

## FCC PART 15.247

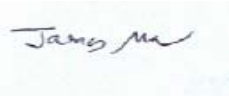
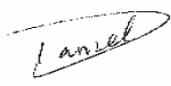
# EMI MEASUREMENT AND TEST REPORT

For

### Always On Wireless, Inc.

3701 Kirby Dr. Suite 1090  
Houston TX 77098

**FCC ID: SINWDB30G**  
**Model: WDB30G**

|                                                                                     |                                                                                                                                               |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>This Report Concerns:</b><br><input checked="" type="checkbox"/> Original Report | <b>Product Type:</b><br>802.11b/g bridge with VOIP                                                                                            |
| <b>Test Engineer:</b> <u>James Ma</u>                                               |                                                           |
| <b>Report No.:</b> <u>R0604265</u>                                                  |                                                                                                                                               |
| <b>Report Date:</b> <u>2006-06-06</u>                                               |                                                                                                                                               |
| <b>Reviewed By:</b> <u>Daniel Deng</u>                                              |                                                           |
| <b>Prepared By:</b>                                                                 | Bay Area Compliance Laboratory Corporation (BACL)<br>1274 Anvilwood Ave.<br>Sunnyvale, CA 94089<br>Tel: (408) 732-9162<br>Fax: (408) 732 9164 |

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## GENERAL INFORMATION

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

The *Always On Wireless, Inc.*'s. product, *FCC ID: SINWDB30G*, or the "EUT" as referred to this report is a *802.11b/g Bridge with VOIP* which measures approximately 127 mmL x 89 mmW x 20.3 mmH.

*\* The test data gathered are from production sample, MAC address: 0011E0026B88, provided by the manufacturer.*

### EUT Photo



*Additional photos in Exhibit C*

### Objective

This type approval report is prepared on behalf of *Always On Wireless, Inc.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

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

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

No Related Submittals.

### Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### **Test Facility**

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

Test site at BACL 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 has 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 facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and is listed under FCC registration number: 90464 and VCCI Registration No.: C-1298 and R-1234. 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 is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

## SYSTEM TEST CONFIGURATION

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### Justification

The host system was configured for testing according to ANSI C63.4-2003.

The EUT was tested in the normal (native) operating mode to represent *worst*-case results during the final qualification test.

### EUT Exercise Software

Ubicom Software is using for testing, and the following power setting was used during the testing:

|         | <u>2412 MHz</u> | <u>2437 MHz</u> | <u>2462 MHz</u> | <u>TX Power Setting</u> |
|---------|-----------------|-----------------|-----------------|-------------------------|
| 802.11b | 17 dBm          | 17 dBm          | 17 dBm          | 17                      |
| 802.11g | 16 dBm          | 16 dBm          | 16 dBm          | 255                     |

### Special Accessories

N/A

### Equipment Modifications

No modifications were made to the EUT.

### Local Support Equipment List and Details

| Manufacturer | Description | Model         | Serial Number |
|--------------|-------------|---------------|---------------|
| Compaq       | Laptop      | Preserio 2100 | CNF43403FB    |

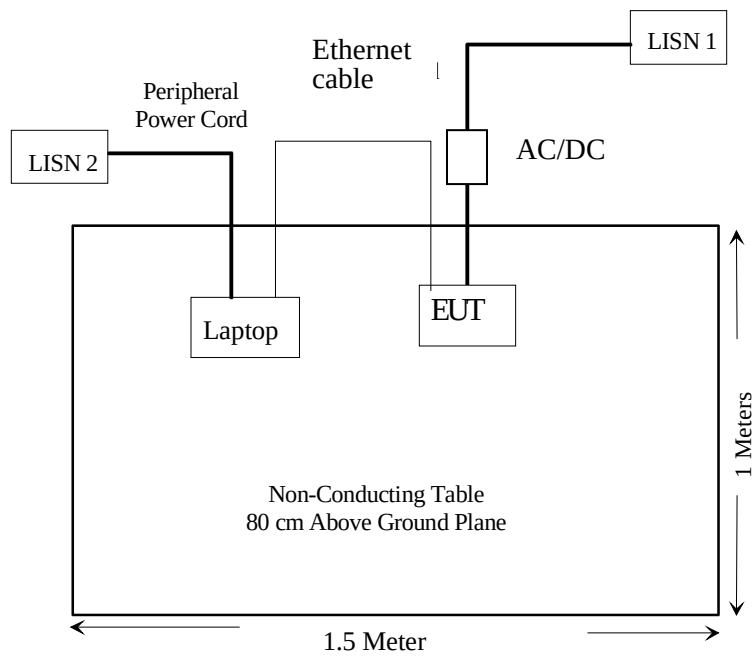
### Power Supply Information

| Manufacturer | Description   | Model    | Serial Number |
|--------------|---------------|----------|---------------|
| WiFiyer      | AC-DC adaptor | 310-0618 | 507-0233020   |

### Interface Ports and Cabling

| Cable Description      | Length (M) | From                     | To                           |
|------------------------|------------|--------------------------|------------------------------|
| Unshielded RJ 45 Cable | 1.5        | RJ 45 Ethernet Port/ EUT | RJ 45 Ethernet Port/ Laptops |

Test Setup Block Diagram



## SUMMARY OF TEST RESULTS

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Results reported relate only to the product tested.

| FCC RULES                   | DESCRIPTION OF TEST                      | RESULT   |
|-----------------------------|------------------------------------------|----------|
| §15.247(e)(i)<br>§2.1091    | RF Exposure                              | Complies |
| §15.203                     | Antenna Requirement                      | Complies |
| § 15.207 (a)                | Conducted Emissions                      | Complies |
| §2.1051 &<br>§15.247(d)     | Spurious Emission at Antenna Port        | Complies |
| §15.205                     | Restricted Band                          | Complies |
| §15.209 (a) &<br>§15.247(d) | Radiated Emission                        | Complies |
| §15.247 (a)(2)              | 6 dB Bandwidth                           | Complies |
| §15.247 (b)(3)              | Maximum Peak Output Power                | Complies |
| § 15.247 (d)                | 100 kHz Bandwidth of Frequency Band Edge | Complies |
| §15.247 (e)                 | Peak Power Spectral Density              | Complies |

*\*The test data was within the measurement of uncertainty.*

## **§15.247(e)(i), §2.1091 - RF EXPOSURE**

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According to §15.247(e)(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.

According to §1.1310 and §2.1091 RF exposure is calculated.

### 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 (minute) |
|-----------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|-------------------------|
| 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

### **MPE Prediction**

Prediction of MPE limit at a given distance

Equation from page 18 of 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

Maximum peak output power at antenna input terminal: 17.66 (dBm)

Maximum peak output power at antenna input terminal: 58.34 (mW)

Prediction distance: 20 (cm)

Prediction frequency: 2400 (MHz)

Antenna Gain (typical): 2.0 (dBi)

antenna gain: 1.58 (numeric)

Power density at prediction frequency at 20 cm: 0.018 (mW/cm<sup>2</sup>)

MPE limit for uncontrolled exposure at prediction frequency: 1.0 (mW/cm<sup>2</sup>)

### **Test Result**

The EUT is a base device. The power density level at 20 cm is 0.018 mW/cm<sup>2</sup>, which is below the uncontrolled exposure limit of 1.0mW/cm<sup>2</sup> at 2400 MHz.

## **§15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to § 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.

And according to § 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.

The diversity antennas for this device are antennas with a gain of 2.0 dBi using “Reverse-Polarity” SMA connectors.

## §15.207 (a) - CONDUCTED EMISSION

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### Measurement Uncertainty

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

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is  $\pm 2.4$  dB.

### Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4 – 2003 measurement procedure. The specification used was FCC Class B limits.

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

The EUT was connected with LISN-1.

### Test Equipment List and Details

| Manufacturer    | Description            | Model   | Serial Number | Cal Date   |
|-----------------|------------------------|---------|---------------|------------|
| Rohde & Schwarz | Receiver, EMI Test     | ESCS30  | 100176        | 2006-03-13 |
| Rohde & Schwarz | LISN, Artificial Mains | ESH2-Z5 | 871884/039    | 2005-11-14 |

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

### Test Procedure

During the conducted emission test, the power cord of the EUT 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”.

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 16° C     |
| Relative Humidity: | 55%       |
| ATM Pressure:      | 1024 mbar |

*\*The testing was performed by James Ma on 2006-05-25*

Summary of Test Results

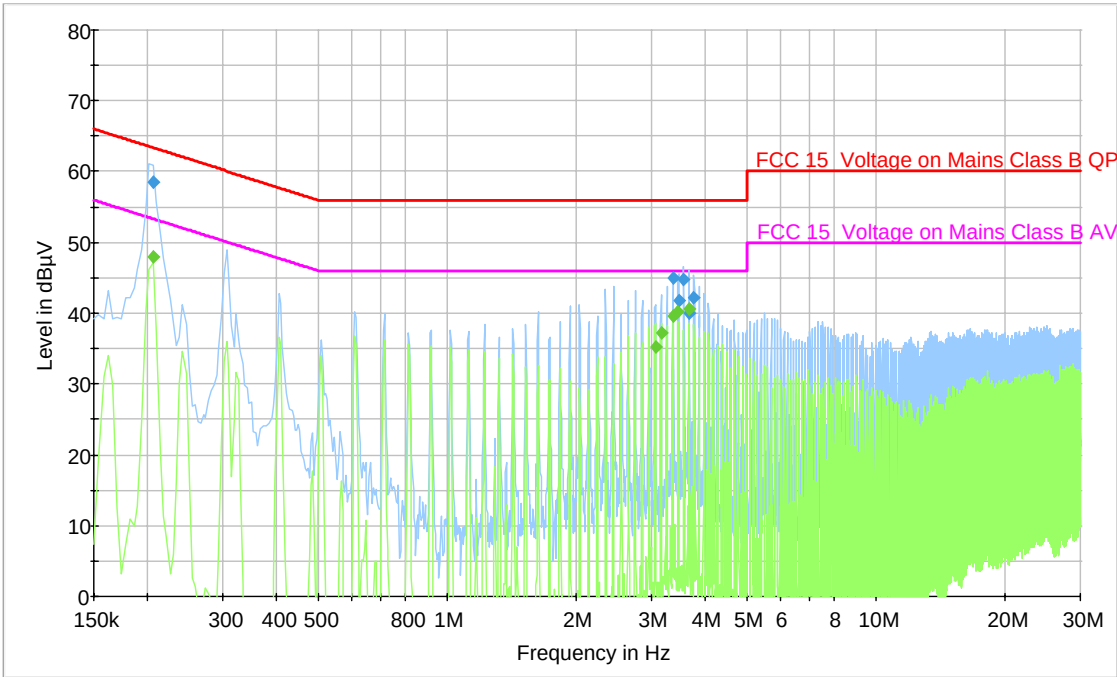
According to the recorded data in following table, the EUT complied with the FCC Conducted limit for a Class B device, with the *worst* margin reading of:

**-0.8 dB** at **3.358 MHz** in the **Neutral** conductor mode

*\* The test data was within the measurement of uncertainty.*

Conducted Emissions Test plots and Data

120V 60HZ - Line



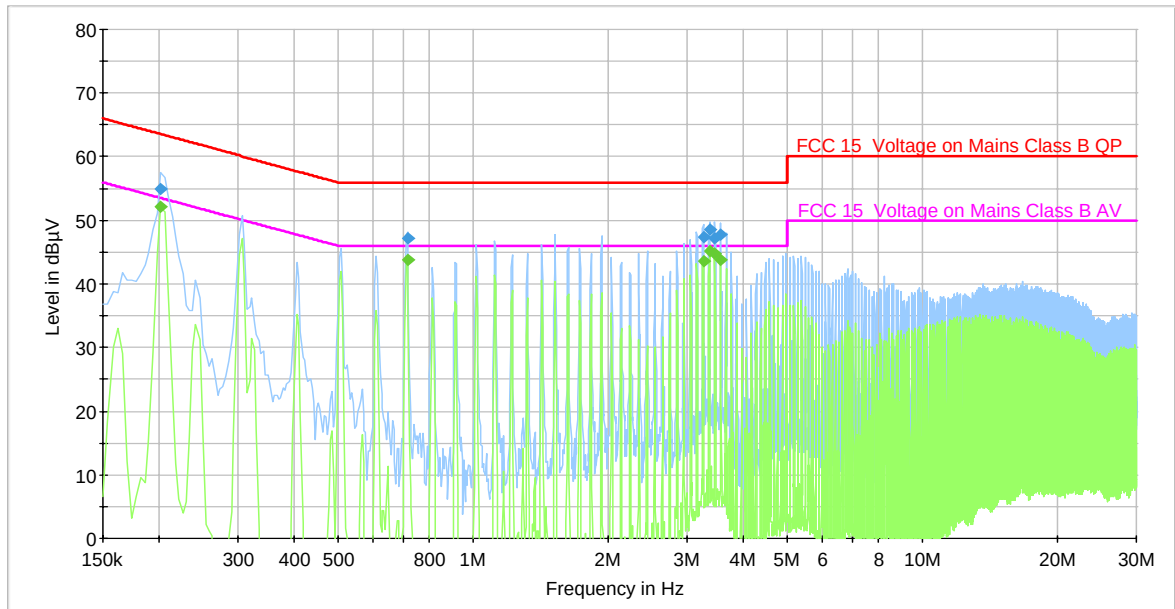
### QP Measurements

| Frequency (MHz) | QuasiPeak (dBμV) | Line | Corrected Reading (dB) | Limit (dBμV) | Margin (dB) |
|-----------------|------------------|------|------------------------|--------------|-------------|
| 0.206000        | 58.6             | L1   | 0.2                    | 63.4         | -4.8        |
| 3.362000        | 44.9             | L1   | 0.3                    | 56.0         | -11.1       |
| 3.566000        | 44.7             | L1   | 0.3                    | 56.0         | -11.3       |
| 3.770000        | 42.2             | L1   | 0.3                    | 56.0         | -13.8       |
| 3.466000        | 41.7             | L1   | 0.3                    | 56.0         | -14.3       |
| 3.670000        | 40.1             | L1   | 0.3                    | 56.0         | -15.9       |

### Average Measurements

| Frequency (MHz) | Average (dBμV) | Line | Corrected Reading (dB) | Limit (dBμV) | Margin (dB) |
|-----------------|----------------|------|------------------------|--------------|-------------|
| 3.666000        | 40.7           | L1   | 0.3                    | 46.0         | -5.3        |
| 0.206000        | 48.0           | L1   | 0.2                    | 53.4         | -5.4        |
| 3.462000        | 40.3           | L1   | 0.3                    | 46.0         | -5.7        |
| 3.362000        | 39.7           | L1   | 0.3                    | 46.0         | -6.3        |
| 3.158000        | 37.3           | L1   | 0.3                    | 46.0         | -8.7        |
| 3.058000        | 35.2           | L1   | 0.3                    | 46.0         | -10.8       |

## 120V 60HZ - Neutral



### QP Measurements

| Frequency (MHz) | QuasiPeak (dBµV) | Line | Corrected Reading (dB) | Limit (dBµV) | Margin (dB) |
|-----------------|------------------|------|------------------------|--------------|-------------|
| 3.358000        | 48.6             | N    | 0.3                    | 56.0         | -7.4        |
| 3.562000        | 47.8             | N    | 0.3                    | 56.0         | -8.2        |
| 0.202000        | 55.0             | N    | 0.2                    | 63.5         | -8.5        |
| 3.258000        | 47.4             | N    | 0.3                    | 56.0         | -8.6        |
| 0.714000        | 47.2             | N    | 0.3                    | 56.0         | -8.8        |
| 3.462000        | 47.1             | N    | 0.3                    | 56.0         | -8.9        |

### Average Measurements

| Frequency (MHz) | Average (dBµV) | Line | Corrected Reading (dB) | Limit (dBµV) | Margin (dB) |
|-----------------|----------------|------|------------------------|--------------|-------------|
| 3.358000        | 45.2           | N    | 0.3                    | 46.0         | -0.8        |
| 3.458000        | 44.9           | N    | 0.3                    | 46.0         | -1.2        |
| 0.202000        | 52.1           | N    | 0.2                    | 53.5         | -1.4        |
| 0.714000        | 43.8           | N    | 0.3                    | 46.0         | -2.2        |
| 3.562000        | 43.8           | N    | 0.3                    | 46.0         | -2.2        |
| 3.258000        | 43.5           | N    | 0.3                    | 46.0         | -2.5        |

\* The test data was within the measurement of uncertainty.

