



EMC Technologies Pty Ltd

ABN 82 057 105 549
176 Harrick Road
Keilor Park Victoria Australia 3042

Ph: + 613 9365 1000
Fax: + 613 9331 7455
email: melb@emctech.com.au

**EMI TEST REPORT FOR CERTIFICATION
to
FCC PART 15 Subpart E (Section 15.407) & RSS-210**

FCC ID: EJE-WB0046
Industry Canada ID: 337J-WB0046

Test Sample: LifeBook P Series
Model: P7230

Radio Modules: 4965AGN Kedron INTEL Mini-PCI WLAN Module
& EYTF3CSFT Bluetooth Module

Report Number M070228_Cert_4965AGN_NII_BT

Tested for: Fujitsu Australia Ltd.

Issue Date: 14th May 2007

EMC Technologies Pty Ltd reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. EMC Technologies Pty Ltd shall have no liability for any deductions, inferences or generalisations drawn by the client or others from EMC Technologies Pty Ltd issued reports. This report shall not be used to claim, constitute or imply product endorsement by EMC Technologies Pty Ltd.



The tests, calibrations or measurements covered by this document have been performed in accordance with NATA requirements (FCC Part 15 unintentional and intentional emitters in the frequency range 9kHz to 18 GHz) which include the requirements of ISO/IEC 17025 and are traceable to national standards of measurement. This document shall not be reproduced, except in full. The certificate on page 3 may be reproduced in full.

NATA Accredited Laboratory Number: 5292

EMI TEST REPORT FOR CERTIFICATION
to
FCC PART 15 Subpart E (Section 15.407) & RSS-210

EMC Technologies Report No. M070228_Cert_4965AGN_NII_BT

Issue Date: 14th May 2007

CONTENTS

- 1.0 INTRODUCTION**
- 2.0 GENERAL INFORMATION**

FCC 15.407 (U-NII) RESULTS

- 3.0 CONDUCTED EMI MEASUREMENTS**
- 4.0 RADIATED EMI MEASUREMENTS**
- 5.0 PEAK OUTPUT POWER**
- 6.0 CHANNEL BANDWIDTH**
- 7.0 PEAK POWER SPECTRAL DENSITY**
- 8.0 PEAK EXCURSION**
- 9.0 FREQUENCY STABILITY**
- 10.0 DYNAMIC FREQUENCY SELECTION**
- 11.0 DISCONTINUE TRANSMISSION**
- 12.0 RADIO FREQUENCY EXPOSURE**
- 13.0 ANTENNA REQUIREMENT**
- 14.0 COMPLIANCE STATEMENT**

FCC 15.247 (DTS) RESULTS - WLAN

Refer to Report No: M070228_Cert_4965AGN_DTS_BT

FCC 15.247 (DTS) RESULTS – Bluetooth

Refer to Report No: M070228_Cert_EYTF3CSFT_WLAN

- APPENDIX A: MEASUREMENT INSTRUMENTATION DETAILS**
- APPENDIX B: REPORT PHOTOGRAPHS**
- APPENDIX C: OPERATIONAL DESCRIPTION**
- APPENDIX D: BLOCK DIAGRAM**
- APPENDIX E: SCHEMATICS**
- APPENDIX F: ANTENNA INFORMATION**
- APPENDIX G: SPECIFICATIONS**
- APPENDIX H: FCC LABELLING DETAILS**
- APPENDIX I: USER MANUAL**

Attachment 1: RF Exposure Information

Attachment 2: FCC DOC for LifeBook P Series

Attachment 3: FCC Part 15B Test Report (Report: FG06-142EAL-2)

Attachment 4: INTEL Part 15.407 Test Report (Report: INTEL-060908F)

Attachment 5: Dynamic Frequency Selection Results



EMI TEST REPORT FOR CERTIFICATION
to
FCC PART 15 Subpart E (Section 15.407) & RSS-210

Report Number: M070228_Cert_4965AGN_NII_BT

Test Sample: LifeBook P Series
Model: P7230
Radio Modules: Kedron INTEL Mini-PCI WLAN Module, Model: 4965AGN (Intel Corp.)
Bluetooth Module, Model: EYTF3CSFT (TAIYO YUDEN)

FCC ID: EJE-WB0046
Industry Canada ID: 337J-WB0046
Equipment Type: Intentional Radiator (Transceiver)

Manufacturer (LifeBook): Fujitsu Ltd - Mobile Computing Division
Address: 1-1 Kamikodanaka 4-Chome, Nakahara-Ku, Kawasaki, Japan
Contact: Mr. Tsuyoshi Uchihara

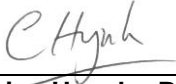
Tested for: Fujitsu Australia Ltd

Test Standards: FCC Part 15 – Radio Frequency Devices (August 2006)
FCC Part 15, Subpart E – Unlicensed National Information, Infrastructure
Devices
FCC Part 15.407, General Technical Requirements
ANSI C63.4 – 2003
OET Bulletin No. 65

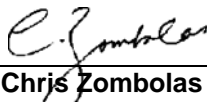
RSS-210 Issue 6 Low Power Licence-Exempt RadioCommunication Devices:
6.2.2 (o) 2400 – 2483.5 MHz & 5725 – 5850 MHz Spread Spectrum

