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# APPLICATION CERTIFICATION FCC Part 15.247 & RSS-247 On Behalf of Edifier International Limited

Portable Bluetooth Speaker Model No.: MP120

# FCC ID: Z9G-EDF88 IC: 10004A-EDF88

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# **Test Report Certification**

Applicant	:	Edifier International Limited
Address	:	P.O. Box 6264, General Post Office, Hong Kong
Manufacturer	:	Beijing Edifier Technology Co., Ltd.
Address	:	8th floor, ZuoAn Building, NO.68 BeiSiHuanXiLu, Haidian District, Beijing 100080, CHINA
Factory	:	Dongguan Edifier Technology Co., Ltd.
Address	:	No.2 Gongyedong Road, Songshan Lake Sci&Tech Industry Park, Dongguan, Guangdong 523808, PR.China
Product	:	Portable Bluetooth Speaker
Model No.	:	MP120

Measurement Procedure Used:

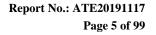
#### FCC Rules and Regulations Part 15 Subpart C Section 15.247 ANSI C63.10: 2013 RSS-247 Issue 2 February 2017 **RSS-Gen Issue 5 April 2018**

The device described above is tested by Shenzhen Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 and RSS-247 limits. The measurement results are contained in this test report and Shenzhen Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC and IC requirements.

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

Date of Test :	July 15-July 22, 2019
Date of Report :	July 24, 2019
Prepared by :	(PrA al g. Eristeer)
Approved & Authorized Signer :	Genne V

(Sean Liu, Manager)





# **1. GENERAL INFORMATION**

# 1.1.Description of Device (EUT)

Model Number	:	MP120
HVIN	:	MP120
Bluetooth Version	:	BT5.0
Range of Frequency	:	2402-2480MHz
Number of Channels	:	79
Antenna Gain(Max)	:	2.12dBi
Type of Antenna	:	Integral Antenna
Modulation mode	:	GFSK, $\pi/4$ DQPSK
Power supply	:	Input: 5V==2A

# 1.2. Accessory and Auxiliary Equipment

Notebook PC: Manufacturer: Lenovo M/N: ThinkPad X240 S/N: n.a



# 1.3.Description of Test Facility

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

# 1.4. Measurement Uncertainty

Radiated Emission Expanded Uncertainty (9kHz-30MHz)	:	U=2.66dB, k=2
Radiated Emission Expanded Uncertainty (30MHz-1000MHz)	:	U=4.28dB, k=2
Radiated Emission Expanded Uncertainty (1G-18GHz)	:	U=4.98dB, k=2
Radiated Emission Expanded Uncertainty (18G-26.5GHz)	:	U=5.06dB, k=2
Conduction Emission Expanded Uncertainty (Mains ports, 9kHz-30MHz)	:	U=2.72dB, k=2



# 2. MEASURING DEVICE AND TEST EQUIPMENT

## Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Туре	S/N	Calibrated dates	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 05, 2019	One Year
EMI Test Receiver	Rohde&Schwarz	ESR	101817	Jan. 05, 2019	One Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 05, 2019	One Year
Pre-Amplifier	Compliance Direction	RSU-M2	38322	Jan. 05, 2019	One Year
Pre-Amplifier	Agilent	8447D	294A10619	Jan. 05, 2019	One Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 05, 2019	One Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 05, 2019	One Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 05, 2019	One Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 05, 2019	One Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 05, 2019	One Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 05, 2019	One Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 05, 2019	One Year
RF Coaxial Cable (Conducted Emission)	SUHNER	N-2m	No.2	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	RESENBERGER	N-12m	No.11	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	RESENBERGER	N-0.5m	No.12	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-2m	No.13	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-0.5m	No.15	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-2m	No.16	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	RESENBERGER	N-6m	No.17	Jan. 05, 2019	One Year
Conducted Emission Measurement Software: ES-K1 V1.71					
Radiated Emission Measurement Software: EZ_EMC V1.1.4.2					



# 3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode Low Channel: 2402MHz Middle Channel: 2441MHz High Channel: 2480MHz Hopping

# 3.2. Configuration and peripherals

EUT
Figure 1 Setup: Transmitting mode



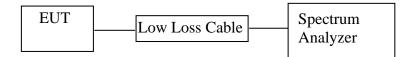
# 4. TEST PROCEDURES AND RESULTS

FCC & IC Rules	Description of Test	Result
FCC Section 15.247(a)(1) RSS-247 Section 5.1(a)	20dB Bandwidth Test	Compliant
RSS-Gen Section 6.7	99% Occupied Bandwidth Test	Compliant
FCC Section 15.247(a)(1) RSS-247 Section 5.1(b)	Carrier Frequency Separation Test	Compliant
FCC Section 15.247(a)(1)(iii) RSS-247 Section 5.1(d)	Number Of Hopping Frequency Test	Compliant
FCC Section 15.247(a)(1)(iii) RSS-247 Section 5.1(d)	Dwell Time Test	Compliant
FCC Section 15.247(b)(1) RSS-247 Section 5.4(b)	Maximum Peak Output Power Test	Compliant
FCC Section 15.247(d) FCC Section 15.209 RSS-247 Section 5.5 RSS-Gen Section 6.13 RSS-Gen Section 8.9	Radiated Emission Test	Compliant
FCC Section 15.247(d) RSS-247 Section 5.5 RSS-Gen Section 8.9 RSS-Gen Section 8.10	Band Edge Compliance Test	Compliant
FCC Section 15.207 RSS-Gen Section 8.8	AC Power Line Conducted Emissions Limits Test	Compliant
FCC Section 15.247(d) RSS-247 Section 5.5	Conducted Spurious Emission Test	Compliant
FCC Section 15.203 RSS-Gen Section 6.8	Antenna Requirement	Compliant



# 5. 20DB BANDWIDTH TEST

#### 5.1.Block Diagram of Test Setup



## 5.2. The Requirement For 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. The Requirement For RSS-247 Section 5.1(a)

The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system's radio frequency (RF) bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. 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.

## 5.4.EUT Configuration on Test

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

## 5.5. Operating Condition of EUT

- 5.5.1.Setup the EUT and simulator as shown as Section 5.1.
- 5.5.2.Turn on the power of all equipment.
- 5.5.3.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.



## 5.6.Test Procedure

- 5.6.1.Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 5.6.2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
- 5.6.3.RBW shall be in the range of 1% to 5% of the OBW and VBW shall be approximately three times RBW.
- 5.6.4. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

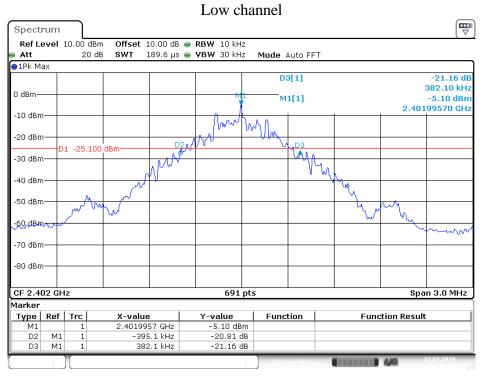
#### 5.7.Test Result

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	π /4 DQPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.777	1.242	Pass
Middle	2441	0.782	1.250	Pass
High	2480	0.782	1.246	Pass

The spectrum analyzer plots are attached as below.

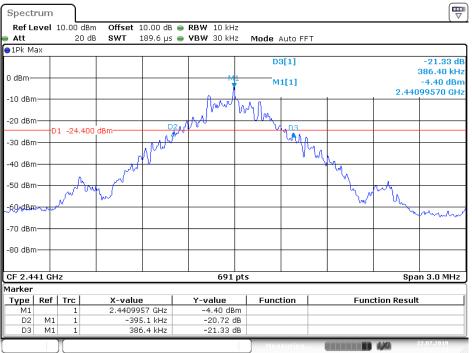


#### GFSK Mode



Date: 22.JUL.2019 17:16:10

Middle channel



Date: 22.JUL.2019 17:17:28



#### High channel Spectrum Ref Level 10.00 dBm Att 20 dB Offset 10.00 dB ● RBW 10 kHz SWT 189.6 µs ● VBW 30 kHz Mode Auto FFT Att 🔵 1 Pk Max -21.16 dB 386.40 kHz -4.09 dBm D3[1] 0 dBm-M1[1] 2.47999570 GHz -10 dBm male W - P2AA they have a start where the st -20 dBm· D1 -24.090 dBm -30 dBm 40 dBm -50 dBm h -6ე-ძგო m -70 dBm--80 dBm-691 pts CF 2.48 GHz Span 3.0 MHz Marker **Y-value** -4.09 dBm -20.73 dB -21.16 dB Type Ref Trc M1 1 Function Result X-value 2.4799957 GHz Function M1 M1 -395.1 kHz 386.4 kHz D2 DЗ 1

Date: 22.JUL.2019 17:18:27

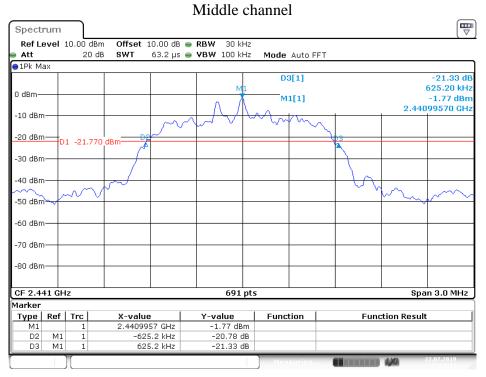
# $\pi$ /4 DQPSK Mode

#### Low channel

Spectru	m										
Ref Lev	<b>el</b> 10	).00 dBm	Offset :	10.00 dB 🧉	RBW	30 kHz					
Att		20 dB	SWT	63.2 µs 🧉	<b>VBW</b> 10	00 kHz	Mode	Auto FFT			
●1Pk Max											
0 dBm						M1		3[1] 1[1]			-21.47 dB 620.80 kHz -2.45 dBm
						- /\				2.401	99570 GHz
-10 dBm—				~~	$\overline{\gamma}$	$\overline{\nabla}$	V.	m			
-20 dBm—	-D1	-22,450	dBm - Ba			_			ψ <u>a</u>		
-30 dBm—	-		f*						$\square$		
-40 dBm—	_								+ b		
-50 dBm	~	$\sim$	<u> </u>						- ·	$\sim$	$\sim$
-60 dBm—	_				-						
-70 dBm—	+										
-80 dBm—	+				+	_					
CF 2.402	GHz					691 pts				 Spa	n 3.0 MHz
Marker											
	lef   '	Trc	X-value	e	Y-valu	ie	Func	tion	Fund	tion Result	:
M1		1	2.40199		-2.4	5 dBm					
	M1 M1	1		D.8 kHz D.8 kHz		37 dB 47 dB					
							) Mea	suring		1/0	22.07.2019

Date: 22.JUL.2019 17:22:13





Date: 22.JUL.2019 17:21:11

High channel

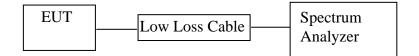


Date: 22.JUL.2019 17:19:54



# 6. 99% OCCUPIED BANDWIDTH TEST

## 6.1.Block Diagram of Test Setup



# 6.2. The Requirement for RSS-Gen Clause 6.7

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the "x dB bandwidth" is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

## 6.3.EUT Configuration on Test

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

## 6.4. Operating Condition of EUT

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

- 6.4.2.Turn on the power of all equipment.
- 6.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.



## 6.5.Test Procedure

- 6.5.1.The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 6.5.2. The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- 6.5.3.The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- 6.5.4. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

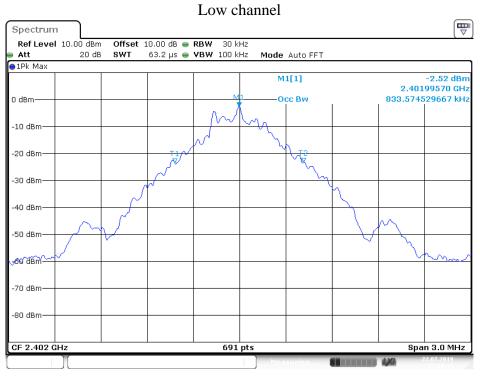
Channel	Frequency (MHz)	GFSK 99% Bandwidth (MHz)	$\pi$ /4 DQPSK 99% Bandwidth (MHz)	Result
Low	2402	0.834	1.159	Pass
Middle	2441	0.829	1.159	Pass
High	2480	0.834	1.159	Pass

#### 6.6.Test Result

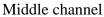
The spectrum analyzer plots are attached as below.

