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Electromagnetic Emissions Test Report

Application for Grant of Equipment Authorization
Class II Permissive Change
pursuant to

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

on the
Intel Corporation
Transmitter
Model: 512AN_MMW (MMC)

UPN:	1000M-L512ANMU
FCC ID:	PD9LEN512ANMU
GRANTEE:	Intel Corporation 2111 N.E. 25th Ave. Hillsboro, OR 97124-5961
TEST SITE:	Elliott Laboratories 684 W. Maude Ave Sunnyvale, CA 94086
REPORT DATE:	September 2, 2008
FINAL TEST DATE:	August 8, August 11, August 12 and August 13, 2008
AUTHORIZED SIGNATORY:	Mark Briggs Staff Engineer

ACCREDITED

Testing Cert #2016-01

REVISION HISTORY

Rev #	Date	Comments	Modified By
1	September 3, 2008	Initial Release	-

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SCOPE

An electromagnetic emissions test has been performed on the Intel Corporation model 512AN_MMW (MMC) pursuant to the following rules:

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

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

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

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

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

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

The test results recorded herein are based on a single type test of the Intel Corporation model 512AN_MMW (MMC) and therefore apply only to the tested sample. The sample was selected and prepared by Robert Paxman of Intel Corporation

OBJECTIVE

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

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

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

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

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

STATEMENT OF COMPLIANCE

The tested sample of Intel Corporation model 512AN_MMW (MMC) complied with the requirements of the following regulations:

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

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

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses OFDM / DSSS techniques	-	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	No tests performed, the maximum power, power spectral density, conducted spurious emissions and minimum 6dB bandwidth remain unchanged from the values originally reported. The proposed addition of antenna does not affect the operation of the device as it relates to these requirements.		
	RSP100	99% 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			
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 30MHz – 25 GHz (Note 2, note 3)	52.8dBµV/m @ 7388.8MHz	15.207 in restricted bands, all others <-30dBc Note 2	Complies (-1.2dB)

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).
Note 2: Spurious emissions below 1GHz were independent of operating channel and operating mode (transmit versus receive). Measurements for radiated emissions below 1GHz are therefore reported for receive mode only.
Note 3: The original test report worst case emissions were 53.0 dBµV/m @ 2483.6 MHz.

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	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	No tests performed, the maximum power, power spectral density, conducted spurious emissions and minimum 6dB bandwidth remain unchanged from the values originally reported. The proposed addition of antenna does not affect the operation of the device as it relates to these requirements.		
	RSP100	99% Bandwidth			
15.247 (b)	RSS 210 A8.2 (4)	Output Power (multipoint systems)			
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density			
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 30MHz – 40 GHz (Note 2, note 3)	47.3dBµV/m @ 11650.0MHz	15.207 in restricted bands, all others <-30dBc Note 2	Complies (-6.7dB)

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).
Note 2: Spurious emissions below 1GHz were independent of operating channel and operating mode (transmit versus receive). Measurements for radiated emissions below 1GHz are therefore reported for receive mode only.
Note 3: The original test report worst case emissions were 53.1dBµV/m @ 11489.8MHz.

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	The proposed addition of antenna does not affect the antenna connector		
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	50.9dBµV/m @ 3000.4MHz	RSS GEN Table 1	Complies (-3.1dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	The proposed addition of antenna does not affect the AC conducted emissions.		
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, RSS 102 declaration	Refer to OET 65, FCC Part 1 and RSS 102	Complies
	RSP 100 RSS GEN 7.1.5	User Manual	The User's Manual that was submitted for the original application remains unchanged.		
	RSP 100 RSS GEN 7.1.5	User Manual			
Note 1: Spurious emissions below 1GHz were independent of operating mode and dominated by emissions from the test fixture. Test were not performed below 1GHz as the proposed changes are only to the antenna The highest emission below 1GHz during the original testing was 43.4dBµV/m @ 108.287MHz 3MHz (0.1dB below the limit).. The highest emission above 1Ghz in receive mode from the original testing was receive mode was 50.5dBµV/m @ 3000.3MHz (3.5dB below the limit).					

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	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Intel Corporation model 512AN_MMW (MMC) is a 2x1 MISO 802.11abgn radio module that is designed to be installed in laptops. The module supports 802.11b, 802.11g and 802.11n protocols in the 2400 - 2483.5 MHz band and 802.11a and 802.11n protocols in the 5150 - 5250 MHz, 5250 - 5350 MHz, 5470 - 5725 MHz and 5725 - 5850 MHz bands. In legacy modes (802.11abg) and n (802.11n) modes one transmit chain is active and either 1 or 2 receive chains can be active. In 802.11n mode it supports both 20-MHz and 40-MHz channels.

For testing purposes, and in accordance with requirements for evaluating a device for modular approvals, the EUT was installed onto an extender card that was connected into a PC. The EUT was outside of the PC's enclosure. The electrical rating of the EUT is 3.3 Volts DC, 0.5 Amps.

The sample was received on August 8, 2008 and tested on August 8, August 11, August 12 and August 13, 2008. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Intel	512AN_MW	802.11abgn Module	0016EA01AF0	PD9LEN512ANMU

ANTENNA SYSTEM

Refer to the PROPOSED MODIFICATION DETAILS section of this report.

ENCLOSURE

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

MODIFICATIONS

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

SUPPORT EQUIPMENT

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

Manufacturer	Model	Description	Serial Number	FCC ID
Dell	-	Laptop PC	Prototype	-

No remote support equipment was used during emissions testing.

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
DC power port	DC power sourse	Multi connect	Unshielded	0.3
PCI Extender	Laptop	Multi connect	Unshielded	0.3
Antenna port 1	Antenna	u.FL	Shielded	0.2
Antenna port 2	Antenna	u.FL	Shielded	0.2

EUT OPERATION

During testing the EUT was transmitting at the stated power level at a data rate of 1Mb/s for 802.11b mode and 6Mb/s for 802.11g and n20 modes and 12Mb/s for 802.11n 40MHz mode.

The following modes were selected as the worst case mode(s) for each of the transmitter-related measurements:

- Band Edge, 2.4GHz Band: 802.11g and 802.11n 40MHz modes
- Band Edge, 5150MHz, 5350MHz, 5470MHz: : 802.11n 20MHz and 40MHz modes
- Spurious emissions, 2.4GHz Band: 802.11b and 802.11n 20MHz modes
- Spurious emissions, 5150-5250MHz Band: 802.11a mode
- Spurious emissions, 5250-5350MHz Band: 802.11a and 802.11n 40MHz modes
- Spurious emissions, 5470-5725MHz Band: 802.11n 20MHz mode
- Spurious emissions, 5725-5850MHz Band: 802.11a mode

Receiver-related measurements were made with the device operating on each chain alone and on both chains simultaneously.

PROPOSED MODIFICATION DETAILS

GENERAL

This section details the modifications to the Intel Corporation model 512AN_MMW (MMC) being proposed. All performance and construction deviations from the characteristics originally reported to the FCC are addressed

ANTENNA

The original certification included a Universe PIFA antenna and so covered all PIFA antennas of lower gain. The proposed change is to add a PIFA-based antenna designed for use with the module. Selection of operating modes for each series of tests (band-edge spurious emissions, radiated spurious emissions) is based on previous results with the universe PIFA antenna.

Antenna Name and model	Type	Antenna Gain				Comments
		2.4GHz	5.2GHz	5.5GHz	5.7GHz	
Universe	PIFA	3.24	3.73	4.77	4.97	Original Antenna tested
Amphenol WLAN Main: 14G152168231LV:	PIFA	-0.59	1.36	2.18	1.64	Proposed new antenna
WLAN Aux: 14G152168131LV:	Carrier	-1.00	0.01	2.19	2.76	

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on August 8, August 11, August 12 and August 13, 2008 at the Elliott Laboratories semi anechoic chambers 3 and 4 located at 41039 Boyce Road, Fremont, California. 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.

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 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 requirements of ANSI C63.4:2003.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