RSS-102 Issue 1 (Provisional), Evaluation Procedure for Mobile and Portable
Radio Transmitters with respect to Health Canada's Safety Code 6 for
Exposure of Humans to Radio Frequency Fields

Test Dates: 14th March to 11th May 2007

Senior Test Engineer: 
Chieu Huynh - B.Eng (Hons) Electronics

Attestation: *I hereby certify that the device(s) described herein were tested as described in this report and that the data included is that which was obtained during such testing.*

Authorised Signatory: 
Chris Zombolas
Technical Director
EMC Technologies Pty Ltd



EMI TEST REPORT FOR CERTIFICATION
to
FCC PART 15 Subpart E (Section 15.407) & RSS-210

1.0 INTRODUCTION

EMI testing was performed on the Fujitsu notebook PC, Model: P7230 with INTEL Mini-PCI Wireless LAN Module (Kedron 802.11a/b/g/n), Model: 4965AGN & TAIYO YUDEN Bluetooth Module, Model: EYTF3CSFT.

The Kedron WLAN module was originally certified by INTEL as a modular approval under FCC ID: PD94965AGN (Canada ID: 1000M-4965AGN). The Radio modules are installed in a controlled environment at the Fujitsu notebook production/assembly factory.

The Bluetooth module was originally certified by TAIYO YUDEN as a modular approval under FCC ID: RYYEYTF3CSFT (Canada ID: 4389AEYTF3CSFT). The Radio modules are installed in a controlled environment at the Fujitsu notebook production/assembly factory.

The Kedron WLAN supports IEEE 802.11b, IEEE 802.11g, IEEE 802.11a and IEEE 802.11n (DTS & U-NII) configurations. Tests were performed in all configurations and also on the Bluetooth.

The U-NII results for configuration IEEE 802.11a and IEEE 802.11n are reported in this test report.

The DTS and DSS (Bluetooth) results are reported separately.

Refer to EMC Technologies' test report: M070228_Cert_4965AGN_NII_BT (U-NII) and M070228_Cert_EYTF3CSFT_WLAN (Bluetooth).

Test results and procedures were performed in accordance with the following Federal Communications Commission (FCC) standards/regulations:

| | |
|-----------------------------|---|
| 47 CFR, Part 15, Subpart E: | Unlicensed National Information Infrastructure Devices (U-NII) operating in the 5.15-5.35 GHz, 5.47-5.725 GHz and 5.725-5.825 GHz frequency bands |
| Section 15.203: | Antenna requirements |
| Section 15.205: | Restricted bands of operation |
| Section 15.207: | Conducted Emission Limits |
| Section 15.209: | Radiated Emission Limits (General requirements) |
| Section 15.407: | General Technical Requirements |

The results and technical details of the test sample are detailed in this report. The test sample **complied** with the requirements of 47 CFR, Part 15 Subpart E - Section 15.407.

The test sample also complied with the Industry Canada RSS-210 issue 6 (Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands)) clause 6.2.2(q1) requirements and the RF exposure requirements of RSS-102.

The measurement procedure used was in accordance with ANSI C63.4-2003 and OET Bulletin No. 65. The instrumentation conformed to the requirements of ANSI C63.2-1996.



1.1 Summary of Results

1.1.1 FCC Subpart E, Section 15.407

| FCC Part 15, Subpart E Clauses | Industry Canada RSS-210 Clauses | Test Performed | Result |
|--------------------------------|---------------------------------|---------------------------------|---|
| 15.203 | 5.5 | Antenna Requirement | Complies |
| 15.205 | 6.3 | Operation in Restricted Band | Complies |
| 15.207 | 6.6 | Conducted Emissions | Complies |
| 15.209 | 6.3 | Radiated Emissions | Complies |
| 15.407 (a)(1) (a)(2) | Annex A9.2 | Peak Transmit Power | Complies |
| 15.407 (a)(5) | Annex A9.2 | Peak Power Spectral Density | Complies |
| 15.407 (a)(6) | | Peak Excursion | Complies |
| 15.407 (b) | Annex A9.3 | Undesirable Emission | Complies |
| 15.407 (c) | | Discontinue Transmission | Complies |
| 15.407 (d) | | Reserved | - |
| 15.407 (e) | | Restricted to Indoor Operations | Complies |
| 15.407 (f) | | Radio Frequency Hazard | Complies |
| 15.407 (g) | Annex A9.5(e) | Frequency Stability | Complies |
| 15.407 (h) | | Transmit Power Control | Not Applicable E.I.R.P < 500 mW |
| 15.407 (h) | Annex A9.4 | Dynamic Frequency Selection | Complies |

1.1.2 FCC Subpart C, Section 15.247 - WLAN

Refer to EMC Technologies Report No: M070228_Cert_4965AGN_DTS_BT

1.1.3 FCC Subpart C, Section 15.247 – Bluetooth

Refer to EMC Technologies Report No: M070228_Cert_EYTF3CSFT_WLAN

1.1 Modifications by EMC Technologies

No modifications were required.



