1250 Peterson Dr., Wheeling, IL 60090

Company: Zebra Technologies Corporation
Model Tested: 402931
Report Number: 12921

FCC Rules and Regulations / Intentional Radiators

Operational in the Band 13.553-13.567 MHz

Part 15, Subpart C, Section 15.225

THE FOLLOWING "**MEETS**" THE ABOVE TEST SPECIFICATION

| | |
|---|---|
| Formal Name: | RFID 402931 |
| Kind of Equipment: | RFID Encoder |
| Test Configuration: | Limited Modular Approval - Tested in P330i & P430i (Tested at 120 vac, 60 Hz) |
| Model Number(s): | 402931 |
| Model(s) Tested: | 402931 |
| Serial Number(s): | NA |
| Date of Tests: | January 18, 19 & 22 & September 24, 2007 |
| Test Conducted For: | Zebra Technologies Corporation<br>333 Corporate Woods Parkway<br>Vernon Hills, Illinois 60061 |

**NOTICE**: "This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report.

1250 Peterson Dr., Wheeling, IL 60090

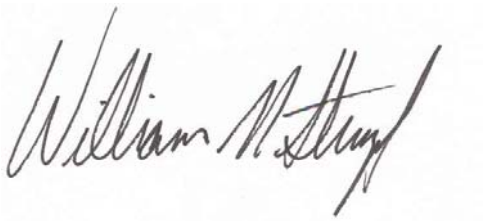
Company: Zebra Technologies Corporation
Model Tested: 402931
Report Number: 12921

SIGNATURE PAGE

Report By:

Arnom C. Rowe
Test Engineer
EMC-001375-NE

Reviewed By:



William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

Company Official:

Zebra Technologies Corporation

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United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

# Certificate of Accreditation to ISO/IEC 17025:1999

NVLAP LAB CODE: 100276-0

**D.L.S. Electronic Systems, Inc.**
Wheeling, IL

*is recognized by the National Voluntary Laboratory Accreditation Program for conformance with criteria set forth in NIST Handbook 150:2001 and all requirements of ISO/IEC 17025:1999.*
*Accreditation is granted for specific services, listed on the Scope of Accreditation, for:*

## ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

2006-10-01 through 2007-09-30
*Effective dates*

*For the National Institute of Standards and Technology*

NVLAP-01C (REV. 2005-05-19)

## 1.0 SUMMARY OF TEST REPORT

It was found that the RFID 402931, Model Number(s) 402931, **''meets''** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.225 for operational in the 13.553-13.567 MHz Band.

## 2.0 INTRODUCTION

On January 18, 19 & 22 & September 24, 2007, a series of radio frequency interference measurements was performed on RFID 402931, Model Number(s) 402931, Serial Number: NA. The tests were performed according to the procedures of the FCC as stated in the "Methods of Measurement of Radio-Noise Emissions for Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" found in the American National Standards Institute, ANSI C63.4-2003. Tests were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at http://www.dlsemc.com/certificate. Our facilities are registered with the FCC, Industry Canada, and VCCI.

## 3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency interference emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Sections 15.209 & 15.225 for Intentional Radiators operating in the Band 13.553-13.567 MHz.

## 4.0 TEST SET-UP

All emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the American National Standards Institute, ANSI C63.4-2003, Section 8, (Figures 11a and 11b).

All emissions tests were performed with the test item placed on a 80 cm high rotating non-conductive table, located in the test room. Equipment normally operated on the floor was placed on a metal covered turntable which is flush with the surrounding conducting ground plane. The ground plane has an electrical isolation layer over its surface approximately 7 mm thick. The EUT is separated from the turntable ground plane by a non-conductive layer. The equipment under test was set up according to ANSI C63.4-2003, Sections 6, 7 and 8.

## 5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the HP Spectrum Analyzer or ESI 26/40 Fixed Tuned Receiver. The data was taken using Peak, Quasi-Peak or the Average Detector Functions as required. This information was then used to determine the frequencies of maximum emissions. Above 1000 MHz, final data was taken using the Average Detector.

Below 1000 MHz, final data was taken using the HP Spectrum Analyzer and/or ESI 26/40 Fixed Tuned Receiver. These plots were made using the Peak or Quasi-Peak Detector functions, with manual measurements performed on the questionable frequencies using the Quasi-Peak or the Average Detector Function of the Analyzer or ESI 26/40 Fixed Tuned Receiver as required. Above 1000 MHz, final data was taken using the Average Detector on the Spectrum Analyzer.

The bandwidths shown below are specified by ANSI C63.4-2003, Section 4.2.

| Frequency Range | Bandwidth (-6 dB) |
|---|---|
| 10 to 150 kHz | 200 Hz |
| 150 kHz to 30 MHz | 9 kHz |
| 30 MHz to 1 GHz | 120 kHz |
| Above 1 GHz | 1 MHz |

A list of the equipment used can be found in Table 1. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.

## 6.0 AMBIENT MEASUREMENTS

For emissions measurements, broadband antennas and an EMI Test Receiver with a panoramic spectrum display are used. First the frequency range is scanned and displayed on the test receiver display. Next the scanned frequency range is divided into smaller ranges, and then it is manually tuned through to determine the emissions from the EUT. A headset or loudspeaker is connected to the test receiver's AM/FM demodulated output as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT. If there is any doubt as to the source of the emission, it is further investigated by rotating the EUT, or by disconnecting the power from the EUT.

The EUT is set up in its typical configuration and operated in its various modes. For tabletop systems, cables are manipulated within the range of likely configurations. For floor-standing equipment, the cables are located in the same manner as the user would install them and no further manipulation is made. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation, the frequency spectrum is monitored. Variations in antenna height, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) are explored to produce the emissions that have the highest amplitude relative to the limit. These methods are performed to the specifications in MP-5 or ANSI C63.4-2003, as appropriate.

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7.0 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 8.0)

7.1 Description:

The RFID 402931 is a radio module used in Zebra printers whose purpose is to detect when a wax ribbon cartridge is present. This is done by interrogating a passive tag on the ribbon cartridge.

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 12 cm x Width: 6 cm

7.3 LINE FILTER USED:

NA

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

NA

Clock Frequencies:

13.56 MHz and 10 MHz

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. RFID PCB Assembly PN: 402932
2. Host Printer PN: P330i
3. Host Printer PN: P430i

8.0 ADDITIONAL DESCRIPTION OF TEST SAMPLE:
(See also Paragraph 7.0)

1: There were no additional descriptions noted at the time of test.

NOTE:

The RFID 402931 transmits and receives at the same time. The receiver cannot receive without transmitting.

13.56 MHz transceiver tested installed in the Printers without running the 900 MHz (co-located) transceiver.

Verification of 13.56 MHz and the 900 MHz transceivers transmitting simultaneously.

I certify that the above, as described in paragraph 7.0, describes the equipment tested and will be manufactured as stated.

By: _____ _____
Signature Title

For: _____ _____
Company Date

**1250 Peterson Dr., Wheeling, IL 60090**

## 9.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 RFID 402931
Model Number: 402931; Serial Number: NA

Item 1 Non-shielded AC Power Line Cord. 1.5m

Item 2 Non-shielded Ethernet Cable with Plastic Shells to Remote PC. 10m

Item 3 Shielded USB Cable with Metal Shells. 1.5m

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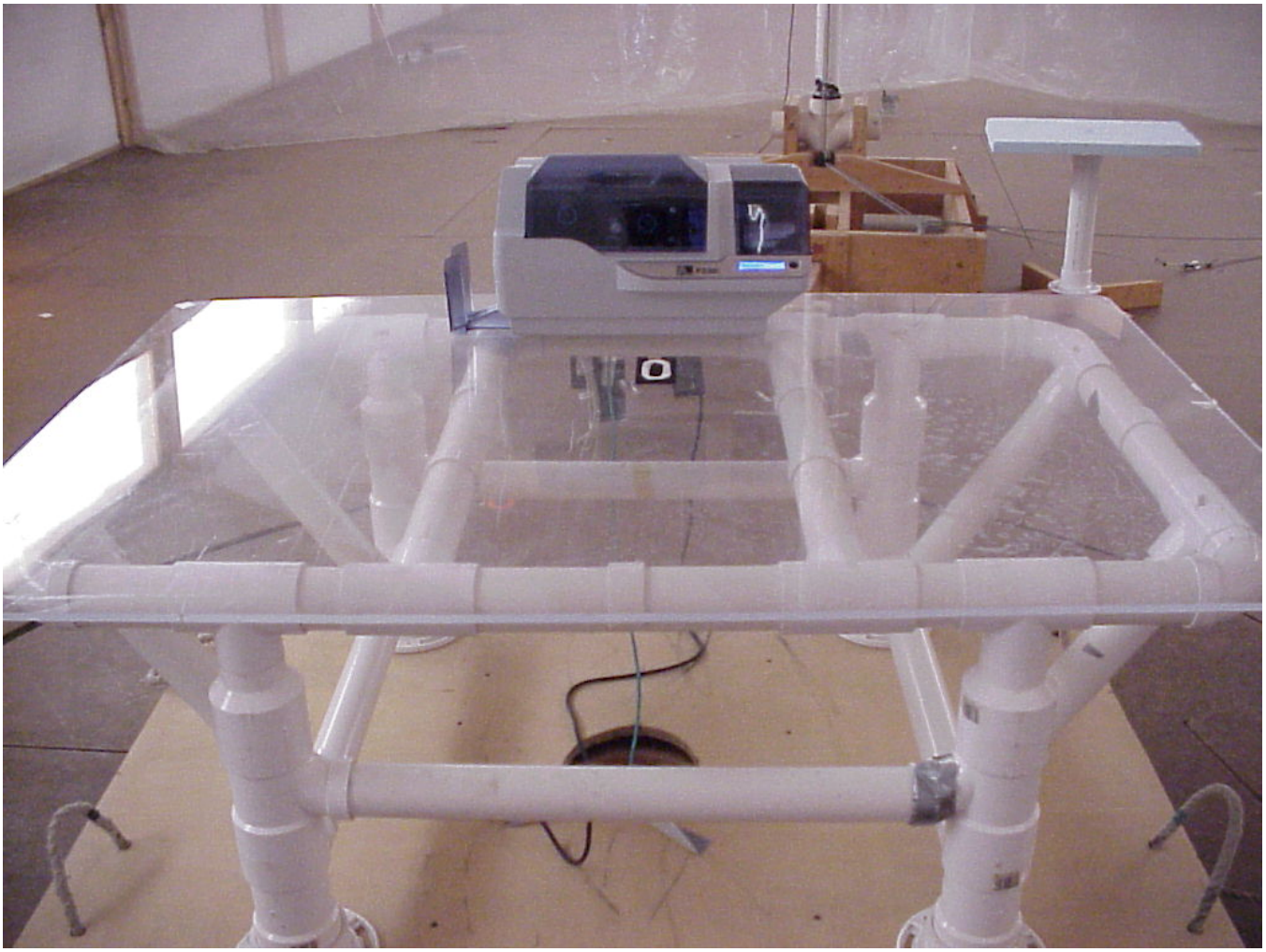
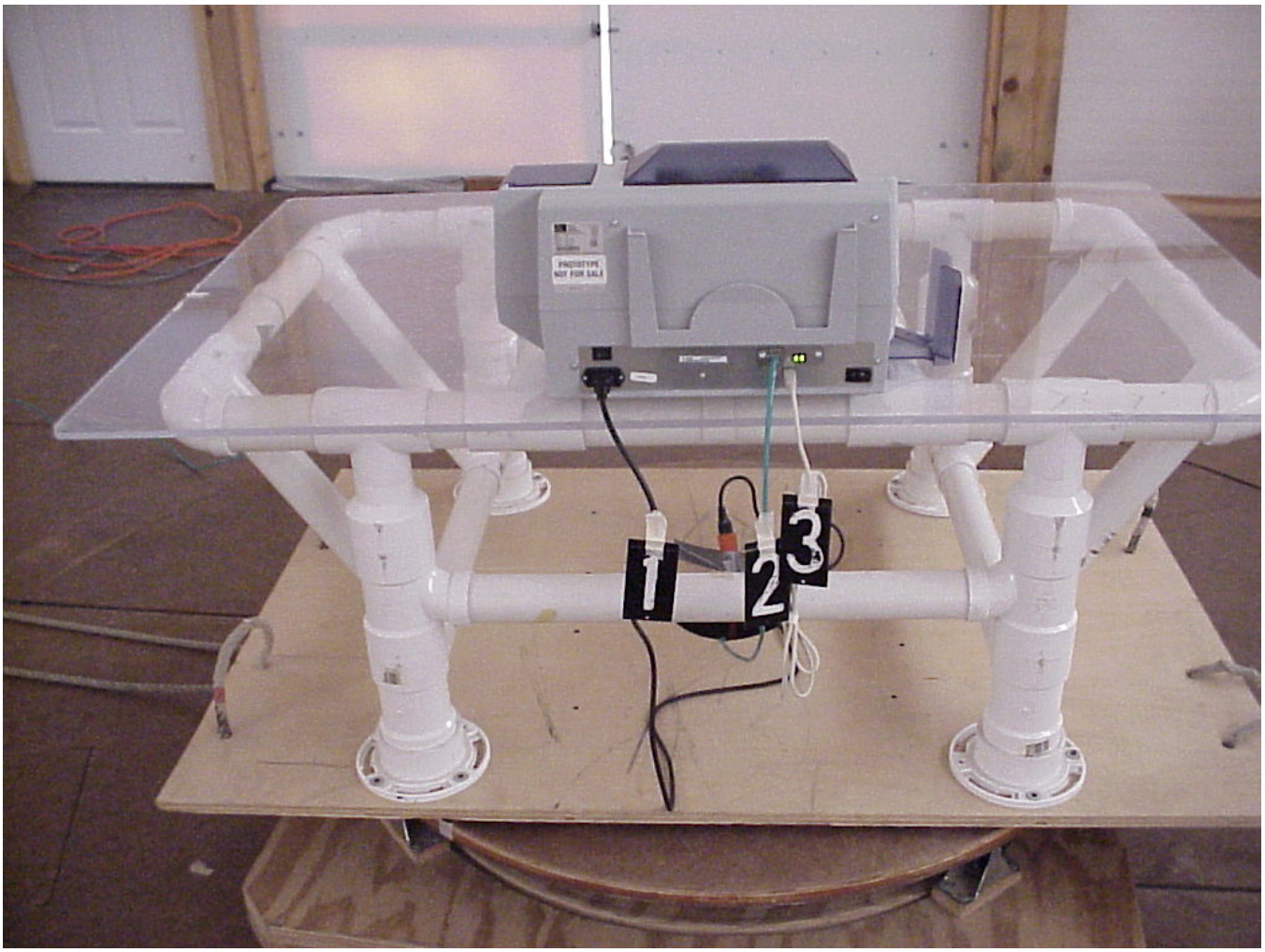
## 10.0 RADIATED PHOTOS TAKEN DURING TESTING



P330i PRINTER
FRONT VIEW

1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)




