# Test Certificate

**A sample of the following product received on August 6, 2010 and tested on August 6, 2010 complied with the requirements of,**

- **Subpart B of Part 15 of FCC Rules for Class B digital devices**
- **Industry Canada Interference Causing Equipment Standard ICES 003, dated February 2004 (Class B)**

**given the measurement uncertainties detailed in Elliott report R81054.**

## Intel Corporation
## Intel® Centrino® Wireless-N 6205 (model 62205BGHMW)

Mark Briggs
Staff Engineer

_____
Intel Corporation

_____
Printed Name

A2LA ACCREDITED
Testing Cert #2016.01

Elliott Laboratories is accredited by the A2LA, certificate number 2016.01, to perform the test(s) listed in this certificate.
This certificate shall not be reproduced, except in its entirety, without the written approval of Elliott Laboratories

Elliott Laboratories
www.elliottlabs.com
41039 Boyce Road
Fremont, CA. 94538
510-578-3500 Phone
510-440-9525 Fax

*EMC Test Report*

*Class B*
*Information Technology Equipment*

*FCC Part 15*
*Industry Canada ICES 003*

*Intel® Centrino® Wireless-N 6205 (model 62205BGHMW)*

| | |
|---|---|
| COMPANY: | Intel Corporation<br>100 Center Point Circle Suite 200<br>Columbia, SC 29210 |
| TEST SITE(S): | Elliott Laboratories<br>41039 Boyce Road.<br>Fremont, CA. 94538-2435 |
| REPORT DATE: | November 3, 2010 |
| FINAL TEST DATES: | August 6, 2010 |

AUTHORIZED SIGNATORY:

Mark Briggs
Staff Engineer
Elliott Laboratories, An NTS Company

A2LA ACCREDITED
Testing Cert #2016.01

## *REVISION HISTORY*

| Rev# | Date | Comments | Modified By |
|---|---|---|---|
| - | 11-03-2010 | First release | |

## *TABLE OF CONTENTS*

## *SCOPE*

Governments and standards organizations around the world have published requirements regarding the electromagnetic compatibility (EMC) of electronic equipment. Testing has been performed on the Intel Corporation Intel® Centrino® Wireless-N 6205 (model 62205BGHMW), pursuant to the following standards.

| Standard | Title | Standard Date |
|---|---|---|
| FCC Part 15, Subpart B | Radio Frequency Devices | October 2009 as Amended |
| ICES-003, Issue 4 | Digital apparatus | 2004 |

All measurements and evaluations have been in accordance with these specifications, test procedures, and measurement guidelines as outlined in Elliott Laboratories test procedures, and in accordance with the standards referenced therein.

## *OBJECTIVE*

The objective of Intel Corporation is to verify compliance with FCC requirements for digital devices and Canada's requirements for digital devices.

## *STATEMENT OF COMPLIANCE*

The tested sample of Intel® Centrino® Wireless-N 6205 (model 62205BGHMW) complied with the requirements of:

| Standard/Regulation | Equipment Type/Class | Standard Date |
|---|---|---|
| Subpart B of Part 15 of the FCC Rules (CFR title 47) | Class B | 2009 as amended |
| ICES-003, Issue 4 | Class B | 2004 |

The test results recorded herein are based on a single type test of the Intel Corporation Intel® Centrino® Wireless-N 6205 model (62205BGHMW) and therefore apply only to the tested sample(s). The sample was selected and prepared by Steve Hackett of Intel Corporation.

Maintenance of compliance is the responsibility of the company. Any modification of the product that could result in increased emissions or susceptibility should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different enclosure, different line filter or power supply, harnessing and/or interface cable changes, etc.).

## *DEVIATIONS FROM THE STANDARDS*

No deviations were made from the published requirements listed in the scope of this report.

## *INFORMATION TECHNOLOGY EQUIPMENT EMISSIONS TEST RESULTS*

The following emissions tests were performed on the Intel Corporation Intel® Centrino® Wireless-N 6205 (model 62205BGHMW). The measurements were extracted from the data recorded during testing and represent the highest amplitude emissions relative to the specification limits. The complete test data is provided in the appendices of this report.

### *CONDUCTED EMISSIONS (MAINS PORT)*

| Frequency Range Operating Voltage | Standard/Section | Requirement | Measurement | Margin | Status |
|---|---|---|---|---|---|
| 0.15-30 MHz, 120V, 60Hz | FCC § 15.107(a) (Class B) | 0.15-0.5 MHz: 66-56 dBµV QP 56-46 dBµV Av 0.5-5.0 MHz: 56 dBµV QP 46 dBµV Av 5.0-30.0 MHz: 60 dBµV QP 50 dBµV Av | 47.7dBµV @ 1.884MHz | -8.3dB | Complied |
| 0.15-30 MHz, 230V, 50Hz | | | 54.7dBµV @ 2.007MHz | -1.3dB | Complied |

### *RADIATED EMISSIONS*

| Frequency Range | Standard/Section | Requirement | Measurement | Margin | Status |
|---|---|---|---|---|---|
| 30-1000 MHz | FCC §15.109(g) Class B | 30 – 230, 30 dBµV/m 230 – 1000, 37 dBµV/m (10m limit) | 31.8dBµV/m @42.98 MHz | -8.2dB | Complied |
| Note 1 | FCC §15.109(a) Class B | 54.0 dBµV/m Av 74.0 dBµV/m Pk (3m limit) | Note 1 | | |
| Note 1 Testing above 1GHz against FCC 15.109(a) requirements was not required because the highest frequency generated in the EUT was declared to be less than 108 MHz (40MHz is the digital clock) | | | | | |

