



**FCC CFR47 PART 15 SUBPART C  
CERTIFICATION  
TEST REPORT**

**FOR**

**NOTEBOOK PC**

**MODEL NUMBER: NP-Q1**

**FCC ID: A3L-NP-Q1**

**REPORT NUMBER: 06I10115-1**

**ISSUE DATE: MARCH 21, 2006**

*Prepared for*

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
#416, MAETAN -3 DONG, PARDAL-GU  
SUWON CITY, GYEONGGI-DO 442-742  
KOREA

**EUT DESCRIPTION:** NOTEBOOK PC

**MODEL:** NP-Q1

**SERIAL NUMBER:** 625C1047762

**DATE TESTED:** FEBRUARY 22 – MARCH 15, 2006

| APPLICABLE STANDARDS  |                         |
|-----------------------|-------------------------|
| STANDARD              | TEST RESULTS            |
| FCC PART 15 SUBPART C | NO NON-COMPLIANCE NOTED |

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER                           | UNCERTAINTY    |
|-------------------------------------|----------------|
| Radiated Emission, 30 to 200 MHz    | +/- 3.3 dB     |
| Radiated Emission, 200 to 1000 MHz  | +4.5 / -2.9 dB |
| Radiated Emission, 1000 to 2000 MHz | +4.5 / -2.9 dB |
| Power Line Conducted Emission       | +/- 2.9 dB     |

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a notebook PC with 802.11b/g transceiver and BT module installed.

The WLAN transceiver radio module is manufactured by Atheros.

The BT radio module is manufactured by Broadcom. It is already certified under FCC ID: QDS-BRCM1018.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

2400 to 2483.5 MHz Authorized Band

| Frequency Range<br>(MHz) | Mode    | Output Power<br>(dBm) | Output Power<br>(mW) |
|--------------------------|---------|-----------------------|----------------------|
| 2412 - 2462              | 802.11b | 20.23                 | 105.44               |
| 2412 - 2462              | 802.11g | 24.00                 | 251.19               |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The WLAN radio utilizes either one of the following antennas:

1) PIFA Antenna:

Manufacturer: Amphenol KAE Co., Ltd.

P/N: SS-03-03-076

Peak gain with cable loss: 1.71dBi (2400-2500 MHz)

2) PIFA Antenna:

Manufacturer: HON HAI Precision Ind. Co., Ltd.

P/N: WDAN-S1SAT001-DF

Peak gain with cable loss: 1.67dBi (2400-2500 MHz)

## **5.4. SOFTWARE AND FIRMWARE**

The EUT driver software installed in the host support equipment during testing was art Wid=7105

The test utility software used during testing was Atheros ART 5.3.Build #11

## **5.5. WORST-CASE CONFIGURATION AND MODE**

EUT was tested in three orthogonal orientations to find out the worst orientation, the worst orientation was found out to be X orientation.

For the frequency range of 30 MHz to 25 GHz, radiated emissions, Low, Mid and High channels for both 11b and 11g modes were tested. Low channel was at 2412 MHz, Mid channel was at 2437 MHz, and high channel was at 2462 MHz.

For 11b mode, 1 Mbps data rate was selected. For 11g mode, 6 Mbps data rate was selected.

## 5.6. DESCRIPTION OF TEST SETUP

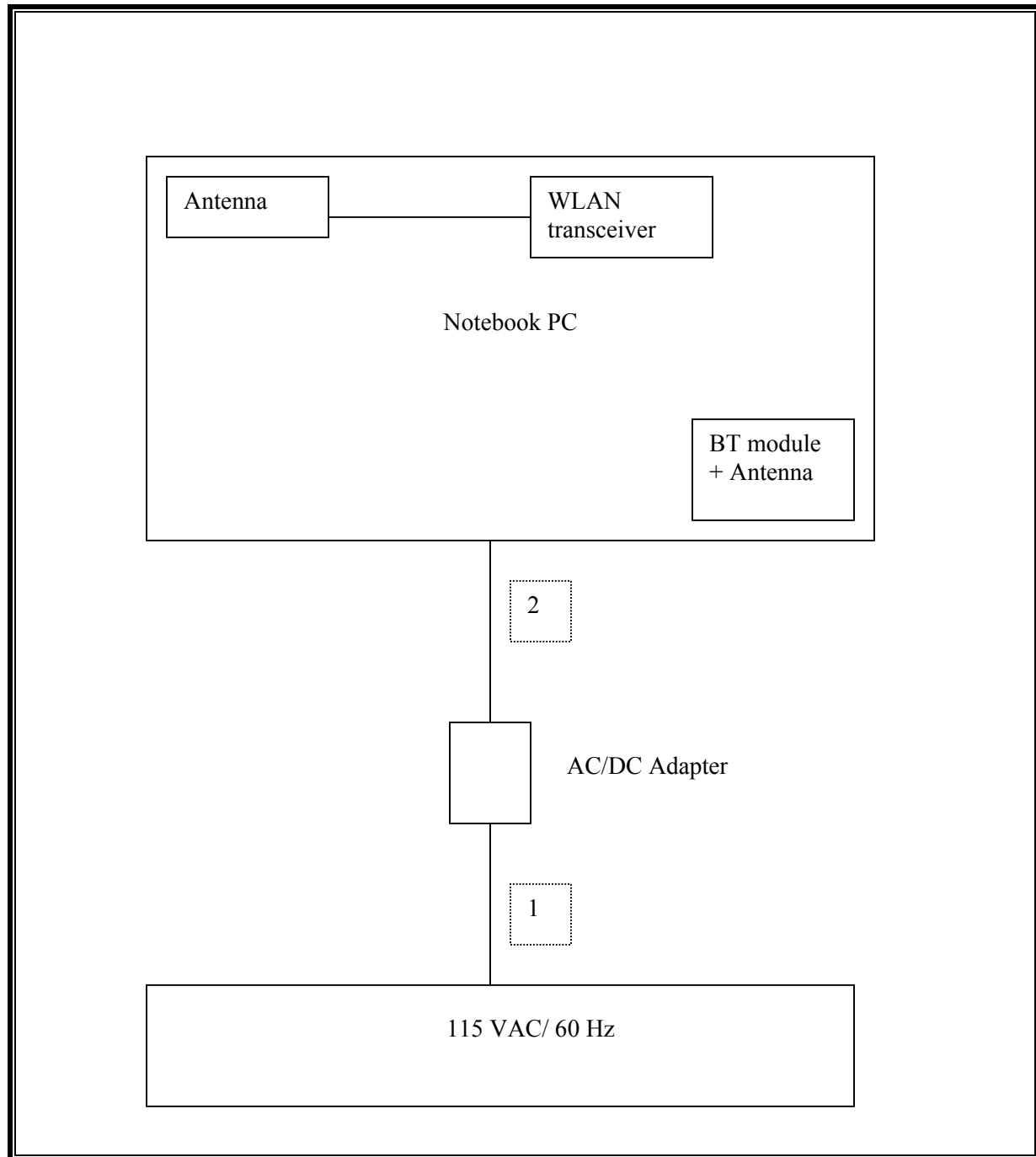
### COMPONENTS OF SYSTEM UNDER TEST

| COMPONENTS OF SYSTEM UNDER TEST |              |             |                         |              |
|---------------------------------|--------------|-------------|-------------------------|--------------|
| Description                     | Manufacturer | Model       | Serial Number           | FCC ID       |
| AC/DC Adapter                   | AcBel        | API1AD02    | CNBA4400162ABJ6F5CR0547 | DoC          |
| Laptop Computer                 | Samsung      | NP-Q1       | 467F93AYC00017W         | A3L-NP-Q1    |
| WLAN Transceiver                | Atheros      | AR5BXB61    | 625C1047762             | NA           |
| BT Module                       | Broadcom     | BCN92045NMD | 20050J0891              | QDS-BRCM1018 |

### I/O CABLES

| I/O CABLE LIST |      |                      |                |            |              |         |
|----------------|------|----------------------|----------------|------------|--------------|---------|
| Cable No.      | Port | # of Identical Ports | Connector Type | Cable Type | Cable Length | Remarks |
| 1              | AC   | 1                    | AC             | Unshielded | 1m           | N/A     |
| 2              | DC   | 1                    | DC             | Unshielded | 1.8m         | N/A     |

**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST              |                |                  |               |          |
|----------------------------------|----------------|------------------|---------------|----------|
| Description                      | Manufacturer   | Model            | Serial Number | Cal Due  |
| Spectrum Analyzer 3 Hz ~ 44 GHz  | Agilent        | E4446A           | US42070220    | 07/29/06 |
| Antenna, Horn 1 ~ 18 GHz         | EMCO           | 3115             | 2238          | 04/22/06 |
| Preamplifier, 1 ~ 26.5 GHz       | Agilent        | 8449B            | 3008A00561    | 10/03/07 |
| Antenna, Horn 18 ~ 26 GHz        | ARA            | MWH-1826/B       | 1049          | 09/12/06 |
| Power Meter                      | HP             | 437B             | 3125U11347    | 04/18/07 |
| Power Sensor                     | HP             | 8481A            | 2702A66876    | 01/11/07 |
| Antenna, Bilog 30 MHz ~ 2 GHz    | Sunol Sciences | JB1              | A121003       | 09/03/06 |
| EMI Receiver, 9 kHz ~ 2.9 GHz    | HP             | 8542E            | 3942A00286    | 02/04/07 |
| RF Filter Section                | HP             | 85420E           | 3705A00256    | 02/04/07 |
| EMI Test Receiver                | R & S          | ESHS 20          | 827129/006    | 06/03/06 |
| LISN, 10 kHz ~ 30 MHz            | FCC            | LISN-50/250-25-2 | 2023          | 08/30/06 |
| (2.4-2.5) GHz Band Reject Filter | MicroTronics   | BRM50702         | 001           | C.N.R    |

## 7. LIMITS AND RESULTS

### 7.1. CHANNEL TESTS FOR THE 2400 TO 2483.5 MHz BAND

#### 7.1.1. 6 dB BANDWIDTH

##### LIMIT

§15.247 (a) (2) For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

##### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

##### RESULTS

No non-compliance noted:

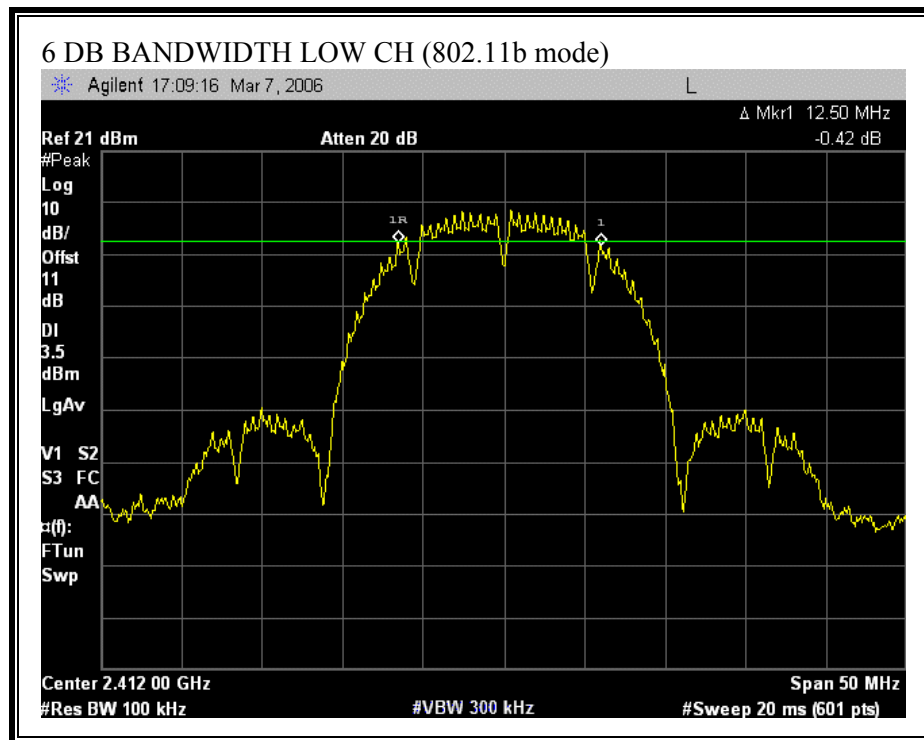
##### 802.11b Mode

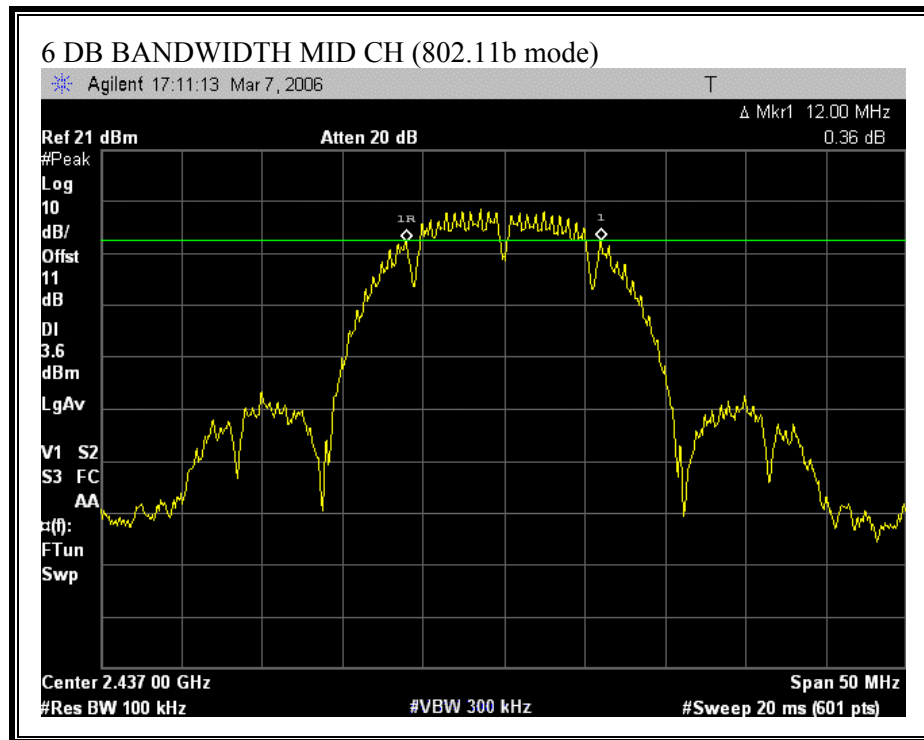
| Channel | Frequency<br>(MHz) | 6 dB Bandwidth<br>(kHz) | Minimum Limit<br>(kHz) | Margin<br>(kHz) |
|---------|--------------------|-------------------------|------------------------|-----------------|
| Low     | 2412               | 12500                   | 500                    | 12000           |
| Middle  | 2437               | 12000                   | 500                    | 11500           |
| High    | 2462               | 12500                   | 500                    | 12000           |

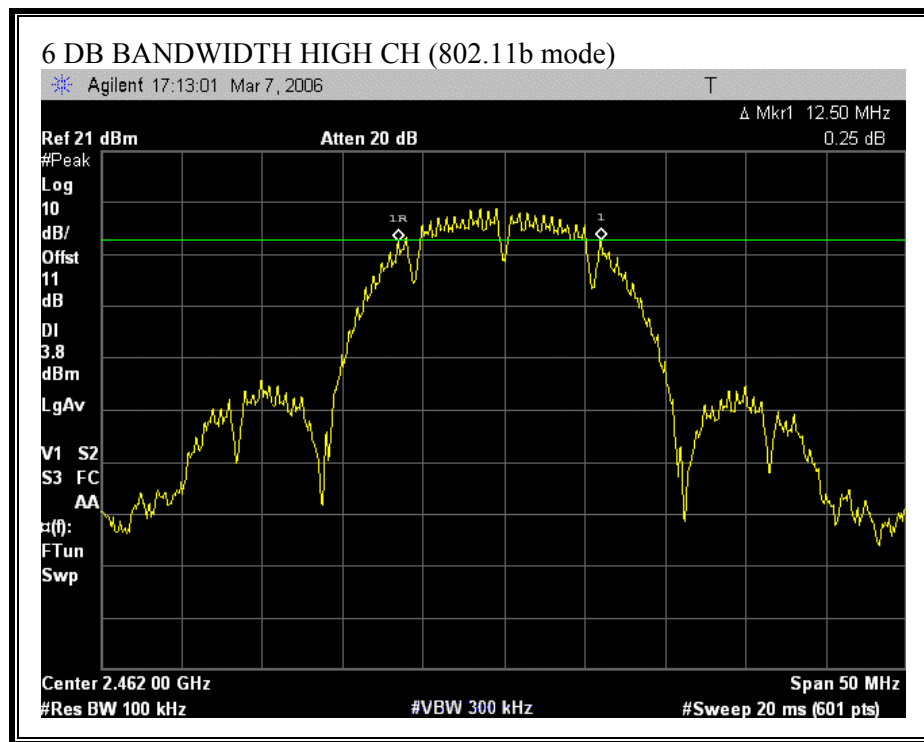
##### 802.11g Mode

| Channel | Frequency<br>(MHz) | 6 dB Bandwidth<br>(kHz) | Minimum Limit<br>(kHz) | Margin<br>(kHz) |
|---------|--------------------|-------------------------|------------------------|-----------------|
| Low     | 2412               | 16580                   | 500                    | 16080           |
| Middle  | 2437               | 16420                   | 500                    | 15920           |
| High    | 2462               | 16580                   | 500                    | 16080           |

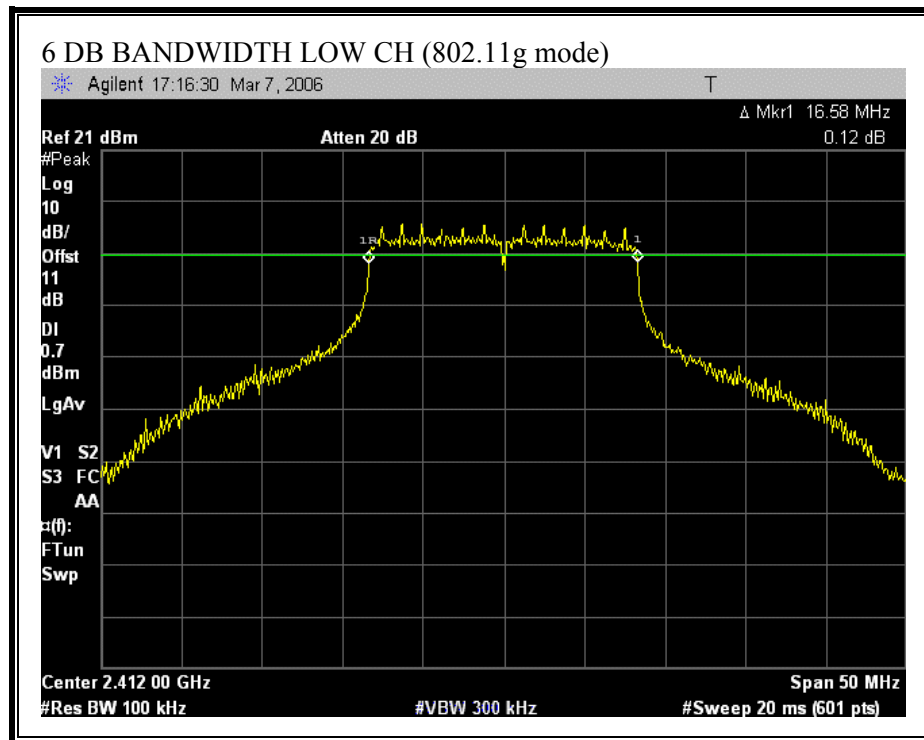
**6 DB BANDWIDTH (802.11b MODE)**

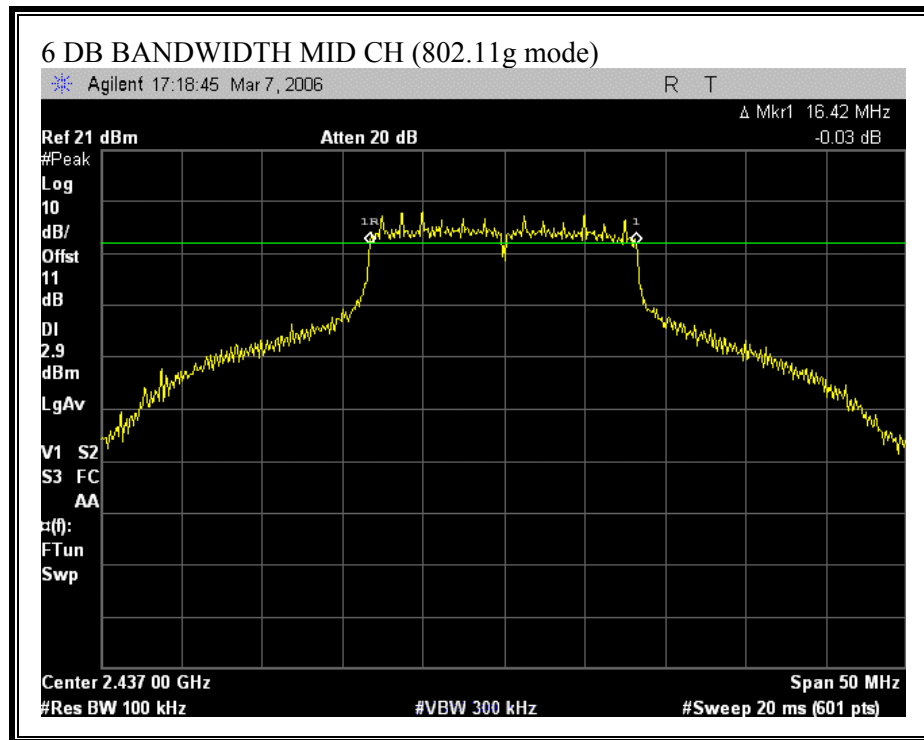


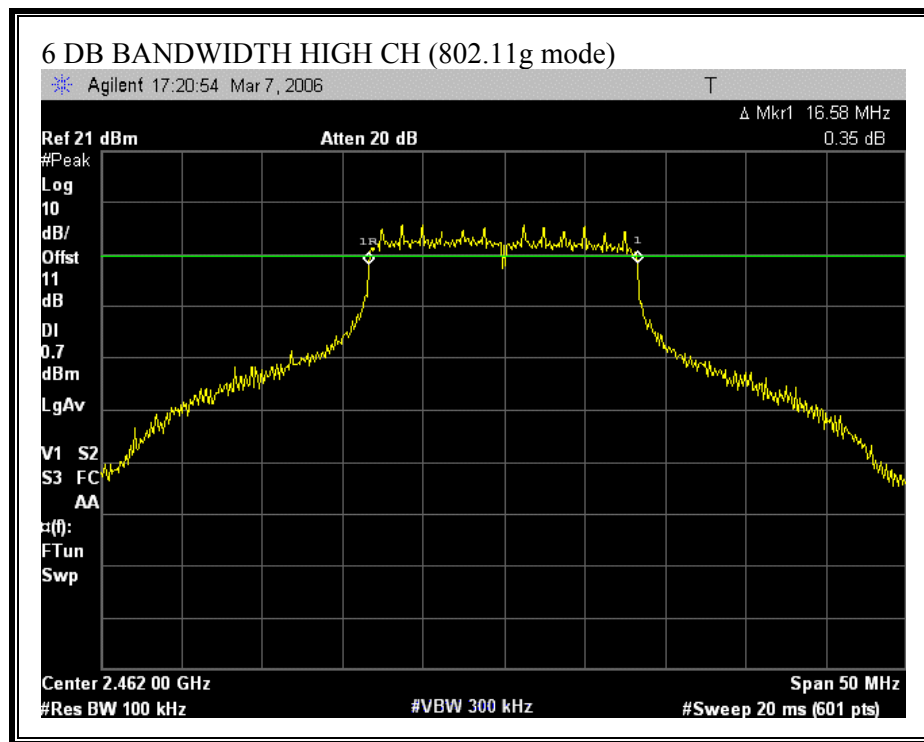




**6 DB BANDWIDTH (802.11g MODE)**







### 7.1.2. 99% BANDWIDTH

#### LIMIT

None: for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

#### RESULTS

No non-compliance noted:

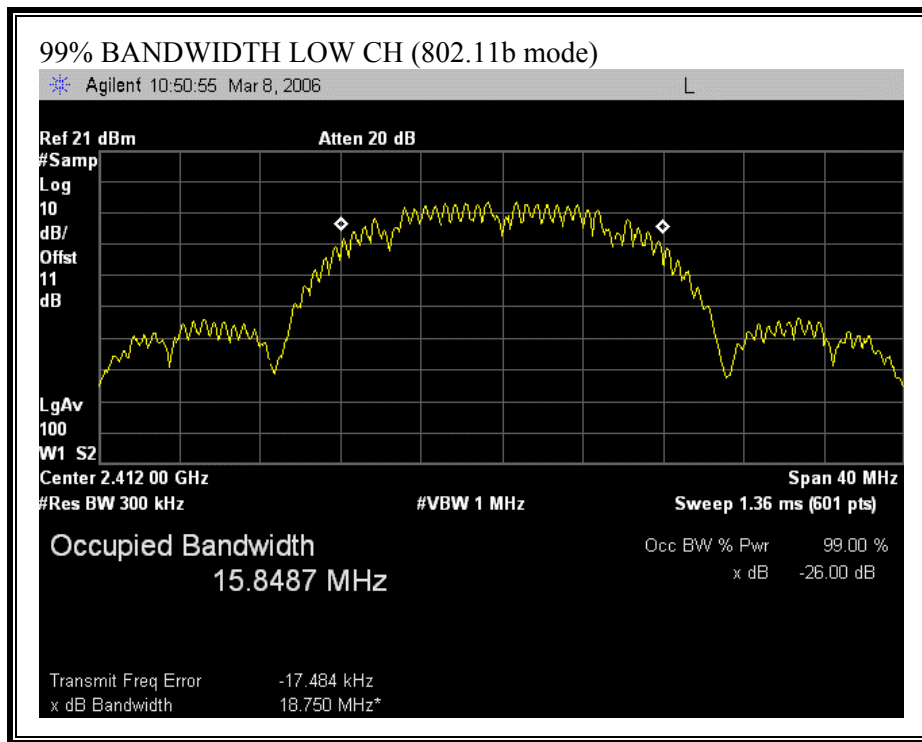
##### 802.11b Mode

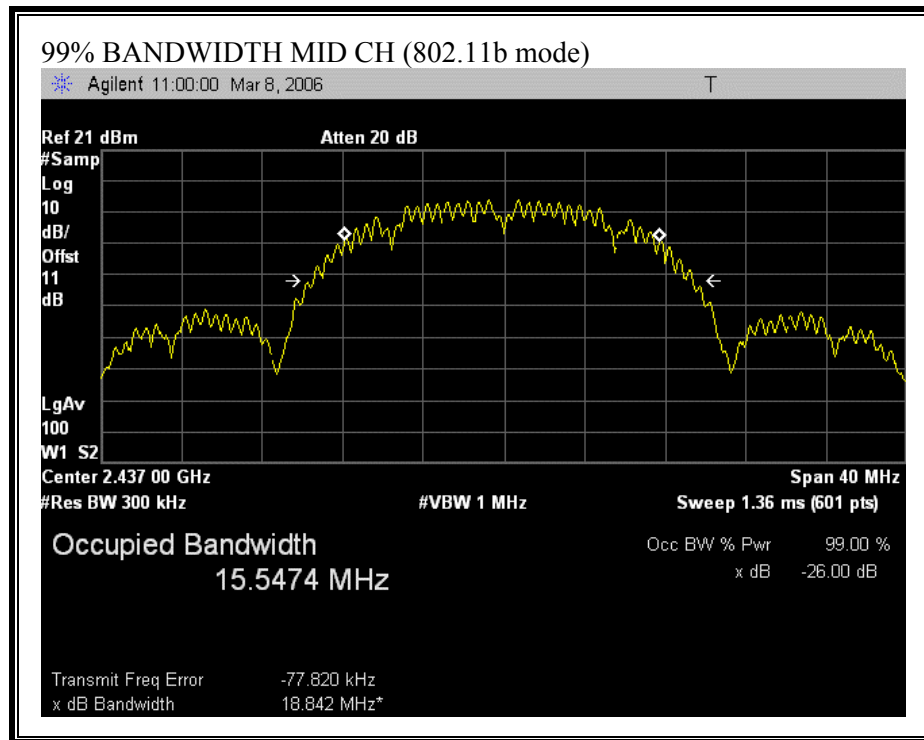
| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|
| Low     | 2412               | 15.8487                |
| Middle  | 2437               | 15.5474                |
| High    | 2462               | 15.6003                |

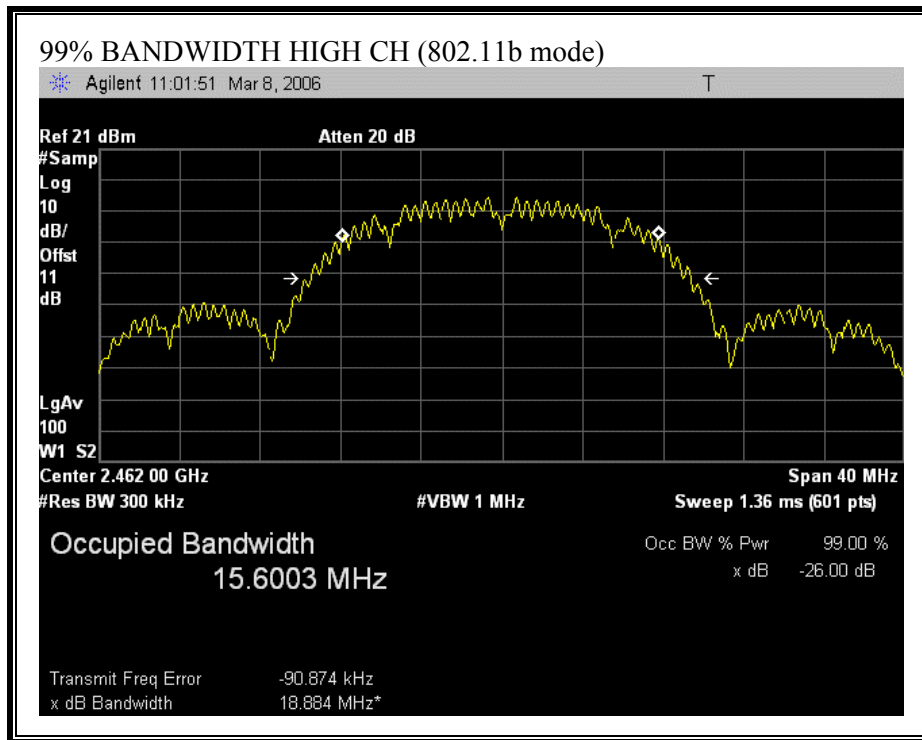
##### 802.11g Mode

| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|
| Low     | 2412               | 16.5068                |
| Middle  | 2437               | 16.5947                |
| High    | 2462               | 16.5288                |

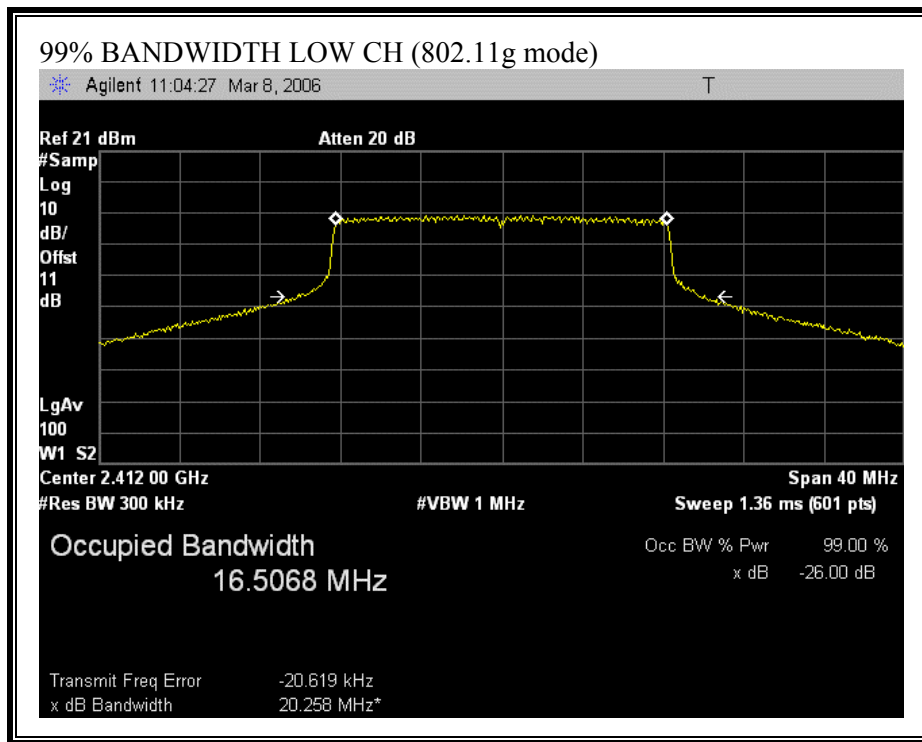
**99% BANDWIDTH (802.11b MODE)**

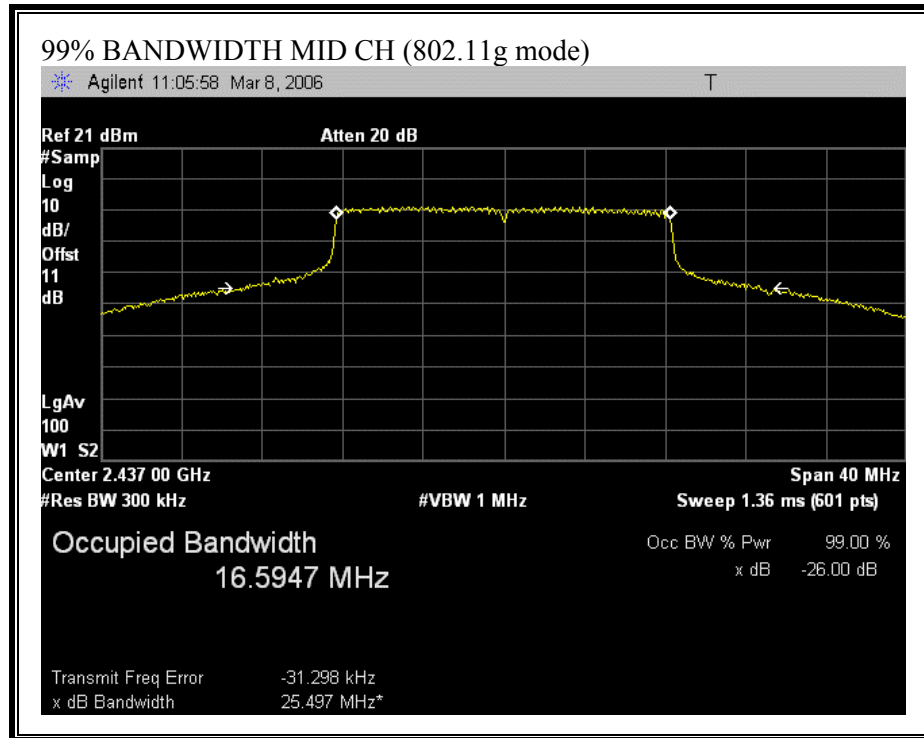


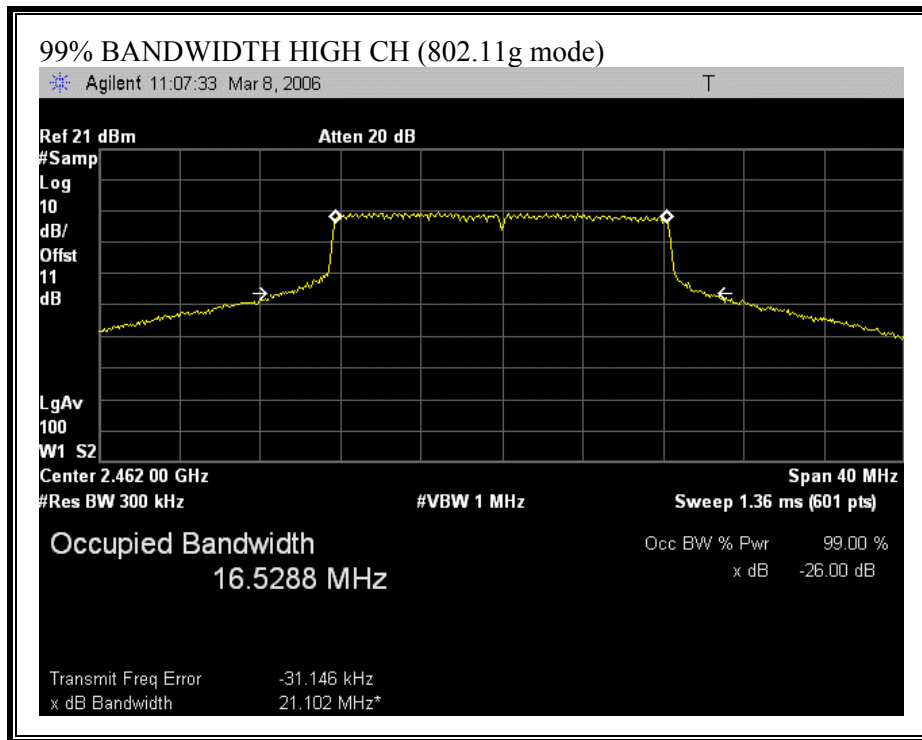




**99% BANDWIDTH (802.11g MODE)**







### **7.1.3. PEAK OUTPUT POWER**

#### **PEAK POWER LIMIT**

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz , and 5725-5850 MHz bands: 1 watt.

§15.247 (b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz , and 5725-5850 MHz bands: 1 watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

§15.247 (b) (4) (i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

#### **TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer and the analyzer's internal channel power integration function is used to integrate the power over a bandwidth greater than or equal to the 99% bandwidth.

## **RESULTS**

The maximum antenna gain is 1.71 dBi for other than fixed, point-to-point operations; therefore the limit is 30 dBm.

No non-compliance noted:

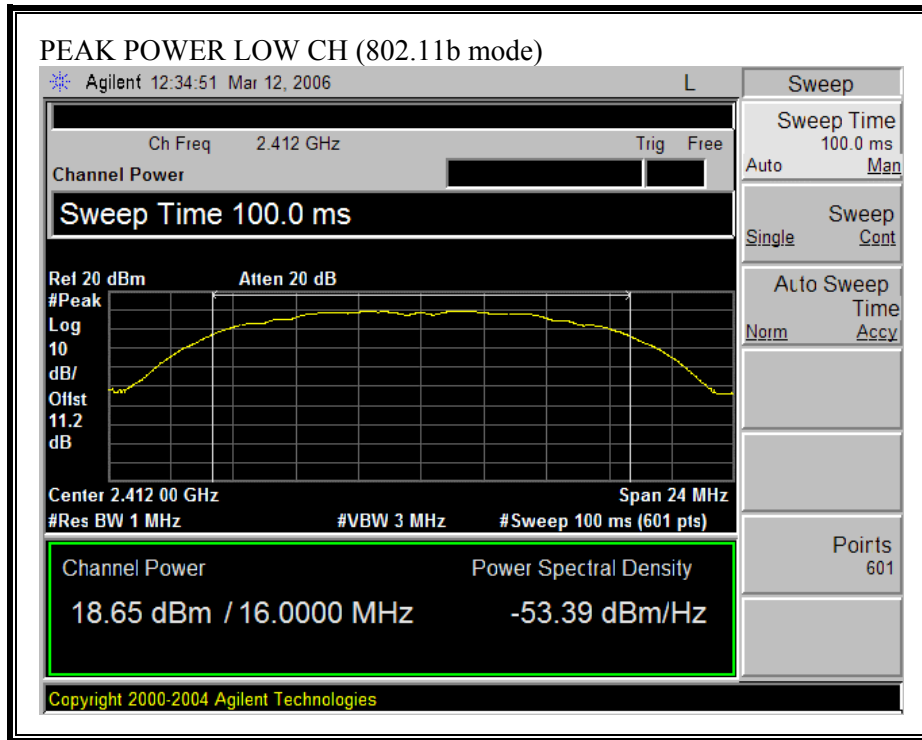
### 802.11b Mode

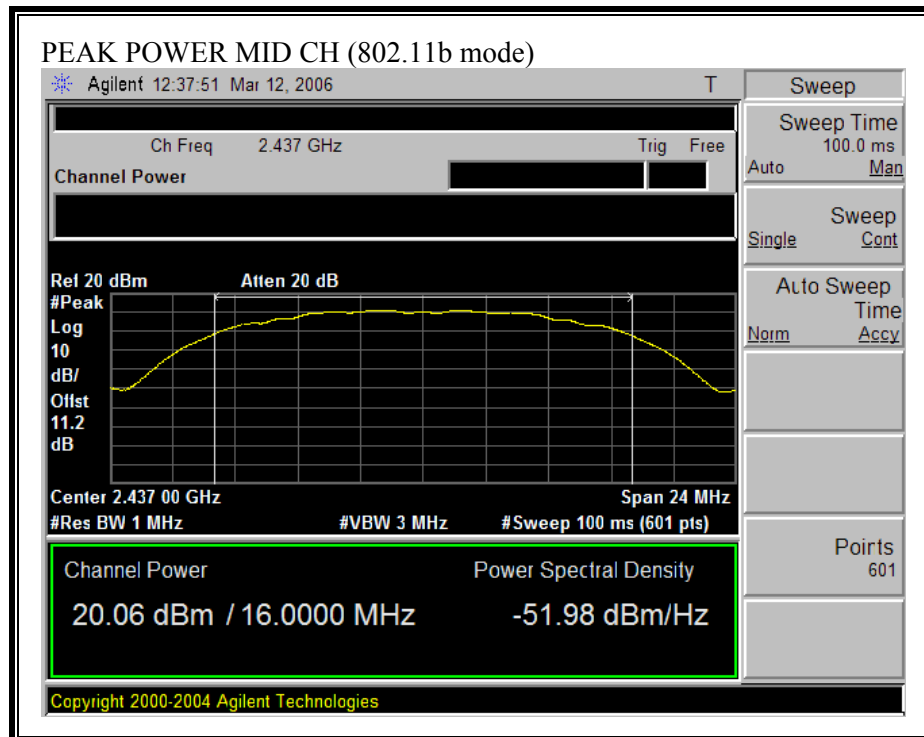
| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Peak Power<br/>(dBm)</b> | <b>Limit<br/>(dBm)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|-----------------------------|------------------------|------------------------|
| Low            | 2412                       | 18.65                       | 30                     | -11.35                 |
| Middle         | 2437                       | 20.08                       | 30                     | -9.92                  |
| High           | 2462                       | 20.23                       | 30                     | -9.77                  |

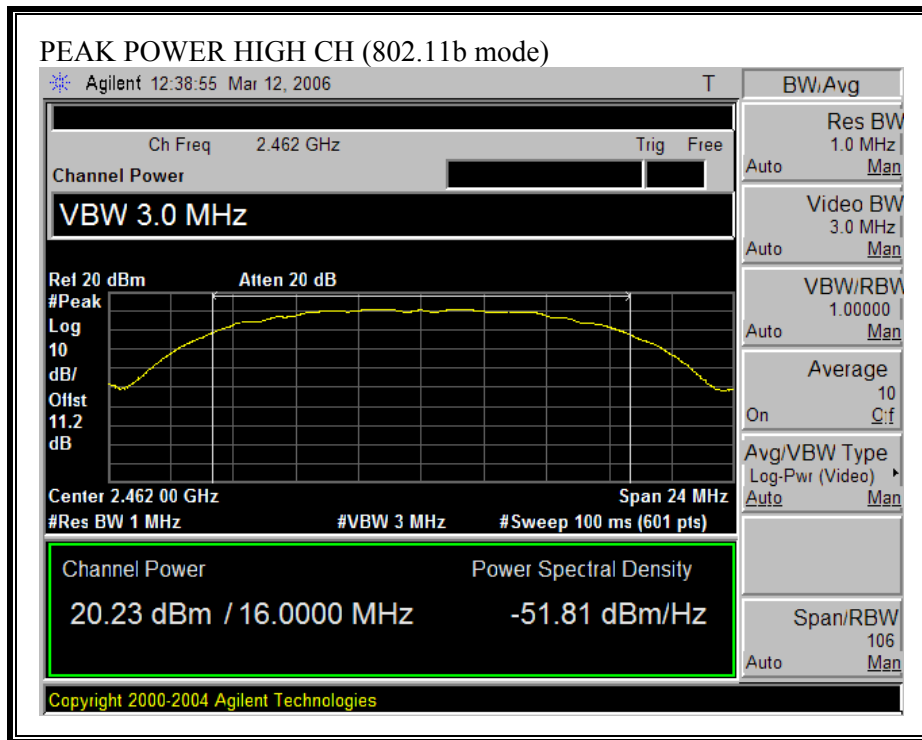
### 802.11g Mode

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Peak Power<br/>(dBm)</b> | <b>Limit<br/>(dBm)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|-----------------------------|------------------------|------------------------|
| Low            | 2412                       | 22.91                       | 30                     | -7.09                  |
| Middle         | 2437                       | 23.84                       | 30                     | -6.16                  |
| High           | 2462                       | 24.00                       | 30                     | -6.00                  |

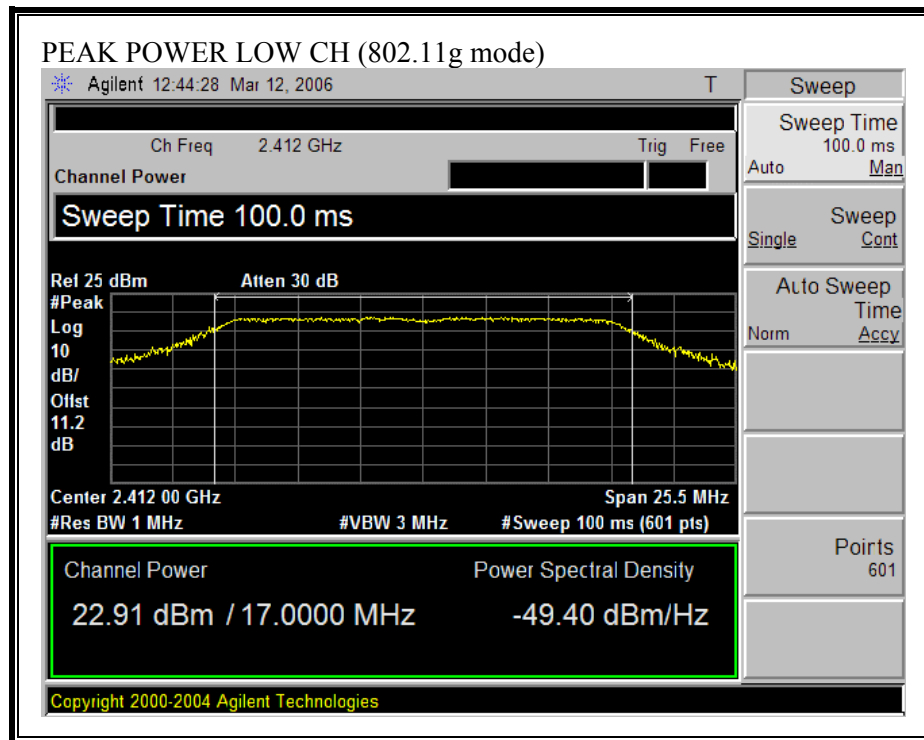
**OUTPUT POWER (802.11b MODE)**

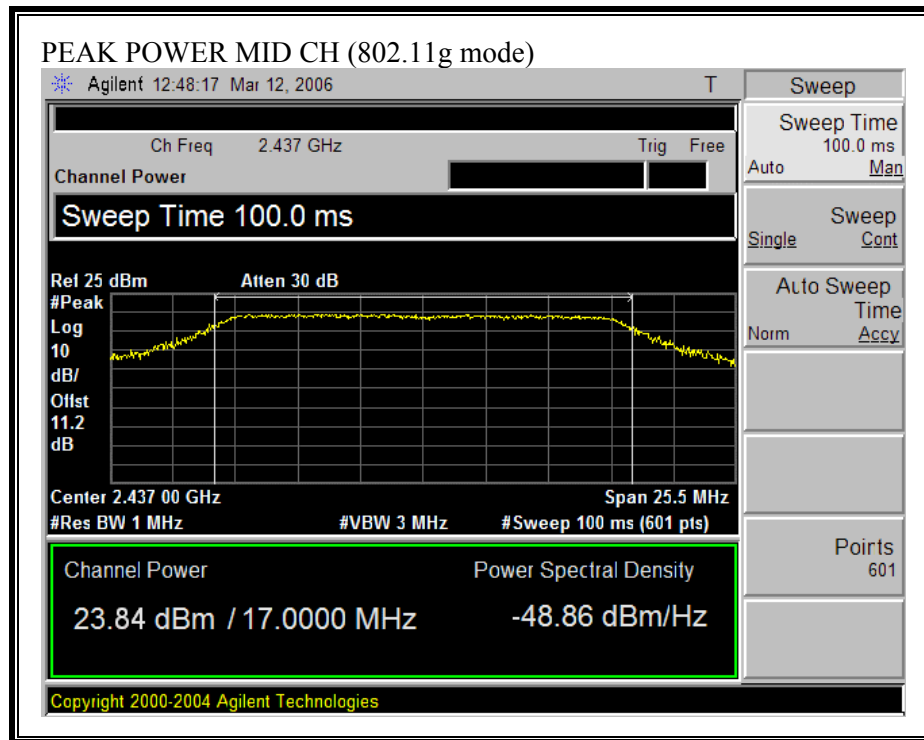


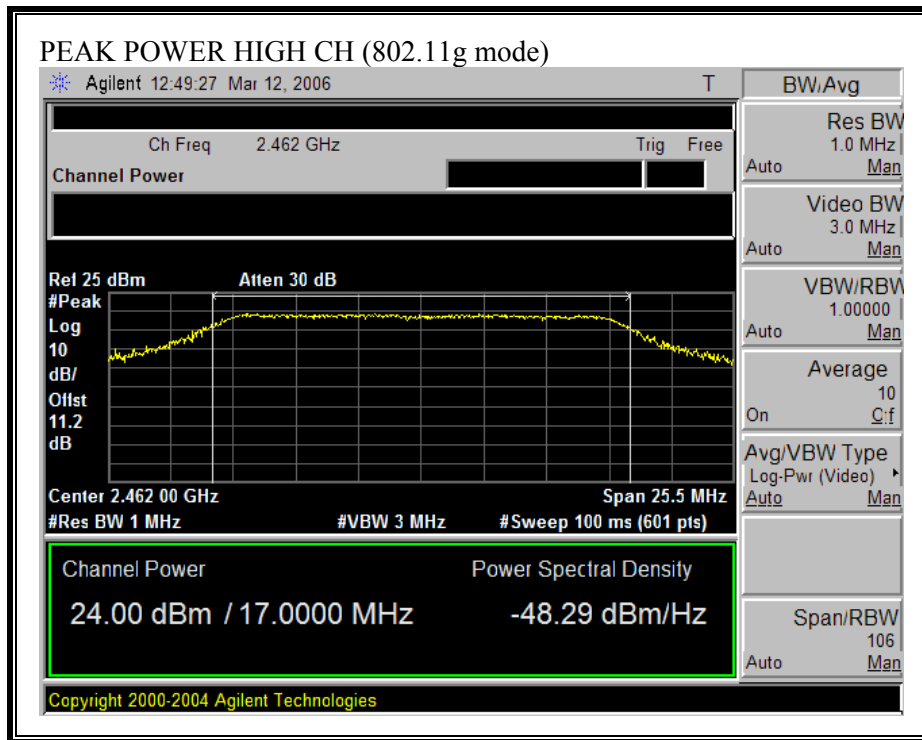




**OUTPUT POWER (802.11g MODE)**







## 7.1.4. MAXIMUM PERMISSIBLE EXPOSURE

### LIMITS

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

| Frequency range (MHz)                                   | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|---------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (A) Limits for Occupational/Controlled Exposures        |                               |                               |                                     |                          |
| 0.3–3.0 .....                                           | 614                           | 1.63                          | *(100)                              | 6                        |
| 3.0–30 .....                                            | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | 6                        |
| 30–300 .....                                            | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300–1500 .....                                          | .....                         | .....                         | f/300                               | 6                        |
| 1500–100,000 .....                                      | .....                         | .....                         | 5                                   | 6                        |
| (B) 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                       |

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

| Frequency range (MHz) | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|-----------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| 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

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

## **CALCULATIONS**

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:

$$d = \sqrt{((30 * P * G) / (3770 * S))}$$

Changing to units of Power to mW and Distance to cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

yields

$$d = 100 * \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$$

$$d = 0.282 * \sqrt{(P * G / S)}$$

where

d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW/cm<sup>2</sup>

Substituting the logarithmic form of power and gain using:

$$P \text{ (mW)} = 10^{(P \text{ (dBm)} / 10)} \text{ and}$$

$$G \text{ (numeric)} = 10^{(G \text{ (dBi)} / 10)}$$

yields

$$d = 0.282 * 10^{((P + G) / 20)} / \sqrt{S}$$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm<sup>2</sup>

Rearranging terms to calculate the power density at a specific distance yields

$$S = 0.0795 * 10^{((P + G) / 10)} / (d^2)$$

## **LIMITS**

From §1.1310 Table 1 (B), the maximum value of  $S = 1.0 \text{ mW/cm}^2$

## **RESULTS**

No non-compliance noted: (MPE distance equals 20 cm)

| Mode    | MPE Distance (cm) | Output Power (dBm) | Antenna Gain (dBi) | Power Density ( $\text{mW/cm}^2$ ) |
|---------|-------------------|--------------------|--------------------|------------------------------------|
| 802.11b | 20.0              | 20.23              | 1.71               | 0.03                               |
| 802.11g | 20.0              | 24.00              | 1.71               | 0.07                               |

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

### 7.1.5. AVERAGE POWER

#### AVERAGE POWER LIMIT

None: for reporting purposes only.

