APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Lightcomm Technology Co., Ltd.

Portable Bluetooth Speaker
Model No.: BTD15-E, NS-SPBTWAVE2,
NS-SPBTWAVE2-XX（XX=A-Z, a-z, 0-9,or blank）XX represents different color

FCC ID: XMF-SPBTWAVE2

Prepared for	:	Lightcomm Technology Co., Ltd.
Address	:	RM 1808 18/F FO TAN INDUSTRIAL CENTRE NOS. 26-28 AU PUI WAN STREET FO TAN SHATIN NEW TERRITORIES
Prepared by	:	Shenzhen Accurate Technology Co., Ltd.
Address	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.
		Tel: (0755) 26503290 Fax: (0755) 26503396

Report No.	:	ATE20180327
Date of Test	:	Feb. 7--Mar. 1, 2018
Date of Report	:	Mar. 8, 2018

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Test Report Certification

Applicant	:	Lightcomm Technology Co., Ltd.
Address	:	RM 1808 18/F FO TAN INDUSTRIAL CENTRE NOS. 26-28 AU PUI WAN STREET FO TAN SHATIN NEW TERRITORIES
Manufacturer	:	Lightcomm Technology Co., Ltd.
Address	:	RM 1808 18/F FO TAN INDUSTRIAL CENTRE NOS. 26-28 AU PUI WAN STREET FO TAN SHATIN NEW TERRITORIES
Product	:	Portable Bluetooth Speaker
Model No.	:	BTD15-E, NS-SPBTWAVE2, NS-SPBTWAVE2-XX（XX=A-Z, a-z, 0-9,or blank）XX represents different color

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 Apr 05, 2017 KDB558074 D01 DTS Meas Guidance v04 for compliance to FCC 47CFR 15.247 requirements.

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. 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 Shenzhen Accurate Technology Co., Ltd.

Date of Test :	Feb. 7--Mar. 1, 2018
Date of Report:	Mar. 8, 2018

Prepared by : (Stan Yang, Engineer)

Approved & Authorized Signer : (Sean Liu, Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Portable Bluetooth Speaker
Model Number	:	BTD15-E, NS-SPBTWAVE2, NS-SPBTWAVE2-XX（XX=A-Z, a-z, 0-9,or blank）XX represents different color (Note: Above models are identical in schematic, structure and critical components except for model name, So we prepare NS-SPBTWAVE2-BK for test.)
Bluetooth version	:	BT V4.1 LE
Frequency Range	:	2402MHz-2480MHz
Number of Channels	:	40
Antenna Gain	:	0dBi
Antenna type	:	PCB Antenna
Modulation mode	:	GFSK
Power Supply	:	DC 3.7V (Powered by Lithium battery) or DC 5V (Powered by USB port)
Trade Name	:	n.a
Applicant	:	Lightcomm Technology Co., Ltd.
Address	:	RM 1808 18/F FO TAN INDUSTRIAL CENTRE NOS. 26-28 AU PUI WAN STREET FO TAN SHATIN NEW TERRITORIES
Manufacturer	:	Lightcomm Technology Co., Ltd.
Address	:	RM 1808 18/F FO TAN INDUSTRIAL CENTRE NOS. 26-28 AU PUI WAN STREET FO TAN SHATIN NEW TERRITORIES
Date of sample received	:	Feb. 24, 2018
Date of Test	:	Feb. 7--Mar. 1, 2018

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

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

1.4.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

1.5.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	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 06, 2018	Jan. 05, 2019
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 06, 2018	Jan. 05, 2019
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 06, 2018	Jan. 05, 2019
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 06, 2018	Jan. 05, 2019
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 06, 2018	Jan. 05, 2019
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 12, 2018	Jan. 11, 2019
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 12, 2018	Jan. 11, 2019
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 12, 2018	Jan. 11, 2019
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 12, 2018	Jan. 11, 2019
Open Switch and Control Unit	Rohde&Schwarz	OSP120 + OSP-B157	101244 + 100866	Jan. 06, 2018	Jan. 05, 2019
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 06, 2018	Jan. 05, 2019
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 06, 2018	Jan. 05, 2019
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 06, 2018	Jan. 05, 2019
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 06, 2018	Jan. 05, 2019

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

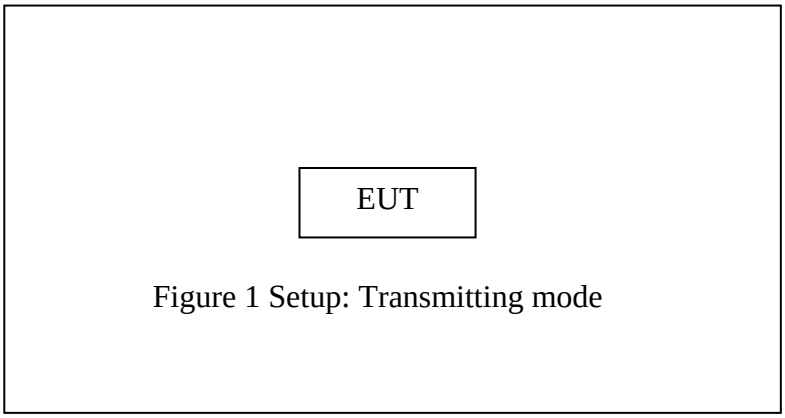


Figure 1 Setup: Transmitting mode

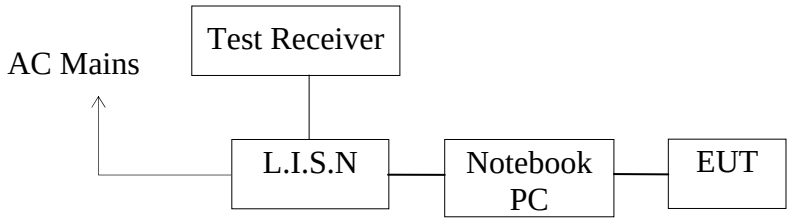
4. TEST PROCEDURES AND RESULTS

FCC&IC Rules	Description of Test	Result
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 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

Remark：The RF module of the product is the same as the report ATE20180324, Part of the report's test data reference to report ATE20180324.

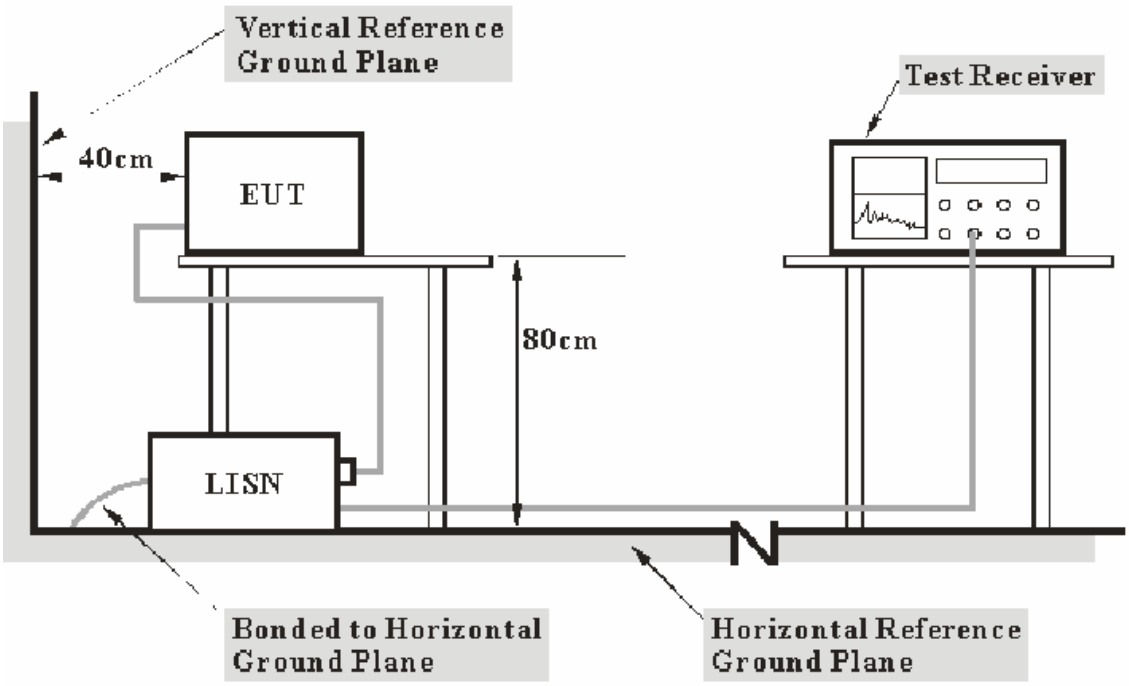
5. POWER LINE CONDUCTED MEASUREMENT

5.1.Block Diagram of Test Setup



(EUT: Portable Bluetooth Speaker)

5.2.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.

5.3.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.		

5.4.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.

5.5.Operating Condition of EUT

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

5.5.2. Turn on the power of all equipment.

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

5.6.Test Procedure

The EUT is put on the plane 0.8 m 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.

5.7.Data Sample

Frequency (MHz)	QuasiPeak Level (dBμv)	Average Level (dBμv)	Transducer value (dB)	QuasiPeak Result (dBμv)	Average Result (dBμv)	QuasiPeak Limit (dBμv)	Average Limit (dBμv)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	29.4	18.3	11.1	40.5	29.4	56.0	56.0	15.5	16.6	Pass

Transducer value = Insertion loss of LISN + Cable Loss
Result = Quasi-peak Level/Average Level + Transducer value
Limit = Limit stated in standard

Calculation Formula:
Margin = Limit – Reading level value – Transducer value

5.8.Power Line Conducted Emission Measurement Results

PASS.

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

Test mode : BT Communication
Test Voltage: 120V/60Hz

MEASUREMENT RESULT: "TUV-0227-03_fin"

2/27/2018

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.150000	53.40	10.5	66	12.6	QP	L1	GND
0.480000	39.60	10.7	56	16.7	QP	L1	GND
4.520000	33.50	11.1	56	22.5	QP	L1	GND

MEASUREMENT RESULT: "TUV-0227-03_fin2"

2/27/2018

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.495000	37.10	10.7	46	9.0	AV	L1	GND
2.120000	26.90	11.0	46	19.1	AV	L1	GND
23.995000	22.10	11.5	50	27.9	AV	L1	GND

MEASUREMENT RESULT: "TUV-0227-04_fin"

2/27/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.170000	49.00	10.5	65	16.0	QP	N	GND
0.485000	40.30	10.7	56	16.0	QP	N	GND
3.660000	30.80	11.1	56	25.2	QP	N	GND

MEASUREMENT RESULT: "TUV-0227-04_fin2"

2/27/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.490000	36.90	10.7	46	9.3	AV	N	GND
2.130000	26.90	11.0	46	19.1	AV	N	GND
17.380000	17.10	11.4	50	32.9	AV	N	GND

Emissions attenuated more than 20 dB below the permissible value are not reported. The spectral diagrams are attached as below.

ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART 15 C

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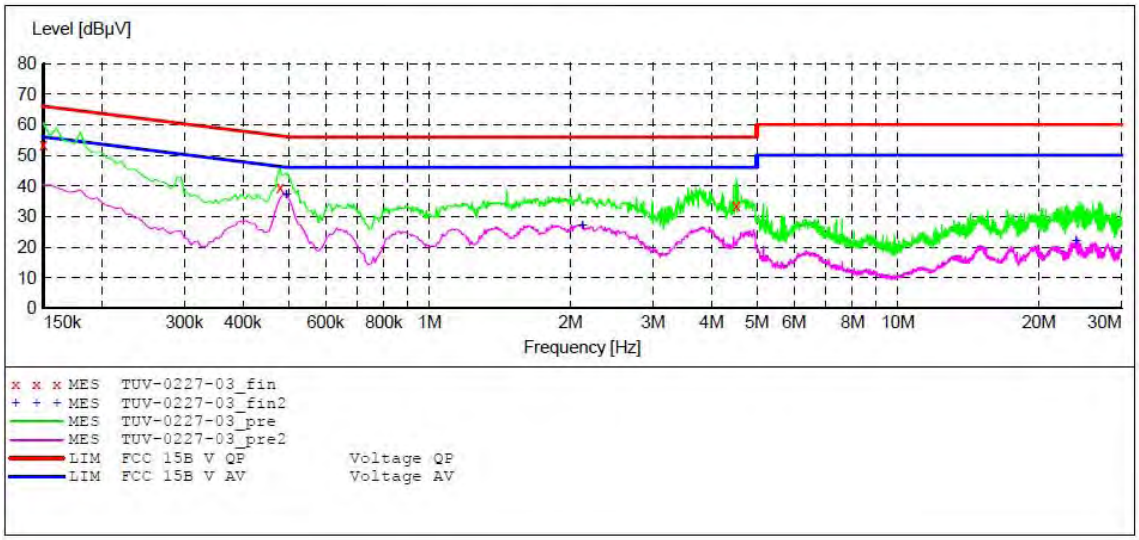
EUT:                 Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer:        Lightcomm Technology Co., Ltd.
Operating Condition: BT Communication
Test Site:           1#Shielding Room
Operator:            WADE
Test Specification:  L 120V/60Hz
Comment:             Mains port
Start of Test:       2/27/2018 /
```

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	5.0 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "TUV-0227-03_fin"

2/27/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.150000	53.40	10.5	66	12.6	QP	L1	GND
0.480000	39.60	10.7	56	16.7	QP	L1	GND
4.520000	33.50	11.1	56	22.5	QP	L1	GND

MEASUREMENT RESULT: "TUV-0227-03_fin2"

2/27/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.495000	37.10	10.7	46	9.0	AV	L1	GND
2.120000	26.90	11.0	46	19.1	AV	L1	GND
23.995000	22.10	11.5	50	27.9	AV	L1	GND

ACCURATE TECHNOLOGY CO.,LTD

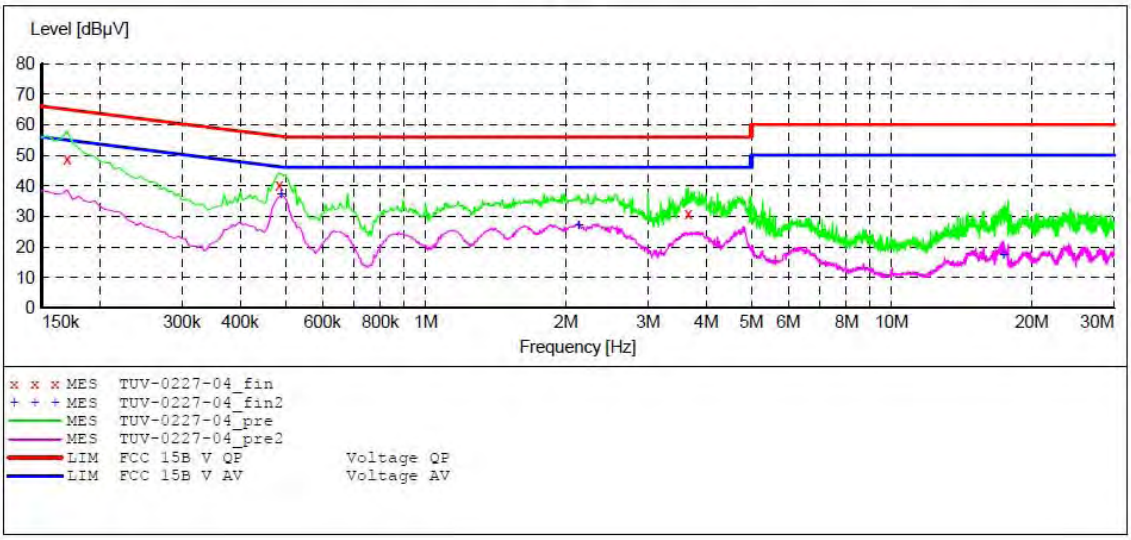
CONDUCTED EMISSION STANDARD FCC PART 15 C

EUT: Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.
Operating Condition: BT Communication
Test Site: 1#Shielding Room
Operator: WADE
Test Specification: N 120V/60Hz
Comment: Mains port
Start of Test: 2/27/2018 /

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	5.0 kHz	QuasiPeak Average	1.0 s	9 kHz	NSLK8126 2008



MEASUREMENT RESULT: "TUV-0227-04_fin"

2/27/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.170000	49.00	10.5	65	16.0	QP	N	GND
0.485000	40.30	10.7	56	16.0	QP	N	GND
3.660000	30.80	11.1	56	25.2	QP	N	GND

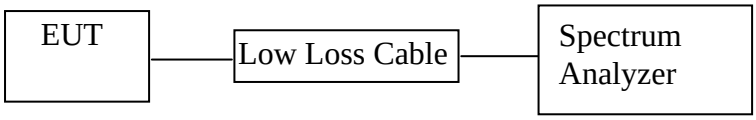
MEASUREMENT RESULT: "TUV-0227-04_fin2"

2/27/2018

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.490000	36.90	10.7	46	9.3	AV	N	GND
2.130000	26.90	11.0	46	19.1	AV	N	GND
17.380000	17.10	11.4	50	32.9	AV	N	GND

6. 6DB BANDWIDTH MEASUREMENT

6.1.Block Diagram of Test Setup



(EUT: Portable Bluetooth Speaker)

6.2.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.

6.3.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.

6.4.Operating Condition of EUT

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

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, 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 100 kHz and VBW to 300 kHz.

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

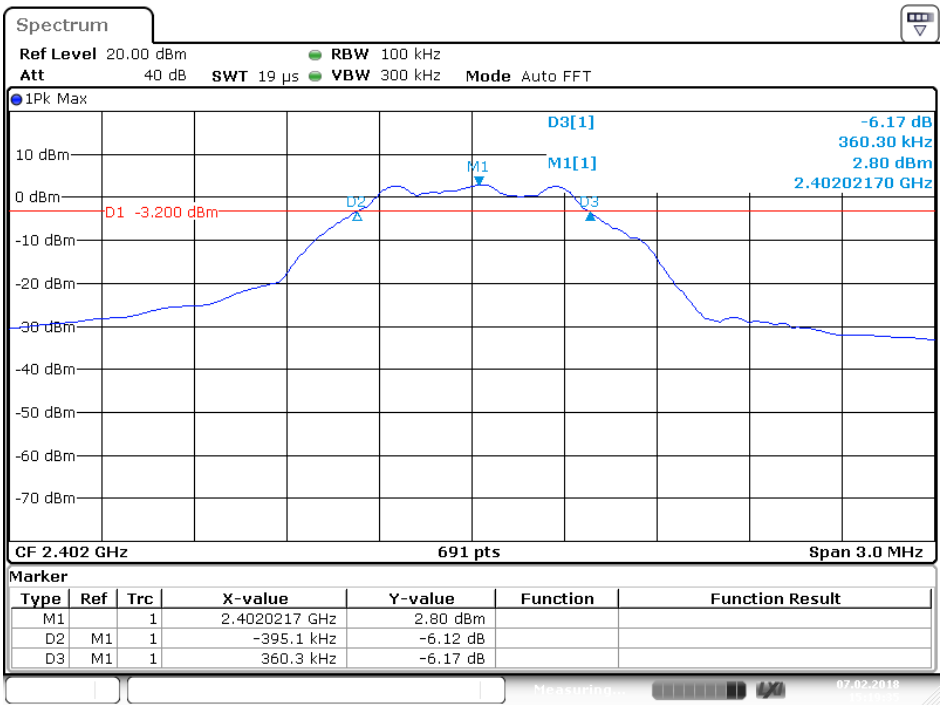
6.6.Test Result

Channel	Frequency (MHz)	6 dB Bandwith (MHz)	Minimum Limit(MHz)	PASS/FAIL
0	2402	0.755	0.5	PASS
19	2440	0.755	0.5	PASS
39	2480	0.760	0.5	PASS

Note: The RF module of the product is the same as the report ATE20180324, so the data Reference to report is ATE20180324.

The spectrum analyzer plots are attached as below.

channel 0



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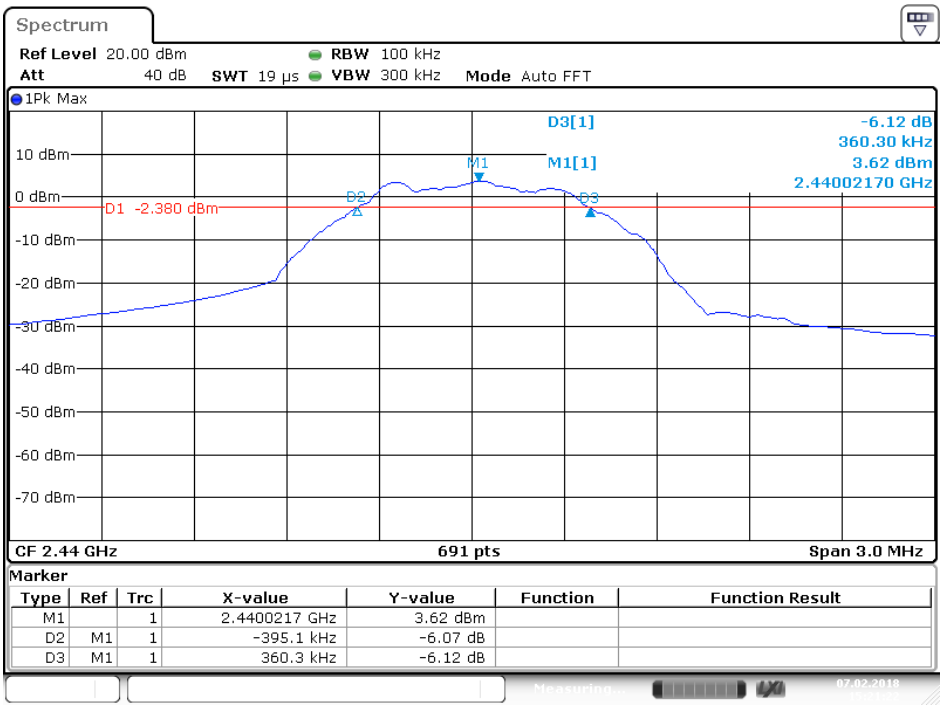
channel 19



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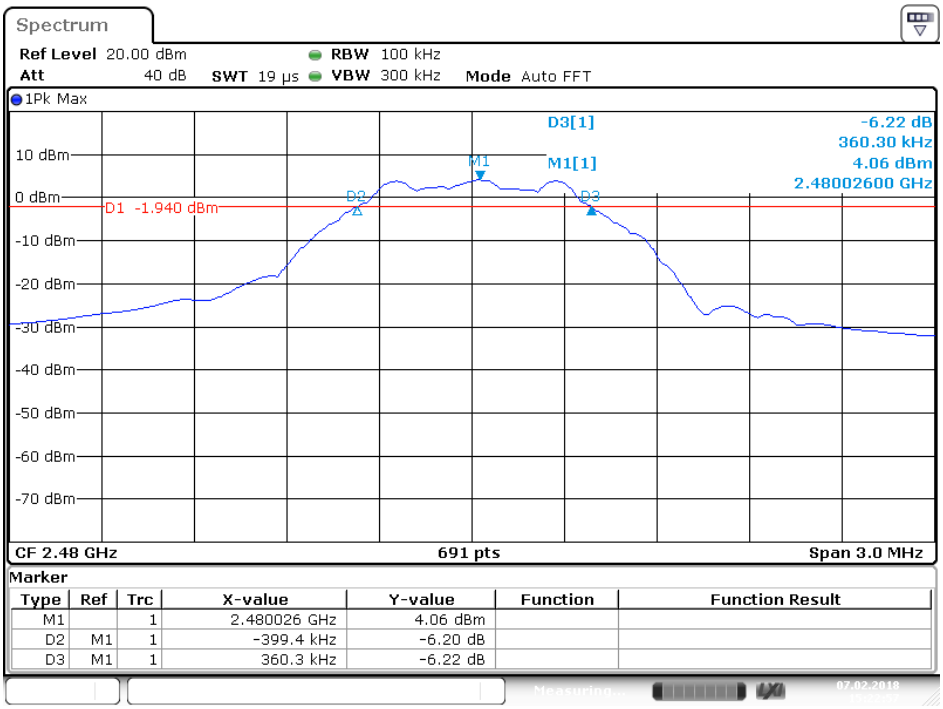
channel 39



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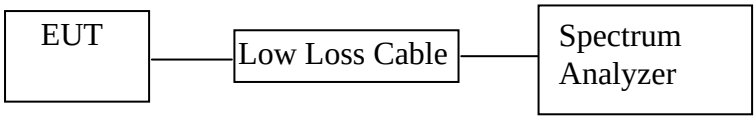
7. MAXIMUM PEAK OUTPUT POWER

7.1.Block Diagram of Test Setup



(EUT:Portable Bluetooth Speaker)

7.2.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.

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

