

APPLICATION CERTIFICATION
On Behalf of
ACOUSTMAX INTERNATIONAL CO., LTD

Indoor/Outdoor speaker with Bluetooth
Model No.: BTW248XBK, BTW248XWH, BTW348XBK, BTW548XBK, BTW648XBK,
BTW748XBK, BTW848XBK, BTW948XBK

FCC ID: 2AAIN-BTW248XBK

Prepared for : ACOUSTMAX INTERNATIONAL CO., LTD
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Report Number : ATE2014131
Date of Test : Feb 10-26,2014
Date of Report : Feb 26,2014

TABLE OF CONTENTS

Description	Page
 Test Report Certification	
1. GENERAL INFORMATION	5
1.1. Description of Device (EUT).....	5
1.2. Description of Test Facility	6
1.3. Measurement Uncertainty.....	6
2. MEASURING DEVICE AND TEST EQUIPMENT	7
3. OPERATION OF EUT DURING TESTING	8
3.1. Operating Mode	8
3.2. Configuration and peripherals	8
4. TEST PROCEDURES AND RESULTS	9
5. 6DB OCCUPIED BANDWIDTH TEST	10
5.1. Block Diagram of Test Setup.....	10
5.2. The Requirement For Section 15.247(a)(1).....	10
5.3. EUT Configuration on Measurement	10
5.4. Operating Condition of EUT	10
5.5. Test Procedure	10
5.6. Test Result	11
6. POWER SPECTRAL DENSITY TEST.....	15
6.1. Block Diagram of Test Setup.....	15
6.2. The Requirement For Section 15.247(e).....	15
6.3. EUT Configuration on Measurement	15
6.4. Operating Condition of EUT	15
6.5. Test Procedure	15
6.6. Test Result	16
7. RF CONDUCTED SPURIOUS EMISSIONS TEST	20
7.1. Block Diagram of Test Setup.....	20
7.2. The Requirement For Section 15.247(d)	20
7.3. EUT Configuration on Measurement	20
7.4. Operating Condition of EUT	20
7.5. Test Procedure	20
7.6. Test Result	20
8. CONDUCTED PEAK OUTPUT POWER TEST	24
8.1. Block Diagram of Test Setup.....	24
8.2. The Requirement For Section 15.247(b)(3).....	24
8.3. EUT Configuration on Measurement	24
8.4. Operating Condition of EUT	24
8.5. Test Procedure	24
8.6. Test Result	25
9. RADIATED EMISSION TEST	29
9.1. Block Diagram of Test Setup.....	29
9.2. The Limit For Section 15.247(d)	29
9.3. Restricted bands of operation	30
9.4. Configuration of EUT on Measurement	30

9.5.	Test Procedure	31
9.6.	The Field Strength of Radiation Emission Measurement Results	32
10.	BAND EDGE COMPLIANCE TEST	44
10.1.	Block Diagram of Test Setup.....	44
10.2.	The Requirement For Section 15.247(d)	44
10.3.	EUT Configuration on Measurement	44
10.4.	Operating Condition of EUT	44
10.5.	Test Procedure	45
10.6.	Test Result	45
11.	AC POWER LINE CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.207(A) ..	52
11.1.	Block Diagram of Test Setup.....	52
11.2.	The Emission Limit	52
11.3.	Configuration of EUT on Measurement	53
11.4.	Operating Condition of EUT	53
11.5.	Test Procedure	53
11.6.	Power Line Conducted Emission Measurement Results	53
12.	ANTENNA REQUIREMENT.....	57
12.1.	The Requirement	57
12.2.	Antenna Construction	57

Test Report Certification

Applicant : ACOUSTMAX INTERNATIONAL CO., LTD
Manufacturer : Musilab Electronic(DongGuan) Co.,Ltd
EUT Description : Indoor/Outdoor speaker with Bluetooth
(A) MODEL NO.: BTW248XBK, BTW248XWH, BTW348XBK,
BTW548XBK, BTW648XBK, BTW748XBK, BTW848XBK,
BTW948XBK.
(B) Trade Name: Monster
(C) POWER SUPPLY: DC 11.1V (battery) Or AC 120V/60Hz

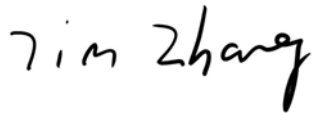
Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
KDB558074 D01

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 : Feb 10-Feb 26, 2014

Prepared by : 
(Tim.zhang, Engineer)

Approved & Authorized Signer : 
(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Indoor/Outdoor speaker with Bluetooth
Model Number	:	BTW248XBK, BTW248XWH, BTW348XBK, BTW548XBK, BTW648XBK, BTW748XBK, BTW848XBK, BTW948XBK
Operation Frequency	:	5736MHz, 5762MHz, 5814MHz
Number of Channels	:	3
Modulation type	:	QPSK
Antenna Gain	:	3dBi
Antenna type	:	PCB Antenna
Power Supply	:	DC 11.1V Or AC 120V/60Hz
Applicant	:	ACOUSTMAX INTERNATIONAL CO., LTD
Address	:	Unit D16/F Cheuk Nang Plaza 250 Hennessy Road Wanchai HongKong, China
Manufacturer	:	Musilab Electronic(DongGuan) Co.,Ltd
Address	:	A2 LinDong 3Road, LinCun, TangXia Town, DongGuan City, Guangdong, China
Date of sample received	:	Feb 10, 2014
Date of Test	:	Feb 10-26,2014

EUT	:	Indoor/Outdoor speaker with Bluetooth
Model Number	:	BTW248XBK, BTW248XWH, BTW348XBK, BTW548XBK, BTW648XBK, BTW748XBK, BTW848XBK, BTW948XBK
BT Frequency Band	:	2402MHz-2480MHz
Number of Channels	:	79
Modulation type	:	GFSK, $\Pi/4$ -DQPSK, 8DPSK
Antenna Gain	:	0dBi
Antenna type	:	PCB Antenna

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 dates	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	BBHA9120D	9120D-1067	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
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 11, 2014	Jan. 10, 2015
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 11, 2014	Jan. 10, 2015

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode

Low Channel: 5736MHz

Middle Channel: 5762MHz

High Channel: 5814MHz

3.2.Configuration and peripherals

EUT

(EUT: Indoor/Outdoor speaker with Bluetooth)

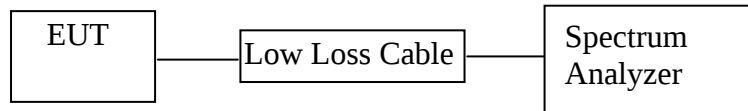
Note: The EUT have two antenna(A and B), They can not transmit simultaneously, The EUT select a antenna to transmit according to signal strength automatically, One Antenna of EUT does not work when Another antenna is transmitting

4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	AC power Line Conducted Emission Test	Compliant
Section 15.247(a)(2)	6dB Occupied Bandwidth Test	Compliant
Section 15.247(b)(3)	Conducted Peak Output Power Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.205 Section 15.209	Radiated Spurious Emissions Test	Compliant
Section 15.247(d)	RF Conducted spurious emissions Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 6DB OCCUPIED BANDWIDTH TEST

5.1. Block Diagram of Test Setup



(EUT: Indoor/Outdoor speaker with Bluetooth)

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

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

5.3. EUT Configuration on Measurement

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

5.4. Operating Condition of EUT

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

5.4.2. Turn on the power of all equipment.

5.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 5736MHz, 5762MHz, 5814MHz,. We select these frequency to transmit.

5.5. Test Procedure

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

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

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

5.6.Test Result

Antenna A test data

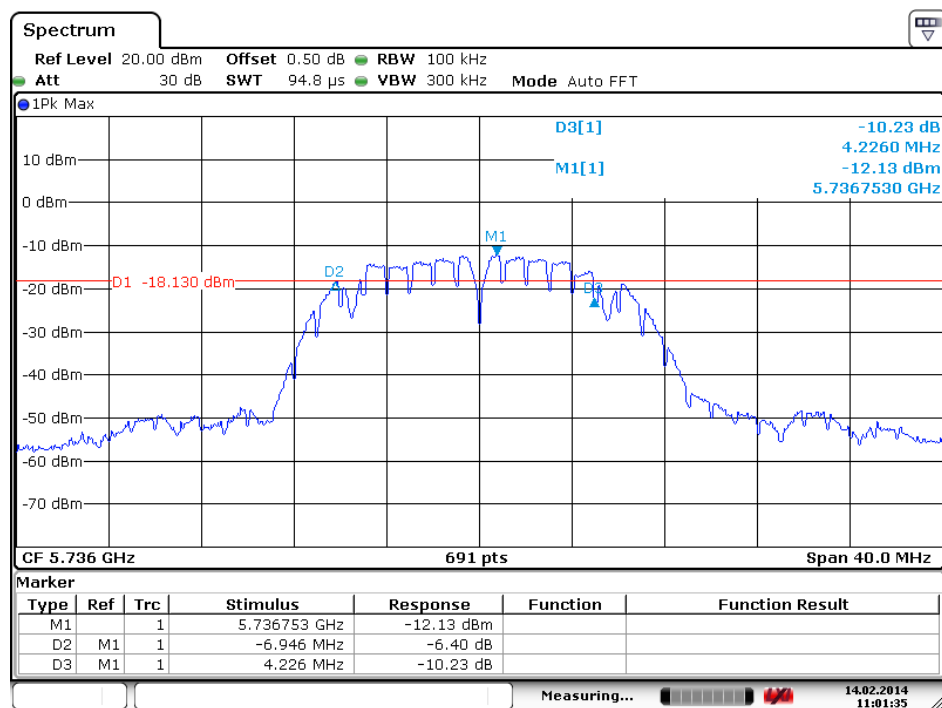
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Result
Low	5736	11.172	Pass
Middle	5762	11.057	Pass
High	5814	11.115	Pass

Antenna B test data

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Result
Low	5736	11.057	Pass
Middle	5762	11.057	Pass
High	5814	11.057	Pass

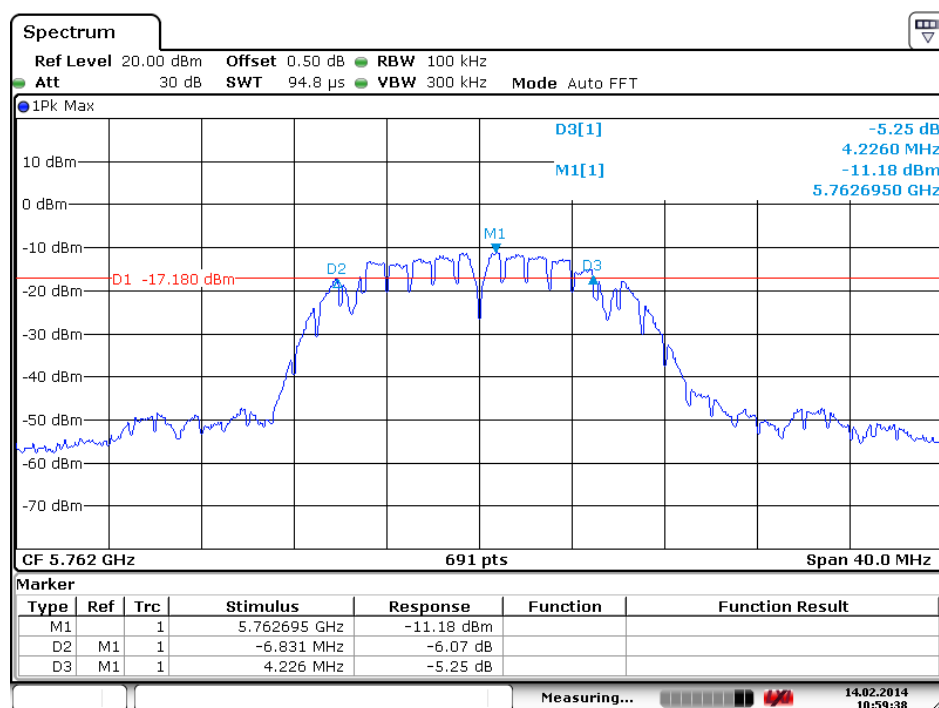
The spectrum analyzer plots are attached as below.

Low channel(Antenna A)



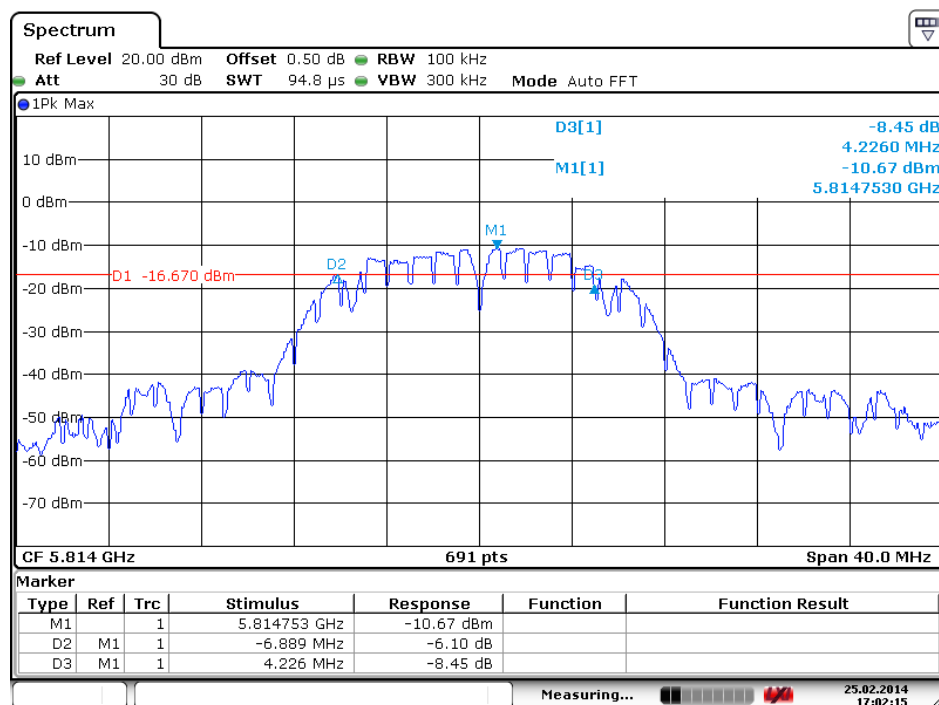
Date: 14.FEB.2014 11:01:34

Middle channel(Antenna A)



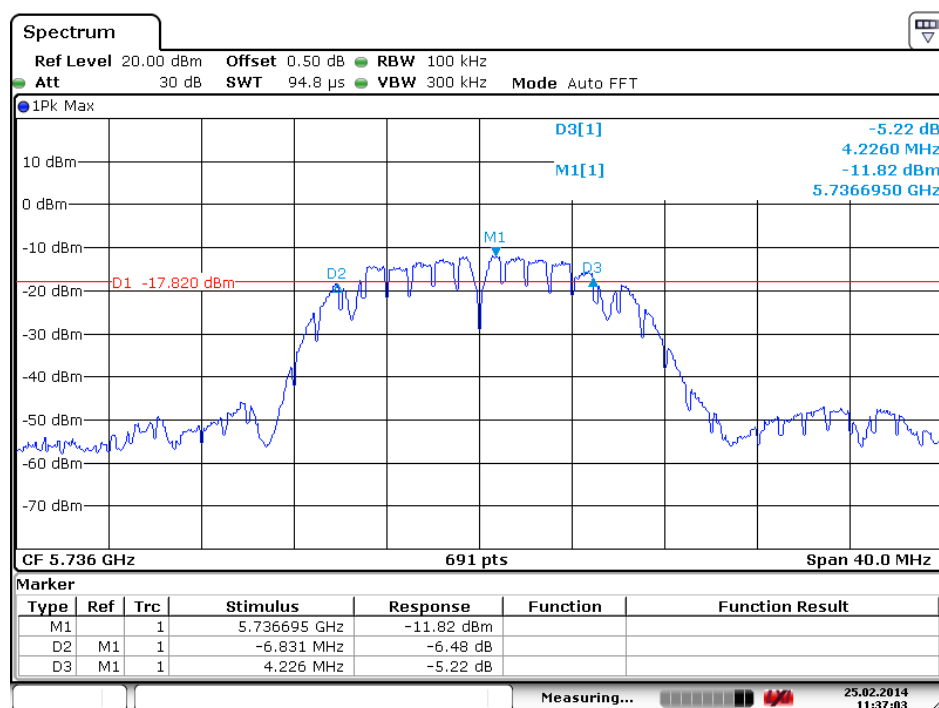
Date: 14.FEB.2014 10:59:38

High channel(Antenna A)



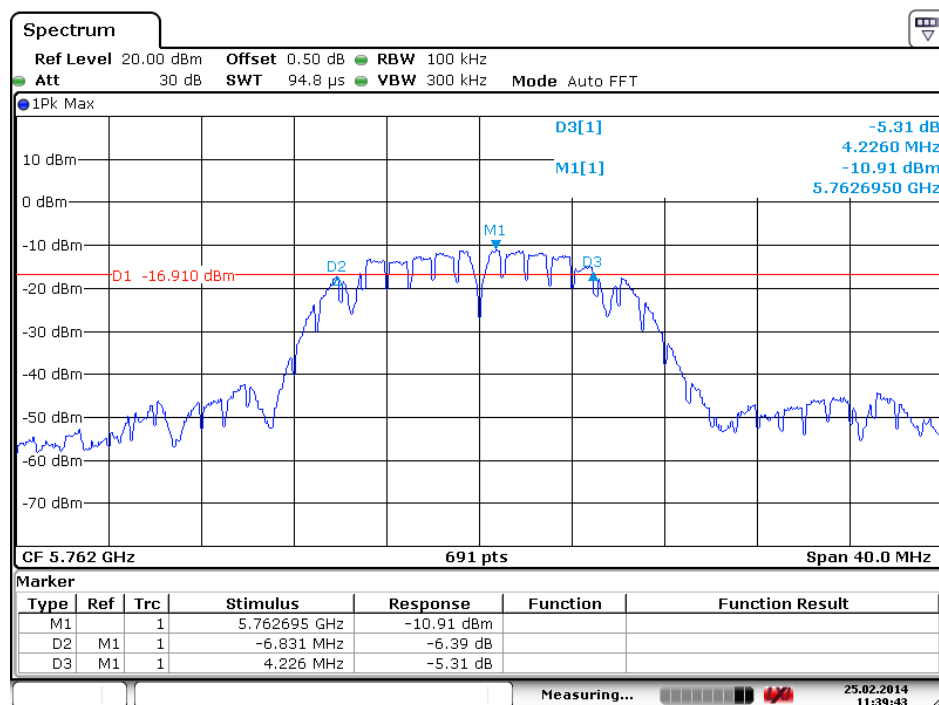
Date: 25.FEB.2014 17:02:14

Low channel(Antenna B)



