FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

Sounding Audio Industrial Ltd.

Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth

Model Number: PA450UM

Brand Name: POLK

FCC ID: OPDPA450UM

Prepared for : Sounding Audio Industrial Ltd.
Unit N, 7/F, Stage 2. Wah Fung Industrial Center 33-39
Kwai Fung Road, Kwai Chung, Hong Kong

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block,
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Nantou, Shenzhen, Guangdong, China

Tel: (0755) 26639496

Report Number : ACS-F13187

Date of Test : May.28~Jun.17, 2013

Date of Report : Jul.22, 2013

TABLE OF CONTENTS

TEST REPORT CERTIFICATION

Applicant	:	Sounding Audio Industrial Ltd.
Manufacturer	:	Eagle Plastic Development Co. Ltd
EUT Description	:	Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth
FCC ID	:	OPDPA450UM

(A) MODEL NO.	:	PA450UM
(B)Brand Name	:	POLK
(C)POWER SUPPLY	:	DC 12V
(D)TEST VOLTAGE	:	DC 12V

Tested for comply with:
FCC Rules and Regulations Part 15 Subpart C: 2012
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 : May.28~ Jun.17, 2013 Report of date: Jul.22, 2013

Prepared by : Sherry Zhuo
Sherry Zhuo / 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

Approved & Authorized Signer : Signature: David Jin 7.22
David Jin / Deputy 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
Carrier Frequency Separation Test	FCC Part 15: 15.247(a)(1) ANSI C63.10 :2009	PASS
20dB Bandwidth Test	FCC Part 15: 15.215 ANSI C63.10 :2009	PASS
Number Of Hopping Frequency Test	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10 :2009	PASS
Dwell Time Test	FCC Part 15: 15.247(a)(1)(iii) 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
N/A is an abbreviation for Not Applicable.		

2. GENERAL INFORMATION

2.1.Description of Device (EUT)

EUT name	:	Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth
Model Number	:	PA450UM
Brand Name	:	POLK
Radio		Bluetooth V3.0
Operation frequency		Bluetooth 2402-2480MHz
Channel Number		Bluetooth: 79 channels
Modulation Technology		GFSK
Antenna Type	:	PIFA Antenna, 3.0dBi Max gain
Applicant	:	Sounding Audio Industrial Ltd. Unit N, 7/F, Stage 2. Wah Fung Industrial Center 33-39 Kwai Fung Road, Kwai Chung, Hong Kong
Manufacturer	:	Eagle Plastic Development Co. Ltd Sima District, Changping, China
Date of Test	:	May.28~Jun.17, 2013
Date of Receipt		May.27, 2013
Sample Type	:	Prototype production

2.2.Test information

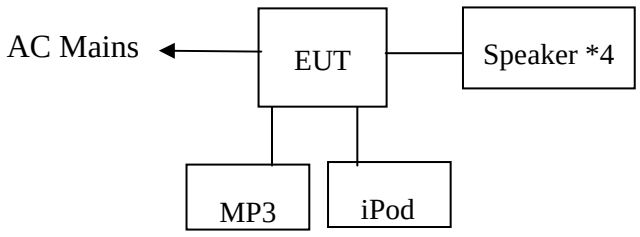
The test software “bluesuite.exe” was used to control EUT work in Continuous TX mode, and select test channel.

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: CH39	2441
	1	High: CH78	2480

2.3.Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number	Approved type
1.	Speaker #1	ACS-EMC-SP01TB	QINLE	QL618	N/A	☑FCC DoC ☐BSMI ID
		Cable: Shielded, Undetachabled, 0.9m				
2.	Speaker #2	ACS-EMC-SP02TB	QINLE	QL618	N/A	☑FCC DoC ☐BSMI ID
		Cable: Shielded, Undetachabled, 0.9m				
3.	Speaker #3	ACS-EMC-SP03TB	QINLE	QL618	N/A	☑FCC DoC ☐BSMI ID
		Cable: Shielded, Undetachabled, 0.9m				
4.	Speaker #4	ACS-EMC-SP04TB	QINLE	QL618	N/A	☑FCC DoC ☐BSMI ID
		Cable: Shielded, Undetachabled, 0.9m				
5.	iPod nano	ACS-EMC-IP03	APPLE	A1199	YM711H3LVQ5	☑FCC DoC ☑BSMI ID: R33057
		Data Cable: Shielded, Detachabled, 1.0m				
6.	MP3 Player	--	Sony	BNP-1	N/A	☑FCC DoC ☐BSMI ID

2.4.Block Diagram of Test Setup



(EUT: Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth)

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: Jun.13, 2014
		Certificated by DAkkS, Germany Registration No: D-PL-12151-01-01 Valid Date: Feb.01, 2014
		Accredited by NVLAP, USA NVLAP Code: 200372-0 Valid Date: Mar.31, 2014

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

Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	3.08 dB(9KHz to 150KHz)
	3.10 dB (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)	5.04 dB (1~6GHz, Distance: 3m)
	5.06 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. RADIATED EMISSION MEASUREMENT

3.1.Test Equipment

Frequency rang: 30~1000MHz

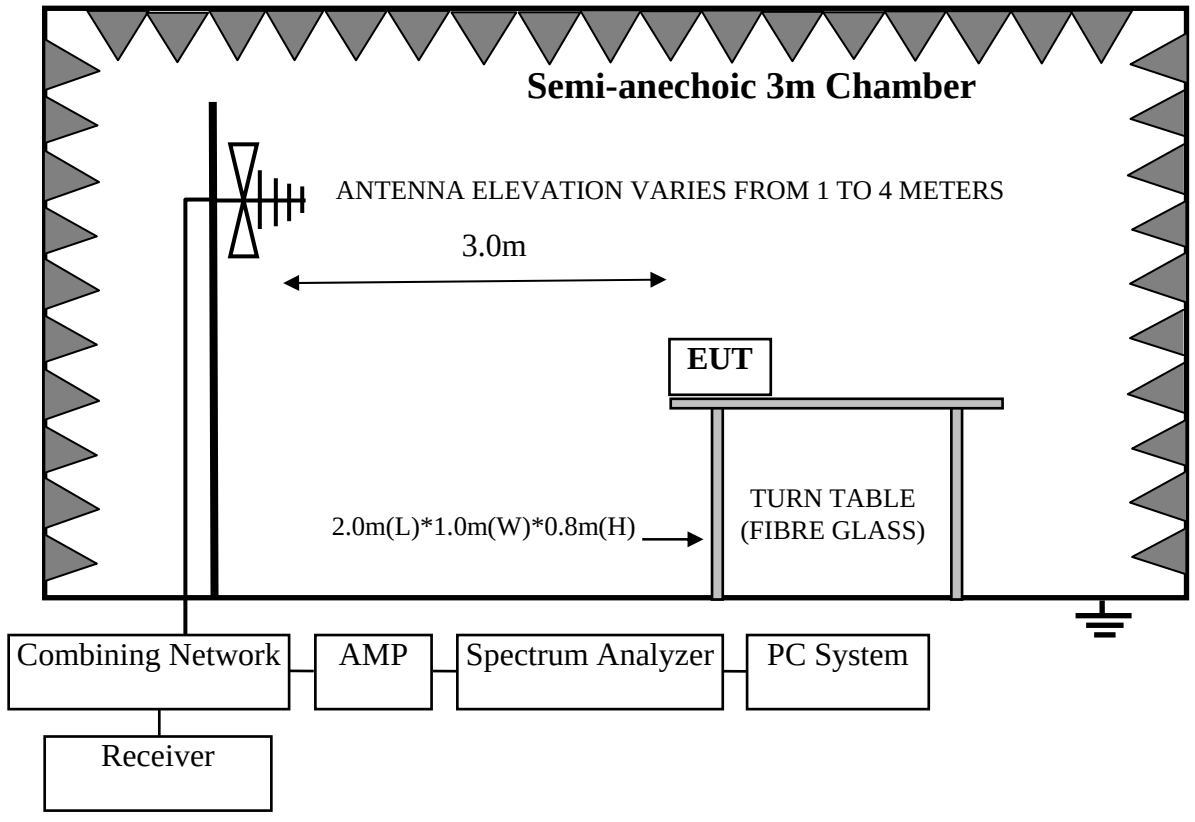
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	3#Chamber	AUDIX	N/A	N/A	Nov.24,12	1 Year
2	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 13	1 Year
3	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 13	1 Year
4	Amplifier	HP	8447D	2648A04738	May.08, 13	1 Year
5	Bilog Antenna	Schaffner	CBL6111C	2598	Mar.14,13	1 Year
6	RF Cable	MIYAZAKI	CFD400-NL	3# Chamber No.1	May.08, 13	1 Year
7	Coaxial Switch	Anritsu	MP59B	M74389	May.08, 13	1 Year

3.1.1.For frequency range 1GHz~25GHz (In 3m Anechoic Chamber)

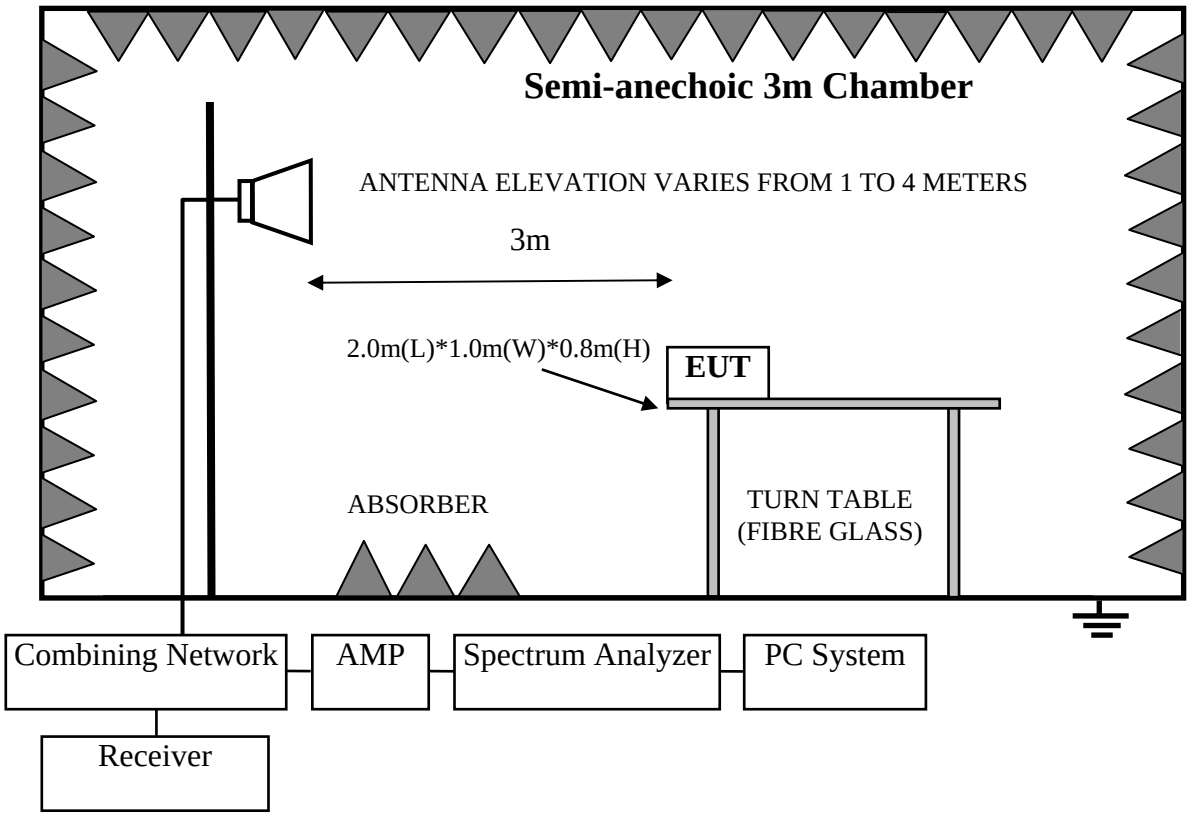
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4407B	MY41440292	May.08, 13	1 Year
2	Horn Antenna	EMCO	3115	9607-4877	May.08, 13	1 Year
3	Amplifier	Agilent	8449B	3008A00863	May.08, 13	1 Year
4	RF Cable	Hubersuhner	SUCOFLEX106	77980/6	May.08, 13	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX106	77977/6	May.08, 13	1 Year
6	Horn Antenna	EMCO	3116	00060088	June.05,13	1 Year

3.2.Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range 1GHz-25GHz



3.3. 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.

3.4.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.

3.4.1.Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth (EUT)

Model Number : PA450UM
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.Turned on the power of all equipment.

3.5.3.Let EUT work in Tx mode.

3.6.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 above 1GHz

This device is pulse Modulated, a duty cycle factor was used to calculated average level based measured peak level.

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.

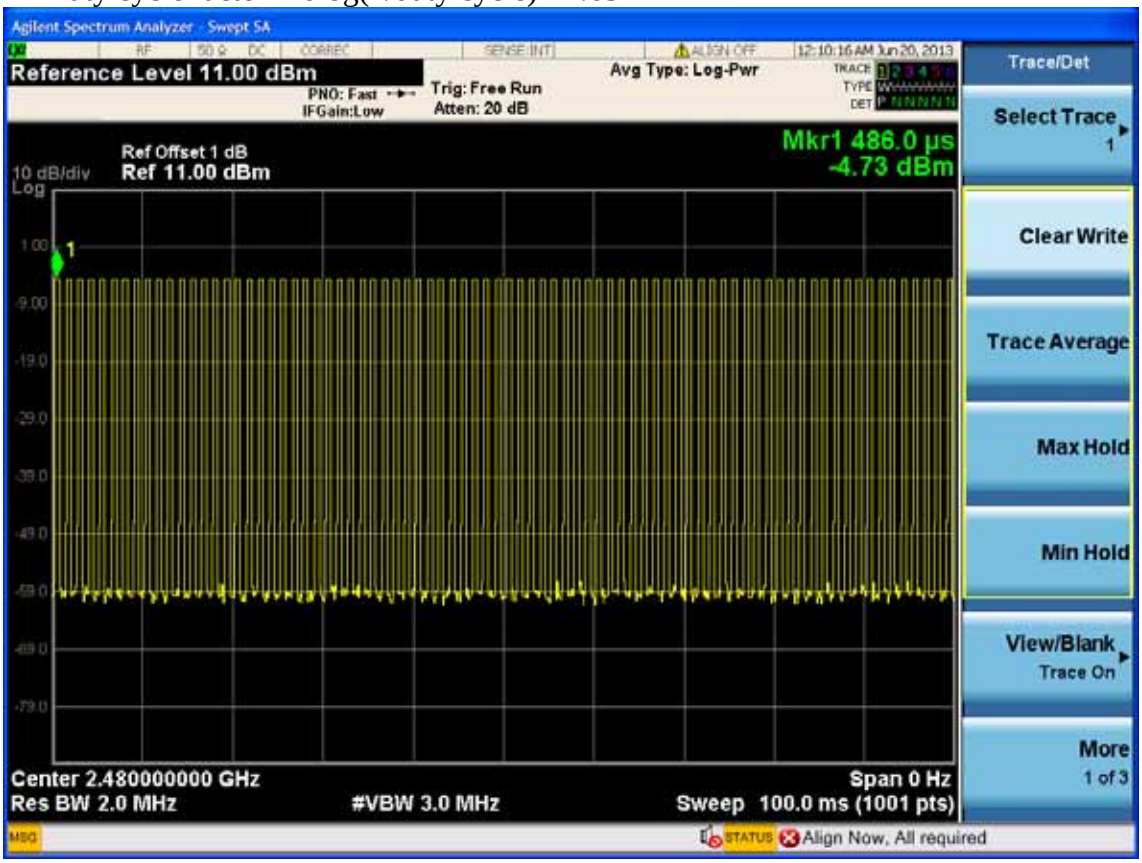
3.7.Radiated Emission Test Results

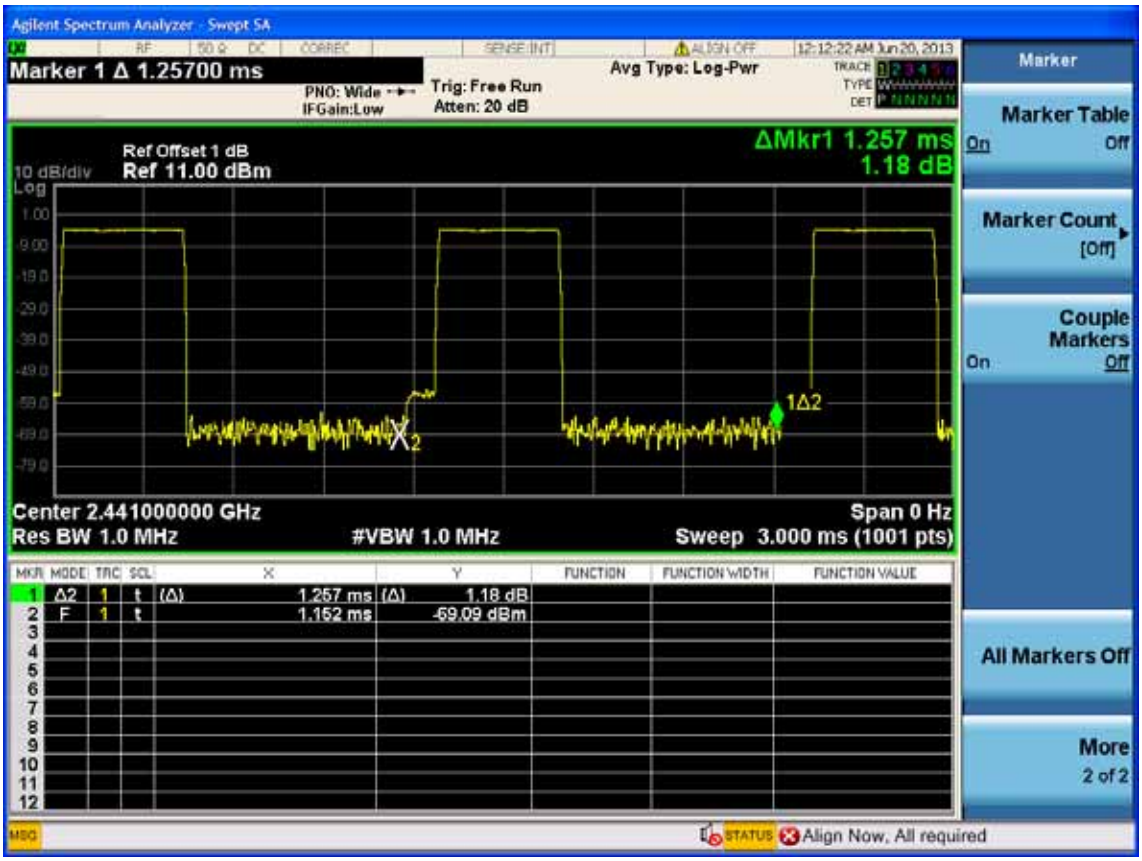
PASS.