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 RBW of spectrum analyzer to 1 MHz and VBW to 3MHz.

7.5.3.Measurement the maximum peak output power.

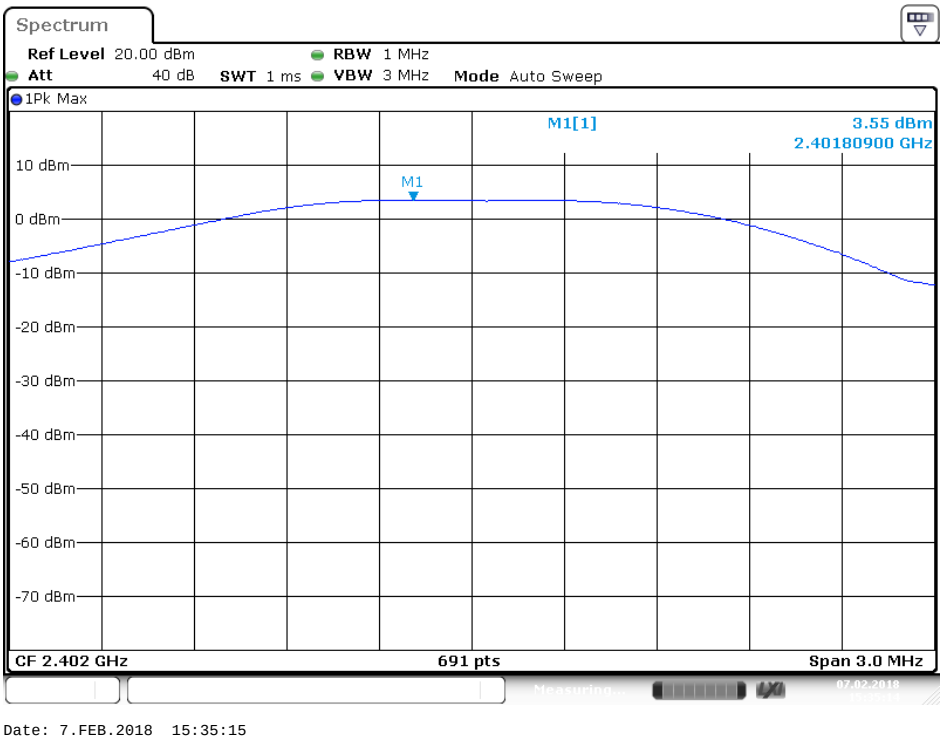
7.6.Test Result

Channel	Frequency (MHz)	Peak Power Output (dBm)	Antenna gain (dBi)	E.I.P.R. (dBm)	Peak Power Limit (dBm)	Pass / Fail
0	2402	3.55	0	3.55	30	PASS
19	2440	4.34	0	4.34	30	PASS
39	2480	4.80	0	4.80	30	PASS

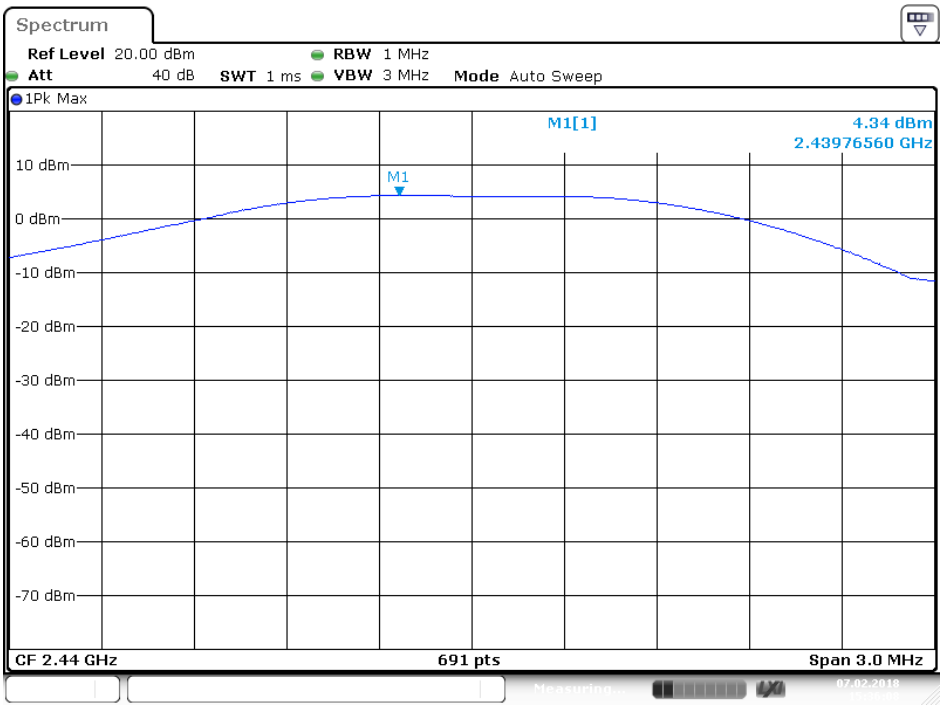
Note: The RF module of the product is the same as the report ATE20180324, so the data Reference to report is ATE20180324.

The spectrum analyzer plots are attached as below.

channel 0



channel 19



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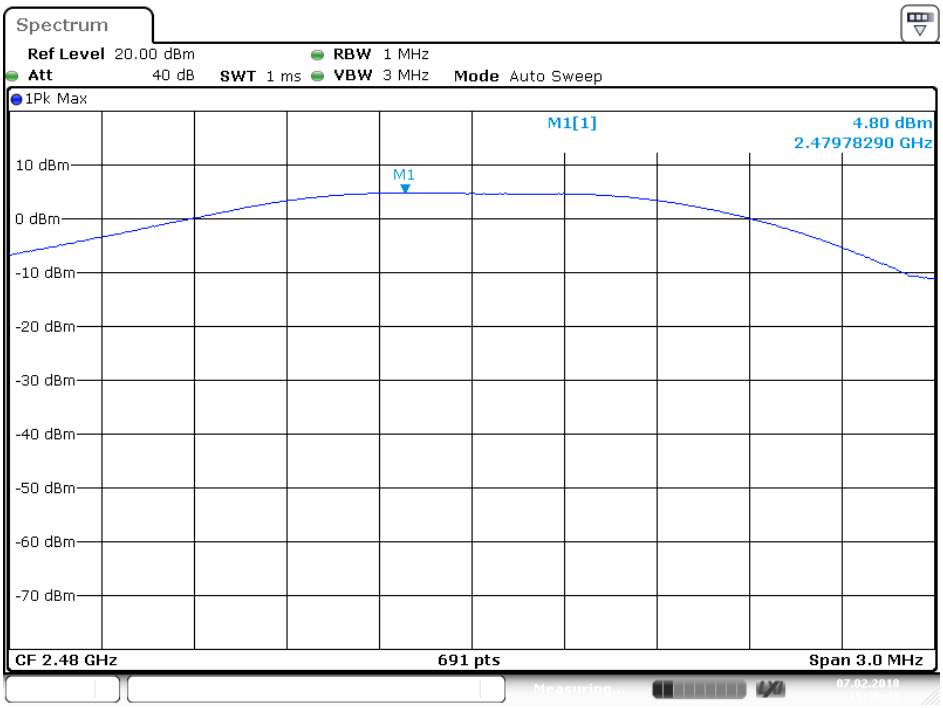
channel 39



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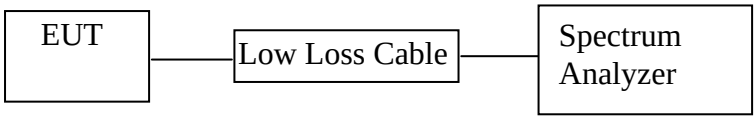
8. POWER SPECTRAL DENSITY MEASUREMENT

8.1.Block Diagram of Test Setup



(EUT:Portable Bluetooth Speaker)

8.2.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.

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 modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2440MHz, 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.Measurement Procedure PKPSD:

8.5.3.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 3kHz) and repeat.

8.5.4.Measurement the maximum power spectral density.

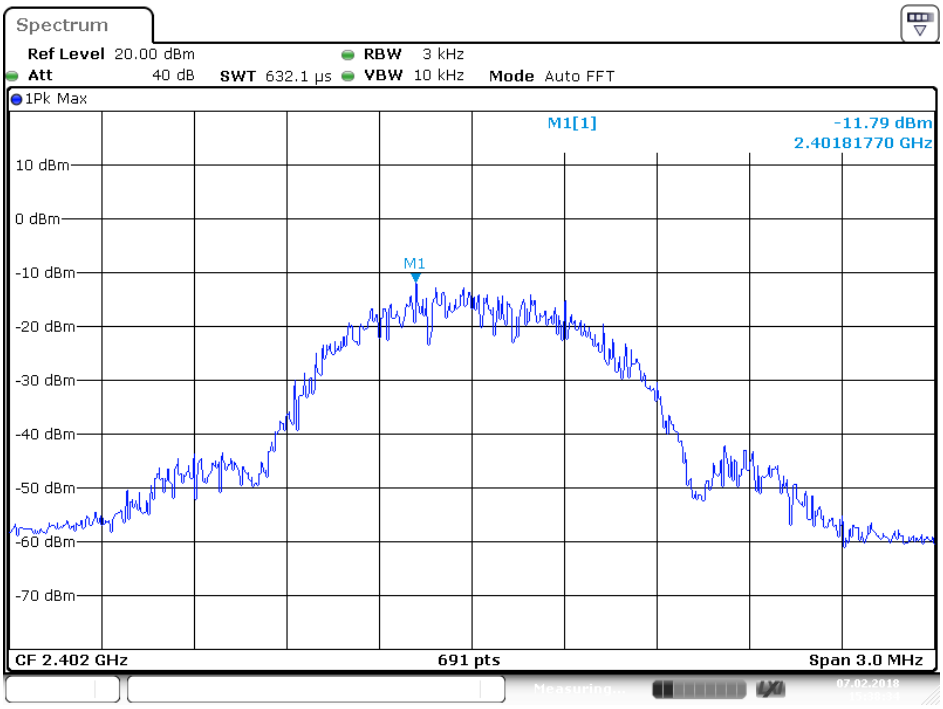
8.6.Test Result

CHANNEL NUMBER	FREQUENCY (MHz)	PSD (dBm/3kHz)	LIMIT (dBm/3kHz)	PASS/FAIL
0	2402	-11.79	8	PASS
19	2440	-11.69	8	PASS
39	2480	-10.33	8	PASS

Note: The RF module of the product is the same as the report ATE20180324, so the data Reference to report is ATE20180324.

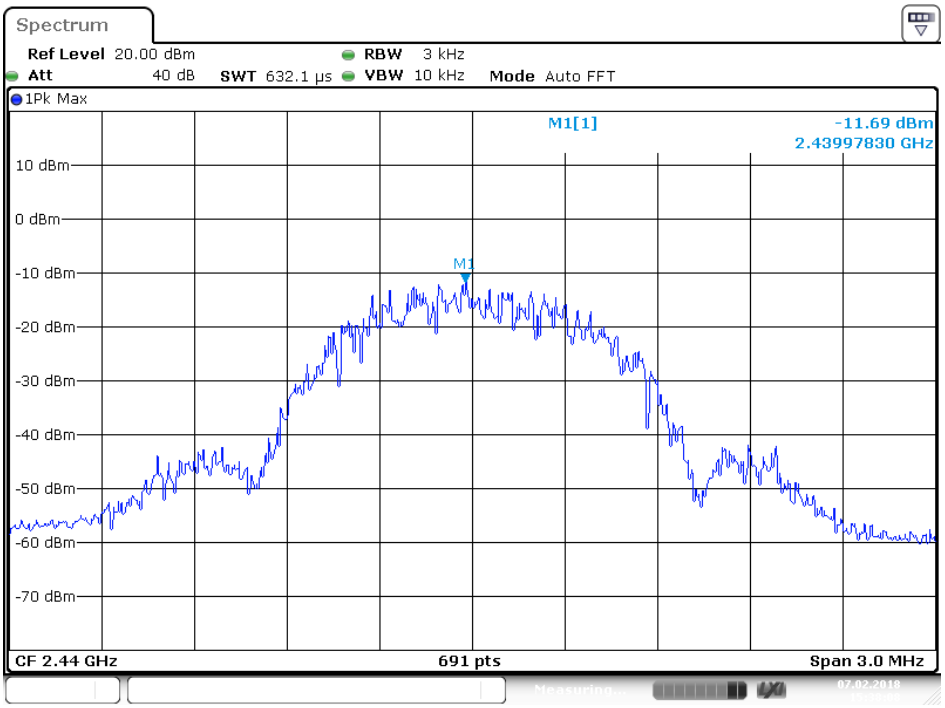
The spectrum analyzer plots are attached as below.

channel 0



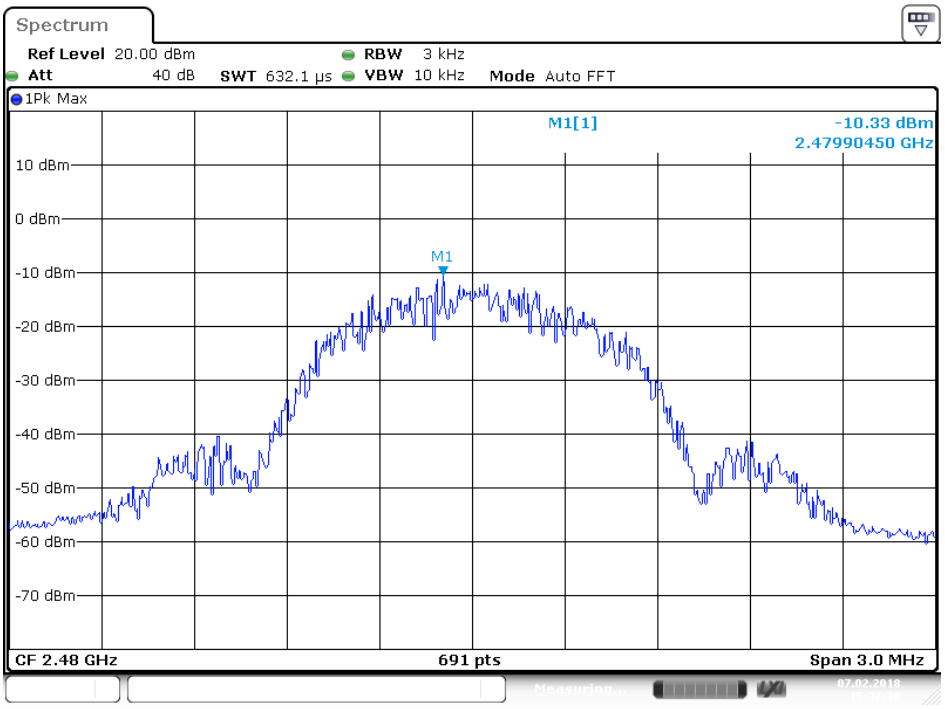
Date: 7.FEB.2018 15:38:35

channel 19



Date: 7.FEB.2018 15:38:08

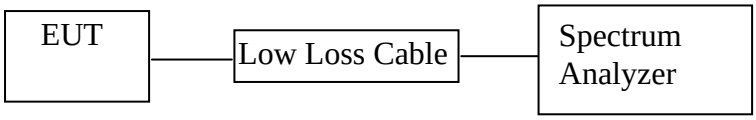
channel 39



Date: 7.FEB.2018 15:37:31

9. BAND EDGE COMPLIANCE TEST

9.1.Block Diagram of Test Setup



(EUT:Portable Bluetooth Speaker)

9.2.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).

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

9.5.Test Procedure

Conducted Band Edge:

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

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

9.5.3. Radiate Band Edge:

9.5.4.The EUT is placed on a turntable, which is 0.1m above the ground plane and worked at highest radiated power.

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

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

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

9.5.8.RBW=1MHz, VBW=1MHz

9.5.9.The band edges was measured and recorded.

9.6.Test Result

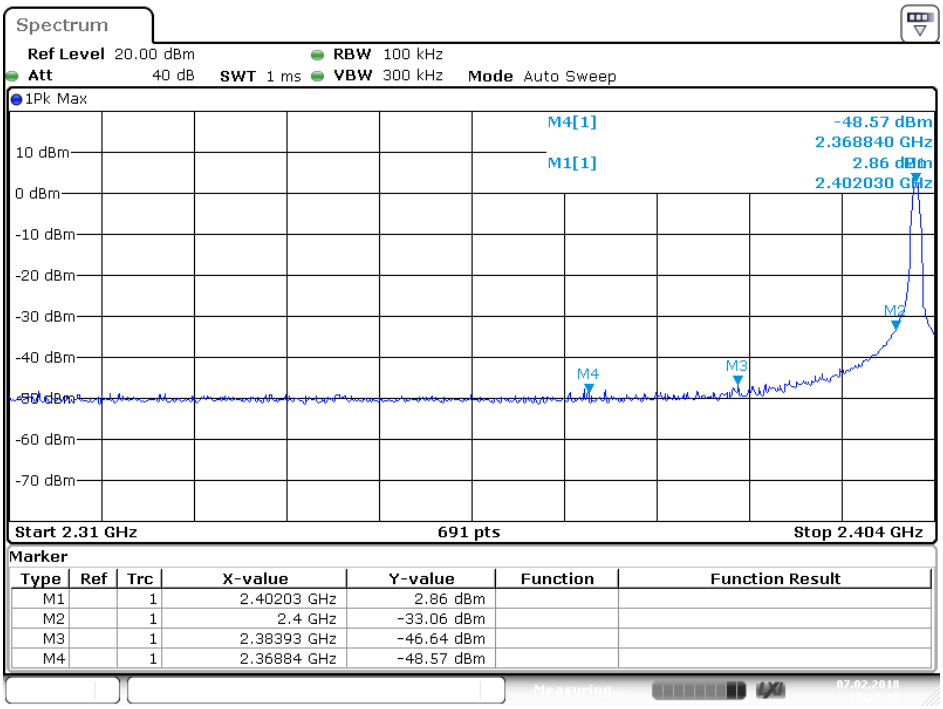
Pass

Channel	Frequency	Delta peak to band emission	Limit(dBc)
0	2.4GHz	35.92	20
39	2.4835GHz	42.51	20

Note: The RF module of the product is the same as the report ATE20180324, so the conduction Band Edge data Reference to report is ATE20180324.

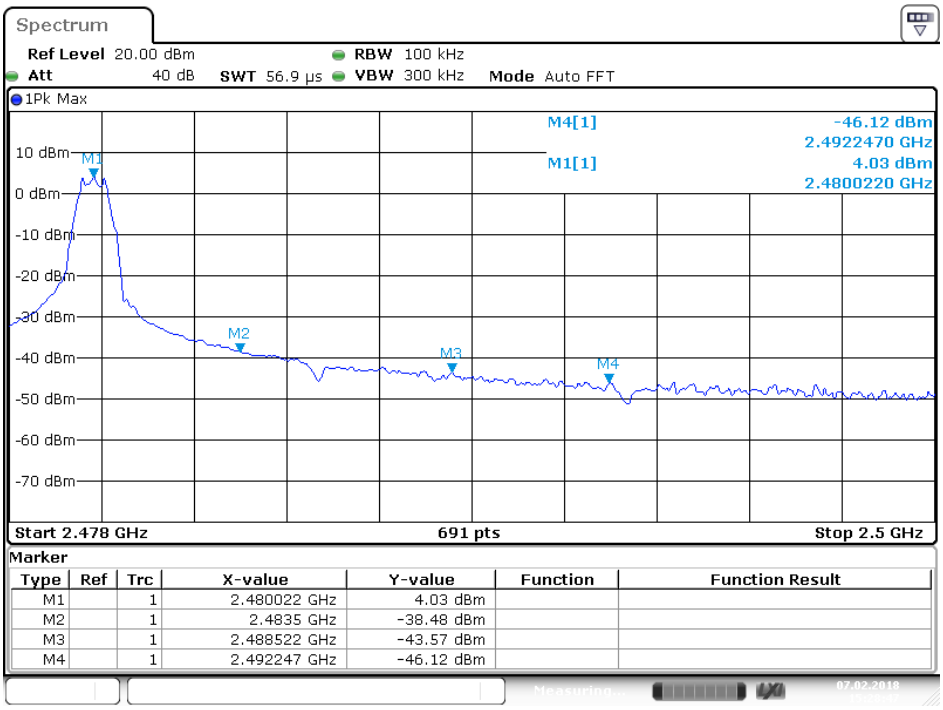
The spectrum analyzer plots are attached as below.

channel 0



Date: 7.FEB.2018 15:27:16

channel 39



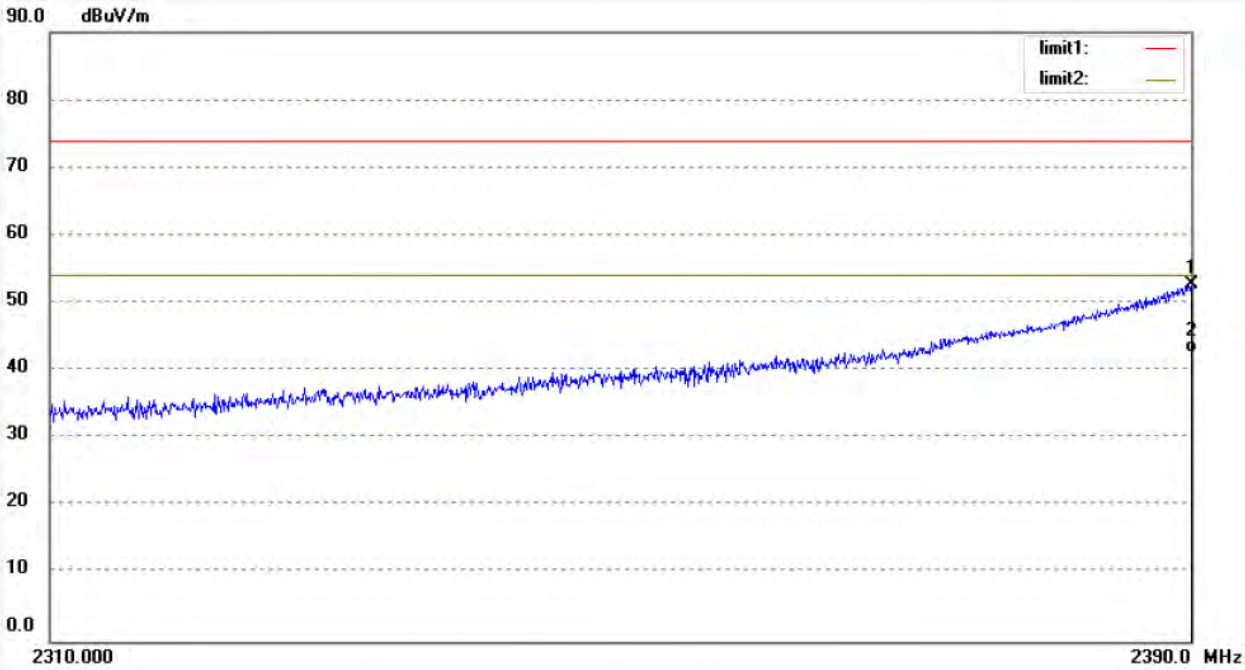
Date: 7.FEB.2018 15:28:47

