NOVATEL WIRELESS TEST REPORT

FOR THE

NOVATEL EU850D PCI EXPRESS MINI-CARD, EU850D

FCC PART 22 AND PART 24 RADIATED EMISSIONS ONLY

TESTING

DATE OF ISSUE: OCTOBER 16, 2007

PREPARED FOR:

Novatel Wireless
325 - 6715-8th St. N.E., Suite 200
Calgary, Alberta T2E 7H7 Canada

P.O. No.: 1000796
W.O. No.: 86985

PREPARED BY:

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CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Date of test: September 19 - October 11, 2007

Report No.: FC07-078

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ADMINISTRATIVE INFORMATION

DATE OF TEST: September 19 - October 11, 2007

DATE OF RECEIPT: September 19, 2007

REPRESENTATIVE: Jim Turner

MANUFACTURER:
Novatel Wireless
325 - 6715-8th St. N.E., Suite 200
Calgary, Alberta T2E 7H7 Canada

TEST LOCATION:
CKC Laboratories, Inc.
22116 23rd Drive S.E., Suite A
Bothell, WA 98021-4413

FREQUENCY RANGE TESTED: 30 MHz-20 GHz

TEST METHOD: FCC Part 22 and Part 24

PURPOSE OF TEST: To perform the testing of the Novatel EU850D PCI Express Mini-Card, EU850D with the requirements for FCC Part 22 and Part 24 spurious radiated emissions only.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Joyce Walker, Quality Assurance Administrative Manager

Katie Molina, Senior EMC Engineer/Lab Manager

TEST PERSONNEL:

Ryan Rutledge, EMC Test Technologist

CONDITIONS DURING TESTING

No modifications to the EUT were necessary during testing. EUT is being retested to check for compliance after a modification was made to the metal shield over the RF section of the module. A sim card slot is now present in a hole that has been cut into the shield. Due to the nature of this change and the absence of any other changes, only spurious radiated emissions around the fundamental and the higher harmonics were tested. Testing was limited to above 30 MHz.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit.

EQUIPMENT UNDER TEST

WWAN Module

Manuf:	Novatel Wireless
Model:	EU850D
Serial:	020207000160
FCC ID:	NBZNRM-EU850D (pending)

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

RF Antenna (3 dBi)

Manuf:	PCTEL
Model:	ASPRDM1994S
Serial:	NA

Module Developer Board

Manuf:	Serac
Model:	PCA-1017856 Rev B
Serial:	17017568

Laptop PC

Manuf:	Dell
Model:	Inspiron E1720
Serial:	CN-0Y2C2-48643-6C9-0280

Laptop Power Supply

Manuf:	Dell
Model:	PA-1131-02D
Serial:	CN-09Y819-71615-459-0C22

TEMPERATURE AND HUMIDITY DURING TESTING
The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

FCC 2.1033 (c)(4) TYPE OF EMISSIONS
WCDMA and GSM

FCC 2.1033 (c)(5) FREQUENCY RANGE
824.2 MHz – 848.8 MHz Part 22
1850.2 MHz – 1909.8 MHz Part 24

FCC 2.1033 (c)(6) OPERATING POWER
2 watts EIRP

FCC 2.1033(c)(14)/2.1053/22.917 - FIELD STRENGTH OF SPURIOUS RADIATION

Test Setup Photos

Test Data Sheets

Test Location: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer: **Novatel Wireless**
Specification: **FCC Part 22.917(a) Radiated Spurious Emission**
Work Order #: **86985** Date: 10/9/2007
Test Type: **Radiated Scan** Time: 16:38:25
Equipment: **WWAN Module** Sequence#: 31
Manufacturer: Novatel Wireless Tested By: Ryan Rutledge
Model: EU850D
S/N: 020207000160

