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RADIO TEST REPORT FOR CERTIFICATION to FCC PART 15 Subpart C (Section 15.247) & RSS-210 DTS – WLAN (2.4 GHz, 5.8 GHz), Bluetooth LE				
Client: Test Sample: Model: FCC ID: Industry Canada ID:	Fujitsu Australia Ltd LIFEBOOK T series T725 EJE-WB0091 337J-WB0091			
Radio Module:	Intel Stonepeak 7265NGW (802.11 a/b/g/n/ac Wireless LAN + BT V 4.0) FCC ID: PD97265NG IC ID: 1000M-7265NG			
Report Number:	M141038a-2 (Supersedes M141038-2)			
Issue Date:	01 December 2014			

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

# EMC Technologies Report No. M141038a-2

## Issue Date: 01 December 2014

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

# Report No. M141038a-2

Client: Test Sample: Model: FCC ID: Industry Canada ID: Equipment Type:	Fujitsu Australia Ltd LifeBook T Series T725 EJE-WB0091 337J-WB0091 Intentional Radiator (Transceiver)					
Radio Module:	Intel Stonepeak 7265NGW (802.11 a/b/g/n/ac Wireless LAN + BT V 4.0) FCC ID: PD97265NG IC ID: 1000M-7265NG					
Manufacturer (LifeBook): Address:	Fujitsu Ltd 1-1 Kamikodanaka 4-Chome, Na	kahara-Ku, Kawasaki, Japan				
Standards:	FCC Part 15 – <i>Radio Frequency</i> FCC Part 15 Subpart C – <i>Intentic</i> Section 15.247 – <i>Operation wit</i> <i>MHz</i> , <i>5725-5875 MHZ</i> , and 24.0-	Devices (October 2009) onal Radiators thin the bands 902-928 MHz, 2400-2483.5 :24.25 GHz.				
	KDB 558074 D01 Guidance for Digital Transmission Systems (D	Performing Compliance Measurements on TS) Operating Under §15.247 (v03r02).				
	ANSI C63.4 – 2009 Ameri Measurement of Radio-Noise E Electronic Equipment in the Rang	ican National Standard for Methods of Emissions from Low-Voltage Electrical and ge of 9 kHz to 40 GHz				
	RSS-210 Issue 8 Low Power Licence-Exempt RadioCommunication Devices Annex 8: 2400–2483.5 MHz & 5725–5850 MHz Operation Bands					
	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:	31 <sup>st</sup> October, 5 <sup>th</sup> to 7 <sup>th</sup> November	and 13 <sup>th</sup> November 2014				
Test Engineers:	M. Gimuron. M. ShassenDei					
	Matthew GrimwoodMahan GhassempouriEMC Test OfficerEMC Test Officer					
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:	Bhhi					
	Rob Weir					

Rob Weir Facility Manager, Melbourne EMC Technologies Pty Ltd

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

# 1.0 INTRODUCTION

EMI testing was performed on the Portable PC Fujitsu LifeBook T Series, Model: T725 incorporating an Intel Stonepeak 7265NGW (802.11 a/b/g/n/ac Wireless LAN + BT V 4.0), Model: 7265NGW radio module.

The 7265NGW WLAN module was originally certified by INTEL Corporation as a modular approval under FCC ID: PD97265NG (Canada ID: 1000M-7265NG).

The intention of this application is to FCC certify Intel Stonepeak 7265NGW (802.11 a/b/g/n/ac Wireless LAN + BT V 4.0), Model: 7265NGW installed in Portable PC Fujitsu LifeBook T Series, Model: T725.

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

Rules for intentional radiators (particularly section 15.247)
Antenna requirements
Restricted bands of operation
Radiated Emission Limits (General requirements)
Operation in the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz

## 1.1 Summary of Results

#### FCC Subpart C, Section 15.247, Measured at EMC Technologies

FCC Part 15 Subpart C Clauses	Industry Canada RSS-210 Issue 8 and RSS-Gen Clauses	Test Performed	Results
15.203	RSS-Gen (7.1.4)	Antenna requirement	Complied
15.205	2.2 (Table 1)	Operation in restricted band	Complied
15.209	RSS-Gen (6)	Radiated emissions limits	Complied
15.247 (d)	RSS-210 Clause	Radiated emissions	Complied
	A8.5		
15.247 (i)	RSS-Gen (5.5)	Radio Frequency Hazard	Complied