Radiated Band Edge Result

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

Job No.: LGW2018 #466	Polarization: Horizontal
Standard: FCC (Band Edge)	Power Source: DC 3.7V
Test item: Radiation Test	Date: 18/02/08/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Portable Bluetooth Speaker	Engineer Signature: WADE
Mode: TX 2402MHz	Distance: 3m
Model: NS-SPBTWAVE2-BK	
Manufacturer: Lightcomm Technology Co., Ltd.	

Note:



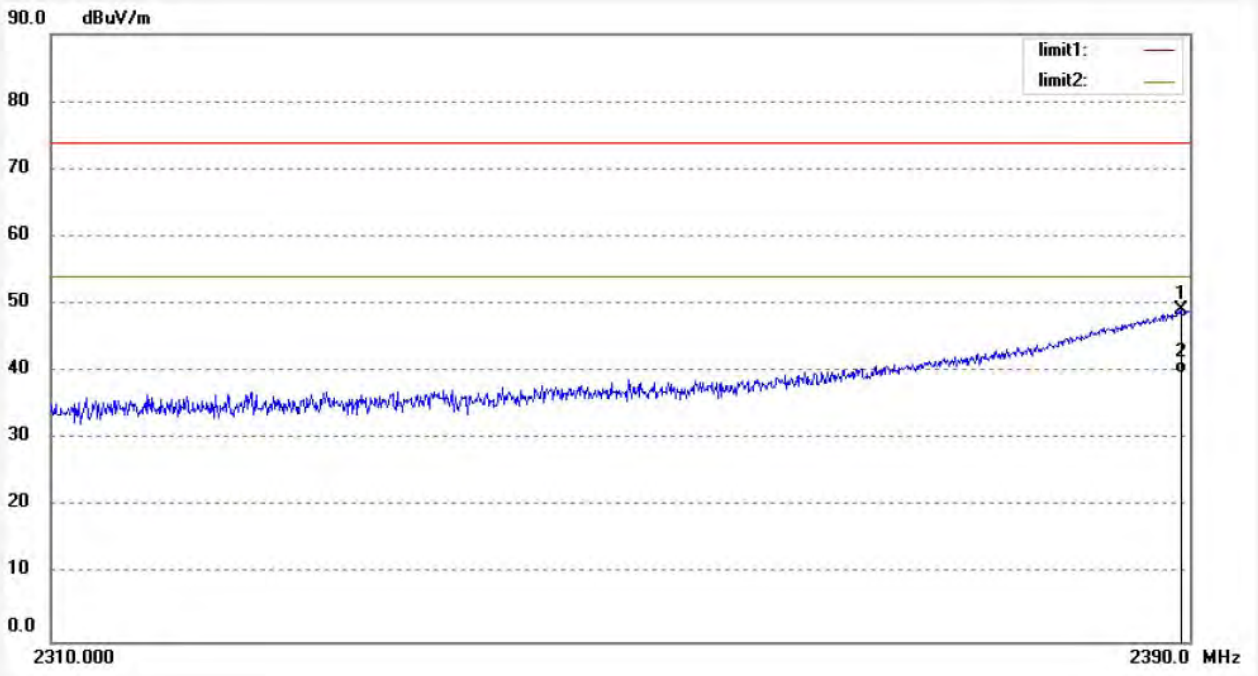
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	51.99	0.79	52.78	74.00	-21.22	peak			
2	2390.000	41.75	0.79	42.54	54.00	-11.46	AVG			

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

Job No.: LGW2018 #465
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2402MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note: Bluetooth 4.0



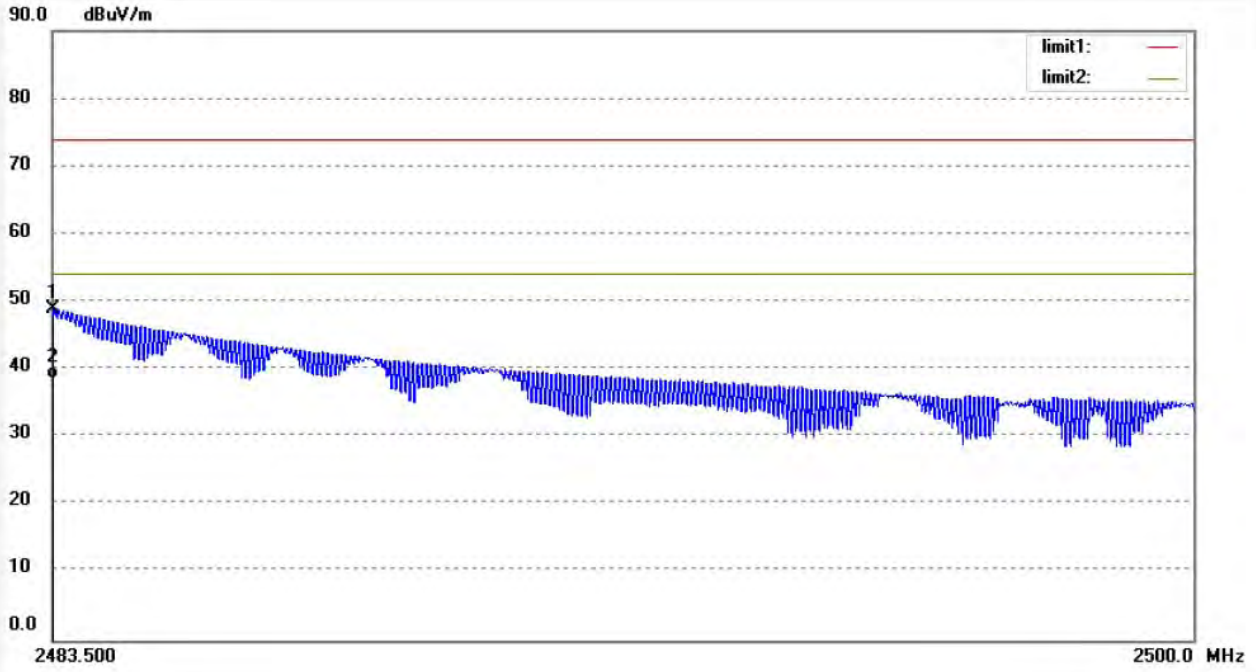
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2389.360	48.31	0.79	49.10	74.00	-24.90	peak			
2	2389.360	38.85	0.79	39.64	54.00	-14.36	AVG			

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

Job No.: LGW2018 #471
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2480MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:

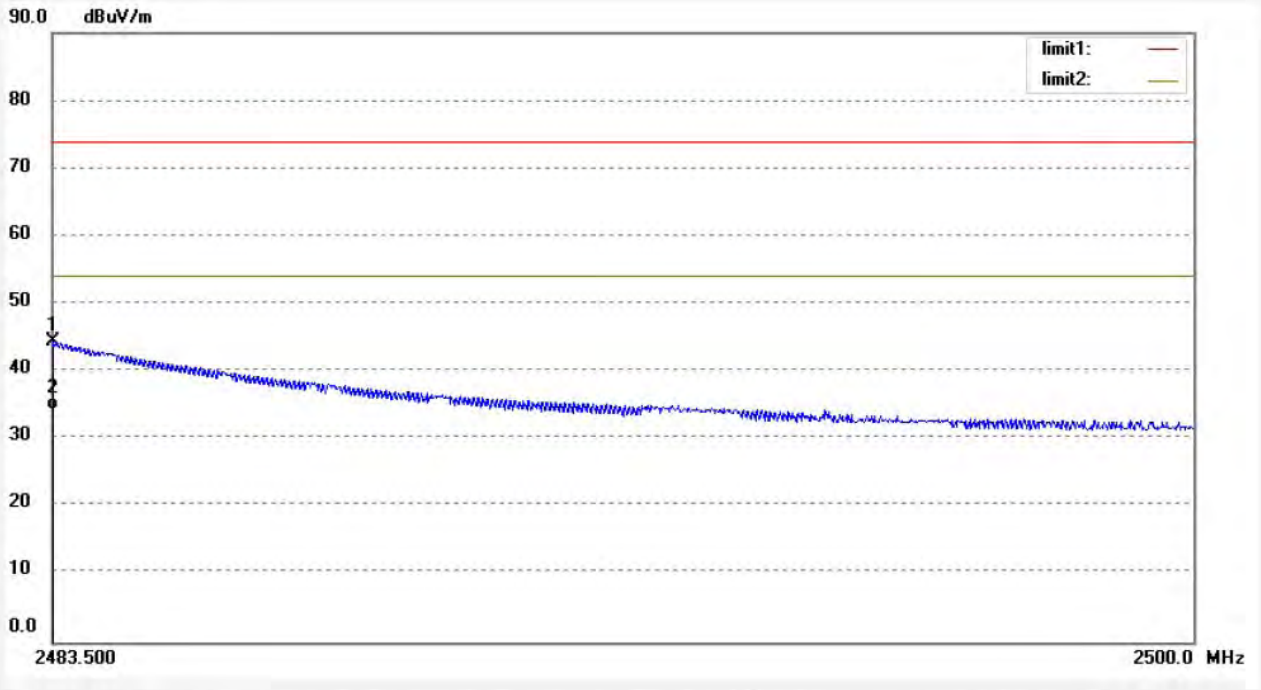


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	47.88	1.10	48.98	74.00	-25.02	peak			
2	2483.500	37.44	1.10	38.54	54.00	-15.46	AVG			

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

Job No.: LGW2018 #472	Polarization: Vertical
Standard: FCC (Band Edge)	Power Source: DC 3.7V
Test item: Radiation Test	Date: 18/02/08/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Portable Bluetooth Speaker	Engineer Signature: WADE
Mode: TX 2480MHz	Distance: 3m
Model: NS-SPBTWAVE2-BK	
Manufacturer: Lightcomm Technology Co., Ltd.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.517	43.32	1.10	44.42	74.00	-29.58	peak			
2	2483.517	33.14	1.10	34.24	54.00	-19.76	AVG			

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

10.RADIATED SPURIOUS EMISSION TEST

10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and peripherals

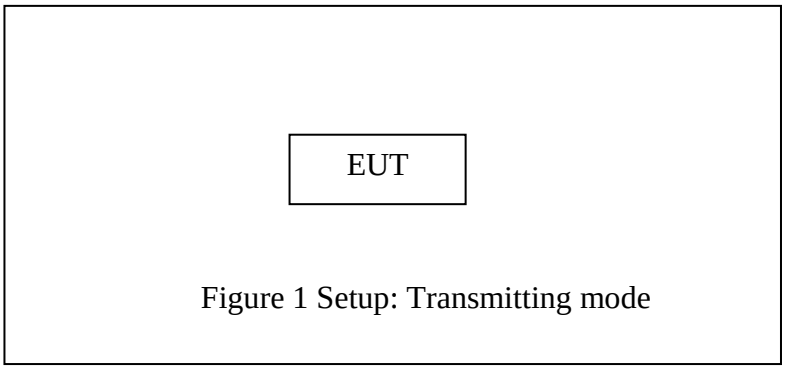
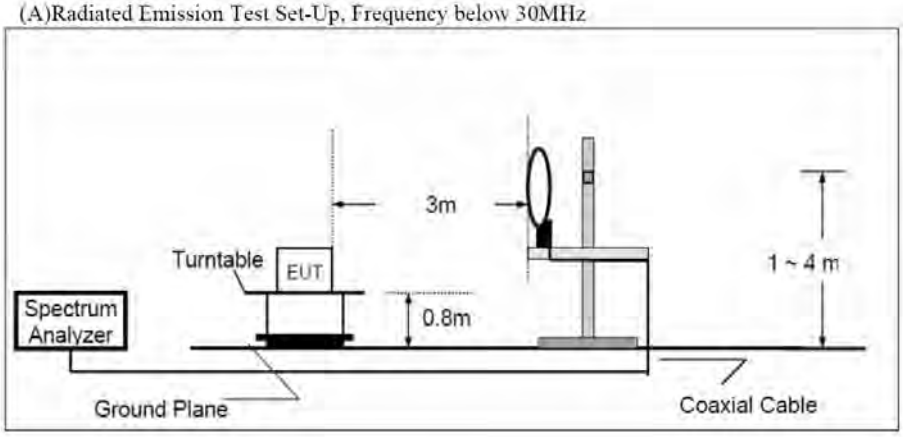


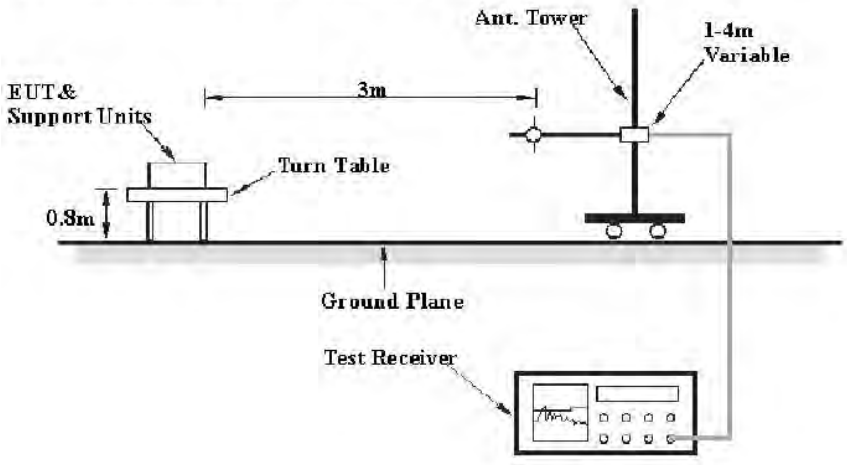
Figure 1 Setup: Transmitting mode

10.1.2.Semi-Anechoic Chamber Test Setup Diagram

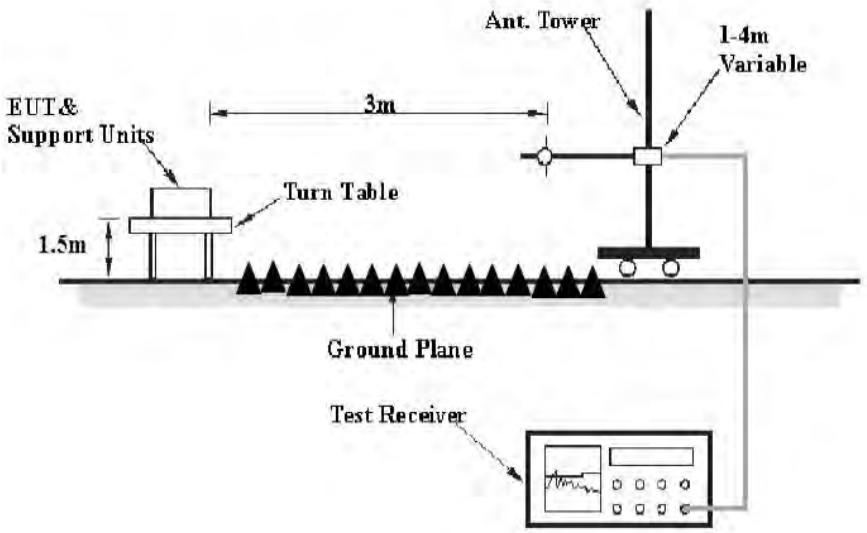
(A)Radiated Emission Test Set-Up, Frequency below 30MHz



(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).

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	([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.

10.4.Configuration of EUT on Measurement

The equipment are 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.

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, 2440MHz, 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.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9 kHz to 25GHz is checked.
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.
The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

10.7.Data Sample

Frequency (MHz)	Reading (dBμv)	Factor (dB/m)	Result (dBμv/m)	Limit (dBμv/m)	Margin (dB)	Remark
X.XX	48.69	-13.35	35.34	46	-10.66	QP

Frequency(MHz) = Emission frequency in MHz
Reading(dBμv) = Uncorrected Analyzer/Receiver reading
Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain
Result(dBμv/m) = Reading(dBμv) + Factor(dB/m)
Limit (dBμv/m) = Limit stated in standard
Margin (dB) = Result(dBμv/m) - Limit (dBμv/m)
QP = Quasi-peak Reading

Calculation Formula:
Margin(dB) = Result (dBμV/m)–Limit(dBμV/m)
Result(dBμV/m)= Reading(dBμV)+ 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.

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

2. *: Denotes restricted band of operation.

The spectrum analyzer plots are attached as below.

FCC PART15C(9K-30MHz)

ACCURATE TECHNOLOGY CO.,LTD

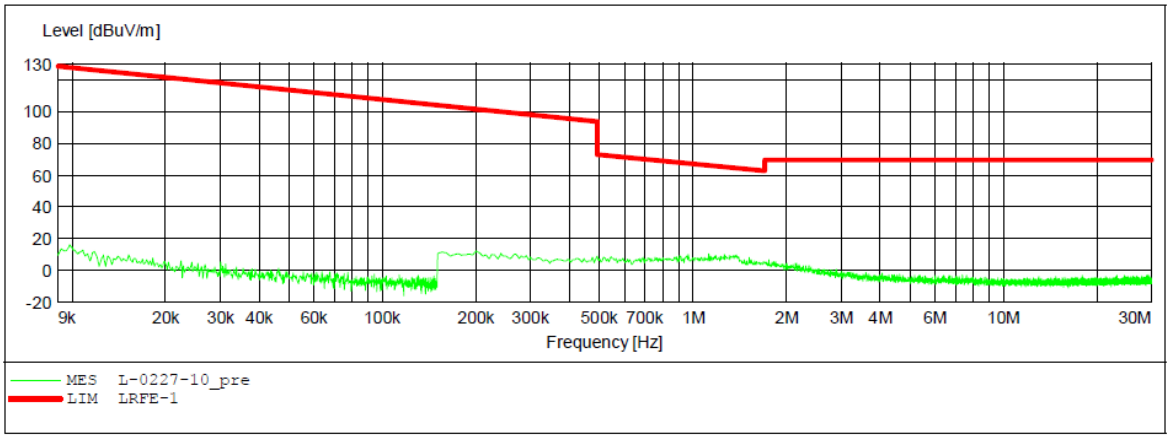
FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer:	Lightcomm Technology Co., Ltd.
Operating Condition:	TX 2402MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	DC 3.7V
Comment:	X
Start of Test:	2018-2-27 /

SCAN TABLE: "LFRE 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	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

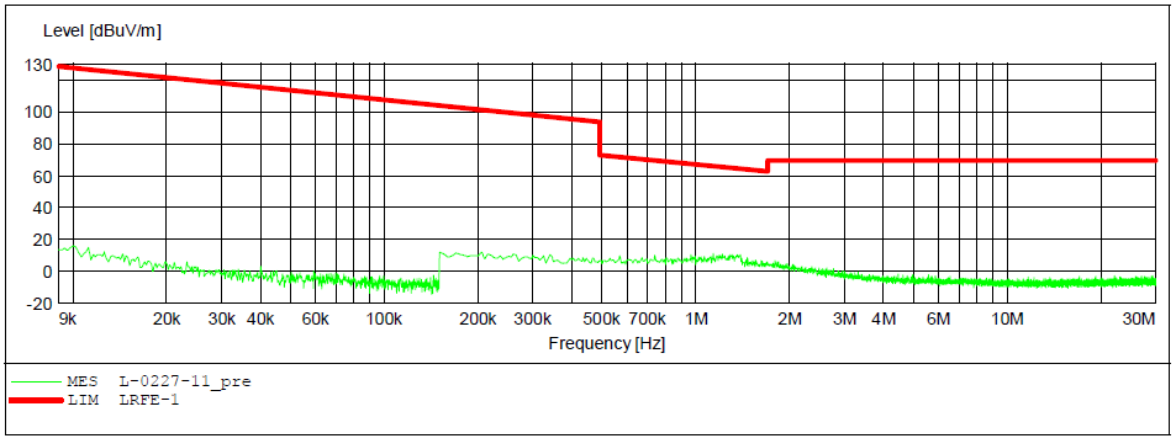
FCC Class B 3M Radiated

EUT: Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.
Operating Condition: TX 2402MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: DC 3.7V
Comment: Y
Start of Test: 2018-2-27 /

SCAN TABLE: "LFRE 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	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

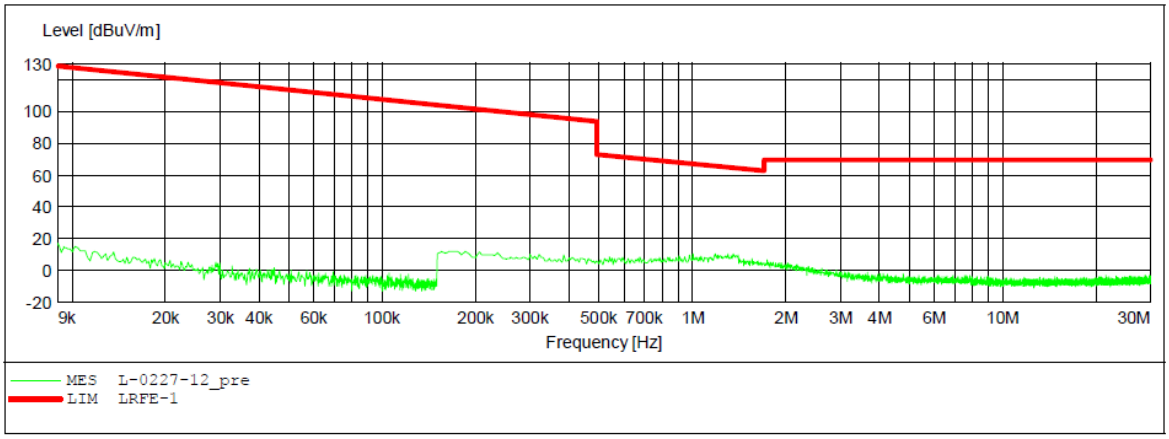
FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer:	Lightcomm Technology Co., Ltd.
Operating Condition:	TX 2402MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	DC 3.7V
Comment:	Z
Start of Test:	2018-2-27 /

SCAN TABLE: "LFRE 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	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

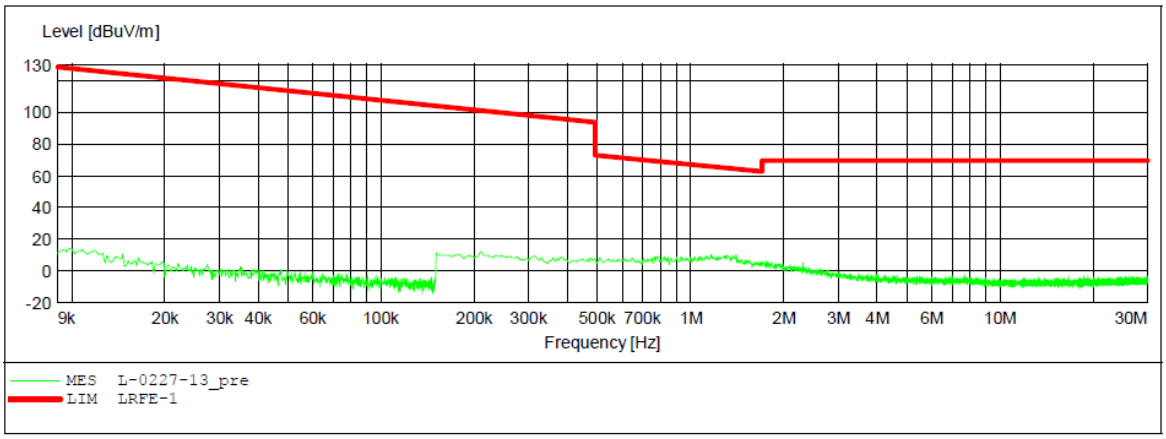
FCC Class B 3M Radiated

EUT: Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.
Operating Condition: TX 2440MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: DC 3.7V
Comment: X
Start of Test: 2018-2-27 /

SCAN TABLE: "LFRE 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	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

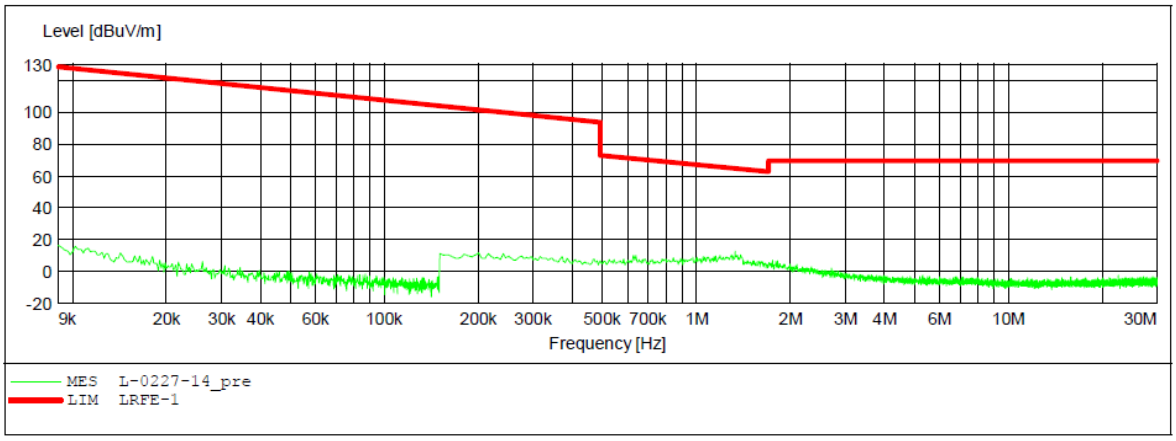
FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer:	Lightcomm Technology Co., Ltd.
Operating Condition:	TX 2440MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	DC 3.7V
Comment:	Y
Start of Test:	2018-2-27 /

SCAN TABLE: "LFRE 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	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

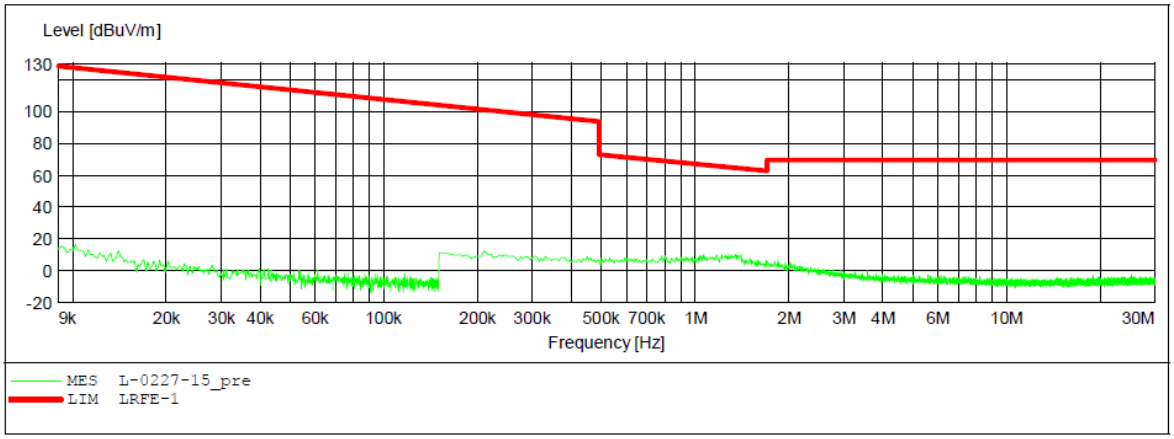
FCC Class B 3M Radiated

EUT: Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.
Operating Condition: TX 2440MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: DC 3.7V
Comment: Z
Start of Test: 2018-2-27 /

SCAN TABLE: "LFRE 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	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

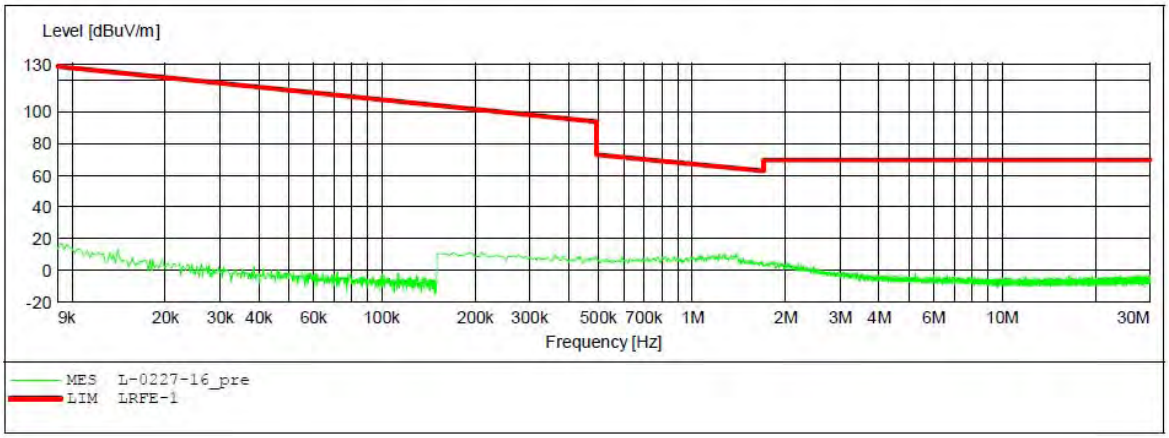
FCC Class B 3M Radiated

EUT: Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.
Operating Condition: TX 2480MHz
Test Site: 2# Chamber
Operator: WADE
Test Specification: DC 3.7V
Comment: X
Start of Test: 2018-2-27 /

SCAN TABLE: "LFRE 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	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

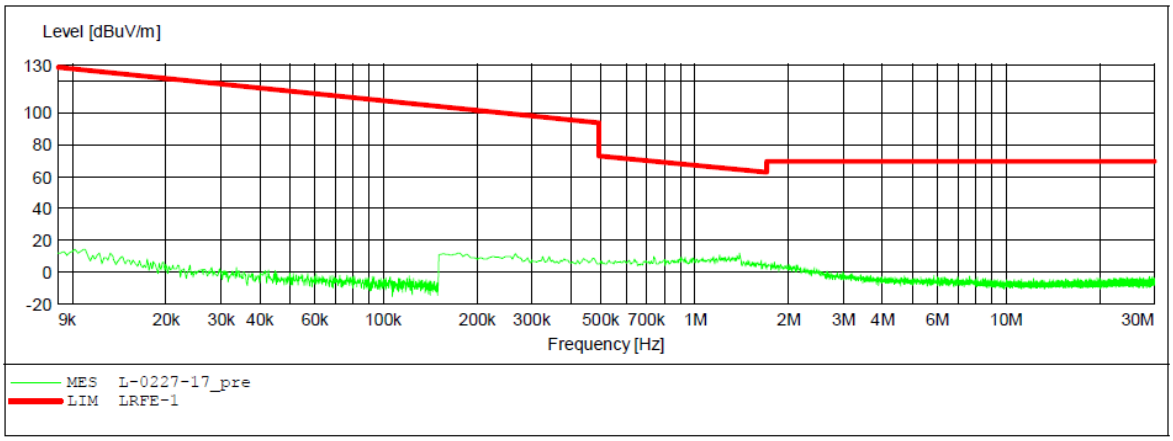
FCC Class B 3M Radiated