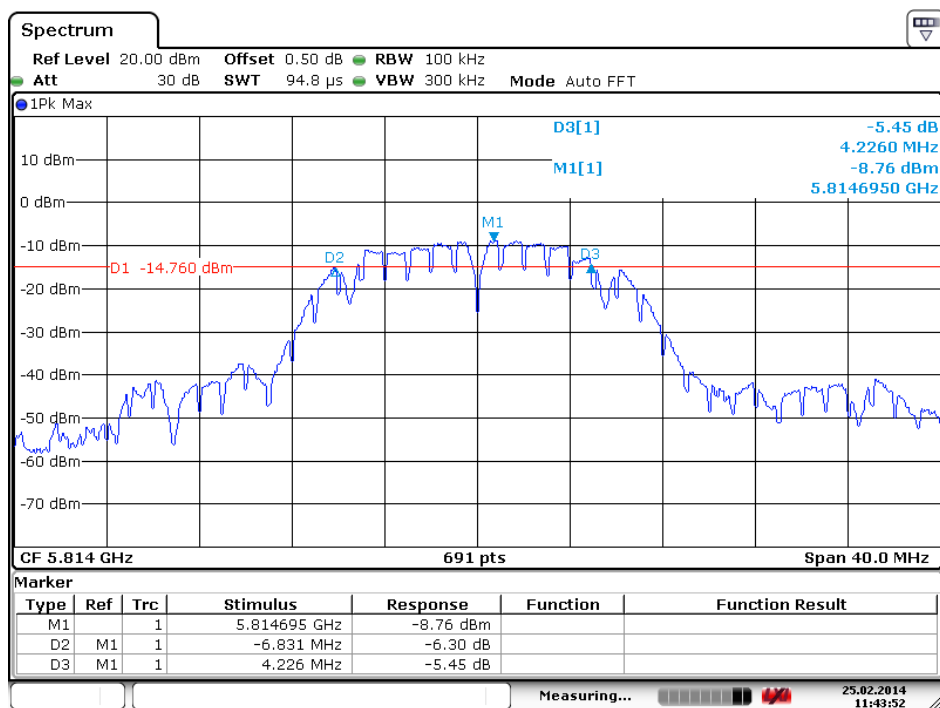
Date: 25.FEB.2014 11:37:03

Middle channel(Antenna B)



Date: 25.FEB.2014 11:39:43

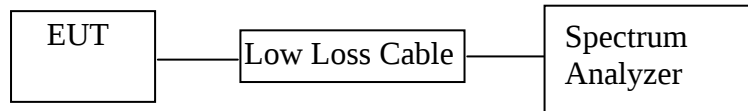
High channel(Antenna B)



Date: 25.FEB.2014 11:43:52

6. POWER SPECTRAL DENSITY TEST

6.1. Block Diagram of Test Setup



(EUT: Indoor/Outdoor speaker with Bluetooth)

6.2. 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 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

6.3. EUT Configuration on Measurement

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

6.4. Operating Condition of EUT

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

6.4.2. Turn on the power of all equipment.

6.4.3. Let the EUT work in TX modes measure it. The transmit frequency are 5736MHz, 5762MHz, 5814MHz,. We select these frequency to transmit.

6.5. Test Procedure

Refer to KDB558074 D01

6.6.Test Result

Antenna B test result

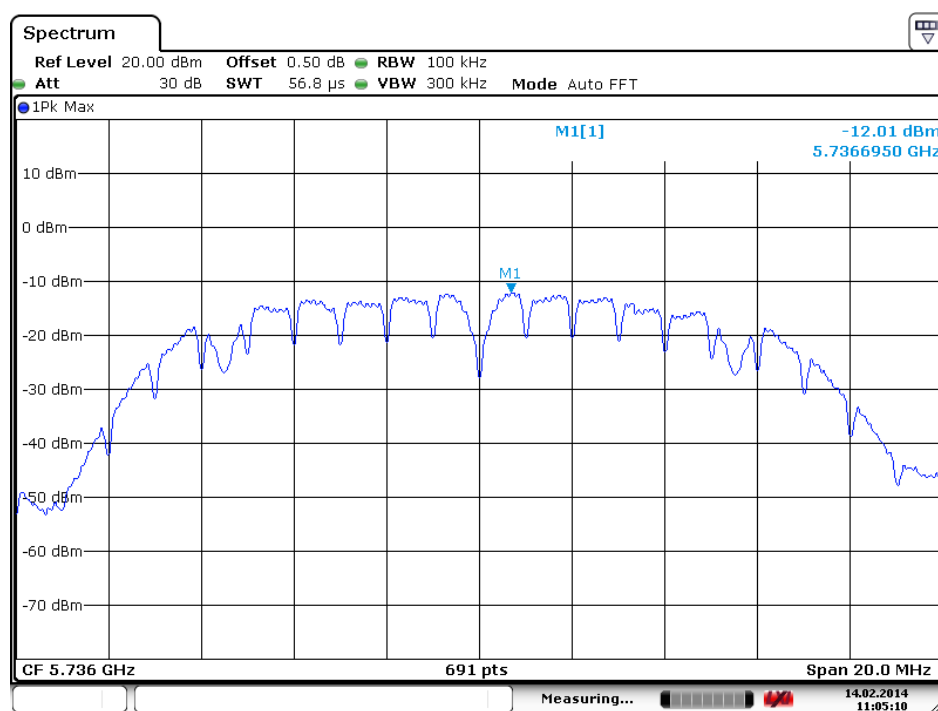
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
Low	5736MHz	-12.01	≤ 8.00	PASS
Middle	5762MHz	-11.94	≤ 8.00	PASS
High	5814MHz	-10.75	≤ 8.00	PASS

Antenna A test result

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limit (dBm)	Result
Low	5736MHz	-10.71	≤ 8.00	PASS
Middle	5762MHz	-10.91	≤ 8.00	PASS
High	5814MHz	-8.45	≤ 8.00	PASS

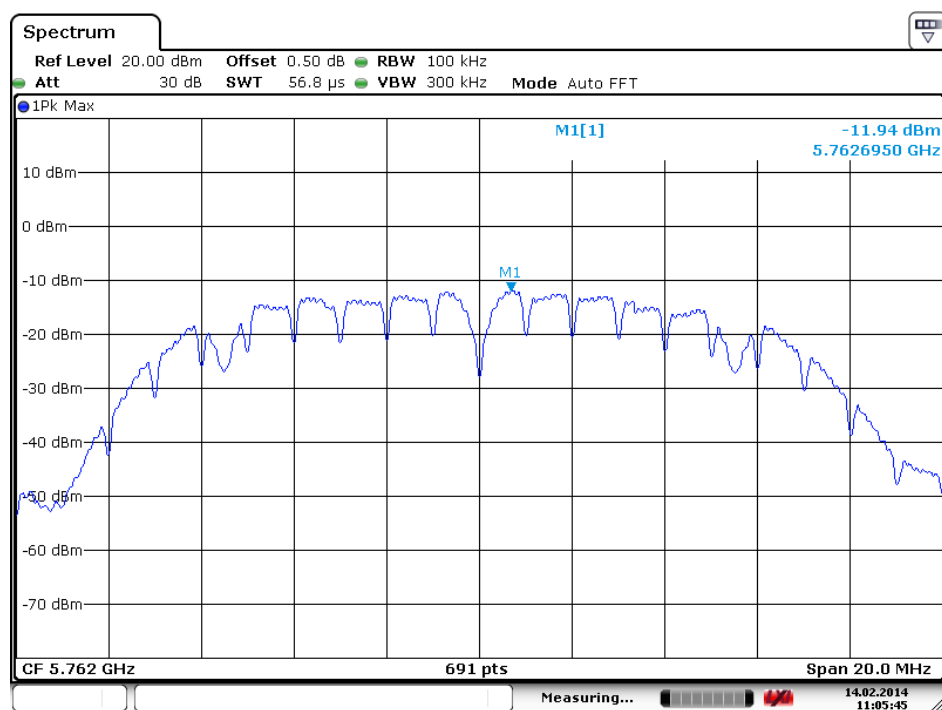
The spectrum analyzer plots are attached as below.

Low channel(Antenna B)



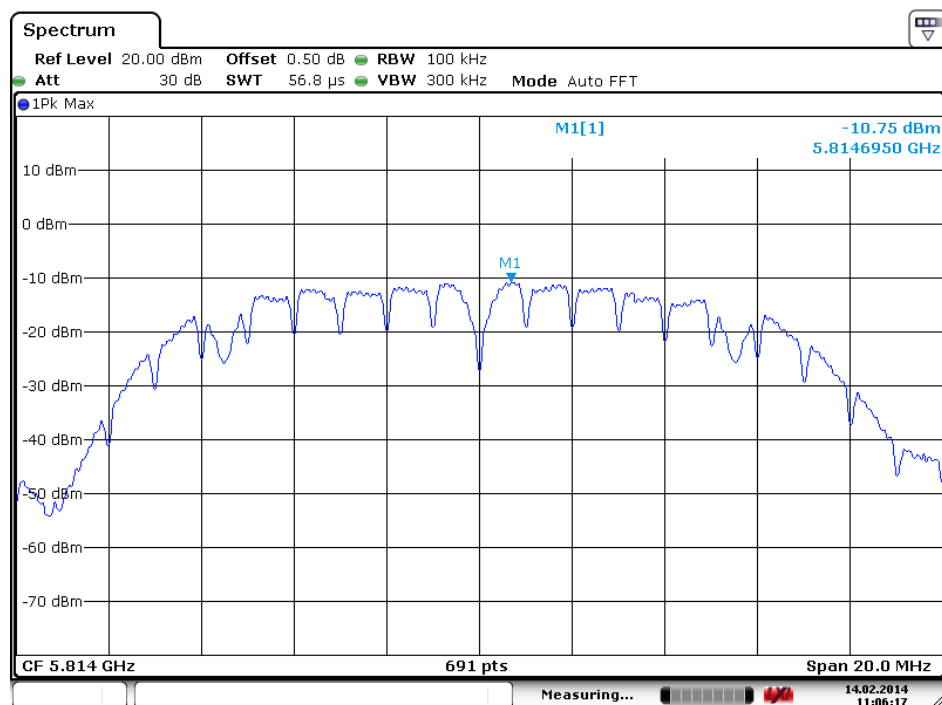
Date: 14.FEB.2014 11:05:09

Middle channel(Antenna B)



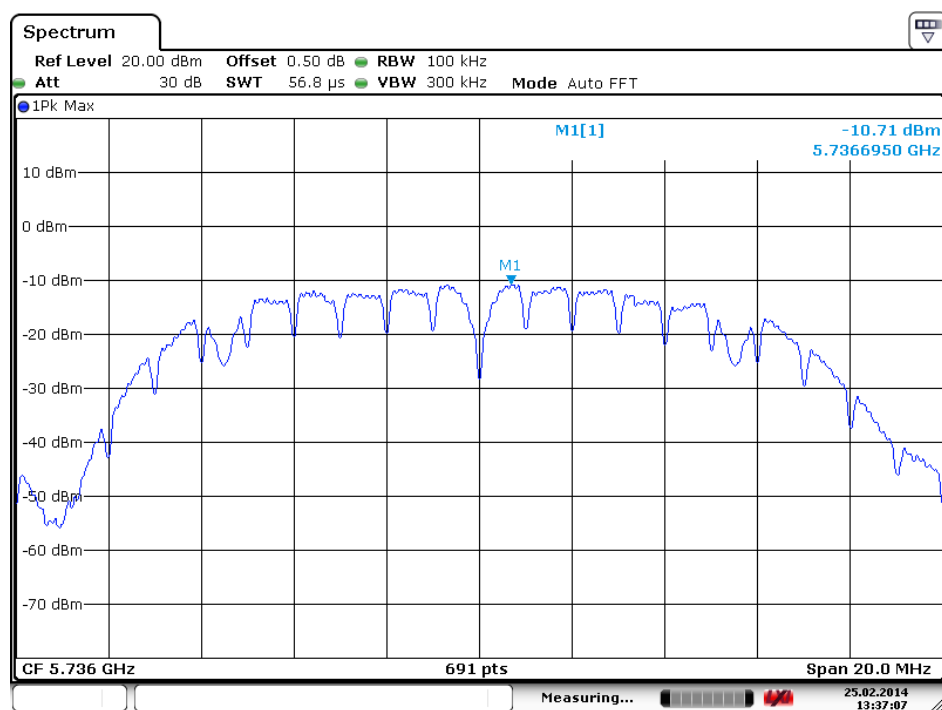
Date: 14.FEB.2014 11:05:44

High channel(Antenna B)



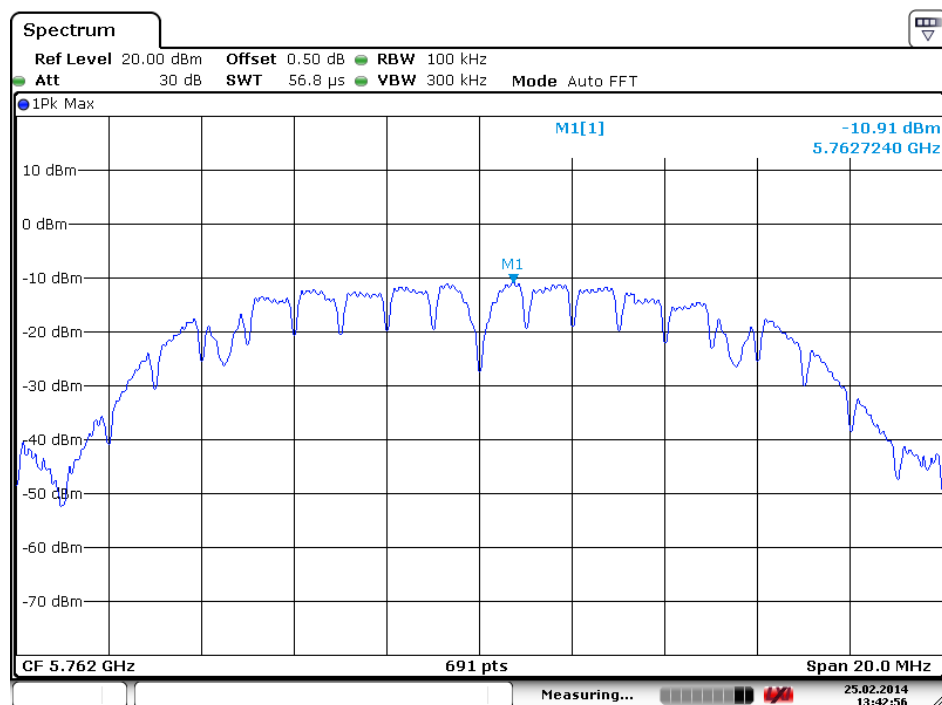
Date: 14.FEB.2014 11:06:16

Low channel(Antenna A)



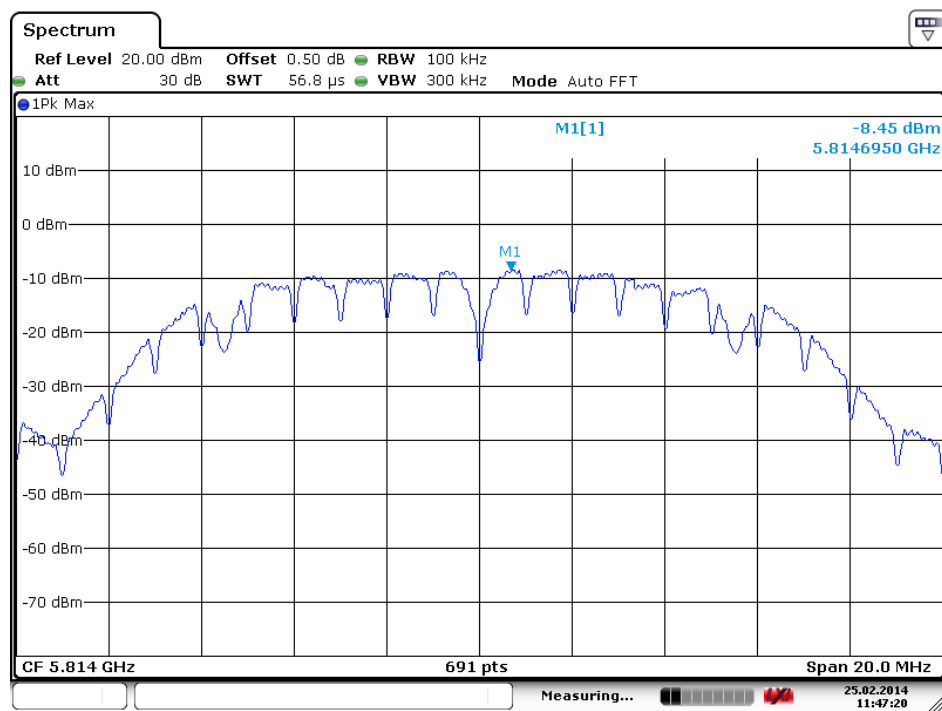
Date: 25.FEB.2014 13:37:08

Middle channel(Antenna A)



Date: 25.FEB.2014 13:42:56

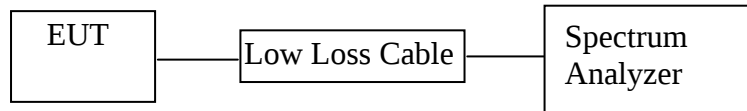
High channel(Antenna A)



Date: 25.FEB.2014 11:47:20

7. RF CONDUCTED SPURIOUS EMISSIONS TEST

7.1. Block Diagram of Test Setup



(EUT: Indoor/Outdoor speaker with Bluetooth)

7.2. 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.

