



FCC PART 15 SUBPART C  
IC RSS-210, ISSUE 8, DEC 2010

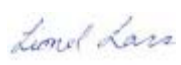
TEST AND MEASUREMENT REPORT

For

**Wi2Wi, Inc.**

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San Jose, CA 95131, USA

**FCC ID: U9R-W2CBW0015**  
**IC: 7089A-W2CBW0015**

|                                                                                                                                             |                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>Report Type:</b><br>Original Report                                                                                                      | <b>Product Type:</b><br>Wi-Fi and BT Combo Module |
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| <b>Report Number:</b> <u>R1206041-247</u>                                                                                                   |                                                   |
| <b>Report Date:</b> <u>2012-09-07</u>                                                                                                       |                                                   |
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**DOCUMENT REVISION HISTORY**

| Revision Number | Report Number | Description of Revision | Date of Revision |
|-----------------|---------------|-------------------------|------------------|
| 0               | R1206041-247  | Original Report         | 2012-09-07       |

## 1 General Description

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### 1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report was prepared on behalf of *Wi2Wi, Inc.* and their product, *model: W2CBW0015, FCC ID: U9R-W2CBW0015, IC: 7089A-W2CBW0015* or the “EUT” as referred to this report. The EUT is Bluetooth and 802.11b/g/n Wi-Fi combo module.

### 1.2 Mechanical Description of EUT

The EUT measures approximately 10 mm (L) x 10 mm (W) x 1 mm (H) and weighs approximately 0.5 g.

*The data gathered are from a typical production sample provided by the manufacturer with serial number: CGI-062292*

### 1.3 Objective

This report is prepared on behalf of *Wi2Wi, Inc.* in accordance with Part 2, Subpart J, and Part 15, Subparts B and C of the Federal Communication Commissions rules and IC RSS-210 Issue 8, Dec 2010.

The objective is to determine compliance with FCC Part 15.247 and IC RSS-210 rules for Output Power, Antenna Requirements, 6 dB Bandwidth, and power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Spurious Emissions, Conducted and Radiated Spurious Emissions.

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

N/A

### 1.5 Test Methodology

All measurements contained in this report were conducted in accordance 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.

### 1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the 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 CISPR16-4-2:2003, The Treatment of Uncertainty in EMC Measurements, the values ranging from  $\pm 2.0$  dB for Conducted Emissions tests and  $\pm 4.0$  dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

## 1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2003, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

<http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b>

## 2 System Test Configuration

### 2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2009.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

### 2.2 EUT Exercise Software

The software is provided by customer. The EUT exercise program used during radiated testing was designed to exercise the system components.

The EUT had been tested with the following data rate settings:

| Radio Mode   | Bandwidth (MHz) | Frequency/Data rate |                   |               |
|--------------|-----------------|---------------------|-------------------|---------------|
|              |                 | Low CH (MHz/Mbps)   | Mid CH (MHz/Mbps) | High CH (MHz) |
| 802.11b      | 20              | 2412/1              | 2437/1            | 2462/1        |
| 802.11g      | 20              | 2412/6              | 2437/6            | 2462/6        |
| 802.11n HT20 | 20              | 2412/MCS0           | 2437/ MCS0        | 2462/MCS0     |
| 802.11n HT40 | 40              | 2422/MCS0           | 2437/MCS0         | 2452/MCS0     |
| Bluetooth    | -               | 2402                | 2441              | 2480          |

### 2.3 Special Accessories

N/A

### 2.4 Equipment Modifications

No modifications were made to the EUT.

### 2.5 Local Support Equipment

| Manufacturer | Description | Model No. | Serial No.     |
|--------------|-------------|-----------|----------------|
| IBM          | Laptop      | X41       | LV-K5206 06/05 |

### 2.6 Power Supply and Line Filters

N/A

## 2.7 Interface Ports and Cabling

| Cable Description | Length (m) | From | To                |
|-------------------|------------|------|-------------------|
| RF Cable          | <1         | EUT  | Spectrum Analyzer |

## 2.8 Supporting Parts List and Details

| Manufacturers | Descriptions | Models | Serial Numbers |
|---------------|--------------|--------|----------------|
| Marvell       | Test Board   | 8787   | -              |

### 3 Summary of Test Results

#### WLAN:

| FCC & IC Rules                          | Description of Test                      | Results   |
|-----------------------------------------|------------------------------------------|-----------|
| FCC §15.247(i), §2.1091<br>IC RSS-102   | RF Exposure                              | Compliant |
| FCC §15.203<br>IC RSS-Gen §7.1.4        | Antenna Requirement                      | Compliant |
| FCC §15.207(a)<br>IC RSS-Gen §7.2.2     | Conducted Emissions                      | Compliant |
| FCC §15.209<br>IC RSS-210 §2.6          | Spurious Emissions at Antenna Port       | Compliant |
| FCC §15.205<br>IC RSS-210 §2.2          | Restricted Bands                         | Compliant |
| FCC §15.209, §15.247<br>IC RSS-210 §2.6 | Radiated Spurious Emissions              | Compliant |
| FCC §15.247(a)(2)<br>IC RSS-210 §A8.2   | 6 dB Bandwidth                           | Compliant |
| FCC §15.247(b)(3)<br>IC RSS-210 §A8.4   | Maximum Peak Output Power                | Compliant |
| FCC §15.247(d)<br>IC RSS-210 §A8.5      | 100 kHz Bandwidth of Frequency Band Edge | Compliant |
| FCC §15.247(e)<br>IC RSS-210 §A8.2(b)   | Power Spectral Density                   | Compliant |
| IC RSS-210 §2.6<br>& RSS-Gen §4.10      | Receiver Spurious Emission               | Compliant |

#### Bluetooth:

| FCC & IC Rules                                                              | Description of Test                           | Result    |
|-----------------------------------------------------------------------------|-----------------------------------------------|-----------|
| FCC §15.247 (i), §2.1091<br>IC RSS-102                                      | RF Exposure                                   | Compliant |
| FCC §15.203<br>IC RSS-Gen §7.1.4                                            | Antenna Requirements                          | Compliant |
| FCC §15.207 (a)<br>IC RSS-Gen §7.2.2                                        | AC Line Conducted Emissions                   | Compliant |
| FCC §15.247(d)<br>IC RSS-210 §A8.5                                          | Spurious Emissions at Antenna Port            | Compliant |
| FCC §15.205, §15.209, §15.247(d)<br>IC RSS-210 §2.2, §2.6,<br>RSS-210 §A8.5 | Restricted Bands, Spurious Radiated Emissions | Compliant |
| FCC §15.247 (a)(1)<br>IC RSS-210 §A8.1                                      | 20 dB Channel Bandwidth                       | Compliant |
| FCC §15.247(a)<br>IC RSS-210 §A8.1                                          | Maximum Peak Output Power                     | Compliant |
| FCC §15.247(d)<br>IC RSS-210 §A8.5                                          | Band Edge                                     | Compliant |
| IC RSS-Gen §6                                                               | Receiver Spurious Emission                    | Compliant |
| FCC §15.247 (a)(1)<br>IC RSS-210 §A8.1(b)                                   | Hopping Channel Separation                    | Compliant |
| FCC §15.247 (a)(1)<br>IC RSS-210 §A8.1(d)                                   | Dwell Time                                    | Compliant |
| FCC §15.247(b)(1)<br>IC RSS-210 §A8.1                                       | Number of Hopping Channels                    | Compliant |

## 4 FCC §15.247 (i), §2.1091 & IC RSS-102 - RF Exposure

### 4.1 Applicable Standard

According to FCC §15.247(i) and §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 General Population/Uncontrolled Exposure

| Frequency Range (MHz)                               | Electric Field Strength (V/m) | Magnetic Field Strength (A/m) | Power Density (mW/cm <sup>2</sup> ) | Averaging Time (minutes) |
|-----------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| Limits for General Population/Uncontrolled Exposure |                               |                               |                                     |                          |
| 0.3-1.34                                            | 614                           | 1.63                          | * (100)                             | 30                       |
| 1.34-30                                             | 824/f                         | 2.19/f                        | * (180/f <sup>2</sup> )             | 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

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF fields.

According to IC RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

| Frequency Range (MHz) | Electric Field (V/m rms) | Magnetic Field (A/m rms)                 | Power Density (W/m <sup>2</sup> ) | Time Averaging (min)      |
|-----------------------|--------------------------|------------------------------------------|-----------------------------------|---------------------------|
| 0.003 - 1             | 280                      | 2.19                                     | -                                 | 6                         |
| 1 - 10                | 280 / f                  | 2.19 / f                                 | -                                 | 6                         |
| 10 - 30               | 28                       | 2.19 / f                                 | -                                 | 6                         |
| 30 - 300              | 28                       | 0.073                                    | 2*                                | 6                         |
| 300 - 1 500           | 1.585 f <sup>0.5</sup>   | 0.0042 f <sup>0.5</sup>                  | f / 150                           | 6                         |
| 1 500 - 15 000        | 61.4                     | 0.163                                    | 10                                | 6                         |
| 15 000 - 150 000      | 61.4                     | 0.163                                    | 10                                | 616000 / f <sup>1.2</sup> |
| 150 000- 300 000      | 0.158 f <sup>0.5</sup>   | 4.21 x 10 <sup>-4</sup> f <sup>0.5</sup> | 6.67 x 10 <sup>-5</sup> f         | 616000 / f <sup>1.2</sup> |

**Note:** f is frequency in MHz

\* = Power density limit is applicable at frequencies greater than 100 MHz

## 4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

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

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

## 4.3 MPE Results

### WLAN:

|                                                                                         |               |
|-----------------------------------------------------------------------------------------|---------------|
| <u>Maximum peak output power at antenna input terminal (dBm):</u>                       | <u>15.89</u>  |
| <u>Maximum peak output power at antenna input terminal (mW):</u>                        | <u>38.815</u> |
| <u>Prediction distance (cm):</u>                                                        | <u>20</u>     |
| <u>Prediction frequency (MHz):</u>                                                      | <u>2437</u>   |
| <u>Maximum Antenna Gain, typical (dBi):</u>                                             | <u>3.1</u>    |
| <u>Maximum Antenna Gain (numeric):</u>                                                  | <u>2.042</u>  |
| <u>Power density of prediction frequency at 20.0 cm (mW/cm<sup>2</sup>):</u>            | <u>0.0158</u> |
| <u>Power density of prediction frequency at 20.0 cm (W/m<sup>2</sup>):</u>              | <u>0.158</u>  |
| <u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u> | <u>1.0</u>    |
| <u>MPE limit for uncontrolled exposure at prediction frequency (W/m<sup>2</sup>):</u>   | <u>10</u>     |

### Bluetooth:

|                                                                                         |                |
|-----------------------------------------------------------------------------------------|----------------|
| <u>Maximum peak output power at antenna input terminal (dBm):</u>                       | <u>10.10</u>   |
| <u>Maximum peak output power at antenna input terminal (mW):</u>                        | <u>10.23</u>   |
| <u>Prediction distance (cm):</u>                                                        | <u>20</u>      |
| <u>Prediction frequency (MHz):</u>                                                      | <u>2441</u>    |
| <u>Maximum Antenna Gain, typical (dBi):</u>                                             | <u>3.1</u>     |
| <u>Maximum Antenna Gain (numeric):</u>                                                  | <u>2.042</u>   |
| <u>Power density of prediction frequency at 20.0 cm (mW/cm<sup>2</sup>):</u>            | <u>0.00416</u> |
| <u>Power density of prediction frequency at 20.0 cm (W/m<sup>2</sup>):</u>              | <u>0.0416</u>  |
| <u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u> | <u>1.0</u>     |
| <u>MPE limit for uncontrolled exposure at prediction frequency (W/m<sup>2</sup>):</u>   | <u>10</u>      |

The device is compliant with the requirement MPE limit for uncontrolled exposure.

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## 5 FCC §15.203 & IC RSS-Gen §7.1.4 – Antenna Description

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### 5.1 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 use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to IC RSS-Gen §7.1.4: Transmitter Antenna, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

### 5.2 Antenna Connector Construction

The EUT has one chip antenna with 3.1 dBi max antenna gain and will be soldered onto the PCB. This is in accordance to sections FCC Part 15.203 and IC RSS-Gen §7.1.4, is considered sufficient to comply with the provisions of these sections. Please refer to the EUT photos.

## 6 FCC §15.207 & IC RSS-Gen §7.2.2 - Conducted Emissions

### 6.1 Applicable Standards

As per FCC §15.207 and IC RSS-Gen §7.2.2 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

| Frequency of Emission<br>(MHz) | Conducted Limit (dBuV)     |                            |
|--------------------------------|----------------------------|----------------------------|
|                                | Quasi-peak                 | Average                    |
| 0.15-0.5                       | 66 to 56 <sup>Note 1</sup> | 56 to 46 <sup>Note 1</sup> |
| 0.5-5                          | 56                         | 46                         |
| 5-30                           | 60                         | 50                         |

*Note 1: Decreases with the logarithm of the frequency.*

### 6.2 Test Setup

The measurement was performed in a shielded room. The test setup and measurement procedure was per ANSI C63.4-2009. The specification limits were in accordance with FCC §15.207 and IC RSS-Gen §7.2.2.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The AC/DC power adapter of the EUT was connected with LISN-1 which provided 120 V / 60 Hz AC power.

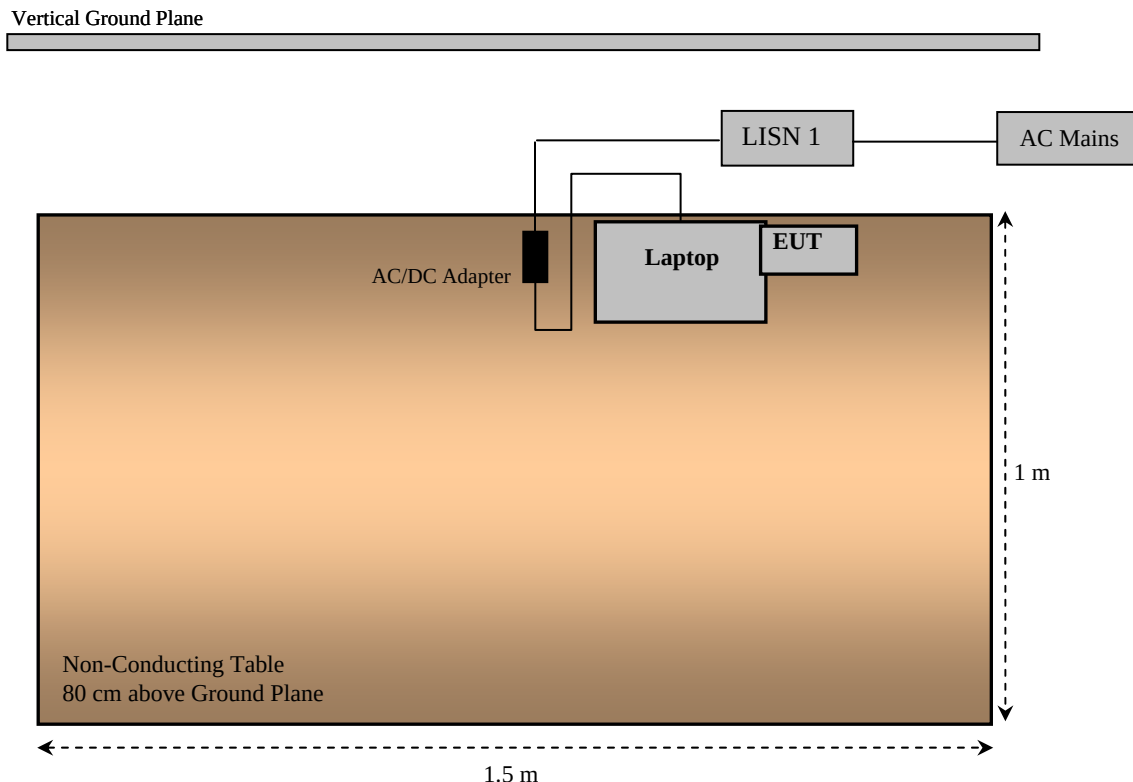
### 6.3 Test Procedure

During the conducted emissions test, the power cord of the EUT host system was connected to the mains outlet of the LISN-1.

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

All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a "QP." Average readings are distinguished with an "Ave".

## 6.4 Test Setup Block Diagram



## 6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Cable Loss (CL) plus the High Pass Filter/Attenuator value (HA) and subtracting the Amplifier Gain (Ga) to the indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + CL + HA - Ga$$

For example, a corrected amplitude (CA) of 36 dBuV = Indicated Amplitude reading (Ai) of 50.0 dBuV + Cable Loss (CL) 1.0 dB + High Pass Filter/Attenuator (IA) 5 dB - Amplifier Gain (Ga) 20 dB

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

$$\text{Margin (dB)} = \text{Corrected Amplitude (dBuV)} - \text{Limit (dBuV)}$$

## 6.6 Test Equipment List and Details

| Manufacturer      | Description       | Model No.             | Serial No. | Calibration Date | Calibration Interval |
|-------------------|-------------------|-----------------------|------------|------------------|----------------------|
| Rohde & Schwarz   | EMI Test Receiver | ESCI<br>1166.5950K03  | 100044     | 2012-04-30       | 1 year               |
| Solar Electronics | LISN              | 9252-R-24-BNC         | 511205     | 2012-06-30       | 1 year               |
| TTE               | High Pass Filter  | H985-150K-50-<br>720N | M1149      | 2012-05-30       | 1 year               |

**Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

## 6.7 Test Environmental Conditions

### WLAN and BT:

|                    |          |
|--------------------|----------|
| Temperature:       | 21 °C    |
| Relative Humidity: | 56%      |
| ATM Pressure:      | 101.6kPa |

The testing was performed by Lionel Lara on 2012-07-24 at 5meter chamber3.

## 6.8 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC standard's conducted emissions limits, with a worst case margin of:

Transmitter Mode

### WLAN:

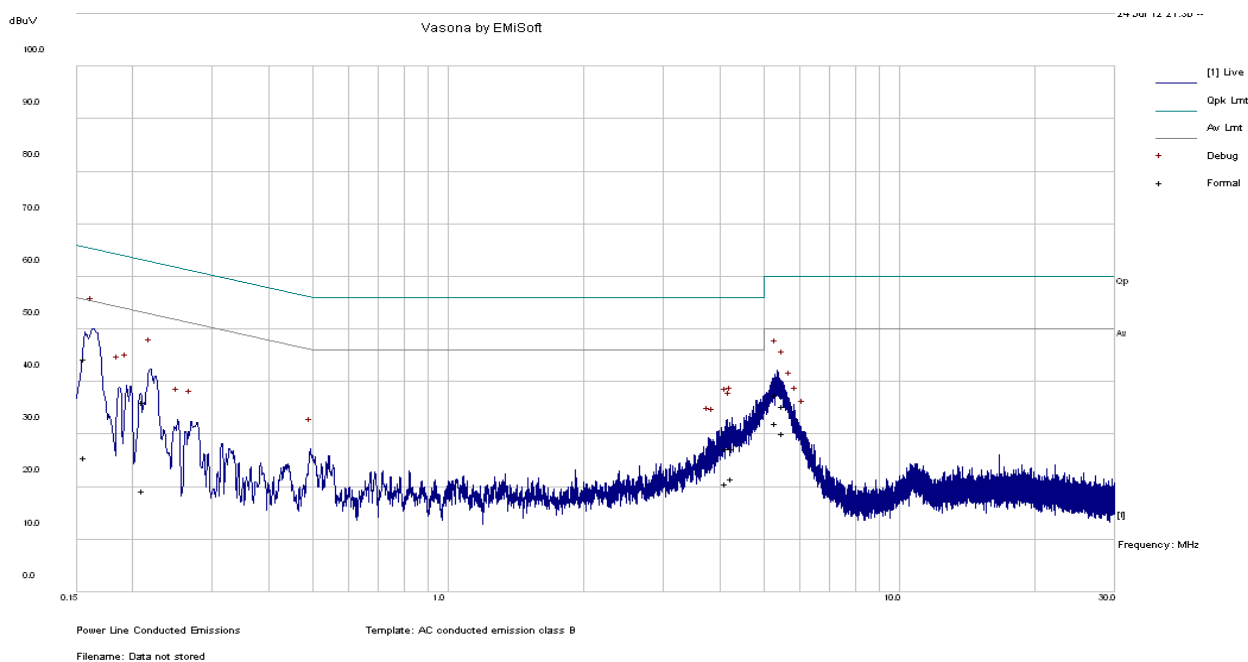
| Connection: AC/DC adapter of Laptop connected to 120 V/60 Hz, AC |                 |                          |             |
|------------------------------------------------------------------|-----------------|--------------------------|-------------|
| Margin (dB)                                                      | Frequency (MHz) | Conductor (Line/Neutral) | Range (MHz) |
| -16.77                                                           | 0.164211        | Neutral                  | 0.15 to 30  |

### BT:

| Connection: AC/DC adapter of Laptop connected to 120 V/60 Hz, AC |                 |                          |             |
|------------------------------------------------------------------|-----------------|--------------------------|-------------|
| Margin (dB)                                                      | Frequency (MHz) | Conductor (Line/Neutral) | Range (MHz) |
| -12.37                                                           | 5.366681        | Neutral                  | 0.15 to 30  |

## 6.9 Conducted Emissions Test Plots and Data

### WLAN: 802.11b, Middle Channel – Line

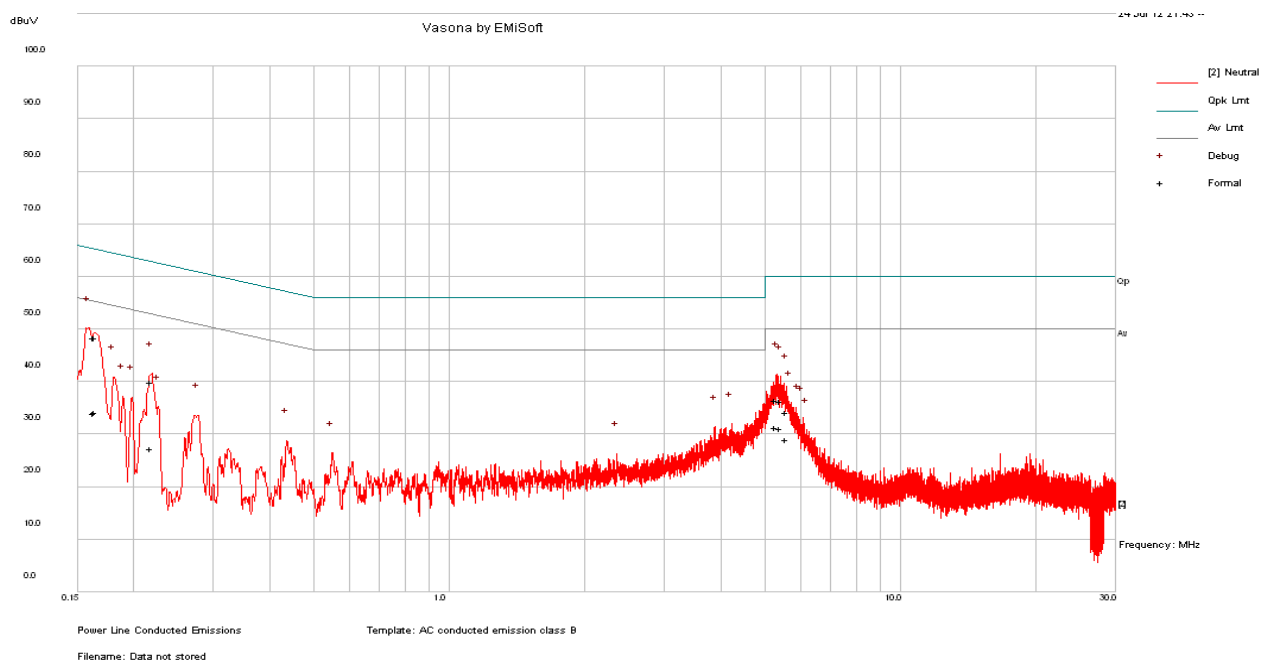


### Quasi-Peak Measurements

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) |
|-----------------|----------------------------|--------------------------|--------------|-------------|
| 0.157158        | 44.29                      | Line                     | 65.61        | -21.32      |
| 5.343392        | 37.38                      | Line                     | 60           | -22.62      |
| 5.540558        | 35.43                      | Line                     | 60           | -24.57      |
| 0.211302        | 36.16                      | Line                     | 63.15        | -26.99      |
| 4.140161        | 27.34                      | Line                     | 56           | -28.66      |
| 4.262717        | 27.31                      | Line                     | 56           | -28.69      |

### Average Measurements

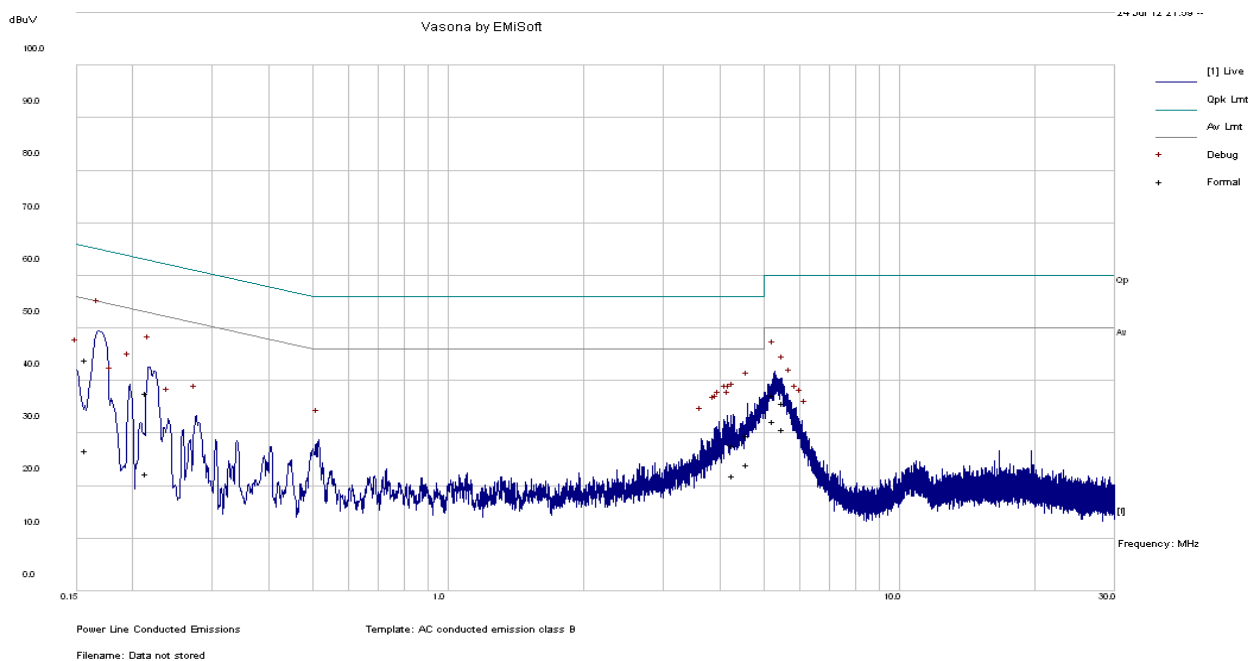
| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) |
|-----------------|----------------------------|--------------------------|--------------|-------------|
| 5.343392        | 32.12                      | Line                     | 50           | -17.88      |
| 5.540558        | 30.25                      | Line                     | 50           | -19.75      |
| 4.262717        | 21.49                      | Line                     | 46           | -24.51      |
| 4.140161        | 20.56                      | Line                     | 46           | -25.44      |
| 0.157158        | 25.49                      | Line                     | 55.61        | -30.12      |
| 0.211302        | 19.17                      | Line                     | 53.15        | -33.99      |

**WLAN: 802.11b, Middle Channel – Neutral****Quasi-Peak Measurements**

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) |
|-----------------|----------------------------|--------------------------|--------------|-------------|
| 0.164211        | 48.48                      | Neutral                  | 65.25        | -16.77      |
| 0.163743        | 48.36                      | Neutral                  | 65.27        | -16.91      |
| 0.218286        | 39.87                      | Neutral                  | 62.88        | -23.01      |
| 5.312672        | 36.45                      | Neutral                  | 60           | -23.55      |
| 5.43143         | 36.27                      | Neutral                  | 60           | -23.73      |
| 5.58713         | 34.18                      | Neutral                  | 60           | -25.82      |

**Average Measurements**

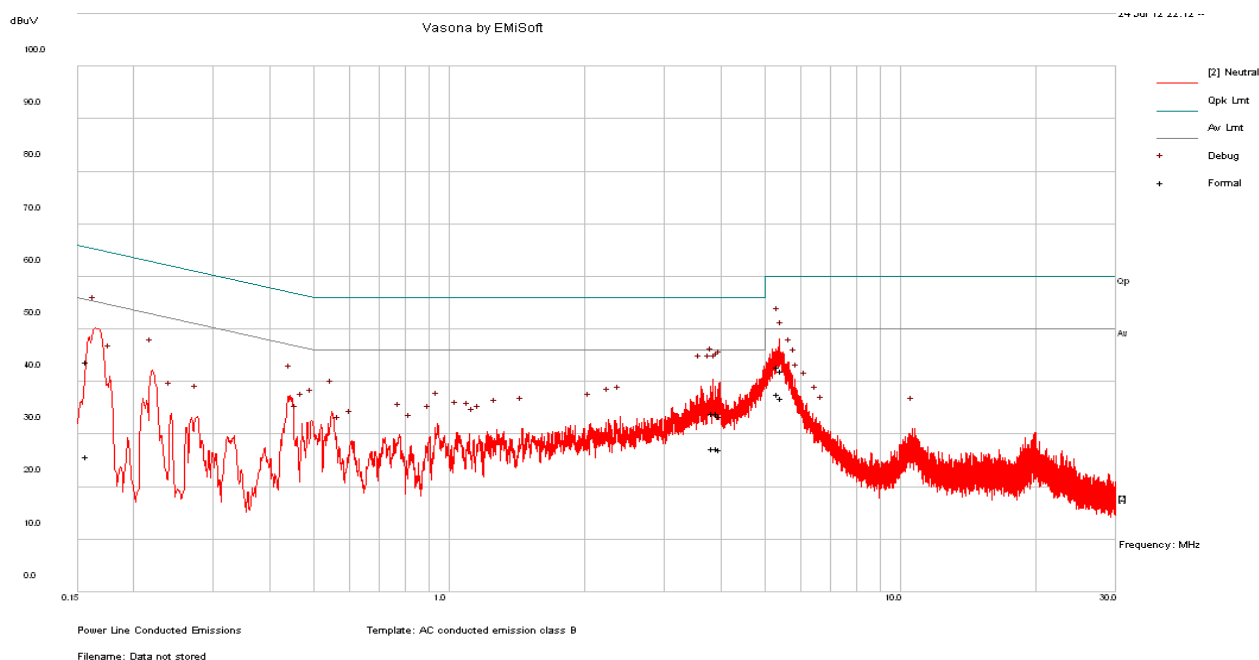
| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) |
|-----------------|----------------------------|--------------------------|--------------|-------------|
| 5.312672        | 31.36                      | Neutral                  | 50           | -18.64      |
| 5.43143         | 31.2                       | Neutral                  | 50           | -18.80      |
| 5.58713         | 29.1                       | Neutral                  | 50           | -20.90      |
| 0.164211        | 34.19                      | Neutral                  | 55.25        | -21.06      |
| 0.163743        | 34.04                      | Neutral                  | 55.27        | -21.23      |
| 0.218286        | 27.35                      | Neutral                  | 52.88        | -25.54      |

**BT: GFSK, Middle Channel – Line****Quasi-Peak Measurements**

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) |
|-----------------|----------------------------|--------------------------|--------------|-------------|
| 0.157629        | 43.92                      | Line                     | 65.59        | -21.67      |
| 5.278652        | 37.35                      | Line                     | 60           | -22.65      |
| 5.531429        | 35.8                       | Line                     | 60           | -24.20      |
| 0.214854        | 37.58                      | Line                     | 63.02        | -25.43      |
| 4.599374        | 29.55                      | Line                     | 56           | -26.45      |
| 4.299119        | 27.62                      | Line                     | 56           | -28.38      |

**Average Measurements**

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) |
|-----------------|----------------------------|--------------------------|--------------|-------------|
| 5.278652        | 32.21                      | Line                     | 50           | -17.79      |
| 5.531429        | 30.7                       | Line                     | 50           | -19.30      |
| 4.599374        | 24.07                      | Line                     | 46           | -21.93      |
| 4.299119        | 21.92                      | Line                     | 46           | -24.08      |
| 0.157629        | 26.68                      | Line                     | 55.59        | -28.91      |
| 0.214854        | 22.37                      | Line                     | 53.02        | -30.64      |

**BT: GFSK, Middle Channel – Neutral****Quasi-Peak Measurements**

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) |
|-----------------|----------------------------|--------------------------|--------------|-------------|
| 5.366681        | 42.8                       | Neutral                  | 60           | -17.20      |
| 5.467028        | 42                         | Neutral                  | 60           | -18.00      |
| 0.157929        | 43.7                       | Neutral                  | 65.57        | -21.88      |
| 3.94076         | 34.09                      | Neutral                  | 56           | -21.91      |
| 3.835685        | 34.03                      | Neutral                  | 56           | -21.97      |
| 3.990794        | 33.39                      | Neutral                  | 56           | -22.61      |

**Average Measurements**

| Frequency (MHz) | Corrected Amplitude (dBuV) | Conductor (Line/Neutral) | Limit (dBuV) | Margin (dB) |
|-----------------|----------------------------|--------------------------|--------------|-------------|
| 5.366681        | 37.63                      | Neutral                  | 50           | -12.37      |
| 5.467028        | 36.89                      | Neutral                  | 50           | -13.11      |
| 3.94076         | 27.22                      | Neutral                  | 46           | -18.78      |
| 3.835685        | 27.21                      | Neutral                  | 46           | -18.79      |
| 3.990794        | 27.04                      | Neutral                  | 46           | -18.96      |
| 0.157929        | 25.75                      | Neutral                  | 55.57        | -29.82      |

## 7 FCC §15.247(d) & IC RSS-210 §A8.5 - Spurious Emissions at Antenna Terminals

### 7.1 Applicable Standard

For FCC §15.247(d) and IC RSS-210 §A8.5 in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

### 7.2 Measurement Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

### 7.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4440A    | MY44303352 | 2012-05-10       | 1 year               |

**Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed per the A2IA requirements, traceable to the NIST.

### 7.4 Test Environmental Conditions

#### WLAN:

|                    |          |
|--------------------|----------|
| Temperature:       | 21.1 °C  |
| Relative Humidity: | 56%      |
| ATM Pressure:      | 101.2kPa |

*The testing was performed by Lionel Lara on 2012-06-15 at RF Test Site.*

#### Bluetooth:

|                    |          |
|--------------------|----------|
| Temperature:       | 22 °C    |
| Relative Humidity: | 57 %     |
| ATM Pressure:      | 101.1kPa |

*The testing was performed by Lionel Lara on 2012-06-18 at RF test site.*

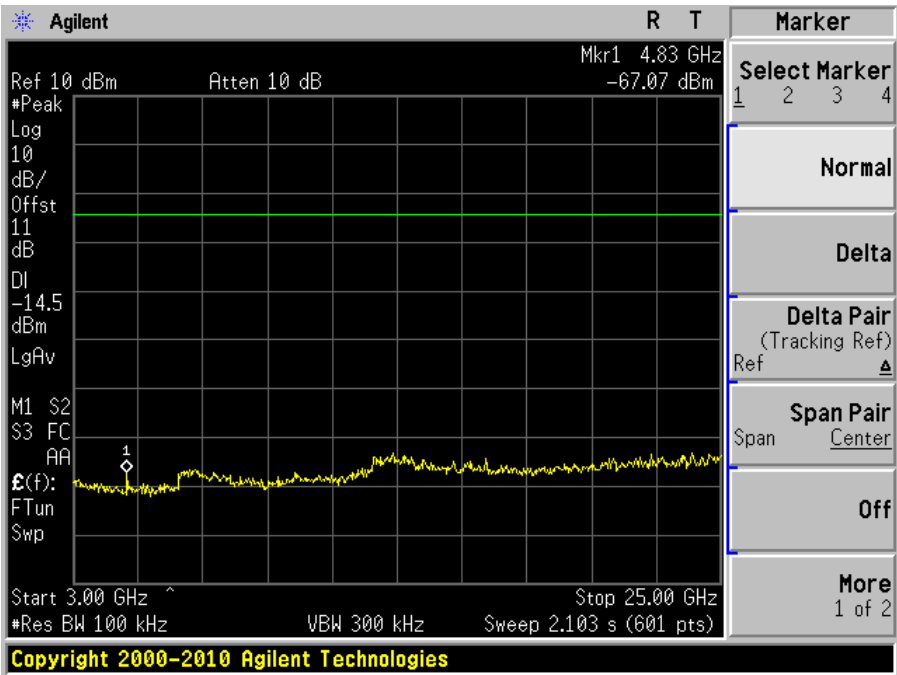
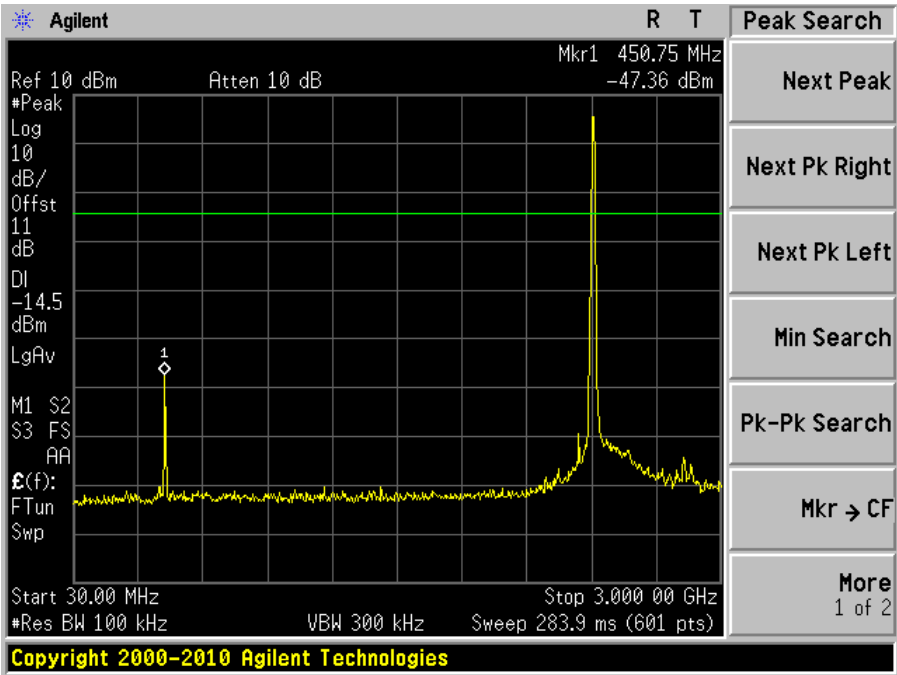
7.5 Test Results

Please refer to following plots.

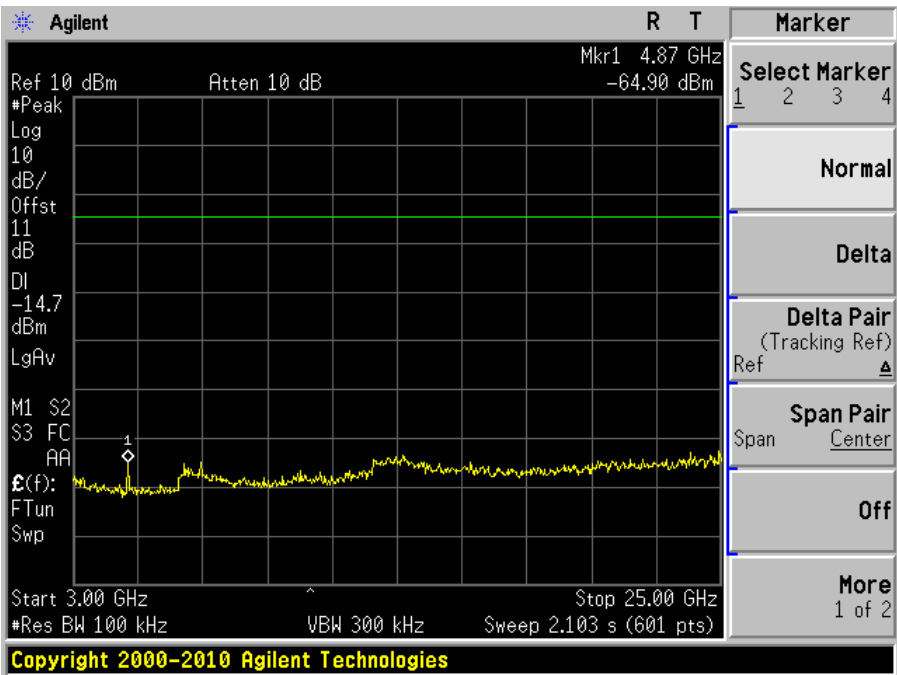
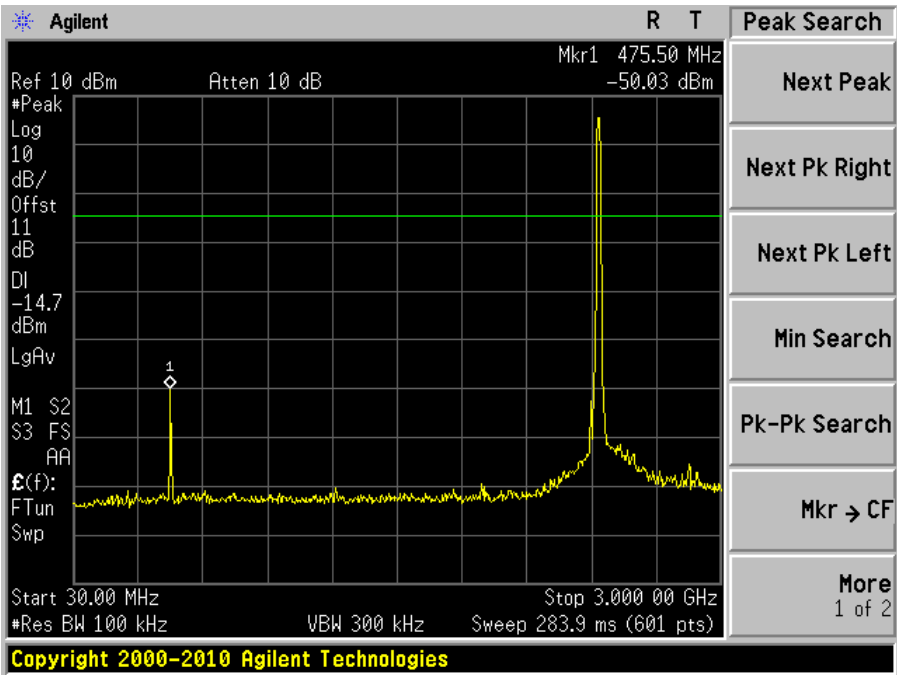
WLAN

802.11b

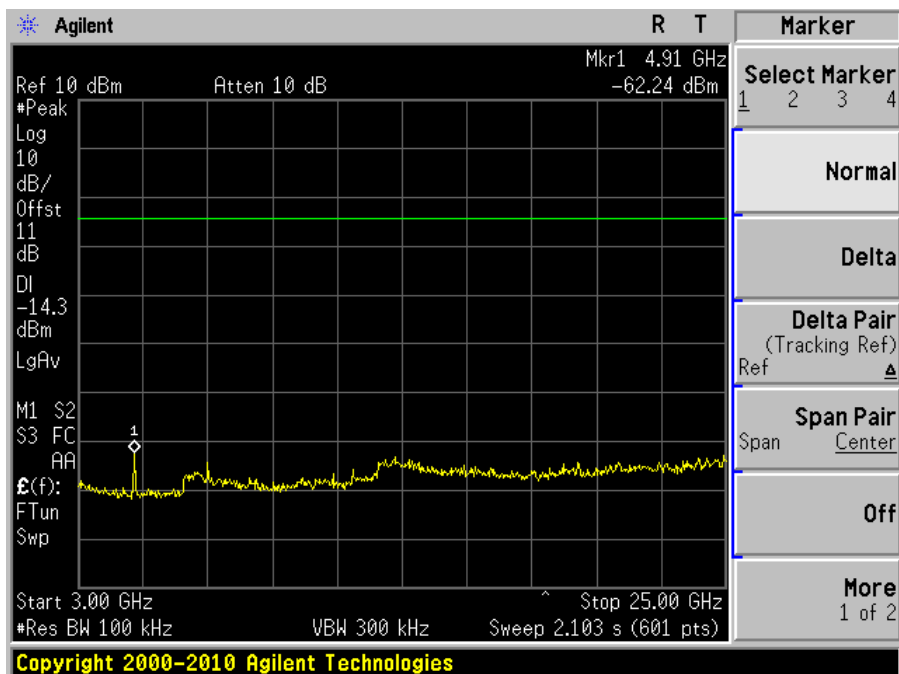
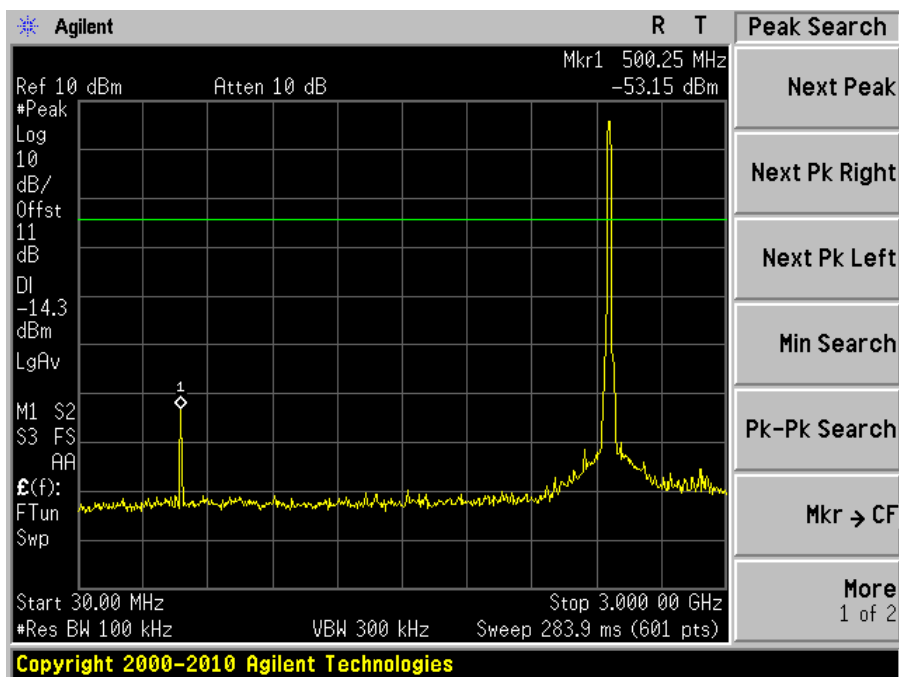
Low Channel 2412 MHz



Middle Channel 2437 MHz

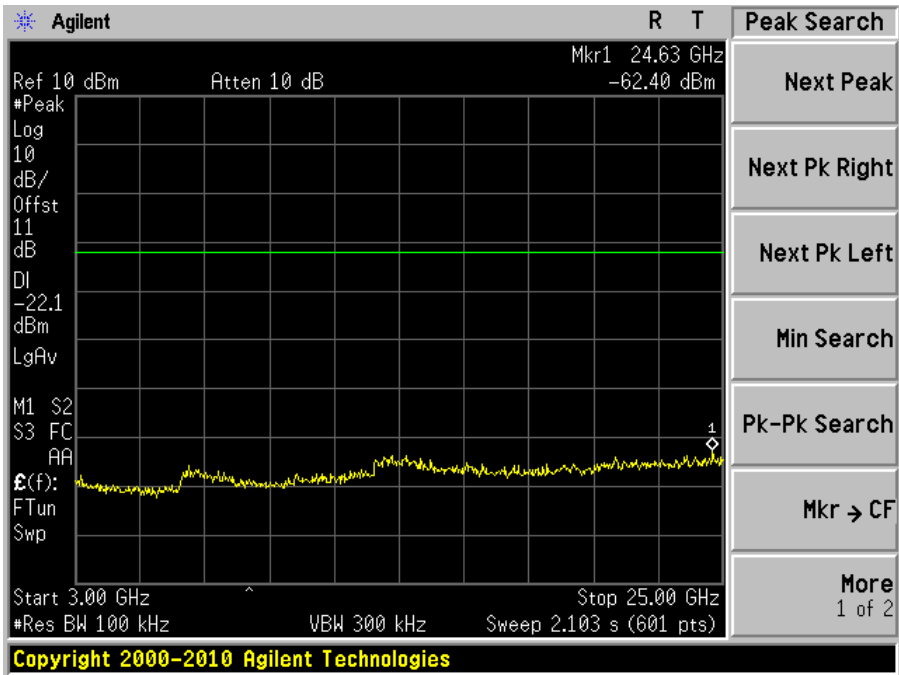
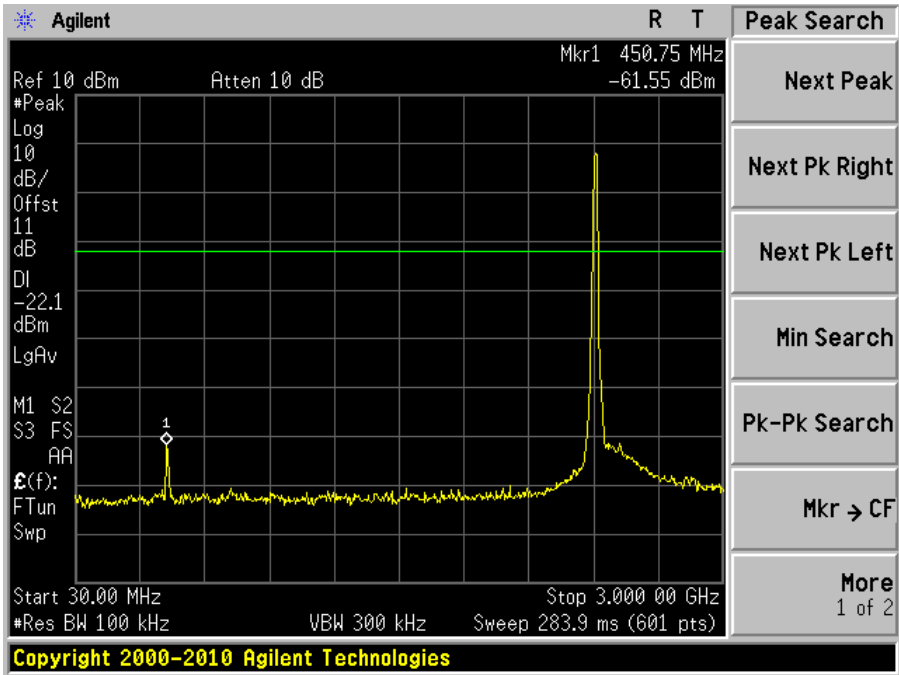


## High Channel 2462 MHz

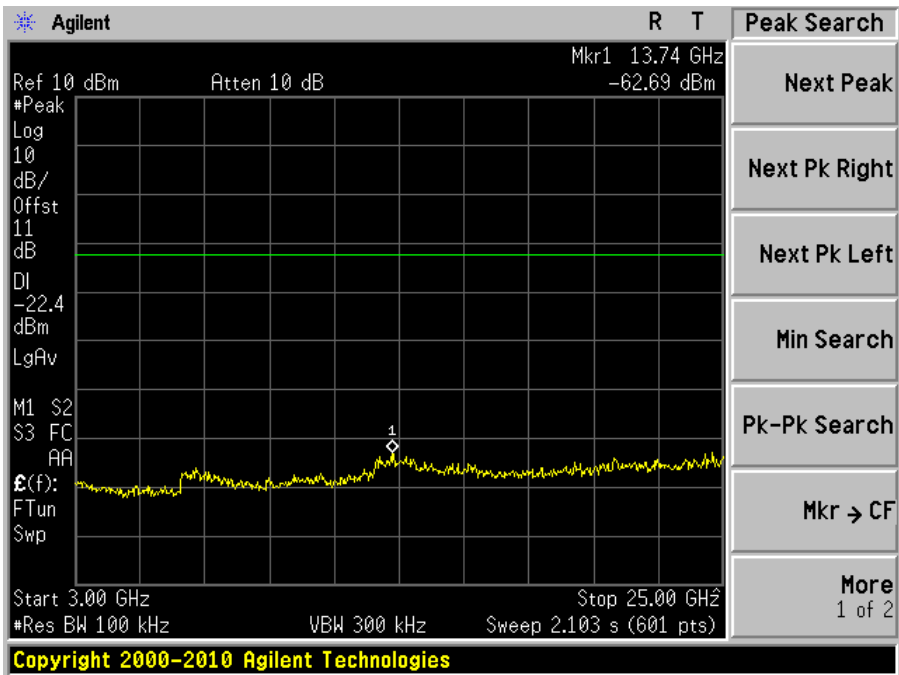
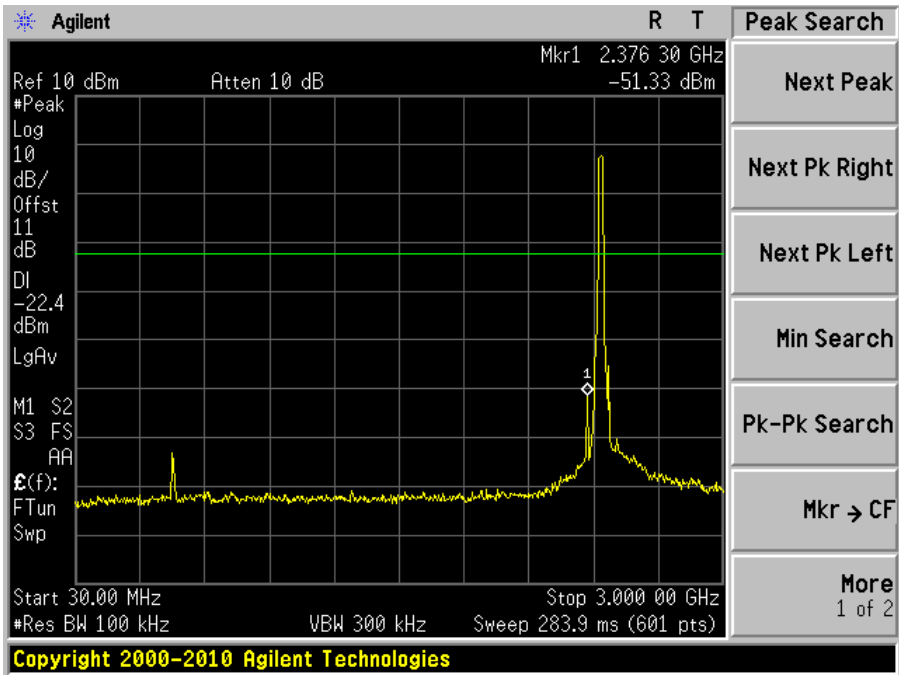


