

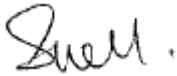
# FCC PART 24 TYPE APPROVAL EMI MEASUREMENT AND TEST REPORT

For

## Novatel Wireless Technologies Ltd.

Suite 200, 6715 – 8th Street N.E.  
Calgary, Alberta  
Canada, T2E 7H7

**FCC ID: NBZNRM-U630**

|                                                                                                                                                                     |                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| <b>This Report Concerns:</b><br><input checked="" type="checkbox"/> Class II Permissive Change Report                                                               | <b>Equipment Type:</b><br>Transmitter, Portable |
| <b>Test Engineer:</b> Daniel Deng /                                             |                                                 |
| <b>Report No.:</b> R0511221                                                                                                                                         |                                                 |
| <b>Report Date:</b> 2005-12-02                                                                                                                                      |                                                 |
| <b>Reviewed By:</b> Snell Leong/                                                |                                                 |
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**Note:** The test report is specially limited to the above company and the product model only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the US Government.

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## GENERAL INFORMATION

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### Product Description for Equipment Under Test (EUT)

The *Novatel Wireless Technologies Ltd.* product, FCC ID: NBZNRM-U630 or the "EUT" as referred to in this report is a Transmitter, Portable, which measures approximately 120mm(L) x 53mm(W) x 8mm(H). The EUT operates at the frequency of 1850.2 – 1909.8 MHz, maximum output power (ERP) 29.2dBm (0.832W), frequency tolerance 0.054ppm and emission designator 253KGXW.

*\* The test data gathered are from typical production sample, serial number: Novatel0804, provided by the manufacturer.*

### Objective

This type approval report is prepared on behalf of *Novatel Wireless Technologies Ltd.* in accordance with Part 2, Subpart J, and Part 24 Subpart E of the Federal Communication Commissions rules.

This is a class II permissive change report. The only different which compares with previous test item is an internal antenna. Due the change describes above, Middle Channel Spurious Emission was retested. The detail information please refers to R0408161.

The objective is to determine compliance with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, field strength of spurious radiation, frequency stability, band edge and radiated margin.

### Related Submittal(s)/Grant(s)

Detail information please refers to R0408161. The original was granted on 2004-09-27.

### Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 24 Subpart E - PCS

Applicable Standards: TIA EIA 137-A, TIA EIA 98-C, ANSI 63.4-2003, and TIA/EIA-603C.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Test Facility

The Open Area Test site used by BACL Corp. to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA with registration number: 90464.

Test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules and Article 8 of the VCCI regulations. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-1992.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, CISPR 22: 1997, Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods.

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## SYSTEM TEST CONFIGURATION

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### Justification

The EUT was configured for testing according to TIA/EIA 603A.

The final qualification test was performed with the EUT operating at normal mode.

### Block Diagram

Please refer to Exhibit D.

### Equipment Modifications

No modifications were made to the EUT.

### Local Support Equipment List and Details

| Manufacturer | Description                 | Model    | Serial Number | FCC ID |
|--------------|-----------------------------|----------|---------------|--------|
| Dell         | Notebook                    | Latitude | CIF0B00227    | DOC    |
| Agilent      | Analyzer,<br>Communications | E5515C   | GB44051221    | DOC    |

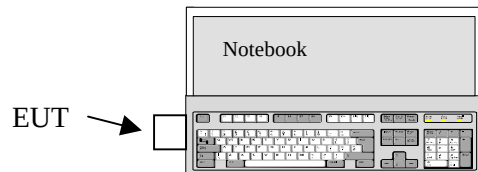
### External Cables List and Details

| Cable Description | Length (M) | From   | To      |
|-------------------|------------|--------|---------|
| RF Cable          | 1.5        | E5515C | Antenna |