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.

7.5. Test Procedure

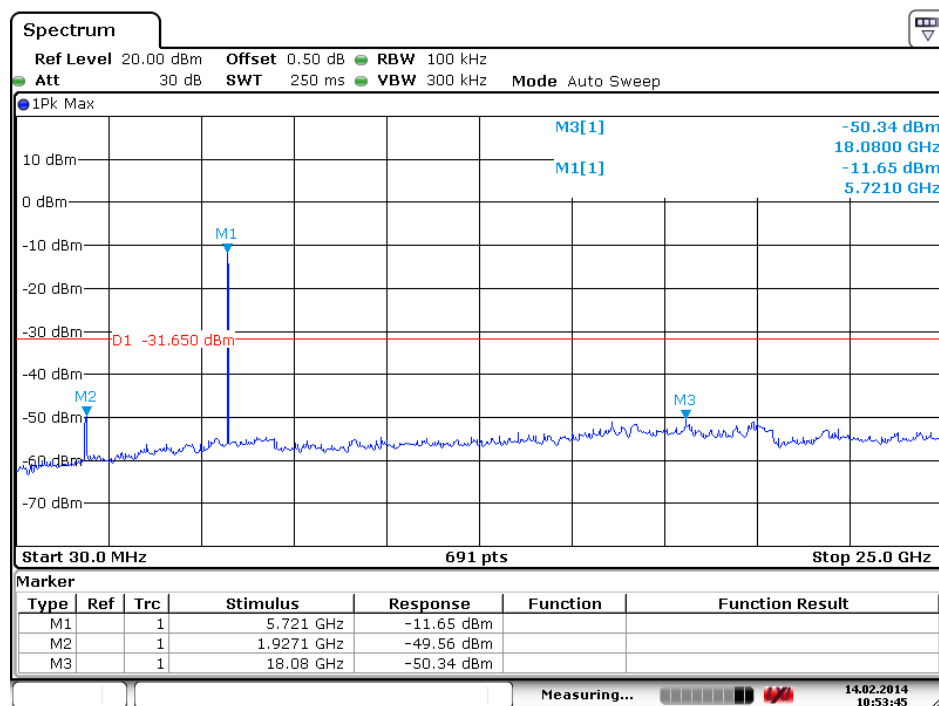
7.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2. Set the test frequency range from 30MHz to 25GHz and set RBW=100 kHz, VBW=300 kHz.

7.6. Test Result

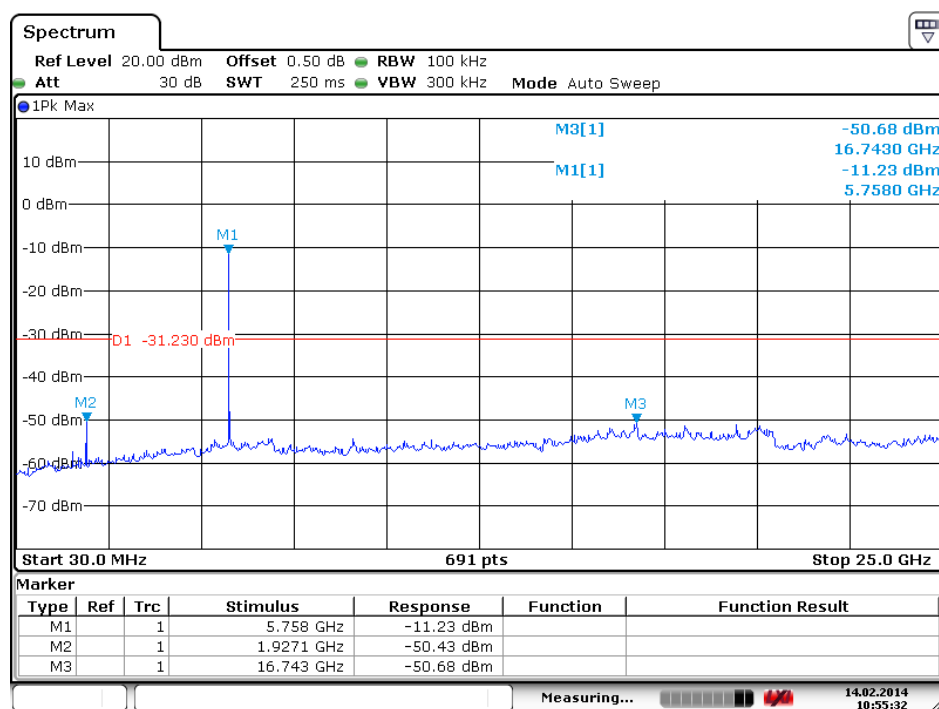
The spectrum analyzer plots are attached as below.

Low channel(Antenna A)



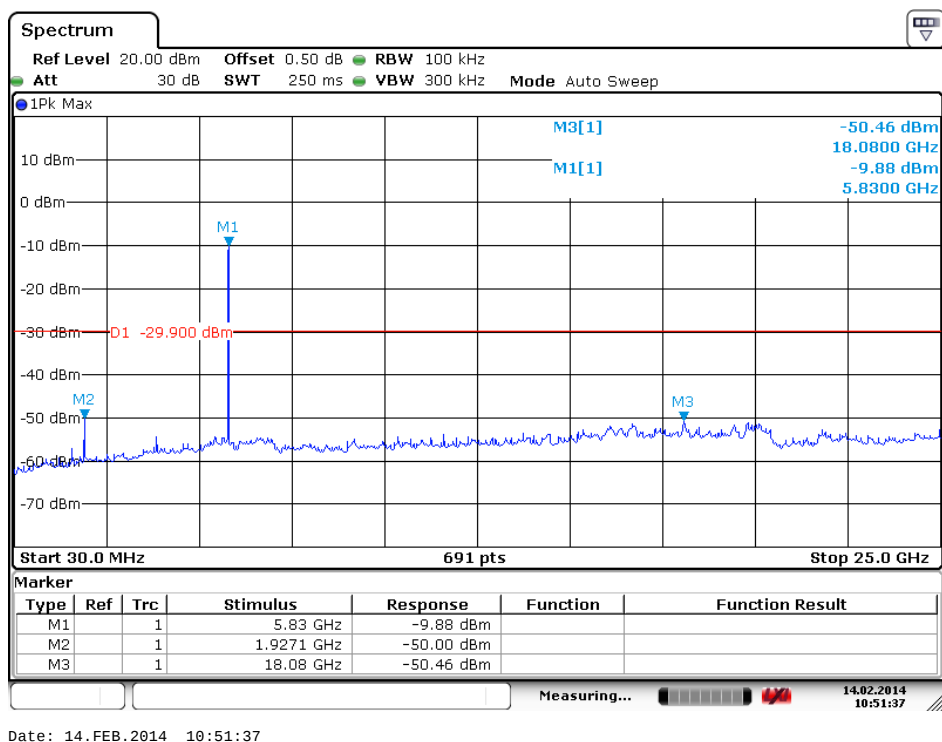
Date: 14.FEB.2014 10:53:44

Middle channel(Antenna A)

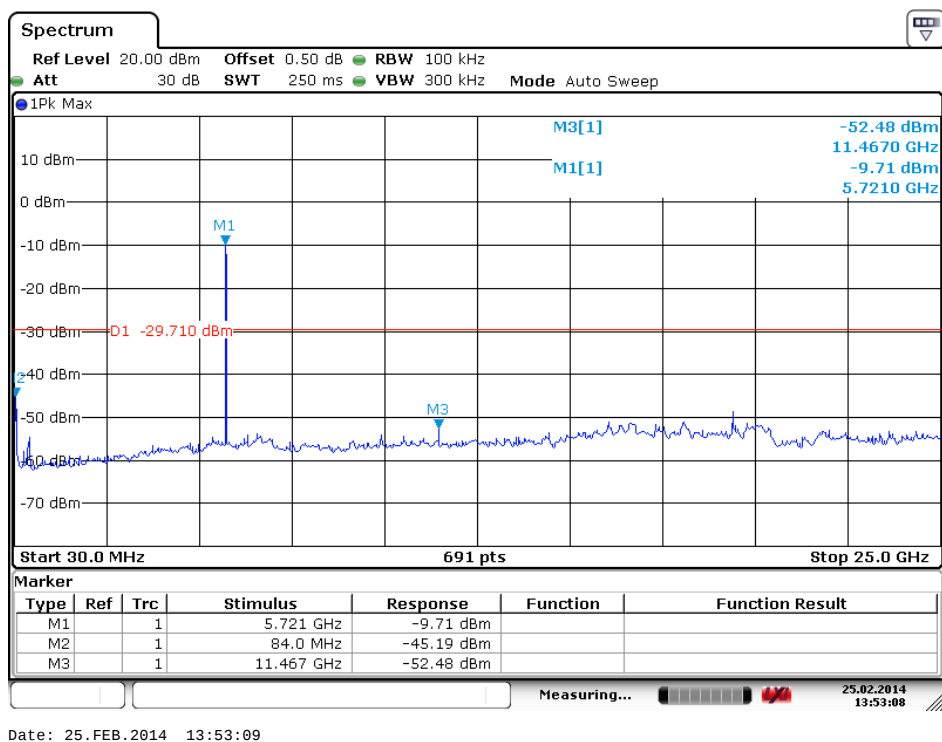


Date: 14.FEB.2014 10:55:32

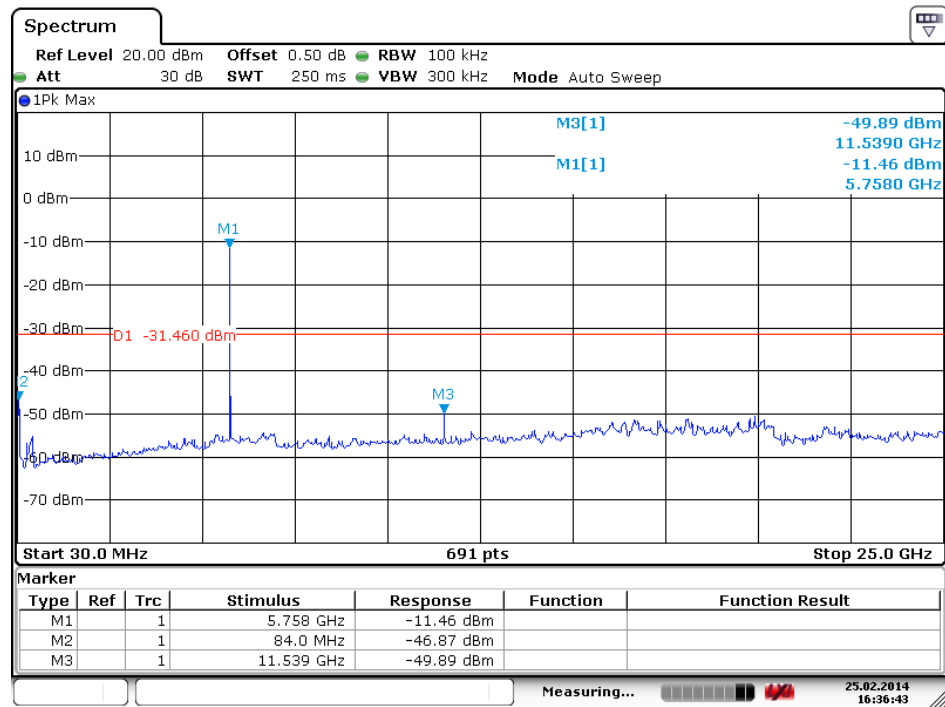
High channel(Antenna A)



Low channel(Antenna B)

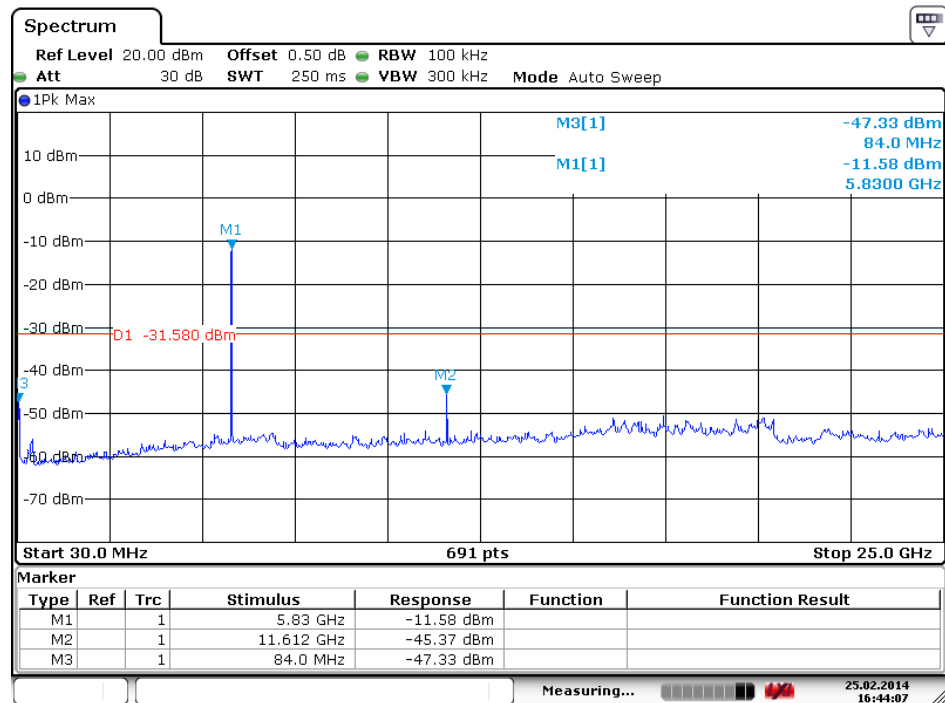


Middle channel(Antenna B)



Date: 25.FEB.2014 16:36:43

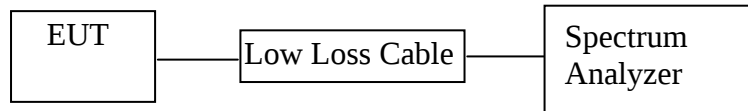
High channel(Antenna B)



Date: 25.FEB.2014 16:44:07

8. CONDUCTED PEAK OUTPUT POWER TEST

8.1. Block Diagram of Test Setup



(EUT: Indoor/Outdoor speaker with Bluetooth)

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

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.

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 9.1.

