



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

**FOR**

**WIRELESS MOUSE**

**MODEL NUMBER: AS00765-001**

**FCC ID: JJ4-AS00765**

**REPORT NUMBER: 05U3274-1 REV B**

**ISSUE DATE: APRIL 12, 2005**

*Prepared for*

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*Prepared by*

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**LAB CODE:200065-0**

Revision History

| Rev. |  | Revisions                                                                                                   |  | Revised By  |
|------|--|-------------------------------------------------------------------------------------------------------------|--|-------------|
| B    |  | Remove original Section 7.1.4 Maximum Permissible Exposure                                                  |  | Danielle Z. |
|      |  | Replace all high channel test data (high channel frequency changed from 2478 MHz to 2479 MHz and re-tested) |  | Danielle Z. |
|      |  |                                                                                                             |  |             |
|      |  |                                                                                                             |  |             |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** GYRATION  
12950 SARATOGA AVE.  
SARATOGA, CA 95070, USA

**EUT DESCRIPTION:** WIRELESS MOUSE

**MODEL:** AS00765-001

**SERIAL NUMBER:** SVT 10, 13

**DATE TESTED:** FEBRUARY 25 – APRIL 12, 2005

| 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.

Approved & Released For CCS By:

Tested By:



THU CHAN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

HITESH H. SOLANKI  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 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 Wireless Mouse, which uses DS SS and operates at 2.4 GHz band. It communicates with a USB Transceiver connected to a computer. The mouse sends data to the computer via the radio. The transceiver receives data and sends out acknowledgements for the data received and awaits further data from the mouse.

The mouse can be powered by battery, or as an option, by a charging cradle.

The radio module is manufactured by CYPRESS.

### 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) |
|--------------------------|-------|-----------------------|----------------------|
| 2403 - 2479              | DS SS | -1.74                 | 0.67                 |

### **5.3. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes an integral antenna with a maximum gain of 0 dBi.

### **5.4. SOFTWARE AND FIRMWARE**

The firmware installed in the EUT during testing was FCC Test Mouse Revision 3.

The test utility software used during testing was USB\_HID\_TOOL, Revision 1.2.

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

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 2403 MHz.

## **5.6. DESCRIPTION OF TEST SETUP**

### **SUPPORT EQUIPMENT**

N/A.

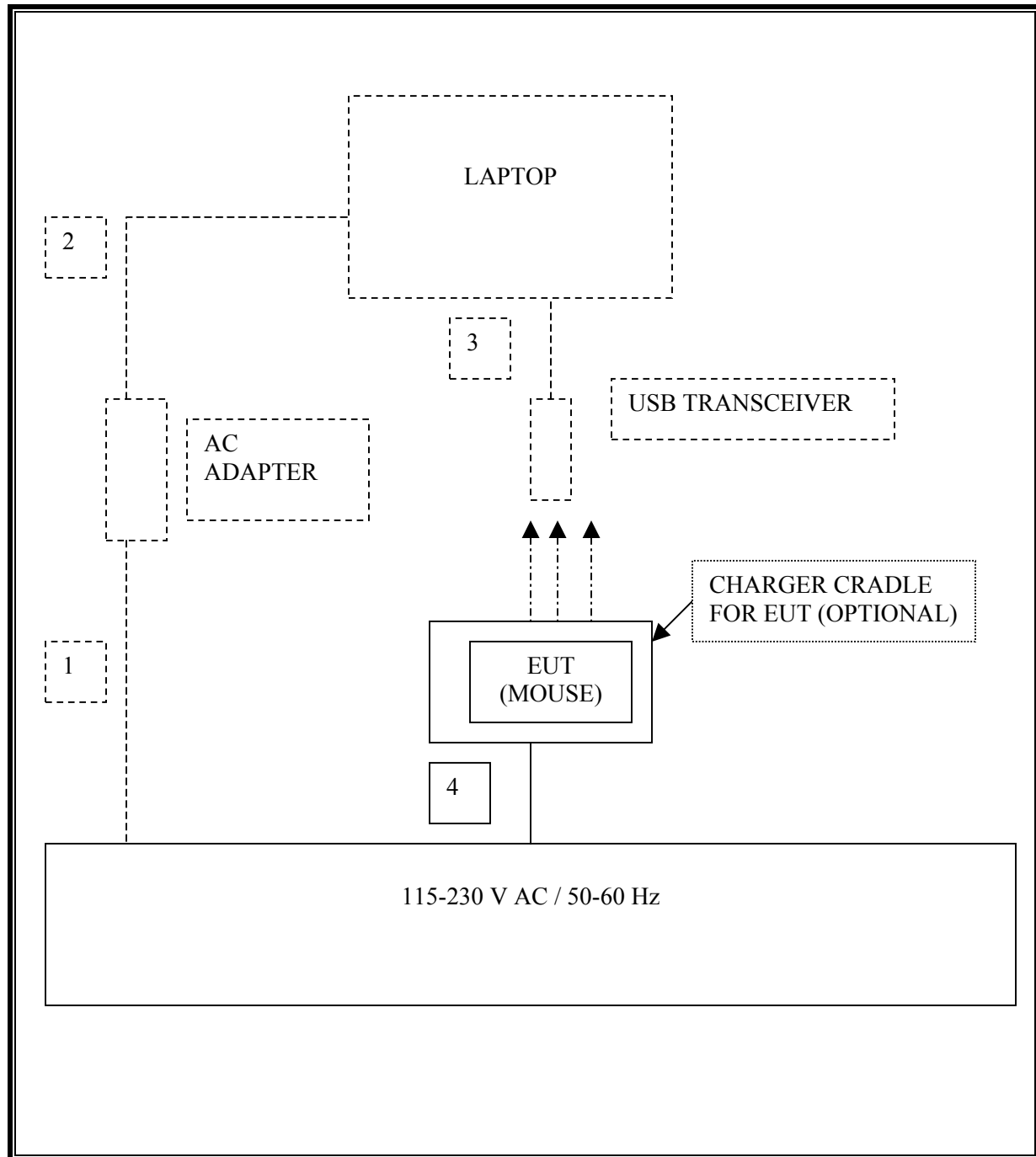
### **I/O CABLES**

N/A.

### **TEST SETUP**

The EUT is a standalone unit with charging cradle and AC adapter as optional power supply. It communicates with the USB Transceiver connected to the host Laptop via a wireless link.

**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    |
| EMI Test Receiver                    | R & S          | ESHS 20          | 827129/006    | 10/22/2005 |
| Site A Line Stabilizer / Conditioner | Tripplite      | LC-1800a         | A0051681      | CNR        |
| LISN, 10 kHz ~ 30 MHz                | FCC            | LISN-50/250-25-2 | 2023          | 8/30/2005  |
| LISN, 10 kHz ~ 30 MHz                | Solar          | 8012-50-R-24-BNC | 8379443       | 10/21/2005 |
| Spectrum Analyzer                    | HP             | E4446A           | US42510266    | 8/25/2005  |
| Antenna, Horn 1 ~ 18 GHz             | EMCO           | 3117             | 29310         | 9/12/2005  |
| Preamplifier, 1 ~ 26.5 GHz           | HP             | 8449B            | 3008A00369    | 8/17/2005  |
| Temperature / Humidity Chamber       | Thermotron     | SE 600-10-10     | 29800         | 5/13/2005  |
| Peak Power Meter                     | Agilent        | E4416A           | GB41291160    | 11/7/2005  |
| Peak / Average Power Sensor          | Agilent        | E9327A           | US40440755    | 11/7/2005  |
| RF Filter Section                    | HP             | 85420E           | 3705A00256    | 11/21/2005 |
| EMI Receiver, 9 kHz ~ 2.9 GHz        | HP             | 8542E            | 3942A00286    | 11/21/2005 |
| 30MHz--- 2Ghz                        | Sunol Sciences | JB1 Antenna      | A121003       | 9/12/2005  |
| 4.0 High Pass Filter                 | Micro Tronics  | HPM13351         | 3             | CNR        |
| 2.4 - 2.5 Band Reject Filter         | Micro Tronics  | BRM50702         | 1             | CNR        |

## 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

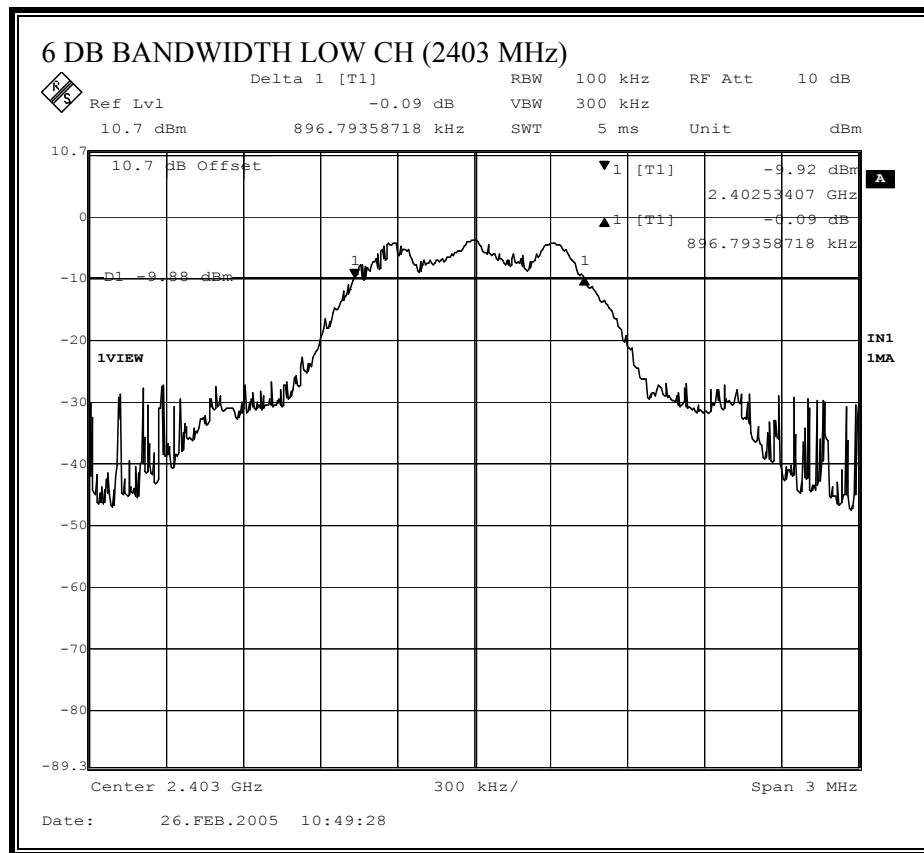
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

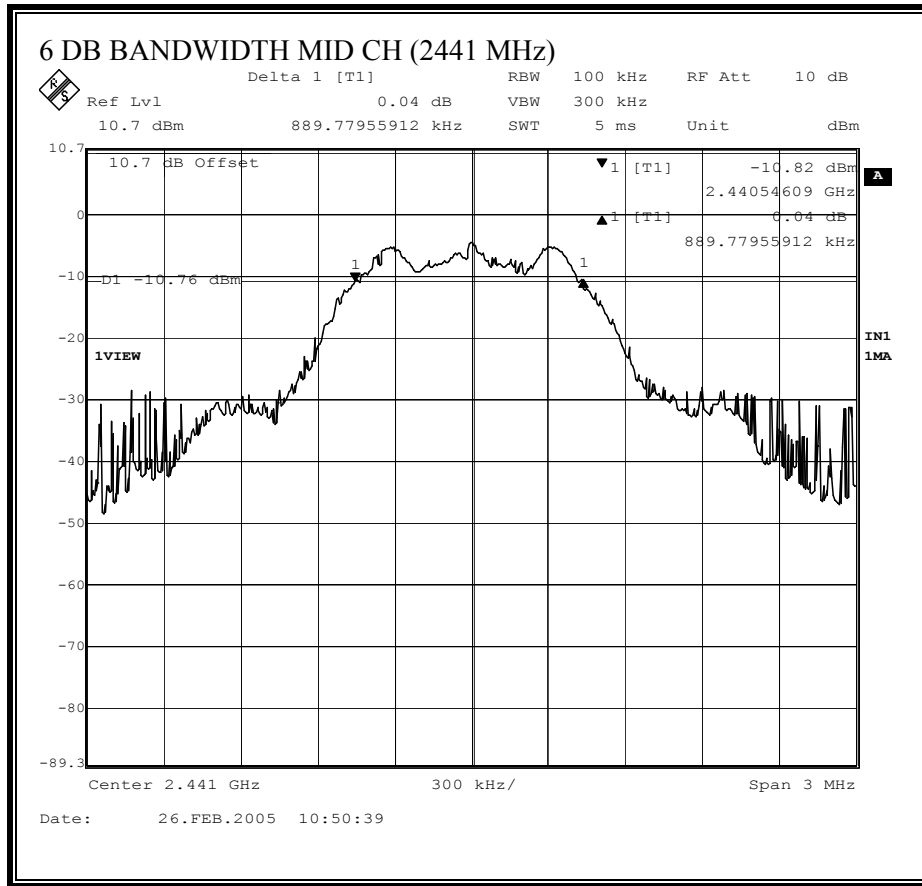
##### RESULTS

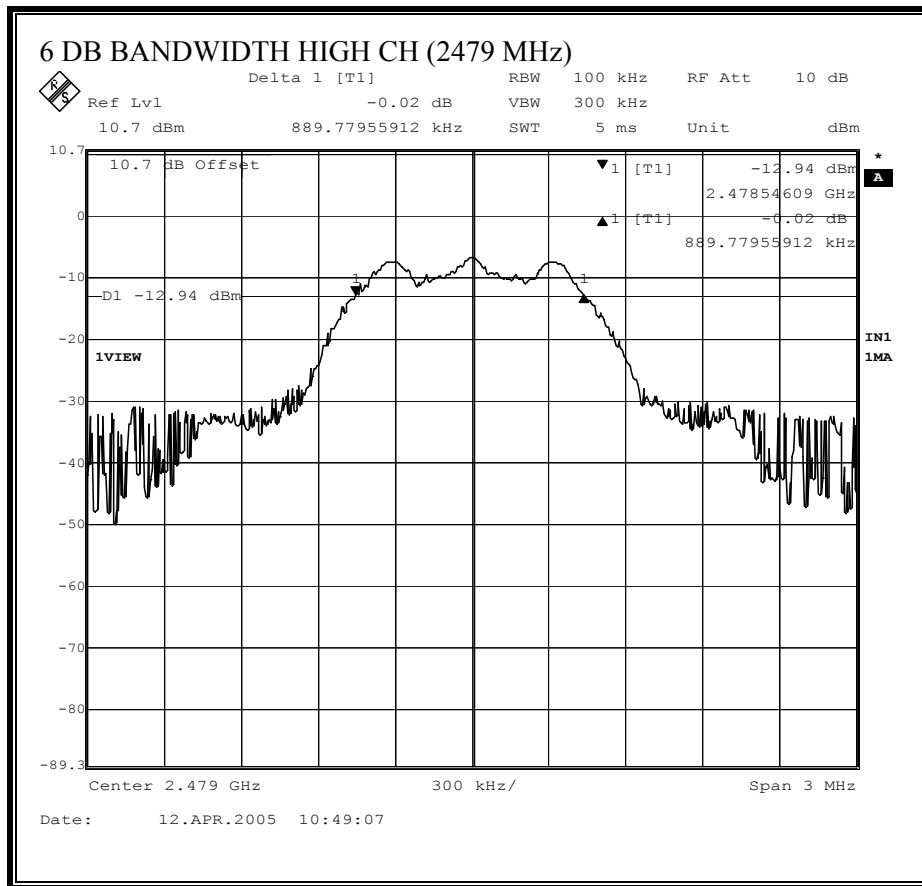
No non-compliance noted:

| Channel | Frequency<br>(MHz) | 6 dB Bandwidth<br>(kHz) | Minimum Limit<br>(kHz) | Margin<br>(kHz) |
|---------|--------------------|-------------------------|------------------------|-----------------|
| Low     | 2403               | 896.793                 | 500                    | 397             |
| Middle  | 2441               | 889.779                 | 500                    | 390             |
| High    | 2479               | 889.77                  | 500                    | 390             |

**6 DB BANDWIDTH**







### 7.1.2. 99% BANDWIDTH

#### LIMIT

None; for reporting purposes only.

#### TEST PROCEDURE

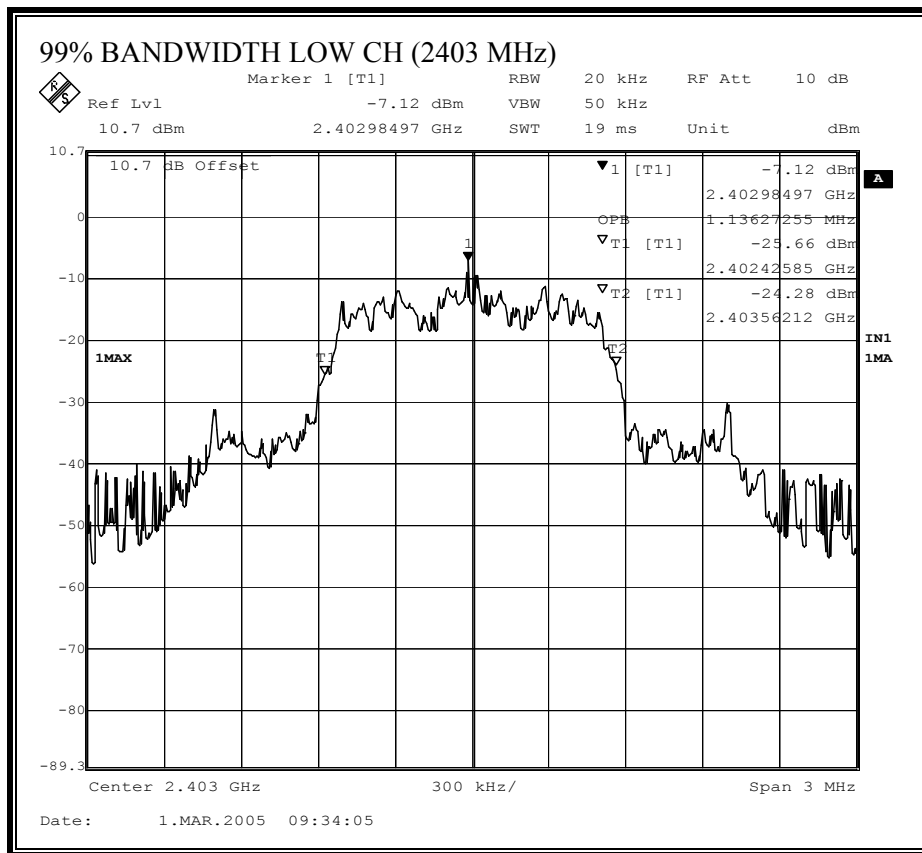
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

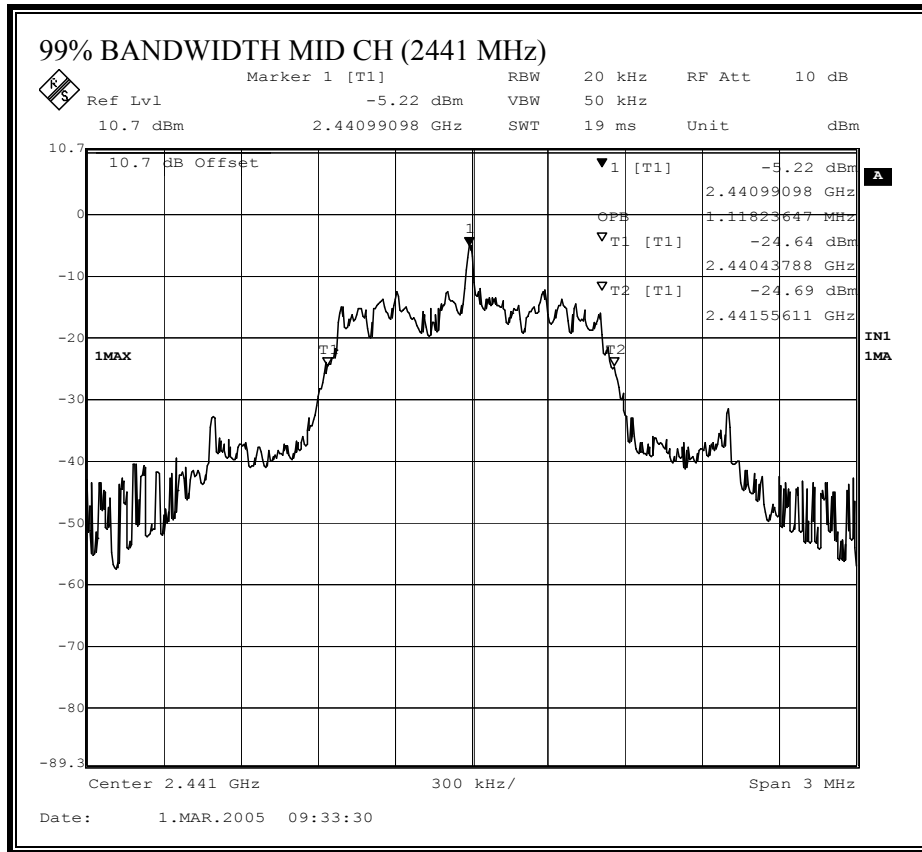
#### RESULTS

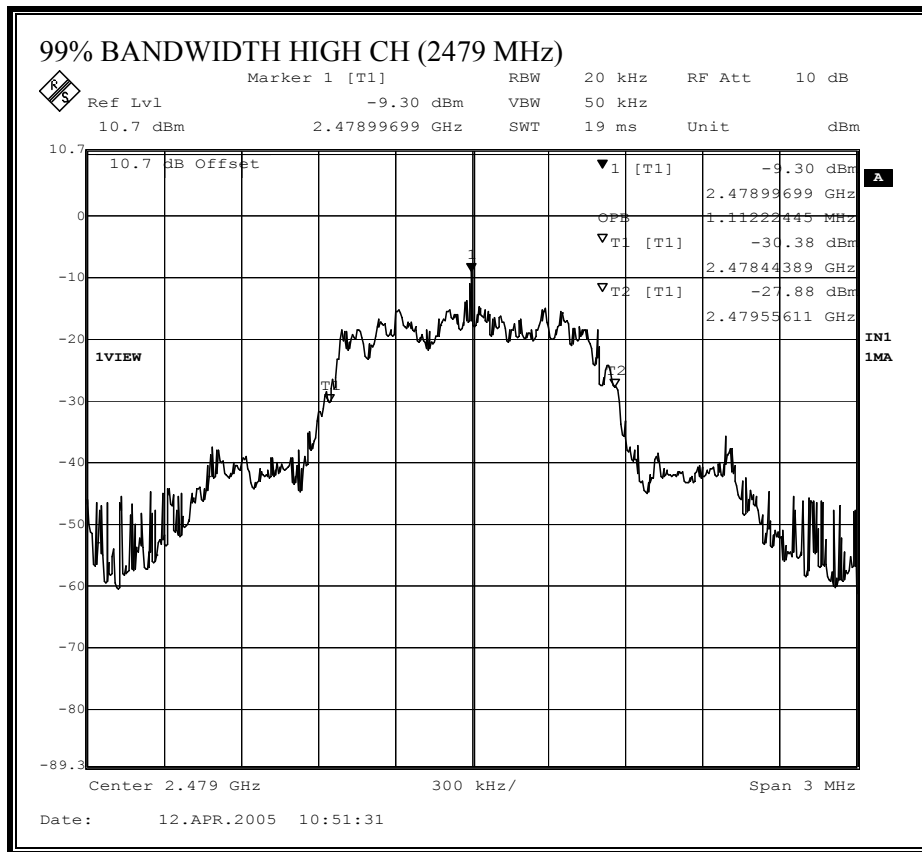
No non-compliance noted:

| Channel | Frequency<br>(MHz) | 99% Bandwidth<br>(MHz) |
|---------|--------------------|------------------------|
| Low     | 2403               | 1.136                  |
| Middle  | 2441               | 1.118                  |
| High    | 2479               | 1.112                  |

**99% BANDWIDTH**







### **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) (4) Except as shown in paragraphs (b)(4) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§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.

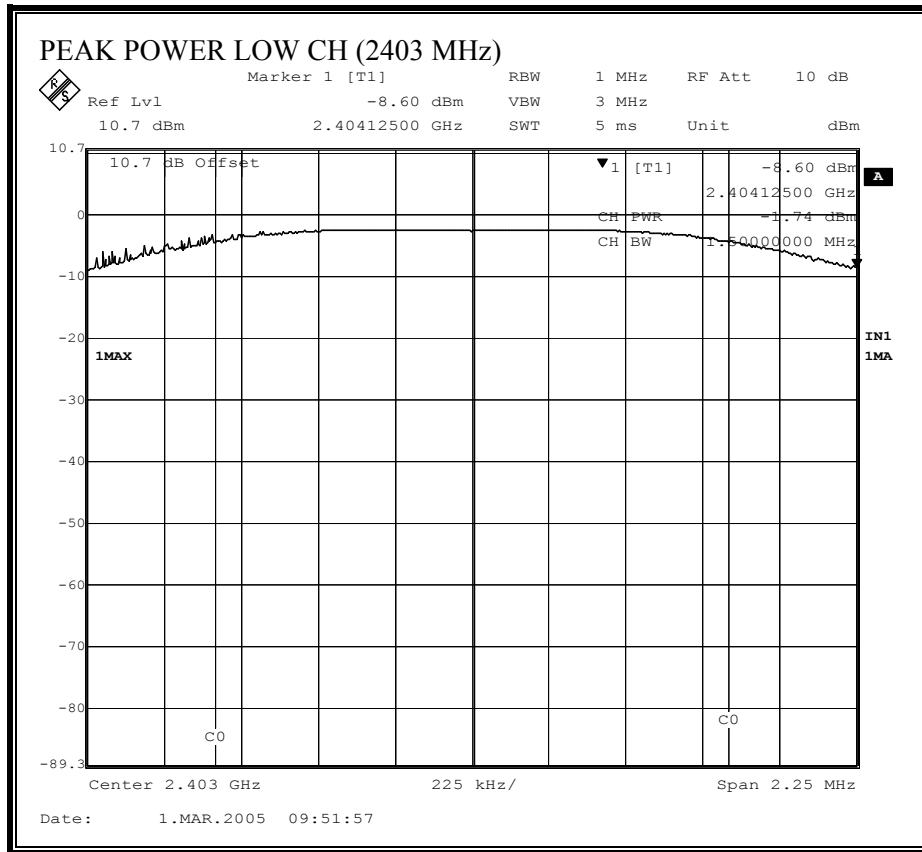
## **RESULTS**

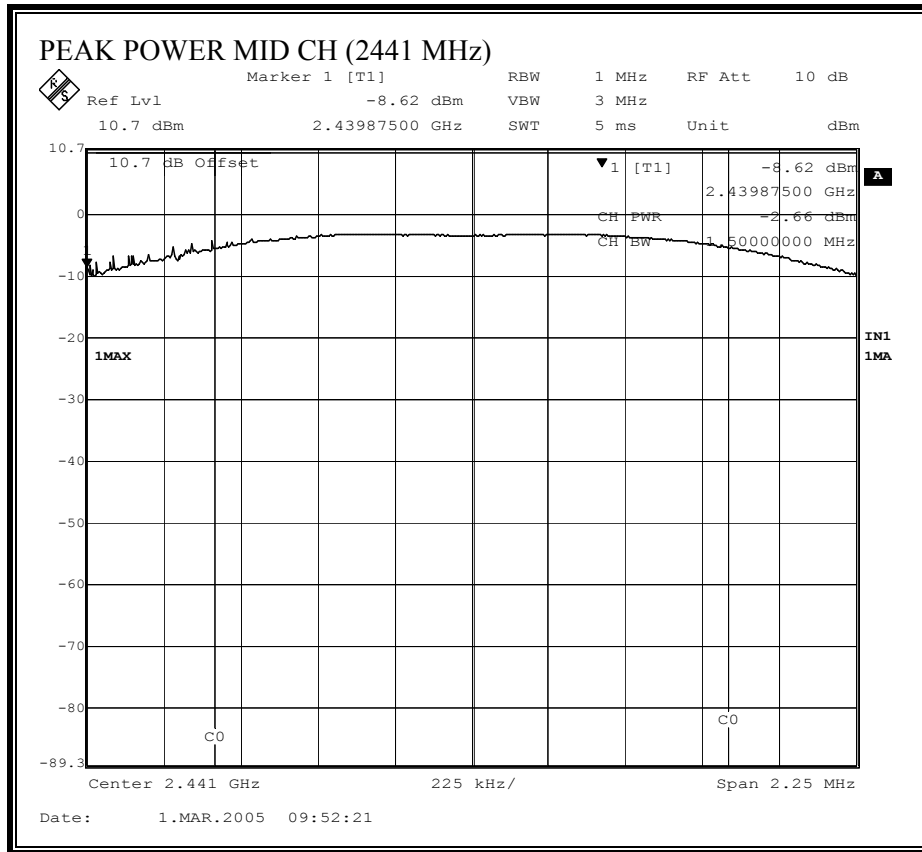
The maximum antenna gain is 0 dBi for other than fixed, point-to-point operations, therefore the limit is 30 dBm.