2.0 GENERAL INFORMATION
(Information supplied by the Client)

2.1 EUT (WLAN) Details

Transmitter: Mini-Card Wireless LAN Module
Wireless Module: Kedron (802.11a/b/g/n)
Model Number: 4965AGN
Manufacturer: Intel Corporation
Modulation Type: Direct Sequence Spread Spectrum (DSSS for 802.11b)
 Orthogonal Frequency Division Multiplexing (OFDM for 802.11g)
 Orthogonal Frequency Division Multiplexing (OFDM for 802.11a)
 Orthogonal Frequency Division Multiplexing (OFDM for 802.11n)
2.4 GHz (802.11b/g/n): DBPSK, DQPSK, CCK, 16QAM and 64QAM
5 GHz (802.11a/n): BPSK, QPSK, 16QAM and 64QAM
Maximum Data Rate: 802.11b = 11Mbps, 802.11g and 802.11a = 54Mbps
 802.11n = 300 Mbps
Frequency Ranges: 2.412 –2.462 GHz for 11b/g/n
 5.18 - 5.32 GHz and 5.745 - 5.825 GHz for 11a/n
Number of Channels: 11 channels for 11b/g/n
 13 channels for 11a/n with 20 MHz bandwidth
 6 channels for 11n with 40 MHz bandwidth
Antenna Types: Tx: Nissei Electric Inverted F Antenna
 Model: CP313544-01 (Main: Right), CP313545-01 (Aux: Left)
 Location: Top edge of LCD screen
 Rx: Nissei Electric Inverted F Antenna, Model: CP313546-01
Antenna gain: Max antenna gain is less than 6 dBi.
 Refer antenna data provided separately
Power Supply: 3.3 VDC from PCI bus

Channels Tested and Output power setting:

| Channel and Mode | Frequency MHz | Average Output Power dBm |
|--|---------------------|--------------------------|
| 802.11b/g/n mode | | |
| **Channels 1, 6 and 11 | 2412, 2437 and 2462 | 15.5 |
| 802.11a/n mode with 20MHz Bandwidth | | |
| *Channels 36 | 5180 | 16.5 |
| *Channels 48 | 5240 | 16.5 |
| *Channels 64 | 5320 | 16.5 |
| **Channels 149 | 5745 | 17.5 |
| **Channels 157 | 5785 | 17.5 |
| **Channels 165 | 5825 | 17.5 |
| 802.11n mode with 40MHz Bandwidth | | |
| *Channels 38 | 5190 | 14.5 |
| *Channels 46 | 5230 | 16.5 |
| *Channels 62 | 5310 | 15.5 |
| **Channels 151 | 5755 | 17.5 |
| **Channels 159 | 5795 | 17.5 |

*Channels tested and reported in this report

**Channels tested and reported in the U-NII submission (M070228_Cert_4965AGN_DTS_BT)



2.2 EUT (Bluetooth) Details

Transmitter: Bluetooth
Model Number: EYTF3CS FT
Manufacturer: TAIYO YUDEN
Network Standard: Bluetooth™ RF Test Specification
Modulation Type: Frequency Hopping Spread Spectrum (FHSS)
Frequency Range: 2402 MHz to 2480 MHz
Number of Channels: 79
Carrier Spacing: 1.0 MHz
Antenna Types: Nissei Electric Inverted F Antenna, Model: CP115428
 Location: Right palm rest area
Antenna gain: Max antenna gain is less than 6 dBi.
 Refer antenna data provided separately
Max. Output Power: 4 dBm
Reference Oscillator: 16 MHz (Built-in)
Power Supply: 3.3 VDC from host.

Frequency allocation:

| Channel Number | Frequency (MHz) | Bluetooth Utility power setting |
|----------------|-----------------|---------------------------------|
| 1* | 2402 | Power (Ext, Int) = 0, 96 |
| 2 | 2403 | |
| - | - | |
| 39 | 2440 | |
| 40* | 2441 | |
| 41 | 2442 | |
| - | - | |
| 78 | 2479 | |
| 79* | 2480 | |

*Channels tested and reported in the Bluetooth submission (M070228_Cert_EYTF3CSFT_WLAN)

2.3 EUT (Notebook PC) Details

EUT: LifeBook P series
Model Name: P7230
Serial Number: Pre-production Sample
Manufacturer: FUJITSU LIMITED

CPU Type and Speed: Core Duo U2500 1.2GHz
LCD: 10.6" WXGA
Wired LAN: Marvell 88E8055 : 10 Base-T/100 Base-TX/1000Base-T
Modem: Agere MDC1.5 modem Model: D40
Port Replicator Model: FPCPR72

AC Adapter Model: 60W:SEC80N2-16.0(Sanken)
Voltage: 16 V
Current Specs: 3.75A
Watts: 60W



2.4 Operational Description

The Intel WLAN test software "CRTU" was used to transmit continuously during the tests. For Spurious and Harmonics tests both radio modules (WLAN and Bluetooth) were simultaneously transmitting.

2.5 Test Configuration

Conducted tests were performed at the WLAN Antenna ports.
Radiated tests were performed for measuring the harmonics and spurious from the transmitters.

2.6 Technical Specifications

Refer to Appendix G for details

2.7 Block Diagram

Refer to Appendix D - Block Diagram

2.8 Support Equipment

Refer to Attachment 3 – FCC Part 15B Test Report (Report: FG06-142EAL-2)

2.9 Test Procedure

Emissions measurements were performed in accordance with the procedures of ANSI C63.4-2003. Radiated emissions tests were performed at a distance of 1 and 3 metres from the EUT. OET Bulletin 65 dated June 2001 was used for reference.

