**ENGINEERING TEST REPORT**

**NUMBER: 13512EUS1**

**ON**

**Model No.(s):**
2.5-2.6 PMX V2

**IN ACCORDANCE WITH:**
**CFR 47, PART 15, SUBPART B,**
**CLASS B VERIFICATION**

**TESTED FOR:**
Navini Networks
2240 Campbell Creek Blvd
Richardson, TX 75082

**TESTED BY:**
Nemko USA, Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

TESTED BY: _____ DATE: 4/08/08
Arturo Ruvalcaba, EMC Engineer

APPROVED BY: _____ DATE: 5/16/08
Brian Boyea, EMC Engineer

NVLAP®
LAB CODE: 100426-0



**Total Pages 16**

## Table of Contents

## Section 1. Summary of Test Results

**General:**

**All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with CFR 47, Part 15, Subpart B for Class B Digital Devices.

These tests were conducted using measurement procedures of ANSI C63.4-2003.

The equipment was tested for conducted emissions from 0.150 MHz to 30 MHz using a 50 microhenry line impedance stabilization network (L.I.S.N.) as described in ANSI C63.4-2003. Peripheral equipment was also operated through a 50 microhenry L.I.S.N.

The equipment was tested for radiated emissions from 30 MHz to 1000 MHz in accordance with the requirements of CFR 47, Part 15, Subpart B. Equipment with oscillator frequencies above 107 MHz were tested to the fifth harmonic or in accordance with the requirements of CFR 47, Part 15.33. Frequencies were initially identified in a semi-anechoic chamber. Amplitude measurements were made in a semi-anechoic chamber. Details of the chamber are on file with the FCC and Industry Canada.

**Abstract:**

| Name of Test | Basic Standard | Results |
|---|---|---|
| Conducted Emissions (Mains port) | CFR 47, Part 15, Subpart B Para. No. 15.107 | Note 1 |
| Radiated Emissions | CFR 47, Part 15, Subpart B Para. No. 15.109 | Complies |
| Microwave Radiated Emissions | CFR 47, Part 15, Subpart B, Para. No. 15.109 | Not Tested |

Note1: No AC Mains.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE: **NONE**

## Section 2. Equipment Under Test (E.U.T.)

| | |
|---|---|
| Manufacturer: | Navini Networks |
| Name: | BWX 120 Modem, 2.5-2.6 GHz |
| Model Number: | 2.5-2.6 PMX V2 |
| Serial Number: | N/A |
| Part Number: | 91-00226-40R |
| Production Status: | Pre-Production |
| E.U.T. Arrival Date: | 3/20/08 |

**Description of E.U.T.**
PCMCIA card for laptop.

**Clock, Oscillator, Highest Frequencies Utilized:**

16 MHz, 8 MHz, 10 MHz, 3.2 MHz, 42 MHz, 84 MHz, 168 MHz, 32kHz.

**Modifications Incorporated in E.U.T.**
The E.U.T. has not been modified from what is described by the brand name and unique type identification stated above.

**Justification:**
The E.U.T. was configured for testing as per typical installation. Position and bundling of cables were investigated to establish maximum amplitude of emissions.

The following combinations were investigated to establish worst-case configuration:
Installed in laptop linked up to Base Station.

**Exercise Program:**
The E.U.T. exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

The EUT was in the following exercise mode:
Installed in laptop linked up to Base Station.