#### TEST PROCEDURE

The transmitter output is connected to a power meter.

#### RESULTS

No non-compliance noted:

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

#### 802.11b Mode

| Channel | Frequency<br>(MHz) | Power<br>(dBm) |
|---------|--------------------|----------------|
| Low     | 2412               | 14.95          |
| Middle  | 2437               | 16.90          |
| High    | 2462               | 17.00          |

#### 802.11g Mode

| Channel | Frequency<br>(MHz) | Power<br>(dBm) |
|---------|--------------------|----------------|
| Low     | 2412               | 15.20          |
| Middle  | 2437               | 16.90          |
| High    | 2462               | 16.03          |

### 7.1.6. PEAK POWER SPECTRAL DENSITY

#### LIMIT

§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.

#### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer, the maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3 kHz and VBW > 3 kHz, sweep time = span / 3 kHz, and video averaging is turned off. The PPSD is the highest level found across the emission in any 3 kHz band.

#### RESULTS

No non-compliance noted:

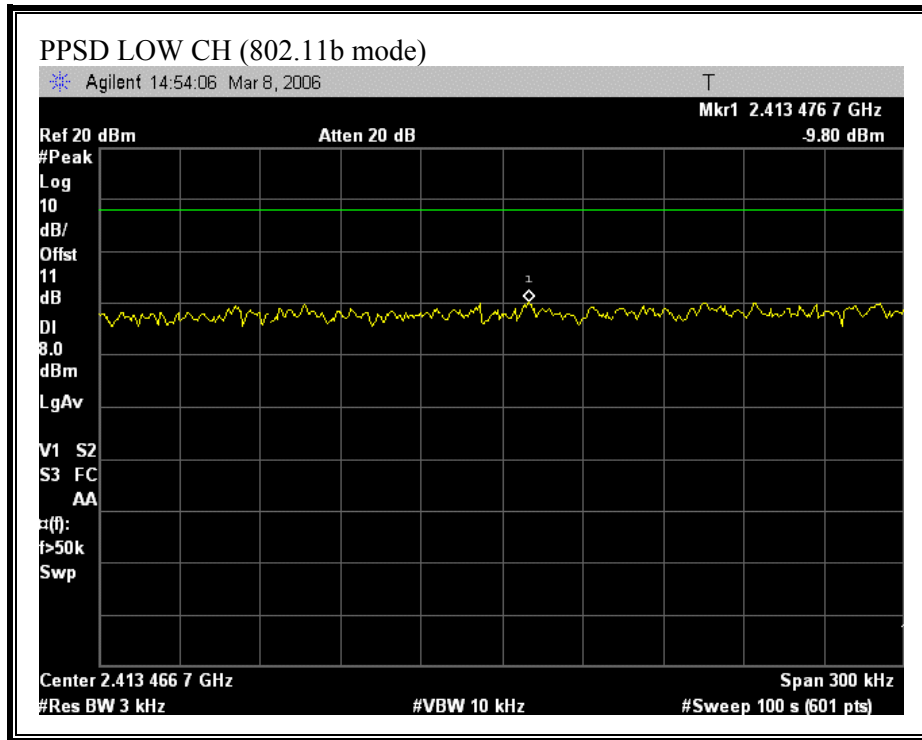
##### 802.11b Mode

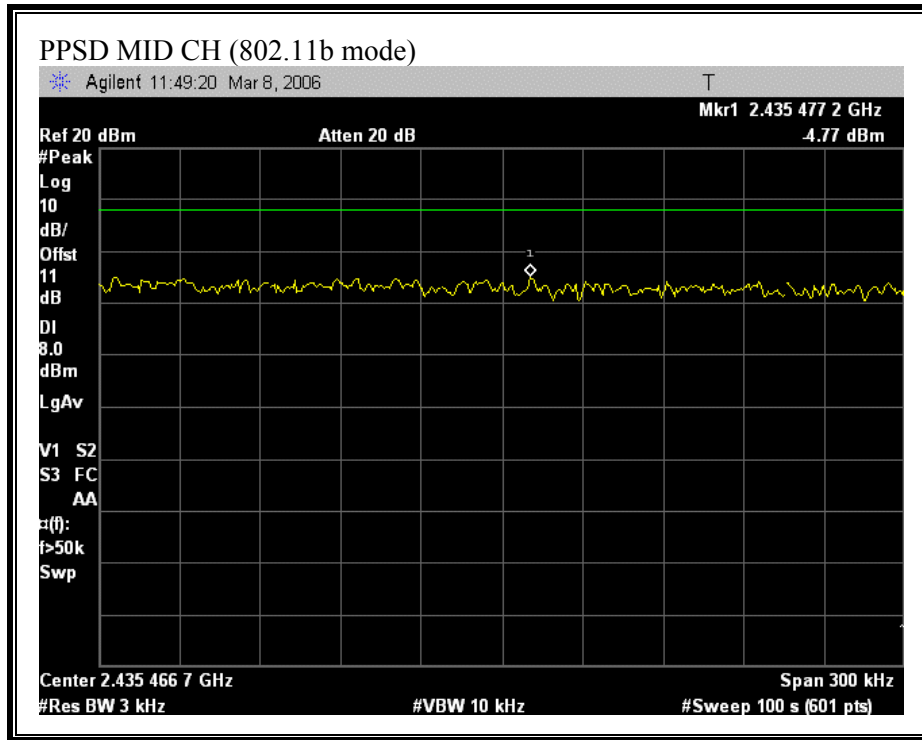
| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|------------|-------------|-------------|
| Low     | 2412            | -9.80      | 8           | -17.80      |
| Middle  | 2437            | -4.77      | 8           | -12.77      |
| High    | 2462            | -2.98      | 8           | -10.98      |

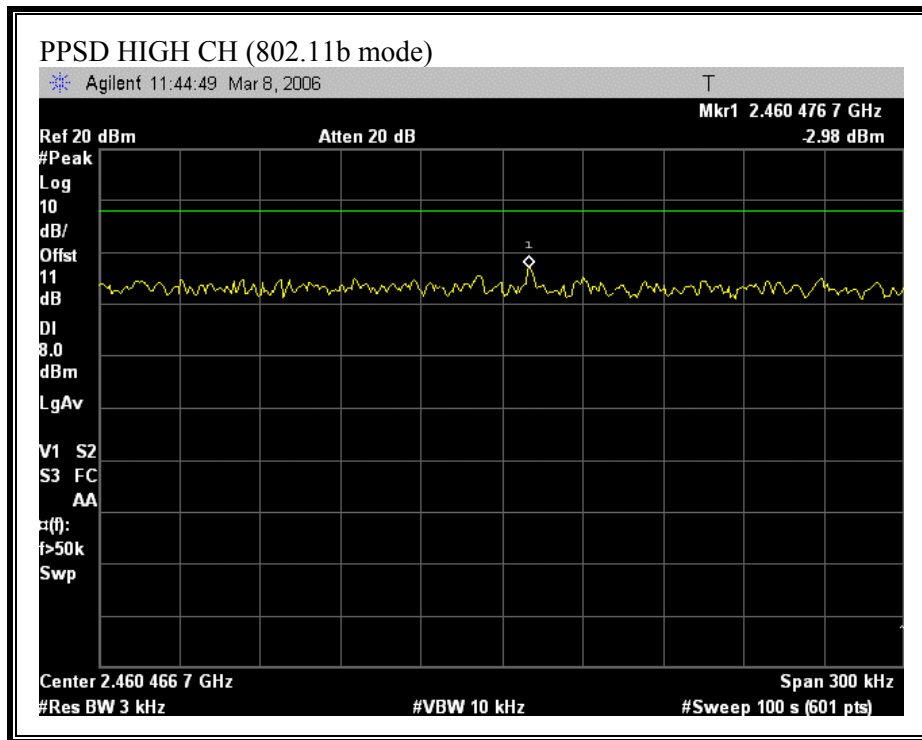
##### 802.11g Mode

| Channel | Frequency (MHz) | PPSD (dBm) | Limit (dBm) | Margin (dB) |
|---------|-----------------|------------|-------------|-------------|
| Low     | 2412            | -5.70      | 8           | -13.70      |
| Middle  | 2437            | -2.51      | 8           | -10.51      |
| High    | 2462            | -5.73      | 8           | -13.73      |

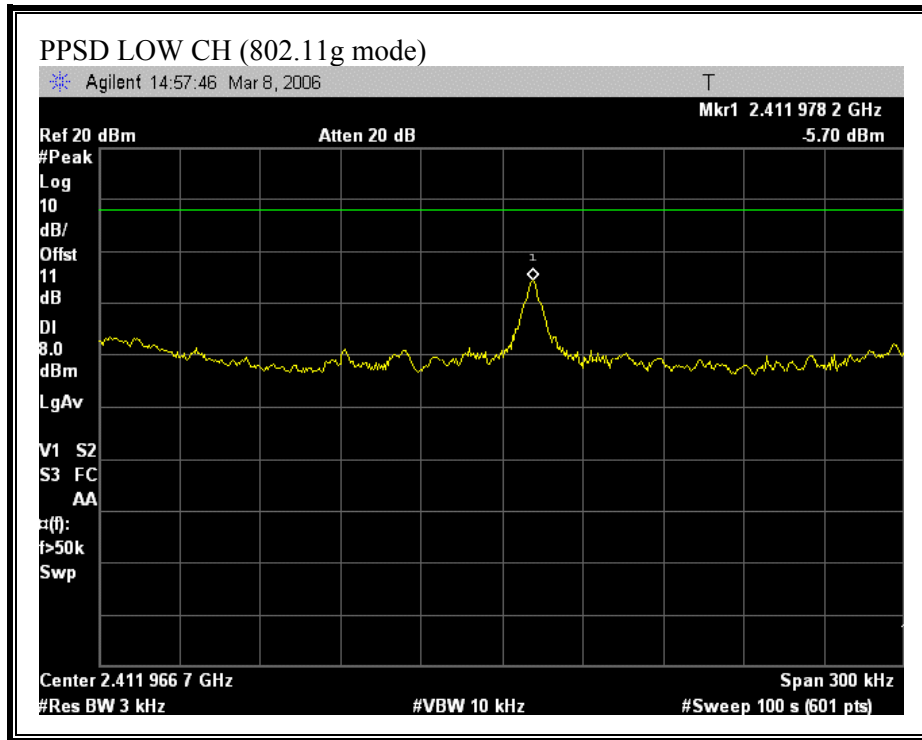
**PEAK POWER SPECTRAL DENSITY (802.11b MODE)**

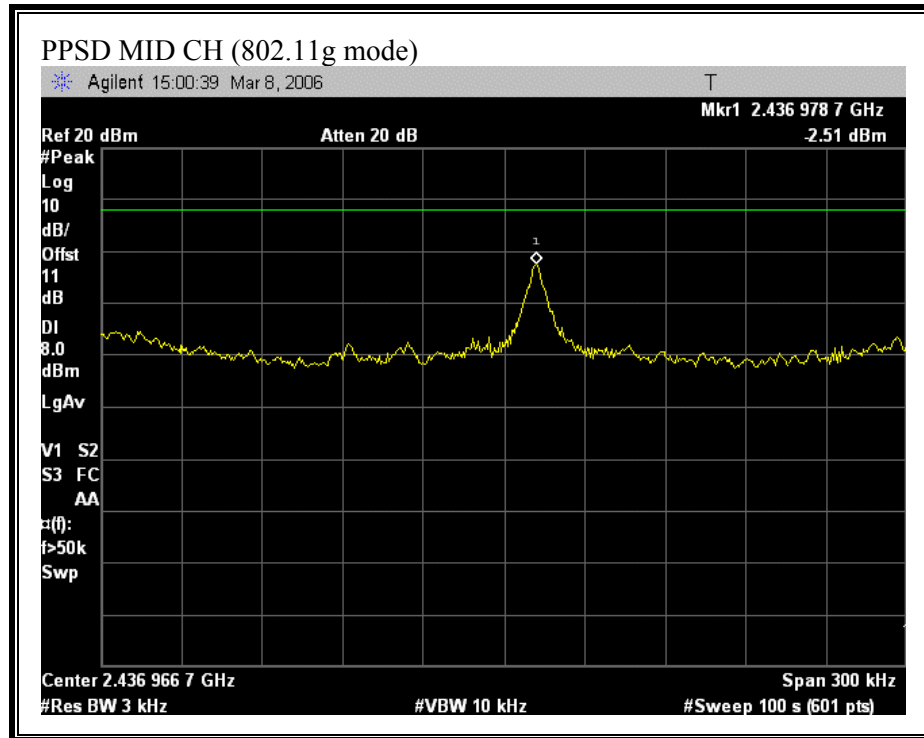


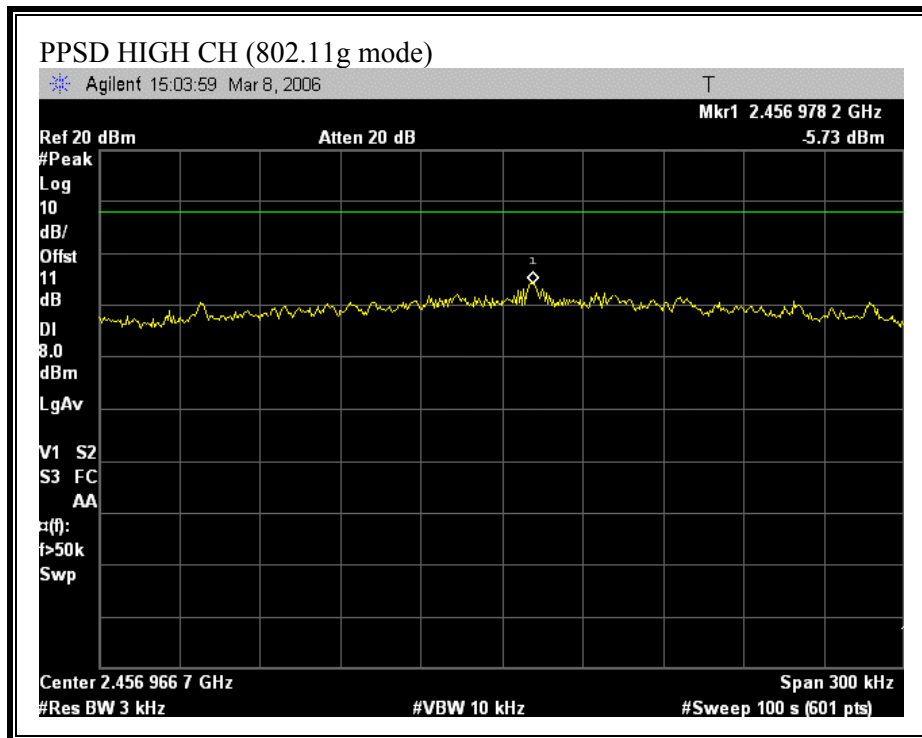




**PEAK POWER SPECTRAL DENSITY (802.11g MODE)**







## 7.1.7. CONDUCTED SPURIOUS EMISSIONS

### **LIMITS**

§15.247 (c) In any 100 kHz bandwidth outside the frequency band 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. 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)).

Conducted power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

### **TEST PROCEDURE**

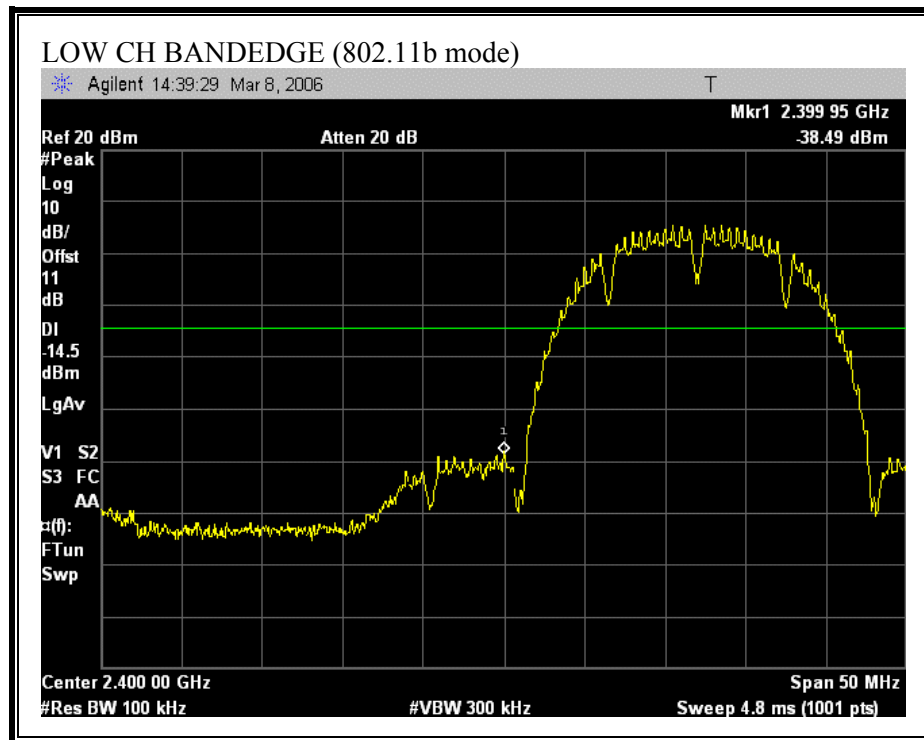
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

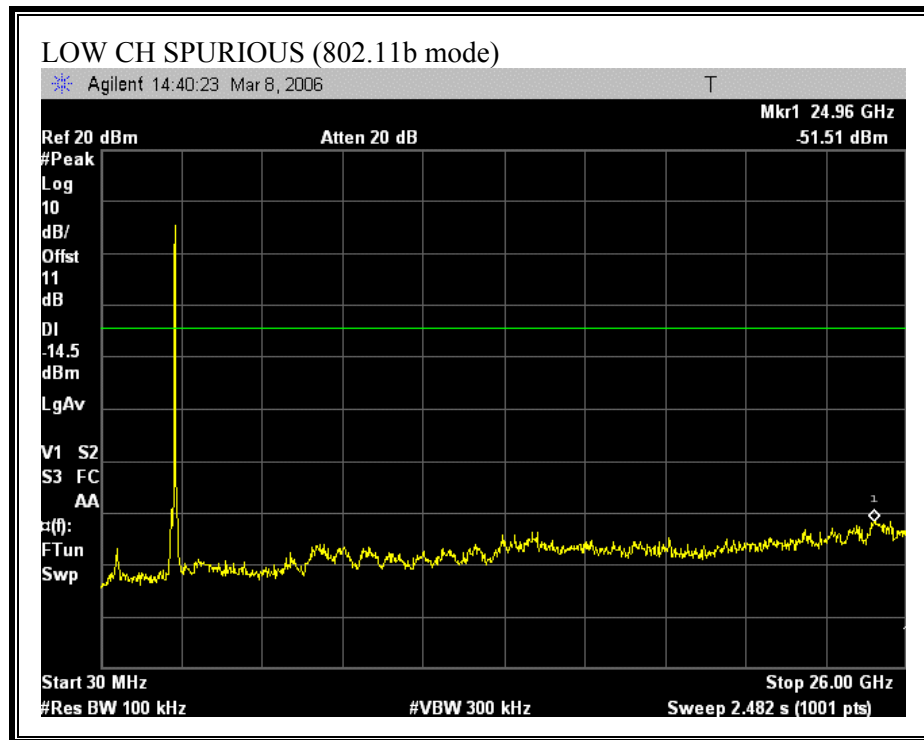
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

### **RESULTS**

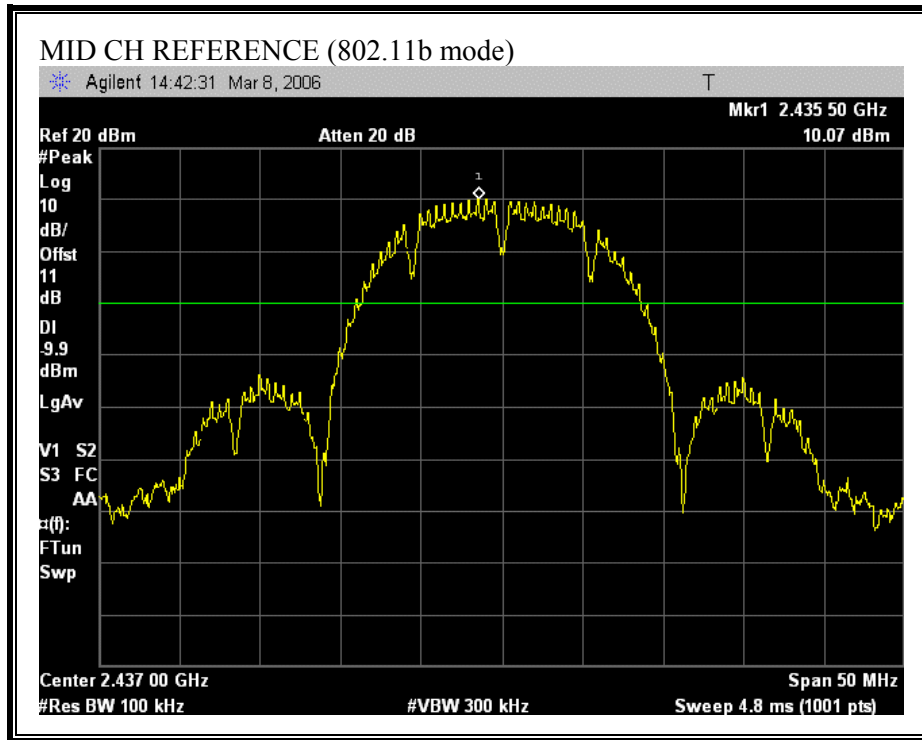
No non-compliance noted:

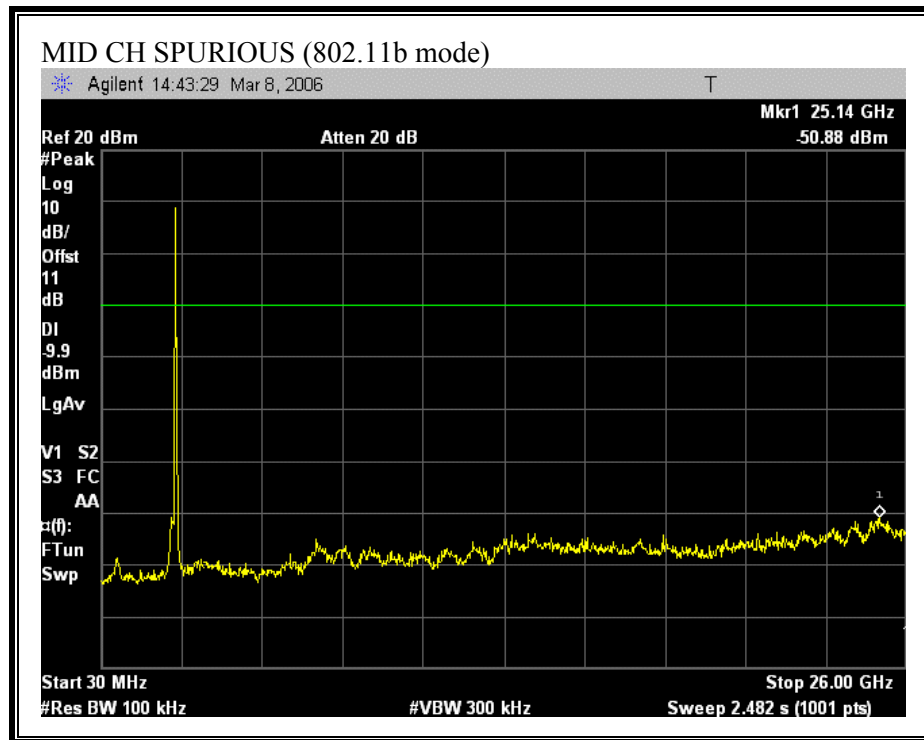
**SPURIOUS EMISSIONS, LOW CHANNEL (802.11b MODE)**