```
EUT:                  Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer:         Lightcomm Technology Co., Ltd.
Operating Condition:  TX 2480MHz
Test Site:            2# Chamber
Operator:             WADE
Test Specification:   DC 3.7V
Comment:              Y
Start of Test:        2018-2-27 /
```

SCAN TABLE: "LFRE 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	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



ACCURATE TECHNOLOGY CO.,LTD

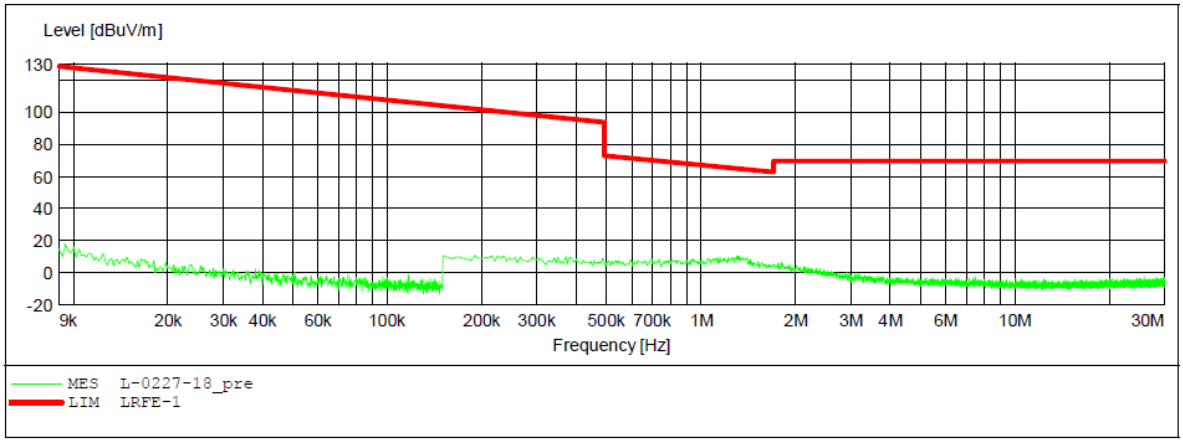
FCC Class B 3M Radiated

EUT:	Portable Bluetooth Speaker M/N:NS-SPBTWAVE2-BK
Manufacturer:	Lightcomm Technology Co., Ltd.
Operating Condition:	TX 2480MHz
Test Site:	2# Chamber
Operator:	WADE
Test Specification:	DC 3.7V
Comment:	Z
Start of Test:	2018-2-27 /

SCAN TABLE: "LFRE 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	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



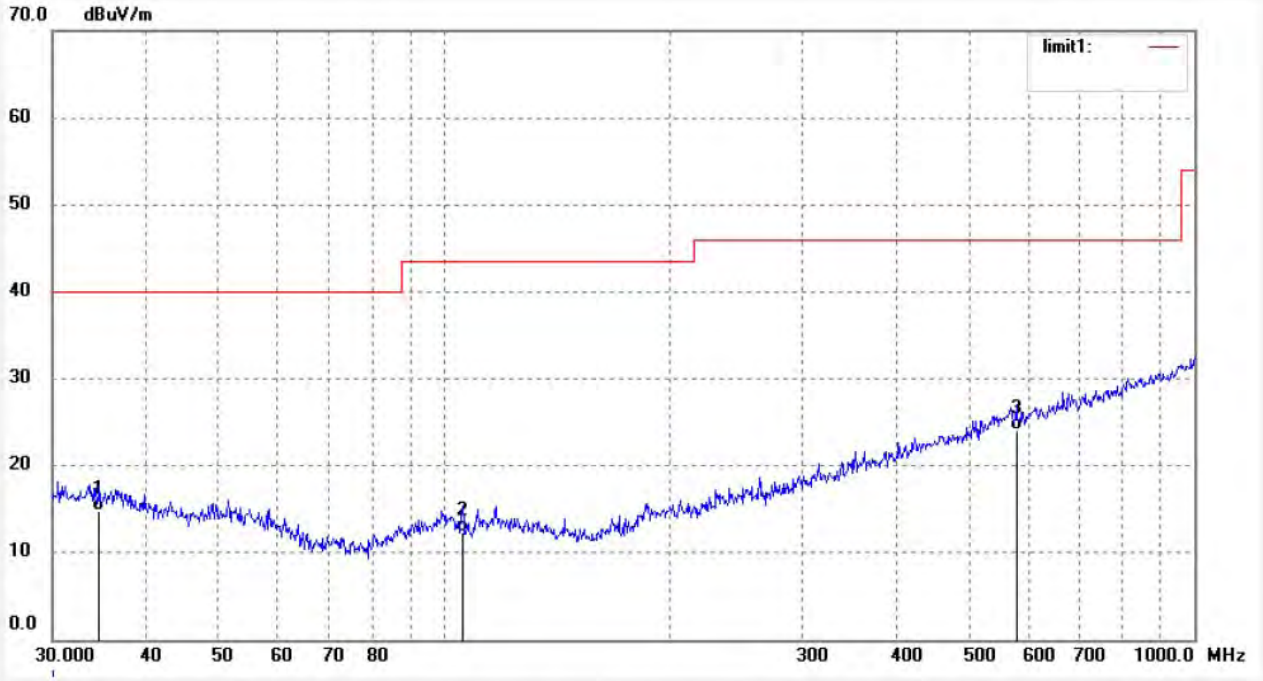
FCC PART15C(30MHz-1000MHz)

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

Job No.: LGW2018 #485
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2402MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 18/02/09/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	34.6385	25.23	-10.39	14.84	40.00	-25.16	QP			
2	105.6414	26.23	-13.86	12.37	43.50	-31.13	QP			
3	578.6698	26.57	-2.56	24.01	46.00	-21.99	QP			

ACCURATE TECHNOLOGY CO., LTD.
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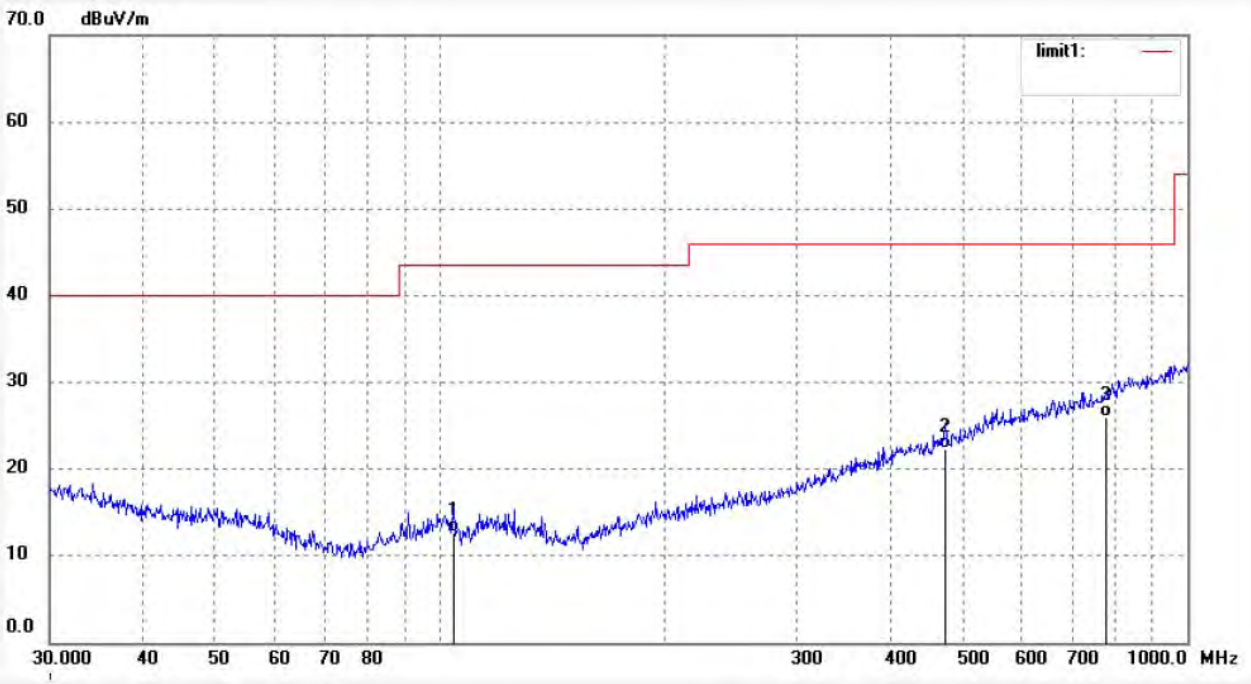
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: LGW2018 #486
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2402MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/09/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	104.1701	26.46	-13.73	12.73	43.50	-30.77	QP			
2	473.8346	27.21	-4.97	22.24	46.00	-23.76	QP			
3	776.8777	25.77	0.26	26.03	46.00	-19.97	QP			

ACCURATE TECHNOLOGY CO., LTD.
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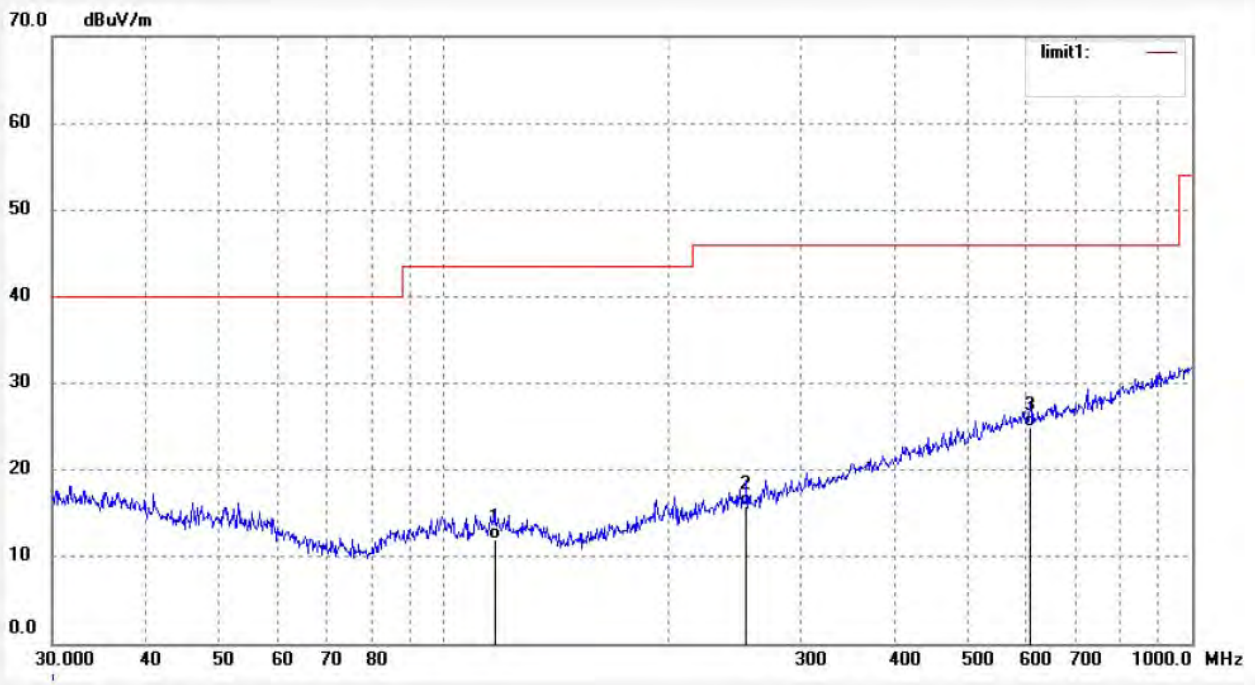
Fax:+86-0755-26503396

Job No.: LGW2018 #488
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2440MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 18/02/09/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	116.9495	25.11	-13.06	12.05	43.50	-31.45	QP			
2	253.8367	26.32	-10.53	15.79	46.00	-30.21	QP			
3	607.7866	27.23	-2.24	24.99	46.00	-21.01	QP			

ACCURATE TECHNOLOGY CO., LTD.
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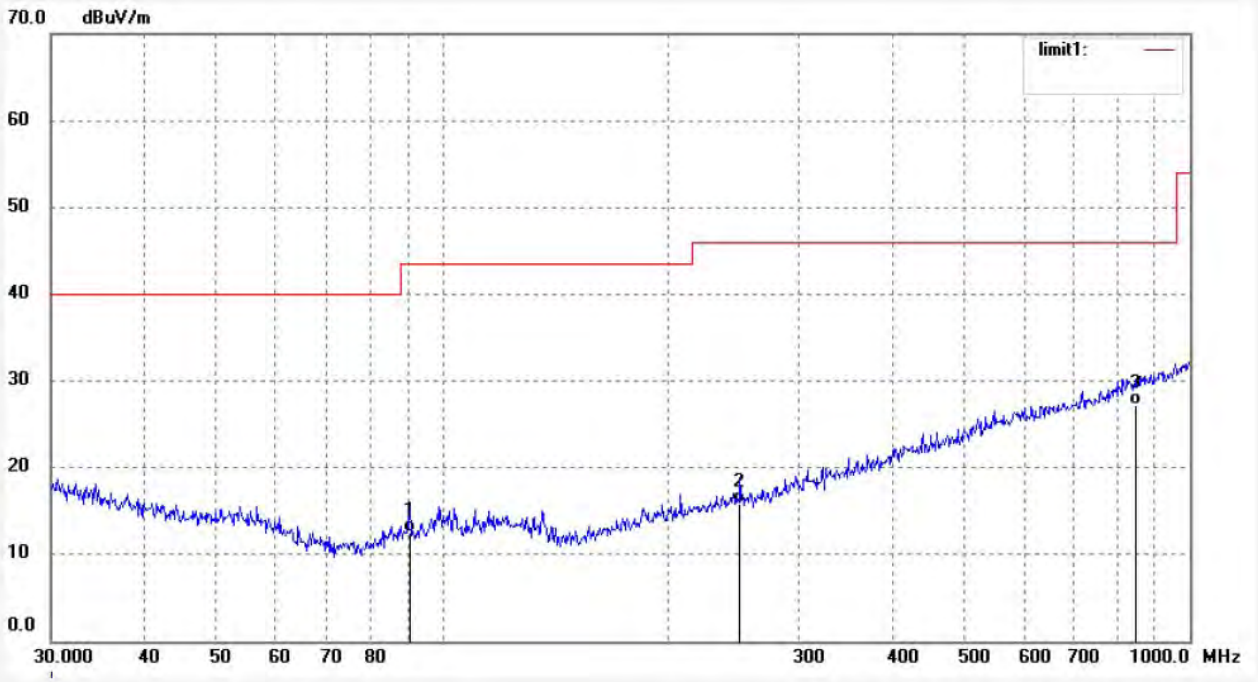
Fax:+86-0755-26503396

Job No.: LGW2018 #487
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2440MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/09/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	90.5374	27.54	-14.98	12.56	43.50	-30.94	QP			
2	250.3011	26.42	-10.54	15.88	46.00	-30.12	QP			
3	845.0878	25.74	1.53	27.27	46.00	-18.73	QP			

ACCURATE TECHNOLOGY CO., LTD.
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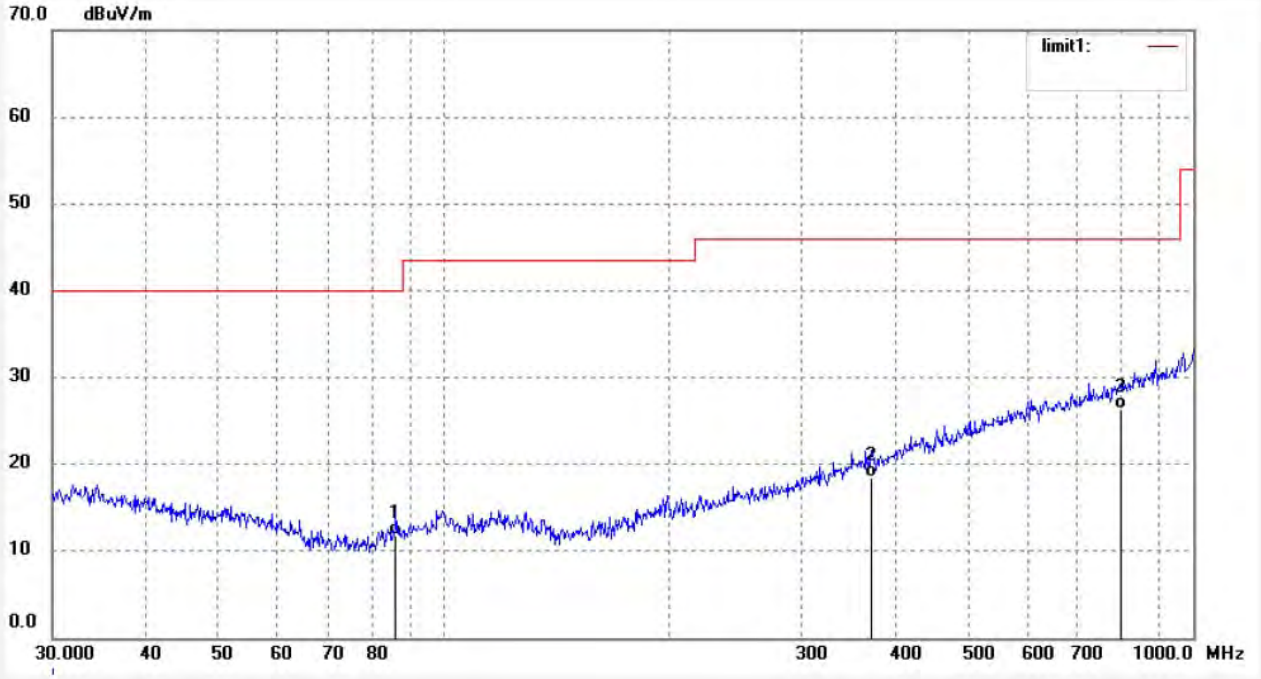
Fax:+86-0755-26503396

Job No.: LGW2018 #489	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 18/02/09/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Portable Bluetooth Speaker	Engineer Signature: WADE
Mode: TX 2480MHz	Distance: 3m
Model: NS-SPBTWAVE2-BK	
Manufacturer: Lightcomm Technology Co., Ltd.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	86.2001	27.00	-15.25	11.75	40.00	-28.25	QP			
2	372.0045	25.67	-7.13	18.54	46.00	-27.46	QP			
3	798.9796	25.46	0.81	26.27	46.00	-19.73	QP			

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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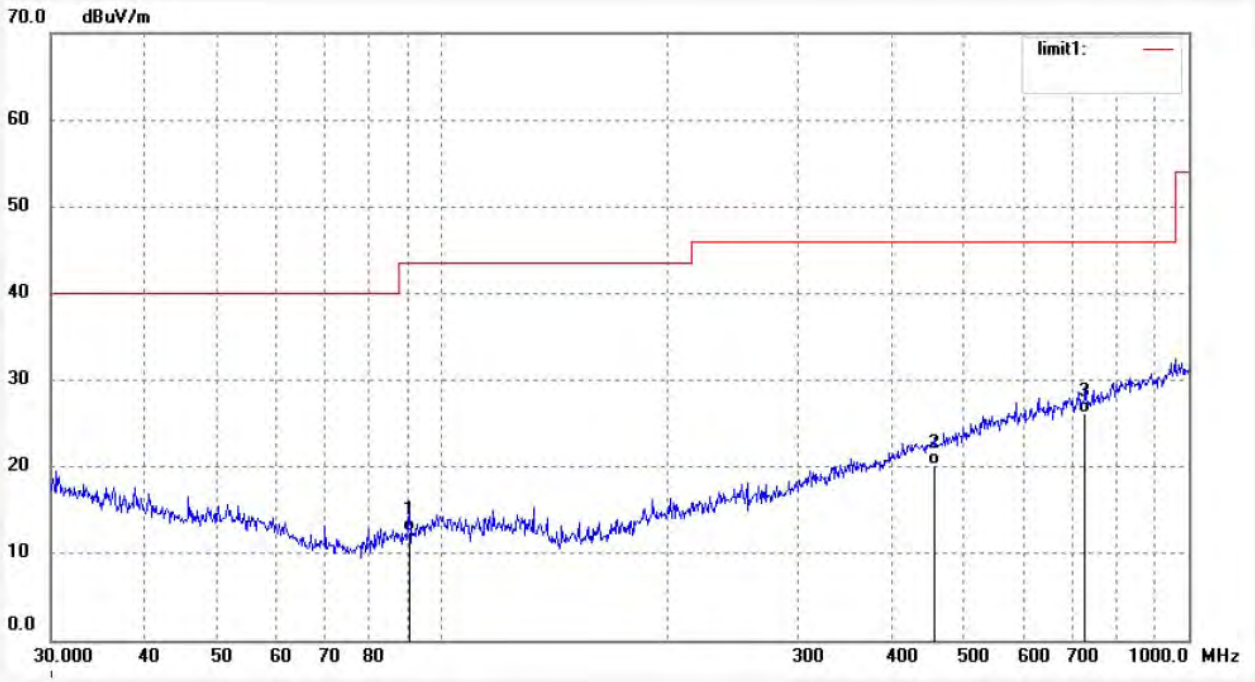
Fax:+86-0755-26503396

