DLS ELECTRONIC SYSTEMS, INC.
NVLAP 100276-0

Company: Intermatic Inc.
Model Tested: HA02
Report Number: 10668

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

FCC Rules and Regulations / Intentional Radiators

Operational in the 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz Bands

Part 15, Subpart C, Section 15.249

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

| | |
|---|---|
| Formal Name: | Plug-in Appliance Module |
| Kind of Equipment: | Appliance Module |
| Test Configuration: | Plug-in (Tested at 120 vac, 60 Hz) |
| Model Number(s): | HA02 |
| Model(s) Tested: | HA02 |
| Serial Number(s): | N/A |
| Date of Tests: | April 8, 2004 |
| Test Conducted For: | Intermatic Inc.<br>7777 Winn Road<br>Spring Grove, Illinois 60081 |

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

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:

Intermatic Inc.

1250 Peterson Dr., Wheeling, IL 6009

Company: Intermatic Inc.
Model Tested: HA02
Report Number: 10668

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC 17025:1999
ISO 9002:1994

## Certificate of Accreditation

**D.L.S. ELECTRONIC SYSTEMS, INC.**
WHEELING, IL

*is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:*

**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

September 30, 2004
*Effective through*

*For the National Institute of Standards and Technology*
NVLAP Lab Code: 100276-0

NVLAP-01C (06-01)

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**NVLAP LAB CODE 100276-0**

**D.L.S. ELECTRONIC SYSTEMS, INC.**
1250 Peterson Drive
Wheeling, IL 60090-6454
Mr. Brian J. Mattson
Phone: 847-537-6400 Fax: 847-537-6488
E-Mail: bmattson@dlsemc.com
URL: http://www.dlsemc.com

| *NVLAP Code* | *Designation / Description* |
|---|---|
| **Emissions Test Methods:** | |
| 12/160D21 | RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 21 - Emission of Radio Frequency Energy |
| 12/300220a | EN 300 220-1 V1.3.1 (2000-09): Electromagnetic compatibility and Radio spectrum Matters; Short Range Devices; Radio equipment to be used in the 25 MHz to 1000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods |
| 12/300386a | EN 300 386 V.1.2.1: Electromagnetic compatibility and radio spectrum matter (ERM); Telecommunication network equipment; Electromagnetic compatibility (EMC) requirements |
| 12/C63.17 | ANSI C63.17-1998: American National Standard for Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices |

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| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/C6317a | ANSI C63.17-1998: American National Standard for Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices |
| 12/CIS11 | IEC/CISPR 11 + A1 (1997), EN 55011 (1998), AS/NZS 2064 (1997), and CNS 137803 (1997): Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical Radio-Frequency Equipment |
| 12/CIS13 | IEC/CISPR 13 (2001-04), EN 55013 (2001), AS/NZS 1053 (2001), and CNS 13439 (2001): Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement |
| 12/CIS14 | CISPR 14-1 (March 30, 2000): Limits and methods of measurement of radio interference characteristics of household electrical appliances, portable tools and similar electrical apparatus - Part 1: Emissions |
| 12/CIS14a | EN 55014-1 (1993) with Amendments A1 (1997) & A2 (1999) |
| 12/CIS14d | IEC/CISPR 14-1 (2001) and A1 (2001): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emissions |
| 12/CIS14e | EN 55014-1 (2001) and A1 (2001): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission |

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|---|---|
| 12/CIS14f | AS/NZS 1044 (2001) and A1 (2001): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission |
| 12/CIS14g | CNS 13783-1 (2001) and A1 (2001): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission |
| 12/CIS15 | IEC/CISPR 15 (2000) + A1 (2001): Limits and methods of measurements of radio disturbance characteristics of electrical lighting and similar equipment |
| 12/CIS15a | AS/NZS CISPR (2002): Limits and methods of measurements of radio disturbance characteristics of electrical lighting and similar equipment |
| 12/CIS15b | CNS 13439 (2000) + A1 (2001): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment |
| 12/CIS15c | EN 55015 (2000) + A1 (2001): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment |
| 12/CIS22 | IEC/CISPR 22 (1997) and EN 55022 (1998): Limits and methods of measurement of radio disturbance characteristics of information technology equipment |
| 12/CIS22a | IEC/CISPR 22 (1993): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1:1995, and Amendment 2:1996. |

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| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/CIS22b | CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment |
| 12/EM02a | IEC 61000-3-2, Edition 2.1 (2001-10), EN 61000-3-2 (2000), and AS/NZS 2279.1 (2000): Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A) |
| 12/EM03 | EN 61000-3-3 (1995), IEC 61000-3-3 (1995), and AS/NZS 2279.3 (1995): EMC - Part 3: Limits - Section 3. Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to 16A |
| 12/F18 | FCC OST/MP-5 (1986): FCC Methods of Measurement of Radio Noise Emissions for ISM Equipment (cited in FCC Method 47 CFR Part 18 - Industrial, Scientific, and Medical Equipment) |
| 12/FCC15b | ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart B: Unintentional Radiators |
| 12/FCC15c | ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart C: Intentional Radiators |
| 12/FCC15d | ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart D: Unlicensed Personal Communications Service Devices |

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|---|---|
| 12/FCC15e | ANSI C63.4 (2001) with FCC Method - CFR Part 15, Subpart E: Unlicensed National Information Infrastructure Service Devices |
| 12/T51 | AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment |
| 12/VCCIa | Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/02.04 |

**Immunity Test Methods:**

| | |
|---|---|
| 12/1089a | GR-1089-CORE, Issue 3, October 2002: Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment (sections 2, 3.3, and 3.5) |
| 12/160D16 | RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 16 - Power Input |
| 12/160D17 | RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 17 - Voltage Spike |
| 12/160D18 | RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 18 - Audio Frequency Conducted Susceptibility - Power Inputs |

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| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/160D19 | RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 19 - Induced Signal Susceptibility |
| 12/160D20 | RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 20 - Radio Frequency Susceptibility (Radiated and Conducted) |
| 12/160D22 | RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 22 - Lightning Induced Transient Susceptibility |
| 12/160D25 | RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 25 - Electrostatic Dischare (ESD) |
| 12/I01 | IEC 61000-4-2 (1995) and Amendment 1 (1998) and EN 61000-4-2: Electrostatic Discharge Immunity Test |
| 12/I02 | IEC 61000-4-3 (1995) and Amendment 1 (1998) and EN 61000-4-3: Radiated, Radio-Frequency Electromagnetic Field Immunity Test |
| 12/I03 | IEC 61000-4-4 (1995) and EN 61000-4-4: Electrical Fast Transient/Burst Immunity Test |
| 12/I04 | IEC 61000-4-5 (1995) and EN 61000-4-5: Surge Immunity Test |

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| *NVLAP Code* | ***Designation / Description*** |
|---|---|
| 12/I05 | IEC 61000-4-6 (1996) and EN 61000-4-6: Immunity to Conducted Disturbances, Induced Radio-Frequency Fields |
| 12/I06 | IEC 61000-4-8 (1993): Power Frequency Magnetic Field Immunity Test |
| 12/I07 | IEC 61000-4-11 (1994): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests |
| 12/J111324 | SAE J1113/24: Immunity to radiated electromagnetic fields; 10 kHz to 200 MHz - Crawford TEM cell and 10 kHz to 5 GHz - Wideband TEM cell |
| 12/J111341 | SAE J1113/41 (1995-07): Limits and methods of measurement of radio disturbance characteristics of components and modules for the protection of receivers used on board vehicles |

**Radio Test Methods**

| | |
|---|---|
| 12/RSS119 | RSS-119, Issue 6 (March 25, 2000): Land Mobile and Fixed Radio Transmitters and Receivers, 27.41 to 960 MHz |
| 12/RSS123 | RSS-123, Issue 1, Rev. 2 (November 6, 1999): Low Power Licensed Radiocommunication Devices |
| 12/RSS137 | RSS-137, Issue 1, Rev. 1 (September 25, 1999): Location and Monitoring Service (902 - 928 MHz) |

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| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/RSS139 | RSS-139, Isssue 1 (February 5, 2000): Licensed Radiocommunications Devices in the Band 2400 - 2483.5 MHz |
| 12/CIS15c | EN 55015 (2000) + A1 (2001): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment |
| **MIL-STD-462 : Conducted Emissions:** | |
| 12/A18 | MIL-STD-461 Version E Method CE106 |
| **MIL-STD-462 : Conducted Susceptibility:** | |
| 12/B12 | MIL-STD-462 Version D Method CS101 |
| 12/B13 | MIL-STD-462 Version D Method CS103 |
| 12/B25 | MIL-STD-461 Version E Method CS114 |
| 12/B26 | MIL-STD-461 Version E Method CS115 |
| 12/B27 | MIL-STD-461 Version E Method CS116 |
| **MIL-STD-462 : Radiated Emissions:** | |
| 12/D04 | MIL-STD-462 Version D Method RE101 |

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**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

**NVLAP LAB CODE 100276-0**

**D.L.S. ELECTRONIC SYSTEMS, INC.**

| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/D05 | MIL-STD-462 Version D Method RE102 |
| 12/D06 | MIL-STD-462 Version D Method RE103 |

**MIL-STD-462 : Radiated Susceptibility:**

| | |
|---|---|
| 12/E08 | MIL-STD-462 Version D Method RS101 |
| 12/E09 | MIL-STD-462 Version D Method RS103 |

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## 1.0 SUMMARY OF TEST REPORT

It was found that the Plug-in Appliance Module, Model Number(s) HA02, **"meets"** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.249 for operational in the 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz Bands.

This test report relates only to the items tested and contains the following number of pages.

Text: 78

## 2.0 INTRODUCTION

On April 8, 2004, a series of radio frequency interference measurements was performed on Plug-in Appliance Module, Model Number(s) HA02, Serial Number: N/A. 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 C63.4-2001. Tests were performedby personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

## 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 15.35(b), 15.37(d), 15.209 & 15.249 for Intentional Radiators operating in the Bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24-24.25 GHz.

## 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 C63.4-2001, Section 8, (Figures 11a and 11b). The conducted tests were performed with the test item placed on a non-conductive table (table top equipment), located in the test room. Equipment normally operated on the floor was tested by placing it on the metal ground plane. The ground plane has an electrical isolation layer over its surface approximately 7mm thick. The power line supplied was connected to a dual line impedance stabilization network electrically bonded to the ground plane, located on the floor. The networks were constructed per the requirements of the American National Standards Institute, ANSI C63.4-2001, Section 4, (Figure 2).

All radiated 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 C63.4-2001, Sections 6 and 8.

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## 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 C63.4-2001, 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.

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## 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: 2001.

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

7.1 Description:

The device is an electronically controlled plug-in appliance module, intended to be used to switch appliances ON or OFF, with ratings up to 15Amperes (resistive) or lighting loads up to 8.3Amperes (tungsten). It includes a multi-function switch for turning the load ON or OFF or programming the unit to work with a remote controller.

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7.0 DESCRIPTION OF TEST SAMPLE: (CON'T)

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 41.66mm x Width: 69.60mm x Height: 97.28mm

7.3 LINE FILTER USED:

NA

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

NA

Clock Frequencies:

7.376974 MHz

7.0 DESCRIPTION OF TEST SAMPLE: (CON'T)

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. Power PCB: CSA certified printed wiring board material manufactured by Dong Guan Shijie New Energy Electronic Factory 130 C max. operating temperature, CEM-1 KB, UL94 V0 flame class, FR4 grade PN: 000-221857-001000, V1

2. Button and LED PCB: Certified printed wiring board material, manufactured by Dong Guan Shijie New Energy Electronic Factory,

130 C max. UL94HB 1.2mm thick with 1 oz. copper deposit. PN: 000-221848-010100, V0

3. RF Module PCB: FR-4 4-layer, Flame class V-0, Lucky View PCB (H.K.) Ltd

PN: 000-010257-102110, V0

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

1: There were no changes made at D.L.S. Electronic Systems, Inc.

