

Page 1 of 76

APPLICATION CERTIFICATION FCC Part 15C On Behalf of SHENZHEN SHENGLAI TECHNOLOGY CO., LIMITED

Bluetooth Earphones Model No.: 40012BT

FCC ID: 2AL9B-40012BT

Prepared for

SHENZHEN SHENGLAI TECHNOLOGY CO., LIMITED Address ROOM 709, BLOCK B, XINTIAN CENTURY BUSINESS

CENTRE, FUMING ROAD, FUTIAN DISTRICT, SHENZHEN,

CHINA

Prepared by

Shenzhen Accurate Technology Co., Ltd.

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Report No. ATE20180396

Date of Test March 21-March 23, 2018

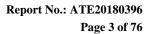
Date of Report March 24, 2018



Page 2 of 76

TABLE OF CONTENTS

Descri	ption	Page
Tost D	eport Certification	
	_	•
	OF CONTENTS	
1. GI	ENERAL INFORMATION	5
1.1.	Description of Device (EUT)	
1.2.	Accessory and Auxiliary Equipment	
1.3.	Description of Test Facility	
1.4.	Measurement Uncertainty	
2. M	EASURING DEVICE AND TEST EQUIPMENT	7
3. Ol	PERATION OF EUT DURING TESTING	8
3.1.	Operating Mode	
3.2.	Configuration and peripherals	8
4. TI	EST PROCEDURES AND RESULTS	9
5. 20	DB BANDWIDTH TEST	10
5.1.	Block Diagram of Test Setup	
5.2.	The Requirement For Section 15.247(a)(1)	
5.3.	EUT Configuration on Measurement	
5.4.	Operating Condition of EUT	
5.5.	Test Procedure	
5.6.	Test Result	
	ARRIER FREQUENCY SEPARATION TEST	
6.1.	Block Diagram of Test Setup	
6.2.	The Requirement For Section 15.247(a)(1)	
6.3. 6.4.	EUT Configuration on Measurement	
6.5.	Test Procedure	
6.6.	Test Result	
	UMBER OF HOPPING FREQUENCY TEST	
7.1.	Block Diagram of Test Setup	
7.2.	The Requirement For Section 15.247(a)(1)(iii)	23
7.3.	EUT Configuration on Measurement	
7.4.	Operating Condition of EUT	
7.5.	Test Procedure	23
7.6.	Test Result	24
8. DV	WELL TIME TEST	26
8.1.	Block Diagram of Test Setup	
8.2.	The Requirement For Section 15.247(a)(1)(iii)	
8.3.	EUT Configuration on Measurement	
8.4.	Operating Condition of EUT	
8.5.	Test Procedure	
8.6.	Test Result	
	AXIMUM PEAK OUTPUT POWER TEST	
9.1.	Block Diagram of Test Setup	33





9.2.	The Requirement For Section 15.247(b)(1)	33
9.3.	EUT Configuration on Measurement	33
9.4.	Operating Condition of EUT	
9.5.	Test Procedure	33
9.6.	Test Result	34
10. RA	ADIATED EMISSION TEST	40
10.1.	Block Diagram of Test Setup	40
10.2.	The Limit For Section 15.247(d)	
10.3.	Restricted bands of operation	42
10.4.	Configuration of EUT on Measurement	
10.5.	Operating Condition of EUT	43
10.6.	Test Procedure	43
10.7.	Data Sample	44
10.8.	The Field Strength of Radiation Emission Measurement Results	44
11. BA	ND EDGE COMPLIANCE TEST	57
11.1.	Block Diagram of Test Setup	57
11.2.	The Requirement For Section 15.247(d)	
11.3.	EUT Configuration on Measurement	
11.4.	Operating Condition of EUT	57
11.5.	Test Procedure	58
11.6.	Test Result	58
12. AC	POWER LINE CONDUCTED EMISSION FOR FCC PART 15 SECTION 1	5.207(A)69
12.1.	Block Diagram of Test Setup	69
12.2.	Power Line Conducted Emission Measurement Limits	
12.3.	Configuration of EUT on Measurement	70
12.4.	Operating Condition of EUT	
12.5.	Test Procedure	70
12.6.	Data Sample	71
12.7.	Power Line Conducted Emission Measurement Results	71
13. AN	TENNA REQUIREMENT	76
13.1.	The Requirement	
13.2.	Antenna Construction	



Page 4 of 76

Test Report Certification

Applicant : SHENZHEN SHENGLAI TECHNOLOGY CO., LIMITED

Manufacturer : SHENZHEN SHENGLAI TECHNOLOGY CO., LIMITED

EUT Description : Bluetooth Earphones

Model No. : 40012BT

Brand Name : N/A

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2018 ANSI C63.10: 2013

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

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

Date of Test:	March 21-March 23, 2018
Date of Report:	March 24, 2018
Test Engineer:	Star Yang
	(Star Yang, Engineer)
Prepared by:	STECHNOLOGICAL TOP TO THE PARTY OF THE PARTY
Approved & Authorized Signer:	(St. Approved Approve
11	(Sean Liu, Manager)



Page 5 of 76

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

Model Number : 40012BT

Bluetooth version : V 4.2

Frequency Range : 2402MHz-2480MHz

Number of Channels : 79

Antenna Gain(Max) : 0dBi

Antenna type : PCB antenna

Adapter Input Voltage : DC 3.7V (Powered by Lithium battery) or

DC 5V (Powered by USB port)

Modulation mode : GFSK, π /4 DQPSK, 8DPSK

Hardware version : V1.2

Software version : V027

Applicant : SHENZHEN SHENGLAI TECHNOLOGY CO.,

LIMITED

Address : ROOM 709, BLOCK B, XINTIAN CENTURY

BUSINESS CENTRE, FUMING ROAD, FUTIAN

DISTRICT, SHENZHEN, CHINA

Manufacturer : SHENZHEN SHENGLAI TECHNOLOGY CO.,

LIMITED

Address : ROOM 709, BLOCK B, XINTIAN CENTURY

BUSINESS CENTRE, FUMING ROAD, FUTIAN

DISTRICT, SHENZHEN, CHINA

1.2. Accessory and Auxiliary Equipment

AC/DC Power Adapter	:	Model:TEKA006-0501000UKU
(provided by laboratory)		Input: 100-240V~50/60Hz 0.3A
		Output: DC 5V/1A



Page 6 of 76

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 . Shenzhen Accurate Technology Co., Ltd.

Site Location . 1/F., Building A, Changyuan New Material Port, Science

& Industry Park, Nanshan District, Shenzhen, Guangdong,

P.R. China

1.4. Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty = 3.08dB, k=2

(9kHz-30MHz)

Radiated emission expanded uncertainty = 4.42dB, k=2

(30MHz-1000MHz)

Radiated emission expanded uncertainty = 4.06dB, k=2

(Above 1GHz)



Page 7 of 76



2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Туре	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 06, 2018	1 Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 06, 2018	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 06, 2018	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 06, 2018	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 06, 2018	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 06, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 06, 2018	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 06, 2018	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 06, 2018	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 06, 2018	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10S S	N/A	Jan. 06, 2018	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2 375/2510-60/11SS	N/A	Jan. 06, 2018	1 Year
RF COAXIAL CABLE	SUHNER	N-5m(Frequency range:9KHz-26.5GHz)	NO.3	Jan. 06, 2018	1 Year
RF COAXIAL CABLE	SUHNER	N-5m(Frequency range:9KHz-26.5GHz)	NO.4	Jan. 06, 2018	1 Year
RF COAXIAL CABLE	SUHNER	N-1m(Frequency range:9KHz-26.5GHz)	NO.5	Jan. 06, 2018	1 Year
RF COAXIAL CABLE	SUHNER	N-1m(Frequency range:9KHz-26.5GHz)	NO.6	Jan. 06, 2018	1 Year
Temporary antenna connector	NTGS	14AE	N/A	March 21, 2018	N/A

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.



Page 8 of 76



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

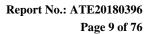
Note: The equipment under test (EUT) was tested under fully-charged battery.

The Bluetooth has been tested under continuous transmission mode.

3.2. Configuration and peripherals

EUT

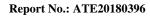
Figure 1 Setup: Transmitting mode





4. TEST PROCEDURES AND RESULTS

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

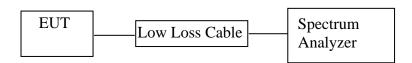


Page 10 of 76



5. 20DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



(EUT: Bluetooth Earphones)

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

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

5.3.EUT Configuration on Measurement

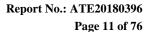
The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4. Operating Condition of EUT

- 5.4.1. Setup the EUT and simulator as shown as Section 5.1.
- 5.4.2. Turn on the power of all equipment.
- 5.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

5.5.Test Procedure

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





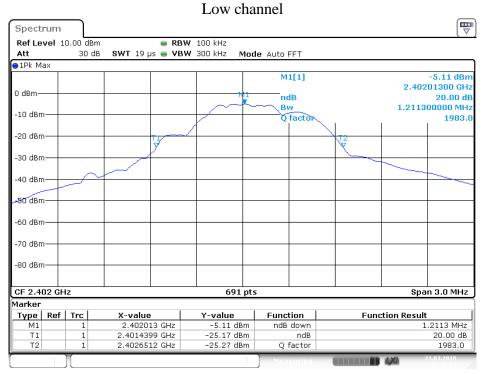
5.6.Test Result

Test Lab: Shielding room Test Engineer: Star

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	∏/4-DQPSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	1.211	1.350	1.368	Pass
Middle	2441	1.316	1.398	1.441	Pass
High	2480	1.329	1.411	1.433	Pass

The spectrum analyzer plots are attached as below.

