



*EMC Test Report*

*Application for Grant of Equipment Authorization*

*Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7  
FCC Part 15 Subpart C*

*Model: Intel® Centrino® Wireless-N 100 (model  
100BNHMW)*

IC CERTIFICATION #: 1000M-100BNH and 1000M-100BNHU  
FCC ID: PD9100BNH and PD9100BNHU

APPLICANT: Intel Corporation  
100 Center Point Circle Suite 200  
Columbia, SC 29210

TEST SITE(S): Elliott Laboratories  
41039 Boyce Road.  
Fremont, CA. 94538-2435

IC SITE REGISTRATION #: 2845B-3; 2845B-4, 2845B-5, 2845B-7

REPORT DATE: October 19, 2010

FINAL TEST DATES: September 21, 22, 23, 24, 27 and 28, 2010

AUTHORIZED SIGNATORY:

A handwritten signature in blue ink that reads "Mark Briggs".

Mark Briggs  
Staff Engineer  
Elliott Laboratories



Testing Cert #2016.01

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**REVISION HISTORY**

Rev#	Date	Comments	Modified By
-	10-06-2010	First release	
1	10-19-2010	Reissued to correct the EUT description table.	Dave Guidotti

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## SCOPE

An electromagnetic emissions test has been performed on the Intel Corporation model Intel® Centrino® Wireless-N 100 (model 100BNHMW), pursuant to the following rules:  
Industry Canada RSS-Gen Issue 2  
RSS 210 Issue 7 “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”  
FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4:2003  
FCC DTS Measurement Procedure KDB558074, March 2005

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

## OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer’s declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body’s review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

### **STATEMENT OF COMPLIANCE**

The tested sample of Intel Corporation model Intel® Centrino® Wireless-N 100 (model 100BNHMW) complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 2

RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"

FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Intel Corporation model Intel® Centrino® Wireless-N 100 (model 100BNHMW) and therefore apply only to the tested sample. The sample was selected and prepared by Steve Hackett of Intel Corporation.

### **DEVIATIONS FROM THE STANDARDS**

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

**TEST RESULTS SUMMARY****DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	9.7 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11b: 43 mW 802.11g: 35.3 mW n20: 34.8 mW n40: 16.4 mW EIRP = 0.09 W <sup>Note 1</sup>	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	-18.7 dBm / 3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All spurious below -30dBc	< -30dBc <sup>Note 2</sup>	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	52.9dB $\mu$ V/m @ 2483.5MHz	15.207 in restricted bands, all others <-30dBc <sup>Note 2</sup>	Complies (1.1dB margin)
Note 1: EIRP calculated using antenna gain of 3.2dBi for the highest EIRP system.					
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).					

**GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS**

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Unique connector	Device must use a unique or integral connector	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	43.6dB $\mu$ V/m @ 7500.0MHz	Refer to page 18	Complies (-10.4 dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	44.5dB $\mu$ V @ 14.055MHz	Refer to page 17	Complies (-15.5dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations, RSS 102 declaration and User Manual (page 20, 22)	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Page 20	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	The host system antenna is intended to be integral to the host	Statement for products with detachable antenna	N/A
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	802.11b: 13.14 MHz 802.11g: 17.39 MHz n20: 18.64 MHz n40: 36.77 MHz	Information only	N/A

**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 are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dB $\mu$ V/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dB $\mu$ V	0.15 to 30 MHz	± 2.4 dB

**EQUIPMENT UNDER TEST (EUT) DETAILS****GENERAL**

The Intel Corporation model Intel® Centrino® Wireless-N 100 (model 100BNHMH) is a PCIe Half Mini Card form factor IEEE 802.11b/g/n wireless network adapter that supports 1x1 (SISO).

The Intel® Centrino® Wireless-N 100 is sold under model numbers 100BNHMH and 100BNHU. Model numbers with FCC ID: PD9100BNHU and IC: 1000M-100BNHU are intended for end user installation and operate with a BIOS lock feature to ensure they can only be used in the appropriate host systems to prevent unauthorized operation. Other models are only intended for OEM factory installation.

For radio testing purposes the card was installed in a test fixture that exposed all sides of the card. For digital device testing for certification under equipment code JBP the card was installed inside a laptop PC.

The sample was received on September 21, 2010 and tested on September 21, 22, 23, 24, 27 and 28, 2010. The EUT consisted of the following component(s):

Company	Model	Description	MAC	FCC ID IC UPN
Intel Corporation	100BNHMH	PCIe Half Mini Card form factor Bluetooth / IEEE 802.11b/g/n wireless network adapter	78929C0023FA	PD9100BNH PD9100BNHU 1000M-100BNH
	100BNHU			1000M-100BNHU

**ANTENNA SYSTEM**

The EUT antenna is 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 has no enclosure. It is designed to be installed within the enclosure of a host computer.

**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 testing:

Company	Model	Description	Serial Number	FCC ID
Intel Corporation	Shiloh (1543)	Test Fixture	-	N/A
Dell	-	Laptop PC	-	N/A
Agilent		DC Supply	-	N/A

**EUT INTERFACE PORTS**

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

Port		Description	Cable(s)	
From	To		Shielded/Unshielded	Length(m)
Laptop Mini PCI	Fixture PCIe	Ribbon	unshielded	1
DC Power	Fixture DC power	2-wire	unshielded	1

**EUT OPERATION**

The EUT was installed into a test fixture that exposed all sides of the card. The test fixture interfaced to a laptop computer and dc power supply. The laptop computer was used to configure the EUT to continuously transmit at a specified output power or continuously receive on the channel specified in the test data. For transmit mode measurements the system was configured to operate in each of the available operating modes – 802.11b, 802.11g, 802.11n (20 MHz channel bandwidth) and 802.11n (40MHz channel bandwidth).

The data rates used for all tests were the lowest data rates for each 802.11 mode – 1Mb/s for 802.11b, 6Mb/s for 802.11a and 802.11g, 6.5MB/s for 802.11n (20MHz), and 13 Mb/s for 802.11n (40MHz). The device operates at its maximum output power at the lowest data rate as shown in the table on the following page which was obtained using the test utility to control power via the on-board EEPROM settings.

Power versus Data Rate		
Mode	Data Rate	Power
802.11b	1	13.4dBm
	2	13.4dBm
	5.5	13.3dBm
	11	13.2dBm
802.11g	6	12.8dBm
	12	12.7dBm
	18	12.6dBm
	24	12.4dBm
	36	12.3dBm
	48	12.2dBm
	54	11.0dBm
802.11n 20MHz	6.5	12.4dBm
	13	12.2dBm
	19.5	11.7dBm
	26	12.2dBm
	39	11.6dBm
	52	11.5dBm
	58.5	10.8dBm
	65	9.2dBm
802.11n 40MHz	13.5	10.5dBm
	27	10.4dBm
	40.5	10.3dBm
	54	10.2dBm
	81	10.1dBm
	108	10.0dBm
	121.5	10.0dBm
	135	8.5dBm

Receiver spurious emissions were evaluated by using the test utility to enable the receiver on the center channel.

The PC was using the Intel test utility DRTU Version 1.2.12.0197 Driver version 14.0.0.39.

**TEST SITE****GENERAL INFORMATION**

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Registration Numbers		Location
	FCC	Canada	
Chamber 4	211948	2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 5	211948	2845B-5	
Chamber 7	A2LA accreditation	2845B-7	

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003.

**CONDUCTED EMISSIONS CONSIDERATIONS**

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. Measurements are made with the EUT connected to the public power network through a 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.

**RADIATED EMISSIONS CONSIDERATIONS**

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

## **MEASUREMENT INSTRUMENTATION**

### **RECEIVER SYSTEM**

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. 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. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak 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 1000MHz 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, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

### **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 run automated data collection programs which 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 measurements utilize a fifty microhenry 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.

### *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 loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

### *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. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 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 from 3 to 12 mm 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 manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

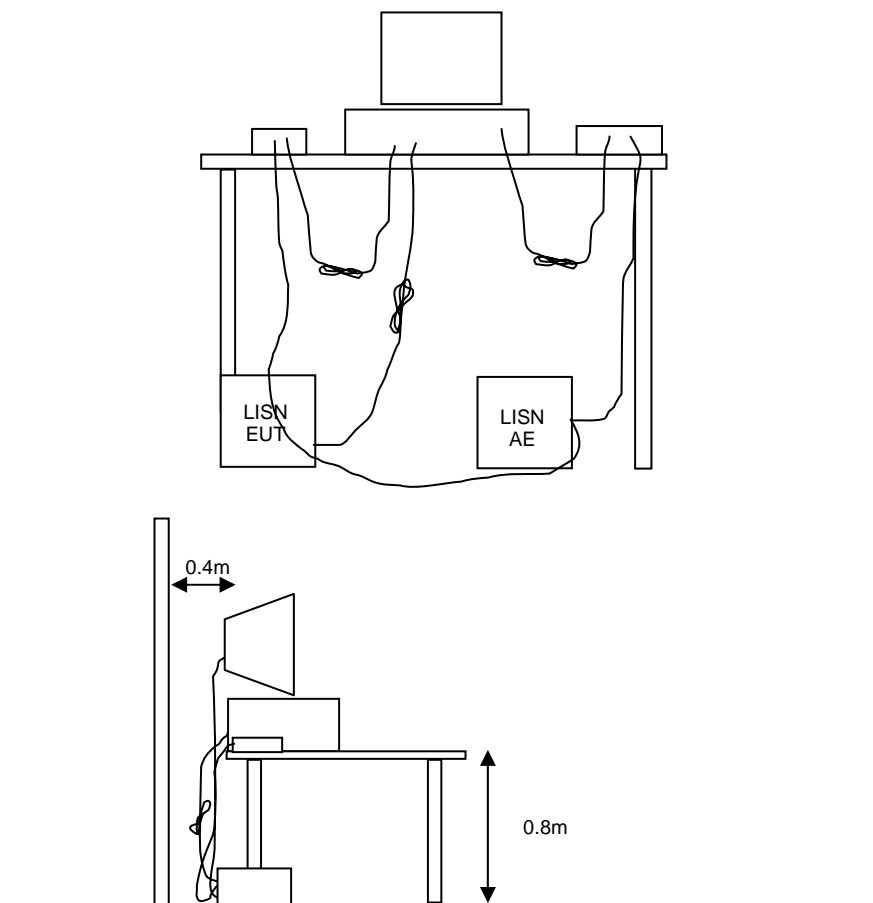
## TEST PROCEDURES

### EUT AND CABLE PLACEMENT

The regulations 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 C63.4:2003, and the worst-case orientation is used for final measurements.

### CONDUCTED EMISSIONS

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.



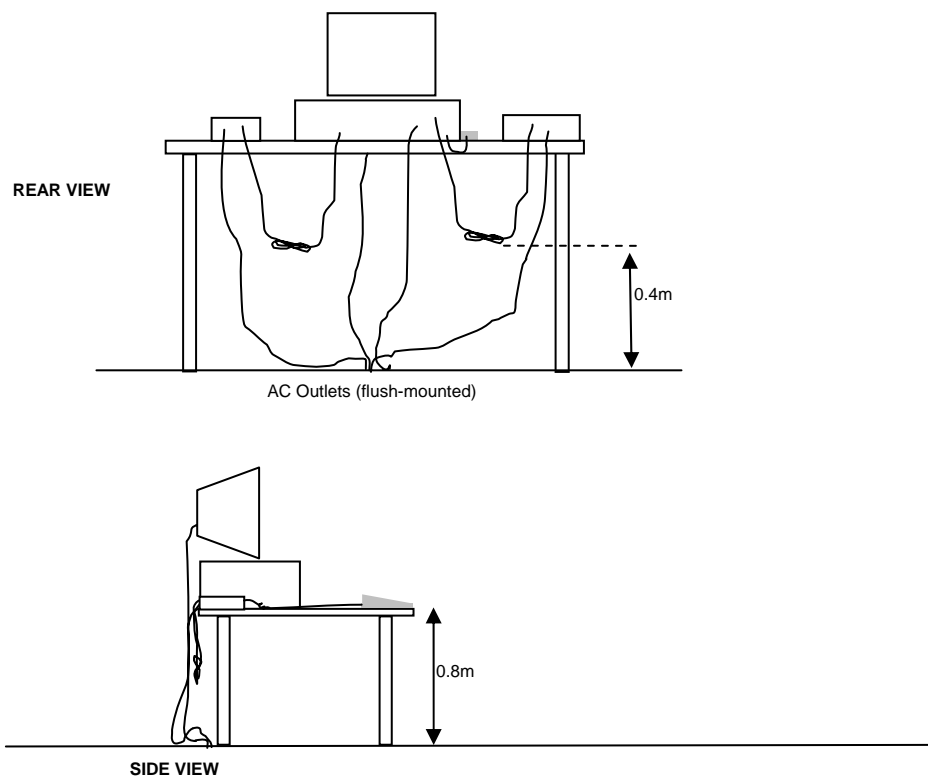
**RADIATED EMISSIONS**

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

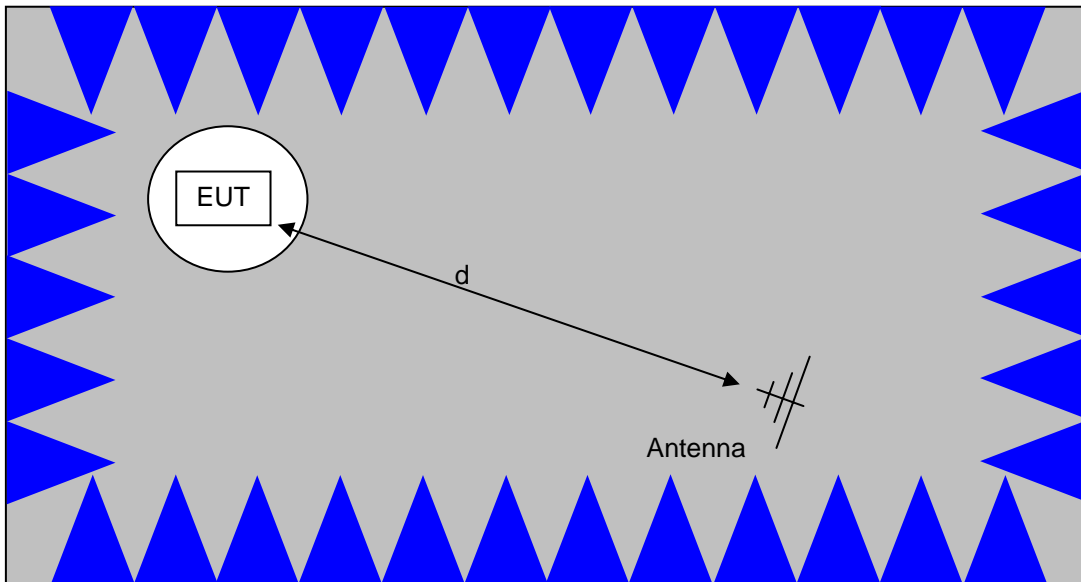
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which 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, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). 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.

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 2.5 meters.

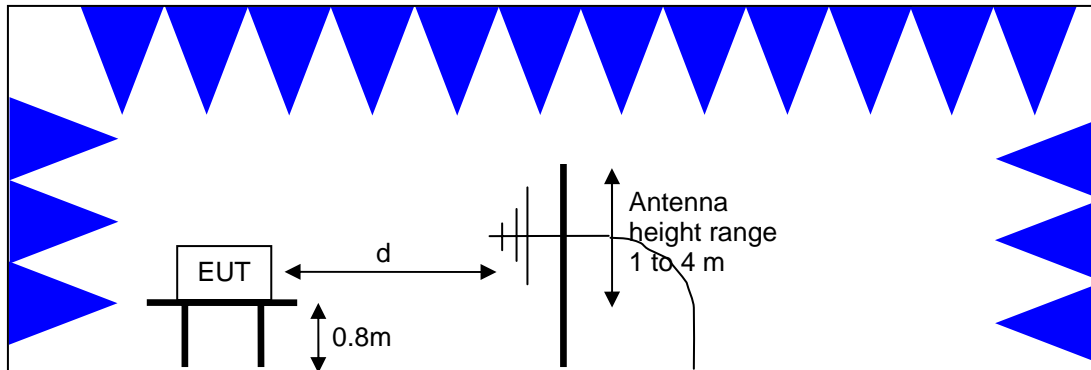


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements  
Semi-Anechoic Chamber, Plan and Side Views

#### **BANDWIDTH MEASUREMENTS**

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN.



**SPECIFICATION LIMITS AND SAMPLE CALCULATIONS**

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

**CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN**

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

**GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS**

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands<sup>1</sup> (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	2400/F <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

**RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS**

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

<sup>1</sup> The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

**OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS**

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

**TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS**

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) 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 above 30MHz, is calculated by using the following formula:

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

where:

$$F_d = \text{Distance Factor in dB}$$

$$D_m = \text{Measurement Distance in meters}$$

$$D_s = \text{Specification Distance in meters}$$

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40 * \text{LOG}_{10} (D_m/D_s)$$

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:

$$R_r = \text{Receiver Reading in dBuV/m}$$

$$F_d = \text{Distance Factor in dB}$$

$$R_c = \text{Corrected Reading in dBuV/m}$$

$$L_s = \text{Specification Limit in dBuV/m}$$

$$M = \text{Margin in dB Relative to Spec}$$

---

**SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION**

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of d (meters) from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{d} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

**Appendix A Test Equipment Calibration Data****Radio (Band Edge), 23-Sep-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/6/2012
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1555	2/5/2011
Rohde & Schwarz	Attenuator, 20 dB , 50 ohm, 10W, DC-18 GHz	20dB, 10W, Type N	1556	2/5/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	8/26/2011
Rohde & Schwarz	Power Meter, Dual Channel	NRVD	1787	12/4/2010

**Radio Antenna Port (Bandedge), 24-Sep-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012

**Radio Antenna Port (Bandedge and Spurious), 24-Sep-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	6/25/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012

**Radio (Band Edges), 27, 28-Sep-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	8/2/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	8/26/2011
Rohde & Schwarz	Power Meter, Dual Channel	NRVD	1787	12/4/2010
Rohde & Schwarz	Attenuator, 20 dB, 10W, DC-18 GHz	20dB, 10W, Type N	1795	6/2/2011
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1796	6/2/2011

**Radiated Emissions, 30 - 26,500 MHz, 29-Sep-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/6/2012
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	6/25/2011
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011

**Radio Antenna Port (Power and Spurious Emissions), 29-30-Sep-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011

**Radiated Emissions, 30 - 1000 MHz, 30-Sep-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
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
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	12/29/2011

**Conducted Emissions - AC Power Ports, 30-Sep-10**

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	LISN, 10 kHz-100 MHz	3825/2	1292	3/12/2011
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	10/15/2010
Fischer Custom Comm.	LISN, 50uH, 25 Amps, Dual Line	FCC-LISN-50/250- 25-2-01	1575	4/19/2011
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1593	5/27/2011

## *Appendix B Test Data*

T80637 55 Pages





## EMC Test Data

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Emissions Standard(s):	FCC 15.247, RSS 210, FCC 15 B	Class:	B
Immunity Standard(s):	-	Environment:	-

# EMC Test Data

For The

## Intel Corporation

Model

**Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)**

Date of Last Test: 9/30/2010

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions (Band Edge)

### Summary of Results

MAC Address: 78929C0023D2 DRTU Tool Version 1.2.12.0197 Driver version 14.0.0.39

Run #	Mode	Channel	Target Power	Measured Power	Test Performed	Limit	Result / Margin
Run # 1	n40 Chain A	#3 2422MHz	16.5	11.0	Restricted Band Edge at 2400 MHz	15.209	52.7dBµV/m @ 2389.8MHz (-1.3dB)
		#9 2452MHz	16.5	10.8	Restricted Band Edge at 2483.5 MHz	15.209	52.8dBµV/m @ 2483.5MHz (-1.2dB)
Run # 2	n40 Chain A	#4 2427MHz	16.5	11.3	Restricted Band Edge at 2400 MHz	15.209	52.3dBµV/m @ 2389.8MHz (-1.7dB)
		#8 2447MHz	16.5	11.5	Restricted Band Edge at 2483.5 MHz	15.209	<b>52.9dBµV/m @ 2483.5MHz (-1.1dB)</b>
Run # 3	n40 Chain A	#5 2432MHz	16.5	12.6	Restricted Band Edge at 2400 MHz	15.209	52.9dBµV/m @ 2390.0MHz (-1.1dB)
		#7 2442MHz	16.5	11.5	Restricted Band Edge at 2483.5 MHz	15.209	52.2dBµV/m @ 2483.5MHz (-1.8dB)
Run # 4	n40 Chain A	#6 2437MHz	16.5	13.2	Restricted Band Edge at 2400 MHz	15.209	49.2dBµV/m @ 2389.6MHz (-4.8dB)
					Restricted Band Edge at 2483.5 MHz	15.209	52.3dBµV/m @ 2483.5MHz (-1.7dB)

Note - the target and measured power are average powers (measured with average power sensor) and are used for reference purposes only. Power is set using "GAIN CONTROL" mode in the DRTU tool.

### Test Specific Details

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

### General Test Configuration

The EUT was installed into a test fixture such that the EUT was exposed (i.e. outside of a host PC). For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

### Ambient Conditions:

Rel. Humidity: 15 - 55 %  
Temperature: 18 - 25 °C

### Modifications Made During Testing

No modifications were made to the EUT during testing

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### Deviations From The Standard

No deviations were made from the requirements of the standard.

### Marker Delta Measurements

Three sets of marker deltas are measured using the following settings: RB=VB=100kHz; RB=1MHz,VB=1MHz; RB=1MHz, VB=10Hz.