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 Plug-in Appliance Module
Model Number: HA02 Serial Number: N/A

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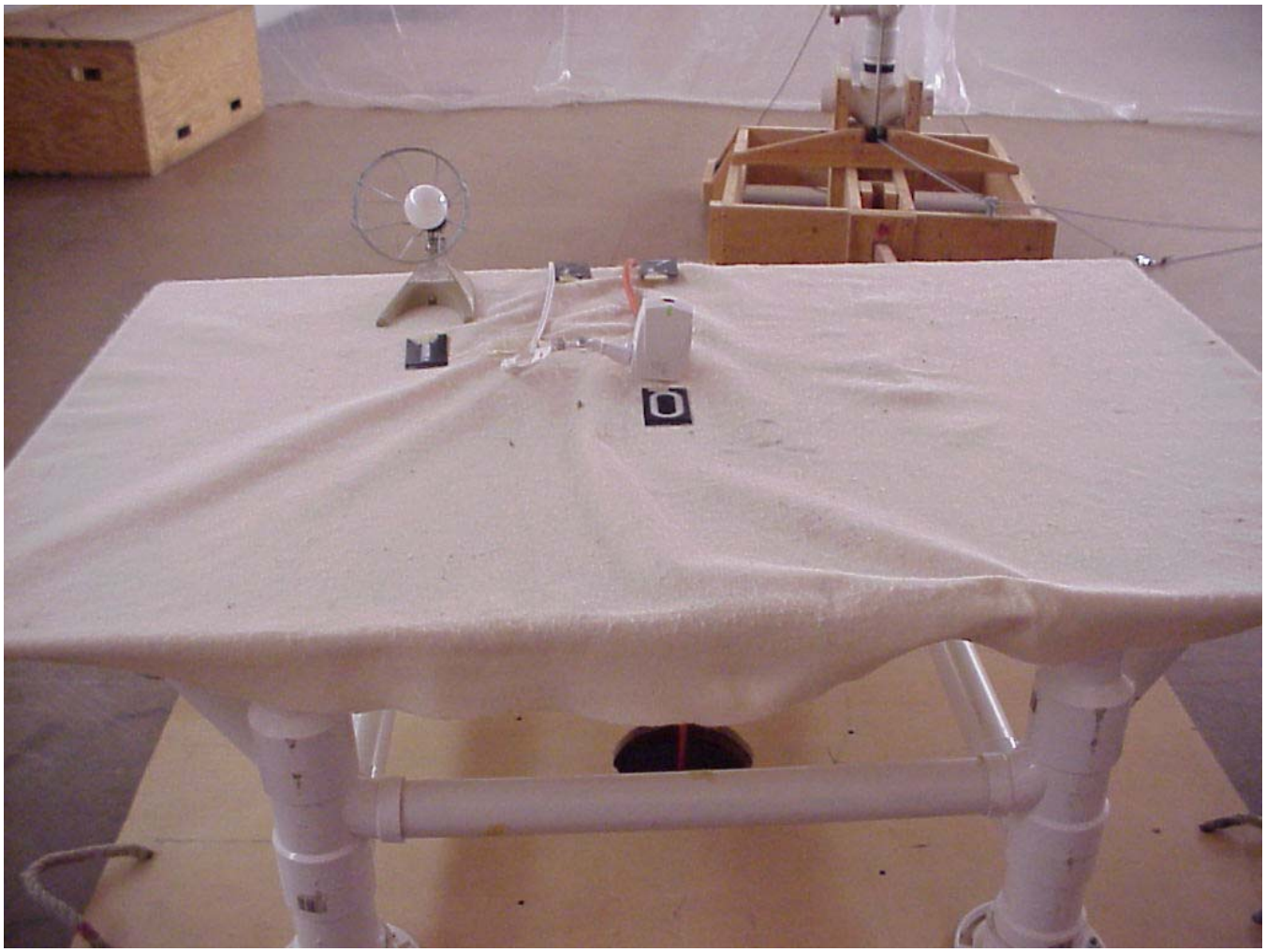
## 10.0 RADIATED PHOTOS TAKEN DURING TESTING



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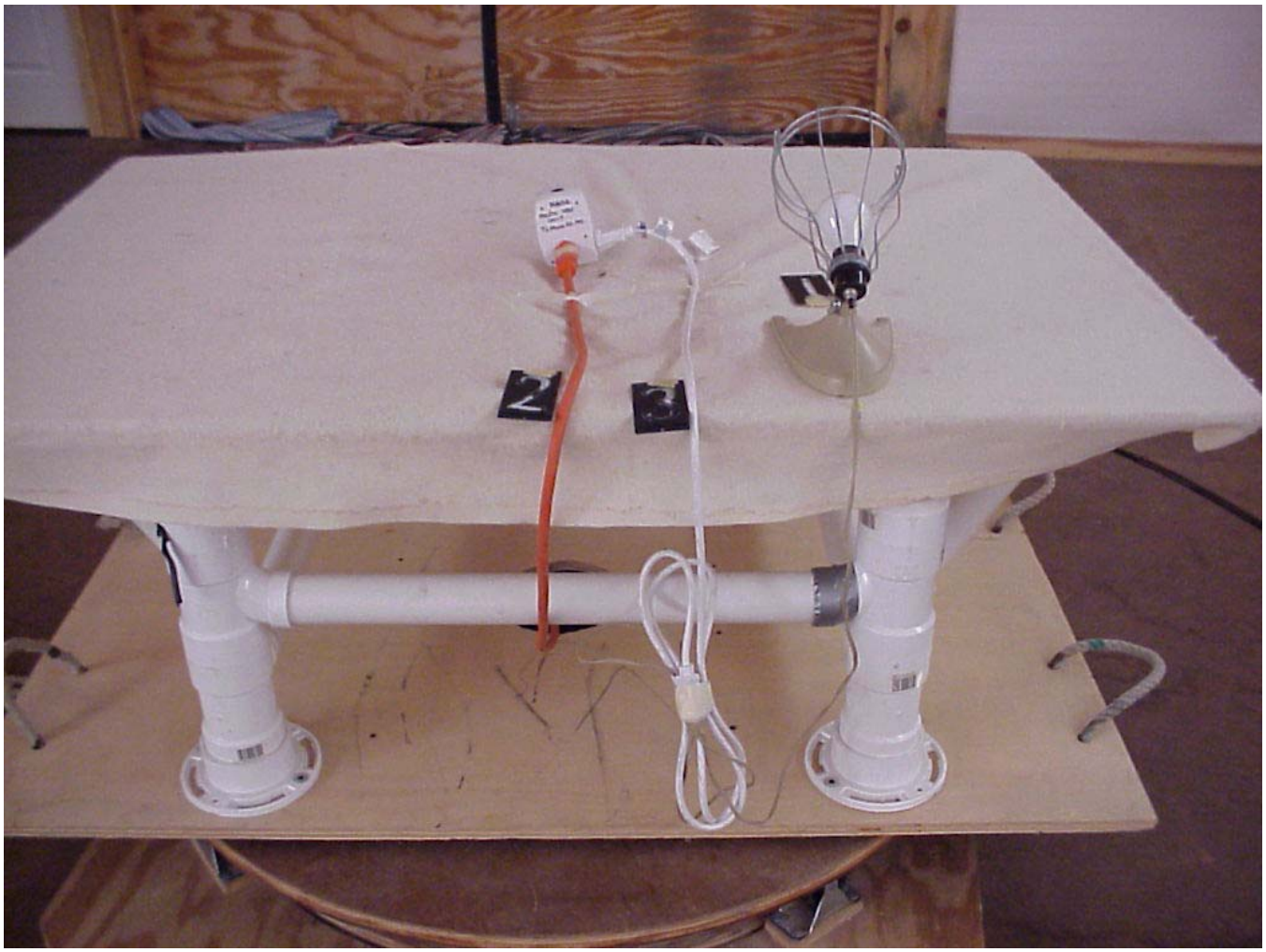
## 10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)



## 10.0 CONDUCTED PHOTOS TAKEN DURING TESTING

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## 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 Plug-in Appliance Module, Model Number(s) HA02 **"meets"** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.249 for operational in the 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz Bands.

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TABLE 1 – EQUIPMENT LIST

| Test Equipment | Manufacturer | Model Number | Serial Number | Frequency Range | Cal Due Dates |
|---|---|---|---|---|---|
| Spectrum Analyzer | Hewlett/ Packard | 8566B | 2240A002041 | 100 Hz – 22 GHz | 10/04 |
| Quasi-Peak Adapter | Hewlett/ Packard | 85650A | 2043A00121 | 10 kHz – 1 GHz | 10/04 |
| Spectrum Analyzer | Hewlett/ Packard | 8566B | 2421A00452 | 100 Hz – 22 GHz | 2/05 |
| Quasi-Peak Adapter | Hewlett/ Packard | 85650A | 2043A00450 | 10 kHz – 1 GHz | 2/05 |
| Spectrum Analyzer | Hewlett/ Packard | 8591A | 3009A00700 | 9 kHz – 1.8 GHz | 3/05 |
| Receiver | Electrometrics | EMC-30 | 44168 | 10 kHz – 1 GHz | 9/04 |
| Receiver | Rohde & Schwarz | ESI 26 | 837491/010 | 20 Hz – 26 GHz | 11/04 |
| Receiver | Rohde & Schwarz | ESI 40 | 837808/006 | 20 Hz – 40 GHz | 12/04 |
| Receiver | Rohde & Schwarz | ESI 40 | 837808/005 | 20 Hz – 40 GHz | 12/04 |
| Antenna | EMCO | 3104C | 00054891 | 20 MHz – 200 MHz | 2/05 |
| Antenna | Electrometrics | LPA-25 | 1114 | 200 MHz – 1 GHz | 3/05 |
| Antenna | EMCO | 3104C | 00054892 | 20 MHz – 200 MHz | 3/05 |

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

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TABLE 1 – EQUIPMENT LIST

| Test Equipment | Manufacturer | Model Number | Serial Number | Frequency Range | Cal Due Dates |
|---|---|---|---|---|---|
| Antenna | Electrometrics | 3146 | 1205 | 200 MHz – 1 GHz | 3/05 |
| Antenna | EMCO | 3104C | 97014785 | 20 MHz – 200 MHz | 2/05 |
| Antenna | EMCO | 3146 | 97024895 | 200 MHz – 1 GHz | 3/05 |
| Antenna | EMCO | 3115 | 2479 | 1 GHz – 18 GHz | 8/04 |
| Antenna | EMCO | 3115 | 99035731 | 1 GHz – 18 GHz | 4/05 |
| Antenna | Rohde & Schwarz | HUF-Z1 | 829381001 | 20 MHz – 1 GHz | 2/05 |
| Antenna | Rohde & Schwarz | HUF-Z1 | 829381005 | 20 MHz – 1 GHz | 8/04 |
| LISN | Solar | 8012-50-R-24-BNC | 8305116 | 10 MHz – 30 MHz | 8/04 |
| LISN | Solar | 8012-50-R-24-BNC | 814548 | 10 MHz – 30 MHz | 8/04 |
| LISN | Solar | 9252-50-R-24-BNC | 961019 | 10 MHz – 30 MHz | 12/04 |
| LISN | Solar | 9252-50-R-24-BNC | 971612 | 10 MHz – 30 MHz | 10/04 |
| LISN | Solar | 9252-50-R-24-BNC | 92710620 | 10 MHz – 30 MHz | 7/04 |

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

1250 Peterson Dr., Wheeling, IL 60090

# APPENDIX A

# TEST PROCEDURE

## Part 15, Subpart C, Section 15.249a-e

**OPERATION WITHIN THE BAND 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz MHz**

ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

## 1.0 CONDUCTED EMISSION MEASUREMENTS

Conducted emissions were measured over the frequency range from 150 kHz to 30 MHz in accordance with the power line measurements as specified in FCC Part 15, Subpart C, Section 15.207 & ANSI C63.4-2000. Since the device is operated from the public utility lines, the 120 Vac, 60 Hz power leads, high (hot) and low (neutral) sides, were measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. During the test, the cables were placed and items moved (when appropriate) to maximize emissions. All signals were then recorded. The allowed levels for Intentional Radiators which is designed to connected to the public utility (AC) power line shall not exceed 250 uV (47.96 dBuV) from 150 kHz to 30 MHz

**NOTE:**

All test measurements were made at a screen room temperature of **73°F** at **66%** relative humidity.

ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# CONDUCTED DATA AND GRAPH(S) TAKEN DURING TESTING

## PART 15.207

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# FCC Part 15 Class B

## Voltage Mains Test

| | |
|---|---|
| EUT: | HA02 |
| Manufacturer: | Intermatic |
| Operating Condition: | 73 deg. F, 66% R.H. |
| Test Site: | DLS OF Screen Room |
| Operator: | Craig Brandt |
| Test Specification: | 120 VAC, 60 Hz |
| Comment: | Line 1 |
| | Date: 4/8/04 |

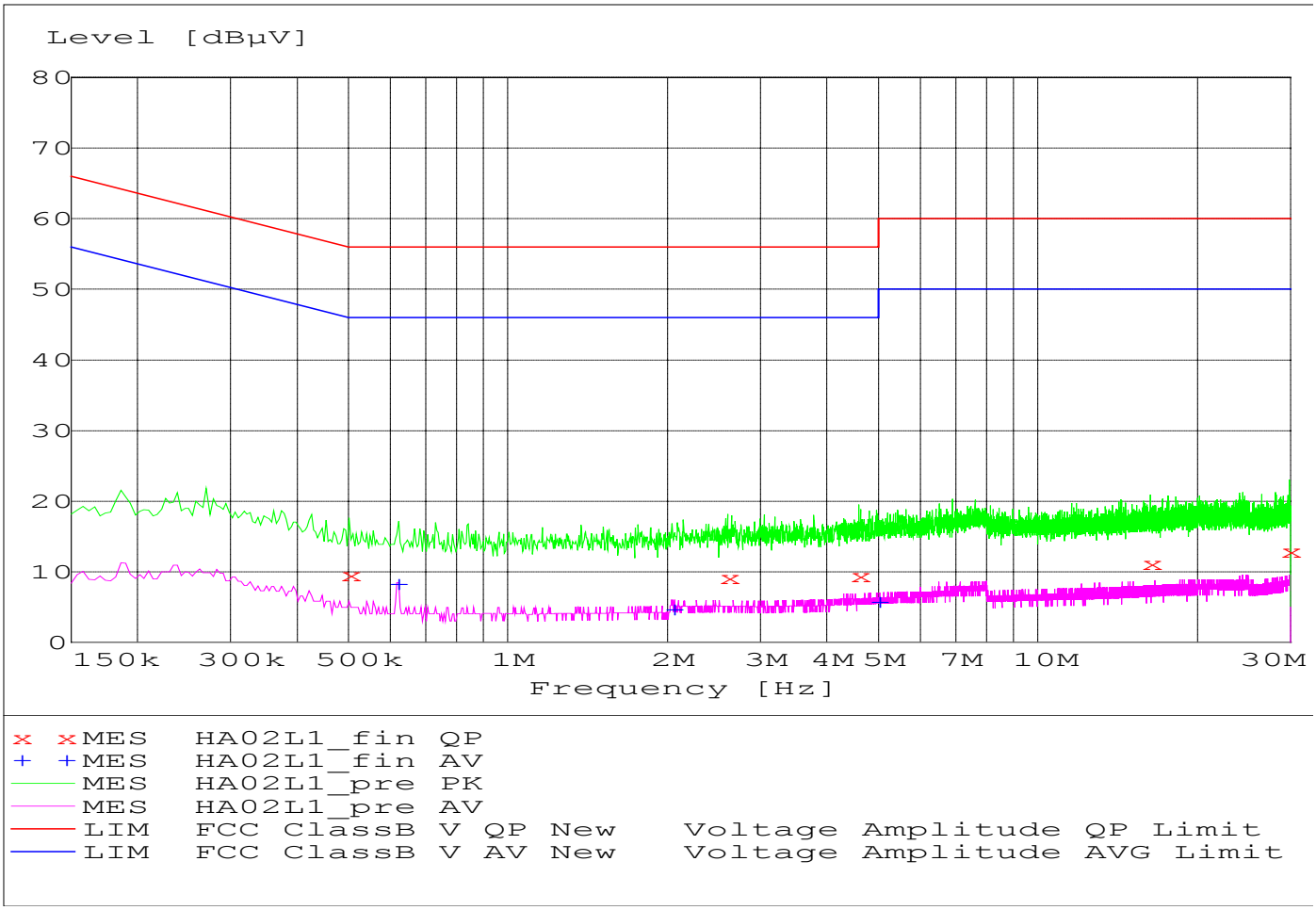
## SCAN TABLE: "FCC ClassB Voltage"

