



FCC CFR47 PART 22 SUBPART H  
FCC CFR47 PART 24 SUBPART E  
INDUSTRY CANADA RSS-132 ISSUE 2  
INDUSTRY CANADA RSS-133 ISSUE 4

**CLASS II PERMISSIVE CHANGE**

**TEST REPORT  
FOR**

**PCI EXPRESS MINI CARD (TESTED INSIDE OF DELL NOTEBOOK PC, INSPIRON  
MODEL 1011)**

**MODEL NUMBER: E760**

**FCC ID: PKRNVWE760D  
IC: 3229B-E760**

**REPORT NUMBER: 09U12621-1**

**ISSUE DATE: JULY 14, 2009**

*Prepared for*

**NOVATEL WIRELESS  
9645 SCRANTON ROAD, SUITE 205  
SAN DIEGO, CA 92121**

*Prepared by*

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**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
---	07/14/09	Initial Issue	T. Chan

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** NOVATEL WIRELESS  
9645 SCRANTON ROAD, SUITE 205  
SAN DIEGO, CA 92121

**EUT DESCRIPTION:** EV-DO MODEM MODULE EMBEDDED IN NOTEBOOK  
COMPUTER

**MODEL NUMBER:** E760

**SERIAL NUMBER:** N/A

**DATE TESTED:** JULY 10, 2009

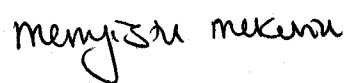
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H and 24E	PASS
IC RSS-132 ISSUE 2 and RSS-133 ISSUE 4	

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



THU CHAN  
EMC MANAGER  
COMPLIANCE CERTIFICATION SERVICES

MENGISTU MEKURIA  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 2, FCC CFR 47 Part 22, FCC CFR Part 24, RSS-132 Issue 2, and RSS-133 Issue 4.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

## **5. EQUIPMENT UNDER TEST**

### **5.1. DESCRIPTION OF EUT**

The EUT is a mini-PCIe card that installed inside Dell Notebook. The radio module is manufactured by Novatel Wireless.

### **5.2. MAXIMUM OUTPUT POWER**

The test measurement passed within  $\pm 0.5$ dBm of the original output power.

### **5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE**

The major change filed under this application is adding Dell mobile notebook.

### **5.4. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes PIFA antennas, with a maximum gain of -1.02 and 2.67 dBi for Cell and PCS bands respectively.

## 5.5. SOFTWARE AND FIRMWARE

The EUT is linked with Agilent Communication Test Set.

### PROCEDURE USED TO ESTABLISH TEST SIGNAL

#### **3G-CDMA2000 1xRTT**

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

<u>Application</u>	<u>Rev. License</u>
CDMA2000 Mobil Test	B.10.11, L

#### 1xRTT

- Call Setup > Shift & Preset
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > RC3 (Fwd3, Rvs3)
- FCH Service Option (SO) Setup > 55
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps  
> R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Cell Info > Cell Parameters > System ID (SID) > 65535  
> Network ID (NID) > 4, 4106

Once "Active Cell" show "Connected " then change "Rvs Power Ctrl" from "Active bits" to "**All Up bits**" to get the maximum power.

Worst-case Measurement Result @ Low, Middle and High Channel

Worst-case Measurement Result for Low, Middle and High Channel under Radio Configuration RC3 and Service Option 55.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Inspiron Mini	N/A	DoC
AC/DC	Delta Electronics Inc.	ADP-30LH B	PK100001R00-A01-095G-18794	DoC

