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

FCC ID: EJE-WB0047  
Industry Canada ID: 337J-WB0047

Test Sample: LifeBook T Series  
Model: T4220

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

Report Number M070237\_Cert\_4965AGN\_NII\_BT

Tested for: Fujitsu Australia Ltd.

Issue Date: 8<sup>th</sup> May 2007

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**EMI TEST REPORT FOR CERTIFICATION**  
**to**  
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**EMC Technologies Report No. M070237\_Cert\_4965AGN\_NII\_BT**

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

**Report Number:** M070237\_Cert\_4965AGN\_NII\_BT

**Test Sample:** LifeBook T Series  
**Model:** T4220  
**Radio Modules:** Kedron INTEL Mini-PCI WLAN Module, Model: 4965AGN (Intel Corp.)  
Bluetooth Module, Model: EYTF3CSFT (TAIYO YUDEN)

**FCC ID:** EJE-WB0047  
**Industry Canada ID:** 337J-WB0047  
**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:** 8<sup>th</sup> March to 24<sup>th</sup> May 2007

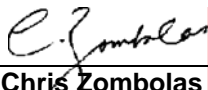
**Senior Test Engineer:**

  
\_\_\_\_\_  
**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**



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## 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: T4220 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: M070237\_Cert\_4965AGN\_NII\_BT (U-NII) and M070237\_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: M070237\_Cert\_4965AGN\_DTS\_BT

### 1.1.3 FCC Subpart C, Section 15.247 – Bluetooth

Refer to EMC Technologies Report No: M070237\_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

<b>Transmitter:</b>	Mini-Card Wireless LAN Module
<b>Wireless Module:</b>	Kedron (802.11a/b/g/n)
<b>Model Number:</b>	4965AGN
<b>Manufacturer:</b>	Intel Corporation
<b>Modulation Type:</b>	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)
<b>2.4 GHz (802.11b/g/n):</b>	DBPSK, DQPSK, CCK, 16QAM and 64QAM
<b>5 GHz (802.11a/n):</b>	BPSK, QPSK, 16QAM and 64QAM
<b>Maximum Data Rate:</b>	802.11b = 11Mbps, 802.11g and 802.11a = 54Mbps 802.11n = 300 Mbps
<b>Frequency Ranges:</b>	2.412 –2.462 GHz for 11b/g/n 5.18 - 5.32 GHz and 5.745 - 5.825 GHz for 11a/n
<b>Number of Channels:</b>	11 channels for 11b/g/n 13 channels for 11a/n with 20 MHz bandwidth 6 channels for 11n with 40 MHz bandwidth
<b>Antenna Types:</b>	Tx: Yokowo Monopole Antenna - Model: CP335166 Location: Top edge of LCD screen Rx: Yokowo Monopole Antenna - Model: CP335176-02
<b>Antenna gain:</b>	Max antenna gain is less than 6 dBi. Refer antenna data provided separately
<b>Power Supply:</b>	3.3 VDC from PCI bus

#### Channels Tested and Output power setting:

Channel and Mode	Frequency MHz	Average Output Power dBm
<b>802.11b/g/n mode</b>		
**Channels 1, 6 and 11	2412, 2437 and 2462	15.5
<b>802.11a/n mode with 20MHz Bandwidth</b>		
*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
<b>802.11n mode with 40MHz Bandwidth</b>		
*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 (M070237\_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:** Yokowo Monopole Antenna, Model: CP335171  
Location: Mid. Of top edge of LCD screen  
**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 (M070237\_Cert\_EYTF3CSFT\_WLAN)

## 2.3 EUT (Notebook PC) Details

**EUT:** LifeBook T series  
**Model Name:** T4220  
**Serial Number:** Pre-production Sample  
**Manufacturer:** FUJITSU LIMITED

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**CPU Type and Speed:** Core2 Duo T7700 2.4GHz  
**LCD** 12" SXGA+ / 12" XGA  
**Wired LAN:** Marvell 88E8055 : 10 Base-T/100 Base-TX/1000Base-T  
**Modem:** Agere MDC1.5 modem Model: D40  
**Port Replicator Model:** FPCPR65

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**AC Adapter Model:** SEC100P2-19.0(Sanken) / SEC100P3-19.0(Sanken, 3pin) / ADP-80NB A(Delta)  
**Voltage:** 19 V  
**Current Specs:** 4.22A  
**Watts:** 80W



## **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: FG07-059EAL)

## **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 Lerderderg Gorge, near the township of Bacchus Marsh in Victoria, Australia. Conducted measurements at 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](http://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 (A<sup>2</sup>LA).

