



*Test Report*

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

*Model: Intel Centrino Advanced-N 6200 with Yageo p/n  
79010C500-011-G and p/n 79010C400-011-G antennas*

IC CERTIFICATION #: 1000M-622ANHU, 1000M-622ANH  
FCC ID: PD9622ANHU, PD9622ANH

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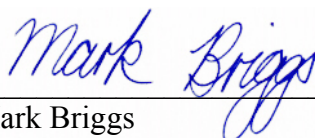
TEST SITE(S): Elliott Laboratories  
41039 Boyce Road.  
Fremont, CA. 94538-2435

IC SITE REGISTRATION #: 2845B-4 and 2845B-5

REPORT DATE: April 8, 2010

FINAL TEST DATES: March 25 to April 1, 2010

AUTHORIZED SIGNATORY:

  
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Testing Cert #2016-01

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**REVISION HISTORY**

Revision #	Date	Comments	Modified By
-	April 8, 2010	First release	

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## SCOPE

An electromagnetic emissions test has been performed on the Intel Corporation Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas, pursuant to the following rules:

Industry Canada RSS-Gen Issue 2  
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices  
(All Frequency Bands): Category I Equipment"  
FCC Part 15 Subpart C

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

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

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

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

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

**OBJECTIVE**

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

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

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

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

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

**STATEMENT OF COMPLIANCE**

The tested sample of Intel Corporation Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 2  
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices  
(All Frequency Bands): Category I Equipment"  
FCC Part 15 Subpart C

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

The test results recorded herein are based on a single type test of Intel Corporation Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas and therefore apply only to the tested sample. The sample was selected and prepared by Steve Hackett of Intel Corporation.

**DEVIATIONS FROM THE STANDARDS**

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

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

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	The proposed change to add a new antenna type does not affect the characteristics of the device with respect to output power, bandwidth, power density or other measurements made at the antenna port.		
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth			
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)			
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	The new antenna has a lower gain than the antennas previously evaluated with the device, therefore the maximum eirp remains unchanged from the previously reported value.		
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz			
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.8dBμV/m @ 2483.5MHz (-0.2dB)	15.207 in restricted bands, all others <-30dBc <sup>Note 1</sup>	Complies
Note 1: 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).					

**DIGITAL TRANSMISSION SYSTEMS (5725 –5850 MHz)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	The proposed change to add a new antenna type does not affect the characteristics of the device with respect to output power, bandwidth, power density or other measurements made at the antenna port.		
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth			
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems)			
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	The new antenna has a lower gain than the antennas previously evaluated with the device, therefore the maximum eirp remains unchanged from the previously reported value.		
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions – 30MHz – 40 GHz			
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 40 GHz	42.2dBμV/m @ 3836.7MHz (-11.8dB)	15.207 in restricted bands, all others <-30dBc <sup>Note 1</sup>	Complies
Note 1: 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	No changes to the rf connectors are proposed.		
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	43.6dB $\mu$ V/m @ 2384.9MHz (-10.4dB)	Refer to page 17	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	The proposed change to add a new antenna type does not affect the values originally reported for AC conducted emissions.		
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	The new antenna has a lower gain than the antennas previously evaluated with the device. The maximum eirp and, therefore, the MPE evaluation, remains unchanged from that previously reported.		
-	RSP 100 RSS GEN 7.1.5	User Manual	No changes to the user manual are proposed.		
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	The proposed change to add a new antenna type does not affect the bandwidth of the signal as previously reported.		

**MEASUREMENT UNCERTAINTIES**

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

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

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

The Intel Corporation Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas is a 2x2 802.11abgn mini PCI express module. The device is sold under two different model numbers in Canada, one having a full modular approval (622ANHMH) and the other a limited modular approval (622ANHU). There are no hardware or firmware differences between the two model numbers it is only the scope of the certification that is different..

The sample was received on March 25, 2010 and tested from March 25 to April 1, 2010. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	Cert #
Intel Corporation	622ANHU	2x2 802.11abgn mini PCI express module	MAC Address 002314129674	FCC: PD9622ANHU IC: 1000M-622ANHU
	622ANHMH			FCC: PD9622ANH IC: 1000M-622ANH

**OTHER EUT DETAILS**

The scope of testing was to evaluate a new antenna system comprising of a PIFA design for the main antenna and a couple design for the aux antenna. The model numbers are 79010C500-011-G for the main and 79010C400-011-G for the aux. The antenna details are below.

Frequency Band	Gain (dBi)	
	Main	Aux
2400-2500 MHz	0.95	-0.26
5150-5350 MHz	-1.06	1.4
5470-5725 MHz	-0.21	0.85
5725-5850 MHz	1.05	-0.15

The device was originally approved with the Universe PIFA antennas, specifications are provided below for reference.

Frequency Band	Gain (dBi)	
	Main	Aux
2400-2500 MHz	3.24	
5150-5350 MHz	3.73	
5470-5725 MHz	4.77	
5725-5850 MHz	4.97	

**ENCLOSURE**

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



**MODIFICATIONS**

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

**SUPPORT EQUIPMENT**

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Dell	-	Laptop	Prototype	N/A
Intel	Mini PCIE extender card	Extender card	None	N/A

**EUT INTERFACE PORTS**

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

Port	Connected To	Cable(s)		Length(m)
		Description	Shielded or Unshielded	
Laptop Adapter	AC power	-	Unshielded	1.0
Extender mini PCI	Laptop mini PCI bus	Ribbon	Unshielded	1.0
Extender dc power	DC power supply	2-wires	Unshielded	1.0

**EUT OPERATION**

For measurements on the spurious emissions from the transmitter the EUT was operating on the specified channel at the specified output power using one or both chains, as detailed in the test descriptions, with a > 99% duty cycle. Worst case modes were selected based on either the original test data for spurious emissions. Band edge measurements were made in all modes on the chain that had the highest effective gain based on measurements in one mode on both chains.

The output power for all spurious measurements away from the band edges was at, or above, the maximum power rating in each band. For band edge measurements the output power was set at or above either the rated power in each band or, in some cases, to the maximum nominal operating power (as programmed into the EEPROM) plus +1.5dB to account for the worst case tolerance in output power from the programmed power stored in EEPROM. The EEPROM power is always lower than the maximum rated power by at least 1.5dB. All target powers are measured with an average power meter and, therefore, do not exactly correlate with the powers listed in the grant which are measured in accordance with the FCC procedures based on the U-NII power measurement methods. The original report includes information correlating the average power (measured with a power meter) to the reported average power (measured using a spectrum analyzer).

For receiver spurious the device was in receive mode and tested on the center channel in each band.

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

Final test measurements were taken on April 1, 2010 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	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	211948	2845B-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 16-1-1 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.

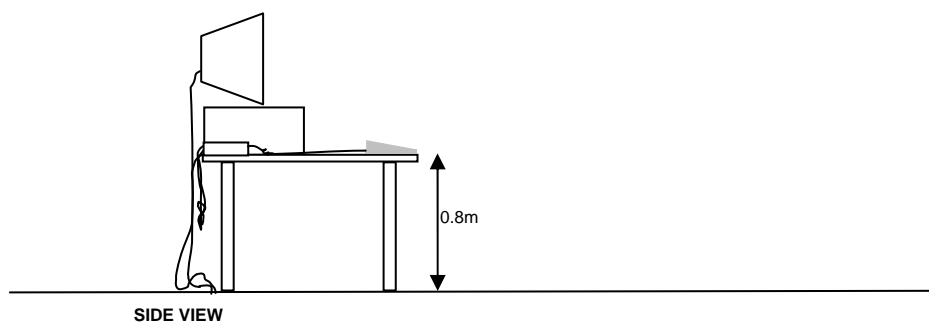
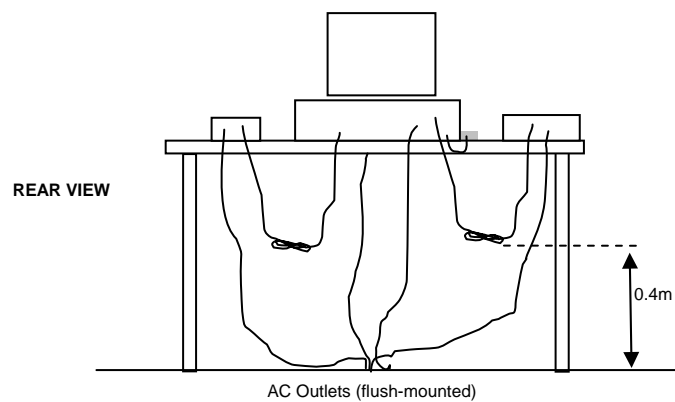
### RADIATED EMISSIONS

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.

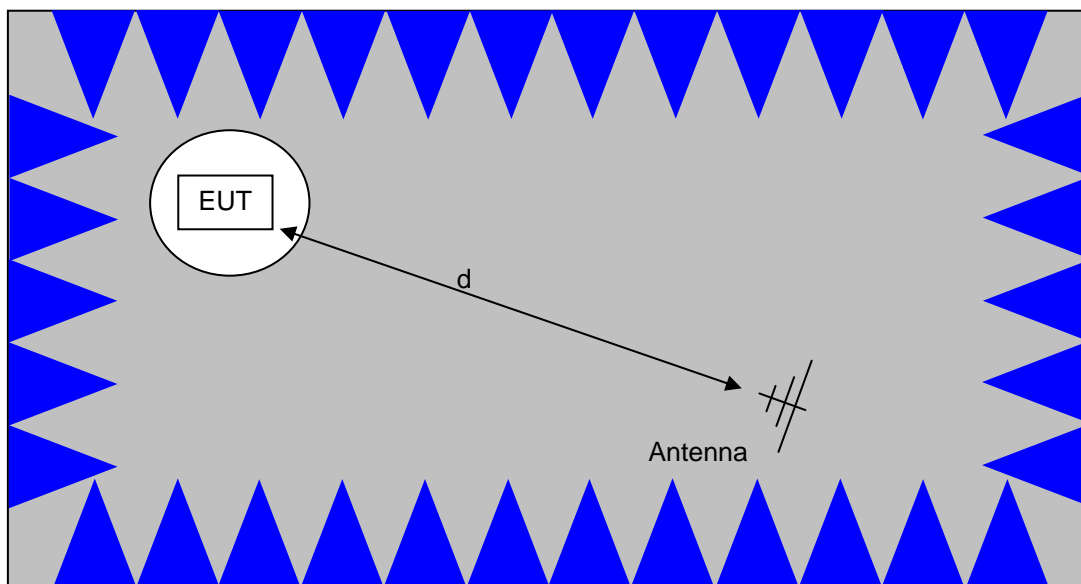
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

