APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Cleer Limited

BT Headphone
Model No.: BT

FCC ID: 2AETW-BT201501

Prepared for	:	Cleer Limited
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Report Number	:	ATE20151031
Date of Test	:	May 15-Jun 17,2015
Date of Report	:	Jun 17,2015

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Test Report Certification

Applicant : Cleer Limited

Manufacturer : Shenzhen Grandsun Electronic Co.,Ltd.

EUT Description : BT Headphone

(A) MODEL NO.: BT

(B) Trade Name.: Cleer

(C) POWER SUPPLY: DC 3.7V (Powered by battery) or DC 5V (Powered by USB)

Measurement Procedure Used:

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

The EUT was tested according to DTS test procedure of Jun 05, 2014 KDB558074 D01 DTS Meas Guidance v03r02 for compliance to FCC 47CFR 15.247 requirements

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

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : May 15-Jun 17,2015

Date of Report: Jun 17,2015

Prepared by : Eric Zhang

(Eric Zhang, Engineer)

Approved & Authorized Signer :

(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	BT Headphone
Model Number	:	BT
Frequency Range	:	2402-2480MHz
Number of Channels	:	40
Antenna Gain	:	1.0dBi
Power Supply	:	DC 5V (Power by USB)&DC 3.7V(Battery)
Modulation mode	:	GFSK
Applicant	:	Cleer Limited
Address	:	Unit518, Lakeside 1, Science Park West Ave. HK Science Park,Hong Kong
Manufacturer	:	Shenzhen Grandsun Electronic Co.,Ltd.
Address	:	Pingdi Gaoqiao Industry Zone,Longgang District, Shenzhen,China
Date of sample received	:	May 15,2015
Date of Test	:	May 15-Jun 17,2015

1.2.Carrier Frequency of Channels

Channel	Frequceny (MHz)	Channel	Frequceny (MHz)	Channel	Frequceny (MHz)	Channe l	Frequceny (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

1.3.Special Accessory and Auxiliary Equipment

N/A

1.4.Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen Listed by FCC The Registration Number is 752051 Listed by Industry Canada The Registration Number is 5077A-2 Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L3193
Name of Firm	:	ACCURATE TECHNOLOGY CO. LTD
Site Location	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.5.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (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	Type	S/N	Calibrated dates	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 10, 2015	One Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 10, 2015	One Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 10, 2015	One Year
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 10, 2015	One Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2015	One Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2015	One Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2015	One Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan. 15, 2015	One Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 10, 2015	One Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 10, 2015	One Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 10, 2015	One Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 10, 2015	One Year
Switch Unit with OSP-B157	Rohde & Schwarz	OSP120	101130	Jan. 10, 2015	One Year

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: **BLE Transmitting mode**
Low Channel: 2402MHz
Middle Channel: 2440MHz
High Channel: 2480MHz

3.2.Configuration and peripherals

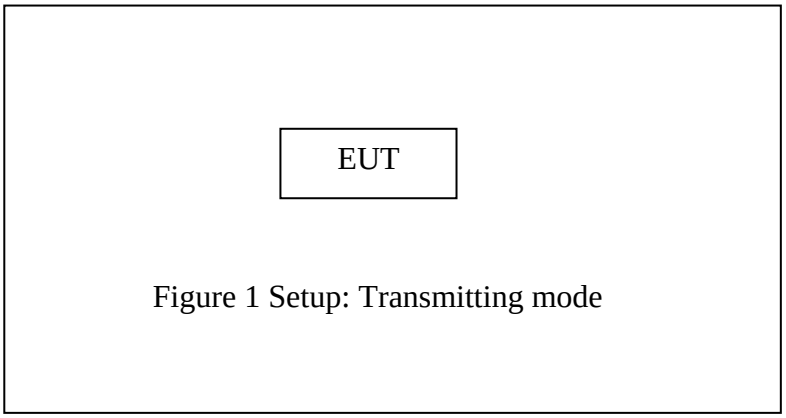


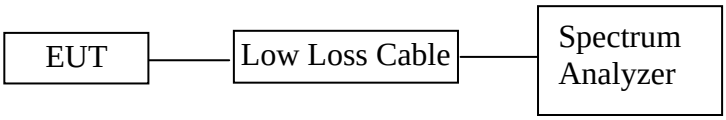
Figure 1 Setup: Transmitting mode

4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Power Line Conducted Emission	Compliant
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 6DB BANDWIDTH MEASUREMENT

5.1.Block Diagram of Test Setup



(EUT: BT Headphone)

5.2.The Requirement For Section 15.247(a)(2)

Section 15.247(a)(2): Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.3.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.

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 modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, 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 to300 kHz.

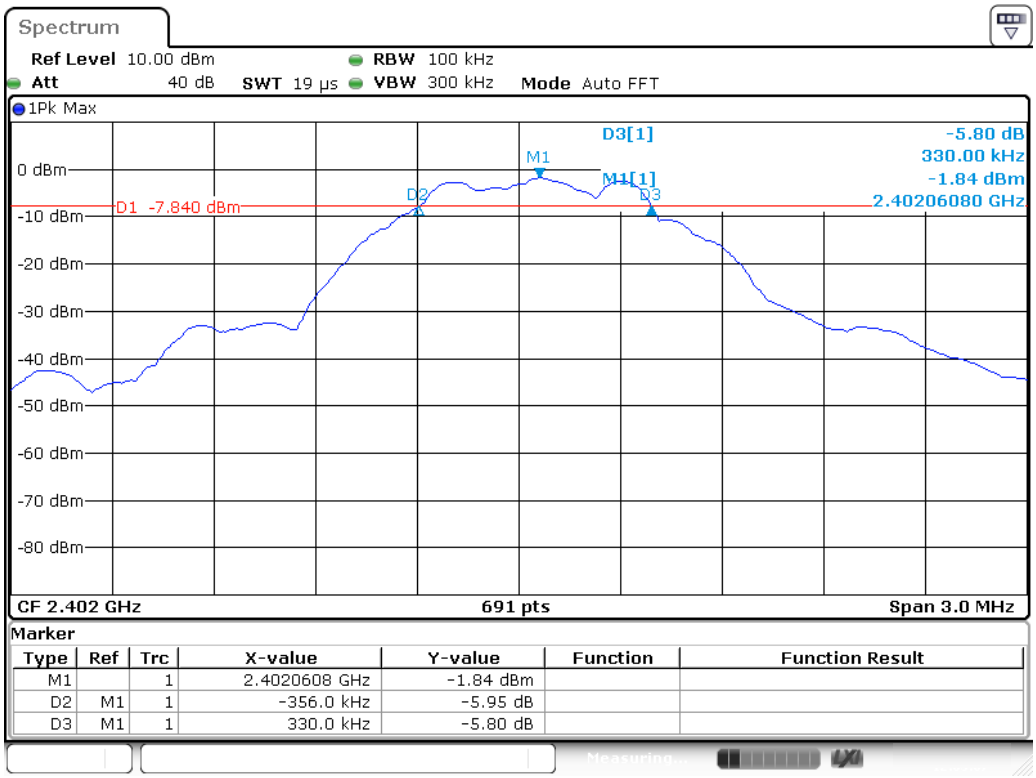
5.5.3.The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

5.6.Test Result

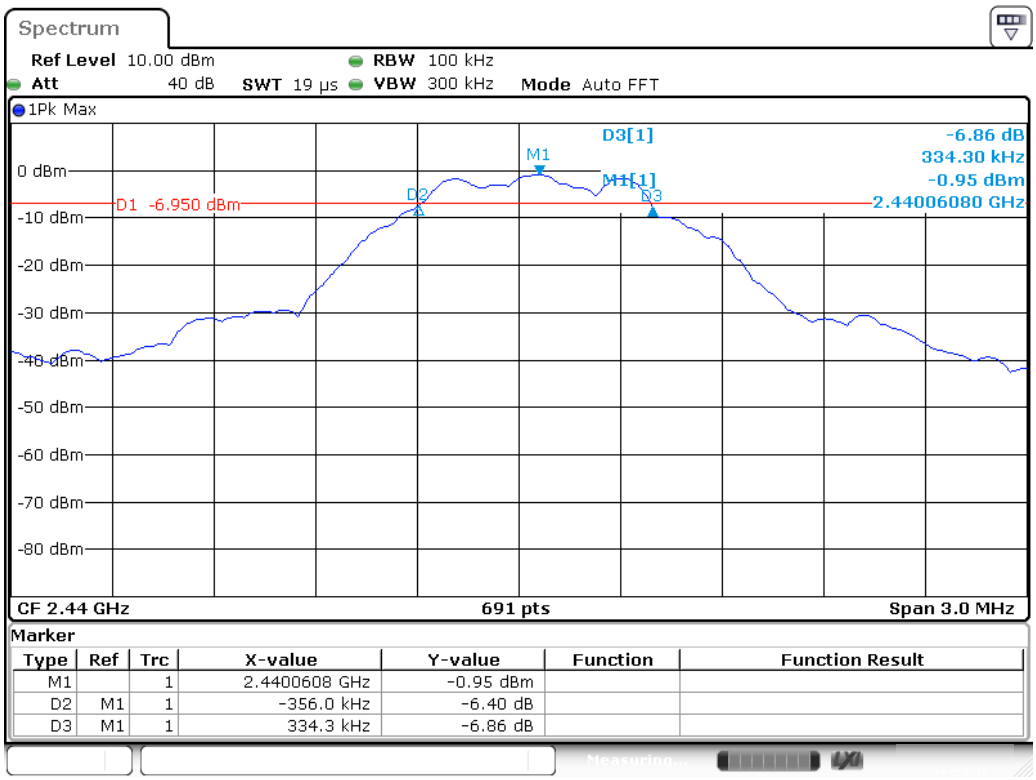
Channel	Frequency (MHz)	6 dB Bandwith (MHz)	Minimum Limit(MHz)	PASS/FAIL
0	2402	0.686	0.5	PASS
19	2440	0.690	0.5	PASS
39	2480	0.686	0.5	PASS

The spectrum analyzer plots are attached as below.

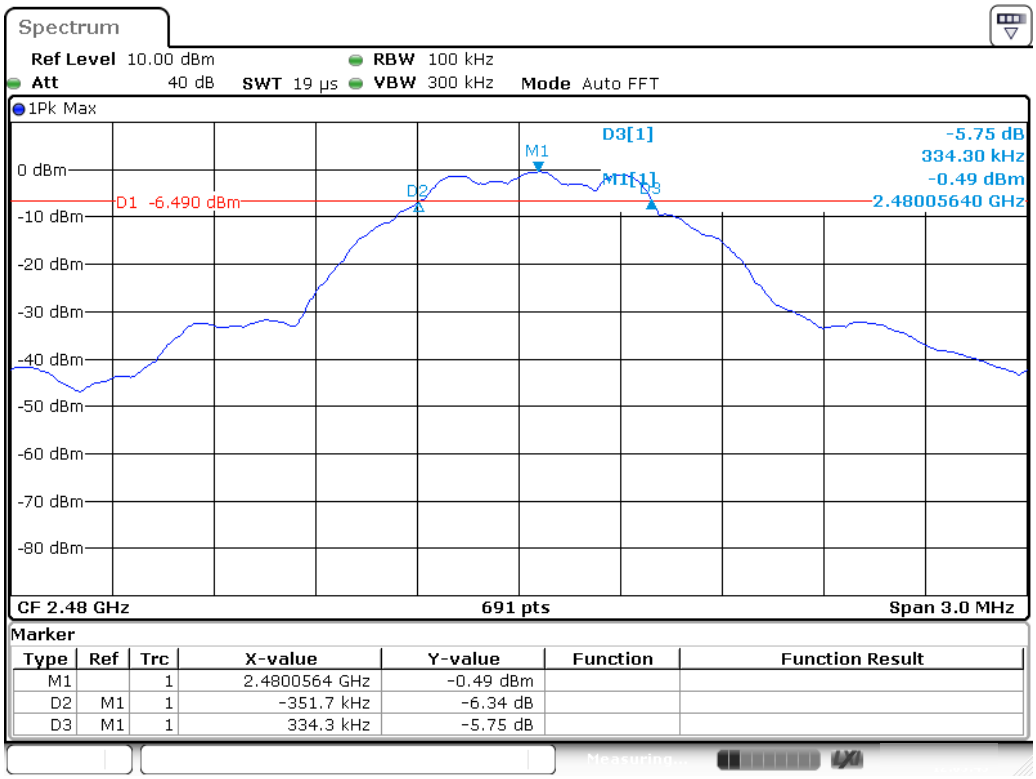
channel 0



channel 19

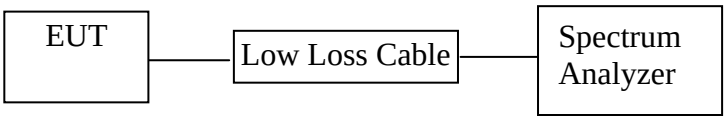


channel 39



6. MAXIMUM PEAK OUTPUT POWER

6.1.Block Diagram of Test Setup



(EUT: BT Headphone)

6.2.The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

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 modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

6.5.Test Procedure

6.5.1.Set the RBW ⩾ DTS bandwidth. VBW ⩾ 3 × RBW.

6.5.2.Set span ⩾ 3 x RBW

6.5.3.Sweep time = auto couple.

6.5.4.Detector = peak.

6.5.5.Trace mode = max hold.