802.11g

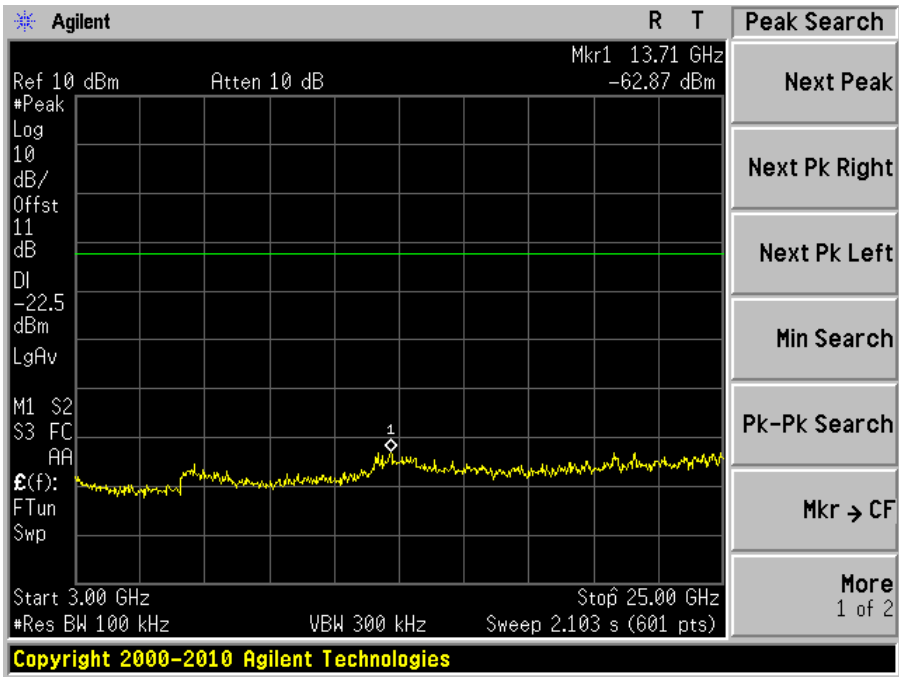
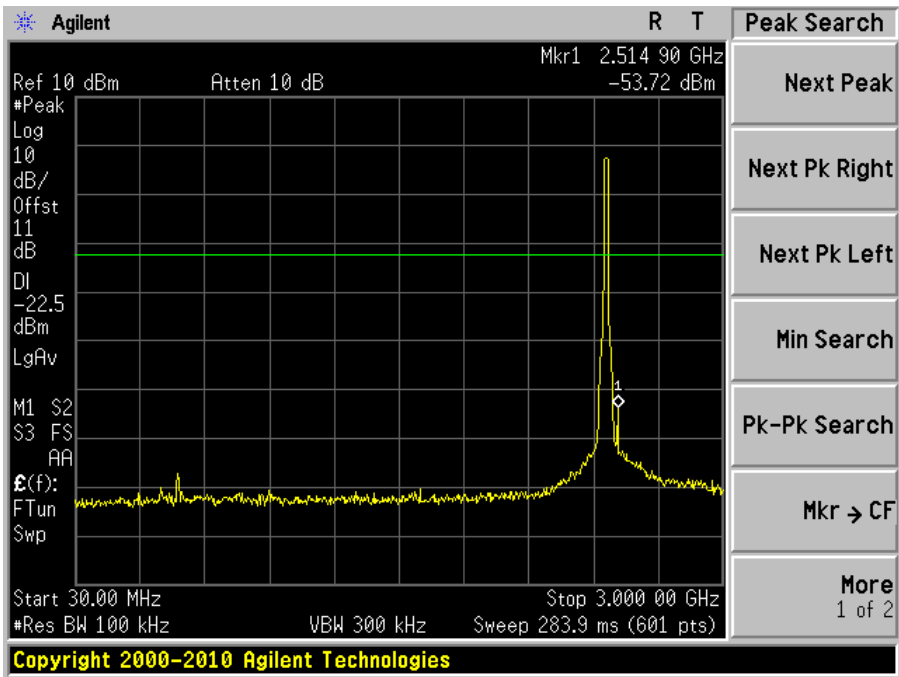
Low Channel 2412 MHz



Middle Channel 2437 MHz

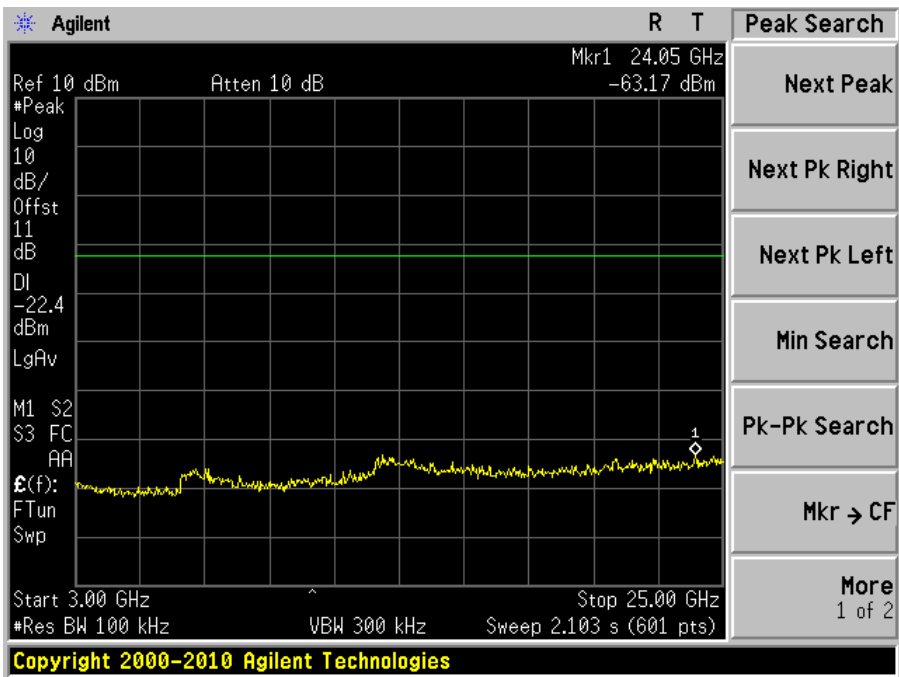
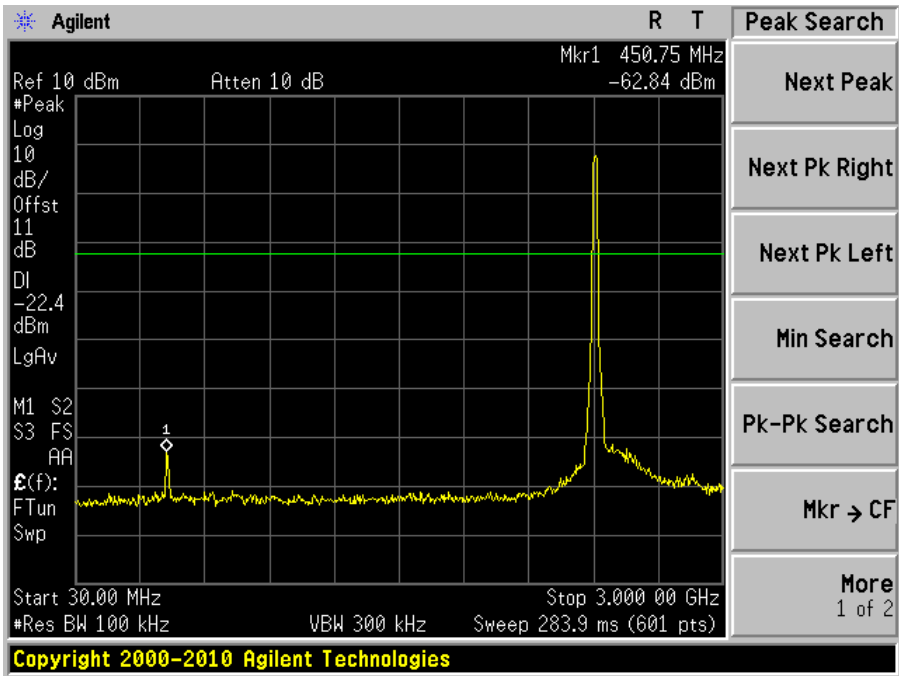


High Channel 2462 MHz

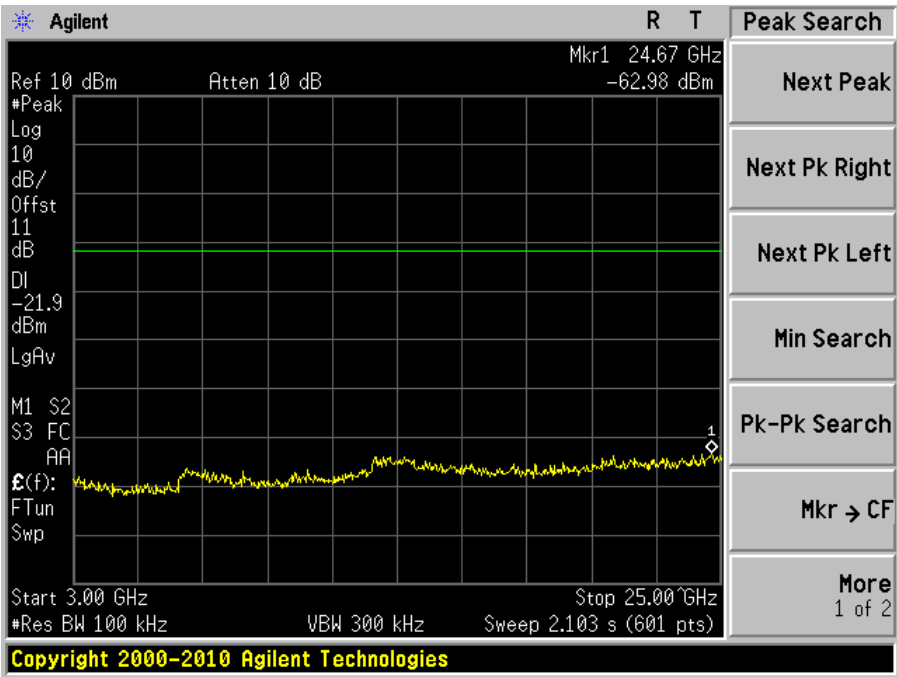
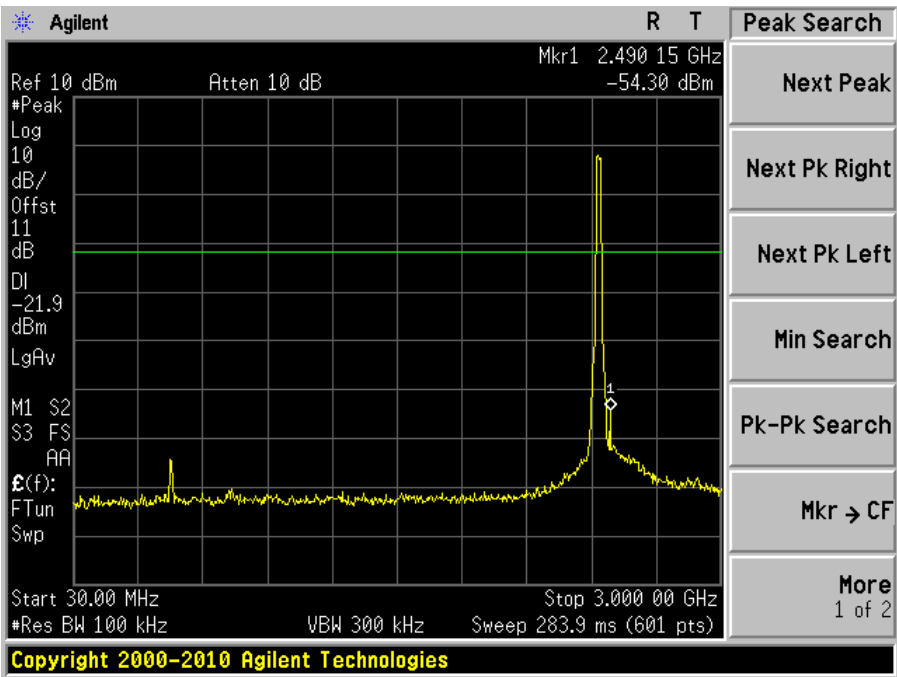


802.11n HT20

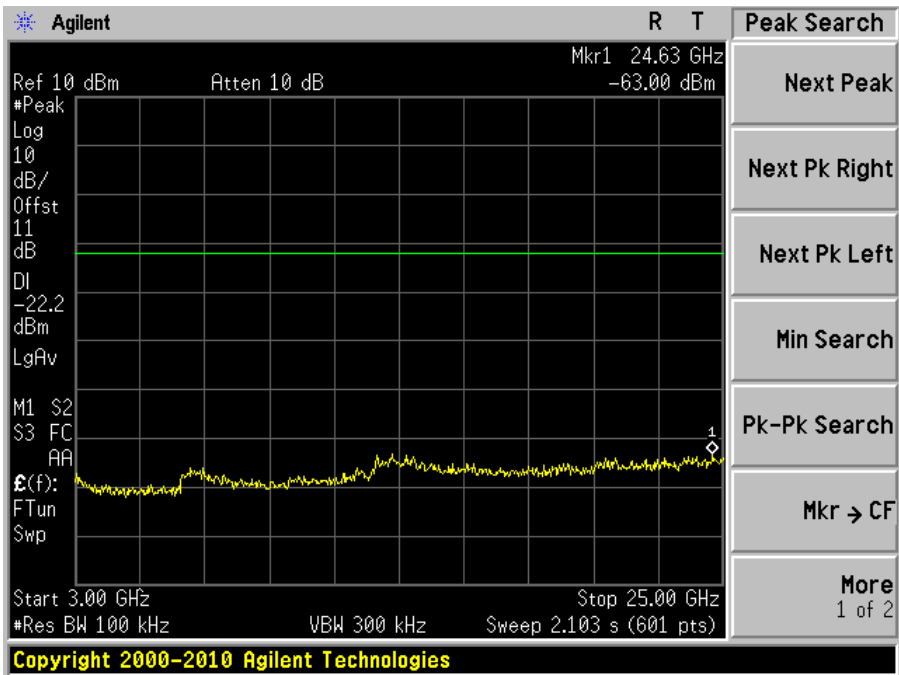
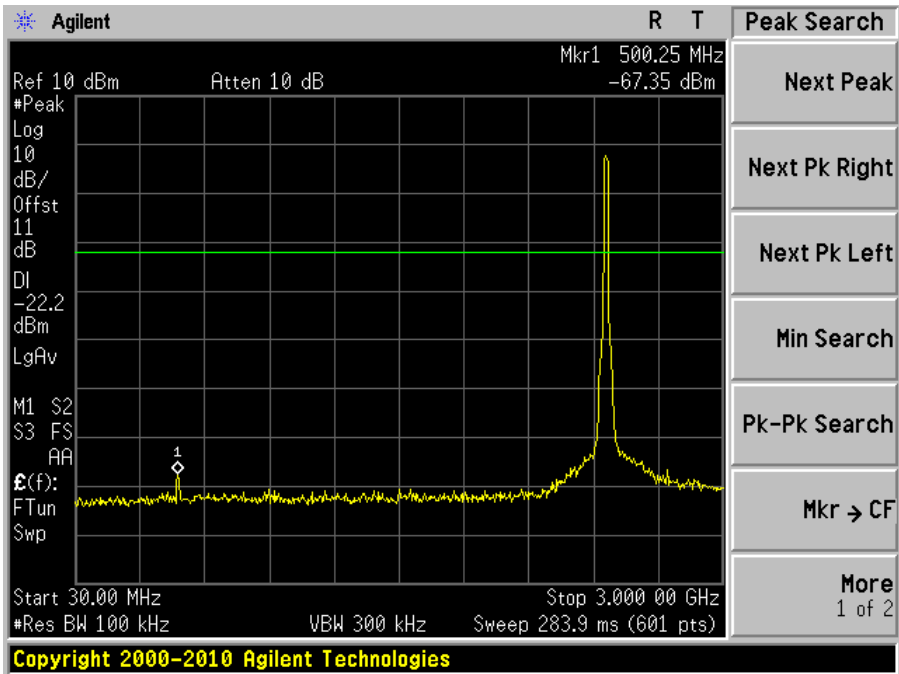
Low Channel 2412 MHz



Middle Channel 2437 MHz

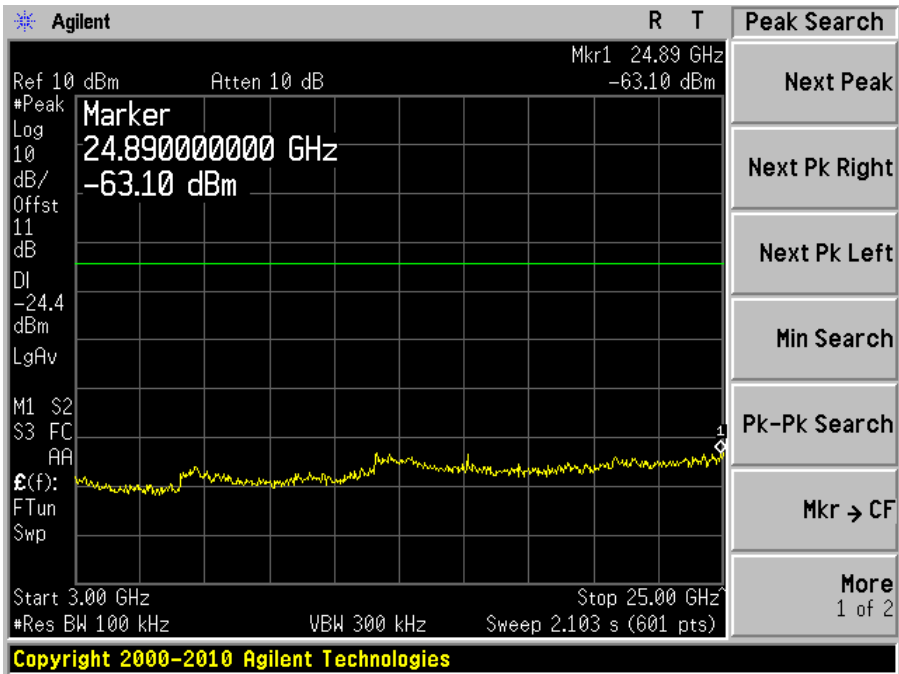
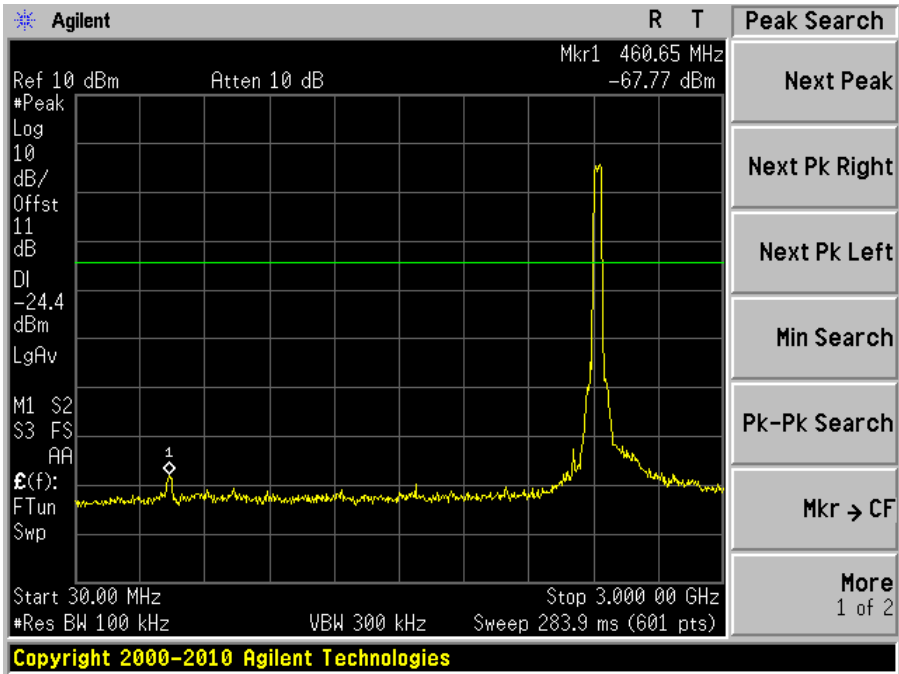


High Channel 2462 MHz

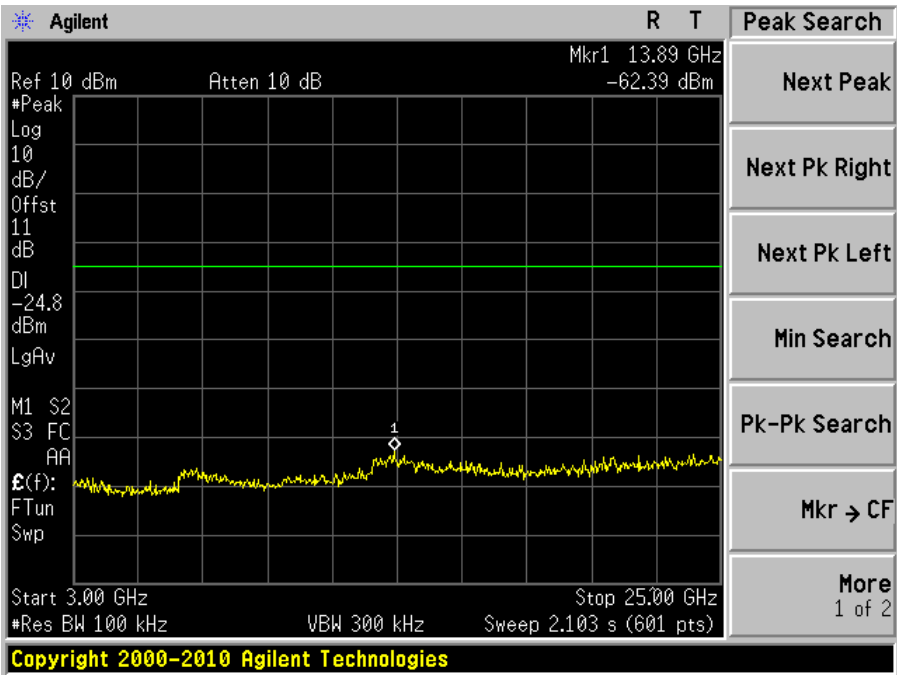
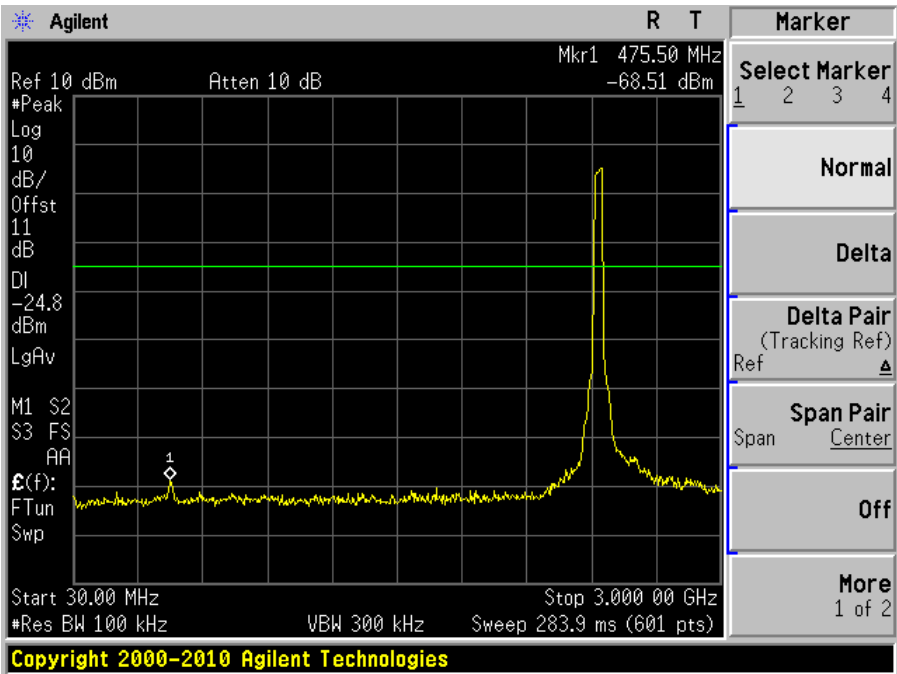


802.11n HT40

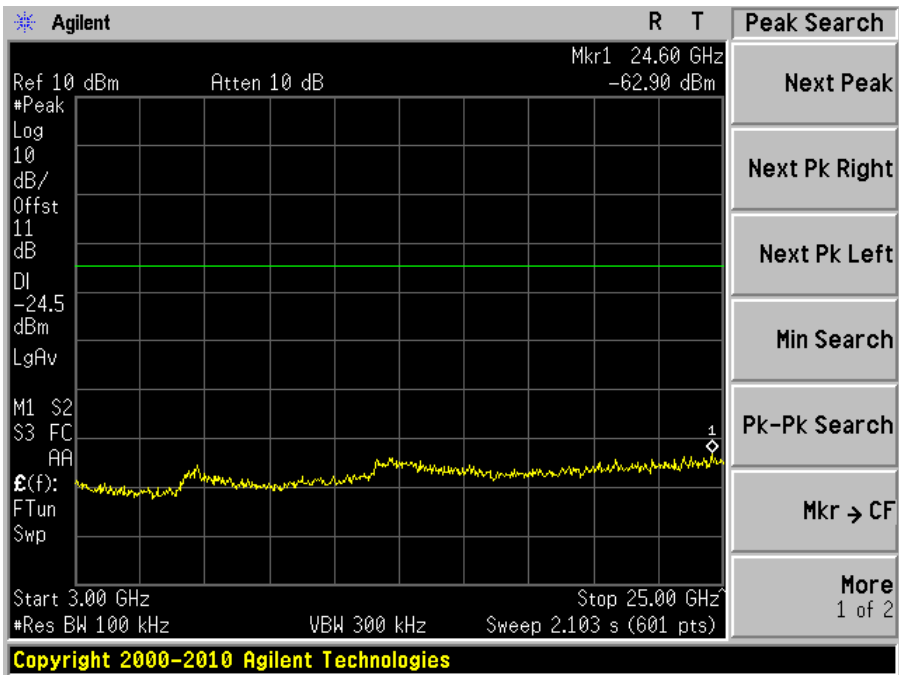
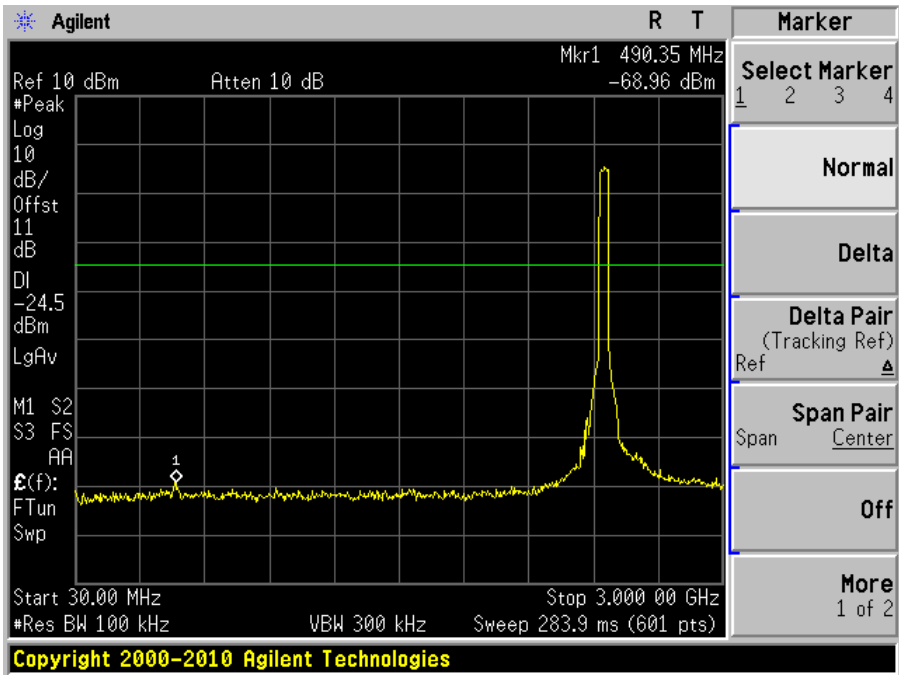
Low Channel 2422 MHz



Middle Channel 2437 MHz

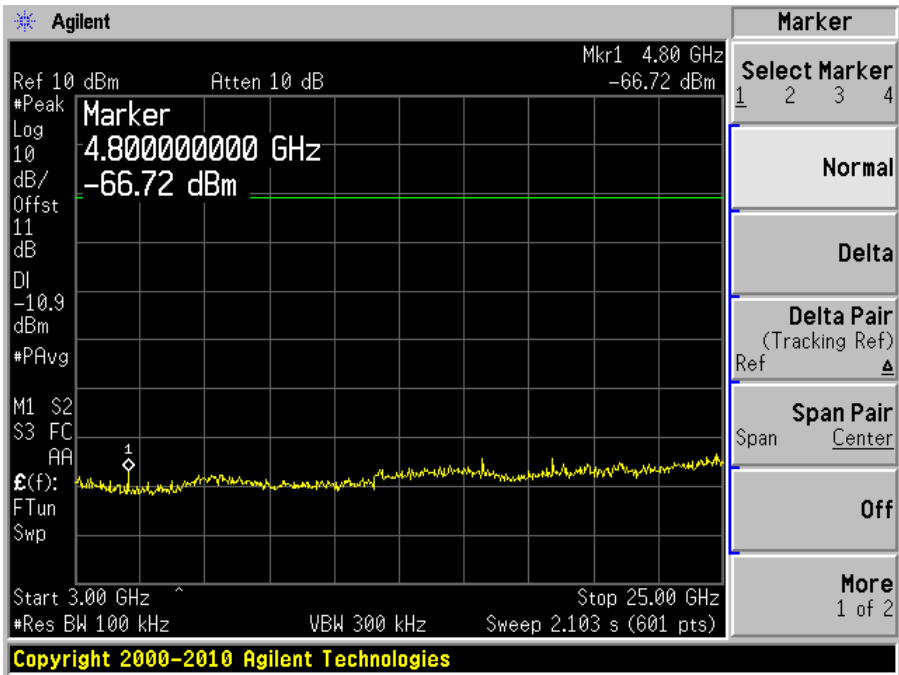
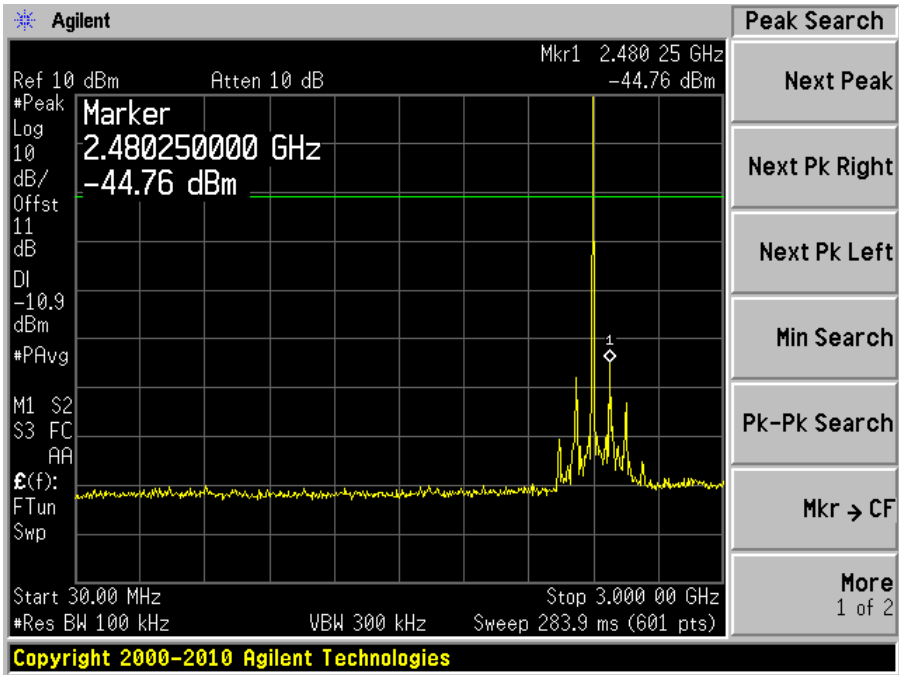


High Channel 2452 MHz

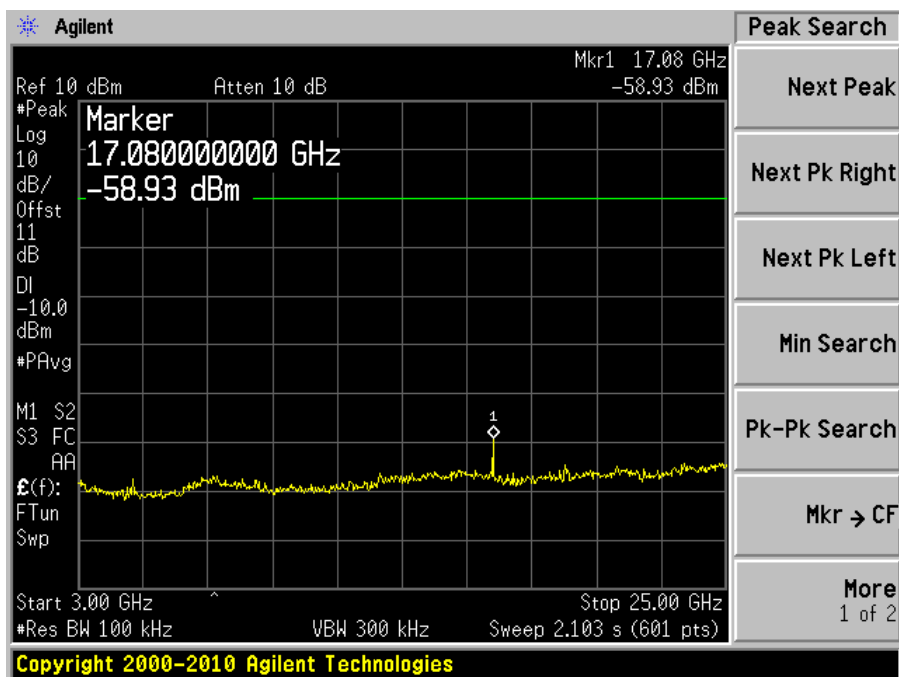
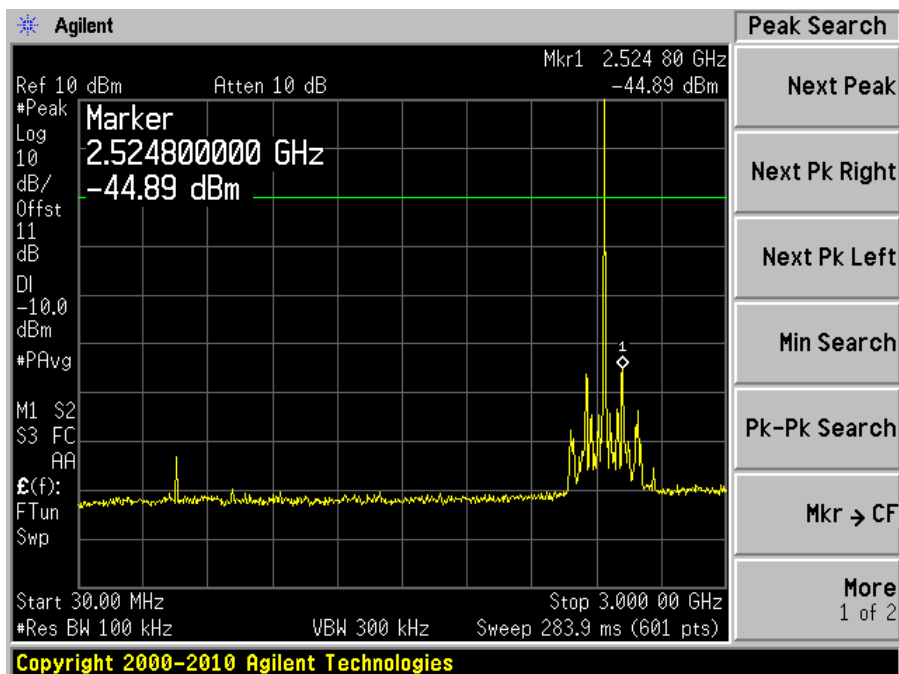


Bluetooth:

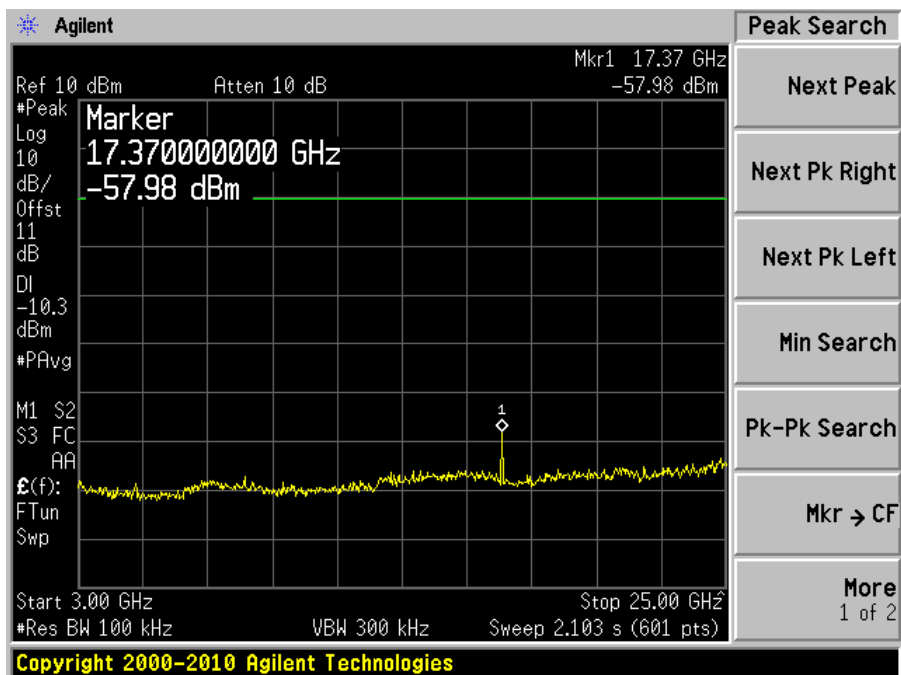
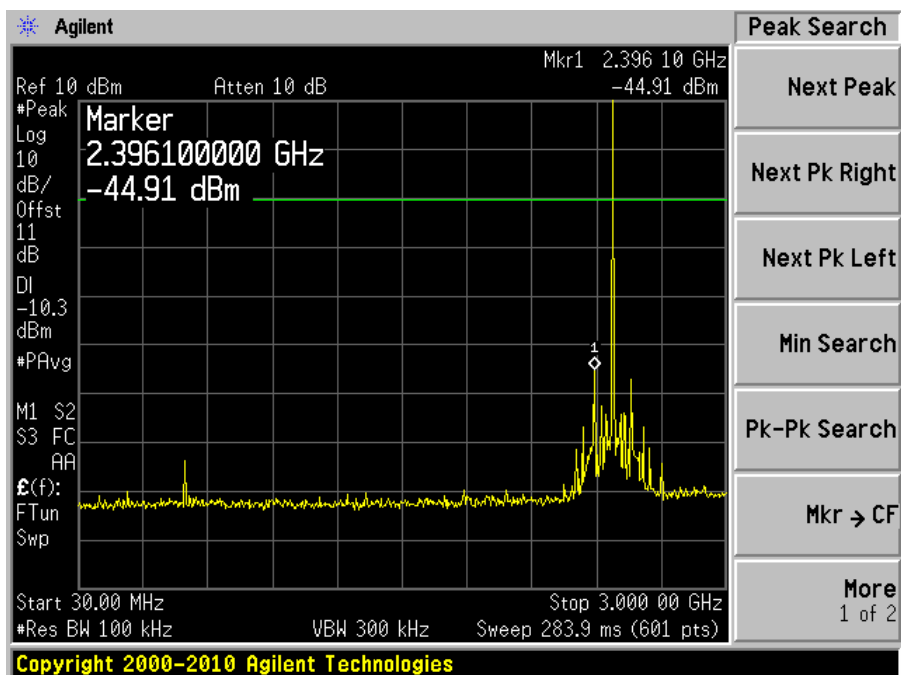
Low Channel GFSK



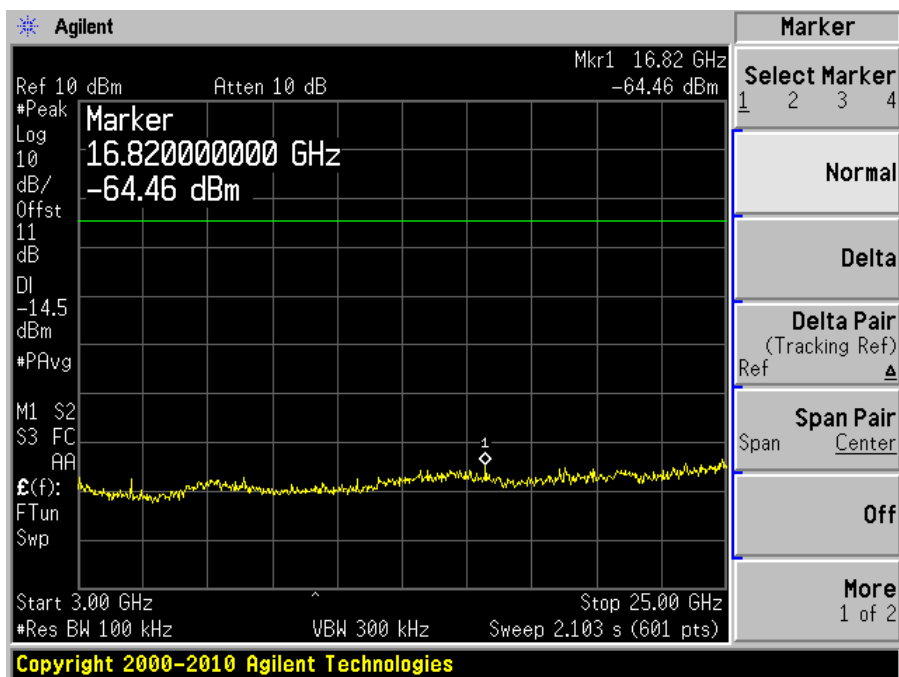
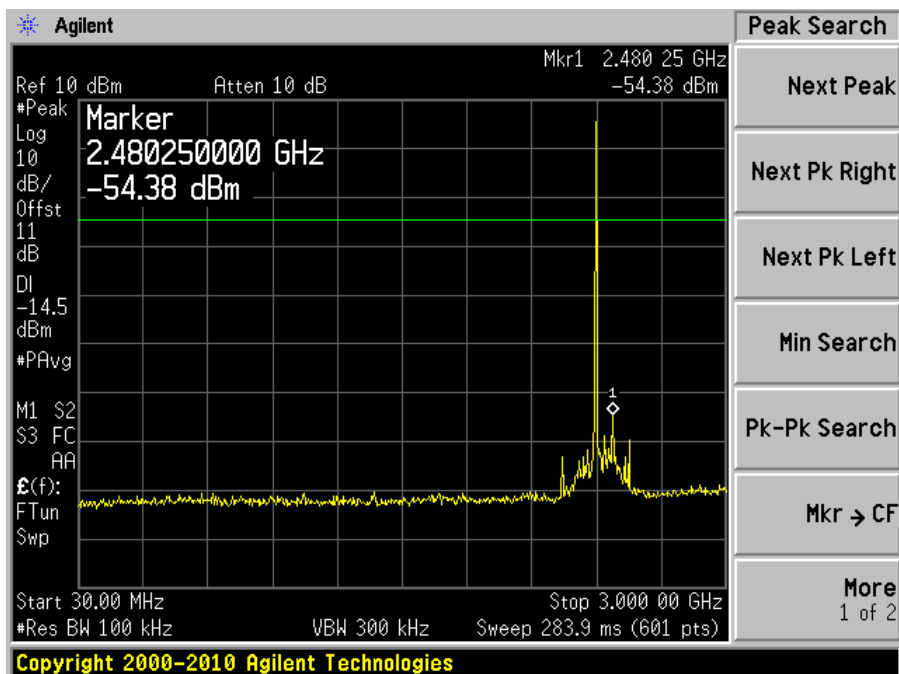
## Middle Channel GFSK



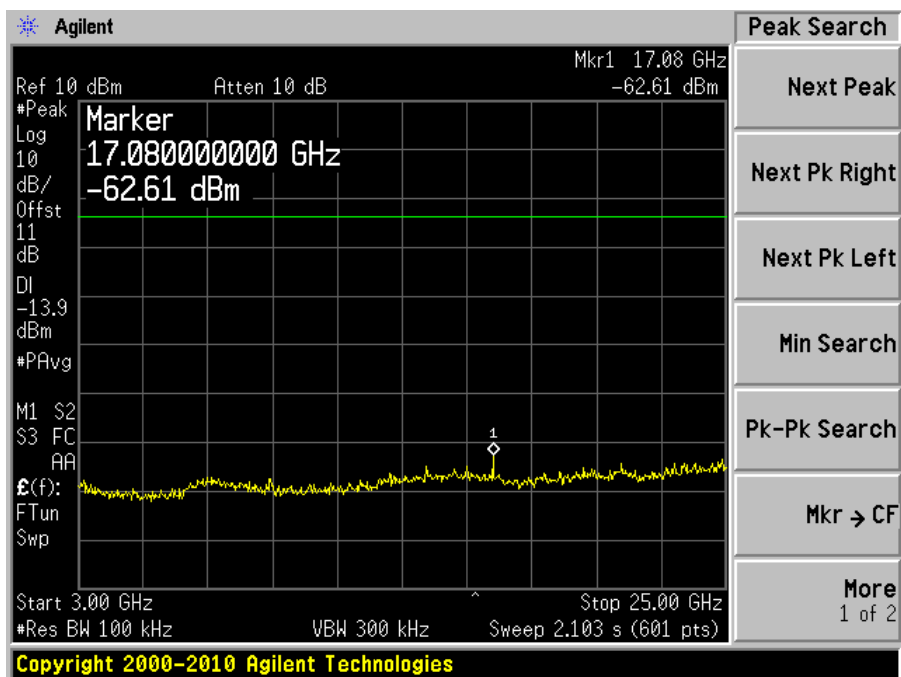
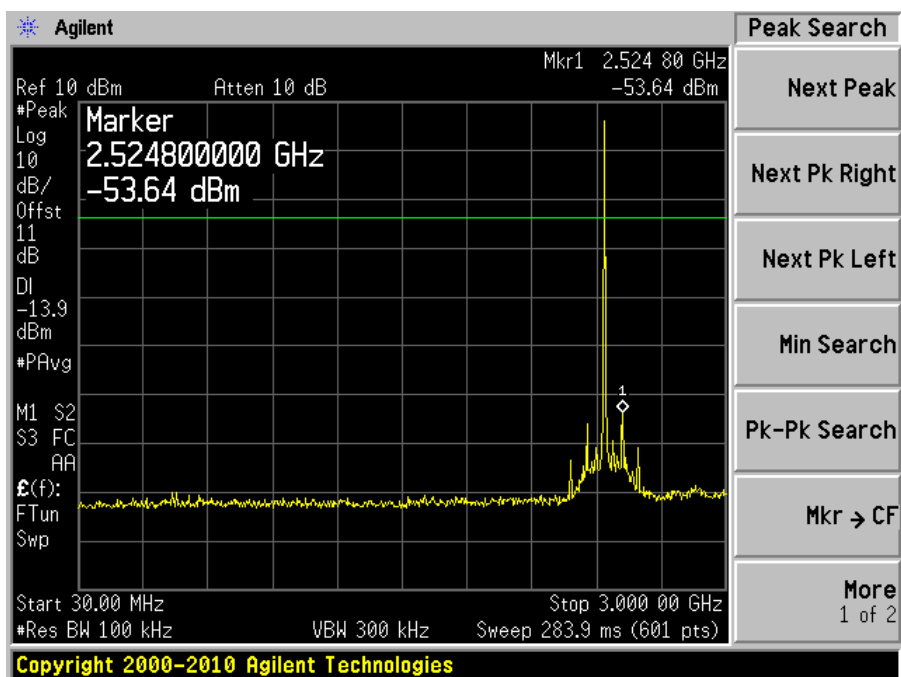
## High Channel GFSK



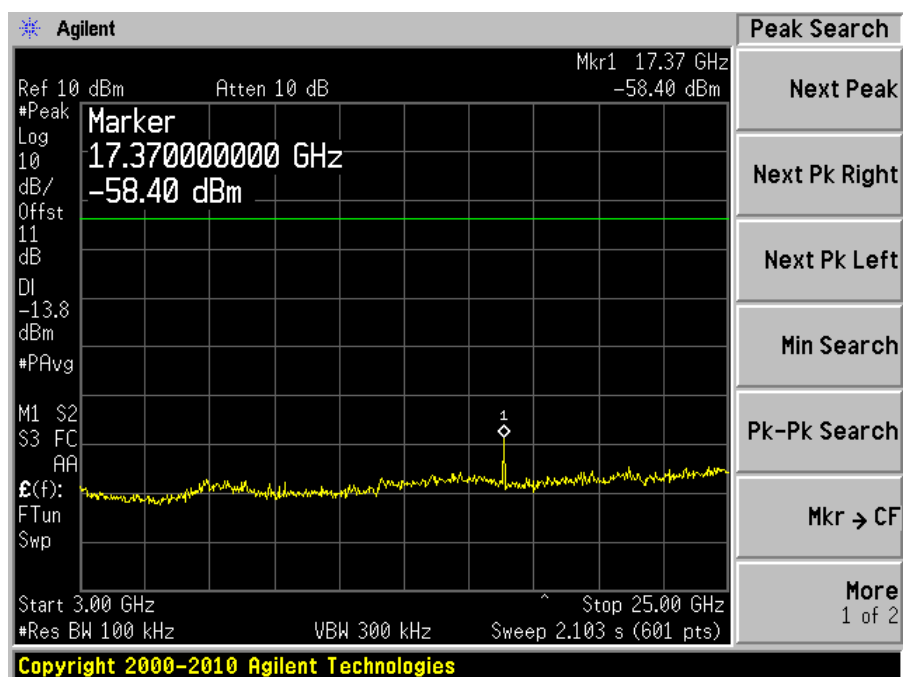
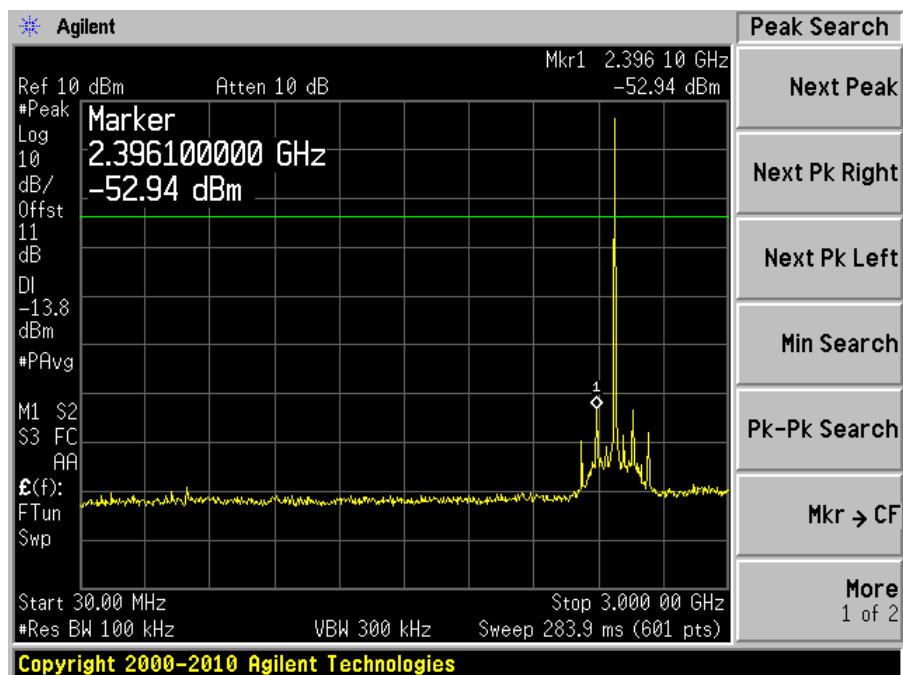
## Low Channel DQPSK



