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# APPLICATION CERTIFICATION FCC Part 15C On Behalf of MERKURY INNOVATIONS LLC

Touch LED Lantern Bluetooth Speaker Model No.: MI-SB019

FCC ID: YCI-MISB019

Prepared for

MERKURY INNOVATIONS LLC

Address

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**United States** 

Prepared by Address

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Report No. : ATE20162021

Date of Test : September 18-28, 2016

Date of Report : October 12, 2016



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## **Test Report Certification**

Applicant : MERKURY INNOVATIONS LLC

Manufacturer : Shenzhen Fortat Skymark Technology Co., LTD

EUT Description: Touch LED Lantern Bluetooth Speaker

: MI-SB019 Model No.

Trade Mark : N/A

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2015 ANSI C63.10: 2013

The device described above is tested by 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 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 ACCURATE TECHNOLOGY CO. LTD.

Date of Test:	September 18-28, 2016	
Date of Report:	October 12, 2016	
Prepared by :	Bobwarg	
	(Bob Wang, Engineer)	
Approved & Authorized Signer :	Lemb	
	(Sean Liu, Manager)	



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#### 1. GENERAL INFORMATION

### 1.1.Description of Device (EUT)

EUT : Touch LED Lantern Bluetooth Speaker

Model Number : MI-SB019

Trade Mark : N/A

Bluetooth version : BT 2.1+EDR

Frequency Range : 2402MHz-2480MHz

Number of Channels : 79 Antenna Gain : 0dBi

Antenna type : Integral Antenna

Power Supply : DC 3.7V & DC 5V(Power by USB port)

Modulation mode : GFSK, π/4 DQPSK, 8DPSK
Applicant : MERKURY INNOVATIONS LLC

Address : 39 Broadway, suite 1530, New York, NY 10006, United

States

Manufacuter : Shenzhen Fortat Skymark Technology Co., LTD Address : No.1, Dunbei Industrial Area, Hualian Community,

Longhua District, Shenzhen

Date of sample received: September 12, 2016
Date of Test: September 18-28, 2016

#### 1.2. Accessory and Auxiliary Equipment

PC : Manufacturer: DELL

M/N: DMC S/N: HZXLM1

#### 1.3.Channel List

2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480



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## 1.4.Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen

Listed by FCC

The Registration Number is 752051

Listed by Industry Canada

The Registration Number is 5077A-2

Accredited by China National Accreditation Committee

for Laboratories

The Certificate Registration Number is L3193

Name of Firm : ACCURATE TECHNOLOGY CO. LTD

Site Location : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.

Science & Industry Park, Nanshan, 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

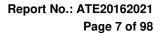
(9kHz-30MHz)

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. 9, 2016	Jan. 09, 2017
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 9, 2016	Jan. 09, 2017
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 9, 2016	Jan. 09, 2017
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 9, 2016	Jan. 09, 2017
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 14, 2016	Jan. 13, 2017
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 14, 2016	Jan. 13, 2017
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 14, 2016	Jan. 12, 2017
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 14, 2016	Jan. 13, 2017
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 9, 2016	Jan. 09, 2017
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 9, 2016	Jan. 09, 2017
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 9, 2016	Jan. 09, 2017
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 9, 2016	Jan. 09, 2017



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## 3. OPERATION OF EUT DURING TESTING

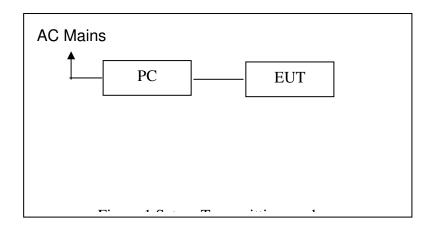
## 3.1. Operating Mode

The mode is used: Transmitting mode

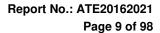
Low Channel: 2402MHz Middle Channel: 2441MHz High Channel: 2480MHz

Hopping

## 3.2. Configuration and peripherals



(EUT: Touch LED Lantern Bluetooth Speaker)





## 4. TEST PROCEDURES AND RESULTS

FCC Rules	<b>Description of Test</b>	Result
Section 15.207	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 15.203	Antenna Requirement	Compliant



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#### 5. 20DB BANDWIDTH TEST

#### 5.1.Block Diagram of Test Setup



(EUT: Touch LED Lantern Bluetooth Speaker)

#### 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.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz.
- 5.5.3. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.



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## 5.6.Test Result

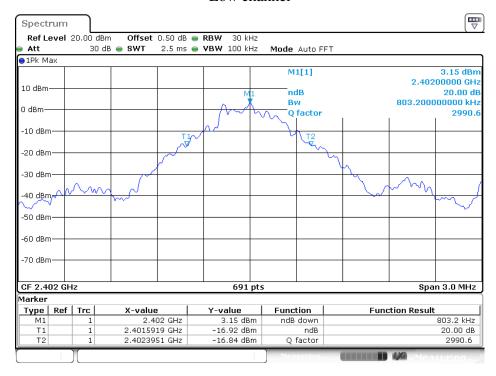
Channel Frequency		GFSK 20dB Bandwidth	∏/4-DQPSK 20dB Bandwidth	8DPSK 20dB Bandwidth	Result
	(MHz)	(MHz)	(MHz)	(MHz)	
Low	2402	0.803	1.220	1.207	Pass
Middle	2441	0.803	1.220	1.207	Pass
High	2480	0.803	1.224	1.211	Pass

The spectrum analyzer plots are attached as below.

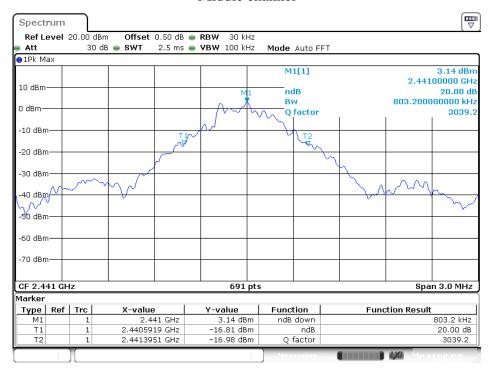


#### **GFSK Mode**

#### Low channel



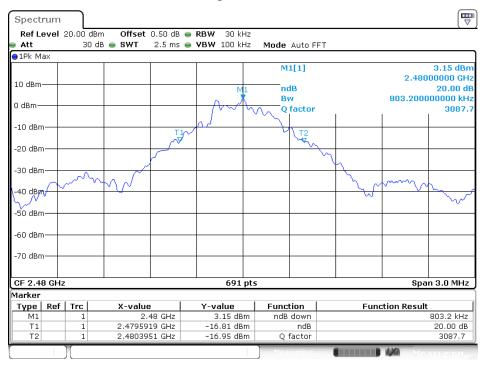
#### Middle channel



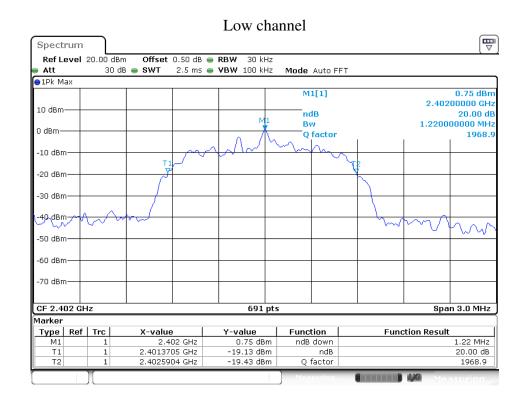


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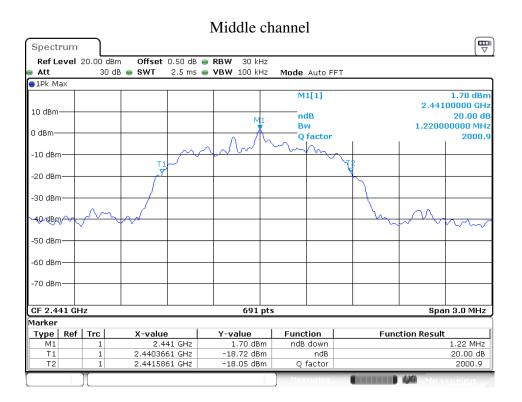
## High channel

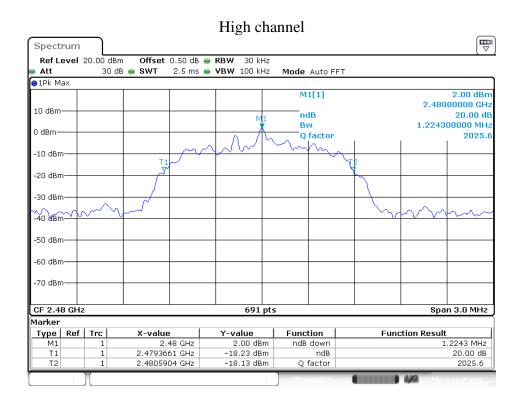


#### ∏/4-DQPSK Mode



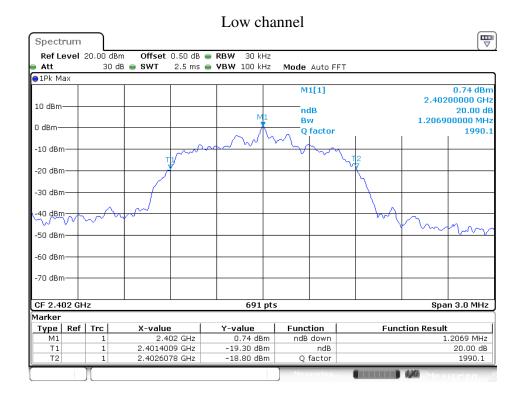


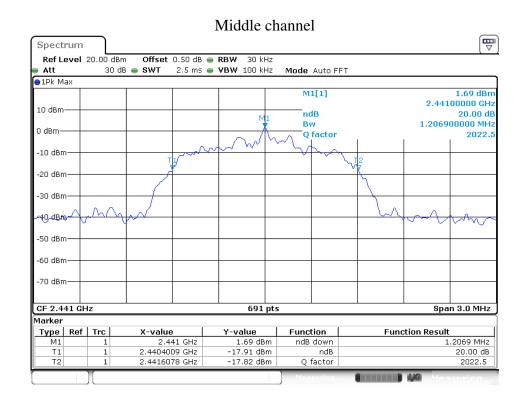




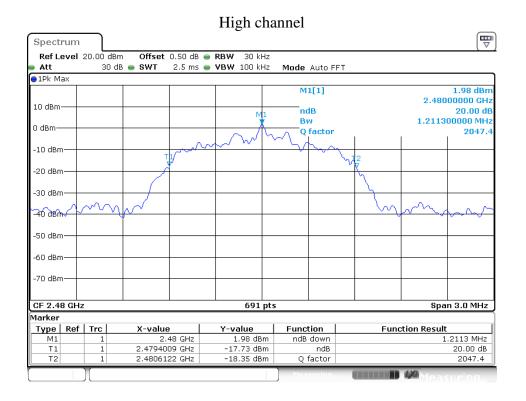


#### 8DPSK Mode







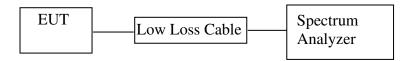




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## 6. CARRIER FREQUENCY SEPARATION TEST

#### 6.1.Block Diagram of Test Setup



(EUT: Touch LED Lantern Bluetooth Speaker)

#### 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.

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#### 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 30 kHz and VBW to 100 kHz. Adjust Span to 2 MHz.
- 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**

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.0014	25KHz or 20dB	PASS
Low	2403	1.0014	bandwidth	rass
Middle	2440	1.0014	25KHz or20dB	PASS
Middle	2441	1.0014	bandwidth	TASS
High	2479	1.0014	25KHz or 20dB	PASS
	2480	1.0014	bandwidth	1 ASS

#### ∏/4-DQPSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.0029	25KHz or 2/3*20dB	PASS
Low	2403	1.0029	bandwidth	rass
Middle	2440	1.0029	25KHz or 2/3*20dB	PASS
Mildale	2441	1.0029	bandwidth	PASS
High	2479	1.0029	25KHz or 2/3*20dB	PASS
	2480	1.0029	bandwidth	LHOO

#### 8DPSK

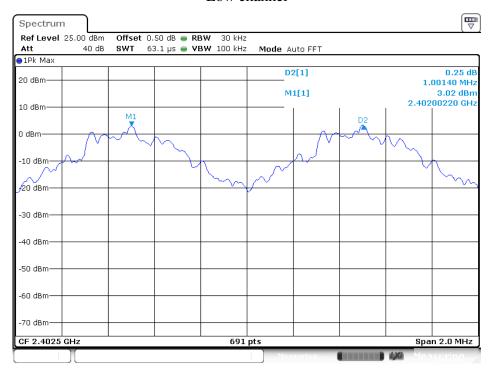
Channel	Frequency	Channel	Limit	Result
Chamie	(MHz)	Separation(MHz)	(MHz)	Kesuit
Low	2402	1.0029	25KHz or 2/3*20dB	PASS
Low	2403	1.0029	bandwidth	PASS
Middle	2440	1.0029	25KHz or 2/3*20dB	PASS
Middle	2441	1.0029	bandwidth	rass
High	2479	1.0029	25KHz or 2/3*20dB	PASS
High	2480	1.0029	bandwidth	rass

The spectrum analyzer plots are attached as below.