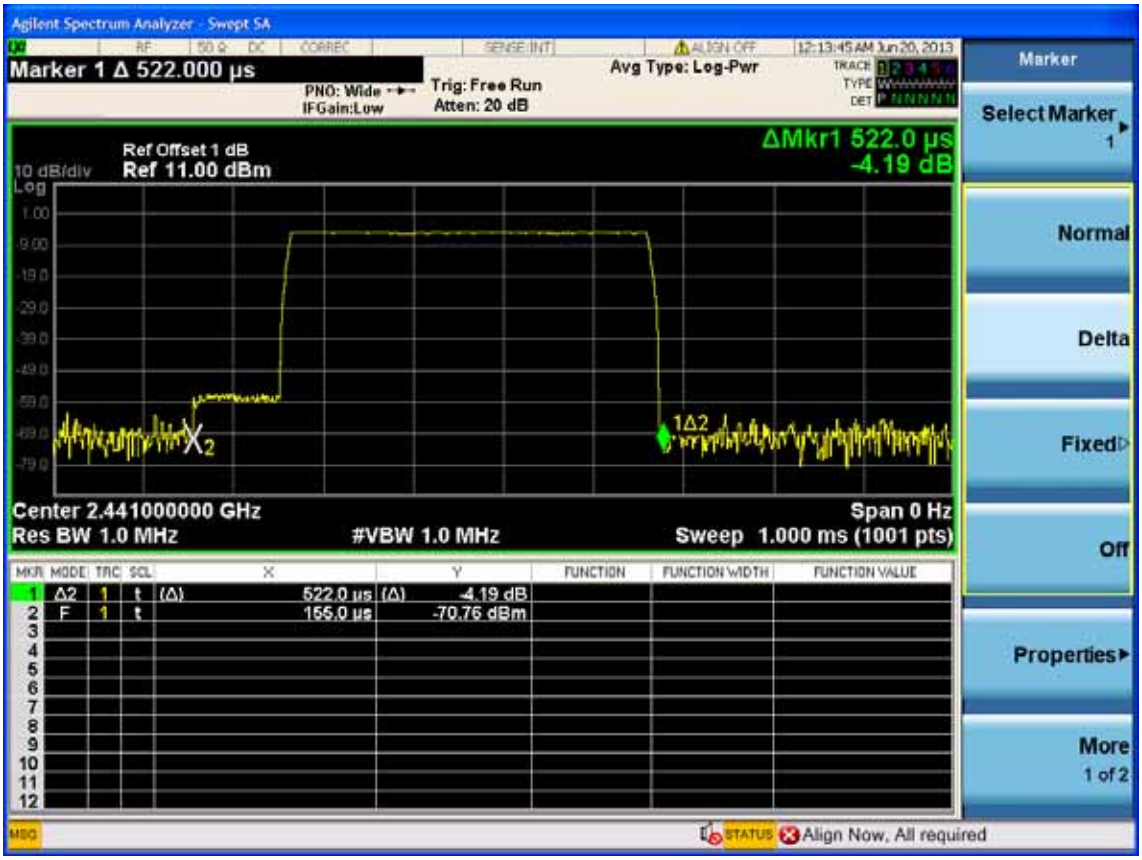
All the emissions from 30MHz to 25GHz were comply with the 15.209 Limit.

Note: The duty cycle factor for calculate average level is 7.63dB, and average limit is 20dB below peak limit, so if peak measured level comply with peak limit, the average level was deemed to comply with average limit.

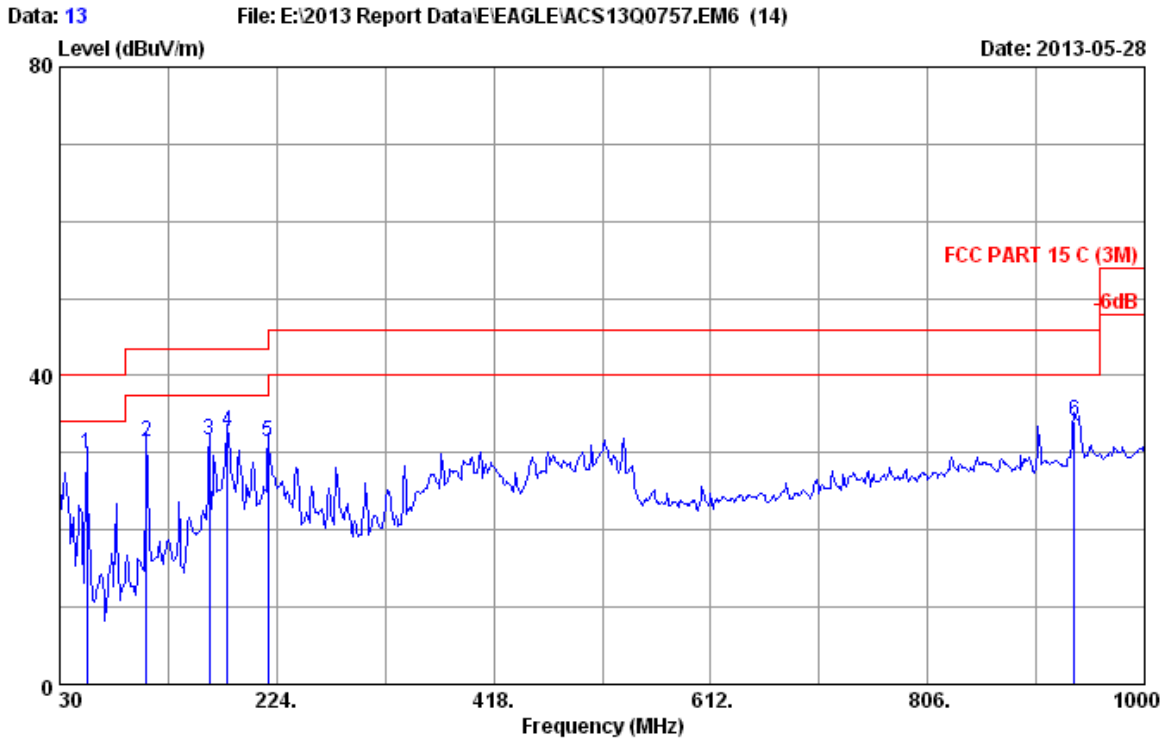
Duty cycle=Tx on/(Tx on+Tx off)=0.522ms/1.257ms*100%=41.527%
Duty cycle factor=20log(1/duty cycle)= 7.63






Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 522.000 µs
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
12:13:45 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Log
Ref 11.00 dBm
ΔMkr1 522.0 µs
-4.19 dB
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 1.000 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 Δ2 1 t (Δ) 522.0 µs (Δ) -4.19 dB
2 F 1 t 155.0 µs -70.76 dBm
Marker
Select Marker
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS
Align Now, All required

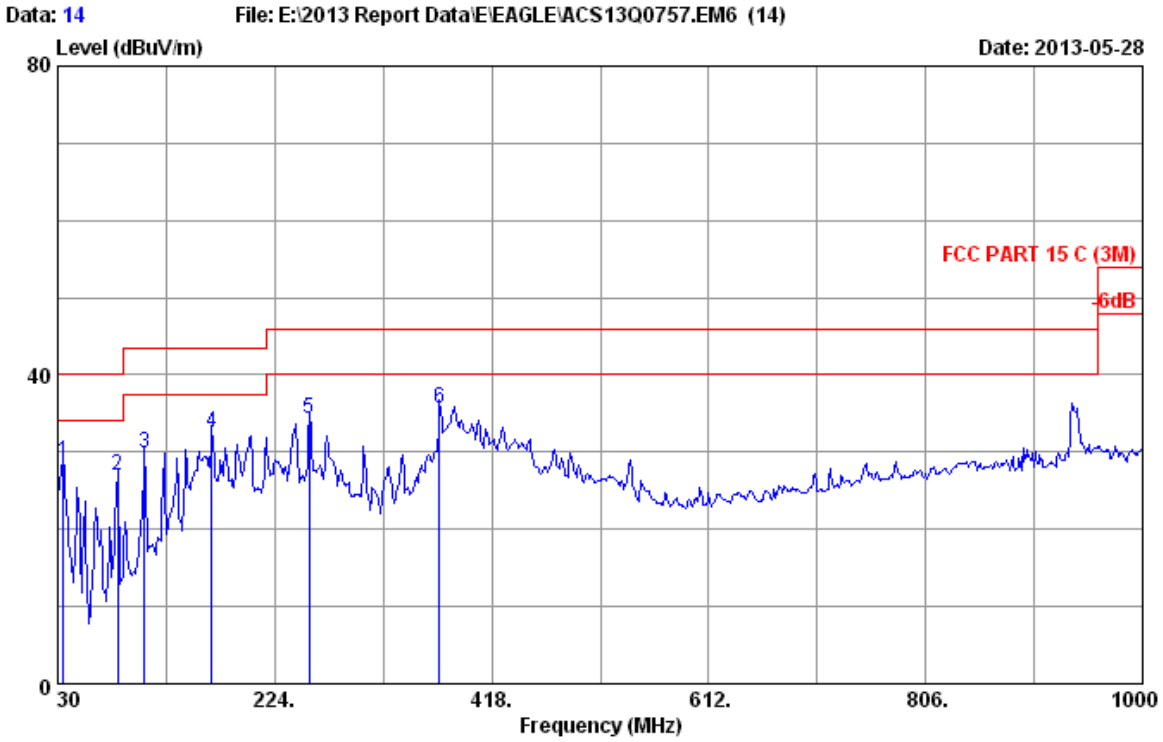
Frequency: 30MHz~1GHz




```
Site no.      : 3m Chamber                    Data no.   : 13
Dis. / Ant.   : 3m   2013 CBL6111C 2598       Ant. pol.  : VERTICAL
Limit         : FCC PART 15 C (3M)
Env. / Ins.   : 24*C/65%                      Engineer   : Even_Deng
EUT           : Marine Audio System With AM/FM/WB/USB-iP
Power rating  : DC 12V
Test Mode     : Tx Mode
                M/N:PA450UM
```

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	54.250	7.23	1.21	21.37	29.81	40.00	10.19	QP
2	107.600	11.36	1.44	18.63	31.43	43.50	12.07	QP
3	163.860	11.01	1.65	18.91	31.57	43.50	11.93	QP
4	180.350	9.38	1.72	21.59	32.69	43.50	10.81	QP
5	216.240	10.05	1.85	19.53	31.43	46.00	14.57	QP
6	936.950	23.80	4.04	6.31	34.15	46.00	11.85	QP

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

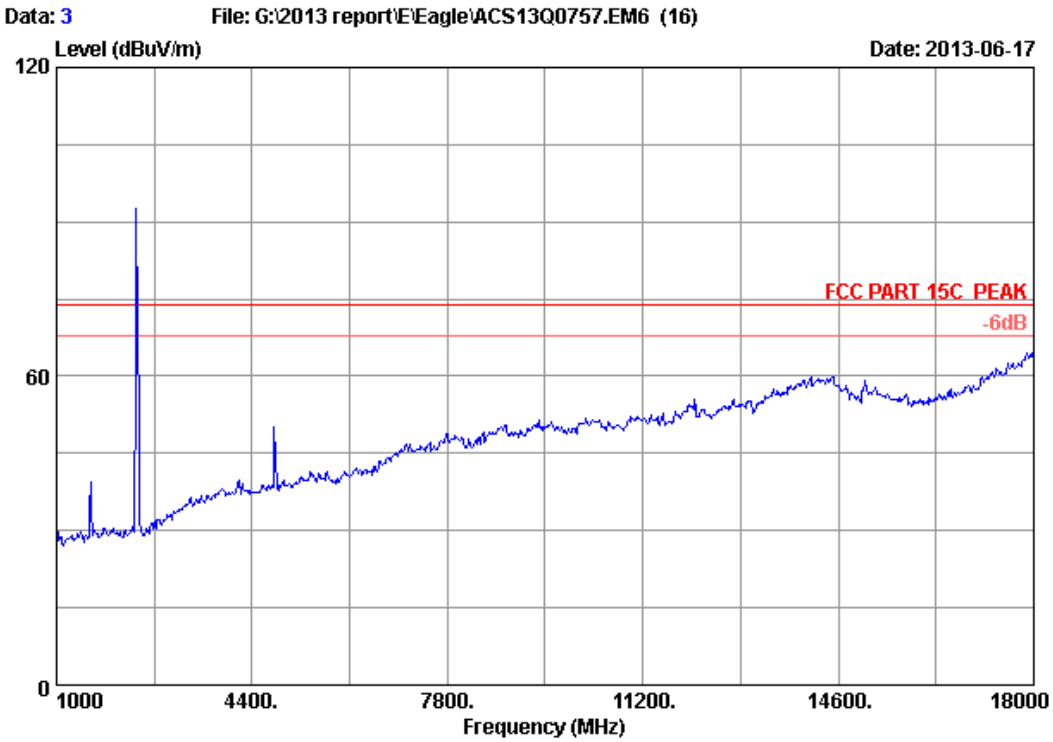


Site no. : 3m Chamber Data no. : 14
Dis. / Ant. : 3m 2013 CBL6111C 2598 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 24*C/65% Engineer : Even_Deng
EUT : Marine Audio System With AM/FM/WB/USB-iP
Power rating : DC 12V
Test Mode : Tx Mode
M/N:PA450UM

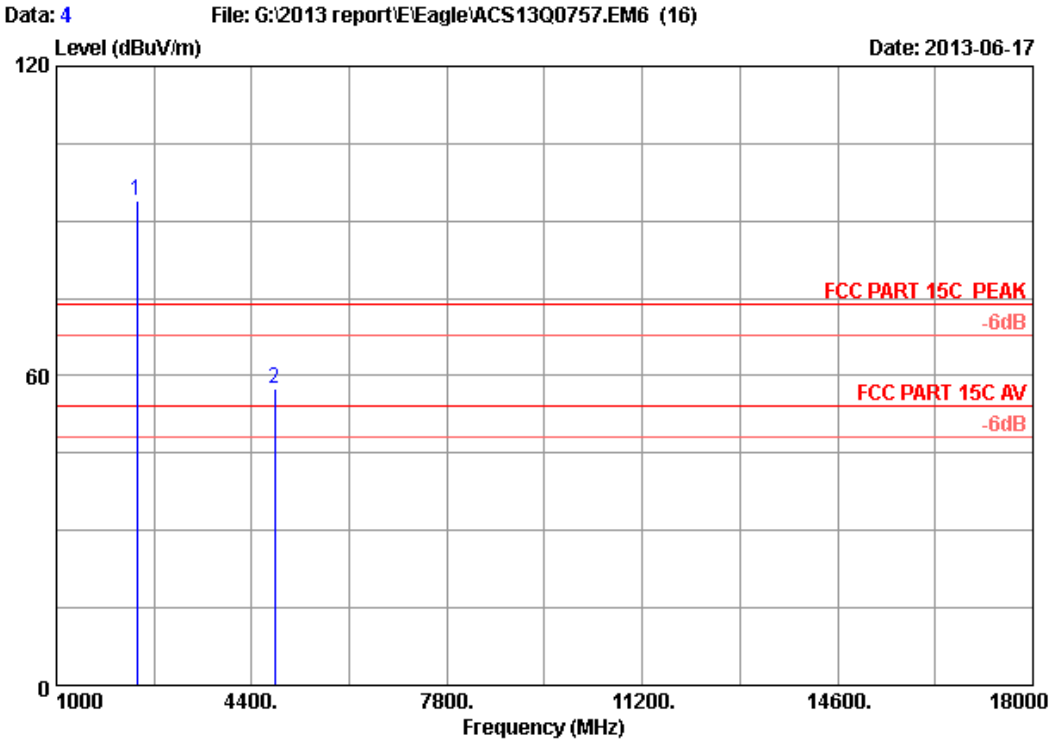
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	34.850	17.13	0.92	10.68	28.73	40.00	11.27	QP
2	83.350	8.44	1.34	17.10	26.88	40.00	13.12	QP
3	107.600	11.36	1.44	17.00	29.80	43.50	13.70	QP
4	167.740	10.53	1.67	20.32	32.52	43.50	10.98	QP
5	255.040	13.20	2.00	19.06	34.26	46.00	11.74	QP
6	371.440	15.53	2.38	17.83	35.74	46.00	10.26	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.	: 3
Dis. / Ant.	: 3m 2012 3115 (4877)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23*C/54%	Engineer	: Tony
EUT	: Marine Audio System with AM/FM/WB/USB-Ipod/Aux in/Bluetooth		
Power supply	: DC 12V		
Test mode	: Tx Mode GFSK 2402MHz		
M/N	: PA450UM		
	:		



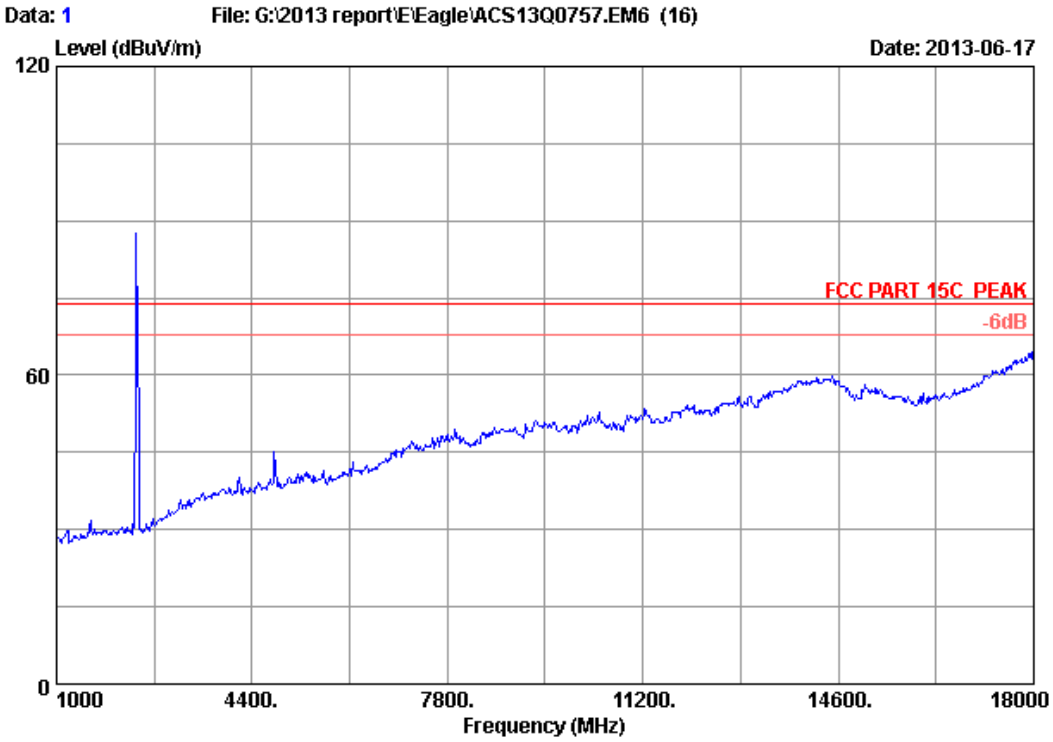
Site no. : 3m Chamber Data no. : 4
Dis. / Ant. : 3m 2012 3115 (4877) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54% Engineer : Tony
EUT : Marine Audio System with AM/FM/WB/USB-Ipod/Aux in/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2402MHz
M/N : PA450UM
:

	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	23.79	5.80	35.70	99.98	93.87			
2	4804.000	31.67	8.56	35.70	52.99	57.52	74.00	16.48	Peak

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

3. Remark: 2402 MHz is the signal from fundamental frequency, no need to comply with The limit.

Freq. (MHz)	Peak level (dBuV/m)	Duty factor (dB)	AV Level (dBuV/m)	Limit (dBuV/m)	Conclusion
4804	57.52	7.63	49.89	54	PASS