## §2.1051 & §15.247(d) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

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### Standard Applicable

Requirements: CFR 47, § 2.1051.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

### 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 10<sup>th</sup> harmonic.

### Equipment List

| Manufacturer | Description        | Model  | Serial Number | Cal. Date  |
|--------------|--------------------|--------|---------------|------------|
| Agilent      | Analyzer, Spectrum | E4446A | US44300386    | 2006-03-06 |

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

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 16° C     |
| Relative Humidity: | 55%       |
| ATM Pressure:      | 1024 mbar |

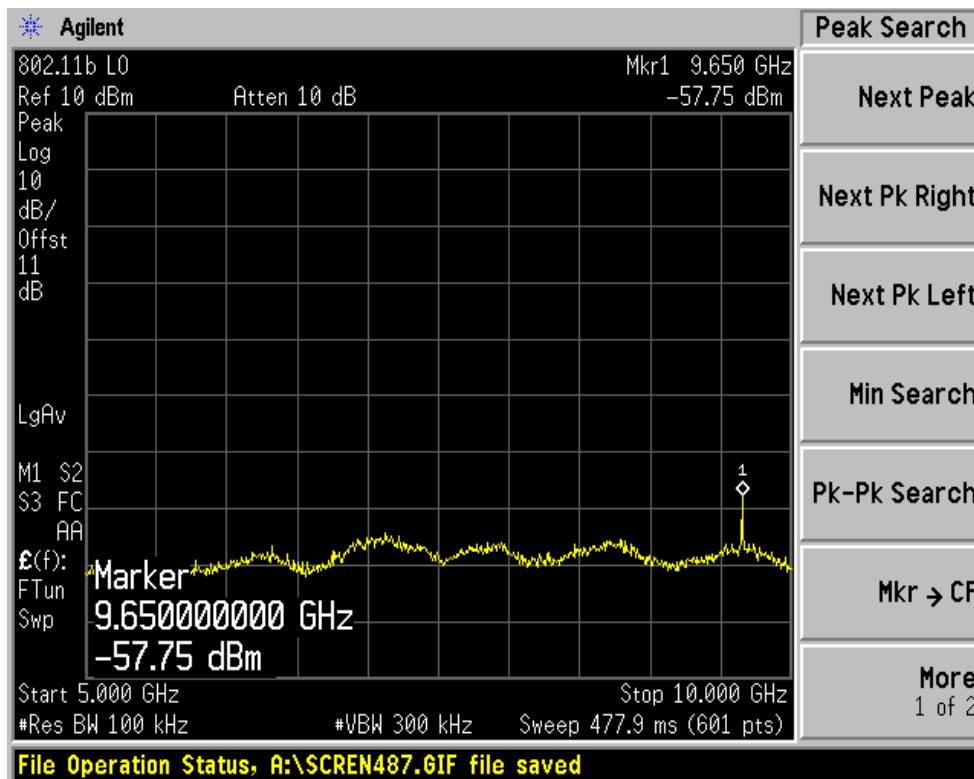
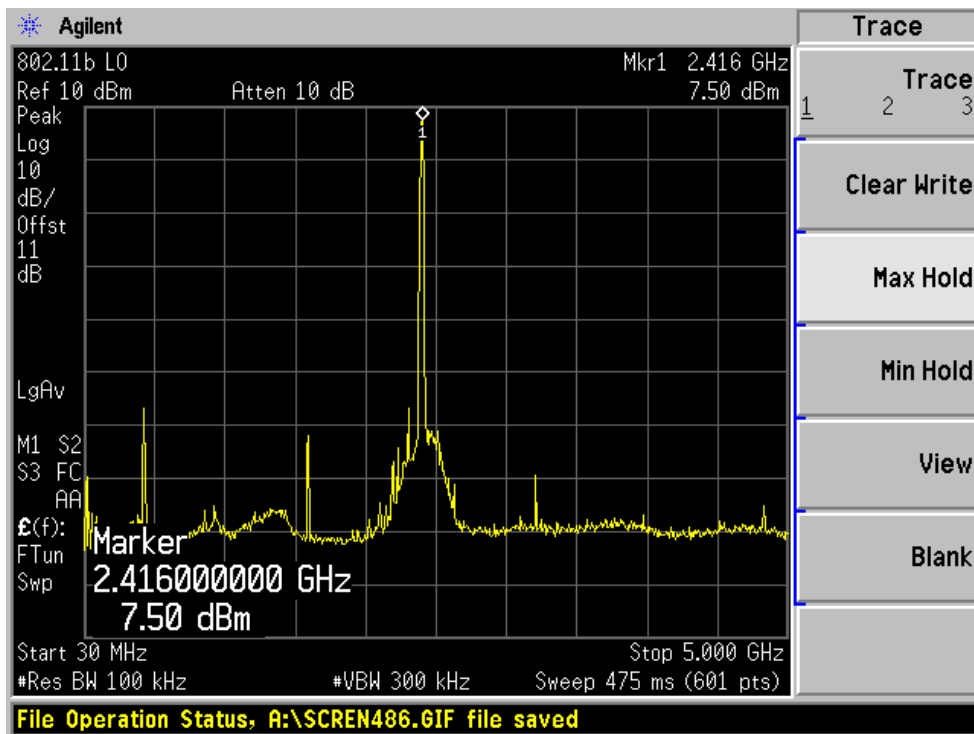
*\*The testing was performed by James Ma on 2006-05-24*

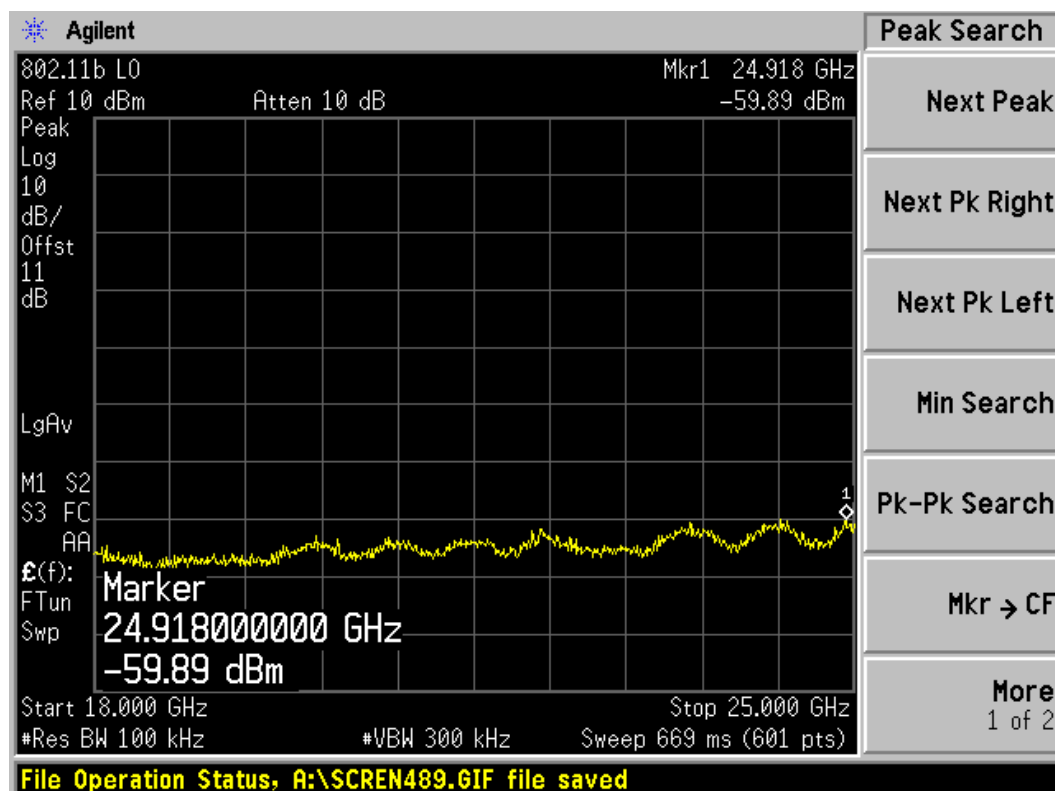
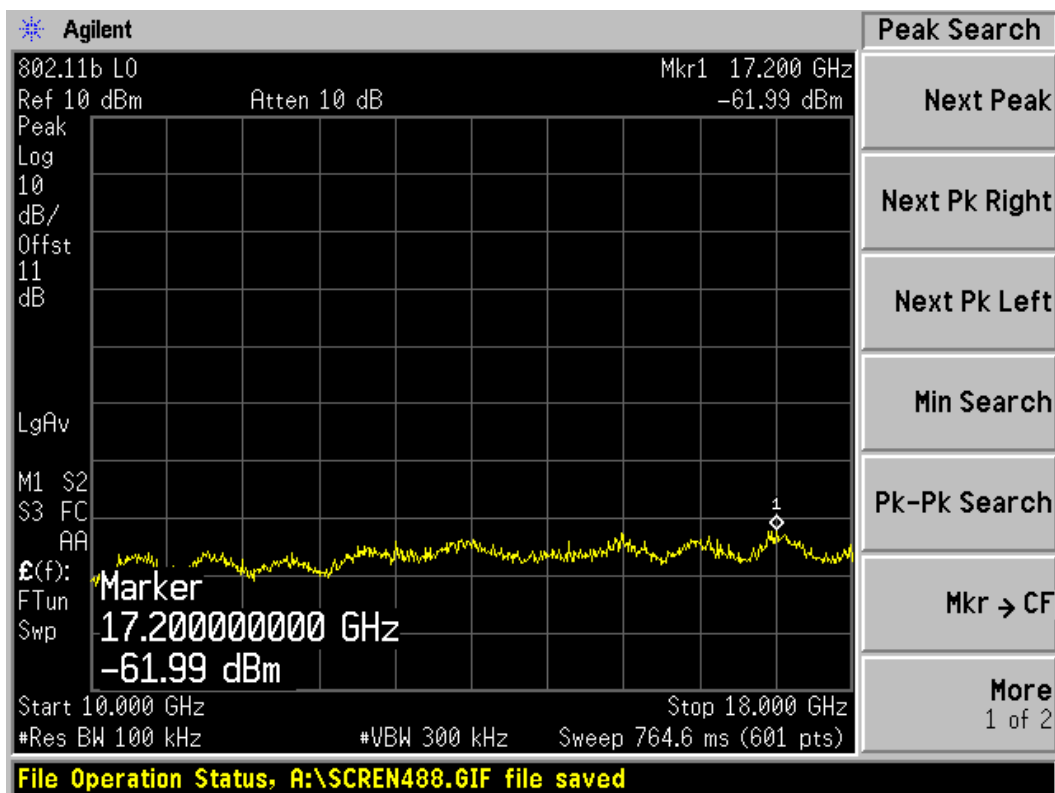
### Measurement Result

Please refer to following pages for plots of spurious emission.

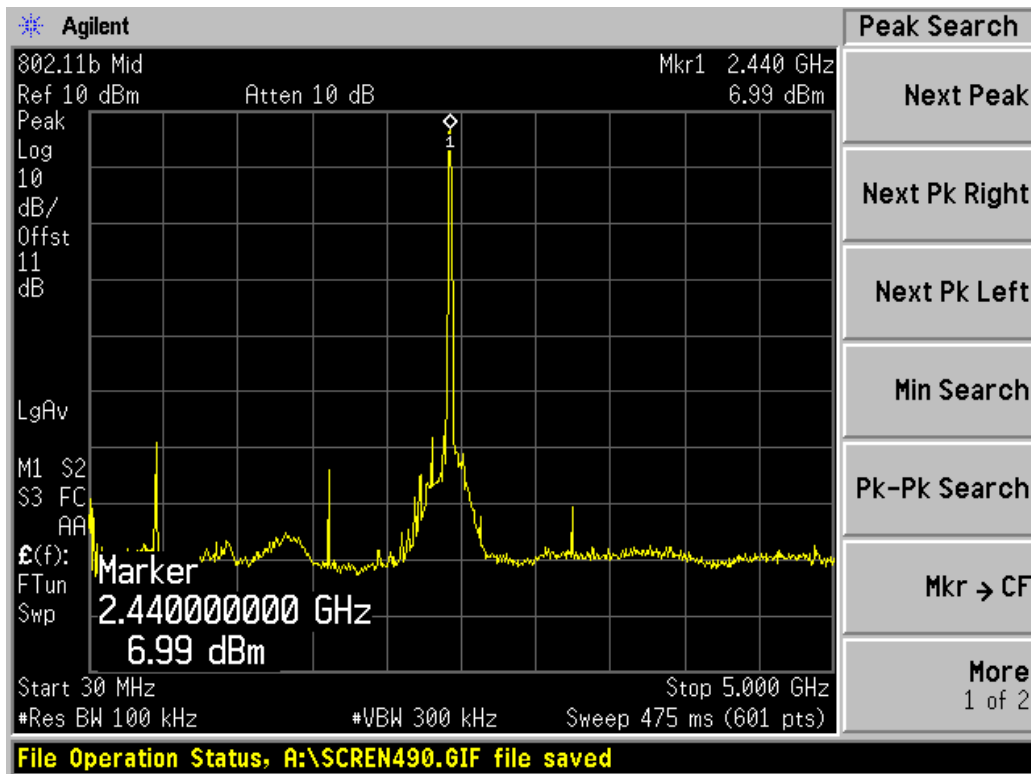
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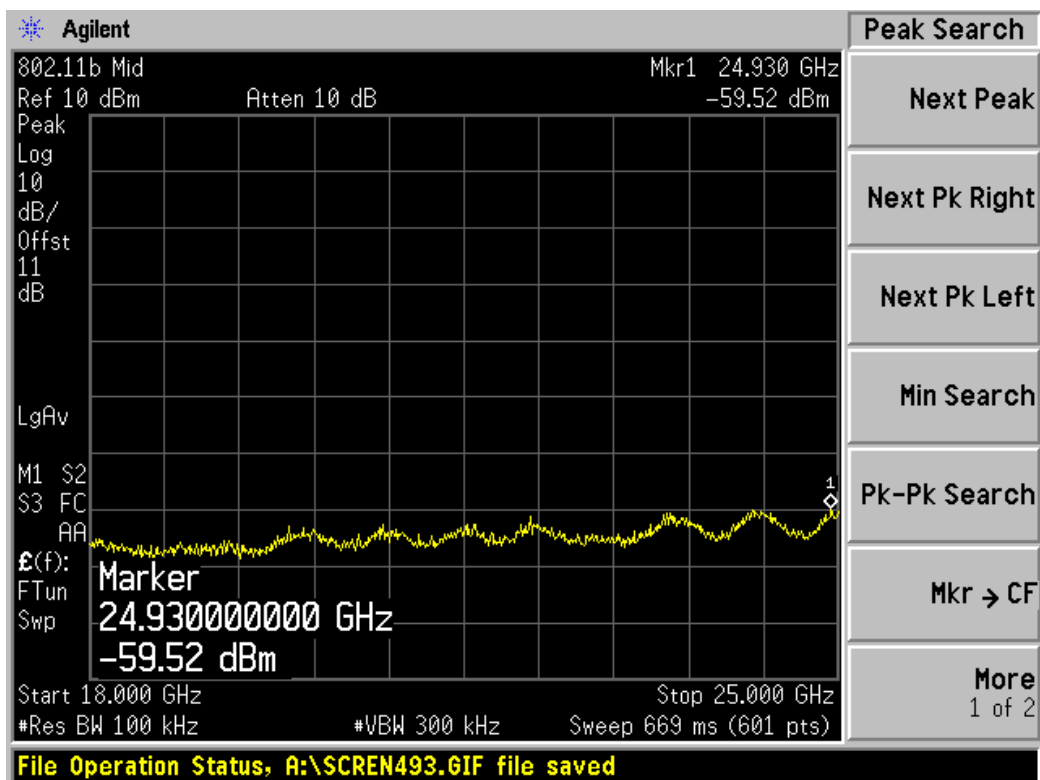
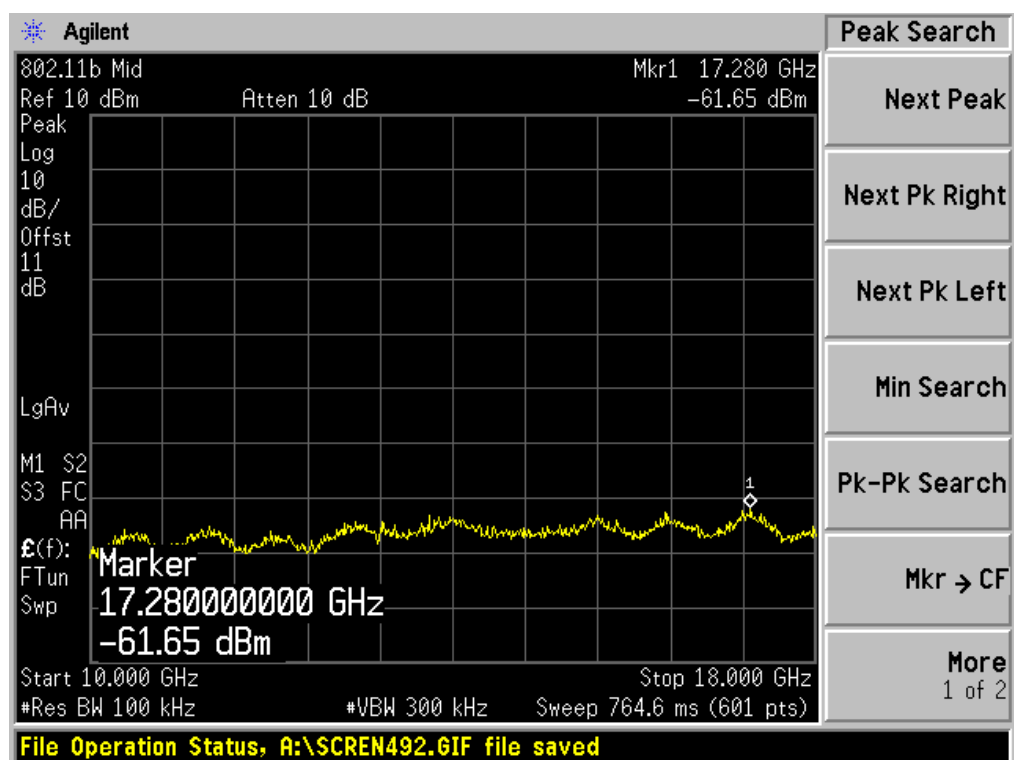
Low Channel



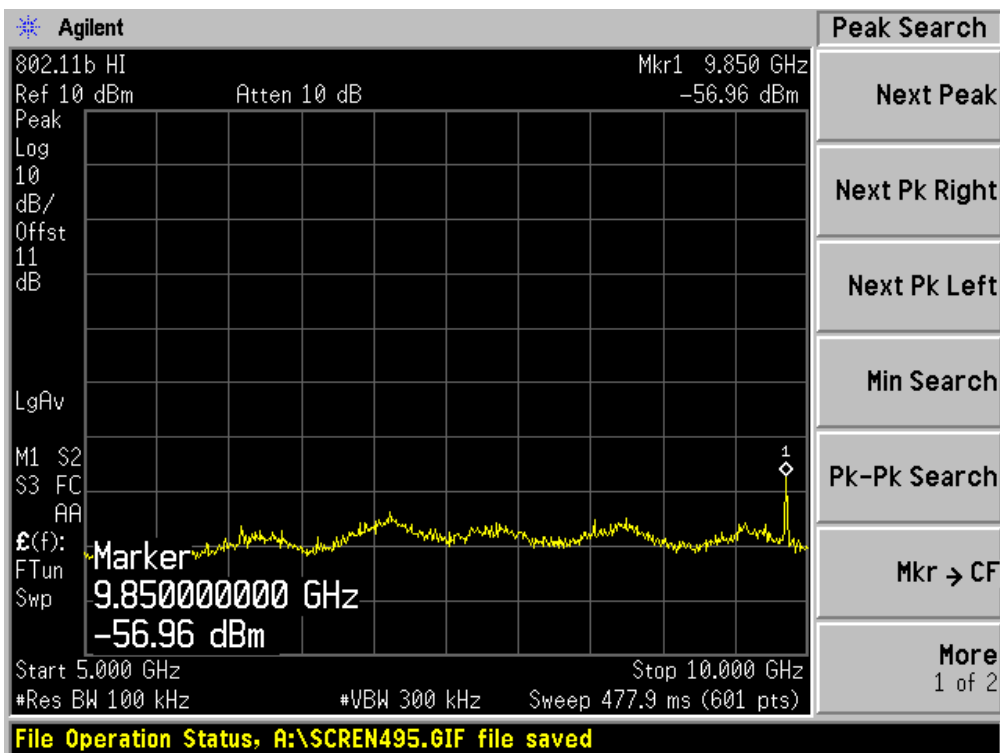
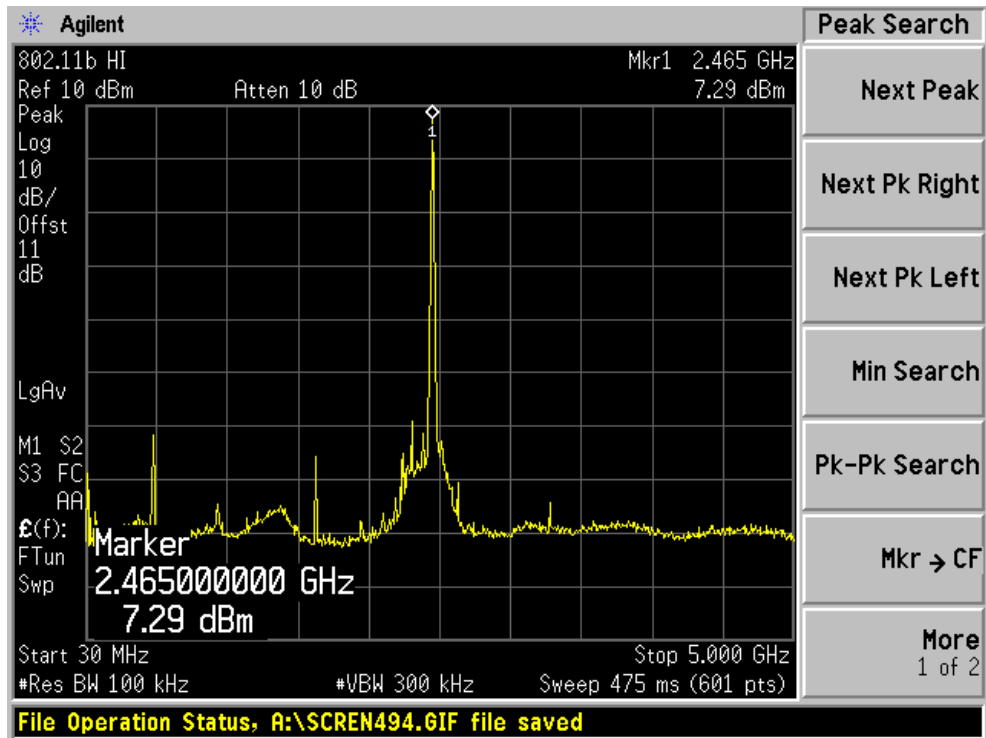