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

INSTRUMENT CONTROL COMPUTER

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

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

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

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

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

INSTRUMENT CALIBRATION

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

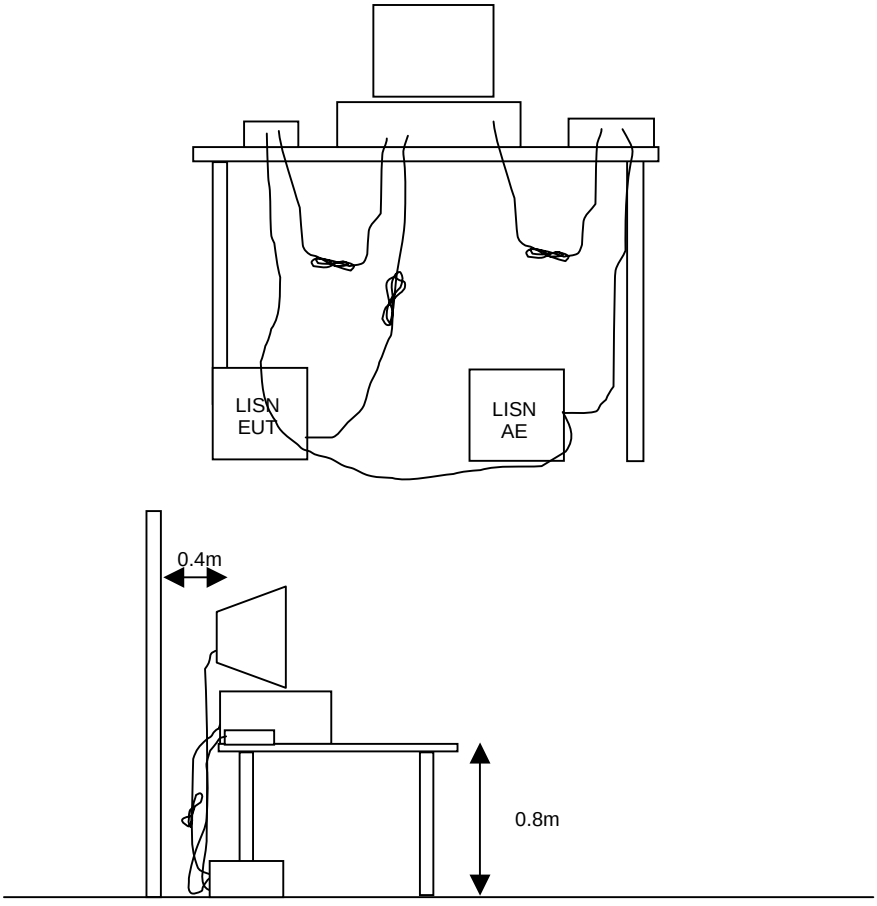
TEST PROCEDURES

EUT AND CABLE PLACEMENT

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

CONDUCTED EMISSIONS

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



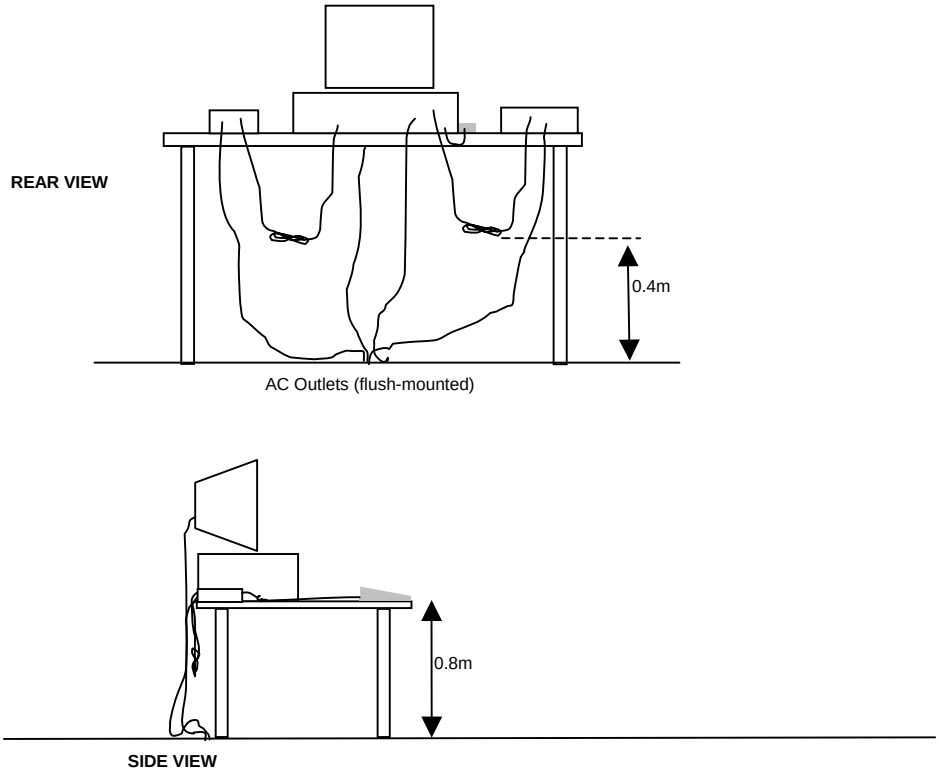
RADIATED EMISSIONS

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

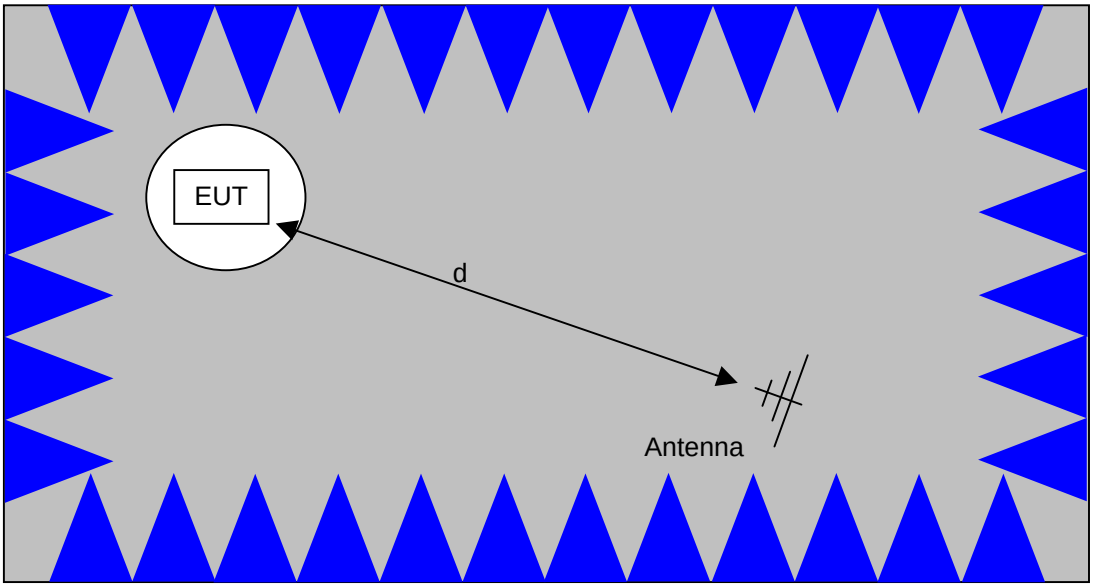
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

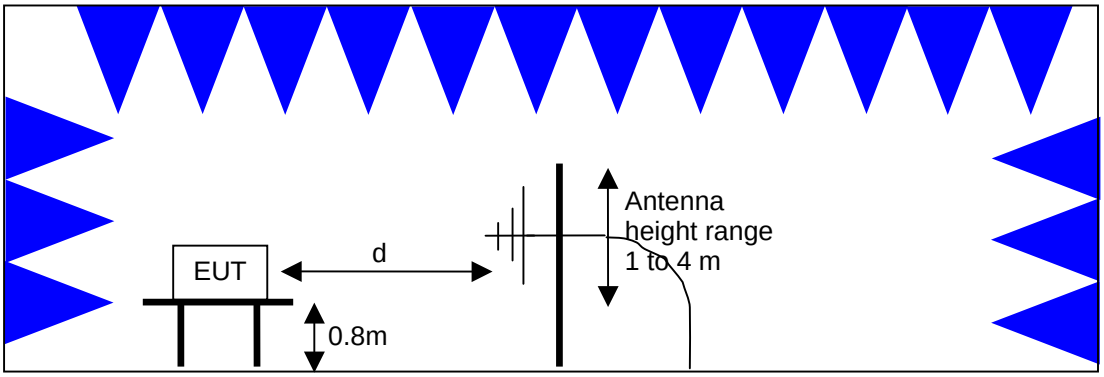


Typical Test Configuration for Radiated Field Strength Measurements



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

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



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

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[1] (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

[1] 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:

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

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:

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

where P is the eirp (Watts)

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 30 - 40,000 MHz
Engineer: rvarelas

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	786	07-Dec-08
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	-
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1731	17-Oct-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	06-Nov-08
Rohde & Schwarz	Power Sensor, 1 uW-100 mW, DC-18 GHz, 50ohms	NRV-Z51	1797	21-Aug-08
Weinschel Corp	Attenuator, 20dB , 50 ohms, 25W, DC-18 GHz	5787A-20	1994	N/A
EMCO	Antenna, Horn, 1-18GHz	3115	868	10-Jun-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Aug-08
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	06-Nov-08

EXHIBIT 2: Test Measurement Data

26 Pages

Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		-
Emissions Standard(s):	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	DTS
Immunity Standard(s):	-	Environment:	-

EMC Test Data - DTS Radiated Emissions
Boxter 13 SL300 Rocky30 Antenna

For The

Intel

Model

512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna

Date of Last Test: 8/18/2008

Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 20.3 °C
Rel. Humidity: 40.5 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Measurements with the universe PIFA antenna indicated that the spurious emissions were highest at the 2390 MHz band edge with the device operating in 802.11g mode and at the 2483.5MHz with the device operating in 802.11n 40MHz mode. Band edge measurements were therefore made in both of those modes.

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	802.11g	2412 MHz	18.0	14.6 dBm	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	48.9dBuV/m @ 2390MHz (-5.1dB)
1b		2462 MHz	18.5	14.1 dBm	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	48.1dBuV/m @ 2483.5MHz (-5.9dB)
2a	802.11n40	2422 MHz	13.5	10.3 dBm	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	48.3dBuV/m @ 2389.7MHz (-5.7dB)
2b		2452 MHz	18.5	14.4dBm	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	51.4dBuV/m @ 2483.5MHz (-2.6dB)
Measurements with the universe PIFA antenna indicated that the spurious emissions at frequencies more than 50MHz from the band edges were highest when the device was operating in 802.11b and 802.11n 20MHz modes. Spurious emissions were therefore made in both of those modes.							
3a	802.11b	2412 MHz	18.5	19.0 dBm	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	46.7dBµV/m @ 4824.0MHz (-7.3dB)
3b		2437 MHz	17.0	16.8 dBm	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	47.1dBµV/m @ 7311.8MHz (-6.9dB)
3c		2462 MHz	20.5	19.3 dBm	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	52.8dBµV/m @ 7388.8MHz (-1.2dB)
4a	802.11n20	2412 MHz	17.0	13.3 dBm	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	39.7dBµV/m @ 4824.0MHz (-14.3dB)
4b		2437 MHz	21. 5	16.6 dBm	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	45.0dBµV/m @ 7310.0MHz (-9.0dB)
4c		2462 MHz	19.0	14.2 dBm	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	41.7dBµV/m @ 7385.2MHz (-12.3dB)

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		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Run #1: Radiated Spurious Emissions, 2.4GHz Band Edges. Operating Mode: 802.11g

Date of Test: 8/8/2008 Config. Used: #1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #3 Host Unit Voltage 120V/60Hz

Run #1a: 2390 MHz Band Edge, 802.11g @ 2412 MHz

Power Setting: 18.0 Average power: 14.6 dBm (for reference purposes)

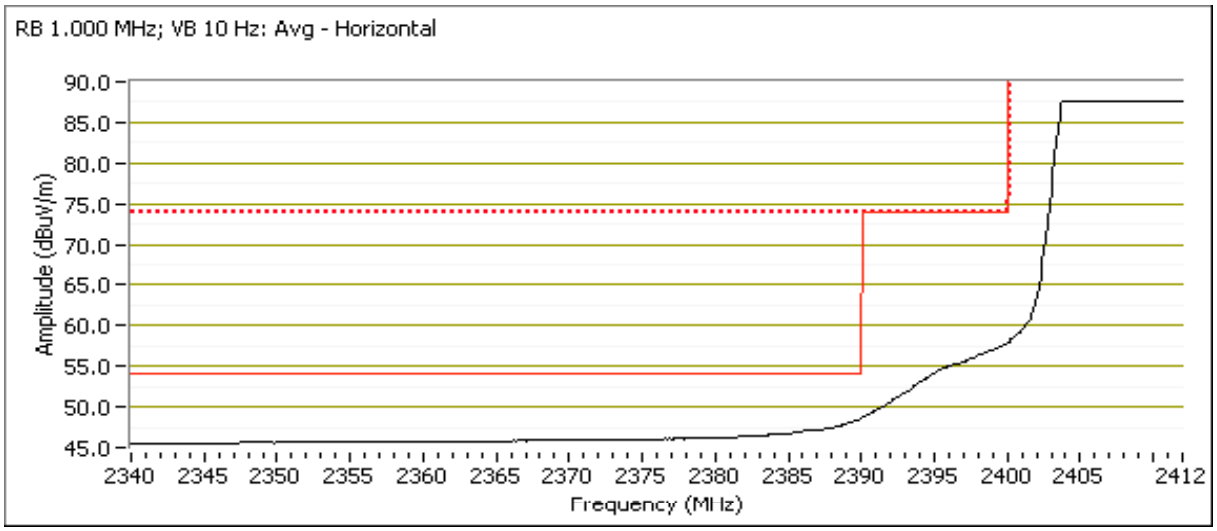
Fundamental Signal Field Strength: Peak value measured in 100kHz

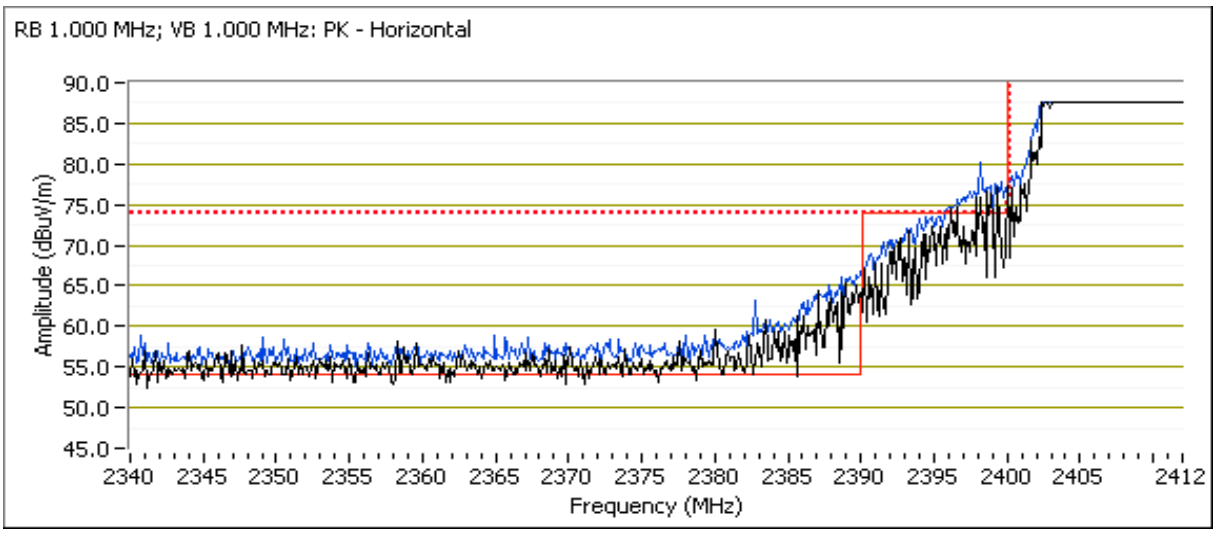
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2405.210	96.0	V	-	-	AVG	303	1.0	RB 1.000 MHz; VB: 10 Hz
2405.130	103.7	V	-	-	PK	303	1.0	RB 1.000 MHz; VB: 1.000 MHz
2415.950	95.5	V	-	-	PK	303	1.0	RB 100 kHz; VB: 100 kHz
2405.130	99.0	H	-	-	AVG	50	1.0	RB 1.000 MHz; VB: 10 Hz
2405.020	106.6	H	-	-	PK	50	1.0	RB 1.000 MHz; VB: 1.000 MHz
2417.200	99.1	H	-	-	PK	50	1.0	RB 100 kHz; VB: 100 kHz

