FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

TCL Technoly Electronics (Huizhou) Co., Ltd.

System Name : Sound Bar
(Active Speaker System and Active Subwoofer)

System Model Number : HT-CT180(SA-CT180 and SA-WCT180)

Brand Name : Sony

EUT Name	EUT Model No.
Active Speaker System	SA-CT180

FCC ID: ZVASB000013

Prepared for : TCL Technoly Electronics (Huizhou) Co., Ltd.
Secion 37, Zhongkai High-tech Development Zone, Huizhou City, Guangdong Province, P.R. China.

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Report Number : ACS-F14354
Date of Test : Oct.15~Nov.04, 2014
Date of Report : Dec.05, 2014

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TEST REPORT CERTIFICATION

Applicant : TCL Technoly Electronics (Huizhou) Co., Ltd.

Manufacturer : Sony Corporation

System Name : Sound Bar(Active Speaker System and Active Subwoofer)

System Model Number : HT-CT180(SA-CT180 and SA-WCT180)

Brand Name : Sony

FCC ID : ZVASB000013

(A) EUT Name & EUT Model Number :

EUT Name	EUT Model No.
Active Speaker System	SA-CT180

(B) SERIAL NO. : N/A
(C)POWER SUPPLY : AC 120V/60Hz
(D)TEST VOLTAGE : AC 120V/60Hz

Tested for comply with:
FCC Rules and Regulations Part 15 Subpart C: 2013
Test procedure used:
ANSI C63.10:2009

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC Part 15 Subpart C requirements. The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC and IC requirements. This report contains data that are not covered by the NVLAP accreditation.

This Report is made under FCC Part 2.1075. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Oct.15~Nov.04, 2014 Report of date: Dec.05, 2014

Prepared by : Kayli He
Kayli He / Assistant

Reviewed by :
Sunny Lu/ Assistant Manager

AUDIX® 信華科技（深圳）有限公司
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report
Signature: David Jin

Approved & Authorized Signer :
David Jin / Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	**Standard**	**Results**
Power Line Conducted Emission Test	FCC Part 15: 15.207 ANSI C63.10 :2009	PASS
Radiated Emission Test	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10 :2009	PASS
Conducted Spurious Emissions	FCC Part 15: 15.247(a)(1) ANSI C63.10 :2009	PASS
6dB Bandwidth Test	FCC Part 15: 15.215 ANSI C63.10 :2009	PASS
Maximum Peak Output Power Test	FCC Part 15: 15.247(b)(1) ANSI C63.10 :2009	PASS
Band Edge Compliance Test	FCC Part 15: 15.247(d) ANSI C63.10 :2009	PASS
Power Spectral Density Test	FCC Part 15: 15.247(d) ANSI C63.10 :2009	PASS

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

System Name : Sound Bar(Active Speaker System and Active Subwoofer)

System Model Number : HT-CT180(SA-CT180 and SA-WCT180)

Brand Name : Sony

EUT Name & EUT Model Number :

Brand Name	EUT Model No.
Active Speaker System	SA-CT180

FCC ID : ZVASB000013

Operation frequency : 2402-2480MHz; 2403-2478MHz

Modulation : Bluetooth V3.0+EDR: GFSK, π/4DQPSK, 8DPSK;
Bluetooth V4.0: GFSK;
General 2.4GHz wireless: GFSK

Radio : Bluetooth V3.0+EDR;
Bluetooth V4.0;
General 2.4GHz wireless

Antenna : Integrated PCB Antenna, 2.0dBi PK gain

Applicant : TCL Technoly Electronics (Huizhou) Co., Ltd.
Secion 37, Zhongkai High-tech Development Zone, Huizhou City, Guangdong Province, P.R. China

Manufacturer : Sony Corporation
1-7-1 Konan, Minato-Ku, Tokyo, 108-0075 Japan

Power Cord : Unshielded, Undetectable, 1.2m

Remote Controller : Brand: Sony, Model Number: RMT-AH100U

Date of Test : Oct.15~Nov.04, 2014

Date of Receipt : Sep.27, 2014

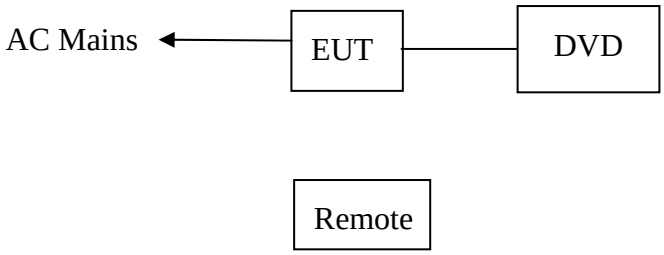
Sample Type : Prototype production

The Product covered in this report was Sound bar; This product consists of Active Speaker System (SA-CT180) and Active Subwoofer (SA-WCT180)

2.2. Tested Supporting System Details

	Description	ACS No.	Manufacturer	Model	Serial Number	Approved type
1.	DVD	ACS-EMC-DVD01	DENON	DVD-3910	4098400342E	☐FCC ID ☐BSMI ID
		Power cord：Unshielded, Detachabled , 1.8m Data Cable：Shielded, Detachabled, 1.8m				

2.3. Block Diagram of connection between EUT and simulators



(EUT: Active Speaker System)

2.4. Test information

The test software “bluesuite.exe” was used to control EUT work in Continuous TX mode, and select test channel.

Tested mode, channel, and data rate information			
Mode	data rate (Mbps)	Channel	Frequency (MHz)
Tx Mode GFSK modulation	1	Low :CH 0	2402
	1	Middle: CH19	2440
	1	High: CH39	2480

2.5. Test Facility

Site Description

Name of Firm	:	Audix Technology (Shenzhen) Co., Ltd. No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park,Nantou, Shenzhen, Guangdong, China
3m Anechoic Chamber	:	Certificated by FCC, USA Registration Number: 90454 Valid Date: Feb.22, 2015
3m & 10m Anechoic Chamber	:	Certificated by FCC, USA Registration Number: 794232 Valid Date: Oct.31, 2015
EMC Lab.	:	Certificated by Industry Canada Registration Number: IC 5183A-1 Valid Date: May.14, 2017 Certificated by DAkkS, Germany Registration No: D-PL-12151-01-00 Valid Date: Dec.15, 2016 Accredited by NVLAP, USA NVLAP Code: 200372-0 Valid Date: Mar.31, 2015

2.6. Measurement Uncertainty (95% confidence levels, k=2)

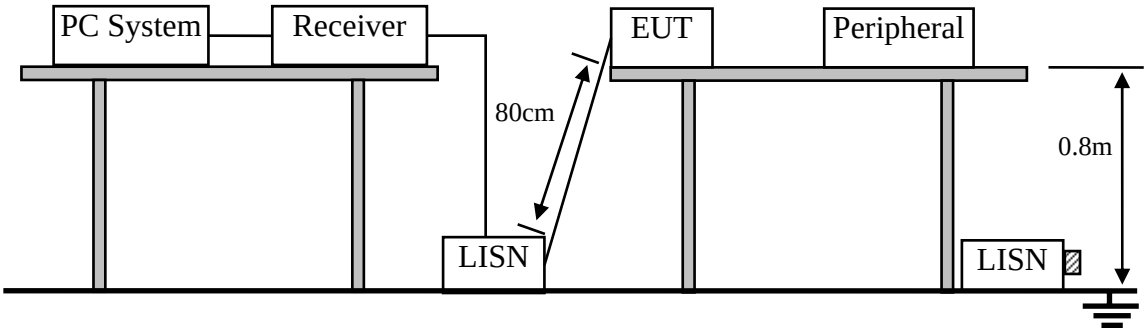
Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	3.10dB (150KHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	3.22 dB(30~200MHz, Polarize: H)
	3.23 dB(30~200MHz, Polarize: V)
	3.49 dB(200M~1GHz, Polarize: H)
	3.39 dB(200M~1GHz, Polarize: V)
Uncertainty for Radiation Emission test in 3m chamber (1GHz-18GHz)	4.97 dB (1~6GHz, Distance: 3m)
	4.99 dB (6~18GHz, Distance: 3m)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.57 dB
Uncertainty for Conduction Spurious emission test	2.00 dB
Uncertainty for Output power test	0.73 dB
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.038 %
Uncertainty for test site temperature and humidity	0.6℃
	3%

3. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	1# Shielding Room	AUDIX	N/A	N/A	Apr.17, 14	1 Year
2.	Test Receiver	Rohde & Schwarz	ESHS10	838693/001	Sep.29, 14	1 Year
3.	L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	100429	Jan.22, 14	1 Year
4.	L.I.S.N.#3	Kyoritsu	KNW-242C	8-1920-1	Apr.28, 14	1 Year
5.	Terminator	Hubersuhner	50Ω	No. 1	Apr.28, 14	1 Year
6.	Terminator	Hubersuhner	50Ω	No. 2	Apr.28, 14	1 Year
7.	RF Cable	Hubersuhner	RG58	0100.6954.20#	Jan.22, 14	1Year
8.	Coaxial Switch	Anritsu	MP59B	6200298346	Apr.28, 14	1 Year
9.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	101838	Jan.22, 14	1 Year

3.2. Block Diagram of Test Setup



:50Ω Terminator

3.3. Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.4. Configuration of EUT on Test

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

3.4.1. Active Speaker System (EUT)

Model Number : SA-CT180
Serial Number : N/A

3.5. Operating Condition of EUT

3.5.1. Setup the EUT and simulator as shown as Section 3.2.

3.5.2. Turn on the power of all equipment.

3.5.3. Let the EUT work in test mode (TX Mode) and measure it.

3.6. Test Procedure

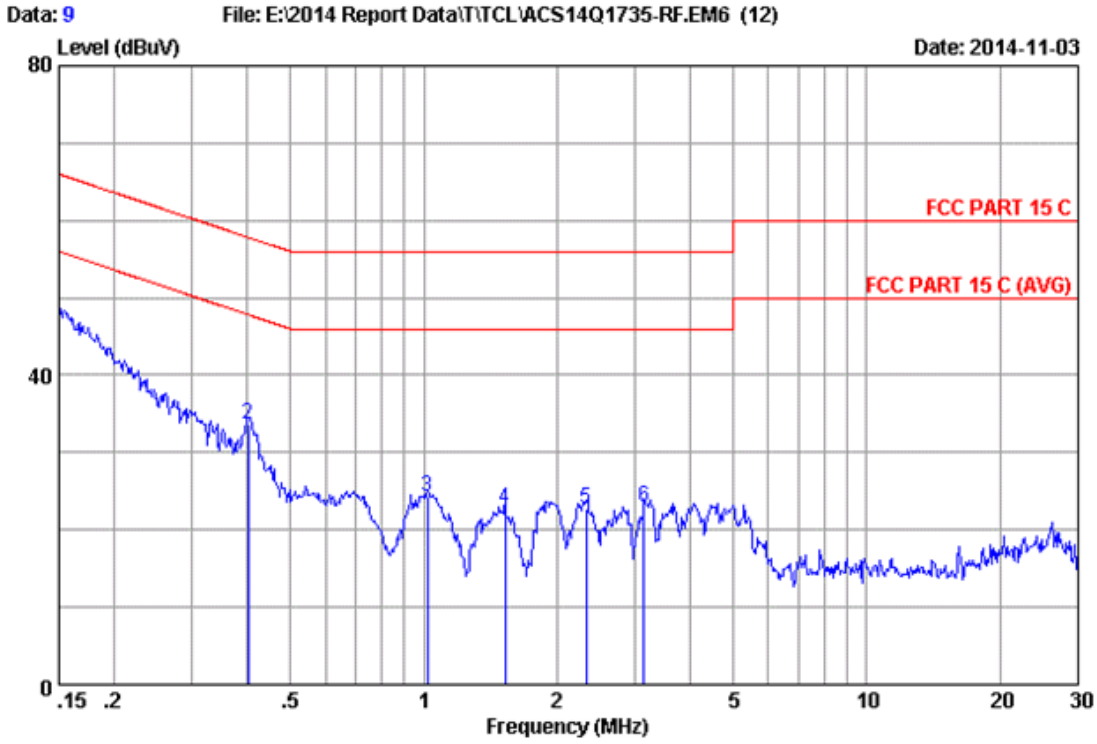
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4-2009 on conducted Emission test.

The bandwidth of test receiver (R&S TEST RECEIVER ESHS10) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 3.7.

3.7. Conducted Emission at Mains Terminals Test Results

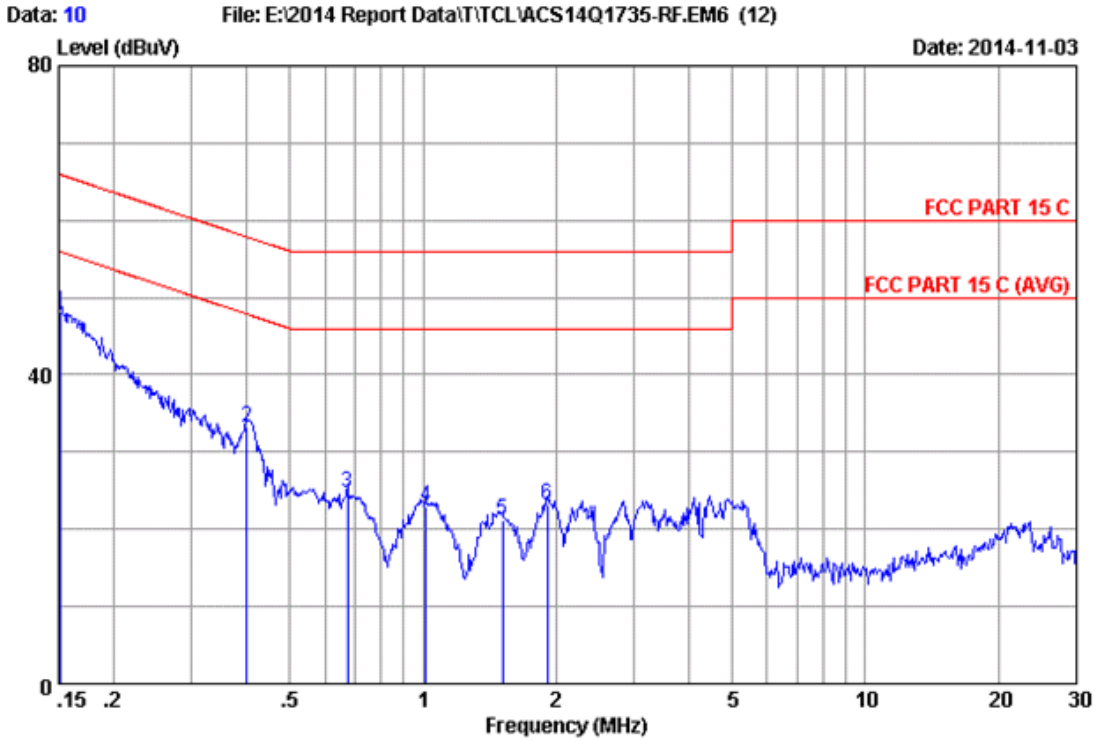
PASS. (All emissions not reported below are too low against the prescribed limits.)