### FCC Subpart C, Section 15.247, Inspected in original module report

FCC Part 15 Subpart C Clauses	Industry Canada RSS-210 Issue 8 and RSS-Gen Clauses	Test Performed	Results
15.247 (a)(2)	A8.2 (a)	6 dB Bandwidth	Complied (Note 1)
15.247 (b)	A8.4 (4)	Maximum peak output power and antenna gain	Complied (Note 1)
15.247 (d)	A8.5	Emission limitations (conducted)	Complied (Note 1)
15.247 (d)	A8.5	Band edge emissions compliance (Transmitter)	Complied (Note 1)
15.247 (e)	A8.2 (b)	Power spectral density	Complied (Note 1)

**Note 1:** Refer to the original module report from Intel.

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## 1.2 Modifications by EMC Technologies

No modifications were required.

## 2.0 GENERAL INFORMATION

(Information supplied by the Client)

# 2.1 EUT (WLAN) Details

Half Mini-Card Wireless LAN Module
Intel Stonepeak 7265NGW (802.11 a/b/g/n/ac Wireless LAN + BT V 4.0)
7265NGW
Intel Corporation
2.412–2.462 GHz for 802.11b/g/n20/n40
5.745-5.825 GHz for 802.11a/n20/n40/ac80
802.11b = 11Mbps, 802.11g and 802.11a = 54Mbps
802.11n = 450 Mbps
Nissei Inverted F PIFA Antenna
2.29 dBi max (less than 6 dBi)
Refer antenna data provided separately

### **Channels and Output Power Settings:**

The following power settings were taken from documentation supplied from client.

#### 2.4 GHz Band

Mode	Channel	Frequency	Data Rate	Tx BW	Average Power	
		(MHz)	(Mbps)	(MHz)	Targe	t (dBm)
					Ch A	Ch B
	1	2412				
902 11h	6	2437			14.5	14.5
002.110	11	2462	1	-	14.5	14.5
	13	2472				
		•		-		
	1	2412			12.5	13.0
	2	2417			14.0	14.0
902 11 a	6	2437			15.0	15.0
002.11g	10	2457	6	-	14.0	14.0
	11	2462			11.0	11.0
	13	2472			15.0	15.0
	1	2412	НТО		12.5	13.0
	2	2417		20	14.0	14.0
	6	2437			15.0	15.0
	10	2457			14.0	14.0
	11	2462			11.0	11.0
	13	2472			15.0	15.0
000 11-	3F	2422			12.0	12.0
802.11h	4F	2427			13.0	13.0
	5F	2432			14.0	14.0
	6F	2437	]		15.0	15.0
	7F	2442	нто	40	15.0	15.0
	8F	2447			14.5	12.0
	9F	2452	1		11.0	10.0
	10F	2457	1		45.0	45.0
	11F	2462	1		15.0	15.0

5.8 GHz Band

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Tx BW (MHz)	Avera Targe	ge Power et (dBm)
					Ch A	Ch B
	149	5745				
	153	5765				
802.11a	157	5785	6	-	- 13.5	13.5
	161	5805				
	165	5825				
	149	5745				
	153	5765				
	157	5785	HT0 20		13.5 13	13.5
802.11n	161	5805				
	165	5825				
	151	5755	μтο	40	10.5 10	12.5
	159	5795	HIU	40	13.5	13.5
802.11ac	155	5775	HT0	80	13.5	13.5

The 7265NGW is capable of feeding two antennas simultaneously, in this configuration the power level is lower for each antenna port than if a single antenna was used.

# 2.2 EUT (Bluetooth LE) Details

Transmitter:	Half Mini-Card Wireless LAN Module
Wireless Module:	Intel Stonepeak 7265NGW (802.11 a/b/g/n/ac Wireless LAN + BT V 4.0)
Model Number:	7265NGW
Manufacturer:	Intel Corporation
Frequency Ranges:	2402 MHz to 2480 MHz
Number of Channels:	40 for Bluetooth Low Energy
Carrier Spacing:	2 MHz for Bluetooth Low Energy
Antenna Types:	Tx1 Antenna: Nissei CP659380-A
	Tx/Rx2 Antenna: Nissei CP659380-B
Antenna gain:	1.91 dBi (Max antenna gain is less than 6 dBi)
	Refer antenna data provided separately
Maximum Output Power:	5 dBm for Bluetooth Low Energy