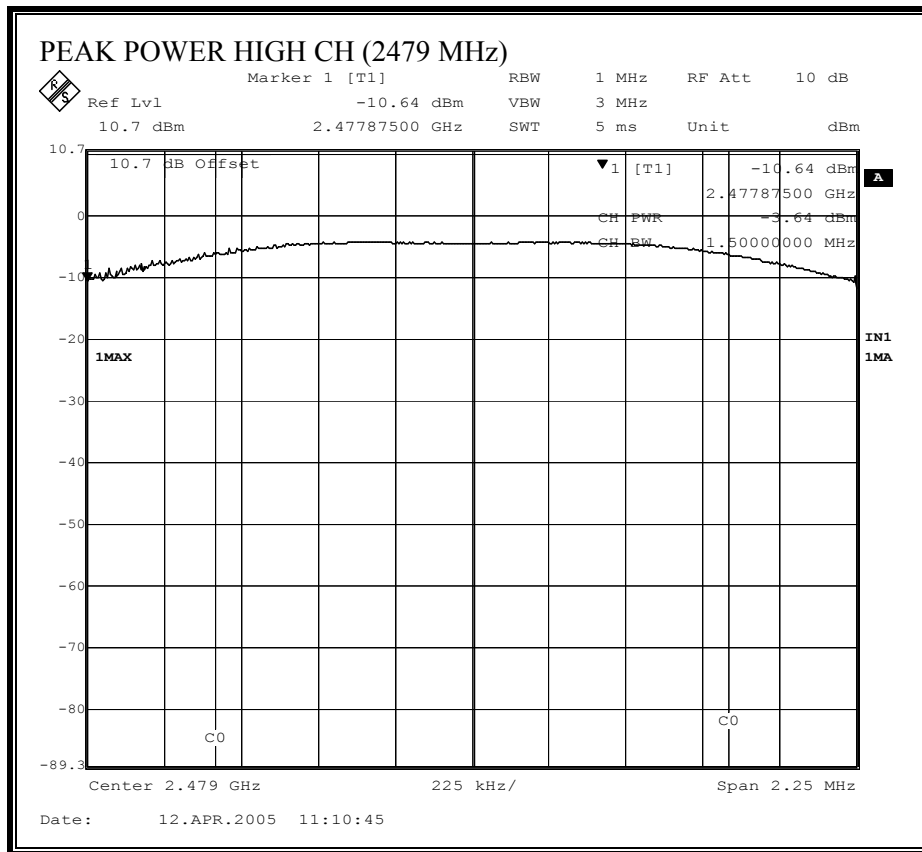
No non-compliance noted:

| <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            | 2403                       | -1.74                       | 30                     | -31.74                 |
| Middle         | 2441                       | -2.66                       | 30                     | -32.66                 |
| High           | 2479                       | -3.64                       | 30                     | -33.64                 |

**OUTPUT POWER**







#### **7.1.4. 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 10.7 dB (including 10 dB pad and 0.7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency<br>(MHz) | Power<br>(dBm) |
|---------|--------------------|----------------|
| Low     | 2403               | -0.90          |
| Middle  | 2441               | -1.20          |
| High    | 2479               | -1.70          |

### 7.1.5. 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**

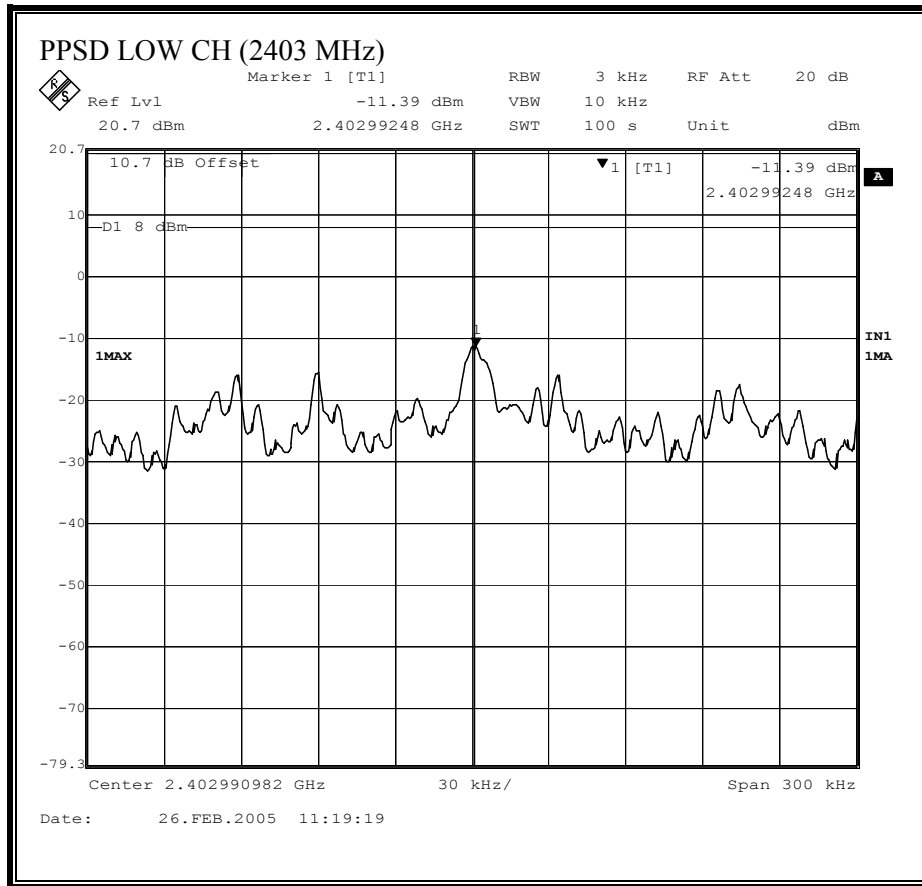
The transmitter output is connected to a spectrum analyzer, the maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3 kHz and VBW > 3 kHz, sweep time = span / 3 kHz, and video averaging is turned off. The PPSD is the highest level found across the emission in any 3 kHz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

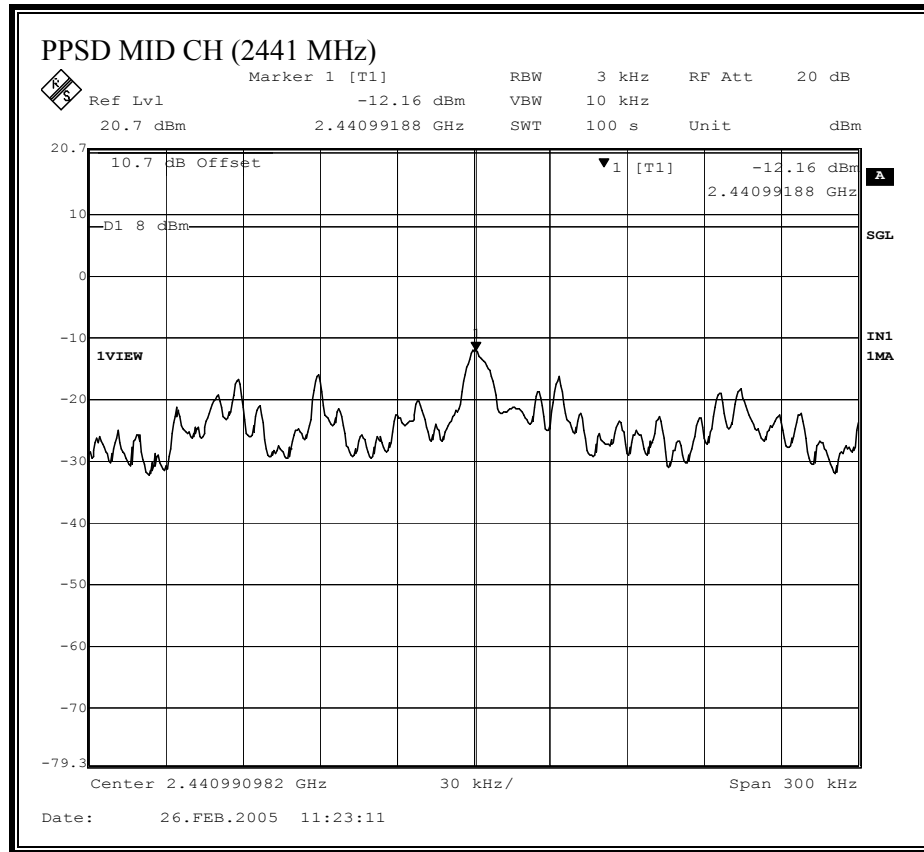
#### **RESULTS**

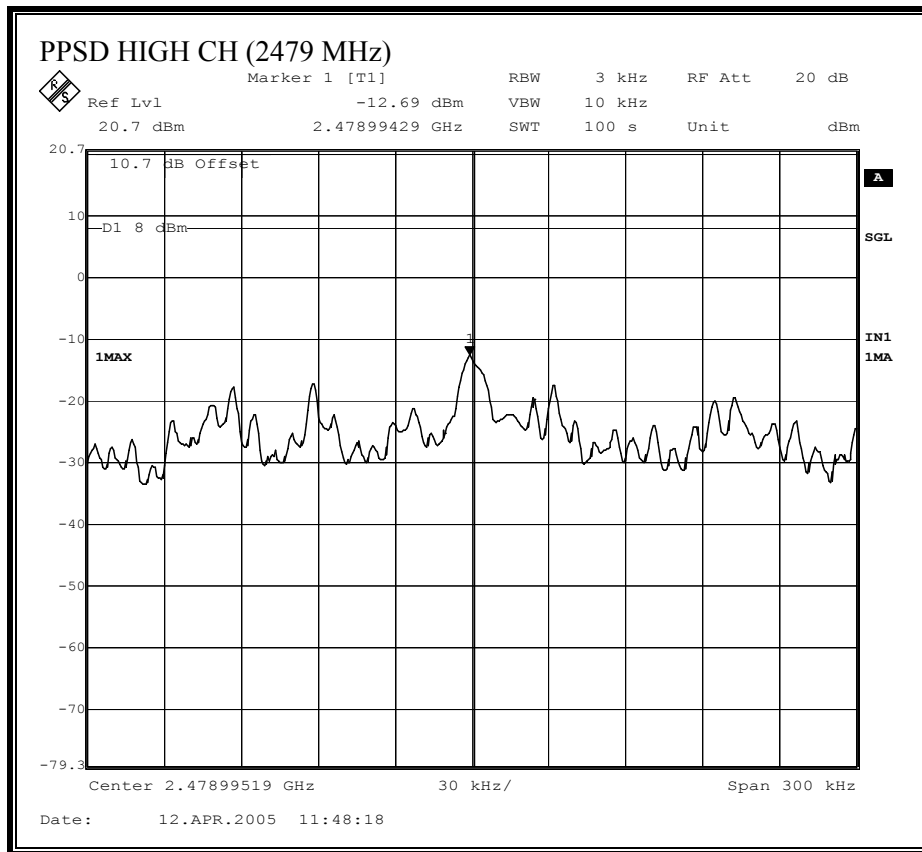
No non-compliance noted:

| Channel | Frequency<br>(MHz) | PPSD<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|---------------|----------------|----------------|
| Low     | 2403               | -11.39        | 8              | -19.39         |
| Middle  | 2441               | -12.16        | 8              | -20.16         |
| High    | 2479               | -12.69        | 8              | -20.69         |