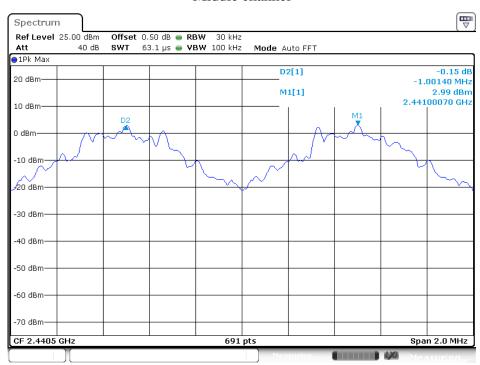


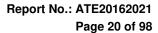
**GFSK Mode** 

#### Low channel



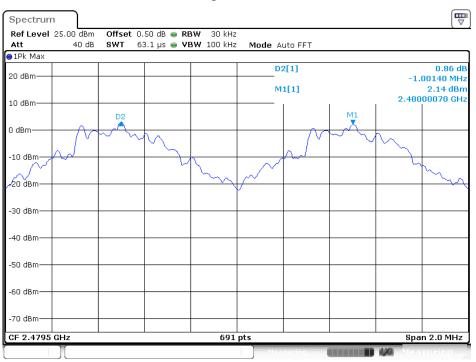
#### Middle channel



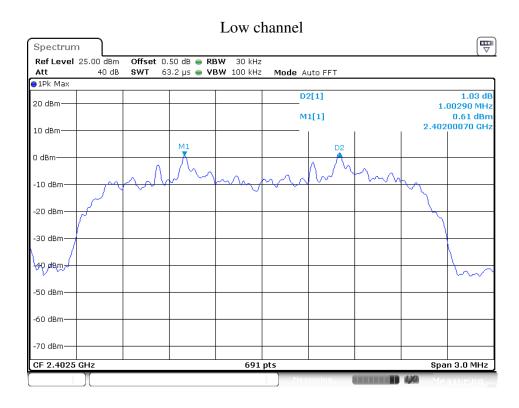




## High channel



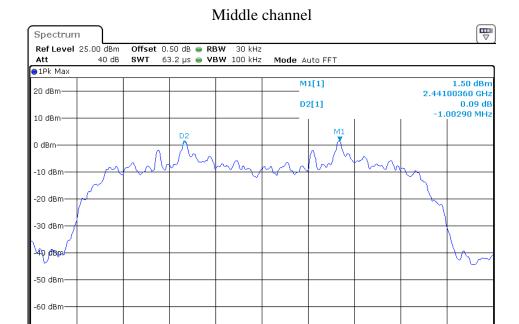
## $\Pi/4$ -DQPSK Mode



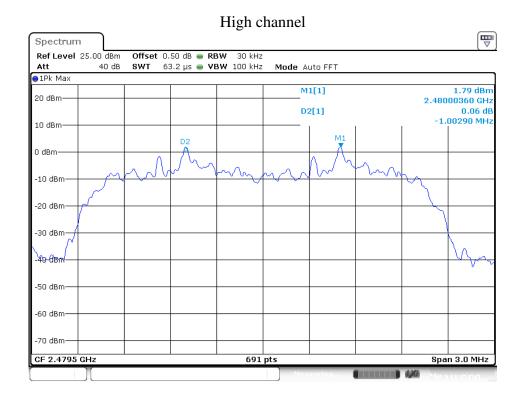


-70 dBm

CF 2.4405 GHz



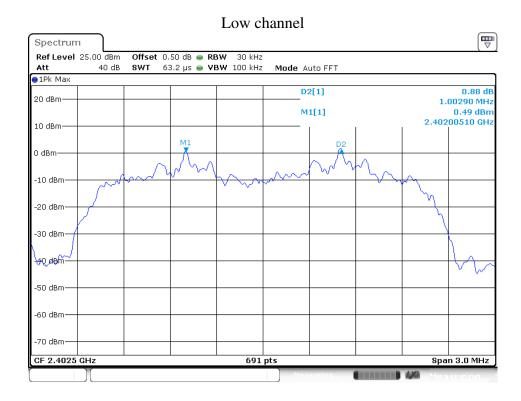
691 pts

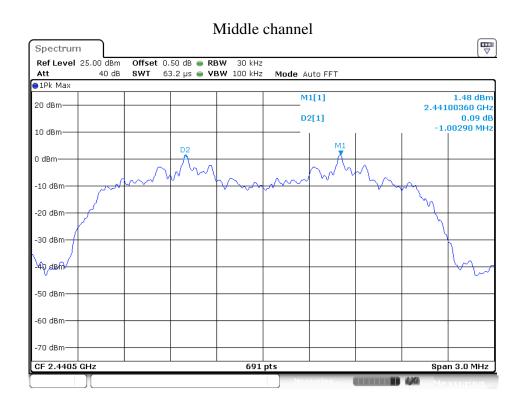


Span 3.0 MHz

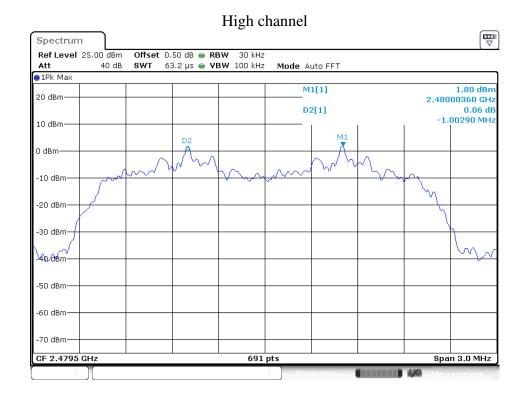


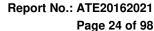
## 8DPSK Mode







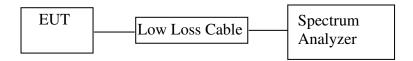






## 7. NUMBER OF HOPPING FREQUENCY TEST

#### 7.1.Block Diagram of Test Setup



(EUT: Touch LED Lantern Bluetooth Speaker)

#### 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=83.5MHz, RBW=100 kHz, VBW=300 kHz.
- 7.5.3.Max hold, view and count how many channel in the band.

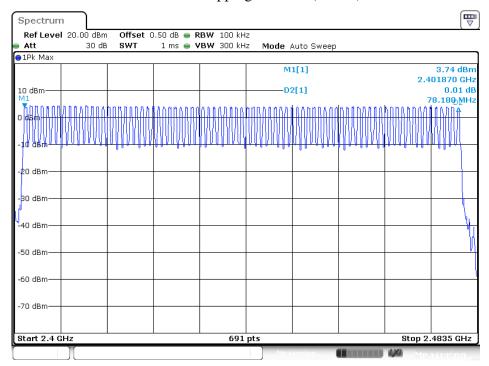


## 7.6.Test Result

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

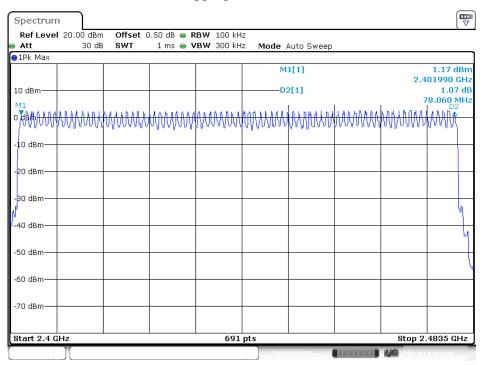
The spectrum analyzer plots are attached as below.

## Number of hopping channels(GFSK)

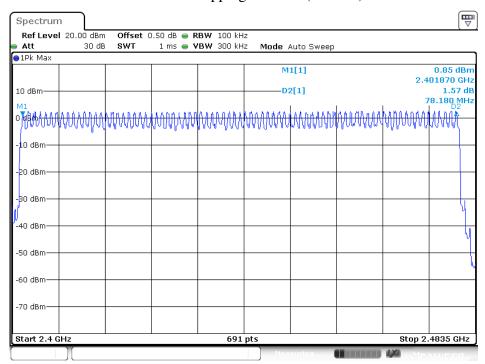




#### Number of hopping channels $(\Pi/4\text{-DQPSK})$



## Number of hopping channels(8DPSK)

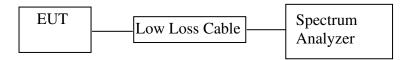




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#### 8. DWELL TIME TEST

#### 8.1.Block Diagram of Test Setup



(EUT: Touch LED Lantern Bluetooth Speaker)

#### 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

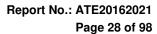
The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

#### 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.

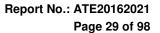
## 8.6.Test Result

## GFSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)		
	2402	0.428	136.96	400		
DH1	2441	0.438	140.16	400		
	2480	0.442	141.44	400		
A period to	ransmit time = $0.4 \times 79 =$	31.6 Dwell time = pu	alse time $\times$ (1600/(2*)	79))×31.6		
	2402	1.746	279.36	400		
DH3	2441	1.790	286.40	400		
	2480	1.761	281.76	400		
A period to	ransmit time = $0.4 \times 79 =$	31.6 Dwell time = pu	alse time $\times$ (1600/(4*)	79))×31.6		
	2402	2.978	317.65	400		
DH5	2441	2.978	317.65	400		
	2480	3.000	320.00	400		
A period transr	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	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)		
	2402	0.446	142.72	400		
DH1	2441	0.442	141.44	400		
	2480	0.438	140.16	400		
A period to	ransmit time = $0.4 \times 79 =$	31.6 Dwell time = pu	alse time $\times$ (1600/(2*)	79))×31.6		
	2402	1.714	274.24	400		
DH3	2441	1.714	274.24	400		
	2480	1.728	276.48	400		
A period to	ransmit time = $0.4 \times 79 =$	31.6 Dwell time = pu	alse time $\times$ (1600/(4*)	79))×31.6		
	2402	3.000	320.00	400		
DH5	2441	3.022	322.35	400		
	2480	2.978	317.65	400		
A period transr	A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$					



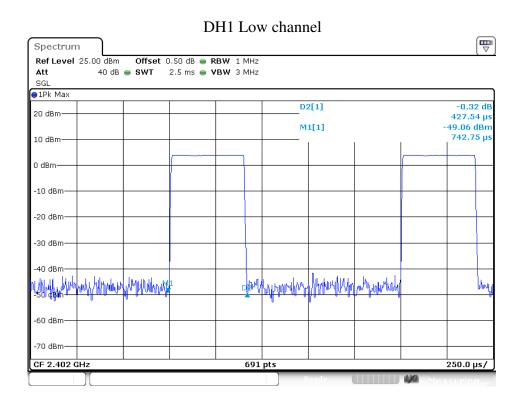


#### 8DPSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.449	143.68	400
	2441	0.446	142.72	400
	2480	0.446	142.72	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2*79)) \times 31.6$				
DH3	2402	1.736	277.76	400
	2441	1.721	275.36	400
	2480	1.736	277.76	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4*79)) \times 31.6$				
DH5	2402	3.040	324.27	400
	2441	2.975	317.33	400
	2480	3.062	326.61	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**



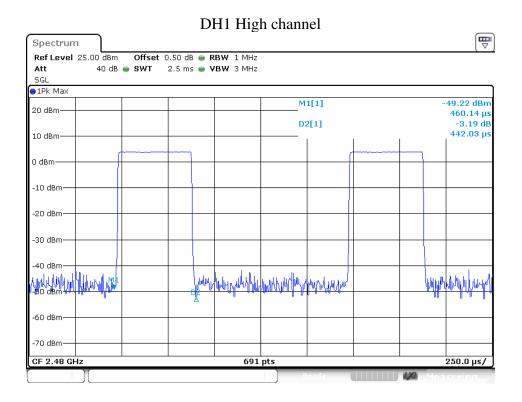


-70 dBm

CF 2.441 GHz

DH1 Middle channel Spectrum Ref Level 25.00 dBm Offset 0.50 dB 🖷 RBW 1 MHz 40 dB 🅌 SWT 2.5 ms 🅌 **VBW** 3 MHz Att SGL ●1Pk Max D2[1] 1.91 dB 20 dBm-438.41 μs M1[1] -49.30 dBm 1.63768 ms 10 dBm 0 dBm--10 dBm--20 dBm--30 dBm-40 dBm 

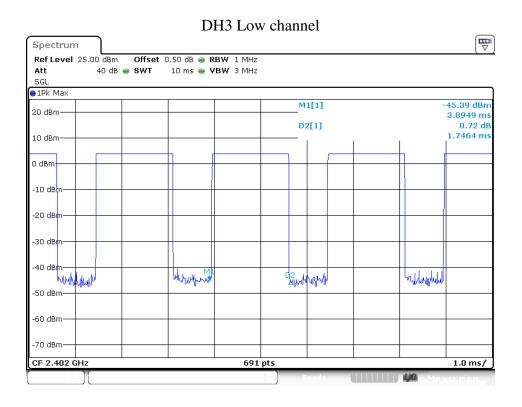
691 pts

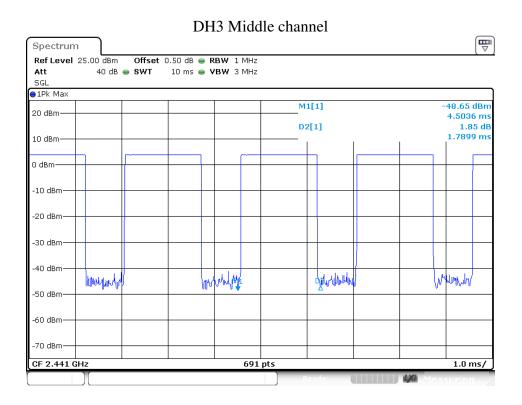


250.0 µs/



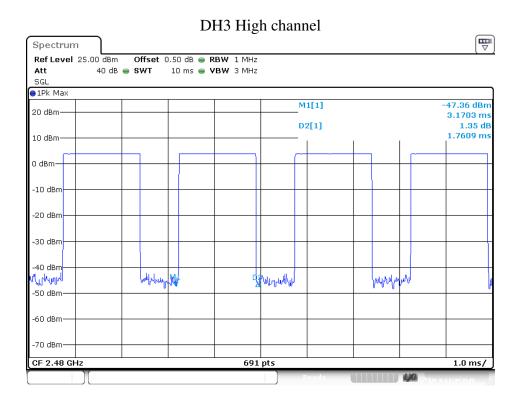
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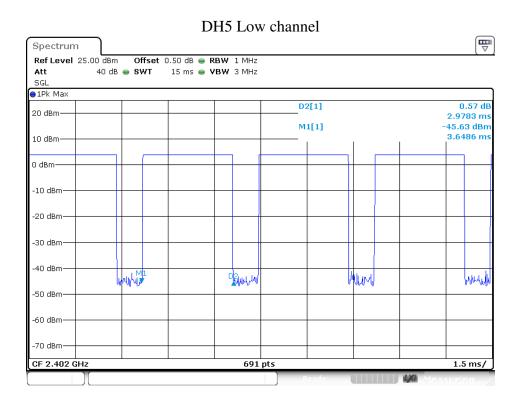




