

APPLICATION CERTIFICATION
On Behalf of
JMTek Technology (Shenzhen) Co., Ltd.

Bluetooth Speaker
Model No.: BTS04A

FCC ID:2ABL7-BTS04A

Prepared for : JMTek Technology (Shenzhen) Co., Ltd.
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Report Number : ATE20140537
Date of Test : April 15, 2014
Date of Report : April 17, 2014

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Test Report Certification

Applicant : JMTek Technology (Shenzhen) Co., Ltd.
Manufacturer : JMTek Technology (Shenzhen) Co., Ltd.
EUT Description : Bluetooth Speaker
(A) MODEL NO.: BTS04A
(B) SERIAL NO.: N/A
(C) POWER SUPPLY: DC 3.7V (Lithium ion battery) & DC 5V
(Power by USB port)

Measurement Procedure Used:

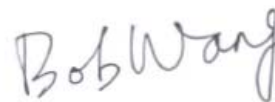
FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.4- 2009

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 : April 15, 2014

Prepared by :



(Engineer)

Approved & Authorized Signer :



(Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Bluetooth Speaker
Model Number	:	BTS04A
Frequency Band	:	2402MHz-2480MHz
Number of Channels	:	79
Modulation type	:	GFSK
Antenna Gain	:	1dBi
Power Supply	:	DC 3.7V (Lithium ion battery) & DC 5V (Power by USB port)
Applicant	:	JMTek Technology (Shenzhen) Co., Ltd.
Address	:	Room 302, Building 4, Zhongxing Industrial Park, Chuangye Rd, Nanshan District, Shenzhen, China
Manufacturer	:	JMTek Technology (Shenzhen) Co., Ltd.
Address	:	Room 302, Building 4, Zhongxing Industrial Park, Chuangye Rd, Nanshan District, Shenzhen, China
Date of sample received	:	April 11, 2014
Date of Test	:	April 15, 2014

1.2. 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

1.3. Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty = 3.08dB, k=2
(9kHz-30MHz)

Radiated emission expanded uncertainty = 4.42dB, k=2
(30MHz-1000MHz)

Radiated emission expanded uncertainty = 4.06dB, k=2
(Above 1GHz)

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated date	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 11, 2014	Jan. 10, 2015
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 11, 2014	Jan. 10, 2015
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 11, 2014	Jan. 10, 2015
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 11, 2014	Jan. 10, 2015
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2014	Jan. 14, 2015
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 15, 2014	Jan. 14, 2015
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 11, 2014	Jan. 10, 2015
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 11, 2014	Jan. 10, 2015

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode

Low Channel: 2402MHz

Middle Channel: 2441MHz

High Channel: 2480MHz

Hopping

3.2.Configuration and peripherals

EUT

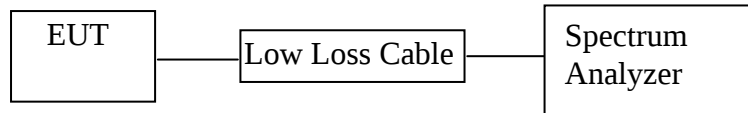
(EUT: Bluetooth Speaker)

4. TEST PROCEDURES AND RESULTS

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

5. 20DB BANDWIDTH TEST

5.1. Block Diagram of Test Setup



(EUT: Bluetooth Speaker)

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

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

5.3. EUT Configuration on Measurement

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

5.3.1. Bluetooth Speaker (EUT)

Model Number : BTS04A
 Serial Number : N/A
 Manufacturer : JMTek Technology (Shenzhen) Co., Ltd.

5.4. Operating Condition of EUT

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

5.4.2. Turn on the power of all equipment.

5.4.3. Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

5.5. Test Procedure

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

5.5.2. Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz.

5.5.3. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

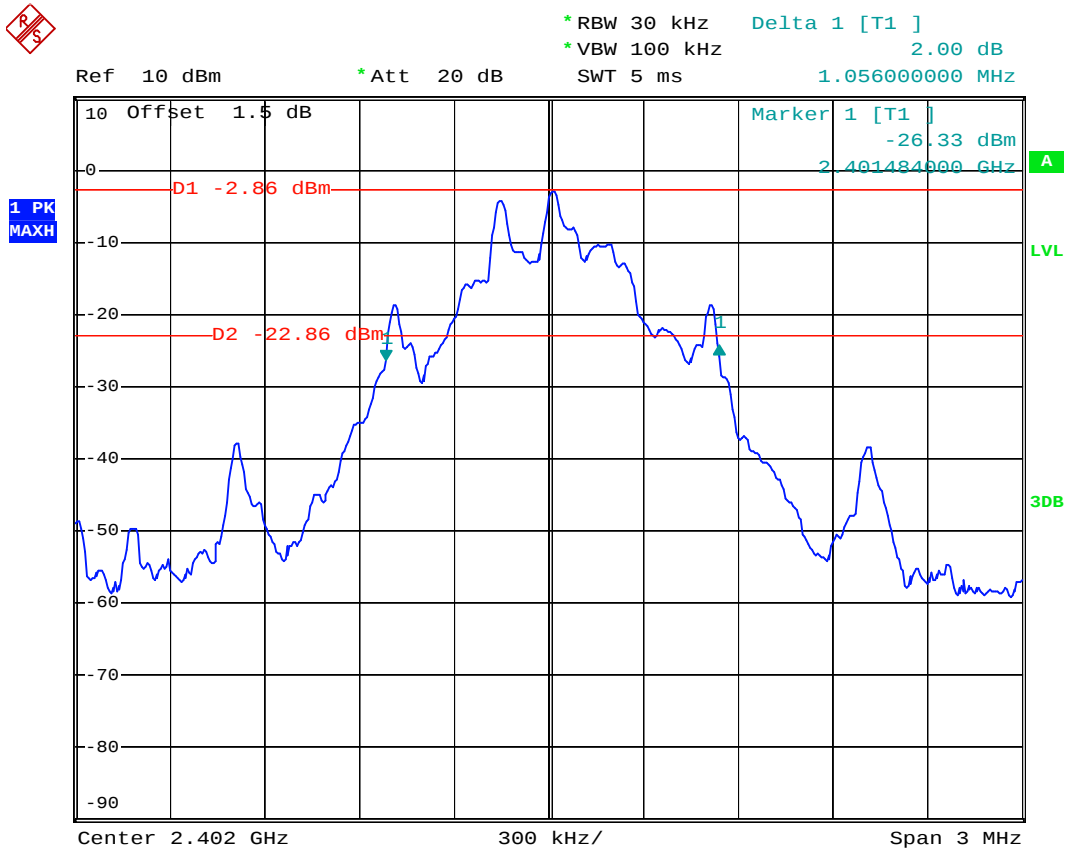
5.6. Test Result

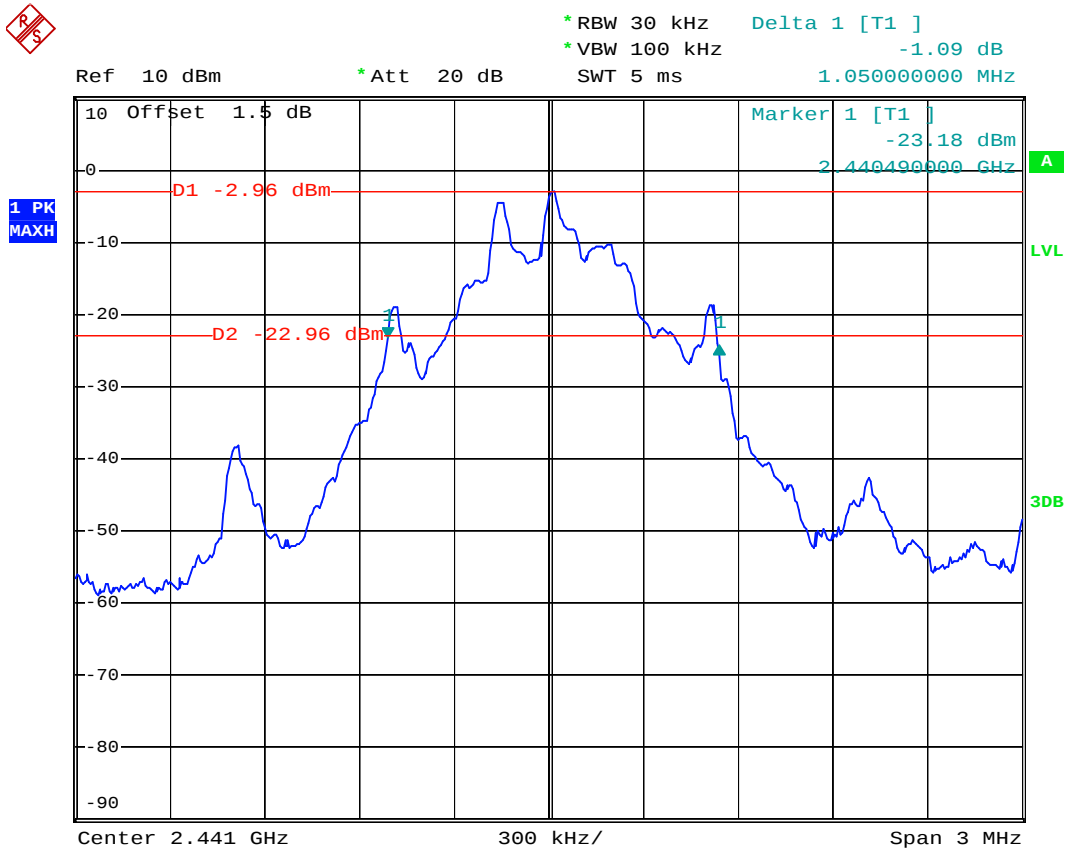
PASS.

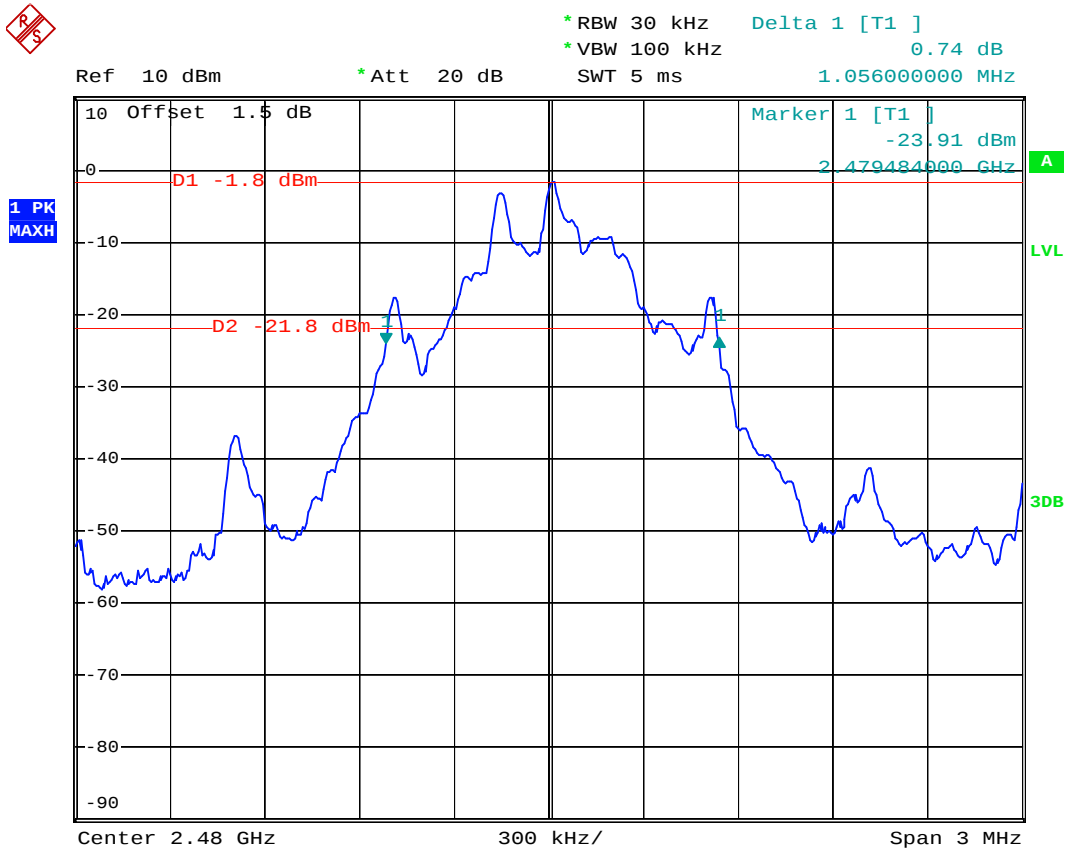
Date of Test:	<u>April 15, 2014</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Speaker</u>	Humidity:	<u>50%</u>
Model No.:	<u>BTS04A</u>	Power Supply:	<u>DC 5V</u>
Test Mode:	<u>TX</u>	Test Engineer:	<u>Star</u>

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
Low	2402	1.056	---
Middle	2441	1.050	---
High	2480	1.056	---

The spectrum analyzer plots are attached as below.

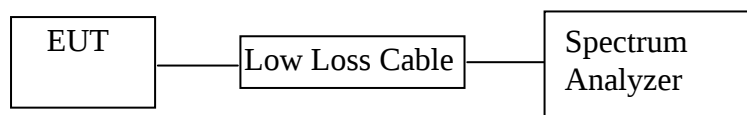






6. CARRIER FREQUENCY SEPARATION TEST

6.1. Block Diagram of Test Setup



(EUT: Bluetooth Speaker)

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

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

6.3. EUT Configuration on Measurement

The following 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.

6.3.1. Bluetooth Speaker (EUT)

Model Number : BTS04A
 Serial Number : N/A
 Manufacturer : JMTek Technology (Shenzhen) Co., Ltd.

6.4. Operating Condition of EUT

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

6.4.2. Turn on the power of all equipment.

6.4.3. Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

6.5. Test Procedure

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

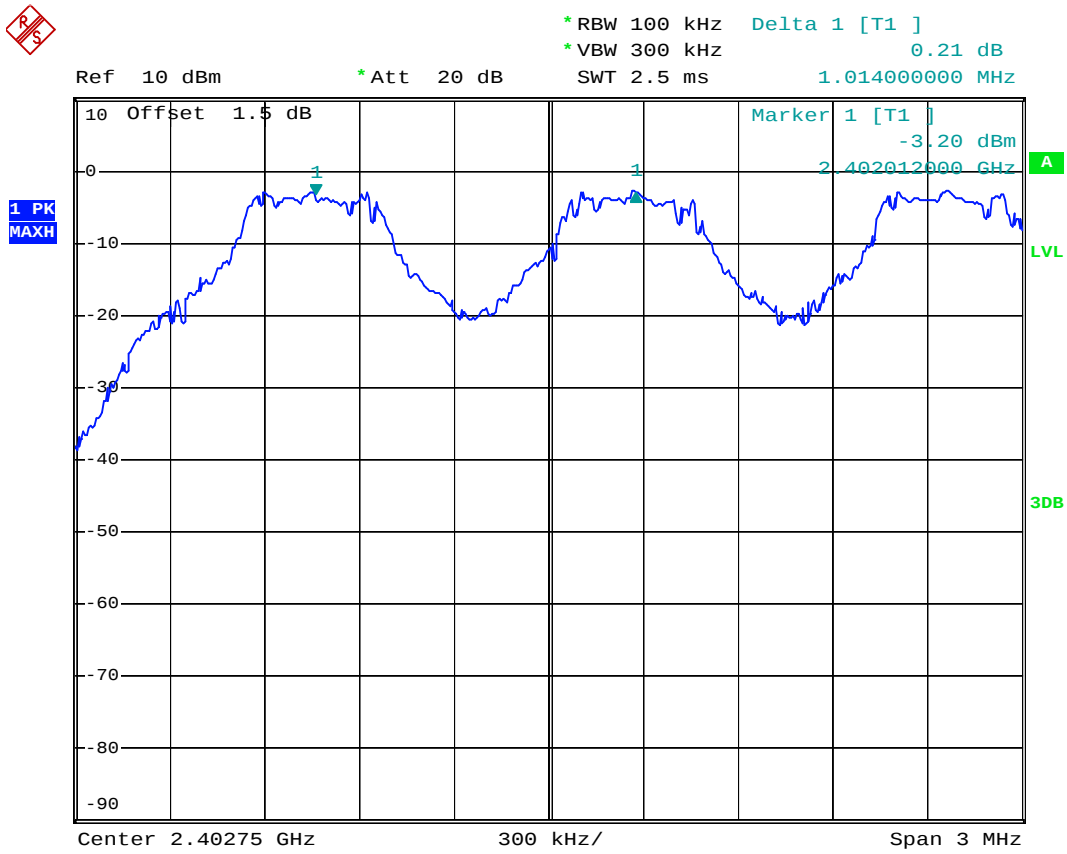
6.6. Test Result

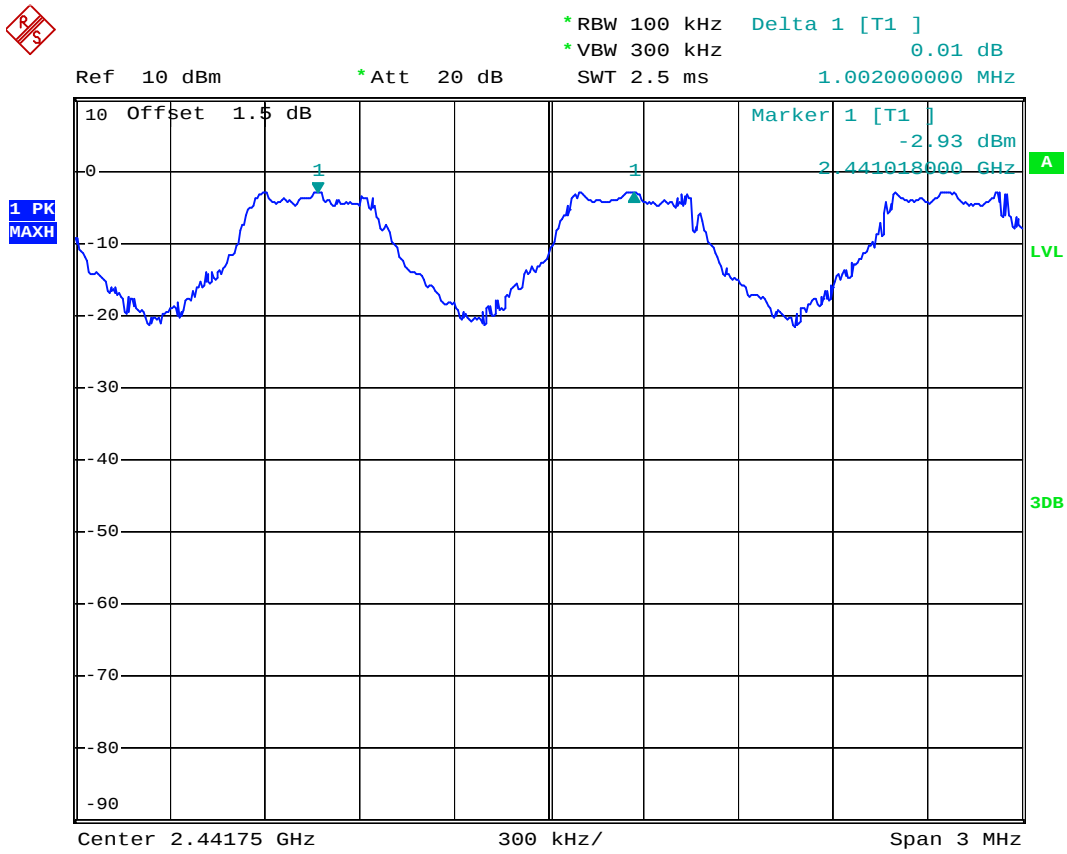
PASS.