8.4.2. Turn on the power of all equipment.

8.4.3. Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 5736MHz, 5762MHz, 5814MHz,. We select these 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 RBW of spectrum analyzer to 1MHz and VBW to 3MHz for test mode

8.5.3. Measurement the maximum peak output power.

8.6.Test Result

Antenna A test result

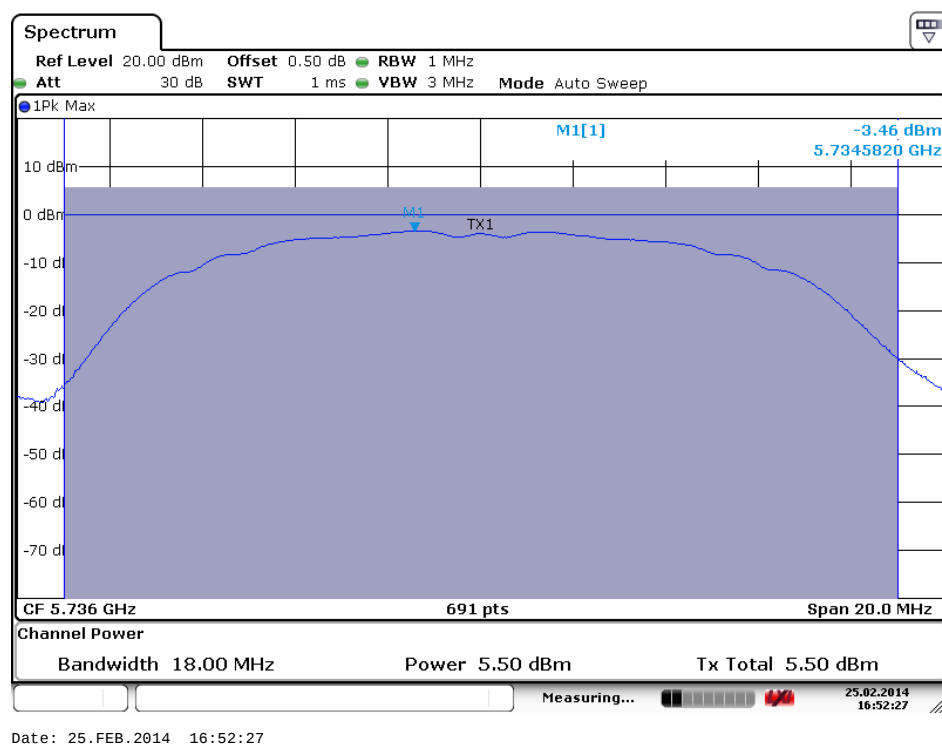
Channel	Frequency (MHz)	Peak Output Power (dBm)	Limits dBm
Low	5736	5.50	30
Middle	5762	7.90	30
High	5814	8.20	30

Antenna B test result

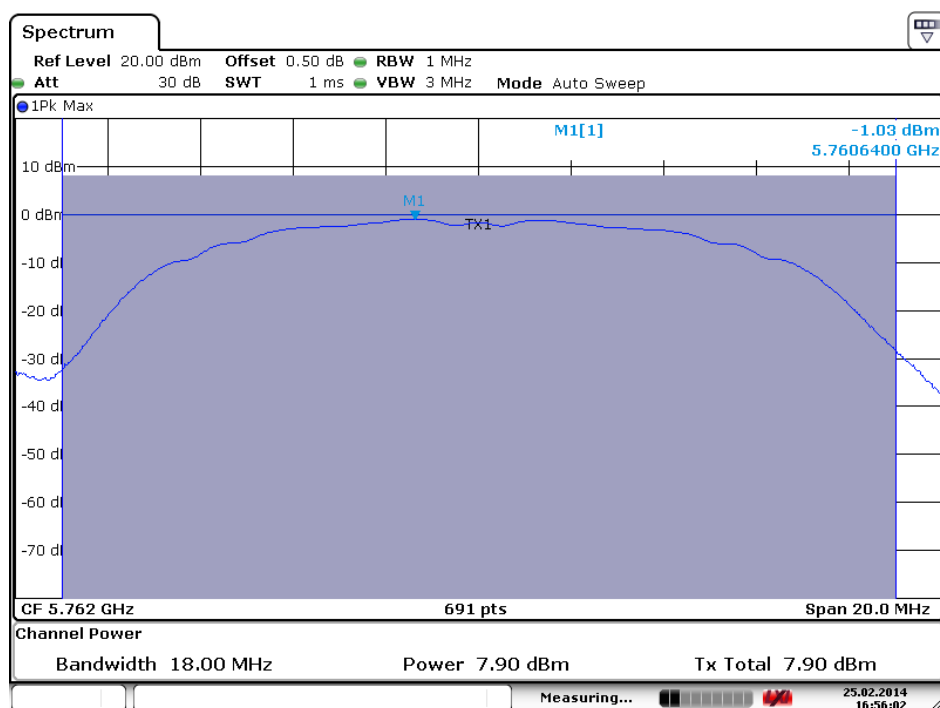
Channel	Frequency (MHz)	Peak Output Power (dBm)	Limits dBm
Low	5736	6.22	30
Middle	5762	6.82	30
High	5814	7.96	30

The spectrum analyzer plots are attached as below.

Low channel (Antenna A)

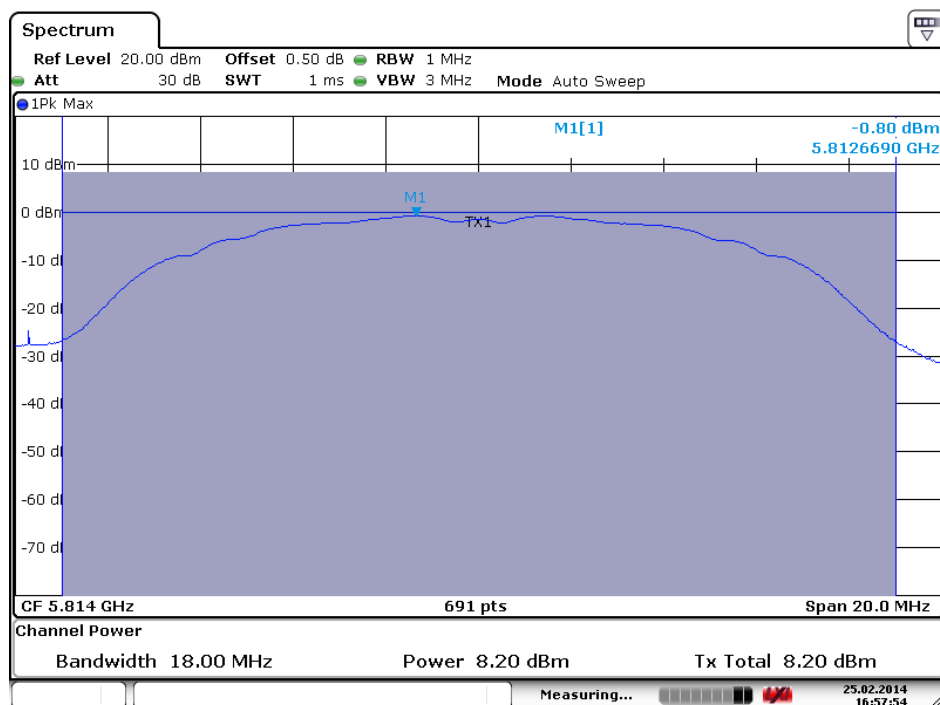


Middle channel (Antenna A)



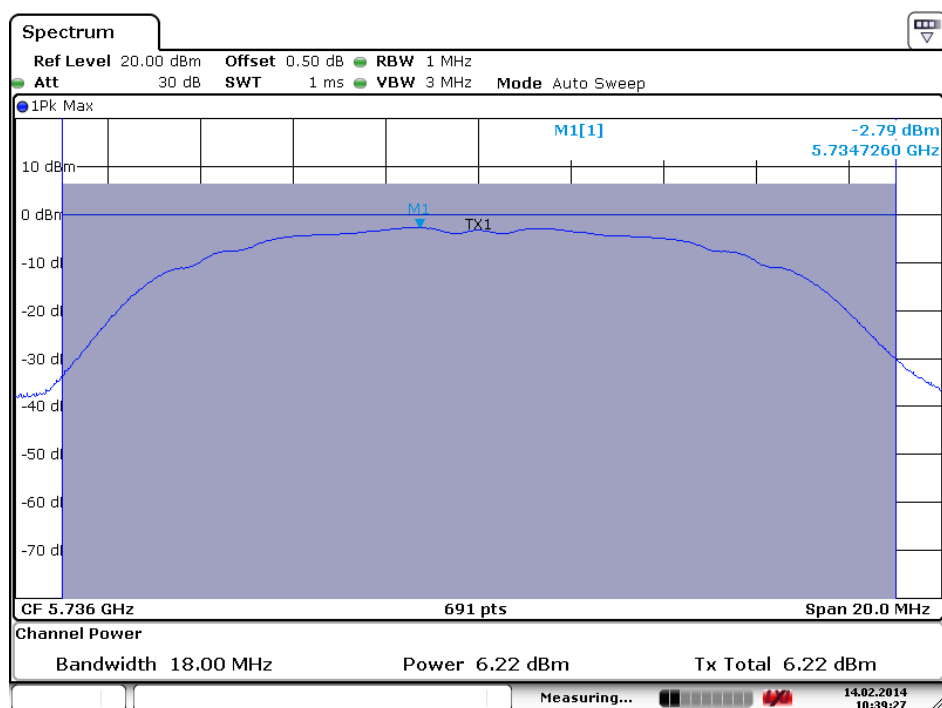
Date: 25.FEB.2014 16:56:02

High channel (Antenna A)



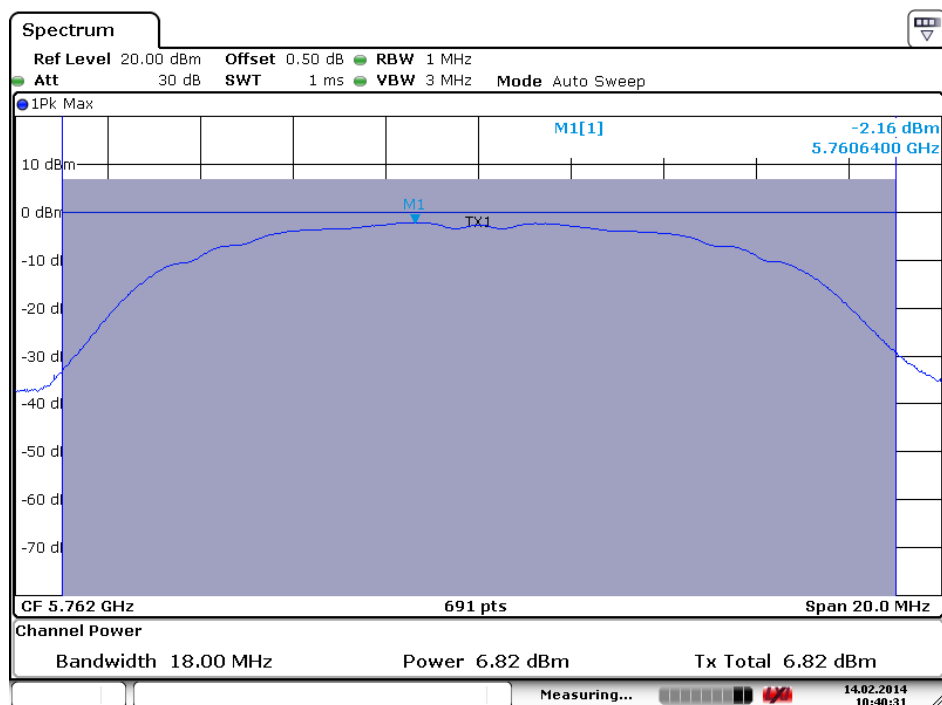
Date: 25.FEB.2014 16:57:54

Low channel (Antenna B)



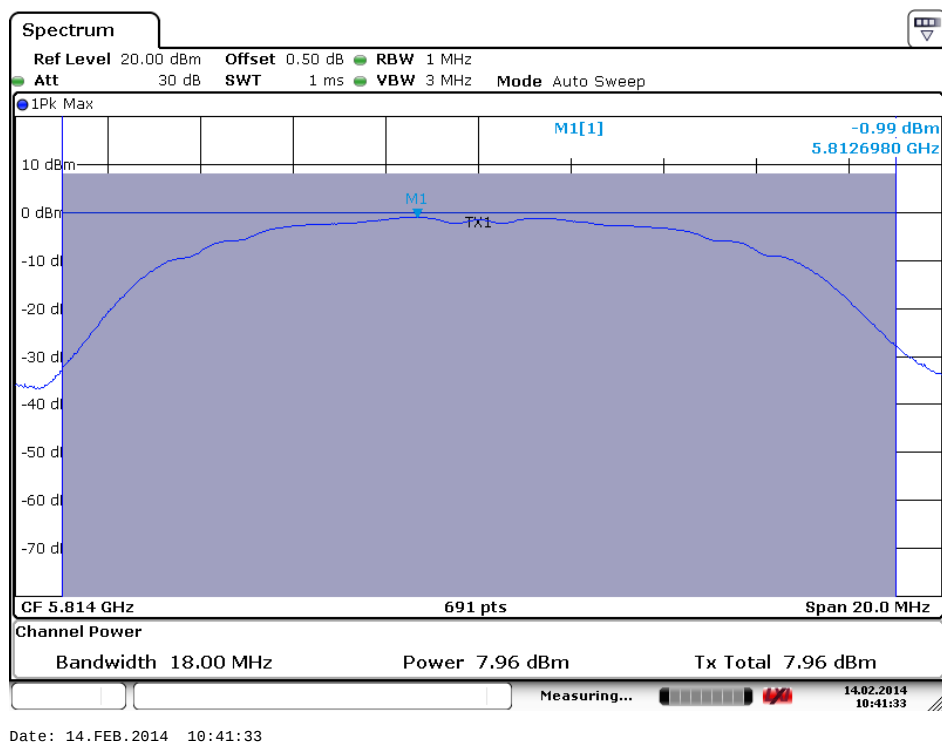
Date: 14.FEB.2014 10:39:27

Middle channel (Antenna B)



Date: 14.FEB.2014 10:40:31

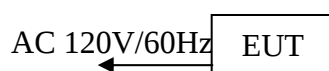
High channel (Antenna B)



9. RADIATED EMISSION TEST

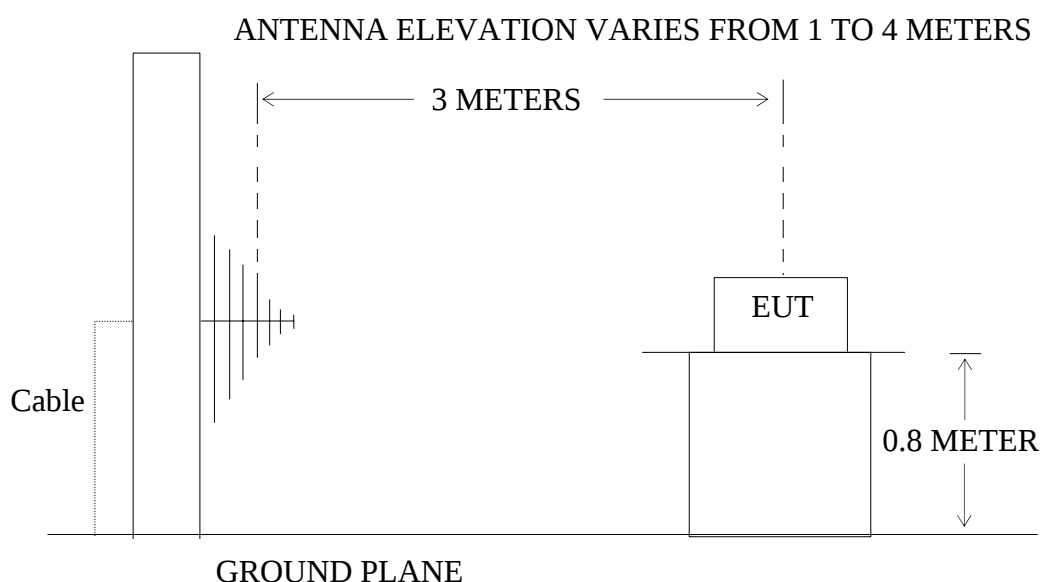
9.1. Block Diagram of Test Setup

9.1.1. Block diagram of connection between the EUT and simulators



(EUT: Indoor/Outdoor speaker with Bluetooth)

9.1.2. Anechoic Chamber Test Setup Diagram



9.2. The Limit For Section 15.247(d)

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

9.3.Restricted bands of operation

9.3.1.FCC Part 15.205 Restricted bands of operation

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

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

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.

9.4.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.

9.5. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. 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 40000MHz 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

9.6.The Field Strength of Radiation Emission Measurement Results

- Note: 1.**We tested battery mode and AC mode and recorded the worst case data(AC mode) for all test mode.
- 2.** The 18-40GHz emissions are not reported, because the levels are too low against the limit.
- 3.** we tested radiation emission of Antenna A and Antenna B, The following test data is the worst case(Antenna A) data which I have recorded



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Job No.: alen #3474

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5736MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Horizontal

Power Source: AC 120V/60Hz

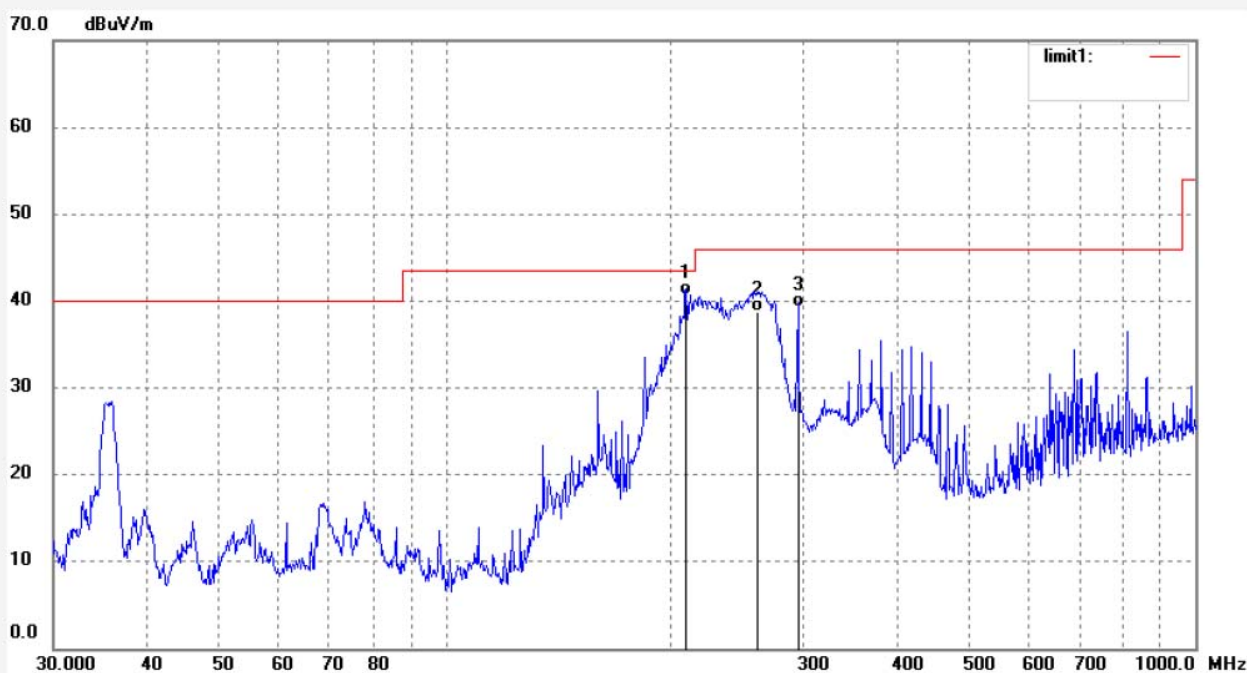
Date: 14/02/14/

Time: 8/41/40

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	209.3129	60.68	-20.02	40.66	43.50	-2.84	QP			
2	261.0583	57.89	-19.08	38.81	46.00	-7.19	QP			
3	295.1469	57.28	-17.95	39.33	46.00	-6.67	QP			