## *MEASUREMENT UNCERTAINTIES*

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below were calculated using the approach described in CISPR 16-4-2:2003 using a coverage factor of k=2, which gives a level of confidence of approximately 95%. The levels were found to be below levels of *U*cispr and therefore no adjustment of the data for measurement uncertainty is required.

| Measurement Type | Measurement Unit | Frequency Range | Expanded Uncertainty |
|---|---|---|---|
| Conducted Emissions | dBuV or dBuA | 150kHz – 30MHz | ± 2.2 dB |
| Radiated Electric Field | dBuV/m | 30 – 1000 MHz | ± 3.6 dB |
| | | 1000 – 40,000 MHz | ± 6.0 dB |

## *EQUIPMENT UNDER TEST (EUT) DETAILS*

### *GENERAL*

The Intel® Centrino® Wireless-N 6205 is a PCIe Half Mini Card form factor IEEE 802.11b/g wireless network adapter that operates in the 2.4 GHz spectra. The card supports 1x2 operation in legacy modes.

For digital device testing for certification under equipment code JBP the card was installed inside a laptop PC.

The card is being certified for full modular approval and is intended for factory installation only by the OEM (FCC ID:PD962205BGH; IC:1000M-62205BGH - see table below).

The sample was received on August 6, 2010 and tested on August 6, 2010. The EUT consisted of the following component(s):

| Manufacturer | Model | Description | Serial Number | FCC ID / IC UPN |
|---|---|---|---|---|
| Intel Corporation | 62205BGHMW | PCIe Half Mini Card 802.11b/g wireless network adapter | MAC address 001500633B2C | PD962205BGH 1000M-62205BGH |

### *OTHER EUT DETAILS*

The EUT antenna is a a two-antenna PIFA antenna system – Shanghai Universe Communication Electron Co., Ltd. The antenna connects to the EUT via a non-standard antenna connector, thereby meeting the requirements of FCC 15.203.

### *ENCLOSURE*

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system.

### *MODIFICATIONS*

No modifications were made to the EUT during the time the product was at Elliott.

*SUPPORT EQUIPMENT*

The following equipment was used as local support equipment for emissions testing:

| Company | Model | Description | Serial Number | FCC ID |
|---|---|---|---|---|
| Toshiba | PSAG8U-04001W | Laptop | 49290792Q | CJ6UPA3655WL |
| Hewlett Packard | Deskjet 5650 | Printer | MY3883K42P | DoC |

The following equipment was used as remote support equipment for emissions testing:

| Company | Model | Description | Serial Number | FCC ID |
|---|---|---|---|---|
| D-Link | DES-1105 | Hub | DRL7298002019 | - |

*INTERFACE PORTS*

The I/O cabling configuration during emissions testing was as follows:

| Port | | Cable(s) | | |
|---|---|---|---|---|
| From | To | Description | Shielded/Unshielded | Length(m) |
| Laptop USB | Printer | USB | Shielded | 1.5 |
| Laptop Ethernet | Hub | Cat-5 | Unshielded | 10 |
| Laptop AC Power | AC Mains | 2Wire | Unshielded | 1 |

*EUT OPERATION*

During emissions testing the EUTs host laptop was scrolling H pattern on the display and the module was active.

## *EMISSIONS TESTING*

### *GENERAL INFORMATION*

Final test measurements were taken at the Elliott Laboratories Anechoic Chambers and/or Open Area Test Site(s) listed below. The test sites contain separate areas for radiated and conducted emissions testing. The sites conform to the requirements of ANSI C63.4: 2003 *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz* and CISPR 16-1-4:2007 - *Specification for radio disturbance and immunity measuring apparatus and methods Part 1-4: Radio disturbance and immunity measuring apparatus Ancillary equipment Radiated disturbances*. They are registered with the VCCI and are on file with the FCC and industry Canada.

| Site | Registration Numbers | | | Location |
|---|---|---|---|---|
| | VCCI | FCC | Canada | |
| Chamber 4 | R-1684<br>G-57<br>C-1796<br>T-1640 | 211948 | IC 2845B-4 | 41039 Boyce Road<br>Fremont,<br>CA 94538-2435 |

Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements.

Emissions measurements were made with the EUT powered from a supply voltage within the expected tolerances of each nominal operating voltage/frequency for each geographical regions covered by the scope of the standards referenced in this report.

### *CONDUCTED EMISSIONS CONSIDERATIONS*

Conducted emissions testing is performed in conformance with ANSI C63.4 and CISPR 22.

Mains port measurements are made with the EUT connected to the public power network through nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

Telecommunication port measurements are made with the network cable connected through an ISN appropriate to the type of cable employed.

### *RADIATED EMISSIONS CONSIDERATIONS*

The FCC has determined that radiated measurements made in a non-anechoic shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an Open Area Test Site or semi-anechoic chamber, as defined in ANSI C63.4. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

## *MEASUREMENT INSTRUMENTATION*

### *RECEIVER SYSTEM*

An EMI receiver as specified in CISPR 16-1-1:2006 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 7 GHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000 MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

### *INSTRUMENT CONTROL COMPUTER*

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer runs automated data collection programs that control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

### *LINE IMPEDANCE STABILIZATION NETWORK (LISN)*

Line conducted emission measurements utilize a fifty micro-Henry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250-uH CISPR adapter. This network provides for calibrated radio-frequency noise measurements by the design of the internal low-pass and high-pass filters on the EUT and measurement ports, respectively.