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Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 23*C/54%                  Engineer   : Tony
EUT           : Marine Audio System with AM/FM/WB/USB-Ipod/Aux
                in/Bluetooth
Power supply  : DC 12V
Test mode     : Tx Mode  GFSK 2402MHz
M/N           : PA450UM
                :
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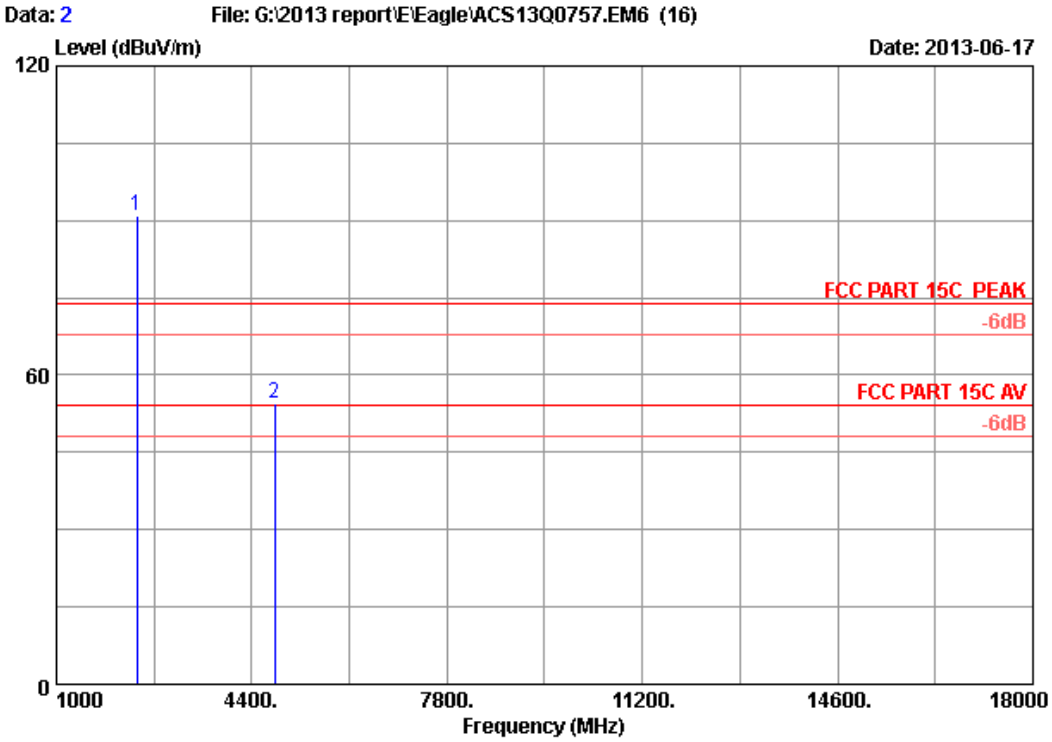


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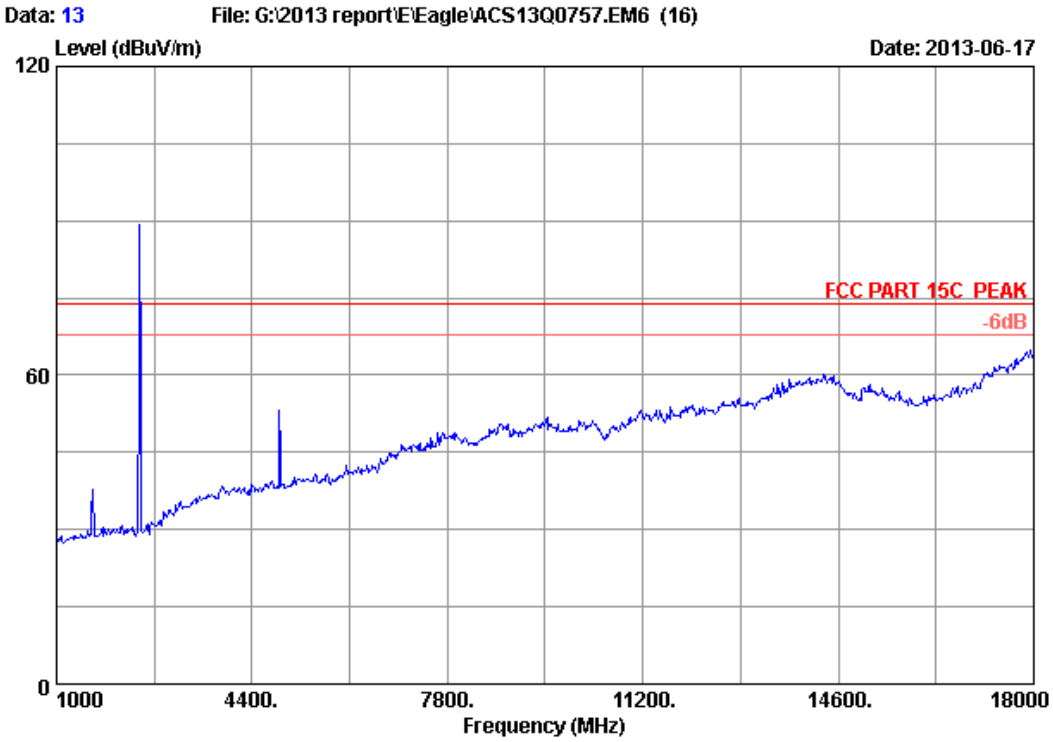
Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 23*C/54%                  Engineer   : Tony
EUT           : Marine Audio System with AM/FM/WB/USB-Ipod/Aux
                in/Bluetooth
Power supply  : DC 12V
Test mode     : Tx Mode  GFSK 2402MHz
M/N           : PA450UM
              :
```

	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	23.79	5.80	35.70	96.94	90.83			
2	4804.000	31.67	8.56	35.70	50.08	54.61	74.00	19.39	Peak

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

3. Remark: 2402 MHz is the signal from fundamental frequency, no need to comply with The limit.

Freq. (MHz)	Peak level (dBuV/m)	Duty factor (dB)	AV Level (dBuV/m)	Limit (dBuV/m)	Conclusion
4804	54.61	7.63	46.98	54	PASS

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Site no.      : 3m Chamber                Data no.   : 13
Dis. / Ant.   : 3m   2012 3115 (4877)     Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 23*C/54%                  Engineer   : Tony
EUT           : Marine Audio System with AM/FM/WB/USB-Ipod/Aux
                in/Bluetooth
Power supply  : DC 12V
Test mode     : Tx Mode  GFSK 2441MHz
M/N           : PA450UM
                :
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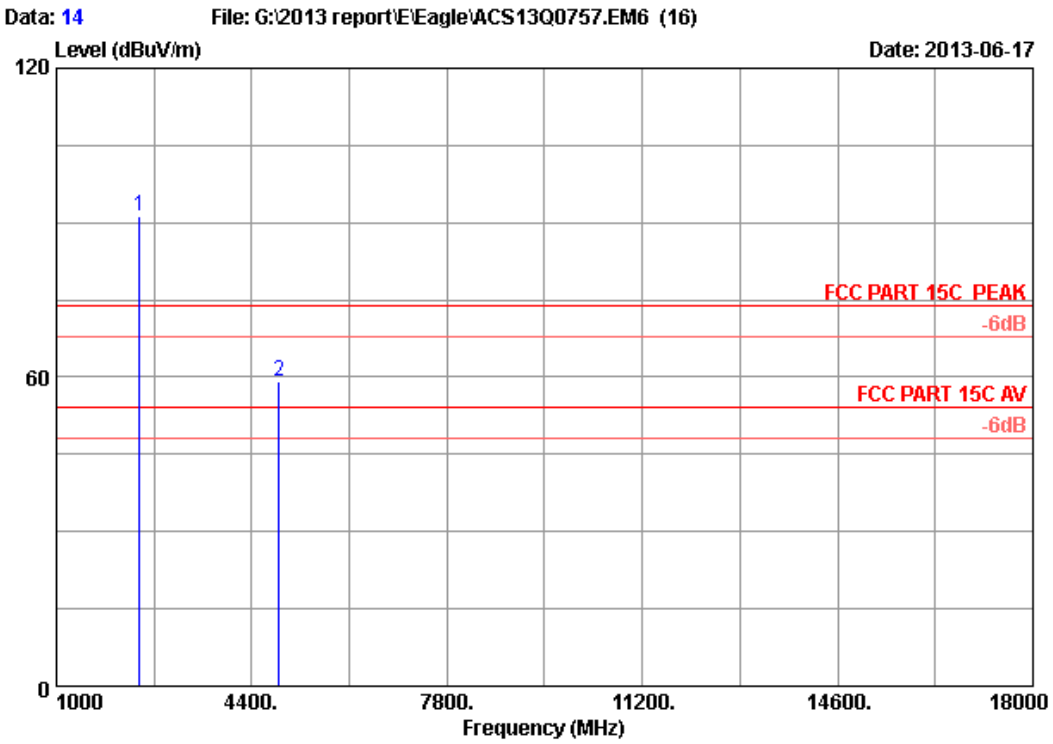


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Site no.      : 3m Chamber                Data no.   : 14
Dis. / Ant.   : 3m   2012 3115 (4877)     Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 23*C/54%                  Engineer   : Tony
EUT           : Marine Audio System with AM/FM/WB/USB-Ipod/Aux
                in/Bluetooth
Power supply  : DC 12V
Test mode     : Tx Mode  GFSK 2441MHz
M/N           : PA450UM
              :
```
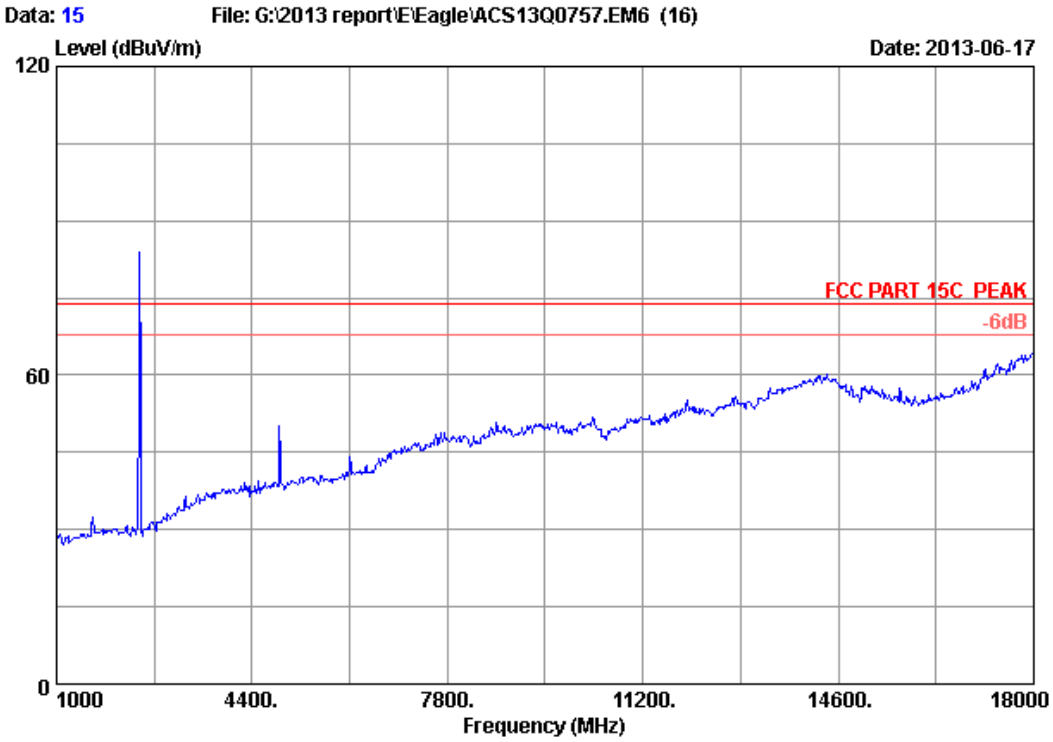
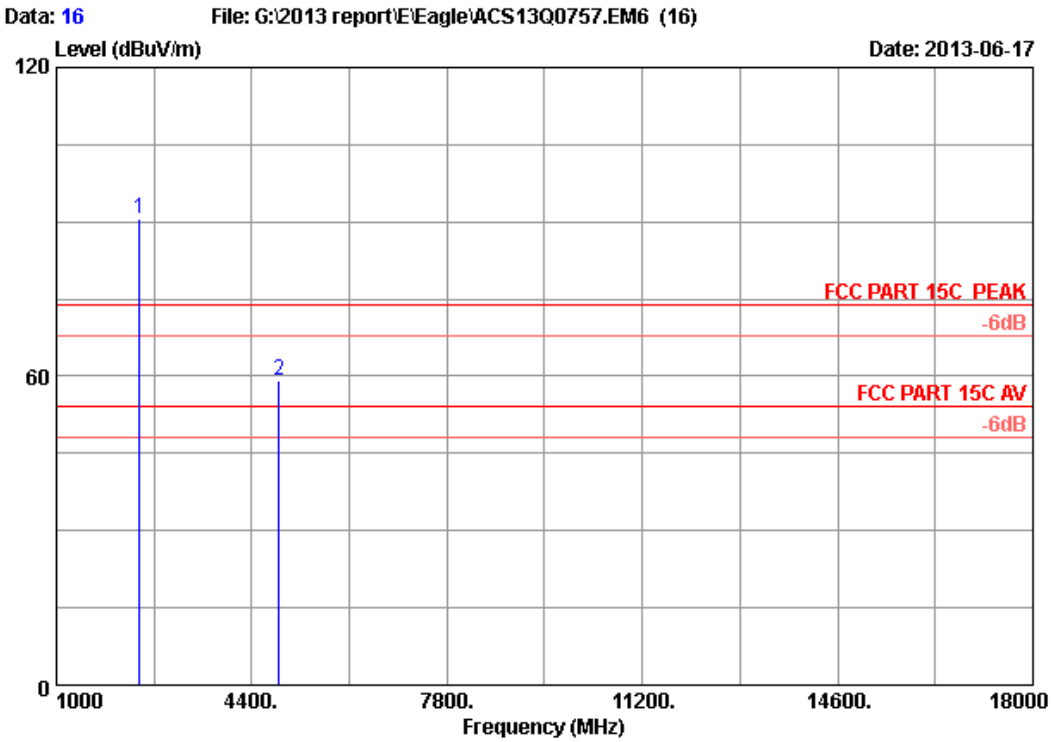

	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.000	23.75	5.86	35.70	97.27	91.18			
2	4882.000	31.88	8.64	35.70	54.24	59.06	74.00	14.94	Peak

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. Remark: 2441 MHz is the signal from fundamental frequency, no need to comply with The limit.

Freq. (MHz)	Peak level (dBuV/m)	Duty factor (dB)	AV Level (dBuV/m)	Limit (dBuV/m)	Conclusion
4882	59.06	7.63	51.43	54	PASS




```
Site no.      : 3m Chamber                Data no.   : 15
Dis. / Ant.   : 3m   2012 3115 (4877)     Ant. pol.  : VERTICAL
Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 23*C/54%                  Engineer   : Tony
EUT           : Marine Audio System with AM/FM/WB/USB-Ipod/Aux
                in/Bluetooth
Power supply  : DC 12V
Test mode     : Tx Mode  GFSK 2441MHz
M/N           : PA450UM
                :
```



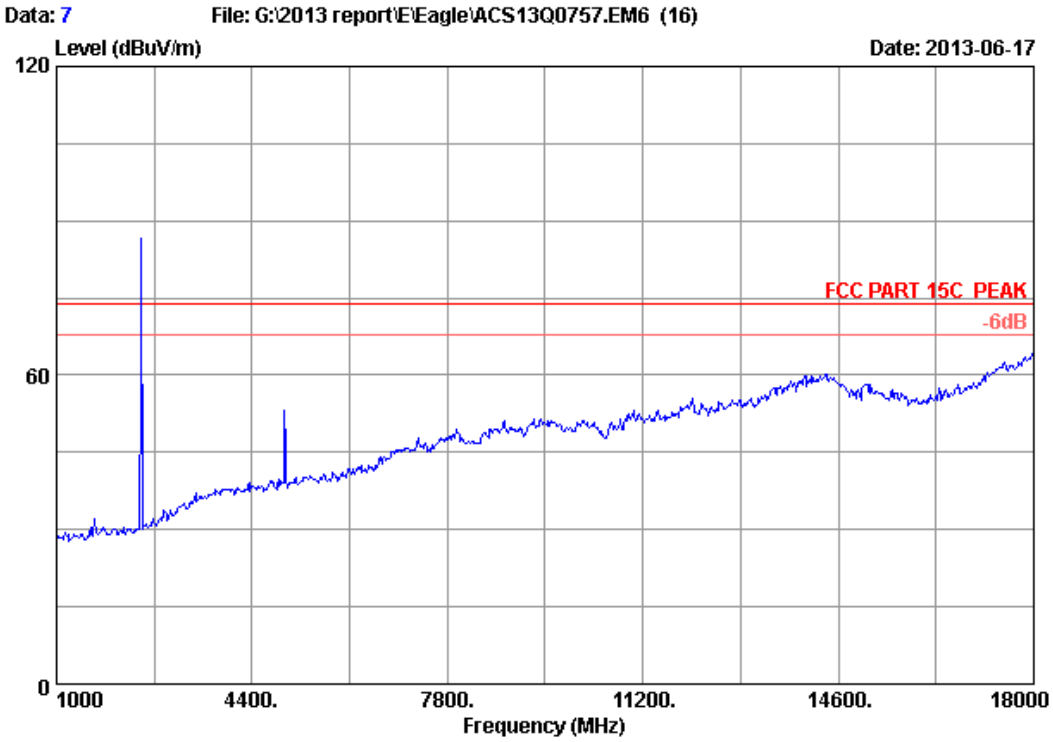
Site no. : 3m Chamber Data no. : 16
Dis. / Ant. : 3m 2012 3115 (4877) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54% Engineer : Tony
EUT : Marine Audio System with AM/FM/WB/USB-Ipod/Aux in/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2441MHz
M/N : PA450UM
:

	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	2441.000	23.75	5.86	35.70	96.59	90.50			
2	4882.000	31.88	8.64	35.70	54.19	59.01	74.00	14.99	Peak

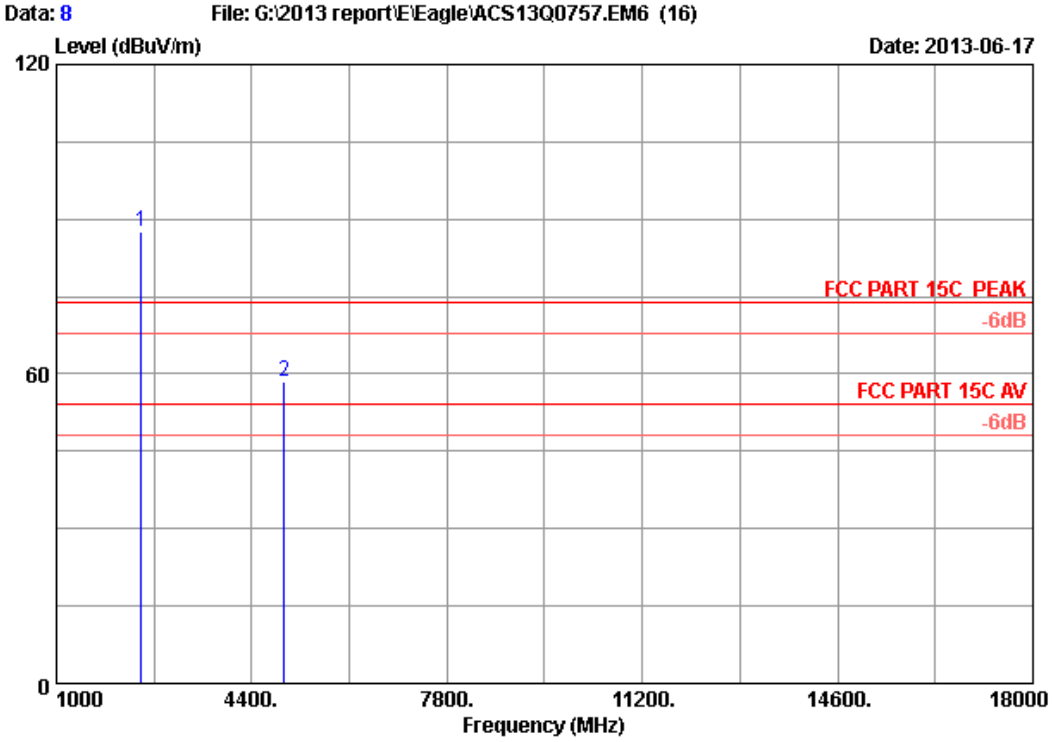
Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

