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EMI TEST REPORT FOR CERTIFICATION to FCC PART 15 Subpart C (Section 15.247) & RSS-210

FCC ID: EJE-BT0001 Industry Canada ID: 337J-BT0001

Test Sample: Bluetooth Module **Model**: EYTF3CSFT

Report Number: M060108_Cert_EYTF3CSFT

Tested for: Fujitsu Australia Ltd.

Issue Date: 8th February 2006

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NATA Accredited Laboratory Number: 5292

EMI TEST REPORT FOR CERTIFICATION to FCC PART 15 Subpart C (Section 15.247) & RSS-210

EMC Technologies Report No. M060108_Cert_EYTF3CSFT

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EMI TEST REPORT FOR CERTIFICATION to FCC PART 15 Subpart C (Section 15.247) & RSS-210

Report Number: M060108_Cert_EYTF3CSFT

Test Sample:Bluetooth ModuleModel:EYTF3CSFTManufacturer:TAIYO YUDEN

FCC ID: EJE-BT0001 Industry Canada ID: 337J-BT0001

Equipment Type: Intentional Radiator (Transceiver)

Host Notebook Fujitsu Ltd.

Manufacturer: 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, Subpart C – Intentional Radiators

FCC Part 15.247, 2400 - 2483.5 MHz Operation Band

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 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: 13th to 18th January 2006

Test Officer:

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 C (Section 15.247) & RSS-210

1.0 INTRODUCTION

Testing was performed on the TAIYO YUDEN Bluetooth Module, Model: EYTF3CSFT installed in Fujitsu notebook PC.

The EYTF3CSFT Bluetooth module was originally certified by TAIYO YUDEN as a modular approval under FCC ID: RYYEYTF3CSFT (Canada ID: 4389AEYTF3CSFT). The intention of this application is to get a Limited Modular approval for this Bluetooth module for use in Fujitsu notebook PCs. The Radio modules are installed in a controlled environment at the Fujitsu notebook production/assembly factory.

The results for the Bluetooth module are reported in this test report.

The second transmitter in the notebook is INTEL WLAN module, model: WM3945ABG. This WLAN transmitter is tested and certified under EMC Technologies report No: M060108_Cert_WM3945ABG_DTS and M060108_Cert_WM3945ABG_NII with FCC ID: EJE-WL0010.

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

47 CFR, Part 15, Subpart C: Rules for intentional radiators (particularly section 15.247)

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 15.247: Operation in the bands 902-928 MHz, 2400-2483.5 MHz,

5725-5850 MHz

The test sample **complied** with the requirements of 47 CFR, Part 15 Subpart C - Section 15.247.

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(o) and the RF exposure requirements of RSS-102.

1.1 Summary of Results

FCC Subpart C (Section 15.247)

| FCC Part 15, | Industry Canada | Test Performed | Result |
|---------------|-----------------|------------------------------|----------------|
| Subpart C | RSS-210 | | |
| Clauses | Clauses | | |
| 15.203 | 5.5 | Antenna Requirement | Not Applicable |
| 15.205 | 6.3 | Operation in Restricted Band | Complies |
| 15.207 | 6.6 | Conducted Emissions | Complies |
| 15.209 | 6.3 | Radiated Emissions | Complies |
| 15.247 (a)(1) | 6.2.2(o)(ii) | Channel Occupancy/Bandwidth | Complies |
| 15.247 (b)(1) | 6.2.2(o)(b) | Peak Output Power | Complies |
| 15.247 (i) | | Radio Frequency Hazard | Complies |
| 15.247 (d) | 6.2.2(o)(e1) | Out of Band Emissions | Complies |

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.

1.2 Modifications by EMC Technologies

No modifications were required.



2.0 GENERAL INFORMATION

(Information supplied by the Client)

2.1 EUT (Bluetooth) Details

Transmitter: Bluetooth Module
Model Number: EYTF3CSFT
Manufacturer: TAIYO YUDEN

Network Standard: BluetoothTM 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
Interface Type: USB

Antenna Types: Yokowo Inverted F Antenna, Model: YCE-5250

Location: Under Left side of the Shift key, above the air vent

Antenna gain: 2.78 dBi
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 | |
| 2 | 2403 | |
| 3 | 2404 | |
| | • | |
| | • | |
| | | |
| 39 | 2440 | |
| 40* | 2441 | Power (Ext, Int) = 0, 96 |
| 41 | 2442 | |
| | • | |
| | | |
| | • | |
| 77 | 2478 | |
| 78 | 2479 | |
| 79* | 2480 | |

^{*}Channels tested and reported in this report

2.2 Operational Description

The Bluetooth Module was tested in Fujitsu host notebook S7110.