## 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.



## 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: FG07-059EAL)

### 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: FG07-059EAL)

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 dBμV/m.

**V** = EMI Receiver Voltage in dBμV. (measured value)

**AF** = Antenna Factor in dB(m<sup>-1</sup>). (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 dBμV 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) ± 4.1 dB



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### 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 dBuV/m @ 3m and 54 dBuV/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 M070237\_Cert\_4965ABN\_DTS\_BT. Harmonics related to the Bluetooth transmitter, refer to M070237\_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	106.2	93.6	-	-	-
		10360	63.4	49.1	68.3	-	Complies
		15540	58.1	44.3	74.0	54.0	Complies
		6906.7	53.7	44.0	68.3	-	Complies
		5150	67.3	51.2	74.0	54.0	Complies
802.11n	HT0	5180	105.4	93.1	-	-	-
		10360	63.7	49.0	68.3	-	Complies
		15540	57.7	44.1	74.0	54.0	Complies
		6906.7	53.5	43.5	68.3	-	Complies
		5150	66.8	50.9	74.0	54.0	Complies
802.11n	HT8	5180	102.6	89.7	-	-	-
		10360	61.8	47.1	68.3	-	Complies
		15540	56.7	43.2	74.0	54.0	Complies
		6906.7	52.8	42.6	68.3	-	Complies
		5150	64.5	49.4	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	106.0	93.3	-	-	-
		10480	61.8	47.2	68.3	-	Complies
		15720	56.0	43.0	74.0	54.0	Complies
		6986.7	54.6	44.8	68.3	-	Complies
802.11n	HT0	5240	105.3	92.8	-	-	-
		10480	61.5	47.5	68.3	-	Complies
		15720	56.0	43.0	74.0	54.0	Complies
		6986.7	54.9	45.0	68.3	-	Complies
802.11n	HT8	5240	101.7	89.4	-	-	-
		10480	59.3	44.6	68.3	-	Complies
		15720	56.0	43.0	74.0	54.0	Complies
		6986.7	52.0	42.1	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	105.7	93.4	-	-	-
		10640	64.6	49.5	68.3	-	Complies
		15960	58.0	44.0	74.0	54.0	Complies
		7093.4	53.1	44.3	68.3	-	Complies
		5350	67.6	51.7	74.0	54.0	Complies
802.11n	HT0	5320	104.3	93.0	-	-	-
		10640	65.1	49.2	68.3	-	Complies
		15960	58.0	44.0	74.0	54.0	Complies
		7093.4	53.7	44.6	68.3	-	Complies
		5350	67.5	51.8	74.0	54.0	Complies
802.11n	HT8	5320	102.1	89.8	-	-	-
		10640	62.0	47.4	68.3	-	Complies
		15960	56.7	43.2	74.0	54.0	Complies
		7093.4	50.1	40.3	68.3	-	Complies
		5350	64.8	49.9	74.0	54.0	Complies

**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	102.3	87.6	-	-	-
		10380	60.2	44.4	68.3	-	Complies
		15570	57.0	43.0	74.0	54.0	Complies
		6920	52.7	43.2	68.3	-	Complies
		5150	70.6	53.7	74.0	54.0	Complies
802.11n	HT8	5190	99.7	83.2	-	-	-
		10380	56.4	41.7	68.3	-	Complies
		15570	57.0	43.0	74.0	54.0	Complies
		6920	50.3	41.8	68.3	-	Complies
		5150	67.1	50.5	74.0	54.0	Complies

**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	103.8	89.2	-	-	-
		10460	59.4	43.9	68.3	-	Complies
		15690	57.0	43.0	74.0	54.0	Complies
		6973.4	53.8	44.6	68.3	-	Complies
802.11n	HT8	5230	101.6	85.9	-	-	-
		10460	56.0	40.8	68.3	-	Complies
		15690	57.0	43.0	74.0	54.0	Complies
		6973.4	50.9	42.7	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	102.5	87.4	-	-	-
		10620	56.7	43.4	68.3	-	Complies
		15930	57.0	43.0	74.0	54.0	Complies
		7080	49.8	44.3	68.3	-	Complies
		5350	71.1	54.0	74.0	54.0	Complies
802.11n	HT8	5310	99.8	83.3	-	-	-
		10620	57.2	43.3	68.3	-	Complies
		15930	57.0	43.0	74.0	54.0	Complies
		7080	46.7	38.5	68.3	-	Complies
		5350	66.6	49.7	74.0	54.0	Complies

**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  $\pm 4.1$  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  $\pm 4.1$  dB.