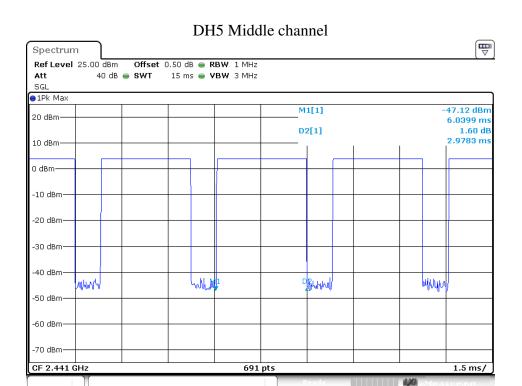


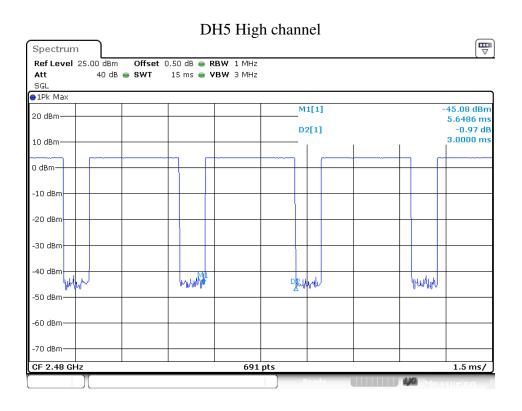
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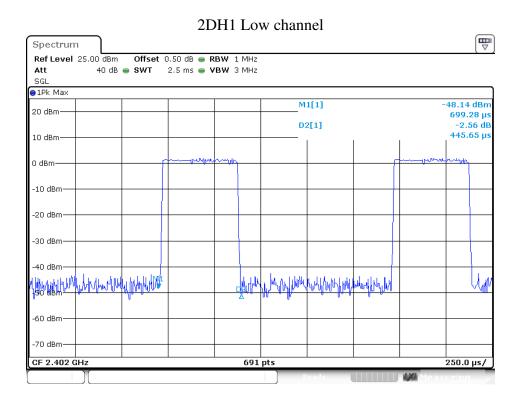


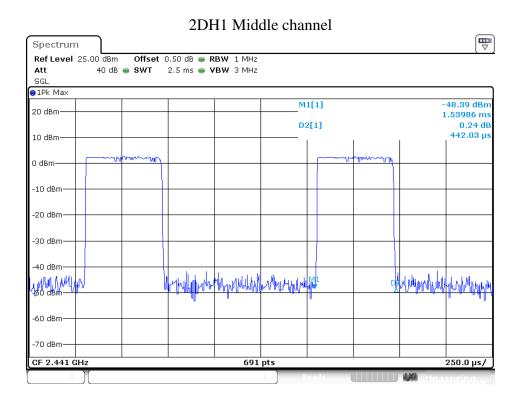




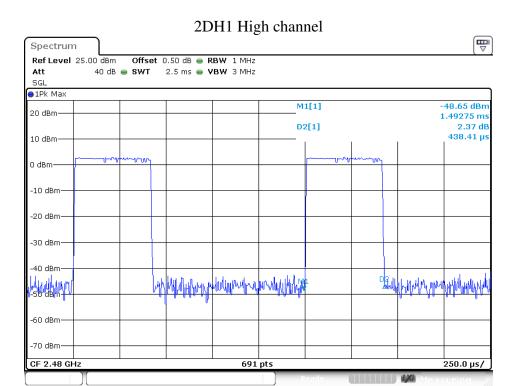


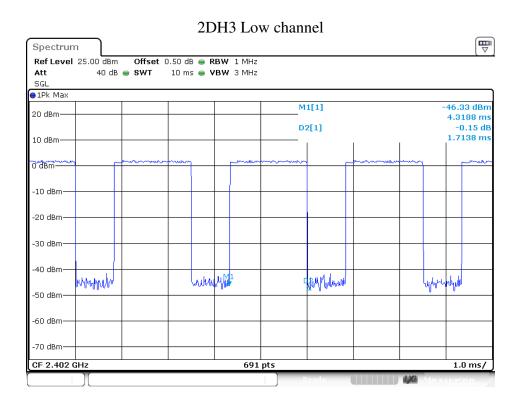
#### $\Pi/4$ -DQPSK





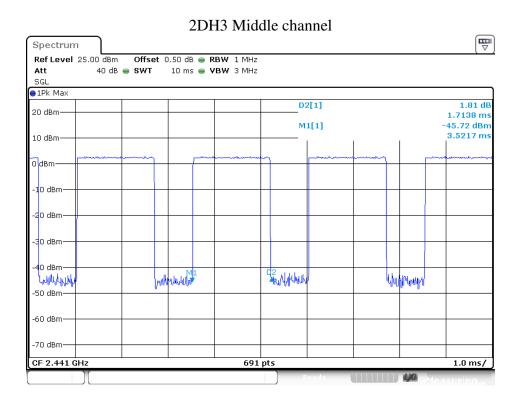


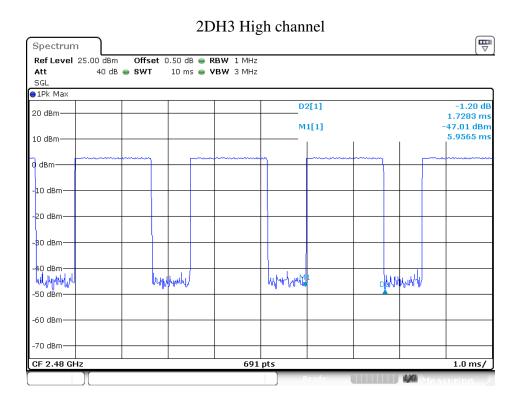






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Att SGL ●1Pk Max

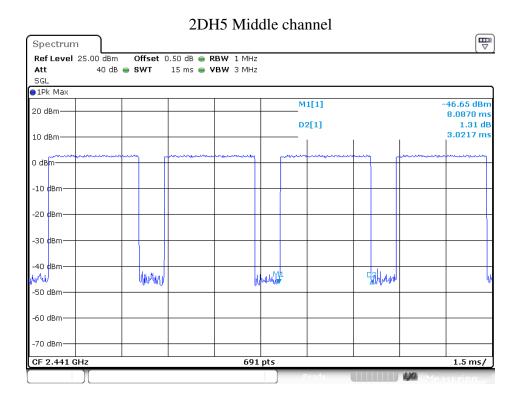
20 dBm-

10 dBm-0 dBm-

-10 dBm--20 dBm--30 dBm--40 dBm-

-50 dBm--60 dBm--70 dBm CF 2.402 GHz

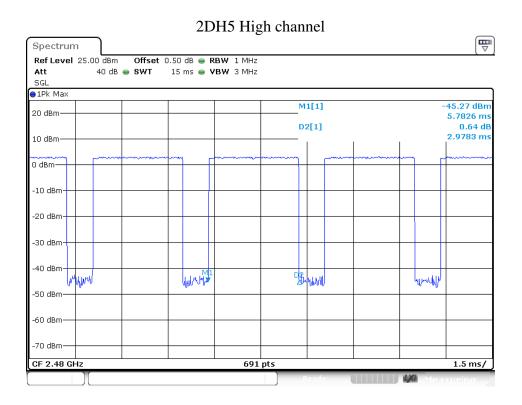
2DH5 Low channel Spectrum Offset 0.50 dB 🖷 RBW 1 MHz Ref Level 25.00 dBm 40 dB 🅌 SWT 15 ms 🁄 **VBW** 3 MHz M1[1] 45.73 dBm 6.7391 ms 1.33 dB D2[1] 3.0000 ms Wyn Though upyp



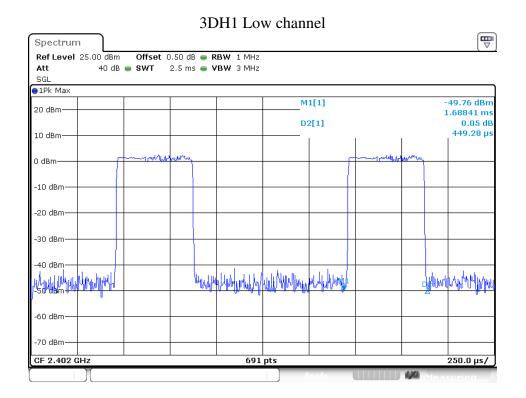
691 pts

1.5 ms/



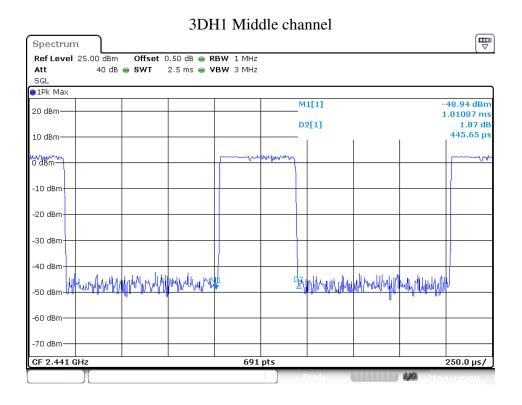


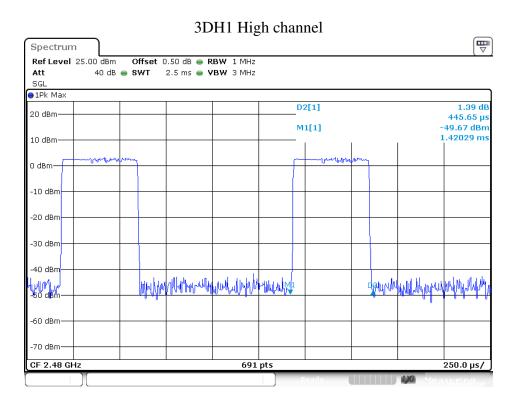
# 8DPSK Mode





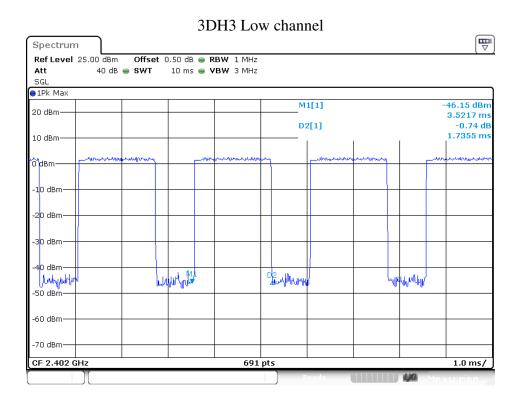
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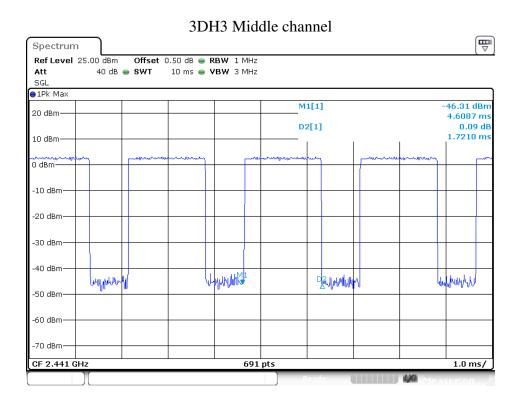




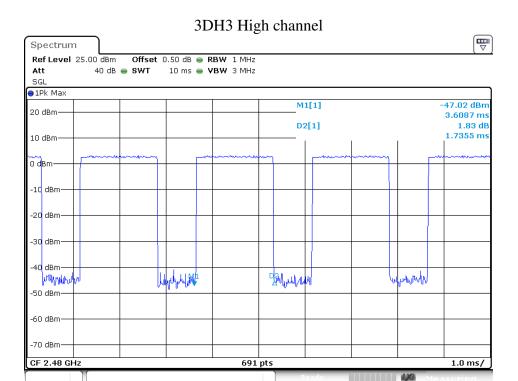


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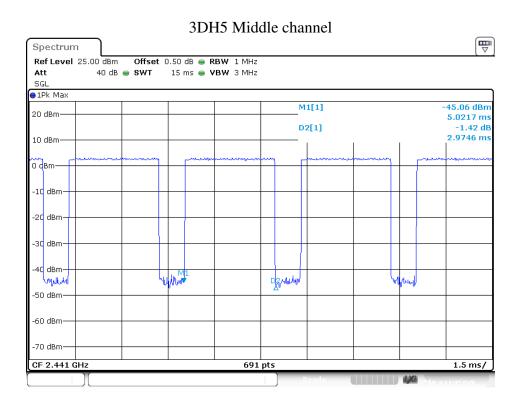


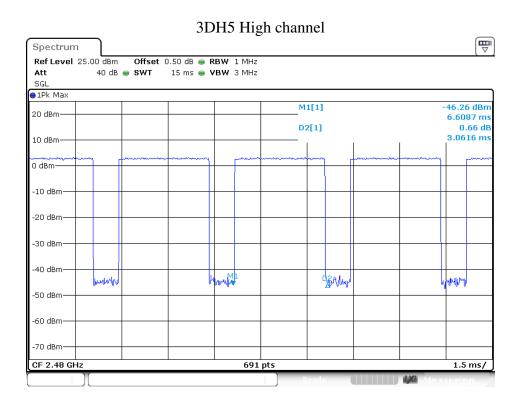






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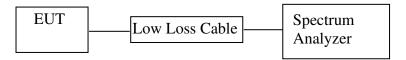


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# 9. MAXIMUM PEAK OUTPUT POWER TEST

# 9.1.Block Diagram of Test Setup



(EUT: Touch LED Lantern Bluetooth Speaker)

# 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

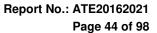
The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

# 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 1MHz and VBW to 3MHz for GFSK mode
- 9.5.3.Set RBW of spectrum analyzer to 3MHz and VBW to 10MHz for other mode
- 9.5.4. Measurement the maximum peak output power.





9.6.Test Result

# **GFSK Mode**

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	4.28/0.0027	30 / 1.0
Middle	2441	4.24/0.0027	30 / 1.0
High	2480	4.10/0.0026	30 / 1.0

# $\Pi$ /4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	3.36/0.0022	21 / 0.125
Middle	2441	3.78/0.0024	21 / 0.125
High	2480	4.06/0.0025	21 / 0.125

# 8DPSK Mode

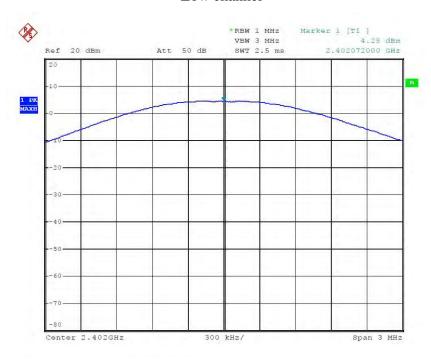
Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	3.78/0.0024	21 / 0.125
Middle	2441	3.94/0.0025	21 / 0.125
High	2480	4.15/0.0026	21 / 0.125

The spectrum analyzer plots are attached as below.