### *IMPEDANCE STABILIZATION NETWORK (ISN)*

Telecommunication port conducted emission measurements utilize an Impedance Stabilization Network with a 150-ohm termination impedance and specific longitudinal conversion loss as the voltage monitoring point. This network provides for calibrated radio-frequency noise measurements by the design of the internal circuitry on the EUT and measurement ports, respectively. For current measurements, a current probe with a uniform frequency response and less than 1-ohm insertion impedance is used.

*FILTERS/ATTENUATORS*

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high-amplitude transient events.

*ANTENNAS*

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz frequency range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors that are programmed into the test receivers.

*ANTENNA MAST AND EQUIPMENT TURNTABLE*

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor drive to vary the antenna height.

ANSI C63.4 specifies that the test height above ground for table-mounted devices shall be 80 centimeters. Floor-mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material up to 12-mm thick if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

*INSTRUMENT CALIBRATION*

All test equipment is regularly checked to ensure that performance is maintained in accordance with the company's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An appendix of this report contains the list of test equipment used and calibration information.

## *TEST PROCEDURES*

### *EUT AND CABLE PLACEMENT*

The standards require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst-case orientation is used for final measurements.

### *CONDUCTED EMISSIONS (MAINS)*

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest-amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak-mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord. Emissions that have peak values close to the specification limit are also measured in the quasi-peak and average detection modes to determine compliance except when the amplitude of the emission when measured with the quasi-peak detector is more than 10 dB below the specification limit for average measurements. In this case only quasi-peak measurements are performed.

### *CONDUCTED EMISSIONS (TELECOMMUNICATION PORTS)*

Conducted emissions voltages are measured at a point 80 cm from the EUT. If conducted emission currents are measured, the current probe is located 70 cm from the EUT. Preliminary measurements are made to determine the highest-amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak-mode scan is then performed in the position and mode for which the highest emission was noted. Emissions that have peak values close to the specification limit are also measured in the quasi-peak and average detection modes to determine compliance except when the amplitude of the emission when measured with the quasi-peak detector is more than 10 dB below the specification limit for average measurements. In this case only quasi-peak measurements are performed.

*RADIATED EMISSIONS (SEMI-ANECHOIC and/or OATS TEST ENVIRONMENT)*

Radiated emissions measurements in a semi-anechoic environment are performed in two phases (preliminary scan and final maximization). Final maximization may be performed on an OATS.

Preliminary Scan

A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulations specified on page 1. One or more of these are performed with the antenna polarized vertically and one or more of these are performed with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit. A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions if required. Other methods used during the preliminary scan for EUT emissions involve scanning with near-field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final Maximization

During final maximization, the highest-amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth that results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions that have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

For measurements above 1GHz every effort is made to ensure the EUT remains within the cone of radiation of the measurement antenna (i.e. 3dB beam-width of the antenna). This may include rotating the product and/or angling the measurement antenna.

When Testing above 18 GHz, the receive antenna is located at 1 meter from the EUT and the antenna height is restricted to a maximum of 2.5m. Maximum emissions are found within this restricted range because emission levels decrease over distance and as the antenna is raised above 2.5m, the distance from the EUT increases. As a result of the increased measurement distance, at antenna heights above 2.5m, lower emission levels are measured as compared to emissions levels measured at antenna heights at 2.5m and below.

## *SAMPLE CALCULATIONS*

### *SAMPLE CALCULATIONS - CONDUCTED EMISSIONS*

Receiver readings are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_r - S = M$$

where:

$R_r$ = Receiver Reading in dBuV
S = Specification Limit in dBuV
M = Margin to Specification in +/- dB

### *SAMPLE CALCULATIONS - RADIATED EMISSIONS*

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements. A distance factor, when used for electric field measurements, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

$F_d$ = Distance Factor in dB
$D_m$ = Measurement Distance in meters
$D_s$ = Specification Distance in meters

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

$R_r$ = Receiver Reading in dBuV/m
$F_d$ = Distance Factor in dB
$R_c$ = Corrected Reading in dBuV/m
$L_s$ = Specification Limit in dBuV/m
M = Margin in dB Relative to Spec

# *Appendix A Test Equipment Calibration Data*

**Radiated Emissions, 30 - 1,000 MHz, 06-Aug-10**

| Manufacturer | Description | Model | Asset # | Cal Due |
|---|---|---|---|---|
| Rohde & Schwarz | EMI Test Receiver, 20 Hz-7 GHz | ESIB7 | 1538 | 10/15/2010 |
| Sunol Sciences | Biconilog, 30-3000 MHz | JB3 | 1549 | 6/4/2011 |
| Hewlett Packard | Preamplifier, 100 kHz - 1.3 GHz | 8447D OPT 010 | 1826 | 5/27/2011 |

**Conducted Emissions - AC Power , 06-Aug-10**

| Manufacturer | Description | Model | Asset # | Cal Due |
|---|---|---|---|---|
| Solar Electronics | LISN | 8028-50-TS-24-BNC support | 904 | 3/2/2011 |
| Rohde & Schwarz | EMI Test Receiver, 20 Hz-7 GHz | ESIB7 | 1538 | 10/15/2010 |
| Rohde & Schwarz | Pulse Limiter | ESH3 Z2 | 1594 | 5/27/2011 |
| Fischer Custom Comm | LISN, 25A, 150kHz to 30MHz, 25 Amp, | FCC-LISN-50-25-2-09 | 2001 | 10/21/2010 |