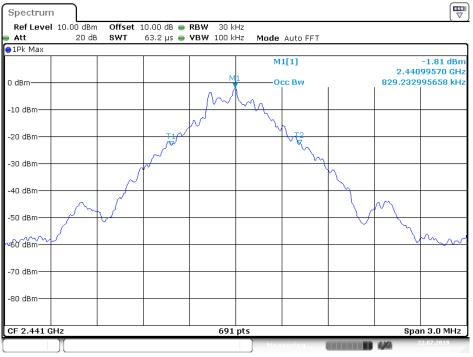


#### GFSK Mode



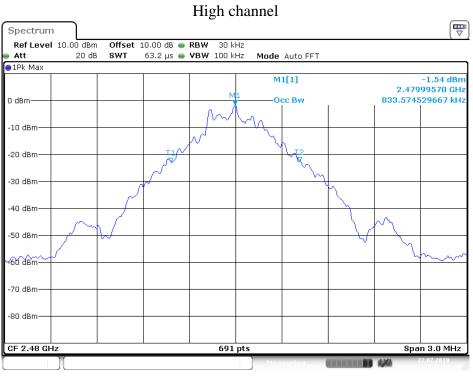
Date: 22.JUL.2019 17:14:45





Date: 22.JUL.2019 17:13:55

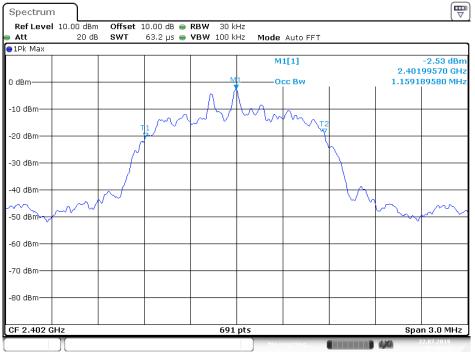




Date: 22.JUL.2019 17:13:15

#### $\pi$ /4 DQPSK Mode

#### Low channel



Date: 22.JUL.2019 17:11:12

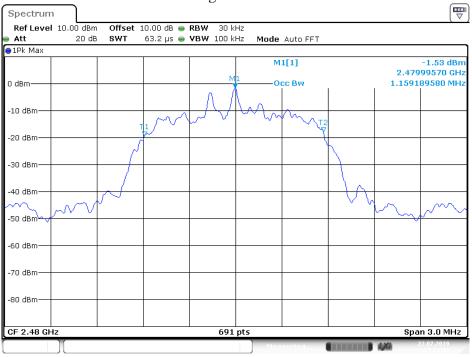


Middle channel **-**Spectrum 
 Offset
 10.00 dB
 ■
 RBW
 30 kHz

 SWT
 63.2 µs
 ■
 VBW
 100 kHz
 Ref Level 10.00 dBm Mode Auto FFT 20 dB Att 😑 1Pk Max -1.82 dBm 2.44099570 GHz 1.159189580 MHz M1[1] Occ Bw 0 dBm--10 dBm-L۸ Λ<u>t</u>2 -20 dBm -30 dBm -40 dBm· -50 dBm -60 dBm· -70 dBm -80 dBm· Span 3.0 MHz CF 2.441 GHz 691 pts

Date: 22.JUL.2019 17:11:59

#### High channel

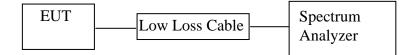


Date: 22.JUL.2019 17:12:42



# 7. CARRIER FREQUENCY SEPARATION TEST

## 7.1.Block Diagram of Test Setup



# 7.2. The Requirement For 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 pseudo randomly 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.

## 7.3. The Requirement For RSS-247 Section 5.1(b)

FHSs 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, FHSs operating in the band 2400-2483.5 MHz 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 that the systems operate with an output power no greater than 0.125 W.

## 7.4.EUT Configuration on Test

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

## 7.5. Operating Condition of EUT

- 7.5.1.Setup the EUT and simulator as shown as Section 7.1.
- 7.5.2.Turn on the power of all equipment.
- 7.5.3.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.



# 7.6.Test Procedure

- 7.6.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 7.6.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz. Adjust Span to 3 MHz.
- 7.6.3.Set the adjacent channel of the EUT maxhold another trace.
- 7.6.4. Measurement the channel separation

## 7.7.Test Result

#### GFSK Mode

-				
Channel	Frequency	Channel	Limit	Result
Channel	(MHz)	Separation(MHz)	(MHz)	Kesult
Low	2402	1.0029	25KHz or 2/3*20dB	Dece
Low	2403	1.0029	bandwidth	Pass
Middle	2440	1.0029	25KHz or 2/3*20dB	Pass
Midule	2441	1.0029	bandwidth	r ass
High	2479	1.0029	25KHz or 2/3*20dB	Pass
Ingli	2480	1.0029	bandwidth	r a88

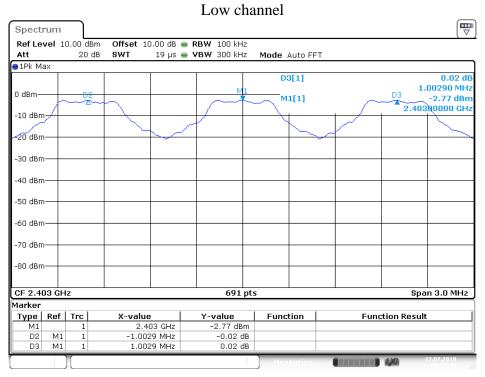
#### $\pi$ /4 DQPSK Mode

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.0029	25KHz or 2/3*20dB	Pass
Low	2403	1.002)	bandwidth	1 455
Middle	2440	1.0029	25KHz or 2/3*20dB	Pass
Wildule	2441	1.0029	bandwidth	1 485
High	2479	1.0029	25KHz or 2/3*20dB	Pass
High	2480	1.0029	bandwidth	rass

The spectrum analyzer plots are attached as below.

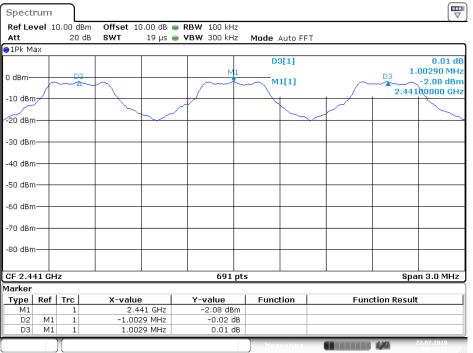


#### GFSK Mode



Date: 22.JUL.2019 09:33:45

#### Middle channel



Date: 22.JUL.2019 09:32:48

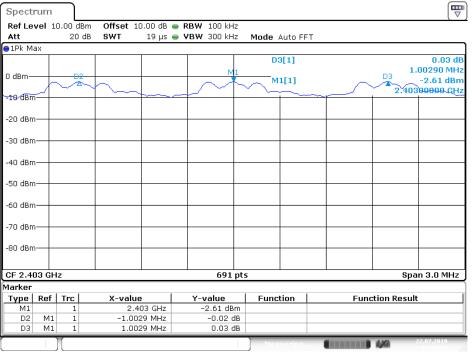


#### High channel [₩ Spectrum Ref Level 10.00 dBm Offset 10.00 dB 👄 RBW 100 kHz Att 20 dB SWT 19 µs 👄 **VBW** 300 kHz Mode Auto FFT ●1Pk Max D3[1] 0.01 dE 1.00290 MHz M DЗ 0 dBm -1.80 dBm 2.47900000 GHz M1[1] -10 dBm<sub>7</sub> -20 dBm -30 dBm· -40 dBm--50 dBm--60 dBm -70 dBm -80 dBm-Span 3.0 MHz CF 2.479 GHz 691 pts Marker Y-value -1.80 dBm Type Ref Trc X-value Function Function Result 2.479 GHz -1.0029 MHz M1 1 D2 Μ1 -0.00 dB 1 DЗ Μ1 1.0029 MHz 0.01 dB 1

Date: 22.JUL.2019 09:32:00

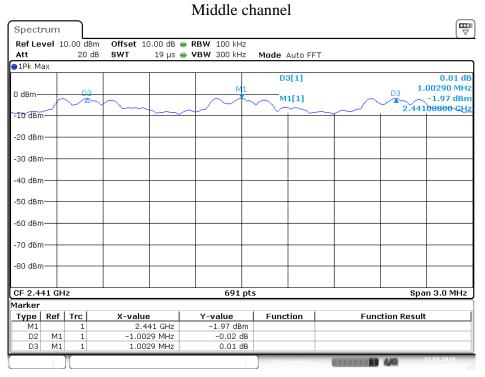
#### $\pi$ /4 DQPSK Mode

#### Low channel



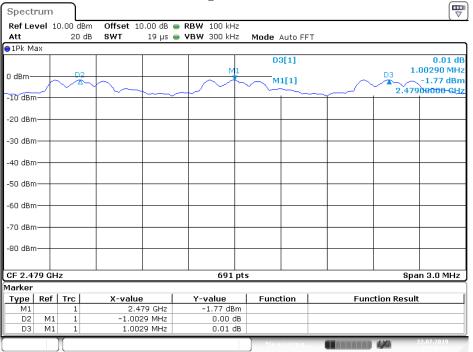
Date: 22.JUL.2019 09:28:01





Date: 22.JUL.2019 09:29:13

#### High channel

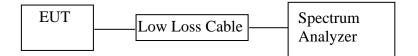


Date: 22.JUL.2019 09:30:42



# 8. NUMBER OF HOPPING FREQUENCY TEST

8.1.Block Diagram of Test Setup



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

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

8.3. The Requirement For RSS-247 Section 5.1(d)

FHSs operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels.

## 8.4.EUT Configuration on Test

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

## 8.5. Operating Condition of EUT

- 8.5.1.Setup the EUT and simulator as shown as Section 8.1.
- 8.5.2.Turn on the power of all equipment.
- 8.5.3.Let the EUT work in TX (Hopping on) modes measure it.

#### **8.6.Test Procedure**

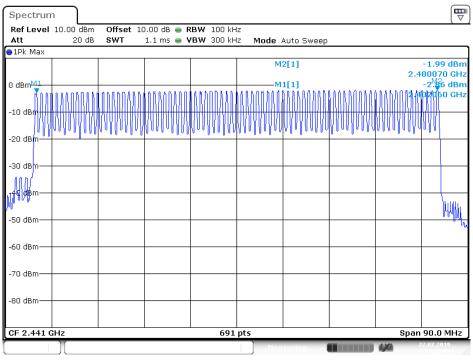
- 8.6.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 8.6.2.Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz.
- 8.6.3.Max hold, view and count how many channel in the band.



## 8.7.Test Result

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

The spectrum analyzer plots are attached as below.



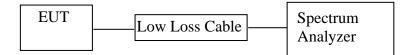
Number of hopping channels (GFSK Mode)

Date: 22.JUL.2019 09:35:10



# 9. DWELL TIME TEST

## 9.1.Block Diagram of Test Setup



## 9.2. The Requirement For 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.

## 9.3. The Requirement For RSS-247 Section 5.1(d)

FHSs operating in the band 2400-2483.5 MHz shall use at least 15 hopping 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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

## 9.4.EUT Configuration on Test

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

# 9.5. Operating Condition of EUT

- 9.5.1.Setup the EUT and simulator as shown as Section 9.1.
- 9.5.2.Turn on the power of all equipment.
- 9.5.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.



# 9.6.Test Procedure

- 9.6.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 9.6.2.Set center frequency of spectrum analyzer = operating frequency.
- 9.6.3.Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=5ms, 10ms, 15ms. Get the pulse time.

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

#### 9.7.Test Result

Pass.

#### GFSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)		
	2402	0.428	136.96	400		
DH1	2441	0.428	136.96	400		
	2480	0.428	136.96	400		
A period to	ransmit time = $0.4 \times 79$ =	31.6 Dwell time = $pt$	alse time $\times$ (1600/(2*)	79))×31.6		
	2402	1.696	271.36	400		
DH3	2441	1.696	271.36	400		
	2480	1.696	271.36	400		
A period tr	ransmit time = $0.4 \times 79$ =	31.6 Dwell time = $pt$	alse time $\times$ (1600/(4*'	79))×31.6		
	2402	2.978	317.65	400		
DH5	2441	2.978	317.65	400		
	2480	2.957	315.41	400		
A period transr	A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$					



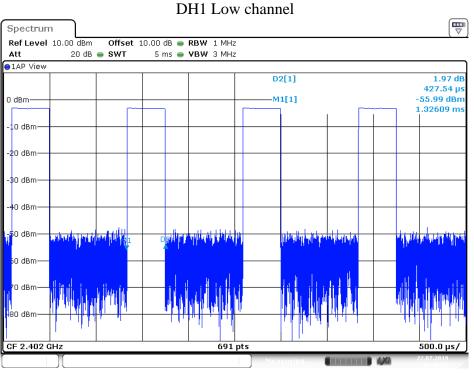
#### $\pi$ /4 DQPSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)		
	· · · · ·					
	2402	0.435	139.20	400		
2DH1	2441	0.435	139.20	400		
	2480	0.435	139.20	400		
A period t	ransmit time = $0.4 \times 79$ =	31.6 Dwell time = $pu$	llse time $\times$ (1600/(2*'	79))×31.6		
	2402	1.710	273.60	400		
2DH3	2441	1.710	273.60	400		
	2480	1.710	273.60	400		
A period t	ransmit time = $0.4 \times 79$ =	31.6 Dwell time = pu	lse time $\times$ (1600/(4*'	79))×31.6		
	2402	2.978	317.65	400		
2DH5	2441	2.957	315.41	400		
	2480	2.978	317.65	400		
A period transi	A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$					

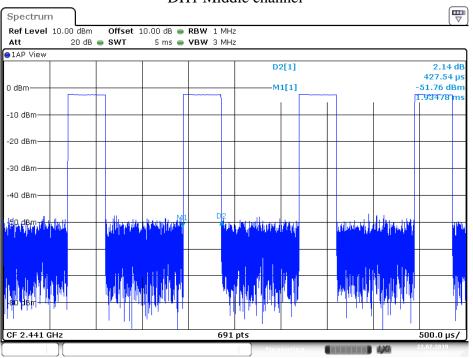
The spectrum analyzer plots are attached as below.