Job No.: alen #3473

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5736MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Vertical

Power Source: AC 120V/60Hz

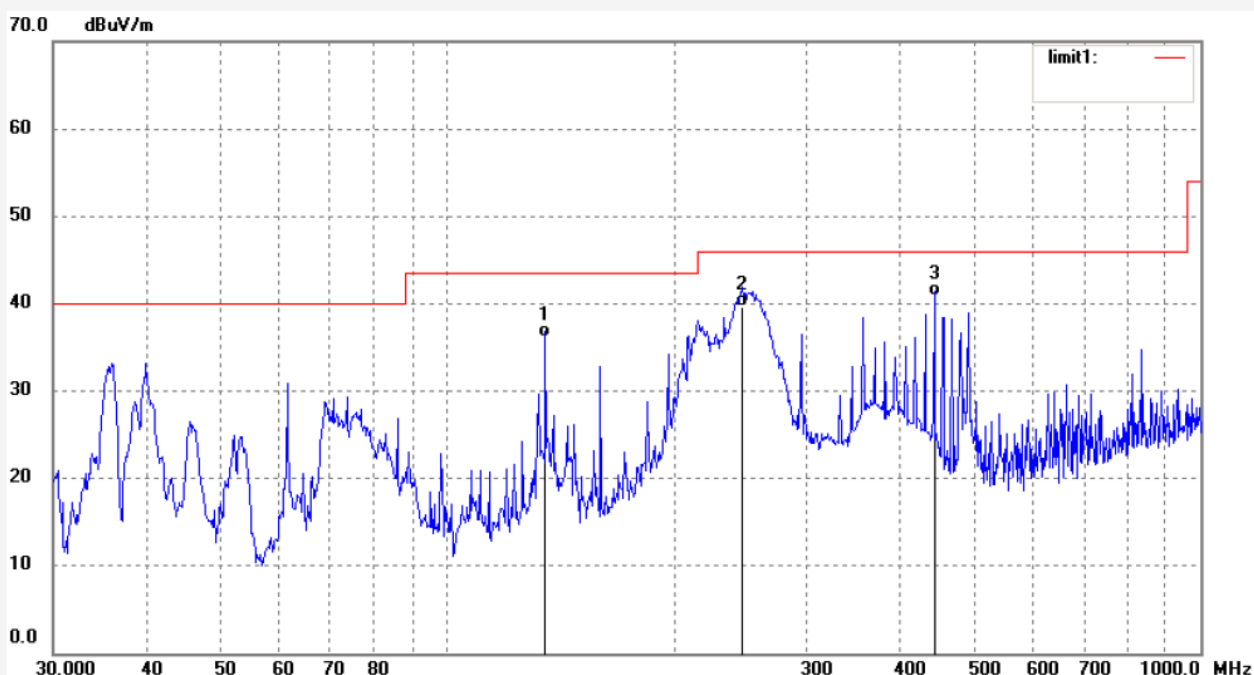
Date: 14/02/14/

Time: 8/40/51

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	135.0319	59.48	-23.27	36.21	43.50	-7.29	QP			
2	245.9509	59.36	-19.76	39.60	46.00	-6.40	QP			
3	443.2943	55.65	-14.83	40.82	46.00	-5.18	QP			

Job No.: alen #3471

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5762MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Horizontal

Power Source: AC 120V/60Hz

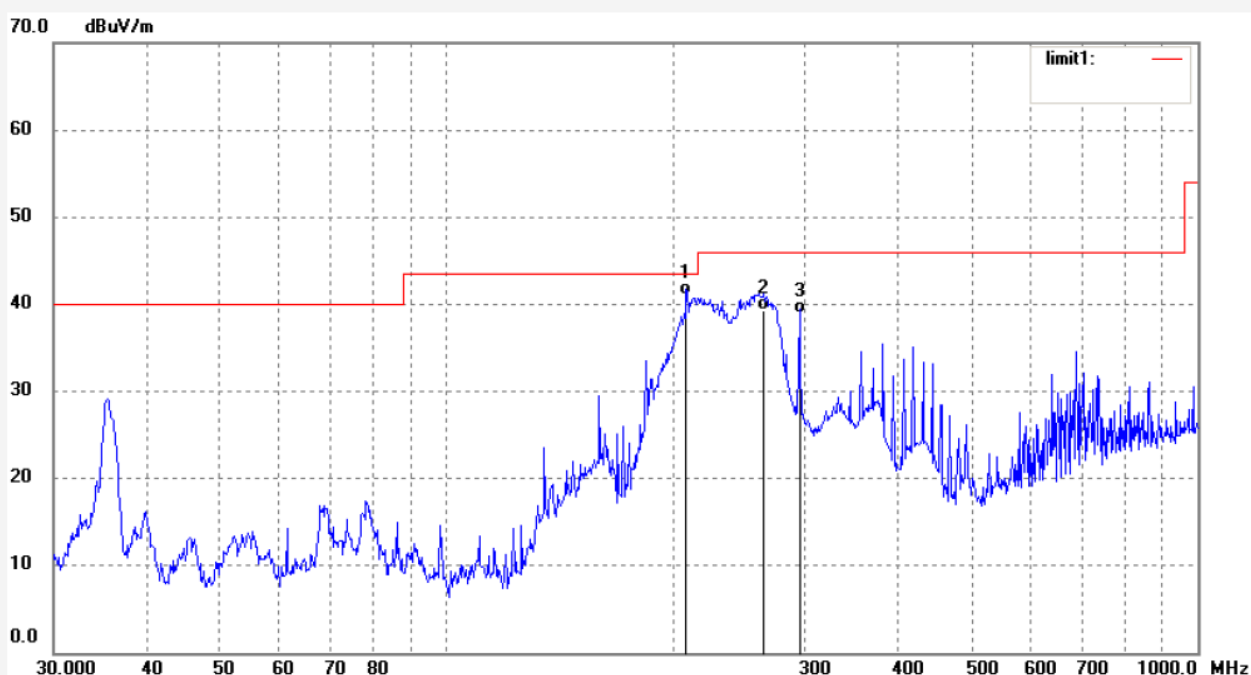
Date: 14/02/14/

Time: 8/39/18

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	208.5803	61.01	-20.03	40.98	43.50	-2.52	QP			
2	264.7457	58.24	-18.87	39.37	46.00	-6.63	QP			
3	295.1469	56.87	-17.95	38.92	46.00	-7.08	QP			

Job No.: alen #3472

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5762MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Vertical

Power Source: AC 120V/60Hz

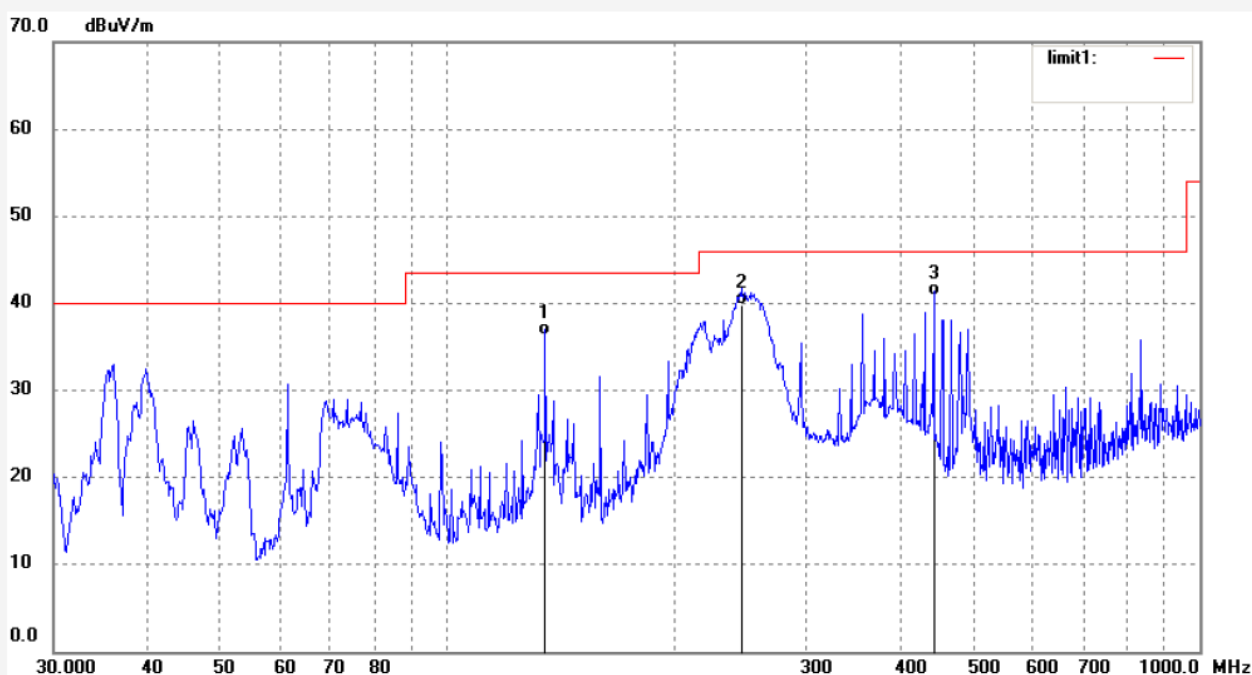
Date: 14/02/14/

Time: 8/40/10

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	135.0319	59.54	-23.27	36.27	43.50	-7.23	QP			
2	245.9509	59.57	-19.76	39.81	46.00	-6.19	QP			
3	443.2943	55.67	-14.83	40.84	46.00	-5.16	QP			

Job No.: alen #3470

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5814MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Horizontal

Power Source: AC 120V/60Hz

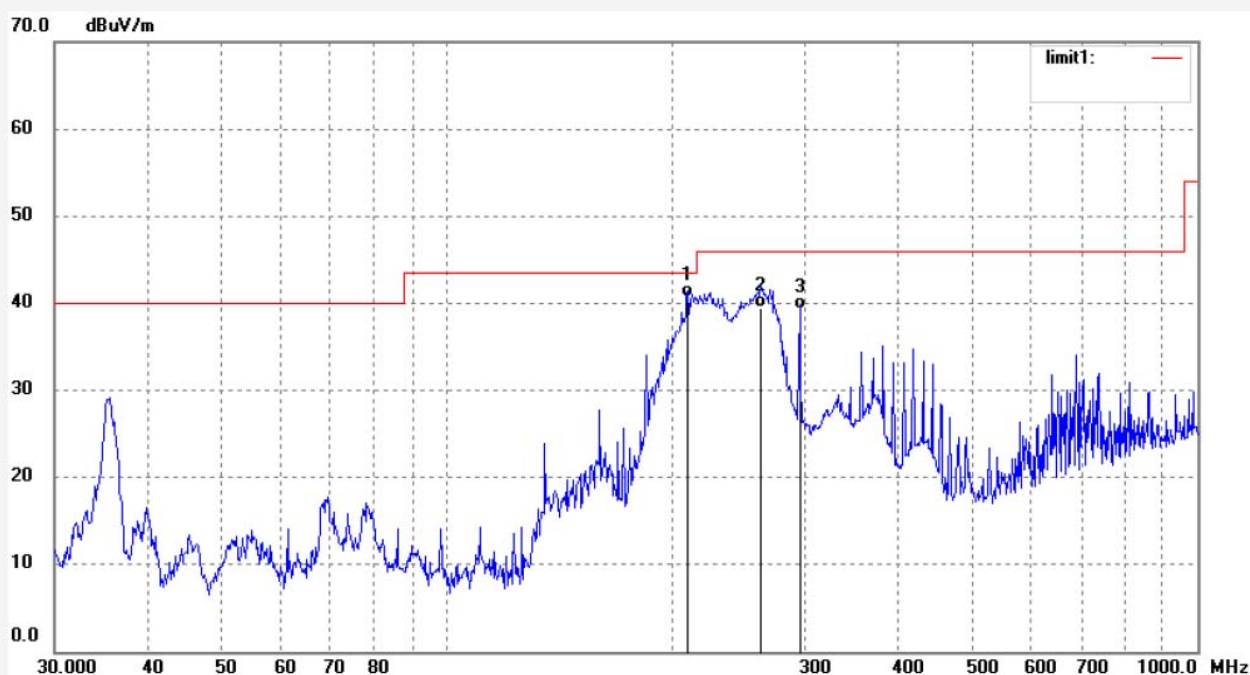
Date: 14/02/14/

Time: 8/38/31

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	209.3129	60.68	-20.02	40.66	43.50	-2.84	QP			
2	261.9753	58.54	-19.02	39.52	46.00	-6.48	QP			
3	295.1469	57.21	-17.95	39.26	46.00	-6.74	QP			

Job No.: alen #3469

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5814MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Vertical

Power Source: AC 120V/60Hz

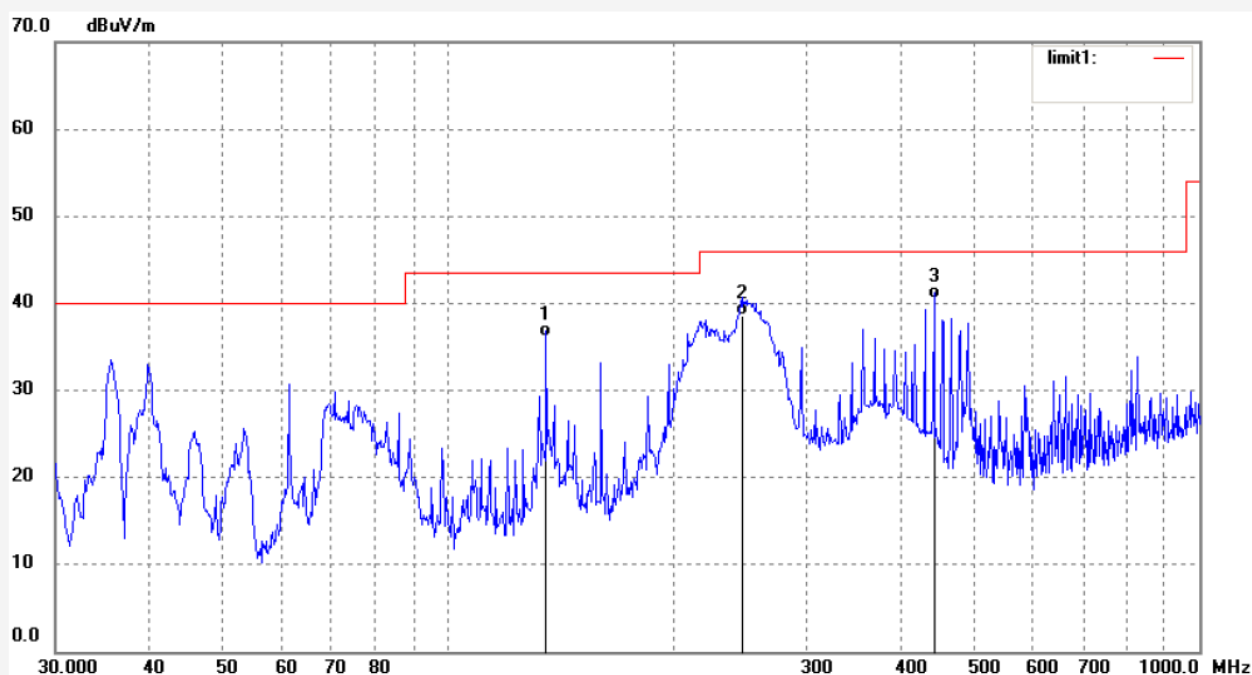
Date: 14/02/14/

Time: 8/37/15

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	135.0319	59.47	-23.27	36.20	43.50	-7.30	QP			
2	245.9509	58.38	-19.76	38.62	46.00	-7.38	QP			
3	443.2943	55.39	-14.83	40.56	46.00	-5.44	QP			

Job No.: alen #3460

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5736MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Horizontal

Power Source: AC 120V/60Hz

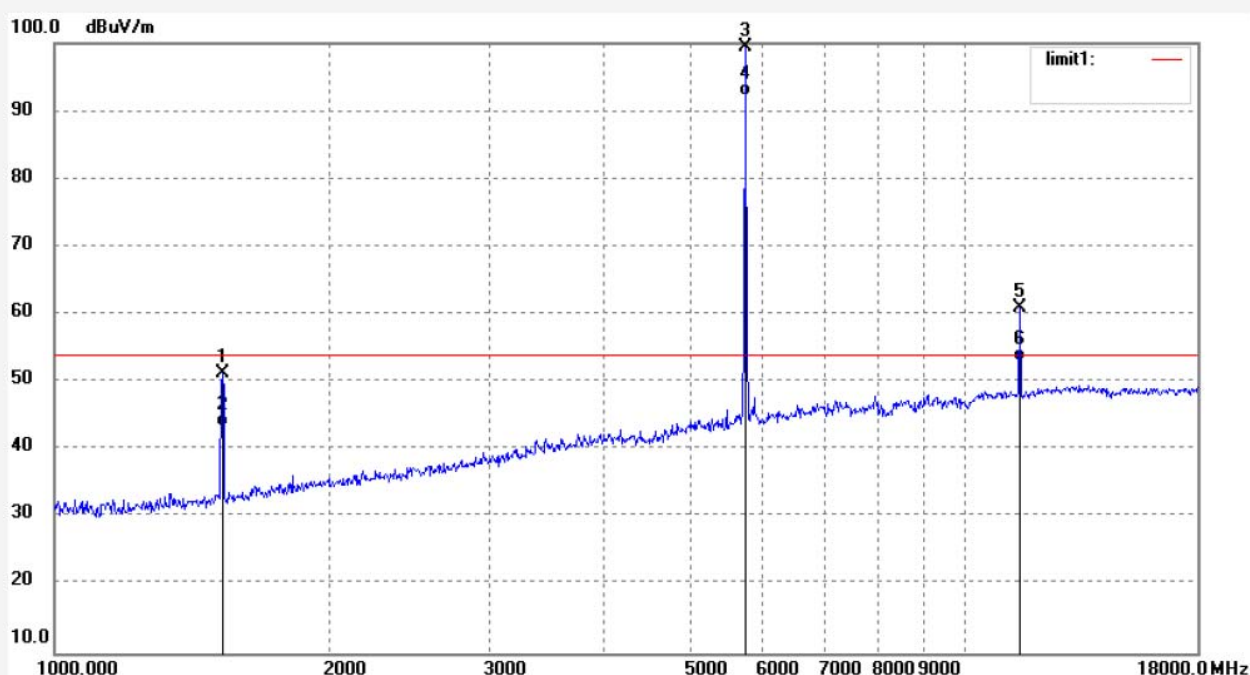
Date: 14/02/13/

Time: 10/57/14

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1529.414	60.93	-9.59	51.34	74.00	-22.66	peak			
2	1529.414	53.01	-9.59	43.42	54.00	-10.58	AVG			
3	5736.095	99.90	-0.37	99.53			peak			
4	5736.095	92.68	-0.37	92.31			AVG			
5	11467.005	55.01	6.01	61.02	74.00	-12.98	peak			
6	11467.005	47.01	6.01	53.02	54.00	-0.98	AVG			