**PEAK POWER SPECTRAL DENSITY**







## **7.1.6. 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)).

### **TEST PROCEDURE**

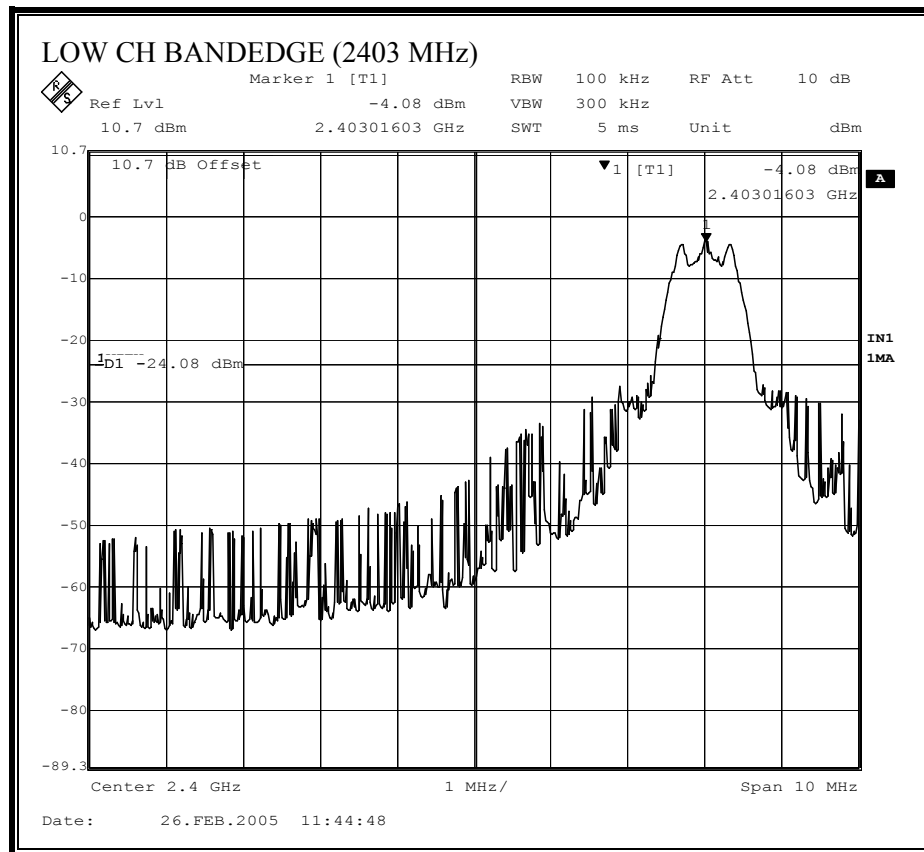
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

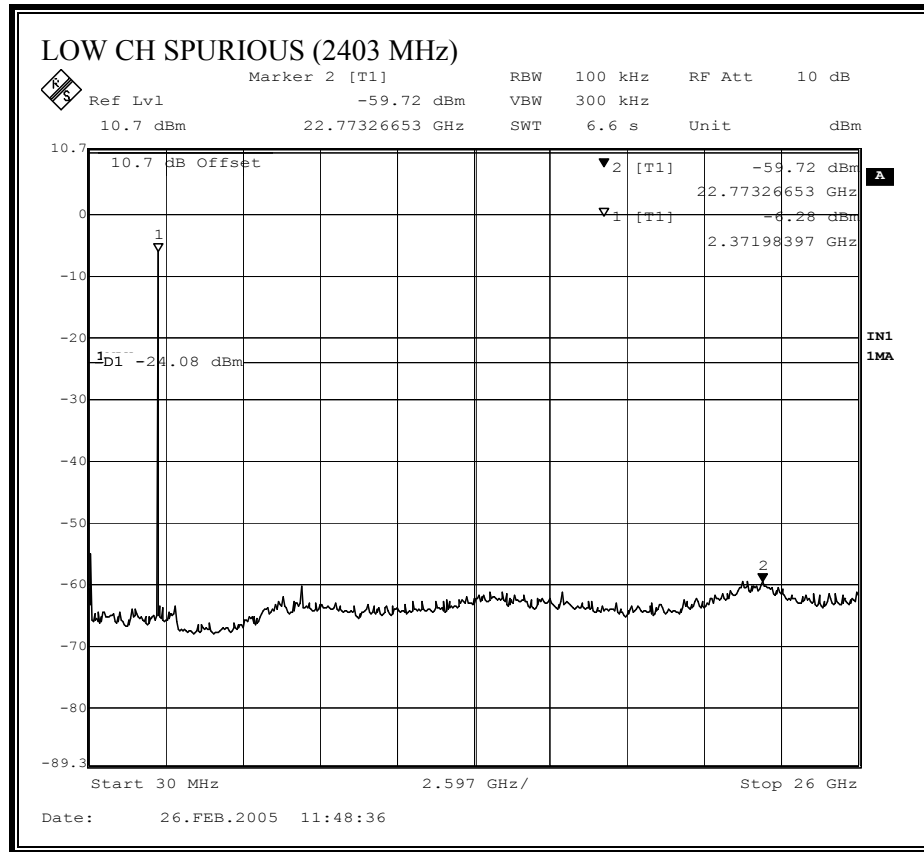
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

### **RESULTS**

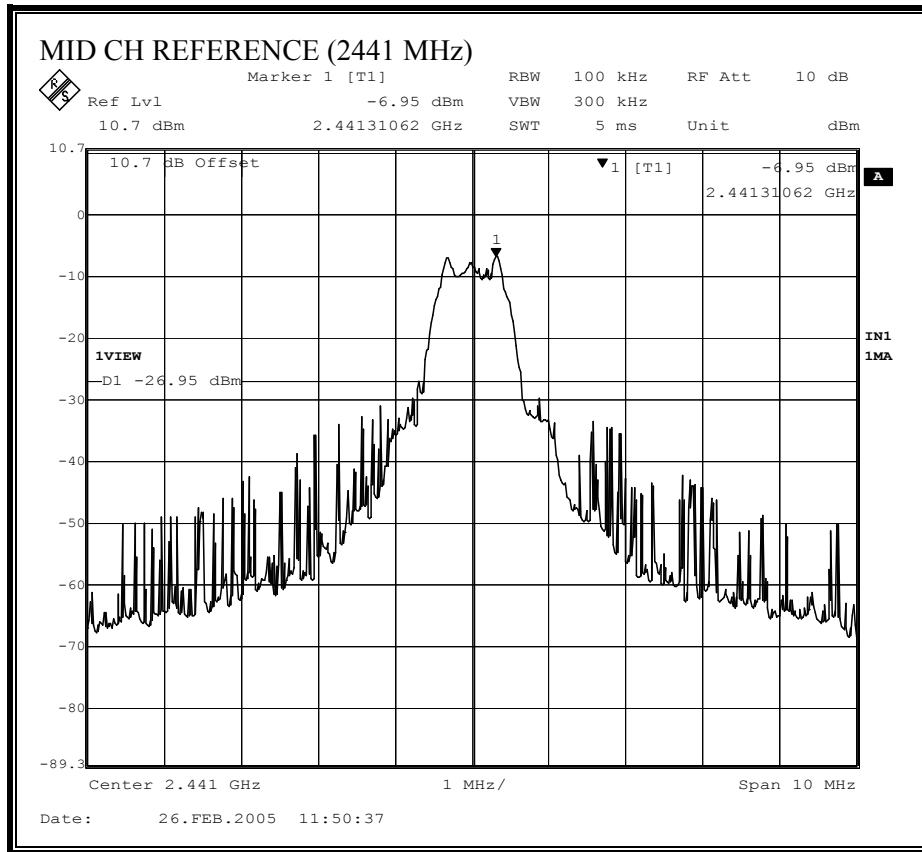
No non-compliance noted:

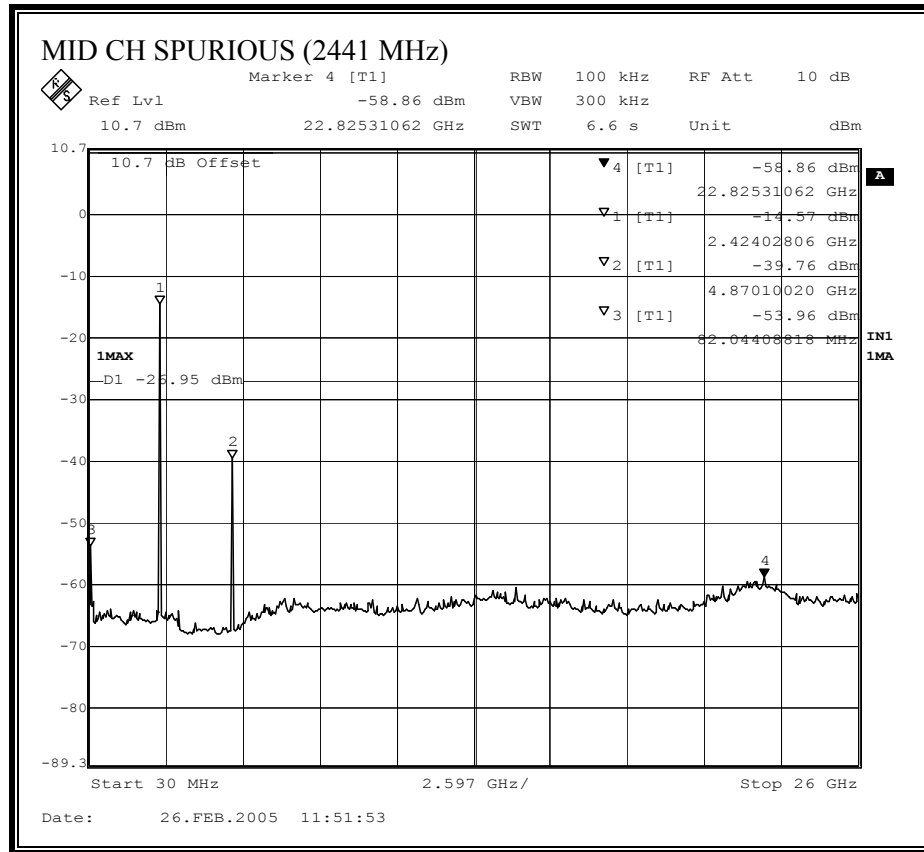
**SPURIOUS EMISSIONS, LOW CHANNEL (2403 MHz)**