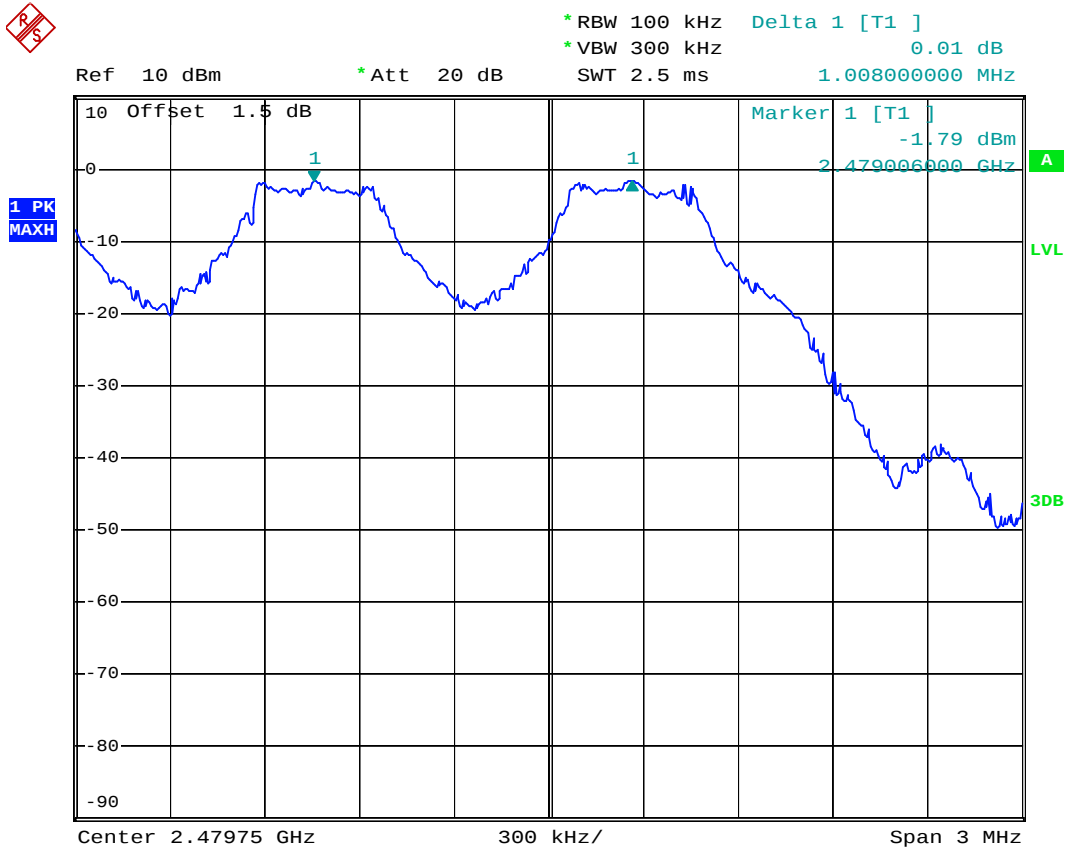
Date of Test:	April 15, 2014	Temperature:	25°C
EUT:	Bluetooth Speaker	Humidity:	50%
Model No.:	BTS04A	Power Supply:	DC 5V
Test Mode:	TX	Test Engineer:	Star

Channel	Channel Frequency (MHz)	Channel separation (MHz)	Limit (MHz)
Low	2402	1.014	0.704
Middle	2441	1.002	0.700
High	2480	1.008	0.704

The spectrum analyzer plots are attached as below.

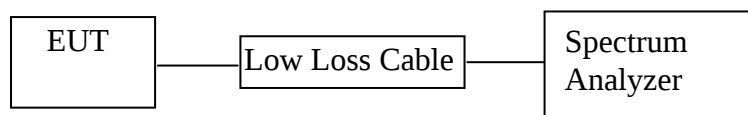






7. NUMBER OF HOPPING FREQUENCY TEST

7.1. Block Diagram of Test Setup



(EUT: Bluetooth Speaker)

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

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

7.3. EUT Configuration on Measurement

The following 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.

7.3.1. Bluetooth Speaker (EUT)

Model Number	:	BTS04A
Serial Number	:	N/A
Manufacturer	:	JMTek Technology (Shenzhen) Co., Ltd.

7.4. Operating Condition of EUT

7.4.1. Setup the EUT and simulator as shown as Section 7.1.

7.4.2. Turn on the power of all equipment.

7.4.3. Let the EUT work in TX (Hopping on) modes measure it.

7.5. Test Procedure

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

7.5.2. Set the spectrum analyzer as Span=83.5MHz, RBW=100 kHz, VBW=300 kHz.

7.5.3. Max hold, view and count how many channel in the band.

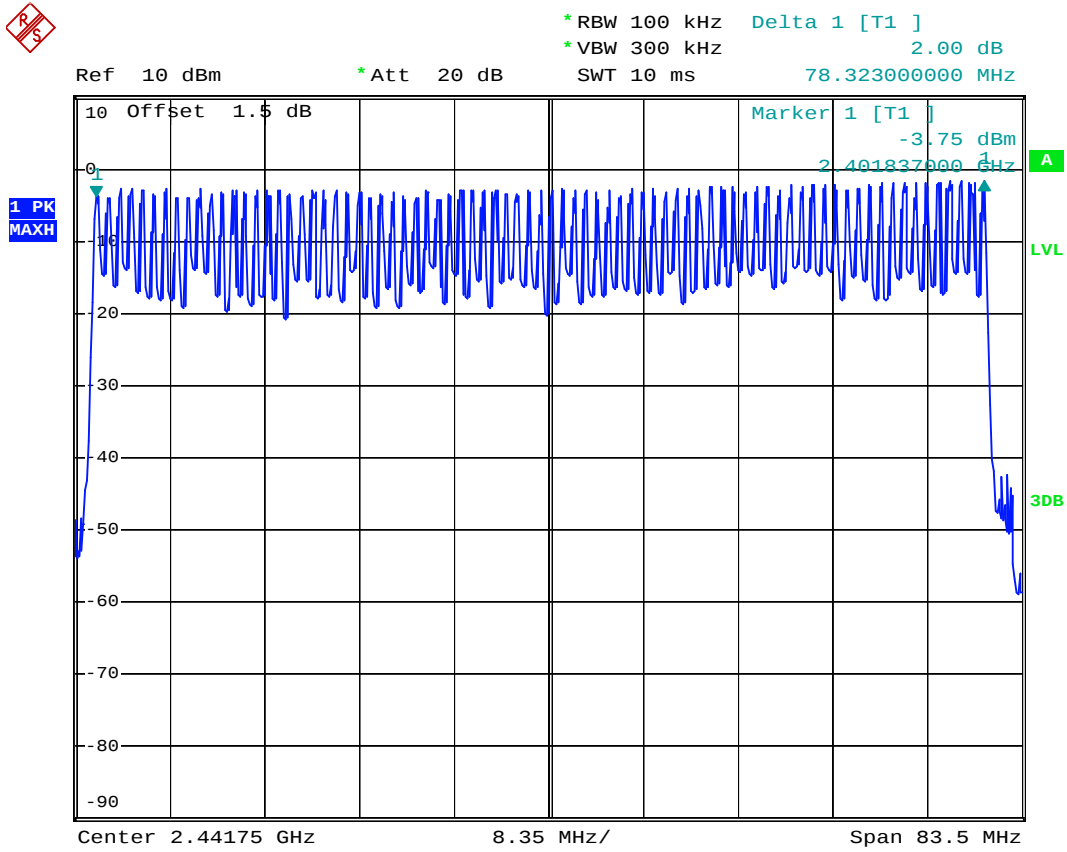
7.6. Test Result

PASS.

Date of Test:	<u>April 15, 2014</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Speaker</u>	Humidity:	<u>50%</u>
Model No.:	<u>BTS04A</u>	Power Supply:	<u>DC 5V</u>
Test Mode:	<u>Hopping</u>	Test Engineer:	<u>Star</u>

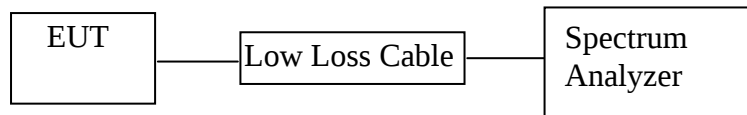
Total number of hopping channel	Measurement result (CH)	Limit (CH)
	79	>15

The spectrum analyzer plots are attached as below.



8. DWELL TIME TEST

8.1. Block Diagram of Test Setup



(EUT: Bluetooth Speaker)

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

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

8.3. EUT Configuration on Measurement

The following 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.

8.3.1. Bluetooth Speaker (EUT)

Model Number	:	BTS04A
Serial Number	:	N/A
Manufacturer	:	JMTek Technology (Shenzhen) Co., Ltd.

8.4. Operating Condition of EUT

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

8.4.2. Turn on the power of all equipment.

8.4.3. Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

8.5. Test Procedure

- 8.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 8.5.2. Set center frequency of spectrum analyzer = operating frequency.
- 8.5.3. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Span=0Hz, Adjust Sweep=1s. Get the burst (in 1 sec.).
- 8.5.4. Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=2ms. Get the pulse time.
- 8.5.5. Repeat above procedures until all frequency measured were complete.

8.6. Test Result

PASS.

Date of Test:	<u>April 15, 2014</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Speaker</u>	Humidity:	<u>50%</u>
Model No.:	<u>BTS04A</u>	Power Supply:	<u>DC 5V</u>
Test Mode:	<u>TX</u>	Test Engineer:	<u>Star</u>

DH1:

A period transmit time = $0.4 \times 79 = 31.6$

Dwell time = pulse time $\times (1600/(2 \times 79)) \times 31.6$

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	0.534	170.88	400
Middle	2441	0.540	172.80	400
High	2480	0.534	170.88	400

DH3:

A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4 \times 79)) \times 31.6$

Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	1.797875	287.66	400
Middle	2441	1.815875	290.54	400
High	2480	1.815875	290.54	400

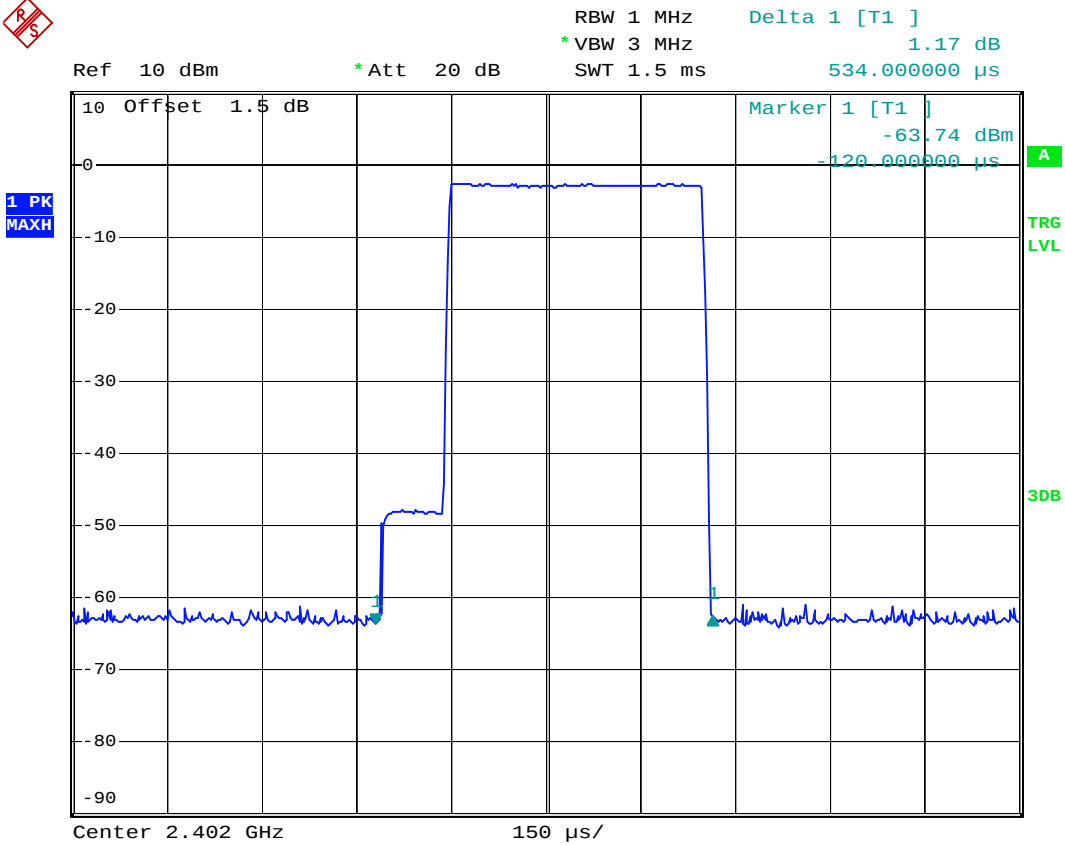
DH5:

A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6 \times 79)) \times 31.6$

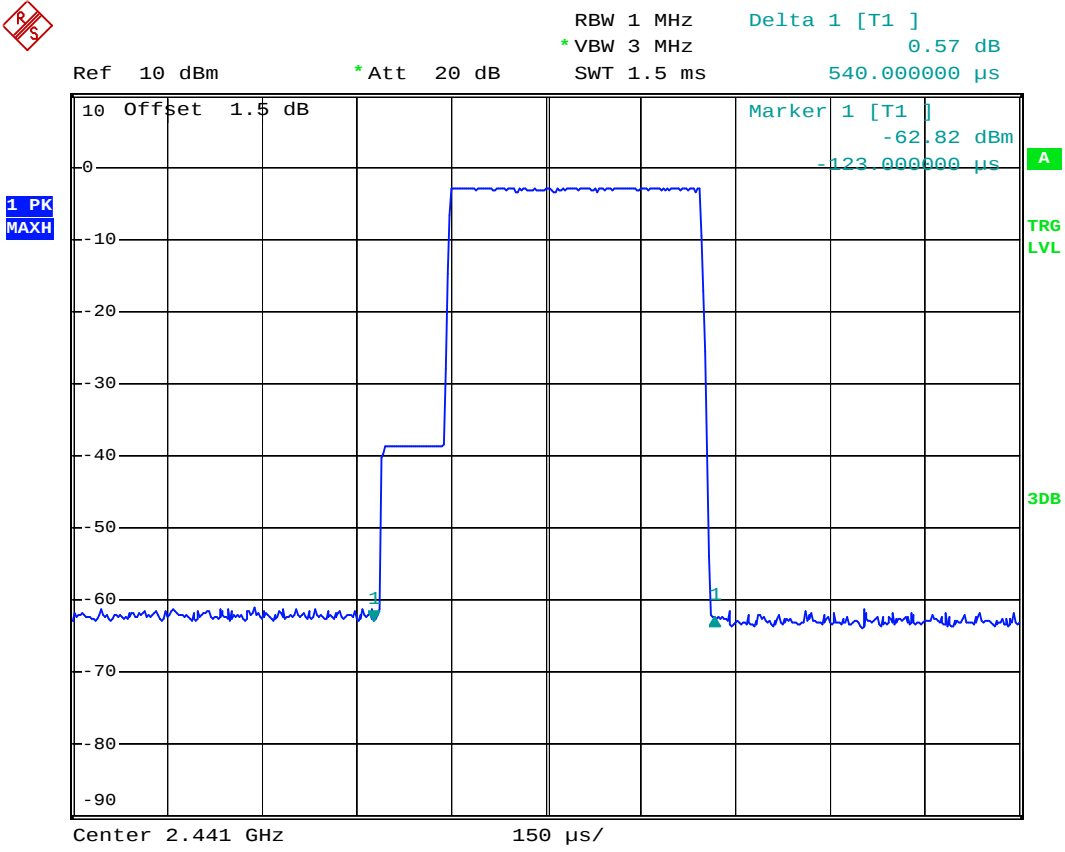
Channel	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
Low	2402	3.073	327.7867	400
Middle	2441	3.097	330.3467	400
High	2480	3.081	328.6400	400

The spectrum analyzer plots are attached as below.

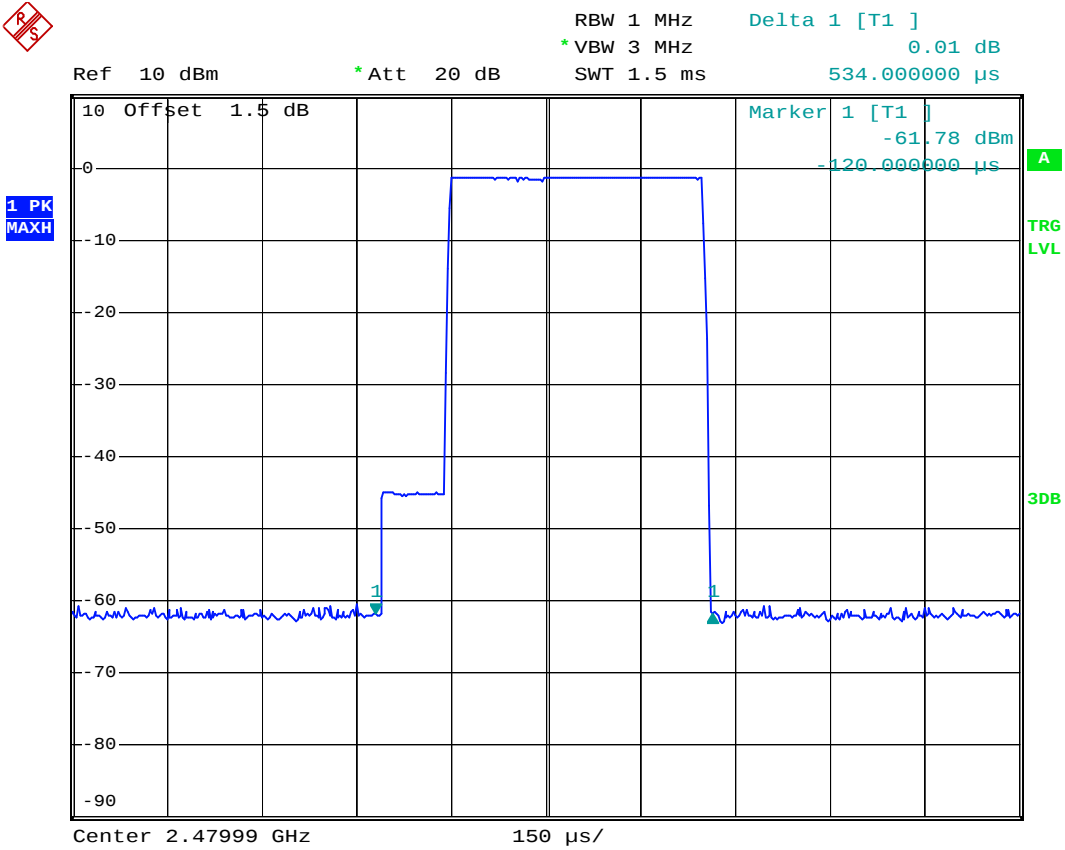
DH1:



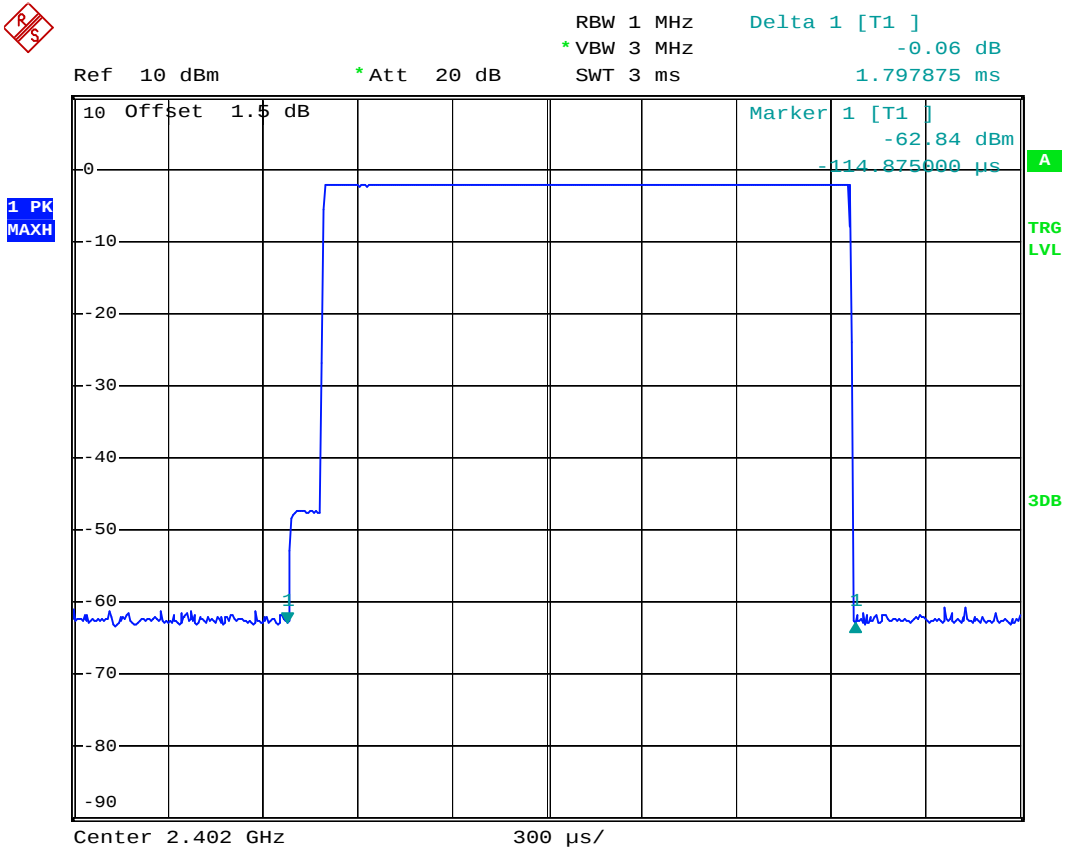
DH1:



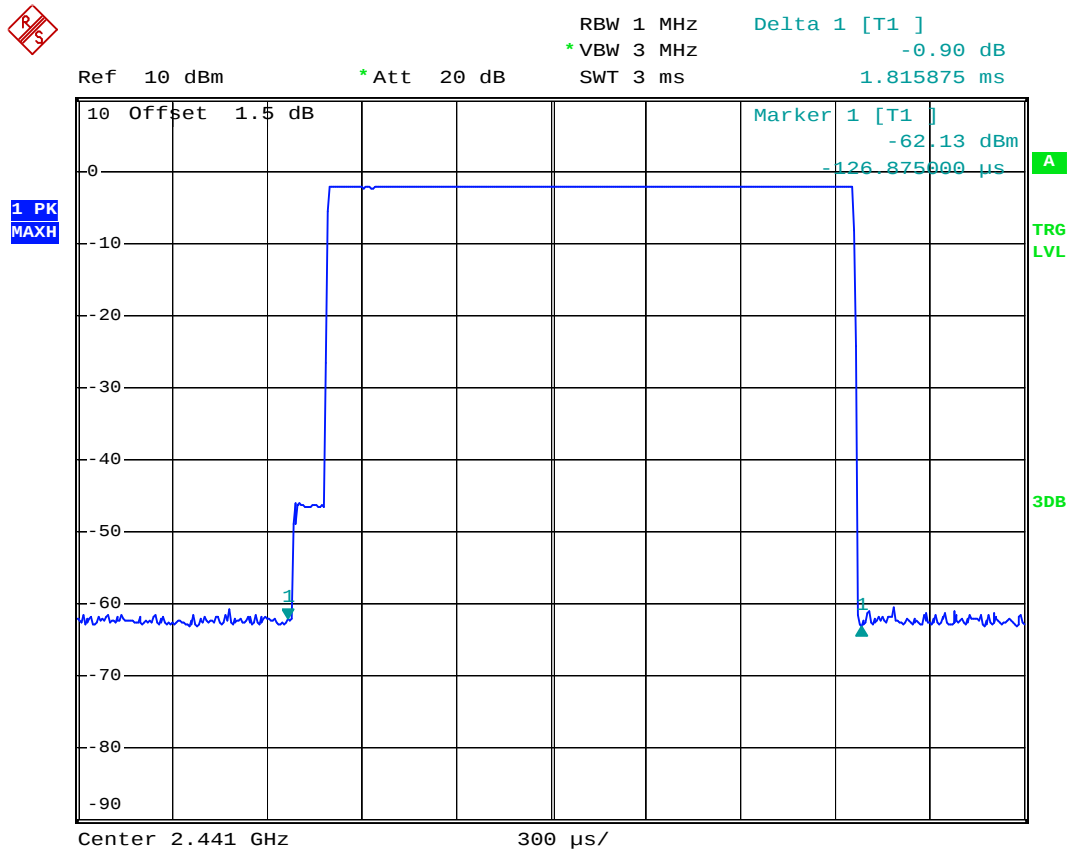
DH1:



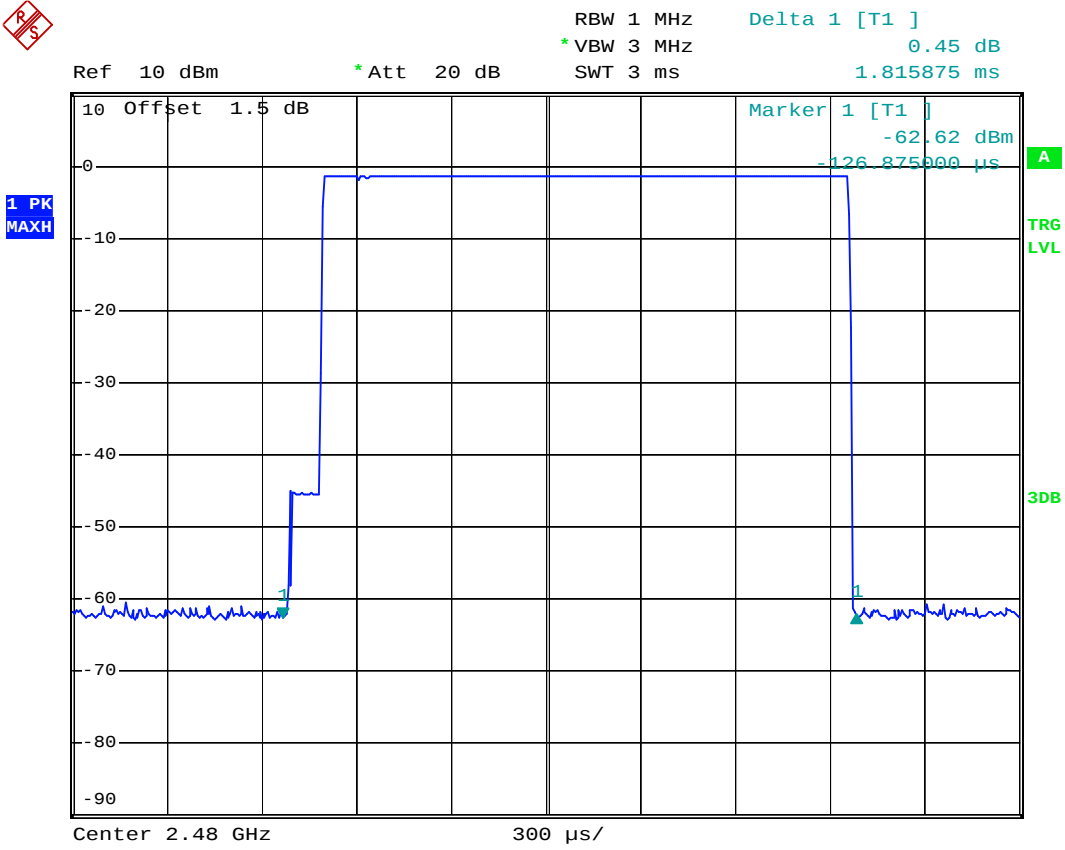
DH3:



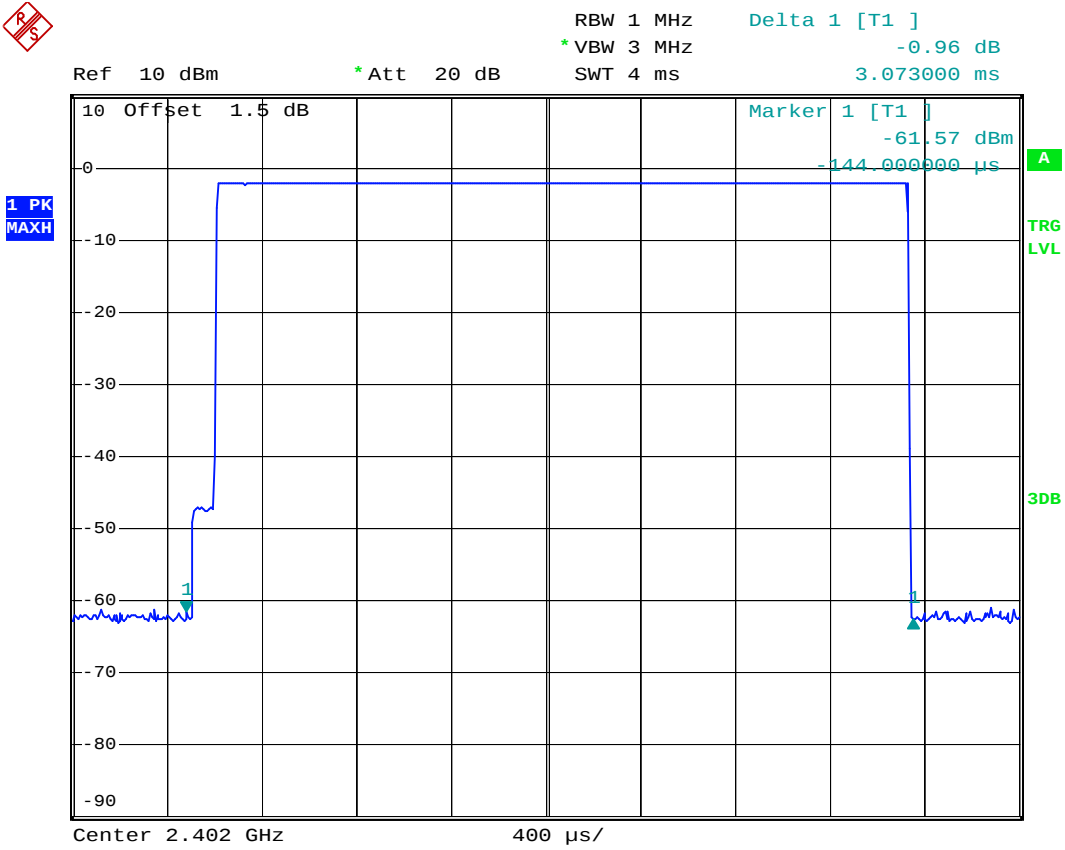
DH3:



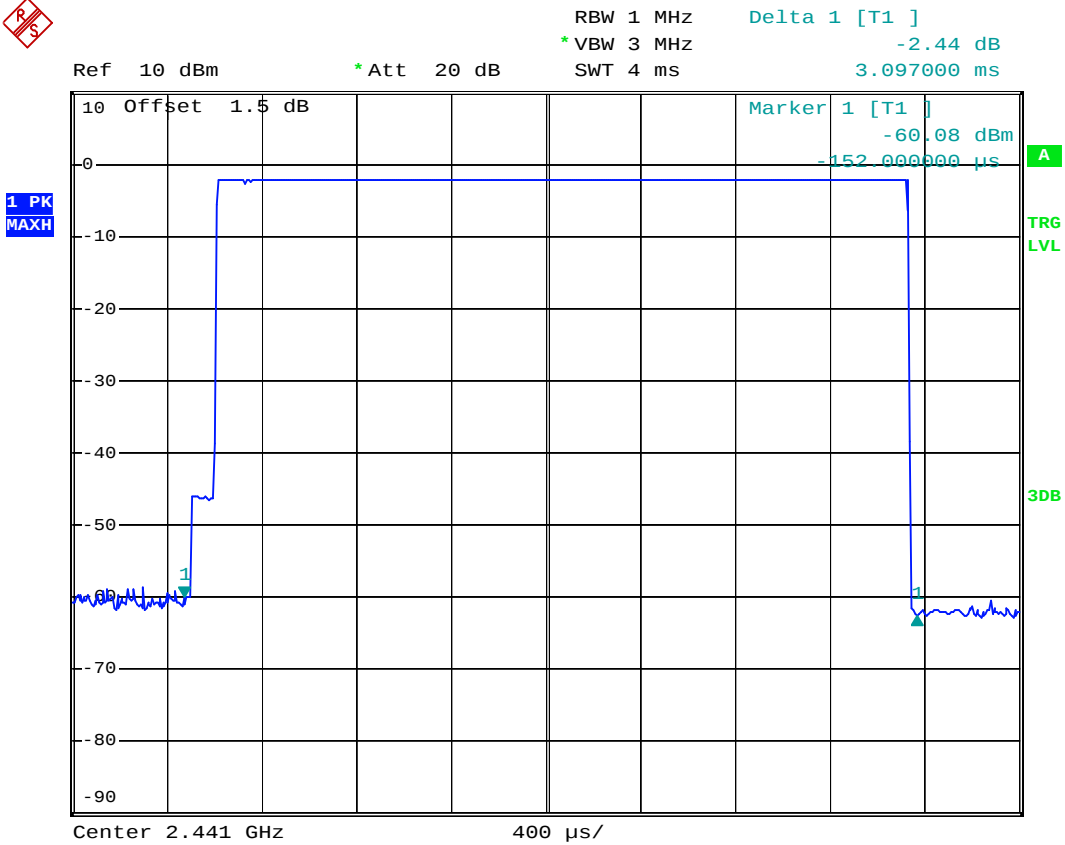
DH3:



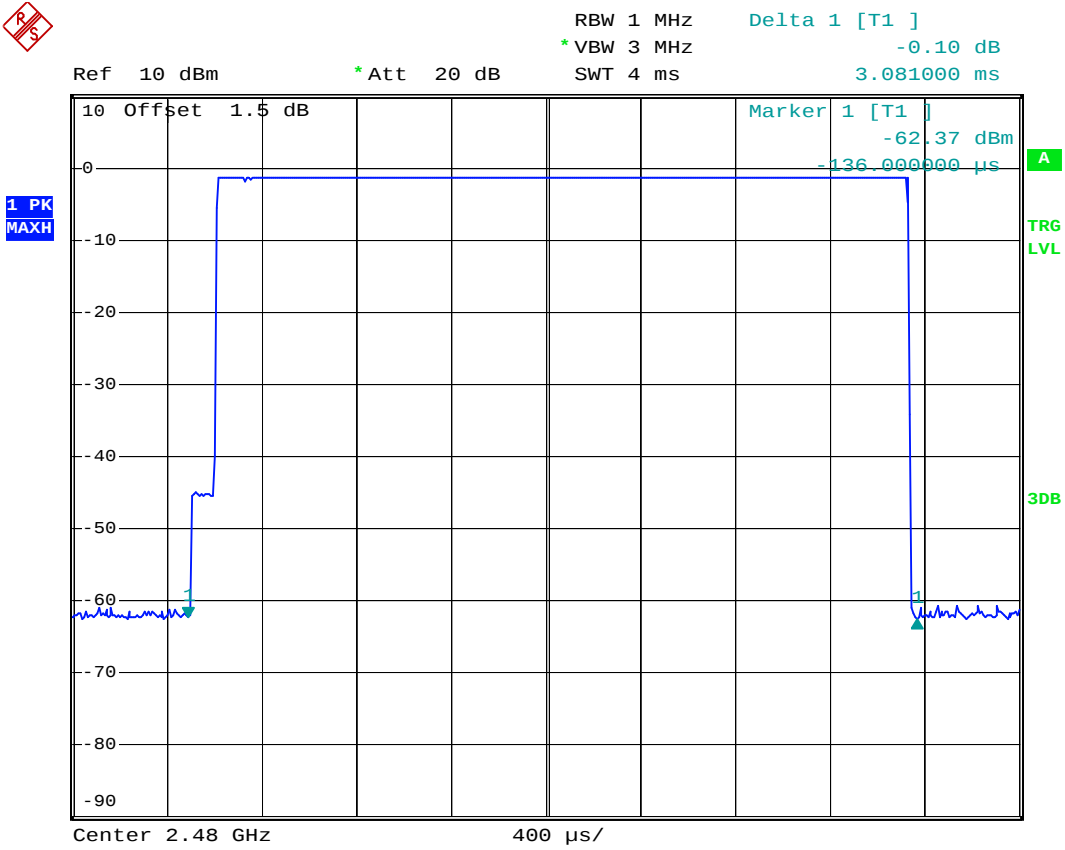
DH5:



DH5:

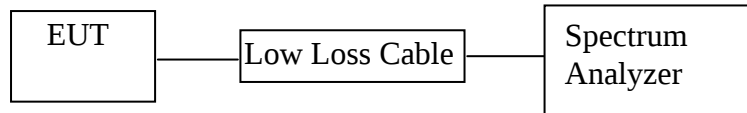


DH5:



9. MAXIMUM PEAK OUTPUT POWER TEST

9.1. Block Diagram of Test Setup



(EUT: Bluetooth Speaker)

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

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

9.3. EUT Configuration on Measurement

The following 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.

9.3.1. Bluetooth Speaker (EUT)

Model Number	:	BTS04A
Serial Number	:	N/A
Manufacturer	:	JMTek Technology (Shenzhen) Co., Ltd.

9.4. Operating Condition of EUT

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

9.4.2. Turn on the power of all equipment.

9.4.3. Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

9.5. Test Procedure

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

9.5.2. Set RBW of spectrum analyzer to 3MHz and VBW to 3MHz.

9.5.3. Measurement the maximum peak output power.

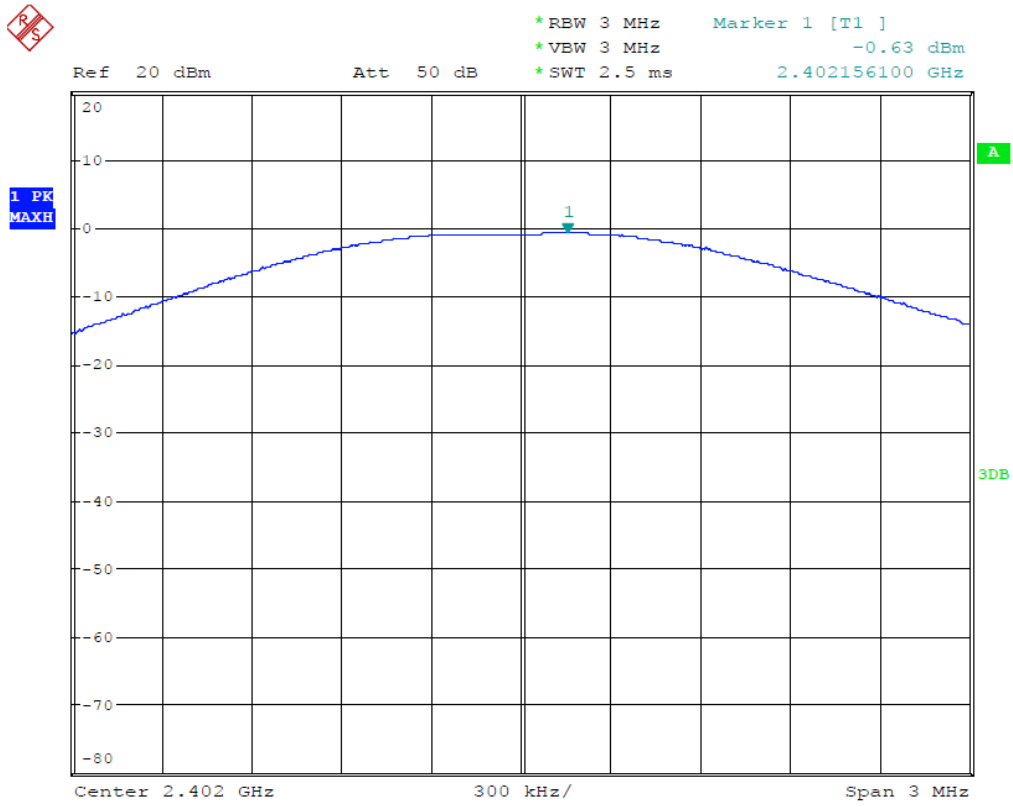
9.6. Test Result

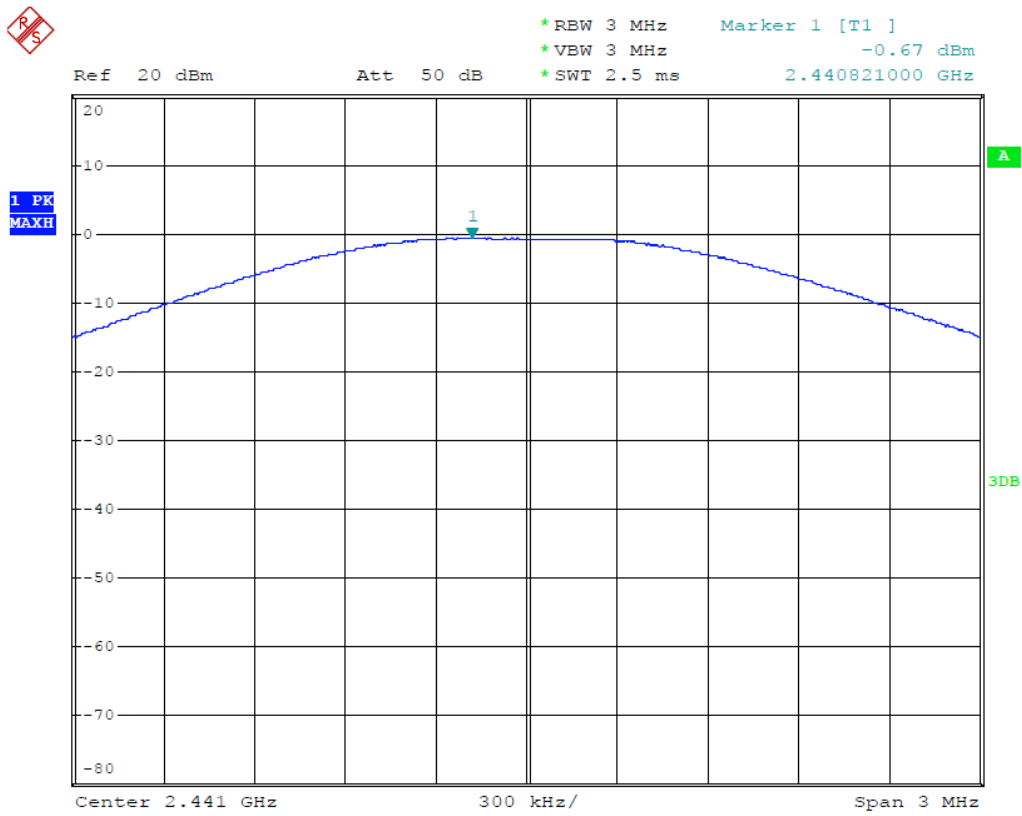
PASS.