The Bluetooth Utility Software was used to transmit continuously during the tests. For Spurious and Harmonics tests both radio modules (WLAN and Bluetooth) were simultaneously transmitting.

2.3 Technical Specifications

Refer to Appendix G for details



2.4 Test Configuration

Conducted tests were performed at the Bluetooth Antenna ports.

Radiated tests were performed for measuring the harmonics and spurious from the transmitters.

Limited Modular Approval (LMA) details to cover the following Fujitsu notebook configurations:

| Fujitsu Notebook Model | Bluetooth Module | Bluetooth Antenna | Antenna Gain dBi |
|---------------------------|---------------------|--------------------|---------------------|
| S7110 | | Inverted F antenna | 2.78 |
| E8110 | EYTF3CSFT | inverted F antenna | -0.22 |
| E8210 | | | -0.22 |

The Bluetooth Module was tested in Fujitsu host notebook S7110 as this notebook has the highest antenna gain.

2.5 Host PC Details

S7110 Model Notebook

Host notebook :LifeBook S seriesModel Name:S7110 / S7110DSerial Number:Pre-production SampleManufacturer:FUJITSU LIMITED

CPU Type and Speed: Yonah-DC 2.16GHz LCD 14"SXGA+ / 14"XGA

Wired LAN: Marvell 88E8055 : 10 Base-TX/100 Base-TX/1000Base-T

Modem: Agere MDC1.5 modem Model: AM3(New)

Port Replicator Model: FPCPR63

AC Adapter Model: 80W: SEB100P2-19.0(Sanken) / SQ2N80W19P-01(Nagano)

64W: SED80N2-19.0(Sanken)

Voltage: 19 V

Current Specs: 4.22A, 3.37A **Watts:** 80W, 64W

RADIO MODULES

Module # 1:Bluetooth ModuleModel Number:EYTF3CSFTManufacturer:TAIYO YUDEN

Interface Type: USB

Antenna Type: Yokowo Inverted F Antenna, Model: YCE-5250

Location: Under Left side of the Shift key, above the air vent

Antenna gain: 2.78 dBi
Max. Output Power: 4 dBm

Module # 2 WLAN (Golan IEEE802.11a+b/g)

WLAN Model No.: WM3945ABG

FCC/IC ID: EJE-WL0010 / 337J-WL0010

WLAN Manufacturer: Intel Corp.

Interface Type: Mini-Card Wireless LAN Module
Antenna Type: Monopole Antenna - Model: YCE-5008

Located on top edge of LCD screen (Left and Right)

2.6 Block Diagram

Refer to Appendix D - Block Diagram

2.7 Support Equipment

Refer to Attachment 3 – FCC Part 15B Test Report (Report: FG06-016EAL)



2.8 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.

2.9 Test Facility

2.9.1 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 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.**

2.9.2 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 Laboratory (NML) 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).

2.10 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 Laboratory (NML). All equipment calibration is traceable to Australia national standards at the National Measurements Laboratory. The reference antenna calibration was performed by NML 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

2.11 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 Bluetooth Module, Model UGXZ5-102A

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: FG06-016EAL)

4.0 SPURIOUS EMISSION MEASUREMENTS

4.1 Test Procedure

Testing was performed in accordance with the requirements of FCC Part 15.247(d).

Radiated emission measurements were performed to the limits as per section 15.209. 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 EMI Receiver was operated under software control via the PC Controller through the IEEE.488 Interface Bus Card Adaptor. 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: FG06-016EAL).

The measurement of emissions above 1000 MHz, appearing in the restricted bands, was made using an average detector with a bandwidth of 1.0 MHz.

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 Quasi-Peak/Average Detectors. The software for cable losses automatically corrected the measurement data for each frequency range, antenna factors and preamplifier gain and all data was then stored on disk in sequential data files. 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⁻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 $_{\mu}V$ 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:

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

Measurement uncertainty with a confidence interval of 95% is:

- Free radiation tests $(1000 \text{ MHz} - 18,000 \text{ MHz}) \pm 4.1 \text{ dB}$



4.3 Radiated 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 54 dB μ V/m limit at 3 metres has been converted to 64 dB μ V/m at 1 metre using a factor of 20 dB per decade where emissions were located in the restricted bands.