# *Appendix B Test Data*

T80123 9 Pages

| | | | |
|---|---|---|---|
| Client: | Intel Corporation | Job Number: | J80050 |
| Model: | 62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205) | T-Log Number: | T80123 |
| | | Account Manager: | Christine Krebil |
| Contact: | Steven Hackett | | - |
| Emissions Standard(s): | FCC 15.247 / FCC 15 E / RSS 210 / FCC 15 B | Class: | B |
| Immunity Standard(s): | - | Environment: | Radio |

# EMC Test Data

For The

# Intel Corporation

Model

62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205)

Date of Last Test: 8/26/2010

| | | | |
|---|---|---|---|
| Client: | Intel Corporation | Job Number: | J80050 |
| Model: | 62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205) | T-Log Number: | T80123 |
| | | Account Manager: | Christine Krebil |
| Contact: | Steven Hackett | | |
| Standard: | FCC 15.247 / FCC 15 E / RSS 210 / FCC 15 B | Class: | B |

# Conducted Emissions - Digital Device (PC Peripheral)

*(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)*

## Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 8/6/2010
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #4

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

## General Test Configuration

For tabletop equipment, the host system was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

## Ambient Conditions:

Temperature: 20.4 °C
Rel. Humidity: 41 %

## Summary of Results

| Run # | Test Performed | Limit | Result | Margin |
|---|---|---|---|---|
| 1 | CE, AC Power,120V/60Hz | Class B | Pass | 47.7dBµV @ 1.884MHz (-8.3dB) |
| 2 | CE, AC Power,230V/50Hz | Class B | Pass | 54.7dBµV @ 2.007MHz (-1.3dB) |

## Modifications Made During Testing

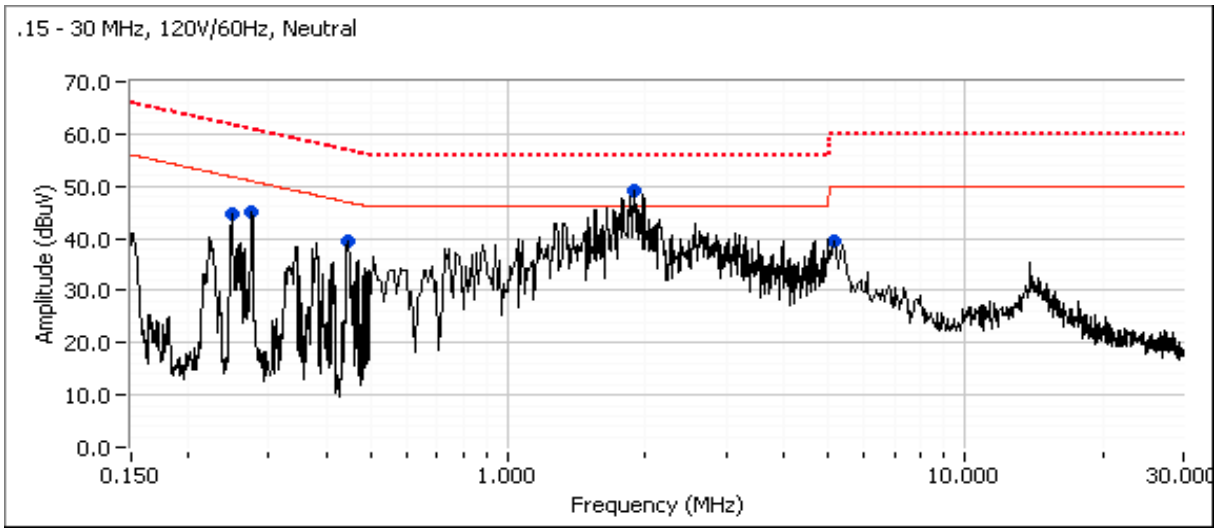
No modifications were made to the EUT during testing

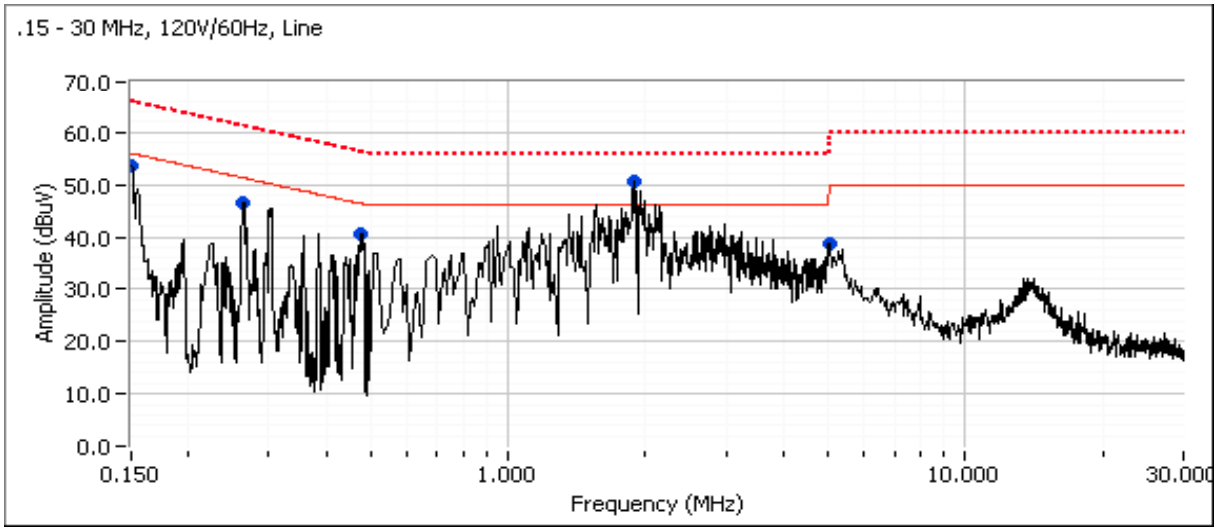
## Deviations From The Standard

No deviations were made from the requirements of the standard.