## E.U.T. Photographs:


## Section 3. Equipment Configuration

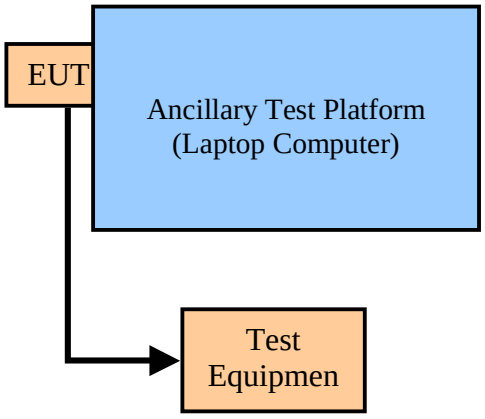
### Equipment Configuration List:

| Equipment Configuration List: | | |
|---|---|---|
| Item | Description | Identification *(M/N #, S/N #, P/N #, Rev.)* |
| (A) | PCMCIA Card | 2.5-2.6 PMX V2 |
| (B) | | |
| (C) | | |
| (D) | | |
| (E) | | |
| (F) | | |
| (G) | | |
| (H) | | |
| (I) | | |
| (J) | | |

| EUT Power and Interfaces: | | | |
|---|---|---|---|
| Item | Description | Type | Qty |
| i. | Laptop | | 1 |
| ii. | | | |
| iii. | | | |
| iv. | | | |
| v. | | | |
| vi. | | | |
| vii. | | | |
| viii. | | | |
| ix. | | | |
| x. | | | |

| Inter-Connection Cables: | | |
|---|---|---|
| Item | Description | Length (m) |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

**Equipment Configuration List:**



## Section 4. Conducted Emissions (Mains ports)

Note: Test Not Applicable**.**

**Purpose:**

The test is intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for conducted disturbance as defined by CFR 47, Part 15, Subpart B, Class B, Paragraphs Number 15.107 utilizing limits defined by CISPR 22 © IEC: 2005+A1: 2005+A2: 2006
for Class B Information Technology Equipment.

**Specification Limits:**

Limits for conducted disturbance at the mains ports

| Frequency Range (MHz) | Quasi-peak Limits (dBuV) | Average Limits (dBuV) |
|---|---|---|
| 0.15 to 0.50 | 66-56 | 56-46 |
| 0.50 to 5.00 | 56 | 46 |
| 5.00-30.0 | 60 | 50 |
| The limit decreases with the logarithm of the frequency in the range 0.15MHz to 0.5 MHz | | |

**Method of Measurement (Procedure ANSI C63.4-2003):**

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak detector. Any emissions that are close to the limit are measured using a test receiver with 9 kHz bandwidth, CISPR Quasi-Peak detector.

See Sections 7 and 8

## Section 5. Radiated Emissions

**Purpose:**

The tests are intended to demonstrate the compliance of the Equipment Under Test (E.U.T.) to the limits for radiated emissions as defined by CFR 47, Part 15, Subpart B, Class B.

**Specification Limits:**

Limits for radiated disturbance of Class B

| Frequency Range (MHz) | 3m Limits (dBuV) | 10m Limits (dBuV) |
|---|---|---|
| 30-88 | 40 | 30 |
| 88-216 | 43.5 | 33.5 |
| 216-960 | 46 | 36 |
| Above 960 | 54 | 44 |

**Method of Measurement (Procedure ANSI C63.4-2003):**

Any emissions above 1 GHz were measured with a horn antenna and low noise pre-amplifier at a distance of 3 meters.

See Sections 5 and 6.

**Test #:** REHE-01

**Tested By:** Art Ruvalcaba

**Date of Tests:** 4/08/08

**Test Conditions:**

Test Voltage: 120VAC

Temperature: 23˚C

Humidity: 33%

**Test Results:**

The E.U.T. complies.

