

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

Multimedia Speaker Model No.: R1080BT

FCC ID: Z9G-EDF86 IC: 10004A-EDF86

Prepared for Address	<ul><li>Edifier International Limited</li><li>P.O. Box 6264 General Post Office Hong Kong</li></ul>
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Report No.	:	ATE20190600
Date of Test	:	April 19-April 23, 2019
Date of Report	:	April 25, 2019



# TABLE OF CONTENTS

# Description

Page

# Test Report Certification

1.	G	ENERAL INFORMATION	5
	1.1.	Description of Device (EUT)	5
	1.2.	Accessory and Auxiliary Equipment	
	1.3.	Description of Test Facility	
	1.4.	Measurement Uncertainty	
2.	Μ	EASURING DEVICE AND TEST EQUIPMENT	7
3.	O	PERATION OF EUT DURING TESTING	
	3.1.	Operating Mode	
	3.2.	Configuration and peripherals	
4.	TI	EST PROCEDURES AND RESULTS	
5.	20	DB BANDWIDTH TEST	
	5.1.	Block Diagram of Test Setup	
	5.2.	The Requirement For Section 15.247(a)(1)	
	5.3.	The Requirement For RSS-247 Section 5.1(a)	
	5.4.	EUT Configuration on Test	
	5.5.	Operating Condition of EUT	
	5.6.	Test Procedure	
	5.7.	Test Result	
6.	99	% OCCUPIED BANDWIDTH TEST	
	6.1.	Block Diagram of Test Setup	
	6.2.	The Requirement for RSS-Gen Clause 6.7	
	6.3.	EUT Configuration on Test	
	6.4.	Operating Condition of EUT	
	6.5.	Test Procedure	
	6.6.	Test Result	
7.	C	ARRIER FREQUENCY SEPARATION TEST	
	7.1.	Block Diagram of Test Setup	
	7.2.	The Requirement For Section 15.247(a)(1)	
	7.3.	The Requirement For RSS-247 Section 5.1(b)	
	7.4.	EUT Configuration on Test	
	7.5.	Operating Condition of EUT	
	7.6.	Test Procedure	
	7.7.	Test Result	
8.	N	UMBER OF HOPPING FREQUENCY TEST	
	8.1.	Block Diagram of Test Setup	
	8.2.	The Requirement For Section 15.247(a)(1)(iii)	
	8.3.	The Requirement For RSS-247 Section 5.1(d)	
	8.4.	EUT Configuration on Test	
	8.5.	Operating Condition of EUT	
	8.6.	Test Procedure	
	8.7.	Test Result	
9.	D	WELL TIME TEST	
	9.1.	Block Diagram of Test Setup	
	9.2.	The Requirement For Section 15.247(a)(1)(iii)	



9.3.	The Requirement For RSS-247 Section 5.1(d)	
9.4.	EUT Configuration on Test	
9.5.	Operating Condition of EUT	
9.6.	Test Procedure	
9.7.	Test Result	
<b>10. M</b> A	AXIMUM PEAK OUTPUT POWER TEST	
10.1.	Block Diagram of Test Setup	
10.2.	The Requirement For Section 15.247(b)(1)	
10.3.	The Requirement For RSS-247 Section 5.4(b)	
10.4.	EUT Configuration on Test	
10.5.	Operating Condition of EUT	
10.6.	Test Procedure	
10.7.	Test Result	
11. RA	DIATED EMISSION TEST	
11.1.	Block Diagram of Test Setup	
11.2.	The Requirement For Section 15.247(d)	
11.3.	The Requirement for RSS-247 section 5.5	
11.4.	Transmitter Emission Limit	
11.5.	Restricted bands of operation	
11.6.	EUT Configuration on Test	
11.7.	Test Procedure	
11.8.	Data Sample	
11.9.	Test Result	
12. BA	ND EDGE COMPLIANCE TEST	
12.1.	Block Diagram of Test Setup	
12.2.	The Requirement For Section 15.247(d)	
12.3.	The Requirement For RSS-247 Section 5.5	
12.4.	EUT Configuration on Test	
12.5.	Operating Condition of EUT	
12.6.	Test Procedure	
12.7.	Test Result	
13. AC	<b>C POWER LINE CONDUCTED EMISSION TEST</b>	
13.1.	Block Diagram of Test Setup	
13.2.	Power Line Conducted Emission Test Limits	
13.3.	EUT Configuration on Test	
13.4.	Operating Condition of EUT	
13.5.	Test Procedure	
13.6.	Data Sample	
13.7.	Test Result	
14. CC	ONDUCTED SPURIOUS EMISSION COMPLIANCE TEST	
14.1.	Block Diagram of Test Setup	
14.2.	The Requirement For Section 15.247(d)	
14.3.	The Requirement for RSS-247 section 5.5	
14.4.	EUT Configuration on Measurement	
14.5.	Operating Condition of EUT	
14.6.	Test Procedure	
14.7.	Test Result	
15. AN	TENNA REQUIREMENT	
15.1.	The Requirement	
15.2.	Antenna Construction	



# Test Report Certification

Applicant	:	Edifier International Limited
Address	:	P.O. Box 6264 General Post Office Hong Kong
Product	:	Multimedia Speaker
Model No.	:	R1080BT

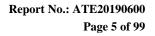
Measurement Procedure Used:

#### 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 :	April 19-April 23, 2019
Date of Report :	April 25, 2019
Prepared by :	(SI TAIST PROVED IN)
Approved & Authorized Signer :	(Sean Liu, Manager)





# **1. GENERAL INFORMATION**

# 1.1.Description of Device (EUT)

Model Number	:	R1080BT
Bluetooth version	:	V5.0 (BDR/EDR) Single mode
Frequency Range	:	2402-2480MHz
Number of Channels	:	79
Antenna Gain(Max)	:	2.59dBi
Antenna type	:	Integral Antenna
Modulation mode	:	GFSK, π/4 DQPSK, 8DPSK
HVIN	:	R1080BT
Trade Mark	:	N/A
Power supply	:	AC 120V/60Hz

# 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

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, 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 (Radiated Emission)	Compliance Direction	RSU-M2	38322	Jan. 05, 2019	One Year
Pre-Amplifier (Radiated Emission)	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)	SUHNER	N-5m	NO.3	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-5m	NO.4	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.5	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-1m	NO.6	Jan. 05, 2019	One Year
Conducted Emission M	easurement Softwar	e: ES-K1 V1.71		1	
Radiated Emission Mea	asurement Software:	EZ_EMC V1.1.4	.2		

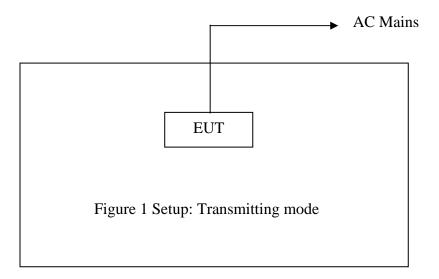


# 3. OPERATION OF EUT DURING TESTING

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





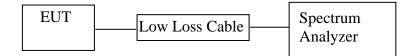
# 4. TEST PROCEDURES AND RESULTS

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 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

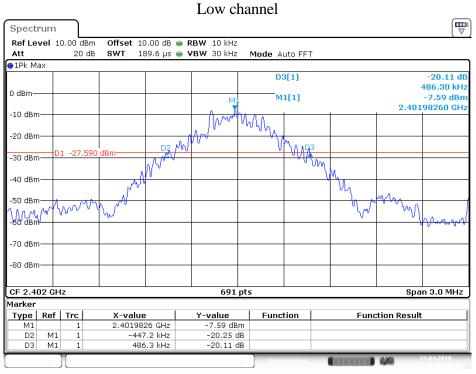
- 5.6.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 5.6.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.
- 5.6.3.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

### 5.7.Test Result

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.934	1.216	Pass
Middle	2441	0.938	1.211	Pass
High	2480	0.938	1.216	Pass

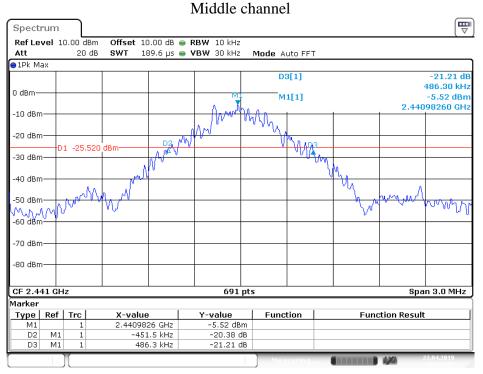
The spectrum analyzer plots are attached as below.

#### GFSK Mode



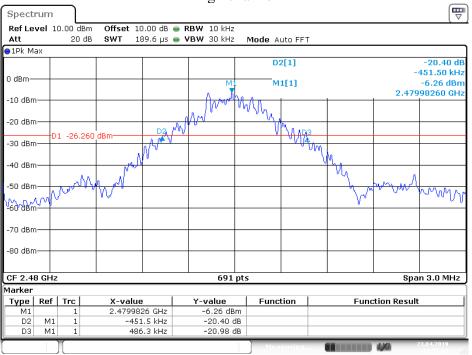
Date: 23.APR.2019 11:38:34





Date: 23.APR.2019 11:39:58

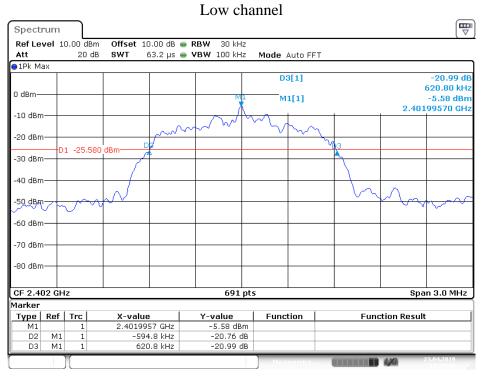
High channel



Date: 23.APR.2019 11:53:33

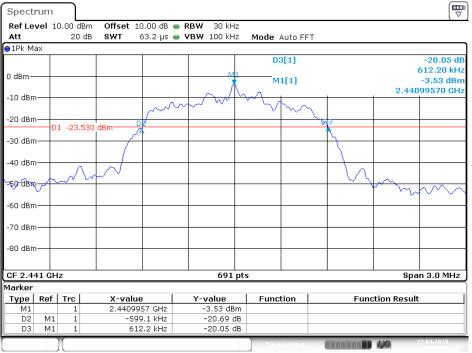


#### 8DPSK Mode



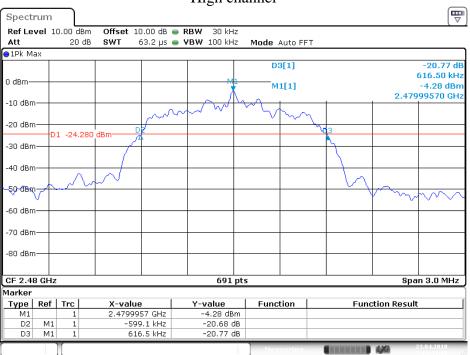
Date: 23.APR.2019 11:45:12

#### Middle channel



Date: 23.APR.2019 11:44:13





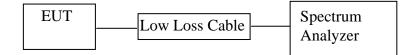
Date: 23.APR.2019 11:43:18

#### High channel



# 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.

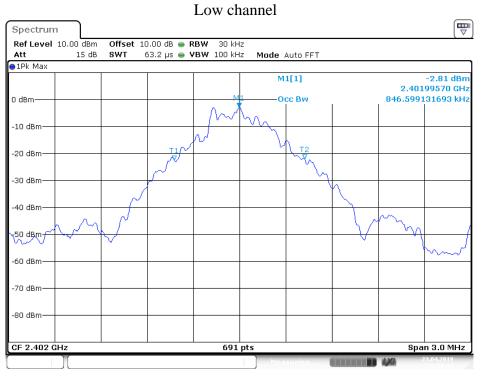
Channel	Frequency (MHz)	GFSK 99% Bandwidth (MHz)	8DPSK 99% Bandwidth (MHz)	Result
Low	2402	0.847	1.151	Pass
Middle	2441	0.842	1.137	Pass
High	2480	0.842	1.137	Pass

#### 6.6.Test Result

The spectrum analyzer plots are attached as below.