#### GFSK Mode



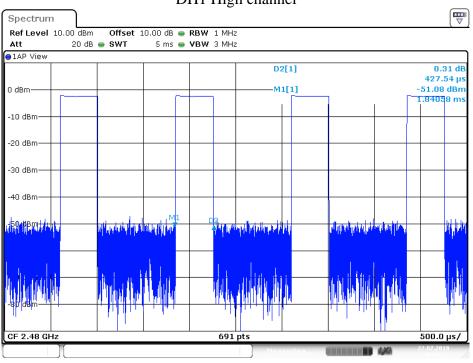
Date: 22.JUL.2019 10:06:13



#### DH1 Middle channel

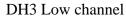
Date: 22.JUL.2019 10:05:29

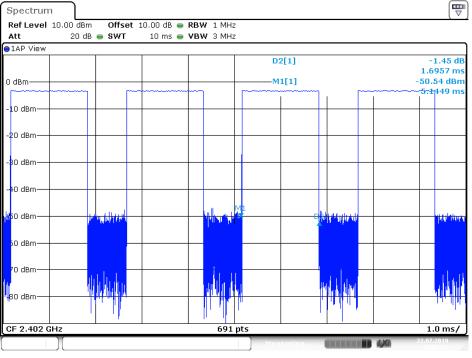




DH1 High channel

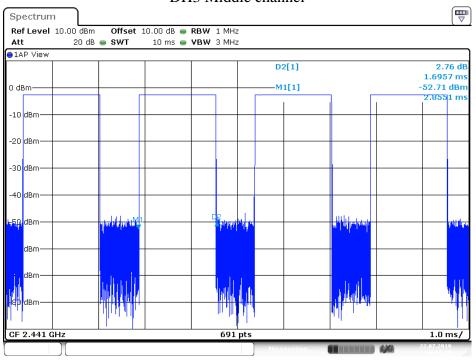
Date: 22.JUL.2019 10:04:51





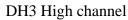
Date: 22.JUL.2019 10:02:23

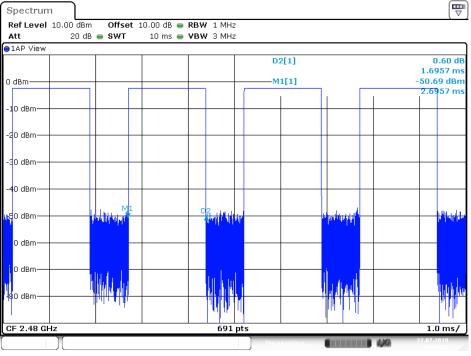




DH3 Middle channel

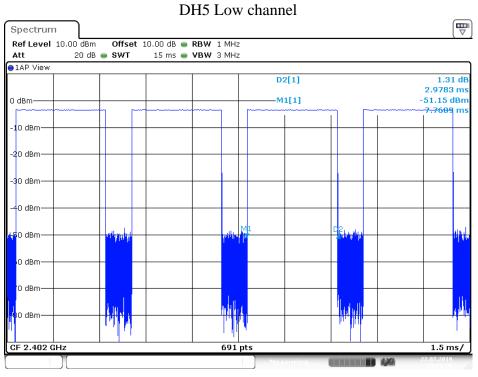
Date: 22.JUL.2019 10:03:20



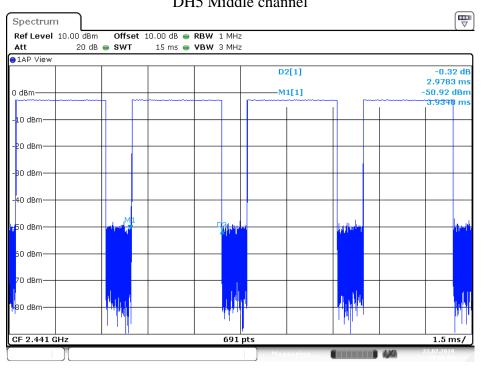


Date: 22.JUL.2019 10:04:11





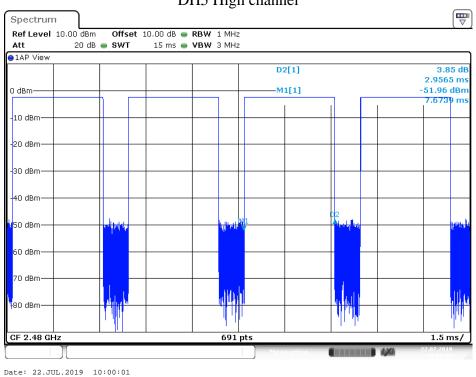
Date: 22.JUL.2019 10:01:37



#### DH5 Middle channel

Date: 22.JUL.2019 10:00:51

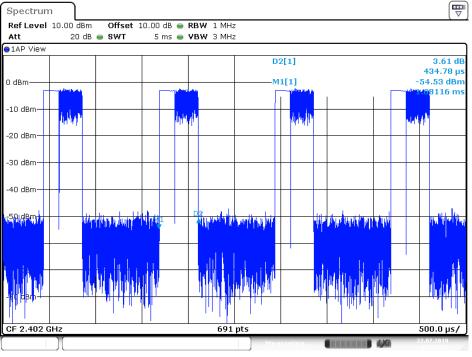




#### DH5 High channel

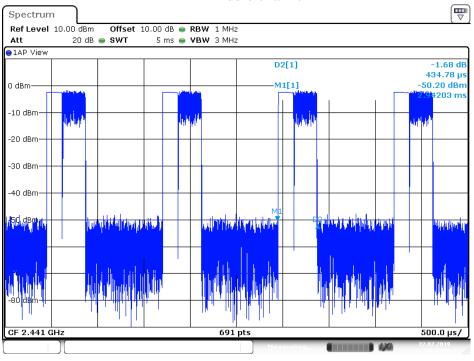
## $\pi$ /4 DQPSK Mode

#### 2DH1 Low channel



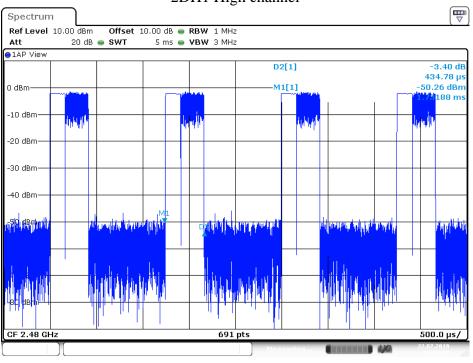
Date: 22.JUL.2019 09:53:11





2DH1 Middle channel

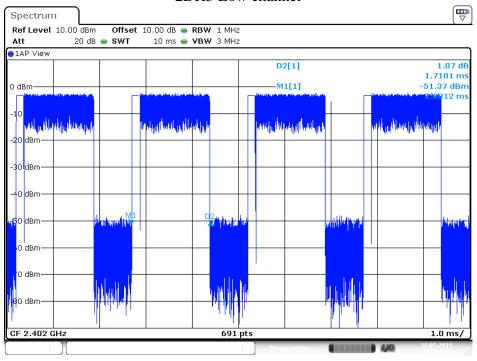
Date: 22.JUL.2019 09:53:55



#### 2DH1 High channel

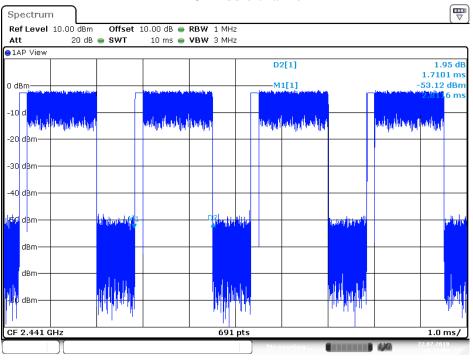
Date: 22.JUL.2019 09:54:29





2DH3 Low channel

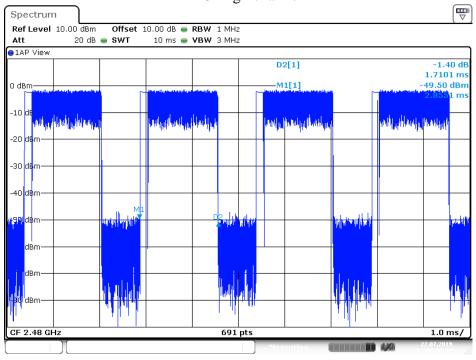
Date: 22.JUL.2019 09:56:42



#### 2DH3 Middle channel

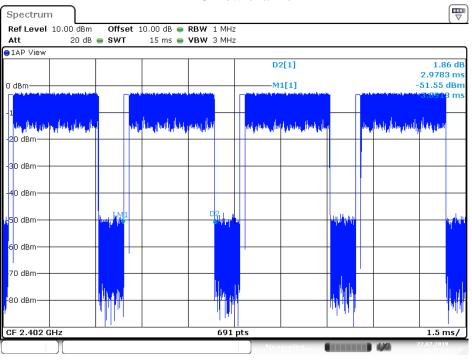
Date: 22.JUL.2019 09:56:05





#### 2DH3 High channel

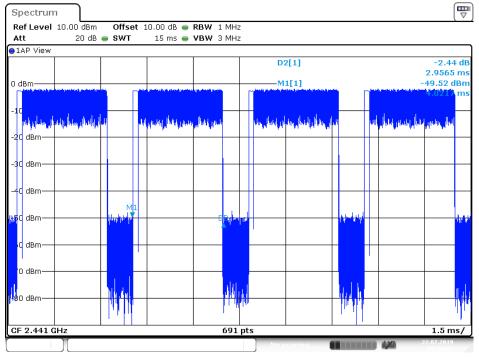
Date: 22.JUL.2019 09:55:19



#### 2DH5 Low channel

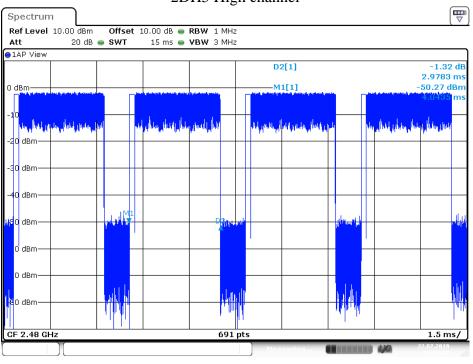
Date: 22.JUL.2019 09:57:34





#### 2DH5 Middle channel

Date: 22.JUL.2019 09:58:23



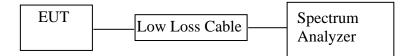
#### 2DH5 High channel

Date: 22.JUL.2019 09:59:13



# **10.MAXIMUM PEAK OUTPUT POWER TEST**

#### 10.1.Block Diagram of Test Setup



#### 10.2. The Requirement For 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.

#### 10.3.The Requirement For RSS-247 Section 5.4(b)

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e).

#### 10.4.EUT Configuration on Test

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

#### 10.5. Operating Condition of EUT

- 10.5.1.Setup the EUT and simulator as shown as Section 10.1.
- 10.5.2.Turn on the power of all equipment.
- 10.5.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.



#### 10.6.Test Procedure

- 10.6.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 10.6.2.Set RBW of spectrum analyzer to 3MHz and VBW to 10MHz.
- 10.6.3.Measurement the maximum peak output power.

#### 10.7.Test Result

#### GFSK Mode

Frequency (MHz)	Peak Output Power (dBm/W)	E.I.R.P (dBm/W)	Limits (dBm/W)	Result
2402	-2.10/ 0.0006	0.02/ 0.0010	21 / 0.125	Pass
2441	-1.50/ 0.0007	0.62/ 0.0012	21 / 0.125	Pass
2480	-1.28/ 0.0007	0.84/ 0.0012	21 / 0.125	Pass

#### $\pi$ /4 DQPSK Mode

Frequency (MHz)	Peak Output Power (dBm/W)	E.I.R.P (dBm/W)	Limits (dBm/W)	Result
2402	-1.13/ 0.0008	0.99/ 0.0013	21 / 0.125	Pass
2441	-0.40/ 0.0009	1.72/ 0.0015	21 / 0.125	Pass
2480	-0.10/ 0.0010	2.02/ 0.0016	21 / 0.125	Pass

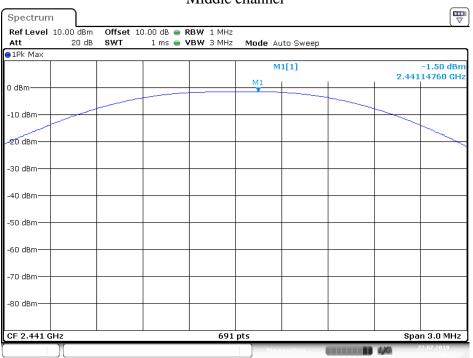
The spectrum analyzer plots are attached as below.