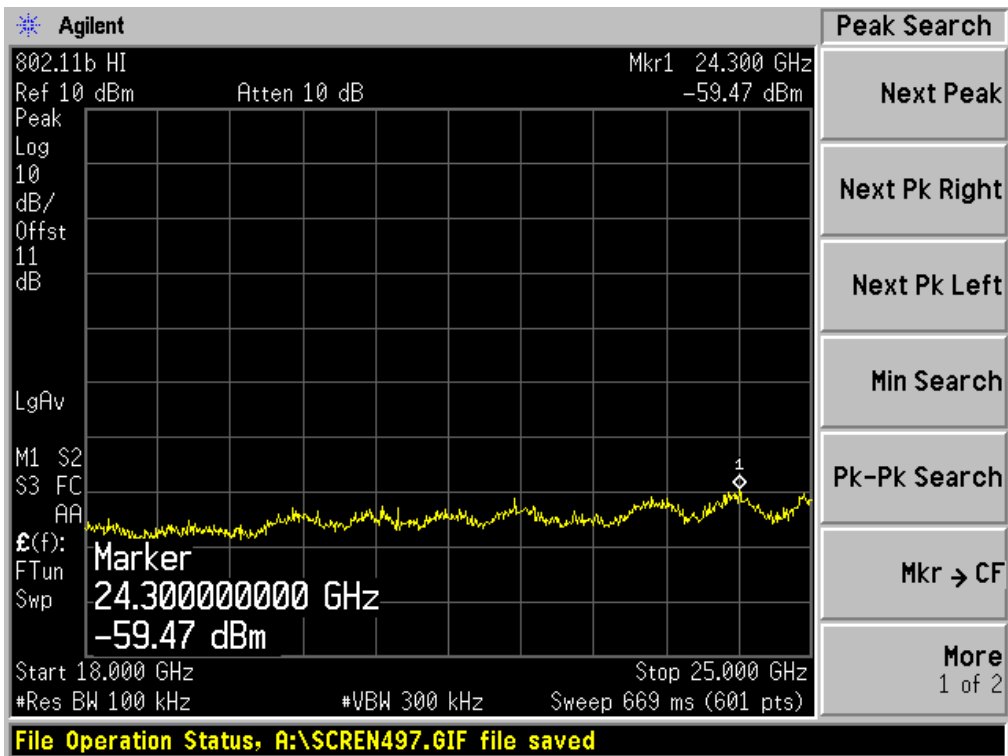
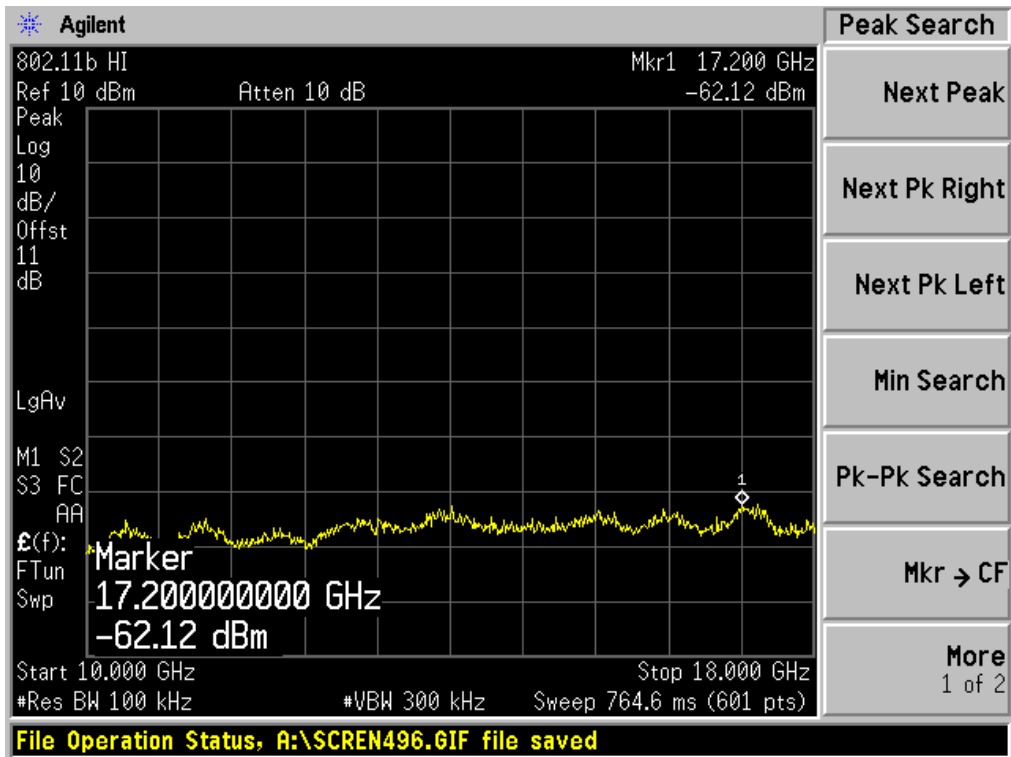
## Mid Channel





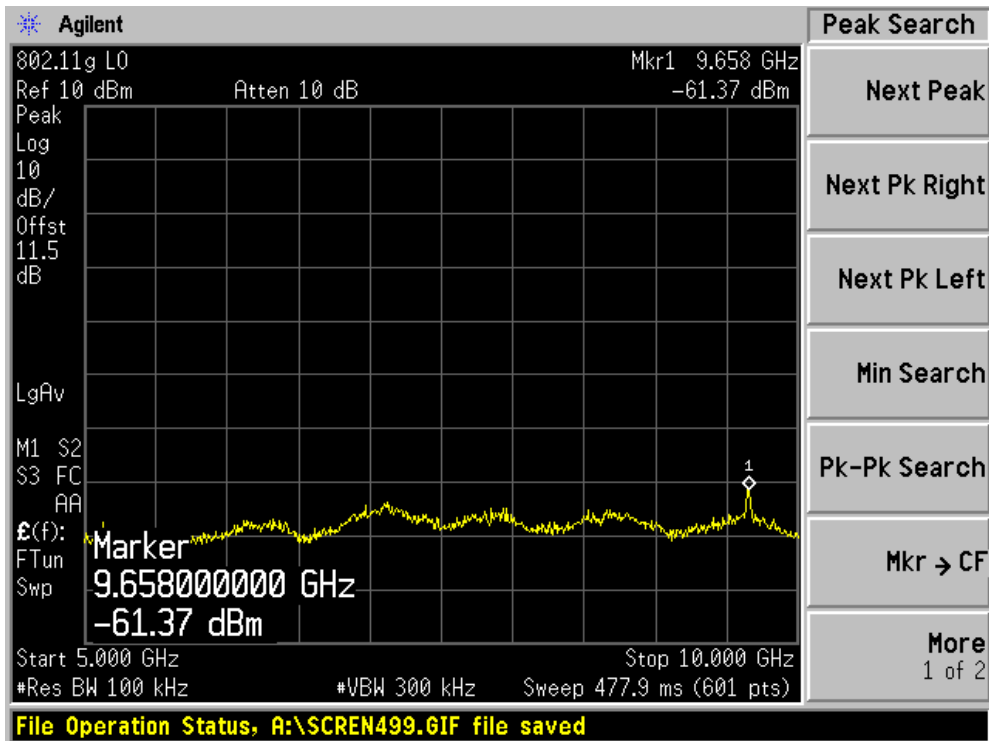
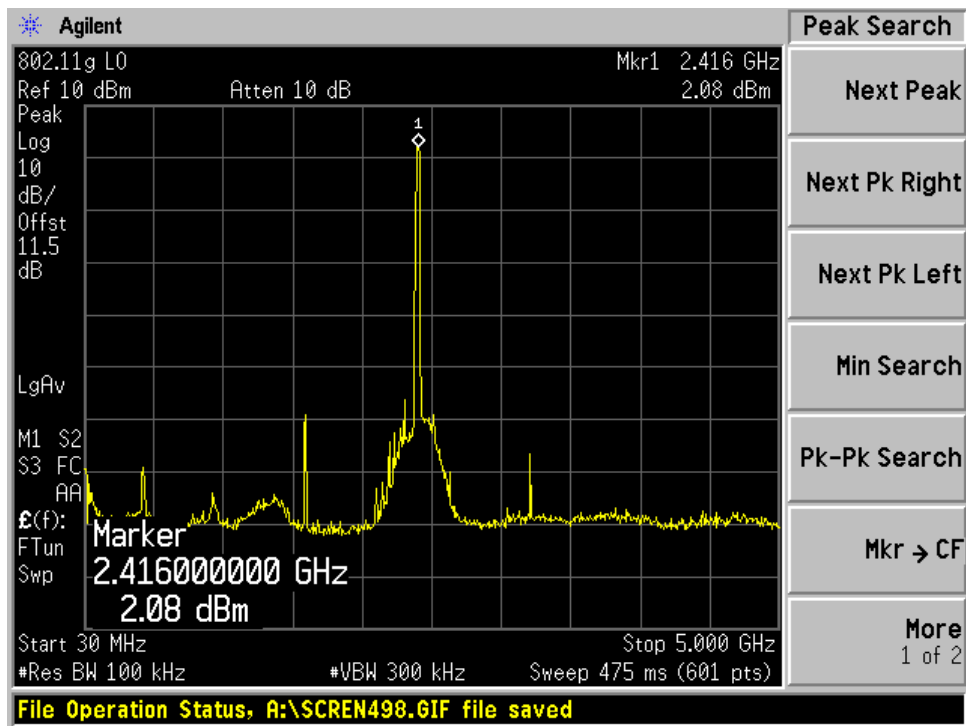
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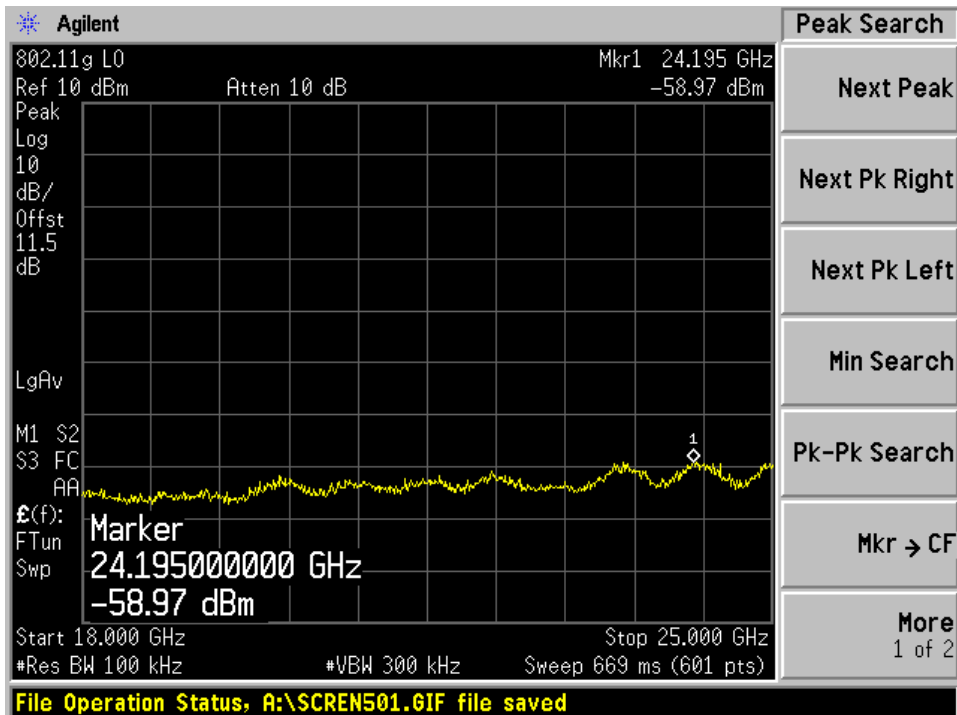
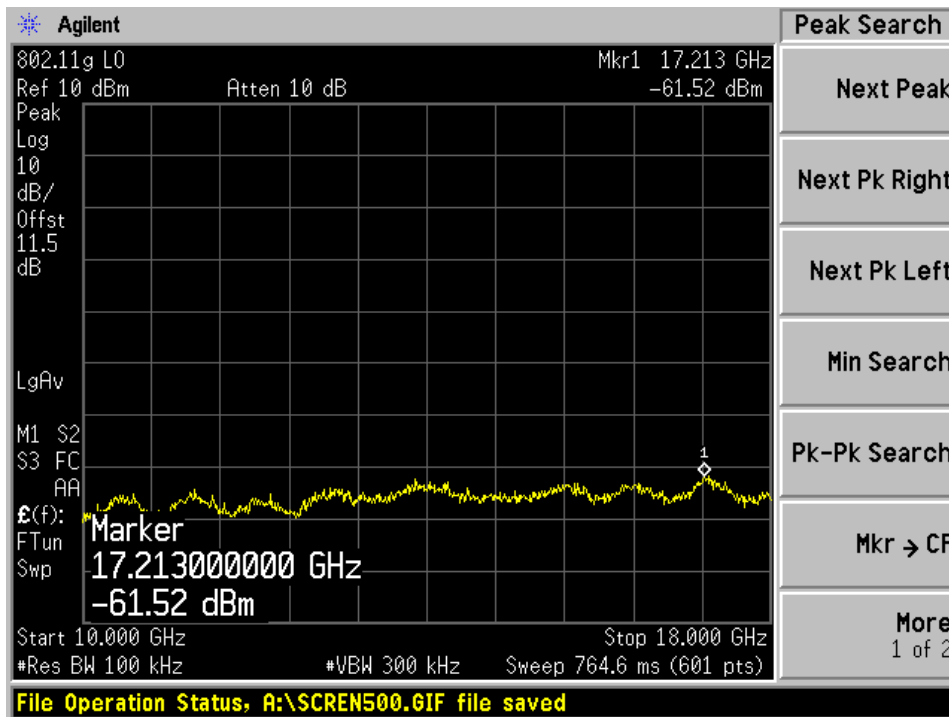