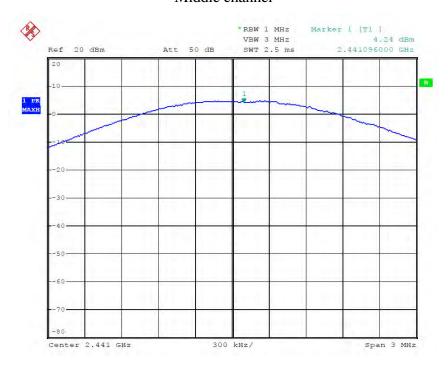


**GFSK Mode** 

# Low channel

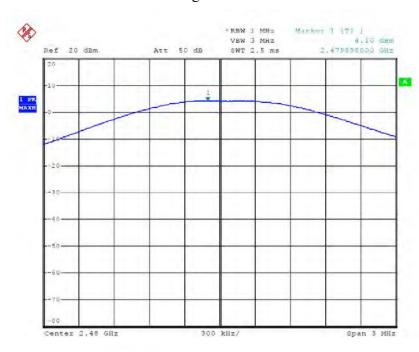


# Middle channel



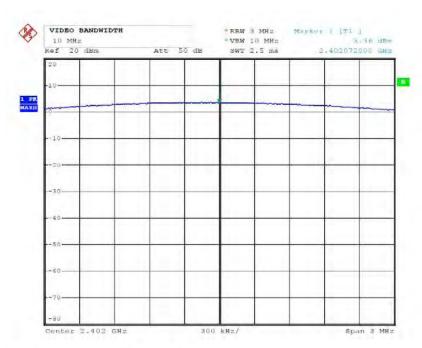


# High channel



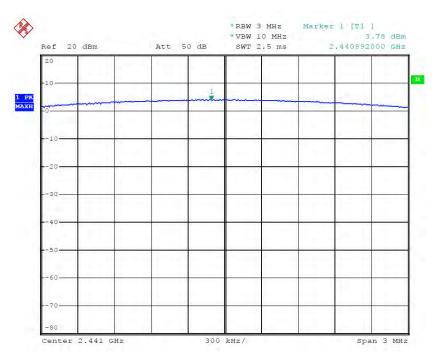
# $\Pi$ /4-DQPSK Mode

# Low channel

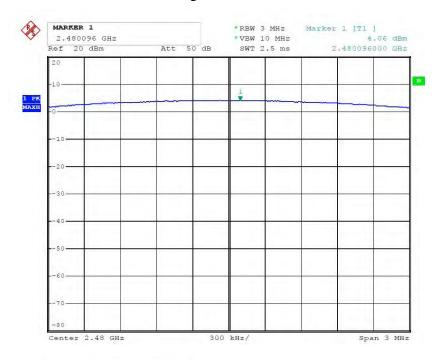




# Middle channel



# High channel





8DPSK Mode

# Low channel



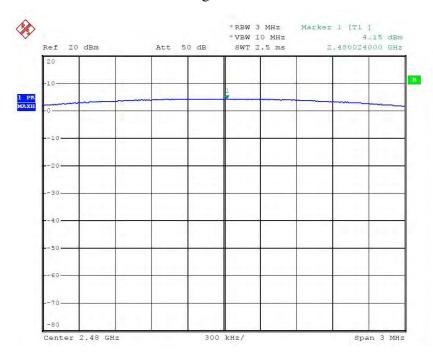
# Middle channel



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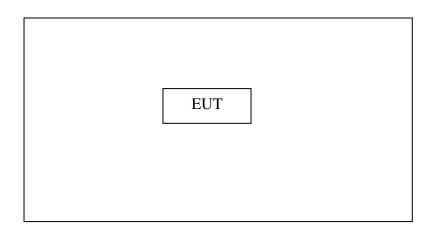
# High channel





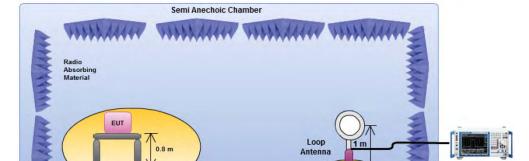
# 10.RADIATED EMISSION TEST

- 10.1.Block Diagram of Test Setup
- 10.1.1.Block diagram of connection between the EUT and peripherals



Setup: Transmitting mode

10.1.2. Semi-Anechoic Chamber Test Setup Diagram



Metal Ground Plane

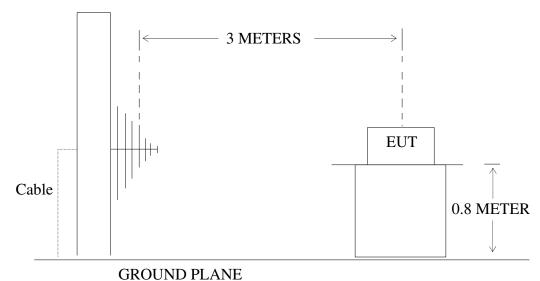
**Below 30MHz** 



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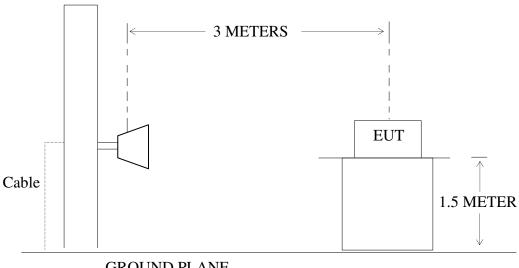
#### 30MHz-1GHz

#### ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



# **Above 1GHz**

#### ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



**GROUND PLANE** 

# 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



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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:

perm	nitted in any of the freque	ncy bands listed below:	
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 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	$\binom{2}{}$
13.36-13.41			

<sup>&</sup>lt;sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510

(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.

# 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.

<sup>&</sup>lt;sup>2</sup>Above 38.6



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# 10.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.1 meter high above ground(Below 1GHz). The EUT and its simulators are placed on a turntable, which is 0.1 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. The EUT was tested in 3 orthogonal planes.

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. The Field Strength of Radiation Emission Measurement Results

#### Note:

- 1.We tested GFSK mode,  $\Pi/4$ -DQPSK Mode & 8QPSK mode and recorded the worst case data (GFSK mode) for all test mode.
- 2. The test frequency is from 30MHz to 25GHz, The 18-25GHz emissions are not reported, because the levels are too low against the limit.





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#### **Below 1GHz**



# 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.: DING #2068

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

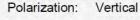
EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2402MHz

MI-SB019 Model:

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

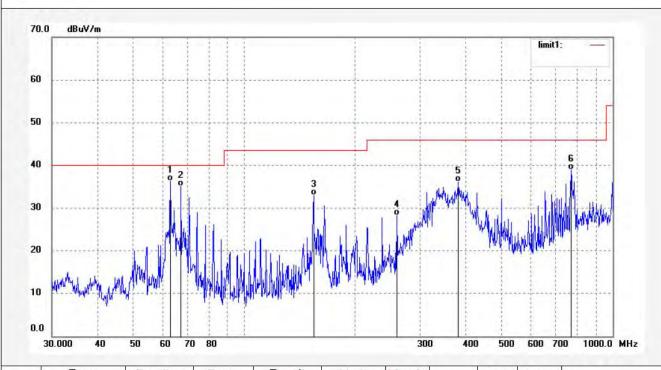
Report NO.:ATE20162021 Note:



Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 12/29/08

Engineer Signature: DING



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	62.9640	58.92	-22.65	36.27	40.00	-3.73	QP				
2	67.3109	57.91	-22.76	35.15	40.00	-4.85	QP				
3	154.2428	54.89	-21.95	32.94	43.50	-10.56	QP				- 1
4	259.4433	45.83	-17.60	28.23	46.00	-17.77	QP				1
5	380.5126	50.20	-14.14	36.06	46.00	-9.94	QP				
6	771.0475	45.26	-6.39	38.87	46.00	-7.13	QP				



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# 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.: DING #2069

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2402MHz

Model:

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

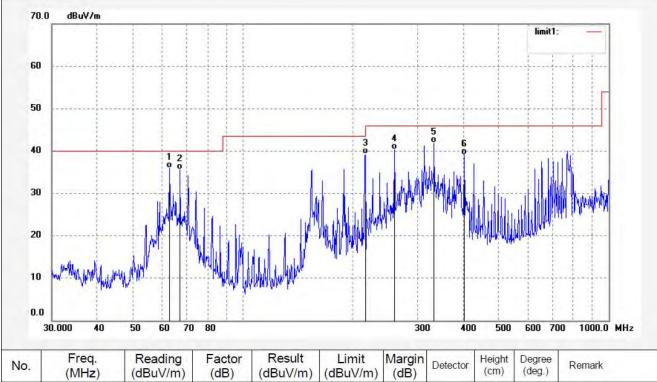
MI-SB019

Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 12/30/37

Engineer Signature: DING





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# 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.: DING #2070 Polaria

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2441MHz Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 12/31/34

Engineer Signature: DING

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No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	62.9640	57.89	-22.65	35.24	40.00	-4.76	QP			
2	67.3109	57.79	-22.76	35.03	40.00	-4.97	QP			
3	154.2427	59.11	-21.95	37.16	43.50	-6.34	QP			
4	215.3616	57.69	-18.43	39.26	43.50	-4.24	QP			
5	259.4433	58.37	-17.60	40.77	46.00	-5.23	QP			
6	312.5482	58.15	-15.99	42.16	46.00	-3.84	QP			



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# 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.: DING #2071

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2441MHz Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 12/32/44

Engineer Signature: DING

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No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	62.9640	58.91	-22.65	36.26	40.00	-3.74	QP			
2	67.3109	58.18	-22.76	35.42	40.00	-4.58	QP			
3	154.2428	55.29	-21.95	33.34	43.50	-10.16	QP			
4	312.5482	50.90	-15.99	34.91	46.00	-11.09	QP			
5	598.7066	44.02	-9.95	34.07	46.00	-11.93	QP			
6	771.0475	47.36	-6.39	40.97	46.00	-5.03	QP			



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# 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.: DING #2072

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2480MHz Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

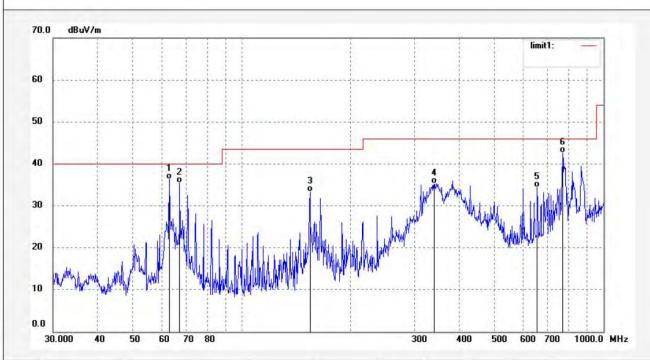
Note: Report NO.:ATE20162021

Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 12/33/45

Engineer Signature: DING



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	62.9640	58.91	-22.65	36.26	40.00	-3.74	QP				
2	67.3109	58.18	-22.76	35.42	40.00	-4.58	QP				
3	154.2427	55.29	-21.95	33.34	43.50	-10.16	QP				
4	340.0473	50.35	-15.02	35.33	46.00	-10.67	QP				
5	655.9765	43.06	-8.74	34.32	46.00	-11.68	QP				
6	771.0475	48.95	-6.39	42.56	46.00	-3.44	QP				(



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# ACCURATE TECHNOLOGY CO., LTD.

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Job No.: DING #2073

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2480MHz Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 12/34/26

Engineer Signature: DING

									limit1:	7	
60									 		
50									 		
40		0			2	.3	4 o 0	6			
30				,						Miana	
20	1,4									· IIda	
10 WWW.	Hall Mary Aut		HAMA	MANA MA	- W''						
0.0					1						

No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	62.9640	59.32	-22.65	36.67	40.00	-3.33	QP	i i		
2	154.2428	58.43	-21.95	36.48	43.50	-7.02	QP			
3	216.1196	56.27	-18.42	37.85	46.00	-8.15	QP			
4	312.5482	56.92	-15.99	40.93	46.00	-5.07	QP			
5	332.9536	57.56	-15.22	42.34	46.00	-3.66	QP			
6	402.5167	52.30	-13.94	38.36	46.00	-7.64	QP			



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#### **Above 1GHz**



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Job No.: DING #2074

Standard: FCC Class B 3M Radiated

Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2402MHz Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

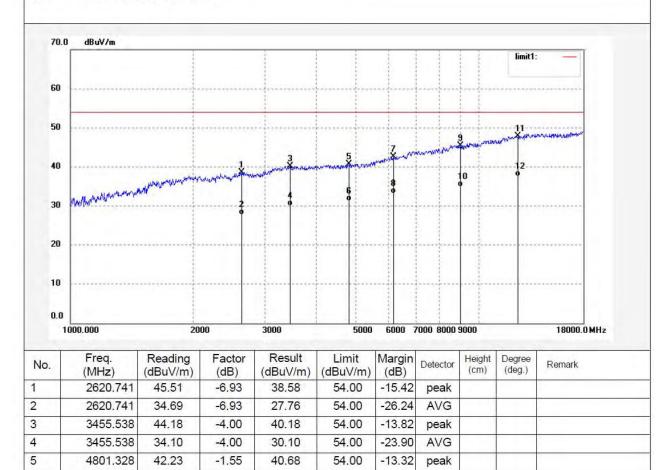
Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 12/43/59

Engineer Signature: DING

Distance: 3m



Note: Average measurement with peak detection at No.2

32.78

41.13

31.59

39.56

29.00

38.86

28.49

-1.55

1.52

1.52

5.94

5.94

9.09

9.09

31.23

42.65

33.11

45.50

34.94

47.95

37.58

54.00

54.00

54.00

54.00

54.00

54.00

54.00

-22.77

-11.35

-20.89

-8.50

-19.06

-6.05

-16.42

AVG

peak

AVG

peak

AVG

peak

AVG

6

7

8

9

10

11

12

4801.328

6167.027

6167.027

9029.750

9029.750

12473,640

12473.640



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

Report No.: ATE20162021

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

Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 12/45/29

Engineer Signature: DING

Distance: 3m

Job No.: DING #2075

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

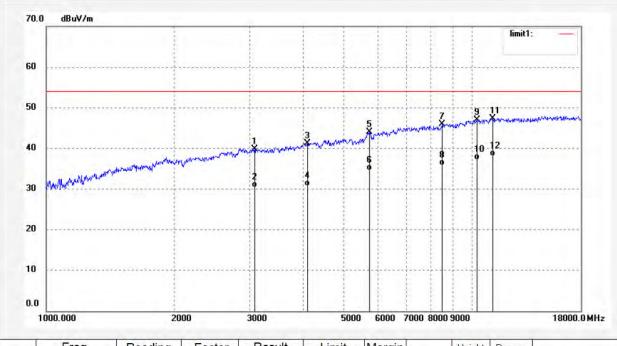
Temp.( C)/Hum.(%) 25 C / 55 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2402MHz Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	3084.714	45.27	-5.37	39.90	54.00	-14.10	peak	171		
2	3084.714	35.70	-5.37	30.33	54.00	-23.67	AVG			
3	4102.975	43.66	-2.49	41.17	54.00	-12.83	peak			
4	4102.975	33.18	-2.49	30.69	54.00	-23.31	AVG			
5	5734.200	43.38	0.64	44.02	54.00	-9.98	peak			
6	5734.200	33.86	0.64	34.50	54.00	-19.50	AVG	- 11		
7	8519.092	40.57	5.40	45.97	54.00	-8.03	peak			
8	8519.092	30.40	5.40	35.80	54.00	-18.20	AVG			
9	10263.538	40.47	6.49	46.96	54.00	-7.04	peak			
10	10263.538	30.67	6.49	37.16	54.00	-16.84	AVG			
11	11200.070	40.16	7.19	47.35	54.00	-6.65	peak			
12	11200.070	30.83	7.19	38.02	54.00	-15.98	AVG			

Note: Average measurement with peak detection at No.2



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# ACCURATE TECHNOLOGY CO., LTD.