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4440A	S/N: MY46186330	10/03/2007	10/03/2009	AN02872
60" Pasternack 40 GHz Coax	S/N: N/A	05/11/2006	05/11/2008	AN05423
30' Andrews Heliax 18 GHz	S/N: N/A	06/19/2006	06/19/2008	AN05545
HP 83017A .5 - 26.5 GHz Pre-amp	S/N: 3123A00464	10/02/2007	10/02/2009	AN01271
EMCO 3115 Horn Ant	S/N: 9606-4854	12/13/2005	12/13/2007	AN01412
1 GHz HP Filter	S/N: 2	03/07/2006	03/07/2008	AN02750
Bothell 5m Cable Set	S/N: P05444	04/26/2007	04/26/2009	ANP05444
20' RG-214 Coax	S/N: 16	11/09/2006	11/09/2008	ANP05360
Chase BILOG	S/N: 2458	01/31/2007	01/31/2009	AN01993

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
WWAN Module*	Novatel Wireless	EU850D	020207000160

Support Devices:

Function	Manufacturer	Model #	S/N
RF Antenna (3 dBi)	PCTEL	ASPRDM1994S	n/a
Module Developer Board	Serac	PCA-1017856 Rev B	17017568
Laptop PC	Dell	Inspiron E1720	CN-0Y2C2-48643-6C9-0280
Laptop Power Supply	Dell	PA-1131-02D	CN-09Y819-71615-459-0C22

Test Conditions / Notes:

EUT resident in developer board. Evaluation of Spurious Emissions is performed in open-chassis configuration with a 3 dBi monopole antenna. EUT is being retested to check for compliance after a modification was made to the metal shield over the RF section of the module. A sim card slot is now present in a hole that has been cut into the shield. Due to the nature of this change and the absence of any other changes, only spurious radiated emissions around the fundamental and the higher harmonics should be affected; therefore testing will be limited to 30-1000 MHz. Carrier/Modulation: WCDMA Band V, WCDMA, frequency tested 836.4 MHz. Carrier on center channel at max power. 30 - 1000 MHz RBW=120 kHz, VBW=120 kHz Quasi-Peak 1 - 10 GHz RBW=1 MHz, VBW=1 MHz Average 120V, 60 Hz, 23°C, 40 % relative humidity.

Transducer Legend:

T1=CAB-ANP05545-061906	T2=ANT-AN01412-121305
T3=CAB-ANP05423-051006	T4=Filter 1GHz HP AN02750
T5=AMP-AN01271-100207 - .5-26.5 GHz	

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	3352.260M	34.1	+2.7	+30.6	+2.6	+0.4	+0.0	37.7	82.3	-44.6	Vert
	Ave		-32.7				18				100
^	3352.220M	49.5	+2.7	+30.6	+2.6	+0.4	+0.0	53.2	82.3	-29.1	Vert
			-32.6				18				100
3	2390.120M	30.7	+2.4	+28.6	+2.2	+0.4	+0.0	31.0	82.3	-51.3	Vert
	Ave		-33.3				30				100
^	2390.079M	46.6	+2.4	+28.6	+2.2	+0.4	+0.0	46.9	82.3	-35.4	Vert
			-33.3				30				100
5	1674.300M	34.3	+2.0	+26.2	+1.8	+0.5	+0.0	30.8	82.3	-51.5	Vert
	Ave		-34.0				103				100
^	1674.378M	49.3	+2.0	+26.2	+1.8	+0.5	+0.0	45.8	82.3	-36.5	Vert
			-34.0				103				100
7	2489.380M	28.9	+2.4	+29.1	+2.2	+0.4	+0.0	29.7	82.3	-52.6	Vert
	Ave		-33.3				17				100
^	2489.434M	45.2	+2.4	+29.1	+2.2	+0.4	+0.0	46.0	82.3	-36.3	Vert
			-33.3				17				100
9	1597.680M	32.4	+2.0	+26.2	+1.8	+0.6	+0.0	28.8	82.3	-53.5	Vert
	Ave		-34.2				329				100
^	1597.581M	52.7	+2.0	+26.2	+1.8	+0.6	+0.0	49.1	82.3	-33.2	Vert
			-34.2				329				100
11	1915.270M	31.1	+2.1	+26.2	+1.9	+0.3	+0.0	28.0	82.3	-54.3	Vert
	Ave		-33.6								100

