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

FCC ID: **EJE-WL0028**
Industry Canada ID: **337J-WL0028**

Test Sample: STYLISTIC Q Series
Model: Q702

Radio Module: Intel Centrino 6205 Taylor Peak 62205ANHMW WLAN

Report Number: M120811_FCC_62205ANHMW_DTS

Issue Date: 15th August 2012

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EMC Technologies Report No. M120811_FCC_62205ANHMW_DTS

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Report No. M120811_FCC_62205ANHMW_DTS

Test Sample:	STYLISTIC Q Series
Model:	Q702
Radio Module:	Intel Centrino Advanced-N 6205 Taylor Peak 62205ANHMW WLAN
FCC ID:	EJE-WL0028
Industry Canada ID:	337J-WL0028
Equipment Type:	Intentional Radiator (Transceiver)
Manufacturer (LifeBook):	Fujitsu Ltd
Address:	1-1 Kamikodanaka 4-Chome, Nakahara-Ku, Kawasaki, Japan
Contact:	Mr. Tsuyoshi Uchihara, Mobile Computing Division
Test Standards:	FCC Part 15 – Radio Frequency Devices FCC Part 15 Subpart C - Intentional Radiators Section 15.247: 2400 – 2483.5 MHz & 5725 – 5850 MHz Operation Bands ANSI C63.4 – 2009 RSS-210 Issue 8 Low Power Licence-Exempt RadioCommunication Devices Annex 8: 2400–2483.5 MHz & 5725–5850 MHz Operation Bands RSS-GEN Issue 3 General Requirements and Information for the Certification of Radiocommunication Equipment
Test Date:	13th August 2012
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:	**Chieu Huynh** **Senior EMC Engineer** **EMC Technologies Pty Ltd**

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

1.0 INTRODUCTION

EMI testing was performed on the STYLISTIC Q Series, Model: Q702 with Intel Centrino Advanced-N 6205 (Taylor Peak 802.11a/b/g/n 2x2), Model: 62205ANHMW.

The Taylor Peak 2x2 WLAN module was originally certified by INTEL as a modular approval under FCC ID: PD962205ANH (Canada ID: 1000M-62205ANH).

The intention of this application is to FCC certify Intel Centrino Advanced-N 6205 (Taylor Peak 802.11a/b/g/n 2x2), Model: 62205ANHMW **installed in** STYLISTIC Q Series, Model: Q702. The Radio modules are installed in a controlled environment at the Fujitsu notebook production/assembly factory.

The other transmitter that may be installed in the STYLISTIC Q Series, Model: Q702 is Broadcom Bluetooth Module, Model: BCM92070MD_REF6. The Bluetooth module was originally certified by Broadcom as a modular approval under FCC ID: QDS-BRCM1043 (Canada ID: 4324A-BRCM1043).

This Bluetooth pre-approved module, is not co-located as the WLAN and Bluetooth antennas are >5cms apart. The maximum power output of the Bluetooth module is 4dBm (2.5mW).

RF exposure and labeling will be addressed by Fujitsu according to FCC multi-transmitter and modular procedures.

There are two variants of the STYLISTIC Q Series, Model: Q702 covered in this report. One that is equipped with the modular certified low power Bluetooth transmitter with built-in antenna and one variant that does not contain Bluetooth transmitter or Bluetooth antenna. Testing was conducted on the sample that is equipped with the Bluetooth transmitter and Bluetooth antenna.

This certification is for the STYLISTIC Q Series, Model: Q702 with Intel 62205ANHMW WLAN module.

Appendix G shows the FCC label details.

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 8 - Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Annex 8 and RSS-Gen.

The measurement procedure used was in accordance with ANSI C63.4-2009. The instrumentation conformed to the requirements of ANSI C63.2-1996.

1.1 Summary of Results

FCC Subpart C, Section 15.247

FCC Part 15 Subpart C Clauses	IC RSS-210 and RSS-Gen Clauses	Test Performed	Results
15.203	RSS-Gen (7.1.2)	Antenna Requirement	**Complies**
15.205	RSS-Gen (7.2.2)	Operation in Restricted Band	**Complies**
15.207	RSS-Gen (7.2.4)	Conducted Emissions	**Note 1**
15.209	RSS-Gen (7.2.5)	Radiated Emissions	**Complies**
15.247 (a)(2)	A8.2 (a)	Channel Bandwidth	**Note 2**
15.247 (b)(3)	A8.4 (4)	Peak Output Power	**Note 2**
15.247 (c)	RSS-Gen (7.1.2)	Antenna Gain > 6 dBi	**Not Applicable.** Antenna gain < 6 dBi
15.247 (d)	A8.5	Out of Band Emissions	**Complies**
15.247 (e)	A8.2 (b)	Peak Power Spectral Density	**Note 2**
15.247 (f)	A8.3	Hybrid Systems (Note 3)	**Not Applicable.** EUT does not employ a hybrid system
15.247 (g)	A8.1	Frequency Hopping	**Not Applicable.** EUT does not employ frequency hopping
15.247 (h)	A8.1	Frequency Hopping	**Not Applicable.** EUT does not employ frequency hopping
15.247 (i)	RSS-Gen (5.6)	Radio Frequency Hazard	**Complies**