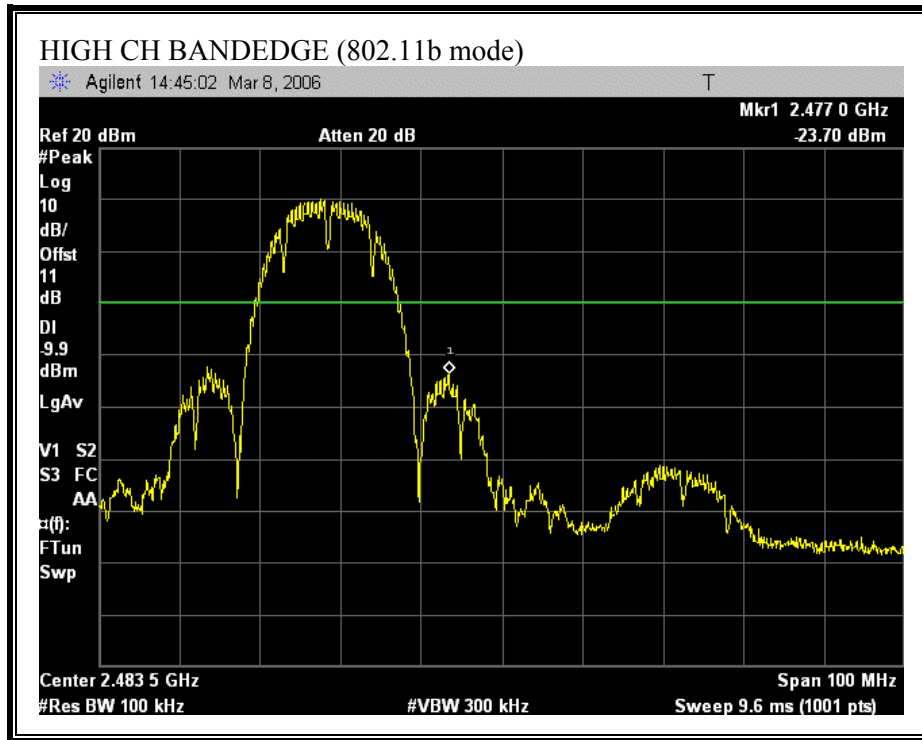


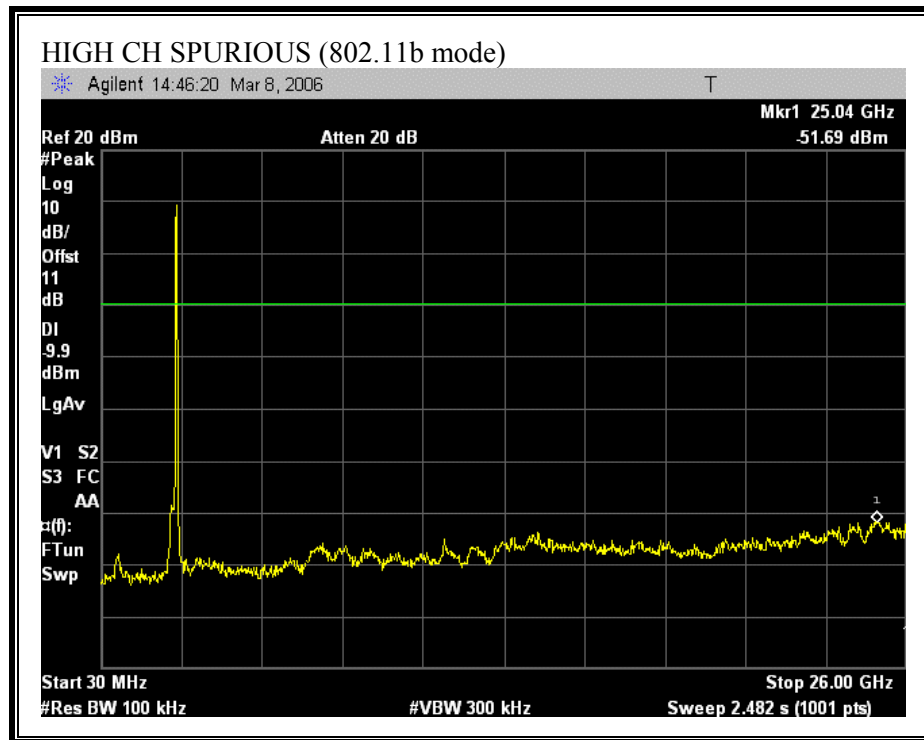
**SPURIOUS EMISSIONS, MID CHANNEL (802.11b MODE)**



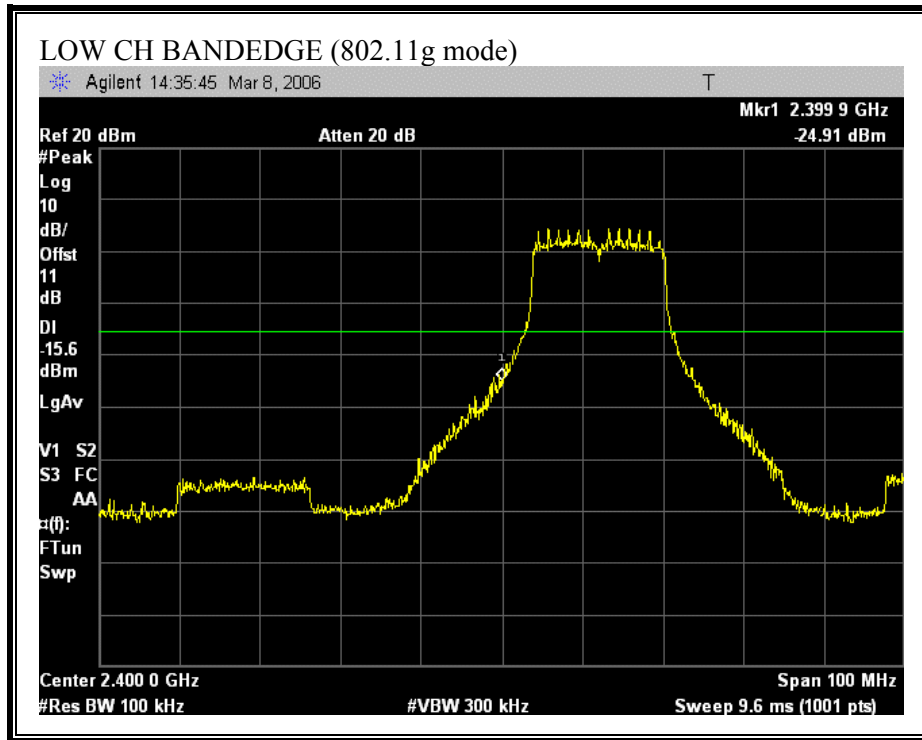


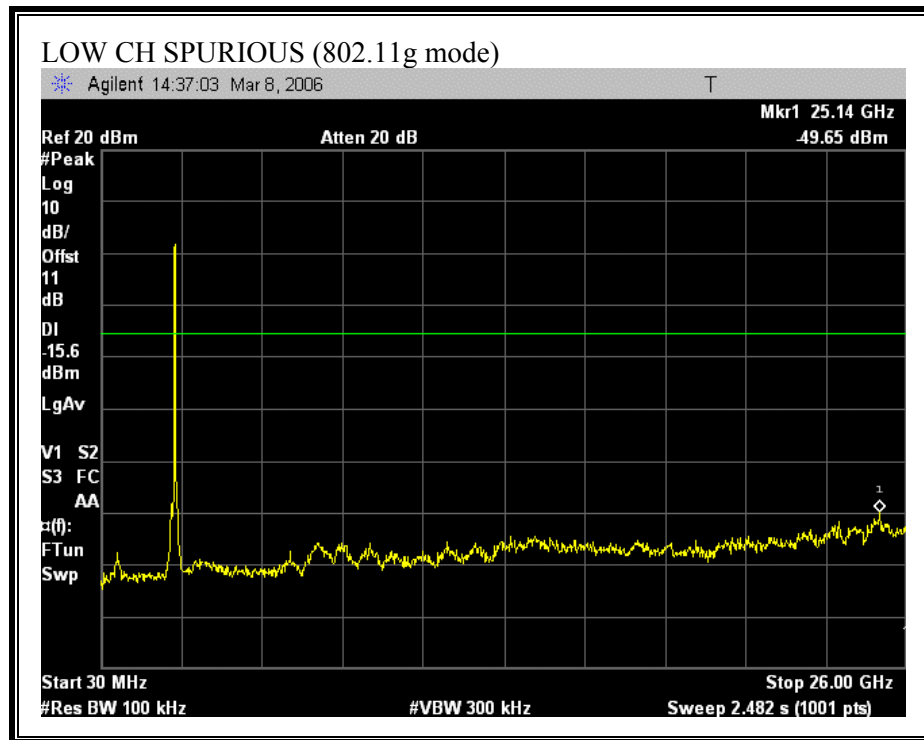
**SPURIOUS EMISSIONS, HIGH CHANNEL (802.11b MODE)**



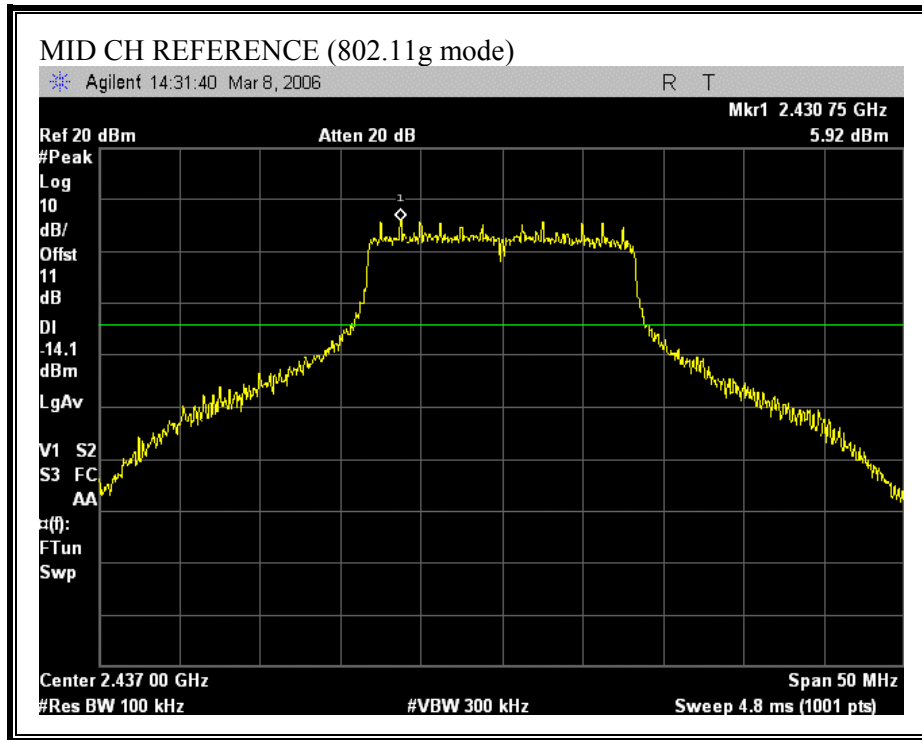


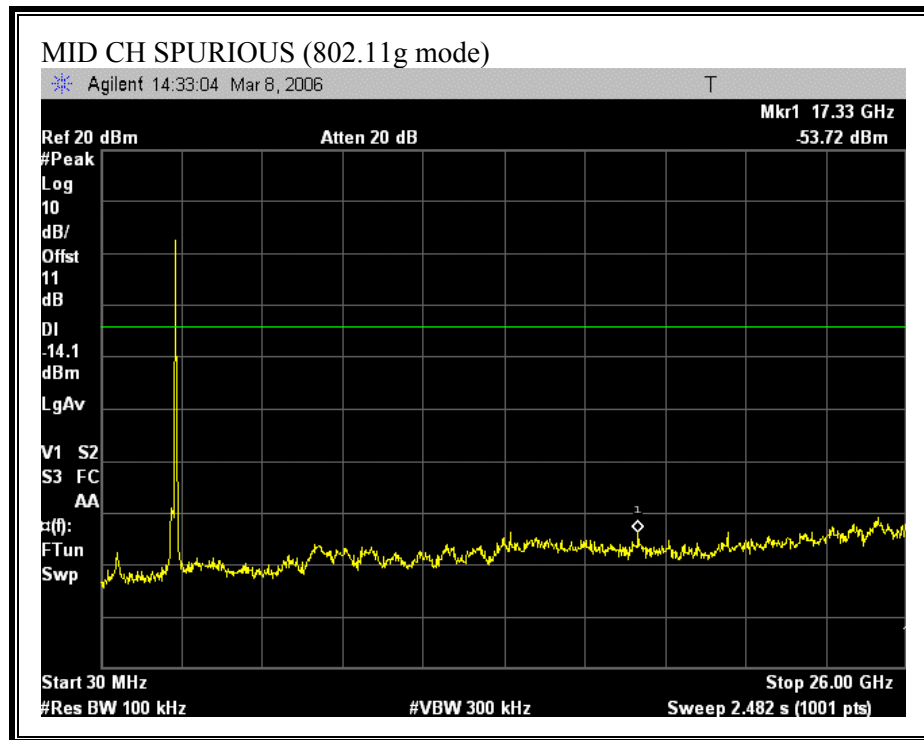
**SPURIOUS EMISSIONS, LOW CHANNEL (802.11g MODE)**



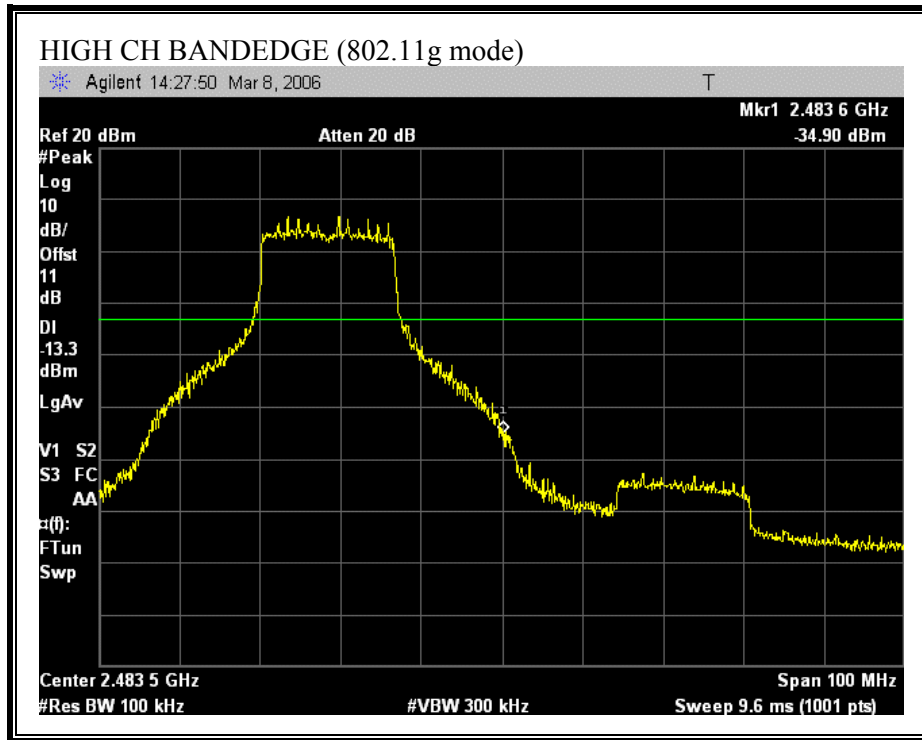


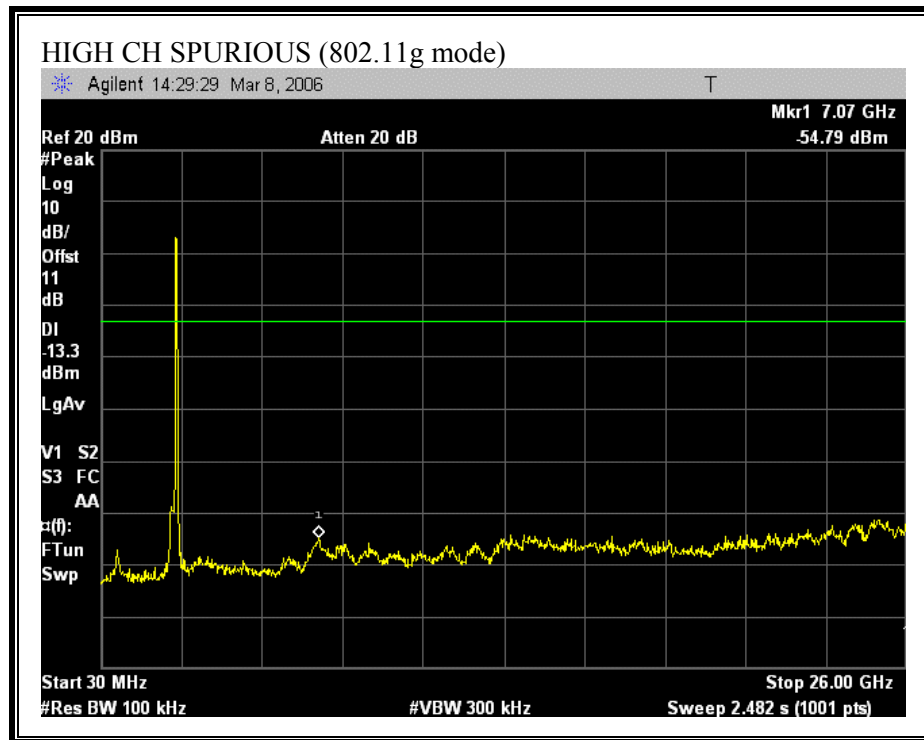
**SPURIOUS EMISSIONS, MID CHANNEL (802.11g MODE)**





**SPURIOUS EMISSIONS, HIGH CHANNEL (802.11g MODE)**





## 7.2. RADIATED EMISSIONS

### 7.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

#### LIMITS

§15.205 (a) Except as shown 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        | 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 - 12.52025        | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41              |                       |                 |                  |

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

<sup>2</sup> Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field 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 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, 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.

§15.209 (a) 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>(microvolts/meter) | Measurement Distance<br>(meters) |
|--------------------|--------------------------------------|----------------------------------|
| 30 - 88            | 100 **                               | 3                                |
| 88 - 216           | 150 **                               | 3                                |
| 216 - 960          | 200 **                               | 3                                |
| Above 960          | 500                                  | 3                                |

\*\* 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.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

## **TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

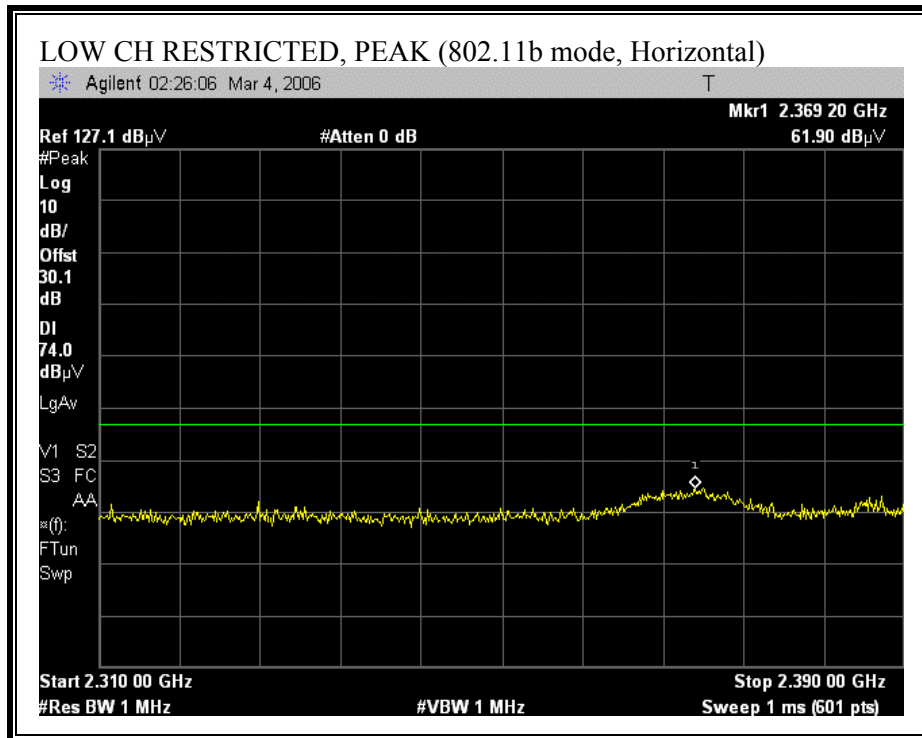
## **SUPPLEMENTAL TEST PROCEDURE FOR CO-LOCATED TRANSMITTERS**

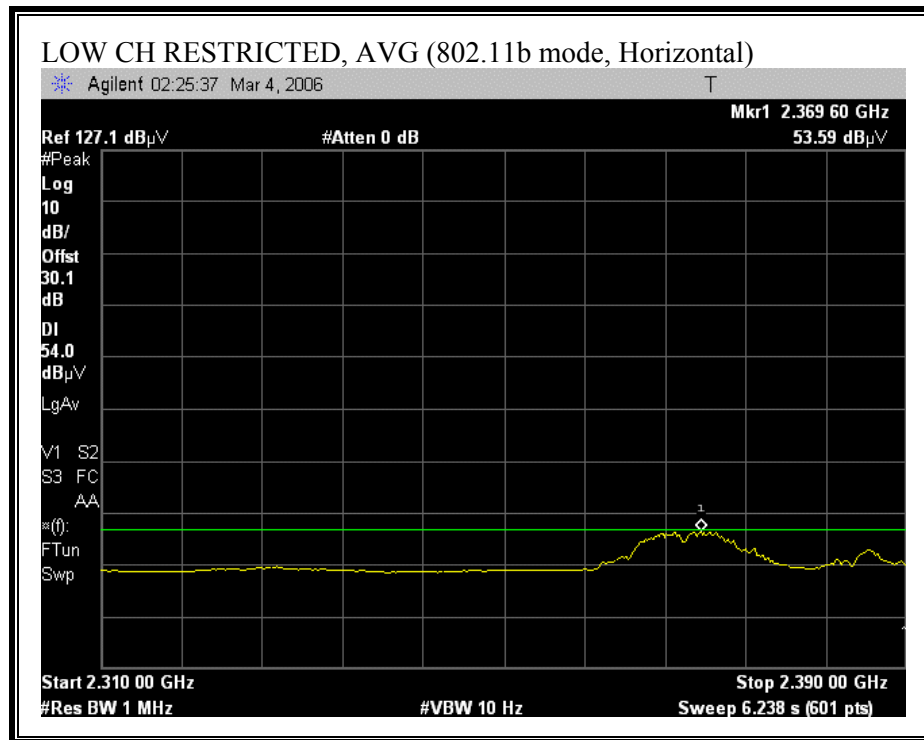
The dominant transmitter is set to the worst case channel. The spurious emissions performance of the dominant transmitter is investigated as the settings of the non-dominant transmitter are varied. The spectrum is searched for intermodulation products. Worst-case results are reported.