Marker deltas are made conducted (analyzer connected to EUT rf port a 20dB pad) for single chain operation.

The fundamental field strength is always measured at a 3m test distance.

Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

### Run # 1, Band Edge Field Strength - n40, Chain A

Date of Test: 9/24/2010

Test Location: FT Chamber #5

Test Engineer: Rafael Varelas

Config Change: none

### Run # 1a, EUT on Channel #3 2422MHz - n40, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	11.0	15.0

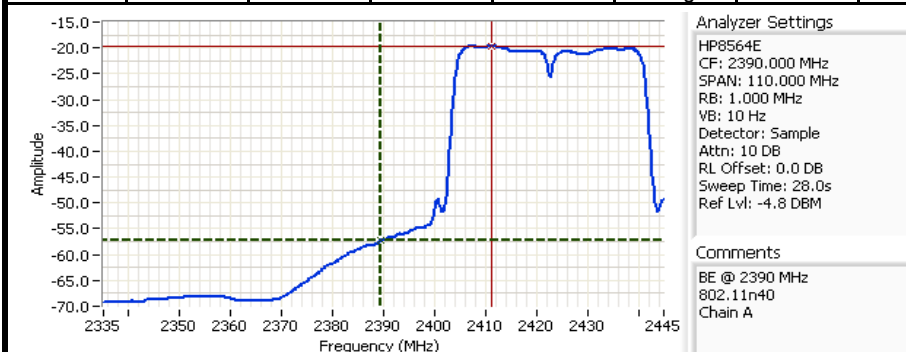
### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2406.000	90.4	H	-	-	AVG	335	1.0	RB 1 MHz;VB 10 Hz;Pk
2409.070	99.5	H	-	-	PK	335	1.0	RB 1 MHz;VB 3 MHz;Pk
2433.000	90.1	V	-	-	AVG	221	1.9	RB 1 MHz;VB 10 Hz;Pk
2431.600	99.0	V	-	-	PK	221	1.9	RB 1 MHz;VB 3 MHz;Pk

### 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	99.5	99.0	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	90.4	90.1	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	37.0 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	62.5 dBuV/m					
Calculated Band-Edge Measurement (Avg):	53.4 dBuV/m		Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	32.8 dB		-1.3	52.7	54	Avg
Delta Marker - 1MHz/10Hz:	37.7 dB		-11.5	62.5	74	Pk
Calculated Band-Edge Measurement (Peak):	66.7 dBuV/m		Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):	52.7 dBuV/m		Using 1MHz delta value			

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.816	52.7	-	54.0	-1.3	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
 HP8564E  
 CF: 2390.000 MHz  
 SPAN: 110.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 28.0s  
 Ref Lvl: -4.8 DBM

**Comments**  
 BE @ 2390 MHz  
 802.11n40  
 Chain A

Cursor 1 2389.4500 -57.30 Delta Freq. 21.817  
 Cursor 2 2411.2666 -19.63 Delta Amplitude 37.67



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### Run # 1b, EUT on Channel #9 2452MHz - n40, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	10.8	15.5

### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2436.130	90.3	V	-	-	AVG	222	1.9	RB 1 MHz;VB 10 Hz;Pk
2436.000	99.2	V	-	-	PK	222	1.9	RB 1 MHz;VB 3 MHz;Pk
2441.130	90.6	H	-	-	AVG	330	1.0	RB 1 MHz;VB 10 Hz;Pk
2436.130	100.0	H	-	-	PK	330	1.0	RB 1 MHz;VB 3 MHz;Pk

### 2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V					
Fundamental emission level @ 3m in 1MHz RBW:	100.0	99.2	Peak Measurement (RB=VB=1MHz)				
Fundamental emission level @ 3m in 1MHz RBW:	90.6	90.3	Average Measurement (RB=1MHz, VB=10Hz)				
<i>Delta Marker - 100kHz</i>			<i>37.2 dB</i>				
Calculated Band-Edge Measurement (Peak):	62.8 dBuV/m		<- this can only be used if band edge signal is highest within 2MHz of band edge.				
Calculated Band-Edge Measurement (Avg):	53.4 dBuV/m						
<i>Delta Marker - 1MHz/1MHz:</i>			28.8 dB	-1.2	52.8	54	Avg
<i>Delta Marker - 1MHz/10Hz:</i>			37.8 dB	-11.2	62.8	74	Pk
Calculated Band-Edge Measurement (Peak):	71.2 dBuV/m		Using 100kHz delta value				
Calculated Band-Edge Measurement (Avg):	52.8 dBuV/m		Using 1MHz delta value				

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.500	52.8	-	54.0	-1.2	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**

HP8564E  
 CF: 2483.500 MHz  
 SPAN: 110.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 28.0s  
 Ref Lvl: -5.3 DBM

**Comments**

BE @ 2483.5 MHz  
 802.11n40  
 Chain A

Cursor 1	2436.0166	-18.80	Delta Freq.	47.483
Cursor 2	2483.5000	-56.63	Delta Amplitude	37.83



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### Run # 2, Band Edge Field Strength - n40, Chain A

Date of Test: 9/24/2010

Test Location: FT Chamber #5

Test Engineer: Rafael Varelas

Config Change: none

### Run # 2a, EUT on Channel #4 2427MHz - n40, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	11.3	15.5

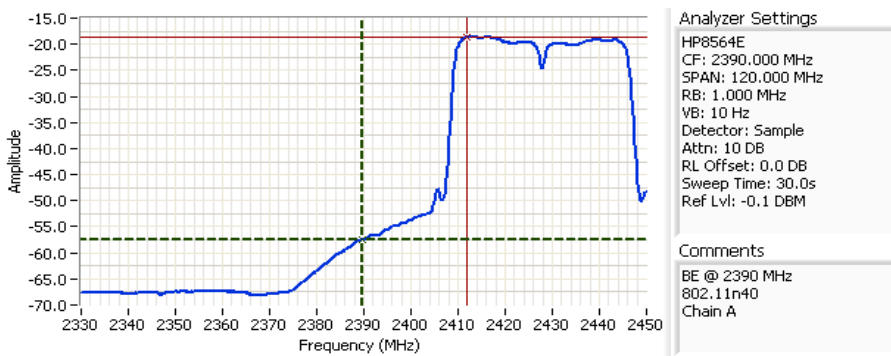
### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2443.270	91.1	V	120.0	-28.9	AVG	220	1.9	RB 1 MHz;VB 10 Hz;Pk
2441.670	100.0	V	120.0	-20.0	PK	220	1.9	RB 1 MHz;VB 3 MHz;Pk
2415.870	90.9	H	120.0	-29.1	AVG	354	1.3	RB 1 MHz;VB 10 Hz;Pk
2414.130	99.9	H	120.0	-20.1	PK	354	1.3	RB 1 MHz;VB 3 MHz;Pk

### 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	99.9	100.0	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	90.9	91.1	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	36.0 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	64.0 dBuV/m					
Calculated Band-Edge Measurement (Avg):	55.1 dBuV/m		Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	32.0 dB		-1.7	52.3	54	Avg
Delta Marker - 1MHz/10Hz:	38.8 dB		-10.0	64.0	74	Pk
Calculated Band-Edge Measurement (Peak):	68.0 dBuV/m		Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):	52.3 dBuV/m		Using 1MHz delta value			

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.800	52.3	-	54.0	-1.7	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
 HP8564E  
 CF: 2390.000 MHz  
 SPAN: 120.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 30.0s  
 Ref Lvl: -0.1 DBM

**Comments**  
 BE @ 2390 MHz  
 802.11n40  
 Chain A

Cursor 1	2389.8000	-57.43	Delta Freq.	22.000
Cursor 2	2411.8000	-18.60	Delta Amplitude	38.83



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### Run # 2b, EUT on Channel #8 2447MHz - n40, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	11.5	16.0

### Fundamental Signal Field Strength

Frequency MHz	Level dBuV/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2431.470	91.7	H	-	-	AVG	331	1.0	RB 1 MHz;VB 10 Hz;Pk
2431.400	100.9	H	-	-	PK	331	1.0	RB 1 MHz;VB 3 MHz;Pk
2431.470	91.4	V	-	-	AVG	221	1.9	RB 1 MHz;VB 10 Hz;Pk
2431.470	100.3	V	-	-	PK	221	1.9	RB 1 MHz;VB 3 MHz;Pk

### 2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	100.9	100.3	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	91.7	91.4	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	37.8 dB		< this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	63.1 dBuV/m					
Calculated Band-Edge Measurement (Avg):	53.9 dBuV/m		Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	31.2 dB		-1.1	52.9	54	Avg
Delta Marker - 1MHz/10Hz:	38.8 dB		-10.9	63.1	74	Pk
Calculated Band-Edge Measurement (Peak):	69.7 dBuV/m		Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):	52.9 dBuV/m		Using 1MHz delta value			

Frequency MHz	Level dBuV/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2483.500	52.9	-	54.0	-1.1	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**

HP8564E  
 CF: 2483.500 MHz  
 SPAN: 120.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 30.0s  
 Ref Lvl: -1.7 DBM

**Comments**

BE @ 2483.5 MHz  
 802.11n40  
 Chain A

Cursor 1	2431.5000	-18.37	
Cursor 2	2483.5000	-57.20	

Delta Freq. 52.000  
 Delta Amplitude 38.83



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### Run # 3, Band Edge Field Strength - n40, Chain A

Date of Test: 9/24/2010

Test Location: FT Chamber #5

Test Engineer: Rafael Varelas

Config Change: none

### Run # 3a, EUT on Channel #5 2432MHz - n40, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	12.6	17.0

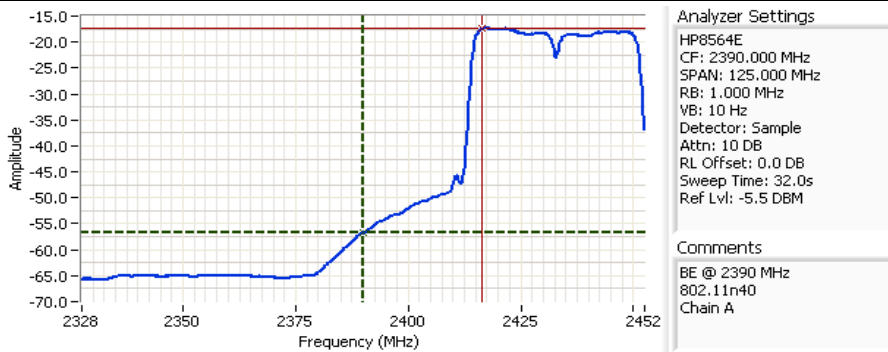
### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2448.330	92.4	V	-	-	AVG	221	1.8	RB 1 MHz;VB 10 Hz;Pk 17
2446.670	101.2	V	-	-	PK	221	1.8	RB 1 MHz;VB 3 MHz;Pk
2416.530	92.3	H	-	-	AVG	336	1.0	RB 1 MHz;VB 10 Hz;Pk
2418.800	101.0	H	-	-	PK	336	1.0	RB 1 MHz;VB 3 MHz;Pk

### 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	101.0	101.2	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	92.3	92.4	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	38.8 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	62.4 dBuV/m					
Calculated Band-Edge Measurement (Avg):	53.6 dBuV/m		Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	34.7 dB		-1.1	52.9	54	Avg
Delta Marker - 1MHz/10Hz:	39.5 dB		-11.6	62.4	74	Pk
Calculated Band-Edge Measurement (Peak):	66.5 dBuV/m		Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):	52.9 dBuV/m		Using 1MHz delta value			

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	52.9	-	54.0	-1.1	Avg	-	-	Using 1MHz delta value



Cursor 1	2390.0000	-56.83	Delta Freq.	26.458
Cursor 2	2416.4583	-17.33	Delta Amplitude	39.50





Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### Run # 3b, EUT on Channel #7 2442MHz - n40, Chain A

Date of Test: 9/27/2010      Test Location: FT Chamber #5  
 Test Engineer: Rafael Varelas      Config Change: none

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	11.5	16.5

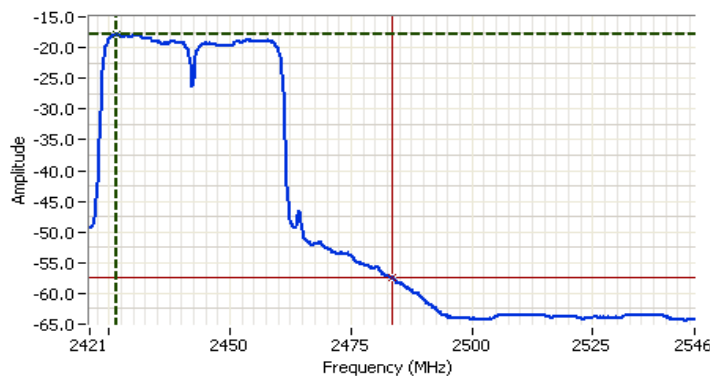
### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2431.000	91.5	H	-	-	AVG	318	1.3	RB 1 MHz;VB 10 Hz;Pk
2430.870	99.0	H	-	-	PK	318	1.3	RB 1 MHz;VB 3 MHz;Pk
2431.000	91.9	V	-	-	AVG	334	1.5	RB 1 MHz;VB 10 Hz;Pk
2430.200	99.7	V	-	-	PK	334	1.5	RB 1 MHz;VB 3 MHz;Pk

### 2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	99.0	99.7	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	91.5	91.9	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	39.2 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	60.5 dBuV/m					
Calculated Band-Edge Measurement (Avg):	52.2 dBuV/m		Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	33.7 dB		-1.8	52.2	54	Avg
Delta Marker - 1MHz/10Hz:	39.7 dB		-13.5	60.5	74	Pk
Calculated Band-Edge Measurement (Peak):	66.0 dBuV/m		Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):	52.2 dBuV/m		Using 1MHz delta value			

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	52.2	-	54.0	-1.8	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
 HP8564E,EMICF: 2483.500 MHz  
 SPAN: 125.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 20 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 47.0s  
 Ref Lvl: 3.7 DBM

**Comments**  
 BE 2483.5 MHz  
 802.11n40  
 Chain A

Cursor 1 2426.4167 -17.80      Delta Freq. 57.083  
 Cursor 2 2483.5000 -57.47      Delta Amplitude 39.67



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### Run # 4, Band Edge Field Strength - n40, Chain A

Date of Test: 9/27/2010

Test Location: FT Chamber #5

Test Engineer: Rafael Varelas

Config Change: none

### EUT on Channel #6 2437MHz - n40, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	13.2	18.0

### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2426.130	92.5	V	-	-	AVG	337	1.5	RB 1 MHz;VB 10 Hz;Pk
2425.730	101.3	V	-	-	PK	337	1.5	RB 1 MHz;VB 3 MHz;Pk

### 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	100.0	101.3	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	92.0	92.5	Average Measurement (RB=1MHz, VB=10Hz)			
<i>Delta Marker - 100kHz</i>	<b>43.3 dB</b>		<- this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	58.0 dBuV/m					
Calculated Band-Edge Measurement (Avg):	49.2 dBuV/m		Margin	Level	Limit	Detector
<i>Delta Marker - 1MHz/1MHz:</i>	35.7 dB		-4.8	49.2	54	Avg
<i>Delta Marker - 1MHz/10Hz:</i>	42.3 dB		-16.0	58.0	74	Pk
Calculated Band-Edge Measurement (Peak):	65.6 dBuV/m		Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):	50.2 dBuV/m		Using 100kHz delta value			

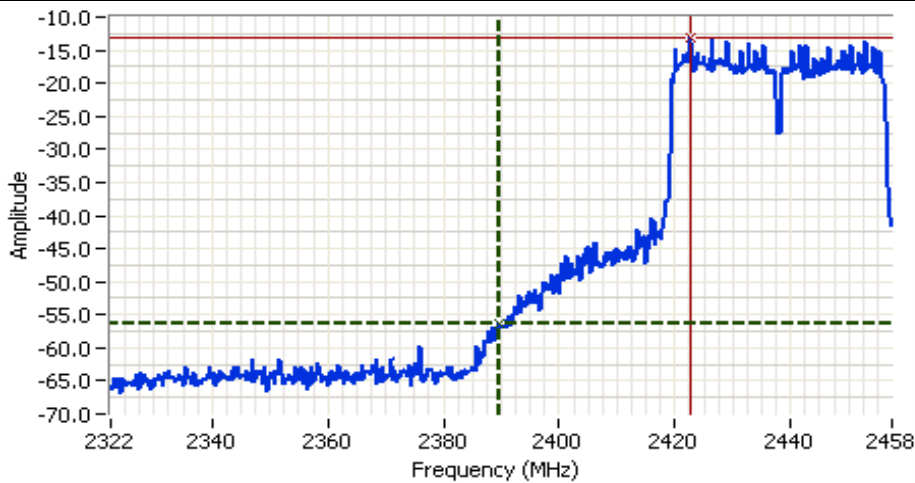
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2389.550	49.2	-	54.0	<b>-4.8</b>	Avg	-	-	Using 100kHz delta value

### 2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	100.0	101.3	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	92.0	92.5	Average Measurement (RB=1MHz, VB=10Hz)			
<i>Delta Marker - 100kHz</i>	39.7 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	61.6 dBuV/m					
Calculated Band-Edge Measurement (Avg):	52.8 dBuV/m		Margin	Level	Limit	Detector
<i>Delta Marker - 1MHz/1MHz:</i>	34.5 dB		-1.7	52.3	54	Avg
<i>Delta Marker - 1MHz/10Hz:</i>	<b>40.2 dB</b>		-12.4	61.6	74	Pk
Calculated Band-Edge Measurement (Peak):	66.8 dBuV/m		Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):	52.3 dBuV/m		Using 1MHz delta value			

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.500	52.3	-	54.0	<b>-1.7</b>	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A



**Analyzer Settings**

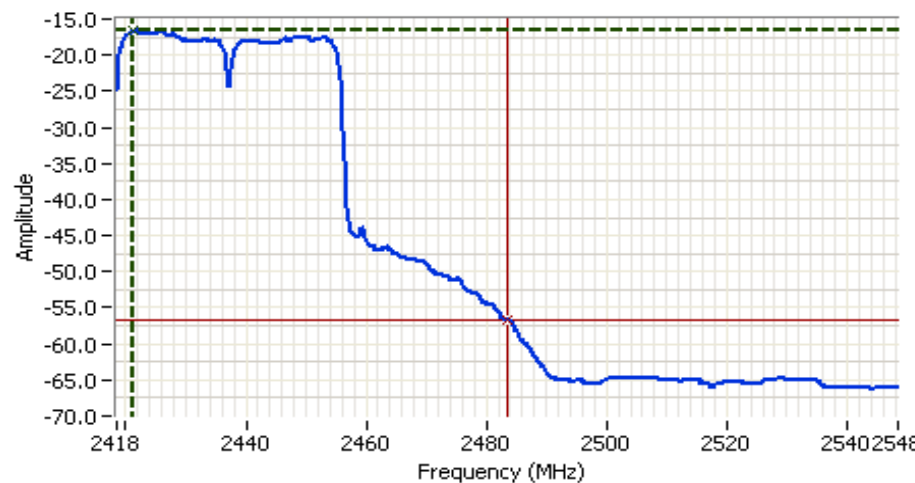
HP8564E,EMICF: 2390.000 MHz  
 SPAN: 135.000 MHz  
 RB: 100 kHz  
 VB: 100 kHz  
 Detector: Normal  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 74.0ms  
 Ref Lvl: 0.0 DBM

**Comments**

BE @ 2390 MHz  
 802.11n40  
 Chain A

Cursor 1	2389.5500	-56.33	
Cursor 2	2422.6250	-13.00	

Delta Freq. 33.075  
 Delta Amplitude 43.33



**Analyzer Settings**

HP8564E,EMICF: 2483.500 MHz  
 SPAN: 130.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 49.0s  
 Ref Lvl: -1.0 DBM

**Comments**

BE @ 2483.5 MHz  
 802.11n40  
 Chain A

Cursor 1	2421.3167	-16.67	
Cursor 2	2483.5000	-56.83	

Delta Freq. 62.183  
 Delta Amplitude 40.17



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions (Band Edge)

### Summary of Results

MAC Address: 78929C0023FE DRTU Tool Version 1.2.12.0197 Driver version 14.0.0.39

Run #	Mode	Channel	Measured Power	Test Performed	Limit	Result / Margin
Run # 5	n20 Chain A	#1 2412MHz	12.2	Restricted Band Edge at 2400 MHz	15.209	52.4dBµV/m @ 2390.0MHz (-1.6dB)
		#11 2462MHz	12.5	Restricted Band Edge at 2483.5 MHz	15.209	<b>52.9dBµV/m @ 2483.5MHz (-1.1dB)</b>
Run # 6	802.11g Chain A	#1 2412MHz	12.7	Restricted Band Edge at 2400 MHz	15.209	51.3dBµV/m @ 2390.0MHz (-2.7dB)
		#11 2462MHz	11.5	Restricted Band Edge at 2483.5 MHz	15.209	50.8dBµV/m @ 2483.5MHz (-3.2dB)
Run # 7	802.11b Chain A	#1 2412MHz	16.6	Restricted Band Edge at 2400 MHz	15.209	44.1dBµV/m @ 2390.0MHz (-9.9dB)
		#11 2462MHz	16.8	Restricted Band Edge at 2483.5 MHz	15.209	45.3dBµV/m @ 2483.5MHz (-8.7dB)
Run # 8	n20 Chain A	#2 2417MHz	15.7	Restricted Band Edge at 2400 MHz	15.209	52.8dBµV/m @ 2390.0MHz (-1.2dB)
		#10 2457MHz	15.4	Restricted Band Edge at 2483.5 MHz	15.209	52.7dBµV/m @ 2483.5MHz (-1.3dB)
Run # 9	802.11g Chain A	#2 2417MHz	16.0	Restricted Band Edge at 2400 MHz	15.209	52.9dBµV/m @ 2390.0MHz (-1.1dB)
		#10 2457MHz	15.9	Restricted Band Edge at 2483.5 MHz	15.209	52.8dBµV/m @ 2483.5MHz (-1.2dB)

Note - the target and measured power are average powers (measured with average power sensor) and are used for reference purposes only. Power is set using " **GAIN CONTROL**" mode in the DRTU tool.