GFSK Mode

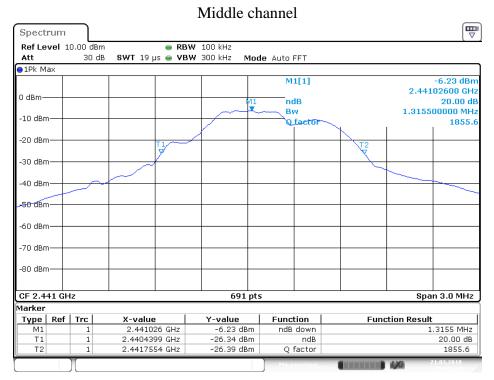


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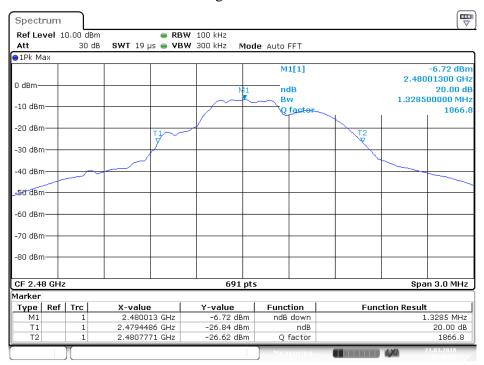


Page 12 of 76



Date: 21.MAR.2018 15:48:25

High channel

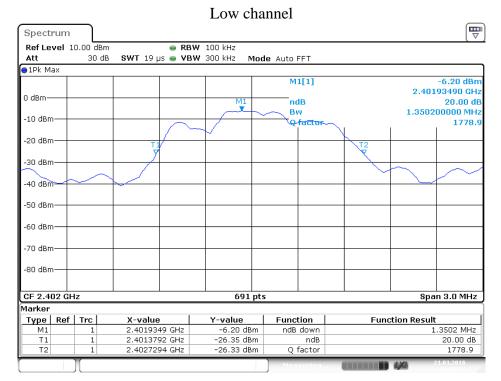


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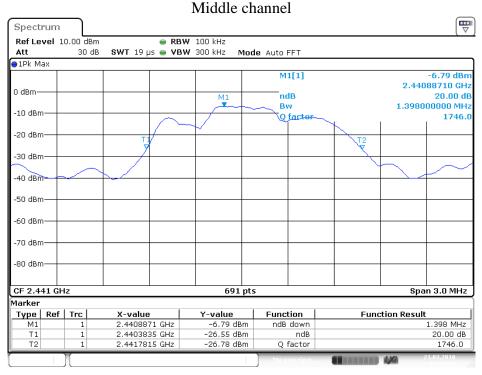
Page 13 of 76



∏/4-DQPSK Mode



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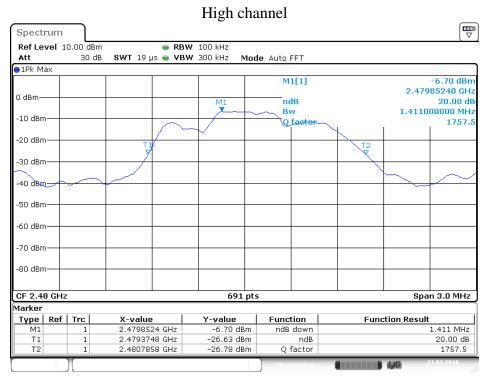


Date: 21.MAR.2018 15:50:03



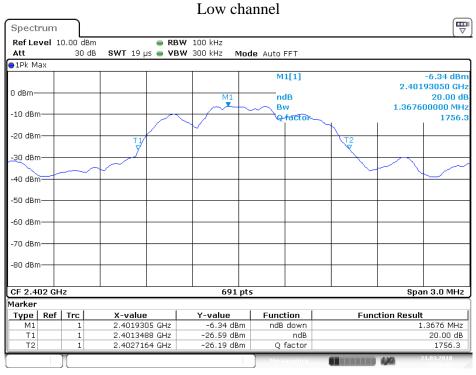


Page 14 of 76



Date: 21.MAR.2018 15:49:16

8DPSK Mode

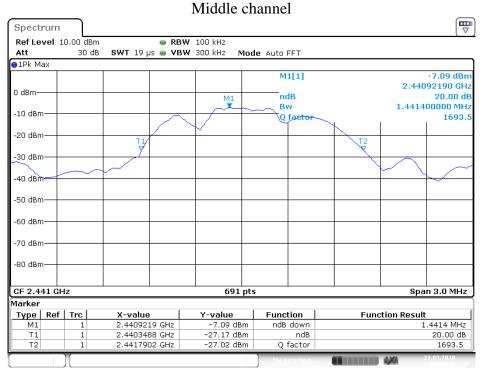


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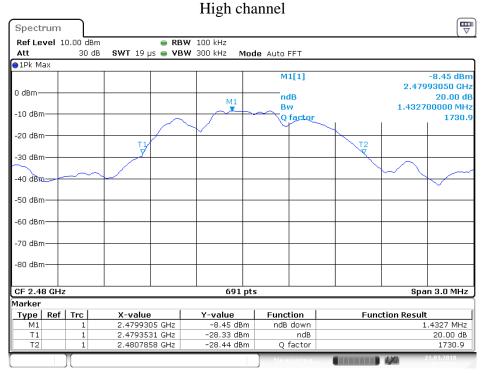




Page 15 of 76



Date: 21.MAR.2018 15:51:31



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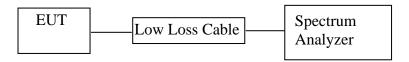


Page 16 of 76



6. CARRIER FREQUENCY SEPARATION TEST

6.1.Block Diagram of Test Setup



(EUT: Bluetooth Earphones)

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

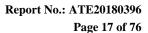
Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

6.3.EUT Configuration on Measurement

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

6.4. Operating Condition of EUT

- 6.4.1. Setup the EUT and simulator as shown as Section 6.1.
- 6.4.2. Turn on the power of all equipment.
- 6.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.





6.5. Test Procedure

- 6.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 6.5.2.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz. Adjust Span to 2MHz.
- 6.5.3.Set the adjacent channel of the EUT Maxhold another trace.
- 6.5.4. Measurement the channel separation

6.6.Test Result

Test Lab: Shielding room Test Engineer: Star

GFSK

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

$\Pi/4$ -DQPSK

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

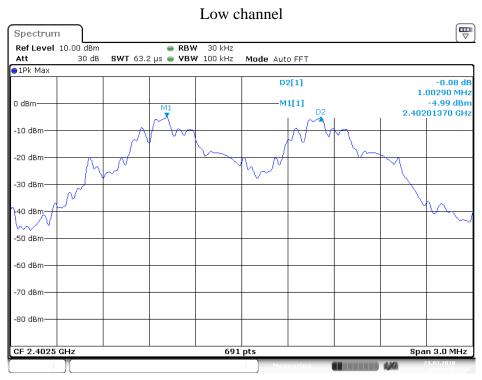
8DPSK

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

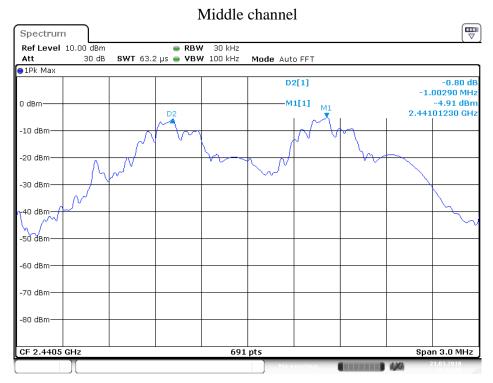
Page 18 of 76



GFSK Mode



Date: 21.MAR.2018 15:37:10



Date: 21.MAR.2018 15:36:30



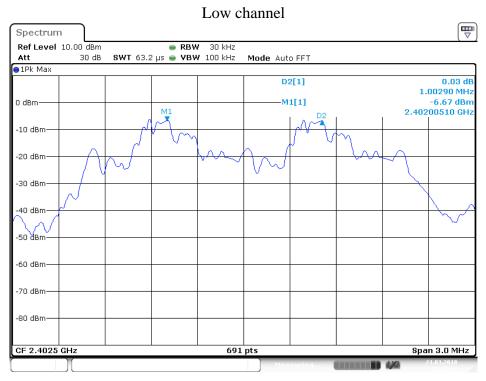
Page 19 of 76



High channel Spectrum **● RBW** 30 kHz **SWT** 63.2 µs **● VBW** 100 kHz Ref Level 10.00 dBm Att 30 dB Mode Auto FFT Att ●1Pk Ma× -0.24 dB -1.00290 MHz -5.32 dBm D2[1] 0 dBm M1[1] 2.48001230 GHz -10 dBm -20 dBm -30 dBm 40 dBm -50 dBm -60 dBm -70 dBm -80 dBm-Span 3.0 MHz CF 2.4795 GHz 691 pts

Date: 21.MAR.2018 15:35:32

$\Pi/4$ -DQPSK Mode

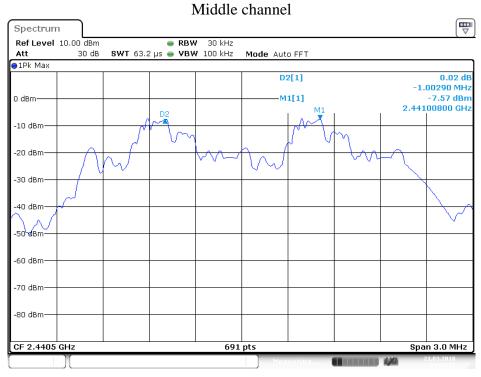


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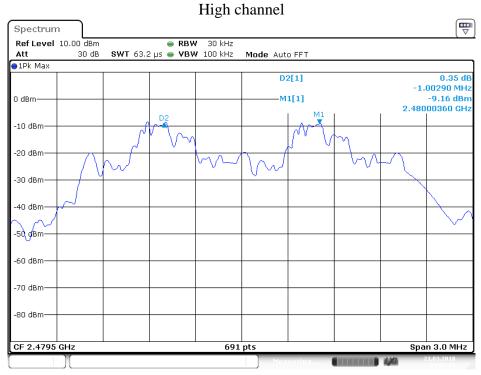




Page 20 of 76



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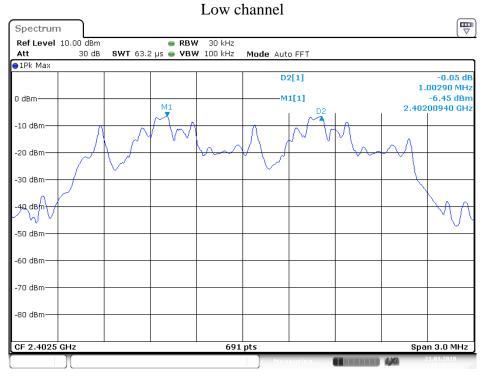


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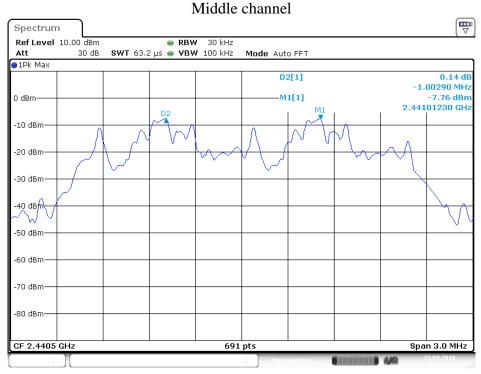
Page 21 of 76



8DPSK Mode



Date: 21.MAR.2018 15:46:23



Date: 21.MAR.2018 15:45:20

Page 22 of 76



High channel Spectrum Ref Level 10.00 dBm Att 30 dB ● RBW 30 kHz SWT 63.2 µs ● VBW 100 kHz Att Mode Auto FFT ●1Pk Max -0.02 dB -1.00290 MHz -9.04 dBm 2.48000360 GHz D2[1] 0 dBm-M1[1] -10 dBm -20 dBm--30 dBm -50 dBm -60 dBm -70 dBm -80 dBm

691 pts

Date: 21.MAR.2018 15:44:20

CF 2.4795 GHz

Span 3.0 MHz

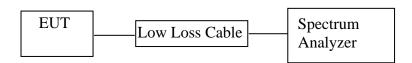


Page 23 of 76



7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Block Diagram of Test Setup



(EUT: Bluetooth Earphones)

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

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

7.3.EUT Configuration on Measurement

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

7.4. Operating Condition of EUT

- 7.4.1. Setup the EUT and simulator as shown as Section 7.1.
- 7.4.2. Turn on the power of all equipment.
- 7.4.3.Let the EUT work in TX (Hopping on) modes measure it.