| | | | |
|---|---|---|---|
| Client: | Intel Corporation | Job Number: | J80050 |
| Model: | 62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205) | T-Log Number: | T80123 |
| | | Account Manager: | Christine Krebil |
| Contact: | Steven Hackett | | |
| Standard: | FCC 15.247 / FCC 15 E / RSS 210 / FCC 15 B | Class: | B |

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz



| | | | |
|---|---|---|---|
| Client: | Intel Corporation | Job Number: | J80050 |
| Model: | 62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205) | T-Log Number: | T80123 |
| | | Account Manager: | Christine Krebil |
| Contact: | Steven Hackett | | |
| Standard: | FCC 15.247 / FCC 15 E / RSS 210 / FCC 15 B | Class: | B |

Run #1: Continued

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

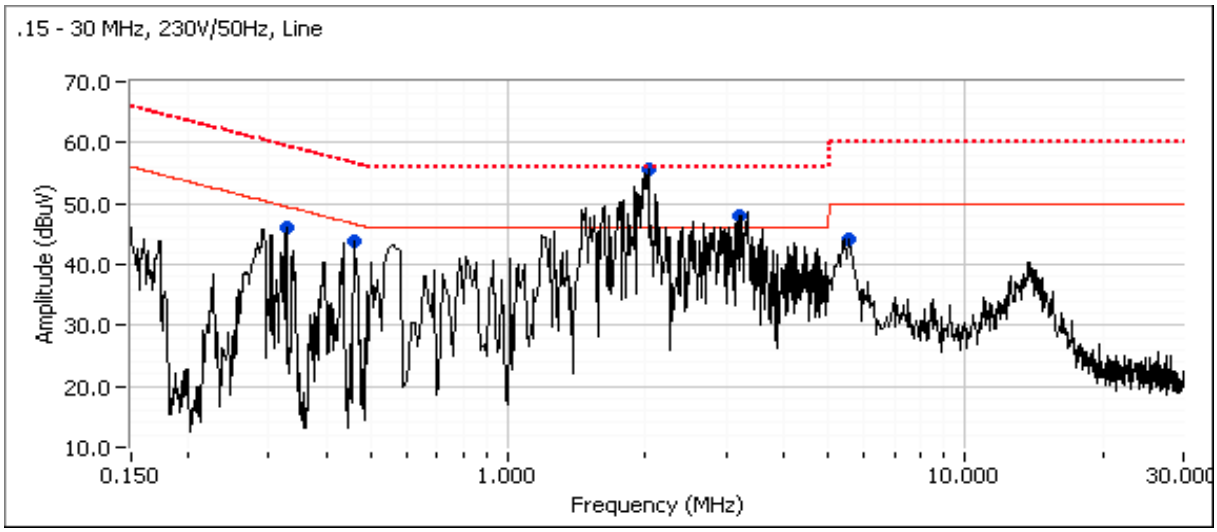
| Frequency | Level | AC | Class B | | Detector | Comments |
|---|---|---|---|---|---|---|
| MHz | dBµV | Line | Limit | Margin | QP/Ave | |
| 0.250 | 44.5 | Neutral | 51.8 | -7.3 | Peak | |
| 0.276 | 45.0 | Neutral | 50.9 | -5.9 | Peak | |
| 0.445 | 39.5 | Neutral | 47.0 | -7.5 | Peak | |
| 1.884 | 49.3 | Neutral | 46.0 | 3.3 | Peak | |
| 5.098 | 39.5 | Neutral | 50.0 | -10.5 | Peak | |
| 0.151 | 53.8 | Line 1 | 56.0 | -2.2 | Peak | |
| 0.265 | 46.6 | Line 1 | 51.3 | -4.7 | Peak | |
| 0.476 | 40.6 | Line 1 | 46.4 | -5.8 | Peak | |
| 1.895 | 50.7 | Line 1 | 46.0 | 4.7 | Peak | |
| 5.142 | 38.9 | Line 1 | 50.0 | -11.1 | Peak | |