#### GFSK Mode



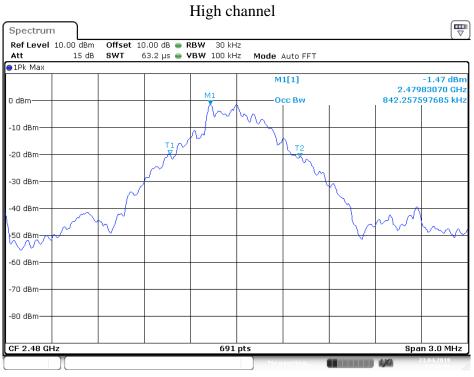
Date: 23.APR.2019 11:50:43

#### Middle channel



Date: 23.APR.2019 11:50:09

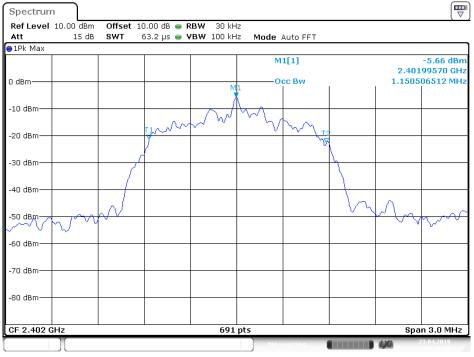




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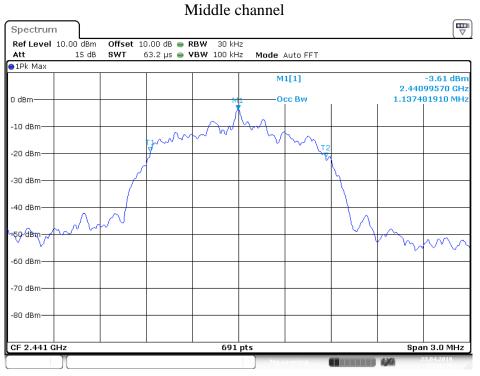
#### 8DPSK Mode

#### Low channel



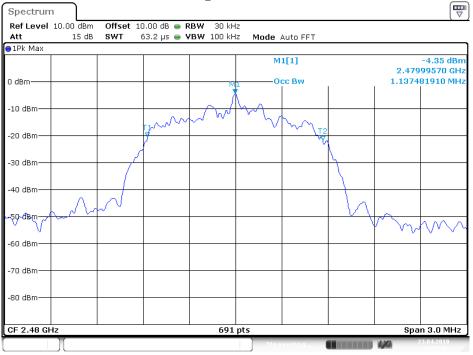
Date: 23.APR.2019 11:46:00





Date: 23.APR.2019 11:46:30



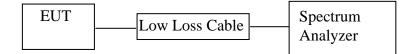


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# 7. CARRIER FREQUENCY SEPARATION TEST

### 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 30 kHz and VBW to 100 kHz. Adjust Span to 2MHz.
- 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)	Result	
Low	2402	1.0029	25KHz or20dB	Dece	
Low	2403	1.0029	bandwidth	Pass	
Middle	2440	1.0029	25KHz or 20dB	Daga	
Midule	2441	1.0029	bandwidth	Pass	
Hich	2479	1.0029	25KHz or 20dB	Dece	
High	2480	1.0029	bandwidth	Pass	

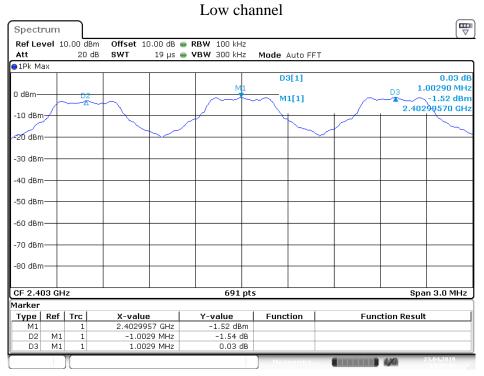
#### 8DPSK Mode

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.0014	25KHz or 2/3*20dB	Pass
LOW	2403	1.0014	bandwidth	r ass
Middle	2440	1.0029	25KHz or 2/3*20dB	Pass
Wildule	2441	1.0029	bandwidth	r ass
High	2479	1.0029	25KHz or 2/3*20dB	Pass
Ingli	2480	1.0029	bandwidth	1 855

The spectrum analyzer plots are attached as below.

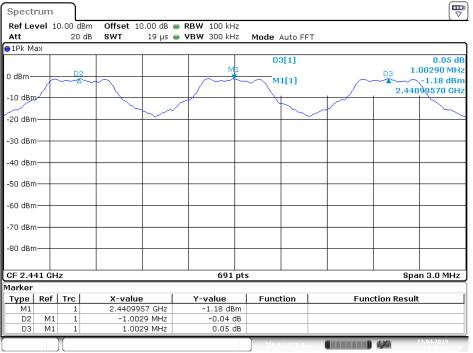


#### GFSK Mode



Date: 23.APR.2019 14:11:14

#### Middle channel



Date: 23.APR.2019 14:10:37



#### High channel Spectrum Ref Level 10.00 dBm Offset 10.00 dB 👄 RBW 100 kHz 19 µs 🖷 **VBW** 300 kHz Att 20 dB SWT Mode Auto FFT ●1Pk Max D3[1] 0.05 dE 1.00290 MHz -1.91 dBm 2.47899570 GHz D3 0 dBm M1[1] -10 dBm/ -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** -1.91 dBm -0.06 dB 0.05 dB Type Ref Trc X-value Function Function Result 2.4789957 GHz -1.0029 MHz M1 1 D2 M1 1 DЗ M1 1 1.0029 MHz

Date: 23.APR.2019 14:09:51

#### 8DPSK Mode

#### Low channel

						iuiiiitti				
Spect	rum									
Refle	vel 1	0.00 dB	m Offset 1	1.00 dB 👄 🛛	RBW 100 kH	,				
Att		20 d			<b>VBW</b> 300 kH		Auto FFT			
●1Pk M	70	20 0	0	10 μ5 🖕		- Moue	Autorri			
	<u> </u>						0[4]			0.04.15
							3[1]			0.04 dE
0 dBm-					M				D3 1	.00430 MHz
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\rightarrow$		$\sim$	$\sim $	11[1]			-1.51 dBm
-10 dBn	~+			$\sim\sim$				~~~	2.402	29 <b>942</b> 8 GH
-20 dBn										
20 000	"									
-30 dBn										
-30 ubn										
40 - 10 -	_									
-40 dBn										
-50 dBn	n									
-60 dBn	n									
-70 dBn	n									
-80 dBn	n									
CF 2.4		I			601				0	
		12			691	prs			aho	in 3.0 MHz
Marker										
Туре	Ref	Trc	X-value		Y-value	Fund	tion	Fun	ction Resul	t
M1		1	2.40299		-1.51 dB					
D2	M1	1		14 MHz	-1.53 c					
D3	M1	1	1.004	43 MHz	0.04 c	В				
						Me	asuring		100	23.04.2019

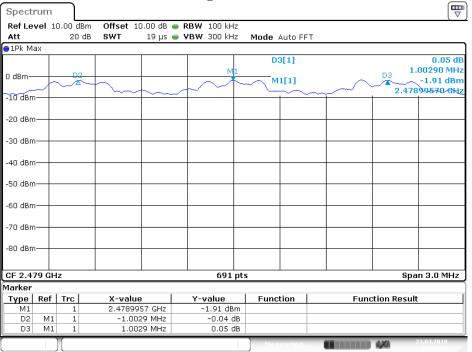
Date: 23.APR.2019 14:05:45



#### Middle channel **-**Spectrum Ref Level 10.00 dBm Att 20 dB Offset 10.00 dB ● RBW 100 kHz SWT 19 µs ● VBW 300 kHz Mode Auto FFT ⊖1Pk Max D3[1] 0.06 dB 1.00290 MHz 0 dBm--1.19 dBm 2.4409<del>913</del>8 GHz M1[1] -10 dBm· -20 dBm -30 dBm -40 dBm -50 dBm· -60 dBm· -70 dBm--80 dBm-691 pts CF 2.441 GHz Span 3.0 MHz Marker Type Ref Trc M1 1 Y-value -1.19 dBm Function Function Result X-value 2.4409913 GHz Μ1 D2 -1.0029 MHz -0.05 dB D3 M1 1 1.0029 MHz 0.06 dB

Date: 23.APR.2019 14:07:19

#### High channel

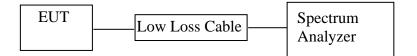


Date: 23.APR.2019 14:08:37



# 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**

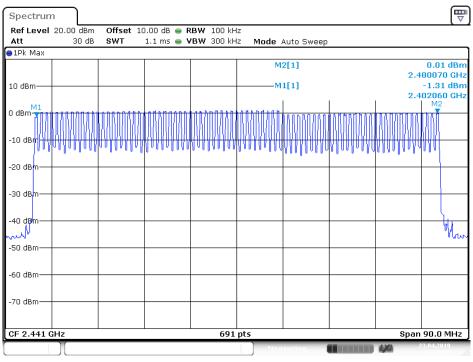
- 8.6.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 8.6.2.Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz.
- 8.6.3.Max hold, view and count how many channel in the band.



### 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.



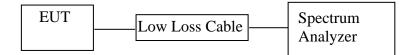
Number of hopping channels (GFSK Mode)

Date: 23.APR.2019 11:30:57



# 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	0.435	139.20	400		
DH1	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 = $pt$	lise time $\times$ (1600/(2*'	79))×31.6		
	2402	1.717	274.72	400		
DH3	2441	1.703	272.48	400		
	2480	1.703	272.48	400		
A period t	ransmit time = $0.4 \times 79$ =	31.6 Dwell time = $pt$	lse time $\times$ (1600/(4*'	79))×31.6		
	2402	2.971	316.91	400		
DH5	2441	2.971	316.91	400		
	2480	2.949	314.56	400		
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$						



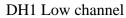
### 8DPSK Mode

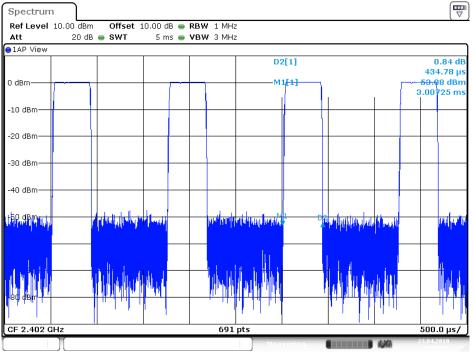
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)	
	2402	0.449	143.68	400	
3DH1	2441	0.449	143.68	400	
	2480	0.449	143.68	400	
A period the	ransmit time = $0.4 \times 79$ =	31.6 Dwell time = $pt$	lse time $\times$ (1600/(2*)	79))×31.6	
	2402	1.717	274.72	400	
3DH3	2441	1.717	274.72	400	
	2480	1.717	274.72	400	
A period the	ransmit time = $0.4 \times 79$ =	31.6 Dwell time = $pt$	llse time $\times$ (1600/(4*)	79))×31.6	
	2402	2.971	316.91	400	
3DH5	2441	2.971	316.91	400	
	2480	2.971	316.91	400	
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$					

The spectrum analyzer plots are attached as below.