Band Edge 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	
2389.870	47.5	V	54.0	-6.5	Avg	303	1.0	RB 1.000 MHz; VB: 10 Hz
2389.470	65.7	V	74.0	-8.3	PK	303	1.0	RB 1.000 MHz; VB: 1.000 MHz
2389.960	48.9	H	54.0	-5.1	Avg	50	1.0	RB 1.000 MHz; VB: 10 Hz
2389.290	68.0	H	74.0	-6.0	PK	50	1.0	RB 1.000 MHz; VB: 1.000 MHz

Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A





Run #1b: 2483.5 MHz Band Edge, 802.11g @ 2462 MHz

Power Setting: 18.5 Average power: 14.1 dBm (for reference purposes)

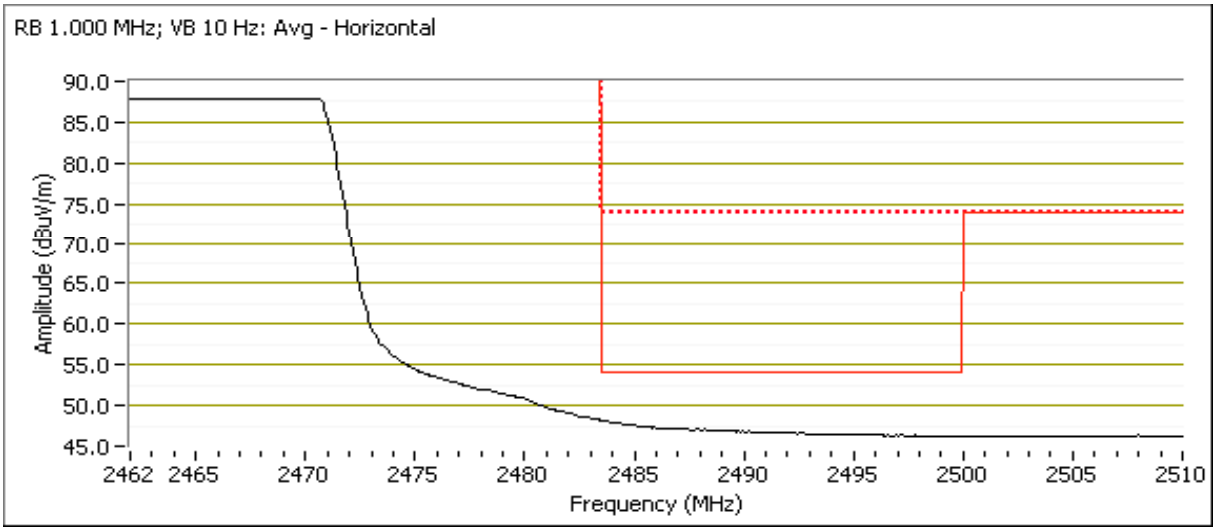
Fundamental Signal Field Strength: Peak value measured in 100kHz

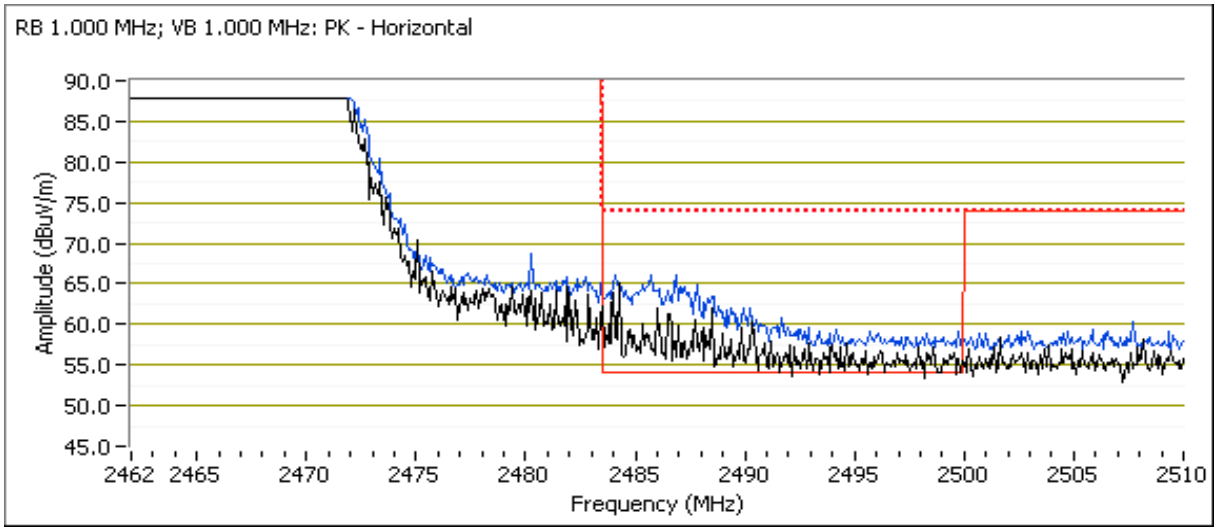
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2465.100	94.7	V	-	-	AVG	302	1.7	RB 1.000 MHz; VB: 10 Hz
2457.900	102.7	V	-	-	PK	302	1.7	RB 1.000 MHz; VB: 1.000 MHz
2463.770	93.3	V	-	-	PK	302	1.7	RB 100 kHz; VB: 100 kHz
2458.070	97.9	H	-	-	AVG	57	1.0	RB 1.000 MHz; VB: 10 Hz
2458.730	105.6	H	-	-	PK	57	1.0	RB 1.000 MHz; VB: 1.000 MHz
2459.600	97.4	H	-	-	PK	57	1.0	RB 100 kHz; VB: 100 kHz

Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Band Edge 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	
2483.500	47.1	V	54.0	-6.9	Avg	302	1.7	RB 1.000 MHz; VB: 10 Hz
2483.820	63.4	V	74.0	-10.6	PK	302	1.7	RB 1.000 MHz; VB: 1.000 MHz
2483.500	48.1	H	54.0	-5.9	Avg	57	1.0	RB 1.000 MHz; VB: 10 Hz
2485.210	65.1	H	74.0	-8.9	PK	57	1.0	RB 1.000 MHz; VB: 1.000 MHz





Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Run #2: Radiated Spurious Emissions, 2.4GHz Band Edges. Operating Mode: 802.11n 40MHz

Date of Test: 8/8/2008 Config. Used: #1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #3 Host Unit Voltage 120V/60Hz

Run #2a: 2390 MHz Band Edge, 802.11n 40MHz @ 2422 MHz

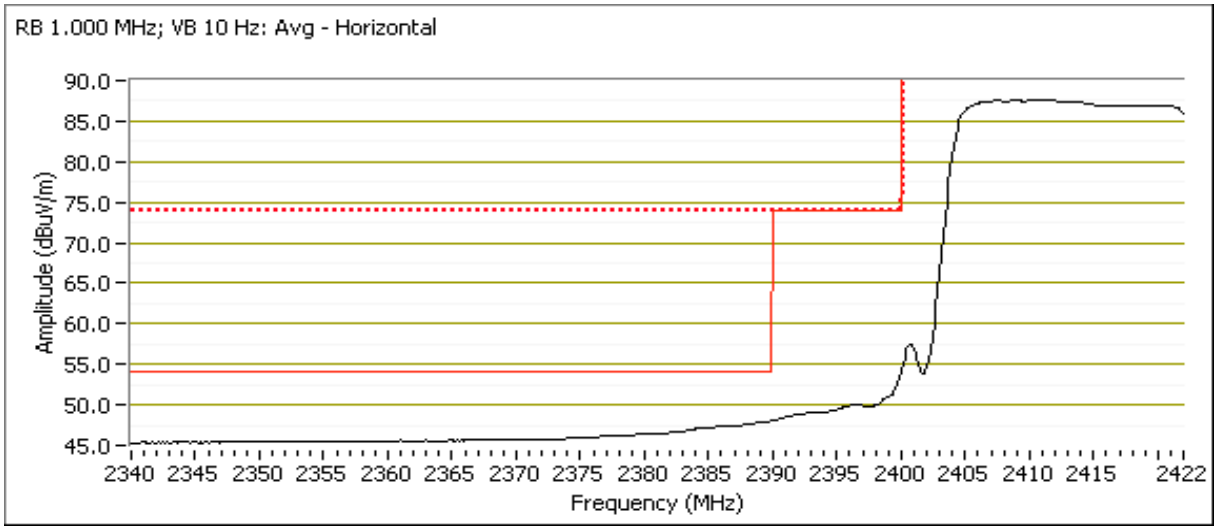
Power Setting: 13.5 Average power: 10.3 dBm (for reference purposes)

Fundamental Signal Field Strength: Peak value measured in 100kHz

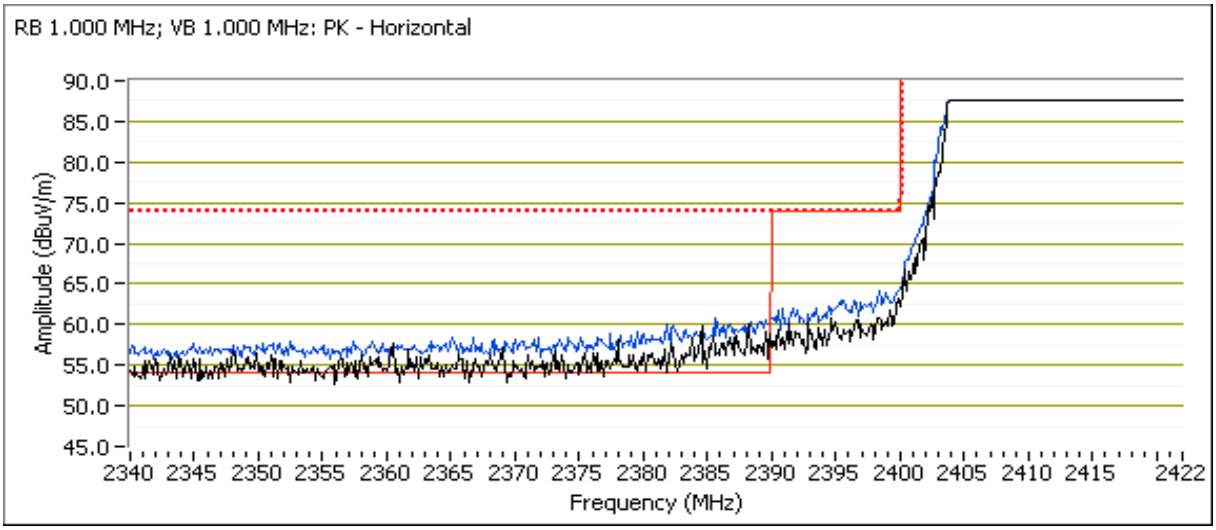
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2406.630	88.3	V	-	-	AVG	260	1.0	RB 1.000 MHz; VB: 10 Hz
2406.110	97.1	V	-	-	PK	260	1.0	RB 1.000 MHz; VB: 1.000 MHz
2410.830	89.5	V	-	-	PK	260	1.0	RB 100 kHz; VB: 100 kHz
2410.890	92.0	H	-	-	AVG	53	1.0	RB 1.000 MHz; VB: 10 Hz
2406.340	100.3	H	-	-	PK	53	1.0	RB 1.000 MHz; VB: 1.000 MHz
2436.150	92.1	H	-	-	PK	53	1.0	RB 100 kHz; VB: 100 kHz

Band Edge 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	
2389.980	46.8	V	54.0	-7.2	Avg	260	1.0	RB 1.000 MHz; VB: 10 Hz
2388.120	59.5	V	74.0	-14.5	PK	260	1.0	RB 1.000 MHz; VB: 1.000 MHz
2389.730	48.3	H	54.0	-5.7	Avg	53	1.0	RB 1.000 MHz; VB: 10 Hz
2388.120	61.2	H	74.0	-12.8	PK	53	1.0	RB 1.000 MHz; VB: 1.000 MHz



Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A



Run #2b: 2483.5 MHz Band Edge, 802.11n 40MHz @ 2452 MHz

Power Setting: 18.5 Average power: 14.4 dBm (for reference purposes)

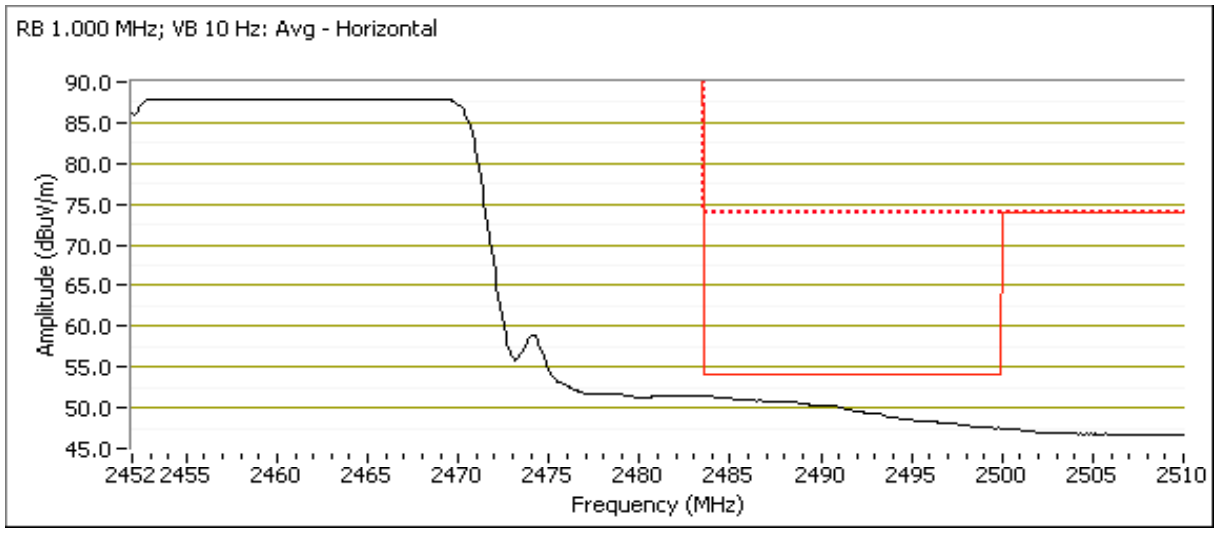
Fundamental Signal Field Strength: Peak value measured in 100kHz

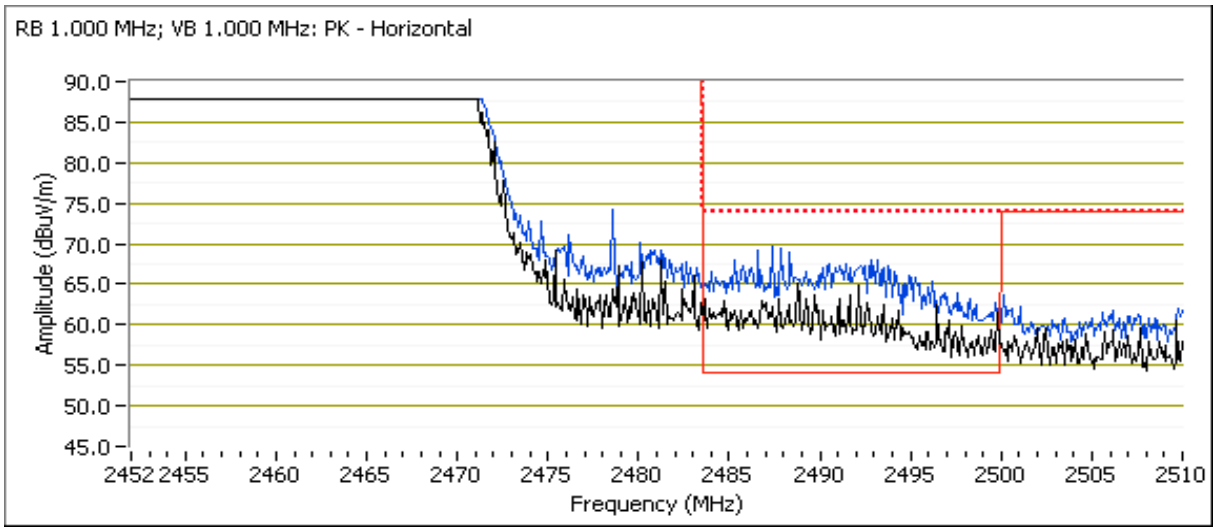
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2436.970	93.9	V	-	-	AVG	304	1.0	RB 1.000 MHz; VB: 10 Hz
2437.650	102.5	V	-	-	PK	304	1.0	RB 1.000 MHz; VB: 1.000 MHz
2444.620	93.9	V	-	-	PK	304	1.0	RB 100 kHz; VB: 100 kHz
2440.730	96.0	H	-	-	AVG	56	1.0	RB 1.000 MHz; VB: 10 Hz
2436.480	104.4	H	-	-	PK	56	1.0	RB 1.000 MHz; VB: 1.000 MHz
2437.030	97.1	H	-	-	PK	56	1.0	RB 100 kHz; VB: 100 kHz

Band Edge 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	
2483.500	49.5	V	54.0	-4.5	Avg	304	1.0	RB 1.000 MHz; VB: 10 Hz
2483.980	65.1	V	74.0	-8.9	PK	304	1.0	RB 1.000 MHz; VB: 1.000 MHz
2483.500	51.4	H	54.0	-2.6	Avg	56	1.0	RB 1.000 MHz; VB: 10 Hz
2486.070	66.7	H	74.0	-7.3	PK	56	1.0	RB 1.000 MHz; VB: 1.000 MHz

Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A





Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Run #3: Radiated Spurious Emissions, Band Edges. Operating Mode: 802.11b - Chain A

Date of Test: 8/8/2008
Test Engineer: Rafael Varelas
Test Location: FT Chamber #3

Run #3a: Low Channel, 802.11b @ 2412 MHz

Power Setting: 18.5 Average power: 19.0 dBm (for reference purposes)

Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2409.390	104.0	V	-	-	AVG	306	1.0	RB 1.000 MHz; VB: 10 Hz
2409.720	106.6	V	-	-	PK	306	1.0	RB 1.000 MHz; VB: 1.000 MHz
2409.100	102.8	V	-	-	PK	306	1.0	RB 100 kHz; VB: 100 kHz
2409.320	106.8	H	-	-	AVG	52	1.0	RB 1.000 MHz; VB: 10 Hz
2413.270	109.5	H	-	-	PK	52	1.0	RB 1.000 MHz; VB: 1.000 MHz
2409.100	105.7	H	-	-	PK	52	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	105.7	dBµV/m	
Limit for emissions outside of restricted bands:	75.7	dBµV/m	Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.000	46.7	V	54.0	-7.3	AVG	188	1.1	RB 1.000 MHz; VB: 10 Hz
4823.930	50.3	V	74.0	-23.7	PK	188	1.1	RB 1.000 MHz; VB: 1.000 MHz
2998.330	49.6	V	74.0	-24.4	Peak	266	1.0	
6426.670	48.8	V	74.0	-25.2	Peak	155	1.0	
7235.000	52.2	V	74.0	-21.8	Peak	251	1.9	
9650.000	57.0	V	74.0	-17.0	Peak	245	1.6	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band, measurement bandwidth is 100kHz.

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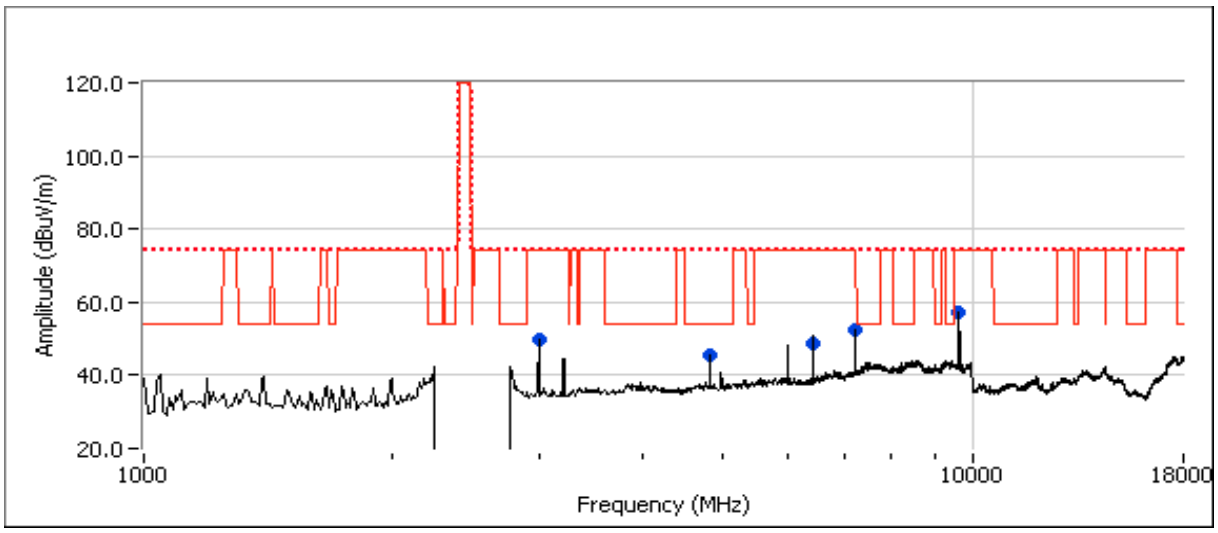
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A



Run #3b: Center Channel, 802.11b @ 2437 MHz

Date of Test: 8/11/2008

Test Engineer: Rafael Varelas

Test Location: FT Chamber #4

Power Setting: 17.0 Average power: 16.8 dBm (for reference purposes)

Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2434.470	102.0	V	120.0	-18.0	AVG	197	1.0	RB 1.000 MHz; VB: 10 Hz
2434.700	104.9	V	120.0	-15.1	PK	197	1.0	RB 1.000 MHz; VB: 1.000 MHz
2434.600	100.2	V	120.0	-19.8	PK	195	1.0	RB 100 kHz; VB: 100 kHz
2434.320	102.7	H	120.0	-17.3	AVG	53	1.0	RB 1.000 MHz; VB: 10 Hz
2434.670	105.1	H	120.0	-14.9	PK	53	1.0	RB 1.000 MHz; VB: 1.000 MHz
2438.670	100.9	H	120.0	-19.1	PK	56	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	100.9	dBµV/m
Limit for emissions outside of restricted bands:	70.9	dBµV/m

Limit is -30dBc (UNII power measurement)

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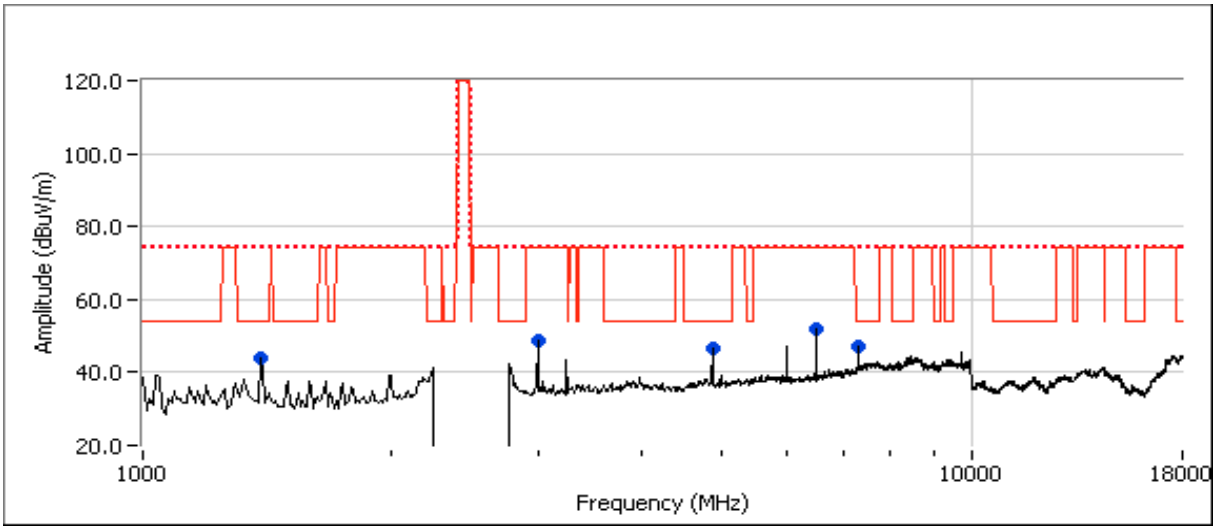
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7311.770	47.1	V	54.0	-6.9	AVG	214	1.6	RB 1.000 MHz; VB: 10 Hz
7312.020	53.3	V	74.0	-20.7	PK	214	1.6	RB 1.000 MHz; VB: 1.000 MHz
1394.750	36.7	V	54.0	-17.3	AVG	127	1.0	RB 1.000 MHz; VB: 10 Hz
1395.670	49.5	V	74.0	-24.5	PK	127	1.0	RB 1.000 MHz; VB: 1.000 MHz
4874.020	45.2	V	54.0	-8.8	AVG	179	1.0	RB 1.000 MHz; VB: 10 Hz
4874.190	49.7	V	74.0	-24.3	PK	179	1.0	RB 1.000 MHz; VB: 1.000 MHz
3000.160	48.6	V	74.0	-25.4	Peak	249	1.3	
6498.720	51.3	V	74.0	-22.7	Peak	165	1.3	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band, measurement bandwidth is 100kHz.



Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Run #3c: High Channel, 802.11b @ 2462 MHz

Power Setting: 20.5 Average power: 19.3 dBm (for reference purposes)

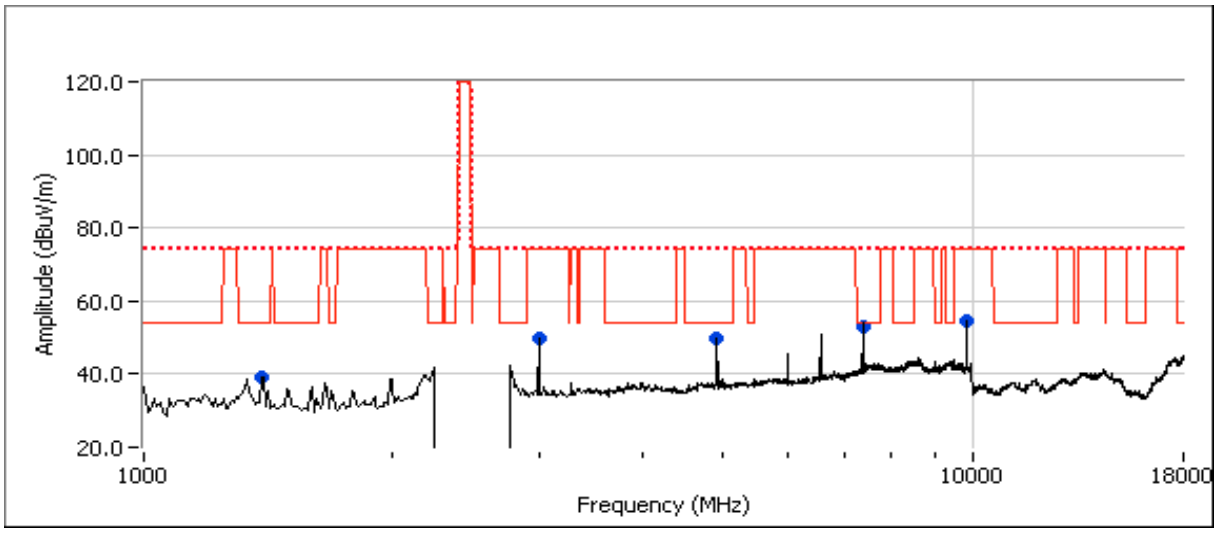
Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2464.800	104.3	V	120.0	-15.7	AVG	239	1.0	RB 1.000 MHz; VB: 10 Hz
2463.120	106.9	V	120.0	-13.1	PK	239	1.0	RB 1.000 MHz; VB: 1.000 MHz
2459.080	103.0	V	120.0	-17.0	PK	240	1.1	RB 100 kHz; VB: 100 kHz
2464.870	105.7	H	120.0	-14.3	AVG	55	1.0	RB 1.000 MHz; VB: 10 Hz
2463.220	108.2	H	120.0	-11.8	PK	55	1.0	RB 1.000 MHz; VB: 1.000 MHz
2459.650	104.4	H	120.0	-15.6	PK	55	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	104.4	dBµV/m	
Limit for emissions outside of restricted bands:	74.4	dBµV/m	Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7388.770	52.8	V	54.0	-1.2	AVG	243	1.1	RB 1.000 MHz; VB: 10 Hz
7382.320	58.8	V	74.0	-15.2	PK	243	1.1	RB 1.000 MHz; VB: 1.000 MHz
4923.990	50.1	V	54.0	-3.9	AVG	174	1.2	RB 1.000 MHz; VB: 10 Hz
4924.040	52.7	V	74.0	-21.3	PK	174	1.2	RB 1.000 MHz; VB: 1.000 MHz
1385.000	39.0	V	54.0	-15.0	Peak	148	1.0	
2998.330	49.6	V	74.0	-24.4	Peak	252	1.0	
9848.330	54.7	V	74.0	-19.3	Peak	147	1.6	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band, measurement bandwidth is 100kHz.



Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Run #4: Radiated Spurious Emissions, Band Edges. Operating Mode: 802.11n (20 MHz) - Chain A

Date of Test: 8/11/2008
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Run #4a: Low Channel, 802.11n (20MHz) @ 2412 MHz
Power Setting: 17.0 Average power: 13.3 dBm (for reference purposes)
Fundamental Signal Field Strength: Peak value measured in 100kHz

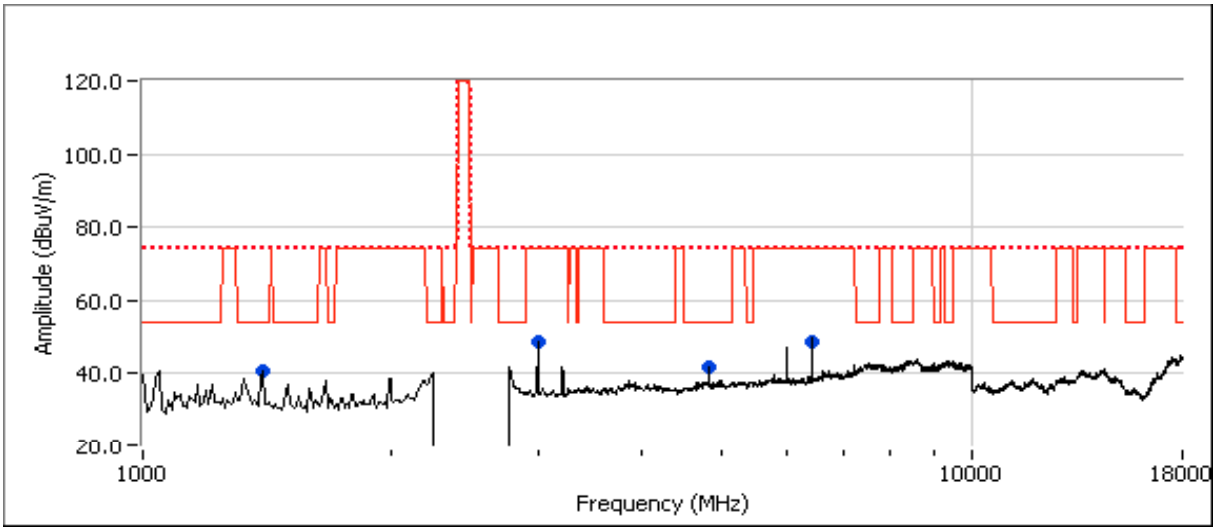
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2405.230	96.5	V	120.0	-23.5	AVG	245	1.0	RB 1.000 MHz; VB: 10 Hz
2406.200	105.0	V	120.0	-15.0	PK	245	1.0	RB 1.000 MHz; VB: 1.000 MHz
2415.950	94.2	V	120.0	-25.8	PK	241	1.0	RB 100 kHz; VB: 100 kHz
2405.100	98.0	H	120.0	-22.0	AVG	32	1.0	RB 1.000 MHz; VB: 10 Hz
2409.170	106.7	H	120.0	-13.3	PK	32	1.0	RB 1.000 MHz; VB: 1.000 MHz
2408.370	97.0	H	120.0	-23.0	PK	32	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	97	dBµV/m	
Limit for emissions outside of restricted bands:	67	dBµV/m	Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.980	39.7	V	54.0	-14.3	AVG	236	1.0	00 MHz; VB: 10 Hz
4823.970	46.3	V	74.0	-27.7	PK	236	1.0	MHz; VB: 1.000 MHz
1398.390	34.6	V	54.0	-19.4	AVG	130	1.0	00 MHz; VB: 10 Hz
1397.420	47.1	V	74.0	-26.9	PK	130	1.0	MHz; VB: 1.000 MHz
2998.330	48.6	V	74.0	-25.4	Peak	185	1.3	
6426.670	48.7	V	74.0	-25.3	Peak	172	1.3	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band, measurement bandwidth is 100kHz.

Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A



Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Run #4b: Center Channel, 802.11n (20MHz) @ 2437 MHz

Power Setting: 21.5 Average power: 16.6 dBm (for reference purposes)

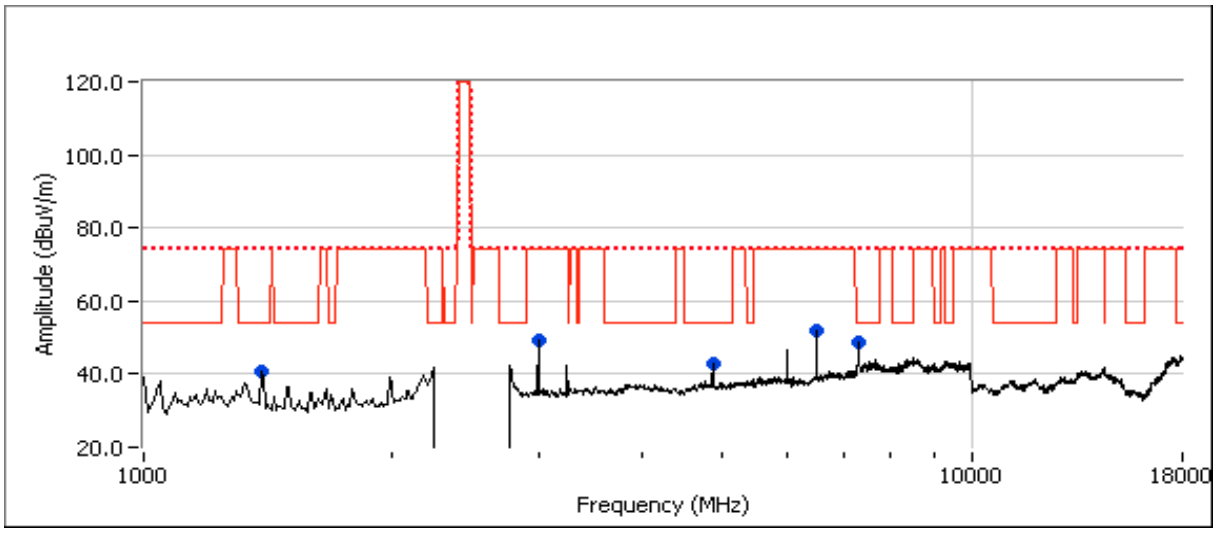
Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2430.000	99.4	V	120.0	-20.6	AVG	242	1.0	RB 1.000 MHz; VB: 10 Hz
2429.610	107.6	V	120.0	-12.4	PK	242	1.0	RB 1.000 MHz; VB: 1.000 MHz
2434.600	98.9	V	120.0	-21.1	PK	242	1.0	RB 100 kHz; VB: 100 kHz
2431.730	100.3	H	120.0	-19.7	AVG	69	1.0	RB 1.000 MHz; VB: 10 Hz
2436.370	108.3	H	120.0	-11.7	PK	69	1.0	RB 1.000 MHz; VB: 1.000 MHz
2429.630	101.3	H	120.0	-18.7	PK	69	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	101.3	dBµV/m	
Limit for emissions outside of restricted bands:	71.3	dBµV/m	Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7309.950	45.0	V	54.0	-9.0	AVG	245	1.6	RB 1.000 MHz; VB: 10 Hz
7312.870	61.4	V	74.0	-12.6	PK	245	1.6	RB 1.000 MHz; VB: 1.000 MHz
4873.980	40.7	V	54.0	-13.3	AVG	235	1.0	RB 1.000 MHz; VB: 10 Hz
4873.920	47.0	V	74.0	-27.0	PK	235	1.0	RB 1.000 MHz; VB: 1.000 MHz
1385.000	40.7	V	54.0	-13.3	Peak	132	1.0	
2998.330	49.4	V	74.0	-24.6	Peak	242	1.3	
6500.000	51.0	V	74.0	-23.0	Peak	163	1.3	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band, measurement bandwidth is 100kHz.



Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Run #4c: High Channel, 802.11n (20MHz) @ 2462 MHz

Power Setting: 19.0 Average power: 14.2 dBm (for reference purposes)

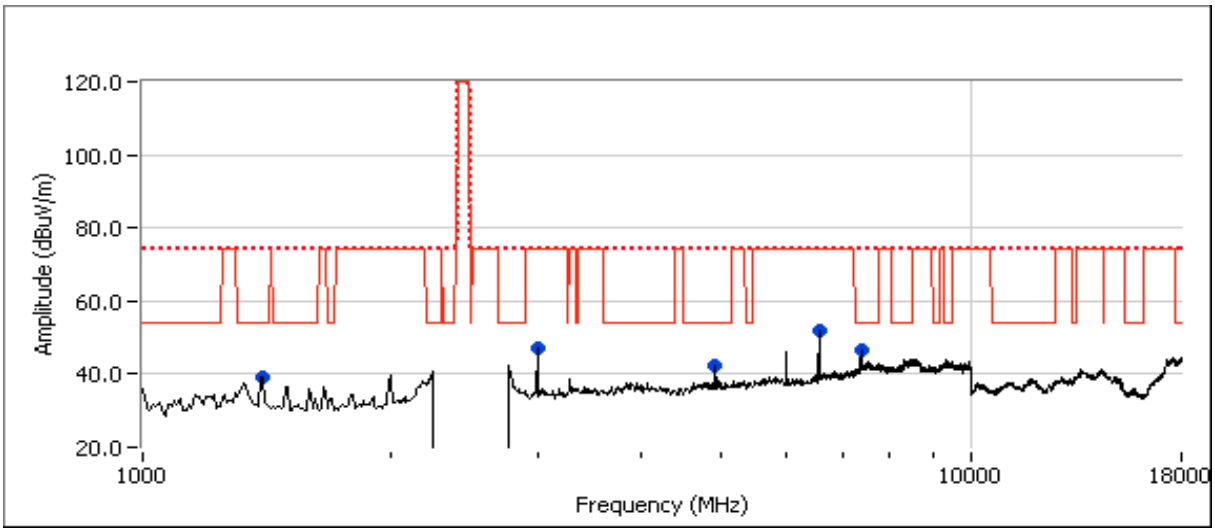
Fundamental Signal Field Strength: Peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2467.430	96.3	V	120.0	-23.7	AVG	209	1.0	RB 1.000 MHz; VB: 10 Hz
2467.170	105.1	V	120.0	-14.9	PK	209	1.0	RB 1.000 MHz; VB: 1.000 MHz
2455.830	97.8	V	120.0	-22.2	PK	206	1.0	RB 100 kHz; VB: 100 kHz
2465.200	97.7	H	120.0	-22.3	AVG	56	1.0	RB 1.000 MHz; VB: 10 Hz
2467.600	106.7	H	120.0	-13.3	PK	56	1.0	RB 1.000 MHz; VB: 1.000 MHz
2455.830	98.7	H	120.0	-21.3	PK	56	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	98.7	dBµV/m	
Limit for emissions outside of restricted bands:	68.7	dBµV/m	Limit is -30dBc (UNII power measurement)

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7385.170	41.7	V	54.0	-12.3	AVG	191	1.3	RB 1.000 MHz; VB: 10 Hz
7388.020	56.5	V	74.0	-17.5	PK	191	1.3	RB 1.000 MHz; VB: 1.000 MHz
4924.010	41.7	V	54.0	-12.3	AVG	231	1.0	RB 1.000 MHz; VB: 10 Hz
4924.040	47.4	V	74.0	-26.6	PK	231	1.0	RB 1.000 MHz; VB: 1.000 MHz
1394.170	38.9	V	54.0	-15.1	Peak	149	1.0	
2998.330	47.2	V	74.0	-26.8	Peak	253	1.3	
6564.170	51.9	V	74.0	-22.1	Peak	157	1.3	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band, measurement bandwidth is 100kHz.



Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

RSS 210 and FCC 15.247 (DTS, 5725 - 5850 MHz)

Radiated Spurious Emissions, 1 - 40GHz 802.11a Mode

Test Specific Details

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

Date of Test: 8/12/2008
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Config. Used: 1
Config Change: None
Host Unit Voltage 3.3 VDC

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT for measurements below 18GHz, 1m for scans and 3m for measurements above 18GHz.

Ambient Conditions:

Temperature: 19.7 °C
Rel. Humidity: 42 %

Summary of Results

Measurements with the universe PIFA antenna indicated that the spurious emissions were higher when the device was operating in 802.11a mode than in either 802.11n modes (20MHz or 40MHz). Spurious emissions were therefore only measured in 802.11a mode.

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	802.11a Chain A	5745 MHz	28.5	16. 6	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	45.8dBµV/m @ 7659.9MHz (-8.2dB)
1b	802.11a Chain A	5785 MHz	28.0	16. 7	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	41.9dBµV/m @ 11570.1MHz (-12.1dB)
1c	802.11a Chain A	5825 MHz	29.0	16.8	Radiated Emissions, 1 - 26 GHz	FCC Part 15.209 / 15.247(c)	47.3dBµV/m @ 11650.0MHz (-6.7dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Run #1: Radiated Spurious Emissions, 1000 - 18000 MHz.. Operating Mode: 802.11a Chain A

Run #1a: Low Channel @ 5745 MHz

Power Setting: 28.5 Average power: AP = 16.6 (for reference purposes)

Fundamental Signal Field Strength: Peak value measured in 100kHz

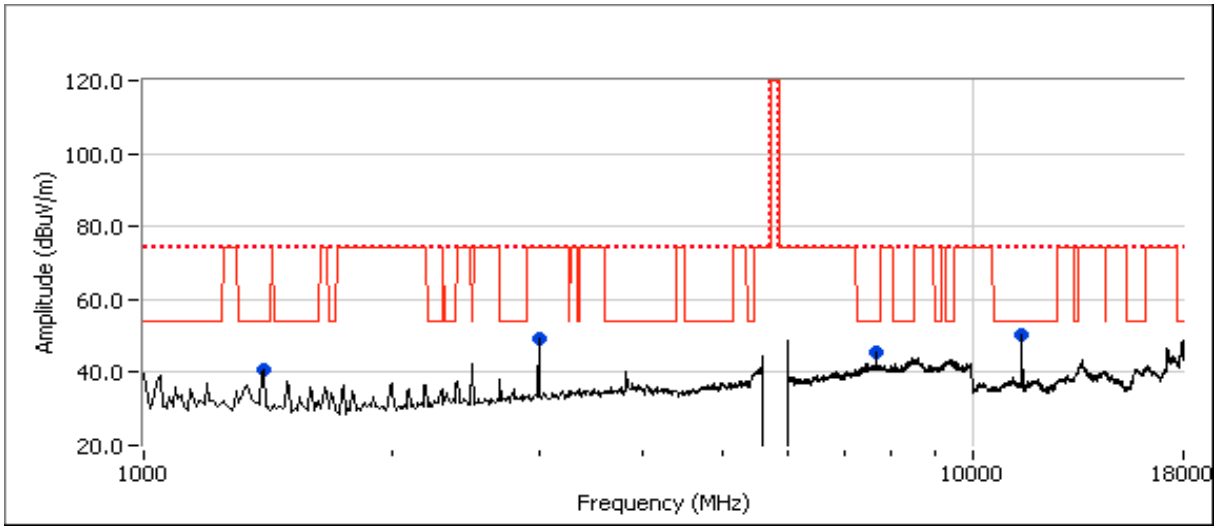
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5752.030	97.9	V	-	-	AVG	215	1.0	RB 1.000 MHz; VB: 10 Hz
5751.270	105.5	V	-	-	PK	215	1.0	RB 1.000 MHz; VB: 1.000 MHz
5743.770	97.6	V	-	-	PK	213	1.0	RB 100 kHz; VB: 100 kHz
5752.030	91.3	H	-	-	AVG	110	1.0	RB 1.000 MHz; VB: 10 Hz
5743.480	99.1	H	-	-	PK	110	1.0	RB 1.000 MHz; VB: 1.000 MHz
5750.200	91.7	H	-	-	PK	106	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	97.6	dBµV/m	
Limit for emissions outside of restricted bands:	67.6	dBµV/m	Limit is -30dBc (UNII power measurement)

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7659.940	45.8	V	54.0	-8.2	AVG	199	1.3	RB 1.000 MHz; VB: 10 Hz
7659.890	51.5	V	74.0	-22.5	PK	199	1.3	RB 1.000 MHz; VB: 1.000 MHz
11480.960	43.7	V	54.0	-10.3	AVG	217	1.2	RB 1.000 MHz; VB: 10 Hz
11479.500	56.0	V	74.0	-18.0	PK	217	1.2	RB 1.000 MHz; VB: 1.000 MHz
1394.170	40.9	V	54.0	-13.1	Peak	133	1.0	
2998.330	49.1	V	74.0	-24.9	Peak	252	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band.



Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Run #1b: Center Channel @ 5785 MHz

Power Setting: 28.0 Average power: AP = 16.7 (for reference purposes)

Fundamental Signal Field Strength: Peak value measured in 100kHz

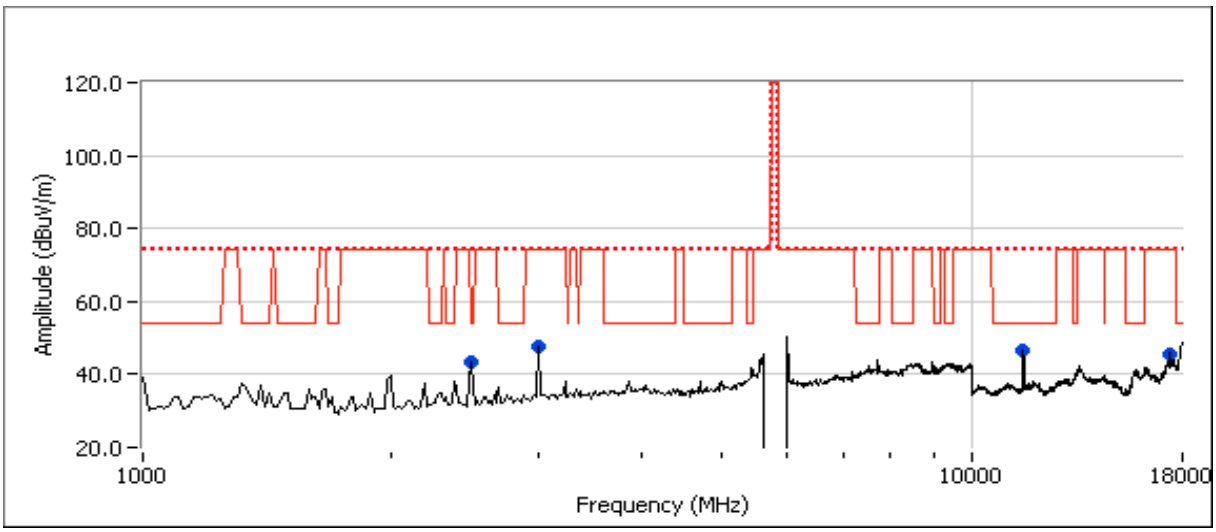
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5791.710	100.8	V	-	-	AVG	255	1.0	RB 1.000 MHz; VB: 10 Hz
5791.010	108.2	V	-	-	PK	255	1.0	RB 1.000 MHz; VB: 1.000 MHz
5788.900	98.7	V	-	-	PK	256	1.0	RB 100 kHz; VB: 100 kHz
5791.670	94.0	H	-	-	AVG	111	1.0	RB 1.000 MHz; VB: 10 Hz
5788.000	101.7	H	-	-	PK	111	1.0	RB 1.000 MHz; VB: 1.000 MHz
5780.000	94.1	H	-	-	PK	111	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	98.7	dBµV/m	
Limit for emissions outside of restricted bands:	68.7	dBµV/m	Limit is -30dBc (UNII power measurement)

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11570.070	41.9	V	54.0	-12.1	AVG	202	1.3	RB 1.000 MHz; VB: 10 Hz
11570.800	52.4	V	74.0	-21.6	PK	202	1.3	RB 1.000 MHz; VB: 1.000 MHz
2490.180	34.1	V	54.0	-19.9	AVG	151	1.3	RB 1.000 MHz; VB: 10 Hz
2487.800	49.1	V	74.0	-24.9	PK	151	1.3	RB 1.000 MHz; VB: 1.000 MHz
17346.670	45.7	V	74.0	-28.3	Peak	180	1.0	
3010.000	47.9	V	74.0	-26.1	Peak	251	1.3	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band.



Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	N/A

Run #1c: High Channel @ 5825 MHz

Power Setting: 29.0 Average power: AP = 16.8 (for reference purposes)

Fundamental Signal Field Strength: Peak value measured in 100kHz

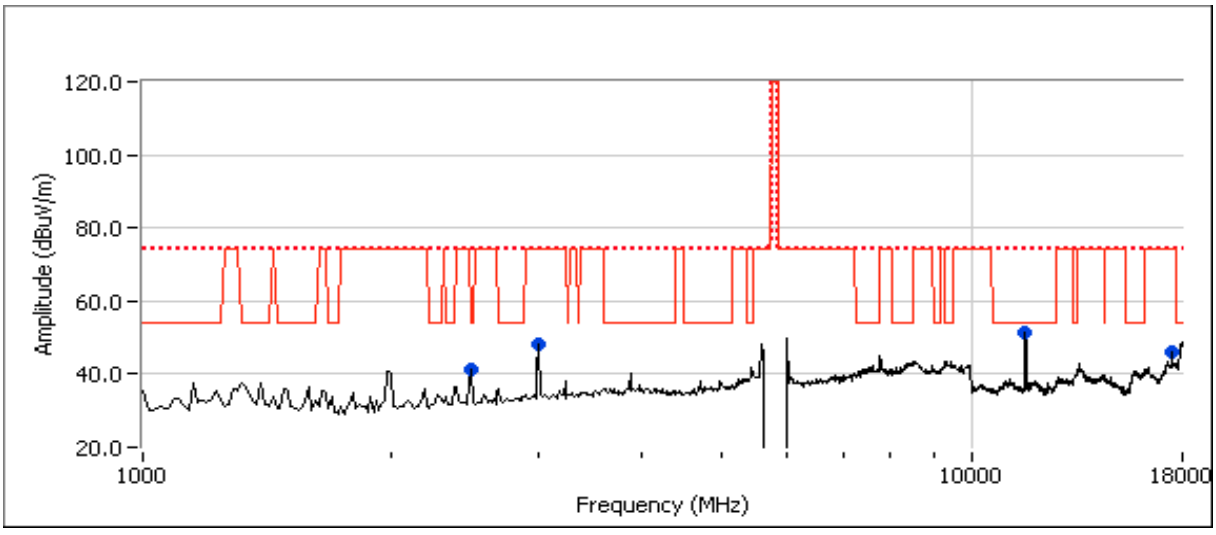
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5817.930	100.2	V	-	-	AVG	159	1.0	RB 1.000 MHz; VB: 10 Hz
5820.000	108.9	V	-	-	PK	159	1.0	RB 1.000 MHz; VB: 1.000 MHz
5822.500	99.5	V	-	-	PK	159	1.0	RB 100 kHz; VB: 100 kHz
5817.970	93.1	H	-	-	AVG	110	1.4	RB 1.000 MHz; VB: 10 Hz
5819.030	100.8	H	-	-	PK	110	1.4	RB 1.000 MHz; VB: 1.000 MHz
5822.530	92.3	H	-	-	PK	110	1.4	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	99.5	dBµV/m	
Limit for emissions outside of restricted bands:	69.5	dBµV/m	Limit is -30dBc (UNII power measurement)

Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
11649.970	47.3	V	54.0	-6.7	AVG	135	1.3	00 MHz; VB: 10 Hz
11648.960	58.6	V	74.0	-15.4	PK	135	1.3	MHz; VB: 1.000 MHz
17466.670	45.9	V	74.0	-28.1	Peak	181	1.0	
2490.140	35.0	V	54.0	-19.0	AVG	206	1.0	RB 1.000 MHz; VB: 10 Hz
2489.130	50.5	V	74.0	-23.5	PK	206	1.0	RB 1.000 MHz; VB: 1.000 MHz
3010.000	48.4	V	74.0	-25.6	Peak	271	1.0	

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band.



Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	DTS

Receiver Spurious Emissions, 1 - 18 GHz

Test Specific Details

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

General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

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

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

Ambient Conditions:

Temperature: 20.3 °C

Rel. Humidity: 39 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1a - RX chain A @ 2437 MHz	RE, 1000 - 18000 MHz, Maximized Emissions	RSS GEN	Pass	50.2dBµV/m @ 3000.4MHz (-3.8dB)
1b - RX chain A @ 5785 MHz	RE, 1000 - 18000 MHz, Maximized Emissions	RSS GEN	Pass	50.2dBµV/m @ 3000.4MHz (-3.8dB)
2a - RX chain B @ 2437 MHz	RE, 1000 - 18000 MHz, Maximized Emissions	RSS GEN	Pass	50.8dBµV/m @ 3000.4MHz (-3.2dB)
2b - RX chain B @ 5785 MHz	RE, 1000 - 18000 MHz, Maximized Emissions	RSS GEN	Pass	50.4dBµV/m @ 3000.4MHz (-3.6dB)
3a - RX chain A + B @ 2437 MHz	RE, 1000 - 18000 MHz, Maximized Emissions	RSS GEN	Pass	49.8dBµV/m @ 3000.4MHz (-4.2dB)
3b - RX chain A + B @ 5785 MHz	RE, 1000 - 18000 MHz, Maximized Emissions	RSS GEN	Pass	50.9dBµV/m @ 3000.4MHz (-3.1dB)

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	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	DTS

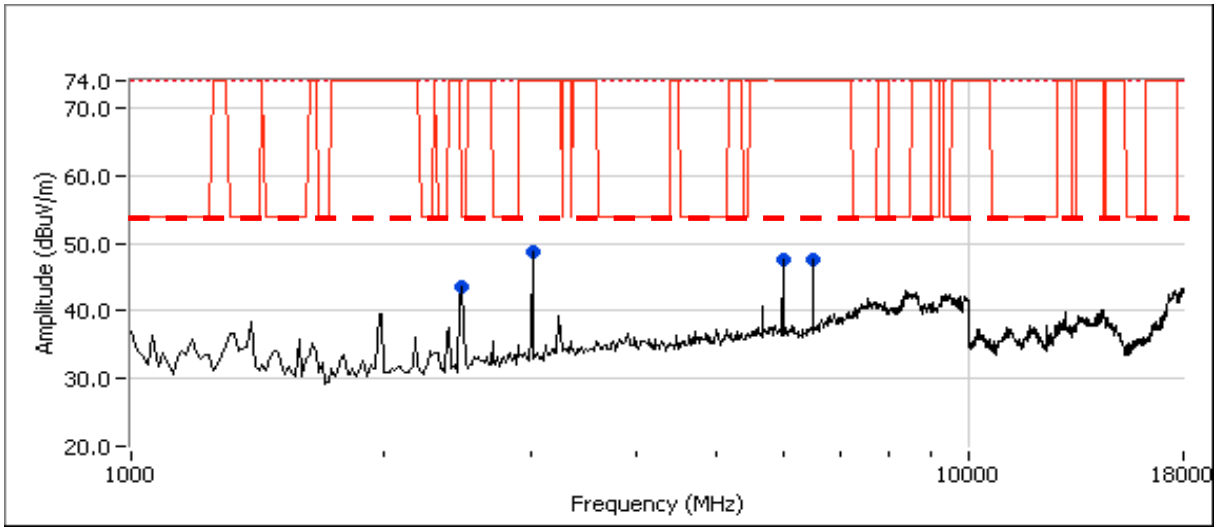
Note 1:	Above 1 GHz, the limit is for an average measurement. In addition, the peak value of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Run #1: Maximized readings, 1000 - 18000 MHz, Receiver single Chain A active

Date of Test: 8/12/2008
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Run # 1a : Receiver Tuned to 2437 MHz -- Chain A active

Frequency	Level	Pol	RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2496.800	35.5	V	54.0	-18.5	AVG	202	1.0	RB 1.0 MHz; VB: 10 Hz
3000.390	50.2	V	54.0	-3.8	AVG	246	1.3	RB 1.0 MHz; VB: 10 Hz
6000.770	47.7	V	54.0	-6.3	AVG	107	1.0	RB 1.0 MHz; VB: 10 Hz
6498.650	46.6	V	54.0	-7.4	AVG	176	1.3	RB 1.0 MHz; VB: 10 Hz
2498.210	51.6	V	74.0	-22.4	PK	202	1.0	RB 1.0 MHz; VB: 1.0 MHz
3000.290	53.9	V	74.0	-20.1	PK	246	1.3	RB 1.0 MHz; VB: 1.0 MHz
6000.560	51.0	V	74.0	-23.0	PK	107	1.0	RB 1.0 MHz; VB: 1.0 MHz
6498.740	50.4	V	74.0	-23.6	PK	176	1.3	RB 1.0 MHz; VB: 1.0 MHz

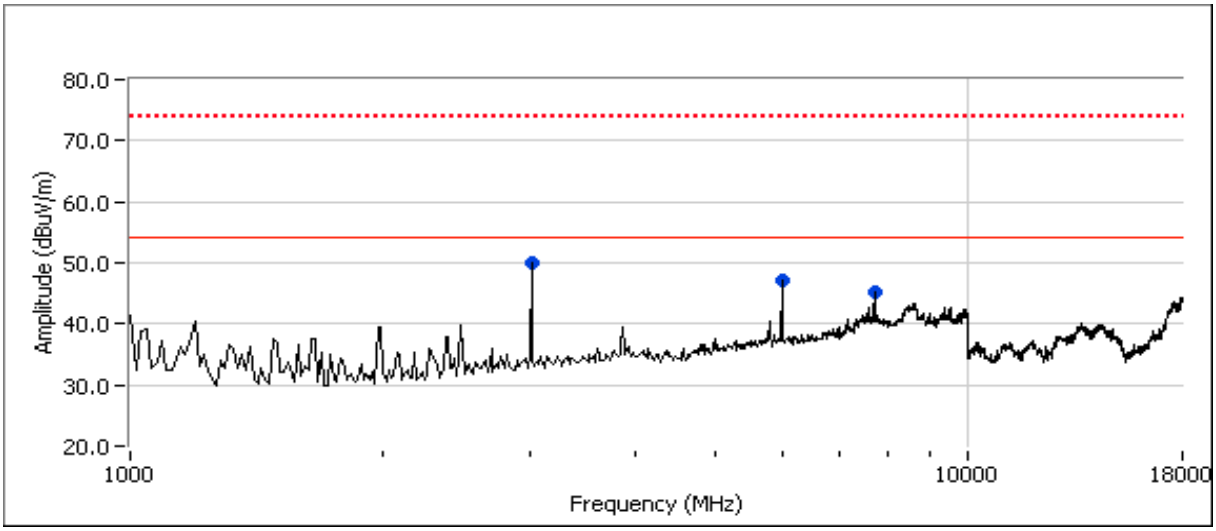


Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	DTS

Run # 1b : Receiver Tuned to 5785 MHz -- Chain A active

Date of Test: 8/13/2008
Test Engineer: Rafael Varelas
Test Location: FT Chamber #3

Frequency	Level	Pol	RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.370	50.2	V	54.0	-3.8	AVG	262	1.0	RB 1.000 MHz; VB: 10 Hz
3000.350	53.6	V	74.0	-20.4	PK	262	1.0	RB 1.000 MHz; VB: 1.000 MHz
6000.800	47.1	V	54.0	-6.9	AVG	271	1.9	RB 1.000 MHz; VB: 10 Hz
6000.960	51.7	V	74.0	-22.3	PK	271	1.9	RB 1.000 MHz; VB: 1.000 MHz
7720.000	45.2	V	54.0	-8.8	Peak	175	1.0	

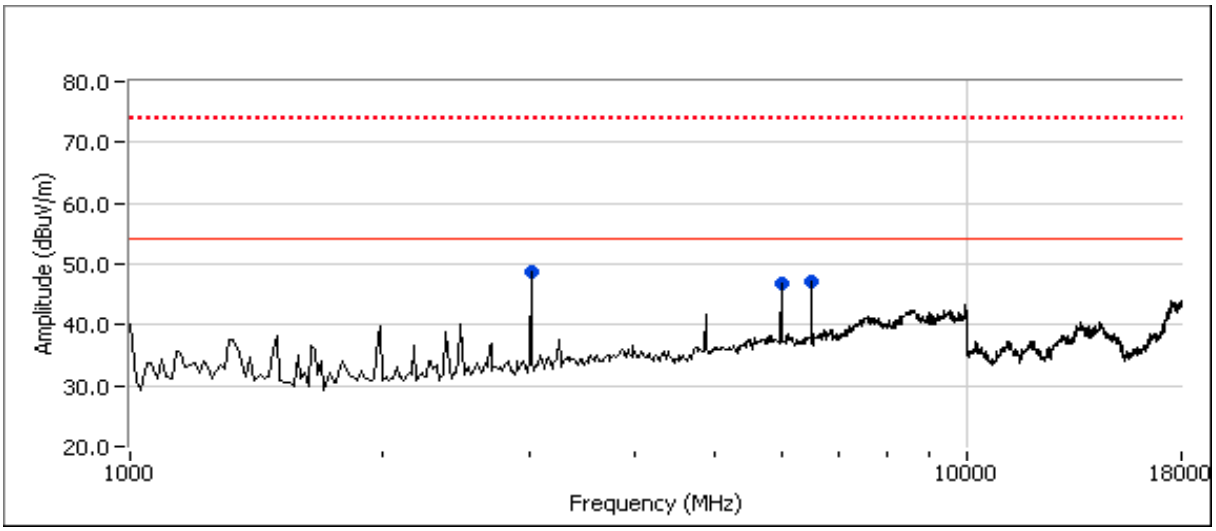


Run #2: Maximized readings, 1000 - 18000 MHz, Receiver single Chain B active

Run # 2a : Receiver Tuned to 2437 MHz -- Chain B active

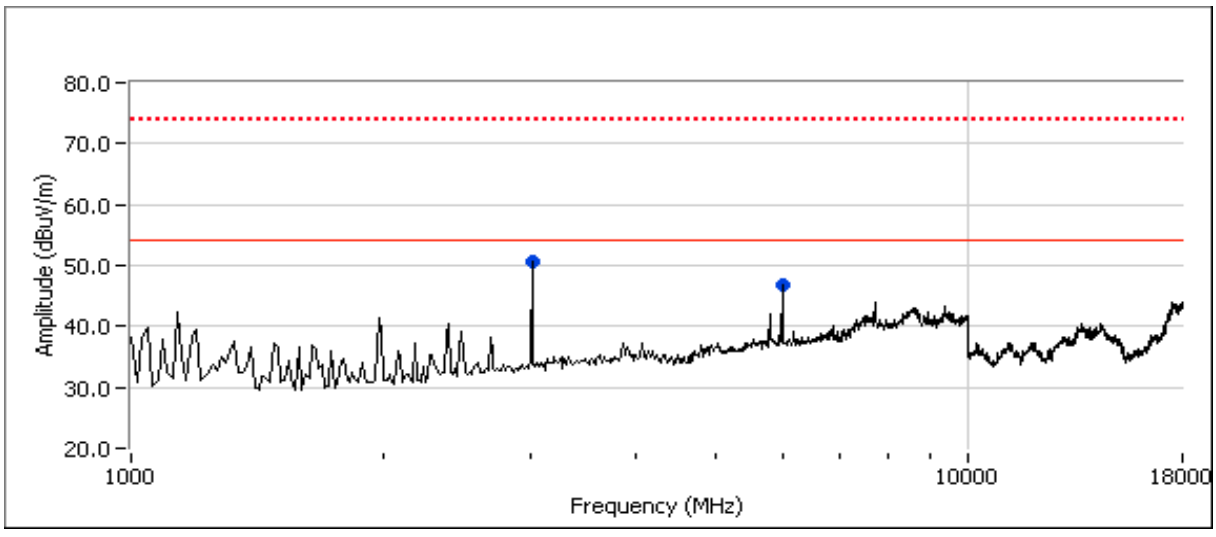
Frequency	Level	Pol	RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.380	50.8	V	54.0	-3.2	AVG	261	1.0	RB 1.000 MHz; VB: 10 Hz
3000.220	54.3	V	74.0	-19.7	PK	261	1.0	RB 1.000 MHz; VB: 1.000 MHz
6000.750	47.0	V	54.0	-7.0	AVG	92	1.0	RB 1.000 MHz; VB: 10 Hz
6000.650	51.2	V	74.0	-22.8	PK	92	1.0	RB 1.000 MHz; VB: 1.000 MHz
6498.660	47.2	V	54.0	-6.8	AVG	185	1.6	RB 1.000 MHz; VB: 10 Hz
6498.520	51.0	V	74.0	-23.0	PK	185	1.6	RB 1.000 MHz; VB: 1.000 MHz

Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	DTS



Run # 2b : Receiver Tuned to 5785 MHz -- Chain B active

Frequency	Level	Pol	RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.390	50.4	V	54.0	-3.6	AVG	259	1.0	RB 1.000 MHz; VB: 10 Hz
3000.220	54.1	V	74.0	-19.9	PK	259	1.0	RB 1.000 MHz; VB: 1.000 MHz
6000.770	47.3	V	54.0	-6.7	AVG	92	1.0	RB 1.000 MHz; VB: 10 Hz
6000.630	51.0	V	74.0	-23.0	PK	92	1.0	RB 1.000 MHz; VB: 1.000 MHz



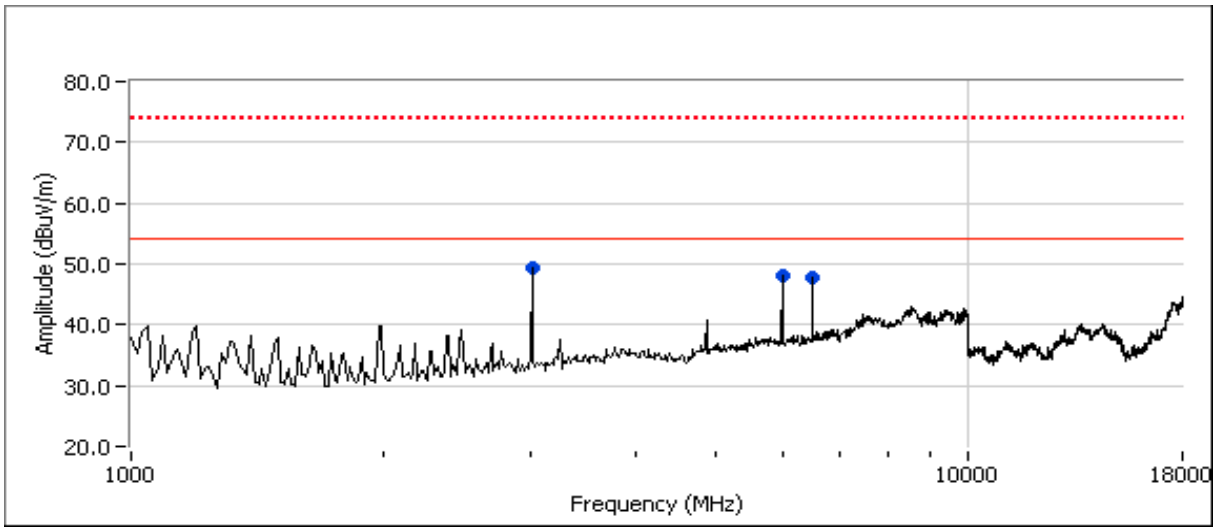
Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	DTS

Run #3: Maximized readings, 1000 - 18000 MHz, Receiver All Chain Active

Date of Test: 8/13/2008
Test Engineer: Rafael Varelas
Test Location: FT Chamber #3

Run # 3a : Receiver Tuned to 2437 MHz - Dual Chain A + B active

Frequency	Level	Pol	RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.370	49.8	V	54.0	-4.2	AVG	264	1.3	RB 1.000 MHz; VB: 10 Hz
3000.150	53.3	V	74.0	-20.7	PK	264	1.3	RB 1.000 MHz; VB: 1.000 MHz
6000.760	47.7	V	54.0	-6.3	AVG	93	1.0	RB 1.000 MHz; VB: 10 Hz
6000.590	51.3	V	74.0	-22.7	PK	93	1.0	RB 1.000 MHz; VB: 1.000 MHz
6498.640	48.5	V	54.0	-5.5	AVG	338	1.3	RB 1.000 MHz; VB: 10 Hz
6498.660	52.0	V	74.0	-22.0	PK	338	1.3	RB 1.000 MHz; VB: 1.000 MHz



Run # 3b : Receiver Tuned to 5785 MHz - Dual Chain A + B active

Frequency	Level	Pol	RSS GEN		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3000.360	50.9	V	54.0	-3.1	AVG	263	1.0	RB 1.000 MHz; VB: 10 Hz
3000.440	54.4	V	74.0	-19.6	PK	263	1.0	RB 1.000 MHz; VB: 1.000 MHz
6000.790	46.8	V	54.0	-7.2	AVG	138	1.0	RB 1.000 MHz; VB: 10 Hz
6000.840	52.0	V	74.0	-22.0	PK	138	1.0	RB 1.000 MHz; VB: 1.000 MHz
5785.000	43.0	V	54.0	-11.0	Peak	192	1.9	
1330.000	43.4	V	54.0	-10.6	Peak	76	1.0	

Client:	Intel	Job Number:	J72587
Model:	512AN_MW with Lenovo Boxter 13 SL300 Rocky30 Antenna	T-Log Number:	T72682
		Account Manager:	Briggs / Eriksen
Contact:	Robert Paxman		
Standard:	RSS 210 / FCC 15.247 DTS (Radiated)	Class:	DTS

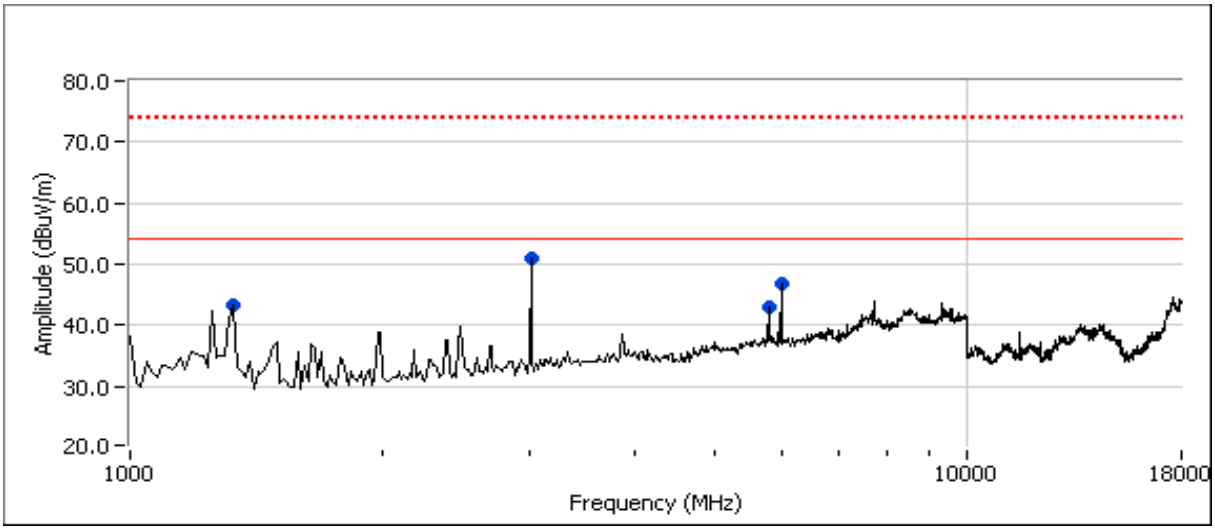


EXHIBIT 3: Photographs of Test Configurations