# 2.3 EUT (Notebook PC) Details

NoteBook PC:	Portable PC LifeBook T series
*Model Name:	T725
Serial Number:	Pre-production Sample
Manufacturer:	FUJITSU LIMITED
CPU Type and Speed:	Core i7 2.6GHz
LCD	12.5"HD+(1366x768) : LP125WH2
Wired LAN:	Intel 218LM : 10 Base-T/100 Base-TX/1000Base-T
Modem:	Non
Port Replicator Model:	FPCPR213
AC Adapter Model:	ADP-65YH B
Voltage out:	19 V
Current out:	3.42A
Watts:	65W

# 2.4 Test Configuration

The Intel WLAN test software "DRTU" was used to control the transmitter module enabling it to transmit continuously and with selected channels, modulation and data rates.

Radiated harmonics and spurious emission measurements were performed while the radio module transmitted a modulated signal continuously.

## 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: <u>www.nata.asn.au</u> 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<sup>2</sup>LA).

## 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 (bi-conical 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 RESULTS (WLAN 2.4 GHz, 5.8 GHz and Bluetooth LE)

## 3.0 RADIATED SPURIOUS EMISSION MEASUREMENTS

### 3.1 Test Procedure

Testing was performed in accordance with the requirements of FCC Part 15.247(d). The measurement procedure used was in accordance with ANSI C63.4-2009. The instrumentation conformed to the requirements of ANSI C63.2-2009.

Radiated emission measurements were performed to the limits as per section 15.209 and 15.247. Measurement below 1 GHz were performed at the distance of 10 metres. 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 above 1000 MHz. A calibrated Bi-Log antenna was used for measurements below 1000 MHz.

The measurement of emissions above 1000 MHz was measured using a following setting: Quasi-Peak measurements setting: RBW = 120 kHz and VBW = 300 kHz

The measurement of emissions above 1000 MHz was measured using a following setting: Peak measurements setting: RBW = VBW = 1 MHzAverage 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. The procedure was repeated with the device orientated in three orthogonal axis to further maximise the emission. In this instance the device antennas are located in the swivel display, this was adjusted to give maximum emissions.

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.

## 3.2 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  $dB\mu V/m$ .
- V = EMI Receiver Voltage in dBµV. (measured value)
- AF = Antenna Factor in dB(m<sup>-1</sup>). (stored as a data array of factor versus frequency)
- **G** = Preamplifier Gain in dB. (stored as a data array of gain versus frequency)
- **L** = Cable insertion 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 20.0 dB. The resulting Field Strength is therefore as follows:

#### 34.0 + 9.2 + 1.9 - 20.0 = 25.1 dBµV/m

### 3.3 Results

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 15C) for full results showing compliance with the spurious and harmonics limits.

However, to ensure the transmitter module installed in the T725 LifeBook is still in compliance, verification tests were performed. Final testing was performed while the transmitter continuously operated in the worst case condition and only those are reported.

#### 3.3.1 Frequency Band: 30 - 1000 MHz

The measurements were made at a distance of 10 metres. Each frequency band and modulation types were checked, the highest emissions are reported.



#### **Vertically Polarised Emissions**

Frequency (MHz)

Peak	Frequency MHz	Polarization	Quasi Peak dBuV/m	Quasi Peak Limit dBuV/m	Margin dB	Result
1	708.70	Vertical	41.3	35.5	5.8	Note1
2	746.00	Vertical	39.0	35.5	3.5	Note1
3	223.81	Vertical	35.7	35.5	0.2	Note1
4	820.58	Vertical	33.8	35.5	-1.7	Note1
5	857.9	Vertical	33.8	35.5	-1.7	Complied
6	261.1	Vertical	32.8	35.5	-2.7	Note1
7	373.00	Vertical	29.3	35.5	-6.2	Note1
8	298.40	Vertical	27.4	35.5	-8.1	Note1
9	186.48	Vertical	24.8	33.0	-8.2	Complied
10	149.21	Vertical	21.0	33.0	-12.0	Note1
11	61.44	Vertical	12.4	29.5	-17.1	Note1

Note1: ambient measurements with transmitter off were recorded (green trace) to verify emission source was not the radio module.