Testing was performed while both the WLAN transmitter and Bluetooth transmitter continuously operated. Harmonics related to the Bluetooth transmitter are reported below. Harmonics related to the WLAN transmitter refer to M060108_Cert_WM3945ABG_DTS and M060108_Cert_WM3945ABG_NII.

The EUT was operating at its highest channel (2480 MHz), the field strength at 2483.5 MHz was: $52.4 \text{ dB}_{\mu}\text{V/m}$ peak and $40.0 \text{ dB}_{\mu}\text{V/m}$ average.

The levels were > 20 dB below the maximum field strength of the in-band carrier.

The EUT was operating at its lowest channel (2402 MHz), the field strength at 2400 MHz was: $60.7 \text{ dB}_{\mu}\text{V/m}$ peak and $45.8 \text{ dB}_{\mu}\text{V/m}$ average.

The levels were > 20 dB below the maximum field strength of the in-band carrier.

Channel 1 - 2402 MHz

| Frequency MHz | S7110 LifeBook Level (dBuV/m) | | Peak Limit | Average Limit | Result |
|------------------|----------------------------------|---------------------|---------------|------------------|--------|
| | Peak Detector | Average Detector | dBuV/m | dBuV/m | |
| 2402 | Transmitter F | undamental | | | |
| 4804 | 58.9 | 44.9 | 74.0 | 54.0 | Pass |
| 7206 | 46 | 35 | - | - | - |
| 9608 | 49 | 38 | - | - | - |
| 12010 | 53 | 41 | 74.0 | 54.0 | Pass |
| 14412 | 57 | 45 | - | - | - |
| 16814 | 56 | 45 | - | - | - |
| 19216 | 65 | 52 | 84.0* | 64.0* | Pass |
| 21618 | 69 | 56 | - | - | - |
| 24020 | 69 | 56 | - | - | - |
| 1602 | 56.8 | 44.5 | 74.0 | 54.0 | Pass |
| 2405.5 | 52.4 | 39.7 | - | - | - |

^{*}Limits were corrected for 1 metre measurement.

Channel 40 - 2441 MHz

| Frequency MHz | S7110 LifeBook Level (dBuV/m) | | Peak Limit | Average Limit | Result |
|------------------|----------------------------------|---------------------|---------------|------------------|--------|
| | Peak Detector | Average Detector | dBuV/m | dBuV/m | |
| 2441 | Transmitter F | undamental | | | |
| 4882 | 55.8 | 44.3 | 74.0 | 54.0 | Pass |
| 7323 | 46 | 35 | 74.0 | 54.0 | Pass |
| 9764 | 49 | 38 | - | - | - |
| 12205 | 53 | 41 | 74.0 | 54.0 | Pass |
| 14646 | 57 | 45 | - | - | - |
| 17087 | 56 | 45 | - | - | - |
| 19528 | 65 | 52 | 84.0* | 64.0* | Pass |
| 21969 | 69 | 56 | - | - | - |
| 24410 | 69 | 56 | - | - | - |
| 1628 | 54.0 | 42.8 | - | - | - |
| 2445 | 49.8 | 37.6 | - | - | - |

^{*}Limits were corrected for 1 metre measurement.

Channel 79 - 2480 MHz

| Frequency MHz | S7110 LifeBook Level (dBuV/m) | | Peak Limit | Average Limit | Result |
|------------------|----------------------------------|---------------------|---------------|------------------|--------|
| | Peak Detector | Average Detector | dBuV/m | dBuV/m | |
| 2480 | Transmitter F | undamental | | | |
| 4960 | 58.7 | 46.3 | 74.0 | 54.0 | Pass |
| 7440 | 46 | 35 | 74.0 | 54.0 | Pass |
| 9920 | 49 | 38 | - | - | - |
| 12400 | 53 | 41 | 74.0 | 54.0 | Pass |
| 14880 | 57 | 45 | - | - | - |
| 17360 | 56 | 45 | - | - | - |
| 19840 | 65 | 52 | 84.0* | 64.0* | Pass |
| 22320 | 69 | 56 | - | - | - |
| 24800 | 69 | 56 | - | - | - |
| 1653.9 | 54.6 | 42.1 | - | - | - |
| 2484.0 | 50.2 | 36.5 | 74.0 | 54.0 | Pass |

^{*}Limits were corrected for 1 metre measurement.