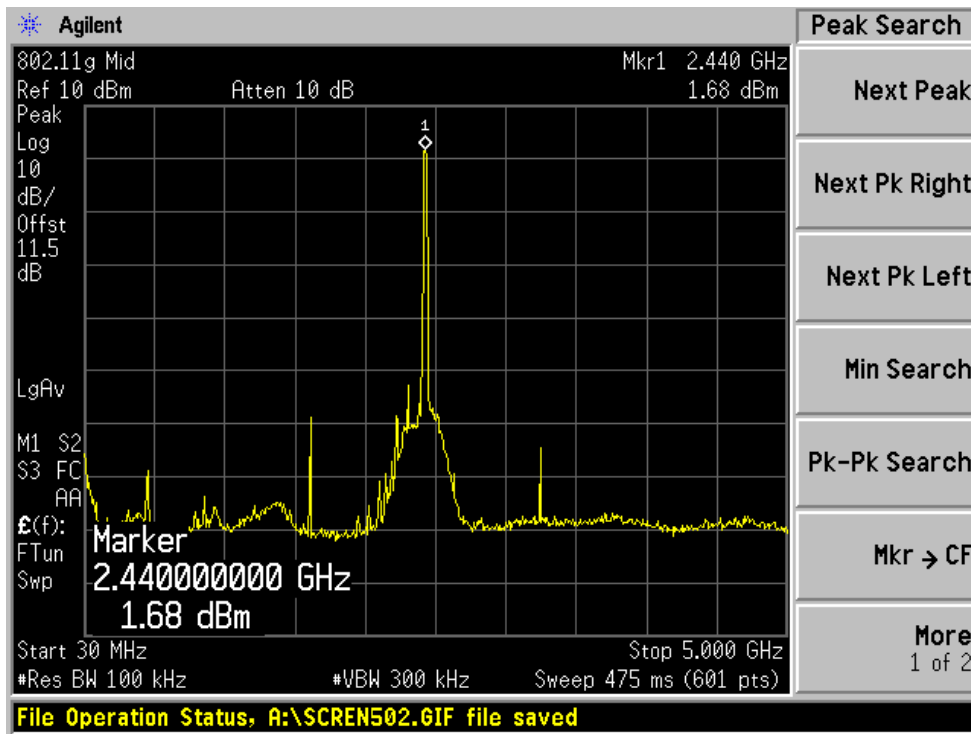
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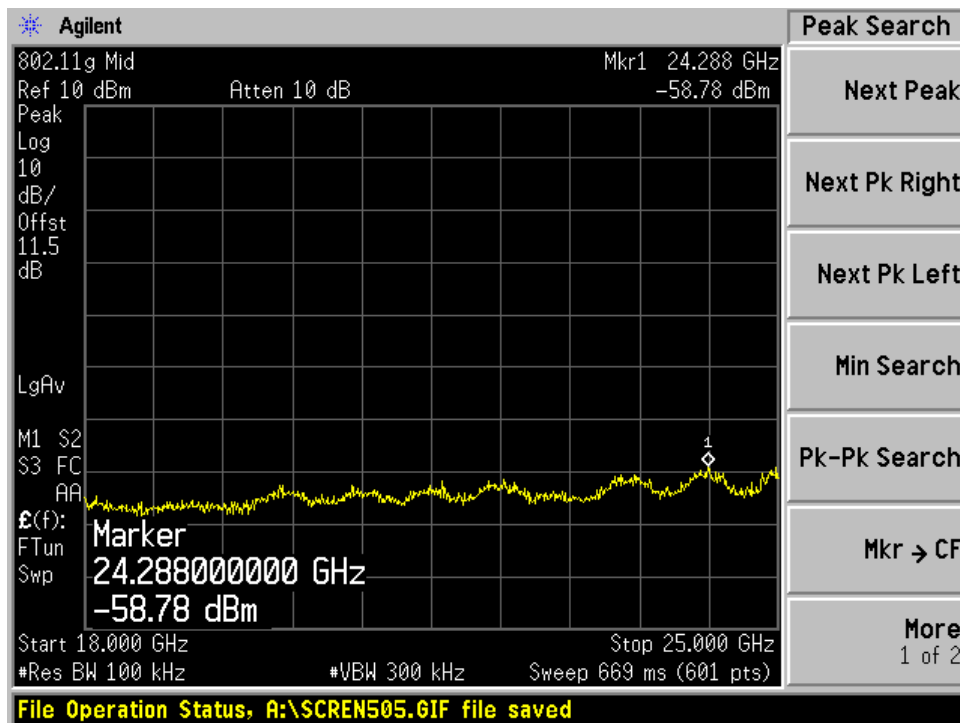
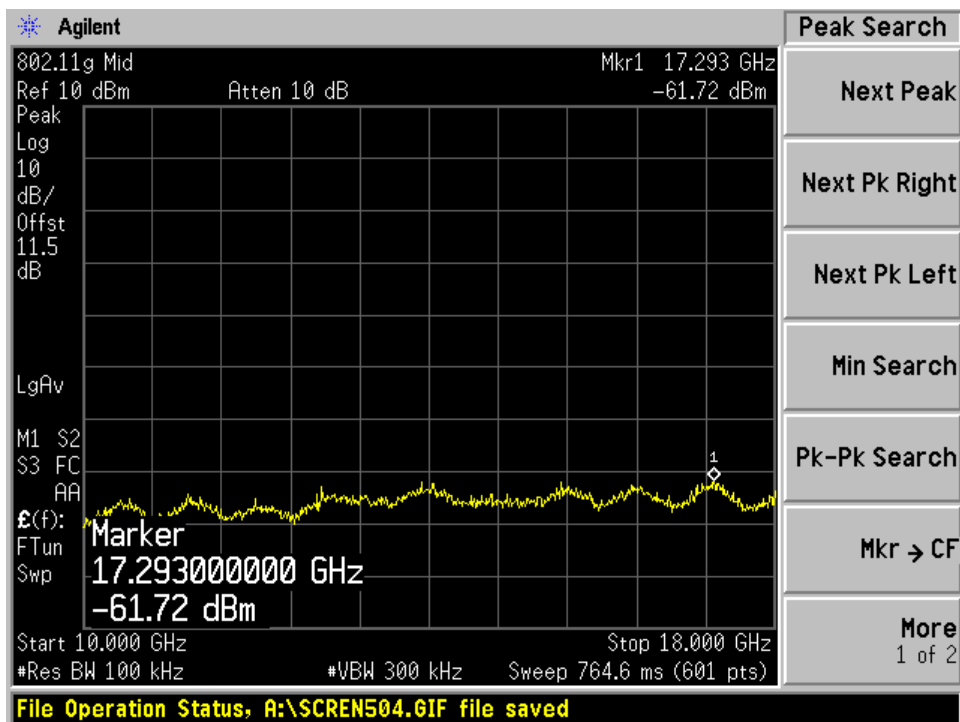
Low Channel



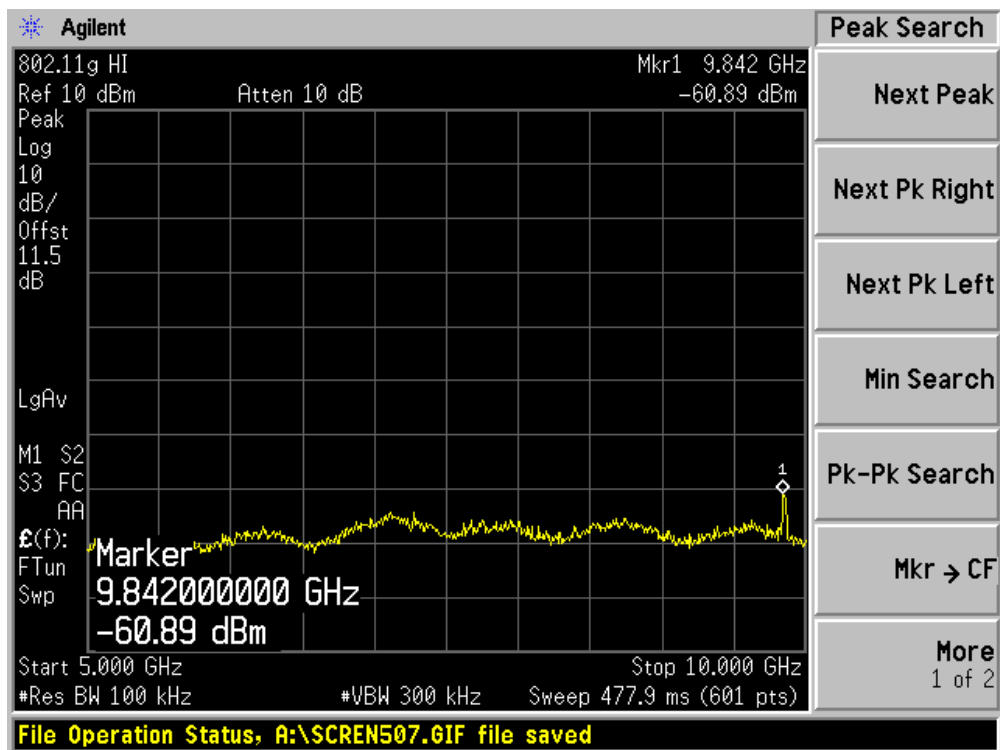
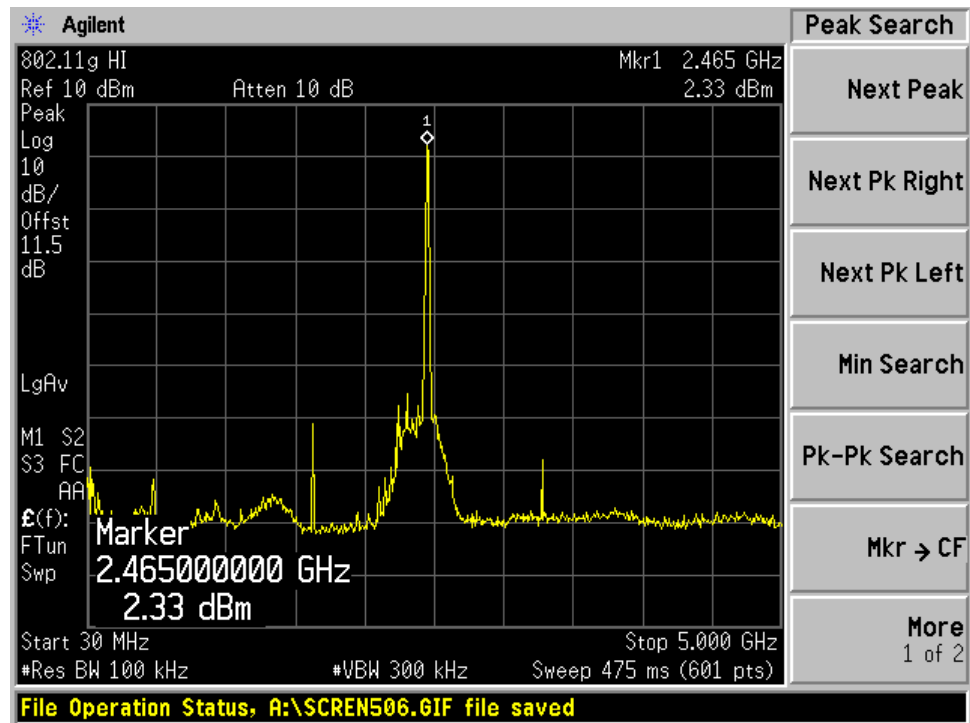


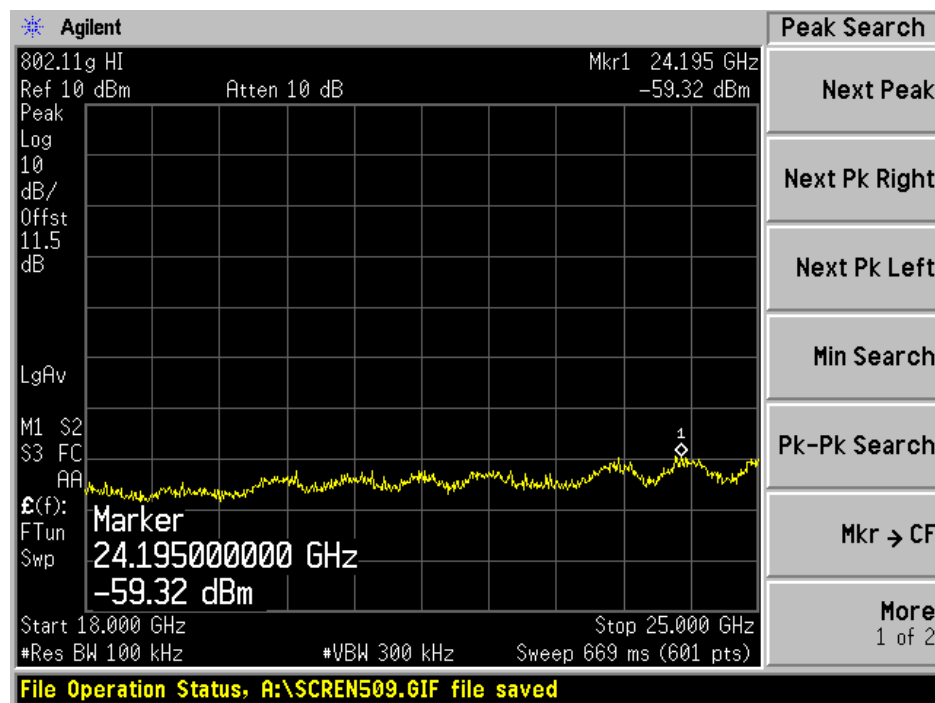
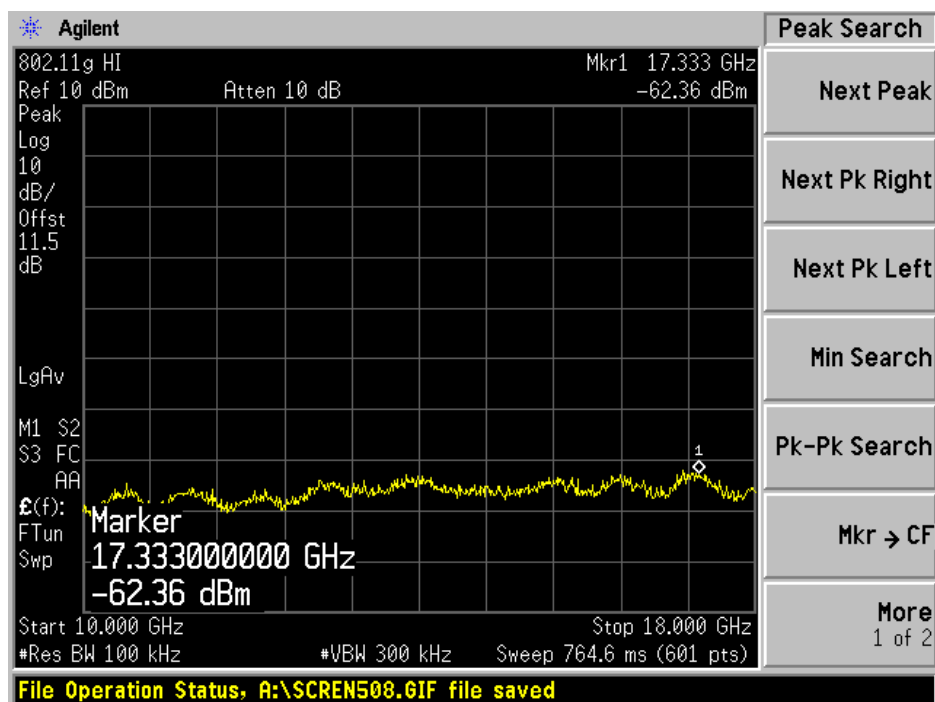
## Mid Channel





## High Channel





## **§15.205 & §15.209 & §15.247(c) - SPURIOUS RADIATED EMISSION**

### **Measurement Uncertainty**

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

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is  $\pm 4.0$  dB.

According to §15.205, except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| <b>MHz</b>                 | <b>MHz</b>            | <b>MHz</b>      | <b>GHz</b>       |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 – 0.110              | 16.42 – 16.423        | 399.9 – 410     | 4.5 – 5.15       |
| <sup>1</sup> 0.495 – 0.505 | 16.69475 – 16.69525   | 608 – 614       | 5.35 – 5.46      |
| 2.1735 – 2.1905            | 16.80425 – 16.80475   | 960 – 1240      | 7.25 – 7.75      |
| 4.125 – 4.128              | 25.5 – 25.67          | 1300 – 1427     | 8.025 – 8.5      |
| 4.17725 – 4.17775          | 37.5 – 38.25          | 1435 – 1626.5   | 9.0 – 9.2        |
| 4.20725 – 4.20775          | 73 – 74.6             | 1645.5 – 1646.5 | 9.3 – 9.5        |
| 6.215 – 6.218              | 74.8 – 75.2           | 1660 – 1710     | 10.6 – 12.7      |
| 6.26775 – 6.26825          | 108 – 121.94          | 1718.8 – 1722.2 | 13.25 – 13.4     |
| 6.31175 – 6.31225          | 123 – 138             | 2200 – 2300     | 14.47 – 14.5     |
| 8.291 – 8.294              | 149.9 – 150.05        | 2310 – 2390     | 15.35 – 16.2     |
| 8.362 – 8.366              | 156.52475 – 156.52525 | 2483.5 – 2500   | 17.7 – 21.4      |
| 8.37625 – 8.38675          | 156.7 – 156.9         | 2655 – 2900     | 22.01 – 23.12    |
| 8.41425 – 8.41475          | 162.0125 – 167.17     | 3260 – 3267     | 23.6 – 24.0      |
| 12.29 – 12.293             | 167.72 – 173.2        | 3332 – 3339     | 31.2 – 31.8      |
| 12.51975 – 12.57725        | 240 – 285             | 3345.8 – 3358   | 36.43 – 36.5     |
| 13.36 – 13.41              | 322 – 335.4           | 3600 – 4400     | ( <sup>2</sup> ) |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510MHz

<sup>2</sup> Above 38.6

Except as provided in paragraph (d) and (e), the filed strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

According to §15.209, the device shall meet radiated emission general requirements.

Except for Class A device, the filed strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency of Emission<br>(MHz) | Field Strength     |                    |
|--------------------------------|--------------------|--------------------|
|                                | (Microvolts/meter) | (dB $\mu$ V/meter) |
| 30 - 88                        | 100                | 40                 |
| 88 - 216                       | 150                | 43.5               |
| 216 - 960                      | 200                | 46                 |
| Above 960                      | 500                | 54                 |

### EUT Setup

The radiated emission tests were performed using the setup in accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 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.

### Test Equipment List and Details

| Manufacturer      | Description                                  | Model     | S/N               | Cal Date   |
|-------------------|----------------------------------------------|-----------|-------------------|------------|
| Agilent           | Analyzer, Spectrum                           | E4446A    | US44300386        | 2006-03-06 |
| HP                | Pre, Amplifier<br>(1 ~ 26.5 GHz)             | 8449B     | 3147A00400        | 2005-08-10 |
| Sonoma Instrument | Amplifier Broadband<br>( 10 KHz - 2500 MHz ) | 317       | 260407            | 2006-03-20 |
| Sunol Science     | 30MHz ~ 3 GHz Antenna                        | JB3       | A020106-3/S006628 | 2006-02-14 |
| A.R.A             | Antenna, Horn, DRG                           | DRG-118/A | 1132              | 2005-08-17 |

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

## Test Procedure

For the radiated emissions test, the EUT, 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.

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

## Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit.