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

Job No.: DING #2076 Polarization:

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2441MHz Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Report NO.:ATE20162021 Note:

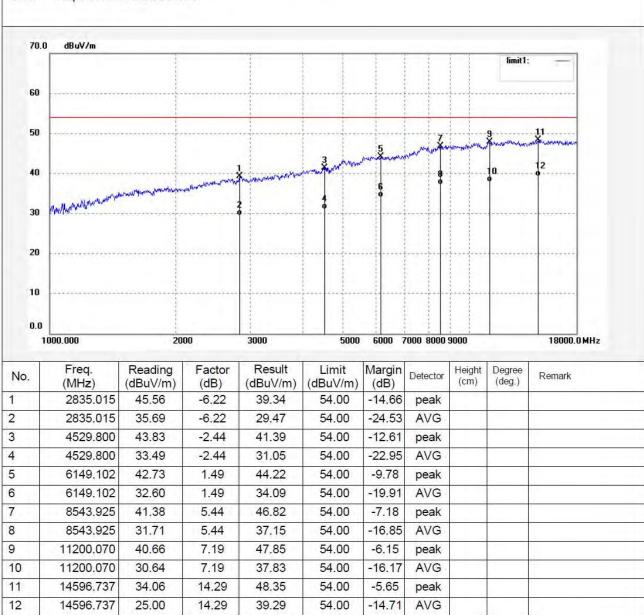
Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 12/47/17

Engineer Signature: DING

Distance: 3m



Note: Average measurement with peak detection at No.2



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Model:

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Report No.: ATE20162021

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Job No.: DING #2077 Polarization: Horizontal

Standard: FCC Class B 3M Radiated Power Source: AC 120V/60Hz

 Test item:
 Radiation Test
 Date: 16/09/28/

 Temp.(
 C)/Hum.(%)
 25
 C / 55 %
 Time: 12/48/56

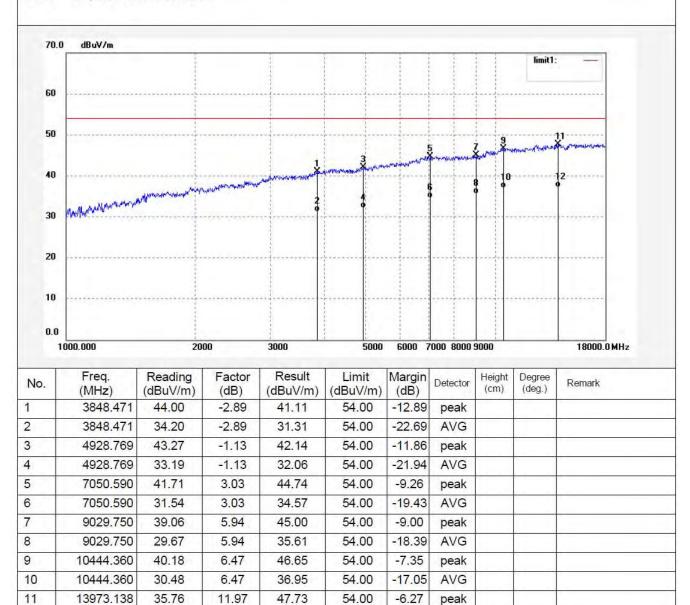
EUT: Touch LED Lantern Bluetooth Speaker Engineer Signature: DING

Mode: TX 2441MHz Distance: 3m

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

MI-SB019



Note: Average measurement with peak detection at No.2

11.97

37.23

54.00

-16.77

AVG

25.26

13973.138

12



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

Job No.: DING #2078 Polarization: Horizontal

Standard: FCC Class B 3M Radiated Power Source: AC 120V/60Hz

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

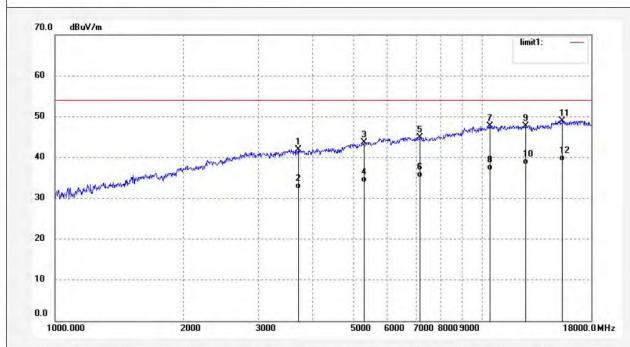
Test item: Radiation Test Date: 16/09/28/
Temp.( C)/Hum.(%) 25 C / 55 % Time: 12/50/02

EUT: Touch LED Lantern Bluetooth Speaker Engineer Signature: DING

Mode: TX 2480MHz Distance: 3m Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	3716.368	45.13	-3.25	41.88	54.00	-12.12	peak			
2	3716.368	35.60	-3.25	32.35	54.00	-21.65	AVG			
3	5285.395	44.03	-0.31	43.72	54.00	-10.28	peak			
4	5285.395	34.18	-0.31	33.87	54.00	-20.13	AVG			
5	7153.952	41.75	3.17	44.92	54.00	-9.08	peak			
6	7153.952	31.91	3.17	35.08	54.00	-18.92	AVG			
7	10444.360	41.18	6.47	47.65	54.00	-6.35	peak			
8	10444.360	30.40	6.47	36.87	54.00	-17.13	AVG			
9	12656.506	38.28	9.47	47.75	54.00	-6.25	peak			
10	12656.506	28.76	9.47	38.23	54.00	-15.77	AVG			
11	15426.737	36.36	12.60	48.96	54.00	-5.04	peak			
12	15426.737	26.50	12.60	39.10	54.00	-14.90	AVG			

Note: Average measurement with peak detection at No.2



Model:

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Report No.: ATE20162021 Page 65 of 98

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

Job No.: DING #2079 Polarization: Vertical

Standard: FCC Class B 3M Radiated Power Source: AC 120V/60Hz

Test item: Radiation Test Date: 16/09/28/ Temp.( C)/Hum.(%) 25 C / 55 % Time: 12/52/17

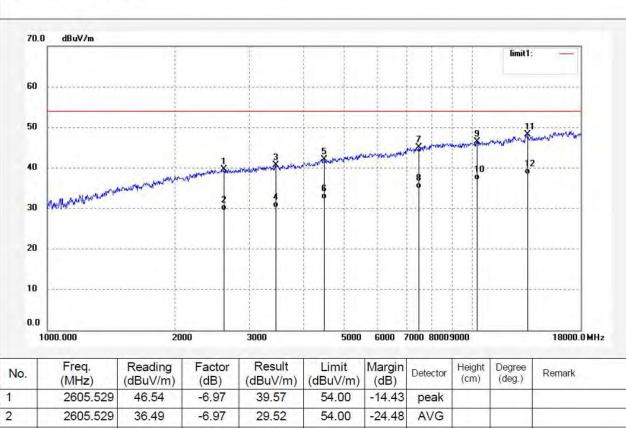
EUT: Touch LED Lantern Bluetooth Speaker Engineer Signature: DING

Mode: TX 2480MHz Distance: 3m

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Report NO.:ATE20162021 Note:

MI-SB019



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2605.529	46.54	-6.97	39.57	54.00	-14.43	peak			1
2	2605.529	36.49	-6.97	29.52	54.00	-24.48	AVG			
3	3455.538	44.68	-4.00	40.68	54.00	-13.32	peak			
4	3455.538	34.15	-4.00	30.15	54.00	-23.85	AVG			
5	4490.416	44.63	-2.54	42.09	54.00	-11.91	peak			
6	4490.416	34.80	-2.54	32.26	54.00	-21.74	AVG			
7	7495.006	41.32	3.67	44.99	54.00	-9.01	peak			
8	7495.006	31.27	3.67	34.94	54.00	-19.06	AVG			
9	10293.456	40.00	6.49	46.49	54.00	-7.51	peak			
10	10293.456	30.50	6.49	36.99	54.00	-17.01	AVG			
11	13532.829	37.15	11.07	48.22	54.00	-5.78	peak			
12	13532.829	27.34	11.07	38.41	54.00	-15.59	AVG			

Note: Average measurement with peak detection at No.2

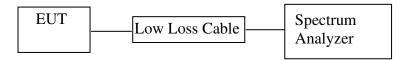


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# 11.BAND EDGE COMPLIANCE TEST

# 11.1.Block Diagram of Test Setup



(EUT: Touch LED Lantern Bluetooth Speaker)

# 11.2. The Requirement For Section 15.247(d)

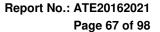
Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band 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

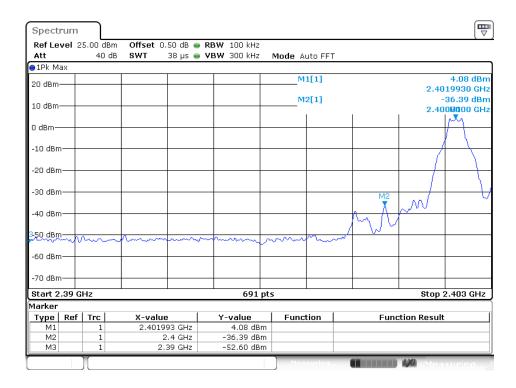
- 11.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.
- 11.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.
- 11.5.3. The band edges was measured and recorded.

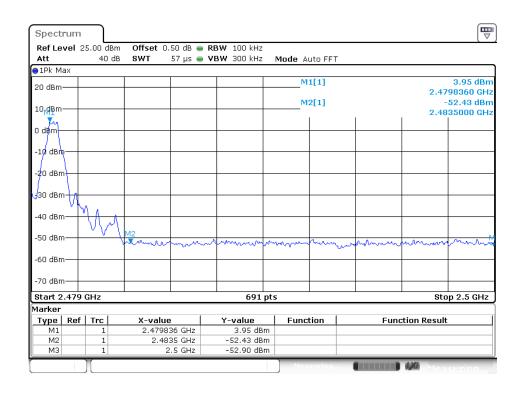
# 11.6.Test Result

Frequency	Result of Band Edge	Limit of Band Edge
(MHz)	(dBc)	(dBc)
	GFSK	
2400.00	40.47	> 20dBc
2483.50	56.38	> 20dBc
	∏/4-DQPSK Mode	
2400.00	33.86	> 20dBc
2483.50	53.11	> 20dBc
	8DPSK	1
2400.00	34.13	> 20dBc
2483.50	51.72	> 20dBc



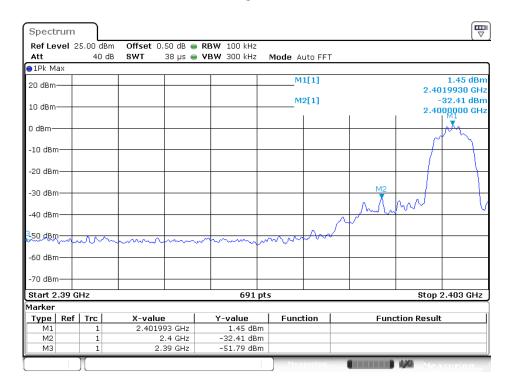
#### **GFSK**

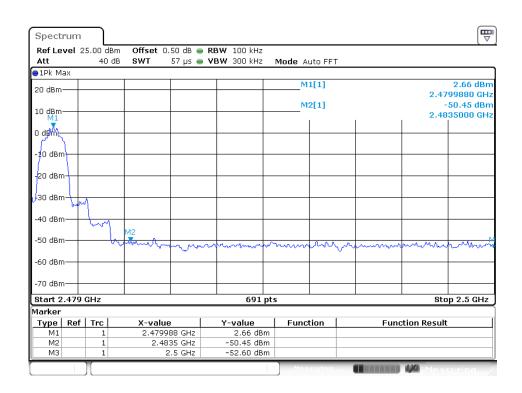


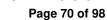




# ∏/4-DQPSK Mode

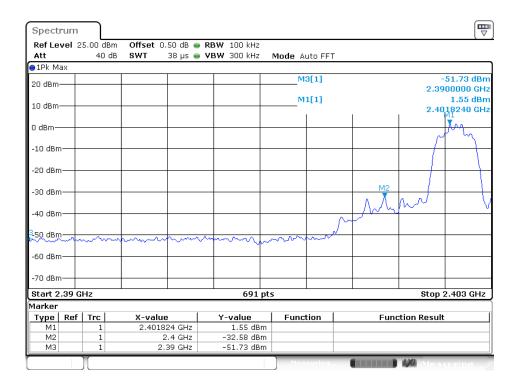


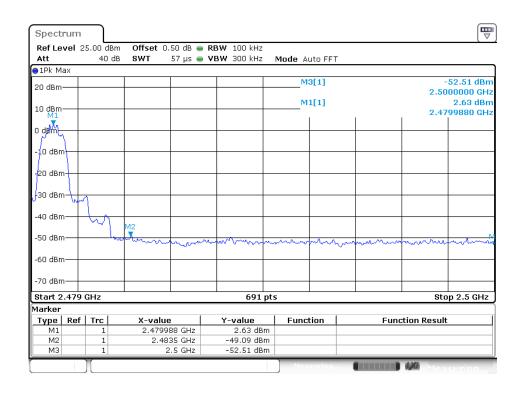






#### 8DPSK







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#### 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:

Result = Reading + Corrected Factor

3. Display the measurement of peak values.

#### Test Procedure:

The EUT and its simulators are placed on a turntable, which is 0.1 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. The EUT was tested in 3 orthogonal planes.