Site no :1# Conduction Data No :9
Dis./Ant. :2014 KNW-242C-VA
Limit :FCC PART 15 C
Env./Ins. :24.1*C/47% Engineer :Kevin_He
EUT :Active Speaker System M/N: SA-CT180
Power Rating :AC 120V/60Hz
Test Mode :TX Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.34	9.87	37.74	47.95	66.00	18.05	QP
2	0.40187	0.34	9.88	23.43	33.65	57.81	24.16	QP
3	1.021	0.41	9.89	13.88	24.18	56.00	31.82	QP
4	1.527	0.41	9.90	12.37	22.68	56.00	33.32	QP
5	2.321	0.42	9.91	12.44	22.77	56.00	33.23	QP
6	3.140	0.44	9.92	12.61	22.97	56.00	33.03	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit) +Reading.
2.If the average limit is met when useing a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



Site no :1# Conduction Data No :10
Dis./Ant. :2014 KNW-242C-VB
Limit :FCC PART 15 C
Env./Ins. :24.1*C/47% Engineer :Kevin_He
EUT :Active Speaker System M/N:SA-CT180
Power Rating :AC 120V/60Hz
Test Mode :TX Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15160	0.06	9.87	38.30	48.23	65.91	17.68	QP
2	0.39974	0.04	9.88	23.37	33.29	57.86	24.57	QP
3	0.67544	0.05	9.89	14.81	24.75	56.00	31.25	QP
4	1.016	0.06	9.89	13.02	22.97	56.00	33.03	QP
5	1.511	0.06	9.90	11.32	21.28	56.00	34.72	QP
6	1.908	0.06	9.91	13.28	23.25	56.00	32.75	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit) +Reading.
2.If the average limit is met when useing a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

4. RADIATED EMISSION MEASUREMENT

4.1.Test Equipment

Frequency rang: 30~1000MHz

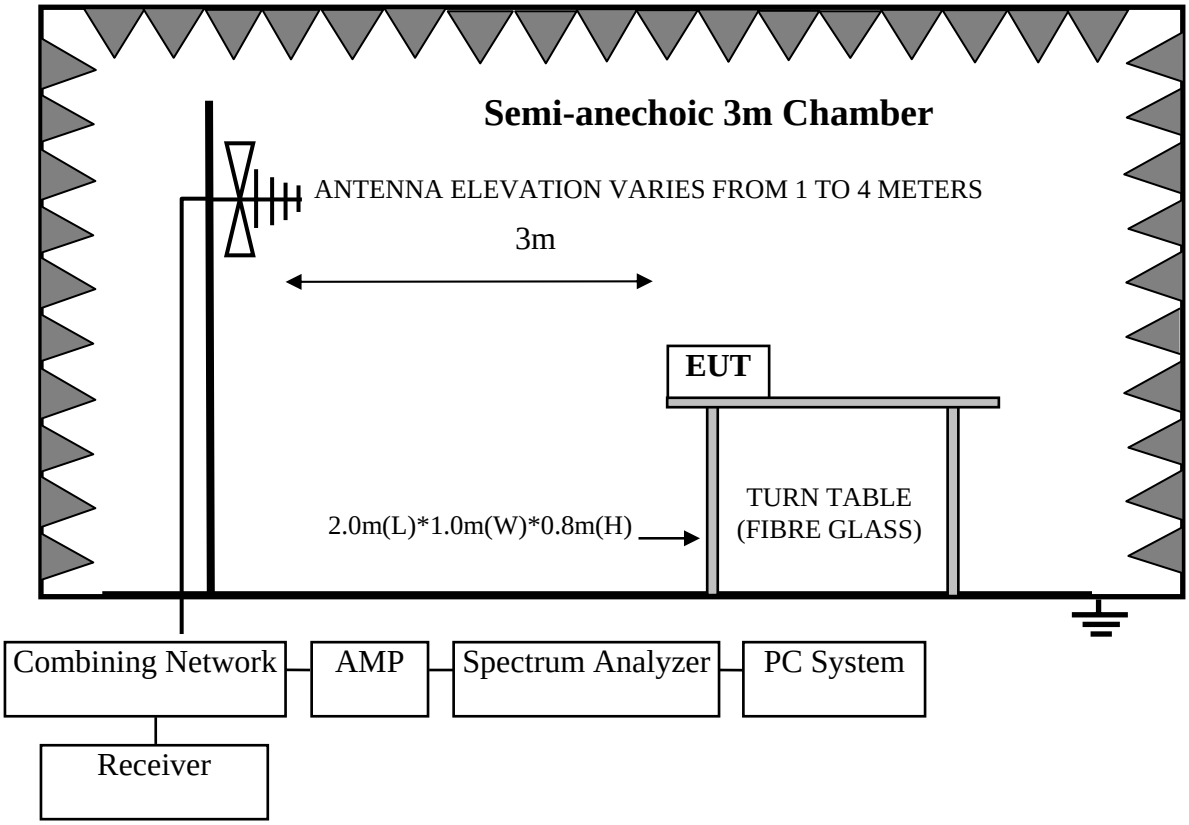
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber	AUDIX	N/A	N/A	Nov.24, 13	1 Year
2.	EMI Spectrum	Agilent	E4407B	MY41440292	Apr. 28,14	1 Year
3.	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	Apr. 28,14	1 Year
4.	Amplifier	HP	8447D	2648A04738	Apr. 28,14	1 Year
5.	Bilog Antenna	Schaffner	CBL6111C	35375	Apr. 08,14	1 Year
6.	RF Cable	MIYAZAKI	CFD400-NL	3# Chamber No.1	Apr. 28,14	1 Year
7.	Coaxial Switch	Anritsu	MP59B	M74389	Apr. 28,14	1 Year

Frequency rang: above 1000MHz

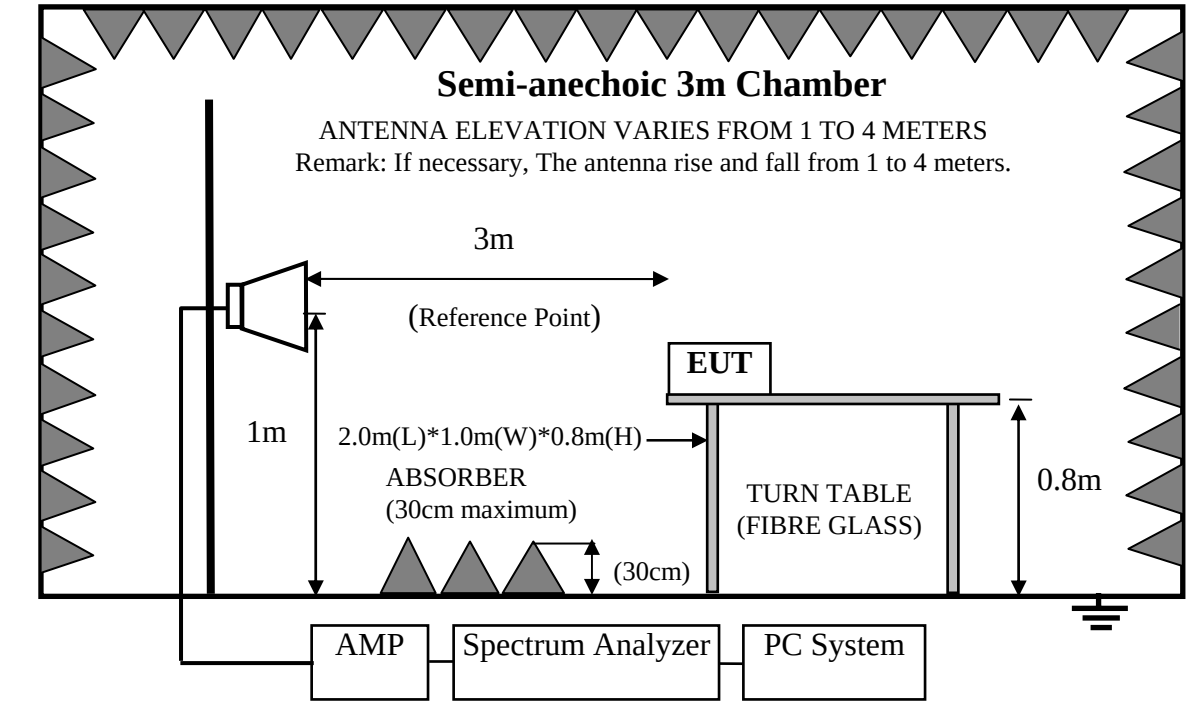
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber	AUDIX	N/A	N/A	Nov.02, 14	1 Year
2.	Spectrum Analyzer	Agilent	E4407B	MY41440292	Apr. 28,14	1 Year
3.	Horn Antenna	ETS	3115	9607-4877	Sep.20, 14	1 Year
4.	Amplifier	Agilent	8449B	3008A00863	Apr. 28,14	1 Year
5.	RF Cable	Hubersuhner	SUCOFLEX106	77977/6	Apr. 28,14	1 Year
6.	RF Cable	Hubersuhner	SUCOFLEX106	28616/2	Apr. 28,14	1 Year
7.	Horn Antenna	ETS	3116	00060089	Sep.20, 14	1 Year

4.2.Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range 1GHz-25GHz



4.3.Radiated Emission Limit Standard: FCC 15.209

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000MHz	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark： (1) Emission level dBμV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

(4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

4.4.EUT Configuration on Test

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

4.4.1. Active Speaker System (EUT)

Model Number : SA-CT180
Serial Number : N/A

4.5.Operating Condition of EUT

4.5.1. Setup the EUT and simulator as shown as Section 4.2.

4.5.2. Turned on the power of all equipment.

4.5.3. Let EUT work in Tx mode.

4.6. Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 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 polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10-2009 on radiated emission Test.

This test was performed with EUT in X, Y, Z position, and the worse case was found when EUT in X position as the test photo indicated.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's RBW is set at 1MHz and VBW is set at 3MHz for peak emissions measurement and RBW is set at 1MHz, VBW is set at 10Hz for average emission measurement above 1GHz.

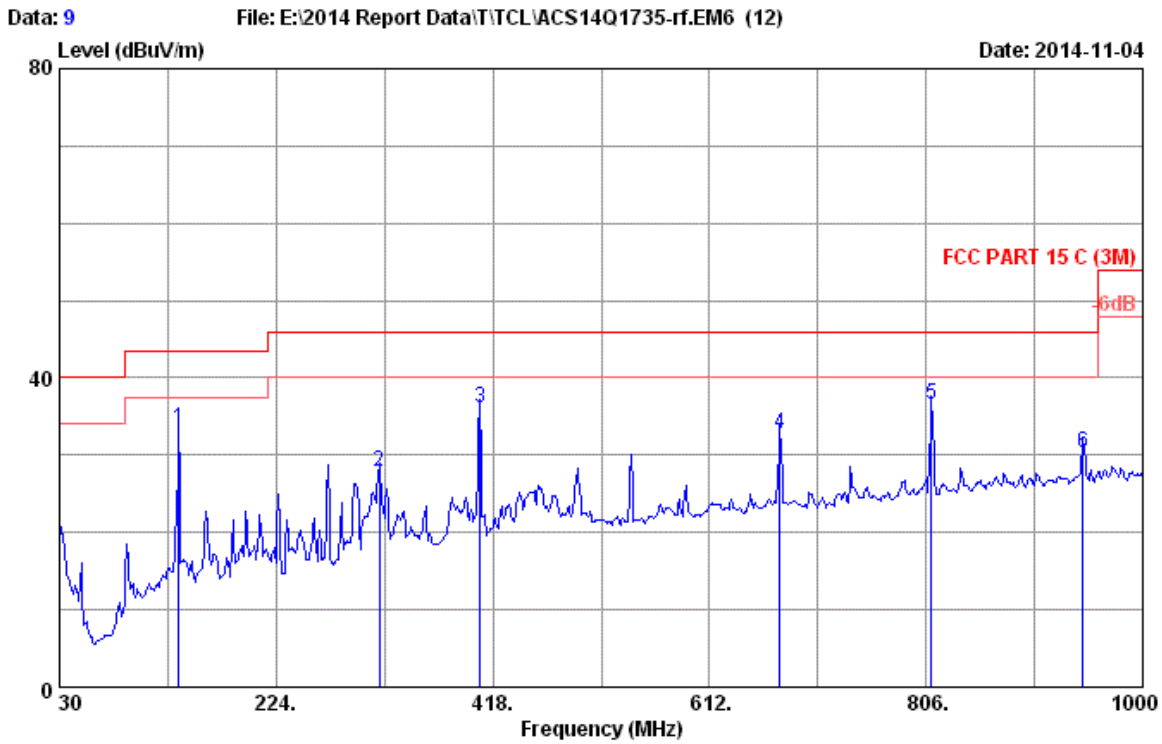
The duty cycle of the test signal is 100%.

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

4.7. Radiated Emission Test Results

PASS.

Frequency: 30MHz~1GHz

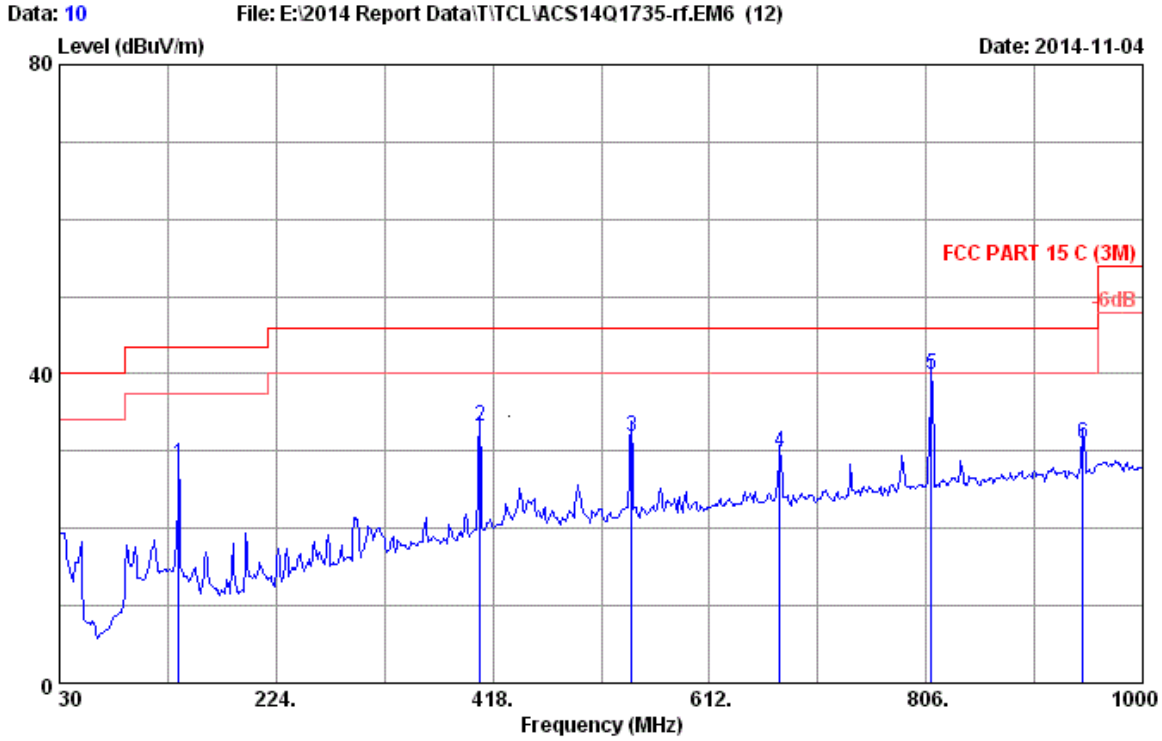


Site no. : 3m Chamber
Dis. / Ant. : 3m 2014 CBL6112D 35375
Limit : FCC PART 15 C (3M)
Env. / Ins. : 23.7*C/51%
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : TX Mode
M/N: SA-CT180

Data no. : 9
Ant. pol. : HORIZONTAL
Engineer : donjon_huang

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	136.700	12.19	1.44	19.78	33.41	43.50	10.09	QP
2	316.150	14.22	2.37	11.33	27.92	46.00	18.08	QP
3	406.360	17.15	2.83	16.22	36.20	46.00	9.80	QP
4	675.050	20.00	4.02	8.82	32.84	46.00	13.16	QP
5	810.850	21.00	4.52	11.07	36.59	46.00	9.41	QP
6	946.650	22.23	5.04	3.10	30.37	46.00	15.63	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