### Test Specific Details

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

### General Test Configuration

The EUT was installed into a test fixture such that the EUT was exposed (i.e. outside of a host PC). For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

### Ambient Conditions:

Rel. Humidity: 15 - 55 %  
Temperature: 18 - 25 °C

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

**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.

**Marker Delta Measurements**

Three sets of marker deltas are measured using the following settings: RB=VB=100kHz; RB=1MHz,VB=1MHz; RB=1MHz, VB=10Hz.

Marker deltas are made conducted (analyzer connected to EUT rf port a 20dB pad) for single chain operation.

The fundamental field strength is always measured at a 3m test distance.

Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

### Run # 5, Band Edge Field Strength - n20, Chain A

Date of Test: 9/23/2010

Test Location: FT Chamber #4

Test Engineer: Joseph Cadigal

Config Change: none

### Run # 5a, EUT on Channel #1 2412MHz - n20, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	12.2	16.0

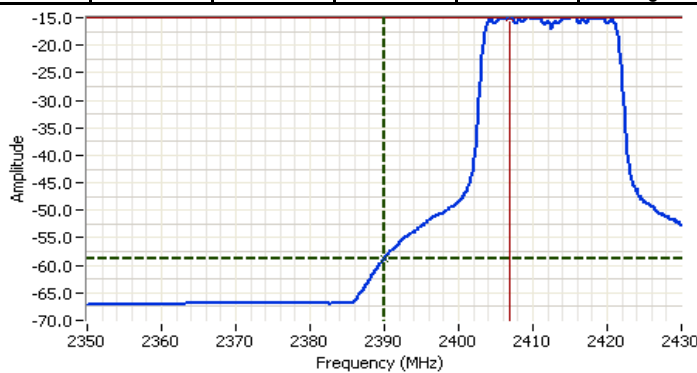
### Fundamental Signal Field Strength

Frequency MHz	Level dBμV/m	Pol v/h	15.209 / 15.247 Limit Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2408.870	94.9	V	- -	AVG	326	1.5	RB 1 MHz;VB 10 Hz;Pk
2409.200	101.5	V	- -	PK	326	1.5	RB 1 MHz;VB 3 MHz;Pk
2404.930	96.2	H	- -	AVG	326	1.0	RB 1 MHz;VB 10 Hz;Pk
2409.130	103.3	H	- -	PK	326	1.0	RB 1 MHz;VB 3 MHz;Pk

### 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	103.3	101.5	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	96.2	94.9	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	40.8 dB		-< this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	62.5 dBuV/m					
Calculated Band-Edge Measurement (Avg):	55.4 dBuV/m	Margin	Level	Limit	Detector	
Delta Marker - 1MHz/1MHz:	33.3 dB	-1.6	52.4	54	Avg	
Delta Marker - 1MHz/10Hz:	43.8 dB	-11.5	62.5	74	Pk	
Calculated Band-Edge Measurement (Peak):	70.0 dBuV/m	Using 100kHz delta value				
Calculated Band-Edge Measurement (Avg):	52.4 dBuV/m	Using 1MHz delta value				

Frequency MHz	Level dBμV/m	Pol v/h	FCC 15.209 Limit Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2390.000	52.4	-	54.0 -1.6	Avg	-	-	Using 1MHz delta value



Analyzer Settings  
 HP8564E,EMICF: 2390.000 MHz  
 SPAN: 80.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 30.0s  
 Ref Lvl: 0.0 DBM

Comments  
 BE @ 2390 MHz  
 802.11n20  
 Chain A

Cursor 1	2390.0000	-58.83	
Cursor 2	2406.8000	-15.00	

Delta Freq. 16.800  
 Delta Amplitude 43.83



Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
Contact: -	Account Manager: Christine Krebill
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

**Run # 5b, EUT on Channel #11 2462MHz - n20, Chain A**

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	12.5	18.5

**Fundamental Signal Field Strength**

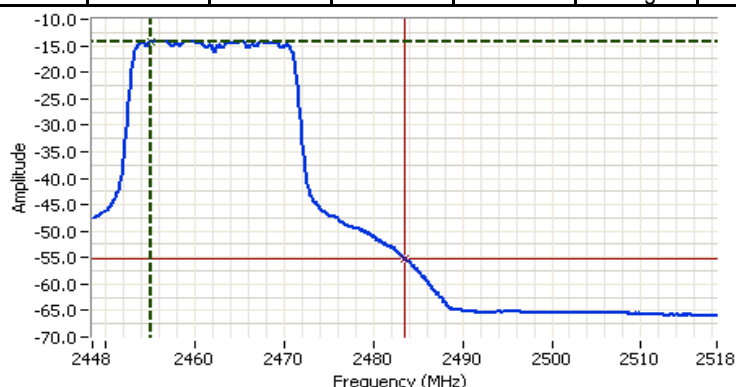
Frequency MHz	Level dBμV/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2454.970	92.8	V	-	-	AVG	247	1.3	RB 1 MHz;VB 10 Hz;Pk
2459.130	101.2	V	-	-	PK	247	1.3	RB 1 MHz;VB 3 MHz;Pk
2459.570	94.1	H	-	-	AVG	247	1.2	RB 1 MHz;VB 10 Hz;Pk
2459.130	103.6	H	-	-	PK	247	1.2	RB 1 MHz;VB 3 MHz;Pk

**2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta**

	H	V		Margin	Level	Limit	Detector
Fundamental emission level @ 3m in 1MHz RBW:	103.6	101.2					
Fundamental emission level @ 3m in 1MHz RBW:	94.1	92.8					
Delta Marker - 100kHz	40.0 dB						
Calculated Band-Edge Measurement (Peak):	63.6 dBμV/m						
Calculated Band-Edge Measurement (Avg):	54.1 dBμV/m						
Delta Marker - 1MHz/1MHz:	31.8 dB			-1.1	52.9	54	Avg
Delta Marker - 1MHz/10Hz:	41.2 dB			-10.4	63.6	74	Pk
Calculated Band-Edge Measurement (Peak):	71.8 dBμV/m						Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	52.9 dBμV/m						Using 1MHz delta value

Peak Measurement (RB=VB=1MHz)  
Average Measurement (RB=1MHz, VB=10Hz)  
-< this can only be used if band edge signal is highest within 2MHz of band edge.

Frequency MHz	Level dBμV/m	Pol v/h	FCC 15.209		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2483.500	52.9	-	54.0	-1.1	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
HP8564E,EMICF: 2483.500 MHz  
SPAN: 70.000 MHz  
RB: 1.000 MHz  
VB: 10 Hz  
Detector: Sample  
Attn: 10 DB  
RL Offset: 0.0 DB  
Sweep Time: 26.0s  
Ref Lvl: 0.0 DBM

**Comments**  
BE @ 2483.5 MHz  
802.11n20  
Chain A

Cursor 1	2455.0334	-14.17	Delta Freq.	28.467
Cursor 2	2483.5000	-55.33	Delta Amplitude	41.17



Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

### Run # 6, Band Edge Field Strength - 802.11g, Chain A

Date of Test: 9/23/2010

Test Location: FT Chamber#7

Test Engineer: Joseph Cadigal

Config Change: none

### Run # 6a, EUT on Channel #1 2412MHz - 802.11g, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	12.7	17.0

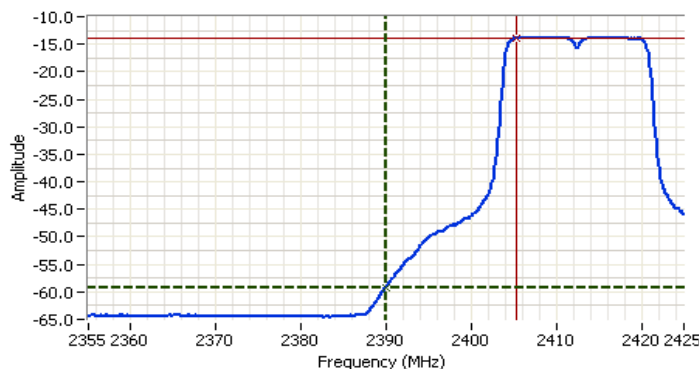
### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2418.830	87.5	V	-	-	AVG	338	1.7	RB 1 MHz;VB 10 Hz;Pk
2417.630	95.4	V	-	-	PK	338	1.7	RB 1 MHz;VB 3 MHz;Pk
2405.000	96.6	H	-	-	AVG	353	1.0	RB 1 MHz;VB 10 Hz;Pk
2405.730	104.7	H	-	-	PK	353	1.0	RB 1 MHz;VB 3 MHz;Pk

### 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	104.7	95.4	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	96.6	87.5	Average Measurement (RB=1MHz, VB=10Hz)
<i>Delta Marker - 100kHz</i>	44.5 dB		-< this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	60.2 dBuV/m		
Calculated Band-Edge Measurement (Avg):	52.1 dBuV/m	Margin	Level
<i>Delta Marker - 1MHz/1MHz:</i>	35.5 dB	-2.7	51.3
<i>Delta Marker - 1MHz/10Hz:</i>	45.3 dB	-13.8	60.2
Calculated Band-Edge Measurement (Peak):	69.2 dBuV/m		74
Calculated Band-Edge Measurement (Avg):	51.3 dBuV/m		

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	51.3	-	54.0	-2.7	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
 HP8564E,EMICF: 2390.000 MHz  
 SPAN: 70.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 26.0s  
 Ref Lvl: 0.0 DBM

**Comments**  
 BE @ 2390 MHz  
 802.11g  
 Chain A

Cursor 1 2390.0000 -59.17 Delta Freq. 15.400  
 Cursor 2 2405.3999 -13.83 Delta Amplitude 45.33





Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
Contact: -	Account Manager: Christine Krebill
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

### Run # 6b, EUT on Channel #11 2462MHz - 802.11g, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5		17.0

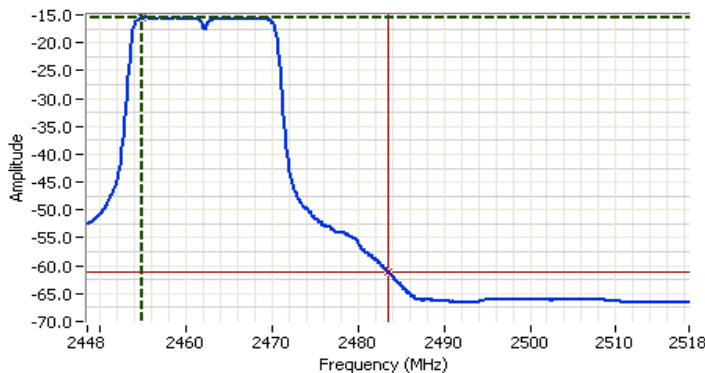
### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2468.670	90.7	V	120.0	-29.3	AVG	248	1.2	RB 1 MHz;VB 10 Hz;Pk
2467.730	98.7	V	120.0	-21.3	PK	248	1.2	RB 1 MHz;VB 3 MHz;Pk
2464.670	96.5	H	120.0	-23.5	AVG	248	1.3	RB 1 MHz;VB 10 Hz;Pk
2465.100	104.3	H	120.0	-15.7	PK	248	1.3	RB 1 MHz;VB 3 MHz;Pk

### 2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	104.3	98.7	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	96.5	90.7	Average Measurement (RB=1MHz, VB=10Hz)			
<i>Delta Marker - 100kHz</i>	44.2 dB		-< this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	60.1 dB $\mu$ V/m					
Calculated Band-Edge Measurement (Avg):	52.3 dB $\mu$ V/m	Margin	Level	Limit	Detector	
<i>Delta Marker - 1MHz/1MHz:</i>	36.8 dB	-3.2	50.8	54	Avg	
<i>Delta Marker - 1MHz/10Hz:</i>	<b>45.7 dB</b>	-13.9	60.1	74	Pk	
Calculated Band-Edge Measurement (Peak):	67.5 dB $\mu$ V/m	Using 100kHz delta value				
Calculated Band-Edge Measurement (Avg):	50.8 dB $\mu$ V/m	Using 1MHz delta value				

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>2483.500</b>	<b>50.8</b>	-	54.0	<b>-3.2</b>	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
 HP8564E,EMICF: 2483.500 MHz  
 SPAN: 70.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 26.0s  
 Ref Lvl: 0.0 DBM

**Comments**  
 BE @ 2483.5 MHz  
 802.11g  
 Chain A

Cursor 1	2454.8000	-15.50	Delta Freq.	28.700
Cursor 2	2483.5000	-61.17	Delta Amplitude	45.67



Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

**Run # 7, Band Edge Field Strength - 802.11b, Chain A**

Date of Test: 9/23/2010

Test Location: FT Chamber#7

Test Engineer: Joseph Cadigal

Config Change: none

**Run # 7a, EUT on Channel #1 2412MHz - 802.11b, Chain A**

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.6	16.5

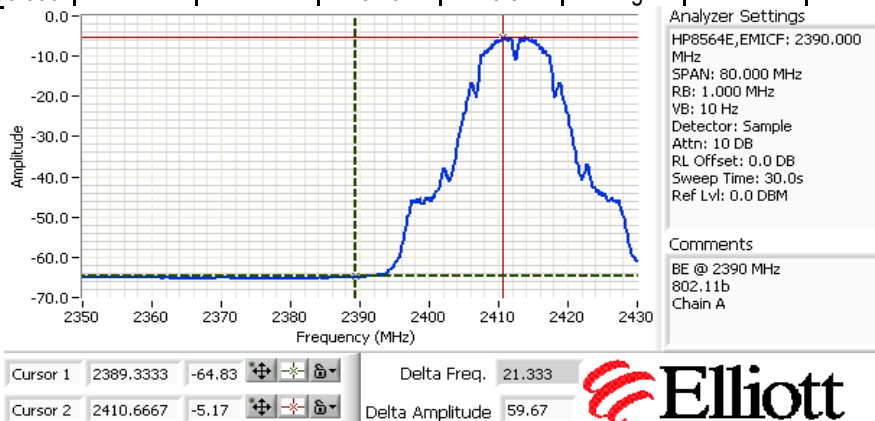
**Fundamental Signal Field Strength**

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2410.330	100.6	V	-	-	AVG	341	1.7	RB 1 MHz;VB 10 Hz;Pk
2411.230	104.0	V	-	-	PK	341	1.7	RB 1 MHz;VB 3 MHz;Pk
2410.330	103.8	H	-	-	AVG	341	1.1	RB 1 MHz;VB 10 Hz;Pk
2411.200	107.1	H	-	-	PK	341	1.1	RB 1 MHz;VB 3 MHz;Pk

**2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta**

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	107.1	104.0	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	103.8	100.6	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz		52.8 dB	-< this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):		54.3 dBuV/m	
Calculated Band-Edge Measurement (Avg):		51.0 dBuV/m	Margin
Delta Marker - 1MHz/1MHz:		40.2 dB	-9.9
Delta Marker - 1MHz/10Hz:		59.7 dB	44.1
Calculated Band-Edge Measurement (Peak):		66.9 dBuV/m	54
Calculated Band-Edge Measurement (Avg):		44.1 dBuV/m	74
			Detector
			Avg
			Pk
			Using 100kHz delta value
			Using 1MHz delta value

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	44.1	-	54.0	-9.9	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

**Run # 7b, EUT on Channel #11 2462MHz - 802.11b, Chain A**

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.8	18.0

**Fundamental Signal Field Strength**

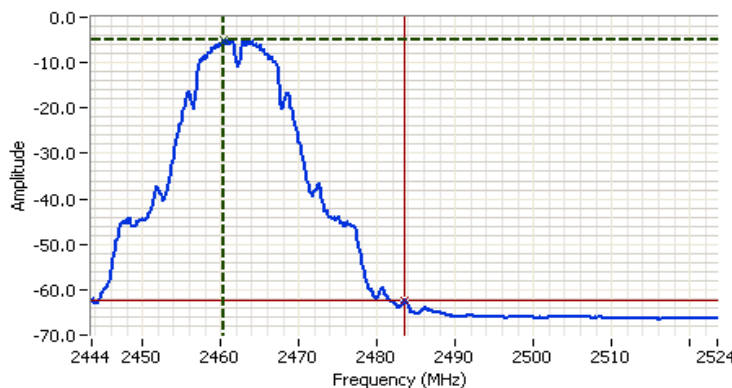
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2463.830	102.8	H	-	-	AVG	255	1.0	RB 1 MHz;VB 10 Hz;Pk
2463.100	106.2	H	-	-	PK	255	1.0	RB 1 MHz;VB 3 MHz;Pk
2463.800	101.7	V	-	-	AVG	243	1.0	RB 1 MHz;VB 10 Hz;Pk
2463.170	105.2	V	-	-	PK	243	1.0	RB 1 MHz;VB 3 MHz;Pk

**2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta**

	H	V		Margin	Level	Limit	Detector
Fundamental emission level @ 3m in 1MHz RBW:	105.2	106.2					
Fundamental emission level @ 3m in 1MHz RBW:	101.7	102.8					
Delta Marker - 100kHz	52.8 dB						
Calculated Band-Edge Measurement (Peak):	53.4 dBuV/m						
Calculated Band-Edge Measurement (Avg):	50.0 dBuV/m						
Delta Marker - 1MHz/1MHz:	41.7 dB			-8.7	45.3	54	Avg
Delta Marker - 1MHz/10Hz:	57.5 dB			-20.6	53.4	74	Pk
Calculated Band-Edge Measurement (Peak):	64.5 dBuV/m						Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	45.3 dBuV/m						Using 1MHz delta value

Peak Measurement (RB=VB=1MHz)  
Average Measurement (RB=1MHz, VB=10Hz)  
-< this can only be used if band edge signal is highest within 2MHz of band edge.

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2483.500	45.3	-	54.0	-8.7	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
HP8564E,EMICF: 2483.500 MHz  
SPAN: 80.000 MHz  
RB: 1.000 MHz  
VB: 10 Hz  
Detector: Sample  
Attn: 10 DB  
RL Offset: 0.0 DB  
Sweep Time: 30.0s  
Ref Lvl: 0.0 DBM

**Comments**  
BE @ 2483.5 MHz  
802.11b  
Chain A

Cursor 1	2460.4333	-5.00	
Cursor 2	2483.5000	-62.50	

Delta Freq. 23.067  
Delta Amplitude 57.50



Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

### Run # 8, Band Edge Field Strength - n20, Chain A

Date of Test: 9/27/2010

Test Location: FT Chamber #5

Test Engineer: Rafael Varelas

Config Change: none

### Run # 8a, EUT on Channel #2 2417MHz - n20, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	15.7	22.0

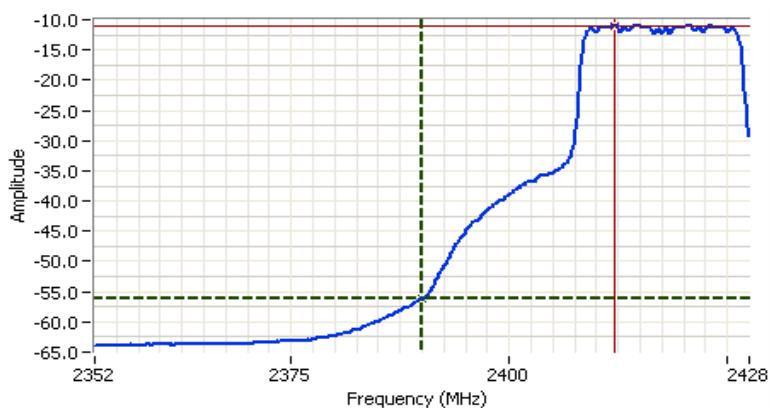
### Fundamental Signal Field Strength

Frequency MHz	Level dBμV/m	Pol v/h	15.209 / 15.247 Limit Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2409.970	98.1	H	- -	AVG	316	1.0	RB 1 MHz;VB 10 Hz;Pk
2417.430	107.0	H	- -	PK	316	1.0	RB 1 MHz;VB 3 MHz;Pk
2410.000	95.3	V	- -	AVG	246	1.0	RB 1 MHz;VB 10 Hz;Pk
2410.200	103.6	V	- -	PK	246	1.0	RB 1 MHz;VB 3 MHz;Pk

### 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	107.0	103.6	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	98.1	95.3	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	45.0 dB		-< this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	62.0 dBuV/m					
Calculated Band-Edge Measurement (Avg):	53.1 dBuV/m	Margin	Level	Limit	Detector	
Delta Marker - 1MHz/1MHz:	36.8 dB	-1.2	52.8	54	Avg	
Delta Marker - 1MHz/10Hz:	45.3 dB	-12.0	62.0	74	Pk	
Calculated Band-Edge Measurement (Peak):	70.2 dBuV/m	Using 100kHz delta value				
Calculated Band-Edge Measurement (Avg):	52.8 dBuV/m	Using 1MHz delta value				

Frequency MHz	Level dBμV/m	Pol v/h	FCC 15.209 Limit Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2390.000	52.8	-	54.0 -1.2	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
 HP8564E,EMICF: 2390.000 MHz  
 SPAN: 75.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 20 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 28.0s  
 Ref Lvl: 2.4 DBM

**Comments**  
 BE @ 2390 MHz  
 802.11n20  
 Chain A

Cursor 1	2390.0000	-56.27	
Cursor 2	2412.1250	-10.93	

Delta Freq.	22.125
Delta Amplitude	45.33



Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
Contact: -	Account Manager: Christine Krebill
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

**Run # 8b, EUT on Channel #10 2457MHz - n20, Chain A**

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	15.4	22.5

**Fundamental Signal Field Strength**

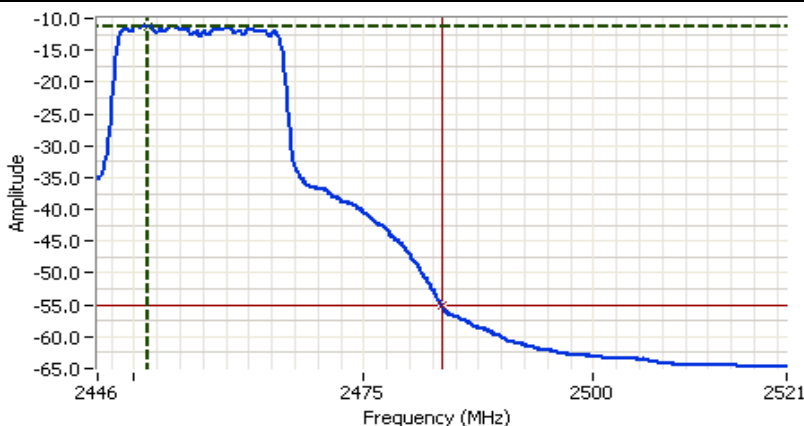
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2450.030	96.7	H	-	-	AVG	266	1.0	RB 1 MHz;VB 10 Hz;Pk
2449.530	105.0	H	-	-	PK	266	1.0	RB 1 MHz;VB 3 MHz;Pk
2462.530	95.9	V	-	-	AVG	265	1.0	RB 1 MHz;VB 10 Hz;Pk
2463.530	104.3	V	-	-	PK	265	1.0	RB 1 MHz;VB 3 MHz;Pk

**2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta**

	H	V		Margin	Level	Limit	Detector
Fundamental emission level @ 3m in 1MHz RBW:	105.0	104.3					
Fundamental emission level @ 3m in 1MHz RBW:	96.7	95.9					
Delta Marker - 100kHz	43.8 dB						
Calculated Band-Edge Measurement (Peak):	61.2 dBuV/m						
Calculated Band-Edge Measurement (Avg):	52.9 dBuV/m						
Delta Marker - 1MHz/1MHz:	36.2 dB			-1.3	52.7	54	Avg
Delta Marker - 1MHz/10Hz:	44.0 dB			-12.8	61.2	74	Pk
Calculated Band-Edge Measurement (Peak):	68.8 dBuV/m						Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	52.7 dBuV/m						Using 1MHz delta value

Peak Measurement (RB=VB=1MHz)  
Average Measurement (RB=1MHz, VB=10Hz)  
-< this can only be used if band edge signal is highest within 2MHz of band edge.

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	52.7	-	54.0	-1.3	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
HP8564E,EMICF: 2483.500 MHz  
SPAN: 75.000 MHz  
RB: 1.000 MHz  
VB: 10 Hz  
Detector: Sample  
Attn: 20 DB  
RL Offset: 0.0 DB  
Sweep Time: 28.0s  
Ref Lvl: 1.8 DBM

**Comments**  
BE @ 2483.5 MHz  
802.11n20  
Chain A

Cursor 1	2451.5000	-11.20	Delta Freq.	32.000
Cursor 2	2483.5000	-55.20	Delta Amplitude	44.00



Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

### Run # 9, Band Edge Field Strength - 802.11g, Chain A

Date of Test: 9/27/2010

Test Location: FT Chamber #5

Test Engineer: Rafael Varelas

Config Change: none

### Run # 9a, EUT on Channel #2 2417MHz - 802.11g, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.0	22.5

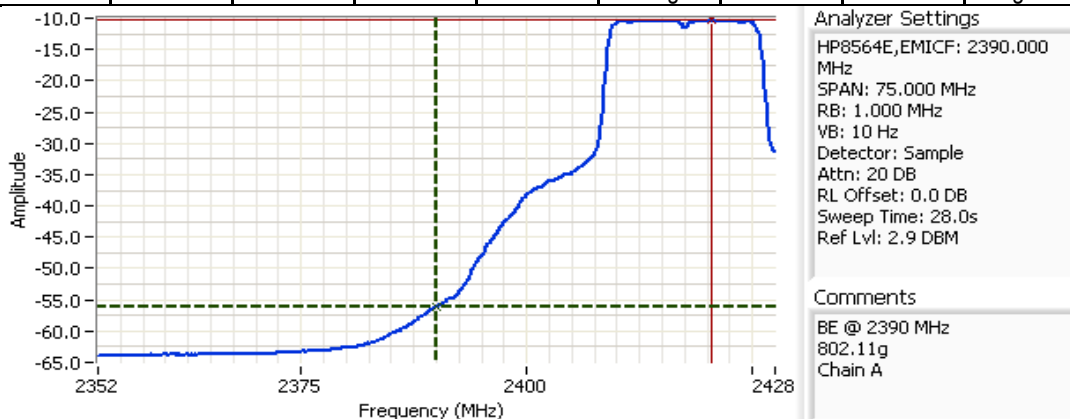
### Fundamental Signal Field Strength

Frequency MHz	Level dBμV/m	Pol v/h	15.209 / 15.247 Limit Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2409.930	98.7	H	- -	AVG	312	1.0	RB 1 MHz;VB 10 Hz;Pk
2410.430	107.5	H	- -	PK	312	1.0	RB 1 MHz;VB 3 MHz;Pk
2409.970	95.7	V	- -	AVG	239	1.0	RB 1 MHz;VB 10 Hz;Pk
2410.530	104.2	V	- -	PK	239	1.0	RB 1 MHz;VB 3 MHz;Pk

### 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	107.5	104.2	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	98.7	95.7	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	45.7 dB		-< this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):	61.8 dBuV/m					
Calculated Band-Edge Measurement (Avg):	53.0 dBuV/m		Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	38.5 dB		-1.1	52.9	54	Avg
Delta Marker - 1MHz/10Hz:	45.8 dB		-12.2	61.8	74	Pk
Calculated Band-Edge Measurement (Peak):	69.0 dBuV/m		Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):	52.9 dBuV/m		Using 1MHz delta value			

Frequency MHz	Level dBμV/m	Pol v/h	FCC 15.209 Limit Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2390.000	52.9	-	54.0 -1.1	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
 HP8564E,EMICF: 2390.000 MHz  
 SPAN: 75.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 20 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 28.0s  
 Ref Lvl: 2.9 DBM

**Comments**  
 BE @ 2390 MHz  
 802.11g  
 Chain A

Cursor 1	2390.0000	-56.10	Delta Freq.	30.375
Cursor 2	2420.3750	-10.27	Delta Amplitude	45.83



Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

### Run # 9b, EUT on Channel #10 2457MHz - 802.11g, Chain A

Date of Test: 9/28/2010      Test Location: FT Chamber #5  
 Test Engineer: Joseph Cadigal      Config Change: none

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5		22.5

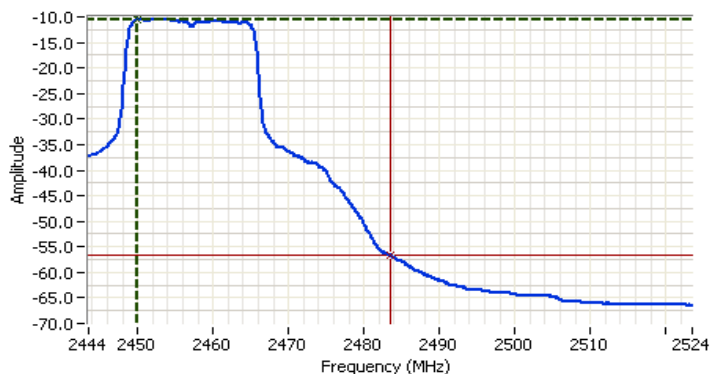
### Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2464.030	99.0	V	-	-	AVG	265	1.3	RB 1 MHz;VB 10 Hz;Pk
2460.230	107.7	V	-	-	PK	265	1.3	RB 1 MHz;VB 3 MHz;Pk
2450.170	97.7	H	-	-	AVG	242	1.0	RB 1 MHz;VB 10 Hz;Pk
2450.770	106.2	H	-	-	PK	242	1.0	RB 1 MHz;VB 3 MHz;Pk

### 2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	106.2	107.7	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	97.7	99.0	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz		44.8 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.		
Calculated Band-Edge Measurement (Peak):		62.9 dBuV/m				
Calculated Band-Edge Measurement (Avg):		54.2 dBuV/m		Margin	Level	Limit
Delta Marker - 1MHz/1MHz:		38.7 dB		-1.2	52.8	54
Delta Marker - 1MHz/10Hz:		46.2 dB		-11.1	62.9	74
Calculated Band-Edge Measurement (Peak):		69.0 dBuV/m		Using 100kHz delta value		
Calculated Band-Edge Measurement (Avg):		52.8 dBuV/m		Using 1MHz delta value		

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	52.8	-	54.0	-1.2	Avg	-	-	Using 1MHz delta value



**Analyzer Settings**  
 HP8564E,EMICF: 2483.500  
 MHz  
 SPAN: 80.000 MHz  
 RB: 1.000 MHz  
 VB: 10 Hz  
 Detector: Sample  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 30.0s  
 Ref Lvl: 0.0 DBM

**Comments**  
 BE @ 2483.5 MHz  
 802.11g  
 Chain A

Cursor 1	2450.0334	-10.50		Delta Freq.	33.467
Cursor 2	2483.5000	-56.67		Delta Amplitude	46.17



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions (1-26GHz)

### Summary of Results

MAC Address: 78929C0023FE DRTU Tool Version 1.2.12.0197 Driver version 14.0.0.39

Run #	Mode	Channel	Target Power	Measured Power	Test Performed	Limit	Result / Margin
Run #1	802.11b Chain A	#1 2412MHz	16.5	16.6	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	43.2dBµV/m @ 4824.0MHz (-10.8dB)
		#6 2437MHz	16.5	16.8			50.6dBµV/m @ 3249.3MHz (-19.4dB)
		#11 2462MHz	16.5	16.8			40.0dBµV/m @ 4924.0MHz (-14.0dB)

Scans on center channel in all three OFDM modes to determine the worst case. Note that for n20 and n40 mode the output power was set to 16.5dBm per chain, the maximum power per chain in MIMO mode would be 13.5dBm, however as the single chain power could be 16.5dBm the scans were run at the higher single-chain power level but with both chains active.

Run # 2	802.11g Chain A	#6 2437MHz	16.5	16.8	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	43.6dBµV/m @ <b>7500.0MHz (-10.4dB)</b>
	802.11n20 Chain A	#6 2437MHz	16.5	16.7			38.3dBµV/m @ 7505.3MHz (-15.7dB)
	802.11n40 Chain A	#6 2437MHz	16.5	16.8			38.1dBµV/m @ 7504.3MHz (-15.9dB)

Top and bottom channels in worst case OFDM mode:

Run # 3	802.11g Chain A	#1 2412MHz	16.5	16.7	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	38.1dBµV/m @ 7505.2MHz (-15.9dB)
		#11 2462MHz	16.5	16.6			39.7dBµV/m @ 7385.1MHz (-14.3dB)

### Receiver Spurious Emissions

Run # 4	Receive Chain A	#6, Chain A	-	-	Radiated Emissions, 1 - 7.5 GHz	RSS 210	<b>46.9dBµV/m @ 3249.5MHz (-7.1dB)</b>
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Note - the target and measured power are average powers (measured with average power sensor) and are used for reference purposes only. Power is set using " **GAIN CONTROL**" mode in the DRTU tool.

Before disconnecting the power meter, EUT antennas or spectrum analyzer from the device please click on **Power Down** to stop the transmitter. Once the rf port is connected back up to the antenna, power meter or analyzer click on "**Start TX**". This prevents the feedback circuit on the EUT from dropping power while there is nothing connected and then ramping it back up when it sees a load.

Use the **Gain Control** mode of adjusting power. Set power to within +/-0.2dB of target.



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

## Test Specific Details

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

## General Test Configuration

The EUT was installed into a test fixture such that the EUT was exposed (i.e. outside of a host PC).  
For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

## Ambient Conditions:

Rel. Humidity: 15 - 55 %  
Temperature: 18 - 25 °C

## 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.

## Run #1, Radiated Spurious Emissions, 1-26GHz, 802.11b, Chain A

Date of Test: 9/23/2010

Test Location: FT Chamber #4

Test Engineer: Joseph Cadigal

Config Change: none

## Run #1a, EUT on Channel #1 2412MHz - 802.11b, Chain A

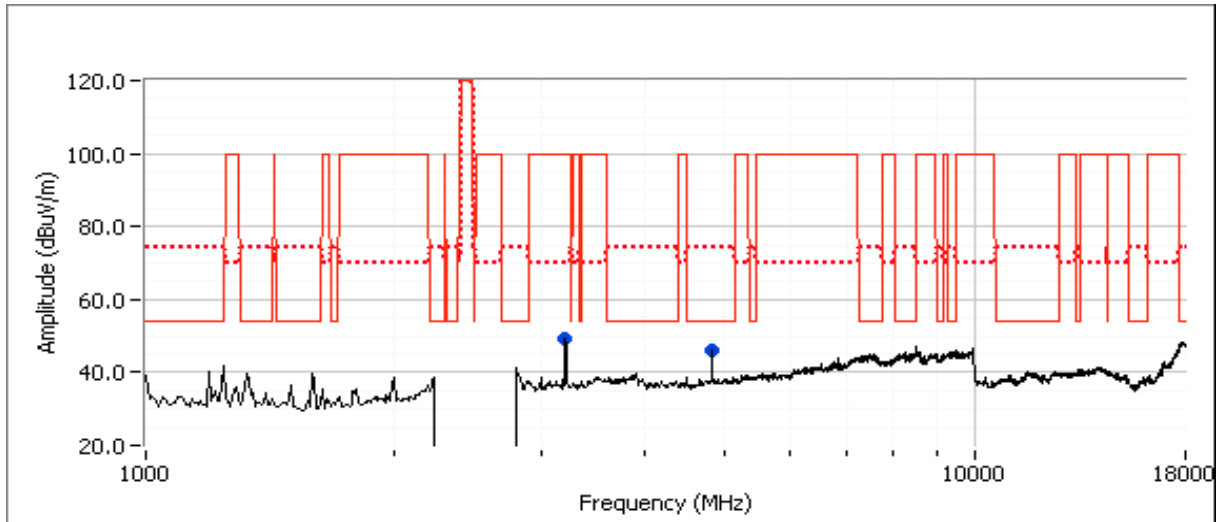
	Target (dBm)	Power Settings	
		Measured (dBm)	Software Setting
Chain A	16.5	16.6	16.5

## Spurious Radiated Emissions:

Frequency MHz	Level dBµV/m	Pol v/h	15.209/15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4824.010	43.2	V	54.0	-10.8	AVG	117	1.0	RB 1 MHz;VB 10 Hz;Pk
3216.010	50.4	H	70.0	-19.6	PK	175	1.3	RB 1 MHz;VB 3 MHz;Pk
4824.060	48.5	V	74.0	-25.5	PK	117	1.0	RB 1 MHz;VB 3 MHz;Pk
3216.030	46.6	H	100.0	-53.4	AVG	175	1.3	RB 1 MHz;VB 10 Hz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A



**Run #1b: , EUT on Channel #6 2437MHz - 802.11b, Chain A**

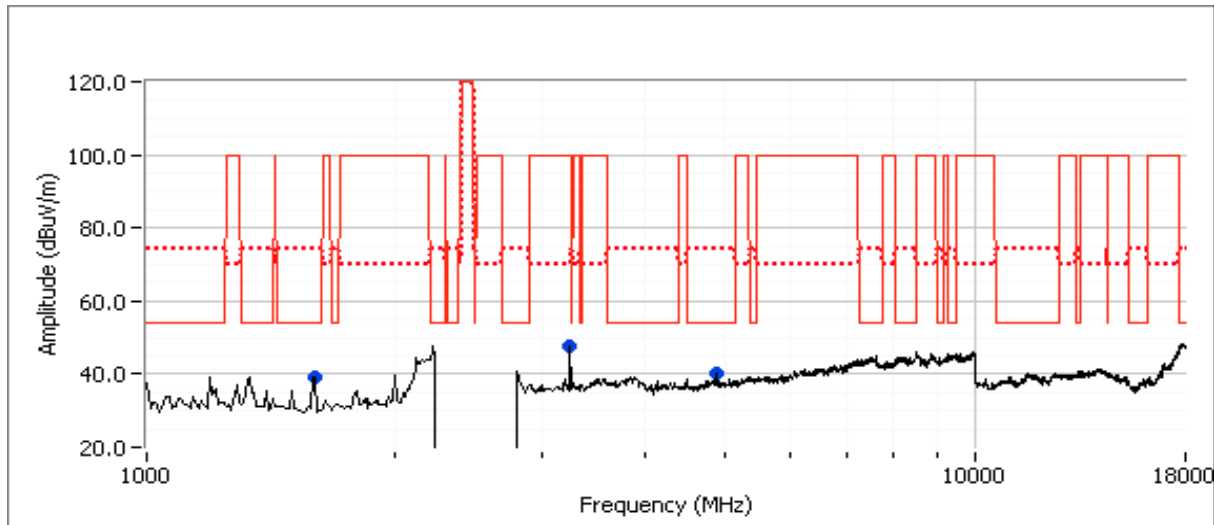
	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.8	17.5

**Spurious Radiated Emissions:**

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3249.280	50.6	V	70.0	-19.4	PK	201	1.2	RB 1 MHz;VB 3 MHz;Pk
4855.720	32.3	V	54.0	-21.7	AVG	173	1.9	RB 1 MHz;VB 10 Hz;Pk
1593.680	31.1	V	54.0	-22.9	AVG	97	1.0	RB 1 MHz;VB 10 Hz;Pk
1593.280	45.4	V	74.0	-28.6	PK	97	1.0	RB 1 MHz;VB 3 MHz;Pk
4857.610	43.7	V	74.0	-30.3	PK	173	1.9	RB 1 MHz;VB 3 MHz;Pk
3249.350	48.0	V	100.0	-52.0	AVG	201	1.2	RB 1 MHz;VB 10 Hz;Pk

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
Note 2:	Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range

Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A



**Run #1c: , EUT on Channel #11 2462MHz - 802.11b, Chain A**

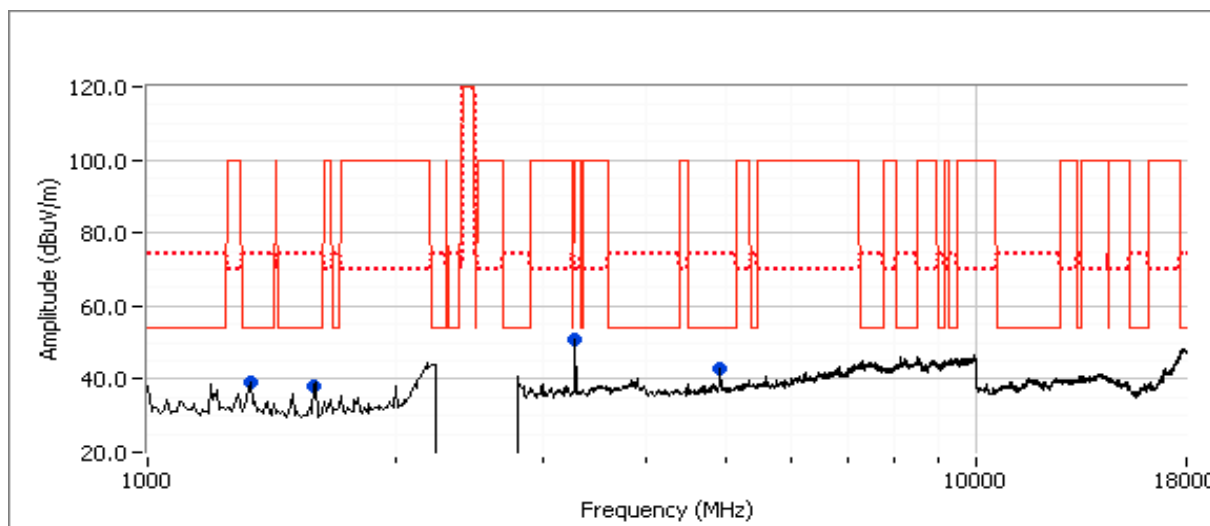
	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.8	18.0

**Spurious Radiated Emissions:**

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
<b>4923.990</b>	<b>40.0</b>	V	54.0	<b>-14.0</b>	AVG	83	1.9	RB 1 MHz;VB 10 Hz;Pk
1331.980	35.9	V	54.0	-18.1	AVG	107	1.9	RB 1 MHz;VB 10 Hz;Pk
3282.570	50.7	V	70.0	-19.3	PK	206	1.5	RB 1 MHz;VB 3 MHz;Pk
1332.130	52.5	V	74.0	-21.5	PK	107	1.9	RB 1 MHz;VB 3 MHz;Pk
1598.350	31.7	V	54.0	-22.3	AVG	96	1.0	RB 1 MHz;VB 10 Hz;Pk
4924.220	46.4	V	74.0	-27.6	PK	83	1.9	RB 1 MHz;VB 3 MHz;Pk
1597.750	45.7	V	74.0	-28.3	PK	96	1.0	RB 1 MHz;VB 3 MHz;Pk
3282.700	47.3	V	100.0	-52.7	AVG	206	1.5	RB 1 MHz;VB 10 Hz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

**Run # 2, Radiated Spurious Emissions, 1-26GHz, 802.11g, n20 and n40, Chain A**

Date of Test: 9/28/2010

Test Location: FT Chamber#5

Test Engineer: Joseph Cadigal

Config Change: none

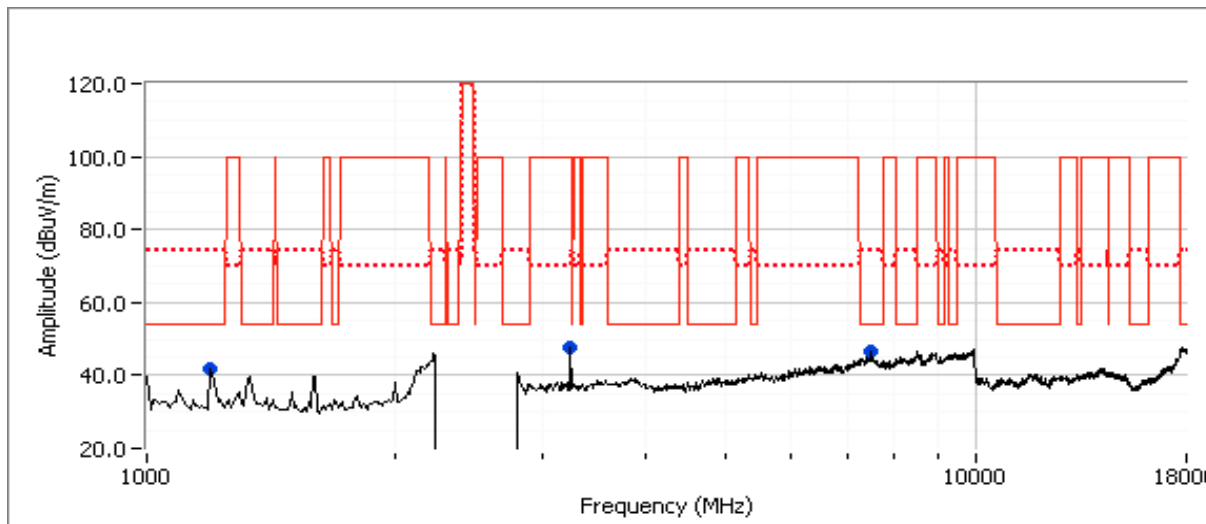
**Run # 2a, EUT on Channel #6 2437MHz - 802.11g Chain A**

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.8	23.0

**Spurious Radiated Emissions:**

Frequency MHz	Level dBμV/m	Pol v/h	15.209/15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
<b>7500.040</b>	<b>43.6</b>	V	54.0	<b>-10.4</b>	AVG	235	1.3	RB 1 MHz;VB 10 Hz;Pk
1198.380	34.0	V	54.0	-20.0	AVG	77	1.3	RB 1 MHz;VB 10 Hz;Pk
3249.350	47.7	V	70.0	-22.3	PK	204	1.3	RB 1 MHz;VB 3 MHz;Pk
7500.000	51.6	V	74.0	-22.4	PK	235	1.3	RB 1 MHz;VB 3 MHz;Pk
1197.990	46.3	V	74.0	-27.7	PK	77	1.3	RB 1 MHz;VB 3 MHz;Pk
3249.350	42.2	V	100.0	-57.8	AVG	204	1.3	RB 1 MHz;VB 10 Hz;Pk

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
- Note 2: Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

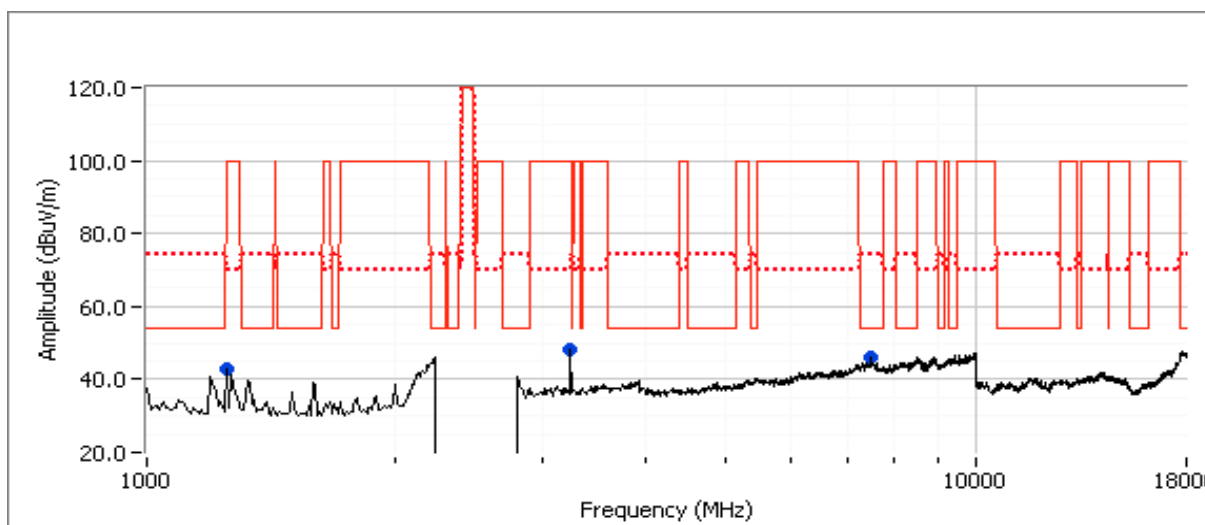
**Run # 2b, EUT on Channel #6 2437MHz - 802.11n 20 Chain A**

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.7	23.0

**Spurious Radiated Emissions:**

Frequency MHz	Level dBμV/m	Pol v/h	15.209/15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
<b>7505.250</b>	<b>38.3</b>	V	54.0	<b>-15.7</b>	AVG	261	1.3	RB 1 MHz;VB 10 Hz;Pk
3249.370	47.3	H	70.0	-22.7	PK	186	1.9	RB 1 MHz;VB 3 MHz;Pk
7503.620	49.9	V	74.0	-24.1	PK	261	1.3	RB 1 MHz;VB 3 MHz;Pk
1257.780	37.4	H	70.0	-32.6	PK	323	1.9	RB 1 MHz;VB 3 MHz;Pk
3249.350	42.2	H	100.0	-57.8	AVG	186	1.9	RB 1 MHz;VB 10 Hz;Pk
1255.030	26.2	H	100.0	-73.8	AVG	323	1.9	RB 1 MHz;VB 10 Hz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

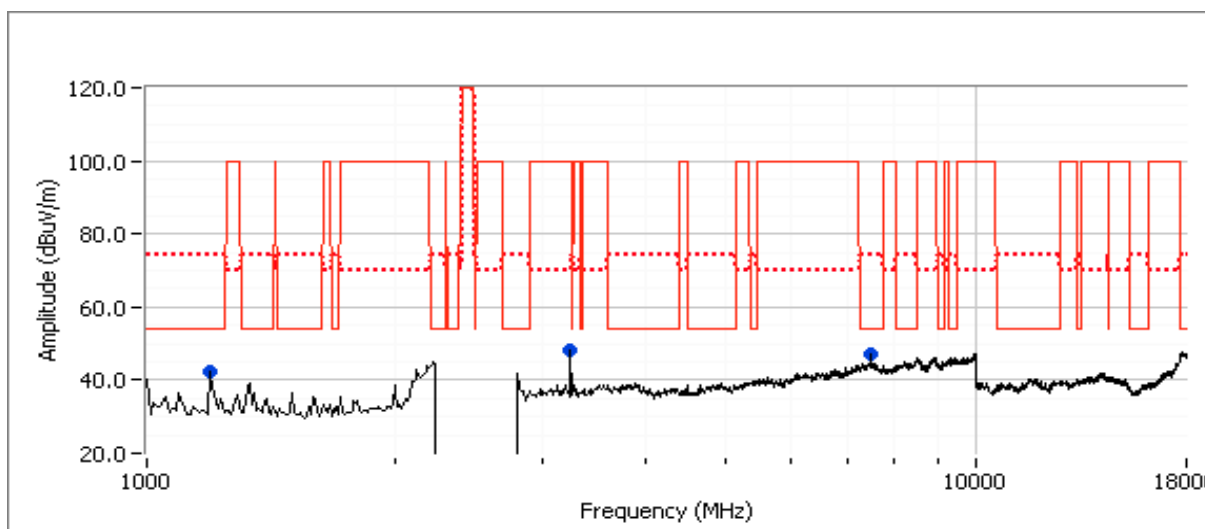
**Run # 2c, EUT on Channel #6 2437MHz - 802.11n 40 Chain A**

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.8	23.0

**Spurious Radiated Emissions:**

Frequency MHz	Level dBμV/m	Pol v/h	15.209/15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
<b>7504.310</b>	<b>38.1</b>	V	54.0	<b>-15.9</b>	AVG	246	1.3	RB 1 MHz;VB 10 Hz;Pk
1198.590	32.5	H	54.0	-21.5	AVG	179	1.3	RB 1 MHz;VB 10 Hz;Pk
3249.320	47.3	H	70.0	-22.7	PK	186	1.9	RB 1 MHz;VB 3 MHz;Pk
7503.850	49.6	V	74.0	-24.4	PK	246	1.3	RB 1 MHz;VB 3 MHz;Pk
1198.450	45.5	H	74.0	-28.5	PK	179	1.3	RB 1 MHz;VB 3 MHz;Pk
3249.370	41.4	H	100.0	-58.6	AVG	186	1.9	RB 1 MHz;VB 10 Hz;Pk

- Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.
- Note 2: Scans made between 18 - 26GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

**Run # 3, Radiated Spurious Emissions, 1-26GHz, 802.11g, Chain A**

Date of Test: 9/28/2010

Test Location: FT Chamber#5

Test Engineer: Joseph Cadigal

Config Change: none

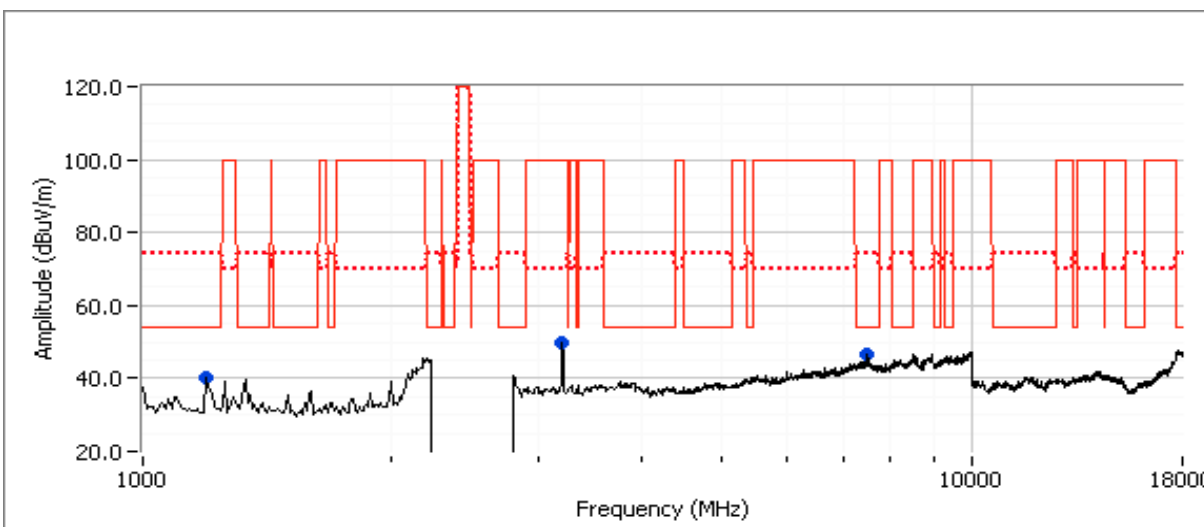
**Run # 3a, EUT on Channel #1 2412MHz - 802.11g, Chain A**

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.7	22.5

**Spurious Radiated Emissions:**

Frequency MHz	Level dBμV/m	Pol v/h	15.209/15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
<b>7505.230</b>	<b>38.1</b>	V	54.0	<b>-15.9</b>	AVG	74	1.3	RB 1 MHz;VB 10 Hz;Pk
3216.000	50.6	V	70.0	-19.4	PK	202	1.3	RB 1 MHz;VB 3 MHz;Pk
1198.690	30.5	H	54.0	-23.5	AVG	187	1.3	RB 1 MHz;VB 10 Hz;Pk
7505.040	49.3	V	74.0	-24.7	PK	74	1.3	RB 1 MHz;VB 3 MHz;Pk
1198.170	43.1	H	74.0	-30.9	PK	187	1.3	RB 1 MHz;VB 3 MHz;Pk
3216.000	47.6	V	100.0	-52.4	AVG	202	1.3	RB 1 MHz;VB 10 Hz;Pk

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.





Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

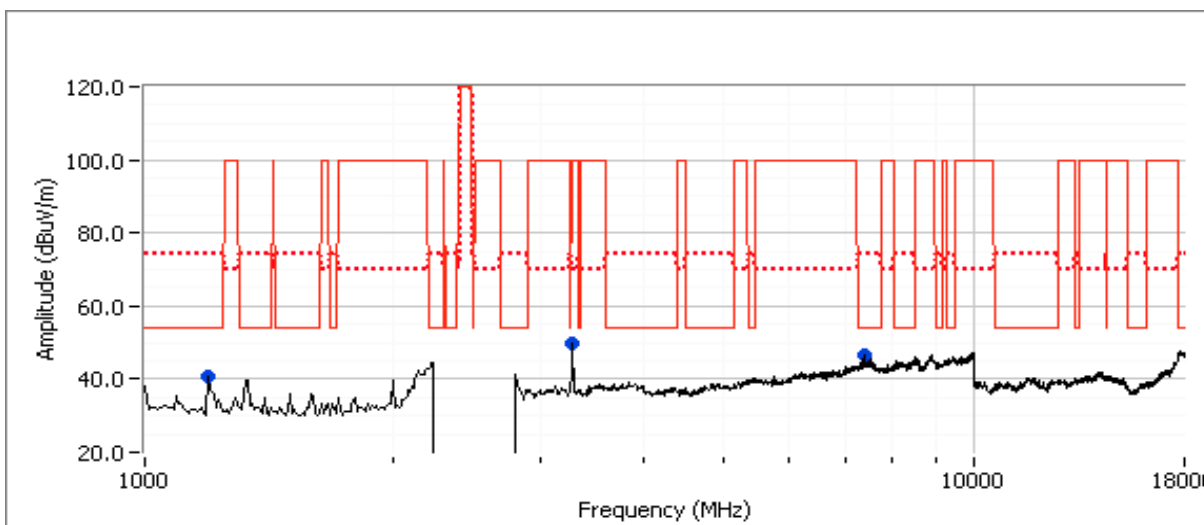
**Run # 3b , EUT on Channel #11 2462MHz - Chain A**

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.6	23.5

**Spurious Radiated Emissions:**

Frequency MHz	Level dBμV/m	Pol v/h	15.209/15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
<b>7385.060</b>	<b>39.7</b>	V	54.0	<b>-14.3</b>	AVG	156	1.6	RB 1 MHz;VB 10 Hz;Pk
3282.750	51.0	V	70.0	-19.0	PK	200	1.6	RB 1 MHz;VB 3 MHz;Pk
1198.550	31.7	H	54.0	-22.3	AVG	179	1.0	RB 1 MHz;VB 10 Hz;Pk
7387.150	51.5	V	74.0	-22.5	PK	156	1.6	RB 1 MHz;VB 3 MHz;Pk
1198.720	43.7	H	74.0	-30.3	PK	179	1.0	RB 1 MHz;VB 3 MHz;Pk
3282.670	48.1	V	100.0	-51.9	AVG	200	1.6	RB 1 MHz;VB 10 Hz;Pk

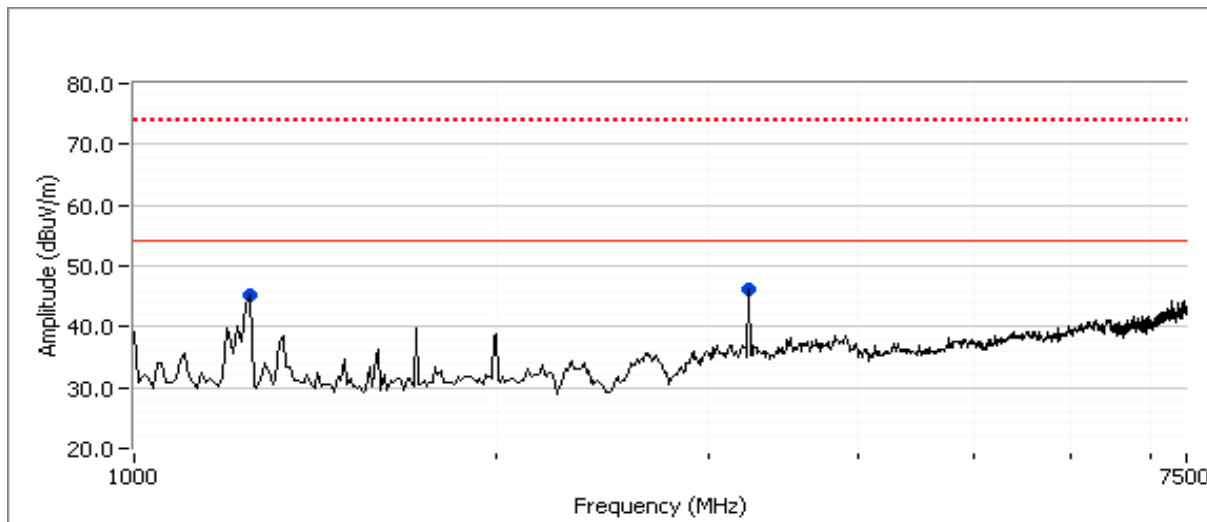
Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

**Run # 4, Radiated Spurious Emissions, 1-26GHz, EUT on Channel #6 2437MHz - Receive**  
 Date of Test: 9/28/2010                      Test Location: FT Chamber#5  
 Test Engineer: Joseph Cadigal              Config Change: none

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	RSS 210		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
3249.500	46.9	V	54.0	-7.1	AVG	248	1.3	RB 1 MHz;VB 10 Hz;Pk
3249.370	49.4	V	74.0	-24.6	PK	248	1.3	RB 1 MHz;VB 3 MHz;Pk
1256.200	25.5	V	54.0	-28.5	AVG	290	1.0	RB 1 MHz;VB 10 Hz;Pk
1254.510	37.3	V	74.0	-36.7	PK	290	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

**RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements  
Power, PSD, Bandwidth and Spurious Emissions**

**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: 9/29/2010  
 Test Engineer: Joseph Cadigal  
 Test Location: FT Chamber#4

Config. Used: 1  
 Config Change: none  
 Host Unit Voltage 120V/60Hz

**General Test Configuration**

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

**Ambient Conditions:**

Temperature: 15 - 55 °C  
 Rel. Humidity: 18 - 25 %

**Summary of Results**

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	-	-	Output Power	15.247(b)	Pass	802.11b: 43 mW 802.11g: 35.3 mW n20: 34.8 mW n40: 16.4 mW
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	-18.7 dBm/3kHz
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	9.7 MHz
3	-	-	99% Bandwidth	RSS GEN	-	802.11b: 13.14 MHz 802.11g: 17.39 MHz n20: 18.64 MHz n40: 36.77 MHz
4	-	-	Spurious emissions	15.247(b)	Pass	See graphs below

**Modifications Made During Testing**

No modifications were made to the EUT during testing

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### Deviations From The Standard

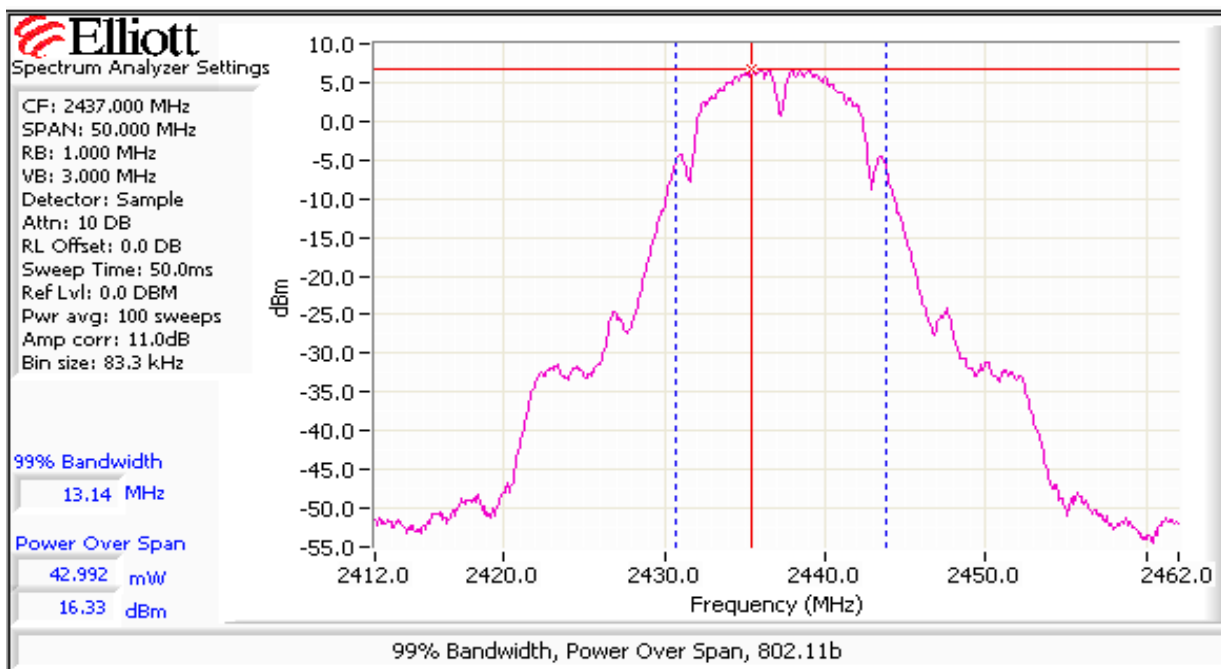
No deviations were made from the requirements of the standard.