**TRANSMITTER ABOVE 1 GHz FOR 2400 TO 2483.5 MHz BAND**

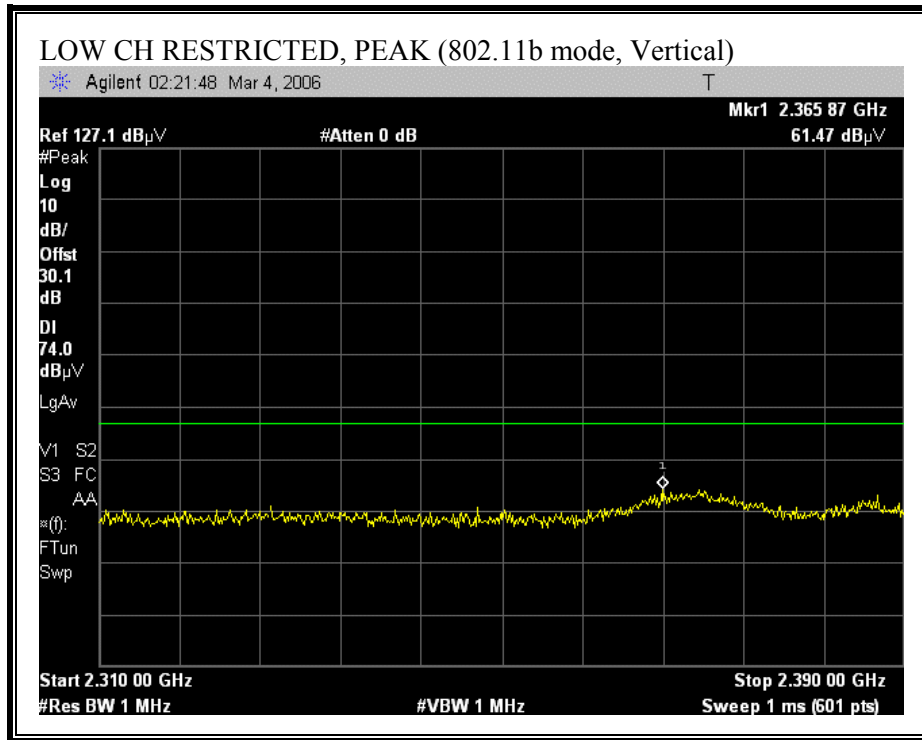
**EUT with Foxconn Antenna**

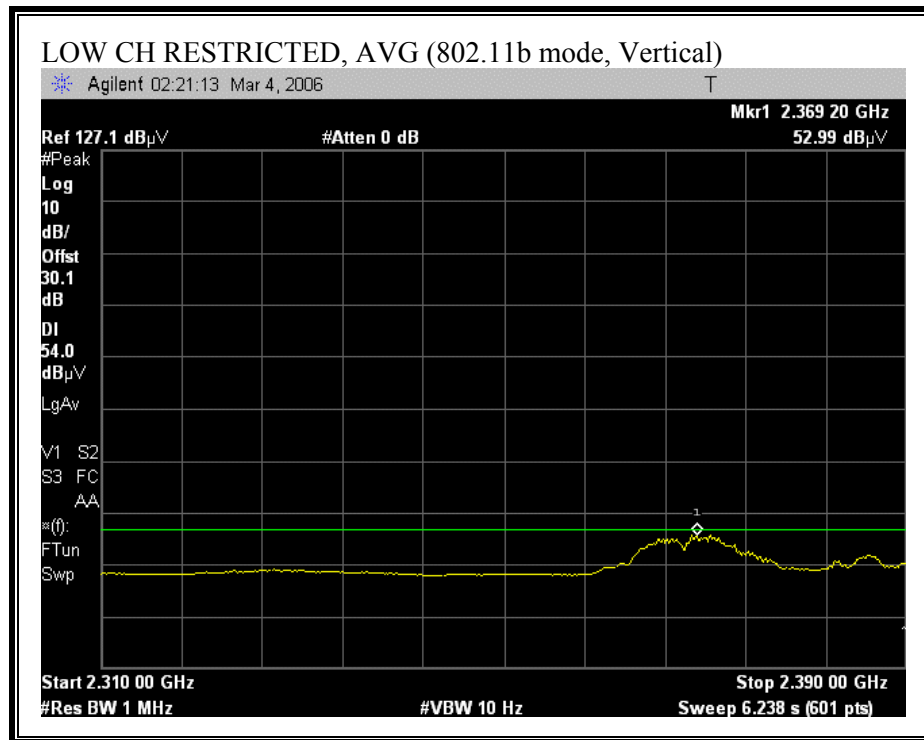
**RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)**



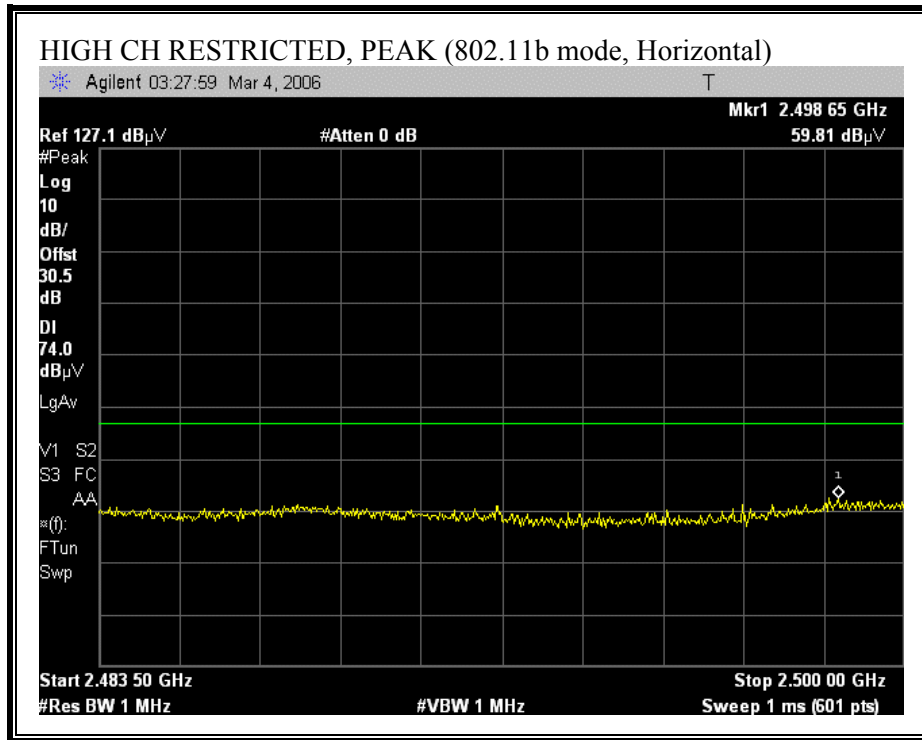


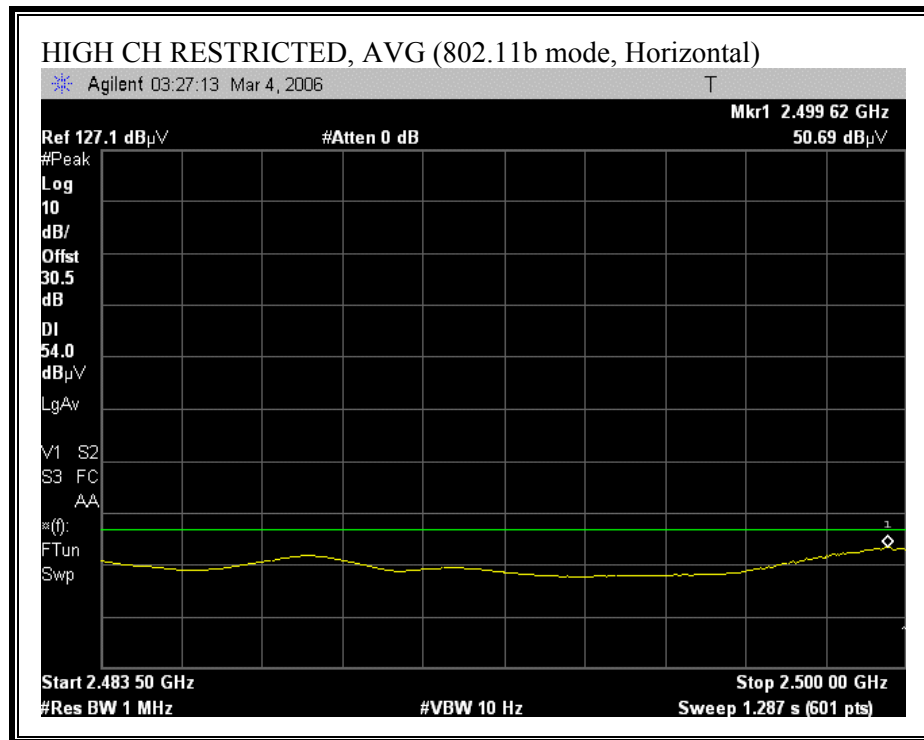
**RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)**



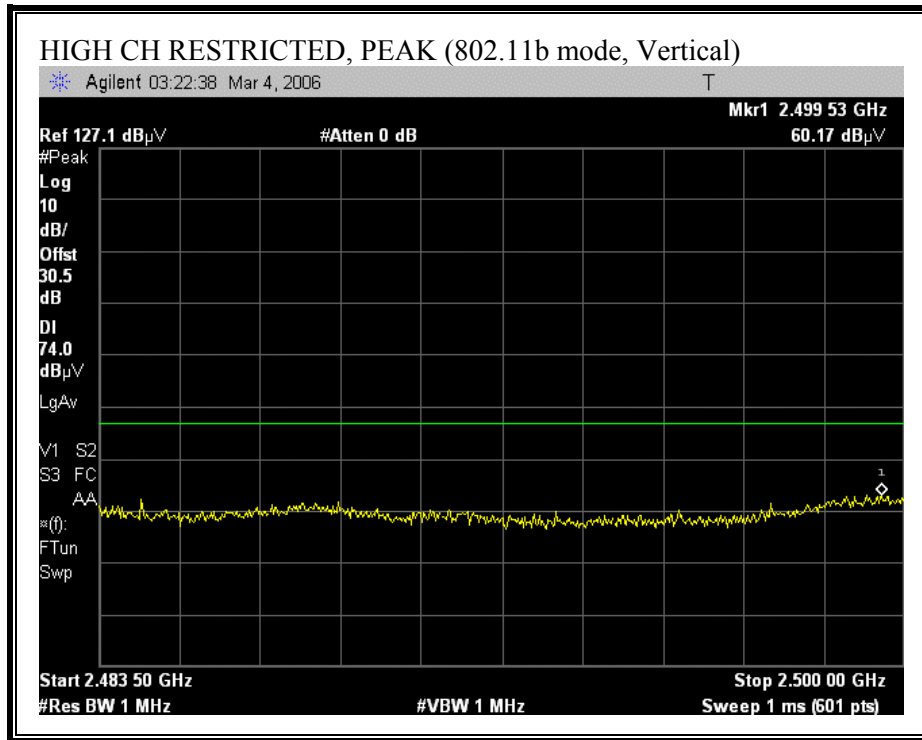


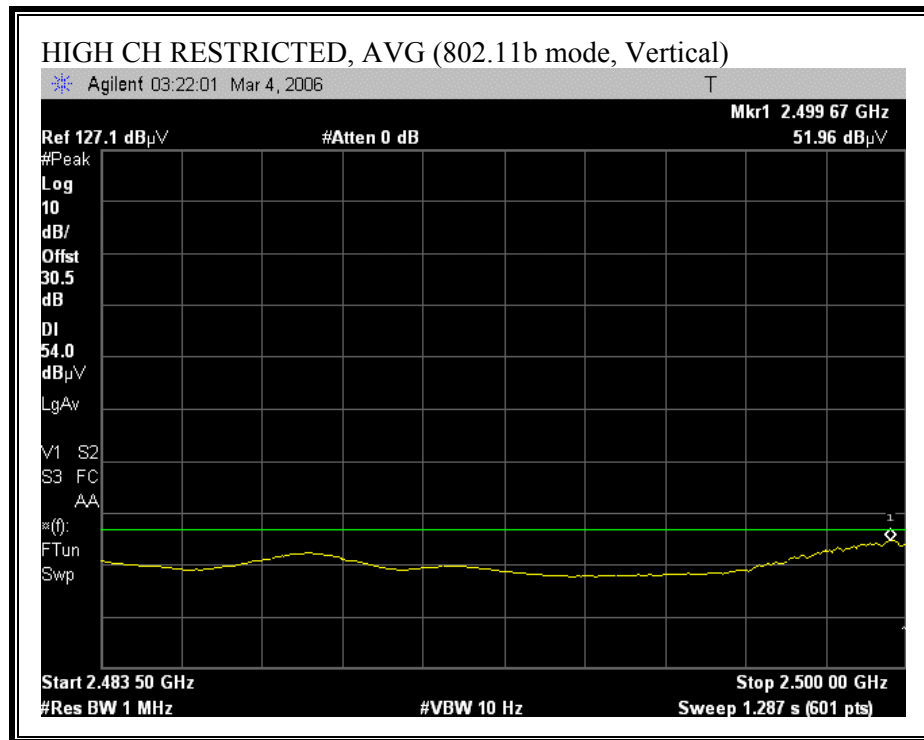
**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)**





**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)**

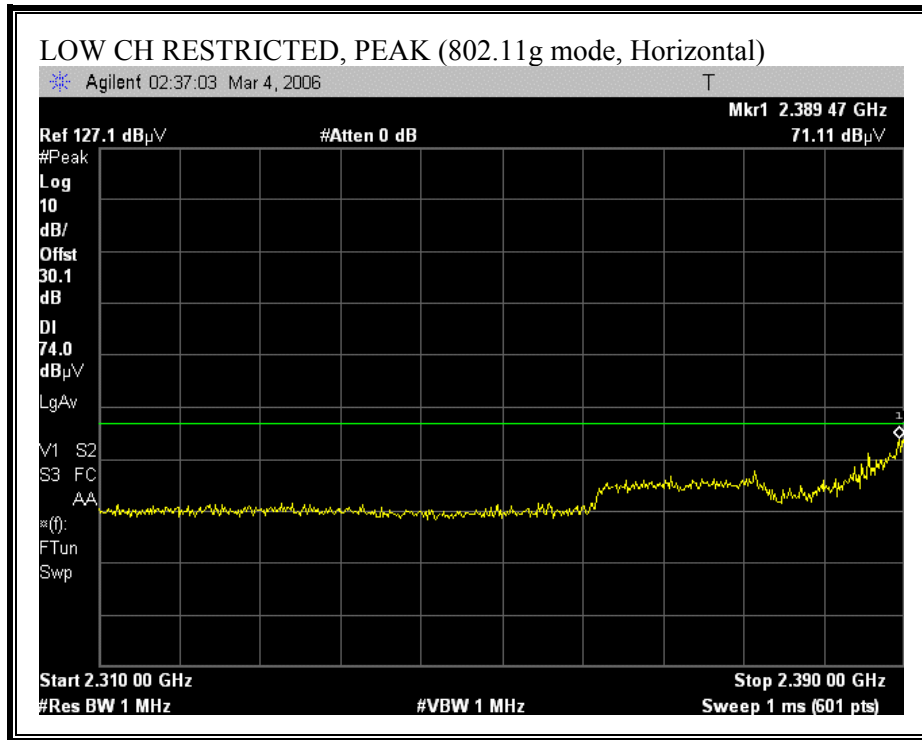


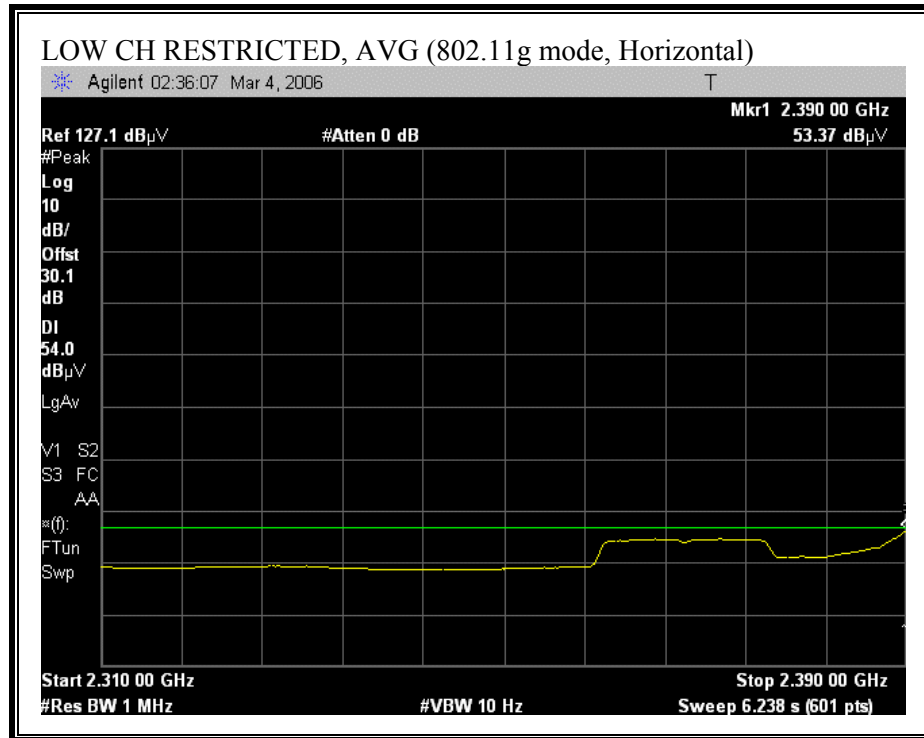


**HARMONICS AND SPURIOUS EMISSIONS (b MODE) – WITH FOXCONN ANTENNA**

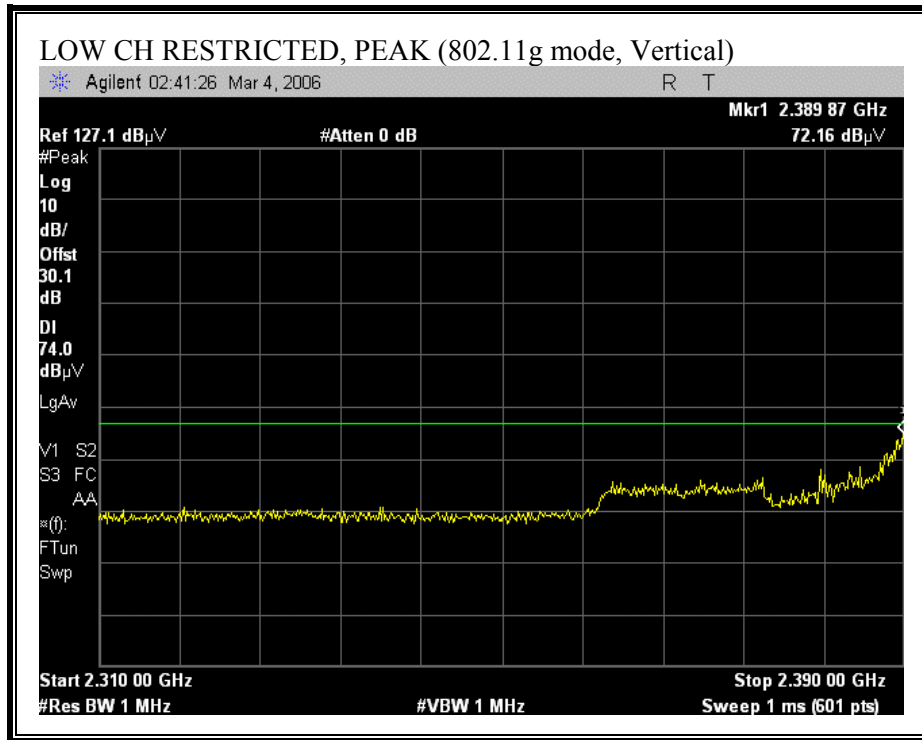
|                                                                                                                     |                       |                                  |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
|---------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------|-------------------|--------------------------------|----------|-----------|--------------|------------------------------|----------------|---------------|------------------|-----------------------------|--------------|---------------|----------------|------------------------------------------------------------------------------------------------|--|--|--|
| 03/06/06 <b>High Frequency Measurement</b><br><b>Compliance Certification Services, Morgan Hill Open Field Site</b> |                       |                                  |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| <b>Test Engineer:</b>                                                                                               |                       | Frank Ibrahim                    |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| <b>Project #:</b>                                                                                                   |                       | 06I10115                         |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| <b>Company:</b>                                                                                                     |                       | Samsung Electronics Co. Ltd.     |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| <b>EUT Description:</b>                                                                                             |                       | Notebook PC with Foxconn Antenna |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| <b>EUT M/N:</b>                                                                                                     |                       | NP-Q1                            |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| <b>EUT S/N:</b>                                                                                                     |                       | 549G93AL200019E                  |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| <b>Test Target:</b>                                                                                                 |                       | FCC 15.247                       |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| <b>Mode Of Operation:</b>                                                                                           |                       | TX ON in 11b mode, 1Mbps         |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| <b>Test Equipment:</b>                                                                                              |                       |                                  |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| Horn 1-18GHz                                                                                                        |                       |                                  |                   | Pre-amplifier 1-26GHz          |          |           |              | Pre-amplifier 26-40GHz       |                |               |                  | Horn > 18GHz                |              |               |                | Limit                                                                                          |  |  |  |
| T73; S/N: 6717 @3m                                                                                                  |                       |                                  |                   | T87 Miteq 924342               |          |           |              |                              |                |               |                  | T89; ARA 18-26GHz; S/N:1049 |              |               |                | FCC 15.205                                                                                     |  |  |  |
| Hi Frequency Cables                                                                                                 |                       |                                  |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| 2 foot cable                                                                                                        |                       |                                  |                   | 3 foot cable                   |          |           |              | 12 foot cable                |                |               |                  | HPF                         |              | Reject Filter |                | <b>Peak Measurements</b><br>RBW=VBW=1MHz<br><b>Average Measurements</b><br>RBW=1MHz ; VBW=10Hz |  |  |  |
|                                                                                                                     |                       |                                  |                   | Frank 177080001                |          |           |              | Frank 187209001              |                |               |                  | HPF_4.0GHz                  |              |               |                |                                                                                                |  |  |  |
| f<br>GHz                                                                                                            | Dist<br>(m)           | Read Pk<br>dBuV                  | Read Avg.<br>dBuV | AF<br>dB/m                     | CL<br>dB | Amp<br>dB | D Corr<br>dB | Fltr<br>dB                   | Peak<br>dBuV/m | Avg<br>dBuV/m | Pk Lim<br>dBuV/m | Avg Lim<br>dBuV/m           | Pk Mar<br>dB | Avg Mar<br>dB | Notes<br>(V/H) |                                                                                                |  |  |  |
| <b>Low Channel (2412 MHz)</b>                                                                                       |                       |                                  |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| 4.824                                                                                                               | 3.0                   | 55.6                             | 50.3              | 33.7                           | 4.0      | -45.3     | 0.0          | 0.6                          | 48.6           | 43.3          | 74               | 54                          | -25.4        | -10.7         | V              |                                                                                                |  |  |  |
| 4.824                                                                                                               | 3.0                   | 53.7                             | 43.4              | 33.7                           | 4.0      | -45.3     | 0.0          | 0.6                          | 46.6           | 36.4          | 74               | 54                          | -27.4        | -17.6         | H              |                                                                                                |  |  |  |
| <b>Mid Channel (2437 MHz)</b>                                                                                       |                       |                                  |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| 4.874                                                                                                               | 3.0                   | 57.9                             | 52.4              | 33.8                           | 4.0      | -45.3     | 0.0          | 0.6                          | 51.0           | 45.5          | 74               | 54                          | -23.0        | -8.5          | V              |                                                                                                |  |  |  |
| 7.311                                                                                                               | 3.0                   | 57.4                             | 51.5              | 35.5                           | 4.6      | -43.2     | 0.0          | 0.6                          | 54.9           | 49.0          | 74               | 54                          | -19.1        | -5.0          | V              |                                                                                                |  |  |  |
| 4.874                                                                                                               | 3.0                   | 55.4                             | 48.8              | 33.8                           | 4.0      | -45.3     | 0.0          | 0.6                          | 48.4           | 41.8          | 74               | 54                          | -25.6        | -12.2         | H              |                                                                                                |  |  |  |
| 7.311                                                                                                               | 3.0                   | 56.4                             | 48.9              | 35.5                           | 4.6      | -43.2     | 0.0          | 0.6                          | 53.9           | 46.4          | 74               | 54                          | -20.1        | -7.6          | H              |                                                                                                |  |  |  |
| <b>High Channel (2462 MHz)</b>                                                                                      |                       |                                  |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| 4.924                                                                                                               | 3.0                   | 56.2                             | 51.7              | 33.8                           | 4.0      | -45.4     | 0.0          | 0.6                          | 49.3           | 44.8          | 74               | 54                          | -24.7        | -9.2          | V              |                                                                                                |  |  |  |
| 7.386                                                                                                               | 3.0                   | 59.4                             | 54.0              | 35.6                           | 4.6      | -43.1     | 0.0          | 0.6                          | 57.1           | 51.7          | 74               | 54                          | -16.9        | -2.3          | V              |                                                                                                |  |  |  |
| 4.924                                                                                                               | 3.0                   | 53.3                             | 43.3              | 33.8                           | 4.0      | -45.4     | 0.0          | 0.6                          | 46.4           | 36.4          | 74               | 54                          | -27.6        | -17.6         | H              |                                                                                                |  |  |  |
| 7.386                                                                                                               | 3.0                   | 57.0                             | 50.1              | 35.6                           | 4.6      | -43.1     | 0.0          | 0.6                          | 54.7           | 47.8          | 74               | 54                          | -19.3        | -6.2          | H              |                                                                                                |  |  |  |
| EUT was scanned from 1 GHz to 25 GHz, no other signals above noise floor were detected.                             |                       |                                  |                   |                                |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| f                                                                                                                   | Measurement Frequency |                                  | Amp               | Preamp Gain                    |          | Avg Lim   |              | Average Field Strength Limit |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| Dist                                                                                                                | Distance to Antenna   |                                  | D Corr            | Distance Correct to 3 meters   |          | Pk Lim    |              | Peak Field Strength Limit    |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| Read                                                                                                                | Analyzer Reading      |                                  | Avg               | Average Field Strength @ 3 m   |          | Avg Mar   |              | Margin vs. Average Limit     |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| AF                                                                                                                  | Antenna Factor        |                                  | Peak              | Calculated Peak Field Strength |          | Pk Mar    |              | Margin vs. Peak Limit        |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |
| CL                                                                                                                  | Cable Loss            |                                  | HPF               | High Pass Filter               |          |           |              |                              |                |               |                  |                             |              |               |                |                                                                                                |  |  |  |

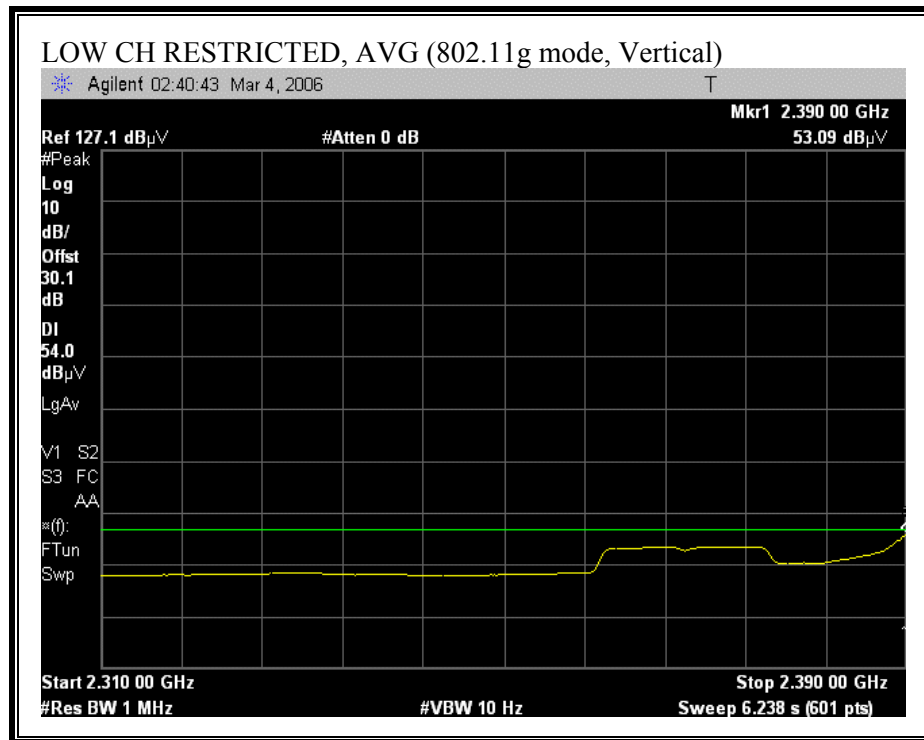
**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)**