7.5.Test Procedure

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



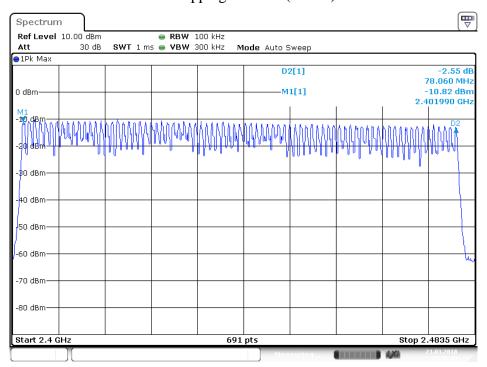
Page 24 of 76

7.6.Test Result

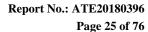
Test Lab: Shielding room Test Engineer: Star

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

Number of hopping channels(GFSK)

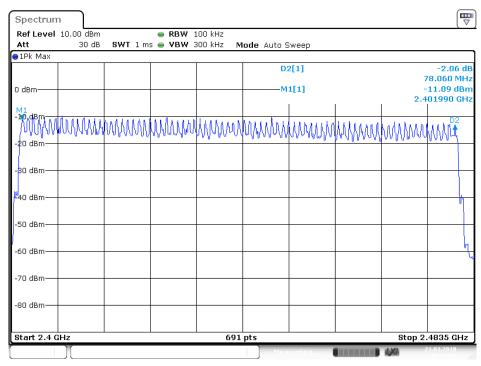


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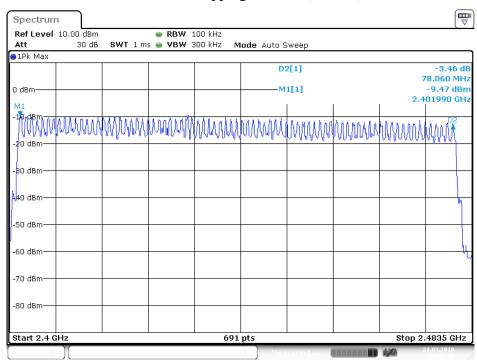


Number of hopping channels($\Pi/4$ -DQPSK)



Date: 21.MAR.2018 15:57:07

Number of hopping channels(8DPSK)



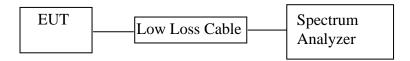
Date: 21.MAR.2018 15:58:36



Page 26 of 76

8. DWELL TIME TEST

8.1.Block Diagram of Test Setup



(EUT: Bluetooth Earphones)

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

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

8.3.EUT Configuration on Measurement

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

8.4. Operating Condition of EUT

- 8.4.1. Setup the EUT and simulator as shown as Section 8.1.
- 8.4.2. Turn on the power of all equipment.
- 8.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

8.5.Test Procedure

- 8.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 8.5.2.Set center frequency of spectrum analyzer = operating frequency.
- 8.5.3.Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=5ms, 10ms, 15ms. Get the pulse time.
- 8.5.4.Repeat above procedures until all frequency measured were complete.



Page 27 of 76

8.6.Test Result

Test Lab: Shielding room Test Engineer: Star

GFSK Mode (Worst case)

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)	
DH1	2441	0.514	164.48	400	
A period to	A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2*79)) \times 31.6$				
DH3	2441	1.790	286.40	400	
A period to	ransmit time = 0.4×79 =	31.6 Dwell time = pt	ulse time \times (1600/(4*'	79))×31.6	
DH5	2441	3.051	325.44	400	
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$					

$\Pi/4$ -DQPSK (Worst case)

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)	
DH1	2441	0.522	167.04	400	
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2*79)) \times 31.6$				79))×31.6	
DH3	2441	1.783	285.28	400	
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4*79)) \times 31.6$			79))×31.6		
DH5	2441	3.065	326.93	400	
A period to	ransmit time = $0.4 \times 79 =$	31.6 Dwell time = pu	Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$		

8DPSK (Worst case)

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)	
DH1	2441	0.522	167.04	400	
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2*79)) \times 31.6$				79))×31.6	
DH3	2441	1.797	287.52	400	
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4*79)) \times 31.6$				79))×31.6	
DH5	2441	3.036	323.84	400	
A period to	ransmit time = $0.4 \times 79 =$	31.6 Dwell time = pt	Dwell time = pulse time $\times (1600/(6*79)) \times 31.6$		

Note: We tested GFSK mode and $\Pi/4$ -DQPSK & 8DPSK mode the low, middle and high channel and recorded the worst case data for all test mode.

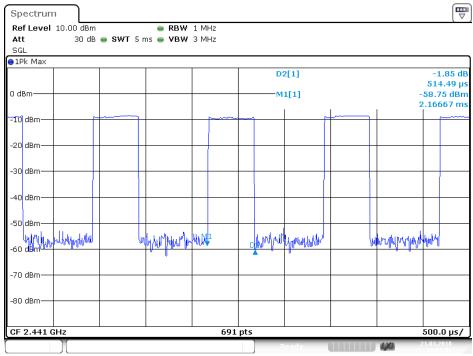
The spectrum analyzer plots are attached as below.

Page 28 of 76



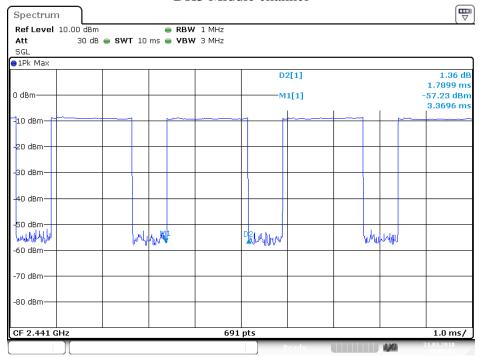
GFSK Mode

DH1 Middle channel



Date: 21.MAR.2018 16:03:42

DH3 Middle channel

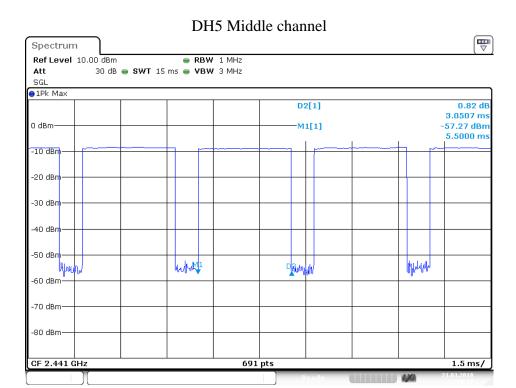


Date: 21.MAR.2018 16:05:13



Page 29 of 76

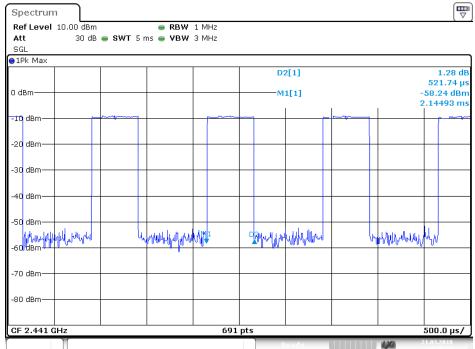




Date: 21.MAR.2018 16:06:28

\prod /4-DQPSK

2DH1 Middle channel

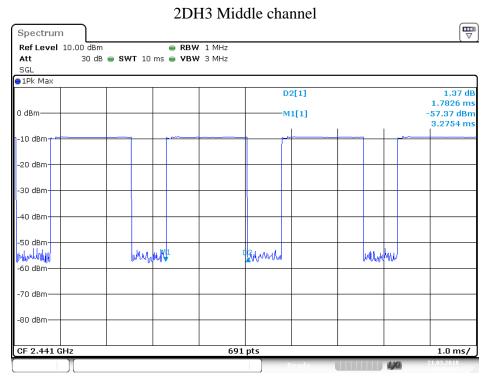


Date: 21.MAR.2018 16:10:20

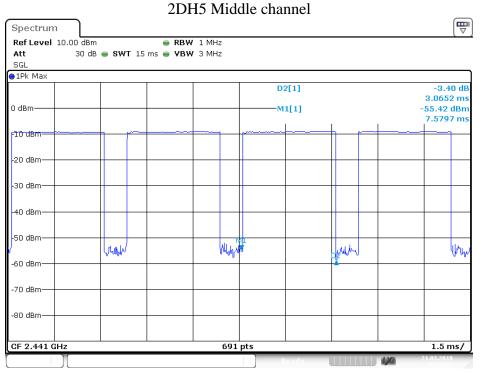




Page 30 of 76



Date: 21.MAR.2018 16:09:34

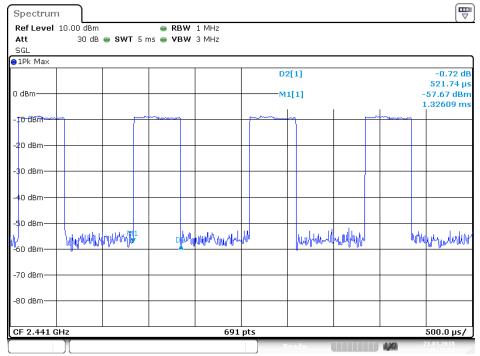


Date: 21.MAR.2018 16:11:24



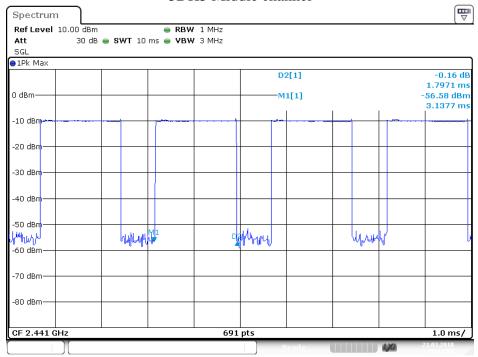
8DPSK

3DH1 Middle channel



Date: 21.MAR.2018 16:12:54

3DH3 Middle channel

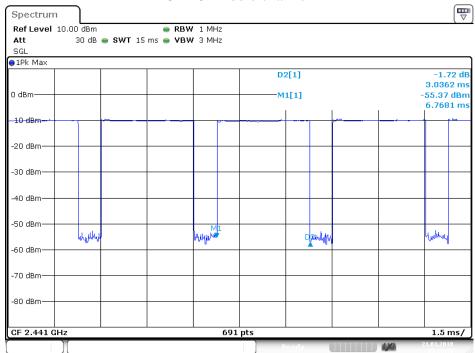


Date: 21.MAR.2018 16:17:55

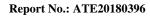


Page 32 of 76

3DH5 Middle channel



Date: 21.MAR.2018 16:19:42



Page 33 of 76



9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Block Diagram of Test Setup



(EUT: Bluetooth Earphones)

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

Section 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

9.3.EUT Configuration on Measurement

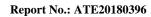
The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.4. Operating Condition of EUT

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

9.5.Test Procedure

- 9.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 9.5.2.Set RBW of spectrum analyzer to 3MHz and VBW to 3MHz.
- 9.5.3. Measurement the maximum peak output power.