3. Remark: 2441 MHz is the signal from fundamental frequency, no need to comply with The limit.

Freq. (MHz)	Peak level (dBuV/m)	Duty factor (dB)	AV Level (dBuV/m)	Limit (dBuV/m)	Conclusion
4882	59.01	7.63	51.38	54	PASS



Site no.	: 3m Chamber	Data no.	: 7
Dis. / Ant.	: 3m 2012 3115 (4877)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15C PEAK		
Env. / Ins.	: 23*C/54%	Engineer	: Tony
EUT	: Marine Audio System with AM/FM/WB/USB-Ipod/Aux in/Bluetooth		
Power supply	: DC 12V		
Test mode	: Tx Mode GFSK 2480MHz		
M/N	: PA450UM		
	:		

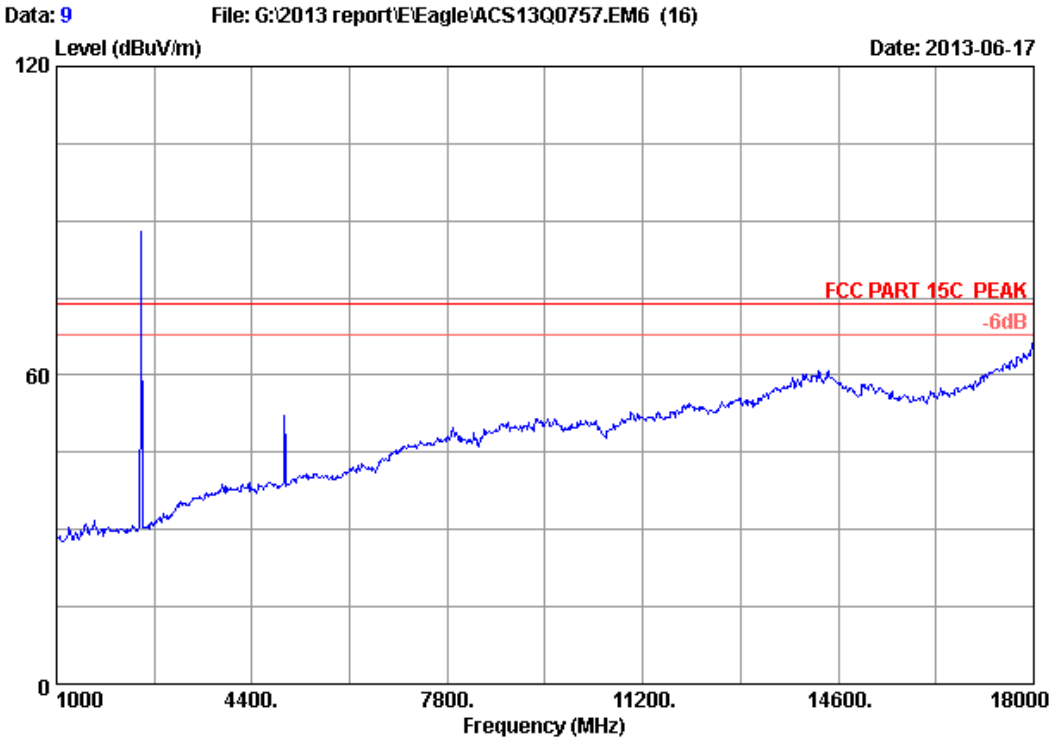



```
Site no.      : 3m Chamber                Data no.   : 8
Dis. / Ant.   : 3m   2012 3115 (4877)     Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 23*C/54%                  Engineer   : Tony
EUT           : Marine Audio System with AM/FM/WB/USB-Ipod/Aux
                in/Bluetooth
Power supply  : DC 12V
Test mode     : Tx Mode  GFSK 2480MHz
M/N           : PA450UM
              :
```

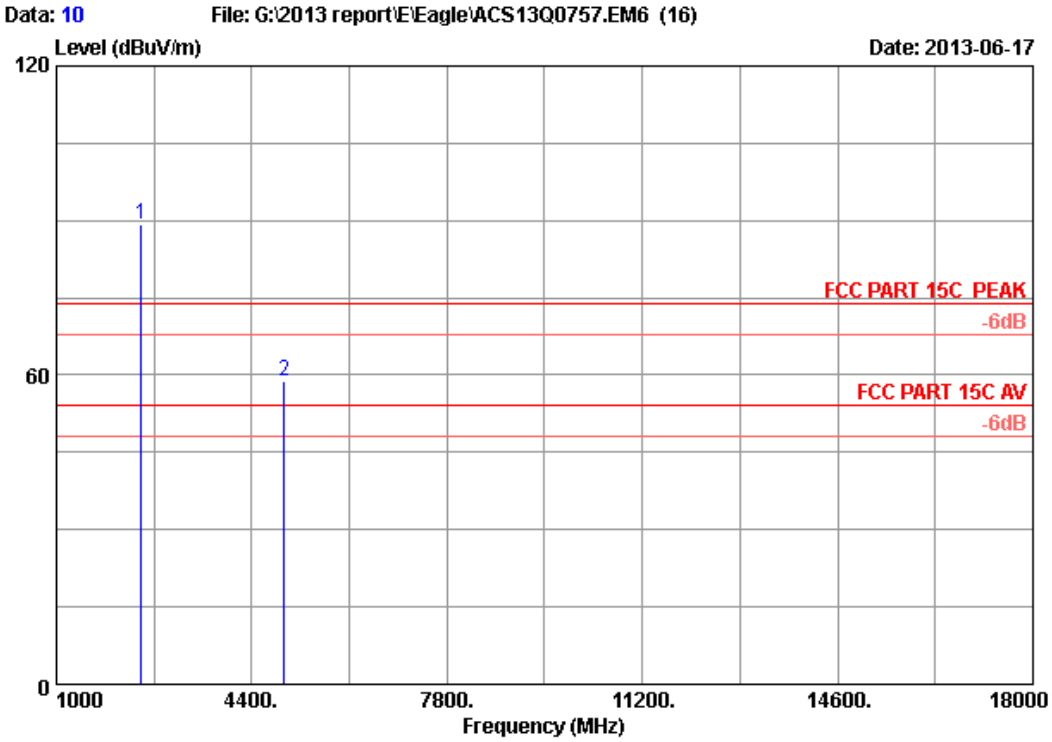
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	23.72	5.91	35.70	93.54	87.47			
2	4960.000	32.09	8.72	35.70	53.38	58.49	74.00	15.51	Peak

Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. Remark: 2480 MHz is the signal from fundamental frequency, no need to comply with The limit.

Freq. (MHz)	Peak level (dBuV/m)	Duty factor (dB)	AV Level (dBuV/m)	Limit (dBuV/m)	Conclusion
4960	58.49	7.63	50.86	54	PASS




```
Site no.      : 3m Chamber                Data no.   : 9
Dis. / Ant.   : 3m   2012 3115 (4877)     Ant. pol.  : VERTICAL
Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 23*C/54%                  Engineer   : Tony
EUT           : Marine Audio System with AM/FM/WB/USB-Ipod/Aux
                in/Bluetooth
Power supply  : DC 12V
Test mode     : Tx Mode  GFSK 2480MHz
M/N           : PA450UM
                :
```




```
Site no.      : 3m Chamber                Data no.   : 10
Dis. / Ant.   : 3m   2012 3115 (4877)     Ant. pol.  : VERTICAL
Limit         : FCC PART 15C  PEAK
Env. / Ins.   : 23*C/54%                  Engineer   : Tony
EUT           : Marine Audio System with AM/FM/WB/USB-Ipod/Aux
                in/Bluetooth
Power supply  : DC 12V
Test mode     : Tx Mode  GFSK 2480MHz
M/N           : PA450UM
              :
```

	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	23.72	5.91	35.70	95.30	89.23			
2	4960.000	32.09	8.72	35.70	53.63	58.74	74.00	15.26	Peak

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

3. Remark: 2480 MHz is the signal from fundamental frequency, no need to comply with The limit.

Freq. (MHz)	Peak level (dBuV/m)	Duty factor (dB)	AV Level (dBuV/m)	Limit (dBuV/m)	Conclusion
4960	58.74	7.63	51.01	54	PASS

4. CONDUCTED SPURIOUS EMISSIONS

4.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1 Year
2.	Attenuator	Agilent	8491B	MY39262165	May.08,13	1 Year
3.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,13	1Year

4.2. 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.

4.3. Test Procedure

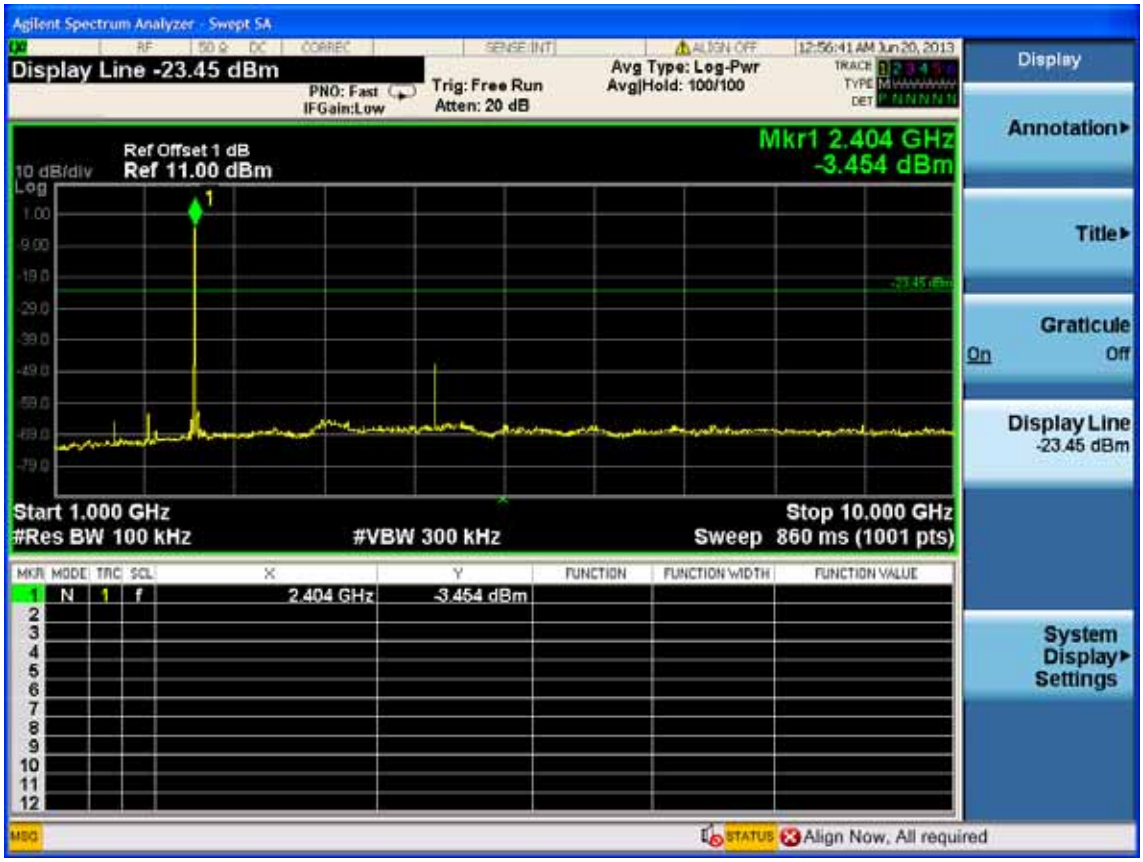
The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.

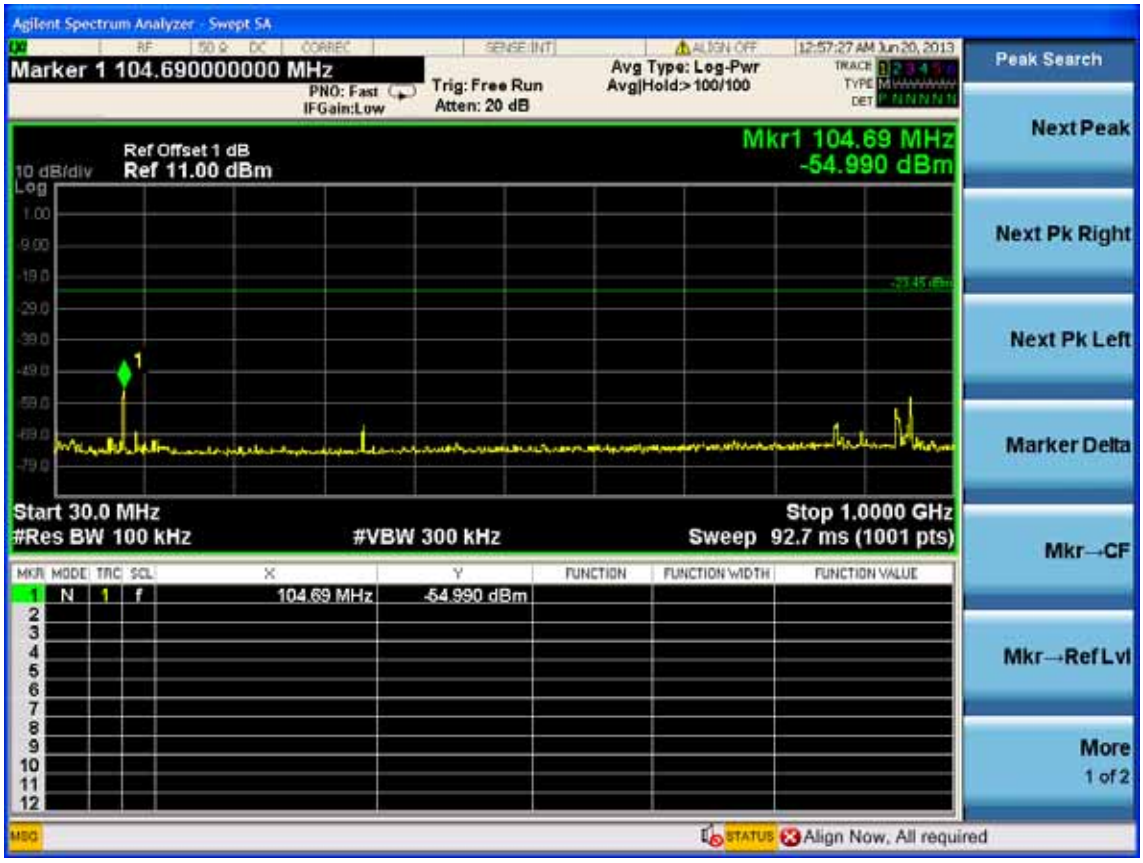
4.4. Test result

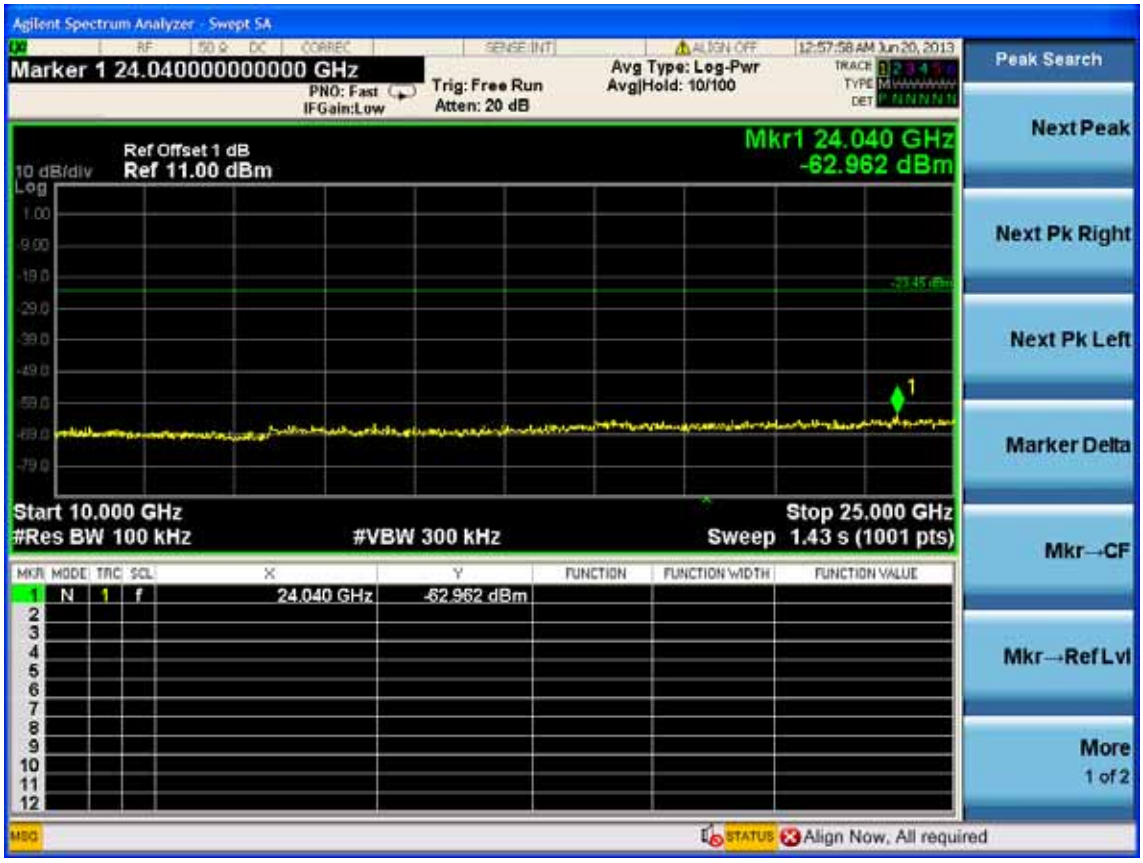
PASS (The testing data was attached in the next pages.)