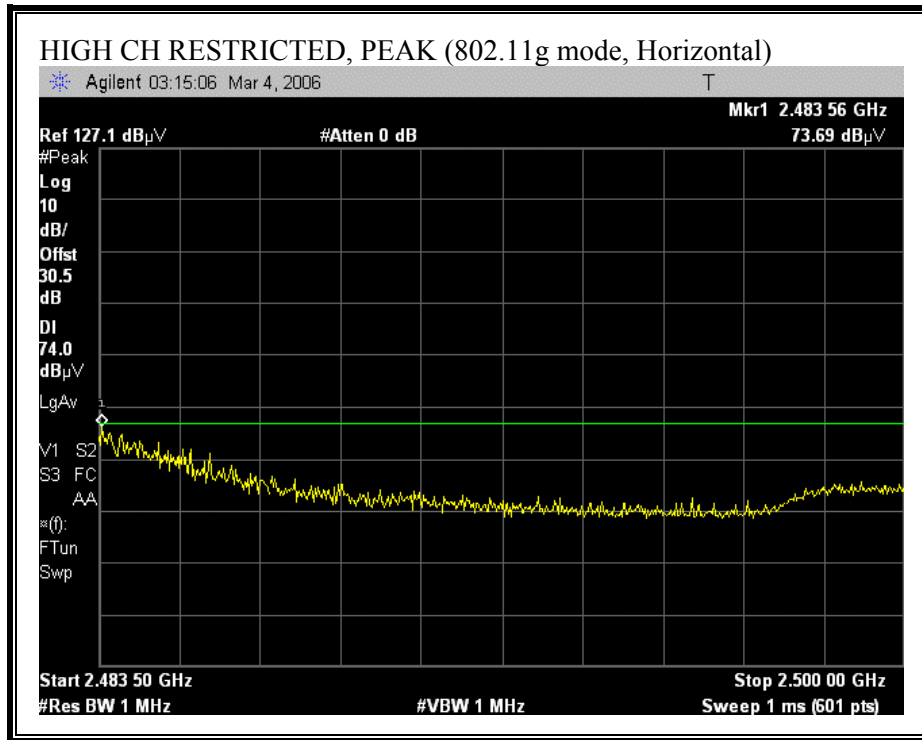


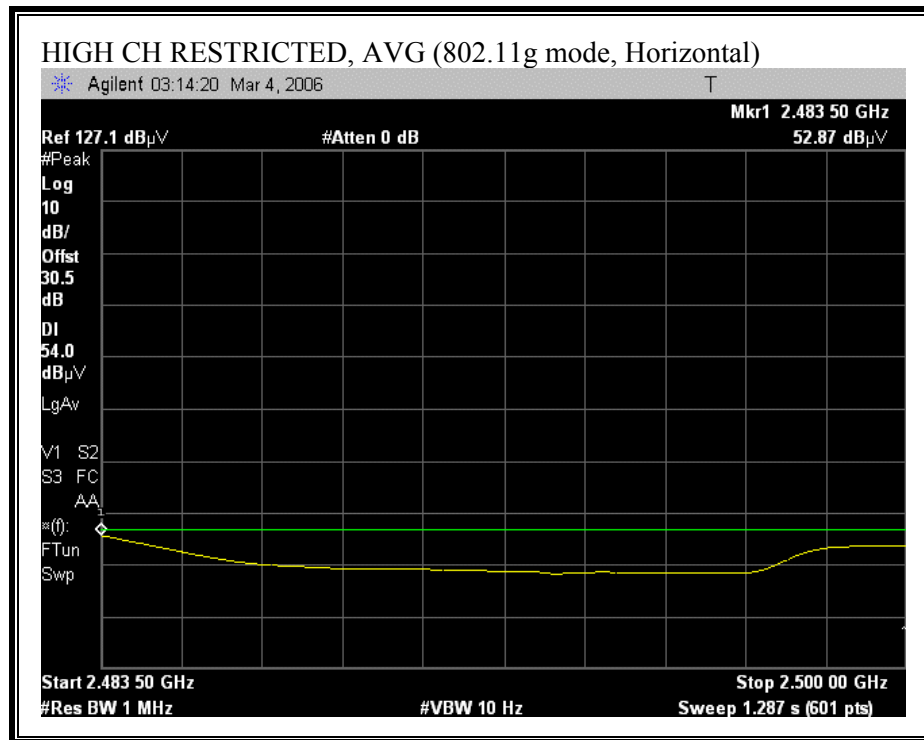
**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)**



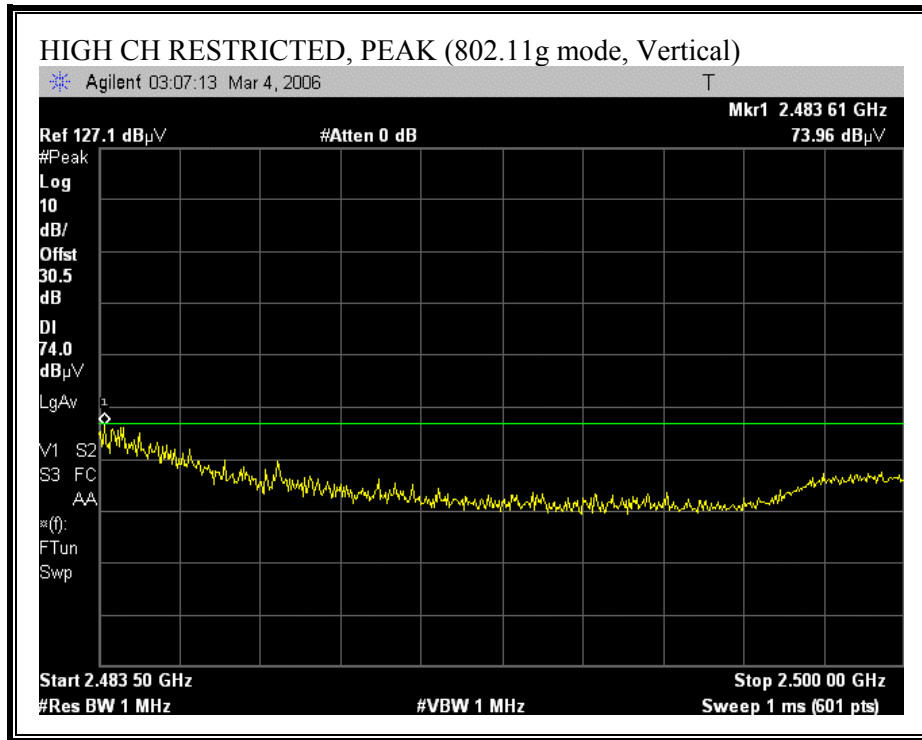


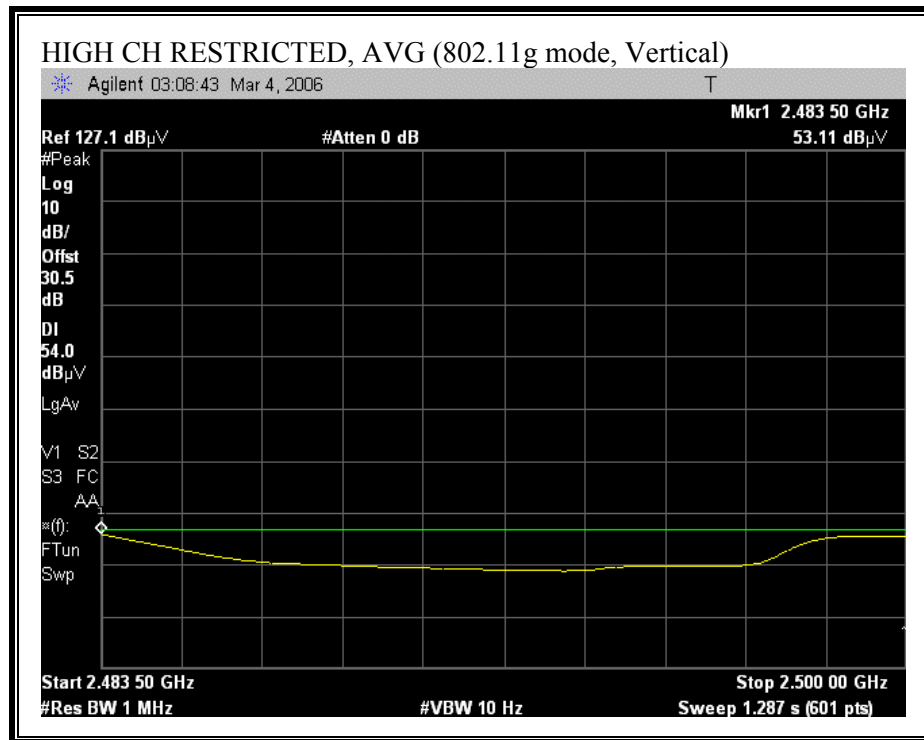
**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)**





**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)**





**HARMONICS AND SPURIOUS EMISSIONS (g MODE) – WITH FOXCONN ANTENNA**

03/07/06 **High Frequency Measurement**  
Compliance Certification Services, Morgan Hill Open Field Site

Test Engineer: Frank Ibrahim  
Project #: 06I10115  
Company: Samsung Electronics Co. Ltd.  
EUT Description: Notebook PC with Foxconn Antenna  
EUT M/N: NP-Q1  
EUT S/N: 549G93AL200019E  
Test Target: FCC 15.247  
Mode Of Operation: TX ON in 11g mode, 6Mbps

**Test Equipment:**

|                                                                                                |                                                  |                                         |                                                       |                            |
|------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------|-------------------------------------------------------|----------------------------|
| <b>Horn 1-18GHz</b><br>T73; S/N: 6717 @3m                                                      | <b>Pre-amplifier 1-26GHz</b><br>T87 Miteq 924342 | <b>Pre-amplifier 26-40GHz</b>           | <b>Horn &gt; 18GHz</b><br>T89; ARA 18-26GHz; S/N:1049 | <b>Limit</b><br>FCC 15.205 |
| Hi Frequency Cables                                                                            |                                                  |                                         |                                                       |                            |
| <b>2 foot cable</b>                                                                            | <b>3 foot cable</b><br>Frank 177080001           | <b>12 foot cable</b><br>Frank 187209001 | <b>HPF</b><br>HPF_4.0GHz                              | <b>Reject Filter</b>       |
| <b>Peak Measurements</b><br>RBW=VBW=1MHz<br><b>Average Measurements</b><br>RBW=1MHz ; VBW=10Hz |                                                  |                                         |                                                       |                            |

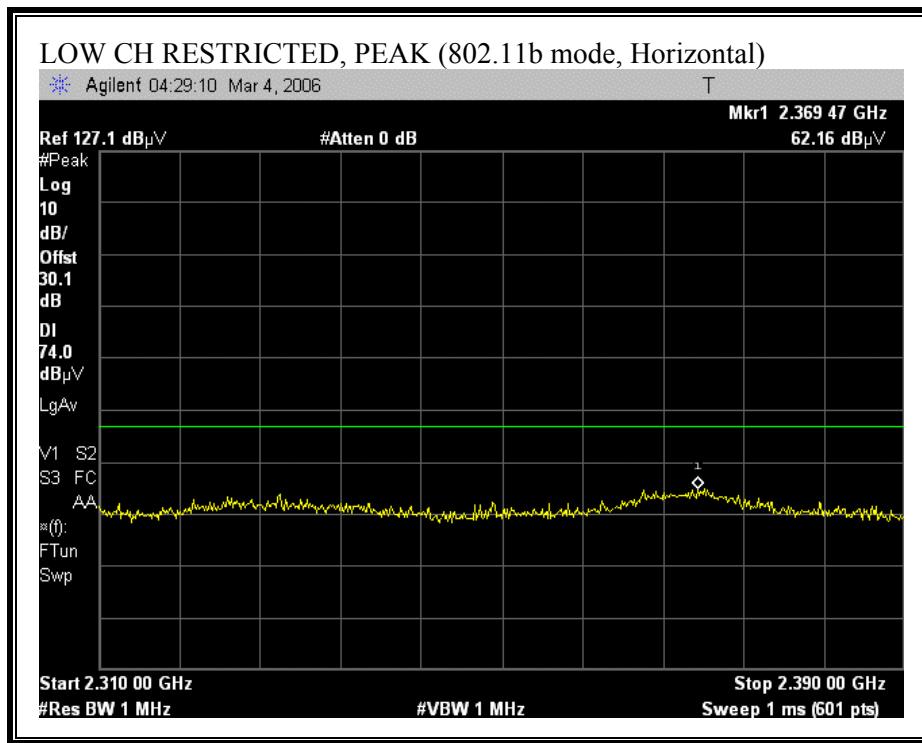
| f GHz                   | Dist (m) | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fltr dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) |
|-------------------------|----------|--------------|----------------|---------|-------|--------|-----------|---------|-------------|------------|---------------|----------------|-----------|------------|-------------|
| Low Channel (2412 MHz)  |          |              |                |         |       |        |           |         |             |            |               |                |           |            |             |
| 4.824                   | 3.0      | 52.1         | 39.4           | 33.7    | 4.0   | -45.3  | 0.0       | 0.6     | 45.1        | 32.4       | 74            | 54             | -28.9     | -21.6      | V           |
| 4.824                   | 3.0      | 52.2         | 39.7           | 33.7    | 4.0   | -45.3  | 0.0       | 0.6     | 45.2        | 32.7       | 74            | 54             | -28.8     | -21.3      | H           |
| Mid Channel (2437 MHz)  |          |              |                |         |       |        |           |         |             |            |               |                |           |            |             |
| 4.874                   | 3.0      | 55.7         | 43.3           | 33.8    | 4.0   | -45.3  | 0.0       | 0.6     | 48.8        | 36.4       | 74            | 54             | -25.2     | -17.6      | V           |
| 7.311                   | 3.0      | 69.1         | 54.3           | 35.5    | 4.6   | -43.2  | 0.0       | 0.6     | 66.6        | 51.9       | 74            | 54             | -7.4      | -2.1       | V           |
| 4.874                   | 3.0      | 52.4         | 39.8           | 33.8    | 4.0   | -45.3  | 0.0       | 0.6     | 45.5        | 32.8       | 74            | 54             | -28.5     | -21.2      | H           |
| 7.311                   | 3.0      | 64.2         | 49.8           | 35.5    | 4.6   | -43.2  | 0.0       | 0.6     | 61.7        | 47.4       | 74            | 54             | -12.3     | -6.6       | H           |
| High Channel (2462 MHz) |          |              |                |         |       |        |           |         |             |            |               |                |           |            |             |
| 4.924                   | 3.0      | 52.5         | 39.4           | 33.8    | 4.0   | -45.4  | 0.0       | 0.6     | 45.6        | 32.5       | 74            | 54             | -28.4     | -21.5      | V           |
| 7.386                   | 3.0      | 66.0         | 49.1           | 35.6    | 4.6   | -43.1  | 0.0       | 0.6     | 63.8        | 46.9       | 74            | 54             | -10.2     | -7.1       | V           |
| 4.924                   | 3.0      | 52.3         | 39.0           | 33.8    | 4.0   | -45.4  | 0.0       | 0.6     | 45.4        | 32.1       | 74            | 54             | -28.6     | -21.9      | H           |
| 7.386                   | 3.0      | 62.5         | 45.0           | 35.6    | 4.6   | -43.1  | 0.0       | 0.6     | 60.3        | 42.8       | 74            | 54             | -13.7     | -11.2      | H           |

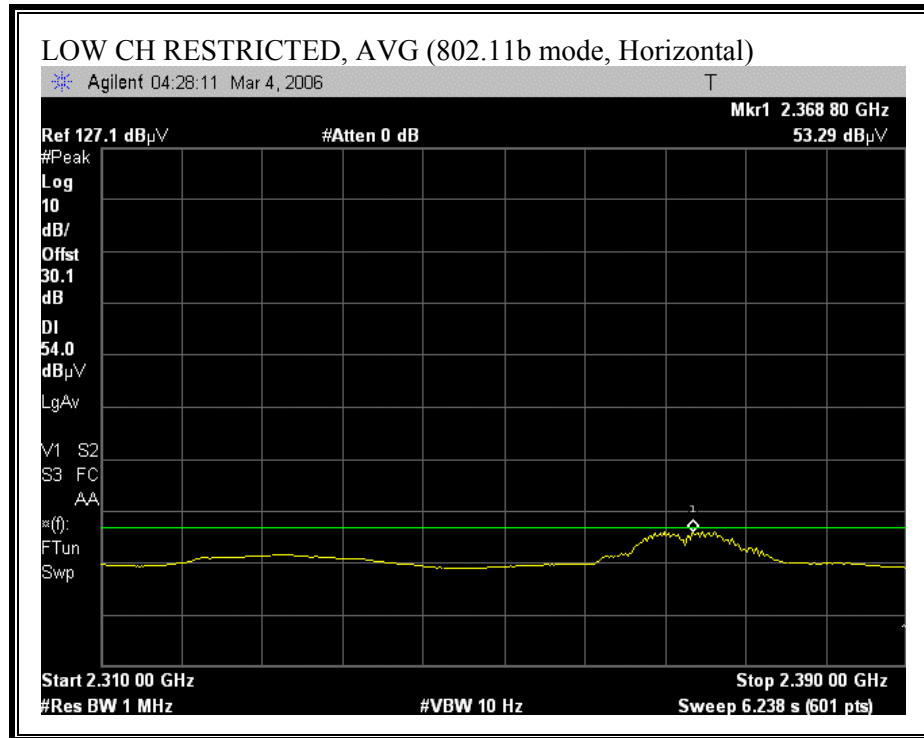
EUT was scanned from 1 GHz to 25 GHz, no other signals above noise floor were detected.

|      |                       |        |                                |         |                              |
|------|-----------------------|--------|--------------------------------|---------|------------------------------|
| f    | Measurement Frequency | Amp    | Preamp Gain                    | Avg Lim | Average Field Strength Limit |
| Dist | Distance to Antenna   | D Corr | Distance Correct to 3 meters   | Pk Lim  | Peak Field Strength Limit    |
| Read | Analyzer Reading      | Avg    | Average Field Strength @ 3 m   | Avg Mar | Margin vs. Average Limit     |
| AF   | Antenna Factor        | Peak   | Calculated Peak Field Strength | Pk Mar  | Margin vs. Peak Limit        |
| CL   | Cable Loss            | HPF    | High Pass Filter               |         |                              |

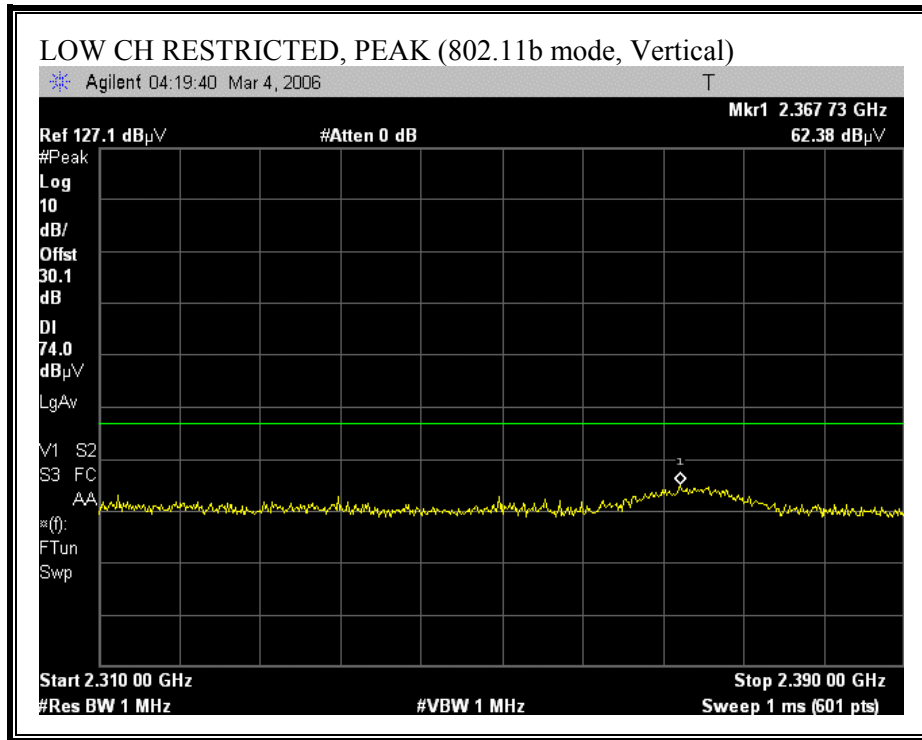
**EUT with KAE Antenna**

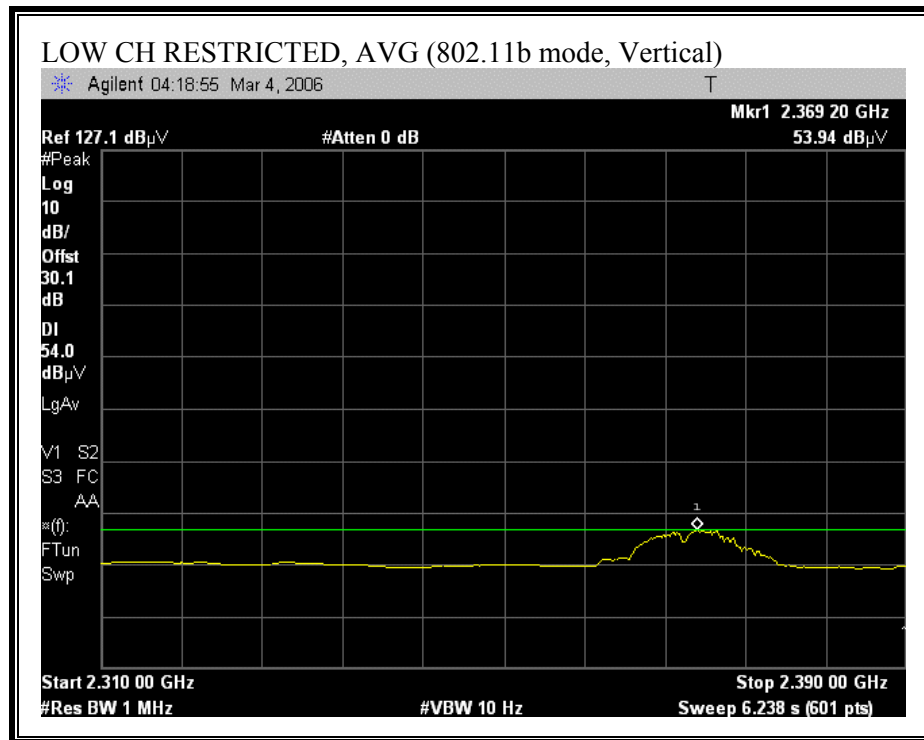
**RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)**



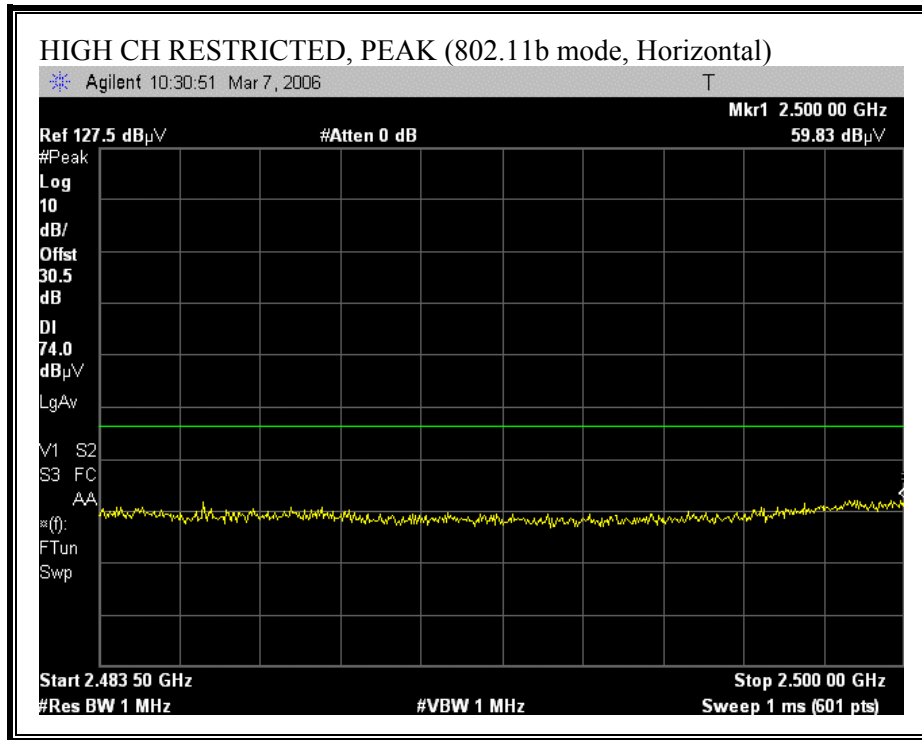


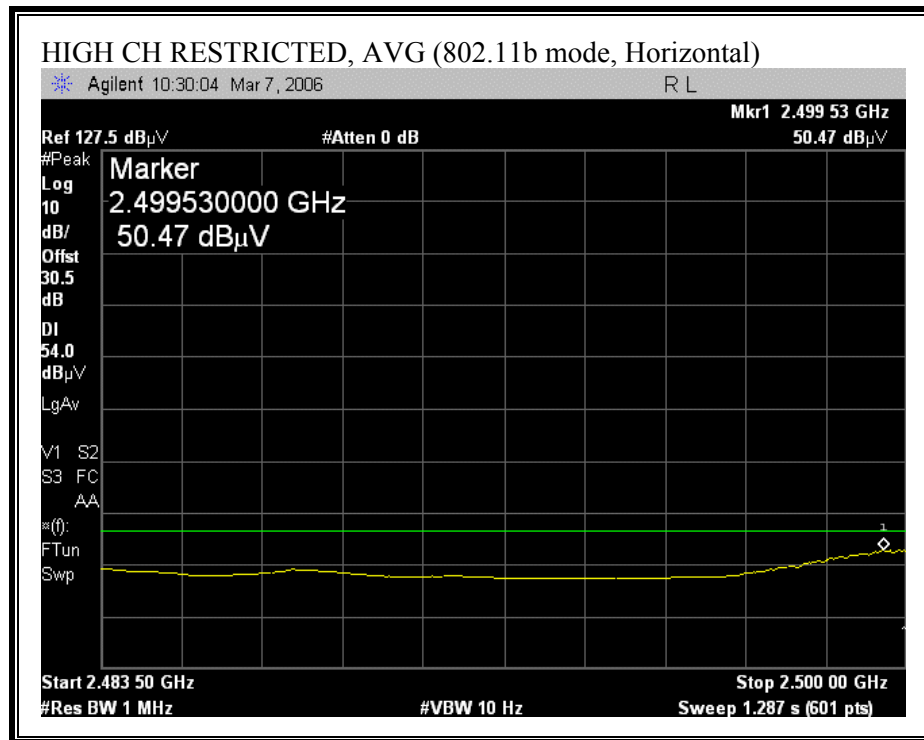
**RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)**



