

Electromagnetic Emissions Test Report

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

Intel Corporation

Model: 112BNHMW

UPN: 1000M-112BNH (Model # 112BNHMW)
1000M-112BNHU (Model # 112BNHU)
FCC ID: PD9112BNH and PD9112BNHU

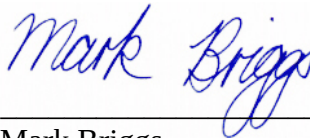
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TEST SITE(S): Elliott Laboratories
41039 Boyce Road.
Fremont, CA. 94538-2435
IC Site Registration #: 2845B-3, 2845B-4

REPORT DATE: May 31, 2009

FINAL TEST DATE: May 7, May 8, May 18, May 19, May 20 and
May 21, 2009

AUTHORIZED SIGNATORY: _____



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Testing Cert #2016-01

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REVISION HISTORY

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SCOPE

An electromagnetic emissions test has been performed on the Intel Corporation model 112BNHMW 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.

The test results recorded herein are based on a single type test of the Intel Corporation model 112BNHMW and therefore apply only to the tested sample. The sample was selected and prepared by Steve Hackett of Intel Corporation

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 112BNHMW 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 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.).

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 and DSSS	Device must use digital modulation	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	802.11b: 9.3 MHz 802.11g: 16.5 MHz n20: 17.7 MHz n40: 35.8 MHz	>500kHz	Complies
	RSP100	99% Bandwidth	802.11b: 13.14 MHz 802.11g: 17.1 MHz n20: 18.6 MHz n40: 36.7 MHz	Information only	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	802.11b: 16.3 dBm 802.11g: 16.8 dBm (0.048 W) n20: 15.6 dBm n40: 11.2 dBm (0.0132 W) EIRP = 0.100 W ^{Note 1}	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	802.11b: -7.5 dBm / 3kHz 802.11g: -8.5 dBm / 3 kHz 802.11n 20MHz -9.7 dBm / 3 kHz 802.11n 40MHz -18.7 dBm / 3 kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All emissions less than -30dBc limit	< -30dBc ^{Note 2}	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	<u>802.11n 40MHz</u> 51.1dBμV/m @ 2389.0MHz (margin: 2.9dB) <u>802.11g</u> 50.8dBμV/m @ 2390.0MHz (margin: 3.2dB)	15.207 in restricted bands, all others <-30dBc ^{Note 2}	Complies

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) / RMS averaging over a time interval, as permitted under RSS 210 section A8.4(4).

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	uFL non-standard connector	Non-standard connector	Complies
-	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	41.8dB μ V/m @ 110.648MHz	RSS GEN 7.2.3 Table 1	Complies (-1.7dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	43.3dB μ V @ 1.929MHz	Refer to standard	Complies (-12.7dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements	Refer to OET 65, FCC Part 1 and RSS 102	Complies
	RSP 100 RSS GEN 7.1.5	User Manual	Page 218 of Condor Peak User Guide pdf document.	Statement required regarding non-interference	Complies
	RSP 100 RSS GEN 7.1.5	User Manual	Not applicable, device is installed by OEM or integrator and end user does not have access to the antennas.	Statement regarding detachable antenna	Complies

MEASUREMENT UNCERTAINTIES

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

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Intel Corporation model 112BNHMW is a PCI express form factor (half-mini) card that is designed to provide a 1x2 802.11bgn interface for host systems such as laptop PCs.

For module-level tests of the transceiver the card was installed into a test fixture that was controlled from a laptop PC. The test fixture exposed the card outside of a host system to meet the modular test requirements of FCC and Industry Canada. The digital device radiated emissions and AC conducted emissions tests were performed with the card installed into the mini-PCI bus of a laptop, with the card located inside the laptop as would be the case in normal use. The electrical rating of the EUT is 3.3Vdc (via mini PCI bus).

The sample was received on May 7, 2009 and tested on May 7, May 8, May 18, May 19, May 20 and May 21, 2009. The EUT consisted of the following component(s):

Manufacturer	Model	Description	MAC Address	FCC ID
Intel	112BNHMW	1x2 802.11bgn Half-Mini PCIe	001E6400E972	PD9112BNH
			001E6400E9B8	PD9112BNHU
001E6400E9B8 was used for AC conducted emissions testing. 001E6400E972 was used for all others.				

ANTENNA SYSTEM

The antenna system used with the Intel Corporation model 112BNHMW would typically be integrated into the display section of the host laptop. For the purposes of testing the device was tested with the Intel Universe Antenna (gain 3.2dBi in the 2.4GHz band) and the antennas were mounted to a glass fixture to simulate the laptop installation.

The antenna connects to the EUT via a non-standard mini-UFL antenna connector, thereby meeting the requirements of FCC 15.203.

ENCLOSURE

The EUT does not have an enclosure. The device does have a shield in order to meet the requirements for certification under the FCC and Industry Canada requirements for modular approval.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

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

Manufacturer	Model	Description	Serial Number	FCC ID
Toshiba	PSAG8U-04001W	Laptop PC(Host)	49290792Q	DoC
Toshiba	ADP-75SB AB	Laptop AC Transformer	N/A	N/A
HP	ThinkJet 5650	Printer	MY3883K42P	DoC
Netgear	FS108	HUB(Fast Ethernet Switch)	FS18H2BCB092554	N/A
The Ethernet Hub was located remotely; all other equipment was located locally.				

The following equipment was used as support equipment for all other measurements:

Manufacturer	Model	Description	Serial Number	FCC ID
Intel	None	PCIe test fixture		N/A
Dell	-	Laptop PC	Prototype	None
Topward	-	DC Supply		N/A

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Laptop Ethernet	HUB(Remote)	Multiwire	Unshielded	10.0
Laptop DC	AC-DC adapter	integral to adapter	Unshielded	1.0
AC-DC adapter AC	AC power	3-wire	Unshielded	1.0
Laptop USB	Printer	USB	Shielded (With integrated Ferrite)	2.0
Printer	AC power Adapter	3-wire	Unshielded (With integrated Ferrite)	1.0

For all other tests the I/O cabling configuration was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Test fixture PCI	Laptop PCI	Ribbon Cable	Unshielded	0.8
Test fixture 3.3Vdc	Bench supply	2-wire	Unshielded	0.8

EUT OPERATION

During AC conducted emissions testing the EUT was being controlled by the CRTU tool to operate in a continuous transmit mode on the center channel. In addition the laptop was displaying a scrolling 'H' pattern on the screen and had link enabled to both the ethernet and USB peripherals. During receiver tests the EUT was being controlled by the Intel CRTU tool to operate in a continuous receive mode on the center channel.

During transmitter tests the EUT was being controlled by the Intel CRTU tool to operate in a continuous transmit mode on the top, bottom or center channel as required and in each of the different modulation modes. The data rates of 1Mb/s for 802.11b, 6Mb/s for 802.11g, 6.5Mb/s / 13.0Mb/s for 802.11n modes were selected based on preliminary testing that identified those data rates having the highest output power in each mode (see table below) when the device is operated under EEPROM control, which reduces power as the data rate is increased to ensure signal integrity.

Mode	Data Rate	Output Power
802.11b	1	14.8
	2	14.7
	5.5	14.6
	11	14.6
802.11g	6	12.5
	9	12.4
	12	12.3
	18	12.3
	24	12.2
	36	12.1
	48	12.1
	54	10.6
802.11n (20MHz)	6.5	12.3
	13	12.1
	19.5	12.2
	26	12.2
	39	12.1
	52	12.0
	58.5	10.9
	65	8.9
802.11n (40MHz)	13.5	9.2
	27	9.1
	40.5	9.0
	54	8.9
	81	8.8
	108	8.6
	121.5	8.6
	135	8.5

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on May 7, May 8, May 18, May 19, May 20 and May 21, 2009 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 3	769238	IC 4549-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	IC 4549-4	

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 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

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

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

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

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

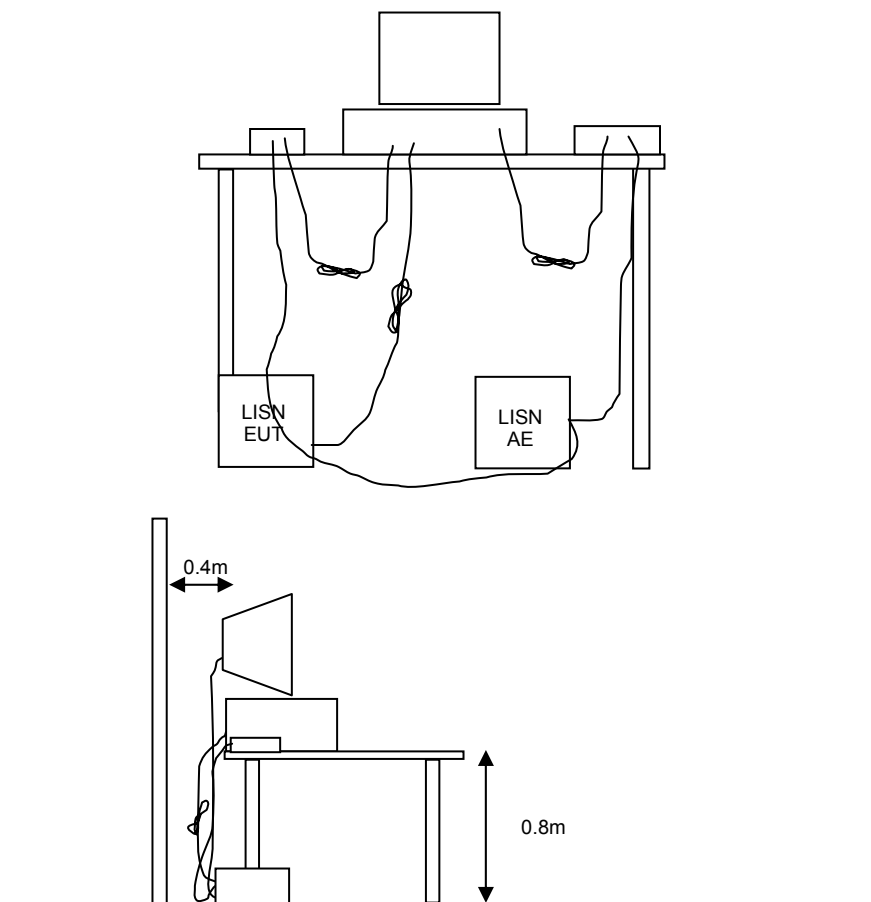
TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.



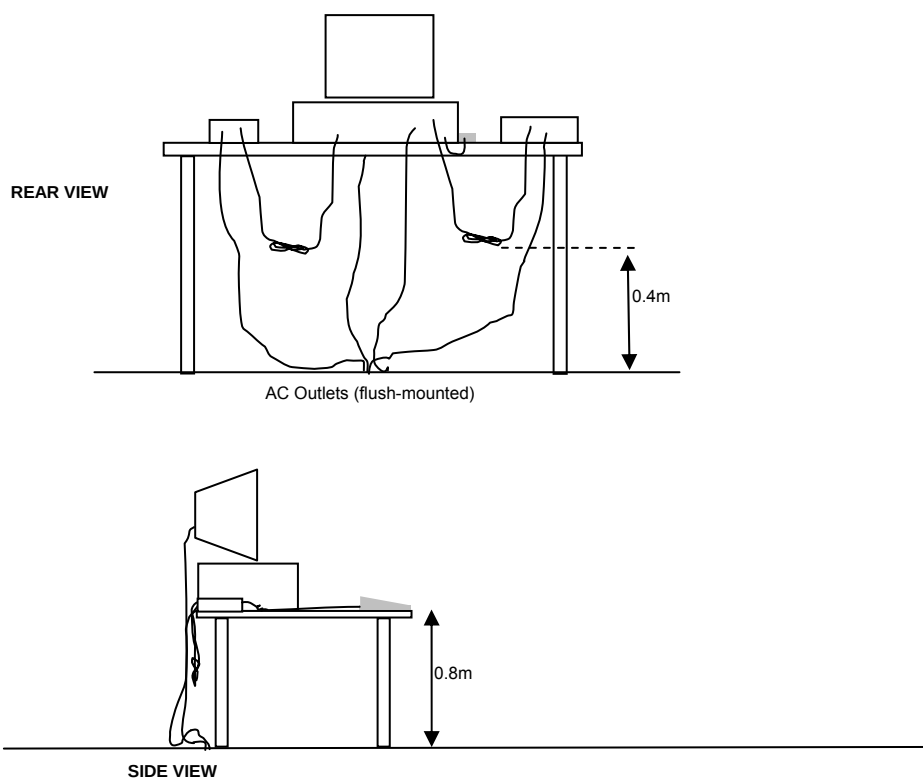
RADIATED EMISSIONS

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

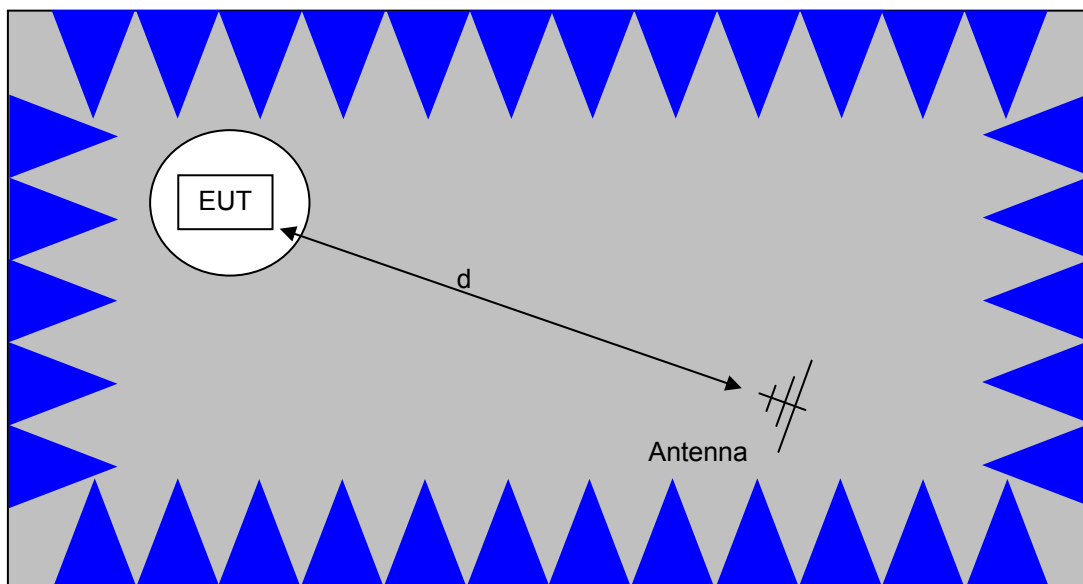
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

When testing above 18 GHz, the receive antenna is located at 1 meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

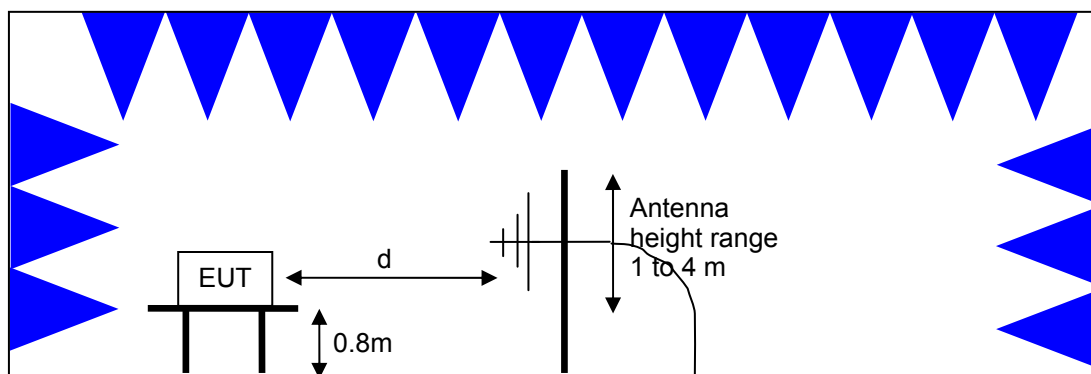


Typical Test Configuration for Radiated Field Strength Measurements



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

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



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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands¹ (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:

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

where:

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

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

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

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

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

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

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

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

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

EXHIBIT 1: Test Equipment Calibration Data**Radiated Emissions, 30 - 6,500 MHz, 07-May-09**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	786	06-Dec-09
Hewlett Packard	SpectAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	10-Apr-10

Radiated Emissions, 30 - 6,500 MHz, 08-May-09

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18GHz	3115	868	10-Jun-10
Hewlett Packard	SpectAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	10-Apr-10

Radio Antenna Port (Power and Spurious Emissions), 08-May-09

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	786	06-Dec-09
Hewlett Packard	SpectAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	10-Apr-10

Radiated Emissions, 30 - 26,500 MHz, 19-May-09

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	06-Jun-09
EMCO	Antenna, Horn, 1-18GHz	3115	868	10-Jun-10
Hewlett Packard	SpectAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	10-Apr-10
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	06-Nov-09
Hewlett Packard	Head (Inc W1-W4, 1742 , 1743) Blue	84125C	1620	22-May-09
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	02-Dec-09
Rohde & Schwarz	Attenuator, 20 dB , 50 □, 10W, DC-18 GHz	20dB, 10W, Type N	1795	16-Jun-09
Rohde & Schwarz	Power Sensor 100 uW - 10 Watts	NRV-Z53	1796	16-Jun-09
A.H. Systems	Blue System Horn, 18-40GHz	SAS-574, p/n: 2581	2159	17-Mar-10
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	19-Sep-09
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103	1632	13-Apr-10

Radio Antenna Port (Power and Spurious Emissions), 20-May-09

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1422	06-Nov-09
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	20-Oct-09

EXHIBIT 2: Test Measurement Data

61 Pages

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
		Account Manager:	Christine Vu Krebill
Contact:	Steve Hackett		Mark Briggs
Emissions Standard(s):	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Intel Corporation

Model

112BNHMW (1x2 bgn Half-Mini Card)

Date of Last Test: 5/21/2009

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	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: 5/21/2009
 Test Engineer: Mehran Birgani

Config. Used: #2 - make sure we have full details
 Config Change: EUT installed inside host system, minimum system per ANSI for PC peripheral

Test Location: FT Chamber #4

Host Unit Voltage 120V/60Hz

General Test Configuration

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

Ambient Conditions:

Temperature: 18-23 °C
 Rel. Humidity: 30-45 %

Summary of Results

MAC Address: 001E6400E9B8 CRTU Tool Version 5.10.24.0000 Driver version 12.5.0.41

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	FCC Class B	Pass	43.3dBµV @ 1.929MHz (-12.7dB)