The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{FCC 15.247 Limit}$$

## Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 16° C     |
| Relative Humidity: | 55%       |
| ATM Pressure:      | 1024 mbar |

*\*The testing was performed by James Ma on 2006-05-24*

## Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, and had the worst margin of:

802.11b:

- 2.4 dB at 9648.00 MHz in the **Vertical** polarization for Low Channel. \*
- 16.8 dB at 9748.00 MHz in the **Vertical** polarization for Middle Channel.\*
- 16.1 dB at 9848.00 MHz in the **Vertical** polarization for High Channel.\*

802.11g:

- 11.5 dB at 9648.00 MHz in the **Vertical** polarization for Low Channel. \*
- 16.2 dB at 9748.00 MHz in the **Vertical** polarization for Middle Channel.\*
- 16.9 dB at 9848.00 MHz in the **Vertical** polarization for High Channel.\*

*\* The test data was within the measurement of uncertainty.*

## Radiated Emissions Test plot & data@ 3 Meters

802.11b mode

Primary scan 1GHz -25GHz, (Low channel 2412 MHz)

| Frequency<br>MHz | Reading<br>dBuV/m | Azimuth<br>Degrees | Height<br>m | Polar<br>H / V | Antenna<br>Loss<br>dB | Cable<br>loss<br>dB | Amplifier<br>dB | Corrected<br>Reading<br>dBuV/m | 15.247<br>Limit<br>(dBuV/m) | 15.247<br>Margin | Comments  | Testing<br>Condition<br>Mode/<br>Distance |
|------------------|-------------------|--------------------|-------------|----------------|-----------------------|---------------------|-----------------|--------------------------------|-----------------------------|------------------|-----------|-------------------------------------------|
| 2412.00          | 113.1             | 330                | 1.4         | V              | 28.7                  | 1.5                 | 35.8            | 97.5                           |                             |                  | Fund/Peak | CW / 3                                    |
| 2412.00          | 102.9             | 330                | 1.4         | H              | 28.7                  | 1.5                 | 35.8            | 87.2                           |                             |                  | Fund/Peak | CW / 3                                    |
| 2412.00          | 108.8             | 330                | 1.4         | V              | 28.7                  | 1.5                 | 35.8            | 93.1                           |                             |                  | Ave       | CW / 3                                    |
| 2412.00          | 99.1              | 330                | 1.2         | H              | 28.7                  | 1.5                 | 35.8            | 83.4                           |                             |                  | Ave       | CW / 3                                    |
| 9648.00          | 44.0              | 180                | 2.0         | V              | 38.1                  | 3.7                 | 34.2            | 51.6                           | 54                          | -2.4             | Ave       | CW / 3                                    |
| 9648.00          | 43.6              | 90                 | 2.0         | H              | 38.1                  | 3.7                 | 34.2            | 51.2                           | 54                          | -2.8             | Ave       | CW / 3                                    |
| 7236.00          | 42.6              | 180                | 2.0         | V              | 36.7                  | 4.2                 | 34.7            | 48.8                           | 54                          | -5.2             | Ave       | CW / 3                                    |
| 7236.00          | 42.3              | 90                 | 2.0         | H              | 36.7                  | 4.2                 | 34.7            | 48.5                           | 54                          | -5.5             | Ave       | CW / 3                                    |
| 4824.00          | 44.9              | 270                | 2.4         | V              | 32.5                  | 1.9                 | 34.8            | 44.5                           | 54                          | -9.5             | Ave       | CW / 3                                    |
| 4824.00          | 44.8              | 180                | 2.3         | H              | 32.5                  | 1.9                 | 34.8            | 44.4                           | 54                          | -9.6             | Ave       | CW / 3                                    |
| 9648.00          | 54.6              | 90                 | 2.0         | V              | 38.1                  | 3.7                 | 34.2            | 62.2                           | 74                          | -11.8            | Peak      | CW / 3                                    |
| 9648.00          | 54.1              | 180                | 2.0         | H              | 38.1                  | 3.7                 | 34.2            | 61.7                           | 74                          | -12.3            | Peak      | CW / 3                                    |
| 7236.00          | 53.3              | 90                 | 2.0         | V              | 36.7                  | 4.2                 | 34.7            | 59.5                           | 74                          | -14.5            | Peak      | CW / 3                                    |
| 7236.00          | 52.8              | 180                | 2.0         | H              | 36.7                  | 4.2                 | 34.7            | 59.0                           | 74                          | -15.0            | Peak      | CW / 3                                    |
| 4824.00          | 55.3              | 200                | 1.7         | V              | 32.5                  | 1.9                 | 34.8            | 54.9                           | 74                          | -19.1            | Peak      | CW / 3                                    |
| 1192.35          | 46.7              | 180                | 2.0         | V              | 23.3                  | 1.1                 | 36.8            | 34.3                           | 54                          | -19.7            | Ave       | CW / 3                                    |
| 4824.00          | 53.6              | 180                | 2.3         | H              | 32.5                  | 1.9                 | 34.8            | 53.2                           | 74                          | -20.8            | Peak      | CW / 3                                    |
| 1192.35          | 45.4              | 90                 | 2.0         | H              | 23.3                  | 1.1                 | 36.8            | 33.0                           | 54                          | -21.0            | Ave       | CW / 3                                    |
| 1192.35          | 63.8              | 90                 | 2.0         | V              | 23.3                  | 1.1                 | 36.8            | 51.4                           | 74                          | -22.6            | Peak      | CW / 3                                    |
| 1192.35          | 58.2              | 180                | 2.0         | H              | 23.3                  | 1.1                 | 36.8            | 45.8                           | 74                          | -28.2            | Peak      | CW / 3                                    |

Primary scan 1GHz -25GHz, (Middle channel 2437MHz)

| Frequency<br>MHz | Reading<br>dBuV/m | Azimuth<br>Degrees | Height<br>m | Polar<br>H / V | Antenna<br>Loss<br>dB | Cable<br>loss<br>dB | Amplifier<br>dB | Corrected<br>Reading<br>dBuV/m | 15.247<br>Limit<br>(dBuV/m) | 15.247<br>Margin | Comments  | Testing<br>Condition<br>Mode/<br>Distance |
|------------------|-------------------|--------------------|-------------|----------------|-----------------------|---------------------|-----------------|--------------------------------|-----------------------------|------------------|-----------|-------------------------------------------|
| 2437.00          | 111.2             | 180                | 1.3         | V              | 28.7                  | 1.5                 | 35.8            | 95.5                           |                             |                  | Fund/Peak | CW / 3                                    |
| 2437.00          | 102.4             | 180                | 1.2         | H              | 28.7                  | 1.5                 | 35.8            | 86.7                           |                             |                  | Fund/Peak | CW / 3                                    |
| 2437.00          | 106.8             | 180                | 1.3         | V              | 28.7                  | 1.5                 | 35.8            | 91.1                           |                             |                  | Ave       | CW / 3                                    |
| 2437.00          | 97.9              | 180                | 1.2         | H              | 28.7                  | 1.5                 | 35.8            | 82.2                           |                             |                  | Ave       | CW / 3                                    |
| 9748.00          | 29.6              | 180                | 2.0         | V              | 38.1                  | 3.7                 | 34.2            | 37.2                           | 54                          | -16.8            | Ave       | CW / 3                                    |
| 9748.00          | 29.1              | 90                 | 2.0         | H              | 38.1                  | 3.7                 | 34.2            | 36.7                           | 54                          | -17.3            | Ave       | CW / 3                                    |
| 7311.00          | 27.9              | 270                | 2.4         | V              | 36.7                  | 4.2                 | 34.7            | 34.1                           | 54                          | -19.9            | Ave       | CW / 3                                    |
| 7311.00          | 27.4              | 180                | 2.1         | H              | 36.7                  | 4.2                 | 34.7            | 33.6                           | 54                          | -20.4            | Ave       | CW / 3                                    |
| 1196.40          | 61.8              | 90                 | 2.0         | V              | 23.3                  | 1.1                 | 36.8            | 49.4                           | 74                          | -24.6            | Peak      | CW / 3                                    |
| 4874.00          | 29.2              | 270                | 2.4         | V              | 32.5                  | 1.9                 | 34.8            | 28.8                           | 54                          | -25.2            | Ave       | CW / 3                                    |
| 9748.00          | 41.2              | 90                 | 2.0         | V              | 38.1                  | 3.7                 | 34.2            | 48.8                           | 74                          | -25.2            | Peak      | CW / 3                                    |
| 4874.00          | 29.1              | 180                | 2.2         | H              | 32.5                  | 1.9                 | 34.8            | 28.7                           | 54                          | -25.3            | Ave       | CW / 3                                    |
| 9748.00          | 40.6              | 180                | 2.0         | H              | 38.1                  | 3.7                 | 34.2            | 48.2                           | 74                          | -25.8            | Peak      | CW / 3                                    |
| 1196.40          | 37.5              | 180                | 2.0         | V              | 23.3                  | 1.1                 | 36.8            | 25.1                           | 54                          | -28.9            | Ave       | CW / 3                                    |
| 1196.40          | 57.2              | 180                | 2.0         | H              | 23.3                  | 1.1                 | 36.8            | 44.8                           | 74                          | -29.2            | Peak      | CW / 3                                    |
| 7311.00          | 38.5              | 270                | 2.4         | V              | 36.7                  | 4.2                 | 34.7            | 44.7                           | 74                          | -29.3            | Peak      | CW / 3                                    |
| 7311.00          | 38.0              | 180                | 2.3         | H              | 36.7                  | 4.2                 | 34.7            | 44.2                           | 74                          | -29.8            | Peak      | CW / 3                                    |
| 1196.40          | 35.6              | 90                 | 2.0         | H              | 23.3                  | 1.1                 | 36.8            | 23.2                           | 54                          | -30.8            | Ave       | CW / 3                                    |
| 4874.00          | 40.2              | 270                | 2.4         | V              | 32.5                  | 1.9                 | 34.8            | 39.8                           | 74                          | -34.2            | Peak      | CW / 3                                    |
| 4874.00          | 40.0              | 180                | 2.2         | H              | 32.5                  | 1.9                 | 34.8            | 39.6                           | 74                          | -34.4            | Peak      | CW / 3                                    |

Primary scan 1GHz -25GHz, (High Channel 2462 MHz)

| Frequency<br>MHz | Reading<br>dBuV/m | Azimuth<br>Degrees | Height<br>m | Polar<br>H / V | Antenna<br>Loss<br>dB | Cable<br>loss<br>dB | Amplifier<br>dB | Corrected<br>Reading<br>dBuV/m | 15.247<br>Limit<br>(dBuV/m) | 15.247<br>Margin | Comments  | Testing<br>Condition<br>Mode/Distance |
|------------------|-------------------|--------------------|-------------|----------------|-----------------------|---------------------|-----------------|--------------------------------|-----------------------------|------------------|-----------|---------------------------------------|
| 2462.00          | 111.4             | 180                | 1.3         | V              | 28.7                  | 1.5                 | 35.8            | 95.7                           |                             |                  | Fund/Peak | CW / 3                                |
| 2462.00          | 104.6             | 180                | 1.2         | H              | 28.7                  | 1.5                 | 35.8            | 88.9                           |                             |                  | Fund/Peak | CW / 3                                |
| 2462.00          | 107.2             | 180                | 1.3         | V              | 28.7                  | 1.5                 | 35.8            | 91.5                           |                             |                  | Ave       | CW / 3                                |
| 2462.00          | 101.2             | 180                | 1.2         | H              | 28.7                  | 1.5                 | 35.8            | 85.5                           |                             |                  | Ave       | CW / 3                                |
| 9848.00          | 30.3              | 180                | 2.0         | V              | 38.1                  | 3.7                 | 34.2            | 37.9                           | 54                          | -16.1            | Ave       | CW / 3                                |
| 9848.00          | 30.1              | 90                 | 2.0         | H              | 38.1                  | 3.7                 | 34.2            | 37.7                           | 54                          | -16.3            | Ave       | CW / 3                                |
| 7386.00          | 29.8              | 270                | 2.4         | V              | 36.7                  | 4.2                 | 34.7            | 36.0                           | 54                          | -18.0            | Ave       | CW / 3                                |
| 7386.00          | 29.2              | 90                 | 2.1         | H              | 36.7                  | 4.2                 | 34.7            | 35.4                           | 54                          | -18.6            | Ave       | CW / 3                                |
| 4924.00          | 30.2              | 270                | 2.4         | V              | 32.5                  | 1.9                 | 34.8            | 29.8                           | 54                          | -24.2            | Ave       | CW / 3                                |
| 4924.00          | 30.0              | 90                 | 2.1         | H              | 32.5                  | 1.9                 | 34.8            | 29.6                           | 54                          | -24.4            | Ave       | CW / 3                                |
| 1199.65          | 61.8              | 90                 | 2.0         | V              | 23.3                  | 1.1                 | 36.8            | 49.4                           | 74                          | -24.6            | Peak      | CW / 3                                |
| 1199.65          | 41.4              | 90                 | 2.0         | H              | 23.3                  | 1.1                 | 36.8            | 29.0                           | 54                          | -25.0            | Ave       | CW / 3                                |
| 9848.00          | 41.0              | 90                 | 2.0         | V              | 38.1                  | 3.7                 | 34.2            | 48.6                           | 74                          | -25.4            | Peak      | CW / 3                                |
| 9848.00          | 40.5              | 180                | 2.0         | H              | 38.1                  | 3.7                 | 34.2            | 48.1                           | 74                          | -25.9            | Peak      | CW / 3                                |
| 7386.00          | 40.8              | 270                | 2.4         | V              | 36.7                  | 4.2                 | 34.7            | 47.0                           | 74                          | -27.0            | Peak      | CW / 3                                |
| 7386.00          | 40.2              | 90                 | 2.1         | H              | 36.7                  | 4.2                 | 34.7            | 46.4                           | 74                          | -27.6            | Peak      | CW / 3                                |
| 1199.65          | 37.8              | 180                | 2.0         | V              | 23.3                  | 1.1                 | 36.8            | 25.4                           | 54                          | -28.6            | Ave       | CW / 3                                |
| 1199.65          | 55.6              | 180                | 2.0         | H              | 23.3                  | 1.1                 | 36.8            | 43.2                           | 74                          | -30.8            | Peak      | CW / 3                                |
| 4924.00          | 41.5              | 270                | 2.4         | V              | 32.5                  | 1.9                 | 34.8            | 41.1                           | 74                          | -32.9            | Peak      | CW / 3                                |
| 4924.00          | 40.8              | 90                 | 2.1         | H              | 32.5                  | 1.9                 | 34.8            | 40.4                           | 74                          | -33.6            | Peak      | CW / 3                                |

802.11g mode

Primary scan 1GHz -25GHz, (Low channel 2412 MHz)

| Frequency | Reading | Azimuth | Height | Polar | Antenna<br>Loss | Cable<br>loss | Amplifier | Corrected<br>Reading | 15.247<br>Limit<br>(dBuV/m) | 15.247<br>Margin |           | Testing<br>Condition |
|-----------|---------|---------|--------|-------|-----------------|---------------|-----------|----------------------|-----------------------------|------------------|-----------|----------------------|
| MHz       | dBuV/m  | Degrees | m      | H / V | dB              | dB            | dB        | dBuV/m               |                             |                  | Comments  | Mode/Distance        |
| 2412.00   | 111.8   | 330     | 1.4    | V     | 28.7            | 1.5           | 35.8      | 96.1                 |                             |                  | Fund/Peak | CW / 3               |
| 2412.00   | 101.6   | 330     | 1.4    | H     | 28.7            | 1.5           | 35.8      | 85.9                 |                             |                  | Fund/Peak | CW / 3               |
| 2412.00   | 102.1   | 330     | 1.4    | V     | 28.7            | 1.5           | 35.8      | 86.4                 |                             |                  | Ave       | CW / 3               |
| 2412.00   | 91.5    | 330     | 1.2    | H     | 28.7            | 1.5           | 35.8      | 75.8                 |                             |                  | Ave       | CW / 3               |
| 9648.00   | 34.9    | 180     | 2.0    | V     | 38.1            | 3.7           | 34.2      | 42.5                 | 54                          | -11.5            | Ave       | CW / 3               |
| 9648.00   | 34.5    | 90      | 2.0    | H     | 38.1            | 3.7           | 34.2      | 42.1                 | 54                          | -11.9            | Ave       | CW / 3               |
| 7236.00   | 33.9    | 180     | 2.0    | V     | 36.7            | 4.2           | 34.7      | 40.1                 | 54                          | -13.9            | Ave       | CW / 3               |
| 7236.00   | 33.6    | 90      | 2.0    | H     | 36.7            | 4.2           | 34.7      | 39.8                 | 54                          | -14.2            | Ave       | CW / 3               |
| 4824.00   | 35.9    | 270     | 2.4    | V     | 32.5            | 1.9           | 34.8      | 35.5                 | 54                          | -18.5            | Ave       | CW / 3               |
| 9648.00   | 47.8    | 90      | 2.0    | V     | 38.1            | 3.7           | 34.2      | 55.4                 | 74                          | -18.6            | Peak      | CW / 3               |
| 4824.00   | 35.5    | 180     | 2.3    | H     | 32.5            | 1.9           | 34.8      | 35.1                 | 54                          | -18.9            | Ave       | CW / 3               |
| 9648.00   | 47.3    | 180     | 2.0    | H     | 38.1            | 3.7           | 34.2      | 54.9                 | 74                          | -19.1            | Peak      | CW / 3               |
| 7236.00   | 45.9    | 90      | 2.0    | V     | 36.7            | 4.2           | 34.7      | 52.1                 | 74                          | -21.9            | Peak      | CW / 3               |
| 7236.00   | 45.4    | 180     | 2.0    | H     | 36.7            | 4.2           | 34.7      | 51.6                 | 74                          | -22.4            | Peak      | CW / 3               |
| 1196.20   | 38.8    | 180     | 2.0    | V     | 23.3            | 1.1           | 36.8      | 26.4                 | 54                          | -27.6            | Ave       | CW / 3               |
| 4824.00   | 46.7    | 200     | 1.7    | V     | 32.5            | 1.9           | 34.8      | 46.3                 | 74                          | -27.7            | Peak      | CW / 3               |
| 4824.00   | 46.5    | 180     | 2.3    | H     | 32.5            | 1.9           | 34.8      | 46.1                 | 74                          | -27.9            | Peak      | CW / 3               |
| 1196.20   | 38.1    | 90      | 2.0    | H     | 23.3            | 1.1           | 36.8      | 25.7                 | 54                          | -28.3            | Ave       | CW / 3               |
| 1196.20   | 55.2    | 90      | 2.0    | V     | 23.3            | 1.1           | 36.8      | 42.8                 | 74                          | -31.2            | Peak      | CW / 3               |
| 1196.20   | 54.3    | 180     | 2.0    | H     | 23.3            | 1.1           | 36.8      | 41.9                 | 74                          | -32.1            | Peak      | CW / 3               |

Primary scan 1GHz -25GHz, (Middle channel 2437MHz)

| Frequency | Reading | Azimuth | Height | Polar | Antenna Loss | Cable loss | Amplifier | Corrected Reading | 15.247 Limit | 15.247 |           | Testing Condition |
|-----------|---------|---------|--------|-------|--------------|------------|-----------|-------------------|--------------|--------|-----------|-------------------|
| MHz       | dBuV/m  | Degrees | m      | H / V | dB           | dB         | dB        | dBuV/m            | (dBuV/m)     | Margin | Comments  | Mode/Distance     |
| 2437.00   | 112.8   | 180     | 1.3    | V     | 28.7         | 1.5        | 35.8      | 97.1              |              |        | Fund/Peak | CW / 3            |
| 2437.00   | 102.6   | 180     | 1.2    | H     | 28.7         | 1.5        | 35.8      | 86.9              |              |        | Fund/Peak | CW / 3            |
| 2437.00   | 102.2   | 180     | 1.3    | V     | 28.7         | 1.5        | 35.8      | 86.5              |              |        | Ave       | CW / 3            |
| 2437.00   | 91.7    | 180     | 1.2    | H     | 28.7         | 1.5        | 35.8      | 76.0              |              |        | Ave       | CW / 3            |
| 9748.00   | 30.2    | 180     | 2.0    | V     | 38.1         | 3.7        | 34.2      | 37.8              | 54           | -16.2  | Ave       | CW / 3            |
| 9748.00   | 29.4    | 90      | 2.0    | H     | 38.1         | 3.7        | 34.2      | 37.0              | 54           | -17.0  | Ave       | CW / 3            |
| 7311.00   | 28.2    | 270     | 2.4    | V     | 36.7         | 4.2        | 34.7      | 34.4              | 54           | -19.6  | Ave       | CW / 3            |
| 7311.00   | 27.8    | 180     | 2.1    | H     | 36.7         | 4.2        | 34.7      | 34.0              | 54           | -20.0  | Ave       | CW / 3            |
| 4874.00   | 29.2    | 270     | 2.4    | V     | 32.5         | 1.9        | 34.8      | 28.8              | 54           | -25.2  | Ave       | CW / 3            |
| 9748.00   | 41.2    | 90      | 2.0    | V     | 38.1         | 3.7        | 34.2      | 48.8              | 74           | -25.2  | Peak      | CW / 3            |
| 9748.00   | 40.8    | 180     | 2.0    | H     | 38.1         | 3.7        | 34.2      | 48.4              | 74           | -25.6  | Peak      | CW / 3            |
| 4874.00   | 28.5    | 180     | 2.2    | H     | 32.5         | 1.9        | 34.8      | 28.1              | 54           | -25.9  | Ave       | CW / 3            |
| 7311.00   | 40.6    | 270     | 2.4    | V     | 36.7         | 4.2        | 34.7      | 46.8              | 74           | -27.2  | Peak      | CW / 3            |
| 1201.40   | 58.6    | 180     | 2.0    | H     | 23.3         | 1.4        | 36.8      | 46.4              | 74           | -27.6  | Peak      | CW / 3            |
| 1201.40   | 58.3    | 90      | 2.0    | V     | 23.3         | 1.4        | 36.8      | 46.1              | 74           | -27.9  | Peak      | CW / 3            |
| 7311.00   | 39.3    | 180     | 2.3    | H     | 36.7         | 4.2        | 34.7      | 45.5              | 74           | -28.5  | Peak      | CW / 3            |
| 1201.40   | 37.7    | 180     | 2.0    | V     | 23.3         | 1.4        | 36.8      | 25.5              | 54           | -28.5  | Ave       | CW / 3            |
| 1201.40   | 37.0    | 90      | 2.0    | H     | 23.3         | 1.4        | 36.8      | 24.8              | 54           | -29.2  | Ave       | CW / 3            |
| 4874.00   | 41.6    | 270     | 2.4    | V     | 32.5         | 1.9        | 34.8      | 41.2              | 74           | -32.8  | Peak      | CW / 3            |
| 4874.00   | 41.2    | 180     | 2.2    | H     | 32.5         | 1.9        | 34.8      | 40.8              | 74           | -33.2  | Peak      | CW / 3            |

