# FCC
# Electromagnetic Compatibility
# Test Report

**For**

## 3M™ Document Reader
## Model PV30

**3M Security Systems Division**
**St. Paul, MN 55144-1000**

**3 August 2005**

**Report Number: F0705001**

**Prepared By:**

**3M Corporate Research Laboratories**
**SEMS Product Safety - EMC Laboratory**
**Building 76-1-01**
**410 East Fillmore Avenue**
**St. Paul, Minnesota 55144-1000**

| | | |
|---|---|---|
| 3M Product Safety<br>SEMS Technology Center<br>Building 76-1-01<br>St. Paul, MN 55144-1000 | Phone: 651-778-6279<br>FAX: 651-778-6252 | 3M<br>EMC Laboratory |


# CERTIFICATE OF COMPLIANCE

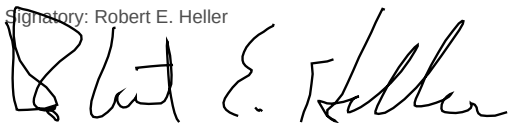
## USA STANDARD 47 CODE OF FEDERAL REGULATIONS

**Radiated Emissions (FCC Part 15, Subpart B, Class A)**
**Conducted Emissions (FCC Part 15, Subpart B, Class A)**
**Radiated Emissions (FCC Part 15, Subpart C)**
**Conducted Emissions (FCC Part 15, Subpart C)**

| | |
|---|---|
| MANUFACTURER'S NAME | 3M Company |
| NAME OF EQUIPMENT | 3M™ Document Reader PV30 |
| MODEL NUMBER | PV30 |
| SERIAL NUMBER | A4-01115 |
| DESCRIPTION | Passport Reader with RFID |
| TEST REPORT NUMBER | F0705001 |
| DATE | 3 August 2005 |

As the responsible EMC Engineer, I hereby declare that the equipment tested, as specified in the test report, at the 3M Product Safety EMC Laboratory is in compliance with 47 CFR, Part 15, Subpart B and Subpart C. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

Signatory: Robert E. Heller



Robert E. Heller
Senior EMC Engineer

## TABLE OF CONTENTS

## 1.0 TEST SUMMARY

| | |
|---|---|
| Test Report Number: | F0705001 |
| Requester: | Stephen Bernard, 3M-AiT Canada |
| Company: | 3M Security Systems Division<br>St. Paul, MN 55144 |
| Telephone Number: | (613) 725-1485 x 1555 |
| Test Dates: | July 1, 5, 28, 2005 |
| Equipment Under Test | Model PV30 Document Reader (with RFID) |
| Date Of Receipt: | June 26, 2005; EUT was in good working order |
| Test Environment | Temperature: 22 degrees C<br>Relative Humidity: 52 % RH<br>Barometric Pressure (inHg): 30.10 |
| Test Results: | Passed the following tests:<br>Conducted Emissions: FCC Part 15 Subpart B Class A<br>Radiated Emissions: FCC Part 15 Subpart B Class A<br>Conducted Emissions: FCC Part 15 Subpart C<br>Radiated Emissions: FCC Part 15 Subpart C |
| Modifications: | Ferrite and etch cut required, see Paragraph 2.5 |
| Test Location: | 3M Corporate Research Laboratories<br>SEMS Product Safety - EMC Laboratory<br>Building 76-1-01<br>410 East Fillmore Avenue<br>St. Paul, Minnesota 55144-1000 |

# 2.0 INTRODUCTION

## 2.1 Scope

This report contains results describing the conformance of the Equipment Under Test (EUT) to FCC Part 15, Subpart B, "Class A" rules for unintentional radiators and FCC Part 15, Subpart C rules for intentional radiators.

This report is the confidential property of the client and applies only to the specific item tested under the stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. This report shall not be reproduced without the written approval of the testing laboratory. When approval has been granted, the report shall be reproduced in its entirety.

The appropriate testing standards and references are contained in Section 3.0. The worst case test data, test configuration, and photographs (worst case configuration) are provided in Sections 4.0 and 5.0. Test equipment and EUT labeling information is contained in Sections 6.0 and 7.0.

Subsequent tests of the EUT are necessary from time to time on equipment taken at random from production. A retest is also required when the EMC profile has been changed or is suspected of being changed.

The 3M Product Safety EMC Laboratory is recognized under the United States Department of Commerce National Institute of Standards and Technology's National Voluntary Laboratory Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQ Q92-1987) as suppliers of test results. Accreditation by the National Voluntary Laboratory Accreditation Program is awarded for specific services, listed on the Scope of Accreditation for: Electromagnetic Compatibility and Telecommunications, FCC, under Lab Code 200033. A complete copy of the Scope of Accreditation is available upon request. The FCC Site Registration Number is 93334.

The NVLAP accreditation or this test report does not in any way constitute or imply product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

## 2.2 EUT Descriptions and Operation

The Equipment Under Test (EUT) is the Model PV30 Document Reader (with RFID), Serial Number PV30-00-17-00-03. The Model PV30 Document Reader (with RFID) is a full-image capture device that provides automated data capture from a variety of personal identification documents.

The reader has a transmit frequency of 13.56 MHz and a measured power output level of 0.650W (28.13dBm) as measured into a 50-ohm load. This maximum output is factory preset.

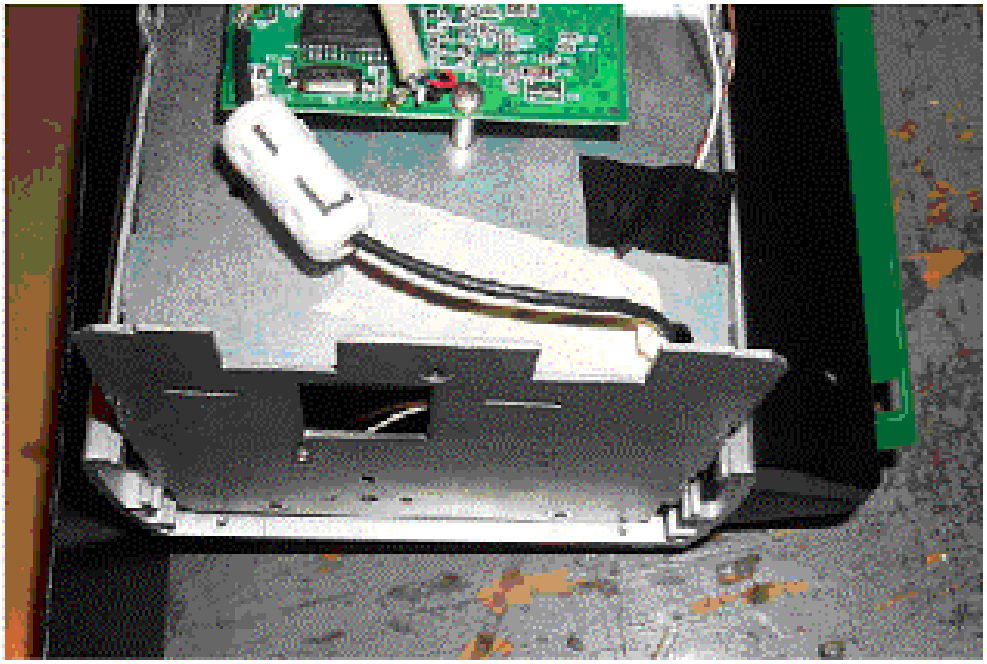
The EUT contains a figure-8 antenna that is 140mm x 145mm (one part of the “8” is 140mm x 90mm and the other is 140mm x 55mm). The antenna is mounted on the top of the unit surrounding the document access window. The antenna is cabled to the RFID reader board and the antenna connection is via coax cable and a MMCX connector.