Short Description: FCC Class B Voltage

| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|---|
| 150.0 kHz | 30.0 MHz | 4.0 kHz | MaxPeak<br>Average | 10.0 ms | 9 kHz | LISN 961019 |

ELECTRONIC SYSTEMS, INC.
**1250 Peterson Dr., Wheeling, IL 60090**

# APPENDIX A



1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

## MEASUREMENT RESULT: "HA02L1_fin QP"

4/8/2004 3:12PM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line |
|---|---|---|---|---|---|
| 0.502000 | 9.60 | 10.6 | 56 | 46.4 | 1 |
| 2.598000 | 9.20 | 10.7 | 56 | 46.8 | 1 |
| 4.594000 | 9.40 | 10.9 | 56 | 46.6 | 1 |
| 16.302000 | 11.10 | 12.0 | 60 | 48.9 | 1 |
| 29.842000 | 12.90 | 12.9 | 60 | 47.1 | 1 |

# MEASUREMENT RESULT: "HA02L1_fin AV"

4/8/2004 3:12PM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line |
|---|---|---|---|---|---|
| 0.618000 | 8.20 | 10.5 | 46 | 37.8 | 1 |
| 2.050000 | 4.60 | 10.8 | 46 | 41.4 | 1 |
| 4.986000 | 5.70 | 11.0 | 46 | 40.3 | 1 |

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APPENDIX A

# FCC Part 15 Class B

## Voltage Mains Test

| | |
|---|---|
| EUT: | HA02 |
| Manufacturer: | Intermatic |
| Operating Condition: | 73 deg. F, 66% R.H. |
| Test Site: | DLS OF Screen Room |
| Operator: | Craig Brandt |
| Test Specification: | 120 VAC, 60 Hz |
| Comment: | Line 2 |
| | Date: 4/8/04 |

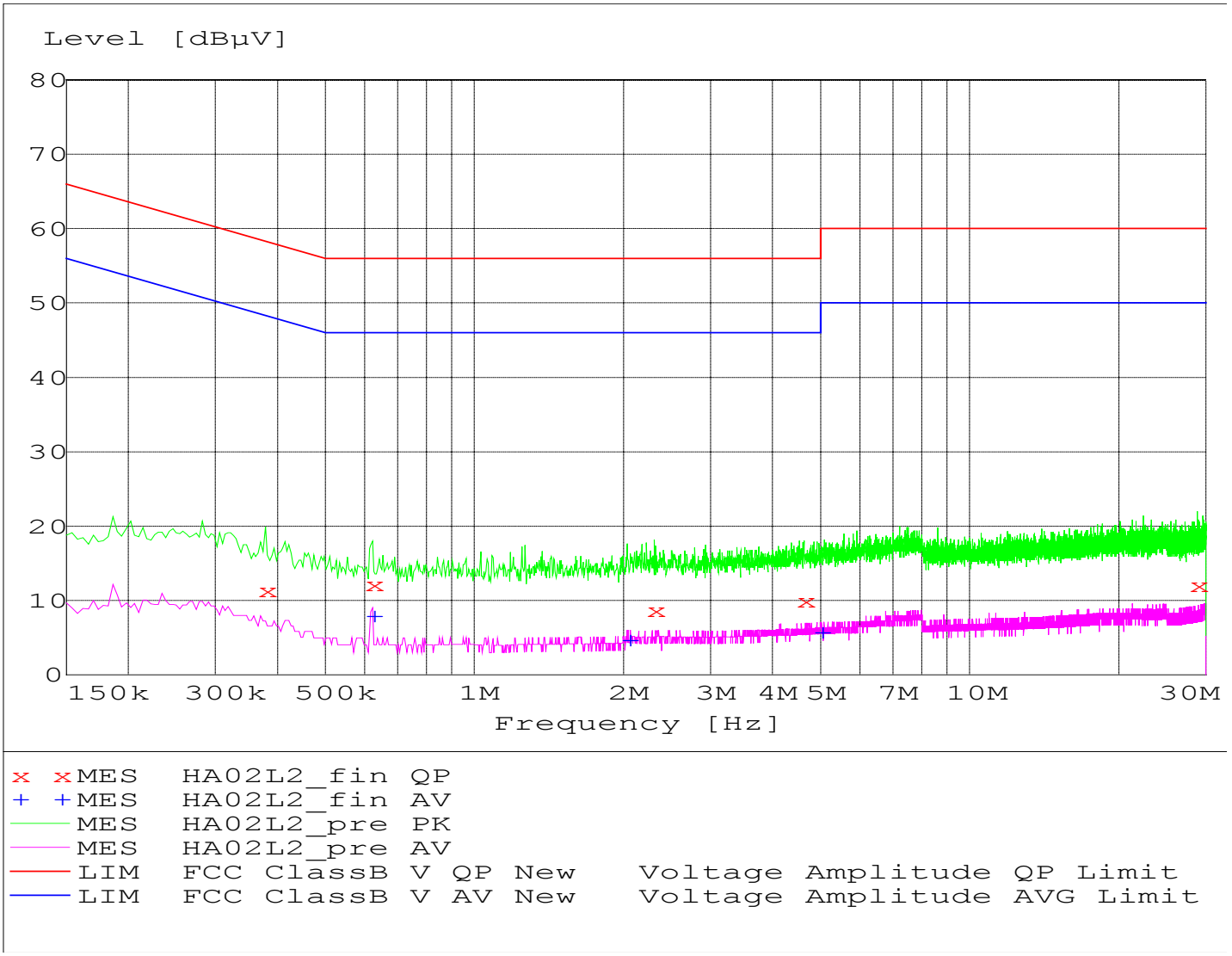
## SCAN TABLE: "FCC ClassB Voltage"

Short Description: FCC Class B Voltage

| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|---|
| 150.0 kHz | 30.0 MHz | 4.0 kHz | MaxPeak<br>Average | 10.0 ms | 9 kHz | LISN 961019 |

ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 60090

# APPENDIX A



1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# MEASUREMENT RESULT: "HA02L2_fin QP"

4/8/2004 3:16PM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line |
|---|---|---|---|---|---|
| 0.378000 | 11.40 | 10.5 | 58 | 46.9 | 1 |
| 0.622000 | 12.20 | 10.5 | 56 | 43.8 | 1 |
| 2.310000 | 8.70 | 10.7 | 56 | 47.3 | 1 |
| 4.630000 | 10.00 | 10.9 | 56 | 46.0 | 1 |
| 28.862000 | 12.10 | 12.6 | 60 | 47.9 | 1 |

# MEASUREMENT RESULT: "HA02L2_fin AV"

4/8/2004 3:16PM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Line |
|---|---|---|---|---|---|
| 0.622000 | 7.90 | 10.5 | 46 | 38.1 | 1 |
| 2.046000 | 4.70 | 10.8 | 46 | 41.3 | 1 |
| 4.998000 | 5.70 | 11.0 | 46 | 40.3 | 1 |

ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

## 2.0 BAND EDGE AND RESTRICT BAND COMPLIANCE

The field strength of any emissions appearing outside the 902 to 928 MHz band shall not exceed the general radiated emissions limits as stated Section 15.209. The fundamental from the Plug-in Appliance Module transmitter shall not be inside the restrict band 960 to 1240 MHz.

**NOTE:** See the radiated data taken of the Fundamental Emissions on pages 42 to 53.

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

## 3.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS (SECTION 15.249a-d)

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the Plug-in Appliance Module, Model Number: HA02, 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 30 MHz 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 Plug-in Appliance Module were made up to 10000 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 908.42 MHz. For intentional radiators, the frequency range to be investigated is determined by the lowest radio frequency generated by the device without going below 30 MHz, up to at least the tenth harmonic of the highest fundamental frequency or 10 GHz, whichever is lower. At those frequencies where significant signals were detected, measurements were made over the entire frequency range specified in FCC Part 15, Subpart C, Section 15.249 at the open field test site, located at Genoa City, Wisconsin, FCC file number **31040/SIT**. When required, levels were extrapolated from 10 meters to 3 meters using a linear extrapolation.

All signals in the frequency range of 30 MHz to 2000 MHz were measured with a Biconical Antenna or tuned dipoles and from 200 MHz to 1000 MHz, a Log Periodic or Tuned Dipoles were used. From 1000 MHz to 10 GHz Horn Antennas 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 of emissions. In order to find maximum emissions, the cables were moved through all the positions the equipment would be expected to experience in the field. The EUT, peripheral equipment and cables were configured to meet the conditions in ANSI C63.4-2000, Clauses 6 & 8. Tests were made with the receive antenna(s) in both the horizontal and vertical planes of polarization. In each case, the table was rotated to find the maximum emissions.

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APPENDIX A

3.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS (CON'T)

For operation in the bands 902 to 928 MHz, 2400 to 2483.5 MHz, 5725 to 5875 MHz, and 24.0 to 24.25 GHz the field strength of any emissions within this band shall not exceed the field strength levels specified in the following table as stated in FCC, Part 15, Section 15.249(a).

| Frequency range in MHz | Field Strength of Fundamental millivolts/meter | Field Strength of Fundamental dBuV/meter | Field Strength of Harmonics microvolts/meter | Field Strength of Harmonics dBuV/meter |
|---|---|---|---|---|
| 902 to 928 | 50 | 93.98 | 500 | 53.98 |
| 2400 to 2483.5 | 50 | 93.98 | 500 | 53.98 |
| 5725 to 5875 | 50 | 93.98 | 500 | 53.98 |
| 24000 to 24250 | 250 | 107.96 | 2500 | 67.96 |

Field strength limits are at a distance of 3 meters. The emission limits shown are based on measurement instrumentation employing an average detector.

Emissions radiated outside of the specified frequency bands, except for harmonics are attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Preliminary radiated emission measurements were performed at a 3 meter test distance. The frequency range from 30 MHz to 1000 MHz was automatically scanned and plotted at various angles.

**NOTE:**

All radiated emissions measurements were made at a test room temperature of **70°F** at **33%** relative humidity.

ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# RADIATED DATA AND GRAPH(S) TAKEN FOR

# FUNDAMENTAL EMISSION MEASUREMENTS

## PART 15.249

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

## FCC Part 15 Class B

## Electric Field Strength

EUT: HA02
Manufacturer: Intermatic
Operating Condition: 72 deg. F; 33% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: 120 V; 60 Hz
Comment: Continuous Transmit mode
Date: 4/8/04

## TEXT: "Site 3 MidV 3M"

Short Description: Test Set-up Vert30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 26 SN: 837491/010

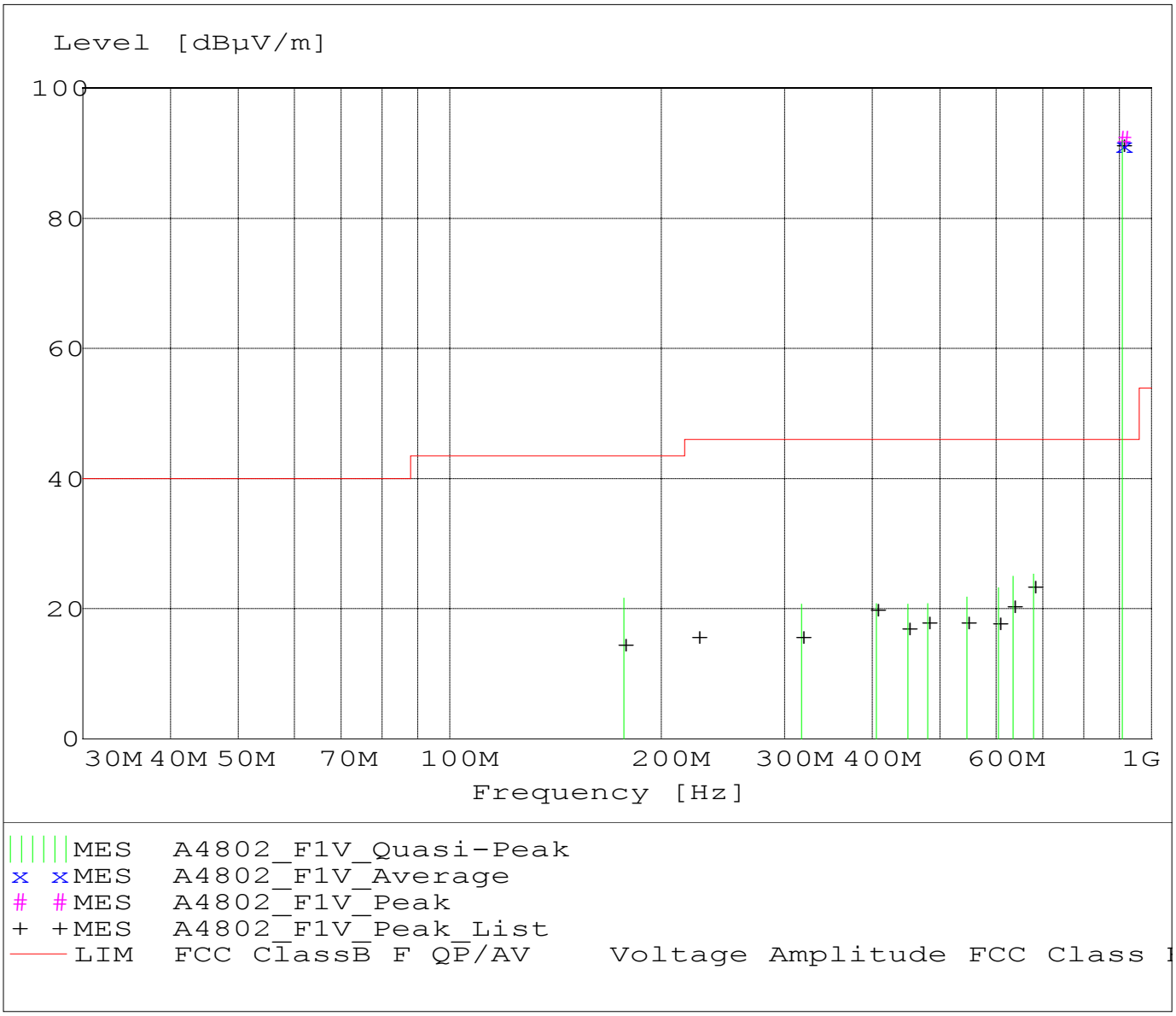
Antennas ---
Biconical -- EMCO 3104C SN: 9701-4785
Log Periodic -- EMCO 3146 SN: 9702-4895