Modifications Made During Testing

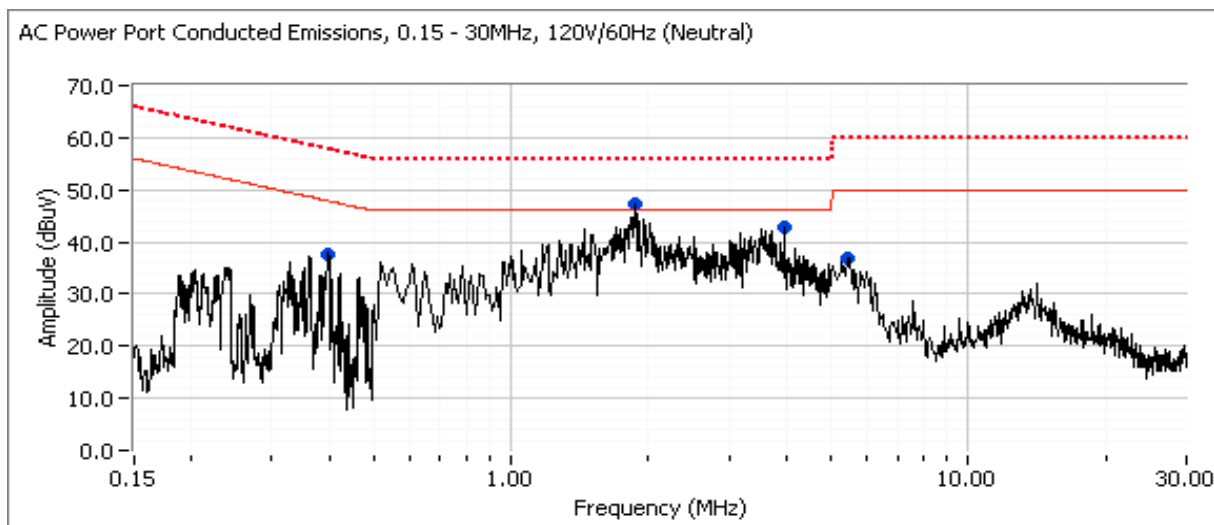
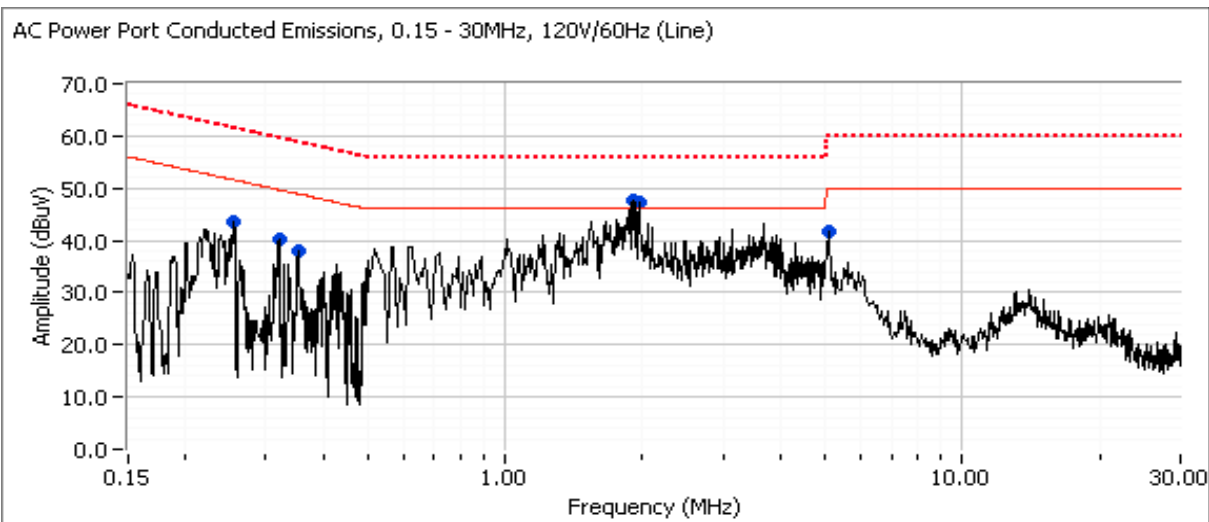
No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHWW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	B

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



Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	B

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

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

Frequency MHz	Level dBμV	AC Line	FCC Class B		Detector QP/Ave	Comments
			Limit	Margin		
1.929	47.5	Line	46.0	1.5	Peak	
1.951	47.4	Line	46.0	1.4	Peak	
1.865	47.3	Neutral	46.0	1.3	Peak	
3.963	42.7	Neutral	46.0	-3.3	Peak	
0.257	43.6	Line	51.6	-8.0	Peak	
5.026	41.6	Line	50.0	-8.4	Peak	
0.319	40.2	Line	49.7	-9.5	Peak	
0.398	37.7	Neutral	47.9	-10.2	Peak	
0.353	37.8	Line	48.9	-11.1	Peak	
5.327	37.0	Neutral	50.0	-13.0	Peak	

Final quasi-peak and average readings

Frequency MHz	Level dBμV	AC Line	FCC Class B		Detector QP/Ave	Comments
			Limit	Margin		
0.257	19.0	Line	51.5	-32.5	AVG	AVG (0.10s)
0.319	19.1	Line	49.7	-30.6	AVG	AVG (0.10s)
0.353	17.6	Line	48.9	-31.3	AVG	AVG (0.10s)
0.398	15.9	Neutral	47.9	-32.0	AVG	AVG (0.10s)
1.865	30.2	Neutral	46.0	-15.8	AVG	AVG (0.10s)
1.929	31.0	Line	46.0	-15.0	AVG	AVG (0.10s)
1.951	29.6	Line	46.0	-16.4	AVG	AVG (0.10s)
3.963	24.1	Neutral	46.0	-21.9	AVG	AVG (0.10s)
5.026	21.4	Line	50.0	-28.6	AVG	AVG (0.10s)
5.327	21.4	Neutral	50.0	-28.6	AVG	AVG (0.10s)
0.257	38.6	Line	61.5	-22.9	QP	QP (1.00s)
0.319	36.1	Line	59.7	-23.6	QP	QP (1.00s)
0.353	34.7	Line	58.9	-24.2	QP	QP (1.00s)
0.398	31.9	Neutral	57.9	-26.0	QP	QP (1.00s)
1.865	42.5	Neutral	56.0	-13.5	QP	QP (1.00s)
1.929	43.3	Line	56.0	-12.7	QP	QP (1.00s)
1.951	42.6	Line	56.0	-13.4	QP	QP (1.00s)
3.963	33.5	Neutral	56.0	-22.5	QP	QP (1.00s)
5.026	31.1	Line	60.0	-28.9	QP	QP (1.00s)
5.327	29.7	Neutral	60.0	-30.3	QP	QP (1.00s)

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions - 802.11b Mode

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: 5/19/2009
 Test Engineer: Suhaila Khushzad
 Test Location: Chamber # 5

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: 21 °C
 Rel. Humidity: 45 %

Summary of Results

MAC Address: 001E6400E972 CRTU Tool Version 5.10.24.0 Driver version 12.5.0.41

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	18.5	-	Output Power	15.247(b)	Pass	16.3 dBm
2	18.5	-	Power spectral Density (PSD)	15.247(d)	Pass	-7.50 dBm/3kHz
3	19.0	-	Minimum 6dB Bandwidth	15.247(a)	Pass	9.3 MHz
3	19.0	-	Maximum 99% Bandwidth	RSS GEN	-	13.14 MHz
4		-	Spurious emissions	15.247(b)	Pass	All emissions less than -30dBc limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

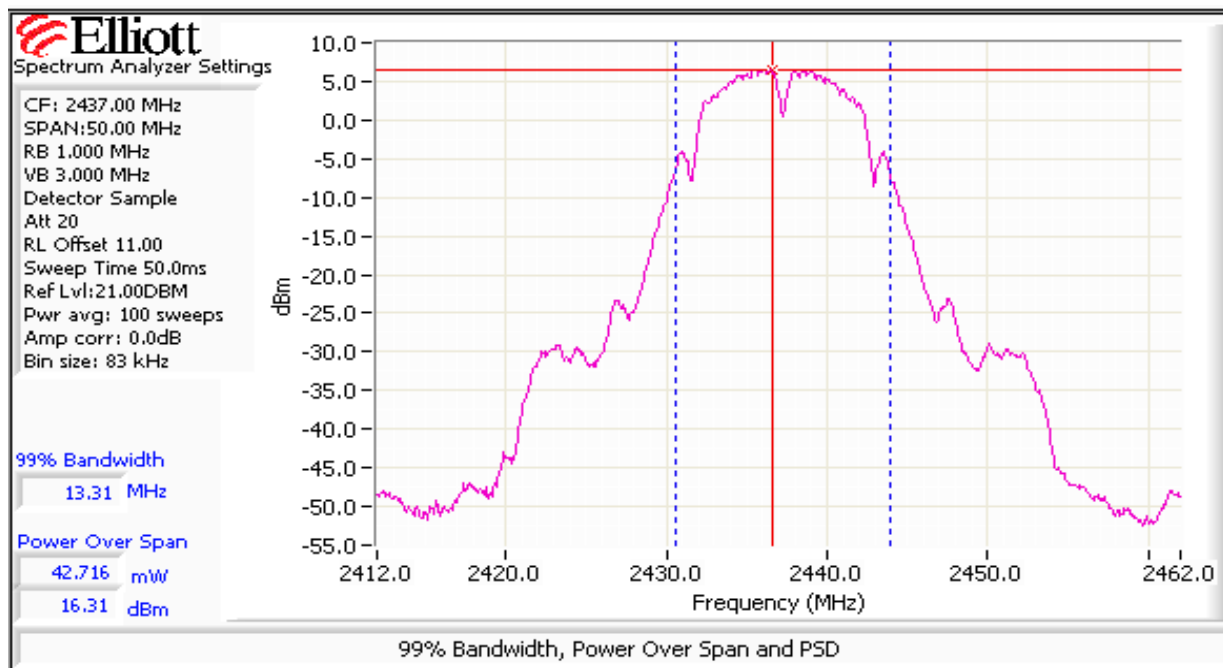
No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #1: Output Power

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP ^{Note 2}		Output Power Note 3	
		(dBm) ¹	mW			dBm	W	Target	Actual
18	2412	16.2	41.2	3.2	Pass	19.4	0.086	16.5	16.6
18.5	2437	16.3	42.8	3.2	Pass	19.5	0.089	16.5	16.6
19	2462	16.2	41.6	3.2	Pass	19.4	0.087	16.3	16.5

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz. Spurious limit is -30dBc because this method was used. The output power limit is 30dBm
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.



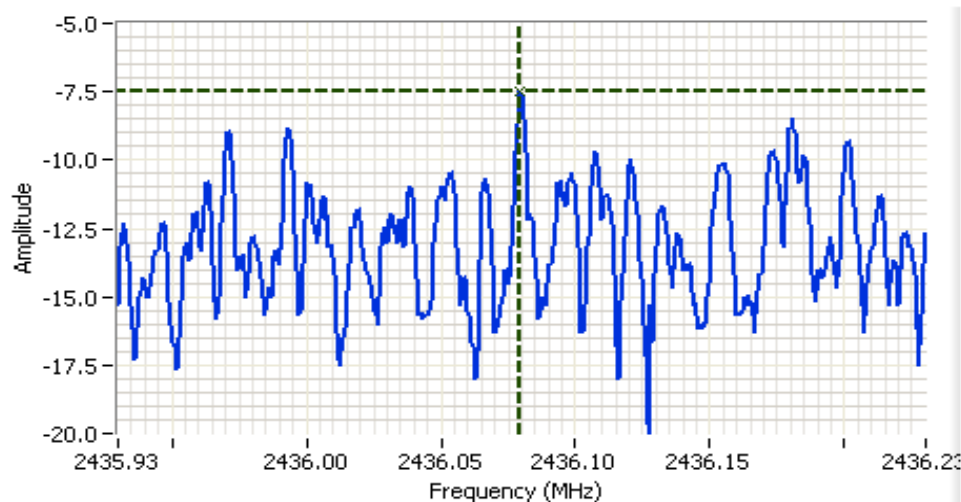
Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) Note 1		
18	2412	-8.8	8.0	Pass
18.5	2437	-7.5	8.0	Pass
19	2462	-8.2	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.



Analyzer Settings

HP8564E,EMI
 CF: 2436.080 MHz
 SPAN:300 kHz
 RB 3.00 kHz
 VB 10.00 kHz
 Detector POS
 Att 20
 RL Offset 11.00
 Sweep Time 100.0s
 Ref Lvl:21.00DBM

Comments

PSD= -7.50dBm/3kHz
 2437 MHz

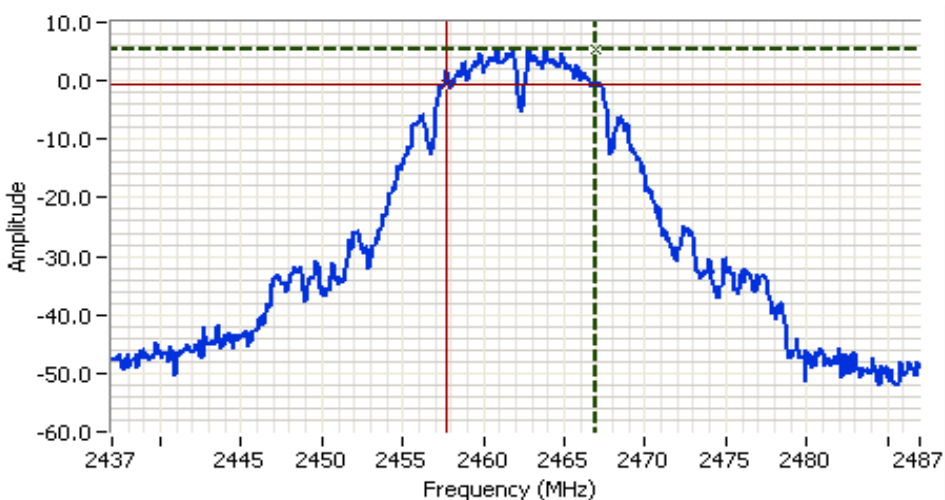
Cursor 1	2436.0796	-7.50	
	0.0000	0.00	

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
18	2412	100k	9.8	13.39
18.5	2437	100k	9.8	13.31
19	2462	100k	9.3	13.14

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



Analyzer Settings

HP8564E,EMI
 CF: 2462.000 MHz
 SPAN:50.000 MHz
 RB 100 kHz
 VB 100 kHz
 Detector POS
 Att 20
 RL Offset 11.00
 Sweep Time 50.0ms
 Ref Lvl:21.00DBM

Comments

6dB BW: 9.333 MHz
 2462 MHz

Cursor 1	2467.0000	5.50	
Cursor 2	2457.6667	-0.50	

Delta Freq. 9.333

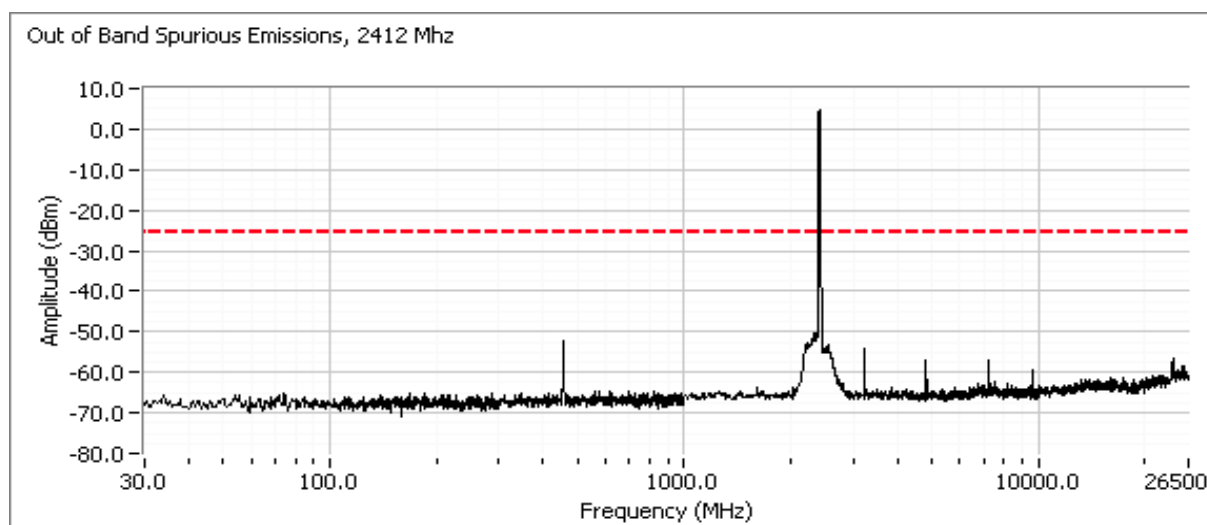
Delta Amplitude 6.00

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

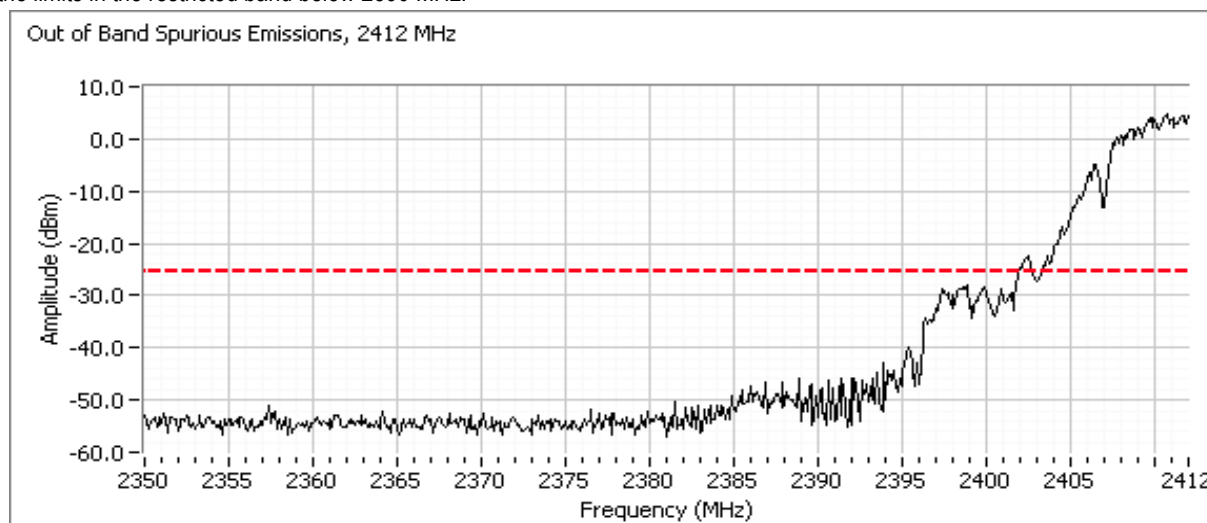
Run #4: Out of Band Spurious Emissions

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

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

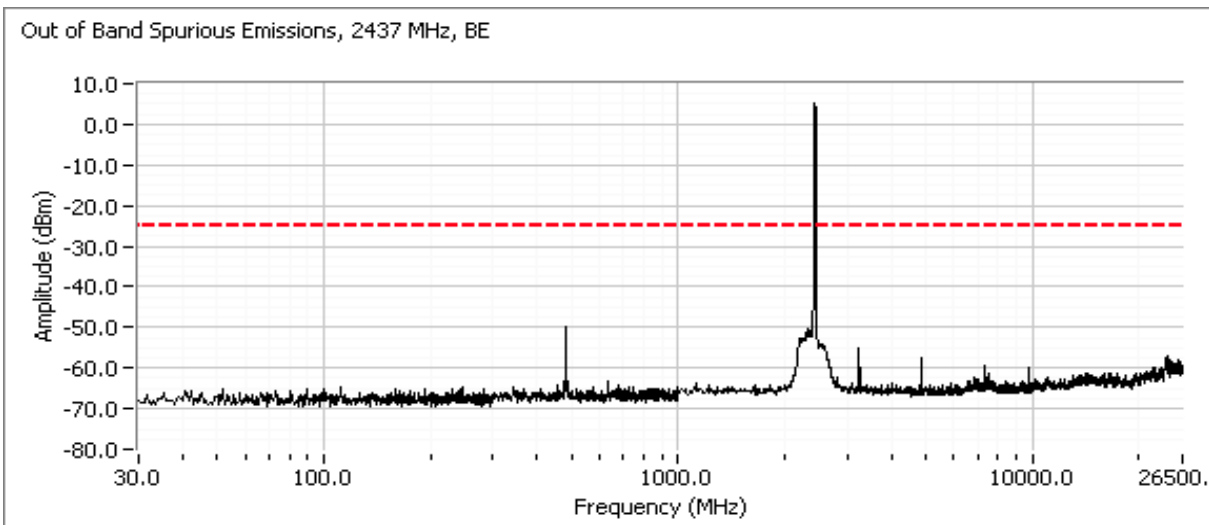


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

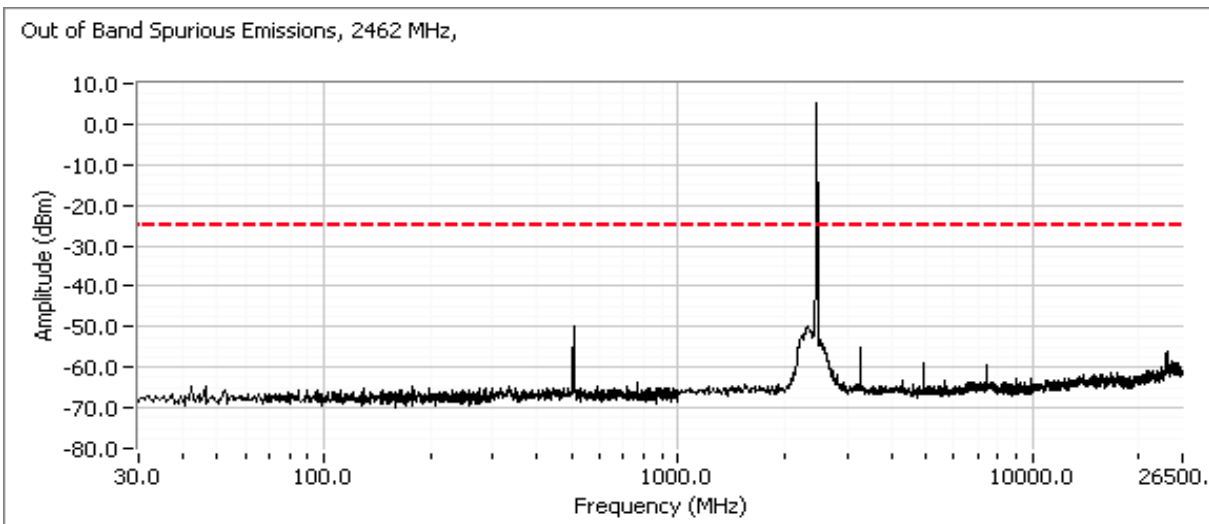


Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

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



Plots for high channel, power setting(s) = 19



Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHWW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions - 802.11g Mode