### I/O CABLES

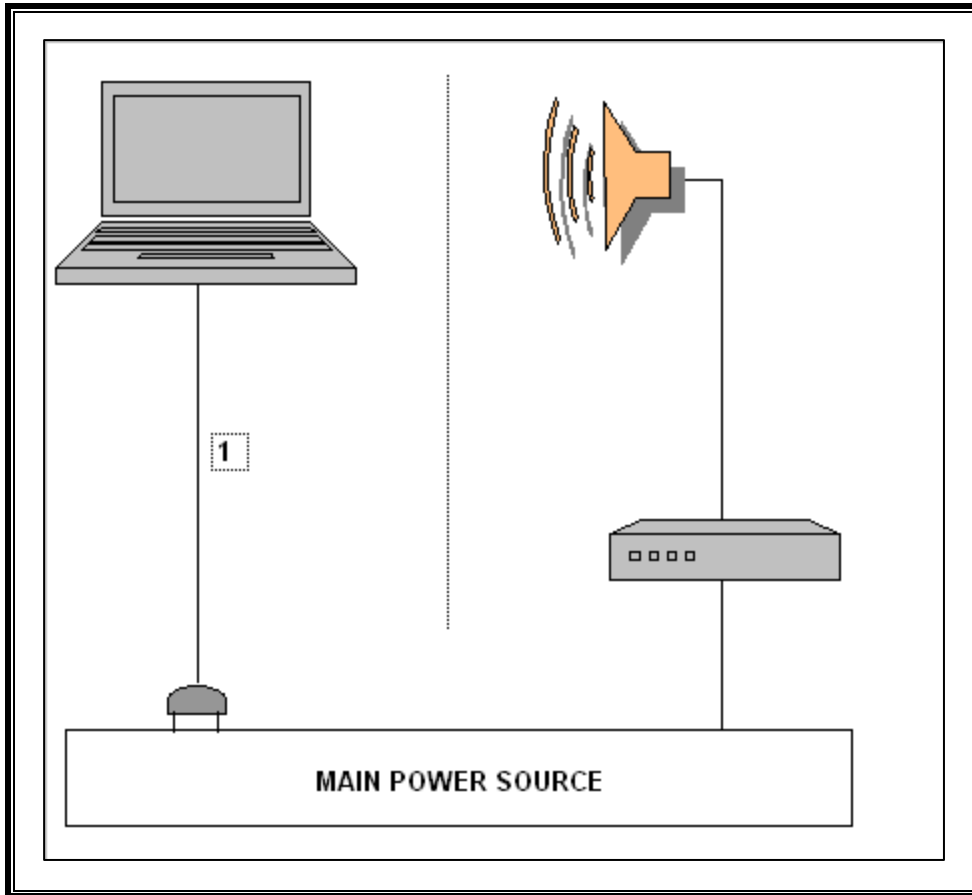
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	DC Input	1	DC	Un-Shielded	2.0 m	N/A

### TEST SETUP

The EUT is a CDMA PCI E Mini card that installed inside Dell Notebook Laptop. Communications Test Set is used to link the device under test.



**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	02/04/10
Antenna, Horn, 18 GHz	EMCO	3115	C00943	01/29/10
Antenna, Horn, 18 GHz	EMCO	3115	C00872	01/29/10
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	01/14/10
Dipole	Speag	D900V2	NA	11/16/11
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02689	CNR
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Signal Generator	R & S	SMP04	C00953	02/16/11
Communications Test Set	Agilent / HP	E5515C	C01086	06/16/10
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01161	08/06/09

## 7. LIMITS AND RESULTS

### 7.1. MAXIMUM RADIATED OUTPUT POWER

The transmitter has a maximum ERP & EIRP Peak output powers as follows:

824 to 849 MHz Authorized Band

Frequency Range (MHz)	Modulation	ERP Peak Power (dBm)	ERP Peak Power (mW)
Low CH - 824.70	CDMA2000	23.6	229.1
Mid CH - 836.52		24.3	269.2
High CH - 848.31		25.8	380.2

1850 to 1910 MHz Authorized Band

Frequency Range (MHz)	Modulation	EIRP Peak Power (dBm)	EIRP Peak Power (mW)
Low CH - 1851.25	CDMA2000	25.2	331.1
Mid CH - 1880.00		29.7	933.3
High CH - 1908.75		28.9	776.2

## **7.2. RADIATED OUTPUT POWER**

### **LIMITS**

22.913(a) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(b) & RSS133 § 6.4 Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

RSS-132 § 4.4 The maximum ERP shall be 6.3 Watts for mobile stations.

### **TEST PROCEDURE**

ANSI / TIA / EIA 603 Clause 2.2.17, RSS-132, and RSS-133.