Primary scan 1GHz -25GHz, (High Channel 2462 MHz)

| Frequency | Reading | Azimuth | Height | Polar | Antenna Loss | Cable loss | Amplifier | Corrected Reading | 15.247 Limit | 15.247 |           | Testing Condition |
|-----------|---------|---------|--------|-------|--------------|------------|-----------|-------------------|--------------|--------|-----------|-------------------|
| MHz       | dBuV/m  | Degree  | m      | H / V | dB           | dB         | dB        | dBuV/m            | (dBuV/m)     | Margin | Comments  | Mode/Distance     |
| 2462.00   | 111.9   | 180     | 1.3    | V     | 28.7         | 1.5        | 35.8      | 96.2              |              |        | Fund/Peak | CW / 3            |
| 2462.00   | 101.3   | 180     | 1.2    | H     | 28.7         | 1.5        | 35.8      | 85.6              |              |        | Fund/Peak | CW / 3            |
| 2462.00   | 100.9   | 180     | 1.3    | V     | 28.7         | 1.5        | 35.8      | 85.2              |              |        | Ave       | CW / 3            |
| 2462.00   | 90.7    | 180     | 1.2    | H     | 28.7         | 1.5        | 35.8      | 75.0              |              |        | Ave       | CW / 3            |
| 9848.00   | 29.5    | 180     | 2.0    | V     | 38.1         | 3.7        | 34.2      | 37.1              | 54           | -16.9  | Ave       | CW / 3            |
| 9848.00   | 29.3    | 90      | 2.0    | H     | 38.1         | 3.7        | 34.2      | 36.9              | 54           | -17.1  | Ave       | CW / 3            |
| 7386.00   | 29.8    | 270     | 2.4    | V     | 36.7         | 4.2        | 34.7      | 36.0              | 54           | -18.0  | Ave       | CW / 3            |
| 7386.00   | 28.5    | 90      | 2.1    | H     | 36.7         | 4.2        | 34.7      | 34.7              | 54           | -19.3  | Ave       | CW / 3            |
| 4924.00   | 30.5    | 270     | 2.4    | V     | 32.5         | 1.9        | 34.8      | 30.1              | 54           | -23.9  | Ave       | CW / 3            |
| 4924.00   | 30.0    | 90      | 2.1    | H     | 32.5         | 1.9        | 34.8      | 29.6              | 54           | -24.4  | Ave       | CW / 3            |
| 9848.00   | 41.2    | 90      | 2.0    | V     | 38.1         | 3.7        | 34.2      | 48.8              | 74           | -25.2  | Peak      | CW / 3            |
| 1201.40   | 60.8    | 90      | 2.0    | V     | 23.3         | 1.4        | 36.8      | 48.6              | 74           | -25.4  | Peak      | CW / 3            |
| 9848.00   | 40.5    | 180     | 2.0    | H     | 38.1         | 3.7        | 34.2      | 48.1              | 74           | -25.9  | Peak      | CW / 3            |
| 1201.40   | 37.1    | 180     | 2.0    | V     | 23.3         | 1.4        | 36.8      | 24.9              | 54           | -29.1  | Ave       | CW / 3            |
| 1201.40   | 36.8    | 90      | 2.0    | H     | 23.3         | 1.4        | 36.8      | 24.6              | 54           | -29.4  | Ave       | CW / 3            |
| 7386.00   | 37.8    | 270     | 2.4    | V     | 36.7         | 4.2        | 34.7      | 44.0              | 74           | -30.0  | Peak      | CW / 3            |
| 7386.00   | 37.4    | 90      | 2.1    | H     | 36.7         | 4.2        | 34.7      | 43.6              | 74           | -30.4  | Peak      | CW / 3            |
| 1201.40   | 54.4    | 180     | 2.0    | H     | 23.3         | 1.4        | 36.8      | 42.2              | 74           | -31.8  | Peak      | CW / 3            |
| 4924.00   | 42.2    | 270     | 2.4    | V     | 32.5         | 1.9        | 34.8      | 41.8              | 74           | -32.2  | Peak      | CW / 3            |
| 4924.00   | 41.6    | 90      | 2.1    | H     | 32.5         | 1.9        | 34.8      | 41.2              | 74           | -32.8  | Peak      | CW / 3            |

## §15.247(a)(2) – 6 dB BANDWIDTH

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### Standard Applicable

According to §15.247(a)(2), for digital modulation techniques, the minimum 6dB bandwidth shall be at least 500 kHz.

### 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 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 emission bandwidth. (6 dB bandwidth for DTS)
4. Repeat above procedures until all frequencies measured were complete.

### Equipment List

| Manufacturer | Description        | Model  | Serial Number | Cal. Date  |
|--------------|--------------------|--------|---------------|------------|
| Agilent      | Analyzer, Spectrum | E4446A | US44300386    | 2006-03-06 |

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

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 16° C     |
| Relative Humidity: | 55%       |
| ATM Pressure:      | 1024 mbar |

\*The testing was performed by James Ma on 2006-05-24

### Measurement Result

#### 802.11b: Test Result

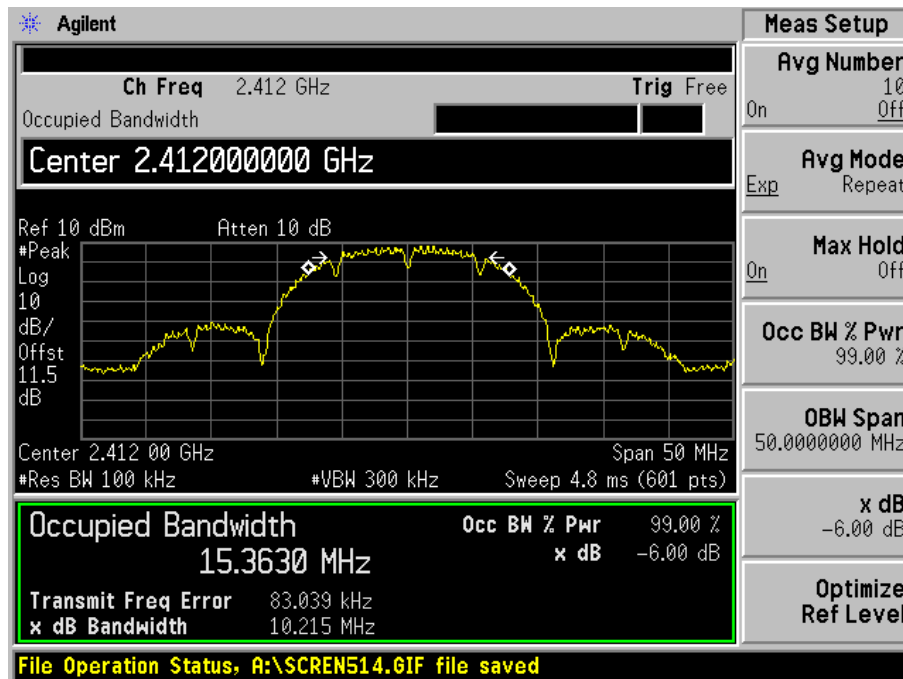
| Channel | Frequency<br>MHz | Channel<br>Bandwidth (KHz) | Limit<br>KHz |
|---------|------------------|----------------------------|--------------|
| Low     | 2412             | 10215                      | >500         |
| Mid     | 2437             | 12117                      | >500         |
| High    | 2462             | 11183                      | >500         |

## 802.11g: Test Result

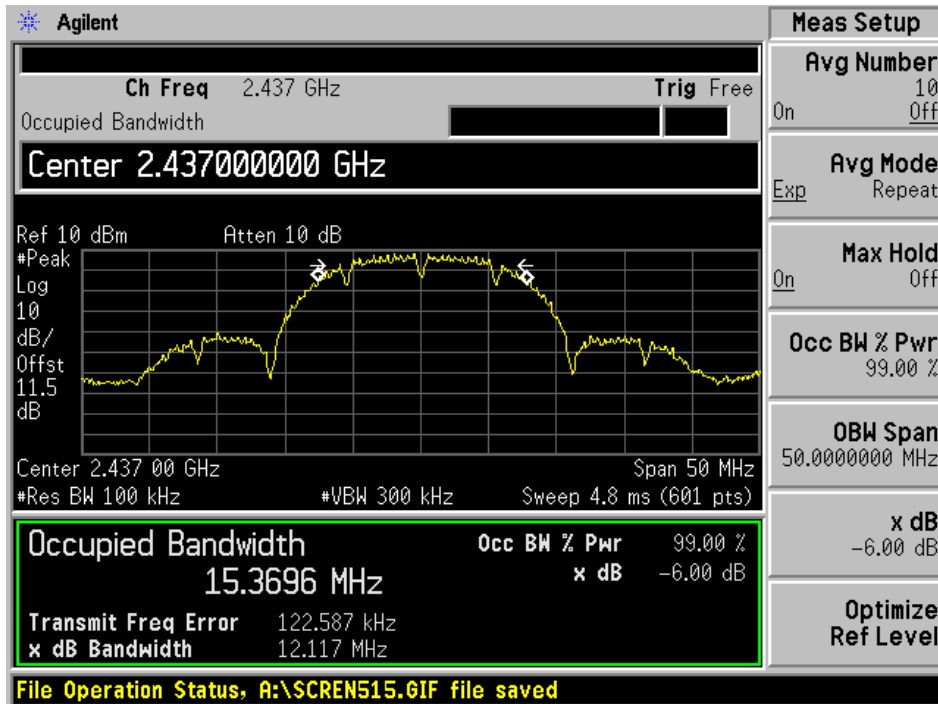
| Channel | Frequency<br>MHz | Channel<br>Bandwidth (KHz) | Limit<br>KHz |
|---------|------------------|----------------------------|--------------|
| Low     | 2412             | 16452                      | >500         |
| Mid     | 2437             | 16365                      | >500         |
| High    | 2462             | 16563                      | >500         |

802.11b Plots:

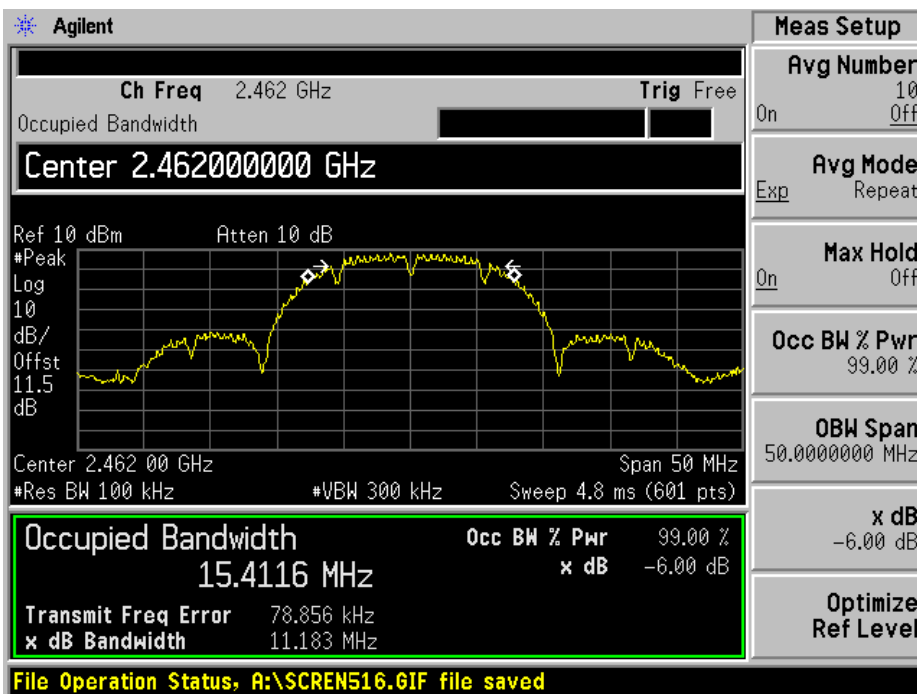
Low Channel



## Middle Channel

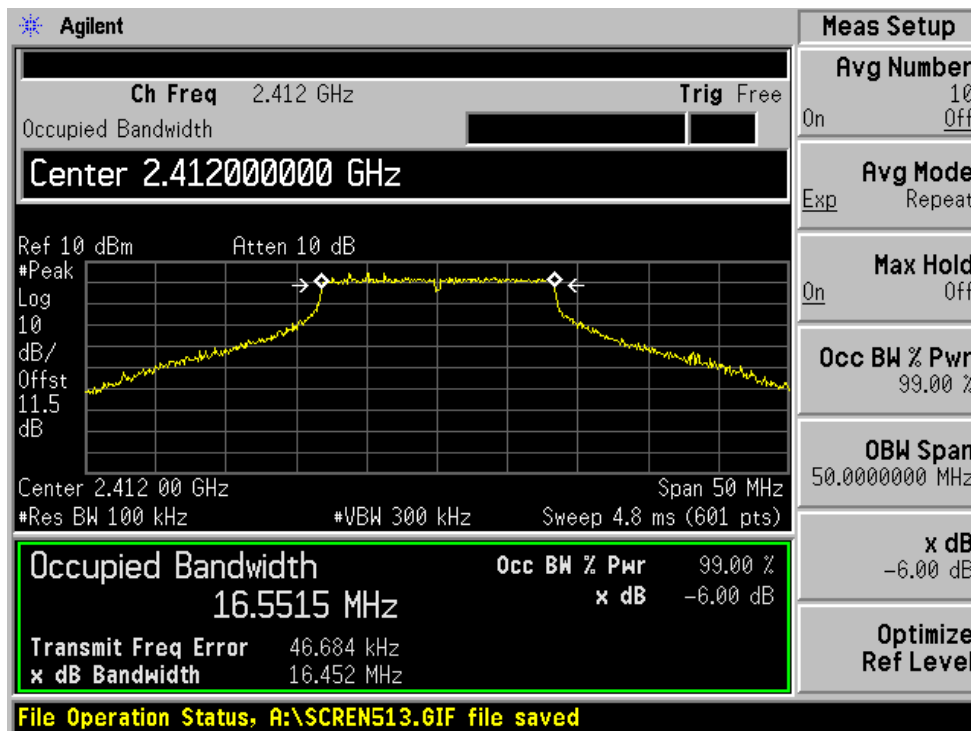


## High Channel

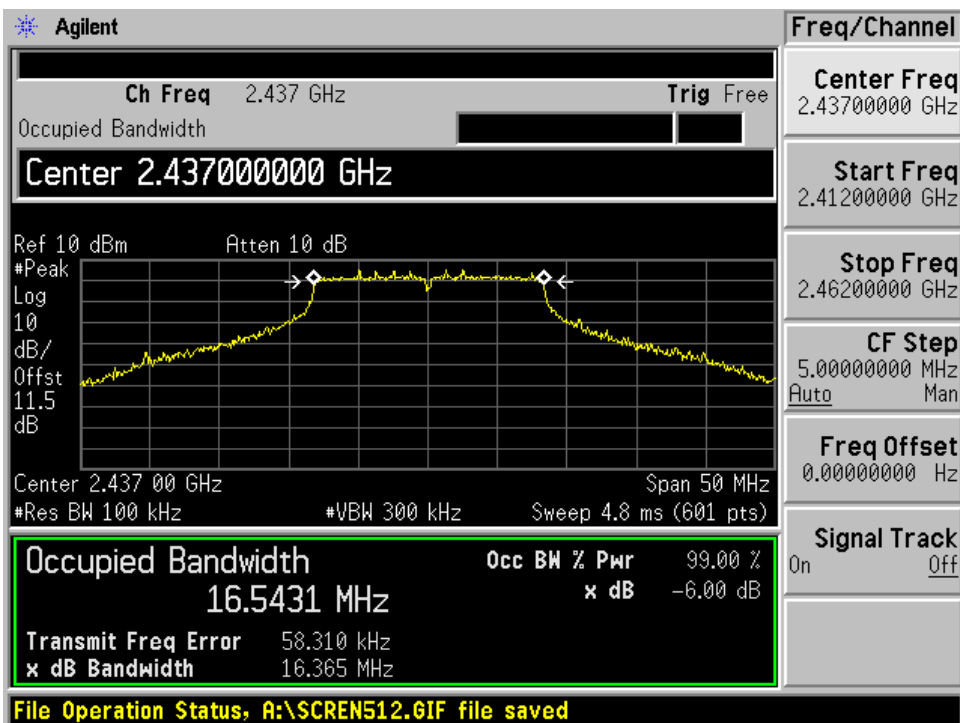


802.11g plots:

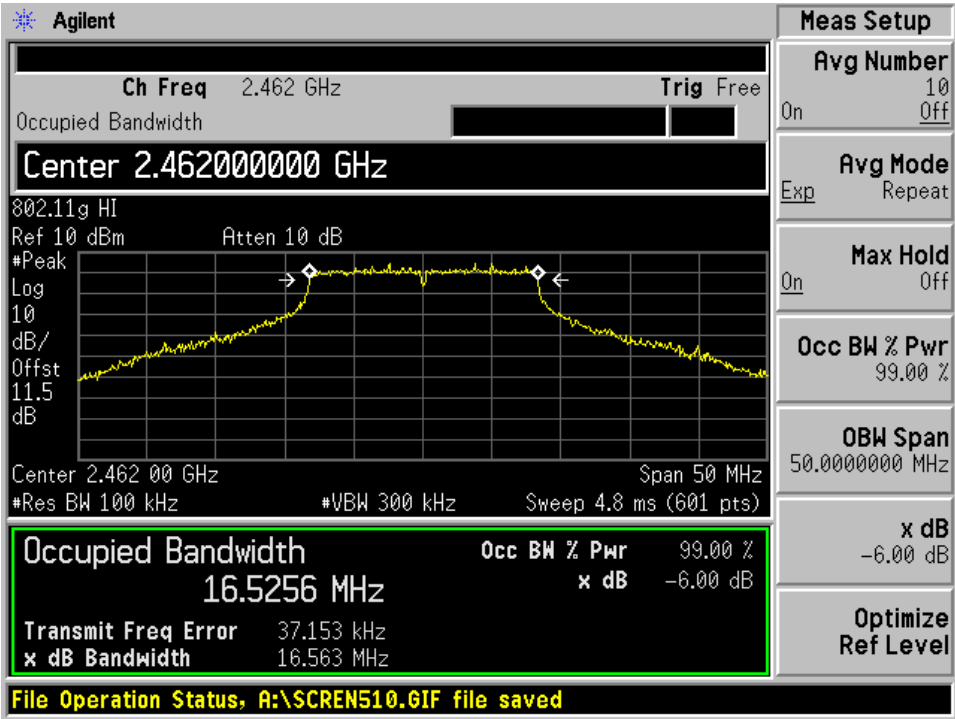
Low Channel



Mid. Channel



High Channel



## §15.247(b)(3) - PEAK OUTPUT POWER MEASUREMENT

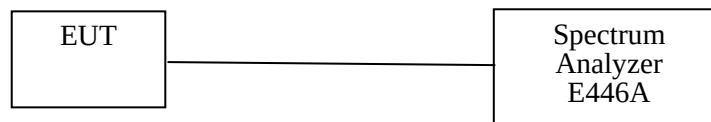
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### Standard Applicable

According to §15.247(b) (3), for systems using digital modulation in 2400-2483.5 MHz: 1 Watt

### 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.



### Equipment List

| Manufacturer | Description        | Model  | Serial Number | Cal. Date  |
|--------------|--------------------|--------|---------------|------------|
| Agilent      | Analyzer, Spectrum | E4446A | US44300386    | 2006-03-06 |

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

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 16° C     |
| Relative Humidity: | 55%       |
| ATM Pressure:      | 1024 mbar |

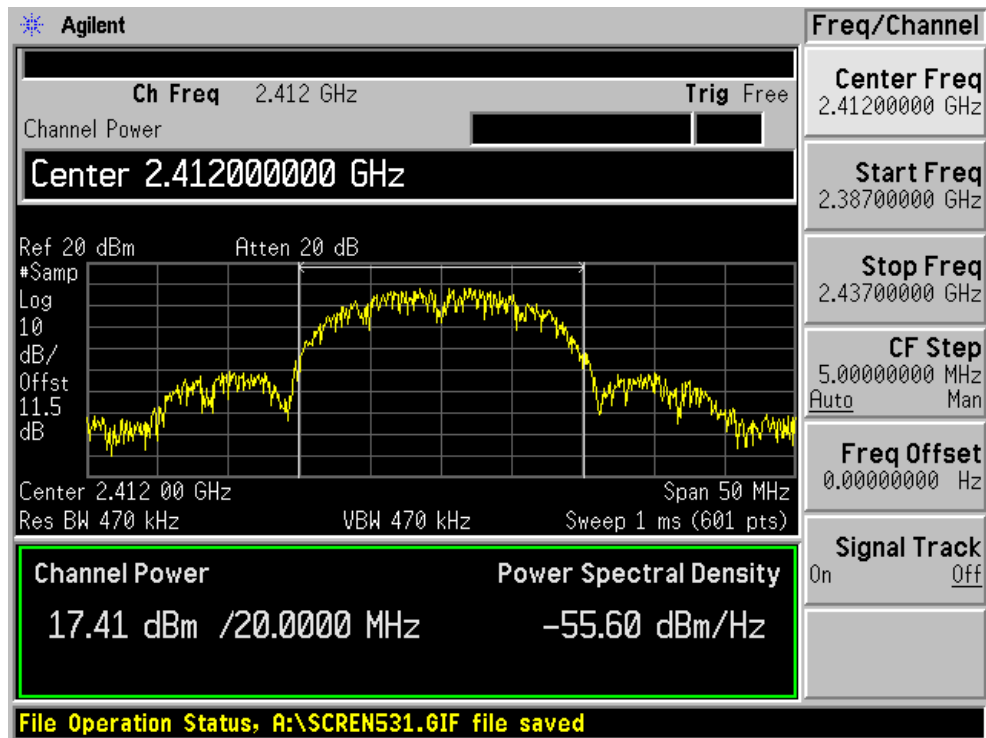
*\*The testing was performed by James Ma on 2006-05-24*

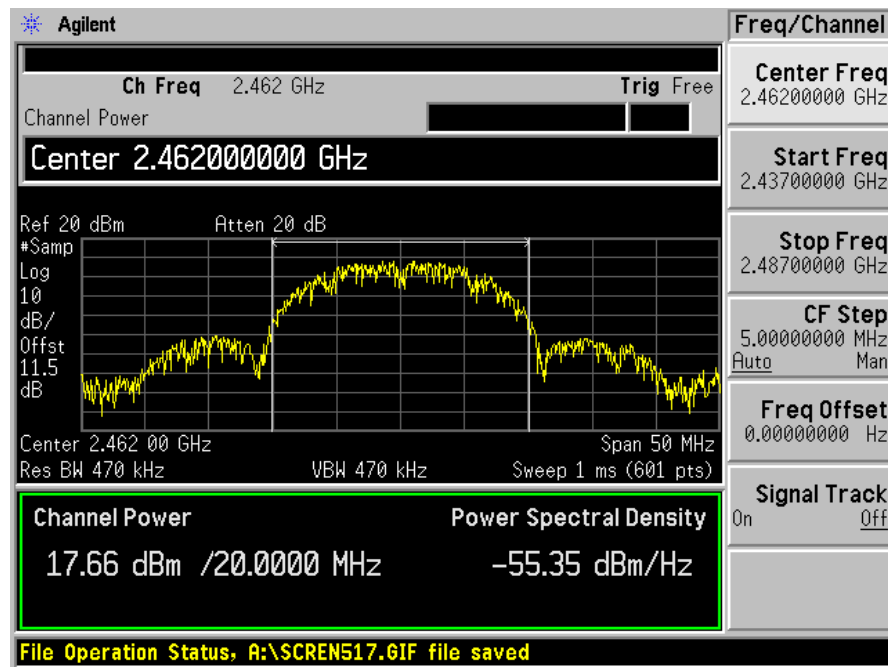
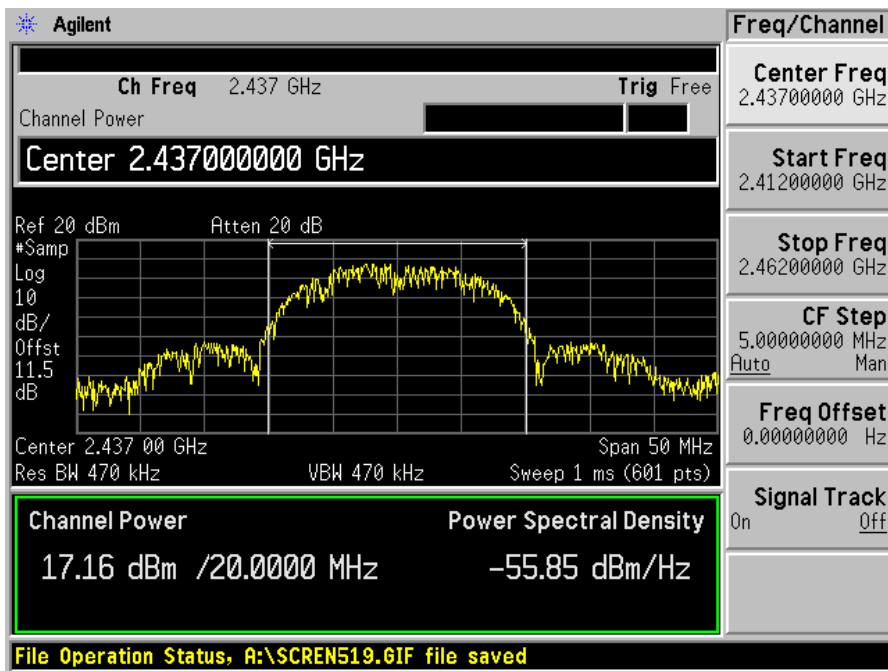
## Measurement Result

### RF Output Power

802.11b mode:

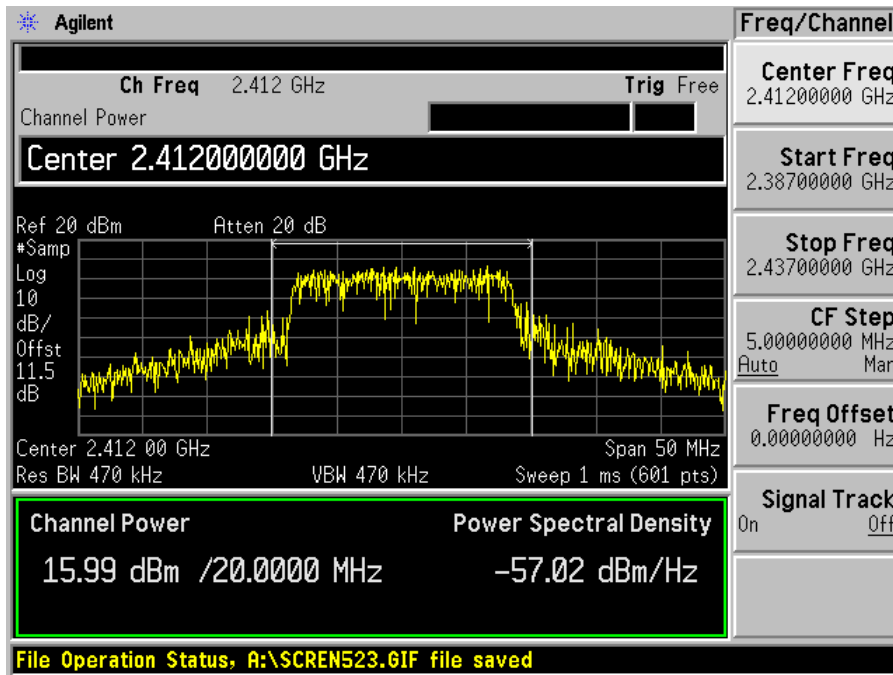
| Channel | Frequency<br>MHz | Max Peak Output Power<br>(dBm) | Output Power<br>(m Watt) | Limit<br>(m Watt) | Result   |
|---------|------------------|--------------------------------|--------------------------|-------------------|----------|
| Low     | 2412             | 17.41                          | 55.08                    | 1000              | Complies |
| Mid     | 2437             | 17.16                          | 52.00                    | 1000              | Complies |
| High    | 2462             | 17.66                          | 58.34                    | 1000              | Complies |

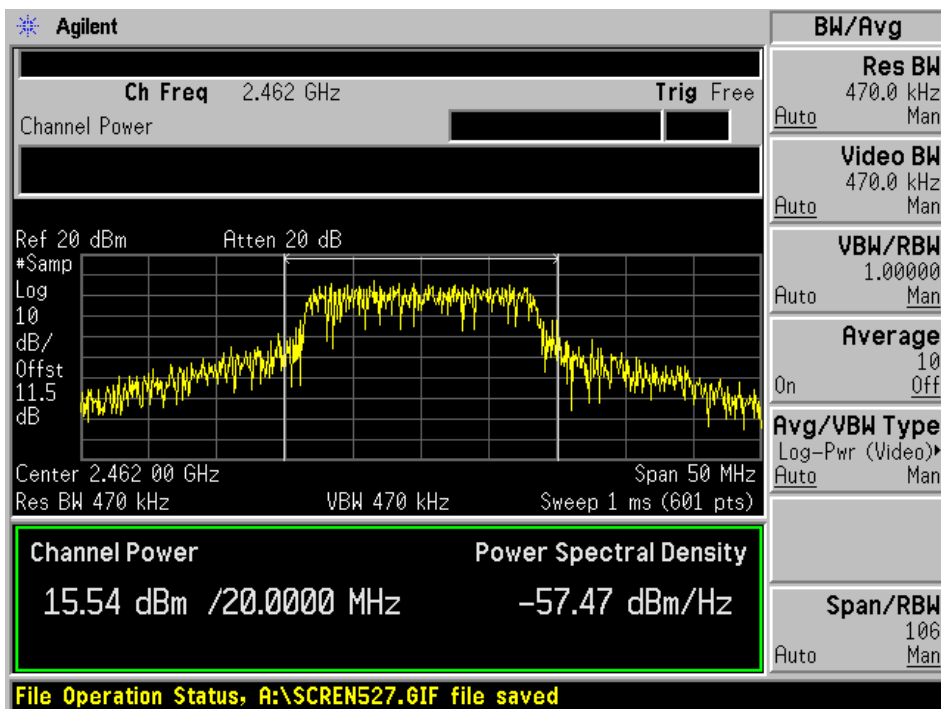
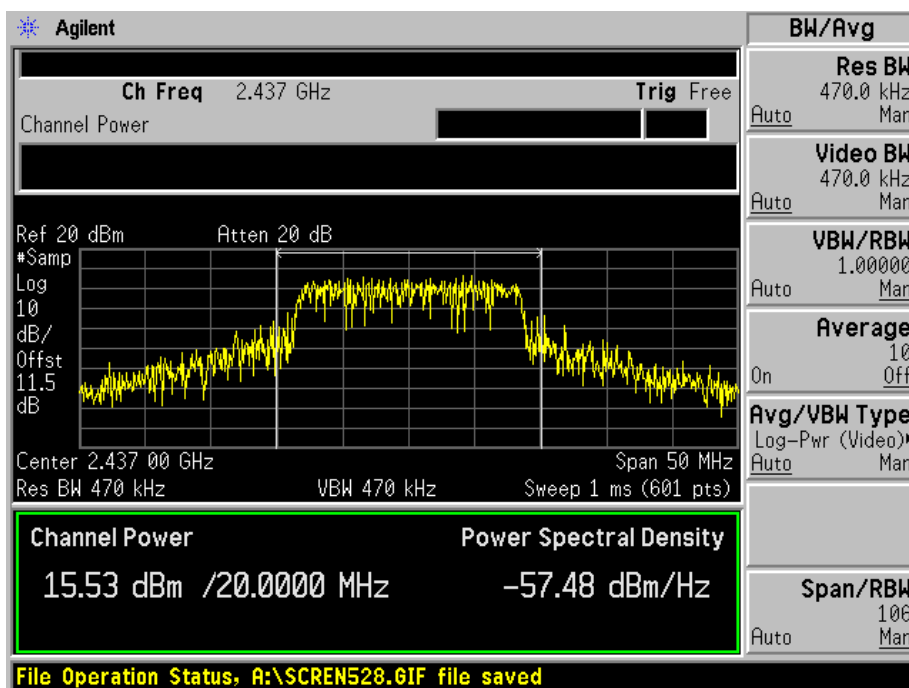




802.11g mode:

| Channel | Frequency<br>MHz | Max Peak Output Power |          | Limit<br>(m Watt) | Result   |
|---------|------------------|-----------------------|----------|-------------------|----------|
|         |                  | (dBm)                 | (m Watt) |                   |          |
| Low     | 2412             | 15.99                 | 39.72    | 1000              | Complies |
| Mid     | 2437             | 15.53                 | 35.73    | 1000              | Complies |
| High    | 2462             | 15.54                 | 35.81    | 1000              | Complies |





## §15.247(c) - 100 KHZ BANDWIDTH OF BAND EDGES

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### Standard Applicable

According to §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 emission limits specified in §15.209(a) see §15.205(c)).

### 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.

### Equipment List

| Manufacturer | Description        | Model  | Serial Number | Cal. Date  |
|--------------|--------------------|--------|---------------|------------|
| Agilent      | Analyzer, Spectrum | E4446A | US44300386    | 2006-03-06 |

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

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 16° C     |
| Relative Humidity: | 55%       |
| ATM Pressure:      | 1024 mbar |

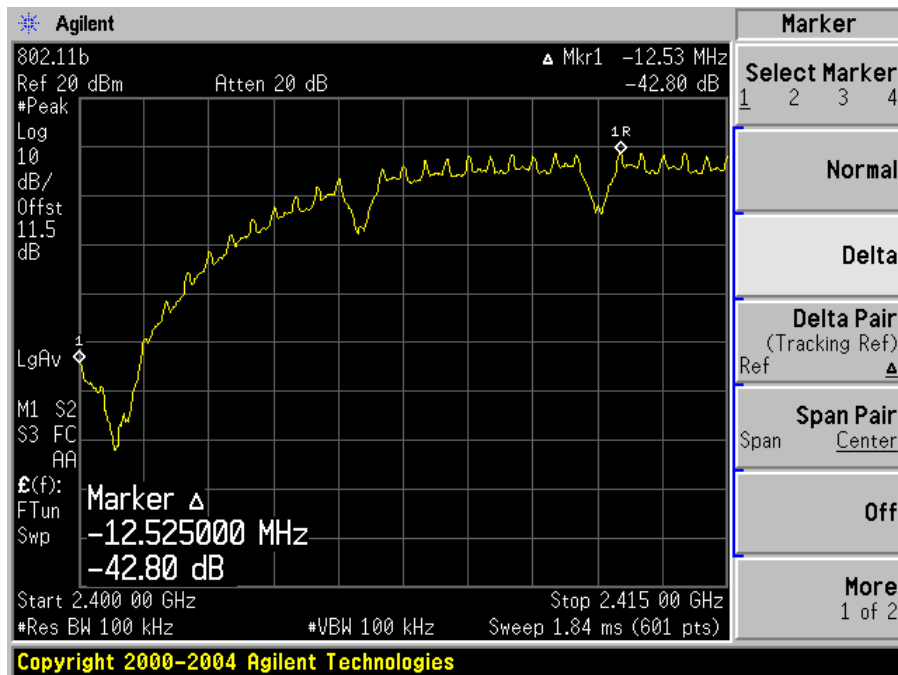
*\*The testing was performed by James Ma on 2006-05-24*

## Measurement Result

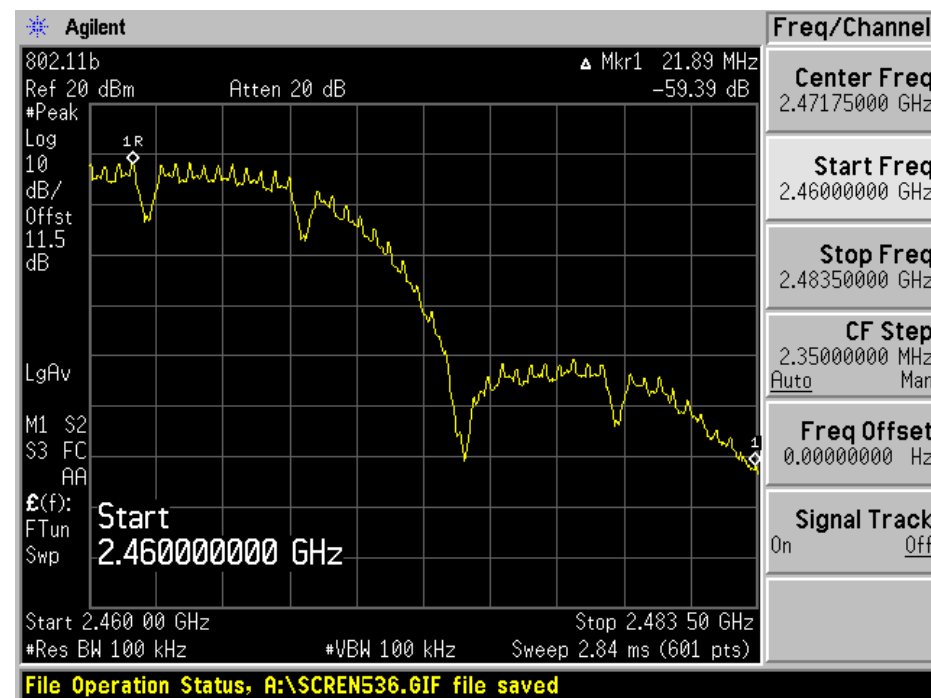
Please refer to following pages for plots of band edge.

