DLS ELECTRONIC SYSTEMS, INC.

1250 Peterson Dr., Wheeling, IL 60090

Company: Mortara Instrument, Inc.
Model Tested: X12P-600
Report Number: 10903

FCC Rules and Regulations / Intentional Radiators

Operational in the 174-216 MHz and 470-668 MHz Bands

Part 15, Subpart C, Section 15.242

Tested from 608 MHz to 632 MHz

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

Formal Name:	X12 Transmitter
Kind of Equipment:	Medical Telemetry Transmitter
Test Configuration:	Patient cable installed with shorting bar to simulate connected to patient. (Tested at 1.5 vdc)
Model Number(s):	X12P-600
Model(s) Tested:	X12P-600
Serial Number(s):	Proto
Date of Tests:	August 18 and September 28, 2004
Test Conducted For:	Mortara Instrument, Inc. 7865 N.86th St. Milwaukee, WI 53224

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:

Mortara Instrument, Inc.

1250 Peterson Dr., Wheeling, IL 6009

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC 17025:1999
ISO 9002:1994

Certificate of Accreditation

DEPARTMENT OF COMMERCE ★ UNITED STATES OF AMERICA ★

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)

1250 Peterson Dr., Wheeling, IL 6009

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

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

September 30, 2004
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

1250 Peterson Dr., Wheeling, IL 6009

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 100276-0

D.L.S. ELECTRONIC SYSTEMS, INC.

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

September 30, 2004

Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

DLS ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 6009

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 100276-0

D.L.S. ELECTRONIC SYSTEMS, INC.

NVLAP Code	*Designation / Description*
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.

September 30, 2004
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

1250 Peterson Dr., Wheeling, IL 6009

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS — **NVLAP LAB CODE 100276-0**

D.L.S. ELECTRONIC SYSTEMS, INC.

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

September 30, 2004
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

DLS ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 6009

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 100276-0

D.L.S. ELECTRONIC SYSTEMS, INC.

NVLAP Code	*Designation / Description*
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

September 30, 2004
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

DLS ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 6009

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 100276-0

D.L.S. ELECTRONIC SYSTEMS, INC.

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

September 30, 2004
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

DLS ELECTRONIC SYSTEMS, INC.
1250 Peterson Dr., Wheeling, IL 6009

National Institute of Standards and Technology **NVLAP®** National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS **NVLAP LAB CODE 100276-0**

D.L.S. ELECTRONIC SYSTEMS, INC.

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)

September 30, 2004
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

National Institute of Standards and Technology **NVLAP®** National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 100276-0

D.L.S. ELECTRONIC SYSTEMS, INC.

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

September 30, 2004

Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

1250 Peterson Dr., Wheeling, IL 6009

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC 17025:1999
ISO 9002:1994

Scope of Accreditation

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

September 30, 2004
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (06-01)

1250 Peterson Dr., Wheeling, IL 6009

TABLE OF CONTENTS

1250 Peterson Dr., Wheeling, IL 6009

1.0 SUMMARY OF TEST REPORT

It was found that the X12 Transmitter, Model Number(s) X12P-600, **"meets"** the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.242 for operational in the 174-216 MHz and 470-668 MHz Bands. The conducted emissions test was not required because the X12 Transmitter is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.

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

Text: 78

2.0 INTRODUCTION

On August 18 and September 28, 2004, a series of radio frequency interference measurements was performed on X12 Transmitter, Model Number(s) X12P-600, Serial Number: Proto. 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 15.209 & 15.242 for Intentional Radiators operating in the Band 174-216 MHz and 470-668 MHz.

1250 Peterson Dr., Wheeling, IL 6009

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).

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.

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.

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.

1250 Peterson Dr., Wheeling, IL 6009

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

7.1 Description:

The original Mortara X12-600 with FCC ID# HJR-X12-600-15 and Canada #3758104616 is a medical device that transmits ECG data to a medical monitor for cardiographic interpretations. The device was tested to FCC Part 15.242 and RSS-210 Sect. 6.2.2 which allows for medical devices to operate within the TV bands. The product approval date was 9/27/2001.

Due to customer demand for a smaller better mechanical packaging of the X12-600, a redesign of the device was done. But to remain compatible with fielded receiver systems, the electronic design and RF characteristics had to remain the same. To achieve this, a modern processor and digital integration was used but the RF oscillator and modulation devices are using the same design but with a new circuit board to meet the mechanical requirement. The new product is called X12P-600 which is the subject of these tests.