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

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

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A



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APPENDIX A

# MEASUREMENT RESULT: "A4802_F1V_Final"

4/8/2004 1:43PM

| Frequency | Level | Antenna Factor | System Loss | Total Level | Limit | Margin | Height | EUT Angle | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | dBµV | dBµV/m | dB | dBµV/m | dBµV/m | dB | m | deg | | |
| 908.41 | 88.27 | 22.40 | -18.5 | 92.2 | 94.0 | 1.8 | 1.10 | 135 | MAX PEAK | Fundamental |
| 908.41 | 88.00 | 22.40 | -18.5 | 91.9 | 94.0 | 2.1 | 1.10 | 135 | QUASI-PEAK | Fundamental |
| 908.41 | 87.30 | 22.40 | -18.5 | 91.2 | 94.0 | 2.8 | 1.10 | 135 | AVERAGE | Fundamental |
| 678.66 | 23.92 | 21.09 | -19.7 | 25.3 | 46.0 | 20.7 | 1.00 | 315 | QUASI-PEAK | None |
| 634.40 | 26.28 | 19.00 | -20.3 | 25.0 | 46.0 | 21.0 | 1.00 | 45 | QUASI-PEAK | None |
| 177.07 | 28.74 | 15.51 | -22.6 | 21.6 | 43.5 | 21.9 | 1.00 | 315 | QUASI-PEAK | None |
| 604.89 | 24.80 | 18.94 | -20.6 | 23.2 | 46.0 | 22.8 | 1.00 | 45 | QUASI-PEAK | None |
| 545.88 | 24.02 | 18.54 | -20.8 | 21.8 | 46.0 | 24.2 | 1.00 | 270 | QUASI-PEAK | None |
| 479.48 | 24.56 | 17.40 | -21.1 | 20.8 | 46.0 | 25.2 | 1.10 | 135 | QUASI-PEAK | None |
| 405.73 | 26.33 | 15.91 | -21.4 | 20.8 | 46.0 | 25.2 | 1.00 | 180 | QUASI-PEAK | None |
| 317.21 | 26.61 | 15.74 | -21.7 | 20.7 | 46.0 | 25.3 | 2.00 | 315 | QUASI-PEAK | None |
| 449.99 | 25.10 | 16.62 | -21.1 | 20.7 | 46.0 | 25.3 | 1.40 | 90 | QUASI-PEAK | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

## FCC Part 15 Class B

## Electric Field Strength

EUT: HA02
Manufacturer: Intermatic
Operating Condition: 72 deg. F; 33% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: 120 V; 60 Hz
Comment: Continuous Transmit mode
Date: 4/8/04

## TEXT: "Site 3 MidH 3M"

Short Description: Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 40 SN: 837808/006

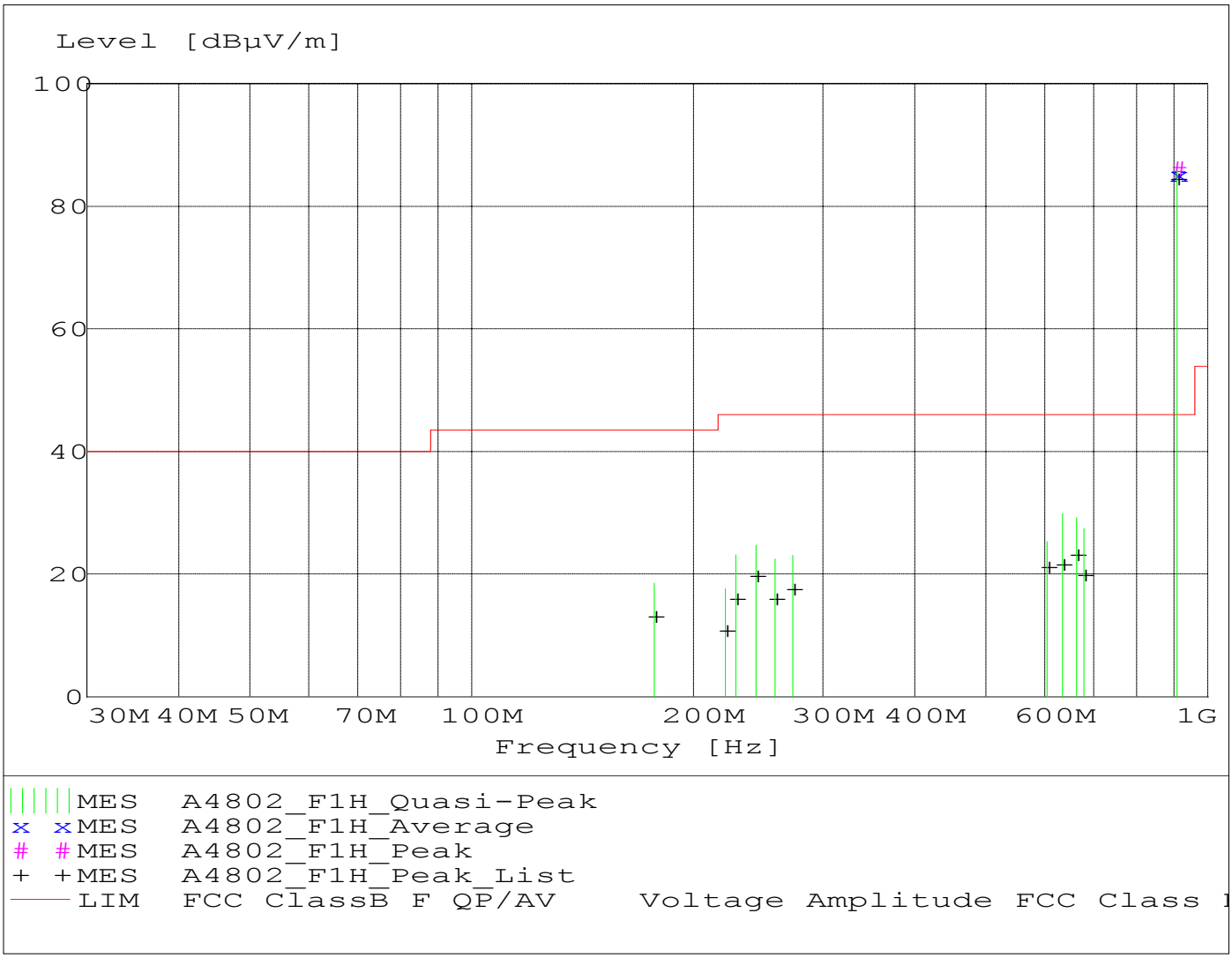
Antennas ---
Biconical -- EMCO 3104C SN: 9701-4785
Log Periodic -- EMCO 3146 SN: 9702-4895

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

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

ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A



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APPENDIX A

# MEASUREMENT RESULT: "A4802_F1H_Final"

4/8/2004 1:57PM

| Frequency MHz | Level dBµV | Antenna Factor dBµV/m | System Loss dB | Total Level dBµV/m | Limit dBµV/m | Margin dB | Height Ant. m | EUT Angle deg | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 908.41 | 82.15 | 22.40 | -18.5 | 86.1 | 94.0 | 7.9 | 1.30 | 160 | MAX PEAK | Fundamental |
| 908.41 | 81.83 | 22.40 | -18.5 | 85.8 | 94.0 | 8.2 | 1.30 | 160 | QUASI-PEAK | Fundamental |
| 908.41 | 81.14 | 22.40 | -18.5 | 85.1 | 94.0 | 8.9 | 1.30 | 160 | AVERAGE | Fundamental |
| 634.40 | 31.08 | 19.00 | -20.3 | 29.8 | 46.0 | 16.2 | 1.00 | 225 | QUASI-PEAK | None |
| 663.91 | 28.67 | 20.60 | -20.1 | 29.2 | 46.0 | 16.8 | 1.10 | 225 | QUASI-PEAK | None |
| 678.67 | 25.97 | 21.09 | -19.7 | 27.4 | 46.0 | 18.6 | 1.00 | 225 | QUASI-PEAK | None |
| 604.90 | 26.91 | 18.94 | -20.6 | 25.3 | 46.0 | 20.7 | 1.50 | 225 | QUASI-PEAK | None |
| 243.44 | 34.74 | 12.32 | -22.3 | 24.8 | 46.0 | 21.2 | 1.40 | 270 | QUASI-PEAK | None |
| 228.67 | 33.90 | 11.51 | -22.3 | 23.1 | 46.0 | 22.9 | 1.10 | 135 | QUASI-PEAK | None |
| 272.94 | 31.50 | 13.49 | -22.0 | 23.0 | 46.0 | 23.0 | 1.00 | 135 | QUASI-PEAK | None |
| 258.18 | 31.82 | 12.76 | -22.1 | 22.5 | 46.0 | 23.5 | 1.00 | 135 | QUASI-PEAK | None |
| 177.04 | 25.67 | 15.50 | -22.6 | 18.5 | 43.5 | 25.0 | 3.50 | 270 | QUASI-PEAK | None |
| 221.32 | 28.45 | 11.44 | -22.3 | 17.6 | 46.0 | 28.4 | 1.70 | 135 | QUASI-PEAK | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

## FCC Part 15 Class B

## Electric Field Strength

EUT: HA02
Manufacturer: Intermatic
Operating Condition: 72 deg. F; 33% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: 120 V; 60 Hz
Comment: Continuous Receive mode
Date: 4/8/04

## TEXT: "Site 3 MidV 3M"

Short Description: Test Set-up Vert30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 26 SN: 837491/010

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

1250 Peterson Dr., Wheeling, IL 60090

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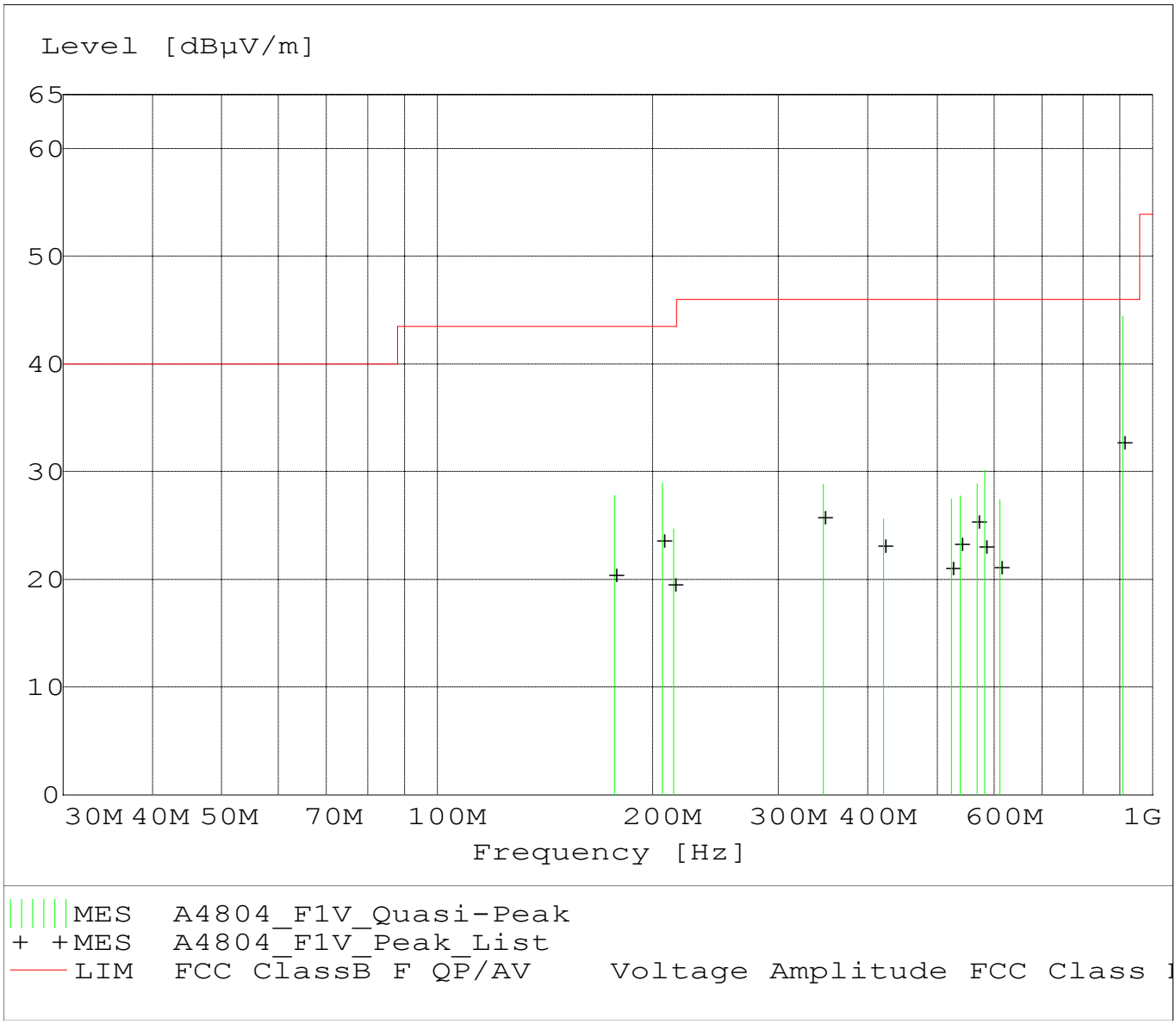