6.5.6.Allow trace to fully stabilize.

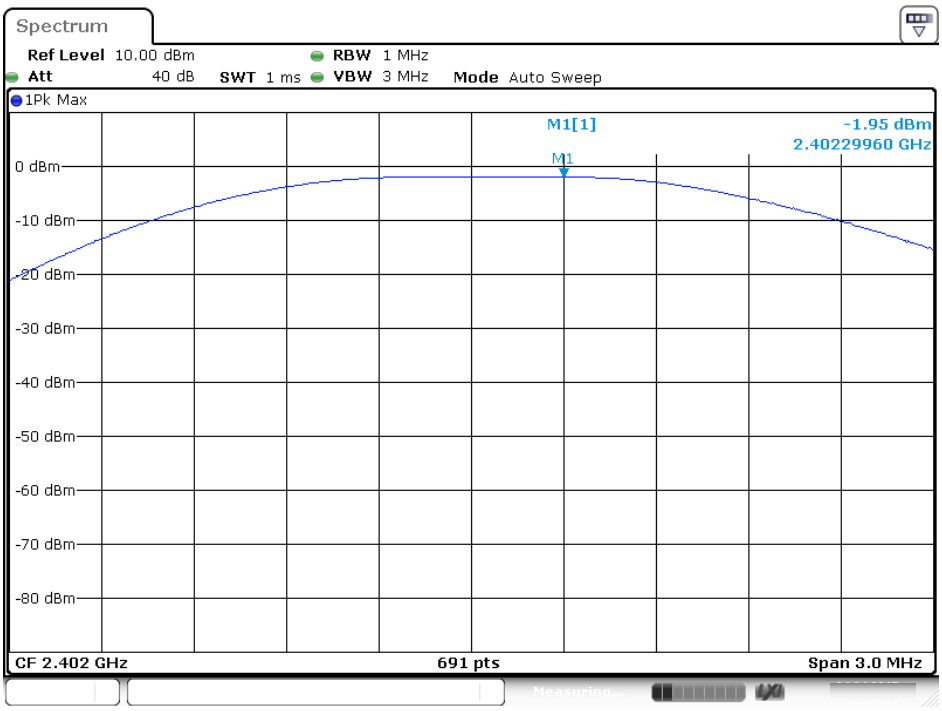
6.5.7.Use peak marker function to determine the peak amplitude level.

6.6.Test Result

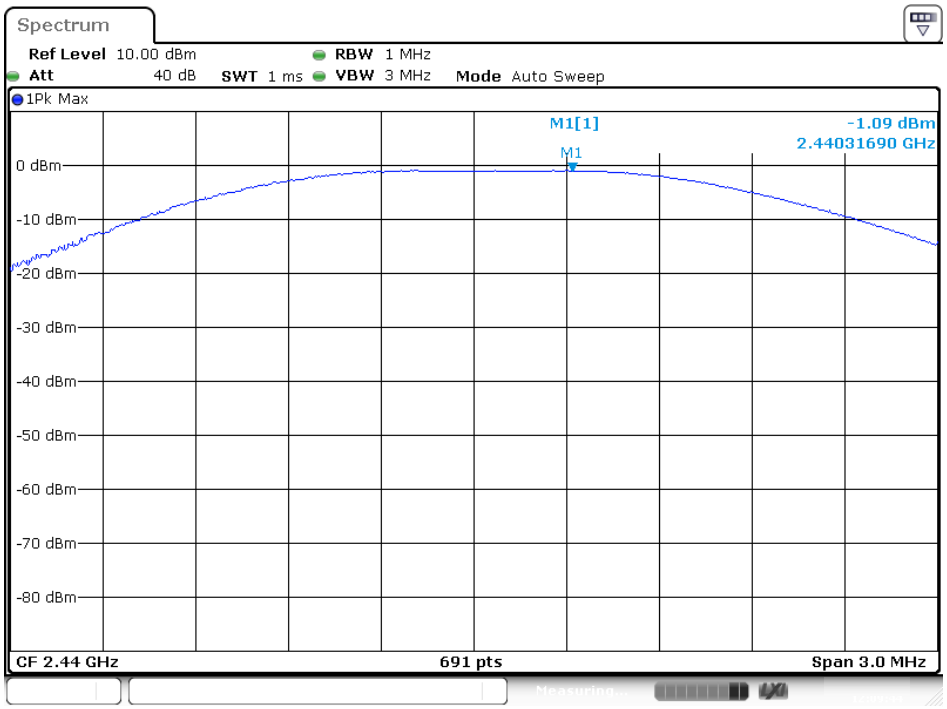
Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Output Power (mW)	Peak Power Limit (dBm)	Pass / Fail
0	2402	-1.95	0.64	30	PASS
19	2440	-1.09	0.78	30	PASS
39	2480	-0.69	0.85	30	PASS

The spectrum analyzer plots are attached as below.

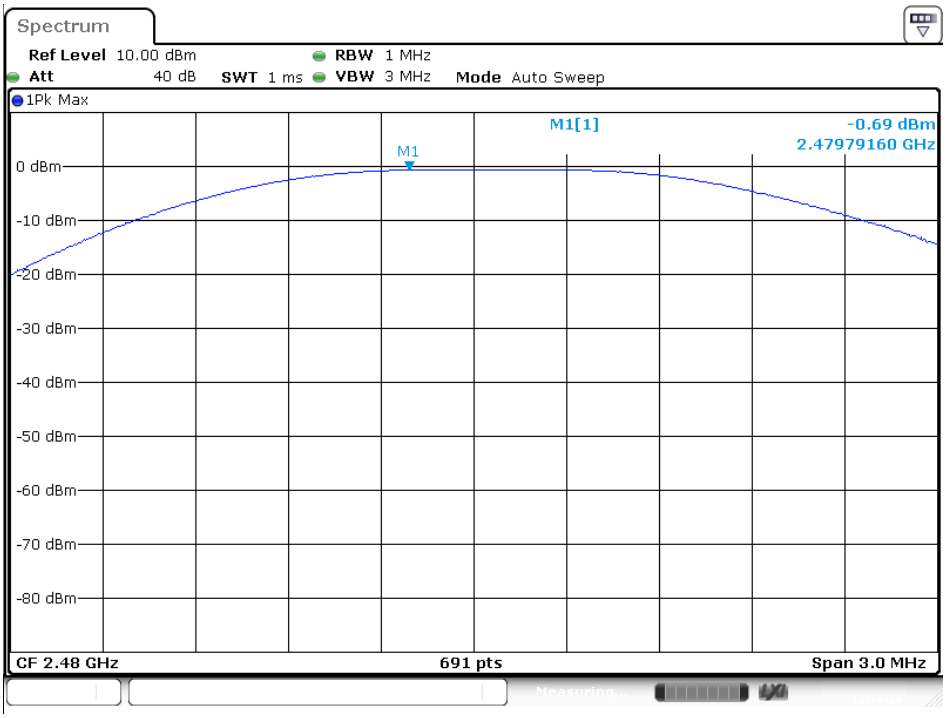
channel 0



channel 19

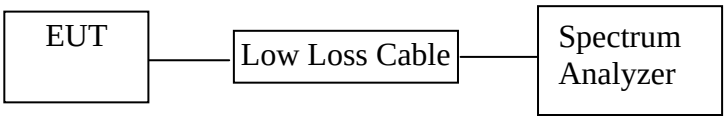


channel 39



7. POWER SPECTRAL DENSITY MEASUREMENT

7.1.Block Diagram of Test Setup



(EUT: BT Headphone)

7.2.The Requirement For Section 15.247(e)

Section 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.3.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.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 8.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

7.5. Test Procedure

7.5.1. The EUT was tested according to DTS test procedure of KDB558074 D01 DTS Meas Guidance v03r02 for compliance to FCC 47CFR 15.247 requirements.

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

7.5.3. Measurement Procedure PKPSD:

This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

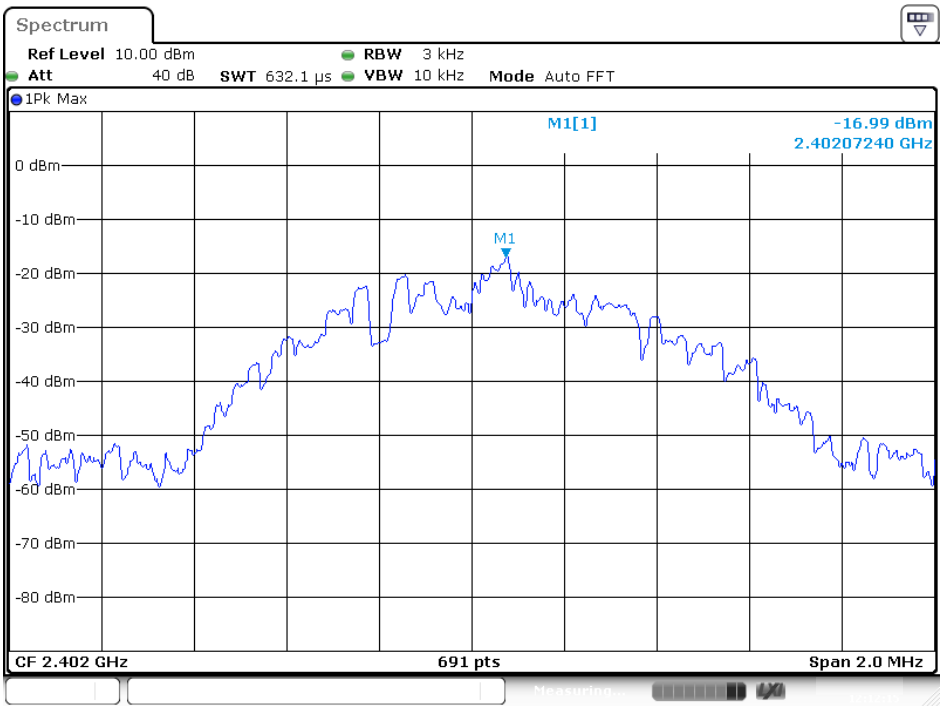
7.5.4. Measurement the maximum power spectral density.

7.6.Test Result

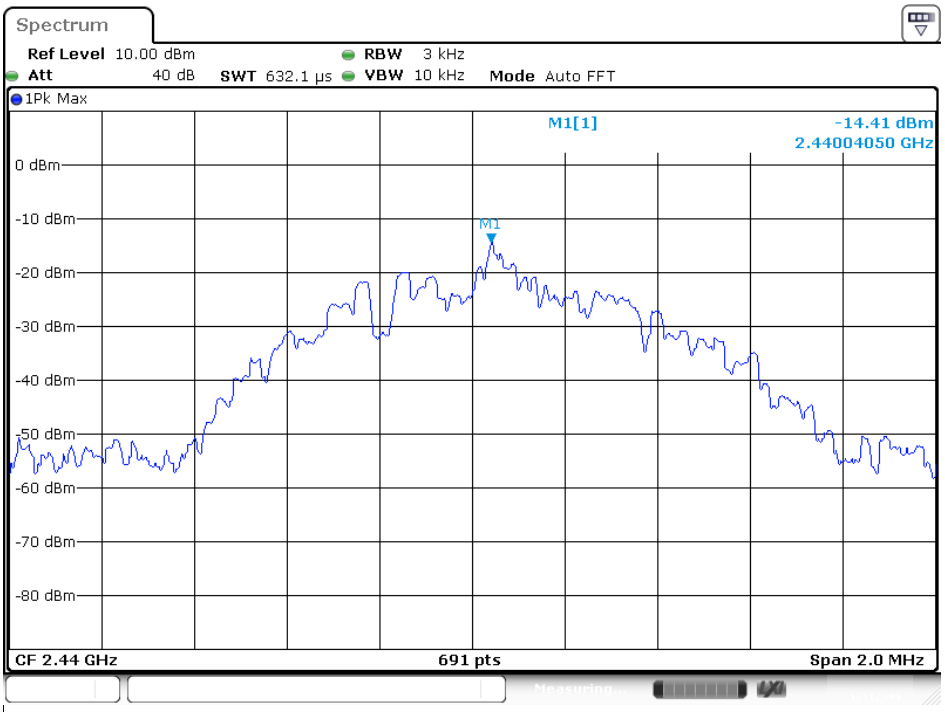
CHANNEL NUMBER	FREQUENCY (MHz)	PSD (dBm/3KHz)	LIMIT (dBm/3KHz)	PASS/FAIL
0	2402	-16.99	8	PASS
19	2440	-14.41	8	PASS
39	2480	-14.06	8	PASS

The spectrum analyzer plots are attached as below.