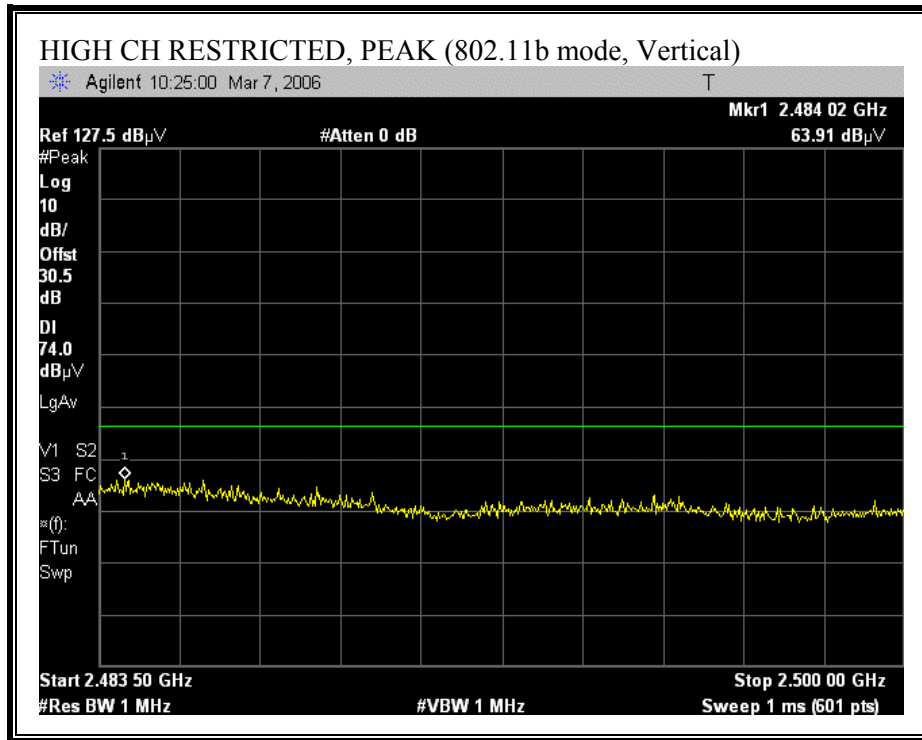


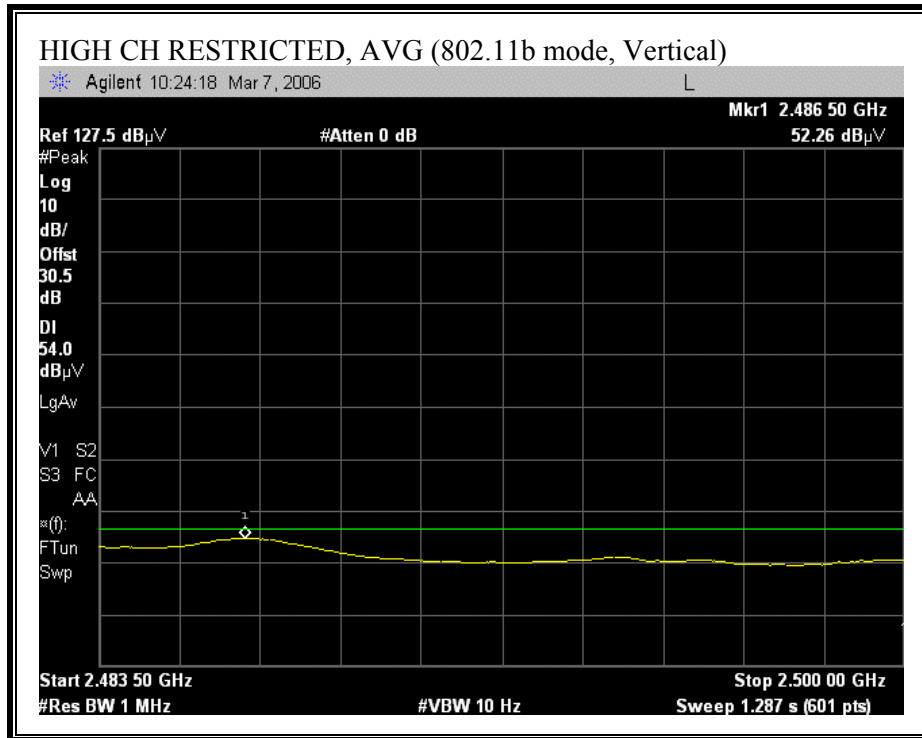
**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)**





**RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)**

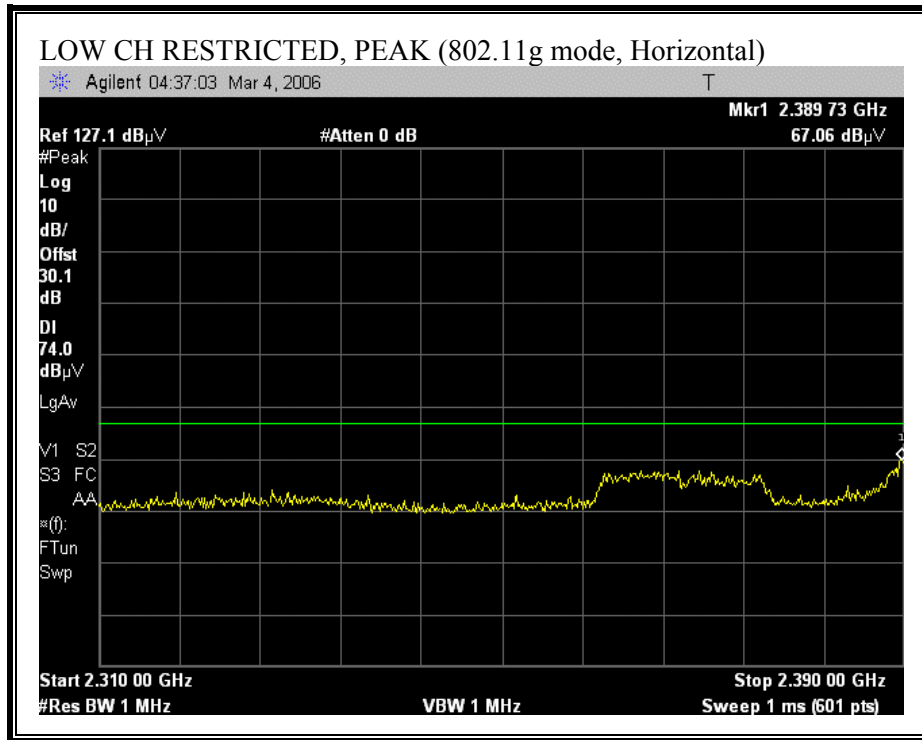


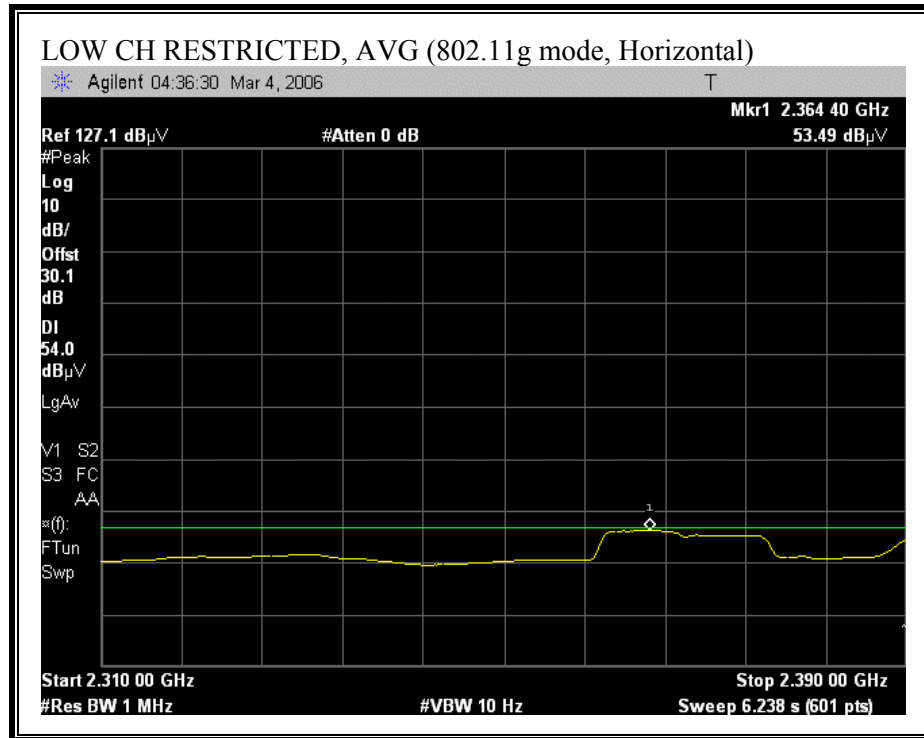


**HARMONICS AND SPURIOUS EMISSIONS (b MODE) – WITH KAE ANTENNA**

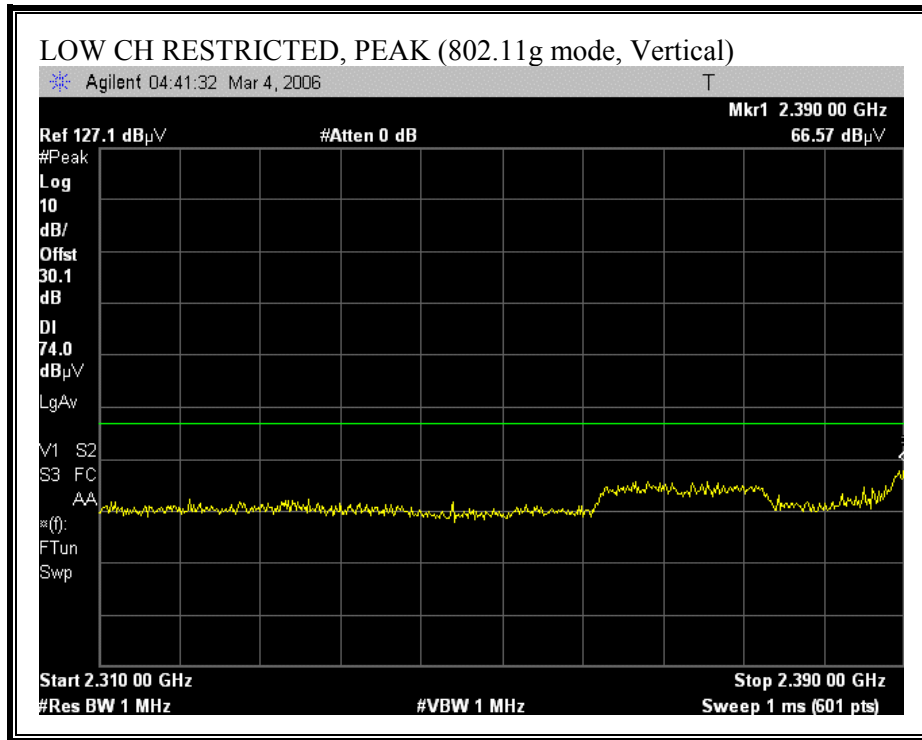
| 03/06/06 <b>High Frequency Measurement</b><br><b>Compliance Certification Services, Morgan Hill Open Field Site</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------|--------------------------------|-------------------------------------------|------------------------------|-----------|--------------|----------------------------------|----------------|---------------|------------------|-------------------|--------------|---------------|----------------|----------------------------------------------------------------------------------|---|-----------------------|-----|-------------|---------|------------------------------|------|---------------------|--------|------------------------------|--------|---------------------------|------|------------------|-----|------------------------------|---------|--------------------------|----|----------------|------|--------------------------------|--------|-----------------------|----|------------|-----|------------------|--|--|
| <b>Test Engineer:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       | Frank Ibrahim                |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Project #:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       | 06I10115                     |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Company:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       | Samsung Electronics Co. Ltd. |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>EUT Description:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       | Notebook PC with KAE Antenna |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>EUT M/N:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       | NP-Q1                        |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>EUT S/N:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       | 549G93AL200019E              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Test Target:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       | FCC 15.247                   |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Mode Of Operation:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       | TX ON in 11b mode, 1Mbps     |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Test Equipment:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| Horn 1-18GHz<br>T73; S/N: 6717 @3m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                              |                                | Pre-amplifier 1-26GHz<br>T87 Miteq 924342 |                              |           |              | Pre-amplifier 26-40GHz           |                |               |                  | Horn > 18GHz      |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| Hi Frequency Cables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 2 foot cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                              |                                | 3 foot cable<br>Frank 177080001           |                              |           |              | 12 foot cable<br>Frank 187209001 |                |               |                  | HPF<br>HPF_4.0GHz |              | Reject Filter |                | Peak Measurements<br>RBW=VBW=1MHz<br>Average Measurements<br>RBW=1MHz ; VBW=10Hz |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| f<br>GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Dist<br>(m)           | Read Pk<br>dBuV              | Read Avg.<br>dBuV              | AF<br>dB/m                                | CL<br>dB                     | Amp<br>dB | D Corr<br>dB | Filtr<br>dB                      | Peak<br>dBuV/m | Avg<br>dBuV/m | Pk Lim<br>dBuV/m | Avg Lim<br>dBuV/m | Pk Mar<br>dB | Avg Mar<br>dB | Notes<br>(V/H) |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Low Channel (2412 MHz)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.824                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 51.6                         | 38.5                           | 33.7                                      | 4.0                          | -45.3     | 0.0          | 0.6                              | 44.6           | 31.5          | 74               | 54                | -29.4        | -22.5         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.824                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 51.7                         | 38.9                           | 33.7                                      | 4.0                          | -45.3     | 0.0          | 0.6                              | 44.7           | 31.9          | 74               | 54                | -29.3        | -22.1         | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Mid Channel (2437 MHz)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.874                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 53.3                         | 43.0                           | 33.8                                      | 4.0                          | -45.3     | 0.0          | 0.6                              | 46.4           | 36.1          | 74               | 54                | -27.6        | -17.9         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 7.311                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 55.0                         | 44.2                           | 35.5                                      | 4.6                          | -43.2     | 0.0          | 0.6                              | 52.5           | 41.7          | 74               | 54                | -21.5        | -12.3         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.874                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 56.8                         | 52.7                           | 33.8                                      | 4.0                          | -45.3     | 0.0          | 0.6                              | 49.8           | 45.7          | 74               | 54                | -24.2        | -8.3          | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 7.311                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 55.2                         | 47.2                           | 35.5                                      | 4.6                          | -43.2     | 0.0          | 0.6                              | 52.7           | 44.7          | 74               | 54                | -21.3        | -9.3          | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>High Channel (2462 MHz)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.924                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 53.1                         | 43.6                           | 33.8                                      | 4.0                          | -45.4     | 0.0          | 0.6                              | 46.2           | 36.7          | 74               | 54                | -27.8        | -17.3         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 7.386                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 54.0                         | 43.3                           | 35.6                                      | 4.6                          | -43.1     | 0.0          | 0.6                              | 51.8           | 41.0          | 74               | 54                | -22.2        | -13.0         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.924                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 55.4                         | 49.1                           | 33.8                                      | 4.0                          | -45.4     | 0.0          | 0.6                              | 48.6           | 42.2          | 74               | 54                | -25.4        | -11.8         | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 7.386                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 54.0                         | 43.2                           | 35.6                                      | 4.6                          | -43.1     | 0.0          | 0.6                              | 51.8           | 41.0          | 74               | 54                | -22.2        | -13.0         | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <table><tr><td>f</td><td>Measurement Frequency</td><td>Amp</td><td>Preamp Gain</td><td>Avg Lim</td><td>Average Field Strength Limit</td></tr><tr><td>Dist</td><td>Distance to Antenna</td><td>D Corr</td><td>Distance Correct to 3 meters</td><td>Pk Lim</td><td>Peak Field Strength Limit</td></tr><tr><td>Read</td><td>Analyzer Reading</td><td>Avg</td><td>Average Field Strength @ 3 m</td><td>Avg Mar</td><td>Margin vs. Average Limit</td></tr><tr><td>AF</td><td>Antenna Factor</td><td>Peak</td><td>Calculated Peak Field Strength</td><td>Pk Mar</td><td>Margin vs. Peak Limit</td></tr><tr><td>CL</td><td>Cable Loss</td><td>HPF</td><td>High Pass Filter</td><td></td><td></td></tr></table> |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  | f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit | Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit | Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit | AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit | CL | Cable Loss | HPF | High Pass Filter |  |  |
| f                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Measurement Frequency | Amp                          | Preamp Gain                    | Avg Lim                                   | Average Field Strength Limit |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| Dist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Distance to Antenna   | D Corr                       | Distance Correct to 3 meters   | Pk Lim                                    | Peak Field Strength Limit    |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| Read                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Analyzer Reading      | Avg                          | Average Field Strength @ 3 m   | Avg Mar                                   | Margin vs. Average Limit     |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| AF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Antenna Factor        | Peak                         | Calculated Peak Field Strength | Pk Mar                                    | Margin vs. Peak Limit        |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| CL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Cable Loss            | HPF                          | High Pass Filter               |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| EUT was scanned from 1 GHz to 25 GHz, no other signals above noise floor were detected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |

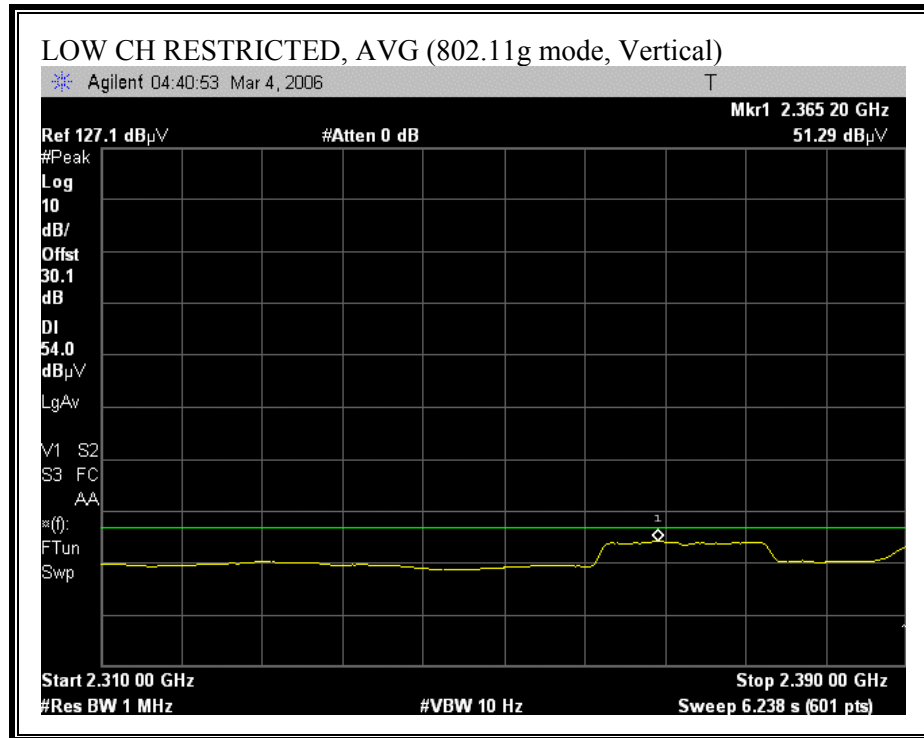
**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)**



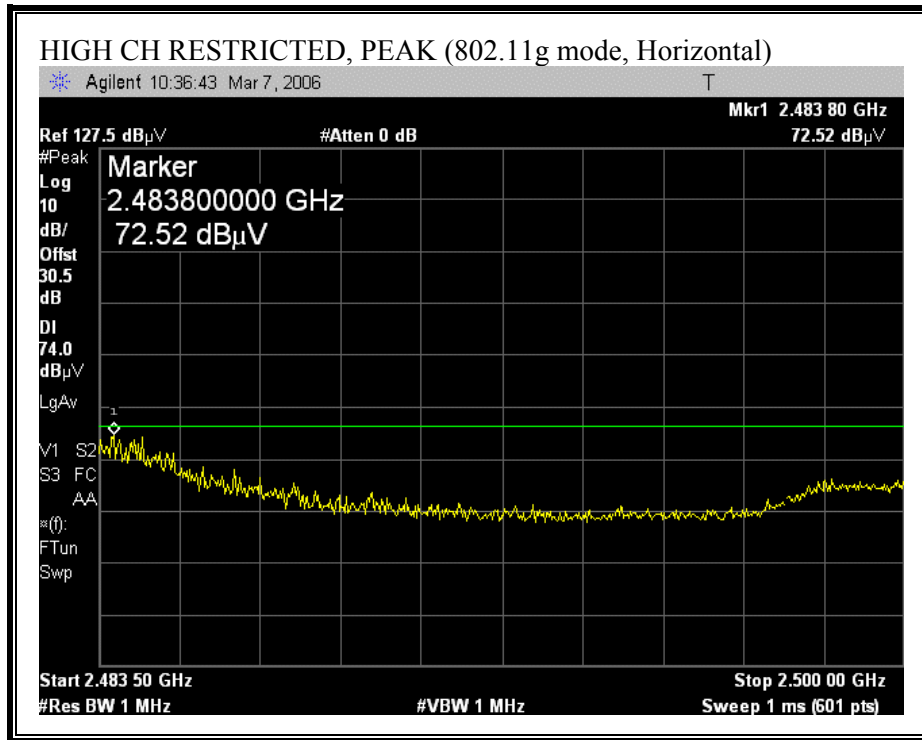


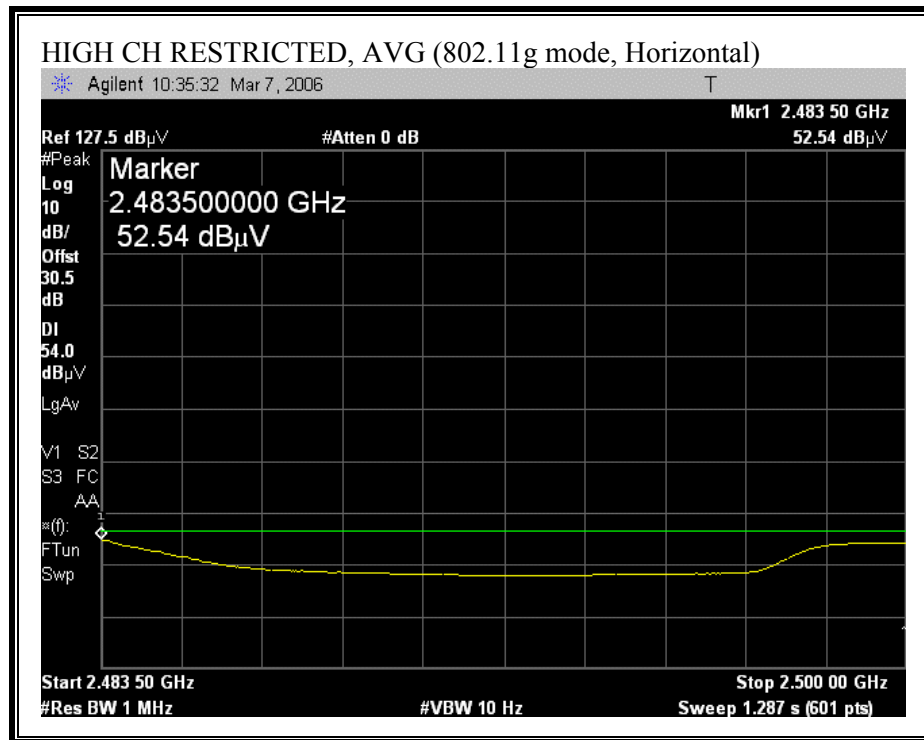
**RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)**