All tests were made using an input of 120 V RMS, 60 Hz, and single-phase power. The EUT was tested with an program to exercise the Reader and imaging functions. The Reader was set to the fastest read time and was reading tags during all testing (except for the image only (digital) testing).

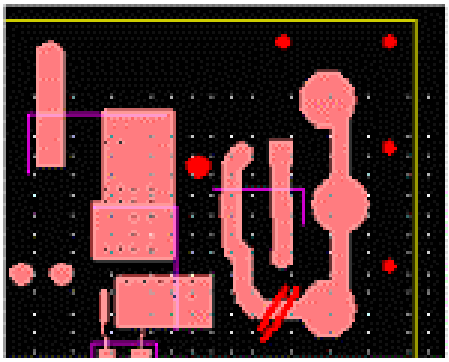
### 2.3 Block Diagram
Block diagram is on a separate exhibit.

### 2.4 Parts List
Parts list is on a separate exhibit.

### 2.5 Modifications to the EUT
A Steward 28A0392-0A0 (or equivalent) ferrite was required on the antenna cable at the Reader board for harmonic suppression (see photo). An etch cut was required at the power input to the power supply (isolated the shield from board ground).



Antenna Cable Ferrite Modification



Power Supply Etch Cut

### 2.6 Measurement Uncertainty

The data and test results referenced in this report are true and accurate. However, there may be deviations within the calibration limits of the test equipment and facilities that can account for a nominal measurement deviation of ± 2 dB. Furthermore, EUT component and manufacturing process variables may result in additional deviation. The calculated confidence level is 95 %.

## 3.0 APPLICABLE DOCUMENTS

The following documents were used as reference for the limits and test procedures specified herein.

| | | |
|---|---|---|
| CFR 47 | Part 15 Radio Frequency Devices | 2004 |
| ANSI C63.4 | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 KHz to 40 GHz. | 2003 |
| CISPR 16-1 | Specification for radio disturbance and immunity measuring apparatus and methods | |
| | -1 Measuring Apparatus | 2003 |
| | -2 Ancillary Equipment – Conducted Disturbance | 2004 |
| | -3 Ancillary Equipment – Disturbance Power | 2004 |
| | -4 Ancillary Equipment – Radiated Disturbance | 2004 |
| CISPR 16-2 | Specification for radio disturbance and immunity measuring apparatus and methods | |
| | -1 Conducted Disturbance Measurements | 2003 |
| | -2 Measurements of Disturbance Power | 2004 |
| | -3 Radiated Disturbance Measurements | 2003 |
| CISPR 16-4 | -1 Uncertainties in Standardized EMC Tests | 2005 |

## 4.0 CONDUCTED EMISSIONS

A conducted emissions test was performed in accordance with ANSI C63.4. The limits are prescribed in FCC Part 15, Subpart B and in FCC Part 15, Subpart C. Conducted emissions tests were made to determine the level of electromagnetic noise that is conducted onto the power mains from the EUT.

### 4.1 Test Procedure

A Line Impedance Stabilization Network (LISN) with 50Ω/50μH characteristic was used to isolate the EUT and give accurate and repeatable readings. An EMI test receiver was used for the emissions measurements in the range from 150kHz to 30MHz. Initial measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Initial results were measured at discrete frequencies utilizing quasi-peak detection. Measurement results were automatically calculated via software running the EMI receiver. The final quasi-peak and average measurements recorded were determined by the following:

Result (dBμV) = receiver reading (μV) + LISN (dB) + cable loss (dB)

### 4.2 Test Criteria

The FCC Class 'B' conducted limits are given below. The lower limit shall apply at the transition frequency.

| Mains Terminal Disturbance Limits | | |
|---|---|---|
| Frequency (MHz) | Quasi-Peak (dBμV) | Average (dBμV) |
| 0.15 to 0.50 | 66 to 56 decreases with log(f) | 56 to 46 decreases with log(f) |
| 0.50 to 5.0 | 56 | 46 |
| 5.0 to 30.0 | 60 | 50 |

### 4.3 Test Results

### 4.3 Test Results

The EUT met the FCC Class 'B' conducted emission requirements. The worst-case quasi-peak emission was as follows:

| 3M™ PV30 | | | | |
|---|---|---|---|---|
| Frequency (MHz) | QP Limit (dBμV) | QP L1 (dBμV) | QP L2 (dBμV) | Passing Margin (dB) |
| 0.509 | 46.00 | 40.7 | 40.5 | 5.3 |

# CONDUCTED EMISSIONS

3M EMC Lab

TEST REPORT # F0705001 SHEET 1 OF 1

EUT MODEL # PV30 EUT SERIAL # A4-01115

DESCRIPTION Document Reader (with RFID)