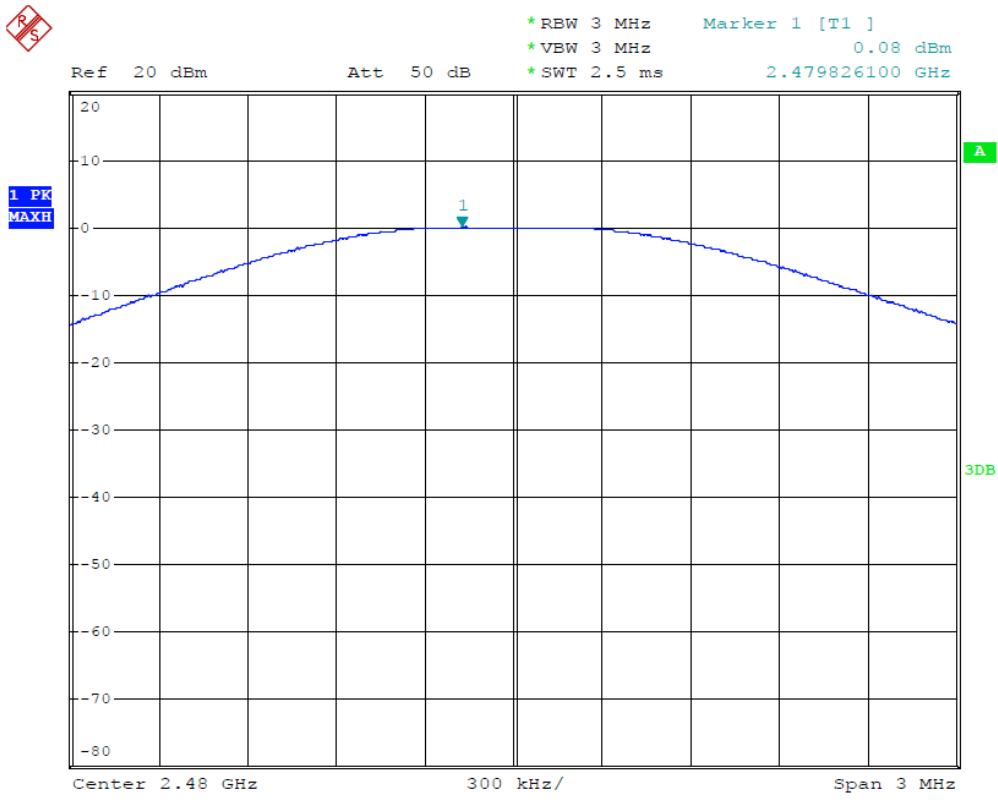
Date of Test:	<u>April 15, 2014</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Speaker</u>	Humidity:	<u>50%</u>
Model No.:	<u>BTS04A</u>	Power Supply:	<u>DC 5V</u>
Test Mode:	<u>TX</u>	Test Engineer:	<u>Star</u>

Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / mW
Low	2402	-0.63	0.86	21 dBm / 125 mW
Middle	2441	-0.67	0.85	21 dBm / 125 mW
High	2480	0.08	1.01	21 dBm / 125 mW

The spectrum analyzer plots are attached as below.







10. RADIATED EMISSION TEST

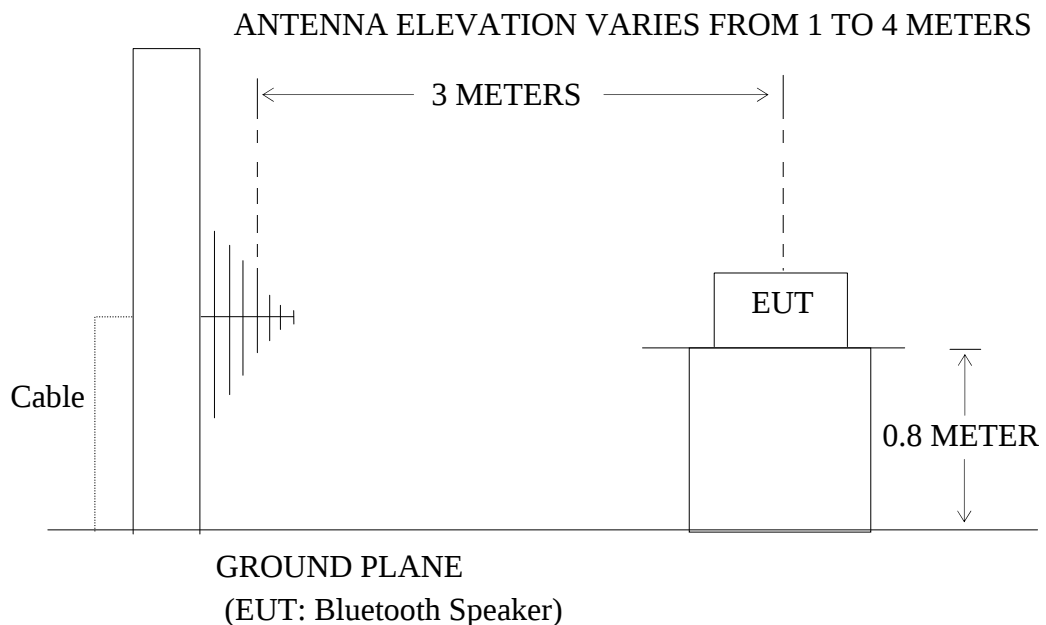
10.1. Block Diagram of Test Setup

10.1.1. Block diagram of connection between the EUT and simulators



(EUT: Bluetooth Speaker)

10.1.2. Anechoic Chamber Test Setup Diagram



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			

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

²Above 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 Section 15.209 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 following 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.

10.4.1.Bluetooth Speaker (EUT)

Model Number : BTS04A
 Serial Number : N/A
 Manufacturer : JMTek Technology (Shenzhen) Co., Ltd.

10.5.est 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. 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 C63.4- 2009 on radiated emission measurement.

The bandwidth of test receiver (R&S ESI26) is set at 120 KHz in 30-1000MHz. and set at 1MHz in above 1000MHz.

The frequency range from 30MHz to 25000MHz 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

10.6.The Field Strength of Radiation Emission Measurement Results

PASS.

Date of Test:	April 15, 2014	Temperature:	25°C
EUT:	Bluetooth Speaker	Humidity:	50%
Model No.:	BTS04A	Power Supply:	DC 5V
Test Mode:	TX (2402MHz)	Test Engineer:	Star

For 30MHz-1000MHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m)	Factor Corr. (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
446.4141	49.28	-14.75	34.53	46.00	-11.47	Horizontal
665.8035	48.89	-10.35	38354	46.00	-7.46	Horizontal
893.8567	43.05	-6.22	36.83	46.00	-9.17	Horizontal
444.8514	54.14	-14.78	39.36	46.00	-6.64	Vertical
593.0497	54.21	-11.83	42.38	46.00	-3.62	Vertical
962.1623	45.96	-5.23	40.73	54.00	-13.27	Vertical

For 1GHz-25GHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading(dBμV/m)		Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
4804.000	33.25	41.72	-1.59	31.66	40.13	54.00	74.00	-22.34	-33.87	Vertical
4804.000	37.58	44.06	-1.59	35.99	42.47	54.00	74.00	-18.01	-31.53	Horizontal

Note: 1.The emission emitted by the EUT is too low to be measured except the emission listed above.

2. *: Denotes restricted band of operation.

3. The fundamental radiated emissions were reduced by 2.4G Band Reject Filter in the attached plots.

Date of Test:	April 15, 2014	Temperature:	25°C
EUT:	Bluetooth Speaker	Humidity:	50%
Model No.:	BTS04A	Power Supply:	DC 5V
Test Mode:	TX (2441MHz)	Test Engineer:	Star

For 30MHz-1000MHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m)	Factor Corr. (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
148.4410	59.87	-23.77	36.10	43.50	-7.40	Horizontal
665.8034	47.95	-10.35	37.60	46.00	-8.40	Horizontal
815.9678	44.53	-7.50	37.03	46.00	-8.97	Horizontal
71.8319	52.52	-21.45	31.07	40.00	-8.93	Vertical
446.4141	54.47	-14.75	39.72	46.00	-6.28	Vertical
593.0497	53.60	-11.83	41.77	46.00	-4.23	Vertical

For 1GHz-25GHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading(dBμV/m)		Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
4882.000	35.70	42.99	-1.35	34.35	41.64	54.00	74.00	-19.65	-32.36	Vertical
4882.000	36.14	45.59	-1.35	34.79	43.24	54.00	74.00	-19.21	-30.76	Horizontal

Note: 1.The emission emitted by the EUT is too low to be measured except the emission listed above.**2. *: Denotes restricted band of operation.****3. The fundamental radiated emissions were reduced by 2.4G Band Reject Filter in the attached plots.**

Date of Test:	April 15, 2014	Temperature:	25°C
EUT:	Bluetooth Speaker	Humidity:	50%
Model No.:	BTS04A	Power Supply:	DC 5V
Test Mode:	TX (2480MHz)	Test Engineer:	Star

For 30MHz-1000MHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m)	Factor Corr. (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
148.4410	57.05	-23.77	33.28	43.50	-10.22	Horizontal
446.4141	50.37	-14.75	35.62	46.00	-10.38	Horizontal
665.8034	49.34	-10.35	38.99	46.00	-7.01	Horizontal
147.9214	61.48	-23.76	37.72	46.50	-5.78	Vertical
446.4141	54.01	-14.75	39.26	46.00	-6.74	Vertical
593.0497	53.40	-11.83	41.57	46.00	-4.43	Vertical

For 1GHz-25GHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading(dBμV/m)		Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
4960.000	36.25	42.94	-1.11	35.14	41.83	54.00	74.00	-18.86	-32.17	Vertical
4960.000	35.71	44.30	-1.11	34.60	43.18	54.00	74.00	-19.40	-30.82	Horizontal

Note: 1.The emission emitted by the EUT is too low to be measured except the emission listed above.**2. *: Denotes restricted band of operation.****3. The fundamental radiated emissions were reduced by 2.4G Band Reject Filter in the attached plots.**



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Job No.: star2014 #65

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2402MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

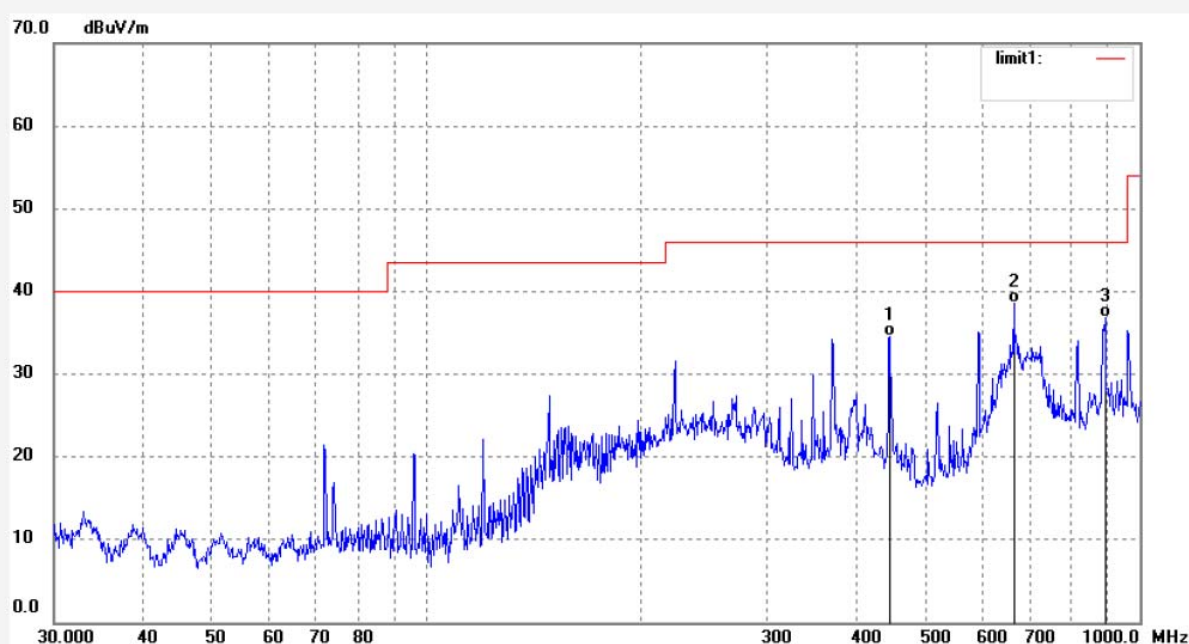
Date: 14/04/15/

Time: 8/57/28

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	446.4141	49.28	-14.75	34.53	46.00	-11.47	QP			
2	665.8035	48.89	-10.35	38.54	46.00	-7.46	QP			
3	893.8567	43.05	-6.22	36.83	46.00	-9.17	QP			



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Job No.: star2014 #66

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2402MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

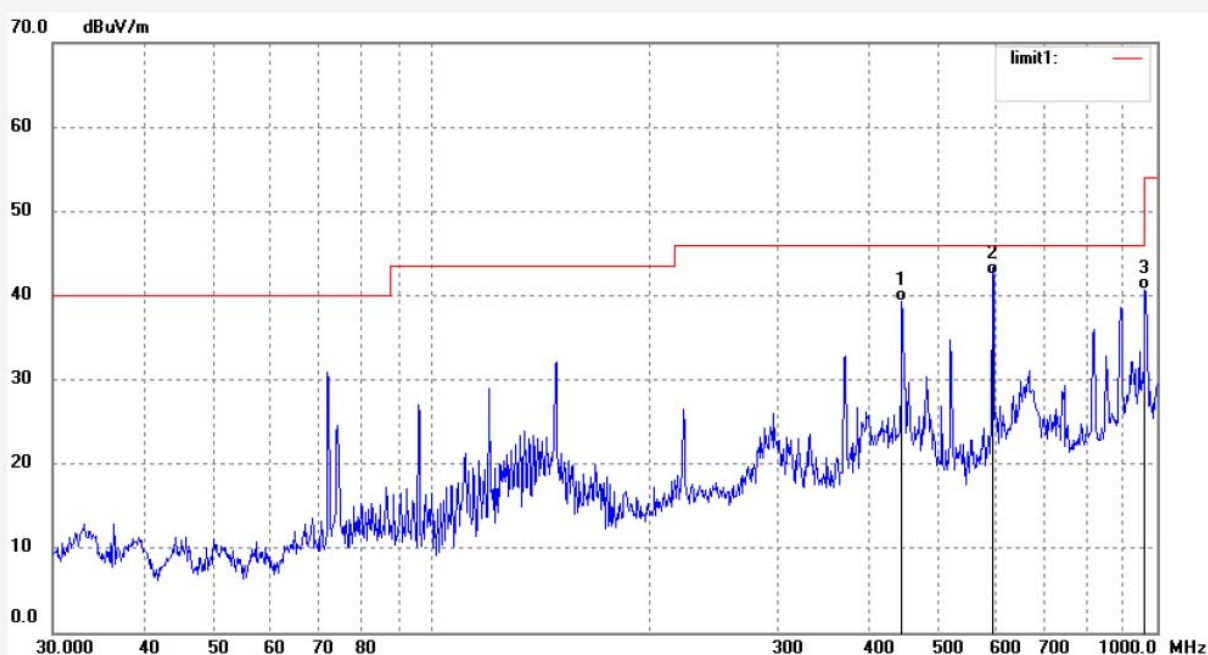
Date: 14/04/15/

Time: 9/01/11

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	444.8514	54.14	-14.78	39.36	46.00	-6.64	QP			
2	593.0497	54.21	-11.83	42.38	46.00	-3.62	QP			
3	962.1623	45.96	-5.23	40.73	54.00	-13.27	QP			



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Job No.: star2014 #75

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2402MHz

Model: BTS04A

Manufacturer: JMtek

Polarization: Vertical

Power Source: DC 5V

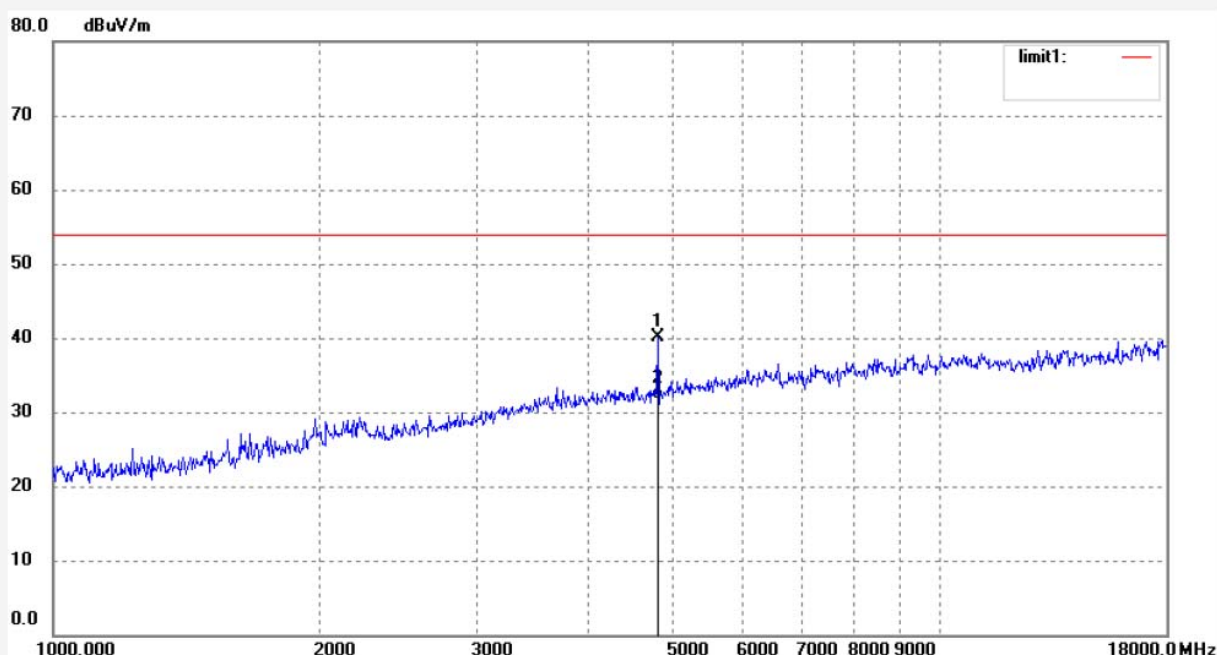
Date: 14/04/15/

Time: 9/42/59

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4804.000	41.72	-1.59	40.13	74.00	-33.87	peak			
2	4804.000	33.25	-1.59	31.66	54.00	-22.34	AVG			


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Job No.: star2014 #76

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2402MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

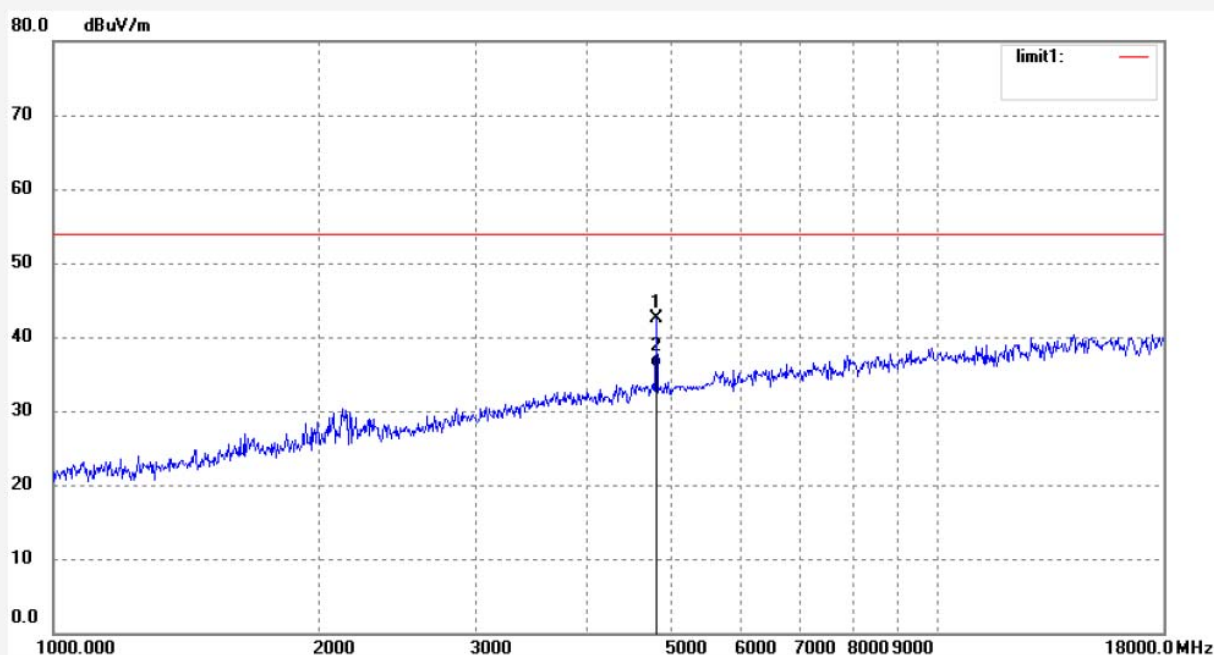
Date: 14/04/15/

Time: 9/46/10

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4804.000	44.06	-1.59	42.47	74.00	-31.53	peak			
2	4804.000	37.58	-1.59	35.99	54.00	-18.01	AVG			


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Job No.: star2014 #77

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2402MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