Result:

 2^{nd} harmonics and spurious emissions were recorded within the restricted bands of up to 25 GHz. Other harmonics were confirmed low with both RBW and VBW reduced (the peak and average levels listed in the above tables were noise floor readings). Harmonics were complied with the FCC limits in sections 15.209 and 15.247 by a margin of 7.3 dB. The measurement uncertainty for radiated emissions in this band was ± 4.1 dB.

4.3.2 Frequency Band: 30 - 1000 MHz

Refer to Attachment 3 – FCC Part 15B Test Report (Report: FG06-016EAL).



4.3.3 RF Conducted Measurements at the antenna terminal

In the 100 kHz bandwidth within the operating band, the highest emissions (spurious/harmonics) level that is produced by the intentional radiator shall be at least 20 dB below.

The transmitter output was connected to the spectrum analyser in peak hold mode.

The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised.

D1 line indicates the 20 dB limit below the highest level of the transmitter

Refer to Appendix K for Harmonics plots

Result: Complies.

4.3.4 Band Edge Measurements

In the 100 kHz bandwidth within the operating band, the highest emissions (spurious/harmonics) level that is produced by the intentional radiator shall be at least 20 dB below.

Testing was performed while the transmitter continuously transmitted on a low (2402 MHz) and high frequency (2480 MHz) channel.

The transmitter output was connected to the spectrum analyser in peak hold mode.

The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised.

D1 line indicates the 20 dB limit below the highest level of the transmitter

Refer to Appendix L for Band Edge plots

Result: Complies.

5.0 PEAK OUTPUT POWER - Section 15.247 (b)(1)

Testing was performed in accordance with the requirements of FCC Part 15.247(b)(1).

Measurements were performed while the Bluetooth transmitter continuously transmitted.

The transmitter output was connected to the spectrum analyser in peak hold mode.

The resolution bandwidth of 1 MHz and the video bandwidth of 3 MHz were utilised.

Variation by +/- 15% of the supply voltage, in accordance with section 15.31(e), to the computer power supply power did not cause any variations to the RF output power.

| Frequency | Power | Limit | Power | Limit | Power Plots |
|-----------|-------|-------|-------|-------|-------------|
| MHz | dBm | dBm | mW | mW | |
| 2402 | 2.7 | 30 | 1.9 | 1000 | Appendix M |
| 2441 | 3.0 | 30 | 2.0 | 1000 | Appendix M |
| 2480 | 3.3 | 30 | 2.1 | 1000 | Appendix M |

Result: Complies.



6.0 CHANNEL BANDWIDTH & CHANNEL OCCUPANCY

Testing was carried out in accordance with the requirements of FCC Part 15.247(a)(1)(iii)

The EUT was a Frequency Hopping Spread Spectrum transmitter and operated as described in section 2 of this report.

6.1 Channel Bandwidth

In the band 2400 - 2483.5 MHz the hopping channel carrier frequencies separated by a minimum of 25kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

The transmitter output was connected to the spectrum analyser in peak hold mode.

A resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised.

| Frequency | Bandwidth | Result | 20 dB Bandwidth |
|-----------|-----------|----------|-----------------|
| MHz | kHz | | Plots |
| 2402 | 751.5 | Complies | Appendix J |
| 2441 | 756.5 | Complies | Appendix J |
| 2480 | 756.5 | Complies | Appendix J |

6.2 Channel Occupancy

79 channels were observed operating between 2400 to 2483.5 MHz. Refer to Appendix N for number of channel plot.

The channel separation of 1 MHz was recorded. Refer to Appendix N for number of channel separation plot.

The device was observed to have a dwell time of 420.8 uS. Refer to Appendix N for dwell time plot.

The specification allows for a dwell time not exceeding 0.4 seconds.

The maximum period is 79 channels x = 0.4 seconds = 31.6 seconds.

During the test the transmitter was observed to activate on average 316 times in 31.6 seconds.

The transmitter therefore occupies in one channel for 316 x 420.8 uS = 0.133 seconds.

Result: Complies.



7.0 RADIO FREQUENCY EXPOSURE (HAZARD) INFORMATION

Testing was performed in accordance with the requirements of FCC Part 15.247(i)

Spread spectrum transmitters operating in the 2400 - 2483.5 MHz and 5725 – 5850 MHz bands 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: The Bluetooth antenna is located under the LHS of keyboard (near Caps lock area) and projected distance of less than 20cm from user.

