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Electromagnetic Emissions Test Report and Application for Grant of Equipment Authorization pursuant to FCC Part 15, Subpart E (UNII Devices) and Industry Canada RSS 210 Issue 4 (LELEAN Devices) on the Intel Corporation Model: WDAP5000

FCC ID:	J30WDAP5000
GRANTEE:	Intel Corporation 2300 Corporate Center Drive Thousand Oaks, CA. 91320
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	February 11, 2002
FINAL TEST DATE:	January 21 and January 22, 2002

AUTHORIZED SIGNATORY: _____

Juan Martinez
Senior EMC Engineer

DECLARATIONS OF COMPLIANCE

Equipment Name and Model:
WDAP5000

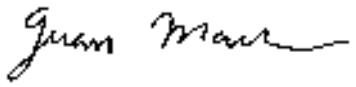
Manufacturer:
Intel Corporation
2300 Corporate Center Drive
Thousand Oaks, CA. 91320

Tested to applicable standards:
RSS-210, Issue 4, December 2000 (Low Power License-Exempt Radiocommunication Devices)
FCC Part 15 Subpart E (UNII Devices)

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845 **SV2** Dated August 12, 2001
Departmental Acknowledgement Number: IC2845 **SV4** Dated July 19, 2001

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of ANSI C63.4 as detailed in section 5.3 of RSS-210, Issue 4); and that the equipment performed in accordance with the data submitted in this report.



Signature	_____
Name	Juan Martinez
Title	Senior EMC Engineer
Company	Elliott Laboratories Inc.
Address	684 W. Maude Ave Sunnyvale, CA 94086 USA
Date:	February 11, 2002

Maintenance of compliance with the above standards 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.).

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SCOPE

An electromagnetic emissions test has been performed on the Intel Corporation model WDAP5000 pursuant to Subpart E of Part 15 of FCC Rules for Unlicensed National Information Infrastructure (UNII) devices and RSS-210 Issue 4 for licence-exempt local area network (LELAN) devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC 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 WDAP5000 and therefore apply only to the tested sample. The sample was selected and prepared by Jim Baer of Intel Corporation

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart E of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their 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.

SUMMARY OF RESULTS

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
Operation in the 5.15 – 5.25 GHz Band				
15.407 (d)		As the device operates in the 5.15 – 5.25 GHz band the antenna must be integral to the device.	Antenna Gain = 1.8 dBi (OMNI) Antenna Gain = 5.6 dBi (Half-Round Front) Antenna Gain = 6.2 dBi (Diversity) The antenna is integral.	COMPLIES
15.407(e)		Indoor operation only	Refer to user's manual in Exhibit 6	COMPLIES
15.407(a) (1)	6.2.2 q1 (i)	Bandwidth	26-dB (27.33 MHz), 20-dB (17.33 MHz)	N/A
15.407(a) (1)	6.2.2 q1 (i)	Output Power	16.9 dBm	COMPLIES
15.407(a) (1))	6.2.2 q1 (i)	Power Spectral Density	-2.30 dBm/MHz	COMPLIES
15.407(b) (5) / 15.209	6.2.2 q1 (ii)	Spurious Emissions above 1GHz	-0.1 dB @ 15,540 MHz	Omni
15.407(b) (5) / 15.209	6.2.2 q1 (ii)	Spurious Emissions above 1GHz	-0.4 dB @ 15,540 MHz	Half-Circle
15.407(b) (2)	6.2.2 q1 (ii)	Spurious Emissions below 1GHz	-3.9dB @ 362.998MHz	COMPLIES
Operation in the 5.25 – 5.35 GHz Band Note: The device is not restricted to indoor use only, therefore the spectral density of spurious emissions in the 5.15 – 5.25 GHz band were limited to the power spectral limit of –27dBm/MHz as detailed in FCC 15.407(b)(2) and RSS 210 6.2.2 q1 (ii)				
		Maximum Antenna Gain /Integral Antenna	Antenna Gain = 1.8 dBi (OMNI) Antenna Gain = 5.6 dBi (Half-Round Front) Antenna Gain = 6.2 dBi (Diversity) The antenna is integral.	COMPLIES
15.407(a) (2)	6.2.2 q1 (ii)	Bandwidth	26-dB (33.0 – 38.1 MHz), 20-dB (18.38 – 22.50 MHz)	N/A
15.407(a) (2)	6.2.2 q1 (ii)	Output Power	21 dBm	COMPLIES
15.407(a) (2))	6.2.2 q1 (ii)	Power Spectral Density	1.7 dBm/MHz	COMPLIES
15.407(b) (5) / 15.209	6.2.2 q1 (ii)	Spurious Emissions above 1GHz	-0.5 dB @ 10,639 MHz	Omni
15.407(b) (5) / 15.209	6.2.2 q1 (ii)	Spurious Emissions above 1GHz	-0.2 dB @ 15,963 MHz	Half-Circle
15.407(b) (2)	6.2.2 q1 (ii)	Spurious Emissions below 1GHz	-3.9dB @ 362.998MHz	COMPLIES

General requirements for all bands				
	6.2.2 q(iv)(a)	Digital Modulation	Digital Modulation is used, refer to the "Theory of Operations" (Exhibit 9) for a detailed explanation.	COMPLIES
	6.2.2 q(iv)(b)	Peak Spectral Density	6.70 – 10.7 dBm/ MHz	COMPLIES
15.407(a)(6)		Peak Excursion Ratio	7.42 – 7.75 dB	COMPLIES
	6.2.2 q(iv)(c)	Channel Selection	The device was tested on the following channels in normal mode: 6, 14, and 20.	N/A
15.407 (c)	6.2.2 q(iv)(d)	Automatic Discontinuation of Operation in the absence of information to transmit	Operation is discontinued in the absence of information to transmit, refer to the "Theory of Operations" in Exhibit 9 for a detailed explanation.	COMPLIES
15.407 (g)	6.2.2 q(iv)(e)	Frequency Stability	Frequency stability is +/- 20 ppm, refer to the "Theory of Operations" in Exhibit 9 for a detailed analysis.	COMPLIES
	6.2.2 q(iv)(g)	User Manual information	All relevant statements have been included in the user's manuals. Refer to Exhibit 6 for details	COMPLIES
15.407 (f)	6.2.2 q(iv)(g)	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11	COMPLIES
15.407(b) / 15.207	6.6	AC Conducted Emissions	-5.3dB @ .15MHz	COMPLIES

MEASUREMENT UNCERTAINTIES

ISO Guide 25 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 NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.2

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Dual Accesspoint contains a 2.4 GHz Mini PCI DSS Radio Module and a 5.15 - 5.35 GHz UNII Mini PCI Radio. The device provides wireless network capabilities and will be used indoors. The 2.4 GHz Mini PCI has been approved by FCC a Modular devices (FCC ID: J3OM3AWEB56GA). Both cards were transmitting at the same time, in the Accesspoint, to demonstrate that the Mini PCI emissions will still be in compliance. Normally, the EUT would be tabletop during operation. The EUT was treated as tabletop equipment during testing to simulate the end user environment.

The sample was received on January 21, 2002 and tested on January 21, January 22 and January 23, 2002. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number
Intel WDAP5000 Wireless Network	-
Yhi/YC-1018-S05-U/Power Supply	-
Intel/WM3A5000/UNII Mini PCI	-
Intel/ M3AWEB/2.4 DSSS Mini PCI module	-

OTHER EUT DETAILS

The EUT uses a combination of Five integral antennas to provide different directionality. The maximum gain of the integral PCB antenna is approximately 1.8 dBi for the OMNI pattern and 5.6 for the Half-Round Front Pattern. This is based on the 5 GHz UNII transmitter. In same PCB antenna is embedded the 2.4 GHz antenna, which has about a 2.4 dBi gain.

ENCLOSURE

The EUT enclosure is constructed of plastic. The AP motherboard and cards are installed inside a metal shield enclosure. It measures approximately 25 cm wide by 4 cm deep by 15 cm high.

MODIFICATIONS

The EUT required the following modifications during testing in order to comply with the emission specifications:

1) Finger gasket place on the back of the 2.4 GHz card to provide ground connection to the AP motherboard.
2) The AP motherboard ground plane improved to minimized coupling to the 2.4 GHz card.

SUPPORT EQUIPMENT

No local support equipment was used during testing.

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

Manufacturer	Model	Description	Serial Number
3Com	OfficeConnect	Hub	0100\7P1F036035
IBM	Thinkpad	Laptop	-

EUT INTERFACE PORTS

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

Cable Description	Length (m)	From Unit/Port	To Unit/Port
Ethernet	10	Accesspoint	Hub

EUT OPERATION

The radio was transmitting at full power on the specified channels 5.18, 5.26, and 5.32GHz (maximum allowed) and at a data rate of 6 Mb/s. The channels were selected since they are at the top, center and bottom of the allocated bands.

The radio was transmitting at full power on the specified channels (center channel for radiated emissions measurements below 1GHz). The channels were selected since they are at the top, center, and bottom of the allocated bands. The RF data rate was 6 Mb/s in normal mode. A data link was established between the remote PC and the EUT via the hub at 100Mb/s.

The Ethernet data rate of 100 Mb/s was selected over 10 Mb/s as preliminary testing identified this as being the worst-case Ethernet data rate. Preliminary testing also showed that an RF data rate of 6 Mb/s produced the highest power spectral density in normal mode and 12 Mb/s produced the highest output power spectral density in turbo mode.

For Intentional Radiated Emission the EUT was test in to separate modes. The EUT has the ability to change the pattern of the antenna per software means. One of the modes was the OMNI pattern, tested for both Normal and Turbo mode. The Second mode was the Half-Round Front pattern, tested for both Normal mode, only. The same antenna can be program to radiate on either pattern.

ANTENNA REQUIREMENTS

As the device is intended to operate in the 5.15 – 5.25 GHz band an integral antenna as detailed in 15.407 (d) and RSS-210 6.2.2(q1) (i) is required. The antenna for the device is an integral antenna. Intel specifically manufactures the antenna. The antenna has a communication port, which enables the AP motherboard to verify the antenna is connected. If it does not detect the original PCB antenna, access to the AP is disable, until the original antenna is re-connected. The device will not function if the original, integral PCB antenna is removed.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on January 21, January 22 and January 23, 2002 at the Elliott Laboratories Open Area Test Site #4 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Federal Communications Commission. In accordance with Industry Canada rules detailed in RSS 210 Issue 4 and RSS-212, construction, calibration, and equipment data for the test sites have been filed with the Federal Communications Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4-1992. 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. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 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.

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.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde and 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.

POWER METER

Either a spectrum analyzer or a power meter and thermister mount are used for all direct output power measurements from transmitters.

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

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

ANSI C63.4 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material 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 FCC requires that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst case orientation is used for final measurements.

CONDUCTED EMISSIONS

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

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. 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. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements are performed with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.

Measurement bandwidths (video and resolution) are set in accordance with FCC procedures for the type of radio being tested.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions from the AC power port are given in units of microvolts, the limits for radiated electric field emissions are given in units of microvolts per meter at a specified test distance and the output power limits are given in temrs of Watts, milliwatts or dBm. 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.

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp) the following formula is used to determine the field strength limit in terms of microvolts per meter at a distance of 3m from the equipment under test:

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

where P is the eirp (Watts)

For reference, converting the voltage and electric field strength specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. Conversion of power specification limits from linear units (in milliwatts) to decibel form (in dBm) is accomplished by taking the base ten logarithm, then multiplying by 10.

FCC 15.407 (a) OUTPUT POWER LIMITS

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
5150 - 5250	50mW (17 dBm)	4 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi.
Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

RS-210 6.2.2(q1) OUTPUT POWER LIMITS

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
5150 - 5250	200mW (23 dBm)	10 dBm/MHz
5250 - 5350	250 mW (24 dBm)	11 dBm/MHz
5725 – 5825	1 Watts (30 dBm)	17 dBm/MHz

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi.
Fixed point-to-point applications using the 5725 – 5825 MHz band may use antennas with gains of up to 23dBi without this limitation. If the gain exceeds 23dBi then the output power limit of 1 Watt is reduced by 1dB for every dB the gain exceeds 23dBi.

SPURIOUS RADIATED EMISSIONS LIMITS

The table below shows the limits for unwanted (spurious) emissions falling in the restricted bands detailed in Part 15.205 and Industry Canada RSS-210 Table 2.

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

The table below shows the limits for unwanted (spurious) emissions outside of the restricted bands above 1GHz.