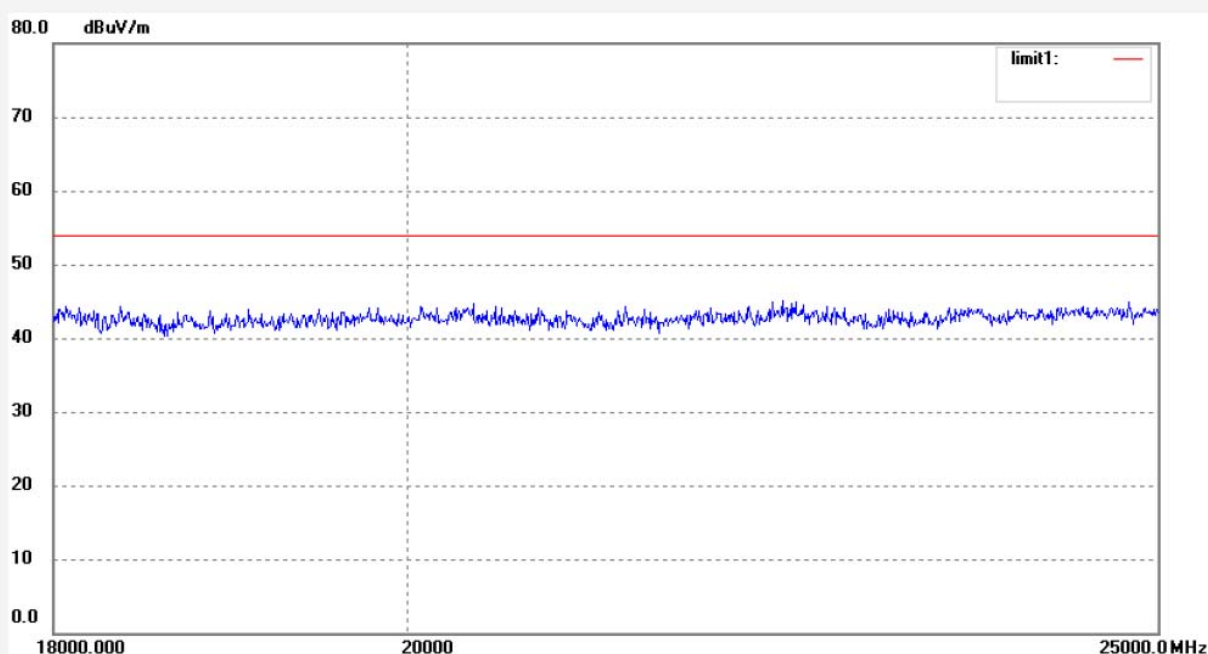
Date: 14/04/15/

Time: 9/50/06

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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Job No.: star2014 #78

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2402MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

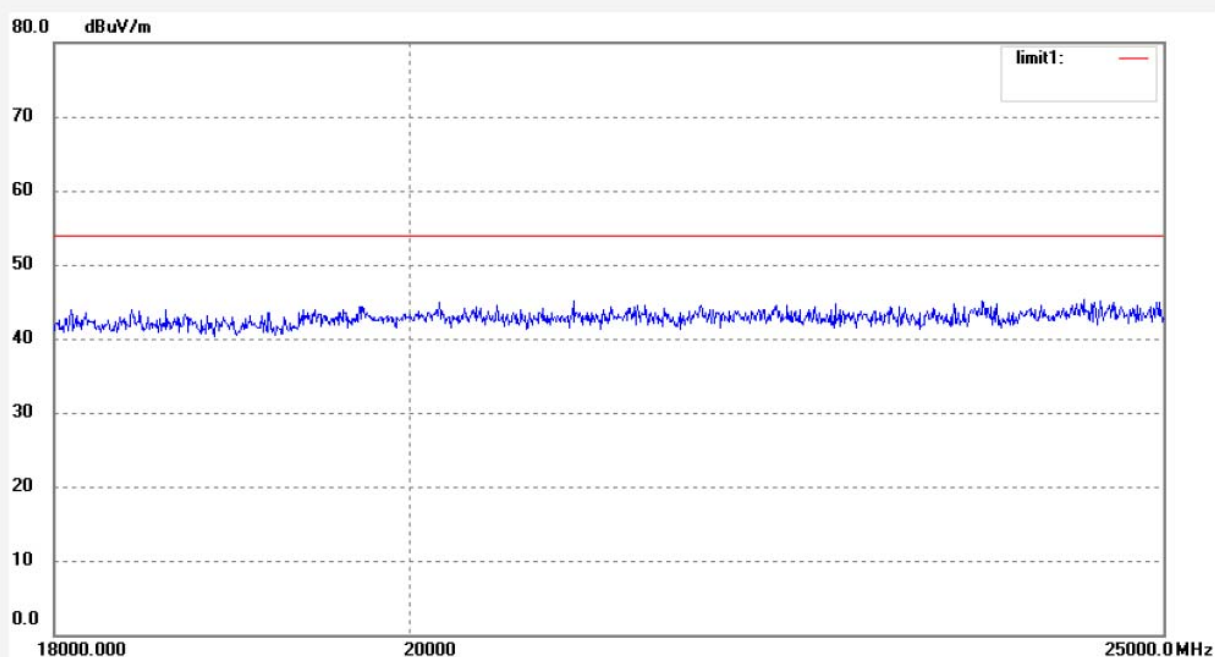
Date: 14/04/15/

Time: 9/54/46

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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Job No.: star2014 #67

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2441MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

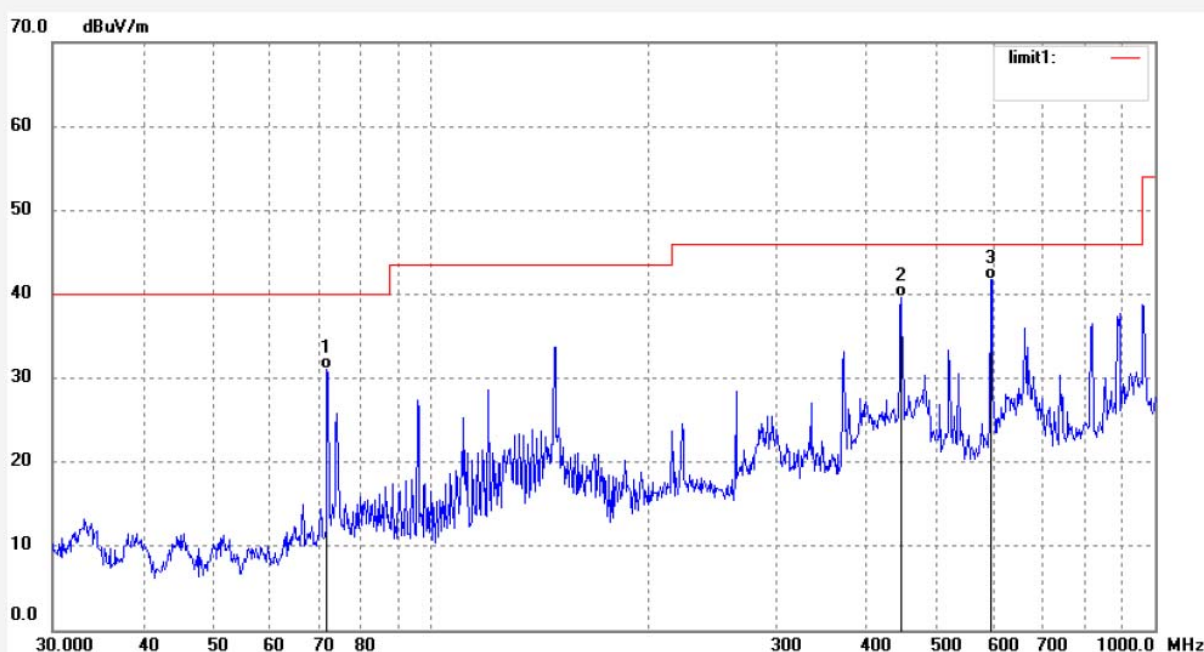
Date: 14/04/15/

Time: 9/05/46

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	71.8319	52.52	-21.45	31.07	40.00	-8.93	QP			
2	446.4141	54.47	-14.75	39.72	46.00	-6.28	QP			
3	593.0497	53.60	-11.83	41.77	46.00	-4.23	QP			



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Job No.: star2014 #68

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2441MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

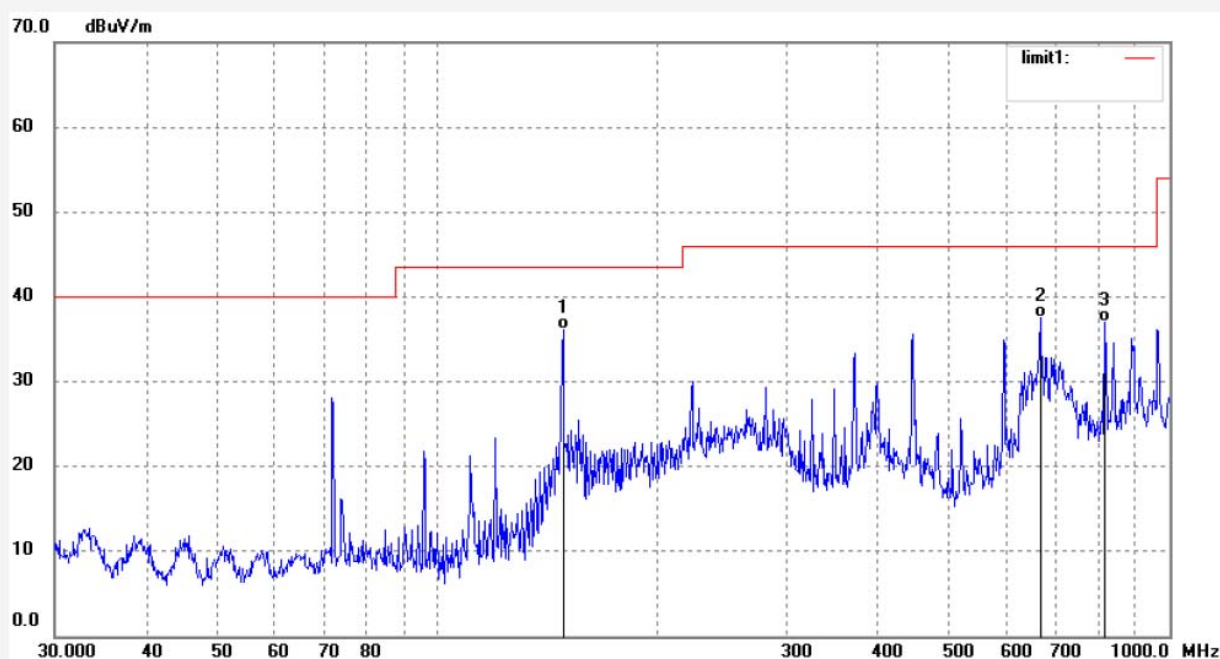
Date: 14/04/15/

Time: 9/09/31

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	148.4410	59.87	-23.77	36.10	43.50	-7.40	QP			
2	665.8034	47.95	-10.35	37.60	46.00	-8.40	QP			
3	815.9678	44.53	-7.50	37.03	46.00	-8.97	QP			



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Job No.: star2014 #73

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2441MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

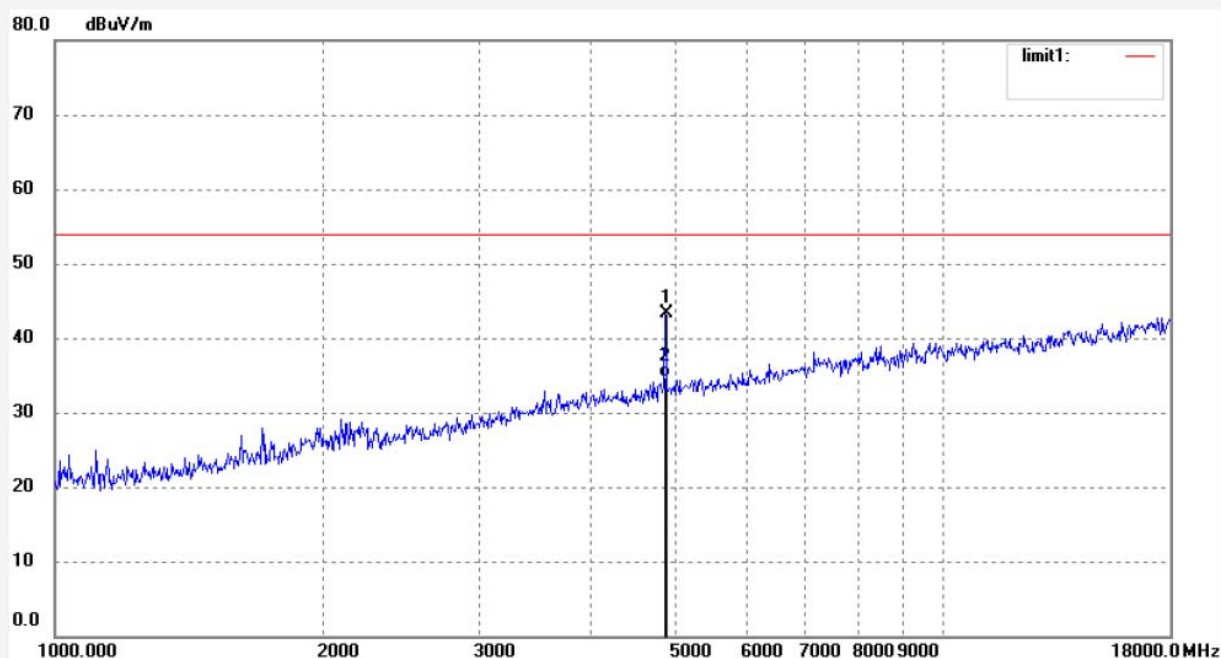
Date: 14/04/15/

Time: 9/34/00

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4882.000	44.59	-1.35	43.24	74.00	-30.76	peak			
2	4882.000	36.14	-1.35	34.79	54.00	-19.21	AVG			


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Job No.: star2014 #74

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2441MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

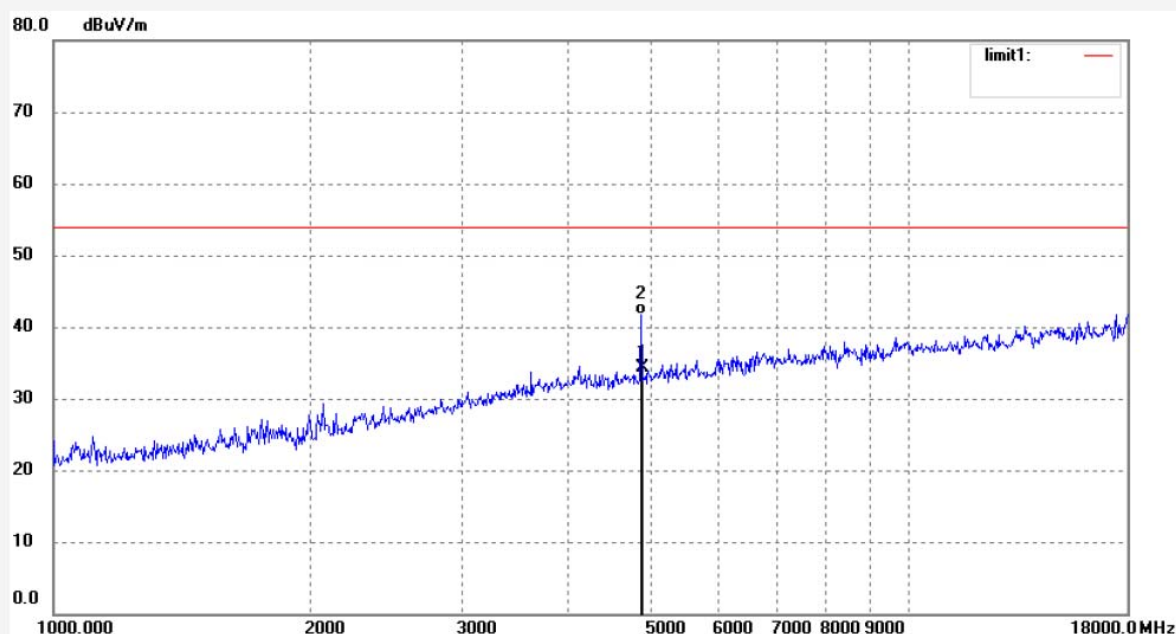
Date: 14/04/15/

Time: 9/38/02

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4882.000	35.70	-1.35	34.35	54.00	-19.65	AVG			
2	4882.000	42.99	-1.35	41.64	74.00	-32.36	peak			


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Job No.: star2014 #79

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2441MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

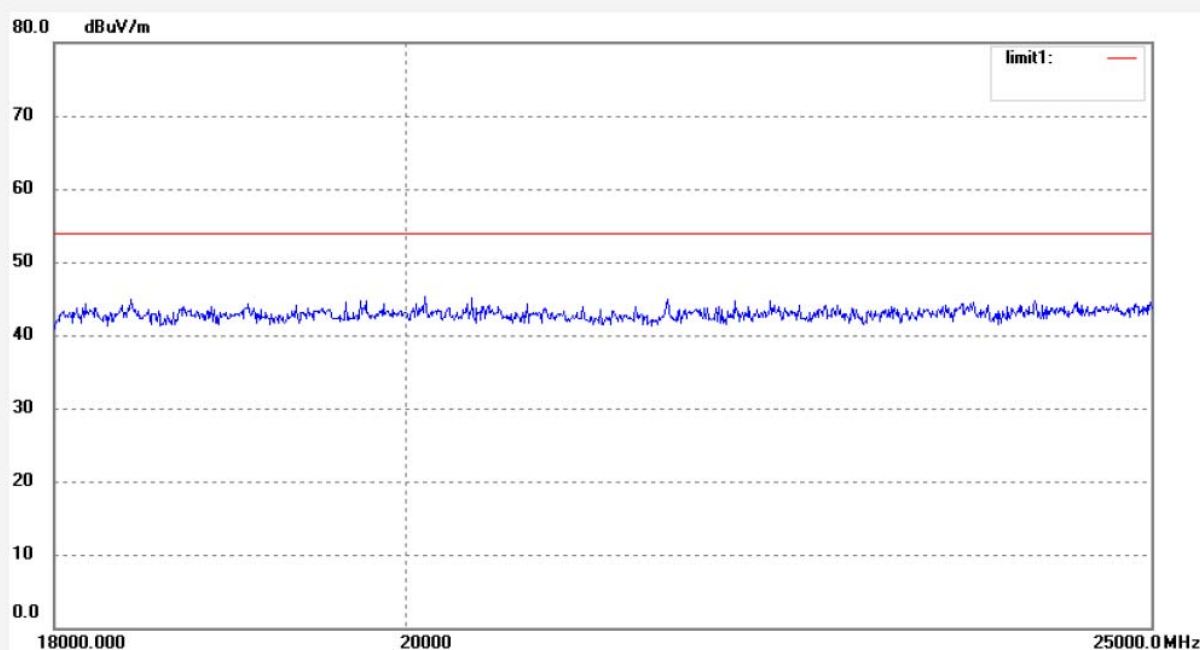
Date: 14/04/15/

Time: 9/58/36

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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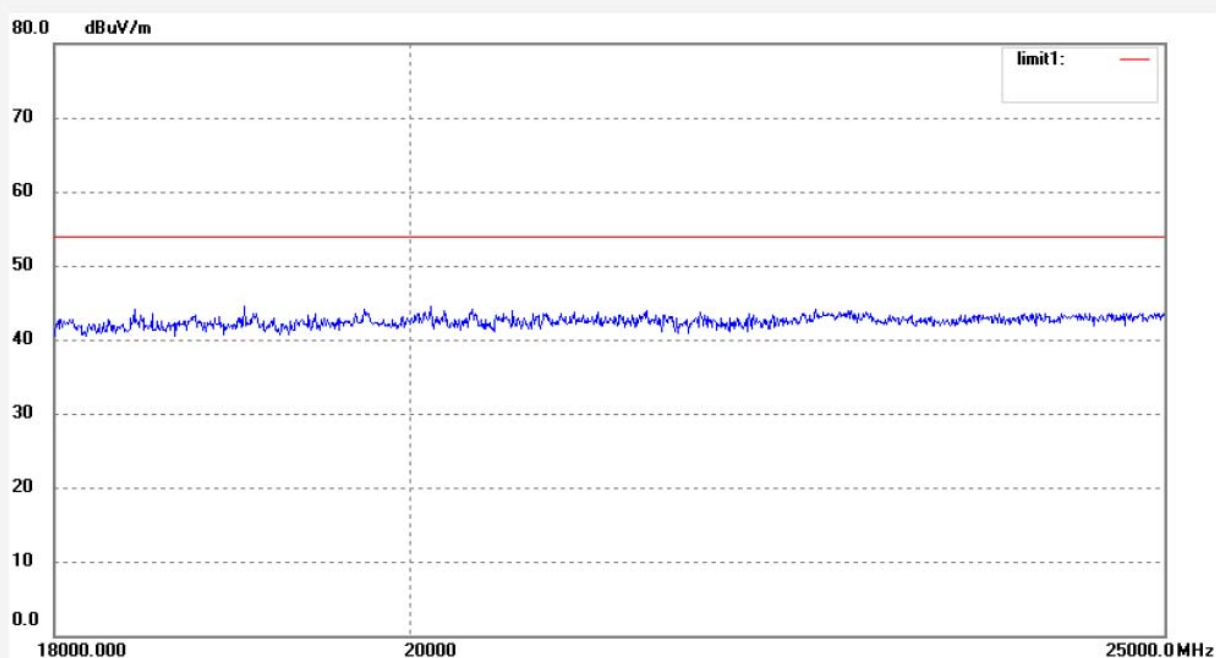
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: star2014 #80
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth Speaker
Mode: TX 2441MHz
Model: BTS04A
Manufacturer: JMTek

Polarization: Horizontal
Power Source: DC 5V
Date: 14/04/15/
Time: 10/02/14
Engineer Signature: STAR
Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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Fax:+86-0755-26503396

Job No.: star2014 #69

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2480MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