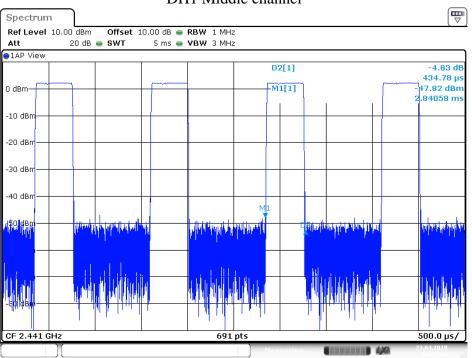


#### GFSK Mode





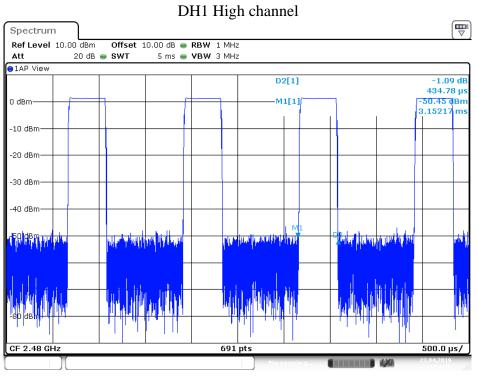
Date: 23.APR.2019 14:55:35



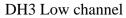
#### DH1 Middle channel

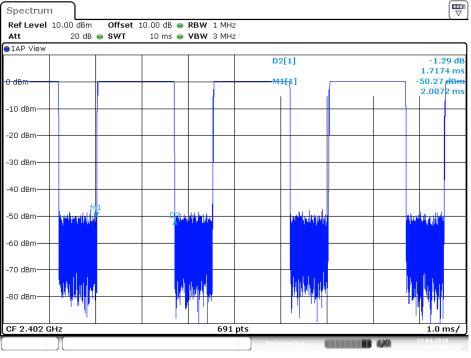
Date: 23.APR.2019 14:55:03





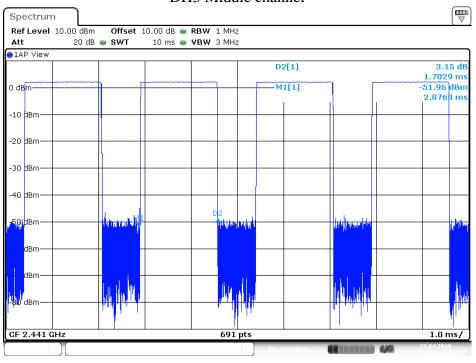
Date: 23.APR.2019 14:54:20





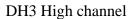
Date: 23.APR.2019 14:52:10

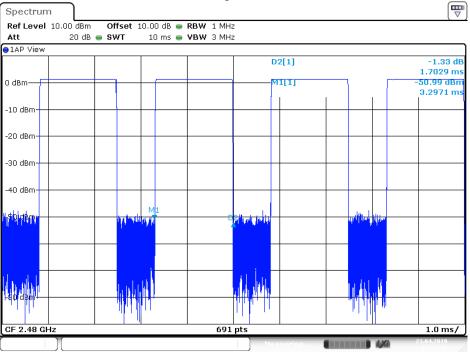




DH3 Middle channel

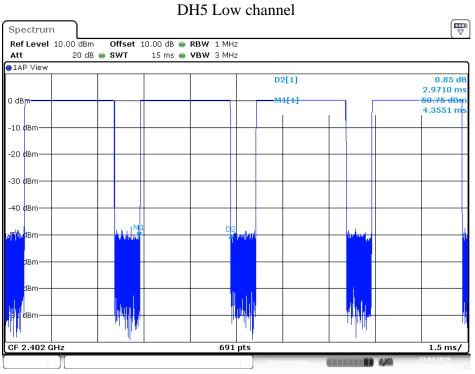
Date: 23.APR.2019 14:52:58



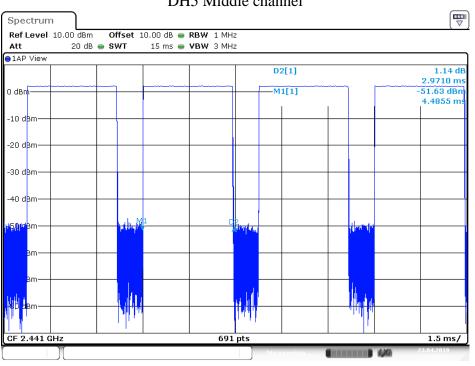


Date: 23.APR.2019 14:53:35





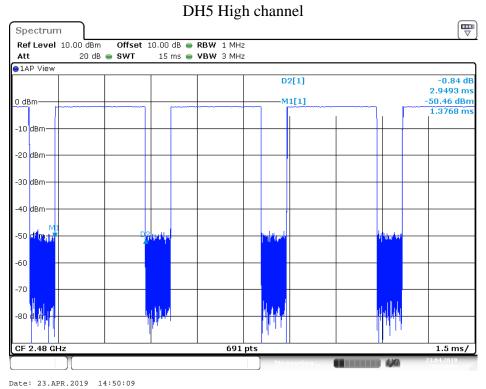
Date: 23.APR.2019 14:51:24



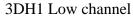
#### DH5 Middle channel

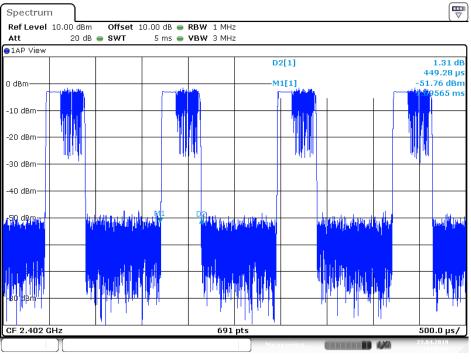
Date: 23.APR.2019 14:50:53





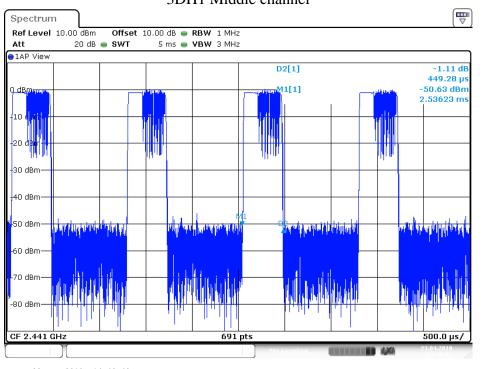
# 8DPSK Mode





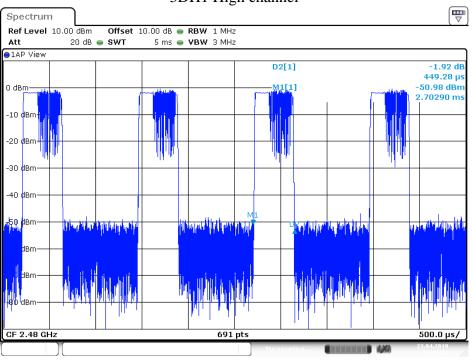
Date: 23.APR.2019 14:39:46





#### 3DH1 Middle channel

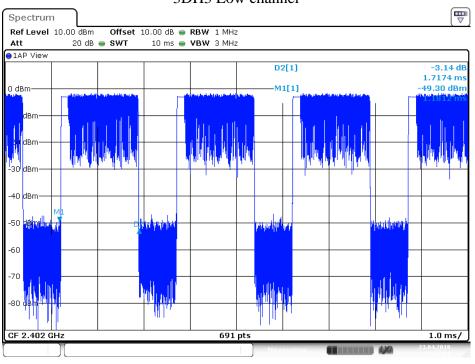
Date: 23.APR.2019 14:40:43



#### 3DH1 High channel

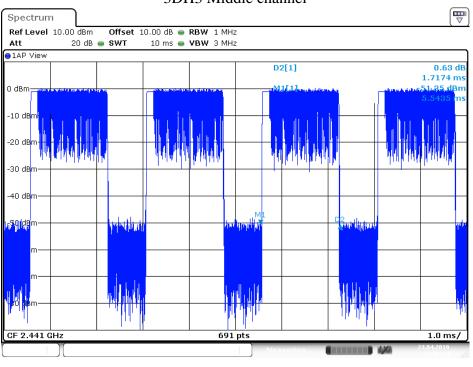
Date: 23.APR.2019 14:41:18





3DH3 Low channel

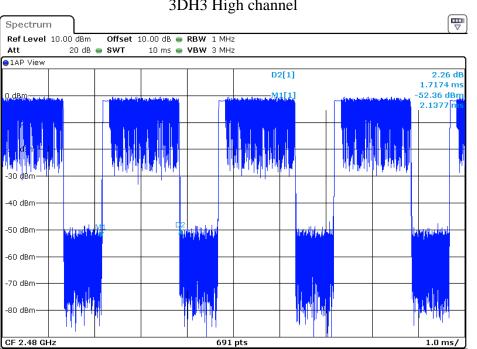
Date: 23.APR.2019 14:47:01



#### 3DH3 Middle channel

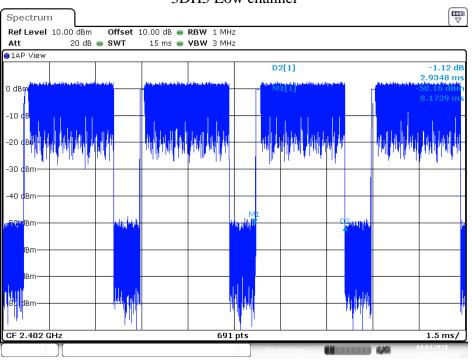
Date: 23.APR.2019 14:46:14





## 3DH3 High channel

Date: 23.APR.2019 14:45:22



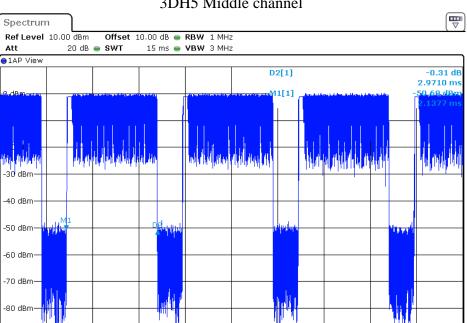
## 3DH5 Low channel

1.0

Date: 4.APR.2019 09:53:23



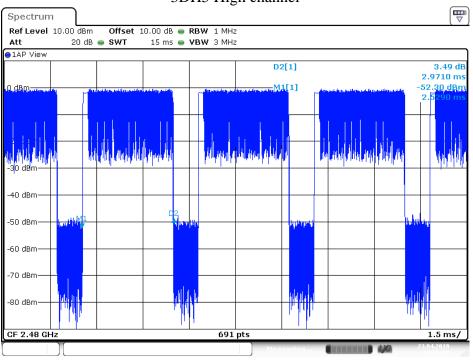
1.5 ms/



#### 3DH5 Middle channel

Date: 23.APR.2019 14:48:32

CF 2.441 GH



## 3DH5 High channel

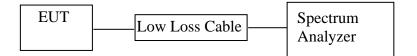
691 pts

Date: 23.APR.2019 14:49:07



# **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	0.39/0.0011	2.98/0.0020	30 / 1	Pass
2441	1.24/0.0013	3.83/0.0024	30 / 1	Pass
2480	0.46/0.0011	3.05/0.0020	30 / 1	Pass

### 8DPSK Mode

Frequency (MHz)	Peak Output Power (dBm/W)	E.I.R.P (dBm/W)	Limits (dBm/W)	Result
2402	-1.01/0.0008	1.58/0.0014	30 / 1	Pass
2441	0.79/0.0012	3.38/0.0022	30 / 1	Pass
2480	0.04/0.0010	2.63/0.0018	30 / 1	Pass

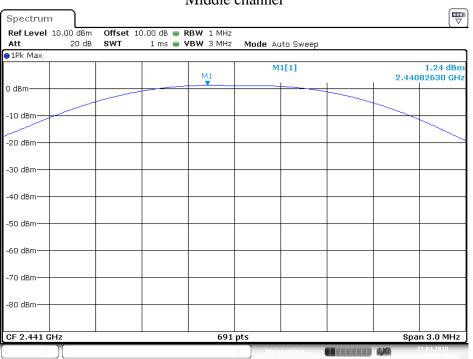
The spectrum analyzer plots are attached as below.



