

EMC Test Report Application for Grant of Equipment Authorization Industry Canada RSS-Gen Issue 3 / RSS 210 Issue 8 FCC Part 15 Subpart C

Intel Centrino Wireless-N 135, models 135BNHMW and 135BNHU

| IC CERTIFICATION #: FCC ID: | 1000M-135BNH and 1000M-135BNHU PD9135BNH and PD9135BNHU |
|--------------------------------|--|
| APPLICANT: | Intel Corporation 100 Center Point Circle Suite 200 Columbia, SC 29210 |
| TEST SITE(S): | Elliott Laboratories 41039 Boyce Road. Fremont, CA. 94538-2435 |
| IC SITE REGISTRATION #: | 2845B-3; 2845B-4, 2845B-5, 2845B-7 |
| REPORT DATE: | October 13, 2011 |
| FINAL TEST DATES: | September 12, 20, 21, 22 and 23, 2011 |
| TOTAL NUMBER OF PAGES: | 80 |
| | |

PROGRAM MGR / TECHNICAL REVIEWER:

David W. Bare Chief Engineer

QUALITY ASSURANCE DELEGATE / EINAL REPORT PREPARER:

David Guidotti

Senior Technical Writer



Elliott Laboratories is accredited by the A2LA, certificate number 2016.01, to perform the test(s) listed in this report, except where noted otherwise. This report and the information contained herein represent the results of testing test articles identified and selected by the client performed to specifications and/or procedures selected by the client. National Technical Systems (NTS) makes no representations, expressed or implied, that such testing is adequate (or inadequate) to demonstrate efficiency, performance, reliability, or any other characteristic of the articles being tested, or similar products. This report should not be relied upon as an endorsement or certification by NTS of the equipment tested, nor does it represent any statement whatsoever as to its merchantability or fitness of the test article, or similar products, for a particular purpose. This report shall not be reproduced except in full.

REVISION HISTORY

| Rev# | Date | Comments | Modified By |
|------|------------|--|---------------|
| - | 10-7-2011 | First release | |
| 1 | 10-13-2011 | Revised to correct typos in the test results | Dave Guidotti |
| | | summary | |

TABLE OF CONTENTS

| REVISION HISTORY | 2 |
|--|-----------|
| TABLE OF CONTENTS | 3 |
| SCOPE | 4 |
| OBJECTIVE | 4 |
| STATEMENT OF COMPLIANCE | 5 |
| DEVIATIONS FROM THE STANDARDS | 5 |
| TEST RESULTS SUMMARY | 6 |
| FREQUENCY HOPPING SPREAD SPECTRUM (2400 – 2483.5 MHZ, LESS THAN 75 CHANNELS) | 6 |
| GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS | 6 |
| MEASUREMENT UNCERTAINTIES | 7 |
| EQUIPMENT UNDER TEST (EUT) DETAILS | 8 |
| GENERAL | 8 |
| ANTENNA SYSTEM | 8 |
| ENCLOSURE | 8 |
| MODIFICATIONS | 8 |
| SUPPORT EQUIPMENT | 9 |
| | 9 |
| | |
| TEST SITE | 10 |
| GENERAL INFORMATION | 10 |
| RADIATED EMISSIONS CONSIDERATIONS | 10 |
| | 11 |
| MEASUKEMENT INSTRUMENTATION | II |
| INSTRUMENT CONTROL COMPLITER | 11 |
| LINE IMPEDANCE STABILIZATION NETWORK (LISN) | 11 |
| FILTERS/ATTENUATORS | |
| ANTENNAS | 12 |
| ANTENNA MAST AND EQUIPMENT TURNTABLE | 12 |
| INSTRUMENT CALIBRATION | 12 |
| TEST PROCEDURES | 13 |
| EUT AND CABLE PLACEMENT | 13 |
| CONDUCTED EMISSIONS | 13 |
| RADIATED EMISSIONS | 13 |
| RADIATED EMISSIONS | 14 |
| CONDUCTED EMISSIONS FROM ANTENNA PORT | |
| BANDWIDTH MEASUKEMENTS | 16 |
| SPECIFICATION LIMITS AND SAMPLE CALCULATIONS | 17 |
| GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS | 17 |
| RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS | 18 |
| OUTPUT POWER LIMITS – FHSS SYSTEMS | |
| TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS AND DTS SYSTEMS | 19 |
| SAMPLE CALCULATIONS - CONDUCTED EMISSIONS | 19 |
| SAMPLE CALCULATIONS - RADIATED EMISSIONS | 20 |
| SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION | 21 |
| APPENDIX A TEST EQUIPMENT CALIBRATION DATA | 22 |
| APPENDIX B TEST DATA | 25 |
| END OF REPORT | 80 |
| | |

SCOPE

An electromagnetic emissions test has been performed on the Intel Corporation model Intel Centrino Wireless-N 135, models 135BNHMW and 135BNHU, pursuant to the following rules:

Industry Canada RSS-Gen Issue 3 RSS 210 Issue 8 "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 FHSS test procedure DA 00-0705A1, March 2000

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

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

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

OBJECTIVE

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

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

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

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

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

Testing was performed only on model Intel Centrino Wireless-N 135, models 135BNHMW and 135BNHU.

STATEMENT OF COMPLIANCE

The tested sample of Intel Corporation model Intel Centrino Wireless-N 135, models 135BNHMW and 135BNHU complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 3 RSS 210 Issue 8 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment" FCC Part 15 Subpart C

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

The test results recorded herein are based on a single type test of Intel Corporation model Intel Centrino Wireless-N 135, models 135BNHMW and 135BNHU and therefore apply only to the tested sample. The sample was selected and prepared by Steve Hackett of Intel Corporation.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS SUMMARY

| FCC Rule Part | RSS Rule Part | Description | Measured Value / Comments | Limit / Requirement | Result | | |
|---|-------------------------------|--|---|---|----------|--|--|
| 15.247 | RSS 210 | 20dB Bandwidth | Basic Rate: 965 kHz EDR: 1300 kHz | Channel spacing > $2/3rds 20dB BW$ | Complies | | |
| (a)(1) | A0.1 (1) | Channel Separation | 1 MHz | 2/3105 200D D W | Complies | | |
| 15.247 (a) (1) (ii) | RSS 210 A8.1 (4) | Number of Channels | Min 20 Max | 15 or more | Complies | | |
| 15.247 (a) (1) (ii) | RSS 210 A8.1 (4) | Channel Dwell Time (average time of occupancy) | 0.4 seconds per 31.6 seconds for 79 channels | <0.4 second within a period of 0.4 x number of channels | Complies | | |
| 15.247 (a) (1) | RSS 210 A8.1 (1) | Channel Utilization | The system uses the Bluetooth algorithm and, therefore, meets all requirements for channel utilization. | All channels shall, on average, be used equally | Complies | | |
| 15.247 (b) (3) | RSS 210 A8.4 (2) | Output Power | Basic Rate: 7.2 dBm (0.005 W) EDR: 4.8 dBm (0.003 W) EIRP = 0.109 W ^{Note 1} | 0.125 Watts (EIRP < 0.5W) | Complies | | |
| 15.247(c) | RSS 210 A8.5 | Spurious Emissions – 30MHz – 25GHz | All spurious emissions < -20dBc | < -20dBc | Complies | | |
| 15.247(c) / 15.209 | RSS 210 A8.5 Table 2, 3 | Radiated Spurious Emissions 30MHz – 25GHz | 47.0dBµV/m @ 2483.5MHz (-7.0dB) | 15.207 in restricted bands, all others < -20dBc | Complies | | |
| 15.247 (a) (1) | RSS 210 A8.1(2) | Receiver bandwidth | Refer to operational description | Shall match the channel bandwidth | Complies | | |
| Note 1: EIRP calculated using antenna gain of 3.2 dBi | | | | | | | |

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

| FCC Rule Part | RSS Rule part | Description | Measured Value / Comments | Limit / Requirement | Result (margin) |
|---------------------------------|-----------------------------|-----------------------------|--|--|--------------------|
| 15.203 | - | RF Connector | | Unique or integral antenna required | Complies |
| 15.207 | RSS GEN Table 4 | AC Conducted Emissions | 41.7dBµV @ 8.000MHz (-8.3dB) | Refer to page 17 | Complies |
| 15.109 | RSS GEN 6.1 Table 2 | Receiver spurious emissions | 49.0dBµV/m @ 2320.0MHz (-5.0dB) | Refer to page 18 | Complies |
| 15.247 (b) (5) 15.407 (f) | RSS GEN 5.6 RSS 102 | RF Exposure Requirements | Refer to MPE calculations in Exhibit 11, RSS 102 declaration and User Manual statements. | Refer to OET 65, FCC Part 1 and RSS 102 | Complies |
| - | RSP 100 RSS GEN 7.1 | User Manual | Refer to page 11 of the user's manual | Statement required regarding non- interference | Complies |
| - | RSP 100 RSS GEN 7.1 | User Manual | Not applicable, antenna is integral to host systems. | Statement for products with detachable antenna | Complies |
| - | RSP 100 RSS GEN 4.6.1 | 99% Bandwidth | Basic: 889 kHz EDR: 1.19 MHz | Information only | N/A |

MEASUREMENT UNCERTAINTIES

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

| Measurement Type | Measurement Unit | Frequency Range | Expanded Uncertainty |
|--|---------------------|-------------------------------------|---|
| RF power, conducted (power meter) | dBm | 25 to 7000 MHz | ± 0.52 dB |
| RF power, conducted (Spectrum analyzer) | dBm | 25 to 7000 MHz | $\pm 0.7 \text{ dB}$ |
| Conducted emission of transmitter | dBm | 25 to 26500 MHz | $\pm 0.7 \text{ dB}$ |
| Conducted emission of receiver | dBm | 25 to 26500 MHz | $\pm 0.7 \text{ dB}$ |
| Radiated emission (substitution method) | dBm | 25 to 26500 MHz | $\pm 2.5 \text{ dB}$ |
| Radiated emission (field strength) | dBµV/m | 25 to 1000 MHz 1000 to 40000 MHz | $\frac{\pm 3.6 \text{ dB}}{\pm 6.0 \text{ dB}}$ |
| Conducted Emissions (AC Power) | dBµV | 0.15 to 30 MHz | $\pm 2.4 \text{ dB}$ |

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Intel Centrino Wireless-N 135, models 135BNHMW and 135BNHU are PCIe Half Mini Card form factor IEEE 802.11b/g/n wireless network adapters that supports 1x1 (SISO) and a Bluetooth adapter that supports Basic Rate, Enhanced Data Rate and Low Energy modes of operation.

The device is sold under model numbers 135BNHMW and 135BNHU

Model numbers with FCC ID: PD9135BNHU and IC: 1000M-135BNHU are intended for end user installation and operate with a BiOS lock feature to ensure they can only be used in the appropriate host systems to prevent unauthorized operation. Other models are only intended for OEM factory installation.

For radio testing purposes the card was installed in a test fixture that exposed all sides of the card. For digital device testing for certification under equipment code JBP the card was installed inside a laptop PC.

The sample was received on September 7, 2011 and tested on September 12, 20, 21, 22 and 23, 2011. The EUT consisted of the following component(s):

| Company | Model | Description | Serial Number | FCC ID |
|----------------------|----------|--|------------------------------|---|
| Intel Corporation | 135BNHMW | 35BNHMW PCIe Half Mini Card form factor Bluetooth / IEEE 0015 | JBP: 00150096B4F5 DTS: | PD9135BNH PD9135BNHU 1000M- 135BNH |
| | 135BNHU | wireless network adapter | 00150096B40F | 1000M- 135BNHU |

ANTENNA SYSTEM

The EUT antenna is a a two-antenna PIFA antenna system – Shanghai Universe Communication Electron Co., Ltd for both chains. There is also an option to use a trace antenna etched onto the board for Chain B Bluetooth transmit operation.

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

| Band | Antenna Gain | | Comment |
|-------------|--------------|------|---------|
| | PIFA Trace | | |
| 2400-2483.5 | 3.2 dBi | 1dBi | |

ENCLOSURE

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

MODIFICATIONS

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

SUPPORT EQUIPMENT

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

| Company | Model | Description | Serial Number | FCC ID |
|---------|----------|----------------|---------------|--------|
| Dell | Latitude | Laptop | - | - |
| Intel | - | Extender board | - | - |
| Agilent | E3610A | Power Supply | - | - |

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

| Company | Model | Description | Serial Number | FCC ID |
|---------|-------|-------------|---------------|--------|
| Netgear | GS108 | Hub | GS16152CB035 | - |
| _ | | | 447 | |

EUT INTERFACE PORTS

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

| Port | | Cable(s) | | | |
|----------------------------|--------------|-------------|---------------------|-----------|--|
| From | То | Description | Shielded/Unshielded | Length(m) | |
| USB | Printer | USB | Shielded | 2 | |
| Ethernet | Hub | CAT 5 | Unshielded | 10 | |
| USB / Test Fixture | Laptop | USB | Shielded | 1 | |
| Ribbon / Test Fixture | Laptop | Multiwire | - | 1 | |
| DC Power / Test Fixture | Power supply | 2wire | - | 1 | |

EUT OPERATION

The EUT was installed into a test fixture that exposed all sides of the card. The test fixture interfaced to a laptop computer and dc power supply. The laptop computer was used to configure the EUT to continuously transmit at a specified output power or continuously receive on the channel specified in the test data. For transmit mode measurements the system was configured to operate in each of the available operating modes - 802.11b, 802.11g, 802.11n (20 MHz channel bandwidth) and 802.11n (40MHz channel bandwidth).

The data rates used for all tests were the lowest data rates for each $802.11 \mod -1 Mb/s$ for 802.11b, 6Mb/s for 802.11a and 802.11g, 6.5MB/s for 802.11n (20MHz), and 13 Mb/s for 802.11n (40MHz). The device operates at its maximum output power at the lowest data rate.

The PC was using the Intel test utility DRTU Version 1.5.3-0320 and the device driver was version 15.0.0.51.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

| Site | Registratio | Location | | |
|-----------|---------------|----------|------------------|--|
| 5110 | FCC | Canada | Location | |
| Chamber 3 | 769238 | 2845B-3 | | |
| Chamber 4 | 211948 | 2845B-4 | 41039 Boyce Road | |
| Chamber 5 | 211948 | 2845B-5 | Fremont, | |
| Chamber 7 | A2LA | 2045D 7 | CA 94538-2435 | |
| Chamber / | accreditation | 28430-7 | | |

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003.

CONDUCTED EMISSIONS CONSIDERATIONS

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

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

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

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

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a nonconductive 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.



Figure 1 Typical Conducted Emissions Test Configuration

RADIATED EMISSIONS

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

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

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

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



Typical Test Configuration for Radiated Field Strength Measurements



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

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



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed, where possible, 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.



Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and Elliott's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands¹ (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

| Frequency Range (MHz) | Limit (uV/m @ 3m) | Limit (dBuV/m @ 3m) |
|-----------------------------|----------------------|------------------------|
| 30 to 88 | 100 | 40 |
| 88 to 216 | 150 | 43.5 |
| 216 to 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

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

OUTPUT POWER LIMITS – FHSS SYSTEMS

The table below shows the limits for output power based on the number of channels available for the hopping system.

| Operating Frequency (MHz) | Number of Channels | Output Power |
|------------------------------|--------------------|----------------------|
| 902 - 928 | ≥ 50 | 1 Watt (30 dBm) |
| 902 - 928 | 25 to 49 | 0.25 Watts (24 dBm) |
| 2400 - 2483.5 | ≥ 75 | 1 Watt (30 dBm) |
| 2400 - 2483.5 | < 75 | 0.125 Watts (21 dBm) |
| 5725 - 5850 | 75 | 1 Watt (30 dBm) |

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 d (meters) from the equipment under test:

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

d

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

Appendix A Test Equipment Calibration Data

| Radiated Emissions, 1 <u>Manufacturer</u> EMCO Hewlett Packard | 000 - 6,500 MHz, 08-Sep-11 Description Antenna, Horn, 1-18 GHz SpecAn 9 kHz - 40 GHz, FT (SA40) Blue | <u>Model</u> 3115 8564E (84125C) | <u>Asset #</u> 487 1393 | <u>Cal Due</u> 7/6/2012 8/9/2012 |
|---|---|--|-------------------------------|--|
| Manufacturer EMCODescription Antenna, Horn, 1-18 GHzHewlett PackardSpecAn 9 kHz - 40 GHz, FT (SA40) Blue | | <u>Model</u> 3115 8564E (84125C) | <u>Asset #</u> 786 1393 | <u>Cal Due</u> 12/11/2011 8/9/2012 |
| Radiated Emissions, 1 <u>Manufacturer</u> Hewlett Packard | ,000 - 40,000 MHz, 12-Sep-11 <u>Description</u> Microwave Preamplifier, 1- | <u>Model</u> 8449B | Asset # 785 | <u>Cal Due</u> 5/18/2012 |
| EMCO Hewlett Packard | Antenna, Horn, 1-18 GHz SpecAn 9 kHz - 40 GHz, FT | 3115 8564E (84125C) | 786 1393 | 12/11/2011 8/9/2012 |
| Rohde & Schwarz Hewlett Packard | EMI Test Receiver, 20 Hz-7 GHz Head (Inc W1-W4, 1742, 1743) | ESIB7 84125C | 1538 1620 | 11/2/2011 5/9/2012 |
| A.H. Systems Sunol Sciences Micro-Tronics | Blue System Horn, 18-40GHz Biconilog, 30-3000 MHz Band Reject Filter, 2400-2500 MHz | SAS-574, p/n: 2581 JB3 BRM50702-02 | 2159 2197 2249 | 3/23/2012 12/29/2011 10/11/2011 |
| Radiated Emissions, 1 | 000 - 40000 MHz, 12-Sep-11 | Madal | A + # | |
| EMCO Hewlett Packard | Antenna, Horn, 1-18 GHz Microwave Preamplifier, 1- | <u>Model</u> 3115 8449B | <u>Asset #</u> 487 785 | <u>Car Due</u> 7/6/2012 5/18/2012 |
| Hewlett Packard | SpecAn 9 kHz - 40 GHz, FT (SA40) Blue | 8564E (84125C) | 1393 | 8/9/2012 |
| A.H. Systems Micro-Tronics | Èlue Śystem Horn, 18-40GHz Band Reject Filter, 2400-2500 MHz | SAS-574, p/n: 2581 BRM50702-02 | 2159 2249 | 3/23/2012 10/11/2011 |
| Radiated Emissions, 1 <u>Manufacturer</u> EMCO Hewlett Packard | 000 - 18,000 MHz, 15-Sep-11 <u>Description</u> Antenna, Horn, 1-18GHz SpecAn 30 Hz -40 GHz, SV (SA40) Red | <u>Model</u> 3115 8564E (84125C) | <u>Asset #</u> 868 1148 | <u>Cal Due</u> 6/8/2012 8/15/2012 |
| Radiated Emissions, 1 | 000 - 40000MHz, 16-Sep-11 | M - 4-1 | | |
| Hewlett Packard | Description Microwave Preamplifier, 1- 26 5GHz | <u>Model</u> 8449B | <u>Asset #</u> 263 | <u>Cal Due</u> 12/8/2011 |
| EMCO Hewlett Packard | Antenna, Horn, 1-18 GHz SpecAn 30 Hz -40 GHz, SV (SA40) Red | 3115 8564E (84125C) | 487 1148 | 7/6/2012 8/15/2012 |
| Micro-Tronics | Band Reject Filter, 2400-2500 MHz | BRM50702-02 | 2249 | 10/11/2011 |
| Radiated Emissions, 1 <u>Manufacturer</u> | 000 - 40,000 MHz, 17-Sep-11 <u>Description</u> | Model | Asset # | <u>Cal Due</u> |

| | Report Date: 0 | clober 7, 2011 Reissue | Dale: Ociol | ber 15, 2011 |
|--------------------------|---|------------------------|----------------|-----------------------|
| EMCO Hewlett Packard | Antenna, Horn, 1-18 GHz Microwave Preamplifier, 1- | 3115 8449B | 487 785 | 7/6/2012 5/18/2012 |
| Hewlett Packard | SpecAn 9 kHz - 40 GHz, FT | 8564E (84125C) | 1393 | 8/9/2012 |
| Hewlett Packard | Head (Inc W1-W4, 1742 , 1743) | 84125C | 1620 | 5/9/2012 |
| Micro-Tronics | Band Reject Filter, 2400-2500 | BRM50702-02 | 1683 | 8/3/2012 |
| A.H. Systems | Blue System Horn, 18-40GHz | SAS-574, p/n: 2581 | 2159 | 3/23/2012 |
| Radiated Emissions, | 1000 - 40000MHz, 20-Sep-11 | | | |
| Manufacturer | Description | Model | Asset # | Cal Due |
| Hewlett Packard | Microwave Preamplifier, 1- 26.5GHz | 8449B | 263 | 12/8/2011 |
| EMCO | Antenna, Horn, 1-18 GHz (SA40-Red) | 3115 | 1142 | 8/2/2012 |
| Hewlett Packard | SpecAn 30 Hz -40 GHz, SV (SA40) Red | 8564E (84125C) | 1148 | 8/15/2012 |
| Micro-Tronics | Band Reject Filter, 2400-2500 MHz | BRM50702-02 | 2249 | 10/11/2011 |
| Radiated Emissions | 1000 - 10 000 MHz 21-Sep-11 | | | |
| Manufacturer | Description | Model | Asset # | Cal Due |
| EMCO | Antenna, Horn, 1-18 GHz | 3115 | 786 | 12/11/2011 |
| Micro-Tronics | Band Reject Filter, 2400-2500 MHz | BRM50702-02 | 1683 | 8/3/2012 |
| Hewlett Packard | Microwave Preamplifier, 1- 26.5GHz | 8449B | 2199 | 2/23/2012 |
| Hewlett Packard | SpecAn 9 kHz - 40 GHz, (SA40) Purple | 8564E (84125C) | 2415 | 7/28/2012 |
| Radiated Emissions, | 30 - 1,000 MHz, 23-Sep-11 | | | |
| Manufacturer | Description | Model | Asset # | Cal Due |
| Rohde & Schwarz | EMI Test Receiver, 20 Hz-7 GHz | ESIB7 | 1538 | 11/2/2011 |
| Hewlett Packard | Preamplifier, 100 kHz - 1.3 GHz | 8447D OPT 010 | 1826 | 5/17/2012 |
| Sunoi Sciences | Biconilog, 30-3000 MHZ | JB3 | 2197 | 12/29/2011 |
| Conducted Emissions | s - AC Power Ports, 23-Sep-11 | | • • • | 0 I D |
| Manufacturer | Description | Model | <u>Asset #</u> | <u>Cal Due</u> |
| ENICO Robde & Schwarz | LISN, TU KHZ-TUU MHZ, 25A Pulse Limiter | 3023/2 FSH3 72 | 1292 | 3/1/2012 |
| Rohde & Schwarz | EMI Test Receiver. 20 Hz-7 GHz | ESIB7 | 1538 | 11/2/2012 |
| Fischer Custom | LISN, 25A, 150kHz to 30MHz, | FCC-LISN-50-25-2- | 2001 | 9/15/2012 |
| Comm | 25 Amp, | 09 | | |
| Radio Antenna Port (I | Power and Spurious Emissions), 2 | 23-Sep-11 | | |
| Manufacturer | Description | Model | Asset # | Cal Due |
| Hewlett Packard | SpecAn 9 kHz - 40 GHz, (SA40) Purple | 8564E (84125C) | 2415 | 7/28/2012 |
| Radiated Emissions, | 30 - 40,000 MHz, 23-Sep-11 | | | |
| Manufacturer | Description | <u>Model</u> | Asset # | Cal Due |
| EMCO | Antenna, Horn, 1-18 GHz | 3115 | 786 | 12/11/2011 |
| | 26.5GHz | 8449B | 2199 | 2/23/2012 |
| Micro-Ironics | Band Reject Filter, 2400-2500 | вкм50702-02 | 2238 | 10/1/2011 |
| Hewlett Packard | SpecAn 9 kHz - 40 GHz, (SA40) | 8564E (84125C) | 2415 | 7/28/2012 |

Purple

| Radiated Emissions, 3 | 80 - 1,000 MHz, 26-Sep-11 | | | |
|----------------------------|--|----------------|----------------|----------------|
| <u>Manufacturer</u> | Description | Model | Asset # | Cal Due |
| Hewlett Packard | EMC Spectrum Analyzer, 9 KHz - 22 GHz | 8593EM | 1319 | 11/22/2011 |
| Rohde & Schwarz | Test Receiver, 9 kHz-2750 MHz | ESCS 30 | 1337 | 11/24/2011 |
| Sunol Sciences | Biconilog, 30-3000 MHz | JB3 | 1548 | 6/24/2012 |
| Com-Power Corp. | Preamplifier, 30-1000 MHz | PA-103 | 1632 | 4/29/2012 |
| Conducted Emissions | - AC Power Ports, 27-Sep-11 | | | |
| <u>Manufacturer</u> | Description | <u>Model</u> | Asset # | Cal Due |
| EMCO | LISN, 10 kHz-100 MHz, 25A | 3825/2 | 1292 | 3/1/2012 |
| EMCO | LISN, 10 kHz-100 MHz | 3825/2 | 1293 | 3/1/2012 |
| Hewlett Packard | EMC Spectrum Analyzer, 9 KHz - 22 GHz | 8593EM | 1319 | 11/22/2011 |
| Rohde & Schwarz | Test Receiver, 9 kHz-2750 MHz | ESCS 30 | 1337 | 11/24/2011 |
| Rohde & Schwarz | Pulse Limiter | ESH3 Z2 | 1401 | 4/21/2012 |
| Radiated Emissions, 3 | 80 - 6,500 MHz, 29-Sep-11 | | | |
| <u>Manufacturer</u> | Description | <u>Model</u> | <u>Asset #</u> | <u>Cal Due</u> |
| EMCO | Antenna, Horn, 1-18 GHz | 3115 | 487 | 7/6/2012 |
| Hewlett Packard | Microwave Preamplifier, 1- 26.5GHz | 8449B | 2199 | 2/23/2012 |
| Hewlett Packard | SpecAn 9 kHz - 40 GHz, (SA40) Purple | 8564E (84125C) | 2415 | 7/28/2012 |

Appendix B Test Data

T84548 Pages 26 - 79



EMC Test Data

| PET APAddee | 2 company | | |
|------------------------|---------------------------|------------------|-------------------|
| Client: | Intel | Job Number: | J84264 |
| Model: | 135BNHMW & 135BNHU | T-Log Number: | T84548 |
| | | Account Manager: | Christine Krebill |
| Contact: | Steve Hackett | | |
| Emissions Standard(s): | FCC 15 B, 15.247, RSS 210 | Class: | В |
| Immunity Standard(s): | - | Environment: | - |
| | | | |

EMC Test Data

For The

Intel

Model

135BNHMW & 135BNHU

Date of Last Test: 9/29/2011

Elliott

EMC Test Data

| | company | | |
|-----------|---------------------------|------------------|-------------------|
| Client: | Intel | Job Number: | J84264 |
| Madalı | | T-Log Number: | T84548 |
| would. | | Account Manager: | Christine Krebill |
| Contact: | Steve Hackett | | |
| Standard: | FCC 15 B, 15.247, RSS 210 | 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. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections running on top of the groundplane or routed in overhead in the GR-1089 test configuration.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

| Ambient Conditions: | Temperature: | 21.5 °C | |
|---------------------|----------------|---------|--|
| | Rel. Humidity: | 41 % | |

Summary of Results

For Wi-Fi, only Chain A is used for Tx. For Bluetooth only chain B is used for Tx. Both chains are used for Rx for Wi-Fi and Bluetooth MAC Address: 00150096B40F DRTU Tool Version 1.5.3-0320 Driver version 15.0.0.51 - Sample with PIFA antenna

| | | | | | | | anterna |
|------------|----------------|---------------|------------------|-------------------|--------------------------|-----------------------|---------------------|
| Run # | Mode | Channel | Power Setting | Measured Power | Test Performed | Limit | Result / Margin |
| | BT Basic | 2402MHz | 7dBm | 5.9 | | FCC Part 15.209 / | 42.6dBµV/m@ |
| 1 | 802.1b | 2412MHz | 16.5dBm | 16.6 | | 15.247(c) | 2251.7MHz (-11.4dB) |
| 2 | BT Basic | 2480MHz | 7dBm | 6.4 | | FCC Part 15.209 / | 46.8dBµV/m @ |
| 2 | 802.1b | 2462MHz | 16.5dBm | 16.7 | Radiated Emissions, | 15.247(c) | 2500.0MHz (-7.2dB) |
| n | BT Basic | 2402MHz | 7dBm | 5.9 | 1 - 10 GHz | FCC Part 15.209 / | 39.7dBµV/m@ |
| 3 | 802.11g | 2412MHz | 16.5dBm | 16.6 | | 15.247(c) | 1457.6MHz (-14.3dB) |
| 4 | BT Basic | 2480MHz | 7dBm | 6.4 | | FCC Part 15.209 / | 44.7dBµV/m @ |
| 4 | 802.1g | 2462MHz | 16.5dBm | 16.8 | | 15.247(c) | 2299.8MHz (-9.3dB) |
| Wi-Fi mode | for the follow | ing runs bas/ | ed on the wo | rst case mod | le from runs 1 through 4 | | |
| F | BT Basic | 2402MHz | 7dBm | 5.9 | | FCC Part 15.209 / | 53.8dBµV/m @ |
| 5 | 802.1b | 2437MHz | 16.5dBm | 16.6 | | 15.247(c) | 2365.0MHz (-0.2dB) |
| 4 | BT Basic | 2440MHz | 7dBm | 6.5 | | FCC Part 15.209 / | 42.2dBµV/m @ |
| 0 | 802.1b | 2412MHz | 16.5dBm | 16.6 | Radiated Emissions, | 15.247(c) | 2868.6MHz (-11.8dB) |
| 7 | BT Basic | 2440MHz | 7dBm | 6.5 | 1 - 10 GHz | FCC Part 15.209 / | 44.4dBµV/m @ |
| 1 | 802.11b | 2462MHz | 16.5dBm | 16.7 | | 15.247(c) | 2299.2MHz (-9.6dB) |
| 0 | BT Basic | 2480MHz | 7dBm | 6.4 | | FCC Part 15.209 / | 42.2dBµV/m @ |
| 0 | 802.11b | 2437MHz | 16.5dBm | 16.6 | | 15.247(c) | 2278.8MHz (-11.8dB) |
| Wi-Fi mode | and channel | and Bluetoot | th channel fo | r the followin | g run based on the worst | case mode from runs 1 | ihrough 8 |
| 0 | BT EDR | 2402MHz | 7dBm | 2.5 | Radiated Emissions, | FCC Part 15.209 / | 50.2dBµV/m@ |
| 9 | 802.1b | 2437MHz | 16.5dBm | 16.6 | 1 - 10 GHz | 15.247(c) | 2370.6MHz (-3.8dB) |
| | | | | | | | |

Elliott

EMC Test Data

| e e | An AZ | Company | | | | | | | | |
|--------------|---------------------|----------------|---------------|---------------|--------------|--------------|------------|--------------|-------------------|---|
| Client: | Intel | | | | | | | Job Number: | J84264 | |
| Madal | | | 1 | | | | T-I | Log Number: | T84548 | |
| wodel: | 133RINHIM | a 132RINHL | J | | | | Αссоι | unt Manager: | Christine Krebill | |
| Contact: | Steve Hacke | ett | | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: | N/A | |
| | | | | | | | | | | |
| Modificat | ions Made | Durina T | estina | | | | | | | |
| No modificat | tions were m | ade to the El | JT during tes | sting | | | | | | |
| | | | Ū | 0 | | | | | | |
| Deviation | s From Th | ie Standar | ď | | | | | | | |
| No deviation | is were made | e from the rea | quirements o | f the standar | d. | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Run #1: Ra | diated Spur | ious Emissi | ons, 1-10GF | lz. Operatin | g Mode: 802. | 11b @ 2412 | , BT Basic | @ 2402 MHz | Z | |
| | Jate of Test: | 9/20/2011 | 00 | | | | | | | |
| | St Engineer: | Kalael Vare | idS r #2 | | | | | | | |
| It | | | #3 | | | | | | | |
| Preliminary | Sourious F | missions ex | cluding allo | cated hand | (Peak versu | s average li | mit) | | | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments | | |
| MHz | dBuV/m | v/h | Limit | Margin | Pk/QP/Avg | dearees | meters | oonintonto | | |
| 1200.190 | 39.2 | V | 54.0 | -14.8 | Peak | 142 | 1.0 | | | |
| 1457.690 | 39.0 | Н | 54.0 | -15.0 | Peak | 159 | 1.0 | | | |
| 7237.170 | 44.9 | V | 70.0 | -25.1 | Peak | 290 | 1.3 | | | |
| | | | | | | | | | | |
| Final measu | urements at | 3m | | | 1 | | | 1 | | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments | | |
| MHZ | dBµV/m | v/h | Limit | Margin | PK/QP/Avg | degrees | meters | | | |
| 1197.920 | 31.4 45.2 | V | 54.0 | -22.6 20.0 | AVG | 138 | 1.0 | | | |
| 1199.920 | 40.Z | V | 74.0 | -20.0 | FN | 130 | 1.0 | KD I WINZ, V | | |
| | | | | | | | | | | |
| 1 | 20.0 | | | | | | | | | |
| 1 | 20.0 | | | | | | | | | |
| | | | | | | | | | | |
| ' | .00.0 - | | | | | | | | | |
| μ/λη | on n - | | | | | | | | | 1 |
| 9 B) | 00.0- | | {}{ | | | | 4 | | | |
| l de | <i>(</i> 0 0 | | | | | | [] []] | | | |
| plit | 60.0- | | | | | | | | | |
| 4 | 40.0- | | | | Lib . | | | | | |
| | 40.0 - N. M | WWW W | richards | Mart | Merter | | | | | |
| | 20.0- | | | | | | | | | |
| | 20.0 - j 1000 | | | | | | i | i i | 10000 | |
| | | | | | Frequency | (MHz) | | | | |
| | | | | | | - | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |





Class: N/A

| | -Ilic | htt | | | | | | FM | r Test D |
|--|---|--|-----------------------------------|--------------|-------------|--------------|-------------|--------------|-------------------|
| | An AZ | A company | | | | | | | |
| Client: | Intei | | | | | | | JOD NUMBER: | J84264 |
| Model [.] | 135BNHMW | & 135BNHI | J | | | | - | Log Number: | 184548 |
| mouon | TOODITIIII | | • | | | | Acco | unt Manager: | Christine Krebill |
| Contact: | Steve Hacke | ett | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: | N/A |
| un #2: Ra [Te Te | idiated Spur Date of Test: est Engineer: est Location: | ious Emissi 9/20/2011 Rafael Vare FT Chambe | ons, 1-10GF las r #3 | lz. Operatin | g Mode: 802 | .11b @ 2462 | 2, BT Basic | : @ 2480 MHz | 2 |
| reliminary | Sourious F | missions ex | cluding allo | cated band | (Peak versu | s average li | mit) | | |
| requency | | Pol | 15 200 | / 15.247 | Detector | Azimuth | Height | Comments | |
| MH7 | dBuV/m | v/h | l imit | Margin | | degrees | meters | Somments | |
| 1232 450 | <u>45</u> 1 | V | 54 0 | -8.6 | Peak | n n | 1 2 | | |
| 1252.450 | 40.4 | V ⊔ | 54.0 | -0.0 12 / | Poak | 171 | 1.5 | | |
| 7306 020 | 40.0 //7.1 | \/ | 54.0 | -60 | Poak | 288 | 1.0 | | |
| 370.030 | 47.1 | v | J4.U | -0.7 | ι ταΝ | 200 | 1.0 | | |
| inal measu | urements at | 3m | | | | | | | |
| requency | | Pol | 15 209 | / 15 247 | Detector | Azimuth | Height | Comments | |
| MHz | dBuV/m | v/h | Limit | Margin | | dearees | meters | Comments | |
| 7390 630 | <u>44</u> 1 | V | 54.0 | _0.0 | AVG | 287 | 1.8 | RB 1 MHz·W | /R 10 Hz·Pk |
| 7386.060 | 51.7 | V | 74.0 | 22.7 | | 207 | 1.0 | | |
| | | V | 74.0 | -22.3 | РК | 287 | 1.8 | RB1MHz;V | 'B 3 MHZ;PK |
| 120. (w/\ngp) apprilduw 40. | 0- 0- 0- 0- | Innha | 74.0 | -22.3 | PK | 287 | | RB 1 MHz;v | B 3 MHz;PK |
| 120. (W/MgP) 80. 9011100 40. 20. | | Innh | 14.0 | -22.3 | | 287 | 1.8 | RB 1 MHz;v | B 3 MHZ;PK |



EMC Test Data

| | 111 214 | | | | | | | | 1 |
|---------------------------------------|---|-------------|-------------|-------------|------------------------|-----------------------|--------|--------------|-------------------|
| Client: | Intel | | | | | | | Job Number: | J84264 |
| Madal | | | | | | | T- | Log Number: | T84548 |
| Wodel: | 135BINHIMM | / & 135BNHU | J | | | - | Acco | unt Manager: | Christine Krebill |
| Contact | Steve Hacke | tt tt | | | | | | 5 | |
| Standard | | 5 2/7 RSS | 210 | | | | | Class | NI/Δ |
| Stariuaru. | | J.247, NJJ. | 210 | | | | | 0/033. | |
| | | | ~~ <i>c</i> | | | | | | |
| Preliminary | Spurious E | missions at | 20cm from | 2-3 GHz (Pe | eak versus av | erage limit) | | | |
| Frequency | Level | P0I | 15.209 | / 15.24/ | Detector | Azimuth | Height | Comments | |
| MHZ | dBµV/m | V/n | Limit | Margin | PK/QP/AVg | degrees | meters | | |
| 2305.000 | 44.7 | V | 54.0 | -9.3 | Peak | 181 | 1.0 | | |
| 2500.000 | 43.8 | V | 54.0 | -10.2 | Реак | 181 | 1.0 | | |
| Einal moas | uromonte at | 2m | | | | | | | |
| Final meas | | Dol | 15 200 | / 15 2/7 | Dotoctor | Azimuth | Hoight | Commonts | |
| MHz | | r Ui v/h | Limit | Margin | | doaroos | motors | COMMENTS | |
| 2500.000 | <u>46</u> 8 | Н | 54.0 | -7.2 | | 352 | 10 | RB 1 MHz·\ | /R 10 Hz·Pk |
| 2300.000 | 55.2 | H | 74.0 | -18.8 | PK | 352 | 1.0 | RB 1 MHz· | /B 3 MHz·Pk |
| 2495 530 | 40.5 | V | 54.0 | -13.5 | AVG | 263 | 1.0 | RB 1 MHz·V | /B 10 Hz·Pk |
| 2495 500 | 50.4 | V | 74.0 | -23.6 | PK | 263 | 1.1 | RB 1 MHz·V | /B 3 MHz·Pk |
| 2299.750 | 44.8 | H | 54.0 | -9.2 | AVG | 240 | 1.1 | RB 1 MHz:V | /B 10 Hz:Pk |
| 2299.980 | 53.9 | Н | 74.0 | -20.1 | PK | 240 | 1.1 | RB 1 MHz:V | /B 3 MHz:Pk |
| 12 10 (W/\ngp) 4 6 4 2 | 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 2000 | 2100 2 | 200 230 | | 0 2500 Frequency (f | ~~~~~ 2600 4Hz) | 2700 | 2800 2 | 2900 3000 |
| | | | | | | | | | |

| | -11: | | | | | | | | |
|----------------------------|--|--|----------------------------|--------------------|--------------|--------------|----------------|---------------|-------------------|
| | | DCC Ar [*] company | | | | | | EM | C Test Da |
| Client: | Intel | | | | | | | Job Number: | J84264 |
| Model | 135RNHMM | / & 135RNHI | 1 | | | | T- | Log Number: | T84548 |
| wouci. | TJJDINI IMIN | & IJJDINIIC | , | | | | Acco | unt Manager: | Christine Krebill |
| Contact: | Steve Hacke | ett | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: | N/A |
| un #3: Ra I Te Tu | adiated Spur Date of Test: est Engineer: est Location: | ious Emissi 9/20/2011 Rafael Vare FT Chambe | ons, 1-10GH las r #3 | Iz. Operatir | ng Mode: 802 | 11g @ 2412 | 2, BT Basic | : @ 2402 MH; | Z |
| eliminary | / Spurious E | Dol | Cluding allo | / 15 247 | Dotoctor | S average II | MIL) Hoight | Commonts | |
| MH7 | dBuV/m | v/h | imit | Margin | Pk/OP/Avn | dearees | meters | COMMENIS | |
| 457.690 | 38.6 | H | 54.0 | -15.4 | Peak | 160 | 1.3 | | |
| 238.670 | 47.6 | V | 54.0 | -6.4 | Peak | 284 | 1.3 | Signal not in | restricted band |
| | | | | | | | | | |
| nal meas | urements at | 3m | 15 000 | 115 047 | Datastas | A | 11.2.4.1 | 0 | |
| equency | | P0I | 15.209 | / 15.247 Margin | Detector | Azimuth | Height | Comments | |
| 10102 157 560 | αΒμν/Π 39.7 | - Will H | 54 0 | 1/1 3 | AVG | 168 | 1 0 | RB 1 MHz·\ | /B 10 Hz·Pk |
| 457.550 | 42.9 | H | 74.0 | -31.1 | PK | 168 | 1.0 | RB 1 MHz:V | /B 3 MHz:Pk |
| Amplitude (dBuV/m) | 120.0 - 100.0 - 80.0 - 60.0 - 40.0 - 20.0 - 1000 | - A.MA | Lunmu | ~~ | Frequence | с,житер с | | | |
| | 20.0 -¦ 1000 | | | | ' ' | , y (MHz) | | | . 10 |

| C | Ellic | ott | | | | | | EM | C Test Da |
|------------------|--|-------------|-------------|--------------------------------|------------------------|---------------|--|--------------|-----------|
| Client | Intel | ළ) company | | | | | | Job Number: | J84264 |
| Madal | | | | | | | T-Log Number: T84548 | | |
| woder | : 135BINHIVIV | / & 135BNHI | J | | | | Account Manager: Christine Kre | | |
| Contact | : Steve Hack | ett | | | | | | | |
| Standard | : FCC 15 B, 7 | 5.247, RSS | 210 | | | | | Class: | N/A |
| | | | | | | | | | |
| Preliminar | y Spurious E | missions at | t 20cm from | <u>2-3 GHz (P€</u> / 15 247 | eak versus av | verage limit) | Hoight | Commonts | |
| MHz | dBuV/m | v/h | Limit | Margin | Pk/OP/Ava | degrees | meters | COMMENTS | |
| | ασμιτιπ | ., | | - mai gin | | uogioco | | | |
| | | | | | | | | | |
| Final meas | surements at | 3m Pol | 15 209 | / 15 247 | Detector | Azimuth | Heinht | Comments | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Ava | degrees | meters | Johnnents | |
| | | | | | | | | | |
| Amplitude (dBuV) | 30.0 - 50.0 - 40.0 - 20.0 - 2000 | 2100 | 2200 23 | 00 240 | 0 2500 Frequency (I | | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ~~ ~~ | 2900 3000 |

| | | | | | | | | EMC Test L |
|---|---|---|--|--------------------|-----------------------|----------------------------|---------------------|------------------------------|
| Client | Intel | company | | | | | | Job Number: J84264 |
| Model | 135RNIHM/// | & 135BNHI | | | | | T- | Log Number: T84548 |
| MUUEI | | | J | | | | Ассо | unt Manager: Christine Krebi |
| Contact | Steve Hacke | tt | | | | | | |
| Standard | FCC 15 B, 15 | 5.247, RSS | 210 | | | | | Class: N/A |
| reliminary | adiated Spurie Date of Test: (est Engineer:) est Location:) | ous Emissi 9/20/2011 Rafael Vare FT Chambe | ions, 1-10GH Has Fr #3 Yochuding allo | Iz. Operatin | ig Mode: 802. | 11g @ 2462 s average li | 2, BT Basic | : @ 2480 MHz |
| Frequency | l evel | Pol | 15 209 | / 15 247 | Detector | Azimuth | Height | Comments |
| MHz | dBuV/m | v/h | Limit | Margin | Pk/QP/Ava | degrees | meters | o si il nonto |
| 1457.690 | 39.5 | H | 54.0 | -14.5 | Peak | 160 | 1.0 | |
| 7381.300 | 48.3 | V | 54.0 | -5.7 | Peak | 282 | 1.6 | |
| | | | | | | | | |
| inal meas | urements at 3 | <u>3m</u> | 15 200 | 115 017 | Detector | A | l la la la la la la | Commonte |
| -requency | Level | P01 | 15.209 | / 15.247 Margin | Delector Dk/OD/Avg | Azimuln | Height | Comments |
| 7385 270 | ΔΔμν/Π 43.1 | V | 54 0 | -10.9 | AVG | 286 | 1 2 | RB 1 MHz·VB 10 Hz·Pk |
| 7387.830 | 55.0 | V | 74.0 | _10.7 | PK | 286 | 1.2 | RB 1 MHz·VB 3 MHz·Pk |
| 120. 100. (⁽⁾ /AP (⁽⁾) 80. | 0- | | • | | | | | |



EMC Test Data

| 0 | An AZ | A company | | | | | | | |
|--------------------|--|-------------|-----------|-------------|----------------------|---------------|------------|--------------|-------------------|
| Client: | Intel | | | | | | | Job Number: | J84264 |
| Madal | | | 1 | | | | T-I | Log Number: | T84548 |
| Model: | 132BINHIVIV | A 135BNH | J | | | | Αссοι | unt Manager: | Christine Krebill |
| Contact: | Steve Hacke | ett | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: | N/A |
| Preliminary | Spurious F | missions at | 20cm from | 2-3 GHz (Pe | ak versus av | verage limit) | | | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments | |
| MHz | dBuV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | |
| 2299.000 | 44.9 | V | 54.0 | -9.1 | Peak | 179 | 1.0 | | |
| Final measu | urements at | 3m | | | | | | | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | |
| 2299.750 | 44.7 | Н | 54.0 | -9.3 | AVG | 236 | 1.0 | RB 1 MHz;V | /B 10 Hz;Pk |
| 2298.580 | 54.6 | Н | 74.0 | -19.4 | PK | 236 | 1.0 | RB 1 MHz;V | /B 3 MHz;Pk |
| 2297.900 | 41.5 | V | 54.0 | -12.5 | AVG | 253 | 1.2 | RB 1 MHz;V | /B 10 Hz;Pk |
| 2297.100 | 52.6 | V | 74.0 | -21.4 | PK | 253 | 1.2 | RB 1 MHz;V | /B 3 MHz;Pk |
| Amplitude (dBuV/m) | 120.0 - 100.0 - 80.0 - 60.0 - 40.0 - 20.0 - 2000 | | 2200 | | 400 250 Frequency | | · · · 2700 | | |
| | | | | | | | | | |

| Client: Model: Contact: Standard: Cun #5: Rac | Intel 135BNHMW Steve Hacke FCC 15 B, 15 | & 135BNHL | J | | | | T- | Job Number: J84264 Log Number: T84548 | | | | |
|---|---|--|--|------------------------|--------------------------------|----------------------------|---------------------|--|--|--|--|--|
| Model: Contact: Standard: I un #5: Rac D | 135BNHMW Steve Hacke FCC 15 B, 15 | & 135BNHL | J | | | | T- | Log Number: T84548 | | | | |
| Contact: Standard: | Steve Hacke FCC 15 B, 15 | | J | | | | Δ | T-Log Number: T84548 | | | | |
| Contact: Standard: Cun #5: Rac | Steve Hacke FCC 15 B, 15 | | | Contact. Stove Hackett | | | | | | | | |
| Standard: In #5: Rac | FCC 15 B, 15 | - 147 DCC | | | | | | | | | | |
| Run #5: Rac D | | 0.247, KSS | 210 | | | | Class: N/A | | | | | |
| Tes Te: reliminary | diated Spuri Date of Test: (st Engineer:) est Location:) Spurious Fr | ous Emissi 9/20/2011 Rafael Vare FT Chambe nissions ex | ions, 1-10GH las r #3 ccluding allo | lz. Operatir | ng Mode: 802. I (Peak versu | 11b @ 2437 s average li | ′ MHz, BT I mit) | Basic @ 2402 MHz | | | | |
| Frequency | Level | Pol | 15.209/ | 15.247 | Detector | Azimuth | Height | Comments | | | | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | | | | |
| 1457.690 | 38.6 | Н | 54.0 | -15.4 | Peak | 161 | 1.3 | | | | | |
| 7317.760 | 45.6 | V | 54.0 | -8.4 | Peak | 283 | 1.6 | | | | | |
| inal maas | iromonto et (| m | | | | | | | | | | |
| Frequency | | Pol | 15,209 | 15.247 | Detector | Azimuth | Height | Comments | | | | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Ava | degrees | meters | | | | | |
| 7313.760 | 43.2 | V | 54.0 | -10.8 | AVG | 286 | 1.6 | RB 1 MHz;VB 10 Hz;Pk | | | | |
| 7307.060 | 51.1 | V | 74.0 | -22.9 | PK | 286 | 1.6 | RB 1 MHz;VB 3 MHz;Pk | | | | |
| 120.0 (U/\ngp) 80.0 (U/\ngp) 60.0 40.0 20.0 | | MM | - Maria | | | 12) | | 10000 | | | | |


| | An ZAZ | AS company | | | | | | | | | | | |
|--------------------|--|--|-----------|-------------|----------------------|---------------|--------|--------------|--|--|--|--|--|
| Client: | Intel | | | | | | | Job Number: | J84264 | | | | |
| | | 35BNHMW & 135BNHU T-Log Number: T84548 Account Manager: Christine Krebill | | | | | | | | | | | |
| Model: | 135BNHMW | (& 135BNHL | J | | | | Acco | unt Manager: | Christine Krebill | | | | |
| Contact: | Steve Hacke | ett | | | | | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: | N/A | | | | |
| | 1 | | | | | | | | I | | | | |
| Preliminary | Spurious E | missions at | 20cm from | 2-3 GHz (Pe | ak versus av | verage limit) | | | | | | | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments | | | | | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | | | | | |
| 2280.000 | 42.0 | V | 54.0 | -12.0 | Peak | 179 | 1.0 | | | | | | |
| 2368.330 | 48.9 | V | 54.0 | -5.1 | Peak | 179 | 1.0 | | | | | | |
| | | | | | | | | | | | | | |
| Final measu | urements at | 3m | 15.000 | | | | | <u> </u> | | | | | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments | | | | | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | | | | | |
| 2364.960 | 53.8 | H | 54.0 | -0.2 | AVG | 345 | 1.3 | RB 1 MHz;V | /B 10 Hz;Pk | | | | |
| 2367.630 | 58.9 | H | 74.0 | -15.1 | PK | 345 | 1.3 | RB 1 MHz;V | /B 3 MHz;Pk | | | | |
| 2364.860 | 51.6 | V | 54.0 | -2.4 | AVG | 86 | 1.1 | RB 1 MHz;V | /B 10 Hz;Pk | | | | |
| 2369.430 | 57.3 | V | 74.0 | -16.7 | PK | 86 | 1.1 | RB 1 MHz;V | /B 3 MHz;Pk | | | | |
| Amplitude (dBuV/m) | 20.0 - 80.0 - 60.0 - 40.0 - 20.0 - 20.0 - 2000 | | 2200 2 | 2300 24 | 00 2500 Frequency | 2600 (MHz) | 2700 | 2800 | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