| FREQUENCY (MHz) | PEAK (dBµV) | | QUASI-PEAK (dBµV) | | | | AVERAGE (dBµV) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | L1 Line | L2 Neut | L1 Line | L2 Neut | Limit | Pass | L1 Line | L2 Neut. | Limit | Pass |
| | | | | | | | | | | |
| 0.150 | 54.9 | 52.6 | 48.3 | 48.4 | 66.0 | 17.6 | 17.5 | 17.6 | 56.0 | 38.4 |
| 0.509 | 48.0 | 52.8 | 41.7 | 41.6 | 56.0 | 14.3 | 40.7 | 40.5 | 46.0 | 5.3 |
| 0.688 | 53.0 | 53.0 | 37.6 | 38.2 | 56.0 | 17.8 | 19.1 | 18.9 | 46.0 | 26.9 |
| 0.868 | 51.4 | 50.5 | 40.2 | 38.8 | 56.0 | 15.8 | 27.5 | 25.2 | 46.0 | 18.5 |
| 0.988 | 52.7 | 52.5 | 46.4 | 46.6 | 56.0 | 9.4 | 38.3 | 37.6 | 46.0 | 7.7 |
| 1.107 | 51.6 | 51.2 | 42.5 | 42.4 | 56.0 | 13.5 | 34.0 | 34.0 | 46.0 | 12.0 |
| 1.406 | 52.4 | 52.9 | 42.4 | 42.2 | 56.0 | 13.6 | 33.1 | 32.3 | 46.0 | 12,9 |
| 1.765 | 52.7 | 52.4 | 47.9 | 48.0 | 56.0 | 8.0 | 40.4 | 40.1 | 46.0 | 5.6 |
| 2.543 | 52.7 | 52.9 | 50.2 | 50.1 | 56.0 | 5.8 | 38.8 | 38.5 | 46.0 | 7.2 |
| | | | | | | | | | | |
| | | | | | | | | | | |
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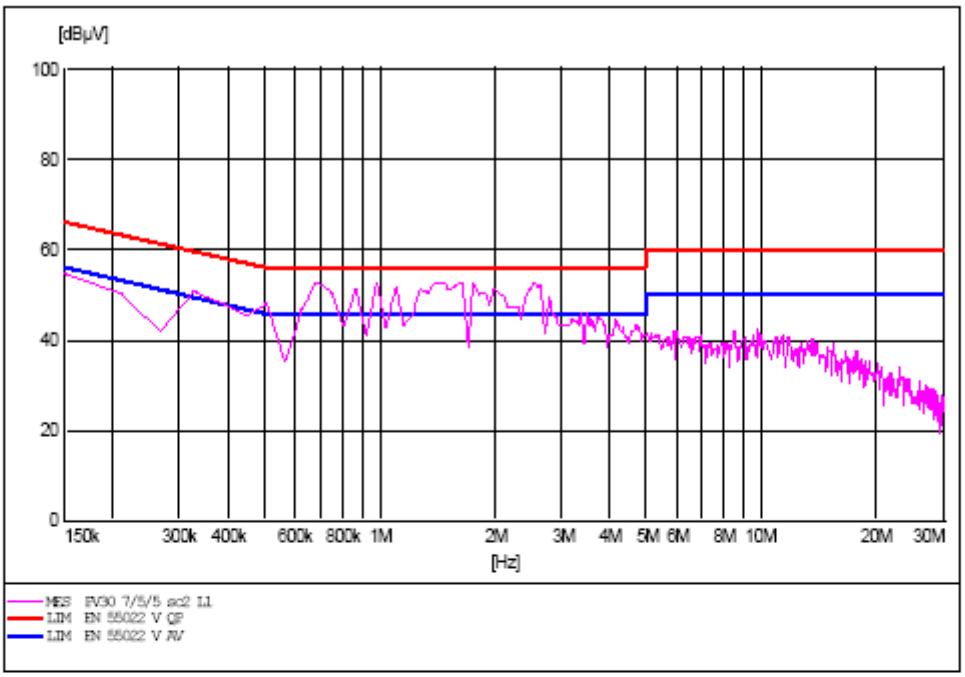
| | | | | | | | | | | |

Test Engineer: R. Heller Date: 7-5-05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60
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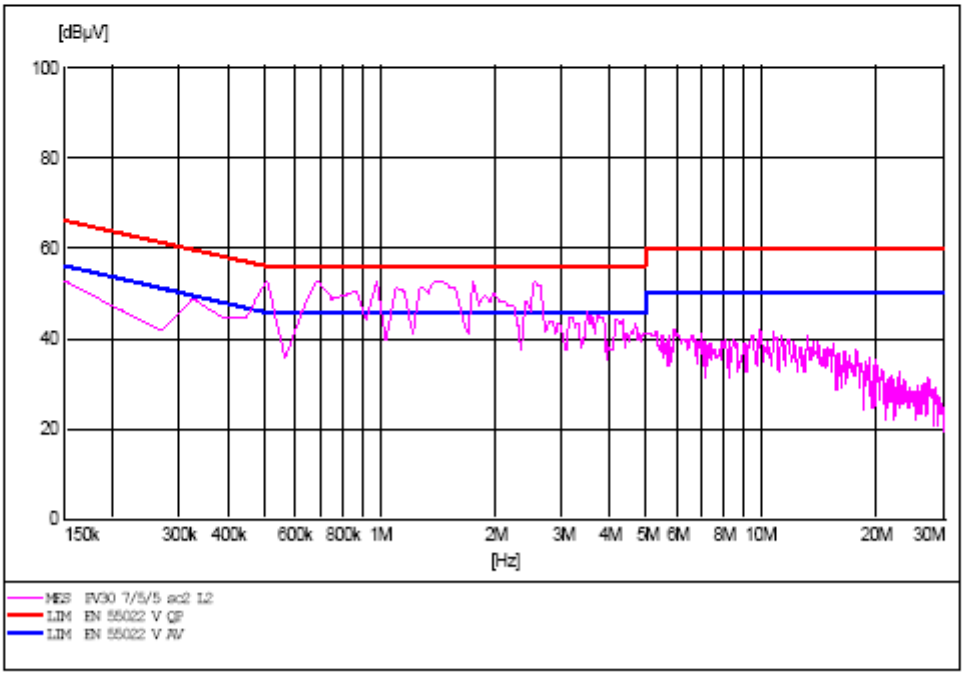
150k
300k
400k
600k
800k
1M
2M
3M
4M
5M
6M
8M
10M
20M
30M
[Hz]
MES PV30 7/5/5 ac2 L1
LIM EN 55022 V QP
LIM EN 55022 V AV


[dBµV]
100
80
60
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20
0
150k
300k
400k
600k
800k
1M
2M
3M
4M
5M
6M
8M
10M
20M
30M
[Hz]
MES PV30 7/5/5 ac2 L2
LIM EN 55022 V QP
LIM EN 55022 V AV

PV30 Conducted Emissions

# 5.0 RADIATED EMISSIONS

Radiated emission testing is performed in accordance with ANSI C63.4. The limits are prescribed in FCC Part 15, Subpart B and in FCC Part 15, Subpart C. Radiated emissions measurements were made to determine the level of electromagnetic energy radiating from the EUT.

## 5.1 Frequency Stability

The frequency stability test was performed in accordance with ANSI C63.4 and FCC Part 15 to insure that the intentional radiator frequency stability was within the allowable limits for input power and temperature variations.

### 5.1.1 Test Procedure

The frequency stability was measured using the radiated signals from the EUT so that the measurement equipment would not load the radio frequency circuits. An EMI receiver was used for the frequency stability measurements. The Reader was put into a continuous output mode through instructions from the host computer (test mode of operation). 1) The frequency was measured while the input AC power to the external power supply was varied over the required input voltage range. 2) The frequency was also measured while the ambient air temperature was varied over the required ambient temperature range (at startup, 2 minutes, 5 minutes, and 10 minutes).

### 5.1.2 Test Criteria

The FCC Part 15, Subpart C for Frequency Stability Limits versus Supply Voltage are given as:

| Carrier Frequency (MHz) | Voltage Range % of Nominal Supply (85 % to 115 %) | Max.Frequency Change (%) |
|---|---|---|
| 13.56 | 102 to 138 V RMS | +/- 0.01 % |

The FCC Part 15, Subpart C for Frequency Stability Limits versus Temperature is given as:

| Carrier Frequency (MHz) | Temperature Range (degrees C) | Max.Frequency Change (%) |
|---|---|---|
| 13.56 | -20 to +50 | +/- 0.01 % |

**5.1.3 Test Results**

The EUT met all FCC Part 15, Subpart C Frequency Stability requirements.

| Carrier Frequency Stability versus Supply Voltage | | | |
|---|---|---|---|
| Voltage (60Hz) | 115 VAC | 97.75 VAC | 132.25 VAC |
| Frequency (MHz) | 13.560379 | 13.560373 | 13.560373 |

| Carrier Frequency Stability versus Temperature | | | |
|---|---|---|---|
| Temperature Interval | At Temperature Stabilization | +10 Minutes | +30 Minutes |
| -20C | 13.560465 | 13.560473 | 13.560476 |
| -10C | 13.560476 | 13.560472 | n/a |
| 0C | 13.560467 | 13.560457 | n/a |
| +10C | 13.560447 | 13.560433 | n/a |
| +20C | 13.560408 | 13.560420 | n/a |
| +30C | 13.560408 | 13.560434 | n/a |
| +40C | 13.560372 | 13.560377 | n/a |
| +55C | 13.560366 | 13.560366 | 13.560374 |

| Carrier Frequency Stability MIN/MAX | | |
|---|---|---|
| | Measured Value | Limit |
| Lowest Frequency (MHz) | 13.560366 | 13.553000 |
| Highest Frequency (MHz) | 13.560476 | 13.567000 |

Test Engineer: Bob Heller
Date: 07-28-2005

### 5.2 Emission Bandwidth

The EUT was placed in a semi-anechoic chamber and a emission bandwidth test was performed in accordance with ANSI C63.4 and FCC Part 15, Paragraph 15.225. The emission bandwidth measurements were made to determine the intentional radiator frequency and determine the level of electromagnetic energy radiated at that frequency and at the band edges from the EUT.

### 5.2.1 Test Procedure

A measurement antenna (loop) was positioned at a distance of 5 meters (to insure far field measurements) from the center of the EUT. An EMI receiver was used for the emissions measurements. Initial sweep measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. The intentional radiator frequency and band edge frequencies utilizing quasi-peak detection were then maximized. Maximizing a frequency involves finding the angle of the highest emission levels by rotating the EUT 360 degrees (sampling at least every 4 degrees). Then the antenna, which was fixed at 1-meter height, was rotated until the highest emissions levels found. Measurement results were automatically calculated via software running the EMI receiver. The final quasi-peak measurements recorded were determined by the following formula:

Result (dBμV/m) = receiver level (μV) + antenna factor (dB/m) + cable loss (dB) - preamp gain (dB) + lineal conversion (dB).

### 5.2.2 Test Criteria

The FCC Part 15 Subpart C, Section 15.225 Carrier Frequency Limits are given as:

| | |
|---|---|
| Lower Band Edge: | 13.5586 MHz |
| Upper Band Edge: | 13.5615 MHz |

The FCC Part 15, Subpart C radiated limits are given as:

| Frequency (MHz) | Test Distance (Meters) | Field Strength (dBμV/m) |
|---|---|---|
| 1.705 to 13.110 | 10 | 48.62 |
| 13.110 to 13.410 | 10 | 59.58 |
| 13.410 to 13.553 | 10 | 69.55 |
| 13.553 to 13.567 | 10 | 103.00 |
| 13.567 to 13.710 | 10 | 69.55 |
| 13.710 to 14.010 | 10 | 59.58 |
| 14.010 to 30.000 | 10 | 48.62 |

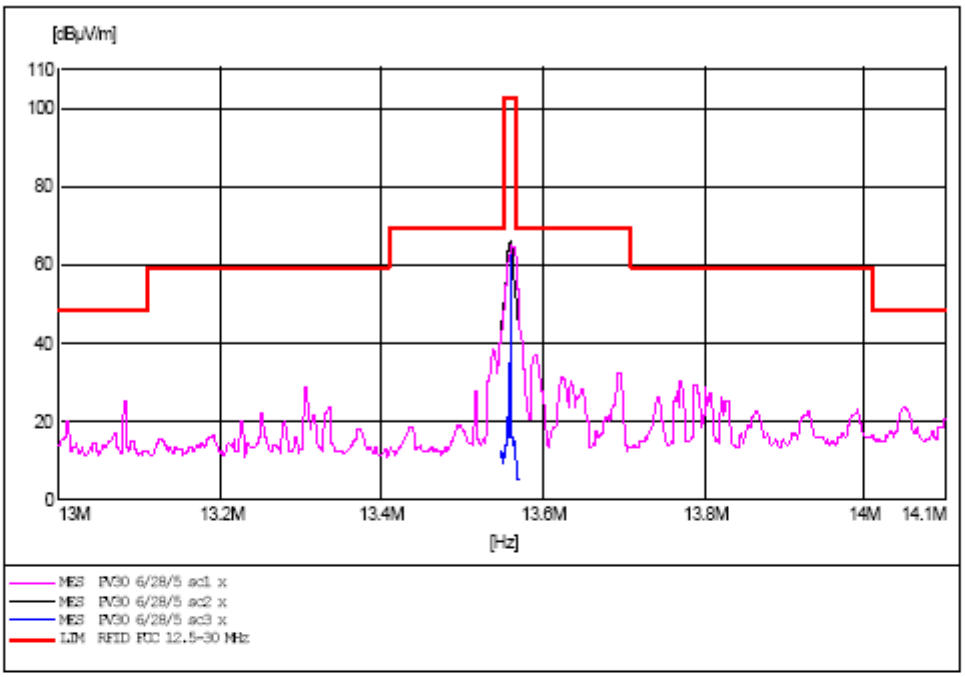
Note: A 40 dB/decade extrapolation factor was used per 15.31.

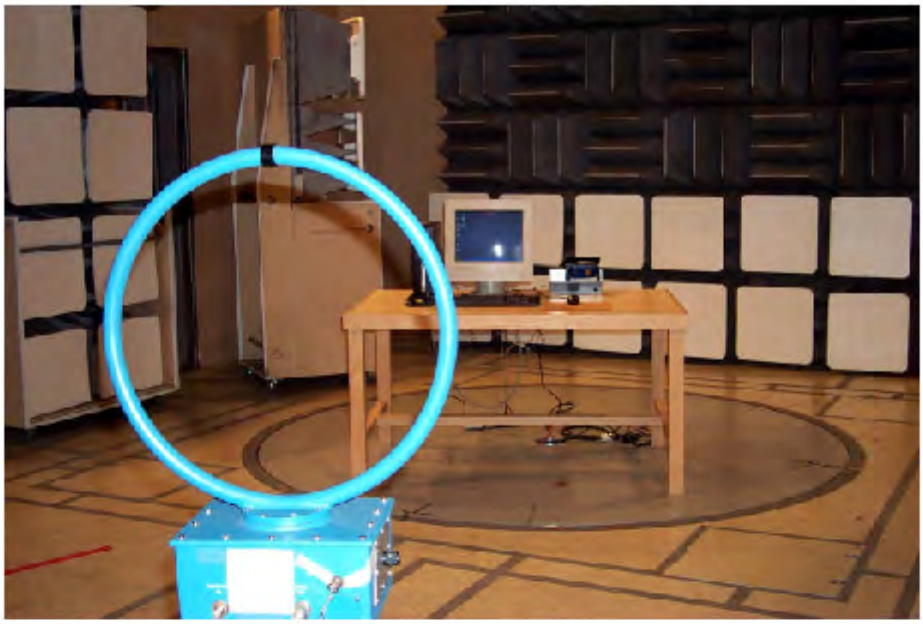
### 5.2.3 Test Results

The EUT met the FCC Part 15, Subpart C Emission Bandwidth requirements. The intentional radiator frequency was within the allowed band and all maximized quasi-peak measurements for the EUT were below the quasi-peak limits.

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Passing Margin (dB) | Turntable (degrees) | Antenna Orientation/Angle (Polarity/degrees) |
|---|---|---|---|---|---|
| 13.5602[1] | 66.5 | 103.00 | 36.5 | 160 | Zero degrees from the X-axis. |
| 13.5530[2] | -1.5 | 69.55 | 71.05 | 160 | Zero degrees from the X-axis. |
| 13.5670[2] | -1.0 | 69.55 | 70.55 | 160 | Zero degrees from the X-axis. |
| 13.1100[3] | - | 59.58 | - | 160 | Zero degrees from the X-axis. |
| 14.0100[3] | - | 59.58 | - | 160 | Zero degrees from the X-axis. |

1 - Intentional Radiator Frequency
2 - Band edges measured with a receiver bandwidth setting of 1 KHz. Per ANSI C63.4 Paragraph 13.1.7.
3 – No perceptible noise


[dBµV/m]
110
100
80
60
40
20
0
13M
13.2M
13.4M
13.6M
13.8M
14M
14.1M
[Hz]
MES PV30 6/28/5 ac1 x
MES PV30 6/28/5 ac2 x
MES PV30 6/28/5 ac3 x
LIM RFID FCC 12.5-30 MHz



PV30 Carrier

### 5.3 Spurious Emissions (12.5 to 30 MHz.)

The EUT was placed in a semi-anechoic chamber and a spurious emissions test was performed in accordance with ANSI C63.4 and FCC Part 15, Subpart C. The spurious emission measurements were made to determine the level of spurious electromagnetic energy radiated from the EUT.

### 5.3.1 Test Procedure

A measurement antenna (loop) was positioned at a distance of 5 meters (to insure far field measurements) from the center of the EUT. An EMI receiver was used for the emissions measurements. Initial sweep measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Acceptance analysis of these sweeps was used to determine which discrete frequencies, other than the intentional radiator frequency and band edge frequencies, were to be maximized. Maximizing a frequency involves finding the angle of the highest emission levels by rotating the EUT 360 degrees (sampling at least every 4 degrees). Then the antenna, which was fixed at 1-meter height, was rotated until the highest emissions levels found. Final measurements were taken utilizing quasi-peak detection. Measurement results were automatically calculated via software running the EMI receiver. The final measurements recorded were determined by the following formula:

Result (dBμV/m) = receiver level (μV) + antenna factor (dB/m) + cable loss (dB) - preamp gain (dB) + lineal conversion (dB).

### 5.3.2 Test Criteria

The FCC Part 15, Subpart C radiated limits are given below.

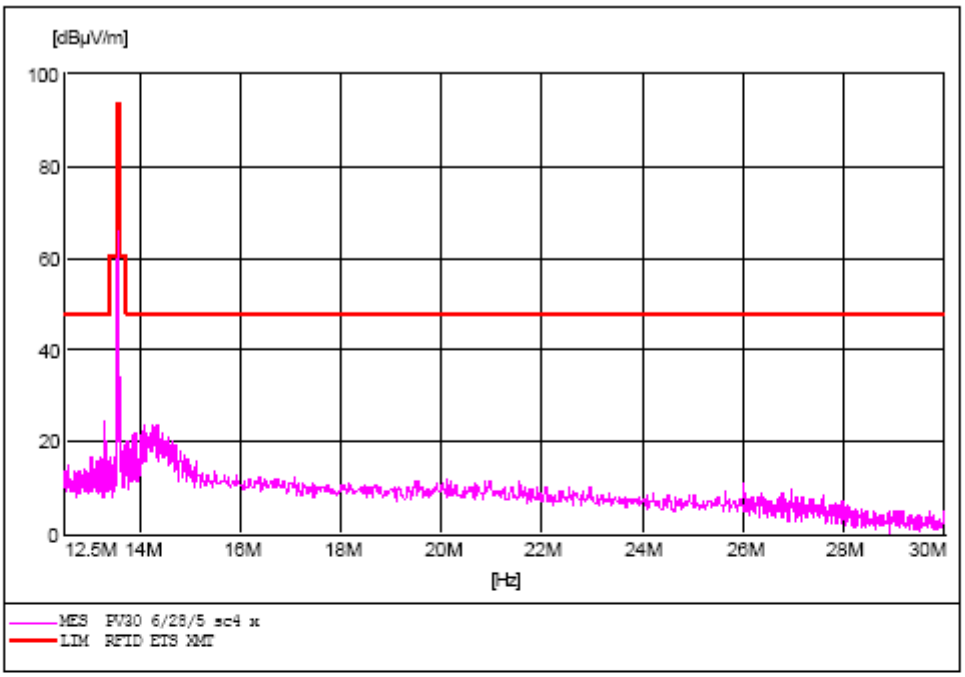
| Frequency (MHz) | Test Distance (Meters) | Field Strength (dBμV/m) |
|---|---|---|
| 1.705 to 13.110 | 10 | 48.62 |
| 13.110 to 13.410 | 10 | 59.58 |
| 13.410 to 13.553 | 10 | 69.55 |
| 13.553 to 13.567 | 10 | 103.00 |
| 13.567 to 13.710 | 10 | 69.55 |
| 13.710 to 14.010 | 10 | 59.58 |
| 14.010 to 30.000 | 10 | 48.62 |

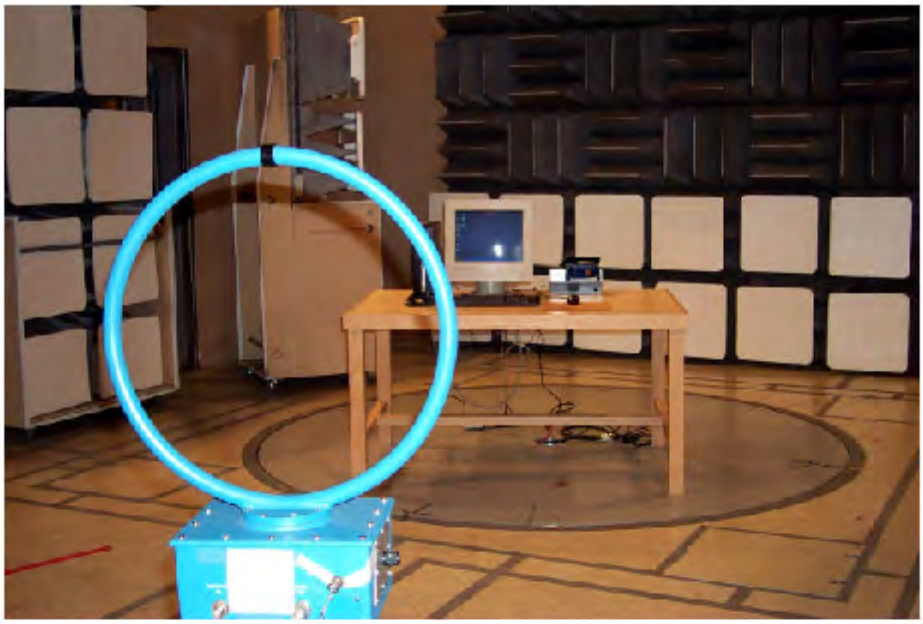
Note: A 40 dB/decade extrapolation factor was used per 15.31.

### 5.3.3 Test Results

The EUT met the FCC Part 15, Subpart C Spurious Emissions (12.5 to 30 MHz.) requirements. All maximized quasi-peak measurements for the EUT were below the quasi-peak limits. The worst-case quasi-peak emission was as follows:

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Passing Margin (dB) | Turntable (degrees) | Antenna Orientation/Angle (Polarity/degrees) |
|---|---|---|---|---|---|
| 13.410 | 29.0 | 69.55 | 40.55 | 160 | Zero degrees from the X-axis. |
| 13.980 | 24.5 | 59.58 | 35.08 | 160 | Zero degrees from the X-axis. |


[dBµV/m]
100
80
60
40
20
0
12.5M 14M 16M 18M 20M 22M 24M 26M 28M 30M
[Hz]
MES PV30 6/28/5 sc4 x
LIM RFID EIS XMT



PV30 Carrier

### 5.4 Radiated Emissions (30 to 40000 MHz)

The EUT was placed in an anechoic chamber and the Spurious Emissions testing was preformed in accordance with ANSI C63.4, FCC Part 15, Subpart B "Class A", and FCC Part 15, Subpart C. The Radiated Emission measurements were made to determine the level of electromagnetic energy radiated from the EUT.

#### 5.4.1 Test Procedure

A measurement antenna was positioned at a distance of 3 meters from the center of the EUT. An EMI receiver was used for the emissions measurements in the range of 30 MHz to 5000 MHz (the upper limit of measurement is determined by Paragraph 15.33). Initial sweep measurements were taken with the receiver in continuous frequency overview mode utilizing peak level signal detection. Acceptance analysis of these sweeps was made to determine which discrete frequencies were to be maximized. Maximizing a frequency involves finding the angle of the highest emission levels by rotating the EUT 360 degrees (sampling at least every 4 degrees) and varying antenna height between 1 and 4 meters at the angle of highest emissions levels found. Final measurements were taken utilizing quasi-peak detection (peak and average detectors were used above 1000 MHz). Measurement results were automatically calculated via software running the EMI receiver. The final measurements recorded were determined by the following formula:

Result (dBμV/m) = receiver level (μV) + antenna factor (dB/m) + cable loss (dB) - preamp gain (dB) + lineal conversion (dB).

#### 5.4.2 Test Criteria

The FCC Part 15, Subpart C radiated limits are given below.

| Frequency (MHz) | Distance (m) | Field Strength (dB μV/m) |
|---|---|---|
| 30 to 88 | 10 | 29.5 |
| 88 to 216 | 10 | 33.5 |
| 216 to 960 | 10 | 35.5 |
| 960 to 40000 | 3 | 53.5 and 73.5 |

The FCC Part 15, Subpart B, "Class A" radiated limits are given below. The lower limit shall apply at the transition frequency.

| Frequency (MHz) | Distance (m) | Field Strength (dB µV/m) |
|---|---|---|
| 30 to 88 | 10 | 39.5 |
| 88 to 216 | 10 | 43.5 |
| 216 to 960 | 10 | 46.5 |
| 960 to 1000 | 10 | 49.5 |
| 1000 to 40000 | 3 | 59.5 and 79.5* |

* Per 15.35(B)

### 5.4.3 Test Results

The EUT met the FCC Part 15, Subpart C and the FCC Part 15, Subpart B, "Class A" Radiated Emissions (30 to 40000MHz.) requirements. All maximized quasi-peak measurements for the EUT were below the quasi-peak limits. Emission scans are shown using the peak detector. The worst-case quasi-peak emission was as follows:

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Passing Margin (dB) | Turntable (degrees) | Antenna (Meters/Polarity) |
|---|---|---|---|---|---|
| 480.190 | 35.5 | 33.5 | 2.0 | 175 | 1.0/H |

# RADIATED EMISSIONS

3M EMC Lab

TEST REPORT # F0705001 SHEET 1 OF 1

EUT MODEL # PV30 EUT SERIAL # A4-01115

DESCRIPTION Document Reader (with RFID)

| FREQ. (MHz) | MAXIMIZED QP SIGNAL H/V | MAXIMIZED QP SIGNAL (dBµV/m) | LIMIT LINE (dBµV/m) | PASSING MARGIN (dB) | MAXIMIZED POSITION TURNTABLE (degrees) | MAXIMIZED POSITION ANTENNA (meters) | REMARKS |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 68.858 | V | 25.0 | 29.5 | 4.5 | 225 | 1.0 | |
| 134.970 | H | 23.0 | 33.5 | 10.5 | 125 | 1.0 | |
| 138.858 | V | 24.1 | 33.5 | 9.4 | 140 | 1.0 | |
| 181.623 | H | 24.8 | 33.5 | 8.7 | 0 | 1.0 | |
| 480.190 | V | 32.3 | 35.5 | 3.2 | 240 | 1.0 | |
| 480.190 | H | 33.5 | 35.5 | 2.0 | 175 | 1.0 | |
| 1193.00 | H | 41.8 | 53.5 | 11.7 | 0 | 1.0 | |
| 1593.00 | H | 40.1 | 53.5 | 13.4 | 0 | 1.0 | |
| 1994.00 | H | 48.3 | 53.5 | 5.3 | 0 | 1.0 | |
| 3012.00 | H | 43.1 | 53.5 | 10.4 | 0 | 1.0 | |
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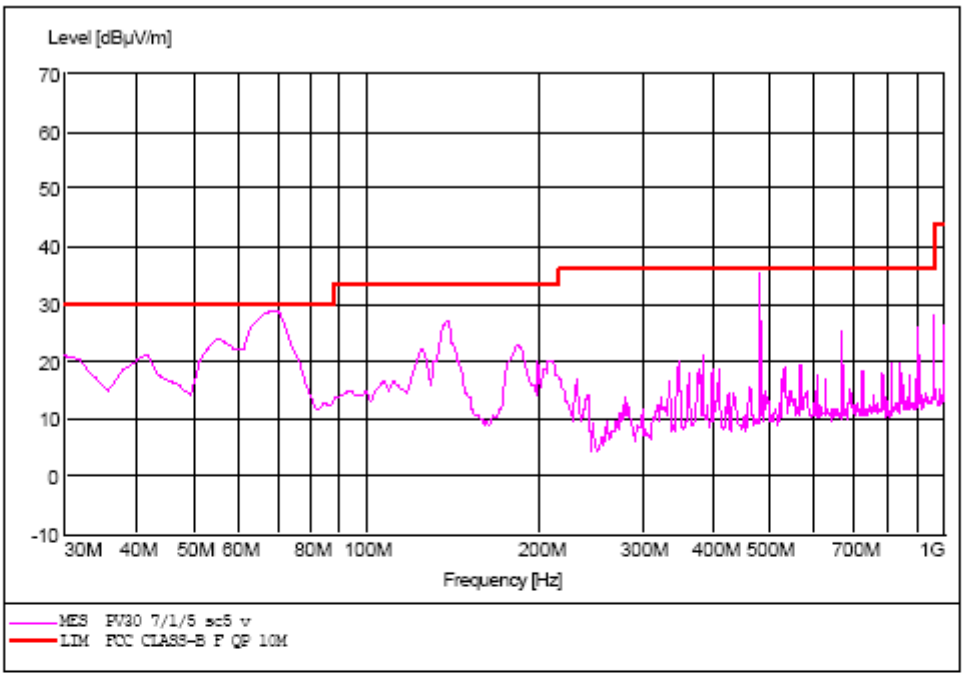
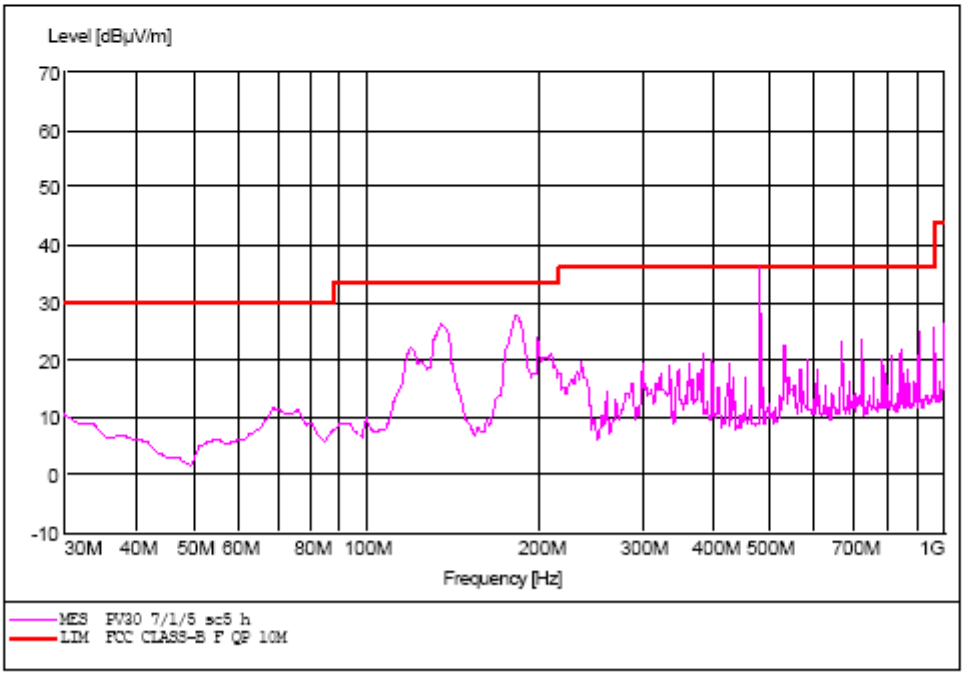
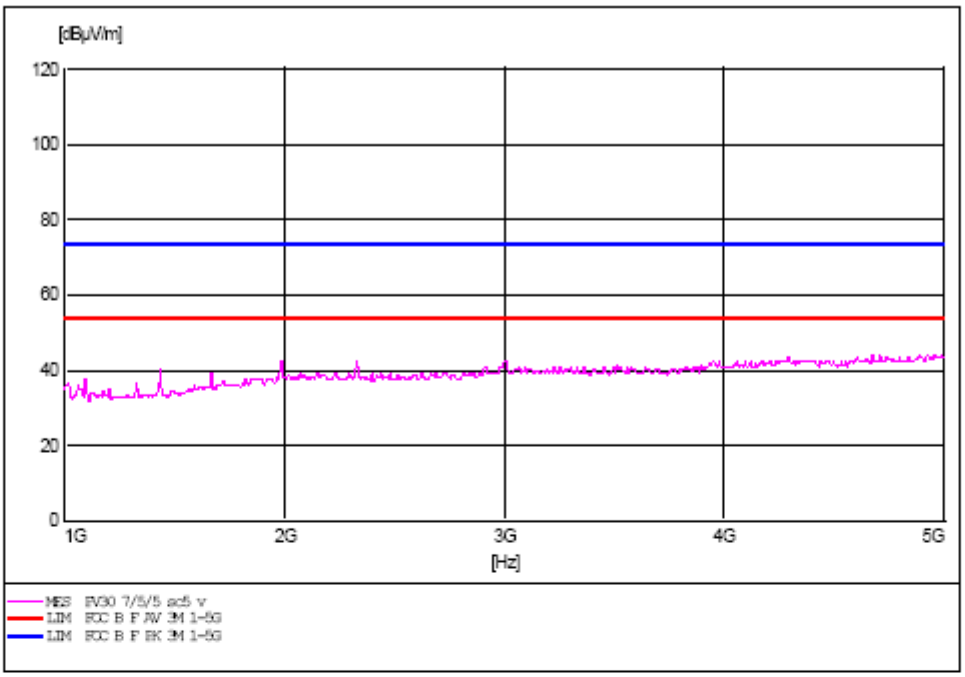
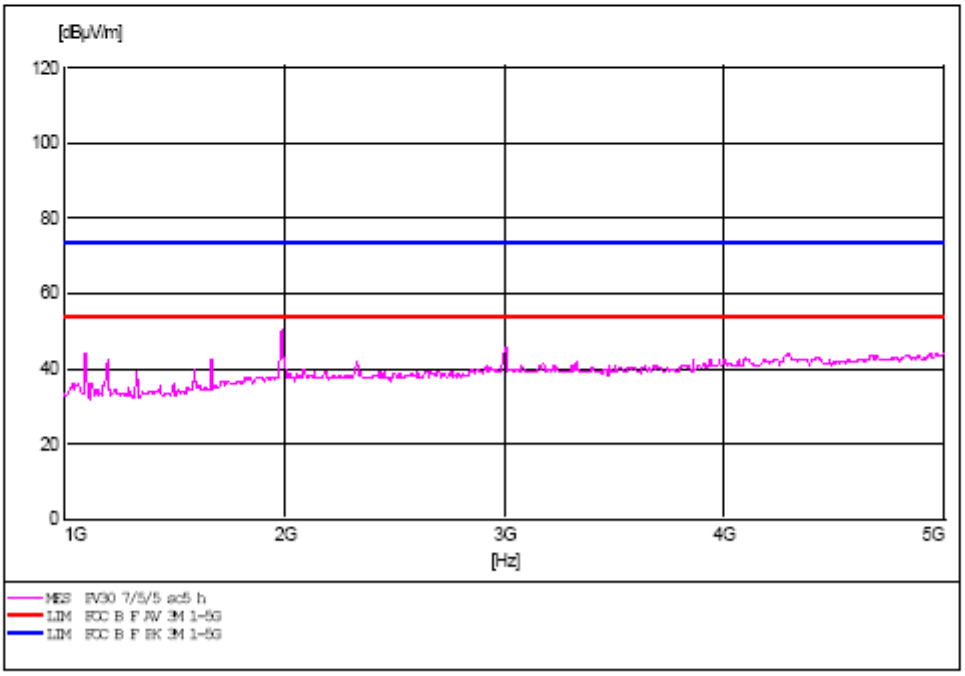
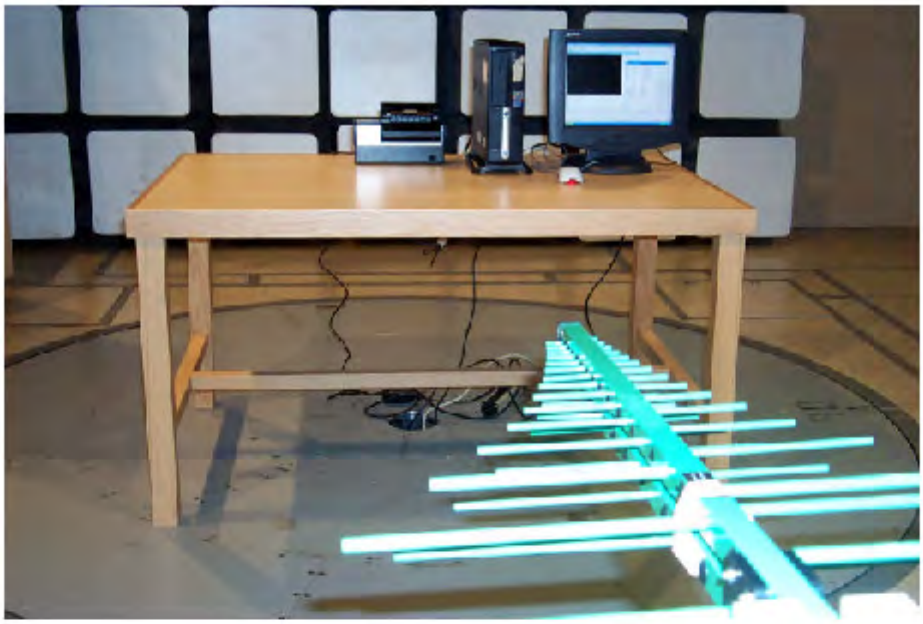
Test Engineer: R. Heller Date: 7-1-05


Level [dBµV/m]
70
60
50
40
30
20
10
0
-10
30M 40M 50M 60M 80M 100M 200M 300M 400M 500M 700M 1G
Frequency [Hz]
MES PV30 7/1/5 sc5 v
LIM FCC CLASS-B F QP 10M


Level [dBµV/m]
70
60
50
40
30
20
10
0
-10
30M 40M 50M 60M 80M 100M 200M 300M 400M 500M 700M 1G
Frequency [Hz]
MES PV30 7/1/5 sc5 h
LIM FCC CLASS-B F QP 10M


[dBµV/m]
120
100
80
60
40
20
0
1G
2G
3G
4G
5G
[Hz]
MES PV30 7/5/5 ac5 v
LIM FCC B F AV 3M 1-5G
LIM FCC B F BK 3M 1-5G


[dBµV/m]
120
100
80
60
40
20
0
1G
2G
3G
4G
5G
[Hz]
MES PV30 7/5/5 ac5 h
LIM FCC B F AV 3M 1-5G
LIM FCC B F BK 3M 1-5G



PV30 Radiated Emissions (30 MHz – 1000 MHz)

PV30 Radiated Emissions (1000 MHz – 5000 MHz)

## 6.0 LIST OF TEST EQUIPMENT

The following test equipment was used to perform the indicated tests. All of the test equipment was calibrated by an accredited calibration laboratory or by the manufacturer. All calibration intervals are one year. All equipment calibrations, test procedures, and the test facility are traceable to the standards of the National Institute of Standards and Technology (NIST). The test facility site attenuation verification results fall within the normalized site attenuation (NSA) criteria for open area test sites using volumetric measurements.

**FREQUENCY STABILITY**
Agilent Frequency Counter, Model 53131A, s/n MY40012264 (cal due date: 15 Sep 05)
Pacific Power Source, Model 140-TMX, s/n 838761 (cal not required)
EMCO Loop Probe, Model 7405-901, s/n none, (cal not required)
Environtronics Chamber, Model FLX900-2-6-wc-h, s/n 08046208 (cal date 4 Apr 06)

**CONDUCTED EMISSIONS**
EMCO LISN, Model 3825-2, Serial No. 1039 (cal due date: 27 Sep 05)
Solar High Pass Filter, Model 8131 - 5.0 (cal due date: 28 Sep 05)
Rohde & Schwarz EMI Receiver, Model ESBI40, S/N 100235 (cal due date: 18 Nov 05)
Rohde & Schwarz ESBI40 Firmware Version 4.32.3

**RADIATED EMISSIONS**
ElectroMetrics Loop Antenna. Model ALR25M, Serial No. 603 (cal due date: 08 Sep 04)
Schaffner Bicon Antenna, Model CBL6112B, Serial No. 27491 (cal due date: 28 Sep 05)
AH Systems Horn Ant., Model SAS-200/571, Serial No. 234, (cal due date: 27 Sep 05)
HP Pre-Amplifier, Model 83017A, Serial No. 3123A00259 (cal due date: 29 Sep 05)
HP Pre-Amplifier, Model 8447D, Serial No. 1937A03090 (cal due date: 29 Sep 05)
Rohde & Schwarz EMI Receiver, Model ESBI40, S/N 100235 (cal due date: 18 Nov 05)
Rohde & Schwarz ESBI40 Firmware Version 4.32.3

**TEST FACILITY**
Lindgren Semi-Anechoic Chamber, (verification due date: 28 Sep 05)

The radiated and conducted emission measurements were performed in our Anechoic Chamber located at 3M Building 76, 410 Fillmore Street, St. Paul, MN. Details concerning the site are on file with the FCC laboratory Division in Columbia Maryland.
The FCC Facility Registration Number is 93334, 31-March – 2003.

## 7.0 LABELING INFORMATION

The FCC (Federal Communications Commission) requires the following labeling information. Since the equipment has intentional and unintentional radiators, it must be labeled as a digital device and as an intentional radiator.

**Labels on the Product**

The following statement shall be placed in a conspicuous location on the device:

> **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.**
>
> **FCC ID: DGFSSDPV30**

**Labels in the Manuals**

The following statements shall be placed in a prominent location in the text of the user manual:

> **NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide a 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.**
>
> **FCC ID: DGFSSDPV30**
>
> **NO MODIFICATIONS. Modifications to this device shall not be made without the written consent of 3M Company. Unauthorized modifications may void the authority granted under Federal Communications Commission Rules permitting the operation of this device.**

Last page of the report.