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APPENDIX A

# MEASUREMENT RESULT: "A4804_F1V_Final"

4/8/2004 11:40AM

| Frequency MHz | Level dBµV | Antenna Factor dBµV/m | System Loss dB | Total Level dBµV/m | Limit dBµV/m | Margin dB | Height Ant. m | EUT Angle deg | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 908.280 | 40.47 | 22.40 | -18.5 | 44.4 | 46.0 | 1.6 | 1.10 | 135 | QUASI-PEAK | None |
| 206.550 | 39.60 | 11.94 | -22.6 | 28.9 | 43.5 | 14.6 | 1.00 | 315 | QUASI-PEAK | None |
| 177.045 | 34.92 | 15.50 | -22.6 | 27.8 | 43.5 | 15.7 | 1.00 | 315 | QUASI-PEAK | None |
| 582.740 | 31.87 | 18.83 | -20.6 | 30.1 | 46.0 | 15.9 | 1.00 | 45 | QUASI-PEAK | None |
| 568.020 | 30.60 | 18.79 | -20.5 | 28.9 | 46.0 | 17.1 | 1.00 | 90 | QUASI-PEAK | None |
| 538.500 | 30.22 | 18.37 | -20.9 | 27.7 | 46.0 | 18.3 | 1.00 | 270 | QUASI-PEAK | None |
| 523.780 | 29.89 | 18.40 | -20.8 | 27.5 | 46.0 | 18.5 | 1.00 | 270 | QUASI-PEAK | None |
| 612.250 | 28.91 | 18.93 | -20.4 | 27.4 | 46.0 | 18.6 | 1.00 | 45 | QUASI-PEAK | None |
| 213.940 | 35.57 | 11.63 | -22.5 | 24.7 | 43.5 | 18.8 | 1.00 | 315 | QUASI-PEAK | None |
| 420.480 | 31.03 | 16.05 | -21.5 | 25.6 | 46.0 | 20.4 | 1.00 | 180 | QUASI-PEAK | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

## FCC Part 15 Class B

## Electric Field Strength

EUT: HA02
Manufacturer: Intermatic
Operating Condition: 72 deg. F; 33% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: 120 V; 60 Hz
Comment: Continuous Receive mode
Date: 4/8/04

## TEXT: "Site 3 MidH 3M"

Short Description: Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 40 SN: 837808/006

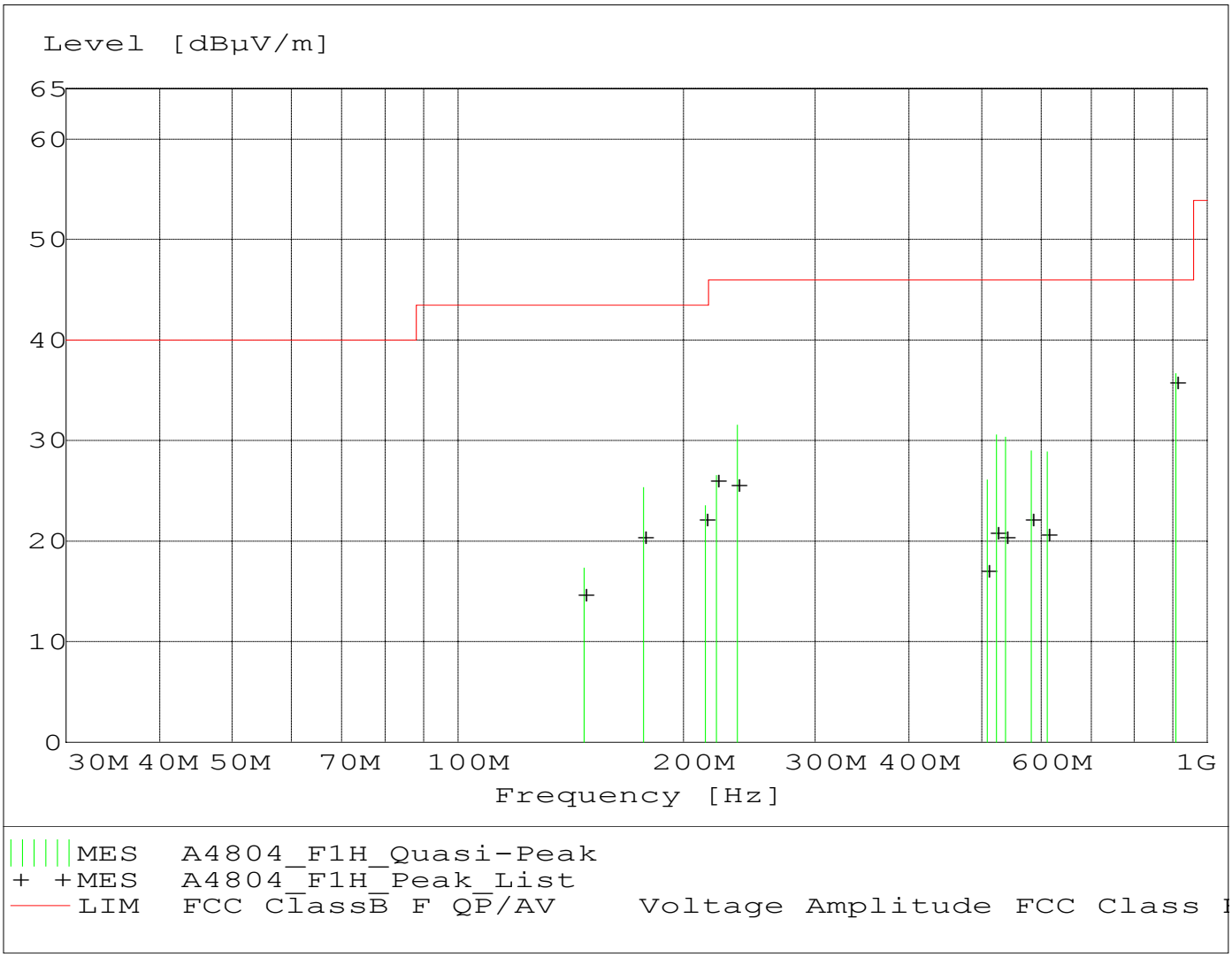
Antennas ---
Biconical -- EMCO 3104C SN: 9701-4785
Log Periodic -- EMCO 3146 SN: 9702-4895

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

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

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A



ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# MEASUREMENT RESULT: "A4804_F1H_Final"

4/8/2004 12:44PM

| 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 | | |
| 908.28 | 32.73 | 22.40 | -18.5 | 36.6 | 46.0 | 9.4 | 1.30 | 135 | QUASI-PEAK | None |
| 236.06 | 42.05 | 11.85 | -22.3 | 31.6 | 46.0 | 14.4 | 1.10 | 270 | QUASI-PEAK | None |
| 523.76 | 32.96 | 18.40 | -20.8 | 30.6 | 46.0 | 15.4 | 1.50 | 225 | QUASI-PEAK | None |
| 538.51 | 32.86 | 18.37 | -20.9 | 30.4 | 46.0 | 15.6 | 1.40 | 225 | QUASI-PEAK | None |
| 582.77 | 30.76 | 18.83 | -20.6 | 29.0 | 46.0 | 17.0 | 1.40 | 225 | QUASI-PEAK | None |
| 612.28 | 30.34 | 18.93 | -20.4 | 28.9 | 46.0 | 17.1 | 1.40 | 225 | QUASI-PEAK | None |
| 177.04 | 32.45 | 15.50 | -22.6 | 25.3 | 43.5 | 18.2 | 2.00 | 270 | QUASI-PEAK | None |
| 221.31 | 37.42 | 11.44 | -22.3 | 26.5 | 46.0 | 19.5 | 1.40 | 315 | QUASI-PEAK | None |
| 509.03 | 28.39 | 18.42 | -20.7 | 26.1 | 46.0 | 19.9 | 2.00 | 135 | QUASI-PEAK | None |
| 213.93 | 34.38 | 11.63 | -22.5 | 23.5 | 43.5 | 20.0 | 1.40 | 315 | QUASI-PEAK | None |
| 147.53 | 28.40 | 12.00 | -23.0 | 17.4 | 43.5 | 26.1 | 1.50 | 290 | QUASI-PEAK | None |

ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# RADIATED DATA AND GRAPH(S) TAKEN FOR

# FIELD STRENGTH

# SPURIOUS EMISSION MEASUREMENTS

## PART 15.209

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# FCC Part 15 Class B

## Electric Field Strength

```
EUT:                  HA02
Manufacturer:         Intermatic
Operating Condition:  72 deg. F; 33% R.H.
Test Site:            DLS OF Site 3
Operator:             Craig Brandt
Test Specification:   120 V; 60 Hz
Comment:              Continuous Transmit mode
                      Date: 4/8/04
```

## TEXT: "Site 3 MidH 3M"

```
  Short Description:            Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 40 SN: 837808/006

                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
```

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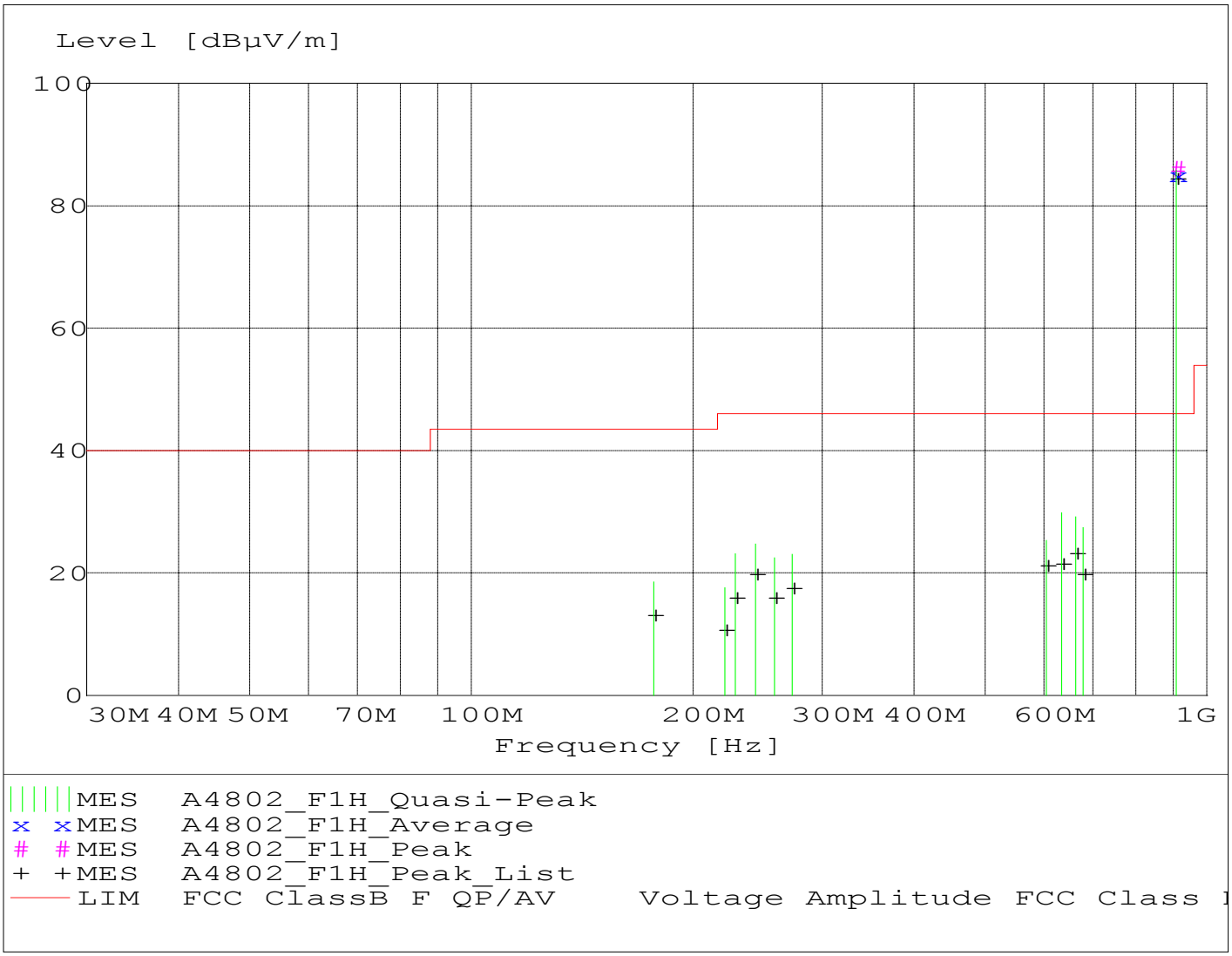
# APPENDIX A