802.11b mode:

Low Channel

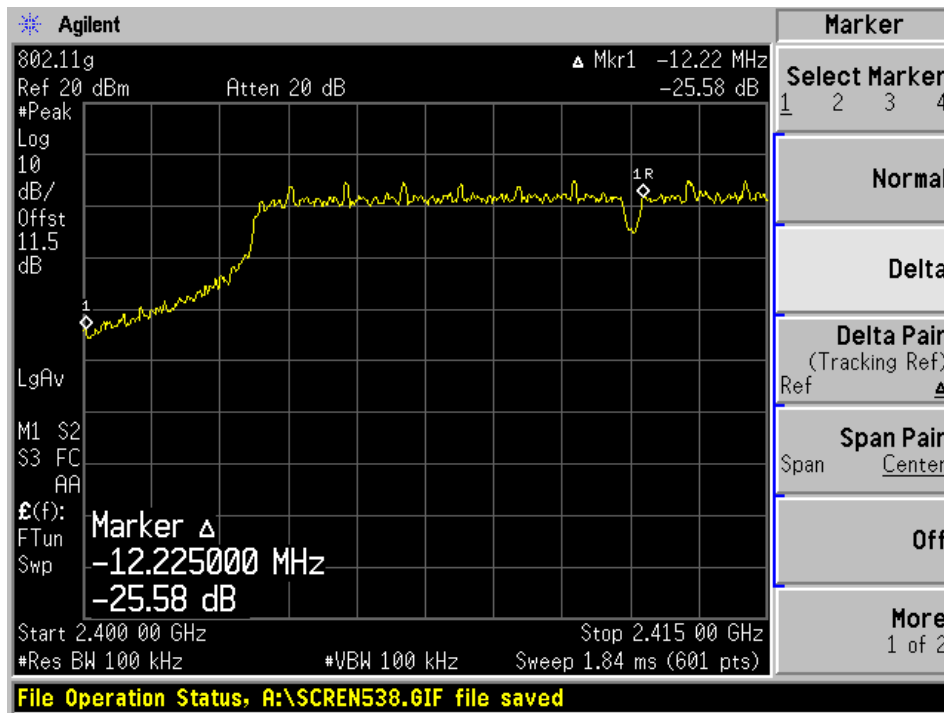


High Channel

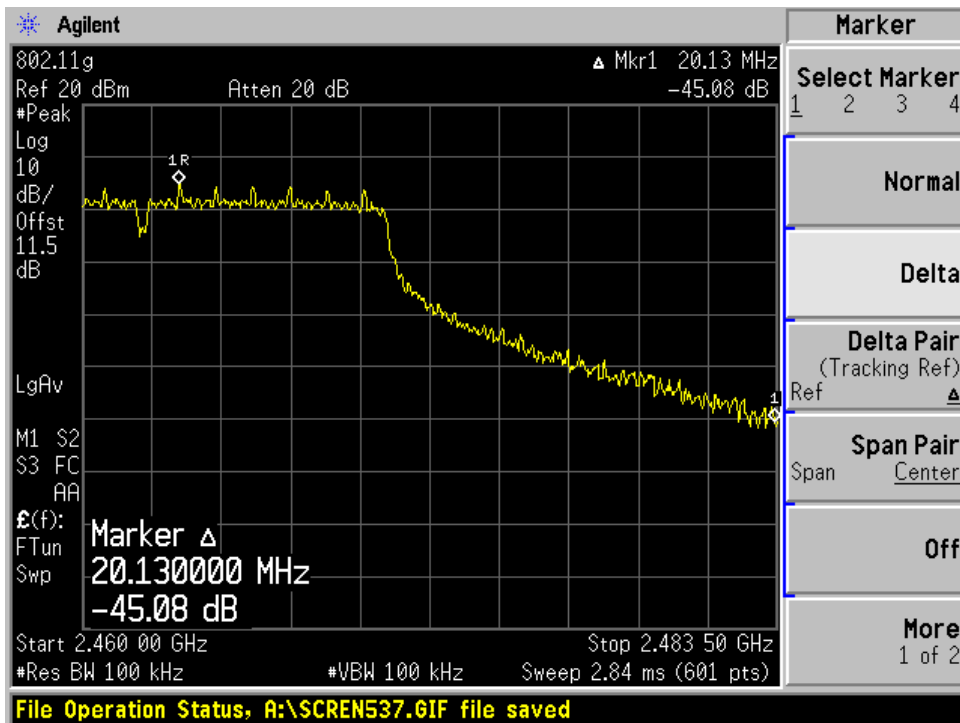


802.11g mode:

Low Channel



High Channel



## §15.247(d) - POWER SPECTRAL DENSITY

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### Standard Applicable

According to §15.247 (d), for direct sequence systems, the peak 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.

### 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 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.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
4. Repeat above procedures until all frequencies measured were complete.

### Equipment List

| Manufacturer | Description        | Model  | Serial Number | Cal. Date  |
|--------------|--------------------|--------|---------------|------------|
| Agilent      | Analyzer, Spectrum | E4446A | US44300386    | 2006-03-06 |

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

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 16° C     |
| Relative Humidity: | 55%       |
| ATM Pressure:      | 1024 mbar |

*\*The testing was performed by James Ma on 2006-05-24*

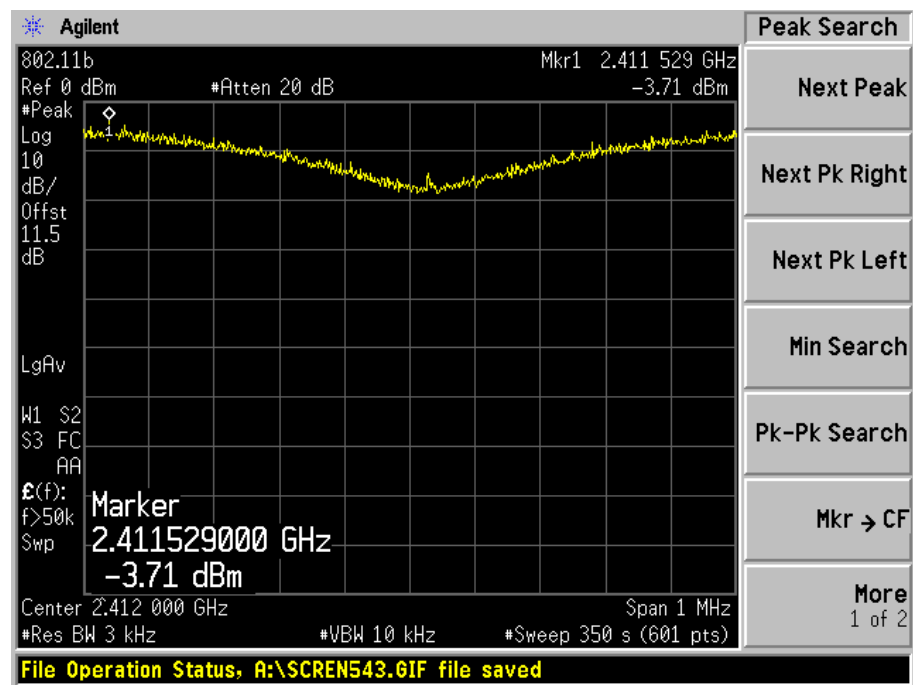
### Measurement Result

#### Test Result

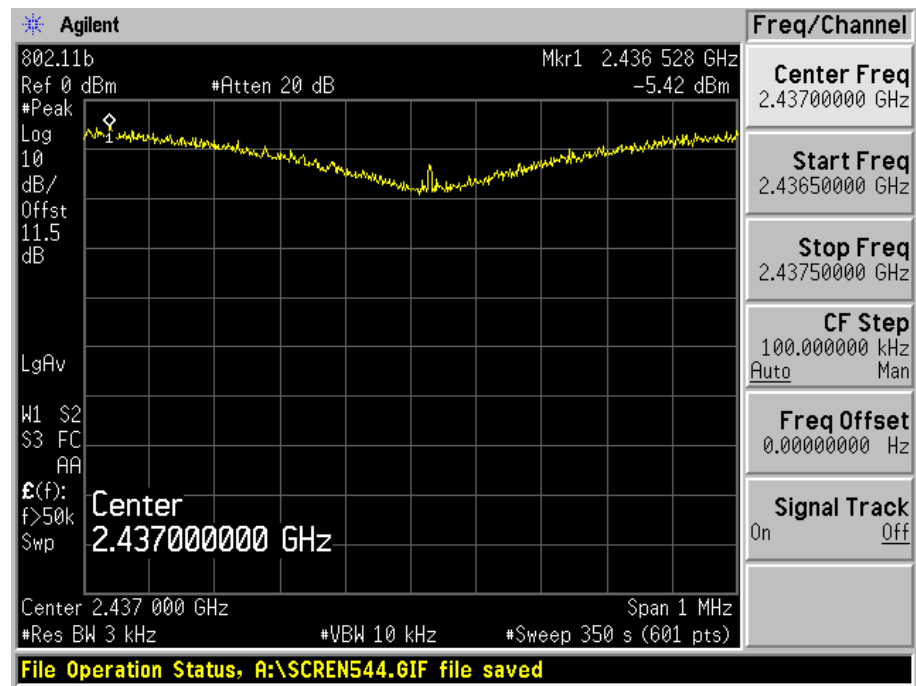
802.11b mode:

| Channel | Frequency<br>MHz | PSD<br>dBm/3KHz | Limit<br>dBm/3KHz |
|---------|------------------|-----------------|-------------------|
| Low     | 2412             | -3.71           | 8                 |
| Mid     | 2437             | -5.42           | 8                 |
| High    | 2462             | -4.45           | 8                 |

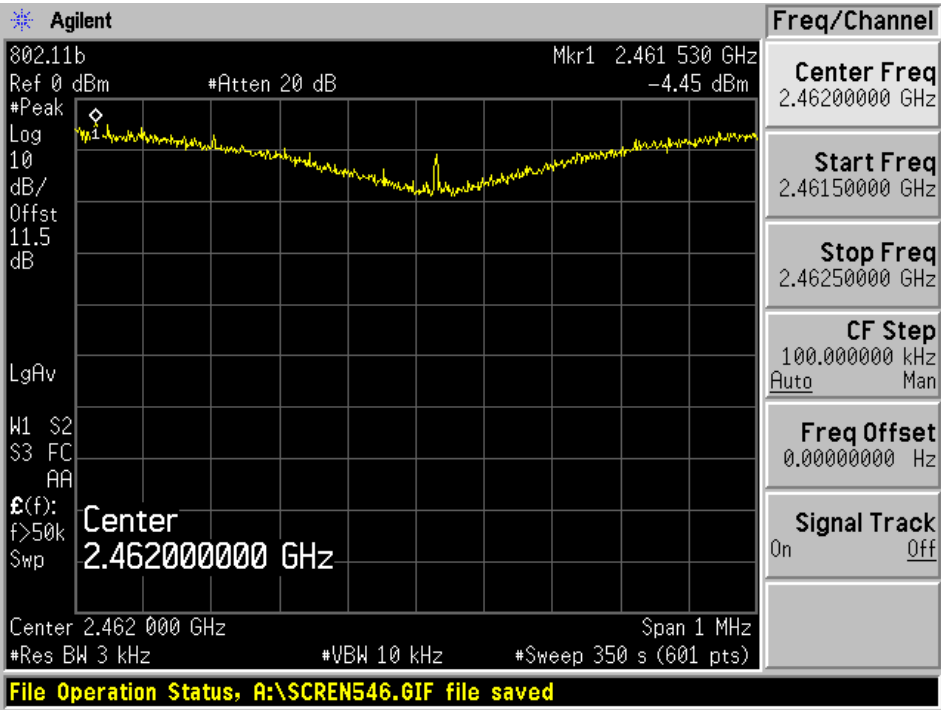
Low Channel



Mid. Channel



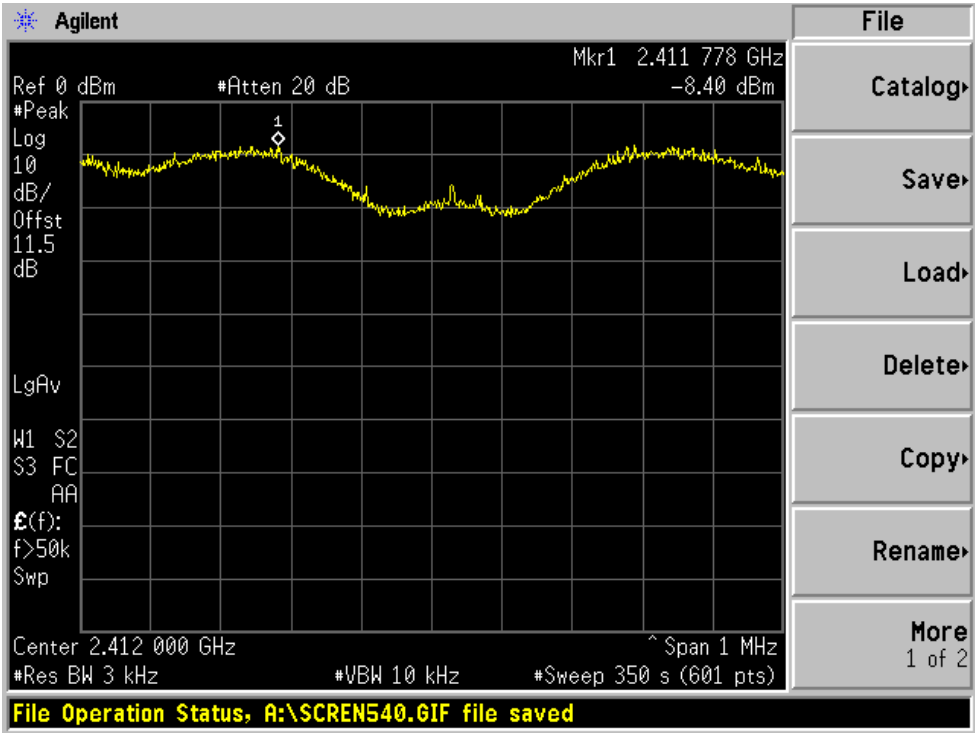
High Channel



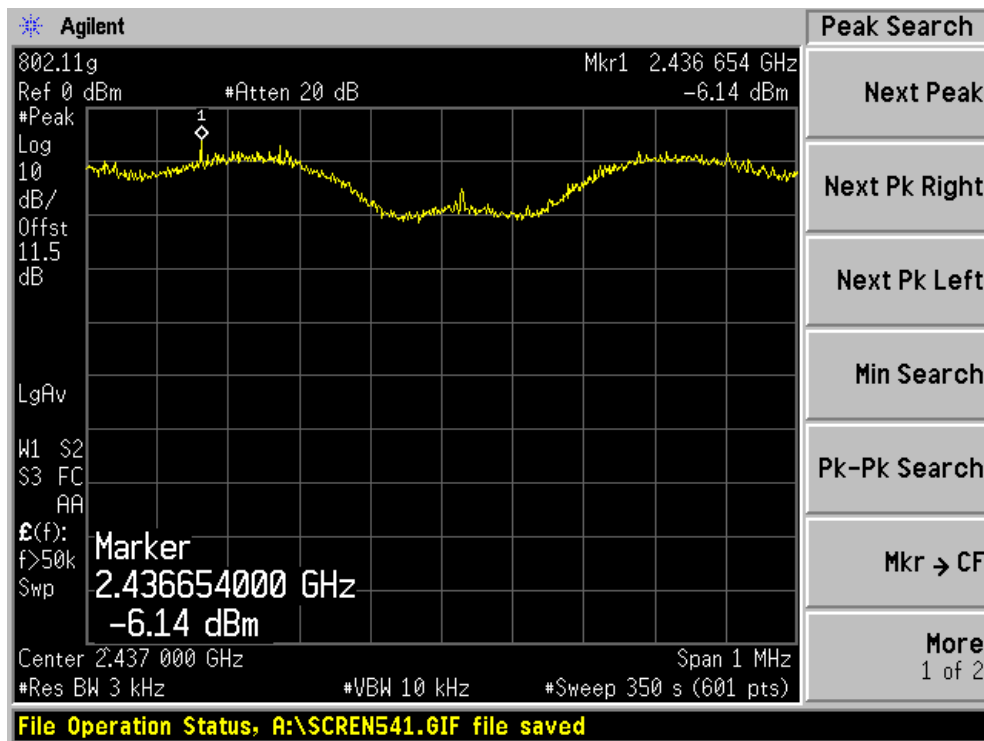
802.11g mode:

| Channel | Frequency<br>MHz | PSD<br>dBm/3KHz | Limit<br>dBm/3KHz |
|---------|------------------|-----------------|-------------------|
| Low     | 2412             | -8.40           | 8                 |
| Mid     | 2437             | -6.14           | 8                 |
| High    | 2462             | -7.93           | 8                 |

Low Channel



## Mid Channel



## High Channel