2.10 Test Facility

2.10.1 General

Radiated Emission measurements were performed at EMC Technologies open area test site (OATS) situated at Lerderberg Gorge, near the township of Bacchus Marsh in Victoria, Australia. Conducted measurements at an antenna ports were performed at EMC Technologies' laboratory in Tullamarine, Victoria Australia.

The above test sites have been accepted for testing by the Federal Communications Commission (FCC) - **FCC Registration Number 90560.**

EMC Technologies open area test site (OATS) has also been accepted by Industry Canada for the performance of radiated measurements in accordance with RSS 212, Issue 1 (Provisional). **Industry Canada File Number IC 4161.**



2.10.2 NATA Accreditation

EMC Technologies is accredited in Australia to test to the following standards by the National Association of Testing Authorities (NATA).

“FCC Part 15 unintentional and intentional emitters in the frequency range 9kHz to 18 GHz excluding TV receivers (15.117 and 15.119), TV interface devices (15.115), cable ready consumer electronic equipment (15.118), cable locating equipment (15.213) and unlicensed national information infrastructure devices (Sub part E).”

The current full scope of accreditation can be found on the NATA website: www.nata.asn.au
It also includes a large number of emission, immunity, SAR, EMR and Safety standards.

NATA is the Australian national laboratory accreditation body and has accredited EMC Technologies to operate to the IEC/ISO17025 requirements. A major requirement for accreditation is the assessment of the company and its personnel as being technically competent in testing to the standards. This requires fully documented test procedures, continued calibration of all equipment to the National Standard at the National Measurements Institute (NMI) and an internal quality system to ISO 9002. NATA has mutual recognition agreements with the National Voluntary Laboratory Accreditation Program (NVLAP) and the American Association for Laboratory Accreditation (A²LA).

2.11 Test Equipment Calibration

All measurement instrumentation and transducers were calibrated in accordance with the applicable standards by an independent NATA registered laboratory such as Agilent Technologies (Australia) Pty Ltd or the National Measurement Institute (NMI). All equipment calibration is traceable to Australia national standards at the National Measurements Institute. The reference antenna calibration was performed by NMI and the working antennas (biconical and log-periodic) calibrated by the NATA approved procedures. The complete list of test equipment used for the measurements, including calibration dates and traceability is contained in Appendix A

2.12 Ambients at OATS

The Open Area Test Site (OATS) is an area of low background ambient signals. No significant broadband ambients are present however commercial radio and TV signals exceed the limit in the FM radio, VHF and UHF television bands. Radiated prescan measurements were performed in the shielded enclosure to check for possible radiated emissions at the frequencies where the OATS ambient signals exceeded the test limit.



FCC 15.407 (U-NII) RESULTS

3.0 CONDUCTED EMISSION MEASUREMENTS

Testing was performed in accordance with the requirements of FCC Part 15.207
Refer to Attachment 3 – FCC Part 15B Test Report (Report: FG06-142EAL-2)

4.0 RADIATED EMISSION MEASUREMENTS

4.1 Test Procedure

Testing was performed in accordance with the requirements of FCC Part 15.407(b).

Radiated emission measurements were performed to the limits as per section 15.209 and 15.407. The measurements were made at the open area test site.

The EUT was set up on the table top (placed on turntable) of total height 80 cm above the ground plane, and operated as described in section 2 of this report. The test frequency range was sub-divided into smaller bands with sufficient frequency resolution to permit reliable display and identification of possible EMI peaks while also permitting fast frequency scan times. Calibrated EMCO 3115, EMCO 3116 and ETS standard gain horn antennas were used for measurements between 1 to 40 GHz.

The measurement of emissions between 30 - 1000 MHz, refer to Attachment 3 – FCC Part 15B Test Report (Report: FG06-142EAL-2).

The measurement of emissions above 1000 MHz was measured using a following setting:

Peak measurements setting: RBW = VBW = 1 MHz

Average measurements setting: RBW = 1 MHz and VBW = 10 Hz

The receiver bandwidth was set to 6 dB.

The EUT was slowly rotated with the Peak Detector set to Max-Hold. This was performed for two antenna heights. When an emission was located, it was positively identified and its maximum level found by rotating the automated turntable, and by varying the antenna height. Each significant peak was investigated with the Peak/Average Detectors. The measurement data for each frequency range was corrected for cable losses, antenna factors and preamplifier gain. This process was performed for both horizontal and vertical antenna polarisations.

4.2 Calculation of field strength

The field strength was calculated automatically by the software using all the pre-stored calibration data. The method of calculation is shown below:

E = V + AF - G + L Where:

E = Radiated Field Strength in dB μ V/m.