P330i PRINTER
REAR VIEW

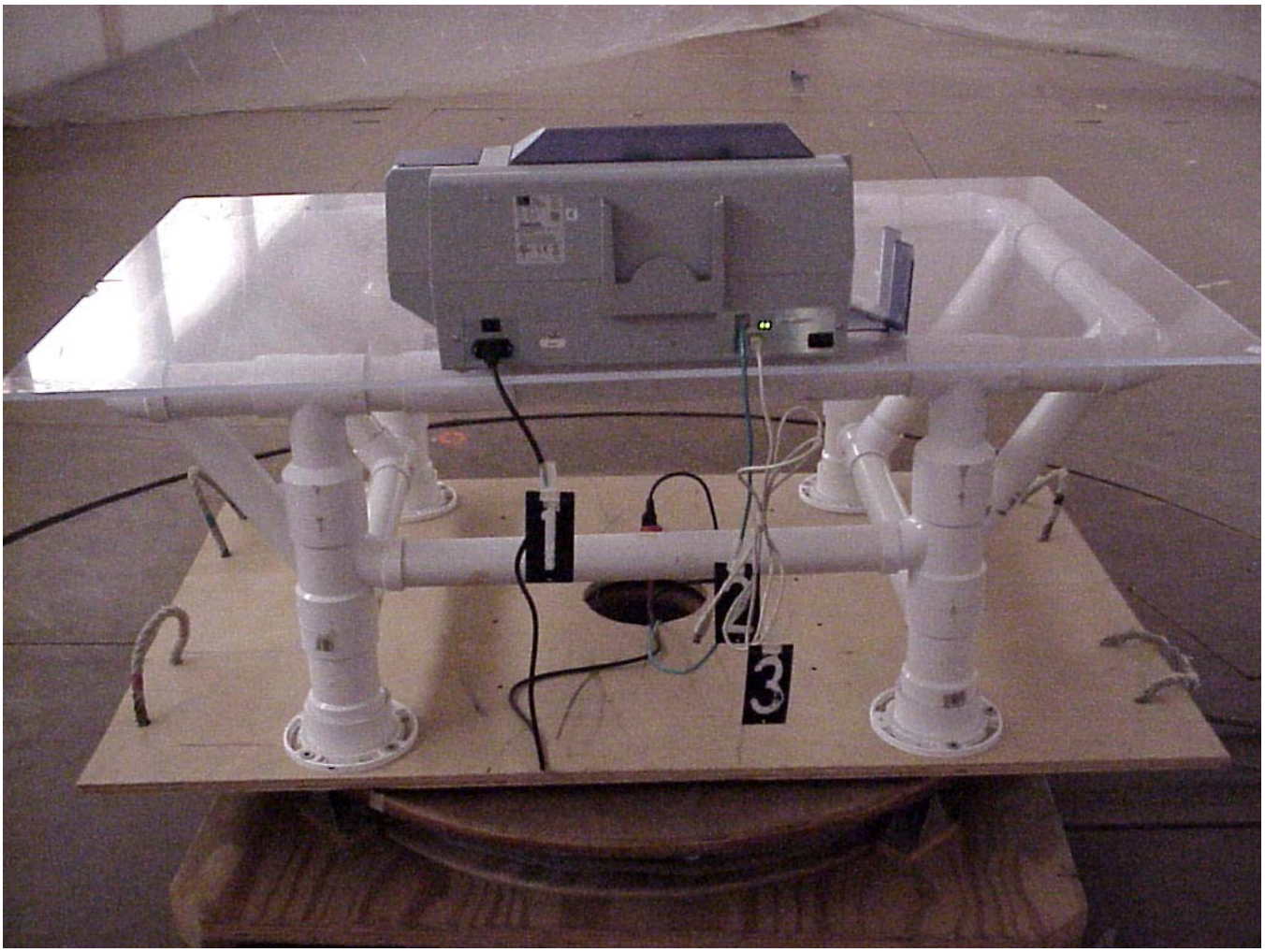
1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)

P430i PRINTER
FRONT VIEW

1250 Peterson Dr., Wheeling, IL 60090

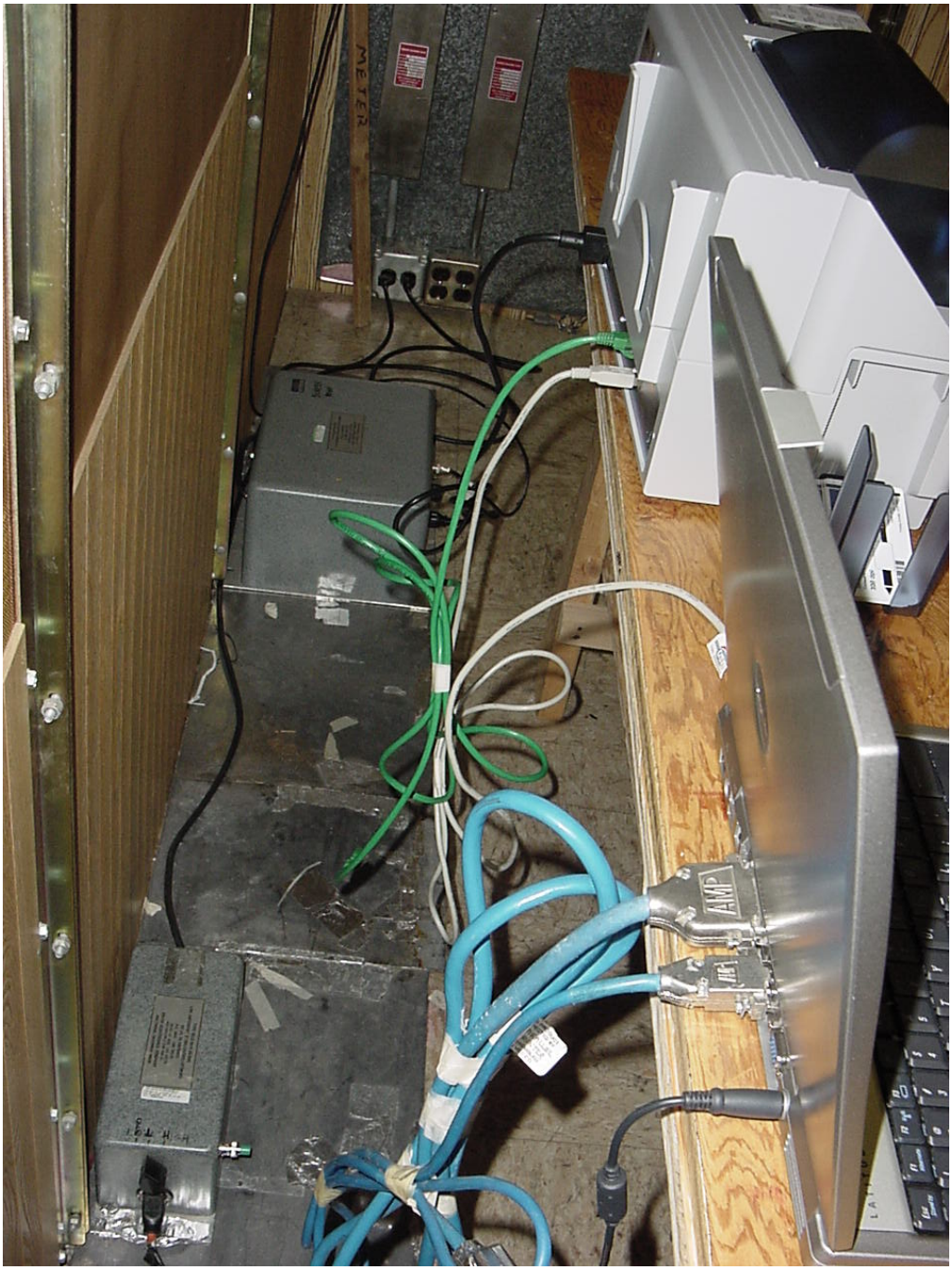
## 10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)




P430i PRINTER
REAR VIEW

1250 Peterson Dr., Wheeling, IL 60090

## 10.0 CONDUCTED PHOTOS TAKEN DURING TESTING



P330i PRINTER

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## 10.0 CONDUCTED PHOTOS TAKEN DURING TESTING

P330i PRINTER

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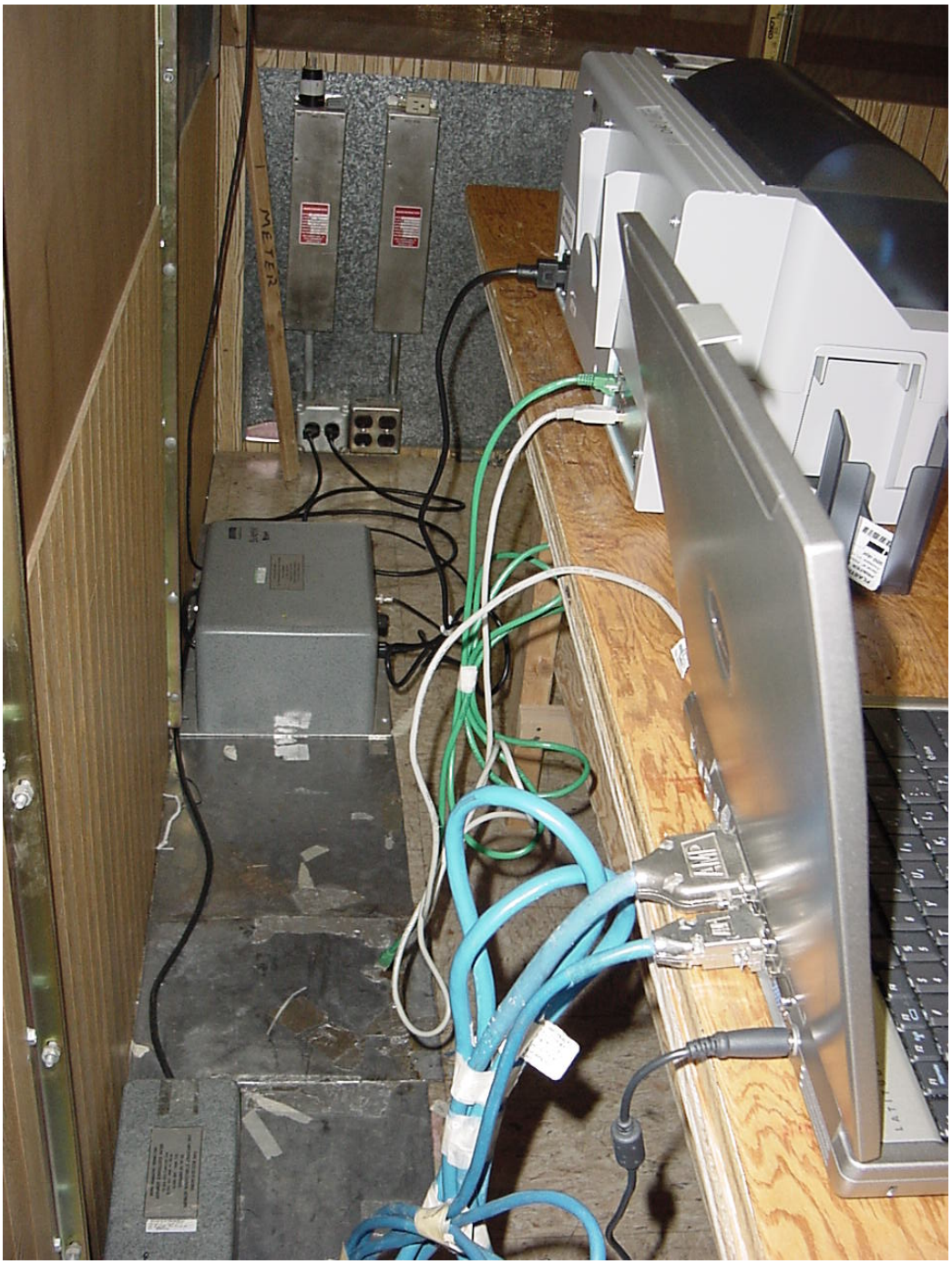
## 10.0 CONDUCTED PHOTOS TAKEN DURING TESTING (CON'T)



P430i PRINTER

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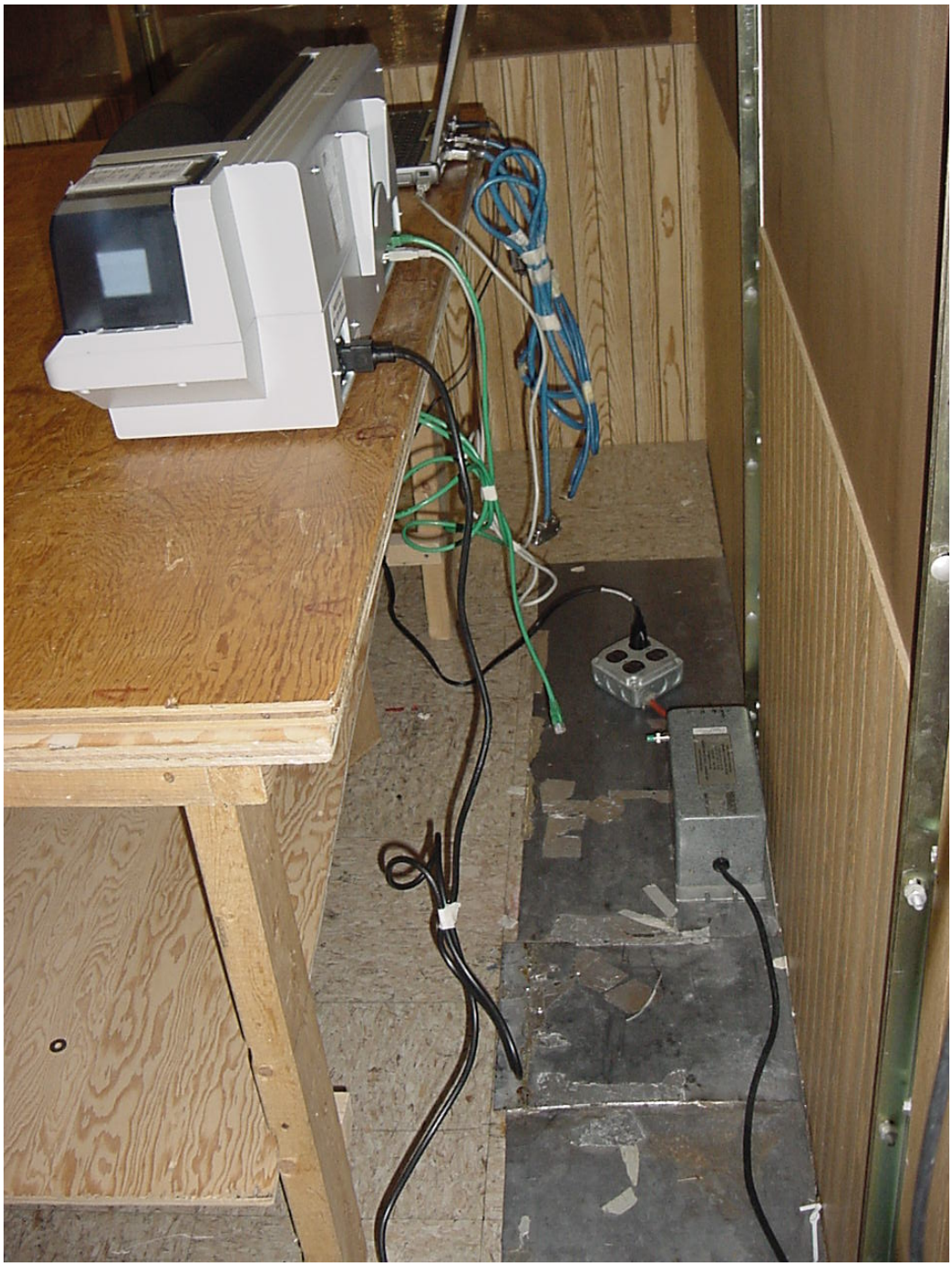
## 10.0 CONDUCTED PHOTOS TAKEN DURING TESTING (CON'T)



P430i PRINTER

## 11.0 RESULTS OF TESTS

The radio interference emission charts results can be seen on the pages at the end of this report. Data sheets indicating the test measurements taken during testing can also be found at the end of this report. Points on the emission charts shown with a yellow mark are background frequencies that were verified during testing.

