



**FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of**

Sounding Audio Industrial Ltd

Heavy Duty radio with AM/FM/USB/Bluetooth

Model Number: JHD40BT; 434-1228

Brand Name: JENSEN; CATERPILLAR

FCC ID: OPDJHD40BT

**Prepared for : Sounding Audio Industrial Ltd
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**Report Number : ACS-F13109
Date of Test : Mar.10~Apr.11, 2013
Date of Report : May. 02, 2013**

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TEST REPORT CERTIFICATION

Applicant : Sounding Audio Industrial Ltd
Manufacturer : Eagle Plastic Development Co. Ltd
EUT Description : Heavy Duty radio with AM/FM/USB/Bluetooth
FCC ID : OPDJHD40BT
(A) MODEL NO. : JHD40BT; 434-1228
(B) Brand Name : JENSEN; CATERPILLAR
(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 : Mar.10~ Apr.11, 2013 Report of date: May. 02, 2013

Prepared by : Miya Zhou / Assistant Reviewed by : Sunny Lu / Assistant Manager

 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: Ken Lu 5/3/13

Approved & Authorized Signer : Ken Lu / 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 | : | Heavy Duty radio with AM/FM/USB/Bluetooth |
| Model Number | : | JHD40BT; 434-1228 Software and connector different |
| Brand Name | : | JENSEN; CATERPILLAR |
| Radio | : | Bluetooth Version: 3.0 disable the EDR function |
| Operation frequency | : | Bluetooth 2402-2480MHz |
| Channel Number | : | Bluetooth: 79 channels |
| Modulation Technology | : | GFSK |
| Antenna Type | : | F type antenna (PCB LAYOUT ANTENNA), 3dBi PK gain |
| Applicant | : | Sounding Audio Industrial Ltd Unit N, 7/F, Stage 2, Wah Fung Ind, Centre 33-39 Kwai Fung Road, Kwai Chung, Hong Kong |
| Manufacturer | : | Eagle Plastic Development Co. Ltd Sima District, Changping, China |
| Date of Test | : | Mar.10~Apr.11, 2013 |
| Date of Receipt | : | Mar.09, 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.

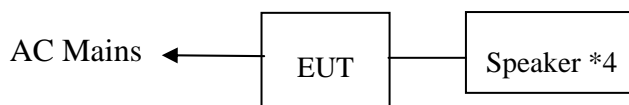
| Tested mode, channel, and data rate information | | | |
|---|------------------|--------------|-----------------|
| Mode | data rate (Mbps) | Channel | Frequency (MHz) |
| Tx Mode GFSK modulation | 1 | Low :CH 0 | 2402 |
| | 1 | Middle: CH39 | 2441 |
| | 1 | High: CH78 | 2480 |
| Tx Mode 8-DPSK modulation | 3 | Low :CH 0 | 2402 |
| | 3 | Middle: CH39 | 2441 |
| | 3 | High: CH78 | 2480 |

Note: $\pi/4$ DQPSK modulation is same type modulation with 8-DPSK, and according exploratory test, 8-DPSK will have worse emissions, so the final test were only performed with GFSK and 8-DPSK modulation.

2.3. Tested Supporting System Details

| No. | Description | ACS No. | Manufacturer | Model | Serial Number | Approved type |
|-----|-------------|--------------------------------------|--------------|-------|---------------|---|
| 1. | Speaker | ACS-EMC-SP01TB | QINLE | QL618 | N/A | <input checked="" type="checkbox"/> FCC DoC <input type="checkbox"/> BSMI ID |
| | | Cable: Shielded, Undetachabled, 0.9m | | | | |
| 2. | Speaker | ACS-EMC-SP02TB | QINLE | QL618 | N/A | <input checked="" type="checkbox"/> FCC DoC <input type="checkbox"/> BSMI ID |
| | | Cable: Shielded, Undetachabled, 0.9m | | | | |
| 3. | Speaker | ACS-EMC-SP03TB | QINLE | QL618 | N/A | <input checked="" type="checkbox"/> FCC DoC <input type="checkbox"/> BSMI ID |
| | | Cable: Shielded, Undetachabled, 0.9m | | | | |
| 4. | Speaker | ACS-EMC-SP04TB | QINLE | QL618 | N/A | <input checked="" type="checkbox"/> FCC DoC <input type="checkbox"/> BSMI ID |
| | | Cable: Shielded, Undetachabled, 0.9m | | | | |

2.4. Block Diagram of Test Setup



(EUT: Heavy Duty radio with AM/FM/USB/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)

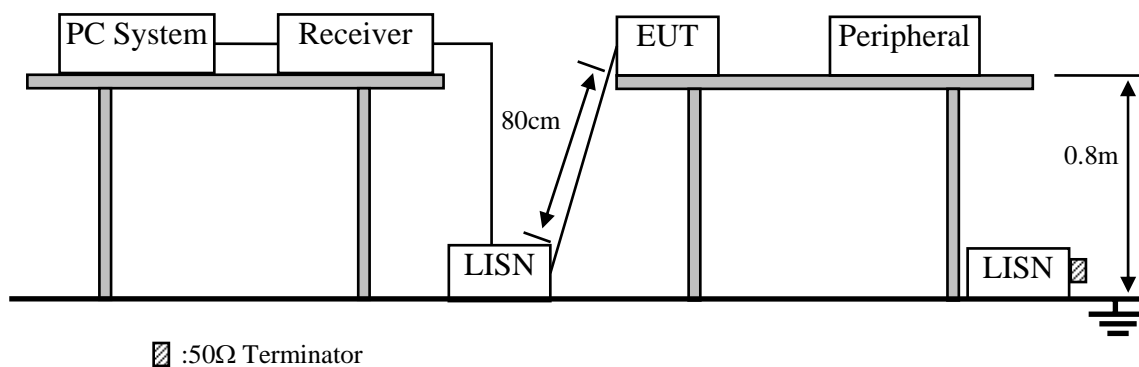
| Test Item | Uncertainty |
|--|-----------------------------------|
| Uncertainty for Conduction emission test in No. 1 Conduction | 3.48dB(9KHz to 150KHz) |
| | 3.06dB (150KHz to 30MHz) |
| Uncertainty for Radiation Emission test in 3m chamber | 3.6 dB(30~200MHz, Polarize: H) |
| | 3.8 dB(30~200MHz, Polarize: V) |
| | 4.2 dB(200M~1GHz, Polarize: H) |
| | 3.8 dB(200M~1GHz, Polarize: V) |
| Uncertainty for Radiation Emission test in 3m chamber (1GHz-18GHz) | 3.1dB (Distance: 3m Polarize: V) |
| | 3.7 dB (Distance: 3m Polarize: H) |
| 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°C |
| | 3% |

3. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1. Test Equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|----------------|-----------------|-----------|------------|------------|---------------|
| 1. | Test Receiver | Rohde & Schwarz | ESHS10 | 838693/001 | Oct.31, 12 | 1 Year |
| 2. | L.I.S.N.#1 | Rohde & Schwarz | ESH2-Z5 | 834066/011 | Oct.31, 12 | 1 Year |
| 3. | L.I.S.N.#3 | Kyoritsu | KNW-242C | 8-1920-1 | May.08, 12 | 1 Year |
| 4. | Terminator | Hubersuhner | 50Ω | No. 1 | May.08, 12 | 1 Year |
| 5. | Terminator | Hubersuhner | 50Ω | No. 2 | May.08, 12 | 1 Year |
| 6. | RF Cable | Fujikura | 3D-2W | No.1 | May.08, 12 | 1 Year |
| 7. | Coaxial Switch | Anritsu | MP59B | M50564 | May.08, 12 | 1 Year |
| 8. | Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | 100341 | May.08, 12 | 1 Year |
| 9. | Horn Antenna | EMCO | 3116 | 00060089 | Nov.25,11 | 1.5 Year |

3.2. Block Diagram of Test Setup



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. Heavy Duty radio with AM/FM/USB/Bluetooth (EUT)

Model Number : JHD40BT

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 & Idle Mode) and measure it.

3.6. Test Procedure

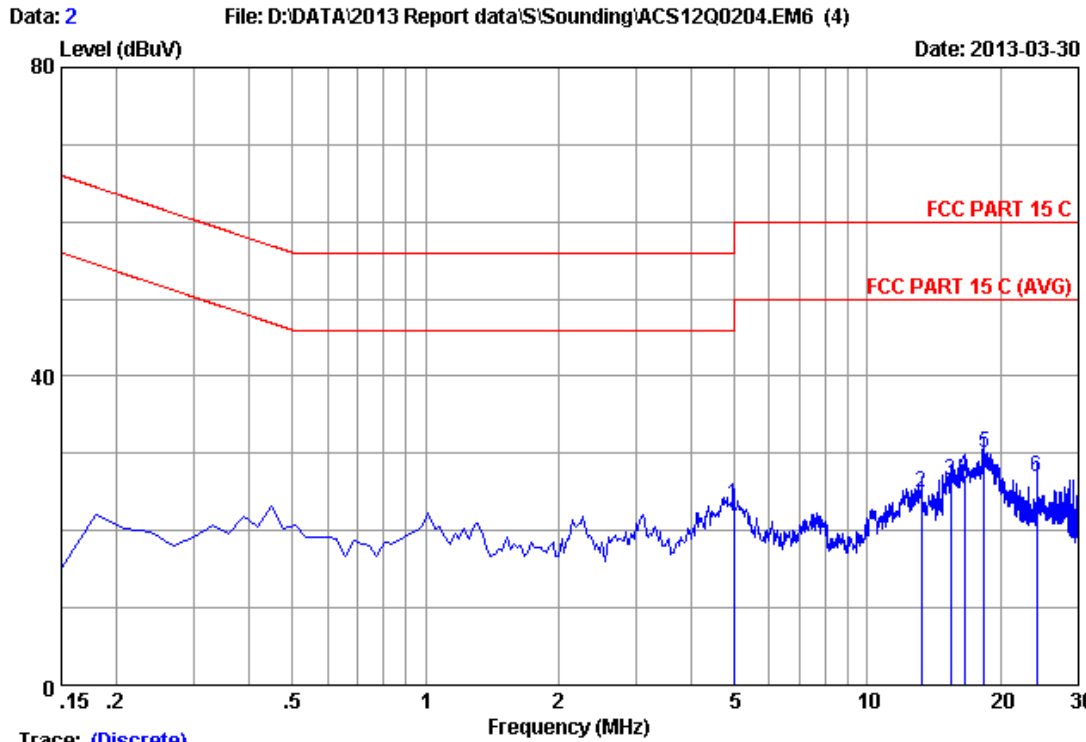
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). 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 9 kHz.

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.)

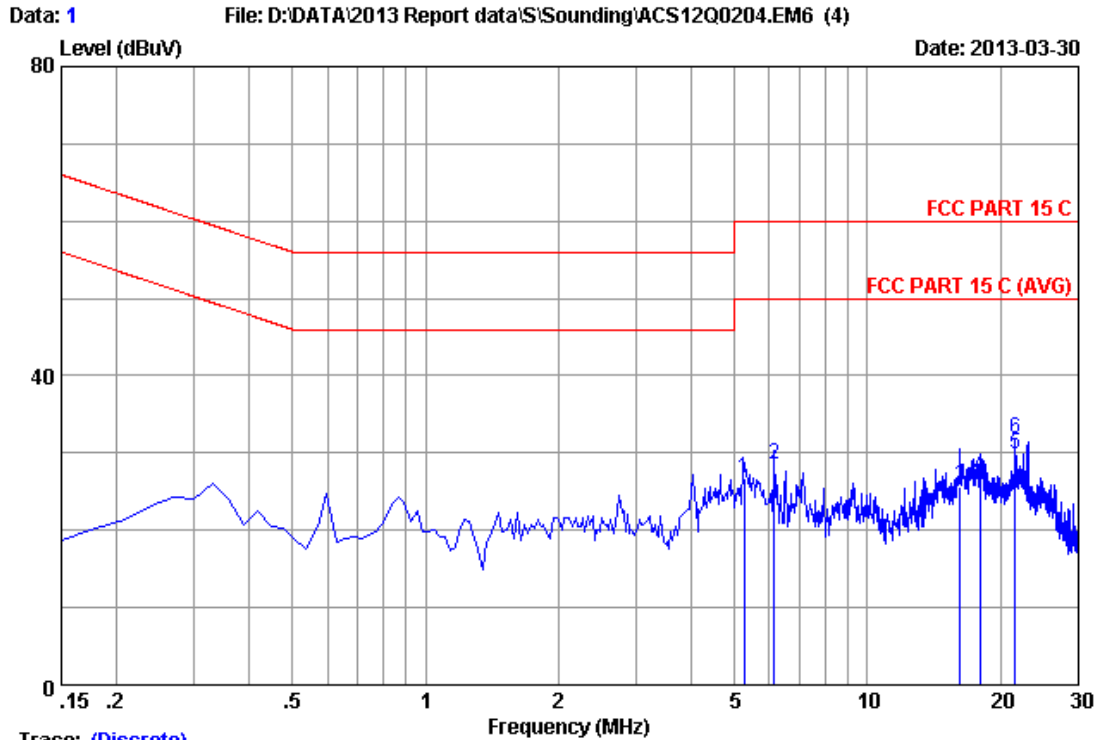


Trace: (Discrete)

Site no :1#conduction Data No :2
 Dis./Ant. :** 2012 ESH2-Z5 LINE
 Limit :FCC PART 15 C
 Env./Ins. :24.3*C/58% Engineer :Leo_Li
 EUT :Heavy Duty radio with AM/FM/USB/Bluetooth
 Power Rating :DC 12V
 Test Mode :Tx Mode
 M/N:JHD40BT

| No | Freq (MHz) | LISN Factor (dB) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV) | Limits (dBuV) | Margin (dB) | Remark |
|----|------------|------------------|-----------------|----------------|-----------------------|---------------|-------------|--------|
| 1 | 4.986 | 0.31 | 0.15 | 22.97 | 23.43 | 56.00 | 32.57 | QP |
| 2 | 13.254 | 0.64 | 0.18 | 24.07 | 24.89 | 60.00 | 35.11 | QP |
| 3 | 15.433 | 0.77 | 0.20 | 25.57 | 26.54 | 60.00 | 33.46 | QP |
| 4 | 16.568 | 0.87 | 0.21 | 26.16 | 27.24 | 60.00 | 32.76 | QP |
| 5 | 18.359 | 1.02 | 0.23 | 28.82 | 30.07 | 60.00 | 29.93 | QP |
| 6 | 24.120 | 1.32 | 0.31 | 25.38 | 27.01 | 60.00 | 32.99 | QP |

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



Trace: (Discrete)

Site no :1#conduction Data No :1
 Dis./Ant. :** 2012 ESH2-Z5 NEUTRAL
 Limit :FCC PART 15 C
 Env./Ins. :24.3°C/58% Engineer :Leo_Li
 EUT :Heavy Duty radio with AM/FM/USB/Bluetooth
 Power Rating :DC 12V
 Test Mode :Tx Mode
 M/N:JHD40BT

| No | Freq (MHz) | LISN Factor (dB) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV) | Limits (dBuV) | Margin (dB) | Remark |
|----|------------|------------------|-----------------|----------------|-----------------------|---------------|-------------|--------|
| 1 | 5.254 | 0.35 | 0.15 | 26.30 | 26.80 | 60.00 | 33.20 | QP |
| 2 | 6.150 | 0.38 | 0.15 | 27.88 | 28.41 | 60.00 | 31.59 | QP |
| 3 | 16.209 | 0.74 | 0.20 | 24.75 | 25.69 | 60.00 | 34.31 | QP |
| 4 | 17.970 | 0.86 | 0.23 | 25.89 | 26.98 | 60.00 | 33.02 | QP |
| 5 | 21.612 | 0.98 | 0.27 | 28.58 | 29.83 | 60.00 | 30.17 | QP |
| 6 | 21.612 | 0.98 | 0.27 | 30.58 | 31.83 | 60.00 | 28.17 | QP |

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
 2.If the average limit is met when using 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

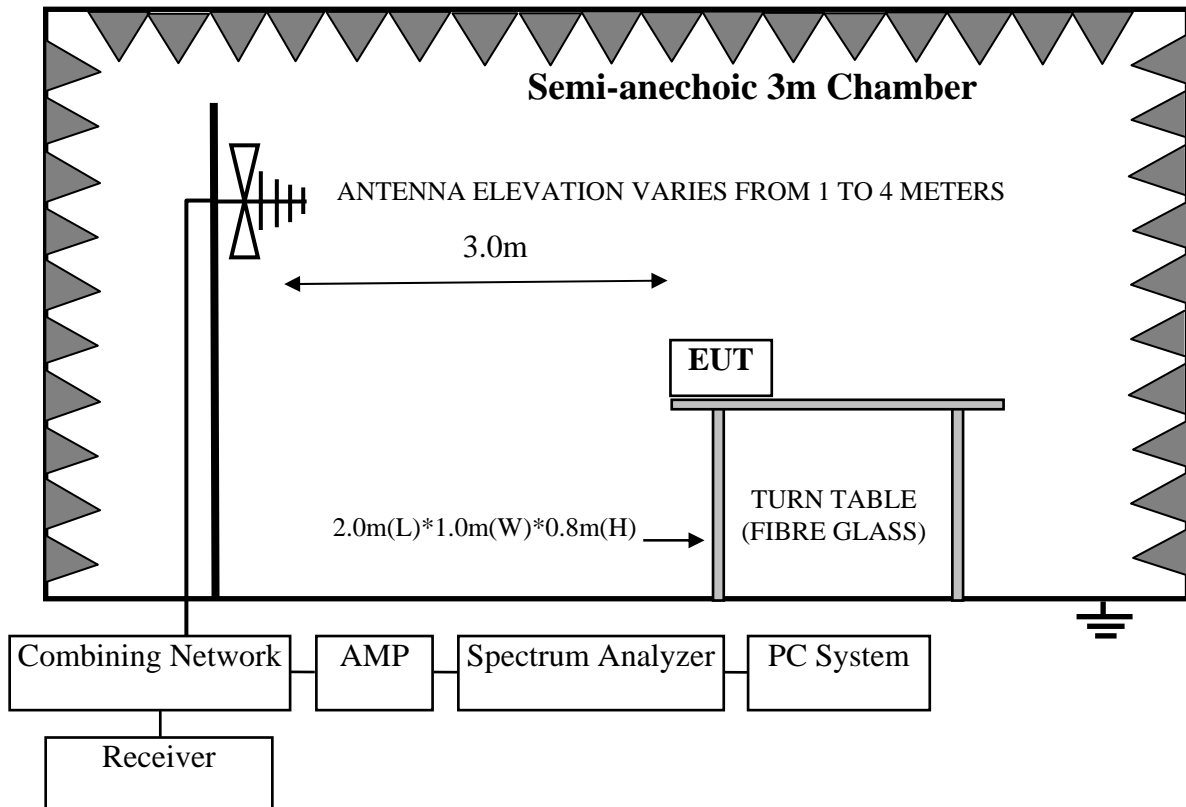
| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|--------------------------|-----------------|-----------|-----------------|------------|---------------|
| 1 | 3#Chamber | AUDIX | N/A | N/A | Nov.24,12 | 1 Year |
| 2 | EMI Spectrum | Agilent | E4407B | MY41440292 | May.08, 12 | 1 Year |
| 3 | Test Receiver | Rohde & Schwarz | ESVS10 | 834468/011 | May.08, 12 | 1 Year |
| 4 | Amplifier | HP | 8447D | 2648A04738 | May.08, 12 | 1 Year |
| 5 | Trilog-Broadband Antenna | SCHWARZBECK | VULB 9168 | 9168-429 | Nov.27, 12 | 1.0 Year |
| 6 | RF Cable | MIYAZAKI | CFD400-NL | 3# Chamber No.1 | May.08, 12 | 1 Year |
| 7 | Coaxial Switch | Anritsu | MP59B | M74389 | May.08, 12 | 1 Year |

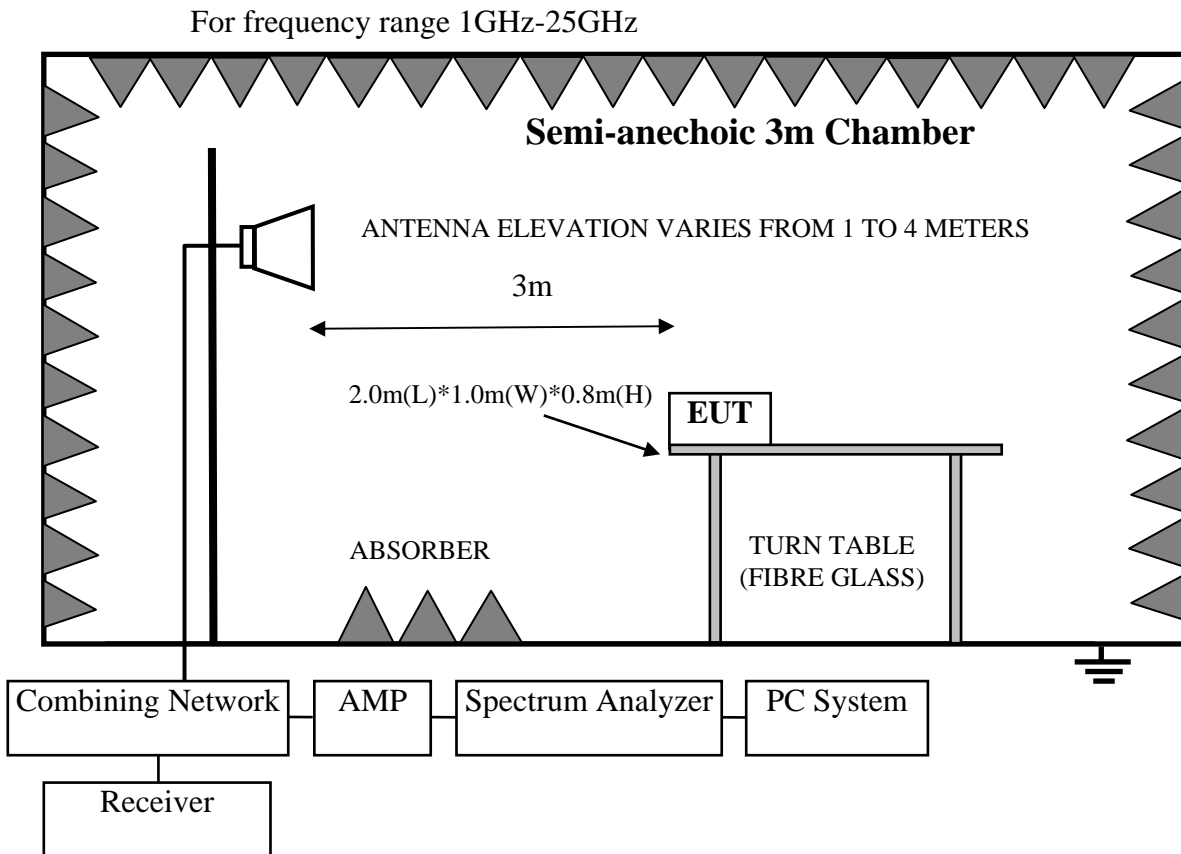
4.1.1. For frequency range 1GHz~25GHz (In 3m Anechoic Chamber)

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-------------------|--------------|-------------|------------|-------------|---------------|
| 1 | Spectrum Analyzer | Agilent | E4407B | MY41440292 | May.08, 12 | 1 Year |
| 2 | Horn Antenna | EMCO | 3115 | 9510-4580 | June.05, 12 | 1 Year |
| 3 | Horn Antenna | EMCO | 3116 | 00060088 | June.05,12 | 1 Year |
| 4 | Amplifier | Agilent | 8449B | 3008A00863 | May.08, 12 | 1 Year |
| 5 | RF Cable | Hubersuhner | SUCOFLEX106 | 77980/6 | May.08, 12 | 1 Year |
| 6. | RF Cable | Hubersuhner | SUCOFLEX106 | 77977/6 | May.08, 12 | 1 Year |

4.2. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz





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. Heavy Duty radio with AM/FM/USB/Bluetooth (EUT)

Model Number : JHD40BT
Serial Number : N/A

4.5. Operating Condition of EUT

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

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 an 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 calculate 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.