V = EMI Receiver Voltage in dB μ V. (measured value)

AF = Antenna Factor in dB(m⁻¹). (stored as a data array)

G = Preamplifier Gain in dB. (stored as a data array)

L = Cable loss in dB. (stored as a data array of Insertion Loss versus frequency)

- **Example Field Strength Calculation**

Assuming a receiver reading of 34.0 dB μ V is obtained at 90 MHz, the Antenna Factor at that frequency is 9.2 dB. The cable loss is 1.9 dB while the preamplifier gain is 20 dB. The resulting Field Strength is therefore as follows:

$$34.0 + 9.2 + 1.9 - 20 = 25.1 \text{ dB}\mu\text{V/m}$$

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests (1000 MHz – 18,000 MHz) \pm 4.1 dB



4.3 Results - Out of Band Emissions (Spurious and Harmonics)

4.3.1 Frequency Band: 1 – 40 GHz

All measurements above 1 GHz were initially made over a distance of 3 metres. This was decreased to 1.0 metre as the emission levels from the device were very low.

The peak limits for undesirable emission outside of the restricted bands are -27 dBm (68.3 dBuV/m @ 3m). However, the 74 dB μ V/m @ 3m and 54 dB μ V/m @ 3m limits are applied for emissions fall in the restricted bands.

Testing was performed while both the WLAN transmitter and Bluetooth transmitter continuously operated. Harmonics related to the WLAN transmitter (5.15 – 5.35 GHz) are reported below. Harmonics in the frequency band 2.4 – 2.4835 GHz and 5.725 – 5.850 GHz, refer to M070228_Cert_WM3945ABG_DTS_BT. Harmonics related to the Bluetooth transmitter, refer to M070228_Cert_EYTF3CSFT_WLAN.

Configuration 802.11a and 802.11n

Initial investigations were performed with all data rates: (6 Mbps to 54 Mbps, HT0 to HT7 and HT8 to HT15). No significant in emissions were observed. Final testing was performed while the transmitter continuously operated.

Channel 36 - 5180 MHz, Tx BW = 20 MHz

| Modes | Data Rates | Frequency MHz | Peak Detector dBuV/m | Average Detector dBuV/m | Peak Limit dBuV/m | Average Limit dBuV/m | Result |
|---------|------------|---------------|----------------------|-------------------------|-------------------|----------------------|----------|
| 802.11a | 6 Mbps | 5180 | 105.2 | 92.4 | - | - | - |
| | | 10360 | 59.8 | 44.9 | 68.3 | - | Complies |
| | | 15540 | 57.3 | 43.9 | 74.0 | 54.0 | Complies |
| | | 6906.7 | 55.6 | 46.9 | 68.3 | - | Complies |
| | | 5150 | 72.3 | 53.8 | 74.0 | 54.0 | Complies |
| 802.11n | HT0 | 5180 | 105.6 | 92.9 | - | - | - |
| | | 10360 | 56.1 | 41.2 | 68.3 | - | Complies |
| | | 15540 | 57.0 | 43.9 | 74.0 | 54.0 | Complies |
| | | 6906.7 | 55.9 | 45.4 | 68.3 | - | Complies |
| | | 5150 | 73.2 | 53.9 | 74.0 | 54.0 | Complies |
| 802.11n | HT8 | 5180 | 103.3 | 87.3 | - | - | - |
| | | 10360 | 55.2 | 41.9 | 68.3 | - | Complies |
| | | 15540 | 57.0 | 42.5 | 74.0 | 54.0 | Complies |
| | | 6906.7 | 55.6 | 46.3 | 68.3 | - | Complies |
| | | 5150 | 70.6 | 51.5 | 74.0 | 54.0 | Complies |



Channel 48 - 5240 MHz, Tx BW = 20 MHz

| Modes | Data Rates | Frequency MHz | Peak Detector dBuV/m | Average Detector dBuV/m | Peak Limit dBuV/m | Average Limit dBuV/m | Result |
|---------|------------|---------------|----------------------|-------------------------|-------------------|----------------------|----------|
| 802.11a | 6 Mbps | 5240 | 104.0 | 92.7 | - | - | - |
| | | 10480 | 62.7 | 42.0 | 68.3 | - | Complies |
| | | 15720 | 57.4 | 43.9 | 74.0 | 54.0 | Complies |
| | | 6986.7 | 55.5 | 44.4 | 68.3 | - | Complies |
| 802.11n | HT0 | 5240 | 105.8 | 92.4 | - | - | - |
| | | 10480 | 58.6 | 45.8 | 68.3 | - | Complies |
| | | 15720 | 57.7 | 43.9 | 74.0 | 54.0 | Complies |
| | | 6986.7 | 55.5 | 44.2 | 68.3 | - | Complies |
| 802.11n | HT8 | 5240 | 103.1 | 86.2 | - | - | - |
| | | 10480 | 57.3 | 43.7 | 68.3 | - | Complies |
| | | 15720 | 56.5 | 43.0 | 74.0 | 54.0 | Complies |
| | | 6986.7 | 55.1 | 44.2 | 68.3 | - | Complies |