## 12.0 CONCLUSION

It was found that the RFID 402931, Model Number(s) 402931 **''meets''** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.225 for operational in the 13.553-13.567 MHz Band.

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TABLE 1 – EQUIPMENT LIST

| Test Equipment | Manufacturer | Model Number | Serial Number | Frequency Range | Cal Due Dates |
|---|---|---|---|---|---|
| Receiver | Rohde & Schwarz | ESI 26 | 837491/010 | 20 Hz – 26 GHz | 11/07 |
| Receiver | Rohde & Schwarz | ESI 40 | 837808/006 | 20 Hz – 40 GHz | 12/07 |
| Receiver | Rohde & Schwarz | ESI 40 | 837808/005 | 20 Hz – 40 GHz | 12/07 |
| Antenna | EMCO | 3104C | 00054891 | 20 MHz – 200 MHz | 2/07 |
| Antenna | Electrometrics | LPA-25 | 1114 | 200 MHz – 1 GHz | 3/07 |
| Antenna | EMCO | 3104C | 00054892 | 20 MHz – 200 MHz | 3/07 |
| Antenna | Electrometrics | 3146 | 1205 | 200 MHz – 1 GHz | 3/07 |
| Antenna | EMCO | 3104C | 97014785 | 20 MHz – 200 MHz | 2/07 |
| Antenna | EMCO | 3146 | 97024895 | 200 MHz – 1 GHz | 3/07 |
| Antenna | EMCO | 3115 | 2479 | 1 GHz – 18 GHz | 8/07 |
| Antenna | EMCO | 3115 | 99035731 | 1 GHz – 18 GHz | 4/07 |
| Antenna | Rohde & Schwarz | HUF-Z1 | 829381001 | 20 MHz – 1 GHz | 2/07 |
| Antenna | Rohde & Schwarz | HUF-Z1 | 829381005 | 20 MHz – 1 GHz | 8/07 |
| LISN | Solar | 8012-50-R-24-BNC | 8305116 | 10 MHz – 30 MHz | 8/07 |
| LISN | Solar | 8012-50-R-24-BNC | 814548 | 10 MHz – 30 MHz | 8/07 |
| LISN | Solar | 9252-50-R-24-BNC | 961019 | 10 MHz – 30 MHz | 12/07 |
| LISN | Solar | 9252-50-R-24-BNC | 971612 | 10 MHz – 30 MHz | 10/07 |
| LISN | Solar | 9252-50-R-24-BNC | 92710620 | 10 MHz – 30 MHz | 7/07 |

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.

# APPENDIX A

# TEST PROCEDURE

## Part 15, Subpart C, Section 15.225a-e

## OPERATION WITHIN THE BAND

## 13.110 MHz - 14.010 MHz

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APPENDIX A

## 1.0 CONDUCTED EMISSION MEASUREMENTS

The conducted emissions were measured over the frequency range from 150 kHz to 30 MHz in accordance with the power line measurements, as specified in ANSI C63.4-2003. Since the device is operated from the public utility lines, the 120 Vac, 60 Hz power leads, high and low sides were measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. All signals were then recorded. The allowed levels for Intentional Radiators which is designed to connected to the public utility (AC) power line cannot exceed the following:

| Frequency of Emissions (MHz) | Conducted Limits (dBuV) | |
|---|---|---|
| | Quasi Peak | Average |
| .15 to .5 | 66 to 56 | 56 to 46 |
| .5 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

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Company: Zebra Technologies Corporation
Model Tested: 402931
Report Number: 12921

# AC POWER LINE CONDUCTED

# DATA AND CHARTS

# TAKEN DURING TESTING

# PART 15.207

# P330i CARD PRINTER

## *FCC Part 15 Class B*

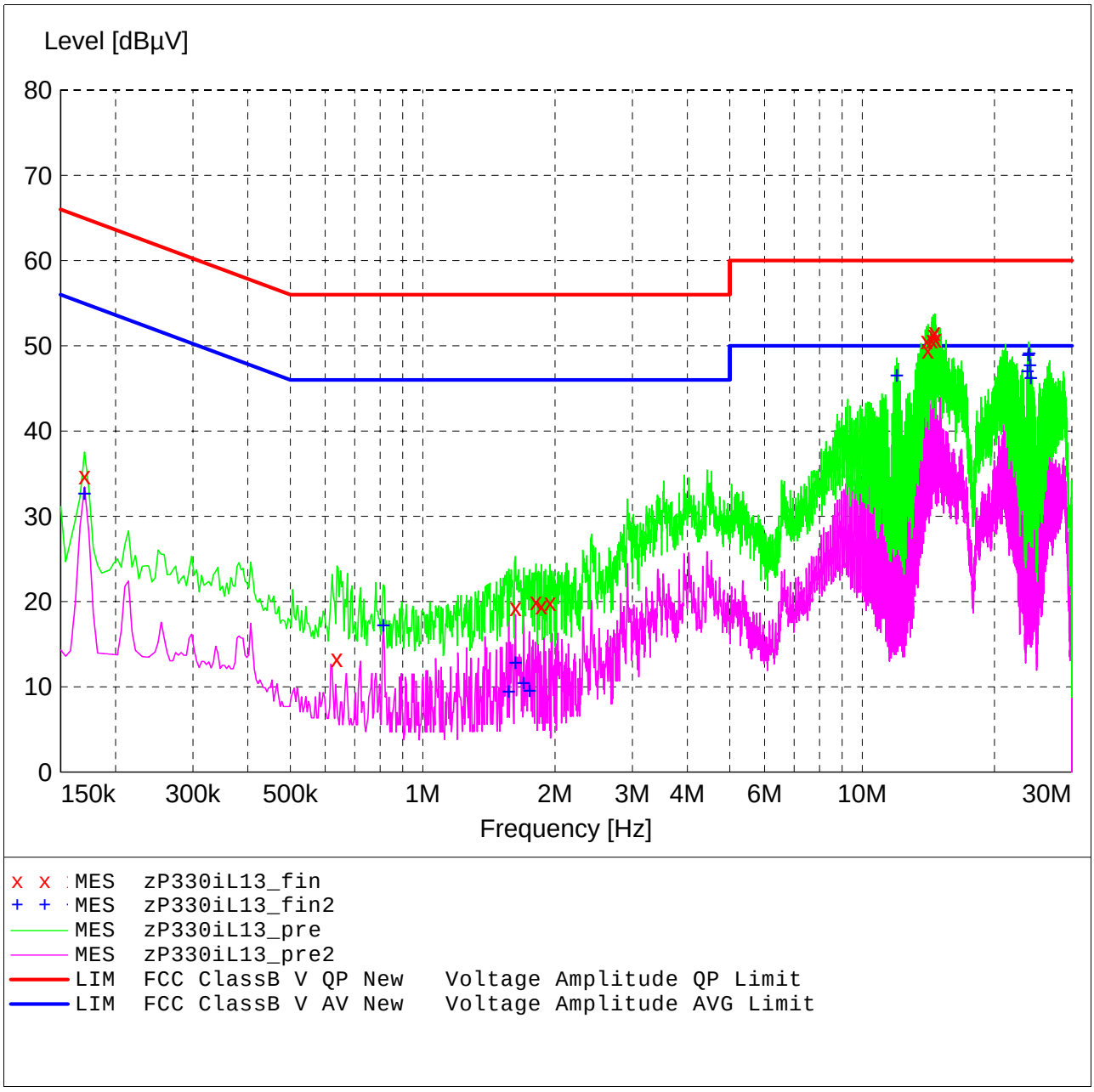
## *Voltage Mains Test*

| | |
|---|---|
| EUT: | P330i with RFID 402931 and ZM4e |
| Manufacturer: | Zebra Technologies |
| Operating Condition: | 72 deg. F, 46% R.H. |
| Test Site: | DLS O.F. Site 1 (Screenroom) |
| Operator: | Craig B |
| Test Specification: | 120 V 60 Hz |
| Comment: | Line 1 |
| | Date: 09-24-2007 |

### *SCAN TABLE: "Line Cond Scrn RmFin"*

Short Description: Line Conducted Emissions

| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|---|
| 150.0 kHz | 30.0 MHz | 4.0 kHz | QuasiPeak CISPR AV | 4.0 s | 9 kHz | LISN DLS#128 |



***MEASUREMENT RESULT: "zP330iL13_fin"***

9/24/2007 8:50AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.170000 | 34.80 | 11.4 | 65 | 30.2 | QP | --- | --- |
| 0.638000 | 13.30 | 10.3 | 56 | 42.7 | QP | --- | --- |
| 1.626000 | 19.30 | 10.4 | 56 | 36.7 | QP | --- | --- |
| 1.810000 | 20.00 | 10.4 | 56 | 36.0 | QP | --- | --- |
| 1.862000 | 19.50 | 10.5 | 56 | 36.5 | QP | --- | --- |
| 1.950000 | 19.90 | 10.5 | 56 | 36.1 | QP | --- | --- |
| 14.018000 | 50.60 | 11.6 | 60 | 9.4 | QP | --- | --- |
| 14.122000 | 49.50 | 11.7 | 60 | 10.5 | QP | --- | --- |
| 14.422000 | 50.70 | 11.7 | 60 | 9.3 | QP | --- | --- |
| 14.522000 | 51.30 | 11.7 | 60 | 8.7 | QP | --- | --- |
| 14.622000 | 51.60 | 11.7 | 60 | 8.4 | QP | --- | --- |
| 14.722000 | 50.80 | 11.7 | 60 | 9.2 | QP | --- | --- |

***MEASUREMENT RESULT: "zP330iL13_fin2"***

9/24/2007 8:50AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.170000 | 32.70 | 11.4 | 55 | 22.3 | CAV | --- | --- |
| 0.814000 | 17.20 | 10.3 | 46 | 28.8 | CAV | --- | --- |
| 1.570000 | 9.40 | 10.4 | 46 | 36.6 | CAV | --- | --- |
| 1.626000 | 12.80 | 10.4 | 46 | 33.2 | CAV | --- | --- |
| 1.698000 | 10.40 | 10.4 | 46 | 35.6 | CAV | --- | --- |
| 1.750000 | 9.50 | 10.4 | 46 | 36.5 | CAV | --- | --- |
| 12.002000 | 46.50 | 11.4 | 50 | 3.5 | CAV | --- | --- |
| 23.802000 | 47.00 | 11.9 | 50 | 3.0 | CAV | --- | --- |
| 23.902000 | 48.90 | 11.9 | 50 | 1.1 | CAV | --- | --- |
| 24.002000 | 49.10 | 11.9 | 50 | 0.9 | CAV | --- | --- |
| 24.102000 | 47.70 | 11.9 | 50 | 2.3 | CAV | --- | --- |
| 24.206000 | 46.20 | 11.9 | 50 | 3.8 | CAV | --- | --- |

## *FCC Part 15 Class B*

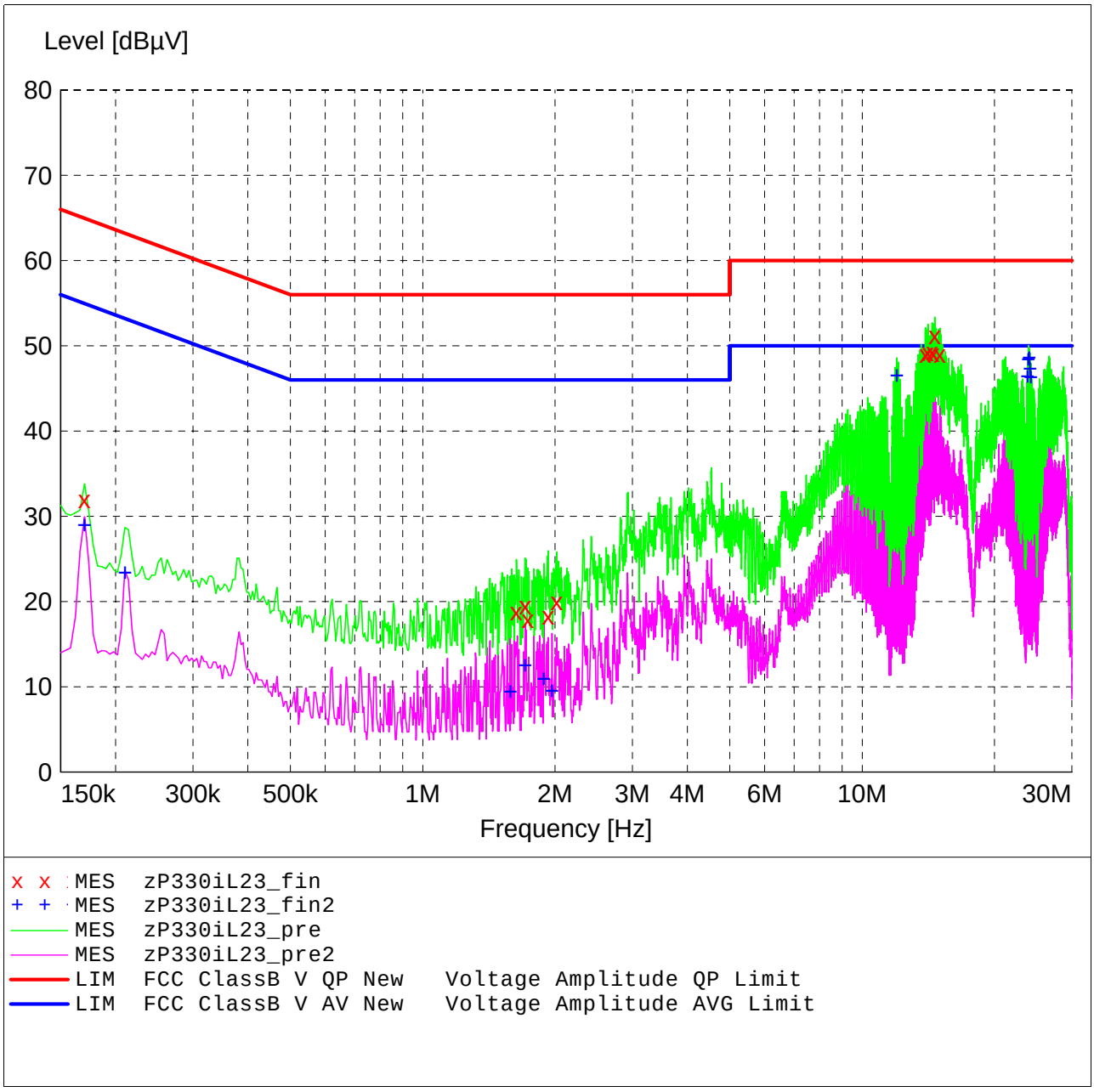
## *Voltage Mains Test*

| | |
|---|---|
| EUT: | P330i with RFID 402931 and ZM4e |
| Manufacturer: | Zebra Technologies |
| Operating Condition: | 72 deg. F, 46% R.H. |
| Test Site: | DLS O.F. Site 1 (Screenroom) |
| Operator: | Craig B |
| Test Specification: | 120 V 60 Hz |
| Comment: | Line 2 |
| | Date: 09-24-2007 |