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#### Horizontally Polarised Emissions



Peak	Frequency MHz	Polarization	Quasi Peak dBuV/m	Quasi Peak Limit dBuV/m	Margin dB	Result
1	223.81	Horizontal	38.0	35.5	2.5	Note1
2	261.11	Horizontal	32.5	35.5	-3.0	Note1
3	298.40	Horizontal	32.4	35.5	-3.1	Note1
4	959.53	Horizontal	26.2	35.5	-9.3	Note1
5	186.50	Horizontal	21.8	33.0	-11.2	Complied

Note1: ambient measurements with transmitter off were recorded (green trace) to verify emission source was not the radio module.

#### 3.3.2 Frequency Band: 1 – 40 GHz

The limits for emissions falling in the restricted band measured using peak and average detector are 74 dB $\mu$ V/m and 54 dB $\mu$ V/m, respectively (measured at 3m distance). For convenience these limits were applied across the entire range. The actual limits for emissions outside the restricted band are 20 dB below the fundamental field strength. The limits are adjusted by 10.5 dB when measurements were performed at the distance of 1m.

Testing was performed while the WLAN transmitter continuously operated. Any spurious emissions and 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.

Measurements were performed with the EUT operating in the worst case mode of single antenna transmitting. For multiple antennas transmitting the power level is lower with respect to single antenna mode.

Harmonics and spurious emissions were measured for channels where the RF output power was highest. Only the highest emission configurations are reported.

### 3.3.2.1 2.4 GHz Band, WLAN

Measurement was performed with peak and average detector up to 26.5 GHz.

#### Peak emissions, 1 GHz – 26.5 GHz



#### Average emissions, 1 GHz – 26.5 GHz

Fujitsu Lifebook T725 FCC 15.209-Average Detector Red: Vertical Polarization Blue: Horizontal Polarization Limit1: FCC15209Av FCC PART 15.209, 1-18GHz@3mtr, 18-40GHz@1mtr Blue: normal FCC 15.209 Radiated Emissions (dBuV/m) r:\fmelb\2014\Oct\M141038 Fujitsu Australia Limited\Radiated Files\M141038G-2\gaaa.txt t-32071115 c1:C2720914 c2:NONE p:NONE a: Site ID: Room#12(iOATS),176 Harrick Rd, Keilor Park,Vic Test Officer:Matthew Grimwood Plot date:11-17-2014 13:25:14 Job No:M141038 Test Date: 10/11/2014 Graph No. 4 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0.0 Frequency (MHz)

Note: intentional transmitter emissions were exempt from the limit.

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#### 3.3.2.2 5.8 GHz Band

#### Peak emissions



Peak	Frequency MHz	Polarization	Peak dBuV/m	Peak Limit dBuV/m	Margin dB	Result
1	5783.63	Vertical	85.4			Note1
2	11566.63	Vertical	61.6	74.0	-12.4	Complied
3	17348.5	Vertical	54.4	74.0	-19.6	Complied
4	1598.79	Vertical	44.6	74.0	-29.4	Complied
5	2389.65	Vertical	43.8	74.0	-30.2	Complied
6	1342.74	Vertical	40.4	74.0	-33.6	Complied
7	11565.59	Horizontal	51.6	74.0	-22.4	Complied
8	2394.84	Horizontal	43.3	74.0	-30.7	Complied
9	1535.52	Horizontal	36.9	74.0	-37.1	Complied

Note: intentional transmitter emissions were exempt from the limit.

#### Average emissions



Peak	Frequency MHz	Polarization	Average dBuV/m	Average Limit dBuV/m	Margin dB	Result
1	17347.57	Vertical	45.1	54.0	-8.9	Complied
2	11569.06	Vertical	53.3	54.0	-0.7	Complied
3	2759.95	Vertical	36.8	54.0	-17.2	Complied
4	1864.94	Vertical	33.0	54.0	-21.0	Complied
5	1342.85	Vertical	32.6	54.0	-21.4	Complied
6	11561.11	Horizontal	43.1	54.0	-10.9	Complied
7	1725.06	Horizontal	32.8	54.0	-21.2	Complied
8	1535.61	Horizontal	30.7	54.0	-23.3	Complied

## 4.0 MAXIMUM PEAK OUTPUT POWER AND ANTENNA GAIN

Refer to original Intel module test report (submitted). Testing was performed by AT4 Wireless, S.A. with FCC registration number 905266 and Canadian Certification reference number IC 4621A-1. Report 41273RRF.002.