Note 1: Refer to attached FCC Part 15B DoC
Note 2: Refer to original approval under FCC ID: PD962205ANH (Canada ID: 1000M-62205ANH)
Note 3: Hybrid systems are those that employ a combination of both frequency hopping and digital modulations technique.

1.2 Modifications by EMC Technologies

No modifications were required.

2.0 GENERAL INFORMATION

(Information supplied by the Client)

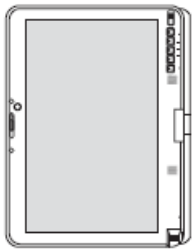
2.1 EUT (WLAN) Details

Transmitter:	Half Mini-Card Wireless LAN Module
Wireless Module:	Intel Centrino Advanced-N 6205 Taylor Peak 2x2 (11a/b/g/n)
Model Number:	62205ANHMW
Manufacturer:	Intel Corporation
Frequency Ranges:	2.412 –2.462 GHz 5.18 - 5.32 GHz, 5.5 – 5.7 GHz and 5.745 - 5.825 GHz
Maximum Data Rates:	802.11b = 11Mbps, 802.11g and 802.11a = 54Mbps 802.11n = 450 Mbps
Antenna Types:	Nissei Inverted F (1^{st} , 2^{nd})
Antenna gain:	Max antenna gain is less than 6 dBi. Refer antenna data provided separately

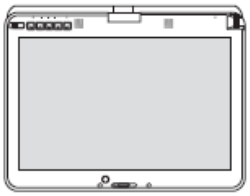
2.2 EUT (Notebook PC) Details

NoteBook PC:	STYLISTIC Q series
Model Name:	Q702
Serial Number:	Pre-production Sample
Manufacturer:	FUJITSU LIMITED
CPU Type and Speed:	Core i5 1.8GHz
LCD	11.7”WXGA(1280x800 : LP116WH4
Graphics chip	None
Wired LAN:	None
Modem:	None
Optional Docking Unit:	FPCPR199
AC Adapter Model:	60W: PXW1931N
Voltage:	19 V
Current Specs:	3.16A
Watts:	60W

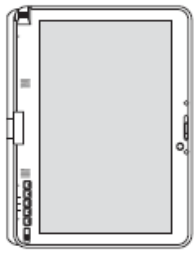
Primary
Landscape Orientation



Primary Portrait
Orientation



Secondary
Landscape Orientation



Secondary Portrait
Orientation

2.3 Test Configuration

The Intel WLAN test software “DRTU” was used during the tests.

Power is provided via an AC adaptor. Testing was performed at a voltage of 120VAC at 50Hz.

2.4 Test Procedure

Emissions measurements were performed in accordance with the procedures of ANSI C63.4-2009. Radiated emissions tests were performed at a distance of 1 and 3 metres from the EUT.

2.5 Test Facility

2.5.1 General

EMC Technologies Pty Ltd is listed by the FCC as a test laboratory able to perform compliance testing for the public. EMC Technologies is listed as an FCC part 47CFR2.948 test lab and may perform the testing required under Parts 15 and 18 – **FCC Registration Number 90560**

EMC Technologies Pty Ltd has also been accredited as a Conformity Assessment Body (CAB) by Australian Communications and Media Authority (ACMA) under the APECTEL MRA and is designated to perform compliance testing on equipment subject to Declaration of Conformity (DoC) and Certification under Parts 15 & 18 of the FCC Commission's rules – **Registration Number 494713 & Designation number AU0001.**

EMC Technologies has also been accepted by Industry Canada for the performance of radiated measurements in accordance with RSS 212, Issue 1 (Provisional) - **Industry Canada number 3569B.**

Measurements were performed at EMC Technologies' laboratory in Keilor Park, Victoria Australia.

2.5.2 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 emissions, 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^2LA).

2.6 Test Equipment Calibration

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 EMC Technologies. The complete list of test equipment used for the measurements, including calibration dates and traceability is contained in Appendix A

FCC 15.247 (DTS) RESULTS

3.0 CONDUCTED EMISSION MEASUREMENTS

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

4.0 RADIATED 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 and 15.247. All measurements above 1 GHz were made over a distance of 3 and 1 metres.