Job No.: LGW2018 #490
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2480MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/09/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	90.5374	27.52	-14.98	12.54	43.50	-30.96	QP			
2	457.5072	25.50	-5.22	20.28	46.00	-25.72	QP			
3	726.8052	26.87	-0.67	26.20	46.00	-19.80	QP			

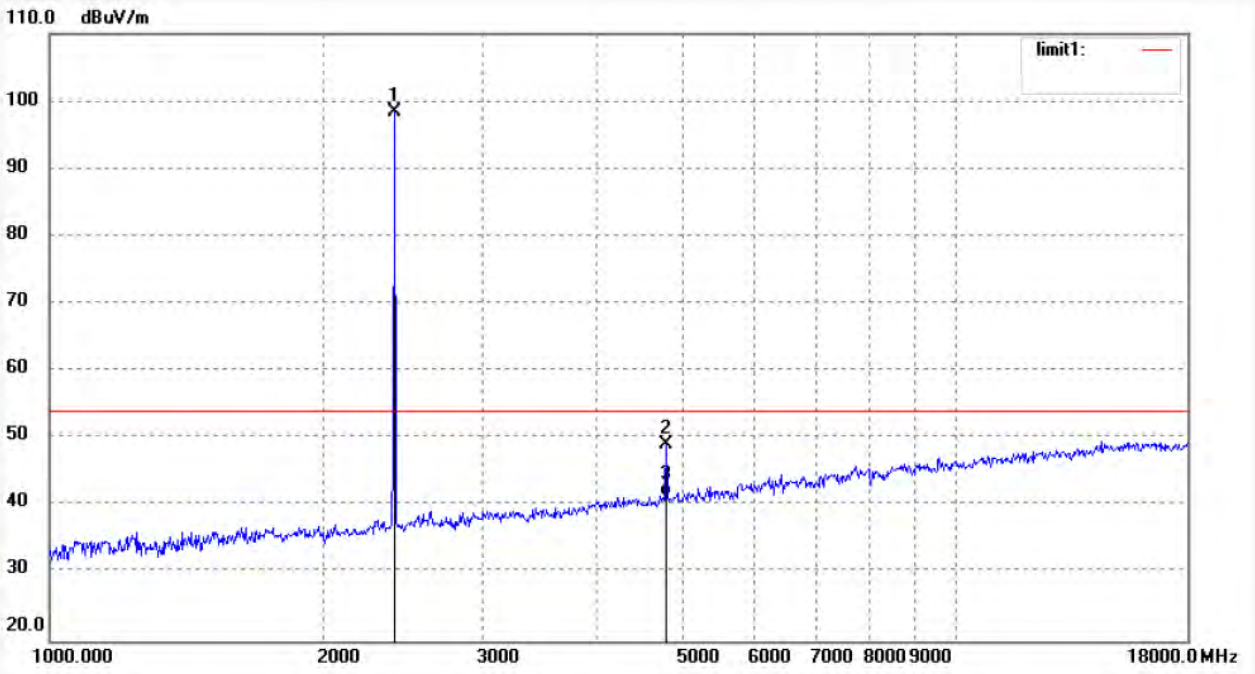
FCC PART15C(1GHz-18GHz)

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

Job No.: LGW2018 #463
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2402MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



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	97.53	0.89	98.42	/	/	peak			
2	4804.025	41.78	7.40	49.18	74.00	-24.82	peak			
3	4804.025	34.07	7.40	41.47	54.00	-12.53	AVG			

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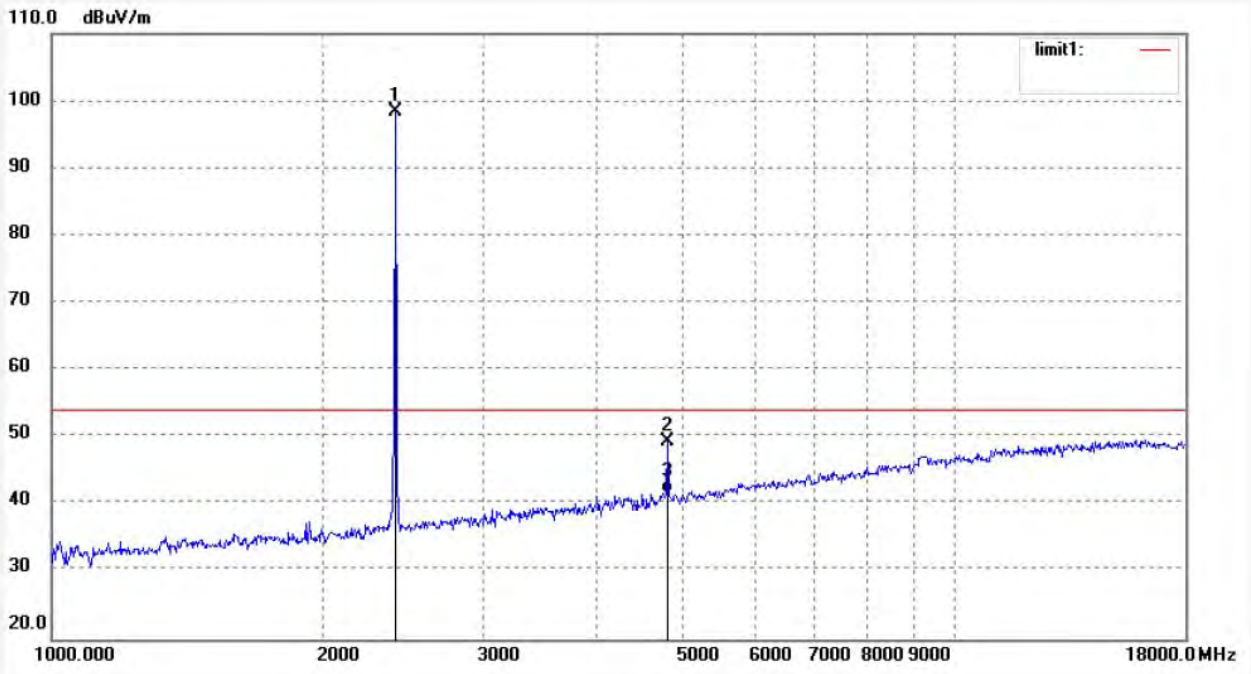
Fax:+86-0755-26503396

Job No.: LGW2018 #464
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2402MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



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	97.43	0.89	98.32	/	/	peak			
2	4804.026	41.87	7.40	49.27	74.00	-24.73	peak			
3	4804.026	34.25	7.40	41.65	54.00	-12.35	AVG			

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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Site: 2# Chamber
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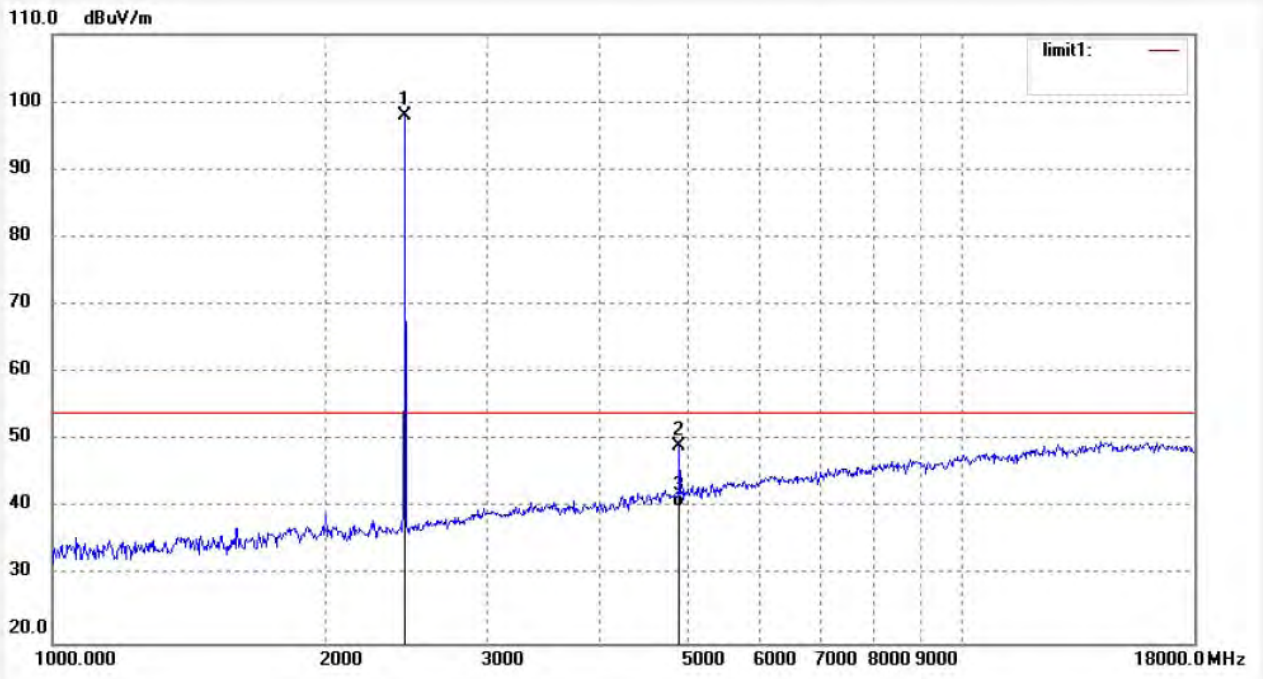
Fax:+86-0755-26503396

Job No.: LGW2018 #467
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2440MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



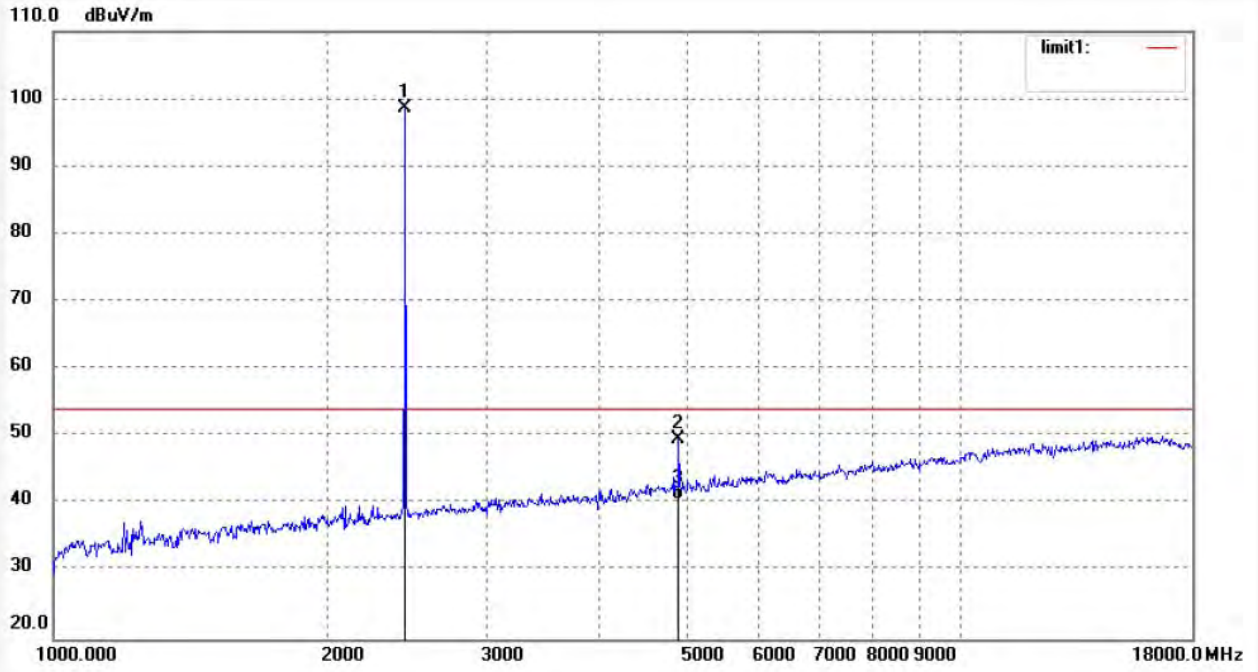
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.000	96.93	1.04	97.97	/	/	peak			
2	4880.027	41.06	8.10	49.16	74.00	-24.84	peak			
3	4880.027	32.14	8.10	40.24	54.00	-13.76	AVG			

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

Job No.: LGW2018 #468
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2440MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



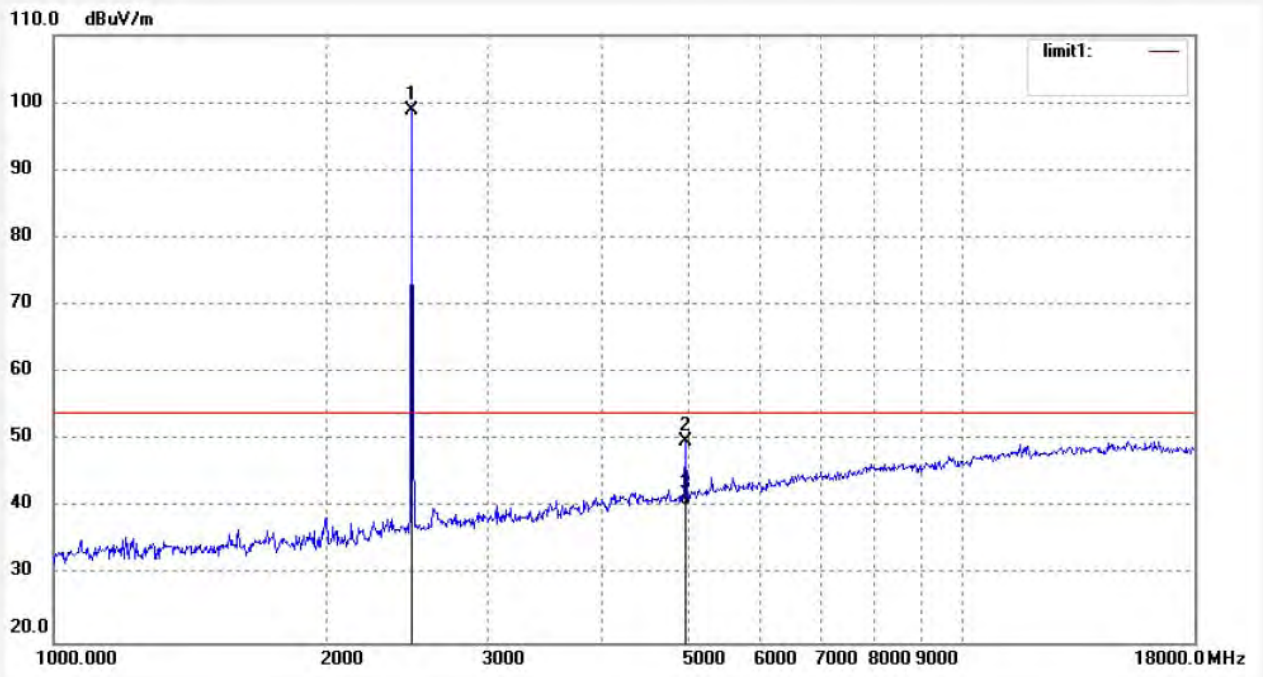
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.000	97.50	1.04	98.54	/	/	peak			
2	4880.027	41.53	8.10	49.63	74.00	-24.37	peak			
3	4880.027	32.47	8.10	40.57	54.00	-13.43	AVG			

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

Job No.: LGW2018 #470
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2480MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



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	97.72	1.10	98.82	/	/	peak			
2	4960.029	41.32	8.60	49.92	74.00	-24.08	peak			
3	4960.029	31.81	8.60	40.41	54.00	-13.59	AVG			

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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Site: 2# Chamber
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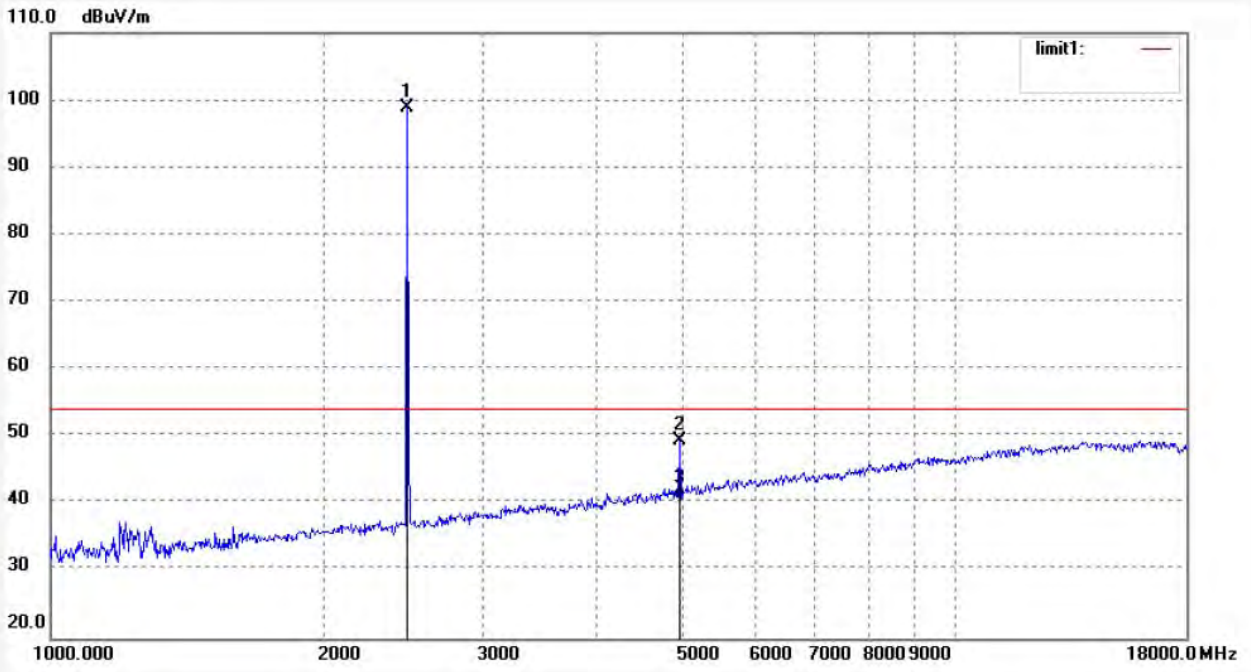
Fax:+86-0755-26503396

Job No.: LGW2018 #469
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2480MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



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	97.83	1.10	98.93	/	/	peak			
2	4960.028	40.87	8.60	49.47	74.00	-24.53	peak			
3	4960.028	31.94	8.60	40.54	54.00	-13.46	AVG			

FCC PART15C(18GHz-26.5GHz)

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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Site: 2# Chamber
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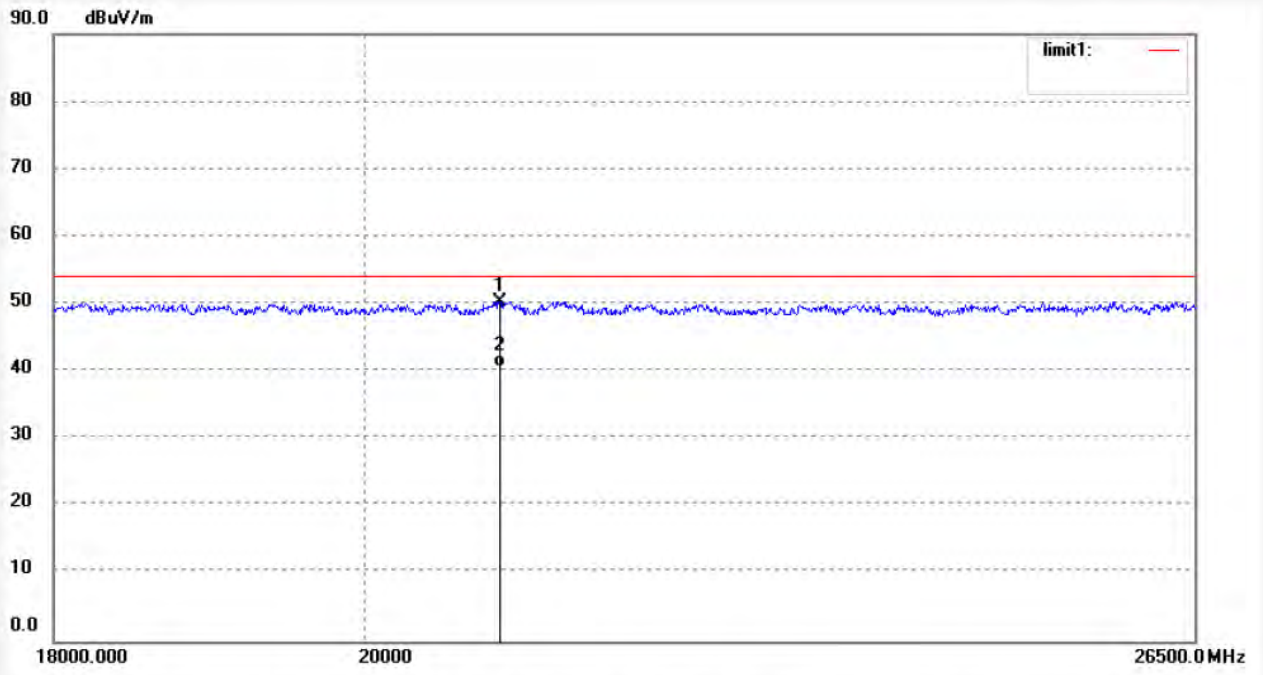
Fax:+86-0755-26503396

Job No.: LGW2018 #474	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3.7V
Test item: Radiation Test	Date: 18/02/08/
Temp.(C)/Hum.(%) 23 C / 48 %	Time:
EUT: Portable Bluetooth Speaker	Engineer Signature: WADE