Page 34 of 76



9.6.Test Result

Test Lab: Shielding room Test Engineer: Star

GFSK Mode

OI DIL 1110GC			
Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-4.66/0.0003	21 / 0.125
Middle	2441	-4.20/0.0004	21 / 0.125
High	2480	-4.21/0.0004	21 / 0.125

∏/4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-5.38/0.0003	21 / 0.125
Middle	2441	-5.08/0.0003	21 / 0.125
High	2480	-4.83/0.0003	21 / 0.125

8DPSK

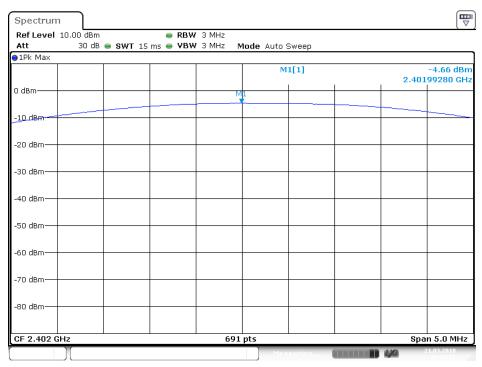
Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	-4.74/0.0003	21 / 0.125
Middle	2441	-4.40/0.0004	21 / 0.125
High	2480	-4.38/0.0004	21 / 0.125

The spectrum analyzer plots are attached as below.

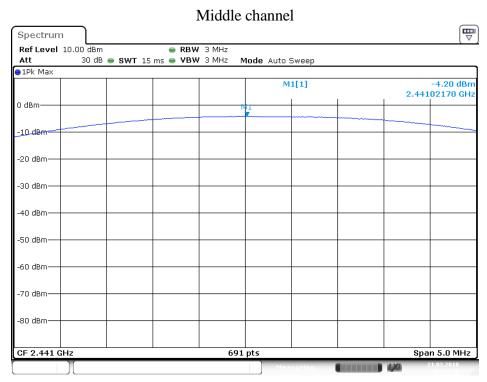


GFSK Mode

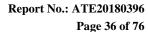
Low channel



Date: 21.MAR.2018 16:33:28

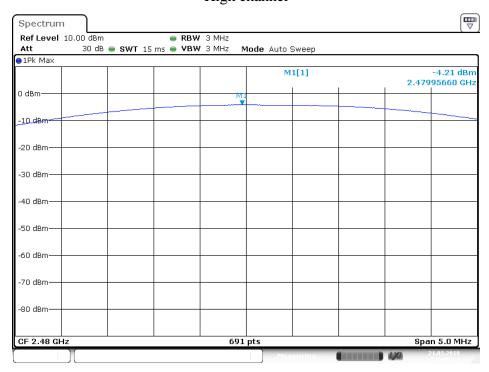


Date: 21.MAR.2018 16:34:30





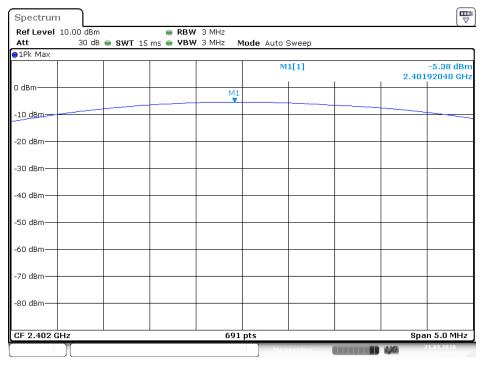
High channel



Date: 21.MAR.2018 16:35:37

$\Pi/4$ -DQPSK Mode

Low channel

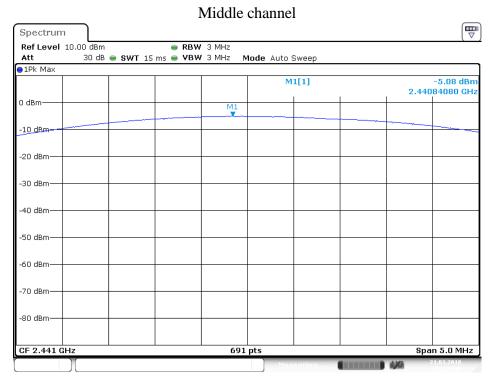


Date: 21.MAR.2018 16:32:24



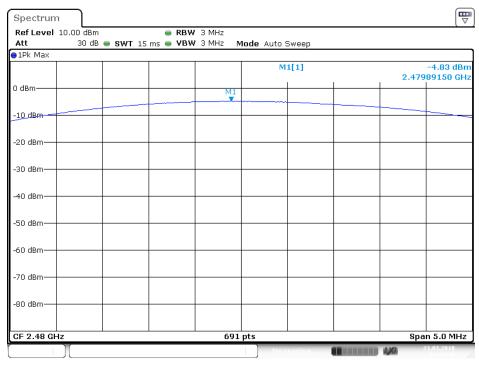


Page 37 of 76



Date: 21.MAR.2018 16:29:46

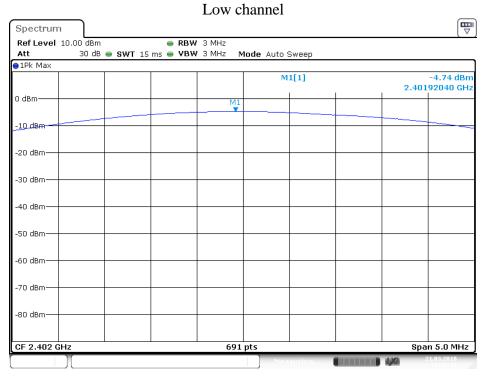
High channel



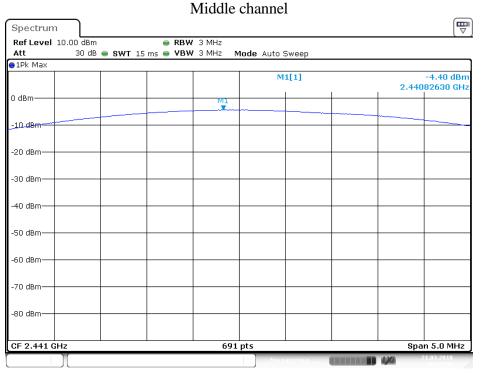
Date: 21.MAR.2018 16:30:48



8DPSK Mode



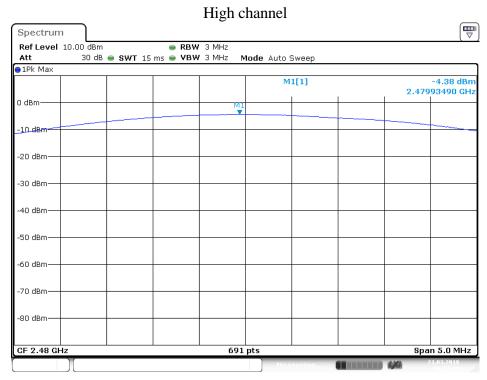
Date: 21.MAR.2018 16:40:08



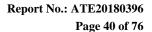
Date: 21.MAR.2018 16:39:08



Page 39 of 76



Date: 21.MAR.2018 16:37:34

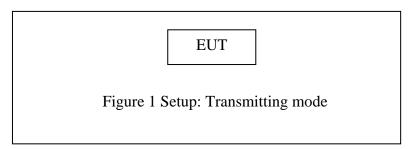




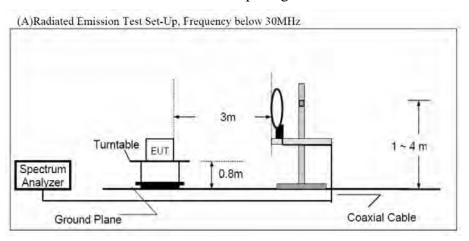
10. RADIATED EMISSION TEST

10.1.Block Diagram of Test Setup

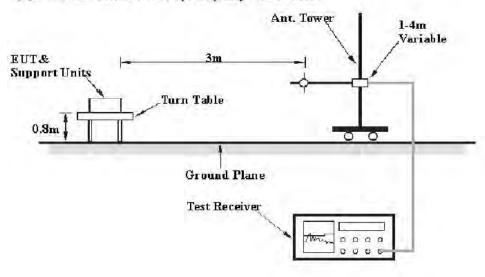
10.1.1.Block diagram of connection between the EUT and peripherals



10.1.2.Semi-Anechoic Chamber Test Setup Diagram

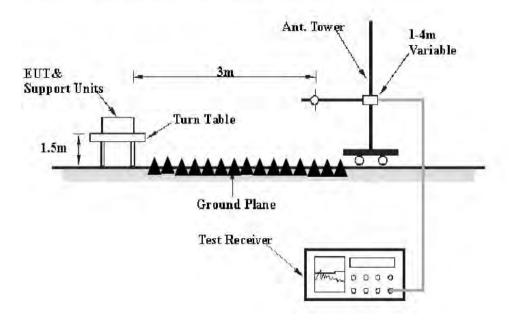


(B)Radiated Emission Test Set-Up, Frequency 30MHz-1GHz





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



10.2. The Limit For Section 15.247(d)

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



Page 42 of 76



10.3.Restricted bands of operation

10.3.1.FCC Part 15.205 Restricted bands of operation

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

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	$\binom{2}{}$
13.36-13.41			

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

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

10.4. Configuration of EUT on Measurement

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

²Above 38.6





Page 43 of 76

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

10.6.Test Procedure

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

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

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



Page 44 of 76

10.7.Data Sample

Frequency	Reading	Factor	Result	Limit	Margin	Remark
(MHz)	(dBµv)	(dB/m)	(dBµv/m)	(dBµv/m)	(dB)	
X.XX	48.69	-13.35	35.34	46	-10.66	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($dB\mu v/m$) = Reading($dB\mu v$) + Factor(dB/m)

Limit $(dB\mu v/m) = Limit$ stated in standard

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

QP = Quasi-peak Reading

Calculation Formula:

 $Margin(dB) = Result (dB\mu V/m)-Limit(dB\mu V/m)$ $Result(dB\mu V/m) = Reading(dB\mu V) + Factor(dB/m)$

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.

10.8. The Field Strength of Radiation Emission Measurement Results

PASS.

Test Lab: 3m Anechoic chamber

Test Engineer: Star

Note: 1.We tested GFSK mode, $\Pi/4$ -DQPSK & 8DPSK Mode and recorded the worst case data (GFSK mode) for all test mode.

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

The spectrum analyzer plots are attached as below.