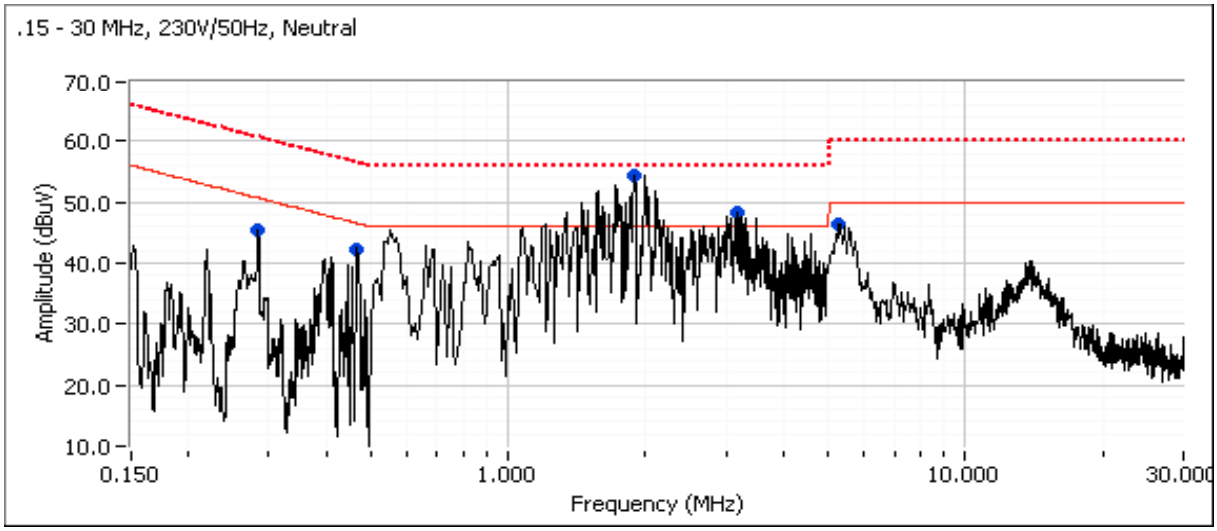
Final quasi-peak and average readings

| Frequency | Level | AC | Class B | | Detector | Comments |
|---|---|---|---|---|---|---|
| MHz | dBµV | Line | Limit | Margin | QP/Ave | |
| 1.884 | 47.7 | Neutral | 56.0 | -8.3 | QP | QP (1.00s) |
| 1.895 | 44.4 | Line 1 | 56.0 | -11.6 | QP | QP (1.00s) |
| 1.884 | 33.8 | Neutral | 46.0 | -12.2 | AVG | AVG (0.10s) |
| 1.895 | 32.2 | Line 1 | 46.0 | -13.8 | AVG | AVG (0.10s) |
| 0.151 | 51.1 | Line 1 | 65.9 | -14.8 | QP | QP (1.00s) |
| 0.265 | 42.9 | Line 1 | 61.3 | -18.4 | QP | QP (1.00s) |
| 0.476 | 37.7 | Line 1 | 56.4 | -18.7 | QP | QP (1.00s) |
| 0.445 | 37.6 | Neutral | 57.0 | -19.4 | QP | QP (1.00s) |
| 0.250 | 41.4 | Neutral | 61.8 | -20.4 | QP | QP (1.00s) |
| 0.276 | 40.0 | Neutral | 60.9 | -20.9 | QP | QP (1.00s) |
| 0.445 | 25.3 | Neutral | 47.0 | -21.7 | AVG | AVG (0.10s) |
| 0.151 | 29.6 | Line 1 | 55.9 | -26.3 | AVG | AVG (0.10s) |
| 0.476 | 19.9 | Line 1 | 46.4 | -26.5 | AVG | AVG (0.10s) |
| 0.265 | 23.2 | Line 1 | 51.3 | -28.1 | AVG | AVG (0.10s) |
| 0.250 | 21.4 | Neutral | 51.8 | -30.4 | AVG | AVG (0.10s) |
| 0.276 | 19.6 | Neutral | 50.9 | -31.3 | AVG | AVG (0.10s) |

| | | | |
|---|---|---|---|
| Client: | Intel Corporation | Job Number: | J80050 |
| Model: | 62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205) | T-Log Number: | T80123 |
| | | Account Manager: | Christine Krebil |
| Contact: | Steven Hackett | | |
| Standard: | FCC 15.247 / FCC 15 E / RSS 210 / FCC 15 B | Class: | B |

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz



| | | | |
|---|---|---|---|
| Client: | Intel Corporation | Job Number: | J80050 |
| Model: | 62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205) | T-Log Number: | T80123 |
| | | Account Manager: | Christine Krebil |
| Contact: | Steven Hackett | | |
| Standard: | FCC 15.247 / FCC 15 E / RSS 210 / FCC 15 B | Class: | B |

Run #2: Continued

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

| Frequency | Level | AC | Class B | | Detector | Comments |
|---|---|---|---|---|---|---|
| MHz | dBµV | Line | Limit | Margin | QP/Ave | |
| 0.328 | 46.2 | Line 1 | 49.5 | -3.3 | Peak | |
| 0.462 | 43.8 | Line 1 | 46.7 | -2.9 | Peak | |
| 2.007 | 55.7 | Line 1 | 46.0 | 9.7 | Peak | |
| 3.231 | 48.1 | Line 1 | 46.0 | 2.1 | Peak | |
| 5.547 | 44.3 | Line 1 | 50.0 | -5.7 | Peak | |
| 0.282 | 45.5 | Neutral | 50.7 | -5.2 | Peak | |
| 0.465 | 42.3 | Neutral | 46.6 | -4.3 | Peak | |
| 1.889 | 54.5 | Neutral | 46.0 | 8.5 | Peak | |
| 3.167 | 48.3 | Neutral | 46.0 | 2.3 | Peak | |
| 5.386 | 46.4 | Neutral | 50.0 | -3.6 | Peak | |