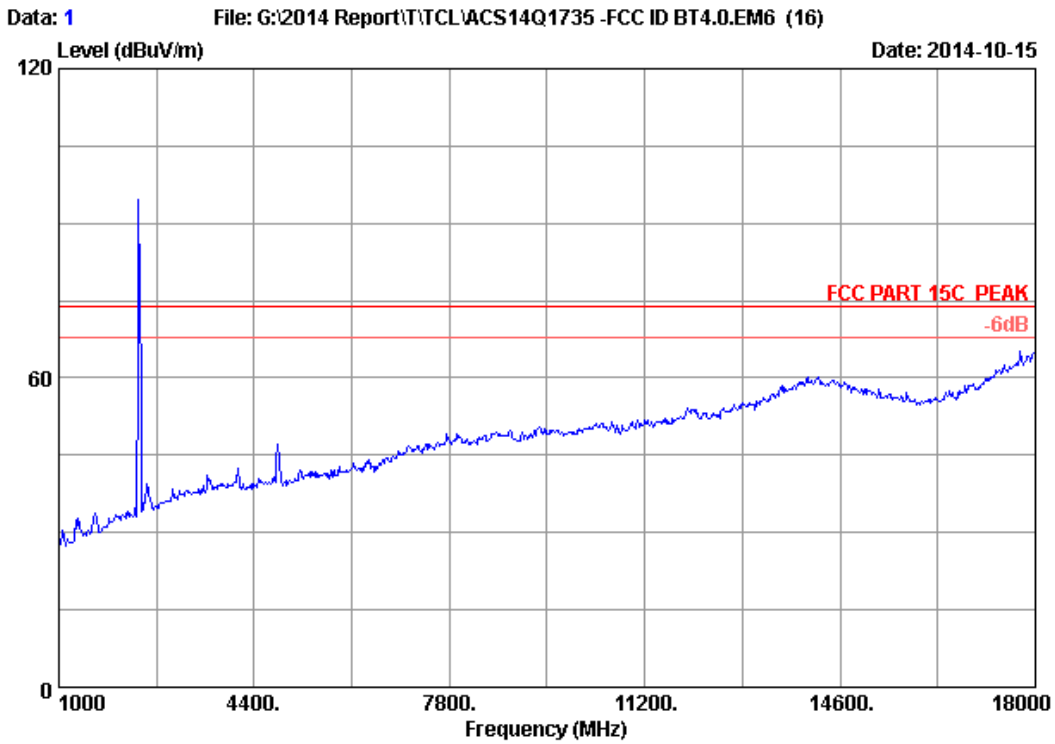
Site no. : 3m Chamber
Dis. / Ant. : 3m 2014 CBL6112D 35375
Limit : FCC PART 15 C (3M)
Env. / Ins. : 23.7*C/51%
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : TX Mode
M/N: SA-CT180

Data no. : 10
Ant. pol. : VERTICAL
Engineer : donjon_huang

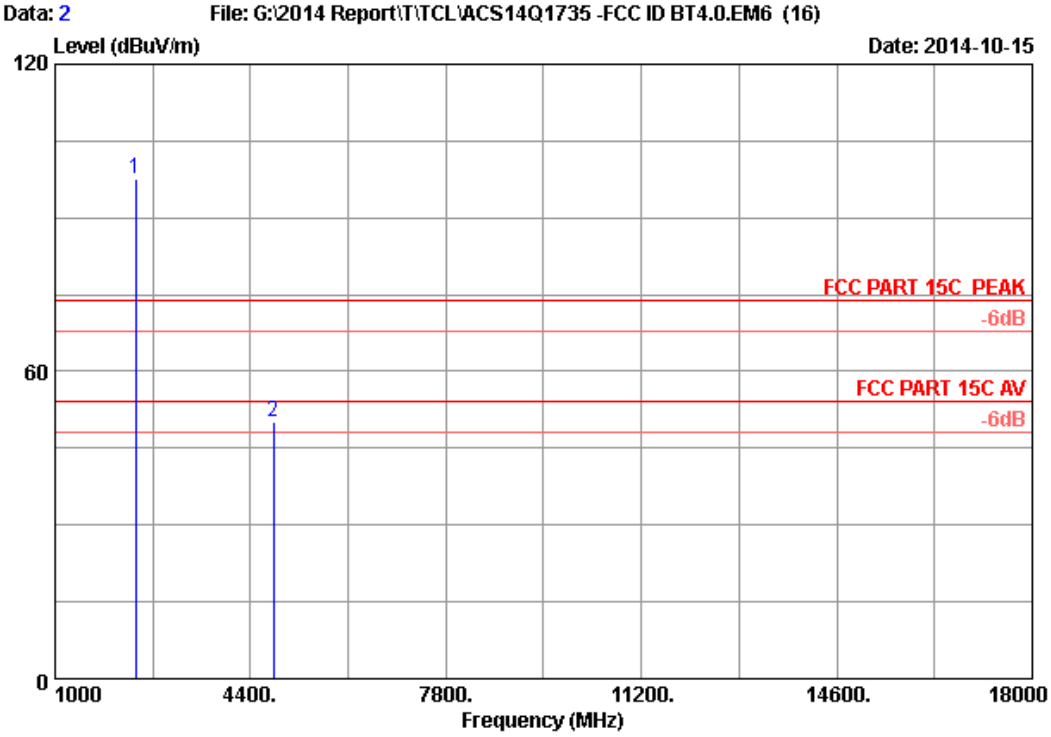
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	136.700	12.19	1.44	14.68	28.31	43.50	15.19	QP
2	406.360	17.15	2.83	13.23	33.21	46.00	12.79	QP
3	542.160	18.69	3.44	9.78	31.91	46.00	14.09	QP
4	675.050	20.00	4.02	5.82	29.84	46.00	16.16	QP
5	810.850	21.00	4.52	14.36	39.88	46.00	6.12	QP
6	946.650	22.23	5.04	3.61	30.88	46.00	15.12	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Frequency: 1GHz~18GHz



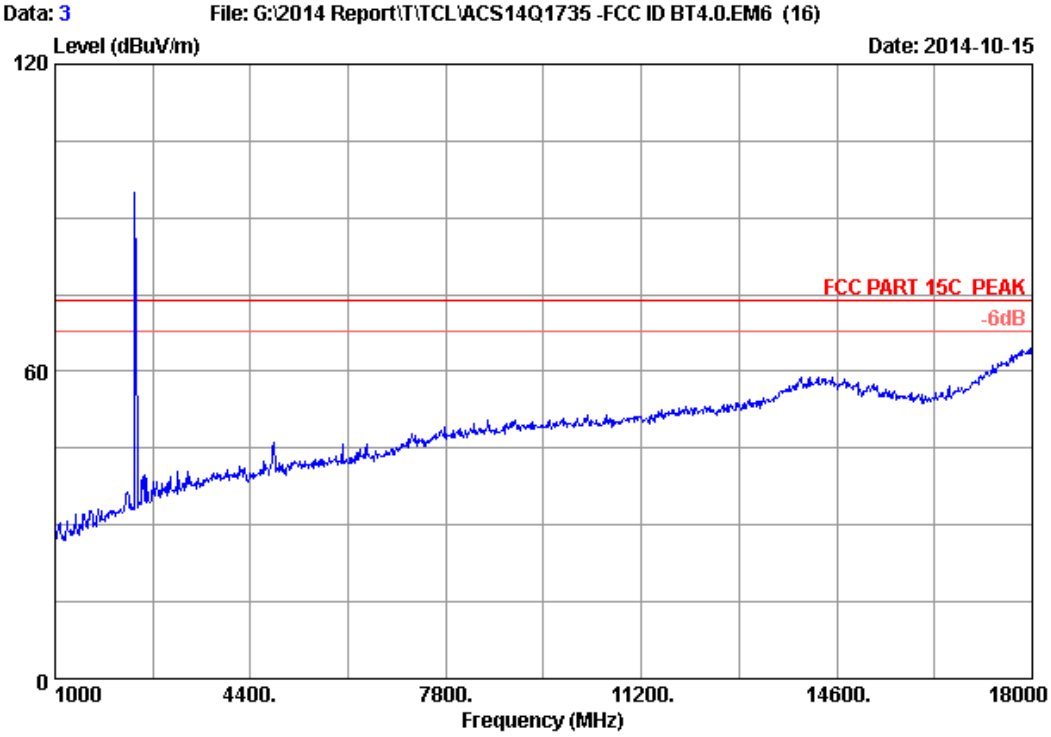

```
Site no.      : 3m Chamber                        Data no.   : 1
Dis. / Ant.   : 3m   2014 3115 (4580)        Ant. pol. : HORIZONTAL
Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 24*C/56%                     Engineer   : Kobe-Huang
EUT           : Active Speaker System
Power rating  : AC 120V/60Hz
Test Mode     : GFSK 2402MHz
M/N           : SA-CT180
```



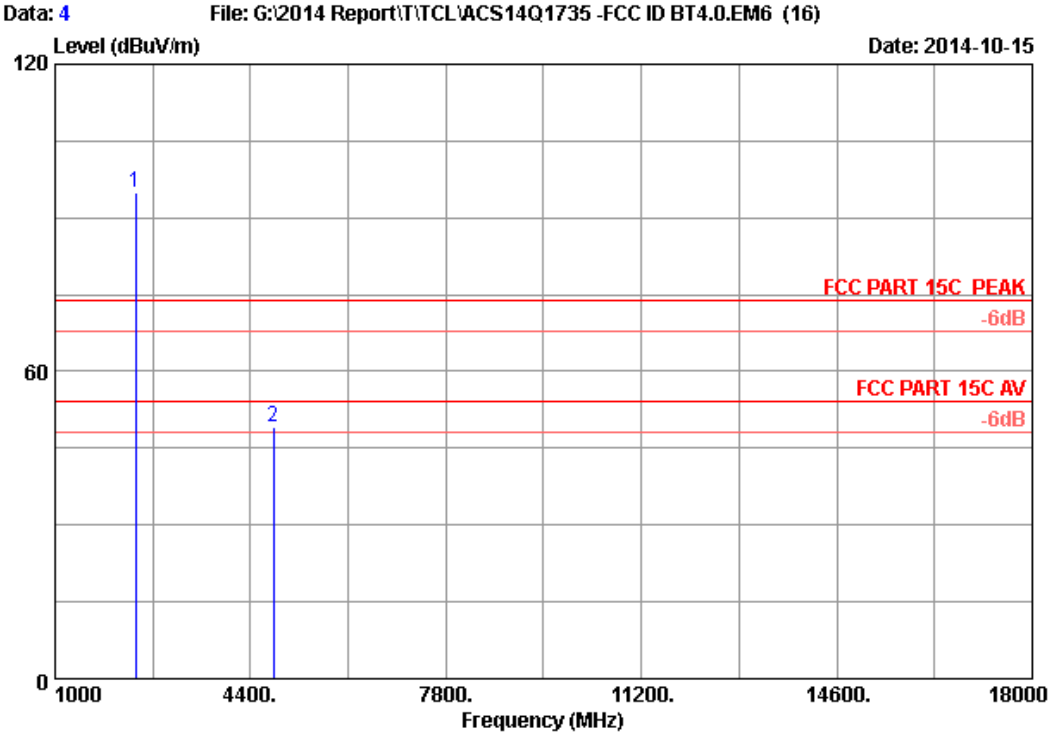
Site no. : 3m Chamber Data no. : 2
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56% Engineer : Kobe-Huang
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2402MHz
M/N : SA-CT180

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.000	28.18	5.80	35.70	99.41	97.69	74.00	-23.69	Peak
2	4804.000	32.85	8.56	35.70	44.44	50.15	74.00	23.85	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



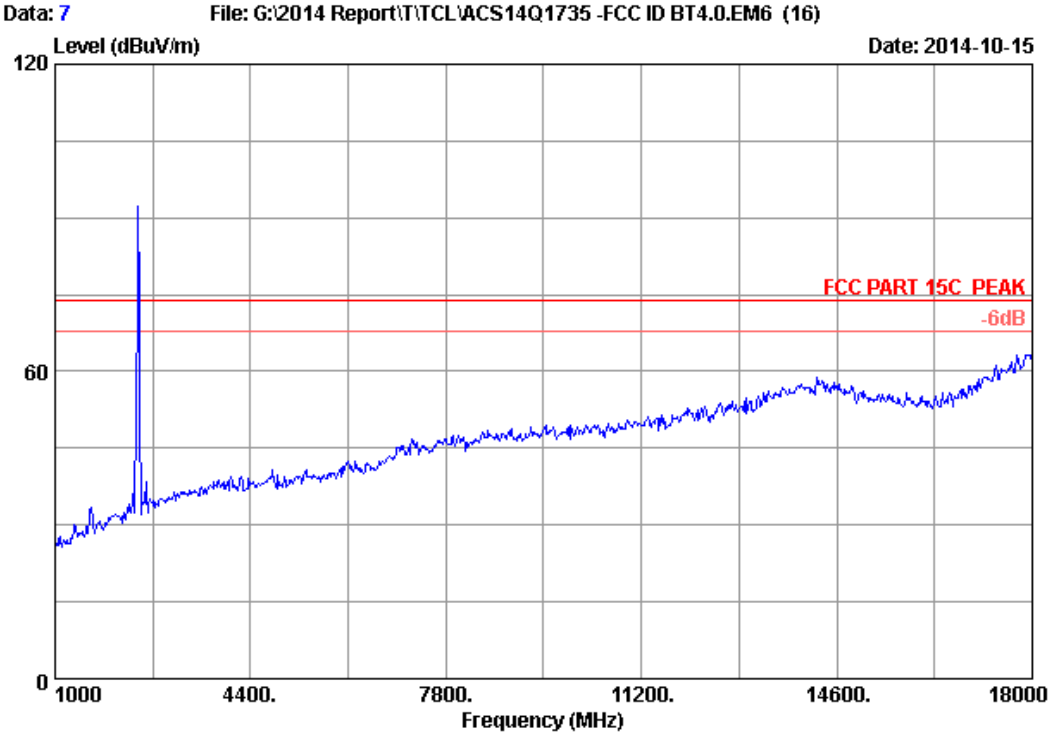
Site no.	: 3m Chamber	Data no.	: 3
Dis. / Ant.	: 3m 2014 3115 (4580)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 24*C/56%	Engineer	: Kobe-Huang
EUT	: Active Speaker System		
Power rating	: AC 120V/60Hz		
Test Mode	: GFSK 2402MHz		
M/N	: SA-CT180		



Site no. : 3m Chamber Data no. : 4
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56% Engineer : Kobe-Huang
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2402MHz
M/N : SA-CT180