Page 45 of 76

Below 1GHz



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Job No.: STAR2018 #72

Standard: FCC Class C 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 % EUT: Bluetooth Earphones

Mode: TX 2402MHz (GFSK)

Model: 40012BT

Manufacturer: SHENGLAI

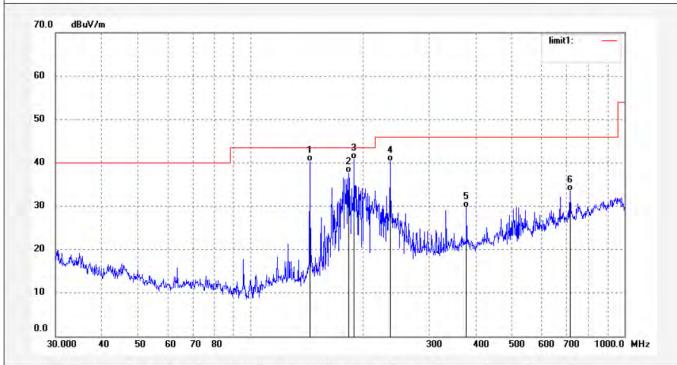
Note: Report No.:ATE20180396

Polarization: Horizontal

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/14/19

Engineer Signature: star



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	143.7760	62.55	-22.20	40.35	43.50	-3.15	QP	771		
2	182.5785	57.72	-20.09	37.63	43.50	-5.87	QP		11.7	
3	189.1076	60.43	-19.52	40.91	43.50	-2.59	QP			
4	235.9622	58.54	-18.28	40.26	46.00	-5.74	QP			
5	377.8481	43.91	-14.16	29.75	46.00	-16.25	QP		1 - 1 -	
6	716.2038	41.05	-7.58	33.47	46.00	-12.53	QP		11	



Page 46 of 76



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Job No.: STAR2018 #71

Standard: FCC Class C 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth Earphones
Mode: TX 2402MHz (GFSK)

Model: 40012BT

Manufacturer: SHENGLAI

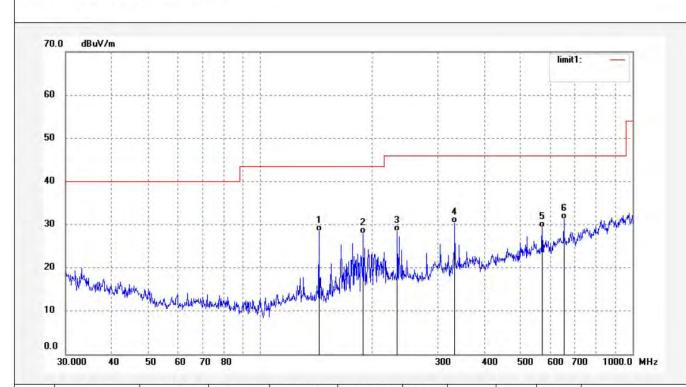
Note: Report No.:ATE20180396

Polarization: Vertical

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/13/09

Engineer Signature: star



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	143.7760	50.68	-22.20	28.48	43.50	-15.02	QP			
2	189.1076	47.38	-19.52	27.86	43.50	-15.64	QP			
3	233.4881	46.79	-18.29	28.50	46.00	-17.50	QP			
4	332.9536	45.59	-15.22	30.37	46.00	-15.63	QP			
5	571.9750	39.81	-10.57	29.24	46.00	-16.76	QP			
6	653.6758	39.95	-8.79	31.16	46.00	-14.84	QP			



Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Page 47 of 76



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Polarization: Horizontal Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/16/32

Engineer Signature: star

Distance: 3m

Job No.: STAR2018 #73

Standard: FCC Class C 3M Radiated

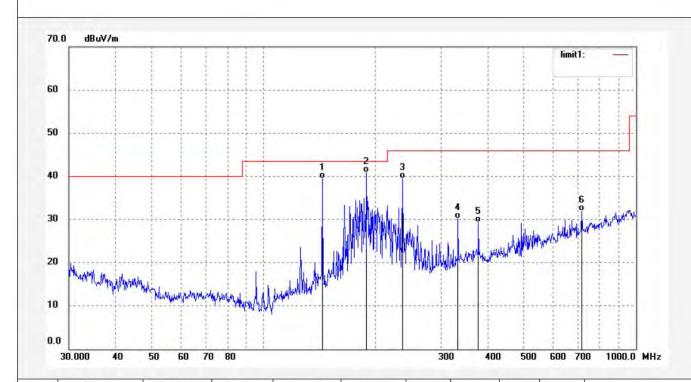
Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 % EUT: Bluetooth Earphones Mode: TX 2441MHz (GFSK)

Model: 40012BT

Manufacturer: SHENGLAI

Note: Report No.:ATE20180396



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	143.7760	61.72	-22.20	39.52	43.50	-3.98	QP			
2	189.1075	60.35	-19.52	40.83	43.50	-2.67	QP			
3	235.9621	57.74	-18.28	39.46	46.00	-6.54	QP			
4	332.9534	45.40	-15.22	30.18	46.00	-15.82	QP			
5	377.8480	43.47	-14.16	29.31	46.00	-16.69	QP			
6	716.2038	39.47	-7.58	31.89	46.00	-14.11	QP			



Page 48 of 76



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Job No.: STAR2018 #74

Standard: FCC Class C 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth Earphones

Mode: TX 2441MHz (GFSK)

Model: 40012BT

Manufacturer: SHENGLAI

Note: Report No.:ATE20180396

Polarization: Vertical

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/17/32

Engineer Signature: star

Distance: 3m

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No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	143.7760	50.52	-22.20	28.32	43.50	-15.18	QP			
2	176.8951	47.45	-20.62	26.83	43.50	-16.67	QP			
3	189.1074	48.40	-19.52	28.88	43.50	-14.62	QP			
4	223.0629	46.70	-18.37	28.33	46.00	-17.67	QP			
5	235.9620	46.08	-18.28	27.80	46.00	-18.20	QP			
6	312.5482	46.41	-15.99	30.42	46.00	-15.58	QP			

70 80

60

10

30.000

600 700

1000.0 MHz



Page 49 of 76



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Job No.: STAR2018 #76

Standard: FCC Class C 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Earphones Mode: TX 2480MHz (GFSK)

Model: 40012BT

Manufacturer: SHENGLAI

Note: Report No.:ATE20180396

Polarization: Horizontal

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/20/07

Engineer Signature: star

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No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	143.7760	61.68	-22.20	39.48	43.50	-4.02	QP			
2	178.7697	56.64	-20.45	36.19	43.50	-7.31	QP			
3	189.1076	59.83	-19.52	40.31	43.50	-3.19	QP		11	
4	235.9622	59.32	-18.28	41.04	46.00	-4.96	QP		11	
5	332.9536	44.52	-15.22	29.30	46.00	-16.70	QP			
6	377.8481	44.05	-14.16	29.89	46.00	-16.11	QP			



Page 50 of 76



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Job No.: STAR2018 #75

Standard: FCC Class C 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 % EUT: Bluetooth Earphones Mode: TX 2480MHz (GFSK)

Model: 40012BT

Manufacturer: SHENGLAI

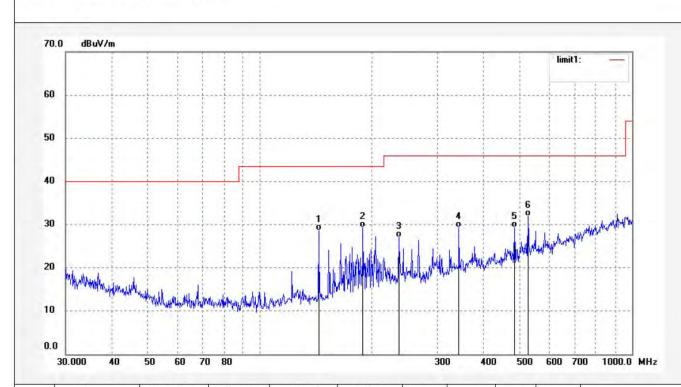
Note: Report No.:ATE20180396

Polarization: Vertical

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/18/21

Engineer Signature: star



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	143.7760	50.77	-22.20	28.57	43.50	-14.93	QP			
2	189.1075	48.75	-19.52	29.23	43.50	-14.27	QP			
3	235.9621	45.29	-18.28	27.01	46.00	-18.99	QP			
4	342.4452	44.24	-14.92	29.32	46.00	-16.68	QP			
5	483.2060	41.68	-12.43	29.25	46.00	-16.75	QP			
6	525.7201	43.58	-11.65	31.93	46.00	-14.07	QP			



Page 51 of 76

Above 1GHz



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Job No.: STAR2018 #78 Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 % EUT: **Bluetooth Earphones** Mode: TX 2402MHz (GFSK)

40012BT Model:

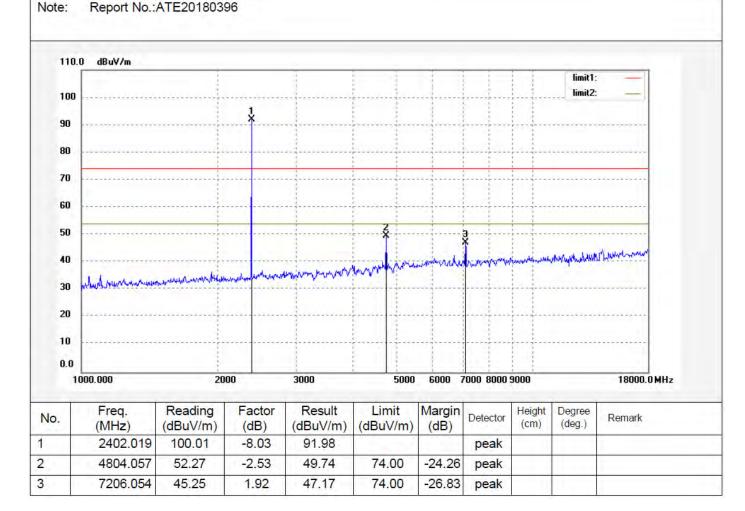
Manufacturer: SHENGLAI

Polarization: Horizontal

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/28/02

Engineer Signature: star





Page 52 of 76



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

Job No.: STAR2018 #77

Standard: FCC PK

Test item: Radiation Test

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

EUT: **Bluetooth Earphones** Mode: TX 2402MHz (GFSK)

Report No.:ATE20180396

Model: 40012BT

Note:

Manufacturer: SHENGLAI

Polarization: Vertical

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/24/47

Engineer Signature: star

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No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.019	105.67	-8.03	97.64			peak			
2	4804.057	47.86	-2.53	45.33	74.00	-28.67	peak			
3	7206.054	43.51	1.92	45.43	74.00	-28.57	peak			



Page 53 of 76



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Job No.: STAR2018 #79 Polarization: Horizontal Standard: FCC PK Power Source: DC 3.7V

Test item: Radiation Test Date: 18/03/23/
Temp.(C)/Hum.(%) 25 C / 55 % Time: 11/29/55