### GFSK Mode

	Low cl	nannel	
Spectrum			
Ref Level         10.00         dBm           Att         20 dB	Offset         10.00 dB         ■         RBW         1 MHz           SWT         1 ms         ■         VBW         3 MHz	Mode Auto Sweep	
●1Pk Max	<u> </u>		
		M1[1]	0.39 dBm 2.40216930 GHz
0 dBm			
-10 dBm			
-20 dBm			
-30 dBm			
-40 dBm			
-50 dBm			
-60 dBm			
-70 dBm			
-80 dBm			
CF 2.402 GHz	691	pts	Span 3.0 MHz
			23.04.2019

Date: 23.APR.2019 13:57:02



### Middle channel

Date: 23.APR.2019 13:57:49

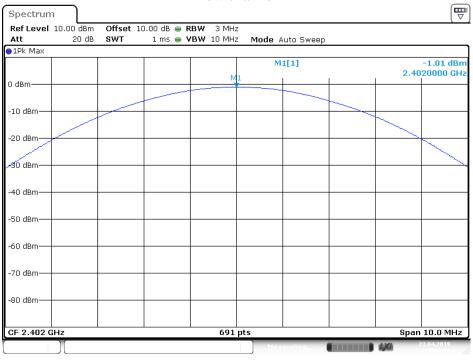


#### High channel Spectrum Ref Level 10.00 dBm Offset 10.00 dB 👄 RBW 1 MHz Att 20 dB SWT 1 ms 👄 **VBW** 3 MHz Mode Auto Sweep 🔵 1 Pk Max 0.46 dBm 2.47980460 GHz M1[1] M1 0 dBm--10 dBm--20 dBm--30 dBm--40 dBm--50 dBm--60 dBm--70 dBm--80 dBm-CF 2.48 GHz 691 pts Span 3.0 MHz цXI

Date: 23.APR.2019 13:58:14

### 8DPSK Mode

#### Low channel



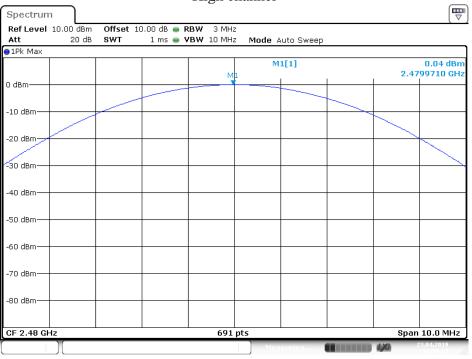
Date: 23.APR.2019 14:00:57



Spectrum Ref Level 10.00 dBm Offset 10.00 dB 😑 RBW 3 MHz 1 ms 👄 **VBW** 10 MHz Att 20 dB SWT Mode Auto Sweep 🔵 1 Pk Max 0.79 dBm 2.4410720 GHz M1[1] 41 0 dBm--10 dBm--20 dBm--30 dBm--40 dBm -50 dBm--60 dBm--70 dBm--80 dBm-CF 2.441 GHz 691 pts Span 10.0 MHz •••••

Date: 23.APR.2019 14:00:22

High channel



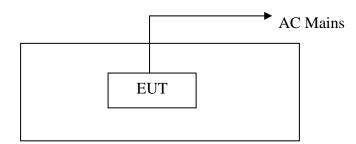
Date: 23.APR.2019 13:59:43



# **11.RADIATED EMISSION TEST**

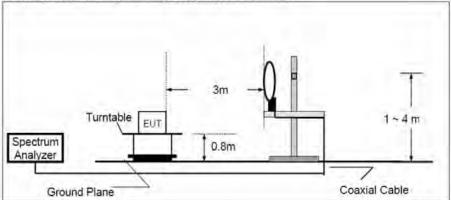
# 11.1.Block Diagram of Test Setup

11.1.1.Block diagram of connection between the EUT and peripherals

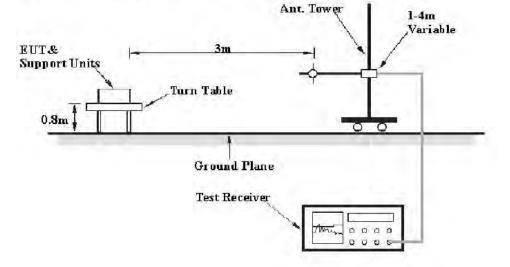


## 11.1.2.Semi-Anechoic Chamber Test Setup Diagram



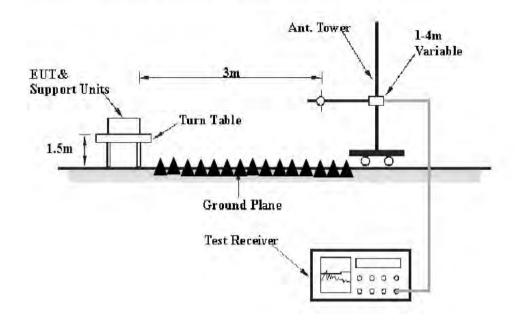


(B)Radiated Emission Test Set-Up, Frequency 30MHz-1GHz





(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.++C

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

9.0 - 9.2 9.3 - 9.5
510 510
1-2-2 (M. 57/12/)
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 & 8DPSK Mode and recorded the Worse case data (GFSK mode) for all test mode.

The spectrum analyzer plots are attached as below.



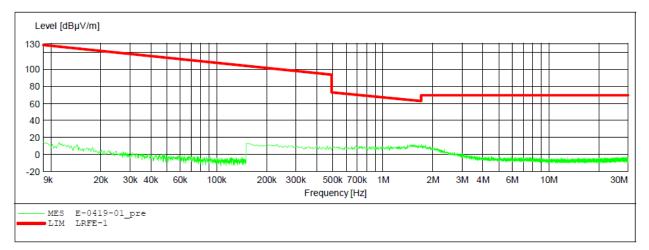
#### 9kHz-30MHz test data

#### ACCURATE TECHNOLOGY CO., LTD

#### FCC Part 15C 3M Radiated

EUT: Multimedia Speaker M/N:R1080BT Manufacturer: Edifier Operating Condition: TX 2402MHz Test Site: 2# Chamber Operator: WADE Test Specification: AC 120V/60Hz Comment: X Start of Test: 2019-4-19 /

Short Description:				SUB STD VTERM2 1.70			
5	Start	Stop	Step –	Detector	Meas.	IF	Transducer
E	requency	Frequency	Width		Time	Bandw.	
9	.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
1	50.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M

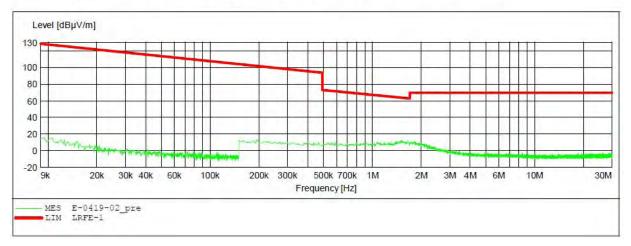




### FCC Part 15C 3M Radiated

EUT:	Multimedia Speaker M/N:R1080BT
Manufacturer:	Edifier
Operating Condition:	TX 2402MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	AC 120V/60Hz
Comment:	Y
Start of Test:	2019-4-19 /

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

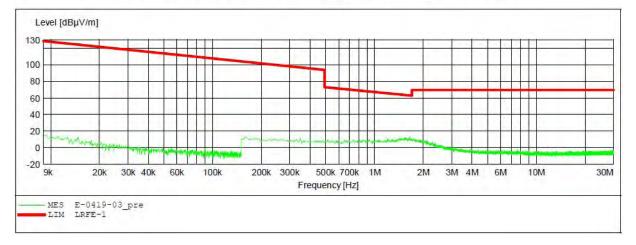




### FCC Part 15C 3M Radiated

EUT:	Multimedia Speaker M/N:R1080BT
Manufacturer:	Edifier
Operating Condition:	TX 2402MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	AC 120V/60Hz
Comment:	Z
Start of Test:	2019-4-19 /

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	

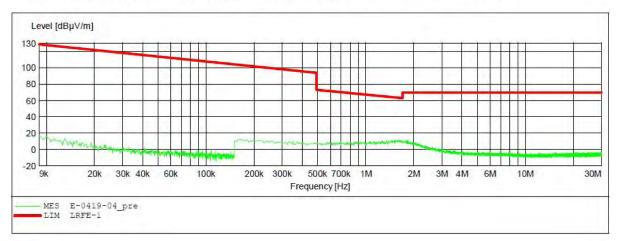




#### FCC Part 15C 3M Radiated

EUT:	Multimedia Speaker M/N:R1080BT				
Manufacturer:	Edifier				
Operating Condition:	TX 2441MHz				
Test Site:	2# Chamber				
Operator:	WADE				
Test Specification:	AC 120V/60Hz				
Comment:	Х				
Start of Test:	2019-4-19 /				

5	Short Desc	ription:	5	SUB STD VTERM2 1.70			
		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

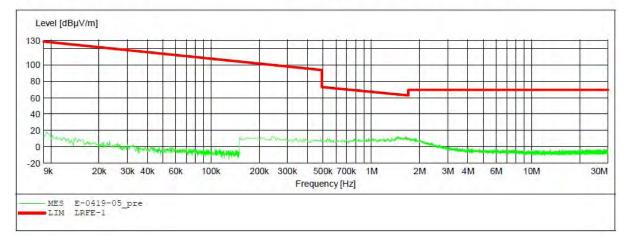




### FCC Part 15C 3M Radiated

EUT:	Multimedia Speaker M/N:R1080BT
Manufacturer:	Edifier
Operating Condition:	TX 2441MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	AC 120V/60Hz
Comment:	Y
Start of Test:	2019-4-19 /

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	

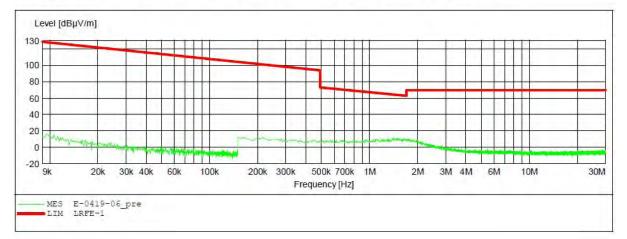




### FCC Part 15C 3M Radiated

EUT:	Multimedia Speaker M/N:R1080BT
	Edifier
Operating Condition:	TX 2441MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	AC 120V/60Hz
Comment:	Z
Start of Test:	2019-4-19 /

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

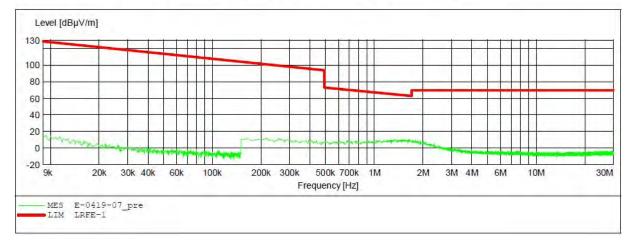




#### FCC Part 15C 3M Radiated

EUT:	Multimedia Speaker M/N:R1080BT
Manufacturer:	Edifier
Operating Condition:	TX 2480MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	AC 120V/60Hz
Comment:	X
Start of Test:	2019-4-19 /

Short Desc	ription:	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

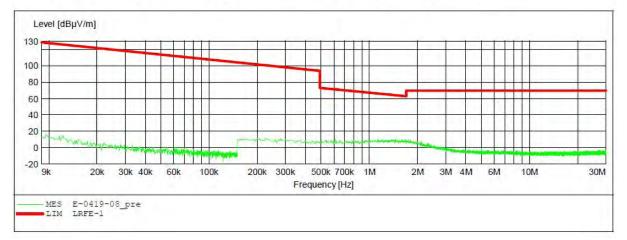




#### FCC Part 15C 3M Radiated

EUT:	Multimedia Speaker M/N:R1080BT
Manufacturer:	Edifier
Operating Condition:	TX 2480MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	AC 120V/60Hz
Comment:	Y
Start of Test:	2019-4-19 /