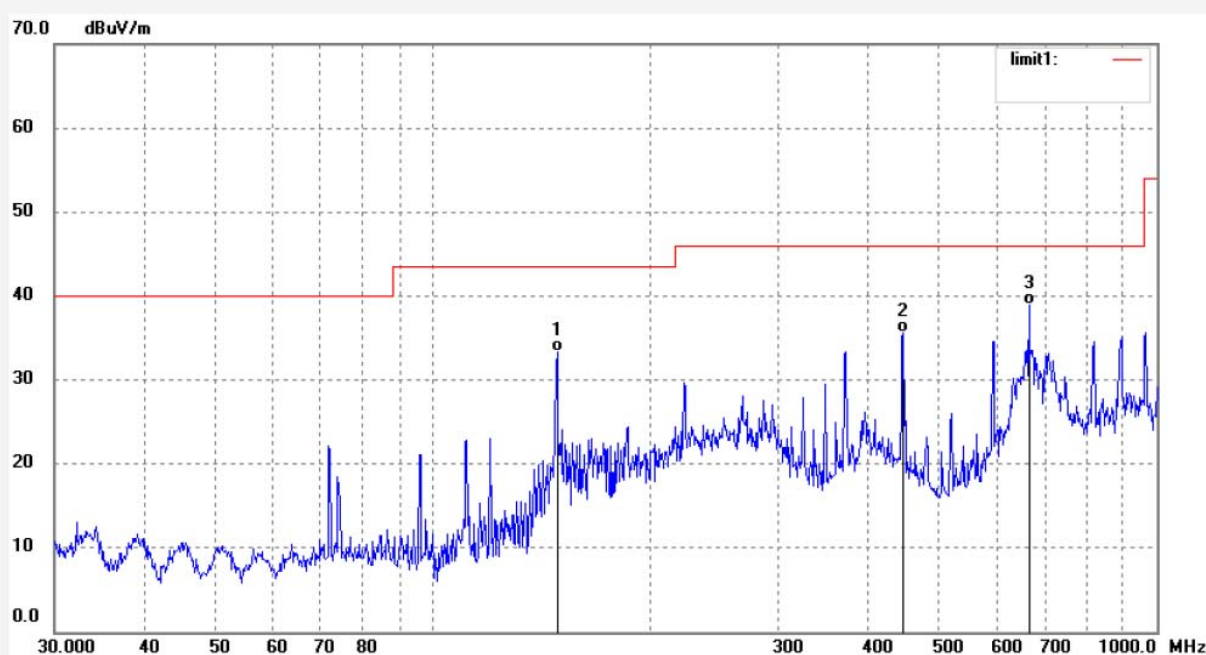
Date: 14/04/15/

Time: 9/13/13

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	148.4410	57.05	-23.77	33.28	43.50	-10.22	QP			
2	446.4141	50.37	-14.75	35.62	46.00	-10.38	QP			
3	665.8034	49.34	-10.35	38.99	46.00	-7.01	QP			



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Job No.: star2014 #70

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2480MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

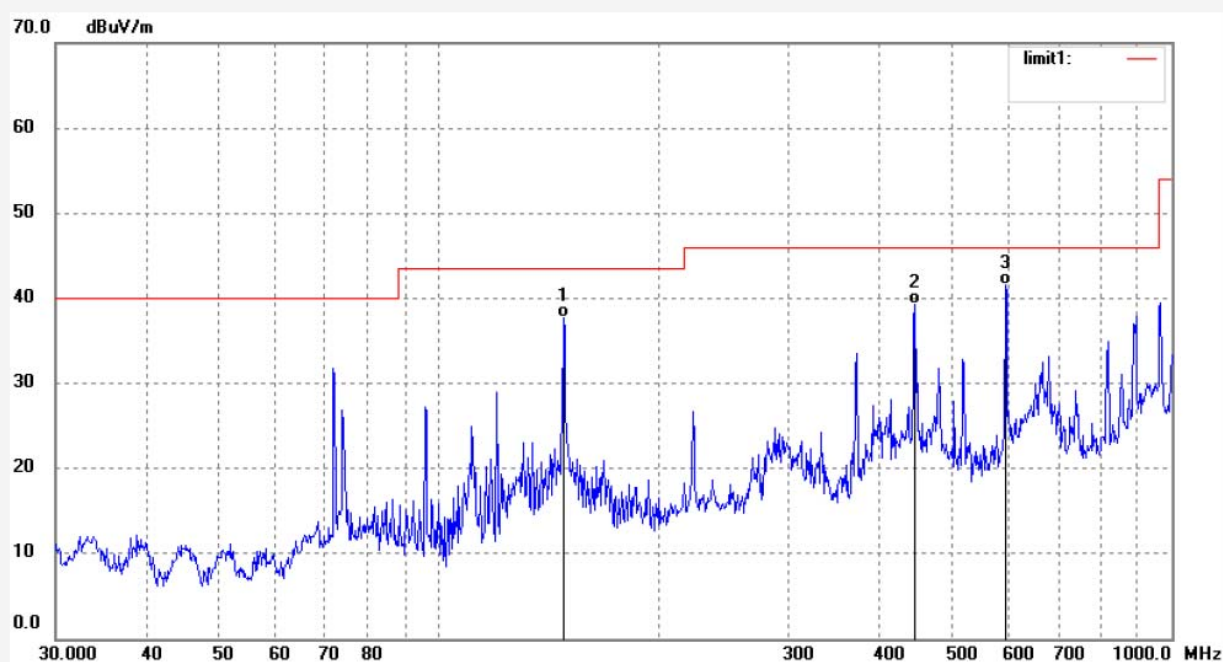
Date: 14/04/15/

Time: 9/17/58

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537





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Job No.: star2014 #71

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2480MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

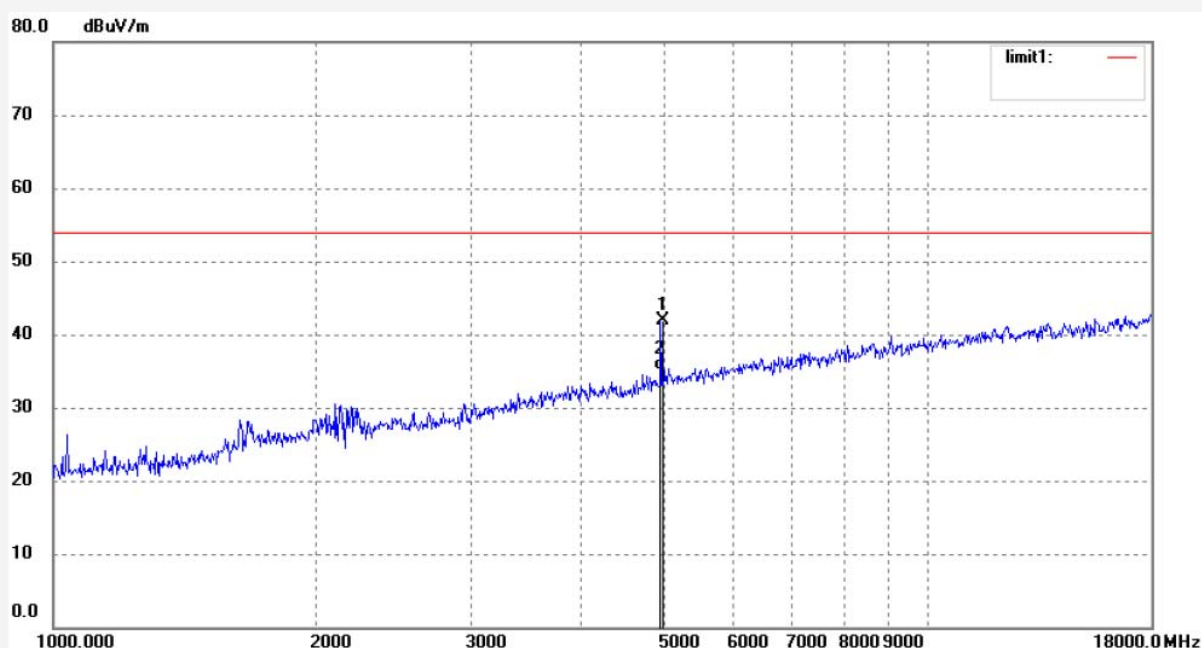
Date: 14/04/15/

Time: 9/23/52

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4960.000	42.94	-1.11	41.83	74.00	-32.17	peak			
2	4960.000	36.25	-1.11	35.14	54.00	-18.86	AVG			



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Job No.: star2014 #72

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2480MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

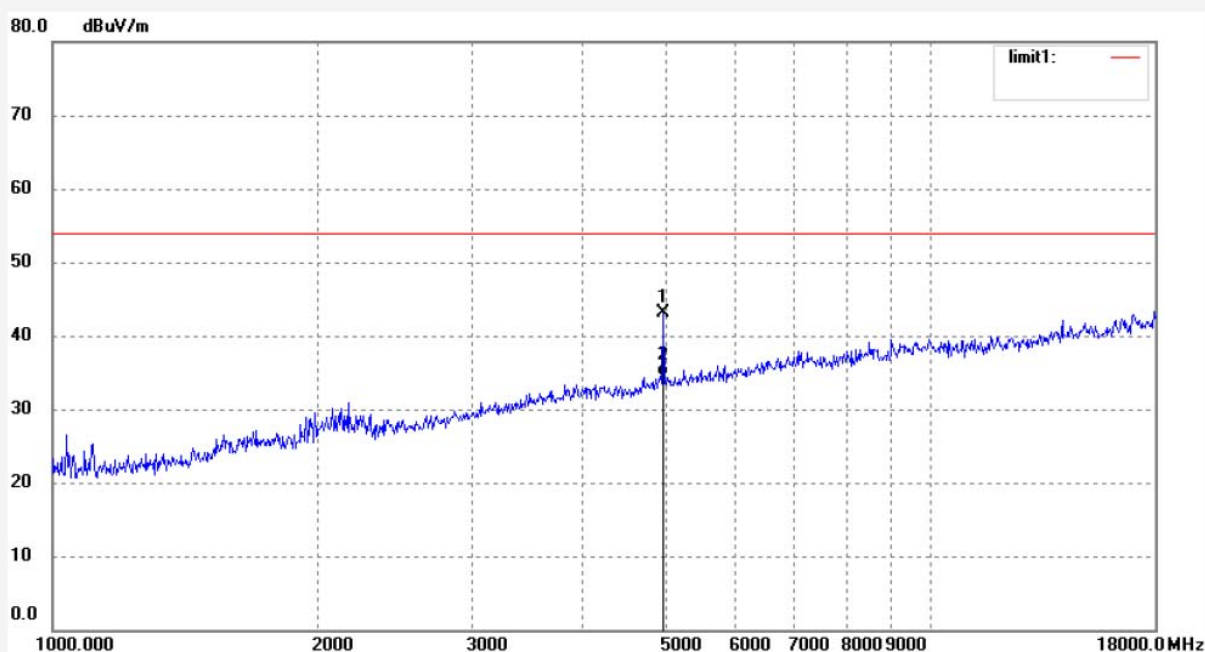
Date: 14/04/15/

Time: 9/28/26

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4960.000	44.30	-1.11	43.18	74.00	-30.82	peak			
2	4960.000	35.71	-1.11	34.60	54.00	-19.40	AVG			



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Job No.: star2014 #81

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2480MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

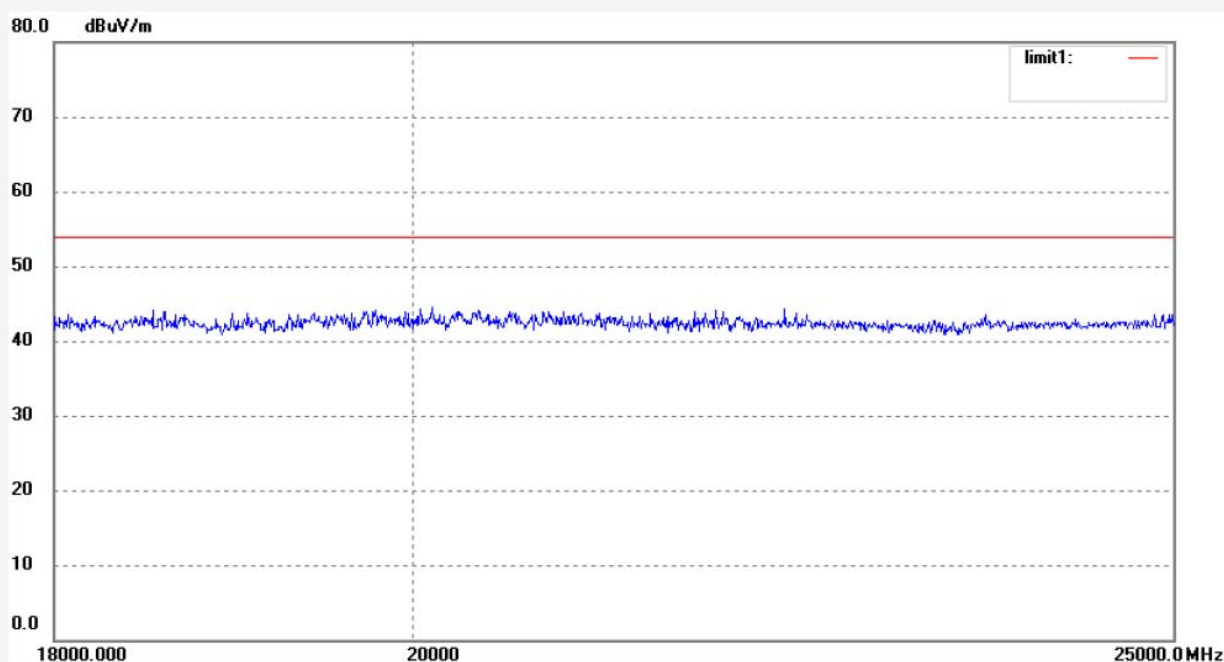
Date: 14/04/15/

Time: 10/07/00

Engineer Signature: STAR

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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Fax:+86-0755-26503396

Job No.: star2014 #82

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2480MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

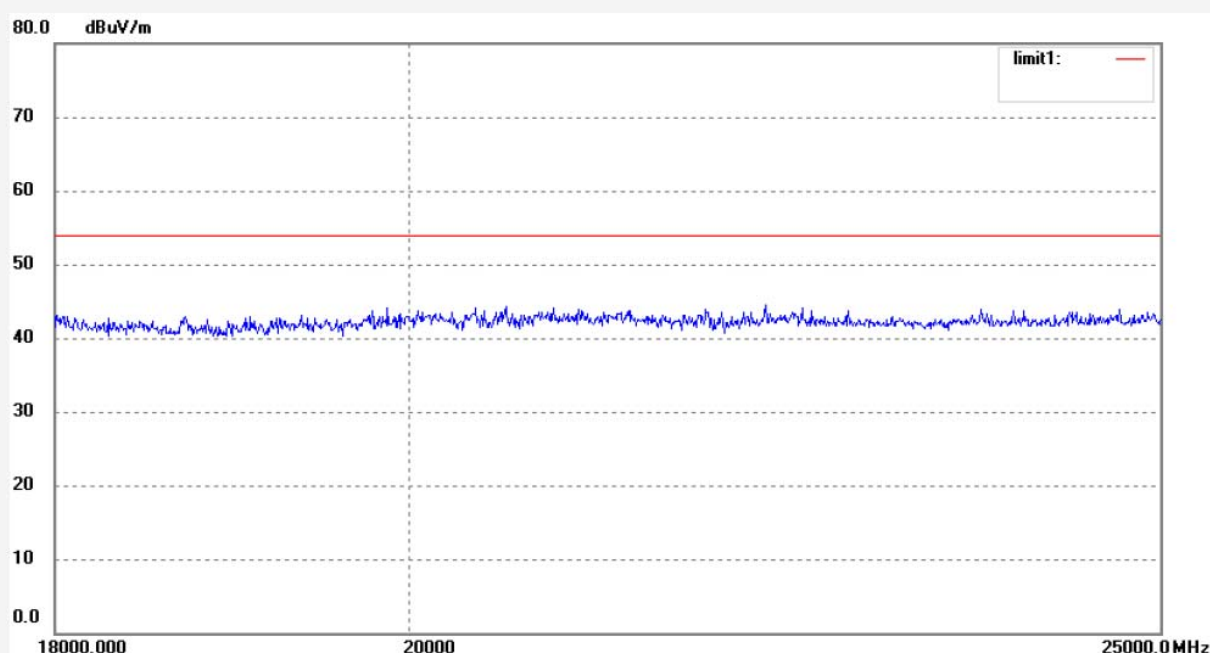
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Time: 10/11/45

Engineer Signature: STAR

Distance: 3m

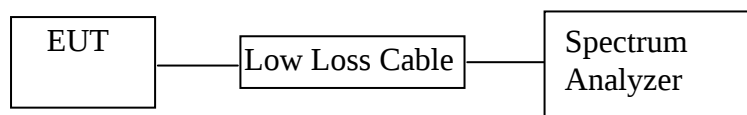
Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



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

11.3.1.Bluetooth Speaker (EUT)

Model Number	: BTS04A
Serial Number	: N/A
Manufacturer	: JMTek Technology (Shenzhen) Co., Ltd.

11.4. Operating Condition of EUT

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

11.4.2. Turn on the power of all equipment.

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

11.5. Test Procedure

Conducted Band Edge:

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 300kHz and VBW to 1MHz.

Radiate Band Edge:

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

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

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

11.5.6. 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

11.5.7. The band edges was measured and recorded.

11.6. Test Result

Pass

Date of Test:	<u>April 15, 2014</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Speaker</u>	Humidity:	<u>50%</u>
Model No.:	<u>BTS04A</u>	Power Supply:	<u>DC 5V</u>
Test Mode:	<u>TX (Hopping off)</u>	Test Engineer:	<u>Star</u>

Conducted test

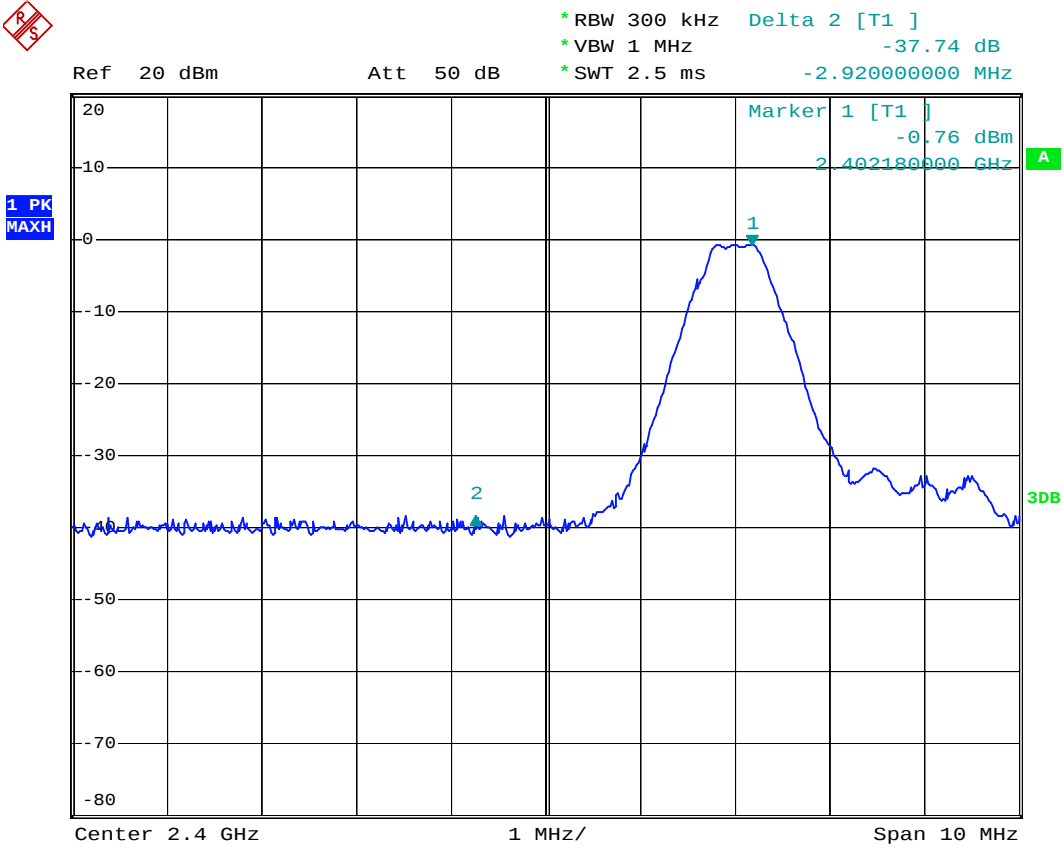
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2402	37.74	> 20dBc
2480	38.25	> 20dBc