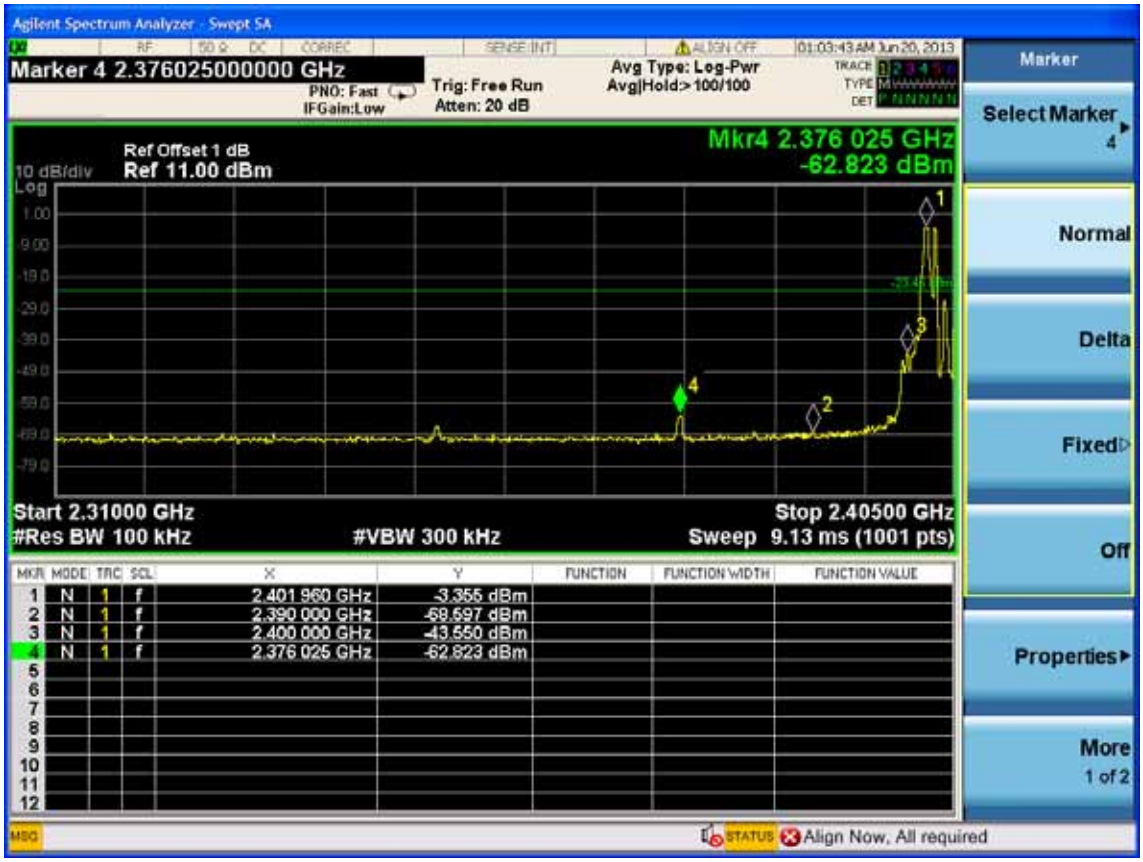
Hopping Off

2402MHz

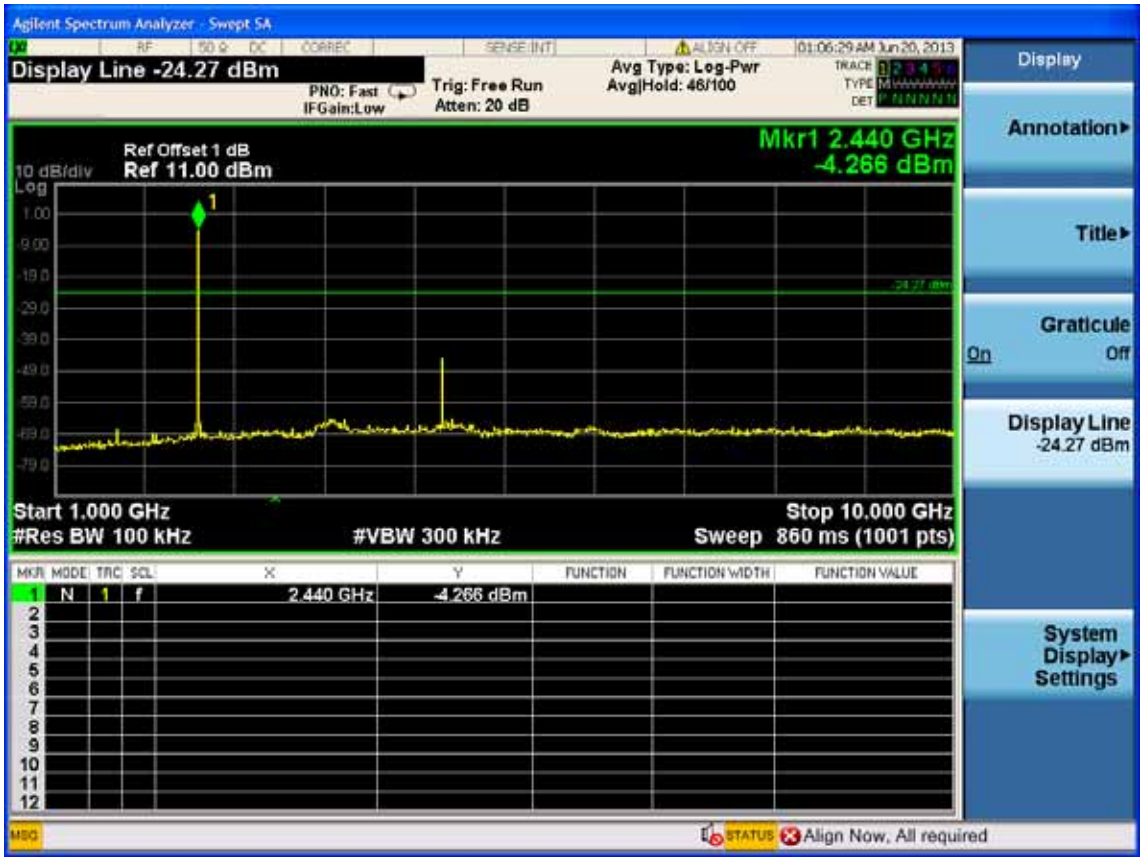


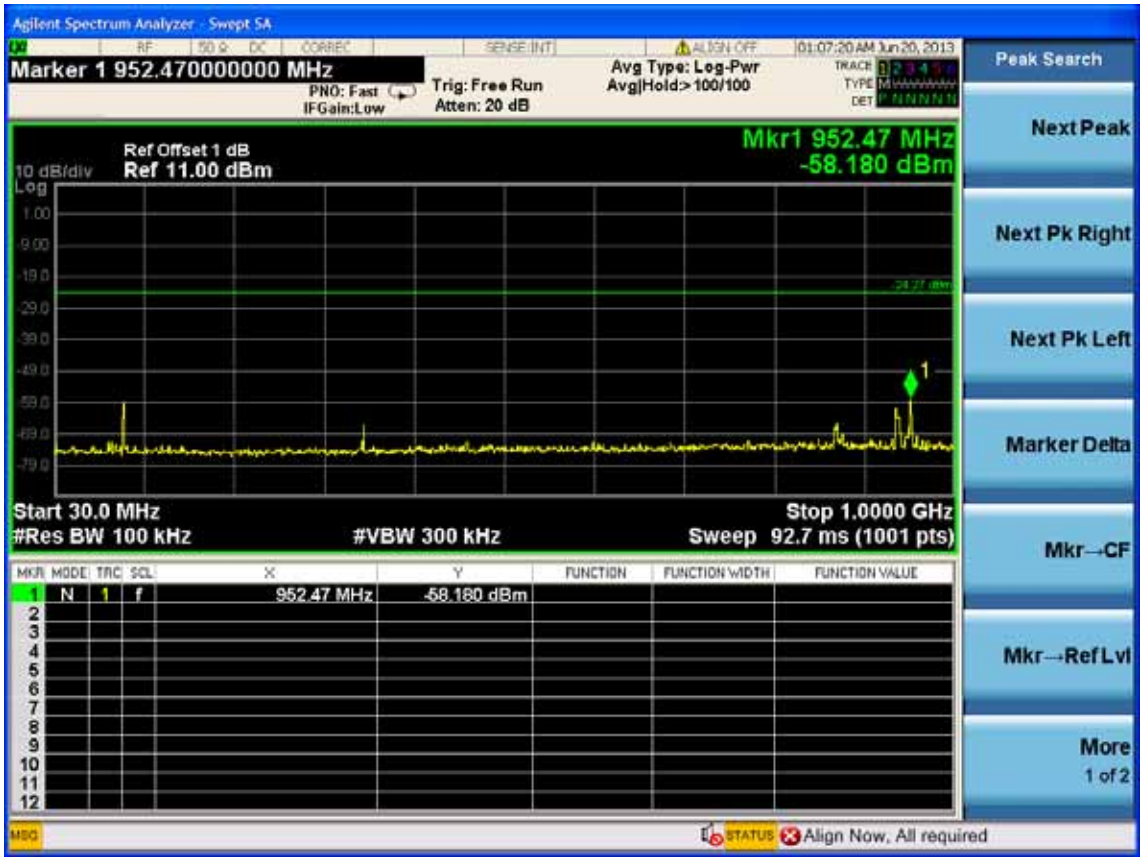


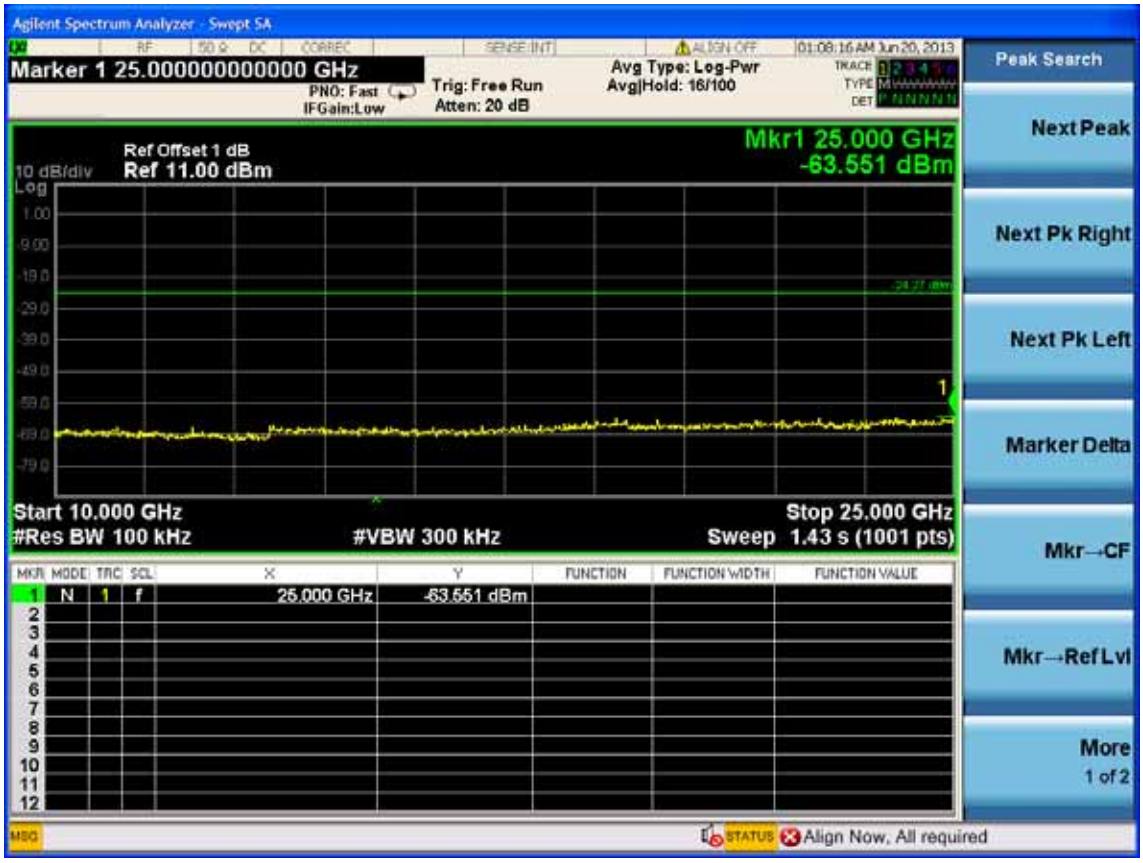

Agilent Spectrum Analyzer - Swept SA
Marker 1 24.040000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 10/100
12:57:58 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Log
Ref 11.00 dBm
Mkr1 24.040 GHz
-62.962 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 1.43 s (1001 pts)
1 N 1 f 24.040 GHz -62.962 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Align Now, All required


Agilent Spectrum Analyzer - Swept SA
Marker 4 2.376025000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:03:43 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Log
Ref 11.00 dBm
Mkr4 2.376 025 GHz
-62.823 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 2.401 960 GHz -3.355 dBm
2 N 1 f 2.390 000 GHz -68.597 dBm
3 N 1 f 2.400 000 GHz -43.550 dBm
4 N 1 f 2.376 025 GHz -62.823 dBm
Marker
Select Marker
4
Normal
Delta
Fixed
Off
Properties
More
1 of 2
Align Now, All required

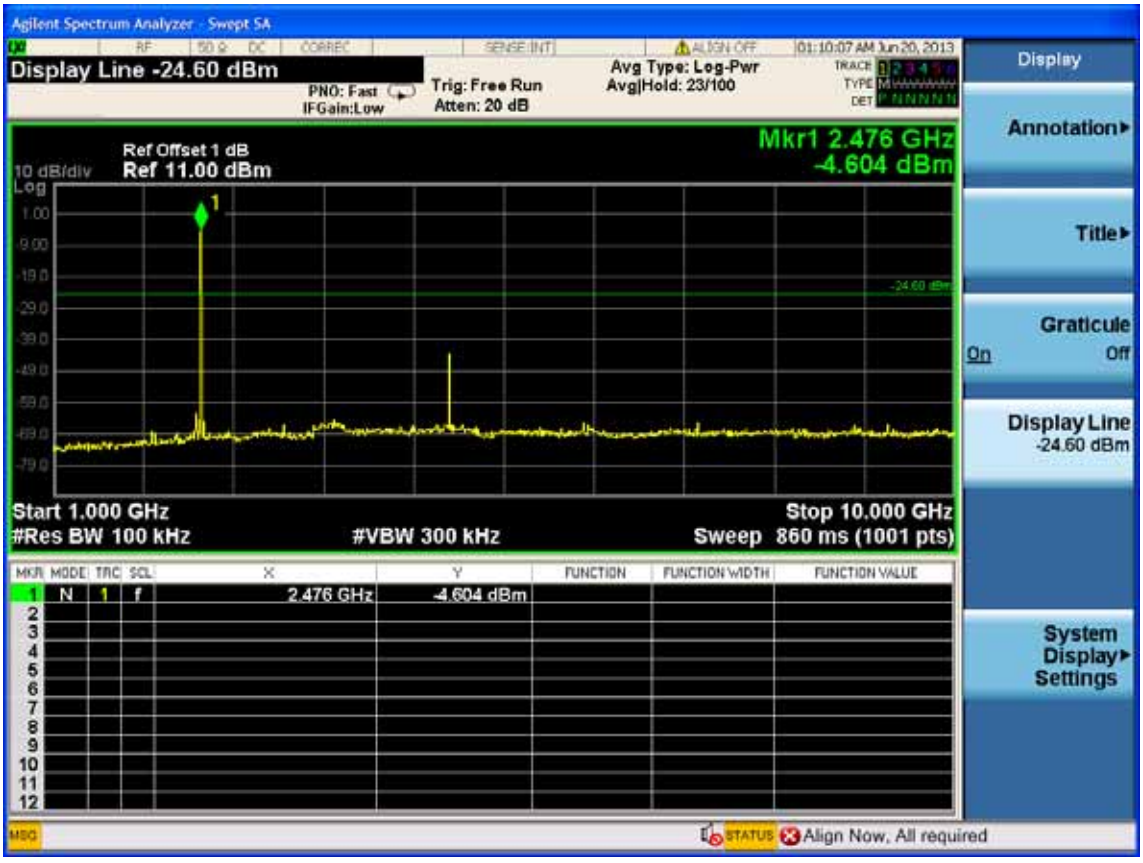
2441MHz

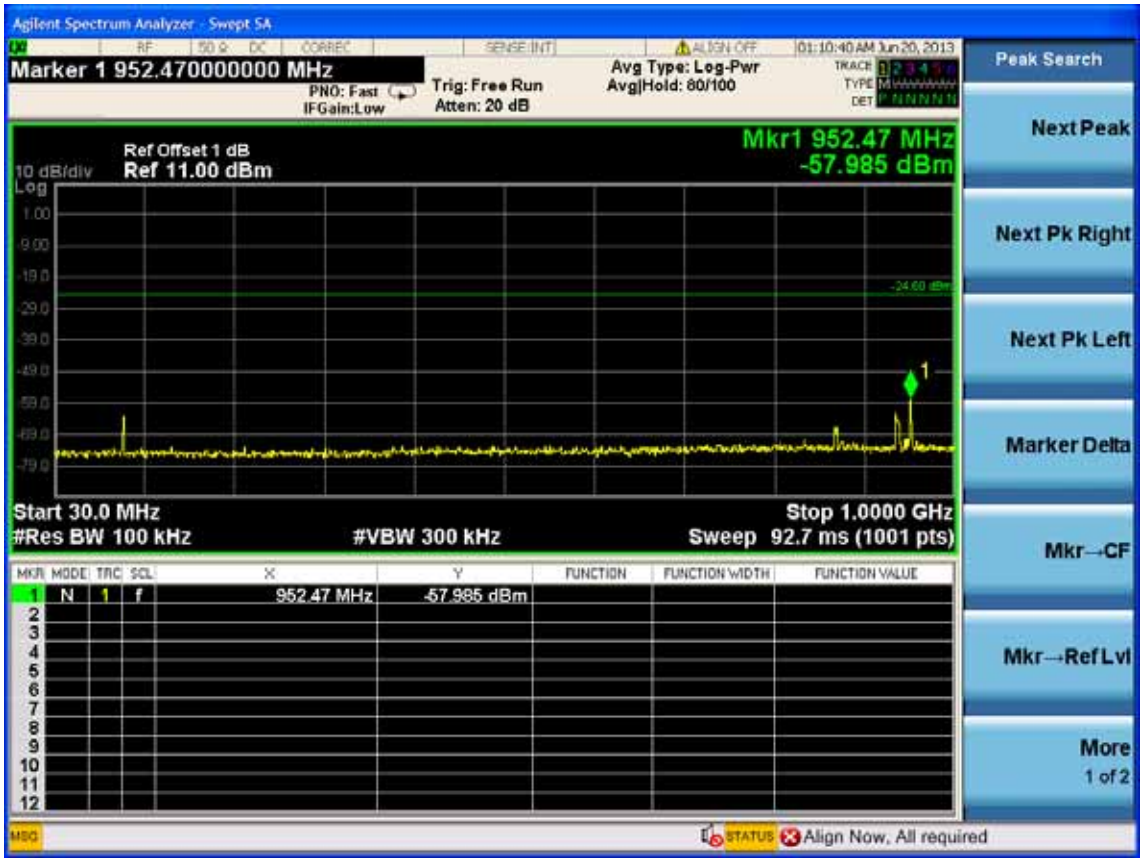

Agilent Spectrum Analyzer - Swept SA
Display Line -24.27 dBm
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 46/100
01:06:29 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 2.440 GHz
-4.266 dBm
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 860 ms (1001 pts)
1 N 1 f 2.440 GHz -4.266 dBm
Display
Annotation
Title
Graticule
On Off
Display Line
-24.27 dBm
System Display Settings
Align Now, All required