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: 5/20/2009
 Test Engineer: Suhaila Khushzad
 Test Location: Chamber # 5

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 °C
 Rel. Humidity: 43 %

Summary of Results

MAC Address: 001E6400E972 CRTU Tool Version 5.10.24.0 Driver version 12.5.0.41

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	23	-	Output Power	15.247(b)	Pass	16.8 dBm
2	23	-	Power spectral Density (PSD)	15.247(d)	Pass	-8.5 dBm/3kHz
3	17	-	Minimum 6dB Bandwidth	15.247(a)	Pass	16.5 MHz
3	17	-	Maximum 99% Bandwidth	RSS GEN	-	17.1 MHz
4	23	-	Spurious emissions	15.247(b)	Pass	All emissions less than -30dBc limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

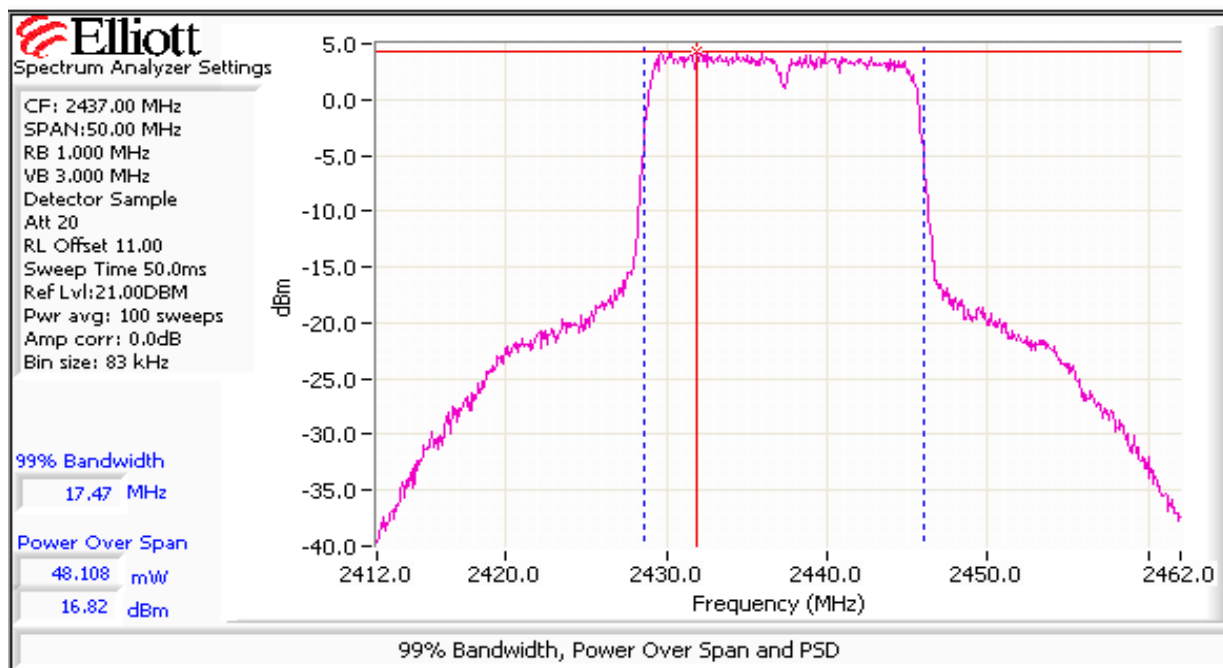
No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #1: Output Power

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP ^{Note 2}		Output Power Note 3	
		(dBm) ¹	mW			dBm	W	Target	Actual
17	2412	12.7	18.5	3.2	Pass	15.9	0.039	12.2	12.4
23	2437	16.8	48.1	3.2	Pass	20.0	0.100	16.5	16.5
17	2462	11.2	13.0	3.2	Pass	14.4	0.027	11.2	11.2

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz. Spurious limit is -30dBc because this method was used. The output power limit is 30dBm
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.



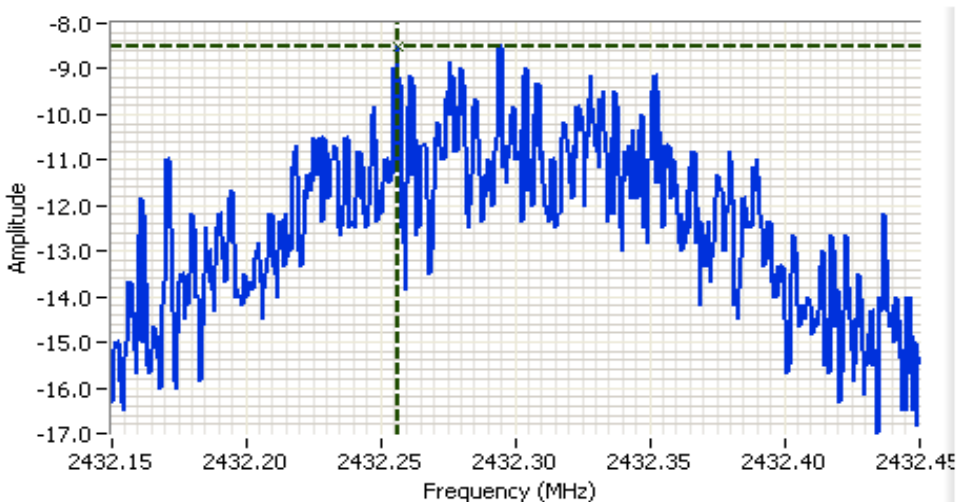
Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) Note 1		
17	2412	-11.2	8.0	Pass
23	2437	-8.5	8.0	Pass
17	2462	-12.7	8.0	Pass

Note 1:

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



Analyzer Settings

HP8564E,EMI
 CF: 2432.300 MHz
 SPAN:300 kHz
 RB 3.00 kHz
 VB 10.00 kHz
 Detector POS
 Att 20
 RL Offset 11.00
 Sweep Time 100.0s
 Ref Lvl:21.00DBM

Comments

PSD = -8.50dB/3kHz
 2437 MHz

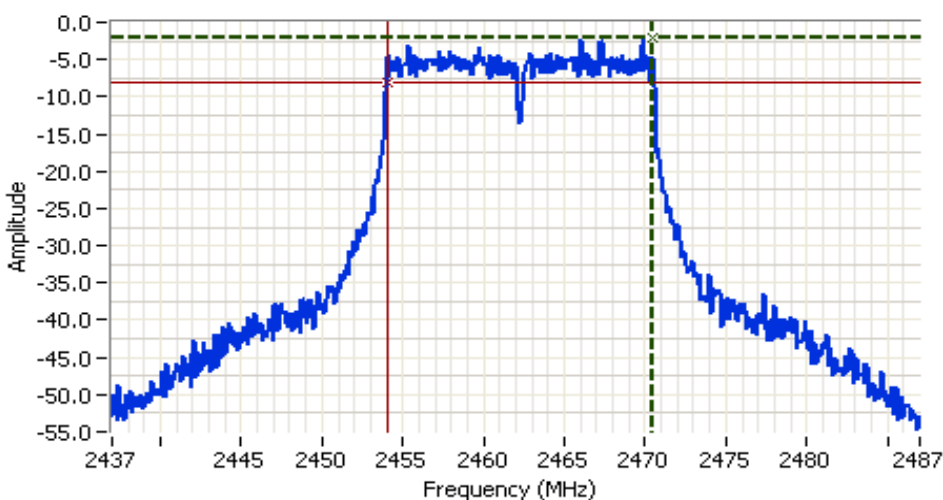
Cursor 1	2432.2563	-8.50		
	0.0000	0.00		

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
17	2412	100k	16.6	17.2
23	2437	100k	16.5	17.5
17	2462	100k	16.5	17.1

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



Analyzer Settings

HP8564E,EMI
 CF: 2462.000 MHz
 SPAN:50.000 MHz
 RB 100 kHz
 VB 100 kHz
 Detector POS
 Att 20
 RL Offset 11.00
 Sweep Time 50.0ms
 Ref Lvl:21.00DBM

Comments

6dB BW: 16.500 MHz
 2462 MHz

Cursor 1	2470.5000	-2.00			
Cursor 2	2454.0000	-8.00			

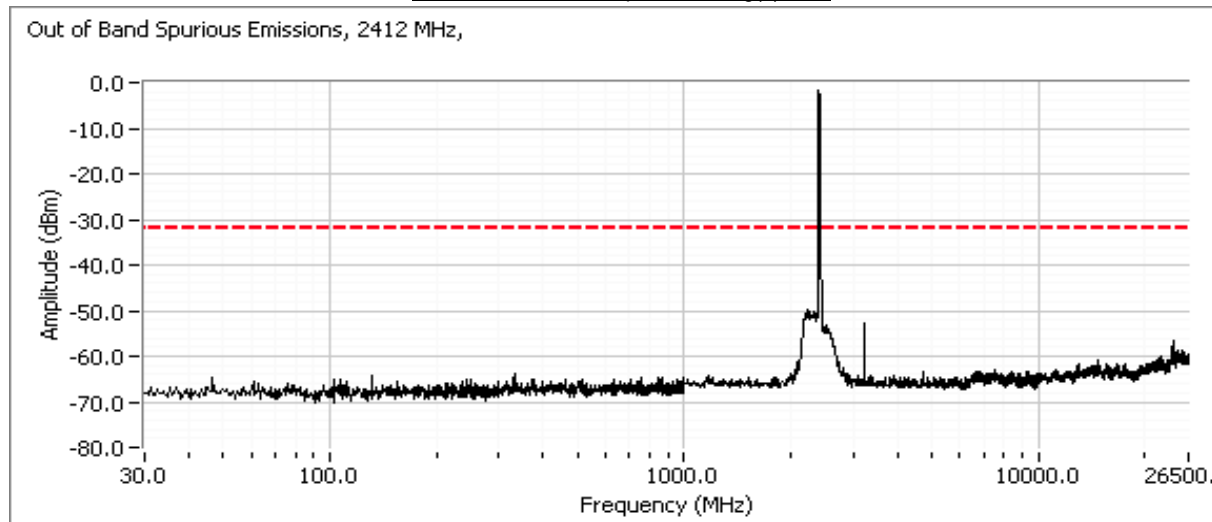
Delta Freq. 16.500
 Delta Amplitude 6.00

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHWW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

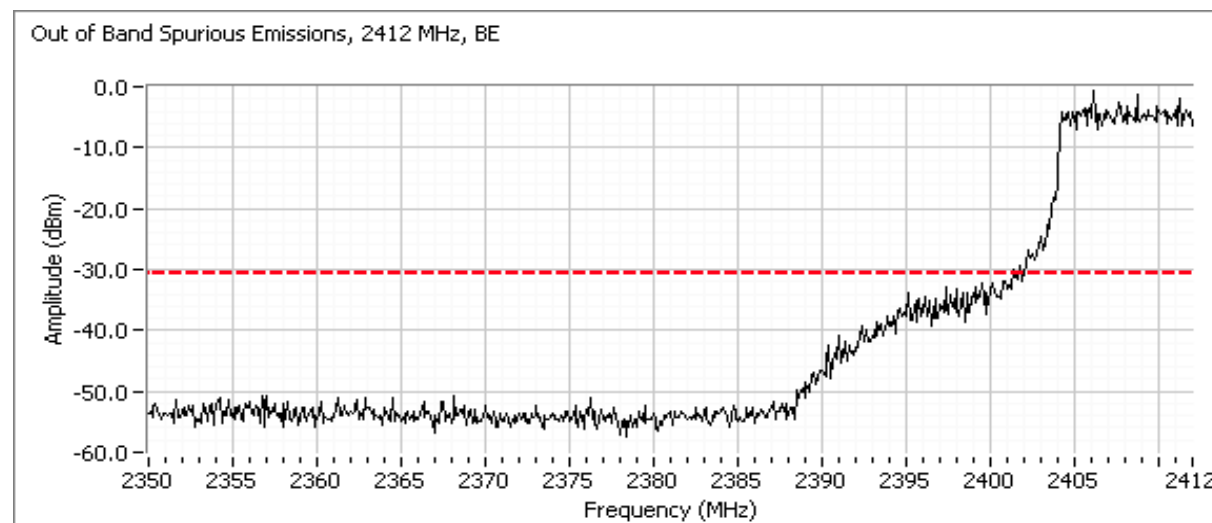
Run #4: Out of Band Spurious Emissions

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

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

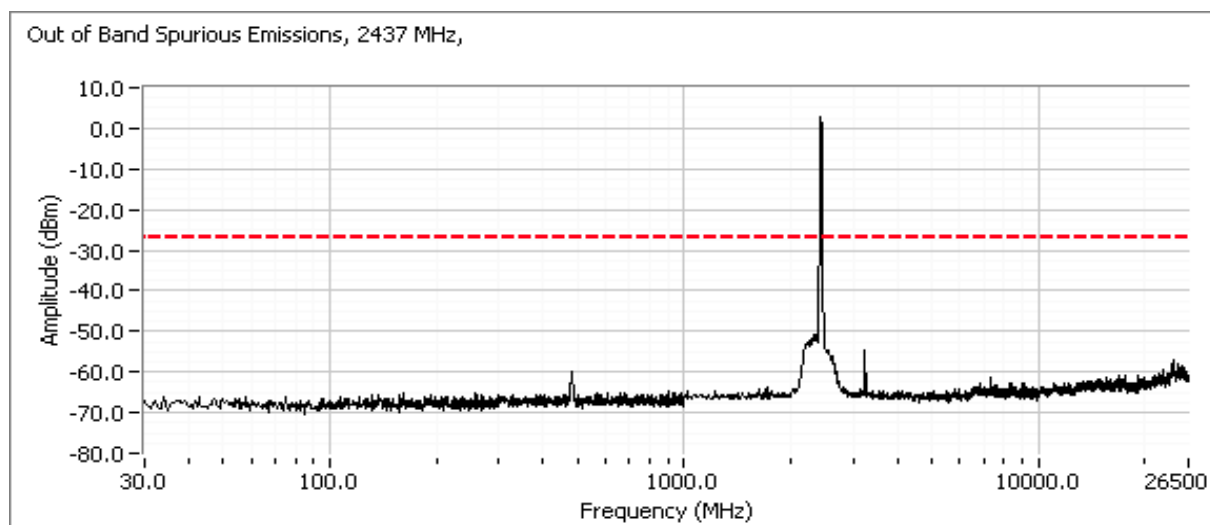


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

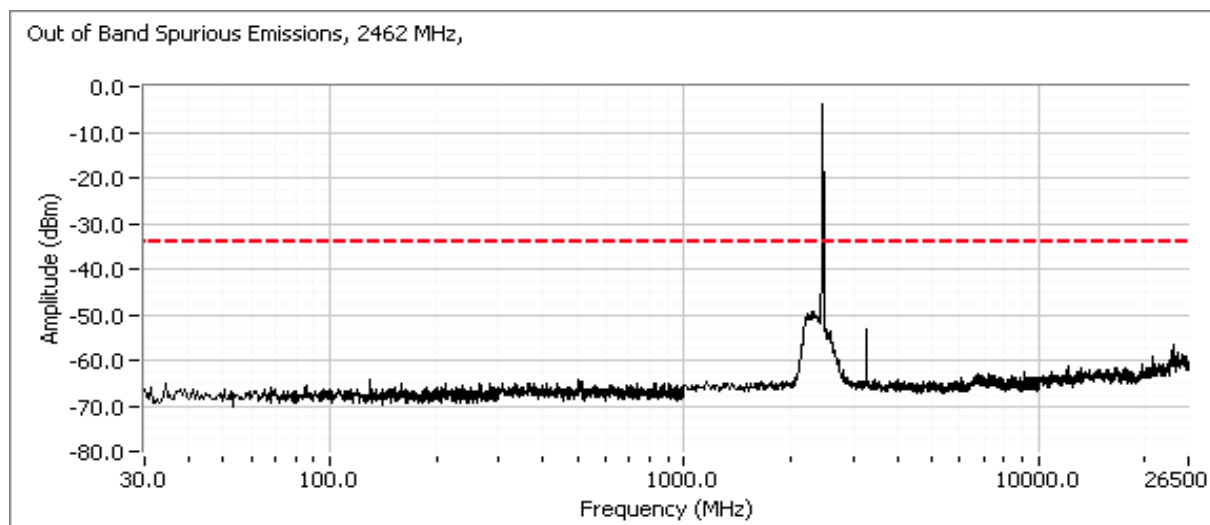


Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

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



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



Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions - 802.11n (20MHz) Mode

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: 5/20/2009
 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: 22.4 °C
 Rel. Humidity: 41 %

Summary of Results

MAC Address: 001E6400E972 CRTU Tool Version 5.10.24.0 Driver version 12.5.0.41

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	23.5	-	Output Power	15.247(b)	Pass	15.6 dBm
2	23.5	-	Power spectral Density (PSD)	15.247(d)	Pass	-9.7 dBm/3kHz
3	16.5	-	Minimum 6dB Bandwidth	15.247(a)	Pass	17.7 MHz
3	23.5	-	Maximum 99% Bandwidth	RSS GEN	-	18.6 MHz
4	23.5	-	Spurious emissions	15.247(b)	Pass	All emissions less than -30dBc limit

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

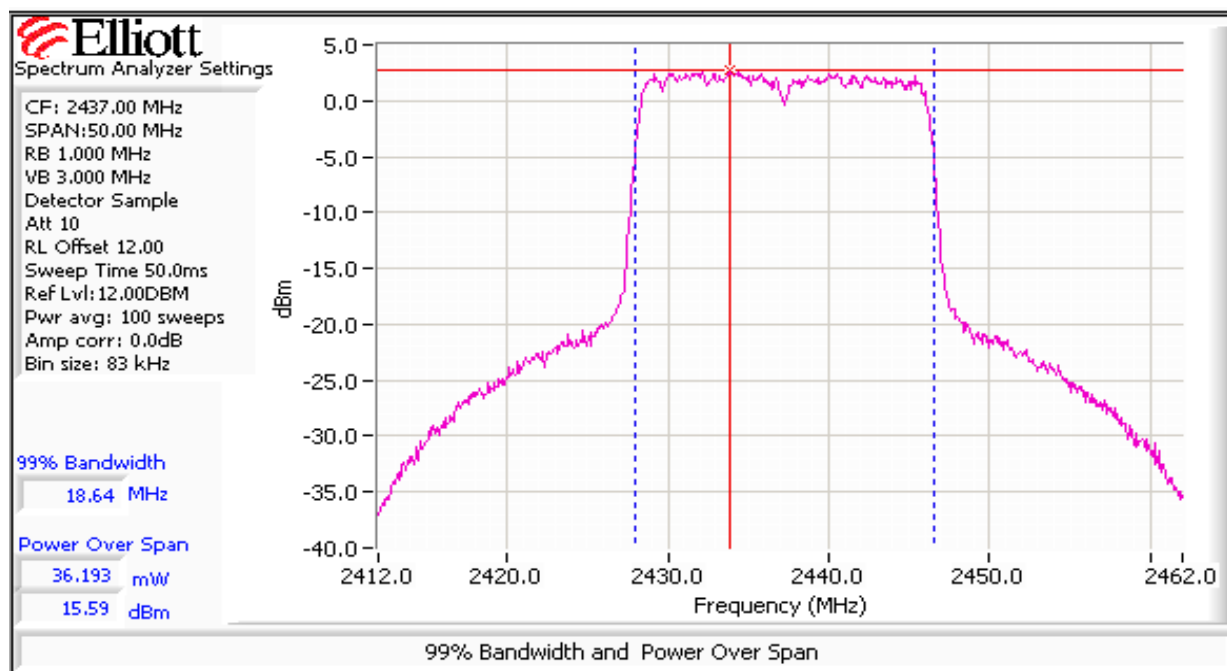
No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #1: Output Power

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP ^{Note 2}		Output Power Note 3	
		(dBm) ¹	mW			dBm	W	Target	Actual
16.5	2412	10.5	11.3	3.2	Pass	13.7	0.024	11.6	11.7
23.5	2437	15.6	36.3	3.2	Pass	18.8	0.076	16.5	16.6
17	2462	9.7	9.3	3.2	Pass	12.9	0.019	10.7	10.8

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz. Spurious limit is -30dBc because this method was used. The output power limit is 30dBm
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.