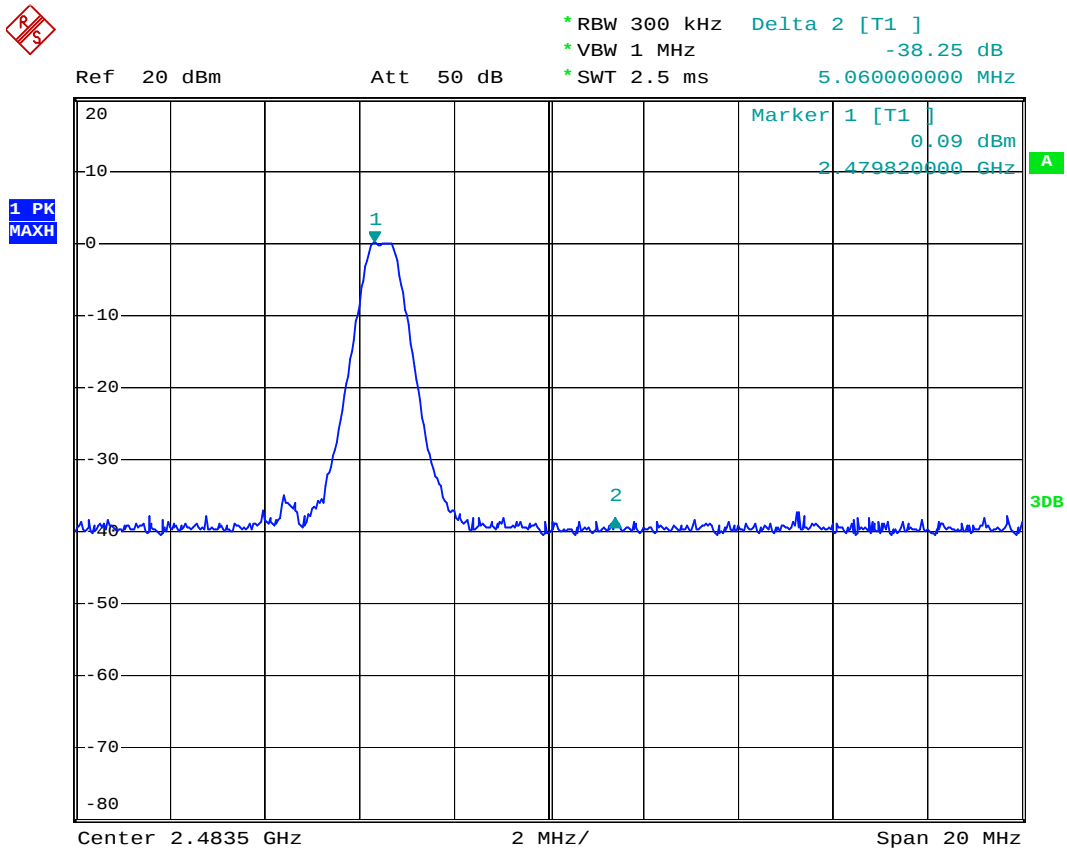
Date of Test:	<u>April 15, 2014</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Speaker</u>	Humidity:	<u>50%</u>
Model No.:	<u>BTS04A</u>	Power Supply:	<u>DC 5V</u>
Test Mode:	<u>TX (Hopping on)</u>	Test Engineer:	<u>Star</u>

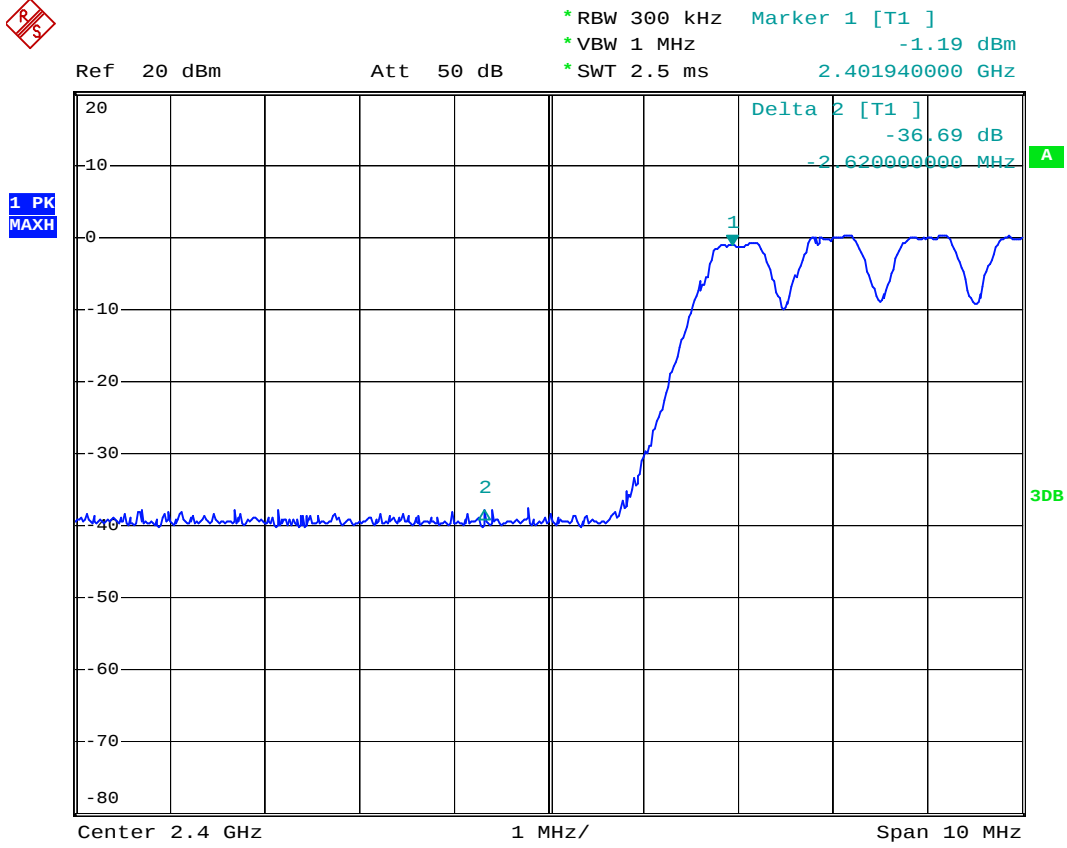
Conducted test

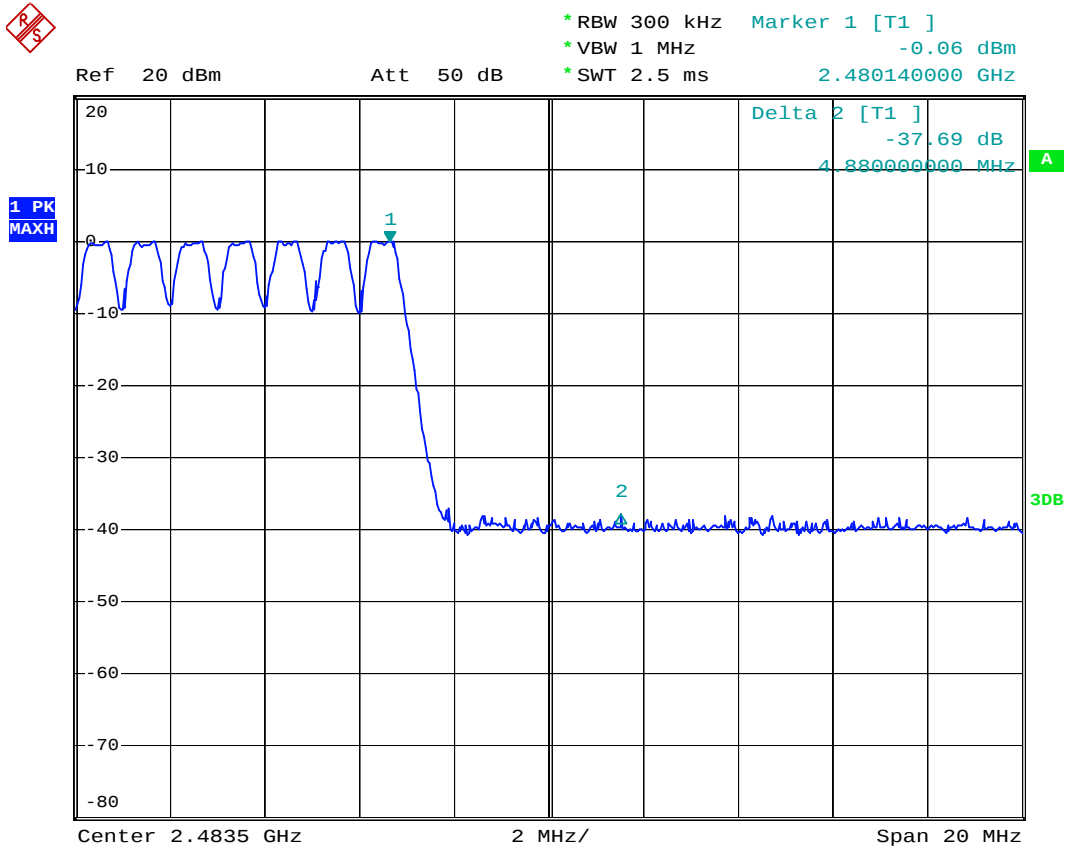
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2402	36.69	> 20dBc
2480	37.69	> 20dBc

"Spectrum analyzer" is R/S









Radiated Band Edge Result

Date of Test:	April 15, 2014	Temperature:	25°C
EUT:	Bluetooth Speaker	Humidity:	50%
Model No.:	BTS04A	Power Supply:	DC 5V
Test Mode:	TX 2402MHz(Hopping off)	Test Engineer:	Star

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2310.000	27.17	35.06	-6.99	20.18	28.07	54.00	74.00	-33.82	-45.93	Vertical
2370.140	28.90	36.32	-6.83	22.07	29.49	54.00	74.00	-31.93	-44.51	Vertical
2390.000	24.67	32.52	-6.78	17.89	25.74	54.00	74.00	-36.11	-48.26	Vertical
2310.000	26.87	34.78	-6.99	19.88	27.79	54.00	74.00	-34.12	-46.21	Horizontal
2355.440	26.50	35.96	-6.88	19.62	29.08	54.00	74.00	-34.38	-44.92	Horizontal
2390.000	25.63	33.12	-6.78	18.85	26.34	54.00	74.00	-35.15	-47.66	Horizontal

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.

Date of Test:	April 15, 2014	Temperature:	25°C
EUT:	Bluetooth Speaker	Humidity:	50%
Model No.:	BTS04A	Power Supply:	DC 5V
Test Mode:	TX 2480MHz (Hopping off)	Test Engineer:	Star

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2483.500	26.78	33.29	-6.54	20.24	26.75	54.00	74.00	-33.76	-47.25	Vertical
2495.680	26.48	34.31	-6.50	19.98	27.81	54.00	74.00	-34.02	-46.19	Vertical
2500.000	25.61	32.91	-6.50	19.11	26.41	54.00	74.00	-34.89	-47.59	Vertical
2483.500	24.60	33.26	-6.54	18.06	26.72	54.00	74.00	-35.94	-47.28	Horizontal
2495.520	31.52	38.08	-6.50	25.02	31.58	54.00	74.00	-28.98	-42.42	Horizontal
2500.000	28.11	36.02	-6.50	21.61	29.52	54.00	74.00	-32.39	-44.48	Horizontal

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.

Date of Test:	<u>April 15, 2014</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Speaker</u>	Humidity:	<u>50%</u>
Model No.:	<u>BTS04A</u>	Power Supply:	<u>DC 5V</u>
Test Mode:	<u>TX 2480MHz (Hopping on)</u>	Test Engineer:	<u>Star</u>

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2310.000	34.29	45.68	-6.99	27.30	38.69	54.00	74.00	-26.70	-35.31	Horizontal
2390.000	36.10	47.42	-6.78	29.32	40.64	54.00	74.00	-24.68	-33.36	Horizontal
2483.500	36.61	45.92	-6.54	30.07	39.38	54.00	74.00	-23.93	-34.62	Horizontal
2500.000	37.88	48.96	-6.50	31.38	42.46	54.00	74.00	-22.62	-31.54	Horizontal
2310.000	35.60	46.88	-6.99	28.61	39.89	54.00	74.00	-25.39	-34.11	Vertical
2390.000	35.10	46.74	-6.78	28.32	39.96	54.00	74.00	-25.68	-34.04	Vertical
2483.500	35.66	45.21	-6.54	29.12	38.67	54.00	74.00	-24.88	-35.33	Vertical
2500.000	36.91	47.76	-6.50	30.41	41.26	54.00	74.00	-23.59	-32.74	Vertical

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.

Non-hopping mode



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Job No.: STAR #3021

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2402MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

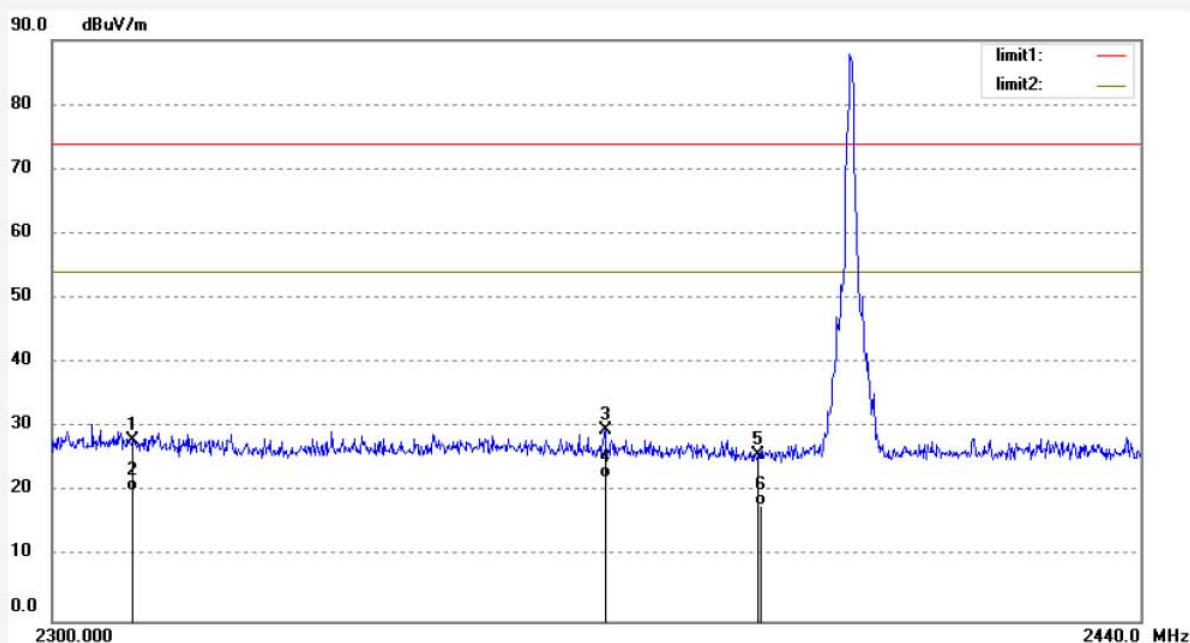
Date: 14/04/15/

Time: 14/46/17

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2310.000	35.06	-6.99	28.07	74.00	-45.93	peak			
2	2310.000	27.17	-6.99	20.18	54.00	-33.82	AVG			
3	2370.140	36.32	-6.83	29.49	74.00	-44.51	peak			
4	2370.140	28.90	-6.83	22.07	54.00	-31.93	AVG			
5	2390.000	32.52	-6.78	25.74	74.00	-48.26	peak			
6	2390.000	24.67	-6.78	17.89	54.00	-36.11	AVG			



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Job No.: STAR #3022

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2402MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

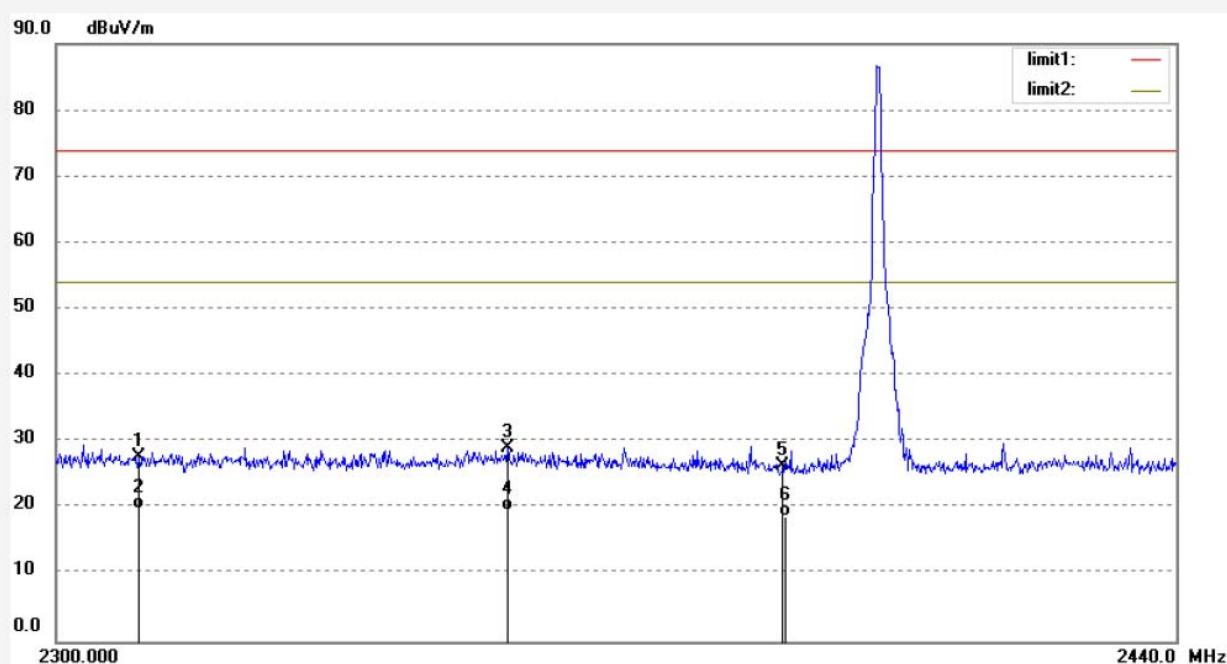
Date: 14/04/15/

Time: 14/49/56

Engineer Signature:

Distance: 3m

Note: Report No.: ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2310.000	34.78	-6.99	27.79	74.00	-46.21	peak			
2	2310.000	26.87	-6.99	19.88	54.00	-34.12	AVG			
3	2355.440	35.96	-6.88	29.08	74.00	-44.92	peak			
4	2355.440	26.50	-6.88	19.62	54.00	-34.38	AVG			
5	2390.000	33.12	-6.78	26.34	74.00	-47.66	peak			
6	2390.000	25.63	-6.78	18.85	54.00	-35.15	AVG			



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Job No.: STAR #3023

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2480MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

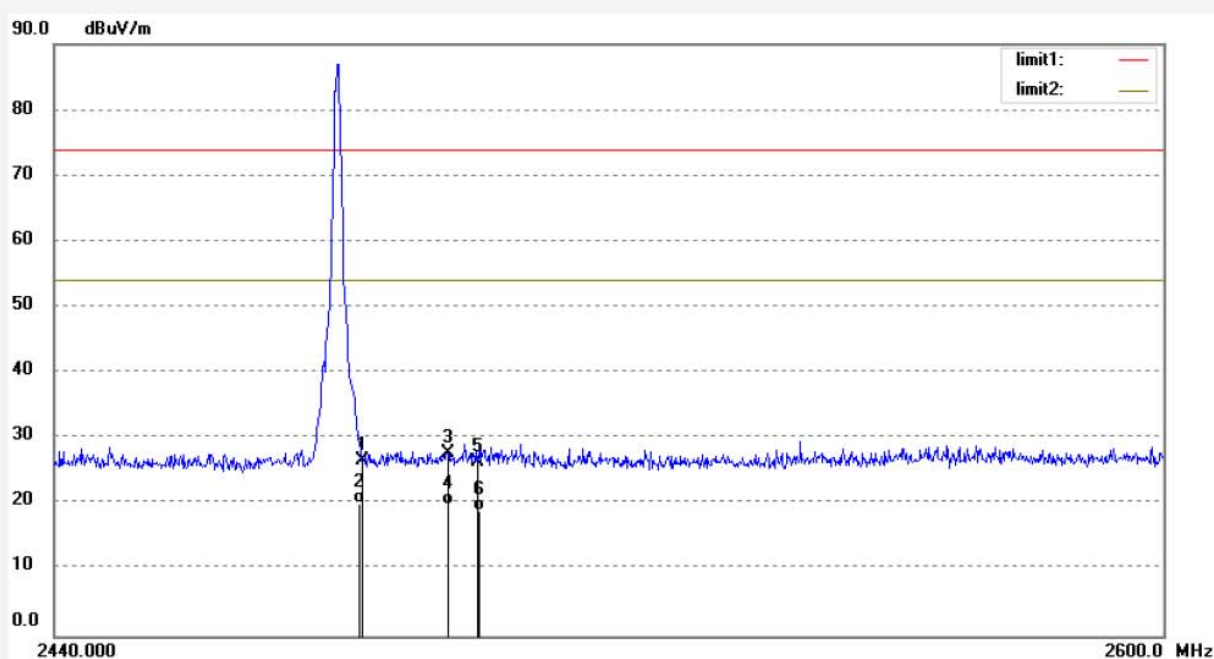
Date: 14/04/15/

Time: 14/52/38

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140537



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	33.29	-6.54	26.75	74.00	-47.25	peak			
2	2483.500	26.78	-6.54	20.24	54.00	-33.76	AVG			
3	2495.680	34.31	-6.50	27.81	74.00	-46.19	peak			
4	2495.680	26.48	-6.50	19.98	54.00	-34.02	AVG			
5	2500.000	32.91	-6.50	26.41	74.00	-47.59	peak			
6	2500.000	25.61	-6.50	19.11	54.00	-34.89	AVG			