Operating Frequency (MHz)	EIRP Limit (dBm)	Equivalent Field Strength At 3m (dBuV/m)
5150 - 5250	-27 dBm	68.3 dBuV/m
5250 - 5350	-27 dBm (note 1)	68.3 dBuV/m
5725 – 5825	-27 dBm (note 2)	68.3 dBuV/m
	-17 dBm (note 3)	78.3 dBuV/m

Note 1: If operation is restricted to indoor use only then emissions in the band 5.15 – 5.25 GHz must meet the power spectral density limits for the intentional signals detailed in RSS 210 and FCC Subpart E for devices operating in the 5.15 – 5.25 Ghz band.
Note 2: Applies to spurious signals separated by more than 10 MHz from the allocated band.
Note 3: Applies to spurious signals within 10 MHz of the allocated band.

AC POWER PORT CONDUCTED EMISSIONS LIMITS

The table below shows the limits for emissions on the AC power line as detailed in FCC Part 15.205 and Industry Canada RSS-210 section 6.6.

Frequency Range (MHz)	Limit (uV)	Limit (dBuV)
0.450 to 30.000	250	48

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - B = C$$

and

$$C - S = M$$

where:

R_r = Receiver Reading in dBuV

B = Broadband Correction Factor*

C = Corrected Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

* Broadband Level - Per ANSI C63.4, 13 dB may be subtracted from the quasi-peak level if it is determined that the emission is broadband in nature. If the signal level in the average mode is six dB or more below the signal level in the peak mode, the emission is classified as broadband.

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

EXHIBIT 1: Test Equipment Calibration Data

Radiated Emissions, 1 - 18GHz, 22-Jan-02
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Hewlett Packard	High Pass filter, 8.2GHz	P/N 84300-80039	1156	12	3/27/01	3/27/02
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	868	12	11/13/01	11/13/02
EMCO	Horn antenna, D. Ridge 1-18GHz (SA40 system antenna)	3115	1142	12	1/29/01	1/29/02
Hewlett Packard	Spectrum Analyzer 9KHz - 26GHz	8563E	284	12	2/22/01	2/22/02

Conducted Emissions, 07-Feb-02
Engineer: Rafael

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	812	12	1/23/02	1/23/03
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	1316	12	5/9/01	5/9/02
Solar Electronics	LISN	8012-50-R-24-BNC	305	12	7/30/01	7/30/02

Radiated Emissions, 30 - 1000 MHz, 07-Feb-02
Engineer: Rafael

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Biconical Antenna, 30-300 MHz	3110B	1320	12	5/23/01	5/23/02
EMCO	Log Periodic Antenna, 0.2-1 GHz	3146	1294	12	3/27/01	3/27/02
Rohde & Schwarz	Test Receiver, 20-1300 MHz	ESVP	1317	12	5/9/01	5/9/02

Antenna Conducte Emissions, 12-Feb-02
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Hewlett Packard	Microwave EMI test system (SA40, 30Hz - 40GHz)	84125C	1149	12	2/5/01	2/5/02

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T45966 43 Pages

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Emissions Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B
Immunity Spec:	N/A	Environment:	-

EMC Test Data

For The

Intel Corporation

Model

WDAP5000

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Emissions Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B
Immunity Spec:	N/A	Environment:	-

EUT INFORMATION

General Description

The EUT Dual Accesspoint. It contains a 2.4 GHz Mini PCI Spread Spectrum Radio Module and a 5.15 - 5.35 GHz UNII Mini PCI Radio. The device provides wireless network capabilities and will be used indoors. The 2.4 GHz Mini PCI has been approved by FCC a Modular devices(FCC ID: J3OM3AWEB56GA). Both cards were transmitting at the same time, in the Accesspoint, to demonstrate that the Mini PCI emissions will still be in compliance.

Normally, the EUT would be placed on a tabletop during operation. The EUT was treated as tabletop equipment during testing to simulate the end-user environment. EUT electrical rating is 120Vac, 60Hz.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Intel	WDAP5000	Accesspoint	-	J30WDAP5000
Intel	WM3A5000	AP Mini PCI	-	J3OWM3A5000
Intel	M3AWEB	2.4 GHz Mini PCI module	900AC10098E3	J3OM3AWEB56GA
Yhi	YC-1018-S05-U	Power Supply	176890	N/A

Antenna

The EUT uses a combination of five integral antennas to provide different directionality. The maximum gain of the integral PCB antenna is approximately 1.8 dBi for the OMNI pattern and 5.6 for the Half-Round Front Pattern. This are based on the 5 GHz UNII transmitter. In same PCB antenna is embeded the 2.4 GHz antenna, which has about a 6.2 dBi gain.

EUT Enclosure

The EUT enclosure is primarily constructed of plastic. It measures approximately 25 cm wide by 4 cm deep by 15 cm high.

Modification History

Mod. #	Test	Date	Modification
1	Radiated Digita	2/6/2002	Added finger to back side of 2.4 GHz MPCI card for better grounding.
2	Radiated Digita	2/7/2002	AP Motherboard ground plane impoved. Also the modification above was still used.

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Emissions Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B
Immunity Spec:	N/A	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
3Com	OfficeConnect	Hub	0100\7P1F036035	-
IBM	Thinkpad	Laptop	-	-

Interface Ports

		Cable(s)		
Port	Connected To	Description	Shielded or Unshielded	Length(m)
Ethernet	Remote Hub	RJ-45	Un-shielded	10

EUT Operation During Emissions Testing (Digital and Radio)

The radio was transmitting at full power on the specified channels 5.18, 5.26, and 5.32GHz (maximum allowed) and at a data rate of 6 Mb/s. The channels were selected since they are at the top, center and bottom of the allocated bands.

The radio was transmitting at full power on the specified channels (center channel for radiated emissions measurements below 1GHz). The channels were selected since they are at the top, center, and bottom of the allocated bands. The RF data rate was 6 Mb/s in normal mode and 12 Mb/s in turbo mode. A data link was established between the remote PC and the EUT via the hub at 100Mb/s.

The Ethernet data rate of 100 Mb/s was selected over 10 Mb/s as preliminary testing identified this as being the worst-case Ethernet data rate. Preliminary testing also showed that an RF data rate of 6 Mb/s produced the highest power spectral density in normal mode and 12 Mb/s produced the highest output power spectral density in turbo mode.

For Intentional Radiated Emission the EUT was test in to separate modes. The EUT has the ability to change the pattern of the antenna per software means. One of the modes was the OMNI pattern, tested for both Normal and Turbo mode. The Second mode was the Half-Round Front pattern, tested for both Normal mode, only. The same antenna can be program to radiate on either pattern.

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		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Radiated Emissions

Test Specifics

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

Date of Test: 2/7/2002
Test Engineer: Rafael
Test Location: SVOATS #2

Config. Used: See runs below
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was located on the turntable for radiated emissions testing. Remote support equipment was located approximately 30 meters from the test area with all I/O connections routed overhead.
On the OATS, the measurement antenna was located 10 meters from the EUT for the measurement range 30 - 1000 MHz.

Ambient Conditions:

Temperature: 10.6°C
Rel. Humidity: 82%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
2	RE, Maximized Emissions	EN55022B	Pass	-3.9dB @ 362.998MHz

Modifications Made During Testing:

Modifications are detailed under each run description.

Deviations From The Standard

No deviations were made from the requirements of the standard.

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

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

New motherboard on AP, **2.4 & 5GHz Card w/ the finger contacts**

Both Cards active (2.4 & 5GHz)

Frequency	Level	Pol	EN55022 B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
362.998	33.1	h	37.0	-3.9	QP	20	2.6	
890.990	32.7	v	37.0	-4.3	QP	20	1.8	
890.990	32.2	h	37.0	-4.8	QP	215	1.0	
362.998	28.8	v	37.0	-8.2	QP	250	1.0	
824.995	25.9	h	37.0	-11.1	QP	170	1.1	
791.995	22.5	h	37.0	-14.5	QP	200	1.0	
824.995	20.3	v	37.0	-16.7	QP	40	1.5	
791.995	18.8	v	37.0	-18.2	QP	40	1.0	

Run #2: Maximized Emissions from Run #1

New motherboard on AP, **2.4 & 5GHz Card w/ the finger contacts**

Both Cards active (2.4 & 5GHz)

Frequency	Level	Pol	EN55022 B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
362.998	33.1	h	37.0	-3.9	QP	25	2.5	
890.990	32.7	v	37.0	-4.3	QP	30	1.8	
890.990	32.2	h	37.0	-4.8	QP	225	1.1	
362.998	28.8	v	37.0	-8.2	QP	265	1.0	
824.995	25.9	h	37.0	-11.1	QP	180	1.1	
791.995	22.5	h	37.0	-14.5	QP	195	1.0	

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Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Conducted Emissions - Power Ports

Test Specifics

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: 2/7/2002
Test Engineer: Rafael
Test Location: SVOATS #2

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

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN.

Ambient Conditions:

Temperature: 10.6°C
Rel. Humidity: 82%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power 120V/60Hz	EN55022 B	Pass	-5.3dB @ .15MHz

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.

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

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

Frequency	Level	Power	EN55022B		Detector	Comments
MHz	dBuV	Lead	Limit	Margin	Function	
0.150	50.4	Line 1	55.7	-5.3	AV	
0.150	50.4	Neutral	55.7	-5.3	AV	
2.743	36.9	Neutral	46.0	-9.1	AV	
0.150	56.0	Neutral	65.7	-9.7	QP	
0.150	55.4	Line 1	65.7	-10.3	QP	
1.846	32.0	Line 1	46.0	-14.0	AV	
0.199	36.3	Neutral	53.6	-17.3	AV	
0.200	36.2	Line 1	53.6	-17.4	AV	
2.743	38.4	Neutral	56.0	-17.6	QP	
0.199	44.9	Neutral	63.6	-18.7	QP	
0.200	44.8	Line 1	63.6	-18.8	QP	
1.846	34.7	Line 1	56.0	-21.3	QP	

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Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

FCC Part 15 Subpart E Tests: Normal Mode

Test Specifics

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:	1/23/2001	Config. Used:	2
Test Engineer:	Jmartinez	Config Change:	N/A
Test Location:	SVOATS# 4	Host Unit Voltage	120Vac, 60Hz

General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT unless stated otherwise.
When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

Ambient Conditions:

Temperature: 8.9°C
Rel. Humidity: 89%

Summary of Results: Turbo Mode

Run #	Test Performed	Limit	Result	Comments
1	Output Power (5.15 - 5.25GHz band)	15.407(a) (1)	Pass	16.9 dBm
1	Output Power (5.25 - 5.35GHz band)	15.407(a) (2)	Pass	21.0 dBm
2	Power Spectral Density (5.15 - 5.25GHz)	15.407(a) (1)	Pass	-2.3 dBm/MHz
2	Power Spectral Density (5.25-5.35GHz)	15.407(a) (2)	Pass	1.70 dBm/MHz
3	26dB Bandwidth	15.407	Pass	27.33 - 38.1 MHz
3	20 dB Bandwidth	RSS 210	Pass	17.33 - 22.5 MHz
4	Peak Excursion Envelope	15.407(a) (6)	Pass	7.42 - 7.75 dB
5	Antenna Conducted - Out of Band Spurious	15.407(b)	Pass	> -27 dBm

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Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

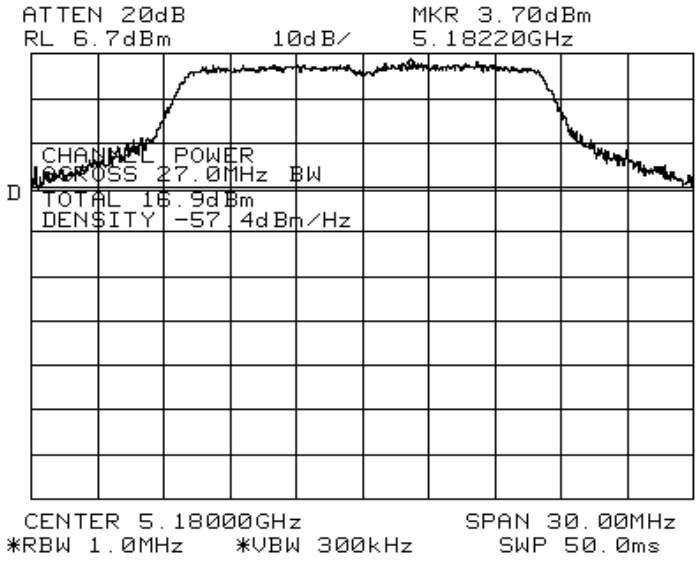
No deviations were made from the requirements of the standard.

Run #1: Output Power

OMNI Antenna Gain: 1.8 dBi
Half-Round Front Gain: 5.6 dBi
2.4GHz antenna Gain: 6.2 dBi

PC-Nom	Frequency (MHz)	VBW (kHz)	26-dB EBW	Measured Power (dBm)	FCC Limit (dBm) (note 3)
5	5180	145	27.33	16.9	17.0
12	5260	202	38.10	21.0	24.0
9	5320	175	33.00	19.2	24.0

Note 1:	Measured using spectrum analyzer's power measurement function (RBW = 1MHz, VBW = (Note 2)) which summed the power over the occupied bandwidth (26dB bandwidth).
Note 2:	VBW was determine by the following formulas: EBW/2*pi*30 or 1/2*pi*T, whichever gives the largest VBW.