Short Description:				SUB STD VTE	RM2 1.70			
	Start		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	

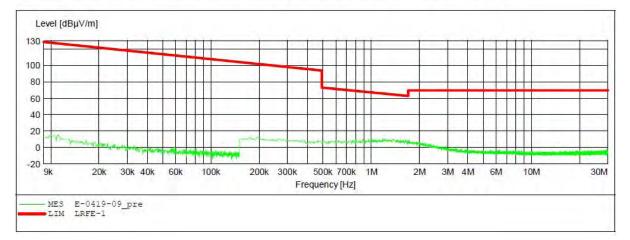




#### FCC Part 15C 3M Radiated

EUT:	Multimedia Speaker M/N:R1080BT
Manufacturer:	Edifier
Operating Condition:	TX 2480MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	AC 120V/60Hz
Comment:	Z
Start of Test:	2019-4-19 /

Short Desc.	ription:	S	SUB STD VTERM2 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			

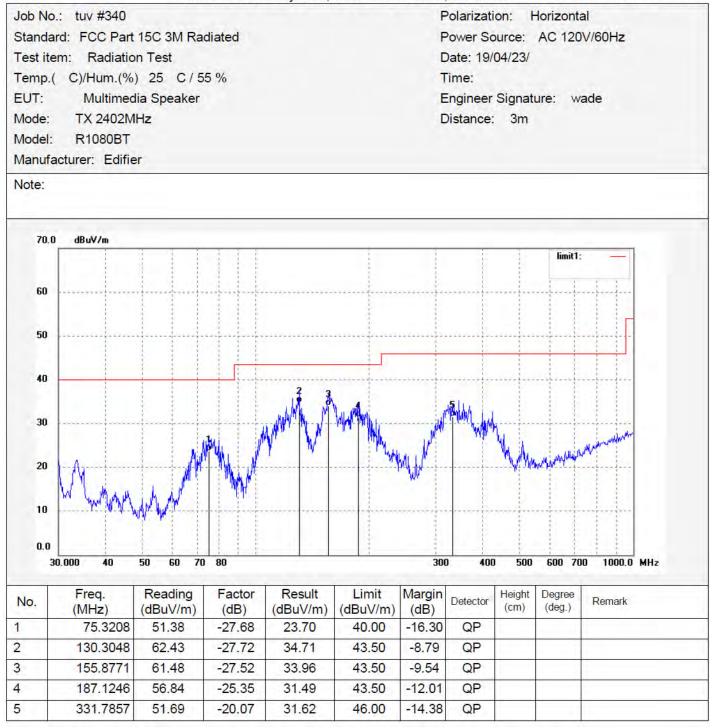




### 30MHz-1GHz test data

## ACCURATE TECHNOLOGY CO., LTD.

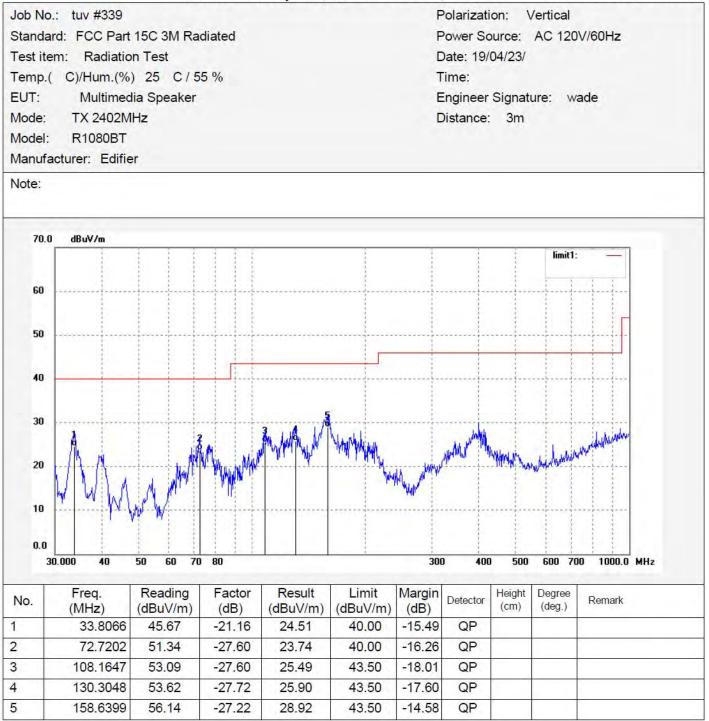
F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China







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







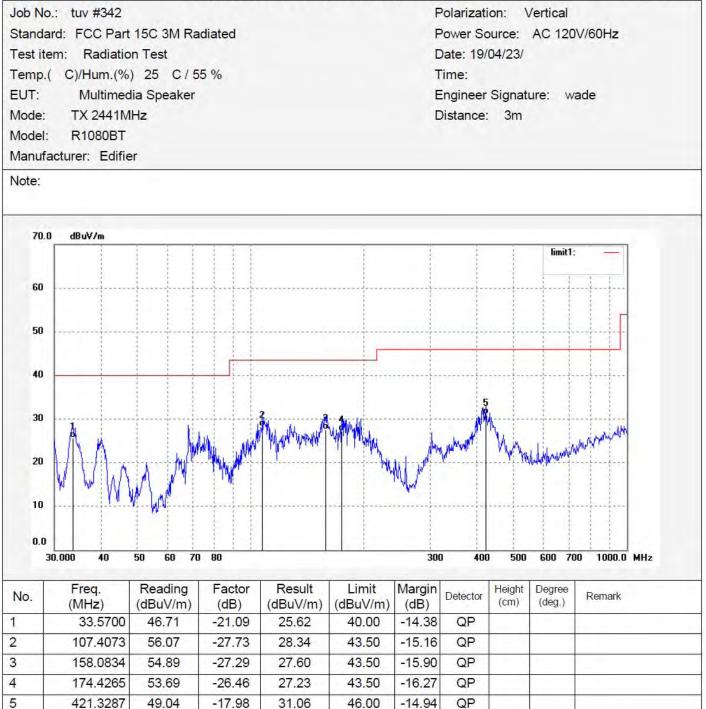
F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China

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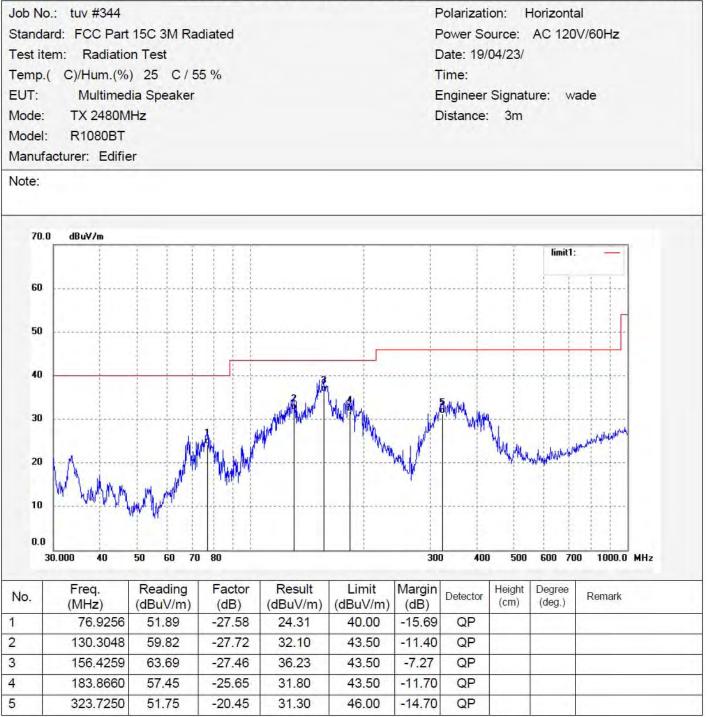
F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China







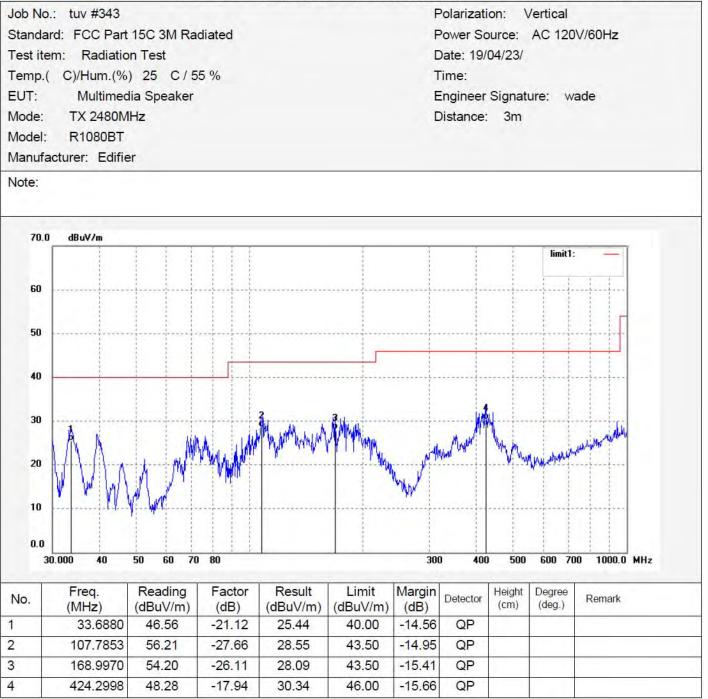
F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park,Nanshan Shenzhen,P.R.China







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

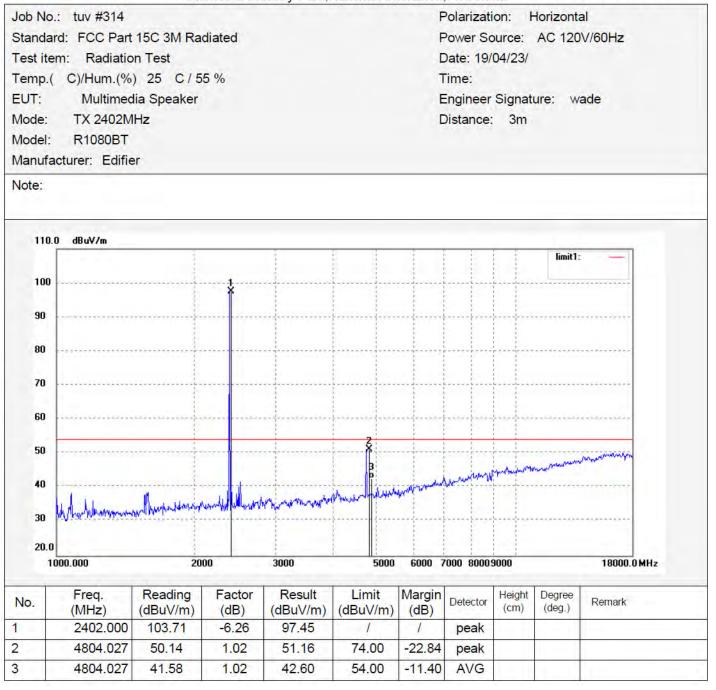




## 1GHz-18GHz test data

## ACCURATE TECHNOLOGY CO., LTD.

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







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

ob No	o.: tuv #315					F	Polarizat	ion: \	/ertical		
tanda	rd: FCC Part	15C 3M Ra	diated			F	Power Se	ource:	AC 120	V/60Hz	
est ite	em: Radiatio	n Test				C	Date: 19/	/04/23/			
emp.(	( C)/Hum.(%	) 25 C/5	5 %			1	Time:				
	Multimed					E	Engineer	Signat	ure: w	ade	
	TX 2402M						Distance				
lodel:	R1080BT										
lanufa	acturer: Edifie	er									
lote:											
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1	000.000	20	DO	3000	5000	6000	7000 8000	9000		18000.0	MHz
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)		Detector	Height (cm)	Degree (deg.)	Remark	
	2402.000	103.11	-6.26	96.85	1	1	peak			3	
	4804.029	49.79	1.02	50.81	74.00	-23.19	peak				
	4804.029	39.18	1.02	40.20	54.00	-13.80	AVG				