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APPENDIX A

# MEASUREMENT RESULT: "A4802_F1H_Final"

4/8/2004 1:57PM

| Frequency MHz | Level dBµV | Antenna Factor dBµV/m | System Loss dB | Total Level dBµV/m | Limit dBµV/m | Margin dB | Height Ant. m | EUT Angle deg | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 908.41 Fundamental | 82.15 | 22.40 | -18.5 | 86.1 | 94.0 | 7.9 | 1.30 | 160 | MAX PEAK | |
| 908.41 Fundamental | 81.83 | 22.40 | -18.5 | 85.8 | 94.0 | 8.2 | 1.30 | 160 | QUASI-PEAK | |
| 908.41 Fundamental | 81.14 | 22.40 | -18.5 | 85.1 | 94.0 | 8.9 | 1.30 | 160 | AVERAGE | |
| 634.40 | 31.08 | 19.00 | -20.3 | 29.8 | 46.0 | 16.2 | 1.00 | 225 | QUASI-PEAK | None |
| 663.91 | 28.67 | 20.60 | -20.1 | 29.2 | 46.0 | 16.8 | 1.10 | 225 | QUASI-PEAK | None |
| 678.67 | 25.97 | 21.09 | -19.7 | 27.4 | 46.0 | 18.6 | 1.00 | 225 | QUASI-PEAK | None |
| 604.90 | 26.91 | 18.94 | -20.6 | 25.3 | 46.0 | 20.7 | 1.50 | 225 | QUASI-PEAK | None |
| 243.44 | 34.74 | 12.32 | -22.3 | 24.8 | 46.0 | 21.2 | 1.40 | 270 | QUASI-PEAK | None |
| 228.67 | 33.90 | 11.51 | -22.3 | 23.1 | 46.0 | 22.9 | 1.10 | 135 | QUASI-PEAK | None |
| 272.94 | 31.50 | 13.49 | -22.0 | 23.0 | 46.0 | 23.0 | 1.00 | 135 | QUASI-PEAK | None |
| 258.18 | 31.82 | 12.76 | -22.1 | 22.5 | 46.0 | 23.5 | 1.00 | 135 | QUASI-PEAK | None |
| 177.04 | 25.67 | 15.50 | -22.6 | 18.5 | 43.5 | 25.0 | 3.50 | 270 | QUASI-PEAK | None |
| 221.32 | 28.45 | 11.44 | -22.3 | 17.6 | 46.0 | 28.4 | 1.70 | 135 | QUASI-PEAK | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# FCC Part 15 Class B

## Electric Field Strength

| | |
|---|---|
| EUT: | HA02 |
| Manufacturer: | Intermatic |
| Operating Condition: | 72 deg. F; 33% R.H. |
| Test Site: | DLS OF Site 3 |
| Operator: | Craig Brandt |
| Test Specification: | 120 V; 60 Hz |
| Comment: | Continuous Transmit mode |
| | Date: 4/8/04 |

## TEXT: "Site 3 MidH 3M"

Short Description: Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 40 SN: 837808/006

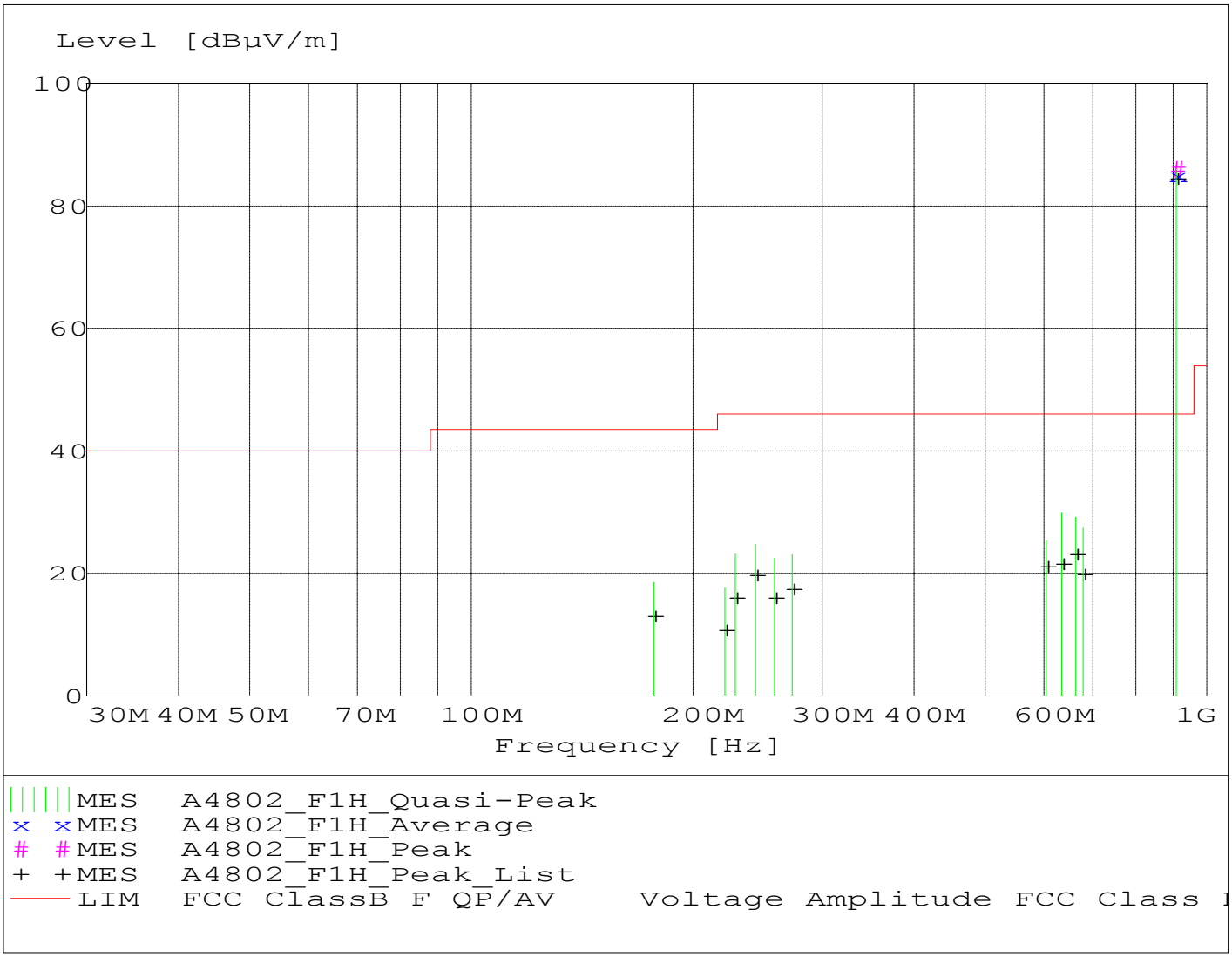
Antennas ---
Biconical -- EMCO 3104C SN: 9701-4785
Log Periodic -- EMCO 3146 SN: 9702-4895

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

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

1250 Peterson Dr., Wheeling, IL 60090

# APPENDIX A



1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# MEASUREMENT RESULT: "A4802_F1H_Final"

4/8/2004 1:57PM

| Frequency MHz | Level dBµV | Antenna Factor dBµV/m | System Loss dB | Total Level dBµV/m | Limit dBµV/m | Margin dB | Height Ant. m | EUT Angle deg | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 908.41 | 82.15 | 22.40 | -18.5 | 86.1 | 94.0 | 7.9 | 1.30 | 160 | MAX PEAK | Fundamental |
| 908.41 | 81.83 | 22.40 | -18.5 | 85.8 | 94.0 | 8.2 | 1.30 | 160 | QUASI-PEAK | Fundamental |
| 908.41 | 81.14 | 22.40 | -18.5 | 85.1 | 94.0 | 8.9 | 1.30 | 160 | AVERAGE | Fundamental |
| 634.40 | 31.08 | 19.00 | -20.3 | 29.8 | 46.0 | 16.2 | 1.00 | 225 | QUASI-PEAK | None |
| 663.91 | 28.67 | 20.60 | -20.1 | 29.2 | 46.0 | 16.8 | 1.10 | 225 | QUASI-PEAK | None |
| 678.67 | 25.97 | 21.09 | -19.7 | 27.4 | 46.0 | 18.6 | 1.00 | 225 | QUASI-PEAK | None |
| 604.90 | 26.91 | 18.94 | -20.6 | 25.3 | 46.0 | 20.7 | 1.50 | 225 | QUASI-PEAK | None |
| 243.44 | 34.74 | 12.32 | -22.3 | 24.8 | 46.0 | 21.2 | 1.40 | 270 | QUASI-PEAK | None |
| 228.67 | 33.90 | 11.51 | -22.3 | 23.1 | 46.0 | 22.9 | 1.10 | 135 | QUASI-PEAK | None |
| 272.94 | 31.50 | 13.49 | -22.0 | 23.0 | 46.0 | 23.0 | 1.00 | 135 | QUASI-PEAK | None |
| 258.18 | 31.82 | 12.76 | -22.1 | 22.5 | 46.0 | 23.5 | 1.00 | 135 | QUASI-PEAK | None |
| 177.04 | 25.67 | 15.50 | -22.6 | 18.5 | 43.5 | 25.0 | 3.50 | 270 | QUASI-PEAK | None |
| 221.32 | 28.45 | 11.44 | -22.3 | 17.6 | 46.0 | 28.4 | 1.70 | 135 | QUASI-PEAK | None |

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APPENDIX A

# FCC Part 15 Class B

## Electric Field Strength

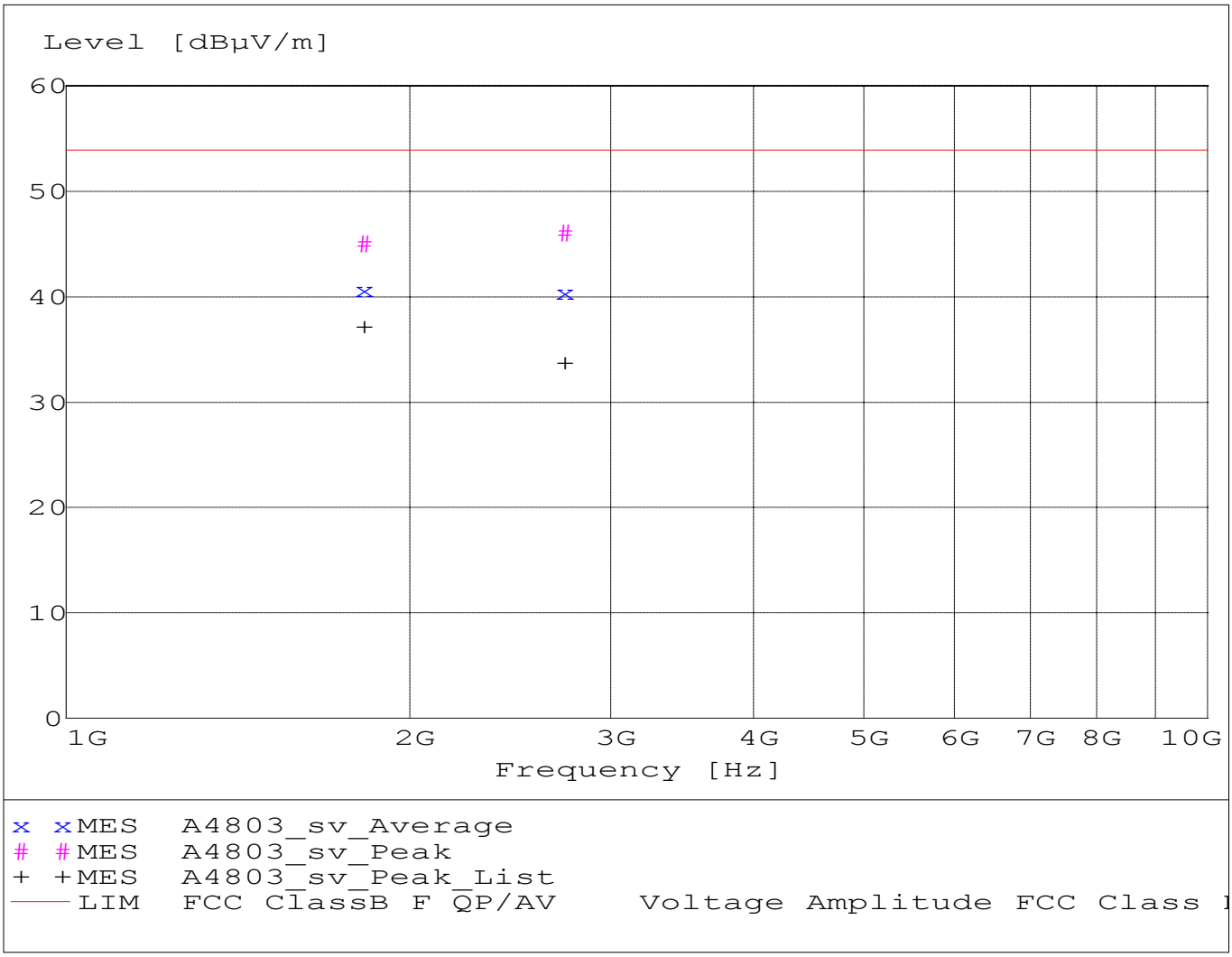
```
EUT:                  HA02
Manufacturer:         Intermatic
Operating Condition:  70 deg F; 33% R.H.
Test Site:            DLS OF Site 3
Operator:             Craig Brandt
Test Specification:   120 V   60 Hz
Comment:              Continuous Transmit mode
                      Date: 4/8/04
```