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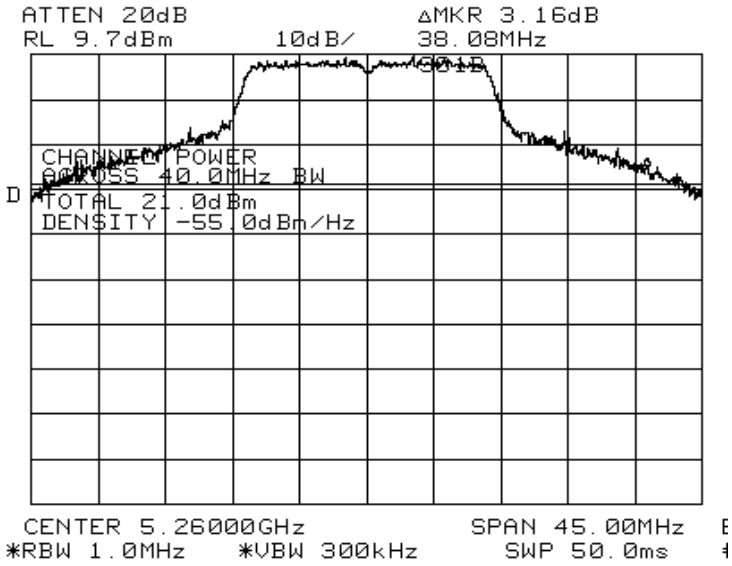

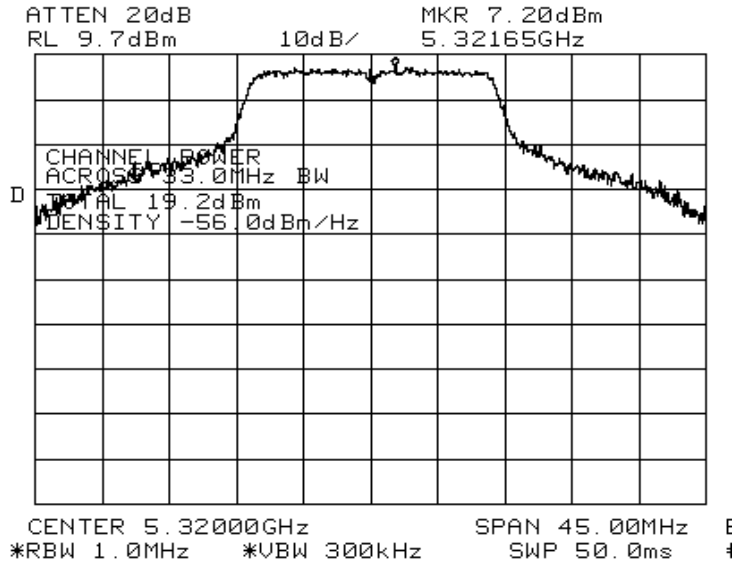

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Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Run #2: Power Spectral Density

OMNI Antenna Gain: 1.8 dBi
Half-Round Front Gain: 5.6 dBi
2.4GHz antenna Gain: 6.2 dBi

Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)	FCC Limit (dBm) note 2	Peak Power Spectral Density (dBm)	
low	5180	-2.30	4.0	6.7	Note 1
mid	5260	1.70	11.0	10.70	Note 1
high	5320	0.20	11.0	8.87	Note 1

Note 1:	The above measurements were made using RBW = 1MHz, VBW = 3MHz, video averaging on. To demonstrate compliance with RSS 210, the peak PSD was also measured using RBW= VBW=1MHz, video averaging off during the peak excursion measurements (run #4). The peak PSD (meausred with RBW=VBW=1MHz) of 9.33 **dBm** did not exceed the maximum permitted average PSD of 10dBm (5.15 to 5.25 GHz band) or 11dBm (5.25-5.35GHz band) so no restriction is placed on the output power or average PSD with respect to RSS 210.
Note 2:	RSS 210 limit is 10dBm/MHz in the 5.15 to 5.25 GHz band, 6dB higher than the FCC limit.

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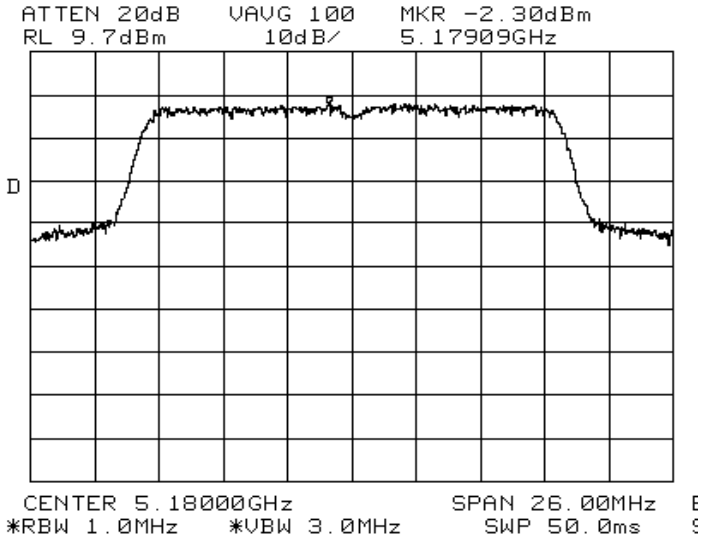
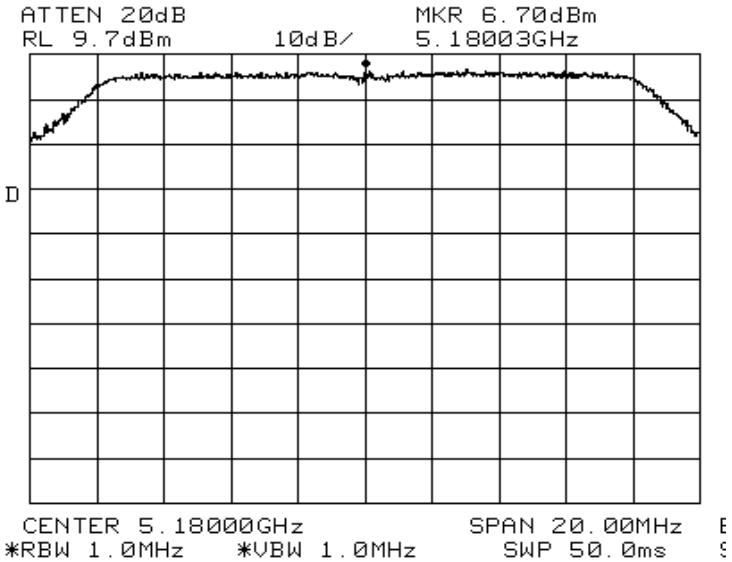
Plots Showing Power Spectral Density (RBW = 1MHz, VBW = 3 MHz, video averaging ON)

FCC Power Density



Canada Power Density



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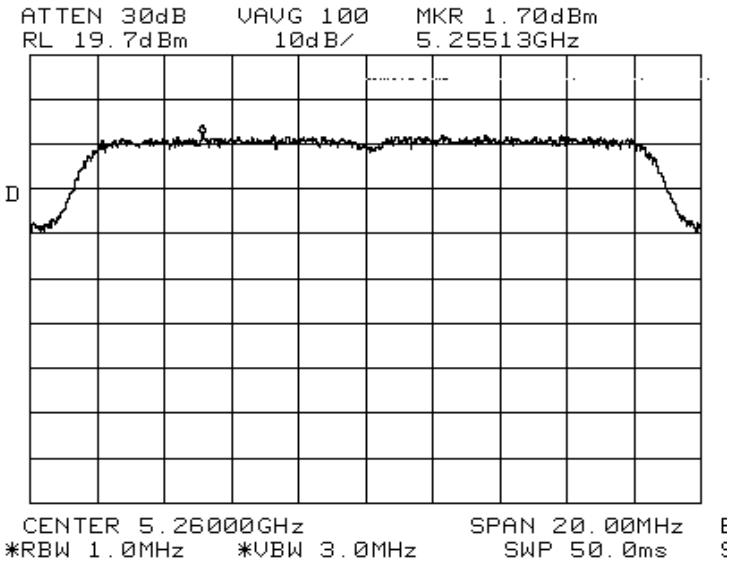
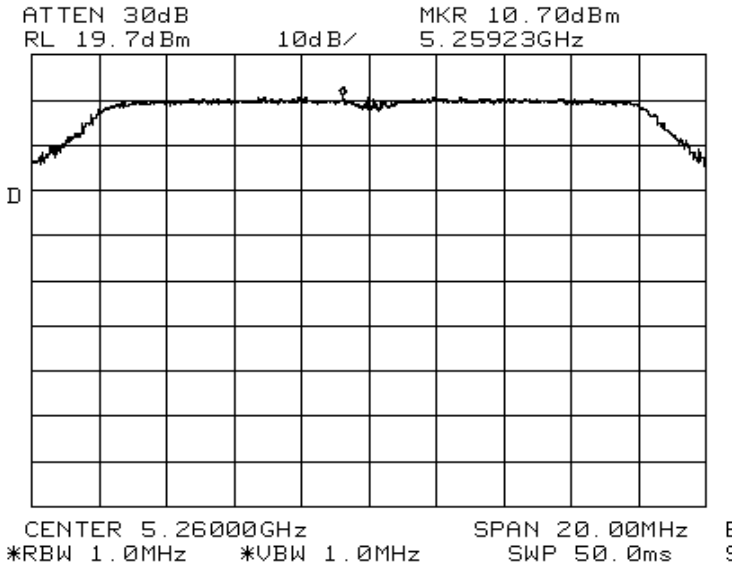
FCC Power Density



Canada Power Density



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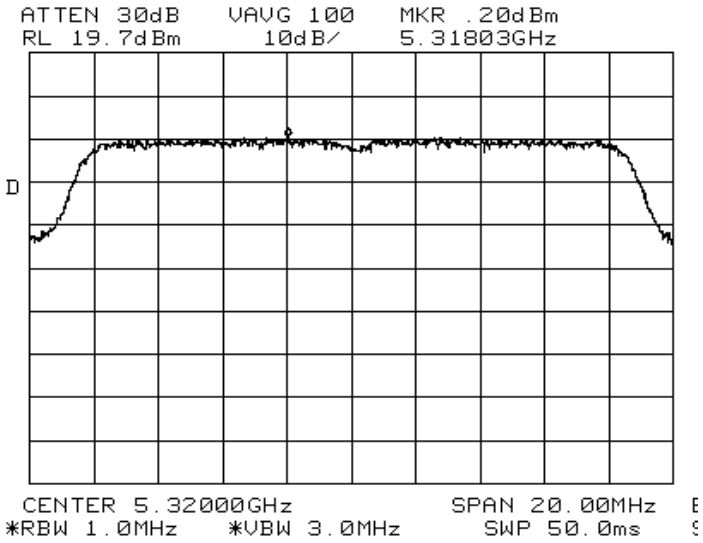
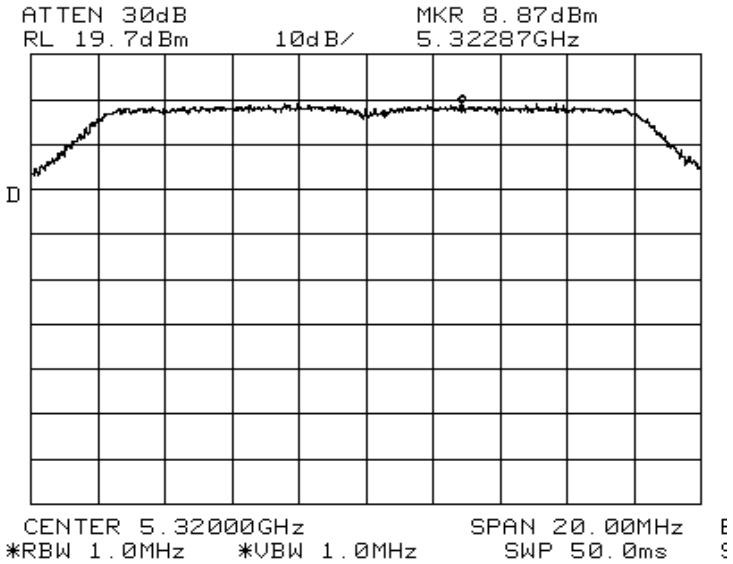
FCC Power Density



Canada Power Density



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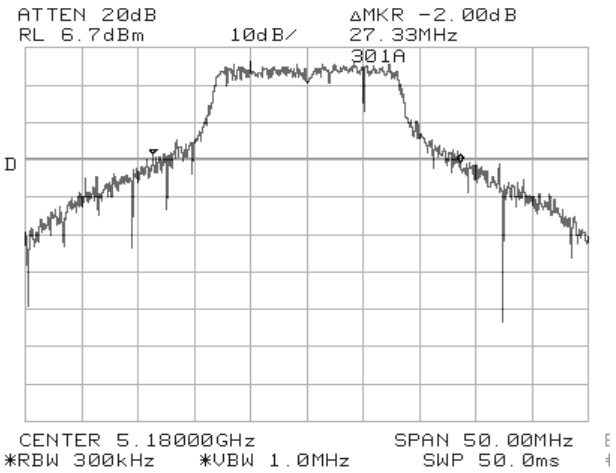
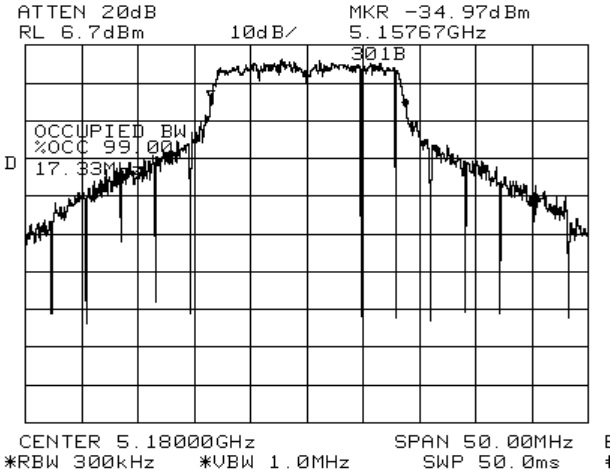
Run #3: Signal Bandwidth

Channel	Frequency (MHz)	Resolution Bandwidth	26 dB Signal Bandwidth (MHz)	20 dB Signal Bandwidth (MHz)	Graph reference #
low	5180	300 kHz	27.33	17.33	301A and 301B
mid	5260	300 kHz	38.10	22.50	302A and 302B
high	5320	300 kHz	33.00	18.38	303A and 303B

Plots Showing Signal Bandwidth





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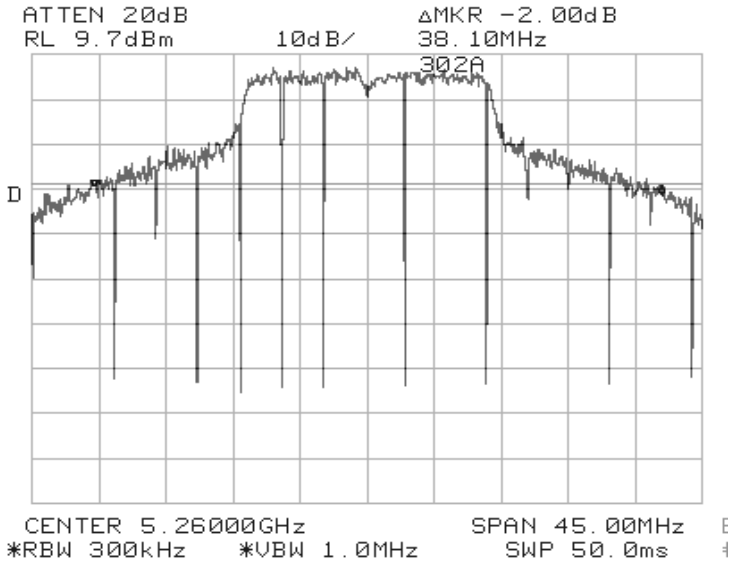

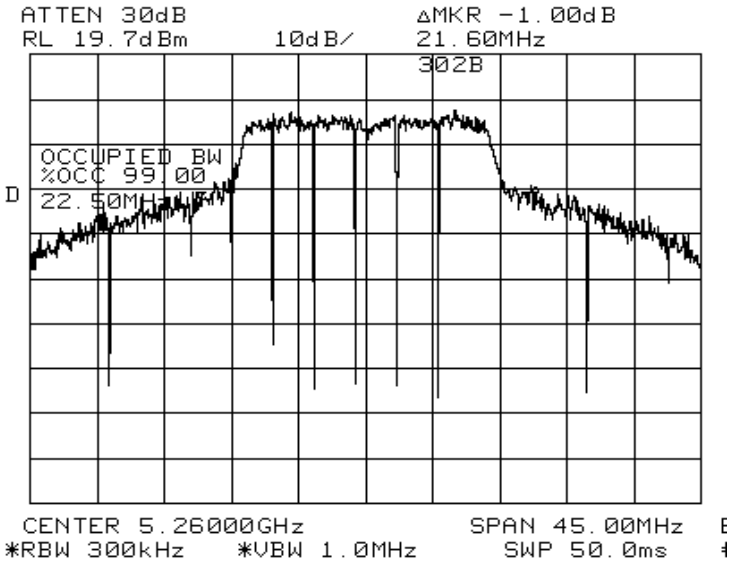

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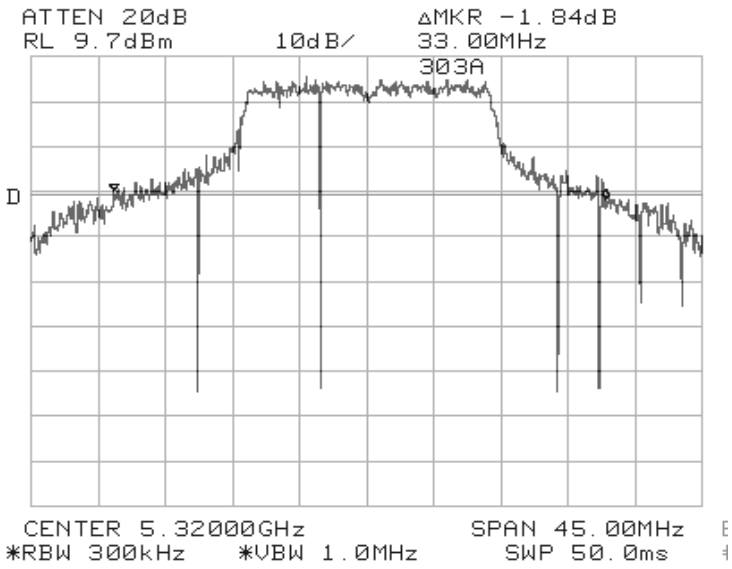

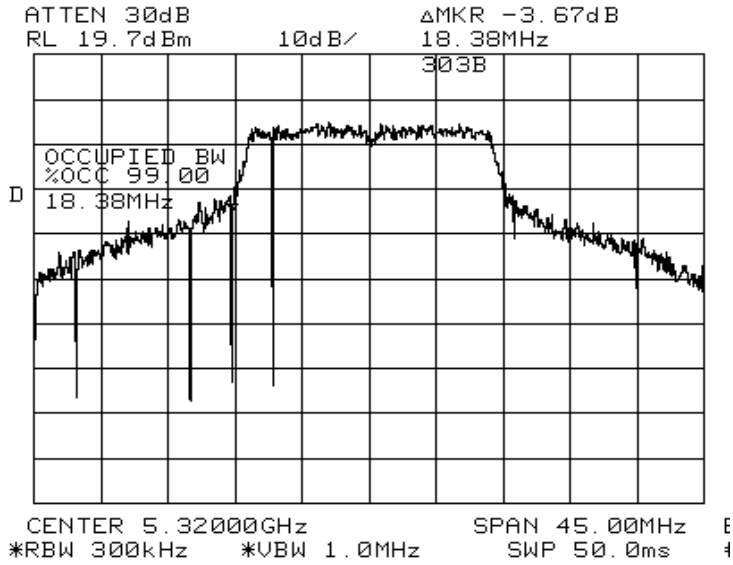

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Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

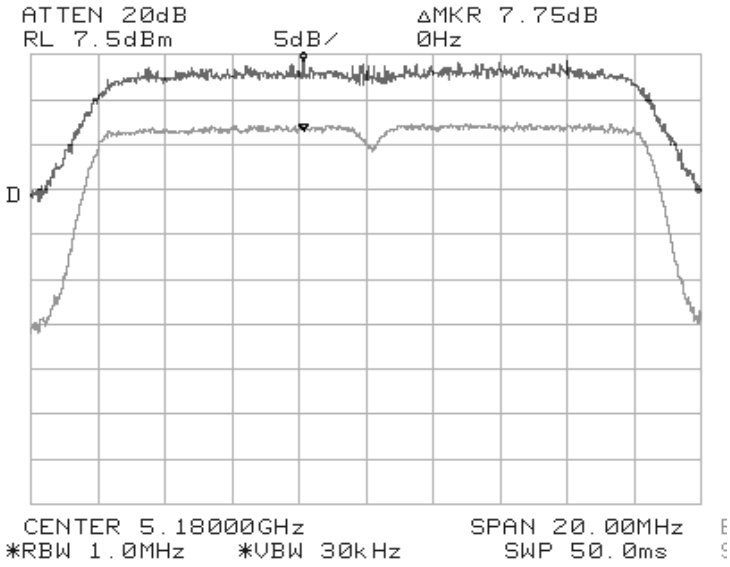
Run #4: Peak Excursion Measurement

Plots Showing Peak Excursion

Trace A: RBW = VBW = 1MHz

Trace B: RBW = 1 MHz, VBW = 30kHz

Low Channel; Peak Excursion = 7.75 dB



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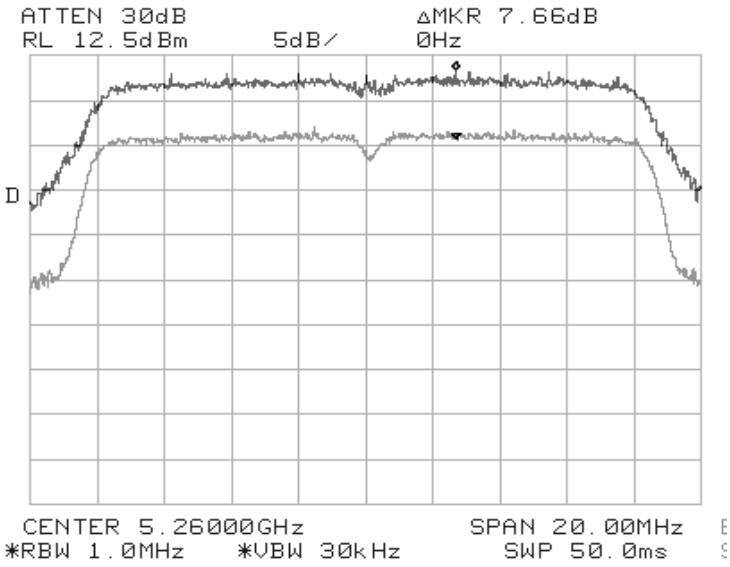
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Middle Channel; Peak Excursion = 7.66 dB



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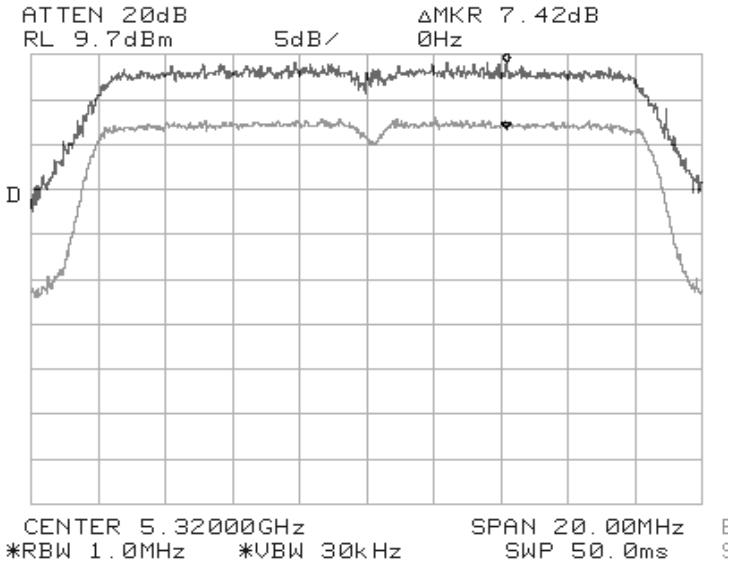
High Channel; Peak Excursion = 7.42 dB



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Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Run #5: Out Of Band Spurious Emissions - Antenna Conducted

The EIRP limit is -27dBm/MHz for all out of band signals that do not fall in restricted bands. A limit of -27 dBm was, therefore, used for signals not in restricted bands and close to the intentional band within 100 MHz of the upper and lower band edges. For signals removed from the band edge by more than 100MHz, radiated measurements were made (refer to run #6) if the signal amplitude exceeded -37dBm.

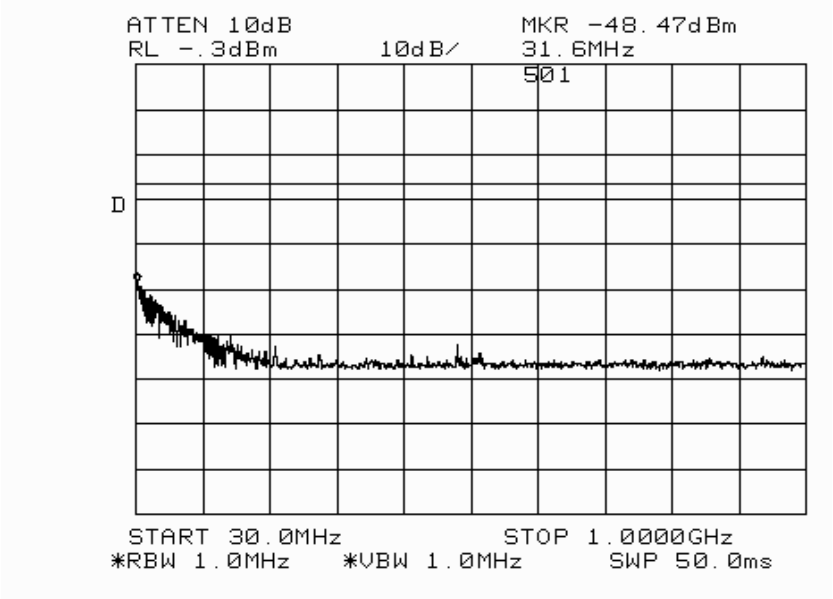
Channel	Frequency (MHz)	Frequency Range	Highest Spurious Signal	Graph reference #
low	5180	30 - 1000 MHz	Note 4	501
		1 to 5.15 GHz	3103 (Note 2), 4140 (Note 1)	502
		5.25 to 10 GHz	6208 (Note 2)	503
		10 GHz to 20 GHz	10350 (Note 3), 15530 (Note 1)	504
		20 GHz to 40 GHz	None	505
mid	5260	30 - 1000 MHz	Note 4	506
		1 to 5.25 GHz	3160 (Note 2), 4209 (Note 1)	507
		5.35 to 10 GHz	6311 (Note2)	508
		10 GHz to 20 GHz	10520 (Note 1), 15780 (Note 3)	509
		20 GHz to 40 GHz	None	510
high	5320	30 - 1000 MHz	Note 4	511
		1 to 5.30 GHz	3193 (Note 2), 4254 (Note 1)	512
		5.34 to 10 GHz	6381 (Note 2)	513
		10 GHz to 20 GHz	10630 (Note 1), 15950 (Note 1)	514
		20 GHz to 40 GHz	None	515

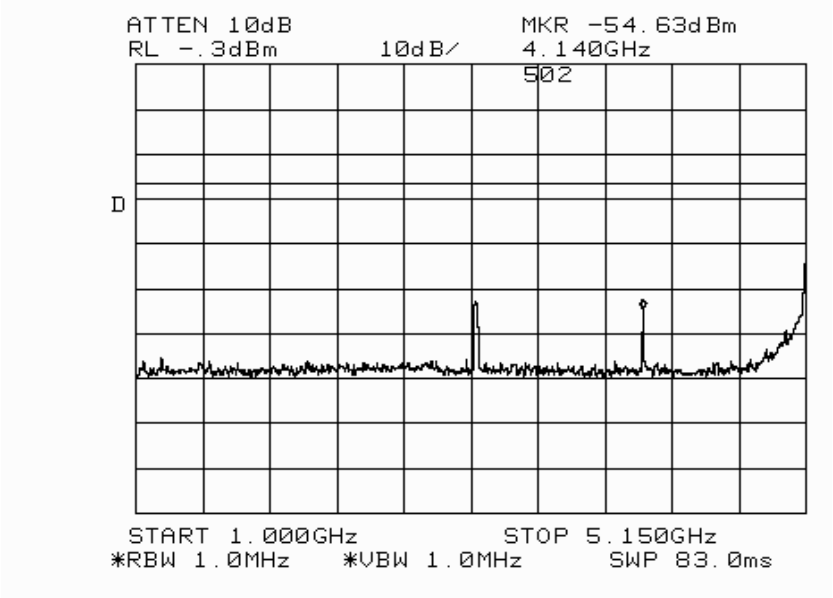
Note 1:	Signal is in a restricted band. Refer to run #6 for field strength measurements.
Note 2:	Signal is not in restricted band. Limit is -27dBm eirp. As the signal strength is significantly lower than -27dBm no field strength measurements required.
Note 3:	Signal is not in restricted band. Limit is -27dBm eirp. Although the signal strength is significantly lower than -27dBm field strength measurements were made (refer to run #6)
Note 4:	All spurious signals in this frequency band measured during digital device radiated emissions test.

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

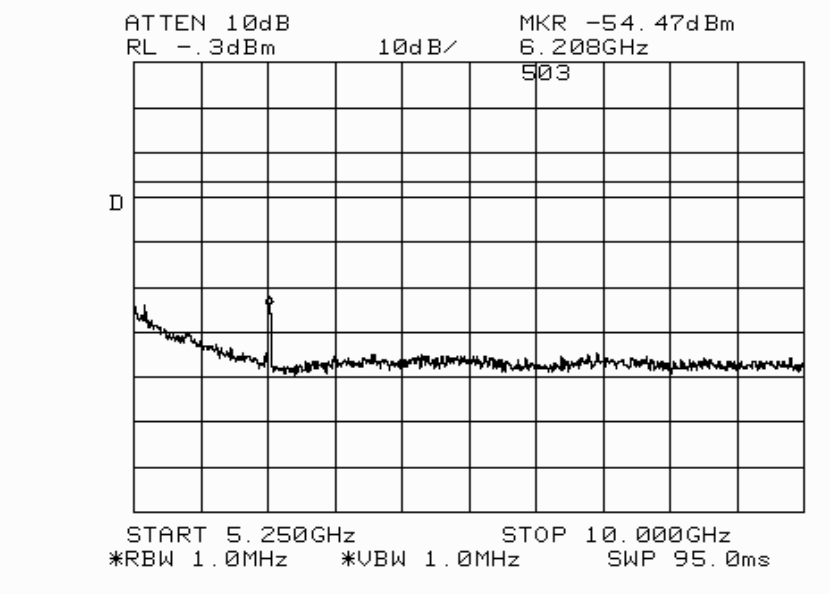
Plots Showing Out-Of-Band Emissions (RBW=VBW=1MHz)

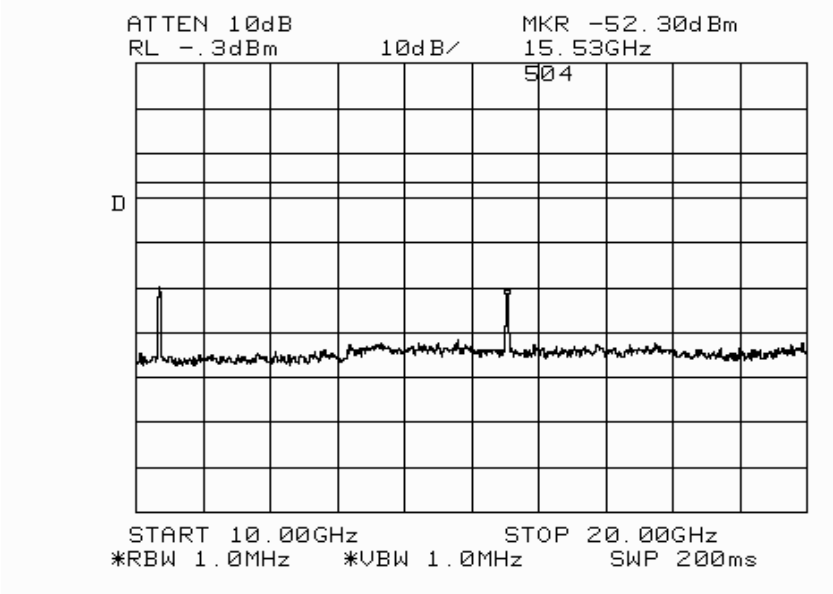
EUT operating at 5.18 GHz:



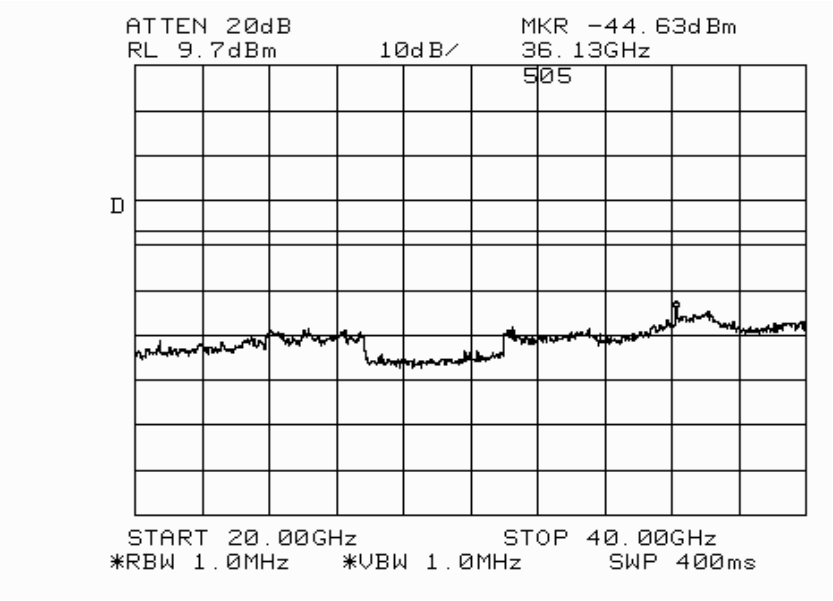


Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

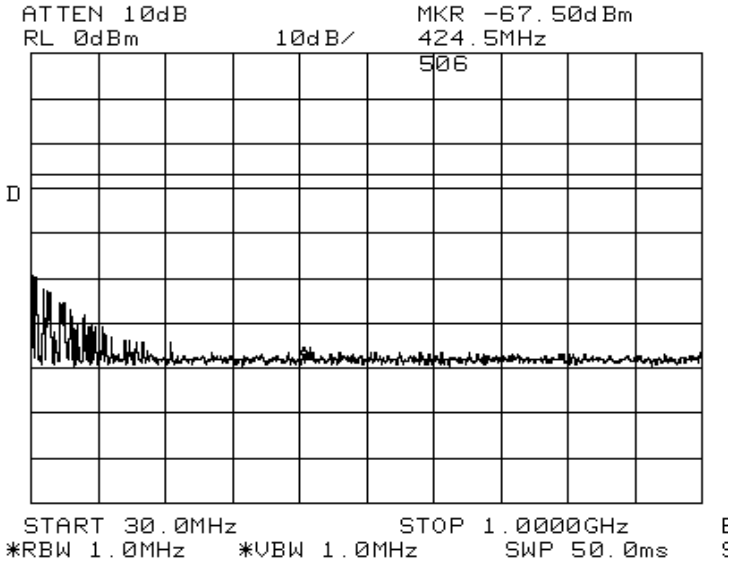




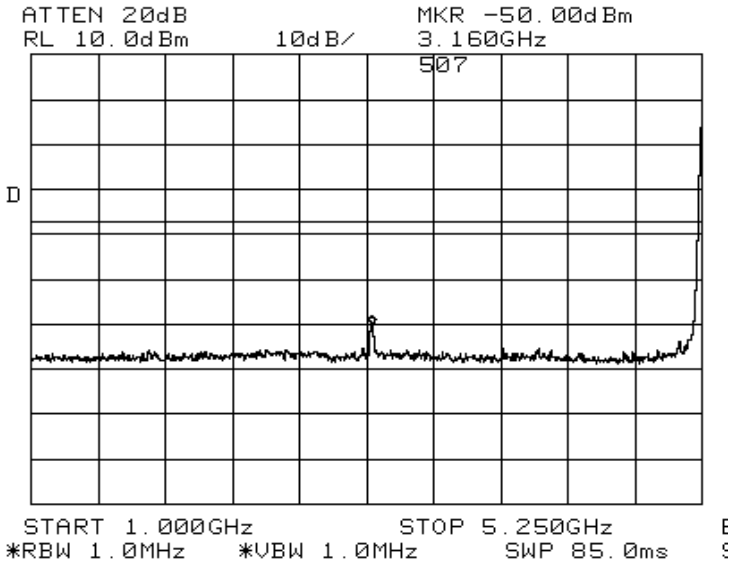
Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

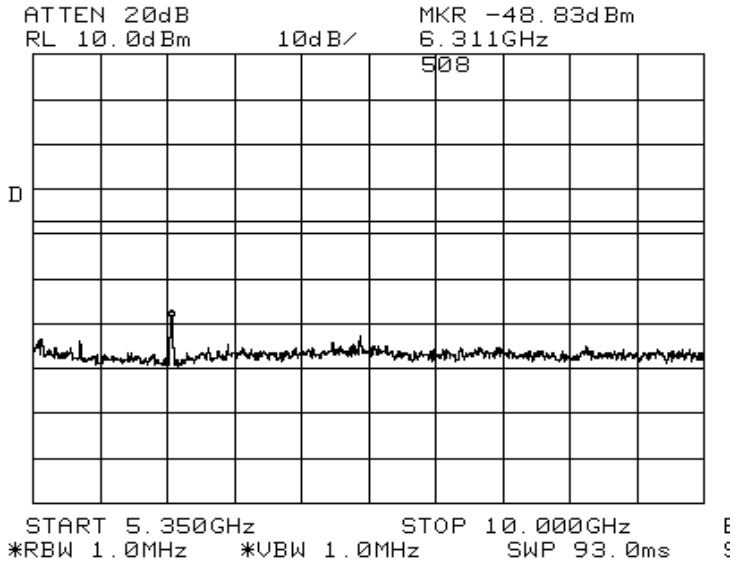


EUT operating at 5.26GHz:

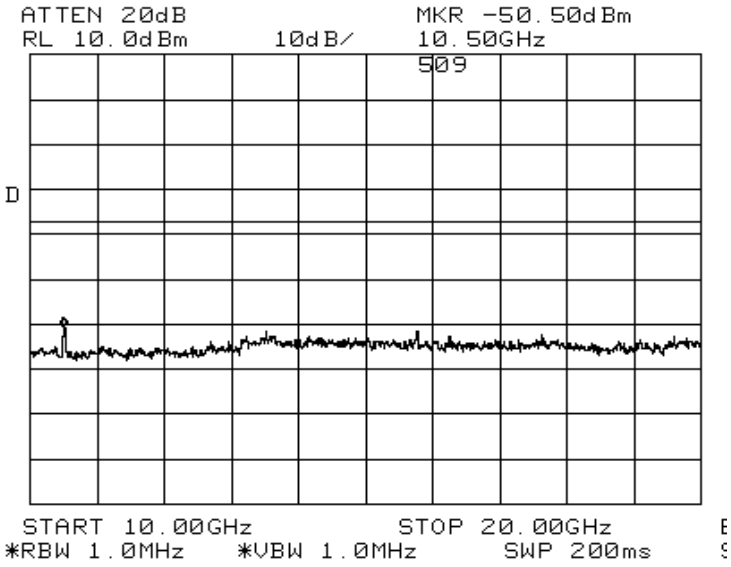


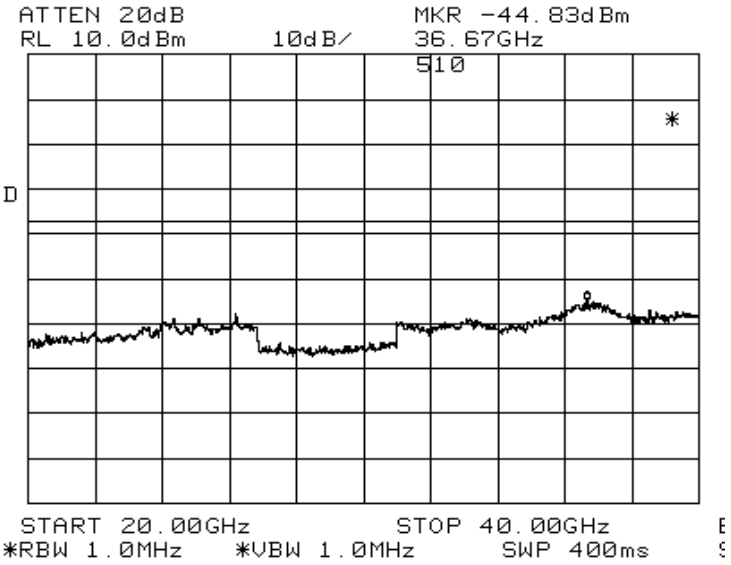
Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B





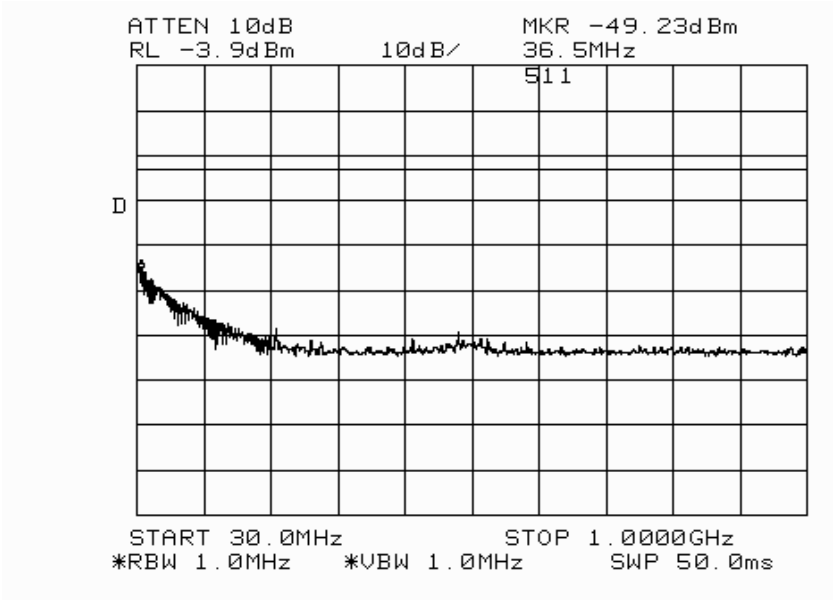
Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

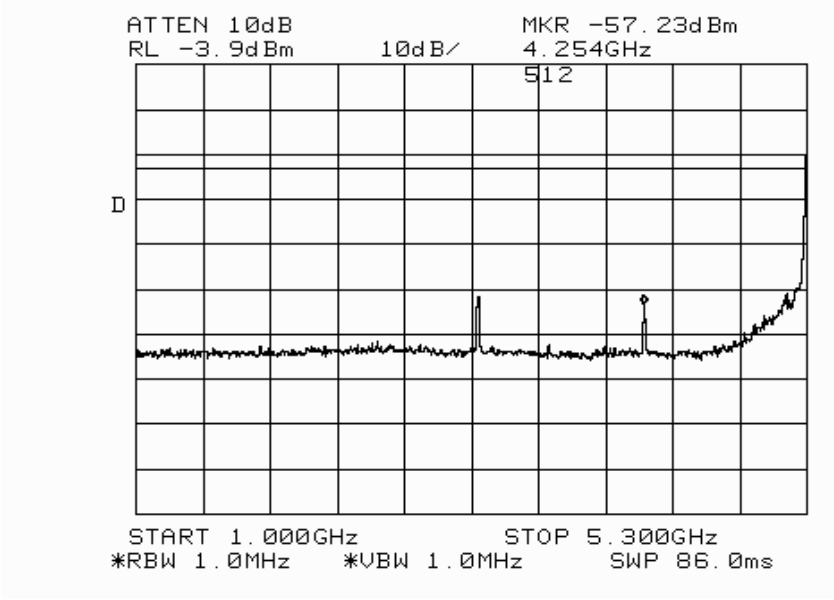




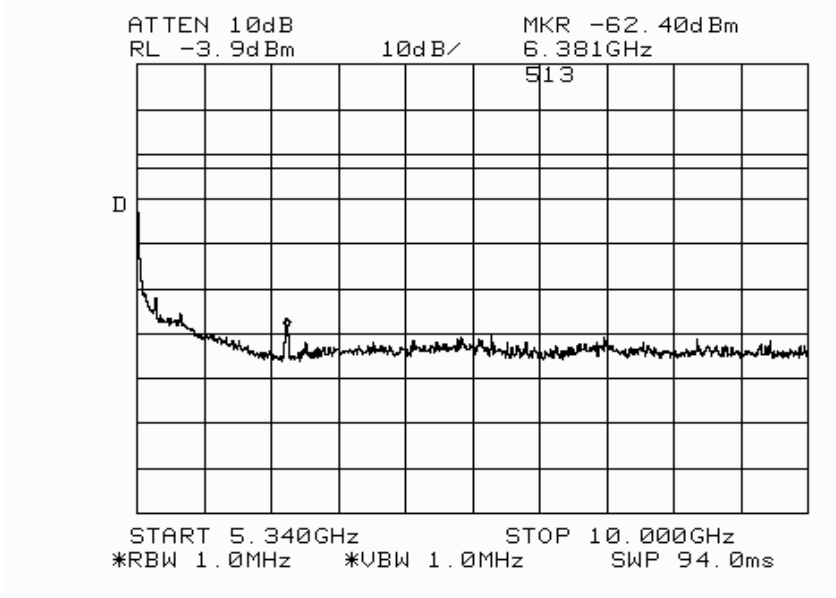
Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

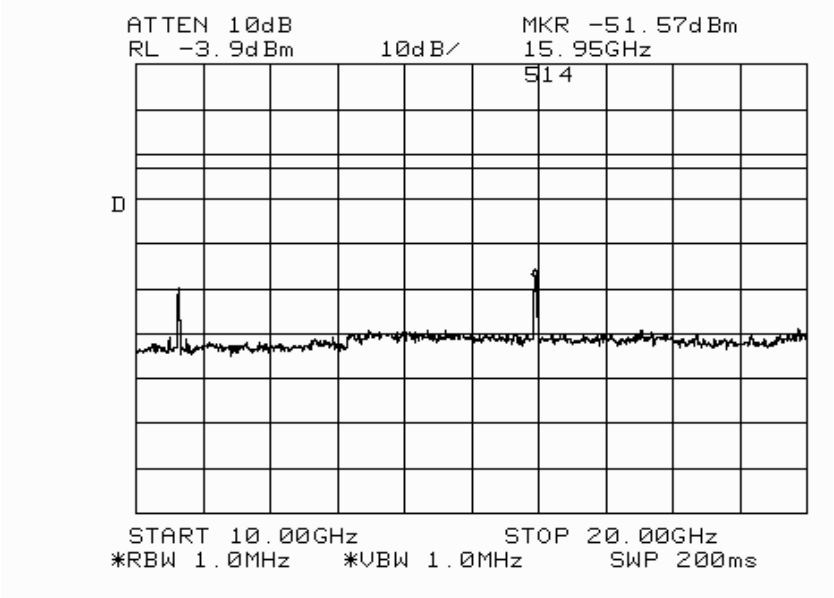
EUT operating at 5.32GHz:



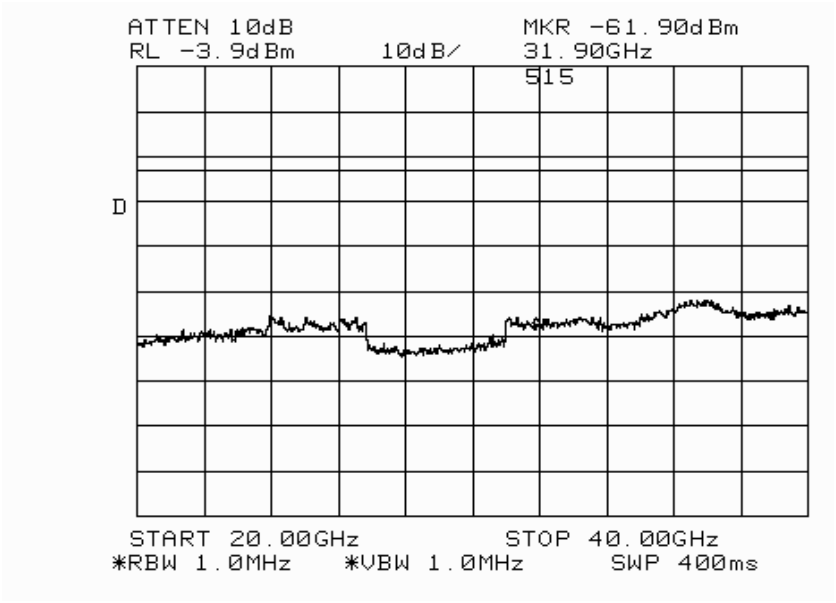


Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B





Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B



Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

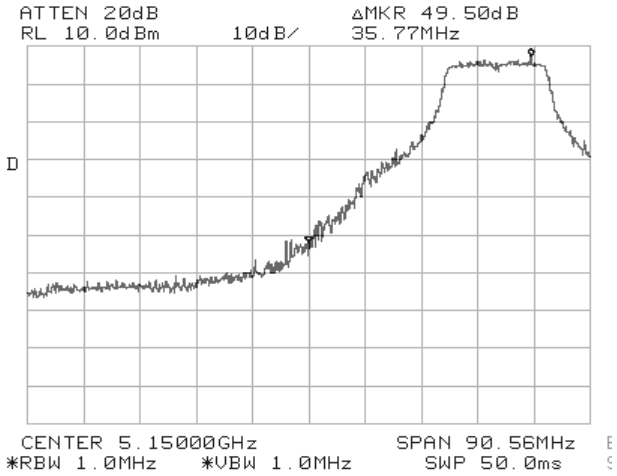
Band Edge Measurements:

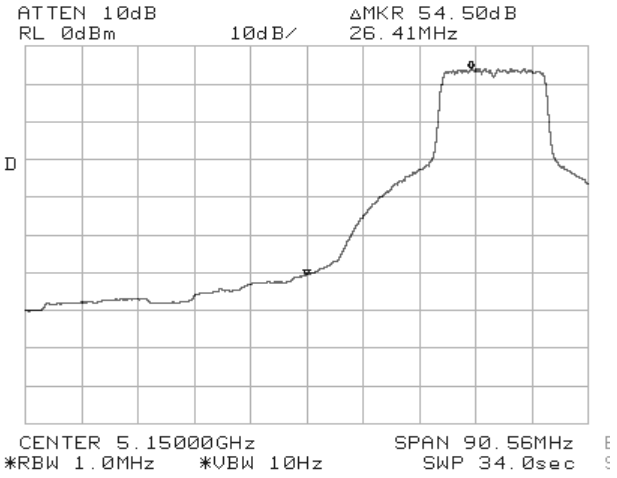
For signals in the restricted bands immediately above and below the 5.15 to 5.35 GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was then applied to the average and peak field strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

Plots Showing Out-Of-Band Emissions (Peak RBW=VBW=1MHz; Average RBW = 1MHz, VBW = 10Hz)

5.15 GHz band edge, EUT operating on the lowest channel

The highest signal within 50 MHz of the 5.15 GHz band was -49.50 dBc (Peak) / -54.50 dBc (Average)

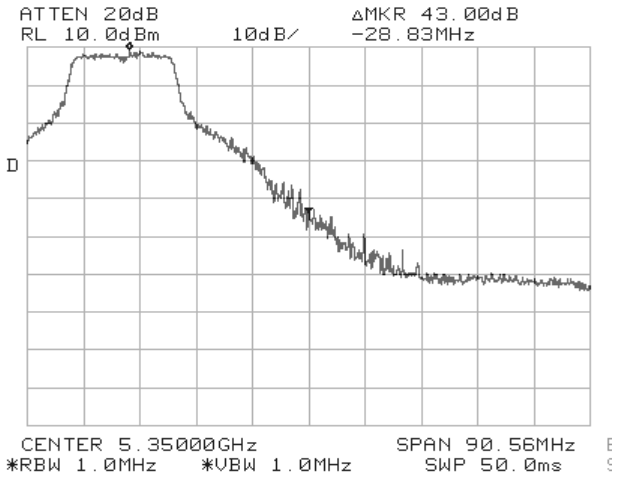


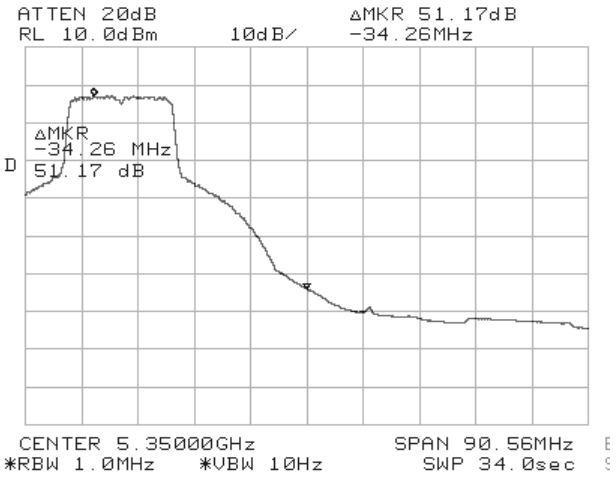


Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

5.35 GHz band edge EUT operating on channel 17 (highest channel):

The highest signal in the 5.35 to 5.46 GHz band was -43.00 dBc (Peak) / -51.17 dBc (Average)





Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

FCC Part 15 Subpart E Tests

Test Specifics

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:	1/21/2001	Config. Used:	
Test Engineer:	Jmartinez	Config Change:	
Test Location:	SVOATS# 4	Host Unit Voltage	

General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT unless stated otherwise.
When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

Ambient Conditions:

Temperature: 11°C
Rel. Humidity: 80%

Summary of Results

Run #	Test Performed	Limit	Result	Comments
1a -1b	RE, 1000 - 40000 MHz - Spurious Emissions	15.407(b)(6)	Pass	Omni
2a -2b	RE, 1000 - 40000 MHz - Spurious Emissions	15.407(b)(6)	Pass	Half-Circle

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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:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Run #1a: Fundamental Normal mode (Omni pattern)

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5180.438	106.1	V	-	-	Pk	160	1.1	Peak reading, peak limit
5181.358	96.9	V	-	-	Avg	160	1.1	Average reading, average limit
5180.212	105.0	H	-	-	Pk	310	1.1	Peak reading, peak limit
5181.270	96.1	H	-	-	Avg	310	1.1	Average reading, average limit
5321.450	106.8	V	-	-	Pk	160	1.1	Peak reading, peak limit
5321.380	97.9	V	-	-	Avg	160	1.1	Average reading, average limit
5320.145	105.5	H	-	-	Pk	320	1.1	Peak reading, peak limit
5321.144	96.6	H	-	-	Avg	320	1.1	Average reading, average limit

Band Edge Field Strength Calculations

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.0	56.6	v	74.0	-17.4	Pk	-	-	Note 1
5150.0	42.4	v	54.0	-11.6	Avg	-	-	Note 1
5150.0	55.5	h	74.0	-18.5	Pk	-	-	Note 1
5150.0	41.6	h	54.0	-12.4	Avg	-	-	Note 1
5350.0	63.8	v	74.0	-10.2	Pk	-	-	Note 2
5350.0	46.7	v	54.0	-7.3	Avg	-	-	Note 2
5350.0	62.5	h	74.0	-11.5	Pk	-	-	Note 2
5350.0	45.4	h	54.0	-8.6	Avg	-	-	Note 2

Note 1:	EUT operating on the lowest channel available in the 5.15 - 5.25 MHz band. Signal level calculated using the relative measurements in run #5 (-49.50 dBc for peak and -54.50 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.
Note 2:	EUT operating on highest channel available in the 5.25 - 5.35 MHz band. Signal level calculated using the relative measurements in run #5 (-43.00 dBc for peak and -51.17 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Run #1b: Radiated Spurious Emissions, 1000 - 40000 MHz (OMNI Pattern)
Testing with the 802.11a on the back and the 802.11b on the Front (LED Side). Flashed AP and label as OB=1 and dB=2.
Both radios transmitting. Checking only the worst and restricted band emissions.
EUT On Lowest Channel Available (5.18 GHz)

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
6216.00	56.2	v	68.3	-12.1	Note 3	163	1.8	pc-nom 7	
6216.00	58.2	h	68.3	-10.1	Note 3	121	1.7	pc-nom 7	
4144.00	38.2	v	74.0	-35.8	Pk	198	2.0	pc-nom 7	
4144.00	37.4	v	54.0	-16.6	Avg	198	2.0	pc-nom 7	
4144.00	37.2	h	74.0	-36.8	Pk	121	1.7	pc-nom 7	
4144.00	36.8	h	54.0	-17.2	Avg	121	1.7	pc-nom 7	
10360.0	54.6	h	68.3	-13.7	Note 3	154	1.2	pc-nom 7	
10360.0	58.6	v	68.3	-9.7	Note 3	145	1.1	pc-nom 7	
15539.96	63.4	V	74.0	-10.6	Pk	188	1.0	pc-nom 7	
15539.92	51.2	V	54.0	-2.8	Avg	188	1.0	pc-nom 7	
15539.56	68.0	H	74.0	-6.0	Pk	38	1.1	pc-nom 7	
15540.12	53.9	H	54.0	-0.1	Avg	38	1.1	pc-nom 7	
15539.56	67.0	H	74.0	-7.0	Pk	38	1.1	pc-nom 7	
15540.12	52.5	H	54.0	-1.5	Avg	38	1.1	pc-nom 7	
EUT On Center Channel (5.26 GHz)									
6312.00	59.6	v	68.3	-8.7	Note 3	181	2.0	pc-nom 12	
6312.00	56.2	h	68.3	-12.1	Note 3	272	1.2	pc-nom 12	
4208.00	36.5	v	74.0	-37.5	Pk	286	1.3	pc-nom 12	
4208.00	28.6	v	54.0	-25.4	Avg	286	1.3	pc-nom 12	
4208.00	40.2	h	74.0	-33.8	Pk	70	1.6	pc-nom 12	
4208.00	35.8	h	54.0	-18.2	Avg	70	1.6	pc-nom 12	
10520.0	52.0	v	68.3	-16.3	Note 3	219	1.6	pc-nom 12	
10520.0	49.6	h	68.3	-18.7	Note 3	263	1.2	pc-nom 12	
15781.42	63.2	V	74.0	-10.9	Pk	183	1.2	pc-nom 12	
15780.59	49.3	V	54.0	-4.7	Avg	183	1.2	pc-nom 12	
15780.46	64.9	H	74.0	-9.1	Pk	125	1.0	pc-nom 12	
15780.48	52.0	H	54.0	-2.0	Avg	125	1.0	pc-nom 12	

Elliott

EMC Test Data

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

EUT On Highest Channel Available (5.32 GHz)

6384.00	61.0	v	68.3	-7.3	Note 3	40	1.5	pc_nom 9
4256.00	35.2	v	74.0	-38.8	Pk	360	1.1	pc_nom 9
4256.00	32.2	v	54.0	-21.8	Avg	360	1.1	pc_nom 9
15963.12	65.4	H	74.0	-8.7	Pk	230	1.0	pc_nom 9
15963.20	52.0	H	54.0	-2.0	Avg	230	1.0	pc_nom 9
10639.30	68.0	H	74.0	-6.0	Pk	40	1.0	pc_nom 9
10639.46	53.5	H	54.0	-0.5	Avg	40	1.0	pc_nom 9
10640.87	65.3	V	74.0	-8.7	Pk	15	1.2	pc_nom 9
10640.09	51.5	V	54.0	-2.5	Avg	15	1.2	pc_nom 9
15963.12	65.1	v	74.0	-8.9	Pk	116	1.0	pc_nom 9
15963.20	52.5	v	54.0	-1.5	Avg	116	1.0	pc_nom 9

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Run #2a: Fundamental Normal mode (Half-cycle Pattern)

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5181.272	106.8	H	-	-	Pk	200	1.0	Peak reading, peak limit
5181.231	98.1	H	-	-	Avg	200	1.0	Average reading, average limit
5180.868	104.3	V	-	-	Pk	160	1.0	Peak reading, peak limit
5181.363	95.3	V	-	-	Avg	160	1.0	Average reading, average limit
5320.915	108.2	V	-	-	Pk	260	1.0	Peak reading, peak limit
5321.343	101.0	V	-	-	Avg	260	1.0	Average reading, average limit
5320.757	106.2	H	-	-	Pk	250	1.1	Peak reading, peak limit
5321.074	98.5	H	-	-	Avg	250	1.1	Average reading, average limit

Band Edge Field Strength Calculations

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.0	57.3	v	74.0	-16.7	Pk	-	-	Note 1
5150.0	46.9	v	54.0	-7.1	Avg	-	-	Note 1
5150.0	54.8	h	74.0	-19.2	Pk	-	-	Note 1
5150.0	44.1	h	54.0	-9.9	Avg	-	-	Note 1
5350.0	65.2	v	74.0	-8.8	Pk	-	-	Note 2
5350.0	49.8	v	54.0	-4.2	Avg	-	-	Note 2
5350.0	63.2	h	74.0	-10.8	Pk	-	-	Note 2
5350.0	47.3	h	54.0	-6.7	Avg	-	-	Note 2

Note 1:	EUT operating on the lowest channel available in the 5.15 - 5.25 MHz band. Signal level calculated using the relative measurements in run #5 (-49.50 dBc for peak and -54.50 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.
Note 2:	EUT operating on highest channel available in the 5.25 - 5.35 MHz band. Signal level calculated using the relative measurements in run #5 (-43.00 dBc for peak and -51.17 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Run #2b: Radiated Spurious Emissions, 1000 - 40000 MHz (Half-Circle Pattern)
Testing with the 802.11a on the back and the 802.11b on the Front (LED Side). Flashed AP and label as OB=1 and dB=2.
Both radios transmitting.
EUT On Lowest Channel Available (5.18 GHz)

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
6216.00	57.0	v	68.3	-11.3	Note 3	163	1.8	pc-nom 7	
6216.00	54.4	h	68.3	-13.9	Note 3	121	1.7	pc-nom 7	
4144.00	40.1	v	74.0	-33.9	Pk	198	2.0	pc-nom 7	
4144.00	29.0	v	54.0	-25.1	Avg	198	2.0	pc-nom 7	
4144.00	38.4	h	74.0	-35.6	Pk	121	1.7	pc-nom 7	
4144.00	28.5	h	54.0	-25.5	Avg	121	1.7	pc-nom 7	
10360.0	53.2	h	68.3	-15.1	Note 3	125	1.1	pc-nom 7	
10360.0	51.0	v	68.3	-17.3	Note 3	26	1.1	pc-nom 7	
15539.96	67.4	V	74.0	-6.7	Pk	177	1.2	pc-nom 7	
15539.92	53.5	V	54.0	-0.5	Avg	177	1.2	pc-nom 7	
15539.56	68.3	H	74.0	-5.7	Pk	3	1.0	pc-nom 7	
15540.12	53.6	H	54.0	-0.4	Avg	3	1.0	pc-nom 7	

EUT On Center Channel (5.26 GHz)

6312.00	58.1	v	68.3	-10.2	Note 3	181	2.0	pc-nom 12	
6312.00	55.5	h	68.3	-12.8	Note 3	272	1.2	pc-nom 12	
4208.00	42.2	v	74.0	-31.8	Pk	286	1.3	pc-nom 12	
4208.00	36.5	v	54.0	-17.5	Avg	286	1.3	pc-nom 12	
4208.00	41.3	h	74.0	-32.7	Pk	70	1.6	pc-nom 12	
4208.00	34.1	h	54.0	-19.9	Avg	70	1.6	pc-nom 12	
10520.0	53.8	v	68.3	-14.5	Note 3	130	1.4	pc-nom 12	
10520.0	52.7	h	68.3	-15.6	Note 3	239	1.0	pc-nom 12	
15781.42	66.5	V	74.0	-7.6	Pk	159	1.1	pc-nom 12	
15780.59	53.7	V	54.0	-0.3	Avg	159	1.1	pc-nom 12	
15780.46	65.5	H	74.0	-8.5	Pk	128	1.0	pc-nom 12	
15780.48	53.4	H	54.0	-0.6	Avg	128	1.0	pc-nom 12	

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

EUT On Highest Channel Available (5.32 GHz)

6384.00	59.6	v	68.3	-8.7	Note 3	40	1.5	pc_nom 9
4256.00	41.2	v	74.0	-32.8	Pk	360	1.1	pc_nom 9
4256.00	29.8	v	54.0	-24.2	Avg	360	1.1	pc_nom 9
15963.12	68.0	H	74.0	-6.1	Pk	101	1.0	pc_nom 9
15963.20	53.8	H	54.0	-0.2	Avg	101	1.0	pc_nom 9
10639.30	65.6	H	74.0	-8.5	Pk	48	1.0	pc_nom 9
10639.46	51.7	H	54.0	-2.3	Avg	48	1.0	pc_nom 9
10640.87	62.3	V	74.0	-11.7	Pk	85	1.1	pc_nom 9
10640.09	48.9	V	54.0	-5.1	Avg	85	1.1	pc_nom 9
15963.12	65.2	v	74.0	-8.8	Pk	210	1.1	pc_nom 9
15963.20	50.6	v	54.0	-3.4	Avg	210	1.1	pc_nom 9

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		Proj Eng:	Mark Briggs
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Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

FCC Part 15.247 Subpart C Test

Test Specifics

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:	1/21/2001	Config. Used:	1
Test Engineer:	Jmartinez	Config Change:	None
Test Location:	SVOATS# 4	Host Unit Voltage	120Vac, 60Hz

General Test Configuration

The EUT was located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT unless stated otherwise.
When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators and cables used.

Ambient Conditions:

Temperature: 11°C
Rel. Humidity: 80%

Summary of Results

Run #	Test Performed	Limit	Result	Comments
1	RE, 1000 - 24,000 MHz - Spurious Emissions	15.247/15.205	Pass	Refer to individual runs

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.

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EMC Test Data

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Run #1a: Radiated Spurious Emissions, 1000 - 40000 MHz
Testing the 802.11b card. 802.11a card off.
EUT On Channel Available (High Channel 2.480GHz)

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.0	48.6	h	74.0	-25.4	Pk	108	1.0	Note 2
4824.0	36.1	h	54.0	-17.9	Avg	108	1.0	Note 2
2483.7	58.1	h	74.0	-15.9	Pk	5	1.6	Restricted emissions
2483.7	53.0	h	54.0	-1.0	Avg	5	1.6	Restricted emissions
2489.0	38.3	h	54.0	-15.7	Pk	167	1.2	Peak Readings, Average limit
2494.0	47.0	h	54.0	-7.0	Pk	160	1.2	Peak Readings, Average limit
2483.7	47.9	v	54.0	-6.1	Pk	70	1.4	Peak Readings, Average limit
2489.0	45.1	v	54.0	-8.9	Pk	70	1.4	Peak Readings, Average limit
2494.0	50.1	v	54.0	-3.9	Pk	70	1.4	Peak Readings, Average limit
EUT On Low Channel (2.412 GHz)								
2433.7	58.4	h	93.0	-34.6	Pk	90	1.4	Non-resctricted emissions
2455.7	52.0	h	93.0	-41.1	Pk	90	1.4	Non-resctricted emissions
2433.7	53.8	v	93.0	-39.2	Pk	90	1.4	Non-resctricted emissions
2455.7	46.9	v	93.0	-46.1	Pk	245	1.5	Non-resctricted emissions

Note 1:	No harmonic emission, from fundamental, detected within 20-dB of the limit.

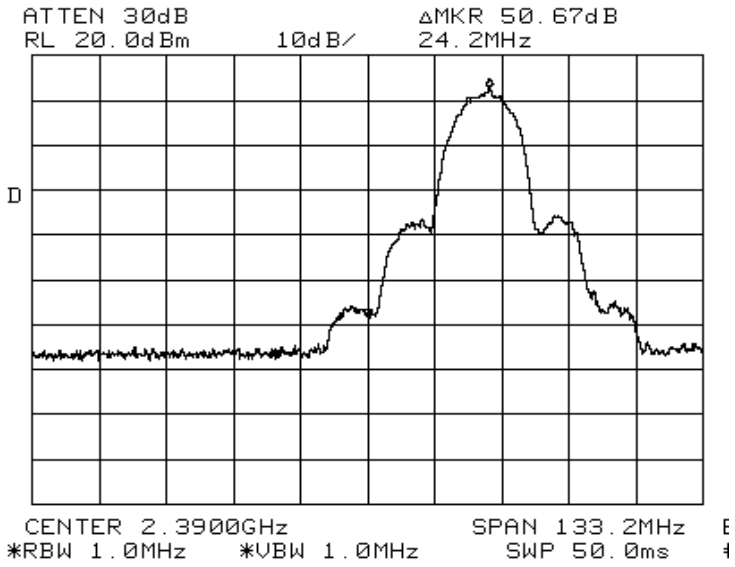
Fundamental Bandedge								
2413.249	108.8	V	-	-	Pk	78	1.2	Peak reading, peak limit
2412.352	101.6	V	-	-	Avg	78	1.2	Average reading, average limit
2413.389	113.5	H	-	-	Pk	89	1.8	Peak reading, peak limit
2412.394	106.4	H	-	-	Avg	89	1.8	Average reading, average limit

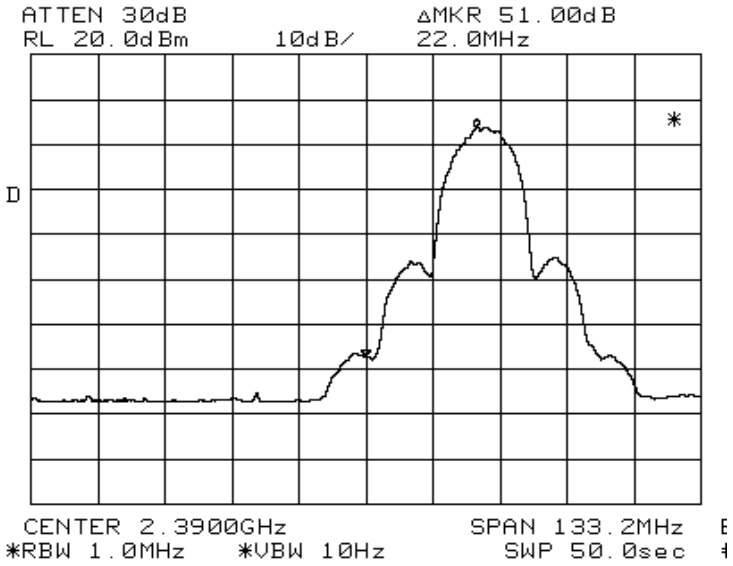
Band Edge Field Strength Calculations

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.0	58.3	v	74.0	-15.7	Pk			Note 1
2390.0	48.6	v	54.0	-5.4	Avg			Note 1
2390.0	63.0	h	74.0	-11.0	Pk			Note 1
2390.0	53.4	h	54.0	-0.6	Avg			Note 1

Note 1:	EUT operating on the Lowest available channel in the 2.402 - 2.4835 GHz band. Signal level calculated using the relative measurements (-50.67 dBc for peak and -53.00 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B





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EMC Test Data

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Run #1b: Radiated Spurious Emissions, 1000 - 40000 MHz
Still testing 802.11b card, but with 802.11a MINI PCI transmitting also.
EUT On Channel Available (High Channel 2.480GHz) With 802.11a on at full power, high Channel.

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.7	58.2	h	74.0	-15.8	Pk	5	1.6	Restricted emission
2483.7	53.2	h	54.0	-0.8	Avg	5	1.6	Restricted emission
2489.0	45.1	h	54.0	-8.9	Pk	223	1.5	Peak Readings, Average limit
2494.0	50.1	h	54.0	-3.9	Pk	85	1.2	Peak Readings, Average limit
2351.7	52.2	h	54.0	-1.8	Pk	0	1.4	Peak Readings, Average limit
2505.0	50.1	h	54.0	-3.9	Pk	155	1.6	Peak Readings, Average limit
2483.7	51.7	v	54.0	-2.3	Pk	266	1.3	Peak Readings, Average limit
2489.0	41.7	v	54.0	-12.3	Pk	266	1.3	Peak Readings, Average limit
2494.0	43.4	v	54.0	-10.6	Pk	266	1.3	Peak Readings, Average limit
EUT On Low Channel (2.412 GHz)								
4824.0	46.9	h	74.0	-27.1	Pk			Restricted emission
4824.0	28.7	h	54.0	-25.3	Avg	176	1.5	Restricted emission
2433.7	57.7	h	92.0	-34.3	Pk	176	1.5	Non-Restricted emission
2455.7	47.8	h	92.0	-44.2	Pk	309	1.7	Non-Restricted emission
2433.7	52.9	v	92.0	-39.1	Pk	85	1.0	Non-Restricted emission
2455.7	43.8	v	92.0	-48.2	Pk	85	1.0	Non-Restricted emission
2367.7	45.4	v	54.0	-8.6	Pk	264	1.4	Peak Readings, Average limit
2367.7	48.2	h	54.0	-5.8	Pk	162	1.6	Peak Readings, Average limit

Note 1:	No harmonic emission, from fundamental, detected within 20-dB of the limit.

Client:	Intel Corporation	Job Number:	J45759
Model:	WDAP5000	T-Log Number:	T45966
		Proj Eng:	Mark Briggs
Contact:	Robert Paxman		
Spec:	FCC Part 15 B and E, RSS-210, EN55022	Class:	B

Fundamental Bandedge

2409.163	105.7	V	-	-	Pk	277	1.8	Peak reading, peak limit
2409.273	98.8	V	-	-	Avg	277	1.8	Average reading, average limit
2411.792	112.3	h	-	-	Pk	7	1.8	Peak reading, peak limit
2411.072	106.3	h	-	-	Avg	7	1.8	Average reading, average limit

Band Edge Field Strength Calculations

Frequency	Level	Pol	15.209 / 15.407		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.5	55.2	v	74.0	-18.8	Pk			Note 1
2483.5	45.5	v	54.0	-8.5	Avg			Note 1
2483.5	61.8	h	74.0	-12.2	Pk			Note 1
2483.5	53.0	h	54.0	-1.0	Avg			Note 1

Note 1: EUT operating on the Highest available channel in the 2.402 - 2.4835 GHz band. Signal level calculated using the relative measurements (-50.50 dBc for peak and -53.34 dBc for average) applied to the highest peak and average field strength measurements of the fundamental signal level.