### **RESULTS**

**CELL OUTPUT POWER (ERP)**

High Frequency Substitution Measurement Compliance Certification Services 3m Chamber							
<b>Company:</b>	NOVATEL WIRELESS						
<b>Project #:</b>	09U12621						
<b>Date:</b>	7/10/2009						
<b>Test Engineer:</b>	MENGISTU MEKURIA						
<b>Configuration:</b>	EUT INSTALLED INSIDE DELL LAPTOP						
<b>Mode:</b>	TX CELL BAND 1xRTT MODE						
<b>Test Equipment:</b>							
Receiving: Sunol T185, and 3m Chamber N-type Cable (Setup this one for testing EUT)							
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.							
f MHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	-7.2	V	30.8	23.6	38.5	-14.8	
824.70	-7.9	H	28.9	21.0	38.5	-17.5	
836.52	-7.5	V	31.8	24.3	38.5	-14.1	
836.52	-7.0	H	28.8	21.9	38.5	-16.6	
848.31	-7.0	V	32.8	25.8	38.5	-12.6	
848.31	-7.0	H	29.6	22.6	38.5	-15.8	
Rev. 1.24.7							

**PCS OUTPUT POWER (EIRP)**

High Frequency Fundamental Measurement Compliance Certification Services 3m Chamber							
<b>Company:</b>		NOVATEL WIRELESS					
<b>Project #:</b>		09U12621					
<b>Date:</b>		7/10/2009					
<b>Test Engineer:</b>		MENGISTU MEKURIA					
<b>Configuration:</b>		EUT INSTALLED INSIDE DELL LAPTOP					
<b>Mode:</b>		TX PCS BAND 1xRTT MODE					
<b>Test Equipment:</b>							
Receiving: Horn T60, and 3m Camber SMA Cables							
Substitution: Horn T72 Substitution, 6ft SMA Cable (SN # 208947003) Warehouse							
f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Path Loss (dBm)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.851	-13.5	V	38.7	25.2	33.0	-7.8	
1.851	-12.0	H	36.8	24.8	33.0	-8.2	
1.880	-12.7	V	39.9	27.2	33.0	-5.8	
1.880	-9.1	H	38.8	29.7	33.0	-3.3	
1.909	-12.0	V	40.9	28.9	33.0	-4.1	
1.909	-10.8	H	37.6	26.8	33.0	-6.2	
Rev. 1.24.7							

### **7.3. FIELD STRENGTH OF SPURIOUS RADIATION**

#### **LIMIT**

§22.917 (e) and §24.238 (a), RSS-132 § 4.5.1, & RSS-133 § 6.5.1 (a) (i) & (b): Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

#### **TEST PROCEDURE**

ANSI / TIA / EIA 603 Clause 3.2.12 & FCC 22.917 (b), FCC 24.238 (b), & FCC 27.53 (g)(1)(2)(3), RSS-132, and RSS-133.

#### **RESULTS**

**CELL SPURIOUS & HARMONIC (ERP)**

**Compliance Certification Services**  
**Above 1GHz High Frequency Substitution Measurement**

**Company:** NOVATEL WIRELESS  
**Project #:** 09U12621  
**Date:** 7/10/2009  
**Test Engineer:** MENGISTU MEKURIA  
**Configuration:** EUT INSTALLED INSIDE DELL LAPTOP  
**Mode:** TX CELL BAND 1xRTT MODE