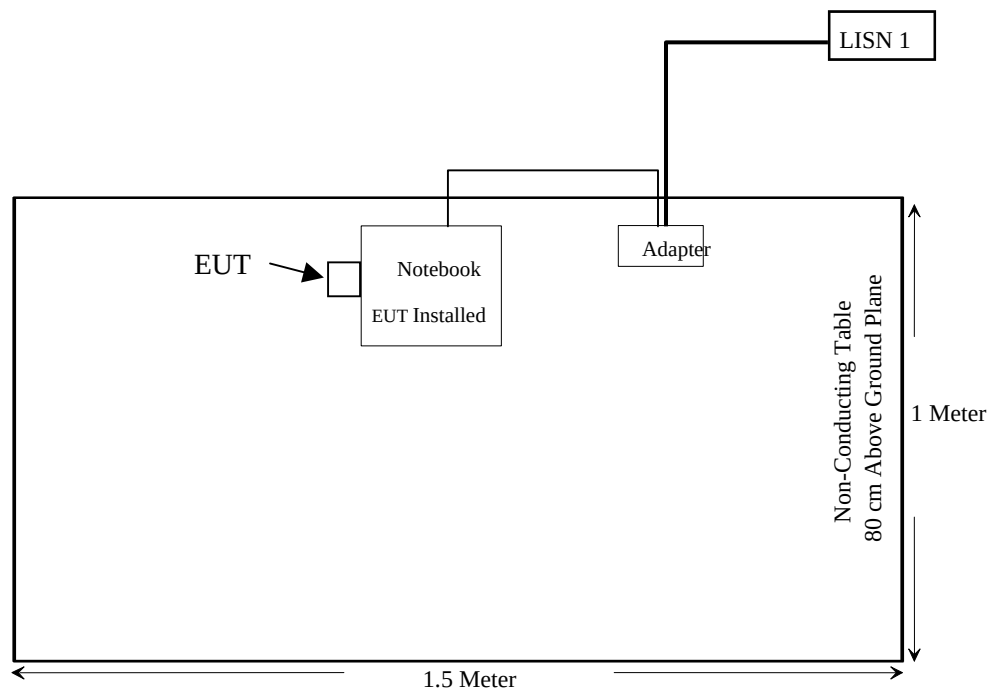
### Power Supply Information

| Manufacturer | Description | Model   | Serial Number            | FCC ID |
|--------------|-------------|---------|--------------------------|--------|
| DELL         | AC adapter  | AA20031 | CN-09364U-16291-13J-0E3F | DOC    |

## Configuration of Test System



## Test Setup Block Diagram



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## SUMMARY OF TEST RESULTS

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Results reported relate only to the product tested, serial number: *Novatel0804*.

| FCC RULE                                 | DESCRIPTION OF TEST                                                    | RESULT    |
|------------------------------------------|------------------------------------------------------------------------|-----------|
| § 2.1047                                 | Modulation Characteristics                                             | N/A       |
| § 2.1053                                 | Field Strength of Spurious Radiation                                   | Compliant |
| §2.1093                                  | RF Exposure                                                            | N/A       |
| § 2.1046,<br>§ 24.232                    | RF Output Power                                                        | N/A       |
| § 2.1046,<br>§ 24.232                    | Conducted Output Power                                                 | N/A       |
| § 2.1049<br>§ 24.238                     | Out of Band Emission, Occupied Bandwidth                               | N/A       |
| § 2.1051,<br>§ 24.238(a)                 | Spurious Emissions at Antenna Terminals                                | N/A       |
| § 2.1055 (a)<br>§ 2.1055 (d)<br>§ 24.235 | Frequency stability vs. temperature<br>Frequency stability vs. voltage | N/A       |
| §24.238                                  | Band Edge                                                              | N/A       |

## §2.1053 - SPURIOUS RADIATED EMISSIONS

### Applicable Standard

Requirements: CFR 47, § 2.1053.

### Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =  $10 \lg (\text{TXpwr in Watts}/0.001)$  – the absolute level

Spurious attenuation limit in dB =  $43 + 10 \text{ Log}_{10} (\text{power out in Watts})$

### Test Equipment List and Details

| Manufacturer | Description          | Model       | Serial Number | Cal. Date  |
|--------------|----------------------|-------------|---------------|------------|
| HP           | Spectrum Analyzer    | 8568B       | 2601A02165    | 2005-07-03 |
| HP           | Amplifier            | 8447E       | 2944A10187    | 2005-09-23 |
| HP           | Quasi-Peak Adapter   | 85650A      | 3019A05393    | 2005-06-13 |
| EMCO         | Biconical Antenna    | 3110B       | 9309-1165     | 2005-10-11 |
| EMCO         | Log Periodic Antenna | 3146        | 2101          | 2005-10-11 |
| AH System    | Horn Antenna         | SAS-200/511 | 261           | 2005-08-02 |
| HP           | Spectrum Analyzer    | HP8564E     | 3943A01781    | 2005-08-01 |

\* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 18° C     |
| Relative Humidity: | 45%       |
| ATM Pressure:      | 1080 mbar |

*The testing was performed by Daniel Deng on 2005-11-23*

**Test Result**

Middle Frequency: -33.5 dB at 1880.00 MHz

## Internal Antenna

| Indicated |       | Table  | Test Antenna |       | Substituted |       | Antenna    | Cable | Absolute | Limit | Margin |
|-----------|-------|--------|--------------|-------|-------------|-------|------------|-------|----------|-------|--------|
| Frequency | Ampl. | Angle  | Height       | Polar | Frequency   | Level | Gain       | Loss  | Level    |       |        |
| MHz       | dBuV  | Degree | Meter        | H/V   | MHz         | dBm   | Correction | dB    | dBm      | dBm   | dB     |
| 688.100   | 46.83 | 90     | 1.95         | V     | 688.100     | -60.9 | 1.1        | 0.6   | -60.4    | -13   | -47.4  |
| 688.100   | 50.10 | 90     | 1.10         | H     | 688.100     | -56.8 | 1.1        | 0.6   | -56.3    | -13   | -43.3  |
| 7520.000  | 32.60 | 270    | 1.60         | H     | 7520.000    | -60.5 | 11.1       | 5.2   | -54.6    | -13   | -41.6  |
| 7520.000  | 33.50 | 90     | 1.70         | V     | 7520.000    | -59.7 | 11.1       | 5.2   | -53.8    | -13   | -40.8  |
| 3759.865  | 36.83 | 270    | 2.10         | H     | 3759.865    | -61.6 | 11.4       | 3.2   | -53.4    | -13   | -40.4  |
| 5639.800  | 43.15 | 270    | 1.70         | H     | 5639.800    | -58.3 | 10.3       | 4.1   | -52.1    | -13   | -39.1  |
| 3759.865  | 40.50 | 90     | 1.90         | V     | 3759.865    | -58.8 | 11.4       | 3.2   | -50.6    | -13   | -37.6  |
| 5639.800  | 45.67 | 90     | 1.70         | V     | 5639.800    | -56.2 | 10.3       | 4.1   | -50.0    | -13   | -37.0  |