1250 Peterson Dr., Wheeling, IL 60090

Company: Brady Corporation
Model Tested: BP-IP300
Report Number: 14831

FCC Rules and Regulations / Intentional Radiators

Operational in the Band 13.553-13.567 MHz

Part 15, Subpart C, Section 15.225a & Subpart B, Section 15.107b*

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

| | |
|---|---|
| Formal Name: | IP Printer Series |
| Kind of Equipment: | Label Printer with 13.56 MHz RFID |
| Frequency Range: | 13.56 MHz |
| Test Configuration: | Printer connected to Laptop PC via USB cable Tested at 120 vac, 60 Hz |
| Model Number(s): | BP-IP300, BP-IP300-C, BP-IP600, BP-IP600-C |
| Model(s) Tested: | BP-IP300 |
| Serial Number(s): | 0013690 |
| Date of Tests: | October 13, 17 & 20, 2008 & March 13, 2009 |
| Test Conducted For: | Brady Corporation<br>6555 W Good Hope Road<br>Milwaukee, Wisconsin 53223 |

**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.

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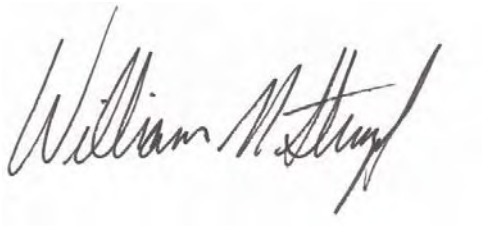
SIGNATURE PAGE

Report By:

Arnom C. Rowe
Test Engineer
EMC-001375-NE

Reviewed By:



William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

1250 Peterson Dr., Wheeling, IL 60090

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United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

# Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

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

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:*

## ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).*

2008-10-01 through 2009-09-30
*Effective dates*

*For the National Institute of Standards and Technology*

NVLAP-01C (REV. 2006-09-13)

## 1.0 SUMMARY OF TEST REPORT

It was found that the IP Printer Series, Model Number(s) BP-IP300 **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, as well as AC Line Conducted Part 15, Subpart B*.

* The RF Module has its power supplied by the host device, which is a Class A device. Therefore AC Line Conducted emissions was tested on the host device using Class A limits.

## 2.0 INTRODUCTION

On October 13, 17 & 20, 2008 & March 13, 2009, a series of radio frequency interference measurements was performed on IP Printer Series, Model Number(s) BP-IP300, Serial Number: 0013690. 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.

**Main Test Facility:**
D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, Illinois 60090

**O.A.T.S. Test Facility:**
D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128
FCC Registration Number: 334127

## 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.

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## 4.0 TEST SET-UP

All emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the ANSI C63.4-2003, Annex H.

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 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 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 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 |

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 ANSI C63.4-2003.

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

7.1 Description:

The IP Printer is a thermal transfer printer. The Windows based label-printing application software receives label media and ribbon type installed in the printer prior to any print function based on information stored and retrieved from RFID tags located on the ribbon and media core. Information is transmitted and received to RFID tags using internal antennas, hardware, and firmware on the transceiver card (BDC). It is then sent to the front panel firmware and via the USB to the application firmware. Print information is sent to the printer via the printer driver. After each label is printed, quantity remaining is updated in RFID tags attached to ribbon and media cores via the BDC and internal antennas. A bar graph on the printer's front panel is updated with the installed media part number and quantity remaining using the front panel hardware and firmware. The process is repeated after each label is printed.

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 425 mm x Width 240 mm: x Height: 290 mm

7.3 LINE FILTER USED:

N/A

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

100 kHz

Clock Frequencies:

33.333 MHz, 25.000 MHz, 13.56 MHz, 12.000 MHz & 32.768 kHz

7.0 DESCRIPTION OF TEST SAMPLE: (CON'T)

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. Main Board PN: 5551122 Index 01
2. Brady Daughter Card (BDC) PN: Y538479 Rev G
3. User Interface Navigator Board (PCB) PN: 5955025 Index 1
4. User Interface Navigator Board (PWA) PN: 5955026 Index 1
5. LCD Circuit Board (PCB) PN: 5955006 Index 2
6. LCD Circuit Board (PWA) PN: 5955007 Index 1

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

1: Added 90 mm x 150 mm piece of metal tape underneath circuit board. It is placed under the processor, at the Ethernet / USB / RS-232 connector board edge.

2. Added ferrite to AC power cord. Fair-Rite #0431164281 (one pass).

3. Added ferrite to printhead cable inside EUT. Ferrishield #SA28B0121 (one pass).

4. Added ferrite to USB cable. Steward #28A0392-0A2 (one pass).

NOTE:

Device uses 3 antennas. Each one transmits separately for a short time. The device was continuously transmitting, cycling through each antenna at a rate of 3 cycles per second.

1. Continuous transmit and receive.
2. Continuous transmit and receive while printing.
3. Communications through Ethernet cable (10/100 Base T)

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## 9.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 IP Printer Series
Model Number: BP-IP300 Serial Number: 0013690

Item 1 Dell keyboard
Model No: SK-8115; Serial No: CN-0DJ331-71616-838-0EXZ

Item 2 Brady HandyMark
Model No: TLS2200; Serial No: BPHMK735214332

Item 3 Dell Latitude D630 PC
Model No: PP18L; Serial No: 27103731949

Item 4 Non-shielded AC power cord. 1.5m

Item 5 Shielded (with metal connector) USB cable. 1.5m

Item 6 Shielded (with metal connector) RS-232 cable. 1.5m

Item 7 Non-Shielded (with plastic connector) CAT 5e Ethernet cable. 2.5m

Item 8 Non-Shielded un-coiled (with plastic connector) RJ9 cable with ferrite. 2m

Item 9 SanDisk 256 MB CompactFlash memory card.

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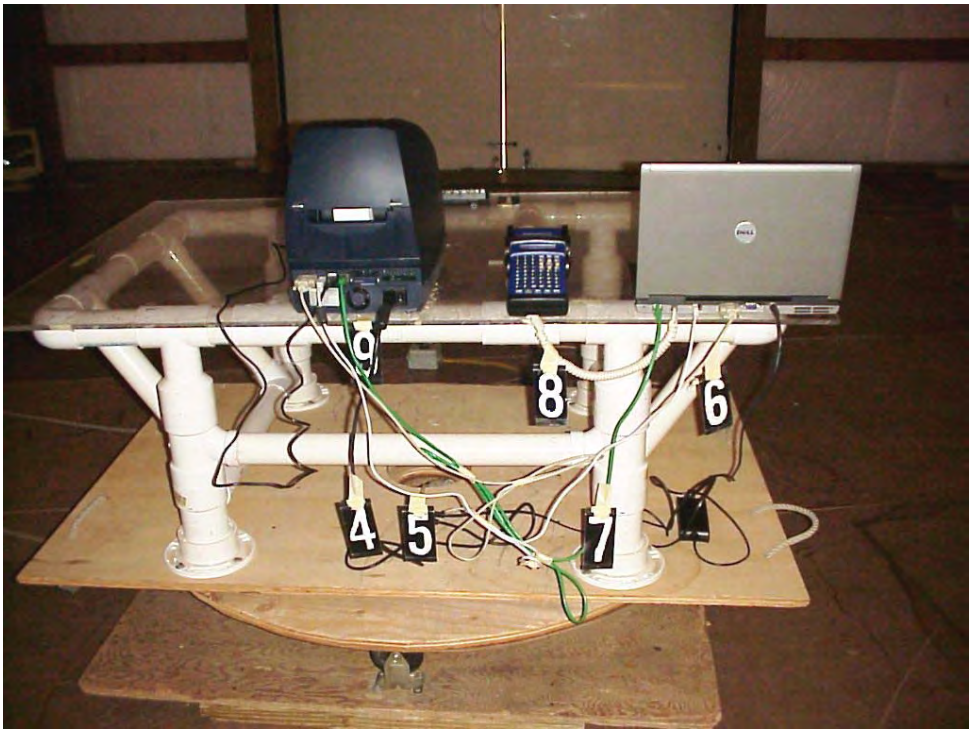
## 10.0 RADIATED PHOTOS TAKEN DURING TESTING

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## 10.0 AC LINE CONDUCTED PHOTOS TAKEN DURING TESTING


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

## 11.0 RESULTS OF TESTS

The radio interference emission charts 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.

## 12.0 CONCLUSION

It was found that the IP Printer Series, Model Number(s) BP-IP300 **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, as well as AC Line Conducted Part 15, Subpart B*.

* The RF Module has its power supplied by the host device, which is a Class A device. Therefore AC Line Conducted emissions was tested on the host device using Class A limits.

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TABLE 1 – EQUIPMENT LIST

| Description | Manufacturer | Model Number | Serial Number | Frequency Range | Cal Due Dates |
|---|---|---|---|---|---|
| Receiver | Rhode & Schwarz | ESI 26 | 837491/010 | 20 Hz – 26 GHz | 12/09 |
| LISN | Solar | 9252-50-R-24-BNC | 961019 | 10 kHz – 30 MHz | 7/09 |
| Filter- High-Pass | SOLAR | 7930-10 | 921541 | 12 kHz | 1/10 |
| Limiter | Electro-Metrics | EM-7600 | 706 | 10 kHz – 30 MHz | 1/10 |
| Receiver | Rohde & Schwarz | ESI 40 | 837808/006 | 20 Hz – 40 GHz | 3/09 |
| Preamplifier | Rohde & Schwarz | TS-PR10 | 032001/004 | 9 kHz – 1 GHz | 1/10 |
| Antenna | EMCO | 6502 | 2038 | 9 kHz – 30 MHz | 8/09 |
| Antenna | EMCO | 3104C | 00054892 | 20 MHz – 200 MHz | 4/10 |
| Antenna | EMCO | 3146 | 1205 | 200 MHz – 1 GHz | 4/10 |

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

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# APPENDIX A

# TEST PROCEDURE

## Part 15, SUBPART C, SECTION 15.225A-E

## OPERATION WITHIN THE BAND 13.110-14.010 MHz

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APPENDIX A

## 1.0 AC POWER LINE 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 | 79 | 66 |
| .5 to 30 | 73 | 60 |
| | | |

Class A limits were used because this is a Class A host device providing power to the transceiver.

# AC POWER LINE CONDUCTED DATA AND GRAPHS TAKEN DURING TESTING

# PART 15.107 (b)

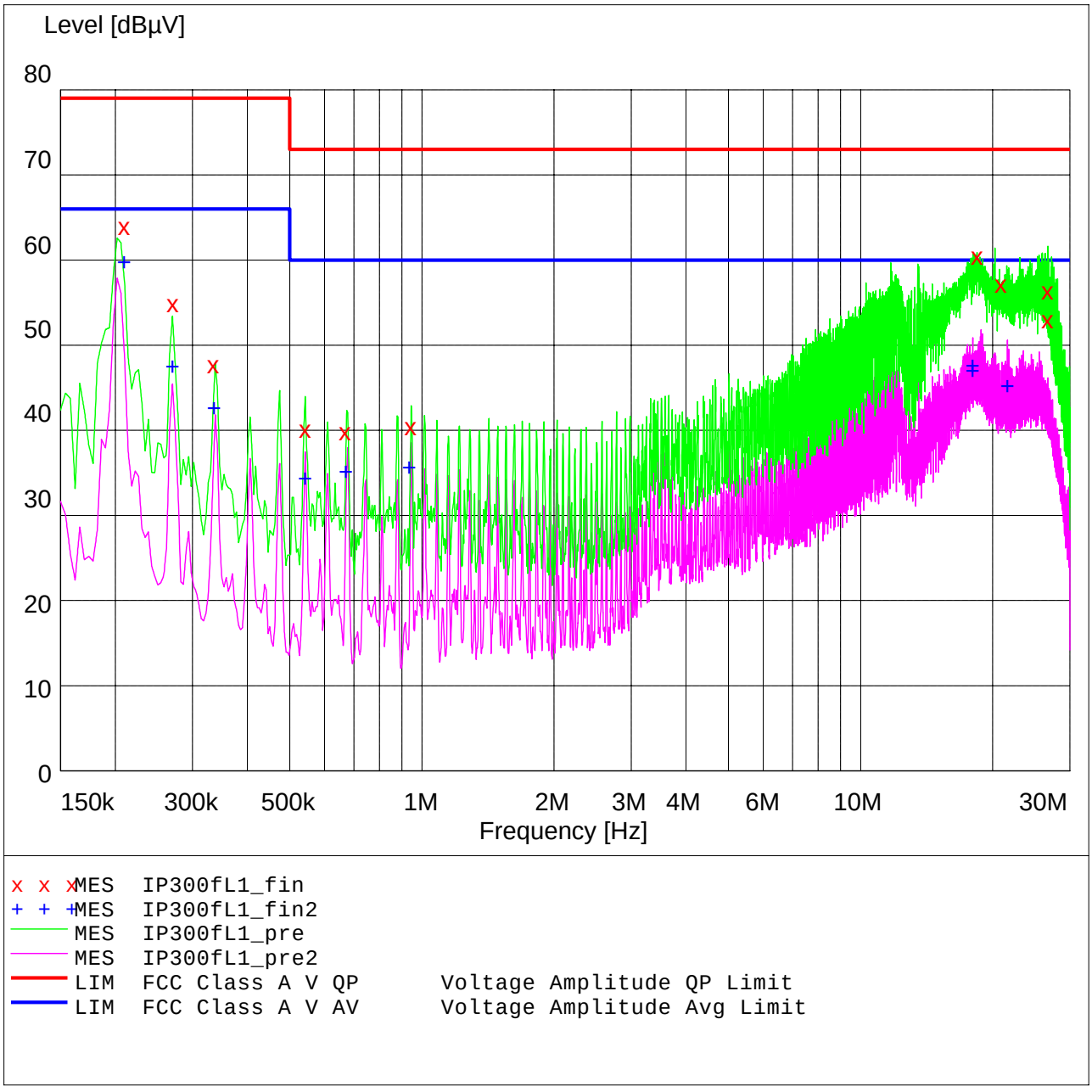
***FCC Part 15 Class A***
***Voltage Mains Test***

| | |
|---|---|
| EUT: | IP300 |
| Manufacturer: | Brady Corp |
| Operating Condition: | 68 deg F, 22% R.H. |
| Test Site: | DLS O.F. Screen Room |
| Operator: | Craig B |
| Test Specification: | Line 1 |
| Comment: | 120 V 60 Hz |
| | Date: 03-13-2009 |