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

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20.0 1	000.000	20	00	3000	5000	6000 7	7000 8000	9000		18000.0 MHz
lo.	Freq.	Reading	Factor	Result	Limit	Margin	Detector	Height	Degree	Remark
	(MHz) 2441.000	(dBuV/m) 103.03	(dB) -6.08	(dBuV/m) 96.95	(dBuV/m)	(dB) /	peak	(cm)	(deg.)	
	4882.034	50.76	1.35	52.11	74.00	-21.89	peak			
_	4882.034	38.58	1.35	39.93	54.00	-14.07	AVG			





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

Stand Test it	o.: tuv #319 ard: FCC Part tem: Radiatic .( C)/Hum.(% Multimed	n Test		    -	Polarization: Vertical Power Source: AC 120V/60Hz Date: 19/04/23/ Time: Engineer Signature: wade					
Mode: Model		Hz				[	Distance:	3m		
	facturer: Edifie	er								
Note:										
11	0.0 dBu¥/m									
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20.	.0	20	00	3000	5000	6000	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	2441.000	103.54	-6.08	97.46	1	1	peak			
2	4882.033	49.59	1.35	50.94	74.00	-23.06				
3	4882.033	38.86	1.35	40.21	54.00	-13.79	AVG			





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

Job N	o.: tuv #321			F	Polarization: Horizontal								
Stand	ard: FCC Part	15C 3M Ra	diated			F	Power Source: AC 120V/60Hz						
Test it	tem: Radiatio	n Test				C	Date: 19/04/23/ Time:						
Temp	.( C)/Hum.(%	) 25 C/5	5 %			-							
EUT:	Multimed	lia Speaker				E	Engineer	Signat	ure: wa	ade			
Mode:	TX 2480M	Hz				C	Distance:	3m					
Model	: R1080BT												
Manut	facturer: Edifie	er											
Note:													
11	0.0 dBu∀/m												
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	1000.000	20	00	3000	5000	6000	7000 8000	9000		18000.0 MHz			
No.	Freq.	Reading	Factor	Result	Limit	Margin	Detector	Height	Degree	Remark			
1. C. 197	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)		(cm)	(deg.)				
1	2480.000	103.36	-5.90	97.46	/	/	peak						
2	4960.035	50.20	1.70	51.90	74.00	-22.10		-					
3	4960.035	39.74	1.70	41.44	54.00	-12.56	AVG						





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

Job No	o.: tuv #322					F	Polarizati	on: \	/ertical			
Standa	ard: FCC Part	15C 3M Ra	adiated			F	Power Source: AC 120V/60Hz Date: 19/04/23/ Time:					
Test it	em: Radiatio	n Test				C						
Temp.	( C)/Hum.(%	) 25 C/5	55 %			٦						
EUT:	Multimed	lia Speaker				E	Ingineer	Signat	ure: wa	ade		
Mode:	TX 2480M	Hz				C	Distance:	3m				
Model	R1080BT											
Manuf	acturer: Edifie	er										
Note:												
110	).0 dBu∀/m											
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20.	0 1000.000	20	000	3000	5000	6000 7	000 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)	and the second second	(cm)	(deg.)	Constantion of the second s		
1	2480.000	103.47	-5.90	97.57	/	/	peak					
2	4960.035	49.37	1.70	51.07	74.00	-22.93	peak					
3	4960.035	39.84	1.70	4 <b>1</b> .54	54.00	-12.46	AVG		()			



B

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

Job No	.: tuv #325			Polarization: Horizontal								
Standa	rd: FCC Part	15C 3M Ra	diated	F	Power Sc	ource:	AC 120	V/60Hz				
Test ite	em: Radiatio	on Test				Date: 19/04/23/						
Temp.	( C)/Hum.(%	) 25 C/5	5 %			Т	Time:					
EUT:	Multimed	lia Speaker				E	Ingineer	Signati	ure: wa	ade		
Mode:	TX 2402M	IHz				E	Distance:	3m				
Model:	R1080BT											
Manufa	acturer: Edifie	er										
Note:												
90.0	) dBu∀/m											
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	0000.000		20000							20300.0 MH2		
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark		
1	20694.937	70.75	-20.71	50.04	74.00	-23.96	peak					
2	20694.937	60.02	-20.71	39.31	54.00	-14.69	AVG					
				· · · · · · · · · · · · · · · · · · ·								





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

Job N	o.: tuv #326					Polarization: Vertical							
Stand	ard: FCC Part	15C 3M Ra	diated			Power Source: AC 120V/60Hz							
Test it	em: Radiatio	on Test				Date: 19/04/23/							
Temp	.( C)/Hum.(%	) 25 C/5	5 %			Time:							
EUT:	Multimed	dia Speaker				E	Ingineer	Signat	ure: w	ade			
Mode:	TX 2402M	IHz			Distance: 3m								
Model	: R1080BT												
Manut	acturer: Edifie	er											
Note:													
90.	0 dBuV/m								limit1:				
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			20000							LUUUU.UPIIIL			
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark			
1	18041.904	71.78	-21.41	50.37	74.00	-23.63	peak						
2	18041.904	60.98	-21.41	39.57	54.00	-14.43	AVG						





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

Job N	o.: tuv #328					F	Polarizati	on: H	lorizonta	al
Stand	ard: FCC Part	15C 3M Ra	diated			F	Power Sc	ource:	AC 120	V/60Hz
Test it	em: Radiatio	on Test				C	Date: 19/	04/23/		
Temp.	( C)/Hum.(%	) 25 C/5	5 %			٦	Time:			
EUT:	Multimed	lia Speaker				E	Engineer	Signatu	ure: wa	ade
Mode:						C	Distance:	3m		
Model	R1080BT									
Manuf	acturer: Edifie	er								
Note:										
90.	0 dBu¥/m									
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30								moni	inan	
20										
			1							
10										
0.0										
	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	20471.583	70.83	-20.77	50.06	74.00	-23.94	peak			
2	20471.583	59.78	-20.77	39.01	54.00	-14.99	AVG			





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

Job No	o.: tuv #327					F	Polarizati	ion: V	ertical	
Standa	rd: FCC Part	15C 3M Ra	diated			F	Power Sc	ource:	AC 120	V/60Hz
Test ite	em: Radiatio	n Test				C	Date: 19/	04/23/		
Temp.	( C)/Hum.(%	) 25 C/5	5 %			Т	Time:			
EUT:	Multimed	lia Speaker				E	Engineer	Signatu	ure: wa	ade
Mode:	TX 2441M	IHz				C	Distance:	3m		
Model:	R1080BT									
Manufa	acturer: Edifie	er								
Note:										
90.0	) dBuV/m									
									limit1:	-
80			4							
70			•••					*******		
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20	********	************	**********	**********		*********				
10										
0.0	8000.000		20000							26500.0 MHz
	0000.000		20000							20300.0 MHZ
No.	Freq.	Reading	Factor	Result	Limit	Margin	Detector	Height	Degree	Remark
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)		(cm)	(deg.)	1.12 C
1	18238.749	71.66	-21.35	50.31	74.00	-23.69	peak			
2	18238.749	60.59	-21.35	39.24	54.00	-14.76	AVG			





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

Job N	o.: tuv #329					F	olarizati	on: H	lorizonta	al
Stand	ard: FCC Part	15C 3M Ra	diated			F	Power Sc	ource:	AC 120	V/60Hz
Test it	em: Radiatio	n Test				0	Date: 19/	04/23/		
Temp	( C)/Hum.(%	) 25 C/5	5 %			Т	Time:			
EUT:	Multimed	lia Speaker				E	Ingineer	Signat	ure: wa	ade
Mode:	TX 2480M	IHz				C	Distance:	3m		
Model	: R1080BT									
Manut	acturer: Edifie	er								
Note:										
90.	0 dBuV/m		1						limit1:	-
80										
1										
70		••••••	···		•••••	•••••				
60										1944104.4
60										
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	2	a of Andrath a short an	a da tha tha da a da a a dh	. Mochel Service and America	and a straight of the straight	low of the section	a Maria and marking the second	And a paral	and a second	Manager a second
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20					•••••	*******				
10										
10	*************									
0.0			1. 9. 1.							
	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	18908.099	71.64	-21.18	50.46	74.00	-23.54	peak			
2	18908.099	60.96	-21.18	39.78	54.00	-14.22	AVG			





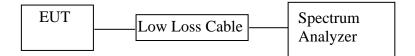
F1,Bldg,A,Changyuan New Material Port Keyuan Rd, Science & Industry Park, Nanshan Shenzhen, P.R. China

Job No	o.: tuv #330					F	Polarizati	on: V	/ertical	
Standa	ard: FCC Part	15C 3M Ra	diated			F	Power So	ource:	AC 120	V/60Hz
Test it	em: Radiatic	n Test				C	Date: 19/	04/23/		
Temp.	( C)/Hum.(%	) 25 C/5	5 %			7	ime:			
EUT:	Multimed	lia Speaker				E	Ingineer	Signatu	ure: wa	ade
Mode:	TX 2480M	Hz				C	Distance:	3m		
Model	R1080BT									
Manuf	acturer: Edifie	er								
Note:										
90.	0 dBu¥/m									
									limit1:	-
80										
70										
70			1							
60			4							
	1		1							
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40	2									
30			4							
20										
20										
10										
0.0			1							
	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	18041.904	72.07	-21.41	50.66	74.00	-23.34	peak			
2	18041.904	61.51	-21.41	40.10	54.00	-13.90	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	
2400.00	44.15	> 20dBc	Pass
2490.34	56.41	> 20dBc	Pass
	8DPSK mo	ode	
2376.02	50.30	> 20dBc	Pass
2497.98	57.34	> 20dBc	Pass

#### Hopping mode

Hopping mode			
Frequency	Result of Band Edge	Limit of Band Edge	Result
(MHz)	(dBc)	(dBc)	
	GFSK mo	de	
2319.97	47.97	> 20dBc	Pass
2486.84	53.41	> 20dBc	Pass
	8DPSK mo	ode	
2317.08	48.88	> 20dBc	Pass
2486.84	52.73	> 20dBc	Pass

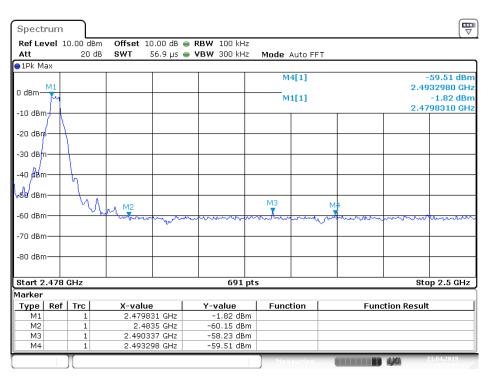
The spectrum analyzer plots are attached as below.