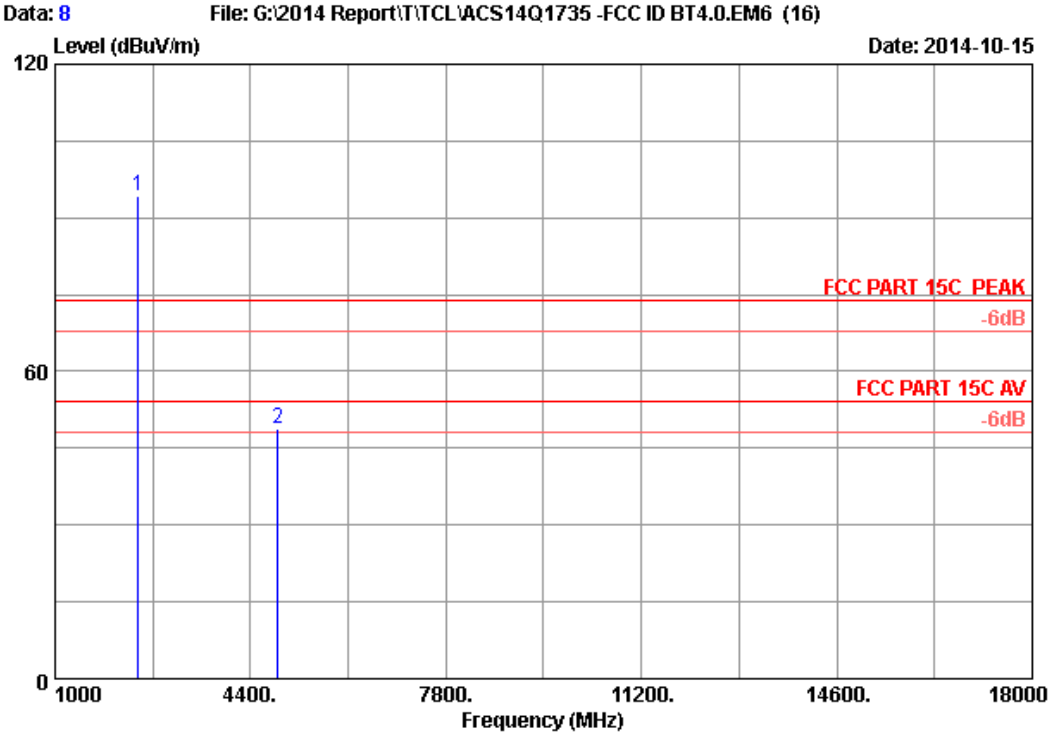
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.000	28.18	5.80	35.70	96.64	94.92	74.00	-20.92	Peak
2	4804.000	32.85	8.56	35.70	43.52	49.23	74.00	24.77	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber
Dis. / Ant. : 3m 2014 3115 (4580)
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56%
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2440MHz
M/N : SA-CT180

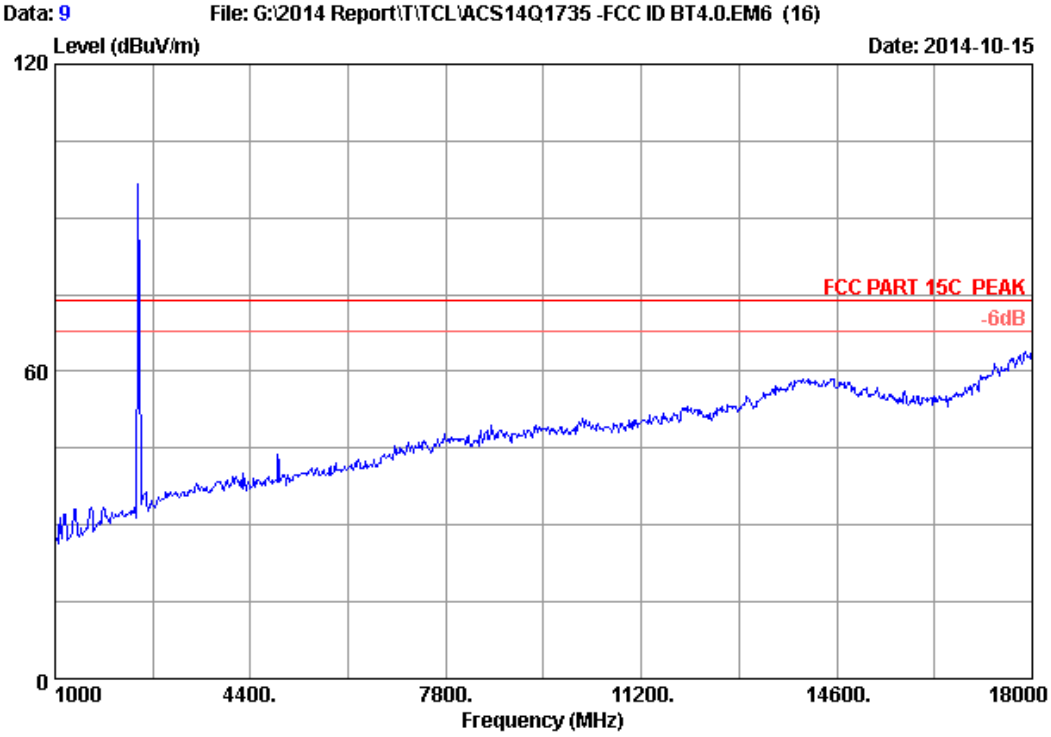
Data no. : 7
Ant. pol. : VERTICAL
Engineer : Kobe-Huang



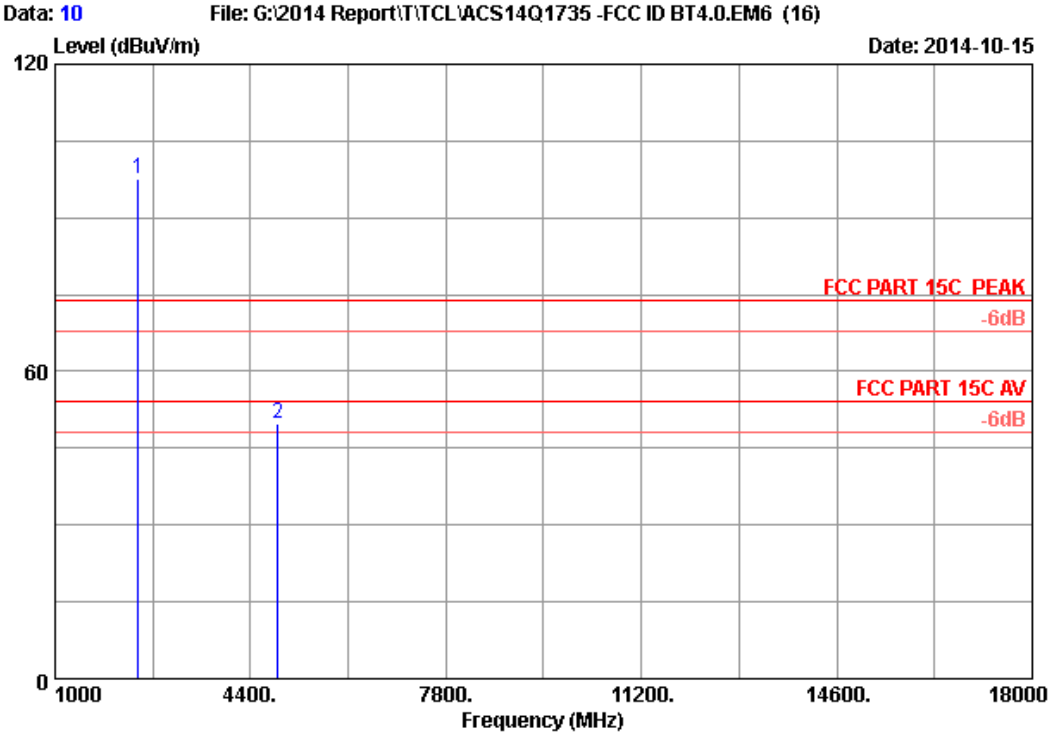
Site no. : 3m Chamber Data no. : 8
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56% Engineer : Kobe-Huang
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2440MHz
M/N : SA-CT180

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.000	28.27	5.86	35.70	95.70	94.13	74.00	-20.13	Peak
2	4876.000	32.98	8.64	35.70	42.77	48.69	74.00	25.31	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



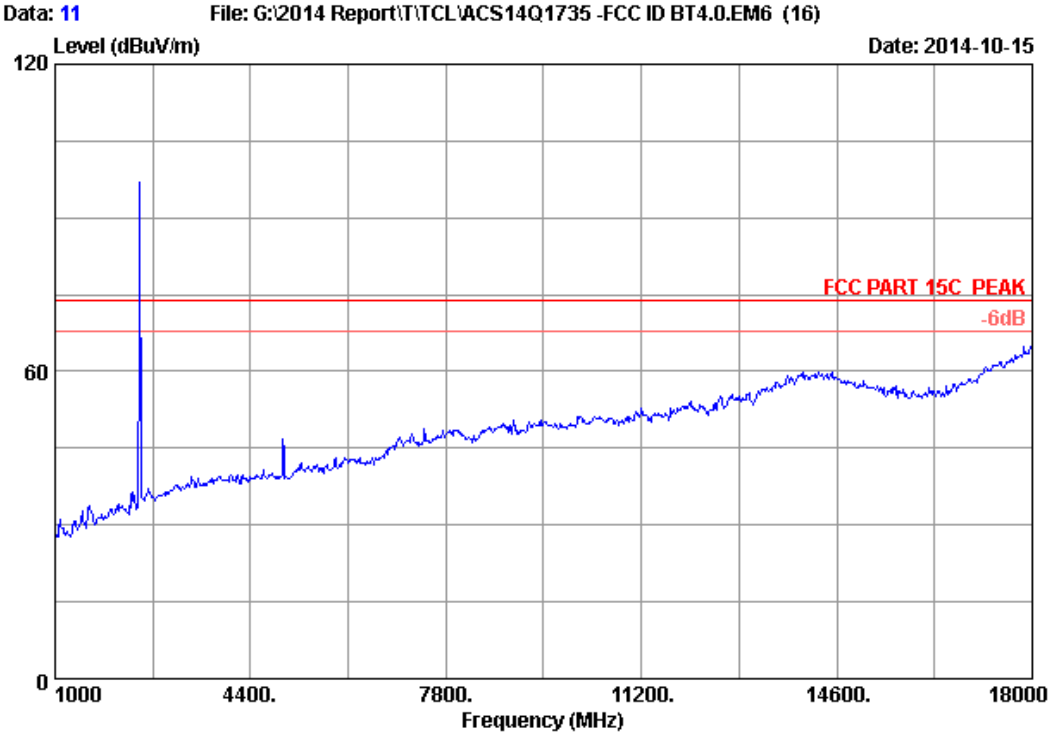
Site no.	: 3m Chamber	Data no.	: 9
Dis. / Ant.	: 3m 2014 3115 (4580)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 24*C/56%	Engineer	: Kobe-Huang
EUT	: Active Speaker System		
Power rating	: AC 120V/60Hz		
Test Mode	: GFSK 2440MHz		
M/N	: SA-CT180		



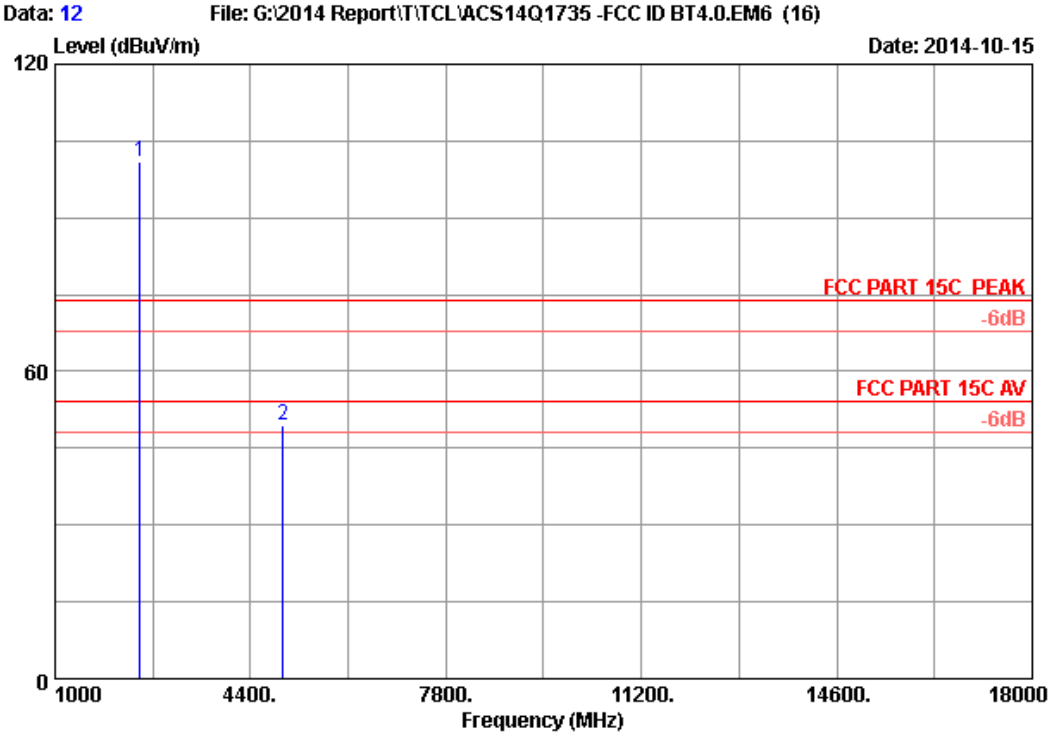
Site no. : 3m Chamber Data no. : 10
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56% Engineer : Kobe-Huang
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2440MHz
M/N : SA-CT180

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.000	28.27	5.86	35.70	99.29	97.72	74.00	-23.72	Peak
2	4880.000	32.98	8.64	35.70	43.81	49.73	74.00	24.27	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



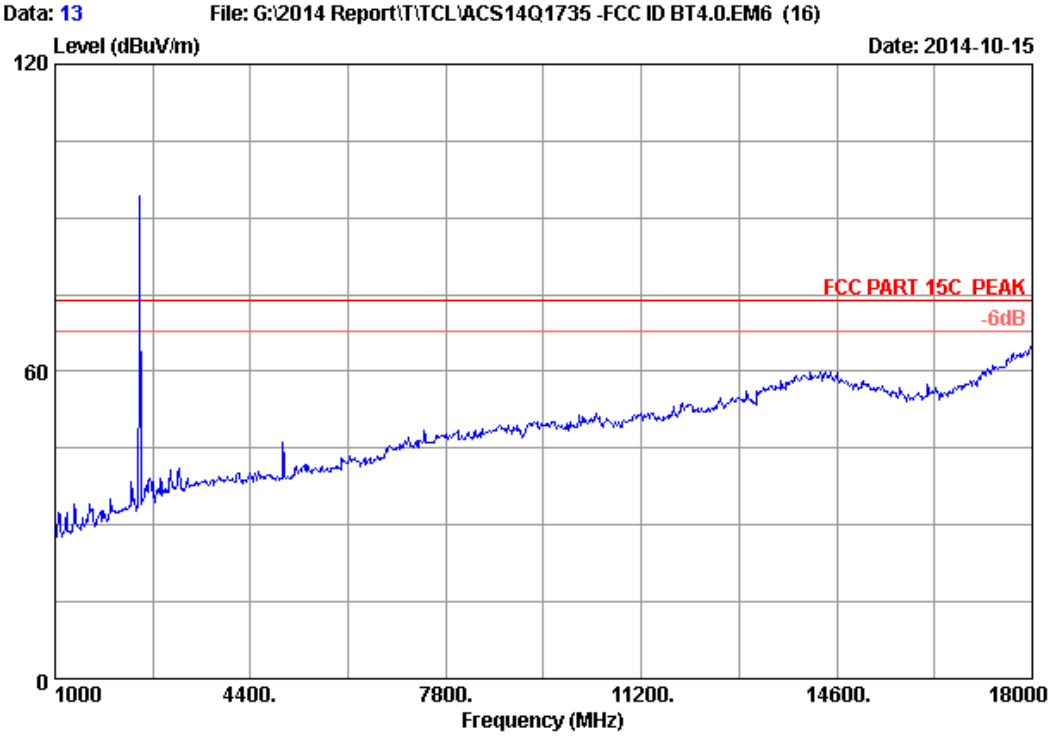

```
Site no.      : 3m Chamber                        Data no.   : 11
Dis. / Ant.   : 3m   2014 3115 (4580)        Ant. pol. : HORIZONTAL
Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 24*C/56%                     Engineer   : Kobe-Huang
EUT           : Active Speaker System
Power rating  : AC 120V/60Hz
Test Mode     : GFSK 2480MHz
M/N           : SA-CT180
```