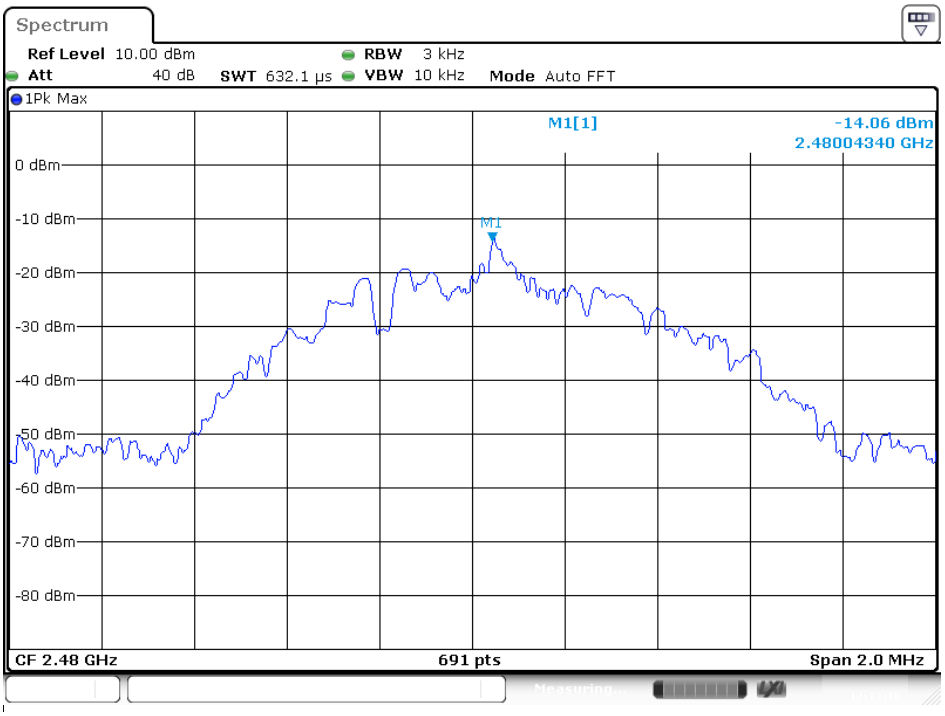
channel 0



channel 19

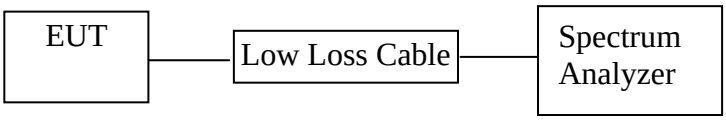


channel 39



8. BAND EDGE COMPLIANCE TEST

8.1.Block Diagram of Test Setup



(EUT: BT Headphone)

8.2.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).

8.3.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.

8.4.Operating Condition of EUT

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

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

8.5.Test Procedure

Conducted Band Edge:

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

8.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz.

Radiate Band Edge:

8.5.3. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

8.5.4. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

8.5.5. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

8.5.6. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=1MHz, VBW=1MHz

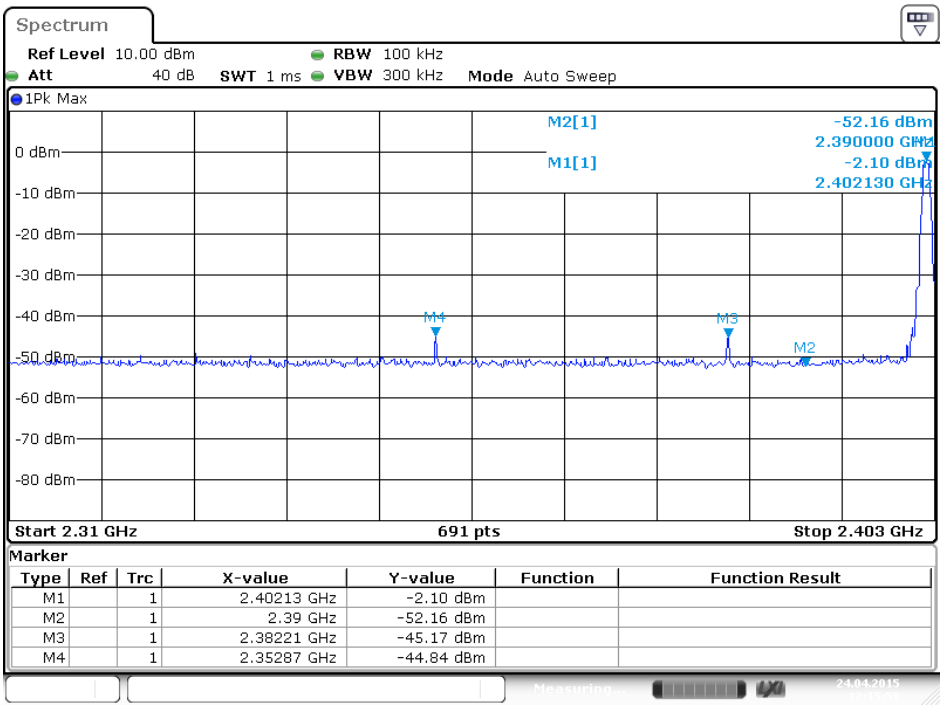
8.5.7.The band edges was measured and recorded.

8.6.Test Result

Pass

Channel	Delta peak to band emission	Limit(dBc)
0	42.74	20
39	49.71	20

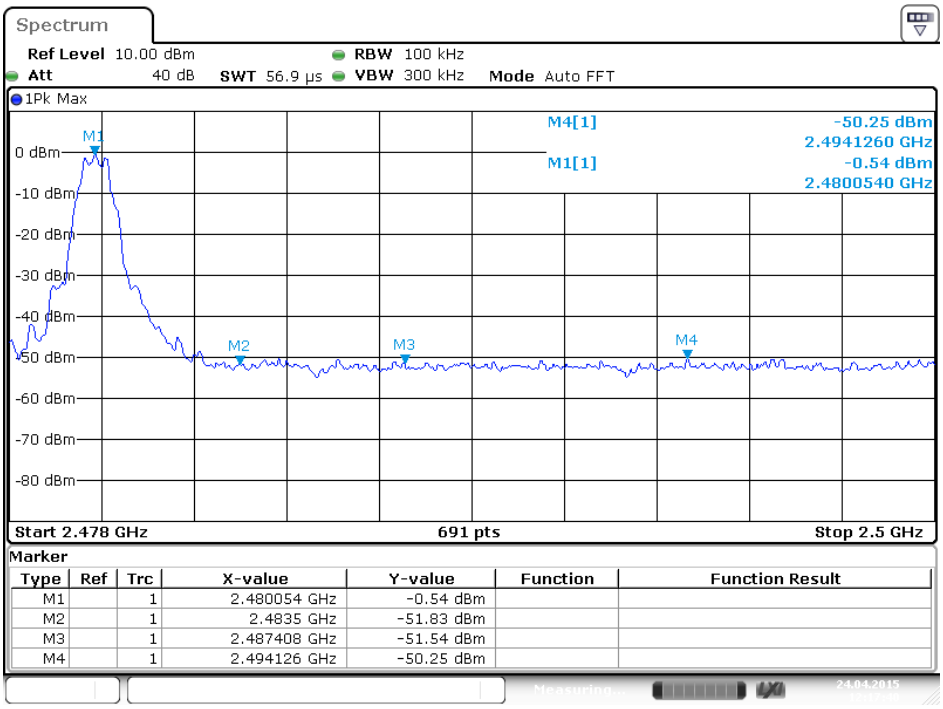
channel 0



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.40213 GHz	-2.10 dBm		
M2		1	2.39 GHz	-52.16 dBm		
M3		1	2.38221 GHz	-45.17 dBm		
M4		1	2.35287 GHz	-44.84 dBm		

channel 39



Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.480054 GHz	-0.54 dBm		
M2		1	2.4835 GHz	-51.83 dBm		
M3		1	2.487408 GHz	-51.54 dBm		
M4		1	2.494126 GHz	-50.25 dBm		

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.

ACCURATE TECHNOLOGY CO., LTD.
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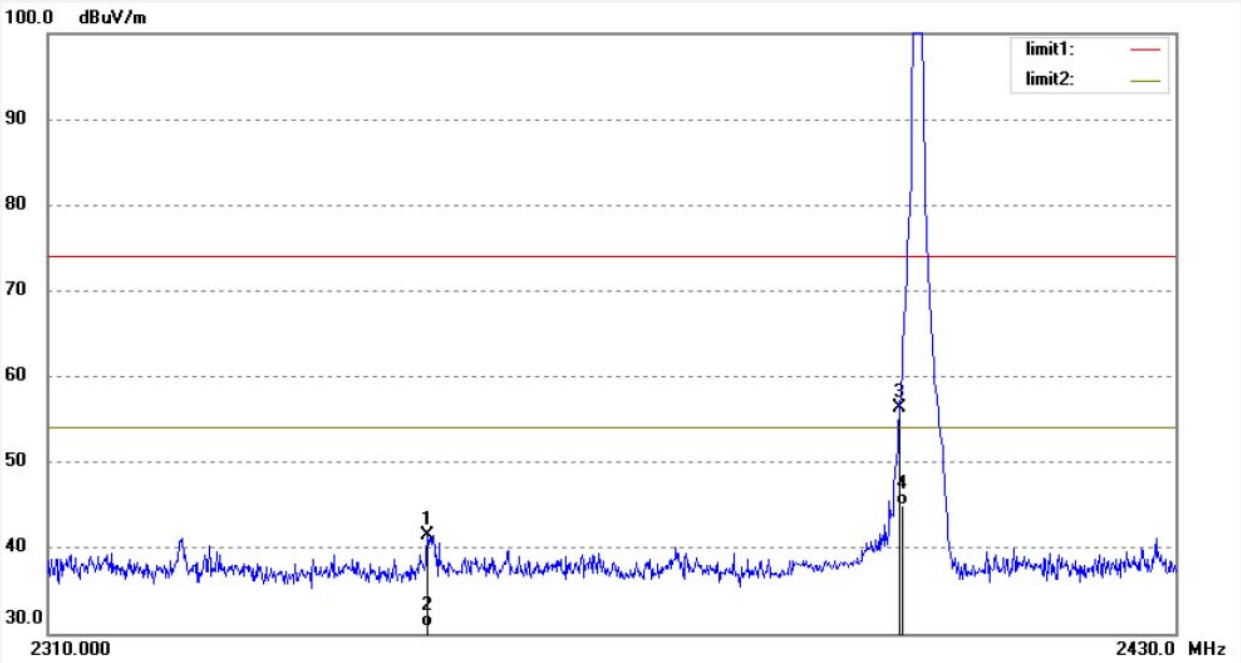
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: ricky-2015 #20	Polarization: Vertical
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 15/05/20/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/52/38
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2349.724	49.40	-7.85	41.55	74.00	-32.45	peak			
2	2349.724	38.65	-7.85	30.80	54.00	-23.20	AVG			
3	2400.000	63.80	-7.50	56.30	74.00	-17.70	peak			
4	2400.000	52.38	-7.50	44.88	54.00	-9.12	AVG			

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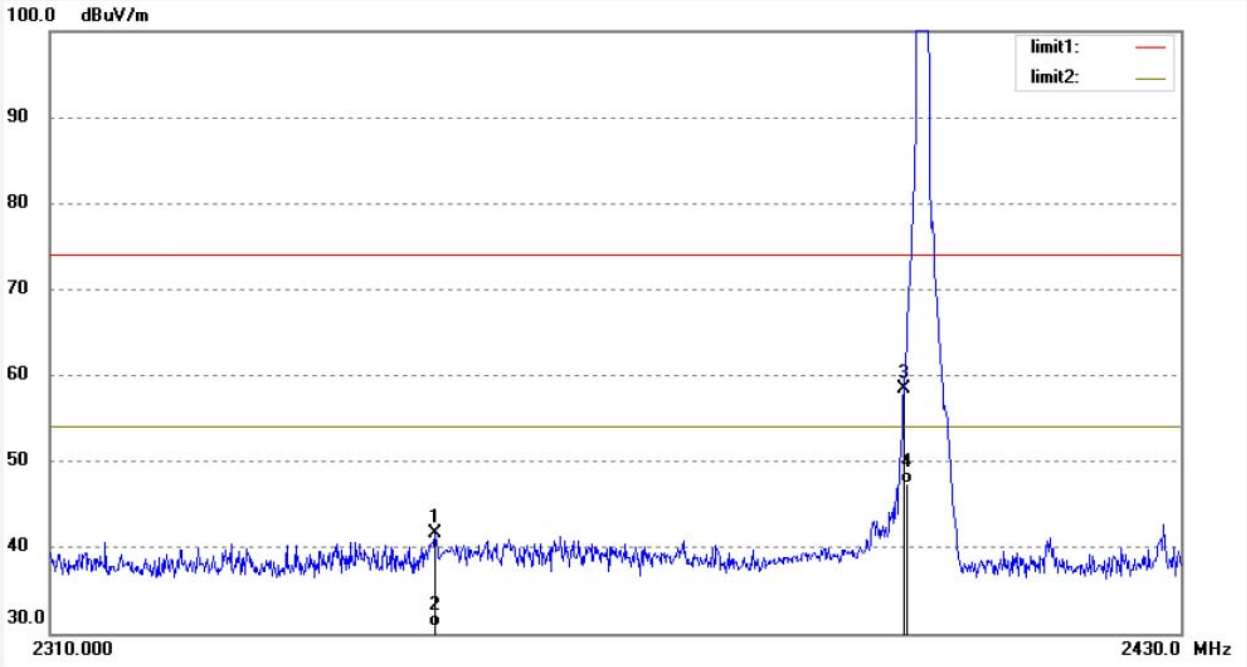
Job No.: ricky-2015 #21	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 15/05/20/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/54/09
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2350.201	49.49	-7.85	41.64	74.00	-32.36	peak			
2	2350.201	38.65	-7.85	30.80	54.00	-23.20	AVG			
3	2400.000	65.99	-7.50	58.49	74.00	-15.51	peak			
4	2400.000	54.94	-7.50	47.44	54.00	-6.56	AVG			