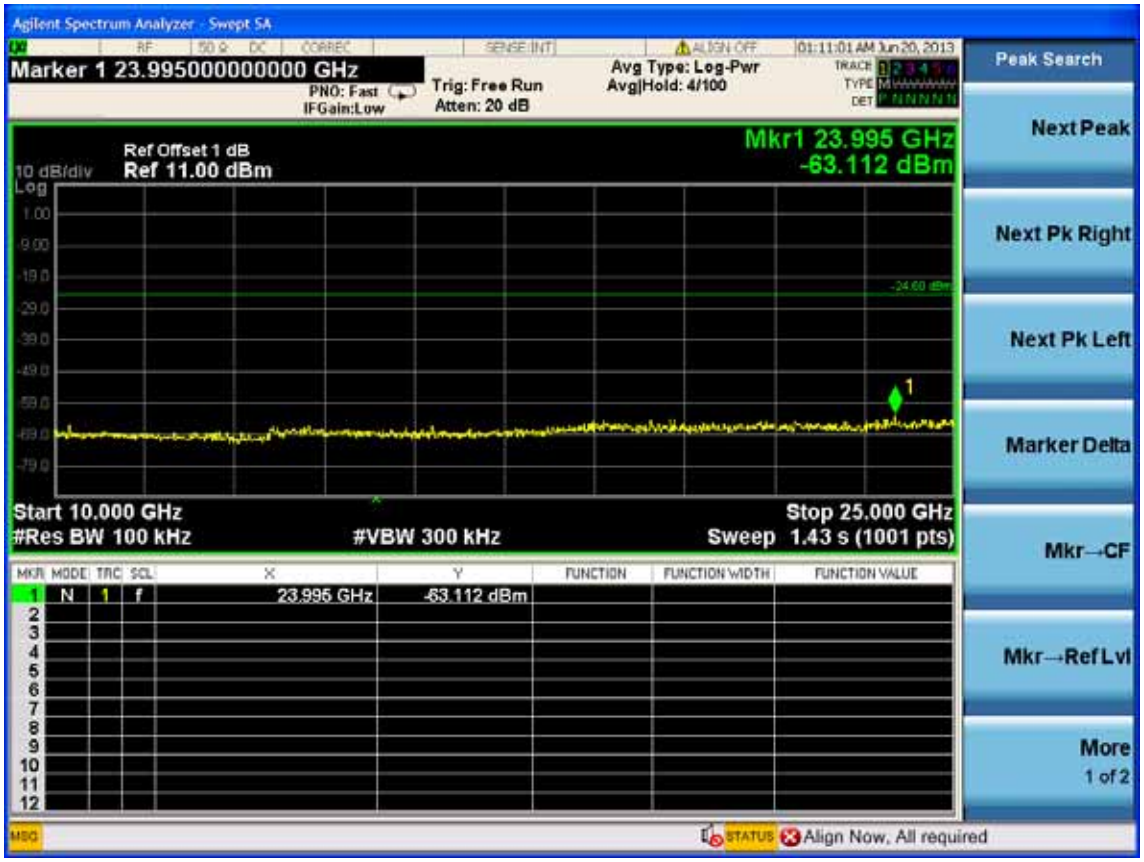

Agilent Spectrum Analyzer - Swept SA
Marker 1 952.470000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:07:20 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 952.47 MHz
-58.180 dBm
Start 30.0 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 92.7 ms (1001 pts)
1 N 1 f 952.47 MHz -58.180 dBm
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Align Now, All required

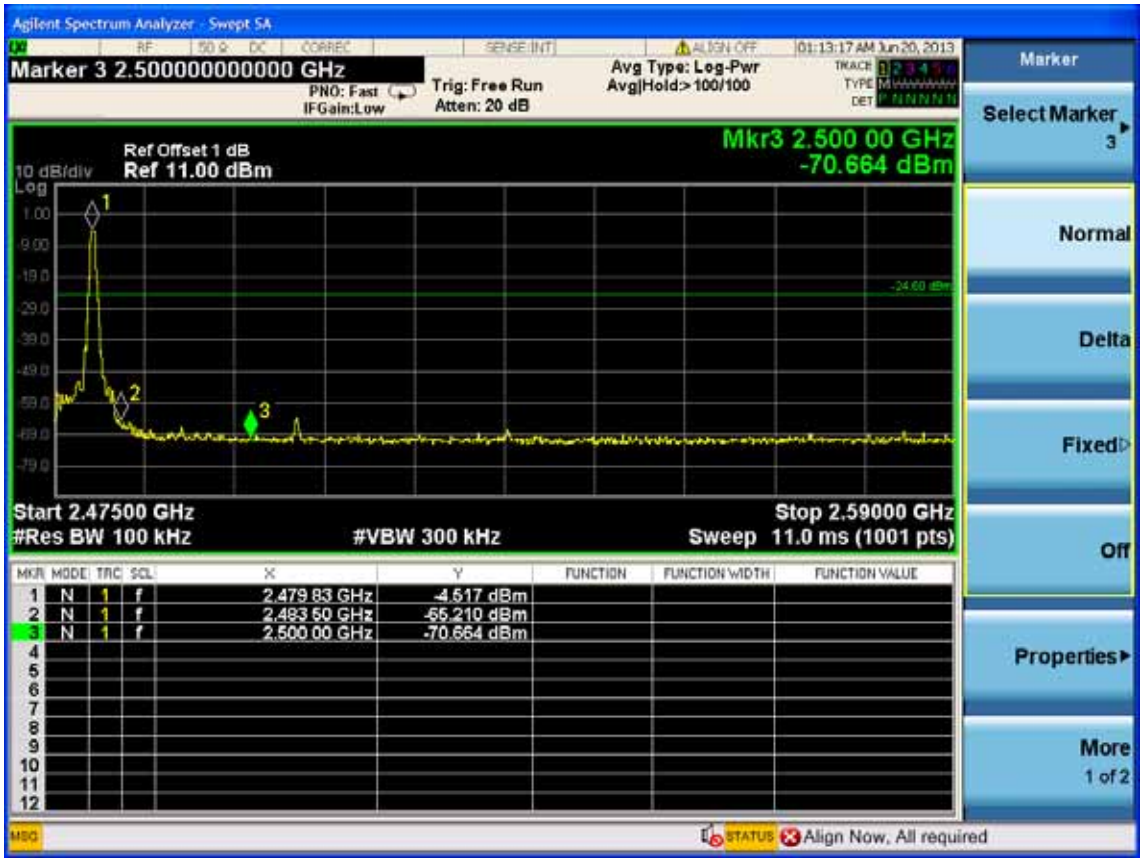

Agilent Spectrum Analyzer - Swept SA
Marker 1 25.000000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 16/100
01:08:16 AM Jun 20, 2013
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 25.000 GHz
-63.551 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 25.000 GHz -63.551 dBm
Align Now, All required

2480MHz

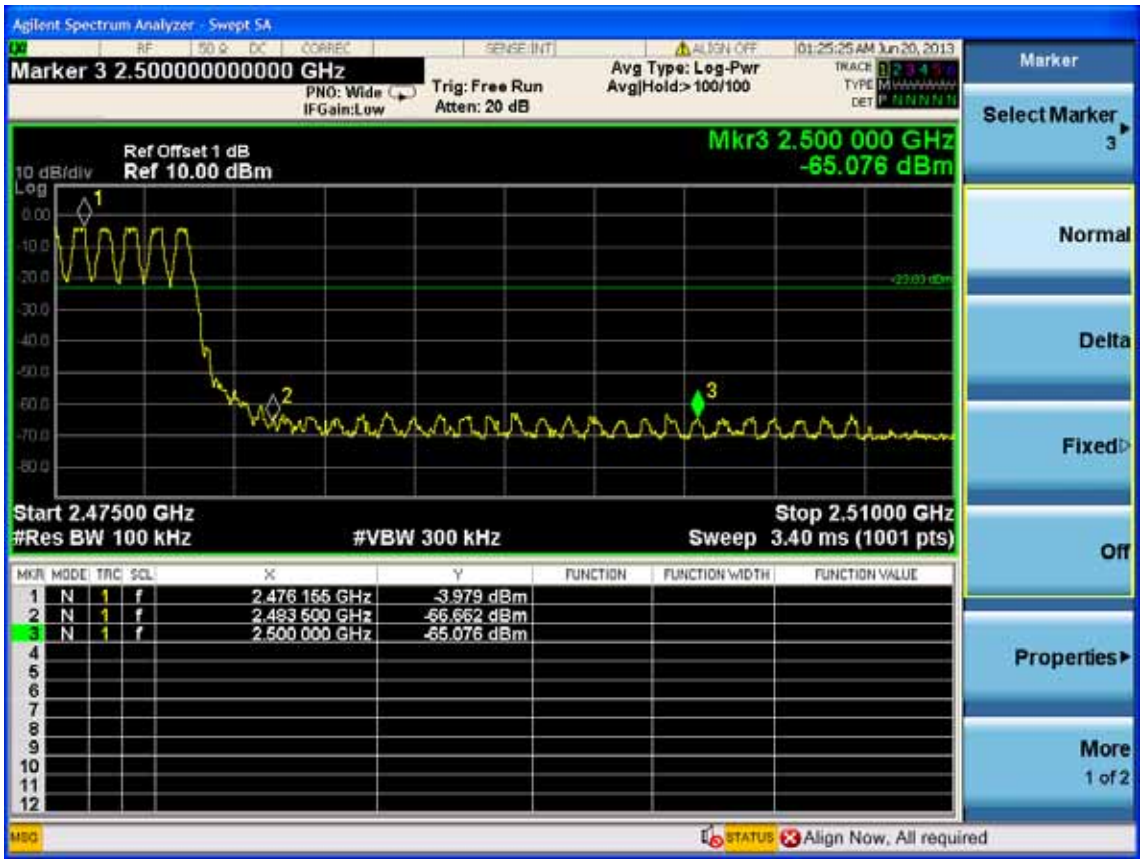

Agilent Spectrum Analyzer - Swept SA
Display Line -24.60 dBm
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 23/100
01:10:07 AM Jun 20, 2013
Display
Annotation
Title
Graticule
On Off
Display Line
-24.60 dBm
System
Display
Settings
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 2.476 GHz
-4.604 dBm
Start 1.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 10.000 GHz
Sweep 860 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.476 GHz -4.604 dBm
Align Now, All required

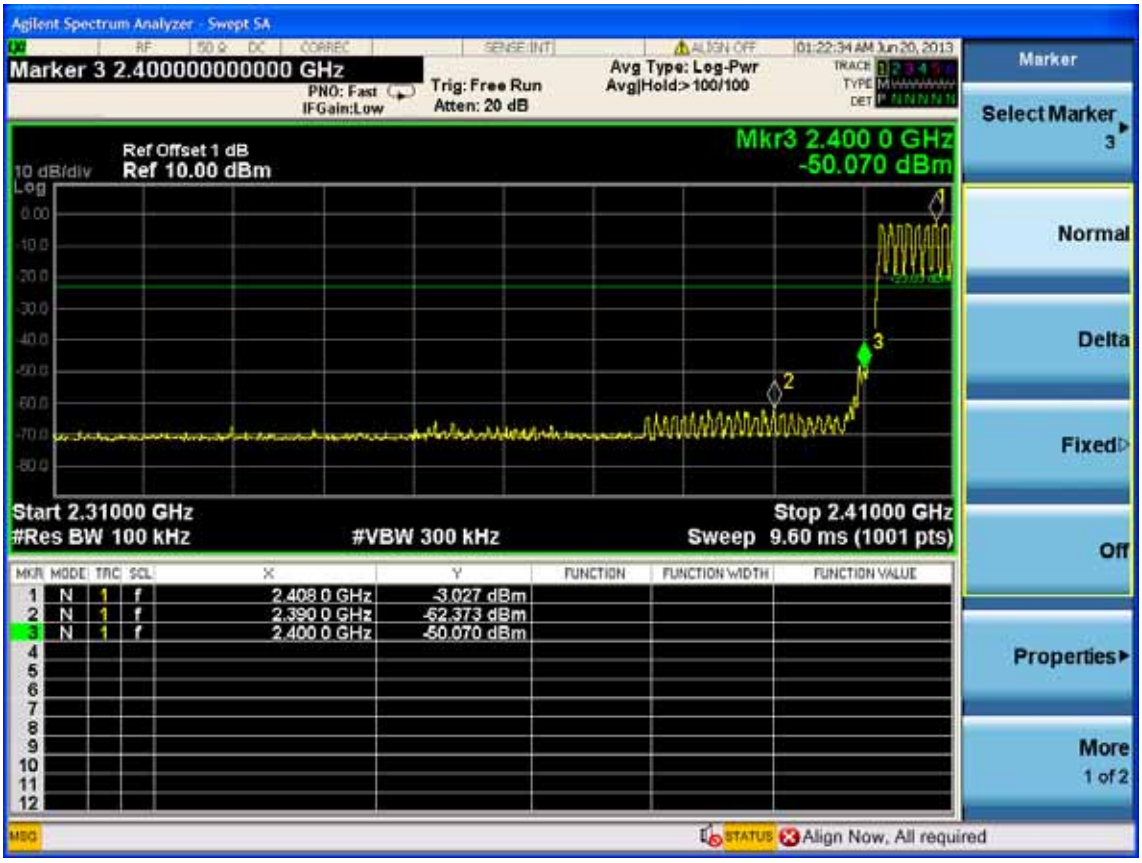

Agilent Spectrum Analyzer - Swept SA
Marker 1 952.470000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 80/100
01:10:40 AM Jun 20, 2013
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Ref Offset 1 dB
10 dB/div
Log
Ref 11.00 dBm
Mkr1 952.47 MHz
-57.985 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 952.47 MHz -57.985 dBm
Align Now, All required


Agilent Spectrum Analyzer - Swept SA
Marker 1 23.995000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 4/100
01:11:01 AM Jun 20, 2013
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Ref Offset 1 dB
10 dB/div
Log
Ref 11.00 dBm
Mkr1 23.995 GHz
-63.112 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 23.995 GHz -63.112 dBm
Align Now, All required


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.500000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:13:17 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Log
Ref 11.00 dBm
Mkr3 2.500 00 GHz
-70.664 dBm
Start 2.47500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.59000 GHz
Sweep 11.0 ms (1001 pts)
1 N 1 f 2.479 83 GHz -4.517 dBm
2 N 1 f 2.483 50 GHz -65.210 dBm
3 N 1 f 2.500 00 GHz -70.664 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2
Align Now, All required

Hopping on


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.500000000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:25:25 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr3 2.500 000 GHz
-65.076 dBm
Start 2.47500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.51000 GHz
Sweep 3.40 ms (1001 pts)
1 N 1 f 2.476 155 GHz -3.979 dBm
2 N 1 f 2.483 500 GHz -66.662 dBm
3 N 1 f 2.500 000 GHz -65.076 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2
Align Now, All required


Agilent Spectrum Analyzer - Swept SA
Marker 3 2.400000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:22:34 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr3 2.400 0 GHz
-50.070 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.41000 GHz
Sweep 9.60 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.408 0 GHz -3.027 dBm
2 N 1 f 2.390 0 GHz -62.373 dBm
3 N 1 f 2.400 0 GHz -50.070 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2
MSG
STATUS
Align Now, All required

5. CARRIER FREQUENCY SEPARATION TEST

5.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1 Year

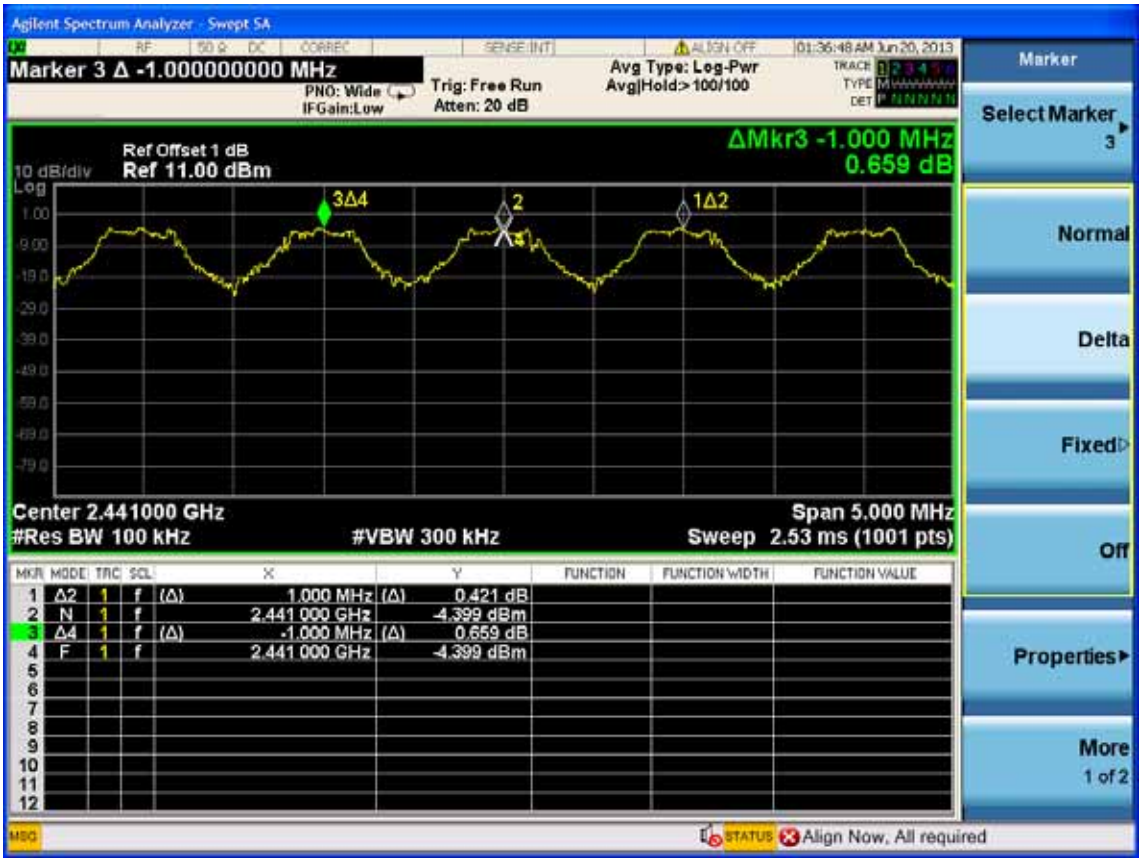
5.2.Limit

Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

5.3.Test Results.