### *SCAN TABLE: "Line Cond Scrn RmFin"*

Short Description: Line Conducted Emissions

| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|---|
| 150.0 kHz | 30.0 MHz | 4.0 kHz | QuasiPeak CISPR AV | 4.0 s | 9 kHz | LISN DLS#128 |



***MEASUREMENT RESULT: "zP330iL23_fin"***

9/24/2007 9:02AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.170000 | 32.00 | 11.4 | 65 | 33.0 | QP | --- | --- |
| 1.634000 | 18.80 | 10.4 | 56 | 37.2 | QP | --- | --- |
| 1.710000 | 19.50 | 10.4 | 56 | 36.5 | QP | --- | --- |
| 1.734000 | 17.90 | 10.4 | 56 | 38.1 | QP | --- | --- |
| 1.930000 | 18.30 | 10.5 | 56 | 37.7 | QP | --- | --- |
| 2.018000 | 20.00 | 10.5 | 56 | 36.0 | QP | --- | --- |
| 13.918000 | 49.00 | 11.6 | 60 | 11.0 | QP | --- | --- |
| 14.122000 | 49.20 | 11.7 | 60 | 10.8 | QP | --- | --- |
| 14.426000 | 49.30 | 11.7 | 60 | 10.7 | QP | --- | --- |
| 14.530000 | 49.10 | 11.7 | 60 | 10.9 | QP | --- | --- |
| 14.622000 | 51.20 | 11.7 | 60 | 8.8 | QP | --- | --- |
| 15.026000 | 49.00 | 11.7 | 60 | 11.0 | QP | --- | --- |

***MEASUREMENT RESULT: "zP330iL23_fin2"***

9/24/2007 9:02AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.170000 | 29.00 | 11.4 | 55 | 26.0 | CAV | --- | --- |
| 0.210000 | 23.40 | 11.0 | 53 | 29.8 | CAV | --- | --- |
| 1.582000 | 9.40 | 10.4 | 46 | 36.6 | CAV | --- | --- |
| 1.710000 | 12.50 | 10.4 | 46 | 33.5 | CAV | --- | --- |
| 1.886000 | 10.90 | 10.5 | 46 | 35.1 | CAV | --- | --- |
| 1.970000 | 9.50 | 10.5 | 46 | 36.5 | CAV | --- | --- |
| 12.002000 | 46.50 | 11.4 | 50 | 3.5 | CAV | --- | --- |
| 23.802000 | 46.40 | 11.9 | 50 | 3.6 | CAV | --- | --- |
| 23.902000 | 48.40 | 11.9 | 50 | 1.6 | CAV | --- | --- |
| 24.002000 | 48.60 | 11.9 | 50 | 1.4 | CAV | --- | --- |
| 24.102000 | 47.30 | 11.9 | 50 | 2.7 | CAV | --- | --- |
| 24.206000 | 46.30 | 11.9 | 50 | 3.7 | CAV | --- | --- |

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# AC POWER LINE CONDUCTED EMISSIONS

# DATA AND CHARTS

# PART 15.207

# P430i CARD PRINTER

## *FCC Part 15 Class B*

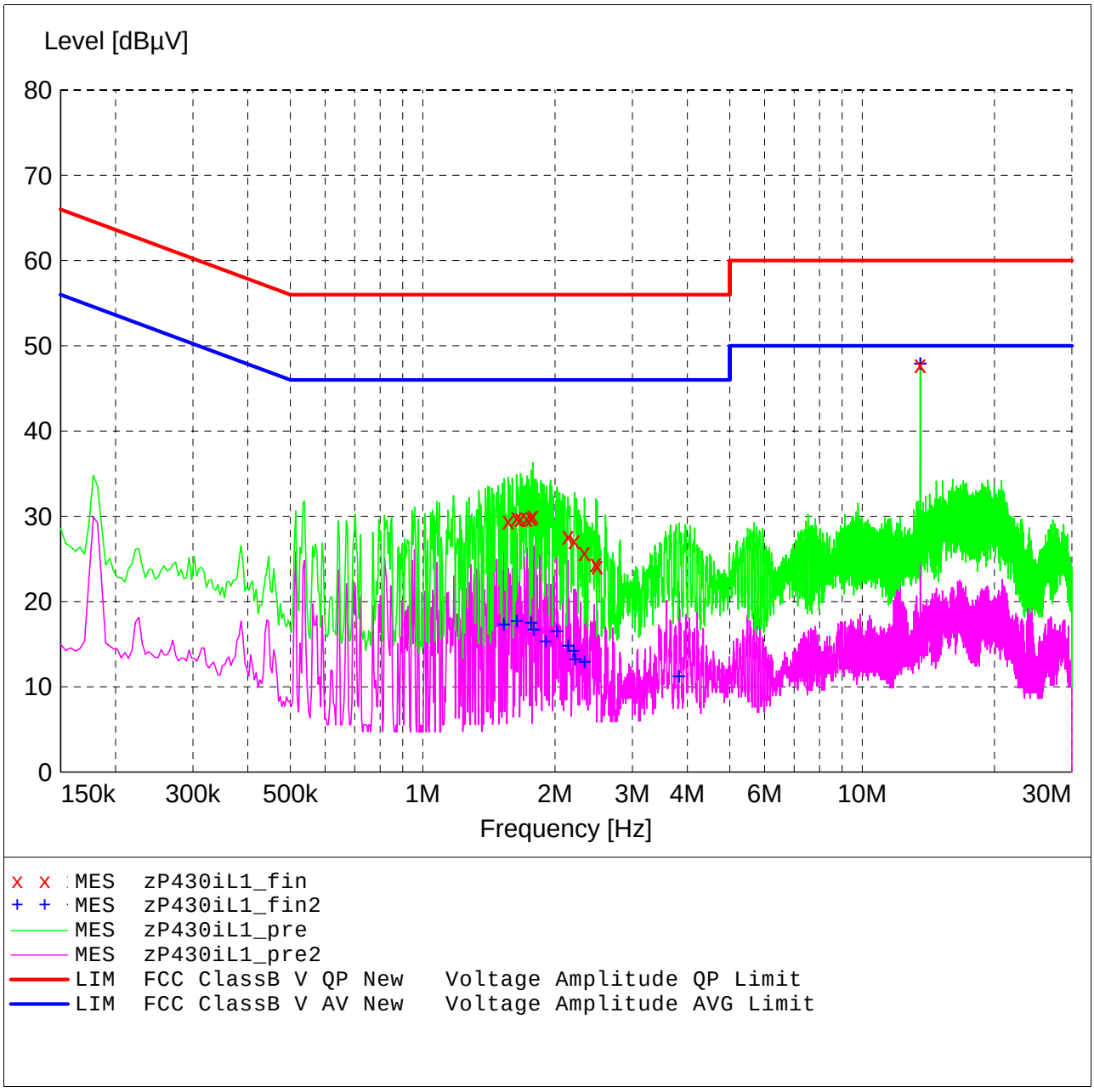
## *Voltage Mains Test*

| | |
|---|---|
| EUT: | P430i with RFID 402931 and ZM4e |
| Manufacturer: | Zebra Technologies |
| Operating Condition: | 72 deg. F, 46% R.H. |
| Test Site: | DLS O.F. Site 1 (Screenroom) |
| Operator: | Craig B |
| Test Specification: | 120 V 60 Hz |
| Comment: | Line 1 |
| | Date: 09-24-2007 |

### *SCAN TABLE: "Line Cond Scrn RmFin"*

Short Description: Line Conducted Emissions

| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|---|
| 150.0 kHz | 30.0 MHz | 4.0 kHz | QuasiPeak CISPR AV | 4.0 s | 9 kHz | LISN DLS#128 |



***MEASUREMENT RESULT: "zP430iL1_fin"***

9/24/2007 9:44AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 1.566000 | 29.50 | 10.4 | 56 | 26.5 | QP | --- | --- |
| 1.638000 | 29.90 | 10.4 | 56 | 26.1 | QP | --- | --- |
| 1.670000 | 29.80 | 10.4 | 56 | 26.2 | QP | --- | --- |
| 1.726000 | 29.80 | 10.4 | 56 | 26.2 | QP | --- | --- |
| 1.766000 | 29.90 | 10.4 | 56 | 26.1 | QP | --- | --- |
| 1.782000 | 30.10 | 10.4 | 56 | 25.9 | QP | --- | --- |
| 2.142000 | 27.70 | 10.5 | 56 | 28.3 | QP | --- | --- |
| 2.214000 | 27.20 | 10.5 | 56 | 28.8 | QP | --- | --- |
| 2.334000 | 25.80 | 10.5 | 56 | 30.2 | QP | --- | --- |
| 2.478000 | 24.50 | 10.6 | 56 | 31.5 | QP | --- | --- |
| 2.494000 | 24.20 | 10.6 | 56 | 31.8 | QP | --- | --- |
| 13.558000 | 47.80 | 11.6 | 60 | 12.2 | QP | --- | --- |

***MEASUREMENT RESULT: "zP430iL1_fin2"***

9/24/2007 9:44AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 1.530000 | 17.30 | 10.4 | 46 | 28.7 | CAV | --- | --- |
| 1.638000 | 17.70 | 10.4 | 46 | 28.3 | CAV | --- | --- |
| 1.766000 | 17.50 | 10.4 | 46 | 28.5 | CAV | --- | --- |
| 1.790000 | 16.70 | 10.4 | 46 | 29.3 | CAV | --- | --- |
| 1.906000 | 15.30 | 10.5 | 46 | 30.7 | CAV | --- | --- |
| 2.018000 | 16.50 | 10.5 | 46 | 29.5 | CAV | --- | --- |
| 2.142000 | 14.80 | 10.5 | 46 | 31.2 | CAV | --- | --- |
| 2.206000 | 14.20 | 10.5 | 46 | 31.8 | CAV | --- | --- |
| 2.222000 | 13.20 | 10.5 | 46 | 32.8 | CAV | --- | --- |
| 2.334000 | 12.90 | 10.5 | 46 | 33.1 | CAV | --- | --- |
| 3.830000 | 11.20 | 10.7 | 46 | 34.8 | CAV | --- | --- |
| 13.558000 | 47.90 | 11.6 | 50 | 2.1 | CAV | --- | --- |

## *FCC Part 15 Class B*

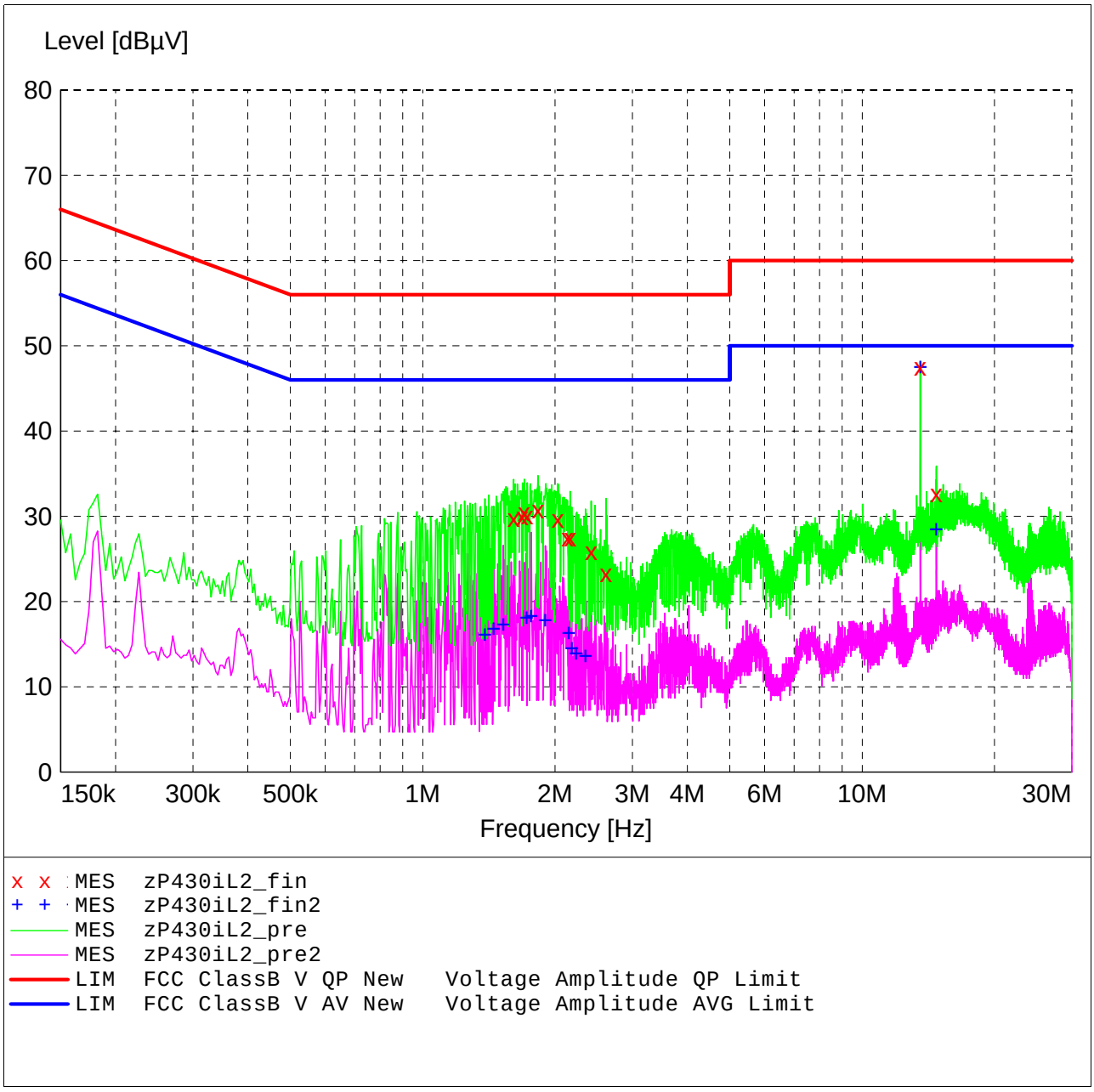
## *Voltage Mains Test*

| | |
|---|---|
| EUT: | P430i with RFID 402931 and ZM4e |
| Manufacturer: | Zebra Technologies |
| Operating Condition: | 72 deg. F, 46% R.H. |
| Test Site: | DLS O.F. Site 1 (Screenroom) |
| Operator: | Craig B |
| Test Specification: | 120 V 60 Hz |
| Comment: | Line 2 |
| | Date: 09-24-2007 |

