Lab Code: 200707-0

# FCC PART 15.247

# MEASUREMENT AND TEST REPORT

For

## Cubic Transportation Systems, Inc.

5650 Kearny Mesa Road, San Diego, CA 92111, USA

## FCC ID: LVC312

| Report Type: | Product Type: |
|---|---|
| Original Report | Mobile Validator (MV) |

| | |
|---|---|
| **Test Engineer:** | Wayne Cheng |
| **Report Number:** | RSZ11022301-15.247BT |
| **Report Date:** | 2011-06-12 |
| **Reviewed By:** | Merry Zhao<br>EMC Engineer |
| **Prepared By:** | Bay Area Compliance Laboratories Corp. (Shenzhen)<br>6/F, the 3rd Phase of WanLi Industrial Building,<br>ShiHua Road, FuTian Free Trade Zone<br>Shenzhen, Guangdong, China<br>Tel: +86-755-33320018<br>Fax: +86-755-33320008 |

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# GENERAL INFORMATION

## Product Description for Equipment under Test (EUT)

The *Cubic Transportation Systems, Inc.*'s product, model number: *5300-10009-3 (FCC ID: LVC312)* or the "EUT" as referred to in this report is a *Mobile Validator (MV),* which measures approximately: 20.0 cm (L) x 12.2 cm (W) x 3.5 cm (H), rated input voltage: DC 12V or DC 24V.

** All measurement and test data in this report was gathered from production sample serial number: 000000000000010 (Assigned by applicant). The EUT was received on 2011-02-23.*

## Objective

This Type approval report is prepared on behalf of *Cubic Transportation Systems, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

## Related Submittal(s)/Grant(s)

FCC Part 22H&24E PCB, Part 15.225 DXX, Part 15.247-Wi-Fi DTS and FCC Part 15B JBP submissions with FCC ID: LVC312.

## Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

The uncertainty of any RF tests which use conducted method measurement is ±0.96 dB, the uncertainty of any radiation emissions measurement is ±4.0 dB.

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is an ISO/IEC 17025 guide accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 200707-0).


The current scope of accreditations can be found at http://ts.nist.gov/Standards/scopes/2007070.htm

# SYSTEM TEST CONFIGURATION

## Description of Test Configuration

The system was configured for testing in an engineering mode, which is provided by manufacture.

Test mode 1: Bluetooth transmitting
Test mode 2: Bluetooth radio transmits simultaneously with GPRS & 13.56 MHz radios.

## EUT Exercise Software

N/A

## Equipment Modifications

No modification was made to the unit tested.

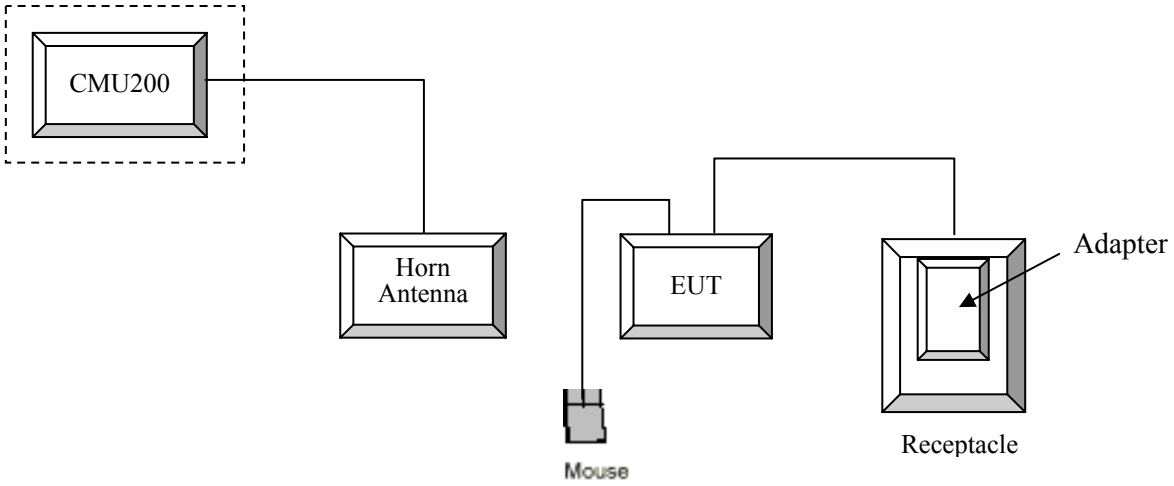
## Local Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| R & S | Universal Radio Commutation Tester | CMU200 | 1100 0008.02 |
| I.T.E | Power supply | SAW18-12.0-1500US | N/A |
| I.T.E | Power supply | SAW18-24.0-1500US | N/A |

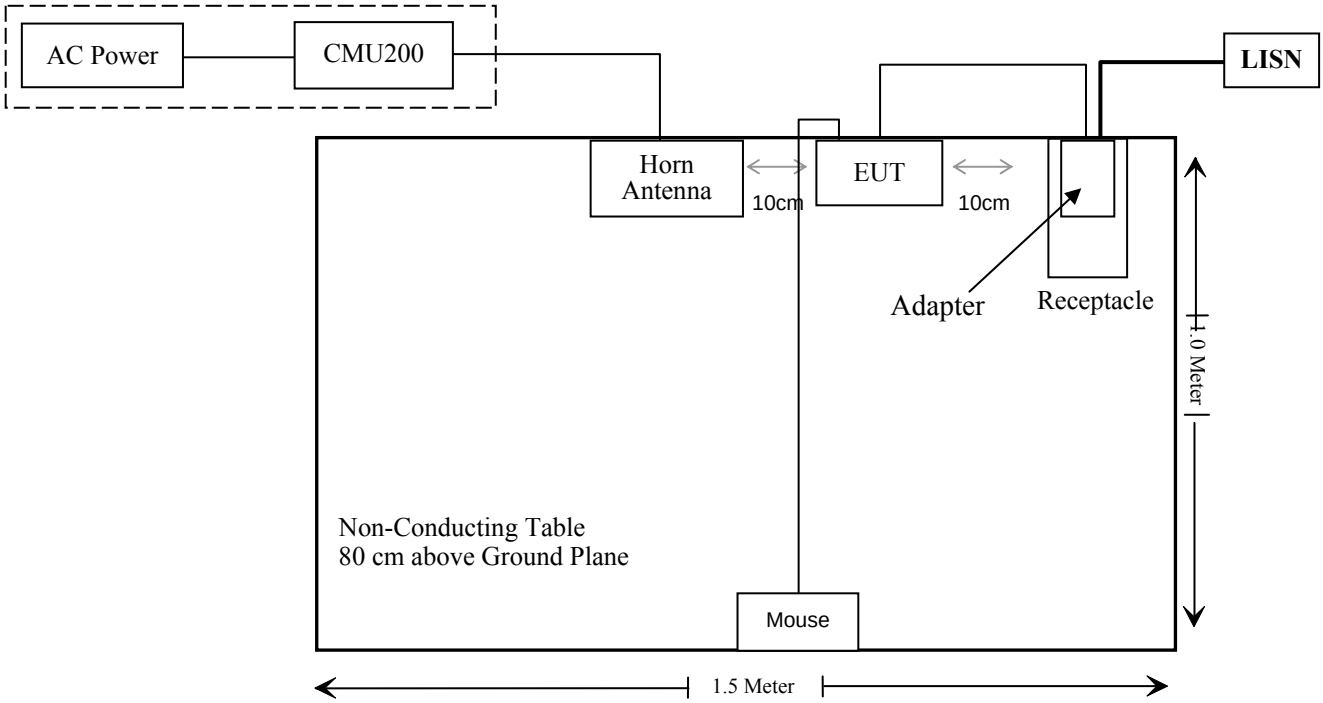
## External I/O Cable

| Cable Description | Length (m) | From Port | To |
|---|---|---|---|
| Unshielded Undetachable Power Cable | 1.8 | Adapter | LISN |
| Unshielded Undetachable Cable | 2.0 | EUT | Adapter |

## Configuration of Test Setup




## Block Diagram of Test Setup



# SUMMARY OF TEST RESULTS

| FCC Rules | Description of Test | Result |
|---|---|---|
| §15.247 (i), §2.1091 | Maximum Permissible exposure (MPE) | Compliance |
| §15.203 | Antenna Requirement | Compliance |
| §15.207 (a) | AC Line Conducted Emissions | Compliance |
| §15.205, §15.209, §15.247(d) | Radiated Emissions | Compliance |
| §15.247 (a)(1) | 20 dB Emission Bandwidth | Compliance |
| §15.247(a)(1) | Channel Separation Test | Compliance |
| §15.247(a)(1)(iii) | Time of Occupancy (Dwell Time) | Compliance |
| §15.247(a)(1)(iii) | Quantity of hopping channel Test | Compliance |
| §15.247(b)(1) | Peak Output Power Measurement | Compliance |
| §15.247(d) | Band Edges | Compliance |

# FCC §15.247 (i) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## Applicable Standard

According to FCC 15.247(i) and subpart §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

| (B) Limits for General Population/Uncontrolled Exposure | | | | |
|---|---|---|---|---|
| **Frequency Range (MHz)** | **Electric Field Strength (V/m)** | **Magnetic Field Strength (A/m)** | **Power Density ($mW/cm^2$)** | **Averaging Time (minutes)** |
| 0.3–1.34 | 614 | 1.63 | *(100) | 30 |
| 1.34–30 | 824/f | 2.19/f | *(180/f²) | 30 |
| 30–300 | 27.5 | 0.073 | 0.2 | 30 |
| 300–1500 | / | / | f/1500 | 30 |
| 1500–100,000 | / | / | 1.0 | 30 |

f = frequency in MHz;
* = Plane-wave equivalent power density;

### MPE Calculation

Predication of MPE limit at a given distance

$$S = PG/4\pi R^2$$

S = power density (in appropriate units, e.g. mW/cm2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

| Radio | Freq. (MHz) | MPE Limit ($mW/cm^2$) | Output Power (mW) | Duty Cycle | Antenna Gain (dBi) | Antenna Gain (Number) | Power Density at 20 cm | % of MPE at 20 cm |
|---|---|---|---|---|---|---|---|---|
| Bluetooth | 2402 | 1.0 | 1.14 | 100% | 2.6 | 1.8 | 0.0004 | 0.04% |
| GPRS 8 | 824 | 0.549 | 1749.85 | 12.5% | 0 | 1 | 0.04 | 7.29% |
| | 1850 | 1.0 | 1205.04 | 12.5% | -1.0 | 0.79 | 0.06 | 6% |
| GPRS 10 | 824 | 0.549 | 572.80 | 25% | 0 | 1 | 0.06 | 10.93% |
| | 1850 | 1.0 | 1099.01 | 25% | -1.0 | 0.79 | 0.02 | 2% |
| GPRS 12 | 824 | 0.549 | 990.83 | 50% | 0 | 1 | 0.04 | 7.29% |
| | 1850 | 1.0 | 690.24 | 50% | -1.0 | 0.79 | 0.05 | 5% |
| WCDMA (Band V) | 824 | 0.549 | 185.35 | 100% | 0 | 1 | 0.04 | 7.29% |
| WCDMA (Band II) | 1850 | 1.0 | 183.65 | 100% | -1.0 | 0.79 | 0.03 | 3% |

The MPE calculations in the spreadsheet above demonstrates that the combination of the Bluetooth with the GPRS/WCDMA radio defined meets the MPE requirement stated in FCC Part 1.1310 at the 20 cm distance required for mobile exposure conditions.

# FCC §15.203 - ANTENNA REQUIREMENT

## Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

## Antenna Connector Construction

The EUT used one Bluetooth antenna, Chip antenna, which in accordance to section 15.203, the antenna's maximum gain is 2.6 dBi, please refer to the internal photos.

**Result:** Compliance.

# FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

## Applicable Standard

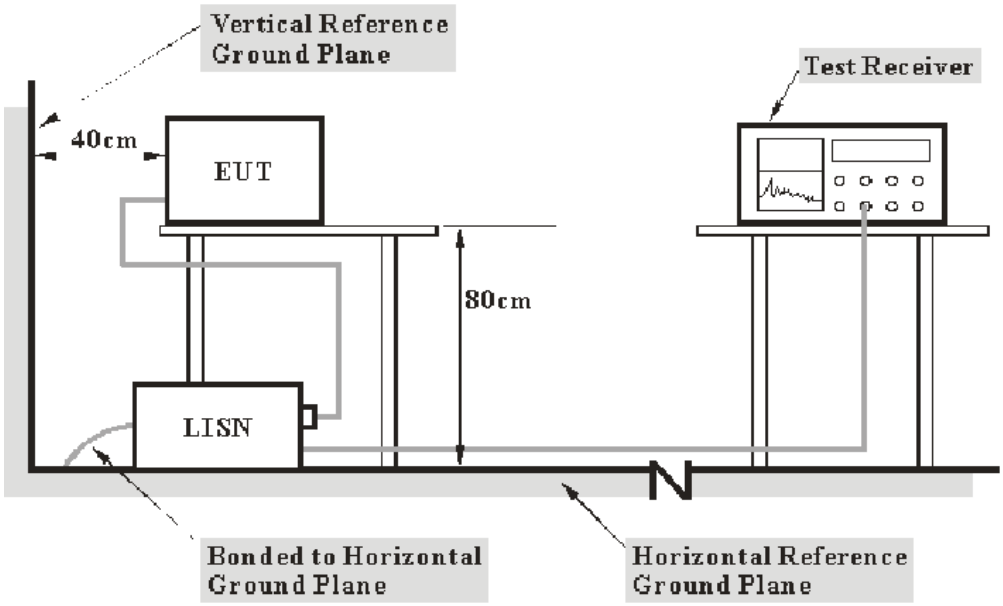
FCC§15.207

## Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratory Corp. (Shenzhen) is ±2.4 dB (k=2, 95% level of confidence).

## EUT Setup




Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The 12V/24V adapters were connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| ***Frequency Range*** | ***IF B/W*** |
|---|---|
| 150 kHz – 30 MHz | 9 kHz |

## Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCS30 | 830245/006 | 2011-03-03 | 2012-03-02 |
| Rohde & Schwarz | L.I.S.N. | ESH2-Z5 | 892107/021 | 2011-03-09 | 2012-03-08 |

*** Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

**14.51dB** at **1.325 MHz** in the **Neutral** conducted mode

## Test Data

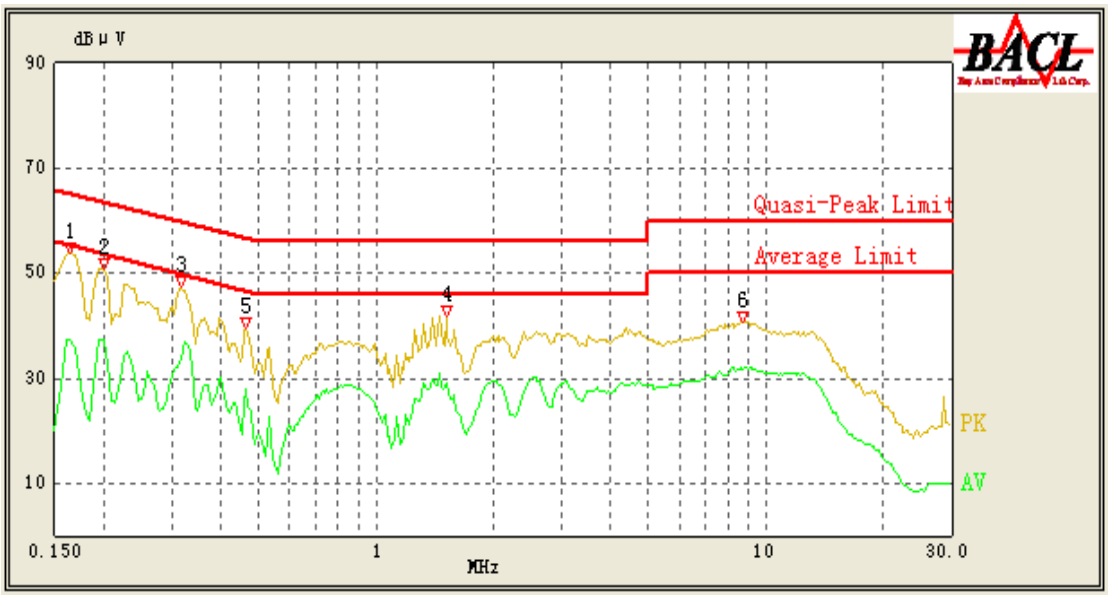
### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 °C |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0kPa |

** The testing was performed by Wayne Cheng on 2011-03-24 to 2011-04.24.*

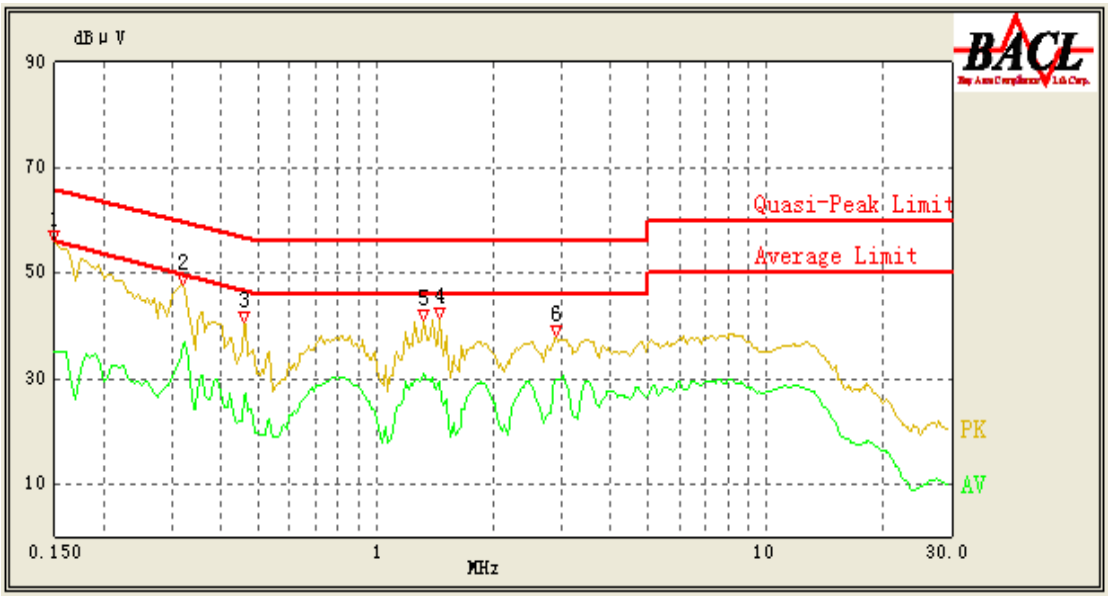
Test Mode: Transmitting

**120 V, 60 Hz, Line (DC 12V adapter):**



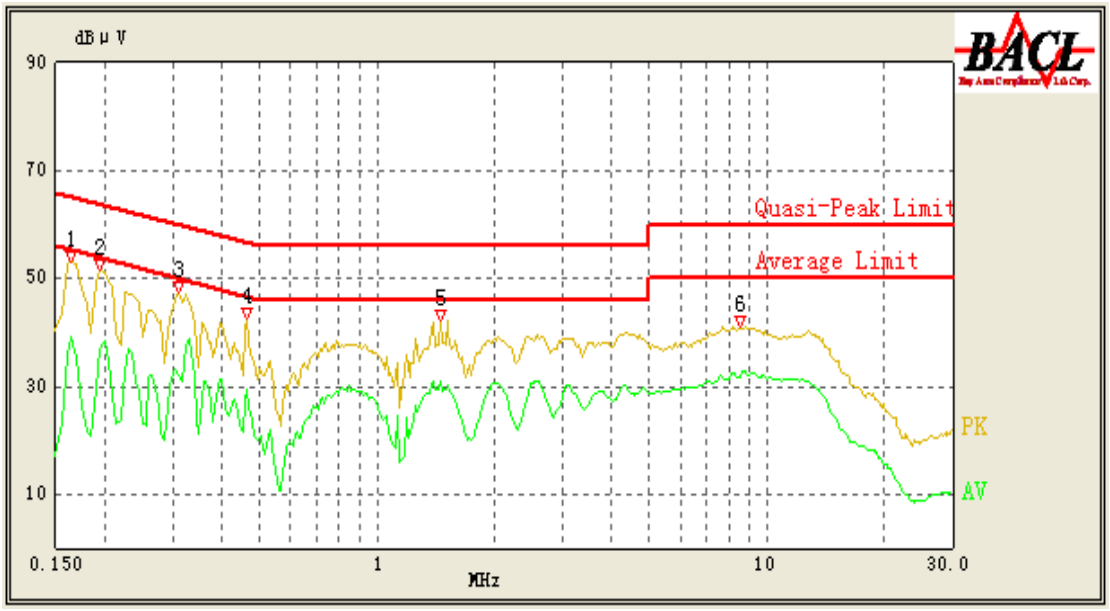

| Conducted Emissions | | | FCC Part 15.207 | | |
|---|---|---|---|---|---|
| **Frequency (MHz)** | **Corrected Result (dBµV)** | **Correction Factor (dB)** | **Limit (dBµV)** | **Margin (dB)** | **Remark (PK/QP/Ave.)** |
| 0.165 | 50.36 | 10.09 | 65.57 | 15.21 | QP |
| 0.200 | 47.58 | 10.07 | 64.57 | 16.99 | QP |
| 1.520 | 28.95 | 10.15 | 46.00 | 17.05 | Ave. |
| 0.200 | 37.32 | 10.07 | 54.57 | 17.25 | Ave. |
| 0.315 | 33.68 | 10.02 | 51.29 | 17.61 | Ave. |
| 8.755 | 31.86 | 10.10 | 50.00 | 18.14 | Ave. |
| 0.165 | 37.24 | 10.09 | 55.57 | 18.33 | Ave. |
| 0.465 | 28.03 | 10.16 | 47.00 | 18.97 | Ave. |
| 1.520 | 36.53 | 10.15 | 56.00 | 19.47 | QP |
| 0.465 | 36.88 | 10.16 | 57.00 | 20.12 | QP |
| 0.315 | 41.01 | 10.02 | 61.29 | 20.28 | QP |
| 8.770 | 36.51 | 10.10 | 60.00 | 23.49 | QP |

**120V, 60 Hz, Neutral (DC 12V adapter):**



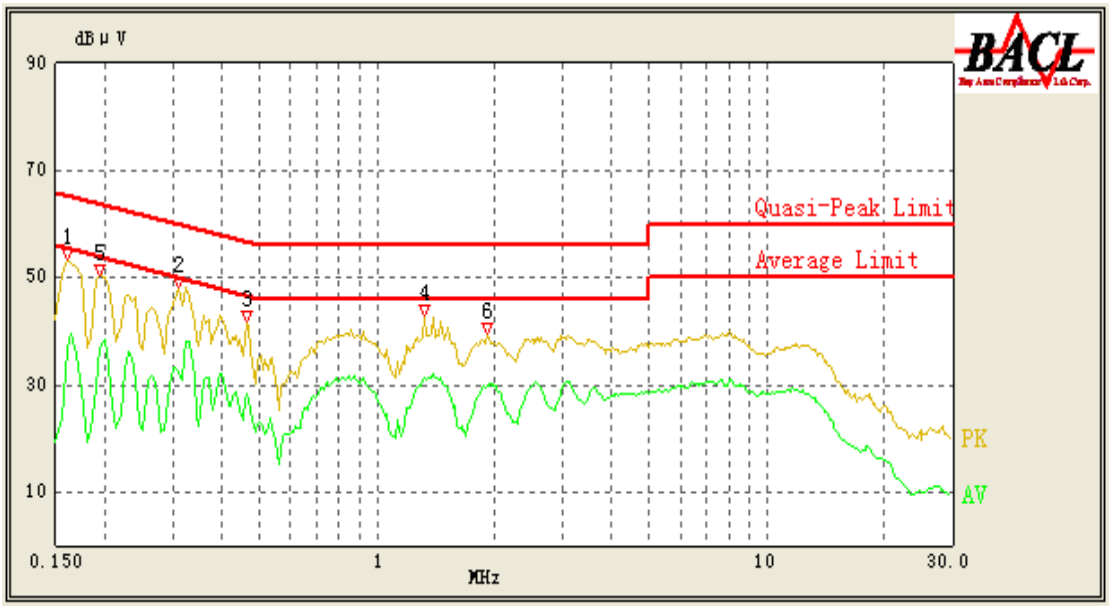

| Conducted Emissions | | | FCC Part 15.207 | | |
|---|---|---|---|---|---|
| Frequency (MHz) | Corrected Result (dBµV) | Correction Factor (dB) | Limit (dBµV) | Margin (dB) | Remark (PK/QP/Ave.) |
| 0.320 | 36.52 | 10.02 | 51.14 | 14.62 | Ave. |
| 1.325 | 30.99 | 10.13 | 46.00 | 15.01 | Ave. |
| 2.905 | 29.63 | 10.15 | 46.00 | 16.37 | Ave. |
| 1.455 | 29.43 | 10.15 | 46.00 | 16.57 | Ave. |
| 0.320 | 43.94 | 10.02 | 61.14 | 17.20 | QP |
| 1.455 | 37.82 | 10.15 | 56.00 | 18.18 | QP |
| 1.325 | 36.98 | 10.13 | 56.00 | 19.02 | QP |
| 0.460 | 26.38 | 10.16 | 47.14 | 20.76 | Ave. |
| 0.150 | 35.13 | 10.10 | 56.00 | 20.87 | Ave. |
| 0.150 | 44.14 | 10.10 | 66.00 | 21.86 | QP |
| 0.460 | 35.06 | 10.16 | 57.14 | 22.08 | QP |
| 2.885 | 33.39 | 10.16 | 56.00 | 22.61 | QP |

**120 V, 60 Hz, Line (DC 24V adapter):**




| Conducted Emissions | | | FCC Part 15.207 | | |
|---|---|---|---|---|---|
| **Frequency (MHz)** | **Corrected Result (dBµV)** | **Correction Factor (dB)** | **Limit (dBµV)** | **Margin (dB)** | **Remark (PK/QP/Ave.)** |
| 1.455 | 31.09 | 10.15 | 46.00 | 14.91 | Ave. |
| 0.165 | 49.93 | 10.09 | 65.57 | 15.64 | QP |
| 0.165 | 39.25 | 10.09 | 55.57 | 16.32 | Ave. |
| 0.465 | 29.55 | 10.16 | 47.00 | 17.45 | Ave. |
| 0.195 | 46.91 | 10.07 | 64.71 | 17.80 | QP |
| 1.460 | 38.17 | 10.15 | 56.00 | 17.83 | QP |
| 0.195 | 36.76 | 10.07 | 54.71 | 17.95 | Ave. |
| 8.520 | 31.85 | 10.10 | 50.00 | 18.15 | Ave. |
| 0.310 | 42.96 | 10.01 | 61.43 | 18.47 | QP |
| 0.465 | 38.05 | 10.16 | 57.00 | 18.95 | QP |
| 0.310 | 32.09 | 10.01 | 51.43 | 19.34 | Ave. |
| 8.515 | 36.24 | 10.10 | 60.00 | 23.76 | QP |

**120V, 60 Hz, Neutral (DC 24V adapter):**




| Conducted Emissions | | | FCC Part 15.207 | | |
|---|---|---|---|---|---|
| Frequency (MHz) | Corrected Result (dBµV) | Correction Factor (dB) | Limit (dBµV) | Margin (dB) | Remark (PK/QP/Ave.) |
| 1.325 | 31.49 | 10.13 | 46.00 | 14.51 | Ave. |
| 1.930 | 29.83 | 10.19 | 46.00 | 16.17 | Ave. |
| 0.160 | 49.09 | 10.09 | 65.71 | 16.62 | QP |
| 0.195 | 47.10 | 10.07 | 64.71 | 17.61 | QP |
| 0.195 | 36.82 | 10.07 | 54.71 | 17.89 | Ave. |
| 1.325 | 37.95 | 10.13 | 56.00 | 18.05 | QP |
| 0.465 | 28.46 | 10.16 | 47.00 | 18.54 | Ave. |
| 0.465 | 38.26 | 10.16 | 57.00 | 18.74 | QP |
| 0.160 | 36.69 | 10.09 | 55.71 | 19.02 | Ave. |
| 0.310 | 32.26 | 10.01 | 51.43 | 19.17 | Ave. |
| 0.310 | 42.19 | 10.01 | 61.43 | 19.24 | QP |
| 1.925 | 35.03 | 10.19 | 56.00 | 20.97 | QP |

# FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

## Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

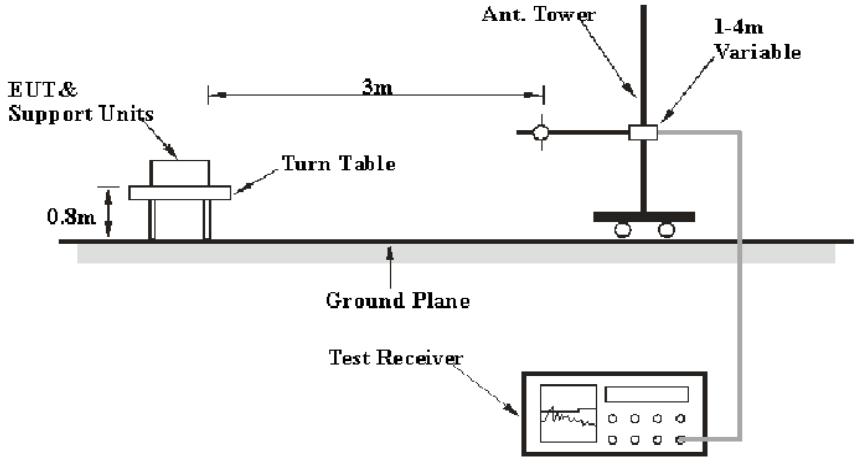
## Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

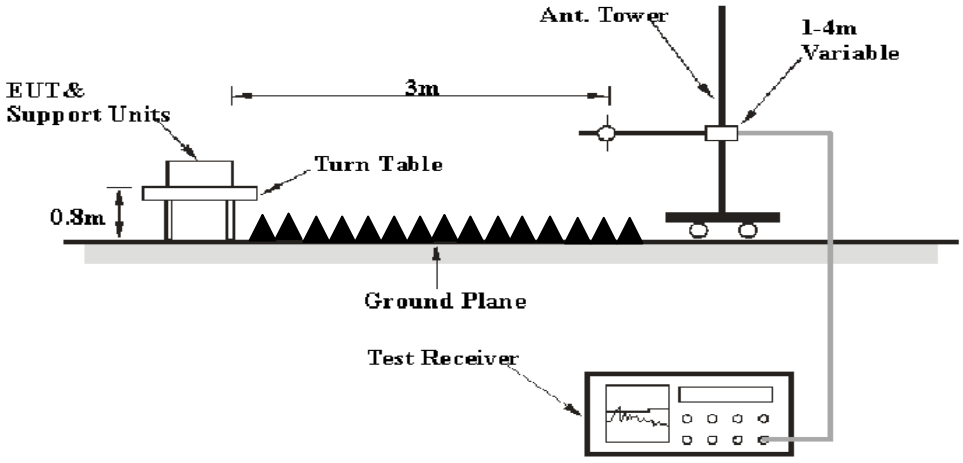
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ±4.0 dB (k=2, 95% level of confidence).

## EUT Setup

**Below 1 GHz:**




**Above 1 GHz:**



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209, and FCC 15.247 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The 12V/24V adapters were connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

| ***Frequency Range*** | ***RBW*** | ***Video B/W*** | ***Detector*** |
|---|---|---|---|
| 30 MHz – 1000 MHz | 100 kHz | 300 kHz | QP |
| 1000 MHz – 25 GHz | 1 MHz | 3 MHz | PK |
| 1000 MHz – 25 GHz | 1 MHz | 10 Hz | Ave. |

## Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| HP | Amplifier | HP8447D | 2944A09795 | 2010-08-02 | 2011-08-01 |
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100035 | 2010-11-11 | 2011-11-10 |
| Sunol Sciences | Broadband Antenna | JB1 | A040904-1 | 2011-03-11 | 2012-03-10 |
| HP | Amplifier | 2VA-213+ | T-E27H | 2011-03-08 | 2012-03-07 |
| Sunol Sciences | Horn Antenna | DRH-118 | A052604 | 2011-05-05 | 2012-05-04 |
| Rohde & Schwarz | Spectrum Analyzer | FSEM30 | 849720/019 | 2010-07-08 | 2011-07-07 |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, and section 15.205, 15.209 and 15.247, with the worst margin reading of:

**Below 1 GHz:**

**3.5 dB** at **162.724 MHz** in the **Horizontal** polarization

**Above 1 GHz:**

**10.77 dB** at **7323 MHz** in the **Horizontal** polarization

## Test Data

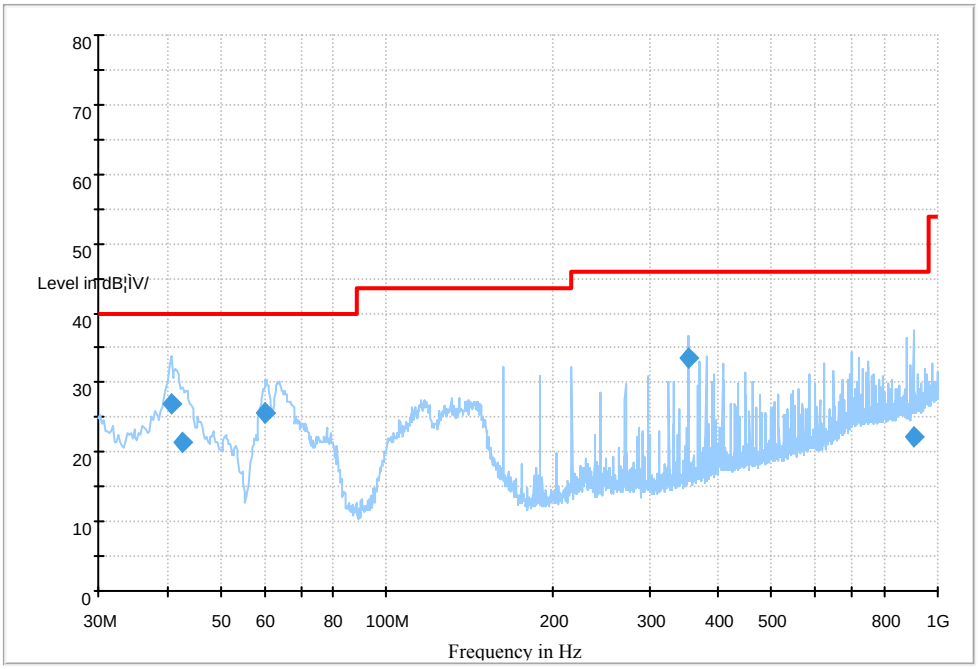
### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 °C |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0kPa |

*The testing was performed by Wayne Cheng on 2011-03-24.*

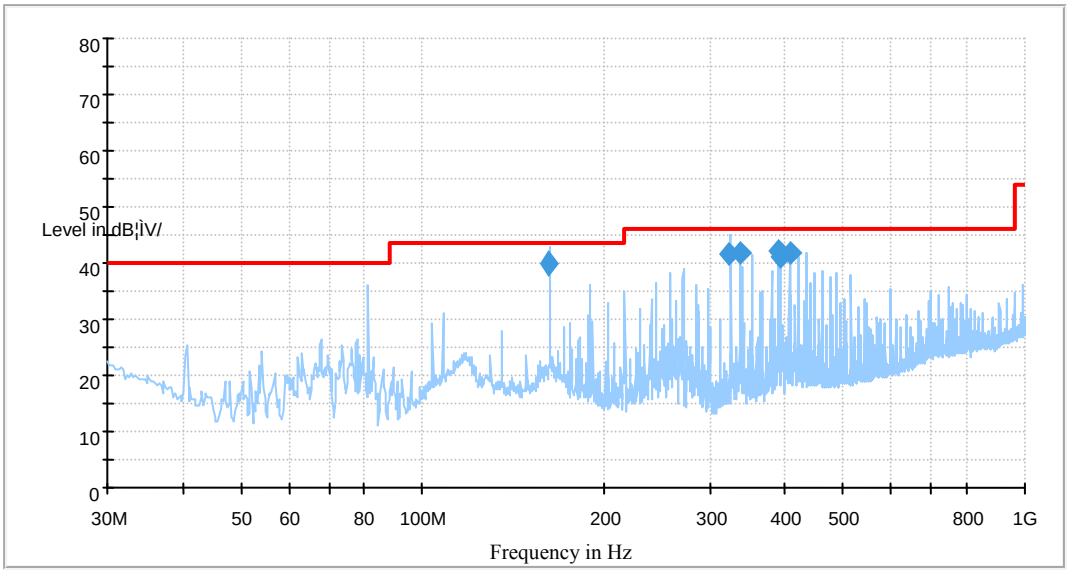
1) Below 1 GHz:

Mode 1: Bluetooth transmitting




| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Test Antenna | | Turntable Position (degree) | Correction Factor (dB) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| | | Height (cm) | Polarity (H/V) | | | | |
| 352.5785 | 33.4 | 104.0 | H | 15 | -11.0 | 46.0 | 12.6 |
| 40.7075 | 27.0 | 103.0 | V | 135 | -14.5 | 40.0 | 13.0 |
| 60.406125 | 25.7 | 102.0 | V | 323 | -18.6 | 47.0 | 14.3 |
| 60.283125 | 25.6 | 138.0 | H | 106 | -18.6 | 40.0 | 14.4 |
| 42.537375 | 21.3 | 106.0 | V | 147 | -13.67 | 40.0 | 18.7 |
| 902.46225 | 22.1 | 105.0 | V | 45 | -7.5.0 | 46.0 | 23.9 |

Mode 2: Bluetooth transmits simultaneously with GPRS/WCDMA and 13.56 MHz radio (worse case)




| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Test Antenna | | Turntable Position (degree) | Correction Factor (dB) | Limit (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| | | Height (cm) | Polarity (H/V) | | | | |
| 162.724000 | 40.0 | 245.0 | H | 110.0 | -14.5 | 43.5 | 3.5* |
| 325.463750 | 41.2 | 103.0 | H | 75.0 | -11.7 | 46.0 | 4.8 |
| 338.003750 | 41.5 | 138.0 | V | 195.0 | -11.4 | 46.0 | 4.5 |
| 389.987000 | 42.0 | 105.0 | V | 207.0 | -10.2 | 46.0 | 4.0 |
| 393.232250 | 41.2 | 104.0 | H | 58.0 | -10.1 | 46.0 | 4.8 |
| 406.838250 | 41.9 | 102.0 | H | 57.0 | -9.8 | 46.0 | 4.1 |

** Measurement within uncertainly*

2) Above 1 GHz:

| Indicated | | Detector (PK/Ave.) | Table Angle Degree | Test Antenna | | Correction Factor | | | FCC Part 15.247/15.209 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | S.A. Reading (dBμV) | | | Height (m) | Polar (H/V) | Ant. Factor (dB/m) | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Amp. (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Comment |
| Low Channel (2402 MHz) | | | | | | | | | | | | |
| 4804 | 32.15 | Ave. | 160 | 1.5 | H | 32.3 | 4.3 | 26.8 | 41.95 | 54 | 12.05 | harmonic |
| 7206 | 26.17 | Ave. | 160 | 1.4 | V | 37 | 5.2 | 26.6 | 41.77 | 54 | 12.23 | harmonic |
| 7206 | 25.46 | Ave. | 170 | 1.0 | H | 36.5 | 5.2 | 26.6 | 40.56 | 54 | 13.44 | harmonic |
| 4804 | 30.42 | Ave. | 180 | 1.2 | V | 32.5 | 4.3 | 26.8 | 40.42 | 54 | 13.58 | harmonic |
| 4804 | 41.45 | PK | 160 | 1.5 | H | 32.3 | 4.3 | 26.8 | 51.25 | 74 | 22.75 | harmonic |
| 7206 | 35.61 | PK | 170 | 1.0 | H | 36.5 | 5.2 | 26.6 | 50.71 | 74 | 23.29 | harmonic |
| 7206 | 34.17 | PK | 160 | 1.4 | V | 37 | 5.2 | 26.6 | 49.77 | 74 | 24.23 | harmonic |
| 4804 | 38.23 | PK | 180 | 1.2 | V | 32.5 | 4.3 | 26.8 | 48.23 | 74 | 25.77 | harmonic |
| Middle Channel (2441 MHz) | | | | | | | | | | | | |
| 7323 | 28.13 | Ave. | 0 | 1.1 | H | 36.5 | 5.2 | 26.6 | 43.23 | 54 | 10.77 | harmonic |
| 7323 | 27.56 | Ave. | 165 | 1.2 | V | 37 | 5.2 | 26.6 | 43.16 | 54 | 10.84 | harmonic |
| 4882 | 30.25 | Ave. | 180 | 1 | H | 32.3 | 4.3 | 26.8 | 40.05 | 54 | 13.95 | harmonic |
| 4882 | 28.76 | Ave. | 185 | 1.2 | V | 32.5 | 4.3 | 26.8 | 38.76 | 54 | 15.24 | harmonic |
| 7323 | 37.89 | PK | 0 | 1.1 | H | 36.5 | 5.2 | 26.6 | 52.99 | 74 | 21.01 | harmonic |
| 7323 | 36.44 | PK | 165 | 1.2 | V | 37 | 5.2 | 26.6 | 52.04 | 74 | 21.96 | harmonic |
| 4882 | 38.41 | PK | 180 | 1 | H | 32.3 | 4.3 | 26.8 | 48.21 | 74 | 25.79 | harmonic |
| 4882 | 36.75 | PK | 185 | 1.2 | V | 32.5 | 4.3 | 26.8 | 46.75 | 74 | 27.25 | harmonic |
| High Channel (2480 MHz) | | | | | | | | | | | | |
| 7440 | 26.74 | Ave. | 100 | 1.1 | H | 36.5 | 5.2 | 26.6 | 41.84 | 54 | 12.16 | harmonic |
| 4960 | 31.61 | Ave. | 20 | 1.2 | H | 32.3 | 4.3 | 26.8 | 41.41 | 54 | 12.59 | harmonic |
| 7440 | 25.8 | Ave. | 120 | 1.6 | V | 37 | 5.2 | 26.6 | 41.4 | 54 | 12.60 | harmonic |
| 4960 | 30.29 | Ave. | 20 | 1.2 | V | 32.5 | 4.3 | 26.8 | 40.29 | 54 | 13.71 | harmonic |
| 7440 | 38.01 | PK | 120 | 1.6 | V | 37 | 5.2 | 26.6 | 53.61 | 74 | 20.39 | harmonic |
| 7440 | 37.19 | PK | 100 | 1.1 | H | 36.5 | 5.2 | 26.6 | 52.29 | 74 | 21.71 | harmonic |
| 4960 | 39.17 | PK | 20 | 1.2 | H | 32.3 | 4.3 | 26.8 | 48.97 | 74 | 25.03 | harmonic |
| 4960 | 37.83 | PK | 20 | 1.2 | V | 32.5 | 4.3 | 26.8 | 47.83 | 74 | 26.17 | harmonic |

3) Restrict band spurious emission

| Indicated | | Detector (PK/Ave.) | Table Angle Degree | Test Antenna | | Correction Factor | | | FCC Part 15.247/15.209/15.205 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency (MHz) | S.A. Reading (dBμV) | | | Height (m) | Polar (H/V) | Ant. Factor (dB/m) | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Amp. (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Comment |
| 2483.53 | 28.93 | Ave. | 0 | 1.2 | V | 29.0 | 3.0 | 26.8 | 34.13 | 54 | 19.87 | spurious |
| 2390 | 27.54 | Ave. | 360 | 1.5 | V | 29.0 | 3.0 | 26.8 | 32.74 | 54 | 21.26 | spurious |
| 2483.65 | 26.78 | Ave. | 46 | 1.5 | H | 28.5 | 3.0 | 26.8 | 31.48 | 54 | 22.52 | spurious |
| 2389.8 | 25.11 | Ave. | 120 | 1.2 | H | 28.5 | 3.0 | 26.8 | 29.81 | 54 | 24.19 | spurious |
| 2483.65 | 38.46 | PK | 46 | 1.5 | H | 28.5 | 3.0 | 26.8 | 43.16 | 74 | 30.84 | spurious |
| 2390 | 37.85 | PK | 360 | 1.5 | V | 29.0 | 3.0 | 26.8 | 43.05 | 74 | 30.95 | spurious |
| 2483.53 | 36.96 | PK | 0 | 1.2 | V | 29.0 | 3.0 | 26.8 | 42.16 | 74 | 31.84 | spurious |
| 2389.8 | 36.42 | PK | 120 | 1.2 | H | 28.5 | 3.0 | 26.8 | 41.12 | 74 | 32.88 | spurious |

# FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

## Applicable Standard

Frequency hopping systems shall have hoping channel carrier frequencies separated by a minimum of 25 kHz 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 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

## Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100035 | 2010-11-11 | 2011-11-10 |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 °C |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.9kPa |

** The testing was performed by Wayne Cheng on 2011-03-23 and 2011-04-28.*

**Test Result:** Compliant.

Please refer to following tables and plots

*Test Mode: Transmitting*

GFSK:

| Channel | Frequency (MHz) | Channel Separation (MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| Low | 2402 | 1.000 | 1.000 | Pass |
| Adjacent | 2403 | | | |
| Middle | 2441 | 1.000 | 1.000 | Pass |
| Adjacent | 2442 | | | |
| High | 2480 | 1.000 | 1.000 | Pass |
| Adjacent | 2479 | | | |

π /4 DQPSK:

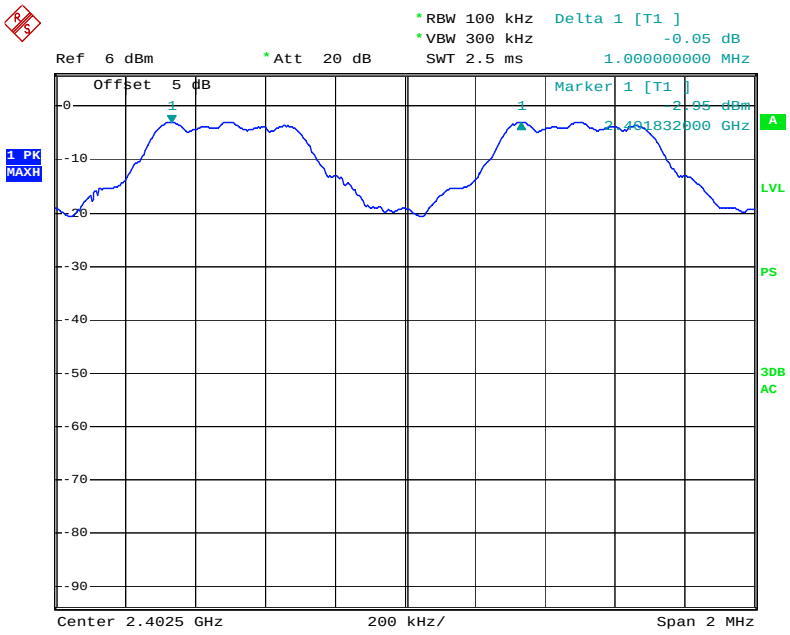
| Channel | Frequency (MHz) | Channel Separation (MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| Low | 2402 | 1.020 | 1.000 | Pass |
| Adjacent | 2403 | | | |
| Middle | 2441 | 1.008 | 1.000 | Pass |
| Adjacent | 2442 | | | |
| High | 2480 | 1.014 | 1.000 | Pass |
| Adjacent | 2479 | | | |

8-DQPSK:

| Channel | Frequency (MHz) | Channel Separation (MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| Low | 2402 | 1.002 | 1.000 | Pass |
| Adjacent | 2403 | | | |
| Middle | 2441 | 1.002 | 1.000 | Pass |
| Adjacent | 2442 | | | |
| High | 2480 | 1.002 | 1.000 | Pass |
| Adjacent | 2479 | | | |

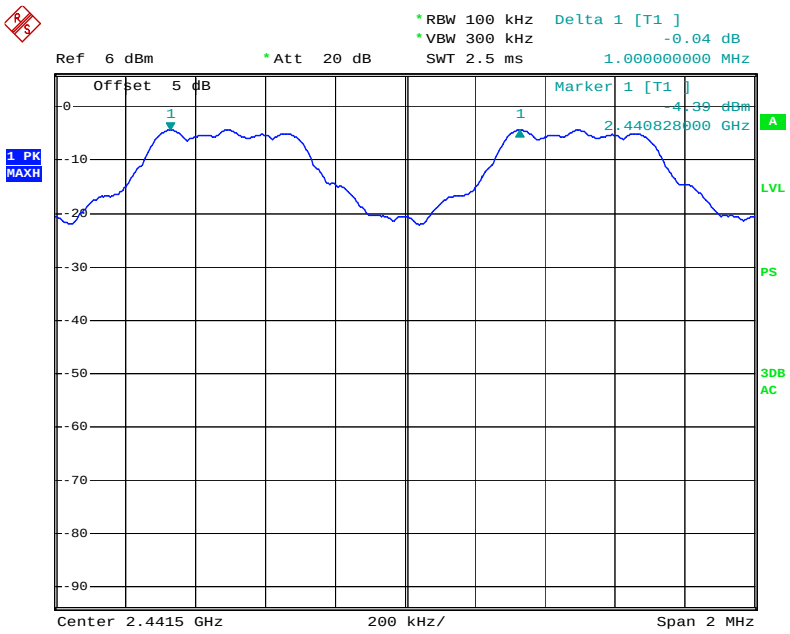
Please refer to the following plots.

## GFSK: Low Channel



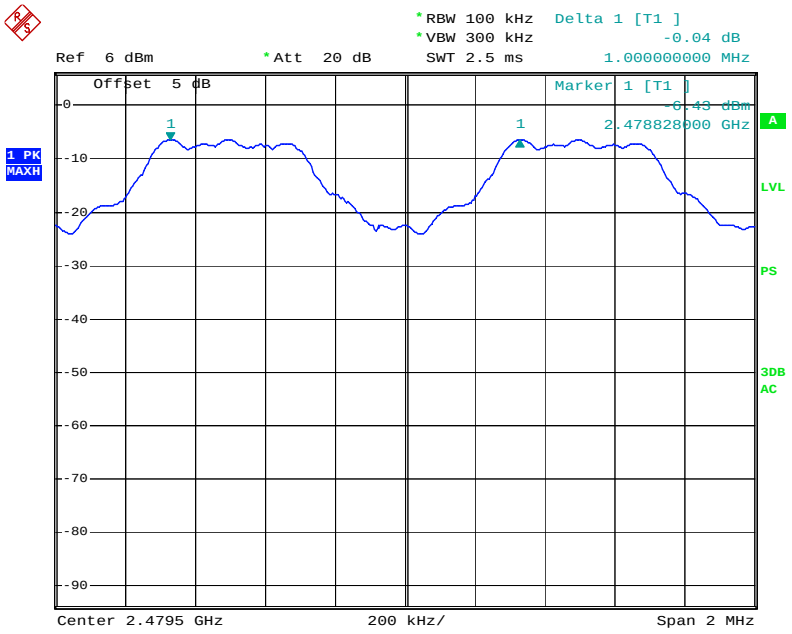

Date: 23.MAR.2011 21:02:25

## GFSK: Middle Channel



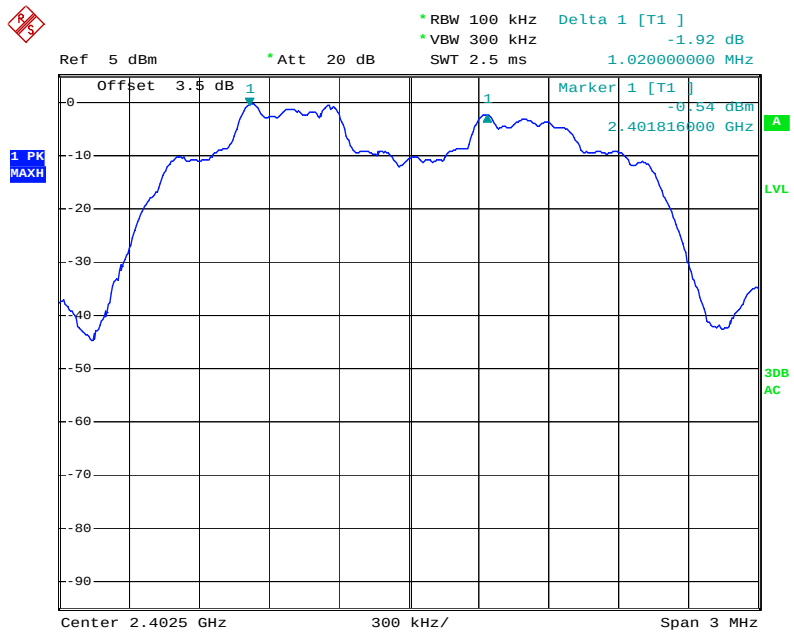

Date: 23.MAR.2011 21:01:35

## GFSK: High Channel



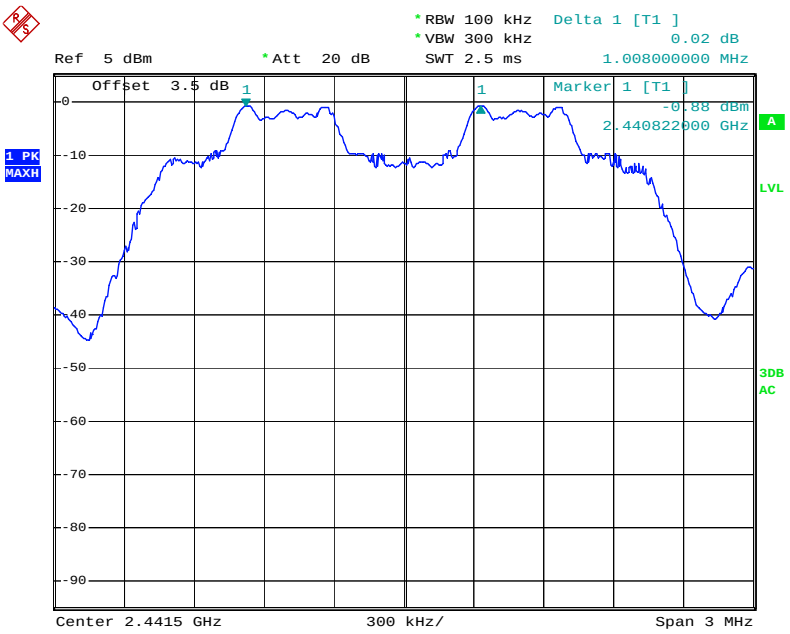

Date: 23.MAR.2011 21:03:16

## π/4 DQPSK: Low Channel



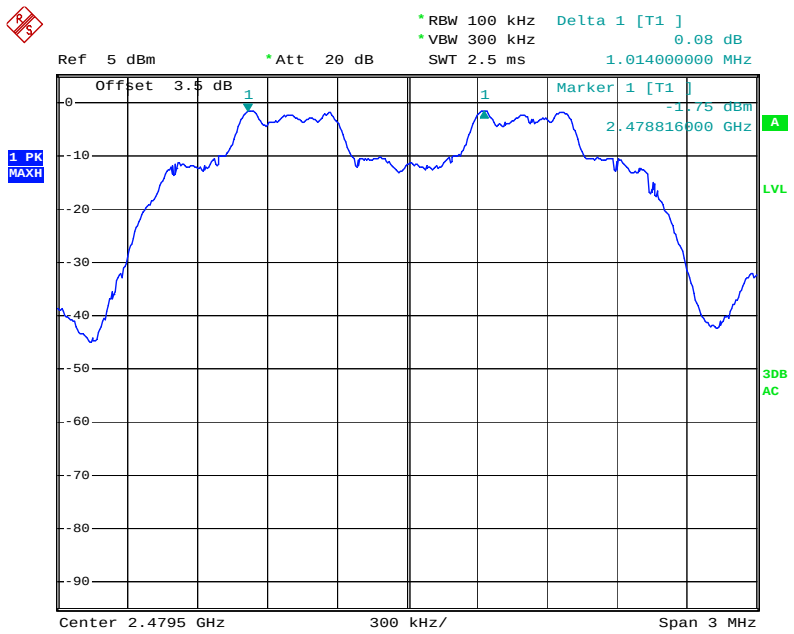

Date: 28.APR.2011 22:32:01

## π/4 DQPSK: Middle Channel



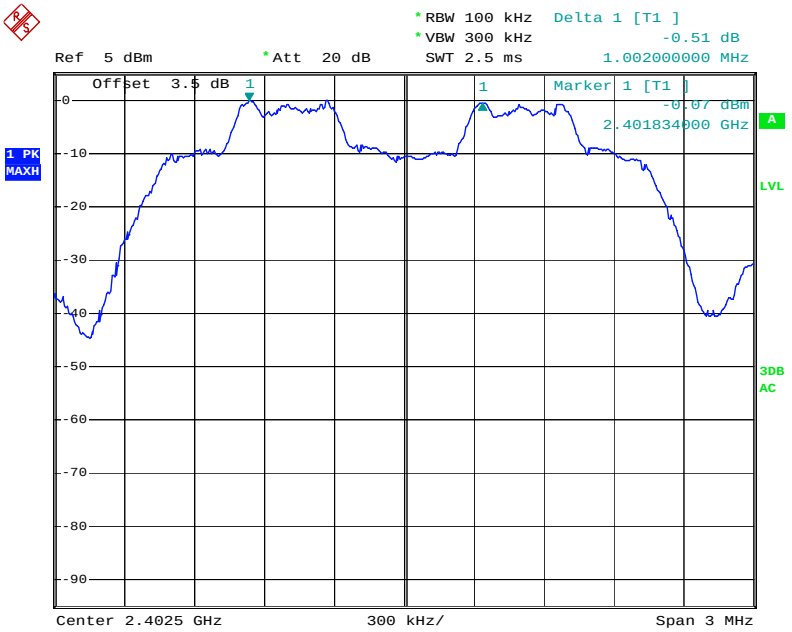

Date: 28.APR.2011 22:35:02

## π/4 DQPSK: High Channel



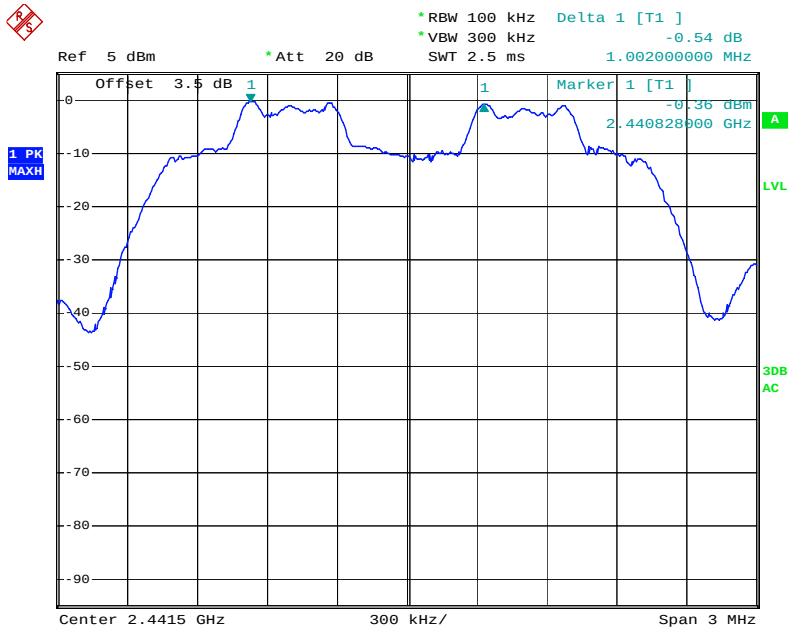

Date: 28.APR.2011 22:37:01

## 8-DQPSK: Low Channel



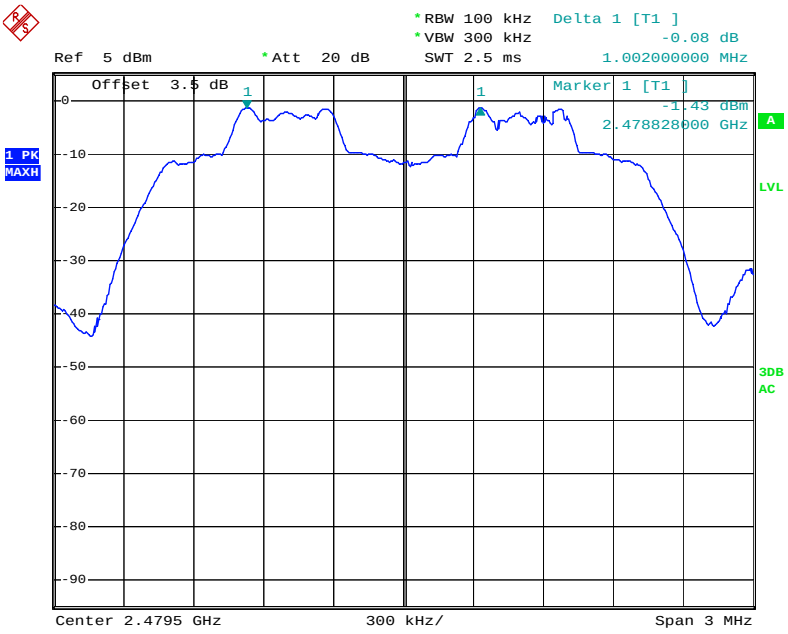

Date: 28.APR.2011 23:57:02

## 8-DQPSK: Middle Channel




Date: 28.APR.2011 23:54:55

## 8-DQPSK: High Channel




Date: 28.APR.2011 22:58:51

# FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH

## Applicable Standard

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.

## Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the test table without connection to measurement instrument. Turn on the EUT. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100035 | 2010-11-11 | 2011-11-10 |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 °C |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.9kPa |

** The testing was performed by Wayne Cheng on 2011-03-23 and 2011-04-28.*

**Test Result:** Compliance.

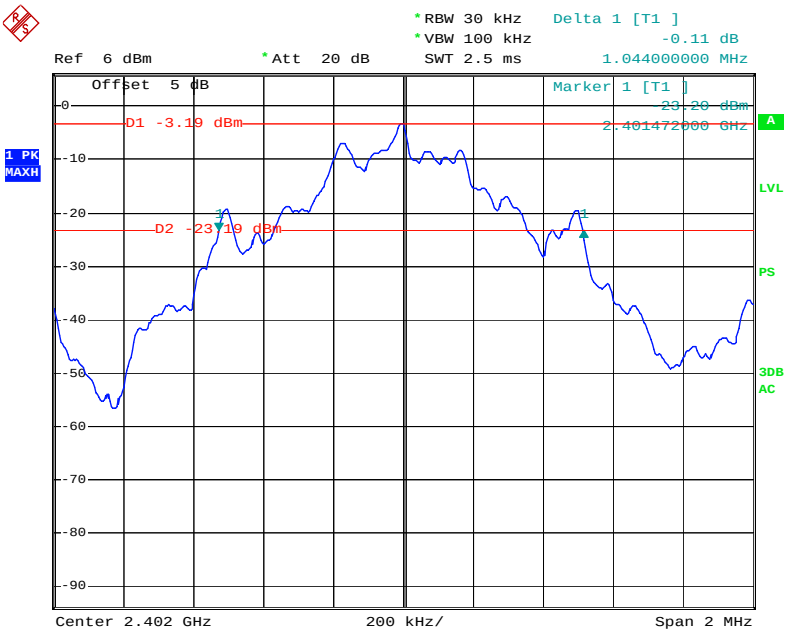
Please refer to following tables and plots

*Test Mode: Transmitting*

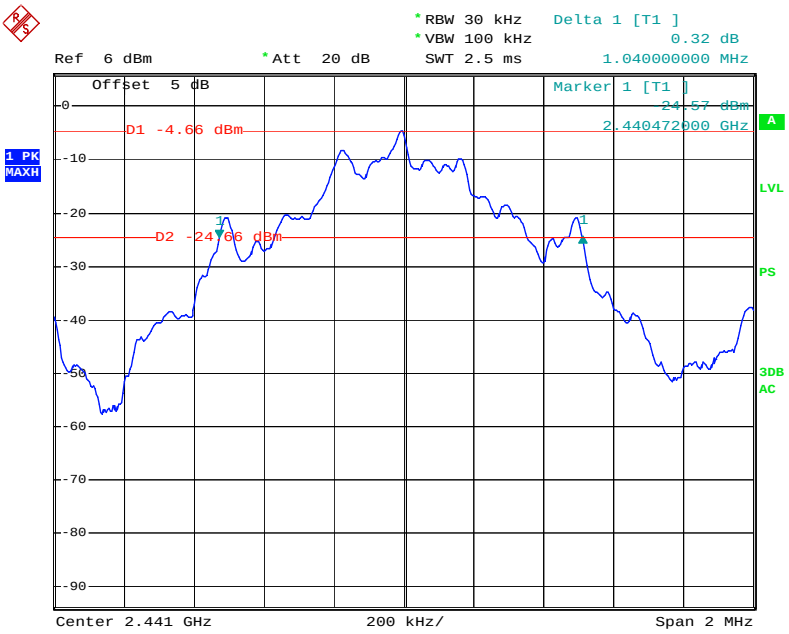
| Modulation | Channel | Frequency (MHz) | 20 dB Bandwidth (MHz) |
|---|---|---|---|
| GFSK | Low | 2402 | 1.044 |
| | Middle | 2441 | 1.040 |
| | High | 2480 | 1.040 |
| π/4 DQPSK | Low | 2402 | 1.148 |
| | Middle | 2441 | 1.200 |
| | High | 2480 | 1.140 |
| 8-DQPSK | Low | 2402 | 1.128 |
| | Middle | 2441 | 1.120 |
| | High | 2480 | 1.120 |

Please refer to the following plots.

**GFSK: Low Channel**

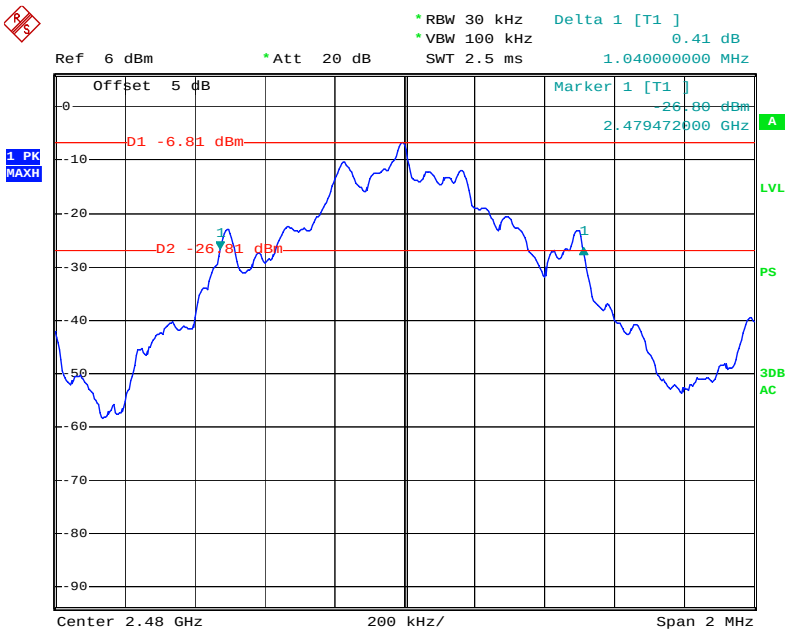


## GFSK: Middle Channel



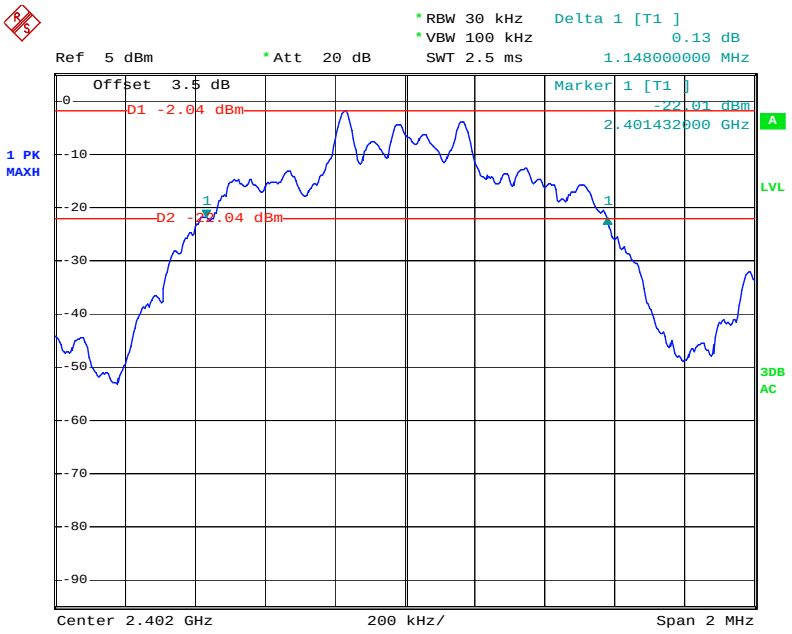

Date: 23.MAR.2011 20:53:35

## GFSK: High Channel



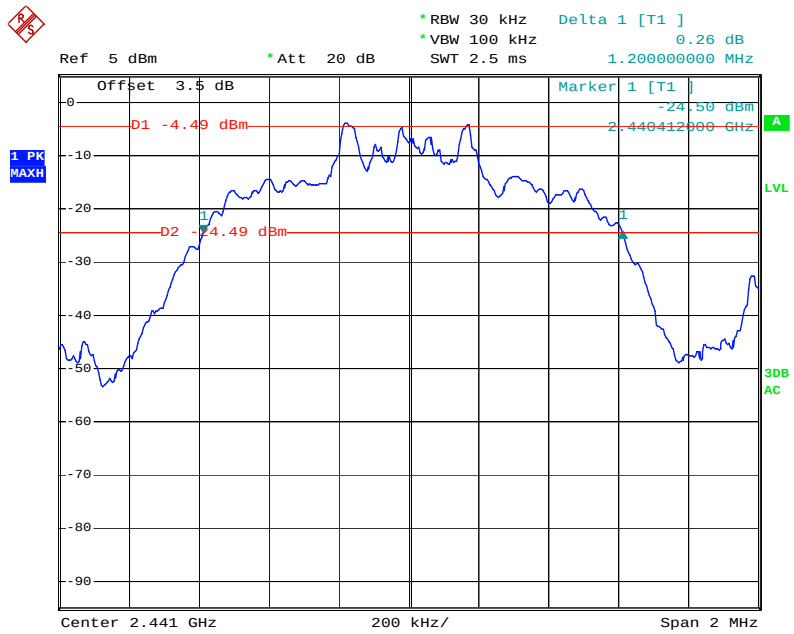

Date: 23.MAR.2011 20:54:43

## π/4 DQPSK: Low Channel



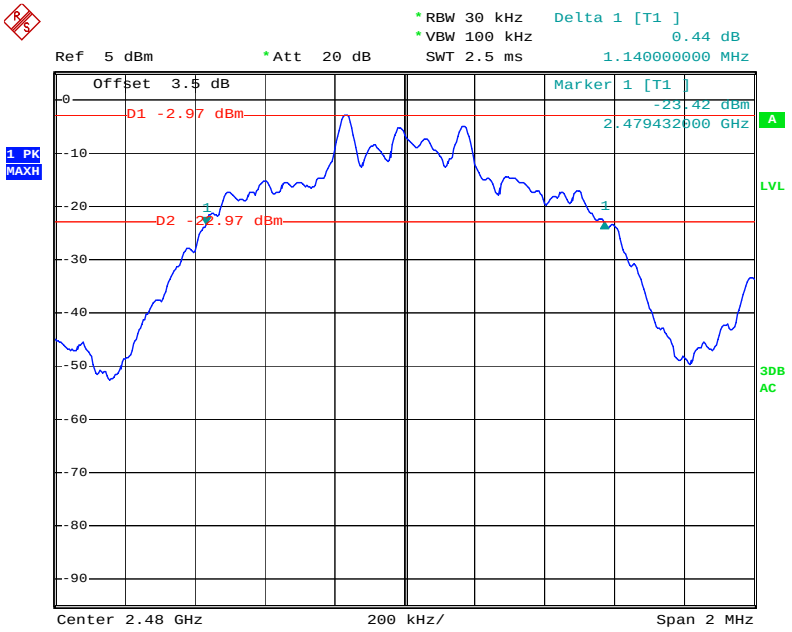

Date: 28.APR.2011 20:24:06

## π/4 DQPSK: Middle Channel



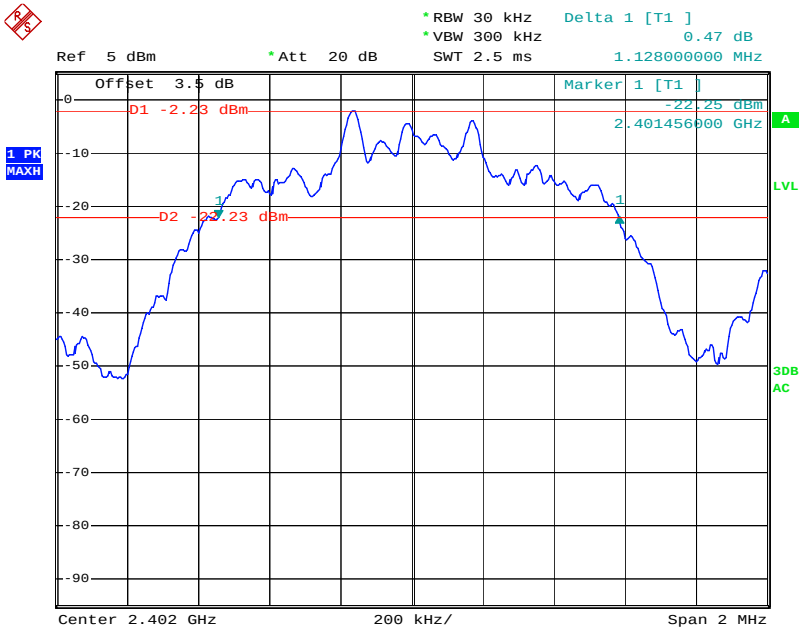

Date: 28.APR.2011 21:07:48

## π/4 DQPSK: High Channel



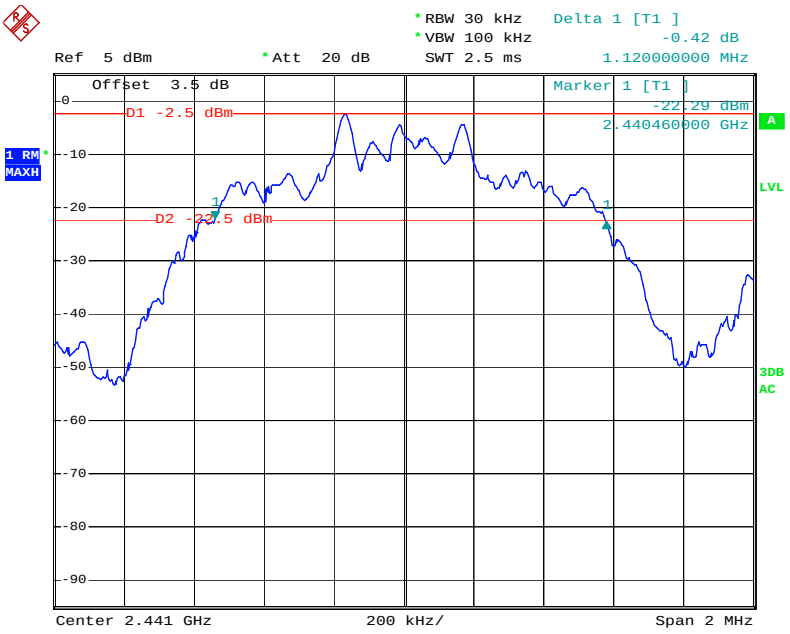

Date: 28.APR.2011 21:23:50

## 8-DQPSK: Low Channel



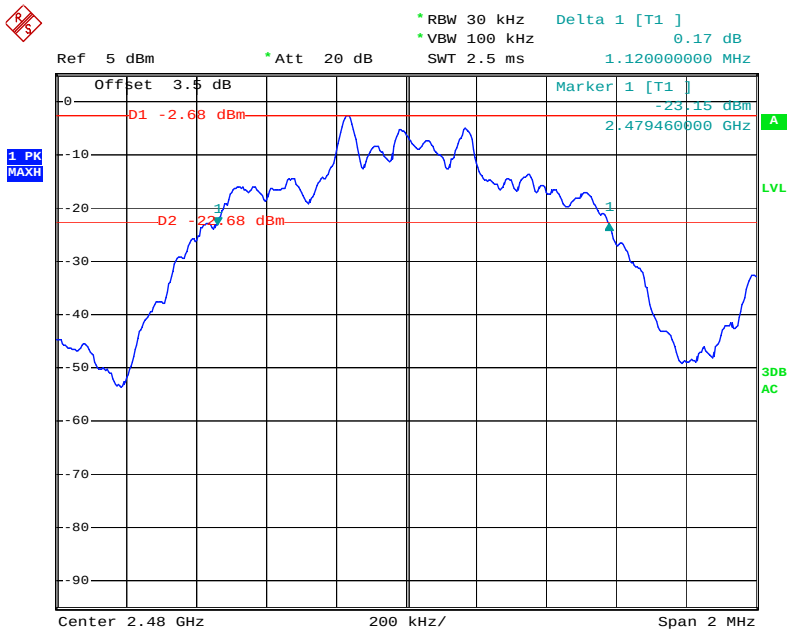

Date: 28.APR.2011 23:58:58

## 8-DQPSK: Middle Channel




Date: 28.APR.2011 23:49:12

## 8-DQPSK: High Channel




Date: 28.APR.2011 23:45:53

# FCC §15.247(a) (1) (iii) - QUANTITY OF HOPPING CHANNEL TEST

## Applicable Standard

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

## Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in hopping mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100035 | 2010-11-11 | 2011-11-10 |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 °C |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.9kPa |

*The testing was performed by Wayne Cheng on 2011-03-23.*

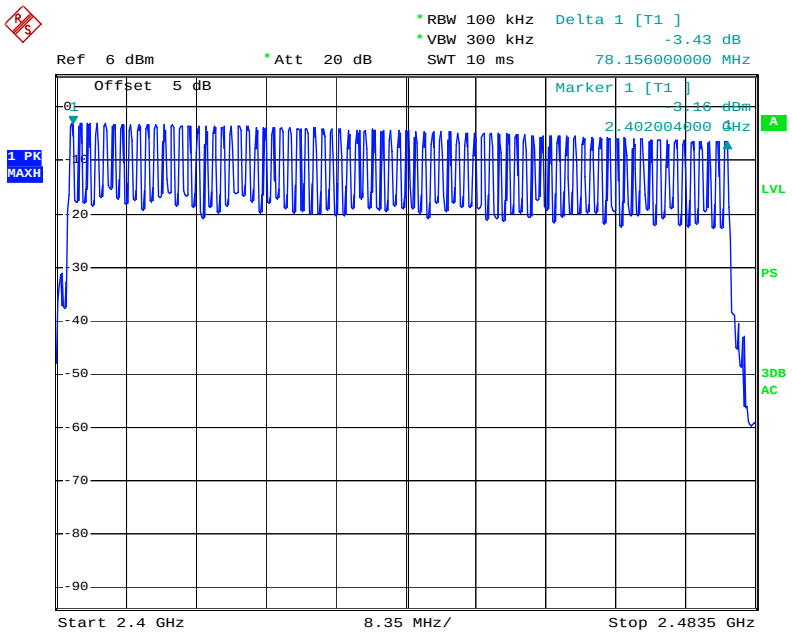
**Test Result:** Compliance.

Please refer to following tables and plots

*Test Mode: Transmitting*

| Frequency Range (MHz) | Number of Hopping Channel | Limit |
|---|---|---|
| 2400-2483.5 | 79 | ≥ 15 |

**Number of Hopping Channels**




Date: 23.MAR.2011 20:50:34

# FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

## Applicable Standard

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

## Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 * channel no. (s), the quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Dwell Time= time slot length * hope rate/ number of hopping channels * 31.6s
Hop rate=1600/s

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100035 | 2010-11-11 | 2011-11-10 |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 °C |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.0kPa |

** The testing was performed by Wayne Cheng on 2011-04-29.*

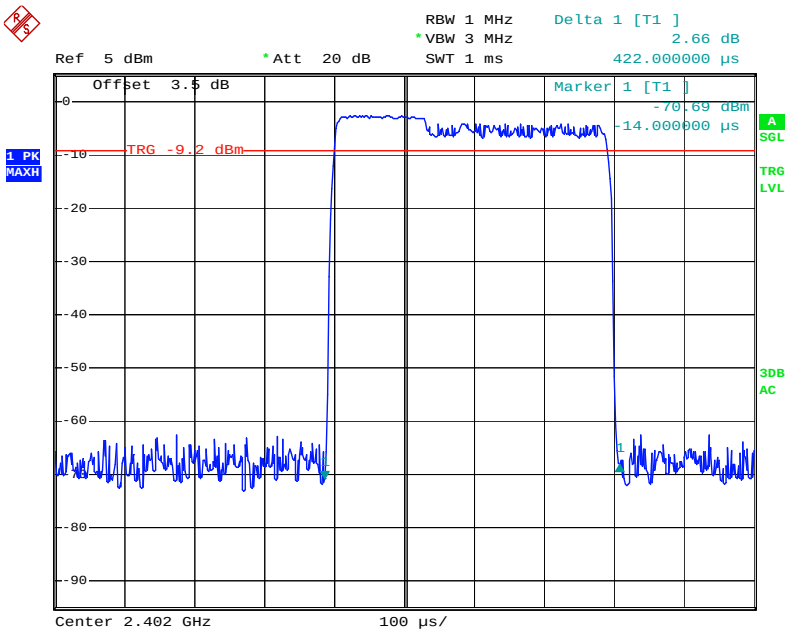
**Test Result:** Compliance.

Please refer to following tables and plots

*Test Mode: Transmitting*

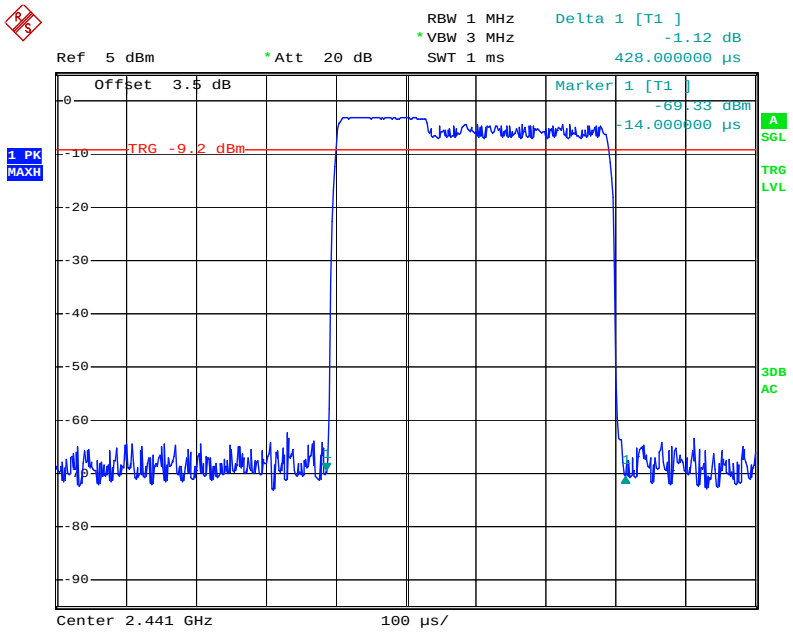
| Mode | Channel | Pulse Width (ms) | Dwell Time (S) | Limit (S) | Result |
|---|---|---|---|---|---|
| DH 1 | Low | 0.422 | 0.135 | 0.4 | Pass |
| | Middle | 0.428 | 0.137 | 0.4 | Pass |
| | High | 0.424 | 0.136 | 0.4 | Pass |
| | Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S | | | | |
| DH 3 | Low | 1.684 | 0.269 | 0.4 | Pass |
| | Middle | 1.698 | 0.272 | 0.4 | Pass |
| | High | 1.710 | 0.274 | 0.4 | Pass |
| | Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S | | | | |
| DH 5 | Low | 2.968 | 0.314 | 0.4 | Pass |
| | Middle | 2.941 | 0.314 | 0.4 | Pass |
| | High | 2.947 | 0.315 | 0.4 | Pass |
| | Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S | | | | |

## Low Channel for DH1



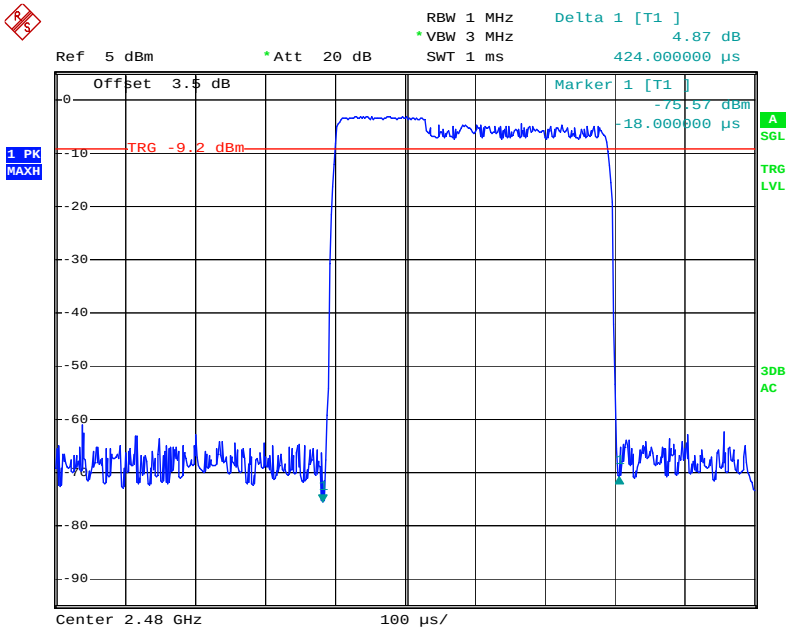

Date: 29.APR.2011 00:05:18

## Middle Channel for DH1



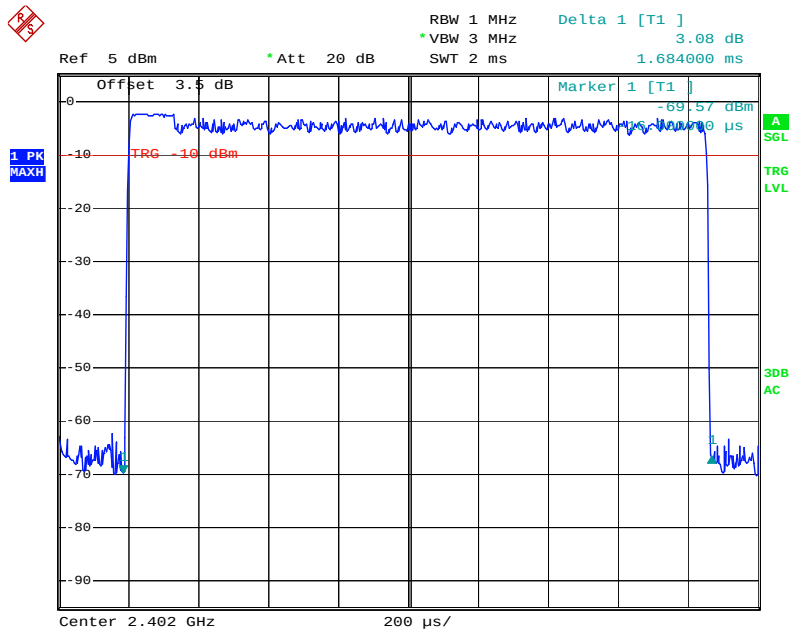

Date: 29.APR.2011 00:04:31

## High Channel for DH1



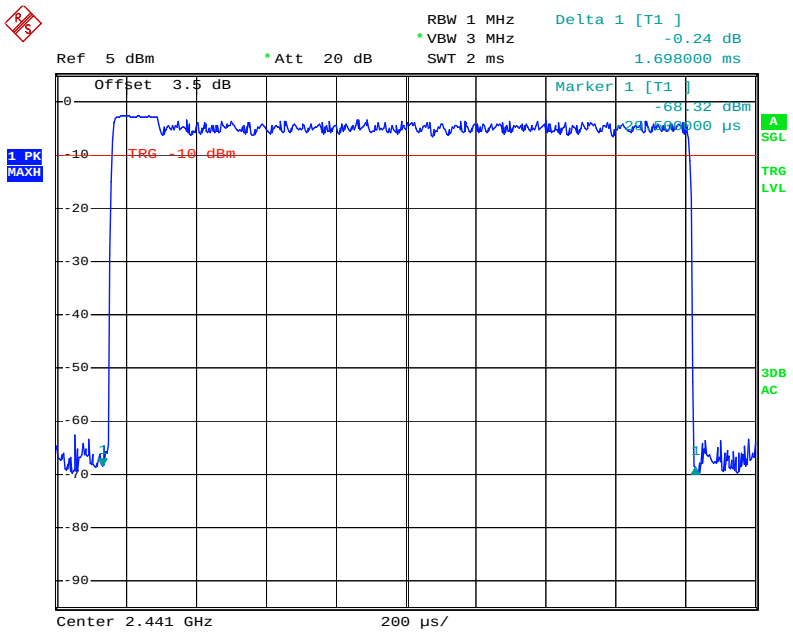

Date: 29.APR.2011 00:06:22

## Low Channel for DH3



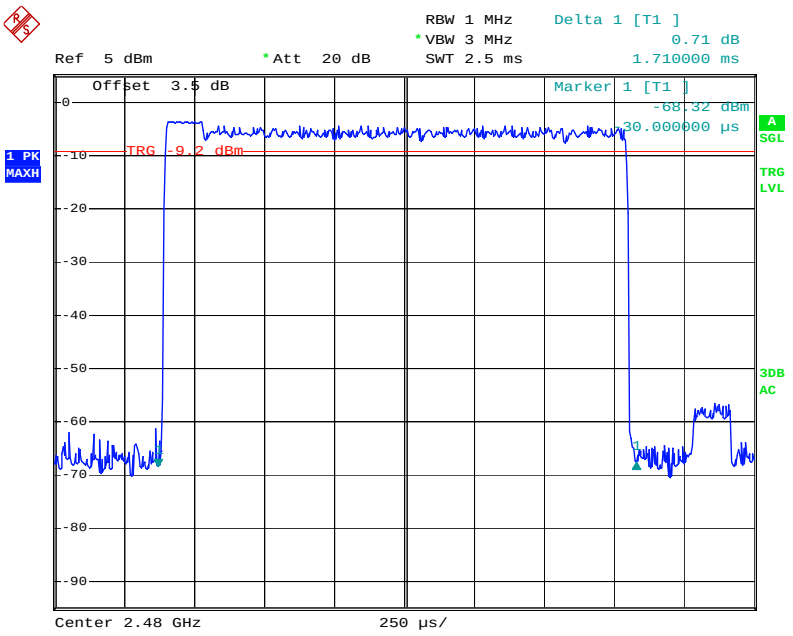

Date: 28.APR.2011 21:01:07

## Middle Channel for DH3



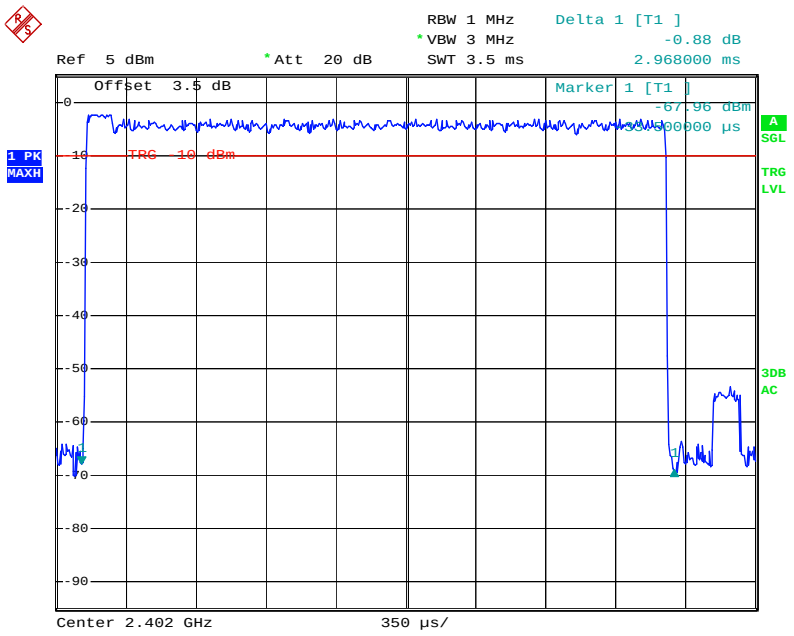

Date: 28.APR.2011 21:16:45

## High Channel for DH3



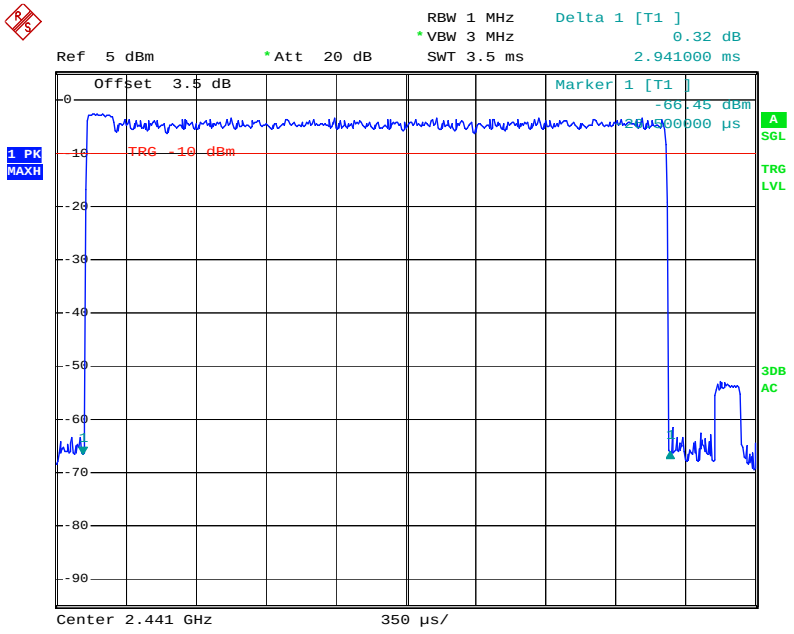

Date: 28.APR.2011 22:22:55

## Low Channel for DH5



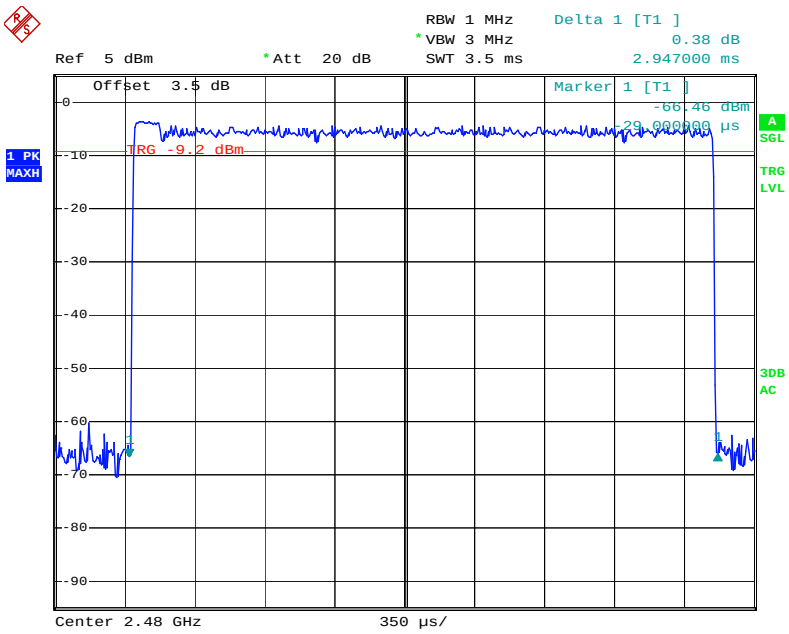

Date: 28.APR.2011 21:03:47

## Middle Channel for DH5




Date: 28.APR.2011 21:18:24

## High Channel for DH5




Date: 28.APR.2011 22:24:31

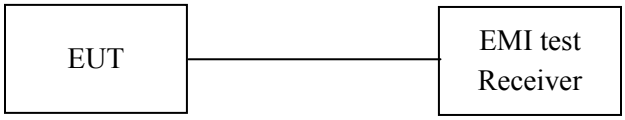
# FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

## Applicable Standard

According to FCC §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. And for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

## Test Procedure

1. Place the EUT on a bench and set in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI test receiver.
3. Add a correction factor to the display.




## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100035 | 2010-11-11 | 2011-11-10 |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 ° C |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 101 kPa |

** The testing was performed by Wayne Cheng on 2011-03-23 to 2011-04-29.*

**Test Result:** Compliance.

*Test Mode: Transmitting*

GFSK:

| Channel | Frequency (MHz) | Conducted Output Power | | Limit (mW) |
|---|---|---|---|---|
| | | (dBm) | (mW) | |
| Low | 2402 | 0.58 | 1.14 | 1000 |
| Middle | 2441 | 0.23 | 1.05 | 1000 |
| High | 2480 | -0.22 | 0.95 | 1000 |

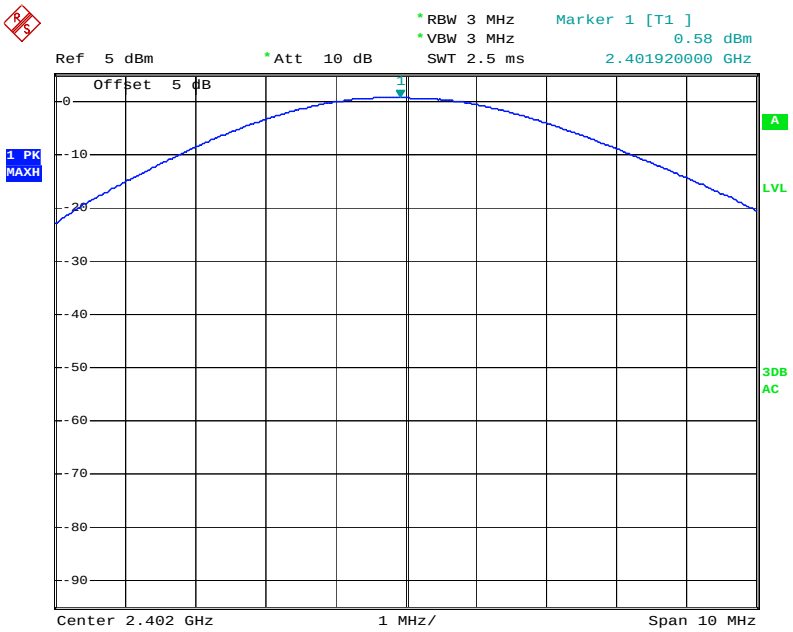
π/4 DQPSK:

| Channel | Frequency (MHz) | Conducted Output Power | | Limit (mW) |
|---|---|---|---|---|
| | | (dBm) | (mW) | |
| Low | 2402 | -0.12 | 0.97 | 1000 |
| Middle | 2441 | -0.42 | 0.91 | 1000 |
| High | 2480 | -1.26 | 0.75 | 1000 |

8-DQPSK:

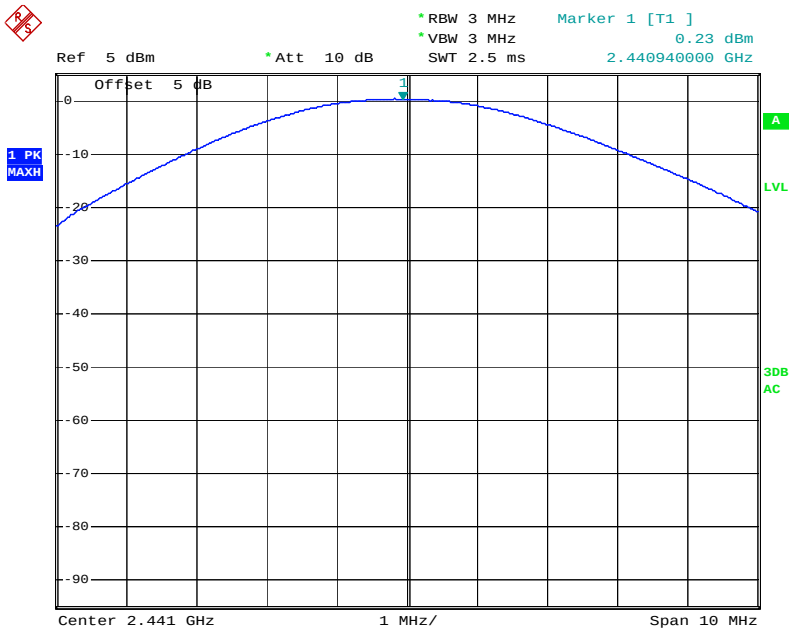
| Channel | Frequency (MHz) | Conducted Output Power | | Limit (mW) |
|---|---|---|---|---|
| | | (dBm) | (mW) | |
| Low | 2402 | -0.17 | 0.96 | 1000 |
| Middle | 2441 | -0.46 | 0.90 | 1000 |
| High | 2480 | -1.80 | 0.66 | 1000 |

## GFSK: Low Channel



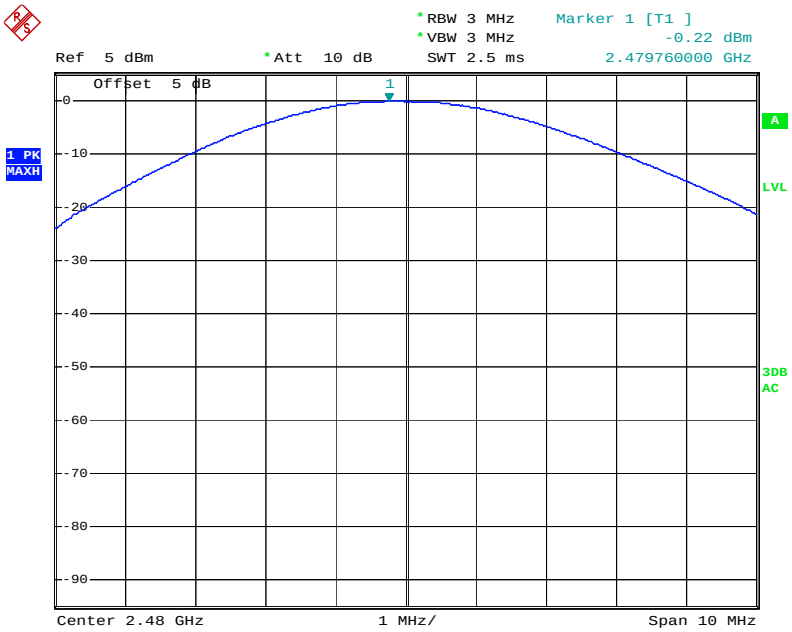

Date: 23.MAR.2011 21:28:31

## GFSK: Middle Channel



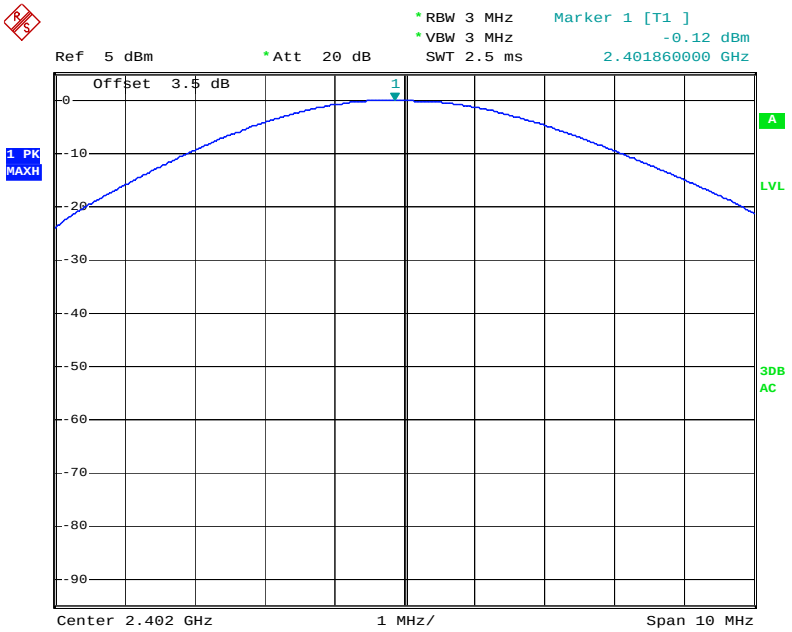

Date: 23.MAR.2011 21:28:58

## GFSK: High Chanel



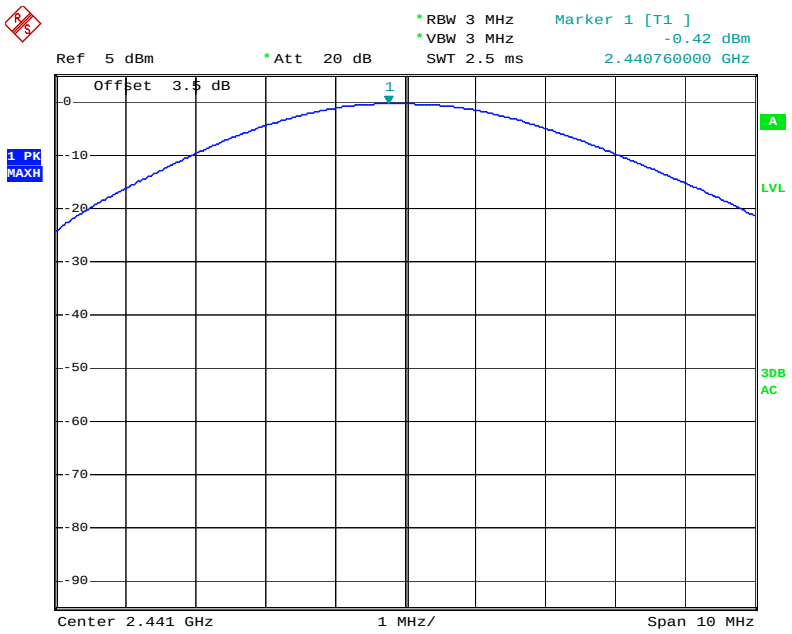

Date: 23.MAR.2011 21:26:51

## π/4 DQPSK: Low Channel



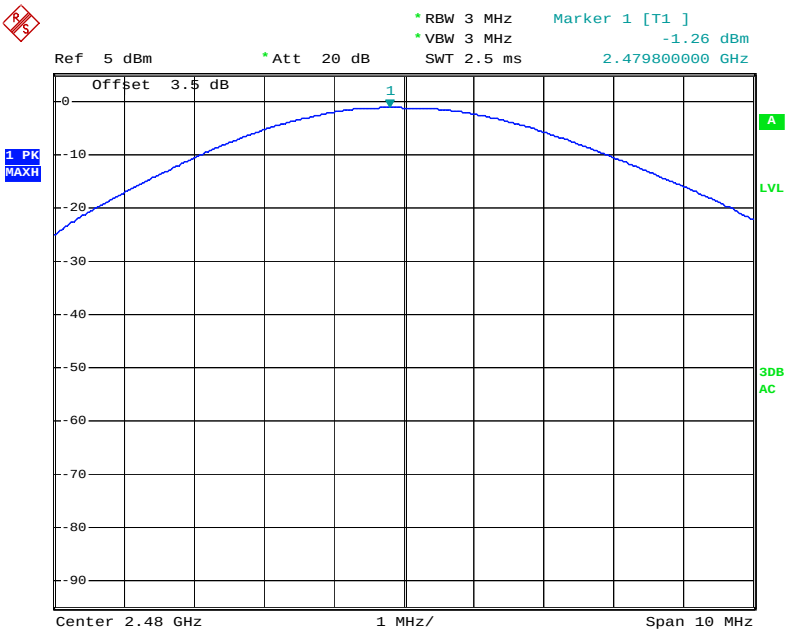

Date: 29.APR.2011 00:21:58

## π/4 DQPSK: Middle Channel



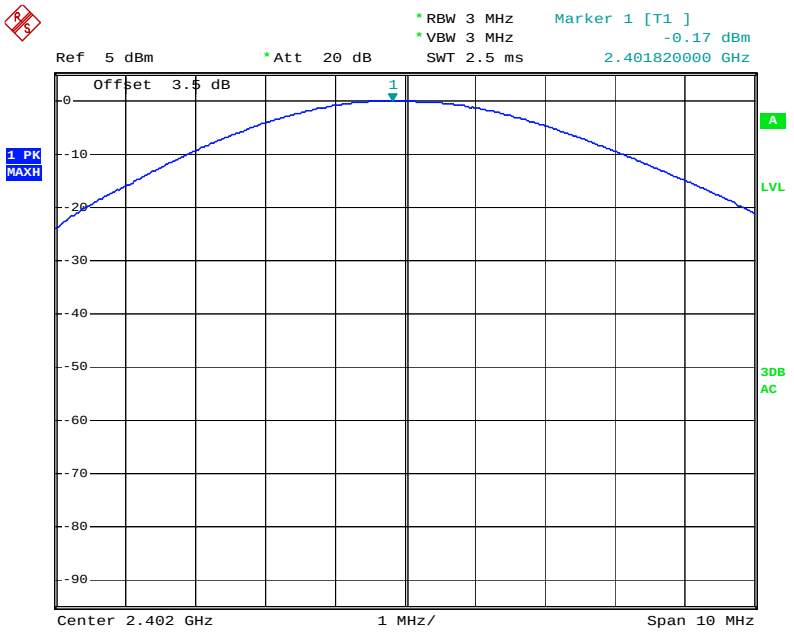

Date: 29.APR.2011 00:23:41

## π/4 DQPSK: High Chanel



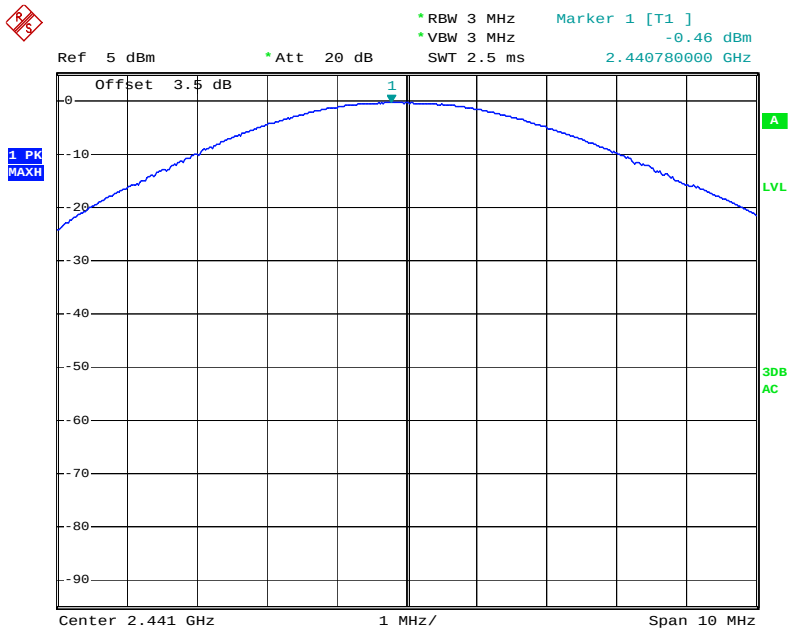

Date: 29.APR.2011 00:24:09

## 8-DQPSK: Low Channel



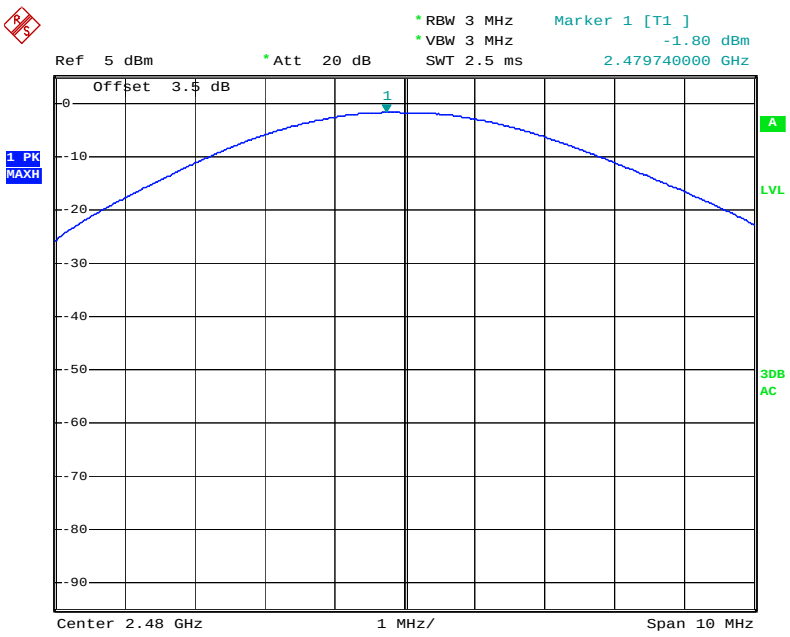

Date: 29.APR.2011 00:22:34

## 8-DQPSK: Middle Channel




Date: 29.APR.2011 00:23:10

## 8-DQPSK: High Chanel




Date: 29.APR.2011 00:24:44

# FCC §15.247(d) - BAND EDGES TESTING

## Applicable Standard

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

## Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

## Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver | ESCI | 100035 | 2010-11-11 | 2011-11-10 |

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Data

### Environmental Conditions

| | |
|---|---|
| **Temperature:** | 25 °C |
| **Relative Humidity:** | 56 % |
| **ATM Pressure:** | 100.9kPa |

**The testing was performed by Wayne Cheng on 2011-03-23 and 2011-04-29.*

**Test Result:** Compliance

Please refer to follow tables and plots:

*Test Mode: Transmitting*

GFSK:

| Frequency (MHz) | Delta Peak to Band Emission (dBc) | Limit (dBc) |
|---|---|---|
| 2399.984 | 48.36 | 20 |
| 2479.924 | 50.79 | 20 |

π/4 DQPSK:

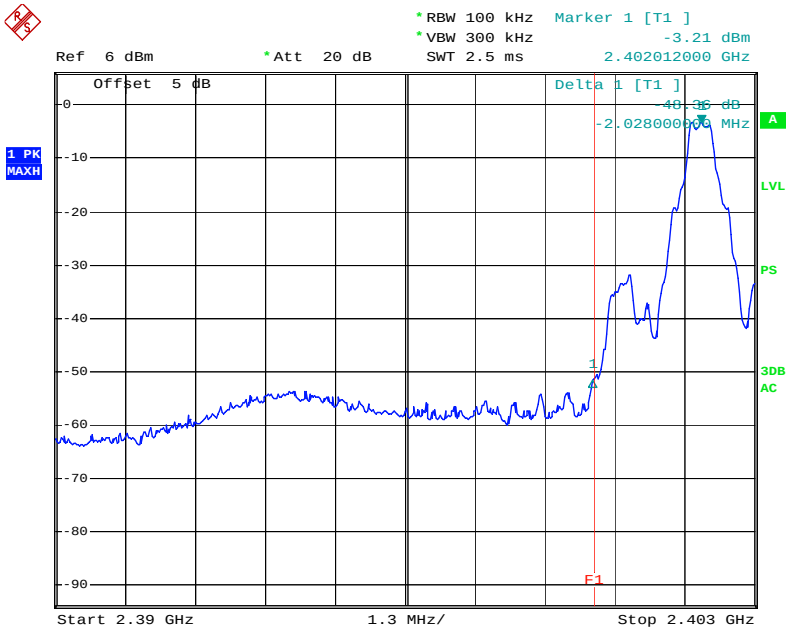
| Frequency (MHz) | Delta Peak to Band Emission (dBc) | Limit (dBc) |
|---|---|---|
| 2399.542 | 51.09 | 20 |
| 2483.788 | 53.32 | 20 |

8-DQPSK:

| Frequency (MHz) | Delta Peak to Band Emission (dBc) | Limit (dBc) |
|---|---|---|
| 2399.984 | 45.25 | 20 |
| 2483.788 | 53.81 | 20 |

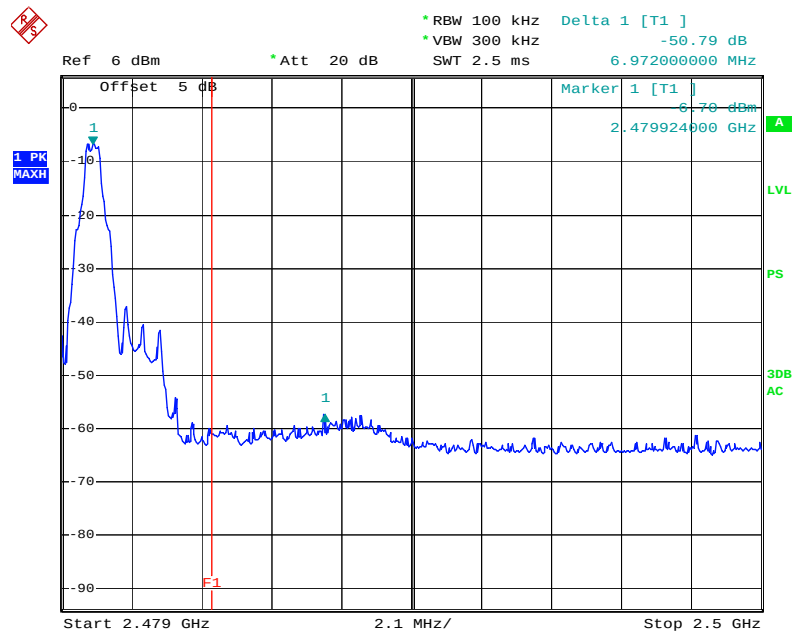
## GFSK

### Band Edge: Left Side




Date: 23.MAR.2011 21:24:06

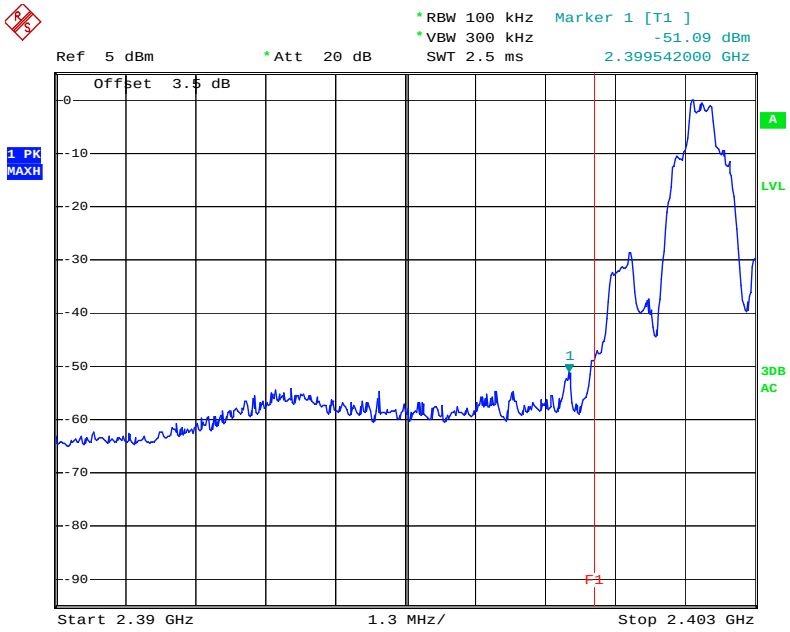
### Band Edge: Right Side




Date: 23.MAR.2011 21:25:23

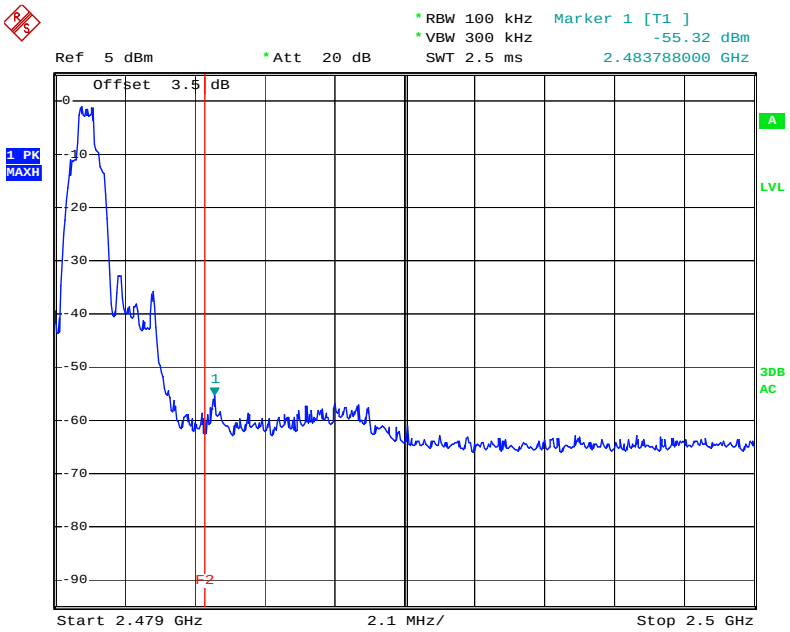
## π/4 DQPSK

### Band Edge: Left Side




Date: 29.APR.2011 00:15:32

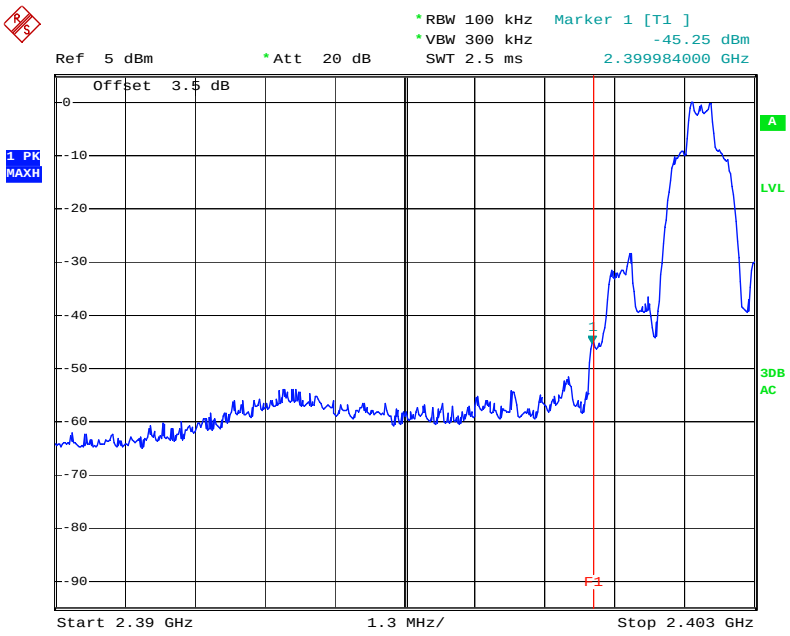
### Band Edge: Right Side




Date: 29.APR.2011 00:14:30

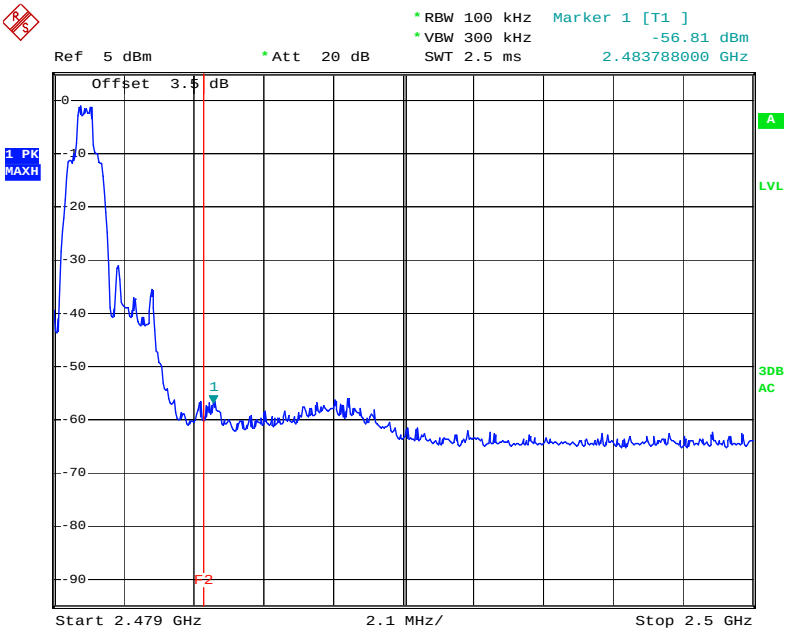
## 8-DQPSK

Band Edge: Left Side




Date: 29.APR.2011 00:16:18

Band Edge: Right Side




Date: 29.APR.2011 00:13:57

******* END OF REPORT *******