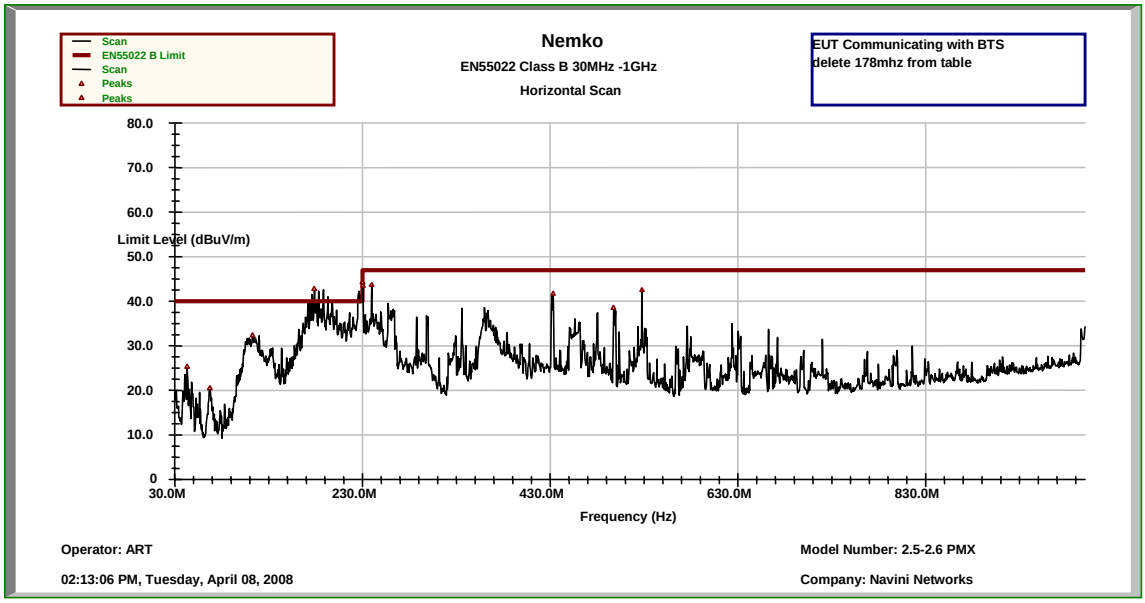
**TEST EQUIPMENT**

**TEST EQUIPMENT**

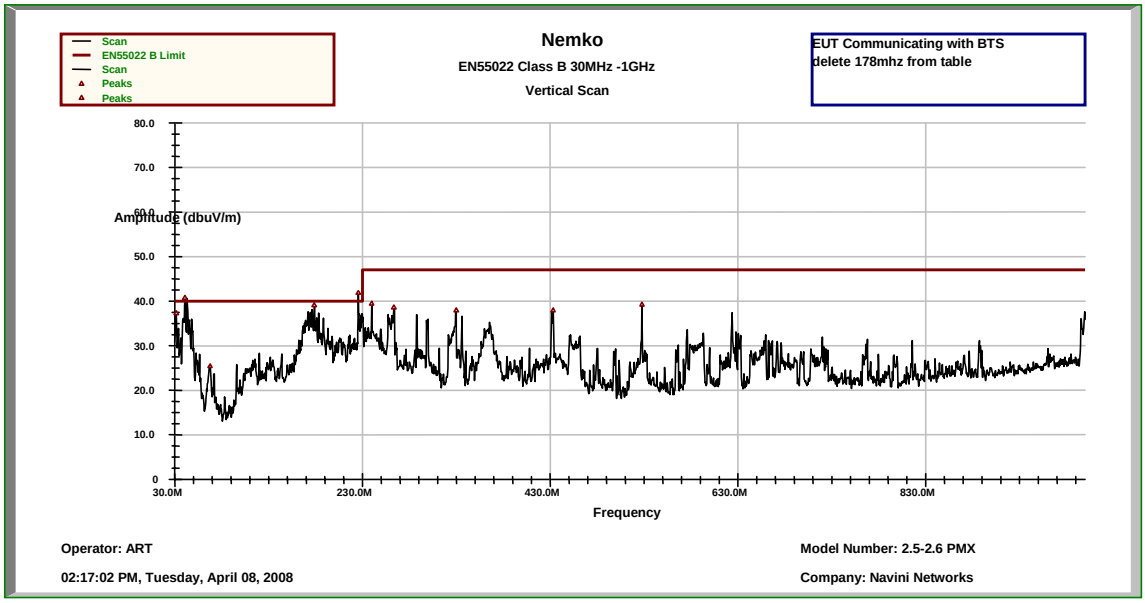
| Asset Number | Description | Manufacturer | Model Number | Serial Number | Last Cal | Cal Due |
|---|---|---|---|---|---|---|
| 1763 | Antenna bilog | Schaffner | CBL6111-D | 22926 | 9/21/07 | 9/21/08 |
| 1762 | Cable Assy, 3m Chamber | Nemko | Chamber | N/A | 8/15/07 | 8/15/08 |
| 1025 | PREAMP, 25dB | Nemko | LNA25 | 399 | 12/06/07 | 12/06/08 |
| 1 | 3m Chamber | Nemko | 1 | 1 | 8/15/07 | 8/15/08 |
| 1659 | Spectrum Analyzer | Rohde & Schwarz | FSP | 100037 | 1/24/07 | 1/24/09 |