Chamber

3m Chamber

Pre-amplifier

T34 8449B

Filter

Filter 1

Limit

FCC PART 22

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch. (@24.7MHz)</b>										
1.65	-47.3	V	3.0	36.9	37.4	1.0	-46.7	-13.0	-33.7	
2.47	-47.7	V	3.0	41.6	36.4	1.0	-41.5	-13.0	-28.5	
4.12	-56.1	V	3.0	46.2	35.1	1.0	-44.0	-13.0	-31.0	
1.65	-48.6	H	3.0	36.6	37.4	1.0	-48.3	-13.0	-35.3	
2.47	-49.0	H	3.0	40.0	36.4	1.0	-44.4	-13.0	-31.4	
4.12	-55.7	H	3.0	45.9	35.1	1.0	-43.9	-13.0	-30.9	
<b>Mid Ch. (@36.52 MHz)</b>										
1.67	-38.8	V	3.0	37.1	37.3	1.0	-38.0	-13.0	-25.0	
2.51	-32.0	V	3.0	41.8	36.4	1.0	-25.5	-13.0	-12.5	
4.18	-54.6	V	3.0	46.3	35.0	1.0	-42.3	-13.0	-29.3	
1.67	-48.0	H	3.0	36.9	37.3	1.0	-47.5	-13.0	-34.5	
2.51	-30.8	H	3.0	40.2	36.4	1.0	-25.9	-13.0	-12.9	
4.18	-52.4	H	3.0	46.1	35.0	1.0	-40.3	-13.0	-27.3	
<b>Hi Ch (@48.31 MHz)</b>										
1.70	-40.3	V	3.0	37.4	37.3	1.0	-39.2	-13.0	-26.2	
2.54	-49.0	V	3.0	41.9	36.3	1.0	-42.5	-13.0	-29.5	
4.24	-55.9	V	3.0	46.4	35.0	1.0	-43.5	-13.0	-30.5	
1.70	-37.3	H	3.0	37.1	37.3	1.0	-36.5	-13.0	-23.5	
2.54	-45.4	H	3.0	40.4	36.3	1.0	-40.3	-13.0	-27.3	
4.24	-53.5	H	3.0	46.3	35.0	1.0	-41.2	-13.0	-28.2	

Rev. 03.03.09



**PCS Spurious & Harmonic (EIRP)**

**Compliance Certification Services**  
**Above 1GHz High Frequency Substitution Measurement**

**Company:** NOVATEL WIRELESS  
**Project #:** 09U12621  
**Date:** 7/10/2009  
**Test Engineer:** MENGISTU MEKURIA  
**Configuration:** EUT INSTALLED INSIDE DELL LAPTOP  
**Mode:** TX PCS BAND 1xRTT MODE

Chamber

Pre-amplifier

Filter

Limit

3m Chamber

T34 8449B

Filter 1

FCC PART 24

f GHz	SA reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Path Loss (dB)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch. (1851.25MHz)</b>										
3.703	-47.5	V	3.0	44.9	35.4	1.0	-36.9	-13.0	-23.9	
5.554	-51.1	V	3.0	49.2	34.7	1.0	-35.6	-13.0	-22.6	
3.703	-42.4	H	3.0	44.7	35.4	1.0	-32.1	-13.0	-19.1	
5.554	-50.8	H	3.0	49.7	34.7	1.0	-34.8	-13.0	-21.8	
<b>Mid Ch. (1880.00 MHz)</b>										
3.760	-51.2	V	3.0	45.1	35.3	1.0	-40.4	-13.0	-27.4	
5.640	-58.4	V	3.0	49.3	34.7	1.0	-42.9	-13.0	-29.9	
3.760	-46.0	H	3.0	44.8	35.3	1.0	-35.5	-13.0	-22.5	
5.640	-58.7	H	3.0	49.9	34.7	1.0	-42.6	-13.0	-29.6	
<b>Hi Ch (1908.75MHz)</b>										
3.818	-41.0	V	3.0	45.3	35.3	1.0	-30.0	-13.0	-17.0	
5.726	-51.8	V	3.0	49.5	34.7	1.0	-36.1	-13.0	-23.1	
7.635	-56.6	V	3.0	52.4	34.9	1.0	-38.1	-13.0	-25.1	
3.818	-37.5	H	3.0	45.0	35.3	1.0	-26.8	-13.0	-13.8	
5.726	-55.4	H	3.0	50.1	34.7	1.0	-39.1	-13.0	-26.1	
7.635	-57.5	H	3.0	53.4	34.9	1.0	-38.1	-13.0	-25.1	

Rev. 03.03.09

## 8. SETUP PHOTOS

### RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION



MOBILE POSITION BACK PHOTO



**END OF REPORT**