 14:16:48

shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China
Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com [Http://www.atc-lab.com](http://www.atc-lab.com)

7. NUMBER OF HOPPING FREQUENCY TEST

7.1. Block Diagram of Test Setup



7.2. The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

7.3. EUT Configuration on Measurement

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 (Hopping on) modes measure it.

7.5. Test Procedure

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

7.5.2. Set the spectrum analyzer as Span=90MHz, RBW=100 kHz, VBW=300 kHz.

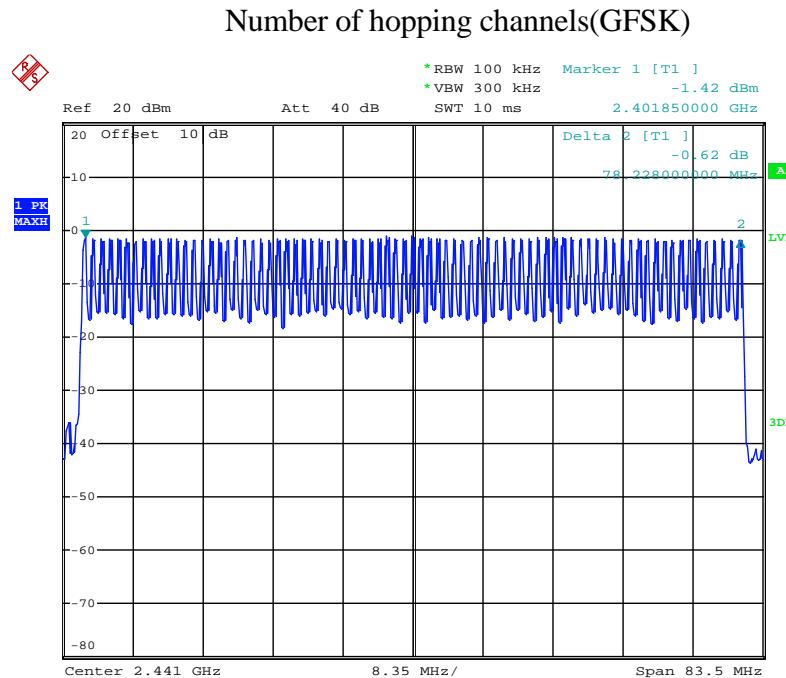
7.5.3. Max hold, view and count how many channel in the band.

7.6. Test Result

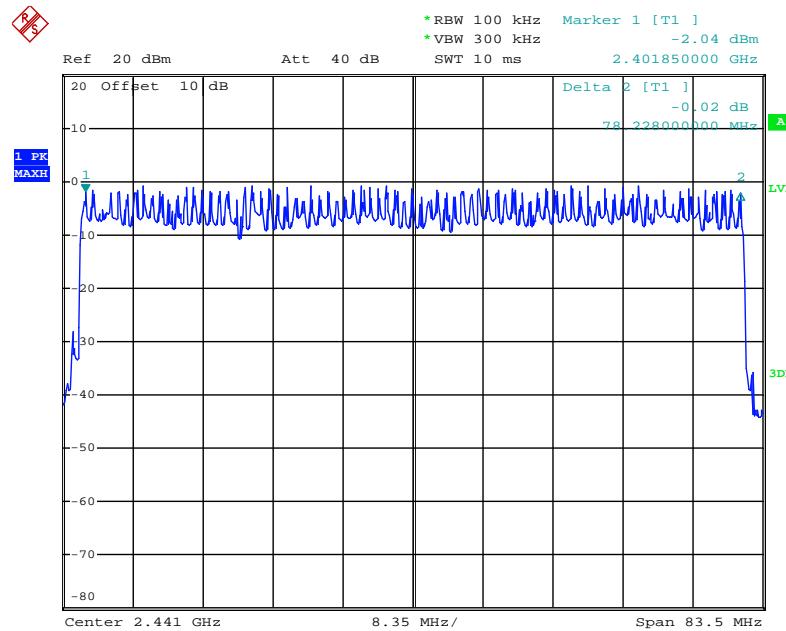
Total number of hopping channel (GFSK mode)	Measurement result(CH)	Limit(CH)
	79	≥ 15

Total number of hopping channel ($\pi/4$ DQPSK mode)	Measurement result(CH)	Limit(CH)
	79	≥ 15

The spectrum analyzer plots are attached as below.



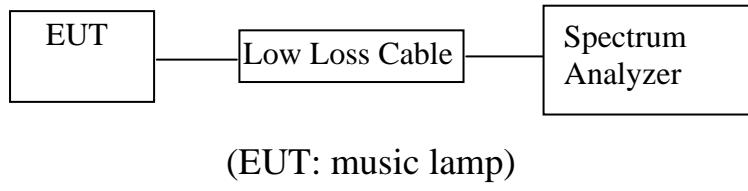
Date: 21.DEC.2018 14:11:40

Number of hopping channels($\pi/4$ DQPSK)

Date: 21.DEC.2018 14:04:49

8. DWELL TIME TEST

8.1. Block Diagram of Test Setup



8.2. The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

8.3. EUT Configuration on Measurement

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 (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

8.5. Test Procedure

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

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

8.5.3. Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=5ms, 10ms, 15ms. Get the pulse time.

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

8.6. Test Result

GFSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.400	128.00	400
	2441	0.400	128.00	400
	2480	0.400	128.00	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2*79)) \times 31.6$				
DH3	2402	1.680	268.80	400
	2441	1.680	268.80	400
	2480	1.680	268.80	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4*79)) \times 31.6$				
DH5	2402	2.940	313.60	400
	2441	2.970	316.80	400
	2480	2.940	313.60	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$				

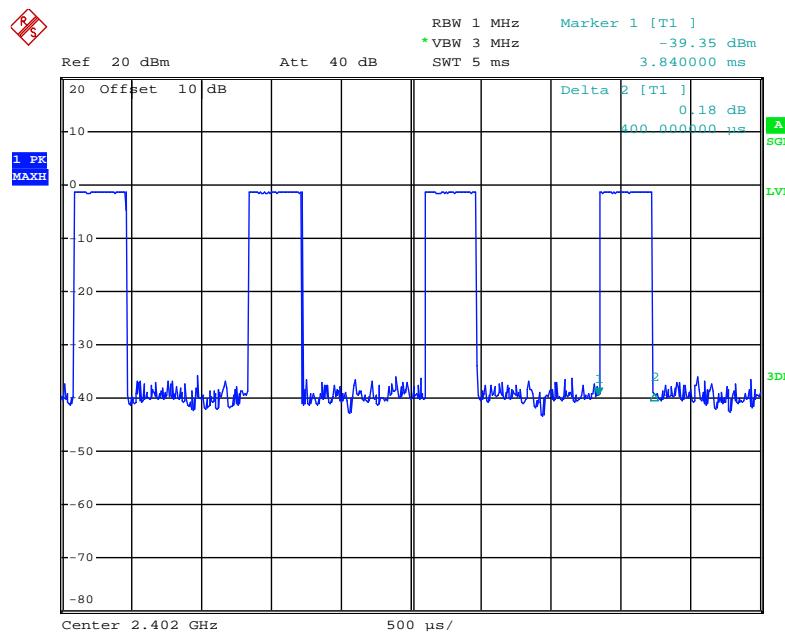
$\pi/4$ DQPSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.410	131.20	400
	2441	0.410	131.20	400
	2480	0.410	131.20	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2*79)) \times 31.6$				
DH3	2402	1.690	270.40	400
	2441	1.680	268.80	400
	2480	1.690	270.40	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4*79)) \times 31.6$				
DH5	2402	2.980	317.87	400
	2441	2.940	313.60	400
	2480	2.940	313.60	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$				

The spectrum analyzer plots are attached as below.

