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 1030 (model 11230BNHMW)

IC CERTIFICATION #:	1000M-11230BNH and 1000M-11230BNHU
FCC ID:	PD911230BNH and PD911230BNHU
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-4, 2845B-5, 2845B-7
REPORT DATE:	October 1, 2010
FINAL TEST DATES:	September 2, 7, 13, 14, and 15, 2010

AUTHORIZED SIGNATORY:

Mark Briggs
Staff Engineer
Elliott Laboratories

Testing Cert #2016.01

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	10-01-2010	First release	

TABLE OF CONTENTS

SCOPE

An electromagnetic emissions test has been performed on the Intel Corporation model Intel® Centrino® Wireless-N 1030 (model 11230BNHMW), 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 1030 (model 11230BNHMW) 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 1030 (model 11230BNHMW) 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	10.2 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power	802.11b: 0.063 W 802.11g: 0.118 W n20: 0.123 W n40: 0.035 W	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	-5.3 dBm/3kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	802.11g and n20MHz: more than -20dBc 802.11b and n40MHz: more than -30dBc	< -20dBc or < -30dBc Note 2	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.8dBµV/m @ 2483.5MHz	15.207 in restricted bands, all others <-30dBc Note 2	Complies (-0.2dB)

Note 1: EIRP calculated using antenna gain of 3.2 dBi
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	Integral or unique connector required	Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	43.5dBµV/m @ 7500.1MHz	Refer to page 18	Complies (-10.5dB))
15.207	RSS GEN Table 2	AC Conducted Emissions	41.7dBµV @ 15.505MHz	Refer to page 17	Complies (-8.3dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations, RSS 102 declaration and User Manual page 8	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Refer to pages 11 and 12 of the user's manual	Statement required regarding non-interference	Complies
-	RSP 100 RSS GEN 7.1.5	User Manual	Not applicable, antenna is integral to host systems.	Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	802.11b: 13.6 MHz 802.11g: 18.4 MHz n20: 19.7 MHz n40: 36.6 MHz	Information only	N/A

ADDITIONAL MEASUREMENTS

As both Bluetooth and 802.11 transmissions can occur simultaneously, radiated spurious measurements were made with both Bluetooth and 802.11 devices transmitting simultaneously.

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.2109	RSS 210	Receiver spurious emissions	51.0dBµV/m @ 2496.2MHz	15.209 in restricted bands, all others < -20dBc	Complies (-3.0dB)

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)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Intel Corporation model Intel® Centrino® Wireless-N 1030 is a PCIe Half Mini Card form factor Bluetooth / IEEE 802.11b/g/n wireless network adapter that supports 802.11bgn and Bluetooth operation. 802.11bgn modes operate in a 1x2 mode (2 receive chains and 1 transmit chain) and the Bluetooth transceiver operates in a 1x1 mode. Both modes can operate simultaneously, but when Bluetooth is enabled 802.11 modes only support 1x1.

The Intel® Centrino® Wireless-N 1030 is sold under model numbers 11230BNHMW and 11230BNHU Model numbers with FCC ID: PD911230BNHU and IC: 1000M-11230BNHU 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 2, 2010 and tested on September 2, 7, 13, 14, and 15, 2010. The EUT consisted of the following component(s):

Company	Model	Description	Mac Address	FCC ID
Intel Corporation	11230BNHMW	PCIe Half Mini Card form factor Bluetooth / IEEE 802.11b/g/n wireless network adapter		PD911230BNH PD911230BNHU 1000M-11230BNH
	11230BNHU			1000M-11230BNHU

ANTENNA SYSTEM

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

ENCLOSURE

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

MODIFICATIONS

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

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Intel Corporation	Shiloh Motherboard	Test Fixture	-	N/A
Dell	-	Laptop PC	Prototype	N/A
Agilent	E3610A	DC Supply	-	N/A

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Laptop USB	Fixture USB	USB cable	Shielded	1
Laptop Mini PCI	Fixture PCIe	Ribbon	unshielded	0.5
DC Power	Fixture DC power	2-wire	unshielded	0.5

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), Bluetooth 1Mb/s and Bluetooth 3Mb/s. In addition radiated spurious tests were repeated with the device operating in both Bluetooth and 802.11 modes to determine if any spurious emissions due to inter-modulation products were created.

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 (this was confirmed through separate measurements). Bluetooth operation was evaluated at both 1Mb/s and 3Mb/s data rates. 2Mb/s data rate was found, through preliminary testing, to produce emissions similar to those for 3Mb/s and had a slightly lower output power than the 3Mb/s data rate.

The PC was using the Intel test utility DRTU Version 1.2.2-0177 and the 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.

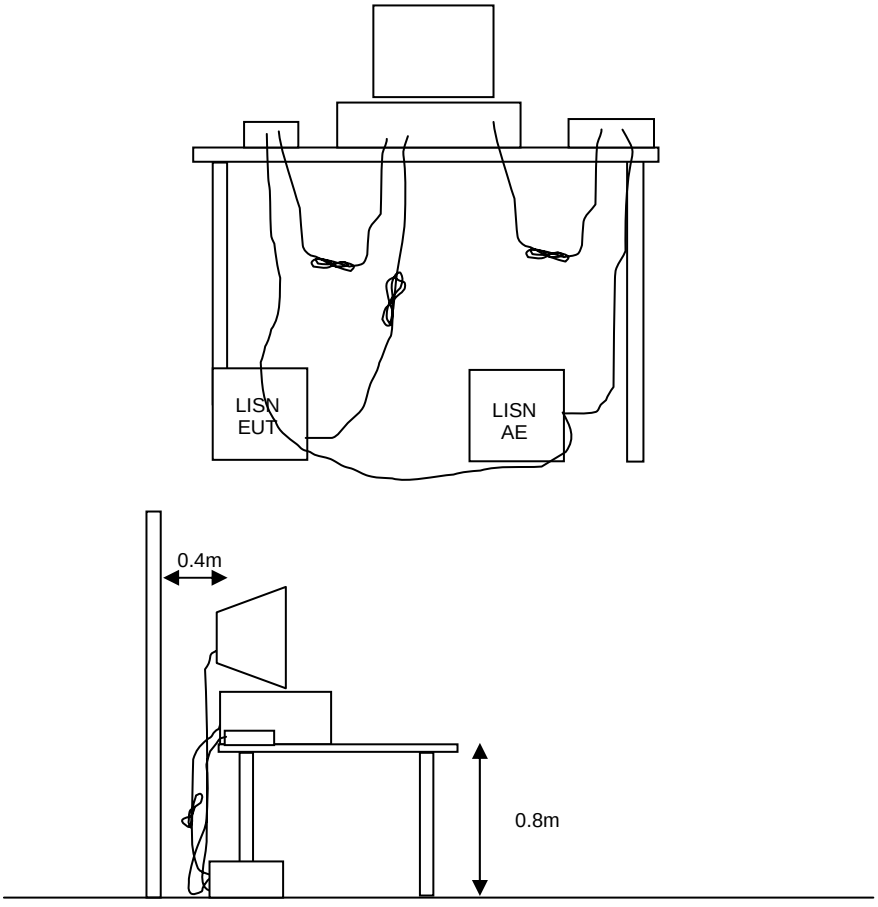
TEST PROCEDURES

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.



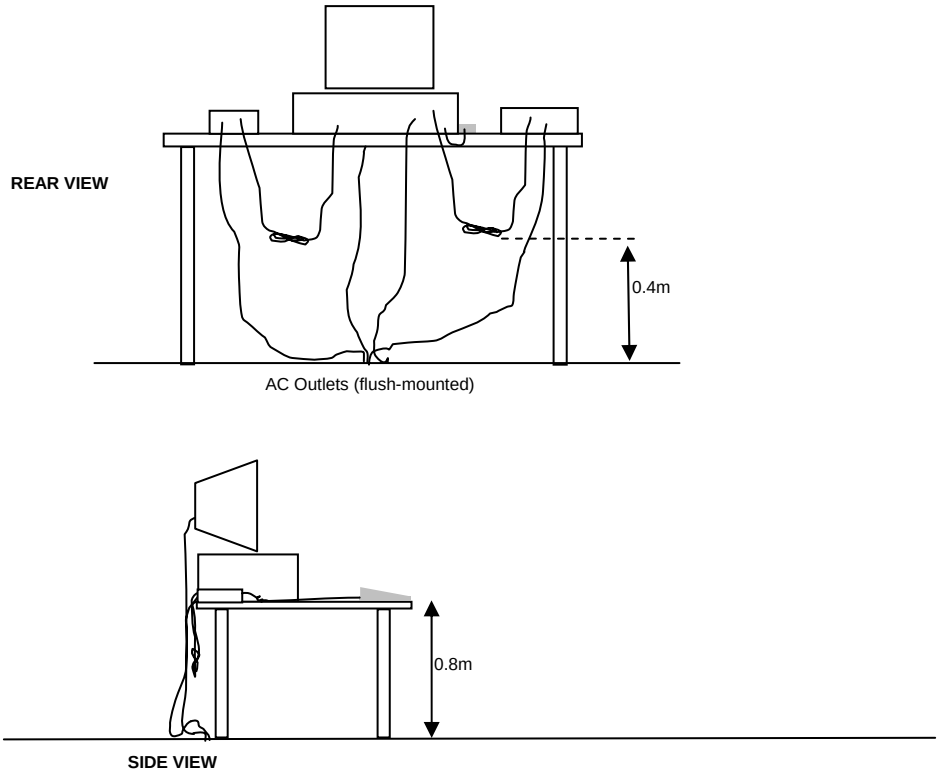
RADIATED EMISSIONS

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.

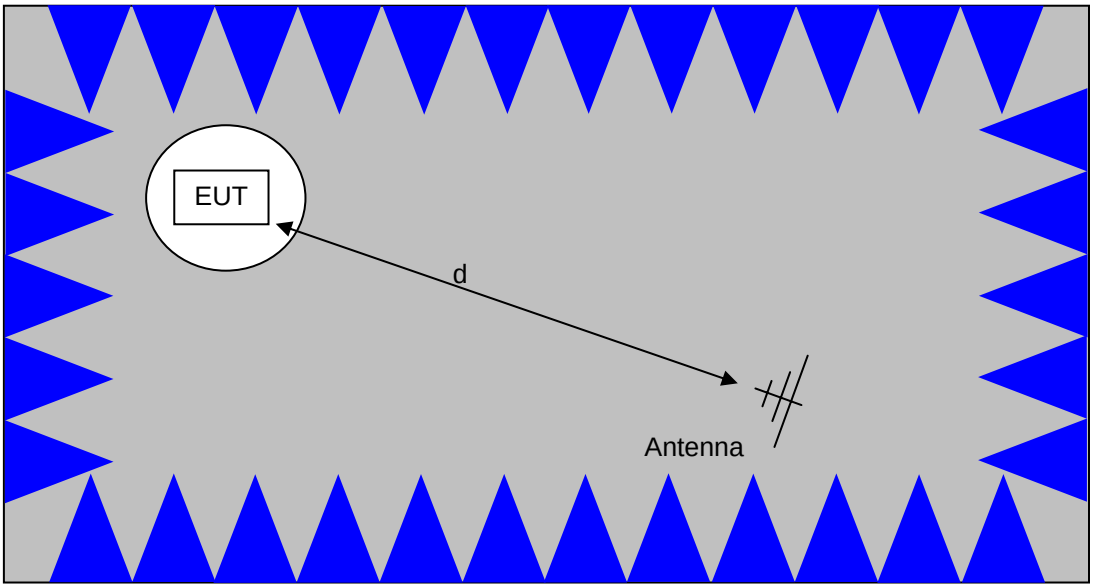
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

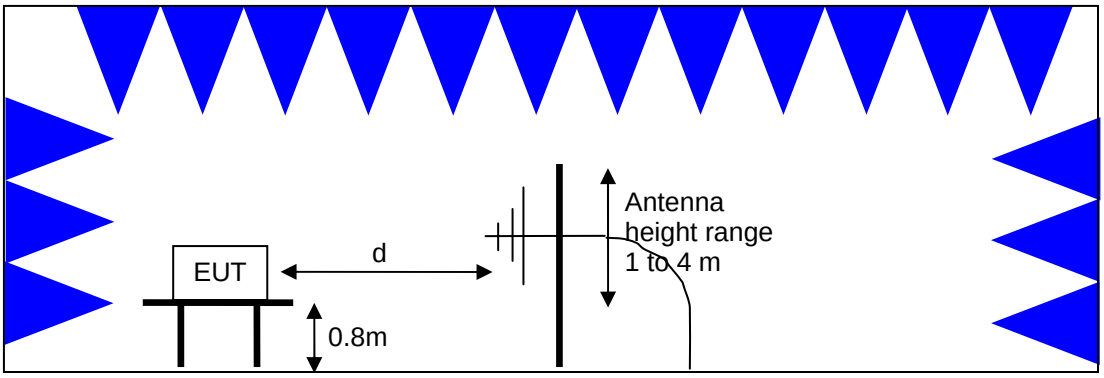


Typical Test Configuration for Radiated Field Strength Measurements



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[1] (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	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 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

[1] 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:

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

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 = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

Appendix A Test Equipment Calibration Data

Radio Antenna Port (Power and Spurious Emissions), 02-03-Sep-10

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/6/2012
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	6/30/2011

Radio Bandedge (Power and Spurious Emissions), 07-08-Sep-10

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

Radiated Emissions, 1000 - 26,500 MHz, 13,14-Sep-10

Manufacturer	Description	Model	Asset #	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	263	12/15/2010
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	10/22/2010
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	4/14/2011
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
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/22/2012
Hewlett Packard	Head (Inc W1-W4, 1742 , 1743) Blue	84125C	1620	5/4/2011
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	11/4/2010
A.H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	3/5/2011

Radio Antenna Port, 14,15-Sep-10

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	10/22/2010
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts (w/ 20 dB pad, SN BJ5155)	NRV-Z32	1536	9/13/2011
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)	8564E (84125C)	1771	8/26/2011

Radiated Emissions, 30 - 1,000 MHz, 15-Sep-10

Manufacturer	Description	Model	Asset #	Cal Due
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7GHz	ESIB7	1538	10/15/2010
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447D OPT 010	1826	5/27/2011
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2197	12/29/2011

Conducted Emissions - AC Power Ports, 15-Sep-10

Manufacturer	Description	Model	Asset #	Cal Due
EMCO	LISN, 10 kHz-100 MHz	3825/2	1292	3/12/2011
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7GHz	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

T80458 75 Pages

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		-
Emissions Standard(s):	FCC.247, RSS-210 Issue 7	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Intel Corporation

Model

Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130

Date of Last Test: 9/15/2010

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	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: 9/15/2010
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Config. Used: Modular Test
Config Change: None
Host Unit Voltage 120V/60Hz

General Test Configuration

The test fixture 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: 21.6 °C
Rel. Humidity: 37 %

Summary of Results

MAC Address: 00150079C6BF DRTU Tool Version 1.2.2-0177 Driver version 14.0.0.39

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	RSS 210 / 15.207	Pass	41.7dBµV @ 15.505MHz (-8.3dB)

Modifications Made During Testing

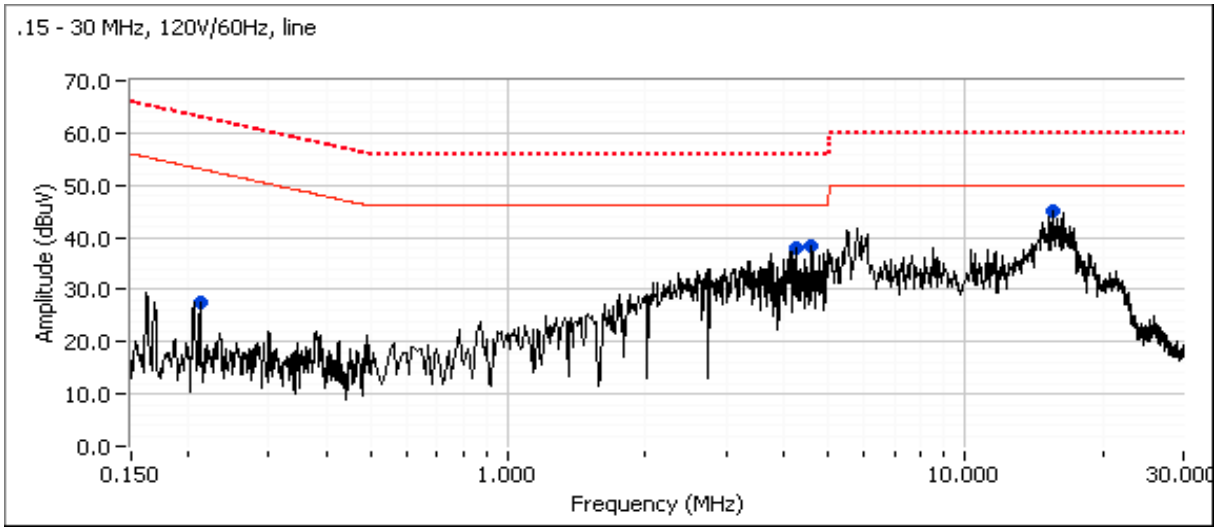
No modifications were made to the EUT during testing

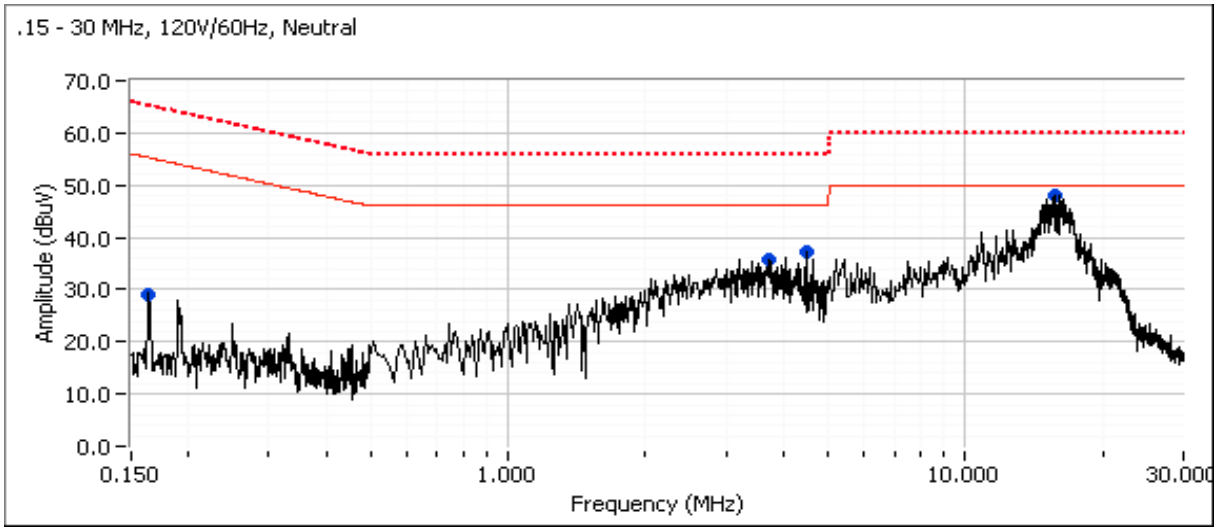
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/50Hz
Preliminary peak readings captured during pre-scan (peak readings vs. average limit)





Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	B

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.213	27.4	Line 1	53.1	-25.7	Peak	
4.229	38.1	Line 1	46.0	-7.9	Peak	
4.617	38.4	Line 1	46.0	-7.6	Peak	
15.408	45.1	Line 1	50.0	-4.9	Peak	
0.164	29.2	Neutral	55.3	-26.1	Peak	
4.468	37.3	Neutral	46.0	-8.7	Peak	
3.731	35.6	Neutral	46.0	-10.4	Peak	
15.505	48.1	Neutral	50.0	-1.9	Peak	

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
15.505	**41.7**	Neutral	50.0	**-8.3**	AVG	AVG (0.10s)
15.408	38.0	Line 1	50.0	-12.0	AVG	AVG (0.10s)
15.505	46.4	Neutral	60.0	-13.6	QP	QP (1.00s)
15.408	42.8	Line 1	60.0	-17.2	QP	QP (1.00s)
3.731	31.4	Neutral	56.0	-24.6	QP	QP (1.00s)
4.229	30.6	Line 1	56.0	-25.4	QP	QP (1.00s)
4.617	29.7	Line 1	56.0	-26.3	QP	QP (1.00s)
4.468	29.6	Neutral	56.0	-26.4	QP	QP (1.00s)
3.731	19.4	Neutral	46.0	-26.6	AVG	AVG (0.10s)
4.229	18.7	Line 1	46.0	-27.3	AVG	AVG (0.10s)
4.617	18.2	Line 1	46.0	-27.8	AVG	AVG (0.10s)
4.468	15.8	Neutral	46.0	-30.2	AVG	AVG (0.10s)

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	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: 9/15/2010
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Config. Used: Modular Test
Config Change: None
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. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

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

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

Ambient Conditions:

Temperature: 21.6 °C
Rel. Humidity: 37 %

Summary of Results

MAC Address: 00150079C6BF DRTU Tool Version 1.2.2-0177 Driver version 14.0.0.39

Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions 30 - 1000 MHz	FCC 15.209 / RSS 210	Pass	30.2dBµV/m @ 200.01MHz (-13.3dB)

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 and max power (7dBm) on the top channel in Bluetooth mode (1Mb/s data rate).**

Modifications Made During Testing

No modifications were made to the EUT during testing

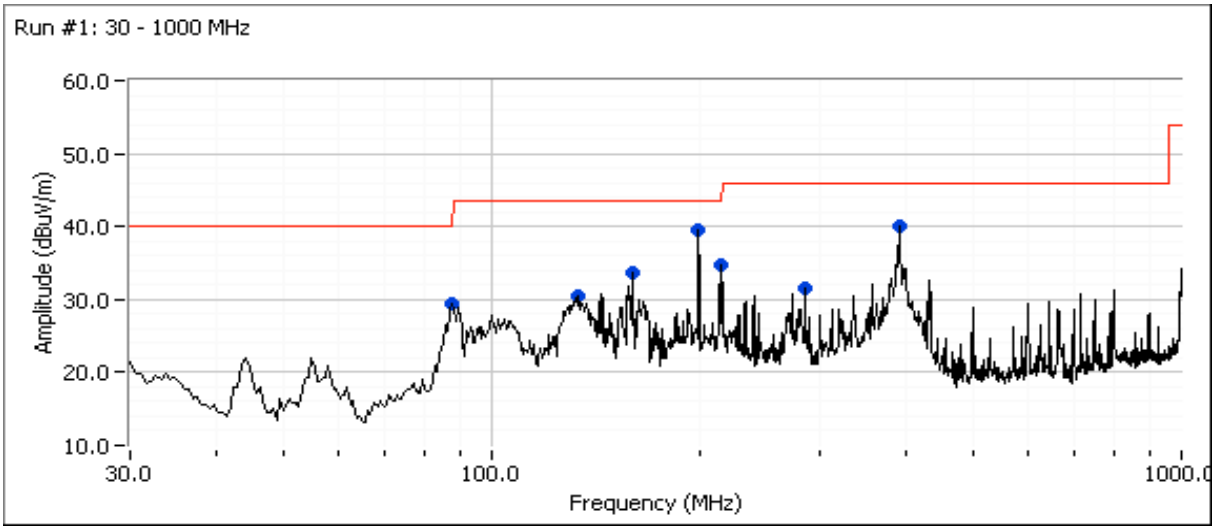
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	B

Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz
Configured to TX , 802.11b 16.5dBm on each chain (settings 20.0) on channel 6, Bluetooth 7dBm, 1Mb/s (settings 8.0)

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



Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
89.727	29.4	H	40.0	-10.6	Peak	52	2.0	
133.637	30.5	V	43.5	-13.0	Peak	175	2.0	
160.029	33.8	H	43.5	-9.7	Peak	217	2.0	
200.008	39.6	H	43.5	-3.9	Peak	218	1.5	
216.011	34.7	H	43.5	-8.8	Peak	238	2.0	
285.274	31.5	V	46.0	-14.5	Peak	95	1.0	
391.699	40.0	H	46.0	-6.0	Peak	188	1.0	

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

Frequency	Level	Pol	FCC 15.209 / RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
200.008	**30.2**	H	43.5	**-13.3**	QP	218	1.5	QP (1.00s)
160.029	29.2	H	43.5	-14.3	QP	205	1.6	QP (1.00s)
89.727	27.5	H	43.5	-16.0	QP	75	2.2	QP (1.00s)
391.699	29.6	H	46.0	-16.4	QP	186	1.0	QP (1.00s)
133.637	21.9	V	43.5	-21.6	QP	191	1.0	QP (1.00s)
216.011	23.0	H	46.0	-23.0	QP	219	1.6	QP (1.00s)

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Summary of Results

MAC Address: 00150079C6BF DRTU Tool Version 1.2.2-0177 Driver version 14.0.0.39

Run #	Mode	Channel		Measured Power	Test Performed	Limit	Result / Margin
Run # 1	n40 Chain A	#3 2422MHz		**12.0**	Restricted Band Edge at 2400 MHz	15.209	53.7dBµV/m @ 2390.0MHz (-0.3dB)
		#9 2452MHz		**11.8**	Restricted Band Edge at 2483.5 MHz	15.209	**53.8dBµV/m @ 2483.5MHz (-0.2dB)**
Run # 2	n40 Chain A	#4 2427MHz		**12.0**	Restricted Band Edge at 2400 MHz	15.209	52.0dBµV/m @ 2390.0MHz (-2.0dB)
		#8 2447MHz		**13.0**	Restricted Band Edge at 2483.5 MHz	15.209	53.4dBµV/m @ 2483.5MHz (-0.6dB)
Run # 3	n40 Chain A	#5 2432MHz		**13.8**	Restricted Band Edge at 2400 MHz	15.209	51.6dBµV/m @ 2390.0MHz (-2.4dB)
		#7 2442MHz		**13.1**	Restricted Band Edge at 2483.5 MHz	15.209	51.3dBµV/m @ 2483.5MHz (-2.7dB)
Run # 4	n40 Chain A	#6 2437MHz		**15.4**	Restricted Band Edge at 2400 MHz	15.209	53.1dBµV/m @ 2390.0MHz (-0.9dB)
				14.5	Restricted Band Edge at 2483.5 MHz	15.209	52.3dBµV/m @ 2483.5MHz (-1.7dB)
Run # 5	n20 Chain A	#1 2412MHz		**14.1**	Restricted Band Edge at 2400 MHz	15.209	51.8dBµV/m @ 2390.0MHz (-2.2dB)
		#11 2462MHz		**13.5**	Restricted Band Edge at 2483.5 MHz	15.209	53.5dBµV/m @ 2483.5MHz (-0.5dB)
Run # 6	802.11g Chain A	#1 2412MHz		16.5	Restricted Band Edge at 2400 MHz	15.209	53.6dBµV/m @ 2390.0MHz (-0.4dB)
		#11 2462MHz		**14.1**	Restricted Band Edge at 2483.5 MHz	15.209	51.9dBµV/m @ 2483.5MHz (-2.1dB)
Run # 7	802.11b Chain A	#1 2412MHz		16.6	Restricted Band Edge at 2400 MHz	15.209	45.9dBµV/m @ 2390.0MHz (-8.1dB)
		#11 2462MHz		16.6	Restricted Band Edge at 2483.5 MHz	15.209	48.7dBµV/m @ 2483.5MHz (-5.3dB)

Note - the measured powers 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.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	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 ws 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.

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:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Date of Test: 9/2/2010 Test Location: FT Chamber #4

Test Engineer: Joseph Cadigal Config Change: none

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	12.0	19.0

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	
2430.400	87.2	V	-	-	AVG	183	1.7	RB 1 MHz;VB 10 Hz;Pk
2432.600	95.6	V	-	-	PK	183	1.7	RB 1 MHz;VB 3 MHz;Pk
2423.480	89.0	H	-	-	AVG	360	1.0	RB 1 MHz;VB 10 Hz;Pk
2423.470	98.2	H	-	-	PK	360	1.0	RB 1 MHz;VB 3 MHz;Pk

2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

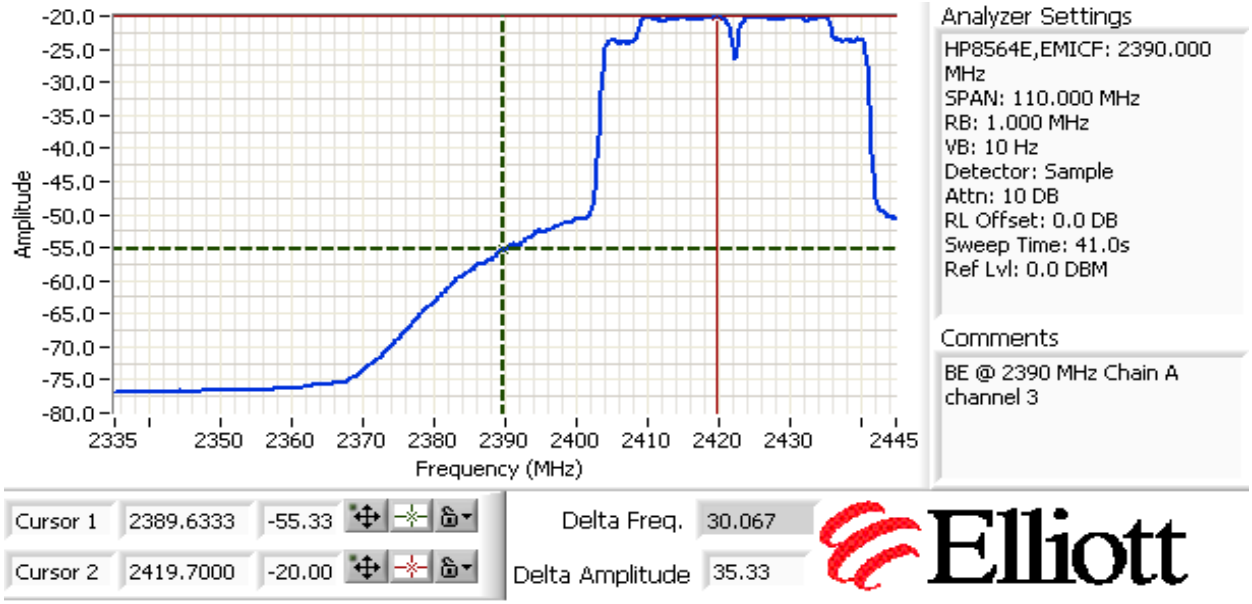
	H	V	
Fundamental emission level @ 3m in **1MHz RBW:**	98.2	95.6	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	89.0	87.2	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*32.7 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	65.5 dBuV/m		
Calculated Band-Edge Measurement (Avg):	56.3 dBuV/m		

	Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	-0.3	53.7	54	Avg
Delta Marker - 1MHz/10Hz: **35.3** *dB*	-8.5	65.5	74	Pk

Calculated Band-Edge Measurement (Peak):	67.0 dBuV/m	Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	53.7 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	53.7	-	54.0	**-0.3**	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	11.8	19.0

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	
2449.270	88.0	V	-	-	AVG	261	1.0	RB 1 MHz;VB 10 Hz;Pk
2448.330	96.4	V	-	-	PK	261	1.0	RB 1 MHz;VB 3 MHz;Pk
2460.070	88.1	H	-	-	AVG	342	1.2	RB 1 MHz;VB 10 Hz;Pk
2459.730	98.9	H	-	-	PK	342	1.2	RB 1 MHz;VB 3 MHz;Pk

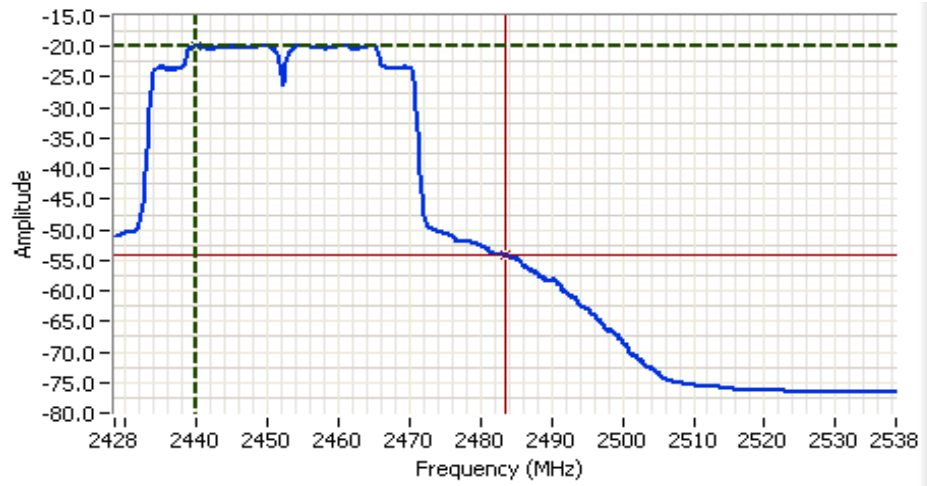
2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in **1MHz RBW:**	98.9	96.4	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	88.1	88.0	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*31.7 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	67.2 dBuV/m		
Calculated Band-Edge Measurement (Avg):	56.4 dBuV/m		
Delta Marker - 1MHz/1MHz:	*30.2 dB*		
Delta Marker - 1MHz/10Hz:	**34.3** *dB*		
Calculated Band-Edge Measurement (Peak):	68.7 dBuV/m		Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	53.8 dBuV/m		Using 1MHz delta value

Margin	Level	Limit	Detector
-0.2	53.8	54	Avg
-6.8	67.2	74	Pk

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.8	-	54.0	**-0.2**	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A



Analyzer Settings

HP8564E,EMICF: 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: 41.0s
Ref Lvl: 0.0 DBM

Comments

BE @ 2483.5 MHz Chain A channel 9

Cursor 1	2439.8667	-19.83	Delta Freq.	43.633	
Cursor 2	2483.5000	-54.17	Delta Amplitude	34.33	

Elliott

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Date of Test: 9/2/2010 Test Location: FT Chamber #4

Test Engineer: Joseph Cadigal Config Change: none

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	12.5	12.0	19.0

Fundamental Signal Field Strength

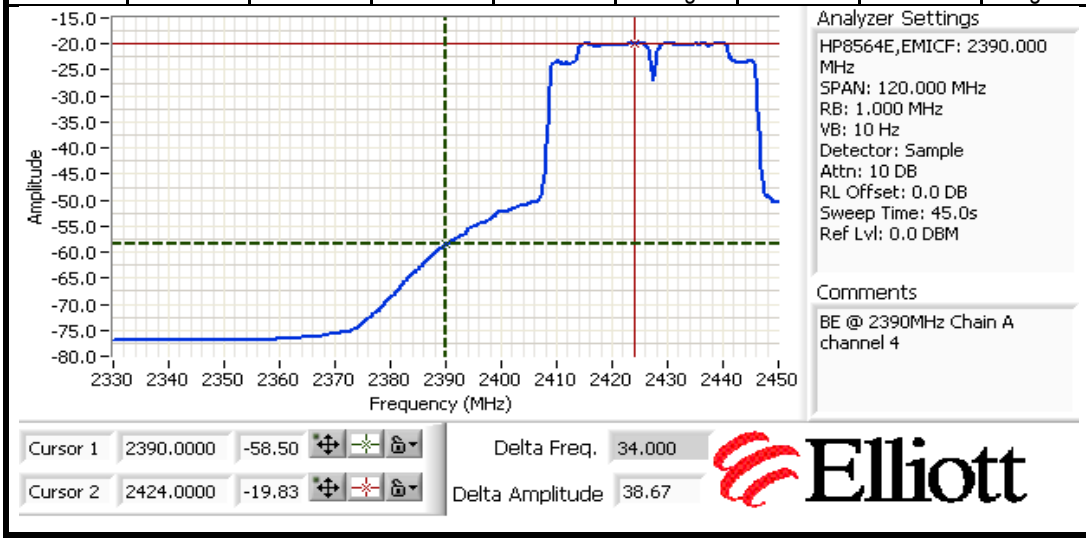
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2424.270	86.7	V			AVG	48	1.0	RB 1 MHz;VB 10 Hz;Pk
2424.470	94.8	V			PK	48	1.0	RB 1 MHz;VB 3 MHz;Pk
2430.400	90.7	H			AVG	7	2.1	RB 1 MHz;VB 10 Hz;Pk
2430.800	98.8	H			PK	7	2.1	RB 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:**	98.8	94.8	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	90.7	86.7	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*36.3 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):	54.4 dBuV/m		

		Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	*35.3 dB*	-2.0	52.0	54	Avg
Delta Marker - 1MHz/10Hz:	**38.7** *dB*	-11.5	62.5	74	Pk
Calculated Band-Edge Measurement (Peak):	63.5 dBuV/m	Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):	52.0 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	52.0	-	54.0	**-2.0**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	13.0	21.0

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	
2448.470	88.7	V	-	-	AVG	172	1.7	RB 1 MHz;VB 10 Hz;Pk
2448.320	97.9	V	-	-	PK	172	1.7	RB 1 MHz;VB 3 MHz;Pk
2445.500	88.9	H	-	-	AVG	360	1.0	RB 1 MHz;VB 10 Hz;Pk
2445.530	98.3	H	-	-	PK	360	1.0	RB 1 MHz;VB 3 MHz;Pk

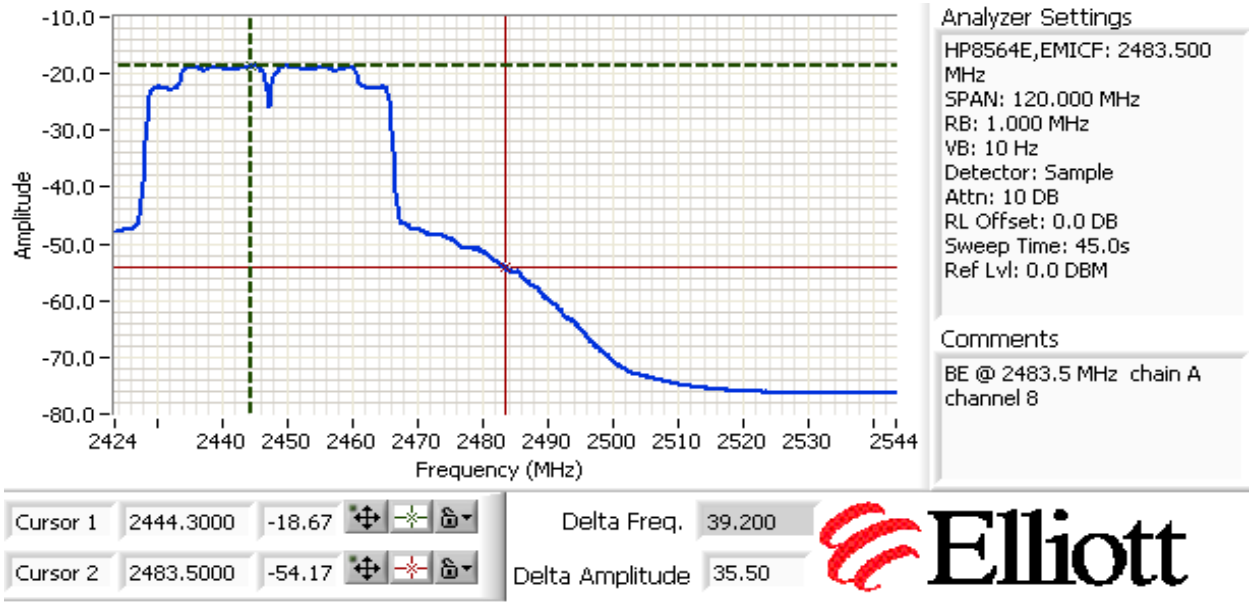
2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in **1MHz RBW:**	98.3	97.9	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	88.9	88.7	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*35.0 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	G458)-F460 dBuV/m		
Calculated Band-Edge Measurement (Avg):	53.9 dBuV/m		

Margin	Level	Limit	Detector
-0.6	53.4	54	Avg
-5.7	68.3	74	Pk

Delta Marker - 1MHz/1MHz:	*30.0 dB*	
Delta Marker - 1MHz/10Hz:	**35.5** *dB*	
Calculated Band-Edge Measurement (Peak):	68.3 dBuV/m	Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	53.4 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	53.4	-	54.0	**-0.6**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Date of Test: 9/2/2010 Test Location: FT Chamber#7

Test Engineer: Joseph Cadigal Config Change: none

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	13.8	21.5

Fundamental Signal Field Strength

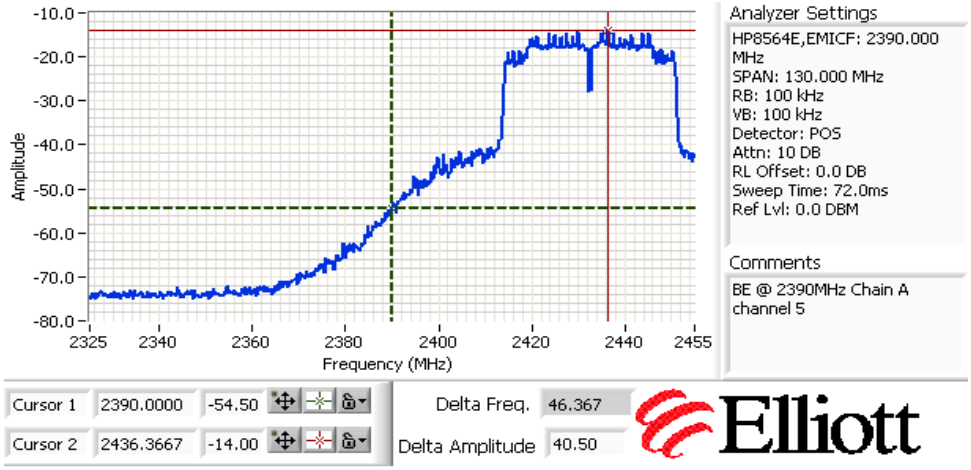
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2429.800	90.9	V	-	-	AVG	350	2.1	RB 1 MHz;VB 10 Hz;Pk
2430.200	99.2	V	-	-	PK	350	2.1	RB 1 MHz;VB 3 MHz;Pk
2435.400	92.1	H	-	-	AVG	6	2.0	RB 1 MHz;VB 10 Hz;Pk
2433.800	100.0	H	-	-	PK	6	2.0	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:**	100.0	99.2	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	92.1	90.9	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	**40.5** *dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	59.5 dBuV/m		
Calculated Band-Edge Measurement (Avg):	51.6 dBuV/m		
Delta Marker - 1MHz/1MHz:	*34.2 dB*		
Delta Marker - 1MHz/10Hz:	*40.0 dB*		
Calculated Band-Edge Measurement (Peak):	65.8 dBuV/m		Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	52.1 dBuV/m		Using 100kHz delta value

Margin	Level	Limit	Detector
-2.4	51.6	54	Avg
-14.5	59.5	74	Pk

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	51.6	-	54.0	**-2.4**	Avg	-	-	Using 100kHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	13.1	20.5

Fundamental Signal Field Strength

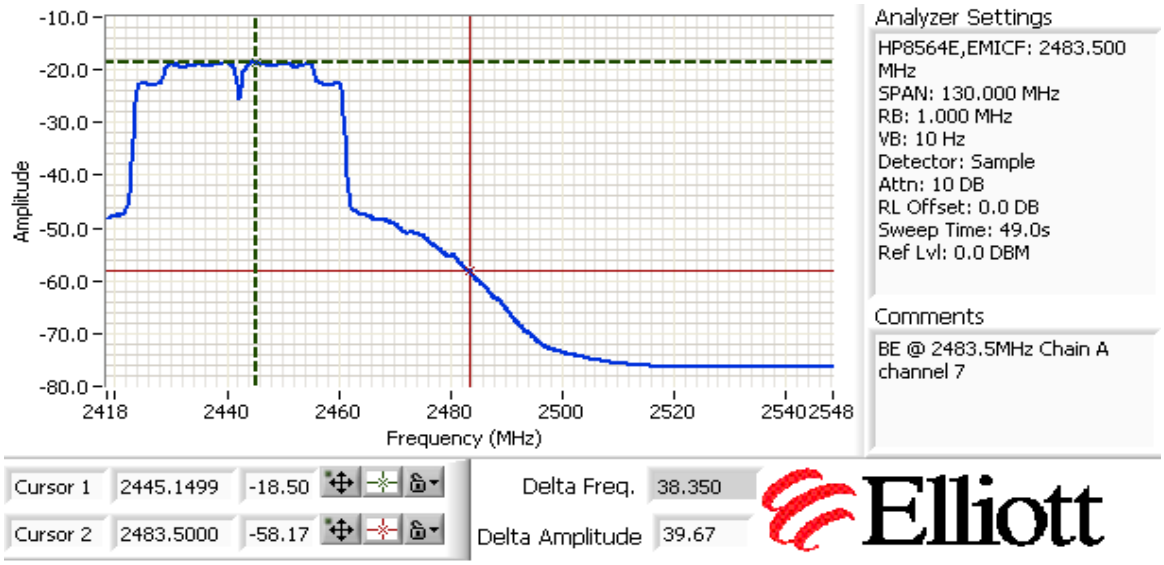
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2454.800	90.1	V	-	-	AVG	350	1.8	RB 1 MHz;VB 10 Hz;Pk
2454.800	98.2	V	-	-	PK	350	1.8	RB 1 MHz;VB 3 MHz;Pk
2443.420	91.0	H	-	-	AVG	10	1.0	RB 1 MHz;VB 10 Hz;Pk
2443.290	99.4	H	-	-	PK	10	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:**	99.4	98.2	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	91.0	90.1	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):	60.6 dBuV/m		
Calculated Band-Edge Measurement (Avg):	52.2 dBuV/m		
Delta Marker - 1MHz/1MHz:	*35.0 dB*		
Delta Marker - 1MHz/10Hz:	**39.7** *dB*		
Calculated Band-Edge Measurement (Peak):	64.4 dBuV/m		Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	51.3 dBuV/m		Using 1MHz delta value

Margin	Level	Limit	Detector
-2.7	51.3	54	Avg
-13.4	60.6	74	Pk

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	51.3	-	54.0	**-2.7**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Date of Test: 9/7/2010 Test Location: FT Chamber#7

Test Engineer: Joseph Cadigal Config Change: none

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	15.4	23.5

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	
2449.600	95.1	H	-	-	AVG	5	1.2	RB 1 MHz;VB 10 Hz;Pk
2446.330	104.1	H	-	-	PK	5	1.2	RB 1 MHz;VB 3 MHz;Pk
2433.870	93.4	V	-	-	AVG	351	1.8	RB 1 MHz;VB 10 Hz;Pk
2429.600	102.1	V	-	-	PK	351	1.8	RB 1 MHz;VB 3 MHz;Pk

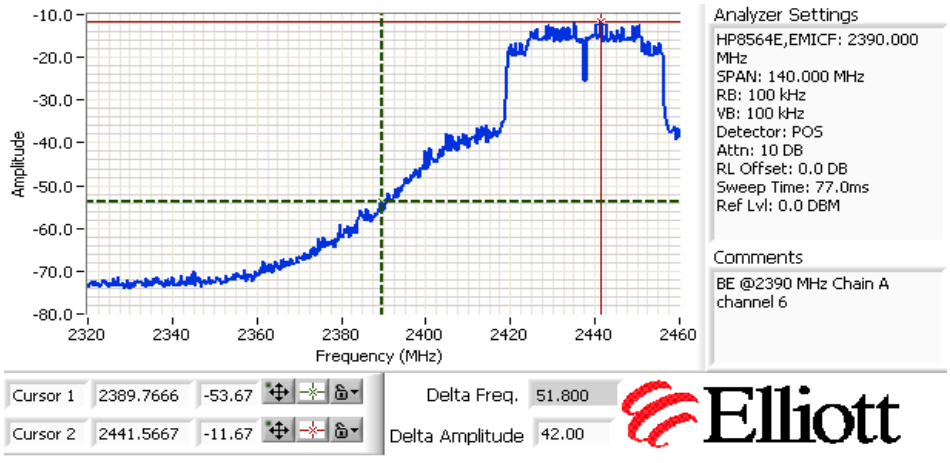
2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in **1MHz RBW:**	104.1	102.1	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	95.1	93.4	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	**42.0** *dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	62.1 dBuV/m		
Calculated Band-Edge Measurement (Avg):	53.1 dBuV/m		

	Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	-0.9	53.1	54	Avg
Delta Marker - 1MHz/10Hz:	-11.9	62.1	74	Pk

Calculated Band-Edge Measurement (Peak):	65.8 dBuV/m	Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	53.4 dBuV/m	Using 100kHz 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	53.1	-	54.0	**-0.9**	Avg	-	-	Using 100kHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	14.5	22.5

Fundamental Signal Field Strength

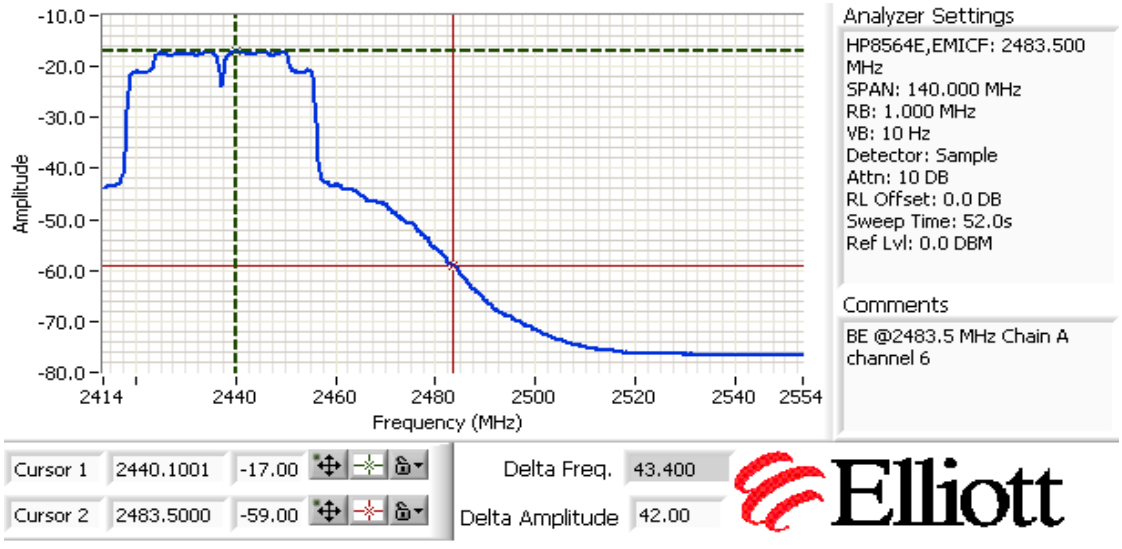
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2434.130	92.1	V	-	-	AVG	351	1.8	RB 1 MHz;VB 10 Hz;Pk
2429.530	100.5	V	-	-	PK	351	1.8	RB 1 MHz;VB 3 MHz;Pk
2433.870	94.3	H	-	-	AVG	5	1.2	RB 1 MHz;VB 10 Hz;Pk
2435.130	102.6	H	-	-	PK	5	1.2	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:**	102.6	100.5	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	94.3	92.1	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*41.3 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	61.3 dBuV/m		
Calculated Band-Edge Measurement (Avg):	53.0 dBuV/m		

		Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	*36.3 dB*	-1.7	52.3	54	Avg
Delta Marker - 1MHz/10Hz:	***42.0*** *dB*	-12.7	61.3	74	Pk
Calculated Band-Edge Measurement (Peak):	66.3 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	
2483.500	52.3	-	54.0	**-1.7**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Date of Test: 9/7/2010 Test Location: FT Chamber#7

Test Engineer: Joseph Cadigal Config Change: none

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	14.1	22.0

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	
2408.830	92.0	V	-	-	AVG	190	1.9	RB 1 MHz;VB 10 Hz;Pk
2408.130	100.0	V	-	-	PK	190	1.9	RB 1 MHz;VB 3 MHz;Pk
2407.770	95.6	H	-	-	AVG	6	1.0	RB 1 MHz;VB 10 Hz;Pk
2408.200	103.6	H	-	-	PK	6	1.0	RB 1 MHz;VB 3 MHz;Pk

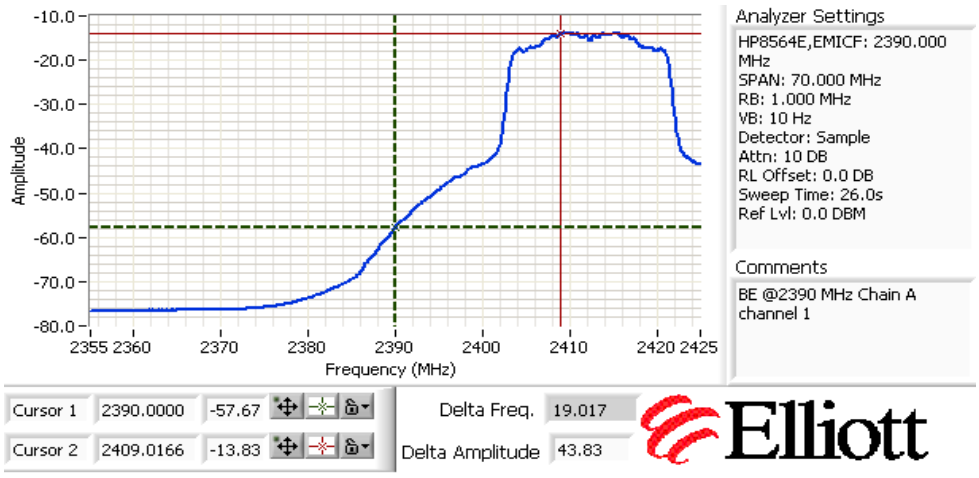
2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in **1MHz RBW:**	103.6	100.0	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	95.6	92.0	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*43.2 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	60.4 dBuV/m		
Calculated Band-Edge Measurement (Avg):	52.4 dBuV/m		

	Margin	Level	Limit	Detector
Delta Marker - 1MHz/1MHz:	-2.2	51.8	54	Avg
Delta Marker - 1MHz/10Hz:	-13.6	60.4	74	Pk

Calculated Band-Edge Measurement (Peak):	68.6 dBuV/m	Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	51.8 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	51.8	-	54.0	**-2.2**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5		21.0

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	
2465.030	95.6	V	-	-	AVG	238	2.2	RB 1 MHz;VB 10 Hz;Pk
2463.930	103.7	V	-	-	PK	238	2.2	RB 1 MHz;VB 3 MHz;Pk
2459.530	97.2	H	-	-	AVG	8	1.2	RB 1 MHz;VB 10 Hz;Pk
2458.270	105.2	H	-	-	PK	8	1.2	RB 1 MHz;VB 3 MHz;Pk

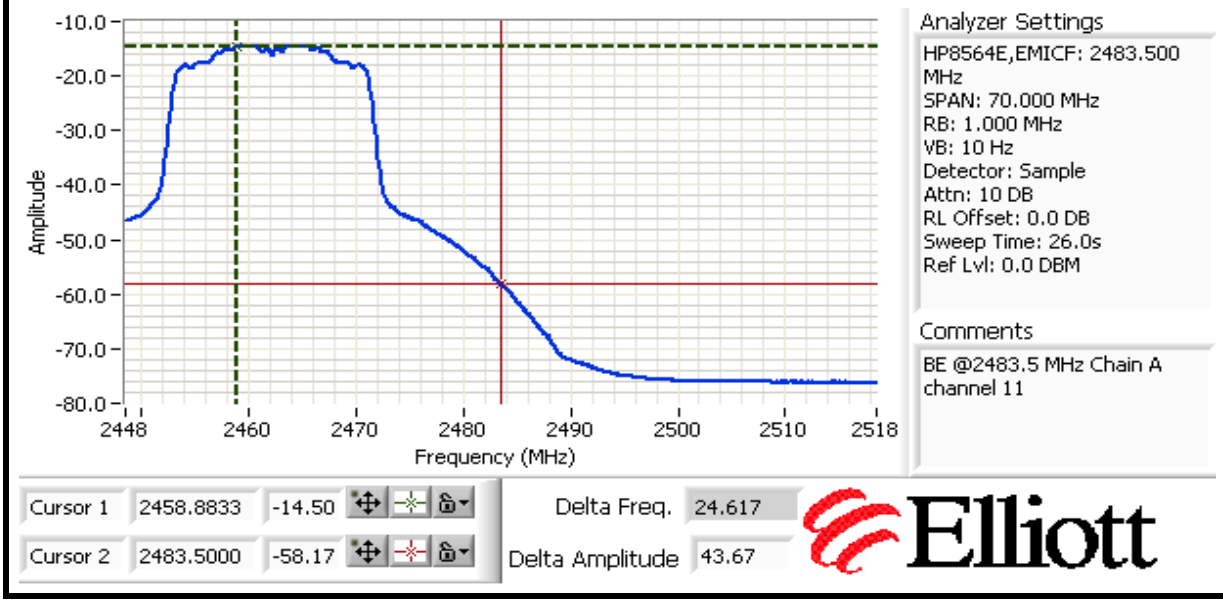
2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in **1MHz RBW:**	105.2	103.7	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	97.2	95.6	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*42.5 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	62.7 dBuV/m		
Calculated Band-Edge Measurement (Avg):	54.7 dBuV/m		

Margin	Level	Limit	Detector
-0.5	53.5	54	Avg
-11.3	62.7	74	Pk

Delta Marker - 1MHz/1MHz:	*34.8 dB*	
Delta Marker - 1MHz/10Hz:	**43.7** *dB*	
Calculated Band-Edge Measurement (Peak):	70.4 dBuV/m	Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	53.5 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	53.5	-	54.0	**-0.5**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Date of Test: 9/7/2010 Test Location: FT Chamber#7

Test Engineer: Joseph Cadigal Config Change: none

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.5	24.5

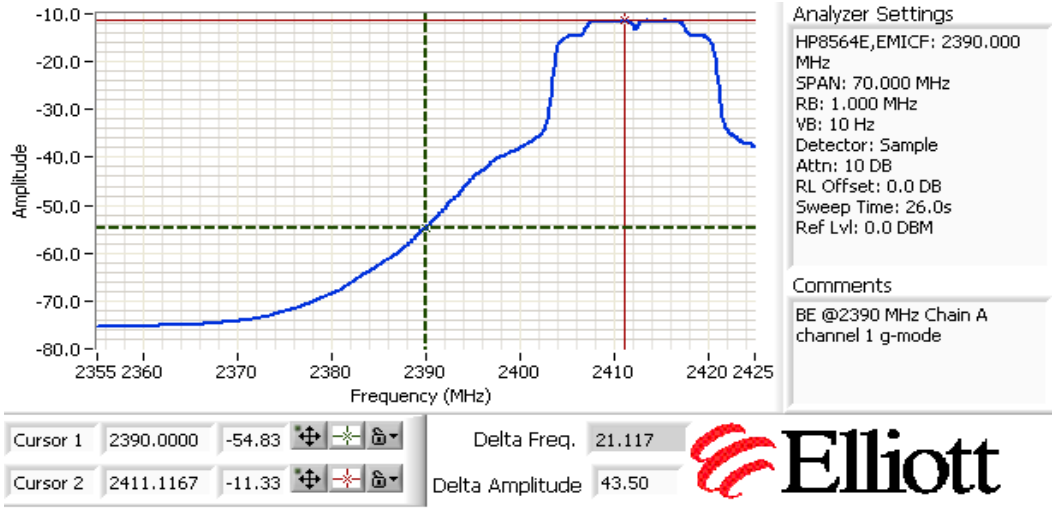
Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2407.530	96.4	V	-	-	AVG	226	2.2	RB 1 MHz;VB 10 Hz;Pk
2408.170	104.8	V	-	-	PK	226	2.2	RB 1 MHz;VB 3 MHz;Pk
2410.500	97.1	H	-	-	AVG	6	1.0	RB 1 MHz;VB 10 Hz;Pk
2410.530	106.0	H	-	-	PK	6	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:**	106.0	104.8	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	97.1	96.4	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*43.0 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	63.0 dBuV/m		
Calculated Band-Edge Measurement (Avg):	54.1 dBuV/m		Margin / Level / Limit / Detector
Delta Marker - 1MHz/1MHz:	*35.3 dB*		-0.4 / 53.6 / 54 / Avg
Delta Marker - 1MHz/10Hz:	**43.5** *dB*		-11.0 / 63.0 / 74 / Pk
Calculated Band-Edge Measurement (Peak):	70.7 dBuV/m		Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	53.6 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	53.6	-	54.0	**-0.4**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	14.1	22.0

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	
2460.130	97.0	V	-	-	AVG	238	2.2	RB 1 MHz;VB 10 Hz;Pk
2465.430	105.1	V	-	-	PK	238	2.2	RB 1 MHz;VB 3 MHz;Pk
2460.230	97.1	H	-	-	AVG	9	1.2	RB 1 MHz;VB 10 Hz;Pk
2464.330	105.1	H	-	-	PK	9	1.2	RB 1 MHz;VB 3 MHz;Pk

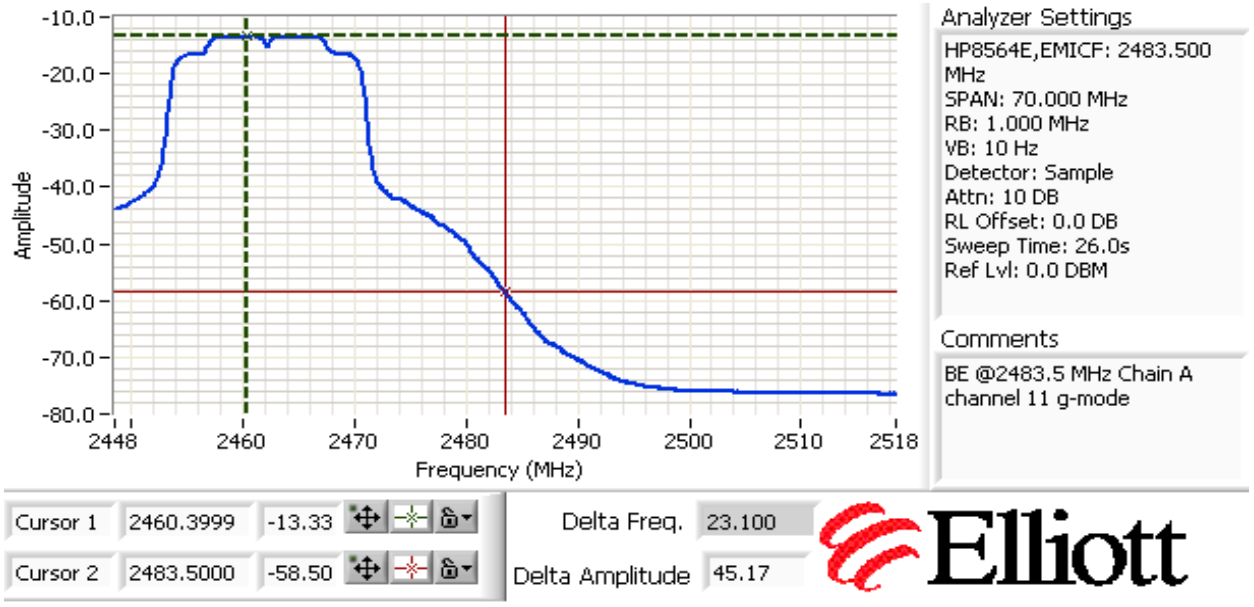
2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in **1MHz RBW:**	105.1	105.1	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	97.1	97.0	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*44.0 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	61.1 dBuV/m		
Calculated Band-Edge Measurement (Avg):	53.1 dBuV/m		

Margin	Level	Limit	Detector
-2.1	51.9	54	Avg
-12.9	61.1	74	Pk

Delta Marker - 1MHz/1MHz:	*34.8 dB*	
Delta Marker - 1MHz/10Hz:	**45.2** *dB*	
Calculated Band-Edge Measurement (Peak):	70.3 dBuV/m	Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	51.9 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	
2483.500	51.9	-	54.0	**-2.1**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Date of Test: 9/7/2010 Test Location: FT Chamber#7

Test Engineer: Joseph Cadigal Config Change: none

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.6	19.5

Fundamental Signal Field Strength

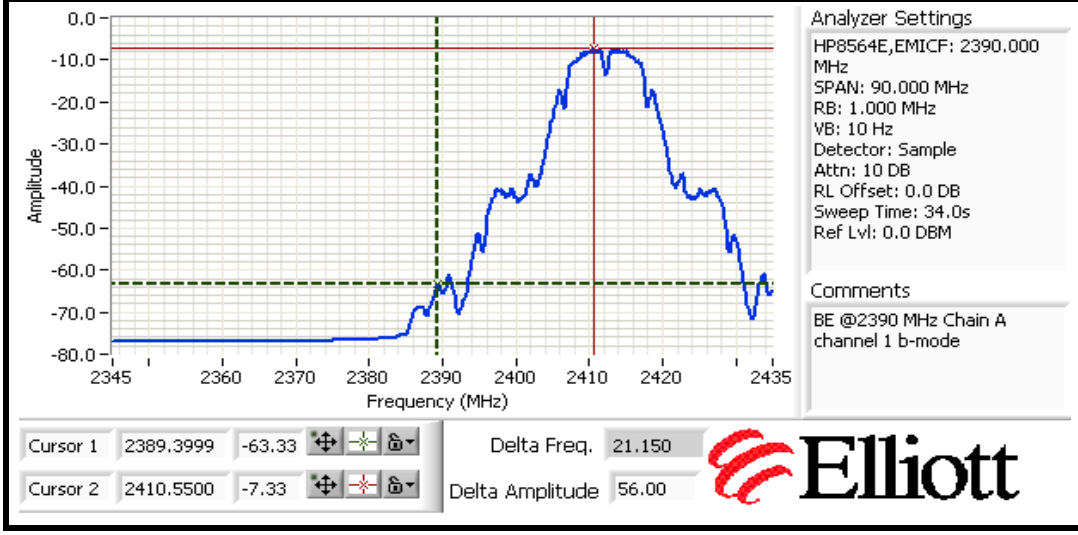
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2410.330	100.4	V	-	-	AVG	225	2.2	RB 1 MHz;VB 10 Hz;Pk
2411.200	103.4	V	-	-	PK	225	2.2	RB 1 MHz;VB 3 MHz;Pk
2410.300	101.9	H	-	-	AVG	25	2.0	RB 1 MHz;VB 10 Hz;Pk
2410.570	105.1	H	-	-	PK	25	2.0	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:**	105.1	103.4	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	101.9	100.4	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*55.5 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	49.6 dBuV/m		
Calculated Band-Edge Measurement (Avg):	46.4 dBuV/m		
Delta Marker - 1MHz/1MHz:	*48.5 dB*		
Delta Marker - 1MHz/10Hz:	**56.0** *dB*		
Calculated Band-Edge Measurement (Peak):	56.6 dBuV/m		Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	45.9 dBuV/m		Using 1MHz delta value

Margin	Level	Limit	Detector
-8.1	45.9	54	Avg
-24.4	49.6	74	Pk

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	45.9	-	54.0	**-8.1**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.6	19.5

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	
2460.370	101.8	V	-	-	AVG	238	2.1	RB 1 MHz;VB 10 Hz;Pk
2461.200	105.0	V	-	-	PK	238	2.1	RB 1 MHz;VB 3 MHz;Pk
2460.370	102.7	H	-	-	AVG	9	1.2	RB 1 MHz;VB 10 Hz;Pk
2460.700	106.0	H	-	-	PK	9	1.2	RB 1 MHz;VB 3 MHz;Pk

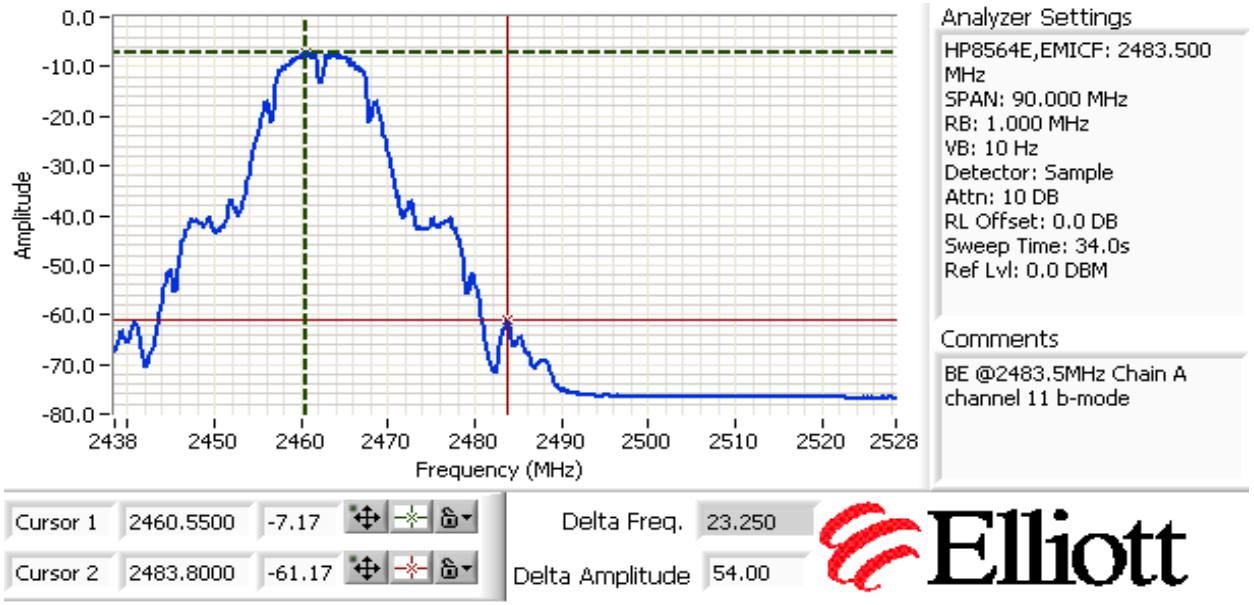
2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in **1MHz RBW:**	106.0	105.0	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in **1MHz RBW:**	102.7	101.8	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	*54.0 dB*		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	52.0 dBuV/m		
Calculated Band-Edge Measurement (Avg):	48.7 dBuV/m		

Margin	Level	Limit	Detector
-5.3	48.7	54	Avg
-22.0	52.0	74	Pk

Delta Marker - 1MHz/1MHz:	*47.5 dB*	
Delta Marker - 1MHz/10Hz:	*54.0 dB*	
Calculated Band-Edge Measurement (Peak):	58.5 dBuV/m	Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	48.7 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	48.7	-	54.0	**-5.3**	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Summary of Results

MAC Address: 00150079C6BF DRTU Tool Version 1.2.2-0177 Driver version 14.0.0.39

Run #	Mode	Channel		Measured Power	Test Performed	Limit	Result / Margin
Run #1	802.11b Chain A	#1 2412MHz		16.8	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	45.2dBµV/m @ 4824.0MHz (-8.8dB)
		#6 2437MHz		16.7			48.6dBµV/m @ 4874.0MHz (-5.4dB)
		#11 2462MHz		16.8			**50.3dBµV/m @ 4924.0MHz (-3.7dB)**
Scans on center channel in all three OFDM modes to determine the worst case							
Run # 2	802.11g Chain A	#6 2437MHz		16.6	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	43.2dBµV/m @ 7500.1MHz (-10.8dB)
	802.11n20 Chain A	#6 2437MHz		16.5			43.0dBµV/m @ 7500.0MHz (-11.0dB)
	802.11n40 Chain A	#6 2437MHz		16.5			43.2dBµV/m @ 7500.0MHz (-10.8dB)
Top and bottom channels in worst case OFDM mode:							
Run # 3	802.11g Chain A	#1 2412MHz		16.6	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	44.1dBµV/m @ 7500.1MHz (-9.9dB)
		#11 2462MHz		16.7			42.7dBµV/m @ 7500.0MHz (-11.3dB)
Receiver Spurious Emissions							
Run # 4	Receive	#6, Chain A	-	-	Radiated Emissions, 1 - 7.5 GHz	RSS 210	43.5dBµV/m @ 7500.1MHz (-10.5dB)

Note - the measured powers are the 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 ws 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:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	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.

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

Date of Test: 9/13/2010 Test Location: FT Chamber #7

Test Engineer: Rafael Varelas Config Change: none

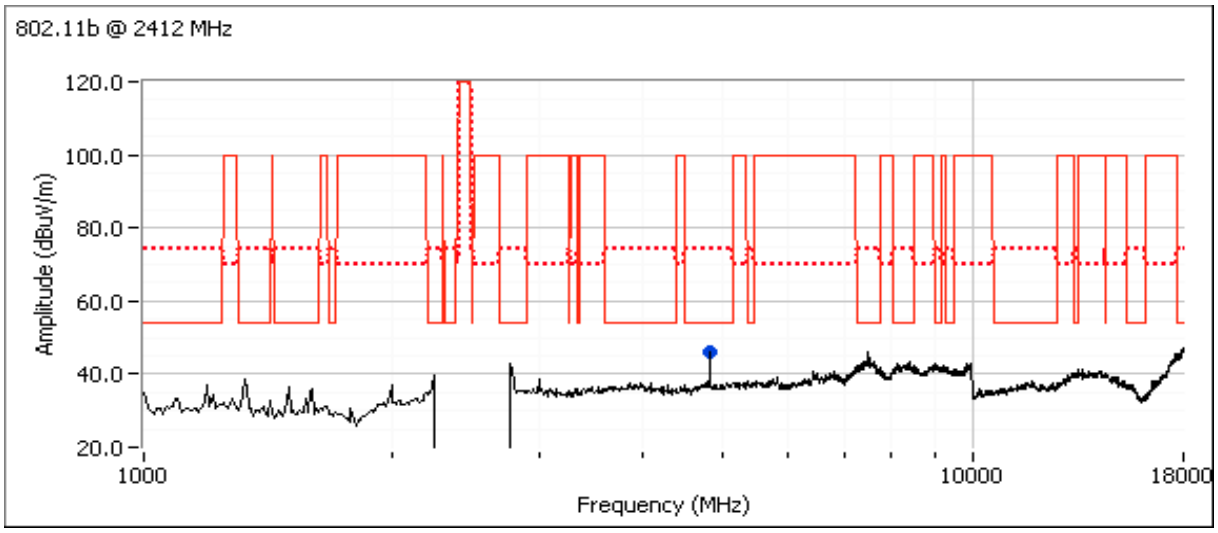
Run #1a, EUT on Channel #1 2412MHz - 802.11b, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.8	20.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.990	45.2	V	54.0	-8.8	AVG	349	1.0	RB 1 MHz;VB 10 Hz;Pk
4823.990	49.6	V	74.0	-24.4	PK	349	1.0	RB 1 MHz;VB 3 MHz;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:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

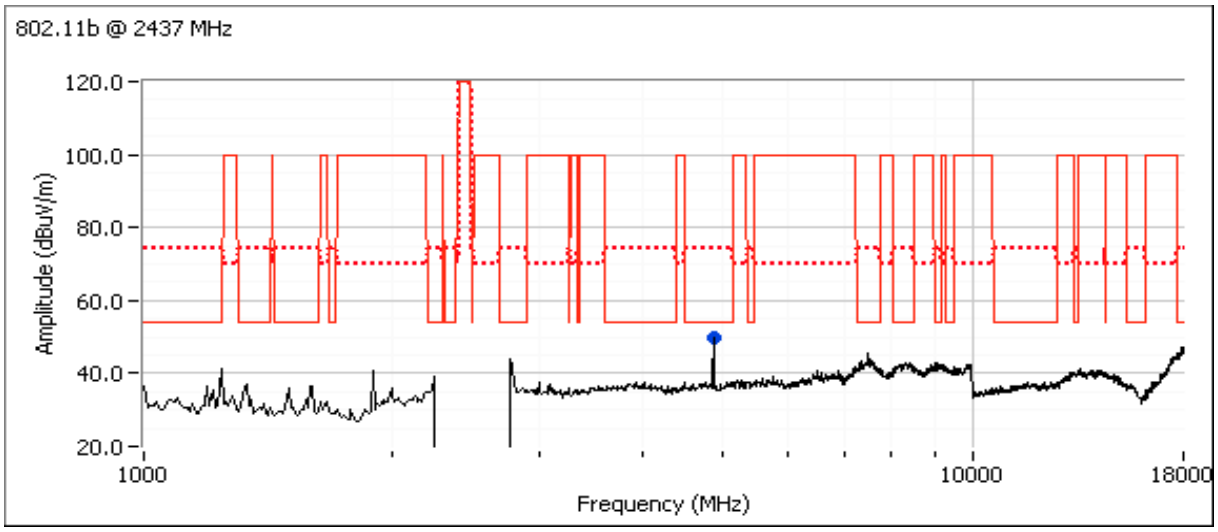
Run #1b: , EUT on Channel #6 2437MHz - 802.11b, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.7	20.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.990	48.6	V	54.0	-5.4	AVG	154	1.0	RB 1 MHz;VB 10 Hz;Pk
4874.020	51.8	V	74.0	-22.2	PK	154	1.0	RB 1 MHz;VB 3 MHz;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 signifcant emissions in this frequency range



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

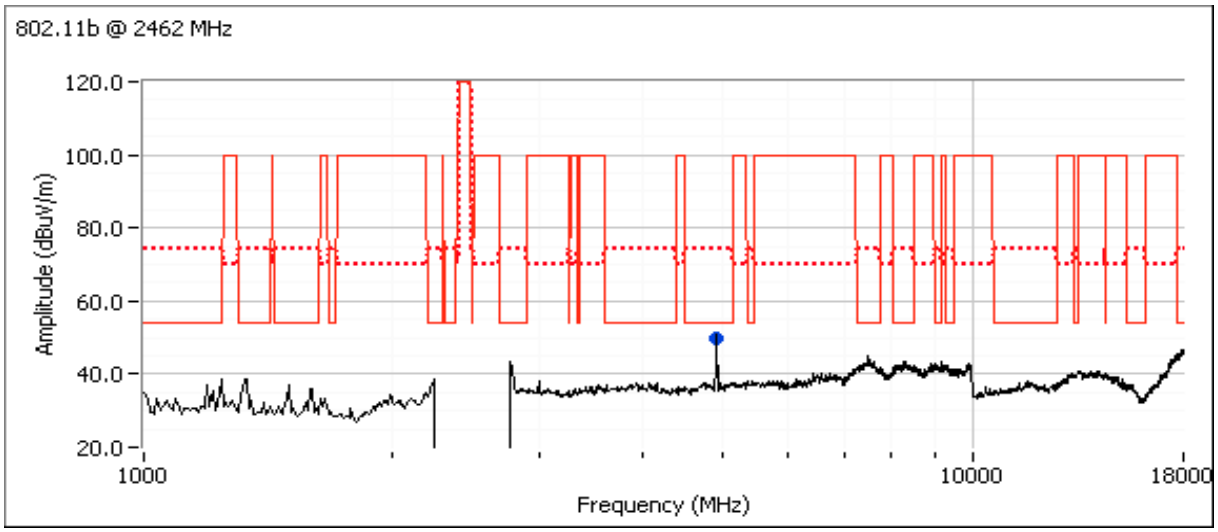
Run #1c: , EUT on Channel #11 2462MHz - 802.11b, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.8	20.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.980	50.3	V	54.0	-3.7	AVG	150	1.8	RB 1 MHz;VB 10 Hz;Pk
4924.080	52.8	V	74.0	-21.2	PK	150	1.8	RB 1 MHz;VB 3 MHz;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:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Date of Test: 9/13/2010 Test Location: FT Chamber #7

Test Engineer: Rafael Varelas Config Change: none

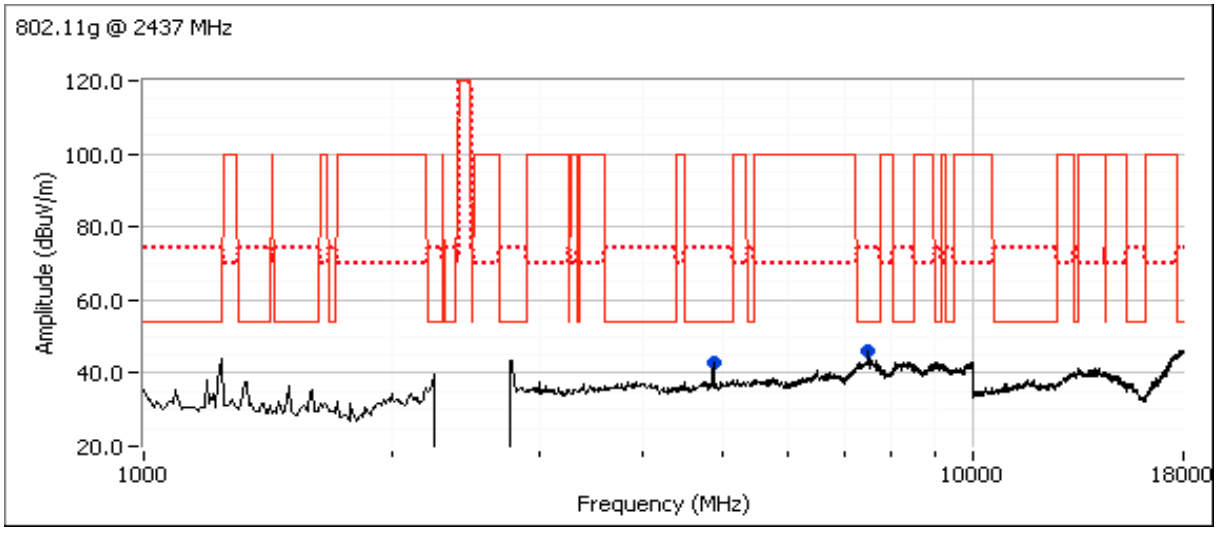
Run # 2a, EUT on Channel #6 2437MHz - 802.11g Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.6	25.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.090	43.2	V	54.0	-10.8	AVG	260	1.1	RB 1 MHz;VB 10 Hz;Pk
7500.370	51.0	V	74.0	-23.0	PK	260	1.1	RB 1 MHz;VB 3 MHz;Pk
4876.010	37.6	V	54.0	-16.4	AVG	240	1.0	RB 1 MHz;VB 10 Hz;Pk
4876.230	51.3	V	74.0	-22.7	PK	240	1.0	RB 1 MHz;VB 3 MHz;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 signifcant emissions in this frequency range



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

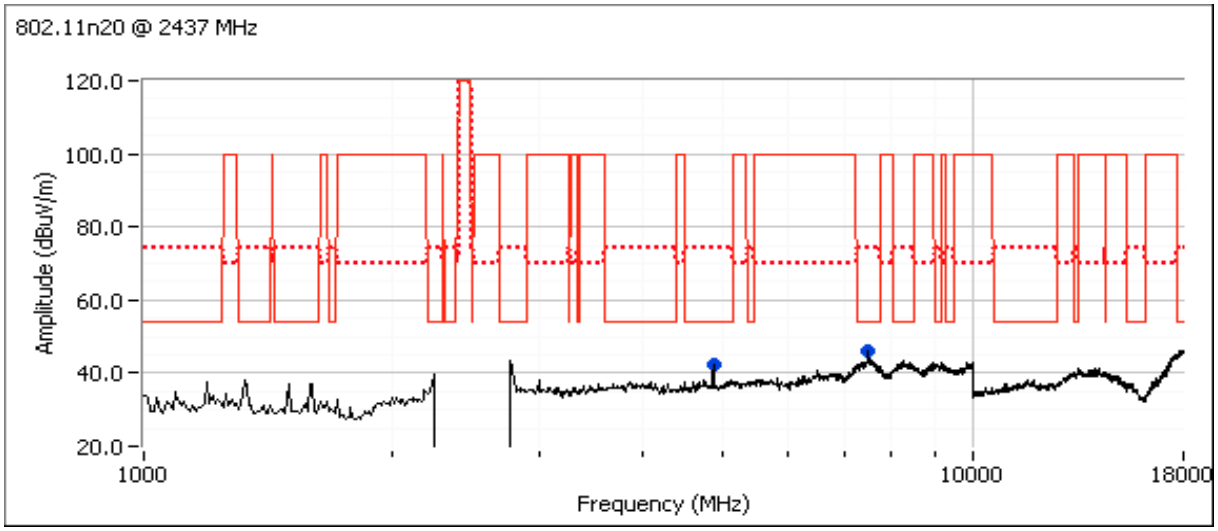
Run # 2b: , EUT on Channel #6 2437MHz - 802.11n20, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.5	25.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7499.950	43.0	V	54.0	-11.0	AVG	86	1.1	RB 1 MHz;VB 10 Hz;Pk
7500.210	50.6	V	74.0	-23.4	PK	86	1.1	RB 1 MHz;VB 3 MHz;Pk
4874.000	38.2	V	54.0	-15.8	AVG	152	1.0	RB 1 MHz;VB 10 Hz;Pk
4873.200	52.0	V	74.0	-22.0	PK	152	1.0	RB 1 MHz;VB 3 MHz;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:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

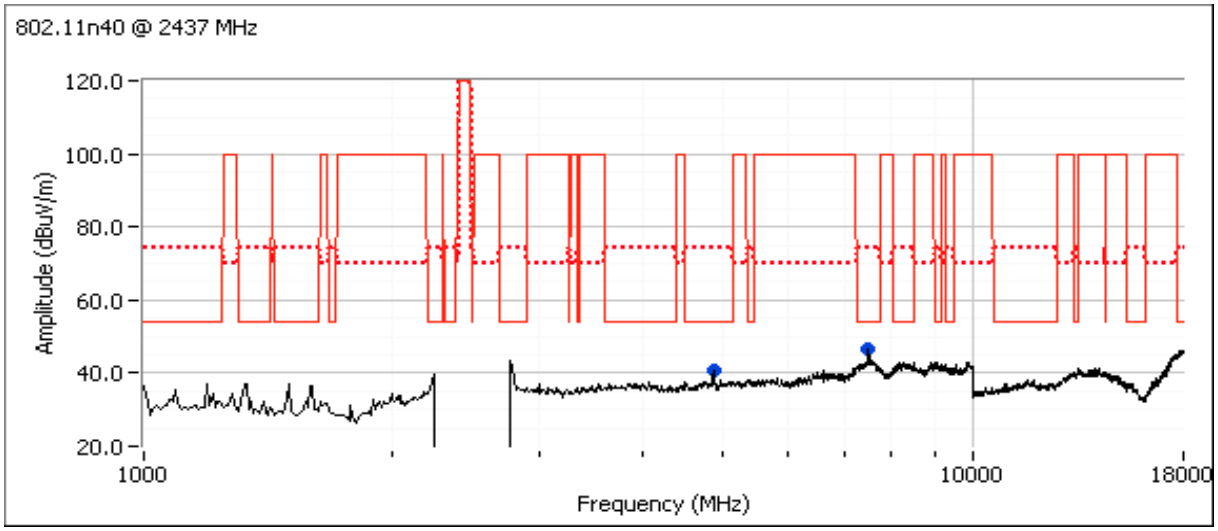
Run # 2c: , EUT on Channel #6 2437MHz - 802.11n40, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.5	25.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7499.990	43.2	V	54.0	-10.8	AVG	85	1.1	RB 1 MHz;VB 10 Hz;Pk
7500.170	50.5	V	74.0	-23.5	PK	85	1.1	RB 1 MHz;VB 3 MHz;Pk
4874.030	36.3	V	54.0	-17.7	AVG	153	1.0	RB 1 MHz;VB 10 Hz;Pk
4873.840	47.6	V	74.0	-26.4	PK	153	1.0	RB 1 MHz;VB 3 MHz;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:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Date of Test: 9/13/2010 Test Location: FT Chamber #7

Test Engineer: Rafael Varelas Config Change: none

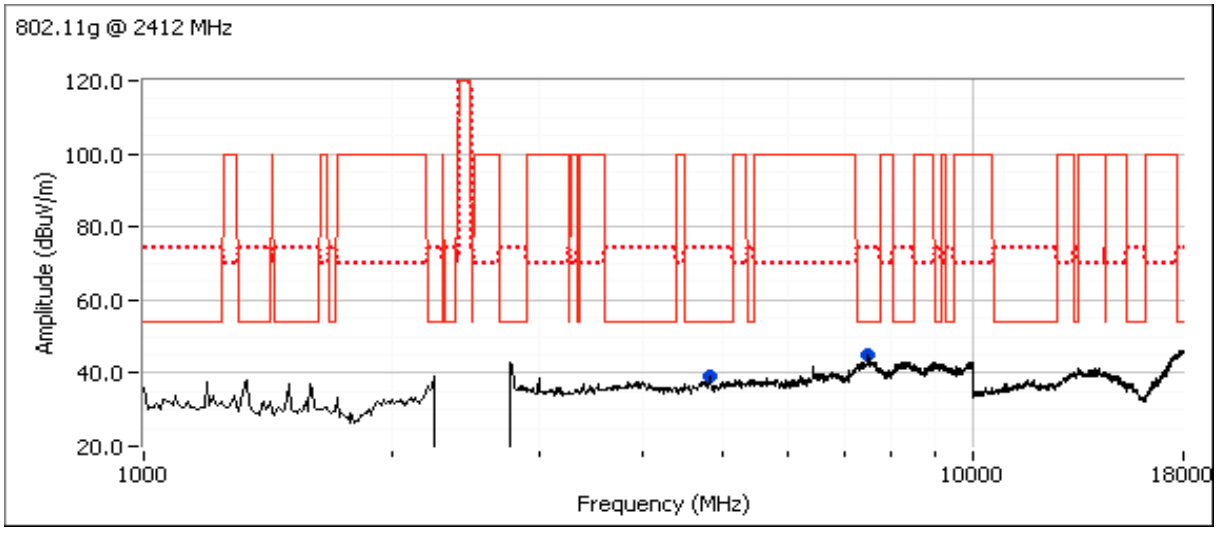
Run # 3a, EUT on Channel #1 2412MHz - 802.11g, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.6	25.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.100	44.1	V	54.0	-9.9	AVG	125	1.1	RB 1 MHz;VB 10 Hz;Pk
7499.970	51.0	V	74.0	-23.0	PK	125	1.1	RB 1 MHz;VB 3 MHz;Pk
4824.090	35.2	V	54.0	-18.8	AVG	155	1.0	RB 1 MHz;VB 10 Hz;Pk
4826.410	48.6	V	74.0	-25.4	PK	155	1.0	RB 1 MHz;VB 3 MHz;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:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

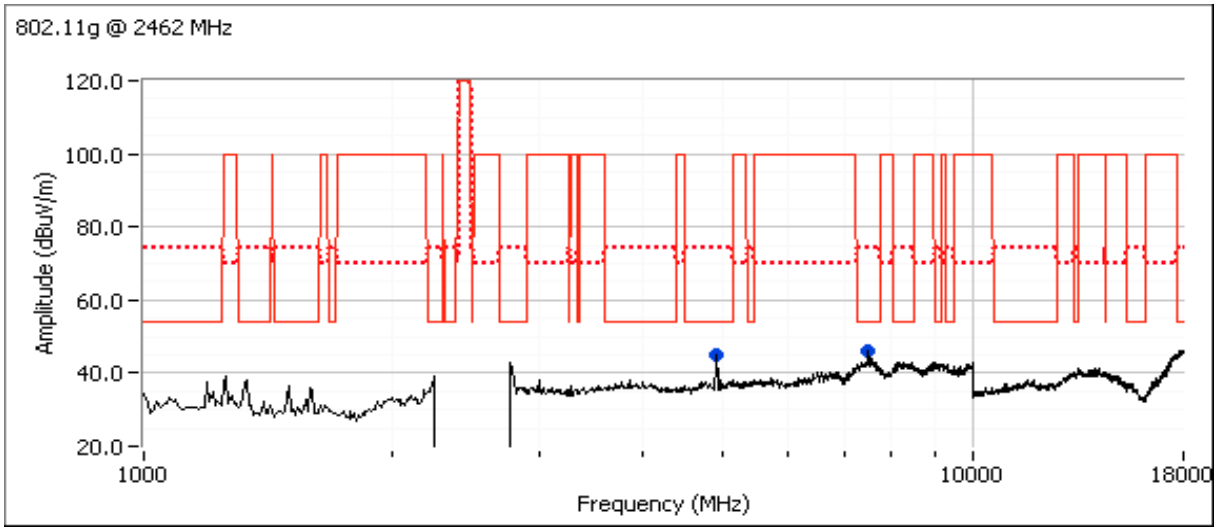
Run # 3b: , EUT on Channel #11 2462MHz - 802.11g, Chain A

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.7	25.0

Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.040	42.7	V	54.0	-11.3	AVG	85	1.0	RB 1 MHz;VB 10 Hz;Pk
7500.310	50.8	V	74.0	-23.2	PK	85	1.0	RB 1 MHz;VB 3 MHz;Pk
4923.980	40.5	V	54.0	-13.5	AVG	150	1.8	RB 1 MHz;VB 10 Hz;Pk
4926.060	52.9	V	74.0	-21.1	PK	150	1.8	RB 1 MHz;VB 3 MHz;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:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

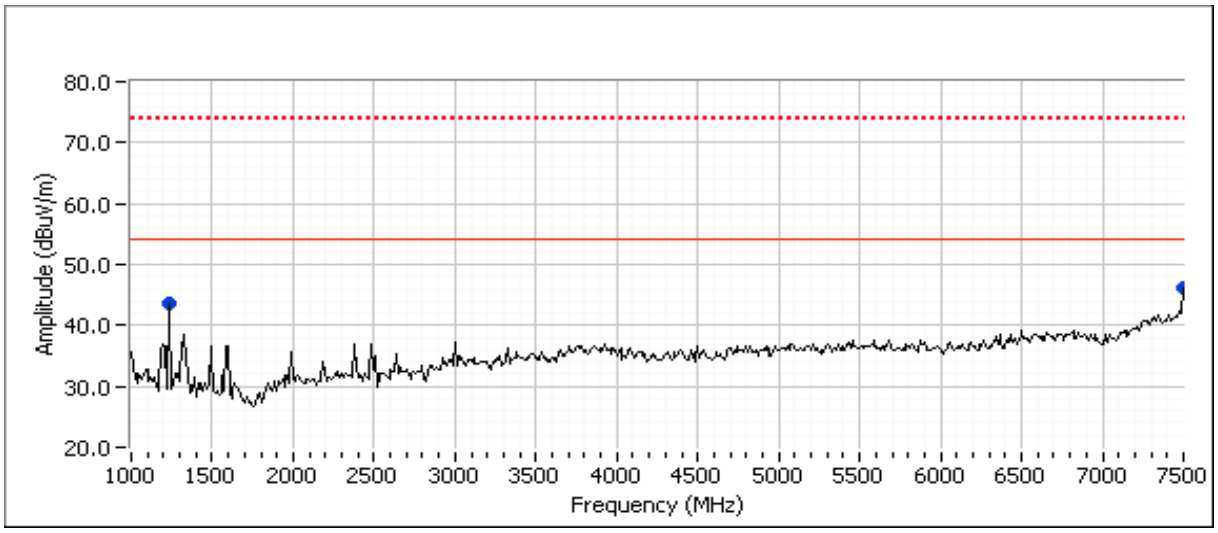
Run # 4, Radiated Spurious Emissions, 1-26GHz, Receive, Chain A

Date of Test: 9/13/2010 Test Location: FT Chamber #7

Test Engineer: Rafael Varelas Config Change: none

Run # 4a, EUT on Channel #6 2437MHz - Receive, Chain A

Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.080	43.5	V	54.0	-10.5	AVG	125	1.1	RB 1 MHz;VB 10 Hz;Pk
7500.200	50.2	V	74.0	-23.8	PK	125	1.1	RB 1 MHz;VB 3 MHz;Pk
1198.270	28.5	V	54.0	-25.5	AVG	152	1.0	RB 1 MHz;VB 10 Hz;Pk
1196.490	41.5	V	74.0	-32.5	PK	152	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

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

Summary of Results

MAC Address: 00150079C6BF DRTU Tool Version 1.2.2-0177 Driver version 14.0.0.39

Run #	Mode	Channel		Measured Power	Test Performed	Limit	Result / Margin
Receiver Spurious Emissions							
Run # 4	Receive Chain A,B, A+B	#6, Chain A	-	-	Radiated Emissions, 1 - 7.5 GHz	RSS 210	43.5dBµV/m @ 7500.1MHz (-10.5dB)
		#6, Chain B	-	-			42.8dBµV/m @ 7500.1MHz (-11.2dB)
		#6, Chain A+B	-	-			42.0dBµV/m @ 7500.0MHz (-12.0dB)

Note - the measured powers are the 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 ws 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.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

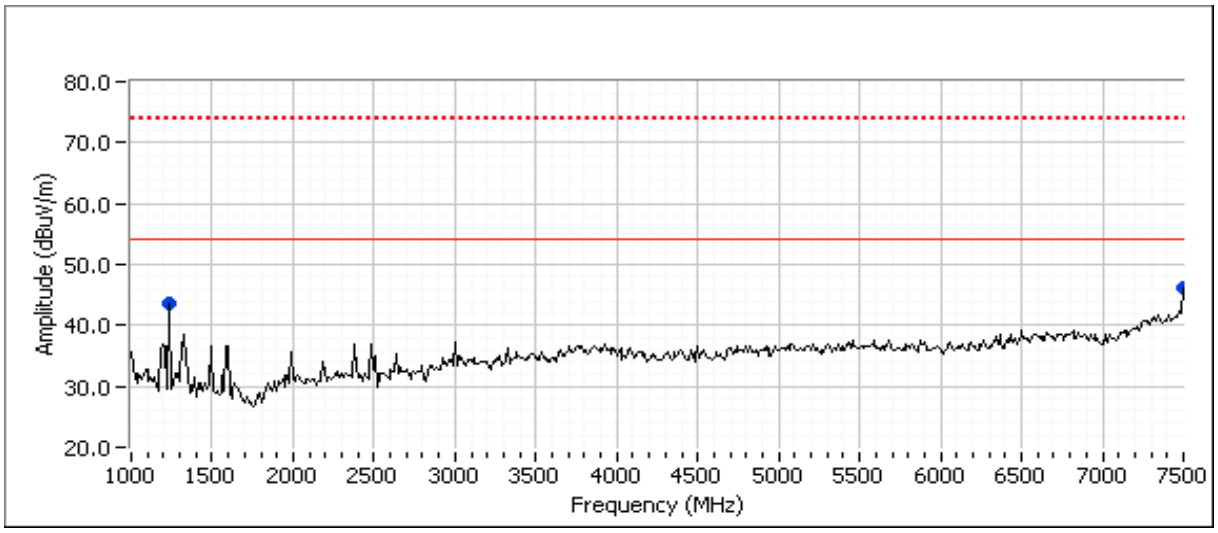
Run # 4, Radiated Spurious Emissions, 1-26GHz, Receive, Chain A,B, A+B

Date of Test: 9/13/2010 Test Location: FT Chamber #7

Test Engineer: Rafael Varelas Config Change: none

Run # 4a, EUT on Channel #6 2437MHz - Receive, Chain A

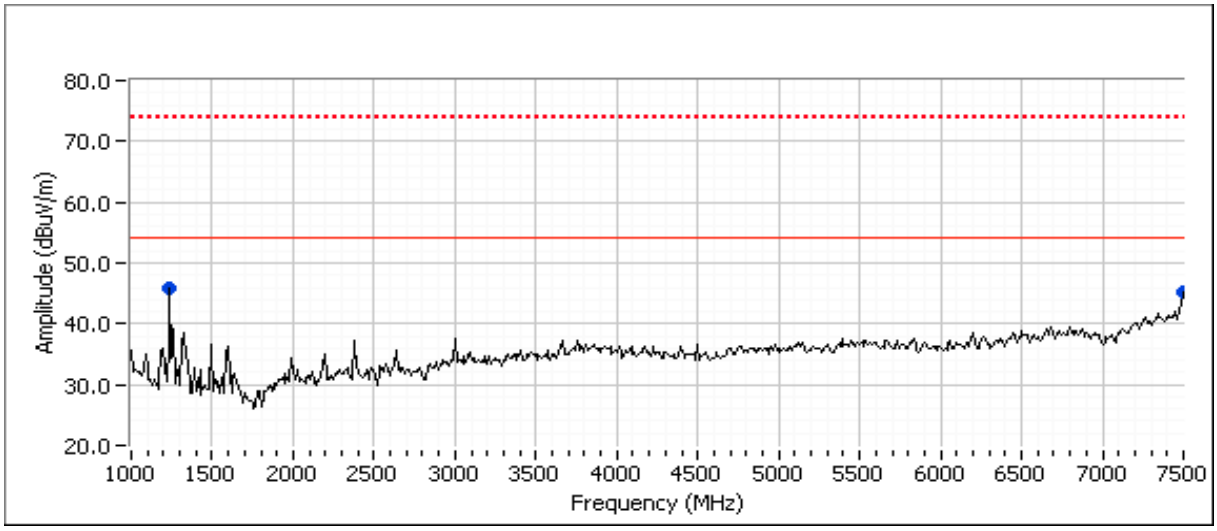
Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.080	43.5	V	54.0	-10.5	AVG	125	1.1	RB 1 MHz;VB 10 Hz;Pk
7500.200	50.2	V	74.0	-23.8	PK	125	1.1	RB 1 MHz;VB 3 MHz;Pk
1198.270	28.5	V	54.0	-25.5	AVG	152	1.0	RB 1 MHz;VB 10 Hz;Pk
1196.490	41.5	V	74.0	-32.5	PK	152	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 4b: EUT on Channel #6 2437MHz - Receive, Chain B

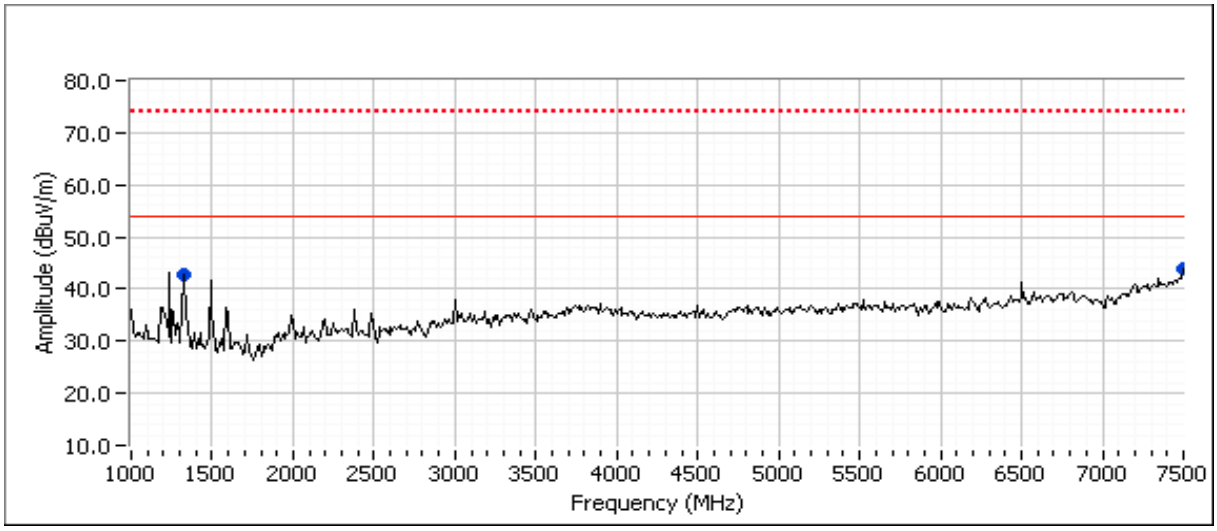
Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.050	42.8	V	54.0	-11.2	AVG	259	1.1	RB 1 MHz;VB 10 Hz;Pk
7500.120	50.0	V	74.0	-24.0	PK	259	1.1	RB 1 MHz;VB 3 MHz;Pk
1212.290	27.4	H	54.0	-26.6	AVG	38	1.0	RB 1 MHz;VB 10 Hz;Pk
1212.490	36.8	H	74.0	-37.2	PK	38	1.0	RB 1 MHz;VB 3 MHz;Pk



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 4c: EUT on Channel #6 2437MHz - Receive, Chain A+B

Frequency	Level	Pol	RSS 210		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.010	42.0	V	54.0	-12.0	AVG	84	1.2	RB 1 MHz;VB 10 Hz;Pk
7499.920	49.9	V	74.0	-24.1	PK	84	1.2	RB 1 MHz;VB 3 MHz;Pk
1328.540	37.3	V	54.0	-16.7	AVG	269	1.1	RB 1 MHz;VB 10 Hz;Pk
1334.290	48.6	V	74.0	-25.4	PK	269	1.1	RB 1 MHz;VB 3 MHz;Pk



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	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: 9/14/2010
Test Engineer: Rafael Varelas
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: 20.8 °C
Rel. Humidity: 38 %

Summary of Results

MAC Address: 00150079C6BF DRTU Tool Version 1.2.2-0177 Driver version 14.0.0.39

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	20	16.8	Output Power	15.247(b)	Pass	802.11b (0.063 W) 802.11g (0.118 W) n20 (0.123 W) n40 (0.035 W)
2	25.5	16.7	Power spectral Density (PSD)	15.247(d)	Pass	-5.3 dBm/3kHz
3	20	16.8	Minimum 6dB Bandwidth	15.247(a)	Pass	10.2 MHz
3	23	14.7	99% Bandwidth	RSS GEN	-	802.11b 13.6 MHz 802.11g 18.4 MHz n20 19.7 MHz n40 36.6 MHz
4	-	-	Spurious emissions	15.247(b)	Pass	Complies with -20dBc limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Deviations From The Standard

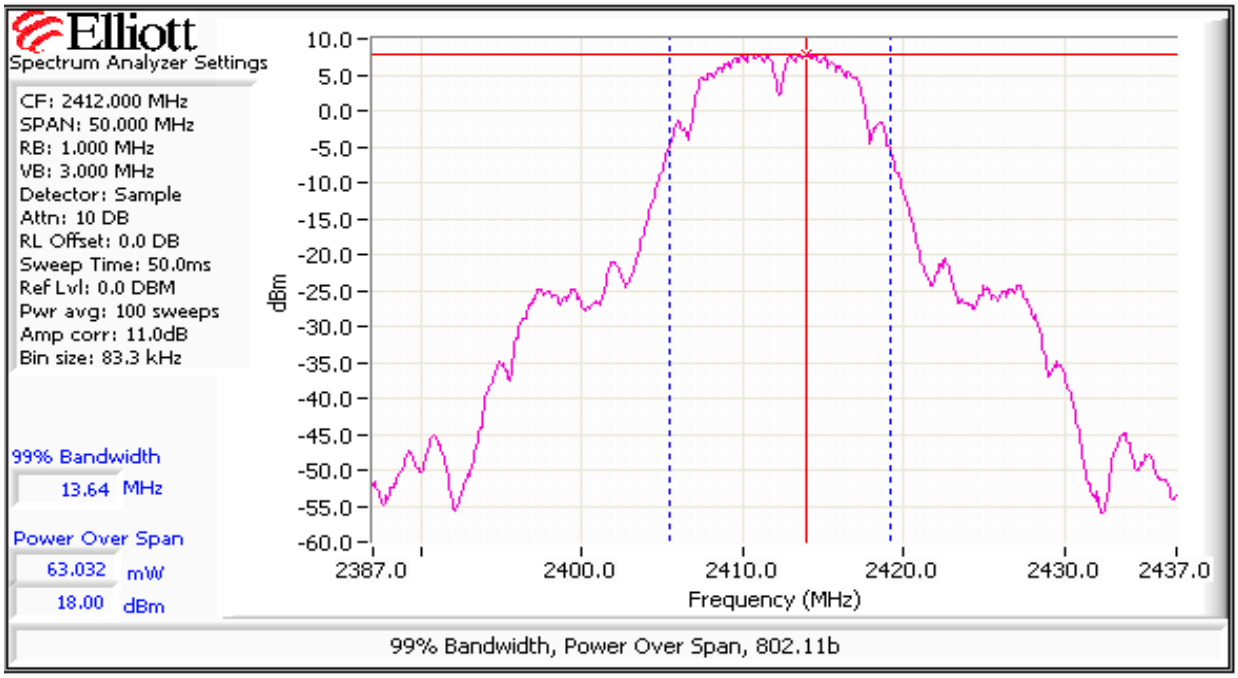
No deviations were made from the requirements of the standard.

Run #1: Output Power

802.11b

Power Setting[2]	Frequency (MHz)	Output Power (dBm)[1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP[Note 2] dBm	EIRP[Note 2] W	Output Power (dBm)[3]	Output Power mW
20	2412	18.0	63.1	3.2	Pass	21.2	0.132	16.8	47.9
20	2437	18.0	63.1	3.2	Pass	21.2	0.132	16.8	47.9
20	2462	17.5	56.2	3.2	Pass	20.7	0.117	16.8	47.9

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 **40 MHz** (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:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

802.11g

Power Setting[2]	Frequency (MHz)	Output Power (dBm)[1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP[Note 2] dBm	EIRP[Note 2] W	Output Power (dBm)[3]	Output Power mW
25	2412	20.6	114.8	3.2	Pass	23.8	0.240	16.7	46.8
25	2437	20.7	117.5	3.2	Pass	23.9	0.245	16.7	46.8
22	2462	19.1	81.3	3.2	Pass	22.3	0.170	14.1	25.7

Note 1:	Output power measured using a peak power meter, spurious limit is **-20dBc**.
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.

n20

Power Setting[2]	Frequency (MHz)	Output Power (dBm)[1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP[Note 2] dBm	EIRP[Note 2] W	Output Power (dBm)[3]	Output Power mW
22.5	2412	19.2	83.2	3.2	Pass	22.4	0.174	14.2	26.3
25.5	2437	20.9	123.0	3.2	Pass	24.1	0.257	16.7	46.8
22	2462	19.1	81.3	3.2	Pass	22.3	0.170	13.8	24.0

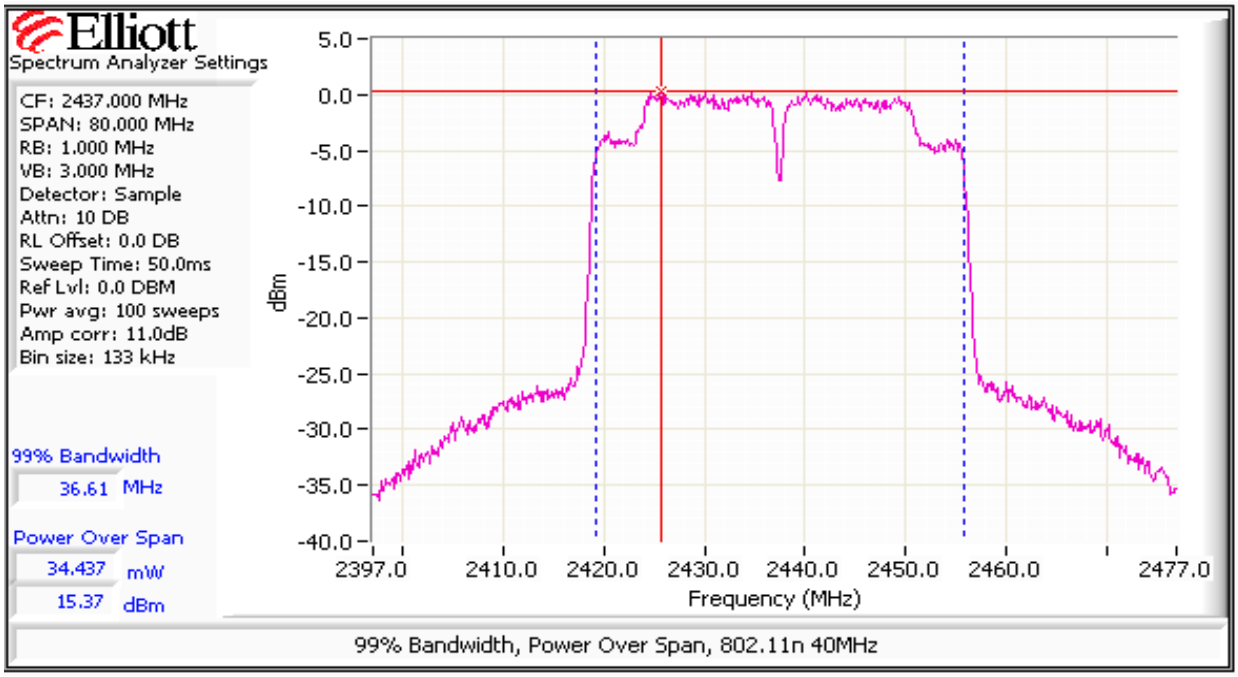
Note 1:	Output power measured using a peak power meter, spurious limit is **-20dBc**.
Note 2:	Power setting - the software power setting used during testing, included for reference only.
Note 3:	Power measured using average power meter and is included for reference only.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

n40

Power Setting[2]	Frequency (MHz)	Output Power (dBm)[1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP[Note 2] dBm	EIRP[Note 2] W	Output Power (dBm)[3]	Output Power mW
20	2422	13.0	20.0	3.2	Pass	16.2	0.042	12.2	16.6
23	2437	15.4	34.7	3.2	Pass	18.6	0.072	14.7	29.5
20	2452	12.7	18.6	3.2	Pass	15.9	0.039	12.3	17.0

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 **80 MHz** (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.

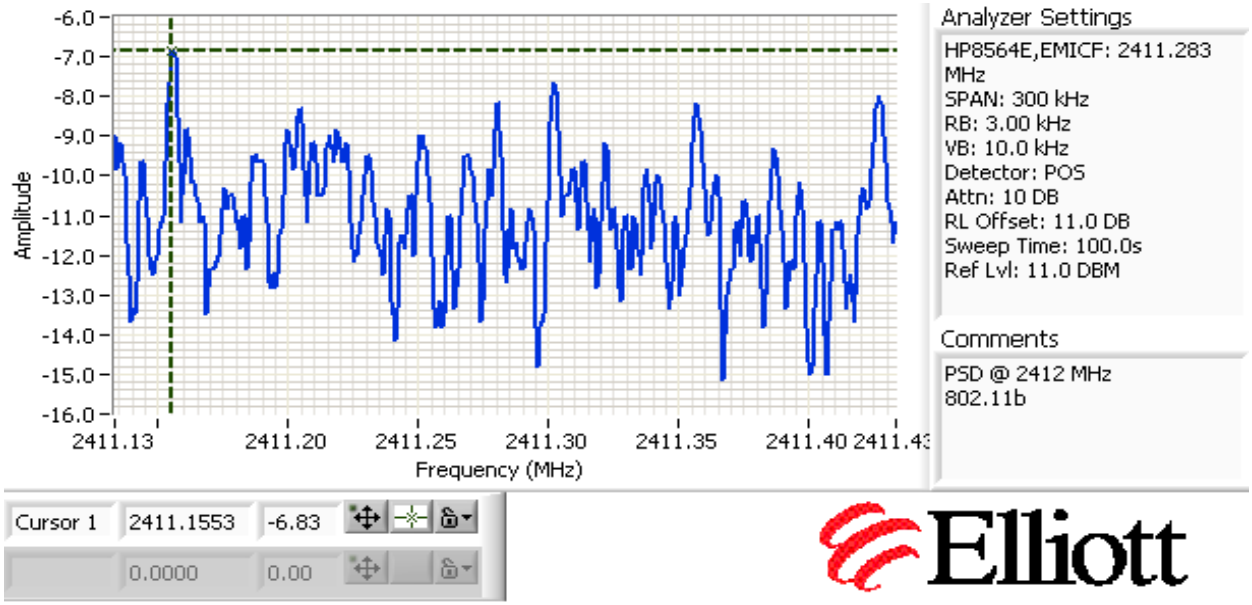


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

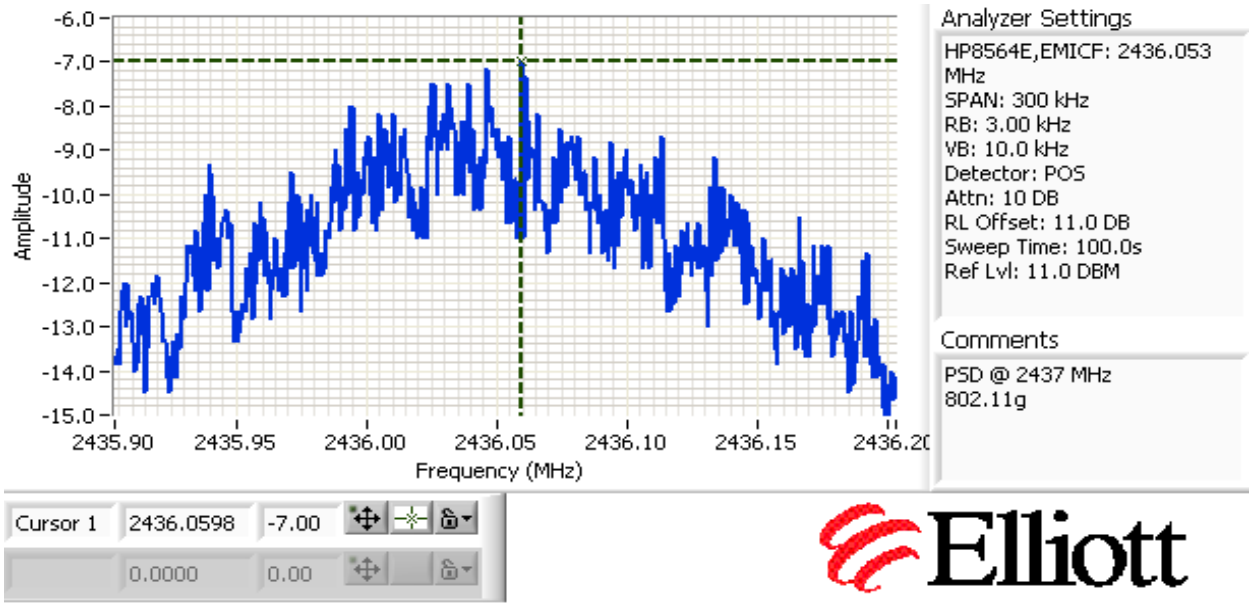
Run #2: Power spectral Density

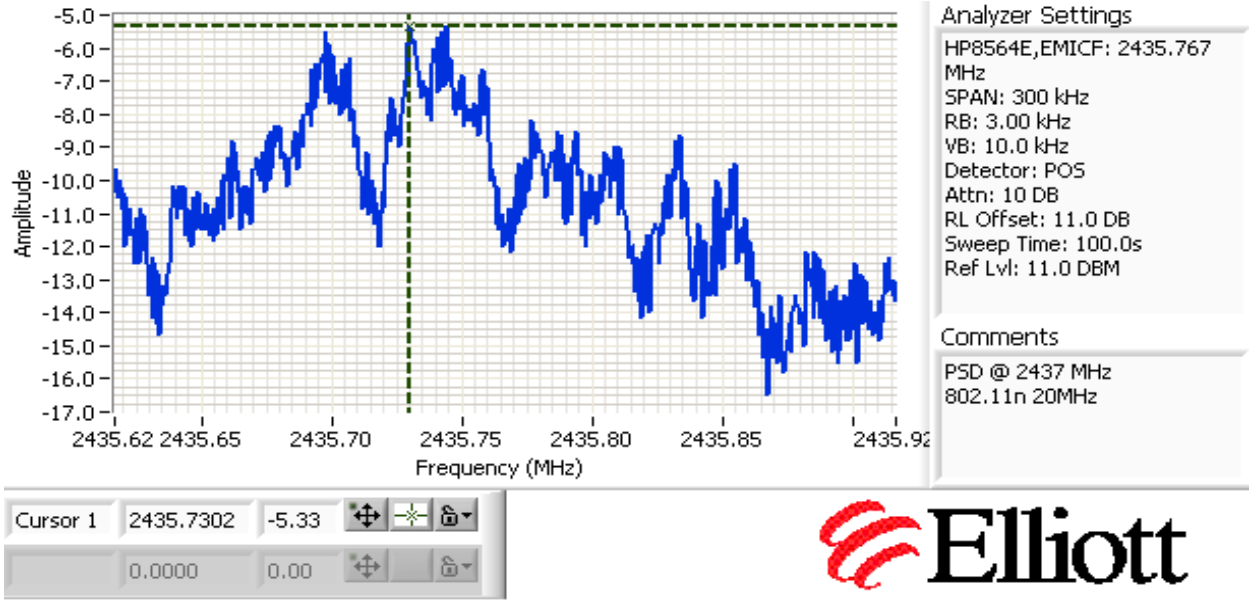
Mode	Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
802.11b	20	2412	-6.8	8.0	Pass
	20	2437	-7.0	8.0	Pass
	20	2462	-8.0	8.0	Pass
802.11g	25	2412	-7.2	8.0	Pass
	25	2437	-7.0	8.0	Pass
	22	2462	-9.7	8.0	Pass
n20	22.5	2412	-7.3	8.0	Pass
	25.5	2437	-5.3	8.0	Pass
	22	2462	-8.8	8.0	Pass
n40	20	2422	-12.3	8.0	Pass
	23	2437	-10.0	8.0	Pass
	20	2452	-12.2	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.

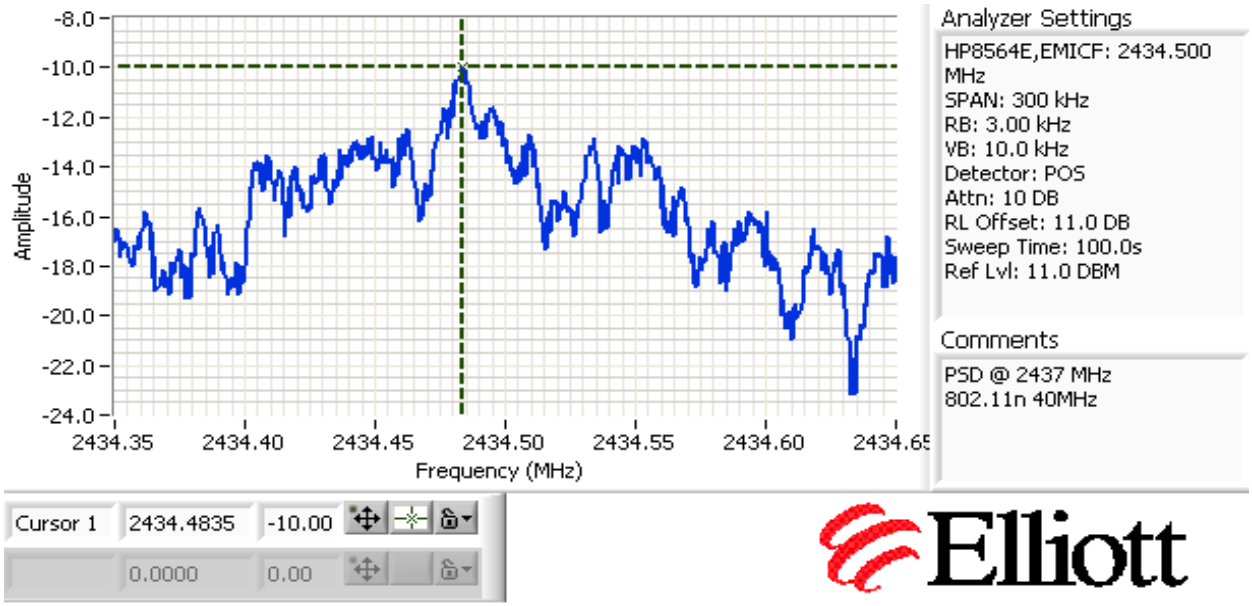


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A





Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

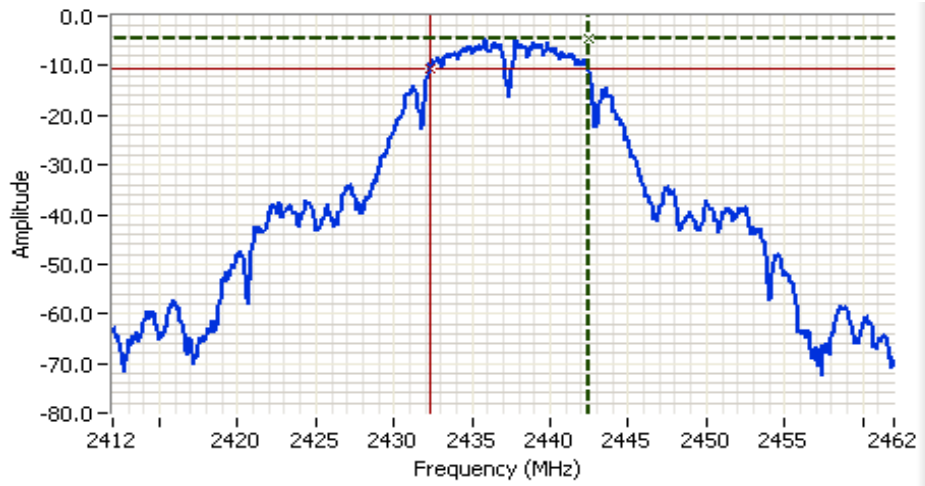


Run #3: Signal Bandwidth

Mode	Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 6dB	99%
802.11b	20	2412	100kHz	10.2	13.6
	20	2437	100kHz	10.2	13.6
	20	2462	100kHz	10.2	13.6
802.11g	25	2412	100kHz	14.5	18.4
	25	2437	100kHz	15.1	18.3
	22	2462	100kHz	15.8	18.3
n20	22.5	2412	100kHz	15.2	19.7
	25.5	2437	100kHz	15.3	19.4
	22	2462	100kHz	15.2	19.3
n40	20	2422	100kHz	32.8	36.5
	23	2437	100kHz	35.5	36.6
	20	2452	100kHz	35.3	36.6

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

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A



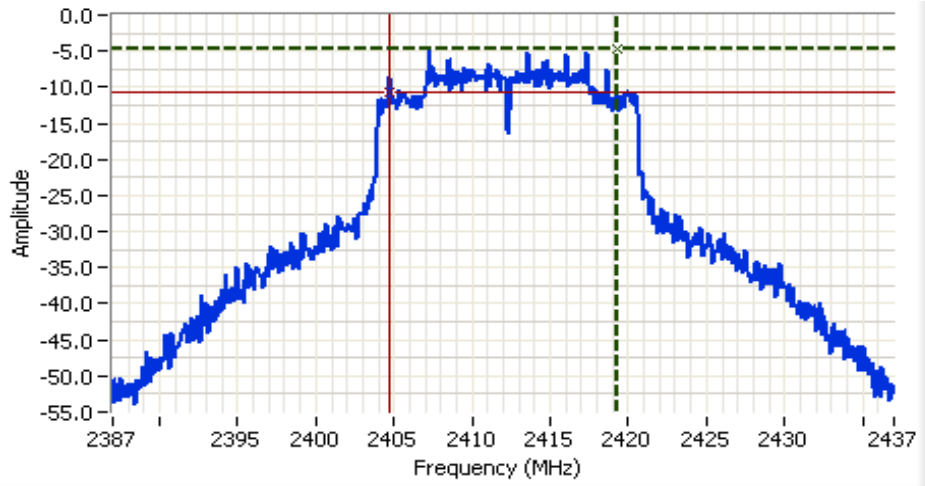
Analyzer Settings

HP8564E,EMICF: 2437.000 MHz
SPAN: 50.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Normal
Attn: 10 DB
RL Offset: 0.0 DB
Sweep Time: 50.0ms
Ref Lvl: 0.0 DBM

Comments

6dB BW: 10.167 MHz
802.11b

Cursor 1	2442.4167	-4.50	Delta Freq.	10.167	Elliott
Cursor 2	2432.2500	-10.50	Delta Amplitude	6.00	



Analyzer Settings

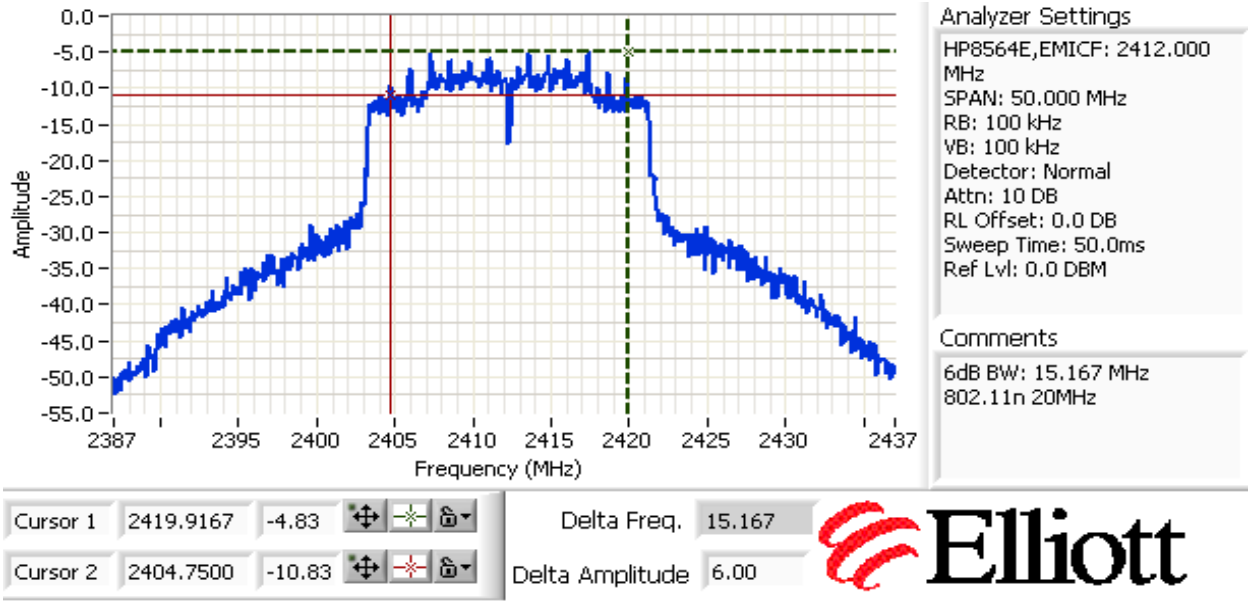
HP8564E,EMICF: 2412.000 MHz
SPAN: 50.000 MHz
RB: 100 kHz
VB: 100 kHz
Detector: Normal
Attn: 10 DB
RL Offset: 0.0 DB
Sweep Time: 50.0ms
Ref Lvl: 0.0 DBM

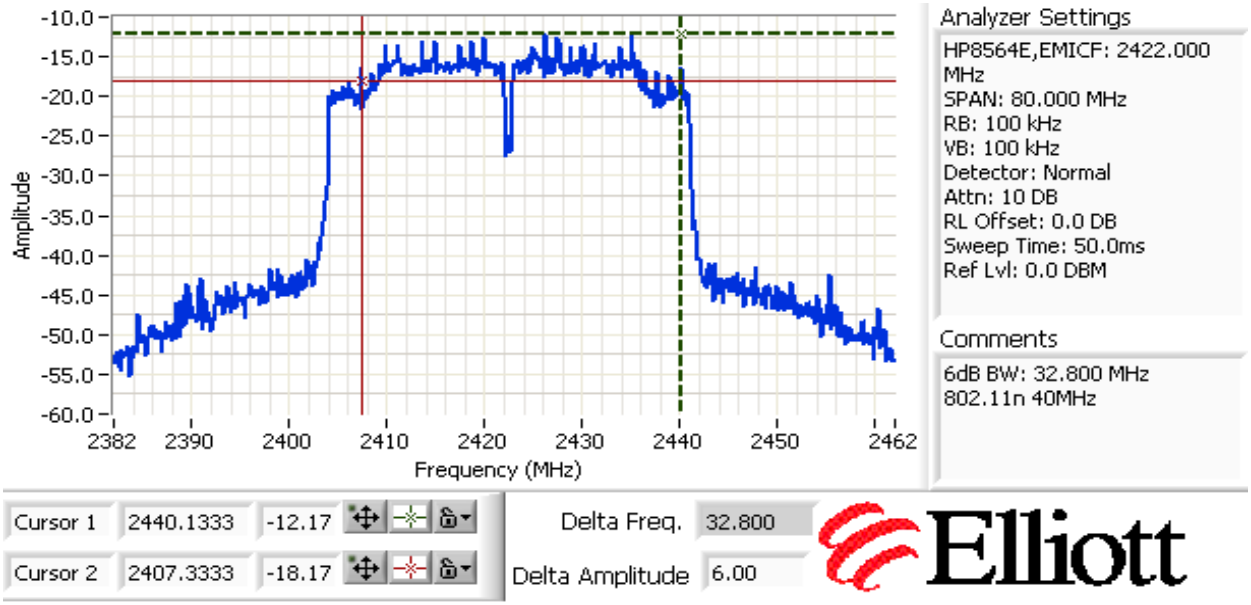
Comments

6dB BW: 14.500 MHz
802.11g

Cursor 1	2419.2500	-4.67	Delta Freq.	14.500	Elliott
Cursor 2	2404.7500	-10.67	Delta Amplitude	6.00	

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A



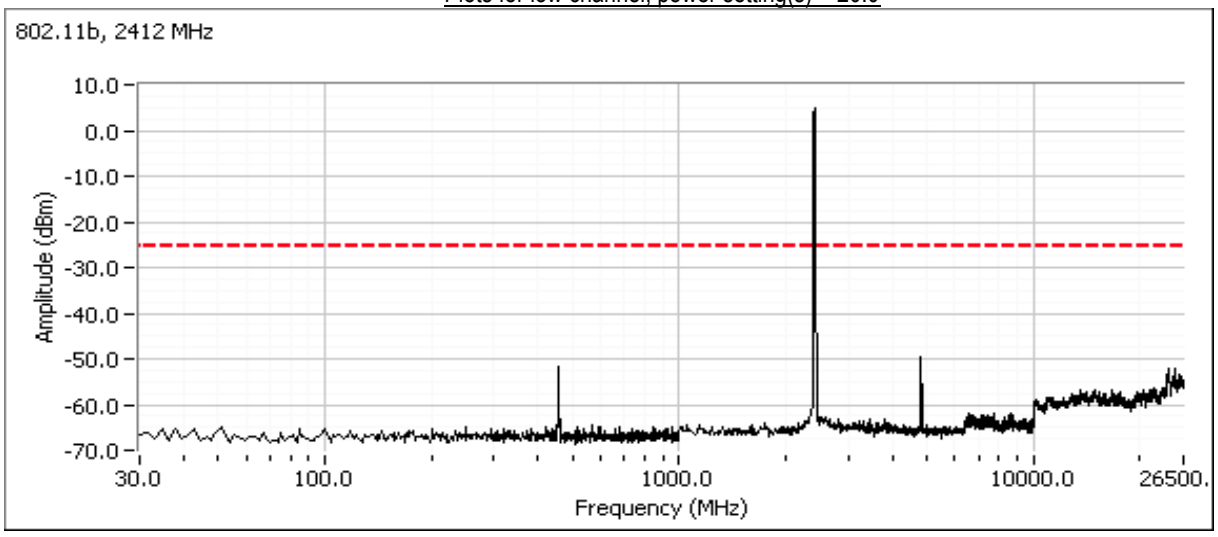


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

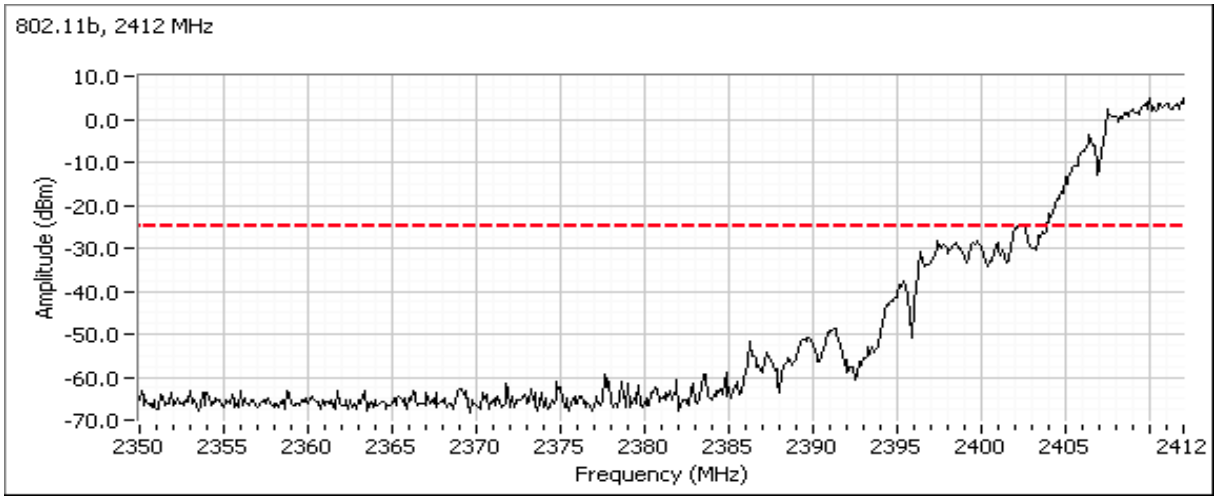
Run #4: Out of Band Spurious Emissions
802.11b

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

Plots for low channel, power setting(s) = 20.0

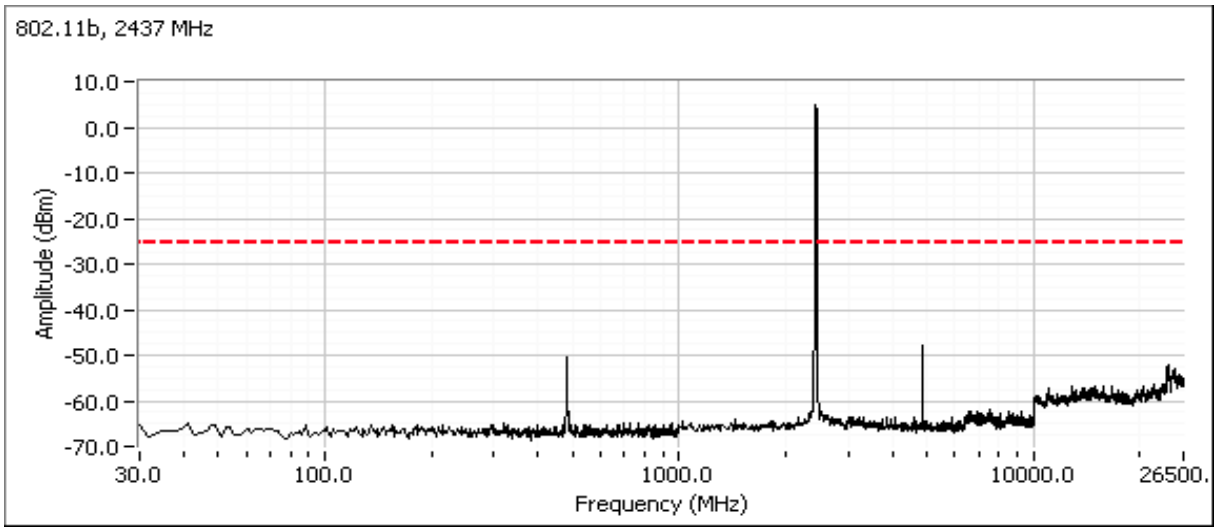


Additional plot showing compliance with ***-30dBc*** limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

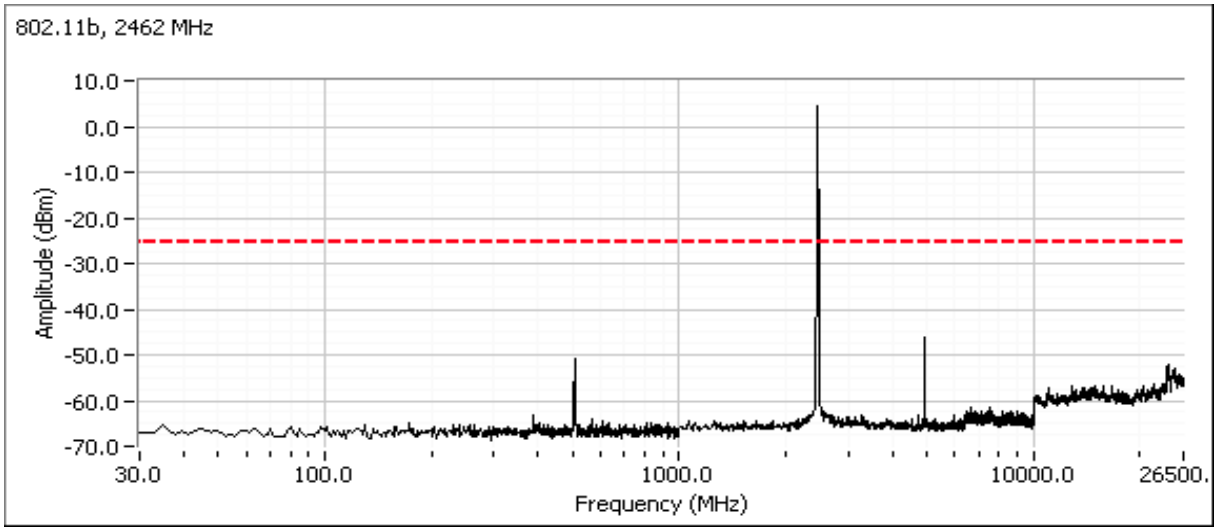


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Plots for center channel, power setting(s) = 20.0



Plots for high channel, power setting(s) = 20.0

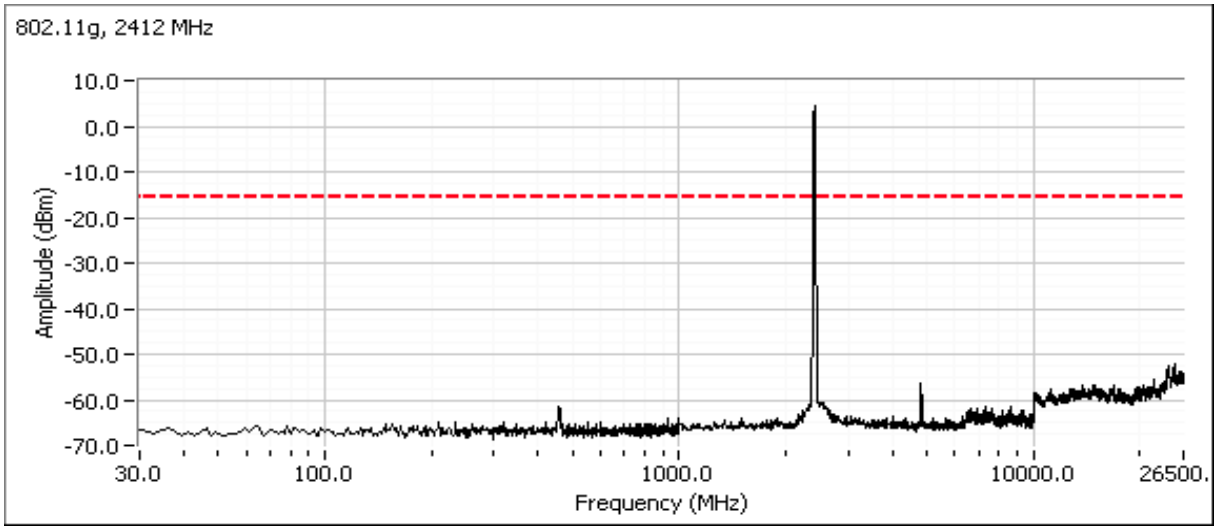


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

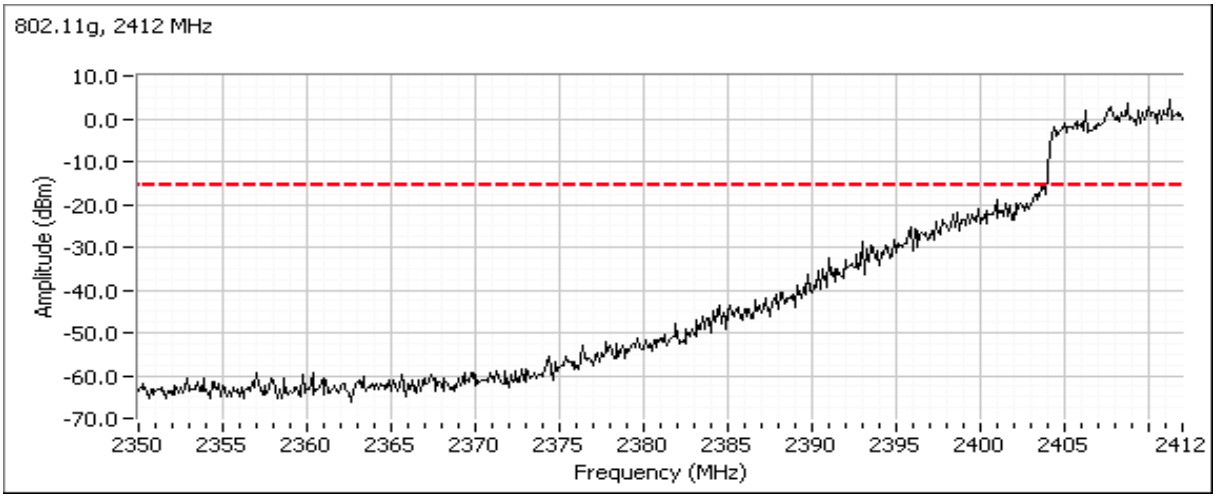
802.11g

Frequency (MHz)	Limit	Result
2412	-20dBc	Pass
2437	-20dBc	Pass
2462	-20dBc	Pass

Plots for low channel, power setting(s) = 25.0

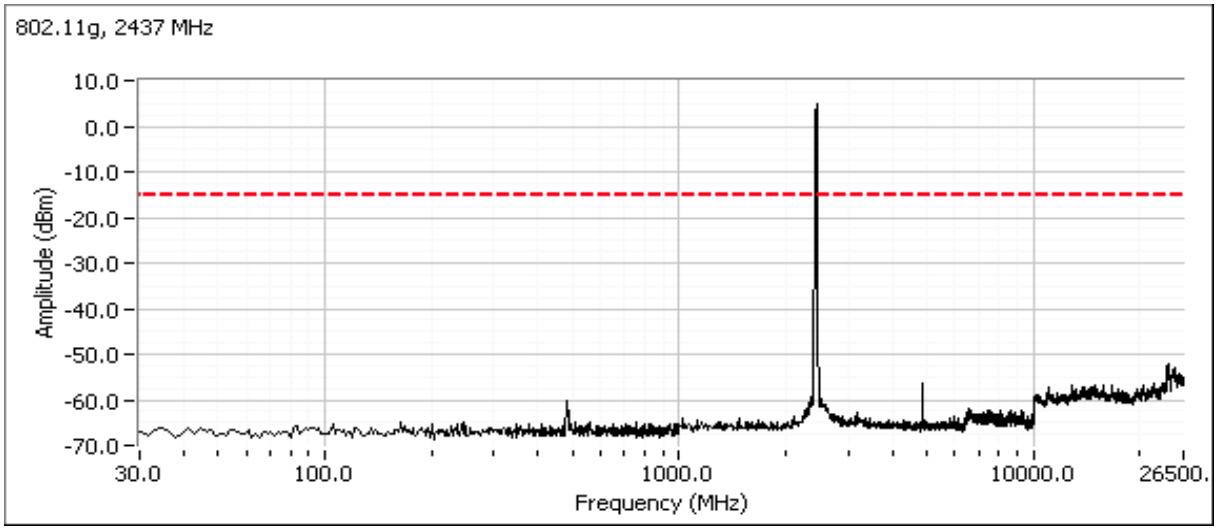


Additional plot showing compliance with ***-20dBc*** limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

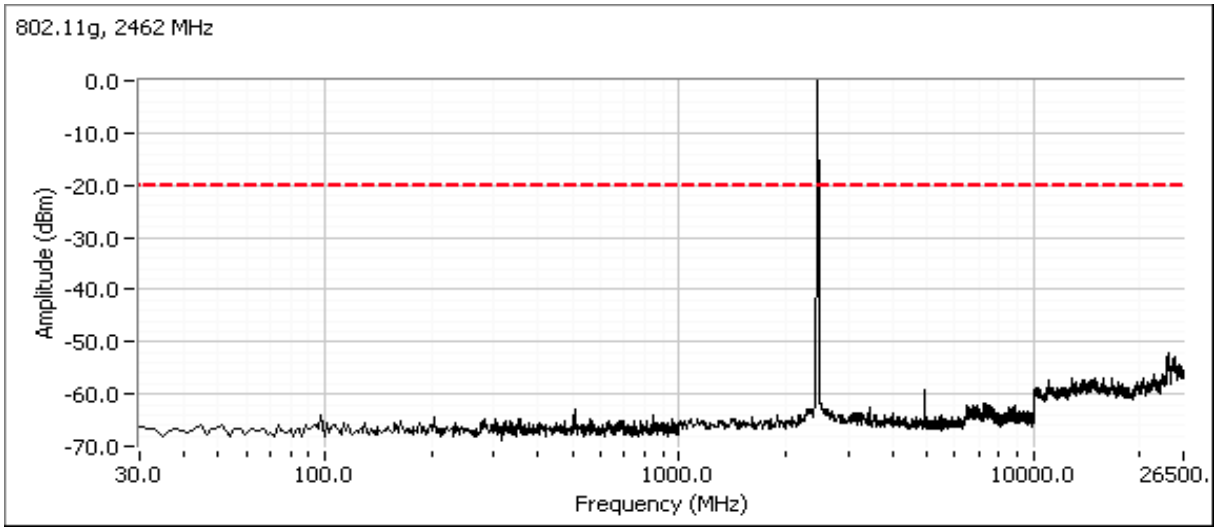


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Plots for center channel, power setting(s) = 25.0



Plots for high channel, power setting(s) = 22.0

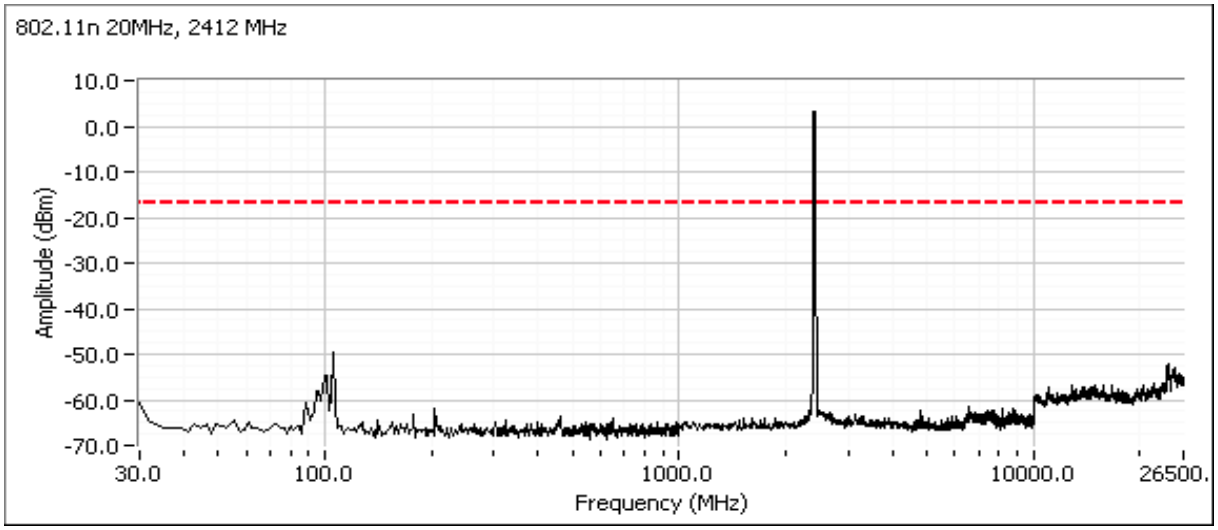


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

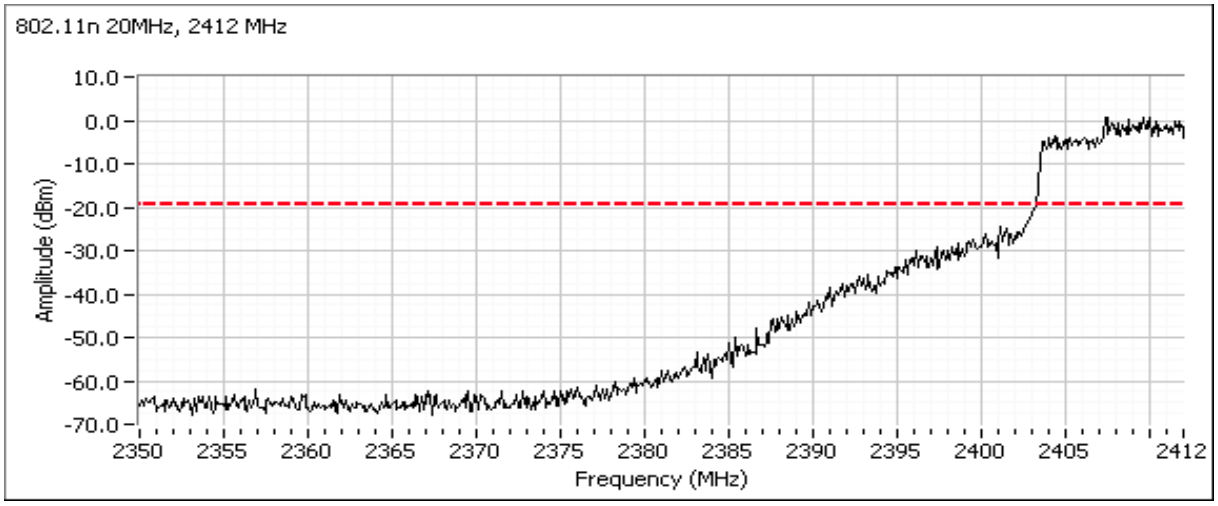
n20

Frequency (MHz)	Limit	Result
2412	-20dBc	Pass
2437	-20dBc	Pass
2462	-20dBc	Pass

Plots for low channel, power setting(s) = 22.5

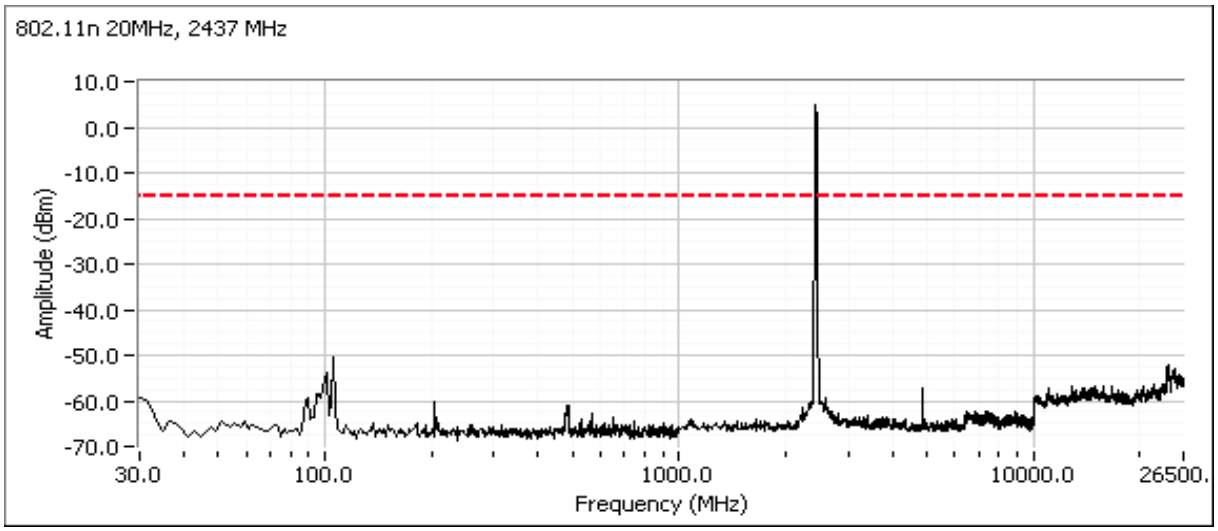


Additional plot showing compliance with ***-20dBc*** limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

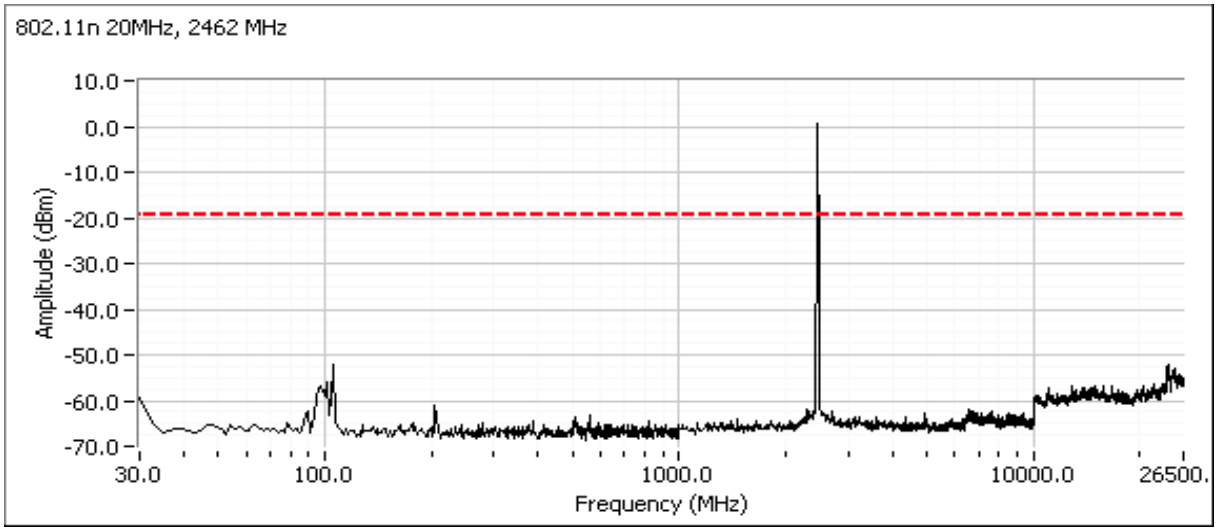


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Plots for center channel, power setting(s) = 25.5



Plots for high channel, power setting(s) = 22.0

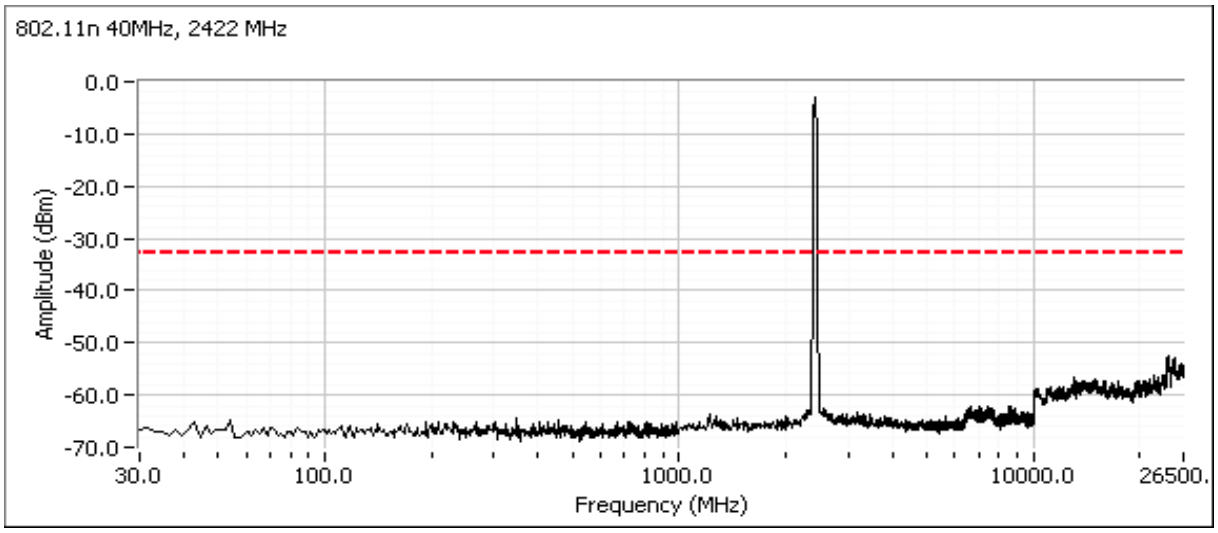


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

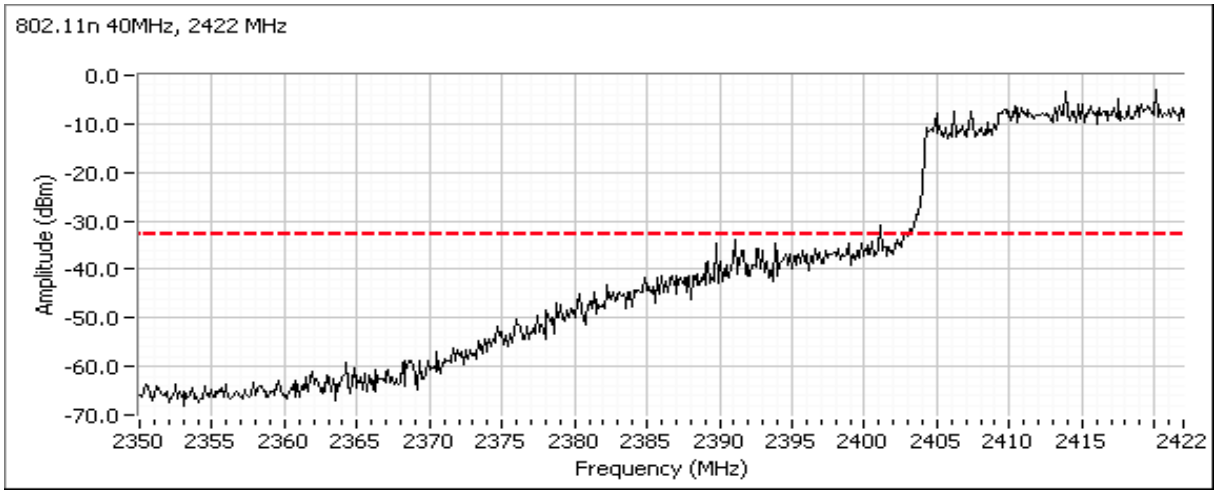
n40

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

Plots for low channel, power setting(s) = 20.0

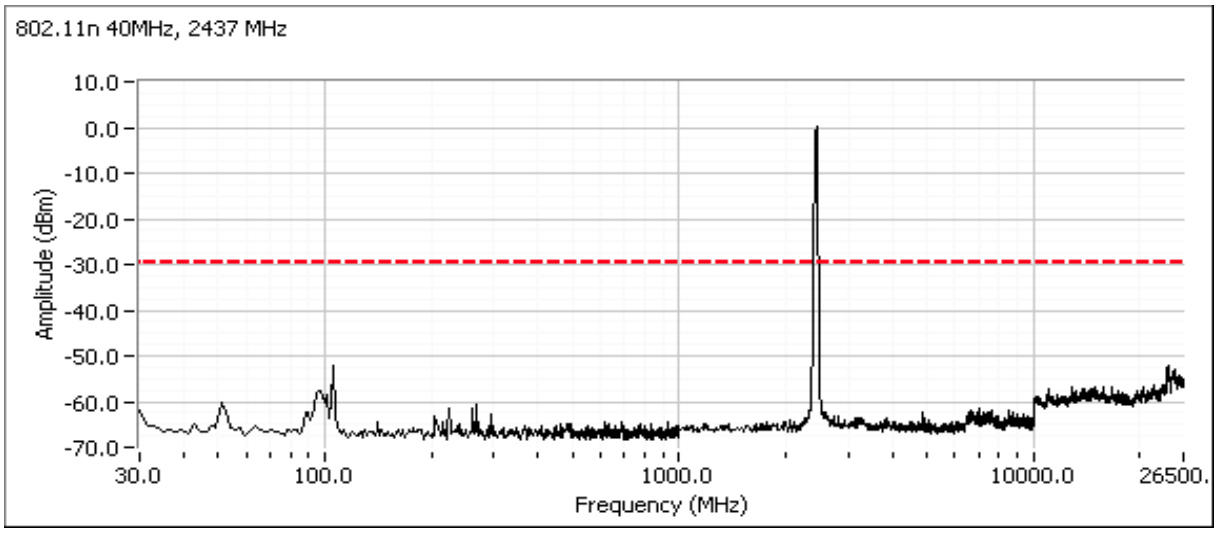


Additional plot showing compliance with ***-30dBc*** limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

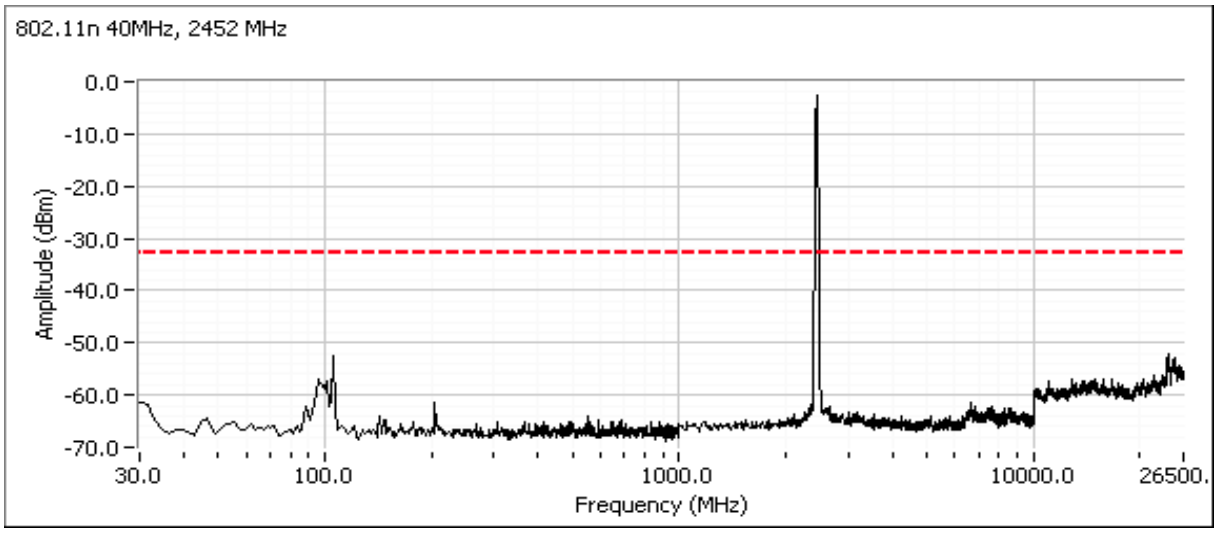


Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Plots for center channel, power setting(s) = 23.0



Plots for high channel, power setting(s) = 20.0



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

RSS 210 and FCC 15.247 (DSS) Radiated Spurious Emissions 802.11bg and Bluetooth - Transmitter Mode

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 conduted emissions testing the measurement antenna port.

Summary of Results

For Bluetooth: Tx is chain B, Rx is chain B. For WiFi, only Chain A is used for transmit.
MAC Address: 00150079C6BF DRTU Tool Version 1.2.2-0177 Driver version 14.0.0.39

Run #	Mode	Channel		Measured Power	Test Performed	Limit	Result / Margin
1	BT **1Mb/s** 802.11b	2402MHz 2412MHz		6.4 16.8	Radiated emissions 1- 10 GHz	FCC 15.247	48.8dBµV/m @ 2282.0MHz (-5.2dB)
2	BT **1Mb/s** 802.11b	2480MHz 2462MHz		6.9 16.8		FCC 15.247	**51.0dBµV/m @ 2496.2MHz (-3.0dB)**
3	BT **1Mb/s** 802.11g	2402MHz 2412MHz		6.4 16.7		FCC 15.247	50.1dBµV/m @ 2282.0MHz (-3.9dB)
4	BT **1Mb/s** 802.11g	2480MHz 2462MHz		6.9 16.8		FCC 15.247	50.7dBµV/m @ 2360.0MHz (-3.3dB)
WiFi mode for the following runs based on worst case mode from runs 1 through 4							
5	BT **1Mb/s** 802.11b	2402MHz 2437MHz		6.4 16.7	Radiated emissions 1- 10 GHz	FCC 15.247	49.0dBµV/m @ 2368.9MHz (-5.0dB)
6	BT **1Mb/s** 802.11b	2440MHz 2412MHz		7.0 16.8		FCC 15.247	50.0dBµV/m @ 2320.0MHz (-4.0dB)
7	BT **1Mb/s** 802.11b	2440MHz 2462MHz		7.0 16.8	Radiated emissions 1- 10 GHz	FCC 15.247	49.8dBµV/m @ 2320.0MHz (-4.2dB)
8	BT **1Mb/s** 802.11b	2480MHz 2437MHz		6.9 16.7		FCC 15.247	50.5dBµV/m @ 2360.0MHz (-3.5dB)
WiFi mode and channel and Bluetooth channel based on the worst case mode from runs 1 through 8							
9	BT **3Mb/s** 802.11b	2440MHz 2462MHz		1.5 16.8	Radiated emissions 1- 10 GHz	FCC 15.247	46.1dBµV/m @ 2320.0MHz (-7.9dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Deviations From The Standard

No deviations were made from the requirements of the standard.

Average Correction Factor Calculation - Bluetooth

Bluetooth uses a frequency hopping algorithm that means that the device, during normal operation, is only on a specific channel for a short period of time. The average correction factor is calculated as follows:

A maximum length packet has a duration of 5 time slots.

The hopping rate is 1600 hops/second so the maximum dwell time is 5/1600 seconds, or 3.125ms.

With a minimum of 20 hopping channels a channel will not be used more than 4 times in any 100ms period.

The maximum dwell time in a 100m period is 4 x 3.125ms = 12.5ms.

The average correction factor is, therefore, 20log(12.5/100) =-18dB

As this is a hopping radio the correction factor can be applied to the average value of the signal provided the average value was measured with the device continuously transmitting. DA 00-0705 permits the use of the average correction on the **measured average** value for frequency hopping radios.

As the measured average value was below the average limit the correction factor was not used for measurements in this data sheet.

Device Information:	**WFM:**	00150079C6BF
	DRTU Version:	1.2.2-0177
	Driver Version:	14.0.0.39
	Board Voltage:	3.31VDC

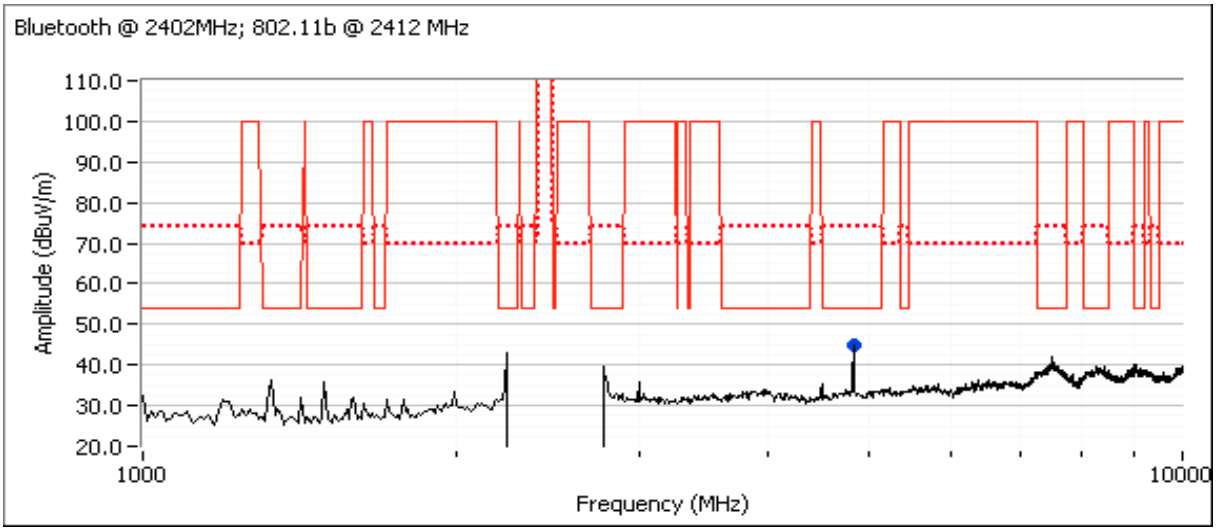
Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 1, Bluetooth/802.11bgn simultaneously: 1-10GHz, 802.11b @ 2412MHz Chain A, BT Basic Rate @ 2402MHz Chain B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	20.0	16.8
Chain B	7.0	8.0	6.4

Spurious Radiated Emissions, 1 - 10GHz exlcuding the allocated band:
Preamplifer and notch filter used for these scans
Preliminary Measurements (Peak versus average limit)

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4822.500	44.7	V	54.0	-9.3	Peak	150	2.2	



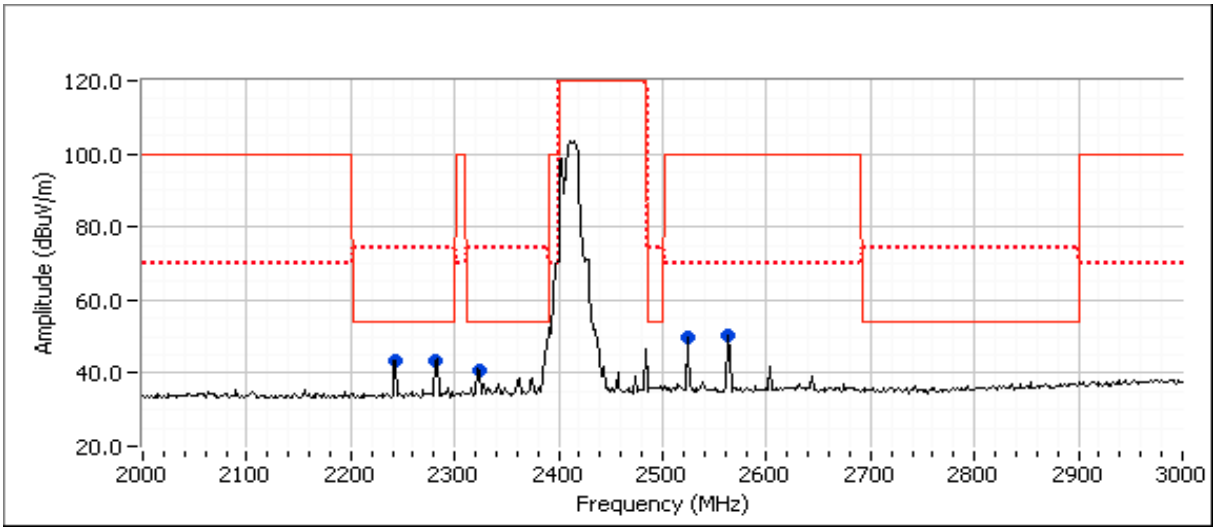
Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Spurious Radiated Emissions, 2 - 3GHz

Preliminary Scan at ~ 20cm from the product to idenitfy potential signals (No preamplifer used for these scans)

Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2243.330	43.2	H	54.0	-10.8	Peak	204	1.0	
2281.670	43.6	H	54.0	-10.4	Peak	204	1.0	
2323.330	40.6	H	54.0	-13.4	Peak	204	1.0	
2523.330	49.8	H	70.0	-20.2	Peak	204	1.0	
2563.330	50.3	H	70.0	-19.7	Peak	204	1.0	



Final measurements at 3m

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2281.990	48.8	H	54.0	-5.2	AVG	205	1.0	RB 1MHz;VB 10 Hz;Pk
2281.840	56.3	H	74.0	-17.7	PK	205	1.0	RB 1MHz;VB 3MHz;Pk
4824.000	45.5	V	54.0	-8.5	AVG	138	1.3	
4824.090	49.1	V	74.0	-24.9	PK	138	1.3	
2241.980	47.8	H	54.0	-6.2	AVG	202	1.0	RB 1MHz;VB 10 Hz;Pk
2241.930	56.7	H	74.0	-17.3	PK	202	1.0	RB 1MHz;VB 3MHz;Pk
2321.960	48.5	H	54.0	-5.5	AVG	206	1.0	RB 1MHz;VB 10 Hz;Pk
2321.810	56.4	H	74.0	-17.6	PK	206	1.0	RB 1MHz;VB 3MHz;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.

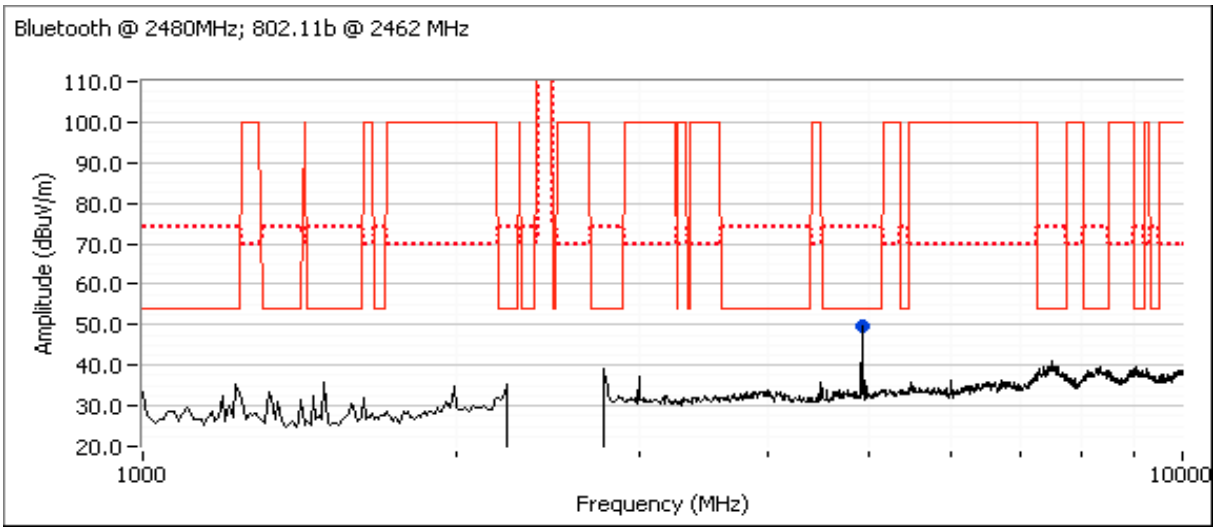
Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 2, Bluetooth/802.11bgn simultaneously: 1-10GHz, 802.11b @ 2462MHz Chain A, BT Basic Rate @ 2480MHz Chain B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	20.0	16.8
Chain B	7.0	8.0	6.9

Spurious Radiated Emissions, 1 - 10GHz exlcuding the allocated band:
Preamplifer and notch filter used for these scans
Preliminary Measurements (Peak versus average limit)

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.970	49.9	V	54.0	-4.1	Peak	233	1.6	802.11b 2nd harmonic



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

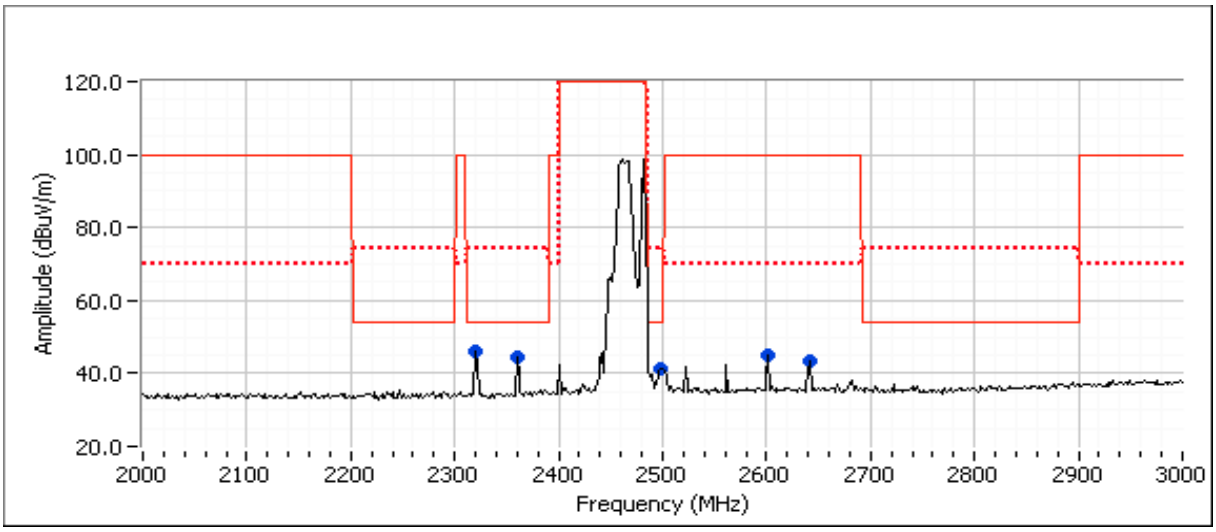
Spurious Radiated Emissions, 2 - 3GHz

Preliminary Scan at ~ 20cm from the product to idenitfy potential signals (No preamplifer used for these scans)

Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2320.000	46.0	H	54.0	-8.0	Peak	206	1.0	
2360.000	44.5	H	54.0	-9.5	Peak	206	1.0	
2601.670	44.8	H	70.0	-25.2	Peak	206	1.0	
2498.330	41.2	H	54.0	-12.8	Peak	206	1.0	
2641.670	43.2	H	70.0	-26.8	Peak	206	1.0	



Final measurements at 3m

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2496.210	51.0	H	54.0	-3.0	AVG	72	1.2	RB 1MHz;VB 10 Hz;Pk
2497.310	59.6	H	74.0	-14.4	PK	72	1.2	RB 1MHz;VB 3MHz;Pk
4923.990	50.9	V	54.0	-3.1	AVG	199	1.0	
4923.940	53.0	V	74.0	-21.0	PK	199	1.0	
2320.000	50.8	H	54.0	-3.2	AVG	208	1.0	RB 1MHz;VB 10 Hz;Pk
2319.950	57.6	H	74.0	-16.4	PK	208	1.0	RB 1MHz;VB 3MHz;Pk
2360.030	49.8	H	54.0	-4.2	AVG	71	1.3	RB 1MHz;VB 10 Hz;Pk
2360.130	57.2	H	74.0	-16.8	PK	71	1.3	RB 1MHz;VB 3MHz;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.

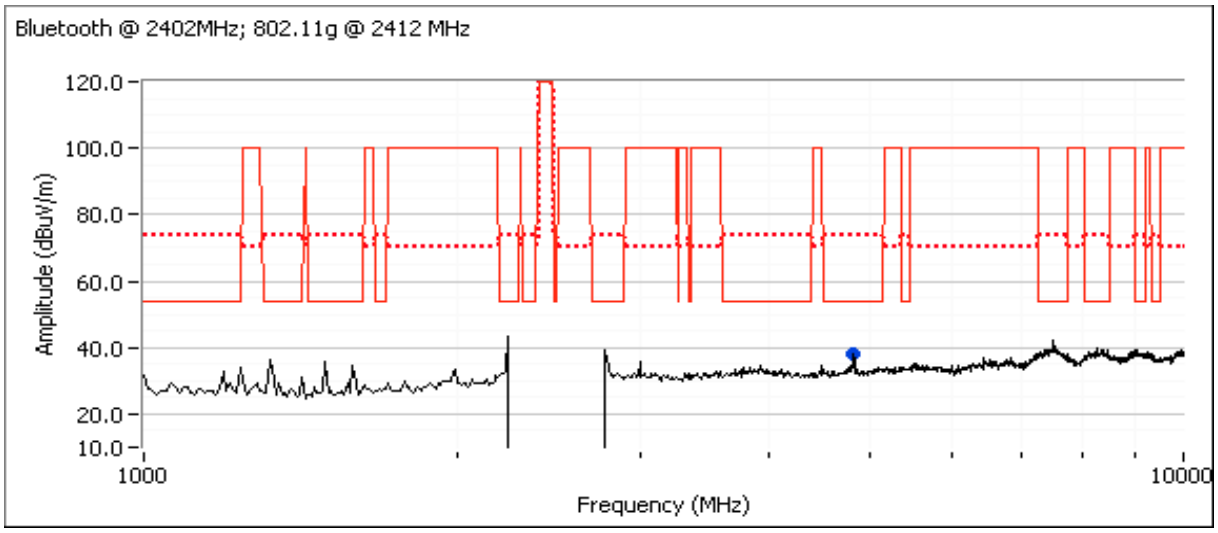
Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 3, Bluetooth/802.11bgn simultaneously: 1-10GHz, 802.11g @ 2412MHz Chain A, BT Basic Rate @ 2402MHz Chain B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	25.0	16.7
Chain B	7.0	8.0	6.4

Spurious Radiated Emissions, 1 - 10GHz exlcuding the allocated band:
Preamplifer and notch filter used for these scans
Preliminary Measurements (Peak versus average limit)

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4807.200	37.9	V	54.0	-16.1	Peak	126	1.9	



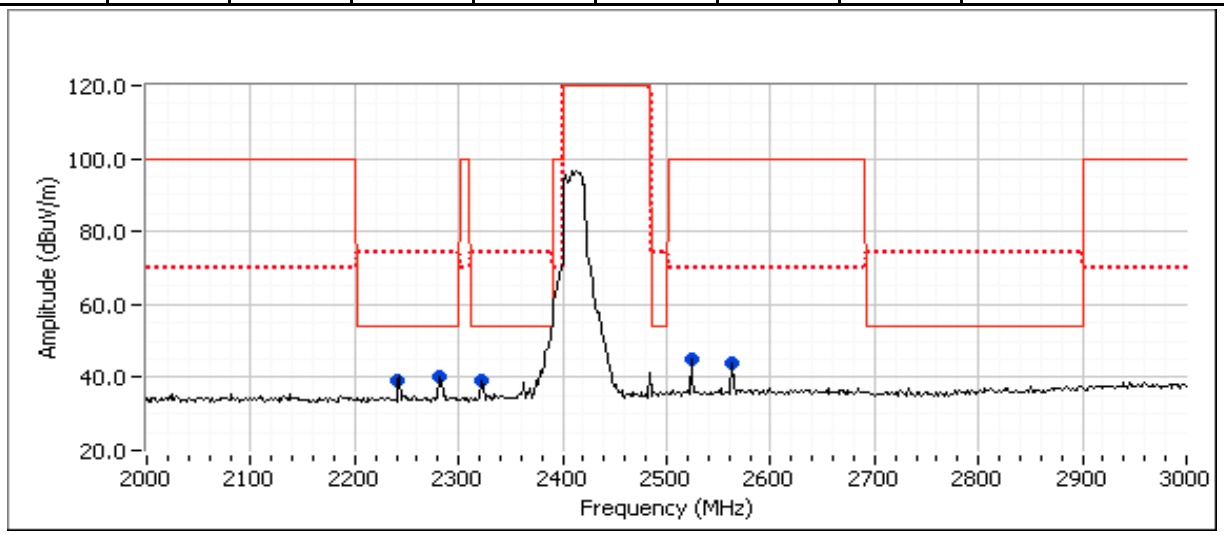
Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Spurious Radiated Emissions, 2 - 3GHz

Preliminary Scan at ~ 20cm from the product to idenitfy potential signals (No preamplifer used for these scans)

Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2241.670	39.2	H	54.0	-14.8	Peak	207	1.0	
2281.670	40.0	H	54.0	-14.0	Peak	207	1.0	
2321.670	39.0	H	54.0	-15.0	Peak	207	1.0	
2523.330	44.8	H	70.0	-25.2	Peak	207	1.0	
2563.330	44.1	H	70.0	-25.9	Peak	207	1.0	



Final measurements at 3m

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2282.040	50.1	H	54.0	-3.9	AVG	242	1.0	RB 1MHz;VB 10 Hz;Pk
2282.020	56.5	H	74.0	-17.5	PK	242	1.0	RB 1MHz;VB 3MHz;Pk
4803.930	37.4	V	54.0	-16.6	AVG	207	1.1	RB 1MHz;VB 10 Hz;Pk
4804.300	45.0	V	74.0	-29.0	PK	207	1.1	RB 1MHz;VB 3MHz;Pk
2241.970	47.5	H	54.0	-6.5	AVG	199	1.1	RB 1MHz;VB 10 Hz;Pk
2241.840	56.7	H	74.0	-17.3	PK	199	1.1	RB 1MHz;VB 3MHz;Pk
2241.960	45.8	V	54.0	-8.2	AVG	161	1.6	RB 1MHz;VB 10 Hz;Pk
2241.640	55.4	V	74.0	-18.6	PK	161	1.6	RB 1MHz;VB 3MHz;Pk
2321.970	48.2	H	54.0	-5.8	AVG	205	1.0	RB 1MHz;VB 10 Hz;Pk
2322.140	56.5	H	74.0	-17.5	PK	205	1.0	RB 1MHz;VB 3MHz;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.

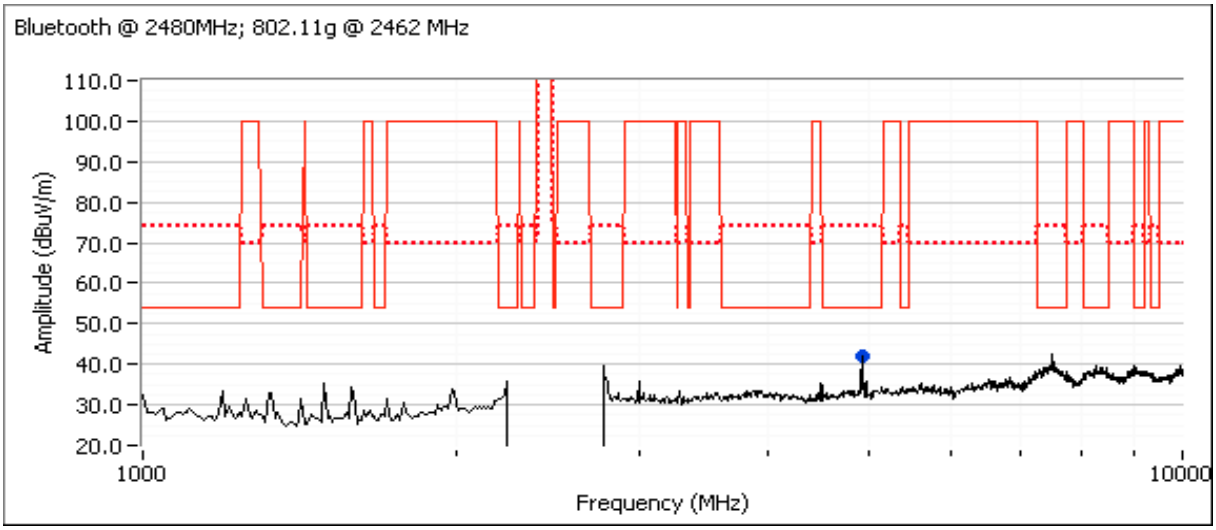
Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 4, Bluetooth/802.11bgn simultaneously: 1-10GHz, 802.11g @ 2462MHz Chain A, BT Basic Rate @ 2480MHz Chain B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	25.0	16.8
Chain B	7.0	8.0	6.9

Spurious Radiated Emissions, 1 - 10GHz exlcuding the allocated band:
Preamplifer and notch filter used for these scans
Preliminary Measurements (Peak versus average limit)

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4922.870	41.9	V	54.0	-12.1	Peak	157	1.9	



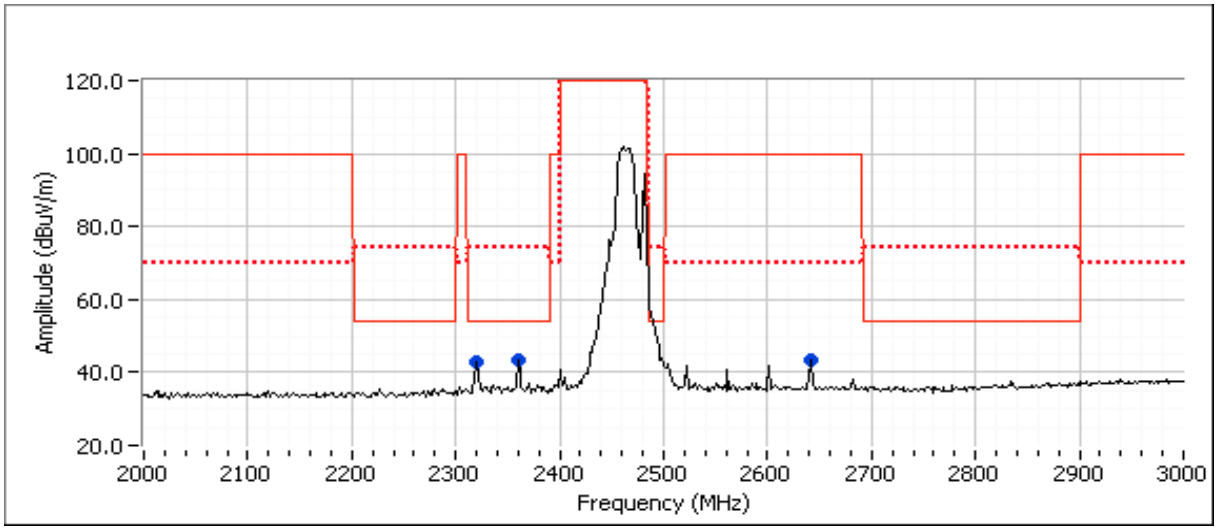
Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Spurious Radiated Emissions, 2 - 3GHz

Preliminary Scan at ~ 20cm from the product to idenitfy potential signals (No preamplifer used for these scans)

Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2320.000	42.8	H	54.0	-11.2	Peak	205	1.0	
2360.000	43.3	H	54.0	-10.7	Peak	205	1.0	
2641.670	43.2	H	70.0	-26.8	Peak	205	1.0	



Final measurements at 3m

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	Setting
2359.970	50.7	H	54.0	-3.3	AVG	75	1.2	RB 1MHz;VB 10 Hz;Pk
2359.700	57.6	H	74.0	-16.4	PK	75	1.2	RB 1MHz;VB 3MHz;Pk
4924.270	40.2	V	54.0	-13.8	AVG	165	1.0	RB 1MHz;VB 10 Hz;Pk
4919.420	52.7	V	74.0	-21.3	PK	165	1.0	RB 1MHz;VB 3MHz;Pk
2320.000	50.5	H	54.0	-3.5	AVG	204	1.0	RB 1MHz;VB 10 Hz;Pk
2319.950	57.7	H	74.0	-16.3	PK	204	1.0	RB 1MHz;VB 3MHz;Pk

Note 2:	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.

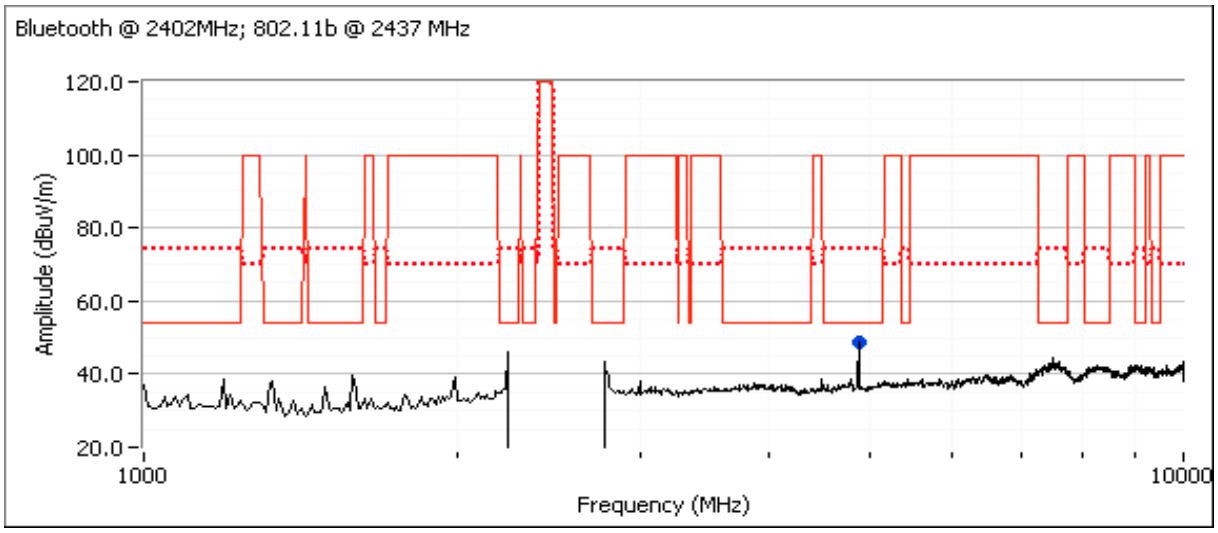
Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 5, Bluetooth/802.11bgn simultaneously: 1-10GHz, 802.11b @ 2437MHz Chain A, BT Basic Rate @ 2402MHz Chain B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.7	20.0
Chain B	7.0	6.4	8.0

Spurious Radiated Emissions, 1 - 10GHz exlcuding the allocated band:
Preamplifer and notch filter used for these scans
Preliminary Measurements (Peak versus average limit)

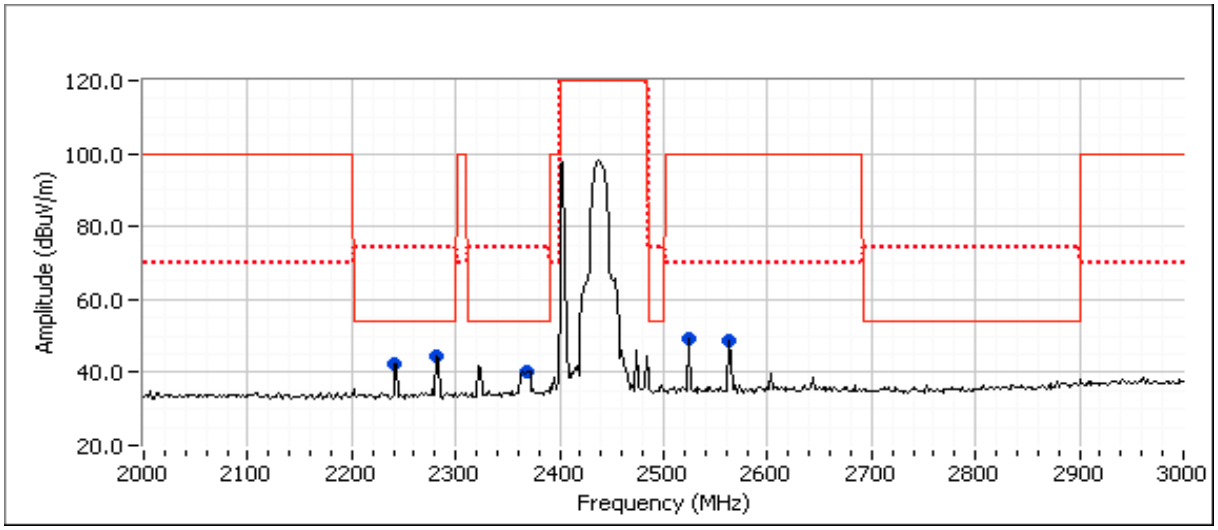
Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.910	48.9	V	54.0	-5.1	Peak	201	1.3	



Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Spurious Radiated Emissions, 2 - 3GHz

Preliminary Scan at ~ 20cm from the product to idenitfy potential signals (No preamplifer used for these scans)



Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2241.670	42.2	H	54.0	-11.8	Peak	206	1.0	
2281.670	44.3	H	54.0	-9.7	Peak	206	1.0	
2368.330	40.4	H	54.0	-13.6	Peak	206	1.0	
2523.330	49.5	H	70.0	-20.5	Peak	206	1.0	
2563.330	48.8	H	70.0	-21.2	Peak	206	1.0	

Final measurements at 3m

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Setting
2368.860	49.0	H	54.0	-5.0	AVG	85	1.0	RB 1MHz;VB 10 Hz;Pk
2368.300	57.6	H	74.0	-16.4	PK	85	1.0	RB 1MHz;VB 3MHz;Pk
2241.940	48.2	H	54.0	-5.8	AVG	75	1.1	RB 1MHz;VB 10 Hz;Pk
2241.770	56.3	H	74.0	-17.7	PK	75	1.1	RB 1MHz;VB 3MHz;Pk
2281.940	48.0	H	54.0	-6.0	AVG	207	1.0	RB 1MHz;VB 10 Hz;Pk
2282.000	56.0	H	74.0	-18.0	PK	207	1.0	RB 1MHz;VB 3MHz;Pk
4873.970	47.6	V	54.0	-6.4	AVG	225	1.7	RB 1MHz;VB 10 Hz;Pk
4874.070	50.4	V	74.0	-23.6	PK	225	1.7	RB 1MHz;VB 3MHz;Pk

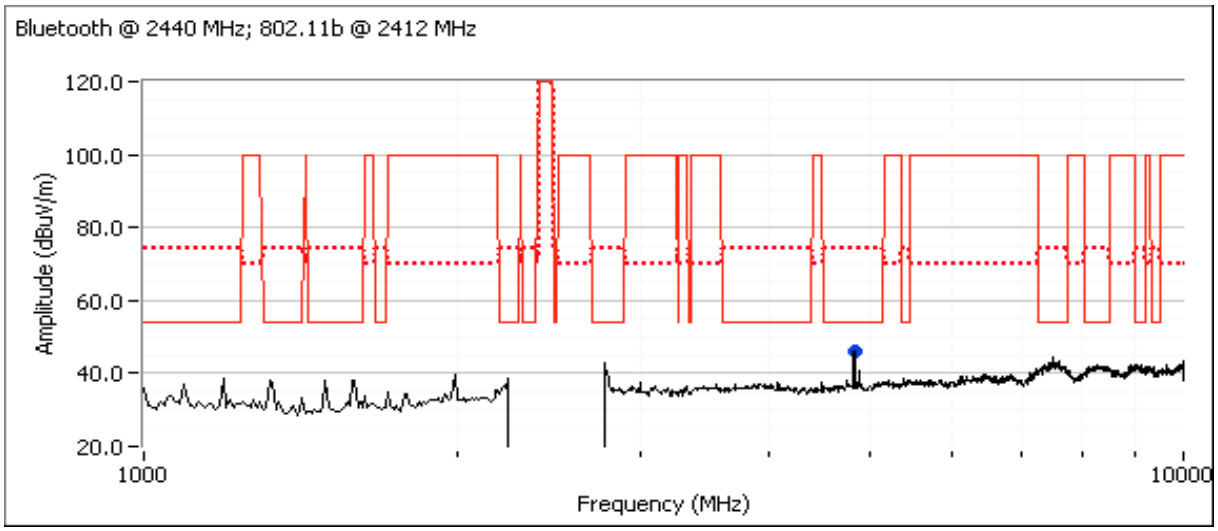
Note 2:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 6, Bluetooth/802.11bgn simultaneously: 1-10GHz, 802.11b @ 2412MHz Chain A, BT Basic Rate @ 2440MHz Chain B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.8	20.0
Chain B	7.0	7.0	8.0

Spurious Radiated Emissions, 1 - 10GHz exlcuding the allocated band:
Preamplifer and notch filter used for these scans



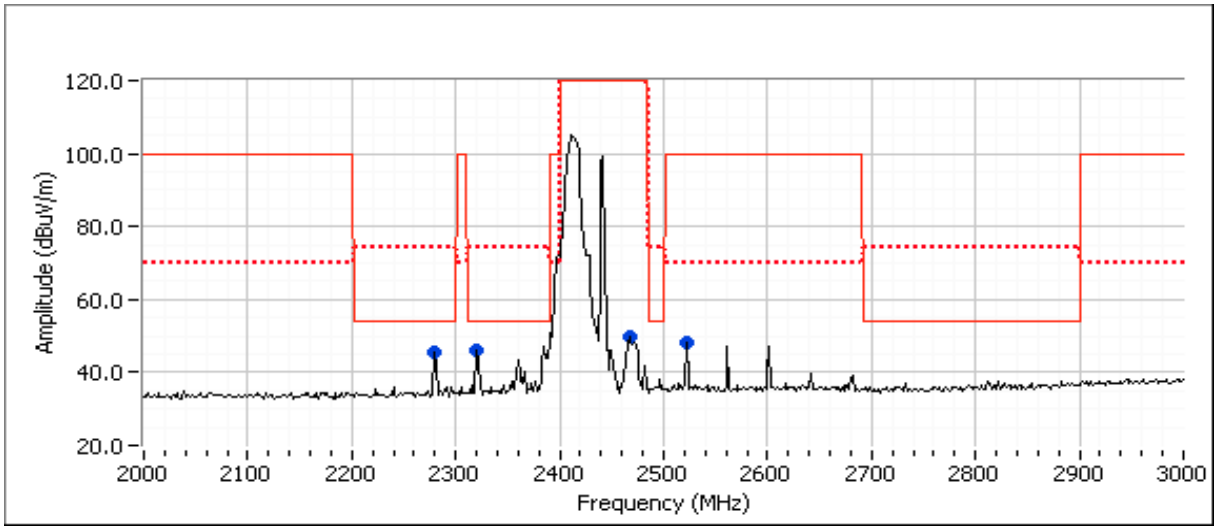
Preliminary Measurements (Peak versus average limit)

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.060	45.9	V	54.0	-8.1	Peak	138	1.3	

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Spurious Radiated Emissions, 2 - 3GHz

Preliminary Scan at ~ 20cm from the product to idenitfy potential signals (No preamplifer used for these scans)



Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2280.000	45.5	H	54.0	-8.5	Peak	206	1.0	6
2320.000	46.1	H	54.0	-7.9	Peak	206	1.0	6
2466.670	49.6	H	120.0	-70.4	Peak	206	1.0	6
2521.670	48.2	H	70.0	-21.8	Peak	206	1.0	6

Final measurements at 3m

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Setting
2320.030	50.0	H	54.0	-4.0	AVG	207	1.0	RB 1MHz;VB 10 Hz;Pk
2319.650	57.7	H	74.0	-16.3	PK	207	1.0	RB 1MHz;VB 3MHz;Pk
2280.050	48.7	H	54.0	-5.3	AVG	93	1.3	RB 1MHz;VB 10 Hz;Pk
2279.550	56.7	H	74.0	-17.3	PK	93	1.3	RB 1MHz;VB 3MHz;Pk
4823.980	45.8	V	54.0	-8.2	AVG	133	1.1	RB 1MHz;VB 10 Hz;Pk
4823.900	49.1	V	74.0	-24.9	PK	133	1.1	RB 1MHz;VB 3MHz;Pk

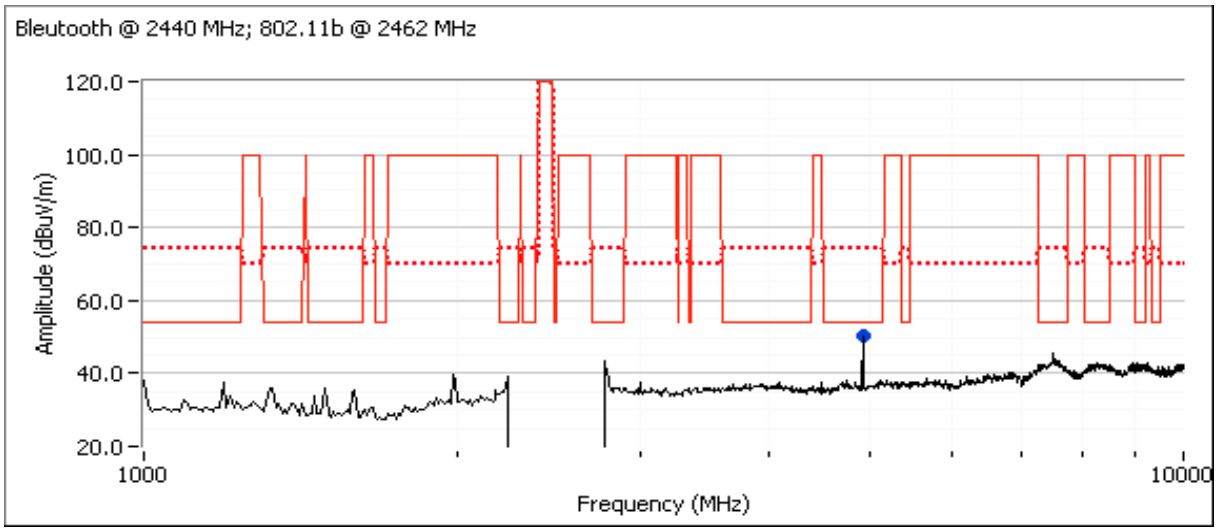
Note 2:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 7, Bluetooth/802.11bgn simultaneously: 1-10GHz, 802.11b @ 2462MHz Chain A, BT Basic Rate @ 2440MHz Chain B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.8	20.0
Chain B	7.0	7.0	8.0

Spurious Radiated Emissions, 1 - 10GHz exlcuding the allocated band:
Preamplifer and notch filter used for these scans



Preliminary Measurements (Peak versus average limit)

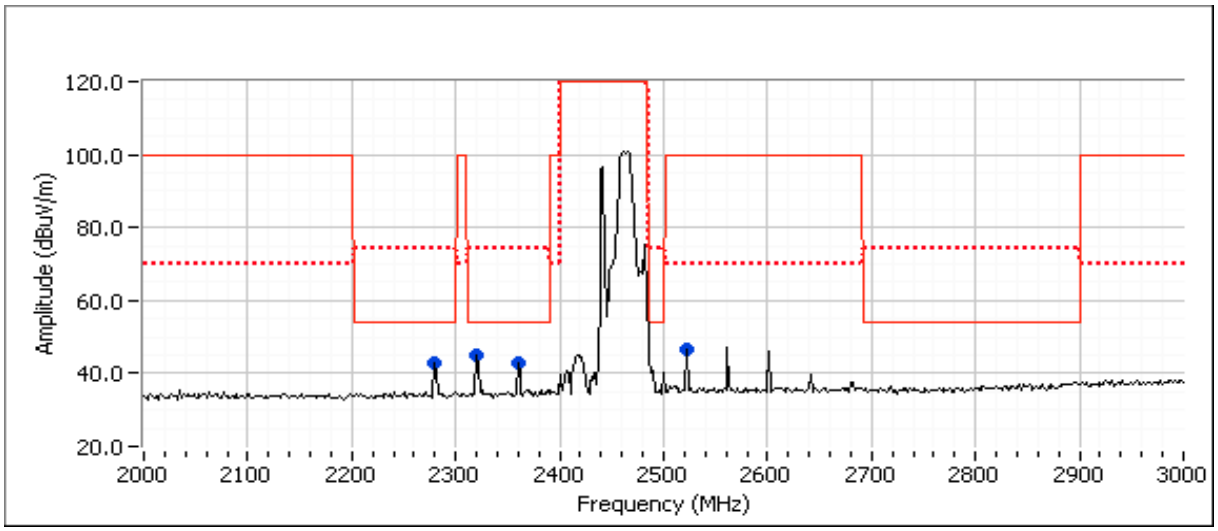
Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.810	50.3	V	54.0	-3.7	Peak	108	1.6	

Note 1:	This is the second harmonic of the 802.11b signal and not an intermodulaiton product. Measurement of harmonics directly related to the 802.11 transmitter are provided in the 802.11 radiated spurious emissions test data.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Spurious Radiated Emissions, 2 - 3GHz

Preliminary Scan at ~ 20cm from the product to idenitfy potential signals (No preamplifer used for these scans)



Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2280.000	42.8	H	54.0	-11.2	Peak	200	1.0	
2320.000	45.0	H	54.0	-9.0	Peak	200	1.0	
2360.000	43.0	H	54.0	-11.0	Peak	200	1.0	
2521.670	46.7	H	70.0	-23.3	Peak	200	1.0	

Final measurements at 3m

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Setting
2320.000	49.8	H	54.0	-4.2	AVG	26	1.0	RB 1MHz;VB 10 Hz;Pk
2359.980	48.4	H	54.0	-5.6	AVG	62	1.0	RB 1MHz;VB 10 Hz;Pk
2279.970	48.1	H	54.0	-5.9	AVG	23	1.0	RB 1MHz;VB 10 Hz;Pk
2279.590	58.1	H	74.0	-15.9	PK	23	1.0	RB 1MHz;VB 3MHz;Pk
2320.080	56.9	H	74.0	-17.1	PK	26	1.0	RB 1MHz;VB 3MHz;Pk
2359.920	56.9	H	74.0	-17.1	PK	62	1.0	RB 1MHz;VB 3MHz;Pk

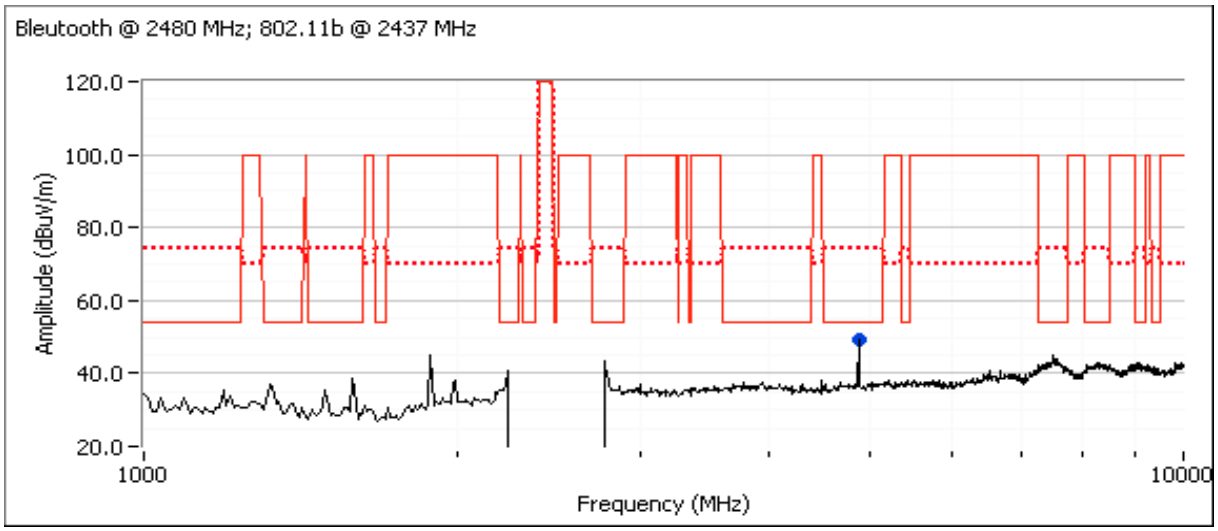
Note 2:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 8, Bluetooth/802.11bgn simultaneously: 1-10GHz, 802.11b @ 2437MHz Chain A, BT Basic Rate @ 2480MHz Chain B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.7	20.0
Chain B	7.0	6.9	8.0

Spurious Radiated Emissions, 1 - 10GHz exlcuding the allocated band:
Preamplifer and notch filter used for these scans



Preliminary Measurements (Peak versus average limit)

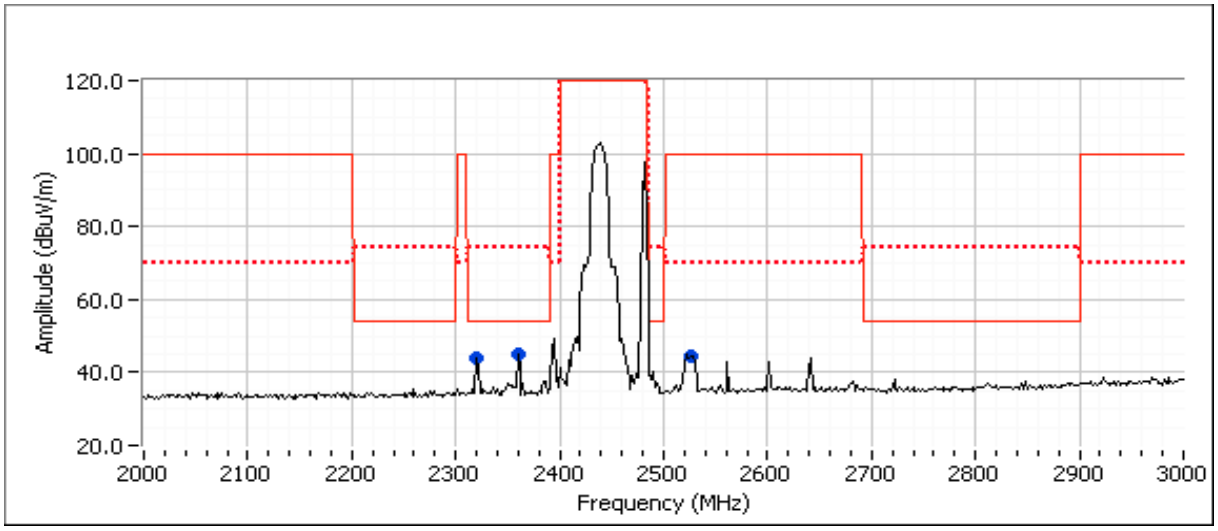
Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.820	49.5	V	54.0	-4.5	Peak	120	1.3	Note 1

Note 1:	This is the second harmonic of the 802.11b signal and not an intermodulaiton product. Measurement of harmonics directly related to the 802.11 transmitter are provided in the 802.11 radiated spurious emissions test data.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Spurious Radiated Emissions, 2 - 3GHz

Preliminary Scan at ~ 20cm from the product to idenitfy potential signals (No preamplifer used for these scans)



Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2320.000	44.0	H	54.0	-10.0	Peak	150	1.0	
2360.000	45.0	H	54.0	-9.0	Peak	150	1.0	
2526.670	44.6	H	70.0	-25.4	Peak	150	1.0	

Final measurements at 3m

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Setting
2360.030	50.5	H	54.0	-3.5	AVG	62	1.0	RB 1MHz;VB 10 Hz;Pk
2320.030	48.7	H	54.0	-5.3	AVG	26	1.0	RB 1MHz;VB 10 Hz;Pk
2359.750	57.5	H	74.0	-16.5	PK	62	1.0	RB 1MHz;VB 3MHz;Pk
2319.630	56.7	H	74.0	-17.3	PK	26	1.0	RB 1MHz;VB 3MHz;Pk

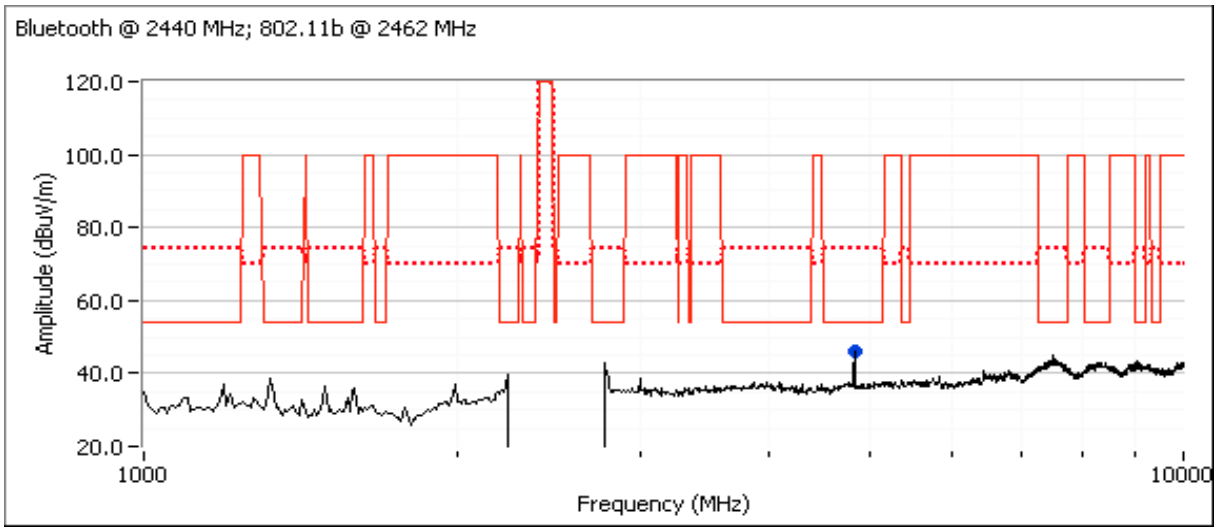
Note 2:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit is -30dBc for peak measurements in a measurement bandwidth of 100kHz.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Run # 9, Bluetooth/802.11bgn simultaneously: 1-10GHz, 802.11b mode @ 2462MHz Chain A, BT EDR @ 2440MHz Chain B

	Power Settings		
	Target (dBm)	Measured (dBm)	Software Setting
Chain A	16.5	16.8	20.0
Chain B	7.0	1.5	8.0

Spurious Radiated Emissions, 1 - 10GHz exlcuding the allocated band:
Preamplifer and notch filter used for these scans



Preliminary Measurements (Peak versus average limit)

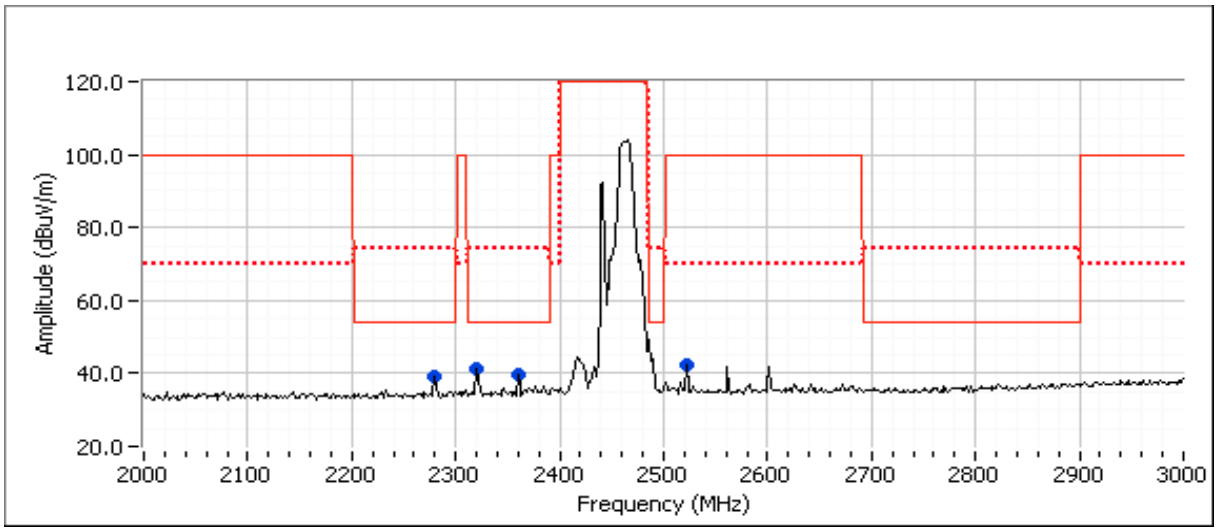
Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.810	50.5	V	54.0	-3.5	Peak	110	1.6	Note 1

Note 1:	This is the second harmonic of the 802.11b signal and not an intermodulaiton product. Measurement of harmonics directly related to the 802.11 transmitter are provided in the 802.11 radiated spurious emissions test data.

Client:	Intel Corporation	Job Number:	J80397
Model:	Intel® Centrino® Wireless-N 1030 and Intel® Centrino® Wireless-N 130	T-Log Number:	T80458
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		
Standard:	FCC.247, RSS-210 Issue 7	Class:	N/A

Spurious Radiated Emissions, 2 - 3GHz

Preliminary Scan at ~ 20cm from the product to idenitfy potential signals (No preamplifer used for these scans)



Preliminary measurements at ~ 20cm, RB=1MHz, VB=100kHz

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2280.000	39.1	H	54.0	-14.9	Peak	199	1.0	
2320.000	41.5	H	54.0	-12.5	Peak	199	1.0	
2360.000	39.5	H	54.0	-14.5	Peak	199	1.0	
2521.670	42.6	H	70.0	-27.4	Peak	199	1.0	

Final measurements at 3m

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Setting
2320.000	46.1	H	54.0	-7.9	AVG	118	1.0	RB 1MHz;VB 10 Hz;Pk
2360.000	45.0	H	54.0	-9.0	AVG	360	1.0	RB 1MHz;VB 10 Hz;Pk
2280.050	44.9	H	54.0	-9.1	AVG	58	1.0	RB 1MHz;VB 10 Hz;Pk
2320.580	55.7	H	74.0	-18.3	PK	118	1.0	RB 1MHz;VB 3MHz;Pk
2360.120	55.6	H	74.0	-18.4	PK	360	1.0	RB 1MHz;VB 3MHz;Pk
2280.220	55.4	H	74.0	-18.6	PK	58	1.0	RB 1MHz;VB 3MHz;Pk

Note 2:	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.