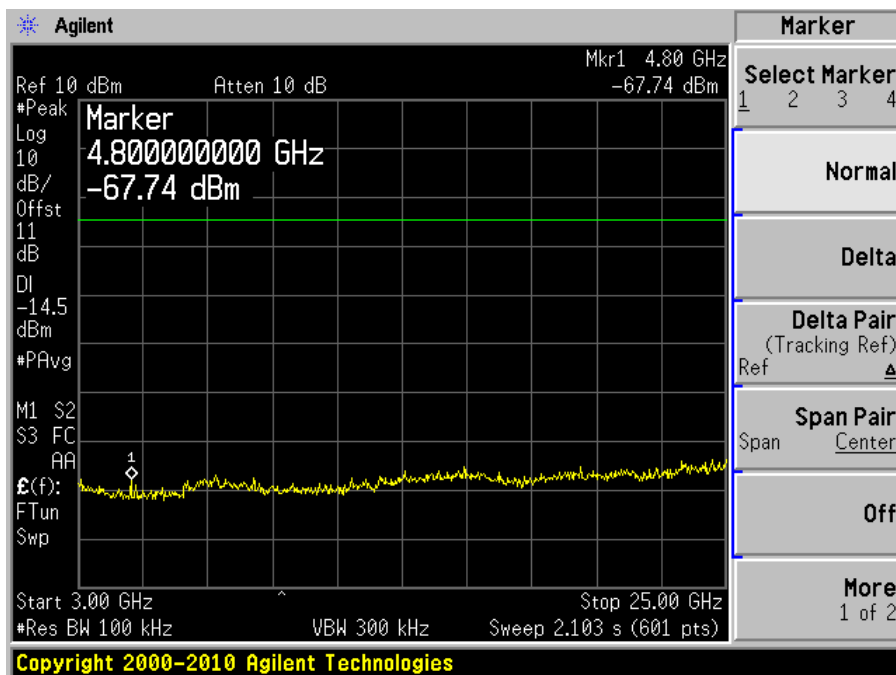
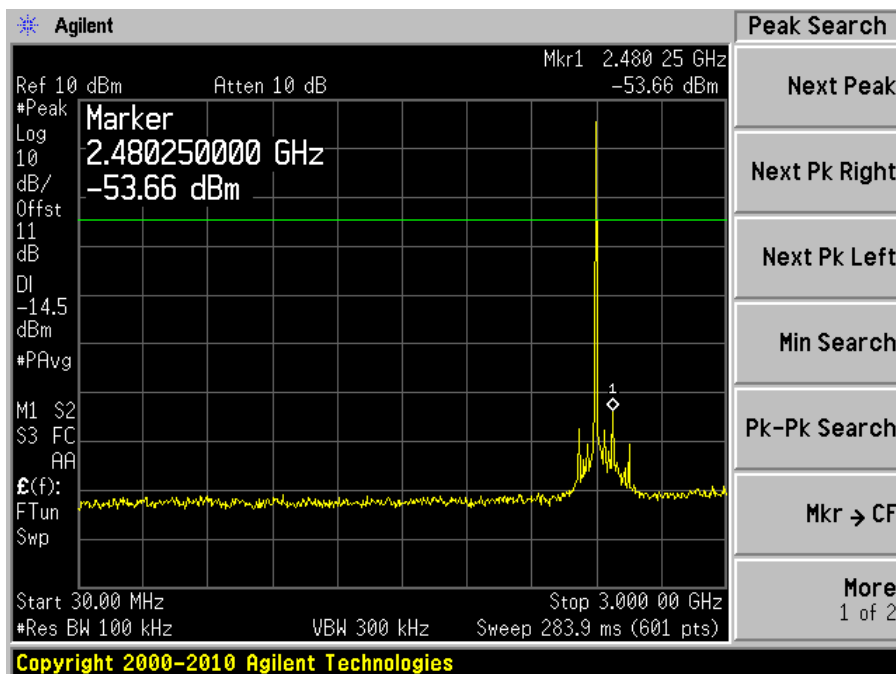
## Middle Channel DQPSK



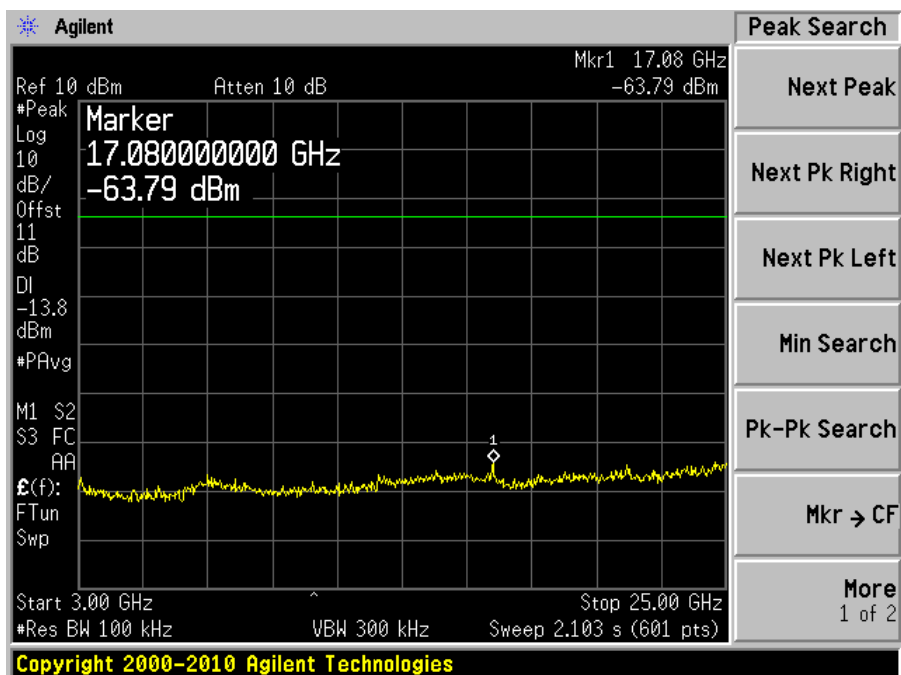
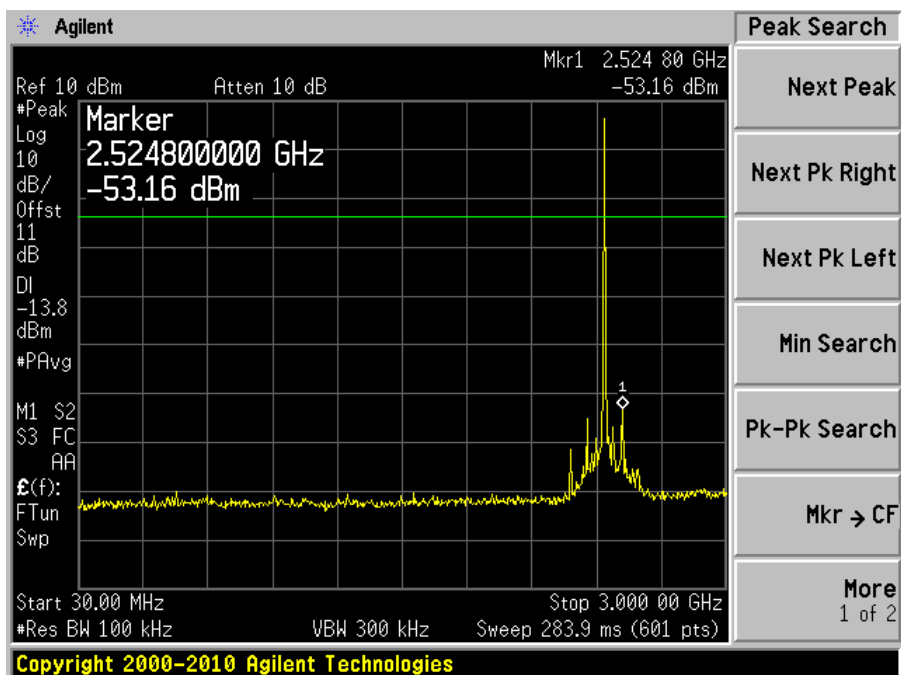
## High Channel DQPSK



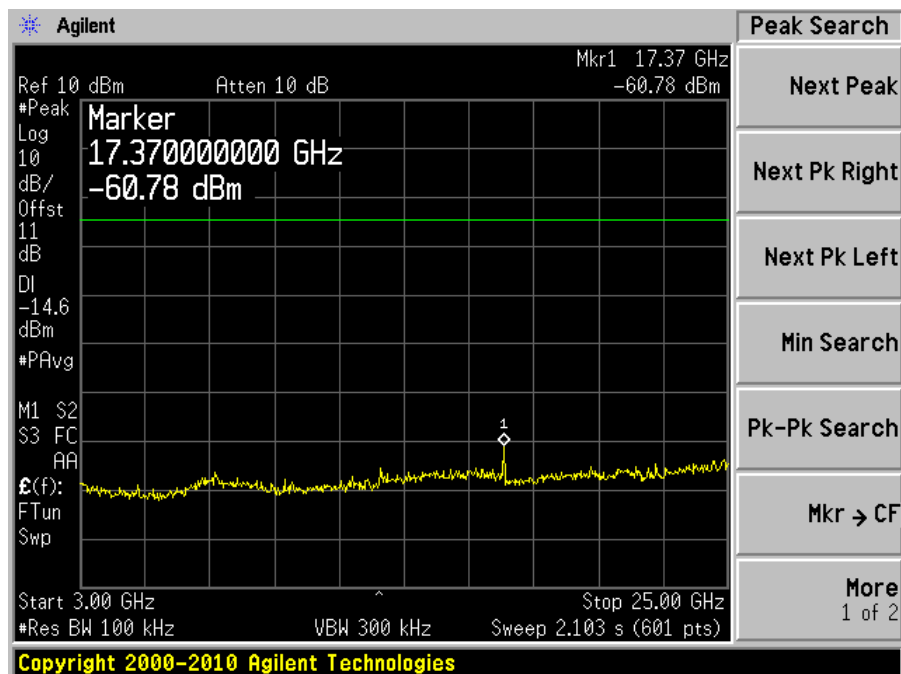
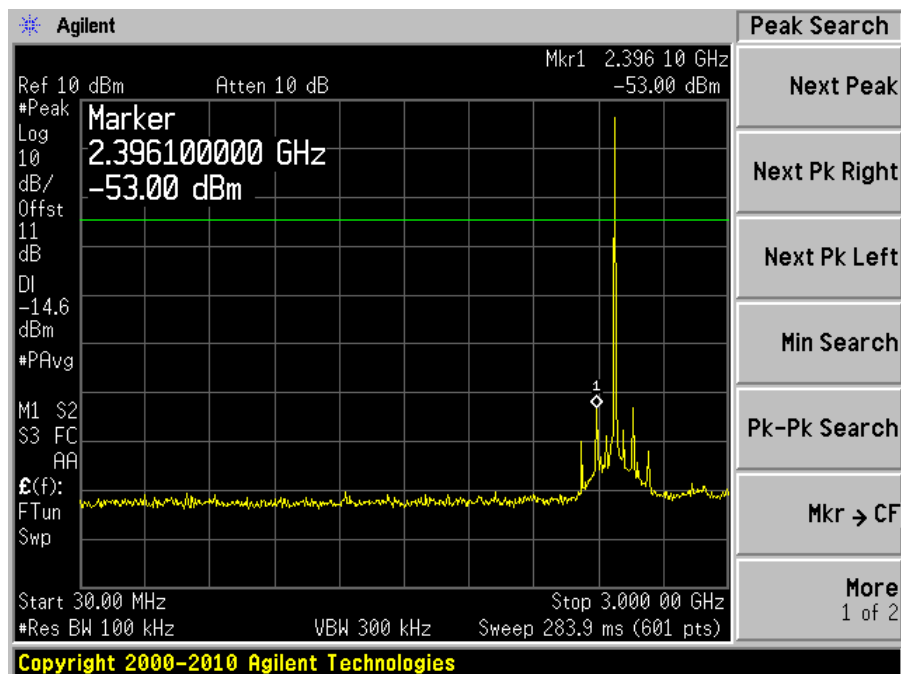
## Low Channel 8PSK



## Middle Channel 8PSK



## High Channel 8PSK



## 8 FCC §15.205, §15.209 & §15.247(d) & IC RSS-210 §A8.5 - Spurious Radiated Emissions

### 8.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a) and RSS-210: Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

| Frequency<br>(MHz) | Field Strength<br>(micro volts/meter) | Measurement Distance<br>(meters) |
|--------------------|---------------------------------------|----------------------------------|
| 0.009 - 0.490      | 2400/F(kHz)                           | 300                              |
| 0.490 - 1.705      | 24000/F(kHz)                          | 30                               |
| 1.705 - 30.0       | 30                                    | 30                               |
| 30 - 88            | 100 <sup>Note 2</sup>                 | 3                                |
| 88 - 216           | 150 <sup>Note 2</sup>                 | 3                                |
| 216 - 960          | 200 <sup>Note 2</sup>                 | 3                                |
| Above 960          | 500                                   | 3                                |

Note 2: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                 | MHz                   | MHz             | GHz           |
|---------------------|-----------------------|-----------------|---------------|
| 0.090 – 0.110       | 16.42 – 16.423        | 960 – 1240      | 4.5 – 5.15    |
| 0.495 – 0.505       | 16.69475 – 16.69525   | 1300 – 1427     | 5.35 – 5.46   |
| 2.1735 – 2.1905     | 25.5 – 25.67          | 1435 – 1626.5   | 7.25 – 7.75   |
| 4.125 – 4.128       | 37.5 – 38.25          | 1645.5 – 1646.5 | 8.025 – 8.5   |
| 4.17725 – 4.17775   | 73 – 74.6             | 1660 – 1710     | 9.0 – 9.2     |
| 4.20725 – 4.20775   | 74.8 – 75.2           | 1718.8 – 1722.2 | 9.3 – 9.5     |
| 6.215 – 6.218       | 108 – 121.94          | 2200 – 2300     | 10.6 – 12.7   |
| 6.26775 – 6.26825   | 123 – 138             | 2310 – 2390     | 13.25 – 13.4  |
| 6.31175 – 6.31225   | 149.9 – 150.05        | 2483.5 – 2500   | 14.47 – 14.5  |
| 8.291 – 8.294       | 156.52475 – 156.52525 | 2690 – 2900     | 15.35 – 16.2  |
| 8.362 – 8.366       | 156.7 – 156.9         | 3260 – 3267     | 17.7 – 21.4   |
| 8.37625 – 8.38675   | 162.0125 – 167.17     | 3.332 – 3.339   | 22.01 – 23.12 |
| 8.41425 – 8.41475   | 167.72 – 173.2        | 3.3458 – 3.358  | 23.6 – 24.0   |
| 12.29 – 12.293      | 240 – 285             | 3.600 – 4.400   | 31.2 – 31.8   |
| 12.51975 – 12.52025 | 322 – 335.4           |                 | 36.43 – 36.5  |
| 12.57675 – 12.57725 | 399.9 – 410           |                 | Above 38.6    |
| 13.36 – 13.41       | 608 – 614             |                 |               |

As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §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)).

As per IC RSS-210 §A8.5, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section A8.4 (4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

## 8.2 Test Setup

The radiated emissions tests were performed in the 5-meter Chamber, using the setup in accordance with ANSI C63.4-2009. The specification used was the FCC 15C and IC RSS-210 limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

## 8.3 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords was connected to the AC floor outlet.

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

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

$$\text{RBW} = 100 \text{ kHz} / \text{VBW} = 300 \text{ kHz} / \text{Sweep} = \text{Auto}$$

Above 1000 MHz:

- (1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
- (2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

## 8.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to the indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + AF + CL + Atten - Ga$$

For example, the Corrected Amplitude (CA) of 40.3 dBuV/m = indicated Amplitude reading (Ai) 32.5 dBuV + Antenna Factor (AF) 23.5dB + Cable Loss (CL) 3.7 dB + Attenuator (Atten) 10 dB - Amplifier Gain (Ga) 29.4 dB

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

$$\text{Margin (dB)} = \text{Corrected Amplitude (dBuV/m)} - \text{Limit (dBuV/m)}$$

## 8.5 Test Equipment List and Details

| Manufacturer       | Description         | Model No.            | Serial No. | Calibration Date | Calibration Interval |
|--------------------|---------------------|----------------------|------------|------------------|----------------------|
| Rohde & Schwarz    | EMI Test Receiver   | ESCI<br>1166.5950K03 | 100338     | 2011-09-14       | 1 year               |
| Agilent            | Spectrum Analyzer   | E4440A               | MY44303352 | 2012-05-10       | 1 year               |
| Sunol Science Corp | System Controller   | SC99V                | 011003-1   | N/R              | 1 year               |
| Sunol Science Corp | Combination Antenna | JB3                  | A020106-3  | 2012-06-18       | 1 year               |
| A.H. Systems       | Horn antenna        | SAS-200/571          | 261        | 2012-01-18       | 1 year               |
| Hewlett Packard    | Pre-amplifier       | 8447D                | 2944A10187 | 2012-03-08       | 1 year               |
| Mini-Circuits      | Pre-amplifier       | ZVA-183-S            | 570400946  | 2012-05-09       | 1 year               |

**Statement of Traceability:** BACL attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.

## 8.6 Test Environmental Conditions

### WLAN:

|                           |                |
|---------------------------|----------------|
| <b>Temperature:</b>       | 20-23 °C       |
| <b>Relative Humidity:</b> | 55-58%         |
| <b>ATM Pressure:</b>      | 101.1-101.4kPa |

The testing was performed by Lionel Lara on 2012-07-14 and 2012-07-19 at 5 meter chamber 3.

### BT:

|                           |                |
|---------------------------|----------------|
| <b>Temperature:</b>       | 21-23 °C       |
| <b>Relative Humidity:</b> | 55-58 %        |
| <b>ATM Pressure:</b>      | 101.1-101.3kPa |

The testing was performed by Lionel Lara on 2012-07-18 to 2012-07-19 in 5 meter chamber 3.

## 8.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15C and IC RSS-210 standard's radiated emissions limits, and had a worst case margin of:

### WLAN:

#### 30-1000 MHz:

| Mode: Transmitting |                 |                                    |                          |
|--------------------|-----------------|------------------------------------|--------------------------|
| Margin (dB)        | Frequency (MHz) | Polarization (Horizontal/Vertical) | Channel, Range           |
| -25.77             | 999.97          | Vertical                           | 802.11g Low, 30-1000 MHz |

#### Above 1 GHz:

| Mode: Transmitting |                 |                                    |                            |
|--------------------|-----------------|------------------------------------|----------------------------|
| Margin (dB)        | Frequency (MHz) | Polarization (Horizontal/Vertical) | Channel, Range             |
| -2.98              | 2484.2          | Horizontal                         | 802.11g High, 1GHz – 25GHz |

### BT:

#### 30-1000 MHz:

| Mode: Transmitting |                 |                                    |                      |
|--------------------|-----------------|------------------------------------|----------------------|
| Margin (dB)        | Frequency (MHz) | Polarization (Horizontal/Vertical) | Channel, Range       |
| -28.06             | 995.46          | Vertical                           | Middle, 30 MHz–1 GHz |

#### Above 1 GHz:

| Mode: Transmitting |                 |                                    |                 |
|--------------------|-----------------|------------------------------------|-----------------|
| Margin (dB)        | Frequency (MHz) | Polarization (Horizontal/Vertical) | Channel, Range  |
| -7.49              | 2487.7          | Horizontal                         | High, 1– 25 GHz |

Please refer to the following table and plots for specific test result details

## 8.8 Radiated Emissions Test Data and Plots

### WLAN:

#### 1) 30 MHz – 1 GHz, Measured at 3 meters

##### 802.11b Mode, Low Channel

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment    |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|------------|
| 995.48          | 25.52                              | 100                 | V                      | 178                         | 54                   | -28.48      | Quasi-Peak |

##### 802.11b Mode, Middle Channel

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment    |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|------------|
| 999.5           | 25.68                              | 100                 | V                      | 175                         | 54                   | -28.32      | Quasi-Peak |

##### 802.11b Mode, High Channel

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment    |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|------------|
| 916.52          | 23.04                              | 100                 | V                      | 337                         | 54                   | -30.96      | Quasi-Peak |

##### 802.11g Mode, Low Channel

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment    |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|------------|
| 999.97          | 28.23                              | 100                 | V                      | 186                         | 54                   | -25.77      | Quasi-Peak |

##### 802.11g Mode, Middle Channel

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment    |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|------------|
| 995.45          | 25.63                              | 100                 | V                      | 167                         | 54                   | -28.37      | Quasi-Peak |

##### 802.11g Mode, High Channel

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment    |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|------------|
| 998.98          | 24.86                              | 100                 | V                      | 191                         | 54                   | -29.14      | Quasi-Peak |

**802.11n HT40 Mode, Low Channel**

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment    |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|------------|
| 995.45          | 25.72                              | 100                 | V                      | 189                         | 54                   | -28.28      | Quasi-Peak |

**802.11n HT40 Mode, Middle Channel**

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment    |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|------------|
| 999.98          | 28.13                              | 100                 | V                      | 180                         | 54                   | -25.87      | Quasi-Peak |

**802.11n HT40 Mode, High Channel**

| Frequency (MHz) | Corrected Amplitude (dB $\mu$ V/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dB $\mu$ V/m) | Margin (dB) | Comment    |
|-----------------|------------------------------------|---------------------|------------------------|-----------------------------|----------------------|-------------|------------|
| 999.45          | 25.68                              | 100                 | V                      | 173                         | 54                   | -28.32      | Quasi-Peak |

Note: 802.11b, 802.11g or HT20, and 802.11n HT40 were tested. Between the 802.11g and 802.11n HT20, 802.11g was the worst case and it was tested.

## 2) 1–25 GHz, Measured at 3 meters

## 802.11b mode:

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|--------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                            |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 2412 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2412                                       | 78.4                      | 64                                | 196            | H                 | 28.36            | 3.12                  | 0                    | 109.88                       | Fund.             | -              | Peak     |
| 2412                                       | 74.91                     | 312                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 106.56                       | Fund.             | -              | Peak     |
| 2412                                       | 74.86                     | 64                                | 196            | H                 | 28.36            | 3.12                  | 0                    | 106.34                       | Fund.             | -              | Avg      |
| 2412                                       | 71.14                     | 312                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 102.79                       | Fund.             | -              | Avg      |
| 4824                                       | 37.79                     | 132                               | 120            | H                 | 33.48            | 4.56                  | 27.7                 | 48.13                        | 74                | -25.87         | Peak     |
| 4824                                       | 39.45                     | 334                               | 113            | V                 | 33.59            | 4.56                  | 27.7                 | 49.9                         | 74                | -24.1          | Peak     |
| 4824                                       | 31.99                     | 132                               | 120            | H                 | 33.48            | 4.56                  | 27.7                 | 42.33                        | 54                | -11.67         | Avg      |
| 4824                                       | 34.18                     | 334                               | 113            | V                 | 33.59            | 4.56                  | 27.7                 | 44.63                        | 54                | -9.37          | Avg      |
| 7236                                       | 40.69                     | 0                                 | 100            | H                 | 35.48            | 5.49                  | 27.58                | 54.08                        | 74                | -19.92         | Peak     |
| 7236                                       | 40.69                     | 0                                 | 100            | V                 | 35.45            | 5.49                  | 27.58                | 54.05                        | 74                | -19.95         | Peak     |
| 7236                                       | 26.01                     | 0                                 | 100            | H                 | 35.48            | 5.49                  | 27.58                | 39.4                         | 54                | -14.6          | Avg      |
| 7236                                       | 26.01                     | 0                                 | 100            | V                 | 35.45            | 5.49                  | 27.58                | 39.37                        | 54                | -14.63         | Avg      |
| 9648                                       | 38.93                     | 0                                 | 100            | H                 | 37.66            | 6.56                  | 27.02                | 56.13                        | 74                | -17.87         | Peak     |
| 9648                                       | 38.93                     | 0                                 | 100            | V                 | 37.66            | 6.56                  | 27.02                | 56.13                        | 74                | -17.87         | Peak     |
| 9648                                       | 24.3                      | 0                                 | 100            | H                 | 37.66            | 6.56                  | 27.02                | 41.5                         | 54                | -12.5          | Avg      |
| 9648                                       | 24.3                      | 0                                 | 100            | V                 | 37.66            | 6.56                  | 27.02                | 41.5                         | 54                | -12.5          | Avg      |

| Frequency<br>(MHz)                            | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|-----------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                               |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Middle Channel 2437 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2437                                          | 76.18                     | 80                                | 224            | H                 | 28.36            | 3.12                  | 0                    | 107.66                       | Fund.             | -              | Peak     |
| 2437                                          | 73.03                     | 311                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 104.68                       | Fund.             | -              | Peak     |
| 2437                                          | 72.8                      | 80                                | 224            | H                 | 28.36            | 3.12                  | 0                    | 104.28                       | Fund.             | -              | Avg      |
| 2437                                          | 70.58                     | 311                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 102.23                       | Fund.             | -              | Avg      |
| 4874                                          | 36.55                     | 131                               | 120            | H                 | 33.57            | 4.54                  | 27.73                | 46.93                        | 74                | -27.07         | Peak     |
| 4874                                          | 38.99                     | 342                               | 100            | V                 | 33.59            | 4.54                  | 27.73                | 49.39                        | 74                | -24.61         | Peak     |
| 4874                                          | 27.08                     | 131                               | 120            | H                 | 33.57            | 4.54                  | 27.73                | 37.46                        | 54                | -16.54         | Avg      |
| 4874                                          | 34.16                     | 342                               | 100            | V                 | 33.59            | 4.54                  | 27.73                | 44.56                        | 54                | -9.44          | Avg      |
| 7311                                          | 41.4                      | 0                                 | 100            | H                 | 36.02            | 5.57                  | 27.51                | 55.48                        | 74                | -18.52         | Peak     |
| 7311                                          | 41.4                      | 0                                 | 100            | V                 | 35.94            | 5.57                  | 27.51                | 55.4                         | 74                | -18.6          | Peak     |
| 7311                                          | 26.39                     | 0                                 | 100            | H                 | 36.02            | 5.57                  | 27.51                | 40.47                        | 54                | -13.53         | Avg      |
| 7311                                          | 26.39                     | 0                                 | 100            | V                 | 35.94            | 5.57                  | 27.51                | 40.39                        | 54                | -13.61         | Avg      |
| 9748                                          | 39.29                     | 0                                 | 100            | H                 | 37.75            | 6.62                  | 26.98                | 56.68                        | 74                | -17.32         | Peak     |
| 9748                                          | 39.29                     | 0                                 | 100            | V                 | 37.71            | 6.62                  | 26.98                | 56.64                        | 74                | -17.36         | Peak     |
| 9748                                          | 24.39                     | 0                                 | 100            | H                 | 37.75            | 6.62                  | 26.98                | 41.78                        | 54                | -12.22         | Avg      |
| 9748                                          | 24.39                     | 0                                 | 100            | V                 | 37.71            | 6.62                  | 26.98                | 41.74                        | 54                | -12.26         | Avg      |

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|---------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                             |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 2462 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2462                                        | 77.1                      | 25                                | 186            | H                 | 29.12            | 3.25                  | 0                    | 109.47                       | Fund.             | -              | Peak     |
| 2462                                        | 71.49                     | 312                               | 100            | V                 | 29.12            | 3.25                  | 0                    | 103.86                       | Fund.             | -              | Peak     |
| 2462                                        | 73.82                     | 25                                | 186            | H                 | 29.12            | 3.25                  | 0                    | 106.19                       | Fund.             | -              | Avg      |
| 2462                                        | 68.19                     | 312                               | 100            | V                 | 29.12            | 3.25                  | 0                    | 100.56                       | Fund.             | -              | Avg      |
| 4924                                        | 38.6                      | 336                               | 100            | H                 | 32.8             | 4.52                  | 27.75                | 48.17                        | 74                | -25.83         | Peak     |
| 4924                                        | 43.55                     | 317                               | 100            | V                 | 32.73            | 4.52                  | 27.75                | 53.05                        | 74                | -20.95         | Peak     |
| 4924                                        | 33.81                     | 336                               | 100            | H                 | 32.8             | 4.52                  | 27.75                | 43.38                        | 54                | -10.62         | Avg      |
| 4924                                        | 41.08                     | 317                               | 100            | V                 | 32.73            | 4.52                  | 27.75                | 50.58                        | 54                | -3.42          | Avg      |
| 7386                                        | 40.91                     | 0                                 | 100            | H                 | 36.14            | 5.62                  | 27.51                | 55.16                        | 74                | -18.84         | Peak     |
| 7386                                        | 40.91                     | 0                                 | 100            | V                 | 36.05            | 5.62                  | 27.51                | 55.07                        | 74                | -18.93         | Peak     |
| 7386                                        | 26.03                     | 0                                 | 100            | H                 | 36.14            | 5.62                  | 27.51                | 40.28                        | 54                | -13.72         | Avg      |
| 7386                                        | 26.03                     | 0                                 | 100            | V                 | 36.05            | 5.62                  | 27.51                | 40.19                        | 54                | -13.81         | Avg      |
| 9848                                        | 38.83                     | 0                                 | 100            | H                 | 38.06            | 6.55                  | 26.98                | 56.46                        | 74                | -17.54         | Peak     |
| 9848                                        | 38.83                     | 0                                 | 100            | V                 | 38.02            | 6.55                  | 26.98                | 56.42                        | 74                | -17.58         | Peak     |
| 9848                                        | 24.46                     | 0                                 | 100            | H                 | 38.06            | 6.55                  | 26.98                | 42.09                        | 54                | -11.91         | Avg      |
| 9848                                        | 24.46                     | 0                                 | 100            | V                 | 38.02            | 6.55                  | 26.98                | 42.05                        | 54                | -11.95         | Avg      |

**802.11g mode:**

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|--------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                            |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 2412 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2412                                       | 76.51                     | 50                                | 228            | H                 | 28.16            | 3.12                  | 0                    | 107.79                       | Fund.             | -              | Peak     |
| 2412                                       | 73.78                     | 126                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 105.02                       | Fund.             | -              | Peak     |
| 2412                                       | 66.83                     | 50                                | 228            | H                 | 28.16            | 3.12                  | 0                    | 98.11                        | Fund.             | -              | Avg      |
| 2412                                       | 64.2                      | 126                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 95.44                        | Fund.             | -              | Avg      |
| 4824                                       | 39.46                     | 0                                 | 100            | H                 | 33.48            | 4.56                  | 27.7                 | 49.8                         | 74                | -24.2          | Peak     |
| 4824                                       | 41.48                     | 342                               | 100            | V                 | 33.59            | 4.56                  | 27.7                 | 51.93                        | 74                | -22.07         | Peak     |
| 4824                                       | 24.79                     | 0                                 | 100            | H                 | 33.48            | 4.56                  | 27.7                 | 35.13                        | 54                | -18.87         | Avg      |
| 4824                                       | 25.21                     | 342                               | 100            | V                 | 33.59            | 4.56                  | 27.7                 | 35.66                        | 54                | -18.34         | Avg      |
| 7236                                       | 40.09                     | 0                                 | 100            | H                 | 35.48            | 5.49                  | 27.58                | 53.48                        | 74                | -20.52         | Peak     |
| 7236                                       | 40.09                     | 0                                 | 100            | V                 | 35.45            | 5.49                  | 27.58                | 53.45                        | 74                | -20.55         | Peak     |
| 7236                                       | 26.05                     | 0                                 | 100            | H                 | 35.48            | 5.49                  | 27.58                | 39.44                        | 54                | -14.56         | Avg      |
| 7236                                       | 26.05                     | 0                                 | 100            | V                 | 35.45            | 5.49                  | 27.58                | 39.41                        | 54                | -14.59         | Avg      |
| 9648                                       | 38.46                     | 0                                 | 100            | H                 | 37.66            | 6.56                  | 27.02                | 55.66                        | 74                | -18.34         | Peak     |
| 9648                                       | 38.46                     | 0                                 | 100            | V                 | 37.66            | 6.56                  | 27.02                | 55.66                        | 74                | -18.34         | Peak     |
| 9648                                       | 24.3                      | 0                                 | 100            | H                 | 37.66            | 6.56                  | 27.02                | 41.5                         | 54                | -12.5          | Avg      |
| 9648                                       | 24.3                      | 0                                 | 100            | V                 | 37.66            | 6.56                  | 27.02                | 41.5                         | 54                | -12.5          | Avg      |

| Frequency<br>(MHz)                            | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|-----------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                               |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Middle Channel 2437 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2437                                          | 75.46                     | 53                                | 220            | H                 | 28.16            | 3.12                  | 0                    | 106.74                       | Fund.             | -              | Peak     |
| 2437                                          | 74.29                     | 122                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 105.53                       | Fund.             | -              | Peak     |
| 2437                                          | 65.45                     | 53                                | 220            | H                 | 28.16            | 3.12                  | 0                    | 96.73                        | Fund.             | -              | Avg      |
| 2437                                          | 64.21                     | 122                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 95.45                        | Fund.             | -              | Avg      |
| 4874                                          | 39.59                     | 0                                 | 100            | H                 | 33.57            | 4.54                  | 27.73                | 49.97                        | 74                | -24.03         | Peak     |
| 4874                                          | 42.04                     | 343                               | 100            | V                 | 33.59            | 4.54                  | 27.73                | 52.44                        | 74                | -21.56         | Peak     |
| 4874                                          | 24.42                     | 0                                 | 100            | H                 | 33.57            | 4.54                  | 27.73                | 34.8                         | 54                | -19.2          | Avg      |
| 4874                                          | 25.62                     | 343                               | 100            | V                 | 33.59            | 4.54                  | 27.73                | 36.02                        | 54                | -17.98         | Avg      |
| 7311                                          | 40.28                     | 0                                 | 100            | H                 | 36.02            | 5.57                  | 27.51                | 54.36                        | 74                | -19.64         | Peak     |
| 7311                                          | 40.28                     | 0                                 | 100            | V                 | 35.94            | 5.57                  | 27.51                | 54.28                        | 74                | -19.72         | Peak     |
| 7311                                          | 26.26                     | 0                                 | 100            | H                 | 36.02            | 5.57                  | 27.51                | 40.34                        | 54                | -13.66         | Avg      |
| 7311                                          | 26.26                     | 0                                 | 100            | V                 | 35.94            | 5.57                  | 27.51                | 40.26                        | 54                | -13.74         | Avg      |
| 9748                                          | 38.36                     | 0                                 | 100            | H                 | 37.75            | 6.62                  | 26.98                | 55.75                        | 74                | -18.25         | Peak     |
| 9748                                          | 38.36                     | 0                                 | 100            | V                 | 37.71            | 6.62                  | 26.98                | 55.71                        | 74                | -18.29         | Peak     |
| 9748                                          | 24.35                     | 0                                 | 100            | H                 | 37.75            | 6.62                  | 26.98                | 41.74                        | 54                | -12.26         | Avg      |
| 9748                                          | 24.35                     | 0                                 | 100            | V                 | 37.71            | 6.62                  | 26.98                | 41.7                         | 54                | -12.3          | Avg      |

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|---------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                             |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 2462 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2462                                        | 75.35                     | 54                                | 220            | H                 | 28.42            | 3.25                  | 0                    | 107.02                       | Fund.             | -              | Peak     |
| 2462                                        | 73.04                     | 123                               | 100            | V                 | 28.27            | 3.25                  | 0                    | 104.56                       | Fund.             | -              | Peak     |
| 2462                                        | 65.64                     | 54                                | 220            | H                 | 28.42            | 3.25                  | 0                    | 97.31                        | Fund.             | -              | Avg      |
| 2462                                        | 63.09                     | 123                               | 100            | V                 | 28.27            | 3.25                  | 0                    | 94.61                        | Fund.             | -              | Avg      |
| 4924                                        | 39.36                     | 0                                 | 100            | H                 | 33.57            | 4.52                  | 27.75                | 49.7                         | 74                | -24.3          | Peak     |
| 4924                                        | 42.37                     | 343                               | 100            | V                 | 33.59            | 4.52                  | 27.75                | 52.73                        | 74                | -21.27         | Peak     |
| 4924                                        | 24.4                      | 0                                 | 100            | H                 | 33.57            | 4.52                  | 27.75                | 34.74                        | 54                | -19.26         | Avg      |
| 4924                                        | 26                        | 343                               | 100            | V                 | 33.59            | 4.52                  | 27.75                | 36.36                        | 54                | -17.64         | Avg      |
| 7386                                        | 40.25                     | 0                                 | 100            | H                 | 36.14            | 5.62                  | 27.51                | 54.5                         | 74                | -19.5          | Peak     |
| 7386                                        | 40.25                     | 0                                 | 100            | V                 | 36.05            | 5.62                  | 27.51                | 54.41                        | 74                | -19.59         | Peak     |
| 7386                                        | 26.07                     | 0                                 | 100            | H                 | 36.14            | 5.62                  | 27.51                | 40.32                        | 54                | -13.68         | Avg      |
| 7386                                        | 26.07                     | 0                                 | 100            | V                 | 36.05            | 5.62                  | 27.51                | 40.23                        | 54                | -13.77         | Avg      |
| 9848                                        | 38.52                     | 0                                 | 100            | H                 | 38.06            | 6.55                  | 26.98                | 56.15                        | 74                | -17.85         | Peak     |
| 9848                                        | 38.52                     | 0                                 | 100            | V                 | 38.02            | 6.55                  | 26.98                | 56.11                        | 74                | -17.89         | Peak     |
| 9848                                        | 24.46                     | 0                                 | 100            | H                 | 38.06            | 6.55                  | 26.98                | 42.09                        | 54                | -11.91         | Avg      |
| 9848                                        | 24.46                     | 0                                 | 100            | V                 | 38.02            | 6.55                  | 26.98                | 42.05                        | 54                | -11.95         | Avg      |

**802.11n HT40 mode:**

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|--------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                            |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 2422 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2422                                       | 73.38                     | 53                                | 234            | H                 | 28.16            | 3.12                  | 0                    | 104.66                       | Fund.             | -              | Peak     |
| 2422                                       | 71.94                     | 123                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 103.18                       | Fund.             | -              | Peak     |
| 2422                                       | 61.96                     | 53                                | 234            | H                 | 28.16            | 3.12                  | 0                    | 93.24                        | Fund.             | -              | Avg      |
| 2422                                       | 60.48                     | 123                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 91.72                        | Fund.             | -              | Avg      |
| 4844                                       | 39.05                     | 0                                 | 100            | H                 | 33.47            | 4.56                  | 27.7                 | 49.38                        | 74                | -24.62         | Peak     |
| 4844                                       | 39.05                     | 0                                 | 100            | V                 | 33.59            | 4.56                  | 27.7                 | 49.5                         | 74                | -24.5          | Peak     |
| 4844                                       | 24.57                     | 0                                 | 100            | H                 | 33.47            | 4.56                  | 27.7                 | 34.9                         | 54                | -19.1          | Avg      |
| 4844                                       | 24.57                     | 0                                 | 100            | V                 | 33.59            | 4.56                  | 27.7                 | 35.02                        | 54                | -18.98         | Avg      |
| 7266                                       | 40.14                     | 0                                 | 100            | H                 | 38.27            | 5.49                  | 27.56                | 56.34                        | 74                | -17.66         | Peak     |
| 7266                                       | 40.14                     | 0                                 | 100            | V                 | 38.33            | 5.49                  | 27.56                | 56.4                         | 74                | -17.6          | Peak     |
| 7266                                       | 26.41                     | 0                                 | 100            | H                 | 38.27            | 5.49                  | 27.56                | 42.61                        | 54                | -11.39         | Avg      |
| 7266                                       | 26.41                     | 0                                 | 100            | V                 | 38.33            | 5.49                  | 27.56                | 42.67                        | 54                | -11.33         | Avg      |
| 9688                                       | 39.03                     | 0                                 | 100            | H                 | 38.41            | 6.56                  | 26.98                | 57.02                        | 74                | -16.98         | Peak     |
| 9688                                       | 39.03                     | 0                                 | 100            | V                 | 38.39            | 6.56                  | 26.98                | 57                           | 74                | -17            | Peak     |
| 9688                                       | 24.64                     | 0                                 | 100            | H                 | 38.41            | 6.56                  | 26.98                | 42.63                        | 54                | -11.37         | Avg      |
| 9688                                       | 24.64                     | 0                                 | 100            | V                 | 38.39            | 6.56                  | 26.98                | 42.61                        | 54                | -11.39         | Avg      |

| Frequency<br>(MHz)                            | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|-----------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                               |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Middle Channel 2437 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2437                                          | 72.24                     | 54                                | 222            | H                 | 28.16            | 3.12                  | 0                    | 103.52                       | Fund.             | -              | Peak     |
| 2437                                          | 70.67                     | 125                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 101.91                       | Fund.             | -              | Peak     |
| 2437                                          | 62.32                     | 54                                | 222            | H                 | 28.16            | 3.12                  | 0                    | 93.6                         | Fund.             | -              | Avg      |
| 2437                                          | 60.81                     | 125                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 92.05                        | Fund.             | -              | Avg      |
| 4874                                          | 39.08                     | 0                                 | 100            | H                 | 33.57            | 4.54                  | 27.73                | 49.46                        | 74                | -24.54         | Peak     |
| 4874                                          | 39.08                     | 0                                 | 100            | V                 | 33.59            | 4.54                  | 27.73                | 49.48                        | 74                | -24.52         | Peak     |
| 4874                                          | 24.46                     | 0                                 | 100            | H                 | 33.57            | 4.54                  | 27.73                | 34.84                        | 54                | -19.16         | Avg      |
| 4874                                          | 24.46                     | 0                                 | 100            | V                 | 33.59            | 4.54                  | 27.73                | 34.86                        | 54                | -19.14         | Avg      |
| 7311                                          | 40.67                     | 0                                 | 100            | H                 | 36.02            | 5.57                  | 27.51                | 54.75                        | 74                | -19.25         | Peak     |
| 7311                                          | 40.67                     | 0                                 | 100            | V                 | 35.94            | 5.57                  | 27.51                | 54.67                        | 74                | -19.33         | Peak     |
| 7311                                          | 26.51                     | 0                                 | 100            | H                 | 36.02            | 5.57                  | 27.51                | 40.59                        | 54                | -13.41         | Avg      |
| 7311                                          | 26.51                     | 0                                 | 100            | V                 | 35.94            | 5.57                  | 27.51                | 40.51                        | 54                | -13.49         | Avg      |
| 9748                                          | 39.25                     | 0                                 | 100            | H                 | 37.75            | 6.62                  | 26.98                | 56.64                        | 74                | -17.36         | Peak     |
| 9748                                          | 39.25                     | 0                                 | 100            | V                 | 37.71            | 6.62                  | 26.98                | 56.6                         | 74                | -17.4          | Peak     |
| 9748                                          | 24.44                     | 0                                 | 100            | H                 | 37.75            | 6.62                  | 26.98                | 41.83                        | 54                | -12.17         | Avg      |
| 9748                                          | 24.44                     | 0                                 | 100            | V                 | 37.71            | 6.62                  | 26.98                | 41.79                        | 54                | -12.21         | Avg      |

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|---------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                             |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 2452 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2452                                        | 72.83                     | 53                                | 222            | H                 | 28.42            | 3.25                  | 0                    | 104.5                        | Fund.             | -              | Peak     |
| 2452                                        | 71.86                     | 124                               | 113            | V                 | 28.27            | 3.25                  | 0                    | 103.38                       | Fund.             | -              | Peak     |
| 2452                                        | 62.31                     | 53                                | 222            | H                 | 28.42            | 3.25                  | 0                    | 93.98                        | Fund.             | -              | Avg      |
| 2452                                        | 60.4                      | 124                               | 113            | V                 | 28.27            | 3.25                  | 0                    | 91.92                        | Fund.             | -              | Avg      |
| 4904                                        | 39.16                     | 0                                 | 100            | H                 | 33.57            | 4.54                  | 27.67                | 49.6                         | 74                | -24.4          | Peak     |
| 4904                                        | 39.16                     | 0                                 | 100            | V                 | 33.59            | 4.54                  | 27.67                | 49.62                        | 74                | -24.38         | Peak     |
| 4904                                        | 23.94                     | 0                                 | 100            | H                 | 33.57            | 4.54                  | 27.67                | 34.38                        | 54                | -19.62         | Avg      |
| 4904                                        | 23.94                     | 0                                 | 100            | V                 | 33.59            | 4.54                  | 27.67                | 34.4                         | 54                | -19.6          | Avg      |
| 7356                                        | 40.49                     | 0                                 | 100            | H                 | 38.2             | 5.62                  | 27.57                | 56.74                        | 74                | -17.26         | Peak     |
| 7356                                        | 40.49                     | 0                                 | 100            | V                 | 38.28            | 5.62                  | 27.57                | 56.82                        | 74                | -17.18         | Peak     |
| 7356                                        | 25.91                     | 0                                 | 100            | H                 | 38.2             | 5.62                  | 27.57                | 42.16                        | 54                | -11.84         | Avg      |
| 7356                                        | 25.91                     | 0                                 | 100            | V                 | 38.28            | 5.62                  | 27.57                | 42.24                        | 54                | -11.76         | Avg      |
| 9808                                        | 39.37                     | 0                                 | 100            | H                 | 38.23            | 6.58                  | 27.02                | 57.16                        | 74                | -16.84         | Peak     |
| 9808                                        | 39.37                     | 0                                 | 100            | V                 | 38.15            | 6.58                  | 27.02                | 57.08                        | 74                | -16.92         | Peak     |
| 9808                                        | 24.63                     | 0                                 | 100            | H                 | 38.23            | 6.58                  | 27.02                | 42.42                        | 54                | -11.58         | Avg      |
| 9808                                        | 24.63                     | 0                                 | 100            | V                 | 38.15            | 6.58                  | 27.02                | 42.34                        | 54                | -11.66         | Avg      |

**3) Restricted Band Emissions****802.11b mode:**

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|--------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                            |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 2412 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2389.6                                     | 34.32                     | 64                                | 196            | H                 | 28.36            | 3.12                  | 0                    | 65.8                         | 74                | -8.2           | Peak     |
| 2389.7                                     | 30.41                     | 312                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 62.06                        | 74                | -11.94         | Peak     |
| 2389.6                                     | 12.78                     | 64                                | 196            | H                 | 28.36            | 3.12                  | 0                    | 44.26                        | 54                | -9.74          | Avg      |
| 2389.7                                     | 12.69                     | 312                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 44.34                        | 54                | -9.66          | Avg      |

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|---------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                             |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 2462 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2483.5                                      | 37.65                     | 25                                | 186            | H                 | 29.12            | 3.25                  | 0                    | 70.02                        | 74                | -3.98          | Peak     |
| 2484.5                                      | 33.03                     | 312                               | 100            | V                 | 29.12            | 3.25                  | 0                    | 65.4                         | 74                | -8.6           | Peak     |
| 2483.5                                      | 13.02                     | 25                                | 186            | H                 | 29.12            | 3.25                  | 0                    | 45.39                        | 54                | -8.61          | Avg      |
| 2484.5                                      | 12.99                     | 312                               | 100            | V                 | 29.12            | 3.25                  | 0                    | 45.36                        | 54                | -8.64          | Avg      |

**802.11g mode:**

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|--------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                            |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 2412 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2388.4                                     | 37.13                     | 50                                | 228            | H                 | 28.16            | 3.12                  | 0                    | 68.41                        | 74                | -5.59          | Peak     |
| 2390                                       | 36.03                     | 126                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 67.27                        | 74                | -6.73          | Peak     |
| 2388.4                                     | 15.32                     | 50                                | 228            | H                 | 28.16            | 3.12                  | 0                    | 46.6                         | 54                | -7.4           | Avg      |
| 2390                                       | 14.61                     | 126                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 45.85                        | 54                | -8.15          | Avg      |

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|---------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                             |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 2462 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2484.2                                      | 39.35                     | 54                                | 220            | H                 | 28.42            | 3.25                  | 0                    | 71.02                        | 74                | -2.98          | Peak     |
| 2483.9                                      | 37.19                     | 123                               | 100            | V                 | 28.27            | 3.25                  | 0                    | 68.71                        | 74                | -5.29          | Peak     |
| 2484.2                                      | 14.07                     | 54                                | 220            | H                 | 28.42            | 3.25                  | 0                    | 45.74                        | 54                | -8.26          | Avg      |
| 2483.9                                      | 13.75                     | 123                               | 100            | V                 | 28.27            | 3.25                  | 0                    | 45.27                        | 54                | -8.73          | Avg      |

**802.11HT40 mode:**

| Frequency<br>(MHz)                         | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|--------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                            |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| Low Channel 2422 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2389.9                                     | 34.53                     | 53                                | 234            | H                 | 28.16            | 3.12                  | 0                    | 65.81                        | 74                | -8.19          | Peak     |
| 2389.9                                     | 33.46                     | 123                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 64.7                         | 74                | -9.3           | Peak     |
| 2389.9                                     | 16.21                     | 53                                | 234            | H                 | 28.16            | 3.12                  | 0                    | 47.49                        | 54                | -6.51          | Avg      |
| 2389.9                                     | 15.73                     | 123                               | 116            | V                 | 28.12            | 3.12                  | 0                    | 46.97                        | 54                | -7.03          | Avg      |

| Frequency<br>(MHz)                          | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC/IC            |                | Comments |
|---------------------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                             |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| High Channel 2452 MHz, measured at 3 meters |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2484                                        | 35.06                     | 53                                | 222            | H                 | 28.42            | 3.25                  | 0                    | 66.73                        | 74                | -7.27          | Peak     |
| 2484.5                                      | 34.46                     | 124                               | 113            | V                 | 28.27            | 3.25                  | 0                    | 65.98                        | 74                | -8.02          | Peak     |
| 2484                                        | 14.09                     | 53                                | 222            | H                 | 28.42            | 3.25                  | 0                    | 45.76                        | 54                | -8.24          | Avg      |
| 2484.5                                      | 13.72                     | 124                               | 113            | V                 | 28.27            | 3.25                  | 0                    | 45.24                        | 54                | -8.76          | Avg      |

**Bluetooth:**

Worst mode was tested (GFSK)

**1) 30 MHz – 1 GHz, Radiated Spurious Emissions Measured at 3 meters**

| Frequency (MHz)                 | Corrected Amplitude (dB) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBµV/m) | Margin (dB) | Comment    |
|---------------------------------|--------------------------|---------------------|------------------------|-----------------------------|----------------|-------------|------------|
| GFSK, Low Channel (2402 MHz)    |                          |                     |                        |                             |                |             |            |
| 995.75                          | 25.3                     | 100                 | V                      | 168                         | 54             | -28.7       | Quasi-Peak |
| GFSK, Middle Channel (2441 MHz) |                          |                     |                        |                             |                |             |            |
| 995.46                          | 25.94                    | 100                 | V                      | 183                         | 54             | -28.06      | Quasi-Peak |
| GFSK, High Channel (2480 MHz)   |                          |                     |                        |                             |                |             |            |
| 996.88                          | 25.03                    | 100                 | V                      | 186                         | 54             | -28.97      | Quasi-Peak |

**2) 1 – 25 GHz, Radiated Spurious Emissions Measured at 3 meters**

| Frequency<br>(MHz)           | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC & IC          |                | Comments |
|------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                              |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| GFSK, Low Channel (2402 MHz) |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2402                         | 76.67                     | 317                               | 122            | H                 | 28.36            | 3.12                  | 0                    | 108.15                       | Fund.             | -              | Peak     |
| 2402                         | 73.43                     | 113                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 105.08                       | Fund.             | -              | Peak     |
| 2402                         | 73.5                      | 317                               | 122            | H                 | 28.36            | 3.12                  | 0                    | 104.98                       | Fund.             | -              | Avg      |
| 2402                         | 70.37                     | 113                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 102.02                       | Fund.             | -              | Avg      |
| 4804                         | 34.32                     | 0                                 | 100            | H                 | 33.48            | 4.56                  | 27.78                | 44.58                        | 74                | -29.42         | Peak     |
| 4804                         | 35.47                     | 337                               | 153            | V                 | 33.59            | 4.56                  | 27.78                | 45.84                        | 74                | -28.16         | Peak     |
| 4804                         | 19.19                     | 0                                 | 100            | H                 | 33.48            | 4.56                  | 27.78                | 29.45                        | 54                | -24.55         | Avg      |
| 4804                         | 23.4                      | 337                               | 153            | V                 | 33.59            | 4.56                  | 27.78                | 33.77                        | 54                | -20.23         | Avg      |
| 7206                         | 33.25                     | 0                                 | 100            | H                 | 38.5             | 5.49                  | 27.59                | 49.65                        | 74                | -24.35         | Peak     |
| 7206                         | 35.6                      | 315                               | 141            | V                 | 38.65            | 5.49                  | 27.59                | 52.15                        | 74                | -21.85         | Peak     |
| 7206                         | 18.36                     | 0                                 | 100            | H                 | 38.5             | 5.49                  | 27.59                | 34.76                        | 54                | -19.24         | Avg      |
| 7206                         | 25.3                      | 315                               | 141            | V                 | 38.65            | 5.49                  | 27.59                | 41.85                        | 54                | -12.15         | Avg      |
| 9608                         | 32.08                     | 0                                 | 100            | H                 | 38.54            | 6.54                  | 27.05                | 50.11                        | 74                | -23.89         | Peak     |
| 9608                         | 31.94                     | 0                                 | 100            | V                 | 38.54            | 6.54                  | 27.05                | 49.97                        | 74                | -24.03         | Peak     |
| 9608                         | 17.04                     | 0                                 | 100            | H                 | 38.54            | 6.54                  | 27.05                | 35.07                        | 54                | -18.93         | Avg      |
| 9608                         | 17.17                     | 0                                 | 100            | V                 | 38.54            | 6.54                  | 27.05                | 35.2                         | 54                | -18.8          | Avg      |

| Frequency<br>(MHz)              | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC & IC          |                | Comments |
|---------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                 |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| GFSK, Middle Channel (2441 MHz) |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2441                            | 75.08                     | 262                               | 103            | H                 | 28.75            | 3.25                  | 0                    | 107.08                       | Fund.             | -              | Peak     |
| 2441                            | 73.35                     | 216                               | 100            | V                 | 28.82            | 3.25                  | 0                    | 105.42                       | Fund.             | -              | Peak     |
| 2441                            | 71.84                     | 262                               | 103            | H                 | 28.75            | 3.25                  | 0                    | 103.84                       | Fund.             | -              | Avg      |
| 2441                            | 70.21                     | 216                               | 100            | V                 | 28.82            | 3.25                  | 0                    | 102.28                       | Fund.             | -              | Avg      |
| 4882                            | 33.82                     | 0                                 | 100            | H                 | 33.57            | 4.54                  | 27.67                | 44.26                        | 74                | -29.74         | Peak     |
| 4882                            | 34.84                     | 0                                 | 100            | V                 | 33.59            | 4.54                  | 27.67                | 45.3                         | 74                | -28.7          | Peak     |
| 4882                            | 19.45                     | 0                                 | 100            | H                 | 33.57            | 4.54                  | 27.67                | 29.89                        | 54                | -24.11         | Avg      |
| 4882                            | 20.44                     | 0                                 | 100            | V                 | 33.59            | 4.54                  | 27.67                | 30.9                         | 54                | -23.1          | Avg      |
| 7323                            | 33.43                     | 0                                 | 100            | H                 | 38.27            | 5.57                  | 27.51                | 49.76                        | 74                | -24.24         | Peak     |
| 7323                            | 33.75                     | 0                                 | 100            | V                 | 38.33            | 5.57                  | 27.51                | 50.14                        | 74                | -23.86         | Peak     |
| 7323                            | 18.45                     | 0                                 | 100            | H                 | 38.27            | 5.57                  | 27.51                | 34.78                        | 54                | -19.22         | Avg      |
| 7323                            | 18.15                     | 0                                 | 100            | V                 | 38.33            | 5.57                  | 27.51                | 34.54                        | 54                | -19.46         | Avg      |
| 9764                            | 31.78                     | 0                                 | 100            | H                 | 38.3             | 6.62                  | 26.98                | 49.72                        | 74                | -24.28         | Peak     |
| 9764                            | 31.48                     | 0                                 | 100            | V                 | 38.3             | 6.62                  | 26.98                | 49.42                        | 74                | -24.58         | Peak     |
| 9764                            | 16.97                     | 0                                 | 100            | H                 | 38.3             | 6.62                  | 26.98                | 34.91                        | 54                | -19.09         | Avg      |
| 9764                            | 16.97                     | 0                                 | 100            | V                 | 38.3             | 6.62                  | 26.98                | 34.91                        | 54                | -19.09         | Avg      |
| GFSK, High Channel (2480 MHz)   |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2480                            | 76.99                     | 318                               | 118            | H                 | 29.12            | 3.25                  | 0                    | 109.36                       | Fund.             | -              | Peak     |
| 2480                            | 73.35                     | 221                               | 127            | V                 | 29.12            | 3.25                  | 0                    | 105.72                       | Fund.             | -              | Peak     |
| 2480                            | 73.8                      | 318                               | 118            | H                 | 29.12            | 3.25                  | 0                    | 106.17                       | Fund.             | -              | Avg      |
| 2480                            | 70.31                     | 221                               | 127            | V                 | 29.12            | 3.25                  | 0                    | 102.68                       | Fund.             | -              | Avg      |
| 4960                            | 33.12                     | 15                                | 135            | H                 | 33.74            | 4.52                  | 27.7                 | 43.68                        | 74                | -30.32         | Peak     |
| 4960                            | 35.64                     | 324                               | 130            | V                 | 33.67            | 4.52                  | 27.7                 | 46.13                        | 74                | -27.87         | Peak     |
| 4960                            | 19.74                     | 15                                | 135            | H                 | 33.74            | 4.52                  | 27.7                 | 30.3                         | 54                | -23.7          | Avg      |
| 4960                            | 28.43                     | 324                               | 130            | V                 | 33.67            | 4.52                  | 27.7                 | 38.92                        | 54                | -15.08         | Avg      |
| 7440                            | 32.1                      | 0                                 | 100            | H                 | 38.36            | 5.66                  | 27.53                | 48.59                        | 74                | -25.41         | Peak     |
| 7440                            | 32.62                     | 0                                 | 100            | V                 | 38.39            | 5.66                  | 27.53                | 49.14                        | 74                | -24.86         | Peak     |
| 7440                            | 17.79                     | 0                                 | 100            | H                 | 38.36            | 5.66                  | 27.53                | 34.28                        | 54                | -19.72         | Avg      |
| 7440                            | 17.818                    | 0                                 | 100            | V                 | 38.39            | 5.66                  | 27.53                | 34.338                       | 54                | -19.662        | Avg      |
| 9920                            | 31.96                     | 0                                 | 100            | H                 | 38               | 6.67                  | 27.01                | 49.62                        | 74                | -24.38         | Peak     |
| 9920                            | 31.73                     | 0                                 | 100            | V                 | 37.9             | 6.67                  | 27.01                | 49.29                        | 74                | -24.71         | Peak     |
| 9920                            | 16.95                     | 0                                 | 100            | H                 | 38               | 6.67                  | 27.01                | 34.61                        | 54                | -19.39         | Avg      |
| 9920                            | 17.04                     | 0                                 | 100            | V                 | 37.9             | 6.67                  | 27.01                | 34.6                         | 54                | -19.4          | Avg      |