### *SCAN TABLE: "Line Cond Scrn RmFin"*

Short Description: Line Conducted Emissions

| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|---|
| 150.0 kHz | 30.0 MHz | 4.0 kHz | QuasiPeak CISPR AV | 4.0 s | 9 kHz | LISN DLS#128 |



***MEASUREMENT RESULT: "zP430iL2_fin"***

9/24/2007 9:36AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 1.610000 | 29.80 | 10.4 | 56 | 26.2 | QP | --- | --- |
| 1.686000 | 30.00 | 10.4 | 56 | 26.0 | QP | --- | --- |
| 1.702000 | 30.50 | 10.4 | 56 | 25.5 | QP | --- | --- |
| 1.730000 | 30.10 | 10.4 | 56 | 25.9 | QP | --- | --- |
| 1.830000 | 30.80 | 10.4 | 56 | 25.2 | QP | --- | --- |
| 2.030000 | 29.70 | 10.5 | 56 | 26.3 | QP | --- | --- |
| 2.134000 | 27.50 | 10.5 | 56 | 28.5 | QP | --- | --- |
| 2.166000 | 27.50 | 10.5 | 56 | 28.5 | QP | --- | --- |
| 2.418000 | 25.90 | 10.6 | 56 | 30.1 | QP | --- | --- |
| 2.614000 | 23.30 | 10.6 | 56 | 32.7 | QP | --- | --- |
| 13.558000 | 47.50 | 11.6 | 60 | 12.5 | QP | --- | --- |
| 14.746000 | 32.70 | 11.7 | 60 | 27.3 | QP | --- | --- |

***MEASUREMENT RESULT: "zP430iL2_fin2"***

9/24/2007 9:36AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 1.386000 | 16.10 | 10.3 | 46 | 29.9 | CAV | --- | --- |
| 1.450000 | 16.80 | 10.3 | 46 | 29.2 | CAV | --- | --- |
| 1.526000 | 17.30 | 10.4 | 46 | 28.7 | CAV | --- | --- |
| 1.722000 | 18.10 | 10.4 | 46 | 27.9 | CAV | --- | --- |
| 1.766000 | 18.30 | 10.4 | 46 | 27.7 | CAV | --- | --- |
| 1.902000 | 17.80 | 10.5 | 46 | 28.2 | CAV | --- | --- |
| 2.150000 | 16.30 | 10.5 | 46 | 29.7 | CAV | --- | --- |
| 2.182000 | 14.50 | 10.5 | 46 | 31.5 | CAV | --- | --- |
| 2.234000 | 13.90 | 10.5 | 46 | 32.1 | CAV | --- | --- |
| 2.346000 | 13.60 | 10.5 | 46 | 32.4 | CAV | --- | --- |
| 13.558000 | 47.50 | 11.6 | 50 | 2.5 | CAV | --- | --- |
| 14.746000 | 28.50 | 11.7 | 50 | 21.5 | CAV | --- | --- |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

## 2.0 RESTRICTED BANDS, BANDWIDTH AND BAND EDGE COMPLIANCE

The field strength of any emissions appearing outside the 13.110 MHz - 14.010 MHz band shall not exceed the general radiated emissions limits as stated Section 15.209. The fundamental 13.56 MHz from the RFID 402931 transmitter shall not be inside the restricted band 13.36 to 13.41 MHz.

**NOTE:** See pages 50 to 63 of this test report for the Restricted Band measurements and the following page (s) for the graph (s) made showing compliance for Bandwidth and Band Edge:

1250 Peterson Dr., Wheeling, IL 60090

# GRAPH (s) TAKEN SHOWING THE

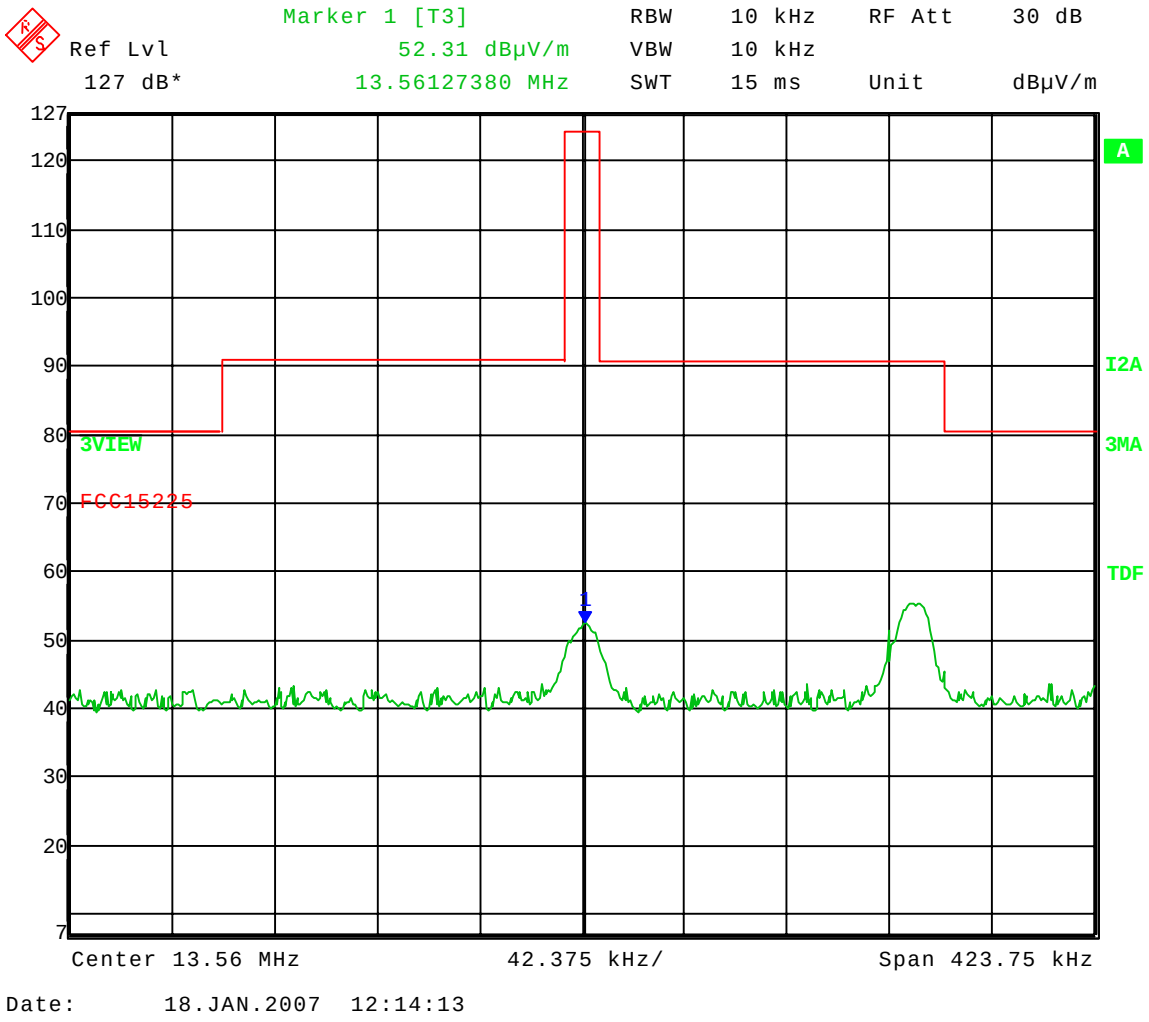
# BANDWIDTH AND BAND EDGE COMPLIANCE

# PART 15.225 (b)

# P330i PRINTER

**1250 Peterson Dr., Wheeling, IL 60090**

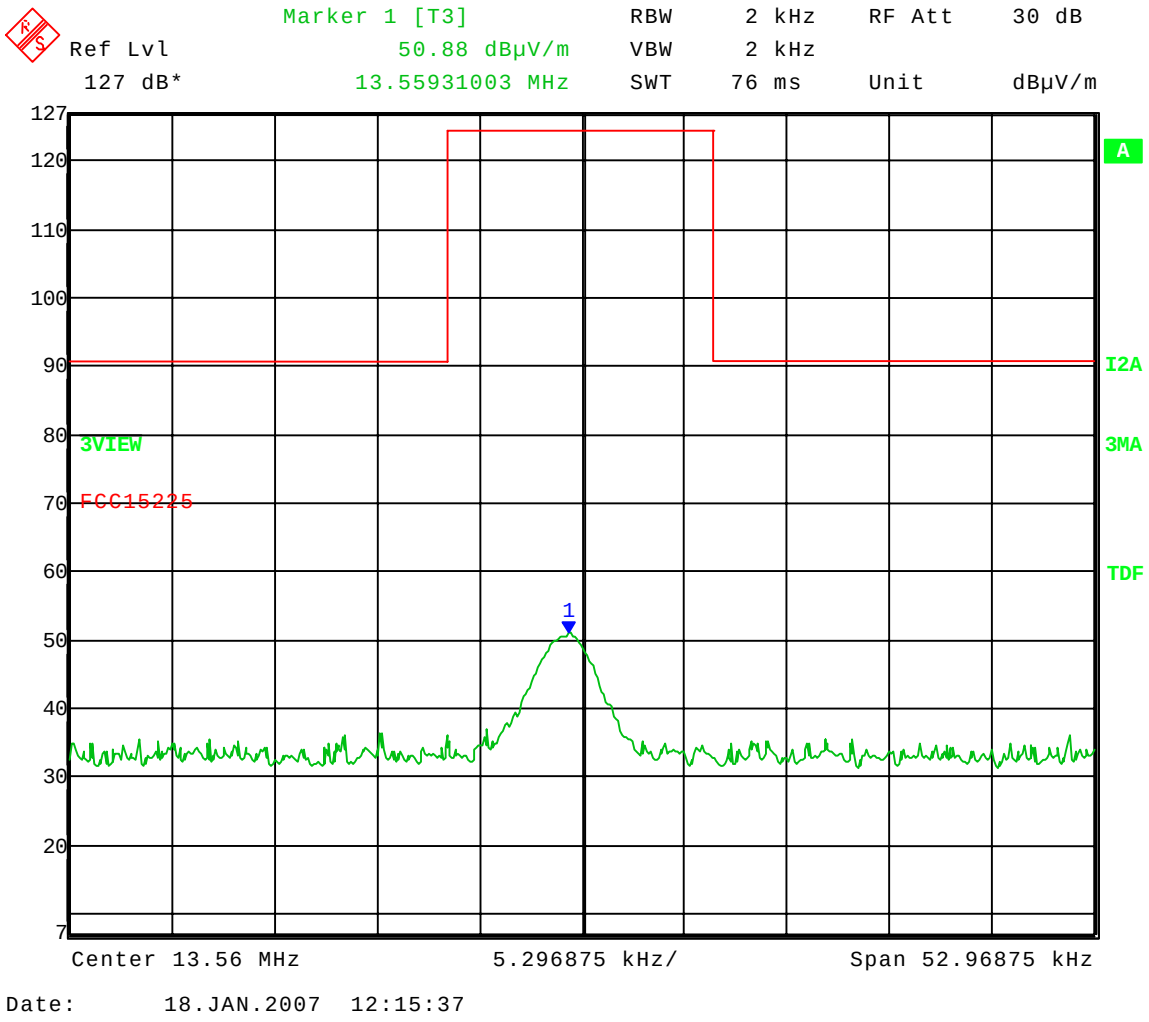
Test Date: 01-18-2007
Company: Zebra Technologies
EUT: RFID 402931 with P330i printer
Test: Bandwidth / Band Edges
Operator: Craig Brandt



1250 Peterson Dr., Wheeling, IL 60090

Company: Zebra Technologies Corporation
Model Tested: 402931
Report Number: 12921

Test Date: 01-18-2007
Company: Zebra Technologies
EUT: RFID 402931 with P330i printer
Test: Bandwidth / Band Edges
Operator: Craig Brandt



1250 Peterson Dr., Wheeling, IL 60090

# GRAPH (s) TAKEN SHOWING THE

# BANDWIDTH AND BAND EDGE COMPLIANCE

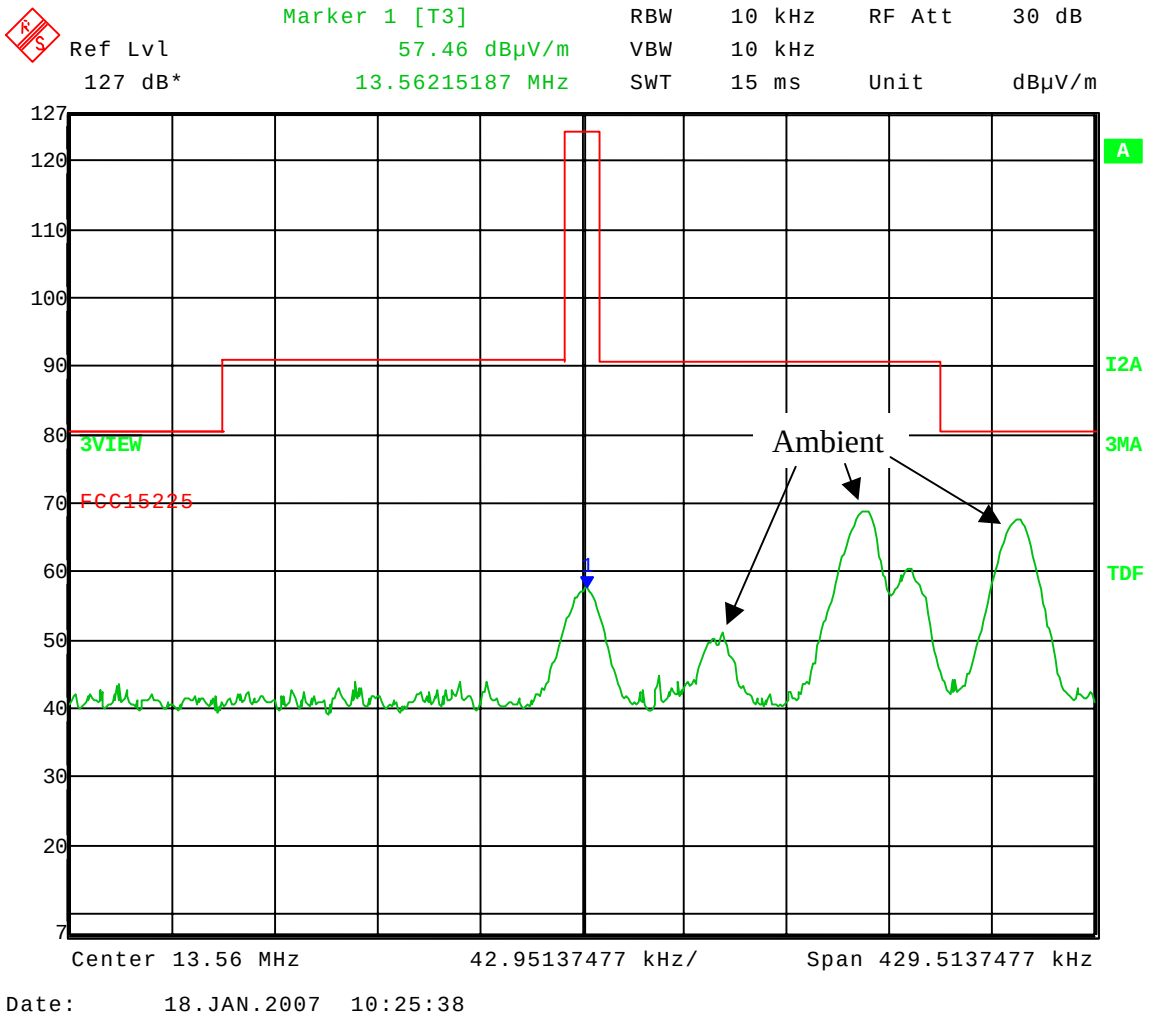
# PART 15.225 (b)