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Job No.: alen #3459

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5736MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Vertical

Power Source: AC 120V/60Hz

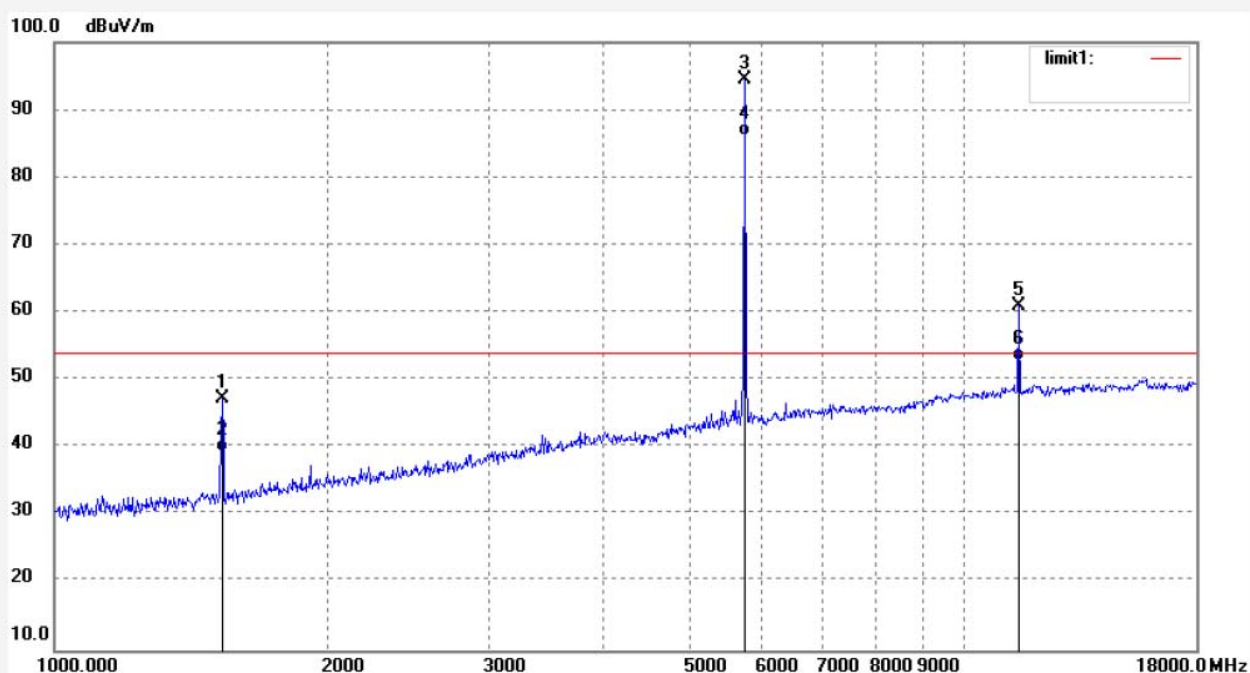
Date: 14/02/13/

Time: 10/54/09

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1529.414	56.90	-9.59	47.31	74.00	-26.69	peak			
2	1529.414	48.94	-9.59	39.35	54.00	-14.65	AVG			
3	5736.095	94.91	-0.37	94.54			peak			
4	5736.095	86.54	-0.37	86.17			AVG			
5	11467.005	54.85	6.01	60.86	74.00	-13.14	peak			
6	11467.005	46.89	6.01	52.90	54.00	-1.10	AVG			

Job No.: alen #3461

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5762MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Horizontal

Power Source: AC 120V/60Hz

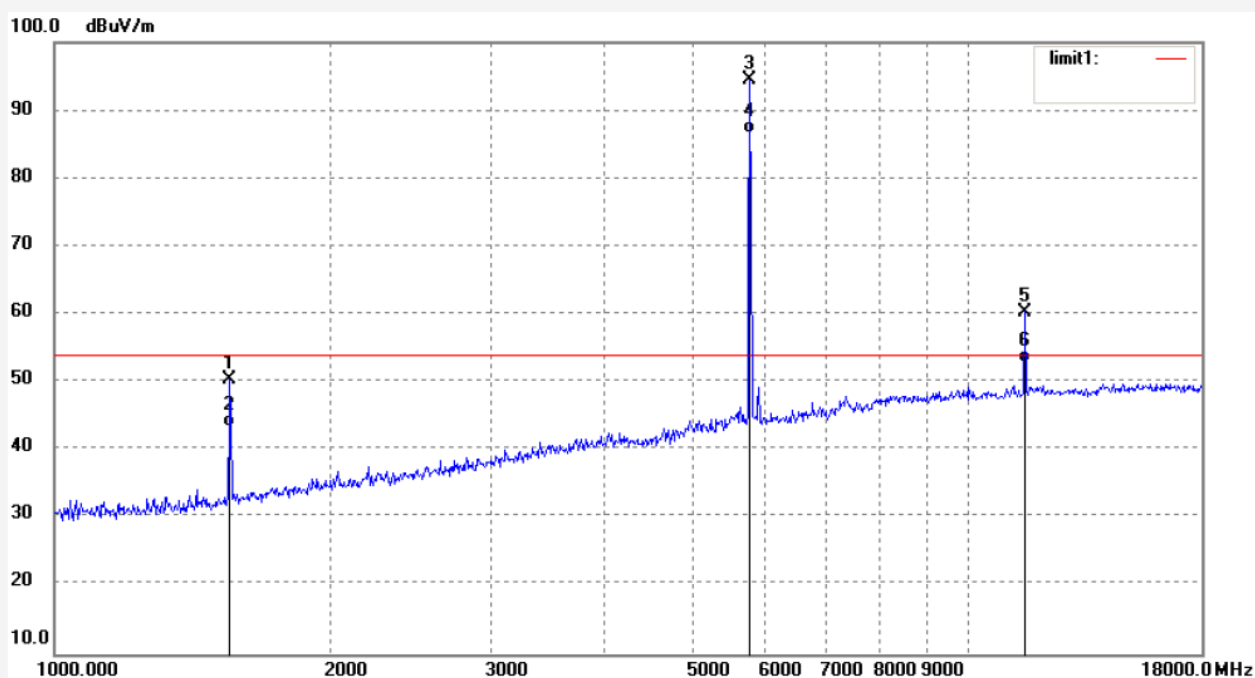
Date: 14/02/13/

Time: 11/01/50

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1556.169	59.90	-9.48	50.42	74.00	-23.58	peak			
2	1556.169	52.79	-9.48	43.31	54.00	-10.69	AVG			
3	5762.017	94.75	-0.34	94.41			peak			
4	5762.017	86.98	-0.34	86.64			AVG			
5	11533.485	54.33	6.07	60.40	74.00	-13.6	peak			
6	11533.485	46.69	6.07	52.76	54.00	-1.24	AVG			

Job No.: alen #3462

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5762MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Vertical

Power Source: AC 120V/60Hz

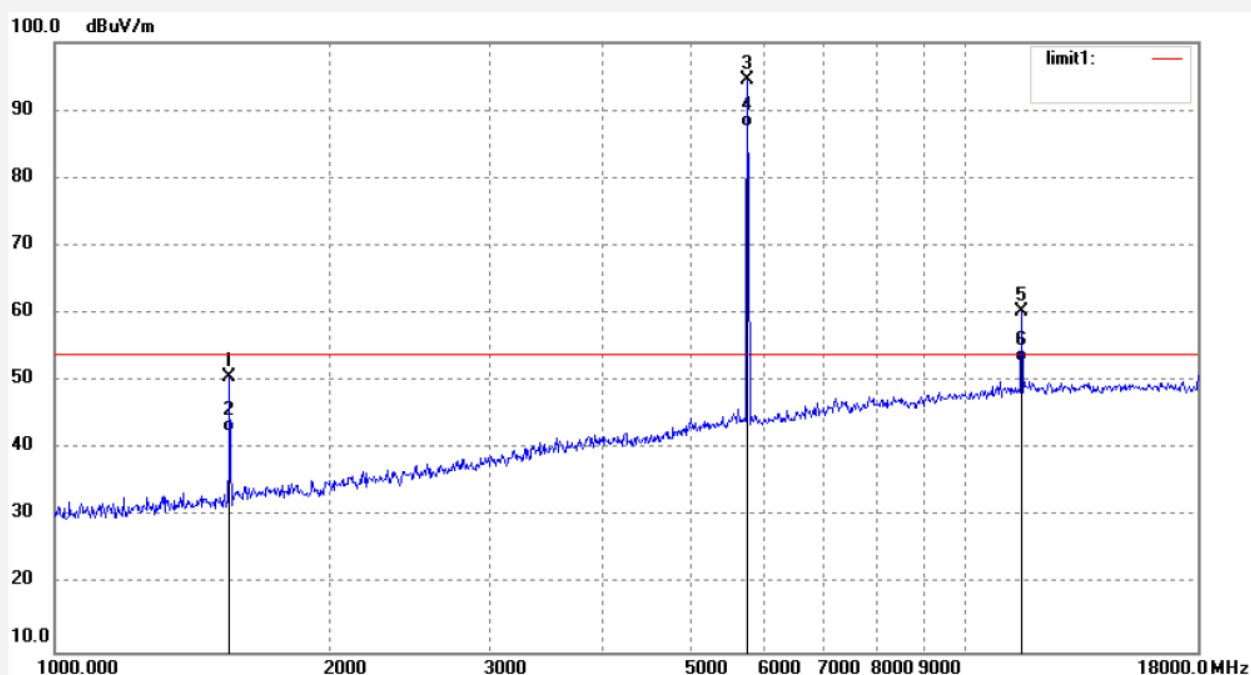
Date: 14/02/13/

Time: 11/03/03

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1556.169	60.06	-9.48	50.58	74.00	-23.42	peak			
2	1556.169	52.01	-9.48	42.53	54.00	-11.47	AVG			
3	5762.017	94.83	-0.34	94.49			peak			
4	5762.017	87.85	-0.34	87.51			AVG			
5	11533.485	54.28	6.07	60.35	74.00	-13.65	peak			
6	11533.485	46.78	6.07	52.85	54.00	-1.15	AVG			

Job No.: alen #3464

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5814MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Horizontal

Power Source: AC 120V/60Hz

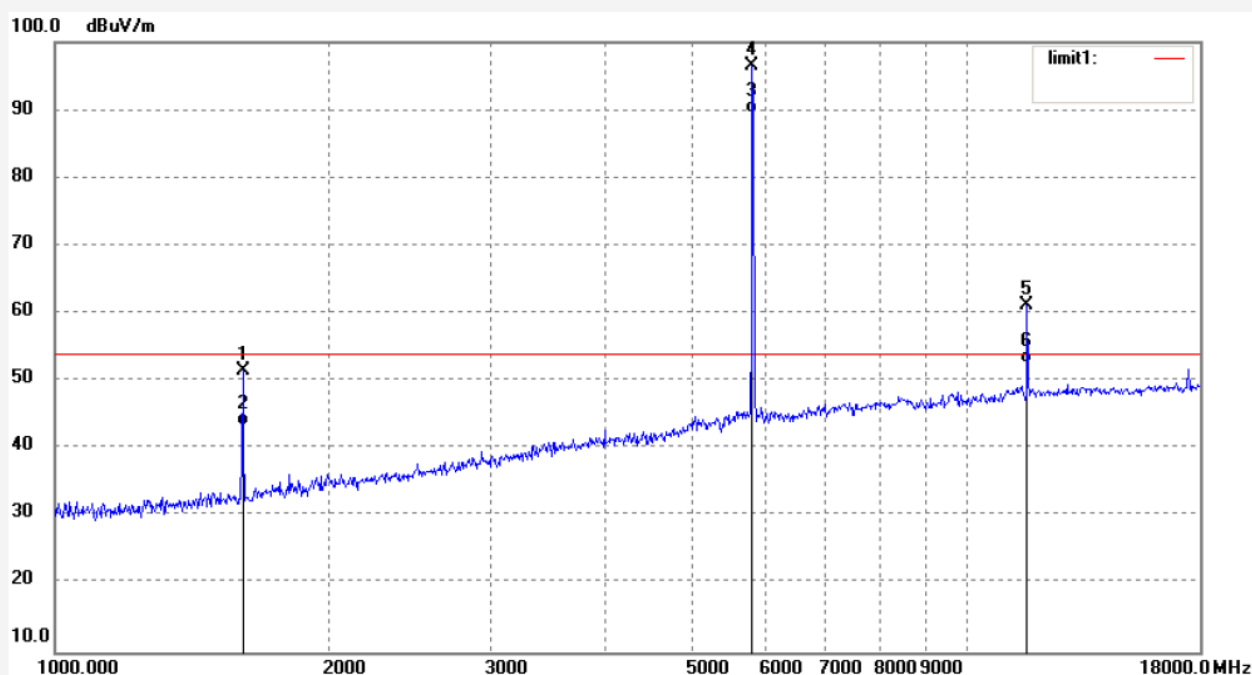
Date: 14/02/13/

Time: 11/05/56

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1606.441	60.80	-9.29	51.51	54.00	-2.49	peak			
2	1606.441	52.65	-9.29	43.36	54.00	-10.64	AVG			
3	5814.011	89.89	-0.29	89.60			AVG			
4	5814.012	96.90	-0.29	96.61			peak			
5	11633.928	55.06	6.16	61.22	54.00	7.22	peak			
6	11633.928	46.59	6.16	52.75	54.00	-1.25	AVG			

Job No.: alen #3463

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5814MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Vertical

Power Source: AC 120V/60Hz

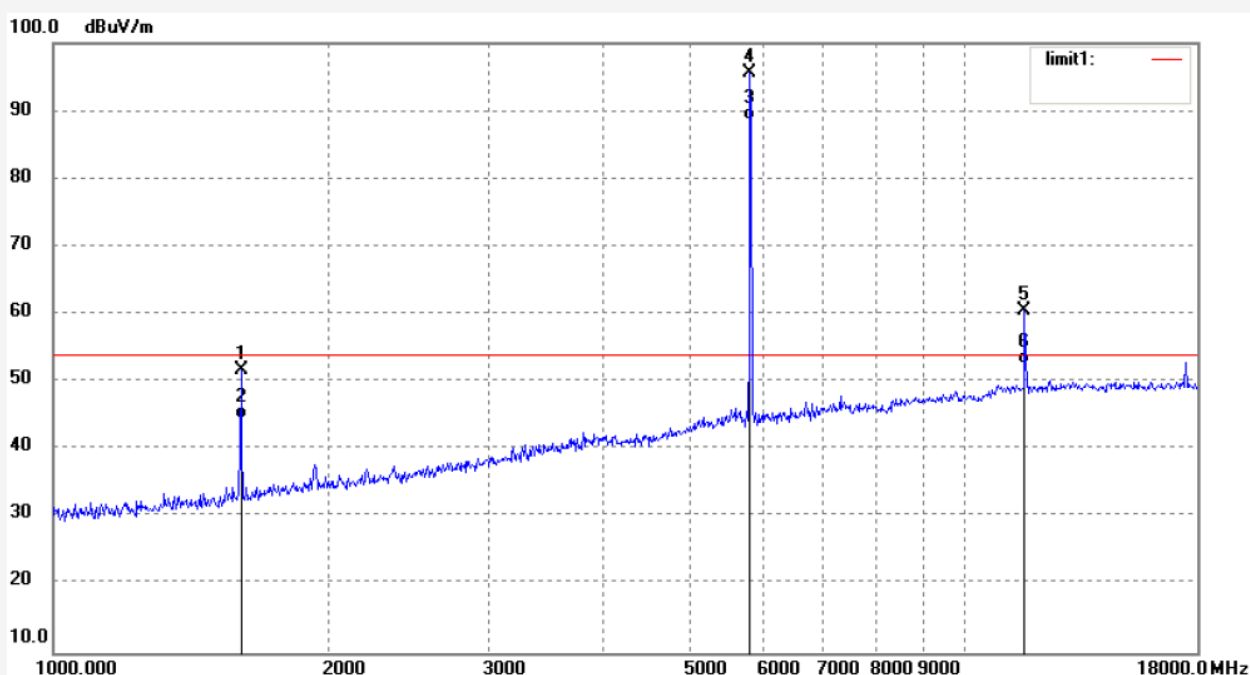
Date: 14/02/13/

Time: 11/04/34

Engineer Signature:

Distance: 3m

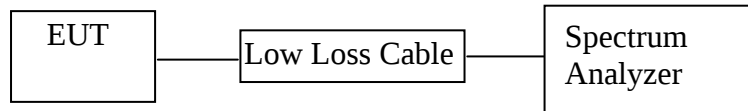
Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	1606.441	61.03	-9.29	51.74	74.00	-22.26	peak			
2	1606.441	53.78	-9.29	44.49	54.00	-9.51	AVG			
3	5814.011	88.97	-0.29	88.68			AVG			
4	5814.012	95.89	-0.29	95.60			peak			
5	11633.928	54.29	6.16	60.45	74.00	-13.55	peak			
6	11633.928	46.57	6.16	52.73	54.00	-1.27	AVG			

10.BAND EDGE COMPLIANCE TEST

10.1.Block Diagram of Test Setup



(EUT: Indoor/Outdoor speaker with Bluetooth)

10.2.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).