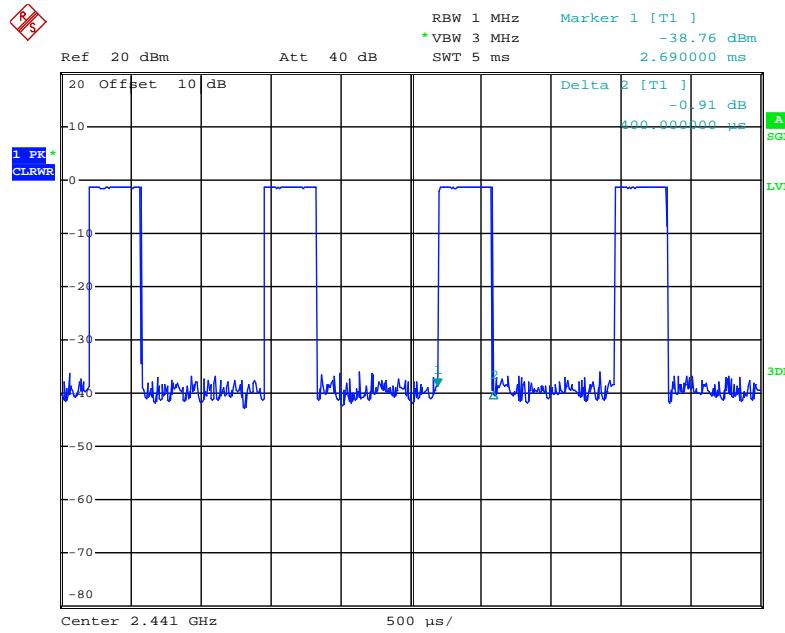
GFSK Mode

DH1 Low channel



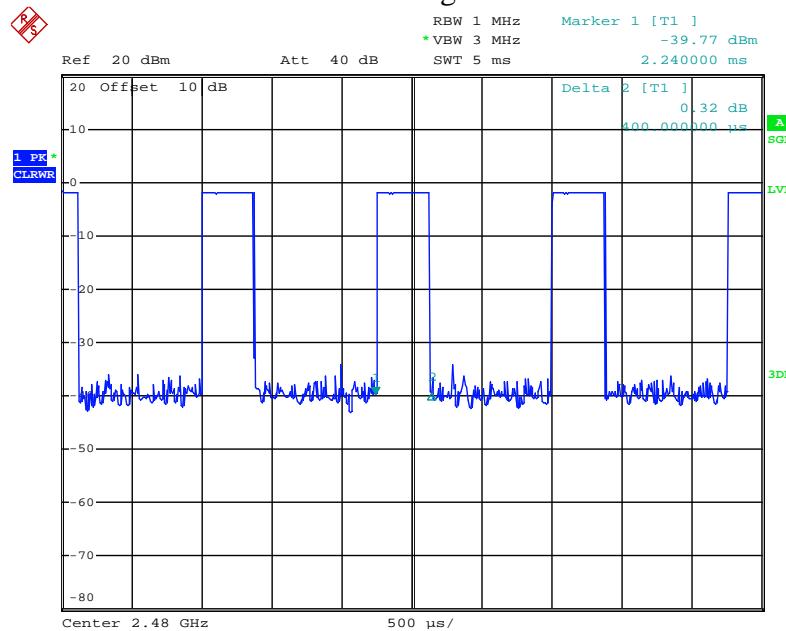
Date: 21.DEC.2018 14:36:09

DH1 Middle channel



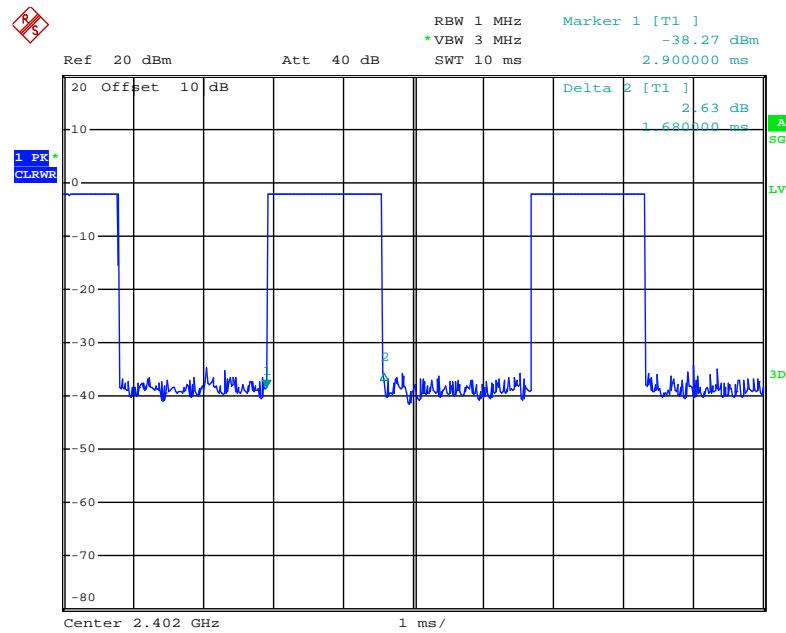
Date: 21.DEC.2018 15:17:13

DH1 High channel



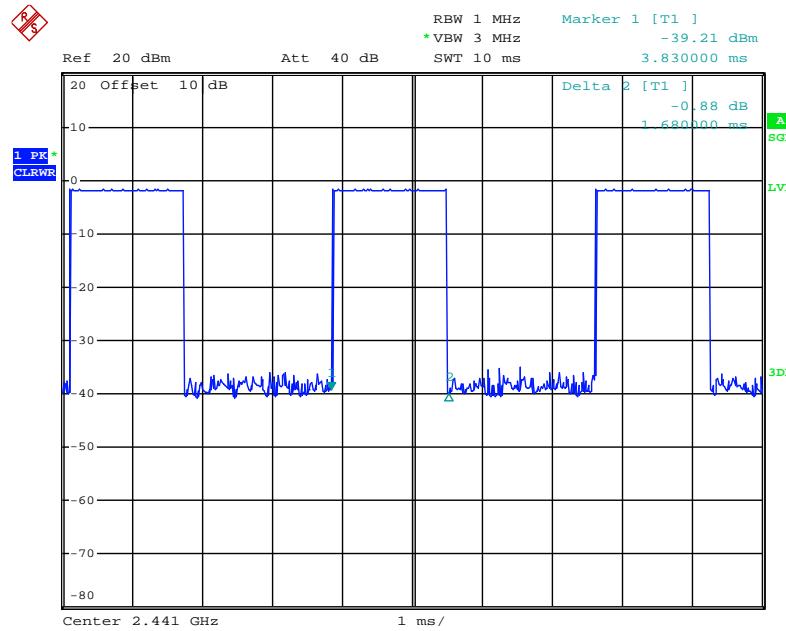
Date: 21.DEC.2018 15:20:51

DH3 Low channel



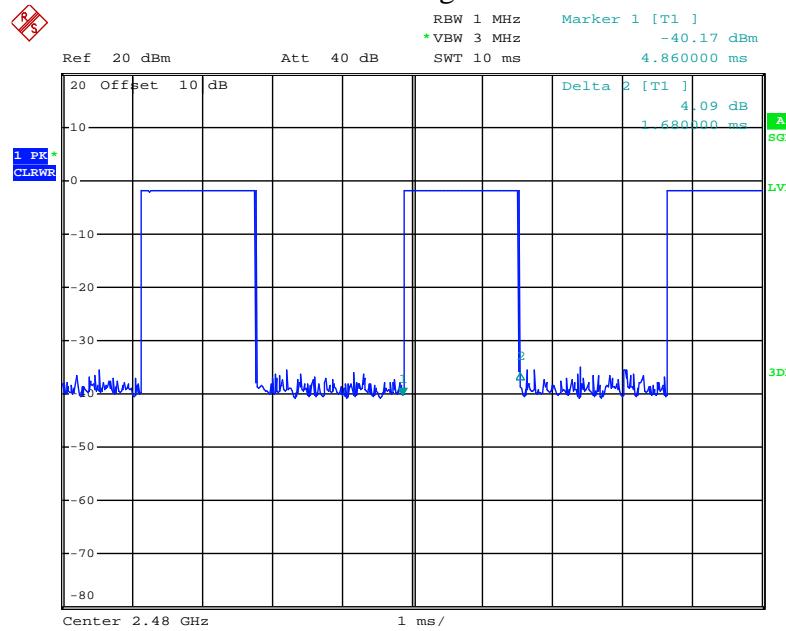
Date: 21.DEC.2018 15:14:09

DH3 Middle channel



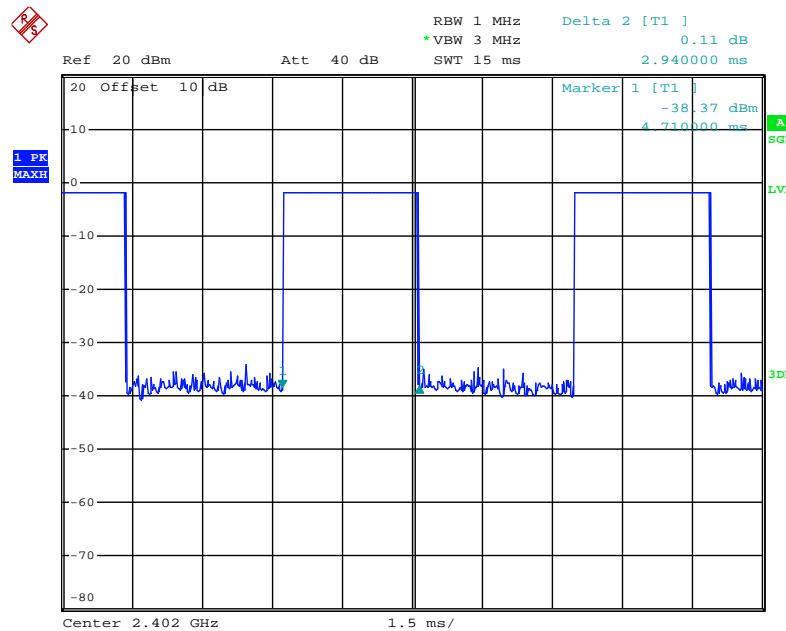
Date: 21.DEC.2018 15:17:56

DH3 High channel



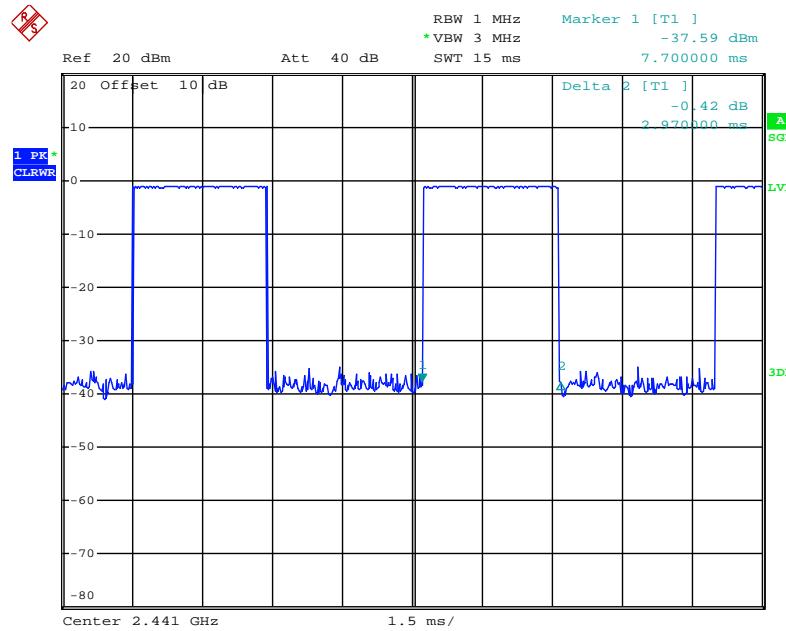
Date: 21.DEC.2018 15:20:08

DH5 Low channel



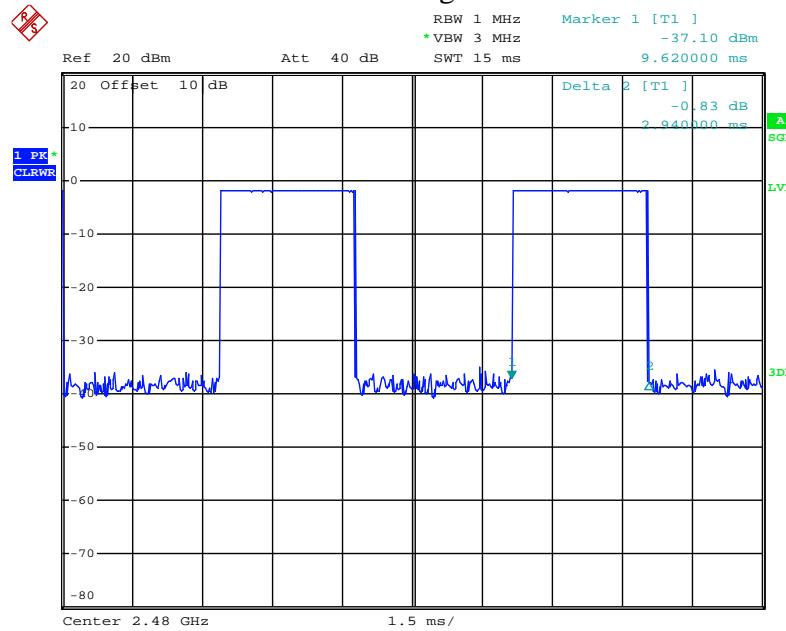
Date: 21.DEC.2018 14:37:44

DH5 Middle channel



Date: 21.DEC.2018 15:18:30

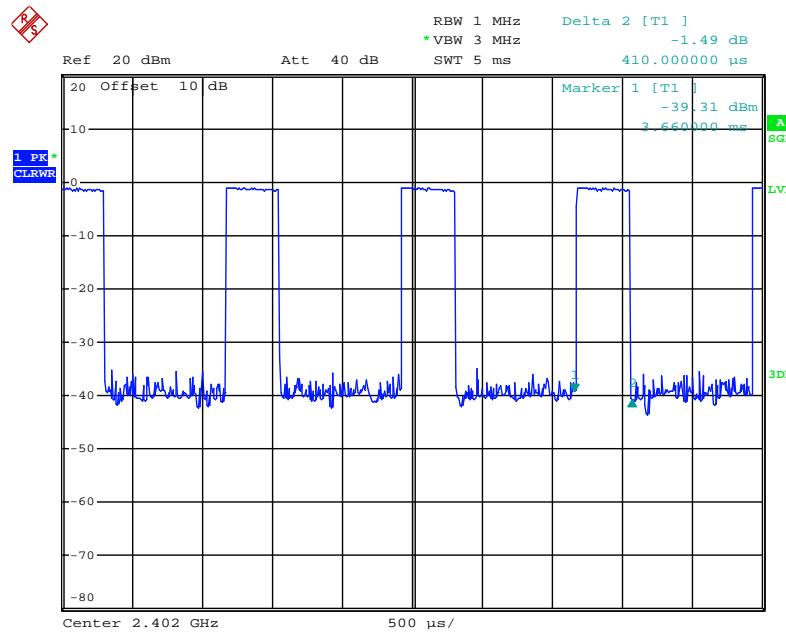
DH5 High channel



Date: 21.DEC.2018 15:19:28

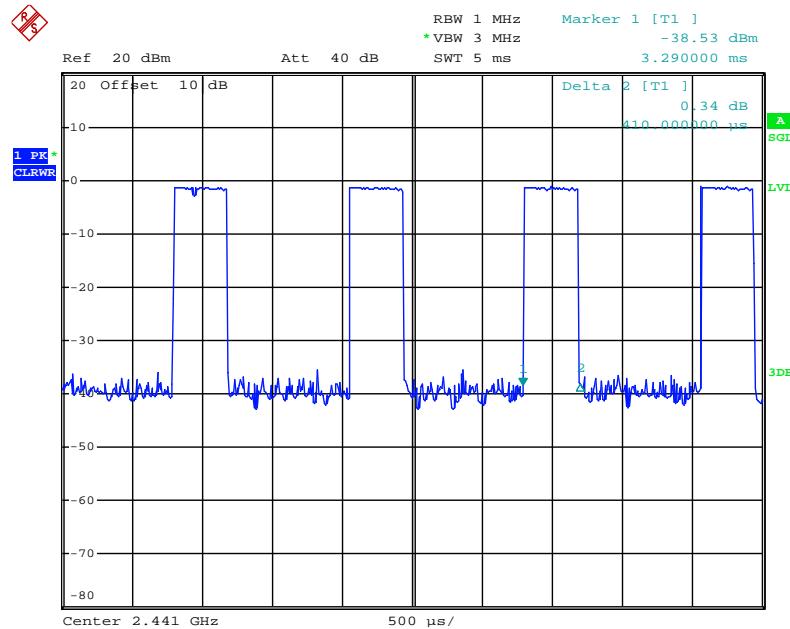
 $\pi/4$ DQPSK Mode

2DH1 Low channel



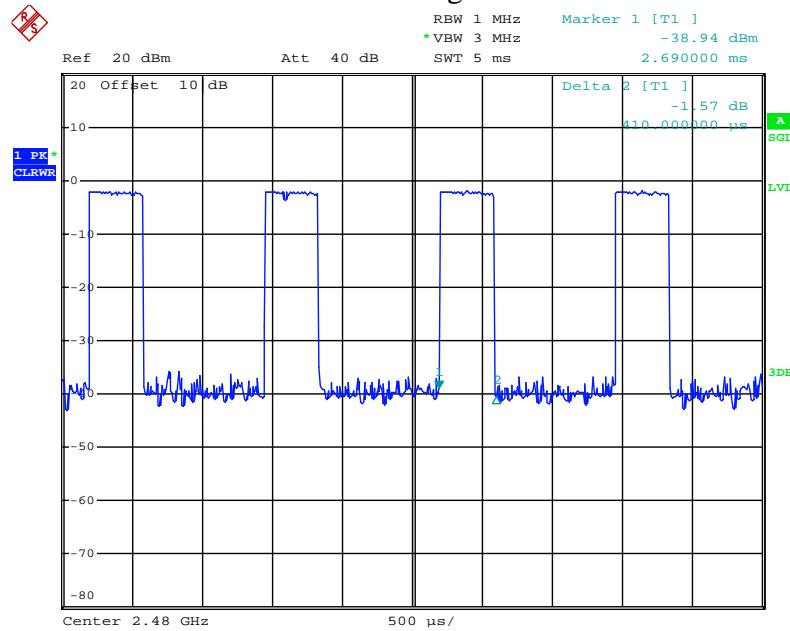
Date: 21.DEC.2018 15:25:46

2DH1 Middle channel



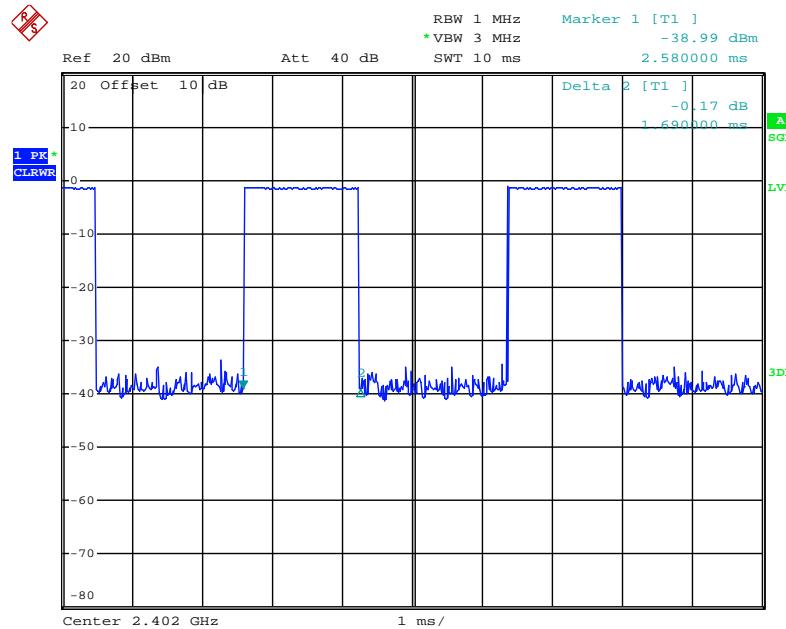
Date: 21.DEC.2018 15:25:10

2DH1 High channel



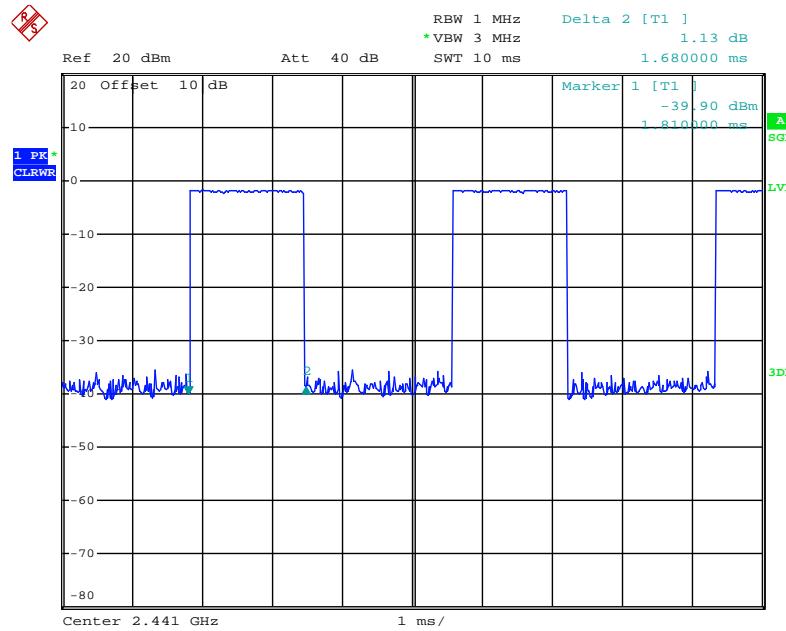
Date: 21.DEC.2018 15:22:16

2DH3 Low channel



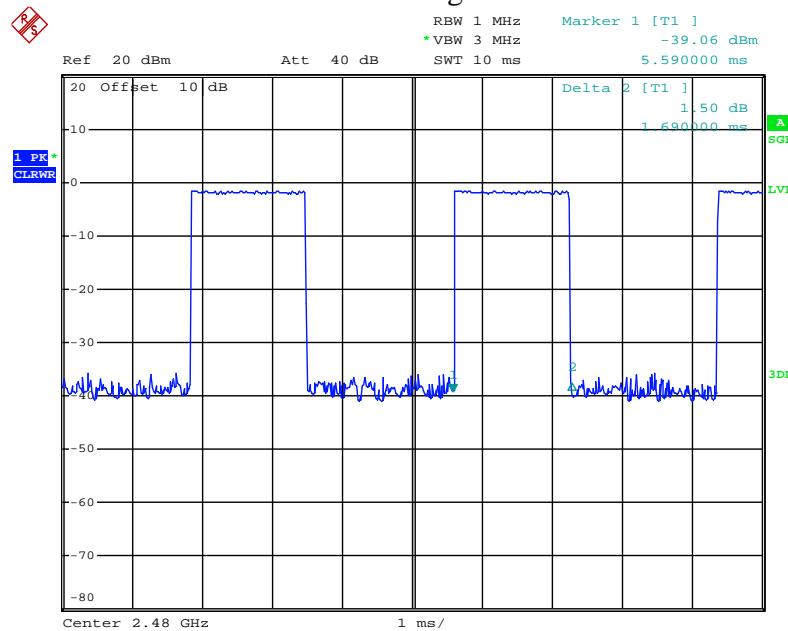
Date: 21.DEC.2018 15:26:15

2DH3 Middle channel



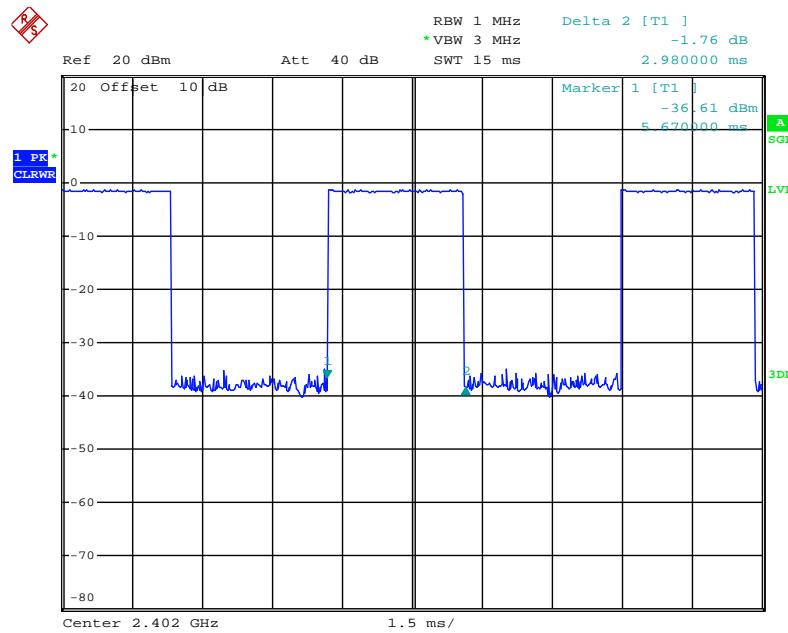
Date: 21.DEC.2018 15:24:41

2DH3 High channel



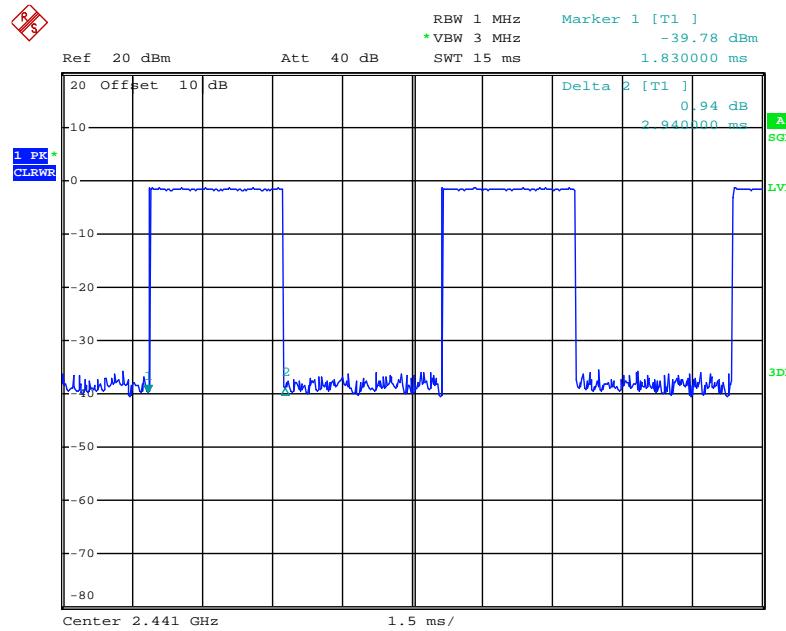
Date: 21.DEC.2018 15:22:59

2DH5 Low channel



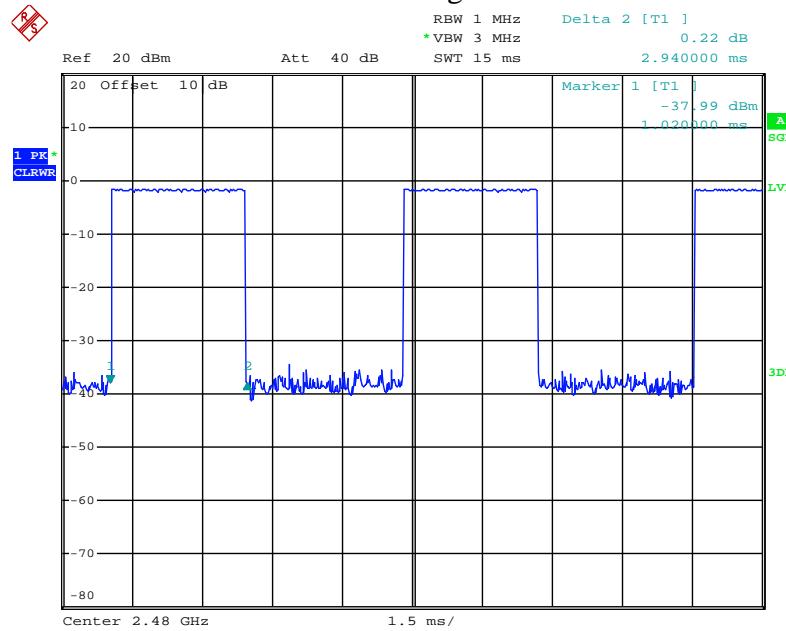
Date: 21.DEC.2018 15:26:48

2DH5 Middle channel



Date: 21.DEC.2018 15:24:15

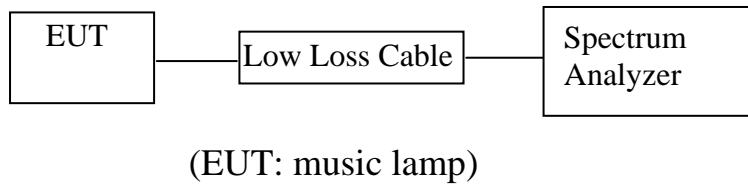
2DH5 High channel



Date: 21.DEC.2018 15:23:39

9. MAXIMUM PEAK OUTPUT POWER TEST

9.1. Block Diagram of Test Setup



9.2. The Requirement For Section 15.247(b)(1)

Section 15.247(b)(1): 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.