Spectrum						T I
Ref Level 1			🖷 RBW 100 kHz			,
Att	20 dB	SWT 1 ms	👄 <b>VBW</b> 300 kHz	Mode Auto S	weep	
1Pk Max						
				M4[1]		-54.91 dBi
0 dBm —						2.359460 GÅ -0.01 dBi
				M1[1]		2.401860 GF
-10 dBm						2.401000 GF
-20 dBm						
-30 dBm						
oo abiii						
-40 dBm						Ma
					мз	
-50 dBm				1 <del>114</del>	- IV	
mound	washinen	man an a	windownant	Woonwermente	month habership	munounder
-60 dBm						
-70 dBm						
-yo ubiii						
-80 dBm						
Start 2.31 G	Hz		691 pt	is l		Stop 2.403 GHz
Marker						
Type   Ref	Trc	X-value	Y-value	Function	Eunc	tion Result
M1	1	2.40186 GHz				
M2	1	2.4 GHz				
MЗ	1	2.37602 GHz				
M4	1	2.35946 GHz	-54.91 dBm			
				Measuring		23.04.2019

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

Date: 23.APR.2019 14:24:35



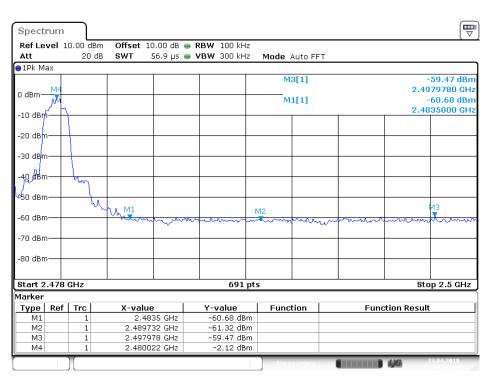
Date: 23.APR.2019 14:23:15



Spectrum	ı ]					
Ref Level			● RBW 100 kHz			,
Att	20 df	B SWT 1 ms	🔵 <b>VBW</b> 300 kHz	Mode Auto S	Sweep	
●1Pk Max						
				M1[1]		-3.23 dBn
0 dBm						2.401990 G
				M2[1]		-53.86 dBr
-10 dBm						2.400000 GH
-20 dBm						
-30 dBm						
10 10						
-40 dBm						h l
-50 dem					M3	Me
10 milium		which was a strange and the section of		proposation of which		Mandra and when and
-60 dBm					-	and and a second a second .
.						
-70 dBm						
-80 dBm						
-00 ubiii						
Start 2.31	GHz		691 pt	s		Stop 2.403 GHz
Marker						
Type   Ref	Trc	X-value	Y-value	Function	Fur	nction Result
M1	1	2.40199 GHz	-3.23 dBm			
M2	1	2.4 GHz	-53.86 dBm			
M3	1	2.37602 GHz	-53.85 dBm			
M4	1	2.31505 GHz	-54.41 dBm			
				Measurin		23.04.2019

#### Non-hopping mode (8DPSK Mode)

Date: 23.APR.2019 14:19:56



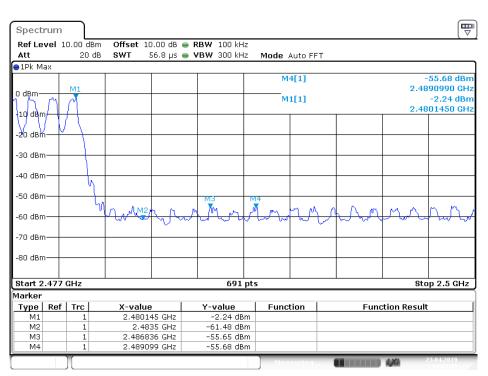
Date: 23.APR.2019 14:22:17



#### ඐ Spectrum Offset 10.00 dB 👄 RBW 100 kHz Ref Level 10.00 dBm SWT 1.1 ms 👄 VBW 300 kHz Mode Auto Sweep Att 20 dB ●1Pk Max M4[1] -51.28 dBn 2.319970<sub>6</sub>H 0 dBm--3.31 den 2.402070 de M1[1] -10 dBm· IW -20 dBm -30 dBm· -40 dBmмз -50 dBm Immunul Muha Jun Northann -60 dBm--70 dBm -80 dBm-691 pts Stop 2.405 GHz Start 2.31 GHz Marker Type Ref Trc Function Function Result X-value Y-value 2.40207 GHz -3.31 dBm Μ1 1 M2 2.4 GHz 2.3432 GHz -53.64 dBm 1 ΜЗ -51.73 dBm 1 Μ4 2.31997 GHz -51.28 dBm 1

Hopping mode (GFSK Mode)

Date: 23.APR.2019 14:13:33



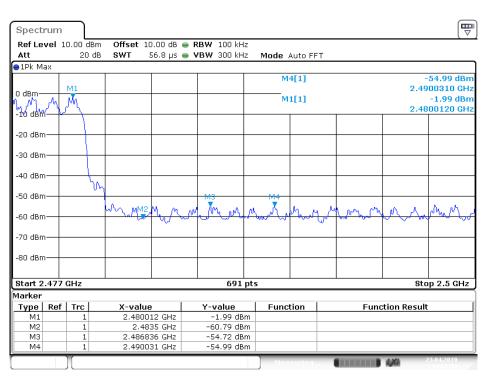
Date: 23.APR.2019 14:14:41



#### Hopping mode (8DPSK Mode)

		mohł	mg moue (o		uc)	_
Spectrum						
Ref Level	10.00 dBr	m Offset 10.00 dB	RBW 100 kHz			
Att	20 d	B SWT 1.1 ms	🔵 <b>VBW</b> 300 kHz	Mode Auto S	weep	
1Pk Max					1	
-				M4[1]		-52.25 dBr
						2.317080 <sub>N</sub> GH
0 dBm				M1[1]		-3.37 da
-10 dBm						2.402040 GH
-10 uBiii						
-20 dBm						
20 00111						
-30 dBm						
-40 dBm						
M4		мз				
-50 dBm		N3 ▼ .				MP
mm	MMMdow	mmunhander	Multimutani	manuchan	humanandah	mountimented
-60 dBm						
-70 dBm						
-70 UBIII-						
-80 dBm						
oo abiii						
Start 2.31	011-		691 pts			Stop 2.405 GHz
arker	GHZ		091 pts	,		atop 2.403 GHz
Type   Ref	f   Trc	X-value	Y-value	Function	Eun	ction Result
M1	1	2,40204 GHz	-3.37 dBm	- i unction	- Full	CUDII NESUIL
M2	1	2.10201 GHz	-54.26 dBm			
M3	1	2.33303 GHz	-53.15 dBm			
M4	1	2.31708 GHz	-52.25 dBm			
				Measuring		23.04.2019
	11					and the second s

Date: 23.APR.2019 14:17:14



Date: 23.APR.2019 14:15:54



#### **Radiated Band Edge Result**

Note:

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

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:

 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.
 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 (8DPSK mode) emissions are reported.

The spectrum analyzer plots are attached as below.

1GHz.





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

lob No.:	tuv #317					F	Polarizati	on: H	lorizonta	al	
Standard:	FCC (Ban	d Edge)				F	ower So	urce:	AC 120	V/60Hz	
Test item:	Radiation	n Test				C	)ate: 19/0	04/23/			
Temp.( (	C)/Hum.(%)	25 C/58	5 %			Т	ime:				
EUT:	Multimedi	a Speaker				E	Ingineer	Signat	ure: w	ade	
Node:	TX 2402MH	Ηz				C	istance:	3m			
Nodel:	R1080BT										
Manufactu	urer: Edifier	r									
Note:		-									
90.0	dBuV/m										
									limit1:		
80									limit2:		-
-											-
70									********	*******	-
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60 50 40 30 20			, der frederingen open		hypergram and stripped	wohalaartela	inter a free of the second		Vanwork		- - - 0 MHz
60 50 40 30 20 10 0.0 2310.	0.000 Freq.	Reading (dBuV/m)	۲actor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	VHI APA Marina Detector	Height (cm)	Degree (deg.)		
60 50 40 30 20 10 0.0 2310.	0.000 Freq.	Reading	Factor	Result	Limit	Margin	Detector	Height	Degree	2390.	





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

Job No	o.: tuv #316					F	Polarizati	on: \	/ertical		
Standa	ard: FCC (Bar	nd Edge)				F	Power Sc	ource:	AC 120	V/60Hz	
Test it	em: Radiatio	on Test				C	Date: 19/	04/23/			
Temp.	( C)/Hum.(%	) 25 C/5	5 %			Т	ime:				
EUT:	Multimed	lia Speaker				E	Ingineer	Signat	ure: wa	ade	
Mode:	TX 2402N	IHz				C	Distance:	3m			
Model	R1080BT										
Manuf	acturer: Edifie	er									
Note:	0 dBuV/m						_			_	
									limit1:	-	
80									limit2:	_	
70				************	*******					******	
60											
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	2310.000									2390.0	MHZ
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	2376.017	44.58	-6.38	38.20	74.00	-35.80	peak	_			
2	2376.017	34.66	-6.38	28.28	54.00	-25.72	AVG				





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

ob No.	: tuv #324					F	Polarizati	on: H	Horizont	al
tandar	rd: FCC (Bar	nd Edge)				F	ower Sc	ource:	AC 120	0V/60Hz
est ite	m: Radiatio	n Test				C	Date: 19/	04/23/		
emp.(	C)/Hum.(%	) 25 C/5	5 %			Т	ime:			
UT:	Multimed	lia Speaker				E	Ingineer	Signat	ure: w	ade
lode:	TX 2480M	Hz				, C	Distance:	3m		
lodel:	R1080BT									
lanufa	cturer: Edifie	er								
lote:										
90.0	dBu¥/m									
									limit1:	
									limit2:	
80										
								******		
80 70										
70 60										
70										
70 60									limit2:	
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70 60 50 40 30 20 10 0.0	183.500	Janahan huikun	terne og for for for						limit2:	
70 60 50 40 30 20 10 0.0	183.500						w		limit2:	
70 60 50 40 30 20 10 0.0		Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	hargin (dB)	Detector	-v/imu-alua Height (cm)	limit2:	
70 60 50 20 10 0.0 24	183.500 Freq.	Reading	Factor	Result	Limit	Margin		Height	Limit2:	2500.0 MHz





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

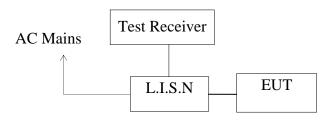
ob No.: tuv #323				F	Polarizatio	on: \	/ertical		
Standard: FCC (Ba	nd Edge)			F	Power So	urce:	AC 120	V/60Hz	(c)
est item: Radiati	on Test			C	Date: 19/0	04/23/			
emp.( C)/Hum.(%	6) 25 C / 55 %			Т	ime:				
EUT: Multime	dia Speaker			E	ngineer	Signat	ure: w	ade	
Node: TX 2480	ИНz			C	)istance:	3m			
Nodel: R1080BT	54 C								
Anufacturer: Edif	er								
lote:									
90.0 dBuV/m									-
							limit1: limit2:		
							mmz.		
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									-
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70 60 50 40 30 20 10 0.0	Reading Factor (dBuV/m) (dB)	Result (dBuV/m)	յուսվորհայտունը Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)		
70 60 50 40 30 20 10 0.0 2483.500 Freq.	Reading Factor (dBuV/m) (dB)	Result	Limit	Margin		Height	Degree	2500	



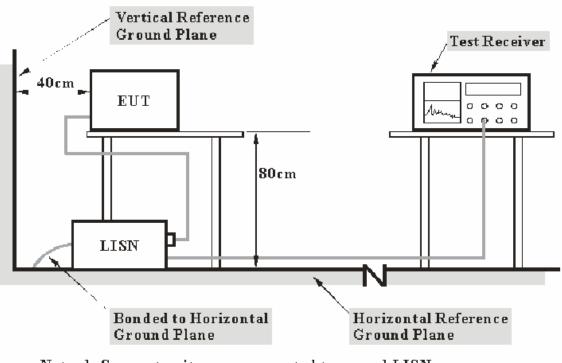
# **13.AC POWER LINE CONDUCTED EMISSION TEST**

## 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



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



Frequency	Conducted L	Conducted Limit 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	ncies.					
NOTE2: The limit decrease	s linearly with the logarithm of	the frequency in the range					
0.15MHz to 0.50	MHz.						