Final quasi-peak and average readings

| Frequency | Level | AC | Class B | | Detector | Comments |
|---|---|---|---|---|---|---|
| MHz | dBµV | Line | Limit | Margin | QP/Ave | |
| 2.007 | 54.7 | Line 1 | 56.0 | -1.3 | QP | QP (1.00s) |
| 1.889 | 50.1 | Neutral | 56.0 | -5.9 | QP | QP (1.00s) |
| 2.007 | 35.7 | Line 1 | 46.0 | -10.3 | AVG | AVG (0.10s) |
| 3.231 | 43.8 | Line 1 | 56.0 | -12.2 | QP | QP (1.00s) |
| 3.167 | 42.7 | Neutral | 56.0 | -13.3 | QP | QP (1.00s) |
| 0.462 | 40.7 | Line 1 | 56.7 | -16.0 | QP | QP (1.00s) |
| 1.889 | 29.8 | Neutral | 46.0 | -16.2 | AVG | AVG (0.10s) |
| 0.328 | 42.2 | Line 1 | 59.5 | -17.3 | QP | QP (1.00s) |
| 0.465 | 37.7 | Neutral | 56.6 | -18.9 | QP | QP (1.00s) |
| 5.386 | 40.9 | Neutral | 60.0 | -19.1 | QP | QP (1.00s) |
| 3.167 | 26.8 | Neutral | 46.0 | -19.2 | AVG | AVG (0.10s) |
| 3.231 | 25.4 | Line 1 | 46.0 | -20.6 | AVG | AVG (0.10s) |
| 5.386 | 23.9 | Neutral | 50.0 | -26.1 | AVG | AVG (0.10s) |
| 0.462 | 19.2 | Line 1 | 46.7 | -27.5 | AVG | AVG (0.10s) |
| 0.328 | 21.3 | Line 1 | 49.5 | -28.2 | AVG | AVG (0.10s) |
| 0.465 | 16.8 | Neutral | 46.6 | -29.8 | AVG | AVG (0.10s) |

| | | | |
|---|---|---|---|
| Client: | Intel Corporation | Job Number: | J80050 |
| Model: | 62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205) | T-Log Number: | T80123 |
| | | Account Manager: | Christine Krebil |
| Contact: | Steven Hackett | | |
| Standard: | FCC 15.247 / FCC 15 E / RSS 210 / FCC 15 B | Class: | B |

# Radiated Emissions - Digital Device (PC Peripheral)

*(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)*

## Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 8/6/2010
Test Engineer: Rafael Varelas
Test Location: Fremont Chamber #4
Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

## General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

## Ambient Conditions:

Temperature: 20.4 °C
Rel. Humidity: 41 %

## Summary of Results

| Run # | Test Performed | Limit | Result | Margin |
|---|---|---|---|---|
| 1 | Radiated Emissions 30 - 1000 MHz | FCC Class B | Pass | 31.8dBµV/m @ 42.98MHz (-8.2dB) |