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.



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Site: 2# Chamber

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#### Non-hopping mode



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Job No.: star2015 #437 Polarization: Vertical

Standard: FCC PK Power Source: AC 120V/60Hz

Test item: Radiation Test Date: 16/09/28/ Temp.( C)/Hum.(%) 23 C / 48 % Time: 18/10/02

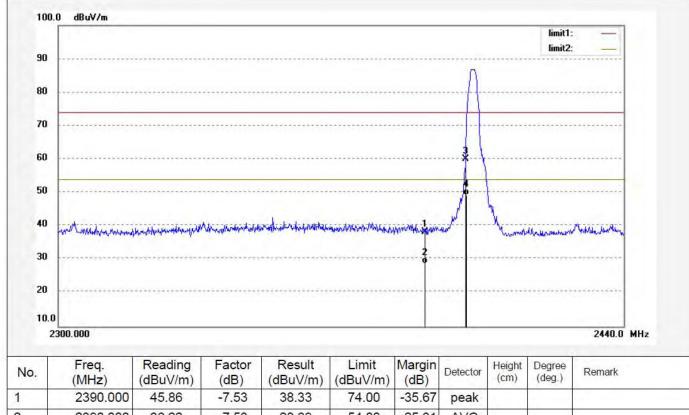
EUT: Touch LED Lantern Bluetooth Speaker Engineer Signature: DING

Mode: Distance: 3m TX 2402MHz(GFSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021



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	45.86	-7.53	38.33	74.00	-35.67	peak				
2	2390.000	36.22	-7.53	28.69	54.00	-25.31	AVG				
3	2400.000	67.51	-7.46	60.05	74.00	-13.95	peak		1		- 1
4	2400.000	56.79	-7.46	49.33	54.00	-4.67	AVG	7			

Note: Average measurement with peak detection at No.2&4



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Fax:+86-0755-26503396

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

Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/12/10

Engineer Signature: DING

Distance: 3m

Job No.: star2015 #438 Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

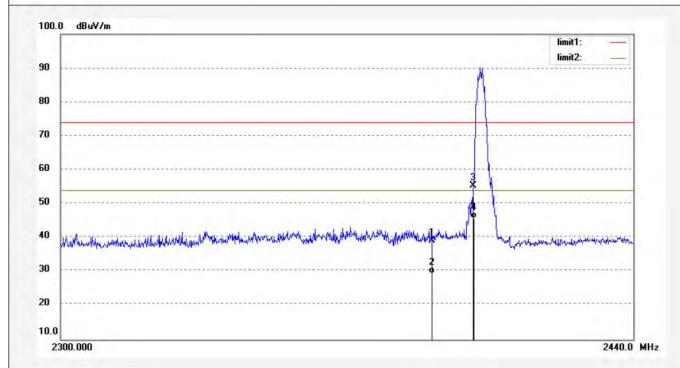
EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2402MHz(GFSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021



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	46.68	-7.53	39.15	74.00	-34.85	peak				
2	2390.000	36.97	-7.53	29.44	54.00	-24.56	AVG				
3	2400.000	62.85	-7.46	55.39	74.00	-18.61	peak				
4	2400.000	53.16	-7.46	45.70	54.00	-8.30	AVG				



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ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: star2015 #439

Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2480MHz(GFSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

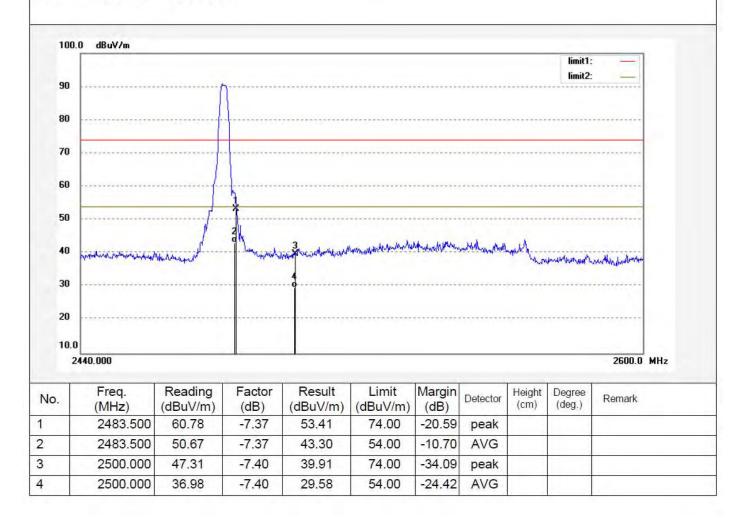
Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/14/18

Engineer Signature: DING

Distance: 3m





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## ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: star2015 #440 Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2480MHz(GFSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/15/42

Engineer Signature: DING

Distance: 3m

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30 20 10.0 244		Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)		Height (cm)	Degree (deg.)	2600.0 MH
30 - 20 - 10.0 <u>244</u>	0.000 Freq.	Reading	Factor	Result	Limit	Margin	Detector	Height		77.
30 - 20 - 10.0 <u>244</u>	0.000 Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector peak	Height		77.
30	0.000 Freq. (MHz) 2483.500	Reading (dBuV/m) 59.76	Factor (dB) -7.37	Result (dBuV/m) 52.39	Limit (dBuV/m) 74.00	Margin (dB) -21.61	Detector peak AVG	Height		77.



Report No.: ATE20162021 Page 76 of 98

## ACCURATE TECHNOLOGY CO., LTD.

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

Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: star2015 #441 Standard: FCC PK Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

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

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Report NO.:ATE20162021

Horizontal Polarization: Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/18/18

Engineer Signature: DING

Distance: 3m

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30 20 10.0 2	1.440.000 Freq.	Reading	Factor	Result	Limit	Margin		Height	Degree		MHz
30 20 10.0	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector			2600.0	MHz
30 20 10.0 2	1.440.000 Freq.	Reading	Factor	Result	Limit	Margin		Height	Degree		MHz
30 20 10.0 2	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height	Degree		MHz
30 20 10.0 2	Freq. (MHz) 2483.500	Reading (dBuV/m) 56.61	Factor (dB)	Result (dBuV/m) 49.24	Limit (dBuV/m) 74.00	Margin (dB) -24.76	Detector peak	Height	Degree		MHz



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Report No.: ATE20162021

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Job No.: star2015 #442

Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2480MHz(∏/4-DQPSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

Polarization: Vertical
Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/19/35

Engineer Signature: DING

Distance: 3m

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30 20 10.0 2		Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin	Detector	Height (cm)	Degree (deg.)	2600.0 N	МНz
30 20 10.0 2	440.000 Freq.	Reading	Factor	Result	Limit	Margin		Height	Degree		МНz
30 20 10.0 2	440.000 Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height	Degree		МНz
40 30 20 10.0 2	440.000 Freq. (MHz) 2483.500	Reading (dBuV/m) 58.83	Factor (dB) -7.37	Result (dBuV/m) 51.46	Limit (dBuV/m) 74.00	Margin (dB) -22.54	Detector peak	Height	Degree		МНz



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

Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: star2015 #443

Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2402MHz(∏/4-DQPSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

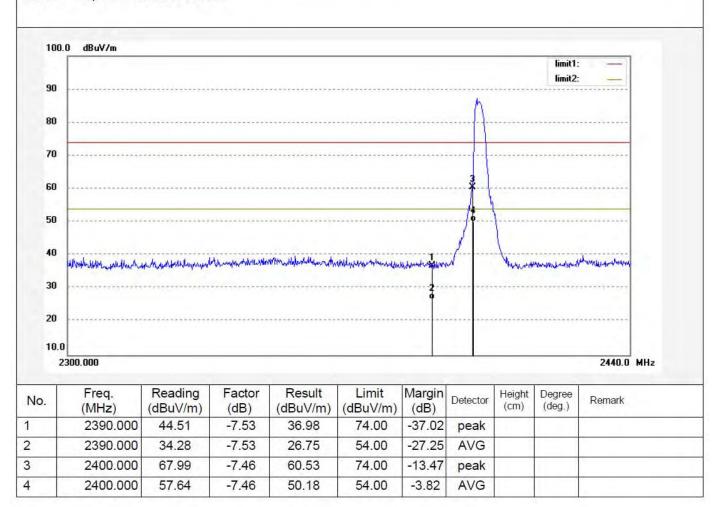
Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/22/26

Engineer Signature: DING

Distance: 3m





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## ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: star2015 #444

Standard: FCC PK
Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2402MHz(∏/4-DQPSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

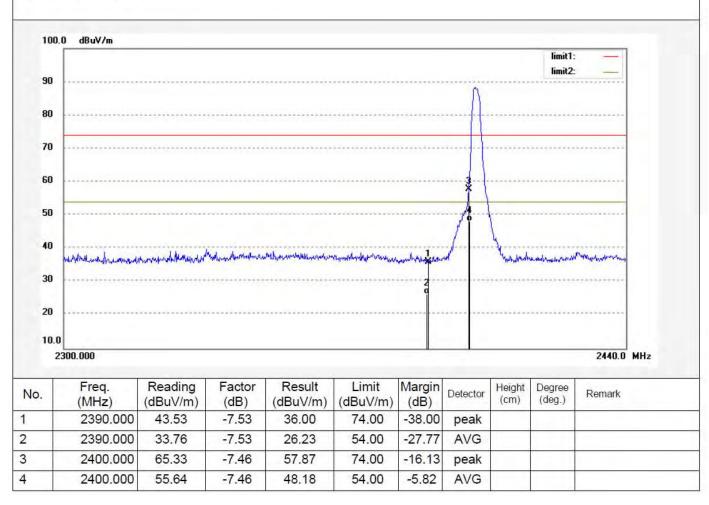
Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/25/30

Engineer Signature: DING

Distance: 3m





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Job No.: star2015 #445

Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LE

Touch LED Lantern Bluetooth Speaker

Mode: TX 2402MHz(8DPSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

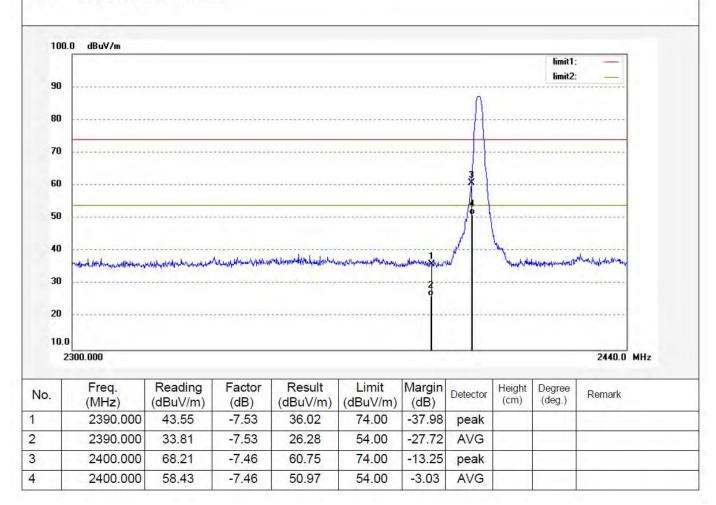
Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/27/57

Engineer Signature: DING

Distance: 3m





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Report No.: ATE20162021

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Job No.: star2015 #446 Polarization: Vertical

Standard: FCC PK Power Source: AC 120V/60Hz

Test item: Radiation Test Date: 16/09/28/
Temp.( C)/Hum.(%) 23 C / 48 % Time: 18/29/04

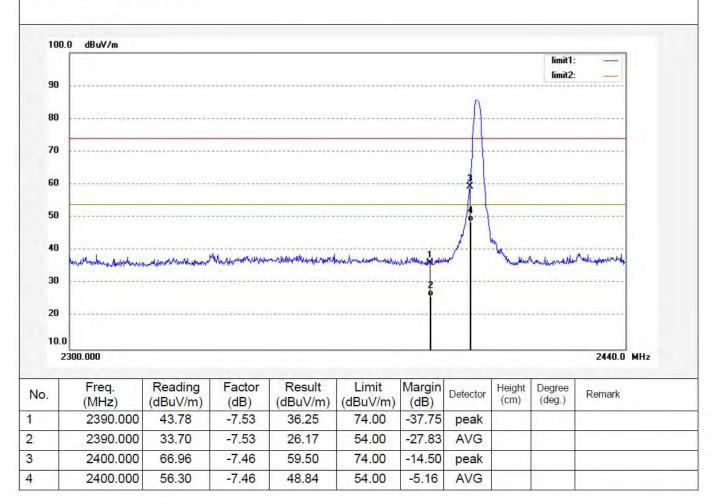
EUT: Touch LED Lantern Bluetooth Speaker Engineer Signature: DING

Mode: TX 2402MHz(8DPSK) Distance: 3m

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021





Report No.: ATE20162021 Page 82 of 98

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## ACCURATE TECHNOLOGY CO., LTD.

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Job No.: star2015 #447

Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LE

Touch LED Lantern Bluetooth Speaker

Mode: TX 2480MHz(8DPSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/31/26

Engineer Signature: DING

Distance: 3m

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30 20 10.	0	Reading (dBuV/m)	Factor (dB)	Result	Limit (dBuV/m)	Margin		Height (cm)	Degree (deg.)	2600.0 h	MHz
30 20 10.	0 2440.000 Freq.	Reading	Factor		Limit	Margin		Height			MHz
30 20 10.	0 2440.000 Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height			MHz
30 20 10.	0 2440.000 Freq. (MHz) 2483.500	Reading (dBuV/m) 60.83	Factor (dB)	Result (dBuV/m) 53.46	Limit (dBuV/m) 74.00	Margin (dB) -20.54	Detector peak AVG	Height			МНz



Report No.: ATE20162021 Page 83 of 98



ACCURATE TECHNOLOGY CO., LTD.