***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 | 2.0 s | 9 kHz | LISN DLS#128 |



***MEASUREMENT RESULT: "IP300fL1_fin"***

3/13/2009 8:33AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.202000 | 62.00 | 12.9 | 79 | 17.0 | QP | 1 | --- |
| 0.270000 | 52.90 | 12.3 | 79 | 26.1 | QP | 1 | --- |
| 0.338000 | 46.20 | 12.0 | 79 | 32.8 | QP | 1 | --- |
| 0.542000 | 40.90 | 11.5 | 73 | 32.1 | QP | 1 | --- |
| 0.674000 | 40.60 | 11.3 | 73 | 32.4 | QP | 1 | --- |
| 0.946000 | 41.20 | 11.1 | 73 | 31.8 | QP | 1 | --- |
| 18.434000 | 58.50 | 11.7 | 73 | 14.5 | QP | 1 | --- |
| 20.258000 | 55.80 | 11.7 | 73 | 17.2 | QP | 1 | --- |
| 25.978000 | 54.80 | 12.1 | 73 | 18.2 | QP | 1 | --- |
| 26.334000 | 53.30 | 12.1 | 73 | 19.7 | QP | 1 | --- |
| 26.402000 | 53.10 | 12.1 | 73 | 19.9 | QP | 1 | --- |
| 26.758000 | 52.80 | 12.1 | 73 | 20.2 | QP | 1 | --- |

***MEASUREMENT RESULT: "IP300fL1_fin2"***

3/13/2009 8:33AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.202000 | 58.00 | 12.9 | 66 | 8.0 | CAV | 1 | --- |
| 0.270000 | 45.70 | 12.3 | 66 | 20.3 | CAV | 1 | --- |
| 0.338000 | 40.60 | 12.0 | 66 | 25.4 | CAV | 1 | --- |
| 0.542000 | 35.70 | 11.5 | 60 | 24.3 | CAV | 1 | --- |
| 0.678000 | 36.60 | 11.3 | 60 | 23.4 | CAV | 1 | --- |
| 0.946000 | 37.20 | 11.1 | 60 | 22.8 | CAV | 1 | --- |
| 18.014000 | 47.80 | 11.7 | 60 | 12.2 | CAV | 1 | --- |
| 18.770000 | 48.60 | 11.7 | 60 | 11.4 | CAV | 1 | --- |
| 18.838000 | 48.50 | 11.7 | 60 | 11.5 | CAV | 1 | --- |
| 18.978000 | 47.60 | 11.7 | 60 | 12.4 | CAV | 1 | --- |
| 21.614000 | 45.70 | 11.8 | 60 | 14.3 | CAV | 1 | --- |

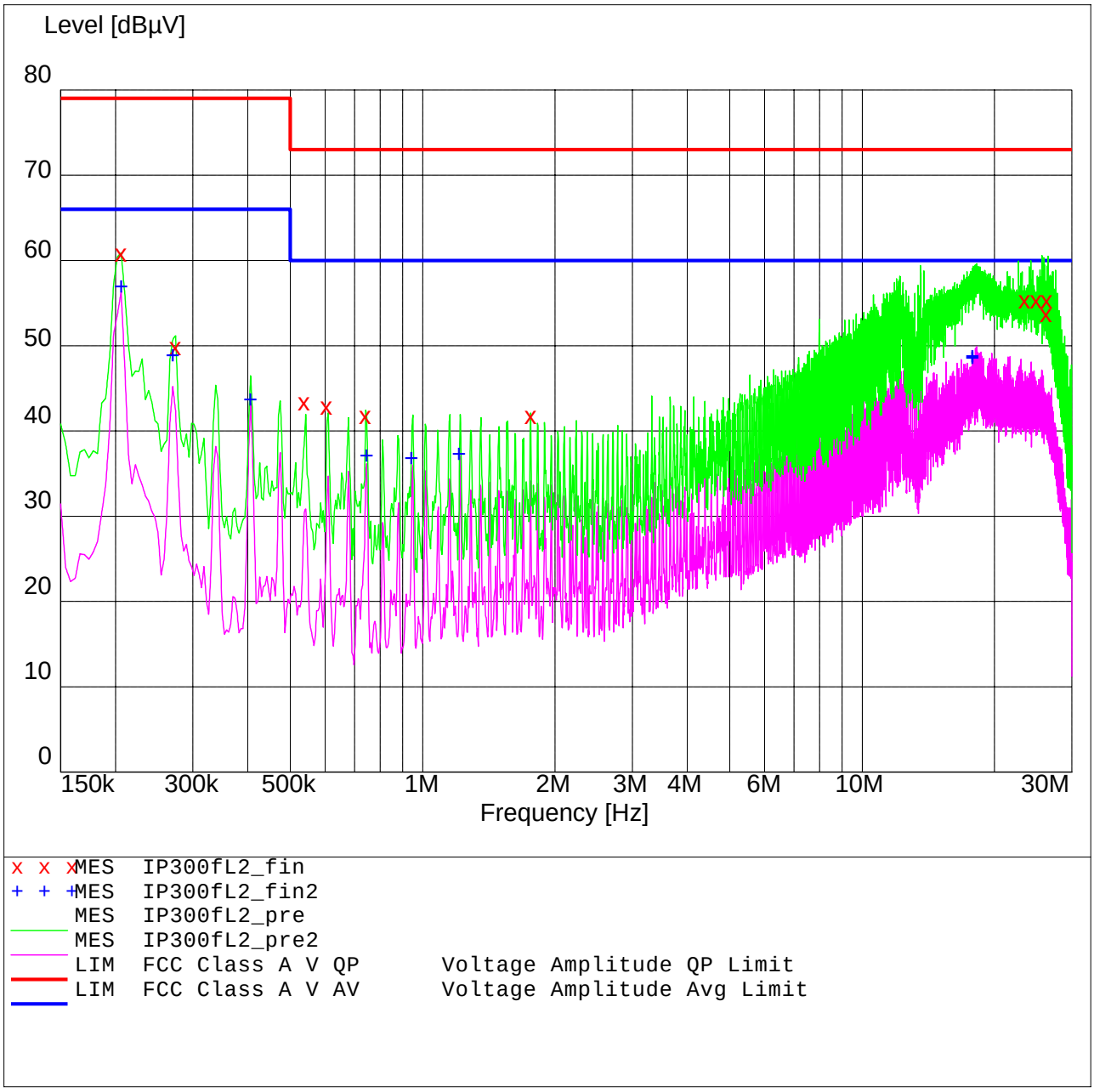
***FCC Part 15 Class A***
***Voltage Mains Test***

| | |
|---|---|
| EUT: | IP300 |
| Manufacturer: | Brady Corp |
| Operating Condition: | 68 deg F, 22% R.H. |
| Test Site: | DLS O.F. Screen Room |
| Operator: | Craig B |
| Test Specification: | Line 2 |
| Comment: | 120 V 60 Hz |
| | Date: 03-13-2009 |

***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<br>CISPR AV | 2.0 s | 9 kHz | LISN DLS#128 |



***MEASUREMENT RESULT: "IP300fL2_fin"***

3/13/2009 8:43AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.206000 | 59.30 | 12.9 | 79 | 19.7 | QP | 1 | --- |
| 0.274000 | 48.80 | 12.3 | 79 | 30.2 | QP | 1 | --- |
| 0.542000 | 41.20 | 11.5 | 73 | 31.8 | QP | 1 | --- |
| 0.610000 | 40.80 | 11.4 | 73 | 32.2 | QP | 1 | --- |
| 0.742000 | 39.60 | 11.2 | 73 | 33.4 | QP | 1 | --- |
| 1.762000 | 39.50 | 11.1 | 73 | 33.5 | QP | 1 | --- |
| 22.706000 | 53.70 | 11.9 | 73 | 19.3 | QP | 1 | --- |
| 24.198000 | 53.70 | 12.0 | 73 | 19.3 | QP | 1 | --- |
| 25.630000 | 53.70 | 12.0 | 73 | 19.3 | QP | 1 | --- |
| 25.842000 | 52.10 | 12.0 | 73 | 20.9 | QP | 1 | --- |
| 25.914000 | 51.20 | 12.0 | 73 | 21.8 | QP | 1 | --- |
| 26.486000 | 51.90 | 12.1 | 73 | 21.1 | QP | 1 | --- |

***MEASUREMENT RESULT: "IP300fL2_fin2"***

3/13/2009 8:43AM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.206000 | 55.10 | 12.9 | 66 | 10.9 | CAV | 1 | --- |
| 0.270000 | 47.20 | 12.3 | 66 | 18.8 | CAV | 1 | --- |
| 0.406000 | 41.60 | 11.7 | 66 | 24.4 | CAV | 1 | --- |
| 0.746000 | 35.60 | 11.2 | 60 | 24.4 | CAV | 1 | --- |
| 0.950000 | 35.30 | 11.1 | 60 | 24.7 | CAV | 1 | --- |
| 1.218000 | 35.90 | 11.1 | 60 | 24.1 | CAV | 1 | --- |
| 17.830000 | 46.80 | 11.7 | 60 | 13.2 | CAV | 1 | --- |
| 18.102000 | 47.20 | 11.7 | 60 | 12.8 | CAV | 1 | --- |
| 18.238000 | 47.20 | 11.7 | 60 | 12.8 | CAV | 1 | --- |
| 18.306000 | 47.40 | 11.7 | 60 | 12.6 | CAV | 1 | --- |
| 18.646000 | 47.30 | 11.7 | 60 | 12.7 | CAV | 1 | --- |

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# APPENDIX A

## 2.0 ANTENNA CONNECTOR – 15.203

As stated in 15.203 the IP Printer Series was designed to ensure that no antenna other than that furnished by Brady Corporation will be used with the EUT. The use of a permanently attached antenna or antenna that uses an unique coupling to the intentional radiator was considered to comply with section 15.203.

## 3.0 BAND EDGE AND RESTRICTED BAND 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 from the IP Printer Series transmitter shall not be inside the restricted band 13.36 to 13.41 MHz.

**NOTE:** See the following page (s) for the graph (s) made showing compliance for Band Edge. See page 34 for the Restricted Band measurements.

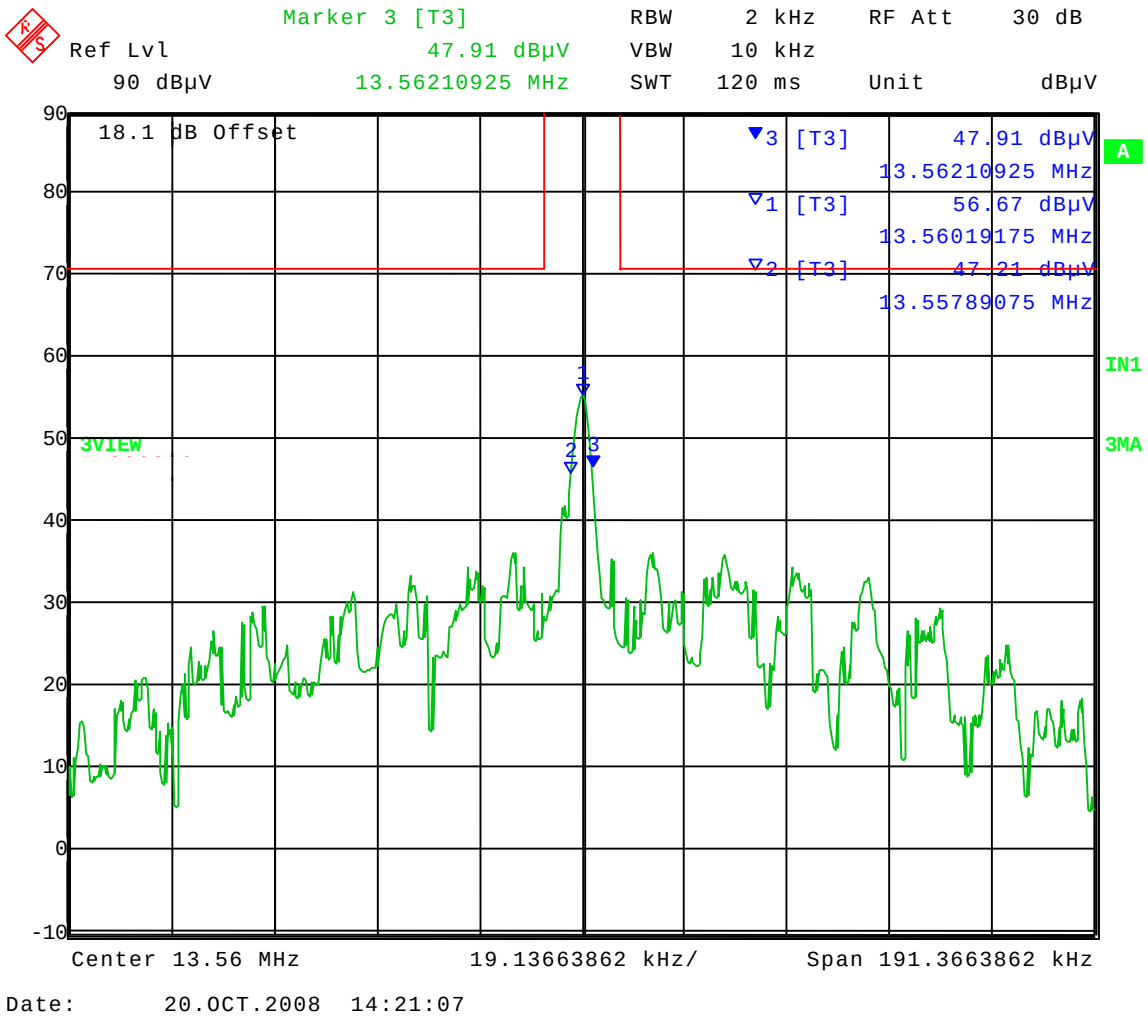
# GRAPH(s) TAKEN SHOWING THE

# BAND EDGE COMPLIANCE

# PART 15.225

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

Test Date: 10-20-2008
Company: Brady Corp.
EUT: BP-IP300
Test: Emission Mask – referenced to field strength measurement
Rule Part: FCC Pt. 15.225
Operator: Craig B



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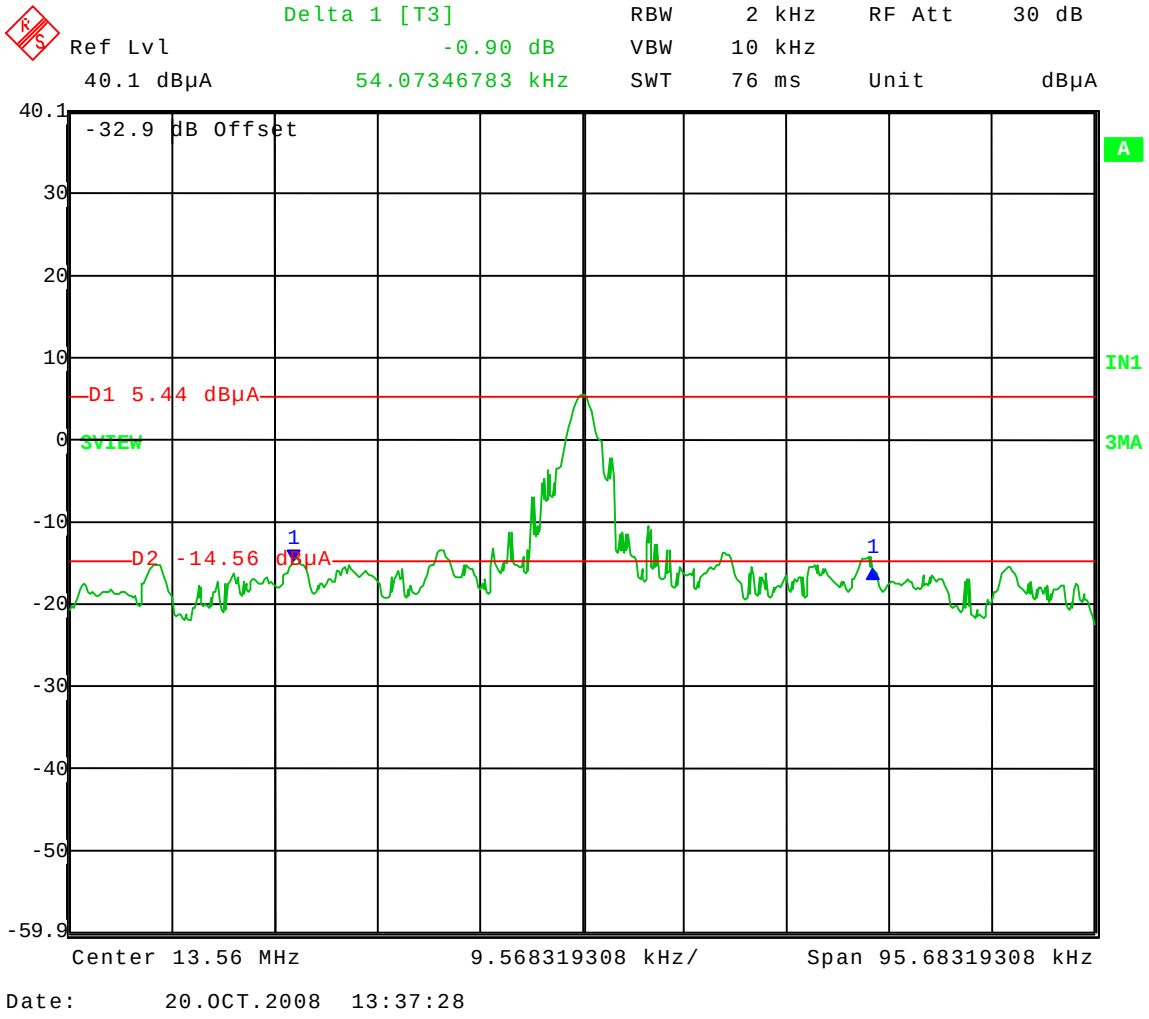
Company: Brady Corporation
Model Tested: BP-IP300
Report Number: 14831

Test Date: 10-20-2008
Company: Brady Corp.
EUT: BP-IP300
Test: 20 dB Bandwidth
Rule part: FCC Part 15.225
Operator: Craig B

Frequency: 13.56 MHz

20 dB bandwidth = 54.07 kHz



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APPENDIX A

## 4.0 FIELD STRENGTH OF FUNDAMENTAL AND SPURIOUS EMISSION MEASUREMENTS (SECTION 15.225a & b)

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the IP Printer Series, Model Number: BP-IP300, 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 IP Printer Series were made up to 1000 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 200 MHz, a Biconical Antenna or tuned dipoles were used and from 200 MHz to 1000 MHz, a Log Periodic 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 and Log Periodic. 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.

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# RADIATED DATA AND GRAPHS TAKEN FOR

# FUNDAMENTAL FIELD STRENGTH

# EMISSION MEASUREMENTS

# PART 15.225

## *FCC Part 15.225*

## *Radiated Emissions*

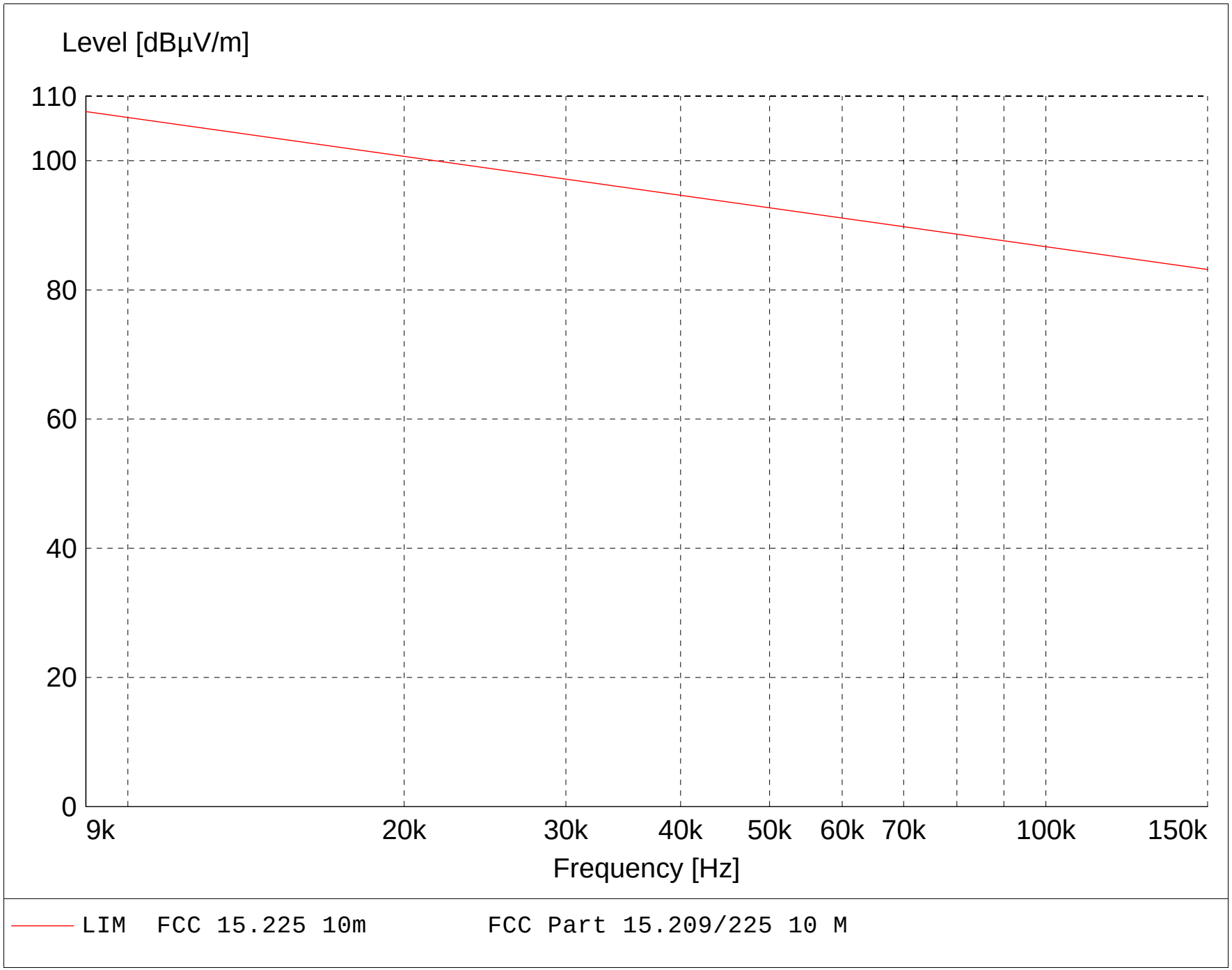
EUT: BP-IP300
Manufacturer: Brady Corp.
Operating Condition: 66 degF ; 58%R.H.
Test Site: D.L.S. O.F. Site 2
Operator: Craig B
Test Specification: 120 V 60 Hz
Comment: Transmit at 13.56 MHz
Date: 10-13-2008

## *TEXT: "Site 2 LowH 3M Act"*

Short Description: Test Set-up 9kHz to 30MHz H
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005

Antennas --- EMCO Active Loop Model: 6502 SN: 1027

TEST SET-UP: EuT Measured at 10 Meters with Loop Antenna


Level [dBµV/m]
110
100
80
60
40
20
0
9k
20k
30k
40k
50k
60k
70k
100k
150k
Frequency [Hz]
LIM FCC 15.225 10m
FCC Part 15.209/225 10 M

## *FCC Part 15.225*

## *Radiated Emissions*

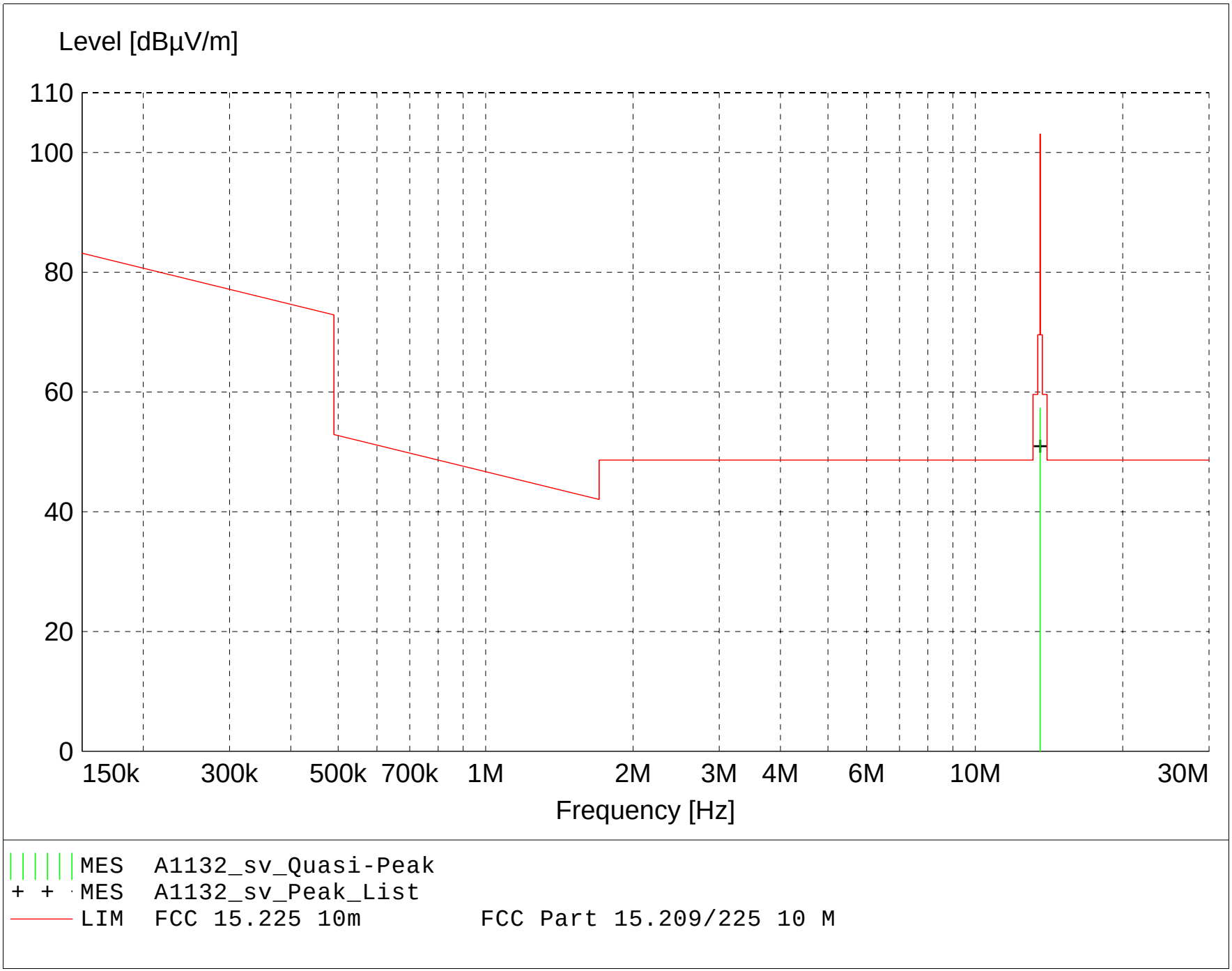
EUT: BP-IP300
Manufacturer: Brady Corp.
Operating Condition: 66 degF ; 58%R.H.
Test Site: D.L.S. O.F. Site 2
Operator: Craig B
Test Specification: 120 V 60 Hz
Comment: Transmit at 13.56 MHz
Date: 10-13-2008

## *TEXT: "Site 2 LowH 3M Act"*

Short Description: Test Set-up 9kHz to 30MHz H
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005

Antennas --- EMCO Active Loop Model: 6502 SN: 1027

TEST SET-UP: EuT Measured at 10 Meters with Loop Antenna


Level [dBµV/m]
110
100
80
60
40
20
0
150k
300k
500k
700k
1M
2M
3M
4M
6M
10M
30M
Frequency [Hz]
MES A1132_sv_Quasi-Peak
MES A1132_sv_Peak_List
LIM FCC 15.225 10m
FCC Part 15.209/225 10 M

***MEASUREMENT RESULT: "A1132_sv_Final"***

10/13/2008 9:18AM

| 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 | | |
| 13.560000 | 46.06 | 10.61 | 0.6 | 57.3 | 103.1 | 45.8 | 1.00 | 135 | QUASI-PEAK | fundamental |

1250 Peterson Dr., Wheeling, IL 60090

Company: Brady Corporation
Model Tested: BP-IP300
Report Number: 14831

# RADIATED DATA TAKEN FOR

# FIELD STRENGTH

# SPURIOUS EMISSION MEASUREMENTS

# PART 15.209

## *FCC Part 15  class B*

## *Electric Field Strength*

```
EUT:                 BP-IP300
Manufacturer:        Brady Corp.
Operating Condition: 68 degF; 42% R.H.
Test Site:           D.L.S. O.F. Site 2
Operator:            Craig B
Test Specification:
Comment:             13.56 MHz; Transmit and Receive modes
                     Date:  10-17-2008
```