Channel 64 - 5320 MHz, Tx BW = 20 MHz

| Modes | Data Rates | Frequency MHz | Peak Detector dBuV/m | Average Detector dBuV/m | Peak Limit dBuV/m | Average Limit dBuV/m | Result |
|---------|------------|---------------|----------------------|-------------------------|-------------------|----------------------|----------|
| 802.11a | 6 Mbps | 5320 | 106.4 | 93.8 | - | - | - |
| | | 10640 | 59.9 | 44.2 | 68.3 | - | Complies |
| | | 15960 | 57.8 | 43.9 | 74.0 | 54.0 | Complies |
| | | 7093.4 | 51.9 | 43.1 | 68.3 | - | Complies |
| | | 5350* | 79.7 | 62.3 | 84.5 | 64.5 | Complies |
| 802.11n | HT0 | 5320 | 106.1 | 92.8 | - | - | - |
| | | 10640 | 59.0 | 45.6 | 68.3 | - | Complies |
| | | 15960 | 57.6 | 43.9 | 74.0 | 54.0 | Complies |
| | | 7093.4 | 51.1 | 43.2 | 68.3 | - | Complies |
| | | 5350* | 80.2 | 62.8 | 84.5 | 64.5 | Complies |
| 802.11n | HT8 | 5320 | 103.8 | 87.4 | - | - | - |
| | | 10640 | 58.5 | 44.7 | 68.3 | - | Complies |
| | | 15960 | 55.2 | 42.7 | 74.0 | 54.0 | Complies |
| | | 7093.4 | 51.7 | 43.1 | 68.3 | - | Complies |
| | | 5350 | 73.1 | 52.9 | 74.0 | 54.0 | Complies |

*Measurement was performed at 1 m distance and the limits were corrected accordingly.



This Laboratory is accredited by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of accreditation for FCC Part 15. This document shall not be reproduced, except in full.

Channel 38 - 5190 MHz, Tx BW = 40 MHz

| Modes | Data Rates | Frequency MHz | Peak Detector dBuV/m | Average Detector dBuV/m | Peak Limit dBuV/m | Average Limit dBuV/m | Result |
|---------|------------|---------------|----------------------|-------------------------|-------------------|----------------------|----------|
| 802.11n | HT0 | 5190 | 102.0 | 86.7 | - | - | - |
| | | 10380 | 51.8 | 39.1 | 68.3 | - | Complies |
| | | 15570 | 57.2 | 43.9 | 74.0 | 54.0 | Complies |
| | | 6920 | 55.6 | 44.0 | 68.3 | - | Complies |
| | | 5150* | 81.4 | 63.4 | 84.5 | 64.5 | Complies |
| 802.11n | HT8 | 5190 | 100.2 | 80.1 | - | - | - |
| | | 10380 | 52.4 | 38.8 | 68.3 | - | Complies |
| | | 15570 | 56.6 | 42.5 | 74.0 | 54.0 | Complies |
| | | 6920 | 56.3 | 44.7 | 68.3 | - | Complies |
| | | 5150 | 71.7 | 53.9 | 74.0 | 54.0 | Complies |

*Measurement was performed at 1 m distance and the limits were corrected accordingly.

Channel 46 - 5230 MHz, Tx BW = 40 MHz

| Modes | Data Rates | Frequency MHz | Peak Detector dBuV/m | Average Detector dBuV/m | Peak Limit dBuV/m | Average Limit dBuV/m | Result |
|---------|------------|---------------|----------------------|-------------------------|-------------------|----------------------|----------|
| 802.11n | HT0 | 5230 | 103.4 | 87.5 | - | - | - |
| | | 10460 | 58.3 | 43.2 | 68.3 | - | Complies |
| | | 15690 | 57.7 | 43.9 | 74.0 | 54.0 | Complies |
| | | 6973.4 | 56.9 | 45.2 | 68.3 | - | Complies |
| 802.11n | HT8 | 5230 | 101.7 | 80.6 | - | - | - |
| | | 10460 | 57.3 | 42.5 | 68.3 | - | Complies |
| | | 15690 | 56.5 | 42.9 | 74.0 | 54.0 | Complies |
| | | 6973.4 | 56.0 | 45.1 | 68.3 | - | Complies |

Channel 62 - 5310 MHz, Tx BW = 40 MHz

| Modes | Data Rates | Frequency MHz | Peak Detector dBuV/m | Average Detector dBuV/m | Peak Limit dBuV/m | Average Limit dBuV/m | Result |
|---------|------------|---------------|----------------------|-------------------------|-------------------|----------------------|----------|
| 802.11n | HT0 | 5310 | 103.1 | 87.3 | - | - | - |
| | | 10620 | 56.0 | 41.5 | 68.3 | - | Complies |
| | | 15930 | 57.8 | 43.9 | 74.0 | 54.0 | Complies |
| | | 7080 | 51.7 | 42.7 | 68.3 | - | Complies |
| | | 5350* | 82.6 | 64.0 | 84.5 | 64.5 | Complies |
| 802.11n | HT8 | 5310 | 101.2 | 80.3 | - | - | - |
| | | 10620 | 55.1 | 40.2 | 68.3 | - | Complies |
| | | 15930 | 55.4 | 42.7 | 74.0 | 54.0 | Complies |
| | | 7080 | 53.5 | 42.8 | 68.3 | - | Complies |
| | | 5350 | 70.5 | 54.0 | 74.0 | 54.0 | Complies |

*Measurement was performed at 1 m distance and the limits were corrected accordingly.

Result: Harmonics and spurious emissions were recorded up to 40 GHz. Harmonics were low and confirmed with both RBW and VBW reduced. Emissions complied with the FCC limits of sections 15.209 and 15.407 by a margin of 0 dB. The measurement uncertainty for radiated emissions in this band was ±4.1 dB.