9.3. EUT Configuration on Measurement

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.

9.4. Operating Condition of EUT

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

9.4.2. Turn on the power of all equipment.

9.4.3. Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

9.5. Test Procedure

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

9.5.2. Set RBW of spectrum analyzer to 3MHz and VBW to 10MHz for GFSK mode

9.5.3. Set RBW of spectrum analyzer to 3MHz and VBW to 10MHz for $\pi/4$ DQPSK

mode.

9.5.4. Measurement the maximum peak output power.

9.6. Test Result

GFSK Mode

Frequency (MHz)	Maximum peak conducted output power (dBm)	Maximum peak conducted output power (W)	Limits dBm / W
2402	-1.70	0.000676	21 / 0.125
2441	-1.48	0.000711	21 / 0.125
2480	-1.67	0.000681	21 / 0.125

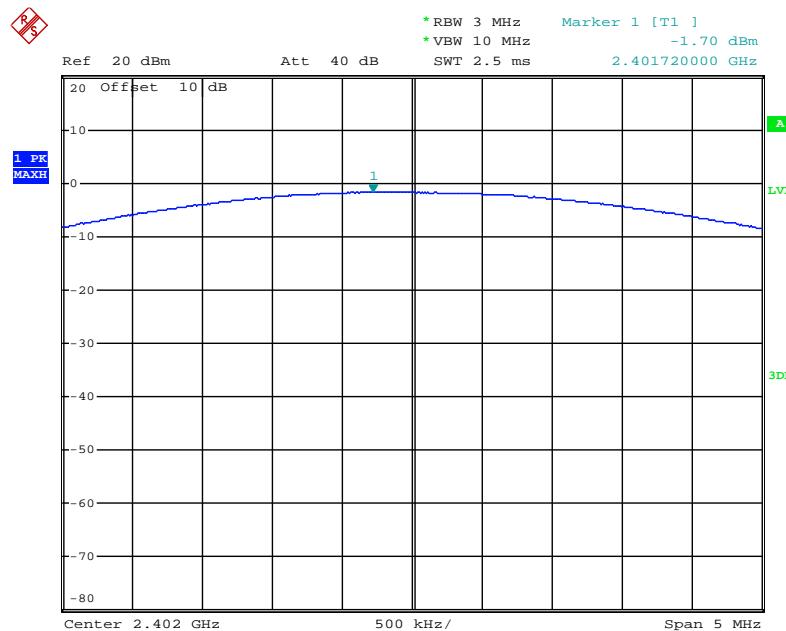
$\pi/4$ DQPSK Mode

Frequency (MHz)	Maximum peak conducted output power (dBm)	Maximum peak conducted output power (W)	Limits dBm / W
2402	-0.81	0.000830	21 / 0.125
2441	-0.69	0.000853	21 / 0.125
2480	-0.57	0.000877	21 / 0.125

The spectrum analyzer plots are attached as below.

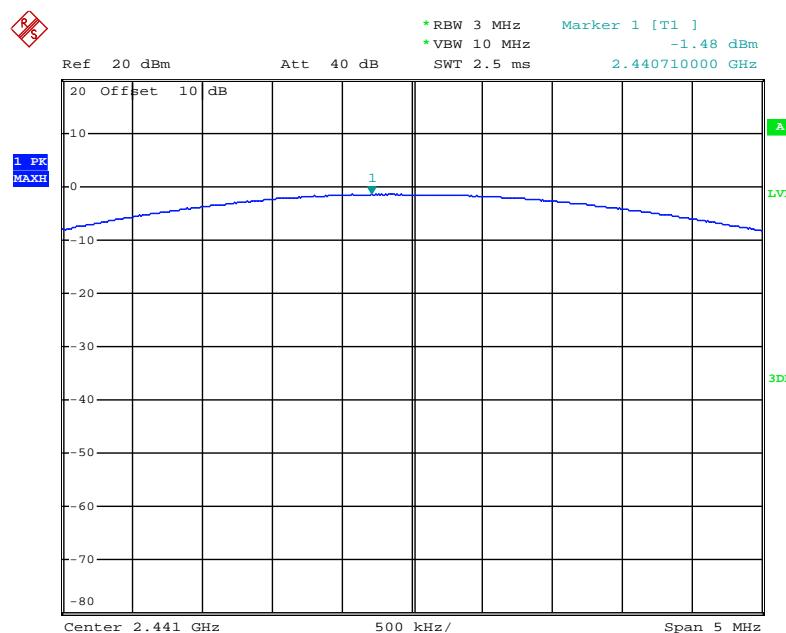
GFSK Mode

Low channel



Date: 21.DEC.2018 13:53:33

Middle channel



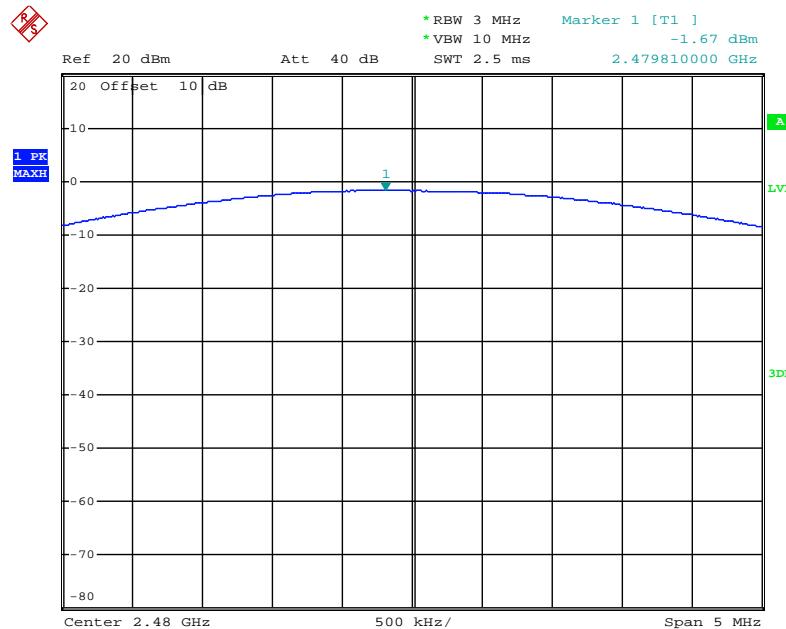
Date: 21.DEC.2018 13:54:27

shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com Http://www.atc-lab.com

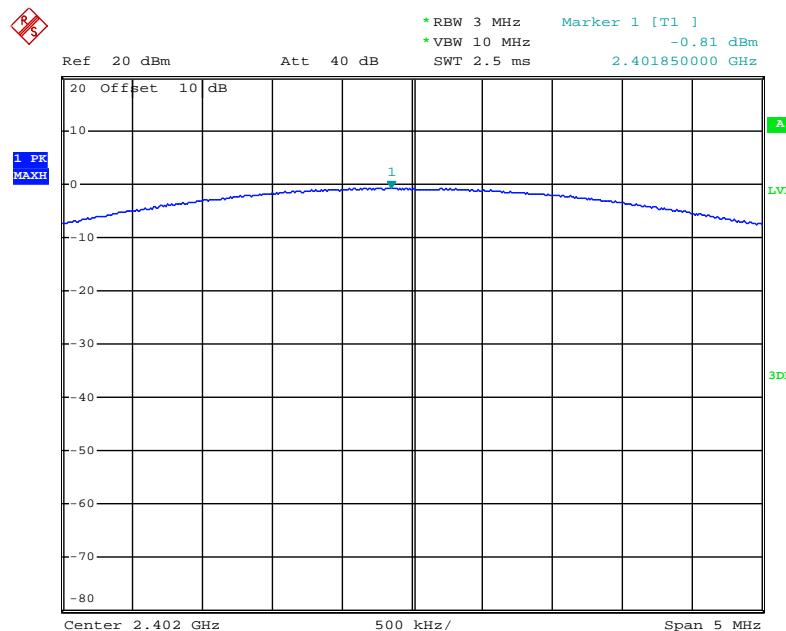
High channel



Date: 21.DEC.2018 13:54:57

 $\pi/4$ DQPSK Mode

Low channel



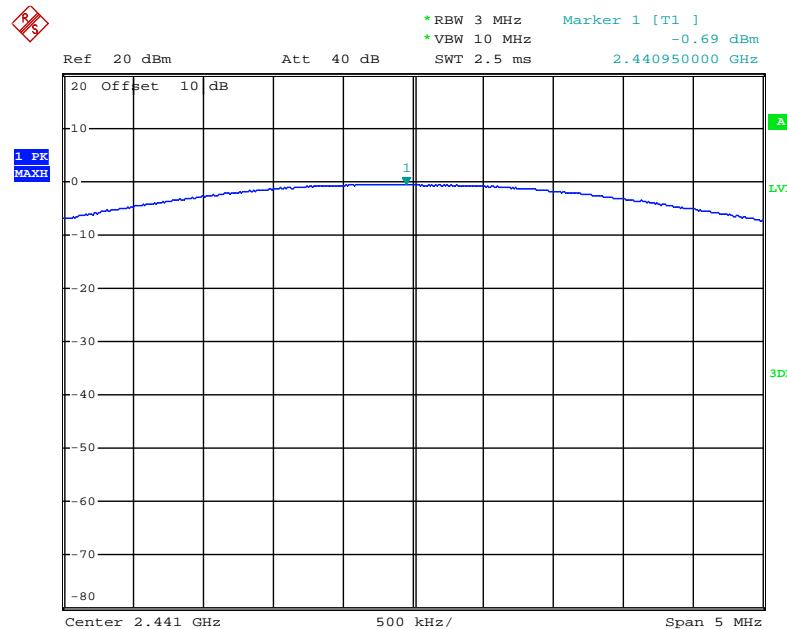
Date: 21.DEC.2018 14:01:38

shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

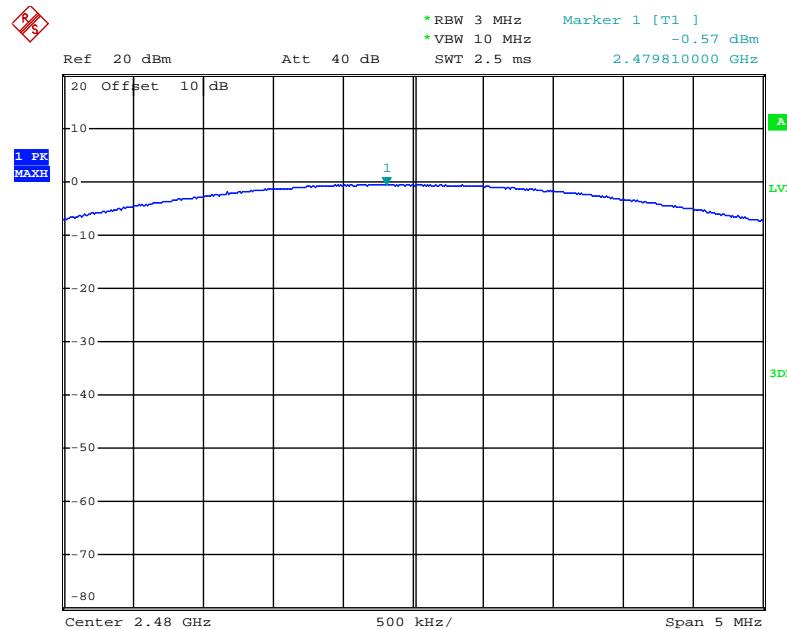
Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com Http://www.atc-lab.com

Middle channel



Date: 21.DEC.2018 13:57:22

High channel



Date: 21.DEC.2018 13:56:04

shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China
Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com [Http://www.atc-lab.com](http://www.atc-lab.com)

10.RADIATED EMISSION TEST

10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and peripherals

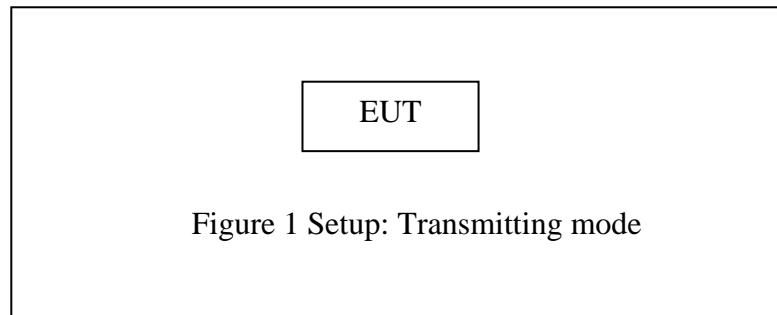
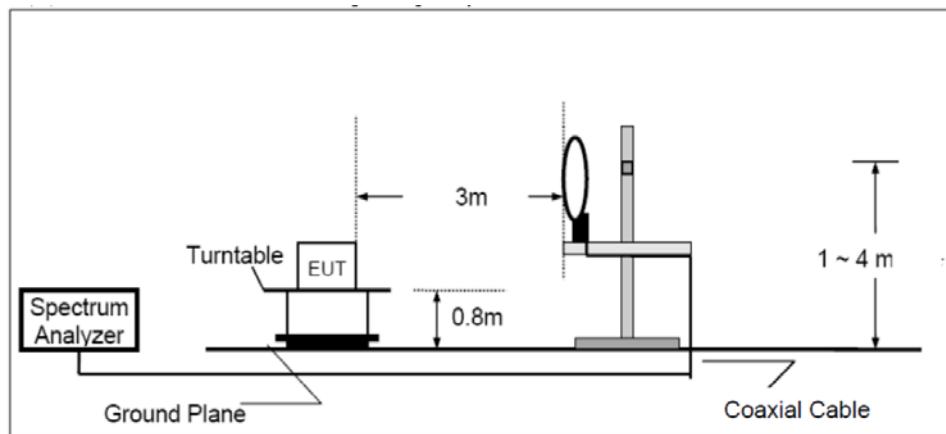


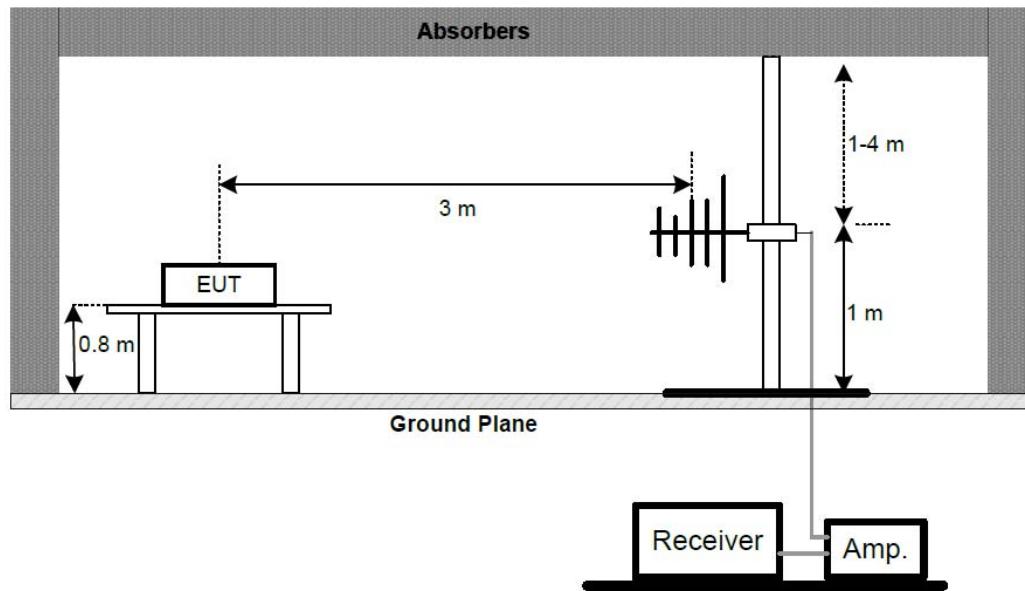
Figure 1 Setup: Transmitting mode

10.1.2.Semi-Anechoic Chamber Test Setup Diagram

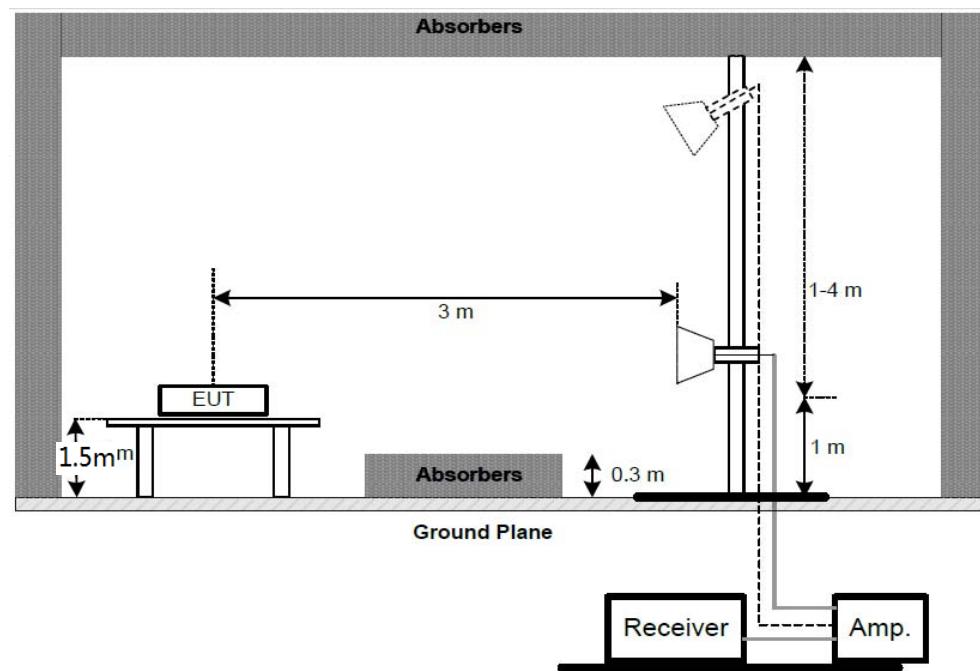
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



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



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



10.2.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).