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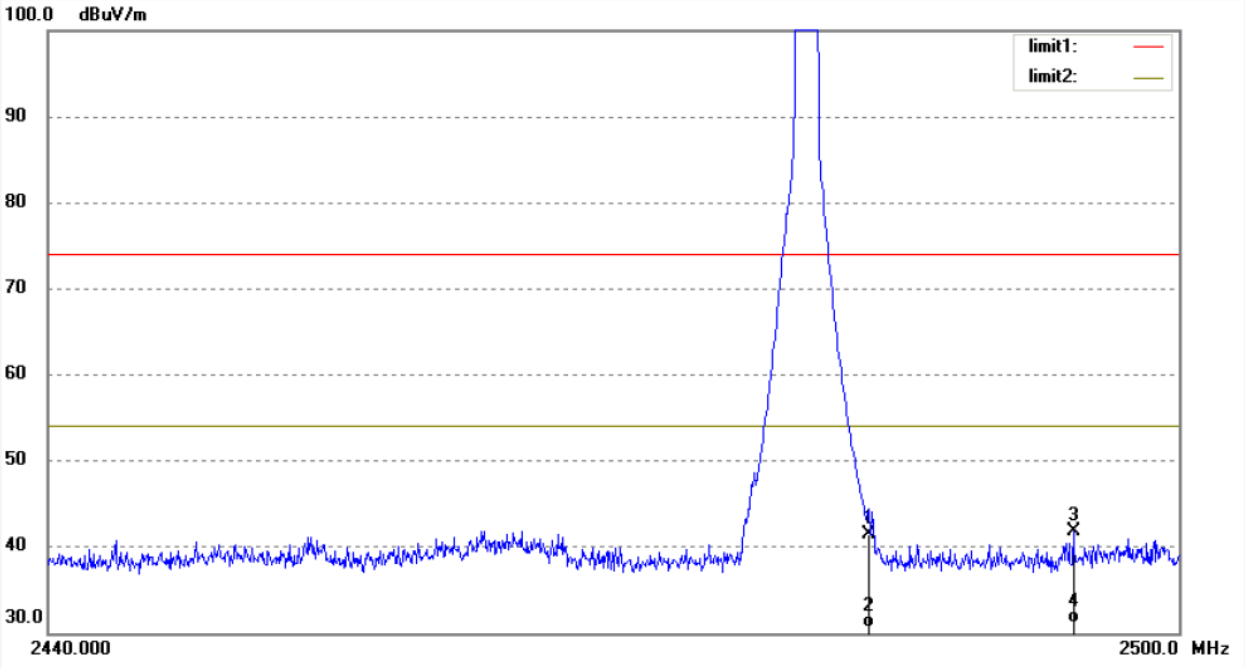
Job No.: ricky-2015 #28	Polarization: Vertical
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 15/05/20/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/15/32
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	48.92	-7.38	41.54	74.00	-32.46	peak			
2	2483.500	37.98	-7.38	30.60	54.00	-23.40	AVG			
3	2494.347	49.25	-7.39	41.86	74.00	-32.14	peak			
4	2494.347	38.55	-7.39	31.16	54.00	-22.84	AVG			

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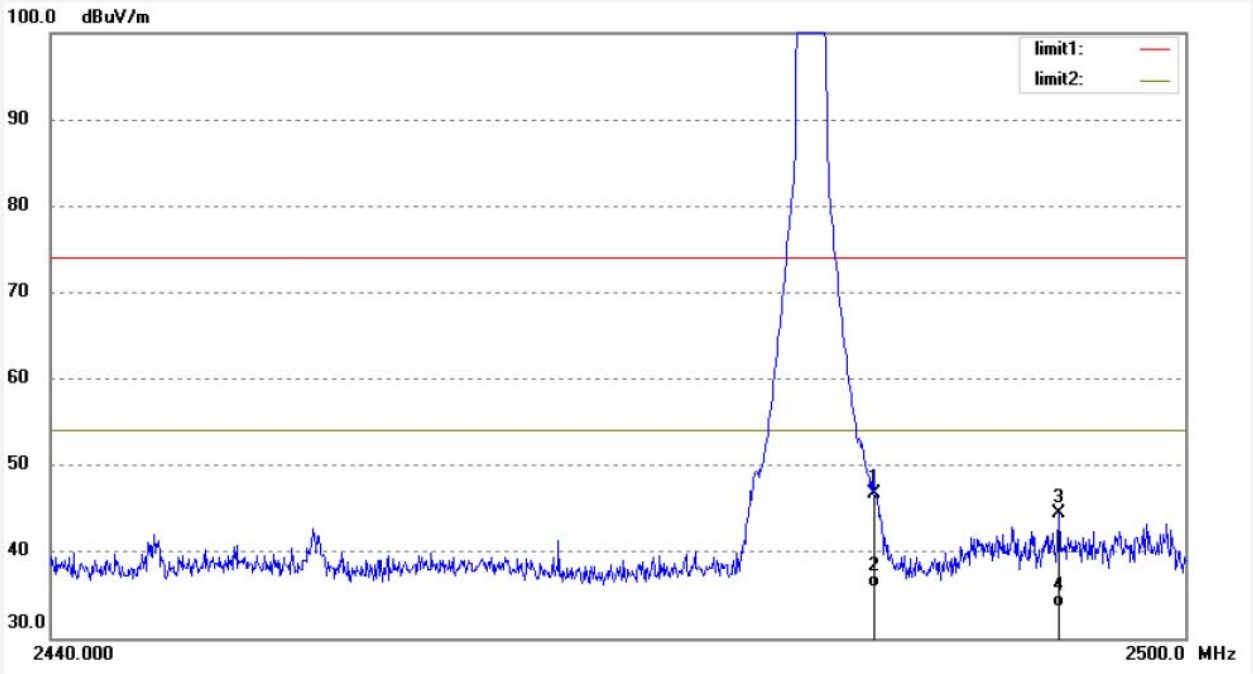
Job No.: ricky-2015 #29	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 5V
Test item: Radiation Test	Date: 15/05/20/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/11/21
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	54.15	-7.38	46.77	74.00	-27.23	peak			
2	2483.500	43.25	-7.38	35.87	54.00	-18.13	AVG			
3	2493.254	51.79	-7.39	44.40	74.00	-29.60	peak			
4	2493.254	40.96	-7.39	33.57	54.00	-20.43	AVG			

9. RADIATED SPURIOUS EMISSION TEST

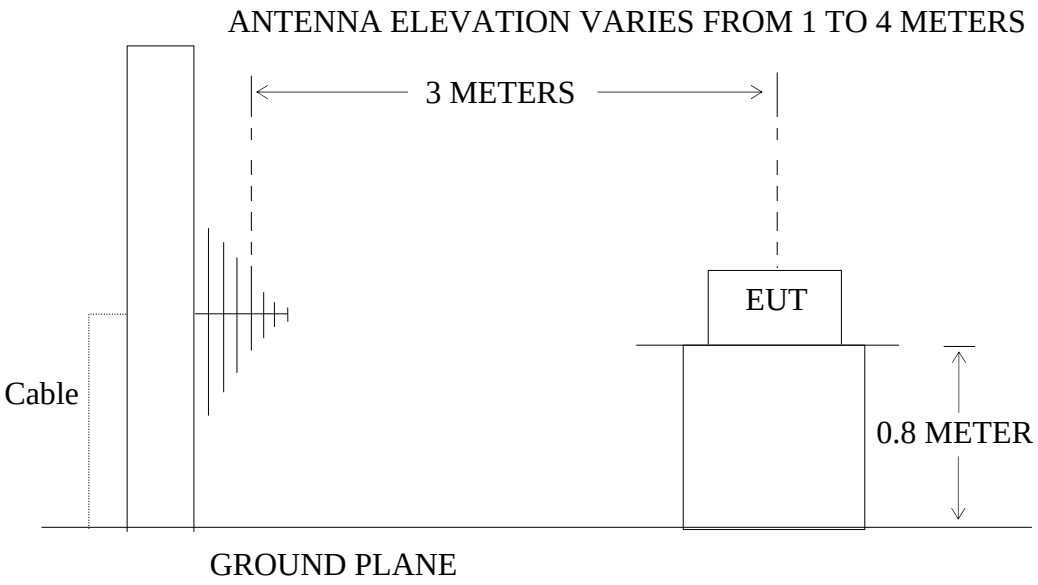
9.1.Block Diagram of Test Setup

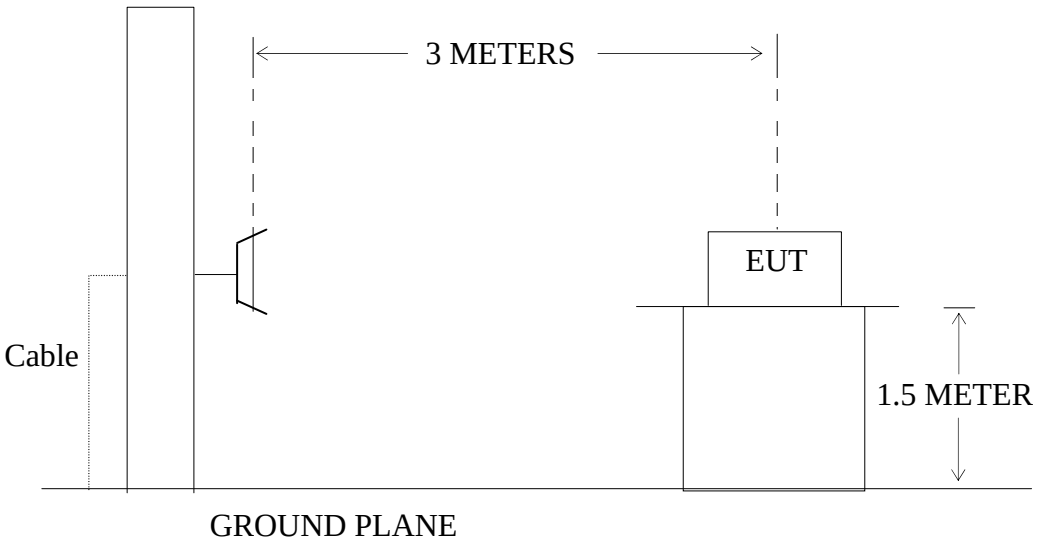
9.1.1.Block diagram of connection between the EUT and peripherals

EUT

Setup: Transmitting mode

9.1.2.Semi-Anechoic Chamber Test Setup Diagram





9.2.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).

9.3.Restricted bands of operation

9.3.1.FCC Part 15.205 Restricted bands of operation

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

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

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

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

9.4. 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.

9.5. Operating Condition of EUT

9.5.1. Setup the EUT and simulator as shown as Section 10.1.

9.5.2. Turn on the power of all equipment.

9.5.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

9.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 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 bilog antenna) is used as receiving antenna.
For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the floor on a support that is RF transparent for the frequencies of interest. 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. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
When average radiated emissions measurements are specified there is also a limit on the peak emissions level which is 20 dB above the applicable maximum permitted average emission limit

RBW (120 kHz), VBW (300 kHz) for QP detector below 1GHz
Peak detector above 1GHz
RBW (1 MHz), VBW (3MHz) for Peak measurement
RBW (1 MHz), VBW (10Hz) for AV measurement

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

9.7.The Field Strength of Radiation Emission Measurement Results

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. The EUT is tested radiation emission at Low, Middle, High channel in three axes. The worst emissions are reported in all channels. The fundamental radiated emissions were reduced by Band Reject Filter in the attached plots.