10.3.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.

10.4.Operating Condition of EUT

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

10.4.2.Turn on the power of all equipment.

10.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 5736-5814MHz. We select 5736MHz, 5814MHz TX frequency to transmit.

10.5. Test Procedure

Conducted Band Edge:

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

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

Radiate Band Edge:

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

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

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

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

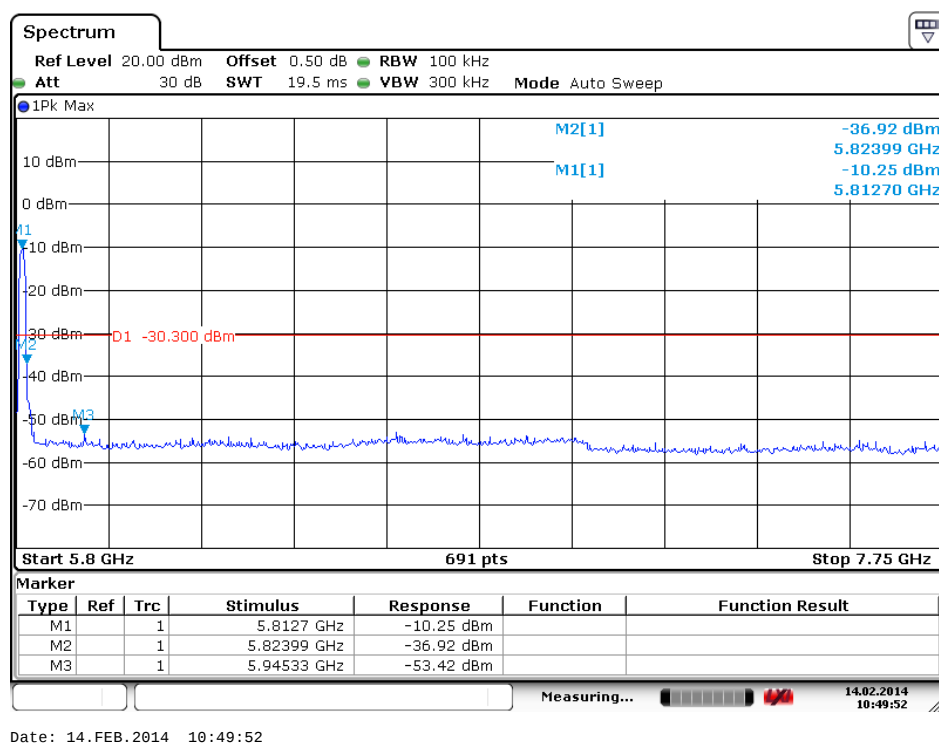
10.5.7. RBW=1MHz, VBW=1MHz

10.5.8. The band edges were measured and recorded.

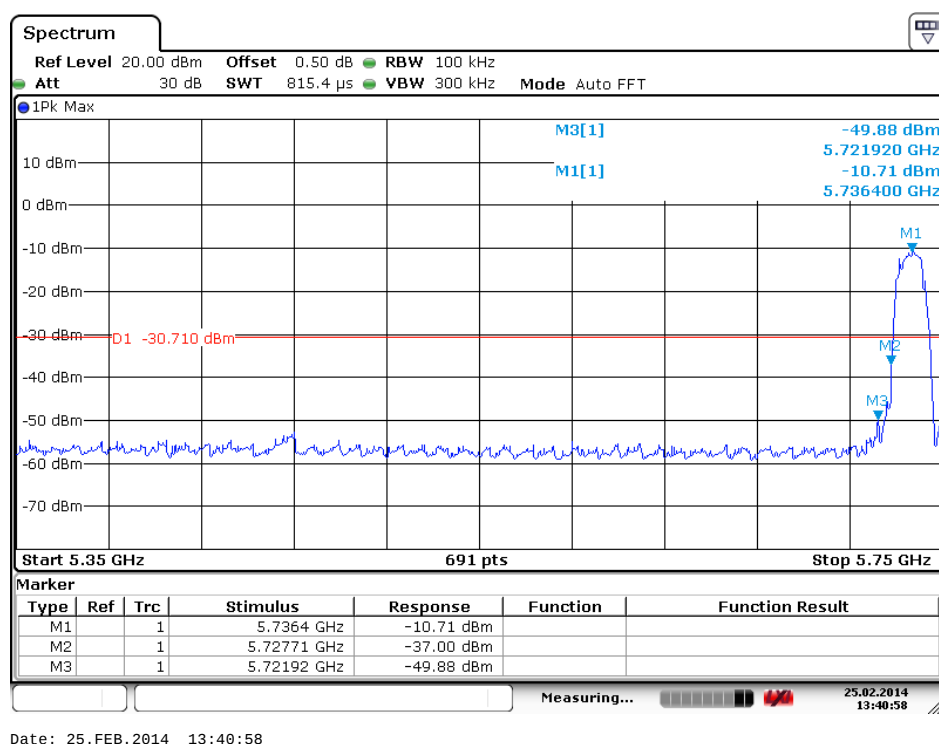
10.6. Test Result

PASS

Antenna A test plot

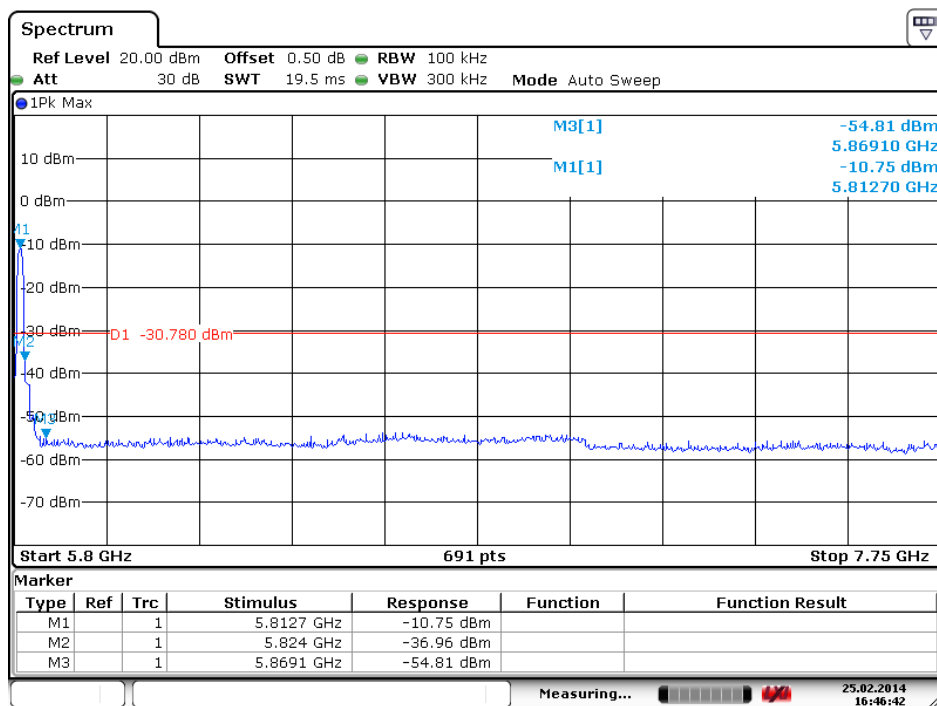


Date: 14.FEB.2014 10:49:52

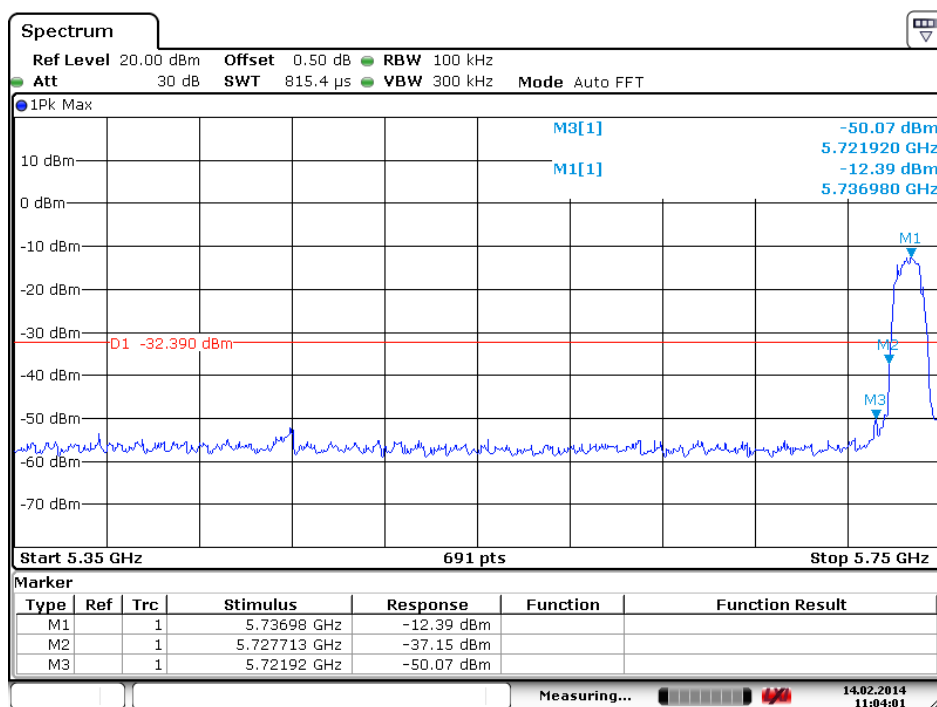


Date: 25.FEB.2014 13:40:58

Antenna B test plot



Date: 25.FEB.2014 16:46:42



Date: 14.FEB.2014 11:04:00

Radiated Band Edge Result

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. we tested radiated band edge of Antenna A and Antenna B, The following test data is the worst case(Antenna A) data which I have recorded
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:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$



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Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: alen #3465

Standard: FCC PK

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5736MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Horizontal

Power Source: AC 120V/60Hz

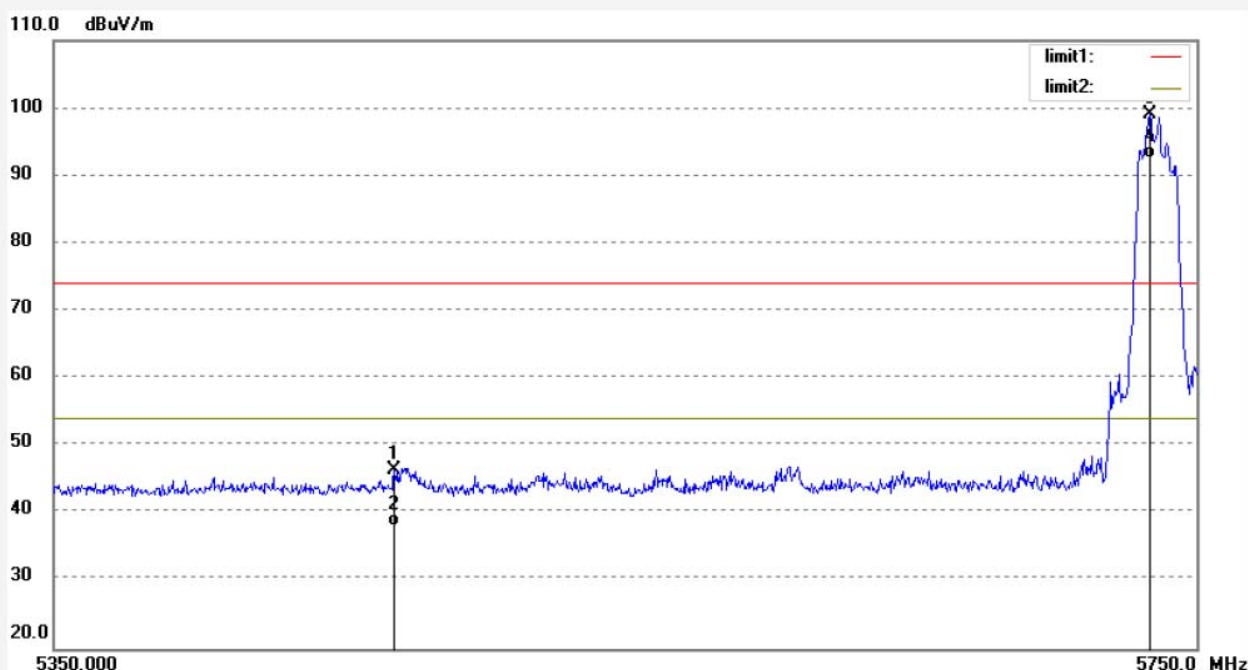
Date: 14/02/13/

Time: 11/25/27

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	5466.400	47.02	-0.63	46.39	74.00	-27.61	peak			
2	5466.400	38.65	-0.63	38.02	54.00	-15.98	AVG			
3	5736.000	99.39	-0.37	99.02			peak			
4	5736.000	92.98	-0.37	92.61			AVG			

Job No.: alen #3466

Standard: FCC PK

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5736MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Vertical

Power Source: AC 120V/60Hz

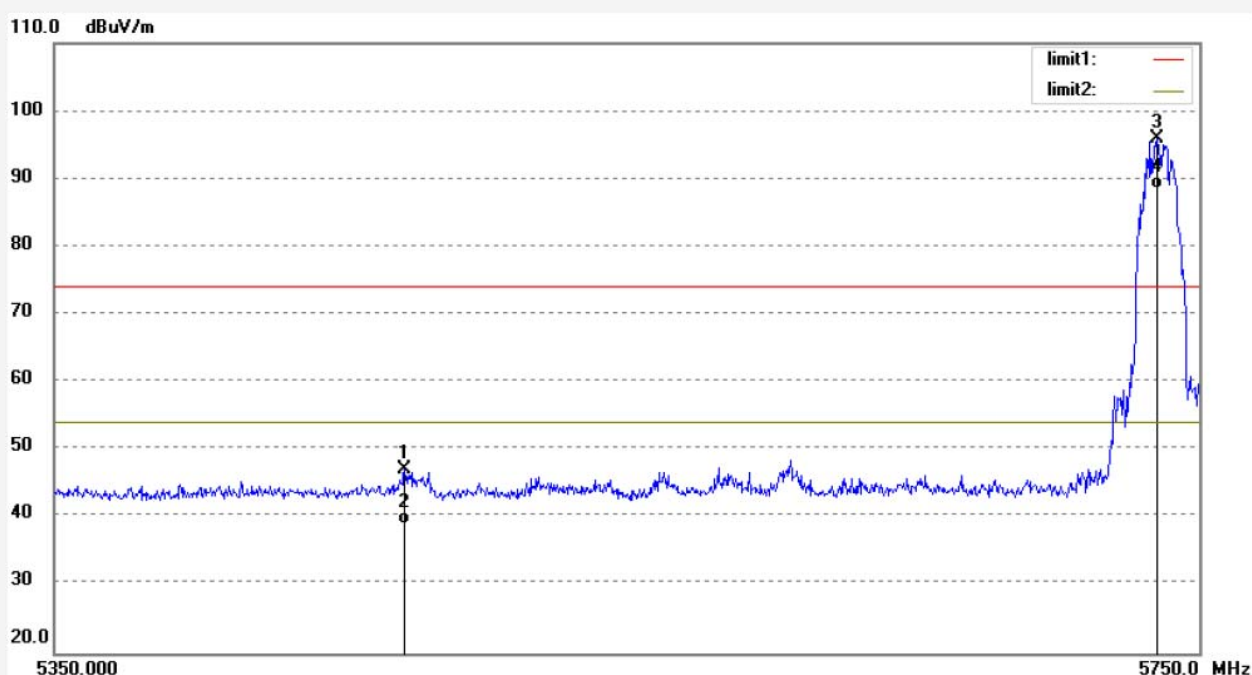
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Time: 11/26/47

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	5469.600	47.71	-0.62	47.09	74.00	-26.91	peak			
2	5469.600	39.56	-0.62	38.94	54.00	-15.06	AVG			
3	5736.000	96.26	-0.36	95.90			peak			
4	5736.000	88.78	-0.36	88.42			AVG			

Job No.: alen #3468

Standard: FCC PK

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5814MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Horizontal