Transmitter # 2: The WLAN antennas are located on the top edge of LCD screen (2 antennas left and right) and projected distance of greater than 20cm from user.

SAR is not required as the WLAN transmitter is mobile device and the power for the Bluetooth transmitter is below the low threshold.

The separation distance between the WLAN and BT antennas is greater than 20cm. Therefore, they are not co-located transmitters.

The MPE calculation shown below is the aggregate of WLAN and BT power densities.

In accordance with Section 1.1310, the Maximum Permissible Exposure (MPE) limit for the General Population/Uncontrolled Exposure of 1.0 has been applied, i.e 1mW/cm².

Friis transmission formula: Pd = $(P*G) / (4*\pi*r^2)$

where: $Pd = power density (mW/cm^2)$

P = power input to the antenna (mW)

G = antenna gain (numeric)

r = distance to the center of radiation of the antenna (cm)

The result was extracted from section 5.0 of this report (Bluetooth Module):

Prediction frequency = 2480 MHz

Maximum peak output power = 3.3 dBm = 2.1 mW

Antenna (Inverted F) gain (max) = 2.78 dBi = 1.9 numeric

The power density calculated = 0.001 mW/cm²

The result was extracted from section 5.0 of M060108_Cert_WM3945ABG_DTS (WLAN)

Prediction frequency = **5785 MHz**

Maximum peak output power = 17.9 dBm = 61.7 mW

Antenna (Monopole) gain (max) = 1.79 dBi = 1.51 numeric

The power density calculated = 0.02 mW/cm²

Prediction frequency = 2437 MHz

Maximum peak output power = 17.1 dBm = 51.3 mW

Antenna (Inverted F) gain (max) = 2.47 dBi = 1.77 numeric

The power density calculated = 0.02 mW/cm²

The result was extracted from section 5.0 of M060108_Cert_WM3945ABG_NII (WLAN)

Prediction frequency = 5320 MHz

Maximum peak output power = 17.8 dBm = 60.3 mW

Antenna (Monopole) gain (max) = 1.66 dBi = 1.47 numeric

The power density calculated = 0.02 mW/cm²

Therefore, the power density (WLAN + BT) = 0.021 mW/cm^2

MPE limit for uncontrolled exposure at prediction frequency = 1 mW/cm²

Results: Calculations show that the Radio devices with described antennas complied with

Maximum Permissible Exposure (MPE) limit for the General Population/Uncontrolled

Exposure



8.0 ANTENNA REQUIREMENT

Testing to the requirements of FCC Part 15.203 was not applicable as this intentional radiator was designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

9.0 COMPLIANCE STATEMENT

The Bluetooth Module, Model: EYTF3CSFT installed in Fujitsu notebook PCs tested on behalf of Fujitsu Australia Ltd, **comply** with the requirements of 47 CFR, Part 15 Subpart C - Rules for Radio Frequency Devices (intentional radiators), Section 15.247 -Operation in the frequency band 2400 - 2483.5 MHz.

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(o) 2400 – 2483.5 MHz Spread Spectrum requirements and the RF exposure requirements of RSS-102.

Results were as follows:

FCC Subpart C (Section 15.247)

| FCC Part 15, | Industry Canada | Test Performed | Result |
|---------------|-----------------|------------------------------|----------------|
| Subpart C | RSS-210 | | |
| Clauses | Clauses | | |
| 15.203 | 5.5 | Antenna Requirement | Not Applicable |
| 15.205 | 6.3 | Operation in Restricted Band | Complies |
| 15.207 | 6.6 | Conducted Emissions | Complies |
| 15.209 | 6.3 | Radiated Emissions | Complies |
| 15.247 (a)(1) | 6.2.2(o)(ii) | Channel Occupancy/Bandwidth | Complies |
| 15.247 (b)(1) | 6.2.2(o)(b) | Peak Output Power | Complies |
| 15.247 (i) | | Radio Frequency Hazard | Complies |
| 15.247 (d) | 6.2.2(o)(e1) | Out of Band Emissions | Complies |

TEST REPORT APPENDICES

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Attachment 1: RF Exposure Information

Attachment 2: FCC DOC for Fujitsu Notebooks

Attachment 3: FCC Part 15B Test Report (Report: FG06-016EAL)