EUT: Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth		
M/N: PA450UM		
Test date:2013-6-22	Pressure: 101.1±1.0 kpa	Humidity: 52.6±3.0%
Tested by: Leo-Li	Test site: RF site	Temperature:24.5±0.6 ℃

Test Mode	Channel separation	Conclusion
GFSK	1.0MHz	PASS


Agilent Spectrum Analyzer - Swept SA
Marker 3 Δ -1.000000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:36:48 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
ΔMkr3 -1.000 MHz
0.659 dB
3Δ4
2
1Δ2
Center 2.441000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 5.000 MHz
Sweep 2.53 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 Δ2 1 f (Δ) 1.000 MHz (Δ) 0.421 dB
2 N 1 f 2.441 000 GHz -4.399 dBm
3 Δ4 1 f (Δ) -1.000 MHz (Δ) 0.659 dB
4 F 1 f 2.441 000 GHz -4.399 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2
MSG
STATUS
Align Now, All required

6. 20 DB BANDWIDTH TEST

6.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1 Year

6.2.Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

6.3.Test Results

EUT: Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth		
M/N: PA450UM		
Test date:2013-6-22	Pressure: 101.1±1.0 kpa	Humidity: 52.6±3.0%
Tested by: Leo-Li	Test site: RF site	Temperature:24.5±0.6 ℃

Test Mode	CH (MHz)	20dB bandwidth (KHz)	Limit (KHz)
GFSK	2402	833.2	N/A
	2441	833.7	N/A
	2480	837.5	N/A
Conclusion：PASS			

GFSK

Test Frequency: 2402MHz

Test Frequency: 2441MHz

Test Frequency: 2480MHz

7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1 Year

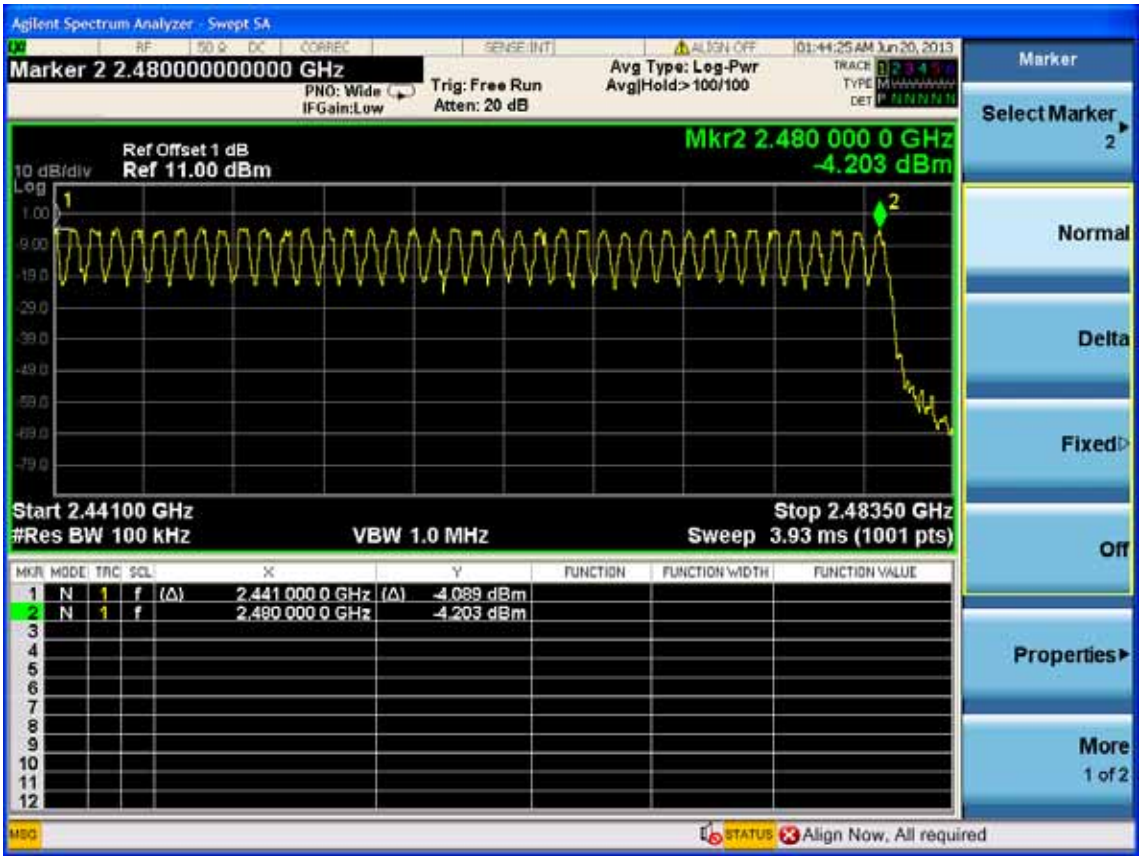
7.2.Limit

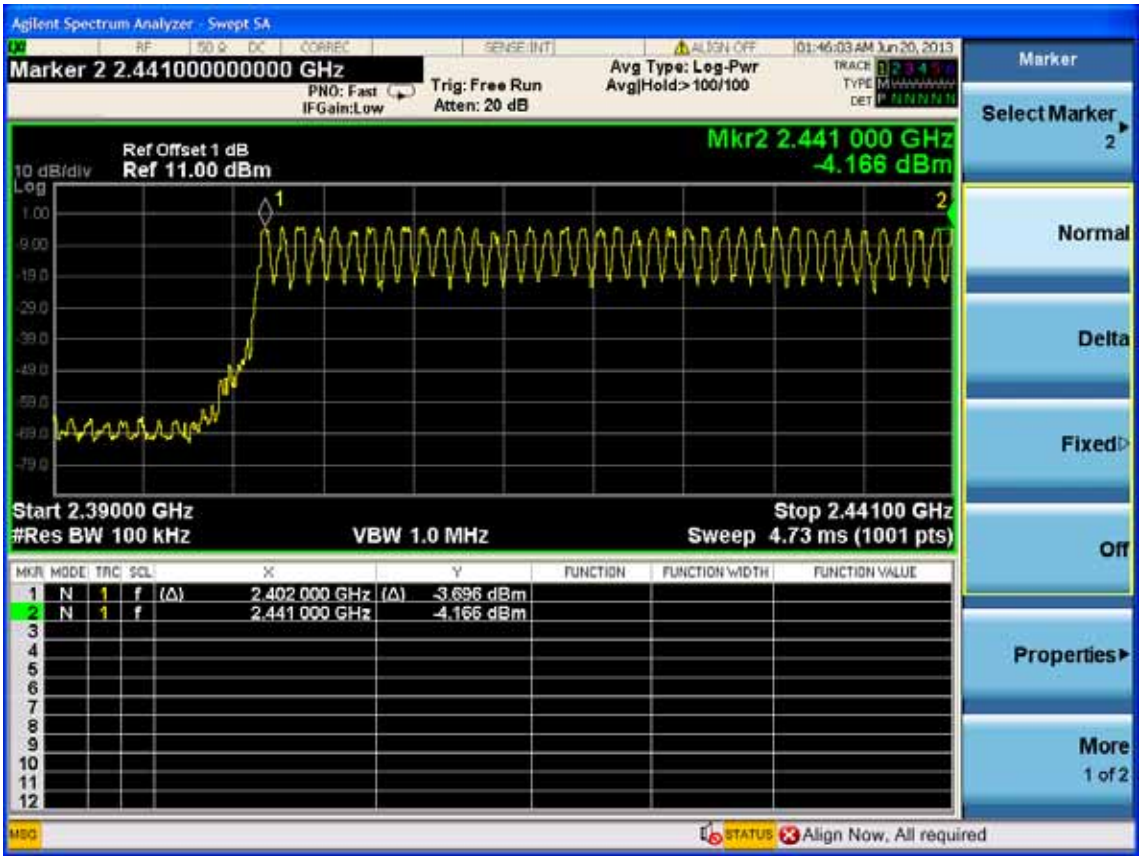
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

7.3.Test Results

EUT: Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth		
M/N: PA450UM		
Test date:2013-6-22	Pressure: 101.1±1.0 kpa	Humidity: 52.6±3.0%
Tested by: Leo-Li	Test site: RF site	Temperature:24.5±0.6 ℃

Test Mode	Number of channel	Limit	Conclusion
GFSK	79	>=15	PASS


Agilent Spectrum Analyzer - Swept SA
Marker 2 2.480000000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:44:25 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr2 2.480 000 0 GHz
-4.203 dBm
Start 2.44100 GHz
#Res BW 100 kHz
VBW 1.0 MHz
Stop 2.48350 GHz
Sweep 3.93 ms (1001 pts)
1 N 1 f (Δ) 2.441 000 0 GHz (Δ) -4.089 dBm
2 N 1 f 2.480 000 0 GHz -4.203 dBm
Marker
Select Marker 2
Normal
Delta
Fixed
Off
Properties
More 1 of 2
Align Now, All required


Agilent Spectrum Analyzer - Swept SA
Marker 2 2.441000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
01:46:03 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr2 2.441 000 GHz
-4.166 dBm
Start 2.39000 GHz
#Res BW 100 kHz
VBW 1.0 MHz
Stop 2.44100 GHz
Sweep 4.73 ms (1001 pts)
1 N 1 f (Δ) 2.402 000 GHz (Δ) -3.696 dBm
2 N 1 f 2.441 000 GHz -4.166 dBm
Marker
Select Marker 2
Normal
Delta
Fixed
Off
Properties
More 1 of 2
Align Now, All required

8. DWELL TIME

8.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1 Year

8.2.Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

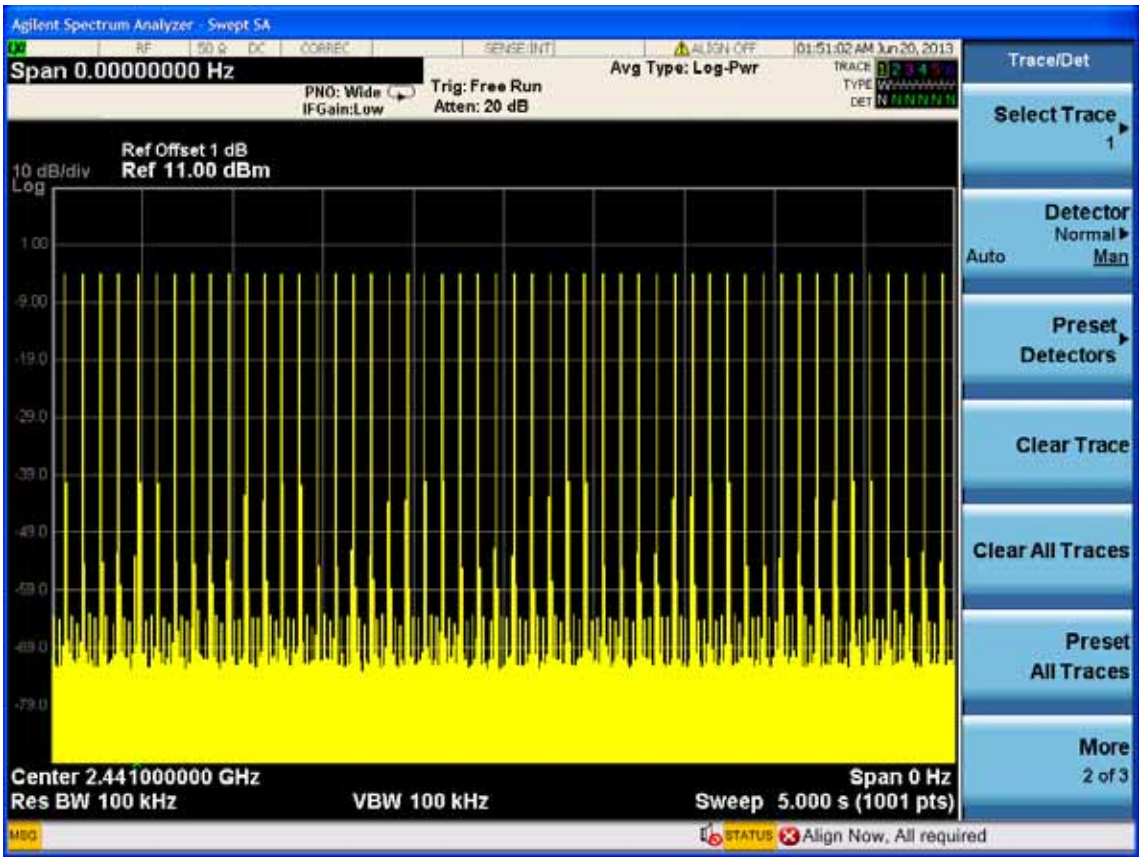
8.3.Test Results

EUT: Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth		
M/N: PA450UM		
Test date:2013-6-22	Pressure: 101.1±1.0 kpa	Humidity: 52.6±3.0%
Tested by: Leo-Li	Test site: RF site	Temperature:24.5±0.6 ℃

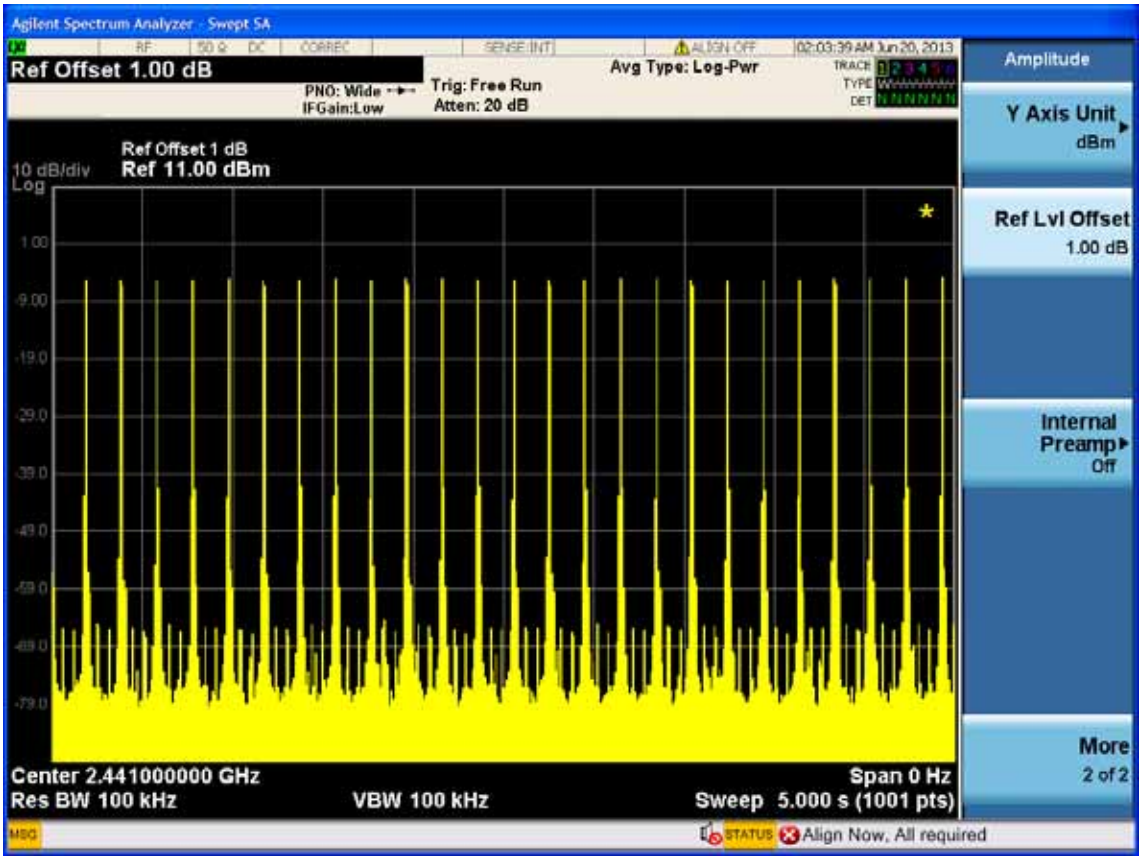
Mode		dwell time	Limit	Conclusion
GFSK	DH1	51hops/5s*0.4*79chanels*0.440ms =141.8208ms	<400ms	PASS
	DH3	26hops/5s*0.4*79chanels*1.710ms =280.9872ms	<400ms	PASS
	DH5	17hops/5s*0.4*79chanels*3.020ms=324.4688ms	<400ms	PASS

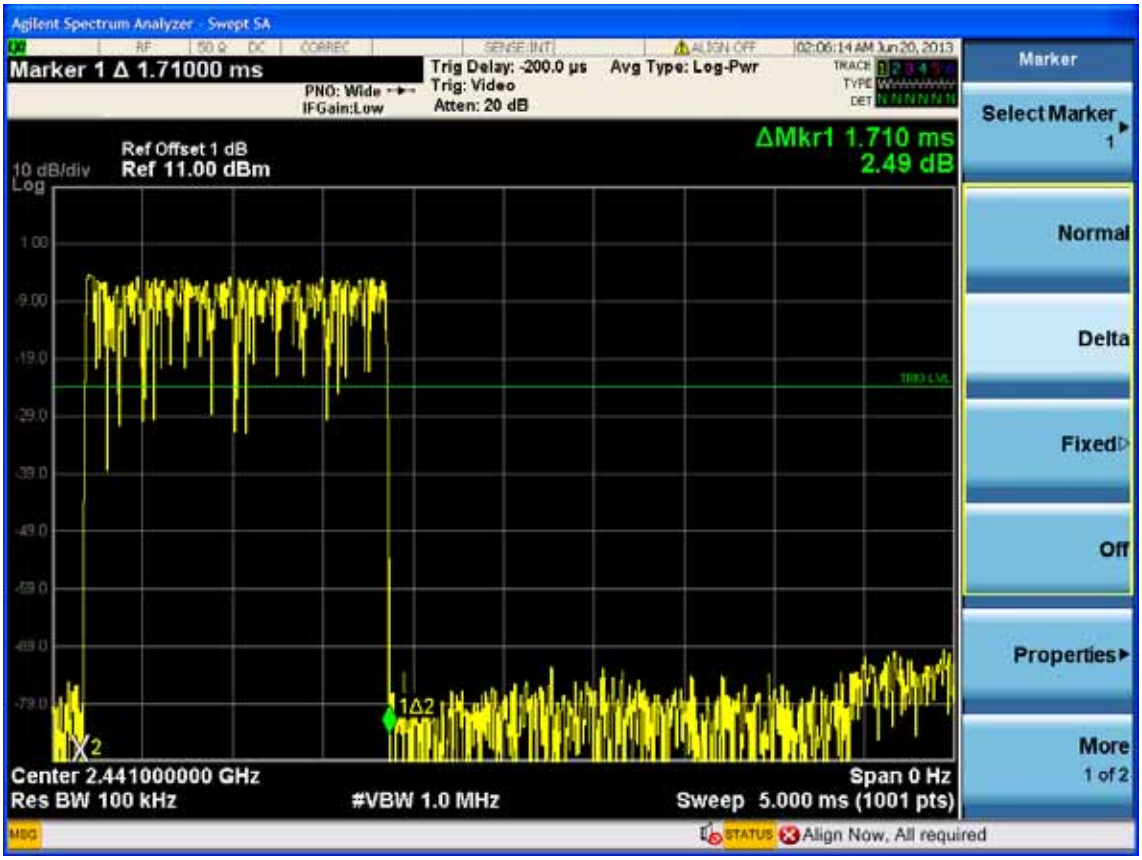
Note: All the lower levels were signal from receiver's, and should not considered in here.