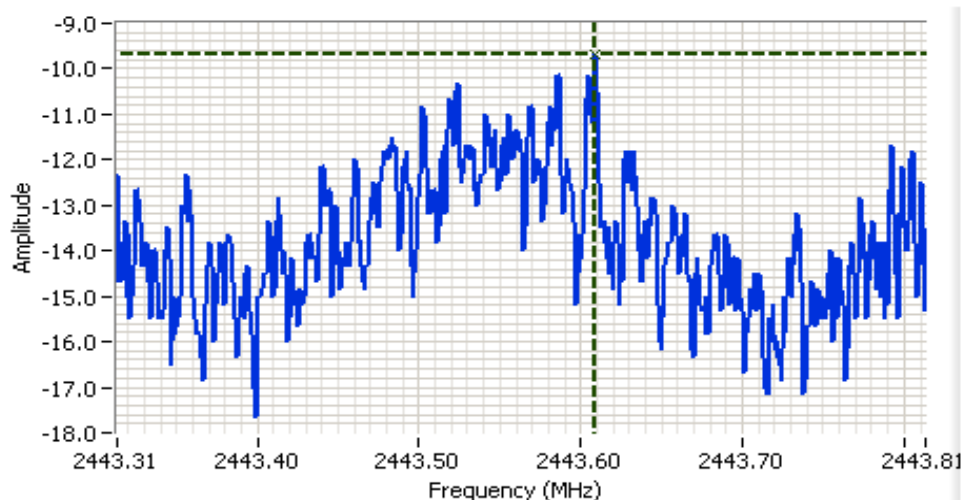
Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) Note 1		
16.5	2412	-15.7	8.0	Pass
23.5	2437	-9.7	8.0	Pass
17	2462	-15.5	8.0	Pass

Note 1:

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



Analyzer Settings

HP8564E, EMI
CF: 2443.563 MHz
SPAN: 500 kHz
RB 3.00 kHz
VB 10.00 kHz
Detector Sample
Att 10
RL Offset 12.00
Sweep Time 100.0s
Ref Lvl: 12.00 DBM

Comments

PSD = -9.67 dBm/3kHz
2437 MHz

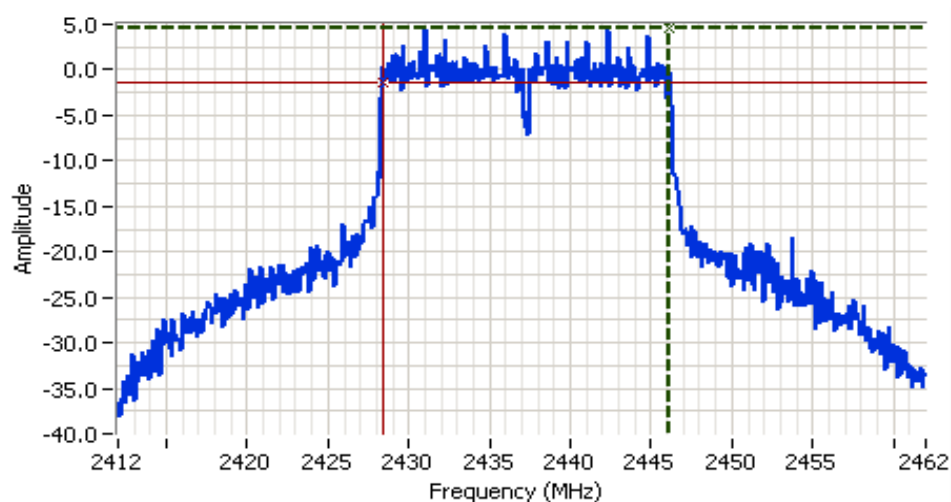
Cursor 1	2443.6091	-9.67	↕	✱	🔒
	0.0000	0.00	↕		🔒

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
16.5	2412	100kHz	17.7	18.3
23.5	2437	100kHz	17.8	18.6
17	2462	100kHz	17.8	18.3

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



Analyzer Settings

HP8564E,EMI
 CF: 2437.000 MHz
 SPAN:50.000 MHz
 RB 100 kHz
 VB 100 kHz
 Detector Sample
 Att 10
 RL Offset 12.00
 Sweep Time 50.0ms
 Ref Lvl:12.00DBM

Comments

6dB BW: 17.750 MHz
 2437 MHz

Cursor 1	2446.1667	4.67	
Cursor 2	2428.4167	-1.33	

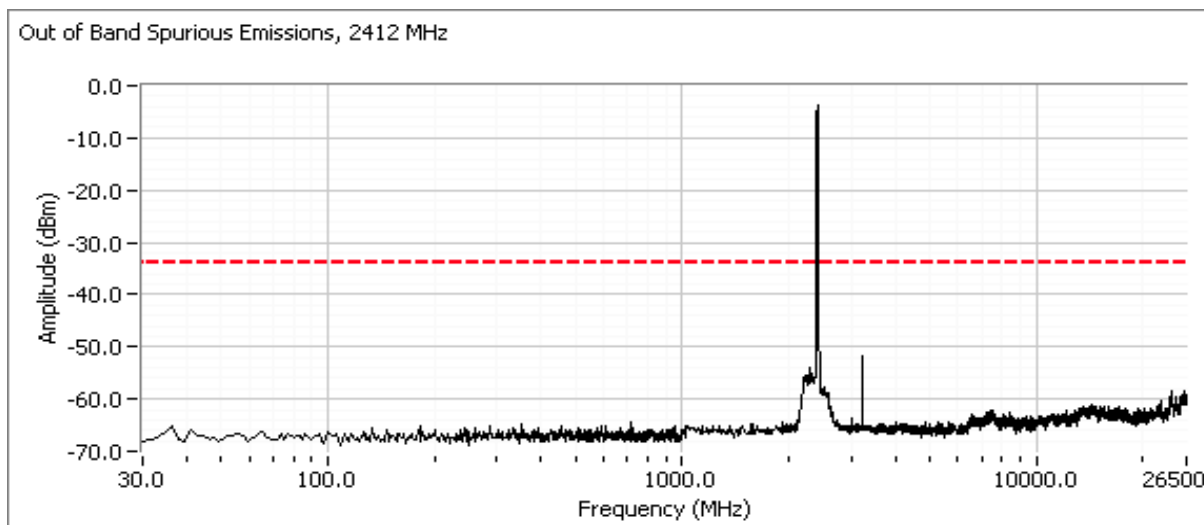
Delta Freq. 17.750
 Delta Amplitude 6.00

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

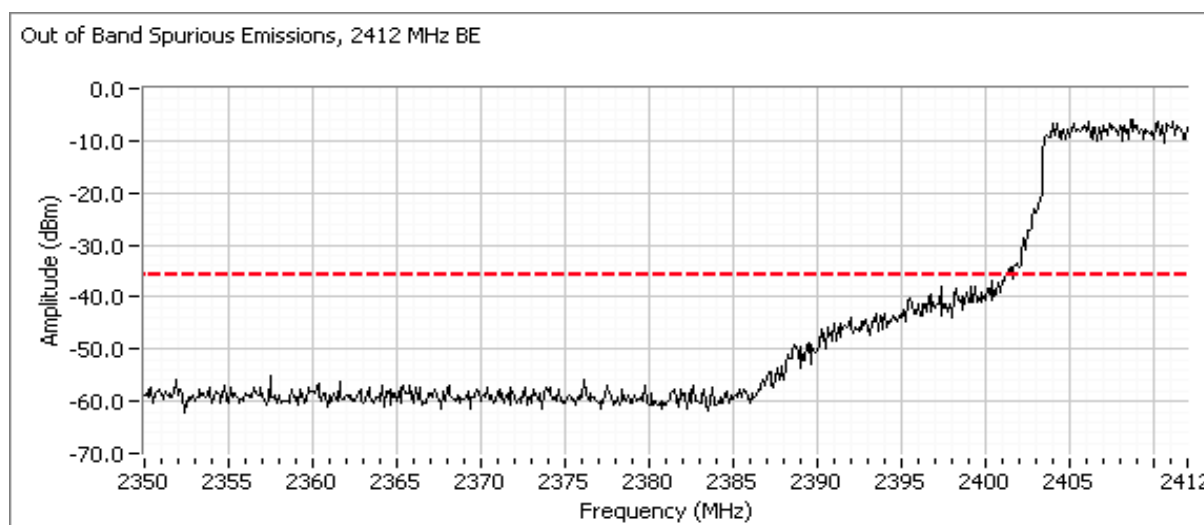
Run #4: Out of Band Spurious Emissions

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

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

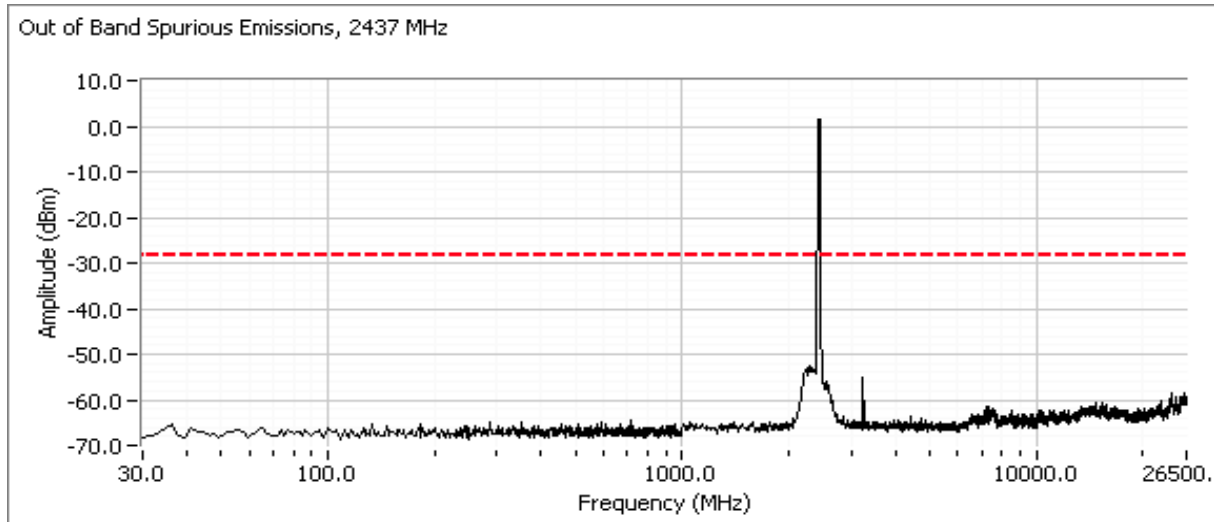


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

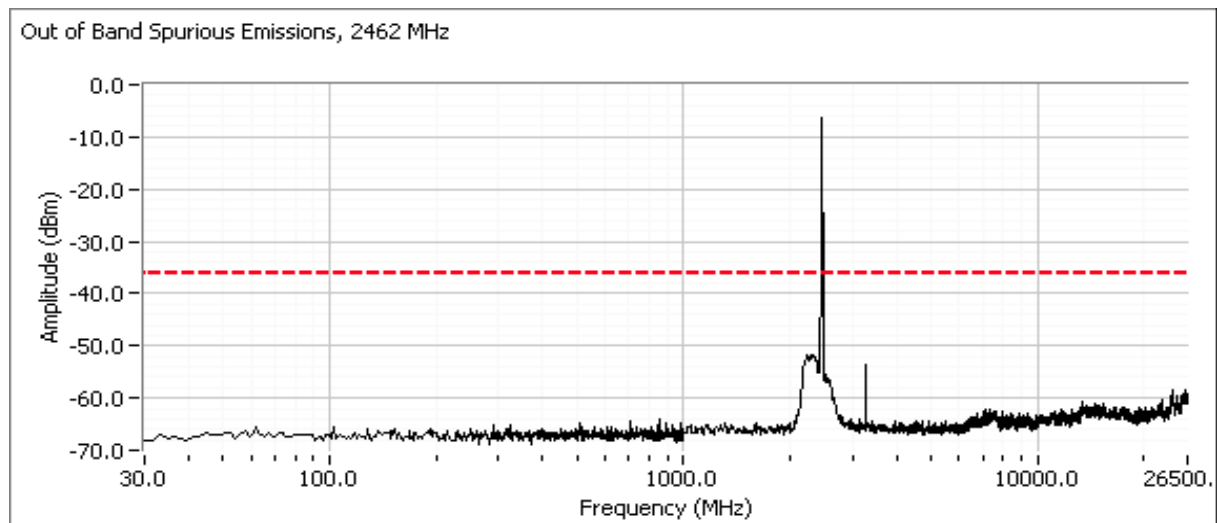


Client: Intel Corporation	Job Number: J75343
Model: 112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number: T75387
Contact: Steve Hackett	Account Manager: Christine Vu Krebill
Standard: FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class: N/A

Plots for center channel, power setting(s) = 23.5



Plots for high channel, power setting(s) = 17.0



Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements Power, PSD, Bandwidth and Spurious Emissions - 802.11n (40MHz) Mode

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: 5/20/2009
 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: 22.4 °C
 Rel. Humidity: 41 %

Summary of Results

MAC Address: 001E6400E972 CRTU Tool Version 5.10.24.0 Driver version 12.5.0.41

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	18.0	-	Output Power	15.247(b)	Pass	11.2 dBm
2	18.0	-	Power spectral Density (PSD)	15.247(d)	Pass	-18.7 dBm/3kHz
3	15.5	-	Minimum 6dB Bandwidth	15.247(a)	Pass	35.8 MHz
3	18.0	-	Maximum 99% Bandwidth	RSS GEN	-	36.7 MHz
4	18.0	-	Spurious emissions	15.247(b)	Pass	All emissions less than

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

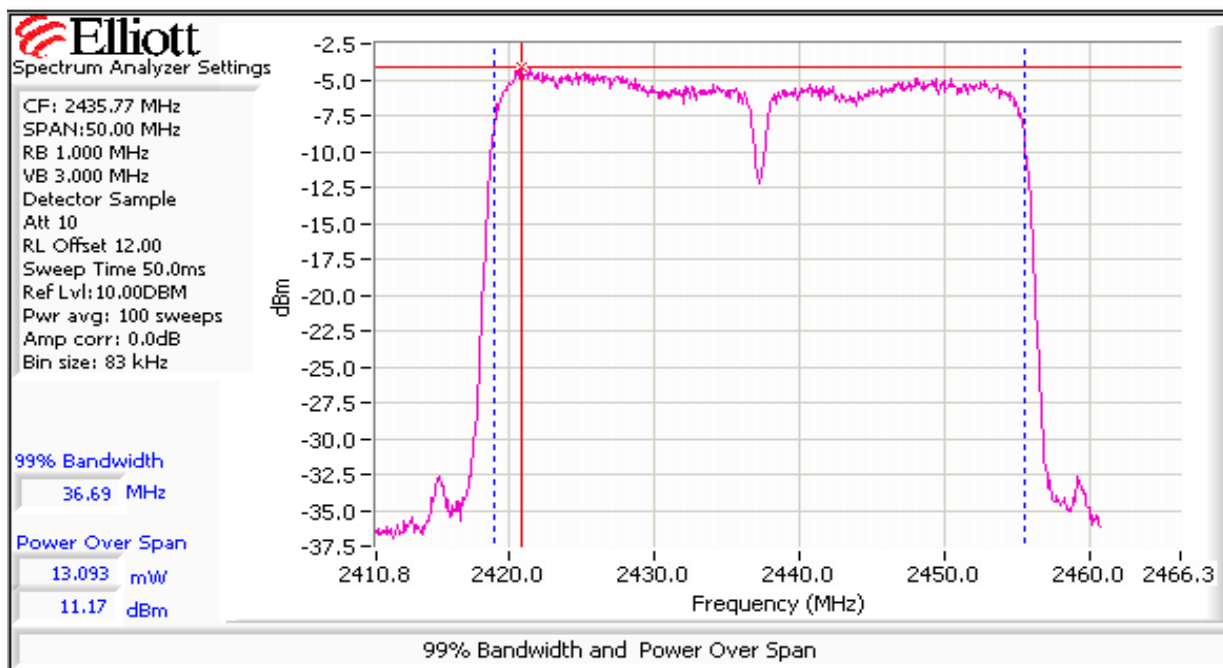
No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #1: Output Power

Power Setting ²	Frequency (MHz)	Output Power		Antenna Gain (dBi)	Result	EIRP ^{Note 2}		Output Power Note 3	
		(dBm) ¹	mW			dBm	W	Target	Actual
15.5	2422	9.0	7.9	3.2	Pass	12.2	0.017	10.5	10.6
18	2437	11.2	13.2	3.2	Pass	14.4	0.028	12.1	12.2
15.5	2452	8.1	6.5	3.2	Pass	11.3	0.013	9.5	9.7

Note 1:	Output power measured using a spectrum analyzer (see plots below): RBW=1MHz, VB=3 MHz, sample detector, power averaging on (transmitted signal was continuous) and power integration over 50 MHz. Spurious limit is -30dBc because this method was used. The output power limit is 30dBm
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.



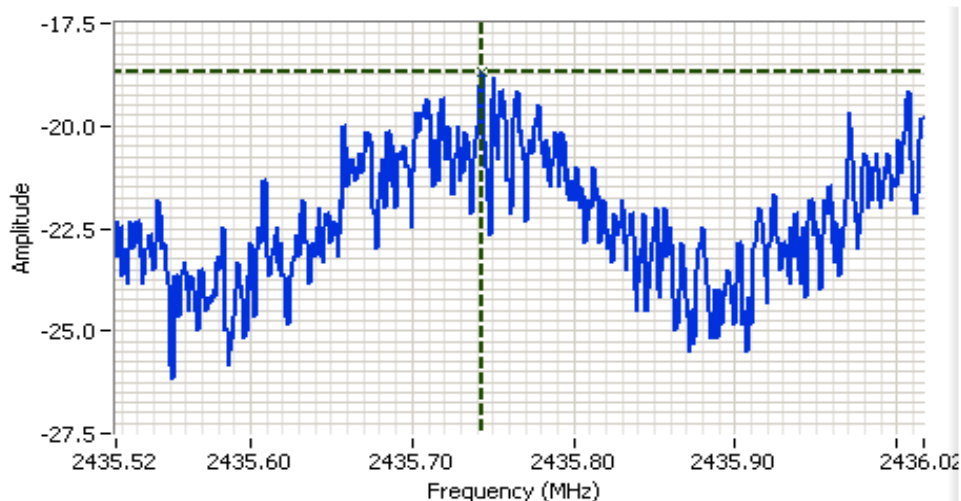
Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD	Limit dBm/3kHz	Result
		(dBm/3kHz) Note 1		
15.5	2422	-18.8	8.0	Pass
18	2437	-18.7	8.0	Pass
15.5	2452	-21.2	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.