#### GFSK Mode

	Low cl	hannel	
Spectrum			
Ref Level 10.00 dBm Att 20 dB	Offset 10.00 dB	Mode Auto Sweep	``````````````````````````````````````
1Pk Max			
		M1[1]	-2.10 dBn 2.40216500 GH
0 dBm		M1	2.40210300 GH
-10 dBm			
~20 dBm			
-20 aBm			
-30 dBm			
-40 dBm			
-50 dBm			
-60 dBm			
-70 dBm			
-/0 ubiii			
-80 dBm			
CF 2.402 GHz	691	pts	Span 3.0 MHz
		Measuring	

Date: 22.JUL.2019 09:22:16



Middle channel

Date: 22.JUL.2019 09:23:03

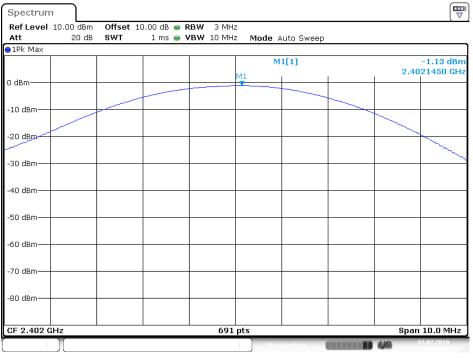


#### High channel Spectrum Ref Level 10.00 dBm Offset 10.00 dB 👄 RBW 1 MHz 1 ms 👄 **VBW** 3 MHz Att 20 dB SWT Mode Auto Sweep 🔵 1 Pk Max -1.28 dBm 2.48015200 GHz M1[1] M1 0 dBm--10 dBm--20 dBm--30 dBm--40 dBm--50 dBm--60 dBm--70 dBm--80 dBm-CF 2.48 GHz 691 pts Span 3.0 MHz

Date: 22.JUL.2019 09:23:47

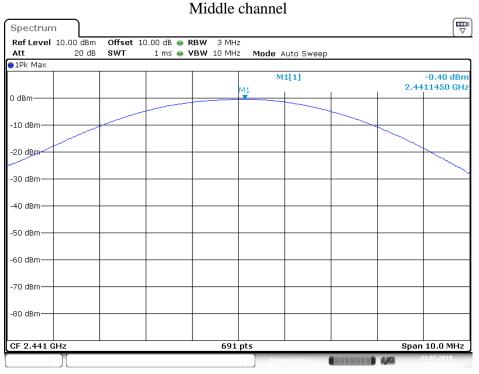
#### $\pi$ /4 DQPSK Mode

#### Low channel



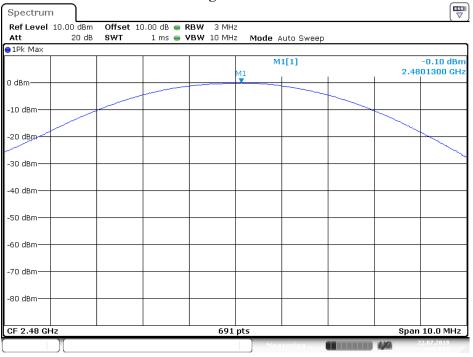
Date: 22.JUL.2019 09:25:55





Date: 22.JUL.2019 09:25:12

High channel



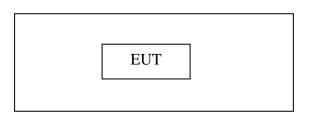
Date: 22.JUL.2019 09:24:29



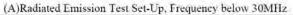
# **11.RADIATED EMISSION TEST**

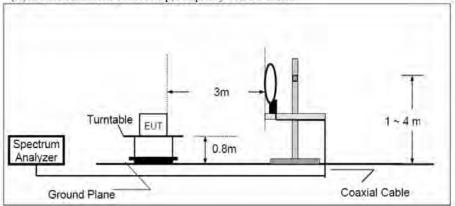
### 11.1.Block Diagram of Test Setup

### 11.1.1.Block diagram of connection between the EUT and peripherals

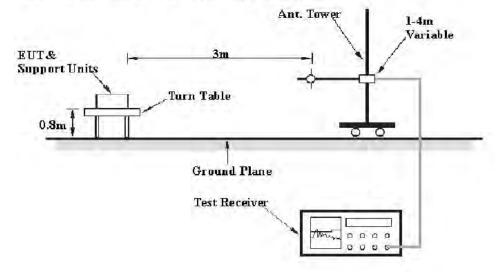


#### 11.1.2.Semi-Anechoic Chamber Test Setup Diagram



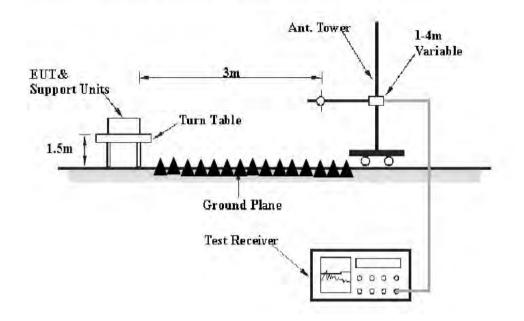


(B)Radiated Emission Test Set-Up, Frequency 30MHz-1GHz





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



#### 11.2. The Requirement For 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.The Requirement for RSS-247 section 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the100 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.



# 11.4. Transmitter Emission Limit

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission

Frequency (MHz)	Field strength (μV/m at 3 m)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Table 5 - General field strength limits at frequencies above 30 MHz

Frequency	Magnetic field strength (H- Field) (μA/m)	Measurement distance (m)
9 - 490 kHz <sup>1</sup>	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.



# 11.5.Restricted bands of operation

Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

(a)The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, *Emergency Position Indicating Radio Beacons (EPIRB), Emergency Locator Transmitters (ELT), Personal Locator Beacons (PLB), and Maritime Survivor Locator Devices (MSLD).* 

(b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.

(c) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.

MHz	MHz
0.090 - 0.110	149.9 - 150.05
0.495 - 0.505	156.52475 - 156.52525
2.1735 - 2.1905	156.7 - 156.9
3.020 - 3.026	162.0125 - 167.17
4.125 - 4.128	167.72 - 173.2
4.17725 - 4.17775	240 - 285
4.20725 - 4.20775	322 - 335.4
5.677 - 5.683	399.9 - 410
6.215 - 6.218	608 - 614
6.26775 - 6.26825	960 - 1427
6.31175 - 6.31225	1435 - 1626.5
8.291 - 8.294	1645.5 - 1646.5
8.362 - 8.366	1660 - 1710
8.37625 - 8.38675	1718.8 - 1722.2
8.41425 - 8.41475	2200 - 2300
12.29 - 12.293	2310 - 2390
12.51975 - 12.52025	2483.5 - 2500
12.57675 - 12.57725	2655 - 2900
13.36 - 13.41	3260 - 3267
16.42 - 16.423	3332 - 3339
16.69475 - 16.69525	3345.8 - 3358
16.80425 - 16.80475	3500 - 4400
25.5 - 25.67	4500 - 5150
37.5 - 38.25	5350 - 5460
73 - 74.6	7250 - 7750
74.8 - 75.2	8025 - 8500
108 - 138	0.00

#### Table 7 - Restricted frequency bands\*

GHz
9.0 - 9.2
9.3 - 9.5
10.6 - 12.7
13.25 - 13.4
14.47 - 14.5
15.35 - 16.2
17.7 - 21.4
22.01 - 23.12
23.6 - 24.0
31.2 - 31.8
36.43 - 36.5
Above 38.6

\* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licenceexempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.



# 11.6.EUT Configuration on Test

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.

### 11.7.Test Procedure

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

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

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



#### 11.8.Data Sample

Frequency	Reading	Factor	Result	Limit	Margin	Remark
(MHz)	(dBµv)	(dB/m)	(dBµv/m)	(dBµv/m)	(dB)	
X.XX	28.66	-15.19	13.47	40.0	-26.53	QP

Frequency(MHz) = Emission frequency in MHz

Reading( $dB\mu\nu$ ) = Uncorrected Analyzer/Receiver reading Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain Result( $dB\mu\nu/m$ ) = Reading( $dB\mu\nu$ ) + Factor(dB/m) Limit ( $dB\mu\nu/m$ ) = Limit stated in standard Margin (dB) = Result( $dB\mu\nu/m$ ) - Limit ( $dB\mu\nu/m$ ) QP = Quasi-peak Reading

Calculation Formula: Margin(dB) = Result ( $dB\mu V/m$ )–Limit( $dB\mu V/m$ ) Result( $dB\mu V/m$ )= Reading( $dB\mu V$ )+ Factor(dB/m)

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

#### 11.9.Test Result

Pass.

The frequency range from 9KHz to 26.5GHz is investigated.

We tested GFSK mode,  $\Pi/4$ -DQPSK Mode and recorded the worse case data ( $\Pi/4$ -DQPSK mode) for all test mode.

The spectrum analyzer plots are attached as below.



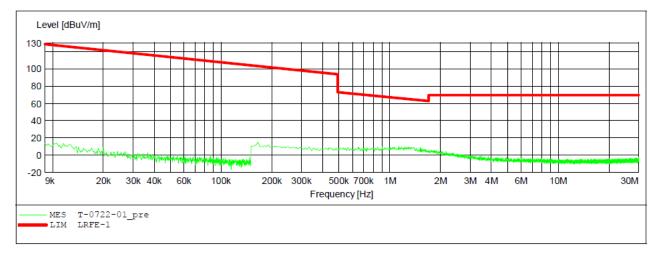
#### 9kHz-30MHz test data

#### ACCURATE TECHNOLOGY CO., LTD

#### FCC Class B 3M Radiated

EUT: Portable Bluetooth Speaker M/N:MP120 Manufacturer: Edifier Operating Condition: TX 2402MHz Test Site: 2# Chamber Operator: WADE Test Specification: DC 3.7V Comment: X Start of Test: 2019-7-22 /

Short Description:			SUB STD VTE	RM2 1.70		
Start	Stop	Step –	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M

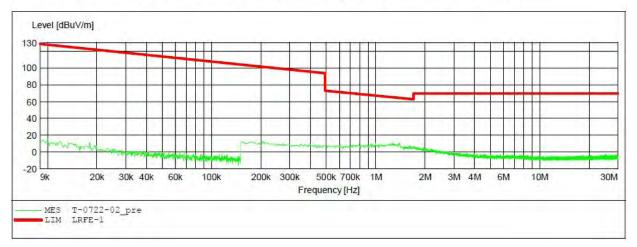




#### FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:MP120
Manufacturer:	Edifier
Operating Condition:	TX 2402MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	DC 3.7V
Comment:	Y
Start of Test:	2019-7-22 /

Short Description:			S	UB STD VTER	RM2 1.70		
	Start	Stop	Step -	Detector	Meas.	IF	Transducer
	Frequency	Frequency	Width		Time	Bandw.	
	9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
	150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M

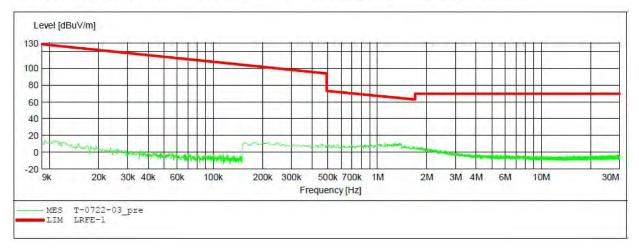




#### FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:MP120
Manufacturer:	Edifier
Operating Condition:	TX 2402MHz
Test Site:	2# Chamber
	WADE
Test Specification:	DC 3.7V
Comment:	Z
Start of Test:	2019-7-22 /

Short Description:			5	SUB STD VTERM2 1.70			
	Start	Stop	Step -	Detector	Meas.	IF	Transducer
	Frequency	Frequency	Width		Time	Bandw.	
	9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
	150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M

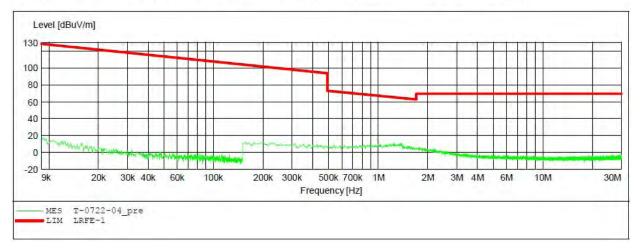




#### FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:MP120				
Manufacturer:	Edifier				
Operating Condition:	TX 2441MHz				
Test Site:	2# Chamber				
	WADE				
Test Specification:	DC 3.7V				
Comment:	Х				
Start of Test:	2019-7-22 /				

Short Description:			SUB STD VTERM2 1.70				
	Start	Stop	Step -	Detector	Meas.	IF	Transducer
	Frequency	Frequency	Width		Time	Bandw.	
	9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
	150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M