^	1915.326M	58.1	+2.1 -33.6	+26.2	+1.9	+0.3	+0.0	55.0	82.3	-27.3	Vert 100

13	1752.180M Ave	31.3	+2.0 -33.8	+26.2	+1.9	+0.4	+0.0 331	28.0	82.3	-54.3	Vert 100
^	1752.249M	51.4	+2.0 -33.8	+26.2	+1.9	+0.4	+0.0 331	48.1	82.3	-34.2	Vert 100
15	1674.120M Ave	27.9	+2.0 -34.0	+26.2	+1.8	+0.5	+0.0 360	24.4	82.3	-57.9	Horiz 163
^	1674.089M	44.9	+2.0 -34.0	+26.2	+1.8	+0.5	+0.0 360	41.4	82.3	-40.9	Horiz 163

FCC 2.1033(c)(14)/2.1053/24.238 - FIELD STRENGTH OF SPURIOUS RADIATION

Test Setup Photos

Test Data Sheets

Test Location: CKC Laboratories •22116 23rd Dr SE • Bothell, WA 98021-4413 • 425-402-1717

Customer: **Novatel Wireless**
Specification: **FCC Part 24.238 Radiated Spurious Emissions**
Work Order #: **86985** Date: 10/10/2007
Test Type: **Radiated Scan** Time: 10:52:59
Equipment: **WWAN Module** Sequence#: 32
Manufacturer: Novatel Wireless Tested By: Ryan Rutledge
Model: EU850D
S/N: 020207000160

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Agilent E4440A	S/N: MY46186330	10/03/2007	10/03/2009	AN02872
60" Pasternack 40 GHz Coax	S/N: N/A	05/11/2006	05/11/2008	AN05423
30' Andrews Heliax 18 GHz	S/N: N/A	06/19/2006	06/19/2008	AN05545
EMCO 3115 Horn Ant	S/N: 9606-4854	12/13/2005	12/13/2007	AN01412
HP 83017A .5 - 26.5 GHz Pre-amp	S/N: 3123A00464	10/02/2007	10/02/2009	AN01271
2.8 GHz HP Filter	S/N: 2	03/07/2006	03/07/2008	AN02745
120" Pasternack 40 GHz Coax	S/N: N/A	07/20/2007	07/20/2009	AN05425
120" Pasternack 40 GHz Coax	S/N: N/A	07/20/2007	07/20/2009	AN05426
18-26 GHz Horn	S/N: 1114018	04/14/2006	04/14/2008	AN02742

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
WWAN Module*	Novatel Wireless	EU850D	020207000160

Support Devices:

Function	Manufacturer	Model #	S/N
RF Antenna (3 dBi)	PCTEL	ASPRDM1994S	n/a
Module Developer Board	Serac	PCA-1017856 Rev B	17017568
Laptop PC	Dell	Inspiron E1720	CN-0Y2C2-48643-6C9-0280
Laptop Power Supply	Dell	PA-1131-02D	CN-09Y819-71615-459-0C22

Test Conditions / Notes:

EUT resident in developer board. Evaluation of Spurious Emissions is performed in open-chassis configuration with a 3 dBi monopole antenna. EUT is being retested to check for compliance after a modification was made to the metal shield over the RF section of the module. A sim card slot is now present in a hole that has been cut into the shield. Due to the nature of this change and the absence of any other changes, only spurious radiated emissions around the fundamental and the higher harmonics should be affected; therefore testing will be limited to 1-20 GHz. Carrier/Modulation: PCS1900, GSM, frequency tested 1880 MHz. Carrier on center channel at max power. 1 - 20 GHz RBW=1 MHz, VBW=1 MHz Average 120V, 60 Hz, 22°C, 44% relative humidity.