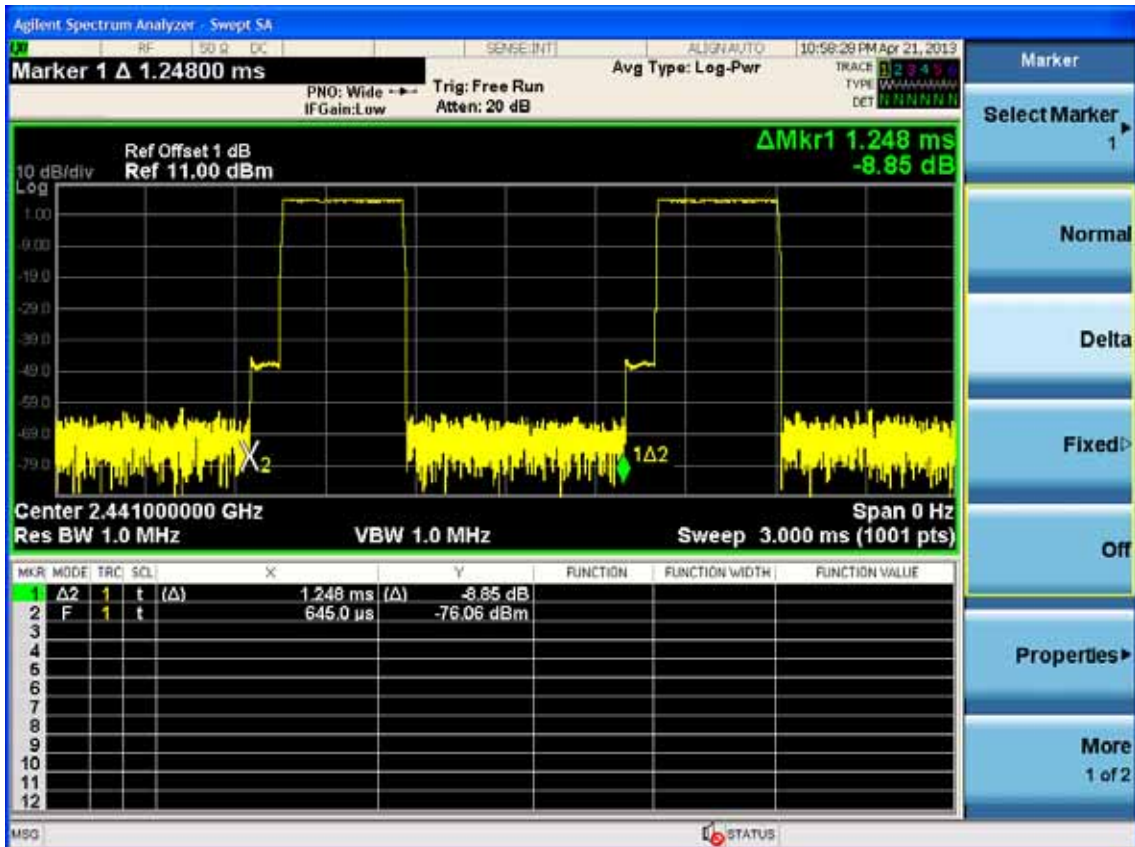
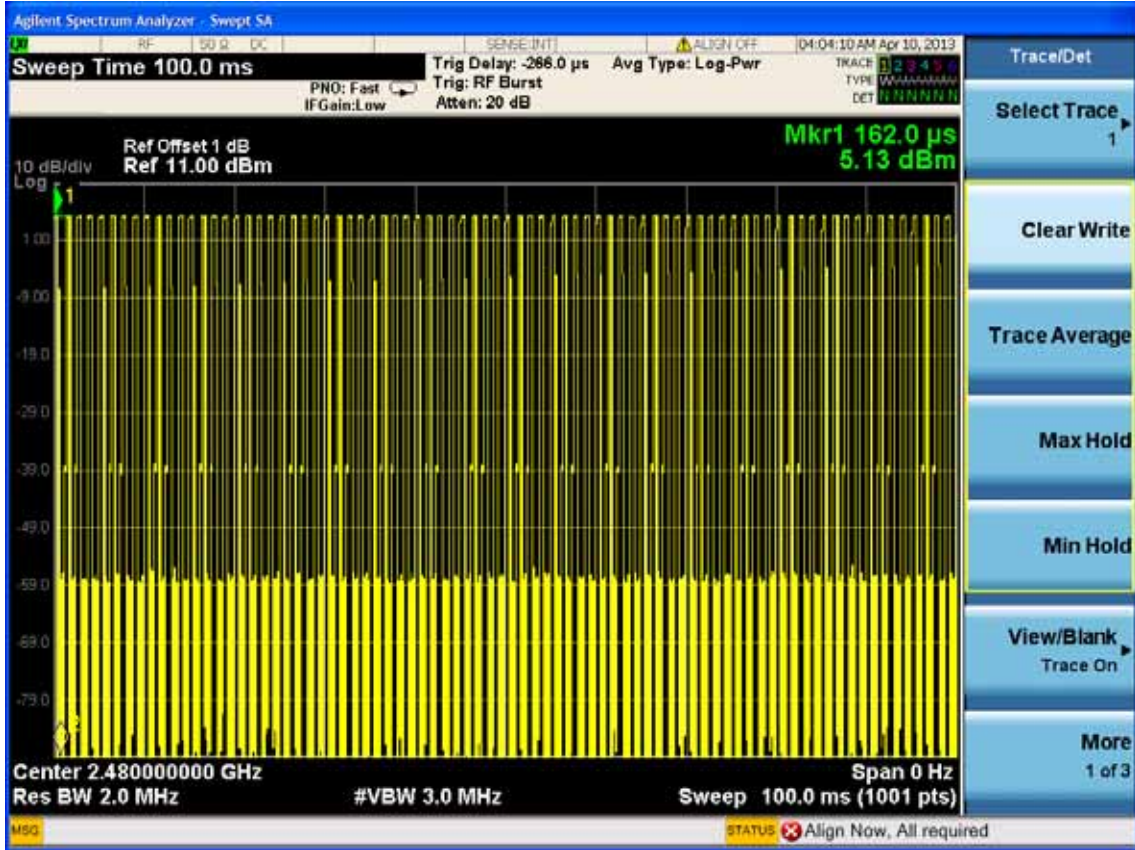
4.7. Radiated Emission Test Results

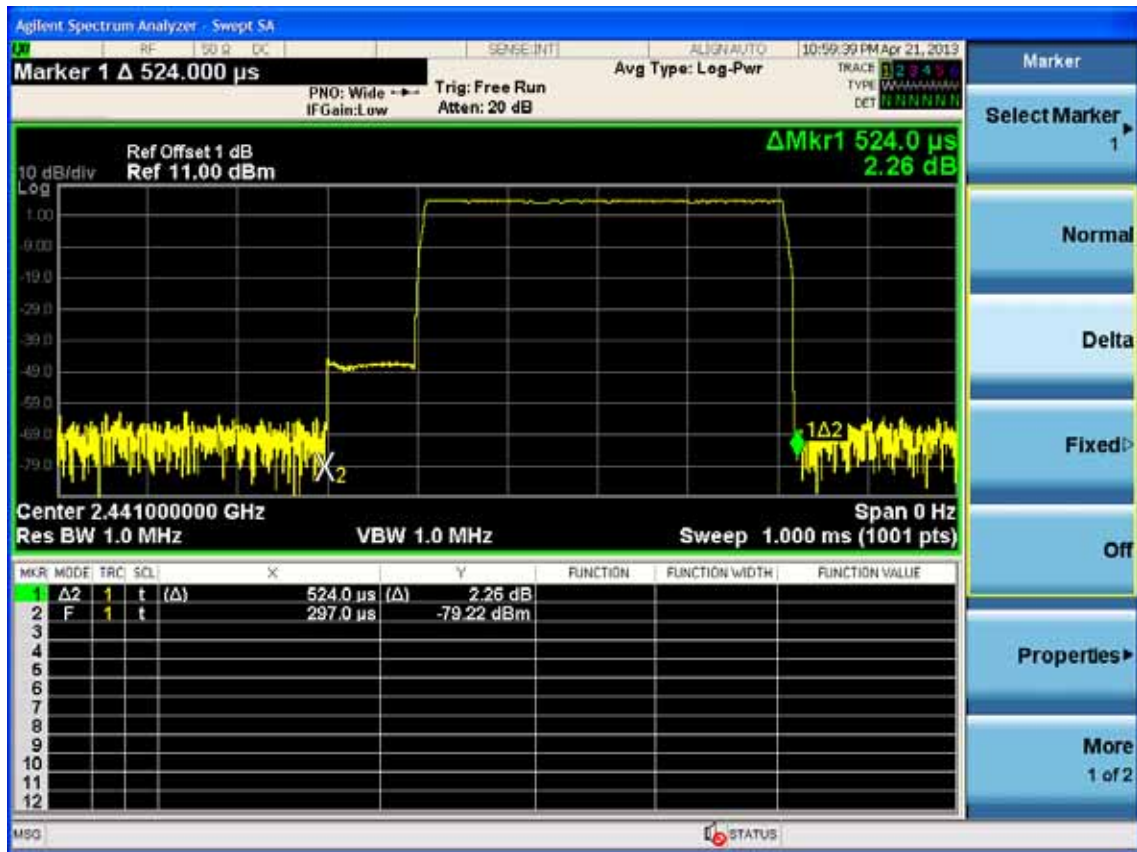
PASS.

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

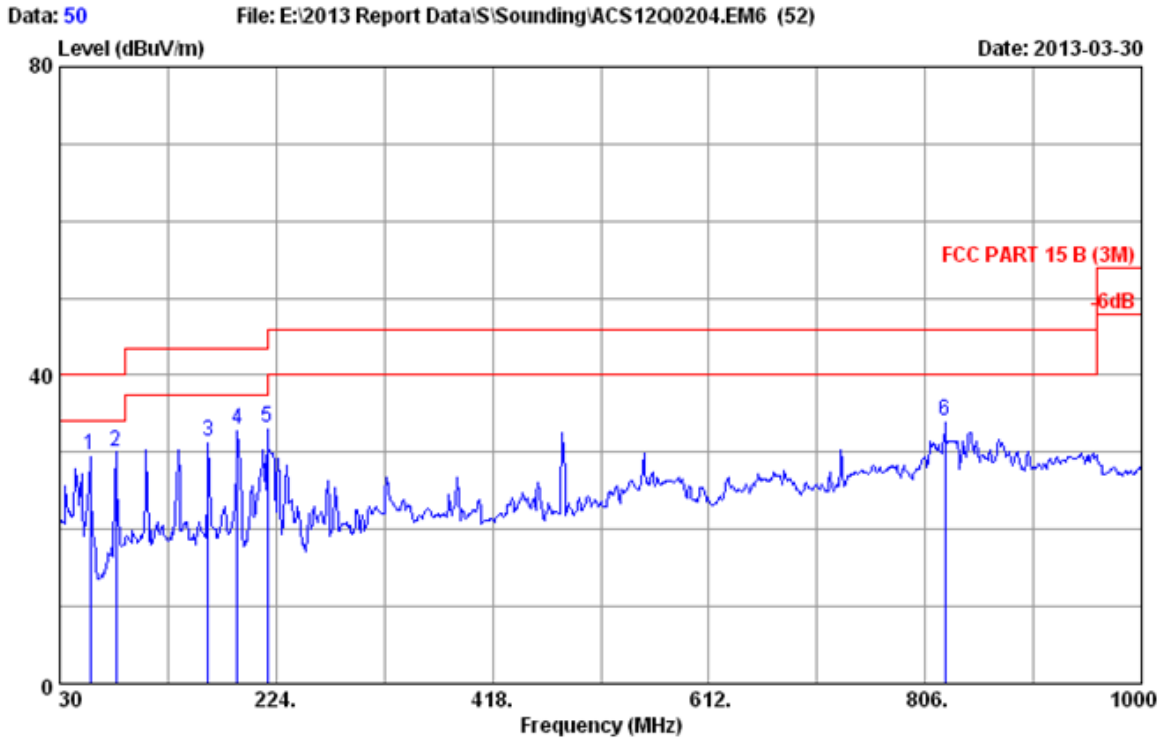
Note: The duty cycle factor for calculate average level is 7.54dB, and average limit is 20dB below peak limit, so if peak measured level comply with peak limit, the average level was deemed to comply with average limit.

Duty cycle: $0.524 \text{ ms} / 1.248 \text{ ms} * 100\% = 41.99\%$
 Duty cycle factor = $20 \log (1/\text{duty cycle}) = 7.54$





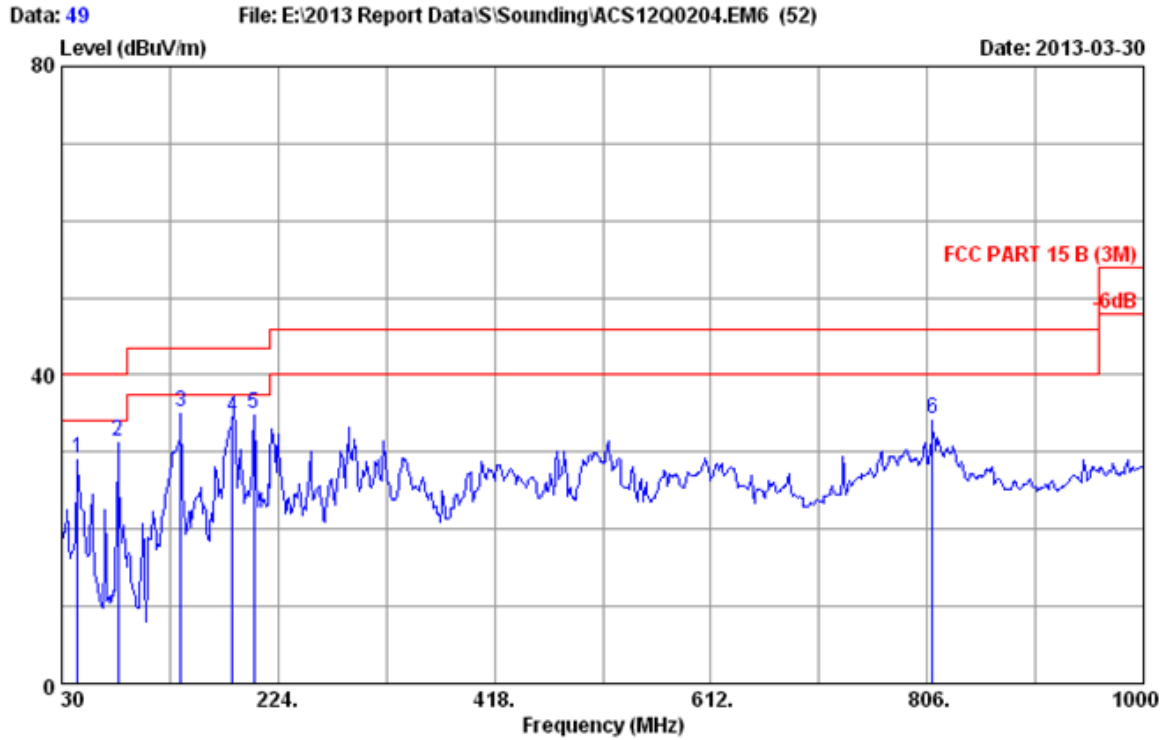
Frequency: 30MHz~1GHz



Site no. : 3m Chamber Data no. : 50
 Dis. / Ant. : 3m 2012 CBL6111C 2598 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B (3M)
 Env. / Ins. : 24°C/65% Engineer : Lei_Zi
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power rating : DC 12V
 Test Mode : Tx Mode & Idle Mode
 M/N:JHD40BT

| No. | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|-----|-------------|--------------------|-----------------|----------------|-------------------------|-----------------|-------------|--------|
| 1 | 57.160 | 6.06 | 0.66 | 22.90 | 29.62 | 40.00 | 10.38 | QP |
| 2 | 80.440 | 7.11 | 0.76 | 22.12 | 29.99 | 40.00 | 10.01 | QP |
| 3 | 162.890 | 10.30 | 0.99 | 20.22 | 31.51 | 43.50 | 11.99 | QP |
| 4 | 189.080 | 8.71 | 1.04 | 23.19 | 32.94 | 43.50 | 10.56 | QP |
| 5 | 216.240 | 9.75 | 1.11 | 22.41 | 33.27 | 46.00 | 12.73 | QP |
| 6 | 823.460 | 22.91 | 2.72 | 8.41 | 34.04 | 46.00 | 11.96 | 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. : 49
 Dis. / Ant. : 3m 2012 CBL6111C 2598 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B (3M)
 Env. / Ins. : 24°C/65% Engineer : Lei_Zi
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power rating : DC 12V
 Test Mode : Tx Mode & Idle Mode
 M/N:JHD40BT

| No. | Freq. (MHz) | Ant. Factor (dB/m) | Cable Loss (dB) | Reading (dBUV) | Emission Level (dBUV/m) | Limits (dBUV/m) | Margin (dB) | Remark |
|-----|-------------|--------------------|-----------------|----------------|-------------------------|-----------------|-------------|--------|
| 1 | 44.550 | 11.02 | 0.57 | 17.54 | 29.13 | 40.00 | 10.87 | QP |
| 2 | 80.440 | 7.11 | 0.76 | 23.51 | 31.38 | 40.00 | 8.62 | QP |
| 3 | 136.700 | 11.32 | 0.93 | 22.86 | 35.11 | 43.50 | 8.39 | QP |
| 4 | 183.260 | 8.83 | 1.03 | 24.72 | 34.58 | 43.50 | 8.92 | QP |
| 5 | 202.660 | 9.58 | 1.08 | 24.25 | 34.91 | 43.50 | 8.59 | QP |
| 6 | 810.850 | 22.68 | 2.72 | 8.86 | 34.26 | 46.00 | 11.74 | QP |

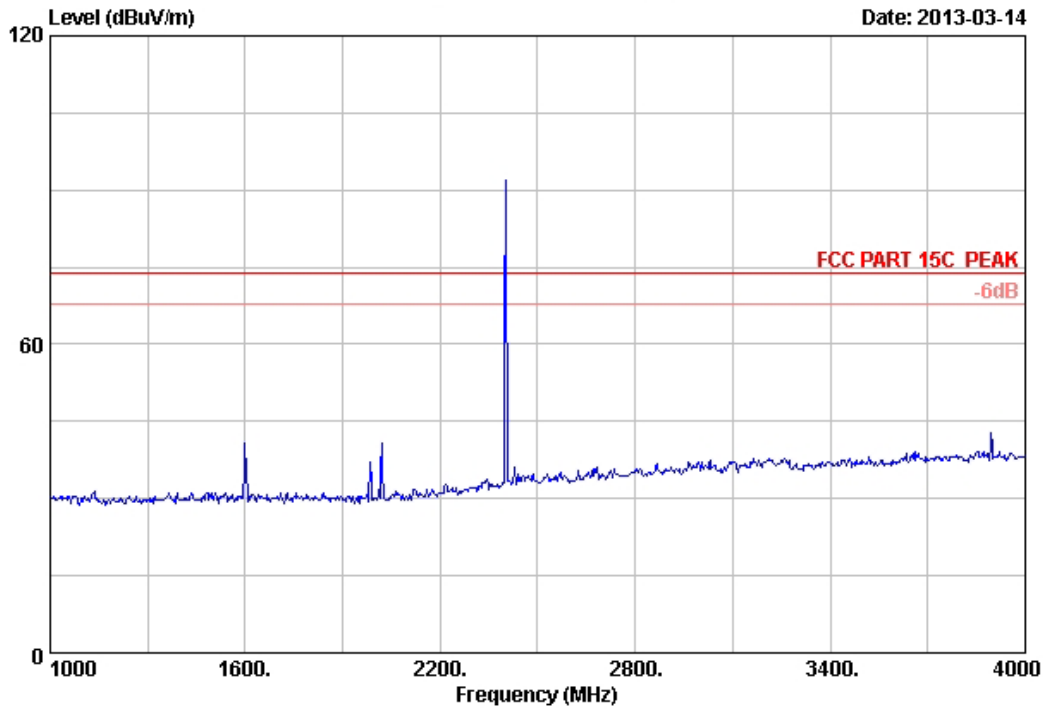
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Frequency: 1GHz~18GHz

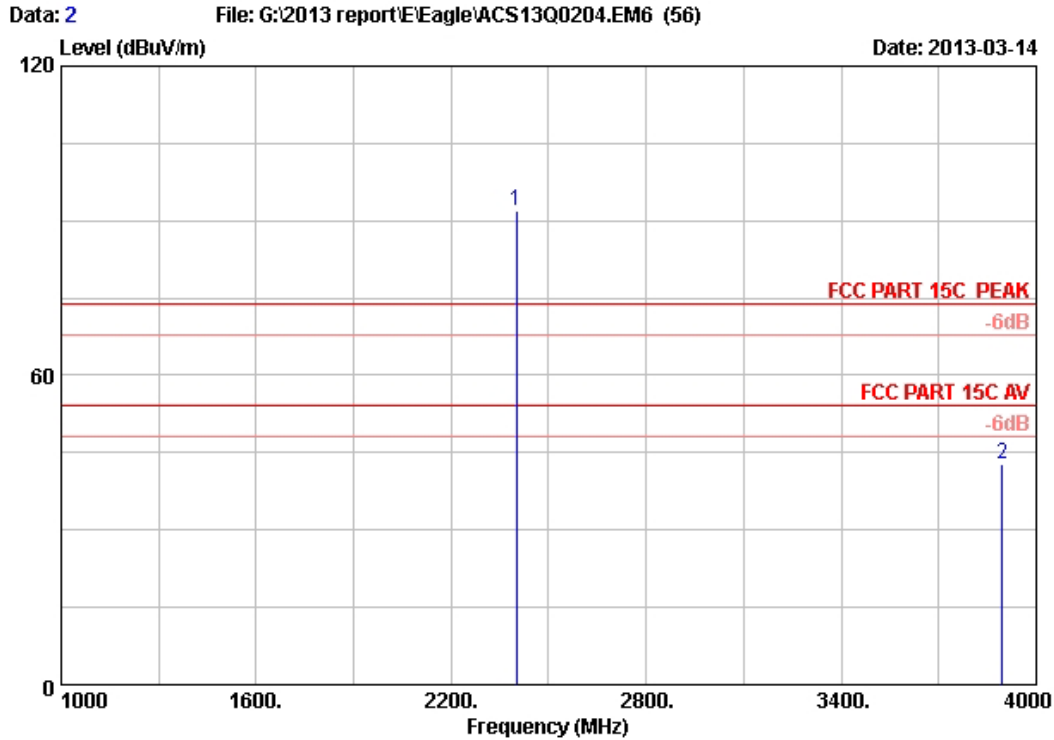
Data: 1

File: G:\2013 report\E\Eagle\ACS13Q0204.EM6 (56)

Date: 2013-03-14



Site no. : 3m Chamber Data no. : 1
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2402MHz
M/N : JHD40BT
:

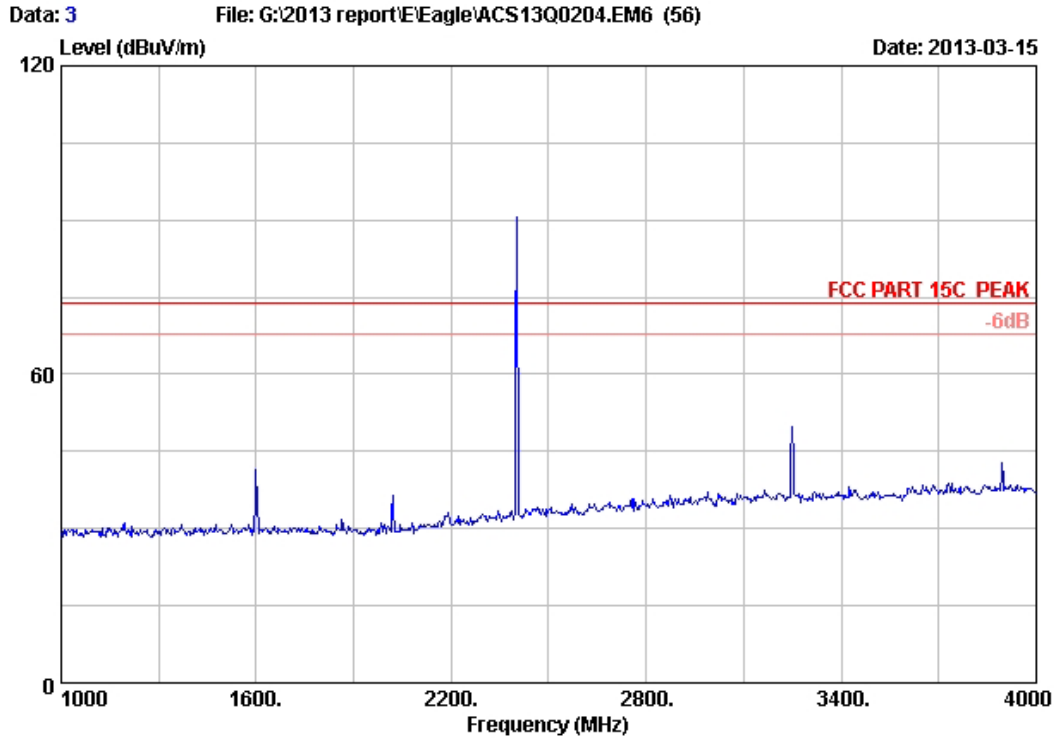


Site no. : 3m Chamber Data no. : 2
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2402MHz
 M/N : JHD40BT
 :