# P430i PRINTER

1250 Peterson Dr., Wheeling, IL 60090

Company: Zebra Technologies Corporation
Model Tested: 402931
Report Number: 12921

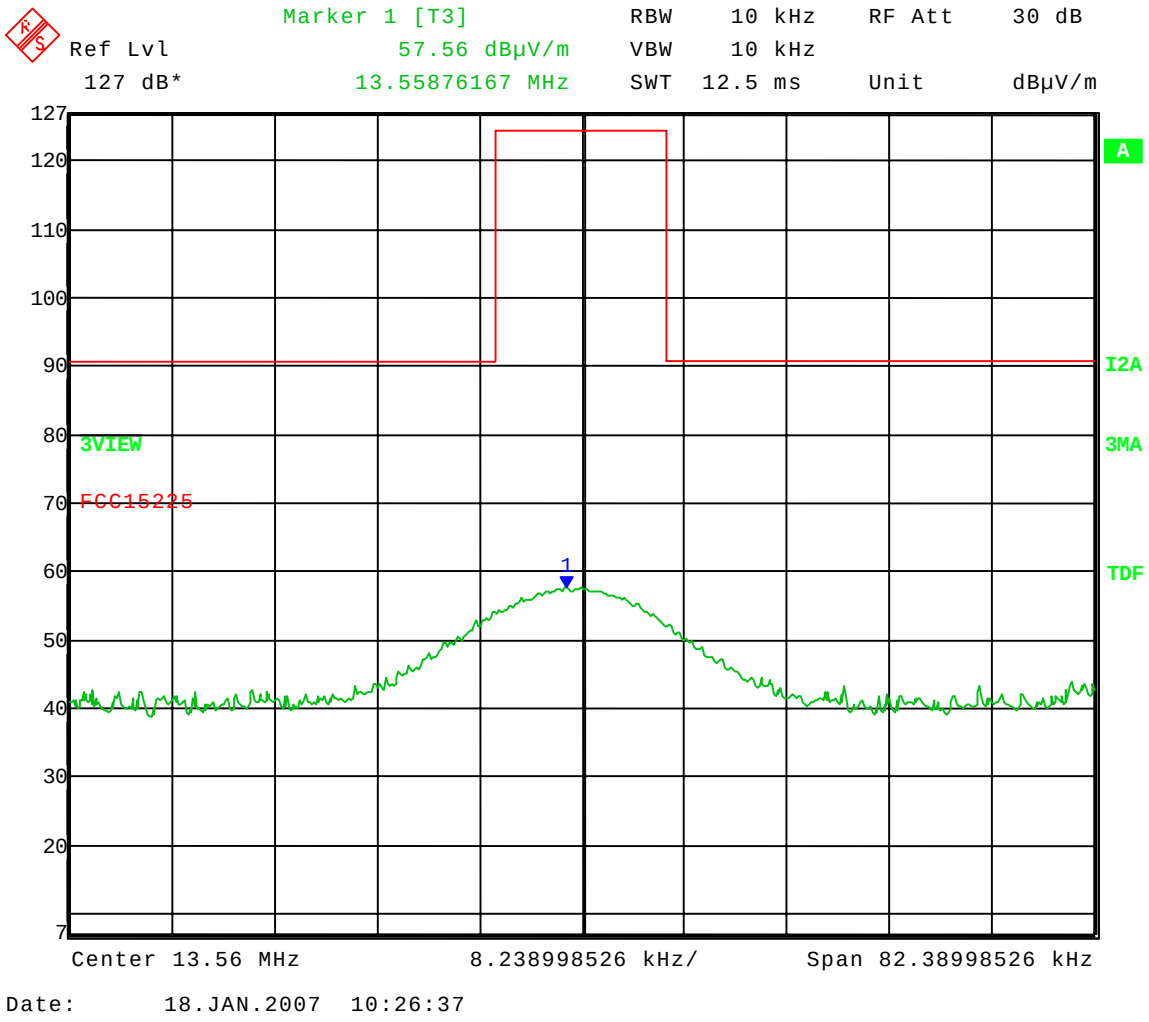
Test Date: 01-18-2007
Company: Zebra Technologies
EUT: RFID 402931 with P430i printer
Test: Bandwidth / Band Edges
Operator: Craig Brandt



1250 Peterson Dr., Wheeling, IL 60090

Company: Zebra Technologies Corporation
Model Tested: 402931
Report Number: 12921

Test Date: 01-18-2007
Company: Zebra Technologies
EUT: RFID 402931 with P430i printer
Test: Bandwidth / Band Edges
Operator: Craig Brandt



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APPENDIX A

## 3.0 FIELD STRENGTH OF FUNDAMENTAL AND SPURIOUS EMISSION MEASUREMENTS (SECTION 15.225a - d)

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the RFID 402931, Model Number: 402931, are shown in tabulated and graph form. Preliminary radiation measurements were performed at a 3 meter test distance with the limits adjusted linearly when required. The frequency range from 9 kHz to over 960 MHz, depending upon the fundamental frequency as stated in Part 15.33a, was automatically scanned and plotted at various angles.

Measurements for the RFID 402931 were made up to 140 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 13.56 MHz. For intentional radiators, the frequency range to be investigated is determined by the lowest radio frequency generated by the device without going below 9 kHz, up to at least the tenth harmonic of the highest fundamental frequency or 1000 MHz, whichever is lower. At those frequencies where significant signals were detected, measurements were made at an open field test site, located at Genoa City, Wisconsin, FCC file number **31040/SIT**, to determine the actual radiation levels.

All signals in the frequency range of 9 kHz to 30 MHz were measured with a low frequency Loop Antenna as a pickup device. From 30 to 140 MHz, a Biconical Antenna or tuned dipoles were used. During the test the equipment was rotated and the antenna was raised and lowered from 1 meter to 4 meters to find the maximum level. In order to find maximum emissions, the cables were moved through all the positions the equipment would be expected to experience in the field. Tests were made in the vertical polarization with the Loop Antenna, rotated 360º around its vertical axis. Tests were also made in both the horizontal and vertical planes of polarization with the Biconical Antenna. In each case, the table was rotated to find the maximum emissions.

When the equipment is out of limit at 3 meters, and the signals from the equipment at 30 meters cannot be recorded due to the background, a representative sample of these frequencies were re-measured at various distances such as 4, 5, 6, 8, 15 meters and the greatest distance that can be measured to demonstrate graphically that the emissions are dropping off and will be under the limit at the specified distance. All signals were then recorded. The allowed levels for Intentional Radiators in the 13.553 MHz to 13.567 MHz band shall not exceed 15,848 uV measured at 30 meters. The field strength of any emissions appearing outside 13.110 MHz – 14.010 MHz shall not exceed the radiated emissions limits shown in Section 15.209.

1250 Peterson Dr., Wheeling, IL 60090

Company: Zebra Technologies Corporation
Model Tested: 402931
Report Number: 12921

# RADIATED DATA AND GRAPHS TAKEN FOR

# FUNDAMENTAL FIELD STRENGTH

# EMISSION MEASUREMENTS

# PART 15.225

# P330i PRINTER

***FCC Part 15.225***

***Electric Field Strength***

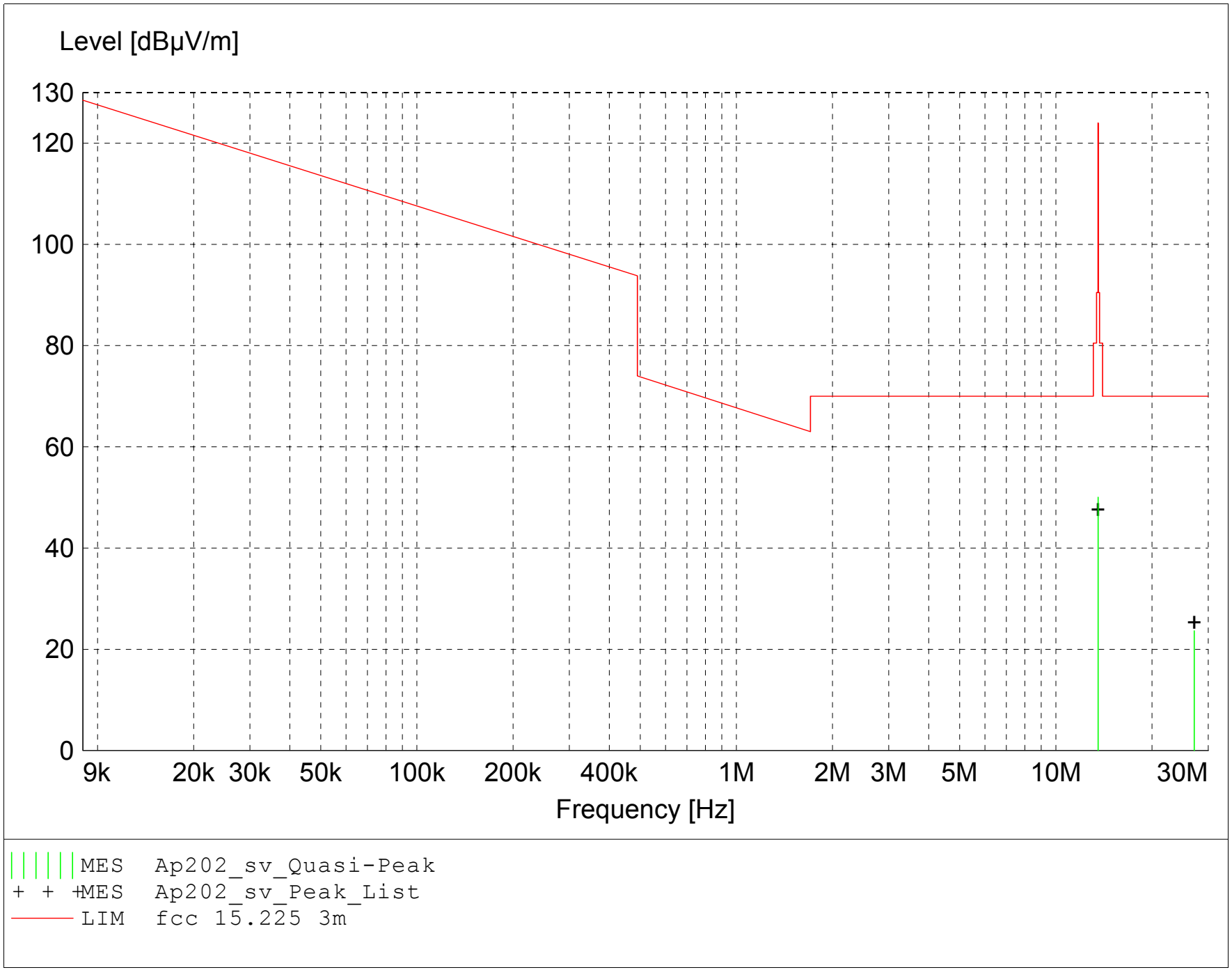
EUT: RFID 402931 with P330i printer
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 25% R.H.
Test Site: DLS O.F. Site 3
Operator: Craig Brandt
Test Specification: 120 V 60 Hz
Comment: 13.56 MHz transmit
Date: 01-18-2007

***TEXT: "Site 3 LowH 3M Act"***

Short Description: Test Set-up 9kHz to 30MHz H
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI40 SN: 837808/005

Antennas --- EMCO Active Loop Model: 6502 SN: 2038

TEST SET-UP: EuT Measured at 3 Meters with H-FIELD Antenna


Level [dBµV/m]
130
120
100
80
60
40
20
0
9k
20k
30k
50k
100k
200k
400k
1M
2M
3M
5M
10M
30M
Frequency [Hz]
MES Ap202_sv_Quasi-Peak
MES Ap202_sv_Peak_List
LIM fcc 15.225 3m

***MEASUREMENT RESULT: "Ap202_sv_Final"***

1/18/2007 11:05AM

| Frequency | Level | Antenna Factor | System Loss | Total Level | Limit | Margin | Height Ant. | EuT Angle | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | dBµV | dBµV/m | dB | dBµV/m | dBµV/m | dB | m | deg | | |
| 27.119500 | 14.02 | 8.58 | 1.1 | 23.7 | 70.0 | 46.3 | 1.00 | 135 | QUASI-PEAK | None |
| 13.559000 | 38.81 | 10.44 | 0.8 | 50.0 | 124.0 | 74.0 | 1.00 | 180 | QUASI-PEAK | Fundamental |

1250 Peterson Dr., Wheeling, IL 60090

# RADIATED DATA AND GRAPHS TAKEN FOR

# FUNDAMENTAL FIELD STRENGTH

# EMISSION MEASUREMENTS

# PART 15.225

# P430i PRINTER

## *FCC Part 15.225*

## *Electric Field Strength*

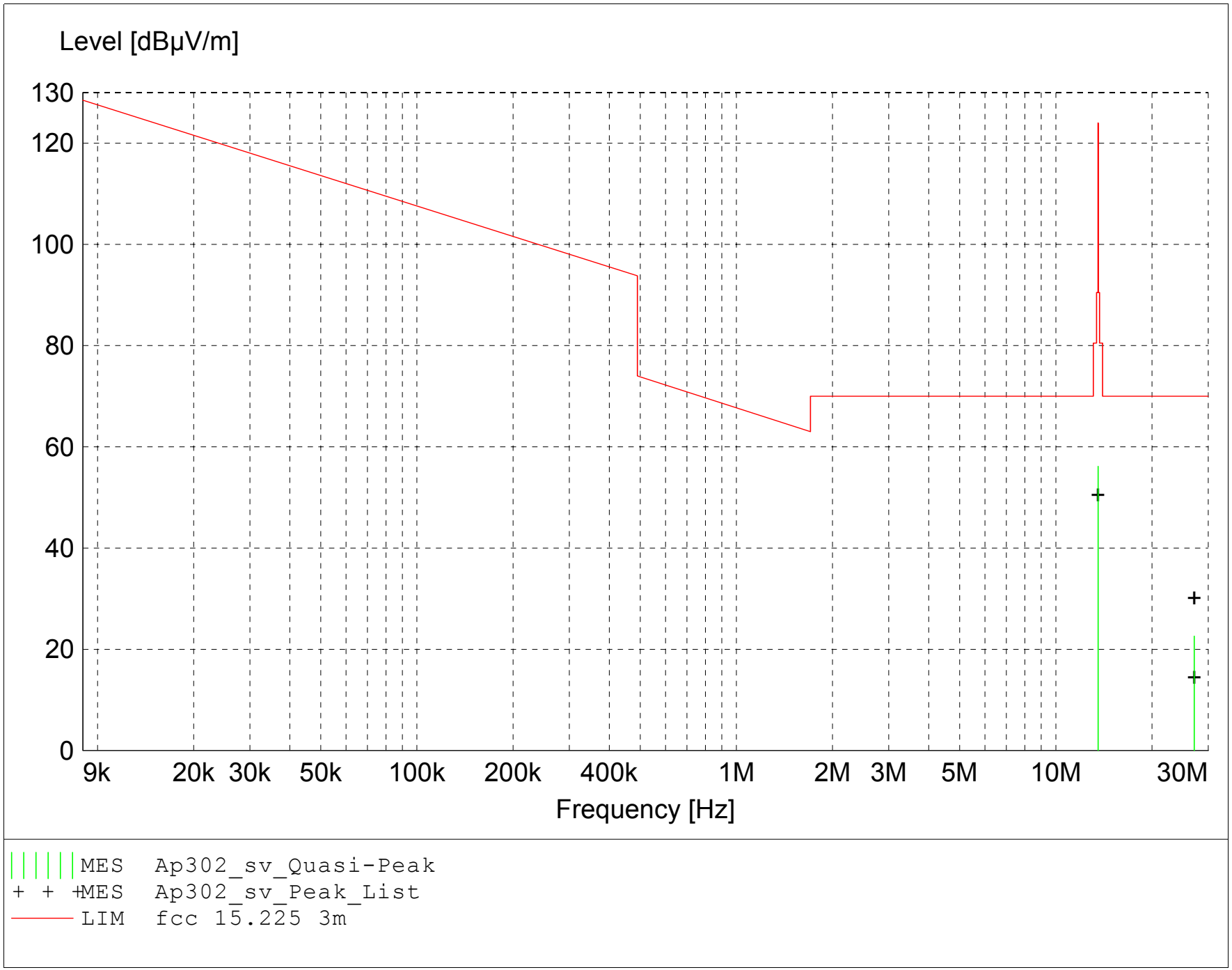
EUT: RFID 402931 with P430i printer
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 25% R.H.
Test Site: DLS O.F. Site 3
Operator: Craig Brandt
Test Specification: 120 V 60 Hz
Comment: 13.56 MHz transmit
Date: 01-18-2007

## *TEXT: "Site 3 LowH 3M Act"*

Short Description: Test Set-up 9kHz to 30MHz H
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI40 SN: 837808/005

Antennas --- EMCO Active Loop Model: 6502 SN: 2038

TEST SET-UP: EuT Measured at 3 Meters with H-FIELD Antenna


Level [dBµV/m]
130
120
100
80
60
40
20
0
9k
20k
30k
50k
100k
200k
400k
1M
2M
3M
5M
10M
30M
Frequency [Hz]
MES Ap302_sv_Quasi-Peak
MES Ap302_sv_Peak_List
LIM fcc 15.225 3m

***MEASUREMENT RESULT: "Ap302_sv_Final"***

1/18/2007 9:30AM

| Frequency | Level | Antenna Factor | System Loss | Total Level | Limit | Margin | Height Ant. | EuT Angle | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | dBµV | dBµV/m | dB | dBµV/m | dBµV/m | dB | m | deg | | |
| 27.120000 | 12.95 | 8.58 | 1.1 | 22.6 | 70.0 | 47.4 | 1.00 | 225 | QUASI-PEAK | None |
| 13.560000 | 44.91 | 10.44 | 0.8 | 56.1 | 124.0 | 67.9 | 1.00 | 180 | QUASI-PEAK | Fundamental |

1250 Peterson Dr., Wheeling, IL 60090

# RADIATED DATA AND GRAPHS TAKEN FOR

# RESTRICTED BAND AND

# SPURIOUS FIELD STRENGTH

# EMISSION MEASUREMENTS

# PART 15.209 AND 15.225(d)

# P330i PRINTER

***FCC Part 15.225***

***Electric Field Strength***

```
EUT:                 RFID 402931 with P330i printer
Manufacturer:        Zebra Technologies
Operating Condition: 72 deg. F; 25% R.H.
Test Site:           DLS O.F. Site 3
Operator:            Craig Brandt
Test Specification:  120 V   60 Hz
Comment:             13.56 MHz transmit
                     Date:  01-18-2007
```

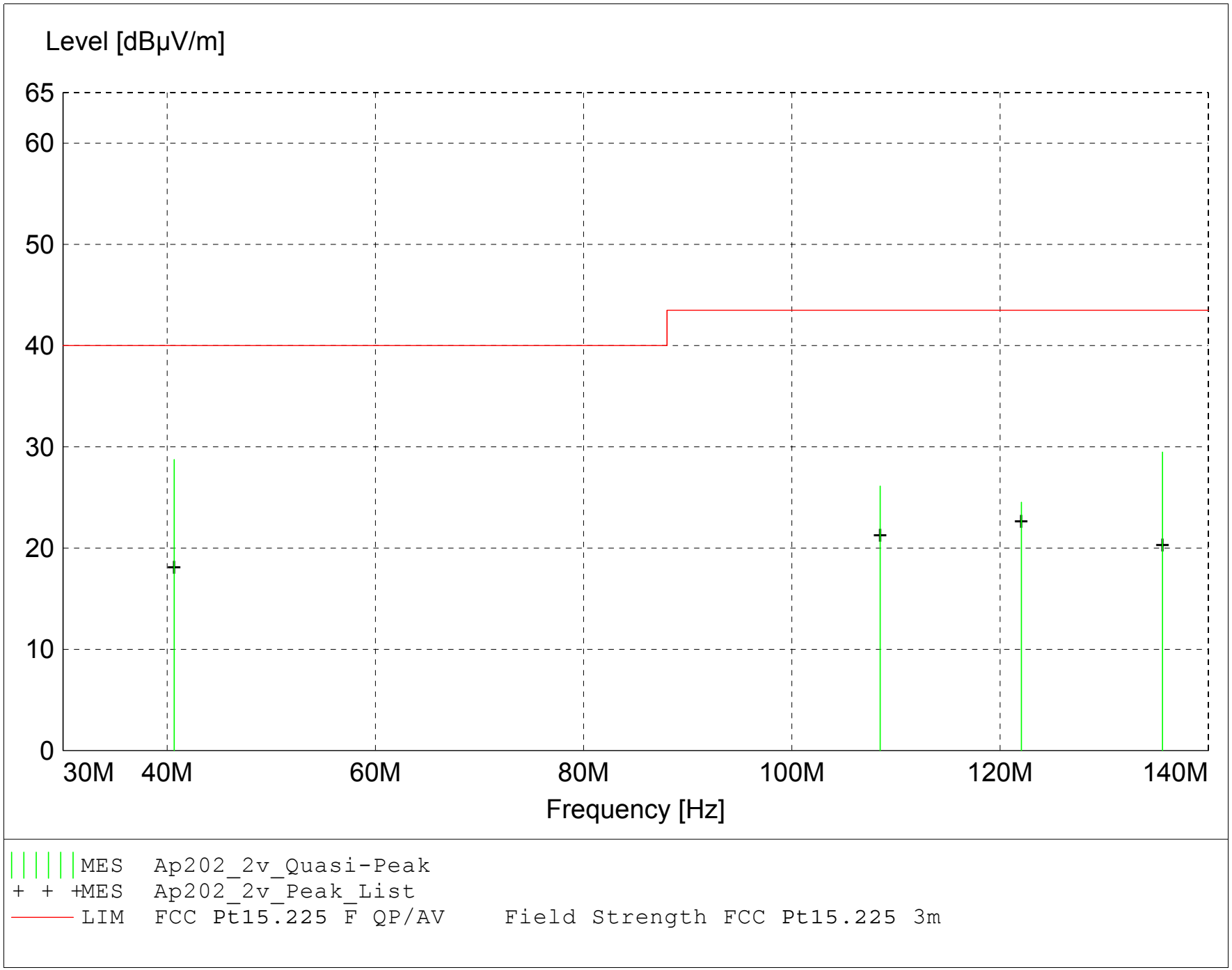
***TEXT: "Site 3 MidV 3M"***

```
  Short Description:            Test Set-up Vert30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005

                Antennas ---
                Biconical    -- EMCO 3104C SN: 9701-4785
                Log Periodic -- EMCO 3146  SN: 9702-4895

                Pre-Amp  --- Rohde&Schwarz TS-PR10 SN: 032001/005

TEST SET-UP:    EUT Measured at 3 Meters with VERTICAL Antenna Polarization
```




MES Ap202_2v_Quasi-Peak
MES Ap202_2v_Peak_List
LIM FCC Pt15.225 F QP/AV Field Strength FCC Pt15.225 3m

***MEASUREMENT RESULT: "Ap202_2v_Final"***

1/18/2007 11:23AM

| Frequency | Level | Antenna Factor | System Loss | Total Level | Limit | Margin | Height Ant. | EuT Angle | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | dBµV | dBµV/m | dB | dBµV/m | dBµV/m | dB | m | deg | | |
| 40.680000 | 41.61 | 11.43 | -24.3 | 28.8 | 40.0 | 11.2 | 1.00 | 30 | QUASI-PEAK | None |
| 135.595000 | 40.71 | 11.89 | -23.1 | 29.5 | 43.5 | 14.0 | 1.00 | 320 | QUASI-PEAK | None |
| 108.475000 | 37.61 | 11.80 | -23.3 | 26.1 | 43.5 | 17.4 | 1.00 | 320 | QUASI-PEAK | None |
| 122.035000 | 35.16 | 12.55 | -23.2 | 24.5 | 43.5 | 19.0 | 1.00 | 290 | QUASI-PEAK | None |

***FCC Part 15.225***

***Electric Field Strength***

```
EUT:                 RFID 402931 with P330i printer
Manufacturer:        Zebra Technologies
Operating Condition: 72 deg. F; 25% R.H.
Test Site:           DLS O.F. Site 3
Operator:            Craig Brandt
Test Specification:  120 V   60 Hz
Comment:             13.56 MHz transmit
                     Date:  01-18-2007
```

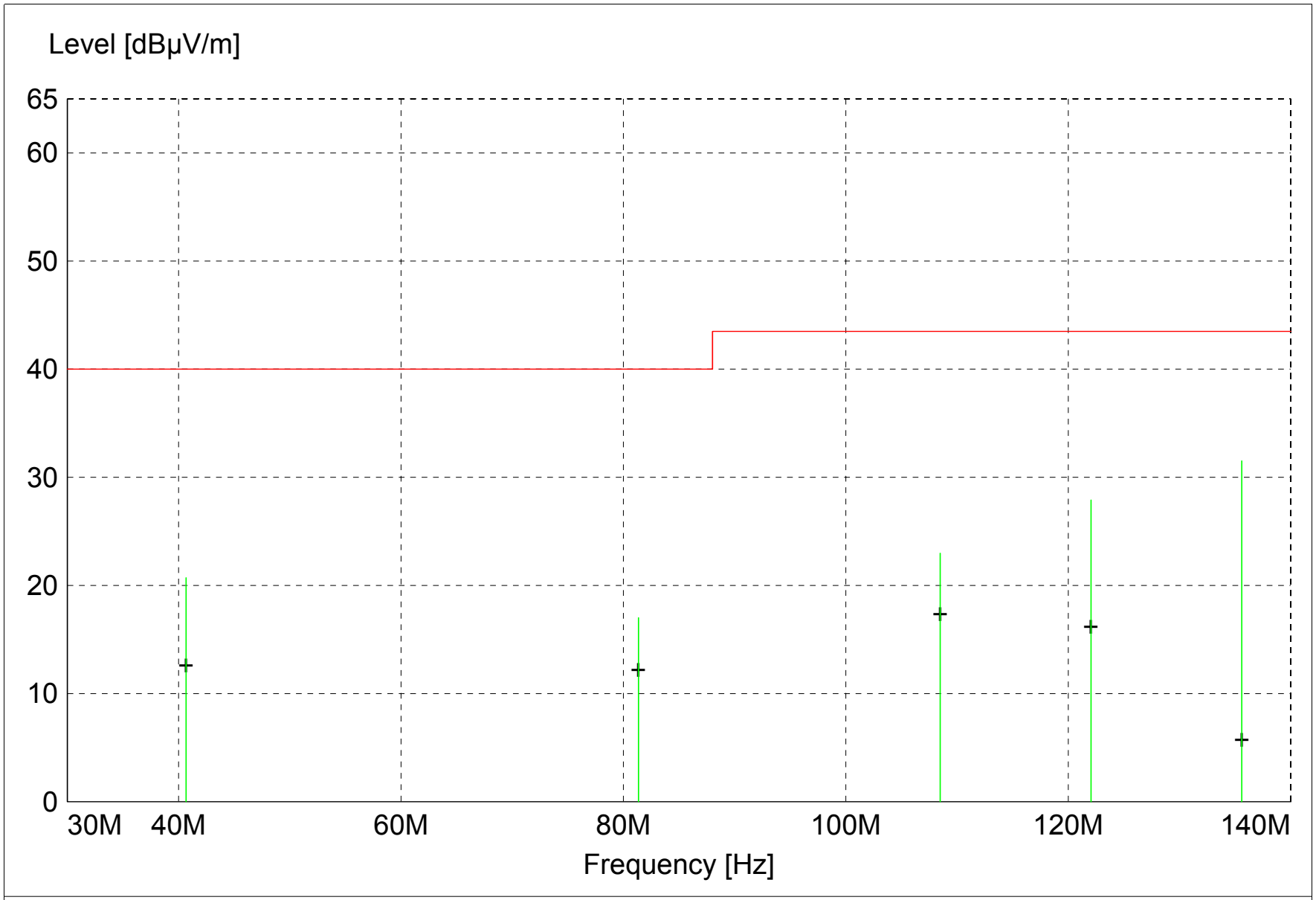
***TEXT: "Site 3 MidH 3M"***

```
  Short Description:            Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005

                Antennas ---
                Biconical    -- EMCO 3104C SN: 9701-4785
                Log Periodic -- EMCO 3146  SN: 9702-4895

                Pre-Amp  --- Rohde&Schwarz TS-PR10 SN: 032001/005

TEST SET-UP:    EUT Measured at 3 Meters with HORIZONTAL Antenna Polarization
```




MES Ap202_2h_Quasi-Peak
MES Ap202_2h_Peak_List
LIM FCC Pt15.225 F QP/AV Field Strength FCC Pt15.225 3m

***MEASUREMENT RESULT: "Ap202_2h_Final"***

1/18/2007 11:33AM

| Frequency | Level | Antenna Factor | System Loss | Total Level | Limit | Margin | Height Ant. | EuT Angle | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | dBµV | dBµV/m | dB | dBµV/m | dBµV/m | dB | m | deg | | |
| 135.595000 | 42.74 | 11.89 | -23.1 | 31.5 | 43.5 | 12.0 | 1.60 | 135 | QUASI-PEAK | None |
| 122.035000 | 38.54 | 12.55 | -23.2 | 27.9 | 43.5 | 15.6 | 2.80 | 135 | QUASI-PEAK | None |
| 40.675000 | 33.57 | 11.44 | -24.3 | 20.7 | 40.0 | 19.3 | 3.00 | 270 | QUASI-PEAK | None |
| 108.475000 | 34.48 | 11.80 | -23.3 | 23.0 | 43.5 | 20.5 | 2.10 | 170 | QUASI-PEAK | None |
| 81.350000 | 34.02 | 6.71 | -23.7 | 17.0 | 40.0 | 23.0 | 2.10 | 0 | QUASI-PEAK | None |