## TEXT: "Site 3 5731&184 V3M"

```
   Short Description:            Test Set-up Vert1GHz-
 TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 40 SN: 837808/006

                 Horn Antenna --- EMCO 3115 SN: 6204

                 Pre-Amps ---
                    1 - 10 GHz  -- Miteq AMF-6D-010100-50     SN:
682425
                    10 - 18 GHz -- Miteq AMF-6F-100200-50-10P SN:
668382

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

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A



1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# MEASUREMENT RESULT: "A4803_sv_Final"

4/8/2004 9:46AM

| 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 | | |
| 2725.20 | 55.15 | 29.74 | -38.8 | 46.0 | 53.9 | 7.9 | 1.10 | 90 | MAX PEAK | None |
| 1816.85 | 56.59 | 27.65 | -39.2 | 45.0 | 53.9 | 8.9 | 1.00 | 0 | MAX PEAK | None |
| 1816.85 | 52.20 | 27.65 | -39.2 | 40.6 | 53.9 | 13.3 | 1.00 | 0 | AVERAGE | None |
| 2725.20 | 49.55 | 29.74 | -38.8 | 40.4 | 53.9 | 13.5 | 1.10 | 90 | AVERAGE | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# FCC Part 15 Class B

## Electric Field Strength

EUT: HA02
Manufacturer: Intermatic
Operating Condition: 70 deg F; 33% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: 120 V 60 Hz
Comment: Continuous Transmit mode
Date: 4/8/04

## TEXT: "Site 3 5731&184 H3M"

Short Description: Test Set-up Horz1GHz-
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 40 SN: 837808/006

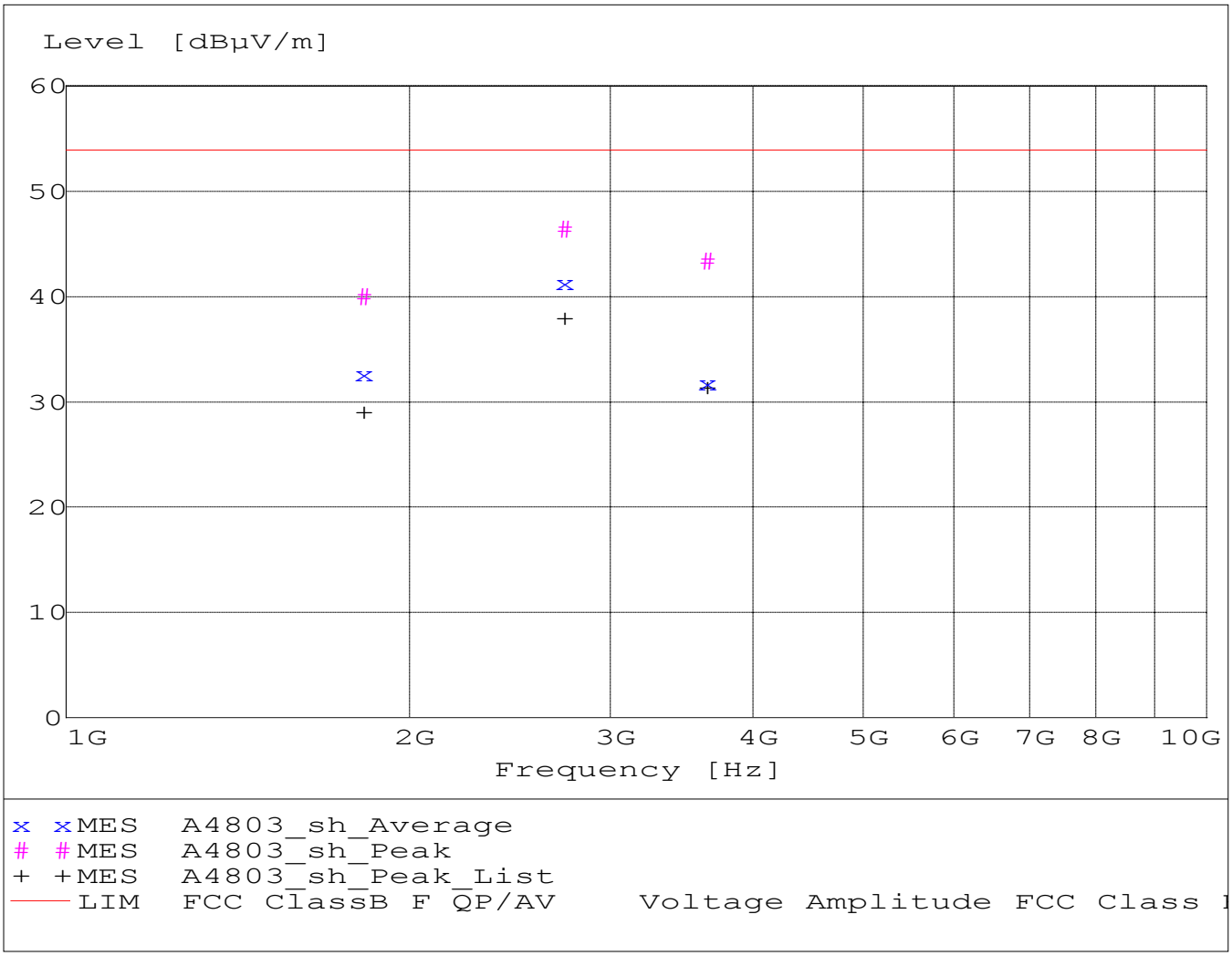
Horn Antenna --- EMCO 3115 SN: 6204

Pre-Amps ---
1 - 10 GHz -- Miteq AMF-6D-010100-50 SN: 682425
10 - 18 GHz -- Miteq AMF-6F-100200-50-10P SN: 668382

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

1250 Peterson Dr., Wheeling, IL 60090

# APPENDIX A



1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# MEASUREMENT RESULT: "A4803_sh_Final"

4/8/2004 9:59AM

| Frequency MHz | Level dBµV | Antenna Factor dBµV/m | System Loss dB | Total Level dBµV/m | Limit dBµV/m | Margin dB | Height Ant. m | EUT Angle deg | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 2725.25 | 55.54 | 29.74 | -38.8 | 46.4 | 53.9 | 7.5 | 1.10 | 315 | MAX PEAK | None |
| 3633.55 | 49.09 | 31.70 | -37.4 | 43.4 | 53.9 | 10.5 | 1.10 | 315 | MAX PEAK | None |
| 2725.25 | 50.40 | 29.74 | -38.8 | 41.3 | 53.9 | 12.6 | 1.10 | 315 | AVERAGE | None |
| 1816.80 | 51.61 | 27.65 | -39.2 | 40.0 | 53.9 | 13.9 | 1.20 | 180 | MAX PEAK | None |
| 1816.80 | 44.22 | 27.65 | -39.2 | 32.6 | 53.9 | 21.3 | 1.20 | 180 | AVERAGE | None |
| 3633.55 | 37.45 | 31.70 | -37.4 | 31.8 | 53.9 | 22.1 | 1.10 | 315 | AVERAGE | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# FCC Part 15 Class B

## Electric Field Strength

```
EUT:                  HA02
Manufacturer:         Intermatic
Operating Condition:  72 deg. F; 33% R.H.
Test Site:            DLS OF Site 3
Operator:             Craig Brandt
Test Specification:   120 V; 60 Hz
Comment:              Continuous Receive mode
                      Date: 4/8/04
```

## TEXT: "Site 3 MidV 3M"

```
   Short Description:            Test Set-up Vert30-1000MHz
 TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 26 SN: 837491/010

                 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
```

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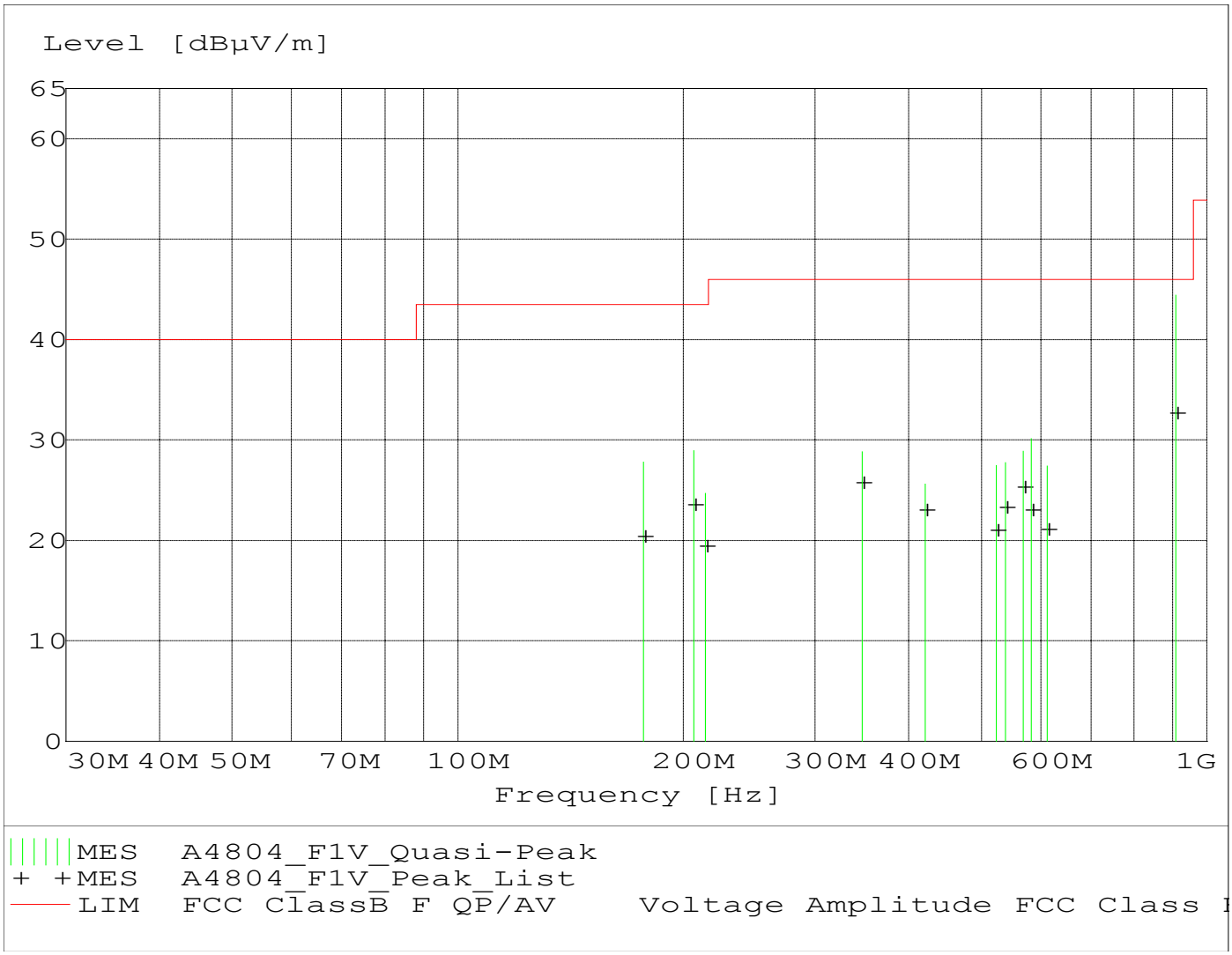
APPENDIX A



1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# MEASUREMENT RESULT: "A4804_F1V_Final"

4/8/2004 11:40AM

| Frequency MHz | Level dBµV | Antenna Factor dBµV/m | System Loss dB | Total Level dBµV/m | Limit dBµV/m | Margin dB | Height Ant. m | EUT Angle deg | Final Detector | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| 908.280 | 40.47 | 22.40 | -18.5 | 44.4 | 46.0 | 1.6 | 1.10 | 135 | QUASI-PEAK | None |
| 206.550 | 39.60 | 11.94 | -22.6 | 28.9 | 43.5 | 14.6 | 1.00 | 315 | QUASI-PEAK | None |
| 177.045 | 34.92 | 15.50 | -22.6 | 27.8 | 43.5 | 15.7 | 1.00 | 315 | QUASI-PEAK | None |
| 582.740 | 31.87 | 18.83 | -20.6 | 30.1 | 46.0 | 15.9 | 1.00 | 45 | QUASI-PEAK | None |
| 568.020 | 30.60 | 18.79 | -20.5 | 28.9 | 46.0 | 17.1 | 1.00 | 90 | QUASI-PEAK | None |
| 346.710 | 35.75 | 14.87 | -21.8 | 28.8 | 46.0 | 17.2 | 1.80 | 315 | QUASI-PEAK | None |
| 538.500 | 30.22 | 18.37 | -20.9 | 27.7 | 46.0 | 18.3 | 1.00 | 270 | QUASI-PEAK | None |
| 523.780 | 29.89 | 18.40 | -20.8 | 27.5 | 46.0 | 18.5 | 1.00 | 270 | QUASI-PEAK | None |
| 612.250 | 28.91 | 18.93 | -20.4 | 27.4 | 46.0 | 18.6 | 1.00 | 45 | QUASI-PEAK | None |
| 213.940 | 35.57 | 11.63 | -22.5 | 24.7 | 43.5 | 18.8 | 1.00 | 315 | QUASI-PEAK | None |
| 420.480 | 31.03 | 16.05 | -21.5 | 25.6 | 46.0 | 20.4 | 1.00 | 180 | QUASI-PEAK | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# FCC Part 15 Class B

## Electric Field Strength

```
EUT:                  HA02
Manufacturer:         Intermatic
Operating Condition:  72 deg. F; 33% R.H.
Test Site:            DLS OF Site 3
Operator:             Craig Brandt
Test Specification:   120 V; 60 Hz
Comment:              Continuous Receive mode
                      Date: 4/8/04
```

## TEXT: "Site 3 MidH 3M"

```
  Short Description:            Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 40 SN: 837808/006