4.3.2 Both WLAN and Bluetooth Transmitters Transmitting

Result: IM spurious emissions were recorded up to 40 GHz. Emissions complied with the FCC limits of sections 15.209 and 15.407. The measurement uncertainty for radiated emissions in this band was ± 4.1 dB.

4.3.3 Frequency Band: 30 - 1000 MHz

Testing was performed by Fujitsu General EMC Laboratory, JAPAN accredited by NVLAP (Lab Code: 200373-0).

Results: Complied - refer to Attachment 3 – FCC Part 15B Test Report (Report: FG06-142EAL-2).

4.3.4 RF Conducted Measurements at the antenna terminal

Testing was performed by Aegis Labs Inc. CA, USA accredited by A2LA (Certificate Number: 1111.01)

Results: Complied – refer to attachment 4, Aegis test report number: INTEL-060908F with FCC ID: PD94965AGN.

4.3.5 Band Edge Measurements

Complied (refer to section 4.3 – radiated emissions).



5.0 PEAK OUTPUT POWER - Section 15.407(a)

Testing was performed in accordance with the requirements of FCC Part 15.407(a)(1)(2)

Measurements were performed while the WLAN transmitter continuously transmitted.

The maximum antenna gains were less than 6 dBi.

The peak output power measurement was performed using the integration method as per test method # 3 of DA 02-2138. The resolution bandwidth of 1 MHz was used. The video bandwidth of 30 kHz was used ($VBW \geq 1/T$, where T (worst case) = 88 μ S).

Variation by +/- 15% of the supply voltage, in accordance with Section 15.31(e), to the computer power supply did not vary the output power observed.

The EUT is capable of using two antennas transmitting simultaneously (HT8 DATA mode) the power level is 3dB lower (50%) than if a single antenna was transmitting.

Configuration 802.11a and 802.11n

Initial investigations were performed with all data rates: (6 Mbps to 54 Mbps, HT0 to HT7 and HT8 to HT15). Peak power with lowest data rates (6 Mbps, HT0 and HT8) was observed to be slightly worst. Final testing was performed while the transmitter continuously operated on the lowest data rates.

| Modes | Data Rates | Frequency MHz | P dBm | Limit dBm | P mW | Limit mW | Result |
|-----------------------|------------|---------------|-------|-----------|------|----------|----------|
| Tx BW = 20 MHz | | | | | | | |
| 802.11a | 6 Mbps | 5180 | 17.0 | 17 | 50.0 | 50 | Complies |
| | | 5240 | 16.8 | 17 | 47.9 | 50 | Complies |
| | | 5320 | 17.0 | 24 | 50.0 | 250 | Complies |
| 802.11n | HT0 | 5180 | 17.0 | 17 | 50.0 | 50 | Complies |
| | | 5240 | 16.9 | 17 | 49.0 | 50 | Complies |
| | | 5320 | 17.2 | 24 | 52.5 | 250 | Complies |
| 802.11n | HT8 | 5180 | 14.1 | 17 | 25.7 | 50 | Complies |
| | | 5240 | 14.2 | 17 | 26.3 | 50 | Complies |
| | | 5320 | 14.4 | 24 | 27.5 | 250 | Complies |
| Tx BW = 40 MHz (Wide) | | | | | | | |
| 802.11n | HT0 | 5190 | 15.3 | 17 | 33.9 | 50 | Complies |
| | | 5230 | 17.0 | 17 | 50.0 | 50 | Complies |
| | | 5310 | 16.4 | 24 | 43.7 | 250 | Complies |
| 802.11n | HT8 | 5190 | 12.3 | 17 | 17.0 | 50 | Complies |
| | | 5230 | 14.3 | 17 | 16.9 | 50 | Complies |
| | | 5310 | 13.5 | 24 | 22.4 | 250 | Complies |

6.0 CHANNEL BANDWIDTH

Testing was performed by Aegis Labs Inc. CA, USA accredited by A2LA (Certificate Number: 1111.01)

Results: Complied – refer to attachment 4, Aegis test report number: INTEL-060908F with FCC ID: PD94965AGN.

7.0 PEAK POWER SPECTRAL DENSITY

Testing was performed by Aegis Labs Inc. CA, USA accredited by A2LA (Certificate Number: 1111.01)

Results: Complied – refer to attachment 4, Aegis test report number: INTEL-060908F with FCC ID: PD94965AGN.



8.0 PEAK EXCURSION

Testing was performed by Aegis Labs Inc. CA, USA accredited by A2LA (Certificate Number: 1111.01)

Results: Complied – refer to attachment 4, Aegis test report number: INTEL-060908F with FCC ID: PD94965AGN.

9.0 FREQUENCY STABILITY

Testing was performed by Aegis Labs Inc. CA, USA accredited by A2LA (Certificate Number: 1111.01)

Results: Complied – refer to attachment 4, Aegis test report number: INTEL-060908F with FCC ID: PD94965AGN.

10.0 DYNAMIC FREQUENCY SELECTION

The EUT is a Client Device without Radar Interference Detection Function.

Testing was performed by Compliance Certification Services (CCS) CA, USA accredited by NVLAP (Lab Code: 200065-0).