| Ű | | D tt | | | | | | EM | C Test Data |
|--|---|---|---|--------------|-------------------------------|-----------------------------|---------------------|---------------|---------------------------------------|
| Client: | Intel | | | | | | | Job Number: | J84264 |
| Model. | 135RNIHM/// | / & 135RNHI | 1 | | | | T- | Log Number: | T84548 |
| wouer. | | | J | | | | Ассо | unt Manager: | Christine Krebill |
| Contact: | Steve Hacke | ett | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: | N/A |
| Run #6: Ra [Te Te Preliminary | idiated Spur Date of Test: est Engineer: est Location: | ious Emissi 9/20/2011 Rafael Vare FT Chambe missions ex | ons, 1-10GH las r #3 ccluding allo | Iz. Operatin | ng Mode: 802 I (Peak versu | .11b @ 2412 s average li | 2 MHz, BT ∣ mit) | Basic @ 244(|) MHz |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | |
| 7237.170 | 44.6 | V | 54.0 | -9.4 | Peak | 293 | 1.3 | Signal not ir | restricted band |
| 1457.690 | 38.3 | H | 54.0 | -15.7 | Peak | 155 | 1.0 | | |
| Final moas | uromonts at | 3m | | | | | | | |
| Frequency | | Pol | 15.209 | / 15.247 | Detector | Azimuth | Heiaht | Comments | |
| MHz | dBuV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | o on internet | |
| 1457.560 | 39.5 | Н | 54.0 | -14.5 | AVG | 163 | 1.0 | RB 1 MHz;V | /B 10 Hz;Pk |
| 1457.550 | 42.9 | Н | 74.0 | -31.1 | PK | 163 | 1.0 | RB 1 MHz;V | /B 3 MHz;Pk |
| 120. 100. (W) 80. 80. 60. 40. 20. | 0 - 0 - 0 - 0 - 0 - 0 - 1000 | hmm | In | | | 1z) | | | · · · · · · · · · · · · · · · · · · · |
| | | | | | | | | | |



| <u> </u> | An ZALZA | Company | | | | | | |
|-----------------------------------|---|---------------|-----------|--------------------------------|------------------------|--------------------|--------|--------------------------------|
| Client: | Intel | | | | | | | Job Number: J84264 |
| | 10551 | | | | T- | Log Number: T84548 | | |
| Model: | 135BNHMW | & 135BNHU | J | | | · | Acco | unt Manager: Christine Krebill |
| Contact: | Steve Hacke | ett | | | | | | |
| Standard | FCC 15 B 1 | 5 247 RSS | 210 | | | | | Class: N/A |
| Standaru. | 100100,1 | 5.2 H , 100 . | 210 | | | | | |
| Droliminory | | miccione at | 20cm from | 2 2 CUz (D/ | ak voreue a | (orago limit) | | |
| Frequency | | Dol | 15 200 | <u>2-3 GHZ (Ре</u> / 15 247 | Detector | | Hoight | Comments |
| MHz | dBuV/m | v/h | L imit | Margin | Pk/OP/Avg | dearees | meters | Comments |
| 2255 000 | <u>44 4</u> | | 54.0 | -96 | Peak | 181 | 10 | |
| 2266.670 | 51.1 | V | NA | NA | Peak | 181 | 1.0 | |
| 2573.330 | 44.6 | V | 54.0 | -9.4 | Peak | 181 | 1.0 | 1 |
| 2871.670 | 45.2 | V | 54.0 | -8.8 | Peak | 181 | 1.0 | |
| | | I | | | | | | |
| Final measu | urements at | 3m | | | | | | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2868.570 | 42.2 | Н | 54.0 | -11.8 | AVG | 235 | 1.0 | RB 1 MHz;VB 10 Hz;Pk |
| 2868.440 | 49.9 | Н | 74.0 | -24.1 | PK | 235 | 1.0 | RB 1 MHz;VB 3 MHz;Pk |
| 2253.670 | 41.9 | Н | 54.0 | -12.1 | AVG | 236 | 1.2 | RB 1 MHz;VB 10 Hz;Pk |
| 2251.470 | 51.6 | Н | 74.0 | -22.4 | PK | 236 | 1.2 | RB 1 MHz;VB 3 MHz;Pk |
| 2874.770 | 39.5 | V | 54.0 | -14.5 | AVG | 271 | 1.0 | RB 1 MHz;VB 10 Hz;Pk |
| 2863.870 | 51.0 | V | 74.0 | -23.0 | PK | 271 | 1.0 | RB 1 MHz;VB 3 MHz;Pk |
| 12 10 (W//m) 6 4 2 | 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - 0.0 - | 2100 2 | 2200 23 | 00 240 | 00 2500 Frequency (| | 2700 | 2800 2900 3000 |
| | | | | | | | | |

| Madal | İ | | | | | | | JOD Mullipel. J04204 | |
|--|--|---|---|--------------|---------------|----------------------------|------------------------------------|----------------------|--|
| | | | 1 | | | | T- | Log Number: T84548 | |
| woder: | 132RIAHIM | & 135BINH | J | | | | Account Manager: Christine Krebill | | |
| Contact: | Steve Hacke | tt | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: N/A | |
| Run #7: Ra [Te Te Preliminary | diated Spuri Date of Test: st Engineer: est Location: | ous Emissi 9/20/2011 Rafael Vare FT Chambe | ons, 1-10GF las r #3 coluding allo | lz. Operatin | ig Mode: 802. | 11b @ 2462 s average li | 2 MHz, BT I | Basic @ 2440 MHz | |
| Frequency | Level | Pol | 15.209 | 15.247 | Detector | Azimuth | Heiaht | Comments | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | |
| 1328.830 | 44.9 | V | 54.0 | -9.1 | Peak | 138 | 1.0 | | |
| 1457.690 | 38.6 | Н | 54.0 | -15.4 | Peak | 163 | 1.0 | | |
| 7385.110 | 47.8 | V | 54.0 | -6.2 | Peak | 283 | 1.6 | | |
| inal mass | iromonto et | 2m | | | | | | | |
| Frequency | | Pol | 15 200 | / 15 247 | Detector | Δzimuth | Height | Comments | |
| MHz | dBuV/m | v/h | l imit | Margin | Pk/OP/Avg | dearees | meters | Comments | |
| 7384.970 | 46.1 | V | 54.0 | -7.9 | AVG | 284 | 1.7 | RB 1 MHz:VB 10 Hz:Pk | |
| 7384.840 | 52.6 | V | 74.0 | -21.4 | PK | 284 | 1.7 | RB 1 MHz;VB 3 MHz;Pk | |
| 1328.200 | 29.3 | V | 54.0 | -24.7 | AVG | 139 | 1.0 | RB 1 MHz;VB 10 Hz;Pk | |
| 1332.160 | 47.1 | V | 74.0 | -26.9 | PK | 139 | 1.0 | RB 1 MHz;VB 3 MHz;Pk | |
| 120. 100. (m/ ngp) apnjitude (gn/ WW 40. 20. | | Winter | Martan | | hallen been w | | | | |
| | | | | Fi | requency (MH | łz) | | | |
| | | | | | | | | | |



| | An /AZ | △ company | | | | | | | |
|----------------------------|--|-------------|-----------|-------------|----------------------|---------------|--------|--------------|-------------------|
| Client: | Intel | | | | | | | Job Number: | J84264 |
| | 4050111000 | | | | | | T- | Log Number: | T84548 |
| Model: | 135BNHMW | & 135BNHU | J | | | | Acco | unt Manager: | Christine Krebill |
| Contact: | Steve Hacke | ett | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: | N/A |
| | | | | | | | | | L |
| Preliminary | Spurious E | missions at | 20cm from | 2-3 GHz (Pe | ak versus av | verage limit) | | | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | |
| 2299.540 | 43.9 | V | 54.0 | -10.1 | Peak | 182 | 1.0 | | |
| 2421.670 | 49.5 | V | NA | NA | Peak | 182 | 1.0 | | |
| | | | | | | | | | |
| Final measu | urements at | 3m | | | | | | 1- | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | |
| 2299.230 | 44.4 | H | 54.0 | -9.6 | AVG | 242 | 1.2 | RB 1 MHz;V | /B 10 Hz;Pk |
| 2299.540 | 53.3 | H | /4.0 | -20.7 | PK | 242 | 1.2 | RB 1 MHz;V | /B 3 MHz;Pk |
| 2299.210 | 42.3 | V | 54.0 | -11./ | AVG | 2/2 | 1.2 | RB 1 MHz;V | /B 10 Hz;Pk |
| 2297.940 | 52.0 | V | /4.0 | -22.0 | PK | 272 | 1.2 | RB 1 MHz;V | /B 3 MHz;Pk |
| 1 (m//mblitude (dBuv/m) | 20.0 - 00.0 - 80.0 - 60.0 - 40.0 - 20.0 - 2000 | 2100 | 2200 2 | 300 24 | 00 2500 Frequency | | 2700 | 2800 | 2900 3000 |
| | | | | | | | | | |
| | | | | | | | | | |

| Client: Intel Model: 135BNHMW & 135BNF Contact: Steve Hackett Standard: FCC 15 B, 15.247, RSS Date of Test: 9/20/2011 Test Engineer: Rafael Var Test Location: FT Chamb Preliminary Spurious Emissions of Frequency Level Pol MHz dBµV/m v/h 1457.690 38.8 H 7318.300 45.1 V inal measurements at 3m Frequency Level Pol MHz dBµV/m v/h 7313.730 44.3 V | U sions, 1-10GHz. Oper elas er #3 excluding allocated k 15.209 / 15.247 Limit Marg 54.0 -15. 54.0 -8.9 | pand (Peak versu Detector 2 Peak | 2.11b @ 2437 us average li Azimuth degrees | T- Acco MHz, BT | Job Number: J84264 Log Number: T84548 unt Manager: Christine Krebil Class: N/A Basic @ 2480 MHz |
|---|---|---|---|---|---|
| Model: 135BNHMW & 135BNH Contact: Steve Hackett Standard: FCC 15 B, 15.247, RSS un #8: Radiated Spurious Emissions Date of Test: 9/20/2011 Test Engineer: Rafael Var Test Location: FT Chamb requency Level Pol MHz dBµV/m v/h 1457.690 38.8 H 7318.300 45.1 V inal measurements at 3m Frequency Level Pol MHz dBµV/m v/h V/h 313.730 44.3 V | U 5 210 5 210 5 210 5 210 5 210 5 210 5 209 5 210 5 209 5 210 5 209 5 210 5 209 5 210 5 200 5 210 5 210 | rating Mode: 802 pand (Peak versu / Detector gin Pk/QP/Avg 2 Peak | 2.11b @ 2437 us average li Azimuth degrees | T- Acco ' MHz, BT I mit) Height | Log Number: T84548 Punt Manager: Christine Krebi Class: N/A Basic @ 2480 MHz |
| Contact: Steve Hackett Standard: FCC 15 B, 15.247, RSS Un #8: Radiated Spurious Emissions Emissions Emissions Engineer: Rafael Var Test Location: FT Chamb Test Location: FT Chamb reliminary Spurious Emissions e Test Location: FT Chamb MHz MHz <td< td=""><td>5 210 sions, 1-10GHz. Oper elas er #3 excluding allocated k 15.209 / 15.247 Limit Marg 54.0 -15. 54.0 -8.9</td><td>rating Mode: 802 pand (Peak versu / Detector gin Pk/QP/Avg 2 Peak</td><td>2.11b @ 2437 us average li Azimuth degrees</td><td>MHz, BT</td><td>Class: N/A Class: N/A Basic @ 2480 MHz</td></td<> | 5 210 sions, 1-10GHz. Oper elas er #3 excluding allocated k 15.209 / 15.247 Limit Marg 54.0 -15. 54.0 -8.9 | rating Mode: 802 pand (Peak versu / Detector gin Pk/QP/Avg 2 Peak | 2.11b @ 2437 us average li Azimuth degrees | MHz, BT | Class: N/A Class: N/A Basic @ 2480 MHz |
| Contact: Steve Hackett Standard: FCC 15 B, 15.247, RSS un #8: Radiated Spurious Emissions Date of Test: 9/20/2011 Test Engineer: Rafael Var Test Location: FT Chamb reliminary Spurious Emissions e Trequency Level MHz dBµV/m v/h 1457.690 38.8 H 7318.300 45.1 V inal measurements at 3m Trequency Level Frequency Level Pol MHz dBµV/m v/h 313.730 44.3 V | 5 210 5 210 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 | rating Mode: 802 pand (Peak versu / Detector gin Pk/QP/Avg 2 Peak | 2.11b @ 2437 us average li Azimuth degrees | MHz, BT | Class: N/A Basic @ 2480 MHz TComments |
| Standard: FCC 15 B, 15.247, RSS un #8: Radiated Spurious Emissions Date of Test: 9/20/2011 Test Engineer: Rafael Var Test Location: FT Chamb reliminary Spurious Emissions e Frequency Level MHz dBµV/m v/h 1457.690 38.8 H 7318.300 45.1 V inal measurements at 3m Frequency Level Pol MHz dBµV/m v/h 7313.730 44.3 V | sions, 1-10GHz. Oper elas er #3 <u>xcluding allocated k</u> <u>15.209 / 15.247</u> <u>Limit Marg</u> <u>54.0 -15.</u> | pand (Peak versu 2 Detector 2 Peak | 2.11b @ 2437 us average li Azimuth degrees | MHz, BT | Class: N/A Basic @ 2480 MHz Comments |
| un #8: Radiated Spurious Emiss Date of Test: 9/20/2011 Test Engineer: Rafael Var Test Location: FT Chamb reliminary Spurious Emissions effequency Erequency Level MHz dBµV/m 1457.690 38.8 7318.300 45.1 V inal measurements at 3m Frequency Level Pol MHz MHZ V | sions, 1-10GHz. Oper elas er #3 excluding allocated to 15.209 / 15.247 Limit Marc 54.0 -15. 54.0 -8.9 | pand (Peak versu 2 Detector 2 Peak | 2.11b @ 2437 us average li Azimuth degrees | MHz, BT | Basic @ 2480 MHz |
| requency Level Pol MHz dBμV/m v/h 1457.690 38.8 H 7318.300 45.1 V nal measurements at 3m requency Level Pol MHz dBμV/m v/h 7318.300 45.1 V | 15.209 / 15.247 Limit Marg 54.0 -15. 54.0 -8.9 | 2 Peak | Azimuth degrees | Height | Comments |
| MHz dBμV/m v/h 1457.690 38.8 H 7318.300 45.1 V inal measurements at 3m Frequency Level Pol MHz dBμV/m v/h 7313.730 44.3 V | Limit Marc 54.0 -15. 54.0 -8.9 | gin Pk/QP/Avg 2 Peak | degrees | motore | |
| 1457.690 38.8 H 7318.300 45.1 V inal measurements at 3m Trequency Level Pol MHz dBμV/m v/h 7313.730 44.3 V | 54.0 -15. 54.0 -8.0 | 2 Peak | | meters | <u> </u> |
| 7318.300 45.1 V inal measurements at 3m Trequency Level Pol MHz dBμV/m v/h 7313.730 44.3 V | 54.0 -8.9 | - | 171 | 1.0 | |
| inal measurements at 3m requency Level Pol MHz dBµV/m v/h 7313.730 44.3 V | | 9 Peak | 285 | 1.6 | |
| requencyLevelPolMHzdBμV/mv/h7313.73044.3V | | | | | |
| MHz dBμV/m v/h 7313.730 44.3 V | 15,209 / 15,247 | Detector | Azimuth | Heiaht | Comments |
| 7313.730 44.3 V | Limit Marc | gin Pk/QP/Avg | degrees | meters | |
| | 54.0 -9. | 7 AVG | 288 | 1.6 | RB 1 MHz;VB 10 Hz;Pk |
| 7315.100 51.5 V | 74.0 -22. | 5 PK | 288 | 1.6 | RB 1 MHz;VB 3 MHz;Pk |
| 120.0- 100.0- (W/ng) e0.0- 40.0- 20.0- 1000 | Martin | Frequency (M | Hz) | | |



| Client: | Intel | Job Number: | J84264 |
|-----------|---------------------------|------------------|-------------------|
| Model | | T-Log Number: | T84548 |
| wouer. | | Account Manager: | Christine Krebill |
| Contact: | Steve Hackett | | |
| Standard: | FCC 15 B, 15.247, RSS 210 | Class: | N/A |
| | | | |