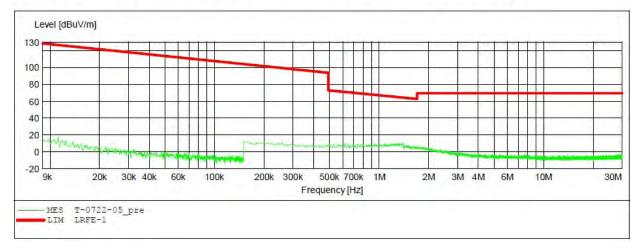




#### FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:MP120
Manufacturer:	Edifier
Operating Condition:	TX 2441MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	DC 3.7V
Comment:	Y
Start of Test:	2019-7-22 /

Short Description:			S	SUB STD VTERM2 1.70			
	Start	Stop	Step -	Detector	Meas.	IF	Transducer
	Frequency	Frequency	Width		Time	Bandw.	
	9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
	150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M

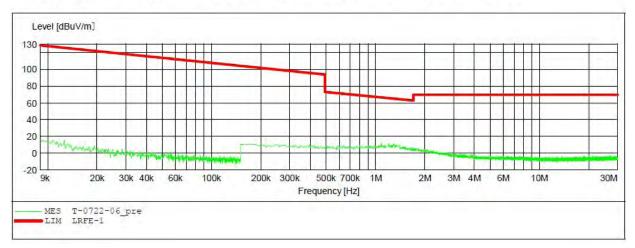




#### FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:MP120
Manufacturer:	Edifier
Operating Condition:	TX 2441MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	DC 3.7V
Comment:	Z
Start of Test:	2019-7-22 /

Short Description:			SUB STD VTERM2 1.70				
	Start	Stop	Step -	Detector	Meas.	IF	Transducer
	Frequency	Frequency	Width		Time	Bandw.	
	9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
	150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M

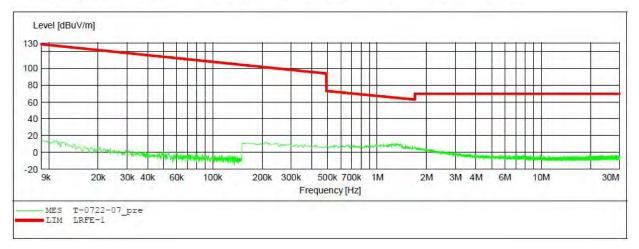




#### FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:MP120				
Manufacturer:	Edifier				
Operating Condition:	TX 2480MHz				
Test Site:	2# Chamber				
Operator:	WADE				
Test Specification:	DC 3.7V				
Comment:	X				
Start of Test:	2019-7-22 /				

Short Desc	ription:	S	UB STD VTE	RM2 1.70		
Start	Stop	Step -	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M
150.0 KHZ	30.0 MHZ	5.0 KHZ	Quasireak	1.0 5	9 KHZ	MOTCT

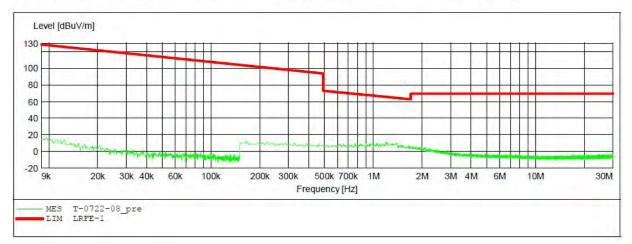




#### FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:MP120
Manufacturer:	Edifier
Operating Condition:	TX 2480MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	DC 3.7V
Comment:	Y
Start of Test:	2019-7-22 /

Short Description:			5	SUB STD VTE	RM2 1.70			
	Start	Stop	Step -	Detector	Meas.	IF	Transducer	
	Frequency	Frequency	Width		Time	Bandw.		
		150.0 kHz		QuasiPeak	1.0 s	200 Hz	1516M	
	150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M	

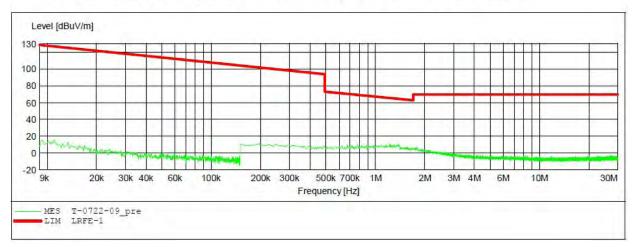




#### FCC Class B 3M Radiated

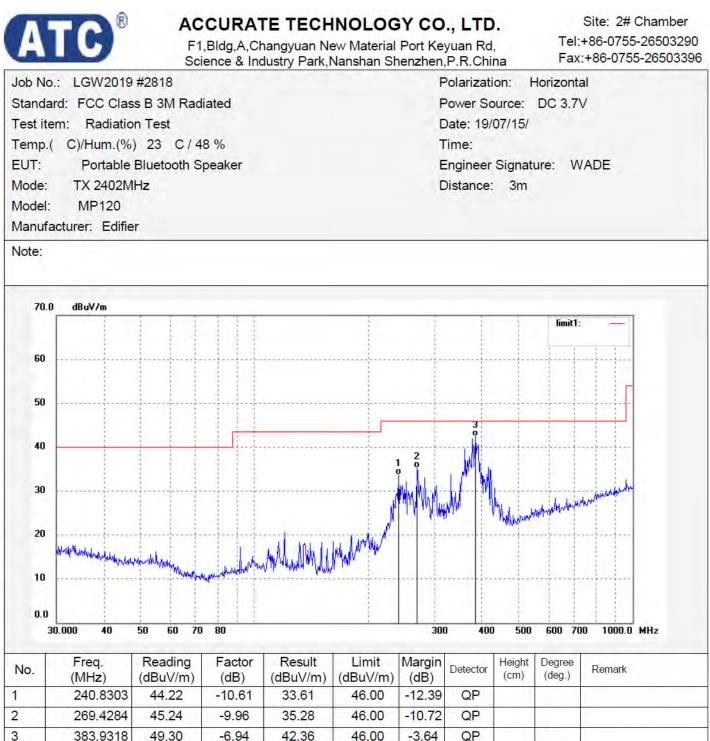
EUT:	Portable Bluetooth Speaker M/N:MP120
Manufacturer:	Edifier
Operating Condition:	TX 2480MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	DC 3.7V
Comment:	Z
Start of Test:	2019-7-22 /

Description:		SUB STD VTE	RM2 1.70		
Stop	Step	Detector	Meas.	IF	Transducer
ency Frequer	cy Width		Time	Bandw.	
Hz 150.0 k	Hz 100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
kHz 30.0 MH	Iz 5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M
	Stop ency Frequer Hz 150.0 k	Stop Step ency Frequency Width	Stop Step Detector ency Frequency Width Hz 150.0 kHz 100.0 Hz QuasiPeak	Stop Step Detector Meas. ency Frequency Width Time Hz 150.0 kHz 100.0 Hz QuasiPeak 1.0 s	Stop Step Detector Meas. IF ency Frequency Width Time Bandw. Hz 150.0 kHz 100.0 Hz QuasiPeak 1.0 s 200 Hz





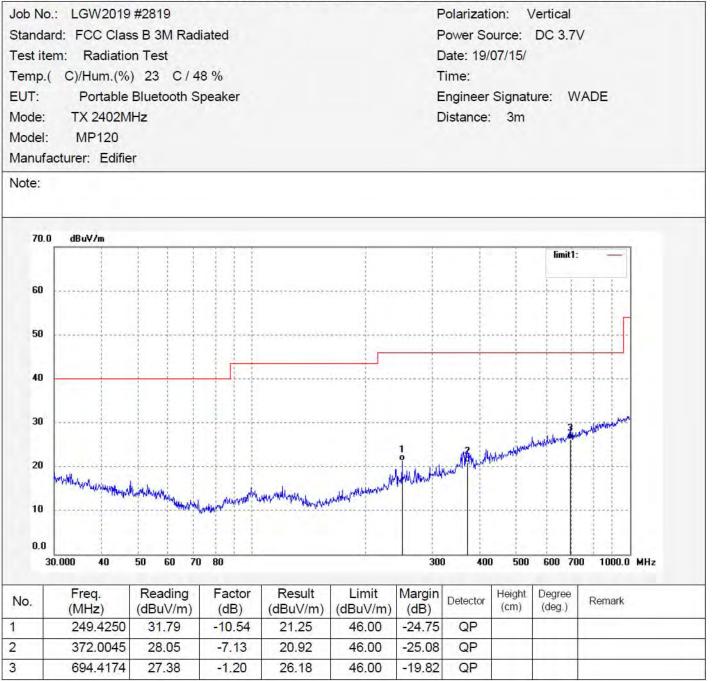
#### 30MHz-1GHz test data







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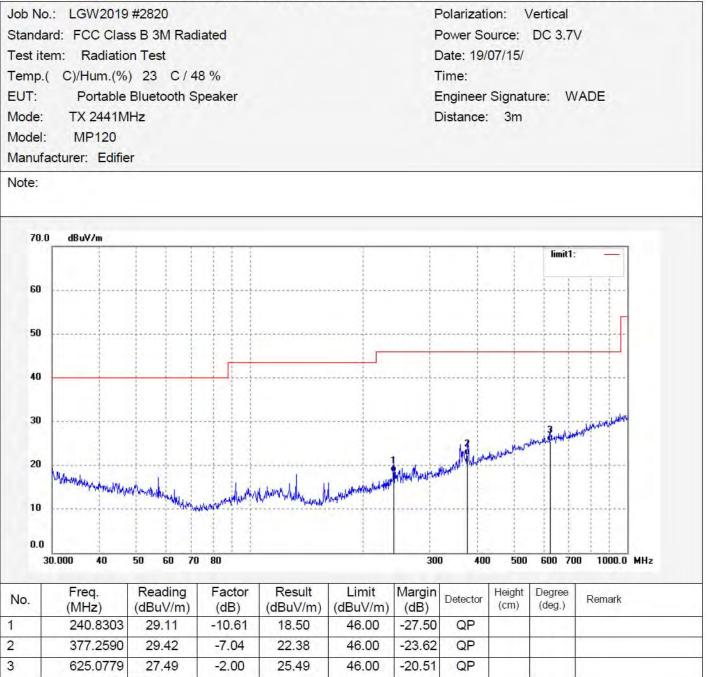




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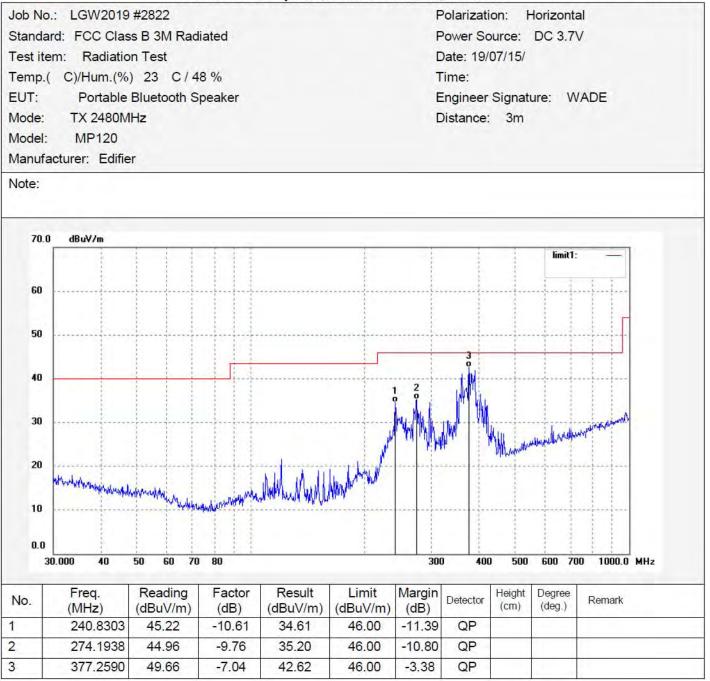
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#### 1GHz-18GHz test data

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Job No.	: LGW2019	#2786				F	Polarizat	ion: H	lorizonta	al
Standar	rd: FCC Clas	s B 3M Rad	F	Power Source: DC 3.7V						
Test item: Radiation Test Temp.( C)/Hum.(%) 23 C / 48 % EUT: Portable Bluetooth Speaker								07/15/		
								Time: Engineer Signature: WADE		
Mode:	TX 2402M						Distance			
Model:	MP120									
Manufa	cturer: Edifie	r								
Note:										
110.0	0 dBuV/m									
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10	000.000	20	00	3000	5000	6000 7	7000 8000	9000		18000.0 MHz
No.	Freq.	Reading	Factor	Result	Limit	Margin	Detector	Height	Degree	Domork
50C2 1	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Delector	(cm)	(deg.)	Remark
1	2402.000	90.92	0.89	91.81	/	1	peak			
2	4804.026	42.76	7.40	50.16	74.00	-23.84	peak			
3	4804.026	34.95	7.40	42.35	54.00	-11.65	AVG			