## Test Data –Radiated Emissions, Electric Field, Test# REHE-01

### Horizontal




### Vertical

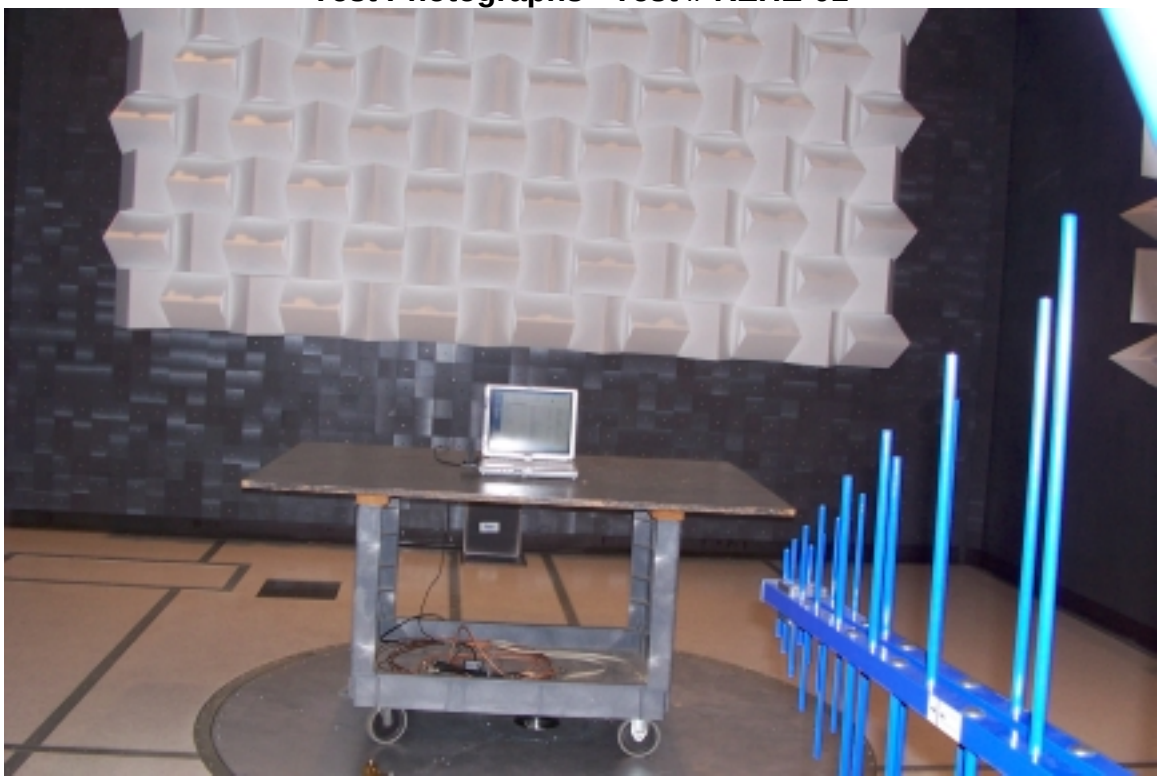


Nemko, Lewisville, TX
FCC 3 Meter Chamber
Final Quasi Peak Measurements
Operator: ART Model Number: 2.5-2.6 PMX
J:\Enqs\YR8\10290\2.5-2.6PMX\2.5 2.6 ESI CISPR B RE-30Mhz-1Ghz Auto QP.TIL Company: Navini Networks
03:38:29 PM, Tuesday, April 08, 2008:

| Frequency | Limit | Horizontal | QP | Vertical | Vertical |
|---|---|---|---|---|---|
| MHz | Limit | QP | Margin | QP | Margin |
| 31.7032 | 40.000 | | | 35.024 | -4.976 |
| 41.1616 | 40.000 | | | 37.605 | -2.395 |
| 43.5665 | 40.000 | 20.377 | -19.623 | | |
| 67.2954 | 40.000 | | | 23.065 | -16.935 |
| 67.3145 | 40.000 | 18.703 | -21.297 | | |
| 113.426 | 40.000 | 28.516 | -11.484 | | |
| 225.331 | 40.000 | | | 31.130 | -8.870 |
| 230.1 | 47.000 | 35.701 | -11.299 | | |
| 230.314 | 47.000 | 35.826 | -11.174 | | |
| 239.993 | 47.000 | 44.674 | -2.326 | 38.052 | -8.948 |
| 263.654 | 47.000 | | | 33.609 | -13.391 |
| 329.646 | 47.000 | | | 33.676 | -13.324 |
| 433.153 | 47.000 | 39.806 | -7.194 | 39.315 | -7.685 |
| 497.688 | 47.000 | 37.022 | -9.978 | | |
| 527.976 | 47.000 | 41.651 | -5.349 | | |
| 528.036 | 47.000 | | | 38.301 | -8.699 |