Preliminary Spurious Emissions at 20cm from 2-3 GHz (Peak versus average limit)

| Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments |
|--------|---|---|---|---|---|---|---|
| dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 42.7 | V | 54.0 | -11.3 | Peak | 183 | 1.0 | |
| 46.1 | V | 54.0 | -7.9 | Peak | 183 | 1.0 | signal not in restricted band |
| 46.4 | V | 54.0 | -7.6 | Peak | 183 | 1.0 | signal not in restricted band |
| | Level dBµV/m 42.7 46.1 46.4 | Level Pol dBμV/m v/h 42.7 V 46.1 V 46.4 V | Level Pol 15.209 dBμV/m v/h Limit 42.7 V 54.0 46.1 V 54.0 46.4 V 54.0 | Level Pol 15.209 / 15.247 dBμV/m v/h Limit Margin 42.7 V 54.0 -11.3 46.1 V 54.0 -7.9 46.4 V 54.0 -7.6 | Level Pol 15.209 / 15.247 Detector dBμV/m v/h Limit Margin Pk/QP/Avg 42.7 V 54.0 -11.3 Peak 46.1 V 54.0 -7.9 Peak 46.4 V 54.0 -7.6 Peak | Level Pol 15.209 / 15.247 Detector Azimuth dBμV/m v/h Limit Margin Pk/QP/Avg degrees 42.7 V 54.0 -11.3 Peak 183 46.1 V 54.0 -7.9 Peak 183 46.4 V 54.0 -7.6 Peak 183 | Level Pol 15.209 / 15.247 Detector Azimuth Height dBμV/m v/h Limit Margin Pk/QP/Avg degrees meters 42.7 V 54.0 -11.3 Peak 183 1.0 46.1 V 54.0 -7.9 Peak 183 1.0 46.4 V 54.0 -7.6 Peak 183 1.0 |

Final measurements at 3m

| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Height | Comments |
|-----------|--------|-----|--------|----------|-----------|---------|--------|----------------------|
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2278.830 | 42.2 | Н | 54.0 | -11.8 | AVG | 242 | 1.2 | RB 1 MHz;VB 10 Hz;Pk |
| 2279.600 | 51.2 | Н | 74.0 | -22.8 | PK | 242 | 1.2 | RB 1 MHz;VB 3 MHz;Pk |



| Client: Model: Contact: Standard: | Intel 135BNHMW Steve Hacket FCC 15 B, 15 | & 135BNHL | J | | | | | Job Number: | J84264 |
|---|--|--|---|--------------|---------------|------------|--------------|-------------------|---------------------------------------|
| Model: Contact: Standard: | 135BNHMW Steve Hacket FCC 15 B, 15 | & 135BNHL t | J | | | | | | |
| Contact: Standard: | Steve Hacket | t |) | | | | T- | Log Number: | T84548 |
| Contact: Standard: | Steve Hacket FCC 15 B, 15 | t | | | | Ассо | unt Manager: | Christine Krebill | |
| Standard: | FCC 15 B, 15 | | | | | | | | |
| un #9∙ Ra | | 5.247, RSS | 210 | | | | | Class: | N/A |
| D Tes Te | diated Spurid Date of Test: 9 St Engineer: F St Location: F | bus Emissi D/20/2011 Rafael Vare T Chambe | ons, 1-10GH las r #3 voluding allo | lz. Operatin | ig Mode: 802. | 11b @ 2437 | ′MHz, BT ∣ | EDR @ 2402 | MHz |
| | Level | Pol | 15.209/ | 15.247 | Detector | Azimuth | Heiaht | Comments | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | e en internet | |
| 1458.330 | 37.8 | Н | 54.0 | -16.2 | Peak | 159 | 1.0 | | |
| 7311.000 | 44.5 | V | 54.0 | -9.5 | Peak | 288 | 1.6 | | |
| inal maagu | iromonto at 2 | | | | | | | | |
| That measu | | Pol | 15 209 | 15 247 | Detector | Azimuth | Height | Comments | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | Comments | |
| 7315.560 | 44.4 | V | 54.0 | -9.6 | AVG | 288 | 1.6 | RB 1 MHz;V | ′B 10 Hz;Pk |
| 7314.930 | 52.1 | V | 74.0 | -21.9 | PK | 288 | 1.6 | RB 1 MHz;V | 'B 3 MHz;Pk |
| 120.0 (W/Mg (W/Ang (W/Ang (W/Ang (W/Ang (W/Ang (W/Ang (W/Ang (W/Ang) (|) -) -) -) -) -) -) -) -) -) - | www. | Juli | | | | | | · · · · · · · · · · · · · · · · · · · |



| | An ZAZ | Company | | | | | | |
|--|--|-------------|-----------|-------------|--|----------------------------|--------|--------------------------------|
| Client: | Intel | | | | | | | Job Number: J84264 |
| | | | | | | | T- | Log Number: T84548 |
| Model: | 135BNHMW | & 135BNHL | J | | | ł | Acco | unt Manager: Christine Krebill |
| Contact: | Steve Hacke | ett | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: N/A |
| otandara | | | | | | | | |
| Preliminary | Spurious F | missions at | 20cm from | 2-3 GHz (Pe | ak versus av | verage limit) | 1 | |
| Frequency | Level | Pol | 15.209 | / 15.247 | Detector | Azimuth | Heiaht | Comments |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2276.670 | 43.0 | V | 54.0 | -11.0 | Peak | 179 | 1.0 | |
| 2368.330 | 46.4 | V | 54.0 | -7.6 | Peak | 179 | 1.0 | |
| 2473.330 | 49.4 | V | NA | NA | Peak | 179 | 1.0 | |
| 2565.000 | 47.1 | V | 54.0 | -6.9 | Peak | 179 | 1.0 | Signal not in restricted band |
| | | | | | | | | |
| Final measu | urements at | 3m | | | • - • • • • • • • • • • • • • • • • • • | ····· | ···· | T. |
| Frequency | Level | Pol | 15.209/ | / 15.24/ | Detector | Azimuth | Height | Comments |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 23/0.600 | 50.2 | <u>H</u> | 54.0 | -3.8 | AVG | 345 | 1.0 | RB1 MHz;VB 10 Hz;PK |
| 2369.230 | 57.8 | <u>H</u> | /4.0 | -16.2 | PK | 345 | 1.0 | |
| 22/8.3/0 | 42.0 | <u>H</u> | 54.0 | -12.0 | AVG | 243 | 1.2 | |
| 2278.500 | 51.1 | H | /4.0 | -22.9 | PK | 243 | 1.2 | |
| 23/0.460 | 46.3 | V | 54.0 | -/./ | AVG | 88 | 1.1 | |
| 2305.900 | 54.3 | V | /4.0 | -19.7 | ΡK | бõ | 1.1 | RB I MHZ;VB 3 MHZ;PK |
| t; 10 11 12 12 14 14 14 14 14 14 14 14 14 14 14 14 14 | 20.0 - 00.0 - 80.0 - 40.0 - 20.0 - 20.0 - | 2100 | 2200 2: | 300 24 | 00 2500 Frequency | ил Паллан 2600 (MHz) | | 2800 2900 3000 |
| | | | | | | | | |
| | | | | | | | | |

| C | | | | | | EMO | C Test Data |
|------------------------|----------------------------|-----------------------------|--------------------------------|------------------------------|-----------------------------------|-------------------------|-------------------------------------|
| Client: | Intel | | | | | Job Number: | J84264 |
| Model [.] | 135BNHMW | / & 135BNHI | J | | | T-Log Number: | T84548 |
| | | | 5 | | | Account Manager: | Christine Krebill |
| Contact: | Steve Hack | ett | 210 | | | Class | ΝΙ/Λ |
| Stanuaru: | FUC 13 D, 1 | J.247, KJJ | 210 | | | Class. | N/A |
| | RS | S 210 Ra | diated S | purious | Emissions (Bluet | ooth Receive Mo | ode) |
| Test Spec | cific Detai | ls | | | | | |
| | Objective: | The objective specification | e of this test listed above | session is to e. | perform final qualification | testing of the EUT with | respect to the |
| Summary | of Result | s - Device | e Operatin | g in the 24 | 00-2483.5 MHz Ban | b | |
| Run # | Mode | Channel | Target Power | Measured Power | Test Performed | Limit | Result / Margin |
| MAC Addre | ss: 0015009 | 6B40F DR1 | U Tool Vers | sion 1.5.3-03 | 20 Driver version 15.0.0 | 0.51 - Sample with PIF | A antenna |
| 1 | | 2441 | | | Radiated Emissions, 1 - 40 GHz | RSS 210 | 36.8dBµV/m @ 2332 1MHz (-17 2dB) |
| MAC Addre | ess: 0015009 | 6C325 DRT | U Tool Vers | ion 1.5.3-032 | 20 Driver version 15.0.0 | .51 - Sample with integ | gral antenna |
| 2 | Receive Trace | 2441 | - | - | Radiated Emissions, 1 - 40 GHz | RSS 210 | 49.0dBµV/m @ 2320.0MHz (-5.0dB) |
| Ambient | Condition | S: | T R | emperature: el. Humidity: | 18-25 °C 30-40 % | | |
| Modificat No modifi | ions Made cations were | e During T made to the | esting EUT during | testing | | | |
| Deviation No deviat | is From Th ions were ma | ne Standa | r d requirement | s of the stand | lard. | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |





| E | | | | EMO | C Test Data |
|-------------------------|--|--------------------------------|--------------------------|---------------------------|-------------------|
| Client: | Intel | | | Job Number: | J84264 |
| Model. | 135RNHMW & 135RNHH | | | T-Log Number: | T84548 |
| | | | | Account Manager: | Christine Krebill |
| Contact: | Steve Hackett | | | Class | ΝΙ/Λ |
| Stanuaru. | FUU 10 D, 10.247, KOO ZIU | | | Ulass. | N/A |
| RS | S 210 and FCC 15.247 | (FHSS) Radia | ted Spurious I | Emissions (Bluet | ooth FHSS) |
| Test Spec | Cific Details Objective: The objective of this specification listed ab | test session is to pe pove. | rform final qualificatio | n testing of the EUT with | respect to the |
| Ambient (| Conditions: | Temperature: Rel. Humidity: | 18 - 25 °C 30 - 45 % | | |
| Modificat No modific | ions Made During Testing cations were made to the EUT dur | ing testing | | | |
| No deviati | ions were made from the requirem | ents of the standard | Ι. | | |

| Ć | | | | | | EMO | C Test Data |
|----------------------|------------------------------|---------------|---------------------------------------|-----------------------------|--|---------------------------------|--------------------------------------|
| Client: | Intel | | | | | Job Number: | J84264 |
| Model | | / 8. 125BNIUI | | T-Log Number: | T84548 | | |
| Mouel. | | | 0 | | Account Manager: | Christine Krebill | |
| Contact: | t: Steve Hackett | | | | | | |
| Standard: | d: FCC 15 B, 15.247, RSS 210 | | | | | Class: | N/A |
| Summary Target po | of Result | s - Device | e Operating | g in the 24 It exceeding | 00-2483.5 MHz Banc 7dBm for both integral and | I PIFA antennas | |
| Run # | Mode | Channel | Power Setting | Measured Power | Test Performed | Limit | Result / Margin |
| MAC Addre | ess: 0015009 | 6B40F DR | TU Tool Vers | ion 1.5.3-03 | 20 Driver version 15.0.0 | .51 - Sample with PIF. | A antenna |
| | | | 8 | 6.1 | Restricted Band Edge | FCC Part 15.209 / | 42.3dBµV/m@ |
| 1a | 2402 | 1a 2402 | | | (2390 IVIHZ) Radiated Emissions | I5.247(C) FCC Part 15 209 / | /3 2dBul//m@ |
| | | | 8 | 6.1 | 1 -40 GHz | 15.247(c) | 1233.2MHz (-10.8dB) |
| 16 | Basic rate | 2441 | 0 | 6.6 | Radiated Emissions, | FCC Part 15.209 / | 43.0dBµV/m @ |
| ai | 1Mb/s | 2441 | ð | 0.0 | 1 - 26 GHz | 15.247(c) | 1457.8MHz (-11.0dB) |
| | | | 8 | 6.4 | Restricted Band Edge | FCC Part 15.209 / | 42.8dBµV/m@ |
| 1c | 2480 | 2480 | | | (2483.5 MHZ) Dadiated Emissions | 15.247(C) | 2483.5MHZ (-11.20B) |
| | | | 8 | 6.4 | 1 -40 GHz | 15.247(c) | 1457.6MHz (-11.3dB) |
| | | | 0 | 2.(| Restricted Band Edge | FCC Part 15.209 / | 42.3dBµV/m @ |
| 29 | | 2402 | 8 | 2.6 | (2390 MHz) | 15.247(c) | 2389.9MHz (-11.7dB) |
| 20 | | 2402 | 8 | 2.6 | Radiated Emissions, | FCC Part 15.209 / | |
| | | | | 2.0 | 1 -40 GHz | 15.247(c) | |
| 2b | EDR 2Mb/s | 2441 | 8 | 3.4 | Radiated Emissions, | FUU Part 15.209 / 15.247(c) | 42.90BµV/m@ 1457.6MHz (11.1dB) |
| | 21010/2 | | | | Restricted Band Edge | FCC Part 15,209 / | 43.0dBuV/m @ |
| 0. | | 0.400 | 8 | 3.0 | (2483.5 MHz) | 15.247(c) | 2483.5MHz (-11.0dB) |
| 2C | | 2480 | 0 | 2.0 | Radiated Emissions, | FCC Part 15.209 / | |
| | | | 0 | 5.0 | 1 -40 GHz | 15.247(c) | |
| MAC Addre | ess: 0015009 | 06C325 DRT | U Tool Vers | ion 1.5.3-032 | 20 Driver version 15.0.0. | 51 - Sample with inte | gral antenna |
| 3a | Worst case | 2402 | 8 | | Restricted Band Edge | FCC Part 15.209 / | 42.1dBµV/m@ |
| | (EDR) | | | | (2390 MHZ) Restricted Band Edge | I5.247(C) FCC Part 15 2097 | 2382.9MHZ (-11.90B) //7.0dBu/V/m@ |
| 3b | (FDR) | 2480 | 8 | | (2483.5 MHz) | 15.247(c) | 2483.5MHz (-7.0dB) |
| 4 | LENY | 0.400 | 0 | | Radiated Emissions, | FCC Part 15.209 / | 46.8dBµV/m @ |
| 48 | Worst case | 2402 | 8 | | 1 -40 GHz | 15.247(c) | 2980.0MHz (-7.2dB) |
| 4b | Mode from | 2441 | 8 | | Radiated Emissions, | FCC Part 15.209 / | 45.3dBµV/m@ |
| | runs 1 and | | , , , , , , , , , , , , , , , , , , , | | 1-40 GHz | 15.247(c) | 2998.3MHz (-8.7dB) |
| 4c | 2 (Basic) | 2480 | 8 | | Raulated Emissions, 1-40 GHz | 15.247(c) | 45.50Bµv/m@ 2998.3MHz (-8.5dB) |
| | | 1 | 1 | | | | |
| | | | | | | | |

| _ | | | | | | | | | |
|---|--|---|-------------------------------------|----------------|-------------------|------------------------------|--------------------------|-----------------|-----------------------|
| CE | | | | | | | | EMO | C Test Data |
| Client: | Intel | | | | | | | Job Number: | J84264 |
| | | | | | | | T-I | Log Number: | T84548 |
| Model: | 135BNHMW | & 135BNHL | J | | | ļ | Αςςοι | unt Manager: | Christine Krebill |
| Contact: | Steve Hacke | ett | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: | N/A |
| otandare | | 012.1.7 | | | | | | | |
| Run #1: Ra C Te Run #1a: L Band Edge | diated Spuri Date of Test: St Engineer: ow Channel Signal Field | ious Emissi 9/12/2011 David Bare @ 2402 MH I Strength - | ons, 1000 - 4 Iz Direct measu | 10,000 MHz. | Operating M Te | lode:Basic r st Location: | rate, 1Mb/s FT Chambe | er #4 | |
| Frequency | Level | Pol | 15.209/ | / 15.247 | Detector | Azimuth | Height | Comments | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | |
| 2389.560 | 42.3 | V | 54.0 | - <u>11.</u> 7 | AVG | 72 | 1.2 | POS; RB11 | MHz; VB: <u>10 Hz</u> |
| 2388.850 | 55.3 | V | 74.0 | -18.7 | PK | 72 | 1.2 | POS; RB 1 M | MHz; VB: 10 MHz |
| 2387.980 | 42.2 | Н | 54.0 | -11.8 | AVG | 246 | 1.5 | POS; RB1N | MHz; VB: 10 Hz |
| 2387.280 | 55.5 | Н | 74.0 | -18.5 | PK | 246 | 1.5 | POS; RB 1 M | MHz; VB: 10 MHz |
| 2 Amplitude (dBuV/m) 5 Amplitu | 0.0 - 0.0 - 0. | Muni | milian | Judal | Frequency | (MHz) | | | · · · 10000 |
| Other Spuri | OUS EMISSIC | DNS Pol | 15,209 | / 15 247 | Detector | ∆zimuth | Height | Comments | |
| MHz | dRuV/m | v/h | Limit | Margin | Pk/OP/Avg | dearees | meters | Comments | |
| 1233.210 | 43.2 | H | 54.0 | -10.8 | Peak | 104 | 1.0 | Peak readin | a vs. average limit |
| 1457.620 | 42.6 | Н | 54.0 | -11.4 | Peak | 133 | 1.0 | Peak readin | g vs. average limit |
| | | | | | | | | <u>I</u> , | |
| Note 1: | For emissior | ns in restricte | ed bands, the | limit of 15.2 | .09 was used. | | | | |
| Note 2: | Emissions n | ot in restricte | ed bands are | measured a | s antenna cor | nducted and | compared t | o the out of b. | and power limit. |
| | Scans made | between 10 | - 40GHz with | n the measu | rement anten | na moved ar | ound the ca | ard and its an | tennas 10-20cm from |
| Note 3: | the device in | idicated there | e were no sig | jnifcant emis | sions in this f | requency rar | nge. 19.696 | GHz was visa | able at 10cm but not |
| | above the no | bise floor of t | he measurm | ent system 1 | meter away. | This emission | on does not | change with | Tx frequency. |
| | | | | | | | | | |



| C I | | | | | | | | EM | C Test Data | | |
|------------|----------------------------|-----------------|---------------|----------------------|----------------|----------------------|---|--|---------------------|--|--|
| Client: | Intel | | | | | | | Job Number: | J84264 | | |
| | | | | T-Log Number: T84548 | | T84548 | | | | | |
| Model: | 135BNHMW | / & 135BNHL | J | Acco | unt Manager: | Christine Krebill | | | | | |
| Contact: | Steve Hacke | Steve Hackett | | | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS | 210 | | | | | Class: | N/A | | |
| | | | | | | | l | | | | |
| Run #1c: H | igh Channel | @ 2480 MH | Z | | | | | | | | |
| Band Edge | Signal Field | Strength - I | Direct measu | urement of | field strength | ١ | | | | | |
| 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 | 42.8 | V | 54.0 | -11.2 | AVG | 284 | 1.2 | POS; RB 1 | MHz; VB: 10 Hz | | |
| 2484.330 | 56.0 | V | 74.0 | -18.0 | PK | 284 | 1.2 | POS; RB 1 | MHz; VB: 10 MHz | | |
| 2483.500 | 42.7 | Н | 54.0 | -11.3 | AVG | 201 | 1.0 | POS; RB 1 | MHz; VB: 10 Hz | | |
| 2484.740 | 55.7 | Н | 74.0 | -18.3 | PK | 201 | 1.0 | POS; RB 1 | MHz; VB: 10 MHz | | |
| (dBuV/m) | 70.0 - 60.0 - 50.0 - | | | | | | | | | | |
| Amplitude | 40.0- 30.0- | MM | millim | And | hillinka | han ha nation and an | مەربىيە مەربى | fyr ^{ande} fyn a ^{bdre} fy | | | |
| | 20.0 - 10.0 - 1000 | | | | Frequency | (MHz) | | | 10000 | | |
| Other Sp | urious Emis | sions | 45.000 | | | | | | | | |
| Frequency | Level | Pol | 15.2097 | / 15.24/ | Detector | Azimuth | Height | Comments | | | |
| MHZ | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | Deale " | | | |
| 1457.570 | 42.7 | H | 54.0 | -11.3 | Peak | 135 | 1.0 | Peak readin | g vs. average limit | | |
| 1233.360 | 41.7 | V | 54.0 | -12.3 | Peak | 19 | 1.0 | Peak readin | g vs. average limit | | |
| | F | | d have to the | | 00 | | | | | | |
| Note 1: | For emission | ns in restricte | a bands, the | imit of 15.2 | was used. | | | | | | |
| Note 2: | Lemissions n | ot in restricte | d bands are | measured a | s antenna cor | nducted and | compared | to the out of b | pand power limit. | | |

| | Intel | | | | | | | Job Number: | J84264 |
|------------------------------|---|--|-----------------------|--------------------------|---------------------------|--------------------------|----------------------------------|---|--|
| Model | | 8. 125RNUI | 1 | | | | T- | Log Number: | T84548 |
| wouer. | | | , | | | | Ассон | unt Manager: | Christine Krebill |
| Contact | Steve Hacke | tt | | | | | | | |
| Standard: | FCC 15 B, 15 | 5.247, RSS 2 | 210 | | | | | Class: | N/A |
| un #2: Ra Te un #2a: L | adiated Spuri Date of Test: (est Engineer:) | ous Emissi 9/12/2011 David Bare @ 2402 MH | ons, 1000 - Z | 40,000 MHz. | . Operating N Te | lode: EDR, ast Location: | 3Mb/s FT Chamb | er #4 | |
| Band Ed | ge Signal Fiel | Id Strength | - Direct me | asurement of 15 247 | Dotoctor | Jth Azimuth | Hoight | Commonts | |
| MH7 | dBuV/m | v/h | Limit | Margin | Pk/OP/Ava | degrees | meters | COMINCHIS | |
| 2389.930 | 42.3 | V | 54.0 | -11.7 | AVG | 72 | 1.2 | POS; RB 1 | MHz; VB: 10 Hz |
| 2389.800 | 57.3 | V | 74.0 | -16.7 | PK | 72 | 1.2 | POS; RB 1 | MHz; VB: 10 MHz |
| 2390.000 | 42.3 | Н | 54.0 | -11.7 | AVG | 246 | 1.5 | POS; RB 1 | MHz; VB: 10 Hz |
| 2389.910 | 54.9 | Н | 74.0 | -19.1 | PK | 246 | 1.5 | POS; RB 1 | MHz; VB: 10 MHz |
| MHz 1457.590 1234.430 | dBμV/m 42.9 42.2 | v/h H H | Limit 54.0 54.0 | Margin -11.1 -11.8 | Pk/QP/Avg Peak Peak | degrees 130 146 | meters 1.0 1.0 | Peak readin Peak readin | g vs. average limit g vs. average limit |
| | ·· | | | · | I | | | | 5 5 |
| lote 1: | For emission | s in restricte | d bands, the | limit of 15.2 | 09 was used. | ducted and | compared t | to the out of h | and nowar limit |
| | The emission | $\frac{1}{10}$ at 1233 a | nd 1457 MH | z do not cha | s anienna cui | FUT Ty free | uency is ch | anded or the | Tx is stonned |
| | 80.0 - | | | | | | | | |
| Amplitude (dBuV/m) | 60.0 - 50.0 - 40.0 - 30.0 - 20.0 - | | multim | shaw | heller | manne | يند. الأو اد مروز روم | , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | |





| Client: | Intel | Job Number: | J84264 |
|-----------|---------------------------|------------------|-------------------|
| Madal | | T-Log Number: | T84548 |
| MUUUEI. | | Account Manager: | Christine Krebill |
| Contact: | Steve Hackett | | |
| Standard: | FCC 15 B, 15.247, RSS 210 | Class: | N/A |
| | | | |

Run #3b: High Channel @ 2480 MHz, Mode: WORST CASE FROM RUNS 1 and 2 (EDR)

| Band Edge Signal Field Strength - Direct measurement of heid 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 | 47.0 | Н | 54.0 | -7.0 | AVG | 129 | 1.0 | RB 1 MHz;VB 10 Hz;Pk | |
| 2483.500 | 42.5 | V | 54.0 | -11.5 | AVG | 302 | 1.0 | RB 1 MHz;VB 10 Hz;Pk | |
| 2483.640 | 56.8 | Н | 74.0 | -17.2 | PK | 129 | 1.0 | RB 1 MHz;VB 3 MHz;Pk | |
| 2483.580 | 52.5 | V | 74.0 | -21.5 | PK | 302 | 1.0 | RB 1 MHz;VB 3 MHz;Pk | |



| | An AZ | うしし A [*] company | | | | | | EIVIO | |
|--|--|---|--|--|--|--|-------------------------------------|--|--|
| Client: | Intel | | | | | | | Job Number: | J84264 |
| Model: | 135BNHMW | ' & 135BNHU | J | | | | T- | Log Number: | T84548 |
| | | | | Acco | unt Manager: | Christine Krebill | | | |
| Contact: | Steve Hacke | ett | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RSS 2 | 210 | | | | | Class: | N/A |
| Run #4: Ra [Te MAC Addre Run #4a: L | adiated Spur Date of Test: est Engineer: ess: 0015009 .ow Channel | ious Emissie 9/23/2011 M. Birgani 6C325 DRTU @ 2402 MH: | ons, 1-40GF J Tool Versi z | lz. Integrate | ed Trace Ante Te 20 Driver ver | enna, Opera est Location: rsion 15.0.0 | ting Mode: FT Chamb .51 - Sam | : Basic er #4 ple with inte | gral antenna |
| Other Sp | urious Emis | sions | | | r r | | | | |
| -requency | Level | Pol | 15.209 | / 15.24/ | Detector | Azimuth | Height | Comments | |
| MHZ | dBµV/m | v/h | Limit | Margin | PK/QP/Avg | degrees | meters | Dook roadin | ave average limit |
| <u>2980.000</u> 1660.000 | 40.8 30.0 | V | 54.0 | -7.Z | Peak | 20/ | 1.0 | Peak readin | g vs. average limit |
| 1192 500 | 38.8 | V H | 54.0 | -15.2 | Peak | 76 | 1.0 | Peak readin | g vs. average limit |
| 1458.330 | 38.2 | H | 54.0 | -15.8 | Peak | 136 | 1.6 | Peak readin | g vs. average limit |
| | | | | | | | | | 5 5 |
| ote 1: | For emission | ns in restricte | d bands, the | limit of 15.2 | 109 was used. | | | | |
| lote 2: | Emissions n | ot in restricte | d bands are | measured a | s antenna cor | nducted and | compared | to the out of b | and power limit. |
| | | between 10 | - 40GHz wit | h the measu | rement anten | na moved ar | round the c | ard and its an | tennas 10-20cm from |
| Amplitude (dBuV/m) | 110.0 - 100.0 - 90.0 - 80.0 - 70.0 - 60.0 - 50.0 - 40.0 - 25.0 - 1000 | alicated there bise floor of the | - 40GHz wit e were no sig he measurm | h the measu gnifcant emis ent system 1 | rement anten ssions in this fi I meter away. | na moved ar requency ran This emission | round the c. | ard and its an oGHz was vis- t change with | tennas 10-20cm from able at 10cm but not Tx frequency. |





Elliott

EMC Test Data

| Client: | Intel | Job Number: | J84264 |
|-----------|---------------------------|------------------|-------------------|
| Model | | T-Log Number: | T84548 |
| wouei. | | Account Manager: | Christine Krebill |
| Contact: | Steve Hackett | | |
| Standard: | FCC 15 B, 15.247, RSS 210 | Class: | N/A |

FCC 15.247 FHSS - Power, Bandwidth and Conducted 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

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 used.

Unless stated otherwise the EUT was operating such that it constantly hopped on either the low, center or high channels.

| Ambient Conditions: | Temperature: | 18-23 °C |
|---------------------|----------------|----------|
| | Rel. Humidity: | 30-40 % |

Summary of Results

MAC: 00150096B40F DRTU Tool Version 1.5.3-0320 Driver version 15.0.0.51

| Run # | Test Performed | Limit | Pass / Fail | Result / Margin |
|-------|--------------------|------------|-------------|--|
| 1 | Output Dowor | 15.247(b) | DACC | Basic Rate: 7.2 dBm (0.005 W) |
| I | Oulpul Power | 15.247(D) | PASS | EDR: 4.8 dBm (0.003 W) |
| 2 | 20dP Pandwidth | 15.247(2) | DACC | Basic Rate: 965 kHz |
| ۲ | | 10.247(a) | PASS | EDR: 1300 kHz |
| 2 | 00% handwidth | 15.247(2) | DASS | Basic Rate: 889 kHz |
| ۷. | 9976 Danuwiuun | 15.247 (a) | PASS | EDR: 1188 kHz |
| 3 | Channel Spacing | 15.247(a) | PASS | 1 MHz |
| 3 | Channel Occupancy | 15.247(a) | PASS | Device complies with the Bluetooth 2 |
| 3 | Number of Channels | 15.247(a) | PASS | hopping channels |
| 5 | Conducted Spurious | 15.247(a) | PASS | All emissions more than 20dB below the highest in-band signal level. |

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.

CElliott

EMC Test Data

| Client: | Intel | Job Number: | J84264 |
|-----------|---------------------------|------------------|-------------------|
| Model | | T-Log Number: | T84548 |
| wouer. | | Account Manager: | Christine Krebill |
| Contact: | Steve Hackett | | |
| Standard: | FCC 15 B, 15.247, RSS 210 | Class: | N/A |
| | | | |

Run #1: Output Power

Date of Test: 9/22/2011 Test Engineer: M. Birgani Test Location: FT Chamber#4

For frequency hopping systems in the 2400-2483.5 MHz band employing less than 75 channels the maximum allowed output power is **0.125 watts**.

Maximum antenna gain: 3.2 dBi

| Mode | Channel | Frequency (MHz) | Res BW | Output Power (dBm) | Output Power (W) | EIRP (W) |
|------------|---------|-----------------|--------|--------------------|------------------|----------|
| | Low | 2402 | 1 MHz | 6.3 | 0.0043 | 0.0089 |
| Basic Rate | Mid | 2441 | 1 MHz | 7.2 | 0.0052 | 0.0109 |
| | High | 2480 | 1 MHz | 7.0 | 0.0050 | 0.0105 |
| EDR | Low | 2402 | 1 MHz | 3.8 | 0.0024 | 0.0050 |
| | Mid | 2441 | 1 MHz | 4.8 | 0.0030 | 0.0064 |
| | High | 2480 | 1 MHz | 4.5 | 0.0028 | 0.0059 |

Run #2: Bandwidth, Channel Occupancy, Spacing and Number of Channels

Date of Test: 9/22/2011

Test Location: FT Chamber#4

| Test Engineer: | M. Birgani |
|----------------|------------|
|----------------|------------|

| Mode | Channel | Frequency (MHz) | Resolution Bandwidth | 20dB Bandwidth (kHz) | Resolution Bandwidth | 99% Bandwidth (kHz) |
|------------|---------|-----------------|-------------------------|----------------------|-------------------------|---------------------|
| | Low | 2402 | 30 kHz | 960 | 30 kHz | 879 |
| Basic Rate | Mid | 2441 | 30 kHz | 965 | 30 kHz | 889 |
| | High | 2480 | 30 kHz | 965 | 30 kHz | 889 |
| EDR | Low | 2402 | 30 kHz | 1295 | 30 kHz | 1178 |
| | Mid | 2441 | 30 kHz | 1300 | 30 kHz | 1188 |
| | High | 2480 | 30 kHz | 1300 | 30 kHz | 1188 |
| | | | | | | |

| Note 1: | 20dB bandwidth measured using $RB = 30kHz$, $VB = 100kHz$ ($VB > RB$) |
|---------|--|
| Note 2: | 99% bandwidth measured using RB = 30kHz, VB = 100kHz VB >=3RB) |



Elliott EMC Test Data Job Number: Client: Intel J84264 T84548 T-Log Number: Model: 135BNHMW & 135BNHU Account Manager: Christine Krebill Contact: Steve Hackett Standard: FCC 15 B, 15.247, RSS 210 Class: N/A Channel Spacing Channel Spacing: 1000.0 kHz 20dB Bandwidth: 1300 kHz The channel spacing was measured in Basic rate mode with hopping enabled - see plot below showing channel spacing: The channel spacing shall be greater than 2/3 Times the widest 20dB bandwidth as the ouput power is <0.125W. Number of channels: 79 Max 20 Min (AFH enabled) The number of channels was measured in Basic rate mode with hopping enabled with both the maximum (all) channels enabled and with the minimum number of channels enabled. The system shall employ a minimum of 15 hopping channels. 8.0 Analyzer Settings HP8564E,EMICF: 2429.000 MHz 6.0 SPAN: 5,000 MHz RB: 300 kHz 4.0 VB: 100 kHz Detector: POS Amplitude Attn: 20 DB 2.0 RL Offset: 10.0 DB Sweep Time: 50.0ms 0.0 Ref Lvl: 10.5 DBM -2.0 Comments Channel Spacing: 1.00 MHz -4.0 -5.0 2431.0 2431.5 2426.5 2427.0 2428.0 2429.0 2430.0 Frequency (MHz) ≁ ն-+ 2430.0385 10.00 Delta Freg. 1.000 Cursor 1 **Elliott**

Run #4: Channel Occupancy and Number of Channels

10.00

2429.0385

Requirement: Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

*- Շ-

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. (Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.)

Delta Amplitude 0.00

The device complies with the Bluetooth protocol and employs a minimum of 20 of the available 79 hopping channels when employing adaptove frequency hopping and all 79 channels when not. Channels are selected in a speudo random manner to ensure, on average, all channels are used equally.

The hopping rate is 1600 hops per second although any new channel may be used for a single hop slot, 3 hop slots or 5 hop slots. The dwell time per channel is, therefore either 0.625ms (single slot), 1.875ms (three slot) or 3.125ms (five slot). The average time of occupancy will not exceed 0.4s in any time interval of 0.4s mutliplied by the number of channels being used.

Cursor 2



Elliott EMC Test Data Client: Intel Job Number: J84264 T84548 T-Log Number: Model: 135BNHMW & 135BNHU Account Manager: Christine Krebill Contact: Steve Hackett Standard: FCC 15 B, 15.247, RSS 210 Class: N/A Run #4: Antenna Conducted Spurious Emissions, 30 - 26500 MHz. Date of Test: 9/22/2011 Test Location: FT Chamber#4 Test Engineer: M. Birgani Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level with the hopping feature disabled. Addiitonal plots with hopping enabled at the band edges. Low channel -Basic Rate Basic rate 10.0 0.0 -10.0 Amplitude (dBm) -20.0 -30.0 -40.0 -50.0 -60.0 -70.0 26500 10000 30 100 1000 Frequency (MHz) Basic rate 10.0 0.0 -10.0 Amplitude (dBm) -20.0 -30.0 "MA -40.0 -50.0 -60.0 2400 2404 2401 2403 2402 Frequency (MHz)





Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level with the **hopping feature enabled** to show compliance with the -20dBc requirement at the allocated band edge. The spectrum analyzer is left in max hold mode until the trace stabilizes.



Low channel, hopping enabled - Basic Rate







Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level with the **hopping feature enabled** to show compliance with the -20dBc requirement at the allocated band edge. The spectrum analyzer is left in max hold mode until the trace stabilizes.



| Ellio | tt | | | EMC : | Test Data |
|---|---|--|---|--|---|
| Intel | company | | | Job Number: J842 | 264 |
| | 12EDNUU | | T | -Log Number: T84 | 548 |
| | (133BNHU | | Acco | ount Manager: Chri | stine Krebill |
| Steve Hackett | 247 DCC 210 | | | | |
| FUC 15 B, 15. | 247, RSS 210 | | | Class: B | |
| | Conduc (Elliott Laboratories Fremo | cted Emissions ont Facility, Semi-Anec | choic Chaml | ber) | |
| cific Details Objective: T s | he objective of this test session is to becification listed above. | perform final qualification | on testing of t | the EUT with respe | ct to the |
| Date of Test: 9/22/2011Config. Used: -Test Engineer: M. BirganiConfig Change: -Test Location: FT Chamber #4Host Unit Voltage 12 | | | | | |
| Fest Configu system was loc LISN. A second | Iration ated on a wooden table inside the se LISN was used for all local support of | emi-anechoic chamber, equipment. | 40 cm from a | a vertical coupling p | plane and 80cm |
| Conditions: | Temperature: | 17-23 °C | | | |
| | Rel. Humidity: | 30-40 % | | | |
| y of Results | | | | | |
| , 150096B40F_D | RTU Tool Version 1.5.3-0320 Driv | ver version 15.0.0.51 | - | | |
| ın # | Test Performed | Limit | Result | Margin | |
| tions Made I ications were m | During Testing ade to the EUT during testing Standard | | | | |
| tions were mad | e from the requirements of the stand | ard. | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | Intel Intel I35BNHMW & Steve Hackett FCC 15 B, 15. Cific Details Objective: TI SP Date of Test: 9/ est Engineer: Me est Location: F Fest Configu system was loc LISN. A second Conditions: y of Results 150096B40F D In # 1 tions Made I ications were made | Intel 135BNHMW & 135BNHU Steve Hackett FCC 15 B, 15.247, RSS 210 Conduction (Elliott Laboratories Freme) Date of Test: 9/22/2011 est Engineer: M. Birgani est Location: FT Chamber #4 Test Configuration System was located on a wooden table inside the second LISN was used for all local support Conditions: remperature: Rel. Humidity: Y of Results 150096B40F DRTU Tool Version 1.5.3-0320 Driv Intest Performed 1 CE, AC Power,120V/60Hz tions Made During Testing ications were made to the EUT during testing Is From The Standard tions were made from the requirements of the stand | Intel 135BNHMW & 135BNHU Steve Hackett FCC 15 B, 15.247, RSS 210 Conducted Emissions Conducted Emissions Conducted Emissions Conducted Emissions Config Change Config V2/2011 Config Change Stere made for this test session is to perform final qualificative Config V2/2011 Config Change Stere made for these above. Date of Test: 9/22/2011 Config Change est Location: FT Chamber #4 Stere was located on a wooden table inside the semi-anechoic chamber, ISO096B40F DRTU Tool Version 1.5.3-0320 Driver version 15.0.0.51 Im# 150096B40F DRTU Tool Version 1.5.3-0320 Driver version 15.0.0.51 Im# 1 Test Performed Limit 1 Ce, AC Power,120V/60Hz Class B | Intel Image: | Image: Display: D |
| 6 | | D tt | | | | | EM | C Test Data |
|--------------------------------------|---|---|-------------------------------------|----------------------------|----------------------------|----------------------|---------------------|-------------|
| Client: | Intel | | | | | | Job Number: | J84264 |
| | | | _ | | | | T-Log Number: | T84548 |
| Model: | 135BNHMW | / & 135BNHL | J | | Account Manager: | Christine Krebill | | |
| Contact: | Steve Hack | ett | | | | | | |
| Standard: | FCC 15 B, 1 | 15.247, RSS 2 | 210 | | | | Class: | В |
| Run #1: AC Note: The Final qua | Power Port e module w si-peak and | Conducted as transmitti average rea | Emissions, ing at 2437 idings | 0.15 - 30MH MHz (Wi-Fi) | lz, 120V/60H at 17dBm a | łz nd 2440 MHz (B | luetooth) at maximu | m level. |
| Frequency | Level | AC | Cla | ss B | Detector | Comments | | |
| MHz | dBµV | Line | Limit | Margin | QP/Ave | | | |
| 8.000 | 41.7 | Line | 50.0 | -8.3 | AVG | AVG (0.10s) | | |
| 8.000 | 40.5 | Neutral | 50.0 | -9.5 | AVG | AVG (0.10s) | | |
| 10.733 | 37.4 | Neutral | 50.0 | -12.6 | AVG | AVG (0.10s) | | |
| 8.000 | 46.2 | Line | 60.0 | -13.8 | QP | QP (1.00s) | | |
| 8.000 | 45.6 | Neutral | 60.0 | -14.4 | QP | QP (1.00s) | | |
| 14.149 | 35.0 | Neutral | 50.0 | -15.0 | AVG | AVG (0.10s) | | |
| 10.342 | 34.5 | Line | 50.0 | -15.5 | AVG | AVG (0.10s) | | |
| 10.733 | 43.6 | Neutral | 60.0 | -16.4 | QP | QP (1.00s) | | |
| 14.633 | 33.5 | Line | 50.0 | -16.5 | AVG | AVG (0.10s) | | |
| 10.342 | 41.0 | Line | 60.0 | -19.0 | QP | QP (1.00s) | | |
| 14.149 | 40.3 | Neutral | 60.0 | -19.7 | QP | QP (1.00s) | | |
| 14.633 | 38.9 | Line | 60.0 | -21.1 | QP | QP (1.00s) | | |
| 0.555 | 19.8 | Line | 56.0 | -36.2 | QP | QP (1.00s) | | |
| 0.549 | 19.8 | Neutral | 56.0 | -36.2 | QP | QP (1.00s) | | |
| 0.228 | 26.2 | Line | 62.5 | -36.3 | QP | QP (1.00s) | | |
| 0.224 | 26.4 | Neutral | 62.7 | -36.3 | QP | QP (1.00s) | | |
| 0.555 | 4.5 | Line | 46.0 | -41.5 | AVG | AVG (0.10s) | | |
| 0 5 40 | 4.3 | Neutral | 46.0 | -41.7 | AVG | AVG (0.10s) | | |
| 0.549 | 10.1 | Line | 52.5 | -42.4 | AVG | AVG (0.10s) | | |
| 0.549 | 10.1 | LINC | | | | | | |





Client: Intel Job Number: J84264 Model: 135BNHMW & 135BNHU T-Log Number: T48548 Contact: Steve Hackett Christine Krebill Standard: FCC 15 B, 15.247, RSS 210 Class:

Radiated Emissions - Module

(Elliott Laboratories Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

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

Date of Test: 9/22/2011 Test Engineer: M. Birgani Test Location: FT Chamber #4 Config. Used: 1 Config Change: -Host Unit Voltage 120V/60Hz

General Test Configuration

The EUT and any 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: | 17-22 °C |
|---------------------|----------------|----------|
| | Rel. Humidity: | 30-40 % |

Summary of Results

| Run # | Test Performed | Limit | Result | Margin |
|-----------------|----------------------------|-----------------|--------|---------------------------------|
| 1a 000 11b | Radiated Emissions | 15.209 / 15.247 | DACC | 44.0dBµV/m @ 662.49MHz (Margin: |
| 1a - 002.11D | 30 - 1000 MHz, Preliminary | RSS 210 | PASS | -2.0dB) |
| 1b Dlustaath | Radiated Emissions | 15.209 / 15.247 | DACC | 45.2dBµV/m @ 662.47MHz (Margin: |
| ID - DIUELUULII | 30 - 1000 MHz, Preliminary | RSS 210 | PASS | -0.8dB) |
| 2 Worst Case | Radiated Emissions | 15.209 / 15.247 | DACC | 45.2dBµV/m @ 662.47MHz (Margin: |
| | 30 - 1000 MHz, Maximized | RSS 210 | PASS | -0.8dB) |

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.

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

| | An CAS | A company | | | | | | | |
|---|--|---|---|---|---|--|---|--|------------------|
| Client | Intel | | | | | | | Job Number: | J84264 |
| Model | 135RNHM/// | 125RN | нп | | | | T- | Log Number: | T84548 |
| wouer. | | & 135DN | ΠŪ | | | | Ассо | unt Manager: | Christine Krebil |
| Contact: | Steve Hacke | ett | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RS | S 210 | | | | | Class: | В |
| n #1a: F | reliminary R | adiated E | Emissions, 3 | 0 - 1000 MH | z, EUT at 243 | 7MHz, 802.1 | 11b Mode (* | 16.5dBm) | |
| 5 | 5.0 | | | | | | | | |
| 5 | 0.0- | | | | | | | | |
| 4 | 5.0- | | | | | | | | |
| l | | | | | | | | | 1 |
| <u>_</u> 4 | J.U- | / | 1 | | | | | | |
| <u> </u> | 5.0- | f | 1 | | | • | | · . | ¶ , , |
| | | | \rightarrow | | | M | | | |
| <u>⊒</u> i 3 | D.O- - V | \sim | 7 / 7 | 1 | | / LA _ L95 | | | |
| 2 Ampliti | 0.0- V 5.0- | \sim | V٣ | | Am MA | CMWM | | | |
| 2 Public | 0.0- 5.0- 0.0- | \sim | V۳ | Wh, | Mym | (Warn | | WWARN | |
| Hilduw 2 | 0.0- V 5.0- 0.0- | \sim | V'n | Why | MyM | (Wym) | W | | |
| 11 Hdw Z 1 | 0.0 - V 5.0 - 0.0 - 5.0 - 30 | ~ | | Wh. 100 | M | | | | |
| Tildue 2 2 1 | 0.0 - V 5.0 - 0.0 - 5.0 - 30 | · · | V ~ | M. . 100 | Frequency | (MHz) | | WMAN | |
| Prelimina | 0.0 - V 5.0 - 0.0 - 5.0 - 30 | | tured during | 100 | Frequency | (Myr) (MHz) | | | 100 |
| <u>Prelimina</u> equency | 0.0 - V 5.0 - 5.0 - 5.0 - 30 | Jings cap | tured during | pre-scan 9 / RSS 210 | | (Myr) (MHz) Azimuth | Height | Comments | |
| Prelimina Prelimina MHz | 0.0 - V 5.0 - 5.0 - 5.0 - 5.0 - 30 Try peak read Level dB μ V/m | Jings cap Pol v/h | tured during FCC 15.200 Limit | pre-scan 9/RSS 210 Margin | Frequency Detector Pk/QP/Avg | (MHz) | Height meters | Comments | |
| Prelimina equency MHz 54.406 | 0.0 - V 5.0 - | dings cap Pol V/h V | tured during FCC 15.20 Limit 40.0 | pre-scan 9 / RSS 210 Margin 0.3 | Frequency Detector Pk/QP/Avg Peak | (MHz) Azimuth degrees 360 | Height meters 1.0 | Comments | |
| Image: Apple of the second s | 0.0 - V 5.0 - | Jings cap Pol V/h V H | tured during FCC 15.20 ^o Limit 40.0 40.0 | 100 pre-scan 9 / RSS 210 Margin 0.3 -1.5 | Frequency Detector Pk/QP/Avg Peak Peak | Azimuth degrees 360 244 | Height meters 1.0 1.0 | Comments | |
| Prelimina equency MHz 54.406 31.915 562.492 | 0.0 - 1 | Jings cap Pol V/h V H H | tured during FCC 15.20 Limit 40.0 40.0 46.0 | 100 pre-scan 9/RSS 210 Margin 0.3 -1.5 -2.1 | Frequency Detector Pk/QP/Avg Peak Peak Peak | Azimuth degrees 360 244 79 | Height meters 1.0 1.5 | Comments | |
| Prelimina equency MHz 54.406 31.915 562.492 32.984 | $p_{0.0} - \bigvee$ $p_{0.0} - \bigvee$ p_{0 | dings cap Pol V/h V H H V | tured during FCC 15.20 Limit 40.0 40.0 46.0 40.0 | 100 pre-scan 9/RSS 210 Margin 0.3 -1.5 -2.1 -5.8 | Frequency Detector Pk/QP/Avg Peak Peak Peak Peak | Azimuth degrees 360 244 79 88 | Height meters 1.0 1.5 1.0 | Comments | |
| Prelimina equency MHz 54.406 31.915 562.492 32.984 599.970 | 0.0 - V 5.0 - | dings cap Pol V/h V H H V H | tured during FCC 15.200 Limit 40.0 40.0 40.0 46.0 46.0 | yre-scan 9/RSS 210 Margin 0.3 -1.5 -2.1 -5.8 -11.1 | Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak | Azimuth degrees 360 244 79 88 224 | Height meters 1.0 1.5 1.0 1.0 1.0 | Comments | |
| Prelimina equency MHz 54.406 31.915 62.492 32.984 99.970 36.587 | $\begin{array}{c c} 0.0 - & V \\ \hline 5.0 - & \\ 0.0 - & \\ \hline 5.0 - & \\ 30 \end{array}$ | Jings cap Pol V/h V H H V H V | tured during FCC 15.20 ⁰ Limit 40.0 40.0 46.0 46.0 46.0 | 100 pre-scan 9/RSS 210 Margin 0.3 -1.5 -2.1 -5.8 -11.1 -13.3 | Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak | Azimuth degrees 360 244 79 88 224 136 | Height meters 1.0 1.5 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | Comments | |
| Prelimina 54.406 31.915 562.492 32.984 599.970 236.587 Prelimina | 0.0 - 0.0 | dings cap Pol V/h V H H V H V H V | tured during FCC 15.20 Limit 40.0 40.0 40.0 46.0 46.0 46.0 46.0 | 9 / RSS 210 Margin 0.3 -1.5 -2.1 -5.8 -11.1 -13.3 pulation of F | Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak UT interface | Azimuth degrees 360 244 79 88 224 136 cables) | Height meters 1.0 1.5 1.0 1.0 1.0 1.0 1.0 1.0 | Comments | |
| Prelimina equency MHz 54.406 31.915 562.492 32.984 599.970 236.587 Prelimina equency | 0.0 - V 5.0 - 30 0.0 - 30 10.0 - | dings cap Pol V/h V H H V H V ak reading Pol | tured during FCC 15.20 ⁰ Limit 40.0 40.0 46.0 46.0 46.0 46.0 55 (no manip | 100 pre-scan 9/RSS 210 Margin 0.3 -1.5 -2.1 -5.8 -11.1 -13.3 pulation of E 9/RSS 210 | Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak UT interface Detector | Azimuth degrees 360 244 79 88 224 136 cables) Azimuth | Height meters 1.0 1.0 1.5 1.0 1.0 1.0 1.0 1.0 Height | Comments | |
| Prelimina equency MHz 54.406 31.915 562.492 32.984 599.970 236.587 Prelimina equency MHz | 0.0 - V 5.0 - | Jings cap Pol V/h V H H V H V Ak reading Pol V/h | tured during FCC 15.20 Limit 40.0 40.0 46.0 46.0 46.0 46.0 5 (no manip FCC 15.20 Limit | 100 pre-scan 9 / RSS 210 Margin 0.3 -1.5 -2.1 -5.8 -11.1 -13.3 pulation of E 9 / RSS 210 Margin | Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Detector Pk/QP/Ava | Azimuth degrees 360 244 79 88 224 136 cables) Azimuth degrees | Height meters 1.0 1.5 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | Comments | |
| Prelimina equency MHz 54.406 31.915 562.492 32.984 599.970 236.587 Prelimina equency MHz 562.492 562.492 | 0.0 - 1 | Jings cap Pol V/h V H H V H V Ak reading Pol V/h H | tured during FCC 15.20 Limit 40.0 40.0 46.0 46.0 46.0 46.0 46.0 5 (no manip FCC 15.20 Limit 46.0 | 100 pre-scan 9/RSS 210 Margin 0.3 -1.5 -2.1 -5.8 -11.1 -13.3 pulation of E 9/RSS 210 Margin -2.0 | Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak UT interface Detector Pk/QP/Avg QP | Azimuth degrees 360 244 79 88 224 136 cables) Azimuth degrees 83 | Height meters 1.0 1.5 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | Comments | |
| Prelimina equency MHz 54.406 31.915 62.492 32.984 99.970 36.587 Prelimina equency MHz 62.492 31.915 | 0.0 - 0.0 | dings cap Pol V/h V H H V H V Ak reading V Pol V/h H H | tured during FCC 15.20 Limit 40.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 | ioo pre-scan 9 / RSS 210 Margin 0.3 -1.5 -2.1 -5.8 -11.1 -13.3 pulation of E 9 / RSS 210 Margin -2.1 -5.8 -11.1 -13.3 pulation of E 9 / RSS 210 Margin -2.0 -10.5 | Frequency Prequency Detector Pk/QP/Avg Peak | Azimuth degrees 360 244 79 88 224 136 cables) Azimuth degrees 83 253 | Height meters 1.0 1.0 1.5 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | Comments Comments Comments Comments Comments QP (1.00s) QP (1.00s) | |
| Prelimina equency MHz 54.406 31.915 62.492 32.984 99.970 36.587 Prelimina equency MHz 62.492 31.915 99.970 | 0.0 - V 5.0 - 30 0.0 - 30 5.0 - 30 10.0 - 30 5.0 - 30 30 10.0 - 30 10.0 - 30 10. | dings cap Pol V/h V H H V H V Ak reading Pol V/h H H H | tured during FCC 15.20 ^o Limit 40.0 40.0 46.0 46.0 46.0 46.0 5 (no manip FCC 15.20 ^o Limit 46.0 40.0 40.0 40.0 40.0 40.0 | intervention interventintervention inter | Frequency Prequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak Peak Detector Pk/QP/Avg QP QP QP QP | Azimuth degrees 360 244 79 88 224 136 cables) Azimuth degrees 83 253 214 | Height meters 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | Comments Comments Comments QP (1.00s) QP (1.00s) | |
| Prelimina equency MHz 54.406 31.915 62.492 32.984 999.970 236.587 Prelimina equency MHz 662.492 31.915 662.492 31.915 999.970 32.984 | 0.0 - V 5.0 - 30 0.0 - 5.0 - 30 10.0 - 5.0 - 30 10.0 - 5.0 - 30 10.0 - 5.0 - 30 10.0 - 5.0 - 5.0 - 30 10.0 - 5.0 - | Jings cap Pol V/h V H H V H V Ak reading Pol V/h H H H H V | tured during FCC 15.20 Limit 40.0 40.0 46.0 46.0 46.0 46.0 5 (no manip FCC 15.20 Limit 46.0 40.0 46.0 40.0 40.0 40.0 40.0 40.0 | 100 pre-scan 9 / RSS 210 Margin 0.3 -1.5 -2.1 -5.8 -11.1 -13.3 pulation of E 9 / RSS 210 Margin -2.0 -10.5 -11.3 -13.7 | Frequency Prequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak Detector Pk/QP/Avg QP QP QP QP QP | Azimuth degrees 360 244 79 88 224 136 cables) Azimuth degrees 83 253 214 80 | Height meters 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | Comments Comments Comments Comments Comments Comments QP (1.00s) QP (1.00s) QP (1.00s) | |
| Prelimina equency MHz 54.406 31.915 562.492 32.984 599.970 236.587 Prelimina equency MHz 562.492 31.915 599.970 32.984 236.587 | 0.0 - 0.0 | Jings cap Pol V/h V H H V H V Ak reading Pol V/h H H H H H V V V | tured during FCC 15.20 ⁰ Limit 40.0 40.0 46.0 46.0 46.0 46.0 46.0 5 (no manip FCC 15.20 ⁰ Limit 46.0 40.0 40.0 40.0 40.0 40.0 40.0 40.0 | pre-scan 9 / RSS 210 Margin 0.3 -1.5 -2.1 -5.8 -11.1 -13.3 pulation of E 9 / RSS 210 Margin -13.3 -10.5 -11.3 -13.7 -14.3 | Frequency Prequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak Detector Pk/QP/Avg QP QP QP QP QP QP QP | Azimuth degrees 360 244 79 88 224 136 cables) Azimuth degrees 83 253 214 80 135 | Height meters 1.0 1.0 1.5 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | Comments Comments Comments Comments Comments Comments QP (1.00s) |

| Client | Intel | | | | | | | Job Number: | J84264 |
|--|---|--|---|--|--|--|--|--|-----------------|
| | 40555444444 | | | | | | T | -Log Number: | T84548 |
| Model: | 135BNHMW | & 135BN | HU | | | | Ассо | unt Manager: | Christine Krebi |
| Contact: | Steve Hacke | tt | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RS | S 210 | | | | | Class: | В |
| n #1b: F 5 5 | 2.0 | adiated E | Emissions, 3 | 30 - 1000 MH | z, EUT at 244 | OMHz, Blue | tooth Basi | c Rate | |
| (m/vuab) | 5.0- | / | 1 | | | | | | |
| 2 Amplitude | 0.0 - 5.0 - 0.0 - 5.0 - | | | Why | M | MuM M | | | |
| Prelimina | 0.0 - 5.0 - 0.0 - 5.0 - 30 | lings cap | tured during | pre-scan | | (MHz) | Hojabt | Commonts | |
| Prelimina equency MHz | 0.0 - 5.0 - 5.0 - 5.0 - 30 | ings cap | tured during FCC 15.20 | y pre-scan | Frequency Detector | (MHz) | Height meters | Comments | |
| Prelimina equency MHz 30.000 | o.o - 5.o - 5.o - 5.o - 30 ary peak read Level dBµV/m 37.8 | lings cap Pol V/h H | tured during FCC 15.20 Limit 40.0 | y pre-scan 9 / RSS 210 Margin -2.2 | Frequency Detector Pk/QP/Avg Peak | (MHz) | Height neters 1.0 | Comments | |
| Prelimina equency MHz 30.000 37.047 | o.o - 5.o - 5.o - 5.o - 30 ary peak read Level dBµV/m 37.8 33.4 | lings cap Pol V/h H V | tured during FCC 15.20 Limit 40.0 40.0 | 9 / RSS 210 Margin -2.2 -6.6 | Frequency Detector Pk/QP/Avg Peak Peak | (MHz) Azimuth degrees 246 326 | Height meters 1.0 1.0 | Comments | |
| Prelimina equency MHz 30.000 37.047 55.475 | o.o - 5.o - 5.o - 5.o - 30 ary peak read Level dBµV/m 37.8 33.4 40.0 | lings cap Pol V/h H V V | tured during FCC 15.20 Limit 40.0 40.0 40.0 | y pre-scan 9 / RSS 210 Margin -2.2 -6.6 0.0 | Frequency Detector Pk/QP/Avg Peak Peak Peak | Azimuth degrees 246 326 42 | Height meters 1.0 1.0 1.0 | Comments | |
| Prelimina Prelimina 2 2 1 Prelimina 2 2 1 2 2 2 1 2 2 1 2 2 1 2 2 2 1 2 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 | 0.0 - 5.0 - 5.0 - 5.0 - 5.0 - 30 ary peak read Level dBμV/m 37.8 33.4 40.0 31.4 | lings cap Pol V/h H V V V | tured during FCC 15.20 Limit 40.0 40.0 40.0 46.0 | y pre-scan 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 | Frequency Detector Pk/QP/Avg Peak Peak Peak Peak | Azimuth degrees 246 326 42 114 | Height meters 1.0 1.0 1.0 1.0 | Comments | |
| Prelimina equency MHz 30.000 37.047 55.475 37.073 662.473 | 0.0 - 5.0 - 5.0 - 5.0 - 30 ary peak read Level dBμV/m 37.8 33.4 40.0 31.4 44.5 | lings cap Pol V/h H V V V V | tured during FCC 15.20 Limit 40.0 40.0 46.0 46.0 | 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 | Frequency Peak Peak Peak Peak Peak Peak | Azimuth degrees 246 326 42 114 82 | Height meters 1.0 1.0 1.0 1.5 | Comments | |
| Prelimina equency MHz 30.000 37.047 55.475 37.073 62.473 99.990 | 0.0 - 5.0 - 5.0 - 5.0 - 5.0 - 30 ary peak read Level dBμV/m 37.8 33.4 40.0 31.4 44.5 35.9 | lings cap Pol V/h H V V V V H H | tured during FCC 15.20 Limit 40.0 40.0 40.0 40.0 46.0 46.0 46.0 | y pre-scan 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 -10.1 | Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak | Azimuth degrees 246 326 42 114 82 221 | Height meters 1.0 1.0 1.0 1.0 1.5 1.0 | Comments | |
| Prelimina 2 2 1 Prelimina 2 2 1 2 2 1 2 2 2 1 2 2 2 1 2 2 1 2 2 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 2 1 2 2 1 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 | o.o - 5.o - 5.o - 5.o - 30 ary peak read Level dBµV/m 37.8 33.4 40.0 31.4 44.5 35.9 | lings cap Pol V/h H V V V H H | tured during FCC 15.20 Limit 40.0 40.0 40.0 46.0 46.0 46.0 | y pre-scan 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 -10.1 | Frequency Peak Peak Peak Peak Peak Peak Peak Peak | Azimuth degrees 246 326 42 114 82 221 | Height meters 1.0 1.0 1.0 1.5 1.0 | Comments | |
| Prelimina equency MHz 30.000 37.047 55.475 237.073 62.473 99.990 Prelimina | 0.0 - 5.0 - 5.0 - 5.0 - 5.0 - 30 ary peak read Level dBμV/m 37.8 33.4 40.0 31.4 44.5 35.9 ary quasi-pea | lings cap Pol V/h H V V V V V H H H | tured during FCC 15.20 Limit 40.0 40.0 40.0 46.0 46.0 46.0 46.0 gs (no manij | 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 -10.1 pulation of E | Frequency Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak | Azimuth degrees 246 326 42 114 82 221 cables) | Height meters 1.0 1.0 1.0 1.5 1.0 | Comments | |
| Prelimina equency MHz 30.000 37.047 55.475 37.073 662.473 99.990 Prelimina equency MHz | o.o - 5.o - 5.o - 5.o - 30 ary peak read Level dBµV/m 37.8 33.4 40.0 31.4 44.5 35.9 ary quasi-pea Level dBµV/m | lings cap Pol v/h H V V V V H H H H | tured during FCC 15.20 Limit 40.0 40.0 40.0 40.0 40.0 40.0 40.0 40. | 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 -10.1 pulation of E 9 / RSS 210 Margin | Frequency Peace | Azimuth degrees 246 326 42 114 82 221 cables) Azimuth degrees | Height meters 1.0 1.0 1.0 1.5 1.0 Height meters | Comments | |
| Prelimina equency MHz 30.000 37.047 55.475 37.073 62.473 99.990 Prelimina equency MHz 62.468 | 0.0 - 5.0 - 5.0 - 5.0 - 5.0 - 5.0 - 5.0 - 30 ary peak read Level dBμV/m 37.8 33.4 40.0 31.4 44.5 35.9 ary quasi-pea Level dBμV/m 45.2 | lings cap Pol V/h H V V V V H H H k readin Pol V/h H | tured during FCC 15.20 Limit 40.0 40.0 40.0 40.0 46.0 46.0 46.0 46.0 | y pre-scan 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 -10.1 pulation of E 9 / RSS 210 Margin -0.8 | Frequency Prequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak Peak Detector Pk/QP/Avg Peak | Azimuth degrees 246 326 42 114 82 221 cables) Azimuth degrees 91 | Height meters 1.0 1.0 1.0 1.0 1.5 1.0 Height meters 1 1 | Comments Comments Comments Comments | |
| Prelimina aquency MHz 30.000 37.047 55.475 37.073 62.473 99.990 Prelimina equency MHz 62.468 99.990 | o.o - 5.o - 5.o - 5.o - 30 ary peak read Level dBµV/m 37.8 33.4 40.0 31.4 44.5 35.9 ary quasi-pea Level dBµV/m 45.2 34.9 | lings cap Pol V/h H V V V V H H H H Ak reading Pol V/h H H | tured during FCC 15.20 Limit 40.0 40.0 40.0 46.0 46.0 46.0 46.0 5 (no manij FCC 15.20 Limit 46.0 46.0 46.0 | 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 -10.1 pulation of E 9 / RSS 210 Margin -0.8 -11.1 | Frequency Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak CUT interface Detector Pk/QP/Avg Peak Peak | Azimuth degrees 246 326 42 114 82 221 cables) Azimuth degrees 91 223 | Height meters 1.0 1.0 1.0 1.5 1.0 Height meters 1.1 1.0 | Comments Comments Comments Comments Comments Comments Comments | |
| Prelimina aquency MHz 30.000 37.047 55.475 37.073 62.473 99.990 Prelimina aquency MHz 62.468 99.990 55.470 | o.o - 5.o - 5.o - 5.o - 30 ary peak read Level dBµV/m 37.8 33.4 40.0 31.4 44.5 35.9 ary quasi-pea Level dBµV/m 45.2 34.9 26.3 | lings cap Pol V/h H V V V V V H H H H H V V V V V V V V | tured during FCC 15.20 Limit 40.0 40.0 40.0 46.0 46.0 46.0 46.0 5 (no manij FCC 15.20 Limit 46.0 46.0 46.0 40.0 | 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 -10.1 pulation of E 9 / RSS 210 Margin -0.8 -11.1 -13.7 | Frequency Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Detector Pk/QP/Avg Peak Detector Pk/QP/Avg Peak Peak Peak | MMHz) Azimuth degrees 246 326 42 114 82 221 cables) Azimuth degrees 91 223 44 | Height meters 1.0 1.0 1.0 1.0 1.5 1.0 Height meters 1.1 1.0 1.0 1.0 | Comments Com | |
| Prelimina equency MHz 30.000 37.047 55.475 37.073 62.473 99.990 Prelimina equency MHz 62.468 99.990 55.470 37.073 | o.o - 5.o - 5.o - 5.o - 30 ary peak read Level dBµV/m 37.8 33.4 40.0 31.4 44.5 35.9 ary quasi-pea Level dBµV/m 45.2 34.9 26.3 31.0 | lings cap Pol V/h H V V V V H H H H H V V V V V V V V V | tured during FCC 15.20 Limit 40.0 40.0 40.0 46.0 46.0 46.0 46.0 46.0 | 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 -10.1 pulation of E 9 / RSS 210 Margin -0.8 -11.1 -13.7 -15.0 | Frequency Frequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak | Azimuth degrees 246 326 42 114 82 221 cables) Azimuth degrees 91 223 44 112 | Height meters 1.0 1.0 1.0 1.0 1.5 1.0 Height meters 1.1 1.0 1.0 1.0 1.0 1.0 1.0 | Comments Com | |
| Prelimina equency MHz 30.000 37.047 55.475 37.073 662.473 699.990 Prelimina equency MHz 662.468 999.990 55.470 237.073 30.012 | o.o - 5.o - 5.o - 5.o - 5.o - 30 ary peak read Level dBµV/m 37.8 33.4 40.0 31.4 44.5 35.9 ary quasi-pea Level dBµV/m 45.2 34.9 26.3 31.0 22.8 | lings cap Pol v/h H V V V V V H H H H H V V V V H H H V V V H H H H H V V V H | tured during FCC 15.20 Limit 40.0 40.0 40.0 40.0 46.0 46.0 46.0 5 (no manin FCC 15.20 Limit 46.0 46.0 46.0 40.0 40.0 40.0 40.0 40.0 | 9 / RSS 210 Margin -2.2 -6.6 0.0 -14.6 -1.5 -10.1 pulation of E 9 / RSS 210 Margin -0.8 -11.1 -13.7 -15.0 -17.2 | Frequency Prequency Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak CUT interface Detector Pk/QP/Avg Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak Peak | Azimuth degrees 246 326 42 114 82 221 cables) Azimuth degrees 91 223 44 112 226 | Height meters 1.0 1.0 1.0 1.0 1.5 1.0 1.5 1.0 Height meters 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 | Comments Com | |

| (7 Ell | iott | |
|---------------------------|------|--|
| Client [,] Intel | | |

EMC Test Data

| | AN ZALZ | company ے | | | | | | | | | |
|------------------------|---|-----------|-----------|-------------|-------------|--------------|-------------------|----------|---|--|--|
| Client: | Intel | | | | Job Number: | J84264 | | | | | |
| Madal | | | | | T- | Log Number: | T84548 | | | | |
| wodel: | 132RINHIM | & 135BIN | 10 | | Accou | unt Manager: | Christine Krebill | | | | |
| Contact: | Steve Hackett | | | | | | | | | | |
| Standard: | FCC 15 B, 1 | 5.247, RS | S 210 | | | | | Class: | В | | |
| Run #2: Ma Maximize | Run #2: Maximized Readings From Run #1 Maximized guasi-peak readings (includes manipulation of EUT interface cables) | | | | | | | | | | |
| Frequency | Level | Pol | FCC 15.20 | 9 / RSS 210 | Detector | Azimuth | Height | Comments | | | |
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | | | |
| 662.468 | 45.2 | Н | 46.0 | -0.8 | Peak | 82 | 1.5 | | | | |
| 699.990 | 34.9 | Н | 46.0 | -11.1 | Peak | 221 | 1.0 | | | | |
| 55.470 | 26.3 | V | 40.0 | -13.7 | Peak | 42 | 1.0 | | | | |
| 236.587 | 31.7 | V | 46.0 | -14.3 | QP | 135 | 1.0 | | | | |
| 32.984 | 26.3 | V | 40.0 | -13.7 | QP | 80 | 1.0 | | | | |
| 31.915 | 29.5 | Н | 40.0 | -10.5 | QP | 253 | 1.0 | | | | |
| | | | | | | | - | | | | |

End of Report

This page is intentionally blank and marks the last page of this test report.