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Site: 1# Chamber

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Fax:+86-0755-26503396

Job No.: STAR #3024

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: TX 2480MHz

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

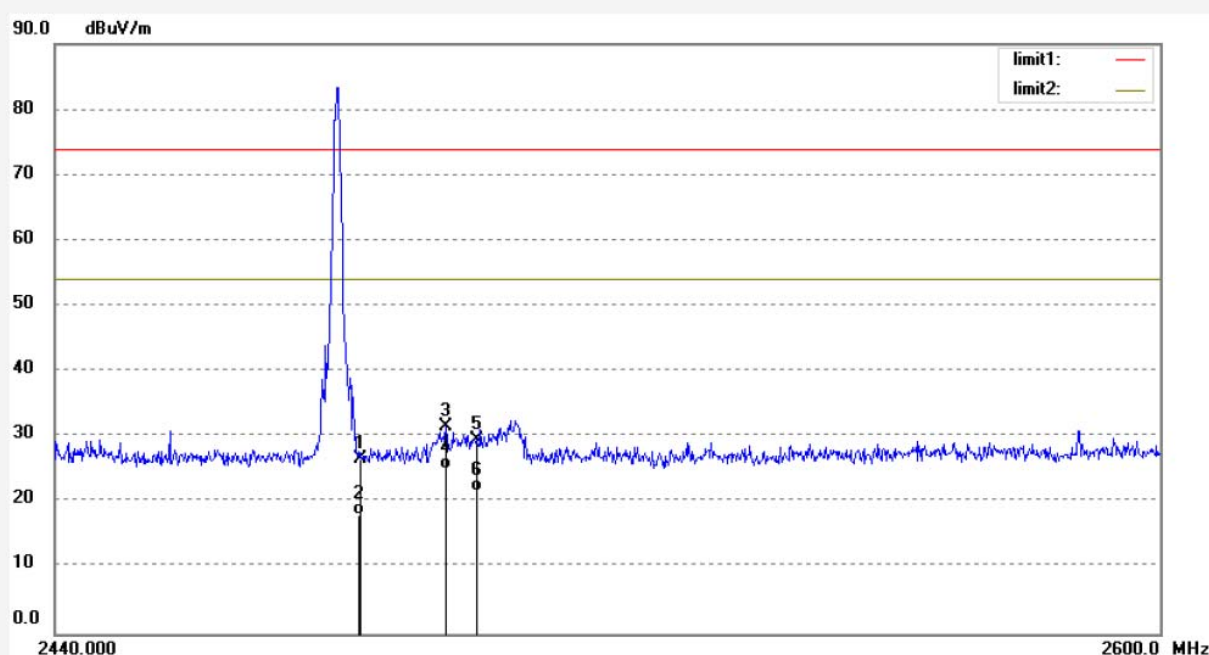
Date: 14/04/15/

Time: 14/56/46

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140537



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	33.26	-6.54	26.72	74.00	-47.28	peak			
2	2483.500	24.60	-6.54	18.06	54.00	-35.94	AVG			
3	2495.520	38.08	-6.50	31.58	74.00	-42.42	peak			
4	2495.520	31.52	-6.50	25.02	54.00	-28.98	AVG			
5	2500.000	36.02	-6.50	29.52	74.00	-44.48	peak			
6	2500.000	28.11	-6.50	21.61	54.00	-32.39	AVG			

Hopping mode



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Job No.: STAR #3031

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: HOPPING

Model: BTS04A

Manufacturer: JMTek

Polarization: Horizontal

Power Source: DC 5V

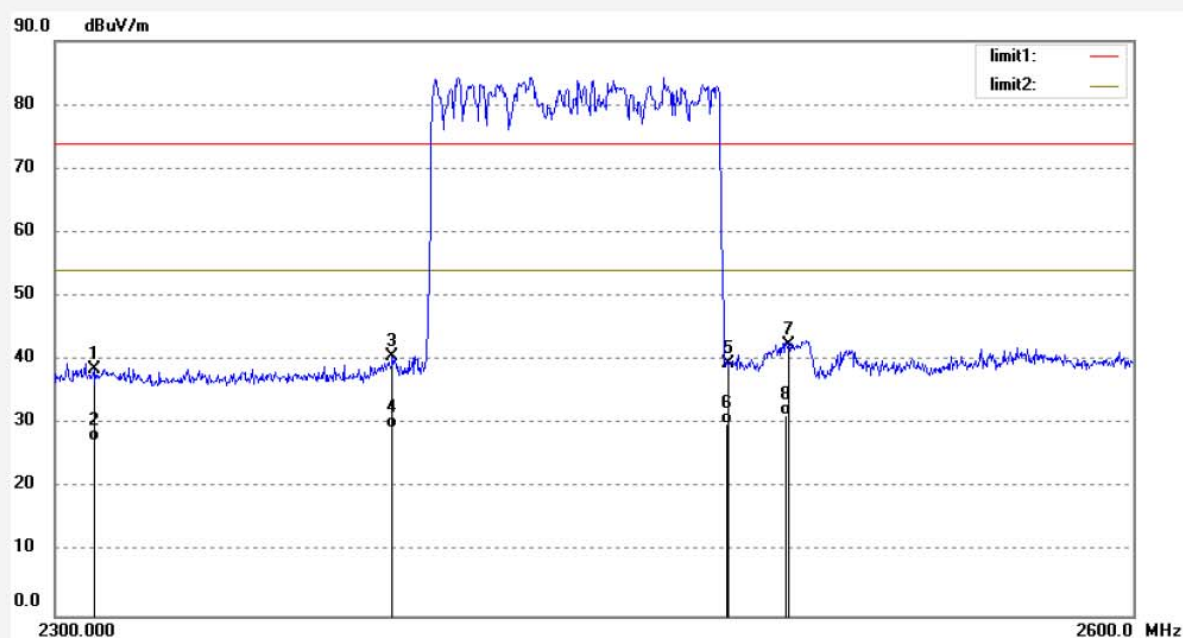
Date: 14/04/15/

Time: 11/36/34

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140537



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2310.000	45.68	-6.99	38.69	74.00	-35.31	peak			
2	2310.000	34.29	-6.99	27.30	54.00	-26.70	AVG			
3	2390.000	47.42	-6.78	40.64	74.00	-33.36	peak			
4	2390.000	36.10	-6.78	29.32	54.00	-24.68	AVG			
5	2483.500	45.92	-6.54	39.38	74.00	-34.62	peak			
6	2483.500	36.61	-6.54	30.07	54.00	-23.93	AVG			
7	2500.000	48.96	-6.50	42.46	74.00	-31.54	peak			
8	2500.000	37.88	-6.50	31.38	54.00	-22.62	AVG			



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Job No.: STAR #3032

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth Speaker

Mode: HOPPING

Model: BTS04A

Manufacturer: JMTek

Polarization: Vertical

Power Source: DC 5V

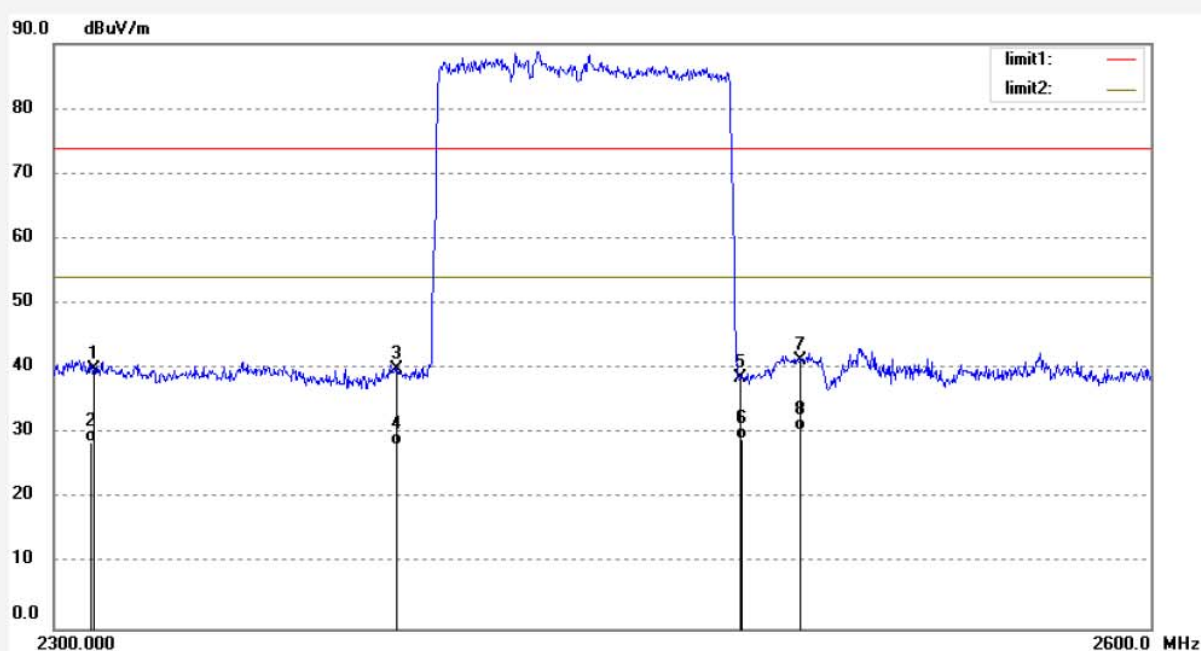
Date: 14/04/15/

Time: 11/39/37

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140537



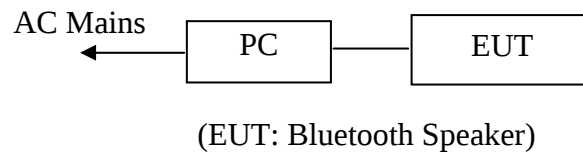
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2310.000	46.88	-6.99	39.89	74.00	-34.11	peak			
2	2310.000	35.60	-6.99	28.61	54.00	-25.39	AVG			
3	2390.000	46.74	-6.78	39.96	74.00	-34.04	peak			
4	2390.000	35.10	-6.78	28.32	54.00	-25.68	AVG			
5	2483.500	45.21	-6.54	38.67	74.00	-35.33	peak			
6	2483.500	35.66	-6.54	29.12	54.00	-24.88	AVG			
7	2500.000	47.76	-6.50	41.26	74.00	-32.74	peak			
8	2500.000	36.91	-6.50	30.41	54.00	-23.59	AVG			

12.AC POWER LINE CONDUCTED EMISSION FOR FCC PART

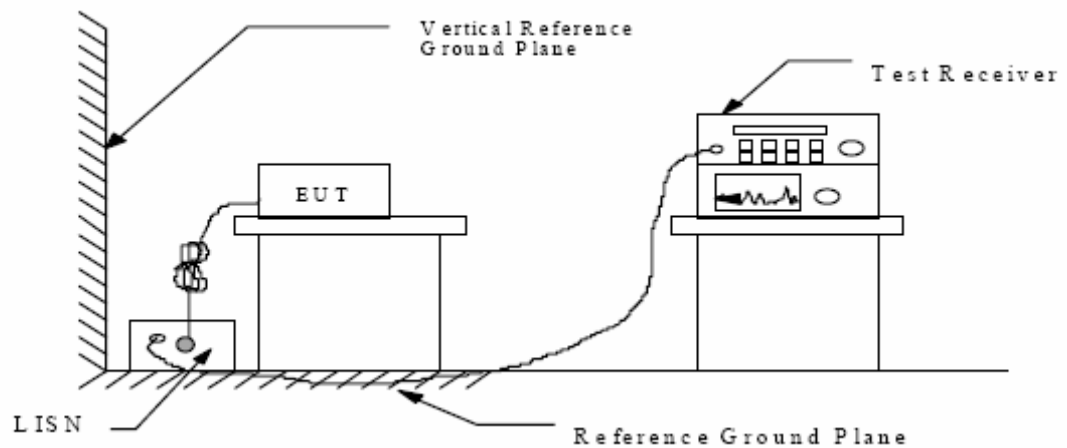
15 SECTION 15.207(A)

12.1.Block Diagram of Test Setup

12.1.1.Block diagram of connection between the EUT and simulators



12.1.2.Shielding Room Test Setup Diagram



(EUT: Bluetooth Speaker)

12.2.The Emission Limit

12.2.1.Conducted Emission Measurement Limits According to Section 15.207(a)

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

* Decreases with the logarithm of the frequency.

12.3.Configuration of EUT on Measurement

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

12.3.1. Bluetooth Speaker (EUT)

Model Number : BTS04A
Serial Number : N/A
Manufacturer : JMTek Technology (Shenzhen) Co., Ltd.

12.4.Operating Condition of EUT

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

12.4.2.Turn on the power of all equipment.

12.4.3.Let the EUT work in (Charging) mode measure it.

12.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4- 2009 on Conducted Emission Measurement.

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

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

12.6.Power Line Conducted Emission Measurement Results

PASS.

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

Date of Test:	<u>April 15, 2014</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Speaker</u>	Humidity:	<u>50%</u>
Model No.:	<u>BTS04A</u>	Power Supply:	<u>AC 120V/60Hz</u>
Test Mode:	<u>Charging</u>	Test Engineer:	<u>Star</u>

Frequency (MHz)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector	Line
0.158785	60.20	66	-5.3	QP	Neutral
0.203604	51.90	64	-11.6	QP	
3.310969	34.70	56	-21.3	QP	
0.156424	45.60	56	-10.1	AV	
0.206676	37.00	53	-16.3	AV	
2.758025	27.20	46	-18.8	AV	
0.150450	59.70	66	-6.3	QP	Live
0.198783	50.80	64	-12.9	QP	
3.452774	32.70	56	-23.3	QP	
0.152720	41.70	56	-14.2	AV	
0.206676	33.40	53	-19.9	AV	
2.824917	28.00	46	-18.0	AV	

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

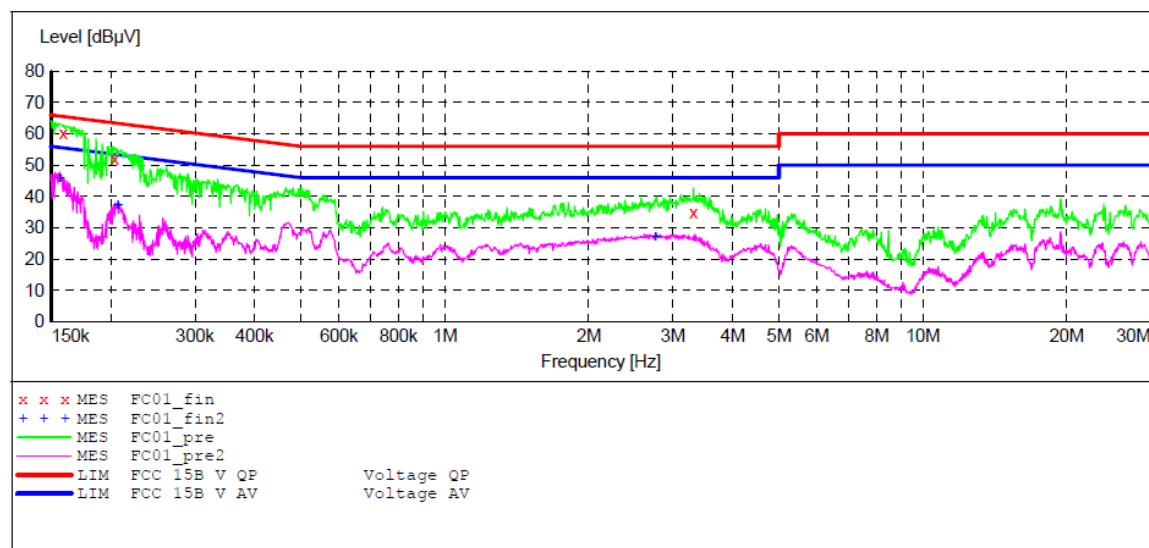
ACCURATE TECHNOLOGY CO.,LTD**CONDUCTED EMISSION STANDARD FCC PART 15B**

EUT: Bluetooth Speaker M/N:BTS04A
 Manufacturer: JMTek
 Operating Condition: Charging
 Test Site: 2#Shielding Room
 Operator: star
 Test Specification: N 120V/60Hz
 Comment: Report NO.:ATE20140537
 Start of Test: 2014-4-15 / 8:57:13

SCAN TABLE: "V 150K-30MHZ fin"

Short Description: _SUB_STD_VTERM2 1.70

Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	0.4 %	QuasiPeak	1.0 s	9 kHz	LISN(ESH3-Z5)
Average						

**MEASUREMENT RESULT: "FC01_fin"**

2014-4-15 8:58

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.158785	60.20	10.4	66	5.3	QP	N	GND
0.203604	51.90	10.9	64	11.6	QP	N	GND
3.310969	34.70	12.3	56	21.3	QP	N	GND

MEASUREMENT RESULT: "FC01_fin2"

2014-4-15 8:58

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.156424	45.60	10.4	56	10.1	AV	N	GND
0.206676	37.00	10.9	53	16.3	AV	N	GND
2.758025	27.20	12.3	46	18.8	AV	N	GND

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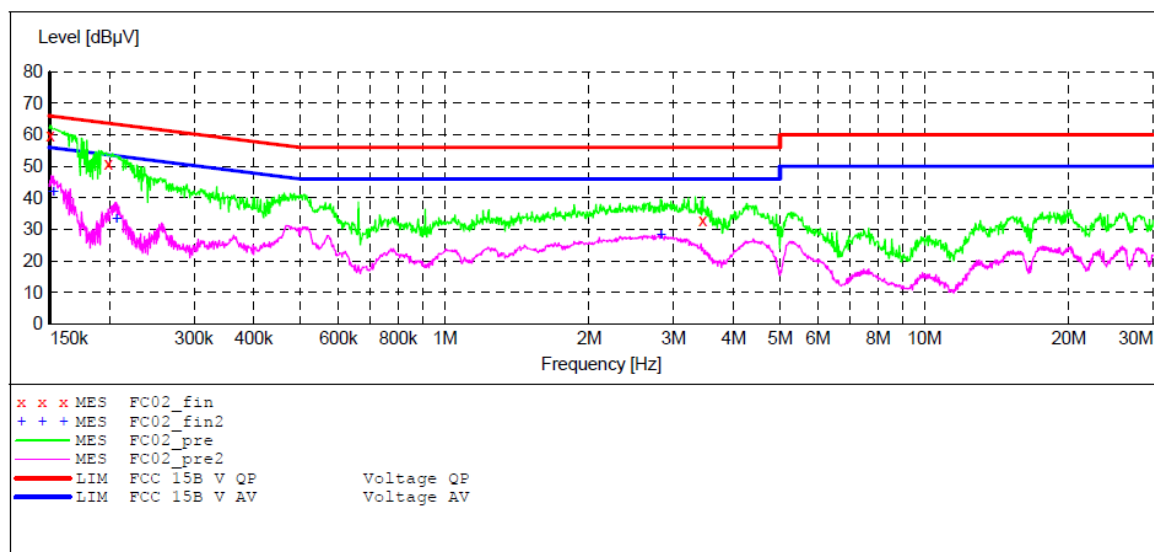
CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: Bluetooth Speaker M/N:BTS04A
 Manufacturer: JMTek
 Operating Condition: Charging
 Test Site: 2#Shielding Room
 Operator: star
 Test Specification: L 120V/60Hz
 Comment: Report NO.:ATE20140537
 Start of Test: 2014-4-15 / 8:59:36

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	0.4 %	QuasiPeak	1.0 s	9 kHz	LISN(ESH3-Z5)
Average						



MEASUREMENT RESULT: "FC02_fin"

2014-4-15 9:02

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.150450	59.70	10.4	66	6.3	QP	L1	GND
0.198783	50.80	10.8	64	12.9	QP	L1	GND
3.452774	32.70	12.3	56	23.3	QP	L1	GND

MEASUREMENT RESULT: "FC02_fin2"

2014-4-15 9:02

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.152720	41.70	10.4	56	14.2	AV	L1	GND
0.206676	33.40	10.9	53	19.9	AV	L1	GND
2.824917	28.00	12.3	46	18.0	AV	L1	GND

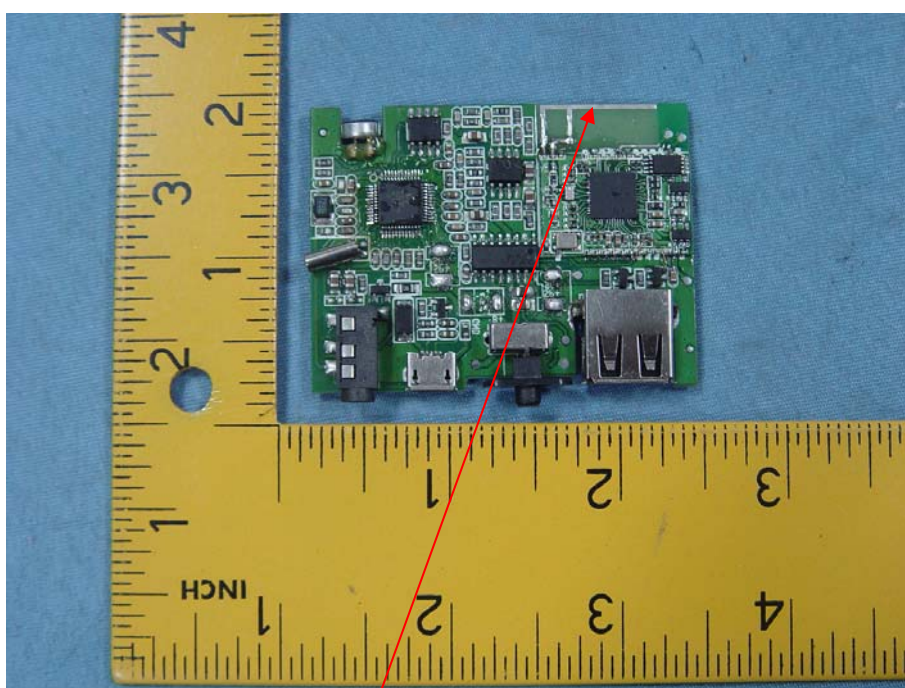
13.ANTENNA REQUIREMENT

13.1.The Requirement

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

13.2.Antenna Construction

The antenna is PCB Layout antenna, no consideration of replacement. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna