| | |
|---|---|
| **Nemko Test Report:** | 6L0355RUS2 rev3 |
| **Applicant:** | Innovation First, Inc.<br>6611 Interstate 30 West<br>Greenville, TX 75402<br>USA |
| **Equipment Under Test: (E.U.T.)** | Operator Interface |
| **In Accordance With:** | **FCC Part 15, Subpart C, 15.249**<br>Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz. |
| **Tested By:** | Nemko USA Inc.<br>802 N. Kealy<br>Lewisville, Texas 75057-3136 |

**TESTED BY:** _____ **DATE:** **06 December 2006**

**Kevin Rose Wireless Engineer**

**APPROVED BY:** _____ **DATE:** **06 December 2006**

Abe Cox, Key Account Manager

**Total Number of Pages: 17**

## Table Of Contents

## Section 1. Summary Of Test Results

Manufacturer: Innovation First, Inc.

Model No.: Operator Interface

Serial No.: None

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 FCC Part 15.249. All tests were conducted using measurement procedure ANSI C63.4-2003. Radiated Emissions were made on an open area test site.

☒ New Submission ☐ Production Unit

☐ Class II Permissive Change ☒ Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.
See " Summary of Test Data".

NVLAP LAB CODE: 100426-0

**Summary Of Test Data**

| NAME OF TEST | PARA. NO. | RESULT |
|---|---|---|
| Conducted Emissions | 15.207 | Complies |
| Radiated Emissions | 15.249 | Complies |

Eut voltage was varied 15%-/+ with no effect on the output power.

**Footnotes For N/A's:**

Receiver measurements were made from 30MHz to 10GHz worst case was recorded.

## Section 2. General Equipment Specification

| | |
|---|---|
| **Frequency Range:** | 902-928 |
| **Operating Frequency(ies) of Sample:** | 922.1-927.95 |
| **User Frequency Adjustment:** | None |

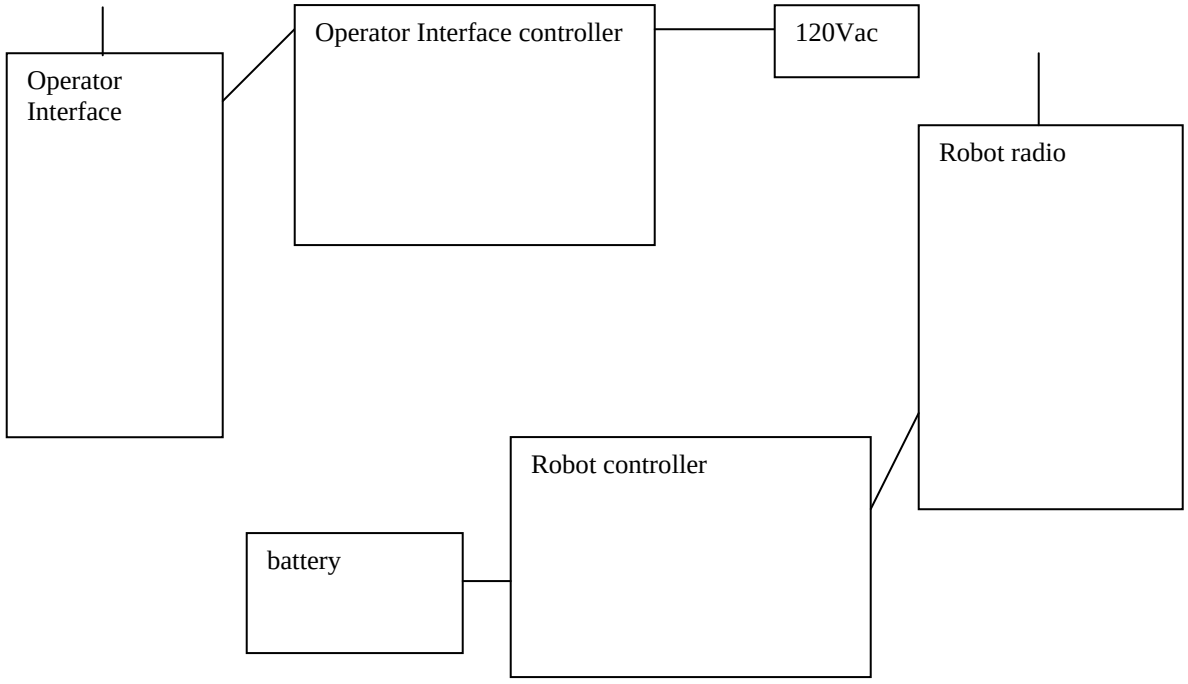
| | **Yes** | **No** |
|---|---|---|
| **Integral Antenna** | ☒ | ☐ |

Eut voltage was varied 15%-/+ with no effect on the output power.

## Description of EUT

The Operator Interface is a 902-928 MHz Frequency Shift Keyed (FSK) transceiver Modem.

## System Diagram



## Section 3. Powerline Conducted Emissions

| NAME OF TEST: Powerline Conducted Emissions | PARA. NO.: 15.207 |
|---|---|
| TESTED BY: Kevin Rose | DATE:10/27/06 |

**Minimum Standard:** §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency of Emission (MHz) | Conducted Limit (dBmV) Quasi-peak | Average |
|---|---|---|
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

**Test Results:** Complies . See attached graph(s).

**Measurement Data:** See attached graph(s).

**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.

**TEST EQUIPMENT**

| Asset Number | Description | Manufacturer | Model Number | Serial Number | Last Cal | Cal Due |
|---|---|---|---|---|---|---|
| 1258 | LISN .15mhz-30mhz | EMCO | 0 | 1305 | 04/19/06 | 04/19/07 |
| 1325 | CABLE, .5m | Nemko USA, Inc. | RG223 | N/A | 04/20/06 | 04/20/07 |
| 1284 | Spectrum analyzer display | Hewlett Packard | 8566B | 1811A00223 | 02/16/06 | 02/16/07 |
| 674 | LIMITER | HP | 11947A | 3107A02200 | 04/19/06 | 04/19/07 |

## Test Data – Powerline Conducted Emissions

***Measurement Data:*** Reading listed by order taken. Test Lead:

| # | Freq MHz | Rdng dBµV | 1258 dB | 1325 dB | dB | dB | Dist Table | Corr dBµV/m | Spec dBµV/m | Margin dB | Polar Ant |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 573.351k | 37.4 | +0.5 | +0.2 | | | +0.0 | 38.1 | 46.0 | -7.9 | Black |
| 2 | 631.018k | 36.8 | +0.5 | +0.2 | | | +0.0 | 37.5 | 46.0 | -8.5 | Black |
| 3 | 151.338k QP | 52.3 | +2.6 | +0.1 | | | +0.0 | 55.0 | 65.9 | -10.9 | Black |
| 4 | 151.135k Ave | 47.1 | +2.6 | +0.1 | | | +0.0 | 49.8 | 55.9 | -6.1 | Black |
| 5 | 186.720k QP | 51.0 | +2.0 | +0.1 | | | +0.0 | 53.1 | 64.2 | -11.1 | Black |
| 6 | 186.744k Ave | 42.9 | +2.0 | +0.1 | | | +0.0 | 45.0 | 54.2 | -9.2 | Black |
| 7 | 301.020k QP | 46.0 | +1.1 | +0.1 | | | +0.0 | 47.2 | 60.2 | -13.0 | Black |
| 8 | 293.940k Ave | 29.7 | +1.1 | +0.1 | | | +0.0 | 30.9 | 50.4 | -19.5 | Black |
| 9 | 301.820k QP | 46.0 | +1.1 | +0.1 | | | +0.0 | 47.2 | 60.2 | -13.0 | Black |

| # | Freq MHz | Rdng dBµV | 1258 dB | 1325 dB | dB | dB | Dist Table | Corr dBµV/m | Spec dBµV/m | Margin dB | Polar Ant |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 480.703k | 42.0 | +0.5 | +0.1 | | | +0.0 | 42.6 | 46.3 | -3.7 | White |
| 2 | 521.315k | 39.8 | +0.5 | +0.1 | | | +0.0 | 40.4 | 46.0 | -5.6 | White |
| 3 | 178.860k QP | 50.2 | +2.1 | +0.1 | | | +0.0 | 52.4 | 64.5 | -12.1 | White |
| 4 | 192.620k Ave | 35.1 | +1.9 | +0.1 | | | +0.0 | 37.1 | 53.9 | -16.8 | White |
| 5 | 183.800k Ave | 35.6 | +2.0 | +0.1 | | | +0.0 | 37.7 | 54.3 | -16.6 | White |
| 6 | 178.720k QP | 50.3 | +2.1 | +0.1 | | | +0.0 | 52.5 | 64.5 | -12.0 | White |
| 7 | 385.000k QP | 41.2 | +0.7 | +0.1 | | | +0.0 | 42.0 | 58.2 | -16.2 | White |

## Conducted Photographs

## Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions PARA. NO.: 15.249

TESTED BY: Kevin Rose DATE:10/27/06

**Minimum Standard:** Para no. 15.249

(a) The field strengths shall not exceed the following:

| Carrier (MHz) | Field Strength (mV/m) | Field Strength (dBµV) | Harmonic (µV/m) | Harmonic (dBµV) |
|---|---|---|---|---|
| 902-928 | 50 | 94 | 500 | 54 |
| 2400-2483.5 | 50 | 94 | 500 | 54 |
| 5725-5875 | 50 | 94 | 500 | 54 |
| 24000-24250 | 250 | 108 | 2500 | 68 |

(b) Field strength limits are specified at a distance of 3 metres.

(c) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated limits of 15.209 whichever is the less attenuation.

(d) …for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

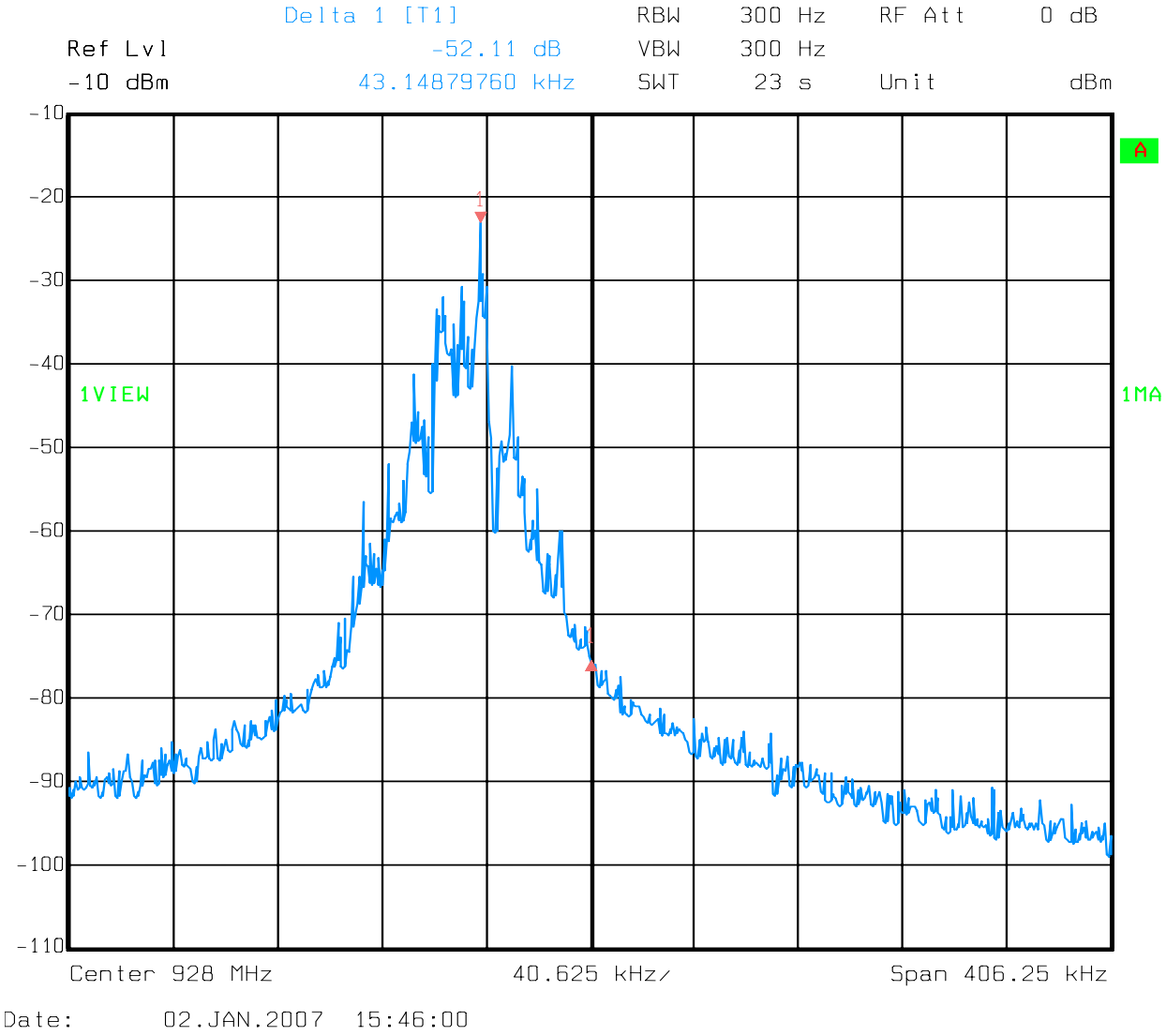
**Test Results:** Complies No emissions above 1GHz were detected

**Measurement Data:** See attached table.

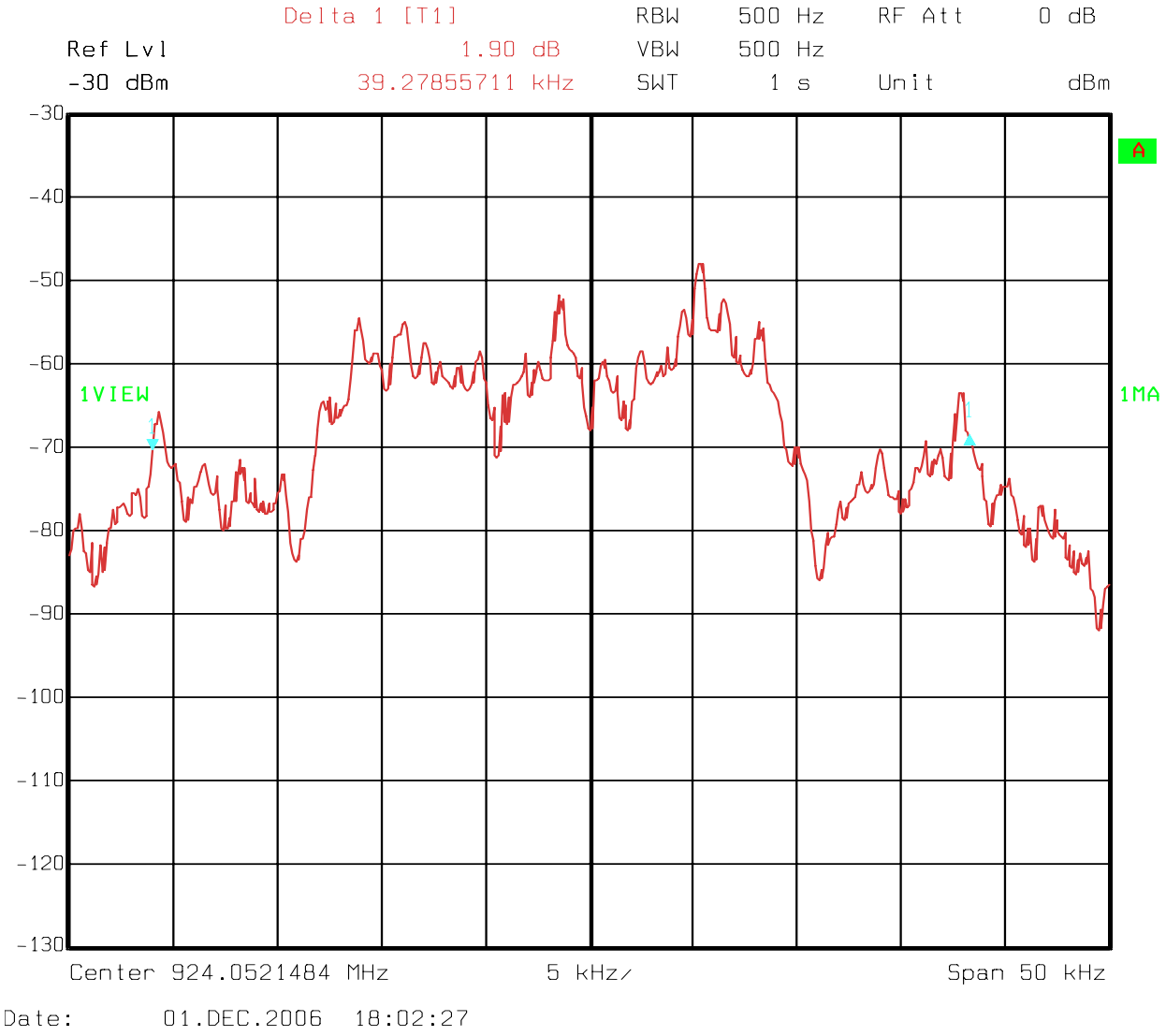
**TEST EQUIPMENT**

| Asset Number | Description | Manufacturer | Model Number | Serial Number | Last Cal | Cal Due |
|---|---|---|---|---|---|---|
| 759 | ANTENNA, LP | A.H. SYSTEMS | SAS-200/510 | 556 | 02/13/06 | 02/13/07 |
| 1306 | Antenna biconical | Nemko USA, | BCON 30300 | 212 | 02/10/06 | 02/10/07 |
| 1522 | Cable Assy, LAB 5 | Nemko USA, | Site D OATS | N/A | 05/09/06 | 05/09/07 |
| 678 | PREAMP, 15DB | Nemko USA | 30-1400 MHz | 408 | 10/03/06 | 10/03/07 |
| 1284 | Spectrum analyzer display | HP | 8566B | 1811A00223 | 02/16/06 | 02/16/07 |
| D oats | Open Area Test Site | Nemko USA, | None | D | 03/21/06 | 03/21/07 |
| 993 | Horn Antenna | A.H. | SAS-200/571 | XXX | 08/01/05 | 08/02/07 |
| 1016 | Preamplifier, 1-20 GHz | HP | 8449A | 2749A00159 | 04/20/06 | 04/20/07 |
| 1464 | Spectrum analyzer | HP | 8563E | 3551A04428 | 01/14/05 | 01/15/07 |
| 1484 | Cable | Storm | PR90-010-072 | NA | 10/02/06 | 10/02/07 |
| 1485 | Cable | Storm | PR90-010-216 | NA | 10/02/06 | 10/02/07 |

## Upper bandedge



## Occupied bandwidth



## Test Data - Radiated Emissions

### Radiated Emissions Data

| | | | | | |
|---|---|---|---|---|---|
| Complete | X | | | Job # : | 6L0355E |
| Preliminary | | | | Page | 1 |
| Client Name : | Innovation First Inc. | | | | |
| EUT Name : | Operator Interface | | | | |
| EUT Model # : | none | | | | |
| EUT Part # : | none | | | | |
| EUT Serial # : | none | | | | |
| EUT Config. : | Full Transmit | | | | |
| Specification : | CFR47 Part 15, Subpart B, Class B | | | Reference : | |
| Rod. Ant. #: | | Temp. (deg. C) : | 21 | Date : | 10/27/06 |
| Bicon Ant.#: | 1306 | Humidity (%) : | 42 | Time : | 13:00 |
| Log Ant.#: | 759 | EUT Voltage : | 120VAC | Staff : | Kevin Rose |
| Bilog Ant.#: | 1306 | EUT Frequency : | 60 | Photo ID: | 6L0355E REHE-01 |
| Dipole Ant.#: | | Phase: | SINGLE | Peak Bandwidth: | 100 KHz |
| Cable#: | 1522 | Location: | D oats | Video Bandwidth | 100 KHz |
| Preamp#: | 678 | Distance: | 3M | QP Bandwidth: | 120 KHz |
| Limiter#: | NA | Barometric pressure: | 1016 | | |
| Atten #: | NA | | | | |
| Detector#: | 1284 | | | | |

| Meas. Freq. (MHz) | Ant. Pol. (H/V) | Atten. (dB) | Meter Reading (dBuV) | Antenna Factor (dB) | Path Loss (dB) | RF Gain (dB) | Corrected Reading (dBuV/m) | Spec. limit (dBuV/m) | CR/SL Diff. (dB) | Pass Fail Unc. | QP readings Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 922.1 | V | 0 | 56.7 | 23.5 | 12.1 | 0.0 | 92.3 | 94.0 | -1.7 | Pass | LOW CHANNEL |
| 927.95 | V | 0 | 56.7 | 23.5 | 12.1 | 0.0 | 92.3 | 94.0 | -1.7 | Pass | HIGH CHANNEL |
| 927.95 | H | 0 | 40.8 | 23.5 | 12.1 | 0.0 | 76.4 | 94.0 | -17.6 | Pass | |
| 922.1 | H | 0 | 41.8 | 23.5 | 12.1 | 0.0 | 77.4 | 94.0 | -16.6 | Pass | |
| | | | | | | | | | | | |
| 39.973 | V | 0 | 33.12 | 12.9 | 2.2 | 13.8 | 34.4 | 40.0 | -5.6 | Pass | |
| 39.973 | H | 0 | 30 | 12.9 | 2.2 | 13.8 | 31.3 | 40.0 | -8.7 | Pass | |
| 800 | H | 0 | 18 | 21.2 | 11.8 | 12.7 | 38.3 | 46.0 | -7.7 | Pass | |
| 500 | H | 0 | 13 | 17.4 | 8.9 | 12.5 | 26.8 | 46.0 | -19.2 | Pass | |
| 300 | H | 0 | 22 | 19.6 | 6.8 | 12.8 | 35.6 | 46.0 | -10.4 | Pass | |
| 800 | V | 0 | 17 | 21.2 | 11.8 | 12.7 | 37.3 | 46.0 | -8.7 | Pass | |
| 500 | V | 0 | 14 | 17.4 | 8.9 | 12.5 | 27.8 | 46.0 | -18.2 | Pass | |
| 300 | V | 0 | 21 | 19.6 | 6.8 | 12.8 | 34.6 | 46.0 | -11.4 | Pass | |
| | | | | | | | | | | | |
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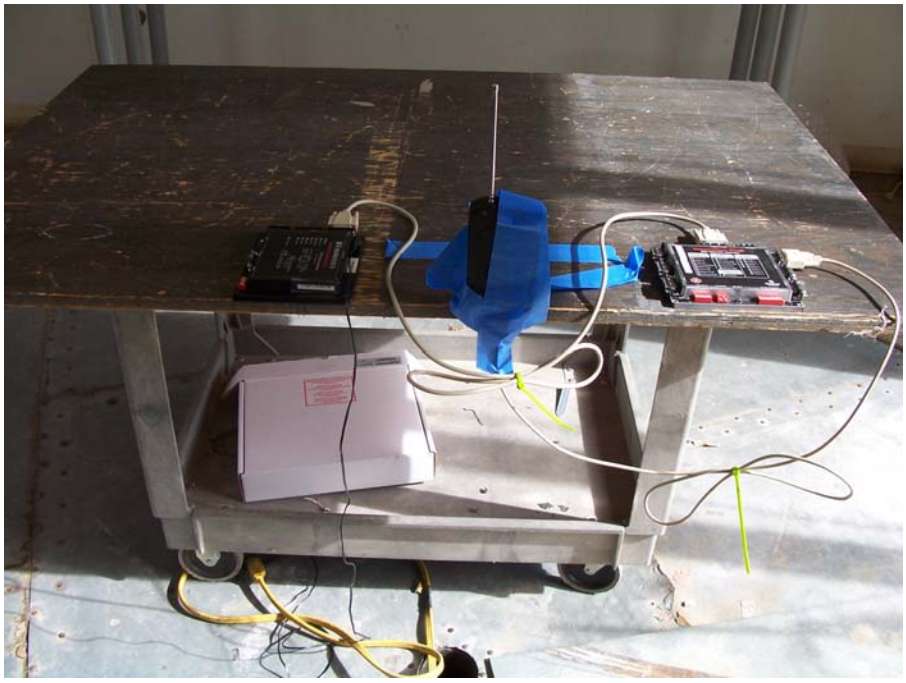
..\EMCShare\AUTOMATE\DATASHTS\RADEMEV Rev C.xls Document Control #EMC DS EM RAD HFE

The spectrum was searched from 30 MHz to 10 GHz

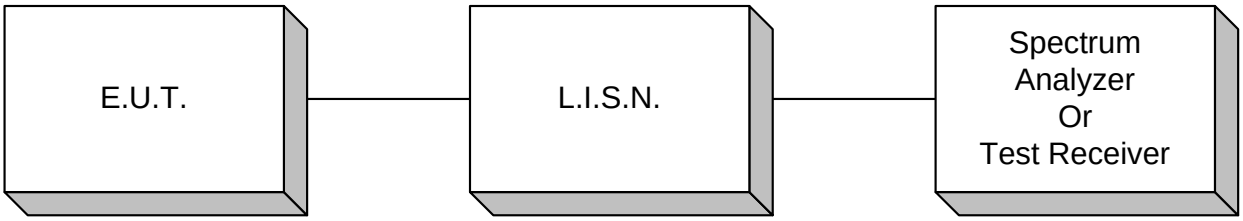
**Radiated Photographs**



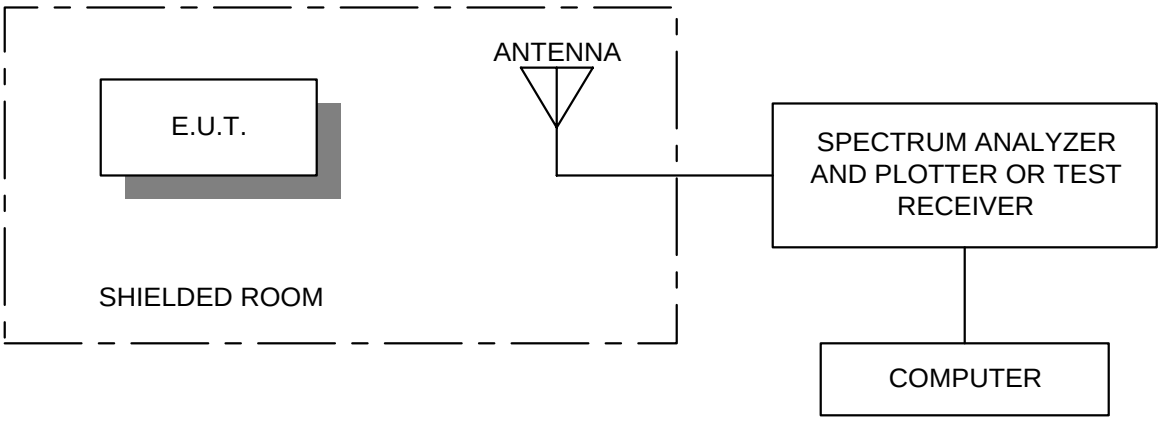
# ANNEX A

# TEST DIAGRAMS

**Conducted Emissions**




**Radiated Prescan**



## Test Site For Radiated Emissions