Analyzer Settings

HP8564E,EMI
 CF: 2435.767 MHz
 SPAN:500 kHz
 RB 3.00 kHz
 VB 10.00 kHz
 Detector Sample
 Att 10
 RL Offset 12.00
 Sweep Time 100.0s
 Ref Lvl:10.50DBM

Comments

PSD = -18.7 dBm/3kHz
 2437 MHz

Cursor 1 2435.7433 -18.67

0.0000

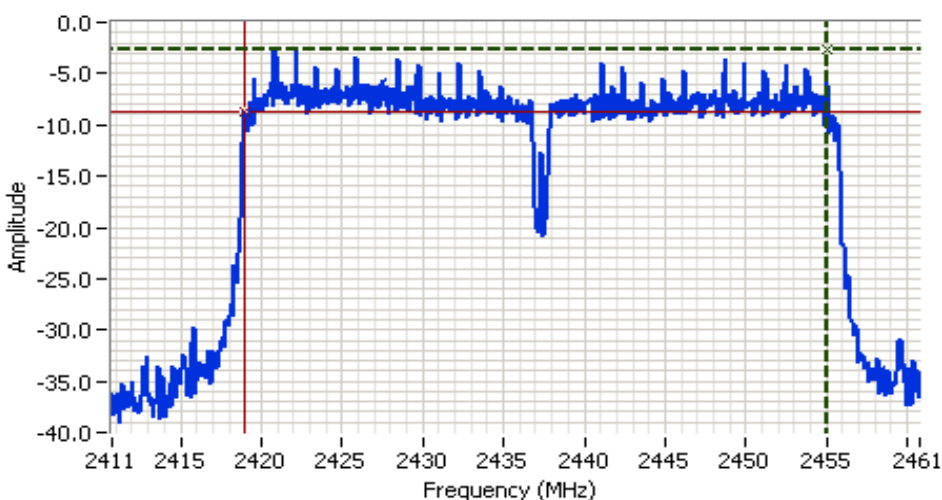
0.00

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz)	
			6dB	99%
15.5	2422	100kHz	36.1	36.7
18	2437	100kHz	36.1	36.7
15.5	2452	100kHz	35.8	36.7

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



Analyzer Settings

HP8564E,EMI
 CF: 2435.767 MHz
 SPAN:50.000 MHz
 RB 100 kHz
 VB 100 kHz
 Detector Sample
 Att 10
 RL Offset 12.00
 Sweep Time 50.0ms
 Ref Lvl:10.50DBM

Comments

6dB BW: 36.083 MHz
 2437 MHz

Cursor 1	2455.0999	-2.67	
Cursor 2	2419.0166	-8.67	

Delta Freq. 36.083

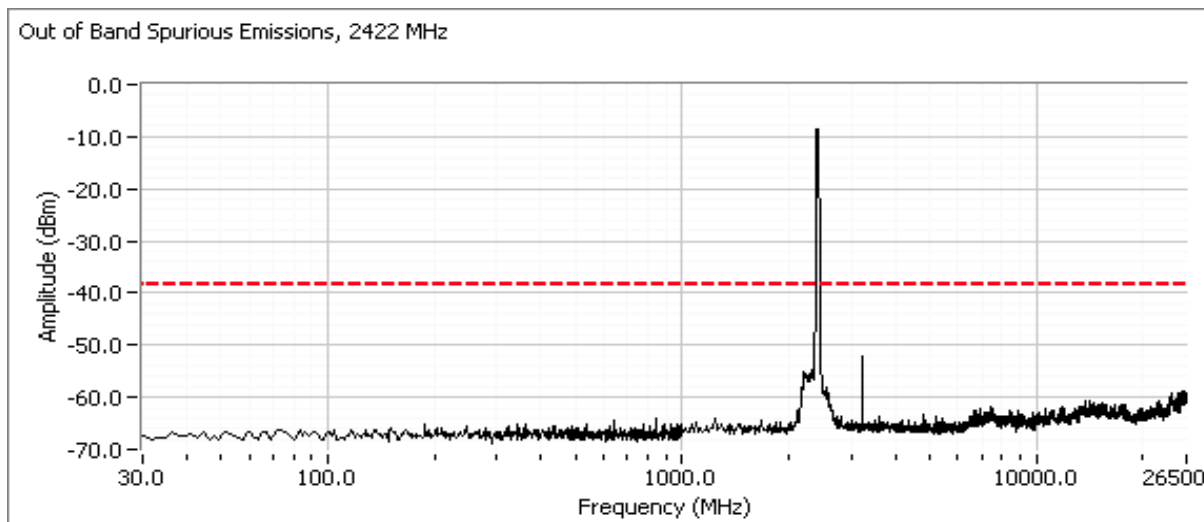
Delta Amplitude 6.00

Client: Intel Corporation	Job Number: J75343
Model: 112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number: T75387
Contact: Steve Hackett	Account Manager: Christine Vu Krebill
Standard: FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class: N/A

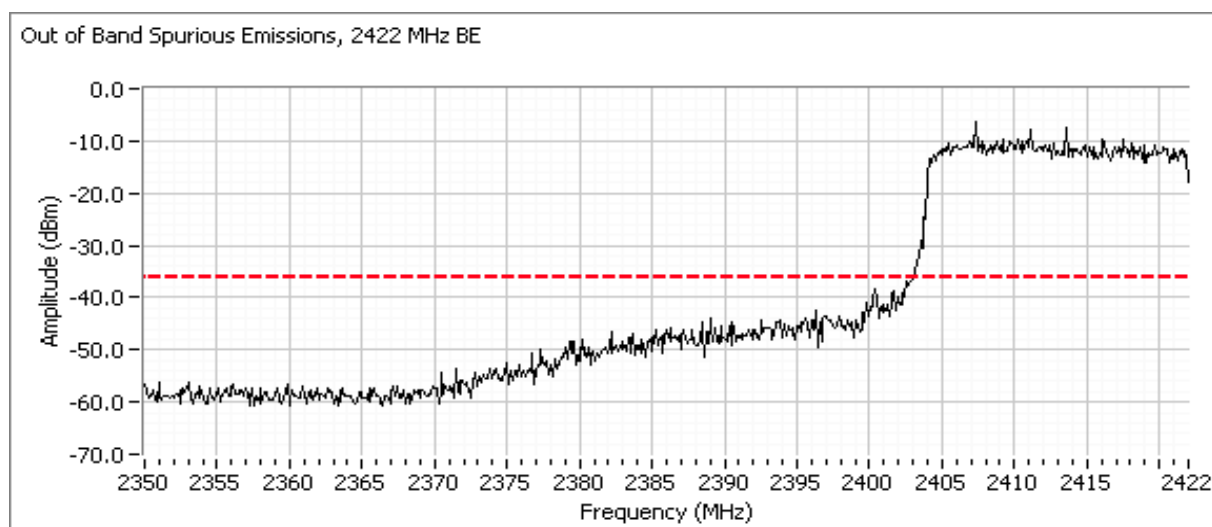
Run #4: Out of Band Spurious Emissions

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

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

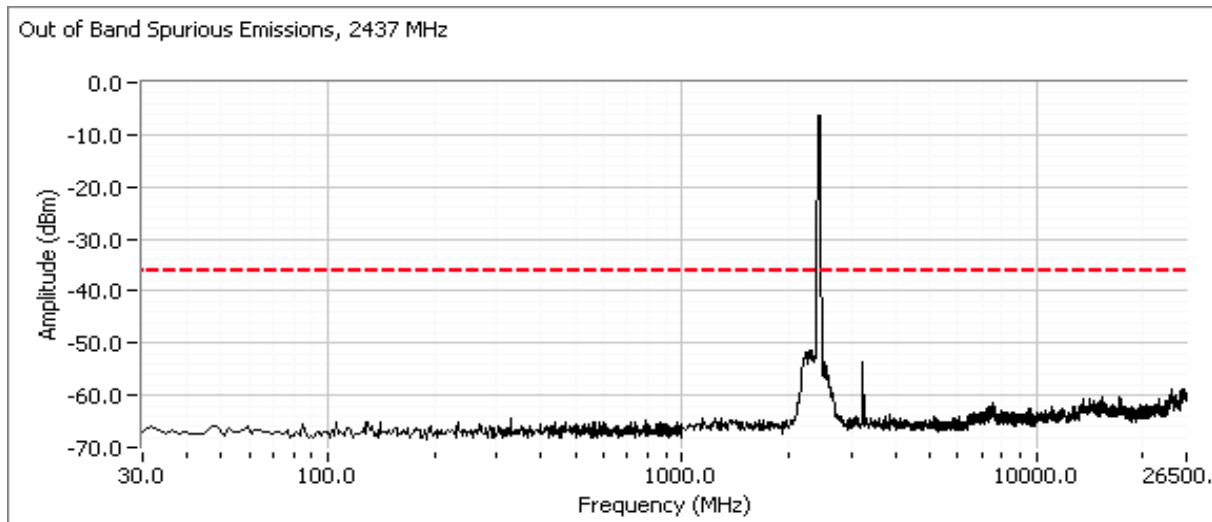


Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

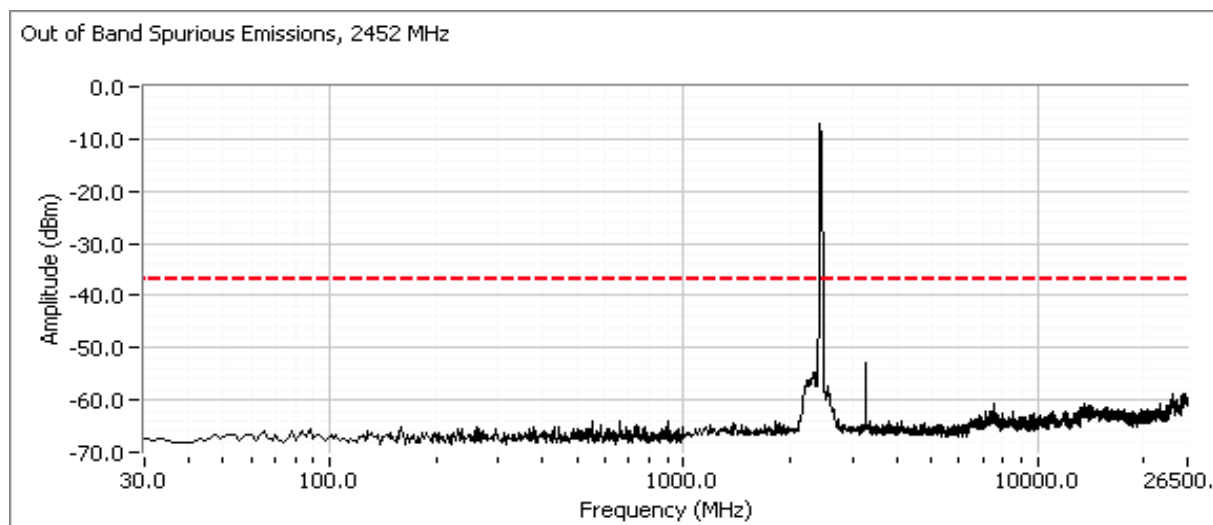


Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Plots for center channel, power setting(s) = 18.0



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



Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

RSS 210, FCC 15.247 (DTS) Band Edge Field Strength

Test Specific Details

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

General Test Configuration

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

Summary of Results

MAC Address: 001E6400E972 CRTU Tool Version 5.10.24.0 Driver version 12.5.0.41

Run #	Mode	Channel	Target Power	Measured Power	Test Performed	Limit	Result / Margin
Run # 1	802.11n 40MHz Chain A	#3 2422MHz	-	10.5	Restricted Band Edge at 2400 MHz	15.209	51.1dBμV/m @ 2389.0MHz (-2.9dB)
		#9 2452MHz	-	9.5	Restricted Band Edge at 2483.5 MHz	15.209	50.8dBμV/m @ 2483.5MHz (-3.2dB)
Run # 2	802.11n 20MHz Chain A	#1 2412MHz	-	11.6	Restricted Band Edge at 2400 MHz	15.209	50.6dBμV/m @ 2390.0MHz (-3.4dB)
		#11 2462MHz	-	10.7	Restricted Band Edge at 2483.5 MHz	15.209	50.5dBμV/m @ 2483.5MHz (-3.5dB)
Run # 3	802.11g Chain A	#1 2412MHz	-	12.2	Restricted Band Edge at 2400 MHz	15.209	50.0dBμV/m @ 2390.0MHz (-4.0dB)
		#11 2462MHz	-	11.2	Restricted Band Edge at 2483.5 MHz	15.209	49.9dBμV/m @ 2483.5MHz (-4.1dB)
Run # 4	802.11b Chain A	#1 2412MHz	-	16.5	Restricted Band Edge at 2400 MHz	15.209	48.0dBμV/m @ 2388.5MHz (-6.0dB)
		#11 2462MHz	-	16.3	Restricted Band Edge at 2483.5 MHz	15.209	49.9dBμV/m @ 2489.3MHz (-4.1dB)
Run # 5	802.11n 40MHz Chain A	#4 2427MHz	-	10.5	Restricted Band Edge at 2400 MHz	15.209	51.0dBμV/m @ 2390.0MHz (-3.0dB)
		#8 2447MHz	-	10.5	Restricted Band Edge at 2483.5 MHz	15.209	50.8dBμV/m @ 2483.5MHz (-3.2dB)
Run # 6	802.11n 20MHz Chain A	#2 2417MHz	-	14.9	Restricted Band Edge at 2400 MHz	15.209	50.7dBμV/m @ 2390.0MHz (-3.3dB)
		#10 2457MHz	-	14.5	Restricted Band Edge at 2483.5 MHz	15.209	50.5dBμV/m @ 2485.5MHz (-3.5dB)

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #	Mode	Channel	Target Power	Measured Power	Test Performed	Limit	Result / Margin
Run # 7	802.11g Chain A	#2 2417MHz	-	15.3	Restricted Band Edge at 2400 MHz	15.209	50.8dBµV/m @ 2390.0MHz (-3.2dB)
		#10 2457MHz	-	14.6	Restricted Band Edge at 2483.5 MHz	15.209	50.5dBµV/m @ 2485.8MHz (-3.5dB)
Run #8	802.11n 40MHz Chain A	#5 2432MHz	-	11.3	Restricted Band Edge at 2400 MHz	15.209	50.2dBµV/m @ 2390.0MHz (-3.8dB)
		#7 2442MHz	-	11.1	Restricted Band Edge at 2483.5 MHz	15.209	51.0dBµV/m @ 2483.5MHz (-3.0dB)
		#6 2437MHz	-	12.1	Restricted Band Edge at 2400 MHz	15.209	50.7dBµV/m @ 2390.0MHz (-3.3dB)
				12.1	Restricted Band Edge at 2483.5 MHz	15.209	50.9dBµV/m @ 2483.5MHz (-3.1dB)

Note - the measured power is the average power (measured with average power sensor) and is used for reference purposes only. The power measurements in accordance with FCC requirements and industry Canada requirements are on a separate data sheet.

Ambient Conditions:

Rel. Humidity: 40 %
 Temperature: 22.3 °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:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run # 1, Band Edge Field Strength - 802.11n 40MHz, Chain A

Date of Test: 5/7/2009

Test Location: FT Chamber #4

Test Engineer: Rafael Varelas

Config Change: none

Run # 1a, EUT on Channel #3 (2422MHz) - 802.11n 40MHz, Chain A

Chain	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	15.0	10.5	15.0

Fundamental Signal Field Strength

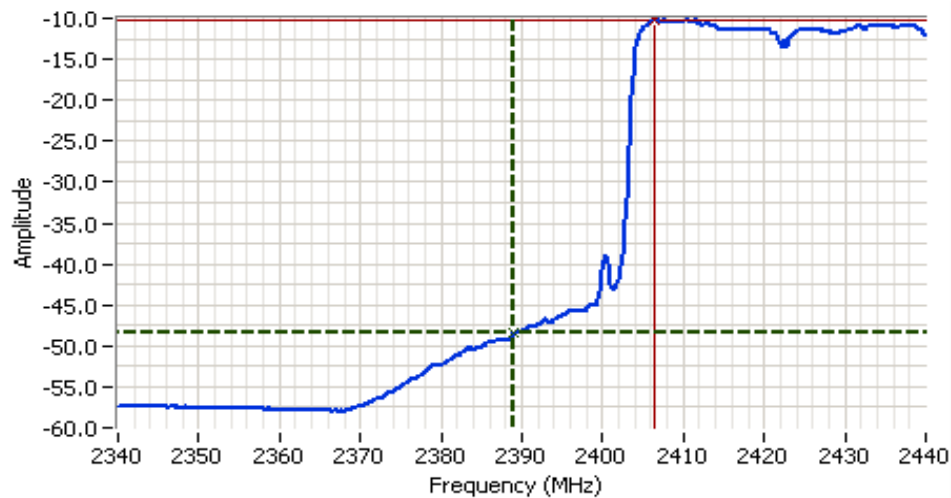
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2411.100	89.4	H	-	-	AVG	360	1.0	RB 1 MHz; VB: 10 Hz @ 15
2414.550	97.9	H	-	-	PK	360	1.0	RB 1 MHz; VB: 1 MHz @ 15
2411.100	86.8	V	-	-	AVG	220	1.0	RB 1 MHz; VB: 10 Hz @ 15
2411.930	94.7	V	-	-	PK	220	1.0	RB 1 MHz; VB: 1 MHz @ 15

2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in 1MHz RBW :	97.4	94.7	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW :	89.4	86.8	Average Measurement (RB=1MHz, VB=10Hz)
<i>Delta Marker - 100kHz</i>	38.2 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	59.2 dBuV/m		
Calculated Band-Edge Measurement (Avg):	51.2 dBuV/m		
<i>Delta Marker - 1MHz/1MHz:</i>	31.7 dB		
<i>Delta Marker - 1MHz/10Hz:</i>	38.3 dB		
Calculated Band-Edge Measurement (Peak):	65.7 dBuV/m		Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	51.1 dBuV/m		Using 1MHz delta value

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.000	51.1	-	54.0	-2.9	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A



Analyzer Settings

HP8564E,EMI
CF: 2390.000 MHz
SPAN:100.000 MHz
RB 1.000 MHz
VB 10 Hz
Detector Sample
Att 10
RL Offset 11.00
Sweep Time 37.0s
Ref Lvl:6.00DBM

Comments

802.11n 40MHz
Chain A
2422 MHz

Cursor 1	2389.0000	-48.50	⊕	⊗	⊞
Cursor 2	2406.5000	-10.17	⊕	⊗	⊞

Delta Freq. 17.500
Delta Amplitude 38.33

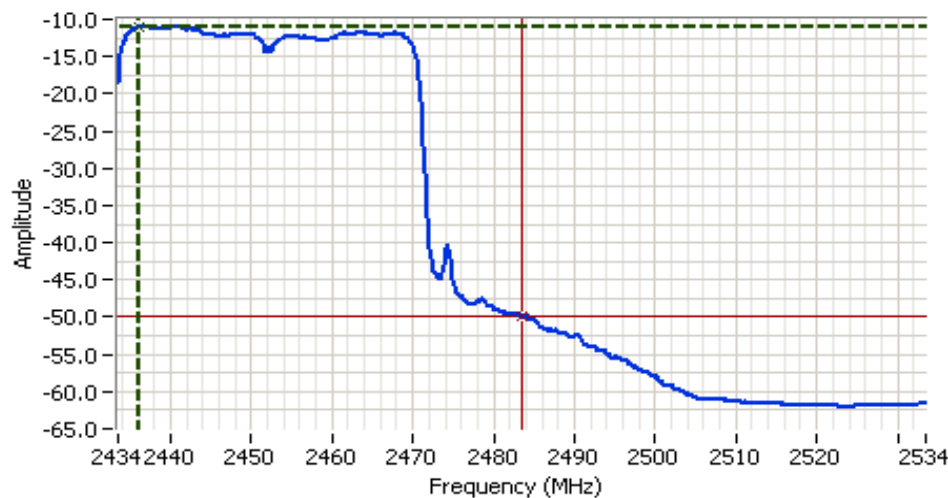
Run # 1b, EUT on Channel #9 (2452MHz) - 802.11n 40MHz, Chain A

Fundamental Signal Field Strength

2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	50.8	-	54.0	-3.2	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A



Analyzer Settings

HP8564E,EMI
 CF: 2483.500 MHz
 SPAN: 100.000 MHz
 RB 1.000 MHz
 VB 10 Hz
 Detector Sample
 Att 0
 RL Offset 11.00
 Sweep Time 37.0s
 Ref Lvl: -2.00DBM

Comments

802.11n 40MHz
 Chain A
 2452 MHz

Cursor 1	2436.0000	-11.00			
Cursor 2	2483.5000	-50.00			

Delta Freq. 47.500

Delta Amplitude 39.00



Elliott

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run # 2, Band Edge Field Strength - 802.11n 20MHz, Chain A

Date of Test: 5/7/2009

Test Location: FT Chamber #4

Test Engineer: Rafael Varelas

Config Change: none

Run # 2a, EUT on Channel #1 (2412MHz) - 802.11n 20MHz, Chain A

Chain	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	15.0	11.6	16.5

Fundamental Signal Field Strength

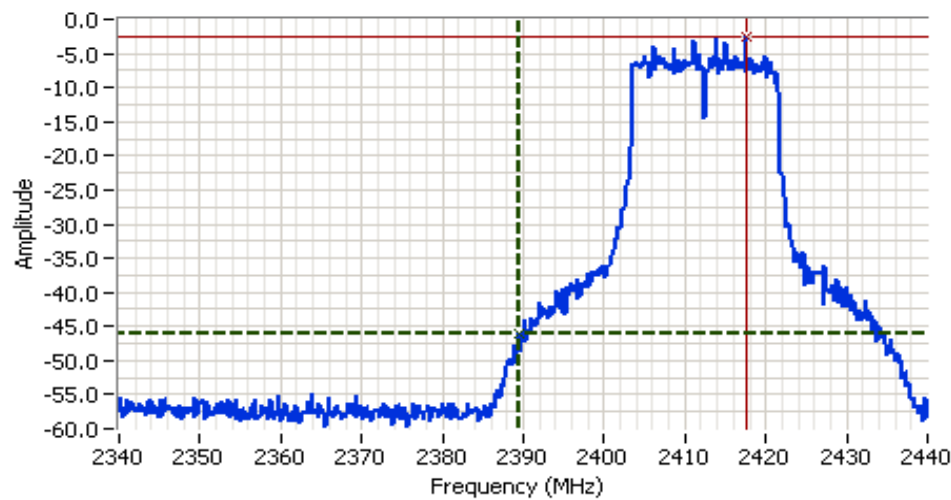
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2415.290	93.9	H	-	-	AVG	0	1.0	RB 1 MHz; VB: 10 Hz @ 16.5
2415.290	101.6	H	-	-	PK	0	1.0	RB 1 MHz; VB: 1 MHz @ 16.5
2417.290	92.6	V	-	-	AVG	334	1.0	RB 1 MHz; VB: 10 Hz @ 16.5
2415.420	100.4	V	-	-	PK	334	1.0	RB 1 MHz; VB: 1 MHz @ 16.5