                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
```

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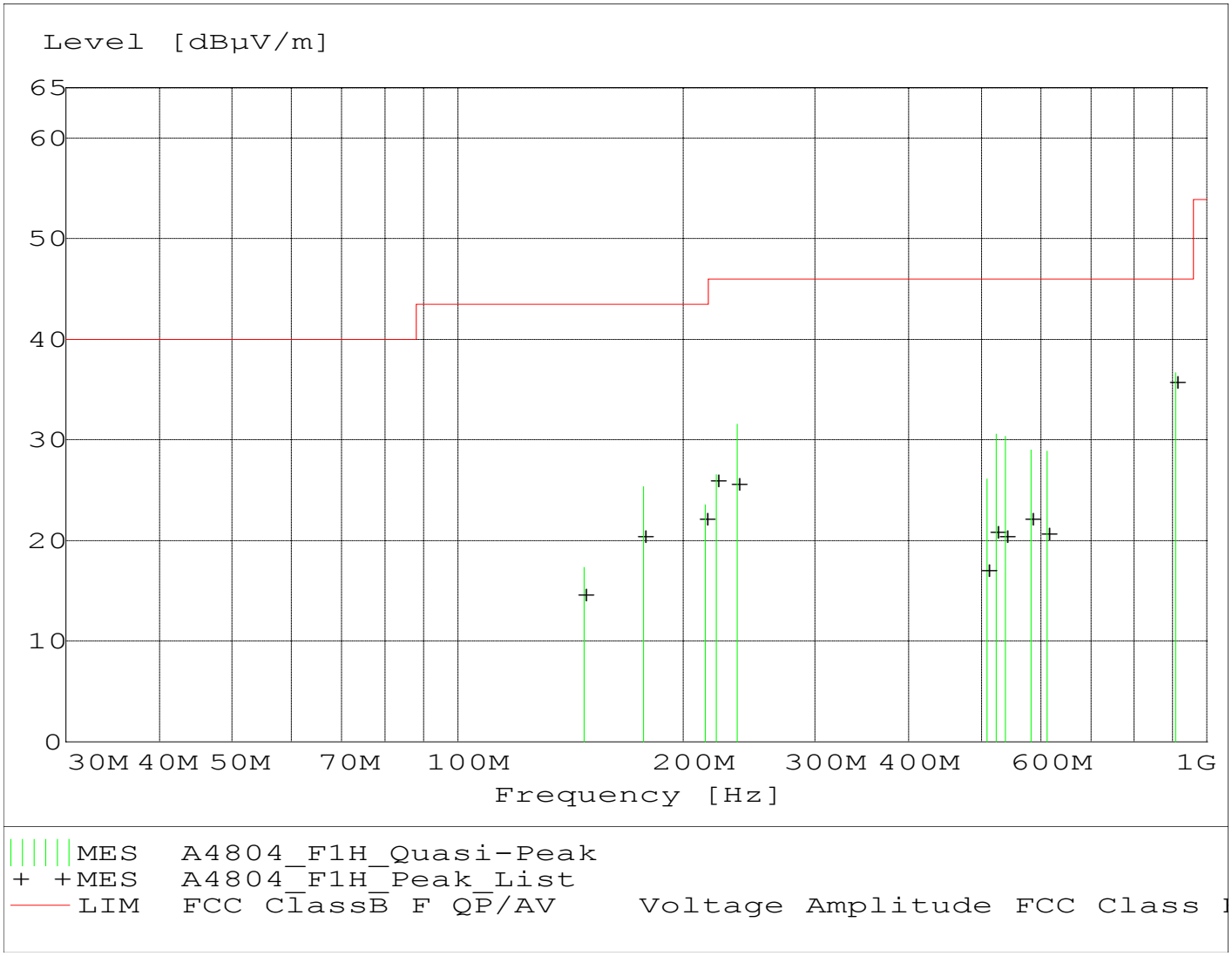
APPENDIX A



ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# MEASUREMENT RESULT: "A4804_F1H_Final"

4/8/2004 12:44PM

| Frequency | Level | Antenna Factor | System Loss | Total Level | Limit | Margin | Height | EUT Angle | Detector | Final Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| MHz | dBµV | dBµV/m | dB | dBµV/m | dBµV/m | dB | m | deg | | |
| 908.28 | 32.73 | 22.40 | -18.5 | 36.6 | 46.0 | 9.4 | 1.30 | 135 | QUASI-PEAK | None |
| 236.06 | 42.05 | 11.85 | -22.3 | 31.6 | 46.0 | 14.4 | 1.10 | 270 | QUASI-PEAK | None |
| 523.76 | 32.96 | 18.40 | -20.8 | 30.6 | 46.0 | 15.4 | 1.50 | 225 | QUASI-PEAK | None |
| 538.51 | 32.86 | 18.37 | -20.9 | 30.4 | 46.0 | 15.6 | 1.40 | 225 | QUASI-PEAK | None |
| 582.77 | 30.76 | 18.83 | -20.6 | 29.0 | 46.0 | 17.0 | 1.40 | 225 | QUASI-PEAK | None |
| 612.28 | 30.34 | 18.93 | -20.4 | 28.9 | 46.0 | 17.1 | 1.40 | 225 | QUASI-PEAK | None |
| 177.04 | 32.45 | 15.50 | -22.6 | 25.3 | 43.5 | 18.2 | 2.00 | 270 | QUASI-PEAK | None |
| 221.31 | 37.42 | 11.44 | -22.3 | 26.5 | 46.0 | 19.5 | 1.40 | 315 | QUASI-PEAK | None |
| 509.03 | 28.39 | 18.42 | -20.7 | 26.1 | 46.0 | 19.9 | 2.00 | 135 | QUASI-PEAK | None |
| 213.93 | 34.38 | 11.63 | -22.5 | 23.5 | 43.5 | 20.0 | 1.40 | 315 | QUASI-PEAK | None |
| 147.53 | 28.40 | 12.00 | -23.0 | 17.4 | 43.5 | 26.1 | 1.50 | 290 | QUASI-PEAK | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# FCC Part 15 Class B

## Electric Field Strength

EUT: HA02
Manufacturer: Intermatic
Operating Condition: 70 deg F; 33% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: 120 V 60 Hz
Comment: Continuous Receive mode
Date: 4/8/04

## TEXT: "Site 3 6204&184 V3M"

Short Description: Test Set-up Vert1GHz-
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 40 SN: 837808/006

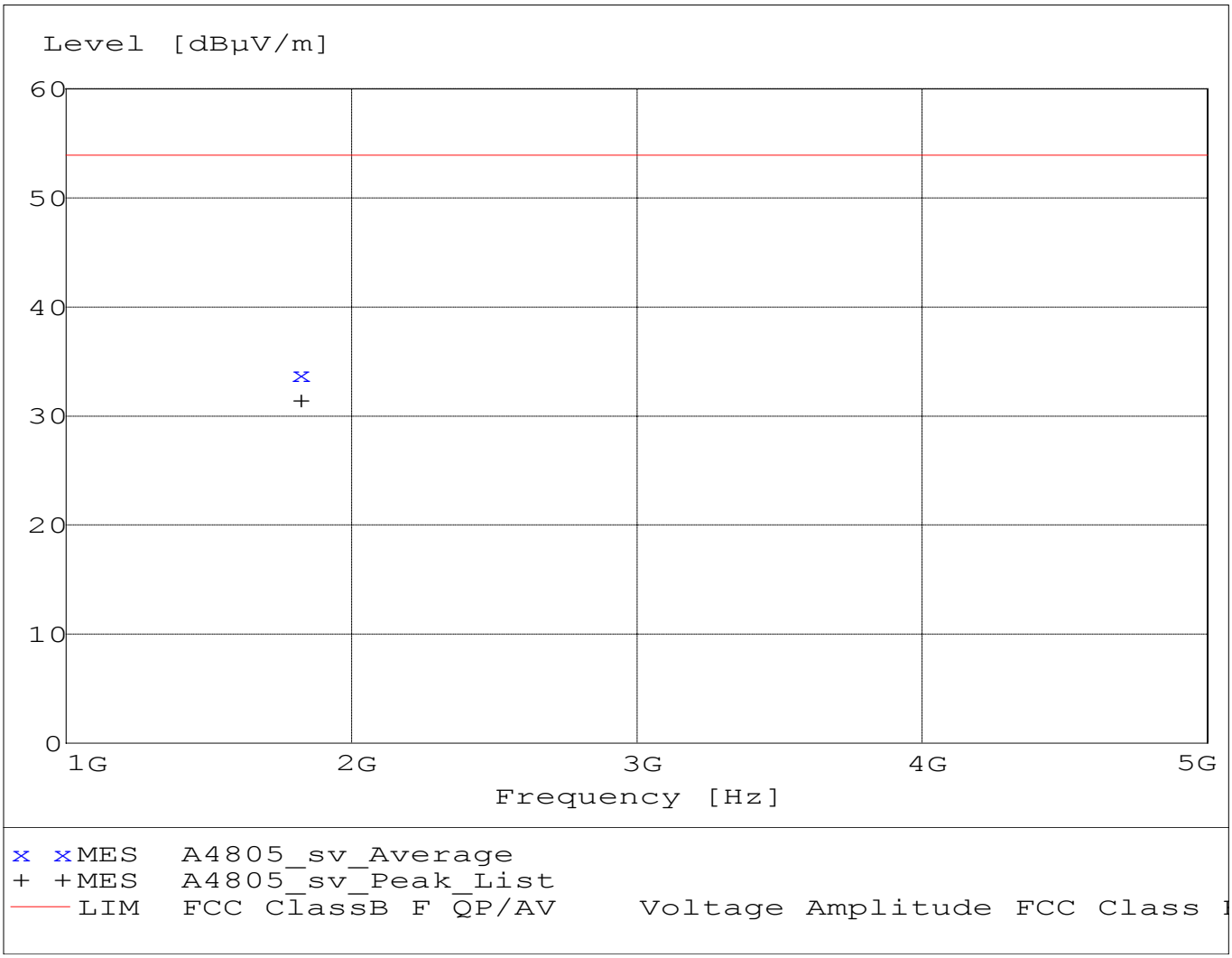
Horn Antenna --- ETS 3115 SN: 6204

Pre-Amps ---
1 - 10 GHz -- Miteq AMF-6D-010100-50 SN: 682425
10 - 18 GHz -- Miteq AMF-6F-100200-50-10P SN: 668382

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

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A



1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# MEASUREMENT RESULT: "A4805_sv_Final"

4/8/2004 10:30AM

| 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 | | |
| 1816.55 | 45.40 | 27.65 | -39.2 | 33.8 | 53.9 | 20.1 | 1.00 | 270 | AVERAGE | None |

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

# FCC Part 15 Class B

## Electric Field Strength

EUT: HA02
Manufacturer: Intermatic
Operating Condition: 70 deg F; 33% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: 120 V 60 Hz
Comment: Continuous Receive mode
Date: 4/8/04

## TEXT: "Site 3 6204&184 H3M"

Short Description: Test Set-up Horz1GHz-
TEST EQUIPMENT: Receiver --- Rohde & Schwarz ESI 40 SN: 837808/006

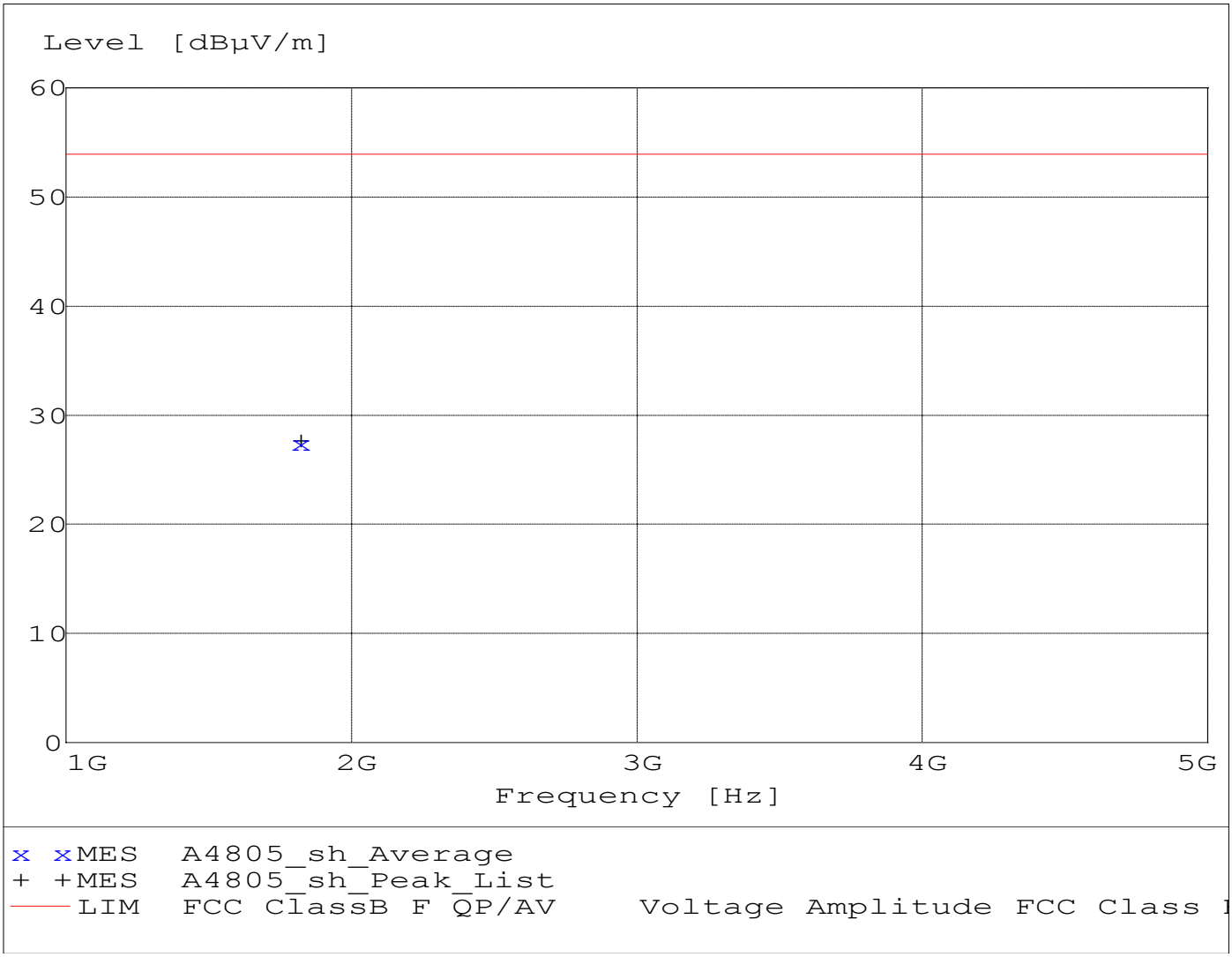
Horn Antenna --- ETS 3115 SN: 6204

Pre-Amps ---
1 - 10 GHz -- Miteq AMF-6D-010100-50 SN: 682425
10 - 18 GHz -- Miteq AMF-6F-100200-50-10P SN: 668382

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

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A



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APPENDIX A

# MEASUREMENT RESULT: "A4805_sh_Final"

4/8/2004 10:38AM

| 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 | | |
| 1816.55 | 39.01 | 27.65 | -39.2 | 27.4 | 53.9 | 26.5 | 1.00 | 180 | AVERAGE | None |