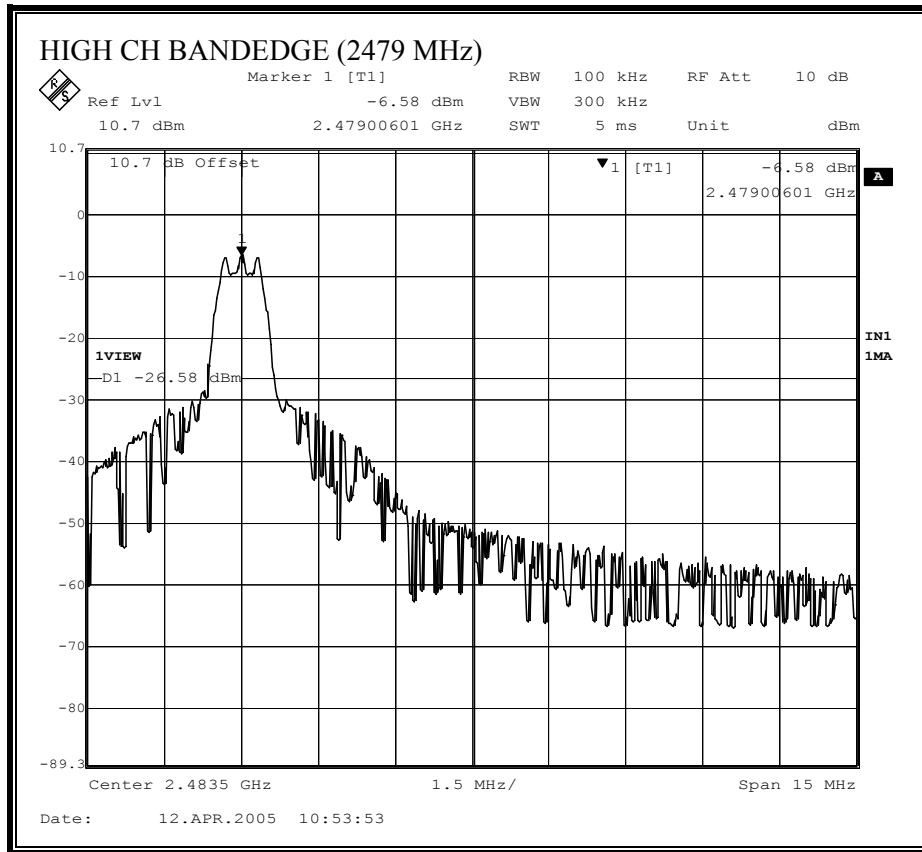


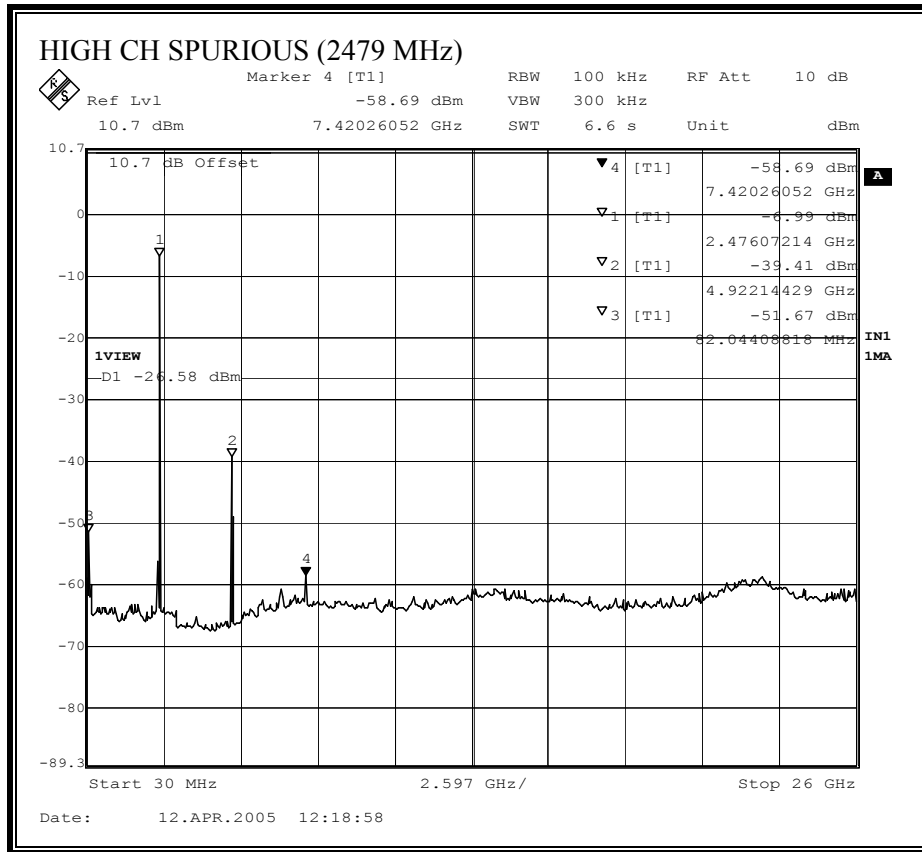
**SPURIOUS EMISSIONS, MID CHANNEL**





**SPURIOUS EMISSIONS, HIGH CHANNEL**





## 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.

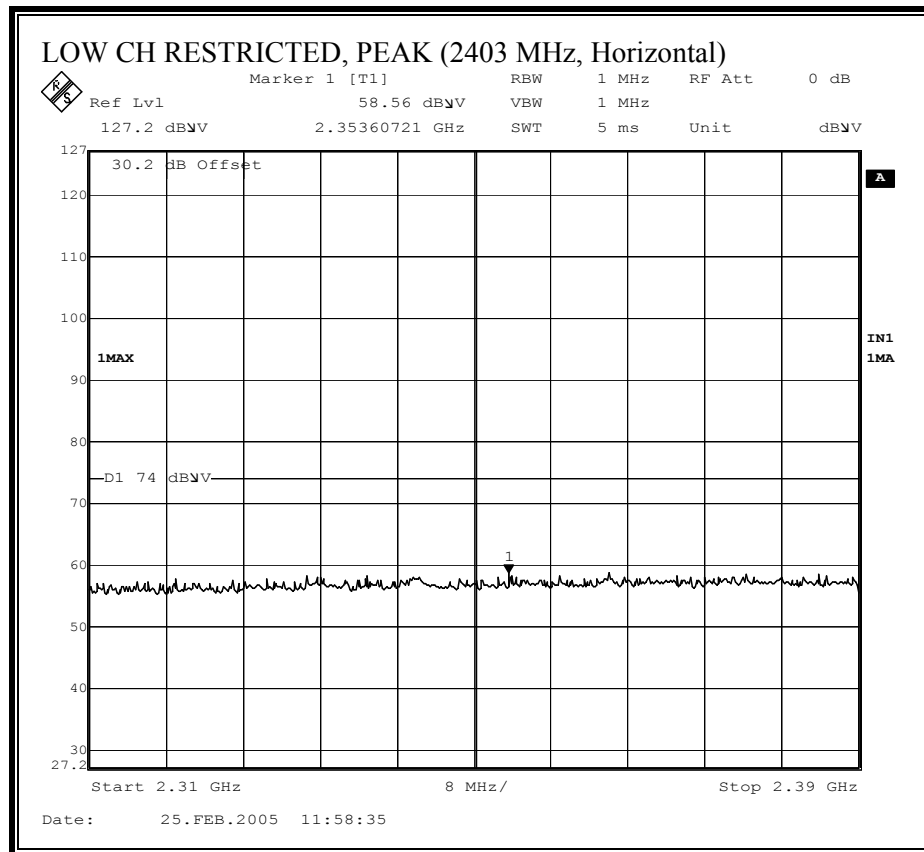
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

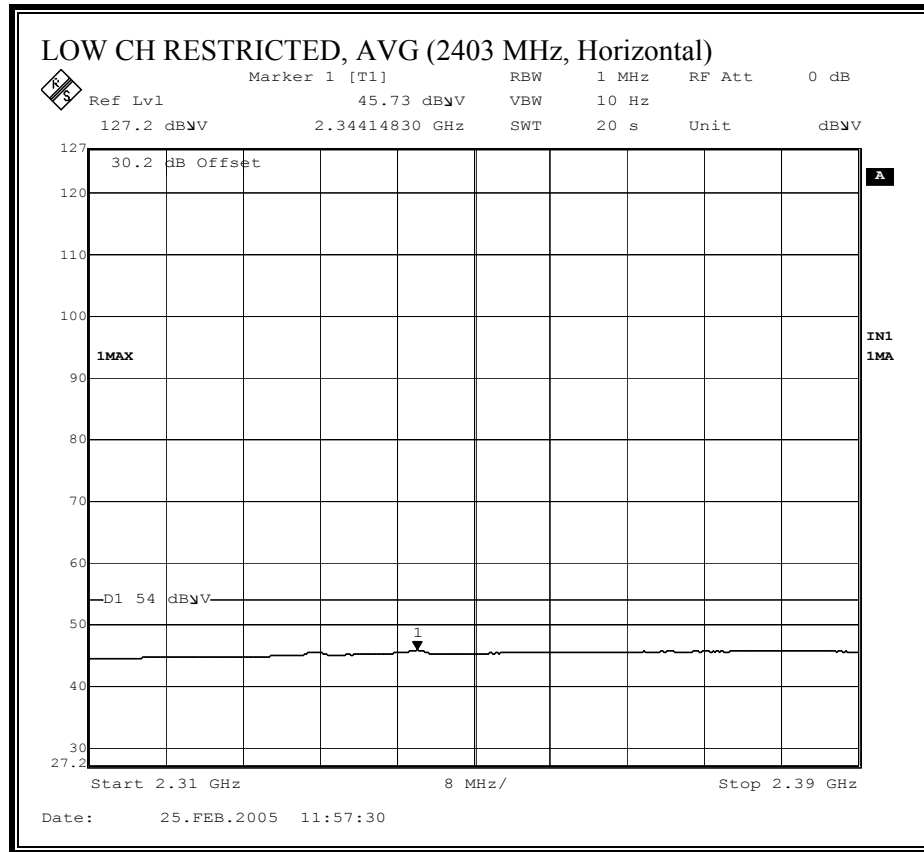
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

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.

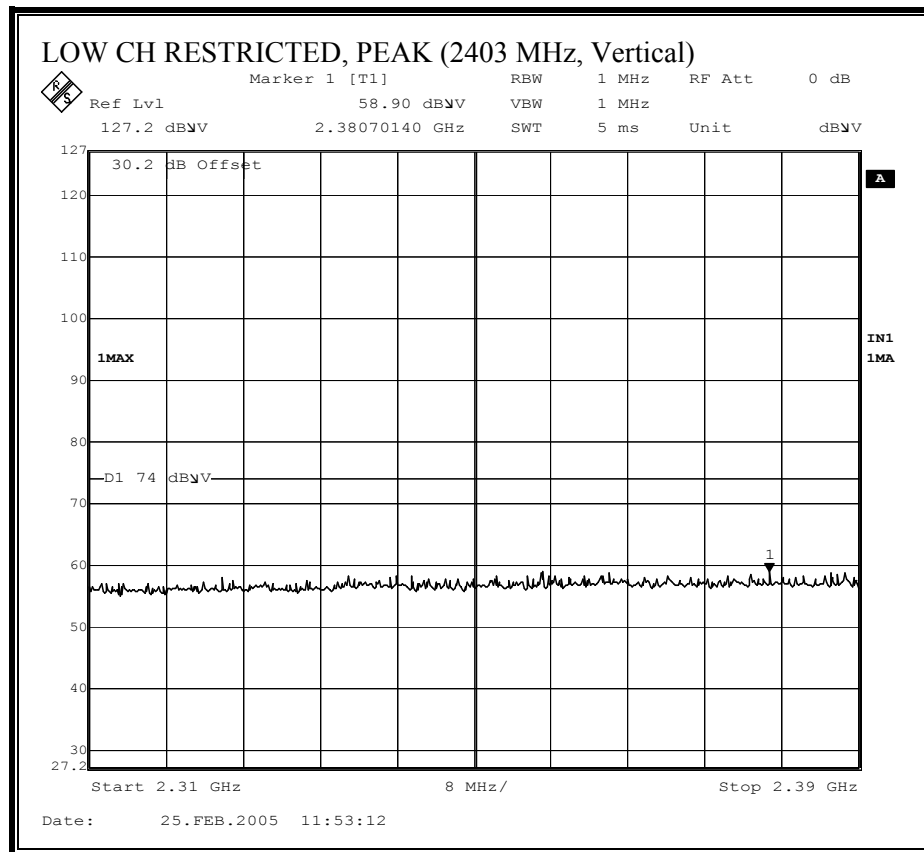
## 7.2.2. TRANSMITTER ABOVE 1 GHz FOR 2400 TO 2483.5 MHz BAND

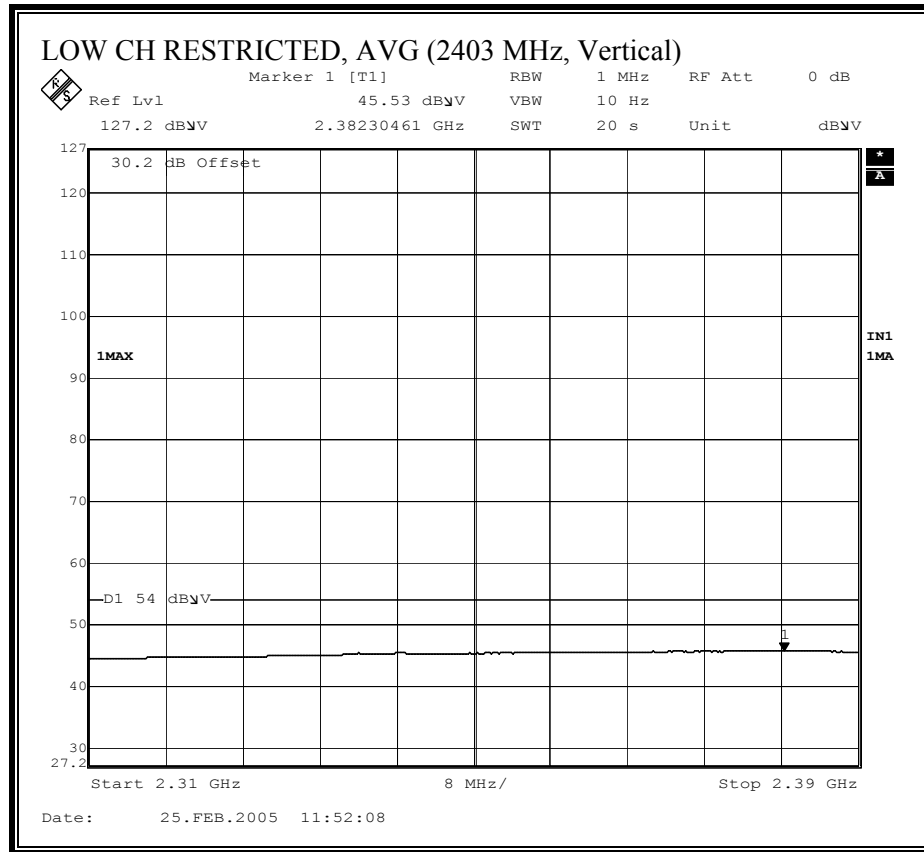
### RESTRICTED BANDEDGE (2403 MHz, LOW CHANNEL, HORIZONTAL)



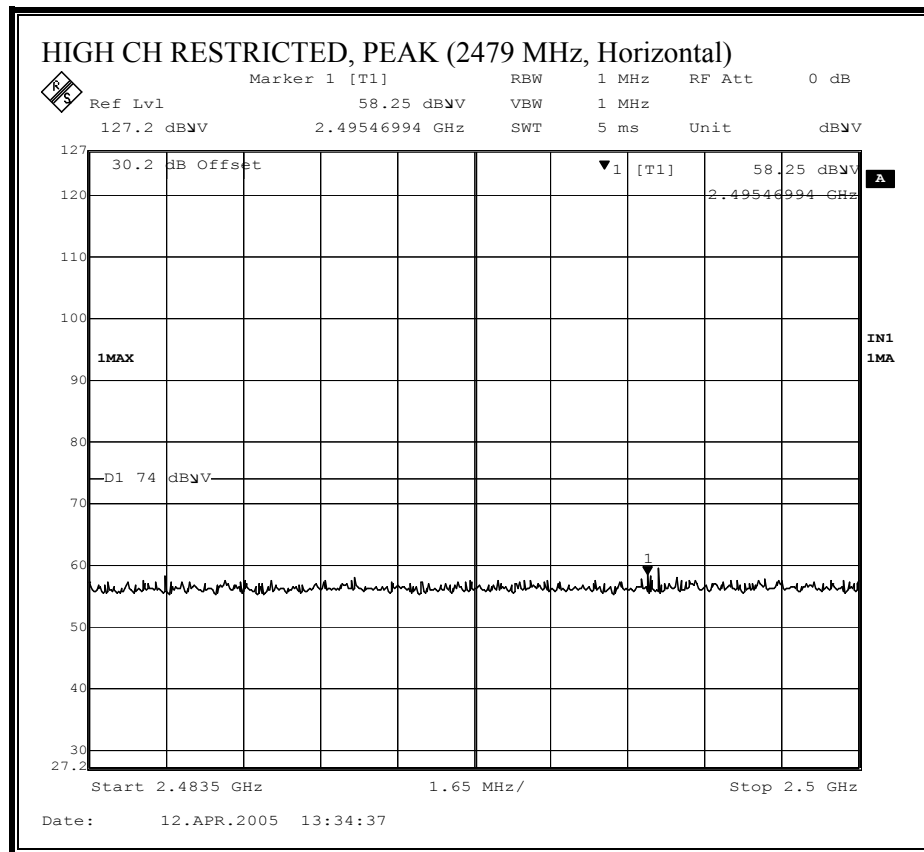


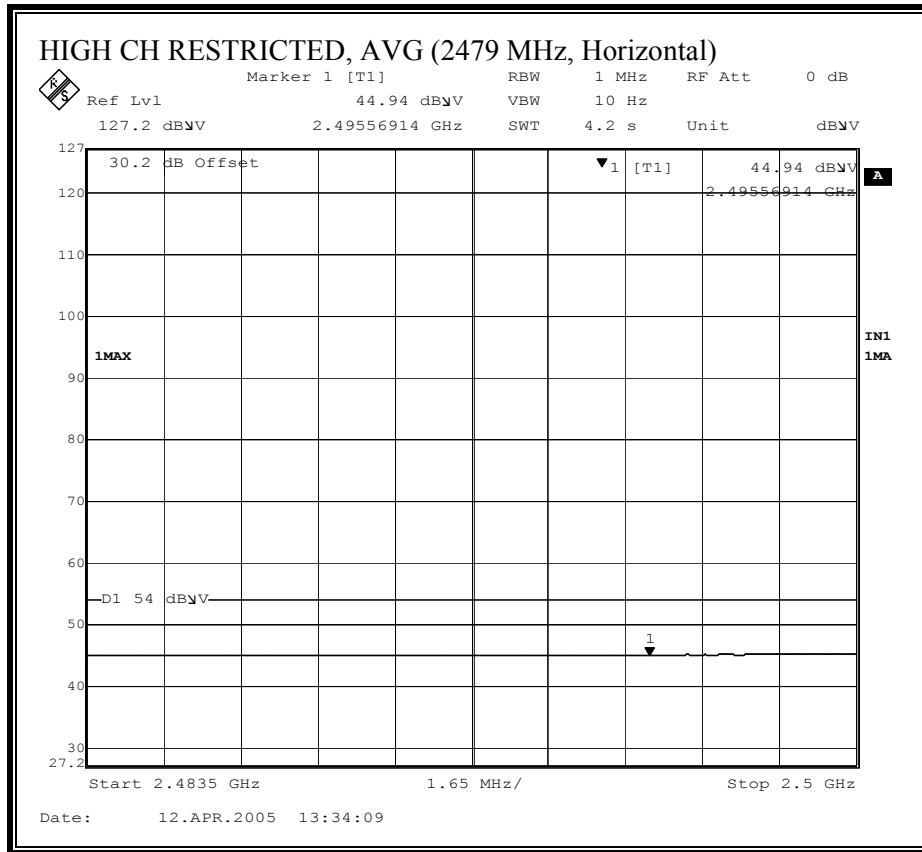
**RESTRICTED BANDEDGE (2403 MHz, LOW CHANNEL, VERTICAL)**