Power Source: AC 120V/60Hz

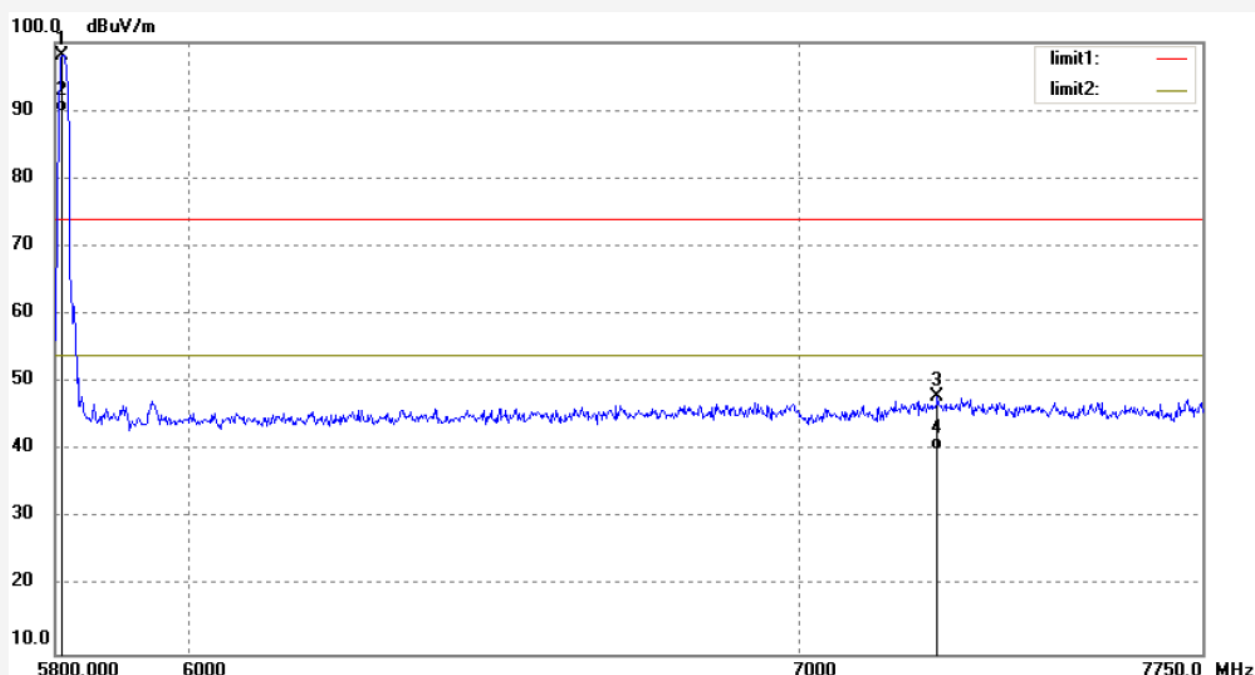
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Time: 11/34/32

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	5814.000	98.43	-0.29	98.14			peak			
2	5814.000	90.10	-0.29	89.81			AVG			
3	7248.850	46.50	1.33	47.83	74.00	-26.17	peak			
4	7248.850	38.65	1.33	39.98	54.00	-14.02	AVG			

Job No.: alen #3467

Standard: FCC PK

Test item: Radiation Test

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

EUT: Indoor/outdoor speaker with bluetooth

Mode: TX 5814MHz

Model: BTW248XBK

Manufacturer: Musilab

Polarization: Vertical

Power Source: AC 120V/60Hz

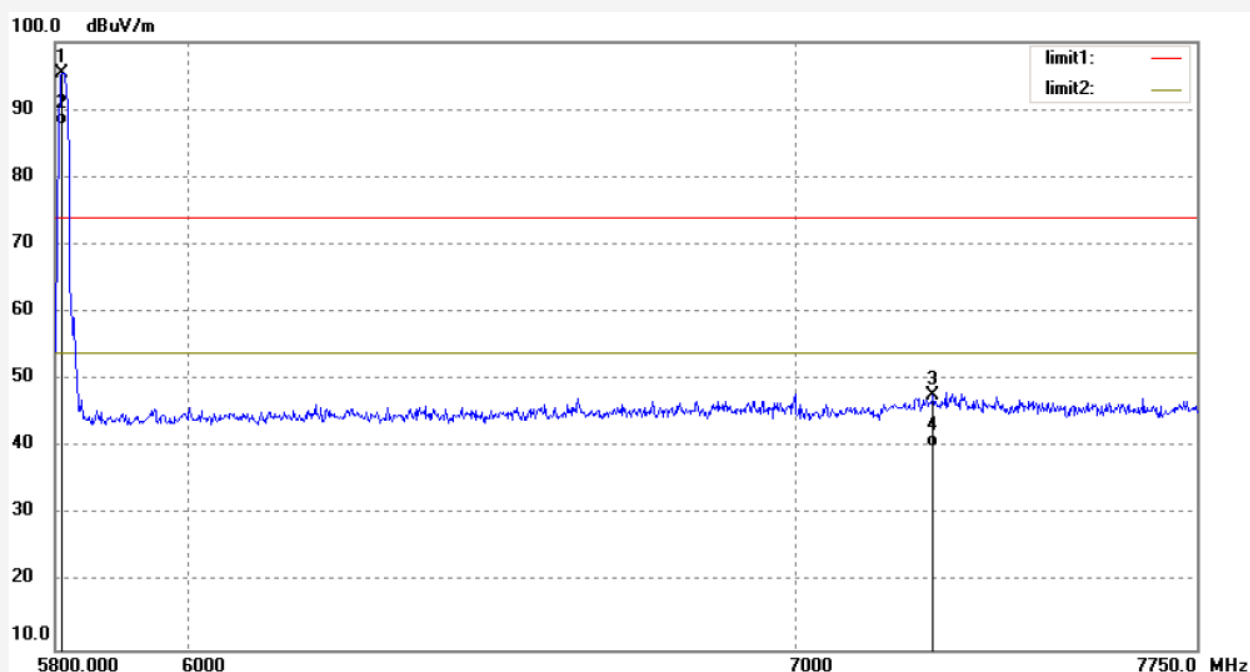
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Time: 11/32/27

Engineer Signature:

Distance: 3m

Note: Report No:ATE20140131



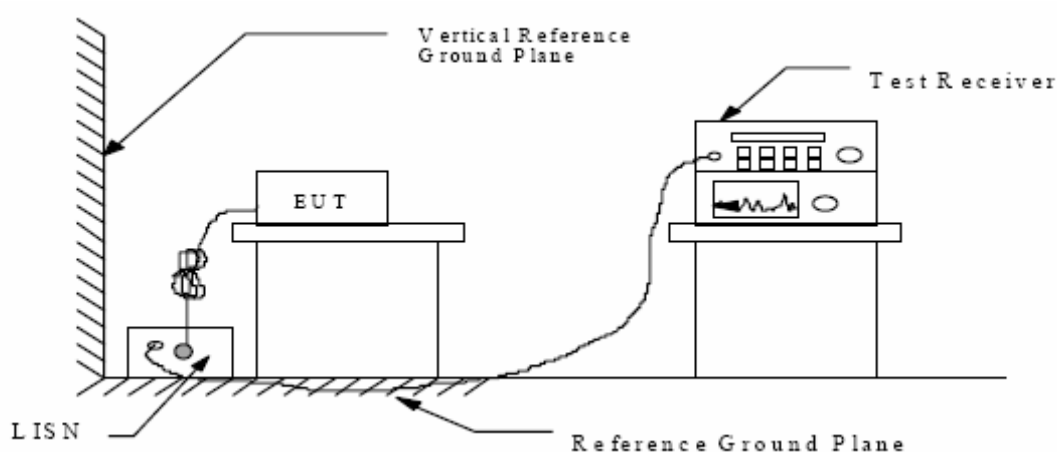
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	5814.000	95.73	-0.29	95.44			peak			
2	5814.000	87.98	-0.29	87.69			AVG			
3	7248.850	46.42	1.33	47.75	74.00	-26.25	peak			
4	7248.850	38.69	1.33	40.02	54.00	-13.98	AVG			

11.AC POWER LINE CONDUCTED EMISSION FOR FCC PART

15 SECTION 15.207(A)

11.1.Block Diagram of Test Setup

11.1.1.Shielding Room Test Setup Diagram



11.2.The Emission Limit

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

Frequency (MHz)	Limit dB(μ V)	
	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.

11.3.Configuration of EUT on Measurement

The equipment is 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.

11.4.Operating Condition of EUT

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

11.4.2.Turn on the power of all equipment.

11.4.3.Let the EUT work in Test mode measure it.

11.5.Test Procedure

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

11.6.Power Line Conducted Emission Measurement Results

PASS.

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

Test mode : 5.8G Operation								
MEASUREMENT RESULT: "A-0210-V02_fin"								
2/10/2014 4:18PM								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.182408	54.70	10.5	64	9.7	QP	L1	GND	
0.449637	44.20	10.7	57	12.7	QP	L1	GND	
0.886326	35.90	10.8	56	20.1	QP	L1	GND	
MEASUREMENT RESULT: "A-0210-V02_fin2"								
2/10/2014 4:18PM								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.183137	38.50	10.5	54	15.8	AV	L1	GND	
0.889871	30.10	10.8	46	15.9	AV	L1	GND	
7.806690	26.50	11.2	50	23.5	AV	L1	GND	
MEASUREMENT RESULT: "A-0210-V01_fin"								
2/10/2014 4:14PM								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.179518	55.30	10.5	65	9.2	QP	N	GND	
1.181465	37.10	10.9	56	18.9	QP	N	GND	
6.217923	28.30	11.2	60	31.7	QP	N	GND	
MEASUREMENT RESULT: "A-0210-V01_fin2"								
2/10/2014 4:14PM								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.182408	38.90	10.5	54	15.5	AV	N	GND	
0.886326	29.00	10.8	46	17.0	AV	N	GND	
6.217923	24.30	11.2	50	25.7	AV	N	GND	

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

The spectral diagrams are attached as below.

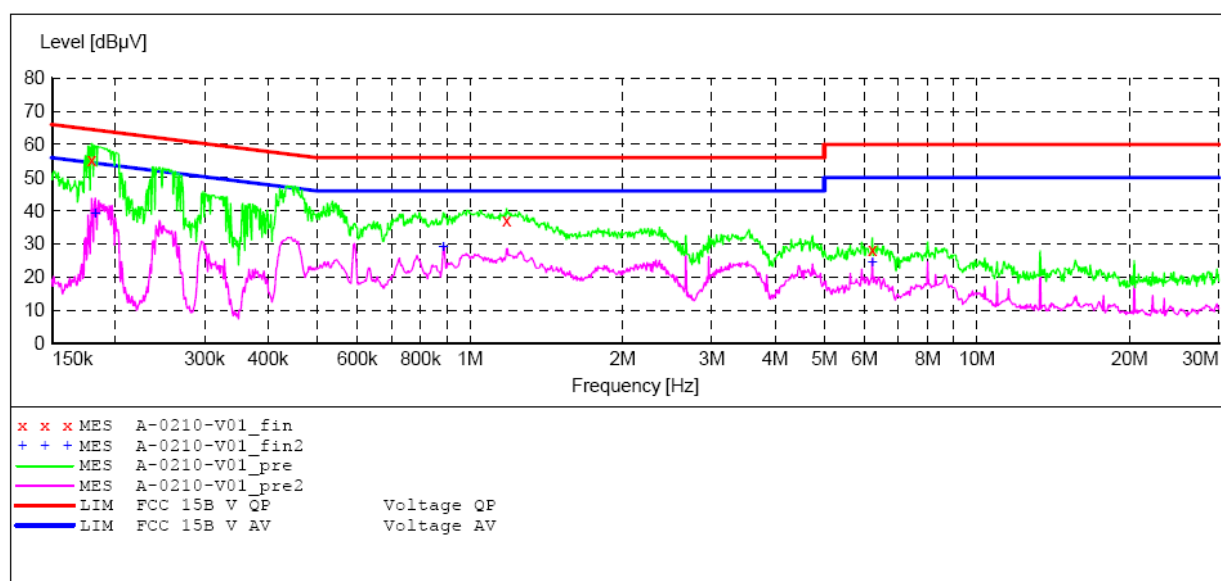
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15

EUT: Indoor/outdoor speaker with bluetooth M/N:BTW248XBK
 Manufacturer: Musilab
 Operating Condition: 5.8G Operation
 Test Site: 1#Shielding Room
 Operator: Alen
 Test Specification: N 120V/60Hz
 Comment: Report No.:ATE20140131
 Start of Test: 2/10/2014 / 4:11:45PM

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

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "A-0210-V01_fin"

2/10/2014 4:14PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.179518	55.30	10.5	65	9.2	QP	N	GND
1.181465	37.10	10.9	56	18.9	QP	N	GND
6.217923	28.30	11.2	60	31.7	QP	N	GND

MEASUREMENT RESULT: "A-0210-V01_fin2"

2/10/2014 4:14PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.182408	38.90	10.5	54	15.5	AV	N	GND
0.886326	29.00	10.8	46	17.0	AV	N	GND
6.217923	24.30	11.2	50	25.7	AV	N	GND

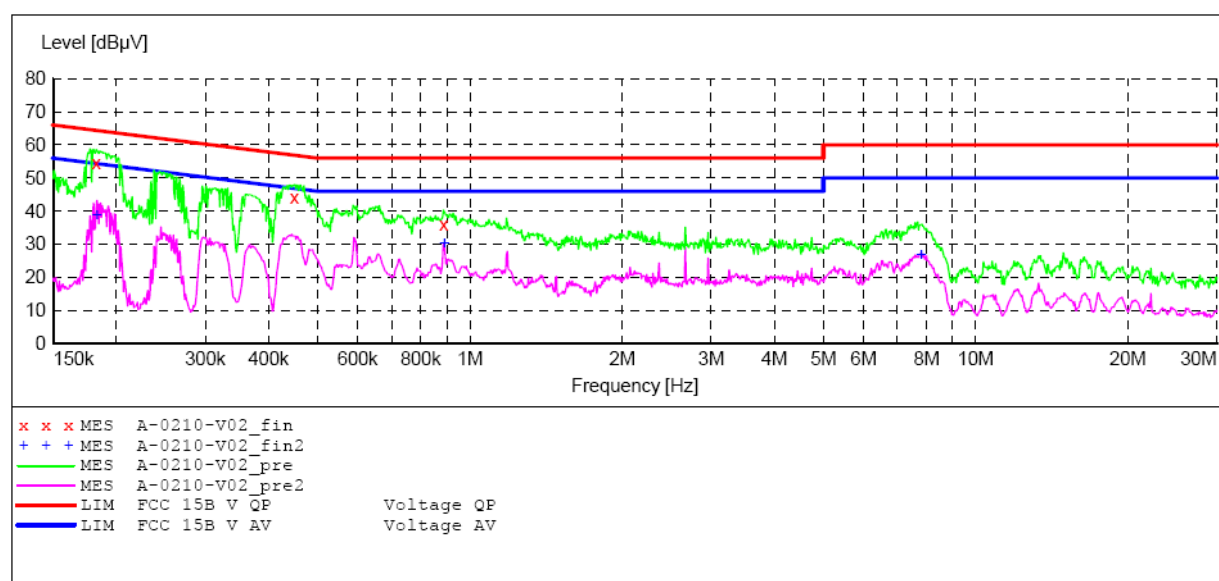
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15

EUT: Indoor/outdoor speaker with bluetooth M/N:BTW248XBK
 Manufacturer: Musilab
 Operating Condition: 5.8G Operation
 Test Site: 1#Shielding Room
 Operator: Alen
 Test Specification: L 120V/60Hz
 Comment: Report No.:ATE20140131
 Start of Test: 2/10/2014 / 4:15:17PM

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

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "A-0210-V02_fin"

2/10/2014 4:18PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.182408	54.70	10.5	64	9.7	QP	L1	GND
0.449637	44.20	10.7	57	12.7	QP	L1	GND
0.886326	35.90	10.8	56	20.1	QP	L1	GND

MEASUREMENT RESULT: "A-0210-V02_fin2"

2/10/2014 4:18PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.183137	38.50	10.5	54	15.8	AV	L1	GND
0.889871	30.10	10.8	46	15.9	AV	L1	GND
7.806690	26.50	11.2	50	23.5	AV	L1	GND

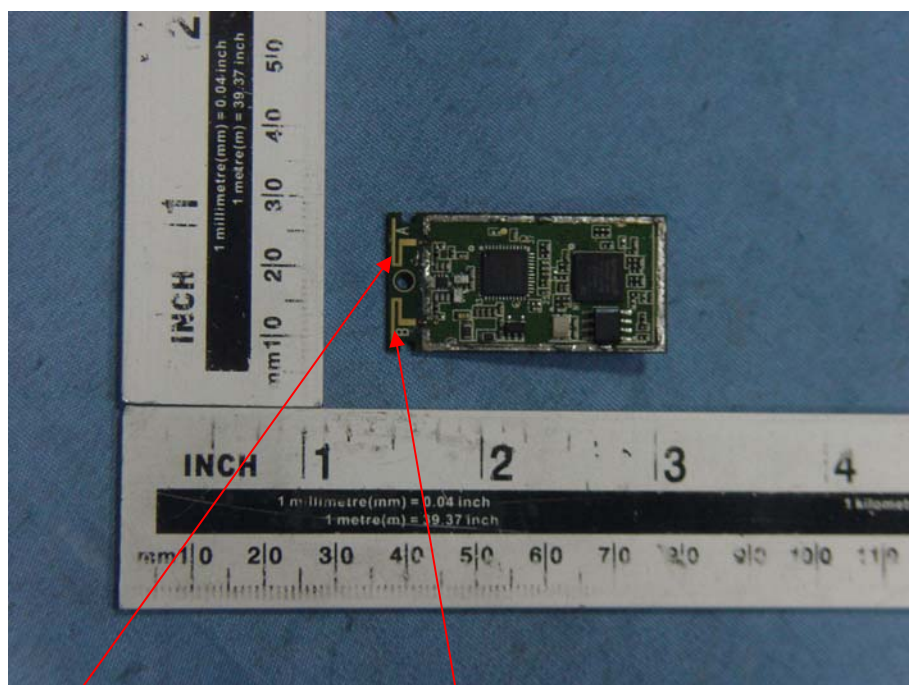
12.ANTENNA REQUIREMENT

12.1.The Requirement

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

12.2.Antenna Construction

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



Antenna A

Antenna B