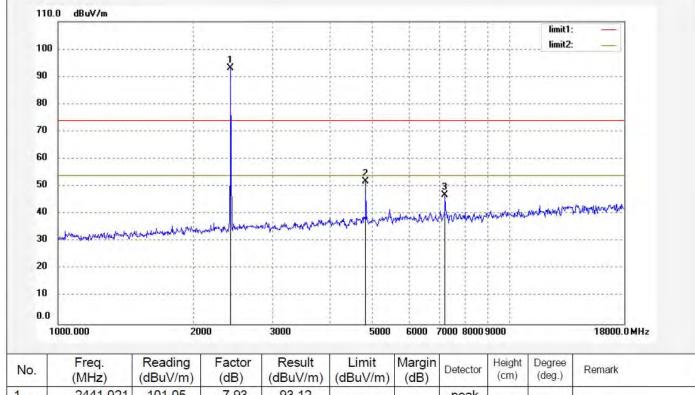
EUT: Bluetooth Earphones Engineer Signature: star

Mode: TX 2441MHz (GFSK) Distance: 3m

Model: 40012BT

Manufacturer: SHENGLAI

Note: Report No.:ATE20180396



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.021	101.05	-7.93	93.12			peak			
2	4882.324	54.03	-2.25	51.78	74.00	-22.22	peak			
3	7323.096	44.87	2.11	46.98	74.00	-27.02	peak			



Page 54 of 76



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

Job No.: STAR2018 #80 Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 % EUT: Bluetooth Earphones Mode: TX 2441MHz (GFSK)

Model: 40012BT

Manufacturer: SHENGLAI

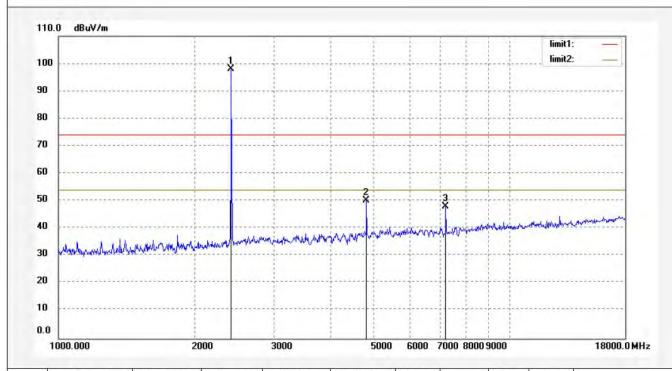
Polarization: Vertical Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/31/45

Engineer Signature: star

Distance: 3m

Report No.:ATE20180396 Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	2441.021	106.00	-7.93	98.07		1 11	peak				
2	4882.324	52.39	-2.25	50.14	74.00	-23.86	peak				
3	7323.096	45.84	2.11	47.95	74.00	-26.05	peak] =	



Page 55 of 76



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Job No.: STAR2018 #82 Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth Earphones
Mode: TX 2480MHz (GFSK)

Model: 40012BT

Manufacturer: SHENGLAI

ote: Report No :ATF20180396

Polarization: Horizontal

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/35/24

Engineer Signature: star

Distance: 3m

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No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	100.91	-7.84	93.07			peak			
2	4960.144	49.58	-1.92	47.66	74.00	-26.34	peak			
3	7440.246	42.71	2.33	45.04	74.00	-28.96	peak			

0.0

1000.000

18000.0 MHz



Page 56 of 76



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

Job No.: STAR2018 #81 Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 % EUT: Bluetooth Earphones

Mode: TX 2480MHz (GFSK) Model: 40012BT

Manufacturer: SHENGLAI

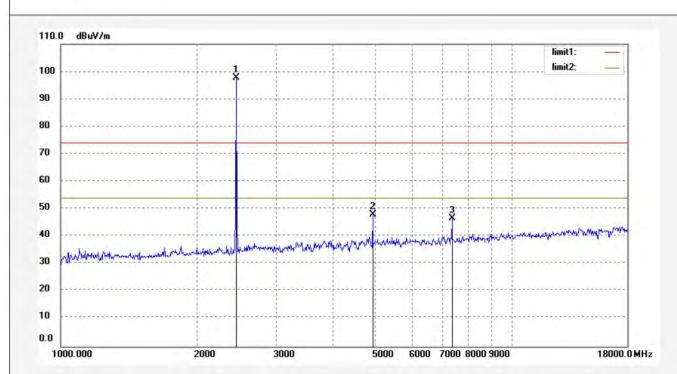
Polarization: Vertical Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/33/21

Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20180396



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	105.61	-7.84	97.77			peak		3	
2	4960.044	49.78	-1.92	47.86	74.00	-26.14	peak			72.2
3	7440.246	44.27	2.33	46.60	74.00	-27.40	peak			<u> </u>



Page 57 of 76



11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



(EUT: Bluetooth Earphones)

11.2. The Requirement For Section 15.247(d)

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

11.3.EUT Configuration on Measurement

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

11.4. Operating Condition of EUT

- 11.4.1. Setup the EUT and simulator as shown as Section 11.1.
- 11.4.2. Turn on the power of all equipment.
- 11.4.3.Let the EUT work in TX (Hopping off, Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.



Page 58 of 76



11.5.Test Procedure

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

11.6.Test Result

Test Lab: Shielding room Test Engineer: Star

Note: Both hopping-on mode and hopping-off mode had been pre-tested, and only the worst case was recorded in the test report.

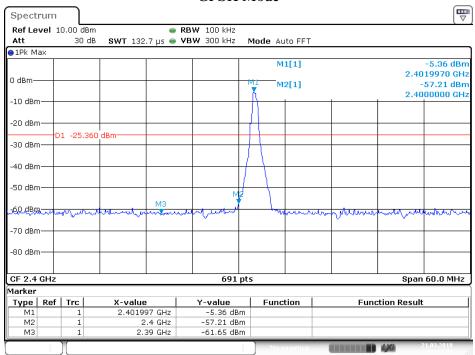
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
` ,	` , ,	` ,
	GFSK Mode	
2400.00	51.86	> 20dBc
2483.50	56.72	> 20dBc
	П/4-DQPSK Mode	
2400.00	50.03	> 20dBc
2483.50	55.36	> 20dBc
	8DPSK Mode	
2400.00	47.79	> 20dBc
2483.50	54.85	> 20dBc

The spectrum analyzer plots are attached as below.

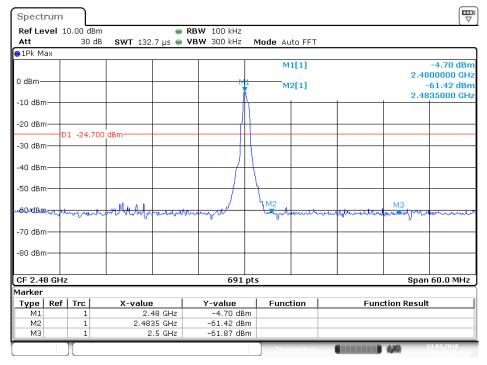
Page 59 of 76



GFSK Mode



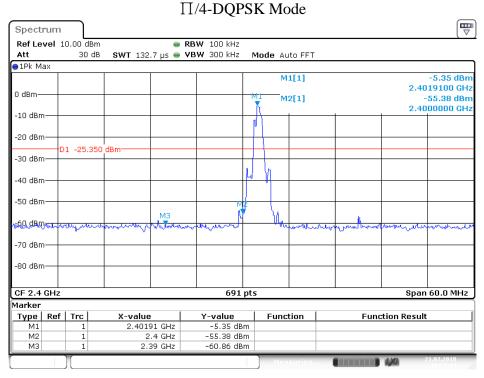
Date: 21.MAR.2018 16:44:19



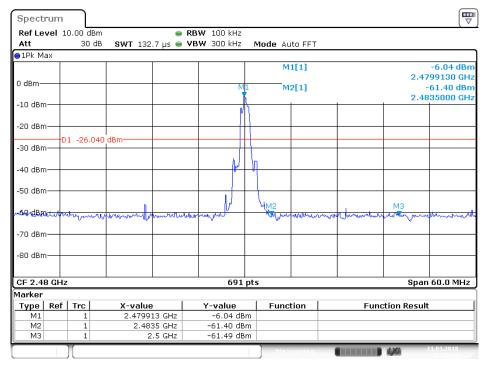
Date: 21.MAR.2018 16:47:00



Page 60 of 76



Date: 21.MAR.2018 16:52:14

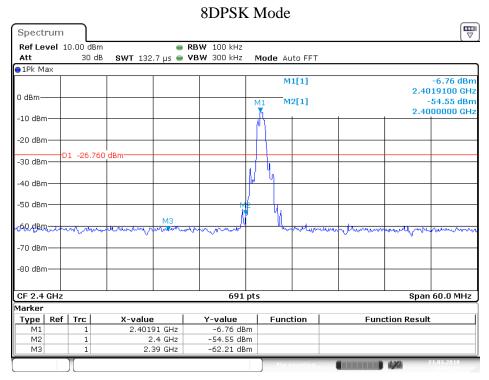


Date: 21.MAR.2018 16:48:43

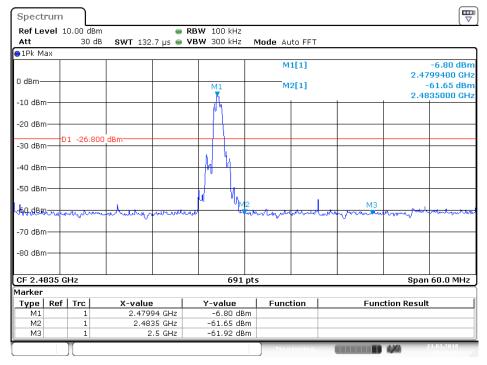




Page 61 of 76



Date: 21.MAR.2018 16:54:25



Date: 21.MAR.2018 16:55:59



Page 62 of 76

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

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

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

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

Test Lab: 3m Anechoic chamber

Test Engineer: Star



Page 63 of 76



Non-hopping mode ACCURATE TECHNOLOGY CO., LTD.

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Job No.: STAR2018 #86 Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 % EUT: Bluetooth Earphones

Mode: TX 2402MHz (GFSK)

Model: 40012BT

Manufacturer: SHENGLAI

Sto territoria (E.S.)