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Standa Test ite Temp.( EUT: Mode: Model: Manufa	Node: TX 2402MHz								Polarization: Vertical Power Source: DC 3.7V Date: 19/07/15/ Time: Engineer Signature: WADE Distance: 3m					
Note:														
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1	000.000	20	100	3000	5000	6000 7	7000 8000	9000		18000.0 MHz				
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark				
1	2402.000	90.19	0.89	91.08	1	1	peak							
2	4804.027	42.80	7.40	50.20	74.00	-23.80	peak							
3	4804.027	34.96	7.40	42.36	54.00	-11.64	AVG							





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

Job N	o.: LGW2019	#2790		De Strees		F	Polarizat	ion: H	Horizonta	al		
Stand	ard: FCC Clas	s B 3M Rad	liated			F	Power So	ource:	DC 3.7	V		
Test item: Radiation Test Temp.( C)/Hum.(%) 23 C / 48 %								07/15/				
								Time:				
EUT: Portable Bluetooth Speaker							Engineer Signature: WADE					
Mode:						C	Distance	3m				
Model	: MP120											
Manuf	acturer: Edifie	er										
Note:												
11	0.0 dBu¥/m											
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	1000.000	20	100	3000	5000	6000	7000 8000	9000		18000.0 MHz		
No.	Freq.	Reading	Factor	Result	Limit	Margin	Detector	Height	Degree	Remark		
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)		(cm)	(deg.)	a para ang		
1	2441.000	90.86	1.06	91.92	74.00	/	peak					
2	4882.025	41.84	8.11	49.95	74.00	-24.05						
3	4882.025	33.24	8.11	41.35	54.00	-12.65	AVG					





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

lob No.	: LGW2019	Contract of the second se			tunonun or		Polarizati		/ertical					
Standar	d: FCC Clas	s B 3M Rad	iated	F	Power So	ource:	DC 3.7	V						
Test item: Radiation Test Temp.( C)/Hum.(%) 23 C / 48 % EUT: Portable Bluetooth Speaker								Date: 19/07/15/ Time:						
														Engineer Signature: WADE
								Node:	TX 2441M					
Model:	MP120													
Manufa	cturer: Edifie	r												
Note:														
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20.0 10	000.000	20	00	3000	5000	6000 7	7000 8000	9000		18000.0 MHz				
No.	Freq.	Reading	Factor	Result	Limit	Margin	Detector	Height	Degree	Domotic				
1761	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)		(cm)	(deg.)	Remark				
1	2441.000	90.12	1.06	91.18	1	1	peak							
2	4882.028	42.39	8.11	50.50	74.00	-23.50	101030							
3	4882.028	34.35	8.11	42.46	54.00	-11.54	AVG							





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Job No	b.: LGW2019	#2792				F	Polarizat	ion: \	/ertical			
Standa	ard: FCC Clas	s B 3M Rad	F	Power Source: DC 3.7V								
Test item: Radiation Test								07/15/				
Temp.( C)/Hum.(%) 23 C / 48 %							Time:					
EUT:								Signat	ure: W	ADE		
Mode:	TX 2480M	Hz				C	Distance	: 3m				
Model	MP120											
Manuf	acturer: Edifie	er										
Note:												
110	.0 dBuV/m											
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	1000.000	20	100	3000	5000	6000 7	7000 8000	9000		18000.0 MHz		
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark		
1	2480.000	90.30	1.10	91.40	1	1	peak		1 1			
2	4960.028	40.54	8.60	49.14	74.00	-24.86	peak					
3	4960.028	32.95	8.60	41.55	54.00	-12.45	AVG					



R

#### 18GHz-26.5GHz test data

# ACCURATE TECHNOLOGY CO., LTD.

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

Test item:Radiation TestDate:Temp.(C)/Hum.(%)23C / 48 %TimeEUT:Portable Bluetooth SpeakerEngin	er Source: DC 3.7V : 19/07/15/
Temp.(C)/Hum.(%)23C / 48 %TimeEUT:Portable Bluetooth SpeakerEngin	
EUT: Portable Bluetooth Speaker Engin	
	•
Mode: TX 2402MHz Dista	neer Signature: WADE
	nce: 3m
Model: MP120	
Manufacturer: Edifier	
Note:	
90.0 dBuV/m	
	limit1:
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40 30 20 10	26500.0 MHz
40 30 20 10 0.0	26500.0 MHz
40         30           30         20           10         0.0           18000.000         20000	26500.0 MHz



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# ACCURATE TECHNOLOGY CO., LTD.

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Job No	.: LGW2019	#2796				F	Polarizati	on: \	/ertical					
Standa	ard: FCC Clas	iated	F	Power Source: DC 3.7V										
Test ite	em: Radiatio		C	Date: 19/07/15/										
Temp.	( C)/Hum.(%	8 %	1	Time:										
EUT:									Engineer Signature: WADE					
Mode:	TX 2402M	Hz				C	Distance:	3m						
Model:	MP120													
Manufa	acturer: Edifie	r												
Note:														
90.0	) dBuV/m		a.						limit1:					
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0.0 1	8000.000		20000							26500.0 MHz				
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark				
1	21975.905	17.90	32.00	49.90	74.00	-24.10	peak		a factor of					
2	21975.905	7.35	32.00	39.35	54.00	-14.65								



# ATC ATC B

# ACCURATE TECHNOLOGY CO., LTD.

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

Job No	.: LGW2019	#2798				F	Polarizati	on: H	lorizonta	al
Standa	rd: FCC Clas	s B 3M Rad	iated			F	Power Sc	ource:	DC 3.7	1
Test ite	em: Radiatio	on Test				0	Date: 19/	07/15/		
Temp.(	C)/Hum.(%	) 23 C/4	8 %			Г	Time:			
EUT:	Portable	peaker	E	Engineer Signature: WADE						
Mode:	TX 2441M	IHz				C	Distance:	3m		
Model:	MP120									
Manufa	acturer: Edifie	er								
Note:										
90.0	dBuV/m		-							
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0.0			4							
	8000.000		20000							26500.0 MHz
	Freq.	Reading	Factor	Result	Limit	Margin	-	Height	Degree	
No.	(MHz)	(dBuV/m)	(dB)	(dBuV/m)			Detector	(cm)	(deg.)	Remark
1	21967.407	17.50	32.13	49.63	74.00	-24.37	peak			
2	21967.407	7.42	32.13	39.55	54.00	-14.45	AVG			



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

Job No	.: LGW2019	#2799				F	Polarizati	on: \	/ertical			
Standa	rd: FCC Clas	s B 3M Rad	iated			F	Power Sc	ource:	DC 3.7	/		
Test ite	em: Radiatio	n Test				C	Date: 19/	07/15/				
Temp.	( C)/Hum.(%	) 23 C/4	8 %			Т	ime:					
EUT:	Portable	Bluetooth S	peaker	E	Engineer Signature: WADE							
Mode:	TX 2441M						Distance:					
Model:	MP120											
Manufa	acturer: Edifie	er										
Note:												
90.0	dBuV/m											
			1						limit1:	-		
80												
-												
70									*******			
60												
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10	100000000000000000000000000000000000000							2000000	100000000	CONTRACTOR OF THE		
0.0												
1	8000.000		20000							26500.0 MHz		
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark		
1	21530.007	17.37	32.12	49.49	74.00	-24.51	peak					
2	21530.007	7.33	32.12	39.45	54.00	-14.55	AVG		1			





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Job No	.: LGW2019	#2801				F	olarizati	on: H	orizonta	al		
Standa	rd: FCC Clas	s B 3M Rad	iated			F	Power Sc	ource:	DC 3.7	/		
Test ite	em: Radiatio	n Test				C	Date: 19/	07/15/				
Temp.(	C)/Hum.(%	) 23 C/4	8 %			1	Time:					
EUT:	Portable	Bluetooth S	peaker		E	Engineer Signature: WADE						
Mode:	TX 2480M				C							
Model:	MP120											
Manufa	acturer: Edifie	er										
Note:												
90.0	dBuV/m		Ţ						limit1:	-1		
80			1									
00			2									
70												
			1									
60		*****		**********		*********			******	******		
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20			1									
10		*****				********						
0.0												
	8000.000		20000		1					26500.0 MHz		
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark		
1	21874.145	18.11	31.98	50.09	74.00	-23.91	peak					
2	21874.145	8.76	31.98	40.74	54.00	-13.26	AVG					



# ATC ATC R

## ACCURATE TECHNOLOGY CO., LTD.

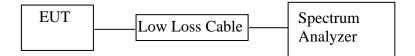
F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China

Job N	b.: LGW2019	#2800				F	Polarizati	on: V	ertical			
Stand	ard: FCC Clas	s B 3M Rad	iated			F	Power Sc	ource:	DC 3.7	/		
Test it	em: Radiatio	on Test				C	)ate: 19/	07/15/				
Temp	( C)/Hum.(%	) 23 C/4	8 %			Т	ime:					
EUT:	Portable	Bluetooth S	peaker		E	Engineer Signature: WADE						
Mode:	TX 2480M	IHz					)istance:					
Model	: MP120											
Manut	acturer: Edifie	er										
Note:												
90	0 dBu¥/m											
									limit1:	_		
80				*****	*****	******	********					
70							ALTIATICS					
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30												
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10					*****			*******				
0.0	Ĺ.											
	18000.000		20000							26500.0 MHz		
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark		
1	21688.807	17.73	32.09	49.82	74.00	-24.18	peak					
2	21688.807	7.03	32.09	39.12	54.00	-14.88	AVG					



## **12.BAND EDGE COMPLIANCE TEST**

#### 12.1.Block Diagram of Test Setup



## 12.2. The Requirement For 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).

#### 12.3.The Requirement For RSS-247 Section 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

#### 12.4.EUT Configuration on Test

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



## 12.5.Operating Condition of EUT

- 12.5.1.Setup the EUT and simulator as shown as Section 12.1.
- 12.5.2.Turn on the power of all equipment.
- 12.5.3.Let the EUT work in TX (Hopping off, Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

#### 12.6.Test Procedure

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

12.6.3.The band edges was measured and recorded.

### 12.7.Test Result

#### **Conducted Band Edge Result**

Non-hopping mode			
Frequency	Result of Band Edge	Limit of Band Edge	Result
(MHz)	(dBc)	(dBc)	
	GFSK mo	de	
2397.95	31.08	> 20dBc	Pass
2483.50	41.03	> 20dBc	Pass
	$\pi$ /4 DQPSK	mode	
2397.95	31.05	> 20dBc	Pass
2483.50	40.93	> 20dBc	Pass

#### Non-hopping mode



#### Hopping mode

Frequency	Result of Band Edge	Limit of Band Edge	Result
(MHz)	(dBc)	(dBc)	
	GFSK mo	de	
2400.00	31.24	> 20dBc	Pass
2483.50	41.28	> 20dBc	Pass
	$\pi$ /4 DQPSK	mode	
2400.00	30.75	> 20dBc	Pass
2483.50	42.24	> 20dBc	Pass

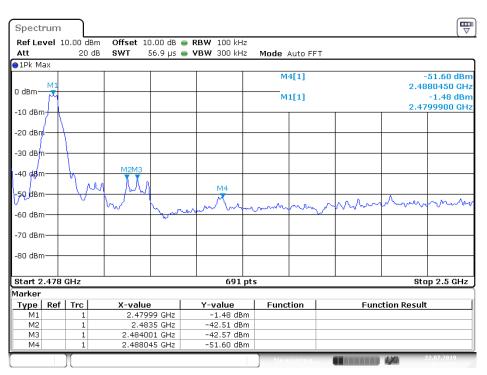
The spectrum analyzer plots are attached as below.