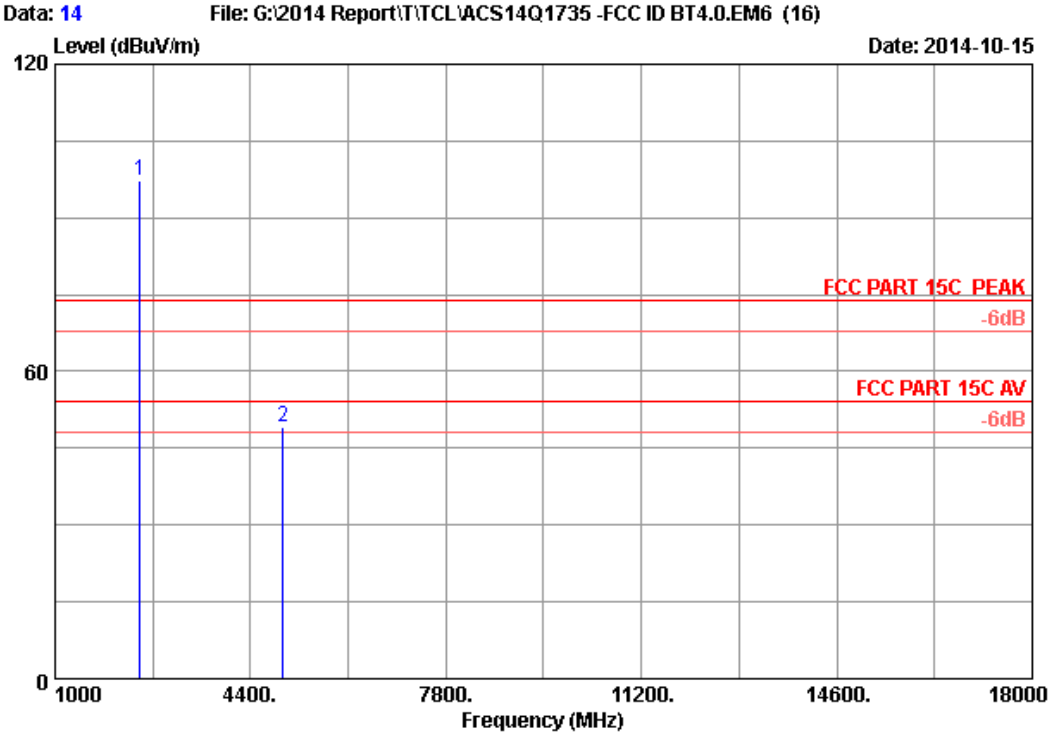
Site no. : 3m Chamber Data no. : 12
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56% Engineer : Kobe-Huang
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2480MHz
M/N : SA-CT180

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	28.36	5.91	35.70	102.21	100.78	74.00	-26.78	Peak
2	4960.000	33.13	8.72	35.70	43.48	49.63	74.00	24.37	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



Site no.	: 3m Chamber	Data no.	: 13
Dis. / Ant.	: 3m 2014 3115 (4580)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 24*C/56%	Engineer	: Kobe-Huang
EUT	: Active Speaker System		
Power rating	: AC 120V/60Hz		
Test Mode	: GFSK 2480MHz		
M/N	: SA-CT180		



Site no. : 3m Chamber Data no. : 14
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56% Engineer : Kobe-Huang
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2480MHz
M/N : SA-CT180

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	28.36	5.91	35.70	98.86	97.43	74.00	-23.43	Peak
2	4960.000	33.13	8.72	35.70	43.00	49.15	74.00	24.85	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

5. CONDUCTED SPURIOUS EMISSIONS

5.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	Sep.29, 14	1 Year
2.	Attenuator	Agilent	8491B	MY39262165	Apr.24,14	1 Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	Apr.24,14	1 Year

5.2.Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

5.3.Test Procedure

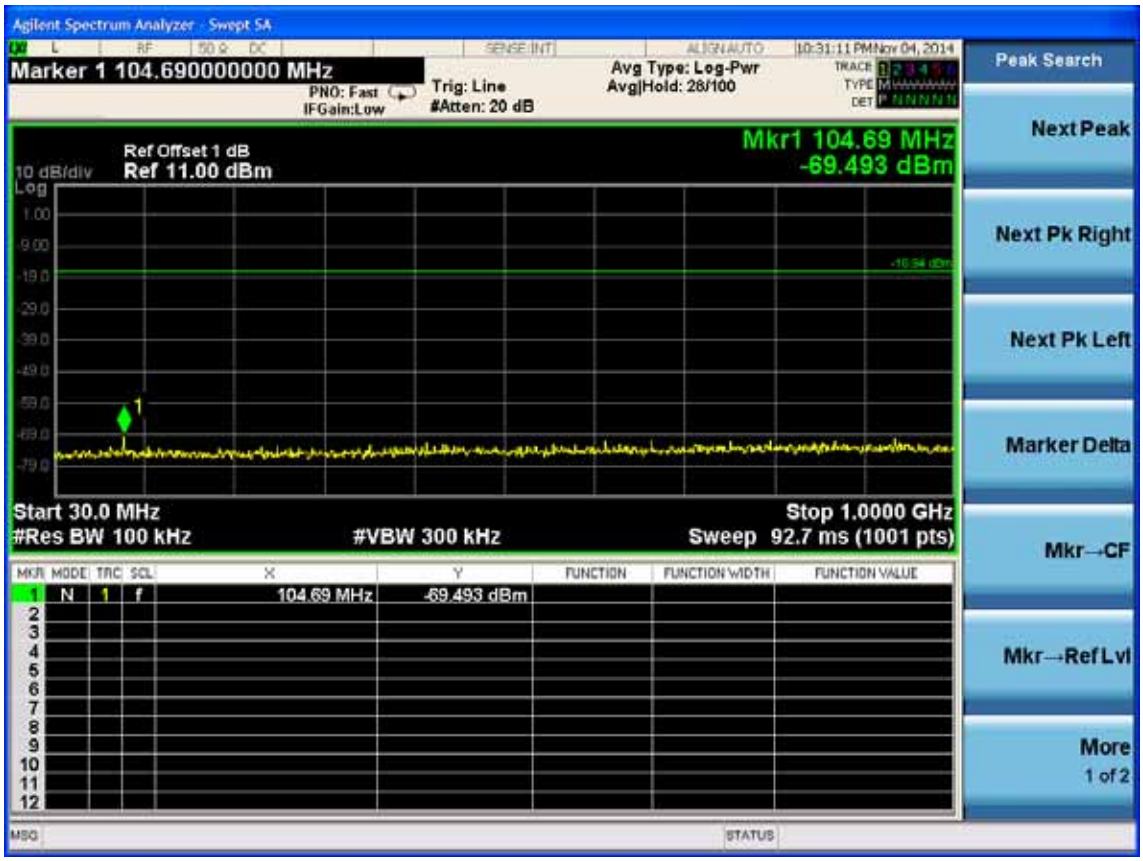
The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.

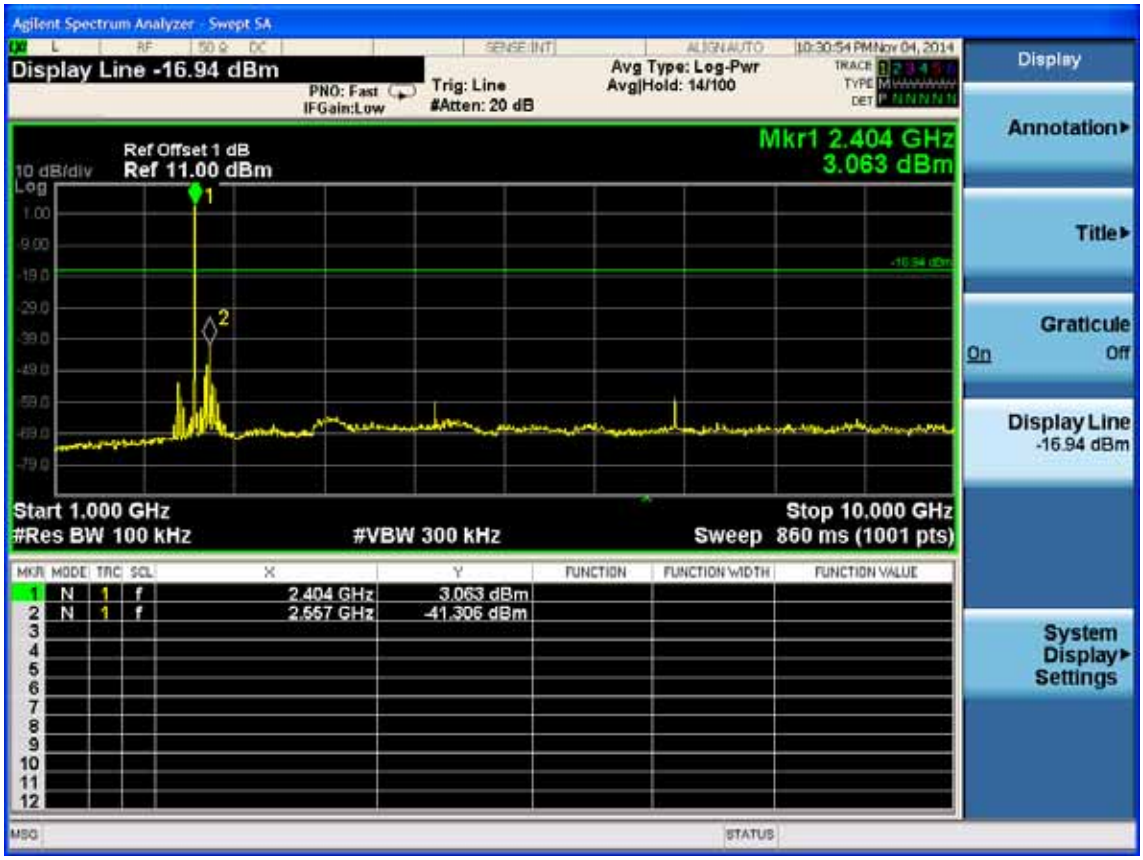
5.4.Test result

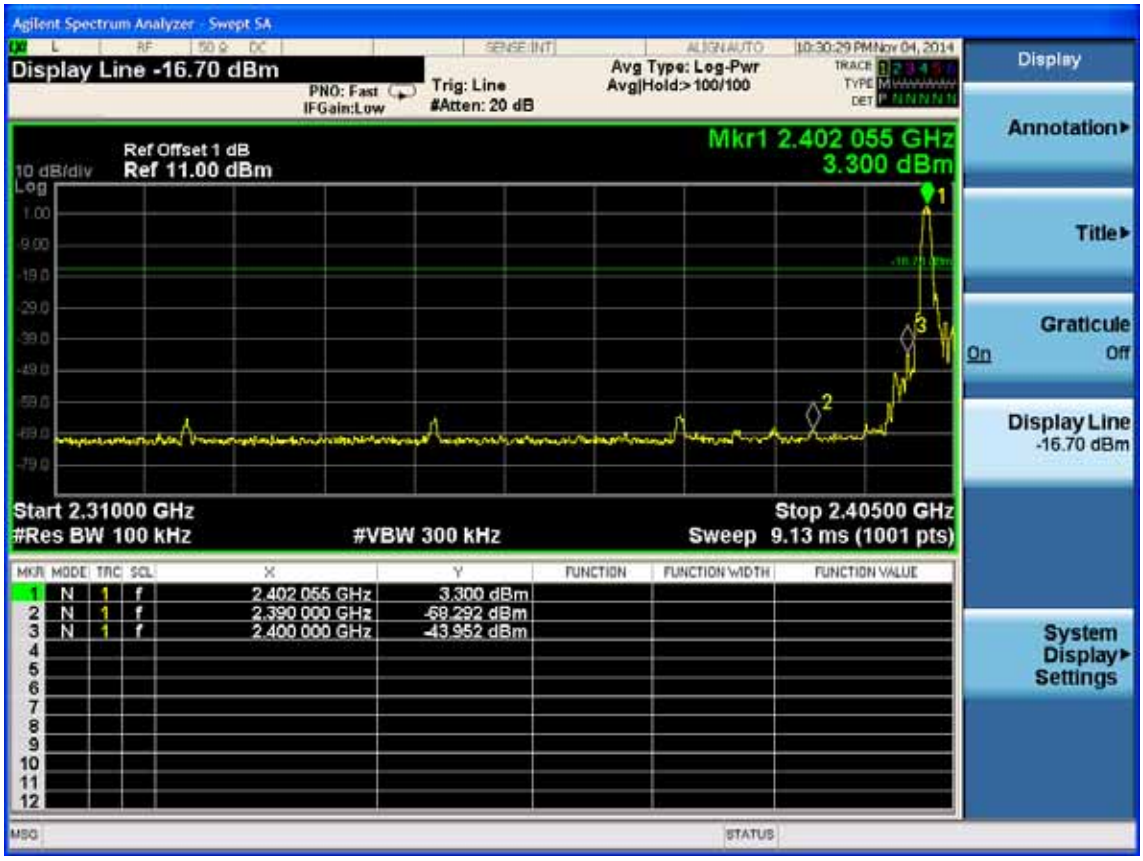
PASS (The testing data was attached in the next pages.)