2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V				
Fundamental emission level @ 3m in 1MHz RBW :	101.6	100.4	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW :	93.9	92.6	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	43.3 dB	<- this can only be used if band edge signal is highest within 2MHz of band edge.				
Calculated Band-Edge Measurement (Peak):	58.3 dBuV/m					
Calculated Band-Edge Measurement (Avg):	50.6 dBuV/m	Margin	Level	Limit	Detector	
Delta Marker - 1MHz/1MHz:	35.0 dB	-3.4	50.6	54	Avg	
Delta Marker - 1MHz/10Hz:	43.2 dB	-15.7	58.3	74	Pk	
Calculated Band-Edge Measurement (Peak):	66.6 dBuV/m	Using 100kHz delta value				
Calculated Band-Edge Measurement (Avg):	50.7 dBuV/m	Using 100kHz delta value				

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	50.6	-	54.0	-3.4	Avg	-	-	Using 100kHz delta value

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHWW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A



Analyzer Settings

HP8564E,EMI
 CF: 2390.000 MHz
 SPAN:100.000 MHz
 RB 100 kHz
 VB 100 kHz
 Detector POS
 Att 10
 RL Offset 11.00
 Sweep Time 55.0ms
 Ref Lvl:11.00DBM

Comments

802.11n 20MHz
 Chain A
 2412 MHz

Cursor 1	2389.5000	-46.00	
Cursor 2	2417.5000	-2.67	

Delta Freq. 28.000
 Delta Amplitude 43.33

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run # 2b, EUT on Channel #11 (2462MHz) - 802.11n 20MHz, Chain A

Chain	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	15.0	10.7	17.0

Fundamental Signal Field Strength

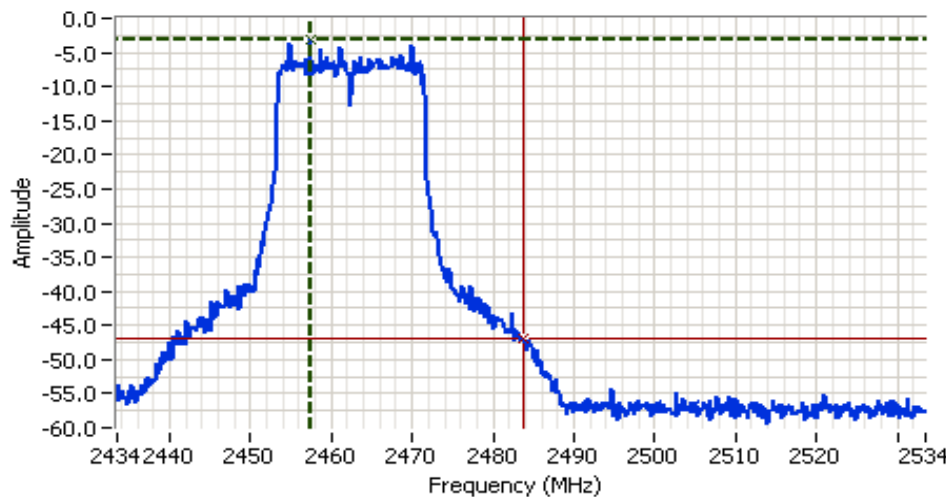
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2470.120	94.3	H	-	-	AVG	330	2.0	RB 1 MHz; VB: 10 Hz @ 17.0
2469.330	102.3	H	-	-	PK	330	2.0	RB 1 MHz; VB: 1 MHz @ 17.0
2454.080	91.6	V	-	-	AVG	335	1.0	RB 1 MHz; VB: 10 Hz @ 17.0
2457.170	99.6	V	-	-	PK	335	1.0	RB 1 MHz; VB: 1 MHz @ 17.0

2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in 1MHz RBW :	102.3	99.6	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW :	94.3	91.6	Average Measurement (RB=1MHz, VB=10Hz)
<i>Delta Marker - 100kHz</i>	43.8 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	58.5 dBuV/m		
Calculated Band-Edge Measurement (Avg):	50.5 dBuV/m	Margin	Level
<i>Delta Marker - 1MHz/1MHz:</i>	34.3 dB	-3.5	50.5
<i>Delta Marker - 1MHz/10Hz:</i>	43.7 dB	-15.5	58.5
Calculated Band-Edge Measurement (Peak):	68.0 dBuV/m		Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	50.6 dBuV/m		Using 100kHz delta value

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	50.5	-	54.0	-3.5	Avg	-	-	Using 100kHz delta value

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A



Analyzer Settings

HP8564E,EMI
CF: 2483.500 MHz
SPAN: 100.000 MHz
RB 100 kHz
VB 100 kHz
Detector POS
Att 10
RL Offset 11.00
Sweep Time 55.0ms
Ref Lvl: 6.00DBM

Comments

802.11n 20MHz
Chain A
2462 MHz

Cursor 1 2457.3333 -3.17
Cursor 2 2483.8333 -47.00

Delta Freq. 26.500
Delta Amplitude 43.83

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run # 3, Band Edge Field Strength - 802.11g, Chain A

Date of Test: 5/7/2009

Test Location: FT Chamber #4

Test Engineer: Rafael Varelas

Config Change: none

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

Chain	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	15.0	12.2	17.0

Fundamental Signal Field Strength

Fundamental Signal Power								
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2414.420	94.8	H	-	-	AVG	304	1.2	RB 1 MHz; VB: 10 Hz @ 17.0
2414.870	102.7	H	-	-	PK	304	1.2	RB 1 MHz; VB: 1 MHz @ 17.0
2414.330	90.9	V	-	-	AVG	225	1.0	RB 1 MHz; VB: 10 Hz @ 17.0
2415.420	98.9	V	-	-	PK	225	1.0	RB 1 MHz; VB: 1 MHz @ 17.0

2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

		H	V				
Fundamental emission level @ 3m in 1MHz RBW :		102.7	98.9	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW :		94.8	90.9	Average Measurement (RB=1MHz, VB=10Hz)			
<i>Delta Marker - 100kHz</i>		44.8 dB	<- this can only be used if band edge signal is highest within 2MHz of band edge.				
Calculated Band-Edge Measurement (Peak):		57.9 dBuV/m					
Calculated Band-Edge Measurement (Avg):		50.0 dBuV/m					
		Margin	Level	Limit	Detector		
<i>Delta Marker - 1MHz/1MHz:</i>		37.3 dB	-4.0	50.0	54	Avg	
<i>Delta Marker - 1MHz/10Hz:</i>		44.5 dB	-16.1	57.9	74	Pk	
Calculated Band-Edge Measurement (Peak):		65.4 dBuV/m	Using 100kHz delta value				
Calculated Band-Edge Measurement (Avg):		50.3 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	50.0	-	54.0	-4.0	Avg	-	-	Using 100kHz delta value

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A



Analyzer Settings

HP8564E,EMI
 CF: 2390.000 MHz
 SPAN:100.000 MHz
 RB 100 kHz
 VB 100 kHz
 Detector POS
 Att 10
 RL Offset 11.00
 Sweep Time 55.0ms
 Ref Lvl:11.00DBM

Comments

802.11g
 Chain A
 2412 MHz

Cursor 1	2390.0000	-46.83	
Cursor 2	2406.1667	-2.00	

Delta Freq. 16.167

Delta Amplitude 44.83

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

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

Chain	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	15.0	11.2	17.5

Fundamental Signal Field Strength

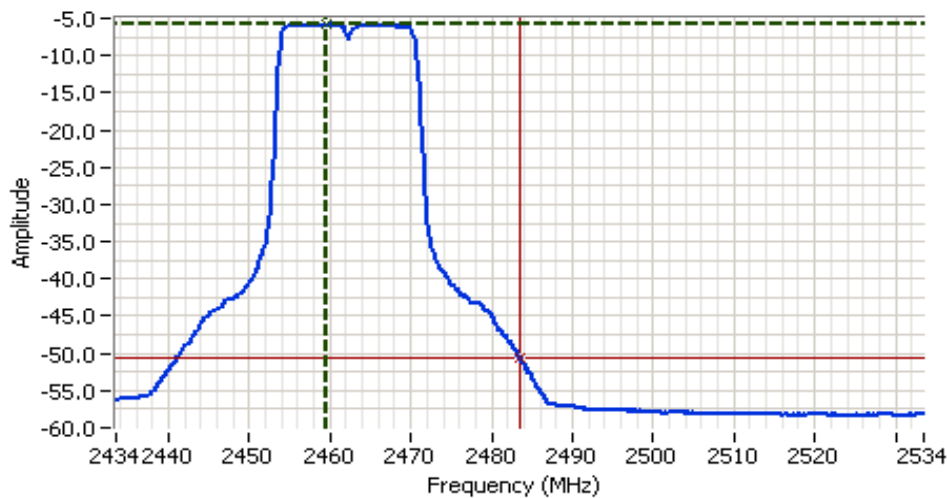
Fundamental Signal: 15.209 MHz								
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2469.080	94.7	H	-	-	AVG	331	1.0	RB 1 MHz; VB: 10 Hz @ 17.5
2468.580	101.9	H	-	-	PK	331	1.0	RB 1 MHz; VB: 1 MHz @ 17.5
2454.790	92.7	V	-	-	AVG	331	2.0	RB 1 MHz; VB: 10 Hz @ 17.5
2455.540	100.7	V	-	-	PK	331	2.0	RB 1 MHz; VB: 1 MHz @ 17.5

2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

Peak Measurement (RB=VB=1MHz)	
Fundamental emission level @ 3m in 1MHz RBW :	101.9
Fundamental emission level @ 3m in 1MHz RBW :	94.7
Average Measurement (RB=1MHz, VB=10Hz)	
<- this can only be used if band edge signal is highest within 2MHz of band edge.	
Delta Marker - 100kHz	44.0 dB
Calculated Band-Edge Measurement (Peak):	57.9 dBuV/m
Calculated Band-Edge Measurement (Avg):	50.7 dBuV/m
Margin	
Level	
Limit	
Detector	
Delta Marker - 1MHz/1MHz:	37.0 dB
Delta Marker - 1MHz/10Hz:	44.8 dB
Calculated Band-Edge Measurement (Peak):	64.9 dBuV/m
Calculated Band-Edge Measurement (Avg):	49.9 dBuV/m
Using 100kHz delta value	
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	49.9	-	54.0	-4.1	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A



Analyzer Settings

HP8564E,EMI
 CF: 2483.500 MHz
 SPAN:100.000 MHz
 RB 1.000 MHz
 VB 10 Hz
 Detector Sample
 Att 10
 RL Offset 11.00
 Sweep Time 37.0s
 Ref Lvl:6.08DBM

Comments

802.11g
 Chain A
 2462 MHz

Cursor 1	2459.6667	-5.75			
Cursor 2	2483.5000	-50.59			

Delta Freq. 23.833

Delta Amplitude 44.83

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run # 4, Band Edge Field Strength - 802.11b, Chain A

Date of Test:

Test Location:

Test Engineer:

Config Change: none

Run # 4a, EUT on Channel #1 (2412MHz) - 802.11b, Chain A

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

Fundamental Signal Field Strength

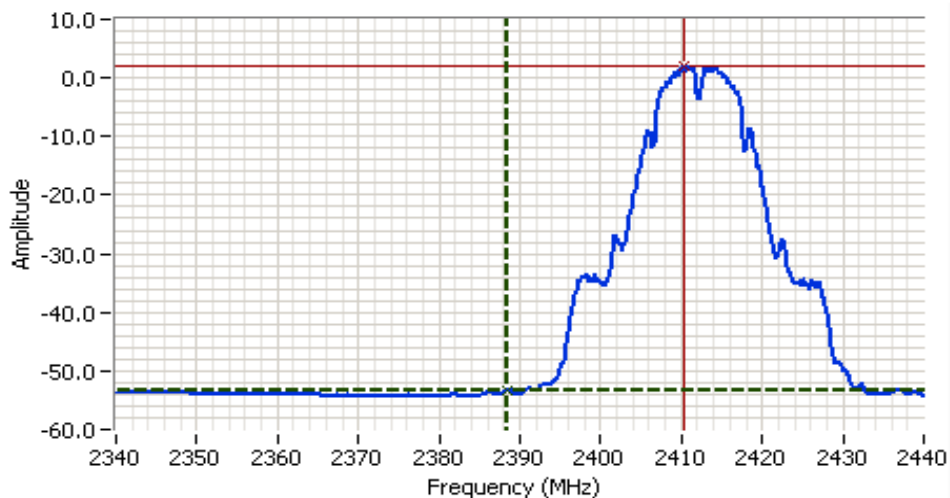
Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments	
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2413.830	102.9	H	-	-	AVG	20	1.0	RB 1 MHz; VB: 10 Hz
2413.130	106.3	H	-	-	PK	20	1.0	RB 1 MHz; VB: 1 MHz
2413.870	103.3	V	-	-	AVG	338	1.6	RB 1 MHz; VB: 10 Hz
2413.100	106.8	V	-	-	PK	338	1.6	RB 1 MHz; VB: 1 MHz

2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in 1MHz RBW :	106.3	106.8	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW :	102.9	103.3	Average Measurement (RB=1MHz, VB=10Hz)
<i>Delta Marker - 100kHz</i>	53.0 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	53.8 dBuV/m		
Calculated Band-Edge Measurement (Avg):	50.3 dBuV/m		
<i>Delta Marker - 1MHz/1MHz</i>	39.3 dB		
<i>Delta Marker - 1MHz/10Hz</i>	55.3 dB		
Calculated Band-Edge Measurement (Peak):	67.5 dBuV/m		Using 100kHz delta value
Calculated Band-Edge Measurement (Avg):	48.0 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	
2388.500	48.0	-	54.0	-6.0	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A



Analyzer Settings

HP8564E,EMI
CF: 2390.000 MHz
SPAN: 100.000 MHz
RB 1.000 MHz
VB 10 Hz
Detector Sample
Att 20
RL Offset 11.00
Sweep Time 37.0s
Ref Lvl: 21.00DBM

Comments

802.11b
Chain A
2412 MHz

Cursor 1	2388.5000	-53.33	
Cursor 2	2410.3333	2.00	

Delta Freq. 21.833

Delta Amplitude 55.33

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run # 4b, EUT on Channel #11 (2462MHz) - 802.11b, Chain A

Chain	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	16.5	16.3	18.5

Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2460.330	101.0	V	-	-	AVG	328	1.9	RB 1 MHz; VB: 10 Hz
2461.230	104.7	V	-	-	PK	328	1.9	RB 1 MHz; VB: 1 MHz
2462.930	102.2	H	-	-	AVG	22	1.0	RB 1 MHz; VB: 10 Hz
2463.170	105.9	H	-	-	PK	22	1.0	RB 1 MHz; VB: 1 MHz

2483.5 MHz Band Edge Signal Radiated Field Strength - Marker Delta

		H	V				
Fundamental emission level @ 3m in 1MHz RBW :		105.9	104.7	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW :		102.2	10.1	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz		50.7	dB	<- this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):		55.2	dBuV/m				
Calculated Band-Edge Measurement (Avg):		51.5	dBuV/m				
Margin							
Delta Marker - 1MHz/1MHz:		40.5	dB	-4.1	49.9	54	Avg
Delta Marker - 1MHz/10Hz:		52.3	dB	-18.8	55.2	74	Pk
Calculated Band-Edge Measurement (Peak):		65.4	dBuV/m	Using 100kHz delta value			
Calculated Band-Edge Measurement (Avg):		49.9	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	
2489.330	49.9	-	54.0	-4.1	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A



Analyzer Settings

HP8564E,EMI
CF: 2483.500 MHz
SPAN:100.000 MHz
RB 1.000 MHz
VB 10 Hz
Detector Sample
Att 20
RL Offset 11.00
Sweep Time 37.0s
Ref Lvl:21.00DBM

Comments

802.11b
Chain A
2462 MHz

Cursor 1	2460.5000	2.17	
Cursor 2	2489.3333	-50.17	

Delta Freq. 28.833
Delta Amplitude 52.33



Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

RSS 210 and FCC 15.247 Transmitter Radiated Spurious Emissions, 30MHz - 26GHz

Test Specific Details

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

General Test Configuration

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

Summary of Results

MAC Address: 001E6400E972 CRTU Tool Version 5.10.24.0 Driver version 12.5.0.41

Run #	Mode	Channel	Target Power	Measured Power	Test Performed	Limit	Result / Margin
1	802.11b	#1 2412 MHz	16.5	16.5	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	42.5dBμV/m @ 2205.8MHz (-11.5dB)
		#6 2437 MHz	16.5	16.8	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	44.7dBμV/m @ 7311.7MHz (-9.3dB)
		#11 2462 MHz	16.5	16.3	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	44.6dBμV/m @ 7385.3MHz (-9.4dB)

Run #2 determines the worst case OFDM mode (g, n20 or n40)

2	802.11g	#6 2437 MHz	16.5	16.6	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	37.9dBμV/m @ 9065.7MHz (-16.1dB)
	802.11n20		16.5	16.6	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	31.8dBμV/m @ 1593.3MHz (-22.2dB)
	802.11n40		16.5	16.8	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	32.6dBμV/m @ 1593.8MHz (-21.4dB)

Run #3 - harmonics of top and bottom channel in the worst case OFDM mode (802.11g)

3	802.11g	#1 2412 MHz	16.5	16.7	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	54.3dBμV/m @ 1328.4MHz (-19.7dB)
		#11 2462 MHz	16.5	16.8	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	42.3dBμV/m @ 7385.0MHz (-11.7dB)

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: No emissions above instrumentation noise floor observed above 18GHz with horn antenna located within 50cm of the EUT.