Spectrum						
Ref Level 1						
Att	20 dB	SWT 1 ms	🔵 <b>VBW</b> 300 kHz	Mode Auto St	weep	
1Pk Max						
				M4[1]		-39.27 dB
) dBm						2.394050 G
				M1[1]		-2.67 dB
-10 dBm						2.401990 GF
-20 dBm —						
30 dBm 🕂						M3
						M4 M2
40 dBm						
						n
-50 dBm				Musersurver	mannah	When HALLY
60 dBm	mouting	- and the second	aller and the second states and the second	vunters		a a a a a a
70 dBm						
80 dBm						
Start 2.31 G	Hz		691 pts	;		Stop 2.403 GH
1arker						
Type   Ref	Trc	X-value	Y-value	Function	Euno	tion Result
M1	1	2.40199 GHz	-2.67 dBm			
M2	1	2.4 GHz	-40.25 dBm			
MЗ	1	2.39795 GHz	-33.75 dBm			
M4	1	2.39405 GHz	-39.27 dBm			
	) (					22.07.2010

#### Non-hopping mode (GFSK Mode)

Date: 22.JUL.2019 17:04:04



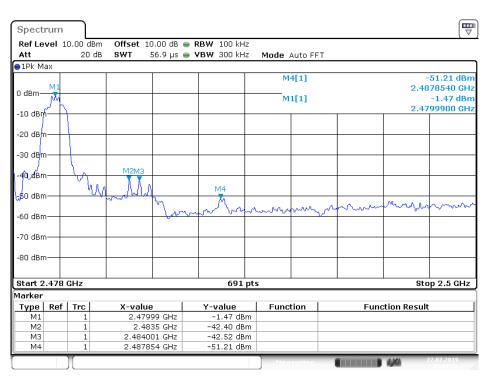
Date: 22.JUL.2019 17:03:00



Spectru Ref Leve			Offset 1	ah 00 C	■ RBW 10	00 kHz						
Att		20 dB			VBW 30		Mode /	Auto Sv	veen			
●1Pk Max												
							M	4[1]				39.25 dBn
0 dBm											2.3	394050 GM -2.71 dBr
							IVI.	1[1]			24	-2.71 aBr 101990 GH
-10 dBm—											2	
-20 dBm—												
-30 dBm—					_							M3
-40 dBm—												14 M2
-50 dBm—											. (	P\a∏.L
<mark>سیاسی</mark> -60 dBm—	nenn	when	montered	how	manner	when	when when	u Marry	al marked	nulun	mound	
-70 dBm—												
-70 0011												
-80 dBm—	-											
Start 2.3	1 GHz					691 pts			1		Stop	2.403 GHz
/larker												
	ef Tr	:	X-value		Y-va		Funct	ion		Fund	tion Result	t
M1		1		99 GHz		71 dBm						
M2		1		.4 GHz		33 dBm						
M3 M4	_	1	2.3979	53 GHZ 05 GHZ		76 dBm 25 dBm						
	1	1	2.201		551							

#### Non-hopping mode ( **π**/4 DQPSK Mode)

Date: 22.JUL.2019 17:00:22



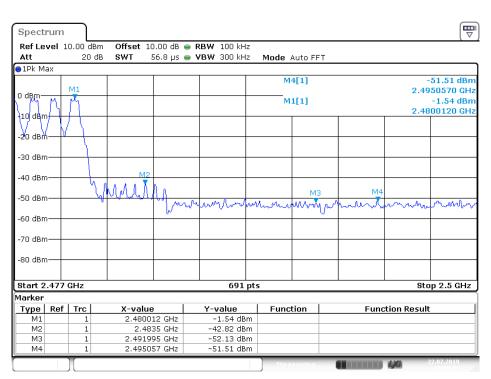
Date: 22.JUL.2019 17:01:51



#### ඐ Spectrum Offset 10.00 dB 👄 RBW 100 kHz Ref Level 10.00 dBm SWT 1.1 ms 👄 VBW 300 kHz Att 20 dB Mode Auto Sweep ●1Pk Max M4[1] 49.85 dBn 2.368090<sub>NGH</sub> 0 dBm--3.13 der 2.401910 GH M1[1] -10 dBm· -20 dBm -30 dBm· Ŵ M3 -40 dBm-THE PROPERTY IN M4 hunnehmunnhannehmunnhannehmun -50 dBm ٨. المد -60 dBm--70 dBm -80 dBm-691 pts Stop 2.405 GHz Start 2.31 GHz Marker Function Type Ref Trc Function Result X-value Y-value 2.40191 GHz -3.13 dBm Μ1 1 M2 2.4 GHz 2.39393 GHz -34.37 dBm 1 ΜЗ -39.72 dBm 1 Μ4 2.36809 GHz -49.85 dBm 1 -----

Hopping mode (GFSK Mode)

Date: 22.JUL.2019 17:05:42



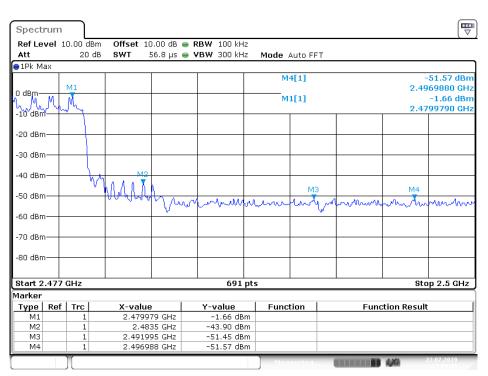
Date: 22.JUL.2019 17:07:09



Att	20 dB	3 <b>SWT</b> 1.1 m	ns 😑 <b>VBW</b> 300 kH	z Mode Auto S	weep	
1Pk Max						
				M4[1]		-50.10 dBr
) dBm —				M1[1]		2.363960 GH -3.76 dBr
				WILLI		2.402180 GH
10 dBm						
-20 dBm						
-30 dBm						M2
40 dBm						M3 MU
TO GDIN						is later
				M4		PP40
-50 dBm —		6 m 4 d 6	المليم العامية	-	LOS BRAALAAL	PP UV
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-60 dBm	dan dan san san san san san san san san san s	mmmmm MMM	whitehout	-		nruv vluum
-60 dBm	un lun lui lui	menere MMb	Mahahayabay	-	, nn lithe an	Judan Andrew
-60 dBm -70 dBm -80 dBm		un market was a second s		untur	,.rnllbersegriter	
-60 dBm -70 dBm -80 dBm -80 dBm		un market was a second s	691	untur	under and the second	Stop 2.405 GHz
60 dBm 70 dBm 80 dBm 80 dBm 3tart 2.31 d	GHz		691	pts		Stop 2.405 GHz
overweiden 60 dBm 70 dBm 80 dBm 80 dBm 3tart 2.31 d Iarker Type   Ref	GHz	X-value	691 Y-value	pts		
-70 dBm -70 dBm -80 dBm 	GHz		691	pts		Stop 2.405 GHz
M1	GHz	X-value 2.40218 GH	691 Z -3.76 dB Z -34.51 dB	pts		Stop 2.405 GHz

#### Hopping mode ( **π /4 DQPSK Mode**)

Date: 22.JUL.2019 17:09:51



Date: 22.JUL.2019 17:08:36



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

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

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

1.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. 2.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above

3. All modes of operation were investigated and the worse case ( $\pi/4$  DQPSK mode) emissions are reported.

The spectrum analyzer plots are attached as below.

1GHz.



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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

bb No.: LGW2019 #2789	Polarization: Horizontal					
tandard: FCC (Band Edge)	Power Source: DC 3.7V					
est item: Radiation Test	Date: 19/07/15/					
emp.( C)/Hum.(%) 23 C / 48 %	Time:					
UT: Portable Bluetooth Speaker	Engineer Signature: WADE					
lode: TX 2402MHz	Distance: 3m					
lodel: MP120						
anufacturer: Edifier						
90.0 dBuV/m	limit1:					
90.0 dBu∀/m 80	limit1: limit2:					
80						
80						
80 70 60 50						

2310.000 239										2390.0	0 MHz
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	2389.360	39.51	0.79	40.30	74.00	-33.70	peak				
2	2389.360	29.62	0.79	30.41	54.00	-23.59	AVG	1			



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

Job No.: LGW2019 #2788	Polarization: Vertical
Standard: FCC (Band Edge)	Power Source: DC 3.7V
Test item: Radiation Test	Date: 19/07/15/
Temp.( C)/Hum.(%) 23 C / 48 %	Time:
EUT: Portable Bluetooth Speaker	Engineer Signature: WADE
Mode: TX 2402MHz	Distance: 3m
Model: MP120	
Manufacturer: Edifier	
Note:	

									limit1: limit2:	
0			nunnn			ing shi ng shi			mm.z.	
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)										<u>ı</u>
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10 20 0					undin subscript Cryot	lar March and a				
0										2390.0 M
0		Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit	Margin		Height (cm)	Degree (deg.)	
0	2310.000 Freq.	Reading	Factor (dB) 0.79	Result (dBuV/m) 46.20		Margin		Height	Degree	2390.0 M



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

		SCI	ence & In	dustry Park,	vansnan Sr	henzhen	P.R.Chi	na	I UA	.100-0133-2030339
Job No	.: LGW2019	#2794				F	Polarizati	on: H	Horizonta	al
Standa	ard: FCC (Bar	nd Edge)				F	Power Sc	ource:	DC 3.7	V
Test it	em: Radiatio	on Test				C	Date: 19/	07/15/		
Temp.	( C)/Hum.(%	) 23 C/4	8 %			Т	īme:			
EUT:	Portable	Bluetooth S	peaker			E	Ingineer	Signat	ure: W	ADE
Mode:	TX 2480M	IHz				C	)istance:	3m		
Model	MP120									
Manuf	acturer: Edifie	er								
Note:										
90.	0 dBuV/m								C 6 54	
									limit1: limit2:	
80										
70										
70										
60										
50	1									
40	Annon									
40	2 0	an 11/10014-12/12/12/12/12/12/12/12/12/12/12/12/12/1	Andrew Manus and Manus Man	whentermeters	. belover whether he					
30						and a manufacture	when manually	NMANAMAN	r-14/172-1-4-14/14/14	the fire billion is a build
20				***********						
10										
10										
0.0										
	2483.500									2500.0 MHz
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.615	44.51	1.10	45.61	74.00	-28.39	peak			

2483.615

34.47

1.10

35.57

54.00

-18.43

AVG

2



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

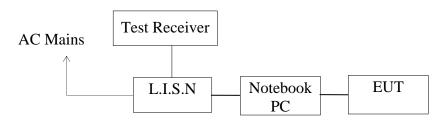
		Sci	ence & In	dustry Park,	Nanshan Sh	nenzhen	,P.R.Chi	na	Fax	:+86-0755-26503396
Job No	.: LGW2019	#2795				F	Polarizati	on: \	/ertical	
Standa	ard: FCC (Bar	nd Edge)				F	Power So	ource:	DC 3.7	V
Test it	em: Radiatio	on Test				0	Date: 19/	07/15/		
Temp.	( C)/Hum.(%	) 23 C/4	8 %			٦	Time:			
EUT:	Portable	Bluetooth S	peaker			E	Engineer	Signat	ure: W	ADE
Mode:	TX 2480M	IHz				C	Distance:	3m		
Model	MP120									
Manuf	acturer: Edifie	er								
Note:										
90.	0 dBuV/m								limit1:	
									limit2:	
80			*********			********	****			
70										
60										
50								1111111111		
50	1									
40	WWW.Water Produces								******	
-	S HINNEY	and the state of t	under the standard and the second standard and the second standard and standard and standard standar	him with the wey have	when he will be a second of the second of th	math	mandutude	Annahanah	uninvanin	Manuahadala
30					******		*******	*******	*****	*****
20										
10								********		*******
0.0										
4	2483.500									2500.0 MHz
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.632	42.90	1.10	44.00	74.00	-30.00	peak			
2	2483.632	33.05	1.10	34.15	54.00	-19.85	AVG			



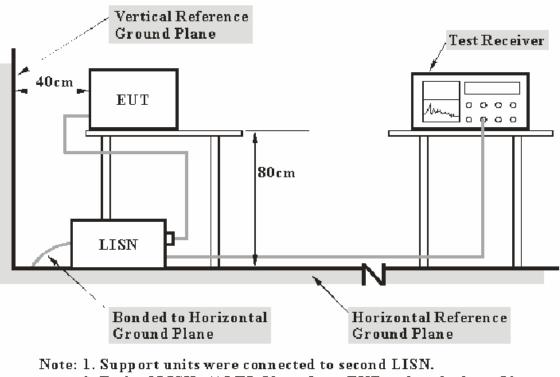
# **13.AC POWER LINE CONDUCTED EMISSION TEST**

## 13.1.Block Diagram of Test Setup

#### 13.1.1.Block diagram of connection between the EUT and simulators



#### 13.1.2.Test System Setup



2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.



### 13.2.Test Limits

Frequency	Conducted L	imit dB(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 sh	all apply at the transition freque	encies.						
NOTE2: The limit decreases linearly with the logarithm of the frequency in the range								
0.15MHz to 0.50	MHz.							

## 13.3.EUT Configuration on Test

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

## 13.4.Operating Condition of EUT

13.4.1.Setup the EUT and simulator as shown as Section 13.1.

13.4.2. Turn on the power of all equipment.

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

### 13.5.Test Procedure

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

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

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



### 13.6.Data Sample

Frequency	Transducer	QuasiPeak	Average	QuasiPeak	Average	QuasiPeak	Average	Remark
(MHz)	value	Level	Level	Limit	Limit	Margin	Margin	(Pass/Fail)
	(dB)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dB)	
X.XX	10.6	25.3	17.0	59.0	49.0	33.4	31.7	Pass

$$\label{eq:Frequency} \begin{split} & Frequency(MHz) = Emission \ frequency \ in \ MHz \\ & Transducer \ value(dB) = Insertion \ loss \ of \ LISN + Cable \ Loss \\ & Level(dB\mu V) = Quasi-peak \ Reading/Average \ Reading + Transducer \ value \\ & Limit \ (dB\mu V) = Limit \ stated \ in \ standard \\ & Margin = Limit \ (dB\mu V) - Level \ (dB\mu V) \end{split}$$

Calculation Formula: Margin = Limit ( $dB\mu V$ ) - Level ( $dB\mu V$ )

### 13.7.Test Result

#### Pass.

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

Maximizing procedure was performed on the four (4) highest emissions of the EUT. Emissions attenuated more than 20 dB below the permissible value are not reported.