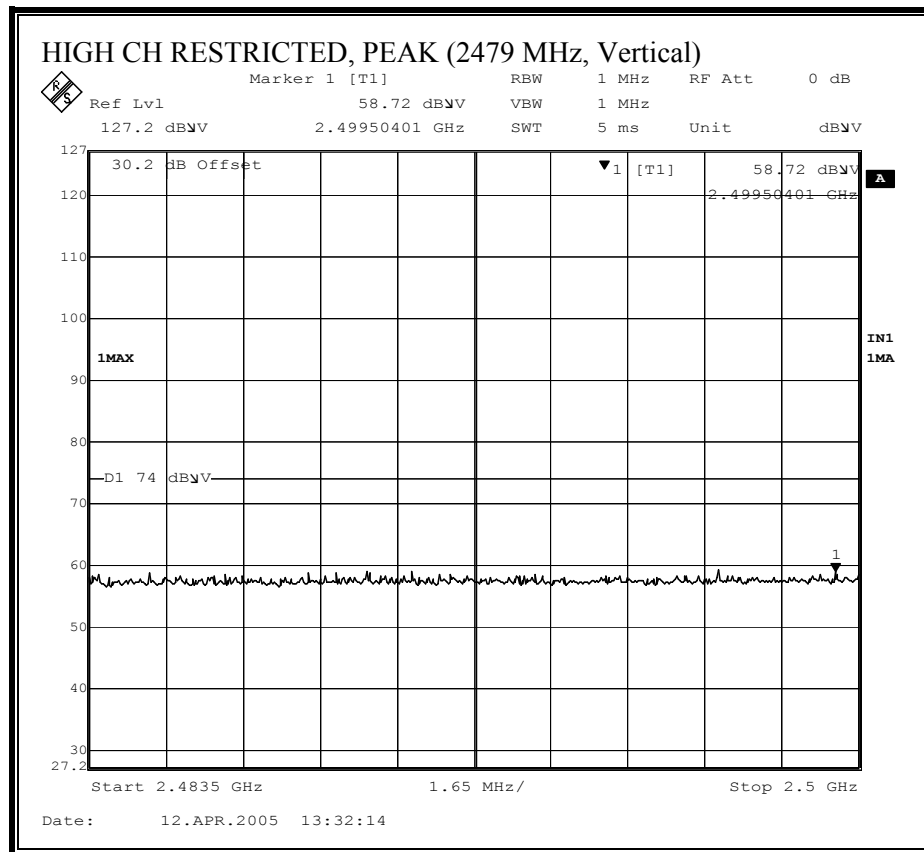


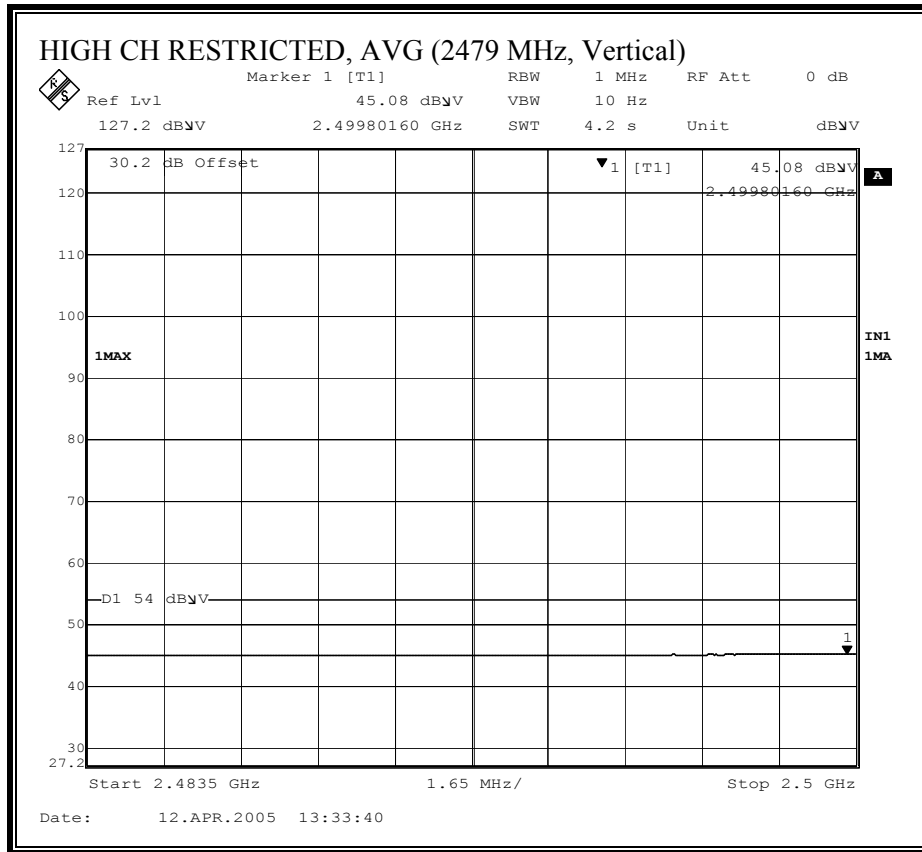
**RESTRICTED BANDEDGE (2479 MHz, HIGH CHANNEL, HORIZONTAL)**





**RESTRICTED BANDEDGE (2479 MHz, HIGH CHANNEL, VERTICAL)**





## HARMONICS AND SPURIOUS EMISSIONS

02/25/05 High Frequency Measurement  
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: HITESH H. SOLANKI  
Project #: 05U3274  
Company: GYRATION  
EUT Descrip.: WIRELESS MOUSE (ULTA II)  
EUT M/N: AS00765-001  
Test Target: FCC CLASS B  
Mode Oper: TRANSMIT ON SPECIFIED CHANNELS (2.4 GHz BAND)

Test Equipment:

EMCO Horn 1-18GHz  
T73; S/N: 6717 @3m

Pre-amplifier 1-26GHz  
T63 Miteq 646456

Pre-amplifier 26-40GHz

Horn > 18GHz

Limit  
FCC 15.209

Hi Frequency Cables

2 foot cable

3 foot cable

4 foot cable  
4\_Hitesh

12 foot cable  
12\_Hitesh

HPF  
HPF\_4.0GHz

Reject Filter  
R\_001

Peak Measurements  
RBW=VBW=1MHz  
  
Average Measurements  
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) |
|-------------------------|-------------|-----------------|-------------------|------------|----------|-----------|--------------|-------------|----------------|---------------|------------------|-------------------|--------------|---------------|----------------|
| LOW CHANNEL 2403 MHz    |             |                 |                   |            |          |           |              |             |                |               |                  |                   |              |               |                |
| 4.806                   | 3.0         | 49.6            | 35.7              | 32.9       | 4.4      | -35.5     | 0.0          | 0.6         | 52.0           | 38.1          | 74               | 54                | -22.0        | -15.9         | V              |
| 7.209                   | 3.0         | 50.4            | 35.0              | 35.7       | 6.1      | -34.9     | 0.0          | 0.6         | 57.9           | 42.5          | 74               | 54                | -16.1        | -11.5         | V              |
| 9.612                   | 3.0         | 46.2            | 32.6              | 37.5       | 7.6      | -33.0     | 0.0          | 0.8         | 59.2           | 45.6          | 74               | 54                | -14.8        | -8.4          | V              |
| MIDDLE CHANNEL 2441 MHz |             |                 |                   |            |          |           |              |             |                |               |                  |                   |              |               |                |
| 4.882                   | 3.0         | 49.5            | 34.7              | 32.9       | 4.5      | -35.5     | 0.0          | 0.6         | 52.0           | 37.2          | 74               | 54                | -22.0        | -16.8         | V              |
| 7.323                   | 3.0         | 50.2            | 34.6              | 35.9       | 6.2      | -34.8     | 0.0          | 0.6         | 58.1           | 42.5          | 74               | 54                | -15.9        | -11.5         | V              |
| 9.764                   | 3.0         | 46.6            | 32.4              | 37.6       | 7.7      | -33.0     | 0.0          | 0.8         | 59.7           | 45.5          | 74               | 54                | -14.3        | -8.5          | V              |
| HIGH CHANNEL 2479 MHz   |             |                 |                   |            |          |           |              |             |                |               |                  |                   |              |               |                |
| 4.958                   | 3.0         | 50.1            | 34.7              | 33.0       | 4.5      | -35.5     | 0.0          | 0.6         | 52.8           | 37.4          | 74               | 54                | -21.2        | -16.6         | V              |
| 7.437                   | 3.0         | 48.3            | 33.7              | 36.1       | 6.3      | -34.7     | 0.0          | 0.6         | 56.6           | 42.0          | 74               | 54                | -17.4        | -12.0         | V              |
| 9.916                   | 3.0         | 47.7            | 33.2              | 37.6       | 7.8      | -33.0     | 0.0          | 0.8         | 60.9           | 46.4          | 74               | 54                | -13.1        | -7.6          | V              |
| LOW CHANNEL 2403 MHz    |             |                 |                   |            |          |           |              |             |                |               |                  |                   |              |               |                |
| 4.806                   | 3.0         | 47.4            | 34.3              | 32.9       | 4.4      | -35.5     | 0.0          | 0.6         | 49.8           | 36.7          | 74               | 54                | -24.2        | -17.3         | H              |
| 7.209                   | 3.0         | 50.7            | 34.6              | 35.7       | 6.1      | -34.9     | 0.0          | 0.6         | 58.2           | 42.1          | 74               | 54                | -15.8        | -11.9         | H              |
| 9.612                   | 3.0         | 45.0            | 31.9              | 37.5       | 7.6      | -33.0     | 0.0          | 0.8         | 58.0           | 44.9          | 74               | 54                | -16.0        | -9.1          | H              |
| MIDDLE CHANNEL 2441 MHz |             |                 |                   |            |          |           |              |             |                |               |                  |                   |              |               |                |
| 4.882                   | 3.0         | 47.3            | 34.4              | 32.9       | 4.5      | -35.5     | 0.0          | 0.6         | 49.8           | 36.9          | 74               | 54                | -24.2        | -17.1         | H              |
| 7.323                   | 3.0         | 49.0            | 34.3              | 35.9       | 6.2      | -34.8     | 0.0          | 0.6         | 56.9           | 42.2          | 74               | 54                | -17.1        | -11.8         | H              |
| 9.764                   | 3.0         | 46.3            | 32.1              | 37.6       | 7.7      | -33.0     | 0.0          | 0.8         | 59.4           | 45.2          | 74               | 54                | -14.6        | -8.8          | H              |
| HIGH CHANNEL 2479 MHz   |             |                 |                   |            |          |           |              |             |                |               |                  |                   |              |               |                |
| 4.958                   | 3.0         | 48.3            | 33.9              | 33.0       | 4.5      | -35.5     | 0.0          | 0.6         | 51.0           | 36.6          | 74               | 54                | -23.0        | -17.4         | H              |
| 7.437                   | 3.0         | 49.1            | 33.6              | 36.1       | 6.3      | -34.7     | 0.0          | 0.6         | 57.4           | 41.9          | 74               | 54                | -16.6        | -12.1         | H              |
| 9.916                   | 3.0         | 45.9            | 32.3              | 37.6       | 7.8      | -33.0     | 0.0          | 0.8         | 59.1           | 45.5          | 74               | 54                | -14.9        | -8.5          | H              |

f Measurement Frequency

Dist Distance to Antenna

Read Analyzer Reading

AF Antenna Factor

CL Cable Loss

Amp Preamp Gain

D Corr Distance Correct to 3 meters

Avg Average Field Strength @ 3 m

Peak Calculated Peak Field Strength

HPF High Pass Filter

Avg Lim Average Field Strength Limit

Pk Lim Peak Field Strength Limit

Avg Mar Margin vs. Average Limit

Pk Mar Margin vs. Peak Limit

Page 47 of 69

COMPLIANCE CERTIFICATION SERVICES  
561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA

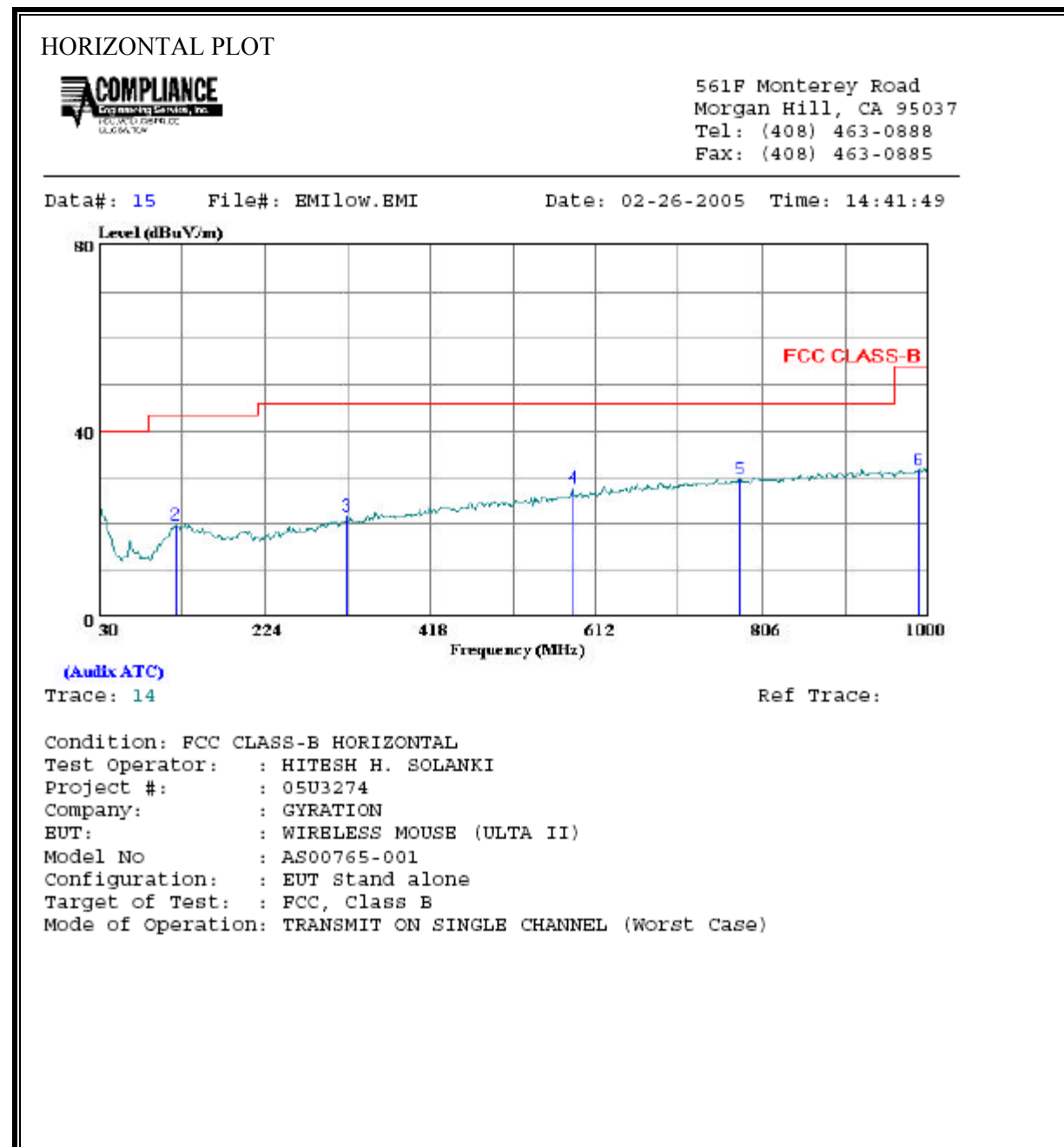
DOCUMENT NO: CCSUP4031A  
TEL: (408) 463-0885 FAX: (408) 463-0888

This report shall not be reproduced except in full, without the written approval of CCS.

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

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

#### EUT STAND ALONE



# HORIZONTAL DATA

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 30.970  | 31.75         | -7.50  | 24.25  | 40.00         | -15.75        | Peak   |
| 2 | 120.210 | 32.26         | -12.69 | 19.57  | 43.50         | -23.93        | Peak   |
| 3 | 320.030 | 33.03         | -11.32 | 21.71  | 46.00         | -24.29        | Peak   |
| 4 | 584.840 | 33.59         | -5.76  | 27.83  | 46.00         | -18.17        | Peak   |
| 5 | 778.840 | 31.92         | -2.18  | 29.74  | 46.00         | -16.26        | Peak   |
| 6 | 988.360 | 32.01         | -0.45  | 31.56  | 54.00         | -22.44        | Peak   |

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

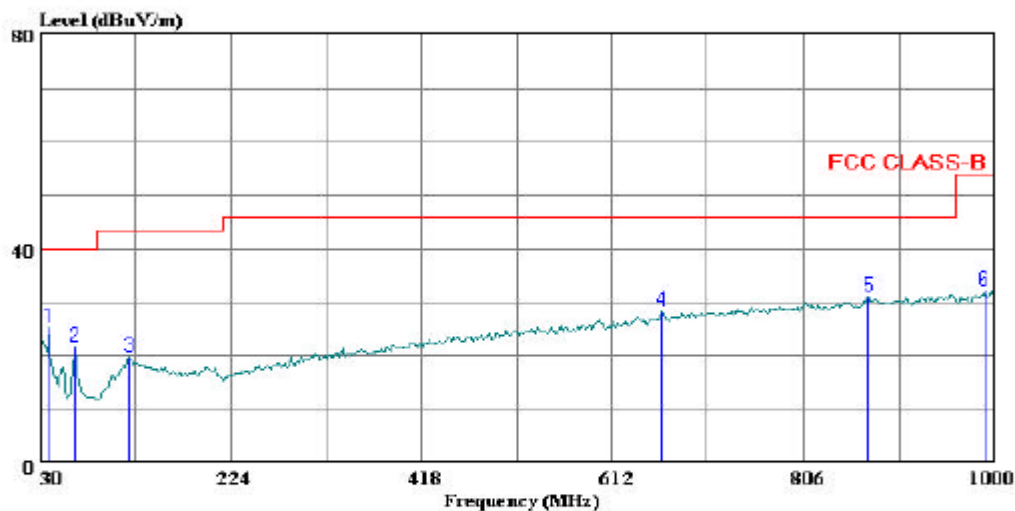
**EUT STAND ALONE**

VERTICAL PLOT



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

Data#: 13 File#: EMIlow.EMI Date: 02-26-2005 Time: 14:27:07



(Auxiliary ATC)

Trace: 12

Ref Trace:

Condition: FCC CLASS-B VERTICAL  
Test Operator: : HITESH H. SOLANKI  
Project #: : 05U3274  
Company: : GYRATION  
EUT: : WIRELESS MOUSE (ULTA II)  
Model No : AS00765-001  
Configuration: : EUT Stand alone  
Target of Test: : FCC, Class B  
Mode of Operation: TRANSMIT ON SINGLE CHANNEL (Worst Case)

# VERTICAL DATA

|   | Freq    | Read<br>Level | Factor | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|---------|---------------|--------|--------|---------------|---------------|--------|
|   | MHz     | dBuV          | dB     | dBuV/m | dBuV/m        | dB            |        |
| 1 | 38.730  | 36.88         | -11.81 | 25.07  | 40.00         | -14.93        | Peak   |
| 2 | 65.890  | 40.27         | -18.76 | 21.51  | 40.00         | -18.49        | Peak   |
| 3 | 121.180 | 32.21         | -12.64 | 19.57  | 43.50         | -23.93        | Peak   |
| 4 | 662.440 | 32.27         | -3.97  | 28.30  | 46.00         | -17.70        | Peak   |
| 5 | 870.990 | 32.26         | -1.17  | 31.09  | 46.00         | -14.91        | Peak   |
| 6 | 989.330 | 32.47         | -0.42  | 32.05  | 54.00         | -21.95        | Peak   |

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

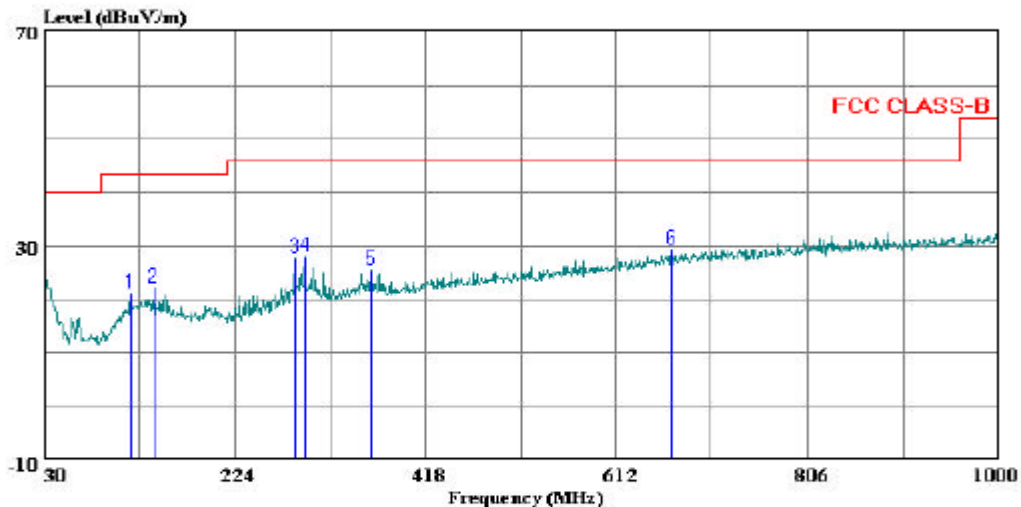
**EUT WITH CHARGING CRADLE**

HORIZONTAL PLOT



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

Data#: 49 File#: EMIlow.EMI Date: 03-16-2005 Time: 12:32:00



(Auxiliary ATC)

Trace: 47

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL  
Test Operator: : VIEN TRAN  
Project #: : 05U3274  
Company: : GYRATION  
EUT: : WIRELESS MOUSE WITH CHARGER CRADLE  
Model No : AS00765-001 w/ AS00767-001  
Configuration: : EUT with charging cradle  
Target of Test: : CISPR CLASS B  
Mode of Operation: CHARGING MODE

# HORIZONTAL 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 | 118.270 | 33.90         | -12.90 | 21.00  | 43.50         | -22.50        | Peak   |
| 2 | 141.550 | 35.10         | -13.02 | 22.08  | 43.50         | -21.42        | Peak   |
| 3 | 286.080 | 40.00         | -12.40 | 27.60  | 46.00         | -18.40        | Peak   |
| 4 | 295.780 | 40.10         | -12.05 | 28.05  | 46.00         | -17.95        | Peak   |
| 5 | 362.710 | 35.80         | -10.33 | 25.47  | 46.00         | -20.53        | Peak   |
| 6 | 668.260 | 33.00         | -3.80  | 29.20  | 46.00         | -16.80        | Peak   |

### EUT WITH CHARGING CRADLE



**COMPLIANCE**  
Engineering Services, Inc.  
FOUR EIGHT FOUR ZERO  
GLASSBORO, NJ

The plot shows the measured signal (green line) is well below the FCC CLASS-B mask (red line) across the entire frequency range from 30 MHz to 1000 MHz. The mask starts at approximately 40 dBuV/m from 30 MHz to 40 MHz, then steps up to 50 dBuV/m at 224 MHz, and finally to 60 dBuV/m at 1000 MHz. The measured signal peaks at approximately 30 dBuV/m around 418 MHz and remains below the mask throughout.

Ref Trace:

Page 54 of 69

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 | 46.490  | 40.59         | -16.12 | 24.47  | 40.00         | -15.53        | Peak   |
| 2 | 63.950  | 41.70         | -18.89 | 22.81  | 40.00         | -17.19        | Peak   |
| 3 | 296.750 | 36.40         | -11.98 | 24.42  | 46.00         | -21.58        | Peak   |
| 4 | 358.830 | 36.10         | -10.43 | 25.67  | 46.00         | -20.33        | Peak   |
| 5 | 419.940 | 37.50         | -9.04  | 28.46  | 46.00         | -17.54        | Peak   |
| 6 | 797.270 | 32.80         | -1.84  | 30.96  | 46.00         | -15.04        | 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.