The X12+ (600) is a patient worn telemetry transmitter used in hospitals and clinics for the transmission of ECG data. The transmitter is made up of an ECG amplifier, microprocessor, and RF transmitter. The ECG amplifier is a 12 lead device with diagnostic quality response and digital conversion. The microprocessor formats the ECG data for transmission, handles user I/O, and sets the RF transmission channel. The RF transmitter operates in the TV Channel 37 band and is designed to meet FCC rules Part 15.242. The modulation of the carrier is done with simple Gaussian Frequency Shift Keying (GFSK). The antenna is integrated internally to the X12+ and is not removable or replaceable. The X12+ has a detachable light weight 12 lead patient cable and operates from single AA Alkaline batteries for over 24 Hours. The battery is installed through a removable back panel. The front side has a three button keypad and a 33x18 mm graphic LCD. The overall dimensions are 110x63x25 mm.

The X12+ is made up of two circuit boards sandwiched together inside the unit. A single 24 pin header provides interconnectivity. The two boards are the X12+ Front End Card and the X12+ Transmit Card.

1250 Peterson Dr., Wheeling, IL 6009

7.0 DESCRIPTION OF TEST SAMPLE: (CON'T)

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

100mm x 63mm x 25mm

7.3 LINE FILTER USED:

None

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

100 kHz

Clock Frequencies:

5.12 MHz

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. X12+ Front End Card PN: 26025-054-51 Rev B1
2. X12+ Transmit Card PN: 26025-055-51 Rev B1
3. X12+ RF Card PN: 26025-064-50 Rev B1

1250 Peterson Dr., Wheeling, IL 60090

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 X12 Transmitter
Model Number: X12P-600 Serial Number: Proto

Item 1 Non-shielded Patient Cable. .6m

1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING

1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)

1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)

1250 Peterson Dr., Wheeling, IL 60090

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 X12 Transmitter, Model Number(s) X12P-600 **"meets"** the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.242 for operational in the 174-216 MHz and 470-668 MHz Bands.The conducted emissions test was not required because the X12 Transmitter is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.

1250 Peterson Dr., Wheeling, IL 60090

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.

1250 Peterson Dr., Wheeling, IL 60090

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	8/05
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	8/05
LISN	Solar	8012-50-R-24-BNC	8305116	10 MHz – 30 MHz	8/05
LISN	Solar	8012-50-R-24-BNC	814548	10 MHz – 30 MHz	8/05
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	7/05

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 15.242a-c

OPERATION WITHIN THE BANDS 174 to 216 MHz and 470 to 668 MHz

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

1.0 BAND EDGE AND RESTRICT BAND COMPLIANCE

As stated in Section 15.205(d-5), biomedical telemetry devices operating under 15.242 are not subject to the restrict bands of **608 to 632 MHz** but are subject to compliance within the other restricted bands.

2.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS (SECTION 15.242b-c)

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the X12 Transmitter, Model Number: X12P-600, 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 X12 Transmitter were made up to 7000 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 613.52 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 15.242 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.

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

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

For operation in the bands 174 to216 MHz and 470 to 668 MHz 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 15.242(c).

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
174 to 216	200	106	200	46.02
470 to 668	200	106	200	46.02

Field strength limits are at a distance of 3 meters. The emission limits shown are based on measurement instrumentation employing a quasi-peak detector using 120 kHz bandwidth ±20 kHz.

Emissions radiated outside of the specified frequency bands shall not exceed the general radiated emission limits in Section 15.209.

Preliminary radiated emission measurements were performed at a 3 meter test distance. The frequency range from 30 MHz to 7000 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 **62%** relative humidity on August .18, 2004 and **68°F** at **49%** relative humidity on September 28, 2004.

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR

FUNDAMENTAL EMISSION MEASUREMENTS

608.48 MHz and 613.52 MHz

PART 15.242

FCC Part 15 Class B

Electric Field Strength

EUT: X12+(600)
Manufacturer: Mortara
Operating Condition: 72 deg. F; 59% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification:
Comment: 608.48 MHz, and 613.52 MHz
Date: 08/18/04

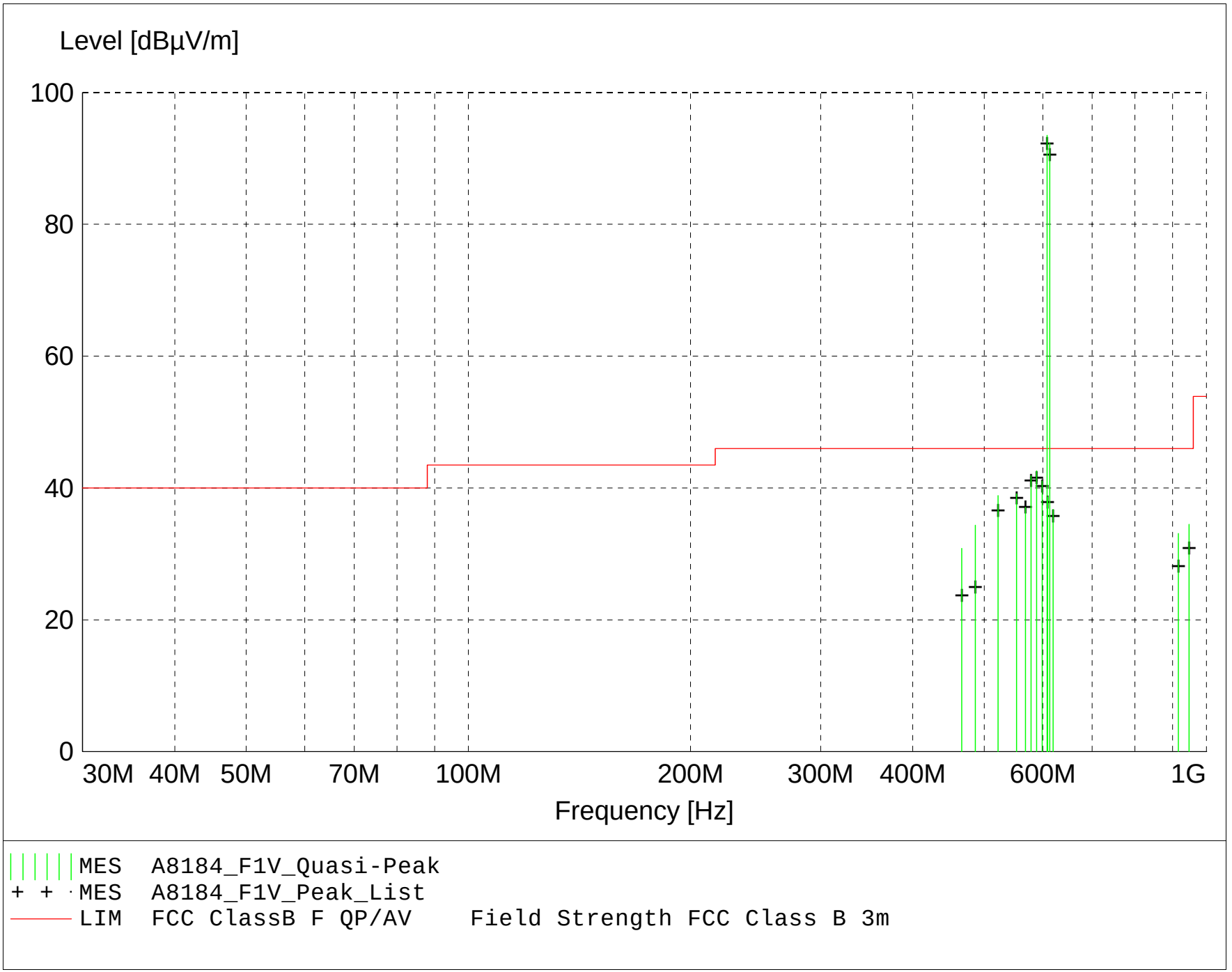
TEXT: "Site 3 MidV 3M"

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 Polarisation


Level [dBµV/m]
100
80
60
40
20
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A8184_F1V_Quasi-Peak
MES A8184_F1V_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A8184_F1V_Final"

8/18/2004 11:30AM

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		
588.780000	44.39	18.83	-20.6	42.6	46.0	3.4	1.00	270	QUASI-PEAK	None
578.540000	43.60	18.81	-20.6	41.8	46.0	4.2	1.00	270	QUASI-PEAK	None
599.020000	42.77	18.93	-20.6	41.1	46.0	4.9	1.00	180	QUASI-PEAK	None
552.950000	41.11	18.64	-20.6	39.1	46.0	6.9	1.00	225	QUASI-PEAK	None
522.220000	41.16	18.51	-20.8	38.9	46.0	7.1	1.00	315	QUASI-PEAK	None
609.260000	40.10	18.94	-20.5	38.6	46.0	7.4	1.00	180	QUASI-PEAK	None
568.300000	38.77	18.79	-20.5	37.0	46.0	9.0	1.00	180	QUASI-PEAK	None
619.510000	38.16	18.96	-20.4	36.8	46.0	9.2	1.00	225	QUASI-PEAK	None
947.170000	29.61	22.90	-18.0	34.5	46.0	11.5	1.00	0	QUASI-PEAK	None
486.380000	38.12	17.35	-21.1	34.4	46.0	11.6	1.00	315	QUASI-PEAK	None
608.480000	95.05	18.94	-20.5	93.5	106.0	12.5	1.00	180	QUASI-PEAK	Fundamental
916.470000	29.23	22.35	-18.5	33.1	46.0	12.9	1.00	0	QUASI-PEAK	None
613.520000	93.74	18.94	-20.4	92.3	106.0	13.7	1.00	0	QUASI-PEAK	Fundamental
465.910000	34.87	17.07	-21.1	30.8	46.0	15.2	1.00	315	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: X12+(600)
Manufacturer: Mortara
Operating Condition: 72 deg. F; 59% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification:
Comment: 608.48 MHz, and 613.52 MHz
Date: 08/18/04

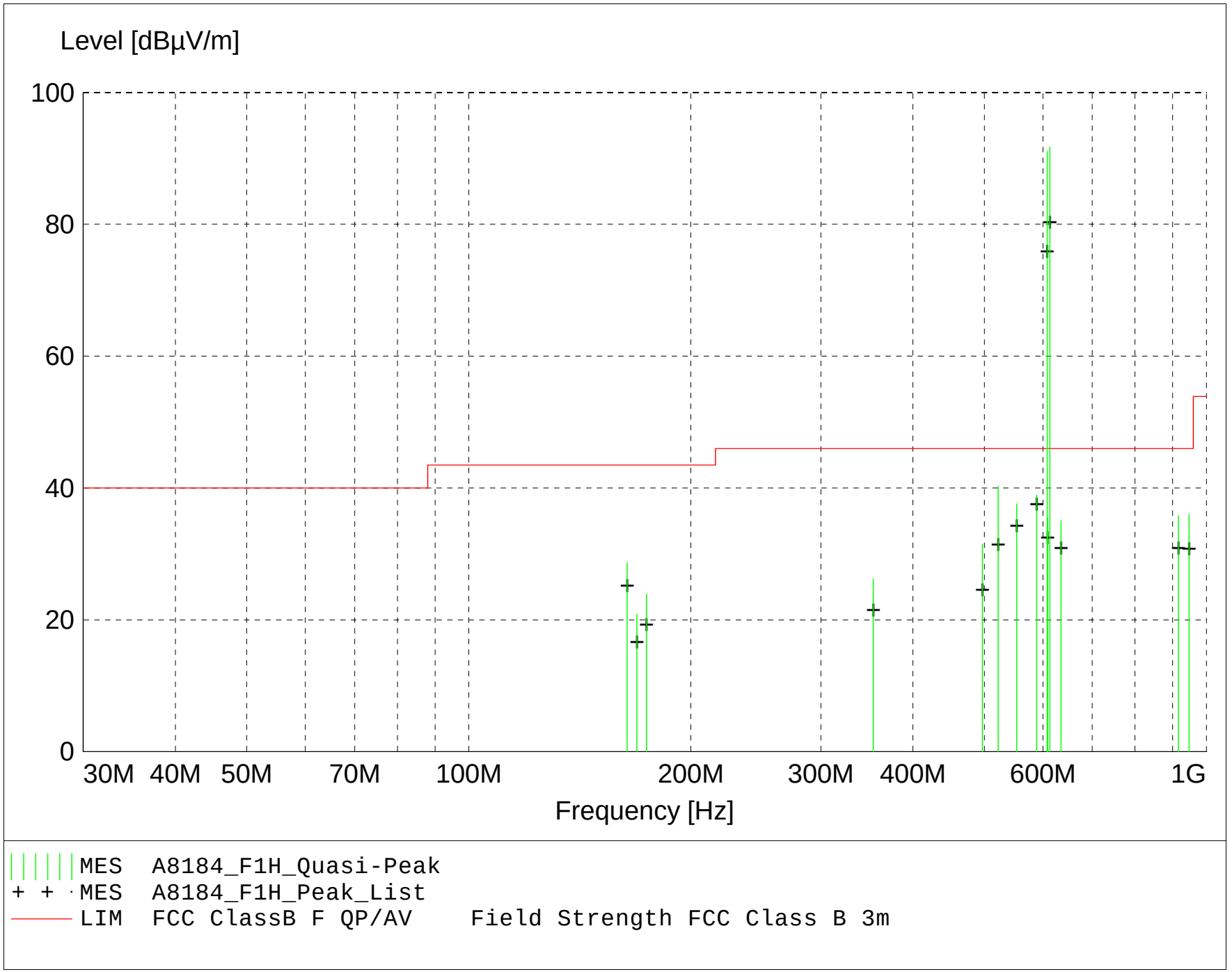
TEXT: "Site 3 MidH 3M"