## 13.2.Power Line Conducted Emission Test Limits

# 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 six (6) 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.

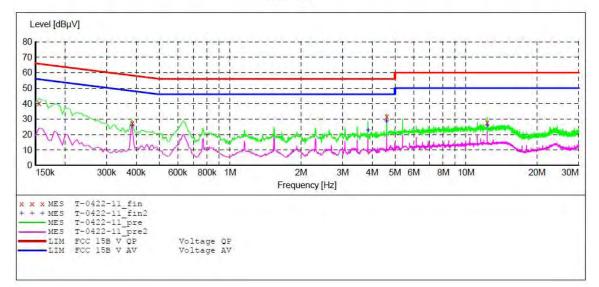


#### CONDUCTED EMISSION STANDARD FCC PART 15 C

EUT:Multimedia Speaker M/N:R1080BTManufacturer:EdifierOperating Condition:Bluetooth CommunicationTest Site:1#Shielding RoomOperator:WADETest Specification:L 120V/60HzComment:Mains portStart of Test:4/22/2019 /

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

Short Desc	ription:	S	UB STD VTE	RM2 1.70			
Start Frequency	Stop Frequency	and the second sec	Detector	Meas. Time	IF Bandw.	Transducer	
9.0 kHz	150.0 kHz	100.0 Hz	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: "T-0422-11 fin"

4/22/2019 Level Transd Limit Margin Detector Line Frequency PE dB MHz dBµV dBµV dB 40.40 0.155000 10.5 25.3 66 QP L1 GND QP 0.385000 27.30 10.7 58 30.9 L1 GND 4.610000 31.60 11.1 56 24.4 L1 GND QP 12.295000 27.90 11.3 60 32.1 QP L1 GND

#### MEASUREMENT RESULT: "T-0422-11 fin2"

4/22/2019 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.385000	25.60	10.7	48	22.6	AV	L1	GND
3.840000	22.80	11.1	46	23.2	AV	L1	GND
4.610000	28.50	11.1	46	17.5	AV	L1	GND
12.295000	25.80	11.3	50	24.2	AV	L1	GND

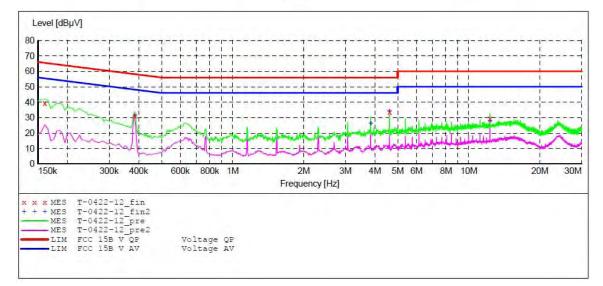


#### CONDUCTED EMISSION STANDARD FCC PART 15 C

EUT:Multimedia Speaker M/N:R1080BTManufacturer:EdifierOperating Condition:Bluetooth CommunicationTest Site:1#Shielding RoomOperator:WADETest Specification:N 120V/60HzComment:Mains portStart of Test:4/22/2019 /

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

Short Desc		· · · · · · · · · · · · · · · · · · ·	UB_STD_VTE			
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	NSLK8126 2008
			Average			
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	NSLK8126 2008
			Average			



#### MEASUREMENT RESULT: "T-0422-12 fin"

4/22/2019 Frequency Level Transd Limit Margin Detector Line PE MHz dBµV dB dBµV dB 0.160000 39.60 10.5 66 25.9 QP GND Ν 27.0 QP 0.385000 31.20 10.7 58 GND N 22.5 4.610000 33.50 11.1 56 QP Ν GND 12.295000 29.20 11.3 30.8 60 OP Ν GND

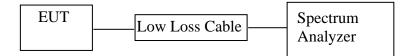
#### MEASUREMENT RESULT: "T-0422-12 fin2"

4/22/2019 Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.385000	30.80	10.7	48	17.4	AV	N	GND
3.840000	26.30	11.1	46	19.7	AV	N	GND
4.610000	33.80	11.1	46	12.2	AV	N	GND
12.295000	27.90	11.3	50	22.1	AV	N	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 13.1.
- 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 Cha	nnel		
Spectrum						
Ref Level 10	.00 dBm	n Offset 10.00 dB (	● RBW 100 kHz			•
Att	20 dE	3 <b>SWT</b> 265 ms (	● <b>VBW</b> 300 kHz	Mode Auto Sv	veep	
∋1Pk Max						
M1				M4[1]		-50.33 dBm
0 dBm						19.4320 GHz -0.79 dBm
				M1[1]		2.3860 GHz
-10 dBm						2.0000 0112
-20 dBm						
-20 uBill						
-30 dBm						
-40 dBm						
		M2		M3	M4	
-50 dBm	ويسمله والمسرية	and about a second areas	man man man	www.www.	wwwwwww	men humphonymeth
-50 dBm		de frank in				
-70 dBm						
-80 dBm						
Start 30.0 MH	lz		691 pts	;		Stop 26.5 GHz
Marker						
	Trc	X-value	Y-value	Function	Fun	ction Result
M1 M2	1	2.386 GHz 6.906 GHz	-0.79 dBm -50.36 dBm			
M2 M3	1	16.138 GHz	-50.36 dBm			
M4	1	19.432 GHz	-50.33 dBm			
1	ſ			Monomiero		23.04.2019

Date: 23.APR.2019 14:26:52

### Middle Channel

Spectrum	J									
Ref Level	10.00 0	dBm Offset 10	0.00 dB 🧉	RBW 100 kH	z					
Att	20	dB SWT	265 ms 🧉	<b>VBW</b> 300 kH	z	Mode Auto	Sweep	o		
●1Pk Max										
M1						M4[1]				-49.85 dBm
0 dBm										16.6360 GHz
o ubiii						M1[1]				1.73 dBm
-10 dBm								1		2.4240 GHz
-20 dBm										
-30 dBm										
-40 dBm										
-50 dBm		M2/13				M4				
-SO dBill	a long here	mounther	M. Northum	manum	unon	mound	how	maturally	mm	munim
-60 dBm	· ·		•							
-70 dBm										
-80 dBm										
Start 30.0	MHz			691	pts				Sto	pp 26.5 GHz
Marker										
Type Ref	Trc	X-value	•	Y-value		Function		Fun	ction Resu	ılt 🛛
M1	1		24 GHz	1.73 dB						
M2	1		23 GHz	-51.68 dB			_			
M3	1		44 GHz	-51.40 dB			_			
M4	1	16.6	36 GHz	-49.85 dB	m					
	$\mathbf{n}$					Measurin	g		4,40	23.04.2019
						,				

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## High Channel

			111	ign Ch	annei		
Spectrum							
Ref Level 10	0.00 di	3m Offset 10.0	0 dB 🔵 RBW	' 100 kHz			
Att	20		5 ms 🕳 VBW		Mode Auto St	weep	
1Pk Max						F	
-					M4[1]		-49.68 dBr
M1							16.0610 GH
0 dBm					M1[1]		1.44 dBr
-10 dBm							2.4620 GH
-10 ubin							
-20 dBm							
-30 dBm							
-40 dBm							
		M3			M4		
-50 dBm		moundary .		A superior align	1 monder and	which maker my	manuful manufacture
-60 dBm	harris	· · · · · · · · · · · · · · · · · · ·	- and a second and a second				
-60 aBm							
-70 dBm							
, o abin							
-80 dBm							
Start 30.0 Mi	LI-7			691 pt:			Stop 26.5 GHz
larker	112			091 pt.	•		3100 20.3 4112
	Trc	X-value	v	value	Function	<b>г</b> .,	nction Result
Type Ref M1	1	2.462		1.44 dBm	Function	Fu Fu	nction Result
M2	1	2.654		48.54 dBm			
M3	1	6.791		50.64 dBm			
M4	1	16.061		49.68 dBm			
	1				Monsuring		23.04.2019
					neasuning.		a specific sectors and a sector se

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### 8DPSK mode

### Low Channel

Cu a atur ura						Ē
Spectrum						
Ref Level 1			🔵 RBW 100 kHz			
Att	20 d	iB <b>SWT</b> 265 ms	🔵 VBW 300 kHz	Mode Auto St	weep	
∋1Pk Max						
				M4[1]		-49.52 dBn
0 dBm <u>M1</u>						16.0610 GH:
T T T				M1[1]		-3.14 dBn
-10 dBm						2.3860 GH
-20 dBm						
-30 dBm						
-40 dBm						
-40 ubiii		мз		M4		
-50 dBm		IVI3		X	worked when when we want the second s	month marine a such ballow me
menorthe	Jul market	many many many ment	ounder allower work	mound	we want - com	monum
-60 dBm						
-70 dBm						
-80 dBm						
Start 30.0 M	Hz		691 pts	:		Stop 26.5 GHz
Marker						
	Trc	X-value	Y-value	Function	Fun	ction Result
M1	1	2.386 GHz	-3.14 dBm			
M2	1	2.539 GHz	-51.70 dBm			
M3 M4	1	6.829 GHz 16.061 GHz	-50.82 dBm -49.52 dBm			
1914	1 I	10.001 GH2	-49.52 UBIN	<u></u>	1	
				Measuring.		23.04.2019

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#### Middle Channel

				Minuale (	Juannei				
Spectrum									
Ref Level 🔅	10.00 c	Bm Offset	10.00 dB	RBW 100 kHz	1				
Att	20	dB SWT		🖷 VBW 300 kHz		o Sweep			
●1Pk Max						· · F			
					M4[1	1			-50.12 dBn
M1						-u			19.3560 GH
0 dBm					M1[1	1			-1.55 dBn
-10 dBm									2.4240 GH
-10 UBIII									
-20 dBm									
20 02									
-30 dBm									
-40 dBm									
		M2				MЗ	M4		
-50 dBm		y money	وريان المرار	warman	el mount	Musher	netwood	homen	mont
-60 dBm	di	~ `	and when we						
-00 ubiii									
-70 dBm									
-80 dBm									
Start 30.0 M	4Hz			691 (	ots			Ste	op 26.5 GHz
Marker				•					•
Type   Ref	Trc	X-va	lue	Y-value	Functio	n	Fu	nction Resu	ılt
M1	1		2.424 GHz	-1.55 dBr					
M2	1		6.791 GHz	-50.46 dBr					
MЗ	1		8.015 GHz	-49.87 dBr					
M4	1	19	9.356 GHz	-50.12 dBr	n				
					Measu	ing		144	23.04.2019
					Measu	'ing		100	

Date: 23.APR.2019 14:35:19

# High Channel

Spectrum Ref Level 1										
Ref Level 1									₩	
	10.00 de	m Offset 10	).00 dB	RBW 100 kHz						
Att	20 dB 🛚 SWT 🛛 265 ms 👄 VBW 300 kHz 🛛 Mode Auto Sweep									
)1Pk Max										
					M4[1]			-49.25 dBm		
D dBm 🛄					M1[1]			18.0920 GHz -2.27 dBm		
Y UDINI										
-10 dBm								2.4620 GHz		
-20 dBm 🕂										
-30 dBm										
-40 dBm						M4				
-50 dBm 🕂		M3				•				
1	and man	whow de labour	June-ul	when manufactures	nowan	www.w	ohnowith	mounder	rowner	
-60 dBm										
-70 dBm —									-	
-80 dBm										
Start 30.0 M	/IHz			s	Stop 26.5 GHz					
1arker										
Type   Ref	Trc	X-value		Y-value	Function		Function Result			
M1	1	2.462 GHz		-2.27 dBm						
M2	1	2.654 GHz		-52.24 dBm						
M3 M4	-	1 6.638 GH		-50.95 dBm						
1714		18.09	92 GHZ	-49.25 dBm						
	Л				Measurin	10		1,70	23.04.2019	

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# **15.ANTENNA REQUIREMENT**

### 15.1.The Requirement

According to Section 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 2.59dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203 and RSS GEN 6.8.

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