3. The radiation emissions from 18-25GHz are not reported, because the test values lower than the limits of 20dB.

4. The average measurement was not performed when peak measured data under the limit of average detection.

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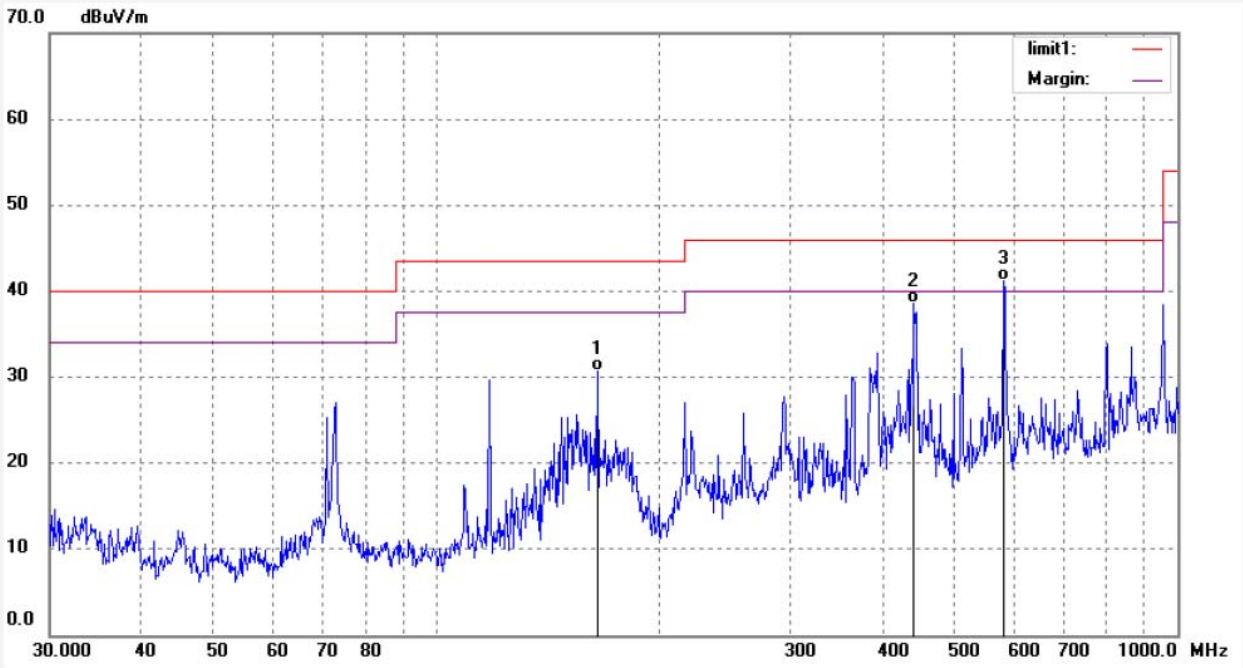
Job No.: ricky-2015 #43	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/06/01/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 8/30/18
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	164.8912	52.99	-22.34	30.65	43.50	-12.85	QP			
2	441.0199	53.54	-14.91	38.63	46.00	-7.37	QP			
3	582.1122	53.21	-12.08	41.13	46.00	-4.87	QP			

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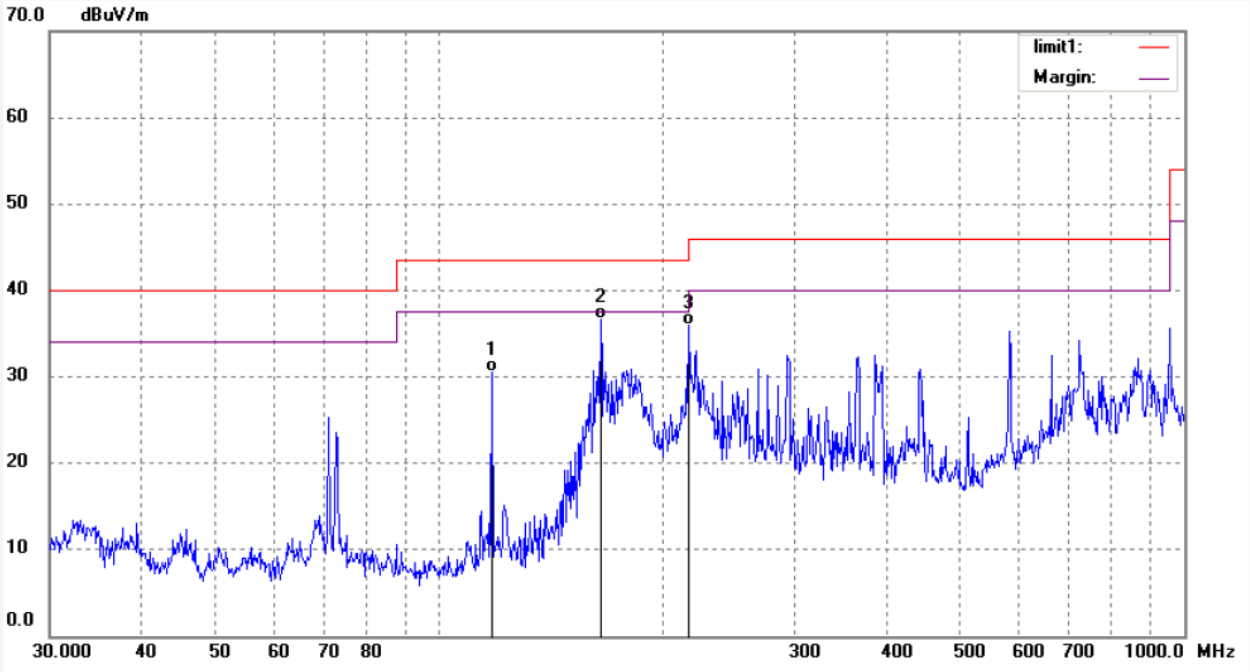
Job No.: ricky-2015 #42
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: BT Headphone
Mode: TX 2402MHz
Model: BT
Manufacturer: Grandsun

Polarization: Horizontal
Power Source: DC 5V
Date: 15/06/01/
Time: 8/29/13
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	117.6815	53.07	-22.45	30.62	43.50	-12.88	QP			
2	164.8912	58.95	-22.34	36.61	43.50	-6.89	QP			
3	216.1197	55.87	-19.96	35.91	46.00	-10.09	QP			

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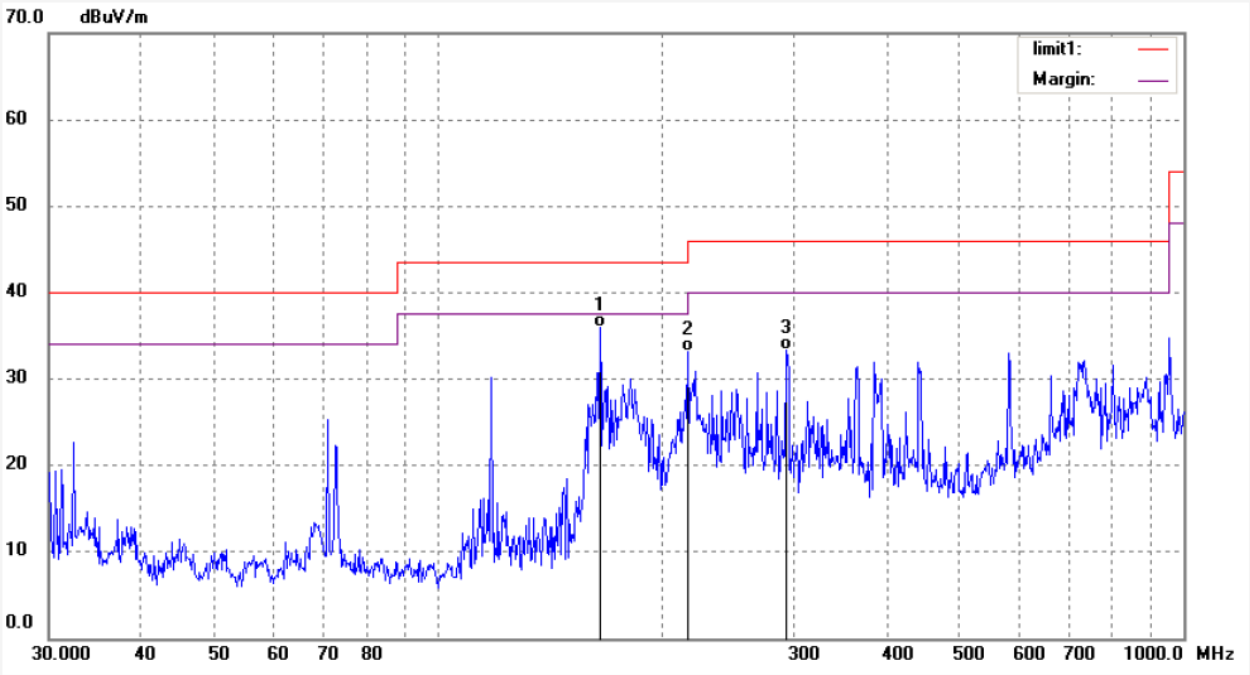
Job No.: ricky-2015 #41	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/06/01/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 8/28/16
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2440MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	164.8912	58.39	-22.34	36.05	43.50	-7.45	QP			
2	216.1197	53.09	-19.96	33.13	46.00	-12.87	QP			
3	293.3933	51.42	-18.00	33.42	46.00	-12.58	QP			

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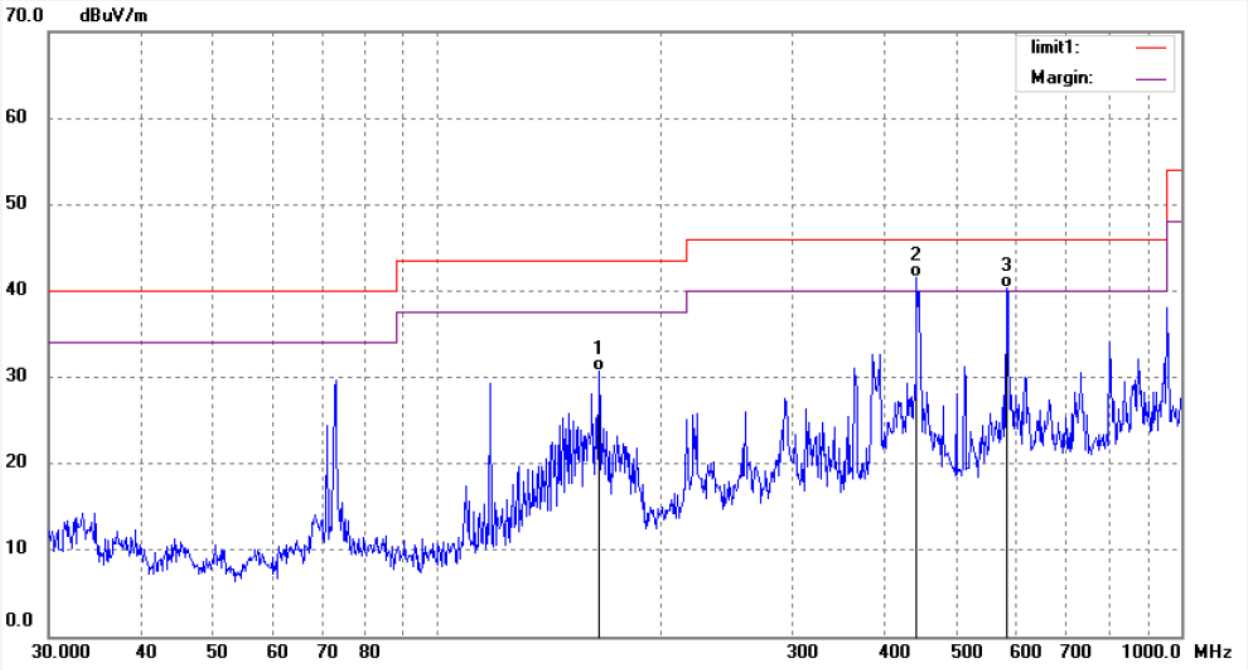
Job No.: ricky-2015 #40	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/06/01/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 8/27/34
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2440MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	164.8912	53.06	-22.34	30.72	43.50	-12.78	QP			
2	441.0199	56.46	-14.91	41.55	46.00	-4.45	QP			
3	582.1122	52.40	-12.08	40.32	46.00	-5.68	QP			

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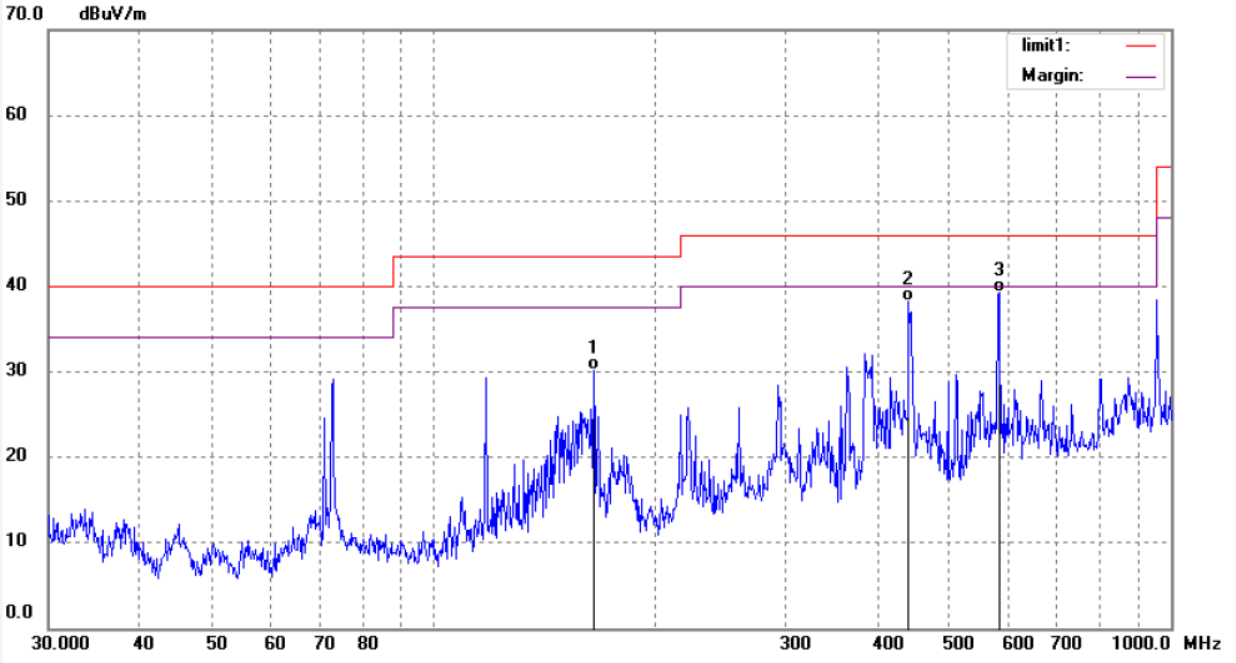
Job No.: ricky-2015 #39	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/06/01/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 8/26/42
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	164.8912	52.56	-22.34	30.22	43.50	-13.28	QP			
2	441.0199	53.08	-14.91	38.17	46.00	-7.83	QP			
3	584.1611	51.38	-12.03	39.35	46.00	-6.65	QP			