EUT Communicating with BTS

## Test Photographs - Test # REHE-01



# Section 6. Test Methods and Block Diagrams.

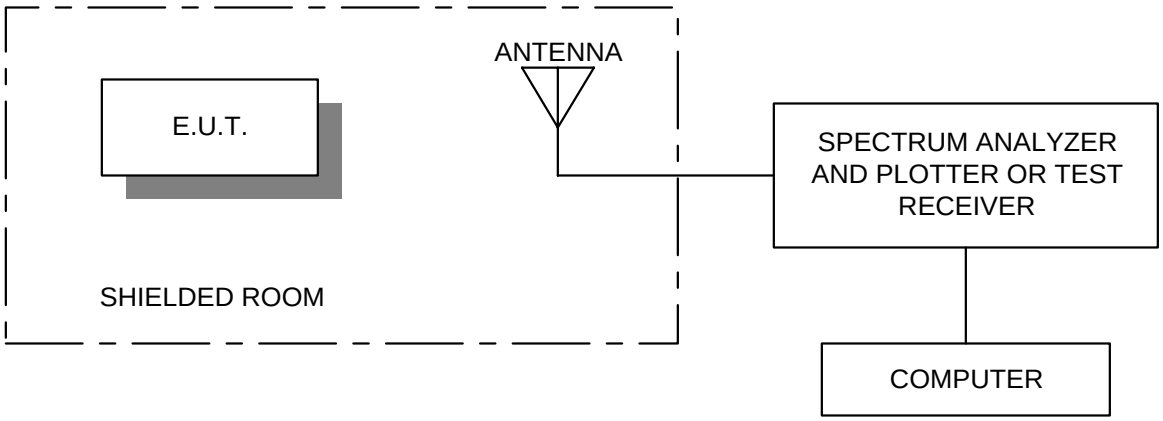
## Radiated Emissions

### Test Method - Radiated Emissions:

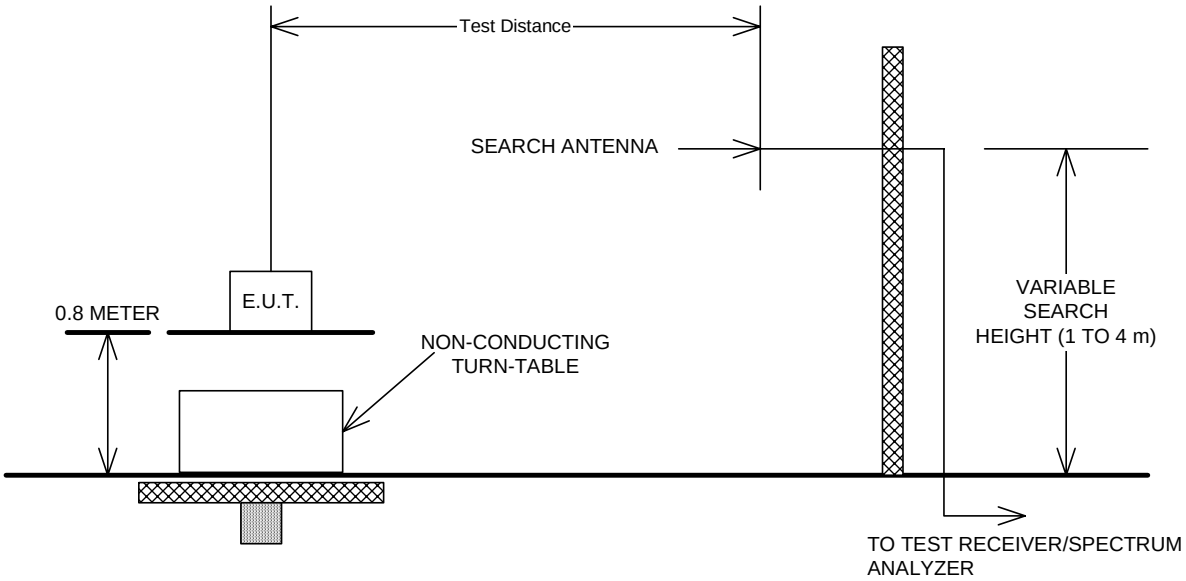
- Applicable Test Standard: CFR47, FCC Pt 15, Subpart B
- The test set-up in the shielded room is as per the test configuration diagram.
- The E.U.T. is configured as typically used.
- The E.U.T. and any accessories are operated with typical load conditions.
- Radiated emissions measurements are made from 30 MHz to 1000 MHz.
- The equipment was prescanned in the shielded room using a spectrum analyzer and broadband antenna to produce a list of frequencies to be investigated in the open area test site.
- The equipment is then set-up on an open area test site.
- Variations in antenna height, antenna polarization, and E.U.T. azimuth are explored to produce the emission that has the highest amplitude relative to the limit.
- The frequencies noted in the preliminary test are investigated on the open-air site where amplitude measurements are made.
- If ambient signal field strength is high at 10 meter, the measurements may be performed at 3 meter and extrapolated to the requisite distance.
- If less than six emissions are better than 20 dB below limit, the noise level of the measuring instrument at representative frequencies is also reported.
- Any emissions above 1 GHz are measured using a horn antenna and low noise pre-amplifier at a distance of 3 meters. The bandwidth was set to 1 MHz and the detector function was average.

## Test Configuration - Radiated Emissions:

### Radiated Pre-scan:




### Outdoor Test Site for Radiated Emissions:



## Section 7. Labeling Requirements

*Your product has successfully complied with 47 CFR FCC Part 15.B Class B requirements.*

**FCC Class B Label:**

**This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.**

In addition to placing the above label on your product, the three items that are required to be included in your product's manual are:

(1) For a Class B digital device or peripheral, the instructions furnished to the user shall include the following or similar statement, placed in a prominent location at the front of the manual:

**NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.**

(2) The user's manual must caution the user that changes or modifications not expressly approved by the party responsible for compliance (you/your company) could void the user's authority to operate the equipment.

(3) The instruction manual must include appropriate instructions on the first page of the manual concerning installation of the device or special accessories (special cabling, shields, adapters) that must be used with the device. An appropriate caution statement should warn the user to utilize the special accessories supplied with the equipment for continued FCC compliance.