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

Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: star2015 #448 Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: TX 2480MHz(8DPSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021 Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/32/57

Engineer Signature: DING

Distance: 3m

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30 20 10.0 2	and the same of th	Reading	Factor	Result	Limit	Margin		Height	Degree		MHz
30 20 10.0	2440.000 Freq. (MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	Margin (dB)	Detector			2600.0	MHz
30 20 10.0 2	2440.000 Freq.					Margin	Detector	Height	Degree		MHz
30 20 10.0 2	2440.000 Freq. (MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	Margin (dB)	Detector	Height	Degree		MHz
30 20 10.0 2	Freq. (MHz) 2483.500	(dBuV/m) 56.54	(dB) -7.37	(dBuV/m) 49.17	(dBuV/m) 74.00	Margin (dB) -24.83	Detector peak AVG	Height	Degree		MHz



Report No.: ATE20162021 Page 84 of 98

Hopping mode

# (ATC)

## ACCURATE TECHNOLOGY CO., LTD.

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Job No.: star2015 #449

Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: HOPPING (GFSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

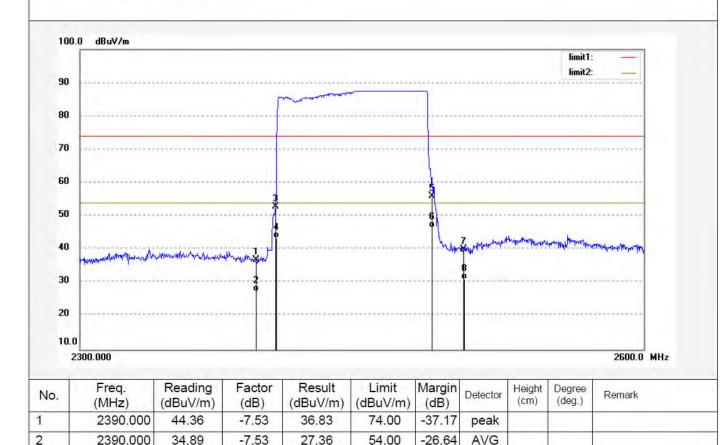
Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/37/00

Engineer Signature: DING

Distance: 3m



Note: Average measurement with peak detection at No.2, 4, 6, 8

-7.46

-7.46

-7.37

-7.37

-7.40

-7.40

52.80

43.33

55.95

46.60

40.05

30.97

74.00

54.00

74.00

54.00

74.00

54.00

-21.20

-10.67

-18.05

-7.40

-33.95

-23.03

peak

**AVG** 

peak

**AVG** 

peak

**AVG** 

3

4

5

6

7

8

2400.000

2400.000

2483.500

2483.500

2500.000

2500.000

60.26

50.79

63.32

53.97

47.45

38.37



Model:

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Report No.: ATE20162021

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Job No.: star2015 #450 Polarization: Horizontal

Standard: FCC PK Power Source: AC 120V/60Hz

 Test item:
 Radiation Test
 Date: 16/09/28/

 Temp.( C)/Hum.(%)
 23 C / 48 %
 Time: 18/38/50

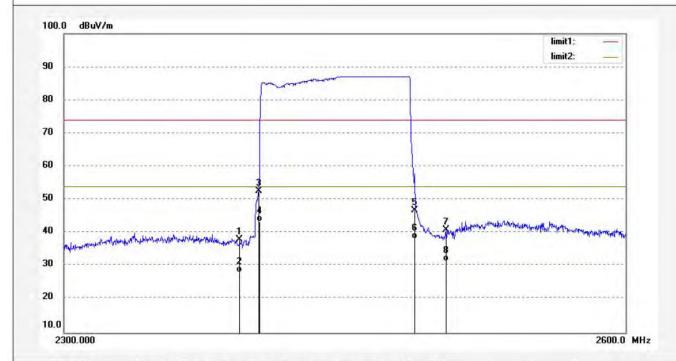
EUT: Touch LED Lantern Bluetooth Speaker Engineer Signature: DING

Mode: HOPPING (GFSK) Distance: 3m

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

MI-SB019



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	45.48	-7.53	37.95	74.00	-36.05	peak	1		
2	2390.000	35.69	-7.53	28.16	54.00	-25.84	AVG			
3	2400.000	60.00	-7.46	52.54	74.00	-21.46	peak			
4	2400.000	50.88	-7.46	43.42	54.00	-10.58	AVG			
5	2483.500	54.24	-7.37	46.87	74.00	-27.13	peak			
6	2483.500	45.67	-7.37	38.30	54.00	-15.70	AVG			
7	2500.000	48.28	-7.40	40.88	74.00	-33.12	peak			
8	2500.000	38.88	-7.40	31.48	54.00	-22.52	AVG			





F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Report No.: ATE20162021

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Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/41/25

Engineer Signature: DING

Distance: 3m

Job No.: star2015 #451
Standard: FCC PK
Test item: Radiation Test

Test item. Radiation rest

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: HOPPING (∏/4-DQPSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021



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	43.96	-7.53	36.43	74.00	-37.57	peak				
2	2390.000	33.76	-7.53	26.23	54.00	-27.77	AVG				
3	2400.000	69.87	-7.46	62.41	74.00	-11.59	peak				
4	2400.000	58.30	-7.46	50.84	54.00	-3.16	AVG				
5	2483.500	62.38	-7.37	55.01	74.00	-18.99	peak				
6	2483.500	52.97	-7.37	45.60	54.00	-8.40	AVG				
7	2500.000	45.96	-7.40	38.56	74.00	-35.44	peak				
8	2500.000	35.99	-7.40	28.59	54.00	-25.41	AVG				1



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## ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: star2015 #452

Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: HOPPING (∏/4-DQPSK)

Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021

Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/43/09

Engineer Signature: DING

Distance: 3m

	.O dBuV/m										
									limit1: limit2:		
90		**********					*******	******			
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80			*********	******	*********		*******	******	*****	**********	
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			2					*	******		
20			8					*******		*********	
	)	************	8					********	******		
20 10.0	300.000		6							2600.0	MHz
20 10.0 2		Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	<b>2600.0</b> Remark	MHz
20 10.0 2	2300.000 Freq.				Control State of the Control of the	Margin (dB)				*****	MHz
20 10.0 2	Freq. (MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)				*****	MHz
20 10.0 2	Freq. (MHz) 2390.000	(dBuV/m) 43.49	(dB) -7.53	(dBuV/m) 35.96	(dBuV/m) 74.00	(dB) -38.04	peak			*****	MHz
20 10.0 2	Freq. (MHz) 2390.000 2390.000	(dBuV/m) 43.49 33.69	(dB) -7.53 -7.53	(dBuV/m) 35.96 26.16	(dBuV/m) 74.00 54.00	(dB) -38.04 -27.84	peak AVG			*****	MHz
20 10.0 2	Freq. (MHz) 2390.000 2390.000 2400.000	(dBuV/m) 43.49 33.69 61.55	(dB) -7.53 -7.53 -7.46	(dBuV/m) 35.96 26.16 54.09	(dBuV/m) 74.00 54.00 74.00	(dB) -38.04 -27.84 -19.91	peak AVG peak			*****	MHz
20	Freq. (MHz) 2390.000 2390.000 2400.000 2400.000	(dBuV/m) 43.49 33.69 61.55 52.79	(dB) -7.53 -7.53 -7.46 -7.46	(dBuV/m) 35.96 26.16 54.09 45.33	(dBuV/m) 74.00 54.00 74.00 54.00	(dB) -38.04 -27.84 -19.91 -8.67	peak AVG peak AVG			*****	MHz



Report No.: ATE20162021

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## ACCURATE TECHNOLOGY CO., LTD.

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

Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Job No.: star2015 #453 Standard: FCC PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

EUT: Touch LED Lantern Bluetooth Speaker

Mode: HOPPING (8DPSK)

MI-SB019 Model:

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021 Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/45/59

Engineer Signature: DING

Distance: 3m

	0.0 dBuV/m									
									limit1: limit2:	
90					Nec-		****			**********
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80		*************			**********				********	***********
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60		**********	*					******	*********	
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30			6							**********
20										
				************				*******		
10		************						*******		2600.0
	2300.000	Danding	Factor	Doguit	l imit	Marsin		Treserve		2600.0
	2300.000 Freq.	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	<b>2600.0</b> Remark
10	2300.000	Reading (dBuV/m) 44.31	Factor (dB) -7.53	Result (dBuV/m) 36.78	Limit (dBuV/m) 74.00	Margin (dB)	Detector			
10	2300.000 Freq. (MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	100000000000000000000000000000000000000			
10	Freq. (MHz) 2390.000	(dBuV/m) 44.31	(dB) -7.53	(dBuV/m) 36.78	(dBuV/m) 74.00	(dB) -37.22	peak			
10	Freq. (MHz) 2390.000 2390.000	(dBuV/m) 44.31 34.69	(dB) -7.53 -7.53	(dBuV/m) 36.78 27.16	(dBuV/m) 74.00 54.00	(dB) -37.22 -26.84	peak AVG			
10	Freq. (MHz) 2390.000 2390.000 2390.000 2400.000	(dBuV/m) 44.31 34.69 65.84	(dB) -7.53 -7.53 -7.46	(dBuV/m) 36.78 27.16 58.38	(dBuV/m) 74.00 54.00 74.00	(dB) -37.22 -26.84 -15.62	peak AVG peak			
10	Freq. (MHz) 2390.000  2390.000 2390.000 2400.000 2400.000	(dBuV/m) 44.31 34.69 65.84 55.55	(dB) -7.53 -7.53 -7.46 -7.46	(dBuV/m) 36.78 27.16 58.38 48.09	(dBuV/m) 74.00 54.00 74.00 54.00	(dB) -37.22 -26.84 -15.62 -5.91	peak AVG peak AVG			
10	Freq. (MHz) 2390.000  2390.000 2390.000 2400.000 2400.000 2483.500	(dBuV/m) 44.31 34.69 65.84 55.55 66.61	(dB) -7.53 -7.53 -7.46 -7.46 -7.37	(dBuV/m) 36.78 27.16 58.38 48.09 59.24	(dBuV/m) 74.00 54.00 74.00 54.00 74.00	(dB) -37.22 -26.84 -15.62 -5.91 -14.76	peak AVG peak AVG			



Site: 2# Chamber Tel:+86-0755-26503290 Fax:+86-0755-26503396

Report No.: ATE20162021

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

Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 16/09/28/ Time: 18/47/18

Engineer Signature: DING

Distance: 3m

Job No.: star2015 #454 Standard: FCC PK Test item: Radiation Test

Temp.( C)/Hum.(%) 23 C / 48 %

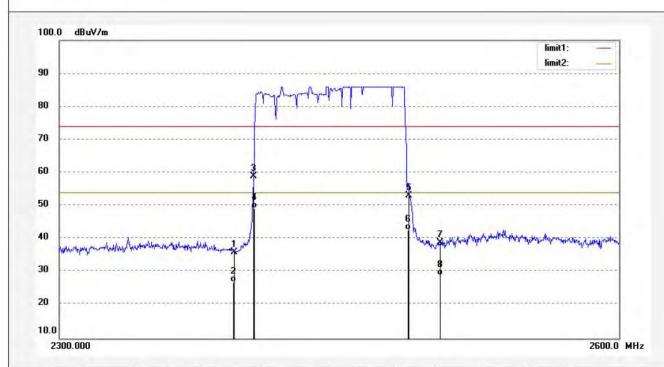
EUT: Touch LED Lantern Bluetooth Speaker

Mode: HOPPING (8DPSK)

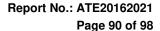
Model: MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Note: Report NO.:ATE20162021



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	43.55	-7.53	36.02	74.00	-37.98	peak			
2	2390.000	34.62	-7.53	27.09	54.00	-26.91	AVG			
3	2400.000	66.47	-7.46	59.01	74.00	-14.99	peak			
4	2400.000	56.79	-7.46	49.33	54.00	-4.67	AVG			
5	2483.500	60.54	-7.37	53.17	74.00	-20.83	peak			
6	2483.500	50.22	-7.37	42.85	54.00	-11.15	AVG			
7	2500.000	46.21	-7.40	38.81	74.00	-35.19	peak			
8	2500.000	36.43	-7.40	29.03	54.00	-24.97	AVG			

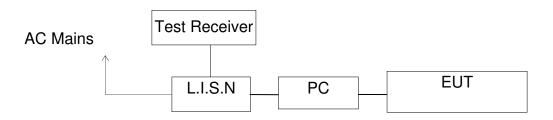




12.AC POWER LINE CONDUCTED EMISSION FOR FCC PART

## **15 SECTION 15.207(A)**

## 12.1.Block Diagram of Test Setup



(EUT: Touch LED Lantern Bluetooth Speaker)

### 12.2. Power Line Conducted Emission Measurement Limits

Frequency	Limit c	lB(μV)
(MHz)	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.

## 12.3. Configuration of EUT on Measurement

The following 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.

## 12.4. Operating Condition of EUT

- 12.4.1. Setup the EUT and simulator as shown as Section 5.1.
- 12.4.2. Turn on the power of all equipment.
- 12.4.3.Let the EUT work in test mode and measure it.



Report No.: ATE20162021

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### 12.5.Test Procedure

The EUT is put on the plane 0.1m 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 on Conducted Emission Measurement.

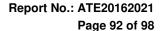
The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

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

### 12.6. Power Line Conducted Emission Measurement Results

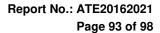
#### PASS.