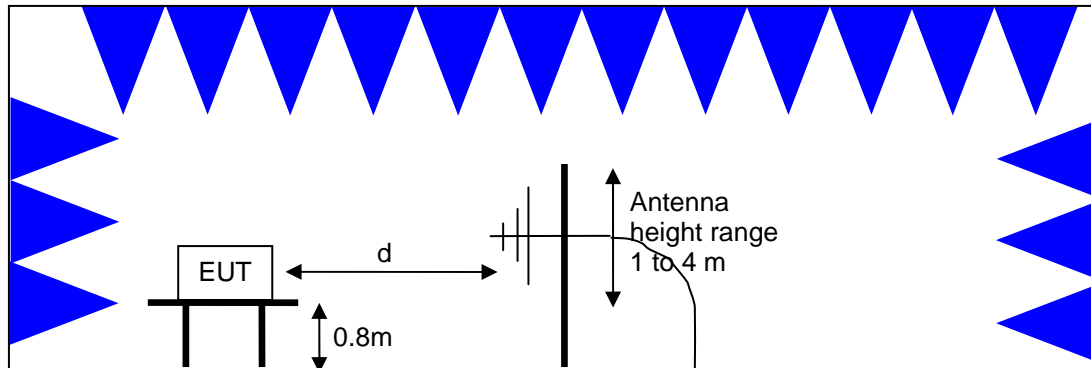


Typical Test Configuration for Radiated Field Strength Measurements



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

**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:

**GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS**

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

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{\text{KHz}} @ 300\text{m}$	$67.6-20*\log_{10}(F_{\text{KHz}}) @ 300\text{m}$
0.490-1.705	$24000/F_{\text{KHz}} @ 30\text{m}$	$87.6-20*\log_{10}(F_{\text{KHz}}) @ 30\text{m}$
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

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



**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

**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:

$F_d$  = Distance Factor in dB

$D_m$  = Measurement Distance in meters

$D_s$  = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

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

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

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

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

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

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

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

**Appendix A Test Equipment Calibration Data**

<b><u>Manufacturer</u></b>	<b><u>Description</u></b>	<b><u>Model #</u></b>	<b><u>Asset #</u></b>	<b><u>Cal Due</u></b>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	03-Jun-10
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	12-Apr-10
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	10-Jun-10
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	29-Jul-10
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	25-Sep-10
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	1771	30-Sep-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	17-Sep-10
A.H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	19-Jan-11

## ***Appendix B Test Data***

T78805 35 Pages

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G	T-Log Number:	T78805
		Account Manager:	Christine Krebill
Contact:	Steve Hackett		-
Emissions Standard(s):	15.209 / 15.247	Class:	B
Immunity Standard(s):	-	Environment:	-

## EMC Test Data

For The

## Intel Corporation

Model

Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas

Date of Last Test: 3/31/2010

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

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

### 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: 002314129674 CRTU Tool Version 5.15.36.0 Driver version 13.0.0.91 Sample: 1

Run #	Mode	Channel	Target Power	Measured Power	Test Performed	Limit	Result / Margin
-------	------	---------	--------------	----------------	----------------	-------	-----------------

The target power is the average power and was taken from the original certification test data

Run # 1	802.11b Chain A	#1 2412MHz	16.5	16.5	Restricted Band Edge at 2400 MHz	15.209	47.1dBµV/m @ 2386.4MHz (-6.9dB)
		#11 2462MHz	16.5	16.7	Restricted Band Edge at 2483.5 MHz	15.209	46.6dBµV/m @ 2483.5MHz (-7.4dB)
Run # 2	802.11b Chain B	#1 2412MHz	16.5	16.5	Restricted Band Edge at 2400 MHz	15.209	47.2dBµV/m @ 2386.4MHz (-6.8dB)
		#11 2462MHz	16.5	16.6	Restricted Band Edge at 2483.5 MHz	15.209	43.4dBµV/m @ 2488.2MHz (-10.6dB)

802.11b mode used to confirm which antenna (chain A or B) has the highest gain at the top and bottom channel. All other measurements made at the bottom channel on the chain with the highest gain antenna and on the top channel on the chain with the highest gain antenna at at frequency.

Run # 3	802.11g Chain A	#1 2412MHz	15.4	15.6	Restricted Band Edge at 2400 MHz	15.209	53.7dBµV/m @ 2390.0MHz (-0.3dB)
		#11 2462MHz	15.5	15.5	Restricted Band Edge at 2483.5 MHz	15.209	53.1dBµV/m @ 2483.5MHz (-0.9dB)
Run # 4	n20 Chain A	#1 2412MHz	14.7	14.2	Restricted Band Edge at 2400 MHz	15.209	52.5dBµV/m @ 2390.0MHz (-1.5dB)
		#11 2462MHz	14.3	14.2	Restricted Band Edge at 2483.5 MHz	15.209	51.8dBµV/m @ 2483.5MHz (-2.2dB)

The target power is the maximum average power set by the EEPROM for #3 and #9 in 802.11n 40 MHz mode

Run # 5	n40 Chain A	#3 2422MHz	10.5	10.5	Restricted Band Edge at 2400 MHz	15.209	53.2dBµV/m @ 2390.0MHz (-0.8dB)
		#9 2452MHz	11.5	11.6	Restricted Band Edge at 2483.5 MHz	15.209	53.8dBµV/m @ 2483.5MHz (-0.2dB)

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	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, Band Edge Field Strength - 802.11b, Chain A

Date of Test: 3/25/2010

Test Engineer: Suhaila Khushzad

Test Location: Chamber #4

Config Change: none

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

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

### Fundamental Signal Field Strength

Frequency MHz	Level dBμV/m	Pol v/h	15.209 / 15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2409.430	101.1	V	-	-	AVG	321	1.0	RB 1 MHz; VB: 10 Hz
2413.270	104.2	V	-	-	PK	321	1.0	RB 1 MHz; VB: 1 MHz
2414.730	100.2	V	-	-	PK	321	1.0	RB 100 kHz; VB: 100 kHz
2409.530	104.9	H	-	-	AVG	210	1.0	RB 1 MHz; VB: 10 Hz
2411.200	107.6	H	-	-	PK	210	1.0	RB 1 MHz; VB: 1 MHz
2409.730	102.4	H	-	-	PK	210	1.0	RB 100 kHz; VB: 100 kHz

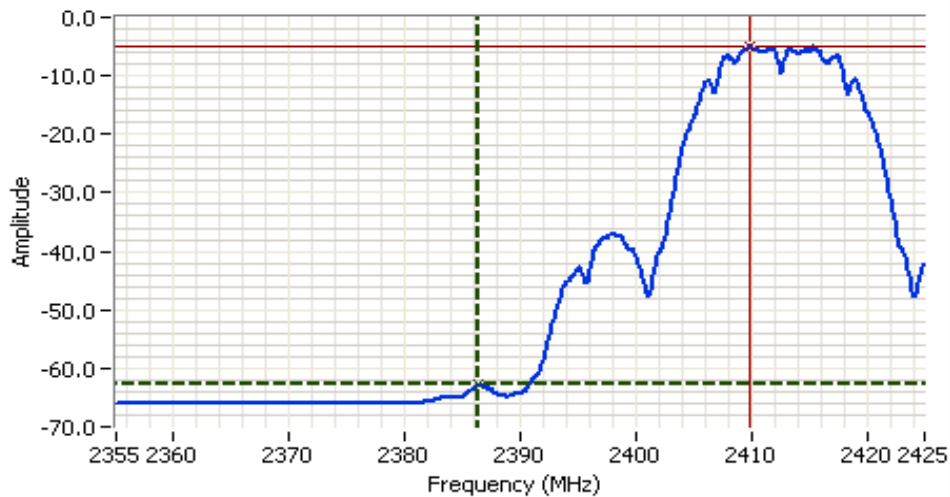
### 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	107.6	104.2	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	104.9	101.1	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	55.2 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	52.4 dBμV/m		
Calculated Band-Edge Measurement (Avg):	49.7 dBμV/m	Margin	Level
Delta Marker - 1MHz/1MHz:	50.5 dB	-6.9	47.1
Delta Marker - 1MHz/10Hz:	57.8 dB	-21.6	52.4
Calculated Band-Edge Measurement (Peak):	57.1 dBμV/m		
Calculated Band-Edge Measurement (Avg):	47.1 dBμV/m		

Frequency MHz	Level dBμV/m	Pol v/h	FCC 15.209 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2386.380	47.1	-	54.0	-6.9	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A









## Analyzer Settings

HP8564E  
CF: 2390.000 MHz  
SPAN: 70.000 MHz  
RB 1.000 MHz  
VB 10 Hz  
Detector Sample  
Att 20  
RL Offset 0.00  
Sweep Time 18.0s  
Ref Lvl: 10.00DBM

## Comments

BE @ 2390 MHz  
802.11b  
Chain A

Cursor 1 2386.3833 -62.83   

Cursor 2 2409.8333 -5.00   

Delta Freq. 23.450  
Delta Amplitude 57.83



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

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

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

## 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	
2459.400	101.3	V	-	-	AVG	325	1.0	RB 1 MHz; VB: 10 Hz
2461.230	104.1	V	-	-	PK	325	1.0	RB 1 MHz; VB: 1 MHz
2460.670	98.7	V	-	-	PK	325	1.0	RB 100 kHz; VB: 100 kHz
2464.870	103.4	H	-	-	AVG	205	1.0	RB 1 MHz; VB: 10 Hz
2463.200	106.2	H	-	-	PK	205	1.0	RB 1 MHz; VB: 1 MHz
2458.630	102.2	H	-	-	PK	205	1.0	RB 100 kHz; VB: 100 kHz

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

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	106.2	104.1	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	103.4	101.3	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	54.8 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	51.4 dBuV/m		
Calculated Band-Edge Measurement (Avg):	48.6 dBuV/m	Margin	Level
Delta Marker - 1MHz/1MHz:	50.5 dB	-7.4	46.6
Delta Marker - 1MHz/10Hz:	56.8 dB	-22.6	51.4
Calculated Band-Edge Measurement (Peak):	55.7 dBuV/m		
Calculated Band-Edge Measurement (Avg):	46.6 dBuV/m		

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	46.6	-	54.0	-7.4	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A



## Analyzer Settings

HP8564E  
 CF: 2483.500 MHz  
 SPAN: 70.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 20  
 RL Offset 0.00  
 Sweep Time 18.0s  
 Ref Lvl: 10.00dBm