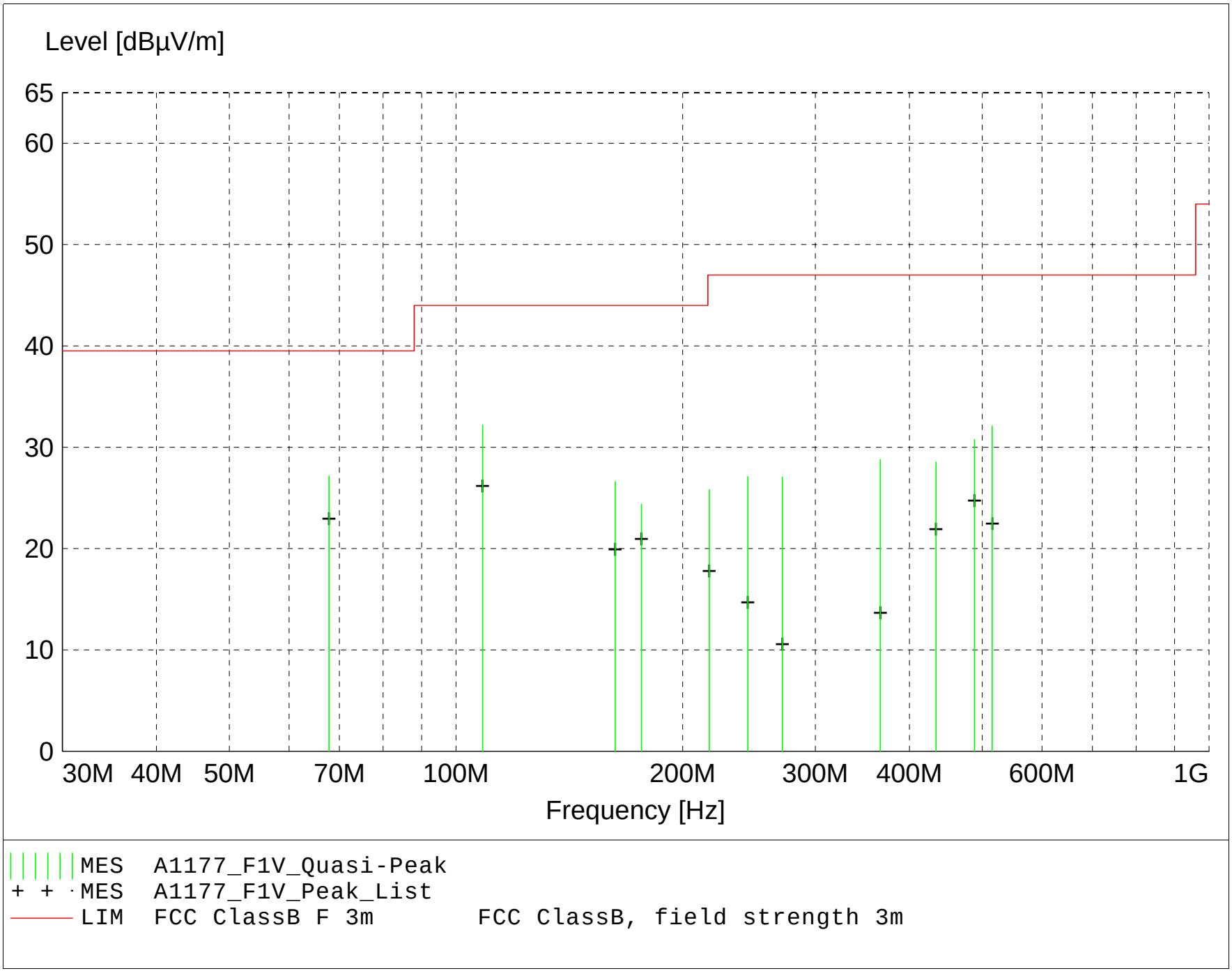
## *TEXT: "Site 2 MidV 3M"*

```
  Short Description:            Test Set-up Vert30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 26 SN: 837460/002

                Antennas ---
                Biconical    -- EMCO 3104C SN: 0005-4892
                Log Periodic -- Electro Metrics LPA-25 SN: 1205

                Pre-Amp  --- Rohde&Schwarz TS-PR10 SN: 032001/004

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


Level [dBµV/m]
65
60
50
40
30
20
10
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A1177_F1V_Quasi-Peak
MES A1177_F1V_Peak_List
LIM FCC ClassB F 3m
FCC ClassB, field strength 3m

***MEASUREMENT RESULT: "A1177_F1V_Final"***

10/17/2008 10:24AM

| 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 | 43.26 | 12.34 | -23.4 | 32.2 | 44.0 | 11.8 | 1.00 | 180 | QUASI-PEAK | None |
| 67.800000 | 43.51 | 7.60 | -23.9 | 27.2 | 39.5 | 12.3 | 1.00 | 45 | QUASI-PEAK | None |
| 515.280000 | 33.99 | 18.76 | -20.7 | 32.1 | 47.0 | 14.9 | 1.00 | 160 | QUASI-PEAK | None |
| 488.160000 | 34.17 | 17.54 | -21.0 | 30.8 | 47.0 | 16.2 | 1.10 | 180 | QUASI-PEAK | None |
| 162.720000 | 36.62 | 13.21 | -23.2 | 26.6 | 44.0 | 17.4 | 1.00 | 180 | QUASI-PEAK | None |
| 366.120000 | 35.27 | 15.06 | -21.5 | 28.8 | 47.0 | 18.2 | 1.50 | 180 | QUASI-PEAK | None |
| 433.920000 | 33.49 | 16.15 | -21.1 | 28.5 | 47.0 | 18.5 | 1.30 | 315 | QUASI-PEAK | None |
| 176.280000 | 31.78 | 15.44 | -22.8 | 24.4 | 44.0 | 19.6 | 1.00 | 135 | QUASI-PEAK | None |
| 244.080000 | 37.32 | 12.00 | -22.2 | 27.1 | 47.0 | 19.9 | 1.00 | 0 | QUASI-PEAK | None |
| 271.200000 | 36.33 | 12.99 | -22.2 | 27.1 | 47.0 | 19.9 | 1.00 | 280 | QUASI-PEAK | None |
| 216.960000 | 37.16 | 11.23 | -22.6 | 25.8 | 47.0 | 21.2 | 1.00 | 180 | QUASI-PEAK | None |

## *FCC Part 15  class B*

## *Electric Field Strength*

EUT: BP-IP300
Manufacturer: Brady Corp.
Operating Condition: 68 degF; 42% R.H.
Test Site: D.L.S. O.F. Site 2
Operator: Craig B
Test Specification:
Comment: 13.56 MHz; Transmit and Receive modes
Date:  10-17-2008

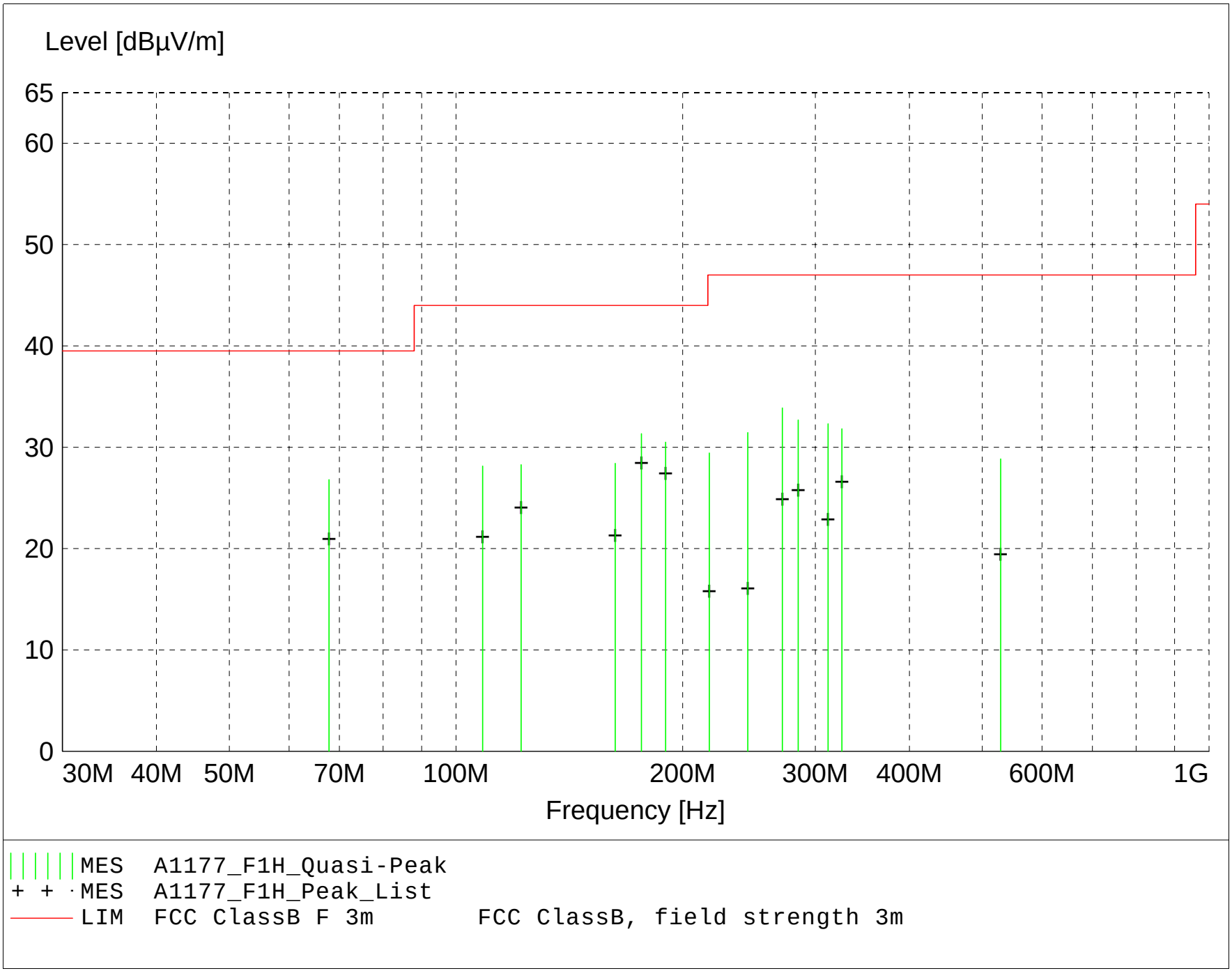
## *TEXT: "Site 2 MidH 3M"*

Short Description: Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 26 SN: 837460/002

Antennas ---
Biconical -- EMCO 3104C SN: 0005-4892
Log Periodic -- Electro Metrics LPA-25 SN: 1205

Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/004

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


Level [dBµV/m]
65
60
50
40
30
20
10
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A1177_F1H_Quasi-Peak
MES A1177_F1H_Peak_List
LIM FCC ClassB F 3m
FCC ClassB, field strength 3m

***MEASUREMENT RESULT: "A1177_F1H_Final"***

10/17/2008 10:50AM

| 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 | | |
| 176.280000 | 38.74 | 15.44 | -22.8 | 31.3 | 44.0 | 12.7 | 1.80 | 90 | QUASI-PEAK | None |