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





Test mode: Charging (AC 120V/60Hz) EUT mode: MI-SB019 MEASUREMENT RESULT: "FS-0918-01 fin" 2016-9-18 9:27 Level Transd Limit Margin Detector Line PE Frequency dBuV dB dBuV dB MHz. 0.176000 54.50 10.5 65 10.2 QP L1 GND 18.7 11.3 QP 0.406000 39.00 58 L1 GND 1.866000 56 35.80 11.7 20.2 QP L1 GND 3.417500 37.70 11.7 56 18.3 QP L1 GND 27.9 5.465000 32.10 11.8 60 QP L1 GND 32.20 12.0 27.8 QP 28.545500 60 L1 GND MEASUREMENT RESULT: "FS-0918-01 fin2" 2016-9-18 9:27 Frequency Level Transd Limit Margin Detector Line PE MHz dBµV dB dBµV dB 0.198000 34.60 10.6 54 19.1 AV GND T.1 0.526000 27.40 11.5 46 18.6 AV L1 GND 2.058500 27.00 11.7 46 19.0 AV L1 GND 3.147500 29.50 11.7 46 16.5 AV L1 GND 25.20 11.8 50 24.8 AV L1 GND 5.465000 18.672500 28.70 11.9 50 21.3 AV L1 GND MEASUREMENT RESULT: "FS-0918-02 fin" 2016-9-18 9:20 Level Transd Limit Margin Detector Line Frequency PE dB dB dBµV dBµV MHz 0.172000 52.40 10.5 65 12.5 QP N GND 0.418000 38.60 11.3 58 18.9 QP N GND 2.000000 11.7 20.0 QP 36.00 56 GND N 2.873000 39.40 11.7 56 16.6 QP N GND 34.90 5.442500 11.8 60 25.1 QP N GND 28.518500 30.90 12.0 60 29.1 QP GND MEASUREMENT RESULT: "FS-0918-02 fin2" 2016-9-18 9:20 Frequency Level Transd Limit Margin Detector Line PE MHz dBuV dB dBuV dB 0.178000 38.50 10.5 55 16.1 AV N GND 0.532000 26.30 11.5 46 19.7 AV GND N 2.103500 27.30 11.7 46 18.7 AV N GND 3.215000 29.80 46 11.7 16.2 AV N GND 5.442500 27.50 11.8 50 22.5 AV N GND 29.10 20.9 18.677000 11 9 50 AV N GND

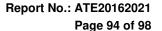




Toot made : Ch	oraina (A	C 240\//	SULT-/				-
Test mode : Cha EUT mode : MI-	SB019		-				
MEASUREMENT	RESULT	: "FS-0	918-03	_fin"			
2016-9-18 9:2	C20504 HM079	_		1221 4	12 10 0		12000
Frequency MHz	Level dBuV		dBµV		Detector	Line	PE
0 174000	And the second				OD	N	CND
0.174000 0.408000	53.20 38.20	10.5 11.3	65 58	11.6 19.5	QP QP	N N	GND GND
2.067500	36.80	11.7	56	19.2		N	GND
3.039500 5.348000	38.60 34.50	11.7 11.8	56 60			N N	GND GND
18.524000	35.80	11.9	60	24.2		N	GND
MEASUREMENT	RESULT	: "FS-0	918-03	_fin2"			
2016-9-18 9:2 Frequency		Transd	Limit	Margin	Detector	Line	PE
MHz	dBµV	dB	dΒμV	_	Decector	птие	FE
0.188000	38.50	10.6	54		AV	N	GND
0.526000 2.099000	26.50 27.60	11.5 11.7	46 46	19.5 18.4	AV	N N	GND GND
3.084500	29.80	11.7	46	16.2	AV	N	GND
5.312000 18.731000	27.70 29.70	11.8 11.9	50 50	22.3	AV AV	N N	GND GND
					AV	IV	GND
MEASUREMENT		: "FS-0	918-04	_fin"			
2016-9-18 9:3 Frequency	0 Level	Transd	Limit	Margin	Detector	Line	PE
MHZ	dΒμV	dB	dΒμV	dB			
0.176000	55.50	10.5	65	9.2	QP	L1	GND
0.428000 2.040500	40.20 35.90	11.3 11.7	57 56		QP QP	L1 L1	GND GND
3.291500	38.10	11.7	56	17.9	QP	L1	GND
5.402000 18.425000	32.30 34.80	11.8 11.9	60 60	27.7 25.2	QP	L1 L1	GND GND
10.425000	34.00	11.9	60	23.2	QF	шт	GND
MEASUREMENT	RESULT	: "FS-0	918-04	fin2"			
2016-9-18 9:3	0			_			
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.184000	38.60	10.5	54	15.7	AV	L1	GND
0.522000	29.20	11.5	46		AV	L1	GND
2.085500 3.395000	27.00 27.80	11.7 11.7	46 46	19.0 18.2	AV AV	L1 L1	GND GND
5.271500	26.10	11.8	50	23.9	AV	L1	GND
18.276500	28.40	11.9	50	21.6	AV	L1	GND

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

The spectral diagrams are attached as below.





#### CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: Touch LED Lantern Bluetooth Speaker M/N:MI-SB019 Shenzhen Fortat Skymark Technology Co., LTD Manufacturer:

Operating Condition: Charging

Test Site: 2#Shielding Room

Operator: DING

Test Specification: L 120V/60Hz
Comment: Report NO.:ATE20162021
Start of Test: 2016-9-18 / 9:25:30

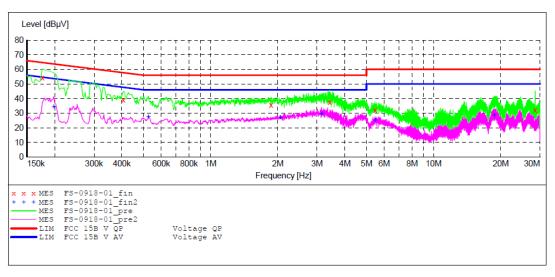
SCAN TABLE: "V 150K-30MHz fin"
Short Description: \_SUB\_STD\_VTERM2 1.70

Step Detector Meas. IF Start Stop Transducer

Time Bandw.

Frequency Frequency Width 150.0 kHz 30.0 MHz 4.5 kHz 9 kHz LISN(ESH3-Z5) QuasiPeak 1.0 s



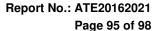


#### MEASUREMENT RESULT: "FS-0918-01 fin"

2016-9-18 9:2 Frequency MHz	7 Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.176000 0.406000 1.866000 3.417500 5.465000 28.545500	54.50 39.00 35.80 37.70 32.10	10.5 11.3 11.7 11.7 11.8	65 58 56 56 60	10.2 18.7 20.2 18.3 27.9 27.8	QP QP QP QP QP	L1 L1 L1 L1 L1	GND GND GND GND GND GND

#### MEASUREMENT RESULT: "FS-0918-01 fin2"

2016-9-18 9: Frequency MHz	27 Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.198000	34.60	10.6	54	19.1	AV	L1	GND
0.526000	27.40	11.5	46	18.6	AV	L1	GND
2.058500	27.00	11.7	46	19.0	AV	L1	GND
3.147500	29.50	11.7	46	16.5	AV	L1	GND
5.465000	25.20	11.8	50	24.8	AV	L1	GND
18.672500	28.70	11.9	50	21.3	AV	L1	GND





#### CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: Touch LED Lantern Bluetooth Speaker M/N:MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Operating Condition: Charging

Test Site: 2#Shielding Room

DING Operator:

Test Specification: N 120V/60Hz

Report NO.:ATE20162021 2016-9-18 / 9:19:08 Comment: Start of Test:

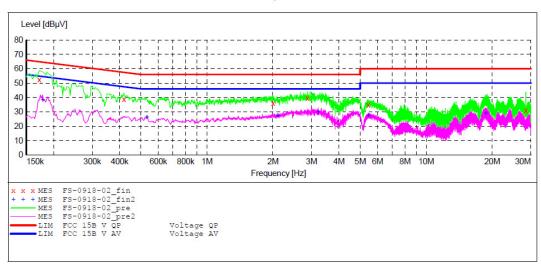
SCAN TABLE: "V 150K-30MHz fin"
Short Description: \_SUB\_STD\_VTERM2 1.70

Start Stop Step Detector Meas. IF Transducer

Frequency Frequency Width 150.0 kHz 30.0 MHz 4.5 kH Time Bandw.

4.5 kHz QuasiPeak 1.0 s 9 kHz LISN (ESH3-Z5)

Average

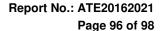


### MEASUREMENT RESULT: "FS-0918-02 fin"

2	016-9-18 9:20 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
	0.172000	52.40	10.5	65	12.5	QP	N	GND
	0.418000	38.60	11.3	58	18.9	QP	N	GND
	2.000000	36.00	11.7	56	20.0	QP	N	GND
	2.873000	39.40	11.7	56	16.6	QP	N	GND
	5.442500	34.90	11.8	60	25.1	QP	N	GND
	28.518500	30.90	12.0	60	29.1	ÕP	N	GND

#### MEASUREMENT RESULT: "FS-0918-02 fin2"

2016-9-18 9:20 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.178000 0.532000 2.103500	38.50 26.30 27.30	10.5 11.5 11.7	55 46 46	16.1 19.7 18.7	AV AV	N N N	GND GND GND
3.215000 5.442500 18.677000	29.80 27.50 29.10	11.7 11.8 11.9	46 50 50	16.2 22.5 20.9	AV AV AV	N N N	GND GND GND





#### CONDUCTED EMISSION STANDARD FCC PART 15B

Touch LED Lantern Bluetooth Speaker M/N:MI-SB019 Shenzhen Fortat Skymark Technology Co., LTD EUT: Manufacturer:

Operating Condition: Charging Test Site: 2#Shielding Room

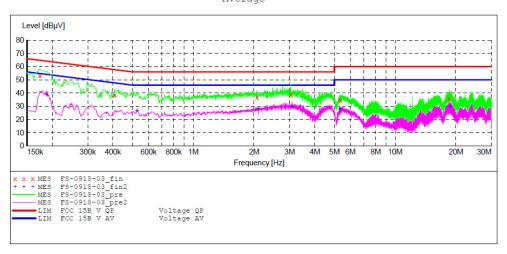
Operator: DING

Test Specification: N 240V/60Hz

Comment: Report NO.:ATE20162021 Start of Test: 2016-9-18 / 9:21:01

SCAN TABLE: "V 150K-30MHz fin"
Short Description: \_SUB\_STD\_VTERM2 1.70
Start Stop Step Detector Meas. Detector Meas. IF Transducer Frequency Frequency Width 150.0 kHz 30.0 MHz 4.5 kHz Time Bandw. QuasiPeak 1.0 s LISN (ESH3-Z5) 9 kHz

Average

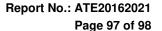


## MEASUREMENT RESULT: "FS-0918-03 fin"

20	16-9-18	9:22							
	Frequen	су	Level	Transd	Limit	Margin	Detector	Line	PE
	M	Hz	dΒμV	dB	dΒμV	dB			
	0 1740	0.0	F2 00	10 5		11 6	0.70		-
	0.1740	00	53.20	10.5	65	11.6	QP	N	GND
	0.4080	00	38.20	11.3	58	19.5	QP	N	GND
	2.0675	00	36.80	11.7	56	19.2	QP	N	GND
	3.0395	00	38.60	11.7	56	17.4	QP	N	GND
	5.3480	00	34.50	11.8	60	25.5	QP	N	GND
	18.5240	00	35.80	11.9	60	24.2	OP	N	GND

#### MEASUREMENT RESULT: "FS-0918-03 fin2"

2016-9-18 9:22 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.188000	38.50	10.6	54	15.6	AV	N	GND
0.526000	26.50	11.5	46	19.5	AV	N	GND
2.099000	27.60	11.7	46	18.4	AV	N	GND
3.084500	29.80	11.7	46	16.2	AV	N	GND
5.312000	27.70	11.8	50	22.3	AV	N	GND
18.731000	29.70	11.9	50	20.3	AV	N	GND





#### CONDUCTED EMISSION STANDARD FCC PART 15B

Touch LED Lantern Bluetooth Speaker M/N:MI-SB019

Manufacturer: Shenzhen Fortat Skymark Technology Co., LTD

Operating Condition: Charging

Test Site: 2#Shielding Room

DING Operator:

Test Specification: L 240V/60Hz

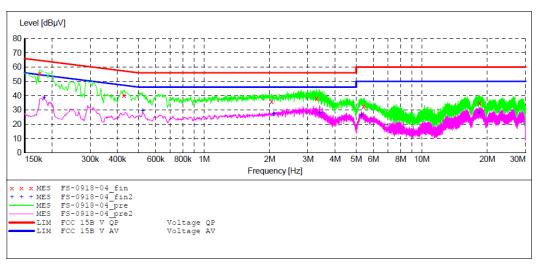
Report NO.:ATE20162021 Comment: Start of Test: 2016-9-18 / 9:28:19

SCAN TABLE: "V 150K-30MHz fin"
Short Description: \_SUB\_STD\_VTERM2 1.70

Step

Start Stop Step Frequency Frequency Width 150.0 kHz 30.0 MHz 4.5 kHz Detector Meas. IF Transducer
Time Bandw.
QuasiPeak 1.0 s 9 kHz LISN(ESH3-Z5)

Average



#### MEASUREMENT RESULT: "FS-0918-04 fin"

2016-9-18 9:30 Frequency MHz		Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.176000	55.50	10.5	65	9.2	QP	L1	GND
0.428000	40.20	11.3	57	17.1	QP	L1	GND
2.040500	35.90	11.7	56	20.1	QP	L1	GND
3.291500	38.10	11.7	56	17.9	QP	L1	GND
5.402000	32.30	11.8	60	27.7	OP	L1	GND
18.425000	34.80	11.9	60	25.2	ÕΡ	T.1	GND

#### MEASUREMENT RESULT: "FS-0918-04 fin2"

2016-9-18 9:3 Frequency MHz	0 Level dBμV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.184000 0.522000 2.085500 3.395000 5.271500 18.276500	38.60 29.20 27.00 27.80 26.10 28.40	10.5 11.5 11.7 11.7 11.8 11.9	54 46 46 46 50	15.7 16.8 19.0 18.2 23.9	AV AV AV AV	L1 L1 L1 L1 L1	GND GND GND GND GND



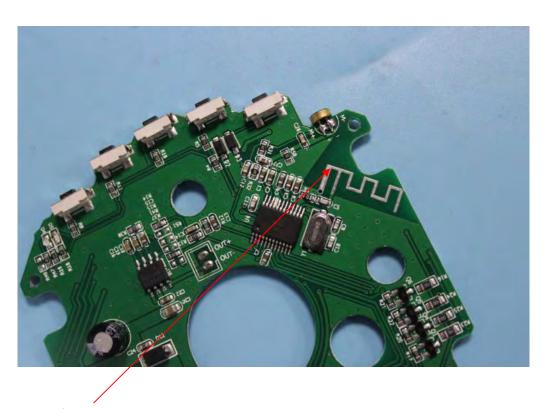
## 13.ANTENNA REQUIREMENT

## 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 0dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



**Antenna**