### Run #1: Output Power

#### 802.11b

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
17.5	2412	16.1	40.6	3.2	Pass	19.3	0.085	16.6	45.7
18	2437	<b>16.3</b>	<b>43.0</b>	3.2	Pass	19.5	0.090	16.7	46.8
18	2462	15.9	39.0	3.2	Pass	19.1	0.081	16.6	45.7

- Note 1: Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over **50MHz** (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes **-30dBc**.
- Note 2: Power setting - the software power setting used during testing, included for reference only.
- Note 3: Power measured using average power meter and is included for reference only.

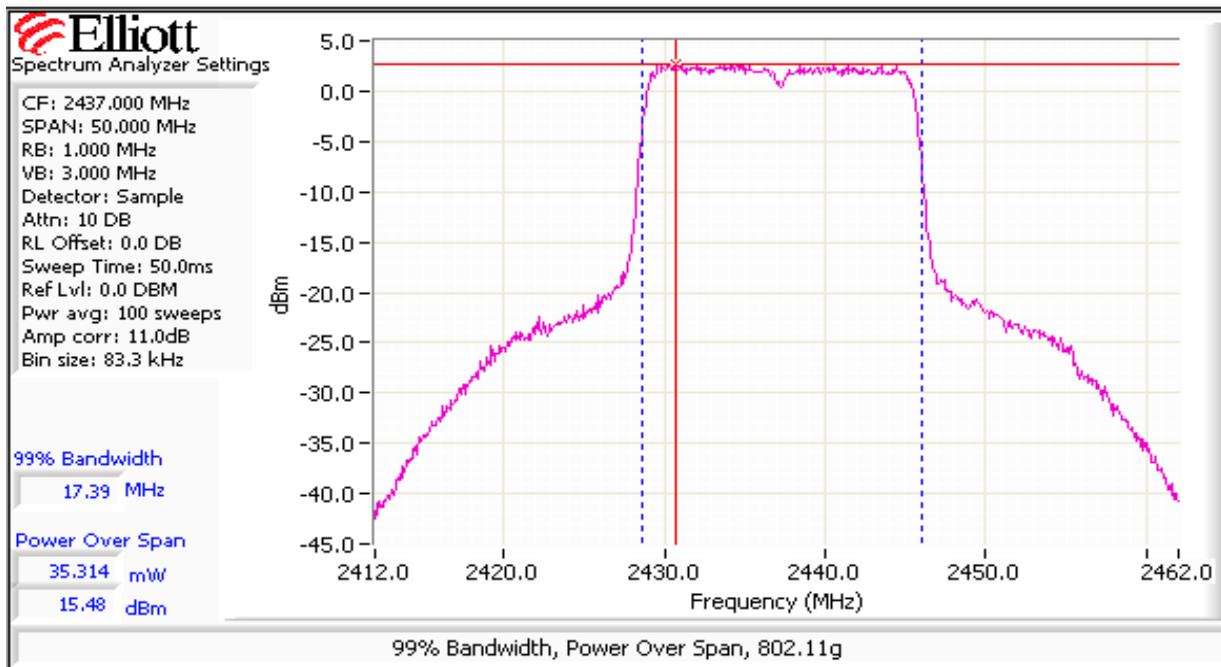


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### 802.11g

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
17.5	2412	11.5	14.1	3.2	Pass	14.7	0.030	12.7	18.6
23	2437	<b>15.5</b>	<b>35.3</b>	3.2	Pass	18.7	0.074	16.7	47.2
16.5	2462	9.6	9.2	3.2	Pass	12.8	0.019	11.6	14.5

- Note 1: Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over **50MHz** (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes **-30dBc**.
- Note 2: Power setting - the software power setting used during testing, included for reference only.
- Note 3: Power measured using average power meter and is included for reference only.

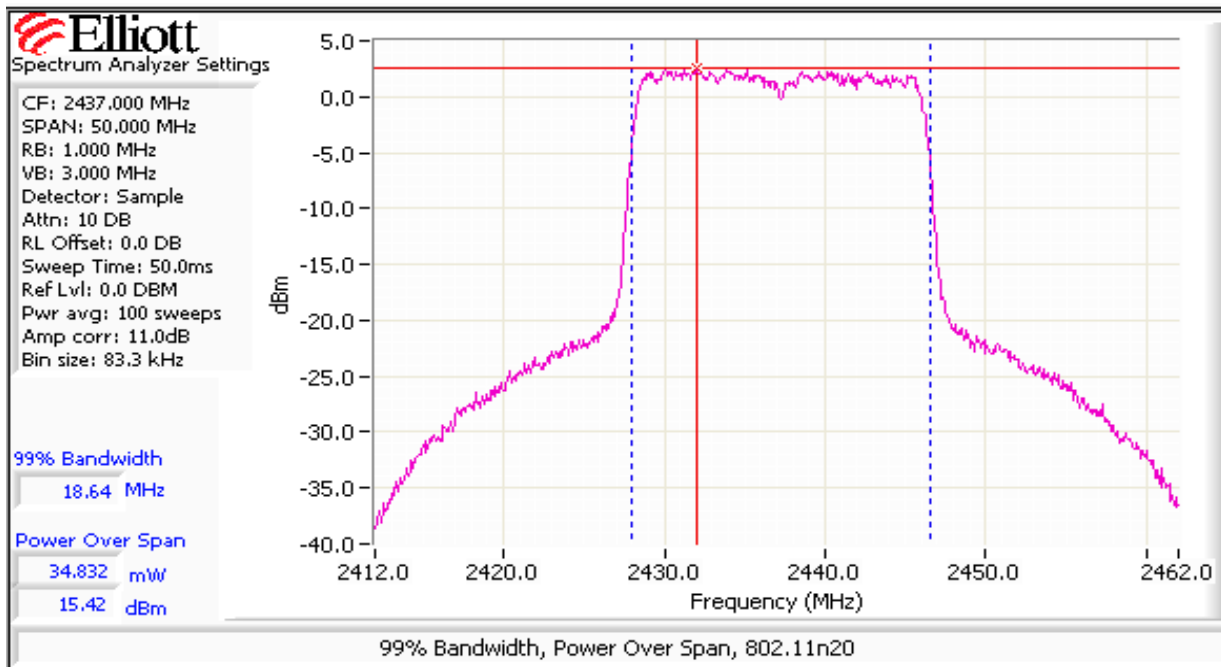


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### 802.11n 20MHz

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
17	2412	11.0	12.5	3.2	Pass	14.2	0.026	12.2	16.6
23	2437	<b>15.4</b>	<b>34.8</b>	3.2	Pass	18.6	0.073	16.6	45.7
17.5	2462	10.2	10.4	3.2	Pass	13.4	0.022	12.5	17.8

- Note 1: Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over **50MHz** (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes **-30dBc**.
- Note 2: Power setting - the software power setting used during testing, included for reference only.
- Note 3: Power measured using average power meter and is included for reference only.

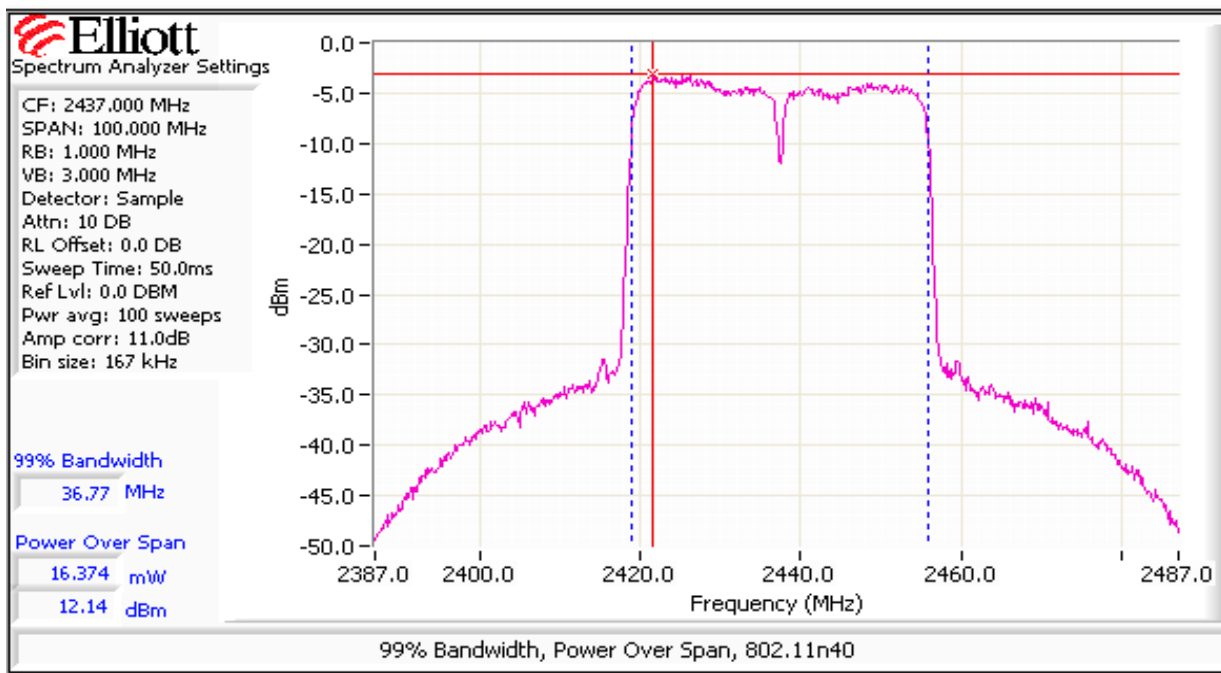


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### 802.11n 40MHz

Power Setting <sup>2</sup>	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP <sup>Note 2</sup>		Output Power	
		(dBm) <sup>1</sup>	mW			dBm	W	(dBm) <sup>3</sup>	mW
15.5	2422	10.1	10.1	3.2	Pass	13.3	0.021	11.1	12.9
18.5	2437	<b>12.1</b>	<b>16.4</b>	3.2	Pass	15.3	0.034	13.5	22.4
15.5	2452	9.2	8.3	3.2	Pass	12.4	0.017	11.0	12.6

- Note 1: Output power measured using a spectrum analyzer (see plots below) with RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over **100MHz** (option #2, method 1 in KDB 558074, equivalent to method 1 of DA-02-2138A1 for U-NII devices). Spurious limit becomes **-30dBc**.
- Note 2: Power setting - the software power setting used during testing, included for reference only.
- Note 3: Power measured using average power meter and is included for reference only.

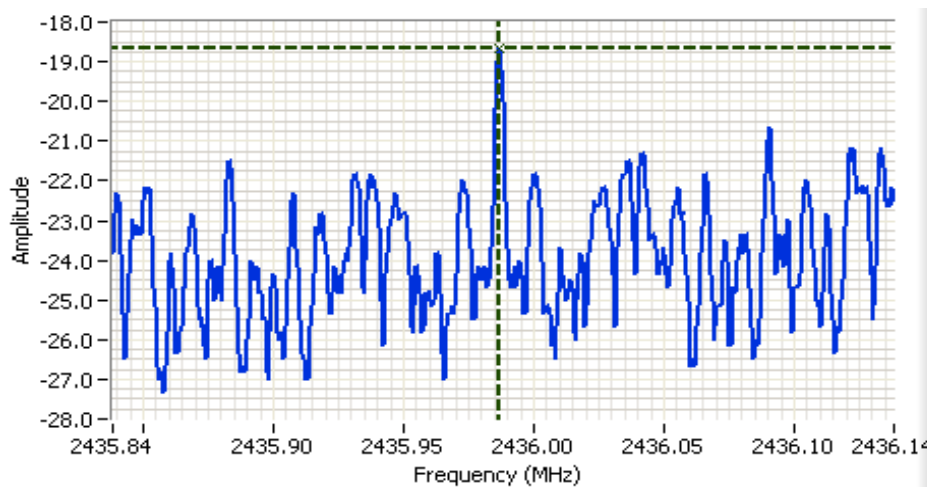


Client: Intel Corporation	Job Number: J80617
Model: Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number: T80637
	Account Manager: Christine Krebill
Contact: -	
Standard: FCC 15.247, RSS 210, FCC 15 B	Class: N/A

### Run #2: Power spectral Density

Mode	Power Setting	Frequency (MHz)	PSD (dBm/3kHz) <sup>Note 1</sup>	Limit dBm/3kHz	Result
802.11b	17.5	2412	-19.3	8.0	Pass
	18	2437	<b>-18.7</b>	8.0	Pass
	18	2462	-21.3	8.0	Pass
802.11g	17.5	2412	-23.2	8.0	Pass
	23	2437	<b>-19.0</b>	8.0	Pass
	16.5	2462	-26.0	8.0	Pass
802.11n 20MHz	17	2412	-23.0	8.0	Pass
	23	2437	-20.7	8.0	Pass
	17.5	2462	-27.2	8.0	Pass
802.11n 40MHz	15.5	2422	-29.3	8.0	Pass
	18.5	2437	-24.7	8.0	Pass
	15.5	2452	-29.5	8.0	Pass

Note 1: Power spectral density measured using RB=3 kHz, VB=10kHz, analyzer with peak detector and with a sweep time set to ensure a dwell time of at least 1 second per 3kHz. The measurement is made at the frequency of PPSD determined from preliminary scans using RB=3kHz using multiple sweeps at a faster rate over the 6dB bandwidth of the signal.



**Analyzer Settings**  
 HP8564E,EMICF: 2435.988 MHz  
 SPAN: 300 kHz  
 RB: 3.00 kHz  
 VB: 10.0 kHz  
 Detector: POS  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 100.0s  
 Ref Lvl: 0.0 DBM

**Comments**  
 802.11b, Chain A

Cursor 1	2435.9868	-18.67	+	*	🔒
	0.0000	0.00	+	*	🔒

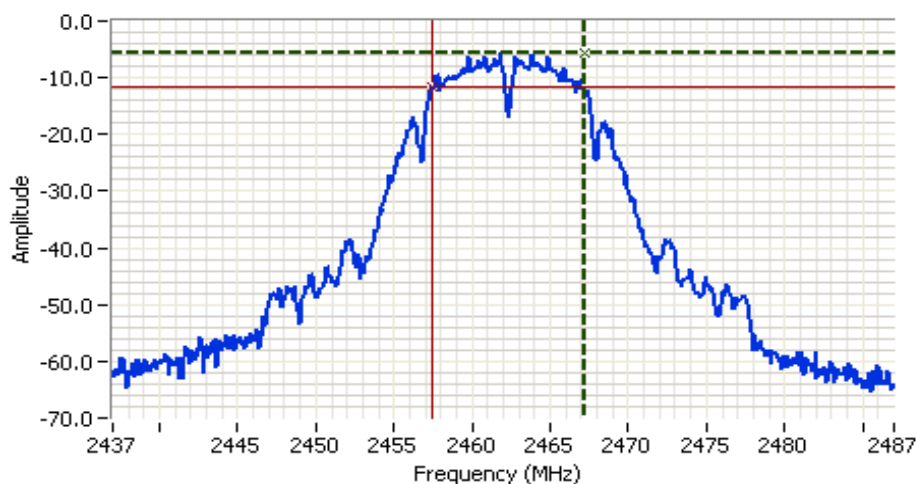


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

### Run #3: Signal Bandwidth

Mode	Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
				6dB	99%
802.11b	17.5	2412	100kHz	10.2	13.06
	18	2437	100kHz	10.0	<b>13.14</b>
	18	2462	100kHz	<b>9.7</b>	12.98
802.11g	17.5	2412	100kHz	16.5	17.14
	23	2437	100kHz	16.5	<b>17.39</b>
	16.5	2462	100kHz	16.5	17.14
802.11n 20MHz	17	2412	100kHz	17.8	18.30
	23	2437	100kHz	17.8	<b>18.64</b>
	17.5	2462	100kHz	17.8	18.30
802.11n 40MHz	15.5	2422	100kHz	35.8	36.61
	18.5	2437	100kHz	35.7	<b>36.77</b>
	15.5	2452	100kHz	36.0	36.61

Note 1: 99% bandwidth measured in accordance with RSS GEN, with RB > 1% of the span and VB > 3xRB



**Analyzer Settings**  
 HP8564E,EMICF: 2462.000 MHz  
 SPAN: 50.000 MHz  
 RB: 100 kHz  
 VB: 100 kHz  
 Detector: POS  
 Attn: 10 DB  
 RL Offset: 0.0 DB  
 Sweep Time: 50.0ms  
 Ref Lvl: 0.0 DBM

**Comments**  
 6dB BW: 9.667 MHz, b

Cursor 1 2467.1667 -5.50  Delta Freq. 9.667  
 Cursor 2 2457.5000 -11.50  Delta Amplitude 6.00

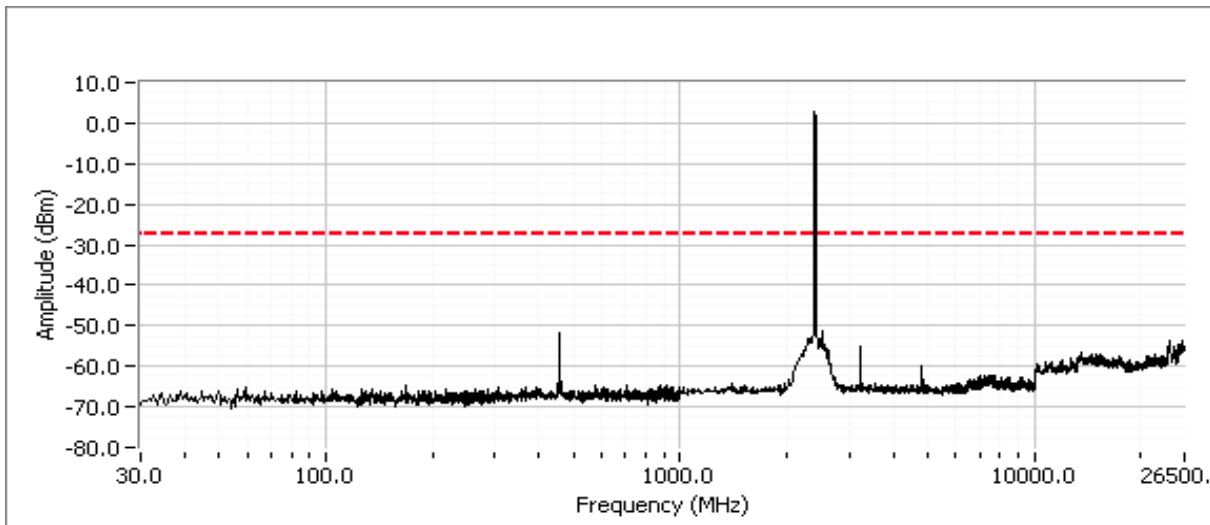


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

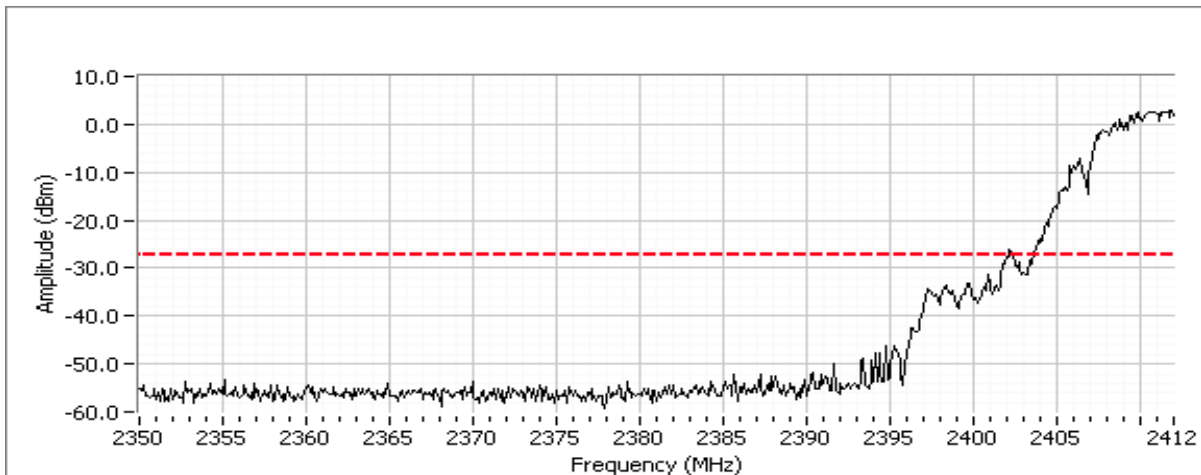
**Run #4: Out of Band Spurious Emissions**  
**802.11b Mode**