All data was recorded in the Quasi-peak and average detection mode.

The spectral diagrams are attached as below.



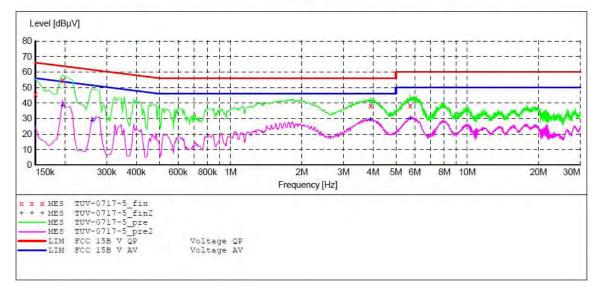
#### ACCURATE TECHNOLOGY CO., LTD

#### CONDUCTED EMISSION STANDARD FCC PART 15 C

EUT:Portable Bluetooth Speaker M/N:MP120Manufacturer:EdifierOperating Condition:BT CommunicationTest Site:1#Shielding RoomOperator:WADETest Specification:N 120V/60HzComment:Mains portStart of Test:7/17/2019 /

#### SCAN TABLE: "V 9K-30MHz fin"

~	Short Desc.	ription:	S	UB STD VTE	RM2 1.70			
		Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer	
		150.0 kHz		QuasiPeak Average	1.0 s	200 Hz	NSLK8126 2008	
	150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008	



#### MEASUREMENT RESULT: "TUV-0717-5 fin"

7/17/2019 Level Transd Limit Margin Detector Line Frequency PE MHz dBµV dB dBµV dB 0.150000 45.70 10.5 66 20.3 QP Ν GND 54.70 9.1 QP 0.195000 10.5 64 N GND 10.8 38.20 56 17.8 QP 3.910000 Ν GND 5.740000 38.30 10.8 21.7 OP 60 N GND

#### MEASUREMENT RESULT: "TUV-0717-5 fin2"

7/17/2019 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195000	38.10	10.5	54	15.7	AV	N	GND
0.260000	28.70	10.5	51	22.7	AV	N	GND
3.890000	29.30	10.8	46	16.7	AV	N	GND
5.740000	30.30	10.8	50	19.7	AV	N	GND



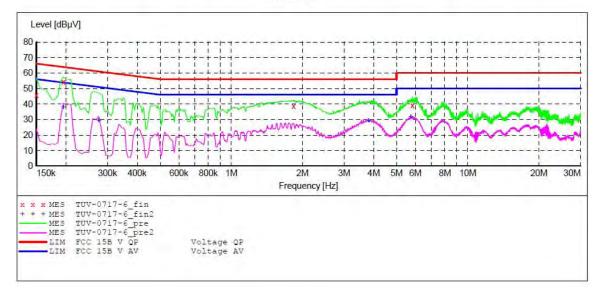
#### ACCURATE TECHNOLOGY CO., LTD

#### CONDUCTED EMISSION STANDARD FCC PART 15 C

EUT:	Portable Bluetooth Speaker M/N:MP120
	Edifier
Operating Condition:	BT Communication
Test Site:	1#Shielding Room
Operator:	WADE
Test Specification:	L 120V/60Hz
Comment:	Mains port
Start of Test:	7/17/2019 /

#### SCAN TABLE: "V 9K-30MHz fin"

~	Short Desc	ription:	S	UB STD VTER	RM2 1.70			
							Transducer	
		Frequency	Width		Time	Bandw.		
	9.0 kHz	150.0 kHz	100.0 Hz		1.0 s	200 Hz	NSLK8126 2008	
				Average				
	150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008	



#### MEASUREMENT RESULT: "TUV-0717-6 fin"

7/17/2019 Level Transd Limit Margin Detector Line Frequency PE MHz dBµV dB dBµV dB 45.50 0.150000 10.5 66 20.5 QP L1 GND 10.5 0.195000 54.20 64 9.6 QP L1 GND 38.70 17.3 QP 1.835000 56 GND L1 5.830000 39.20 10.8 60 20.8 QP L1 GND

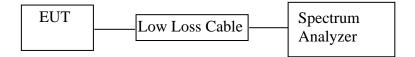
#### MEASUREMENT RESULT: "TUV-0717-6 fin2"

7/17/2019 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195000	37.90	10.5	54	15.9	AV	L1	GND
0.275000	29.50	10.5	51	21.5	AV	L1	GND
3.810000	29.50	10.8	46	16.5	AV	L1	GND
5.740000	31.60	10.8	50	18.4	AV	L1	GND



# 14. CONDUCTED SPURIOUS EMISSION COMPLIANCE TEST

#### 14.1.Block Diagram of Test Setup



## 14.2. The Requirement For 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).

#### 14.3.The Requirement for RSS-247 section 5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the100 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

#### 14.4.EUT Configuration on Measurement

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



## 14.5.Operating Condition of EUT

- 14.5.1.Setup the EUT and simulator as shown as Section 14.1.
- 14.5.2.Turn on the power of all equipment.
- 14.5.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

#### 14.6.Test Procedure

- 14.6.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.
- 14.6.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz
- 14.6.3. The Conducted Spurious Emission was measured and recorded.

## 14.7.Test Result

Pass.

The spectrum analyzer plots are attached as below.



## GFSK mode

					Low C	ha	nnel						_
Spectrur	n												
Ref Level	10.00	dBm	Offset 10	1.00 dB	👄 RBW 100 kH	Ιz							
Att	20	) dB	SWT	265 ms	🔵 <b>VBW</b> 300 kH	Ηz	Mode .	۵uto S	weep				
⊖1Pk Max													
							M	4[1]					49.13 dBm
0 dBm 🕂	1											19	9.4320 GHz -2.53 dBm
							IMI	1[1]					-2.53 dBm 2.3860 GHz
-10 dBm—													2.0000 0112
-20 dBm—													
-20 UBIII-													
-30 dBm													
-40 dBm—													
			M2					M3		M4			
-50 dBm-	he much	الملهاني	Jow Martine		www.ong.	m	Munda	who	ww	nug tan Va	mon	mund	wonderson the
-60 dBm-	ur.ur												
00 0.0													
-70 dBm													
-80 dBm													
Start 30.0	) MHz				691	pts						Stop	26.5 GHz
Marker													
	ef Trc		X-value		Y-value		Func	tion		Fu	inction	Result	
M1 M2	1			36 GHz 14 GHz	-2.53 dE -50.26 dE								
M2 M3	1			14 GH2	-49.15 dt								
M4	1	-		32 GHz	-49.13 di								
	) [					-	) Mar	currin a			1.10		22.07.2019
						<u> </u>	, , , , , , , , , , , , , , , , , , , ,						

Date: 22.JUL.2019 16:53:30

#### **Middle Channel**

									_
Spectrum									
Ref Level 1	0.00 d	Bm Offset 1	0.00 dB	RBW 100 kHz					
Att	20	dB SWT	265 ms	VBW 300 kHz	Mode Auto	Sweep			
∋1Pk Max									
					M4[1]			-50.5	24 dBm
0 dBm								20.08	40 GHz
					M1[1]				92 dBn
-10 dBm								2.42	40 GHz
-20 dBm									
-30 dBm									
-40 dBm									
-40 uBIII		M2				мз	M4		
-50 dBm									
month	mon	remaindury	multo	more My well when and	mound	unna	monup	www.helderale	www.
-60 dBm									
-70 dBm									
-80 dBm									
Start 30.0 M	IHz			691 pt	s			Stop 26.	5 GHz
Marker									
Type Ref	Trc	X-value		Y-value	Function		Funct	ion Result	
M1	1		24 GHz	-1.92 dBm					
M2 M3	1		83 GHz 17 GHz	-50.32 dBm -49.78 dBm		_			
M3 M4	1		17 GH2 84 GH2	-49.78 uBm -50.24 dBm		_			
		20.0		55.24 dbiii	<u></u>	-			30.10
	Л				Measurin			<b>1</b> /0	

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## High Channel

Spectrum											
Ref Level 1				e RBW 🗄							
Att	20	db SWT	265 ms	🔵 VBW 🗧	300 kHz	Mode /	۵uto S	weep			
●1Pk Max			-								
						M	4[1]				-49.34 dBm
0 dBm 🔜											19.9690 GH:
TI.						M	1[1]				-1.90 dBn 2.4620 GH;
-10 dBm											2.4020 GH2
-20 dBm											
-30 dBm											
-40 dBm			_								
-50 dBm		M2				www	M3	when		1 1-1 1-1 1-1 1-1 1-1 1-1 1-1 1-1 1-1 1	Manumm
-60 dBm-+	hurrenter	warn hin	mound	y www.wears	man						
-70 dBm											
-80 dBm											
Start 30.0 M	1Hz				691 pts	5				Sto	p 26.5 GHz
1arker											•
Type   Ref	Trc	X-valu	ie	Y-va	alue	Func	tion		Fun	ction Resu	lt
M1	1		462 GHz		.90 dBm						
M2	1		944 GHz		.68 dBm						
M3 M4	1		636 GHz 969 GHz		.32 dBm .34 dBm						
1117		19.	505 GHZ	- 79	.5+ ubili		_	-		4.965	22.07.2019
	Л					) Mea				1/1	

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## $\pi$ /4 DQPSK mode

## Low Channel

Spectrum	ı									
Ref Level	10.00 dB	m Offset	10.00 dB	● <b>RBW</b> 100 kH	z					
Att	20 0	ib SWT	265 ms	● <b>VBW</b> 300 kH	z Mode	Auto Sv	veep			
⊖1Pk Max										
0 dBm	м1			M4[1] M1[1]			-50.04 dBm 22.3820 GHz -2.59 dBm			
						1[1]				2.3860 GHz
-10 dBm										
-20 dBm										
-30 dBm										
-40 dBm	N	12				мз			M4	
-50 dBm		Lunar	_			▼	344	man	n Martina 1	inder the
-60 dBm-	and an and a start of the second	( manufacture ( )	hours providence	manhamman	- Mar Mar Mar	1.0 mm		V ** V W		preserventer
-70 dBm										
-80 dBm										
Start 30.0	MHz			691	pts				Stop	26.5 GHz
Marker										
Type Ret		X-va		Y-value	Func	tion		Fund	tion Result	t
M1	1		.386 GHz	-2.59 dB						
M2	1		.799 GHz	-48.76 dB						
M3 M4	1		1763 GHz .382 GHz	-49.82 dB -50.04 dB						
					Mea	suring.			4,70	22.07.2019

Date: 22.JUL.2019 16:59:13



#### **Middle Channel** Spectrum Ref Level 10.00 dBm Att 20 dB Offset 10.00 dB ● RBW 100 kHz SWT 265 ms ● VBW 300 kHz Mode Auto Sweep 🔵 1 Pk Max M4[1] -49.30 dBm 19.4320 GHz M 0 dBm M1[1] -2.03 dBm 2.4240 GHz -10 dBm -20 dBm -30 dBm--40 dBm мз M4 M2 -50 dBm· w which on the λ. u. ML. And makerike mar ah -60 dBm -70 dBm· -80 dBm-Stop 26.5 GHz Start 30.0 MHz 691 pts Marker Type Ref Trc M1 1 M2 1 X-value 2.424 GHz 6.983 GHz Y-value -2.03 dBm Function Function Result -50.03 dBm M3 M4 18.015 GHz 19.432 GHz -48.69 dBm 1

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#### **High Channel**

-49.30 dBm

			8 -			Ē		
Spectrum						( <del>-</del>		
Ref Level 1	.0.00 dBi	m Offset 10.00 di	3 👄 RBW 100 kHz					
Att	20 d	IB <b>SWT</b> 265 m:	s 👄 <b>VBW</b> 300 kHz	Mode Auto S	weep			
●1Pk Max								
				M4[1]		-49.60 dBn		
D dBm 🕌						18.0920 GH -1.42 dBn		
I IIII				M1[1]				
-10 dBm						2.4620 GH:		
-20 dBm 🕂								
.								
-30 dBm								
-40 dBm								
-40 ubiii		M2		МЗ	M4			
-50 dBm		· · · · · · · · · · · · · · · · · · ·		<u> </u>	<b>T</b>			
Low dam	whenhald	when when when when a start when the	meentortenner	prover and and	and advert and the	and hand have been and have		
-60 dBm								
-70 dBm								
-80 dBm								
Start 30.0 №	1Hz		691 pt:	5		Stop 26.5 GHz		
/larker								
Type Ref		X-value	Y-value	Function	Fui	nction Result		
M1	1	2.462 GHz						
M2	1	6.983 GHz						
M3 M4	1	15.9465 GHz 18.092 GHz						
T-101		10.092 GH2	-+9.00 ubiii	<u></u>	1			
				Measuring		22.07.2019		

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# **15.ANTENNA REQUIREMENT**

15.1.The Requirement

According to Section 15.203 and RSS GEN 6.8, 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.

#### 15.2.Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The max antenna gain of EUT is 2.12dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203 and RSS GEN 6.8.

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