Ambient Conditions:

Rel. Humidity: 21.9 %
Temperature: 39.6 °C

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	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

Date of Test: 5/18/2009

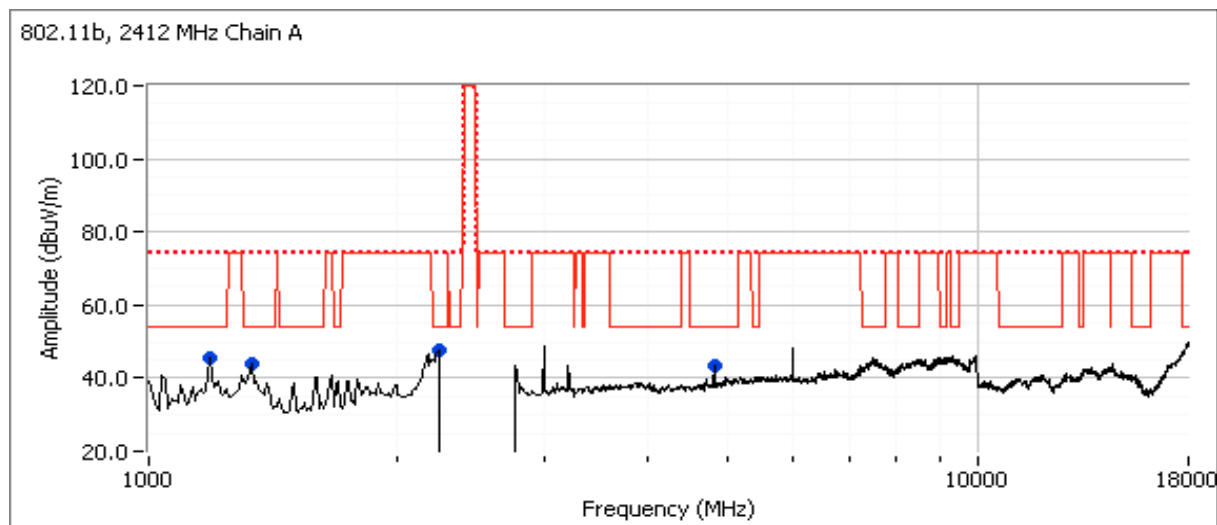
Test Location: FT Chamber #3

Test Engineer: Rafael Varelas

Config Change: None

Run #1a: 802.11b Mode, 2412 MHz (Channel 1)

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



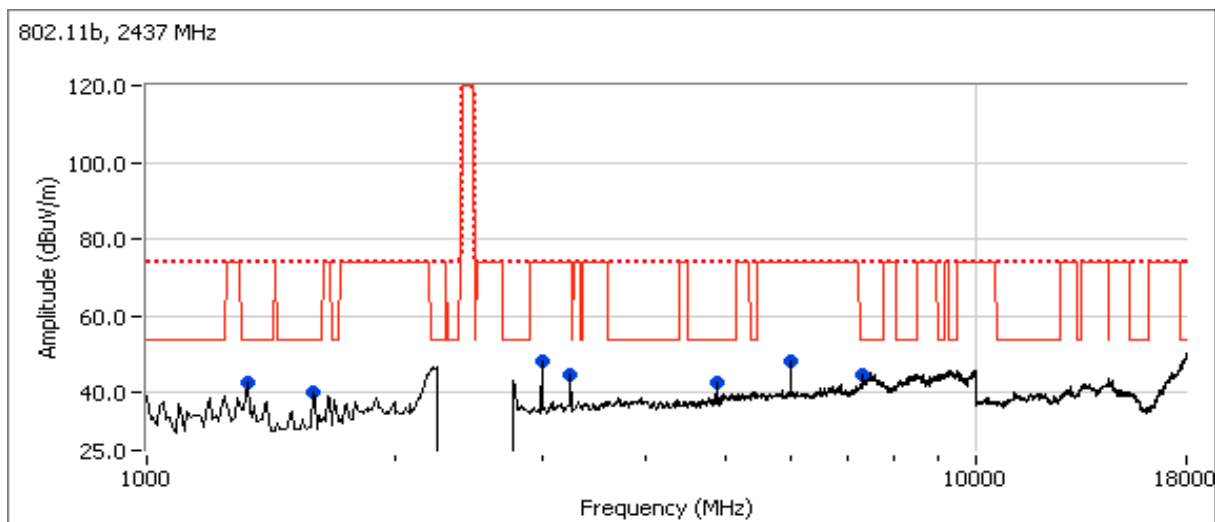
Spurious Radiated Emissions:

Frequency MHz	Level dBuV/m	Pol v/h	15.209/15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2205.840	42.5	V	54.0	-11.5	AVG	207	2.1	MHz; VB: 10 Hz
2221.700	54.9	V	74.0	-19.1	PK	207	2.1	MHz; VB: 1 MHz
1196.080	32.8	V	54.0	-21.2	AVG	151	1.2	MHz; VB: 10 Hz
1187.510	48.7	V	74.0	-25.3	PK	151	1.2	MHz; VB: 1 MHz
1329.970	33.3	V	54.0	-20.7	AVG	241	1.5	MHz; VB: 10 Hz
1337.370	52.5	V	74.0	-21.5	PK	241	1.5	MHz; VB: 1 MHz
4823.670	31.5	V	54.0	-22.5	AVG	0	1.0	MHz; VB: 10 Hz
4823.440	42.8	V	74.0	-31.2	PK	0	1.0	MHz; VB: 1 MHz

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #1b: 802.11b Mode, 2437 MHz (Channel 6)

Chain	Target (dBm)	Power Settings Measured (dBm)	GC Setting
A	16.5	16.8	18.5



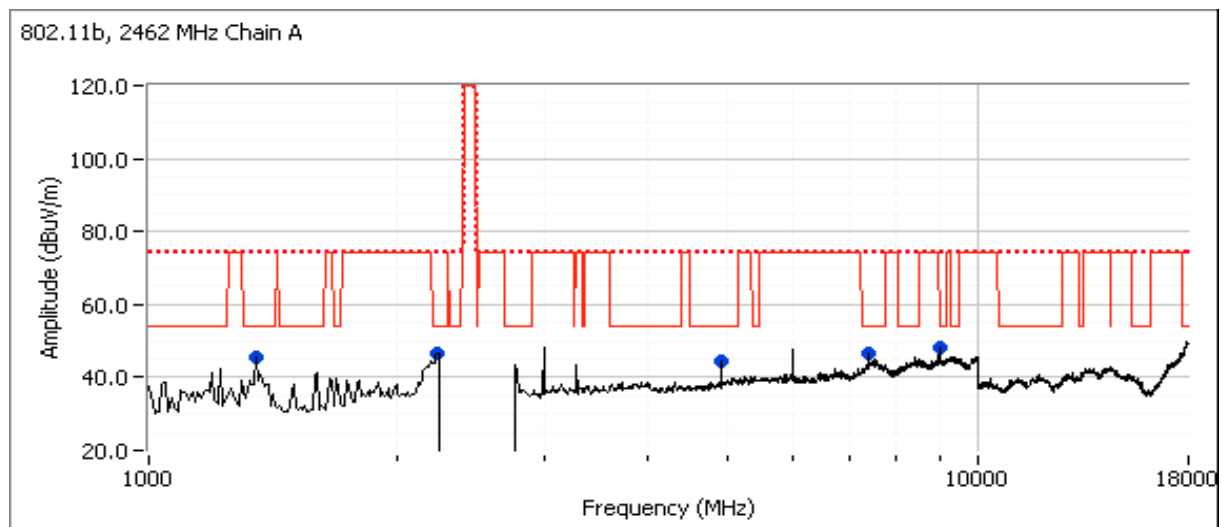
Spurious Radiated Emissions:

Frequency MHz	Level dBuV/m	Pol v/h	15.209/15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
7311.690	44.7	V	54.0	-9.3	AVG	188	1.1	RB 1 MHz; VB: 10 Hz
4873.980	41.0	V	54.0	-13.0	AVG	103	1.6	RB 1 MHz; VB: 10 Hz
7311.870	52.2	V	74.0	-21.8	PK	188	1.1	RB 1 MHz; VB: 1 MHz
1596.830	30.6	V	54.0	-23.4	AVG	117	1.3	RB 1 MHz; VB: 10 Hz
1329.490	28.4	V	54.0	-25.6	AVG	146	1.6	RB 1 MHz; VB: 10 Hz
2998.330	48.3	V	74.0	-25.7	Peak	266	1.0	
5995.830	48.3	V	74.0	-25.7	Peak	103	1.0	
1596.970	47.7	V	74.0	-26.3	PK	117	1.3	RB 1 MHz; VB: 1 MHz
4874.190	47.6	V	74.0	-26.4	PK	103	1.6	RB 1 MHz; VB: 1 MHz
1329.710	46.2	V	74.0	-27.8	PK	146	1.6	RB 1 MHz; VB: 1 MHz
3245.830	44.8	V	74.0	-29.2	Peak	96	1.3	

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #1c: 802.11b Mode, 2462 MHz (Channel 11)

Chain	Target (dBm)	Power Settings Measured (dBm)	GC Setting
A	16.5	16.3	18.5



Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7385.320	44.6	V	54.0	-9.4	AVG	172	1.9	MHz; VB: 10 Hz
7385.120	51.5	V	74.0	-22.5	PK	172	1.9	MHz; VB: 1 MHz
9001.110	40.5	V	54.0	-13.5	AVG	133	1.0	MHz; VB: 10 Hz
9011.370	49.4	V	74.0	-24.6	PK	133	1.0	MHz; VB: 1 MHz
1330.020	31.6	V	54.0	-22.4	AVG	240	1.3	MHz; VB: 10 Hz
1332.690	48.6	V	74.0	-25.4	PK	240	1.3	MHz; VB: 1 MHz
2224.970	39.7	V	54.0	-14.3	AVG	196	1.6	MHz; VB: 10 Hz
2223.970	51.5	V	74.0	-22.5	PK	196	1.6	MHz; VB: 1 MHz
4923.960	38.2	V	54.0	-15.8	AVG	209	1.0	MHz; VB: 10 Hz
4924.060	46.8	V	74.0	-27.2	PK	209	1.0	MHz; VB: 1 MHz

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #2, Radiated Spurious Emissions, 1-26GHz, OFDM modes - Center channel (802.11g, 802.11n20 and 802.11n40)

Date of Test: 5/18/2009

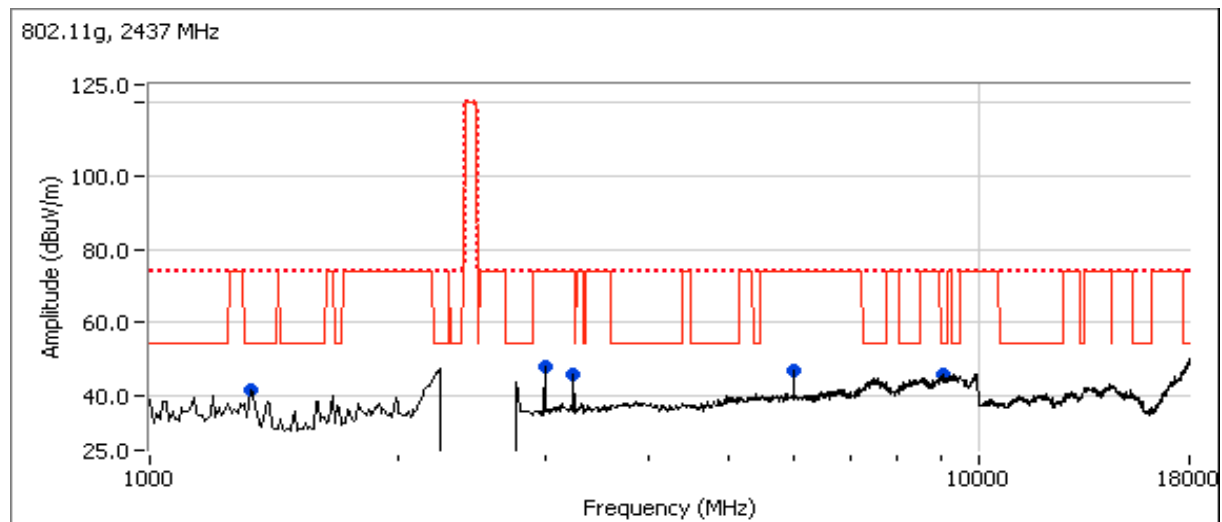
Test Location: FT Chamber #3

Test Engineer: Rafael Varelas

Config Change: None

Run #2a: 802.11g Mode, 2437 MHz (Channel 6)

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



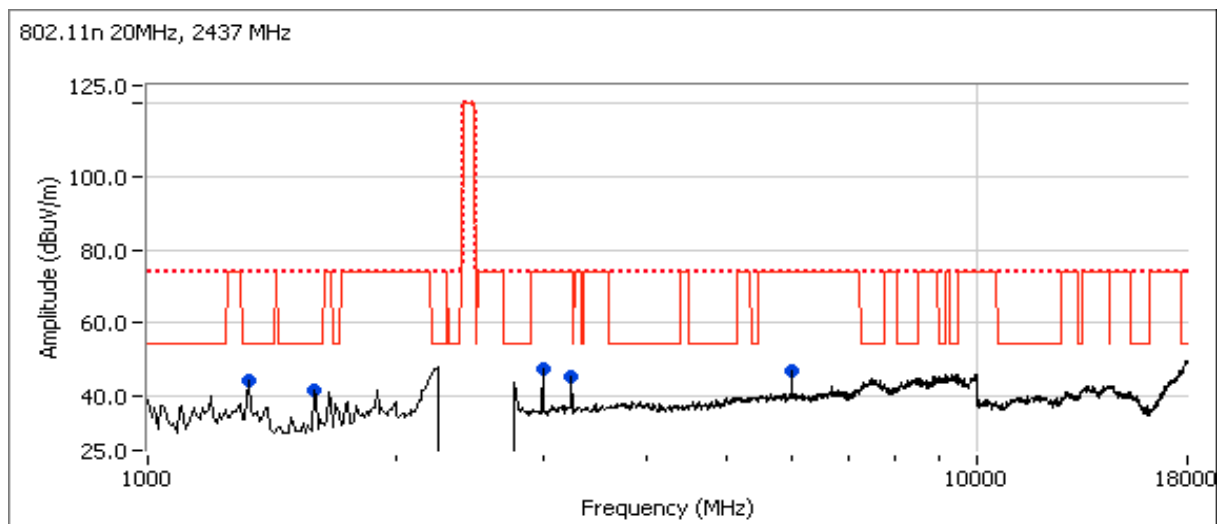
Spurious Radiated Emissions:

Frequency MHz	Level dBuV/m	Pol v/h	15.209/15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
9065.690	37.9	H	54.0	-16.1	AVG	52	1.0	RB 1 MHz; VB: 10 Hz
9065.430	49.1	H	74.0	-24.9	PK	52	1.0	RB 1 MHz; VB: 1 MHz
1329.650	31.2	V	54.0	-22.8	AVG	116	1.0	RB 1 MHz; VB: 10 Hz
1322.050	47.2	V	74.0	-26.8	PK	116	1.0	RB 1 MHz; VB: 1 MHz
2998.330	47.8	V	74.0	-26.2	Peak	268	1.0	
3245.830	46.0	V	74.0	-28.0	Peak	203	1.3	
5995.830	46.8	V	74.0	-27.2	Peak	104	1.0	

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #2b: 802.11n (20MHz) Mode, 2437 MHz (Channel 6)

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



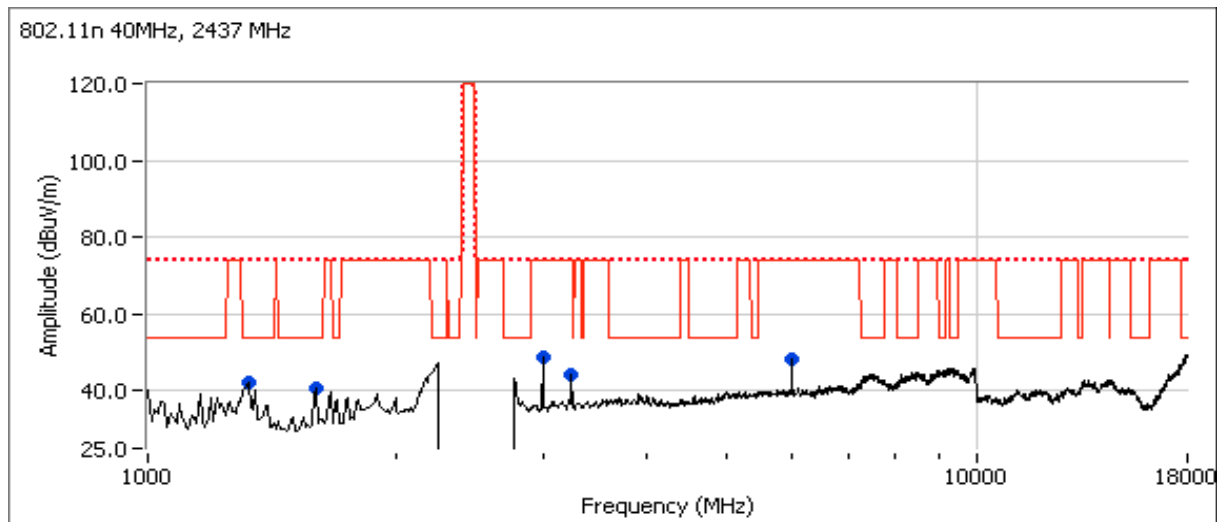
Spurious Radiated Emissions:

Frequency MHz	Level dBuV/m	Pol v/h	15.209/15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
1593.340	31.8	V	54.0	-22.2	AVG	118	1.3	RB 1 MHz; VB: 10 Hz
1592.550	48.9	V	74.0	-25.1	PK	118	1.3	RB 1 MHz; VB: 1 MHz
1331.290	28.4	V	54.0	-25.6	AVG	156	1.0	RB 1 MHz; VB: 10 Hz
1331.060	48.3	V	74.0	-25.7	PK	156	1.0	RB 1 MHz; VB: 1 MHz
2998.330	47.2	H	74.0	-26.8	Peak	174	1.9	
3245.830	45.2	H	74.0	-28.8	Peak	264	1.0	
5995.830	46.8	V	74.0	-27.2	Peak	274	1.6	

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #2c: 802.11n (40MHz) Mode, 2437 MHz (Channel 6)

Chain	Target (dBm)	Power Settings Measured (dBm)	GC Setting
A	16.5	16.8	23.5



Spurious Radiated Emissions:

Frequency MHz	Level dBuV/m	Pol v/h	15.209/15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
1593.790	32.6	V	54.0	-21.4	AVG	127	1.3	RB 1 MHz; VB: 10 Hz
1330.390	30.3	V	54.0	-23.7	AVG	75	1.0	RB 1 MHz; VB: 10 Hz
1592.770	49.5	V	74.0	-24.5	PK	127	1.3	RB 1 MHz; VB: 1 MHz
1329.560	48.8	V	74.0	-25.2	PK	75	1.0	RB 1 MHz; VB: 1 MHz
2998.330	48.8	V	74.0	-25.2	Peak	266	1.0	
5995.830	48.1	V	74.0	-25.9	Peak	149	1.0	
3245.830	44.3	H	74.0	-29.7	Peak	264	1.0	

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #3, Radiated Spurious Emissions, 1-26GHz, Worst case OFDM mode (802.11g)

Date of Test: 5/18/2009

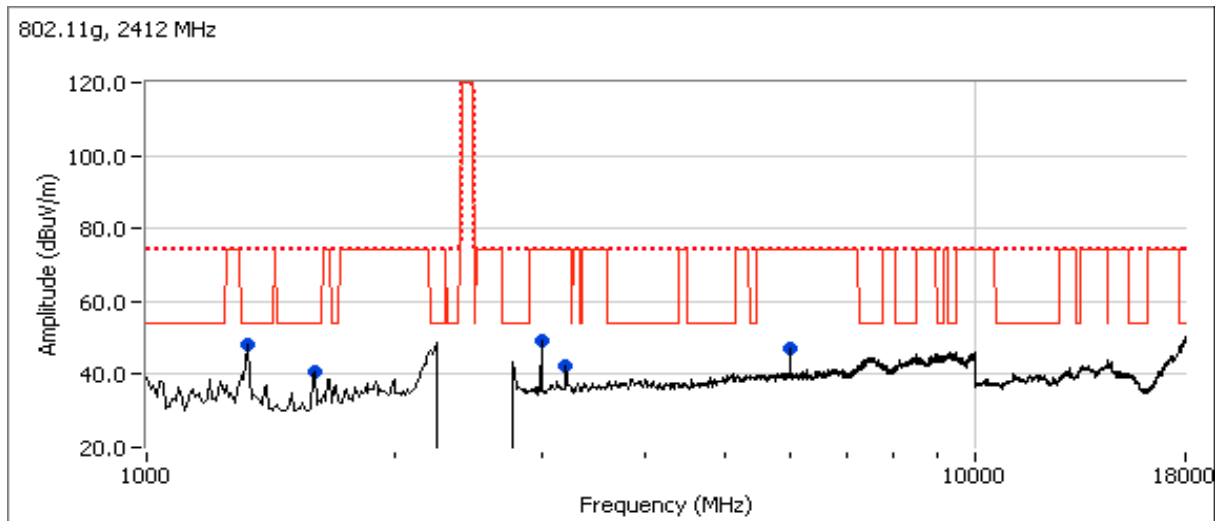
Test Location: FT Chamber #3

Test Engineer: Rafael Varelas

Config Change: None

Run #3a: 802.11g Mode, 2412 MHz (Channel 1)

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



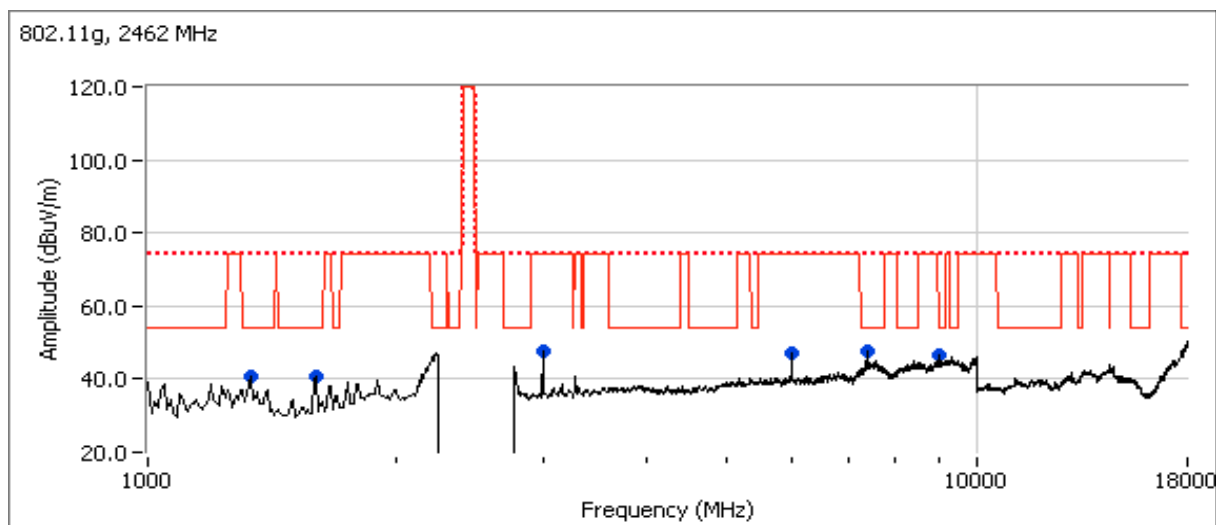
Spurious Radiated Emissions:

Frequency MHz	Level dBuV/m	Pol v/h	15.209/15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
1328.440	54.3	V	74.0	-19.7	PK	105	1.0	RB 1 MHz; VB: 1 MHz
1593.890	33.1	H	54.0	-20.9	AVG	102	1.0	RB 1 MHz; VB: 10 Hz
1329.400	31.9	V	54.0	-22.1	AVG	105	1.0	RB 1 MHz; VB: 10 Hz
1592.090	49.3	H	74.0	-24.7	PK	102	1.0	RB 1 MHz; VB: 1 MHz
2998.330	49.2	V	74.0	-24.8	Peak	257	1.0	
5995.830	47.1	V	74.0	-26.9	Peak	105	1.0	
3209.170	42.2	V	74.0	-31.8	Peak	121	1.3	

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	N/A

Run #3b: 802.11g Mode, 2462 MHz (Channel 11)

Chain	Target (dBm)	Power Settings Measured (dBm)	GC Setting
A	16.5	16.8	24.5



Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7384.950	42.3	V	54.0	-11.7	AVG	181	1.0	RB 1 MHz; VB: 10 Hz
9001.080	41.7	V	54.0	-12.3	AVG	131	1.0	RB 1 MHz; VB: 10 Hz
7387.510	54.8	V	74.0	-19.2	PK	181	1.0	RB 1 MHz; VB: 1 MHz
1597.860	31.3	H	54.0	-22.7	AVG	132	1.0	RB 1 MHz; VB: 10 Hz
9001.210	51.2	V	74.0	-22.8	PK	131	1.0	RB 1 MHz; VB: 1 MHz
1330.540	29.1	V	54.0	-24.9	AVG	141	1.6	RB 1 MHz; VB: 10 Hz
1328.770	48.7	V	74.0	-25.3	PK	141	1.6	RB 1 MHz; VB: 1 MHz
1599.090	48.0	H	74.0	-26.0	PK	132	1.0	RB 1 MHz; VB: 1 MHz
2998.330	47.7	V	74.0	-26.3	Peak	263	1.3	
5995.830	47.1	V	74.0	-26.9	Peak	101	1.0	

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	B

Radiated Emissions - Transmitter/Receiver Spurious 30 - 1000 MHz Receiver Spurious 1 - 7.5GHz (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: 5/18/2009
Test Engineer: Rafael Varelas
Test Location: FT#3

Config. Used: #1 (Module outside of host device)
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 were 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.

Summary of Results

MAC Address: 001E6400E972 CRTU Tool Version 5.10.24.0 Driver version 12.5.0.41

Run #	Test Performed	Limit	Result	Margin
1,2	RE, 30 - 1000 MHz, Maximized Emissions	FCC 15.209 / RSS GEN	Pass	41.8dBμV/m @ 110.648MHz (-1.7dB)
3 (20MHz)	RE, 1000 - 7500 MHz, Maximized Emissions - Chain A	RSS 210 / RSS GEN (Receiver spurious)	Pass	49.0dBμV/m @ 3000.4MHz (-5.0dB)
4 (20MHz)	RE, 1000 - 7500 MHz, Maximized Emissions - Chain A + B	RSS 210 / RSS GEN (Receiver spurious)	Pass	47.7dBμV/m @ 3000.3MHz (-6.3dB)
5 (20MHz)	RE, 1000 - 7500 MHz, Maximized Emissions - Chain B	RSS 210 / RSS GEN (Receiver spurious)	Pass	49.1dBμV/m @ 3000.3MHz (-4.9dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

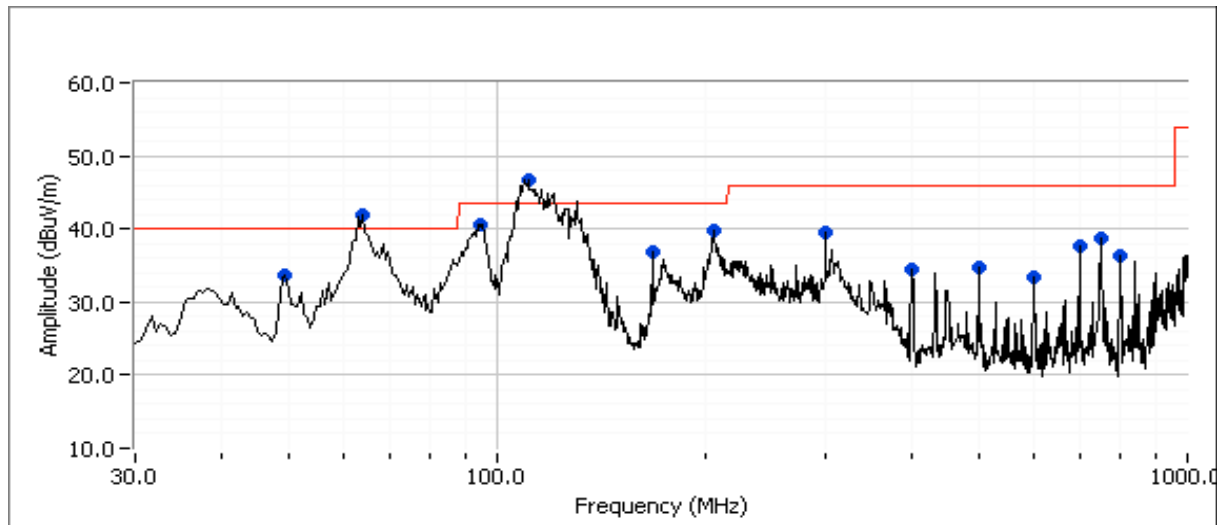
Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	B

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

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



Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC B / RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
110.648	46.8	H	43.5	3.3	Peak	35	3.0	
65.208	41.8	H	40.0	1.8	Peak	224	3.0	
95.141	40.7	H	43.5	-2.8	Peak	233	2.0	
205.349	39.9	H	43.5	-3.6	Peak	60	1.5	
49.376	33.6	V	40.0	-6.4	Peak	20	2.0	
299.477	39.5	H	46.0	-6.5	Peak	110	1.0	
299.477	39.5	H	46.0	-6.5	Peak	110	1.0	
168.003	36.8	H	43.5	-6.7	Peak	110	1.5	
746.303	38.6	V	46.0	-7.4	Peak	3	1.0	
699.365	37.7	H	46.0	-8.3	Peak	360	1.0	
797.225	36.2	H	46.0	-9.8	Peak	129	1.0	
504.010	34.8	H	46.0	-11.2	Peak	19	1.0	
398.687	34.4	V	46.0	-11.6	Peak	181	1.5	
598.531	33.3	V	46.0	-12.7	Peak	142	1.5	

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	B

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

Frequency	Level	Pol	FCC B / RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
110.648	41.8	H	43.5	-1.7	QP	40	2.5	QP (1.00s)
95.141	37.3	H	43.5	-6.2	QP	192	1.9	QP (1.00s)
65.208	32.3	H	40.0	-7.7	QP	219	2.5	QP (1.00s)
205.349	34.5	H	43.5	-9.0	QP	80	1.0	QP (1.00s)
299.477	35.9	H	46.0	-10.1	QP	121	1.0	QP (1.00s)
49.376	27.5	V	40.0	-12.5	QP	60	1.5	QP (1.00s)
699.365	33.5	H	46.0	-12.5	QP	360	1.0	QP (1.00s)
797.225	32.2	H	46.0	-13.8	QP	125	1.0	QP (1.00s)
398.687	30.7	V	46.0	-15.3	QP	197	1.3	QP (1.00s)
598.531	28.1	V	46.0	-17.9	QP	115	1.3	QP (1.00s)
746.303	25.6	V	46.0	-20.4	QP	23	1.0	QP (1.00s)
504.010	24.5	H	46.0	-21.5	QP	21	1.0	QP (1.00s)

Run #2: Maximized Readings From Run #1
Maximized quasi-peak readings (includes manipulation of EUT interface cables)

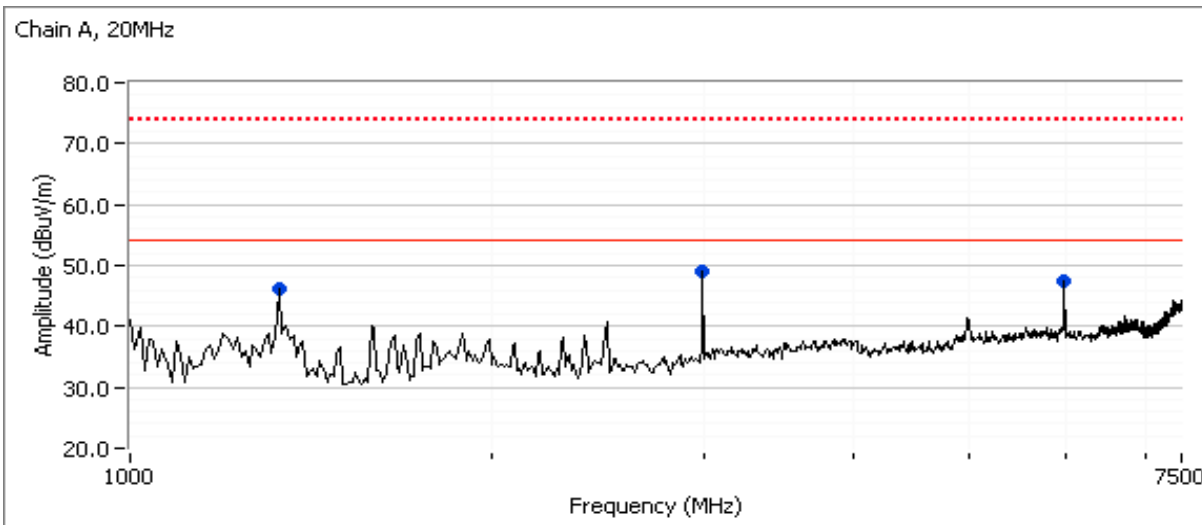
Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
30 - 1000 MHz	3	3	0.0

Frequency	Level	Pol	FCC B / RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
110.648	41.8	H	43.5	-1.7	QP	40	2.5	QP (1.00s)
95.141	37.3	H	43.5	-6.2	QP	190	1.9	QP (1.00s)
65.208	32.3	H	40.0	-7.7	QP	220	2.5	QP (1.00s)
205.349	34.5	H	43.5	-9.0	QP	82	1.0	QP (1.00s)
299.477	35.9	H	46.0	-10.1	QP	124	1.0	QP (1.00s)
49.376	27.6	V	40.0	-12.4	QP	62	1.5	QP (1.00s)

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	B

Run #3: Maximized Readings, 1000 - 7500 MHz, Receiver, Chain A, 20 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 7500Hz	3	3	0.0



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

Frequency	Level	Pol	RSS GEN / FCC B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.010	49.2	V	54.0	-4.8	Peak	262	1.0	
6000.860	47.6	V	54.0	-6.4	Peak	262	1.9	
1330.730	46.3	V	54.0	-7.7	Peak	249	1.3	

Final peak and average readings

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 7500Hz	3	3	0.0

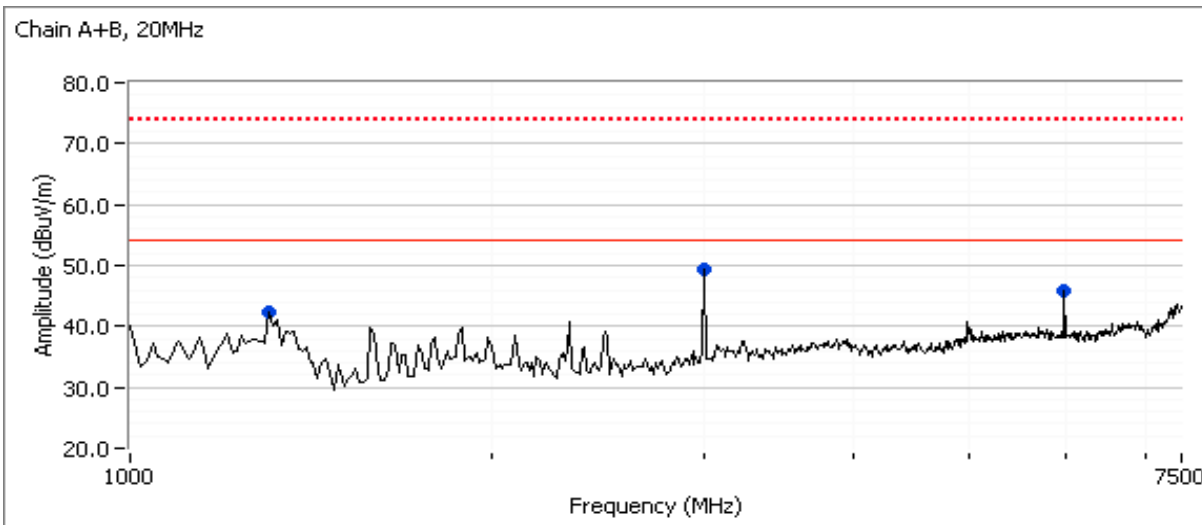
Frequency	Level	Pol	RSS GEN / FCC B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.440	49.0	V	54.0	-5.0	AVG	264	1.0	RB 1 MHz; VB: 10 Hz
3000.310	52.3	V	74.0	-21.7	PK	264	1.0	RB 1 MHz; VB: 1 MHz
1332.830	27.2	V	54.0	-26.8	AVG	288	1.0	RB 1 MHz; VB: 10 Hz
1329.830	46.5	V	74.0	-27.5	PK	288	1.0	RB 1 MHz; VB: 1 MHz
6000.830	39.9	V	54.0	-14.1	AVG	275	1.6	RB 1 MHz; VB: 10 Hz
6000.690	46.7	V	74.0	-27.3	PK	275	1.6	RB 1 MHz; VB: 1 MHz

Note 1: Above 1 GHz, RSS GEN specifies the limit as an average measurement. In addition, RSS GEN states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	B

Run #4: Maximized Readings, 1000 - 7500 MHz, Receiver, Chain A+B 20 MHz,

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 7500Hz	3	3	0.0



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

Frequency	Level	Pol	RSS GEN / FCC B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
6000.840	45.9	V	54.0	-8.1	Peak	137	1.0	
3000.020	49.4	V	54.0	-4.6	Peak	192	1.0	
1296.120	42.2	V	54.0	-11.8	Peak	318	1.0	

Final peak and average readings

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 7500Hz	3	3	0.0

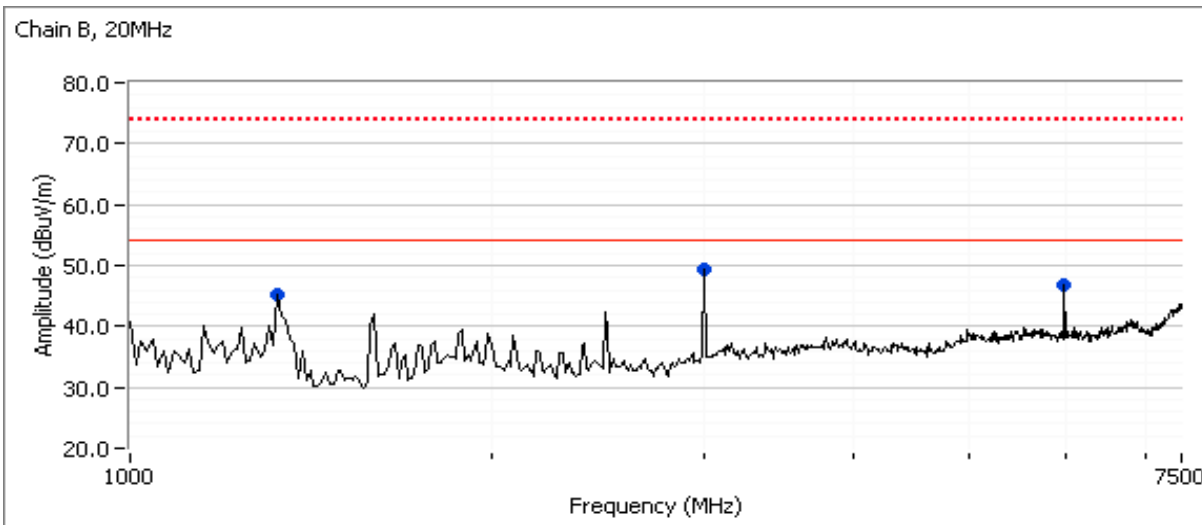
Frequency	Level	Pol	RSS GEN / FCC B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.290	47.7	V	54.0	-6.3	AVG	188	1.0	RB 1 MHz; VB: 10 Hz
3000.220	52.2	V	74.0	-21.8	PK	188	1.0	RB 1 MHz; VB: 1 MHz
6000.840	44.6	V	54.0	-9.4	AVG	151	1.0	RB 1 MHz; VB: 10 Hz
6000.440	50.5	V	74.0	-23.5	PK	151	1.0	RB 1 MHz; VB: 1 MHz
1309.120	26.2	V	54.0	-27.8	AVG	286	1.0	RB 1 MHz; VB: 10 Hz
1301.790	42.7	V	74.0	-31.3	PK	286	1.0	RB 1 MHz; VB: 1 MHz

Note 1: Above 1 GHz, RSS GEN specifies the limit as an average measurement. In addition, RSS GEN states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Client:	Intel Corporation	Job Number:	J75343
Model:	112BNHMW (1x2 bgn Half-Mini Card)	T-Log Number:	T75387
Contact:	Steve Hackett	Account Manager:	Christine Vu Krebill
Standard:	FCC 15.247, RSS 210, FCC 15B (PC Peripheral)	Class:	B

Run #5: Maximized Readings, 1000 - 7500 MHz, Receiver, Chain B, 20MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 7500Hz	3	3	0.0



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

Frequency	Level	Pol	RSS GEN / FCC B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.020	49.4	V	54.0	-4.6	Peak	258	1.0	
6000.840	46.8	V	54.0	-7.2	Peak	271	1.9	
1327.880	45.1	V	54.0	-8.9	Peak	252	2.2	

Final peak and average readings

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 7500Hz	3	3	0.0

Frequency	Level	Pol	RSS GEN / FCC B		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.290	49.1	V	54.0	-4.9	AVG	263	1.0	RB 1 MHz; VB: 10 Hz
3000.290	52.1	V	74.0	-21.9	PK	263	1.0	RB 1 MHz; VB: 1 MHz
6000.840	46.4	V	54.0	-7.6	AVG	262	1.9	RB 1 MHz; VB: 10 Hz
6000.640	50.7	V	74.0	-23.3	PK	262	1.9	RB 1 MHz; VB: 1 MHz
1330.080	26.6	V	54.0	-27.4	AVG	212	2.1	RB 1 MHz; VB: 10 Hz
1332.610	44.8	V	74.0	-29.2	PK	212	2.1	RB 1 MHz; VB: 1 MHz

Note 1: Above 1 GHz, RSS GEN specifies the limit as an average measurement. In addition, RSS GEN states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

EXHIBIT 3: Photographs of Test Configurations

EXHIBIT 4: Proposed FCC ID Label & Label Location

EXHIBIT 5: Detailed Photographs

Pages

EXHIBIT 6: Operator's Manual

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EXHIBIT 7: Block Diagram

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EXHIBIT 8: Schematic Diagrams

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EXHIBIT 9: Theory of Operation

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EXHIBIT 10: Advertising Literature

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EXHIBIT 11: RF Exposure Information

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