## Comments

BE @ 2483.5 MHz  
 802.11b  
 Chain A

Cursor 1 2459.4666 -5.67  
 Cursor 2 2483.5000 -62.50

Delta Freq. 24.033  
 Delta Amplitude 56.83



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## Run # 2, Band Edge Field Strength - 802.11b, Chain B

Date of Test: 3/25/2010

Test Engineer: Suhaila Khushzad

Test Location: Chamber #4

Config Change: none

## Run # 2a, EUT on Channel #1 2412MHz - 802.11b, Chain B

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

## Fundamental Signal Field Strength

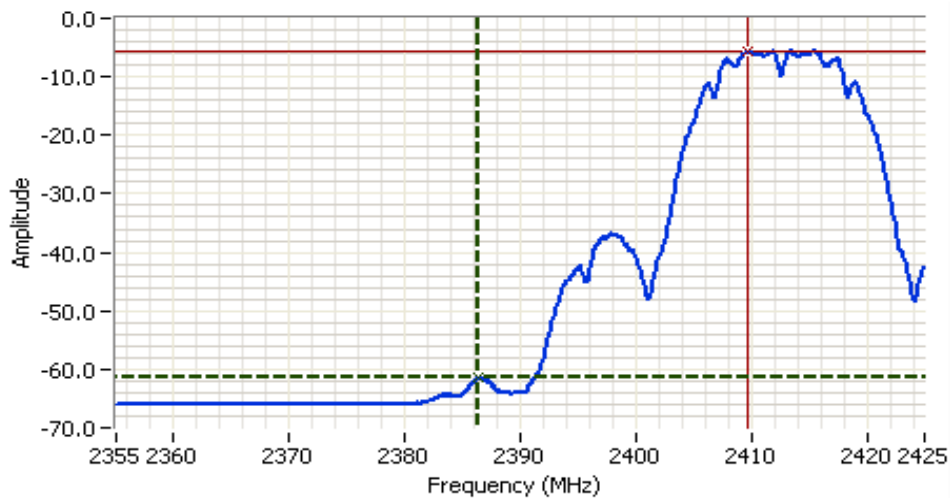
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2409.430	103.2	H	-	-	AVG	47	1.0	RB 1 MHz; VB: 10 Hz
2411.200	105.9	H	-	-	PK	47	1.0	RB 1 MHz; VB: 1 MHz
2409.670	97.9	H	-	-	PK	47	1.0	RB 100 kHz; VB: 100 kHz
2409.470	102.7	V	-	-	AVG	39	1.0	RB 1 MHz; VB: 10 Hz
2413.170	105.5	V	-	-	PK	39	1.0	RB 1 MHz; VB: 1 MHz
2410.700	100.1	V	-	-	PK	39	1.0	RB 100 kHz; VB: 100 kHz

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

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	105.9	105.5	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	103.2	102.7	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	54.0 dB	<- this can only be used if band edge signal is highest within 2MHz of band edge.				
Calculated Band-Edge Measurement (Peak):	51.9 dBuV/m					
Calculated Band-Edge Measurement (Avg):	49.2 dBuV/m	Margin	Level	Limit	Detector	
Delta Marker - 1MHz/1MHz:	50.2 dB	-6.8	47.2	54	Avg	
Delta Marker - 1MHz/10Hz:	56.0 dB	-22.1	51.9	74	Pk	
Calculated Band-Edge Measurement (Peak):	55.7 dBuV/m	Using 100kHz delta value				
Calculated Band-Edge Measurement (Avg):	47.2 dBuV/m	Using 1MHz delta value				

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2386.380	47.2	-	54.0	-6.8	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A



## Analyzer Settings

HP8564E  
CF: 2390.000 MHz  
SPAN: 70.000 MHz  
RB 1.000 MHz  
VB 10 Hz  
Detector Sample  
Att 20  
RL Offset 0.00  
Sweep Time 18.0s  
Ref Lvl: 10.00DBM

## Comments

BE @ 2390 MHz  
802.11b  
Chain B

Cursor 1 2386.3833 -61.50  
Cursor 2 2409.7166 -5.50

Delta Freq. 23.333  
Delta Amplitude 56.00



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## Run # 2b, EUT on Channel #11 2462MHz - 802.11b, Chain B

Date of Test: 3/25/2010

Test Location: Chamber #4

Test Engineer: Rafael Varelas

Config Change: none

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain B	16.5	16.6	25.5

## 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	
2464.870	101.7	V	-	-	AVG	40	1.1	RB 1 MHz; VB: 10 Hz
2463.230	104.3	V	-	-	PK	40	1.1	RB 1 MHz; VB: 1 MHz
2464.730	99.2	V	-	-	PK	40	1.1	RB 100 kHz; VB: 100 kHz
2464.800	101.5	H	-	-	AVG	303	1.2	RB 1 MHz; VB: 10 Hz
2463.200	104.3	H	-	-	PK	303	1.2	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:	104.3	104.3	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	101.5	101.7	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	56.3 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	48.0 dB $\mu$ V/m		
Calculated Band-Edge Measurement (Avg):	45.4 dB $\mu$ V/m	Margin	Level
Delta Marker - 1MHz/1MHz:	53.7 dB	-10.6	43.4
Delta Marker - 1MHz/10Hz:	58.3 dB	-26.0	48.0
Calculated Band-Edge Measurement (Peak):	50.6 dB $\mu$ V/m		
Calculated Band-Edge Measurement (Avg):	43.4 dB $\mu$ V/m		

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2488.167	43.4	-	54.0	-10.6	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A



## Analyzer Settings

HP8564E  
 CF: 2483.500 MHz  
 SPAN: 70.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 10  
 RL Offset 0.00  
 Sweep Time 18.0s  
 Ref Lvl: -0.40DBM

## Comments

BE @ 2483.5  
 802.11g  
 Chain B

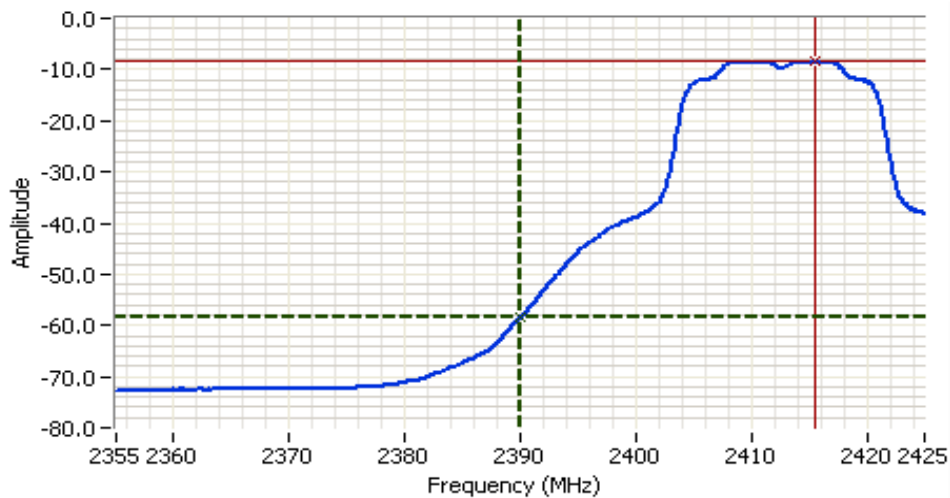
Cursor 1 2459.4666 -5.23  
 Cursor 2 2488.1667 -63.57

Delta Freq. 28.700  
 Delta Amplitude 58.33





Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A



## Analyzer Settings

HP8564E  
 CF: 2390.000 MHz  
 SPAN: 70.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 10  
 RL Offset 0.00  
 Sweep Time 18.0s  
 Ref Lvl: -0.40DBM

## Comments

BE @ 2390  
 802.11g  
 Chain A

Cursor 1 2390.0000 -58.57  
 Cursor 2 2415.5500 -8.40

Delta Freq. 25.550  
 Delta Amplitude 50.17

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

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

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	15.5	15.5	28.5

## Fundamental Signal Field Strength

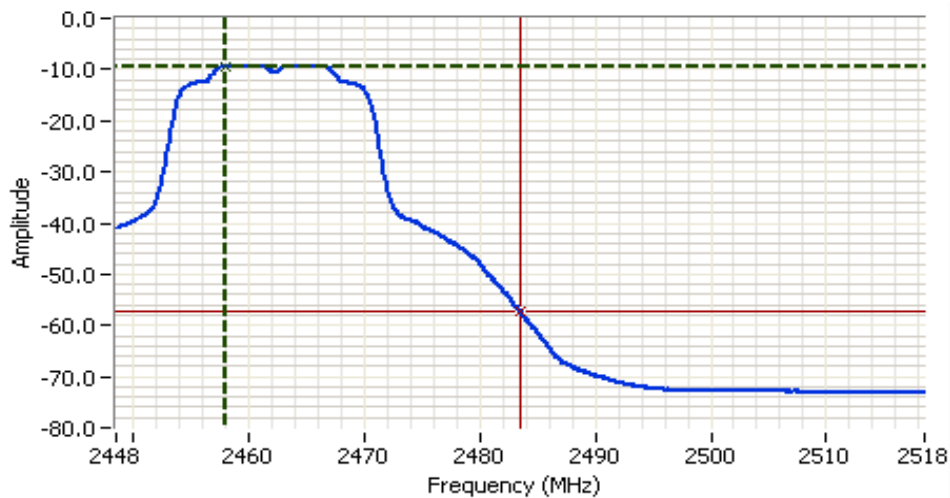
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2465.270	101.1	H	-	-	AVG	56	1.0	RB 1 MHz; VB: 10 Hz
2465.230	109.1	H	-	-	PK	56	1.0	RB 1 MHz; VB: 1 MHz
2464.770	100.9	H	-	-	??	56	1.0	RB 100 kHz; VB: 100 kHz
2458.230	99.3	V	-	-	AVG	324	1.0	RB 1 MHz; VB: 10 Hz
2465.130	106.8	V	-	-	PK	324	1.0	RB 1 MHz; VB: 1 MHz
2466.000	99.7	V	-	-	PK	324	1.0	RB 100 kHz; VB: 100 kHz

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

	H	V				
Fundamental emission level @ 3m in 1MHz RBW:	109.1	106.8	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:	101.1	99.3	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz	47.5 dB	<- this can only be used if band edge signal is highest within 2MHz of band edge.				
Calculated Band-Edge Measurement (Peak):	59.3 dBuV/m					
Calculated Band-Edge Measurement (Avg):	53.6 dBuV/m	Margin	Level	Limit	Detector	
Delta Marker - 1MHz/1MHz:	38.8 dB	-0.9	53.1	54	Avg	
Delta Marker - 1MHz/10Hz:	48.0 dB	-14.7	59.3	74	Pk	
Calculated Band-Edge Measurement (Peak):	68.0 dBuV/m	Using 100kHz delta value				
Calculated Band-Edge Measurement (Avg):	53.1 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	
2483.500	53.1	-	54.0	-0.9	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A









## Analyzer Settings

HP8564E  
 CF: 2483.500 MHz  
 SPAN: 70.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 10  
 RL Offset 0.00  
 Sweep Time 18.0s  
 Ref Lvl: -2.83DBM

## Comments

BE @ 2483.5 MHz  
 802.11g  
 Chain A

Cursor 1	2458.0667	-9.33			
Cursor 2	2483.5000	-57.33			

Delta Freq. 25.433  
 Delta Amplitude 48.00

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## Run # 4, Band Edge Field Strength - n20, Chain A

Date of Test: 3/25/2010

Test Engineer: Rafael Varelas

Test Location: FT Chamber #4

Config Change: none

## Run # 4a, EUT on Channel #1 2412MHz - n20, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	14.7	14.2	27.0

## Fundamental Signal Field Strength

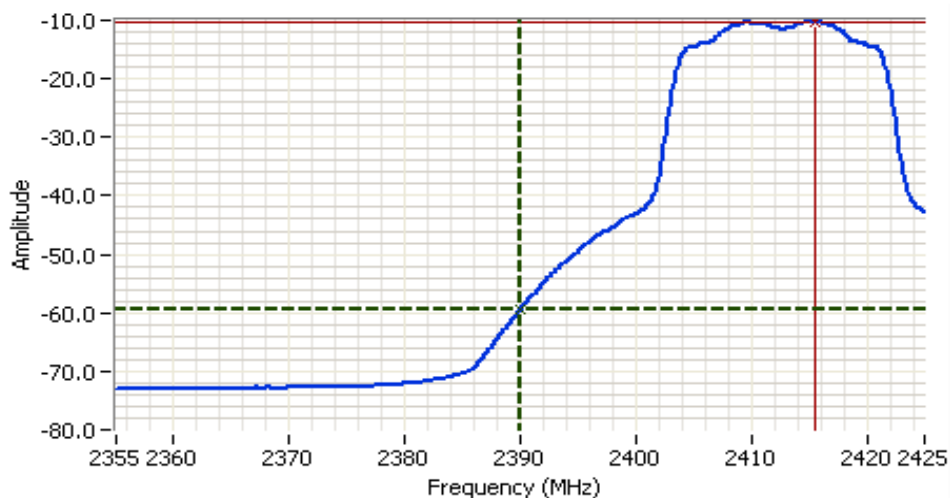
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2409.130	100.2	V	120.0	-19.8	AVG	314	1.1	RB 1 MHz; VB: 10 Hz
2408.900	107.9	V	120.0	-12.1	PK	314	1.1	RB 1 MHz; VB: 1 MHz
2408.930	101.8	H	120.0	-18.2	AVG	57	1.0	RB 1 MHz; VB: 10 Hz
2409.670	109.4	H	120.0	-10.6	PK	57	1.0	RB 1 MHz; VB: 1 MHz
2407.130	102.6	H	120.0	-17.4	PK	57	1.0	RB 100 kHz; VB: 100 kHz

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

100kHz Band-Edge Signal Related Field Strength - Marker Data		H	V				
Fundamental emission level @ 3m in 1MHz RBW:		109.4	107.9	Peak Measurement (RB=VB=1MHz)			
Fundamental emission level @ 3m in 1MHz RBW:		101.8	100.2	Average Measurement (RB=1MHz, VB=10Hz)			
Delta Marker - 100kHz		49.0 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.			
Calculated Band-Edge Measurement (Peak):		60.4 dBuV/m					
Calculated Band-Edge Measurement (Avg):		52.8 dBuV/m					
		Margin	Level	Limit	Detector		
Delta Marker - 1MHz/1MHz:		38.7 dB	-1.5	52.5	54	Avg	
Delta Marker - 1MHz/10Hz:		49.3 dB	-13.6	60.4	74	Pk	
Calculated Band-Edge Measurement (Peak):		70.7 dBuV/m	Using 100kHz delta value				
Calculated Band-Edge Measurement (Avg):		52.5 dBuV/m	Using 1MHz delta value				

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters	
2390.000	52.5	-	54.0	-1.5	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A



## Analyzer Settings

HP8564E  
 CF: 2390.000 MHz  
 SPAN: 70.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 10  
 RL Offset 0.00  
 Sweep Time 18.0s  
 Ref Lvl: 0.00DBM

## Comments

BE @ 2390 MHz  
 802.11n20  
 Chain A

Cursor 1 2390.0000 -59.50  
 Cursor 2 2415.4333 -10.17

Delta Freq. 25.433  
 Delta Amplitude 49.33

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## Run # 4b, EUT on Channel #11 2462MHz - n20, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	14.3	14.2	27.0

## Fundamental Signal Field Strength

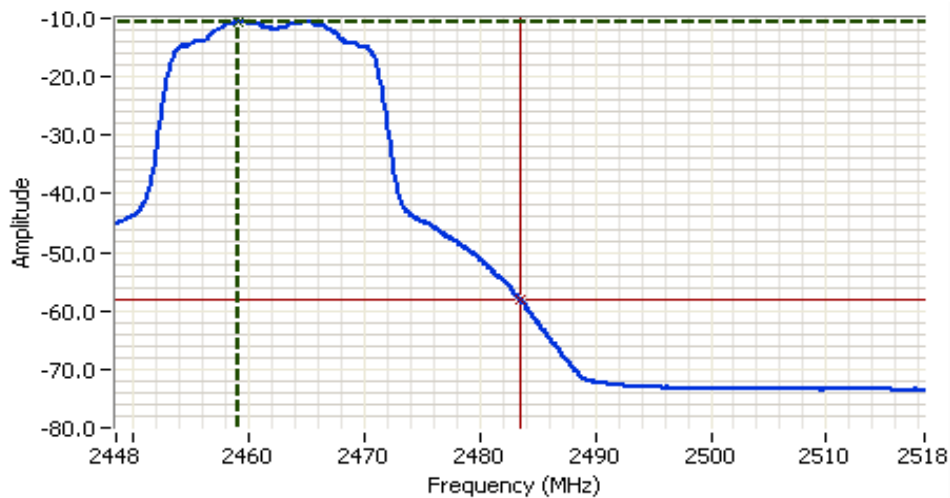
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2458.900	97.4	V	-	-	AVG	324	1.0	RB 1 MHz; VB: 10 Hz
2458.430	105.6	V	-	-	PK	324	1.0	RB 1 MHz; VB: 1 MHz
2465.270	99.5	H	-	-	AVG	60	1.0	RB 1 MHz; VB: 10 Hz
2465.370	107.3	H	-	-	PK	60	1.0	RB 1 MHz; VB: 1 MHz
2467.300	101.0	H	-	-	PK	60	1.0	RB 100 kHz; VB: 100 kHz

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

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	107.3	105.6	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	99.5	97.4	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	46.3 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	61.0 dBuV/m		
Calculated Band-Edge Measurement (Avg):	53.2 dBuV/m	Margin	Level
Delta Marker - 1MHz/1MHz:	36.3 dB	-2.2	51.8
Delta Marker - 1MHz/10Hz:	47.7 dB	-13.0	61.0
Calculated Band-Edge Measurement (Peak):	71.0 dBuV/m		
Calculated Band-Edge Measurement (Avg):	51.8 dBuV/m		

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	51.8	-	54.0	-2.2	Avg	-	-	Using 1MHz delta value

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A



## Analyzer Settings

HP8564E  
 CF: 2483.500 MHz  
 SPAN: 70.000 MHz  
 RB 1.000 MHz  
 VB 10 Hz  
 Detector Sample  
 Att 10  
 RL Offset 0.00  
 Sweep Time 18.0s  
 Ref Lvl: -4.10DBM

## Comments

BE @ 2483.5 MHz  
 802.11n20  
 Chain A

Cursor 1	2459.0000	-10.60	
Cursor 2	2483.5000	-58.27	

Delta Freq. 24.500  
 Delta Amplitude 47.67

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## Run # 6, Band Edge Field Strength - n40, Chain A

Date of Test: 4/1/2010

Test Engineer: Rafael Varelas

Test Location: FT Chamber #4

Config Change: none

## Run # 6a, EUT on Channel #3 2422MHz - n40, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	10.5	10.5	23.0

## 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	
2411.000	91.2	V	-	-	AVG	75	1.0	RB 1 MHz; VB: 10 Hz
2412.000	98.9	V	-	-	PK	75	1.0	RB 1 MHz; VB: 1 MHz
2411.000	94.2	H	-	-	AVG	54	1.0	RB 1 MHz; VB: 10 Hz
2410.670	101.9	H	-	-	PK	54	1.0	RB 1 MHz; VB: 1 MHz
2417.200	94.7	H	-	-	PK	54	1.0	RB 100 kHz; VB: 100 kHz

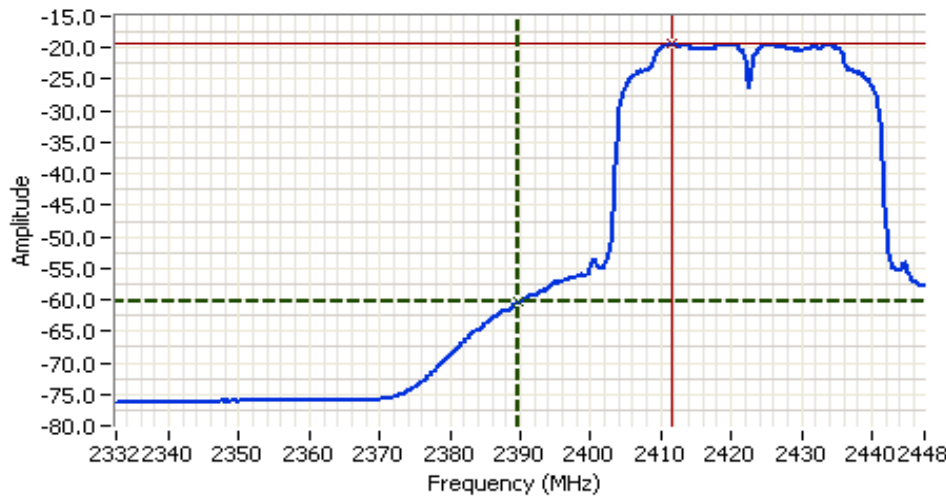
## 2390 MHz Band Edge Signal Radiated Field Strength - Marker Delta

	H	V	
Fundamental emission level @ 3m in 1MHz RBW:	101.9	98.9	Peak Measurement (RB=VB=1MHz)
Fundamental emission level @ 3m in 1MHz RBW:	94.2	91.2	Average Measurement (RB=1MHz, VB=10Hz)
Delta Marker - 100kHz	38.5 dB		<- this can only be used if band edge signal is highest within 2MHz of band edge.
Calculated Band-Edge Measurement (Peak):	63.4 dB $\mu$ V/m		
Calculated Band-Edge Measurement (Avg):	55.7 dB $\mu$ V/m	Margin	Level
Delta Marker - 1MHz/1MHz:	36.0 dB	-0.8	53.2
Delta Marker - 1MHz/10Hz:	41.0 dB	-10.6	63.4
Calculated Band-Edge Measurement (Peak):	65.9 dB $\mu$ V/m		
Calculated Band-Edge Measurement (Avg):	53.2 dB $\mu$ V/m		

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.2	-	54.0	-0.8	Avg	-	-	Using 1MHz delta value



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A



## Analyzer Settings

HP8564E,EMI  
CF: 2390.000 MHz  
SPAN:115.000 MHz  
RB 1.000 MHz  
VB 10 Hz  
Detector Sample  
Att 10  
RL Offset 0.00  
Sweep Time 43.0s  
Ref Lvl:-9.10DBM

## Comments

BE @ 2390 MHz  
802.11n40  
Chain A

Cursor 1	2389.8083	-60.43	
Cursor 2	2411.4666	-19.43	

Delta Freq. 21.658

Delta Amplitude 41.00



Run # 6b, EUT on Channel #9 2452MHz - n40, Chain A

	Target (dBm)	Power Settings Measured (dBm)	Software Setting
Chain A	11.5	11.6	24.5

## Fundamental Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2440.930	91.5	V	-	-	AVG	313	1.1	RB 1 MHz; VB: 10 Hz
2442.000	99.1	V	-	-	PK	313	1.1	RB 1 MHz; VB: 1 MHz
2440.930	94.0	H	-	-	AVG	55	1.0	RB 1 MHz; VB: 10 Hz
2441.930	101.7	H	-	-	PK	55	1.0	RB 1 MHz; VB: 1 MHz
2464.870	93.1	H	-	-	PK	55	1.0	RB 100 kHz; VB: 100 kHz

## Radiated Bandedge Field Strength

Maximize radiated signal level at the band edge then take measurement using SA40 or ESI

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.8	H	54.0	-0.2	AVG	210	1.0	RB 1 MHz; VB: 10 Hz
2484.670	66.8	H	74.0	-7.2	PK	210	1.0	RB 1 MHz; VB: 1 MHz

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) / FCC 15 E Radiated Emissions Band Edge Measurements

### 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: 002314129674 CRTU Tool Version 5.15.36.0 Driver version 13.0.0.91 Sample: 1

The target power is the average power and was taken from the original certification test data

Run #	Mode	Channel	Target Power	Measured Power	Test Performed	Limit	Result / Margin
The original certification test data indicated that 802.11b mode was the worst case of all the available operating modes in the 2.4GHz band with respect to spurious emissions. Target power is the highest average power (center channel).							
Run #1	802.11b Chain A	#1 2412MHz	16.5	16.5	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	42.3dBµV/m @ 7500.1MHz (-11.7dB)
		#6 2437MHz	16.5	16.6			42.4dBµV/m @ 7500.1MHz (-11.6dB)
		#11 2462MHz	16.5	16.7			39.2dBµV/m @ 4500.0MHz (-14.8dB)
Run # 2	802.11b Chain B	#1 2412MHz	16.5	16.5	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	44.1dBµV/m @ 4824.1MHz (-9.9dB)
		#6 2437MHz	16.5	16.5			46.5dBµV/m @ 4874.0MHz (-7.5dB)
		#11 2462MHz	16.5	16.6			42.2dBµV/m @ 4924.0MHz (-11.8dB)
The original certification test data indicated that n40 mode was the worst case of all the available operating modes in the 5725-5850 MHz band with respect to spurious emissions							
Run # 3	n40 Chain A+B	#151 5755MHz	16.5	16.6	Radiated Emissions, 1 - 26 GHz	FCC 15.209 / 15.247	42.2dBµV/m @ 3836.7MHz (-11.8dB)
		#159 5795MHz	16.5	16.6			39.4dBµV/m @ 2385.2MHz (-14.6dB)

### 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:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

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

Date of Test: 3/25/2010

Test Location: Chamber #4

Test Engineer: Rafael Varelas

Config Change: none

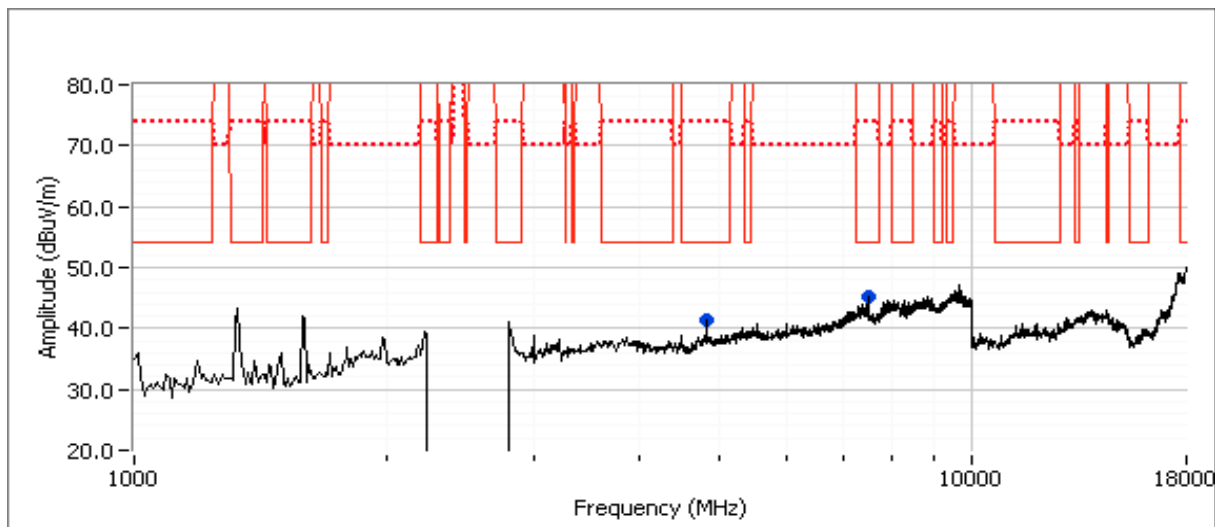
## Run #1a, EUT on Channel Low - 802.11b, Chain A

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

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.050	42.3	V	54.0	-11.7	AVG	83	1.1	MHz; VB: 10 Hz
7500.110	50.6	V	74.0	-23.4	PK	83	1.1	MHz; VB: 1 MHz
4824.070	39.7	V	54.0	-14.3	AVG	216	1.0	MHz; VB: 10 Hz
4824.010	46.9	V	74.0	-27.1	PK	216	1.0	MHz; VB: 1 MHz

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



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

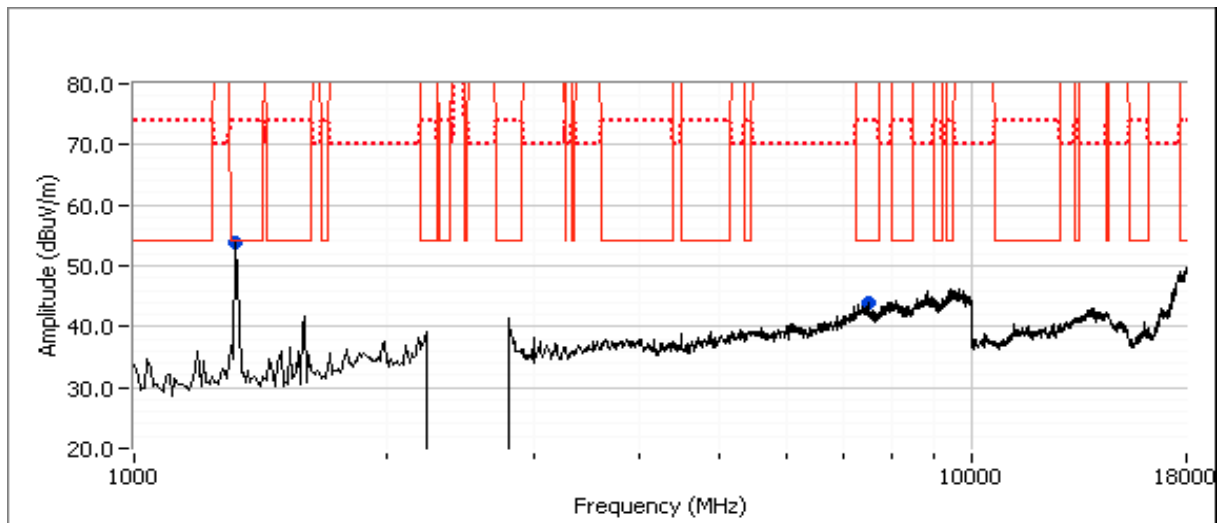
## Run #1b: , EUT on Channel Center - 802.11b, Chain A

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

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.070	42.4	V	54.0	-11.6	AVG	71	1.0	MHz; VB: 10 Hz
7500.280	50.7	V	74.0	-23.3	PK	71	1.0	MHz; VB: 1 MHz
1328.890	34.8	V	54.0	-19.2	AVG	81	1.0	MHz; VB: 10 Hz
1332.420	53.3	V	74.0	-20.7	PK	81	1.0	MHz; VB: 1 MHz

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



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

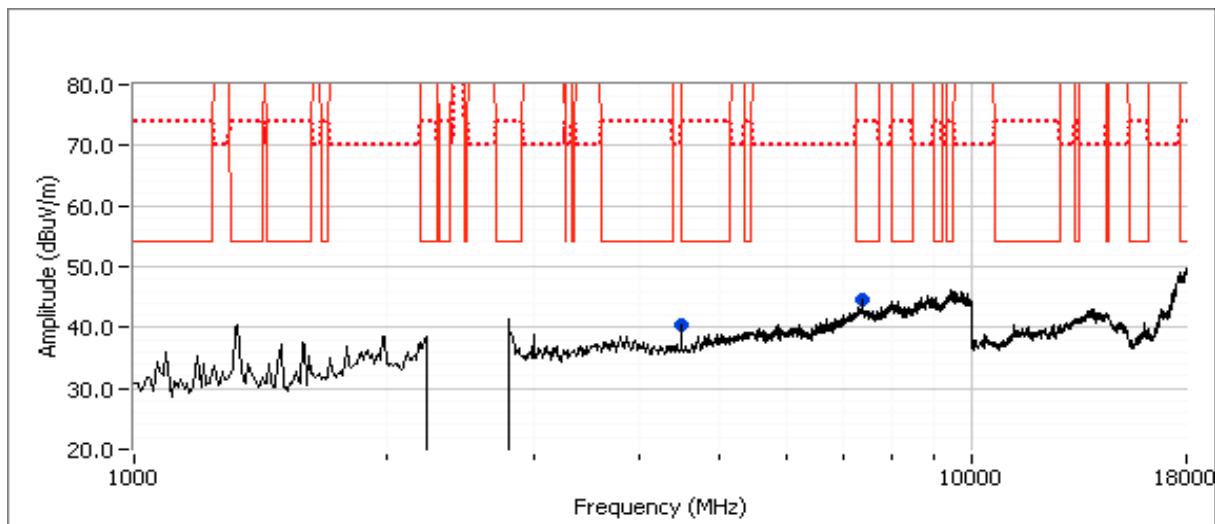
## Run #1c: , EUT on Channel High - 802.11b, Chain A

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

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4500.030	39.2	V	54.0	-14.8	AVG	220	1.0	MHz; VB: 10 Hz
4499.970	46.3	V	74.0	-27.7	PK	220	1.0	MHz; VB: 1 MHz
7390.690	38.3	V	54.0	-15.7	AVG	70	1.0	MHz; VB: 10 Hz
7390.360	50.0	V	74.0	-24.0	PK	70	1.0	MHz; VB: 1 MHz

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



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## Run # 2, Radiated Spurious Emissions, 1-26GHz, 802.11b, Chain B

Date of Test: 3/25/2010

Test Location: Chamber #4

Test Engineer: Rafael Varelas

Config Change: none

## Run # 2a, EUT on Channel Low - 802.11b, Chain B

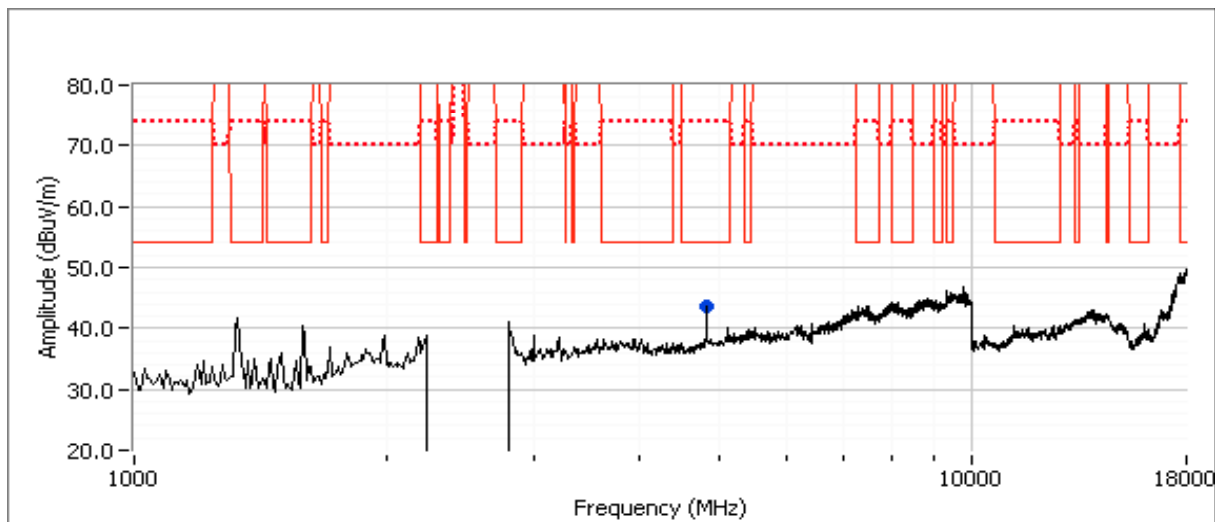
Chain	Target (dBm)				Power Settings Measured (dBm)				Software Setting
	A	B	C	Total	A	B	C	Total	
		16.5		16.5		16.5		16.5	25.0

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.060	44.1	V	54.0	-9.9	AVG	196	1.2	MHz; VB: 10 Hz
4823.830	49.0	V	74.0	-25.0	PK	196	1.2	MHz; VB: 1 MHz

Note 1:

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



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

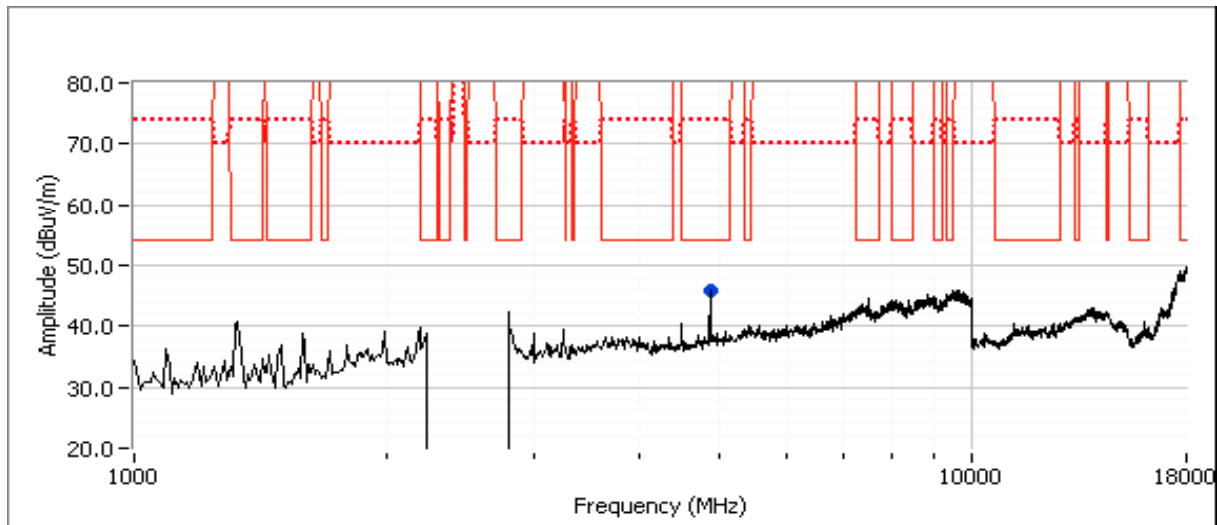
## Run # 2b: , EUT on Channel Center - 802.11b, Chain B

Chain	Target (dBm)				Power Settings Measured (dBm)				Software Setting
	A	B	C	Total	A	B	C	Total	
		16.5		16.5		16.5		16.5	25.5

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4874.020	46.5	V	54.0	-7.5	AVG	196	1.0	MHz; VB: 10 Hz
4874.040	51.2	V	74.0	-22.8	PK	196	1.0	MHz; VB: 1 MHz

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



Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

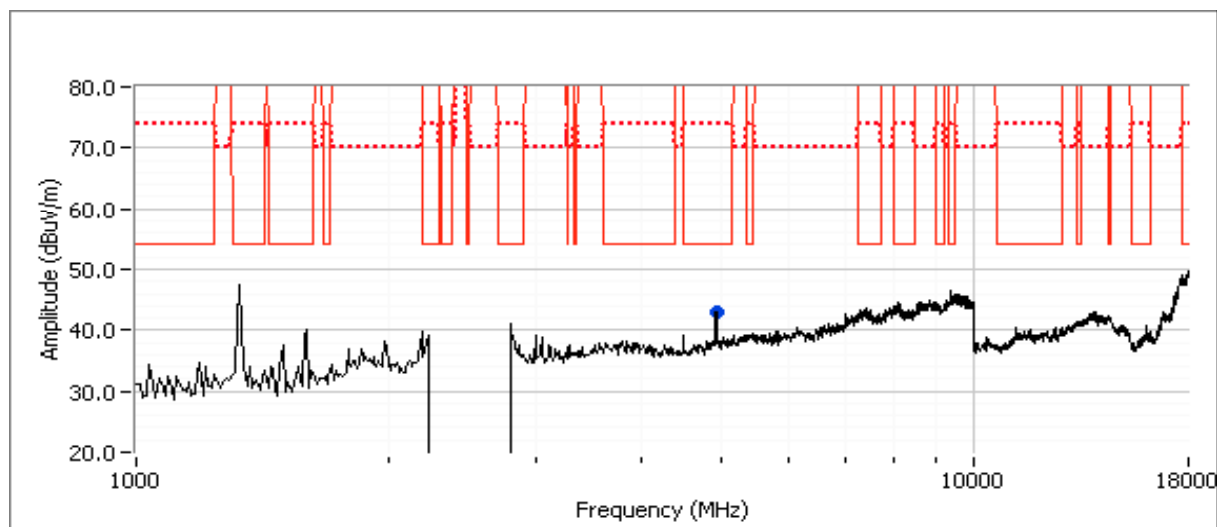
## Run # 2c: , EUT on Channel High - 802.11b, Chain B

Chain	Target (dBm)				Power Settings Measured (dBm)				Software Setting
	A	B	C	Total	A	B	C	Total	
		16.5		16.5		16.6		16.6	25.5

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4924.020	42.2	V	54.0	-11.8	AVG	198	1.0	MHz; VB: 10 Hz
4923.900	48.2	V	74.0	-25.8	PK	198	1.0	MHz; VB: 1 MHz

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





Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## Run # 3, Radiated Spurious Emissions, 1-26GHz, n40, Chain A+B

Date of Test: 3/27/2010

Test Location: Chamber #4

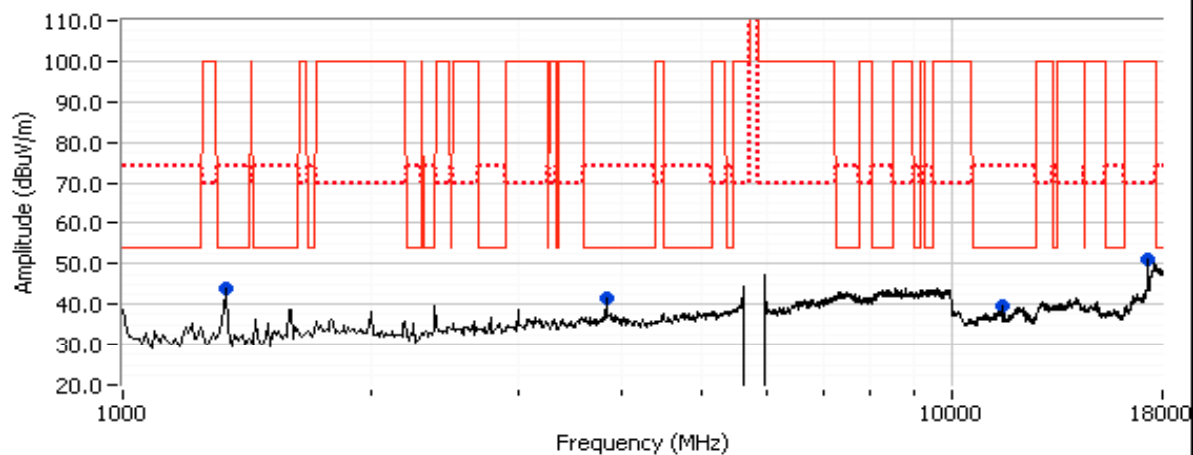
Test Engineer: Suhaila Khushzad

Config Change: None

## Run # 3a, EUT on Channel Low - n40, Chain A+B

Chain	Target (dBm)				Power Settings Measured (dBm)				Software Setting
	A	B	C	Total	A	B	C	Total	
	13.5	13.5		16.5	13.6	13.6		16.6	27 and 28.5

802.11n40, Channel 151 @ 5755 MHz



## Spurious Radiated Emissions:

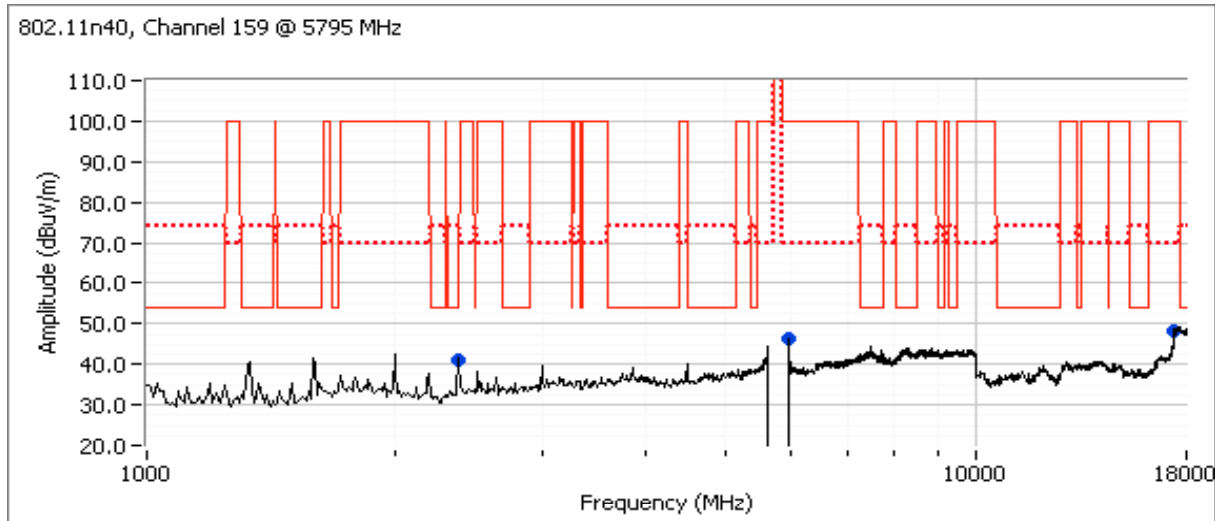
Frequency	Level	Pol	15.209/15.247		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3836.730	42.2	H	54.0	-11.8	AVG	127	1.0	RB 1 MHz; VB: 10 Hz
3836.660	47.2	H	74.0	-26.8	PK	127	1.0	RB 1 MHz; VB: 1 MHz
1330.180	35.6	V	54.0	-18.4	AVG	243	1.3	RB 1 MHz; VB: 10 Hz
1332.580	47.5	V	74.0	-26.5	PK	243	1.3	RB 1 MHz; VB: 1 MHz
11508.930	39.6	V	54.0	-14.4	Peak	114	1.0	
17275.070	51.3	H	70.0	-18.7	Peak	287	1.0	

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

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## Run # 3b: , EUT on Channel Center - n40, Chain A+B

Chain	Target (dBm)				Power Settings Measured (dBm)				Software Setting
	A	B	C	Total	A	B	C	Total	
	13.5	13.5		16.5	13.6	13.6		16.6	27.5 and 28.5



## 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	
2385.240	39.4	V	54.0	-14.6	AVG	247	1.2	MHz; VB: 10 Hz
2385.110	43.8	V	74.0	-30.2	PK	247	1.2	MHz; VB: 1 MHz
17390.630	48.1	V	70.0	-21.9	Peak	256	1.0	
5957.570	46.4	H	70.0	-23.6	Peak	247	1.3	

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

Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## RSS 210 Receiver Spurious Emissions

### 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: 002314129674 CRTU Tool Version 5.15.36.0 Driver version 13.0.0.91 Sample: 1

Run #	Mode	Channel	Target Power	Measured Power	Test Performed	Limit	Result / Margin
Run # 1	Rx Chain A+B	#6 (2437MHz)	-	-	Radiated Emissions, 1 - 7.5 GHz	RSS 210	43.6dBμV/m @ 2384.9MHz (-10.4dB)
		#40 (5200MHz)	-	-	Radiated Emissions, 1 - 18 GHz		40.6dBμV/m @ 7500.0MHz (-13.4dB)
		#60 (5300MHz)	-	-			41.6dBμV/m @ 2385.2MHz (-12.4dB)
		#120 (5600MHz)	-	-			43.8dBμV/m @ 7466.7MHz (-10.2dB)
		#157 (5785MHz)	-	-			40.6dBμV/m @ 7500.0MHz (-13.4dB)

No measurements made below 1GHz - emissions below 1GHz were independent of the antenna connected and operating mode during the original testing so were not repeated here.

### 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:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

## Run # 1, Radiated Spurious Emissions, 1-7.5 / 18 GHz, Rx, Chain A+B

Date of Test: 4/1/2010

Test Location: FT Chamber #4

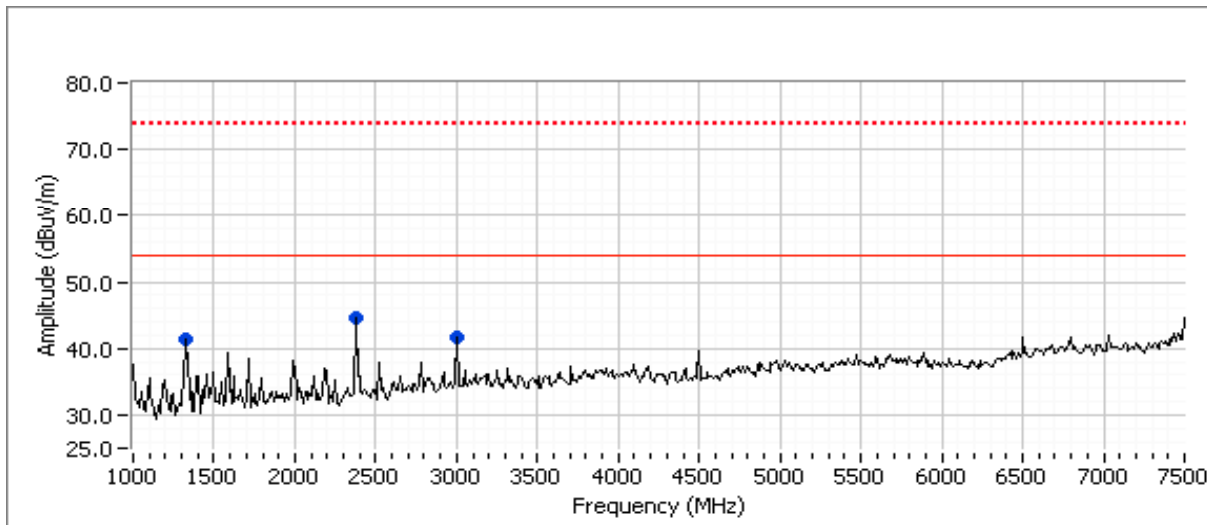
Test Engineer: Rafael Varelas

Config Change: none

## Run # 1a: EUT on Channel #6 (2437MHz) - Rx, Chain A+B

### Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2384.870	43.6	V	54.0	-10.4	AVG	220	1.2	RB 1 MHz; VB: 10 Hz
2385.840	39.1	V	74.0	-34.9	PK	220	1.2	RB 1 MHz; VB: 1 MHz
3000.030	39.0	V	54.0	-15.0	AVG	270	1.0	RB 1 MHz; VB: 10 Hz
2999.880	45.2	V	74.0	-28.8	PK	270	1.0	RB 1 MHz; VB: 1 MHz
1330.000	31.1	V	54.0	-22.9	AVG	163	1.0	RB 1 MHz; VB: 10 Hz
1329.830	50.5	V	74.0	-23.5	PK	163	1.0	RB 1 MHz; VB: 1 MHz

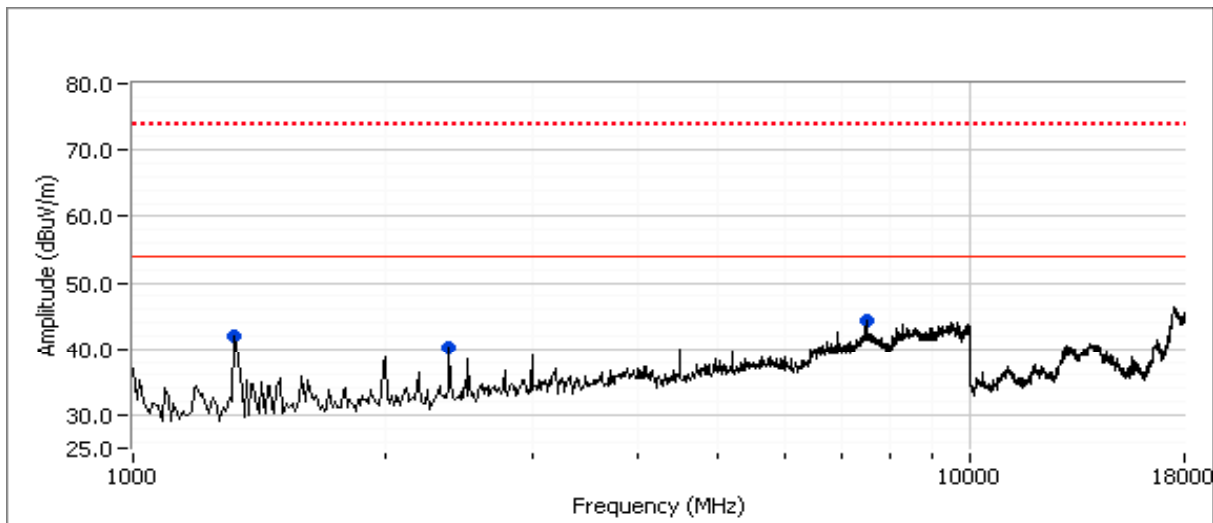


Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

Run # 1b: EUT on Channel #40 (5200MHz) - Rx, Chain A+B

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.000	40.6	V	54.0	-13.4	AVG	252	1.0	MHz; VB: 10 Hz
7500.120	49.0	V	74.0	-25.0	PK	252	1.0	MHz; VB: 1 MHz
1331.160	34.3	V	54.0	-19.7	AVG	92	1.6	MHz; VB: 10 Hz
1332.730	55.2	V	74.0	-18.8	PK	92	1.6	MHz; VB: 1 MHz
2384.470	34.2	V	54.0	-19.8	AVG	223	1.4	MHz; VB: 10 Hz
2385.140	45.8	V	74.0	-28.2	PK	223	1.4	MHz; VB: 1 MHz

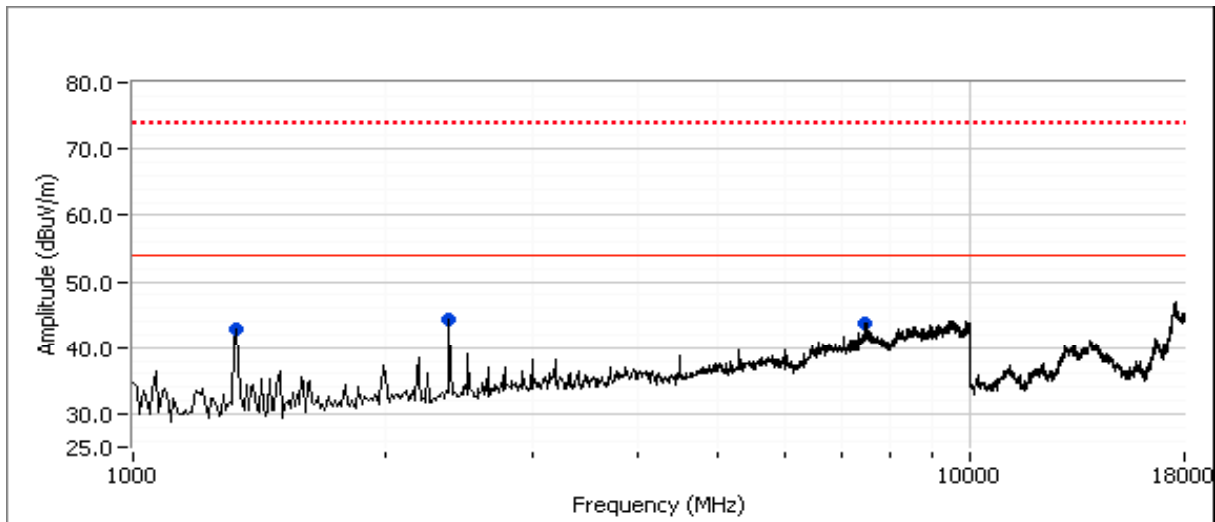


Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

Run # 1c: EUT on Channel #60 (5300MHz) - Rx, Chain A+B

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2385.170	41.6	V	54.0	-12.4	AVG	213	1.3	RB 1 MHz; VB: 10 Hz
2384.350	39.6	V	74.0	-34.4	PK	213	1.3	RB 1 MHz; VB: 1 MHz
1330.840	35.4	V	54.0	-18.6	AVG	255	1.2	RB 1 MHz; VB: 10 Hz
1321.200	55.2	V	74.0	-18.8	PK	255	1.2	RB 1 MHz; VB: 1 MHz
7500.010	40.6	V	54.0	-13.4	AVG	96	1.0	RB 1 MHz; VB: 10 Hz
7499.820	48.9	V	74.0	-25.1	PK	96	1.0	RB 1 MHz; VB: 1 MHz

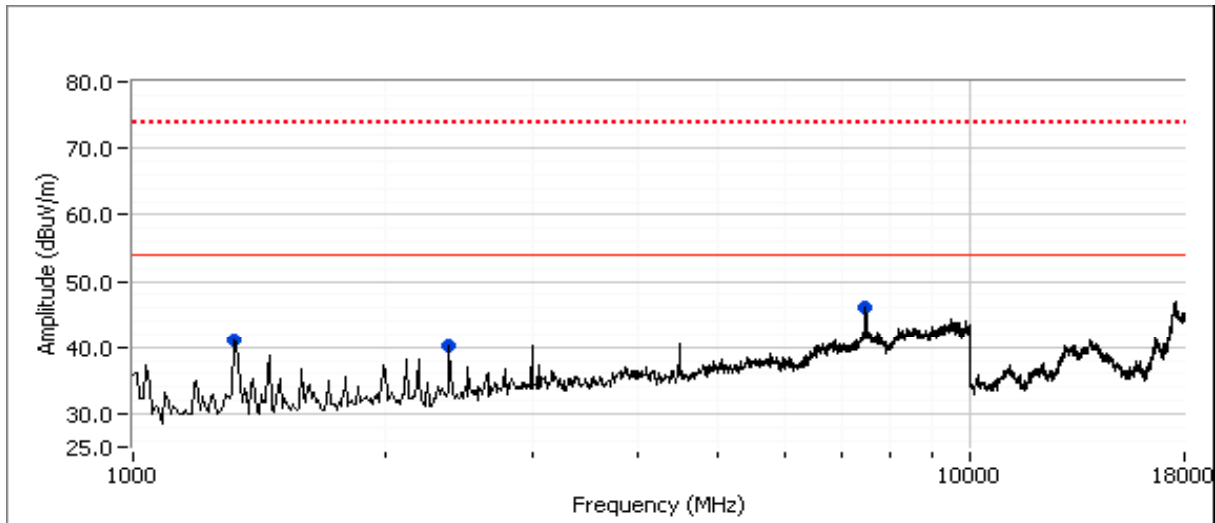


Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

Run # 1d: EUT on Channel #120 (5600MHz) - Rx, Chain A+B

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7466.700	43.8	V	54.0	-10.2	AVG	193	1.4	RB 1 MHz; VB: 10 Hz
7466.800	49.8	V	74.0	-24.2	PK	193	1.4	RB 1 MHz; VB: 1 MHz
2384.990	39.7	V	54.0	-14.3	AVG	20	1.3	RB 1 MHz; VB: 10 Hz
2385.030	44.5	V	74.0	-29.5	PK	20	1.3	RB 1 MHz; VB: 1 MHz
1330.570	34.2	V	54.0	-19.8	AVG	244	1.1	RB 1 MHz; VB: 10 Hz
1329.800	46.9	V	74.0	-27.1	PK	244	1.1	RB 1 MHz; VB: 1 MHz

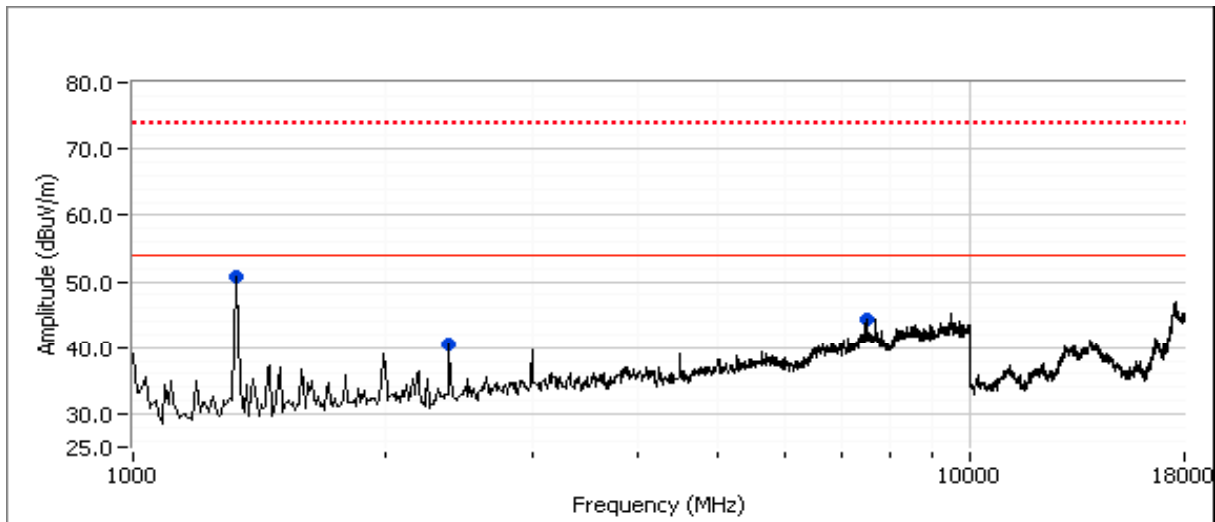


Client:	Intel Corporation	Job Number:	J78748
Model:	Intel Centrino Advanced-N 6200 with Yageo p/n 79010C500-011-G and p/n 79010C400-011-G antennas	T-Log Number:	T78805
Contact:	Steve Hackett	Account Manager:	Christine Krebill
Standard:	15.209 / 15.247	Class:	N/A

Run # 1e: EUT on Channel #157 (5785MHz) - Rx, Chain A+B

## Spurious Radiated Emissions:

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7500.040	40.6	V	54.0	-13.4	AVG	75	1.1	RB 1 MHz; VB: 10 Hz
7500.010	49.5	V	74.0	-24.5	PK	75	1.1	RB 1 MHz; VB: 1 MHz
1329.610	33.3	V	54.0	-20.7	AVG	245	1.2	RB 1 MHz; VB: 10 Hz
1329.550	52.5	V	74.0	-21.5	PK	245	1.2	RB 1 MHz; VB: 1 MHz
2385.070	35.4	V	54.0	-18.6	AVG	140	1.0	RB 1 MHz; VB: 10 Hz
2384.960	41.8	V	74.0	-32.2	PK	140	1.0	RB 1 MHz; VB: 1 MHz





### ***Appendix C Photographs of Test Configurations***

Uploaded as a separate exhibit

### ***Appendix D Theory of Operation***

Uploaded as a separate exhibit – contains detailed information about the new antenna.

### ***Appendix E RF Exposure Information***

Uploaded as a separate exhibit. Note that the rf exposure calculation is taken from the original filing. The antennas evaluated as part of this permissive change are of lower gain, therefore the original evaluation represents the worst case MPE calculation for the device.