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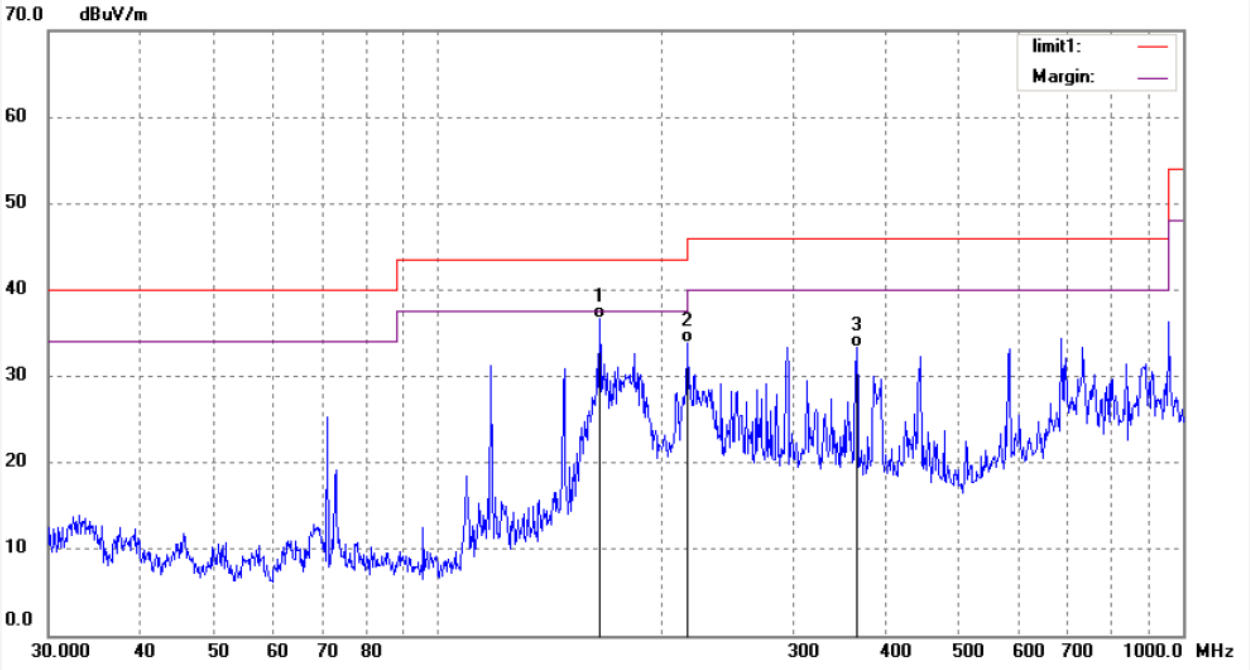
Job No.: ricky-2015 #38	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/06/01/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 8/26/03
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	164.8912	58.92	-22.34	36.58	43.50	-6.92	QP			
2	216.1197	53.81	-19.96	33.85	46.00	-12.15	QP			
3	364.8026	49.27	-15.88	33.39	46.00	-12.61	QP			

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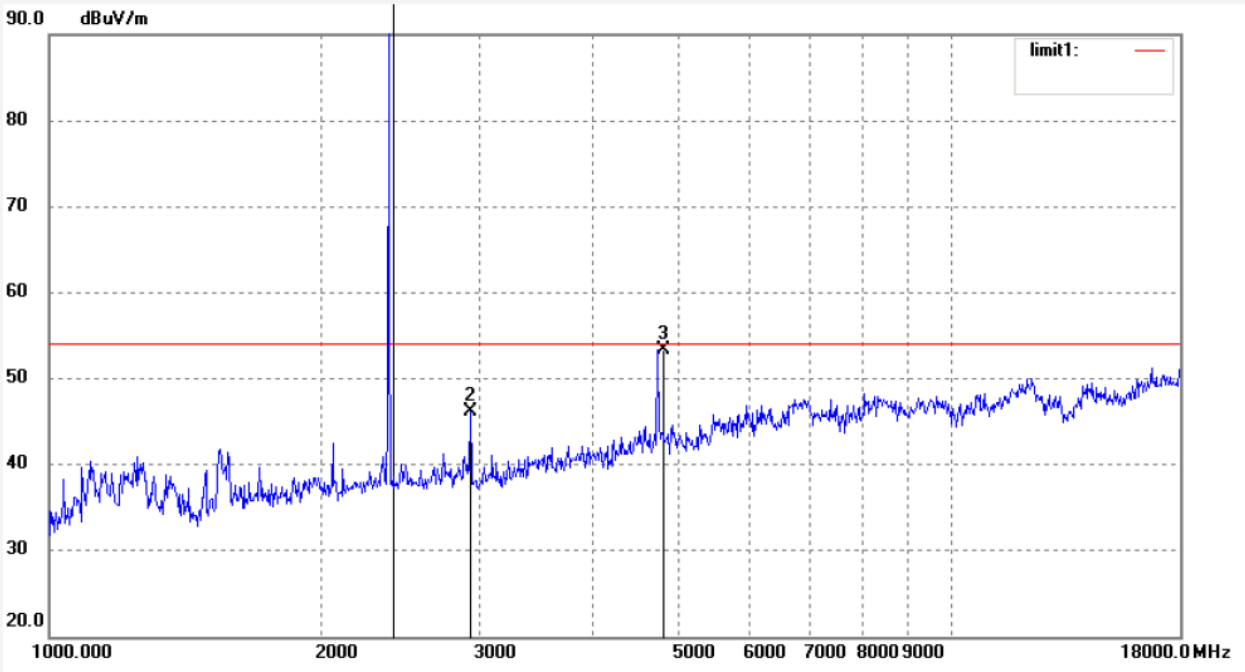
Job No.: ricky-2015 #18
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: BT Headphone
Mode: TX 2402MHz
Model: BT
Manufacturer: Grandsun

Polarization: Horizontal
Power Source: DC 5V
Date: 15/05/20/
Time: 9/47/00
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	118.29	-7.49	110.80	54.00	56.80	peak			
2	2935.789	51.92	-5.68	46.24	54.00	-7.76	peak			
3	4804.000	53.13	0.25	53.38	54.00	-0.62	peak			

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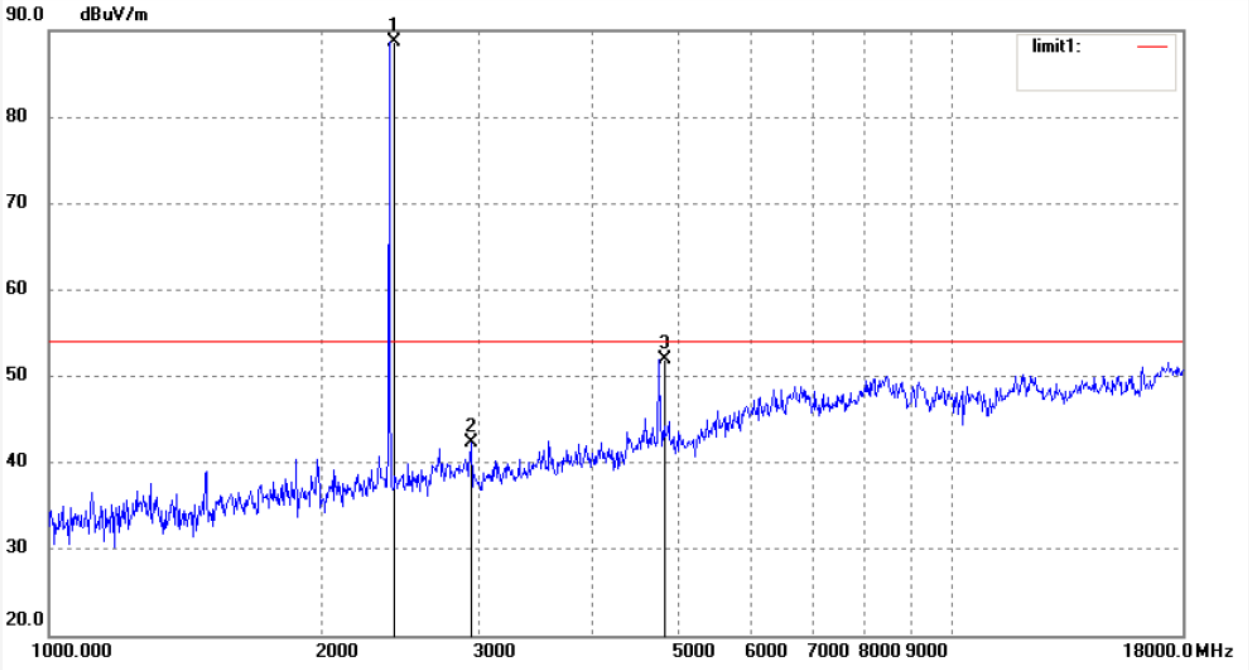
Job No.: ricky-2015 #19	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/05/20/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/49/52
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2402MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	96.26	-7.49	88.77	54.00	34.77	peak			
2	2935.789	47.98	-5.68	42.30	54.00	-11.70	peak			
3	4804.000	51.61	0.25	51.86	54.00	-2.14	peak			

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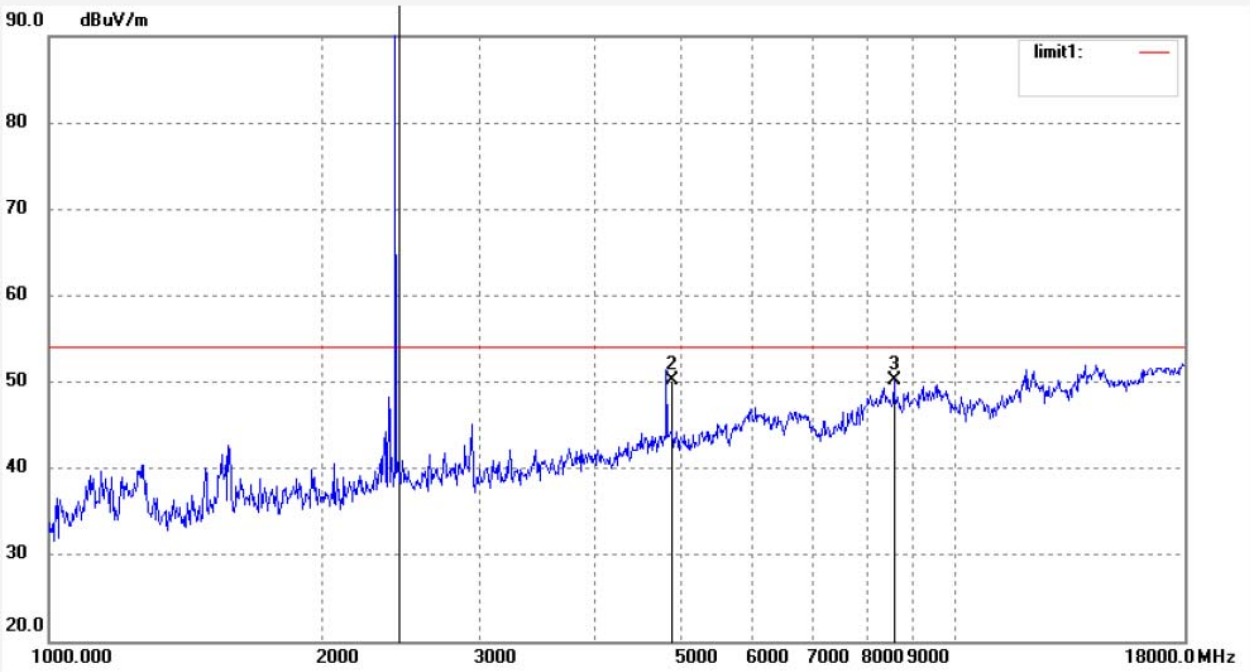
Fax:+86-0755-26503396

Job No.: ricky-2015 #23
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: BT Headphone
Mode: TX 2440MHz
Model: BT
Manufacturer: Grandsun

Polarization: Vertical
Power Source: DC 5V
Date: 15/05/20/
Time: 10/00/12
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.000	119.29	-7.38	111.91	54.00	57.91	peak			
2	4880.000	49.34	0.89	50.23	54.00	-3.77	peak			
3	8593.809	41.53	8.70	50.23	54.00	-3.77	peak			