10.3.Restricted bands of operation

10.3.1.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			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510

²Above 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 Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

10.4. Configuration of EUT on Measurement

The equipment is 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.

10.5. 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.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

10.6.Data Sample

Frequency (MHz)	Reading (dB μ V)	Factor (dB/m)	Result (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Remark
X.XX	48.69	-13.35	35.34	46	-10.66	QP

Frequency(MHz) = Emission frequency in MHz

Reading(dB μ V) = Uncorrected Analyzer/Receiver reading

Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain

Result(dB μ V/m) = Reading(dB μ V) + Factor(dB/m)

Limit (dB μ V/m) = Limit stated in standard

Margin (dB) = Result(dB μ V/m) - Limit (dB μ V/m)

QP = Quasi-peak Reading

Calculation Formula:

Margin(dB) = Result (dB μ V/m)–Limit(dB μ V/m)

Result(dB μ V/m)= Reading(dB μ V)+ 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.

10.7.The Field Strength of Radiation Emission Measurement Results

Note: 1.We tested GFSK mode and $\Pi/4$ -DQPSK Mode and recorded the worst case data

($\Pi/4$ -DQPSK mode) for all test mode.

2.The radiation emissions from 9kHz-30MHz and 18-25GHz are not reported, because the test values lower than the limits of 20dB.

The spectrum analyzer plots are attached as below.

30MHz-1000MHz test data(Worse case)



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: FRANK2018A #574

Polarization: Horizontal

Standard: FCC Class B 3M Radiated

Power Source: AC 120V/60Hz

Test item: Radiation Test

Date: 18/12/12/

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 10/00/06

EUT: Music Lamp

Engineer Signature:

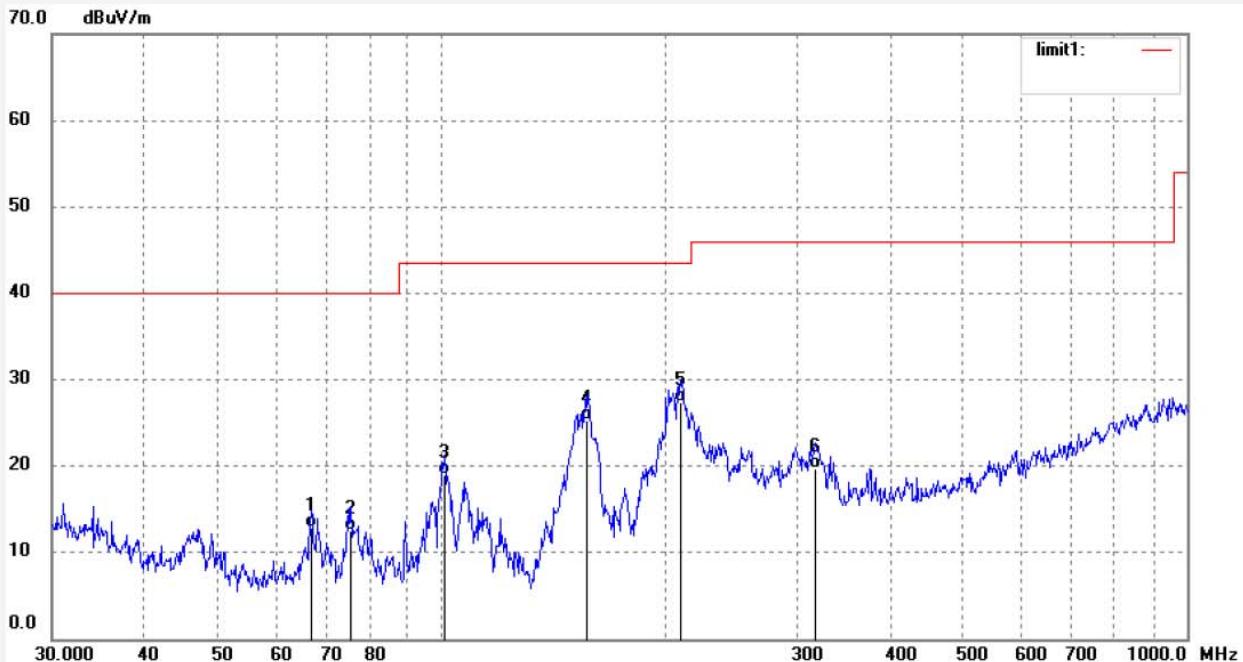
Mode: Charging&BT OPERATION

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	66.8395	40.21	-27.36	12.85	40.00	-27.15	QP	200	122	
2	75.5858	40.21	-27.67	12.54	40.00	-27.46	QP	200	20	
3	100.8247	46.98	-28.05	18.93	43.50	-24.57	QP	200	164	
4	156.4259	52.78	-27.46	25.32	43.50	-18.18	QP	200	218	
5	209.3924	51.48	-24.12	27.36	43.50	-16.14	QP	200	221	
6	316.9717	40.45	-20.74	19.71	46.00	-26.29	QP	200	91	



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #575

Polarization: Vertical

Standard: FCC Class B 3M Radiated

Power Source: AC 120V/60Hz

Test item: Radiation Test

Date: 18/12/12/

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 10/00/55

EUT: Music Lamp

Engineer Signature:

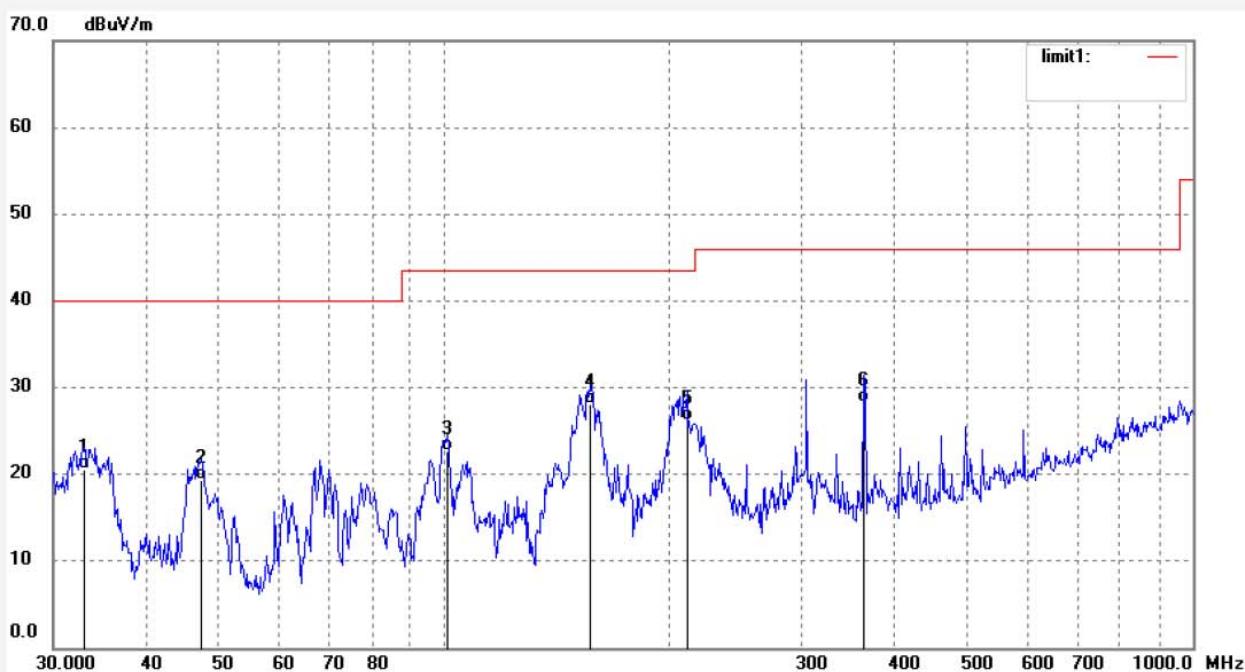
Mode: Charging&BT OPERATION

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	32.9853	41.48	-20.95	20.53	40.00	-19.47	QP	100	103	
2	47.3688	44.54	-25.26	19.28	40.00	-20.72	QP	100	210	
3	100.8247	50.65	-28.05	22.60	43.50	-20.90	QP	100	101	
4	156.4259	55.48	-27.46	28.02	43.50	-15.48	QP	100	68	
5	210.8689	50.18	-24.10	26.08	43.50	-17.42	QP	100	51	
6	363.5230	47.15	-18.86	28.29	46.00	-17.71	QP	100	116	

1GHz-18GHz test data(Worse case)



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Science & Industry Park,Nanshan Shenzhen,P.R.ChinaSite: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #599

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:44:21

EUT: Music Lamp

Engineer Signature:

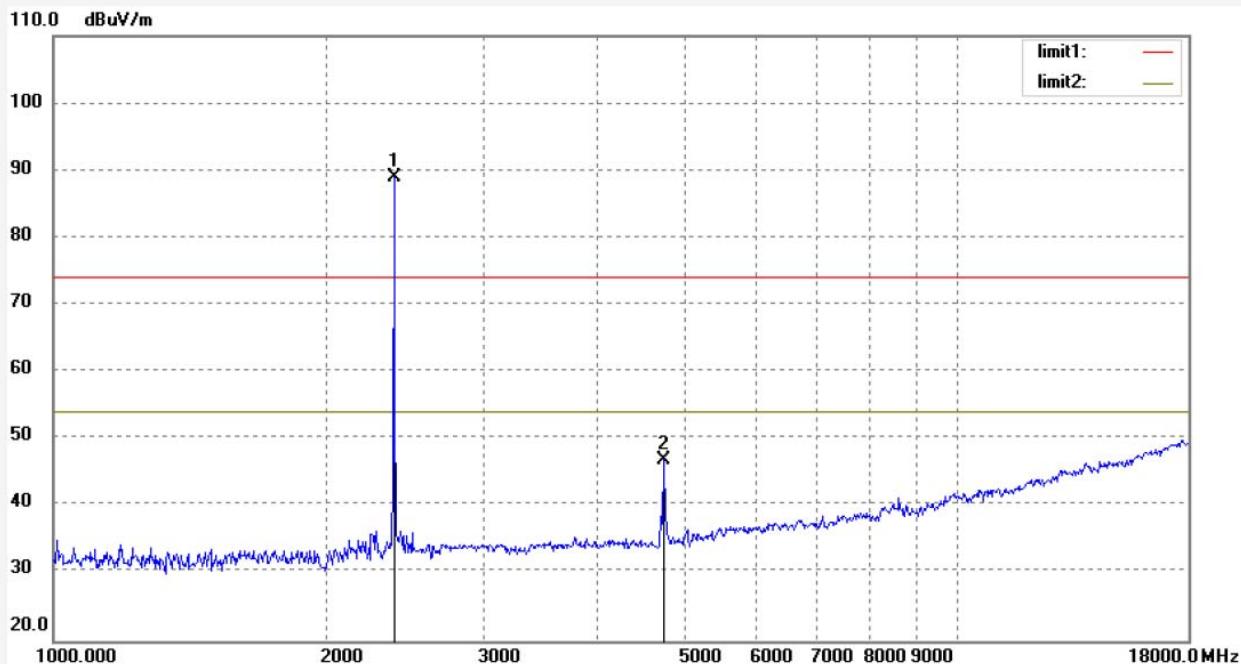
Mode: TX 2402MHz

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.119	95.23	-6.37	88.86			peak	250	222	
2	4804.257	46.27	0.70	46.97	74.00	-27.03	peak	250	103	



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #598

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:43:19

EUT: Music Lamp

Engineer Signature:

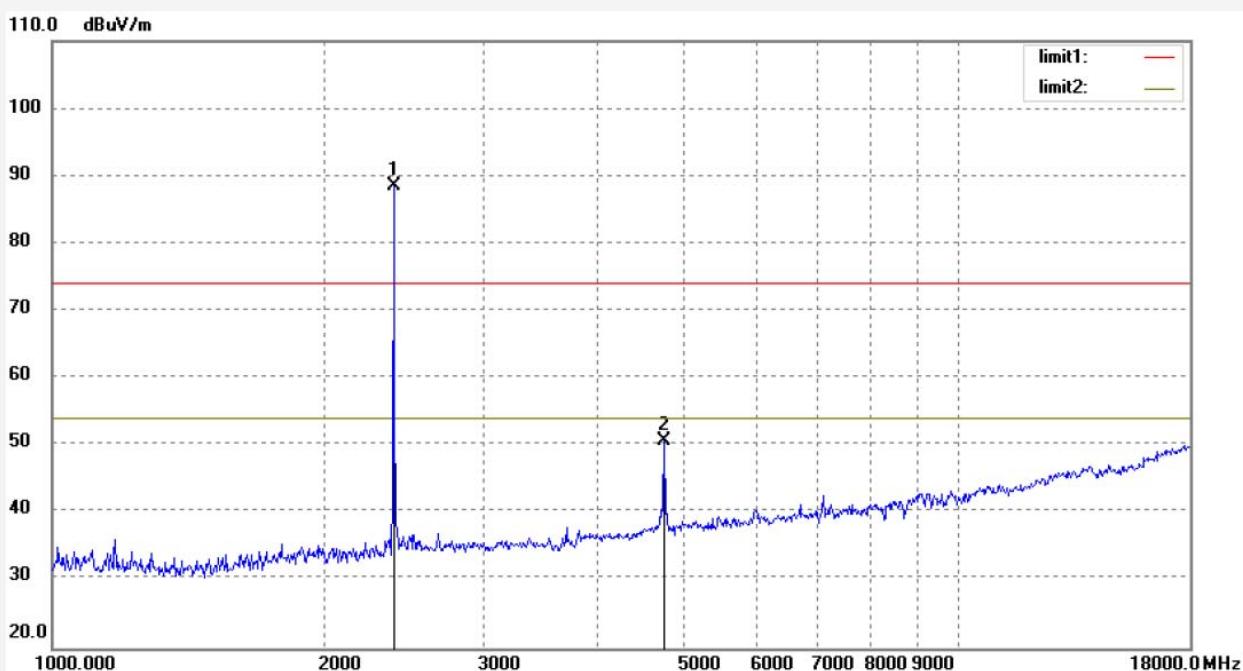
Mode: TX 2402MHz

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.119	94.95	-6.37	88.58			peak	150	155	
2	4804.257	50.01	0.70	50.71	74.00	-23.29	peak	150	302	

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Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com Http://www.atc-lab.com



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #596

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:39:46

EUT: Music Lamp

Engineer Signature:

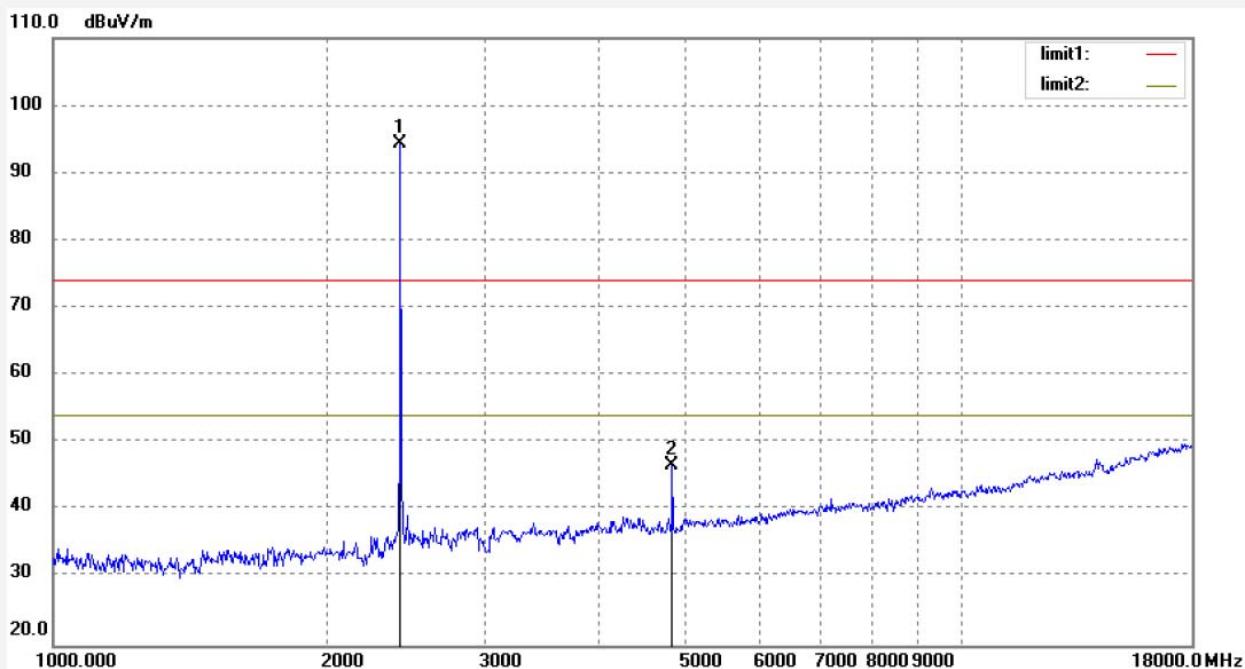
Mode: TX 2441MHz

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.161	100.67	-6.20	94.47			peak	250	126	
2	4882.324	45.62	1.07	46.69	74.00	-27.31	peak	250	104	

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Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com Http://www.atc-lab.com



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #597

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:41:38

EUT: Music Lamp

Engineer Signature:

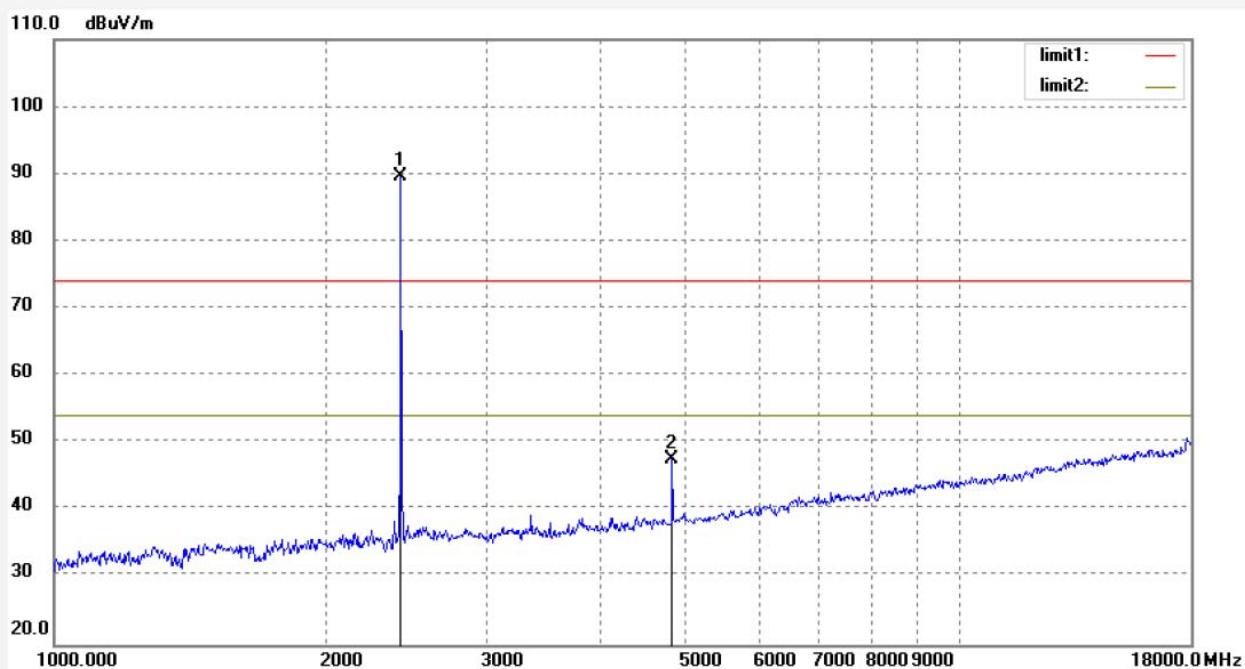
Mode: TX 2441MHz

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.161	95.93	-6.20	89.73			peak	150	165	
2	4882.324	46.52	1.07	47.59	74.00	-26.41	peak	150	302	



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #595

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:36:34

EUT: Music Lamp

Engineer Signature:

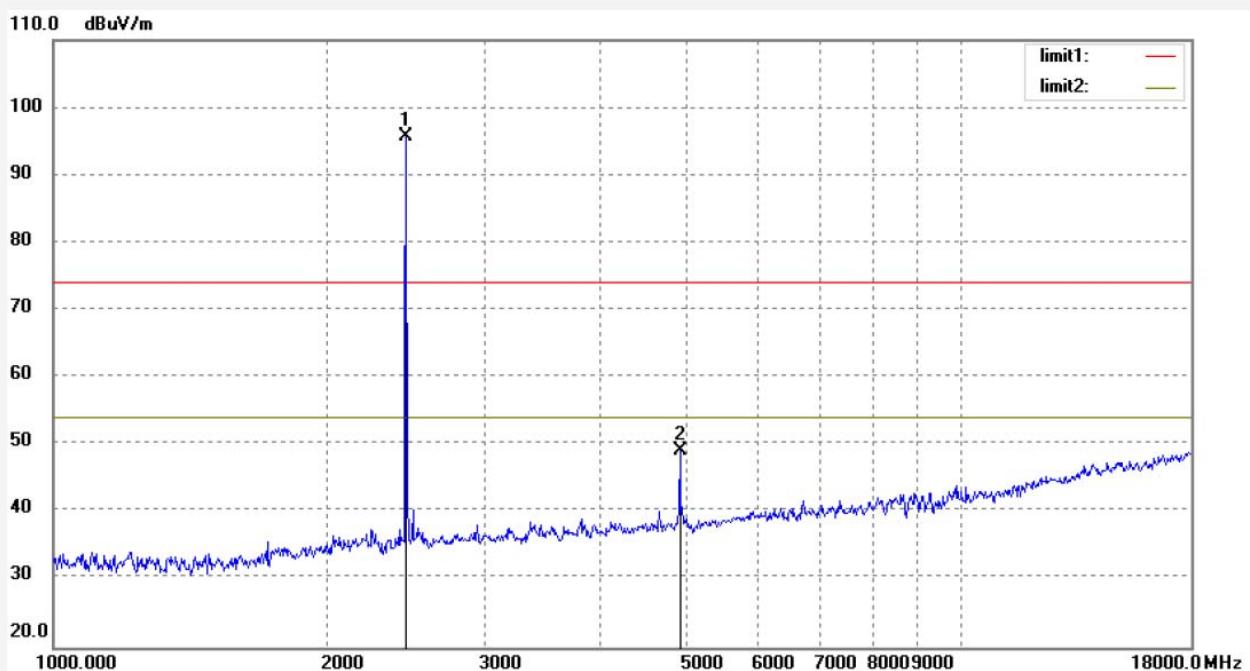
Mode: TX 2480MHz

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	101.73	-6.04	95.69			peak	250	44	
2	4960.064	47.58	1.50	49.08	74.00	-24.92	peak	250	195	



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Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #594

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:35:07

EUT: Music Lamp

Engineer Signature:

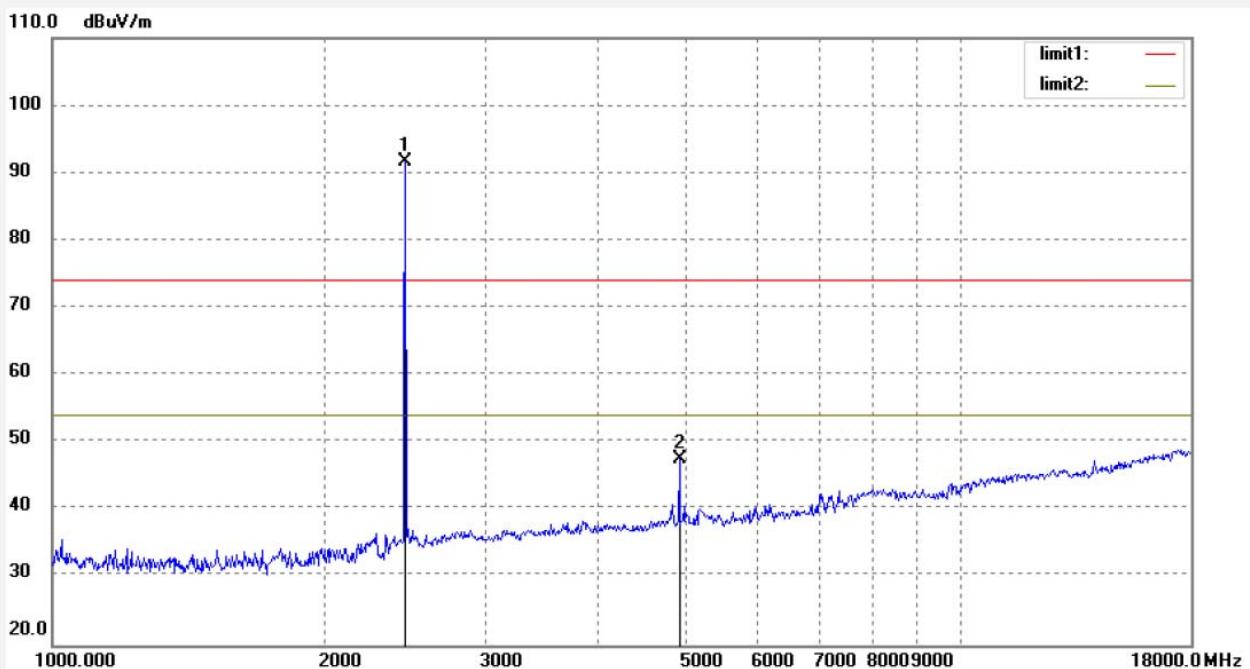
Mode: TX 2480MHz

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

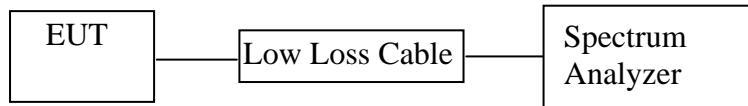
Note: Report NO.:ATE20182088



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	97.65	-6.04	91.61			peak	150	135	
2	4960.064	46.02	1.50	47.52	74.00	-26.48	peak	150	201	

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



(EUT: music lamp)

11.2.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).

11.3.EUT Configuration on Measurement

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.

11.4.Operating Condition of EUT

11.4.1.Setup the EUT and simulator as shown as Section 11.1.

11.4.2.Turn on the power of all equipment.

11.4.3.Let the EUT work in TX (Hopping off, Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

11.5. Test Procedure

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

11.5.2. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.

11.5.3. The band edges was measured and recorded.

11.6. Test Result

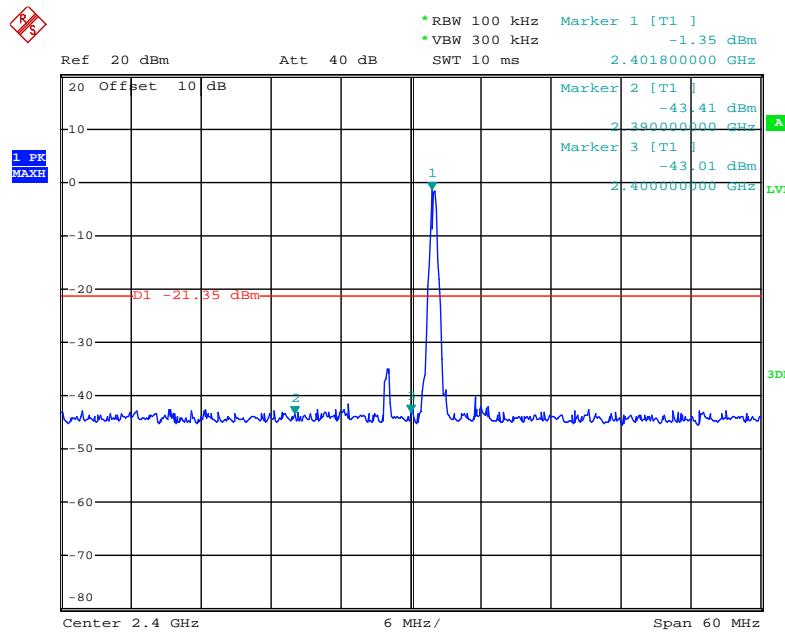
Non-hopping mode

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
GFSK mode		
2400.00	41.66	> 20dBc
2483.50	39.16	> 20dBc
$\pi/4$ DQPSK		
2400.00	39.15	> 20dBc
2483.5	39.76	> 20dBc

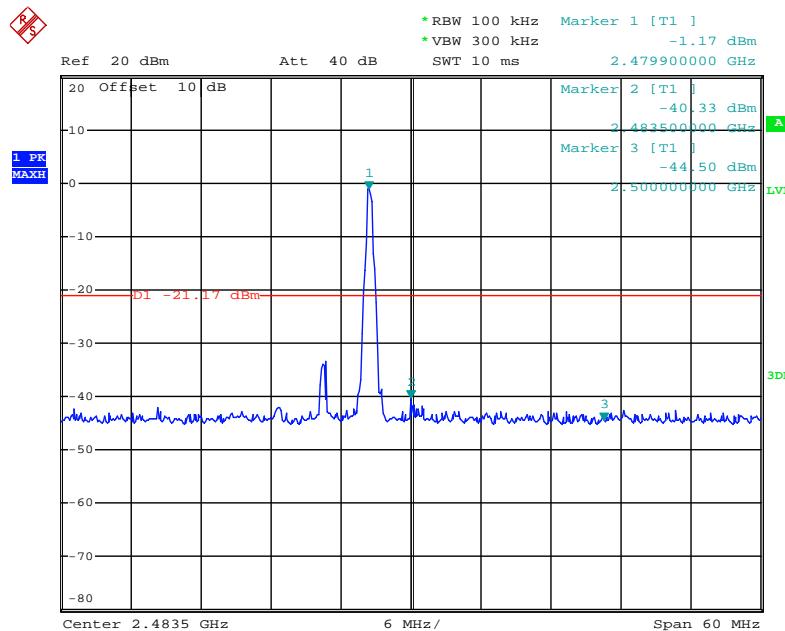
The spectrum analyzer plots are attached as below.

Non-hopping mode

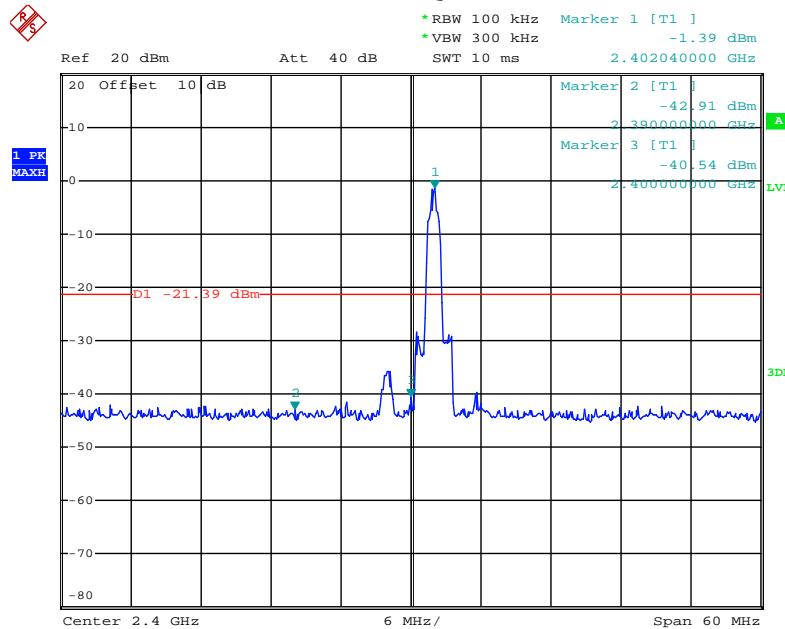
GFSK mode



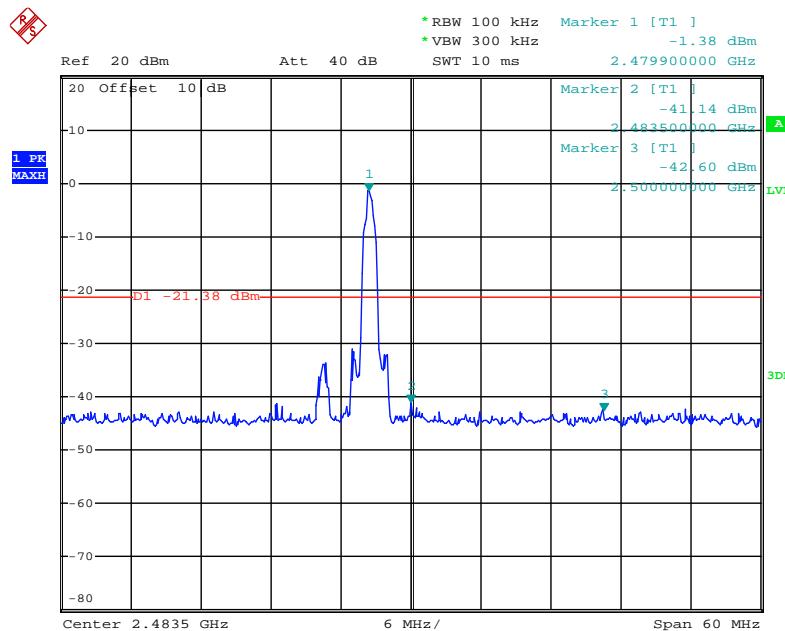
Date: 21.DEC.2018 14:22:20



Date: 21.DEC.2018 14:23:16

$\pi/4$ DQPSK mode

Date: 21.DEC.2018 14:21:29



Date: 21.DEC.2018 14:23:54

Radiated Band Edge Result

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:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

3. Display the measurement of peak values.

Test Procedure:

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.

Let the EUT work in TX (Hopping off, Hopping on) modes measure it.

We select 2402MHz, 2480MHz TX frequency to transmit(Hopping off mode).

We select 2402-2480MHz TX frequency to transmit(Hopping on mode).

During the radiated emission test, the spectrum analyzer was set with the following configurations:

- 1.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
- 2.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
- 3.All modes of operation were investigated and the worst-case emissions are reported.