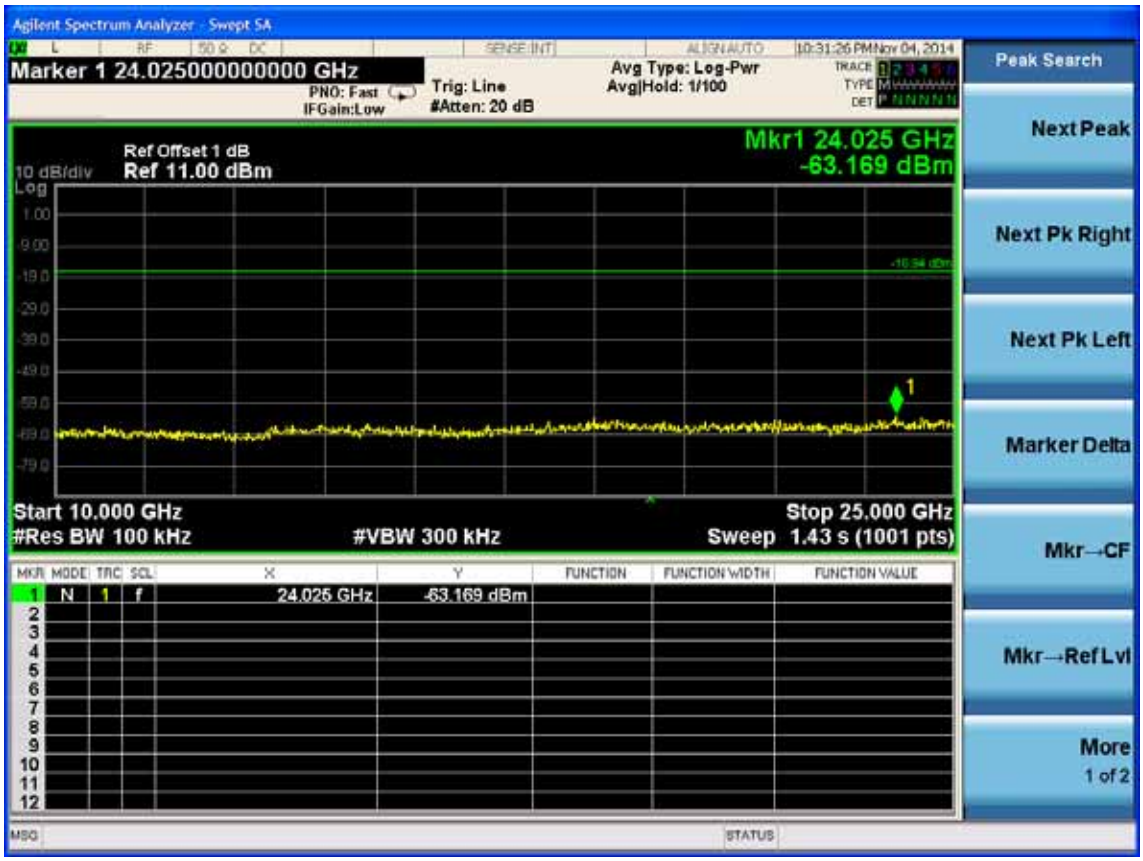
GFSK

2402MHz

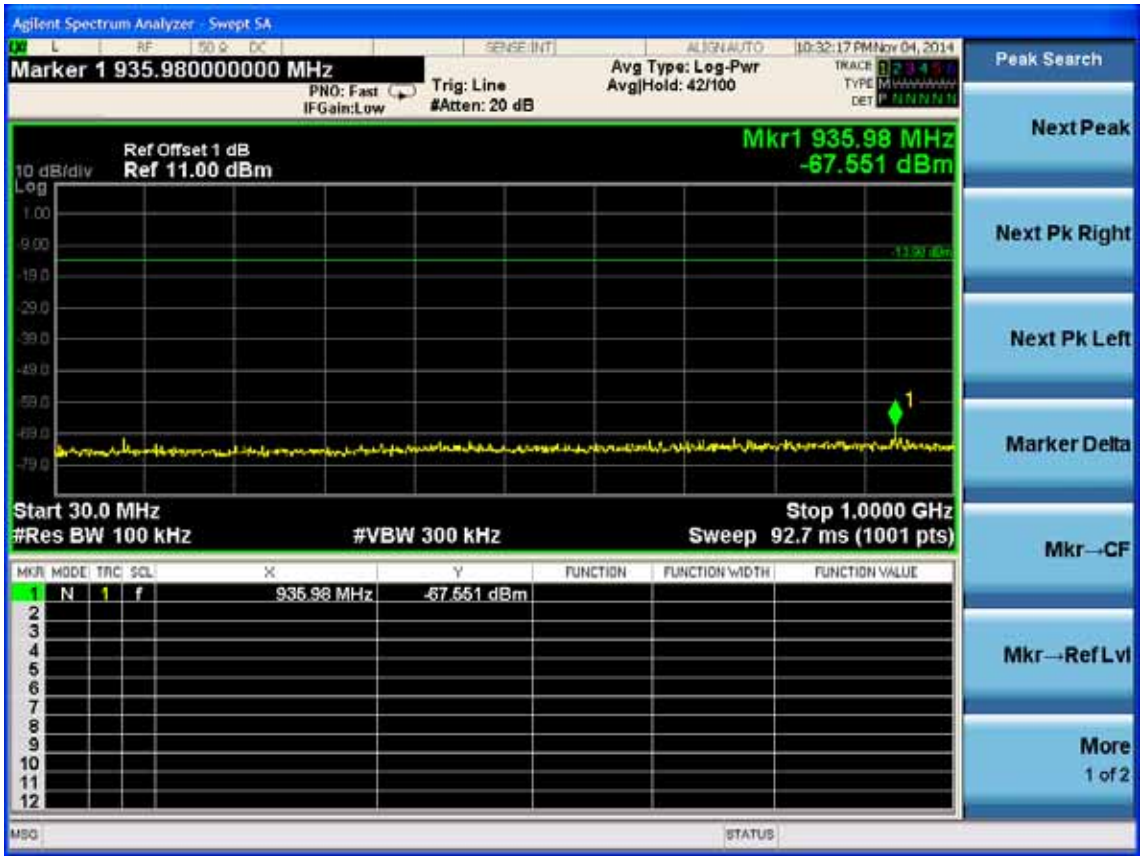


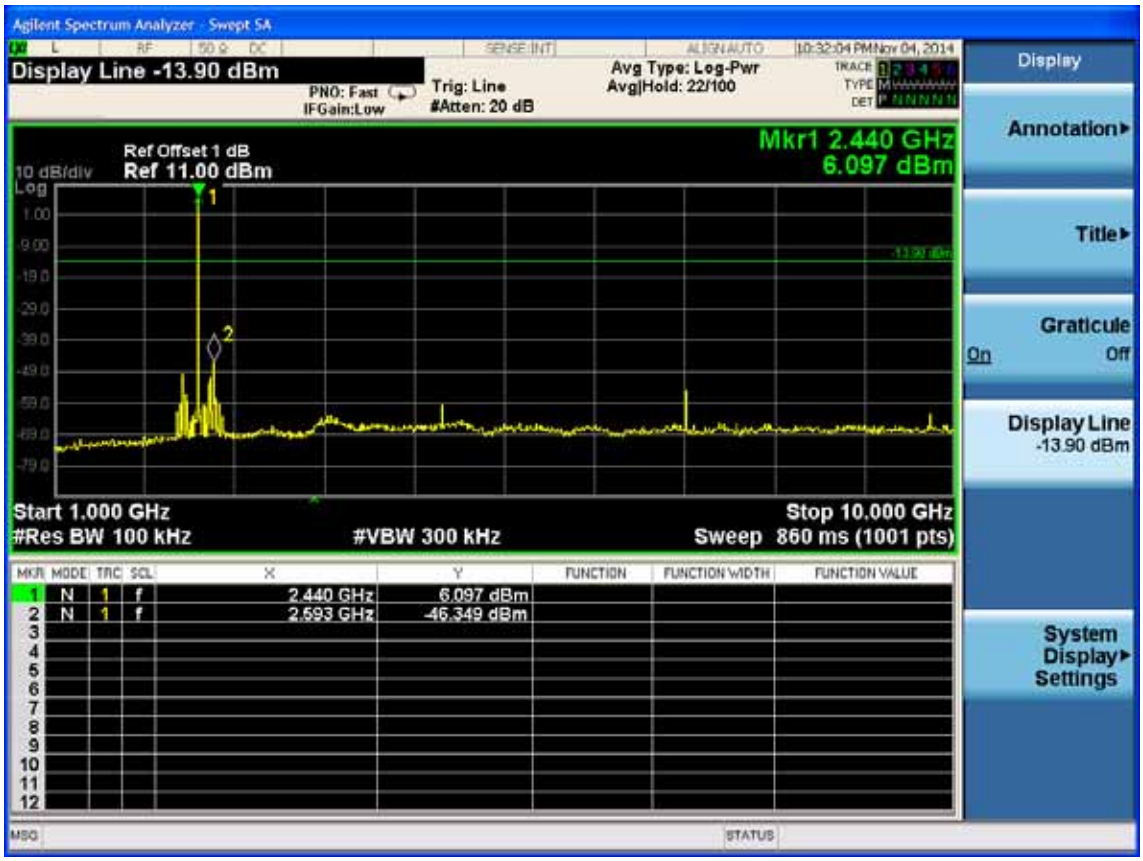


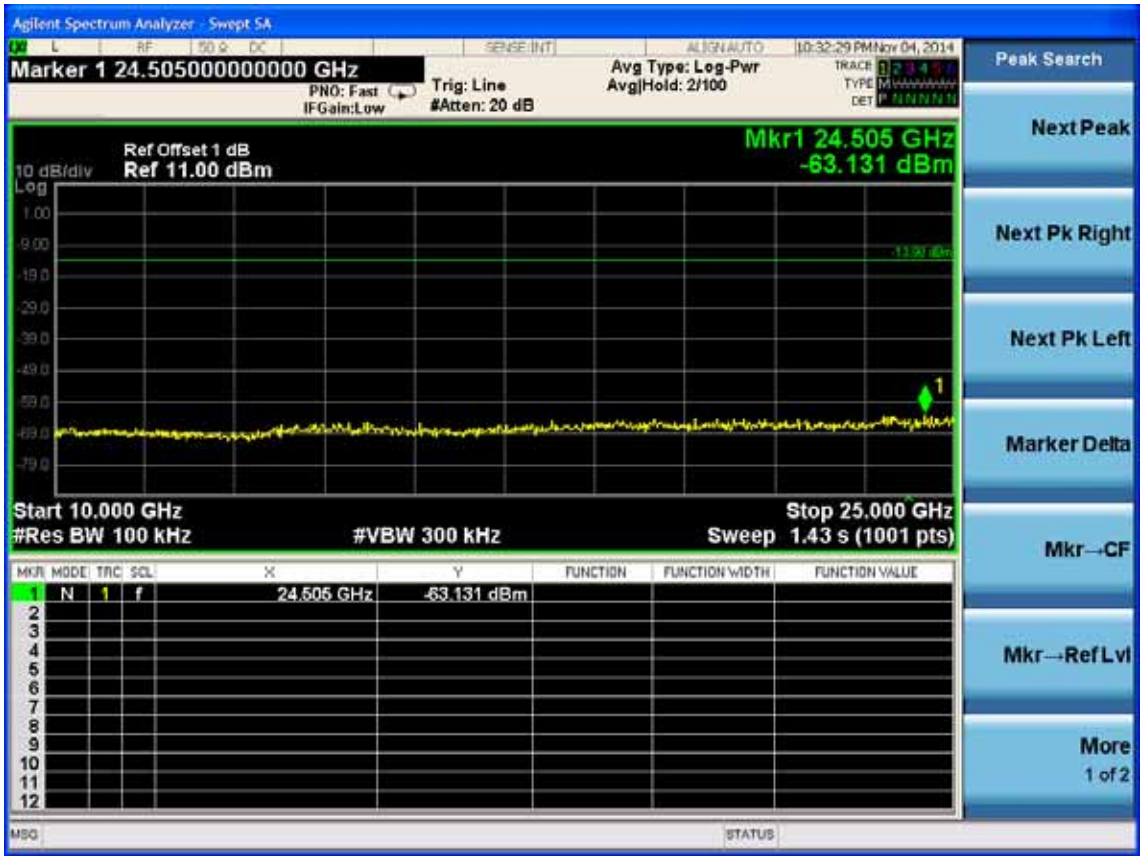

Agilent Spectrum Analyzer - Swept SA
Display Line -16.70 dBm
PNO: Fast
IFGain:Low
Trig: Line
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
10:30:29 PM Nov 04, 2014
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Mkr1 2.402 055 GHz
3.300 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.40500 GHz
Sweep 9.13 ms (1001 pts)
1 N 1 f 2.402 055 GHz 3.300 dBm
2 N 1 f 2.390 000 GHz -68.292 dBm
3 N 1 f 2.400 000 GHz -43.952 dBm
Display
Annotation
Title
Graticule
On Off
Display Line
-16.70 dBm
System Display Settings


Agilent Spectrum Analyzer - Swept SA
Marker 1 24.025000000000 GHz
PNO: Fast
IFGain:Low
Trig: Line
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/100
10:31:26 PM Nov 04, 2014
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Mkr1 24.025 GHz
-63.169 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 1.43 s (1001 pts)
1 N 1 f 24.025 GHz -63.169 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