**3) Spurious Emissions in Restricted Band**

| Frequency<br>(MHz)                | S.A.<br>Reading<br>(dBμV) | Turntable<br>Azimuth<br>(degrees) | Test Antenna   |                   |                  | Cable<br>Loss<br>(dB) | Pre-<br>Amp.<br>(dB) | Cord.<br>Reading<br>(dBμV/m) | FCC & IC          |                | Comments |
|-----------------------------------|---------------------------|-----------------------------------|----------------|-------------------|------------------|-----------------------|----------------------|------------------------------|-------------------|----------------|----------|
|                                   |                           |                                   | Height<br>(cm) | Polarity<br>(H/V) | Factor<br>(dB/m) |                       |                      |                              | Limit<br>(dBμV/m) | Margin<br>(dB) |          |
| (Near Band Edge) Lowest Channel   |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2319.3                            | 27.49                     | 317                               | 122            | H                 | 27.74            | 3.12                  | 0                    | 58.35                        | 74                | -15.65         | Peak     |
| 2383.7                            | 27.64                     | 113                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 59.29                        | 74                | -14.71         | Peak     |
| 2319.3                            | 13.6                      | 317                               | 122            | H                 | 27.74            | 3.12                  | 0                    | 44.46                        | 54                | -9.54          | Avg      |
| 2321.3                            | 12.99                     | 113                               | 100            | V                 | 28.53            | 3.12                  | 0                    | 44.64                        | 54                | -9.36          | Avg      |
| (Near Band Edge): Highest Channel |                           |                                   |                |                   |                  |                       |                      |                              |                   |                |          |
| 2488.9                            | 28.61                     | 318                               | 118            | H                 | 29.12            | 3.25                  | 0                    | 60.98                        | 74                | -13.02         | Peak     |
| 2488                              | 28.14                     | 221                               | 127            | V                 | 29.12            | 3.25                  | 0                    | 60.51                        | 74                | -13.49         | Peak     |
| 2487.7                            | 14.14                     | 318                               | 118            | H                 | 29.12            | 3.25                  | 0                    | 46.51                        | 54                | -7.49          | Avg      |
| 2487.7                            | 13.58                     | 221                               | 127            | V                 | 29.12            | 3.25                  | 0                    | 45.95                        | 54                | -8.05          | Avg      |

## 9 FCC §15.247(a)(2) & IC RSS-210 §A8.2 – 6 dB & 99% Emission Bandwidth

### 9.1 Applicable Standard

According to FCC §15.247(a)(2) and IC RSS-210 A8.2 (a), systems using digital modulation techniques may operate in the 902~928 MHz, 2400~2483.5 MHz, and 5725~5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 9.2 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. Turn on the EUT and connect it to measurement instrument. 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 6 dB from the reference level. Record the frequency difference as the emissions bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

### 9.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4440A    | MY44303352 | 2012-05-10       | 1 year               |

**Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

### 9.4 Test Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 21.1 °C  |
| Relative Humidity: | 59%      |
| ATM Pressure:      | 101.5kPa |

*The testing was performed by Lionel Lara on 2012-06-14 at RF Test Site.*

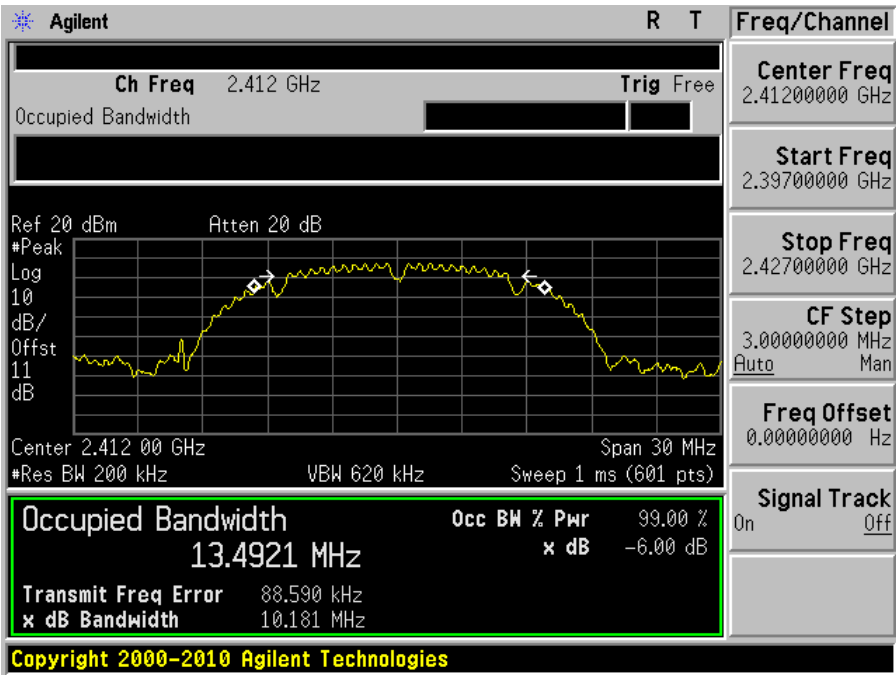
## 9.5 Test Results

| Channel           | Frequency (MHz) | 99% Emission Bandwidth (MHz) | 6 dB Emission Bandwidth (MHz) | Limit (kHz) | Results   |
|-------------------|-----------------|------------------------------|-------------------------------|-------------|-----------|
| 802.11b mode      |                 |                              |                               |             |           |
| Low               | 2412            | 13.4921                      | 10.182                        | > 500       | Compliant |
| Middle            | 2437            | 13.4421                      | 10.180                        | > 500       | Compliant |
| High              | 2462            | 13.5231                      | 10.177                        | > 500       | Compliant |
| 802.11g mode      |                 |                              |                               |             |           |
| Low               | 2412            | 16.5664                      | 16.482                        | > 500       | Compliant |
| Middle            | 2437            | 16.5958                      | 16.555                        | > 500       | Compliant |
| High              | 2462            | 16.5981                      | 16.556                        | > 500       | Compliant |
| 802.11n HT20 mode |                 |                              |                               |             |           |
| Low               | 2412            | 17.7110                      | 17.719                        | > 500       | Compliant |
| Middle            | 2437            | 17.7139                      | 17.724                        | > 500       | Compliant |
| High              | 2462            | 17.7216                      | 17.734                        | > 500       | Compliant |
| 802.11n HT40 mode |                 |                              |                               |             |           |
| Low               | 2422            | 36.2611                      | 36.572                        | > 500       | Compliant |
| Middle            | 2437            | 36.3026                      | 36.637                        | > 500       | Compliant |
| High              | 2452            | 36.2650                      | 36.566                        | > 500       | Compliant |

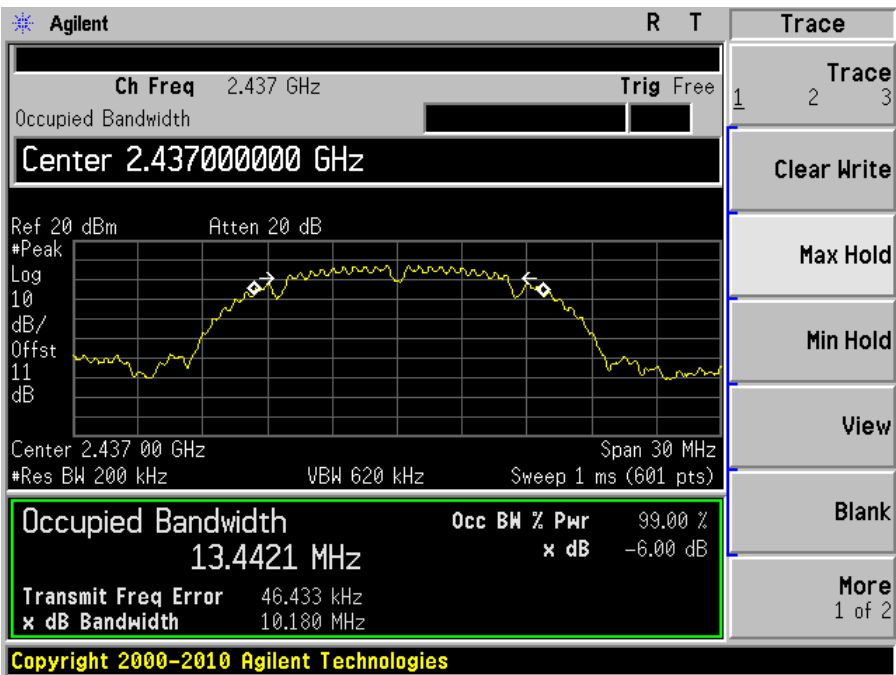
Please refer to the following plots for detailed test results

802.11b

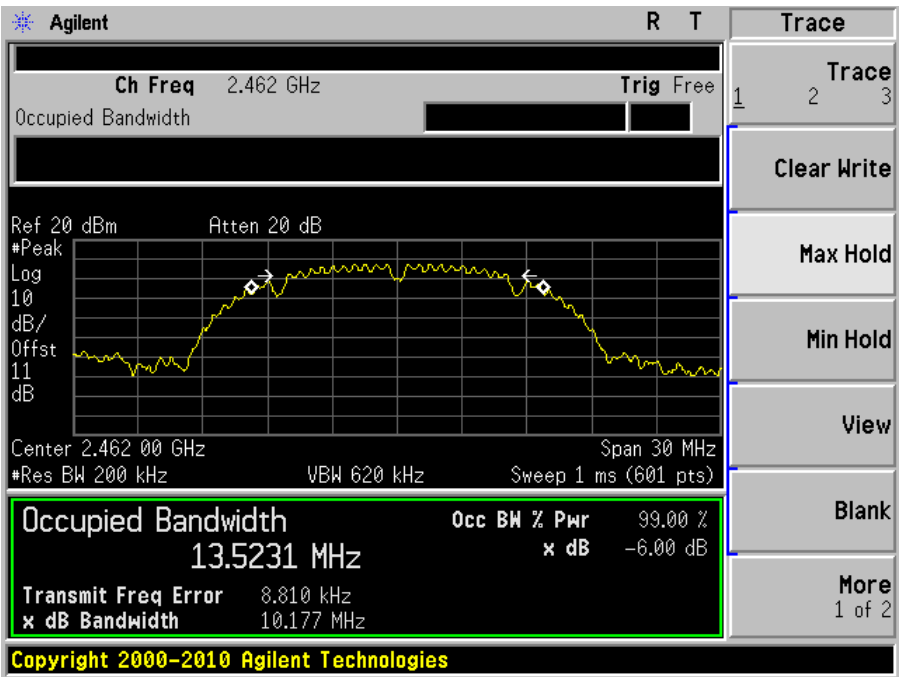
Low channel



Middle channel

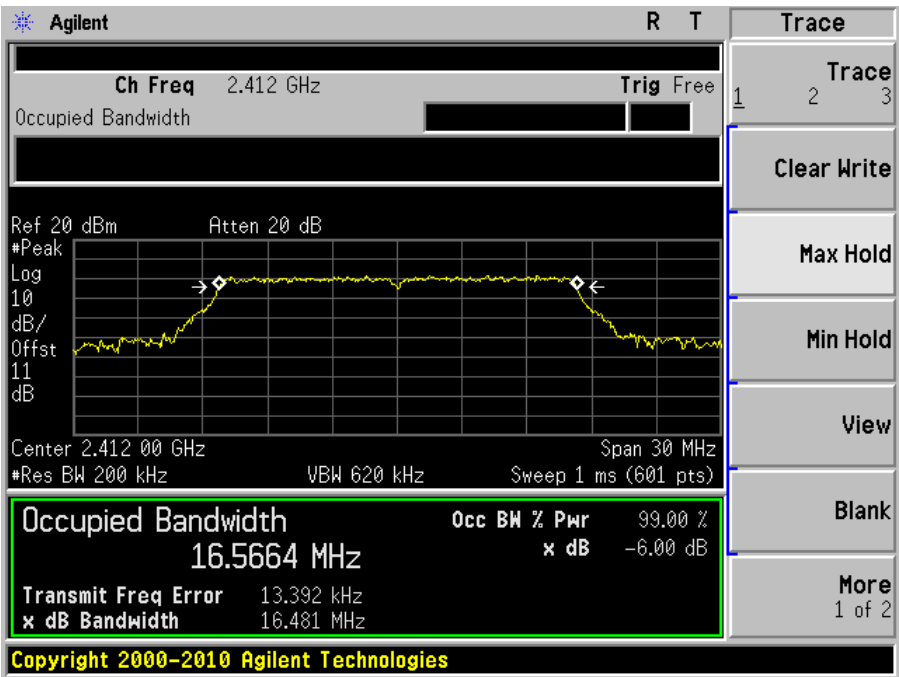


High channel

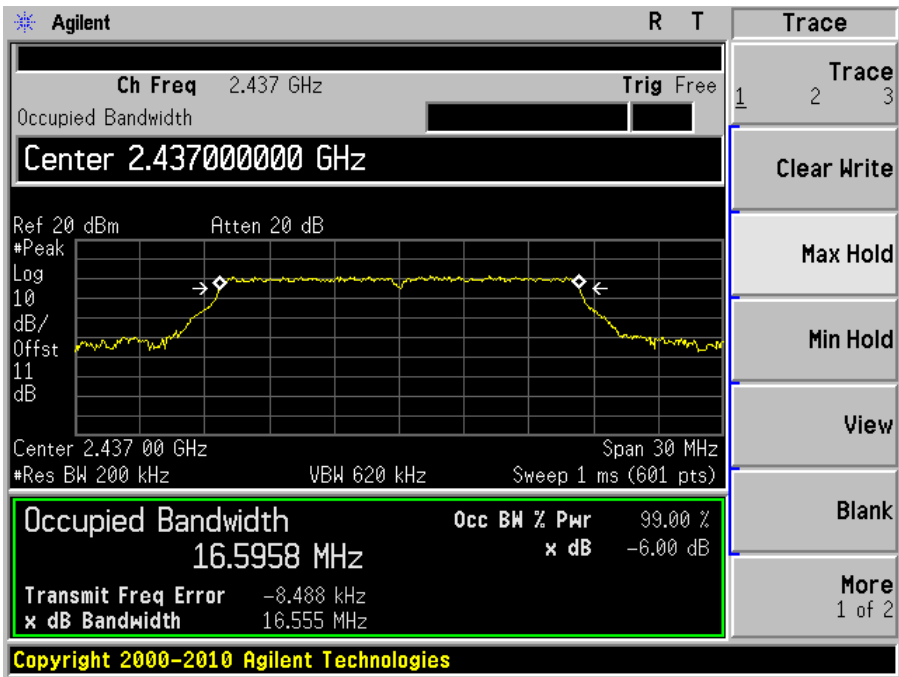


802.11g

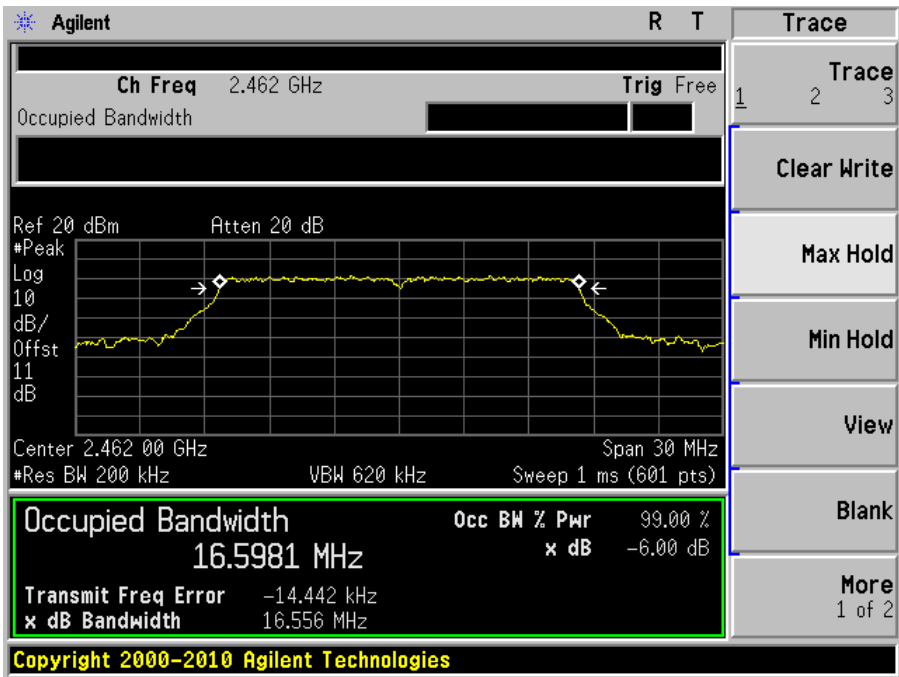
Low channel



Middle channel

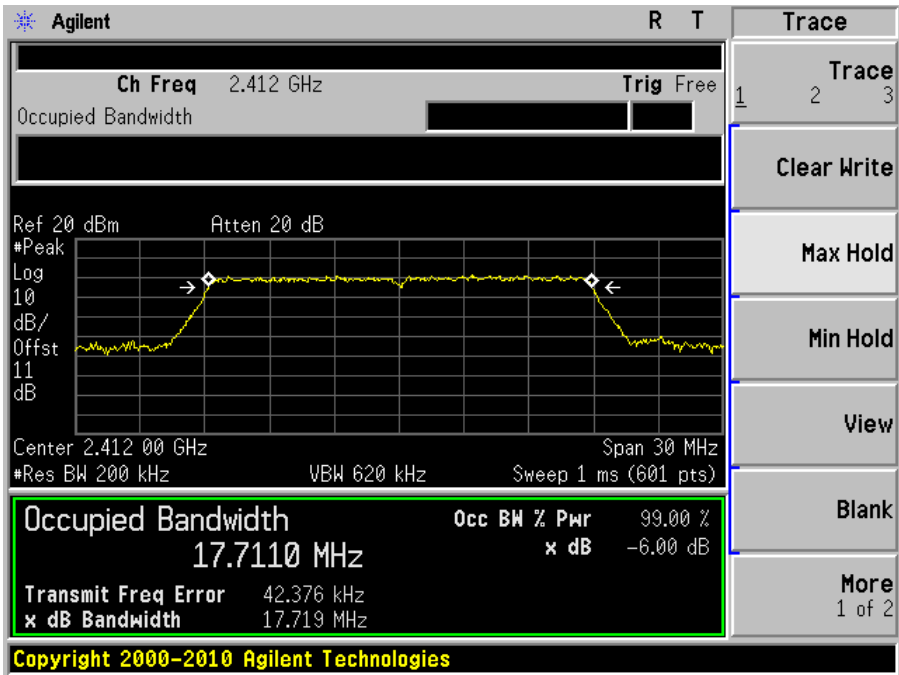


High channel

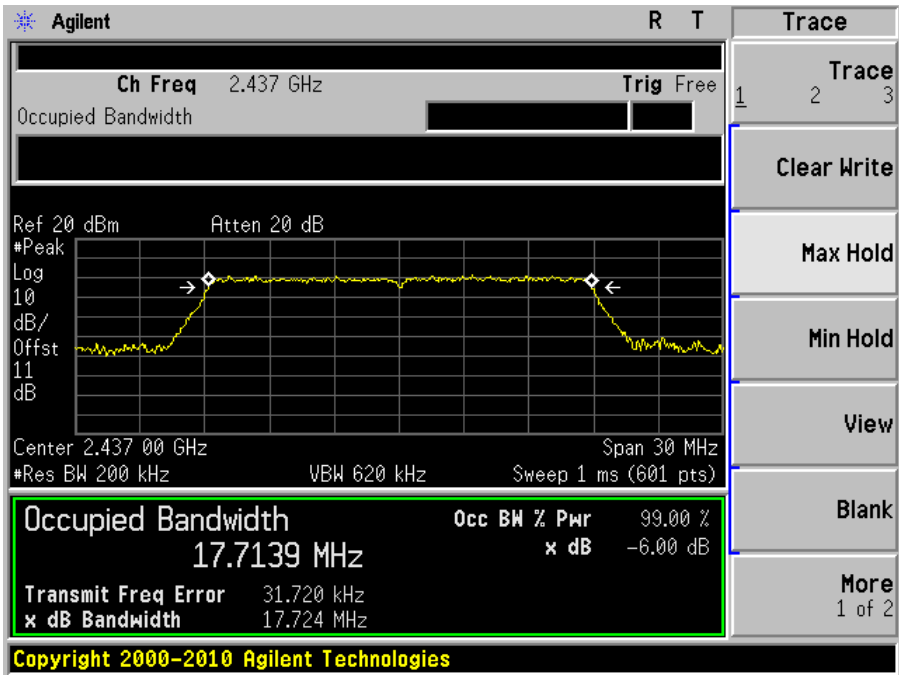


802.11n HT20

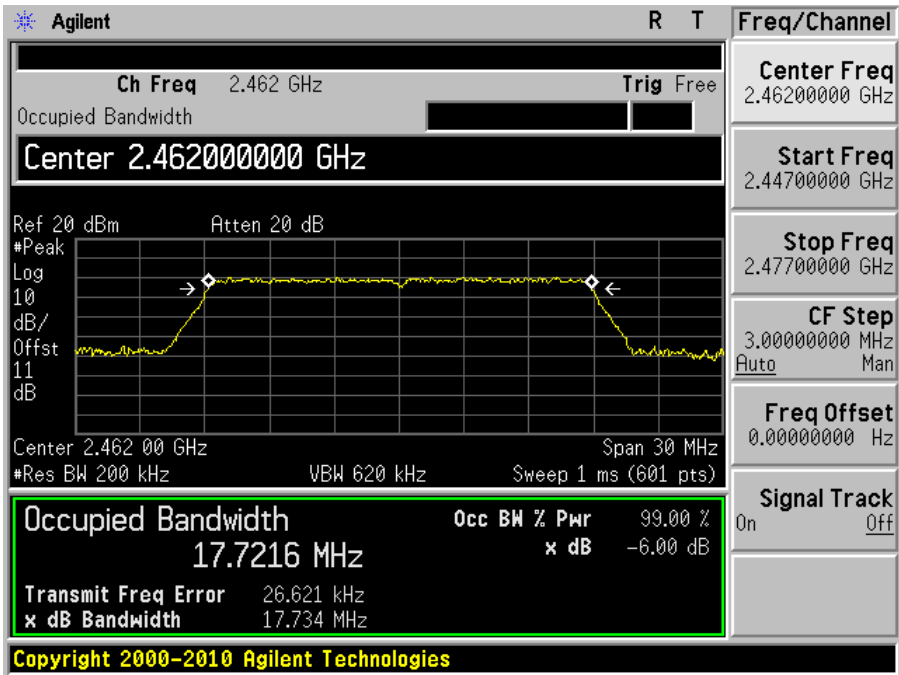
Low channel



Middle channel

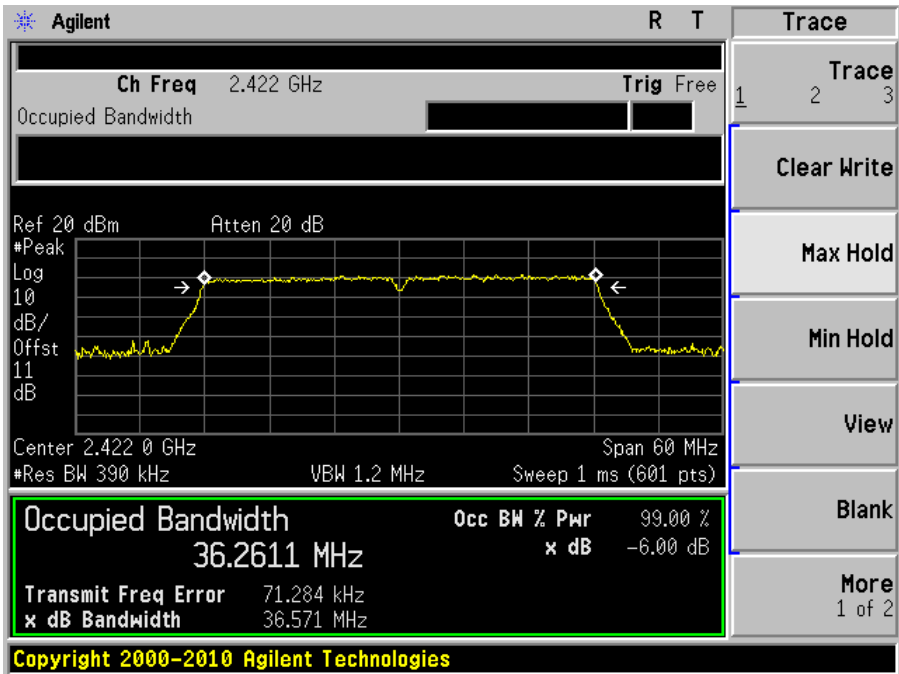


High channel

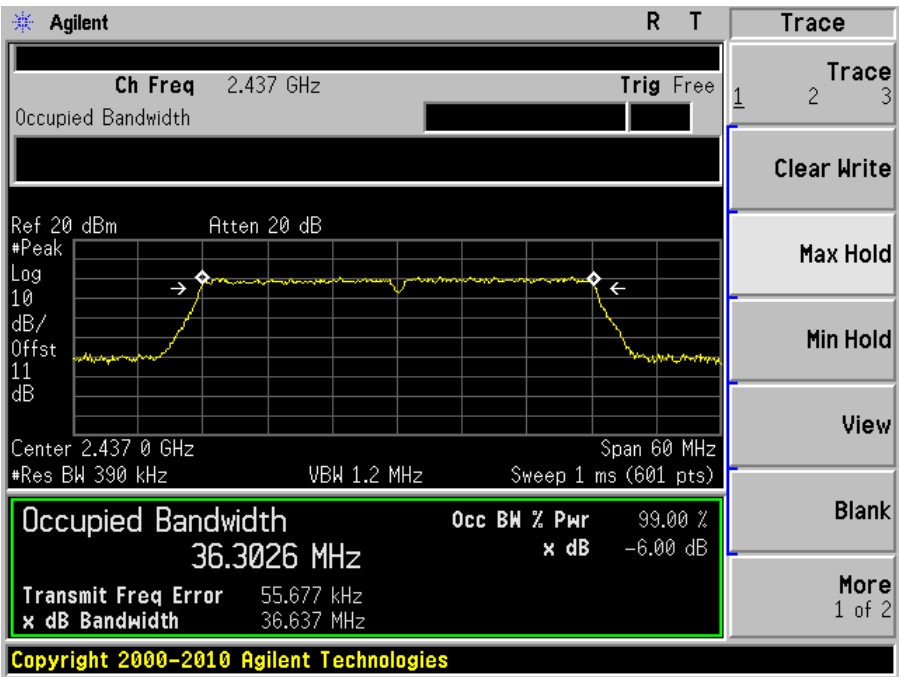


802.11n HT40

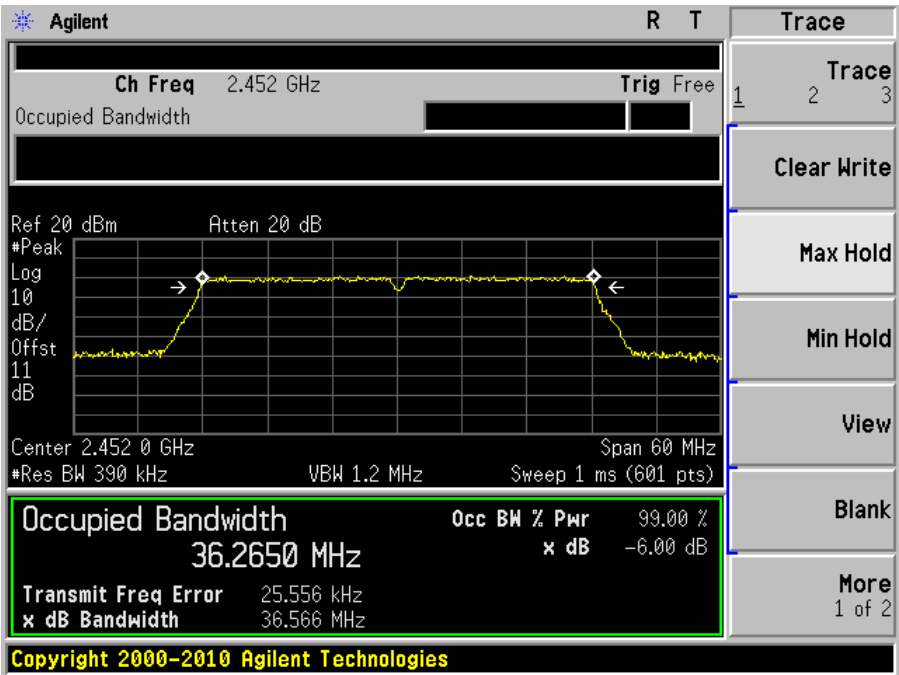
Low channel



Middle channel



High channel



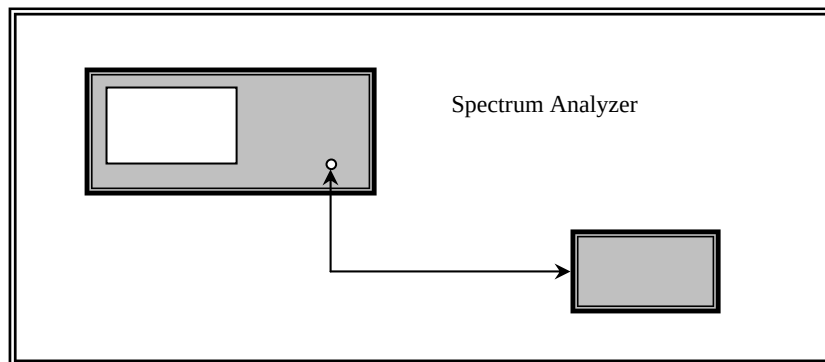
## 10 FCC §15.247(b) & IC RSS-210 §A8.4 - Peak Output Power Measurement

### 10.1 Applicable Standard

According to FCC §15.247(b) and IC RSS-210 §A8.4 (4) for systems using digital modulation in the 902~928 MHz, 2400~2483.5 MHz, and 5725~5850 MHz bands: 1 Watt.

### 10.2 Measurement Procedure

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



### 10.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4440A    | MY44303352 | 2012-05-10       | 1 year               |

**Statement of Traceability:** BACL Corp. attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

## 10.4 Test Environmental Conditions

### WLAN:

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 21.1 °C  |
| <b>Relative Humidity:</b> | 59%      |
| <b>ATM Pressure:</b>      | 101.5kPa |

The testing was performed by Lionel Lara on 2012-06-14 at RF Test Site.

### BT:

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 22 °C    |
| <b>Relative Humidity:</b> | 57 %     |
| <b>ATM Pressure:</b>      | 101.1kPa |

The testing was performed by Lionel Lara on 2012-06-18 at RF test site.

## 10.5 Test Results

### WLAN:

| Channel           | Frequency (MHz) | Conducted Output Power (dBm) | Limit (dBm) | Margin (dB) |
|-------------------|-----------------|------------------------------|-------------|-------------|
| 802.11b mode      |                 |                              |             |             |
| Low               | 2412            | 15.73                        | 30          | -14.27      |
| Middle            | 2437            | 15.89                        | 30          | -14.11      |
| High              | 2462            | 15.80                        | 30          | -14.20      |
| 802.11g mode      |                 |                              |             |             |
| Low               | 2412            | 13.37                        | 30          | -16.63      |
| Middle            | 2437            | 13.28                        | 30          | -16.72      |
| High              | 2462            | 13.15                        | 30          | -16.85      |
| 802.11n HT20 mode |                 |                              |             |             |
| Low               | 2412            | 13.45                        | 30          | -16.55      |
| Middle            | 2437            | 13.19                        | 30          | -16.81      |
| High              | 2462            | 13.09                        | 30          | -16.91      |
| 802.11n HT40 mode |                 |                              |             |             |
| Low               | 2422            | 13.12                        | 30          | -16.88      |
| Middle            | 2437            | 13.38                        | 30          | -16.62      |
| High              | 2452            | 13.39                        | 30          | -16.61      |

**Bluetooth:**

## Modulation GFSK:

| Channel | Frequency (MHz) | Max Peak Output Power |          | Limit (mw) | Result |
|---------|-----------------|-----------------------|----------|------------|--------|
|         |                 | (dBm)                 | (mw)     |            |        |
| Low     | 2402            | 9.54                  | 8.994976 | 125        | Pass   |
| Mid     | 2441            | 10.10                 | 10.23293 | 125        | Pass   |
| High    | 2480            | 10.08                 | 10.18591 | 125        | Pass   |

## Modulation DQPSK:

| Channel | Frequency (MHz) | Max Peak Output Power |          | Limit (mw) | Result |
|---------|-----------------|-----------------------|----------|------------|--------|
|         |                 | (dBm)                 | (mw)     |            |        |
| Low     | 2402            | 7.62                  | 5.78096  | 125        | Pass   |
| Mid     | 2441            | 8.24                  | 6.668068 | 125        | Pass   |
| High    | 2480            | 8.37                  | 6.870684 | 125        | Pass   |

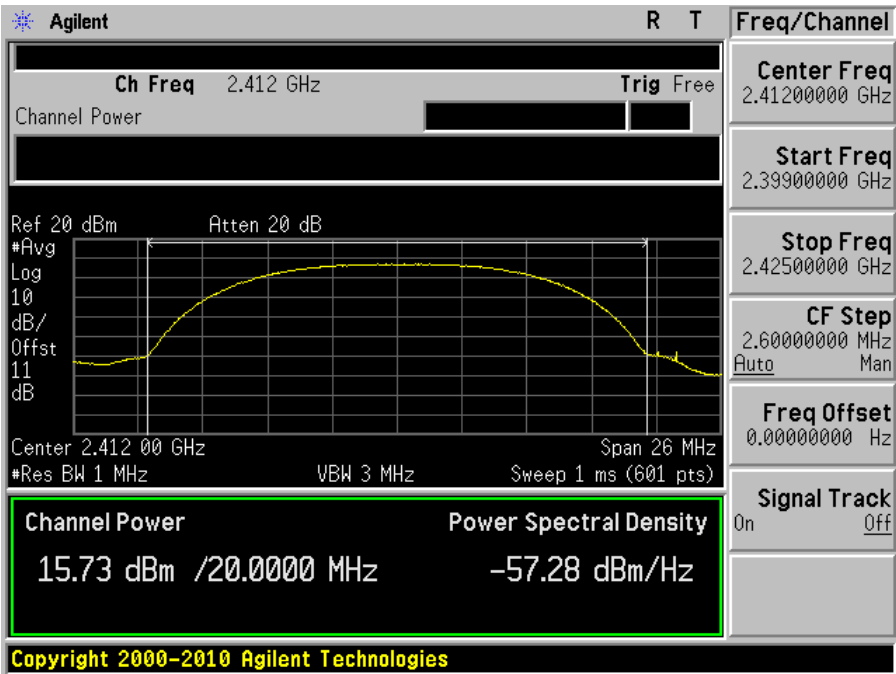
## Modulation 8PSK:

| Channel | Frequency (MHz) | Max Peak Output Power |          | Limit (mw) | Result |
|---------|-----------------|-----------------------|----------|------------|--------|
|         |                 | (dBm)                 | (mw)     |            |        |
| Low     | 2402            | 8.09                  | 6.441693 | 125        | Pass   |
| Mid     | 2441            | 8.69                  | 7.396053 | 125        | Pass   |
| High    | 2480            | 8.80                  | 7.585776 | 125        | Pass   |

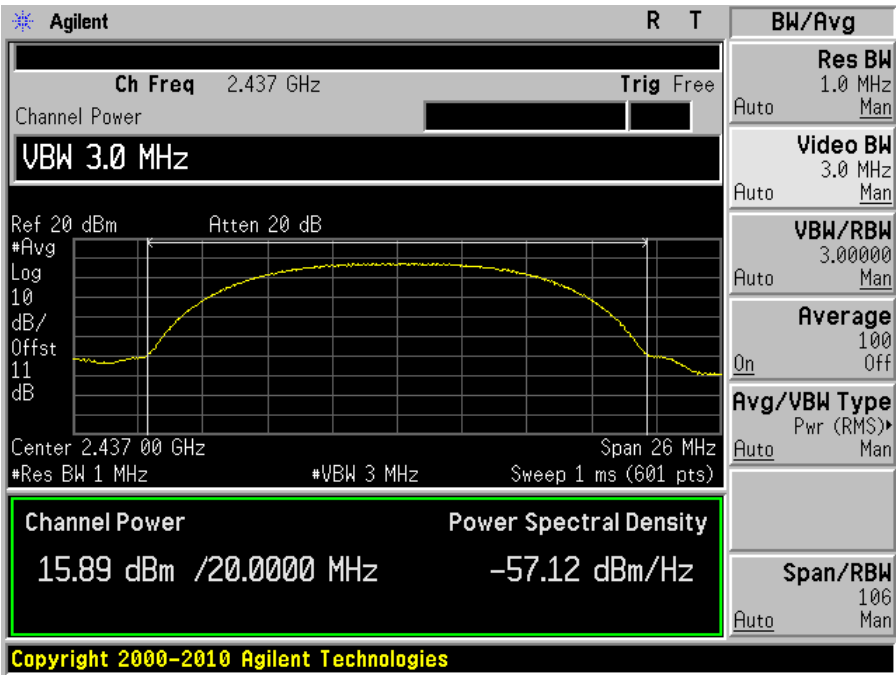
WLAN:

802.11b

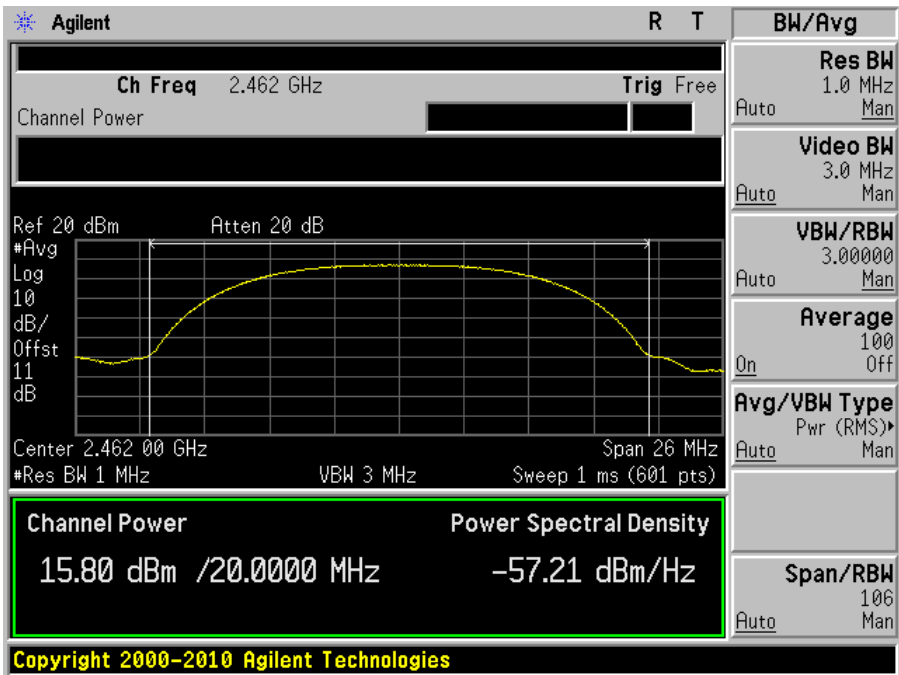
Low channel



Middle channel

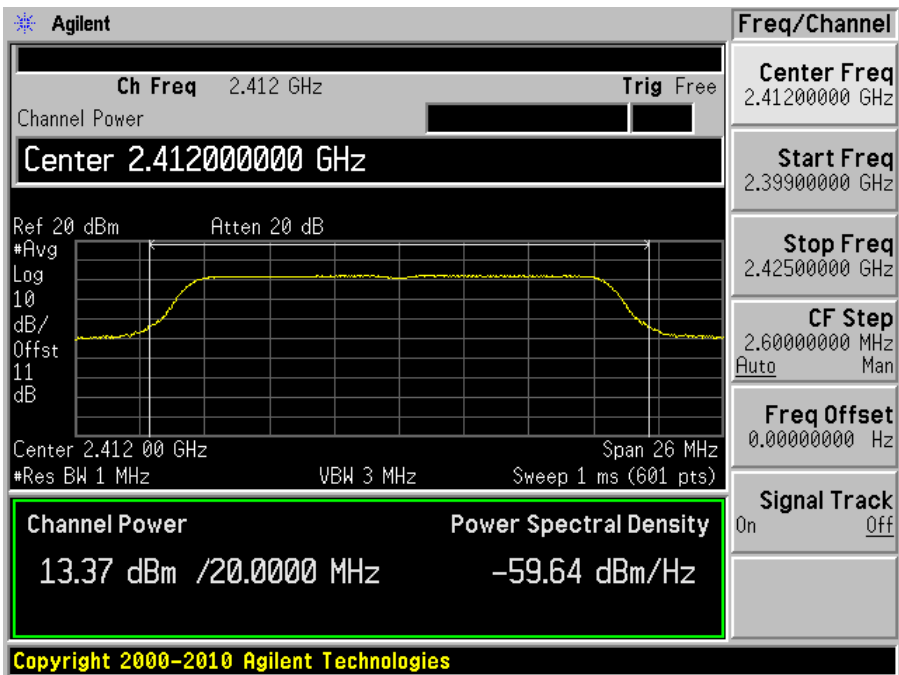


High channel

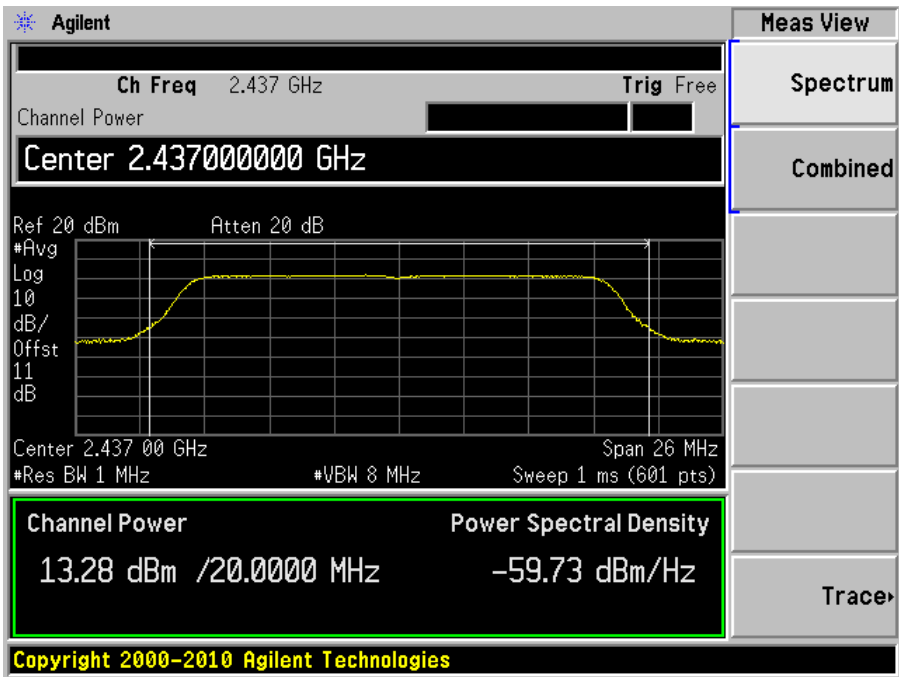


802.11g

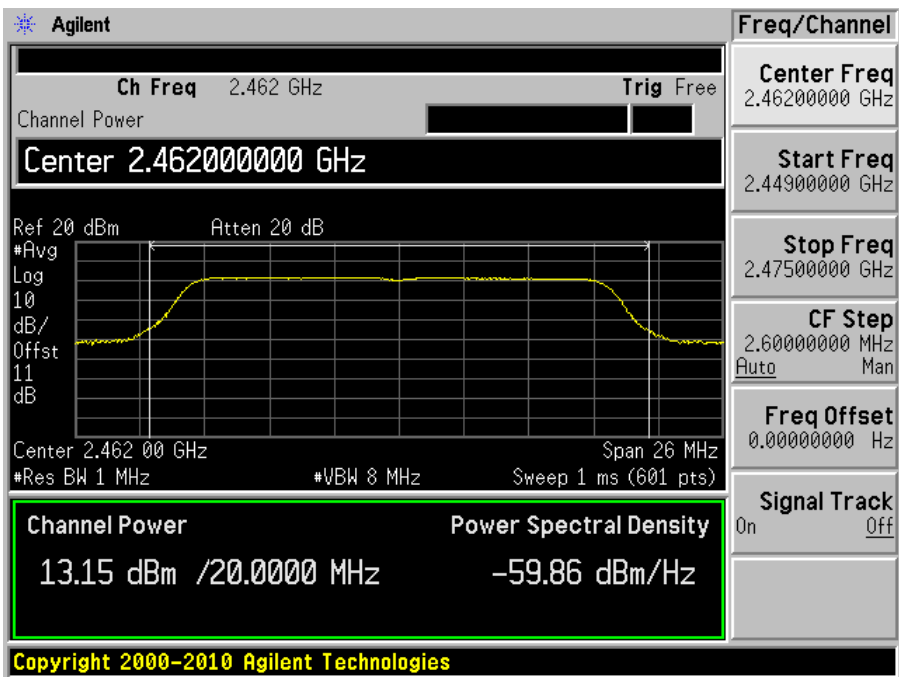
Low channel



Middle channel

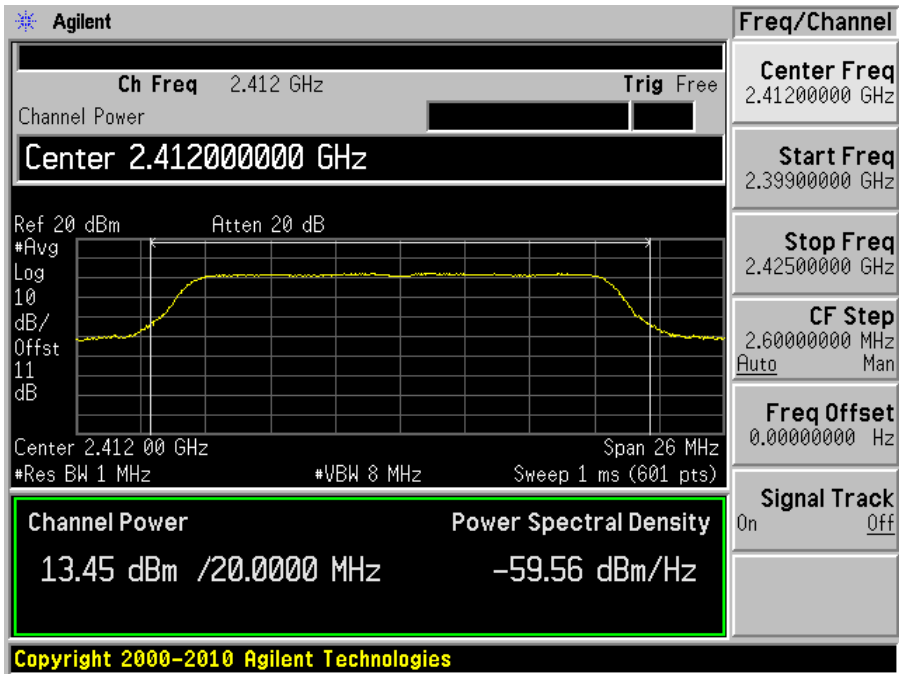


High channel

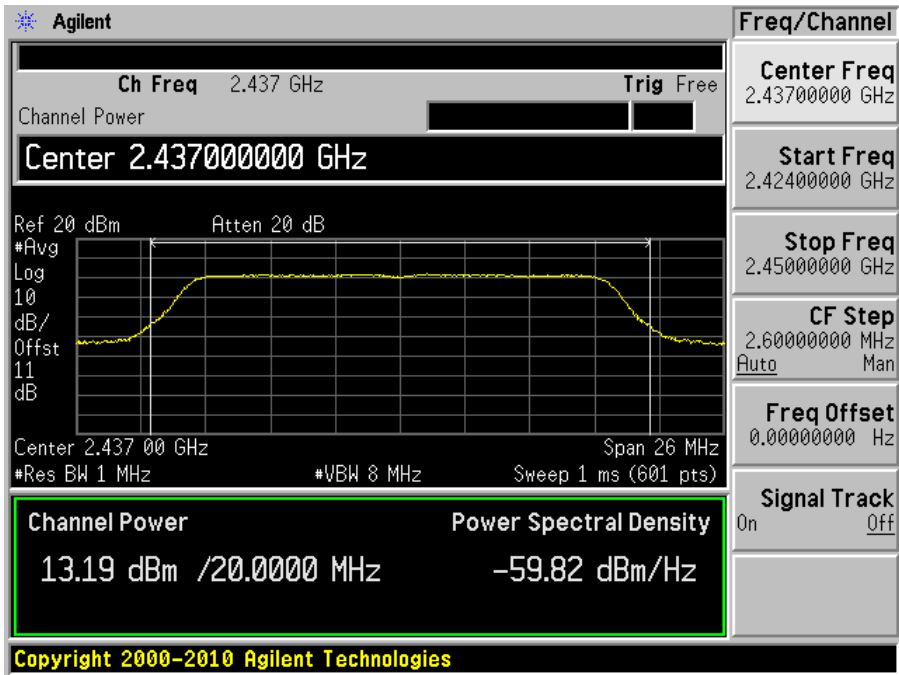


802.11n HT20

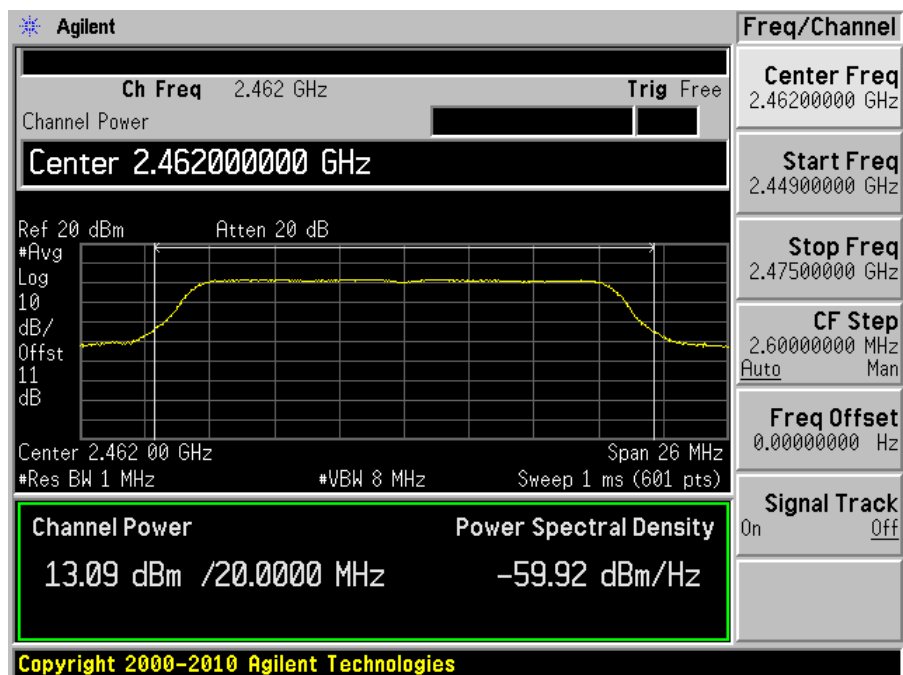
Low channel



Middle channel

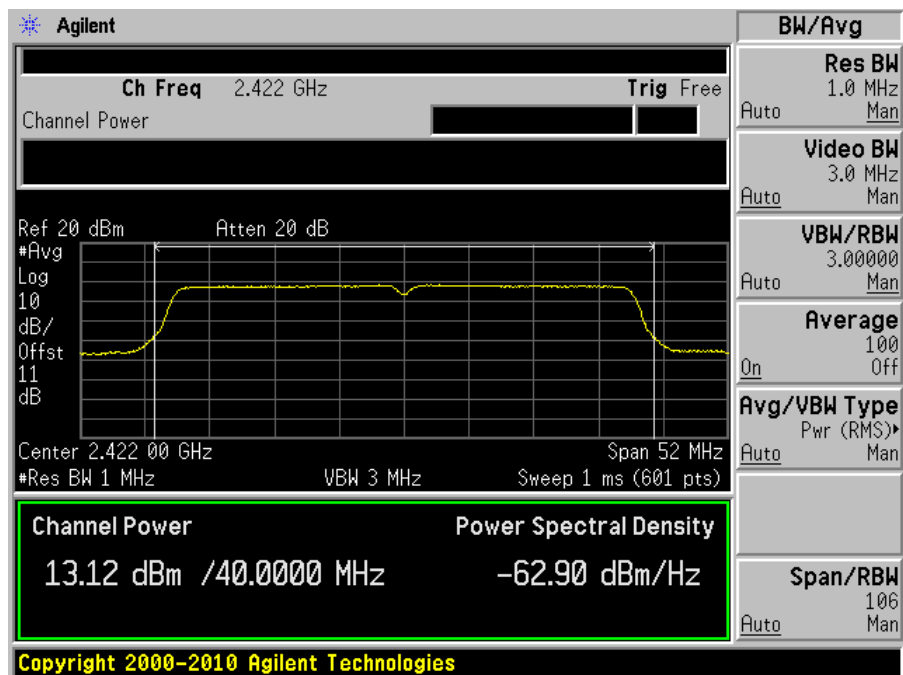


## High channel

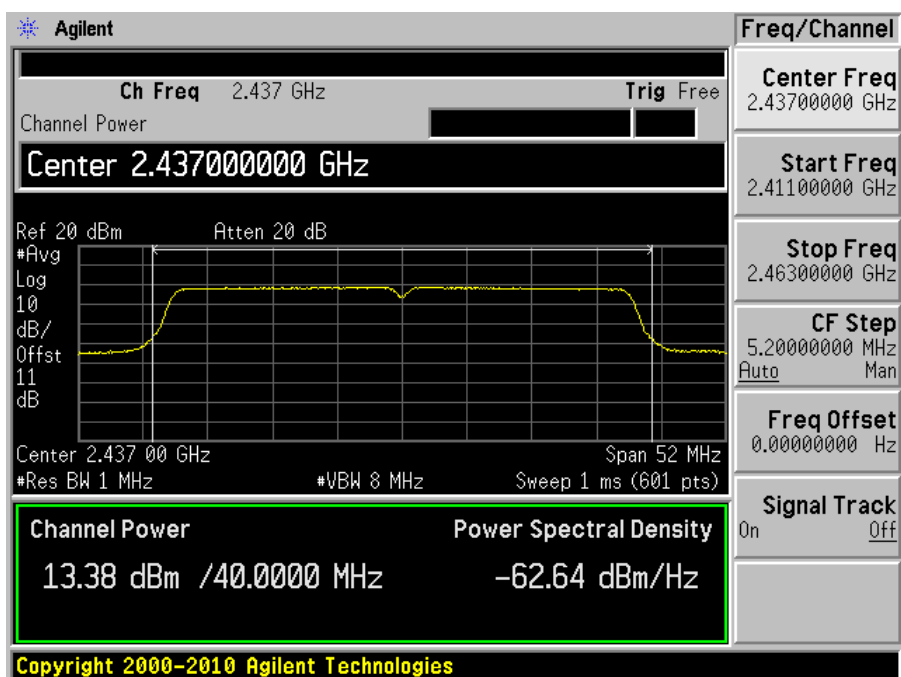


## 802.11n HT40

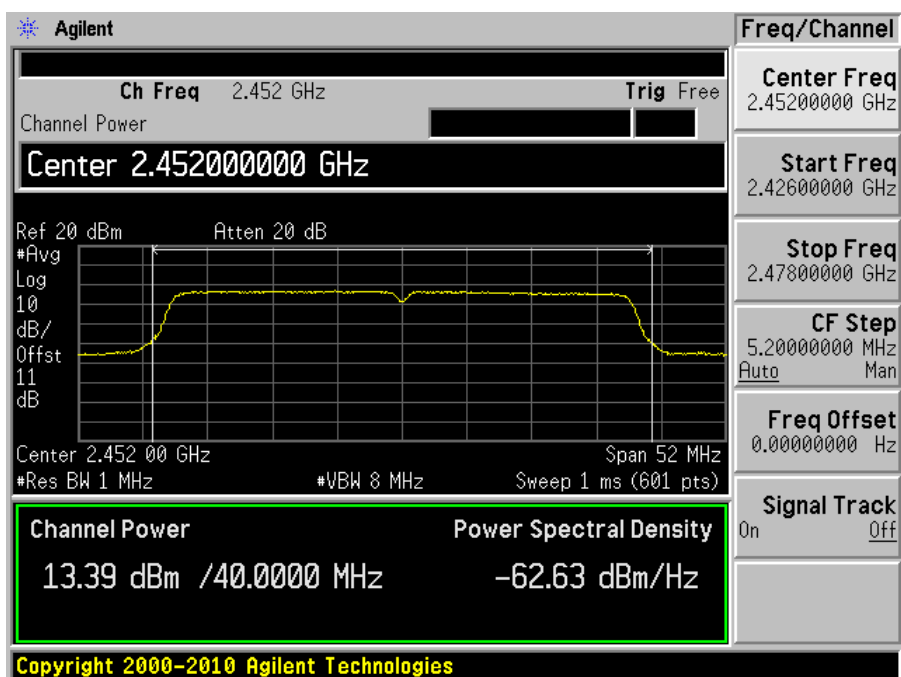
## Low channel



## Middle channel

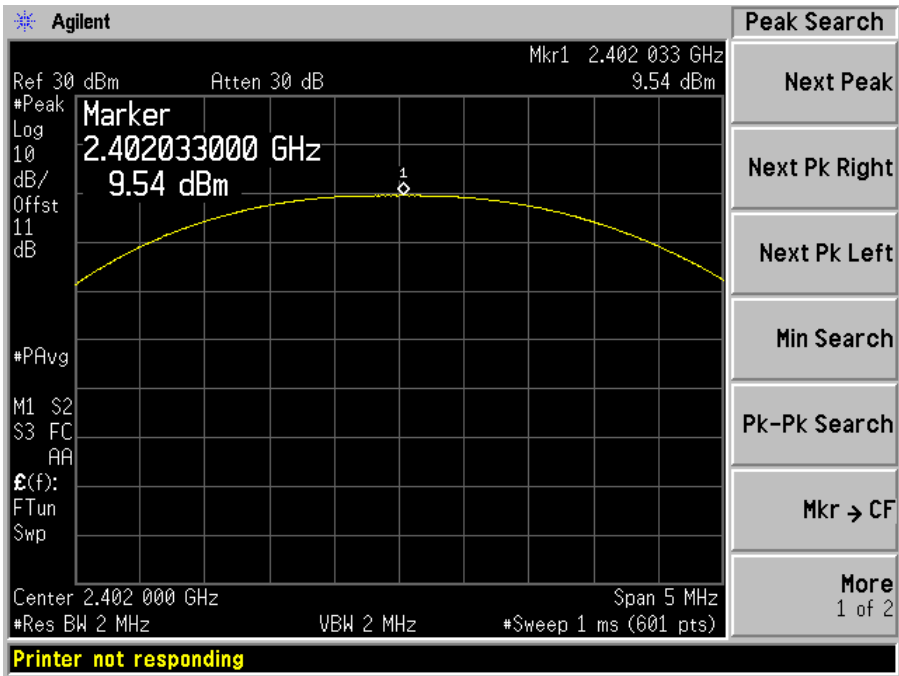


## High channel

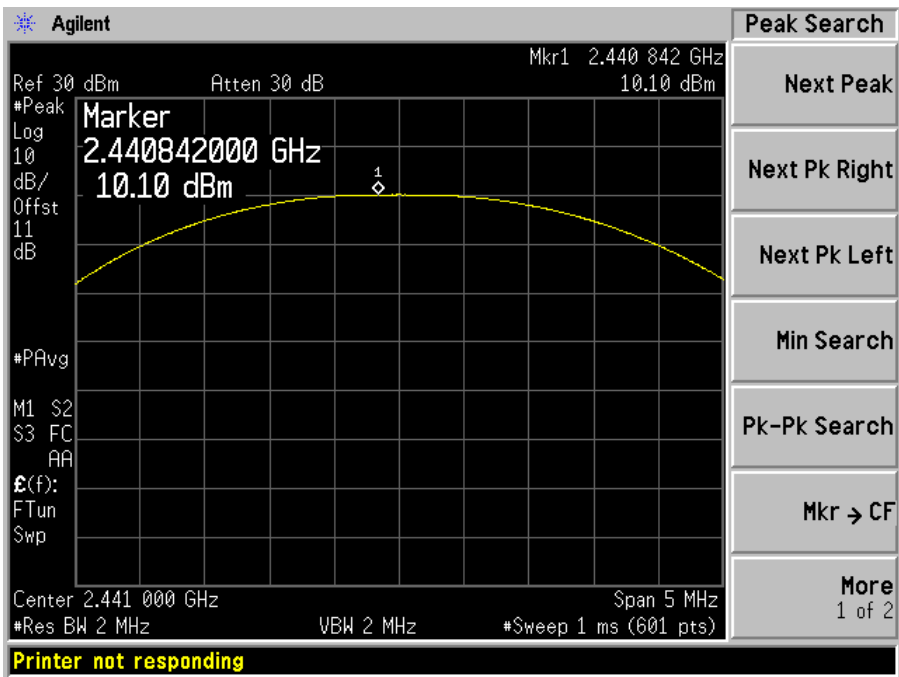


Bluetooth:

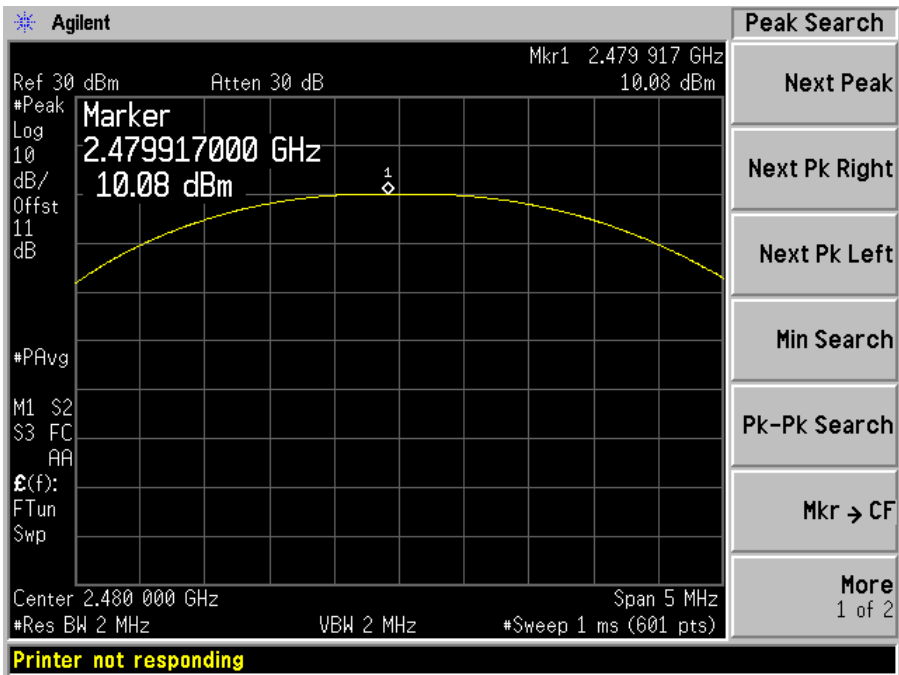
GFSK - Low Channel



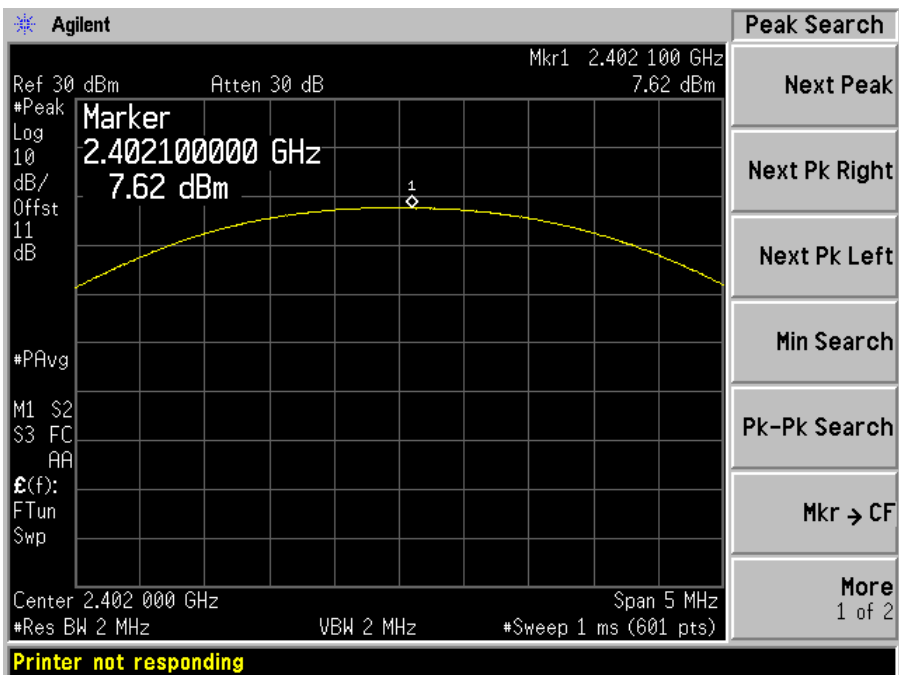
GFSK - Middle Channel



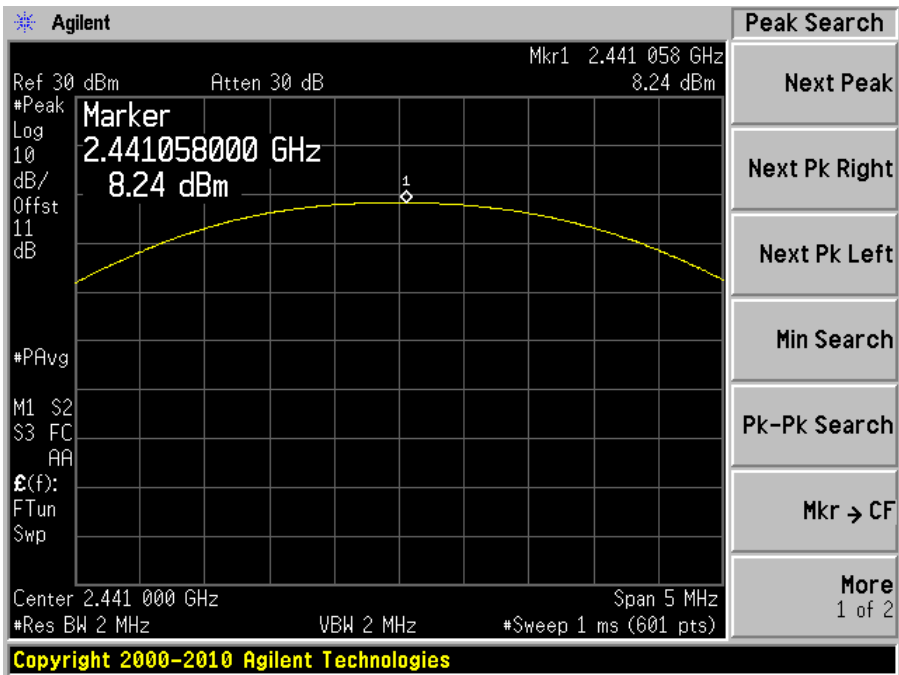
GFSK - High Channel



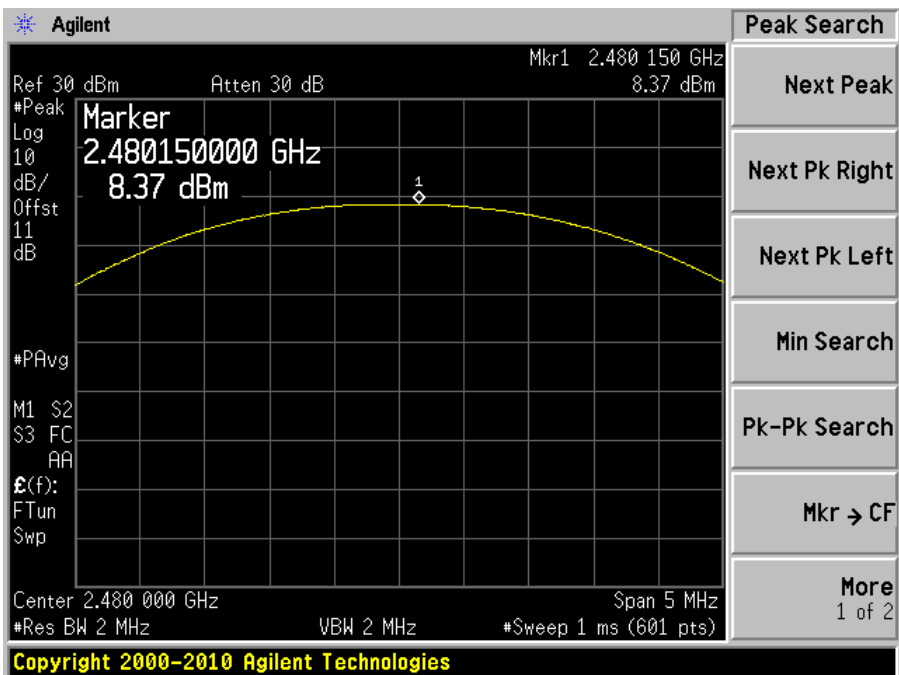
DQPSK - Low Channel



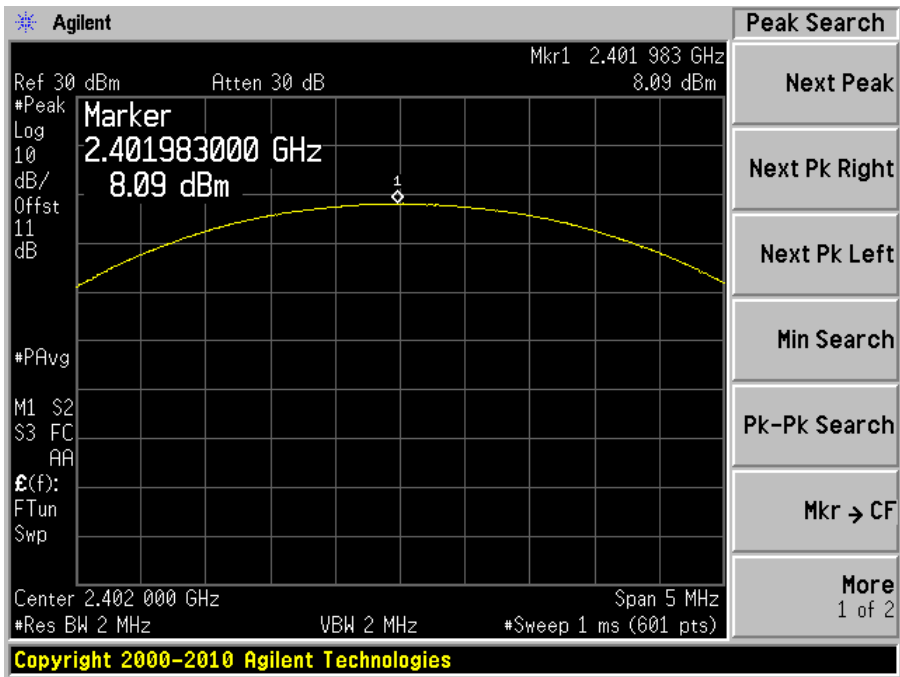
DQPSK - Middle Channel



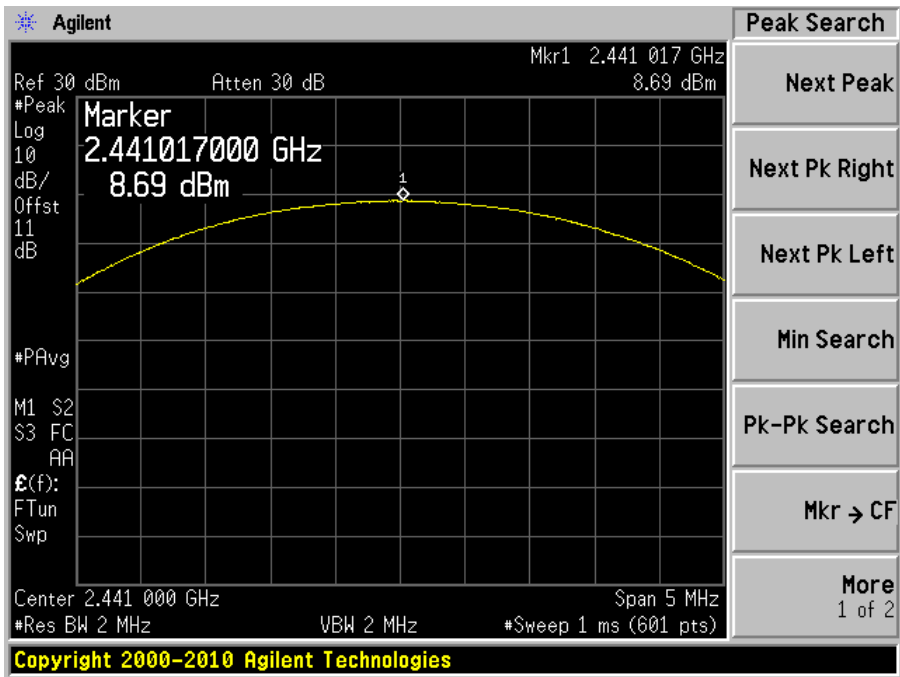
DQPSK - High Channel



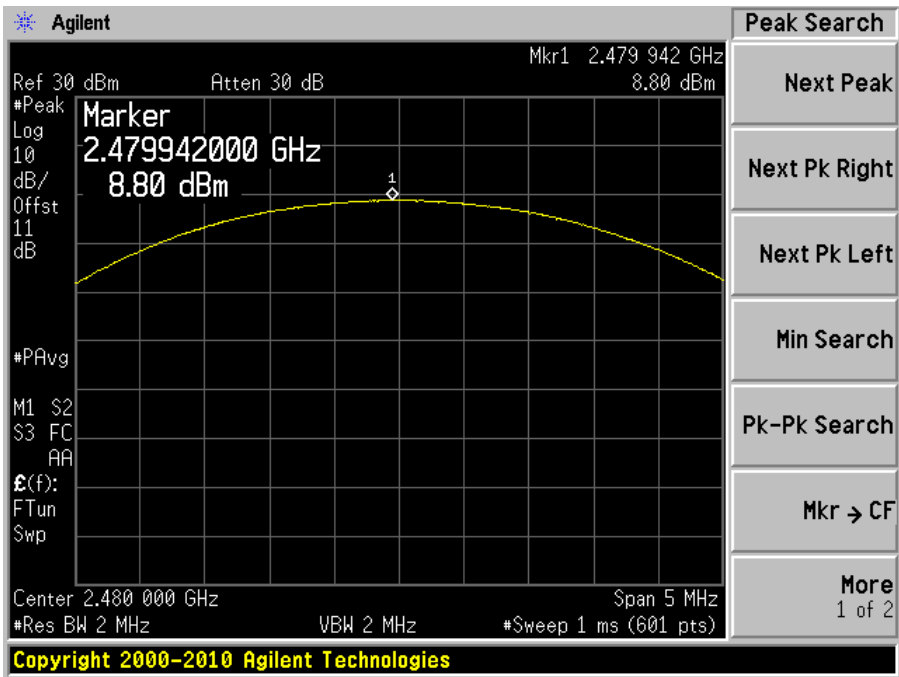
8PSK - Low Channel



8PSK - Middle Channel



8PSK - High Channel



## 11 FCC §15.247(d) & IC RSS-210§A8.5 - 100 kHz Bandwidth of Band Edges

### 11.1 Applicable Standard

According to FCC §15.247(d), in any 100 kHz 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 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. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emissions limits specified in §15.209(a) see §15.205(c).

According to IC RSS-210 §A8.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced 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 section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

### 11.2 Measurement 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. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency 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 100 kHz bandwidth from band edge.
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.

### 11.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4440A    | MY44303352 | 2012-05-10       | 1 year               |

**Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

## 11.4 Test Environmental Conditions

### WLAN:

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 21.1 °C  |
| <b>Relative Humidity:</b> | 56%      |
| <b>ATM Pressure:</b>      | 101.2kPa |

*The testing was performed by Lionel Lara on 2012-06-15 at RF Test Site.*

### BT:

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 22 °C    |
| <b>Relative Humidity:</b> | 57 %     |
| <b>ATM Pressure:</b>      | 101.1kPa |

*The testing was performed by Lionel Lara on 2012-06-18 at RF test site.*

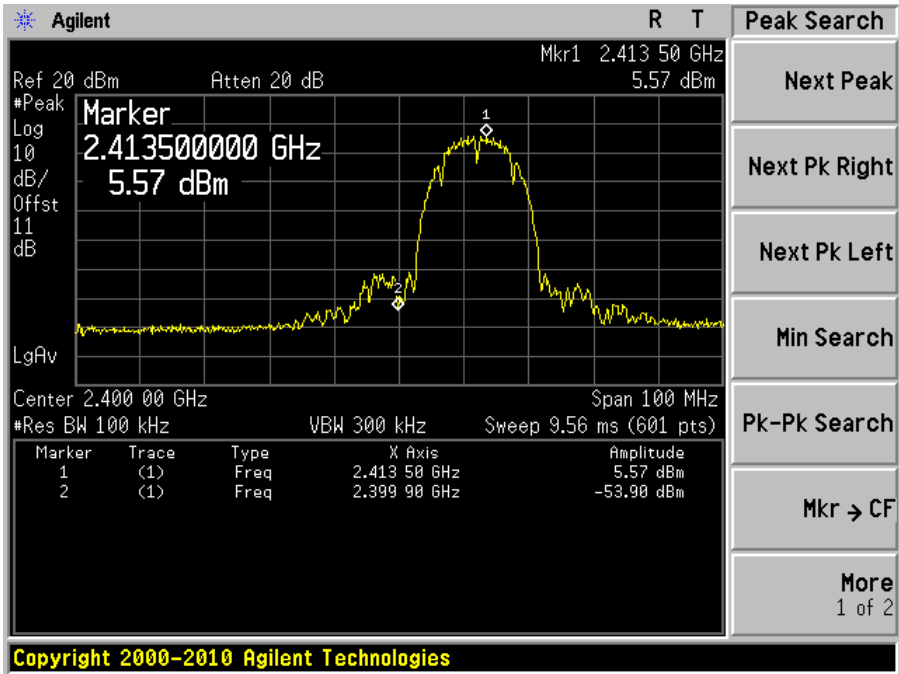
## 11.5 Test Results

Please refer to following pages for plots of band edge.

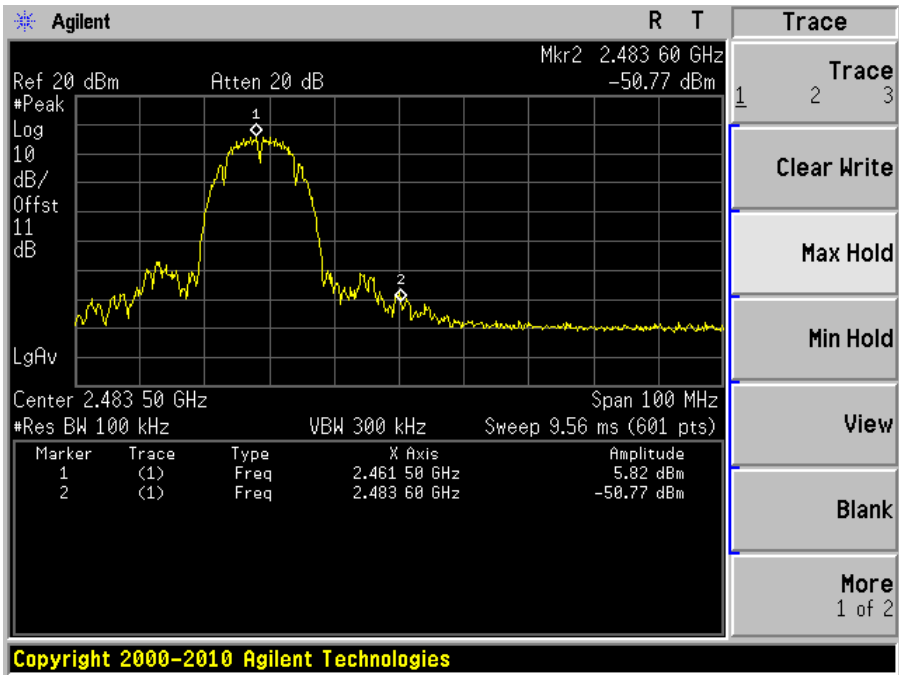
WLAN:

802.11b

Low Band Edge

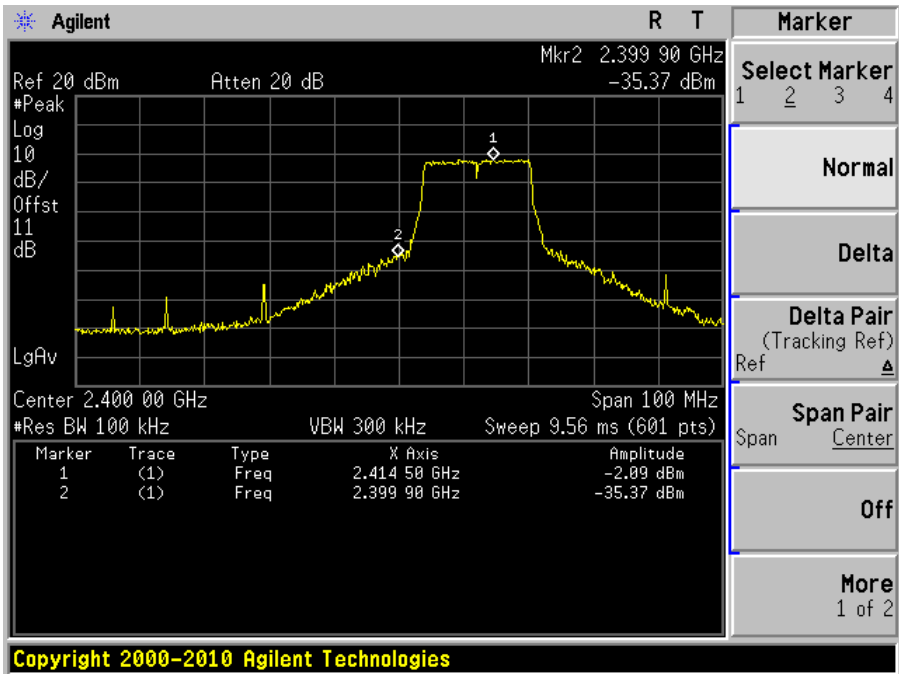


High Band Edge

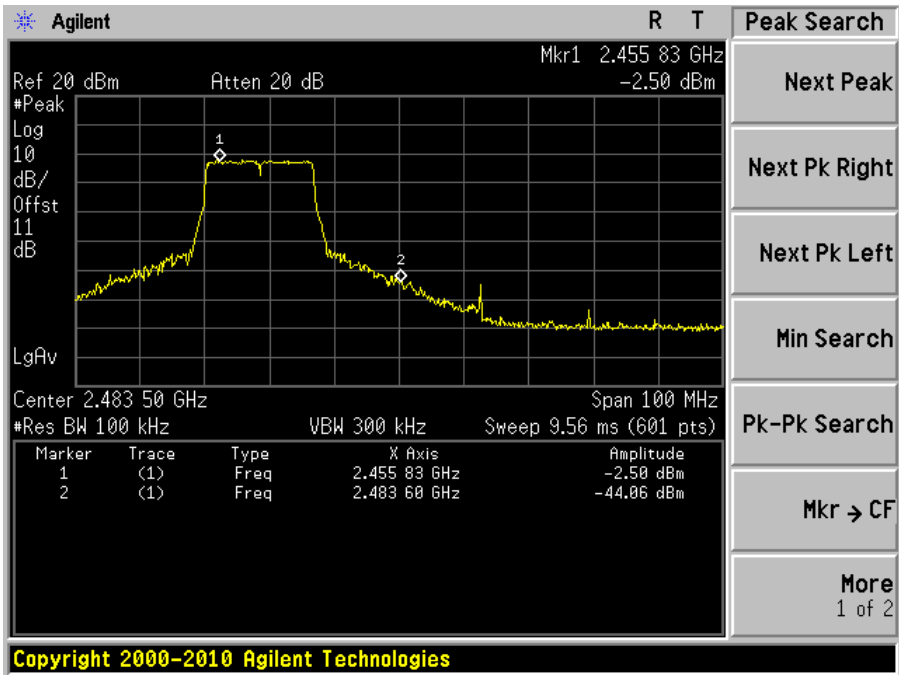


802.11g

Low Band Edge

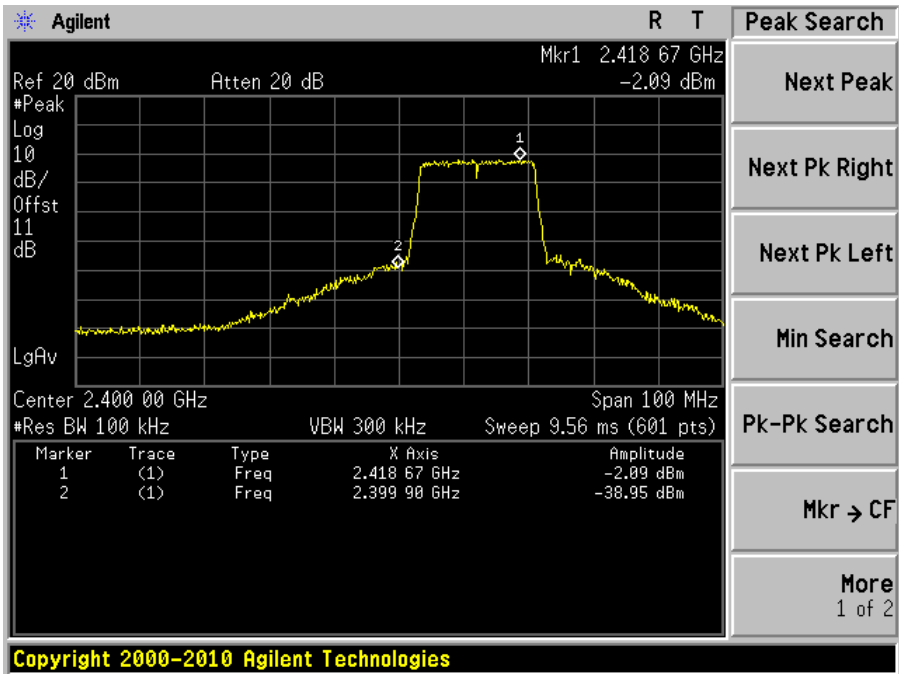


High Band Edge

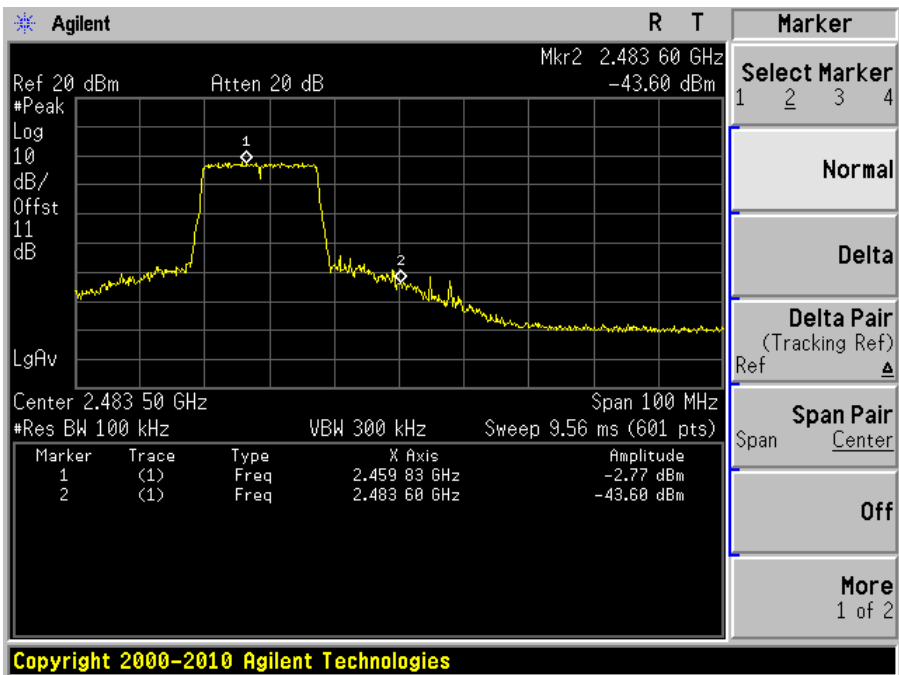


802.11n HT20

Low Band Edge

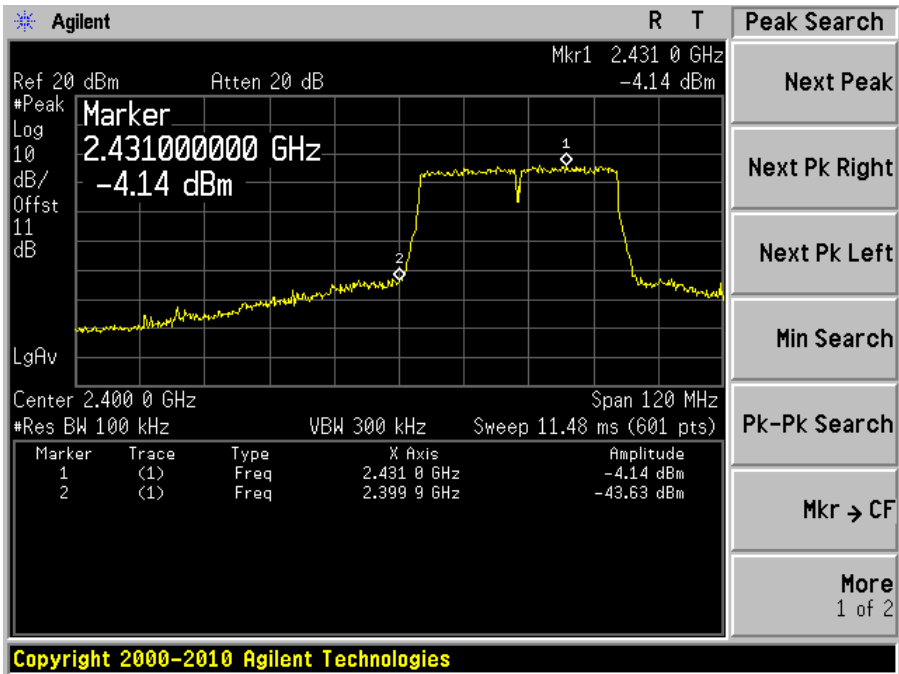


High Band Edge

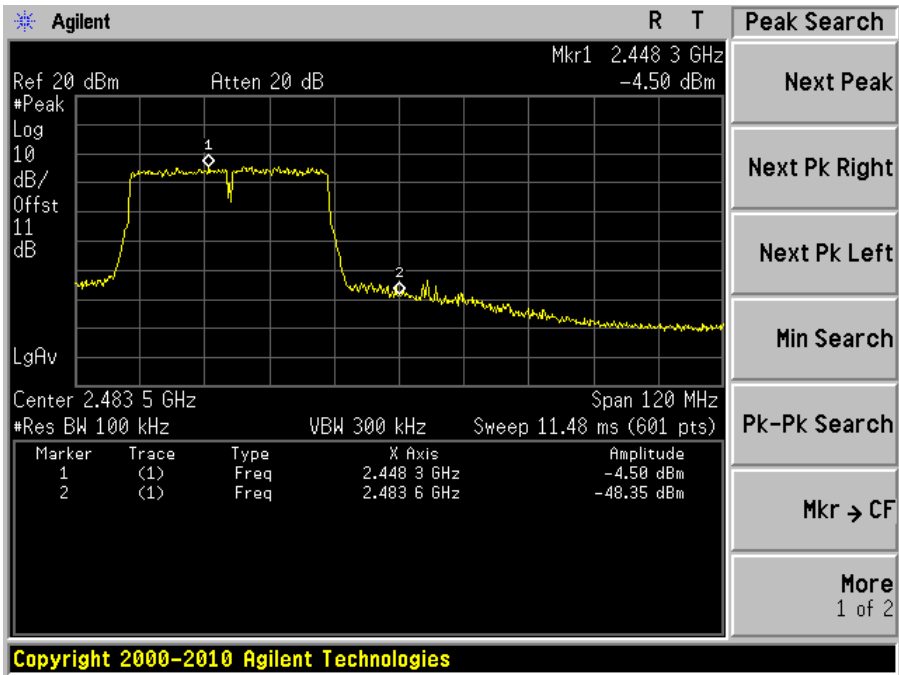


802.11n HT40

Low Band Edge

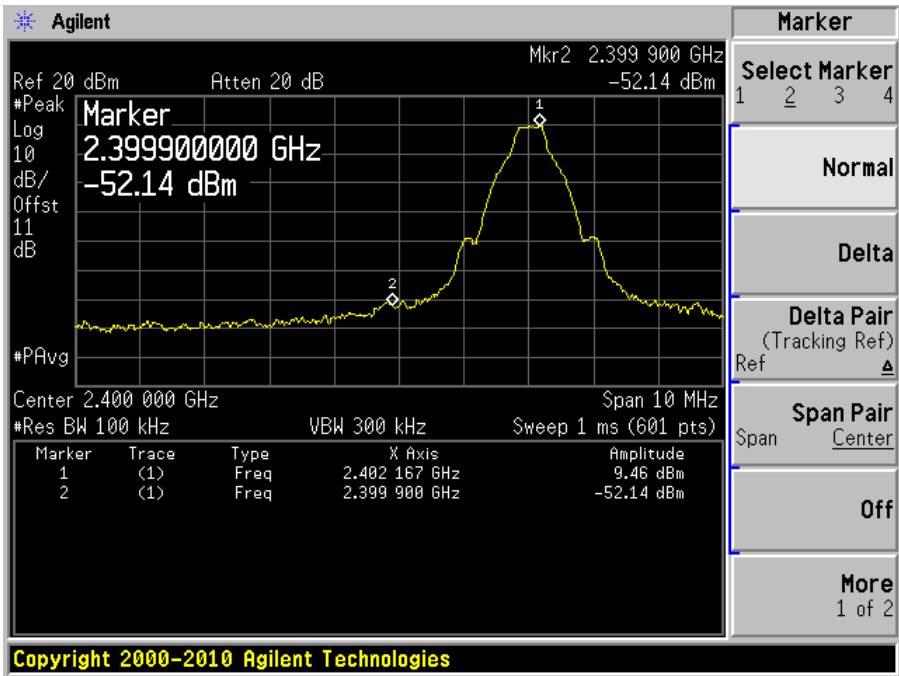


High Band Edge

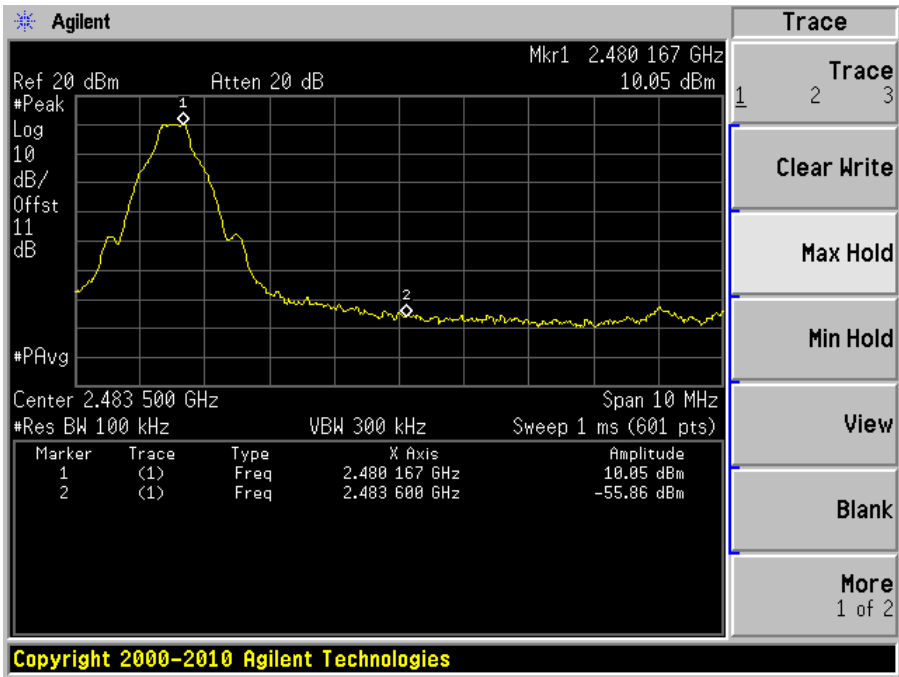


Bluetooth:

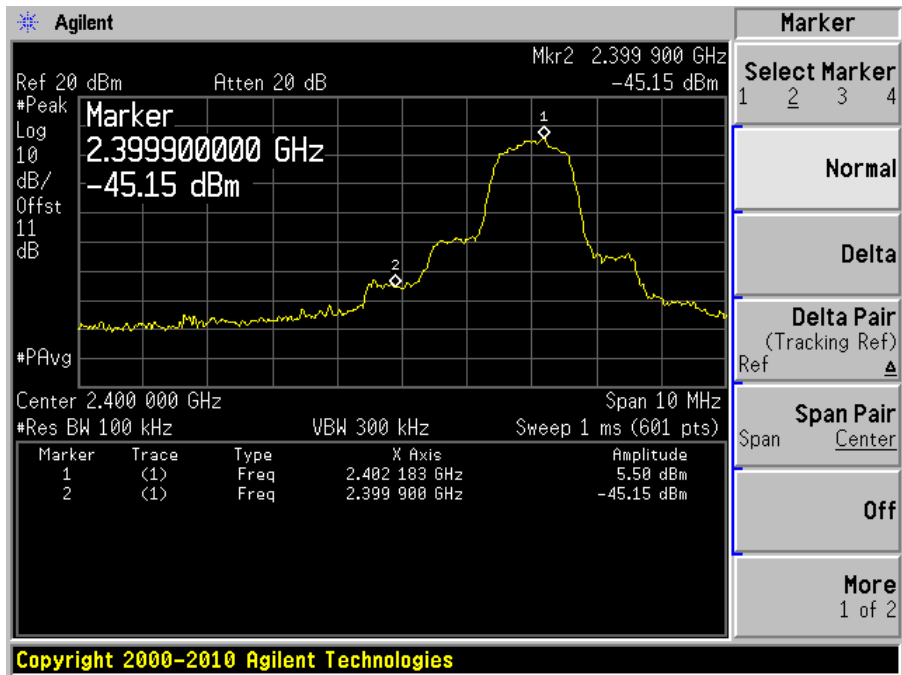
Band Edge: Lowest Channel GFSK



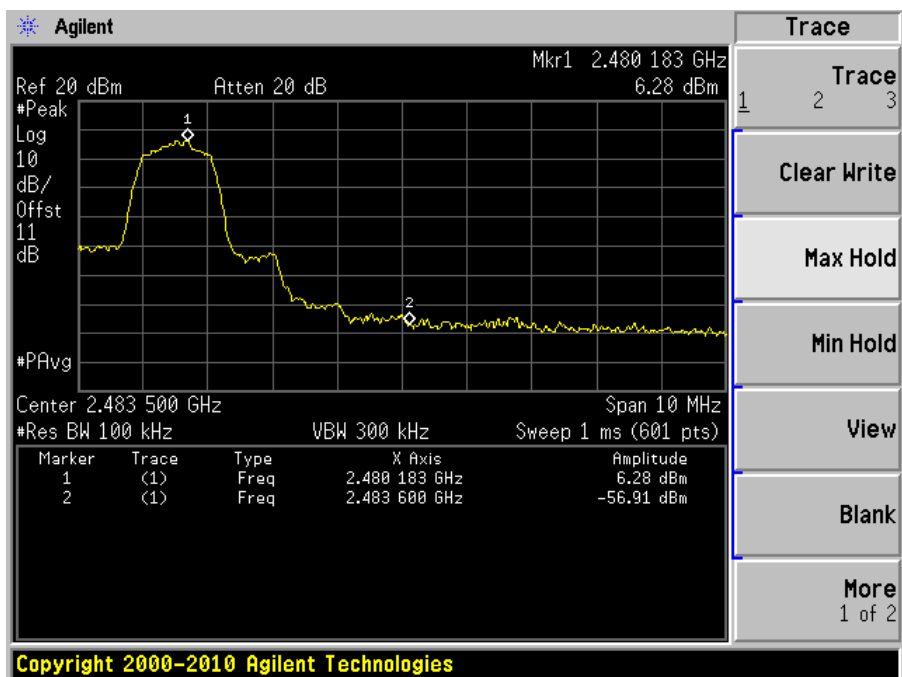
Band Edge: Highest Channel GFSK



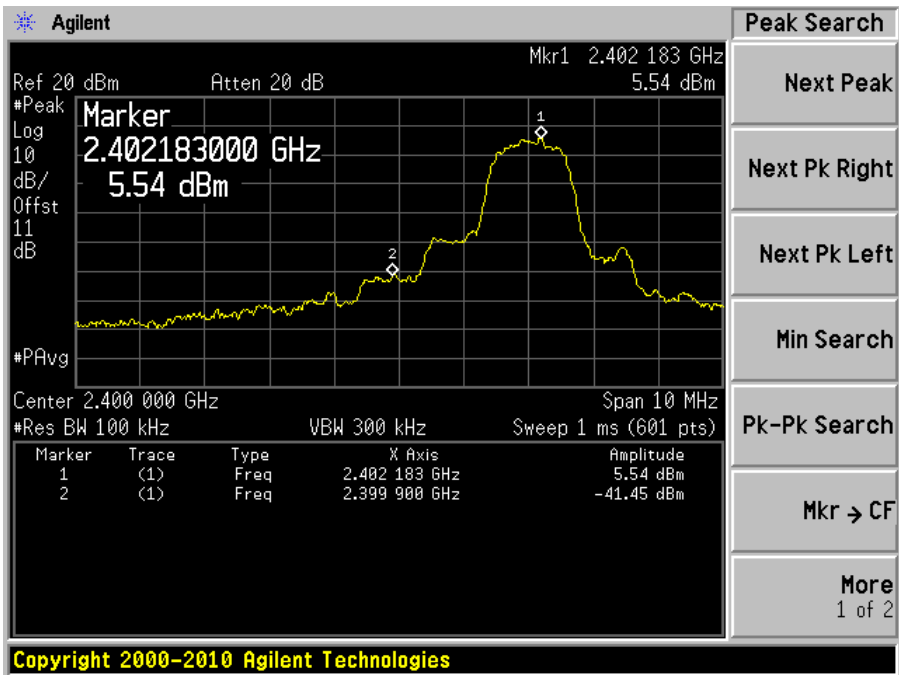
Band Edge: Lowest Channel DQPSK



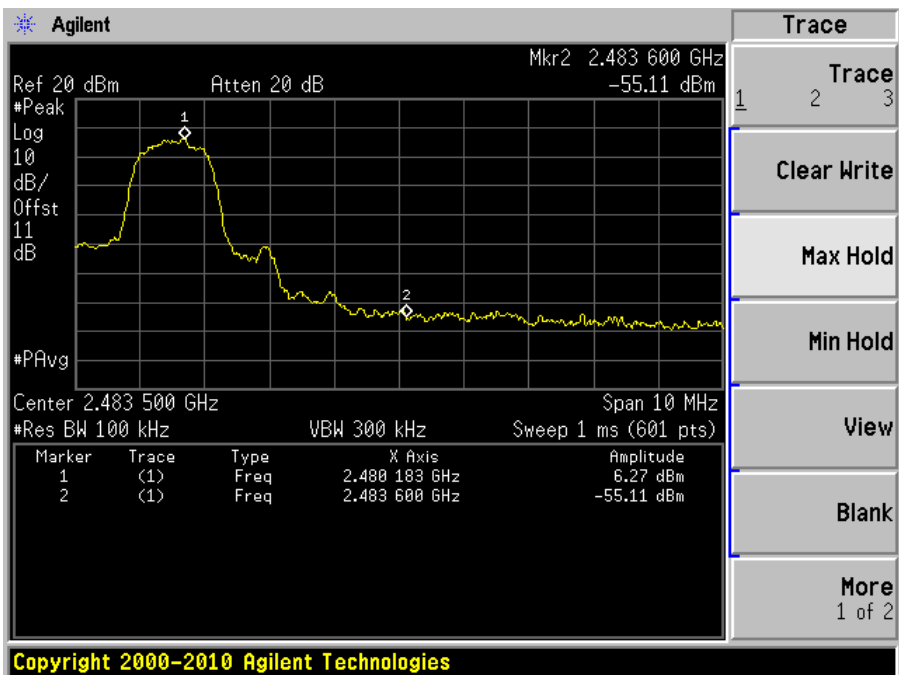
Band Edge: Highest Channel DQPSK



Band Edge: Lowest Channel 8PSK



Band Edge: Highest Channel 8PSK



## 12 FCC §15.247(e) & IC RSS-210 §A8.2 (b) - Power Spectral Density

### 12.1 Applicable Standard

According to FCC §15.247(e) and RSS-210 §A8.2 (b), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 12.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position and set the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. Additionally set RBW and VBW of spectrum analyzer to proper value.
4. Repeat above procedures until all frequencies measured were complete.