Non-hopping mode



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: FRANK2018A #600

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:46:41

EUT: Music Lamp

Engineer Signature:

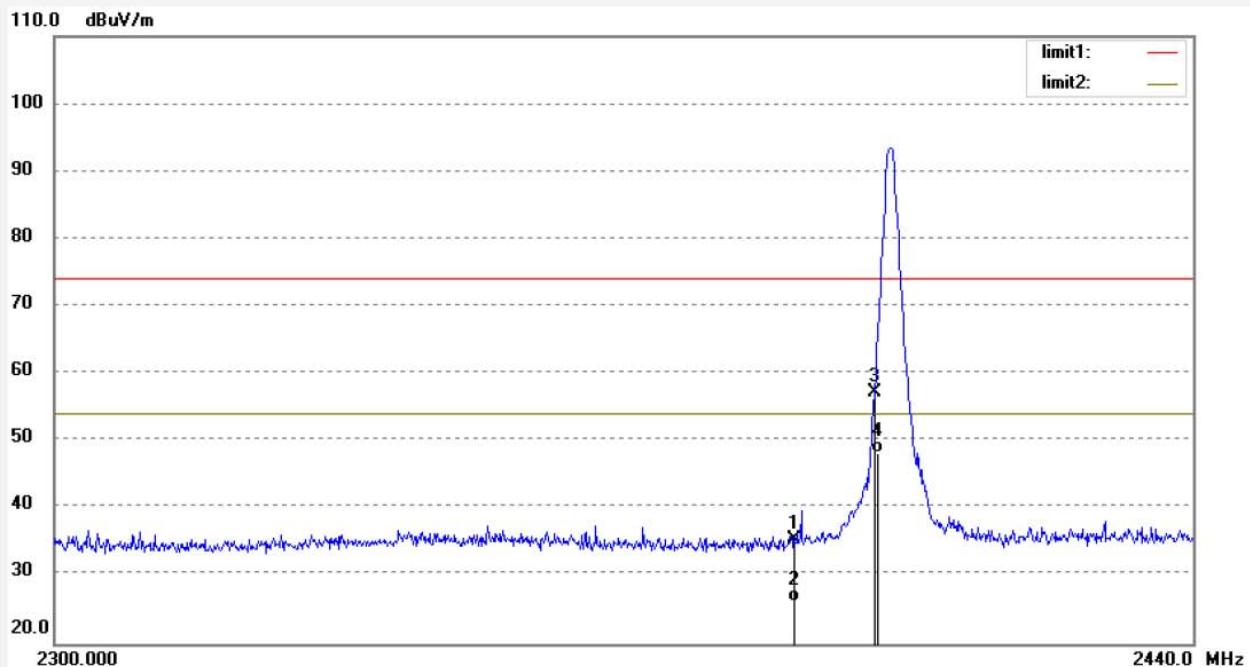
Mode: TX 2402MHz(GFSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	41.71	-6.32	35.39	74.00	-38.61	peak	250	109	
2	2390.000	32.45	-6.32	26.13	54.00	-27.87	AVG	250	321	
3	2400.000	63.49	-6.27	57.22	74.00	-16.78	peak	250	201	
4	2400.000	54.49	-6.27	48.22	54.00	-5.78	AVG	250	89	

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Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com [Http://www.atc-lab.com](http://www.atc-lab.com)



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #601

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:49:25

EUT: Music Lamp

Engineer Signature:

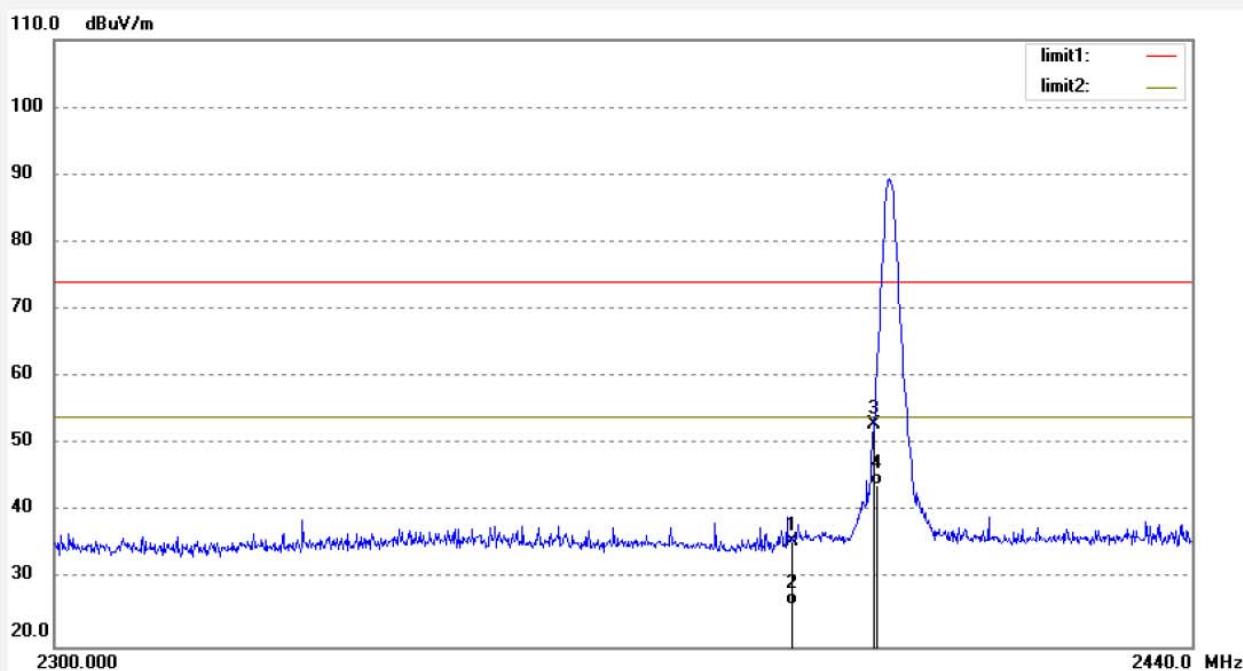
Mode: TX 2402MHz(GFSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	42.05	-6.32	35.73	74.00	-38.27	peak	150	189	
2	2390.000	32.45	-6.32	26.13	54.00	-27.87	AVG	150	95	
3	2400.000	59.15	-6.27	52.88	74.00	-21.12	peak	150	116	
4	2400.000	50.15	-6.27	43.88	54.00	-10.12	AVG	150	302	



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #607

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:59:12

EUT: Music Lamp

Engineer Signature:

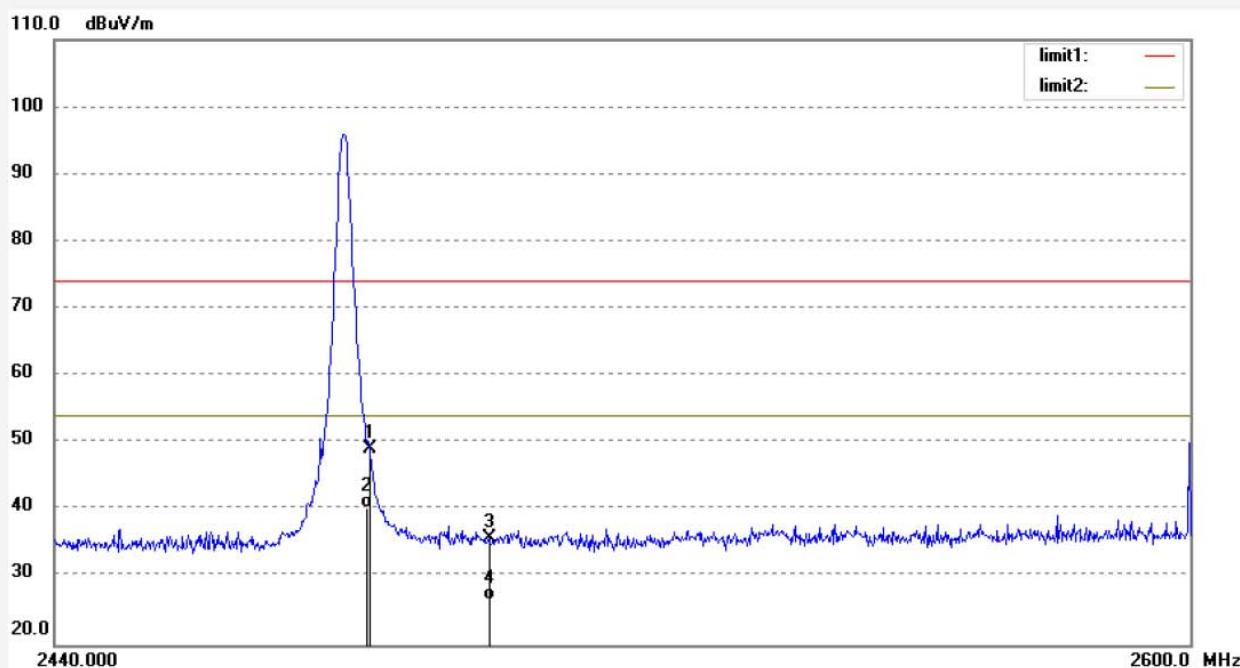
Mode: TX 2480MHz(GFSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	55.08	-5.89	49.19	74.00	-24.81	peak	250	320	
2	2483.500	46.15	-5.89	40.26	54.00	-13.74	AVG	250	96	
3	2500.000	41.76	-5.81	35.95	74.00	-38.05	peak	250	201	
4	2500.000	32.46	-5.81	26.65	54.00	-27.35	AVG	250	103	

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Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com [Http://www.atc-lab.com](http://www.atc-lab.com)



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #606

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:58:22

EUT: Music Lamp

Engineer Signature:

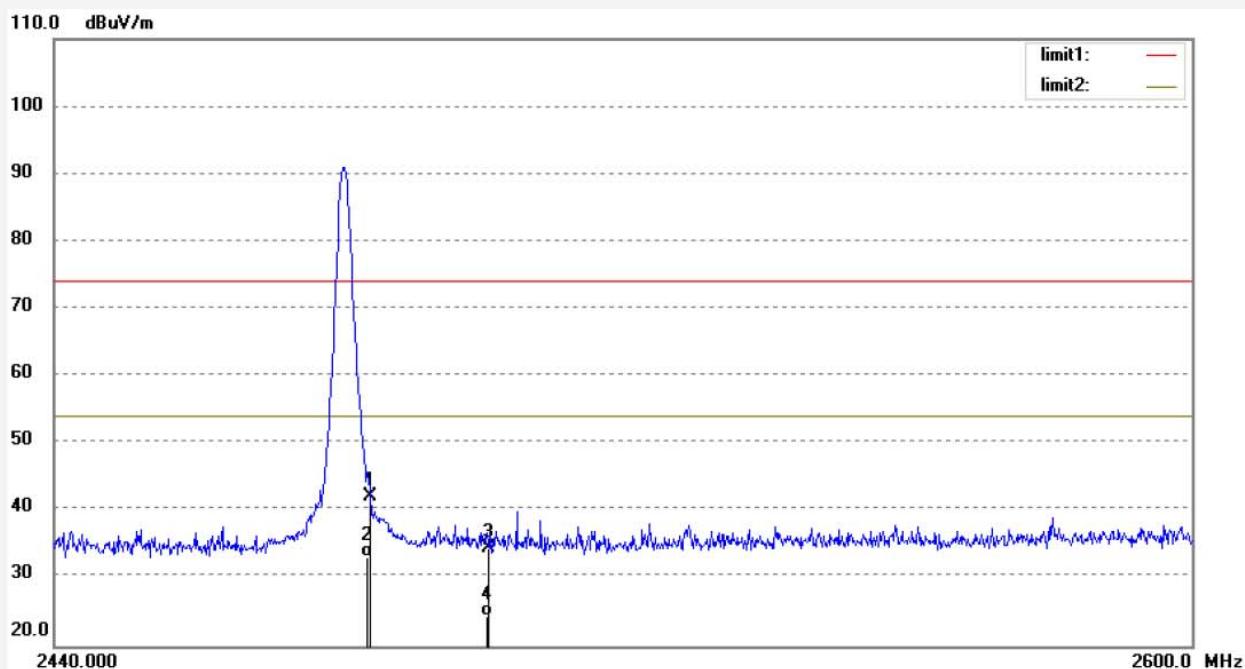
Mode: TX 2480MHz(GFSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	48.00	-5.89	42.11	74.00	-31.89	peak	150	105	
2	2483.500	39.11	-5.89	33.22	54.00	-20.78	AVG	150	66	
3	2500.000	40.41	-5.81	34.60	74.00	-39.40	peak	150	115	
4	2500.000	30.10	-5.81	24.29	54.00	-29.71	AVG	150	302	

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Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com [Http://www.atc-lab.com](http://www.atc-lab.com)



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #603

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:53:34

EUT: Music Lamp

Engineer Signature:

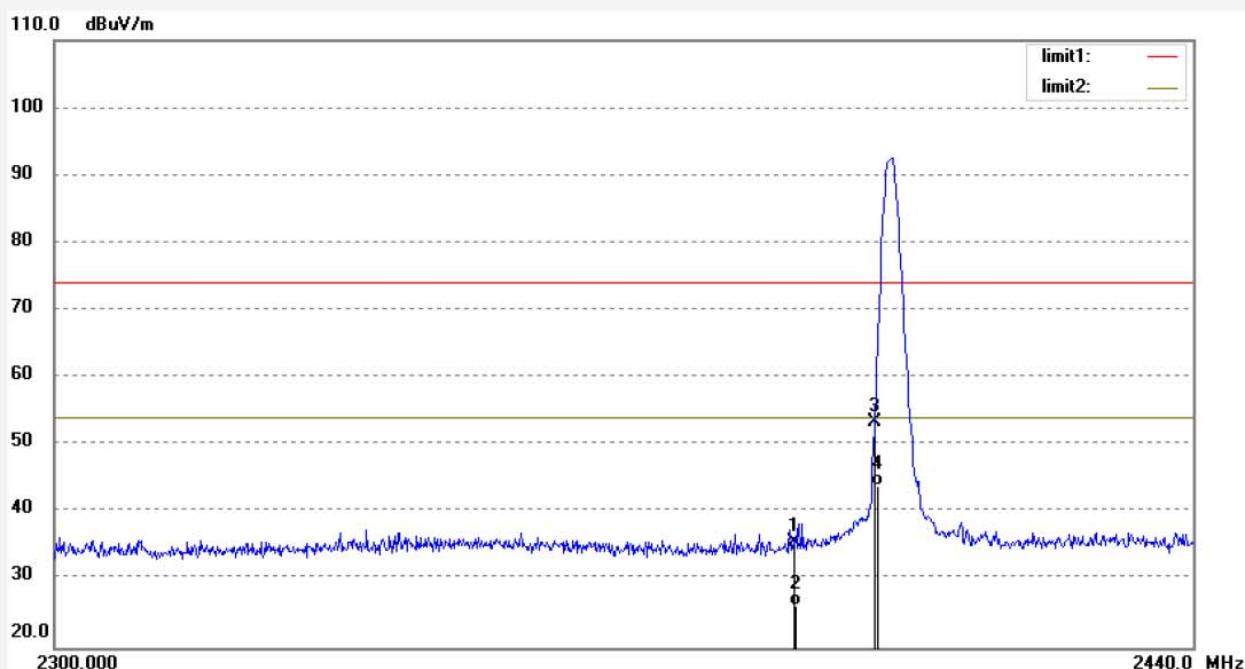
Mode: TX 2402MHz($\pi/4$ DQPSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	41.92	-6.32	35.60	74.00	-38.40	peak	250	103	
2	2390.000	32.45	-6.32	26.13	54.00	-27.87	AVG	250	219	
3	2400.000	59.60	-6.27	53.33	74.00	-20.67	peak	250	220	
4	2400.000	50.15	-6.27	43.88	54.00	-10.12	AVG	250	95	



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #602

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:51:56

EUT: Music Lamp

Engineer Signature:

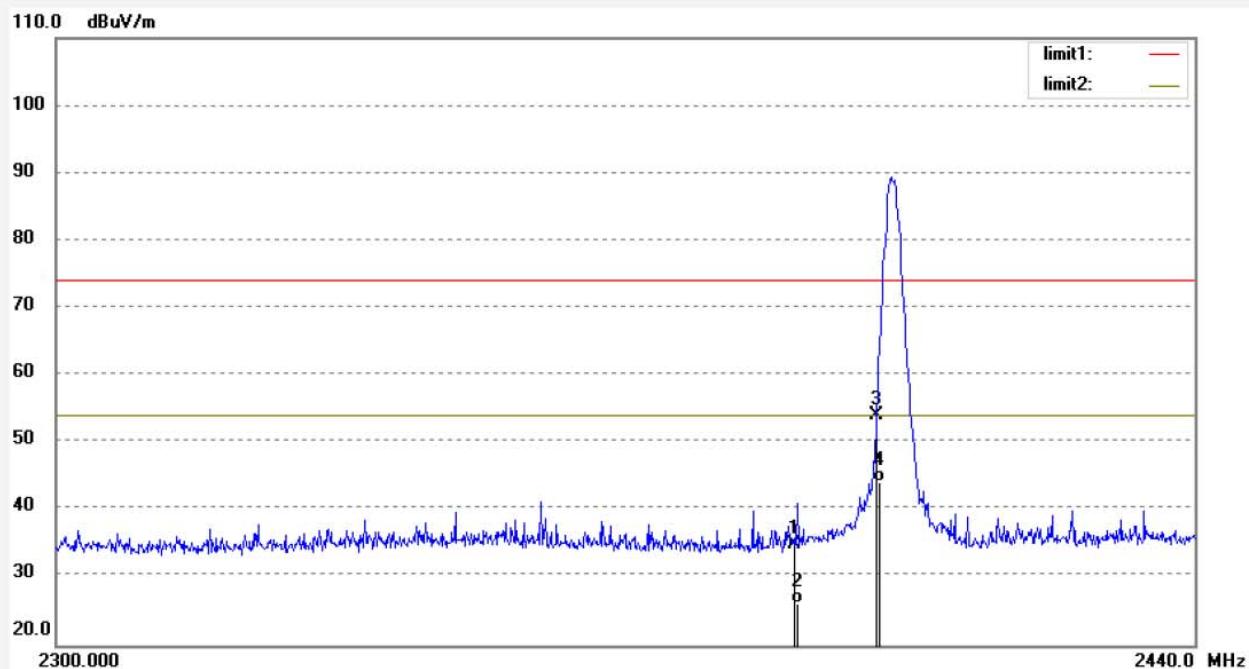
Mode: TX 2402MHz($\pi/4$ DQPSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	41.21	-6.32	34.89	74.00	-39.11	peak	150	139	
2	2390.000	32.45	-6.32	26.13	54.00	-27.87	AVG	150	221	
3	2400.000	60.36	-6.27	54.09	74.00	-19.91	peak	150	123	
4	2400.000	50.45	-6.27	44.18	54.00	-9.82	AVG	150	207	

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Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com [Http://www.atc-lab.com](http://www.atc-lab.com)



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #604

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:56:40

EUT: Music Lamp

Engineer Signature:

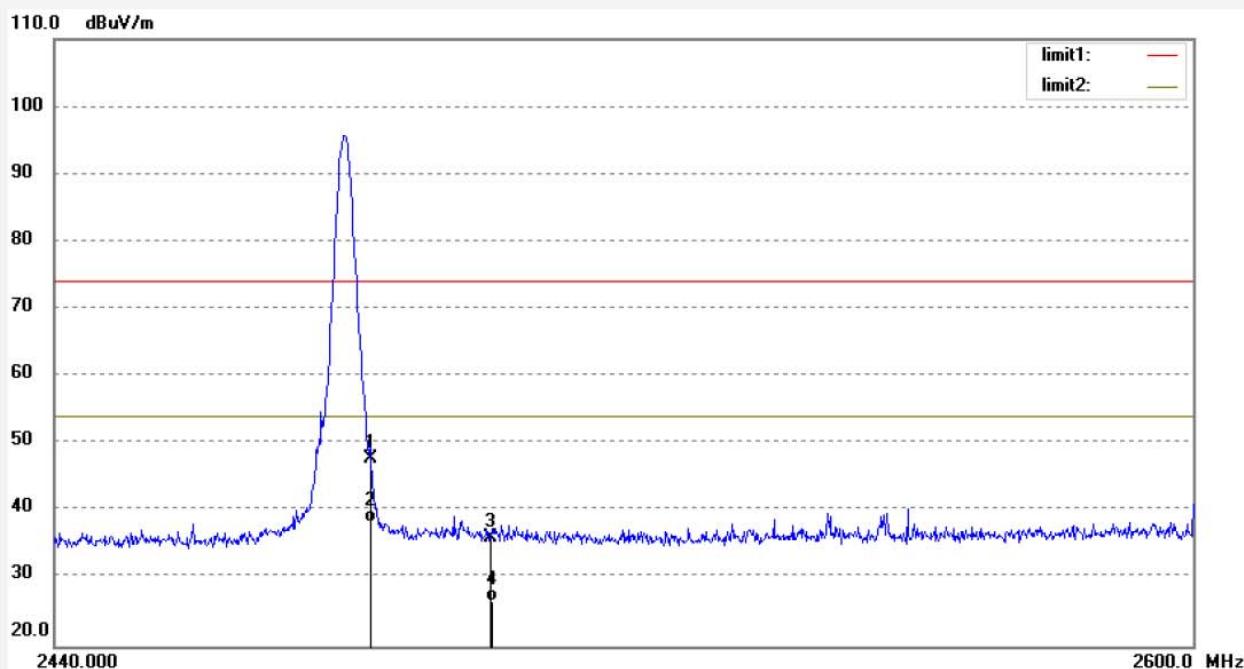
Mode: TX 2480MHz($\pi/4$ DQPSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	53.69	-5.89	47.80	74.00	-26.20	peak	250	321	
2	2483.500	44.15	-5.89	38.26	54.00	-15.74	AVG	250	165	
3	2500.000	41.91	-5.81	36.10	74.00	-37.90	peak	250	210	
4	2500.000	32.45	-5.81	26.64	54.00	-27.36	AVG	250	103	



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #605

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 15:57:40

EUT: Music Lamp

Engineer Signature:

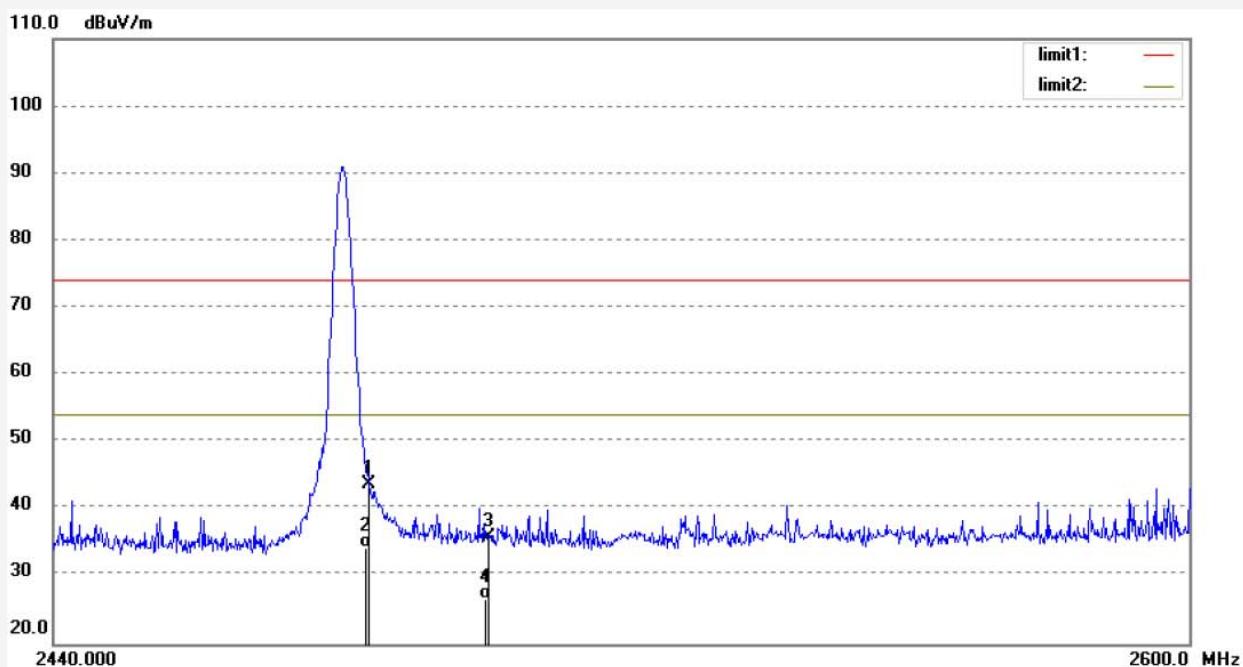
Mode: TX 2480MHz($\pi/4$ DQPSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	49.60	-5.89	43.71	74.00	-30.29	peak	150	87	
2	2483.500	40.15	-5.89	34.26	54.00	-19.74	AVG	150	69	
3	2500.000	41.59	-5.81	35.78	74.00	-38.22	peak	150	211	
4	2500.000	32.45	-5.81	26.64	54.00	-27.36	AVG	150	103	

hopping mode



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.ChinaSite: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #608

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 16:02:40

EUT: Music Lamp

Engineer Signature:

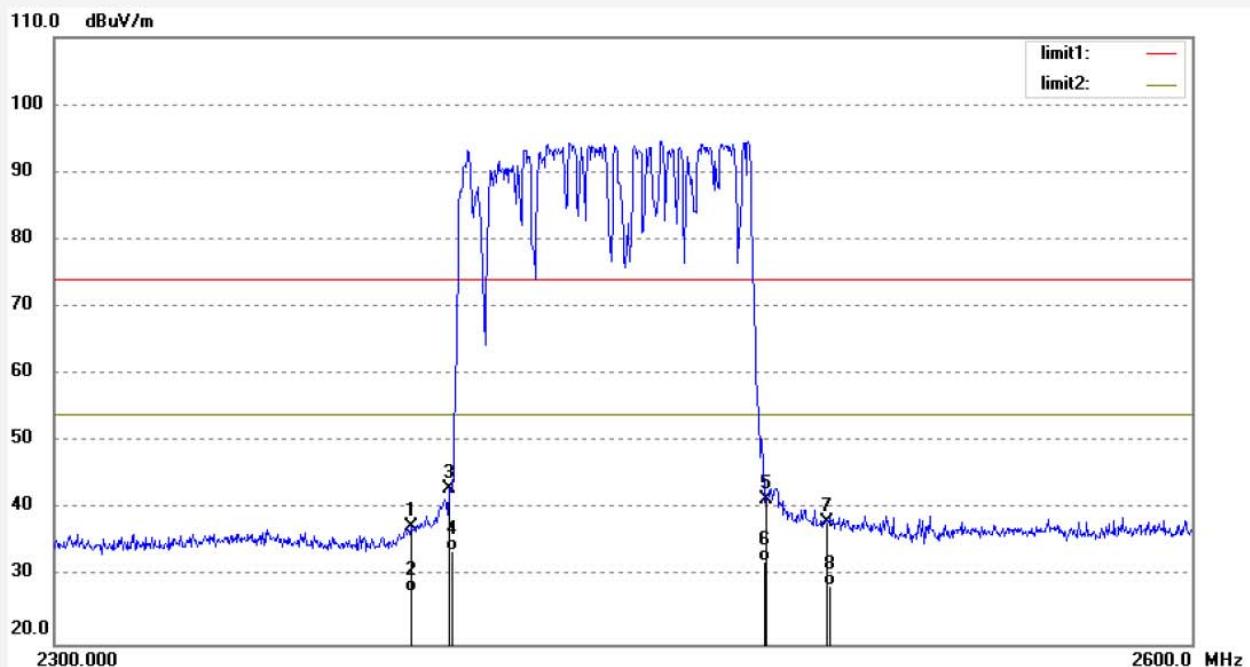
Mode: hopping mode(GFSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	43.69	-6.32	37.37	74.00	-36.63	peak	250	212	
2	2390.000	34.15	-6.32	27.83	54.00	-26.17	AVG	250	301	
3	2400.000	49.28	-6.27	43.01	74.00	-30.99	peak	250	45	
4	2400.000	40.15	-6.27	33.88	54.00	-20.12	AVG	250	169	
5	2483.500	47.48	-5.89	41.59	74.00	-32.41	peak	250	201	
6	2483.500	38.15	-5.89	32.26	54.00	-21.74	AVG	250	99	
7	2500.000	43.92	-5.81	38.11	74.00	-35.89	peak	250	159	
8	2500.000	34.42	-5.81	28.61	54.00	-25.39	AVG	250	102	

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Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com Http://www.atc-lab.com

Job No.: FRANK2018A #609

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 16:04:53

EUT: Music Lamp

Engineer Signature:

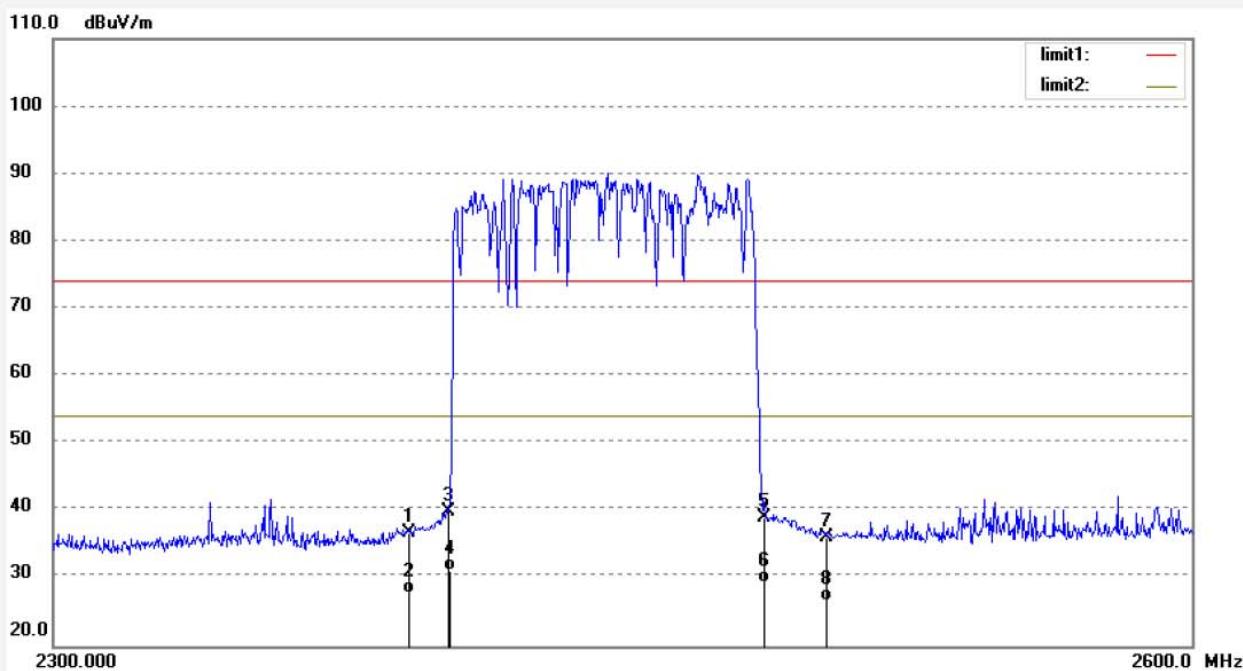
Mode: hopping mode(GFSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	43.17	-6.32	36.85	74.00	-37.15	peak	150	154	
2	2390.000	34.15	-6.32	27.83	54.00	-26.17	AVG	150	139	
3	2400.000	46.28	-6.27	40.01	74.00	-33.99	peak	150	66	
4	2400.000	37.40	-6.27	31.13	54.00	-22.87	AVG	150	206	
5	2483.500	44.94	-5.89	39.05	74.00	-34.95	peak	150	113	
6	2483.500	35.15	-5.89	29.26	54.00	-24.74	AVG	150	99	
7	2500.000	41.96	-5.81	36.15	74.00	-37.85	peak	150	201	
8	2500.000	32.42	-5.81	26.61	54.00	-27.39	AVG	150	103	



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #611

Polarization: Horizontal

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 16:09:05

EUT: Music Lamp

Engineer Signature:

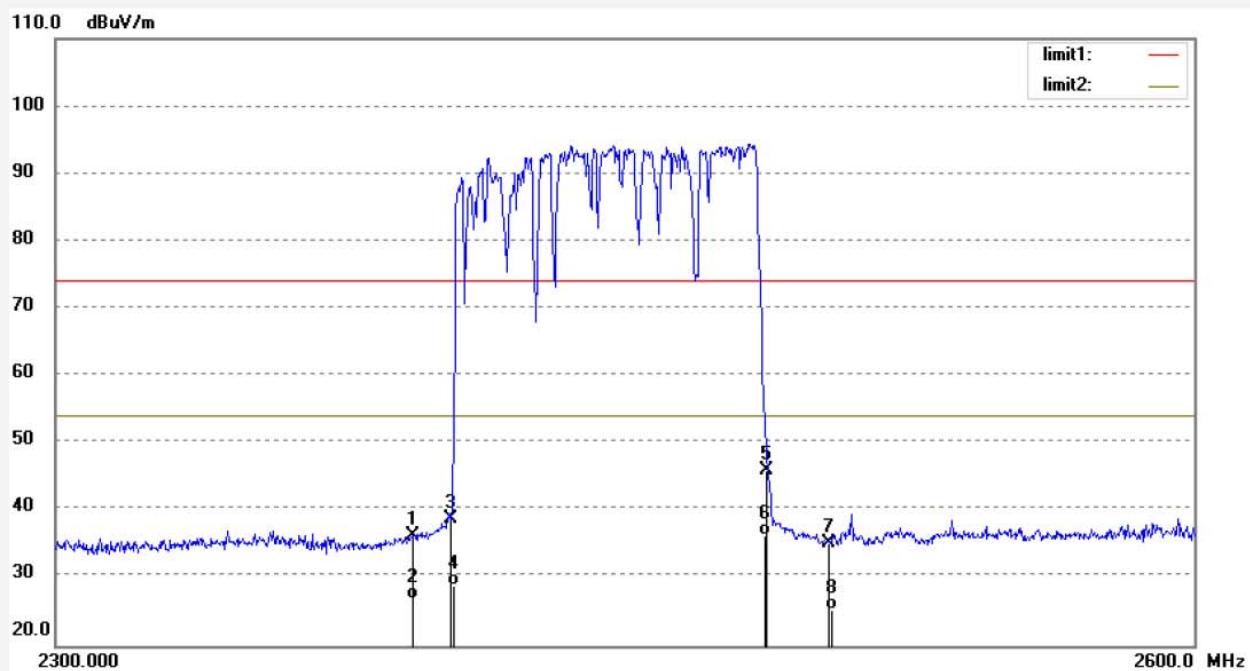
Mode: hopping mode($\pi/4$ DQPSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088



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	42.64	-6.32	36.32	74.00	-37.68	peak	250	221	
2	2390.000	33.15	-6.32	26.83	54.00	-27.17	AVG	250	196	
3	2400.000	45.02	-6.27	38.75	74.00	-35.25	peak	250	69	
4	2400.000	35.15	-6.27	28.88	54.00	-25.12	AVG	250	201	
5	2483.500	51.79	-5.89	45.90	74.00	-28.10	peak	250	333	
6	2483.500	42.15	-5.89	36.26	54.00	-17.74	AVG	250	201	
7	2500.000	40.96	-5.81	35.15	74.00	-38.85	peak	250	221	
8	2500.000	31.12	-5.81	25.31	54.00	-28.69	AVG	250	103	



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: FRANK2018A #610

Polarization: Vertical

Standard: FCC PK

Power Source: DC 3.7V

Test item: Radiation Test

Date: 2018/12/18

Temp.(C)/Hum.(%) 25 C / 55 %

Time: 16:07:20

EUT: Music Lamp

Engineer Signature:

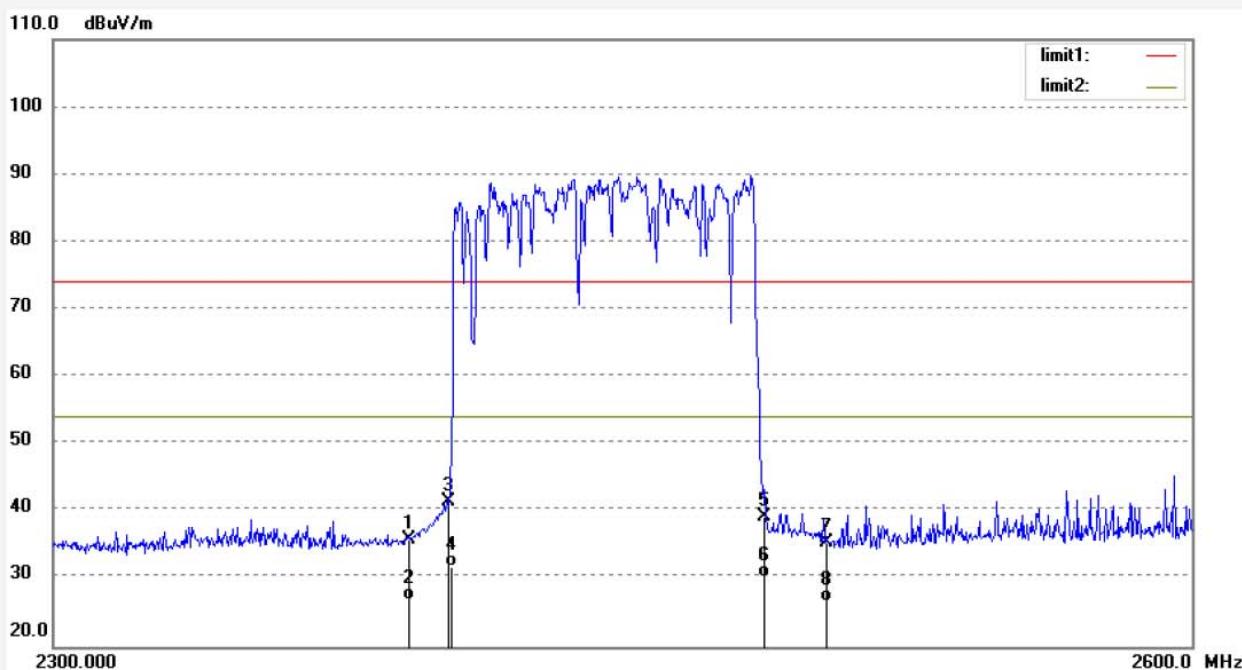
Mode: hopping mode($\pi/4$ DQPSK)