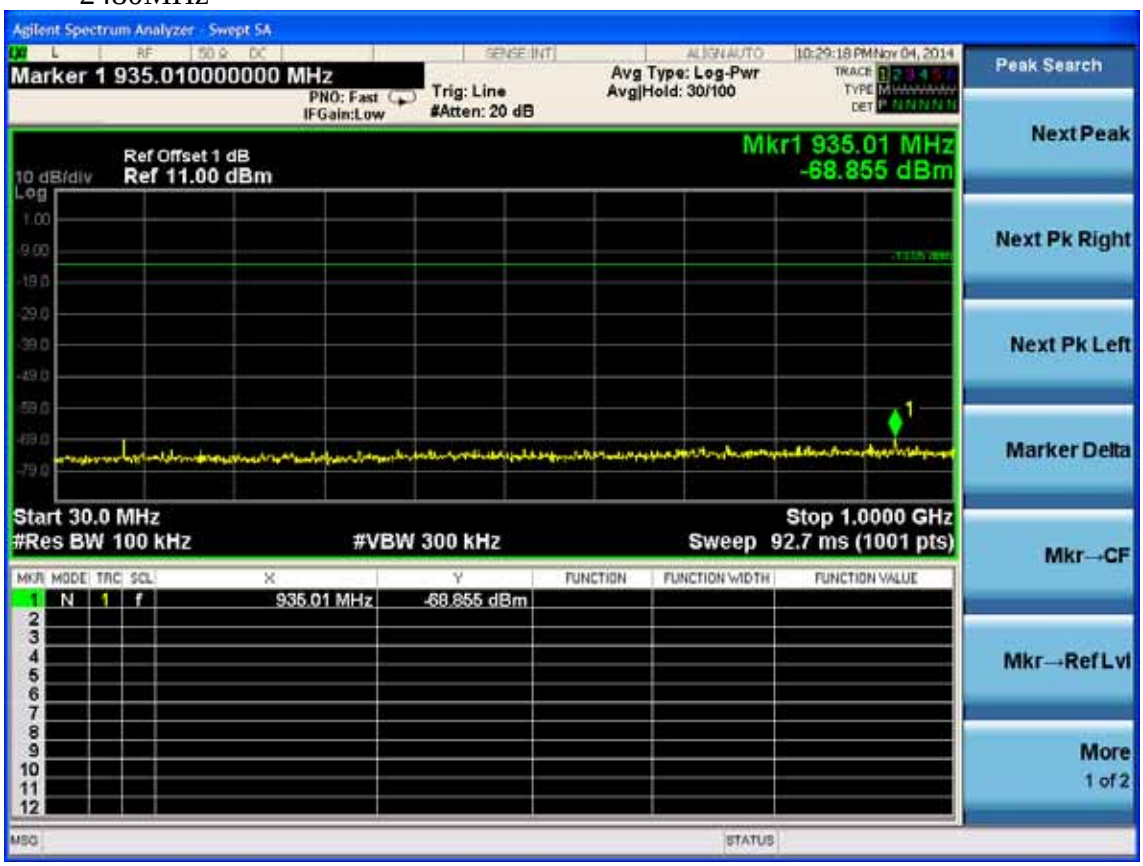
2440MHz

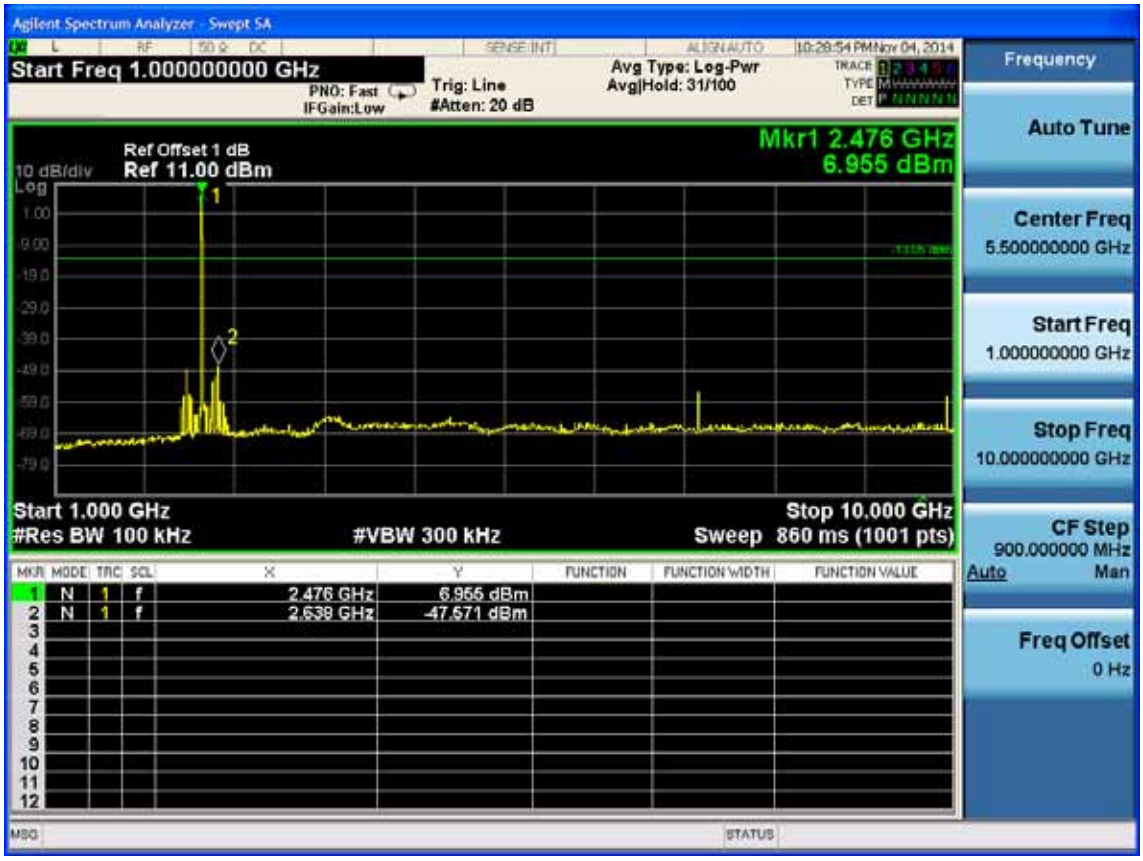

Agilent Spectrum Analyzer - Swept SA
Marker 1 935.980000000 MHz
PNO: Fast
IFGain:Low
Trig: Line
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 42/100
10:32:17 PM Nov 04, 2014
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 935.98 MHz
-67.551 dBm
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 92.7 ms (1001 pts)
1 N 1 f 935.98 MHz -67.551 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Display Line -13.90 dBm
PNO: Fast
IFGain:Low
Trig: Line
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 22/100
10:32:04 PM Nov 04, 2014
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 2.440 GHz
6.097 dBm
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 860 ms (1001 pts)
1 N 1 f 2.440 GHz 6.097 dBm
2 N 1 f 2.593 GHz -46.349 dBm
Display
Annotation
Title
Graticule
On Off
Display Line
-13.90 dBm
System Display Settings

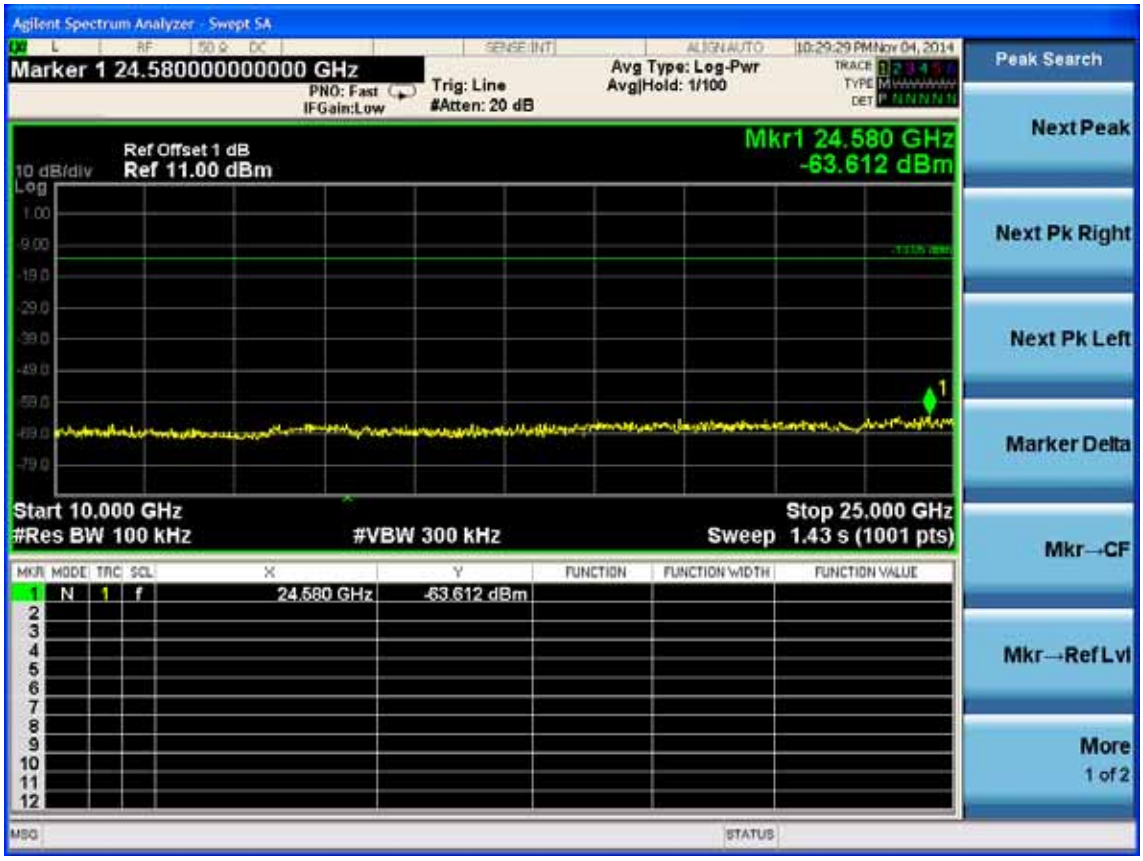

Agilent Spectrum Analyzer - Swept SA
Marker 1 24.505000000000 GHz
PNO: Fast
IFGain:Low
Trig: Line
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 2/100
10:32:29 PM Nov 04, 2014
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Mkr1 24.505 GHz
-63.131 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 1.43 s (1001 pts)
1 N 1 f 24.505 GHz -63.131 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

2480MHz


Agilent Spectrum Analyzer - Swept SA
Marker 1 935.010000000 MHz
PNO: Fast
IFGain:Low
Trig: Line
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 30/100
10:29:18 PM Nov 04, 2014
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Mkr1 935.01 MHz
-68.855 dBm
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 92.7 ms (1001 pts)
1 N 1 f 935.01 MHz -68.855 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Start Freq 1.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Line
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 31/100
10:28:54 PM Nov 04, 2014
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 2.476 GHz
6.955 dBm
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 860 ms (1001 pts)
1 N 1 f 2.476 GHz 6.955 dBm
2 N 1 f 2.639 GHz -47.671 dBm
Frequency
Auto Tune
Center Freq
5.500000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
10.000000000 GHz
CF Step
900.000000 MHz
Auto
Man
Freq Offset
0 Hz

Agilent Spectrum Analyzer - Swept SA
Start Freq 2.477000000 GHz
PNO: Wide
IFGain:Low
Trig: Line
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
10:29:59 PM Nov 04, 2014
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 2.480 003 GHz
7.368 dBm
Start 2.47700 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.51000 GHz
Sweep 3.20 ms (1001 pts)
1 N 1 f 2.480 003 GHz 7.368 dBm
2 N 1 f 2.493 500 GHz -51.078 dBm
3 N 1 f 2.500 000 GHz -63.821 dBm
Frequency
Auto Tune
Center Freq
2.493500000 GHz
Start Freq
2.477000000 GHz
Stop Freq
2.510000000 GHz
CF Step
3.300000 MHz
Auto
Man
Freq Offset
0 Hz


Agilent Spectrum Analyzer - Swept SA
Marker 1 24.580000000000 GHz
PNO: Fast
IFGain:Low
Trig: Line
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 1/100
10:29:29 PM Nov 04, 2014
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 24.580 GHz
-63.612 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 1.43 s (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 24.580 GHz -63.612 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

6. 6dB BANDWIDTH TEST

6.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Sep.29, 14	1Year
2.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr. 28,14	1 Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	Apr. 28,14	1 Year

6.2.Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

6.3.Test Procedure

The transmitter output was connected to a spectrum analyzer, The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 300kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

6.4.Test Results

EUT: Sound Bar		
M/N: HT-CT180		
Test date: 2014-11-04	Pressure: 101.5±1.0kpa	Humidity: 52.1±3.0%
Tested by: Kobe_Huang	Test site: RF site	Temperature: 22.6±0.6℃

Cable loss: 1.0 dB		Attenuator loss: 20 dB	
Test Mode	Frequency (MHz)	6 dB bandwidth (kHz)	Limit (KHz)
GFSK	2402	697.1	>500
	2440	691.2	>500
	2480	698.0	>500
Conclusion：PASS			

GFSK

Test Frequency: 2402MHz

Test Frequency: 2440MHz

Test Frequency: 2480MHz

7. MAXIMUM PEAK OUTPUT POWER TEST

7.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Sep.29, 14	1Year
2.	Power meter	Anritsu	ML2487A	6K00002472	Apr. 28,14	1Year
3.	Power sensor	Anritsu	MA2491A	0033005	Apr. 28,14	1Year
4.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr. 28,14	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	Apr. 28,14	1 Year

7.2.Limit

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.

7.3.Test Procedure

Connected the EUT's antenna port to Power Sensor, and use power meter to test peak output power.

7.4.Test Results

EUT: Sound Bar		
M/N: HT-CT180		
Test date: 2014-11-04	Pressure: 101.3±1.0kpa	Humidity: 51.9±3.0%
Tested by: Kevin_Hu	Test site: RF site	Temperature: 23.1±0.6℃

Test Mode	Frequency (MHz)	Peak output Power (dBm)	Limit (dBm)
GFSK	2402	3.605	30
	2440	6.508	30
	2480	7.475	30
Conclusion: PASS			

8. BAND EDGE COMPLIANCE TEST

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Amp	HP	8449B	3008A02495	Apr. 28,14	1 Year
2.	Horn Antenna	ETS	3115	9510-4580	Jun. 06, 14	1 Year
3.	HF Cable	Hubersuhner	Sucoflex104	274094/4	Apr. 28,14	1 Year
4.	RF Cable	Hubersuhner	Sucoflex102	28610/2	Apr. 28,14	1 Year

8.2. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

8.3. Test Produce

For upper band emissions that are up to two bandwidths(2MHz) away (2483.5MHz to 2485.5MHz) from the band-edge use below produce:

1. Choose a spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the analyzer RBW to 100KHz and with a video bandwidth 300KHz. Record the peak levels of the fundamental emission and the relevant band-edge emission, Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not a field strength measurement, it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.
2. Subtract the delta measured in step (1) from the maximum field strengths measured in clause 4 .The resultant field strengths are then used to determine band-edge compliance as required by Section 15.205

For emissions above two bandwidths away from the band-edge use below produce:

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

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

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

4). Set the spectrum analyzer in the following setting in order to capture the lower and upperband-edges of the emission:

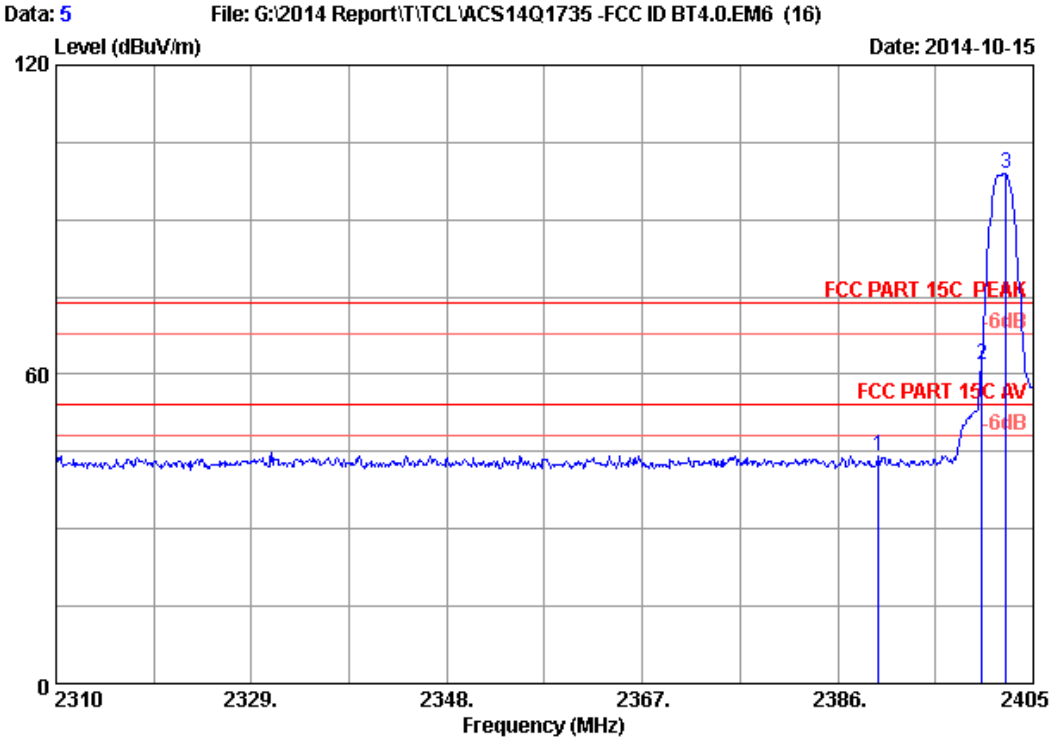
(a) PEAK: RBW=1MHz ;VBW=3MHz, PK detector, Sweep Time=AUTO

(b) AV: RBW=1MHz, VBW= 10Hz, Sweep Time=AUTO

8.4. Test Results

Pass (The testing data was attached in the next pages.)

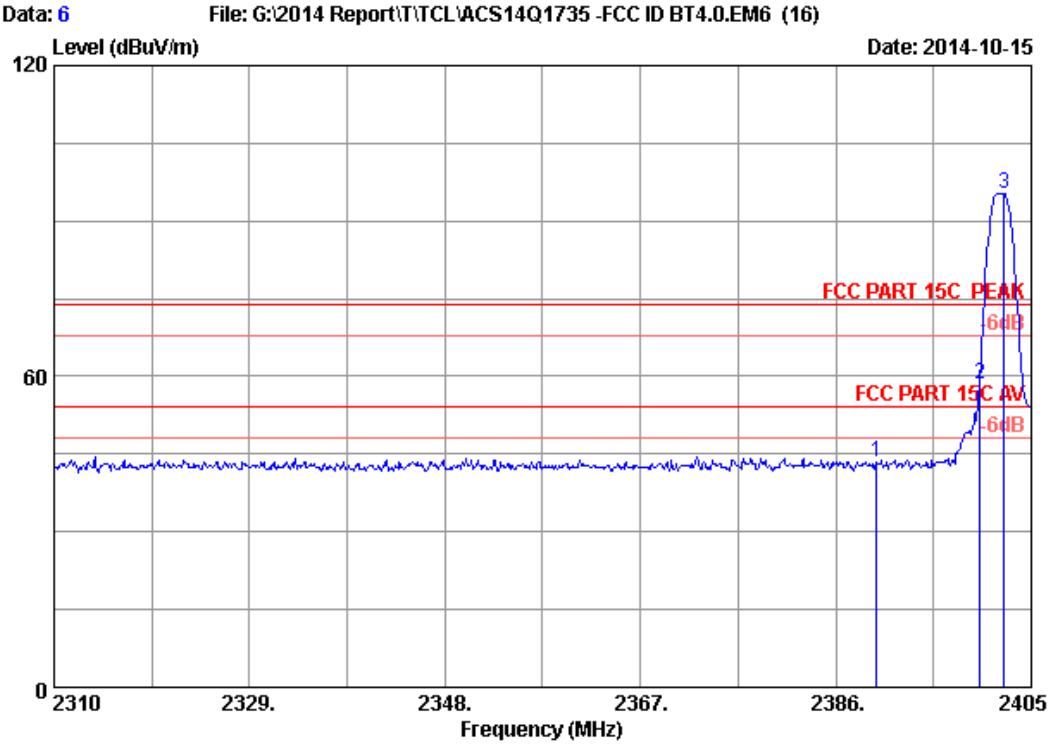
Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.