Calibrated EMCO 3115, EMCO 3116 and ETS standard gain horn antennas were used for measurements between 1 to 40 GHz.

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^{-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 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 dBµV/m

4.3 Radiated Emissions (Spurious and Harmonics)

This transmitter module was originally tested and certified by the manufacturer as a stand-alone module outside a laptop (host) with higher gain antennas. Refer to manufacturer's original test report (FCC Part 15C) for full results showing compliance with the spurious and harmonics limits. However, to ensure the transmitter module install in STYLISTIC Q Series, Model: Q702 is still in compliance, verification tests were performed at the worst case (frequencies with higher average output power) or selected frequencies for harmonics and spurious emissions.

Initial investigations were performed with all data rates. Final testing was performed while the transmitter continuously operated in the worst case condition.

All orientations were investigated and tested. Worst results were reported below.

4.3.1 Frequency Band: 1 – 40 GHz

The 74 dBµV/m @ 3m and 54 dBµV/m @ 3m limits are applied for emissions fall in the restricted bands. The limits for emission outside the restricted band are 20 dB below the fundamental field strength. The limits are adjusted by 10.5 dB when measurements perform at a distance of 1m.

Testing was performed while the WLAN transmitter continuously operated. Harmonics related to the WLAN transmitter operated in the frequency bands 2.4 – 2.4835 GHz and 5.725 – 5.850 GHz are reported below. Harmonics in the frequency bands 5.15 – 5.35 GHz and 5.47 – 5.725 GHz, refer to M120811_FCC_62205ANHMW_NII.

Measurements were performed with the EUT operating in the worst case mode of single antenna transmitting. For multiple antennas transmitting like two antennas transmitting, the power level is 3 dB lower (50%) with respect to single antenna mode.

Harmonics were measured for channels where the average output power was highest.

4.3.1.1 Configuration 802.11b

Frequency MHz	Peak Detector dBuV/m	Average Detector dBuV/m	Peak Limit dBuV/m	Average Limit dBuV/m	Result
2437	Transmit Frequency				
4874	49.1	44.8	74.0	54.0	Complied

Result: Harmonic was recorded up to 25 GHz. Other harmonics were confirmed low with both RBW and VBW reduced. The worst case emissions complied with the FCC limits of sections 15.209 and 15.247 by a margin of 9.2 dB.

4.3.1.2 Configuration 802.11g

Frequency MHz	Peak Detector dBuV/m	Average Detector dBuV/m	Peak Limit dBuV/m	Average Limit dBuV/m	Result
2437	Transmit Frequency				
4874	54.6	40.0	74.0	54.0	Complied

Result: Harmonic was recorded up to 25 GHz. Other harmonics were confirmed low with both RBW and VBW reduced. The worst case emissions complied with the FCC limits of sections 15.209 and 15.247 by a margin of 14.0 dB.

4.3.1.3 Configuration 802.11a

Frequency MHz	Peak Detector dBuV/m	Average Detector dBuV/m	Peak Limit dBuV/m	Average Limit dBuV/m	Result
5825	Transmit Frequency				
11650	53.2	38.5	74.0	54.0	Complied

Result: Harmonic was recorded up to 40 GHz. Other harmonics were confirmed low with both RBW and VBW reduced. The worst case emissions complied with the FCC limits of sections 15.209 and 15.247 by a margin of 15.5 dB.

4.3.1.4 Configuration 802.11n – Tx BW = 20 MHz

Frequency MHz	Peak Detector dBuV/m	Average Detector dBuV/m	Peak Limit dBuV/m	Average Limit dBuV/m	Result
2437	Transmit Frequency				
4874	54.3	38.8	74.0	54.0	Complied

Frequency MHz	Peak Detector dBuV/m	Average Detector dBuV/m	Peak Limit dBuV/m	Average Limit dBuV/m	Result
5745	Transmit Frequency				
11490	53.9	38.7	74.0	54.0	Complied

Result: Harmonic was recorded up to 40 GHz. Other harmonics were confirmed low with both RBW and VBW reduced. The worst case emissions complied with the FCC limits of sections 15.209 and 15.247 by a margin of 15.2 dB.

4.3.1.5 Configuration 802.11n – Tx BW = 40 MHz

Frequency MHz	Peak Detector dBuV/m	Average Detector dBuV/m	Peak Limit dBuV/m	Average Limit dBuV/m	Result
2437	Transmit Frequency				
4874	49.7	35.2	74.0	54.0	Complied

Frequency MHz	Peak Detector dBuV/m	Average Detector dBuV/m	Peak Limit dBuV/m	Average Limit dBuV/m	Result
5795	Transmit Frequency				
11590	50.8	36.4	74.0	54.0	Complied

Result: Harmonic was recorded up to 40 GHz. Other harmonics were confirmed low with both RBW and VBW reduced. The worst case emissions complied with the FCC limits of sections 15.209 and 15.247 by a margin of 17.6 dB.