It was not deemed likely that the host equipment will cause the output power to exceed the 1 watt limit.

### 5.0 6DB BANDWIDTH

Refer to original Intel module test report (submitted). Testing was performed by AT4 Wireless, S.A. with FCC registration number 905266 and Canadian Certification reference number IC 4621A-1. Report 41273RRF.002.

It was not deemed likely that the host equipment will cause the 6 dB bandwidth parameters to change.

# 6.0 PEAK POWER SPECTRAL DENSITY

Refer to original Intel module test report (submitted). Testing was performed by AT4 Wireless, S.A. with FCC registration number 905266 and Canadian Certification reference number IC 4621A-1. Report 41273RRF.002.

It was not deemed likely that the host equipment will cause the power spectral density to exceed the 8 dBm/3kHz limit.

## 7.0 EMISSION LIMITATIONS (CONDUCTED)

Refer to original Intel module test report (submitted). Testing was performed by AT4 Wireless, S.A. with FCC registration number 905266 and Canadian Certification reference number IC 4621A-1. Report 41273RRF.002.

It was not deemed likely that the host equipment will cause spurious emissions from the radio module to change.

### 8.0 BAND EDGE EMISSIONS COMPLIANCE (TRANSMITTER)

Refer to original Intel module test report (submitted). Testing was performed by AT4 Wireless, S.A. with FCC registration number 905266 and Canadian Certification reference number IC 4621A-1. Report 41273RRF.002.

# 9.0 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 reported under EMC Technologies reports: M141024\_FCC\_7265NGW\_SAR\_2.4 (2.4 GHz) and M141024\_FCC\_7265NGW\_SAR\_5.6

SAR values of 0.246 mW/g (2.4GHz) and 0.318 mW/g (5GHz) were measured which complied with the FCC human exposure requirements of 47 CFR 2.1093 (d).

## **10.0 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.

## 11.0 COMPLIANCE STATEMENT

The Portable PC Fujitsu LifeBook T Series, Model: T725 with Intel Stonepeak 7265NGW (802.11 a/b/g/n/ac Wireless LAN + BT V 4.0), Model: 7265NGW, **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 the RF exposure requirements of RSS-102.

# 12.0 MEASUREMENT UNCERTAINTY

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 300 MHz to 1000 MHz 1 GHz to 18 GHz	±5.1 dB ±4.7 dB ±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%.

## APPENDIX A MEASUREMENT INSTRUMENTATION DETAILS

Equipment Type	Make/Model/Serial Number	Last Cal. dd/mm/yy	Due Date dd/mm/yy	Cal. Interval
EMI Receiver	R&S ESU40 20 Hz – 40 GHz Sn: 100392 (R-140)	09/10/2014	09/10/2015	1 Year, *2
Antennas	SUNOL JB6 BICONILOG 30 – 6000 MHz Sn. A012312 (A-363)	16/05/2014	16/05/2015	1 Year, *2
	EMCO 3115 Broadband Horn 1 – 18 GHz Sn. 8908-3282 (A-004)	16/01/2012	16/01/2015	3 Year, *1
	ETS-Lindgren Horn 3160-09 18-26.5 GHz Sn. 66032 (A-307)	12/11/2012	12/11/2015	3 Year, *1
	ETS-Lindgren Horn 3160-10 26.5-40 GHz Sn. 66032 (A-306)	12/11/2012	12/11/2015	3 Year, *1
Cables	Room 12 Inbuilt cable Panel 1 to 3m (C-421)	4/02/2014	4/02/2015	1 Year, *1
	Room 12 Inbuilt cable Panel 1 to 10m (C-422)	6/02/2014	6/02/2015	1 Year, *1
	Sucoflex 102 Huber & Suhner Sn. 27319/2 (C-273)	26/06/2014	26/06/2015	1 Year, *1
Pre-Amplifier	Electronic Development SG18-B3015 1 – 18 GHz Sn. 1 (A-288)	27/02/2014	27/02/2015	1 Year, *1

Note \*1. Internal NATA calibration.

Note \*2. External NATA / A2LA calibration