Mode: TX 2402MHz	Distance: 3m
Model: NS-SPBTWAVE2-BK	
Manufacturer: Lightcomm Technology Co., Ltd.	

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	20938.718	11.98	38.39	50.37	74.00	-23.63	peak			
2	20938.718	2.13	38.39	40.52	54.00	-13.48	AVG			

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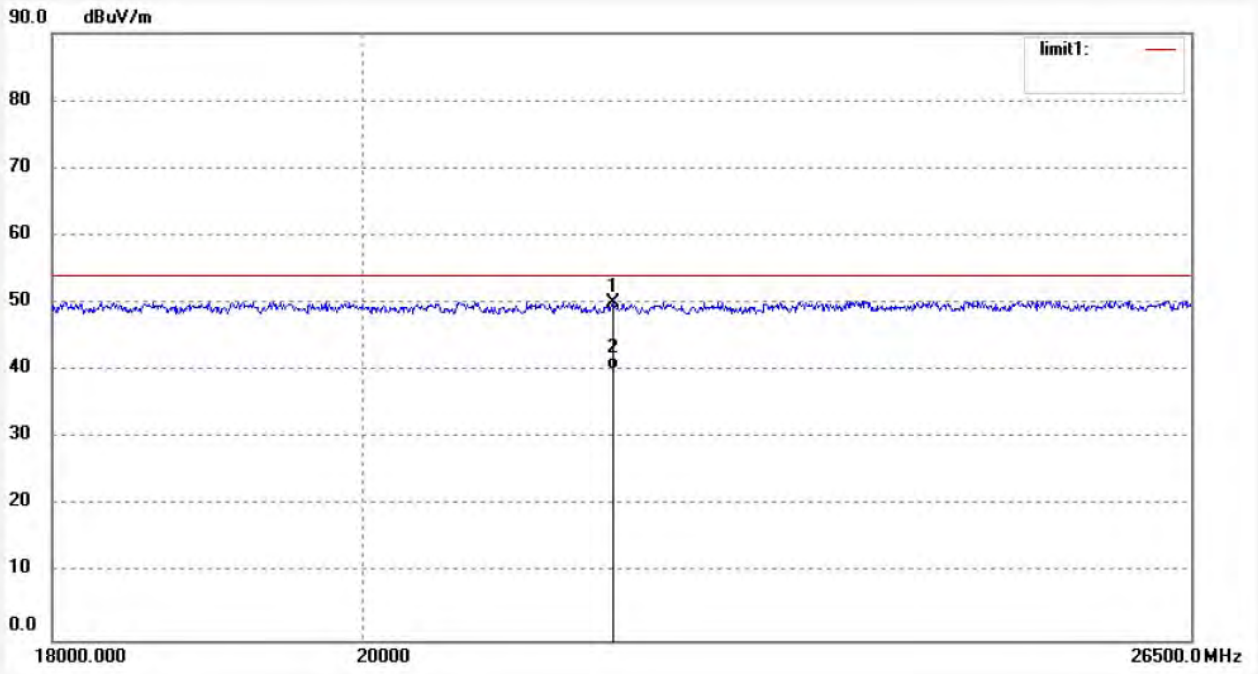
Job No.: LGW2018 #473
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2402MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	21781.279	10.77	39.24	50.01	74.00	-23.99	peak			
2	21781.279	0.99	39.24	40.23	54.00	-13.77	AVG			

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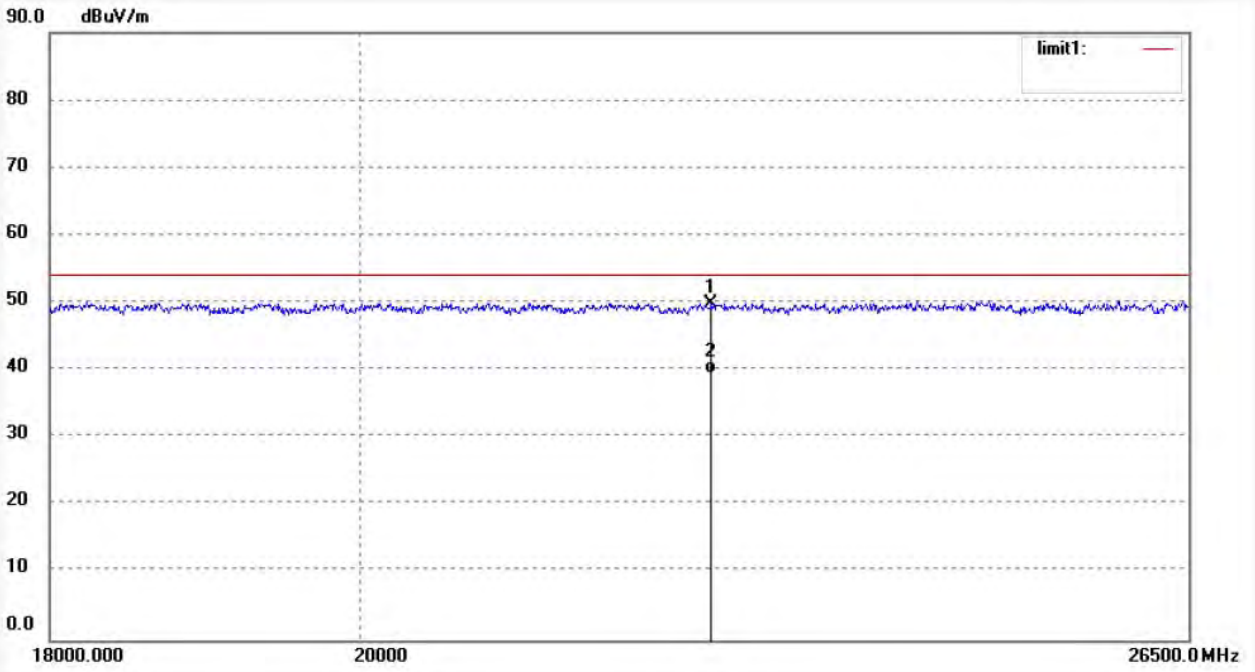
Fax:+86-0755-26503396

Job No.: LGW2018 #475
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2440MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	22535.388	10.00	39.81	49.81	74.00	-24.19	peak			
2	22535.388	-0.40	39.81	39.41	54.00	-14.59	AVG			

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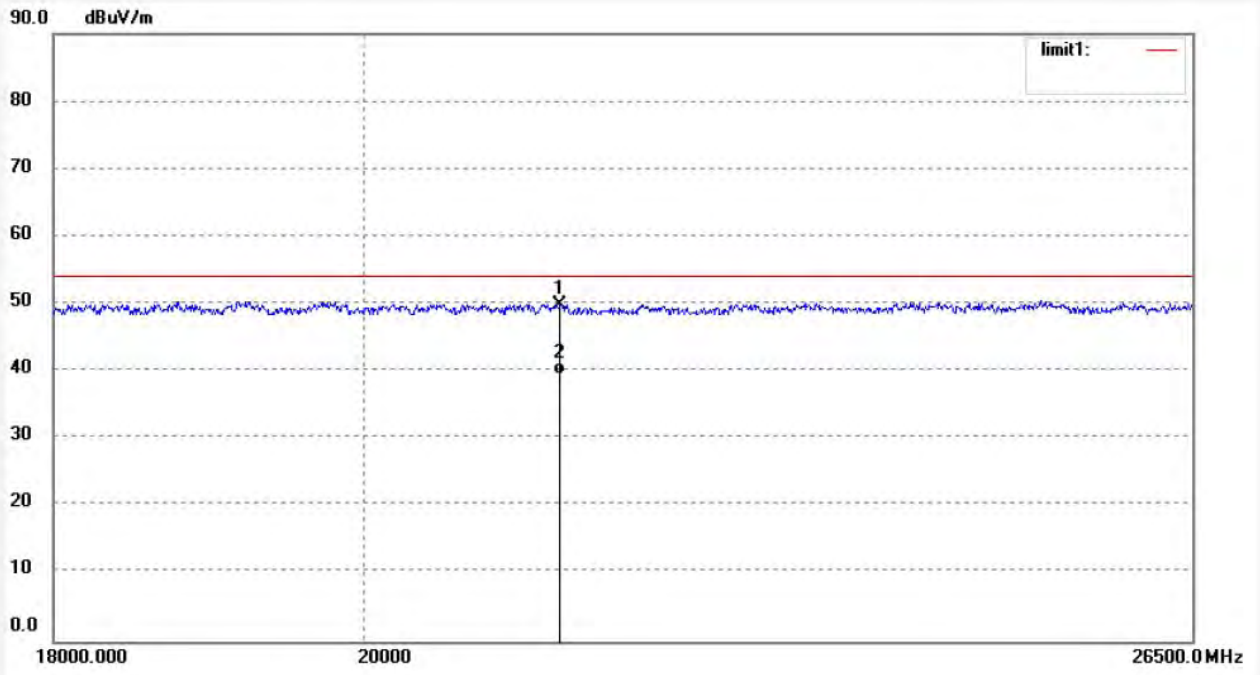
Job No.: LGW2018 #476
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2440MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	21380.638	10.61	39.31	49.92	74.00	-24.08	peak			
2	21380.638	0.10	39.31	39.41	54.00	-14.59	AVG			

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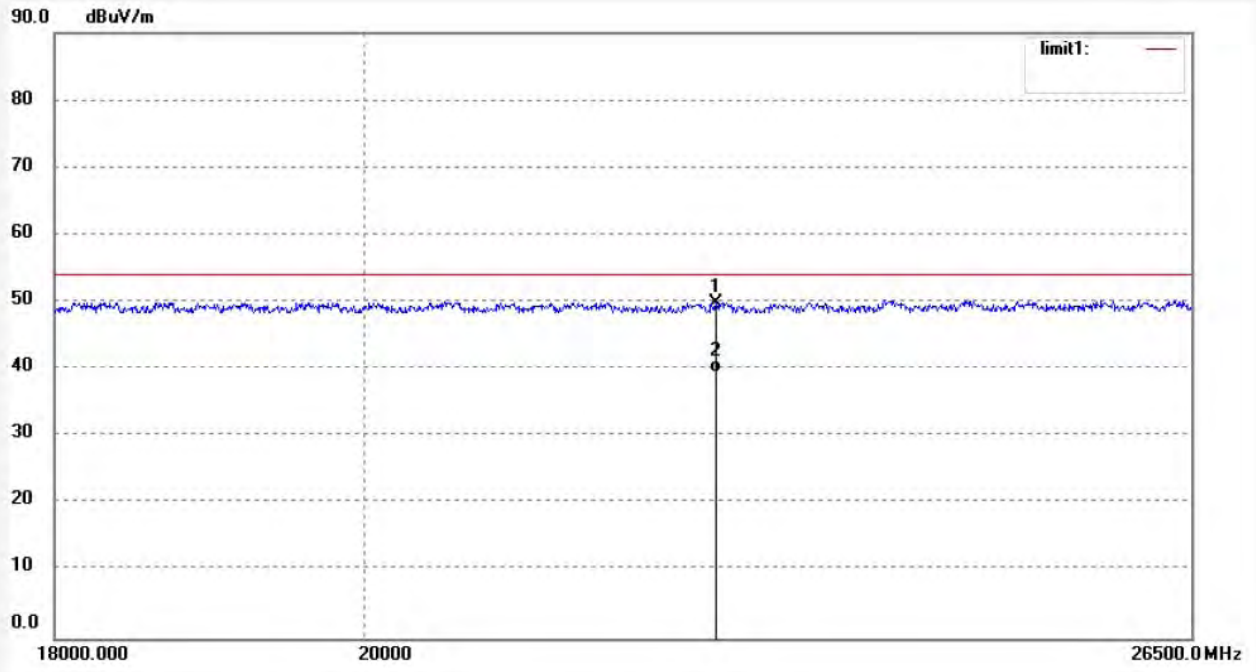
Job No.: LGW2018 #478
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2480MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	22544.105	10.08	39.81	49.89	74.00	-24.11	peak			
2	22544.105	-0.40	39.81	39.41	54.00	-14.59	AVG			

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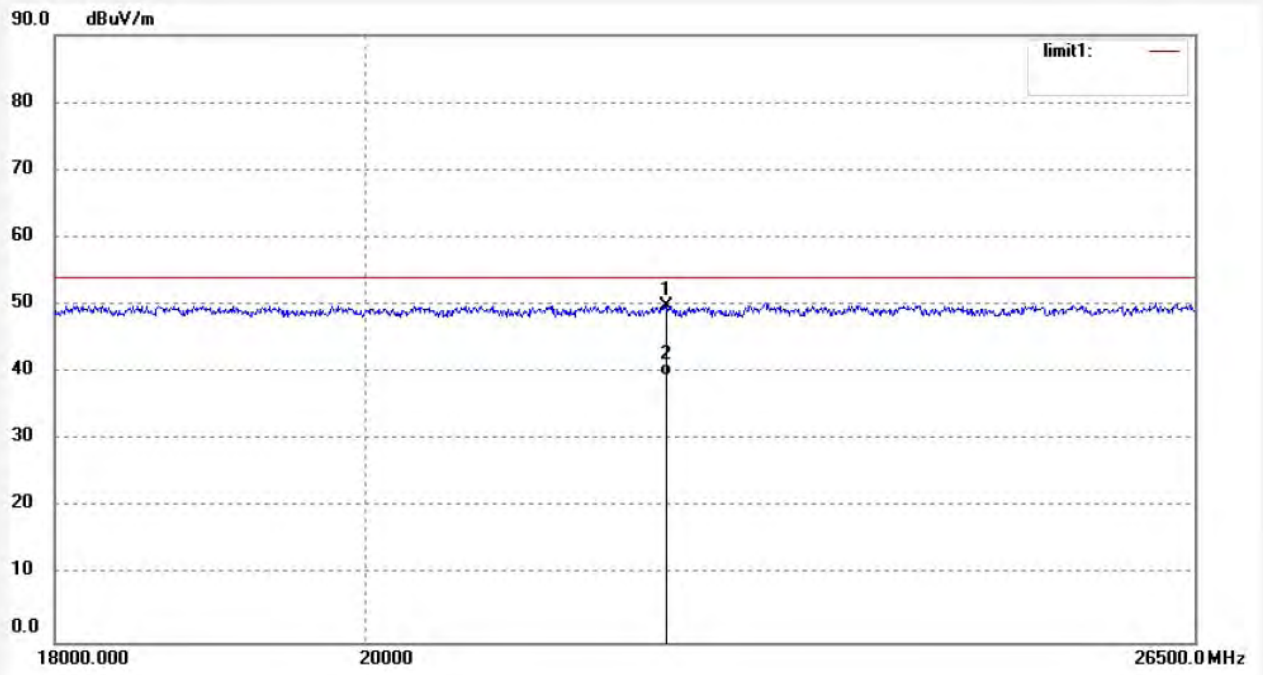
Fax:+86-0755-26503396

Job No.: LGW2018 #477
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Portable Bluetooth Speaker
Mode: TX 2480MHz
Model: NS-SPBTWAVE2-BK
Manufacturer: Lightcomm Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 18/02/08/
Time:
Engineer Signature: WADE
Distance: 3m

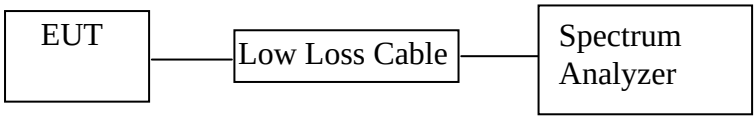
Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	22155.125	10.54	39.27	49.81	74.00	-24.19	peak			
2	22155.125	0.17	39.27	39.44	54.00	-14.56	AVG			

11. CONDUCTED SPURIOUS EMISSION COMPLIANCE TEST

11.1. Block Diagram of Test Setup



(EUT: Portable Bluetooth Speaker)

11.2. The Requirement For Section 15.247(d)

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

11.3. EUT Configuration on Measurement

The equipment 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.

11.4. Operating Condition of EUT

11.4.1. Setup the EUT and simulator as shown as Section 12.1.

11.4.2. Turn on the power of all equipment.

11.4.3. 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.

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 100kHz and VBW to 300kHz

11.5.3.The Conducted Spurious Emission was measured and recorded.

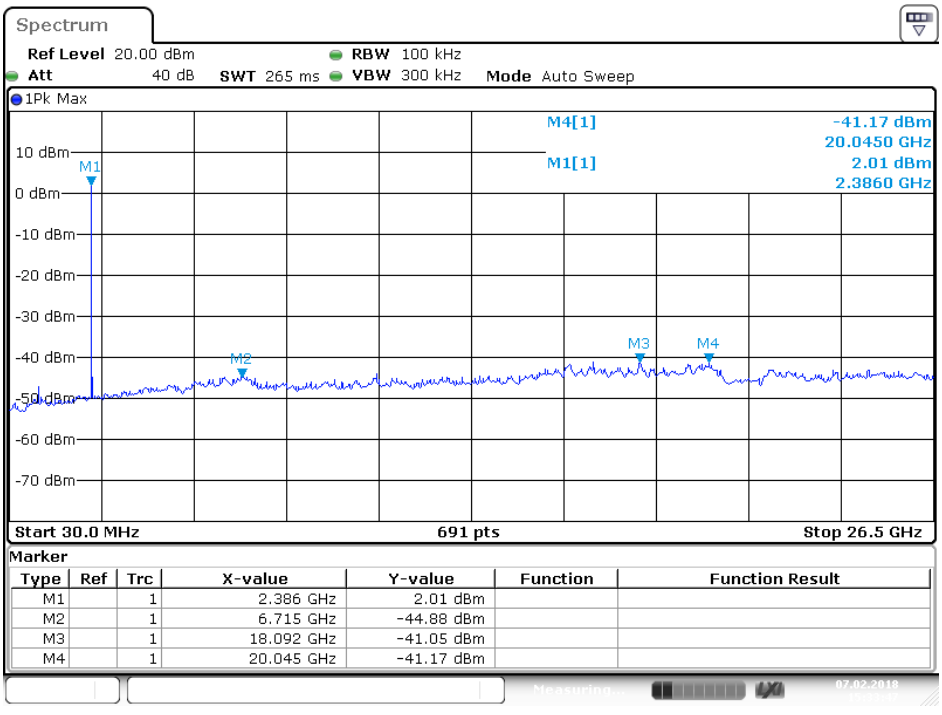
11.6.Test Result

Pass.

Note: The RF module of the product is the same as the report ATE20180324, so the data Reference to report is ATE20180324.

The spectrum analyzer plots are attached as below.

Low Channel 2402MHz



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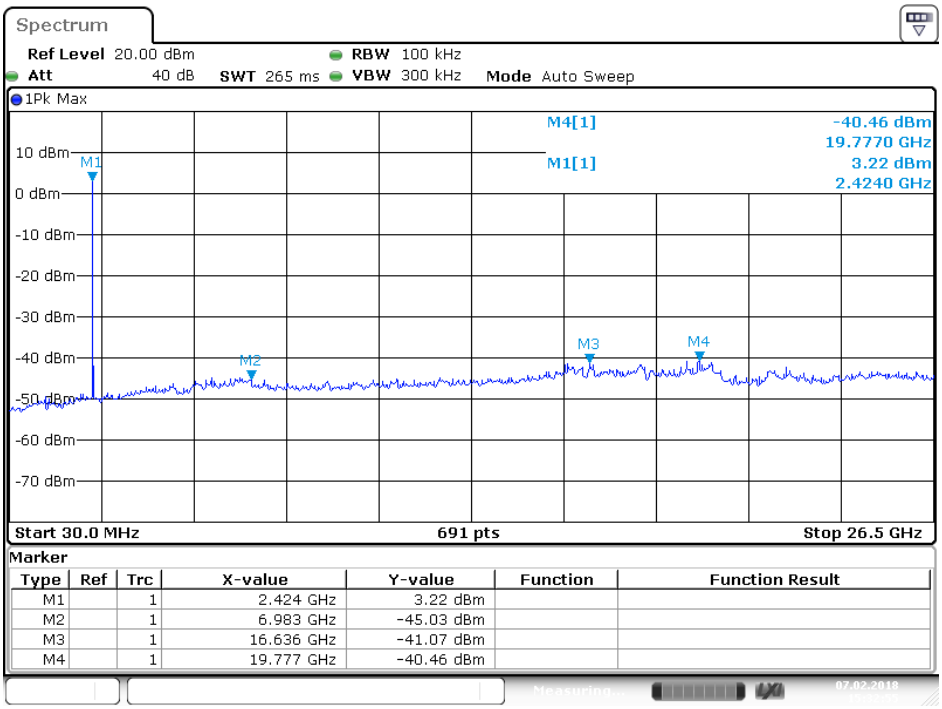
Middle Channel 2440MHz



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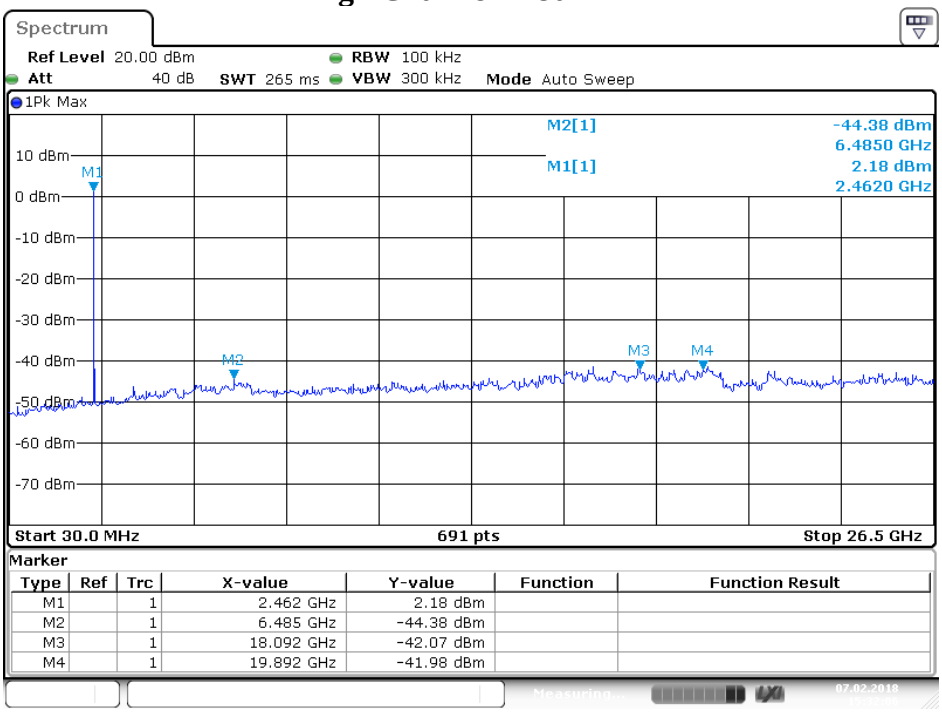
High Channel 2480MHz



Date: 7.FEB.2018 15:32:06

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 permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is 0dBi. Therefore, the equipment complies with the antenna requirement of FCC part 15C Section 15.203.

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