### 12.3 Test Equipment List and Details

| Manufacturer | Description       | Model No. | Serial No. | Calibration Date | Calibration Interval |
|--------------|-------------------|-----------|------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4440A    | MY44303352 | 2012-05-10       | 1 year               |

**Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

### 12.4 Test Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 21.1 °C  |
| Relative Humidity: | 59%      |
| ATM Pressure:      | 101.5kPa |

*The testing was performed by Lionel Lara on 2012-06-14 at RF Test Site.*

## 12.5 Test Results

### 802.11b:

| Channel | Frequency (MHz) | Power Spectral Density (dBm/100kHz) | Corrected Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) | Results   |
|---------|-----------------|-------------------------------------|---------------------------------------------|------------------|-----------|
| Low     | 2412            | 5.32                                | -9.88                                       | 8                | Compliant |
| Middle  | 2437            | 5.36                                | -9.84                                       | 8                | Compliant |
| High    | 2462            | 5.72                                | -9.48                                       | 8                | Compliant |

$BWCF$  (Bandwidth Correction Factor) =  $10 \cdot \log(3 \text{ kHz}/100\text{kHz}) = -15.2\text{dB}$

### 802.11g:

| Channel | Frequency (MHz) | Power Spectral Density (dBm/100kHz) | Corrected Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) | Results   |
|---------|-----------------|-------------------------------------|---------------------------------------------|------------------|-----------|
| Low     | 2412            | -1.82                               | -17.02                                      | 8                | Compliant |
| Middle  | 2437            | -1.28                               | -16.48                                      | 8                | Compliant |
| High    | 2462            | -2.37                               | -17.57                                      | 8                | Compliant |

$BWCF$  (Bandwidth Correction Factor) =  $10 \cdot \log(3 \text{ kHz}/100\text{kHz}) = -15.2\text{dB}$

### 802.11n HT20:

| Channel | Frequency (MHz) | Power Spectral Density (dBm/100kHz) | Corrected Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) | Results   |
|---------|-----------------|-------------------------------------|---------------------------------------------|------------------|-----------|
| Low     | 2412            | -1.55                               | -16.75                                      | 8                | Compliant |
| Middle  | 2437            | -2.35                               | -17.55                                      | 8                | Compliant |
| High    | 2462            | -2.31                               | -17.51                                      | 8                | Compliant |

$BWCF$  (Bandwidth Correction Factor) =  $10 \cdot \log(3 \text{ kHz}/100\text{kHz}) = -15.2\text{dB}$

### 802.11n HT40:

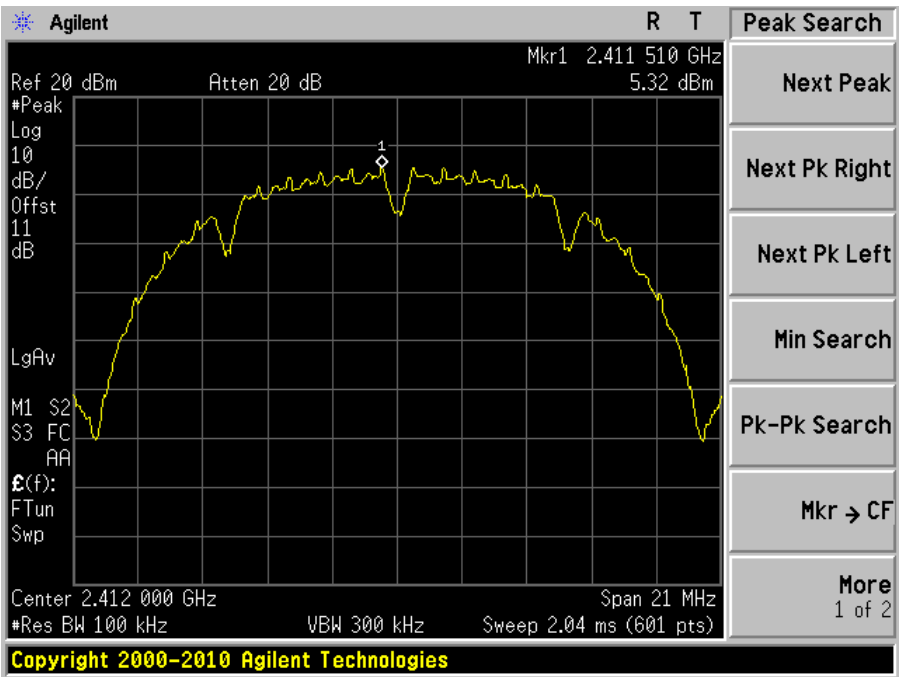
| Channel | Frequency (MHz) | Power Spectral Density (dBm/100kHz) | Corrected Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) | Results   |
|---------|-----------------|-------------------------------------|---------------------------------------------|------------------|-----------|
| Low     | 2422            | -3.99                               | -19.19                                      | 8                | Compliant |
| Middle  | 2437            | -4.36                               | -19.56                                      | 8                | Compliant |
| High    | 2452            | -4.56                               | -19.76                                      | 8                | Compliant |

$BWCF$  (Bandwidth Correction Factor) =  $10 \cdot \log(3 \text{ kHz}/100\text{kHz}) = -15.2\text{dB}$

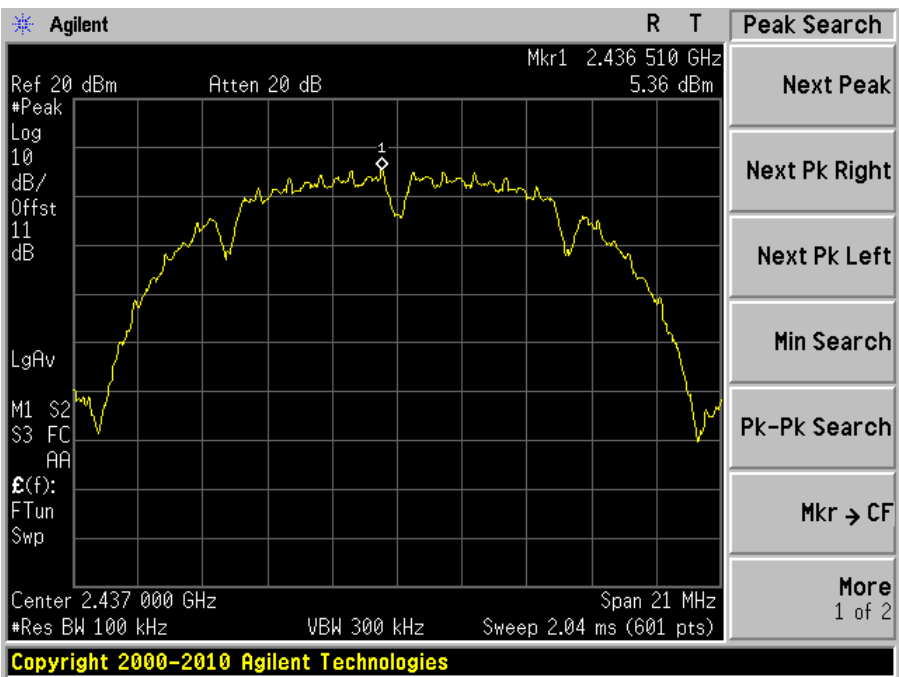
Please refer to the following plots for detailed test results:

802.11b

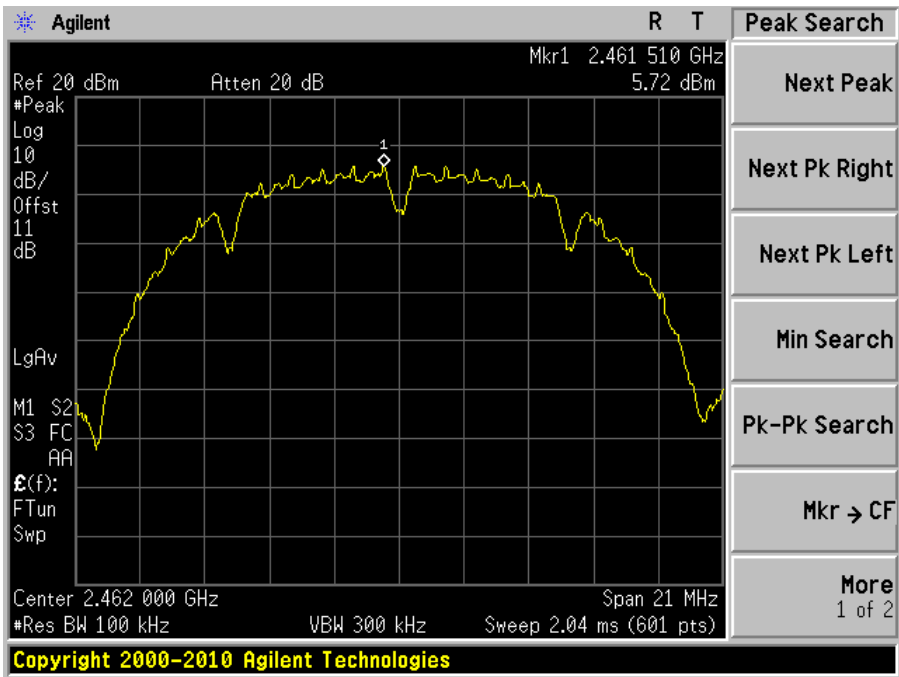
Low channel



Middle channel

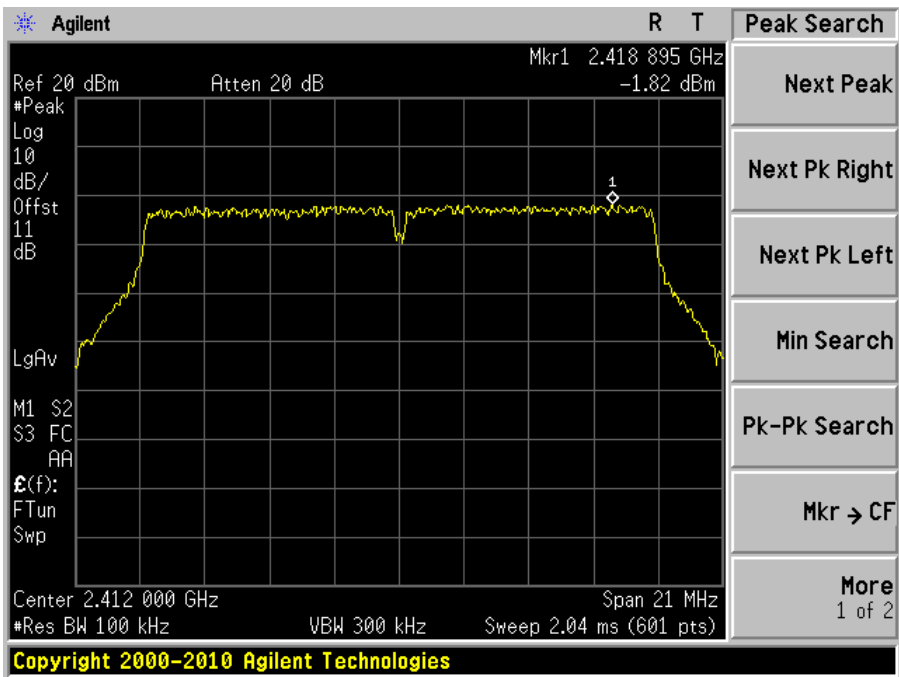


High channel

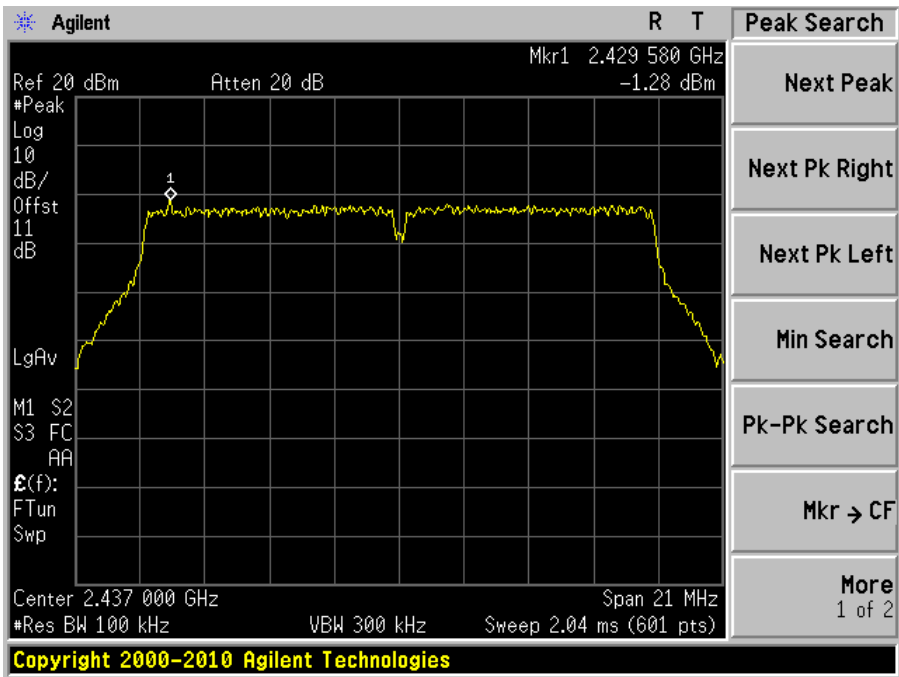


802.11g

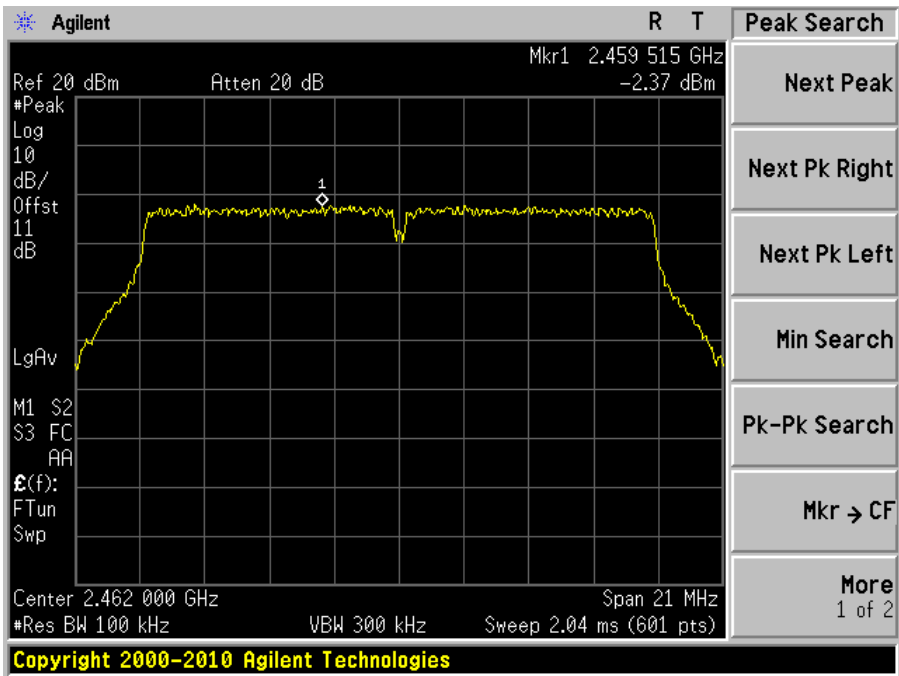
Low channel



Middle channel

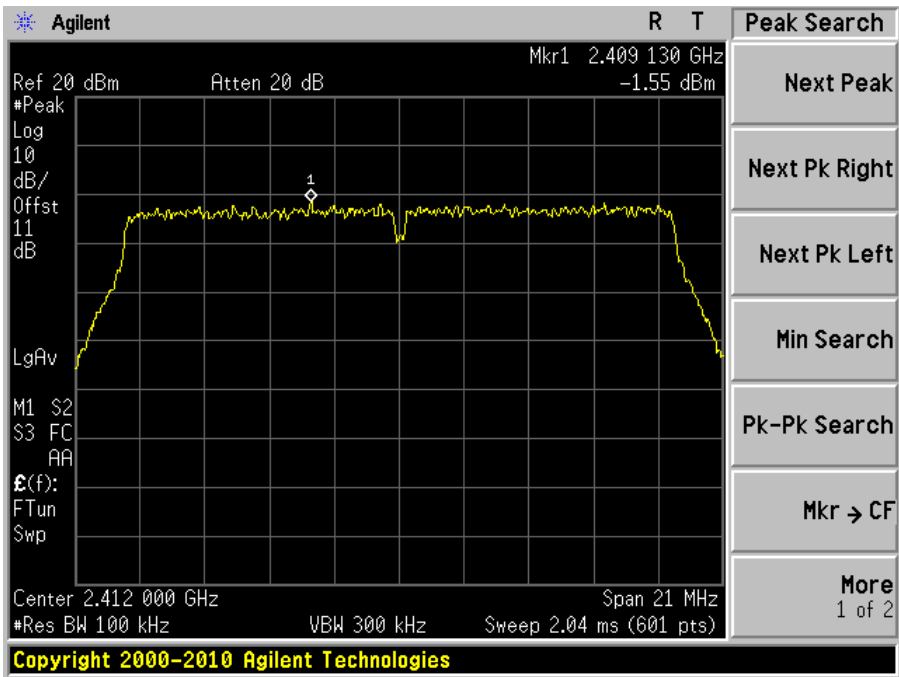


High channel

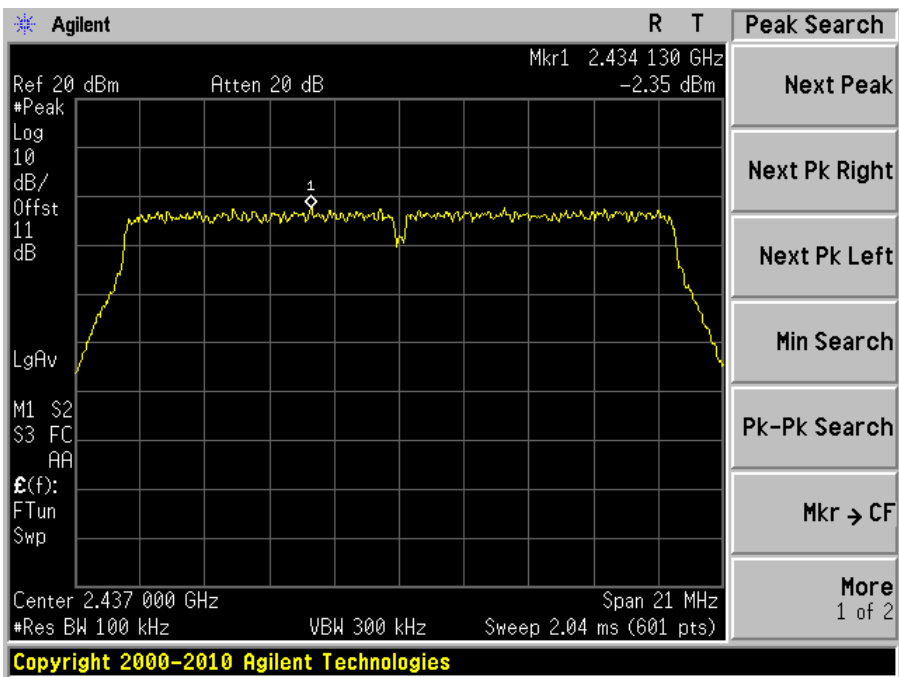


802.11n HT20

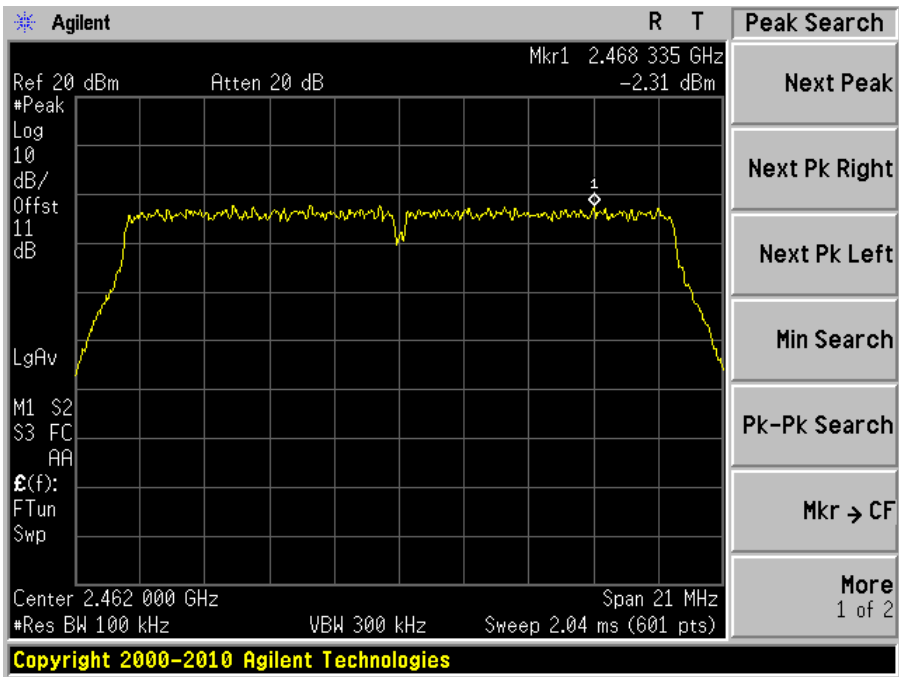
Low channel



Middle channel

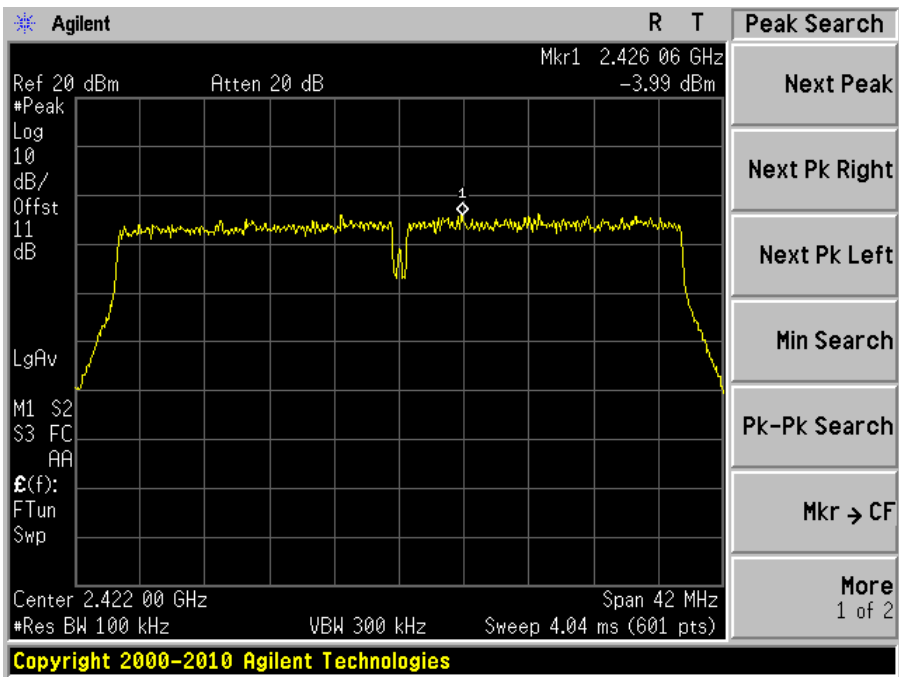


High channel

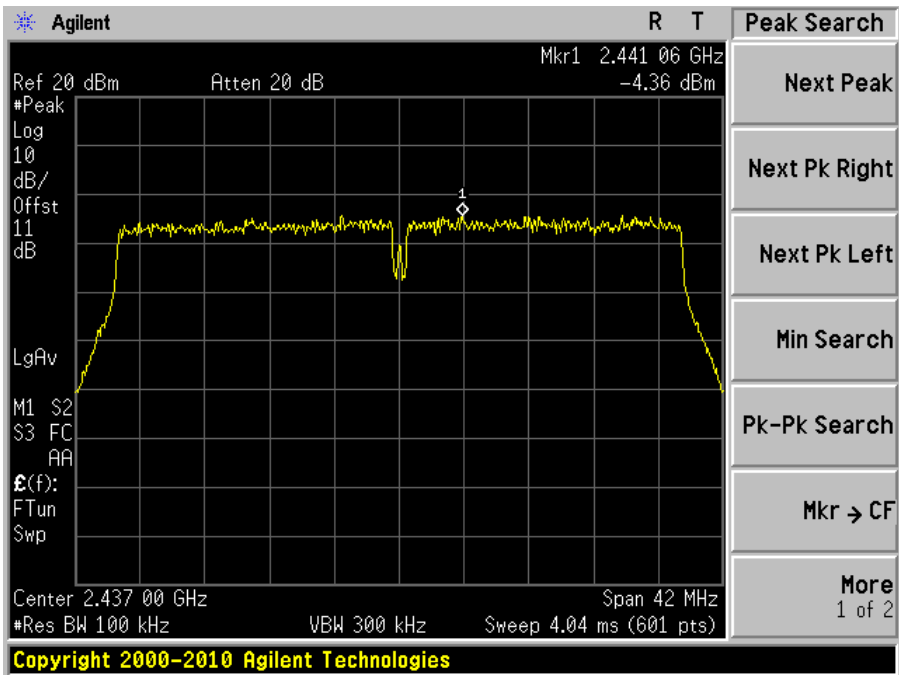


802.11n HT40

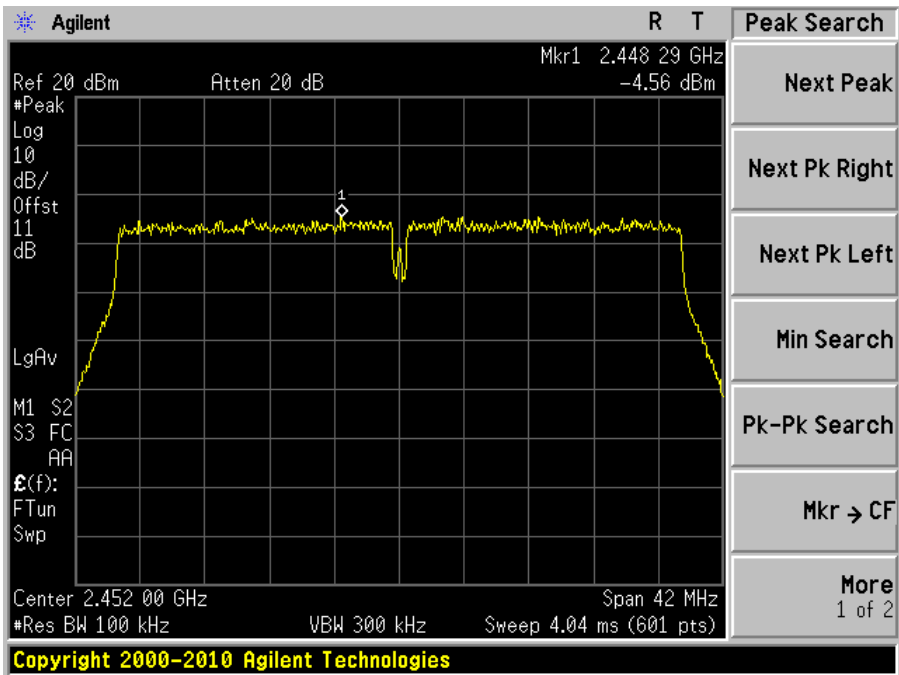
Low channel



Middle channel



High channel



## 13 IC RSS-210 §2.6 & RSS-Gen §4.10 - Receiver Spurious Radiated Emissions

### 13.1 Applicable Standard

According to IC RSS-Gen §4.10, the receiver shall be operated in the normal receive mode near the mid-point of the band over which the receiver is designed to operate.

Unless otherwise specified in the applicable RSS, the radiated emission measurement is the standard measurement method (with the device's antenna in place) to measure receiver spurious emissions.

Radiated emission measurements are to be performed using a calibrated open-area test site.

For either method, the search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz.

For emissions below 1 GHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, compliance with the emission limit can be demonstrated using measuring equipment employing a peak detector with the same measurement bandwidth as that for CISPR quasi-peak measurements. Above 1 GHz, measurements shall be performed using an average detector and a resolution bandwidth of 300 kHz to 1 MHz.

According to RSS-210 §2.6, Tables 2 and 3 show the general field strength limits of unwanted emissions, where applicable, for transmitters and receivers operating in accordance with the provisions specified in this RSS. Transmitters whose wanted emissions are also within the limits shown in Tables 2 and 3 may operate in any of the frequency bands of Tables 2 and 3, other than the restricted bands of Table 1 and the TV bands, and shall be certified under RSS-210.

Table 2: General Field Strength Limits for Transmitters and Receivers at Frequencies above 30 MHz <sup>(Note)</sup>

| Frequency<br>(MHz) | Field Strength<br>Microvolts/m at 3 meters (watts, e.i.r.p.) |              |
|--------------------|--------------------------------------------------------------|--------------|
|                    | Transmitters                                                 | Receivers    |
| 30-88              | 100 (3 nW)                                                   | 100 (3 nW)   |
| 88-216             | 150 (6.8 nW)                                                 | 150 (6.8 nW) |
| 216-960            | 200 (12 nW)                                                  | 200 (12 nW)  |
| Above 960          | 500 (75 nW)                                                  | 500 (75 nW)  |

**Note:** Transmitting devices are not permitted in Table 1 bands or in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz, and 614-806 MHz). Prohibition of operation in TV bands does not apply to momentary devices, or to medical telemetry devices in the band 174-216 MHz, and to perimeter protection systems in the bands 54-72 and 76-88 MHz. The perimeter protection devices are to meet Table 3 field strengths limits.

Table 3: General Field Strength Limits for Transmitters at Frequencies below 30 MHz (Transmit)

| Frequency<br>(fundamental or spurious) | Field Strength<br>(microvolts/m) | Magnetic<br>H-Field<br>(microamperes/m) | Measurement<br>Distance<br>(metres) |
|----------------------------------------|----------------------------------|-----------------------------------------|-------------------------------------|
| 9-490 kHz                              | 2,400/F (F in kHz)               | 2,400/377F (F in kHz)                   | 300                                 |
| 490-1,705 kHz                          | 24,000/F (F in kHz)              | 24,000/377F (F in kHz)                  | 30                                  |
| 1.705-30 MHz                           | 30                               | N/A                                     | 30                                  |

**Note:** The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

### 13.2 EUT Setup

The radiated emissions tests were performed in the 3 meter chamber, using the setup in accordance with ANSI C63.4-2009.

### 13.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emissions was found to be marginal (within -4 dB of specification limits), and are distinguished with a "QP" in the data table.

### 13.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + AF + CL + Atten - Ga$$

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

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

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

### 13.5 Test Equipment List and Details

| Manufacturer       | Description         | Model No.            | Serial No. | Calibration Date | Calibration Interval |
|--------------------|---------------------|----------------------|------------|------------------|----------------------|
| Rohde & Schwarz    | EMI Test Receiver   | ESCI<br>1166.5950K03 | 100338     | 2011-09-14       | 1 year               |
| Agilent            | Spectrum Analyzer   | E4440A               | MY44303352 | 2012-05-10       | 1 year               |
| Sunol Science Corp | System Controller   | SC99V                | 011003-1   | N/R              | 1 year               |
| Sunol Science Corp | Combination Antenna | JB3                  | A020106-3  | 2012-06-18       | 1 year               |
| A.H. Systems       | Horn antenna        | SAS-200/571          | 261        | 2012-01-18       | 1 year               |
| Hewlett Packard    | Pre-amplifier       | 8447D                | 2944A10187 | 2012-03-08       | 1 year               |
| Mini-Circuits      | Pre-amplifier       | ZVA-183-S            | 570400946  | 2012-05-09       | 1 year               |

**Statement of Traceability:** BACL attests that all calibrations have been performed per the A2LA requirements, traceable to NIST.

### 13.6 Test Environmental Conditions

#### WLAN and BT:

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 21 °C    |
| <b>Relative Humidity:</b> | 56%      |
| <b>ATM Pressure:</b>      | 101.6kPa |

The testing was performed by Lionel Lara on 2012-07-24 at 5 meter chamber 3.

### 13.7 Summary of Test Results

According to the test data, the EUT complied with IC RSS-210/RSS-Gen, with the closest margins from the limit listed below:

#### WLAN:

| Mode: Receiving |                 |                                    |             |
|-----------------|-----------------|------------------------------------|-------------|
| Margin (dB)     | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -12.35          | 12500           | Horizontal                         | 30 to 25000 |

#### BT:

| Mode: Receiving |                 |                                    |             |
|-----------------|-----------------|------------------------------------|-------------|
| Margin (dB)     | Frequency (MHz) | Polarization (Horizontal/Vertical) | Range (MHz) |
| -10.48          | 12500           | Horizontal                         | 30 – 25000  |

### 13.8 Test Data and Plots

#### 1) 30-1000 MHz, Measured at 3 meters

WLAN:

Receiving Mode

| Frequency (MHz) | Corrected Amplitude (dBμV/m) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBμV/m) | Margin (dB) | Comments   |
|-----------------|------------------------------|---------------------|------------------------|-----------------------------|----------------|-------------|------------|
| 100             | 6.05                         | 100                 | H                      | 0                           | 43.5           | -37.45      | Quasi-Peak |
| 500             | 16.87                        | 100                 | H                      | 0                           | 46             | -29.13      | Quasi-Peak |
| 900             | 22.31                        | 100                 | H                      | 0                           | 46             | -23.69      | Quasi-Peak |

#### 2) Above 1 GHz Measured at 3 meters

Receiving Mode

| Frequency (MHz) | S.A. Reading (dBμV) | Turntable Azimuth (degrees) | Test Antenna |                |               | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBμV/m) | FCC & IC       |             | Comments |
|-----------------|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
|                 |                     |                             | Height (cm)  | Polarity (H/V) | Factor (dB/m) |                 |               |                        | Limit (dBμV/m) | Margin (dB) |          |
| 1100            | 39.32               | 0                           | 100          | H              | 24.69         | 1.88            | 27.03         | 38.86                  | 74             | -35.14      | Peak     |
| 1100            | 39.32               | 0                           | 100          | V              | 24.18         | 1.88            | 27.03         | 38.35                  | 74             | -35.65      | Peak     |
| 1100            | 24.25               | 0                           | 100          | H              | 24.69         | 1.88            | 27.03         | 23.79                  | 54             | -30.21      | Ave      |
| 1100            | 24.25               | 0                           | 100          | V              | 24.18         | 1.88            | 27.03         | 23.28                  | 54             | -30.72      | Ave      |
| 12500           | 40.61               | 0                           | 100          | H              | 38.31         | 6.47            | 26.9          | 58.49                  | 74             | -15.51      | Peak     |
| 12500           | 40.61               | 0                           | 100          | V              | 38.26         | 6.47            | 26.9          | 58.44                  | 74             | -15.56      | Peak     |
| 12500           | 25.73               | 0                           | 100          | H              | 38.31         | 6.47            | 26.9          | 43.61                  | 54             | -10.39      | Ave      |
| 12500           | 25.73               | 0                           | 100          | V              | 38.26         | 6.47            | 26.9          | 43.56                  | 54             | -10.44      | Ave      |

**Bluetooth:**

1) 30 MHz -1 GHz, measured at 3 meters

| Frequency (MHz) | Corrected Amplitude (dB) | Antenna Height (cm) | Antenna Polarity (H/V) | Turntable Azimuth (degrees) | Limit (dBμV/m) | Margin (dB) | Comments   |
|-----------------|--------------------------|---------------------|------------------------|-----------------------------|----------------|-------------|------------|
| 100             | 11.16                    | 100                 | V                      | 0                           | 43.5           | -32.34      | Quasi-Peak |
| 539.22          | 30.43                    | 100                 | V                      | 288                         | 46             | -15.57      | Quasi-Peak |
| 900             | 22.46                    | 100                 | V                      | 0                           | 46             | -23.54      | Quasi-Peak |

2) 1 – 25 GHz, measured at 3 meters

| Frequency (MHz) | S.A. Reading (dBμV) | Turntable Azimuth (degrees) | Test Antenna |                |               | Cable Loss (dB) | Pre-Amp. (dB) | Cord. Reading (dBμV/m) | FCC & IC       |             | Comments |
|-----------------|---------------------|-----------------------------|--------------|----------------|---------------|-----------------|---------------|------------------------|----------------|-------------|----------|
|                 |                     |                             | Height (cm)  | Polarity (H/V) | Factor (dB/m) |                 |               |                        | Limit (dBμV/m) | Margin (dB) |          |
| 1100            | 40.1                | 0                           | 100          | H              | 24.69         | 1.88            | 27.03         | 39.64                  | 74             | -34.36      | Peak     |
| 1100            | 40.1                | 0                           | 100          | V              | 24.18         | 1.88            | 27.03         | 39.13                  | 74             | -34.87      | Peak     |
| 1100            | 24.76               | 0                           | 100          | H              | 24.69         | 1.88            | 27.03         | 24.3                   | 54             | -29.7       | Ave      |
| 1100            | 24.76               | 0                           | 100          | V              | 24.18         | 1.88            | 27.03         | 23.79                  | 54             | -30.21      | Ave      |
| 12500           | 40.52               | 0                           | 100          | H              | 38.31         | 6.47            | 26.9          | 58.4                   | 74             | -15.6       | Peak     |
| 12500           | 40.52               | 0                           | 100          | V              | 38.26         | 6.47            | 26.9          | 58.35                  | 74             | -15.65      | Peak     |
| 12500           | 25.64               | 0                           | 100          | H              | 38.31         | 6.47            | 26.9          | 43.52                  | 54             | -10.48      | Ave      |
| 12500           | 25.64               | 0                           | 100          | V              | 38.26         | 6.47            | 26.9          | 43.47                  | 54             | -10.53      | Ave      |

## 14 FCC §15.247(a) & IC RSS-210 §A8.1 – Hopping Channel Bandwidth

### 14.1 Applicable Standard

According to FCC§15.247(a) (l) & RSS-210 §A8.1 (a), the maximum 20 dB bandwidth of the hopping channel shall be presented.

### 14.2 Measurement Procedure

5. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
6. Position the EUT without connection to measurement instrument. Turn on the EUT and 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.
7. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emissions bandwidth.
8. Repeat above procedures until all frequencies measured were complete.

### 14.3 Test Equipment List and Details

| Manufacturer | Description       | Model  | Serial Number | Calibration Date | Calibration Interval |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4440A | MY44303352    | 2012-05-10       | 1 year               |

**Statement of Traceability:** BACL Corp. attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 14.4 Test Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 22 °C    |
| Relative Humidity: | 57 %     |
| ATM Pressure:      | 101.1kPa |

*The testing was performed by Lionel Lara on 2012-06-18 at RF test site.*

## 14.5 Test Results

Modulation: GFSK

| Channel | Frequency<br>(MHz) | 20 dB Channel Bandwidth<br>(kHz) |
|---------|--------------------|----------------------------------|
| Low     | 2402               | 1100                             |
| Mid     | 2441               | 1106                             |
| High    | 2480               | 1108                             |

Modulation: DQPSK

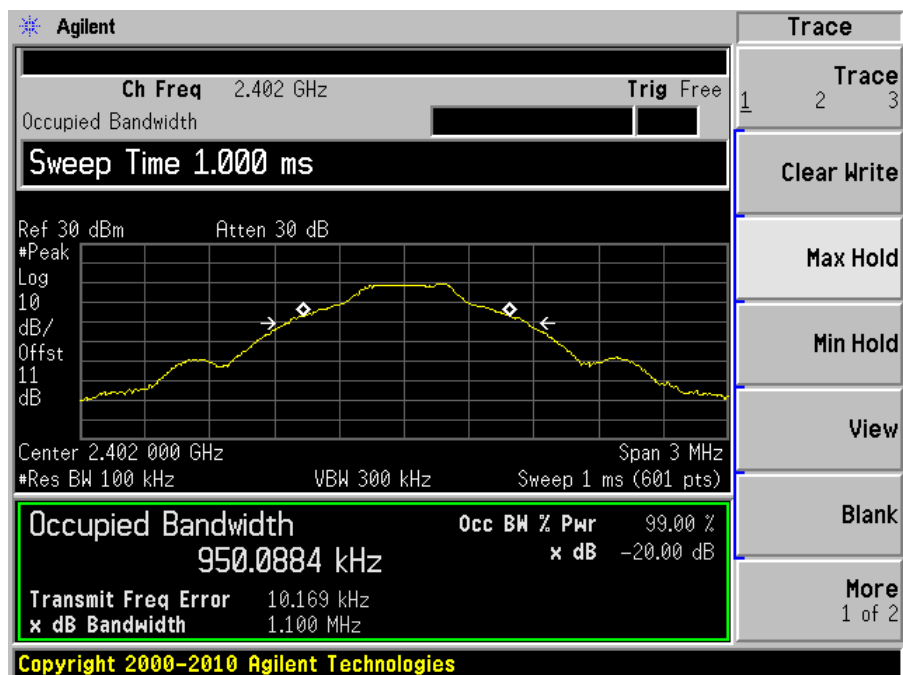
| Channel | Frequency<br>(MHz) | 20 dB Channel Bandwidth<br>(kHz) |
|---------|--------------------|----------------------------------|
| Low     | 2402               | 1376                             |
| Mid     | 2441               | 1379                             |
| High    | 2480               | 1379                             |

Modulation: 8PSK

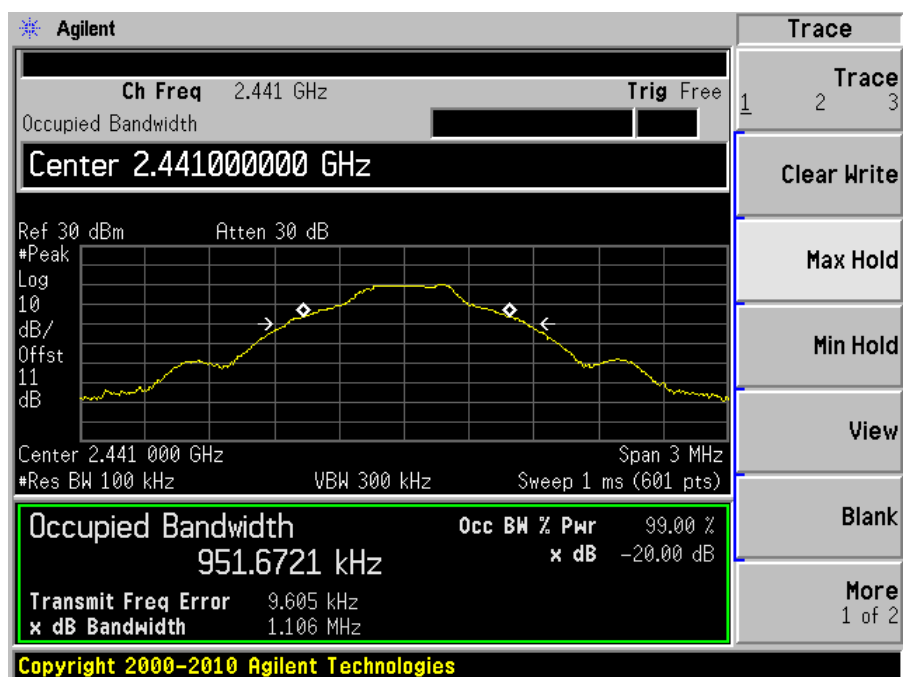
| Channel | Frequency<br>(MHz) | 20 dB Channel Bandwidth<br>(kHz) |
|---------|--------------------|----------------------------------|
| Low     | 2402               | 1376                             |
| Mid     | 2441               | 1379                             |
| High    | 2480               | 1378                             |

Please refer to the following plots.

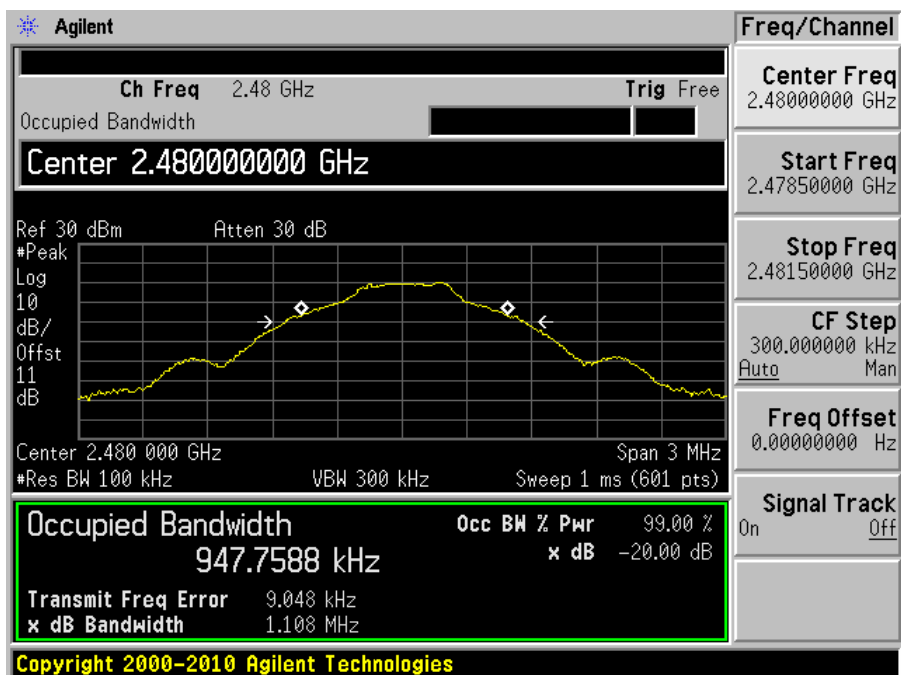
## GFSK - Low Channel



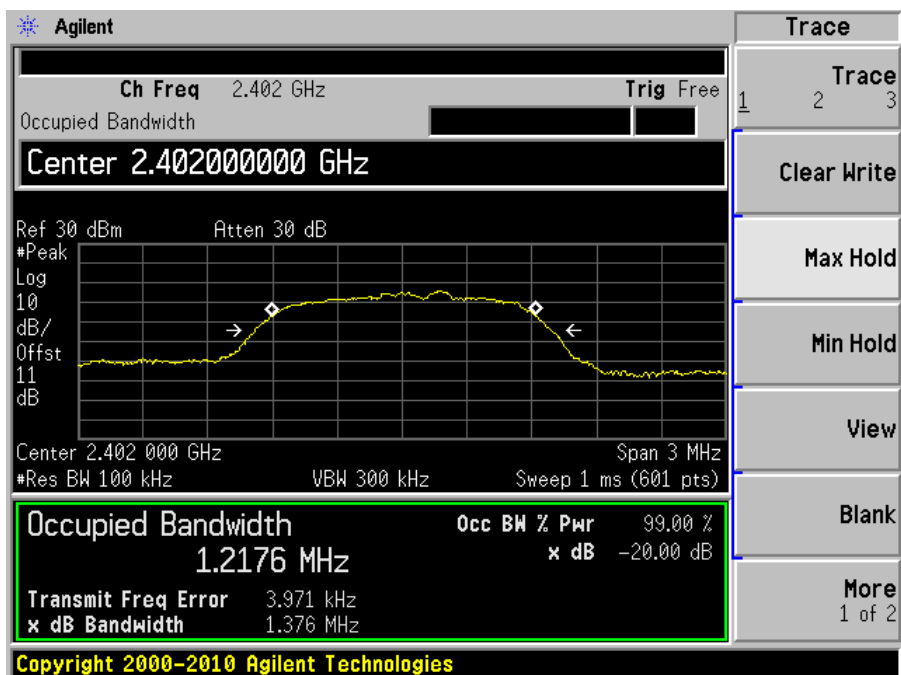
## GFSK - Middle Channel



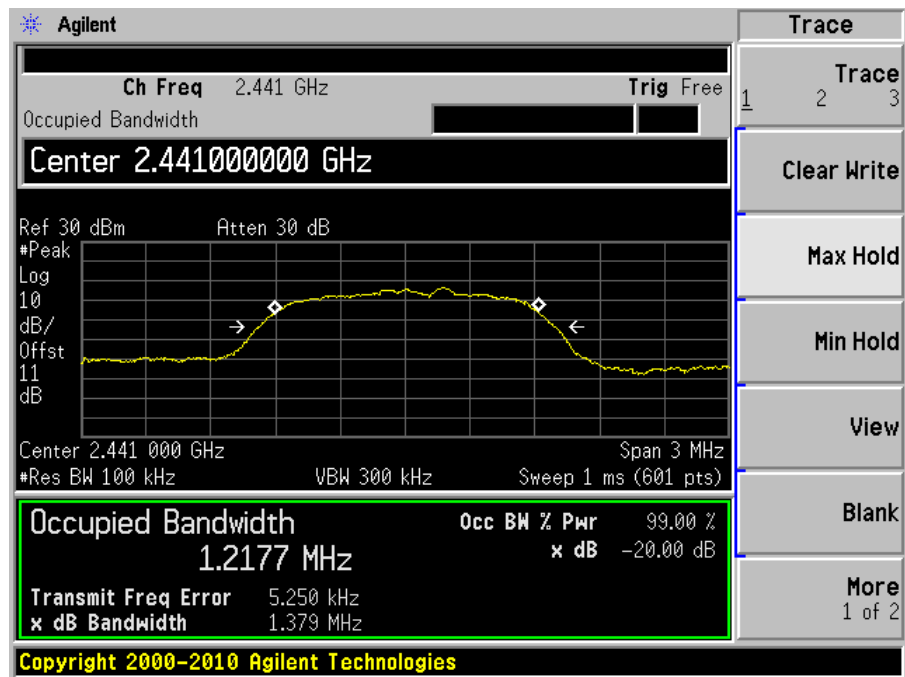
## GFSK - High Channel



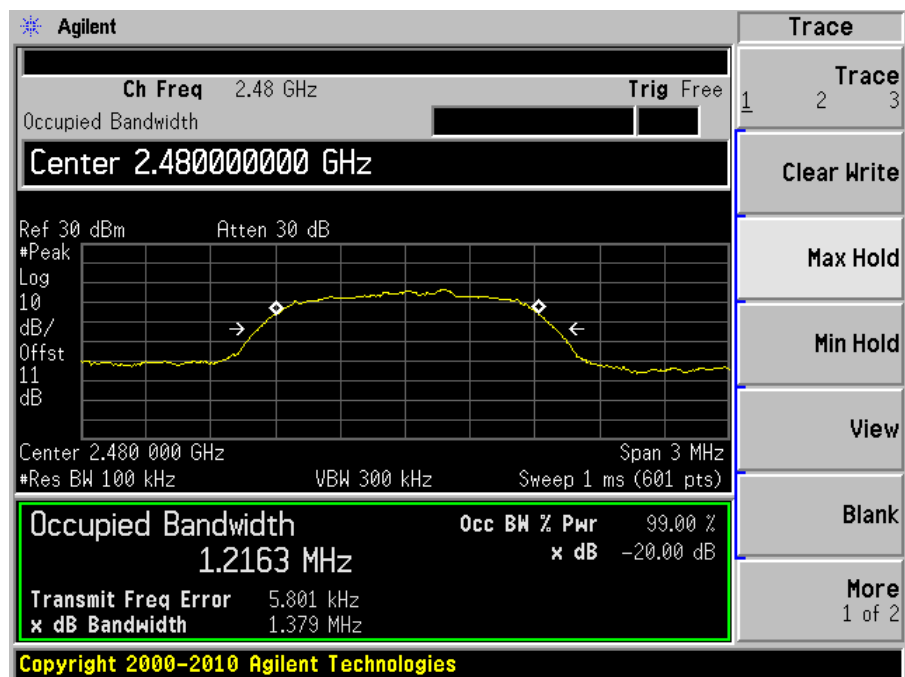
## DQPSK - Low Channel



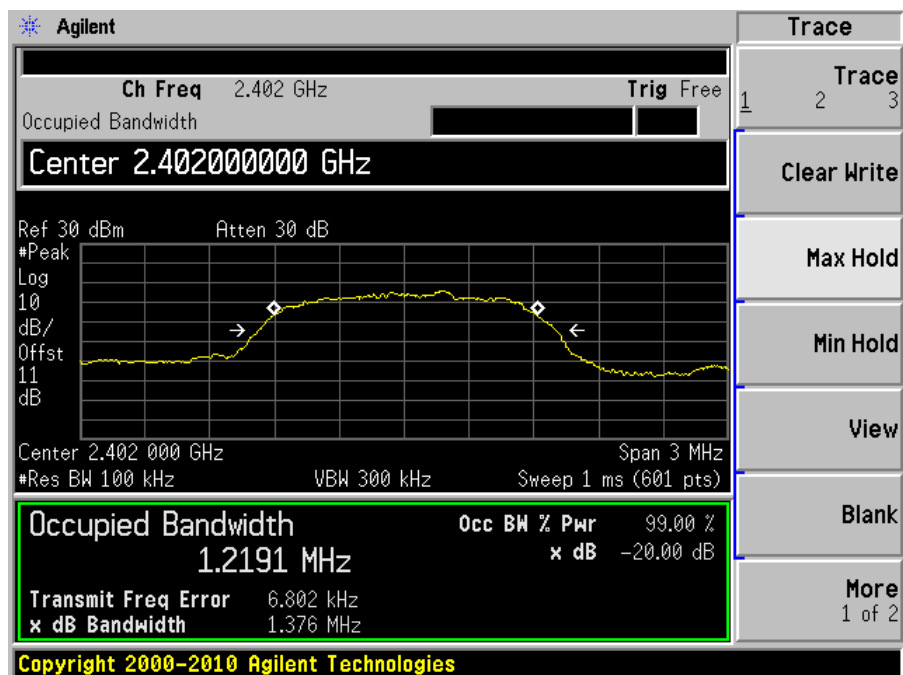
DQPSK - Middle Channel



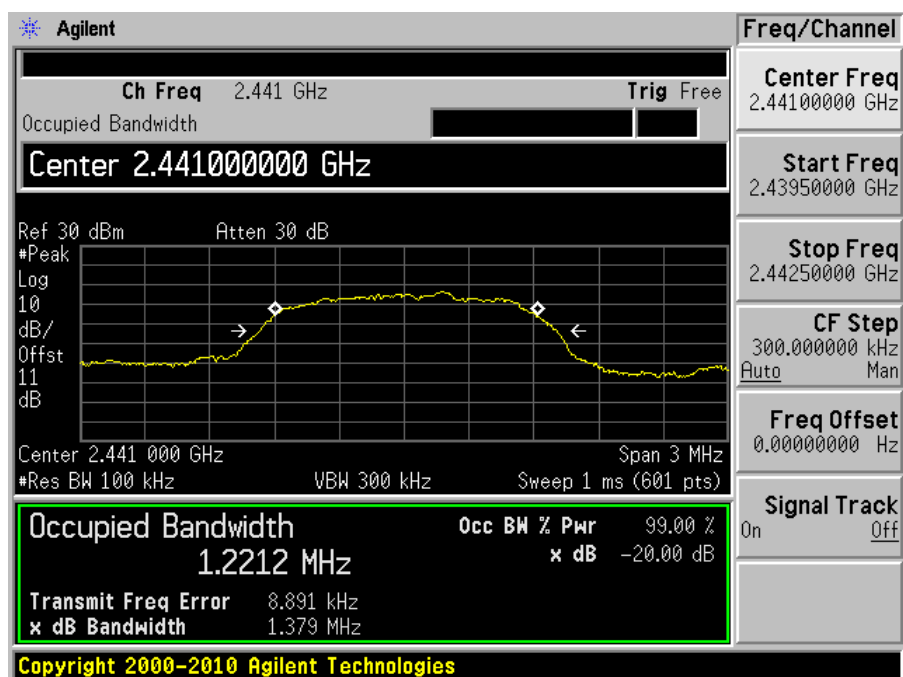
DQPSK - High Channel



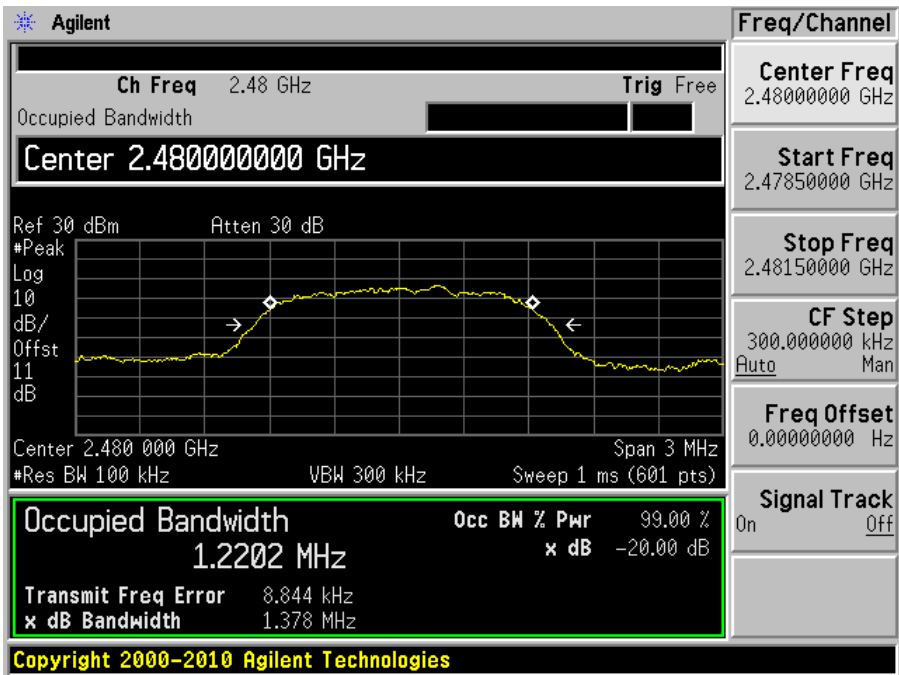
## 8PSK - Low Channel



## 8PSK - Middle Channel



8PSK - High Channel



## 15 FCC §15.247(a) & IC RSS-210 §A8.1 – Hopping Channel Separation

### 15.1 Applicable Standard

According to FCC §15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

According to IC RSS-210 §A8.1(b)(1) Frequency hopping systems shall have hopping 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. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### 15.2 Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on a bench without connection to measurement instrument Turn on the EUT and set it to any one convenient frequency within its operating range.
3. By using the Max-Hold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function, and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

### 15.3 Test Equipment List and Details

| Manufacturer | Description       | Model  | Serial Number | Calibration Date | Calibration Interval |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4440A | MY44303352    | 2012-05-10       | 1 year               |

**Statement of Traceability:** BACL Corp. attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

#### 15.4 Test Environmental Conditions

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 22 °C    |
| <b>Relative Humidity:</b> | 57 %     |
| <b>ATM Pressure:</b>      | 101.1kPa |

The testing was performed by Lionel Lara on 2012-06-18 at RF test site.