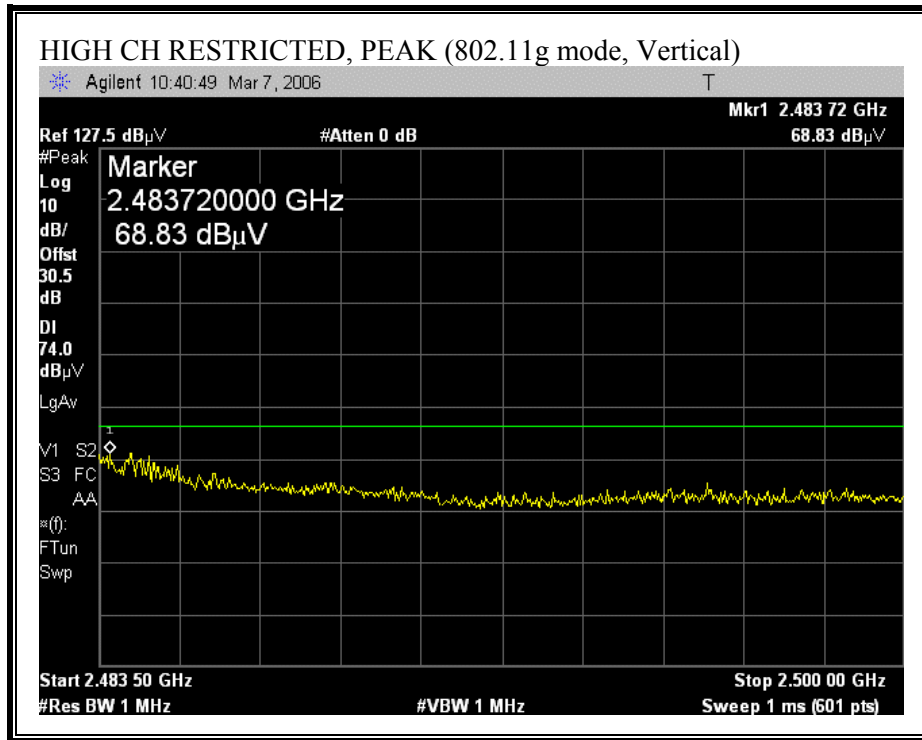


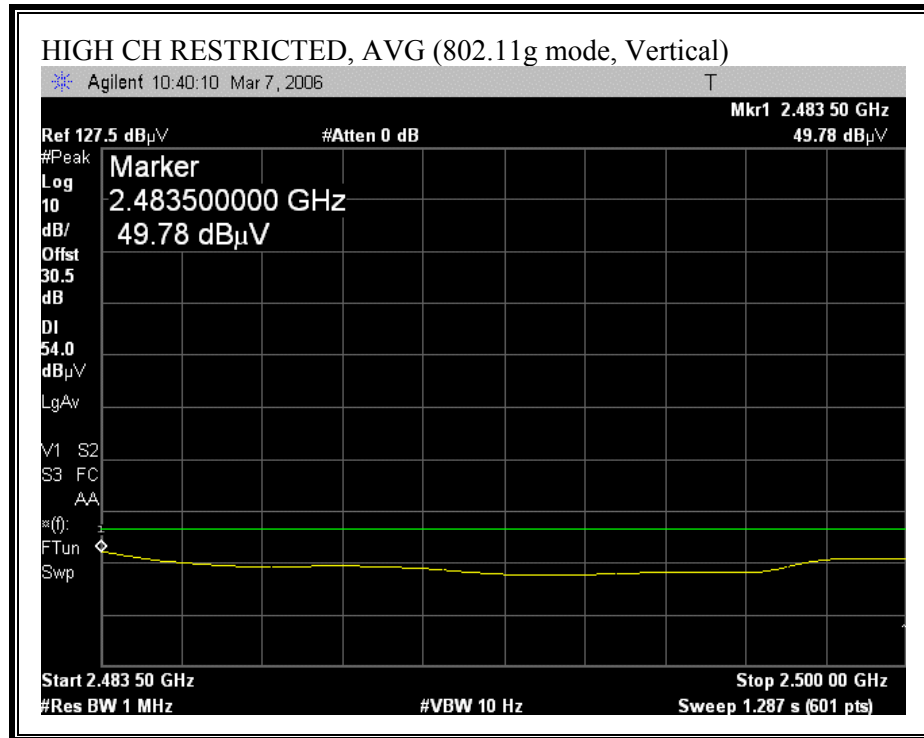
**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)**





**RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)**





**HARMONICS AND SPURIOUS EMISSIONS (g MODE) – WITH KAE ANTENNA**

| 03/07/06 <b>High Frequency Measurement</b><br><b>Compliance Certification Services, Morgan Hill Open Field Site</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------|--------------------------------|-------------------------------------------|------------------------------|-----------|--------------|----------------------------------|----------------|---------------|------------------|-------------------|--------------|---------------|----------------|----------------------------------------------------------------------------------|---|-----------------------|-----|-------------|---------|------------------------------|------|---------------------|--------|------------------------------|--------|---------------------------|------|------------------|-----|------------------------------|---------|--------------------------|----|----------------|------|--------------------------------|--------|-----------------------|----|------------|-----|------------------|--|--|
| <b>Test Engineer:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       | Frank Ibrahim                |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Project #:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       | 06I10115                     |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Company:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       | Samsung Electronics Co. Ltd. |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>EUT Description:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       | Notebook PC with KAE Antenna |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>EUT M/N:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       | NP-Q1                        |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>EUT S/N:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                       | 549G93AL200019E              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Test Target:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       | FCC 15.247                   |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Mode Of Operation:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                       | TX ON in 11g mode, 6Mbps     |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Test Equipment:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| Horn 1-18GHz<br>T73; S/N: 6717 @3m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                              |                                | Pre-amplifier 1-26GHz<br>T87 Miteq 924342 |                              |           |              | Pre-amplifier 26-40GHz           |                |               |                  | Horn > 18GHz      |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| Hi Frequency Cables                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 2 foot cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                              |                                | 3 foot cable<br>Frank 177080001           |                              |           |              | 12 foot cable<br>Frank 187209001 |                |               |                  | HPF<br>HPF_4.0GHz |              | Reject Filter |                | Peak Measurements<br>RBW=VBW=1MHz<br>Average Measurements<br>RBW=1MHz ; VBW=10Hz |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| f<br>GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Dist<br>(m)           | Read Pk<br>dBuV              | Read Avg.<br>dBuV              | AF<br>dB/m                                | CL<br>dB                     | Amp<br>dB | D Corr<br>dB | Filtr<br>dB                      | Peak<br>dBuV/m | Avg<br>dBuV/m | Pk Lim<br>dBuV/m | Avg Lim<br>dBuV/m | Pk Mar<br>dB | Avg Mar<br>dB | Notes<br>(V/H) |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Low Channel (2412 MHz)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.824                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 52.2                         | 39.4                           | 33.7                                      | 4.0                          | -45.3     | 0.0          | 0.6                              | 45.1           | 32.4          | 74               | 54                | -28.9        | -21.6         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.824                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 51.8                         | 38.9                           | 33.7                                      | 4.0                          | -45.3     | 0.0          | 0.6                              | 44.8           | 31.8          | 74               | 54                | -29.2        | -22.2         | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>Mid Channel (2437 MHz)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.280                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 59.2                         | 40.9                           | 33.1                                      | 3.7                          | -45.0     | 0.0          | 0.5                              | 51.5           | 33.2          | 74               | 54                | -22.5        | -20.8         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.874                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 54.5                         | 40.3                           | 33.8                                      | 4.0                          | -45.3     | 0.0          | 0.6                              | 47.6           | 33.3          | 74               | 54                | -26.4        | -20.7         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 7.311                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 57.5                         | 44.7                           | 35.5                                      | 4.6                          | -43.2     | 0.0          | 0.6                              | 55.0           | 42.3          | 74               | 54                | -19.0        | -11.7         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.280                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 59.4                         | 41.6                           | 33.1                                      | 3.7                          | -45.0     | 0.0          | 0.5                              | 51.6           | 33.9          | 74               | 54                | -22.4        | -20.1         | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.874                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 54.2                         | 41.8                           | 33.8                                      | 4.0                          | -45.3     | 0.0          | 0.6                              | 47.2           | 34.8          | 74               | 54                | -26.8        | -19.2         | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 7.311                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 60.3                         | 46.1                           | 35.5                                      | 4.6                          | -43.2     | 0.0          | 0.6                              | 57.8           | 43.6          | 74               | 54                | -16.2        | -10.4         | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <b>High Channel (2462 MHz)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.924                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 51.6                         | 38.6                           | 33.8                                      | 4.0                          | -45.4     | 0.0          | 0.6                              | 44.7           | 31.7          | 74               | 54                | -29.3        | -22.3         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 7.386                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 51.4                         | 38.7                           | 35.6                                      | 4.6                          | -43.1     | 0.0          | 0.6                              | 49.2           | 36.5          | 74               | 54                | -24.8        | -17.5         | V              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 4.924                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 52.0                         | 39.1                           | 33.8                                      | 4.0                          | -45.4     | 0.0          | 0.6                              | 45.2           | 32.2          | 74               | 54                | -28.8        | -21.8         | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| 7.386                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.0                   | 53.1                         | 40.0                           | 35.6                                      | 4.6                          | -43.1     | 0.0          | 0.6                              | 50.9           | 37.8          | 74               | 54                | -23.1        | -16.2         | H              |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| <table><tr><td>f</td><td>Measurement Frequency</td><td>Amp</td><td>Preamp Gain</td><td>Avg Lim</td><td>Average Field Strength Limit</td></tr><tr><td>Dist</td><td>Distance to Antenna</td><td>D Corr</td><td>Distance Correct to 3 meters</td><td>Pk Lim</td><td>Peak Field Strength Limit</td></tr><tr><td>Read</td><td>Analyzer Reading</td><td>Avg</td><td>Average Field Strength @ 3 m</td><td>Avg Mar</td><td>Margin vs. Average Limit</td></tr><tr><td>AF</td><td>Antenna Factor</td><td>Peak</td><td>Calculated Peak Field Strength</td><td>Pk Mar</td><td>Margin vs. Peak Limit</td></tr><tr><td>CL</td><td>Cable Loss</td><td>HPF</td><td>High Pass Filter</td><td></td><td></td></tr></table> |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  | f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit | Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit | Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit | AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit | CL | Cable Loss | HPF | High Pass Filter |  |  |
| f                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Measurement Frequency | Amp                          | Preamp Gain                    | Avg Lim                                   | Average Field Strength Limit |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| Dist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Distance to Antenna   | D Corr                       | Distance Correct to 3 meters   | Pk Lim                                    | Peak Field Strength Limit    |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| Read                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Analyzer Reading      | Avg                          | Average Field Strength @ 3 m   | Avg Mar                                   | Margin vs. Average Limit     |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| AF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Antenna Factor        | Peak                         | Calculated Peak Field Strength | Pk Mar                                    | Margin vs. Peak Limit        |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| CL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Cable Loss            | HPF                          | High Pass Filter               |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |
| EUT was scanned from 1 GHz to 25 GHz, no other signals above noise floor were detected.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                              |                                |                                           |                              |           |              |                                  |                |               |                  |                   |              |               |                |                                                                                  |   |                       |     |             |         |                              |      |                     |        |                              |        |                           |      |                  |     |                              |         |                          |    |                |      |                                |        |                       |    |            |     |                  |  |  |

## **7.2.2. CO-LOCATED TRANSMITTER RADIATED EMISSIONS**

### **RESULTS**

No non-compliance noted:

EUT was activated at mid channel in WLAN 11b mode (2437 MHz), and at mid channel in BT mode (2441 MHz). A pre-scan was performed to investigate whether there is any inter-modulation signal, all the signals that were detected were harmonics of individual transmitters, none of the inter-modulation signals were found in the frequency range of 1 to 25 GHz.

### 7.2.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

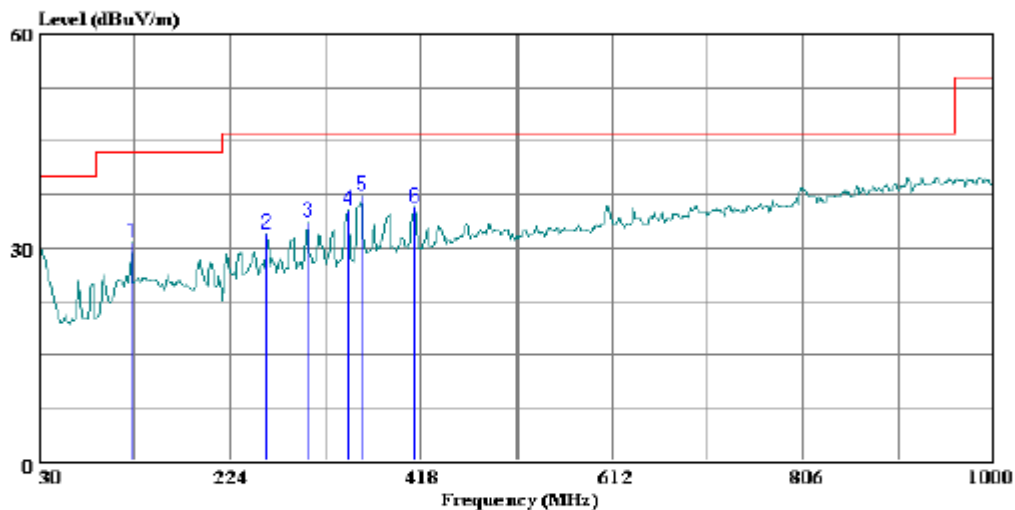
#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

##### HORIZONTAL PLOT



561F Monterey Road  
Morgan Hill, CA 95037  
Tel: (408) 463-0888  
Fax: (408) 463-0885

Data#: 2 File#: rad0223.EMI Date: 02-23-2006 Time: 18:53:38



(Auxiliary ATC)

Trace: 1

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL  
Test Operator : Frank Ibrahim  
Project # : 06I10115  
Company : Samsung Electronics Co. Ltd.  
EUT : Notebook PC  
Model No : NP-Q1  
Configuration : EUT only  
Mode of operation: TX ON in 11b mode, Mid Channel, 1Mbps  
Target of Test : FCC Class B

HORIZONTAL DATA

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 124.090 | 15.48         | 15.23  | 30.71  | 43.50         | -12.79        | Peak   |
| 2 | 261.830 | 17.57         | 14.35  | 31.92  | 46.00         | -14.09        | Peak   |
| 3 | 303.540 | 17.97         | 15.75  | 33.72  | 46.00         | -12.28        | Peak   |
| 4 | 344.280 | 18.46         | 16.79  | 35.25  | 46.00         | -10.75        | Peak   |
| 5 | 358.830 | 20.32         | 17.12  | 37.44  | 46.00         | -8.56         | Peak   |

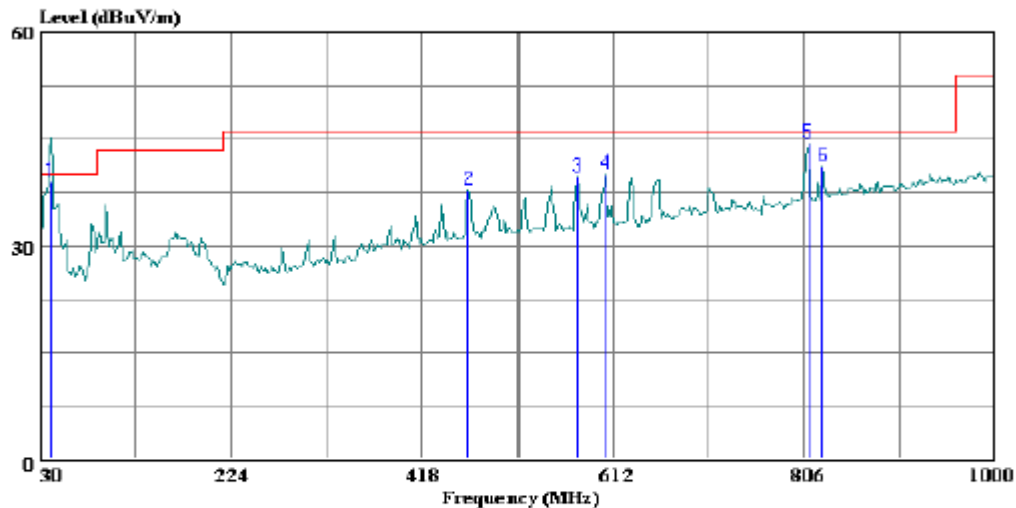
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT



561F Monterey Road  
Morgan Hill, CA 95037  
Tel: (408) 463-0888  
Fax: (408) 463-0885

Data#: 10 File#: rad0223.EMI Date: 02-23-2006 Time: 18:09:51



(Auxiliary ATC)

Trace: 5

Ref Trace:

Condition: FCC CLASS-B VERTICAL  
Test Operator : Frank Ibrahim  
Project # : 06I10115  
Company : Samsung Electronics Co., Ltd.  
EUT : Notebook PC  
Model No : NP-Q1  
Configuration : EUT only  
Mode of operation: TX ON in 11b mode, Mid Channel, 1Mbps  
Target of Test : FCC Class B

VERTICAL DATA

Page: 1

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 41.640  | 38.94         | 0.00   | 38.94  | 40.00         | -1.06         | QP     |
| 2 | 465.530 | 37.80         | 0.00   | 37.80  | 46.00         | -8.20         | Peak   |
| 3 | 575.140 | 39.57         | 0.00   | 39.57  | 46.00         | -6.43         | Peak   |
| 4 | 604.240 | 40.16         | 0.00   | 40.16  | 46.00         | -5.84         | Peak   |
| 5 | 809.880 | 44.36         | 0.00   | 44.36  | 46.00         | -1.64         | Peak   |
| 6 | 824.430 | 41.08         | 0.00   | 41.08  | 46.00         | -4.92         | Peak   |

### 7.3. POWERLINE CONDUCTED EMISSIONS

#### LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, 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 frequency ranges.

| Frequency of Emission (MHz) | Conducted Limit (dBuV) |            |
|-----------------------------|------------------------|------------|
|                             | Quasi-peak             | Average    |
| 0.15-0.5                    | 66 to 56 *             | 56 to 46 * |
| 0.5-5                       | 56                     | 46         |
| 5-30                        | 60                     | 50         |

\* Decreases with the logarithm of the frequency.

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

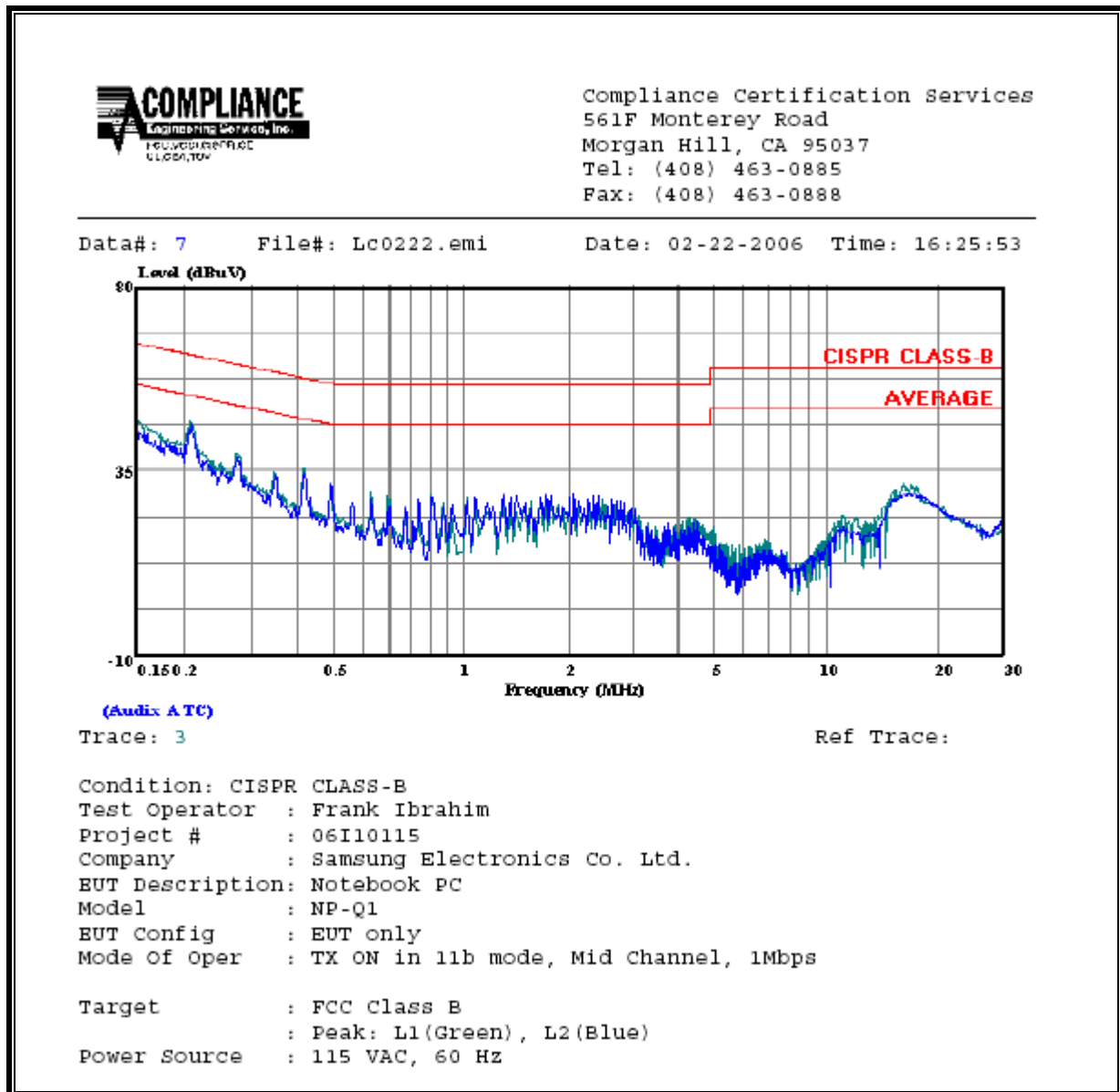
#### RESULTS

No non-compliance noted:

# **6 WORST EMISSIONS**

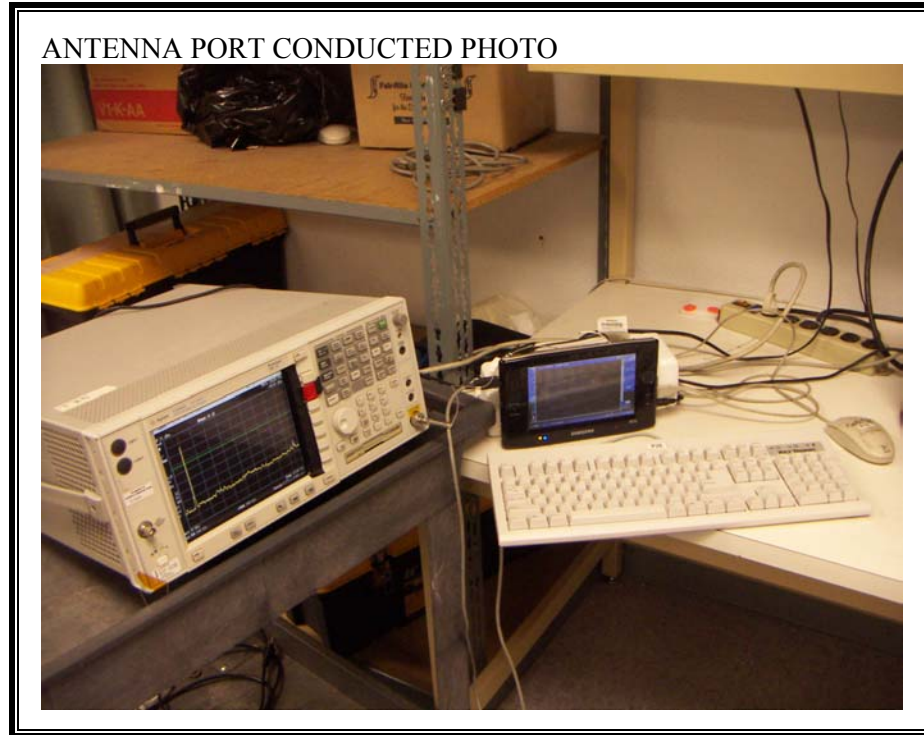
| CONDUCTED EMISSIONS DATA (115VAC 60Hz) |           |           |           |       |       |       |         |         |         |
|----------------------------------------|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq.                                  | Reading   |           |           | Closs | Limit | EN B  | Margin  |         | Remark  |
| (MHz)                                  | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB)  | QP    | AV    | QP (dB) | AV (dB) | L1 / L2 |
| 0.15                                   | 47.30     | --        | --        | 0.00  | 66.00 | 56.00 | -18.70  | -8.70   | L1      |
| 0.21                                   | 46.78     | --        | --        | 0.00  | 63.32 | 53.32 | -16.54  | -6.54   | L1      |
| 0.28                                   | 38.94     | --        | --        | 0.00  | 60.91 | 50.91 | -21.97  | -11.97  | L1      |
| 0.15                                   | 44.88     | --        | --        | 0.00  | 65.94 | 55.94 | -21.06  | -11.06  | L2      |
| 0.21                                   | 45.96     | --        | --        | 0.00  | 63.28 | 53.28 | -17.32  | -7.32   | L2      |
| 0.28                                   | 37.74     | --        | --        | 0.00  | 60.91 | 50.91 | -23.17  | -13.17  | L2      |
| 6 Worst Data                           |           |           |           |       |       |       |         |         |         |

**LINE 1 AND LINE 2 RESULTS**



## 8. SETUP PHOTOS

### ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



**RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION**

X-AXIS FRONT PHOTO



Y-AXIS FRONT PHOTO



Z-AXIS FRONT PHOTO



**RADIATED EMISSIONS SETUP**

FRONT PHOTO



BACK PHOTO



**POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP**



LINE CONDUCTED BACK PHOTO



**END OF REPORT**