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 Polarisation


Level [dBµV/m]
100
80
60
40
20
0
30M
40M
50M
70M
100M
200M
300M
400M
600M
1G
Frequency [Hz]
MES A8184_F1H_Quasi-Peak
MES A8184_F1H_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A8184_F1H_Final"

8/18/2004 11:32AM

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		
522.230000	42.57	18.50	-20.8	40.3	46.0	5.7	1.50	45	QUASI-PEAK	None
588.780000	40.75	18.83	-20.6	38.9	46.0	7.1	1.20	0	QUASI-PEAK	None
552.940000	39.59	18.64	-20.6	37.6	46.0	8.4	1.50	45	QUASI-PEAK	None
947.180000	31.08	22.90	-18.0	36.0	46.0	10.0	1.30	180	QUASI-PEAK	None
916.460000	31.91	22.35	-18.5	35.8	46.0	10.2	1.30	45	QUASI-PEAK	None
609.260000	36.95	18.94	-20.5	35.4	46.0	10.6	1.50	45	QUASI-PEAK	None
634.860000	36.33	19.01	-20.3	35.1	46.0	10.9	1.40	45	QUASI-PEAK	None
634.860000	36.33	19.01	-20.3	35.1	46.0	10.9	1.40	45	QUASI-PEAK	None
613.520000	93.17	18.94	-20.4	91.7	106.0	14.3	1.20	20	QUASI-PEAK	Fundamental
496.620000	34.68	17.65	-20.9	31.5	46.0	14.5	2.20	45	QUASI-PEAK	None
163.825000	37.61	13.78	-22.8	28.6	43.5	14.9	2.50	180	QUASI-PEAK	None
608.480000	92.61	18.94	-20.5	91.1	106.0	14.9	1.20	20	QUASI-PEAK	Fundamental
174.070000	31.35	15.18	-22.6	23.9	43.5	19.6	2.10	0	QUASI-PEAK	None
353.270000	33.06	14.87	-21.8	26.2	46.0	19.8	1.00	45	QUASI-PEAK	None
168.945000	28.97	14.56	-22.7	20.8	43.5	22.7	2.10	0	QUASI-PEAK	None

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

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR

FUNDAMENTAL EMISSION MEASUREMENTS

620.48 MHz

PART 15.242

FCC Part 15 Class B

Electric Field Strength

EUT: X12 Plus
Manufacturer: Mortara Instrument
Operating Condition: 68 deg. F; 49% R.H.
Test Site: DLS OF Site 3
Operator: Craig B
Test Specification:
Comment: 620.48 MHz
Date: 09/28/04