Transducer Legend:

T1=CAB-ANP05545-061906	T2=ANT-AN01412-121305
T3=CAB-ANP05423-051006	T4=Filter 3GHz HP AN02745
T5=AMP-AN01271-100207 - .5-26.5 GHz	T6=CAB-ANP05425-072007
T7=CAB-ANP05426-072007	T8=ANT-AN02742-041406

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	9400.005M	31.0	+5.3	+38.4	+4.5	+0.2	+0.0	46.0	82.3	-36.3	Vert
	Ave		-33.4				69				156
^	9400.078M	49.5	+5.3	+38.4	+4.5	+0.2	+0.0	64.5	82.3	-17.8	Vert
			-33.4				69				156
3	9400.015M	27.2	+5.3	+38.4	+4.5	+0.2	+0.0	42.2	82.3	-40.1	Horiz
	Ave		-33.4				18				174
^	9400.088M	45.3	+5.3	+38.4	+4.5	+0.2	+0.0	60.3	82.3	-22.0	Horiz
			-33.4				18				174
5	11279.990M	30.7	+6.0	+38.4	+4.9	+0.4	+0.0	41.9	82.3	-40.4	Vert
	Ave		-38.5				207				126
^	11280.060M	49.6	+6.0	+38.4	+4.9	+0.4	+0.0	60.8	82.3	-21.5	Vert
			-38.5				207				126
7	1917.520M	10.5	+2.1	+26.2	+1.9	+0.0	+0.0	40.7	82.3	-41.6	Vert
	Ave										100
^	1917.612M	27.8	+2.1	+26.2	+1.9	+0.0	+0.0	58.0	82.3	-24.3	Vert
											100
9	11280.010M	28.1	+6.0	+38.4	+4.9	+0.4	+0.0	39.3	82.3	-43.0	Horiz
	Ave		-38.5				186				159
^	11279.950M	46.6	+6.0	+38.4	+4.9	+0.4	+0.0	57.8	82.3	-24.5	Horiz
			-38.5				186				159
11	7520.010M	27.8	+4.7	+36.8	+4.0	+0.1	+0.0	38.7	82.3	-43.6	Vert
	Ave		-34.7				343				156

^	7519.973M	45.5	+4.7 -34.7	+36.8	+4.0	+0.1	+0.0 343	56.4	82.3	-25.9	Vert 156

13	3352.460M Ave	34.7	+2.7 -32.7	+30.6	+2.6	+0.6	+0.0 17	38.5	82.3	-43.8	Vert 100
^	3352.528M	51.4	+2.7 -32.7	+30.6	+2.6	+0.6	+0.0 17	55.2	82.3	-27.1	Vert 100
15	3759.997M Ave	31.8	+3.0 -32.7	+31.9	+2.8	+0.3	+0.0 347	37.1	82.3	-45.2	Vert 106
^	3760.093M	48.9	+3.0 -32.7	+31.9	+2.8	+0.3	+0.0 347	54.2	82.3	-28.1	Vert 106
17	3760.018M Ave	31.1	+3.0 -32.7	+31.9	+2.8	+0.3	+0.0 191	36.4	82.3	-45.9	Horiz 188
^	3759.956M	48.3	+3.0 -32.7	+31.9	+2.8	+0.3	+0.0 191	53.6	82.3	-28.7	Horiz 188
19	3352.490M Ave	27.8	+2.7 -32.7	+30.6	+2.6	+0.6	+0.0 46	31.6	82.3	-50.7	Horiz 158
^	3352.463M	44.3	+2.7 -32.7	+30.6	+2.6	+0.6	+0.0 46	48.1	82.3	-34.2	Horiz 158
21	3035.360M Ave	26.5	+2.5 -33.0	+29.8	+2.5	+0.7	+0.0 360	29.0	82.3	-53.3	Vert 100
^	3035.324M	42.9	+2.5 -33.0	+29.8	+2.5	+0.7	+0.0 360	45.4	82.3	-36.9	Vert 100