#### 15.5 Test Results

##### GFSK

| Channel | Frequency (MHz) | Channel Separation (kHz) | GFSK Limit<br>> 2/3 20 dB BW (kHz) |
|---------|-----------------|--------------------------|------------------------------------|
| Low     | 2402            | 1000                     | 733                                |
| Mid     | 2441            | 1025                     | 733                                |
| High    | 2480            | 1000                     | 739                                |

##### DQPSK

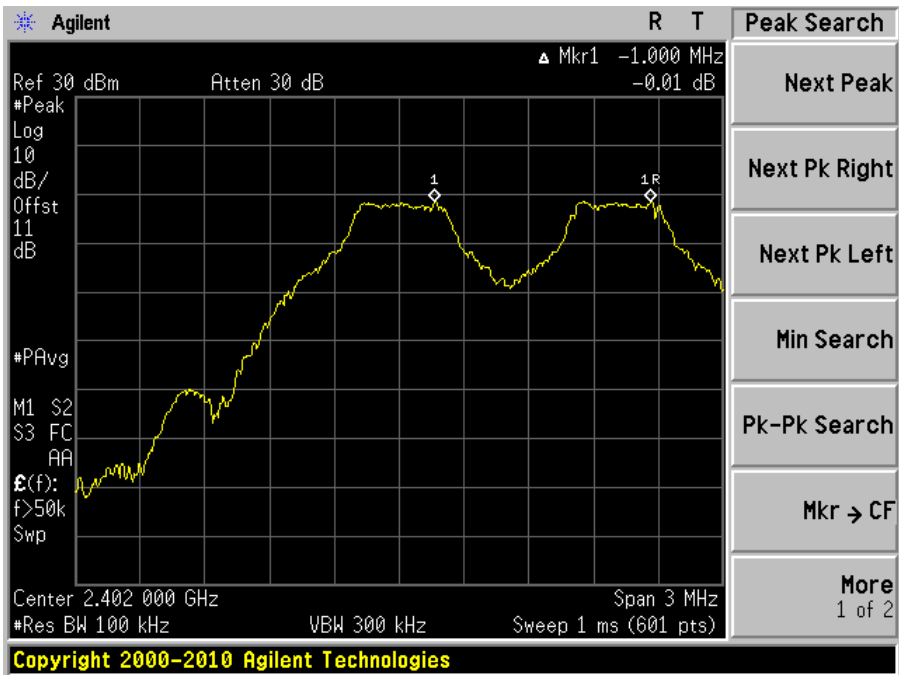
| Channel | Frequency (MHz) | Channel Separation (kHz) | DQPSK Limit<br>> 2/3 20 dB BW (kHz) |
|---------|-----------------|--------------------------|-------------------------------------|
| Low     | 2402            | 1025                     | 917                                 |
| Mid     | 2441            | 1005                     | 919                                 |
| High    | 2480            | 1170                     | 919                                 |

##### 8PSK

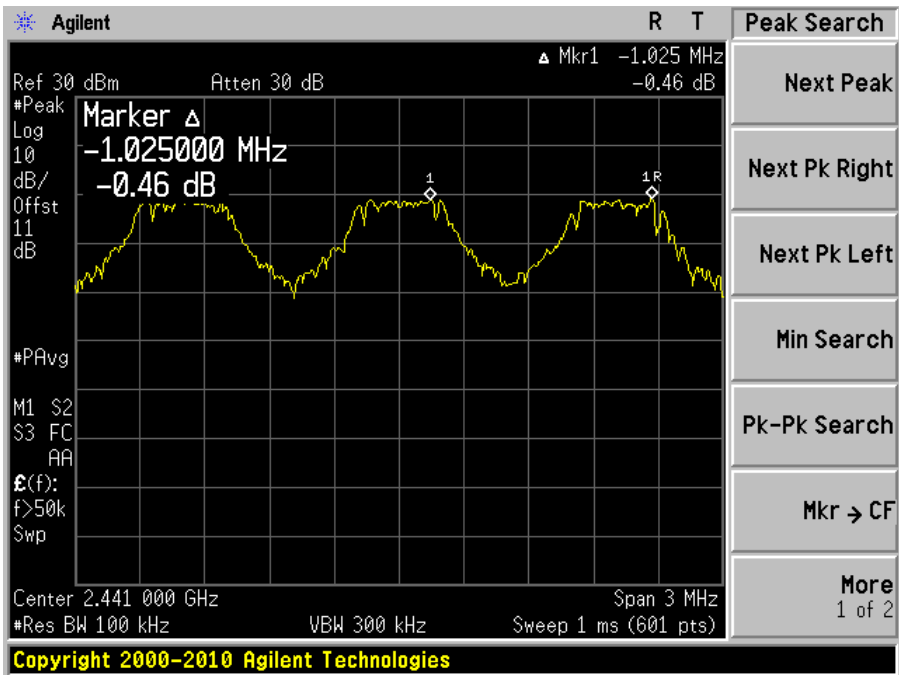
| Channel | Frequency (MHz) | Channel Separation (kHz) | 8PSK Limit<br>> 2/3 20 dB BW (kHz) |
|---------|-----------------|--------------------------|------------------------------------|
| Low     | 2402            | 1000                     | 917                                |
| Mid     | 2441            | 1000                     | 919                                |
| High    | 2480            | 1205                     | 919                                |

Please refer to the following plots.

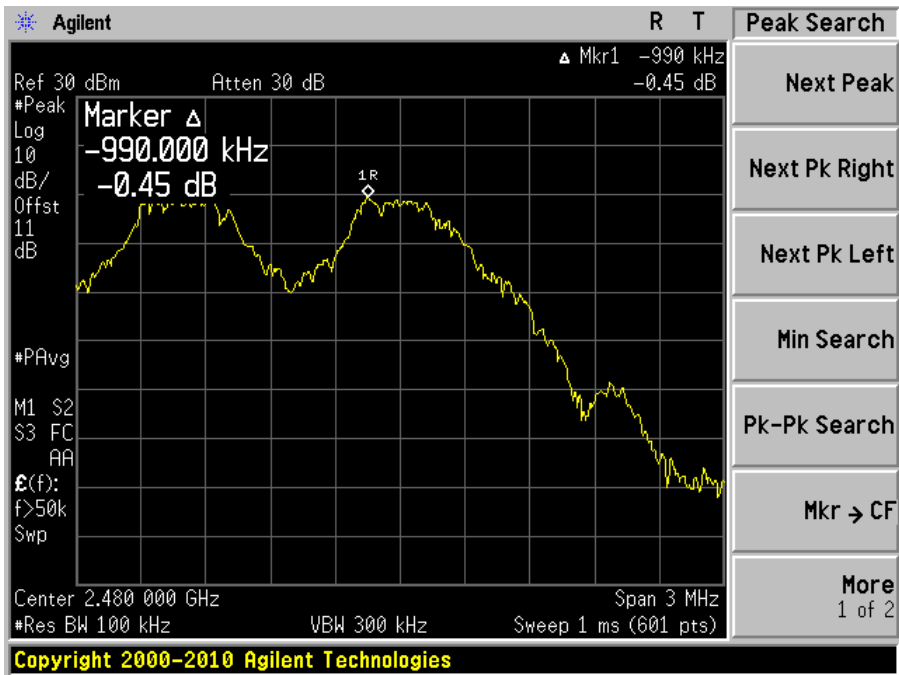
GFSK - Low Channel



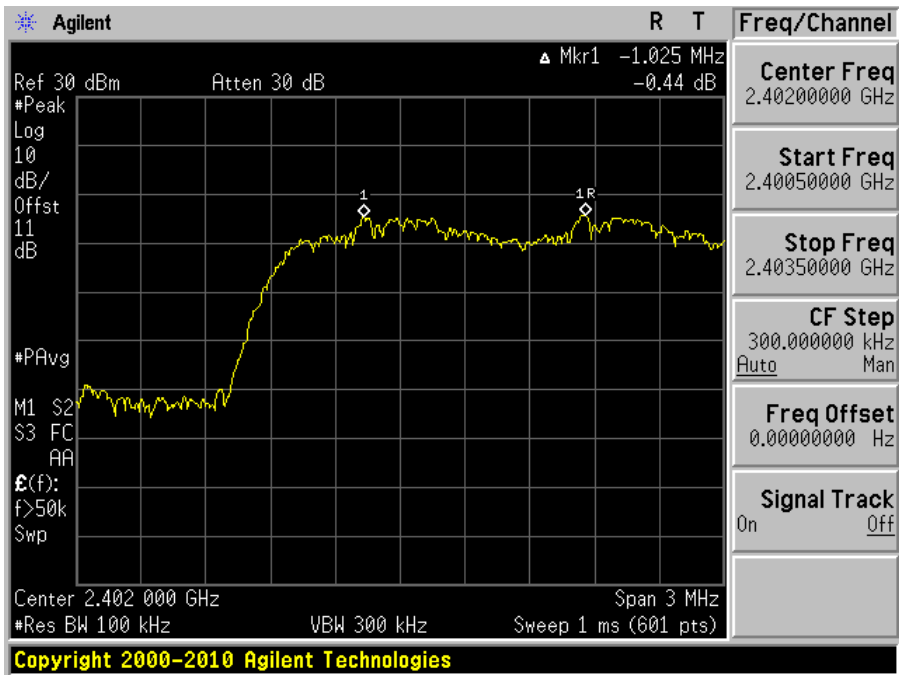
GFSK - Middle Channel



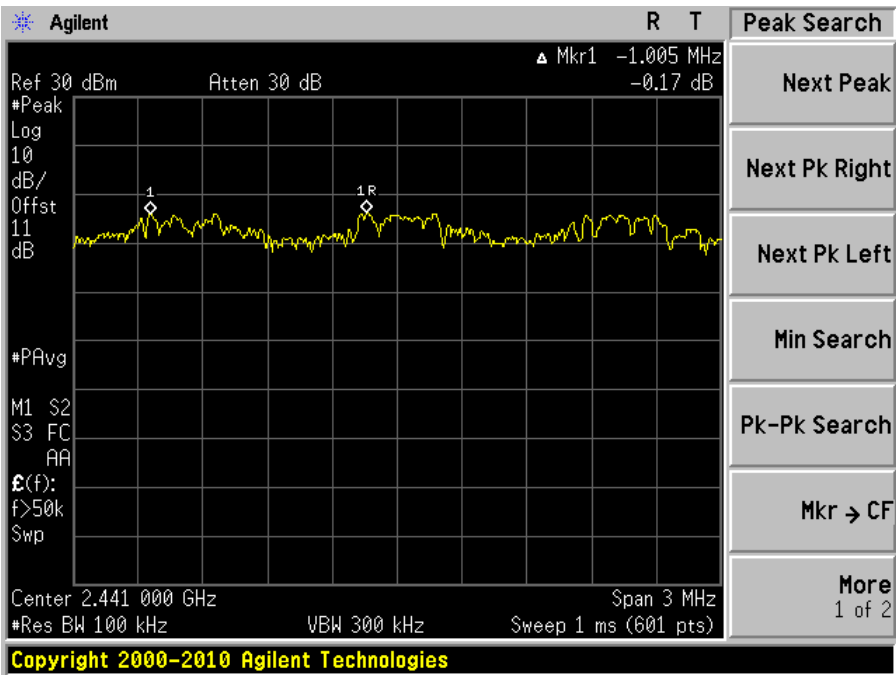
GFSK - High Channel



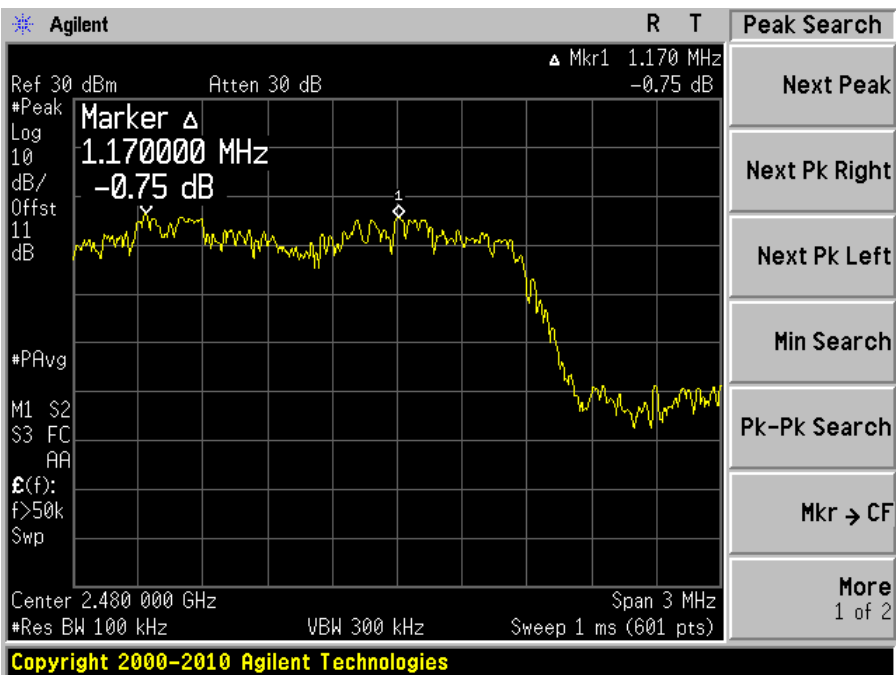
DQPSK - Low Channel



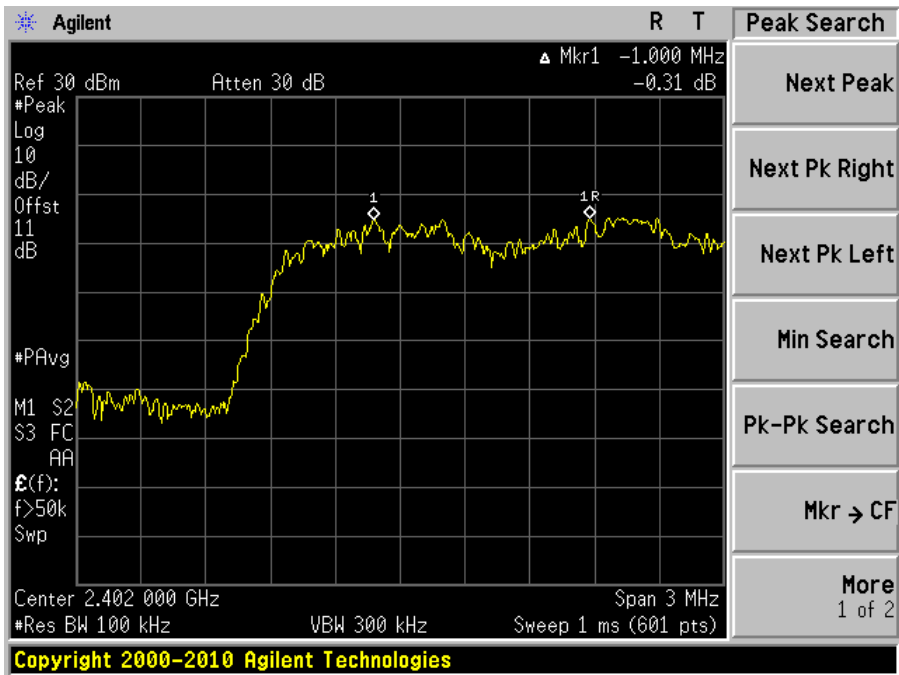
DQPSK - Middle Channel



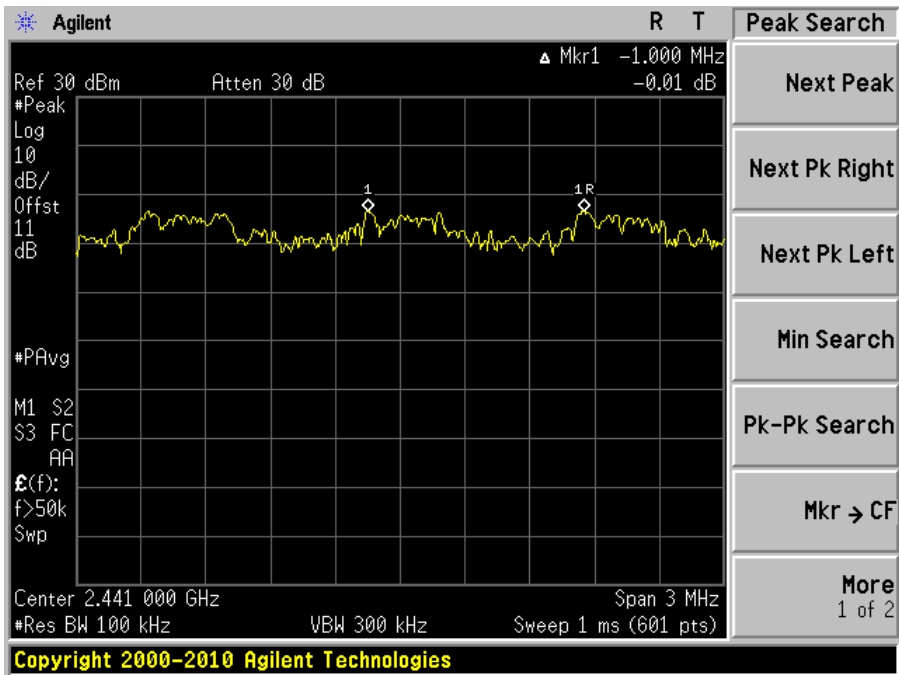
DQPSK - High Channel



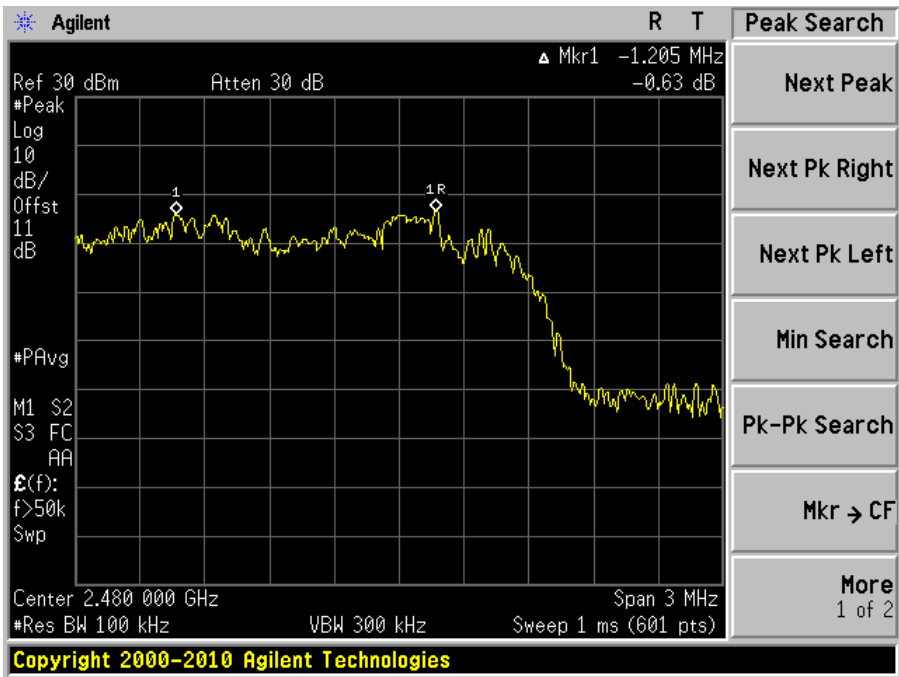
8PSK - Low Channel



8PSK - Middle Channel



8PSK - High Channel



## 16 FCC §15.247(a) & IC RSS-210 §A8.1 - Number of Hopping Channels

### 16.1 Applicable Standard

According to FCC §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

According to IC RSS-210 §A8.1 (d), 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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

### 16.2 Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the bench without connection to measurement instrument. Turn on the EUT and set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the SA on Max-Hold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

### 16.3 Test Equipment List and Details

| Manufacturer | Description       | Model  | Serial Number | Calibration Date | Calibration Interval |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4440A | MY44303352    | 2012-05-10       | 1 year               |

**Statement of Traceability:** BACL Corp. attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 16.4 Test Environmental Conditions

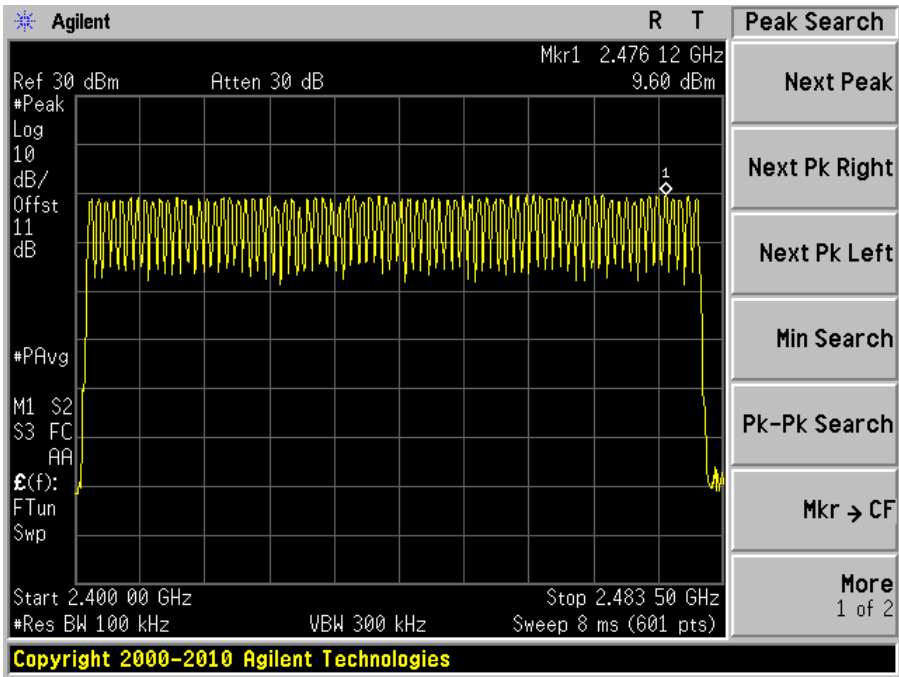
|                    |          |
|--------------------|----------|
| Temperature:       | 22 °C    |
| Relative Humidity: | 57 %     |
| ATM Pressure:      | 101.1kPa |

The testing was performed by Lionel Lara on 2012-06-18 at RF test site.

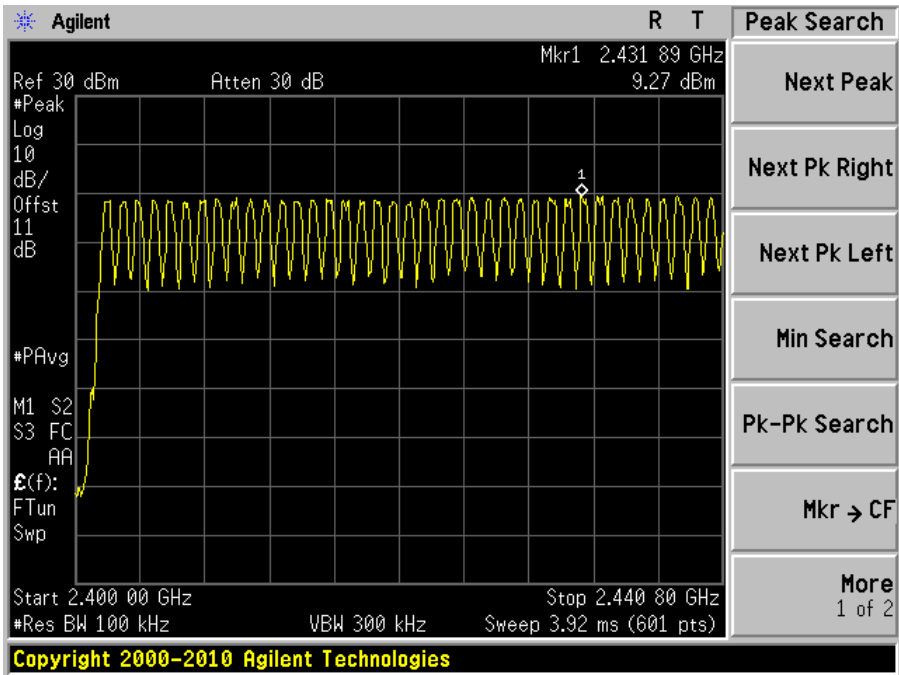
16.5 Test Results

Total 79 channels; please refer to the plots hereinafter.

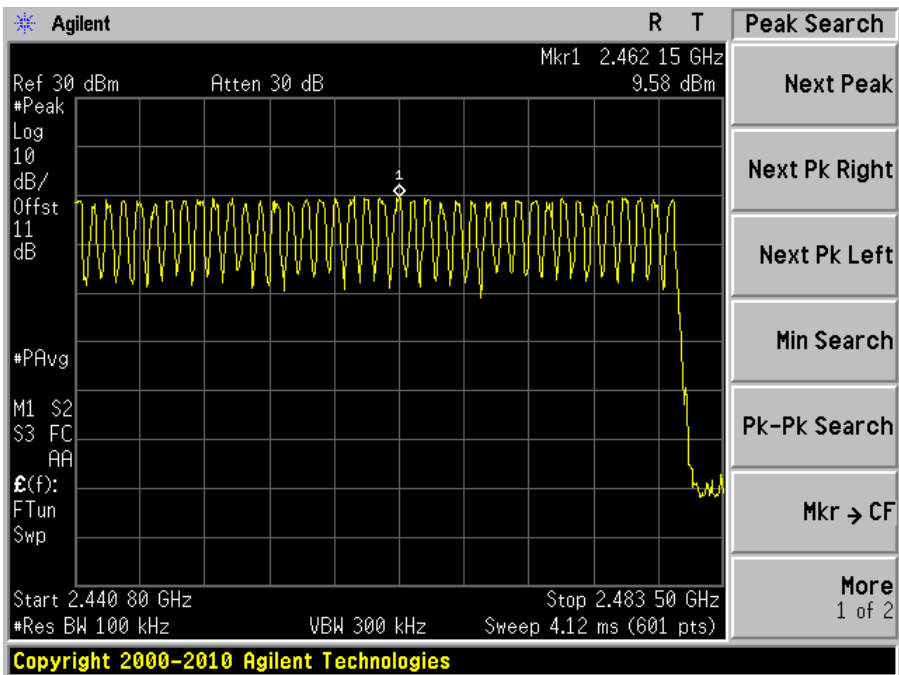
Hopping Channel Number: Total 79 Channels



39 Channels between 2400 to 2440.8 MHz



40 Channels between 2440.59 to 2483.5 MHz



## 17 FCC §15.247(a) & IC RSS-210 §A8.1 - Dwell Time

### 17.1 Applicable Standard

According to FCC §15.247 (a)(1)(iii), 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.

According to IC RSS-210 §A8.1 (d), 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. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

### 17.2 Measurement Procedure

5. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
6. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
7. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
8. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
9. Repeat above procedures until all frequencies measured were complete.

### 17.3 Test Equipment List and Details

| Manufacturer | Description       | Model  | Serial Number | Calibration Date | Calibration Interval |
|--------------|-------------------|--------|---------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | E4440A | MY44303352    | 2012-05-10       | 1 year               |

**Statement of Traceability:** **BACL Corp.** attests that all calibrations have been performed according to A2LA requirements, traceable to the NIST.

### 17.4 Test Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 22 °C    |
| Relative Humidity: | 57 %     |
| ATM Pressure:      | 101.1kPa |

*The testing was performed by Lionel Lara on 2012-06-18 at RF test site.*

## 17.5 Test Results

GFSK, DH1: Packet Size = 27 byte

| Channel | Pulse Width (ms) | Dwell time (sec) | Limit (sec) | Results |
|---------|------------------|------------------|-------------|---------|
| Low     | 0.3865           | 0.12             | 0.4         | Pass    |
| Mid     | 0.3865           | 0.12             | 0.4         | Pass    |
| High    | 0.3865           | 0.12             | 0.4         | Pass    |

Note: Dwell time = Pulse time\*(1600/2/79)\*31.6S

GFSK, DH3: Packet Size = 183 bytes

| Channel | Pulse Width (ms) | Dwell time (sec) | Limit (sec) | Results |
|---------|------------------|------------------|-------------|---------|
| Low     | 1.65             | 0.26             | 0.4         | Pass    |
| Mid     | 1.654            | 0.26             | 0.4         | Pass    |
| High    | 1.654            | 0.26             | 0.4         | Pass    |

Note: Dwell time = Pulse time\*(1600/4/79)\*31.6S

GFSK, DH5: Packet Size = 339 bytes

| Channel | Pulse Width (ms) | Dwell time (sec) | Limit (sec) | Results |
|---------|------------------|------------------|-------------|---------|
| Low     | 2.895            | 0.31             | 0.4         | Pass    |
| Mid     | 2.895            | 0.31             | 0.4         | Pass    |
| High    | 2.903            | 0.31             | 0.4         | Pass    |

Note: Dwell time = Pulse time\*(1600/6/79)\*31.6S

DQPSK, DH1: Packet Size = 27 byte

| Channel | Pulse Width (ms) | Dwell time (sec) | Limit (sec) | Results |
|---------|------------------|------------------|-------------|---------|
| Low     | 0.3876           | 0.12             | 0.4         | Pass    |
| Mid     | 0.3887           | 0.12             | 0.4         | Pass    |
| High    | 0.3876           | 0.12             | 0.4         | Pass    |

Note: Dwell time = Pulse time\*(1600/2/79)\*31.6S

## DQPSK, DH3: Packet Size = 183 bytes

| Channel | Pulse Width (ms) | Dwell time (sec) | Limit (sec) | Results |
|---------|------------------|------------------|-------------|---------|
| Low     | 1.646            | 0.26             | 0.4         | Pass    |
| Mid     | 1.65             | 0.26             | 0.4         | Pass    |
| High    | 1.646            | 0.26             | 0.4         | Pass    |

Note: Dwell time = Pulse time\*(1600/4/79)\*31.6S

## DQPSK, DH5: Packet Size = 339 bytes

| Channel | Pulse Width (ms) | Dwell time (sec) | Limit (sec) | Results |
|---------|------------------|------------------|-------------|---------|
| Low     | 2.903            | 0.31             | 0.4         | Pass    |
| Mid     | 2.903            | 0.31             | 0.4         | Pass    |
| High    | 2.895            | 0.31             | 0.4         | Pass    |

Note: Dwell time = Pulse time\*(1600/6/79)\*31.6S

## 8PSK, DH1: Packet Size = 27 byte

| Channel | Pulse Width (ms) | Dwell time (sec) | Limit (sec) | Results |
|---------|------------------|------------------|-------------|---------|
| Low     | 0.3865           | 0.12             | 0.4         | Pass    |
| Mid     | 0.3876           | 0.12             | 0.4         | Pass    |
| High    | 0.3876           | 0.12             | 0.4         | Pass    |

Note: Dwell time = Pulse time\*(1600/2/79)\*31.6S

## 8PSK, DH3: Packet Size = 183 bytes

| Channel | Pulse Width (ms) | Dwell time (sec) | Limit (sec) | Results |
|---------|------------------|------------------|-------------|---------|
| Low     | 1.641            | 0.26             | 0.4         | Pass    |
| Mid     | 1.65             | 0.26             | 0.4         | Pass    |
| High    | 1.65             | 0.26             | 0.4         | Pass    |

Note: Dwell time = Pulse time\*(1600/4/79)\*31.6S

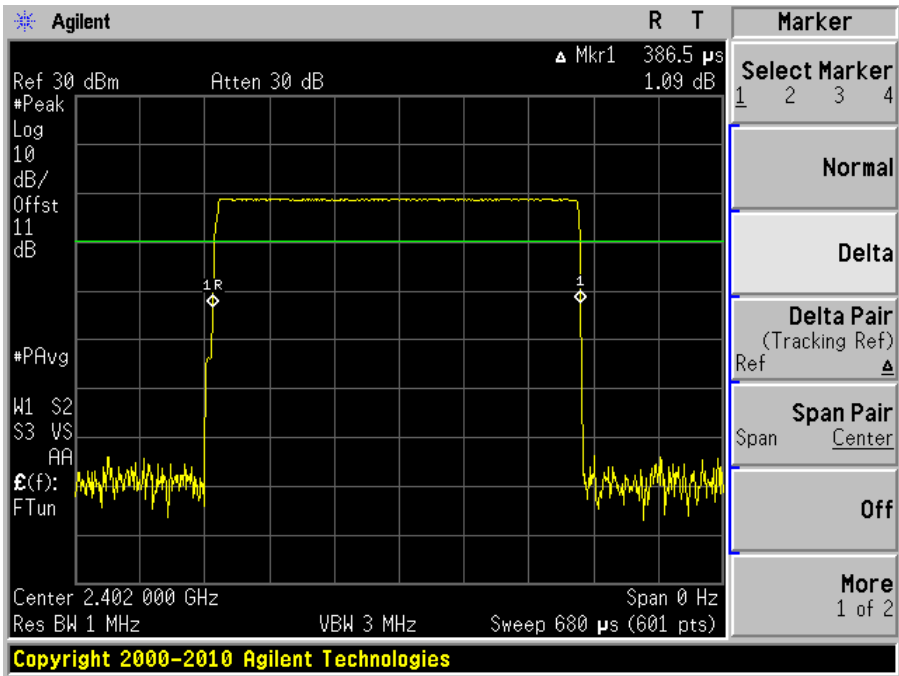
## 8PSK, DH5: Packet Size = 339 bytes

| Channel | Pulse Width (ms) | Dwell time (sec) | Limit (sec) | Results |
|---------|------------------|------------------|-------------|---------|
| Low     | 2.903            | 0.31             | 0.4         | Pass    |
| Mid     | 2.895            | 0.31             | 0.4         | Pass    |
| High    | 2.903            | 0.31             | 0.4         | Pass    |

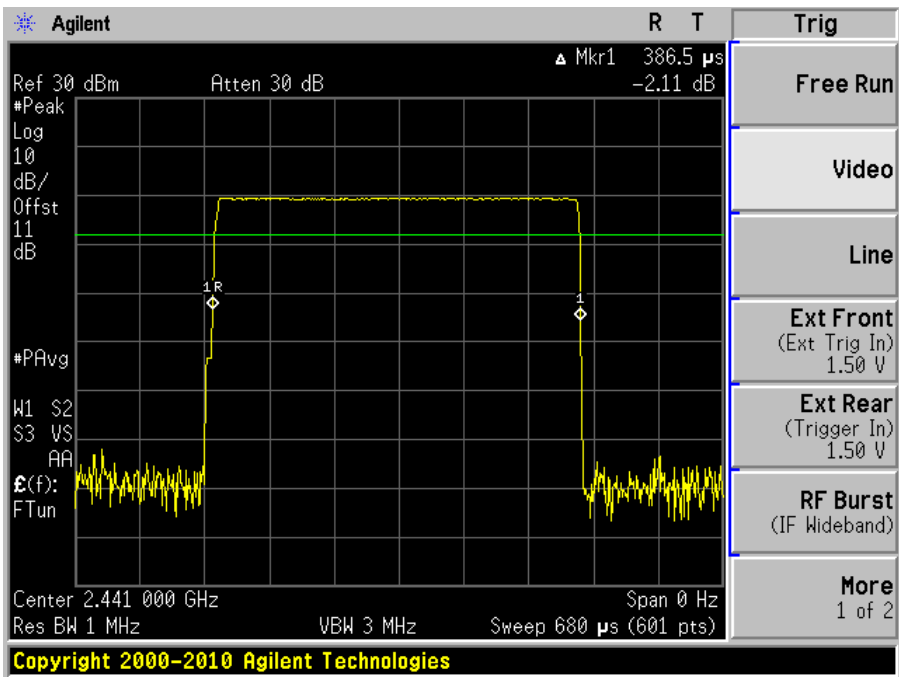
Note: Dwell time = Pulse time\*(1600/6/79)\*31.6S

Please refer to following plots:

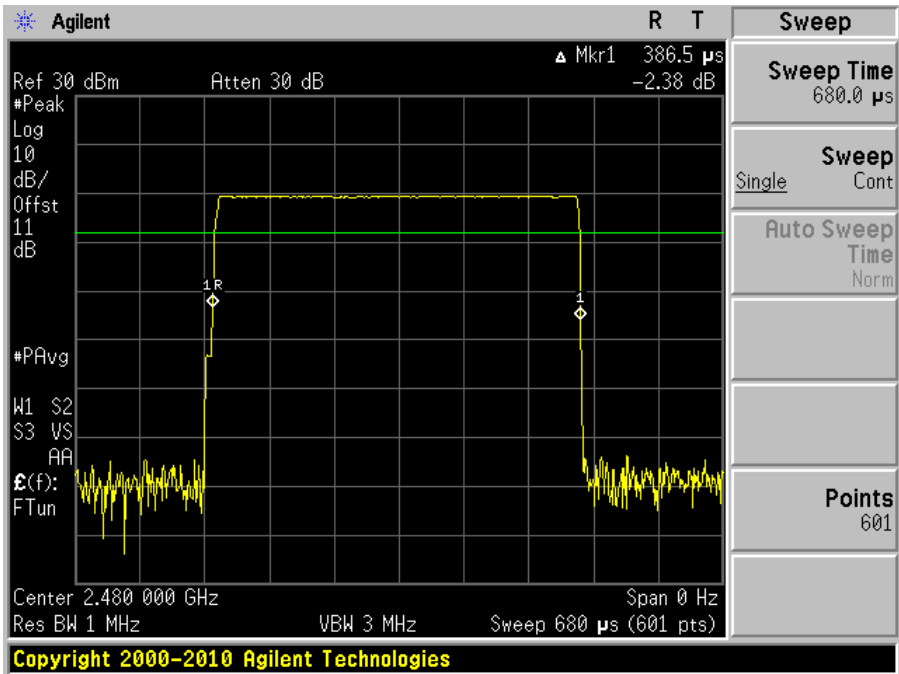
GFSK, DH1 - Low Channel



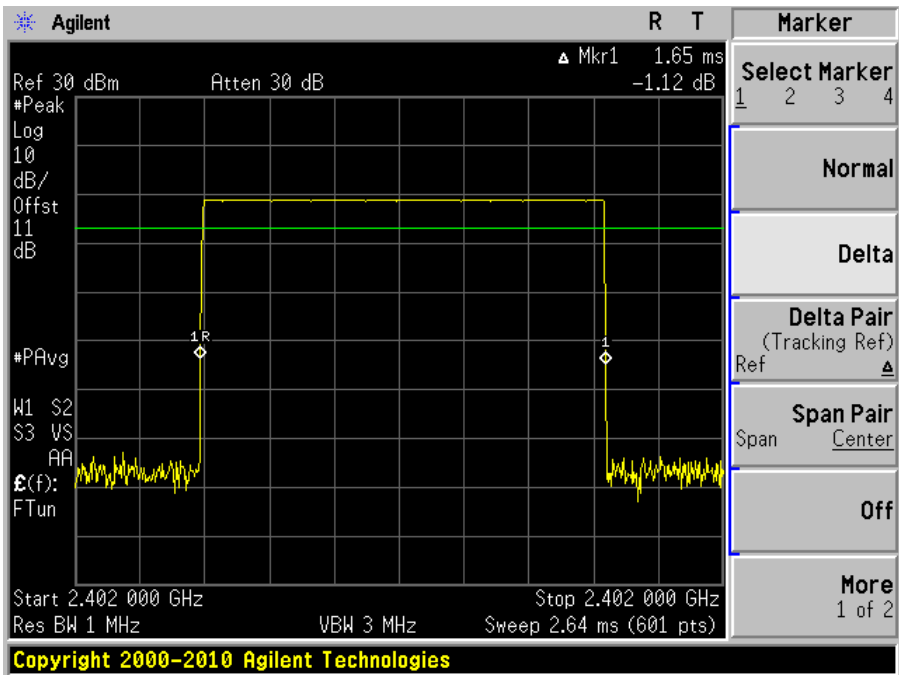
GFSK, DH1 - Middle Channel



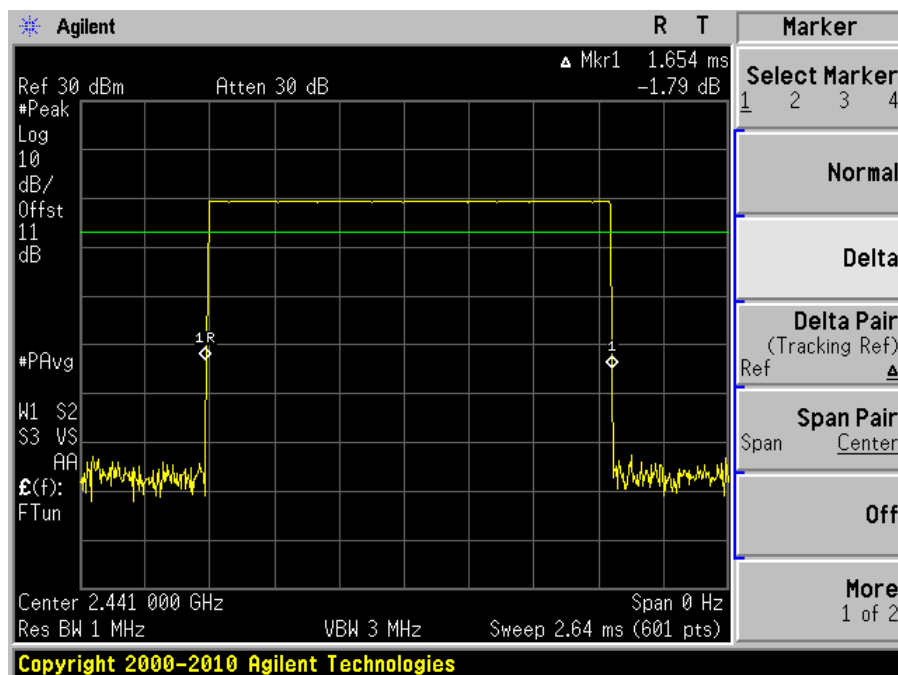
GFSK, DH1 - High Channel



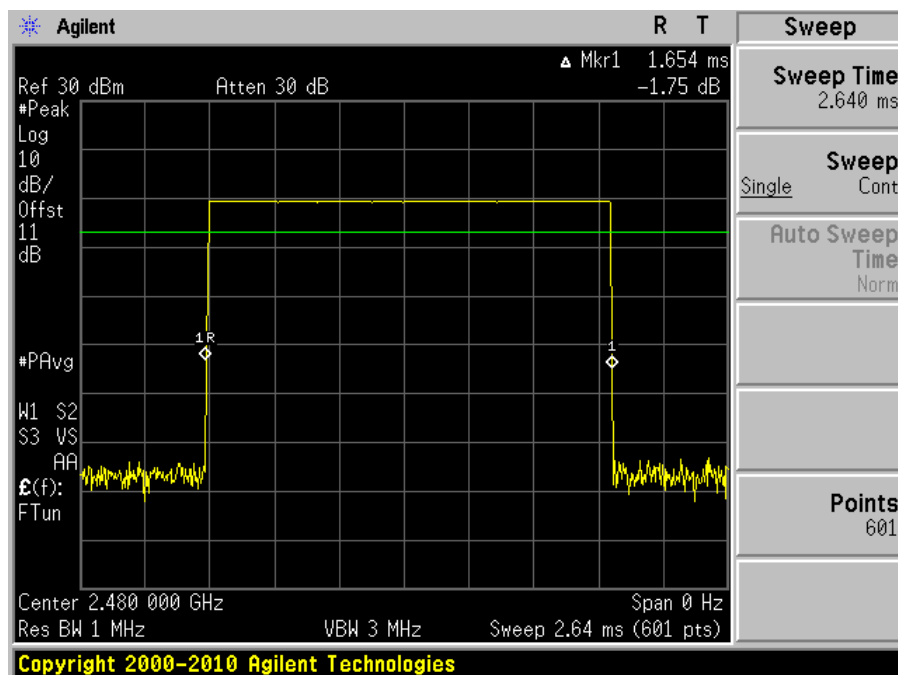
GFSK, DH3 - Low Channel



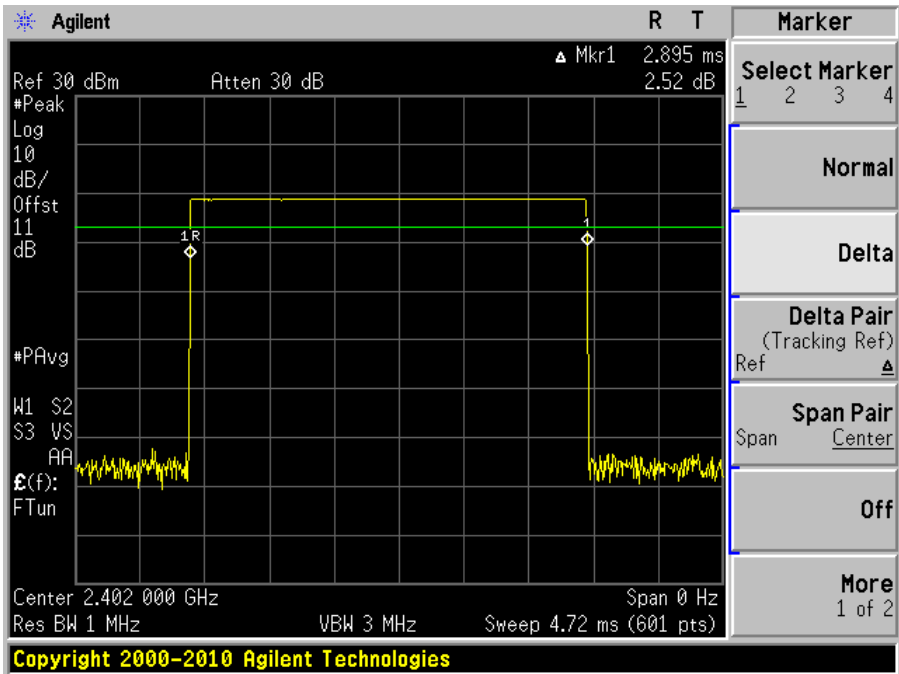
## GFSK, DH3 - Middle Channel



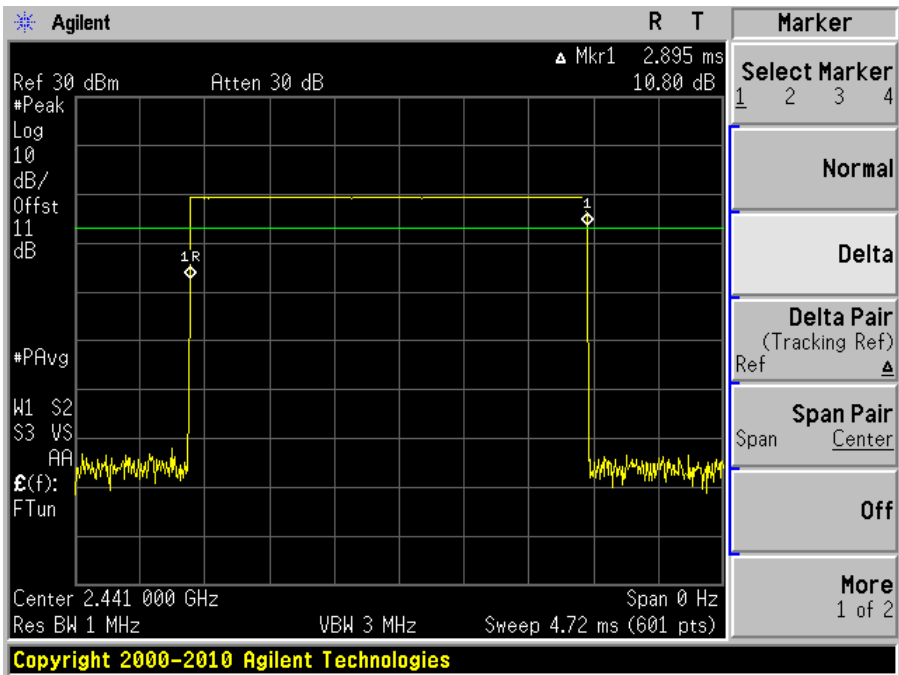
## GFSK, DH3 - High Channel



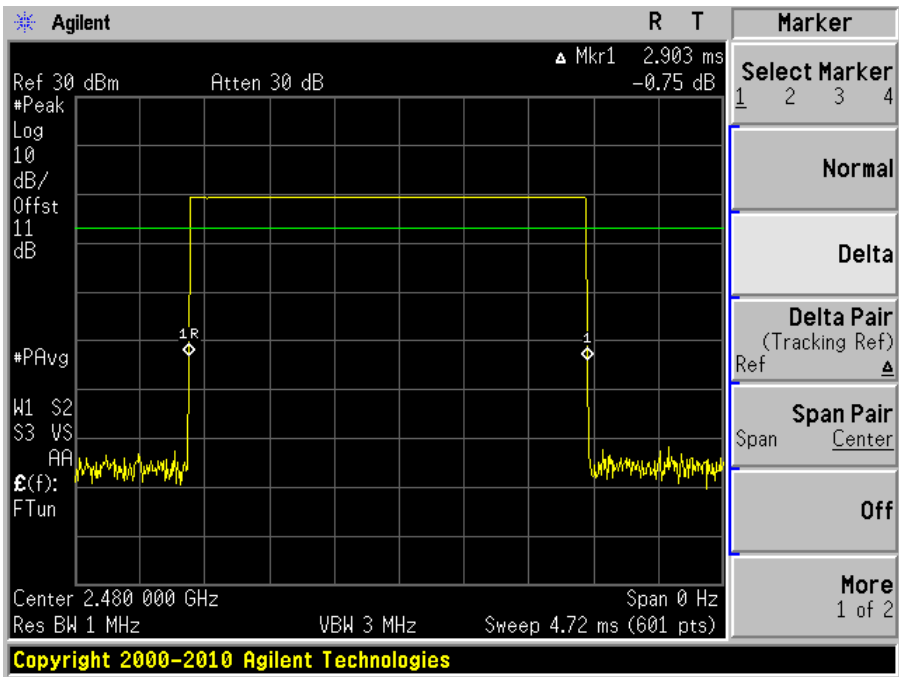
GFSK, DH5 - Low Channel



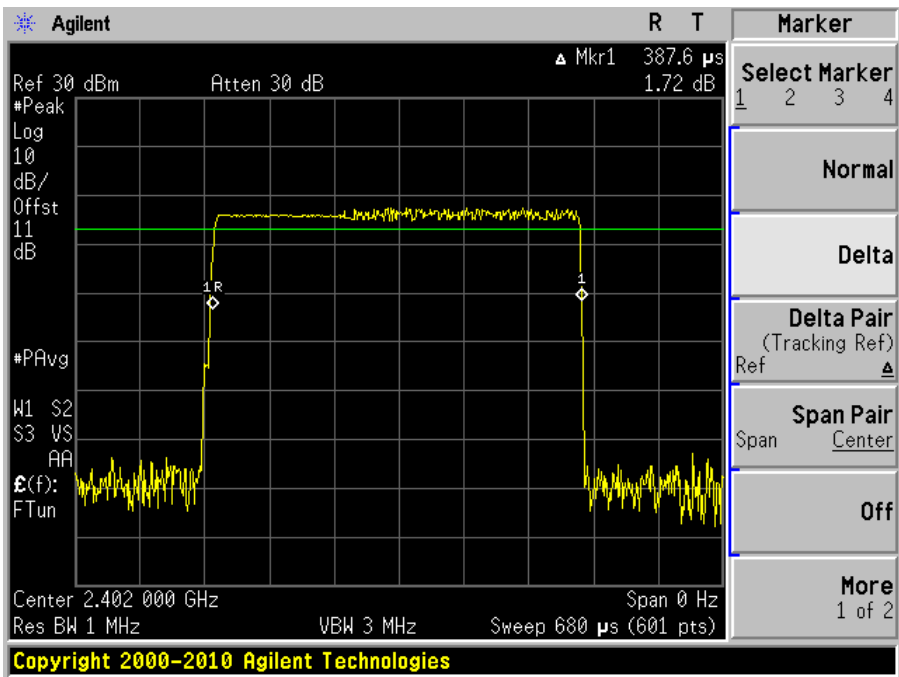
GFSK, DH5 - Middle Channel



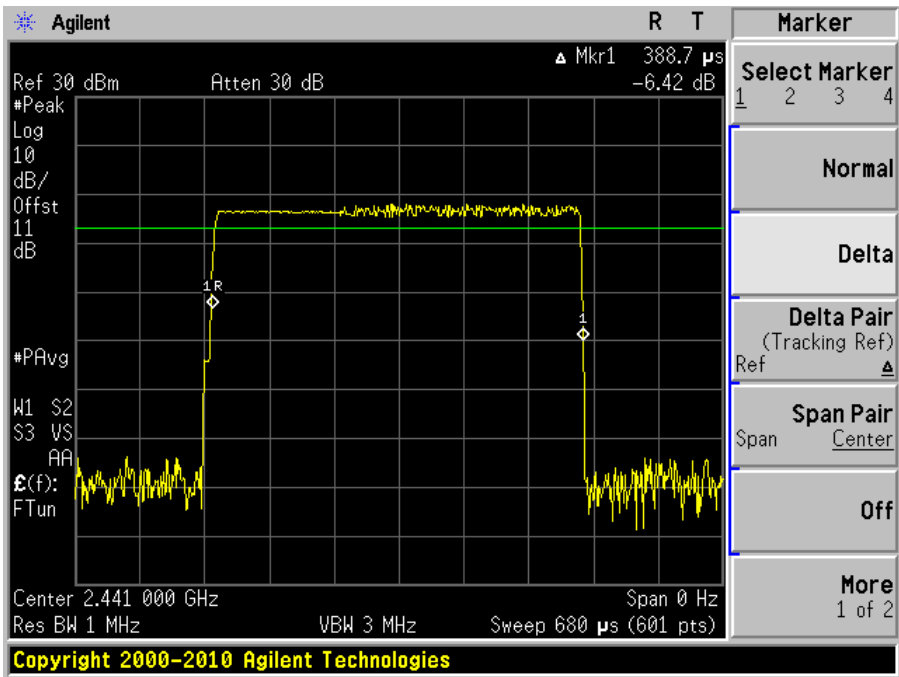
GFSK, DH5 - High Channel



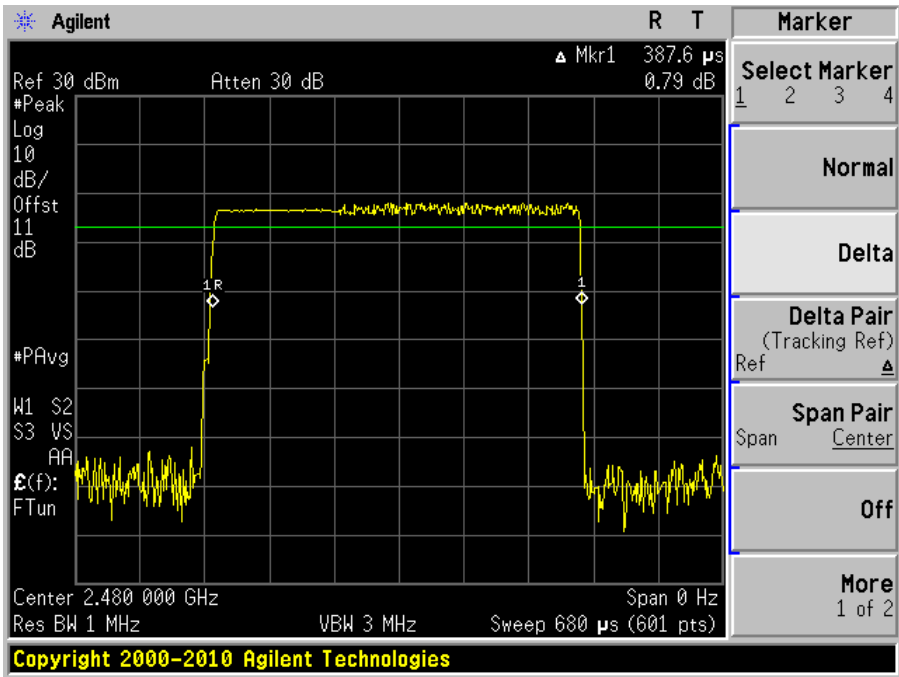
DQPSK, DH1 - Low Channel



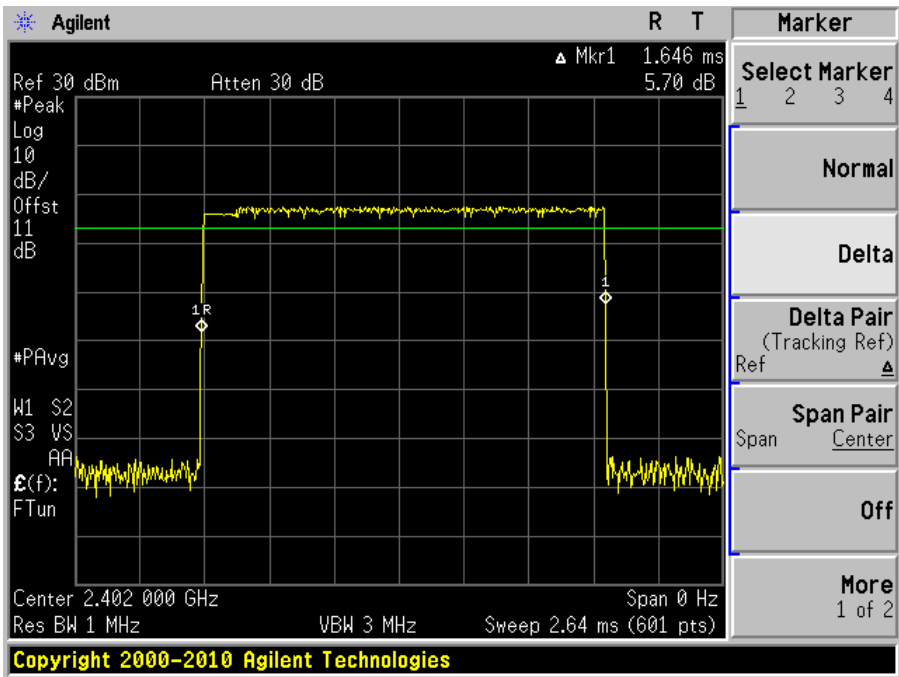
DQPSK, DH1 - Middle Channel



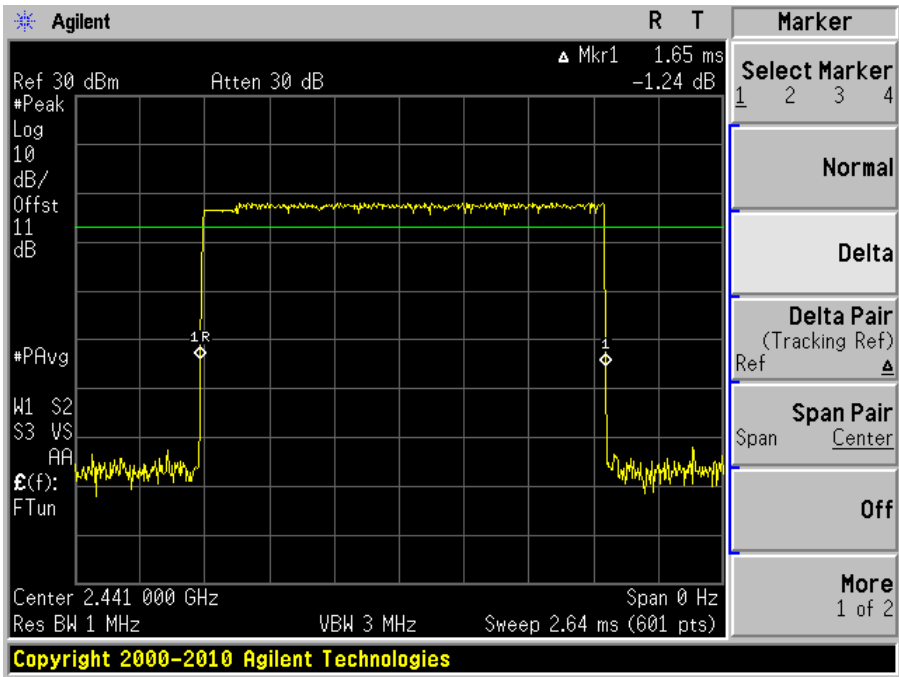
DQPSK, DH1 - High Channel



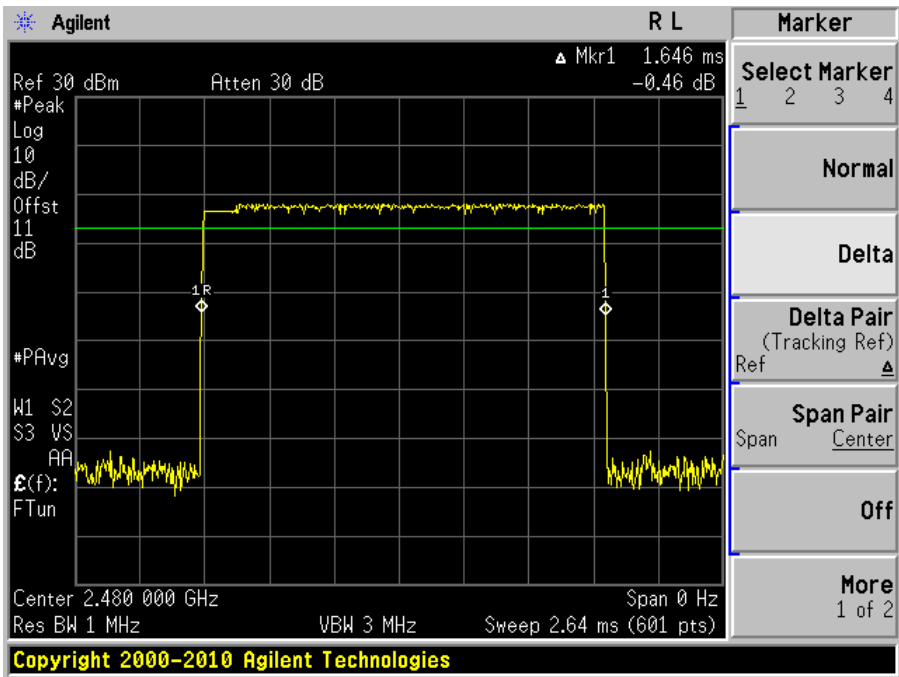
DQPSK, DH3 - Low Channel



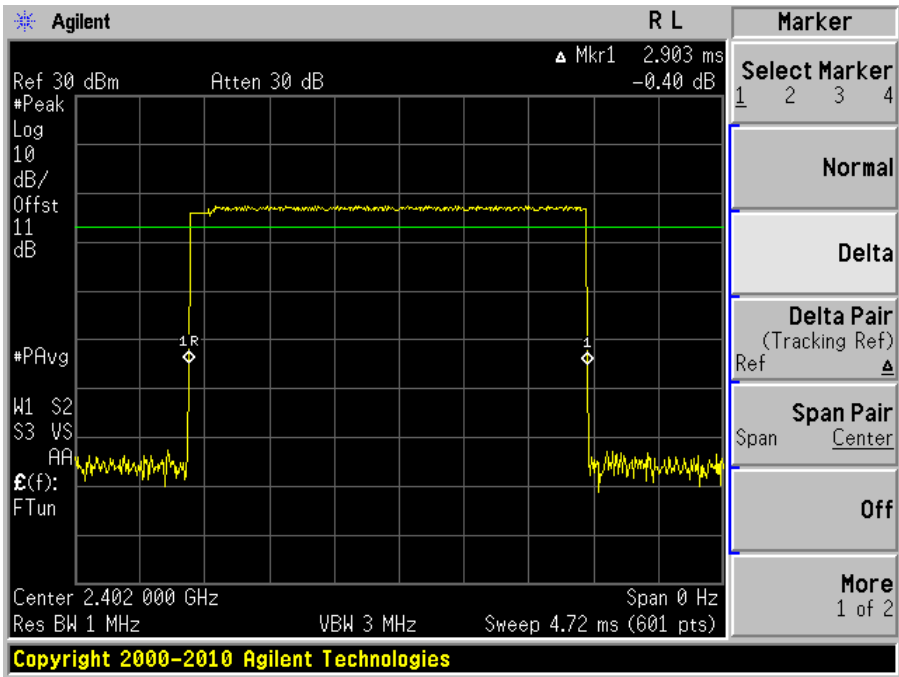
DQPSK, DH3 - Middle Channel



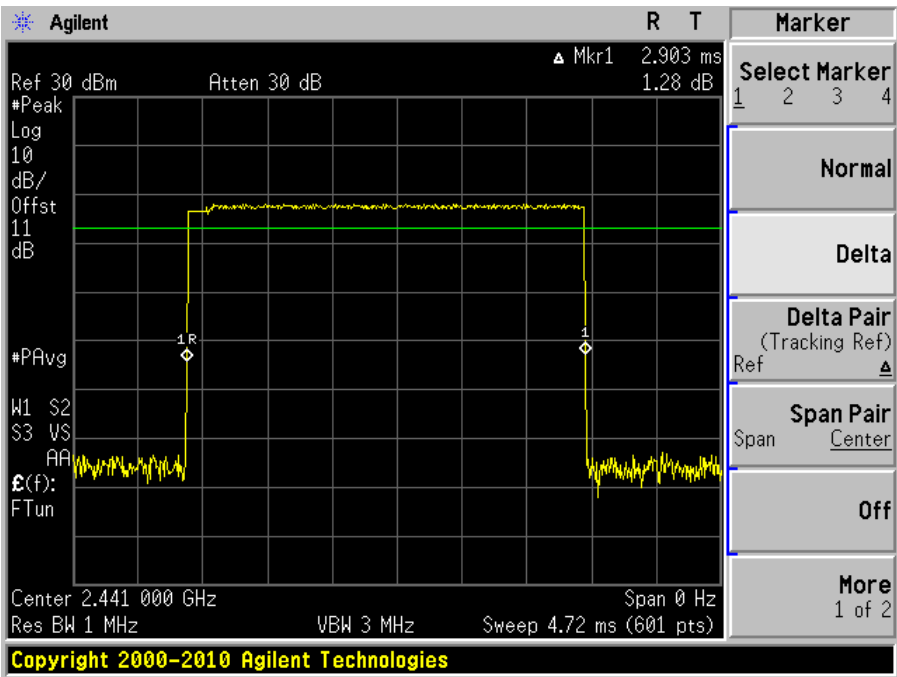
DQPSK, DH3 - High Channel



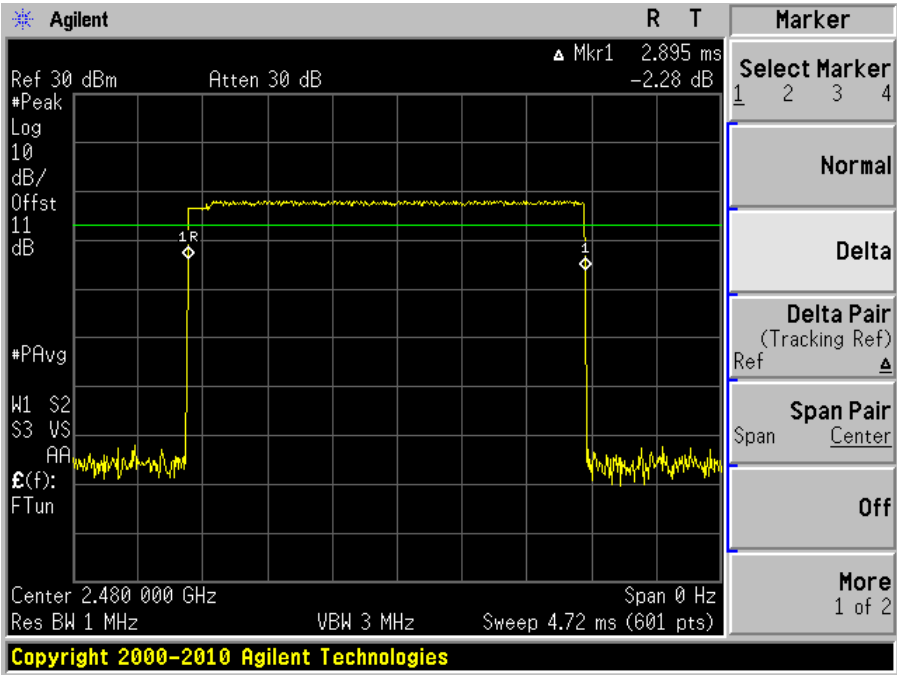
DQPSK, DH5 - Low Channel



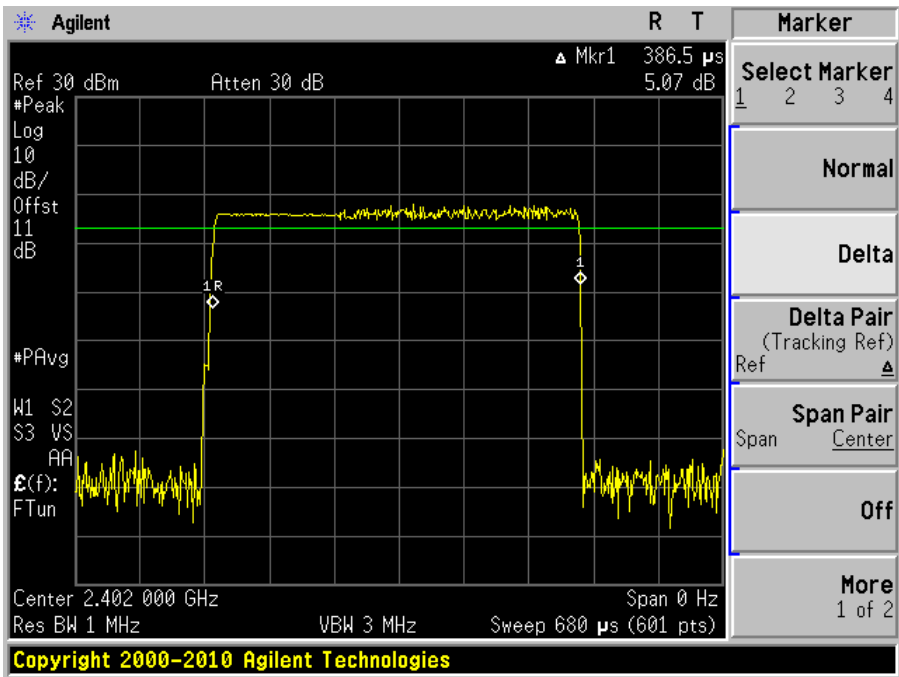
DQPSK, DH5 - Middle Channel



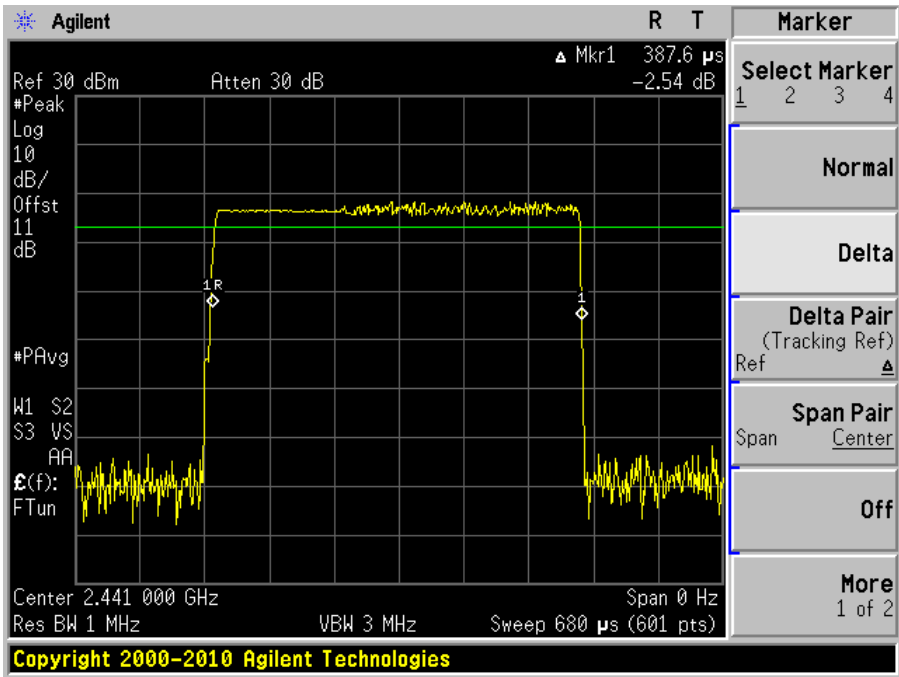
DQPSK, DH5 - High Channel



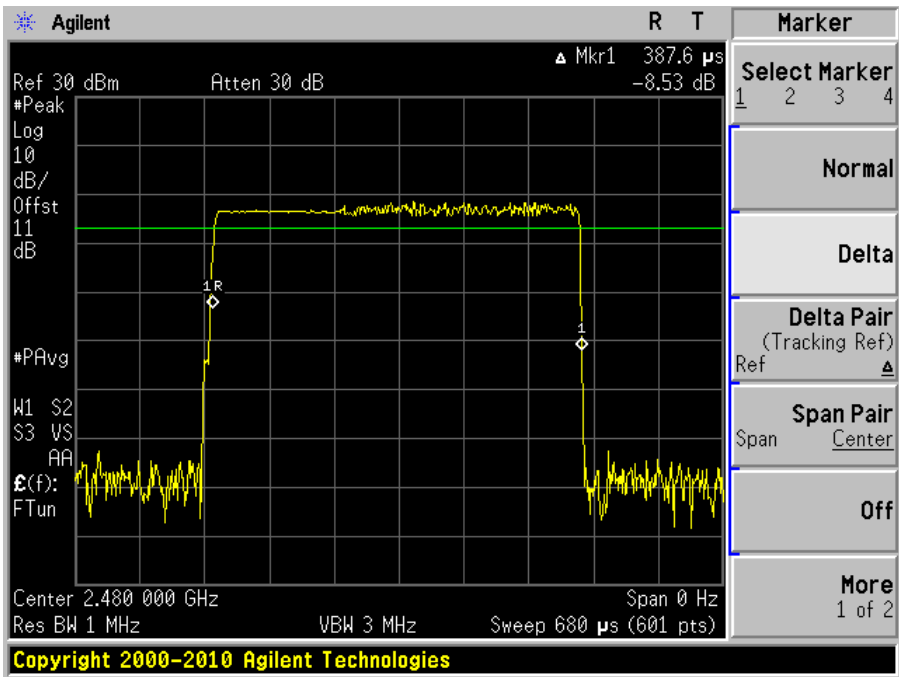
8PSK, DH1 - Low Channel



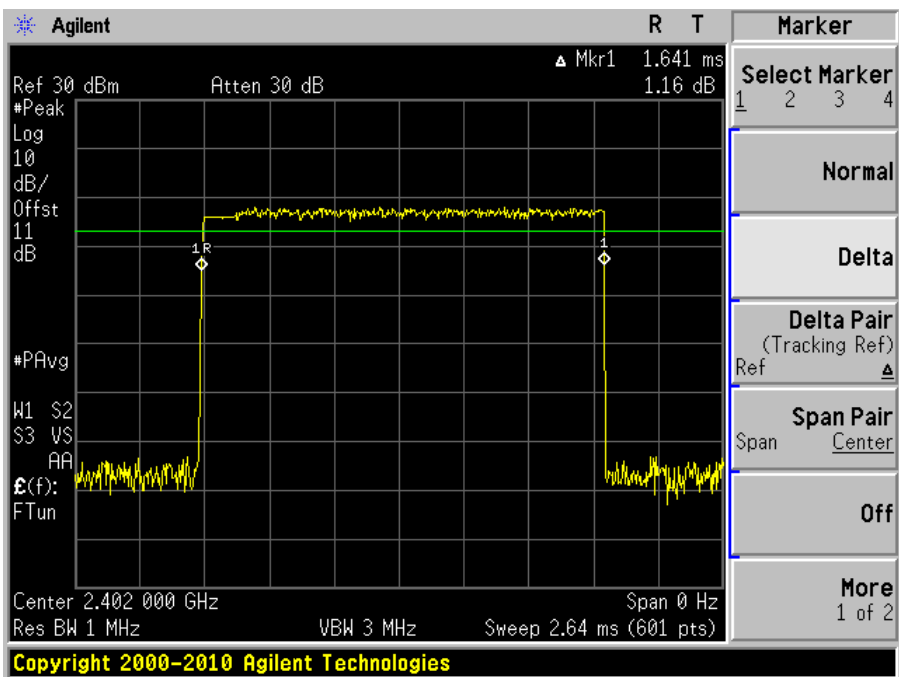
8PSK, DH1 - Middle Channel



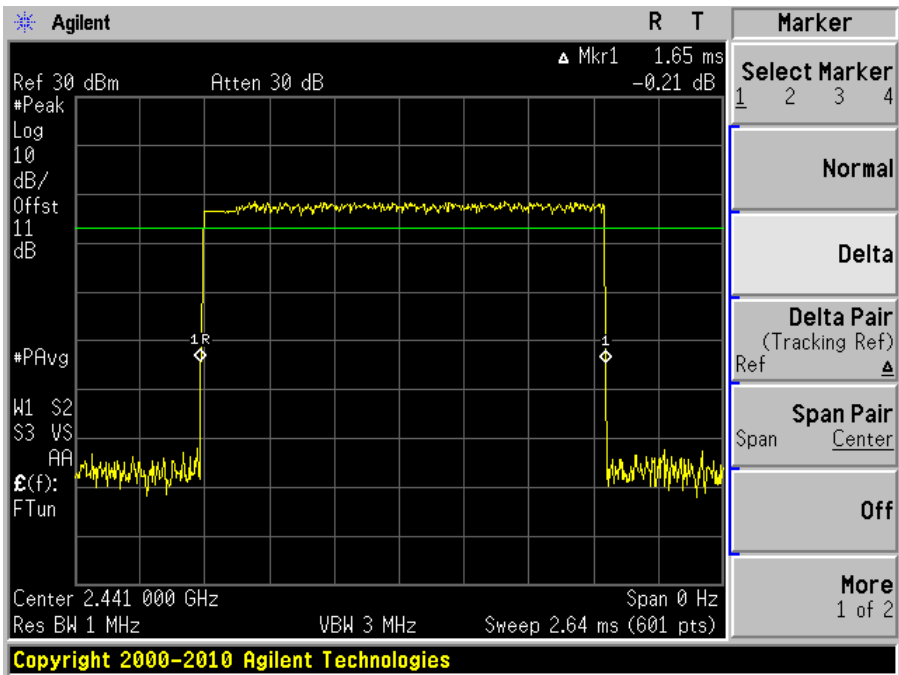
8PSK, DH1 - High Channel



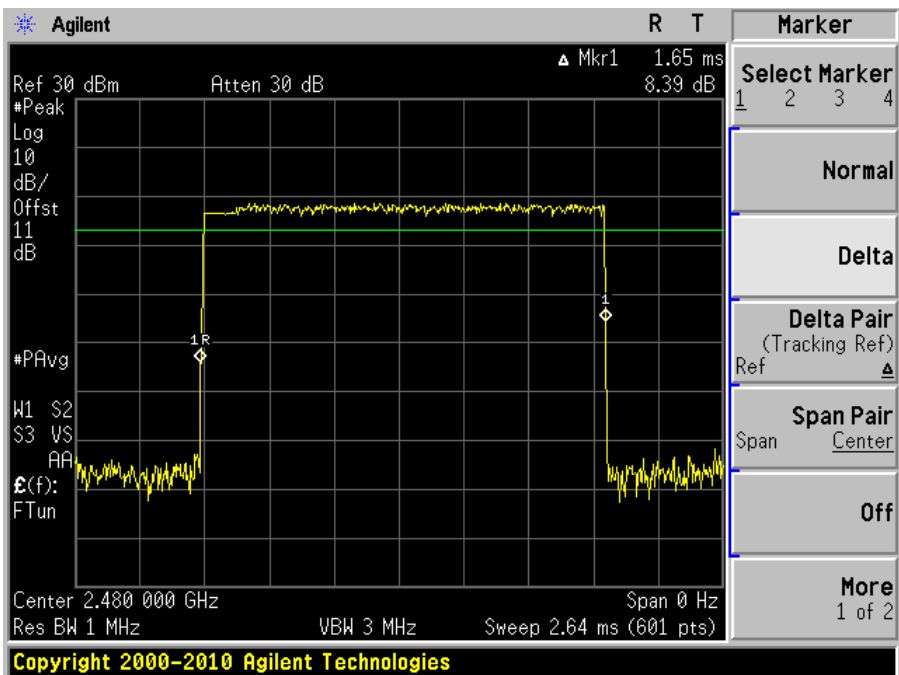
8PSK, DH3 - Low Channel



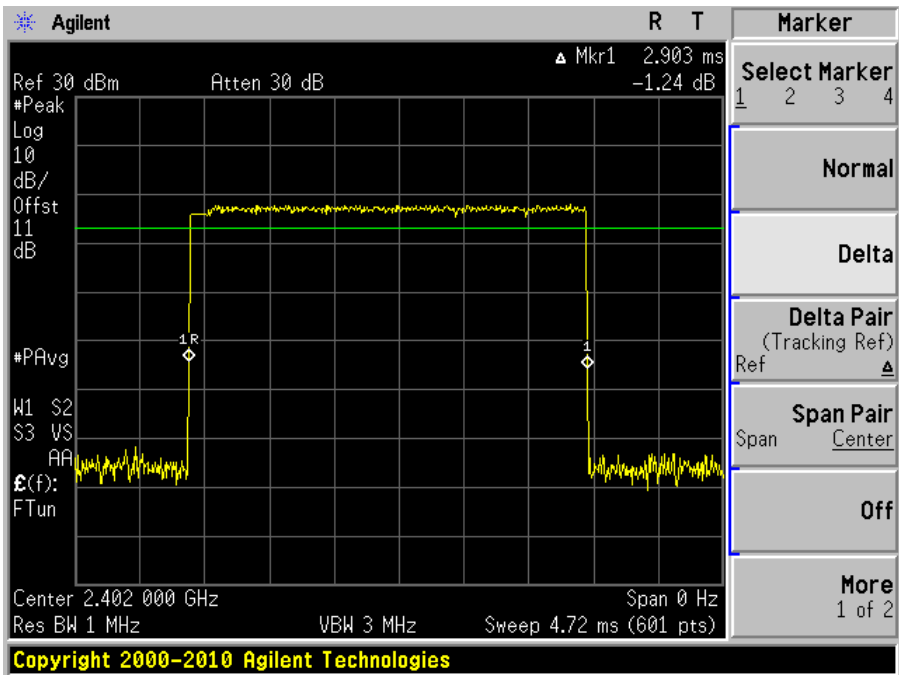
8PSK, DH3 - Middle Channel



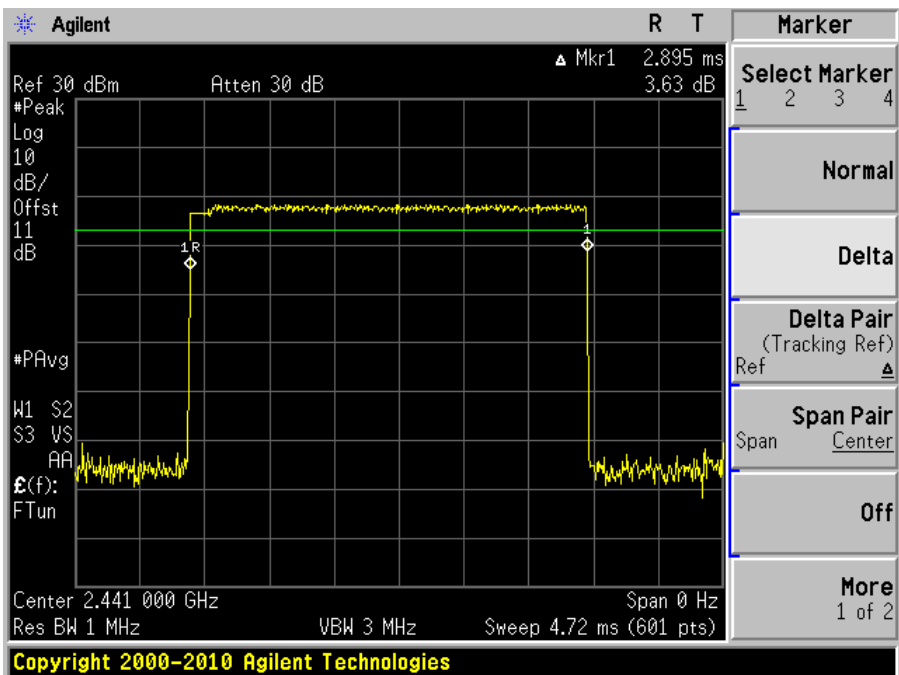
8PSK, DH3 - High Channel



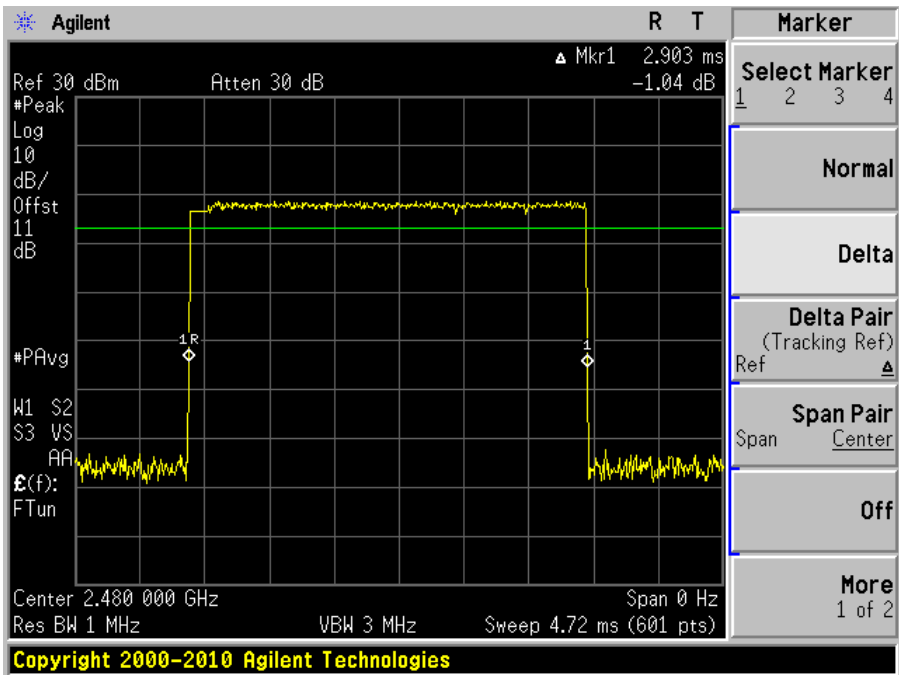
8PSK, DH5 - Low Channel



8PSK, DH5 - Middle Channel



8PSK, DH5 - High Channel



## 18 Exhibit A - FCC & IC Equipment Labeling Requirements

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### 18.1 FCC ID Label Requirements

As per FCC §2.925,

(a) Each equipment covered in an application for equipment authorization shall bear a nameplate or label listing the following:

(1) FCC Identifier consisting of the two elements in the exact order specified in §2.926. The FCC Identifier shall be preceded by the term FCC ID in capital letters on a single line, and shall be of a type size large enough to be legible without the aid of magnification.

*Example:* FCC ID: XXX123

Where: XXX—Grantee Code, 123—Equipment Product Code

As per FCC §15.19,

(a) In addition to the requirements in part 2 of this chapter, a device subject to certification, or verification shall be labeled as follows:

(3) All other devices shall bear the following statement in a conspicuous location on the device:  
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified above is required to be affixed only to the main control unit. If the EUT is integrated within another device then a label affixed to the host shall also state, "Contains FCC ID: XXXXXX"

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

### 18.2 IC Label Requirements

As per IC RSS-Gen §5, the certification number shall appear as follows:

IC: XXXXXX-YYYYYYYY

Where:

- "XXXXXX-YYYYYYYY" is the certification number
- "XXXXXX" is the Certificate Holder Number (CHN), made of at most 6 alphanumeric characters (A-Z, 0-9), assigned by Industry Canada; and
- "YYYYYYYY" is the Unique Product Number (UPN), made of at most 11 alphanumeric characters (A-Z, 0-9) assigned by the applicant.
- Note 1: The term "IC" before the equipment certification number only signifies that the Industry Canada technical specifications were met.
- Note 2: Note 1 shall be conspicuously placed in the equipment user manual.
- Note 3: Permitted alphanumeric characters used in the CHN and UPN are limited to capital letters (A-Z) and digits (0-9). Other characters, such as "#", "/" or "-", shall not be used.

As per IC RSS-Gen §5.2 Equipment Labeling:

Equipment subject to certification under the applicable RSS, shall be permanently labeled on each item, or as an inseparable combination. The label must contain the following information for full compliance:

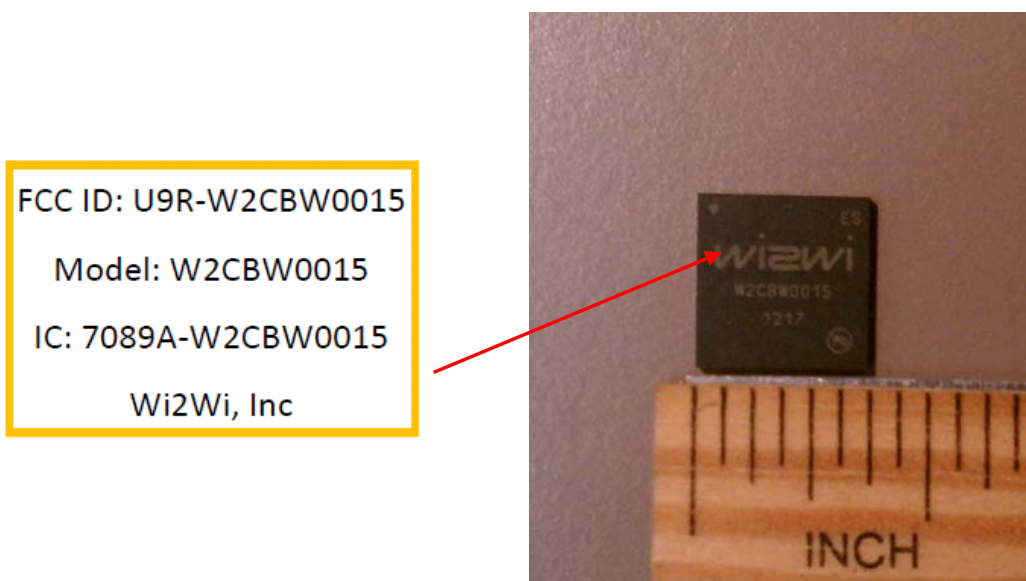
- (a) the certification number, prefixed by the term "IC:";
- (b) the manufacturer's name, trade name or brand name; and
- (c) a model name or number.

Equipment for which a certificate has been issued is not considered certified if it is not properly labeled.

The information on the Canadian label can be combined with the manufacturer's other labeling requirements.

If the device size is too small to put a label, the label can be included in the user's manual, upon agreement with Industry Canada.

### 18.3 FCC ID & IC Label Contents and Location

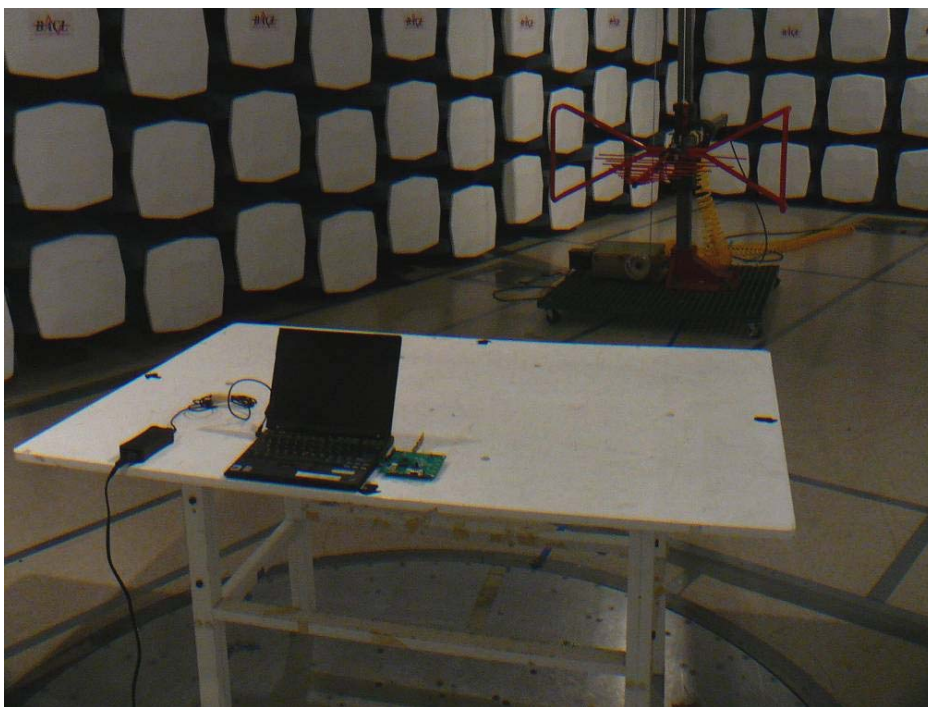


## 19 Exhibit B - Test Setup Photographs

### 19.1 Radiated Emission below 1 GHz Front View



### 19.2 Radiated Emission below 1 GHz Rear View



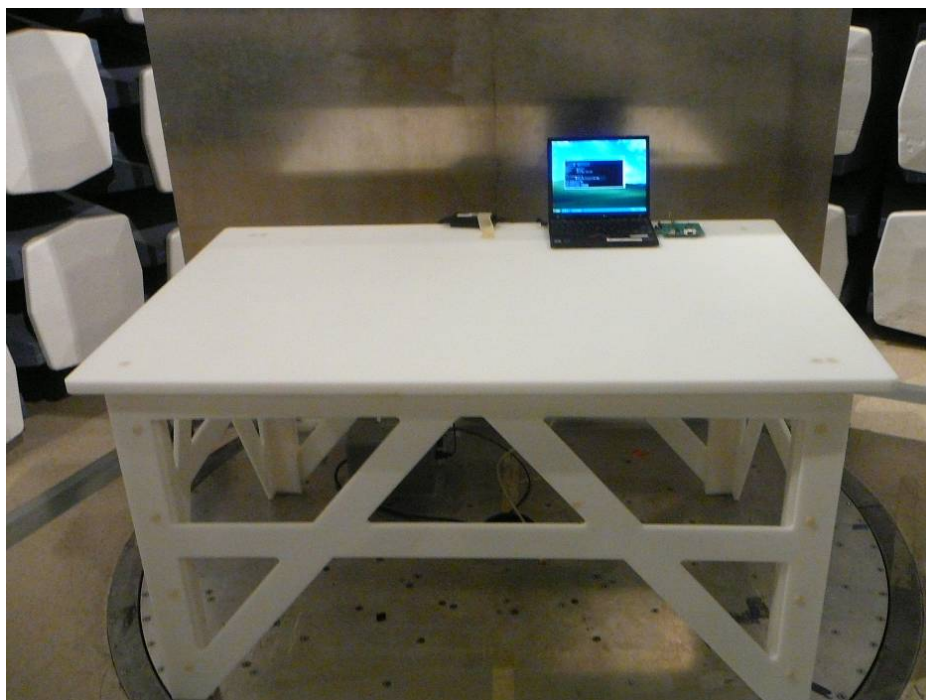
### 19.3 Radiated Emission above 1 GHz Front View



### 19.4 Radiated Emission above 1 GHz Rear View



### 19.5 AC Line Conducted Emission Front View



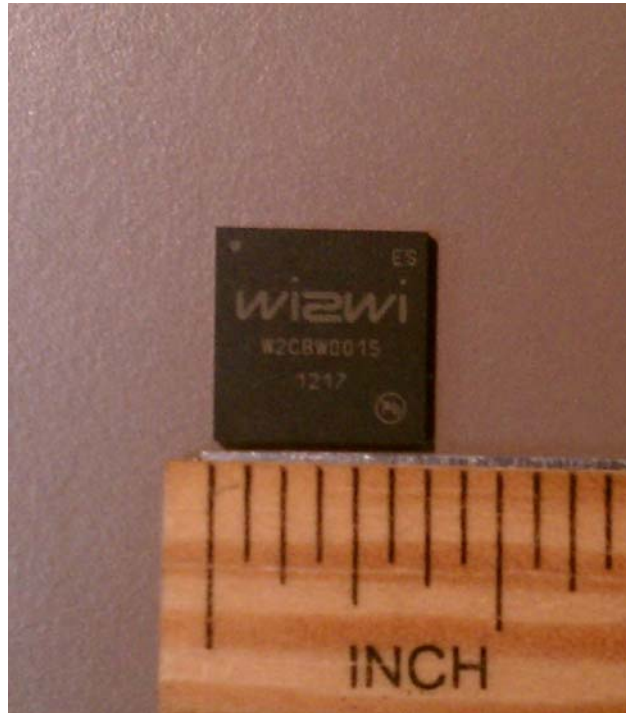
### 19.6 AC Line Conducted Emission Side View



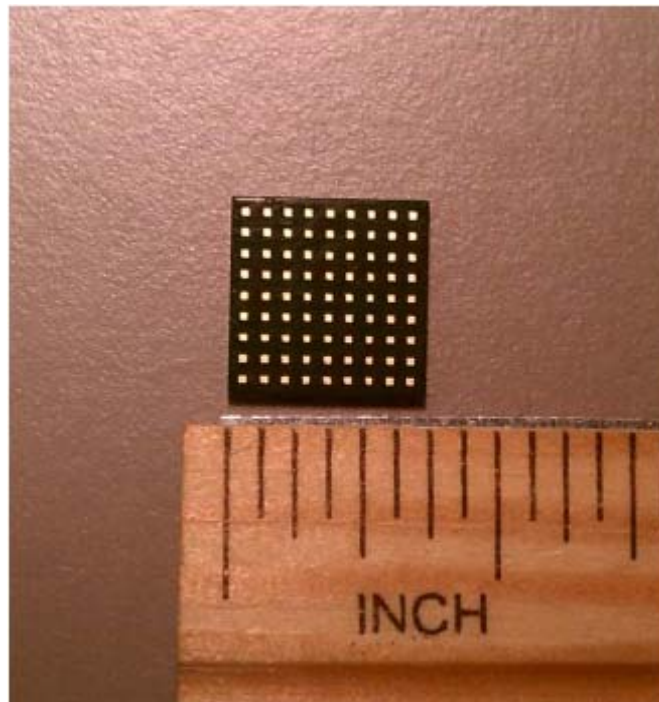
## 20 Exhibit C - EUT Photographs

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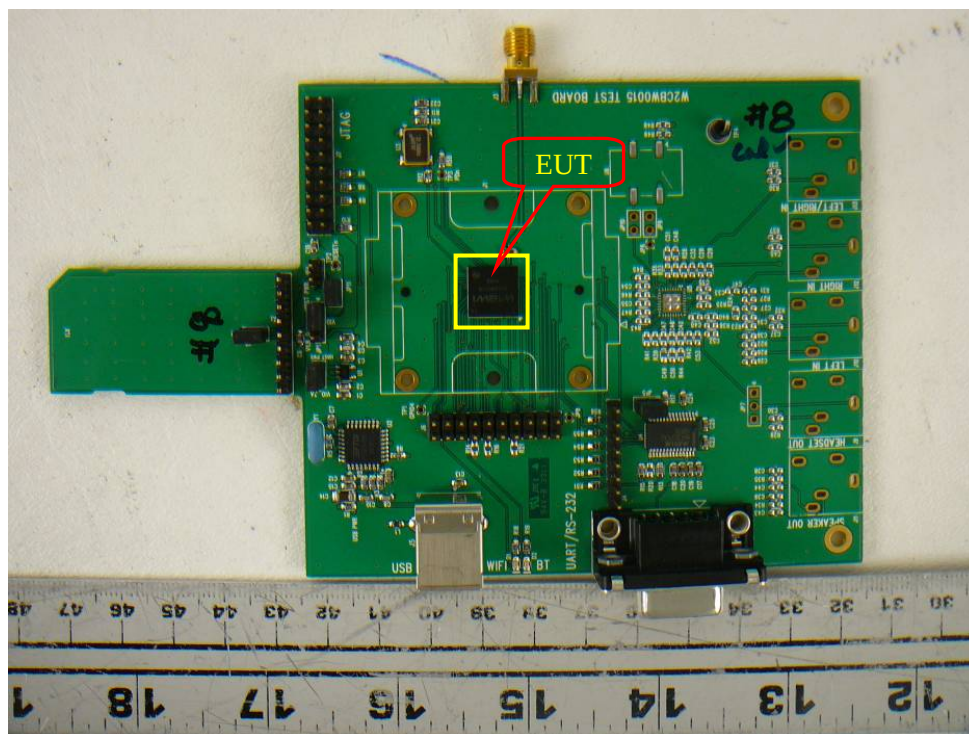
### 20.1 EUT- Top View



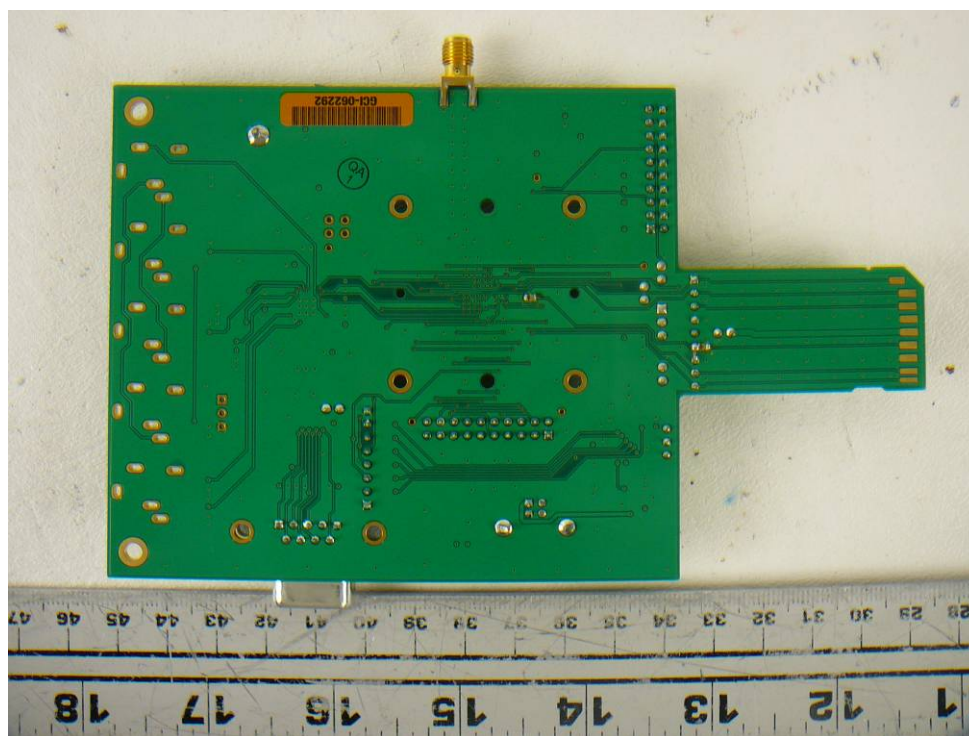
### 20.2 EUT- Bottom View



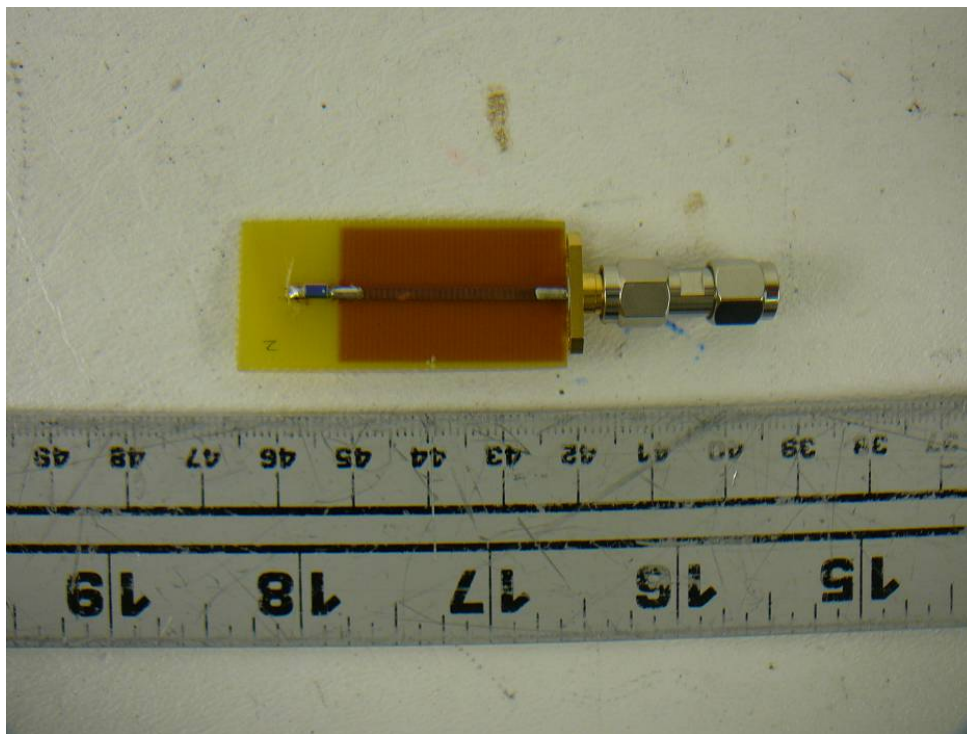
### 20.3 EUT on Supporting Board - Top View



### 20.4 Supporting Board - Bottom View



## 20.5 Antenna View



--- END OF REPORT ---