| 67.800000 | 43.14 | 7.60 | -23.9 | 26.8 | 39.5 | 12.7 | 3.00 | 45 | QUASI-PEAK | None |
| 271.200000 | 43.14 | 12.99 | -22.2 | 33.9 | 47.0 | 13.1 | 1.20 | 135 | QUASI-PEAK | None |
| 189.840000 | 36.58 | 16.59 | -22.7 | 30.5 | 44.0 | 13.5 | 1.30 | 100 | QUASI-PEAK | None |
| 284.760000 | 41.25 | 13.58 | -22.1 | 32.7 | 47.0 | 14.3 | 1.10 | 135 | QUASI-PEAK | None |
| 311.880000 | 38.80 | 15.48 | -22.0 | 32.3 | 47.0 | 14.7 | 1.10 | 315 | QUASI-PEAK | None |
| 325.440000 | 39.06 | 14.67 | -21.9 | 31.8 | 47.0 | 15.2 | 1.00 | 315 | QUASI-PEAK | None |
| 244.080000 | 41.67 | 12.00 | -22.2 | 31.5 | 47.0 | 15.5 | 1.20 | 135 | QUASI-PEAK | None |
| 162.720000 | 38.42 | 13.21 | -23.2 | 28.4 | 44.0 | 15.6 | 2.00 | 225 | QUASI-PEAK | None |
| 122.040000 | 38.83 | 12.73 | -23.3 | 28.3 | 44.0 | 15.7 | 2.50 | 315 | QUASI-PEAK | None |
| 108.480000 | 39.21 | 12.34 | -23.4 | 28.1 | 44.0 | 15.9 | 2.60 | 110 | QUASI-PEAK | None |
| 216.960000 | 40.78 | 11.23 | -22.6 | 29.4 | 47.0 | 17.6 | 1.60 | 225 | QUASI-PEAK | None |
| 528.840000 | 31.23 | 18.26 | -20.6 | 28.9 | 47.0 | 18.1 | 1.70 | 80 | QUASI-PEAK | None |

1250 Peterson Dr., Wheeling, IL 60090

# DATA TAKEN FOR FREQUENCY

# STABILITY WHEN VARYING THE TEMPERATURE

# AND

# PRIMARY SUPPLY VOLTAGE VARIATION

# PART 15.225 (e)

1250 Peterson Dr., Wheeling, IL 60090

Company: Brady Corporation
Model Tested: BP-IP300
Report Number: 14831

DLS Electronic Systems, Inc.

Company: Brady Corp.
Operator: Craig B
Date of test: 10-20-2008

Limit = +/- 0.01% (+/- 1,356 Hz)

Frequency Stability FCC Part 15.225

| Model | Nominal Frequency (MHz) | Measured Frequency | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | +50 deg. C | Error (Hz) | +40 deg. C | Error (Hz) | +30 deg. C | Error (Hz) | +20 deg. C | Error (Hz) | +10 deg. C | Error (Hz) |
| BP-IP300 | 13.560 | 13.559525 | **-475.000** | 13.559550 | **-450.000** | 13.559575 | **-425.000** | 13.559525 | **-475.000** | 13.559563 | **-437.000** |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Frequency Stability FCC Part 15.225

| Model | Nominal Frequency (MHz) | Measured Frequency | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0 deg. C | Error (Hz) | -10 deg. C | Error (Hz) | -20 deg. C | Error (Hz) | | | | |
| BP-IP300 | 13.560 | 13.559613 | **-387.000** | 13.559613 | **-387.000** | 13.559613 | **-387.000** | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Frequency Stability FCC Part 15.225

| Model | Nominal Frequency (MHz) | Measured Frequency | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 102 Volts | Error (Hz) | 120 Volts | Error (Hz) | 138 Volts | Error (Hz) | | | | |
| BP-IP300 | 13.560 | 13.559554 | **-446.200** | 13.559525 | **-475.000** | 13.559525 | **-475.000** | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

1250 Peterson Dr., Wheeling, IL 60090

## 6.0 FREQUENCY STABILITY PHOTOS TAKEN DURING TESTING