Site no. : 3m Chamber Data no. : 5
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56% Engineer : Kobe-Huang
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2402MHz
M/N : SA-CT180

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.16	5.78	35.70	45.76	44.00	74.00	30.00	Peak
2	2400.000	28.18	5.80	35.70	63.53	61.81	74.00	12.19	Peak
3	2402.340	28.19	5.80	35.70	100.63	98.92	74.00	-24.92	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

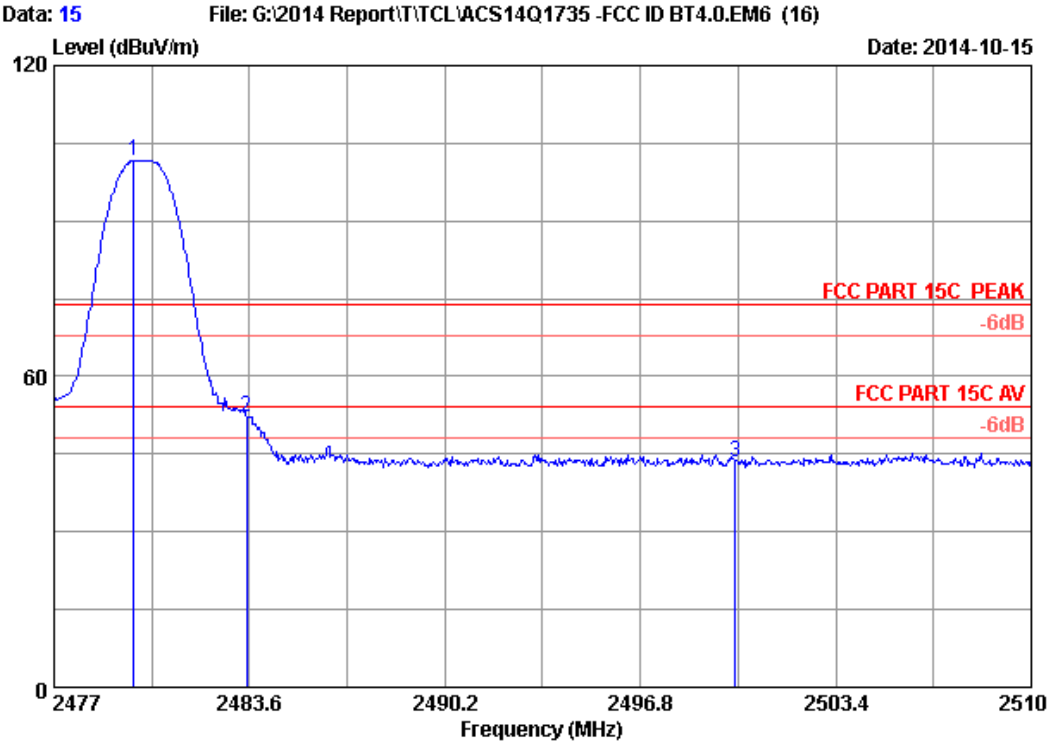


Site no. : 3m Chamber
Dis. / Ant. : 3m 2014 3115 (4580)
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56%
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2402MHz
M/N : SA-CT180

Data no. : 6
Ant. pol. : VERTICAL
Engineer : Kobe-Huang

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	28.16	5.78	35.70	45.09	43.33	74.00	30.67	Peak
2	2400.000	28.18	5.80	35.70	60.31	58.59	74.00	15.41	Peak
3	2402.340	28.19	5.80	35.70	97.13	95.42	74.00	-21.42	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

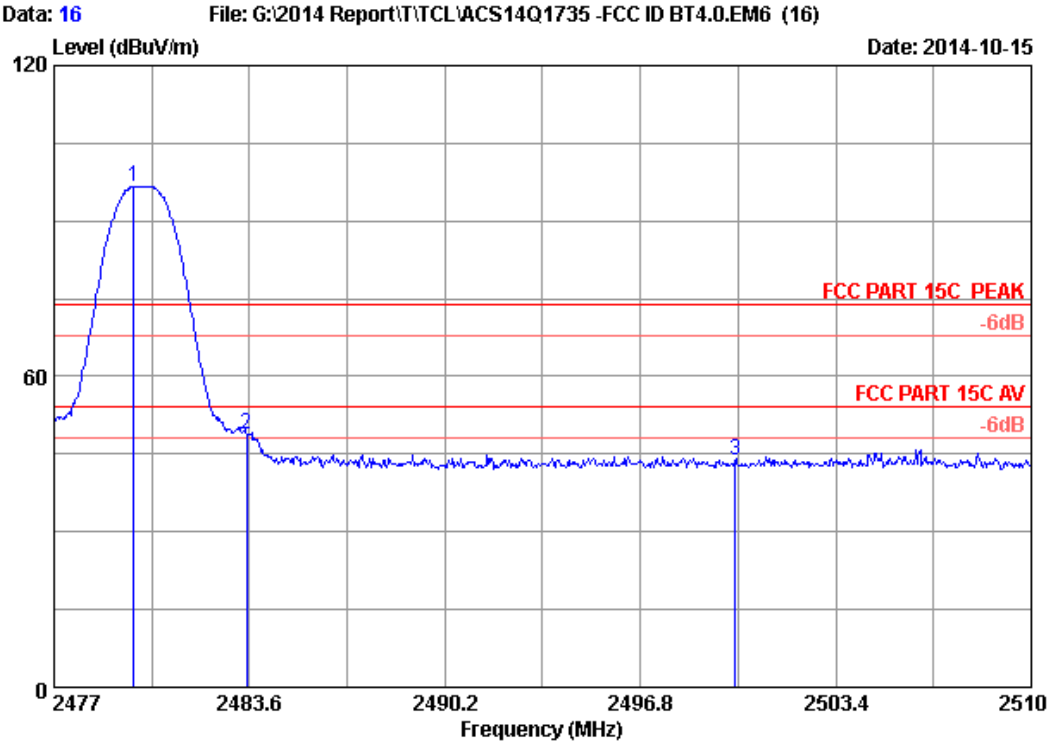


Site no. : 3m Chamber
Dis. / Ant. : 3m 2014 3115 (4580)
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56%
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2480MHz
M/N : SA-CT180

Data no. : 15
Ant. pol. : HORIZONTAL
Engineer : Kobe-Huang

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.706	28.36	5.91	35.70	103.13	101.70	74.00	-27.70	Peak
2	2483.500	28.36	5.92	35.70	53.53	52.11	74.00	21.89	Peak
3	2500.000	28.40	5.94	35.70	44.96	43.60	74.00	30.40	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber
Dis. / Ant. : 3m 2014 3115 (4580)
Limit : FCC PART 15C PEAK
Env. / Ins. : 24*C/56%
EUT : Active Speaker System
Power rating : AC 120V/60Hz
Test Mode : GFSK 2480MHz
M/N : SA-CT180

Data no. : 16
Ant. pol. : VERTICAL
Engineer : Kobe-Huang

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	AMP factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.706	28.36	5.91	35.70	98.13	96.70	74.00	-22.70	Peak
2	2483.500	28.36	5.92	35.70	50.15	48.73	74.00	25.27	Peak
3	2500.000	28.40	5.94	35.70	45.14	43.78	74.00	30.22	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp Factor
2. The emission levels that are 20dB below the official limit are not reported.

9. POWER SPECTRAL DENSITY TEST

9.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	N9030A	MY51380221	Sep.29, 14	1Year
2.	Attenuator (20dB)	Agilent	8491B	MY39262165	Apr. 28,14	1 Year
3	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	Apr. 28,14	1 Year

9.2.Limit

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

9.3.Test Procedure

1. Connected the EUT's antenna port to spectrum analyzer device by 20dB attenuator.

2. Set the test frequency as center frequency, Set RBW=3KHz,VBW=10KHz,Span large enough capture the entire frequency, Read out maximum peak level frequency

3. Set the frequency read from produce 2 as center frequency, then set the span= 300KHz, Sweep time=Span/RBW, Then Max hold, read out each mode and each chain's Power density.

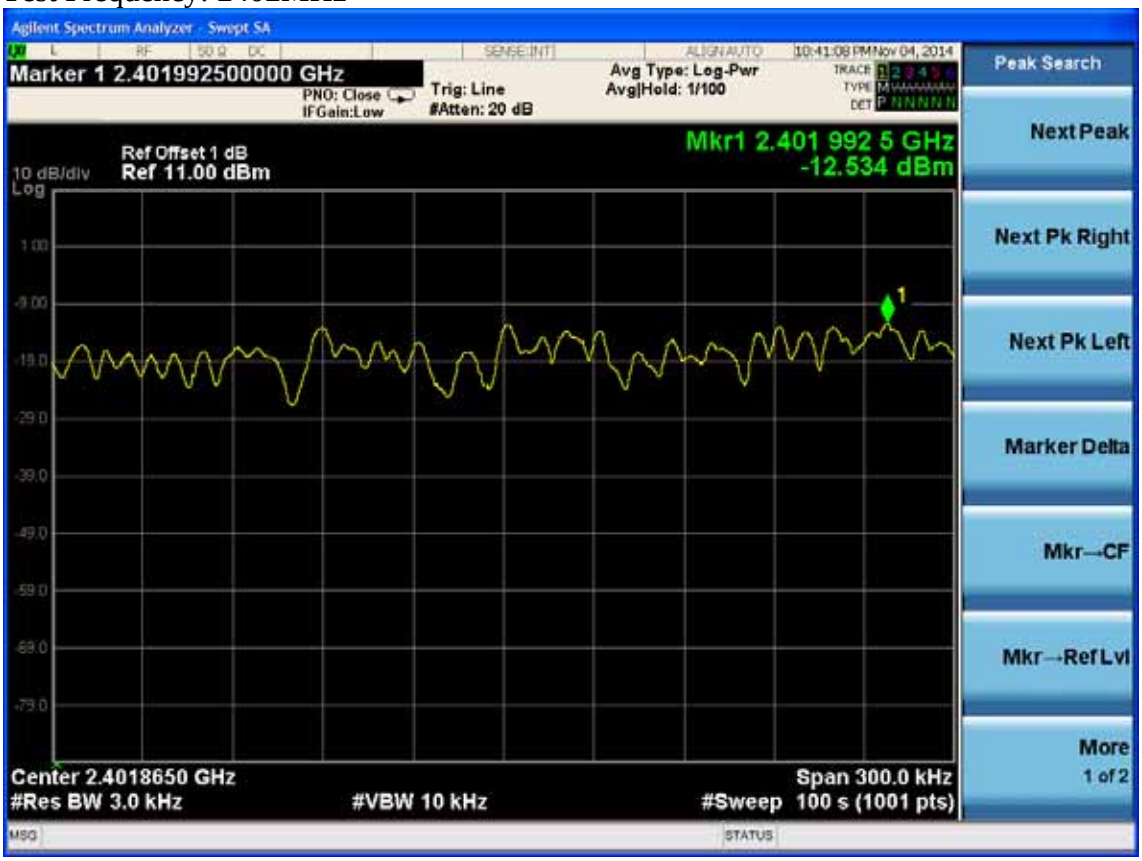
Note: The cable loss and attenuator loss were offset into measure device as an amplitude

9.4.Test Results

EUT: Sound Bar		
M/N: HT-CT180		
Test date: 2014-11-04	Pressure: 101.6±1.0kpa	Humidity: 52.5±3.0%
Tested by: Kobe_Huang	Test site: RF site	Temperature: 23.1±0.6℃

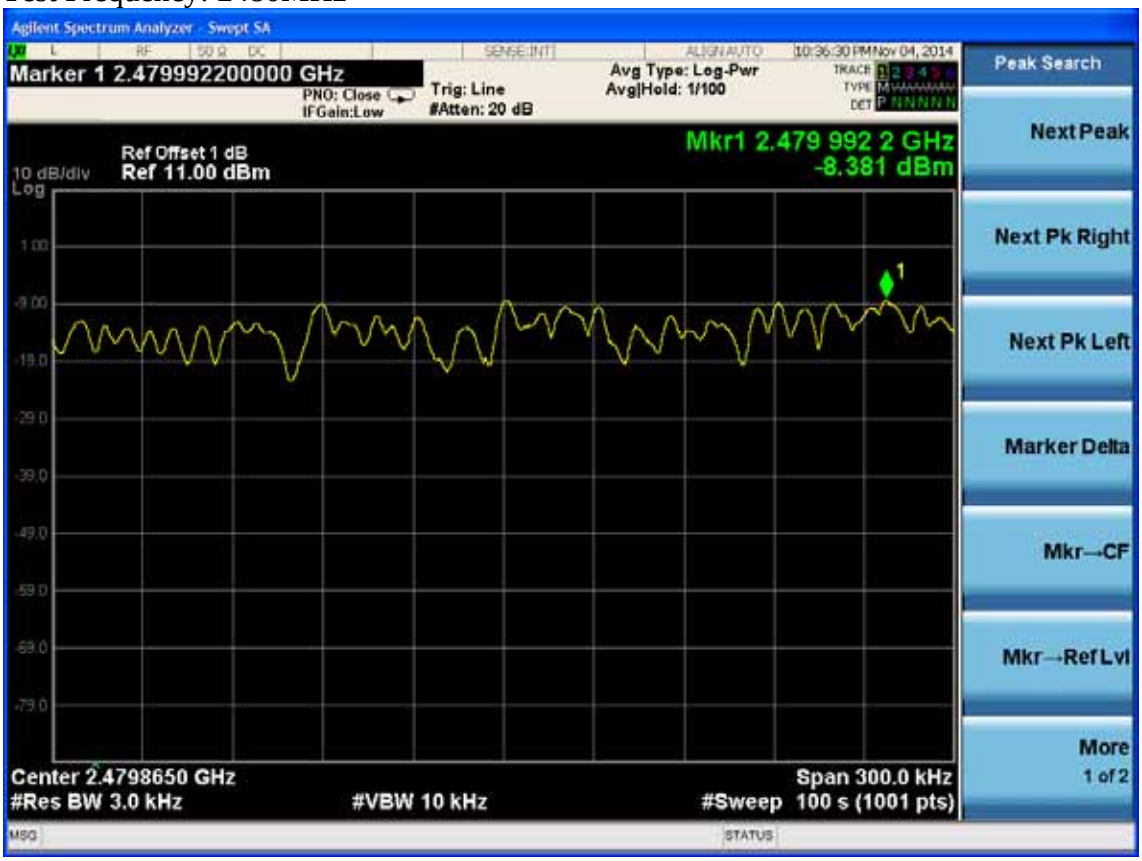
Test Mode	Frequency (MHz)	Power density（dBm/3KHz）	Limit (dBm/3KHz)
GFSK	2402	-12.534	8
	2440	-9.468	8
	2480	-8.381	8
Conclusion：PASS			

Test Frequency: 2402MHz



Test Frequency: 2440MHz

Test Frequency: 2480MHz



10. DEVIATION TO TEST SPECIFICATIONS

[NONE]