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

Plots for low channel, power setting(s) = 17.5

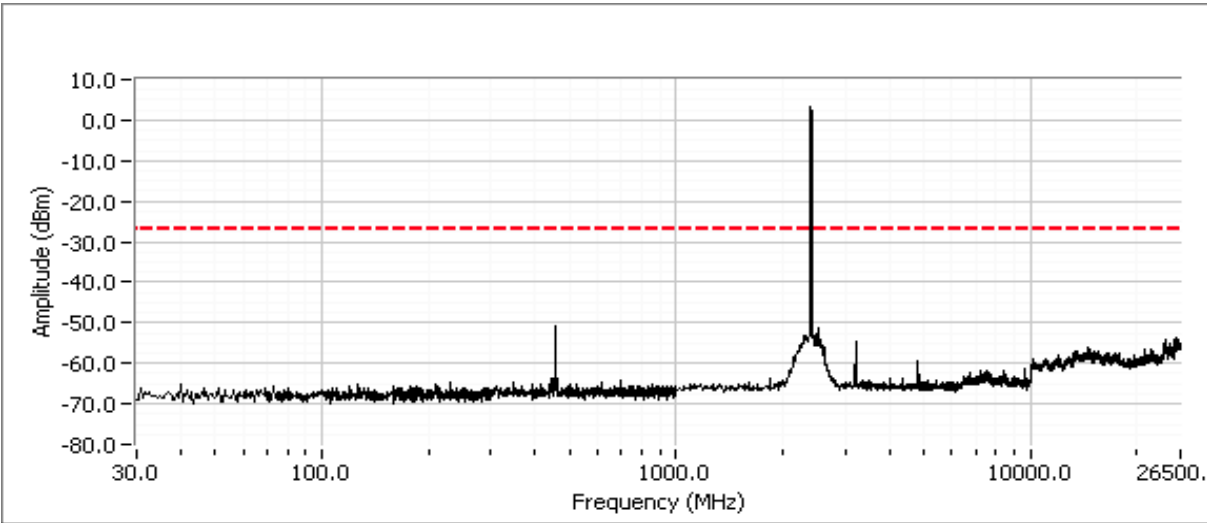


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

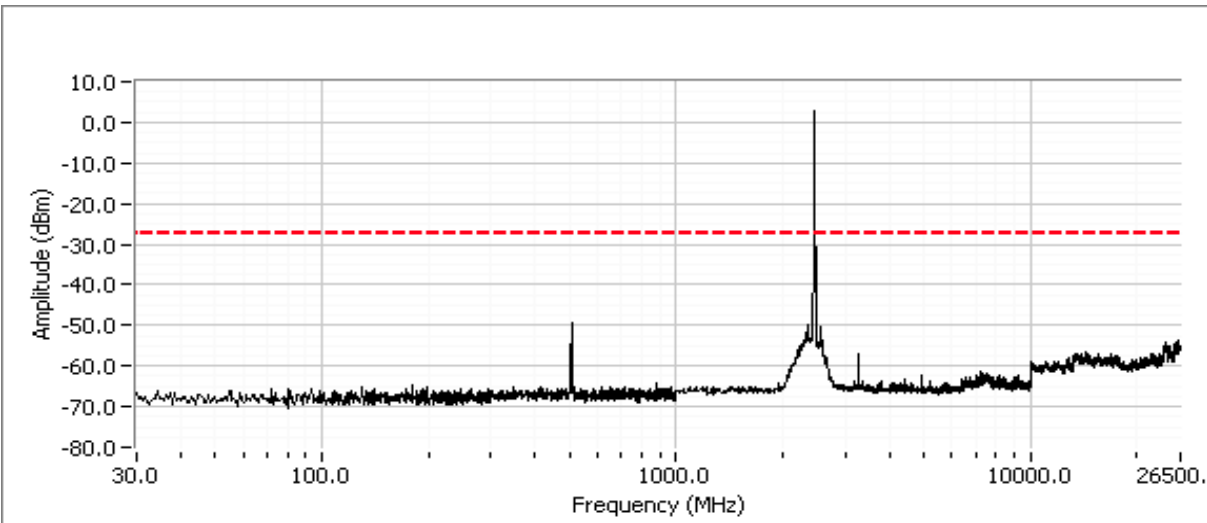


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

Plots for center channel, power setting(s) = 18



Plots for high channel, power setting(s) = 18

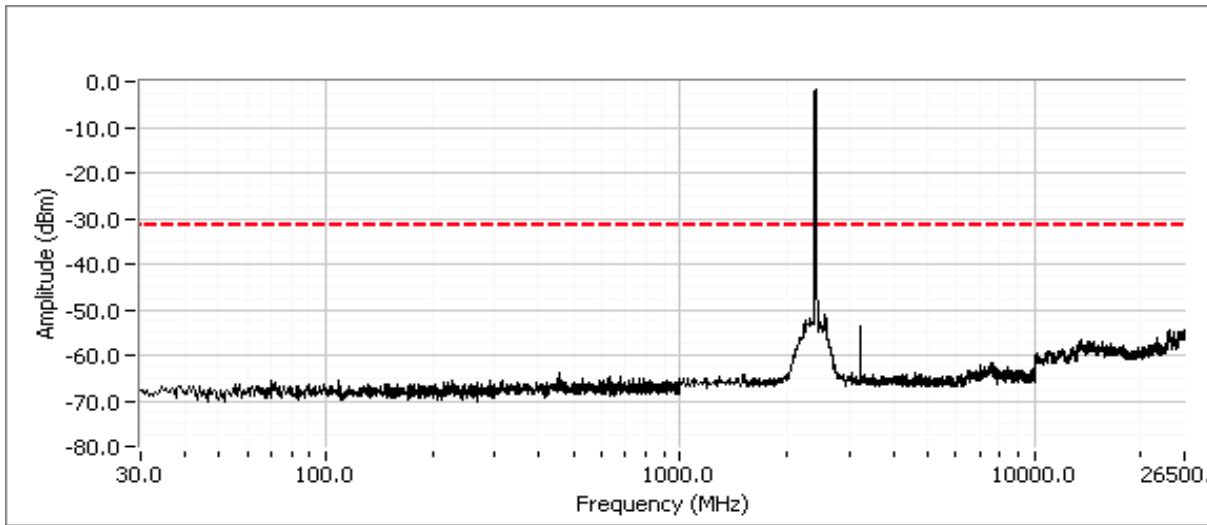


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

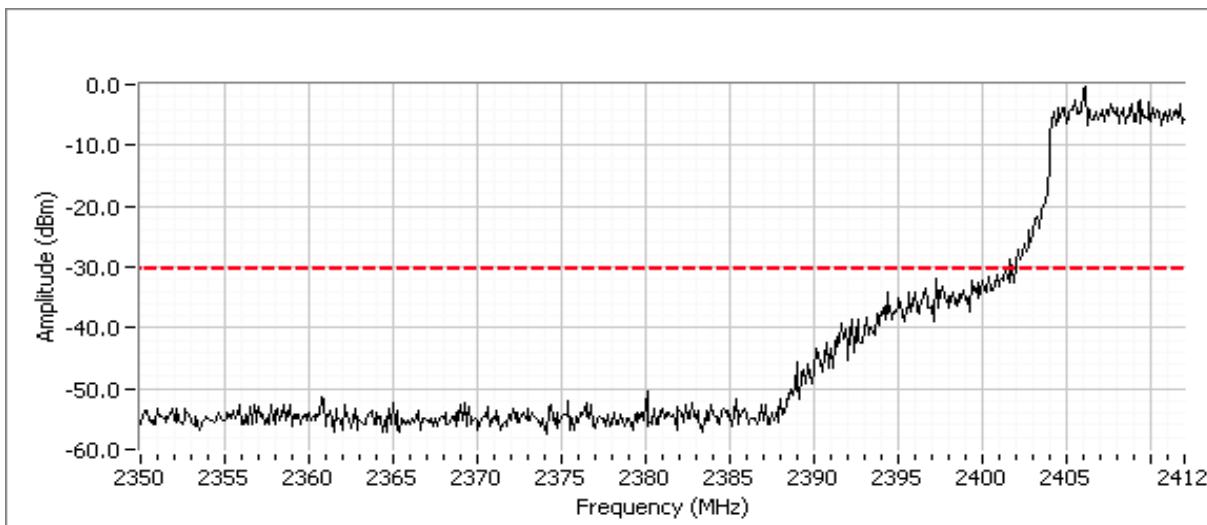
### 802.11g Mode

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

Plots for low channel, power setting(s) = 17.5

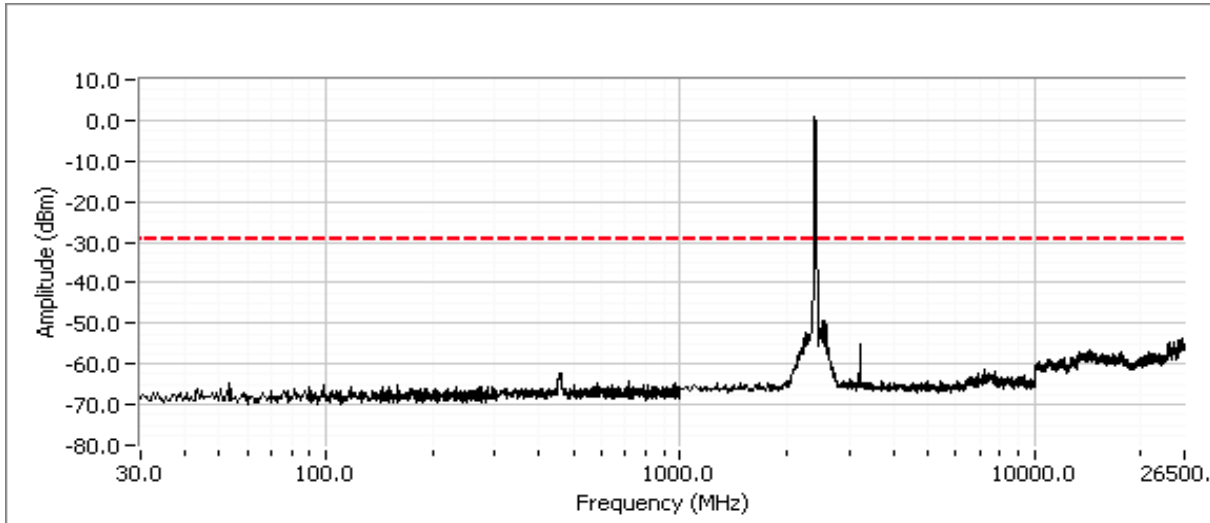


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

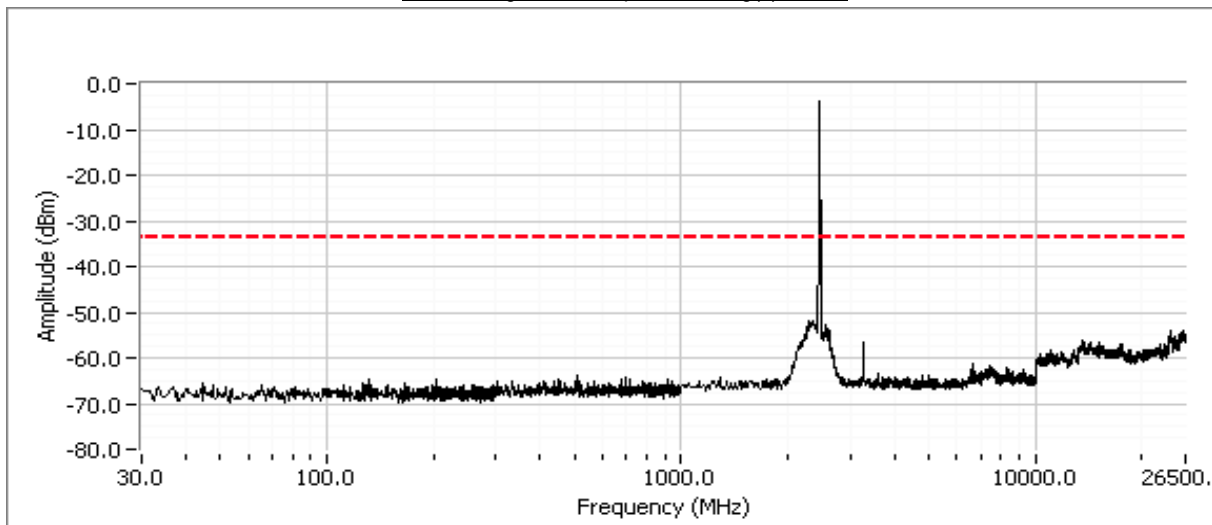


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

Plots for center channel, power setting(s) = 23



Plots for high channel, power setting(s) = 16.5

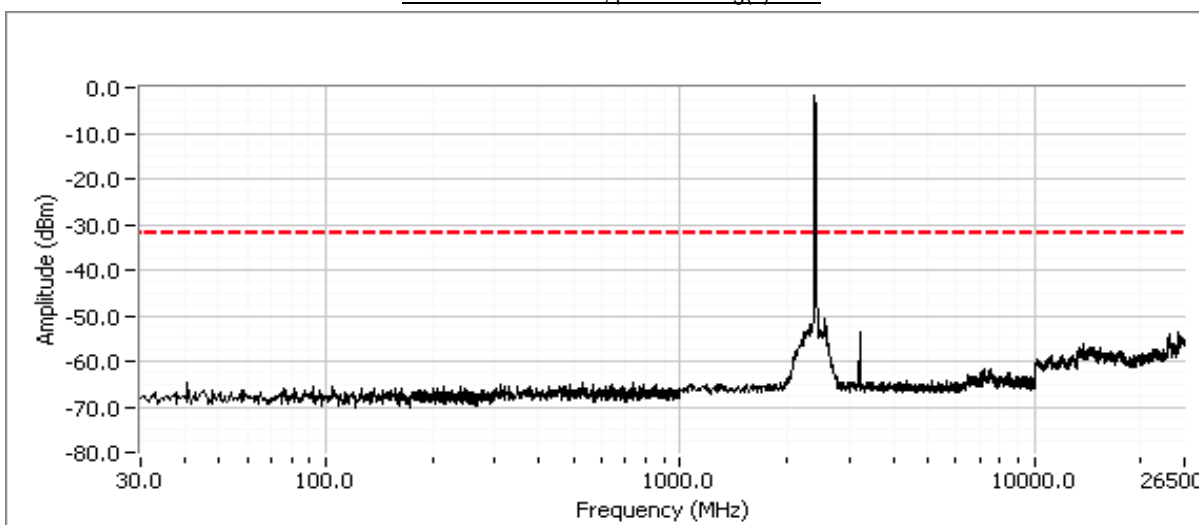


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

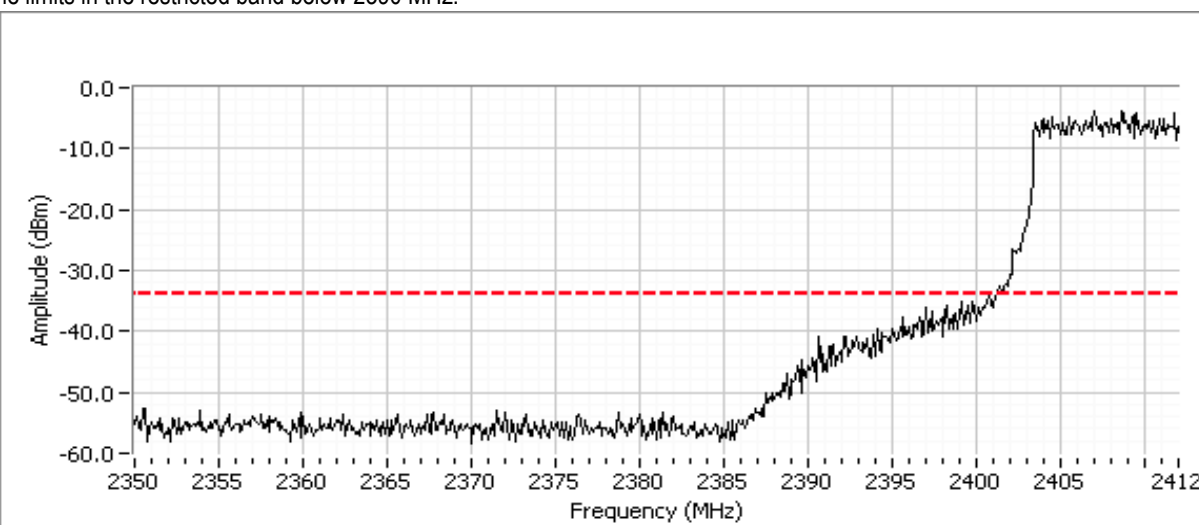
### 802.11n 20MHz Mode

Frequency (MHz)	Limit	Result
2412	-30dBc	Pass
2437	-30dBc	Pass
2462	-30dBc	Pass

Plots for low channel, power setting(s) = 17

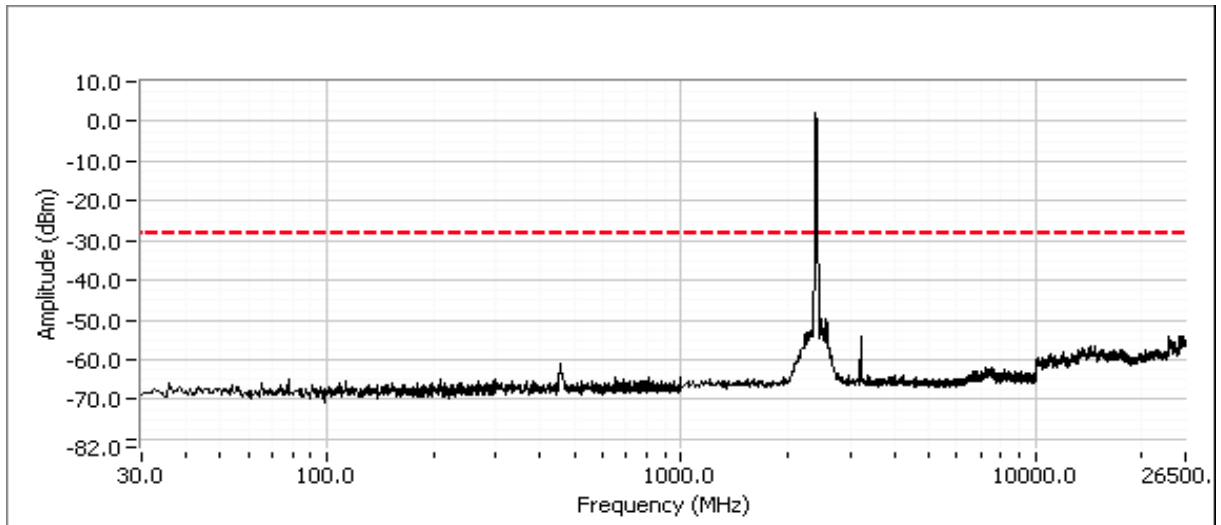


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

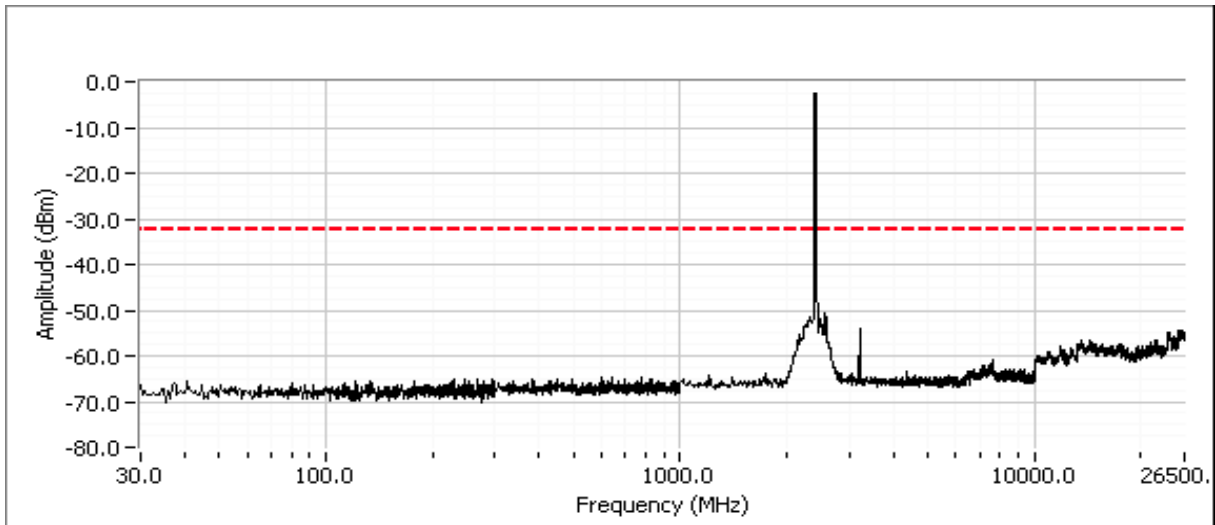


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

Plots for center channel, power setting(s) = 18.5



Plots for high channel, power setting(s) = 17.5

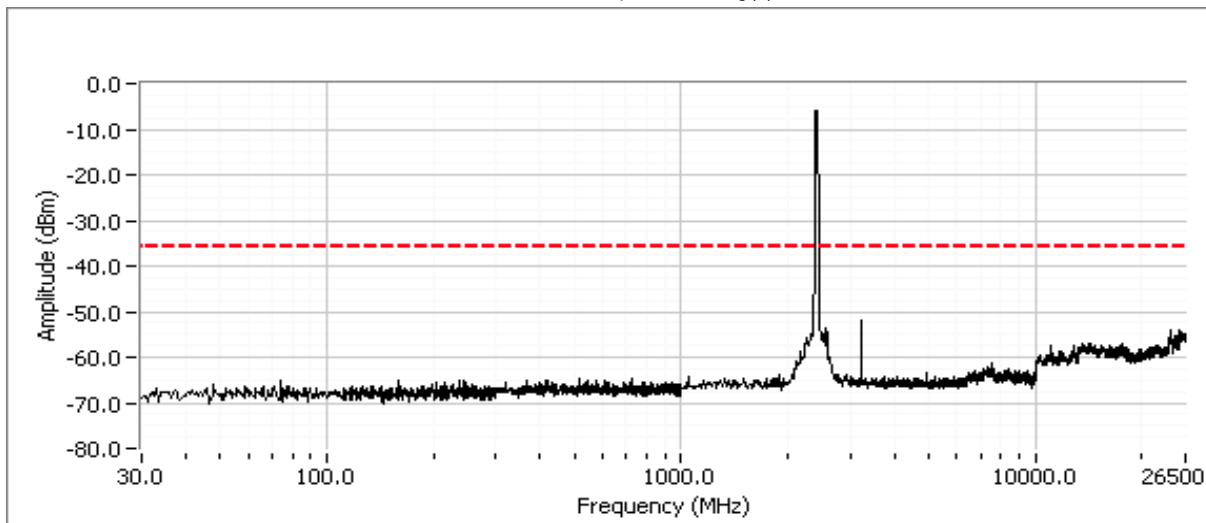


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

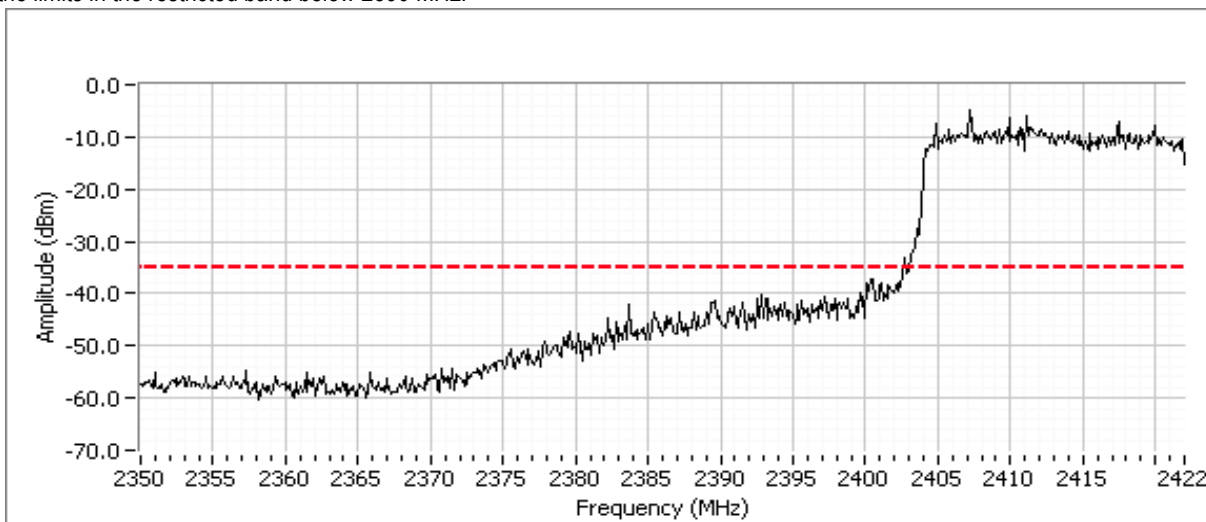
### 802.11n 40MHz Mode

Frequency (MHz)	Limit	Result
2422	-30dBc	Pass
2437	-30dBc	Pass
2452	-30dBc	Pass

Plots for low channel, power setting(s) = 15.5



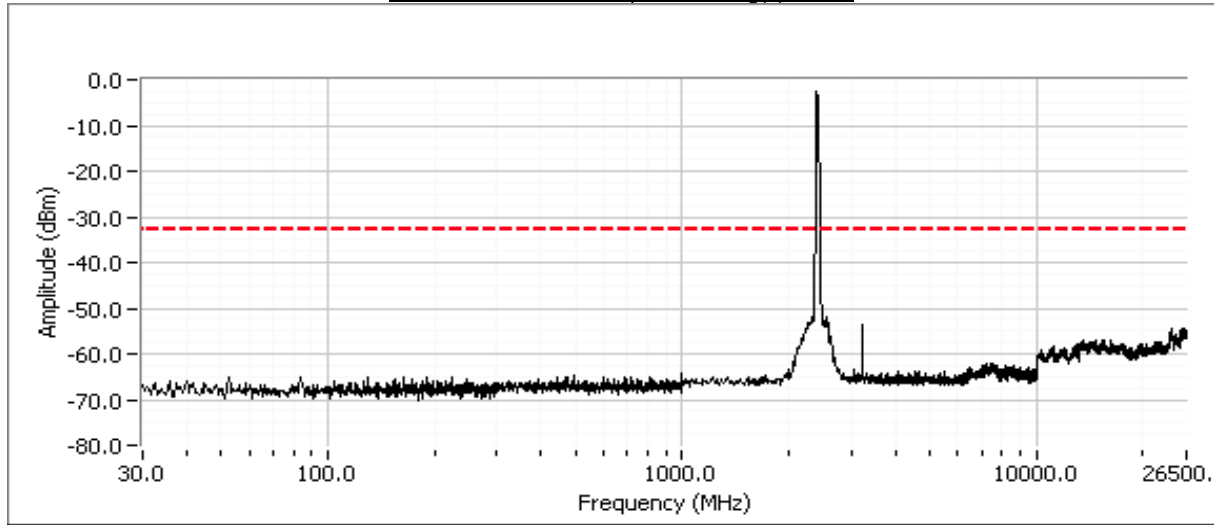
Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



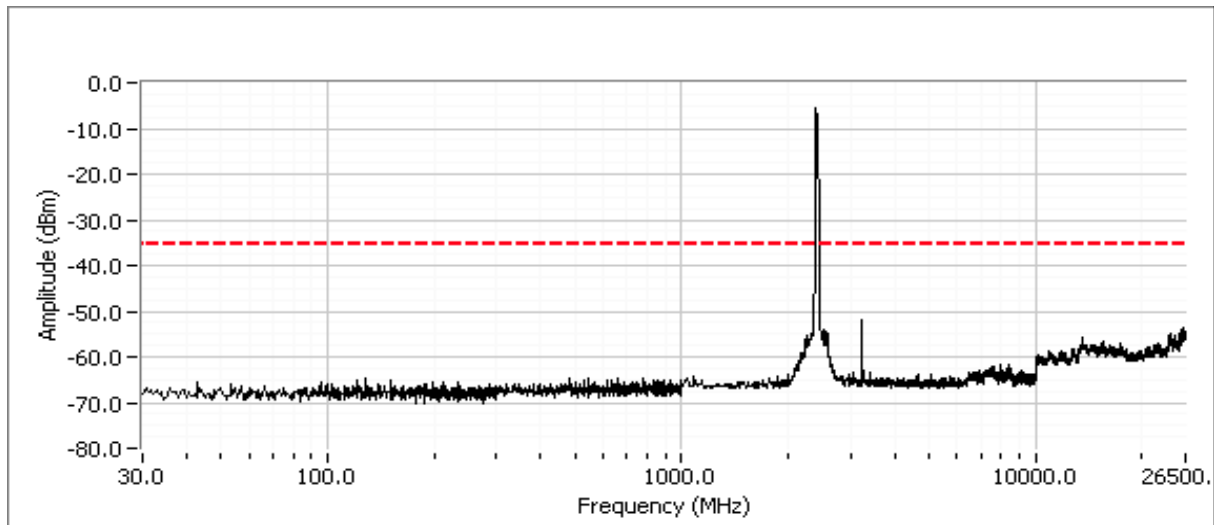


Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	N/A

Plots for center channel, power setting(s) = 18.5



Plots for high channel, power setting(s) = 15.5



Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	B

## Radiated Emissions 30-1000 MHz, Wireless Module (FCC 15.247/RSS 210)

*(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: 9/30/2010	Config. Used: Modular Test
Test Engineer: Riaz Momand	Config Change: None
Test Location: Fremont Chamber # 4	Host Unit 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.

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:	22 °C
Rel. Humidity:	44 %

### Summary of Results

**MAC Address: 78929C0023FE; DRTU Tool Version 1.2.12.0197; Driver version 14.0.0.39**

Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions 30 - 1000 MHz	FCC 15.209 / RSS 210	Pass	32.5dBµV/m @ 622.33MHz (-13.5dB)

Note - preliminary measurements indicated that the radiated emissions from the combination of test fixture and EUT were not affected by the modules operating frequency or mode (transmit versus receive mode). The system was therefore evaluated against the most stringent set of limits from FCC 15.247, FCC 15E and RSS 210 with the **device operating at max power (16.5dBm) on Chain A at 2437MHz, 802.11b mode.**

### Modifications Made During Testing

No modifications were made to the EUT during testing

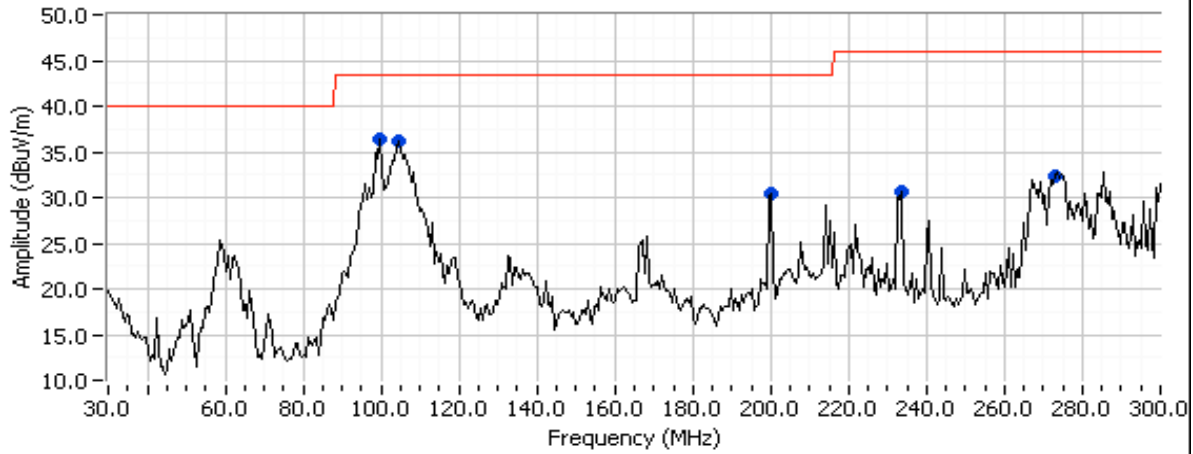
### Deviations From The Standard

No deviations were made from the requirements of the standard.

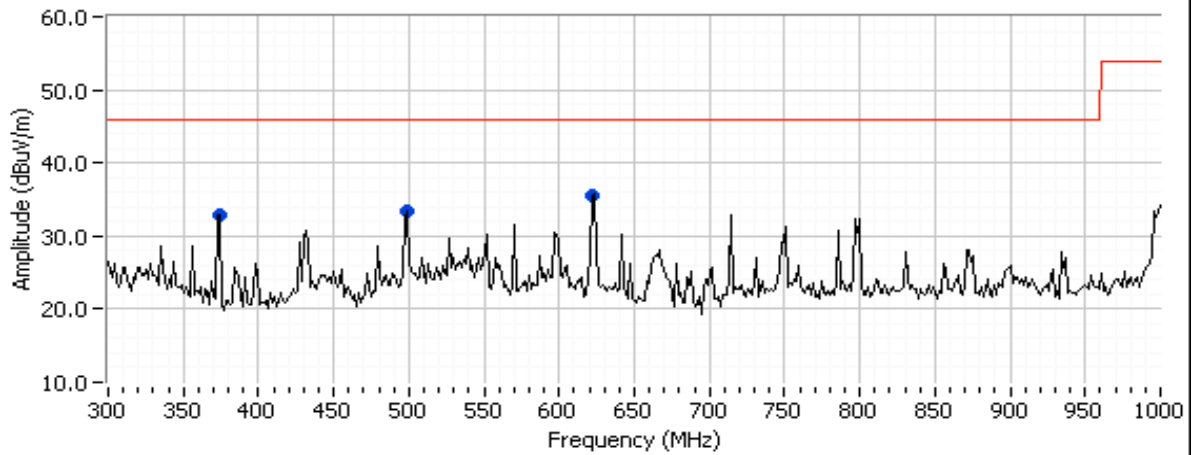
**Run # 1: Preliminary Radiated Emissions, 30 - 1000 MHz**  
**Configured to TX , 802.11b 16.5dBm on chain A (setting 17.5)**

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

Run # 1:



Run # 1:



Run # 1 Continued on Next Page .....

.....Run # 1 Continued

**Preliminary peak readings captured during pre-scan**

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