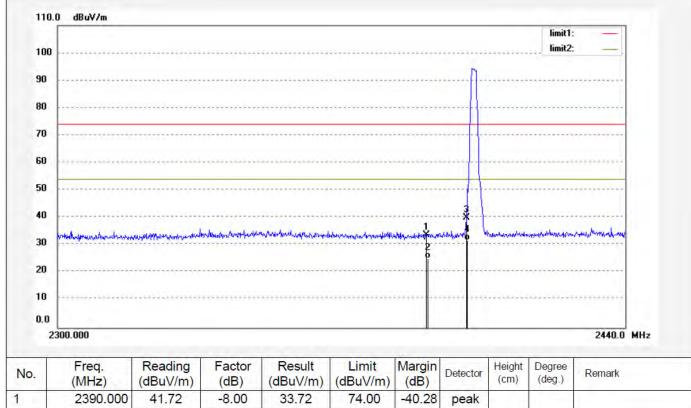
Polarization: Horizontal Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/43/45

Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20180396



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	2390.000	41.72	-8.00	33.72	74.00	-40.28	peak				
2	2390.000	33.25	-8.00	25.25	54.00	-28.75	AVG				
3	2400.000	47.96	-7.97	39.99	74.00	-34.01	peak				
4	2400.000	39.71	-7.97	31.74	54.00	-22.26	AVG				

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



Page 64 of 76



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Job No.: STAR2018 #85

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth Earphones
Mode: TX 2402MHz (GFSK)

Model: 40012BT

Note:

Manufacturer: SHENGLAI

Report No.:ATE20180396

Polarization: Vertical

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/42/32

Engineer Signature: star

Distance: 3m

90	90 80 70 60 50 40	
Freq. Reading Factor Result Limit Margin Detector Height Degree (dBuV/m) (dBu	80 70 60 50 40	
Freq. Reading Factor Result Limit (dBuV/m) (dB) (dBuV/m) (dB) (dBuV/m) (dB) Detector (cm) (deg.) Remark 2390.000 41.82 -8.00 33.82 74.00 -40.18 peak 2390.000 33.54 -8.00 25.54 54.00 -28.46 AVG	70	
60	50	
50 40 30 20 10 0.0 2300.000 Freq. Reading (dBuV/m) (dB) (dB) (dBuV/m) (dB) (dB) (dB) (dB) (dB) (dB) (dB) (dB	50 40	
A10 30 20 20 20 200.000 Freq. Reading Factor Result Limit Margin Detector (cm) Degree (deg.) 2390.000 41.82 -8.00 33.82 74.00 -40.18 peak 2390.000 33.54 -8.00 25.54 54.00 -28.46 AVG	40	
Preq. Reading Factor Result Limit Margin Detector Height Cm) Remark (dBuV/m) (dBuV/m)	the best of the state of the st	
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Freq. Reading Factor Result Limit Margin Detector Height Degree (dBuV/m) (dBu	10	
Freq. (MHz) Reading (dBuV/m) Factor (dBuV/m) Result (dBuV/m) Limit (dBuV/m) Margin (dB) Detector (cm) Height (cm) Degree (deg.) Remark 2390.000 41.82 -8.00 33.82 74.00 -40.18 peak 2390.00 40.00 25.54 54.00 -28.46 AVG AVG -40.00<	0.0	
(MHz) (dBuV/m) (dB) (dBuV/m) (dBuV/m) (dB) dector (cm) (deg.) 2390.000 41.82 -8.00 33.82 74.00 -40.18 peak 2390.000 33.54 -8.00 25.54 54.00 -28.46 AVG	2300.000	2440.0 MHz
2390.000 33.54 -8.00 25.54 54.00 -28.46 AVG		lemark
	2390.000 41.82 -8.00 33.82 74.00 -40.18 peak	
	2390.000 33.54 -8.00 25.54 54.00 -28.46 AVG	
2400.000 50.87 -7.97 42.90 74.00 -31.10 peak	2400.000 50.87 -7.97 42.90 74.00 -31.10 peak	

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



Page 65 of 76



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

Job No.: STAR2018 #83 Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 % EUT: Bluetooth Earphones Mode: TX 2480MHz (GFSK)

Report No.:ATE20180396

Model: 40012BT

Note:

Manufacturer: SHENGLAI

Polarization: Horizontal Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/39/54

Engineer Signature: star

Distance: 3m

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30 20 10 0.0 2	440.000	*********	Factor	Result	Limit			Height	Degree	
30 20 10 0.0 2		Reading (dBuV/m)	3			Margin (dB)	Detector			2600.0 MH:
30 20 10 0.0 2	440.000 Freq.	Reading	Factor	Result	Limit	Margin		Height	Degree	
30 20 10 0.0	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height	Degree	

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



Page 66 of 76



ACCURATE TECHNOLOGY CO., LTD.

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

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

Job No.: STAR2018 #84 Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth Earphones Mode: TX 2480MHz (GFSK)

Report No.:ATE20180396

Model: 40012BT

Note:

Manufacturer: SHENGLAI

Polarization: Vertical

Power Source: DC 3.7V

Date: 18/03/23/ Time: 11/41/01

Engineer Signature: star

Distance: 3m

110	.0 dBuV/m										
									limit1:	_	
100								*****	limit2:	_	
90						*********				*******	
			1.00								
80								*******			
70				*******	******		*********	******		(0)	
60						3.011111111			1	1	
50						******					
40											
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30 20 10 0.0	***************************************	wheneville with the return	Trobales 10	Marie de la company de la comp	-and the first state of the same	and ficting the control of the contr	engerigh sankspropper Stra	enthrophones	and planter and	2600.0	МНz
30 20 10 0.0	2440.000	Reading	Factor	Result	Limit			Height	Degree	2600.0	МНz
30 20 10 0.0	2440.000 Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	*******	***********		МНz
30 20 10 0.0	2440.000 Freq.		Factor	Result	Limit	Margin	Detector	Height	Degree	2600.0	MHz
40 30 20 10 0.0	2440.000 Freq. (MHz)	(dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector peak	Height	Degree	2600.0	MHz

54.00

-28.66

AVG

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

-7.71

25.34

33.05

4

2500.000



Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Page 67 of 76



ATC[®]

ACCURATE TECHNOLOGY CO., LTD.

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

> Polarization: Horizontal Power Source: DC 3.7V

Date: 18/03/23/ Time: 13/47/15

Engineer Signature: star

Distance: 3m

Job No.: STAR2018 #88 Standard: FCC PK Test item: Radiation Test

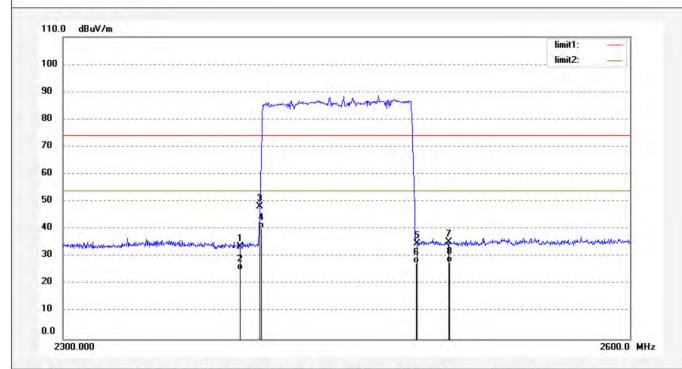
Temp.(C)/Hum.(%) 25 C / 55 % EUT: Bluetooth Earphones

Mode: Hopping (GFSK)

Manufacturer: SHENGLAI

Model: 40012BT

Note: Report No.:ATE20180396



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	2390.000	41.74	-8.00	33.74	74.00	-40.26	peak				
2	2390.000	33.28	-8.00	25.28	54.00	-28.72	AVG				
3	2400.000	56.18	-7.97	48.21	74.00	-25.79	peak				
4	2400.000	48.13	-7.97	40.16	54.00	-13.84	AVG				
5	2483.500	42.48	-7.76	34.72	74.00	-39.28	peak				
6	2483.500	35.48	-7.76	27.72	54.00	-26.28	AVG				
7	2500.000	43.12	-7.71	35.41	74.00	-38.59	peak				
8	2500.000	35.52	-7.71	27.81	54.00	-26.19	AVG	- 11	177		

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



Page 68 of 76



ACCURATE TECHNOLOGY CO., LTD.

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

Job No.: STAR2018 #87 Polarization: Vertical

Standard: FCC PK Power Source: DC 3.7V

Test item: Radiation Test Date: 18/03/23/
Temp.(C)/Hum.(%) 25 C / 55 % Time: 13/42/47

EUT: Bluetooth Earphones Engineer Signature: star

Mode: Hopping (GFSK) Distance: 3m Model: 40012BT

Manufacturer: SHENGLAI

Note: Report No.:ATE20180396



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	2390.000	42.62	-8.00	34.62	74.00	-39.38	peak				
2	2390.000	35.36	-8.00	27.36	54.00	-26.64	AVG				
3	2400.000	59.01	-7.97	51.04	74.00	-22.96	peak				
4	2400.000	52.09	-7.97	44.12	54.00	-9.88	AVG				
5	2483.500	43.36	-7.76	35.60	74.00	-38.40	peak				
6	2483.500	36.14	-7.76	28.38	54.00	-25.62	AVG				
7	2500.000	43.27	-7.71	35.56	74.00	-38.44	peak				
8	2500.000	35.62	-7.71	27.91	54.00	-26.09	AVG				

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

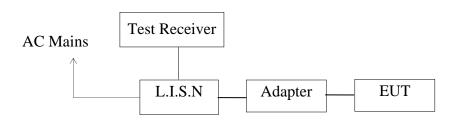


12.AC POWER LINE CONDUCTED EMISSION FOR FCC PART

15 SECTION 15.207(A)

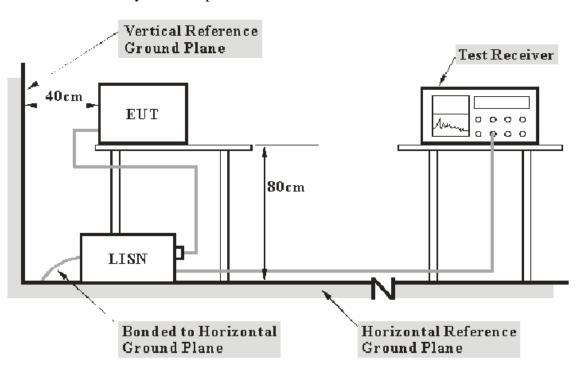
12.1.Block Diagram of Test Setup

12.1.1.Block diagram of connection between the EUT and simulators



(EUT: Bluetooth Earphones)

12.1.2.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.



Page 70 of 76

12.2. Power Line Conducted Emission Measurement Limits

Frequency	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 shall apply at the transition frequencies.

NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

12.3. Configuration of EUT on Measurement

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

12.4. Operating Condition of EUT

- 12.4.1. Setup the EUT and simulator as shown as Section 12.1.
- 12.4.2. Turn on the power of all equipment.
- 12.4.3.Let the EUT work in test mode and measure it.

12.5.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.



Page 71 of 76

12.6.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	10.5	51.1	34.2	56.0	46.0	4.9	11.8	Pass

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

Calculation Formula:

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

12.7. Power Line Conducted Emission Measurement Results

PASS.

Test Lab: Shielding room Test Engineer: Star

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.