1250 Peterson Dr., Wheeling, IL 60090

Company: Zebra Technologies Corporation
Model Tested: 402931
Report Number: 12921

# RADIATED DATA AND GRAPHS TAKEN FOR

# RESTRICTED BAND AND

# SPURIOUS FIELD STRENGTH

# EMISSION MEASUREMENTS

# PART 15.209 AND 15.225(d)

# P430i PRINTER

***FCC Part 15.225***

***Electric Field Strength***

EUT: RFID 402931 with P430i printer
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 25% R.H.
Test Site: DLS O.F. Site 3
Operator: Craig Brandt
Test Specification: 120 V 60 Hz
Comment: 13.56 MHz transmit
Date: 01-18-2007

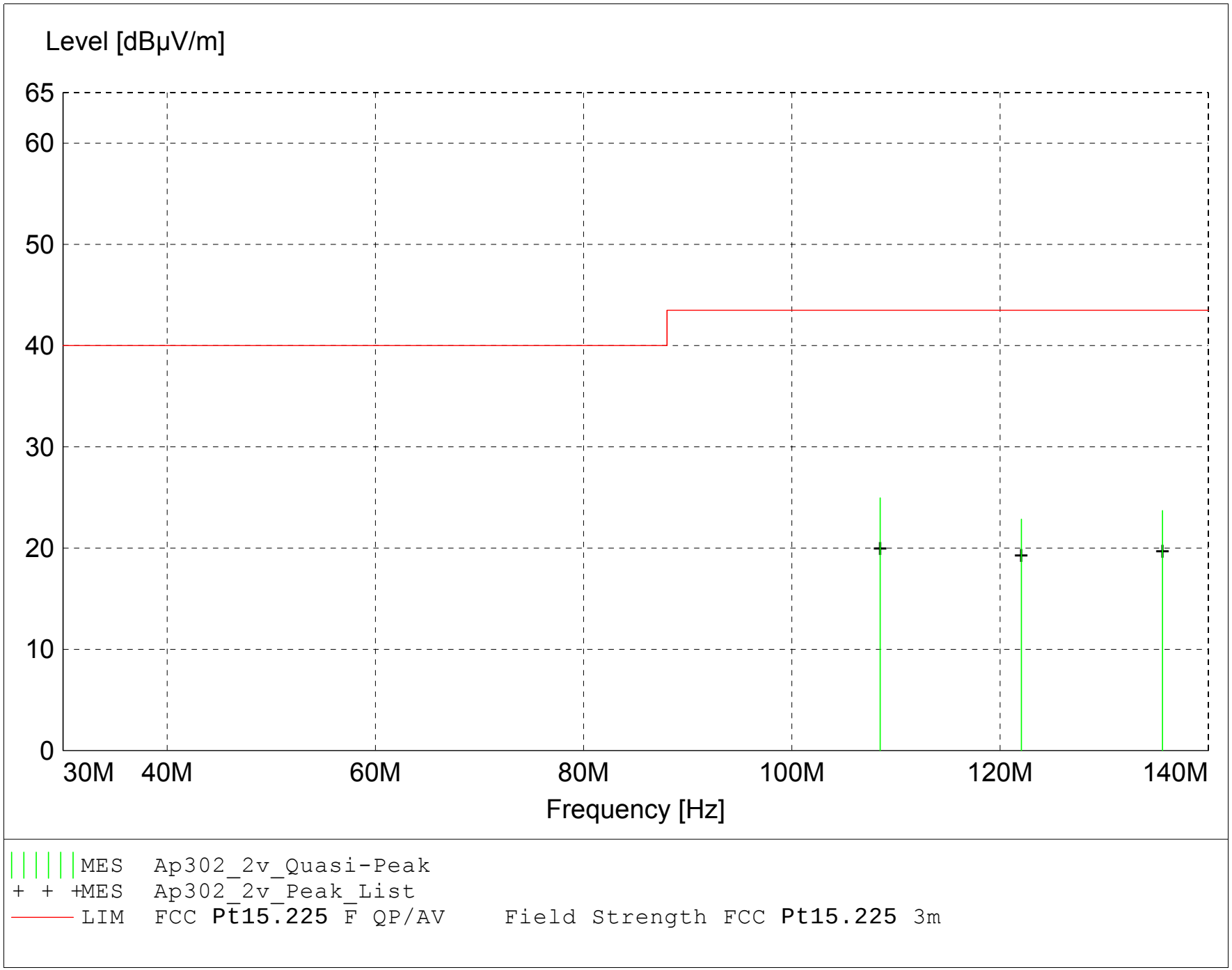
***TEXT: "Site 3 MidV 3M"***

Short Description: Test Set-up Vert30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005

Antennas ---
Biconical -- EMCO 3104C SN: 9701-4785
Log Periodic -- EMCO 3146 SN: 9702-4895

Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/005

TEST SET-UP: EUT Measured at 3 Meters with VERTICAL Antenna Polarization




MES Ap302_2v_Quasi-Peak
+ + +MES Ap302_2v_Peak_List
LIM FCC Pt15.225 F QP/AV Field Strength FCC Pt15.225 3m

***MEASUREMENT RESULT: "Ap302_2v_Final"***

1/18/2007 9:45AM

| Frequency | Level | Antenna Factor | System Loss | Total Level | Limit | Margin | Height Ant. | EuT Angle | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | dBµV | dBµV/m | dB | dBµV/m | dBµV/m | dB | m | deg | | |
| 108.480000 | 36.45 | 11.80 | -23.3 | 25.0 | 43.5 | 18.5 | 1.00 | 320 | QUASI-PEAK | None |
| 135.600000 | 34.93 | 11.88 | -23.1 | 23.7 | 43.5 | 19.8 | 1.00 | 270 | QUASI-PEAK | None |
| 122.035000 | 33.50 | 12.55 | -23.2 | 22.9 | 43.5 | 20.6 | 1.00 | 225 | QUASI-PEAK | None |

***FCC Part 15.225***

***Electric Field Strength***

EUT: RFID 402931 with P430i printer
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 25% R.H.
Test Site: DLS O.F. Site 3
Operator: Craig Brandt
Test Specification: 120 V 60 Hz
Comment: 13.56 MHz transmit
Date: 01-18-2007

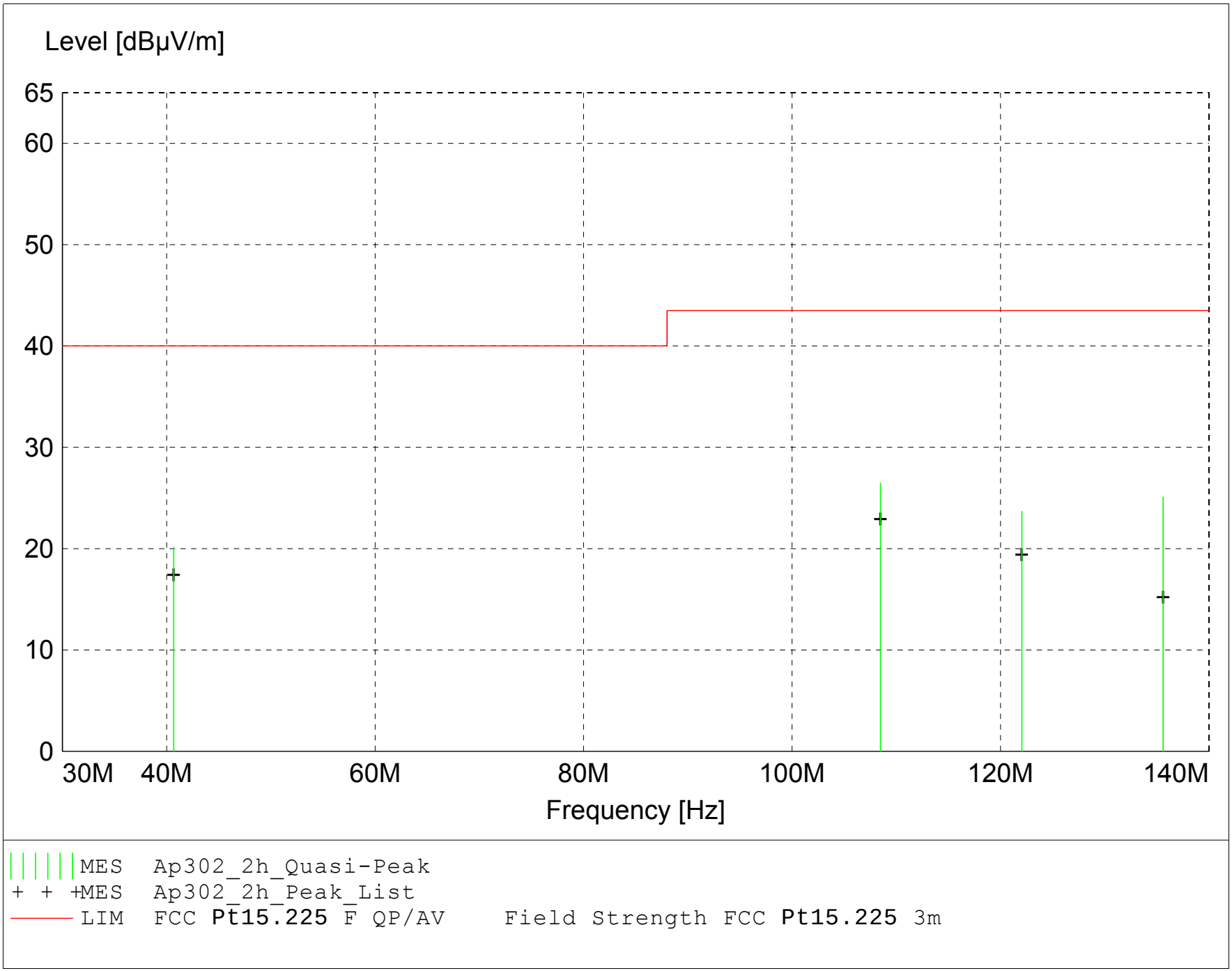
***TEXT: "Site 3 MidH 3M"***

Short Description: Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005

Antennas ---
Biconical -- EMCO 3104C SN: 9701-4785
Log Periodic -- EMCO 3146 SN: 9702-4895

Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/005

TEST SET-UP: EUT Measured at 3 Meters with HORIZONTAL Antenna Polarization




|||||MES  Ap302_2h_Quasi-Peak
+ + +MES  Ap302_2h_Peak_List
——— LIM  FCC **Pt15.225** F QP/AV  Field Strength FCC **Pt15.225** 3m

***MEASUREMENT RESULT: "Ap302_2h_Final"***

1/18/2007 9:54AM

| Frequency | Level | Antenna Factor | System Loss | Total Level | Limit | Margin | Height Ant. | EuT Angle | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | dBµV | dBµV/m | dB | dBµV/m | dBµV/m | dB | m | deg | | |
| 108.480000 | 37.95 | 11.80 | -23.3 | 26.5 | 43.5 | 17.0 | 2.00 | 190 | QUASI-PEAK | None |
| 135.600000 | 36.31 | 11.88 | -23.1 | 25.1 | 43.5 | 18.4 | 2.40 | 0 | QUASI-PEAK | None |
| 122.040000 | 34.31 | 12.55 | -23.2 | 23.7 | 43.5 | 19.8 | 2.00 | 180 | QUASI-PEAK | None |
| 40.680000 | 32.96 | 11.43 | -24.3 | 20.1 | 40.0 | 19.9 | 2.50 | 225 | QUASI-PEAK | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# FREQUENCY STABILITY

# PART 2.1055e

# FREQUENCY VS TEMPERATURE

# AND

# FREQUENCY VS VOLTAGE

### 4.2.5 Frequency Stability

**Requirement(s):** 47 CFR §15.225(e) & RSS-210 (A2.6)

**Procedures:** Frequency Stability was measured according to 47 CFR §2.1055. Measurement was taken with spectrum analyzer. The spectrum analyzer bandwidth and span was set to read in hertz. A voltmeter was used to monitor when varying the voltage.

Limit: ±0.01% of 13.56 MHz = 1356 Hz

**Results: Mifare is activated**

**Frequency versus Temperature**

Reference Frequency: measured 13.559883 MHz at 20°C

| Temperature (Celsius) | Measured Freq. (MHz) | Freq. Drift (Hz) | Freq. Drift (%) |
|---|---|---|---|
| 50 | 13.559741 | -142 | -0.00105 |
| 40 | 13.559756 | -127 | -0.00094 |
| 30 | 13.559782 | -101 | -0.00074 |
| 20 | Reference | | |
| 10 | 13.559792 | -91 | -0.00067 |
| 0 | 13.559792 | -91 | -0.00067 |
| -10 | 13.559842 | -41 | -0.00030 |
| -20 | 13.559850 | -33 | -0.00024 |
| -30 | 13.559858 | -25 | -0.00018 |

**Frequency versus Voltage**

Reference Frequency: measured 13.559883 MHz at 20°C with 120 Vac / 60 Hz

| Measured Voltage ±15% of nominal (AC) | Measured Freq. (MHz) | Freq. Drift (Hz) | Freq. Drift (%) |
|---|---|---|---|
| 138 | 13.559875 | -8 | -0.00006 |
| 102 | 13.559883 | 0 | 0.00000 |

**Results: RFID is activated**

**Frequency versus Temperature**

Reference Frequency: measured 13.559083 MHz at 20°C

| Temperature (Celsius) | Measured Freq. (MHz) | Freq. Drift (Hz) | Freq. Drift (%) |
|---|---|---|---|
| 50 | 13.558975 | -108 | -0.00080 |
| 40 | 13.559008 | -75 | -0.00055 |
| 30 | 13.559025 | -58 | -0.00043 |
| 20 | Reference | | |
| 10 | 13.559025 | -58 | -0.00043 |
| 0 | 13.559017 | -66 | -0.00049 |
| -10 | 13.559217 | 134 | 0.00099 |
| -20 | 13.559325 | 242 | 0.00178 |
| -30 | 13.559217 | 134 | 0.00099 |

**Frequency versus Voltage**

Reference Frequency: measured 13.559083 MHz at 20°C with 120 Vac / 60 Hz

| Measured Voltage ±15% of nominal (AC) | Measured Freq. (MHz) | Freq. Drift (Hz) | Freq. Drift (%) |
|---|---|---|---|
| 138 | 13.559083 | 0 | 0.00000 |
| 102 | 13.559083 | 0 | 0.00000 |

**Tested By: Kerwinn Corpuz**

**Date Tested: 30 April 2007**

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**Requirement(s):** 47 CFR §15.225(e) & RSS-210 (A2.6)

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**Results: RFID is activated**

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| Temperature (Celsius) | Measured Freq. (MHz) | Freq. Drift (Hz) | Freq. Drift (%) |
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**Tested By: Kerwinn Corpuz**

**Date Tested: 30 April 2007**