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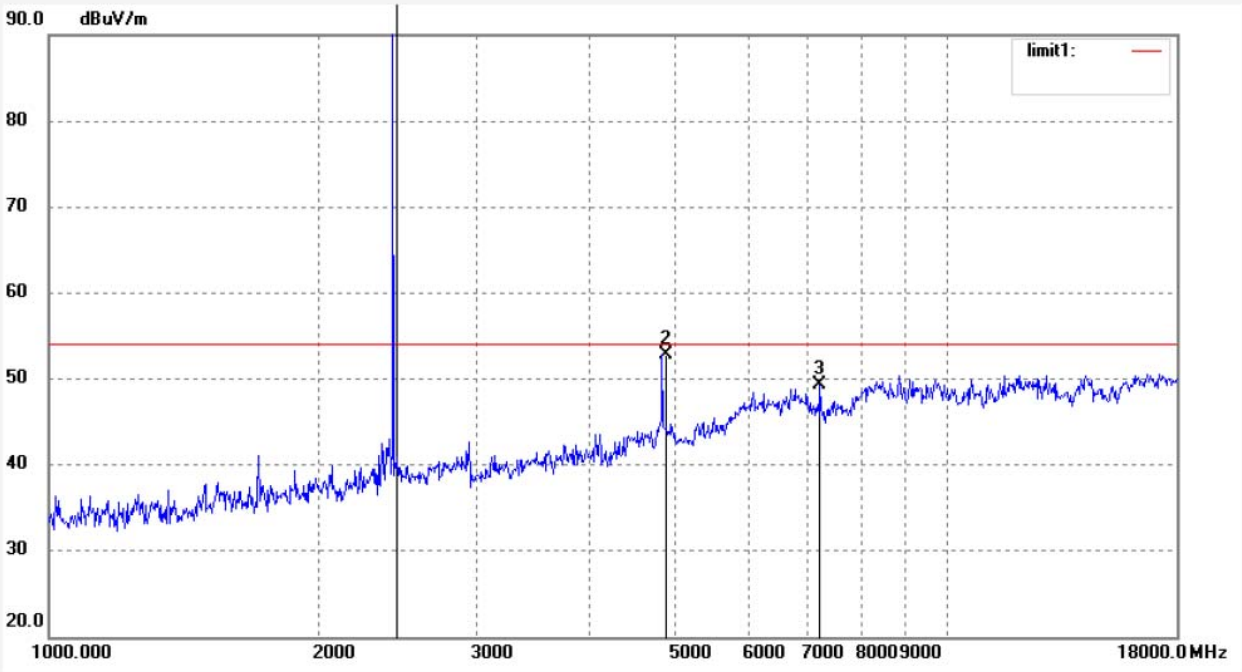
Job No.: ricky-2015 #24
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: BT Headphone
Mode: TX 2440MHz
Model: BT
Manufacturer: Grandsun

Polarization: Horizontal
Power Source: DC 5V
Date: 15/05/20/
Time: 10/03/17
Engineer Signature: Ricky
Distance: 3m

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.000	119.03	-7.38	111.65	54.00	57.65	peak			
2	4880.000	51.98	0.89	52.87	54.00	-1.13	peak			
3	7216.696	44.92	4.37	49.29	54.00	-4.71	peak			

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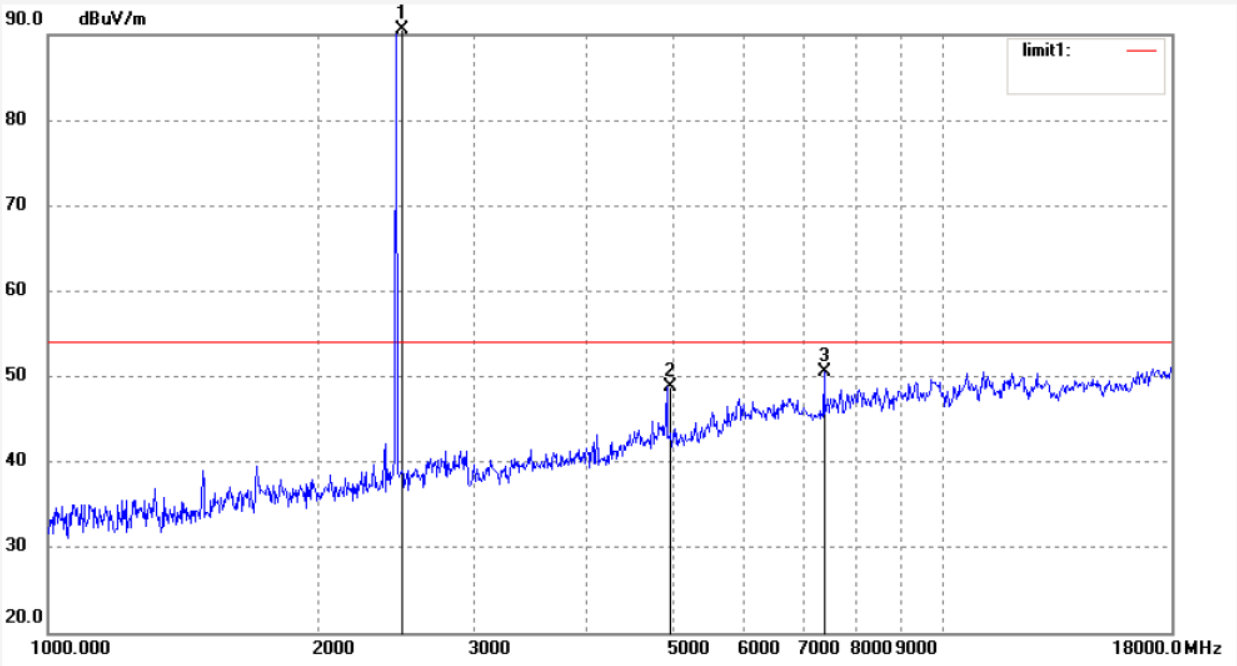
Job No.: ricky-2015 #25	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 5V
Test item: Radiation Test	Date: 15/05/20/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 10/06/31
EUT: BT Headphone	Engineer Signature: Ricky
Mode: TX 2480MHz	Distance: 3m
Model: BT	
Manufacturer: Grandsun	

Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	98.08	-7.38	90.70	54.00	36.70	peak			
2	4960.000	47.52	1.33	48.85	54.00	-5.15	peak			
3	7365.246	46.00	4.62	50.62	54.00	-3.38	peak			

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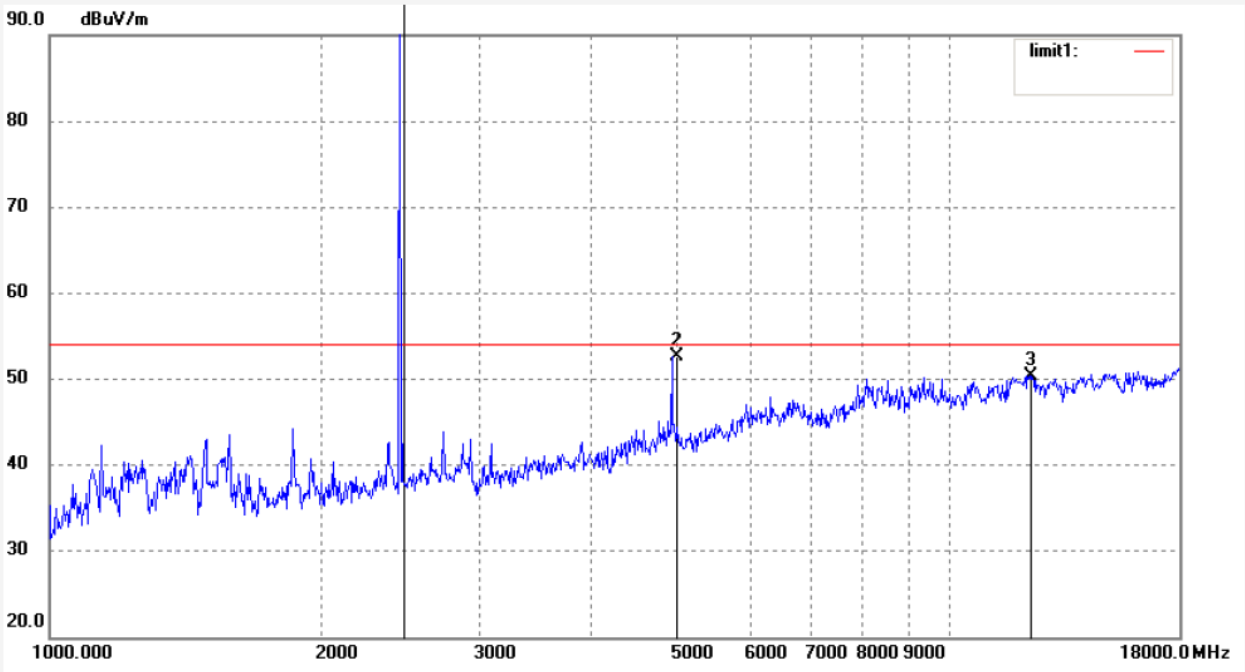
Fax:+86-0755-26503396

Job No.: ricky-2015 #26
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: BT Headphone
Mode: TX 2480MHz
Model: BT
Manufacturer: Grandsun

Polarization: Horizontal
Power Source: DC 5V
Date: 15/05/20/
Time: 10/08/54
Engineer Signature: Ricky
Distance: 3m

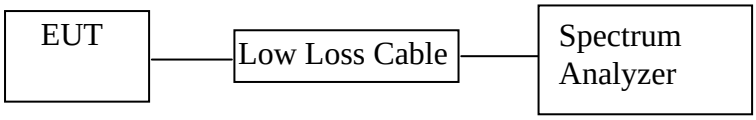
Note: Report No.:ATE201501031



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	119.09	-7.38	111.71	54.00	57.71	peak			
2	4960.000	51.35	1.33	52.68	54.00	-1.32	peak			
3	12329.252	5.28	45.16	50.44	54.00	-3.56	peak			

10. CONDUCTED SPURIOUS EMISSION COMPLIANCE TEST

10.1. Block Diagram of Test Setup



(EUT: BT Headphone)

10.2. The Requirement of Section 15.247(d)

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

10.3. 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.

10.4.Operating Condition of EUT

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

10.4.2.Turn on the power of all equipment.

10.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480 MHz. We select 2402MHz, 2440MHz, and 2480MHz TX frequency to transmit.

10.5.Test Procedure

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

10.5.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz

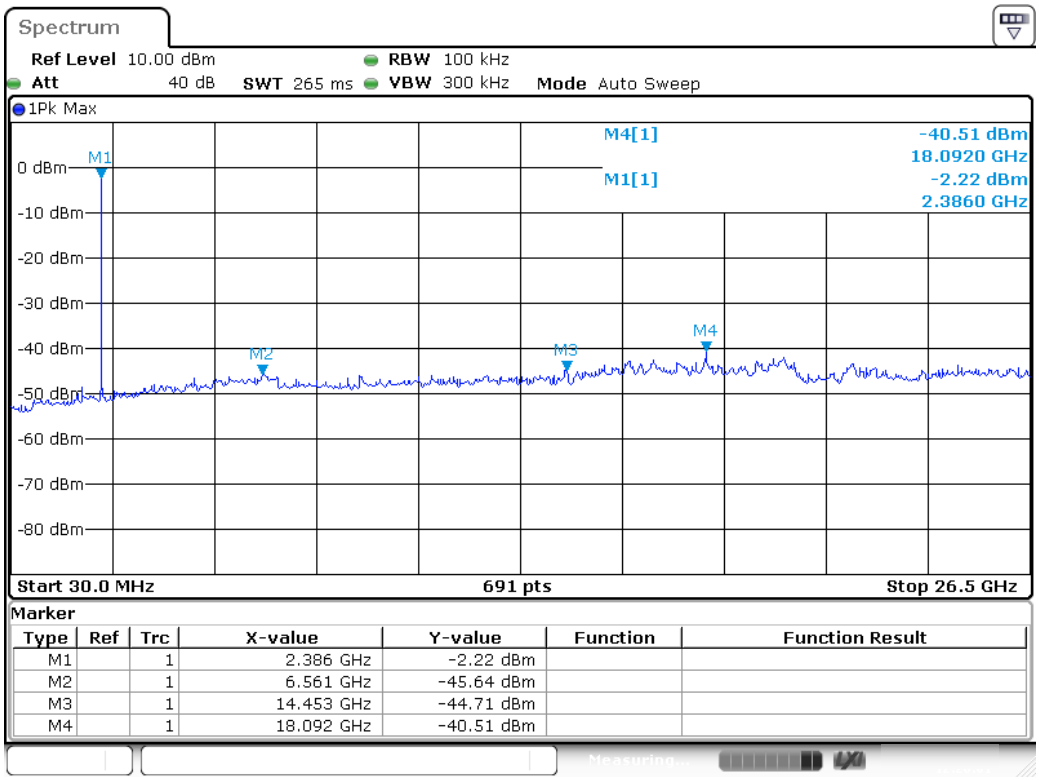
10.5.3.The Conducted Spurious Emission was measured and recorded.

10.6.Test Result

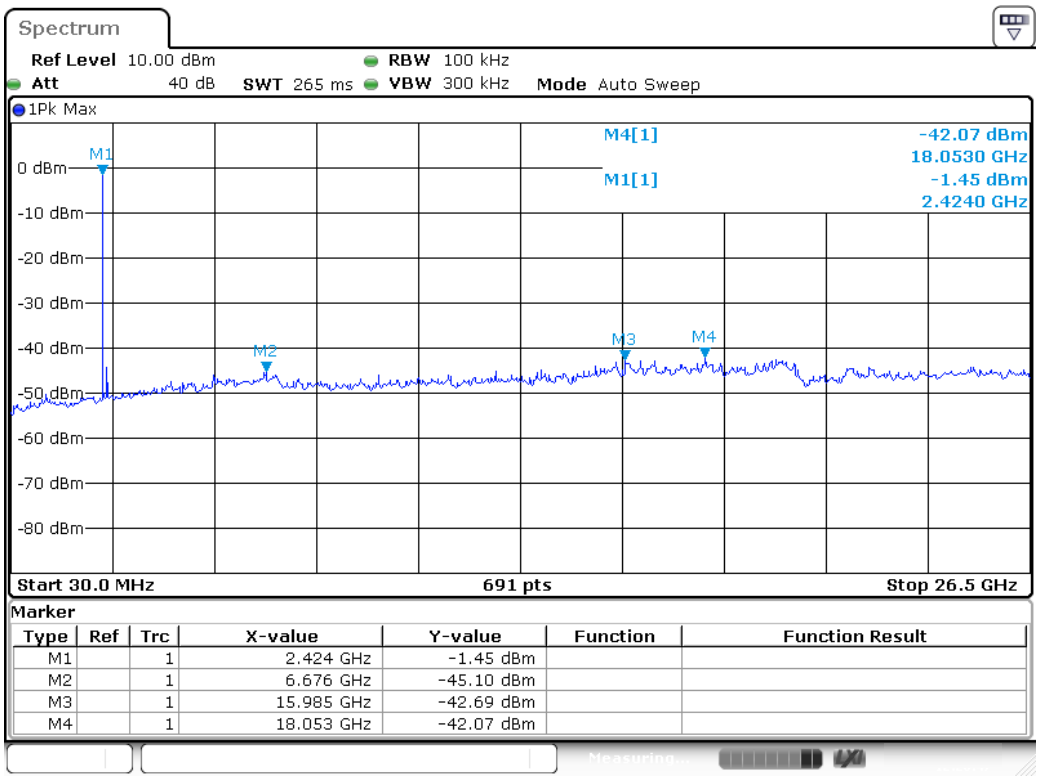
Pass.