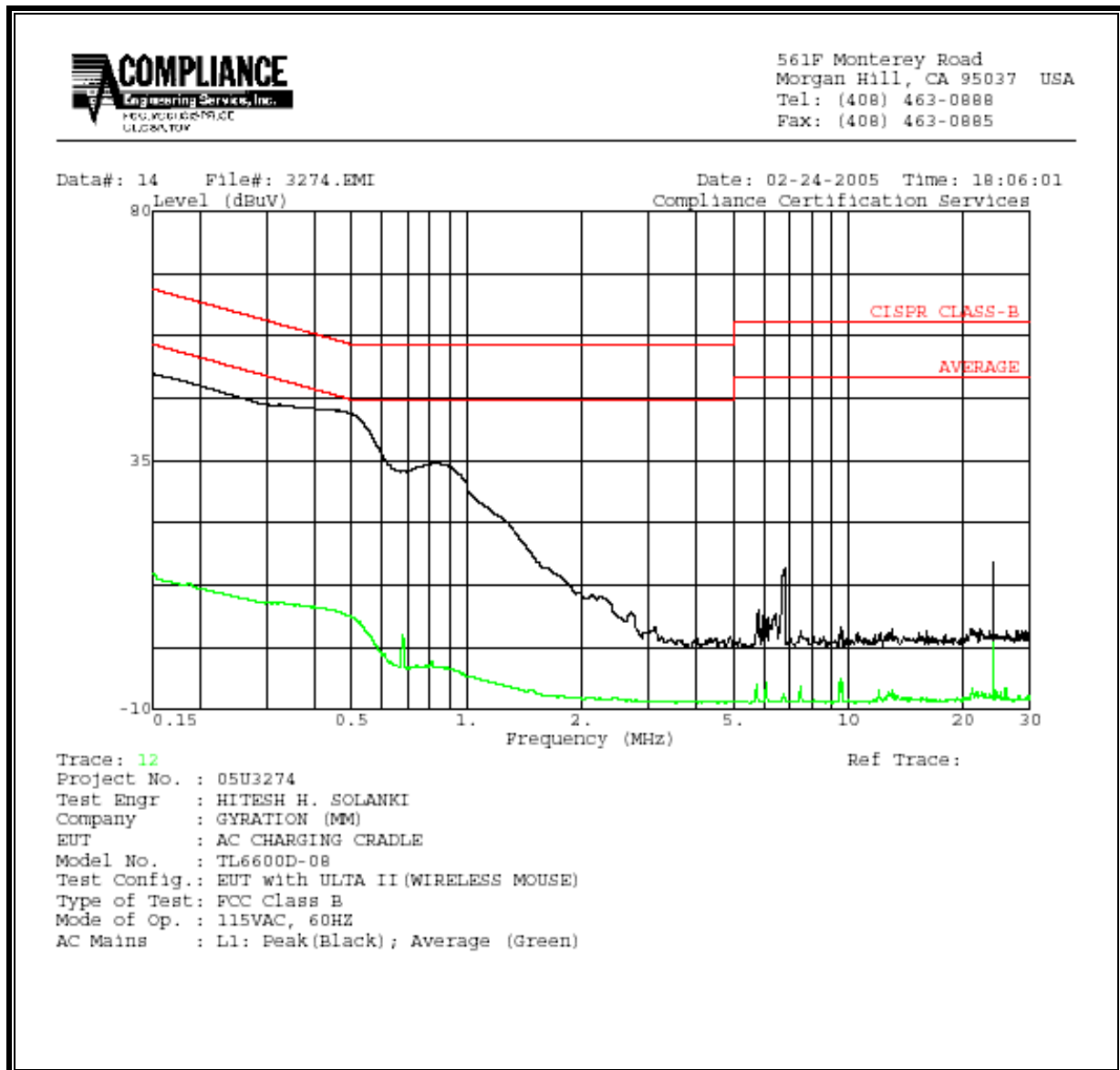
#### RESULTS

No non-compliance noted:

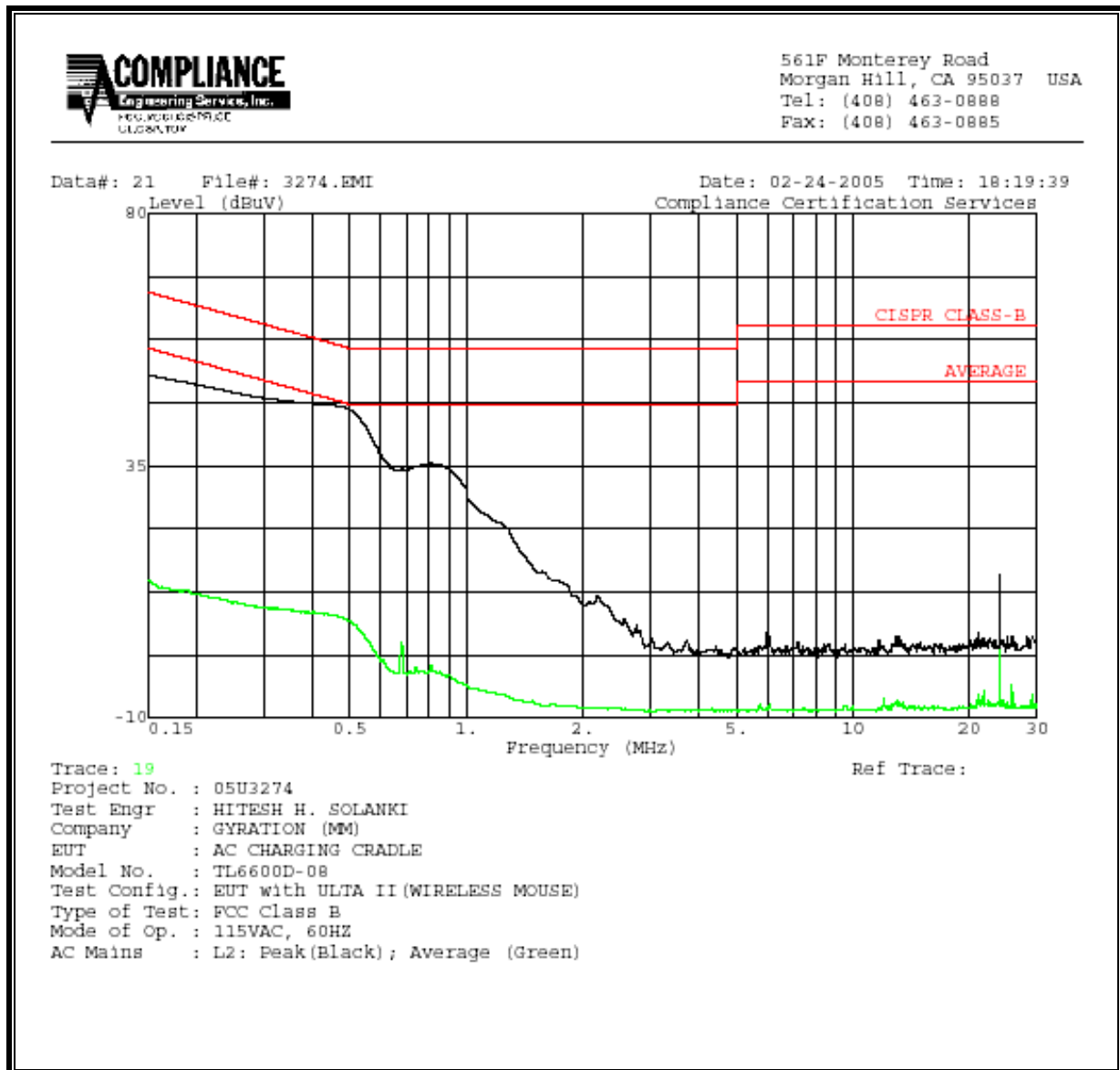
**6 WORST EMISSIONS**

| CONDUCTED EMISSIONS DATA (115VAC 60Hz) |           |           |           |       |       |       |         |         |         |
|----------------------------------------|-----------|-----------|-----------|-------|-------|-------|---------|---------|---------|
| Freq.                                  | Reading   |           |           | Closs | Limit | FCC B | Margin  |         | Remark  |
| (MHz)                                  | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB)  | QP    | AV    | QP (dB) | AV (dB) | L1 / L2 |
| 0.15                                   | 50.72     | --        | --        | 0.00  | 65.94 | 55.94 | -15.22  | -5.22   | L1      |
| 0.51                                   | 43.00     | --        | --        | 0.00  | 56.00 | 46.00 | -13.00  | -3.00   | L1      |
| 24.01                                  | 16.60     | --        | --        | 0.00  | 60.00 | 50.00 | -43.40  | -33.40  | L1      |
| 0.15                                   | 51.22     | --        | --        | 0.00  | 66.00 | 56.00 | -14.78  | -4.78   | L2      |
| 0.49                                   | 45.36     | --        | --        | 0.00  | 56.24 | 46.24 | -10.88  | -0.88   | L2      |
| 24.01                                  | 15.58     | --        | --        | 0.00  | 60.00 | 50.00 | -44.42  | -34.42  | L2      |
| 6 Worst Data                           |           |           |           |       |       |       |         |         |         |

**LINE 1 RESULT**

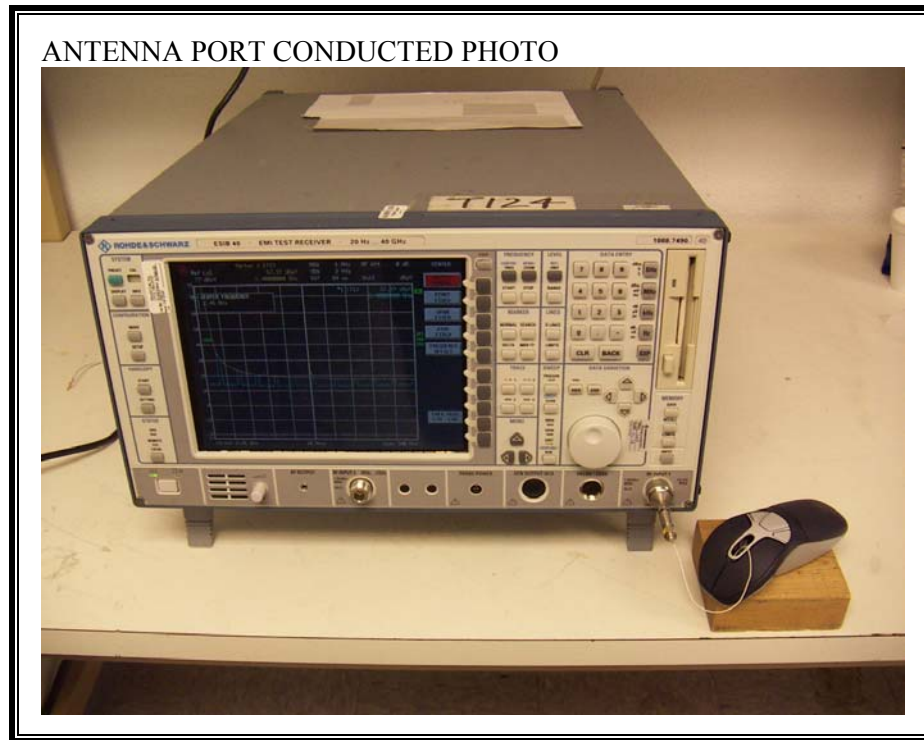


**LINE 2 RESULT**

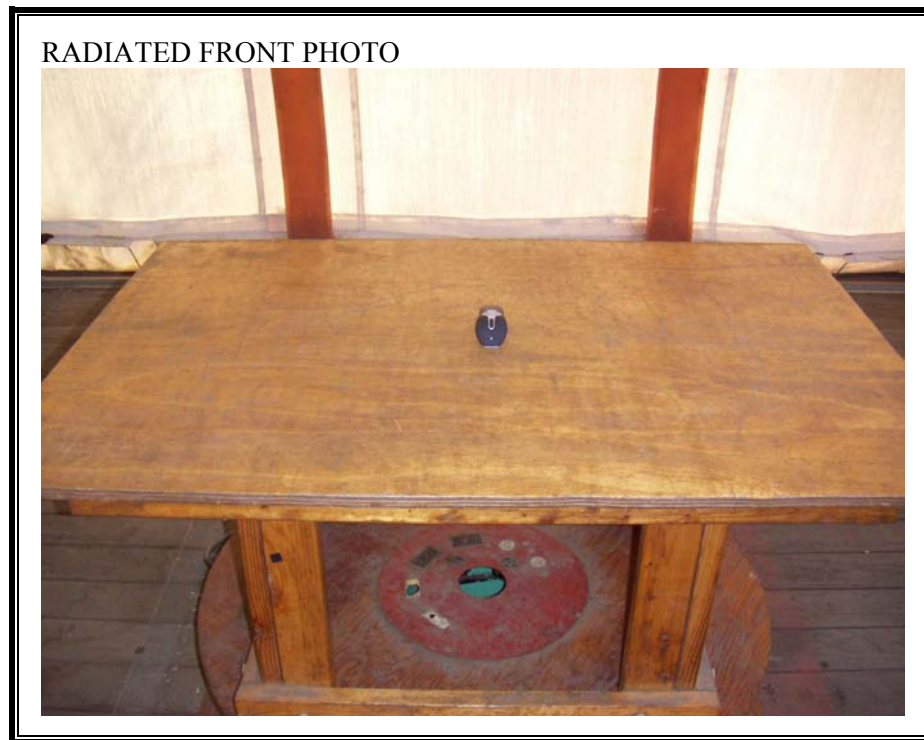


## 8. SETUP PHOTOS

### ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



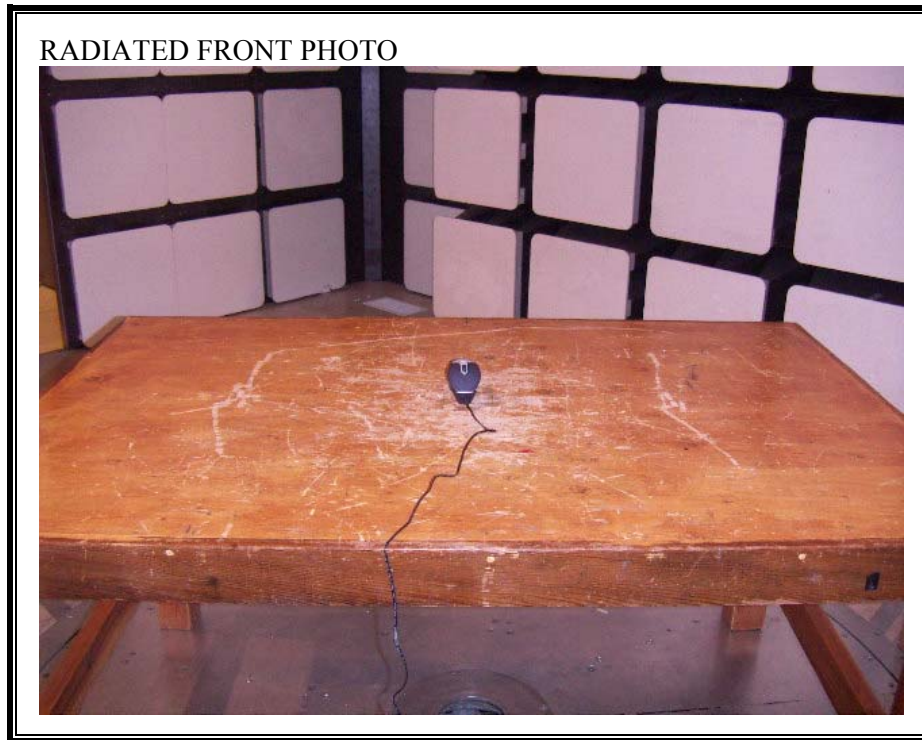
**RADIATED RF MEASUREMENT SETUP – EUT STAND ALONE**



RADIATED BACK PHOTO



**RADIATED RF MEASUREMENT SETUP – EUT WITH CHARGING CRADLE**



RADIATED BACK PHOTO



**POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP**



LINE CONDUCTED BACK PHOTO



**END OF REPORT**