4.3.2 Frequency Band: 30 - 1000 MHz

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

4.3.3 RF Conducted Measurements at the Antenna Terminal (including Band Edge)

Refer to original approval under FCC ID: PD962205ANH (Canada ID: 1000M-62205ANH) certified by INTEL.

Testing was performed by Elliott Laboratories CA, USA accredited by A2LA (Certificate Number: 2016.01)

5.0 PEAK OUTPUT POWER - Section 15.247 (b)(3)

Refer to original approval under FCC ID: PD962205ANH (Canada ID: 1000M-62205ANH) certified by INTEL.

Testing was performed by Elliott Laboratories CA, USA accredited by A2LA (Certificate Number: 2016.01)

6.0 CHANNEL BANDWIDTH

Refer to original approval under FCC ID: PD962205ANH (Canada ID: 1000M-62205ANH) certified by INTEL.

Testing was performed by Elliott Laboratories CA, USA accredited by A2LA (Certificate Number: 2016.01)

7.0 PEAK POWER SPECTRAL DENSITY

Refer to original approval under FCC ID: PD962205ANH (Canada ID: 1000M-62205ANH) certified by INTEL.

Testing was performed by Elliott Laboratories CA, USA accredited by A2LA (Certificate Number: 2016.01)

8.0 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).

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 M120808_FCC_62205ANHMW_SAR_2.4 (2.4 GHz) and M120808_FCC_62205ANHMW_SAR_5.6 (5.18 – 5.825 GHz). SAR values of 1.20 mW/g (5GHz) and 1.16 mW/g (2.4GHz) were measured which complied with the FCC human exposure requirements of 47 CFR 2.1093 (d).

9.0 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.

10.0 COMPLIANCE STATEMENT

The STYLISTIC Q Series, Model: Q702 with Intel Centrino Advanced-N 6205 (Taylor Peak 802.11a/b/g/n 2x2), Model: 62205ANHMW, **complied** 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 and 5725 – 5850 MHz.

The test sample also complied with the Industry Canada RSS-210 issue 8 - Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Annex 8 and RSS-Gen.

Results were as follows:

FCC Subpart C, Section 15.247

FCC Part 15 Subpart C Clauses	IC RSS-210 and RSS-Gen Clauses	Test Performed	Results
15.203	RSS-Gen (7.1.2)	Antenna Requirement	**Complies**
15.205	RSS-Gen (7.2.2)	Operation in Restricted Band	**Complies**
15.207	RSS-Gen (7.2.4)	Conducted Emissions	**Note 1**
15.209	RSS-Gen (7.2.5)	Radiated Emissions	**Complies**
15.247 (a)(2)	A8.2 (a)	Channel Bandwidth	**Note 2**
15.247 (b)(3)	A8.4 (4)	Peak Output Power	**Note 2**
15.247 (c)	RSS-Gen (7.1.2)	Antenna Gain > 6 dBi	**Not Applicable.** Antenna gain < 6 dBi
15.247 (d)	A8.5	Out of Band Emissions	**Complies**
15.247 (e)	A8.2 (b)	Peak Power Spectral Density	**Note 2**
15.247 (f)	A8.3	Hybrid Systems (Note 3)	**Not Applicable.** EUT does not employ a hybrid system
15.247 (g)	A8.1	Frequency Hopping	**Not Applicable.** EUT does not employ frequency hopping
15.247 (h)	A8.1	Frequency Hopping	**Not Applicable.** EUT does not employ frequency hopping
15.247 (i)	RSS-Gen (5.6)	Radio Frequency Hazard	**Complies**

Note 1: Refer to attached FCC Part 15B DoC
Note 2: Refer to original approval under FCC ID: PD962205ANH (Canada ID: 1000M-62205ANH)
Note 3: Hybrid systems are those that employ a combination of both frequency hopping and digital modulations technique.

11.0 MEASUREMENT UNCERTAINTIES

EMC Technologies has evaluated the equipment and the methods used to perform the emissions testing. The estimated measurement uncertainties for emissions tests shown within this report are as follows:

Conducted Emissions:	9 kHz to 30 MHz	±3.2 dB
Radiated Emissions:	30 MHz to 300 MHz	±5.1 dB
	300 MHz to 1000 MHz	±4.7 dB
	1 GHz to 18 GHz	±4.6 dB

The above expanded uncertainties are based on standard uncertainties multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.