The spectrum analyzer plots are attached as below.

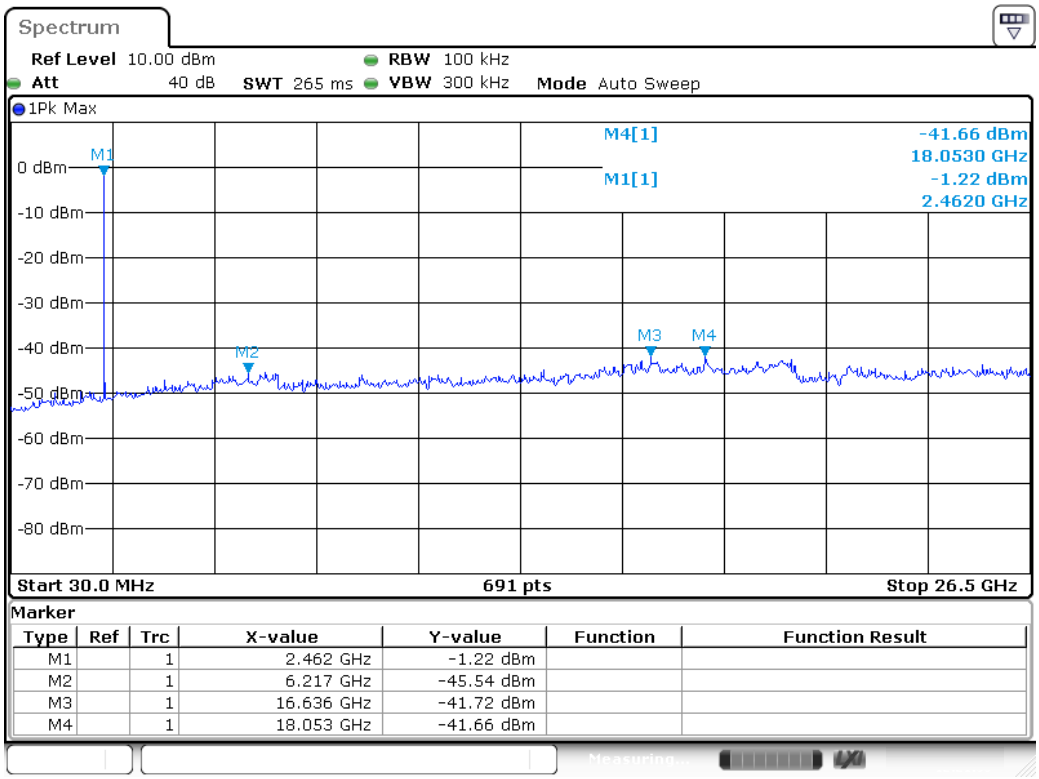
BLE Channel Low 2402MHz



BLE Channel Middle 2440MHz

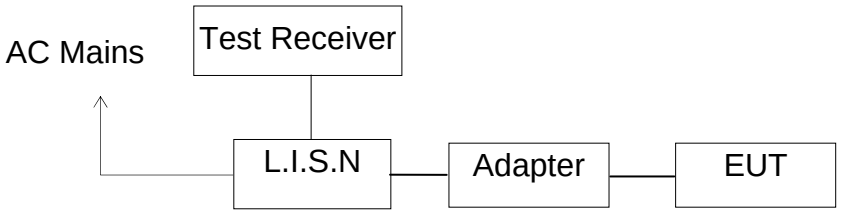


BLE Channel High 2480MHz



11.POWER LINE CONDUCTED MEASUREMENT

11.1.Block Diagram of Test Setup



(EUT: BT Headphone)

11.2.Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies. NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

11.3.Configuration of EUT on Measurement

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

11.4.Operating Condition of EUT

11.4.1.Setup the EUT and simulator as shown as Section 5.1.

11.4.2.Turn on the power of all equipment.

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

11.5.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.

11.6.Power Line Conducted Emission Measurement Results

PASS.

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

The spectral diagrams are attached as below.

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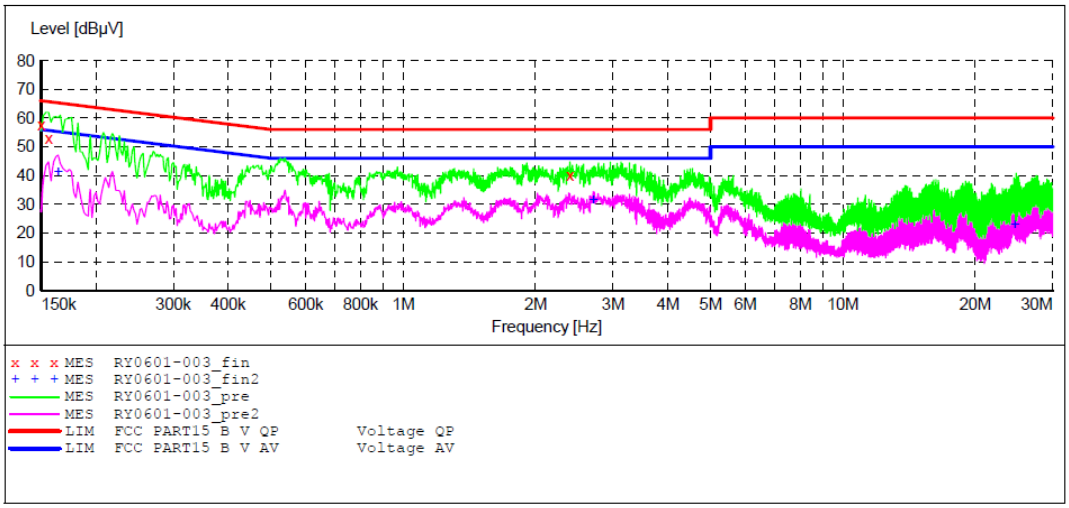
CONDUCTED EMISSION STANDARD FCC PART15 B

EUT:	BT Headphone M/N:BT
Manufacturer:	Grandsun
Operating Condition:	Operation
Test Site:	1#Shielding Room
Operator:	Ricky
Test Specification:	L 120V/60Hz
Comment:	Report No.:ATE201501031
Start of Test:	6/1/2015 / 8:55:02AM

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

Short Description: _SUB_STD_VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	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	4.5 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "RY0601-003_fin"

6/1/2015 8:56AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	57.60	10.5	66	8.4	QP	L1	GND
0.156000	52.70	10.5	66	13.0	QP	L1	GND
2.395000	40.00	11.0	56	16.0	QP	L1	GND

MEASUREMENT RESULT: "RY0601-003_fin2"

6/1/2015 8:56AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.164000	41.30	10.5	55	14.0	AV	L1	GND
2.705000	31.60	11.0	46	14.4	AV	L1	GND
24.595000	22.70	11.5	50	27.3	AV	L1	GND

ACCURATE TECHNOLOGY CO.,LTD

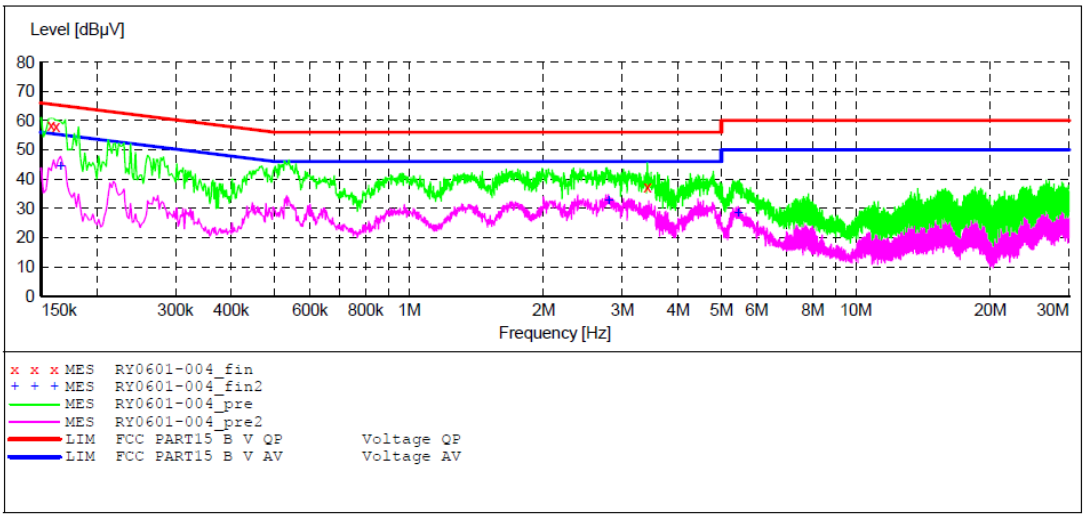
CONDUCTED EMISSION STANDARD FCC PART15 B

EUT:	BT Headphone M/N:BT
Manufacturer:	Grandsun
Operating Condition:	Operation
Test Site:	1#Shielding Room
Operator:	Ricky
Test Specification:	N 120V/60Hz
Comment:	Report No.:ATE201501031
Start of Test:	6/1/2015 / 8:57:35AM

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

Short Description: _SUB_STD_VTERM2 1.70

Start Frequency	Stop Frequency	Step Width	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	4.5 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "RY0601-004_fin"

6/1/2015 8:59AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.158000	58.20	10.5	66	7.4	QP	N	GND
0.162000	58.10	10.5	65	7.3	QP	N	GND
3.415000	37.20	11.1	56	18.8	QP	N	GND

MEASUREMENT RESULT: "RY0601-004_fin2"

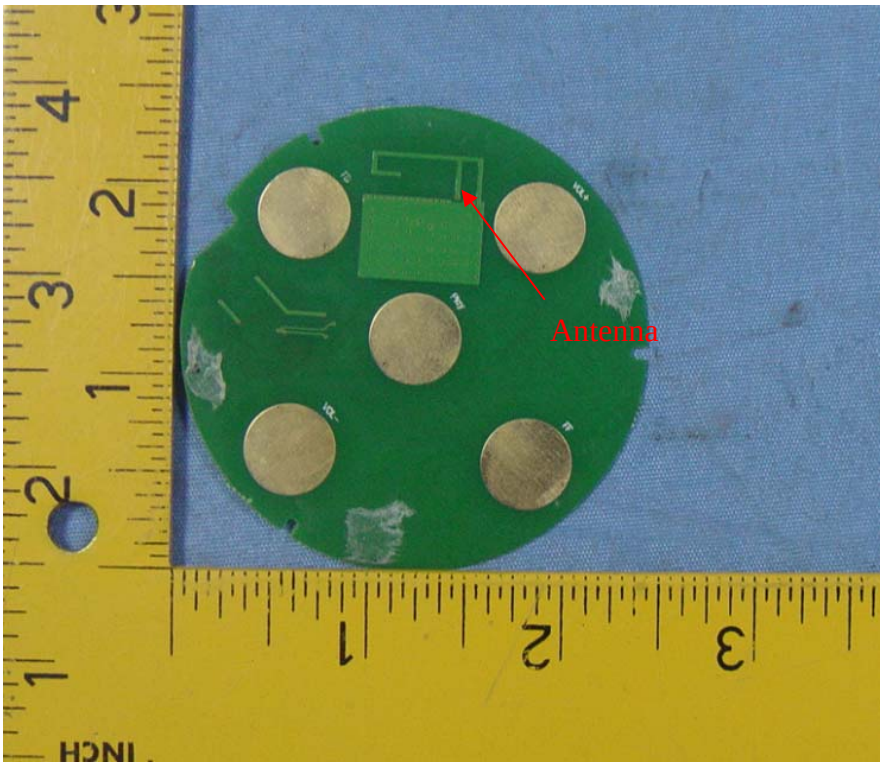
6/1/2015 8:59AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.166000	44.20	10.5	55	11.0	AV	N	GND
2.795000	32.50	11.0	46	13.5	AV	N	GND
5.450000	28.50	11.2	50	21.5	AV	N	GND

12. ANTENNA REQUIREMENT

12.1. 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.

12.2. Antenna Construction

Device is equipped with unique antenna, which isn't displaced by other antenna. Therefore, the equipment complies with the antenna requirement of Section 15.203.