## Modifications Made During Testing

No modifications were made to the EUT during testing

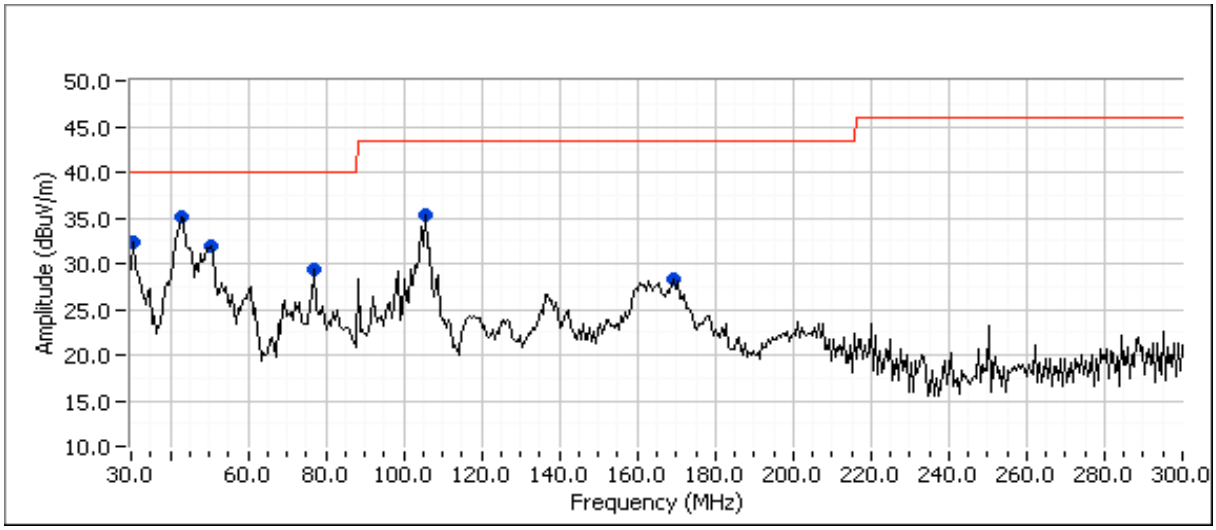
## Deviations From The Standard

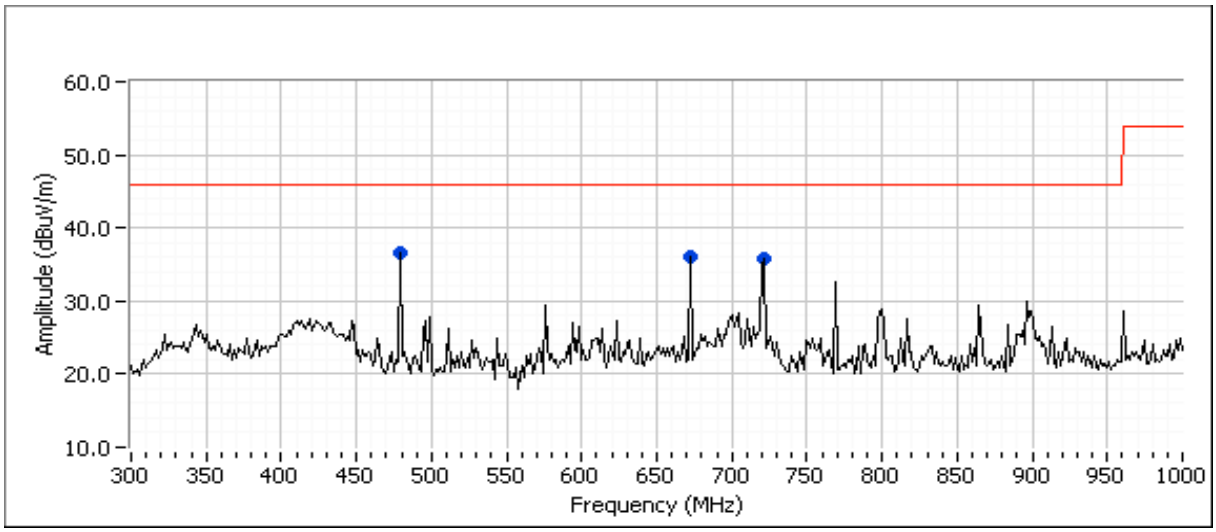
No deviations were made from the requirements of the standard.

| | | | |
|---|---|---|---|
| Client: | Intel Corporation | Job Number: | J80050 |
| Model: | 62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205) | T-Log Number: | T80123 |
| | | Account Manager: | Christine Krebil |
| Contact: | Steven Hackett | | |
| Standard: | FCC 15.247 / FCC 15 E / RSS 210 / FCC 15 B | Class: | B |

Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz

| Frequency Range | Test Distance | Limit Distance | Extrapolation Factor |
|---|---|---|---|
| 30 - 1000 MHz | 3 | 3 | 0.0 |



| | | | |
|---|---|---|---|
| Client: | Intel Corporation | Job Number: | J80050 |
| Model: | 62205BGHMW and 62205ANHMW (Intel® Centrino® Wireless-N 6205) | T-Log Number: | T80123 |
| | | Account Manager: | Christine Krebil |
| Contact: | Steven Hackett | | |
| Standard: | FCC 15.247 / FCC 15 E / RSS 210 / FCC 15 B | Class: | B |

Run #1: Continued

Preliminary peak readings captured during pre-scan

| Frequency | Level | Pol | FCC Class B | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 30.883 | 32.4 | V | 40.0 | -7.6 | Peak | 105 | 1.0 | |
| 42.983 | 35.1 | V | 40.0 | -4.9 | Peak | 259 | 1.0 | |
| 50.558 | 31.9 | V | 40.0 | -8.1 | Peak | 78 | 1.0 | |
| 77.214 | 29.3 | V | 40.0 | -10.7 | Peak | 276 | 1.5 | |
| 105.671 | 35.4 | V | 43.5 | -8.1 | Peak | 263 | 1.0 | |
| 169.743 | 28.2 | V | 43.5 | -15.3 | Peak | 129 | 1.0 | |
| 479.988 | 36.6 | V | 46.0 | -9.4 | Peak | 156 | 1.0 | |
| 671.987 | 36.0 | H | 46.0 | -10.0 | Peak | 231 | 1.5 | |
| 719.992 | 35.7 | V | 46.0 | -10.3 | Peak | 318 | 1.0 | |

Preliminary quasi-peak readings (no manipulation of EUT interface cables)

| Frequency | Level | Pol | FCC Class B | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 105.671 | 34.8 | V | 43.5 | -8.7 | QP | 251 | 1.0 | QP (1.00s) |
| 42.983 | 31.8 | V | 40.0 | -8.2 | QP | 264 | 1.0 | QP (1.00s) |
| 671.987 | 34.7 | H | 46.0 | -11.3 | QP | 209 | 1.2 | QP (1.00s) |
| 479.988 | 37.0 | V | 46.0 | -9.0 | QP | 167 | 1.0 | QP (1.00s) |
| 30.883 | 27.4 | V | 40.0 | -12.6 | QP | 106 | 1.0 | QP (1.00s) |
| 50.558 | 25.3 | V | 40.0 | -14.7 | QP | 75 | 1.0 | QP (1.00s) |

Run #2: Maximized Readings From Run #1

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

| Frequency Range | Test Distance | Limit Distance | Extrapolation Factor |
|---|---|---|---|
| 30 - 1000 MHz | 3 | 3 | 0.0 |

| Frequency | Level | Pol | FCC Class B | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 42.983 | 31.8 | V | 40.0 | -8.2 | QP | 264 | 1.0 | QP (1.00s) |
| 105.671 | 34.8 | V | 43.5 | -8.7 | QP | 251 | 1.0 | QP (1.00s) |
| 479.988 | 37.0 | V | 46.0 | -9.0 | QP | 167 | 1.0 | QP (1.00s) |
| 671.987 | 34.7 | H | 46.0 | -11.3 | QP | 209 | 1.2 | QP (1.00s) |
| 30.883 | 27.4 | V | 40.0 | -12.6 | QP | 106 | 1.0 | QP (1.00s) |
| 50.558 | 25.3 | V | 40.0 | -14.7 | QP | 75 | 1.0 | QP (1.00s) |

# *Appendix C Test Configuration Photographs*

Uploaded as a separate exhibit

# *Appendix D Basic and Reference Standards*

*Subpart B of Part 15 of FCC Rules for digital devices.*

FCC Part 15 Subpart B references the use of ANSI C63.4–2003: "*Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz*" for the purposes of evaluating the radiated and conducted emissions from digital devices.