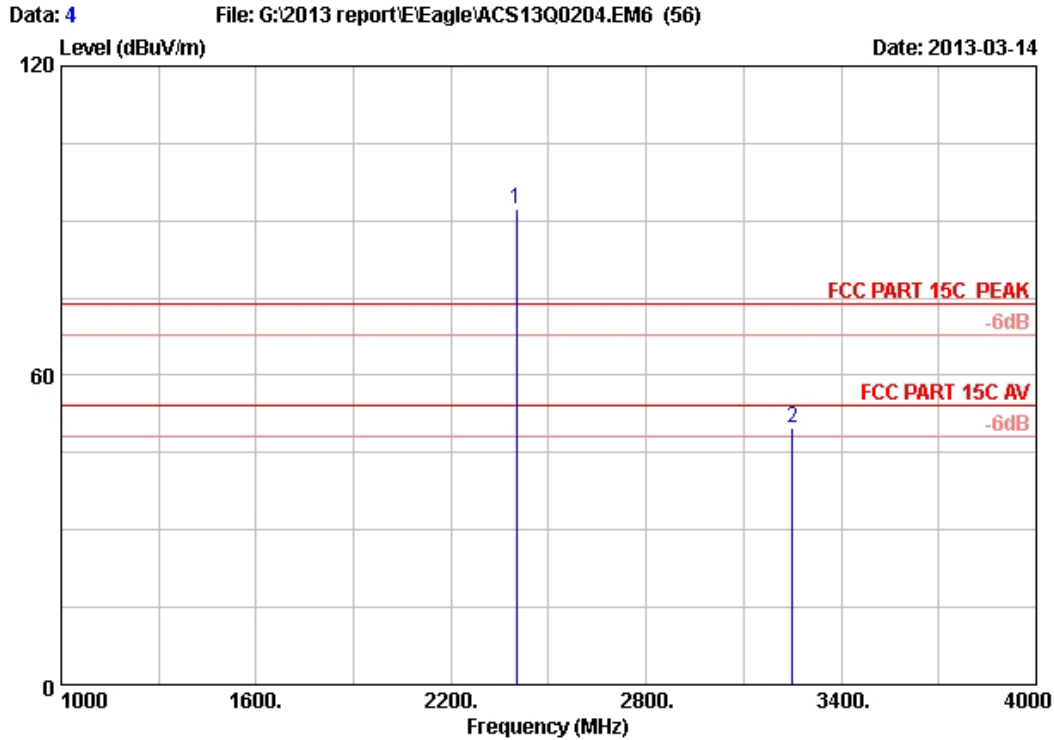
| | Freq. (MHz) | Ant. Factor (dB/m) | Cable loss (dB) | Amp. Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|----------------|--------------------------|-----------------------|------------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2402.000 | 26.77 | 6.02 | 35.92 | 94.96 | 91.83 | 74.00 | -17.83 | Peak |
| 2 | 3895.000 | 31.58 | 7.85 | 35.99 | 39.35 | 42.79 | 74.00 | 31.21 | 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. : 3
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2402MHz
M/N : JHD40BT
:

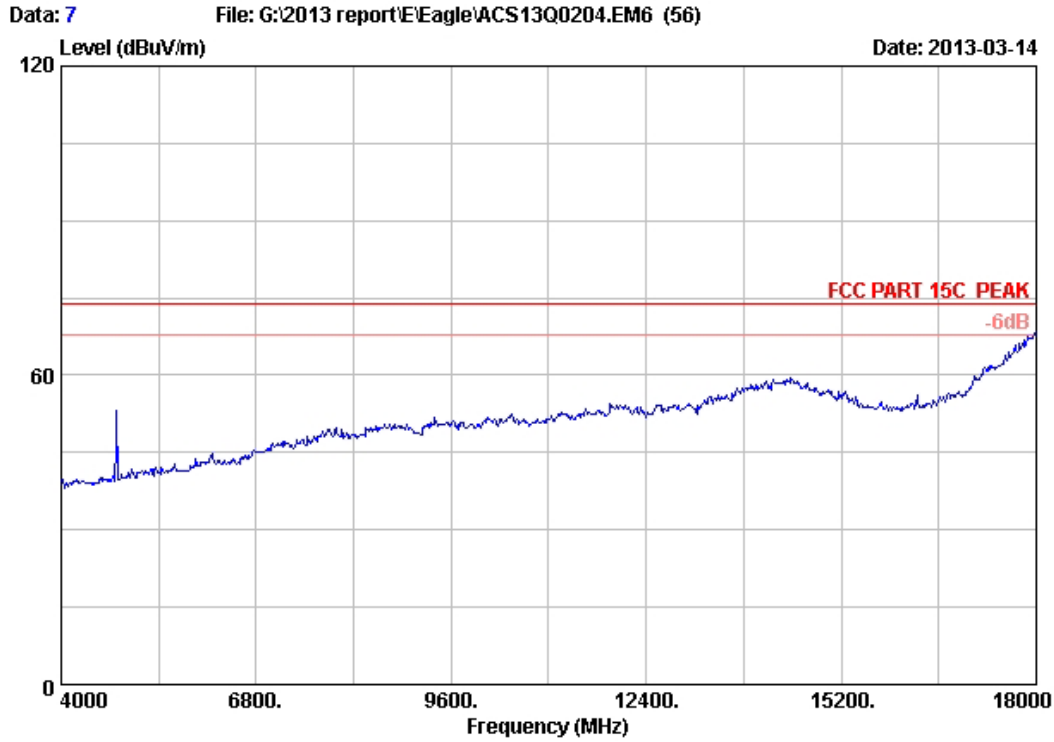


Site no. : 3m Chamber Data no. : 4
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2402MHz
 M/N : JHD40BT
 :

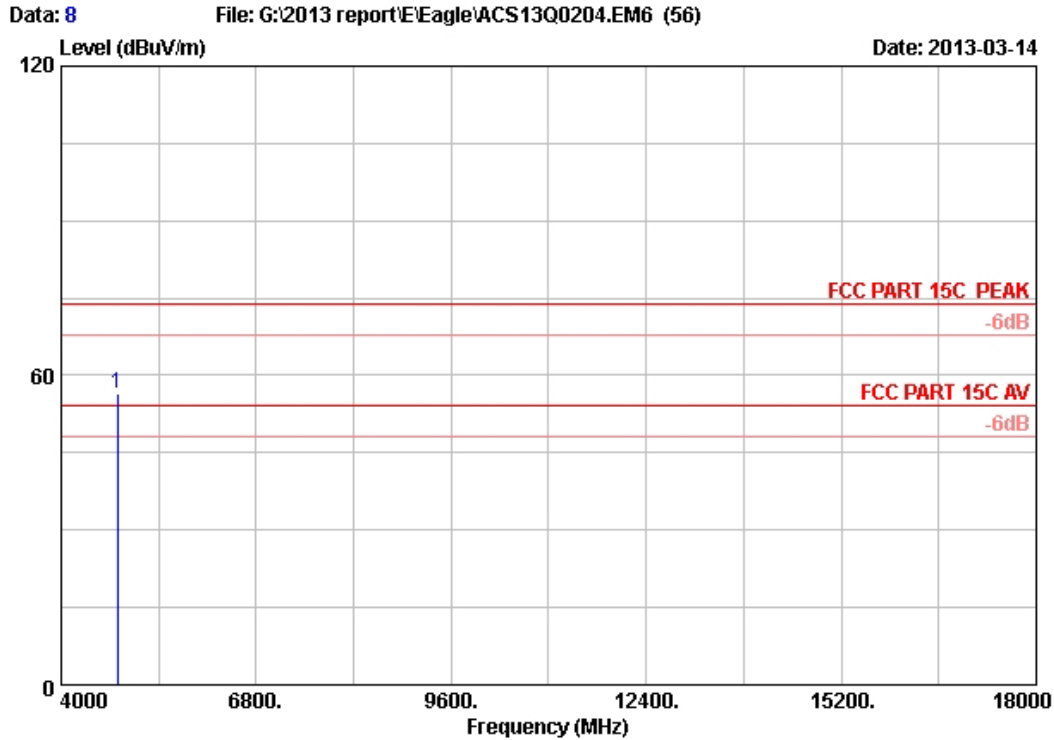
| | Freq. (MHz) | Ant. Factor (dB/m) | Cable loss (dB) | Amp. Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|----------------|--------------------------|-----------------------|------------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2402.000 | 26.77 | 6.02 | 35.92 | 95.35 | 92.22 | 74.00 | -18.22 | Peak |
| 2 | 3250.000 | 29.80 | 7.27 | 35.96 | 48.57 | 49.68 | 74.00 | 24.32 | 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. : 7
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2402MHz
M/N : JHD40BT
:



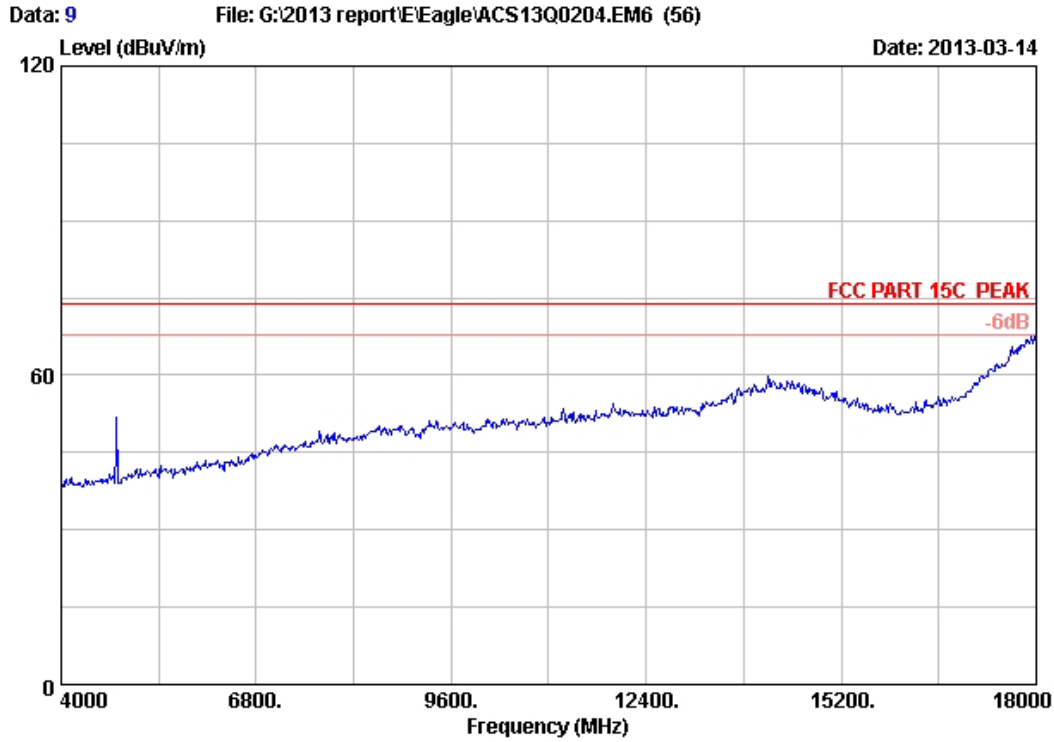
Site no. : 3m Chamber Data no. : 8
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2402MHz
 M/N : JHD40BT
 :

| | Ant. Factor | Cable loss | Amp. Factor | Reading | Emission Level | Limits | Margin | Remark |
|---|-------------|------------|-------------|---------|----------------|----------|--------|--------|
| 1 | (dB/m) | (dB) | (dB) | (dBuV) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 | 32.47 | 8.67 | 35.72 | 50.99 | 56.41 | 74.00 | 17.59 | Peak |

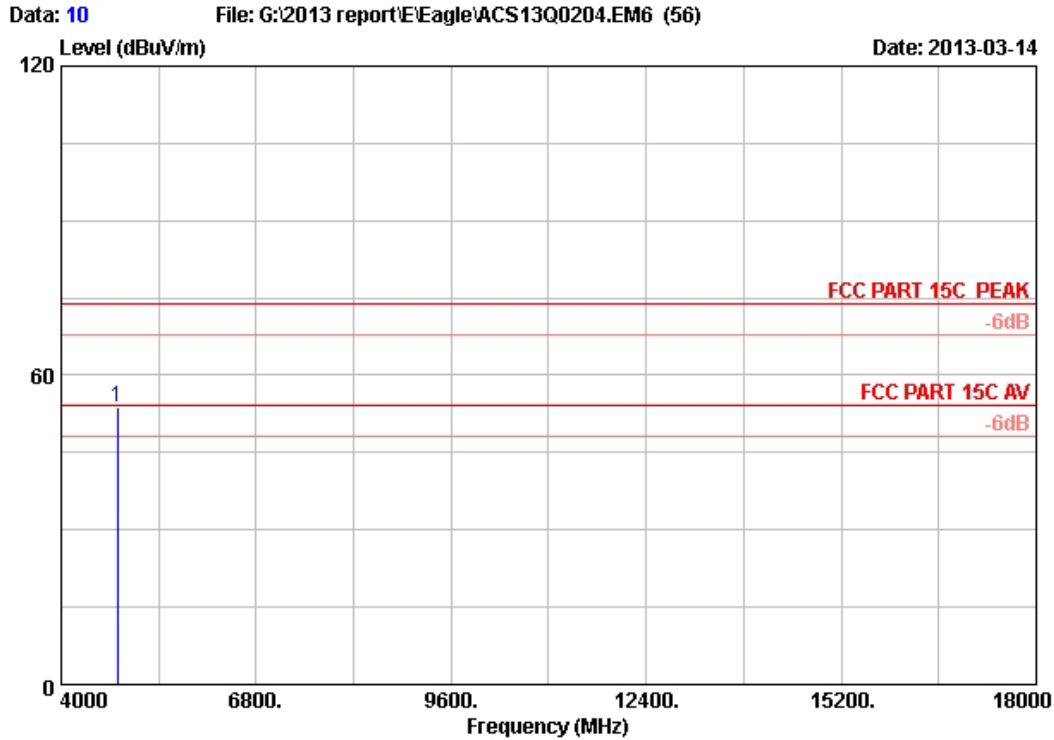
Remarks:

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

| Frequency (MHz) | Peak level (dBuV/m) | Duty cycle factor (dB) | AV level (dBuV/m) | Limit(dBuV/m) | Conclusion |
|-----------------|---------------------|------------------------|-------------------|---------------|------------|
| 4804 | 56.41 | 7.54 | 48.87 | 54 | Pass |



Site no. : 3m Chamber Data no. : 9
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2402MHz
M/N : JHD40BT
:

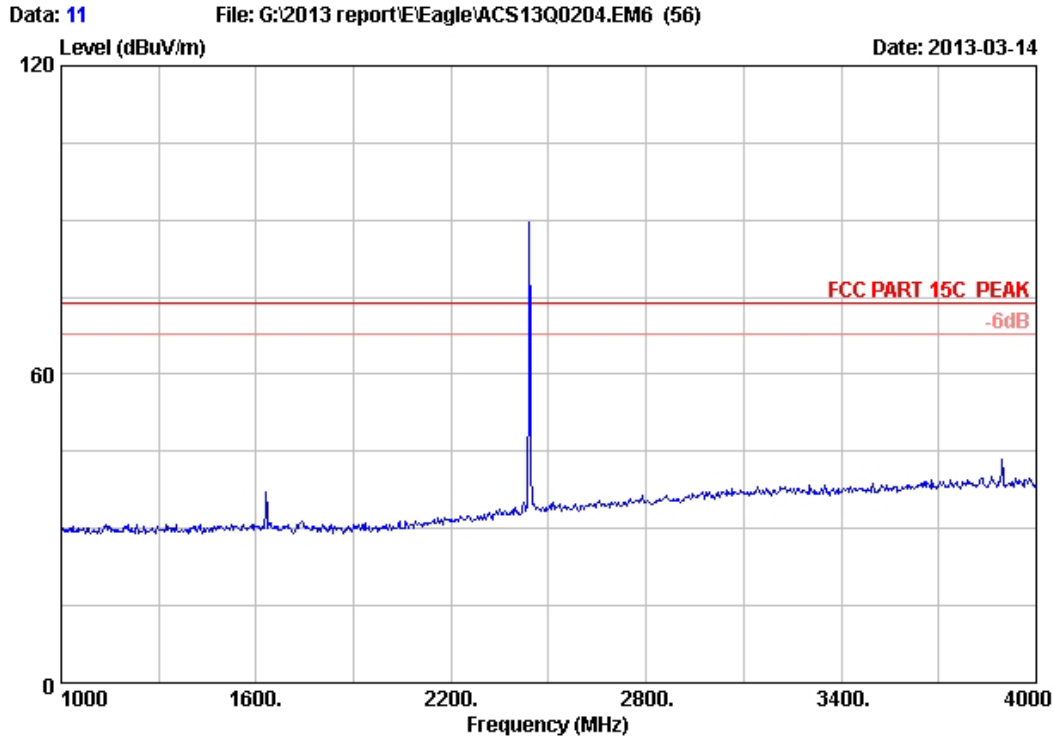


Site no. : 3m Chamber Data no. : 10
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2402MHz
 M/N : JHD40BT
 :

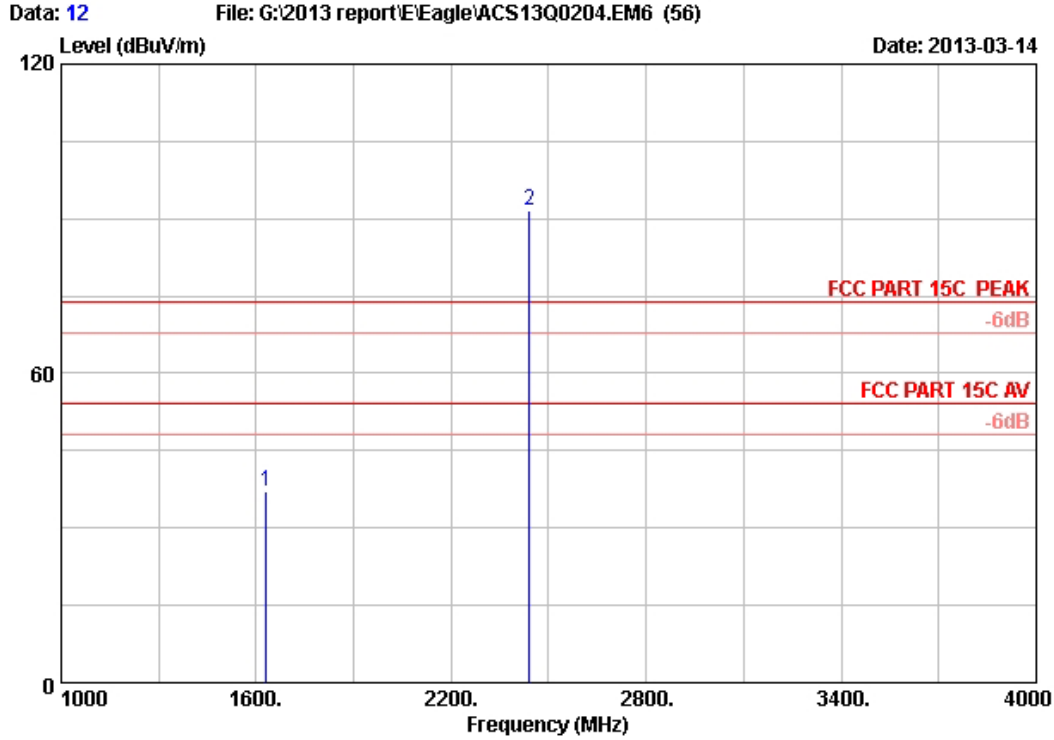
| | Freq. (MHz) | Ant. Factor (dB/m) | Cable loss (dB) | Amp. Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|----------------|--------------------------|-----------------------|------------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 4804.000 | 32.47 | 8.67 | 35.72 | 48.29 | 53.71 | 74.00 | 20.29 | Peak |

Remarks:

- Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
- 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 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2441MHz
M/N : JHD40BT
:



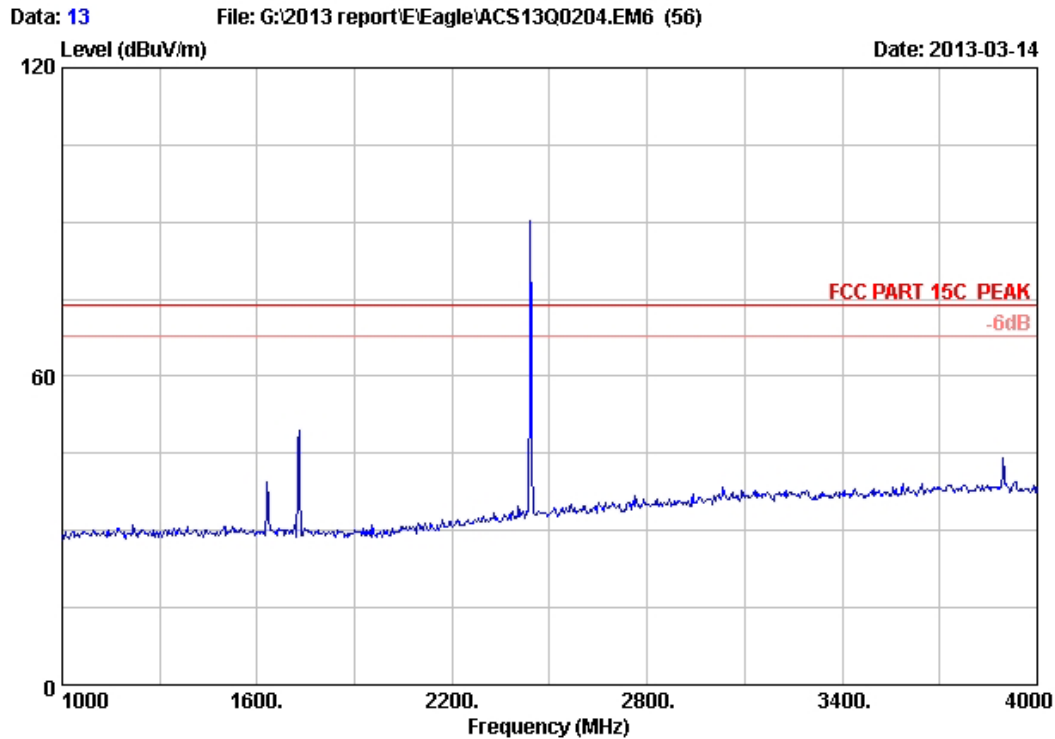
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Site no.      : 3m Chamber           Data no.   : 12
Dis. / Ant.  : 3m 2012 3115 (4580)  Ant. pol.  : VERTICAL
Limit        : FCC PART 15C PEAK
Env. / Ins.  : 23*C/54%             Engineer   : Leo-Li
EUT          : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode    : Tx Mode GFSK 2441MHz
M/N         : JHD40BT
:
  
```

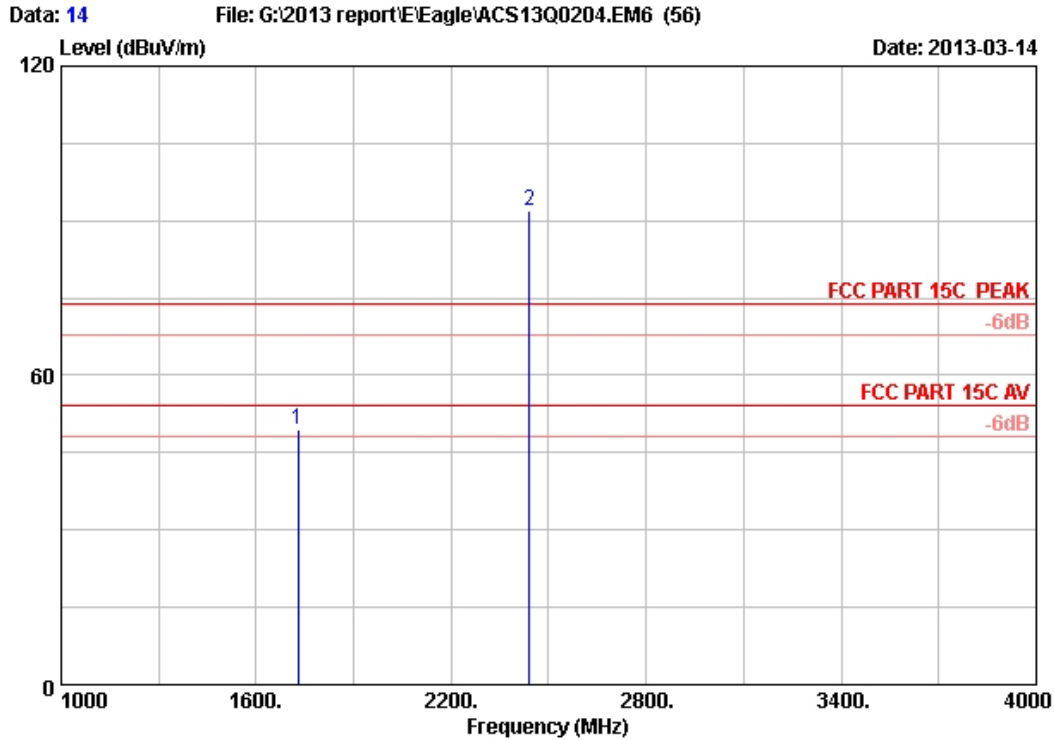
| | Freq. (MHz) | Ant. Factor (dB/m) | Cable loss (dB) | Amp. Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|----------------|--------------------------|-----------------------|------------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 1630.000 | 24.87 | 4.70 | 36.31 | 43.75 | 37.01 | 74.00 | 36.99 | Peak |
| 2 | 2441.000 | 27.02 | 6.09 | 35.92 | 94.39 | 91.58 | 74.00 | -17.58 | 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. : 13
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2441MHz
M/N : JHD40BT
:



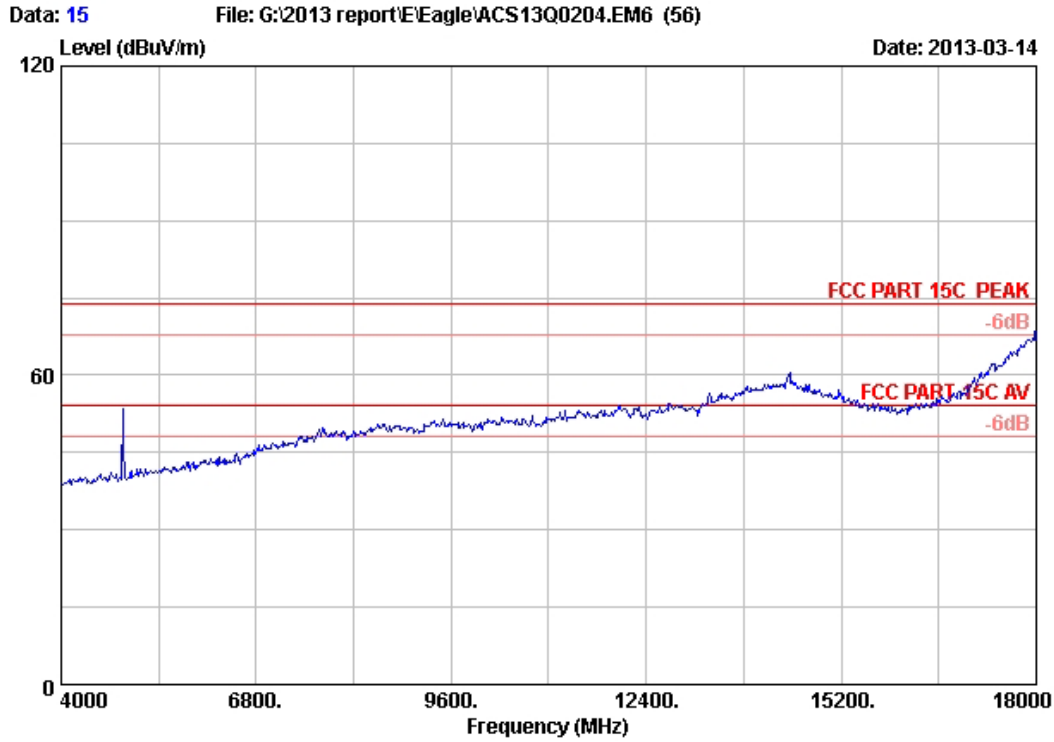
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Site no.      : 3m Chamber           Data no.   : 14
Dis. / Ant.  : 3m 2012 3115 (4580)  Ant. pol.  : HORIZONTAL
Limit       : FCC PART 15C PEAK
Env. / Ins.  : 23*C/54%             Engineer   : Leo-Li
EUT        : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode   : Tx Mode GFSK 2441MHz
M/N        : JHD40BT
:
  
```

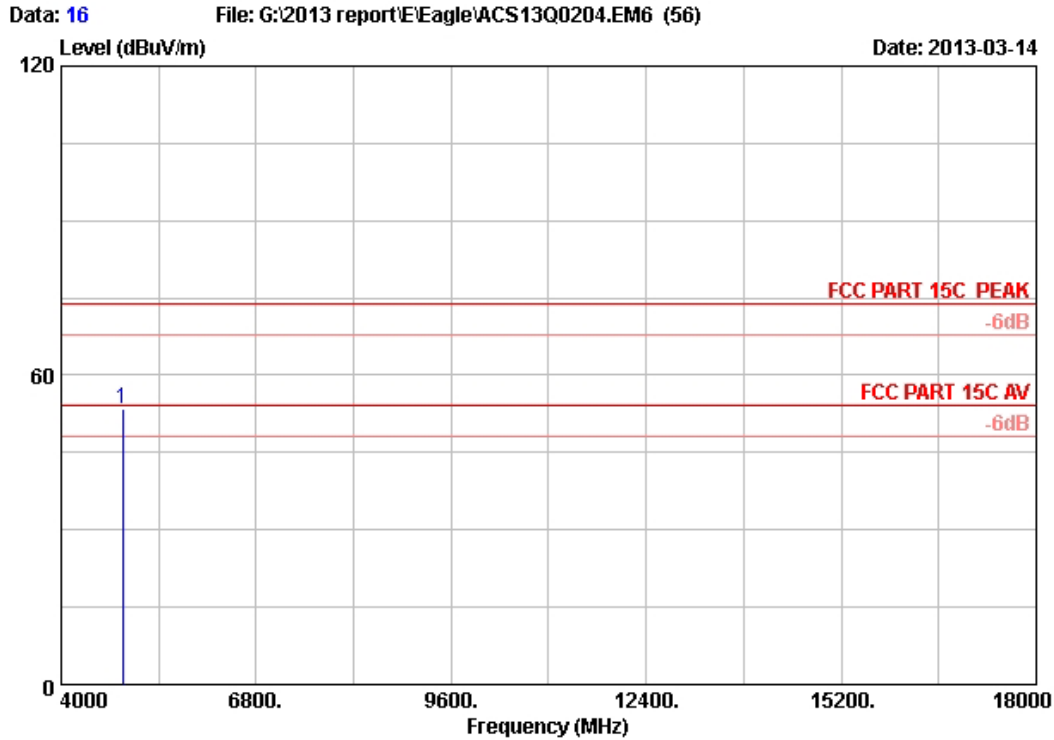
| | Freq. (MHz) | Ant. Factor (dB/m) | Cable loss (dB) | Amp. Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|----------------|--------------------------|-----------------------|------------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 1729.000 | 24.69 | 4.87 | 36.20 | 56.03 | 49.39 | 74.00 | 24.61 | Peak |
| 2 | 2441.000 | 27.02 | 6.09 | 35.92 | 94.71 | 91.90 | 74.00 | -17.90 | 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. : 15
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2441MHz
M/N : JHD40BT
:

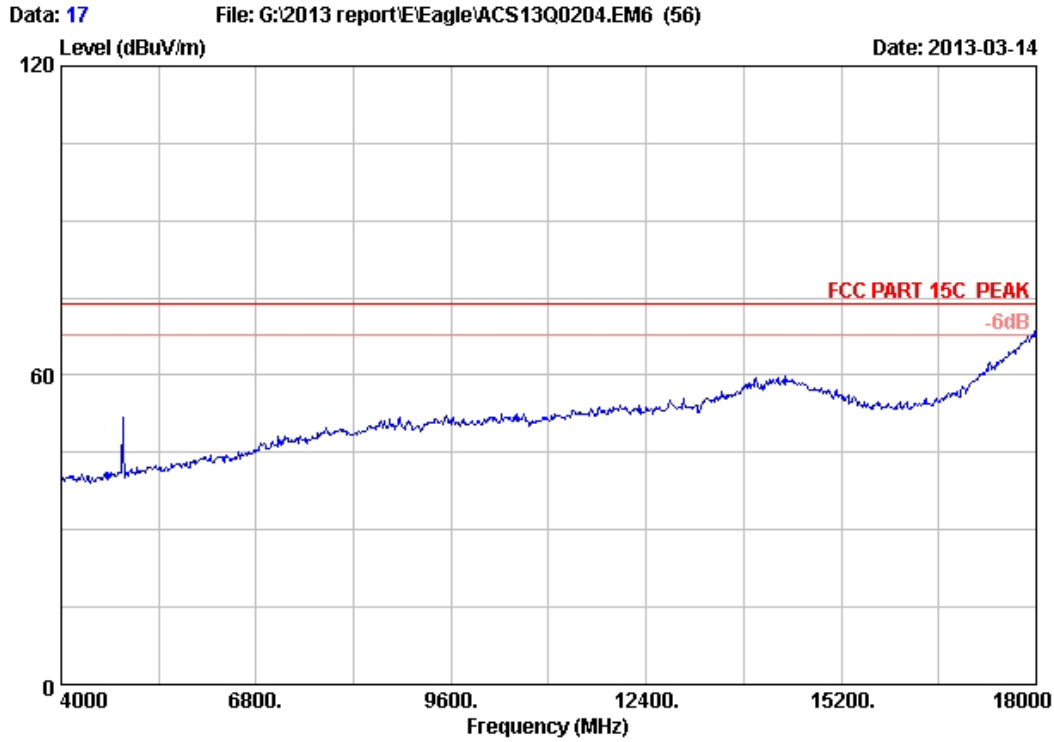


Site no. : 3m Chamber Data no. : 16
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2441MHz
 M/N : JHD40BT
 :

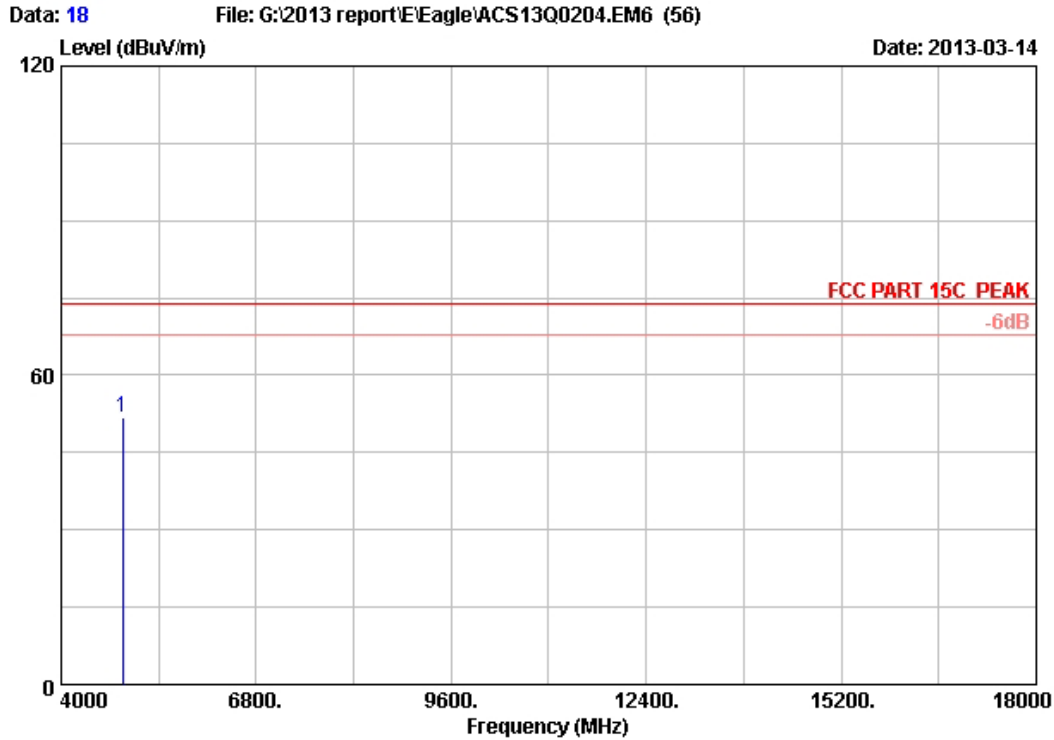
| | Freq. (MHz) | Ant. Factor (dB/m) | Cable loss (dB) | Amp. Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|----------------|--------------------------|-----------------------|------------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 4882.000 | 32.64 | 8.74 | 35.69 | 47.89 | 53.58 | 74.00 | 20.42 | 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. : 17
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2441MHz
M/N : JHD40BT
:

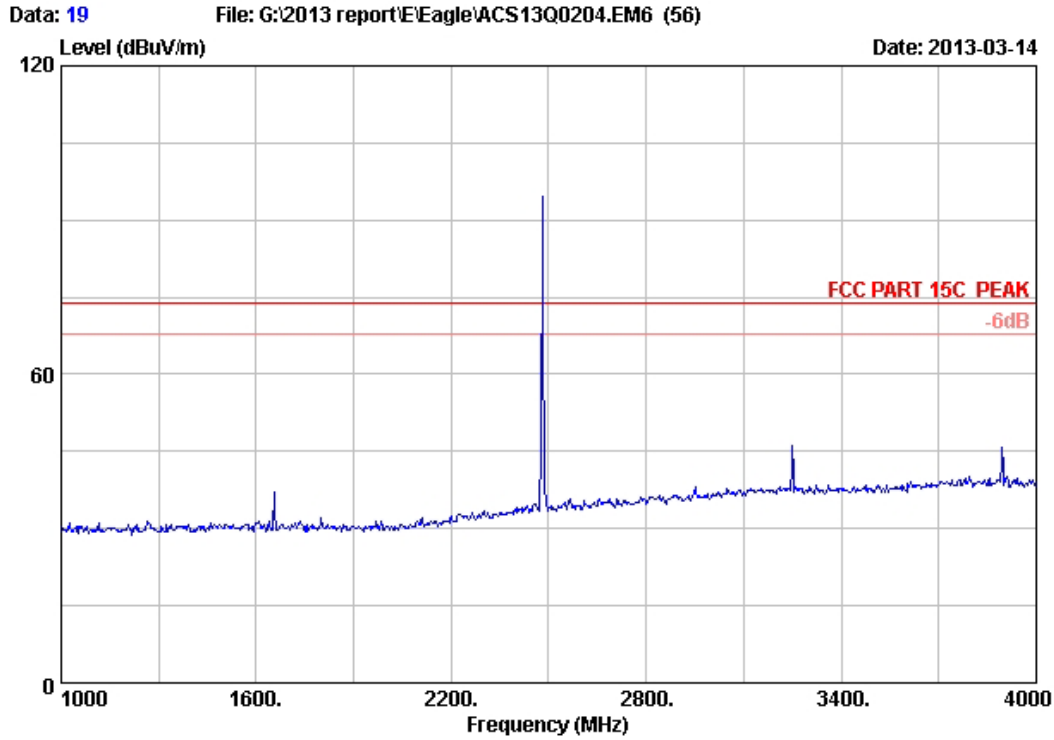


Site no. : 3m Chamber Data no. : 18
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2441MHz
 M/N : JHD40BT
 :

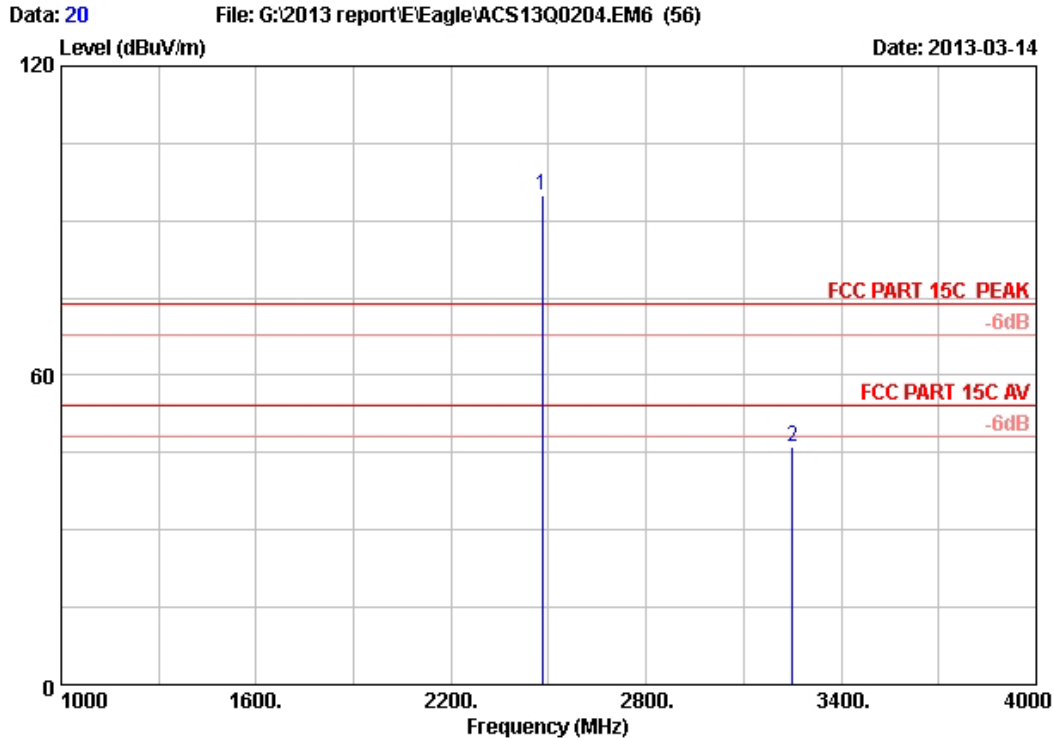
| | Freq. (MHz) | Ant. Factor (dB/m) | Cable loss (dB) | Amp. Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|----------------|--------------------------|-----------------------|------------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 4882.000 | 32.64 | 8.74 | 35.69 | 46.13 | 51.82 | 74.00 | 22.18 | 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. : 19
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2480MHz
M/N : JHD40BT
:

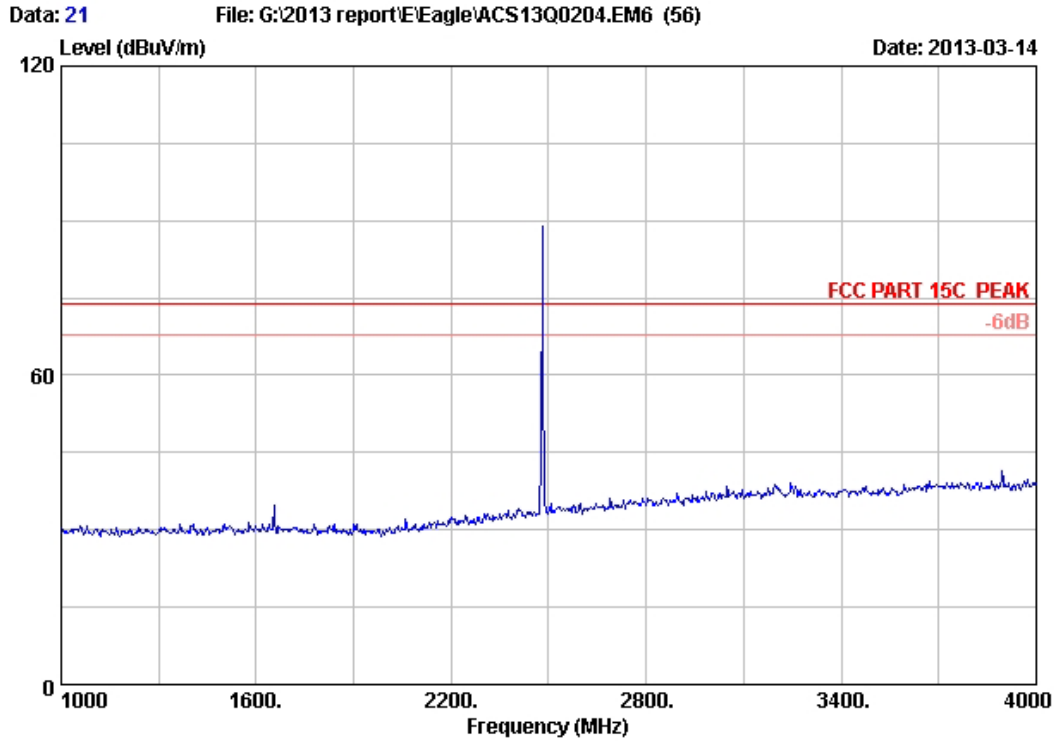


Site no. : 3m Chamber Data no. : 20
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2480MHz
 M/N : JHD40BT
 :

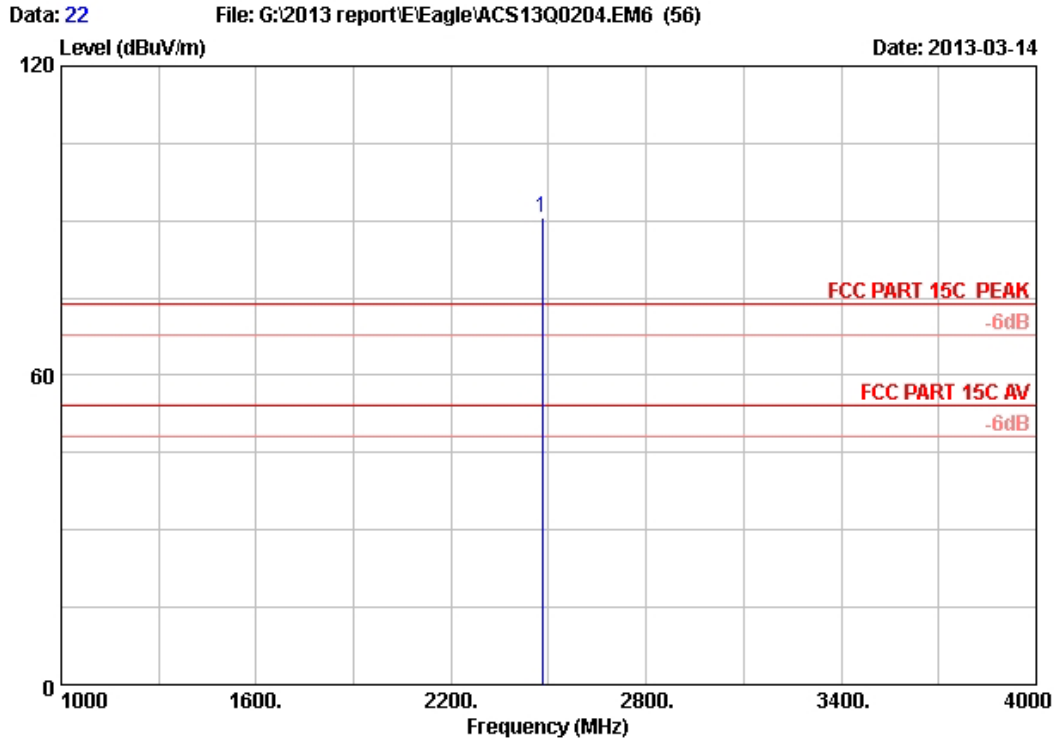
| | Freq. (MHz) | Ant. Factor (dB/m) | Cable loss (dB) | Amp. Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|----------------|--------------------------|-----------------------|------------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 2480.000 | 27.27 | 6.15 | 35.92 | 97.30 | 94.80 | 74.00 | -20.80 | Peak |
| 2 | 3250.000 | 29.80 | 7.27 | 35.96 | 44.93 | 46.04 | 74.00 | 27.96 | 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. : 21
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2480MHz
M/N : JHD40BT
:

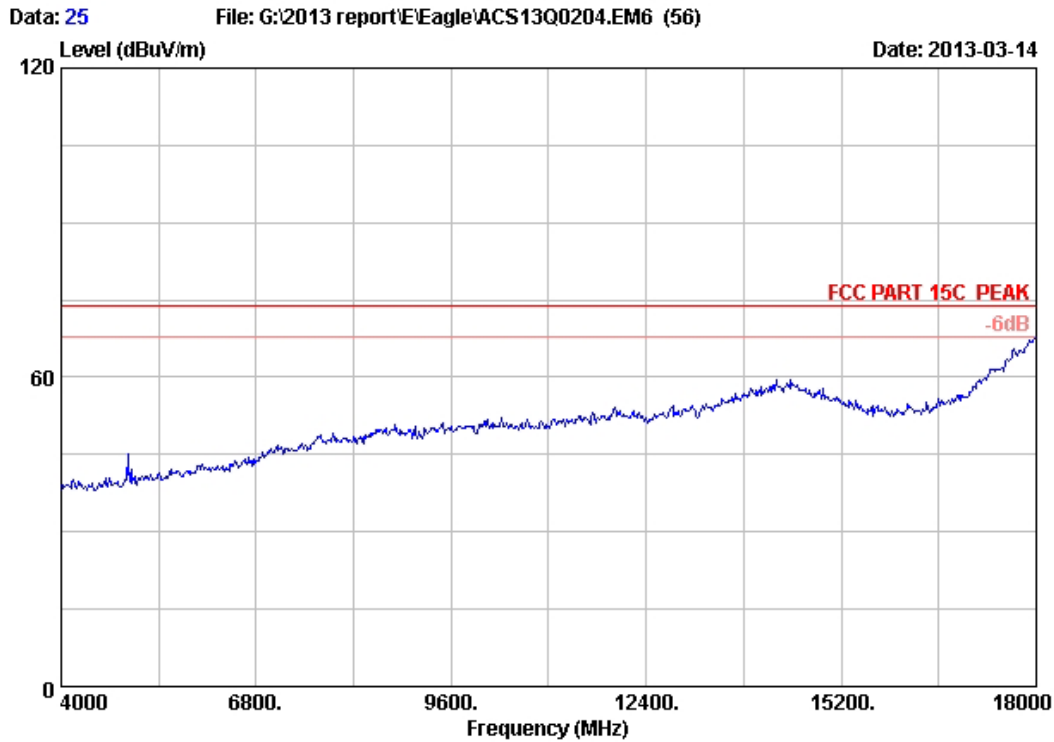


Site no. : 3m Chamber Data no. : 22
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2480MHz
 M/N : JHD40BT
 :

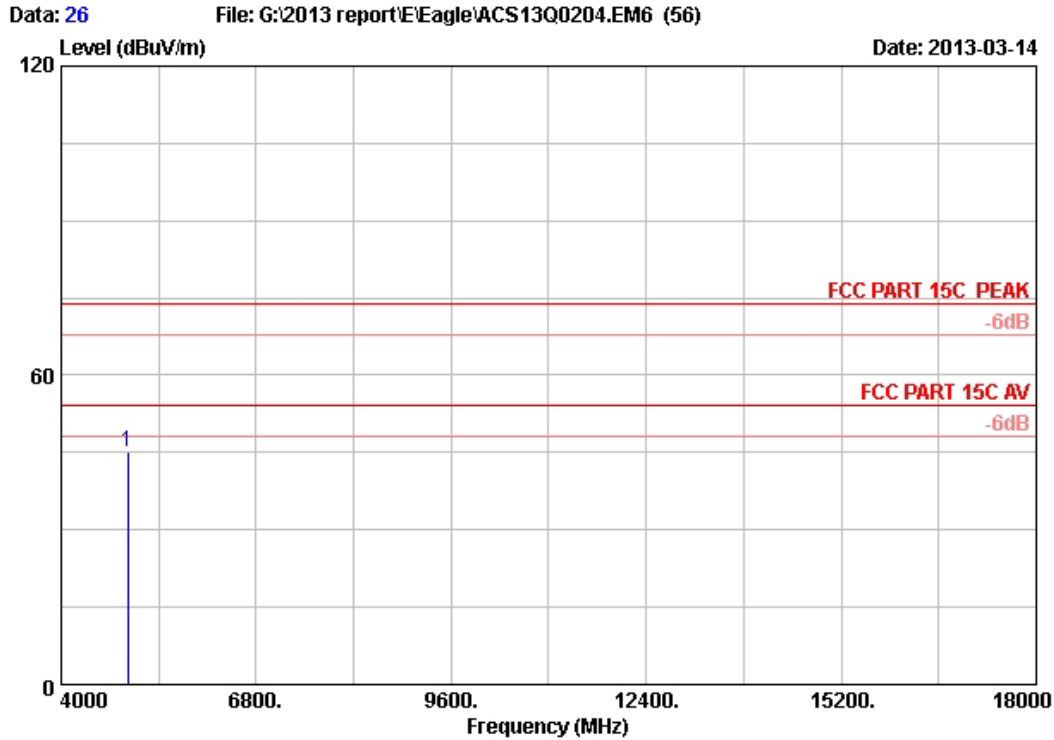
| | Ant. | Cable | Amp. | Emission | | | | |
|------------|--------|-------|--------|----------|----------|----------|--------|--------|
| Freq. | Factor | loss | Factor | Reading | Level | Limits | Margin | Remark |
| (MHz) | (dB/m) | (dB) | (dB) | (dBuV) | (dBuV/m) | (dBuV/m) | (dB) | |
| 1 2480.000 | 27.27 | 6.15 | 35.92 | 93.04 | 90.54 | 74.00 | -16.54 | 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. : 25
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2480MHz
M/N : JHD40BT
:

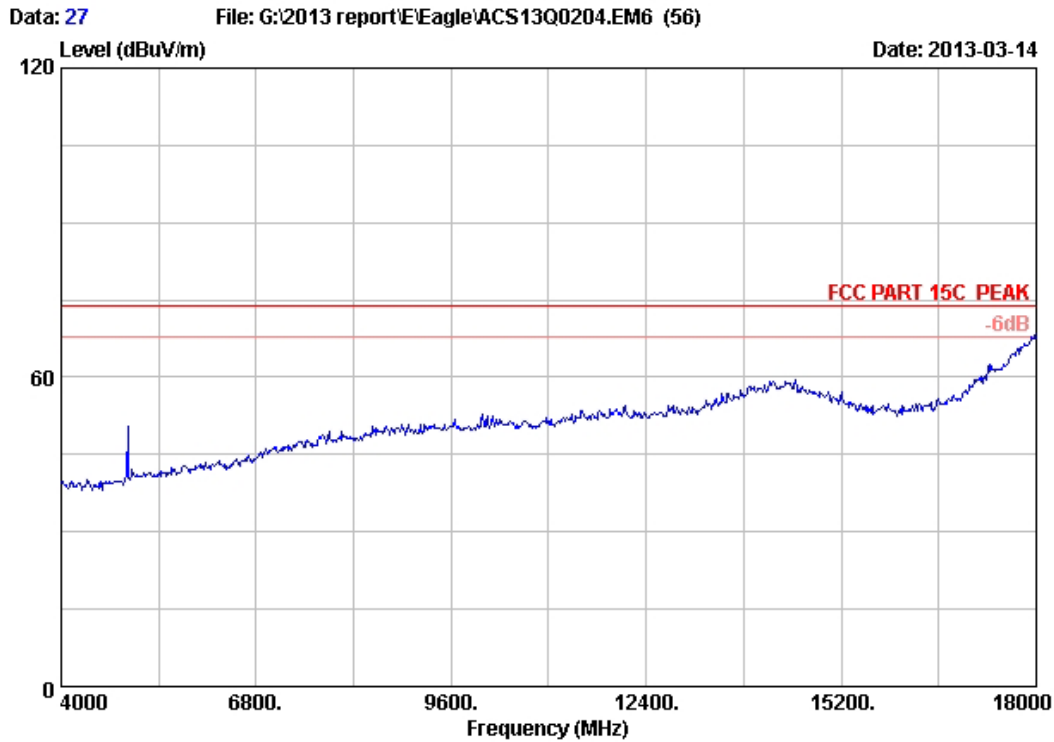


Site no. : 3m Chamber Data no. : 26
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2480MHz
 M/N : JHD40BT
 :

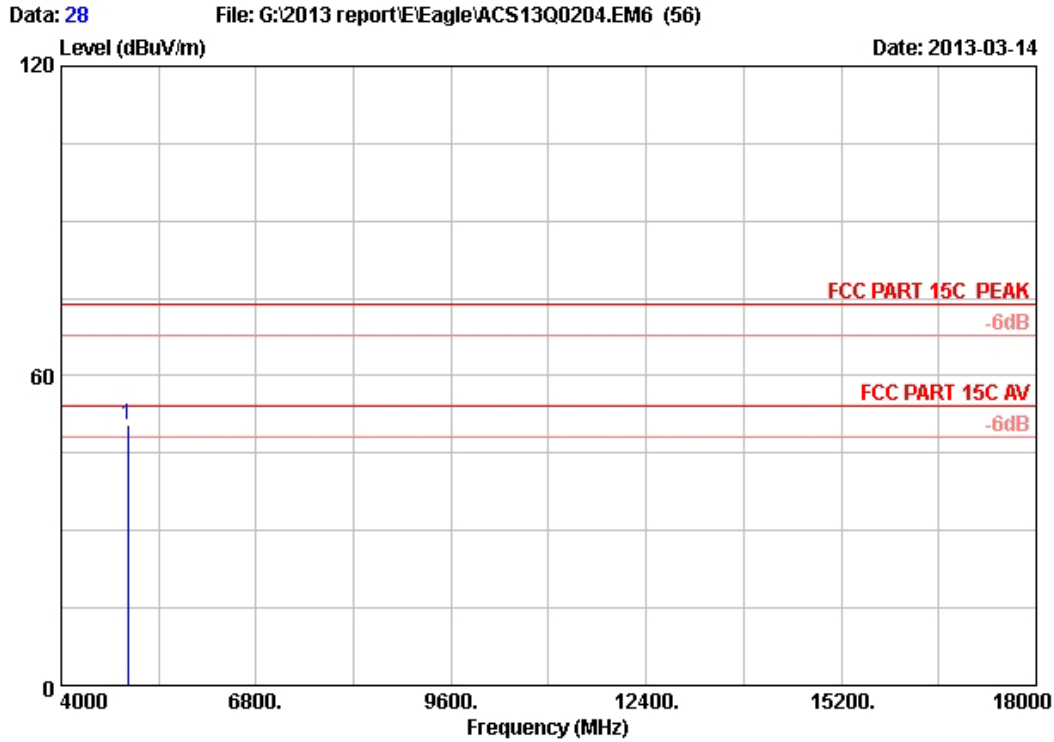
| | Freq. (MHz) | Ant. Factor (dB/m) | Cable loss (dB) | Amp. Factor (dB) | Reading (dBuV) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Remark |
|---|----------------|--------------------------|-----------------------|------------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1 | 4960.000 | 32.81 | 8.81 | 35.66 | 39.07 | 45.03 | 74.00 | 28.97 | 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. : 27
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Leo-Li
EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
Power supply : DC 12V
Test mode : Tx Mode GFSK 2480MHz
M/N : JHD40BT
:



Site no. : 3m Chamber Data no. : 28
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2480MHz
 M/N : JHD40BT
 :

| | 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 | 4952.000 | 32.79 | 8.80 | 35.67 | 44.58 | 50.50 | 74.00 | 23.50 | 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.

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 | May.08,12 | 1 Year |
| 2. | Attenuator | Agilent | 8491B | MY39262165 | May.08,12 | 1 Year |
| 3. | RF Cable | Hubersuhner | SUCOFLEX102 | 28618/2 | May.08,12 | 1 Year |

5.2. Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is 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.

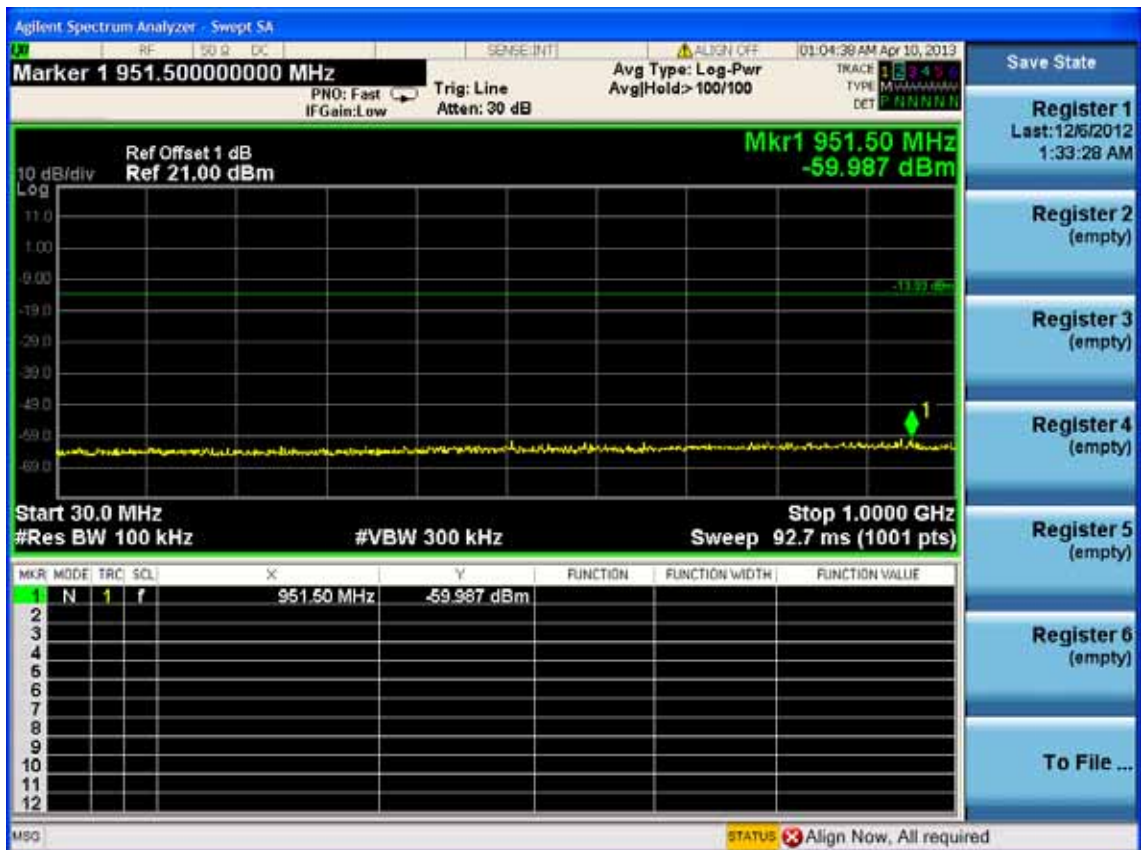
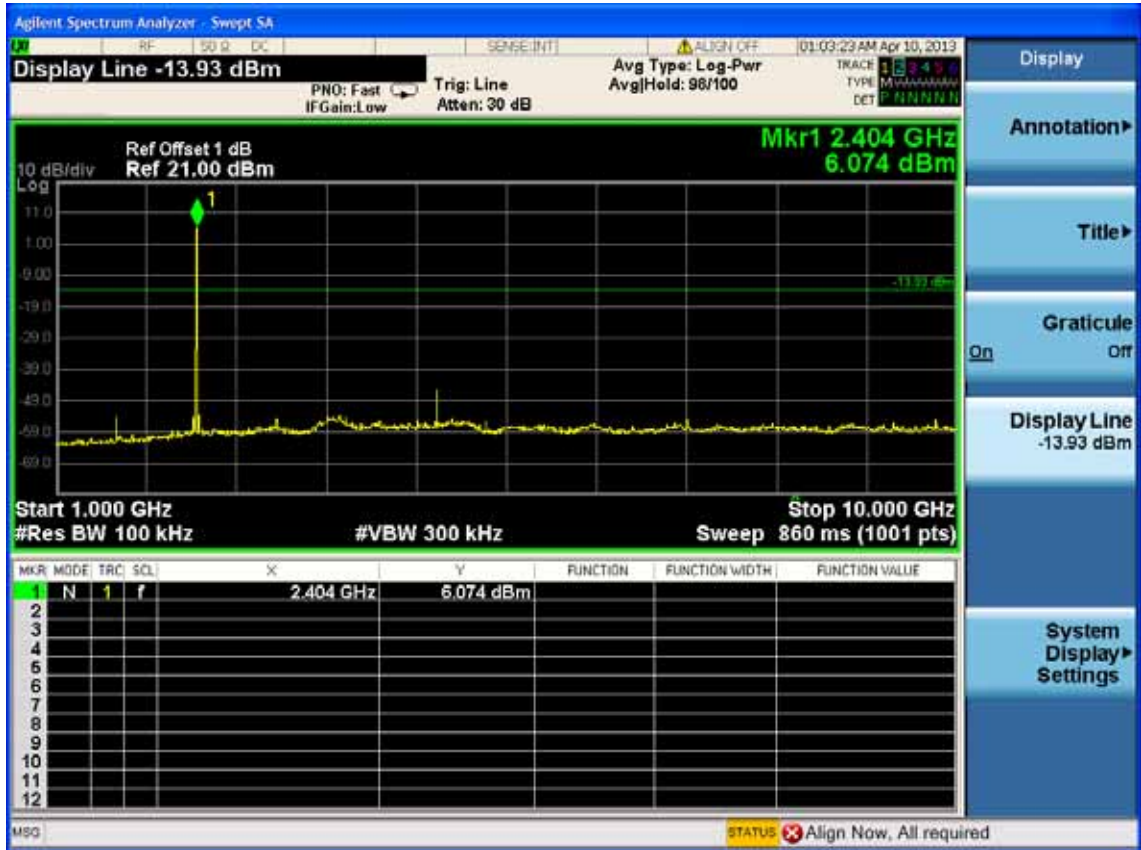
5.3. Test Procedure

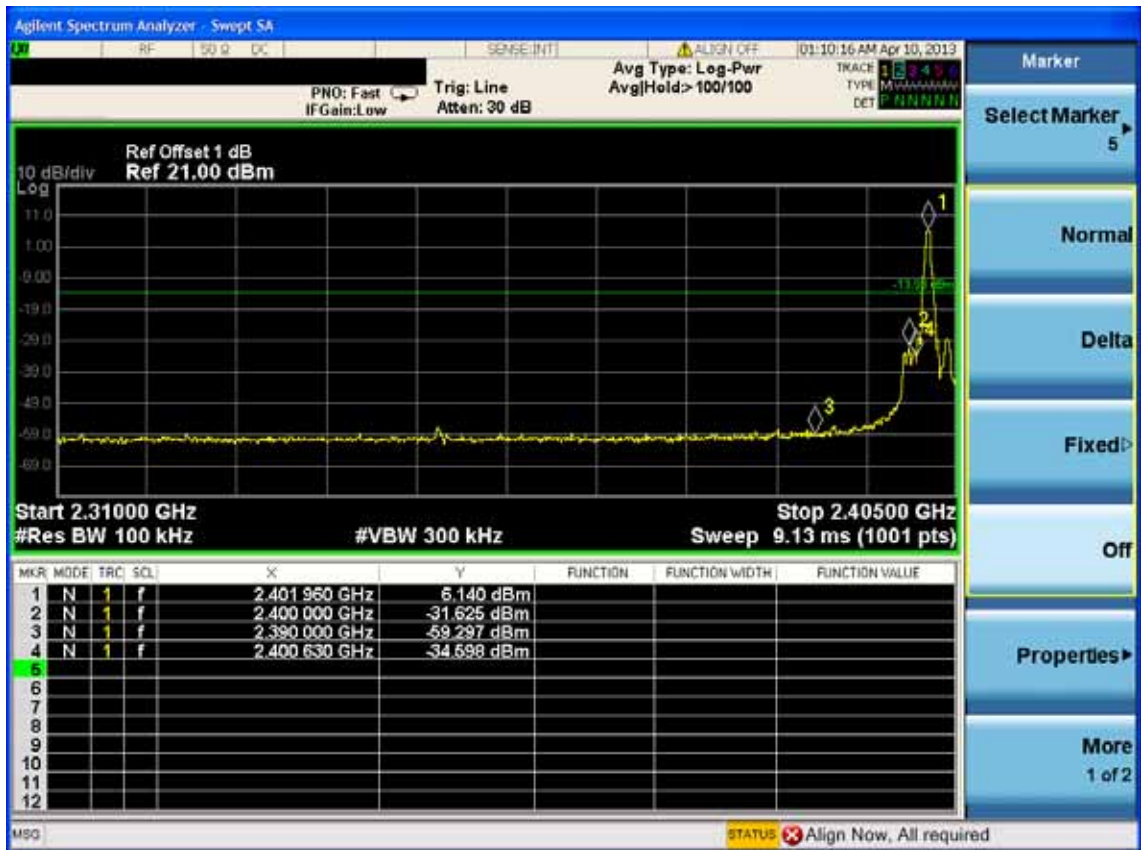
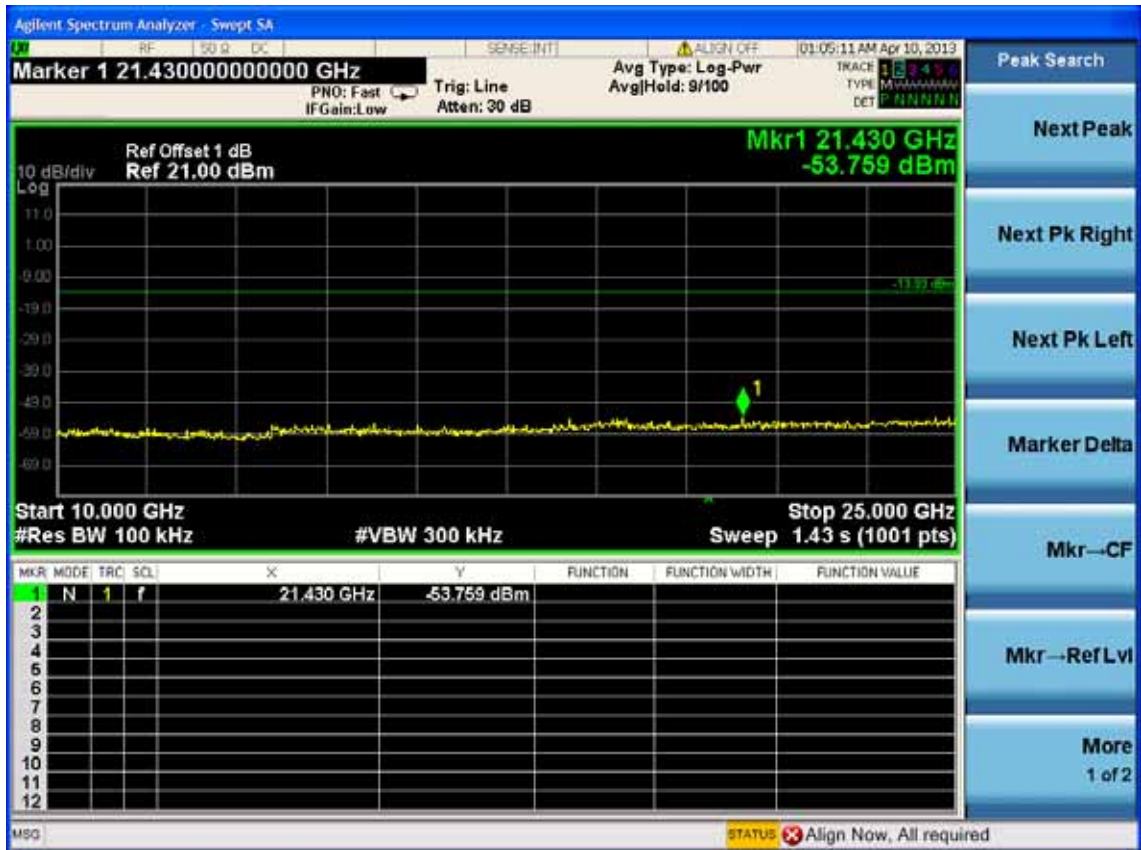
The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions detected.

5.4. Test result

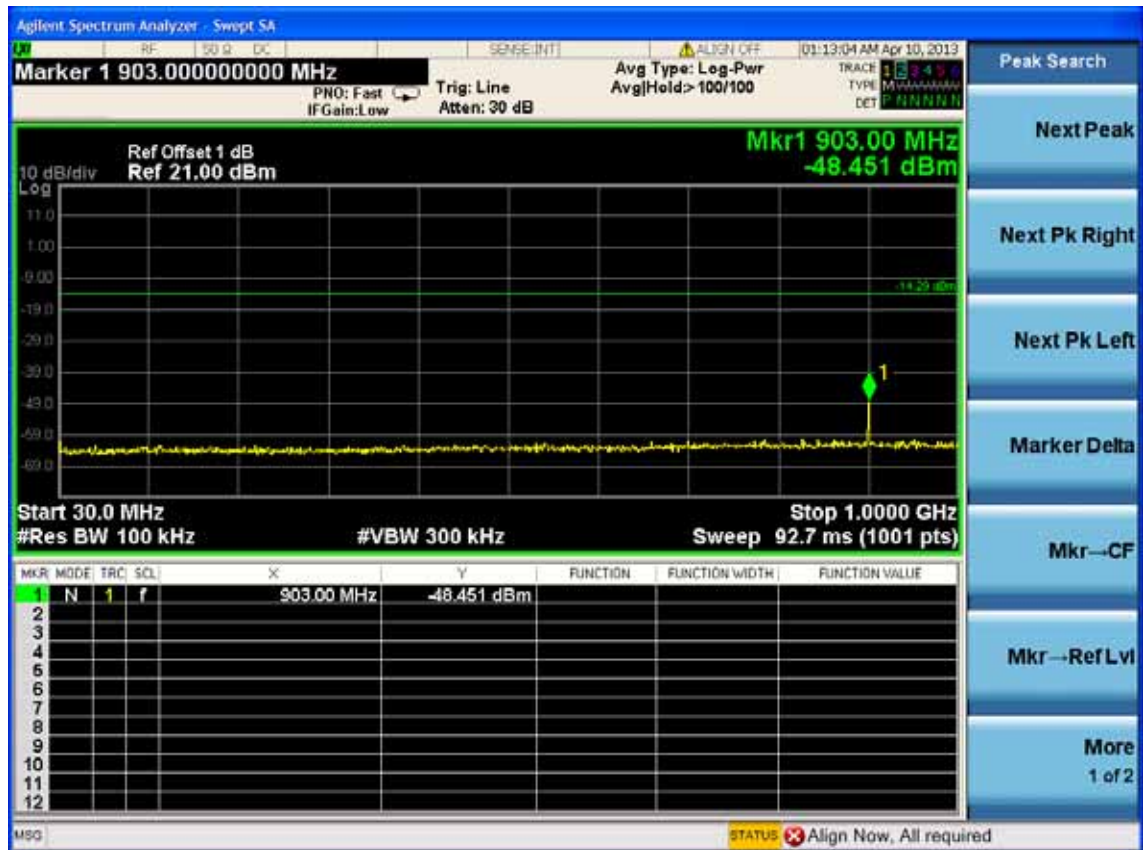
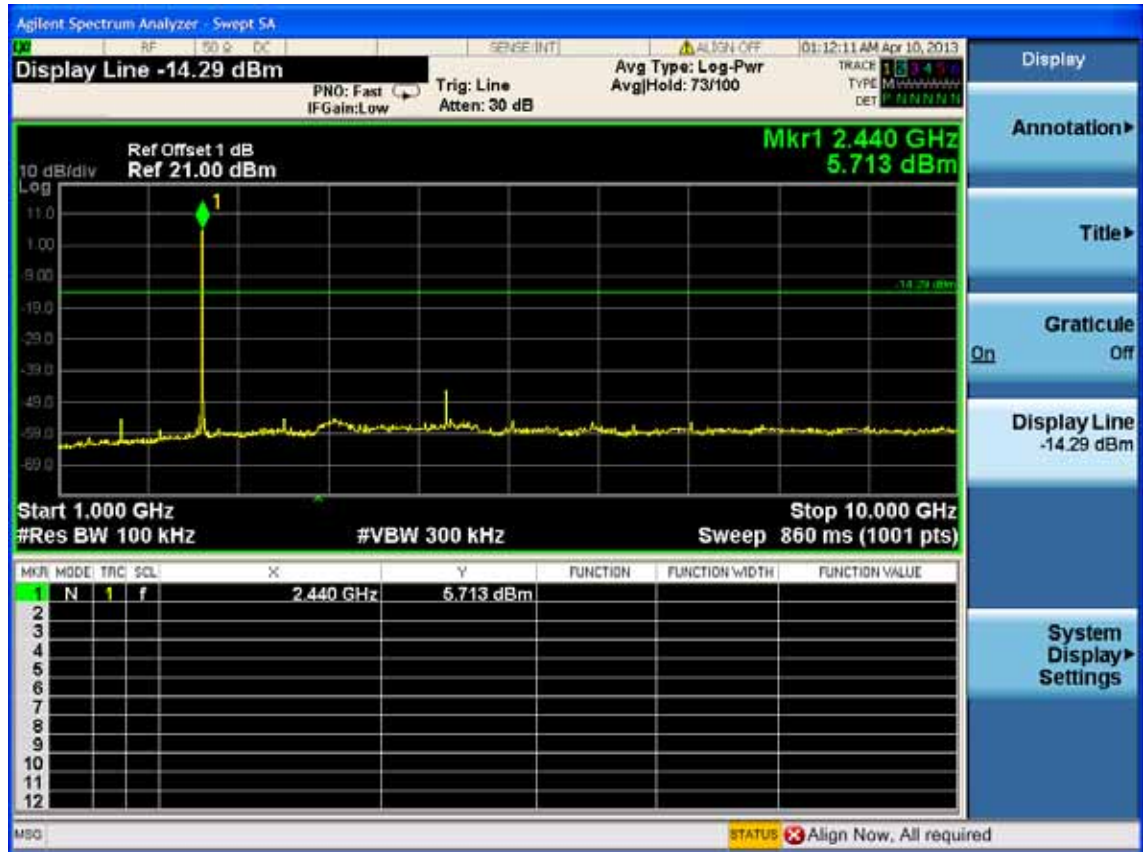
PASS (The testing data was attached in the next pages.)

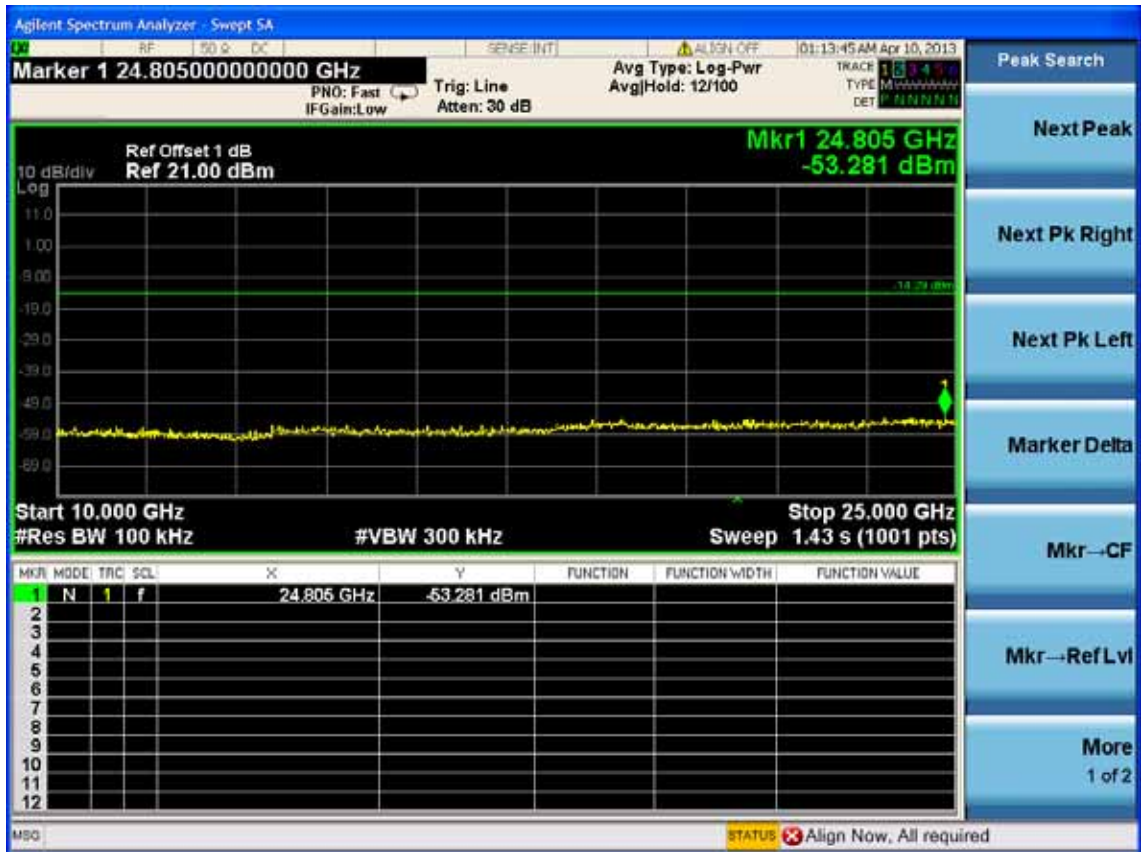
**Hopping Off
GFSK
2402MHz**



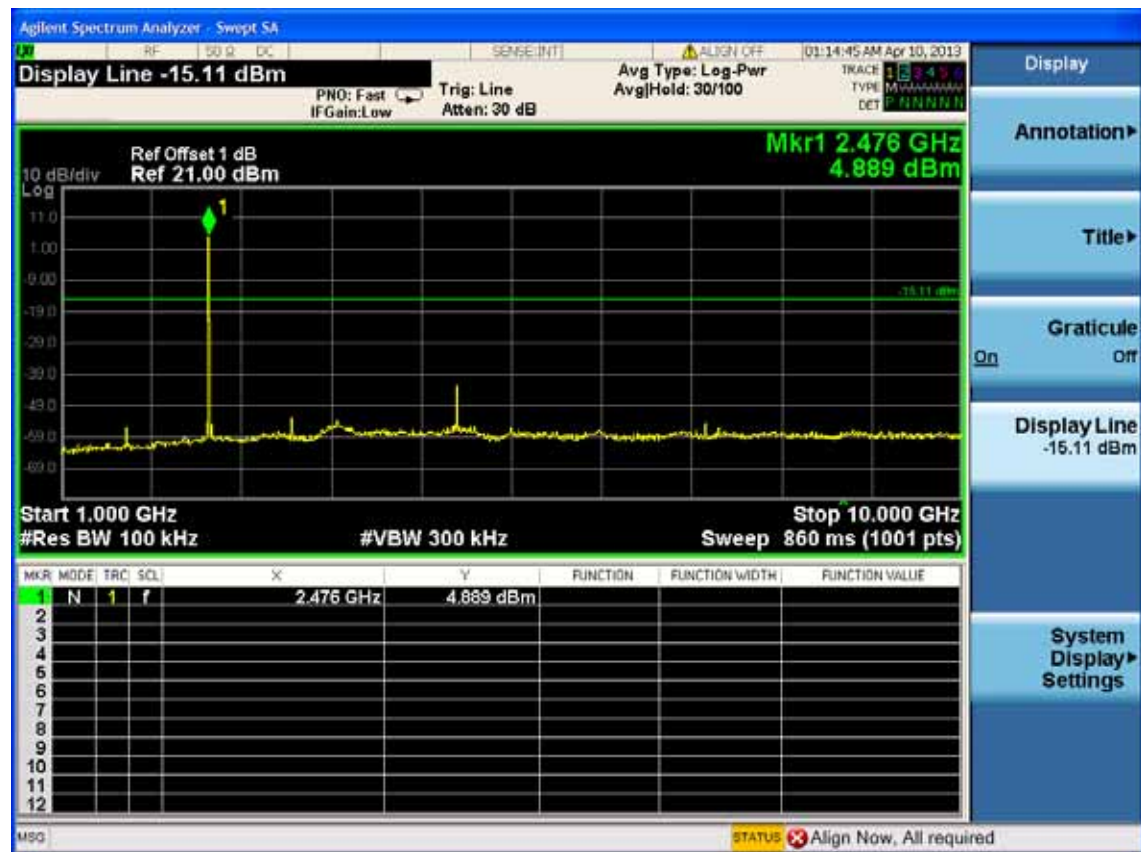


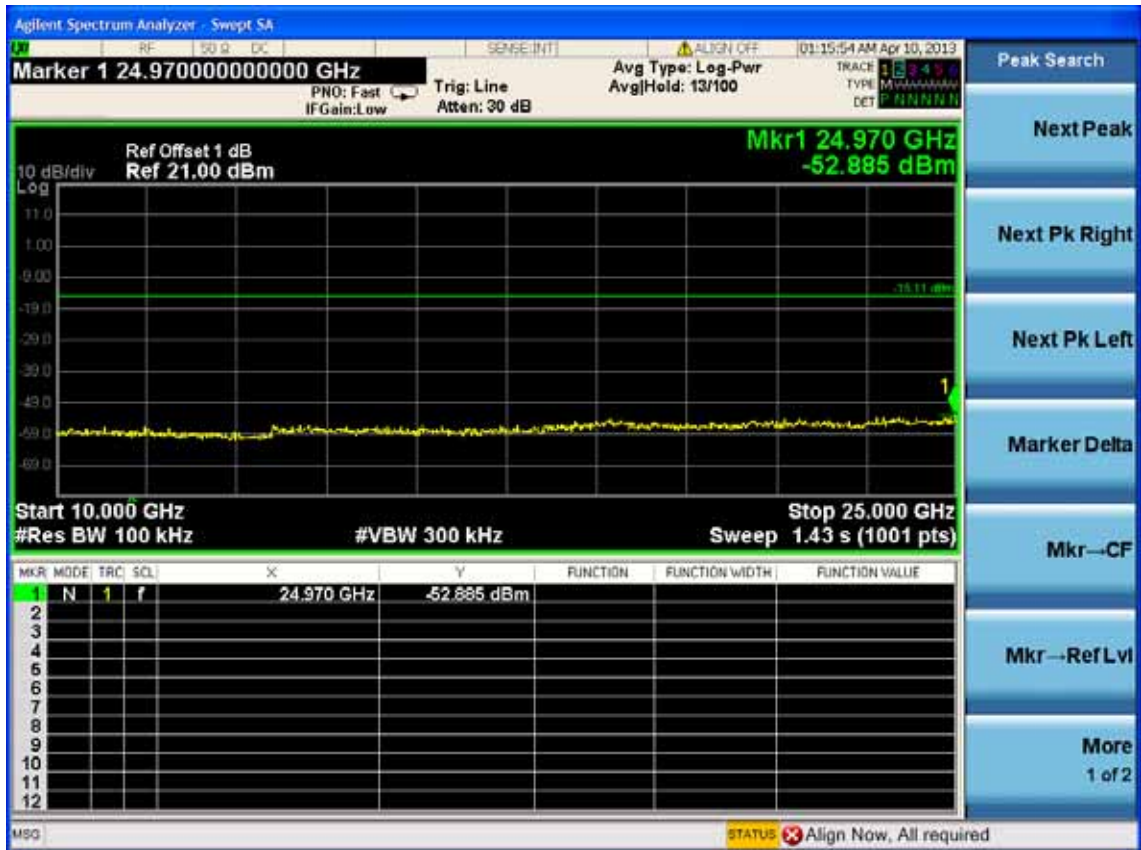
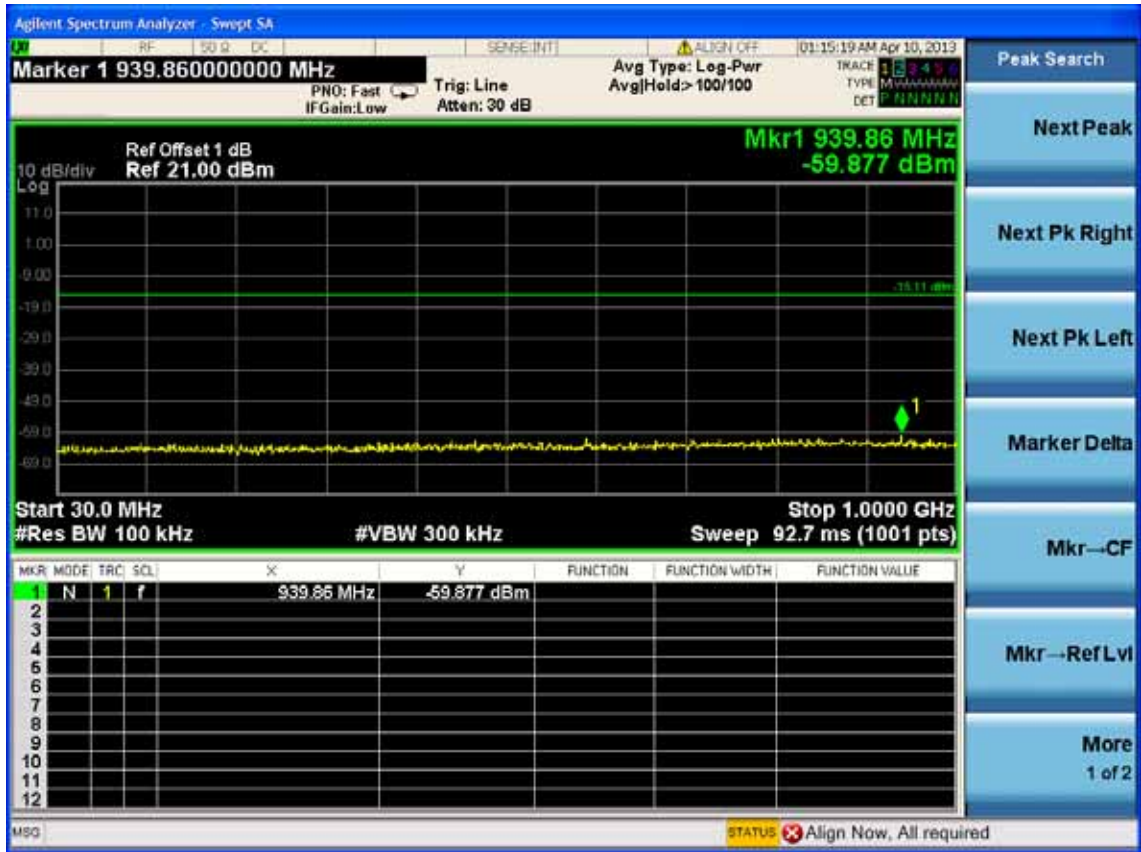
2441MHz

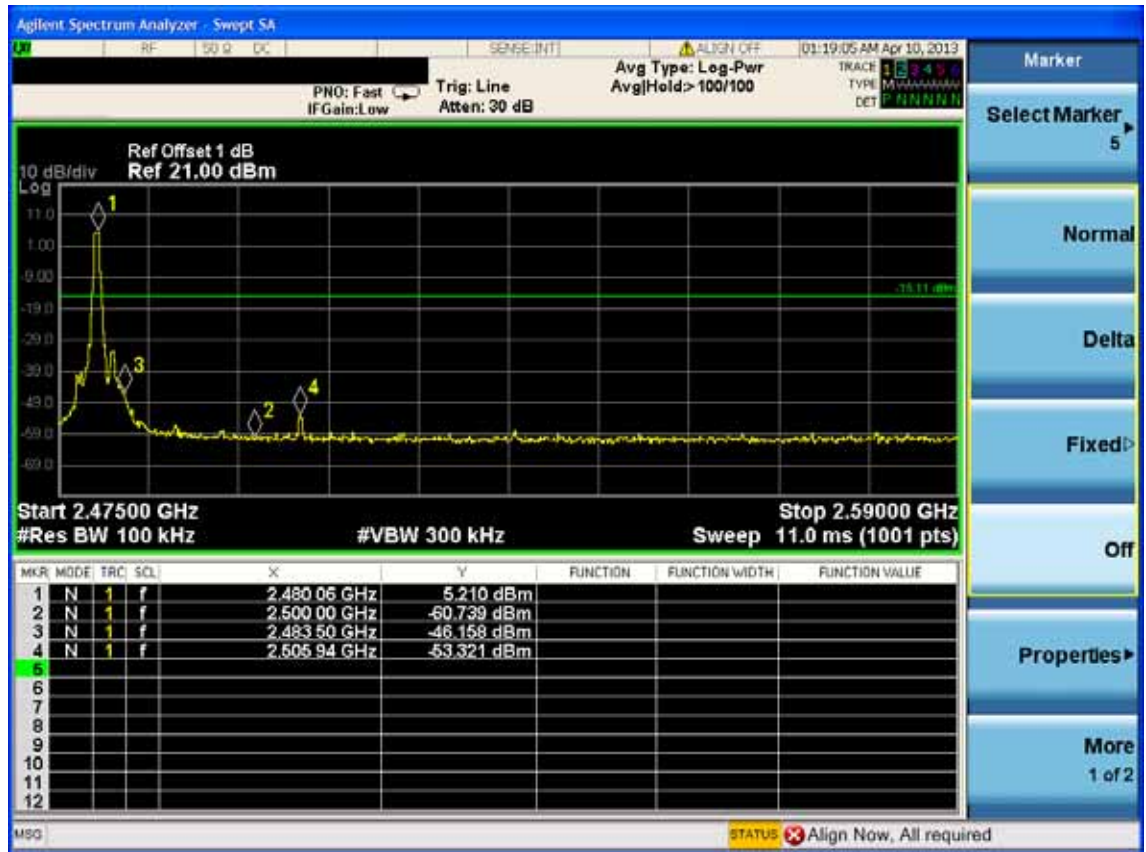




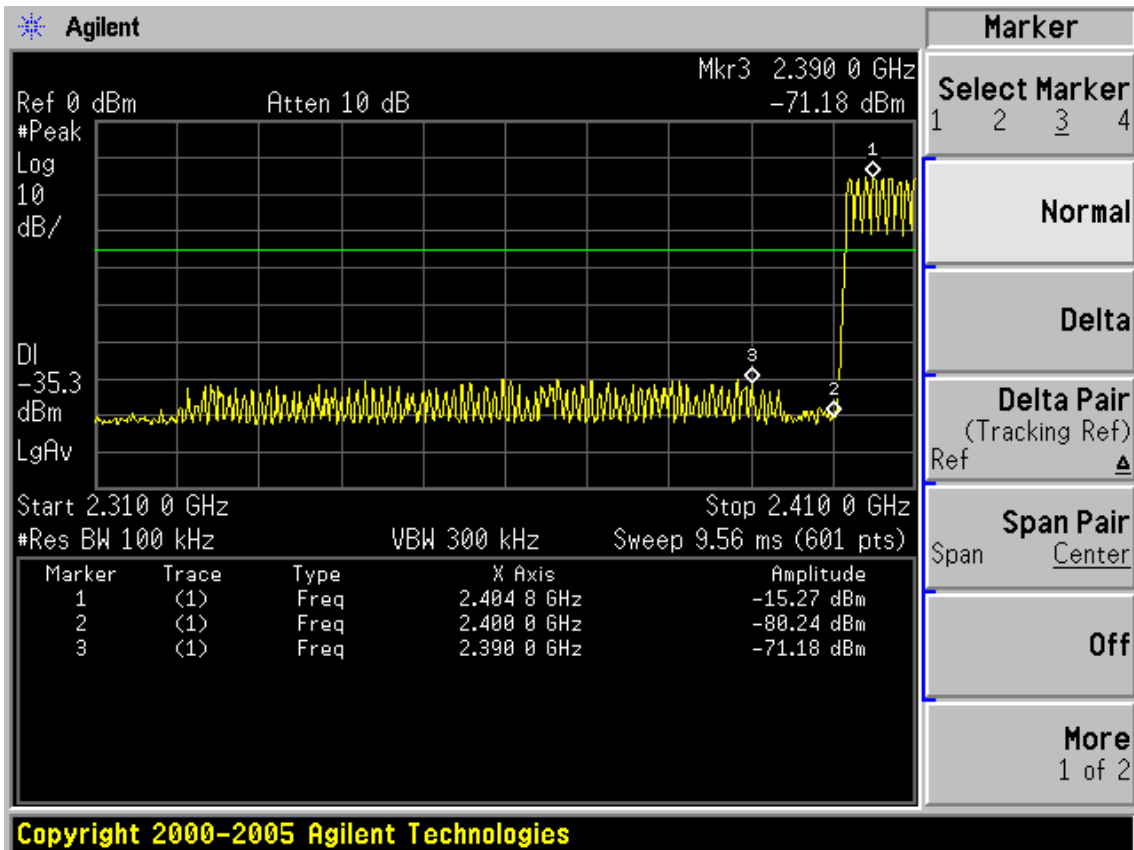
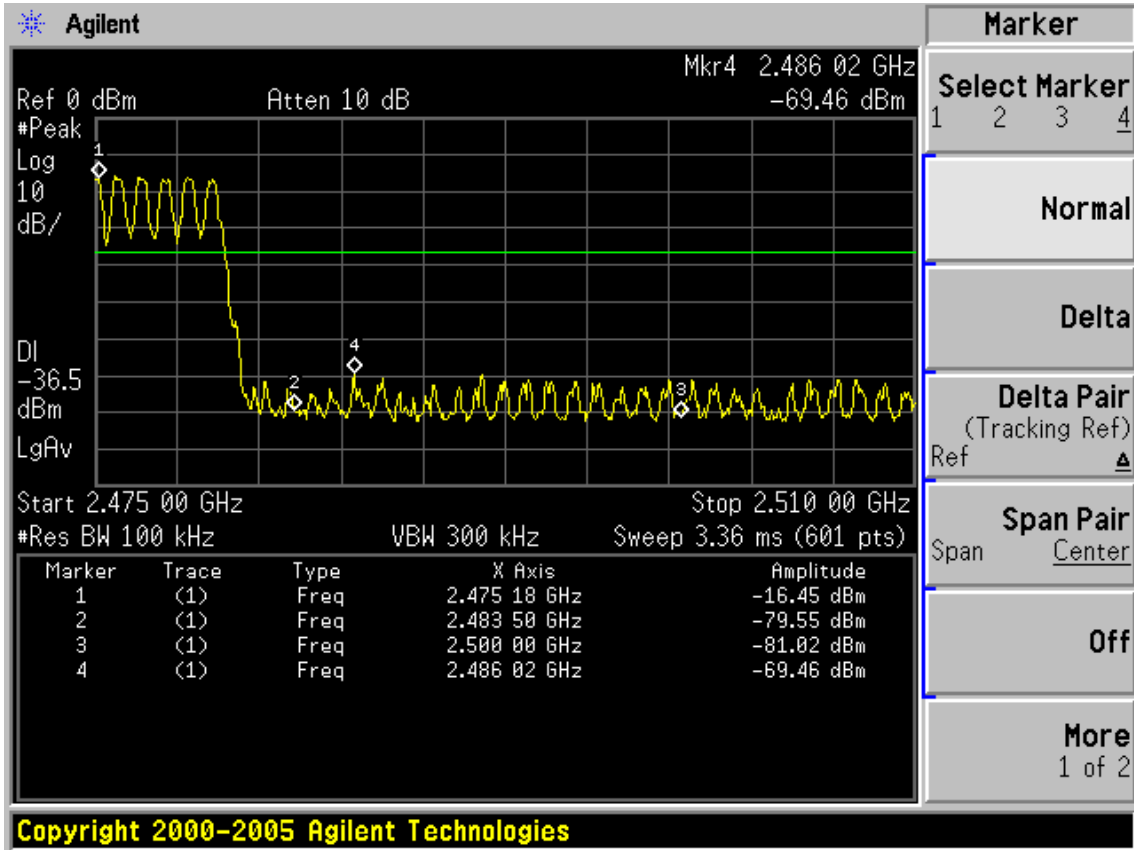
2480MHz







Hopping on GFSK



6. CARRIER FREQUENCY SEPARATION TEST

6.1. Test Equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-------------------|--------------|-----------|------------|------------|---------------|
| 1 | Spectrum Analyzer | Agilent | E4446A | US44300459 | May.08, 12 | 1 Year |

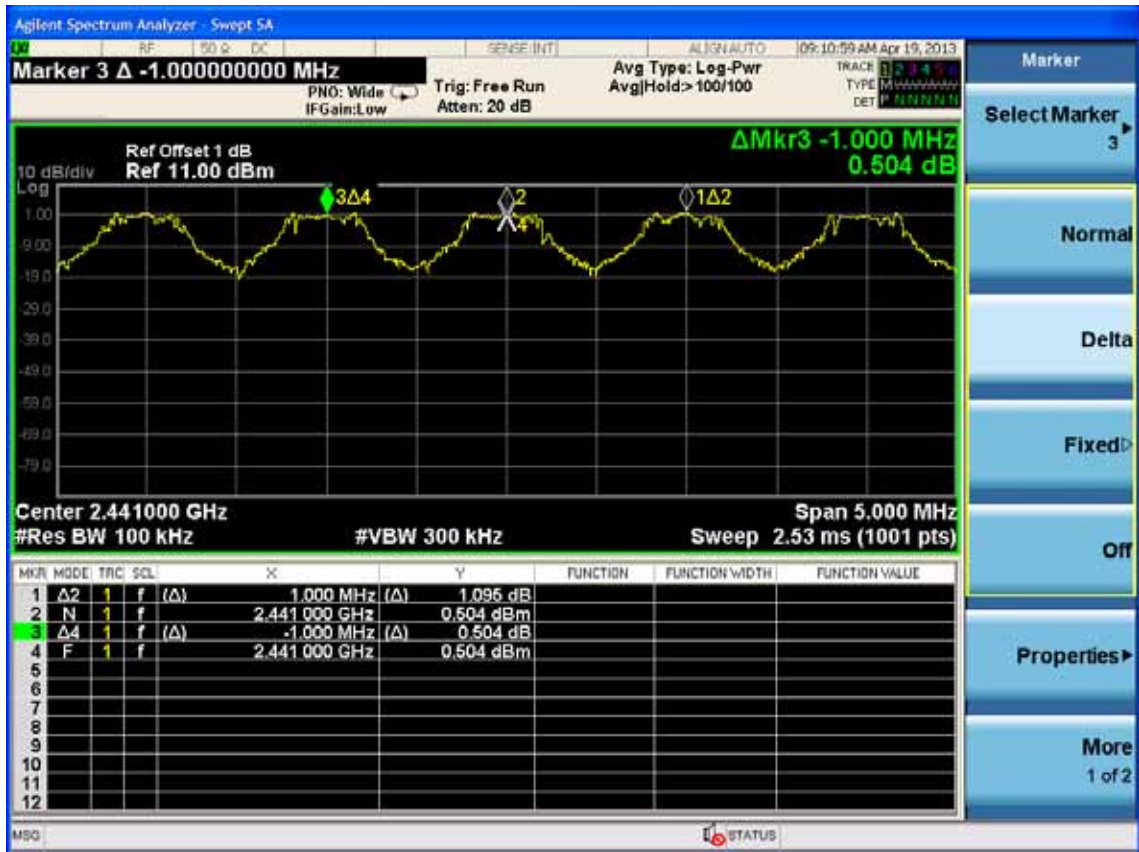
6.2. Limit

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.

6.3. Test Results.

| | | |
|--|-------------------------|-------------------------|
| EUT: Heavy Duty radio with AM/FM/USB/Bluetooth | | |
| M/N:JHD40BT | | |
| Test date: 2013-03-10 | Pressure: 101.3±1.0 kpa | Humidity: 52.5±3.0% |
| Tested by: Leo-Li | Test site: RF Site | Temperature: 22.4±0.6°C |

| Test Mode | Channel separation | Conclusion |
|-----------|--------------------|------------|
| GFSK | 1.0MHz | PASS |



7. 20 DB BANDWIDTH TEST

7.1. Test Equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-----------|--------------|-----------|------------|------------|---------------|
| 1. | Spectrum | Agilent | E4446A | US44300459 | May.08, 12 | 1 Year |

7.2. 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.

7.3. Test Results

| | | |
|--|-------------------------|--------------------------|
| EUT: Heavy Duty radio with AM/FM/USB/Bluetooth | | |
| M/N: JHD40BT | | |
| Test date: 2013-03-10 | Pressure: 101.3±1.0 kpa | Humidity: 52.5±3.0% |
| Tested by: Leo-Li | Test site: RF Site | Temperature : 22.4±0.6°C |

| Test Mode | CH (MHz) | 20dB bandwidth (KHz) | Limit (KHz) |
|-------------------|----------|----------------------|-------------|
| GFSK | 2402 | 857.9 | N/A |
| | 2441 | 850.1 | N/A |
| | 2480 | 858.0 | N/A |
| Conclusion : PASS | | | |

GFSK

Test Frequency: 2402MHz



Test Frequency: 2441MHz



Test Frequency: 2480MHz



8. NUMBER OF HOPPING FREQUENCY TEST

8.1. Test Equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-----------|--------------|-----------|------------|------------|---------------|
| 1 | Spectrum | Agilent | E4446A | US44300459 | May.08, 12 | 1 Year |

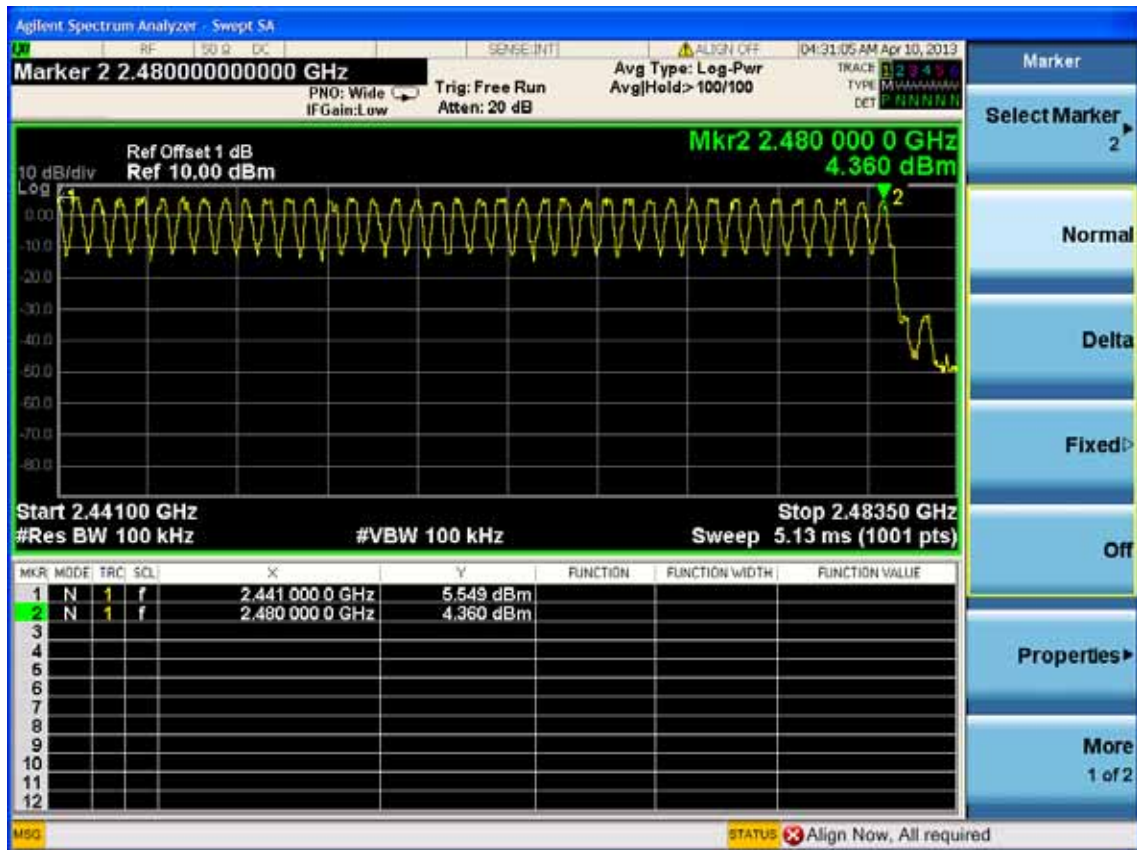
8.2. Limit

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

8.3. Test Results

| | | |
|--|-------------------------|-------------------------|
| EUT: Heavy Duty radio with AM/FM/USB/Bluetooth | | |
| M/N:JHD40BT | | |
| Test date: 2013-03-10 | Pressure: 101.3±1.0 kpa | Humidity: 52.5±3.0% |
| Tested by: Leo-Li | Test site: RF Site | Temperature: 22.4±0.6°C |

| Test Mode | Number of channel | Limit | Conclusion |
|-----------|-------------------|-------|------------|
| GFSK | 79 | ≥15 | PASS |



9. DWELL TIME

9.1. Test Equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-----------|--------------|-----------|------------|------------|---------------|
| 1 | Spectrum | Agilent | E4446A | US44300459 | May.08, 12 | 1 Year |

9.2. 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.

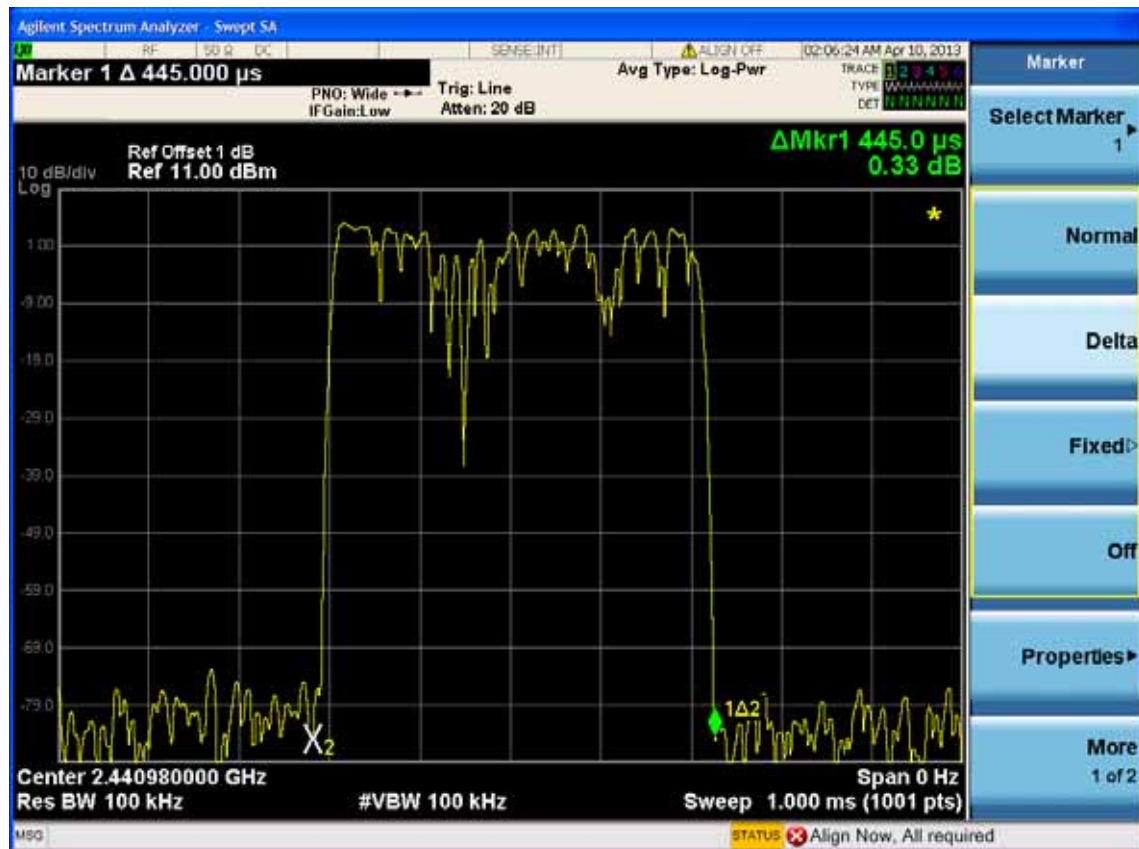
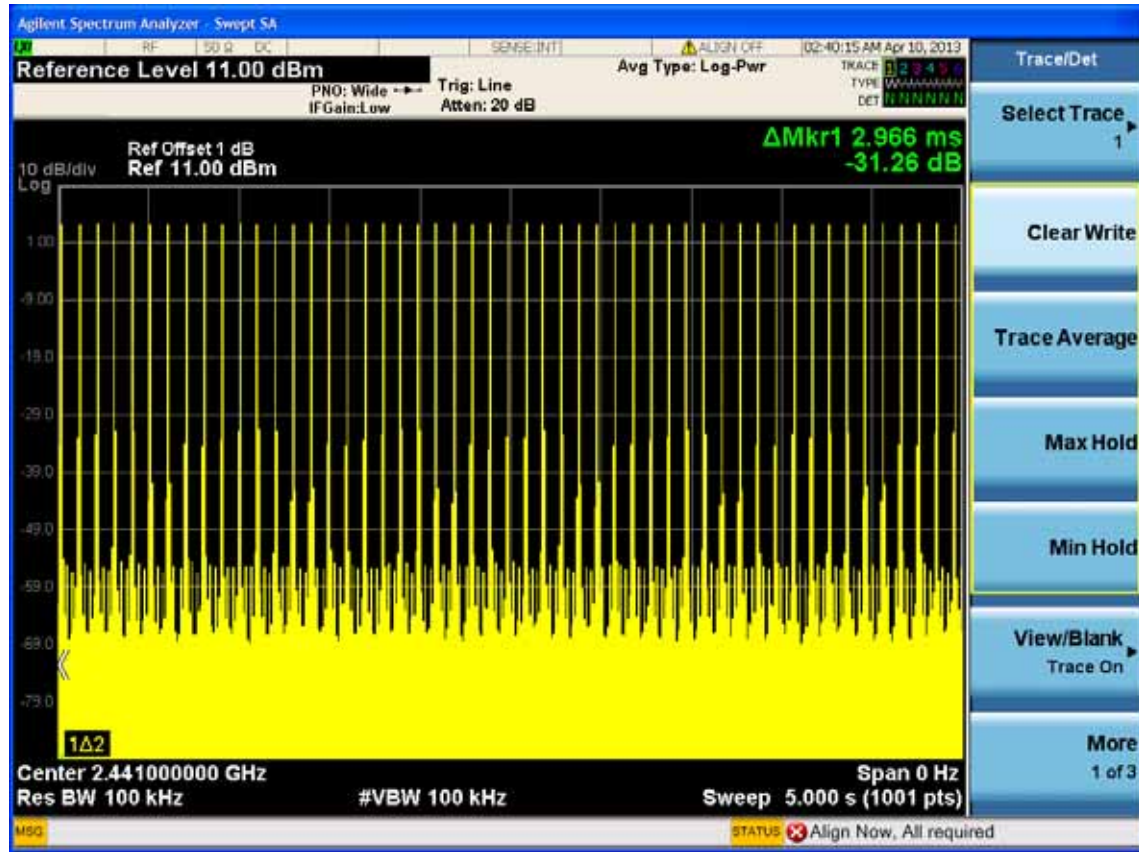
9.3. Test Results

| | | |
|--|-------------------------|-------------------------|
| EUT: Heavy Duty radio with AM/FM/USB/Bluetooth | | |
| M/N:JHD40BT | | |
| Test date: 2013-03-10 | Pressure: 101.3±1.0 kpa | Humidity: 52.5±3.0% |
| Tested by: Leo-Li | Test site: RF Site | Temperature: 22.4±0.6°C |

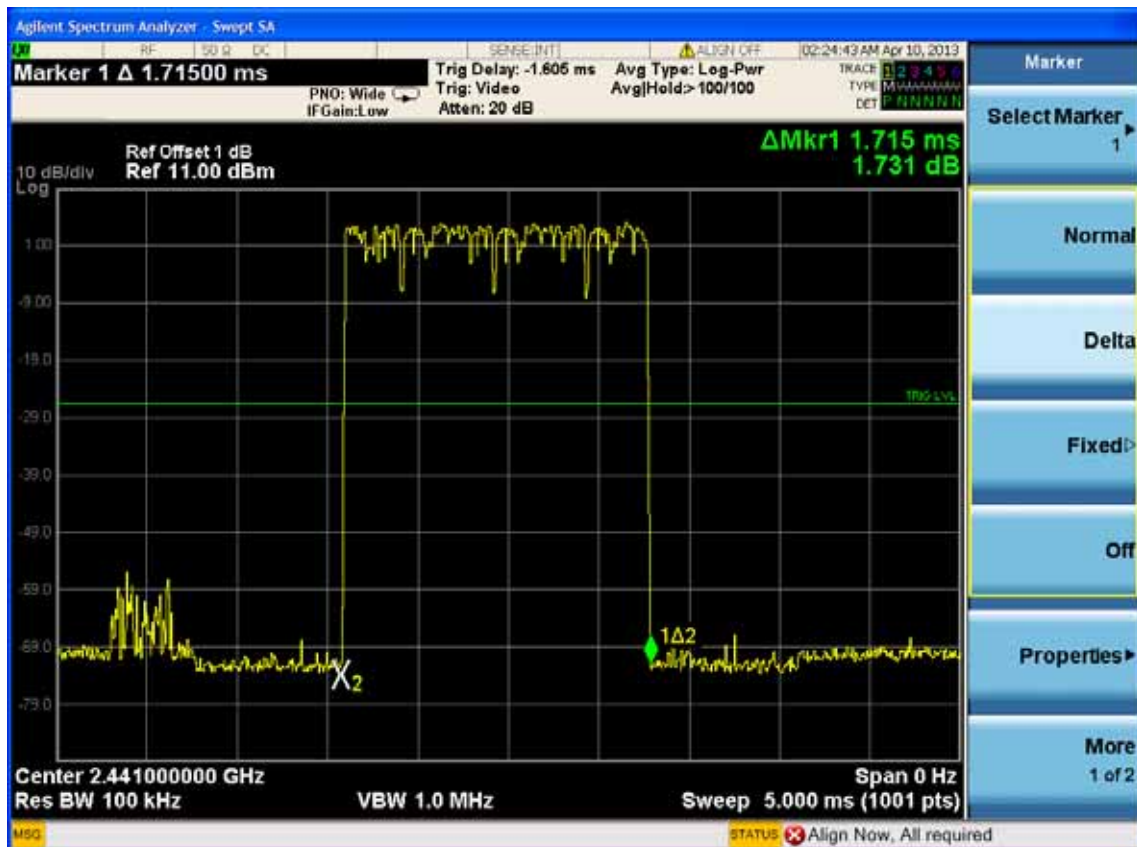
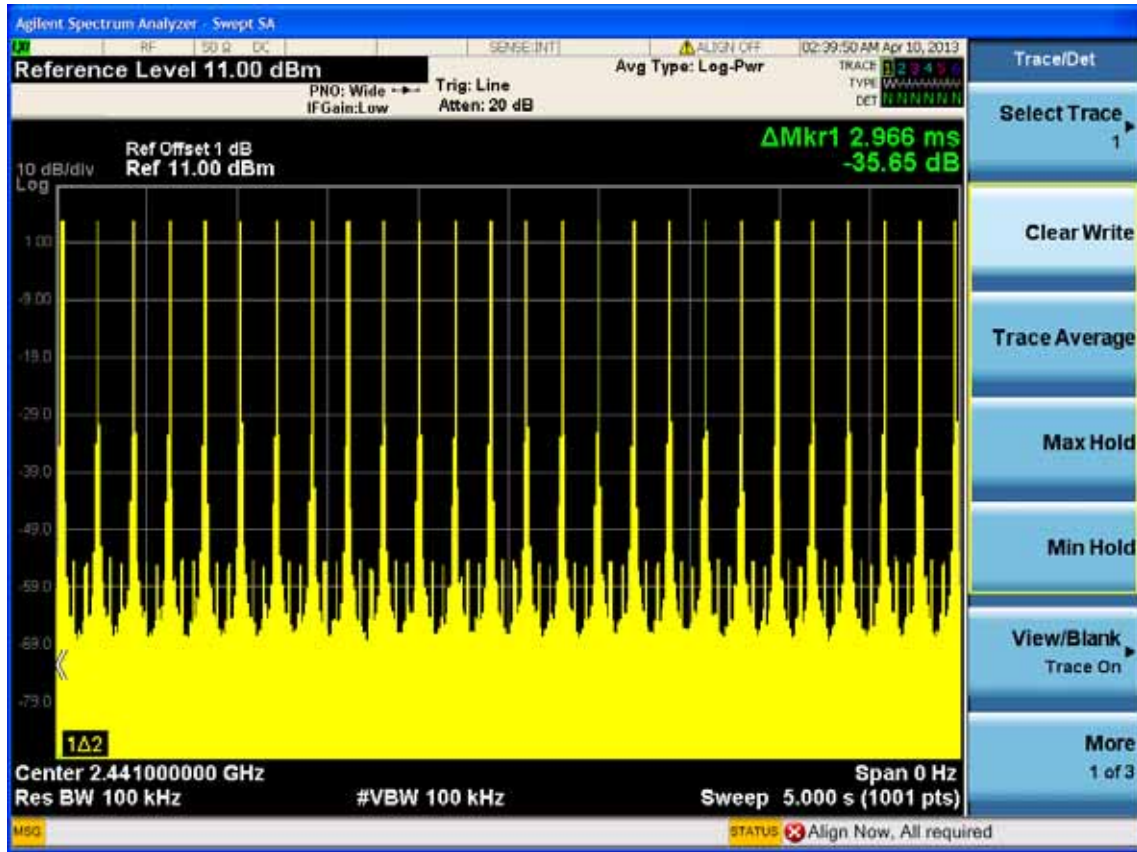
| Mode | dwll time | Limit | Conclusion | |
|------|-----------|--|------------|------|
| GFSK | DH1 | $51\text{hops}/5\text{s} * 0.4 * 79\text{chanel} * 0.445\text{ms} = 143.432\text{ms}$ | <400ms | PASS |
| | DH3 | $26\text{hops}/5\text{s} * 0.4 * 79\text{chanel} * 1.715\text{ms} = 281.8088\text{ms}$ | <400ms | PASS |
| | DH5 | $17\text{hops}/5\text{s} * 0.4 * 79\text{chanel} * 2.985\text{ms} = 320.708\text{ms}$ | <400ms | PASS |

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

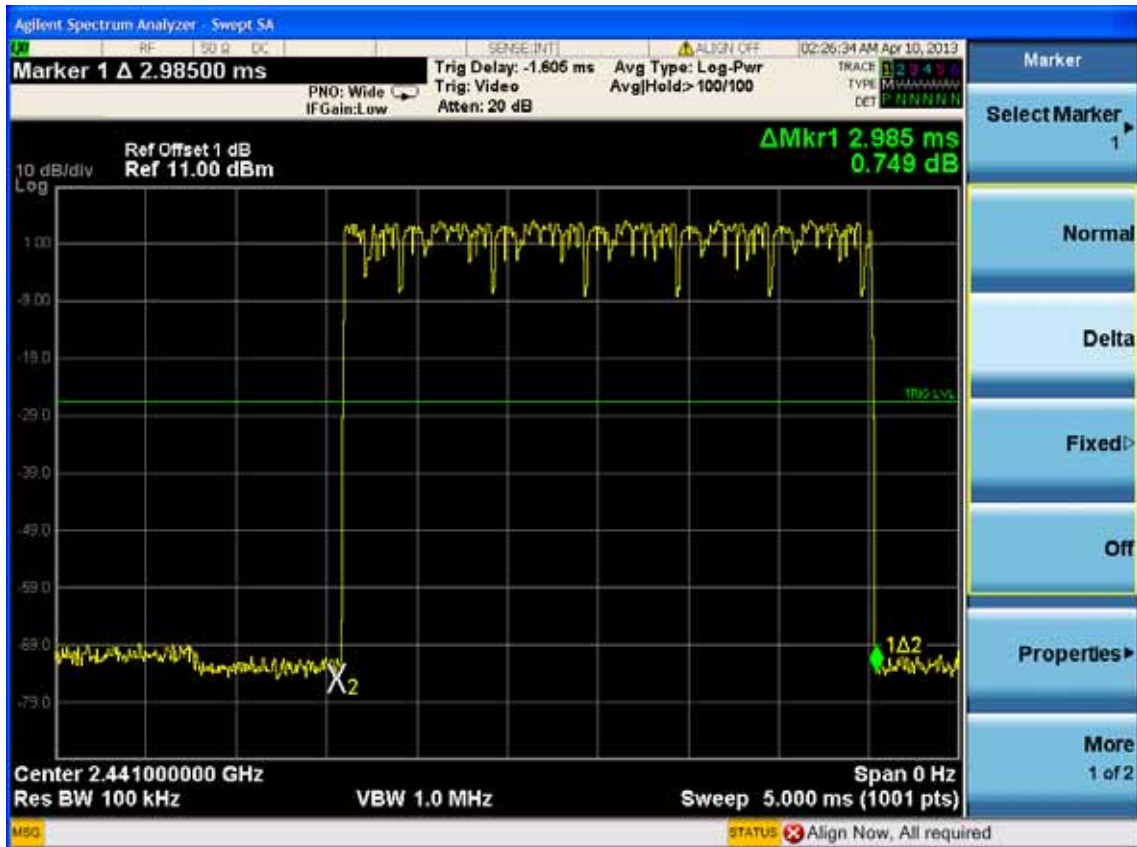
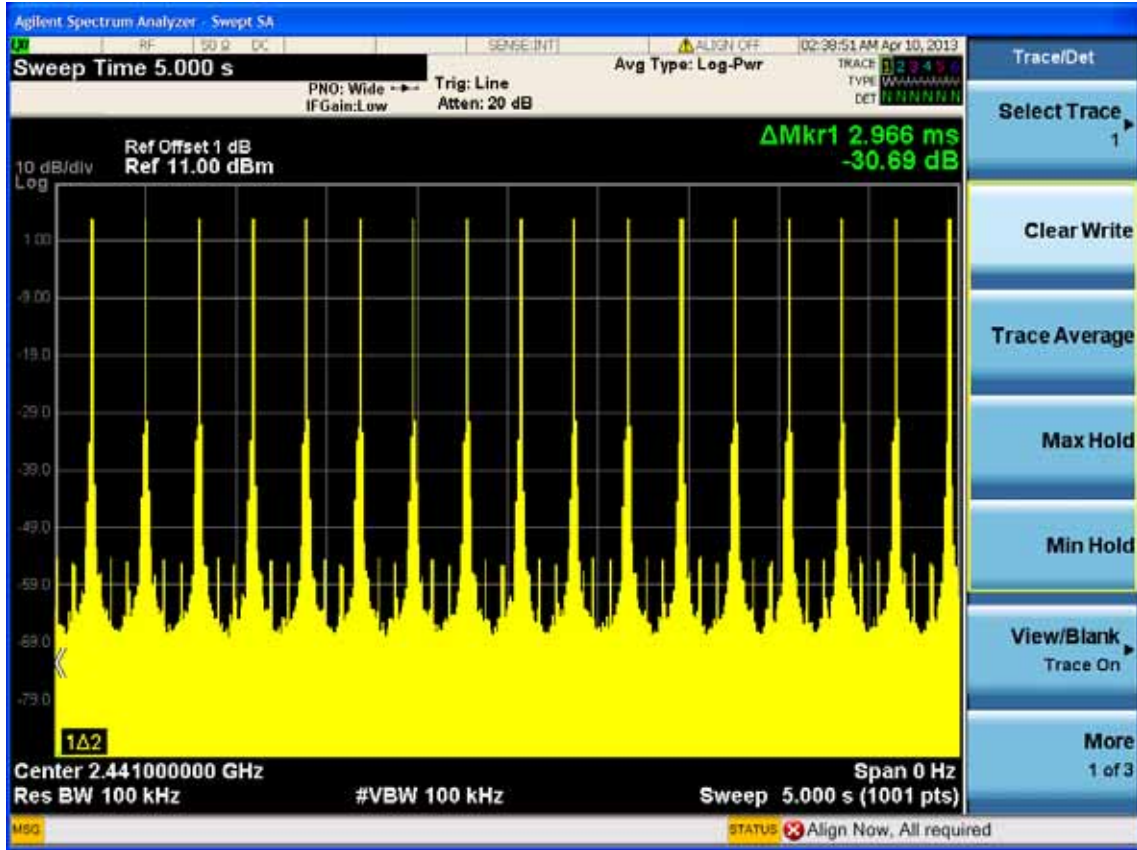
GFSK
DH 1



DH 3



DH 5



10. MAXIMUM PEAK OUTPUT POWER TEST

10.1. Test Equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|--------------|--------------|-------------|------------|------------|---------------|
| 1. | Spectrum | Agilent | E4446A | US44300459 | May.08, 12 | 1 Year |
| 2. | Amp | HP | 8449B | 3008A08495 | May.08, 12 | 1 Year |
| 3. | Antenna | EMCO | 3115 | 9510-4580 | May.31, 12 | 1Year |
| 4. | HF Cable | Hubersuhne | Sucoflex104 | - | May.08, 12 | 1 Year |
| 5 | Power Meter | Anritsu | ML2487A | 6K00002472 | May.08, 12 | 1Year |
| 6 | Power Sensor | Anritsu | MA2491A | 033005 | May.08, 12 | 1Year |

10.2. 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.

10.3. 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.

10.4. Test Results

| EUT: Heavy Duty radio with AM/FM/USB/Bluetooth | | | |
|--|----------|-------------------------|--------------------------|
| M/N: JHD40BT | | | |
| Test date: 2013-03-10 | | Pressure: 101.2±1.0 kpa | Humidity: 54.3±1.0% |
| Tested by: Leo-Li | | Test site: RF site | Temperature: 24.2±1.0 °C |
| Test Mode | CH (MHz) | Peak output Power (dBm) | Limit (dBm) |
| GFSK | 2402 | 6.085 | 30 |
| | 2441 | 5.814 | 30 |
| | 2480 | 5.156 | 30 |
| Conclusion: PASS | | | |

GFSK
2402MHz



2441MHz



2480MHz



11. BAND EDGE COMPLIANCE TEST

11.1. Test Equipment

| Item | Equipment | Manufacturer | Model No. | Serial No. | Last Cal. | Cal. Interval |
|------|-----------|--------------|-------------|------------|------------|---------------|
| 1. | Spectrum | Agilent | E4446A | US44300459 | May.08, 12 | 1 Year |
| 2. | Amp | HP | 8449B | 3008A08495 | May.08, 12 | 1 Year |
| 3. | Antenna | EMCO | 3115 | 4580 | May.08, 12 | 1 Year |
| 4. | HF Cable | Hubersuhne | Sucoflex104 | - | May.08, 12 | 1 Year |

11.2. 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.

11.3. 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

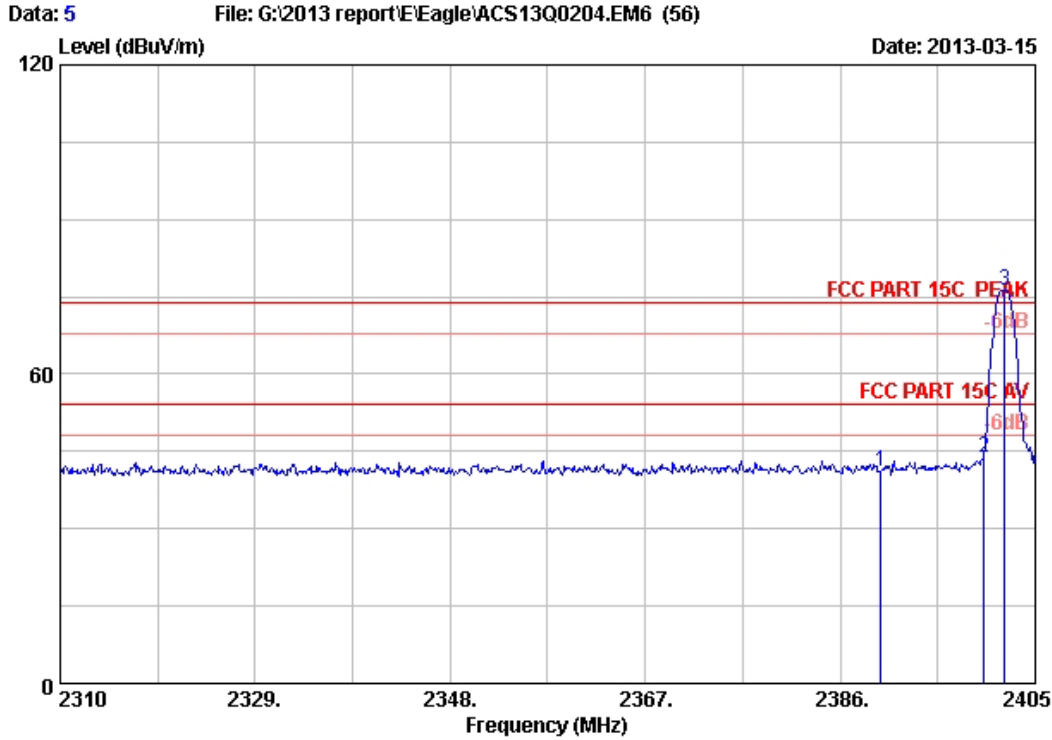
For emissions above two bandwidths away from the band-edge use below produce:

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.

11.4. 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.

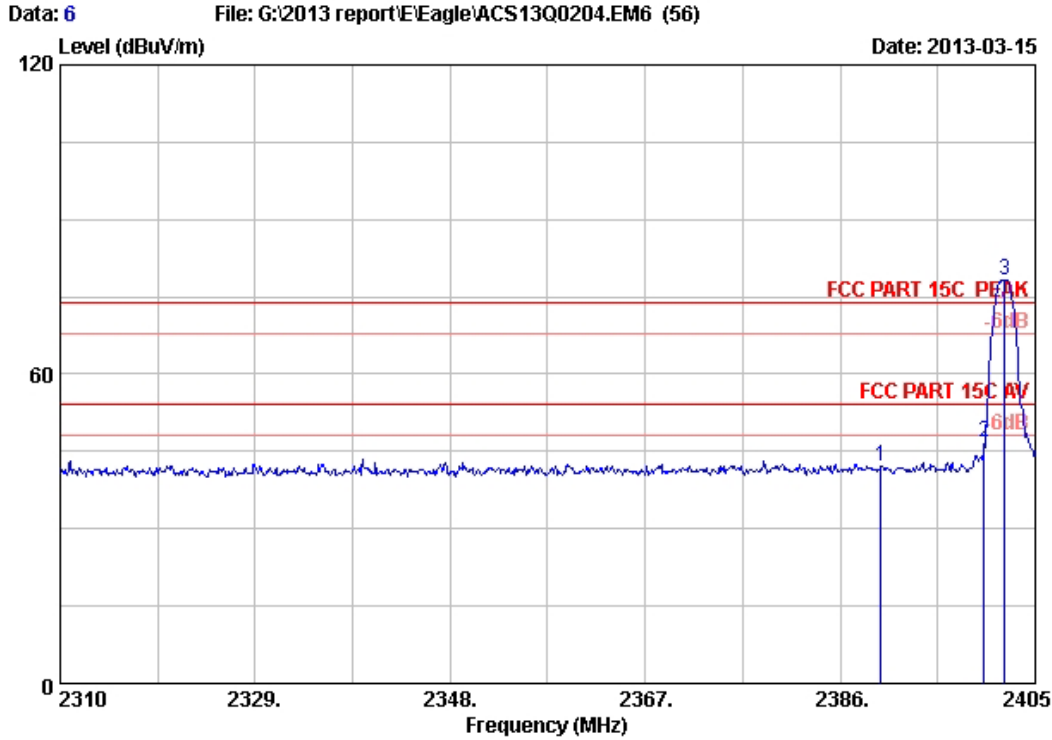


Site no. : 3m Chamber Data no. : 5
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2402MHz
 M/N : JHD40BT
 :

| | 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 | 26.70 | 6.00 | 35.92 | 44.42 | 41.20 | 74.00 | 32.80 | Peak |
| 2 | 2400.000 | 26.76 | 6.02 | 35.92 | 46.76 | 43.62 | 74.00 | 30.38 | Peak |
| 3 | 2402.055 | 26.77 | 6.02 | 35.92 | 79.46 | 76.33 | 74.00 | -2.33 | Peak |

Remarks:

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

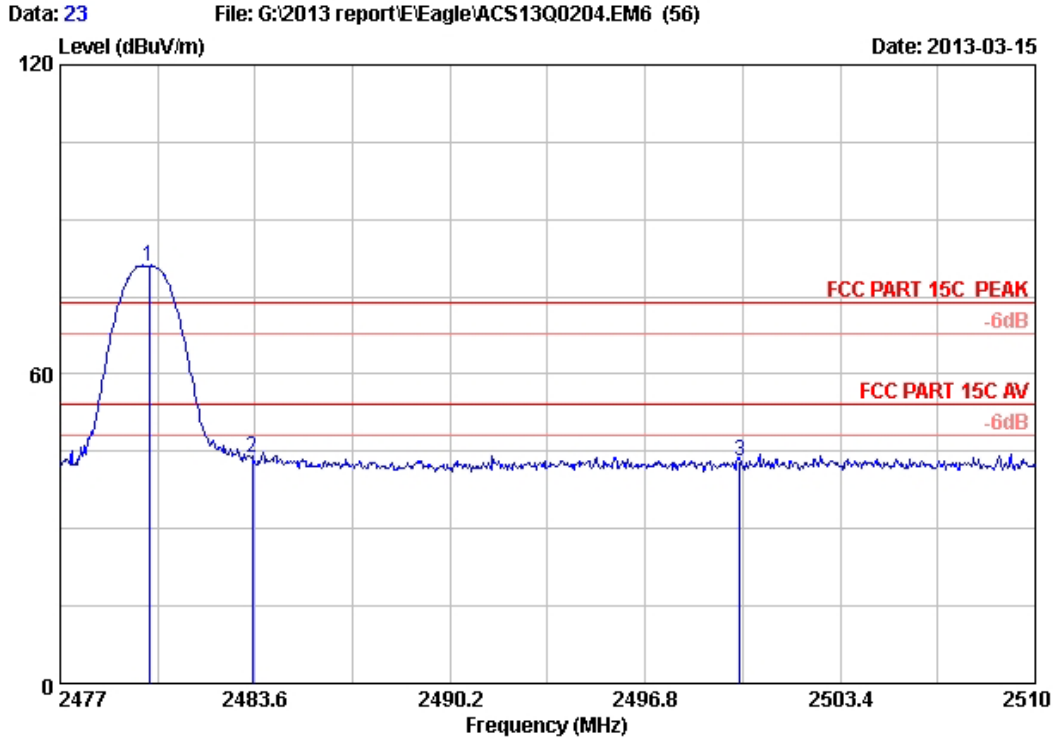


Site no. : 3m Chamber Data no. : 6
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2402MHz
 M/N : JHD40BT
 :

| | 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 | 26.70 | 6.00 | 35.92 | 45.33 | 42.11 | 74.00 | 31.89 | Peak |
| 2 | 2400.000 | 26.76 | 6.02 | 35.92 | 50.06 | 46.92 | 74.00 | 27.08 | Peak |
| 3 | 2402.000 | 26.77 | 6.02 | 35.92 | 81.39 | 78.26 | 74.00 | -4.26 | Peak |

Remarks:

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

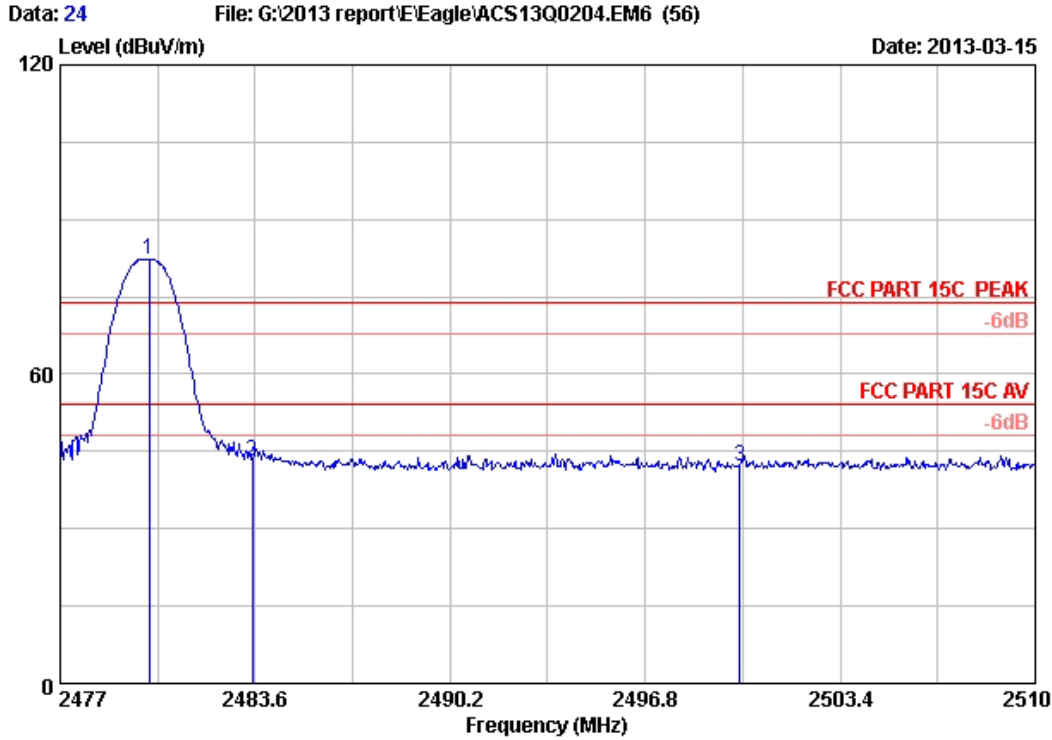


Site no. : 3m Chamber Data no. : 23
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2480MHz
 M/N : JHD40BT
 :

| | Freq. | Ant. | Cable | Amp. | Emission | | | | |
|---|----------|--------|-------|--------|----------|----------|----------|--------|--------|
| | (MHz) | Factor | loss | Factor | Reading | Level | Limits | Margin | Remark |
| | | (dB/m) | (dB) | (dB) | (dBUV) | (dBUV/m) | (dBUV/m) | (dB) | |
| 1 | 2480.000 | 27.27 | 6.15 | 35.92 | 83.51 | 81.01 | 74.00 | -7.01 | Peak |
| 2 | 2483.500 | 27.29 | 6.16 | 35.92 | 46.38 | 43.91 | 74.00 | 30.09 | Peak |
| 3 | 2500.000 | 27.40 | 6.19 | 35.93 | 45.62 | 43.28 | 74.00 | 30.72 | 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. : 24
 Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : 23°C/54% Engineer : Leo-Li
 EUT : Heavy Duty radio with AM/FM/USB/Bluetooth
 Power supply : DC 12V
 Test mode : Tx Mode GFSK 2480MHz
 M/N : JHD40BT
 :

| | 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 | 2480.003 | 27.27 | 6.15 | 35.92 | 84.75 | 82.25 | 74.00 | -8.25 | Peak |
| 2 | 2483.501 | 27.29 | 6.16 | 35.92 | 45.73 | 43.26 | 74.00 | 30.74 | Peak |
| 3 | 2500.001 | 27.40 | 6.19 | 35.93 | 44.55 | 42.21 | 74.00 | 31.79 | 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.

12.DEVIATION TO TEST SPECIFICATIONS

[NONE]