Ad-hoc operation (not under control of a Master Device) is supported in the 2.4 GHz & 5.15 - 5.25 GHz bands only. This Ad-hoc capability is limited in hardware via factory programmed EEPROM settings that cannot be accessed or changed by end users. The Ad-hoc supported channels of operation cannot be modified – regardless of which client utility or operating system control is used.

Complied – refer to attachment 5, CCS test report number: 06U10551-1.

11.0 DISCONTINUE TRANSMISSION

Data Transmission is always initiated by software, which is then passed down through the MAC, through the digital and analog baseband, finally to the RF chip. Several special packets (ACKs, CTS, PSpoll, etc) are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which then turns off at the end of the packet. Therefore, the transmitter will be ON only while one of the four mentioned packets is being transmitted.



12.0 RADIO FREQUENCY EXPOSURE (HAZARD) INFORMATION

Testing was performed in accordance with the requirements of FCC Part 15.407(f)

Spread spectrum transmitters operating in the 2400 - 2483.5 MHz and 5.150 – 5.350 GHz are required to be operated in a manner that ensures that the public is not exposed to RF energy levels in accordance with CFR 47, Section 1.1307(b)(1).

Transmitter # 1 (WLAN): The antennas location: Top edge of LCD screen and projected distance of less than 20cm from user.

Transmitter # 2 (Bluetooth): The antenna location: Right palm rest area and projected distance of less than 20cm from user.

The separation distance between the WLAN and BT antennas is less than 20cm. Therefore, they are co-located transmitters. Testing was performed with both WLAN and BT transmitters transmitting continuously.

In accordance with this section and also section 2.1093 this device has been defined as a portable device.

SAR testing was performed in accordance with OET Bulletin 65 and reported under EMC Technologies reports M070235_Cert_4965AGN_SAR_2.4 and M070235_Cert_4965AGN_SAR_5.6. The highest SAR value is 0.04 mW/g which complies with the FCC human exposure requirements of 47 CFR 2.1093 (d).



13.0 ANTENNA REQUIREMENT

This intentional radiator was designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

14.0 COMPLIANCE STATEMENT

The Fujitsu notebook PC, Model: P7230 with INTEL Mini-PCI Wireless LAN Module ((Kedron 802.11a/b/g/n), Model: 4965AGN and Bluetooth Module, Model: EYTF3CSFT, tested on behalf of Fujitsu Australia Ltd, **complied** with the requirements of 47 CFR, Part 15 Subpart E -Section 15.407 (5.15-5.35 GHz band).

The test sample also complied with the Industry Canada RSS-210 issue 6 (Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands)) clause 6.2.2(q1) 5150-5350 MHz Local Area Network Devices requirements and the RF exposure requirements of RSS-102.

Results were as follows:

FCC Subpart E, Section 15.407

| FCC Part 15, Subpart E Clauses | Industry Canada RSS-210 Clauses | Test Performed | Result |
|--------------------------------|---------------------------------|---------------------------------|---|
| 15.203 | 5.5 | Antenna Requirement | Complies |
| 15.205 | 6.3 | Operation in Restricted Band | Complies |
| 15.207 | 6.6 | Conducted Emissions | Complies |
| 15.209 | 6.3 | Radiated Emissions | Complies |
| 15.407 (a)(1) (a)(2) | Annex A9.2 | Peak Transmit Power | Complies |
| 15.407 (a)(5) | Annex A9.2 | Peak Power Spectral Density | Complies |
| 15.407 (a)(6) | | Peak Excursion | Complies |
| 15.407 (b) | Annex A9.3 | Undesirable Emission | Complies |
| 15.407 (c) | | Discontinue Transmission | Complies |
| 15.407 (d) | | Reserved | - |
| 15.407 (e) | | Restricted to Indoor Operations | Complies |
| 15.407 (f) | | Radio Frequency Hazard | Complies |
| 15.407 (g) | Annex A9.5(e) | Frequency Stability | Complies |
| 15.407 (h) | | Transmit Power Control | Not Applicable E.I.R.P < 500 mW |
| 15.407 (h) | Annex A9.4 | Dynamic Frequency Selection | Complies |

FCC Subpart E, Section 15.247 - WLAN

Refer to EMC Technologies Report No: M070228_Cert_4965AGN_DTS_BT

FCC Subpart C, Section 15.247 – Bluetooth

Refer to EMC Technologies Report No: M070228_Cert_EYTF3CSFT_WLAN



TEST REPORT APPENDICES

APPENDIX A: MEASUREMENT INSTRUMENTATION DETAILS

APPENDIX B: REPORT PHOTOGRAPHS

APPENDIX C: OPERATIONAL DESCRIPTION

APPENDIX D: BLOCK DIAGRAM

APPENDIX E: SCHEMATICS

APPENDIX F: ANTENNA INFORMATION

APPENDIX G: SPECIFICATIONS

APPENDIX H: FCC LABELLING DETAILS

APPENDIX I: USER MANUAL

Attachment 1: RF Exposure Information

Attachment 2: FCC DOC for LifeBook P Series

Attachment 3: FCC Part 15B Test Report (Report: FG06-142EAL-2)

Attachment 4: INTEL Part 15.407 Test Report (Report: INTEL-060908F)

Attachment 5: Dynamic Frequency Selection Results