Distance: 3m

Model: JL-18-JL-210

Manufacturer: Golden Trees Technology Co.,Ltd

Note: Report NO.:ATE20182088

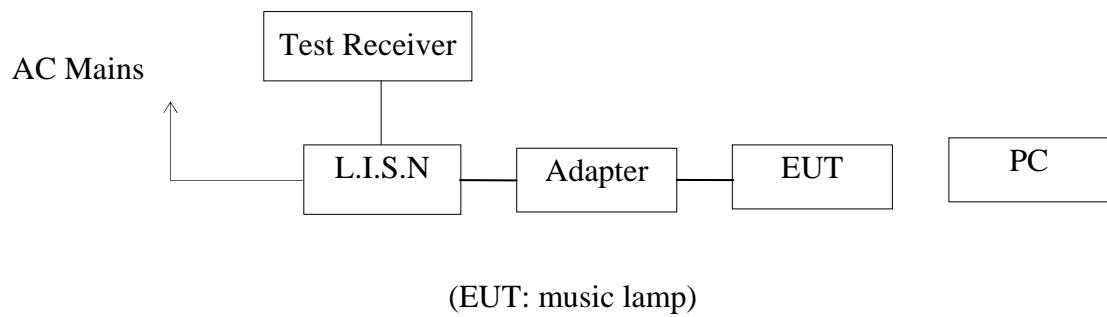


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	42.26	-6.32	35.94	74.00	-38.06	peak	150	103	
2	2390.000	33.15	-6.32	26.83	54.00	-27.17	AVG	150	201	
3	2400.000	47.65	-6.27	41.38	74.00	-32.62	peak	150	52	
4	2400.000	38.15	-6.27	31.88	54.00	-22.12	AVG	150	66	
5	2483.500	45.14	-5.89	39.25	74.00	-34.75	peak	150	214	
6	2483.500	36.15	-5.89	30.26	54.00	-23.74	AVG	150	201	
7	2500.000	41.32	-5.81	35.51	74.00	-38.49	peak	150	330	
8	2500.000	32.42	-5.81	26.61	54.00	-27.39	AVG	150	194	

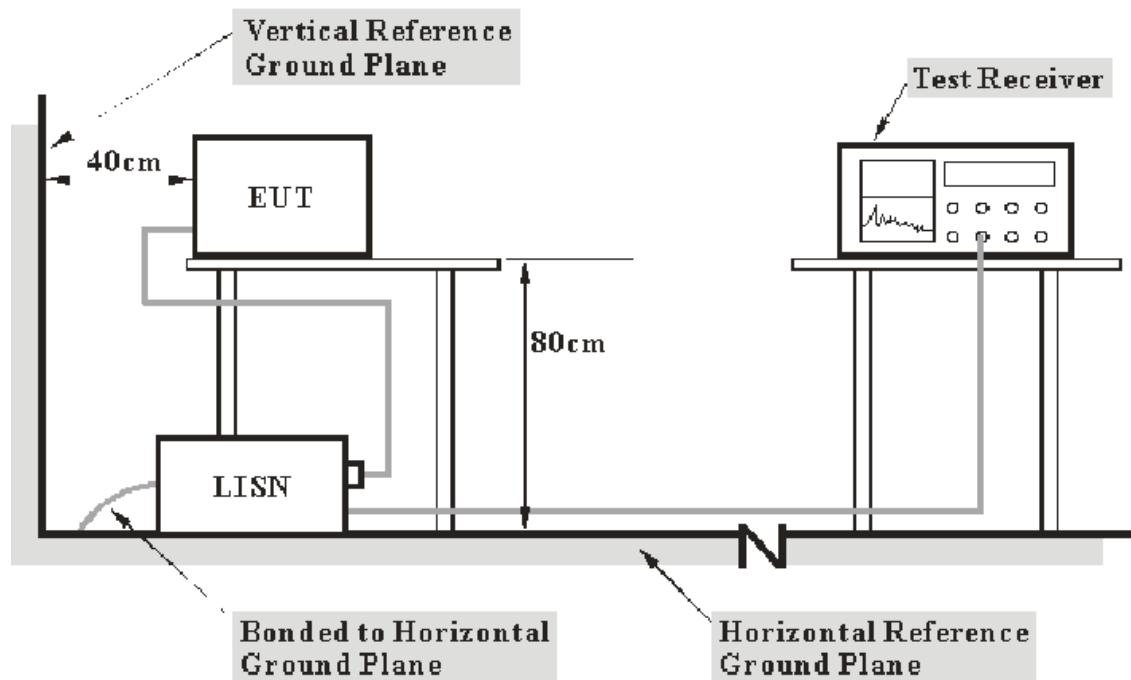
12.AC POWER LINE CONDUCTED EMISSION FOR FCC PART

15 SECTION 15.207(A)

12.1.Block Diagram of Test Setup



12.2.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.

12.3.Power Line Conducted Emission Measurement 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.

12.4.Configuration of EUT on Measurement

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.

12.5.Operating Condition of EUT

12.5.1.Setup the EUT and simulator as shown as Section 12.1.

12.5.2.Turn on the power of all equipment.

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

12.6.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 C63.4: 2014 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

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

12.7.Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dB μ V)	Average Level (dB μ V)	QuasiPeak Limit (dB μ V)	Average Limit (dB μ V)	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(dB μ V) = Quasi-peak Reading/Average Reading + Transducer value

Limit (dB μ V) = Limit stated in standard

Margin = Limit (dB μ V) - Level (dB μ V)

Calculation Formula:

Margin = Limit (dB μ V) - Level (dB μ V)

12.8.Power Line Conducted Emission Measurement Results

PASS.

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

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

Emissions attenuated more than 20 dB below the permissible value are not reported.

We tested the conducted emission of high and low voltage mode and recorded the worst mode data. All data was recorded in the Quasi-peak and average detection mode.

Test mode : CHARGING&BT Operation (AC 120V/60Hz)								
MEASUREMENT RESULT: "F-2082-1_fin"								
2018-12-6 15:16								
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE	
0.344000	30.40	10.9	59	28.7	QP	L1	GND	
0.770000	36.30	11.1	56	19.7	QP	L1	GND	
0.942000	34.40	11.1	56	21.6	QP	L1	GND	
4.975000	34.70	11.4	56	21.3	QP	L1	GND	
5.425000	35.10	11.5	60	24.9	QP	L1	GND	
18.175000	35.60	11.7	60	24.4	QP	L1	GND	
MEASUREMENT RESULT: "F-2082-1_fin2"								
2018-12-6 15:16								
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE	
0.338000	23.70	10.9	49	25.6	AV	L1	GND	
0.770000	27.30	11.1	46	18.7	AV	L1	GND	
0.988000	24.90	11.1	46	21.1	AV	L1	GND	
4.975000	24.00	11.4	46	22.0	AV	L1	GND	
5.400000	25.30	11.5	50	24.7	AV	L1	GND	
17.920000	24.90	11.7	50	25.1	AV	L1	GND	

MEASUREMENT RESULT: "F-2082-2_fin"

2018-12-6 15:20

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.336000	35.50	10.9	59	23.8	QP	N	GND
0.434000	39.70	11.0	57	17.5	QP	N	GND
0.884000	29.80	11.1	56	26.2	QP	N	GND
4.965000	34.50	11.4	56	21.5	QP	N	GND
5.420000	34.80	11.5	60	25.2	QP	N	GND
17.310000	35.80	11.7	60	24.2	QP	N	GND

MEASUREMENT RESULT: "F-2082-2_fin2"

2018-12-6 15:20

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.342000	25.60	10.9	49	23.6	AV	N	GND
0.436000	29.30	11.0	47	17.8	AV	N	GND
0.984000	23.50	11.1	46	22.5	AV	N	GND
4.700000	23.20	11.4	46	22.8	AV	N	GND
5.370000	24.80	11.5	50	25.2	AV	N	GND
18.380000	25.50	11.7	50	24.5	AV	N	GND

Emissions attenuated more than 20 dB below the permissible value are not reported.

The spectral diagrams are attached as below.

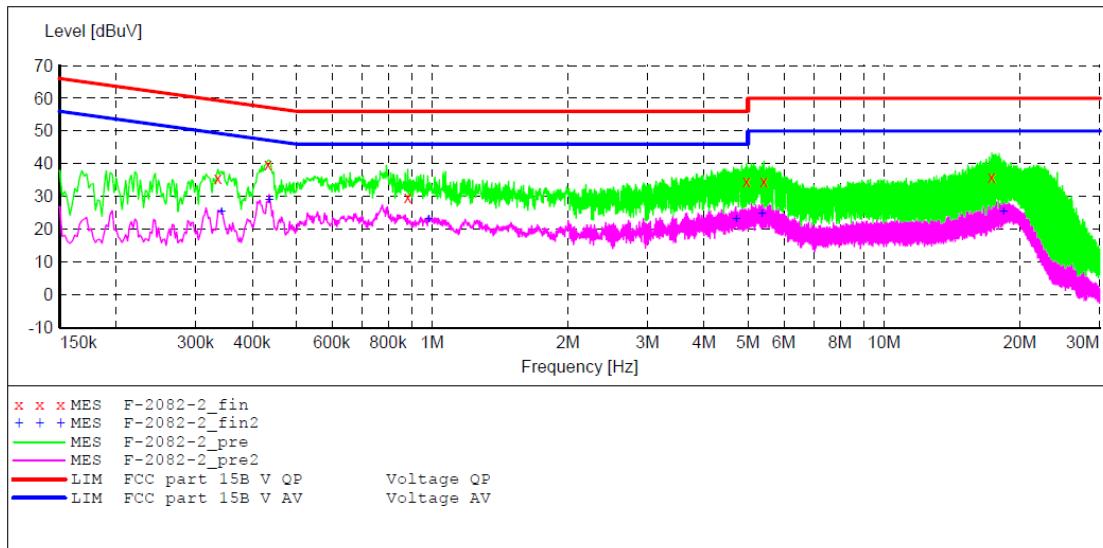
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15C

EUT: Music Lamp M/N:JL-18-JL-210
 Manufacturer: Golden Trees Technology Co, Ltd
 Operating Condition: Charging+BT OPERATION
 Test Site: 2#Shielding Room
 Operator: Frank
 Test Specification: N 120V/60Hz
 Comment: Report NO.:ATE20182088
 Start of Test: 2018-12-6 / 15:17:25

SCAN TABLE: "V 150K-30MHz fin"

Short Description:		SUB STD VTERM2 1.70			
Start Frequency	Stop Frequency	Step Width	Detector	Meas.	IF Bandw.
150.0 kHz	30.0 MHz	4.5 kHz	QuasiPeak	1.0 s	9 kHz NSLK8126 2008
Average					

**MEASUREMENT RESULT: "F-2082-2_fin"**

2018-12-6 15:20

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.336000	35.50	10.9	59	23.8	QP	N	GND
0.434000	39.70	11.0	57	17.5	QP	N	GND
0.884000	29.80	11.1	56	26.2	QP	N	GND
4.965000	34.50	11.4	56	21.5	QP	N	GND
5.420000	34.80	11.5	60	25.2	QP	N	GND
17.310000	35.80	11.7	60	24.2	QP	N	GND

MEASUREMENT RESULT: "F-2082-2_fin2"

2018-12-6 15:20

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.342000	25.60	10.9	49	23.6	AV	N	GND
0.436000	29.30	11.0	47	17.8	AV	N	GND
0.984000	23.50	11.1	46	22.5	AV	N	GND
4.700000	23.20	11.4	46	22.8	AV	N	GND
5.370000	24.80	11.5	50	25.2	AV	N	GND
18.380000	25.50	11.7	50	24.5	AV	N	GND

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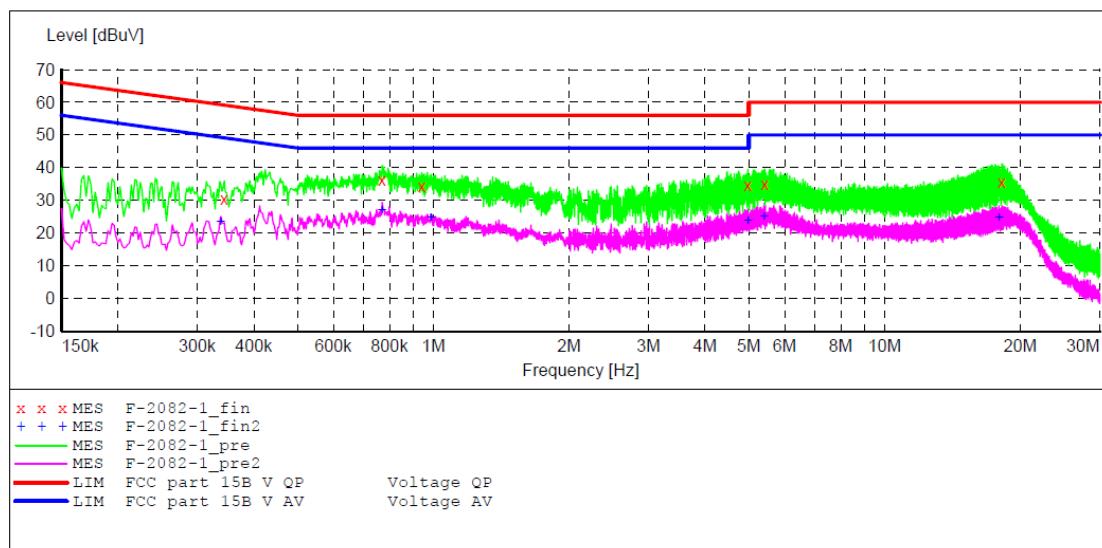
Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com Http://www.atc-lab.com

ACCURATE TECHNOLOGY CO., LTD**CONDUCTED EMISSION STANDARD FCC PART 15C**

EUT: Music Lamp M/N:JL-18-JL-210
 Manufacturer: Golden Trees Technology Co,Ltd
 Operating Condition: Charging+BT OPERATION
 Test Site: 2#Shielding Room
 Operator: Frank
 Test Specification: L 120V/60Hz
 Comment: Report NO.:ATE20182088
 Start of Test: 2018-12-6 / 15:14:59

SCAN TABLE: "V 150K-30MHz fin"

Short Description: SUB STD VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average

**MEASUREMENT RESULT: "F-2082-1_fin"**

2018-12-6 15:16

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.344000	30.40	10.9	59	28.7	QP	L1	GND
0.770000	36.30	11.1	56	19.7	QP	L1	GND
0.942000	34.40	11.1	56	21.6	QP	L1	GND
4.975000	34.70	11.4	56	21.3	QP	L1	GND
5.425000	35.10	11.5	60	24.9	QP	L1	GND
18.175000	35.60	11.7	60	24.4	QP	L1	GND

MEASUREMENT RESULT: "F-2082-1_fin2"

2018-12-6 15:16

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.338000	23.70	10.9	49	25.6	AV	L1	GND
0.770000	27.30	11.1	46	18.7	AV	L1	GND
0.988000	24.90	11.1	46	21.1	AV	L1	GND
4.975000	24.00	11.4	46	22.0	AV	L1	GND
5.400000	25.30	11.5	50	24.7	AV	L1	GND
17.920000	24.90	11.7	50	25.1	AV	L1	GND

shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290 Fax: +86-755-26503396 E-mail: webmaster@atc-lab.com Http://www.atc-lab.com

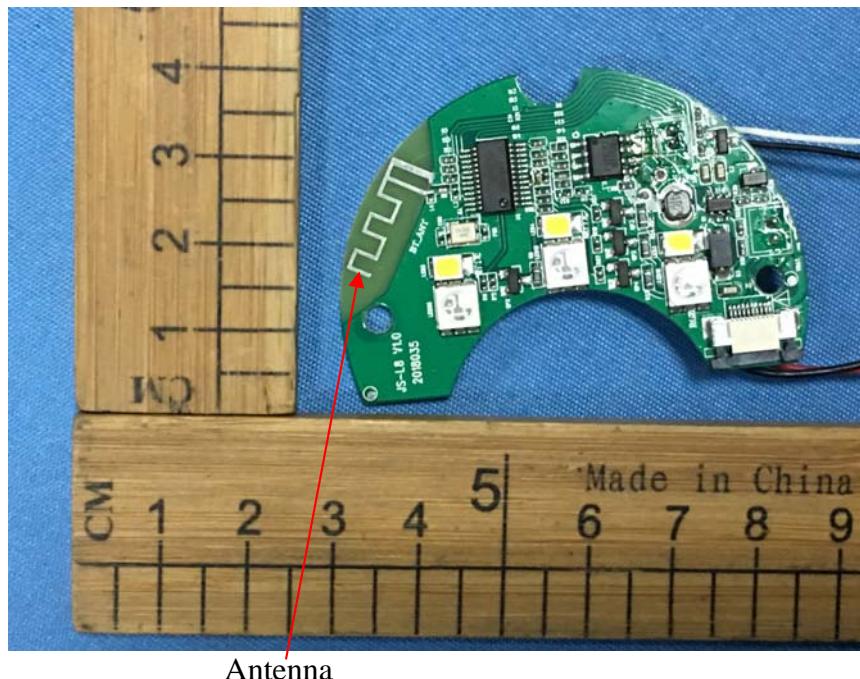
13. ANTENNA REQUIREMENT

13.1. 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.

13.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is -0.68dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



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