#### **4.3.3 Frequency Band: 30 - 1000 MHz**

Refer to Attachment 3 – FCC Part 15B Test Report (Report: FG07-059EAL)

#### **4.3.4 RF Conducted Measurements at the antenna terminal**

Testing was performed by Aegis Labs Inc. CA, USA.

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

#### **4.3.5 Band Edge Measurements**

Complies (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  $\mu$ 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.

### 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	16.9	17	49.0	50	Complies
		5240	16.7	17	46.8	50	Complies
		5320	17.1	24	51.3	250	Complies
802.11n	HT0	5180	16.8	17	47.9	50	Complies
		5240	17.0	17	50.0	50	Complies
		5320	17.3	24	53.7	250	Complies
802.11n	HT8	5180	14.0	17	25.1	50	Complies
		5240	14.3	17	26.9	50	Complies
		5320	14.2	24	26.3	250	Complies
Tx BW = 40 MHz (Wide)							
802.11n	HT0	5190	15.1	17	32.4	50	Complies
		5230	17.0	17	50.0	50	Complies
		5310	16.5	24	44.7	250	
802.11n	HT8	5190	12.2	17	16.6	50	Complies
		5230	14.5	17	28.2	50	
		5310	13.3	24	21.4	250	Complies

## 6.0 CHANNEL BANDWIDTH

Testing was performed by Aegis Labs Inc. CA, USA.

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.

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.

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.

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.

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  
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 is located at the middle of top edge of LCD screen 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 M070238\_Cert\_4965AGN\_SAR\_2.4 and M070238\_Cert\_4965AGN\_SAR\_5.6. The highest SAR value is 1.11 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: T4220 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, **complies** with the requirements of 47 CFR, Part 15 Subpart E -Section 15.407 (5.15-5.35 GHz band).

The test sample also complies 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	<b>Complies</b>
15.205	6.3	Operation in Restricted Band	<b>Complies</b>
15.207	6.6	Conducted Emissions	<b>Complies</b>
15.209	6.3	Radiated Emissions	<b>Complies</b>
15.407 (a)(1) (a)(2)	Annex A9.2	Peak Transmit Power	<b>Complies</b>
15.407 (a)(5)	Annex A9.2	Peak Power Spectral Density	<b>Complies</b>
15.407 (a)(6)		Peak Excursion	<b>Complies</b>
15.407 (b)	Annex A9.3	Undesirable Emission	<b>Complies</b>
15.407 (c)		Discontinue Transmission	<b>Complies</b>
15.407 (d)		Reserved	-
15.407 (e)		Restricted to Indoor Operations	<b>Complies</b>
15.407 (f)		Radio Frequency Hazard	<b>Complies</b>
15.407 (g)	Annex A9.5(e)	Frequency Stability	<b>Complies</b>
15.407 (h)		Transmit Power Control	<b>Not Applicable</b> E.I.R.P < 500 mW
15.407 (h)	Annex A9.4	Dynamic Frequency Selection	<b>Complies</b>

#### FCC Subpart E, Section 15.407 - WLAN

Refer to EMC Technologies Report No: M070237\_Cert\_4965AGN\_NII\_BT

#### FCC Subpart C, Section 15.247 – Bluetooth

Refer to EMC Technologies Report No: M070237\_Cert\_EYTF3CSFT\_WLAN



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.

## TEST REPORT APPENDICES

**APPENDIX A: MEASUREMENT INSTRUMENT DETAILS**  
**APPENDIX B: PHOTOGRAPHS**  
**APPENDIX C: OPERATIONAL DESCRIPTION**  
**APPENDIX D: BLOCK DIAGRAM**  
**APPENDIX E: SCHEMATICS**  
**APPENDIX F: ANTENNA INFORMATION**  
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**Attachment 1: RF Exposure Information**  
**Attachment 2: FCC DOC for LifeBook T Series**  
**Attachment 3: FCC Part 15B Test Report (Report: FG07-059EAL)**  
**Attachment 4: INTEL Part 15.407 Test Report (Report: INTEL-060908F)**  
**Attachment 5: Dynamic Frequency Selection Results**