Report No.: ATE20180396 Page 72 of 76

ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15C

EUT: Bluetooth Earphones M/N:40012BT

Manufacturer: SHENGLAI

Operating Condition: BT Communication Test Site: 2#Shielding Room

star Operator:

Test Specification: N 240V/60Hz

Comment: Report No.:ATE20180396 Start of Test: 2018-3-23 / 16:17:17

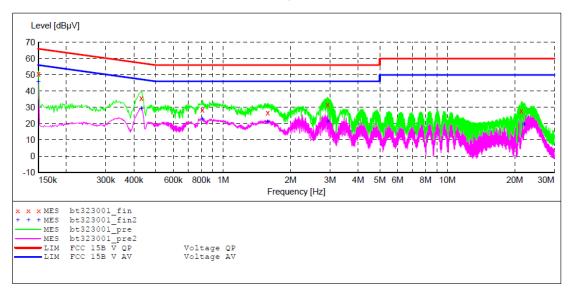
SCAN TABLE: "V 150K-30MHz fin"
Short Description: _SUB_S _____SUB_STD_VTERM2 1.70

Step ΙF Start Stop Detector Meas. Transducer

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

QuasiPeak 1.0 s 9 kHz NSLK8126 2008

Average



MEASUREMENT RESULT: "bt323001 fin"

3-23 16 : 3	19						
equency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
.150000	50.60	10.8	66	15.4	QP	N	GND
.432000	35.70	11.0	57	21.5	QP	N	GND
.808000	28.50	11.1	56	27.5	QP	N	GND
.580000	26.90	11.2	56	29.1	QP	N	GND
.930000	31.90	11.3	56	24.1	QP	N	GND
.420000	27.70	11.7	60	32.3	QP	N	GND
	equency MHz .150000 .432000 .808000 .580000	MHz dBμV .150000 50.60 .432000 35.70 .808000 28.50 .580000 26.90 .930000 31.90	equency Level Transd dB dB dB .150000 50.60 10.8 .432000 35.70 11.0 .808000 28.50 11.1 .580000 26.90 11.2 .930000 31.90 11.3	equency MHz Level dBμV Transd dB dBμV Limit dBμV .150000 50.60 10.8 66 .432000 35.70 11.0 57 .808000 28.50 11.1 56 .580000 26.90 11.2 56 .930000 31.90 11.3 56	equency MHz Level dBμV Transd dB dBμV Limit dB dBμV Margin dB .150000 50.60 10.8 66 15.4 .432000 35.70 11.0 57 21.5 .808000 28.50 11.1 56 27.5 .580000 26.90 11.2 56 29.1 .930000 31.90 11.3 56 24.1	equency MHz Level dBμV Transd dB dBμV Limit dB dBμV Margin dB Detector dB .150000 50.60 10.8 66 15.4 QP .432000 35.70 11.0 57 21.5 QP .808000 28.50 11.1 56 27.5 QP .580000 26.90 11.2 56 29.1 QP .930000 31.90 11.3 56 24.1 QP	equency MHz Level dBμV Transd dB dBμV Limit dB dB Margin dB Detector Line dB .150000 50.60 10.8 66 15.4 QP N .432000 35.70 11.0 57 21.5 QP N .808000 28.50 11.1 56 27.5 QP N .580000 26.90 11.2 56 29.1 QP N .930000 31.90 11.3 56 24.1 QP N

MEASUREMENT RESULT: "bt323001 fin2"

20	18-3-23 16:	19						
	Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
	MITZ	αвμν	αь	αвμν	QБ			
	0.150000	45.60	10.8	56	10.4	AV	N	GND
	0.432000	29.40	11.0	47	17.8	AV	N	GND
	0.808000	22.80	11.1	46	23.2	AV	N	GND
	1.580000	21.20	11.2	46	24.8	AV	N	GND
	2.930000	21.30	11.3	46	24.7	AV	N	GND
	22.025000	19.60	11.7	50	30.4	AV	N	GND





Page 73 of 76

ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15C

EUT: M/N:40012BT Bluetooth Earphones

Manufacturer: SHENGLAI

Operating Condition: BT Communication 2#Shielding Room Test Site:

Operator: star

Test Specification: L 240V/60Hz

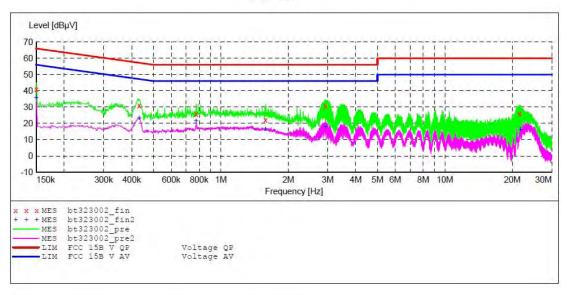
Report No.:ATE20180396 2018-3-23 / 16:20:15 Comment: Start of Test:

SCAN TABLE: "V 150K-30MHz fin"
Short Description: SUB S _SUB_STD_VTERM2 1.70

Detector Meas. Time Stop Step IF Start Transducer Bandw.

Frequency Frequency Width 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008

Average



MEASUREMENT RESULT: "bt323002 fin"

2	018-3-23 16:	22						
	Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
	0.150000	41.00	10.8	66	25.0	QP	L1	GND
	0.432000	30.90	11.0	57	26.3	QP	L1	GND
	0.776000	25.60	11.1	56	30.4	QP	L1	GND
	1.582000	22.20	11.2	56	33.8	QP	L1	GND
	2.930000	30.50	11.3	56	25.5	QP	L1	GND
	21.575000	26.20	11.7	60	33.8	QP	L1	GND

MEASUREMENT RESULT: "bt323002 fin2"

20	18-3-23 16:	22						
	Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
	0.150000	35.70	10.8	56	20.3	AV	L1	GND
	0.432000	23.30	11.0	47	23.9	AV	L1	GND
	0.776000	21.50	11.1	46	24.5	AV	L1	GND
	1.582000	16.50	11.2	46	29.5	AV	L1	GND
	2.930000	17.90	11.3	46	28.1	AV	L1	GND
	21.795000	16.10	11.7	50	33.9	AV	L1	GND





Page 74 of 76

ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15C

EUT: Bluetooth Earphones M/N:40012BT

Manufacturer: SHENGLAI

Operating Condition: BT Communication Test Site: 2#Shielding Room

Operator: star

Test Specification: N 120V/60Hz

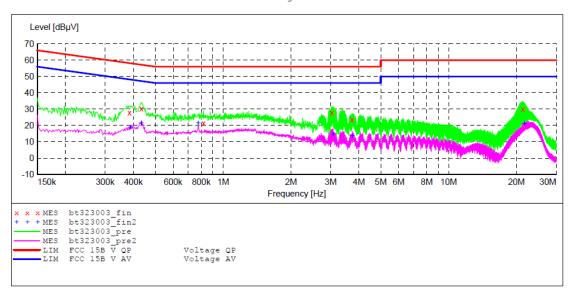
Report No.:ATE20180396 2018-3-23 / 16:22:52 Comment: Start of Test:

SCAN TABLE: "V 150K-30MHz fin"
Short Description: _SUB_S _SUB_STD_VTERM2 1.70

Start Stop Step Detector Meas. ΙF Transducer

Frequency Frequency Width 150.0 kHz 30.0 MHz 4.5 kHz Time Bandw. QuasiPeak 1.0 s 9 kHz NSLK8126 2008

Average



MEASUREMENT RESULT: "bt323003 fin"

2	018-3-23 16:	24						
	Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
	0.384000	27.70	10.9	58	30.5	OP	N	GND
	0.434000	30.40	11.0	57	26.8	QP	N	GND
	0.818000	21.60	11.1	56	34.4	QP	N	GND
	3.040000	27.70	11.3	56	28.3	QP	N	GND
	3.735000	23.50	11.4	56	32.5	QP	N	GND
	21.345000	30.00	11.7	60	30.0	OP	N	GND

MEASUREMENT RESULT: "bt323003 fin2"

2018-3-23 16	:24						
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.388000	18.80	11.0	48	29.3	ΔV	N	GND
0.434000	21.40	11.0	47	25.8	AV	N	GND
0.776000	21.50	11.1	46	24.5	AV	N	GND
3.075000	14.60	11.3	46	31.4	AV	N	GND
3.735000	13.60	11.4	46	32.4	AV	N	GND
21.655000	20.90	11.7	50	29.1	AV	N	GND



Page 75 of 76

ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15C

EUT: Bluetooth Earphones M/N:40012BT

Manufacturer: SHENGLAI

Operating Condition: BT Communication Test Site: 2#Shielding Room

Operator: star

Test Specification: L 120V/60Hz

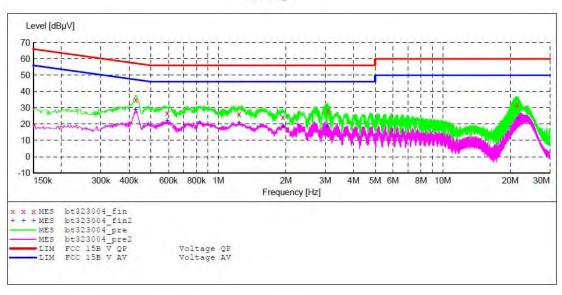
Report No.:ATE20180396 Comment: Start of Test: 2018-3-23 / 16:25:18

SCAN TABLE: "V 150K-30MHz fin"
Short Description: _SUB_S SUB_STD_VTERM2 1.70

Stop Step Detector Meas. IF Time Bandw. Start Transducer

Frequency Frequency Width 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008

Average



MEASUREMENT RESULT: "bt323004 fin"

20	18-3-23 16:	27						
	Frequency	Level	Transd	Limit	Margin	Detector	Line	PE
	MHz	dΒμV	dB	dΒμV	dB			
	0.428000	34.80	11.0	57	22.5	OP	L1	GND
	0.592000	26.90	11.0	56	29.1	QP	L1	GND
	1.236000	26.10	11.2	56	29.9	QP	L1	GND
	1.942000	24.30	11.3	56	31.7	QP	L1	GND
	3.080000	28.30	11.3	56	27.7	QP	L1	GND
	21.455000	31.90	11.7	60	28.1	QP	L1	GND

MEASUREMENT RESULT: "bt323004 fin2"

2018-	3-23 16:	27						
	equency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0	.428000	29.00	11.0	47	18.3	AV	L1	GND
0	.592000	22.10	11.0	46	23.9	AV	L1	GND
1	.236000	20.70	11.2	46	25.3	AV	L1	GND
1	.942000	18.70	11.3	46	27.3	AV	L1	GND
3	.045000	18.60	11.3	46	27.4	AV	L1	GND
21	.660000	23.40	11.7	50	26.6	AV	L1	GND

Page 76 of 76



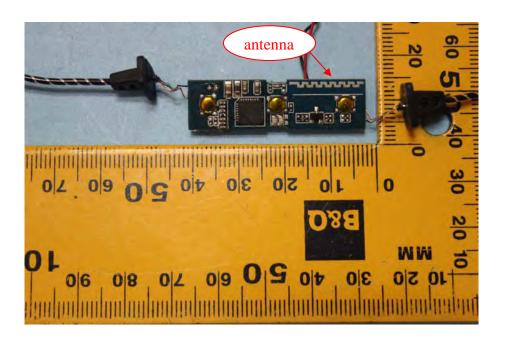
13.ANTENNA REQUIREMENT

13.1.The Requirement

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

13.2.Antenna Construction

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



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