			Limit	Margin				
MHz	dB $\mu$ V/m	v/h			Pk/QP/Avg	degrees	meters	
374.742	32.9	H	46.0	-13.1	Peak	10	1.0	
233.103	30.6	H	46.0	-15.4	Peak	180	1.5	
103.543	36.1	V	43.5	-7.4	Peak	304	1.9	
99.735	36.4	V	43.5	-7.1	Peak	229	2.0	
271.242	32.3	V	46.0	-13.7	Peak	283	2.5	
622.331	35.4	V	46.0	-10.6	Peak	300	1.0	
499.210	33.5	H	46.0	-12.5	Peak	350	1.5	
200.003	30.4	V	43.5	-13.1	Peak	360	2.0	

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

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
			Limit	Margin				
MHz	dB $\mu$ V/m	v/h			Pk/QP/Avg	degrees	meters	
622.331	32.5	V	46.0	-13.5	QP	335	1.0	QP (1.00s)
103.543	30.0	V	43.5	-13.5	QP	306	2.4	QP (1.00s)
99.735	29.2	V	43.5	-14.3	QP	308	2.1	QP (1.00s)
374.742	31.4	H	46.0	-14.6	QP	14	1.2	QP (1.00s)
499.538	30.3	H	46.0	-15.7	QP	18	1.5	QP (1.00s)
233.103	29.5	H	46.0	-16.5	QP	168	1.5	QP (1.00s)
200.003	21.1	V	43.5	-22.4	QP	348	1.0	QP (1.00s)
271.242	17.7	V	46.0	-28.3	QP	355	1.0	QP (1.00s)

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
		Account Manager:	Christine Krebill
Contact:	-		
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	B

## Conducted Emissions

*(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: 9/30/2010	Config. Used: Modular Test
Test Engineer: Riaz Momand	Config Change: None
Test Location: Fremont Chamber # 4	Host Unit Voltage 120V / 60Hz

### General Test Configuration

The host laptop 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.

**Ambient Conditions:**

Temperature:	22 °C
Rel. Humidity:	44 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V / 60Hz	FCC Class B	Pass	44.5dBµV @ 14.055MHz (-15.5dB)

### Modifications Made During Testing

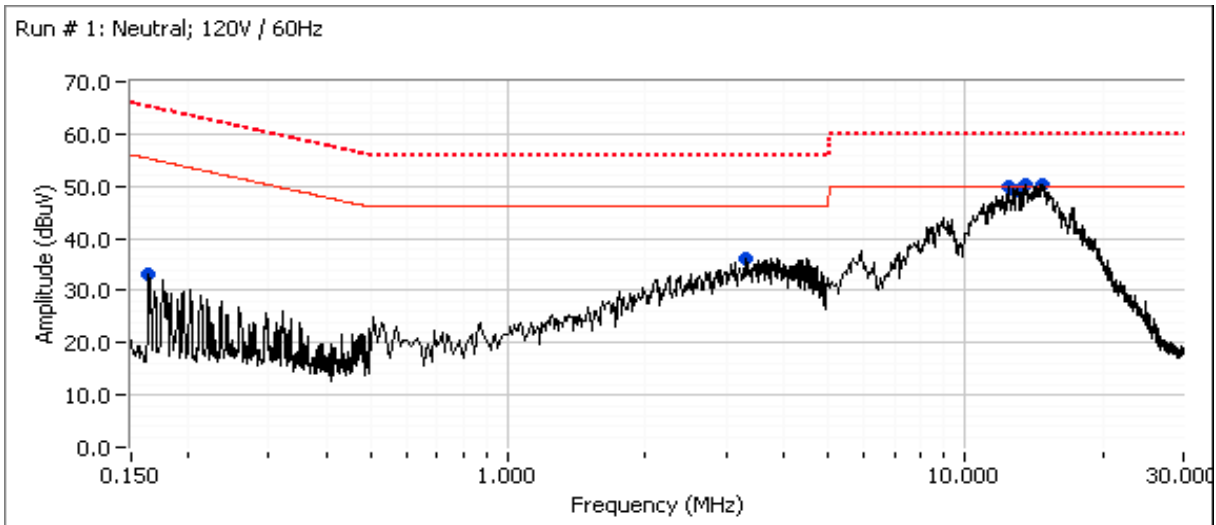
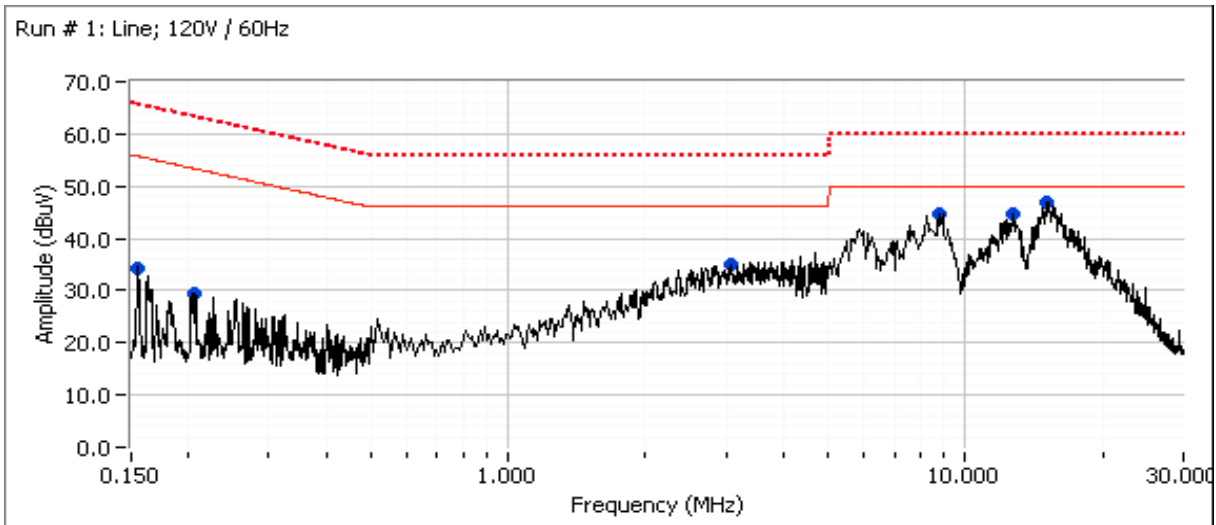
No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	B

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



Run # 1 Continued on Next Page .....

Client:	Intel Corporation	Job Number:	J80617
Model:	Intel® Centrino® Wireless-N 100 (Models 100BNHMW and 100BNHU)	T-Log Number:	T80637
Contact:	-	Account Manager:	Christine Krebill
Standard:	FCC 15.247, RSS 210, FCC 15 B	Class:	B

.....Run # 1 Continued

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

Frequency MHz	Level dBµV	AC Line	FCC Class B		Detector QP/Ave	Comments
			Limit	Margin		
0.156	34.3	Line	55.7	-21.4	Peak	
0.206	29.4	Line	53.3	-23.9	Peak	
2.974	35.1	Line	46.0	-10.9	Peak	
14.692	46.9	Line	50.0	-3.1	Peak	
8.883	44.5	Line	50.0	-5.5	Peak	
12.802	44.6	Line	50.0	-5.4	Peak	
0.157	33.2	Neutral	55.3	-22.1	Peak	
3.308	36.1	Neutral	46.0	-9.9	Peak	
14.287	50.1	Neutral	50.0	0.1	Peak	
14.055	50.3	Neutral	50.0	0.3	Peak	
12.887	50.0	Neutral	50.0	0.0	Peak	
12.528	49.2	Neutral	50.0	-0.8	Peak	

**Final quasi-peak and average readings**

Frequency MHz	Level dBµV	AC Line	FCC Class B		Detector QP/Ave	Comments
			Limit	Margin		
14.055	44.5	Neutral	60.0	-15.5	QP	QP (1.00s)
12.887	42.9	Neutral	60.0	-17.1	QP	QP (1.00s)
14.055	32.8	Neutral	50.0	-17.2	AVG	AVG (0.10s)
12.887	32.3	Neutral	50.0	-17.7	AVG	AVG (0.10s)
14.287	32.2	Neutral	50.0	-17.8	AVG	AVG (0.10s)
12.528	42.0	Neutral	60.0	-18.0	QP	QP (1.00s)
14.287	42.0	Neutral	60.0	-18.0	QP	QP (1.00s)
12.528	30.6	Neutral	50.0	-19.4	AVG	AVG (0.10s)
14.692	39.6	Line	60.0	-20.4	QP	QP (1.00s)
8.883	39.5	Line	60.0	-20.5	QP	QP (1.00s)
14.692	29.2	Line	50.0	-20.8	AVG	AVG (0.10s)
8.883	28.9	Line	50.0	-21.1	AVG	AVG (0.10s)
12.802	37.8	Line	60.0	-22.2	QP	QP (1.00s)
12.802	27.7	Line	50.0	-22.3	AVG	AVG (0.10s)
2.974	29.8	Line	56.0	-26.2	QP	QP (1.00s)
2.974	19.3	Line	46.0	-26.7	AVG	AVG (0.10s)
3.308	28.2	Neutral	56.0	-27.8	QP	QP (1.00s)
3.308	16.1	Neutral	46.0	-29.9	AVG	AVG (0.10s)
0.155	28.6	Line	65.7	-37.1	QP	QP (1.00s)
0.157	28.0	Neutral	65.6	-37.6	QP	QP (1.00s)
0.206	23.0	Line	63.4	-40.4	QP	QP (1.00s)
0.206	10.5	Line	53.4	-42.9	AVG	AVG (0.10s)
0.155	11.6	Line	55.7	-44.1	AVG	AVG (0.10s)
0.157	11.4	Neutral	55.6	-44.2	AVG	AVG (0.10s)