Test Mode: GFSK
DH1

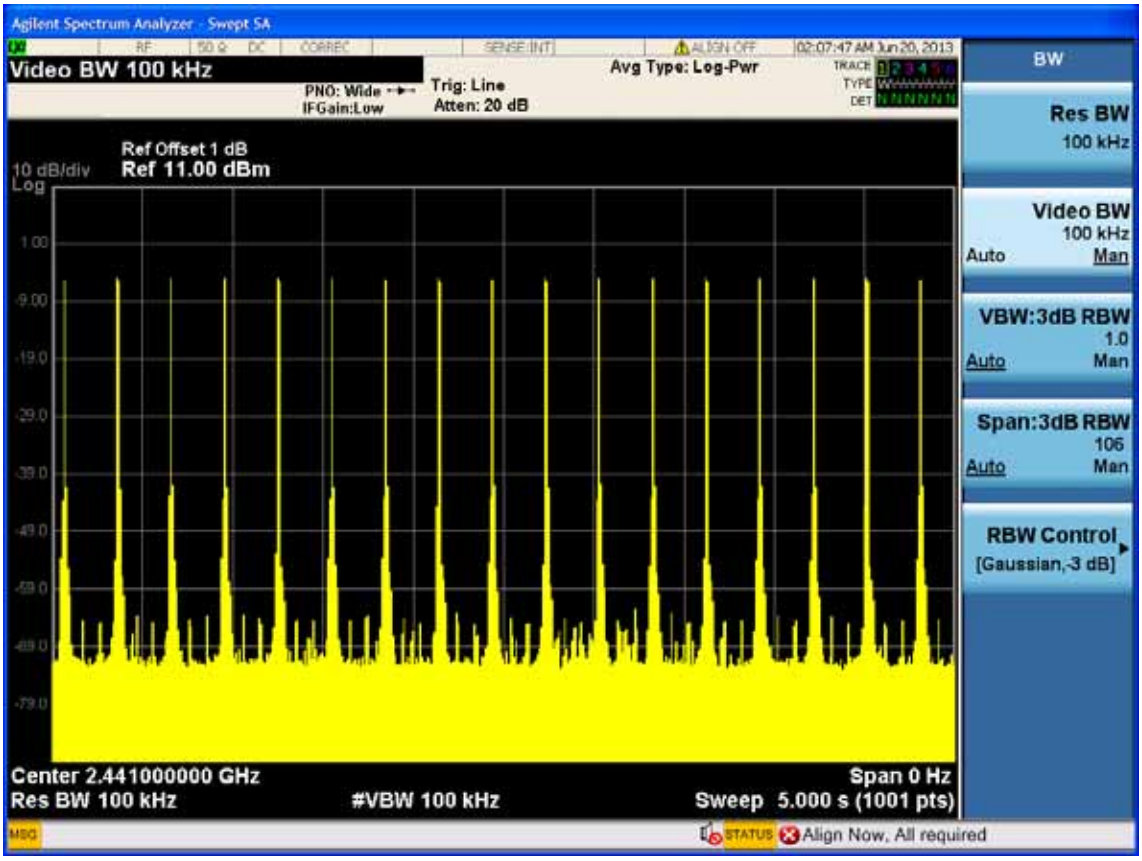


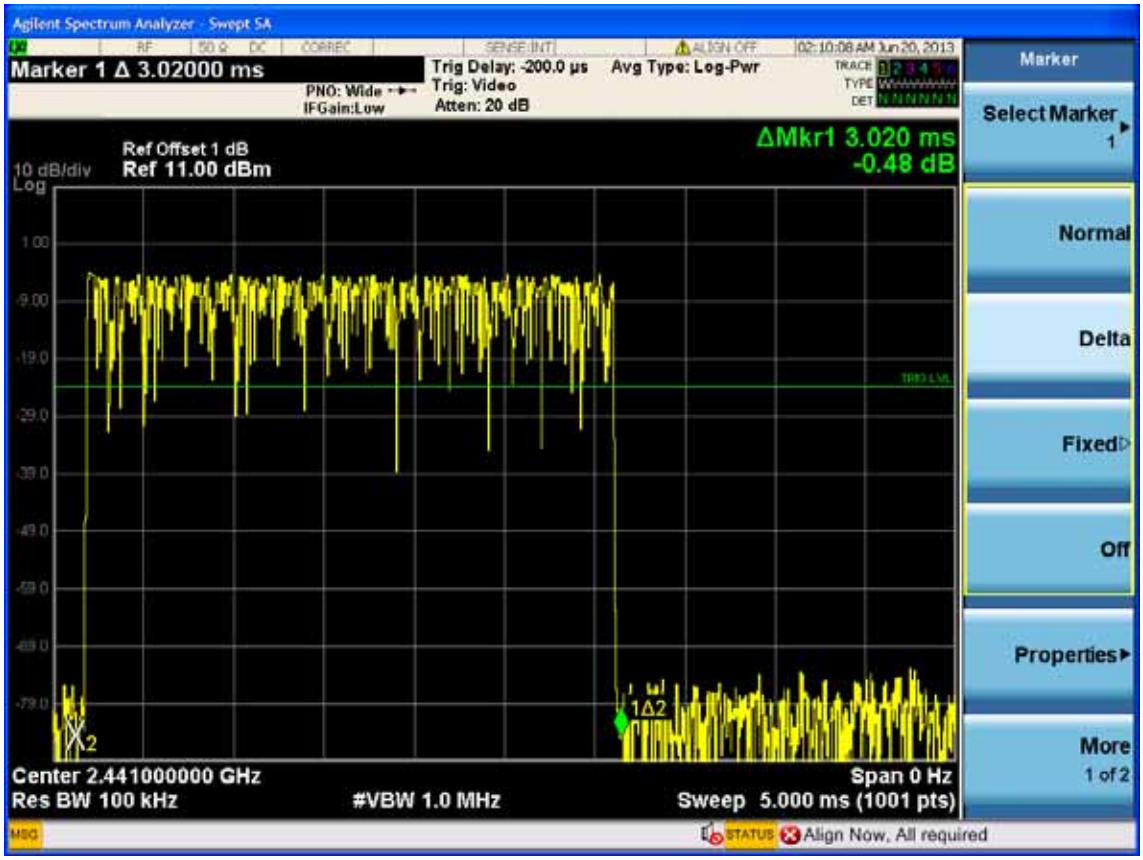
DH3


Agilent Spectrum Analyzer - Swept SA
Ref Offset 1.00 dB
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
02:03:39 AM Jun 20, 2013
Amplitude
Y Axis Unit
dBm
Ref Lvl Offset
1.00 dB
Internal Preamp
Off
More
2 of 2
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Center 2.441000000 GHz
Res BW 100 kHz
VBW 100 kHz
Span 0 Hz
Sweep 5.000 s (1001 pts)
Align Now, All required


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 1.71000 ms
PNO: Wide
IFGain:Low
Trig Delay: -200.0 µs
Trig: Video
Atten: 20 dB
Avg Type: Log-Pwr
02:06:14 AM Jun 20, 2013
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
ΔMkr1 1.710 ms
2.49 dB
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
1Δ2
Center 2.441000000 GHz
Res BW 100 kHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
Align Now, All required

DH5


Agilent Spectrum Analyzer - Swept SA
Video BW 100 kHz
PNO: Wide
IFGain:Low
Trig: Line
Atten: 20 dB
Avg Type: Log-Pwr
02:07:47 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Log
Ref 11.00 dBm
Center 2.441000000 GHz
Res BW 100 kHz
#VBW 100 kHz
Span 0 Hz
Sweep 5.000 s (1001 pts)
Align Now, All required
BW
Res BW
100 kHz
Video BW
100 kHz
Auto
Man
VBW:3dB RBW
1.0
Auto
Man
Span:3dB RBW
106
Auto
Man
RBW Control
[Gaussian,-3 dB]


Agilent Spectrum Analyzer - Swept SA
Marker 1 Δ 3.02000 ms
PNO: Wide
IFGain:Low
Trig Delay: -200.0 µs
Trig: Video
Atten: 20 dB
Avg Type: Log-Pwr
02:10:08 AM Jun 20, 2013
Ref Offset 1 dB
10 dB/div
Log
Ref 11.00 dBm
ΔMkr1 3.020 ms
-0.48 dB
Center 2.441000000 GHz
Res BW 100 kHz
#VBW 1.0 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
Align Now, All required
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2

9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Oct.31, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 13	1 Year
3.	Antenna	EMCO	3115	9510-4580	May.31, 13	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 13	1 Year
5	Power Meter	Anritsu	ML2487A	6K00002472	May.08, 13	1Year
6	Power Sensor	Anritsu	MA2491A	033005	May.08, 13	1Year

9.2.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.

9.3.Test Procedure

1. Connected the EUT's antenna port to spectrum analyzer.
2. Set the RBW> Bandwidth of test Frequency and put the test Frequency, Set the Span large enough to capture the entire signal
3. Use a peak detector on max hold
4. Reading the value from the Spectrum analyzer

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

9.4.Test Results

EUT: Marine Audio System with AM/FM/WB/USB-ipod/Aux in/Bluetooth			
M/N: PA450UM			
Test date: 2013-06-17	Pressure: 101.2±1.0 kpa		Humidity: 54.3±1.0%
Tested by: Leo-Li	Test site: RF site		Temperature:24.2±1.0 ℃
Test Mode	CH (MHz)	Peak output Power (dBm)	Limit (dBm)
GFSK	2402	-4.659	30
	2441	-4.750	30
	2480	-5.092	30
Conclusion: PASS			

2402MHz

2441MHz

2480MHz


Agilent Spectrum Analyzer - Swept SA
Marker 1 2.479860000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
12:01:03 AM Jun 20, 2013
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Ref Offset 1 dB
10 dB/div
Ref 11.00 dBm
Log
Mkr1 2.479 86 GHz
-5.092 dBm
Center 2.480000 GHz
#Res BW 2.0 MHz
#VBW 3.0 MHz
Span 10.00 MHz
Sweep 1.00 ms (1001 pts)
Align Now, All required

10.BAND EDGE COMPLIANCE TEST

10.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 13	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 13	1 Year
3.	Antenna	EMCO	3115	4580	May.08, 13	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 13	1 Year

10.2.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.

10.3.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

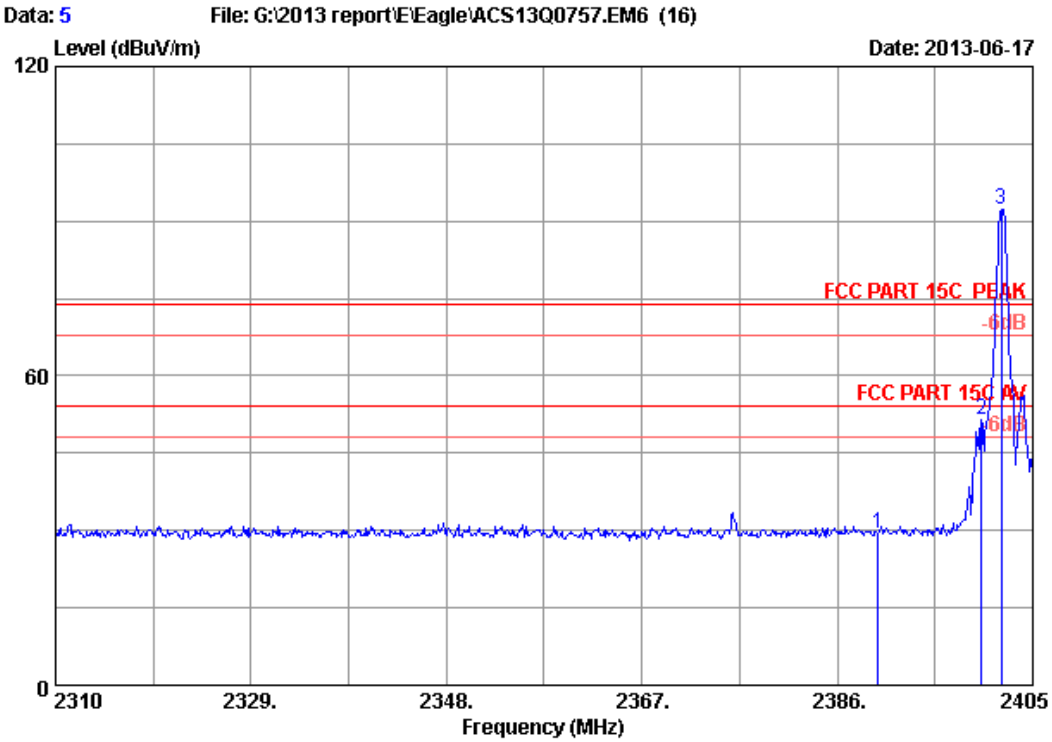
For emissions above two bandwidths away from the band-edge use below produce:

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=AUTO
   (b) This is pulse Modulation device a duty cycle factor was used to calculate average level based measured peak level.

10.4.Test Results

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

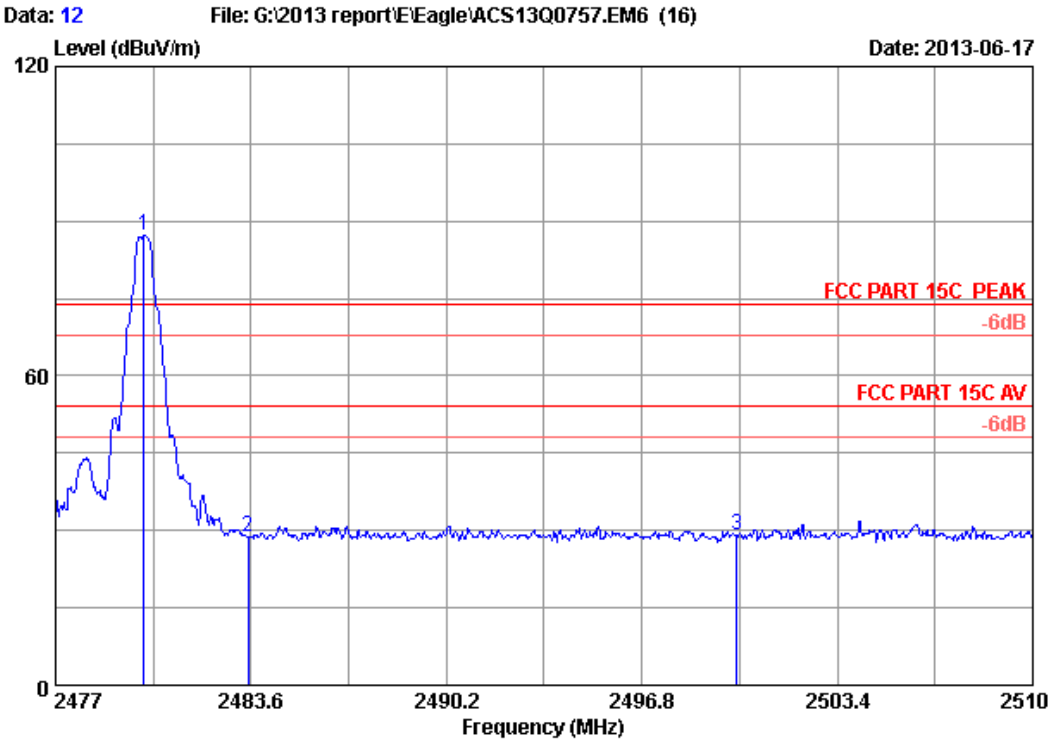
Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.



Site no. : 3m Chamber Data no. : 5
Dis. / Ant. : 3m 2012 3115 (4877) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54% Engineer : Tony
EUT : Marine Audio System with AM/FM/WB/USB-Ipod/Aux in/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2402MHz
M/N : PA450UM
:

	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	23.80	5.78	35.70	35.42	29.30	74.00	44.70	Peak
2	2400.000	23.79	5.80	35.70	57.59	51.48	74.00	22.52	Peak
3	2401.960	23.79	5.80	35.70	98.30	92.19			Peak

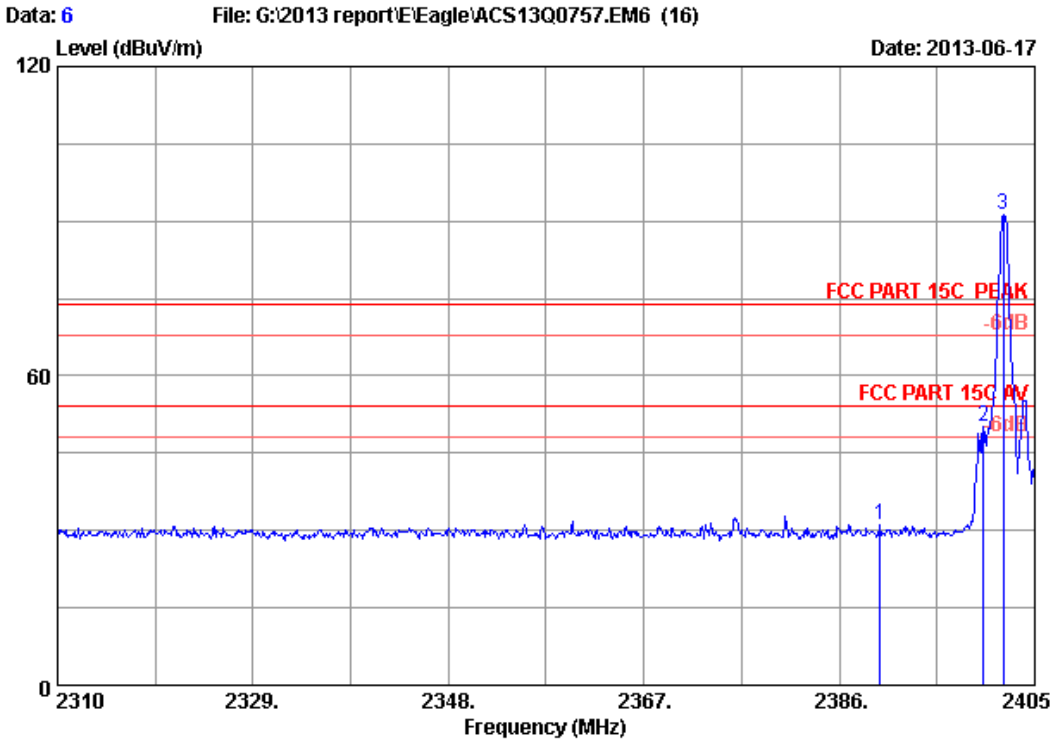
Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 12
Dis. / Ant. : 3m 2012 3115 (4877) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54% Engineer : Tony
EUT : Marine Audio System with AM/FM/WB/USB-Ipod/Aux in/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2480MHz
M/N : PA450UM
:

	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	2479.970	23.72	5.91	35.70	93.23	87.16			Peak
2	2483.500	23.71	5.92	35.70	34.98	28.91	74.00	45.09	Peak
3	2500.000	23.70	5.94	35.70	35.06	29.00	74.00	45.00	Peak

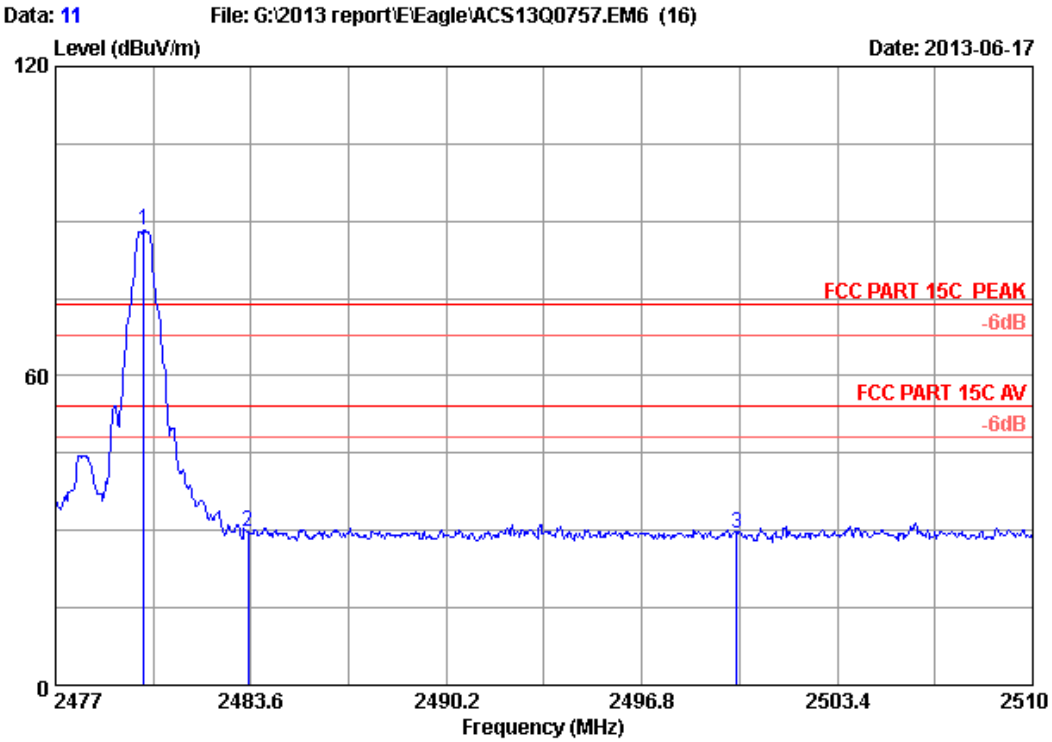
Remarks:
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 6
Dis. / Ant. : 3m 2012 3115 (4877) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54% Engineer : Tony
EUT : Marine Audio System with AM/FM/WB/USB-Ipod/Aux in/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2402MHz
M/N : PA450UM
:

	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	23.80	5.78	35.70	37.26	31.14	74.00	42.86	Peak
2	2400.000	23.79	5.80	35.70	56.08	49.97	74.00	24.03	Peak
3	2401.960	23.79	5.80	35.70	97.23	91.12			Peak

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



Site no. : 3m Chamber Data no. : 11
Dis. / Ant. : 3m 2012 3115 (4877) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23*C/54% Engineer : Tony
EUT : Marine Audio System with AM/FM/WB/USB-Ipod/Aux in/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2480MHz
M/N : PA450UM
:

	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	2479.970	23.72	5.91	35.70	94.40	88.33	-----	-----	Peak
2	2483.500	23.71	5.92	35.70	35.74	29.67	74.00	44.33	Peak
3	2500.000	23.70	5.94	35.70	35.50	29.44	74.00	44.56	Peak

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

11. DEVIATION TO TEST SPECIFICATIONS

[NONE]