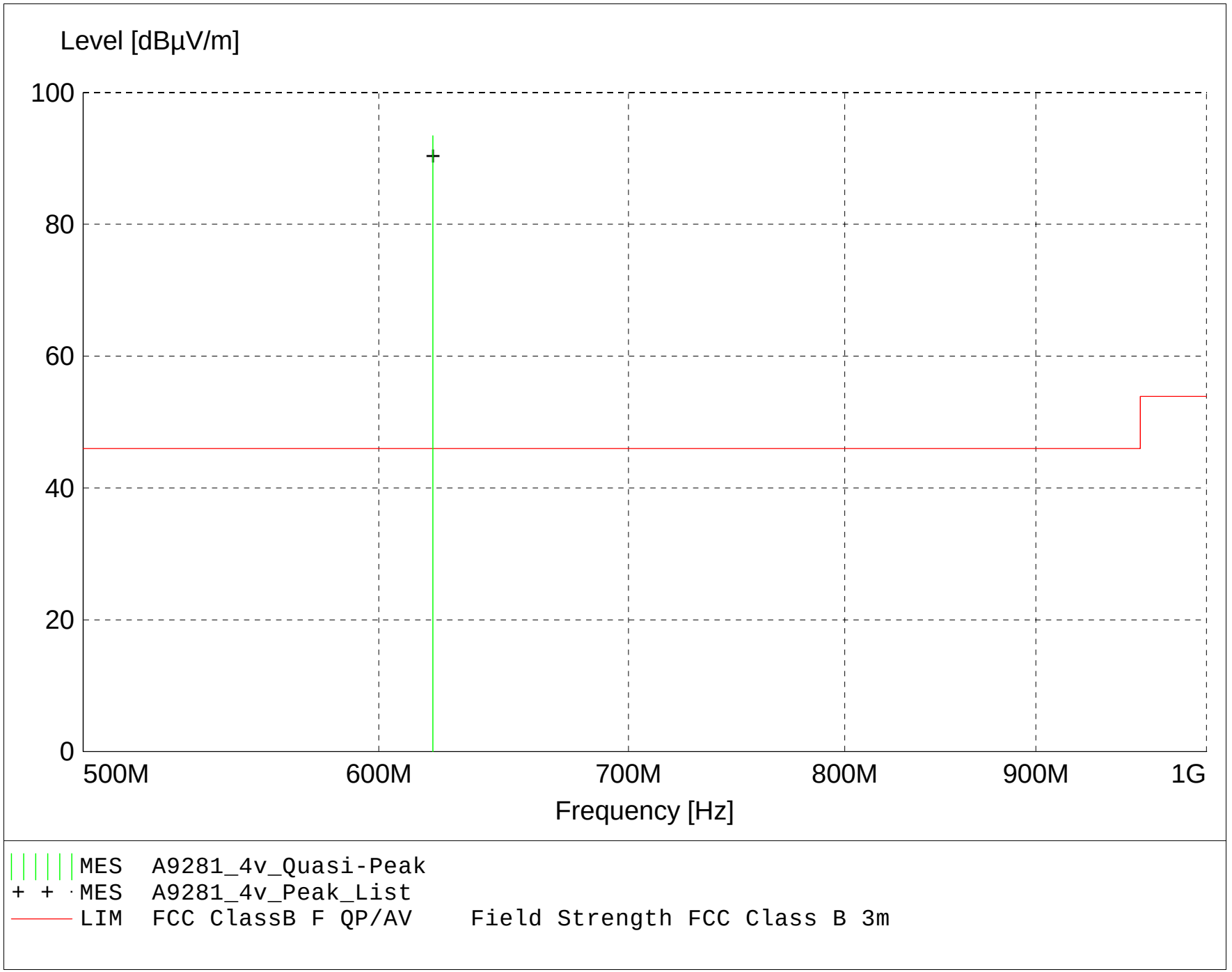
TEXT: "Site 3 MidV 3M"

Short Description: Test Set-up Vert30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 26 SN: ESIB 26 SN: 100200

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 Polarisation


Level [dBµV/m]
100
80
60
40
20
0
500M
600M
700M
800M
900M
1G
Frequency [Hz]
MES A9281_4v_Quasi-Peak
MES A9281_4v_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A9281_4v_Final"

9/28/2004 9:59AM

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		
620.480000	94.84	18.97	-20.3	93.5	106.0	12.5	1.00	315	QUASI-PEAK	Fundamental

FCC Part 15 Class B

Electric Field Strength

```
EUT:                 X12 Plus
Manufacturer:        Mortara Instrument
Operating Condition: 68 deg. F; 49% R.H.
Test Site:           DLS OF Site 3
Operator:            Craig B
Test Specification:
Comment:             620.48 MHz
                     Date: 09/28/04
```

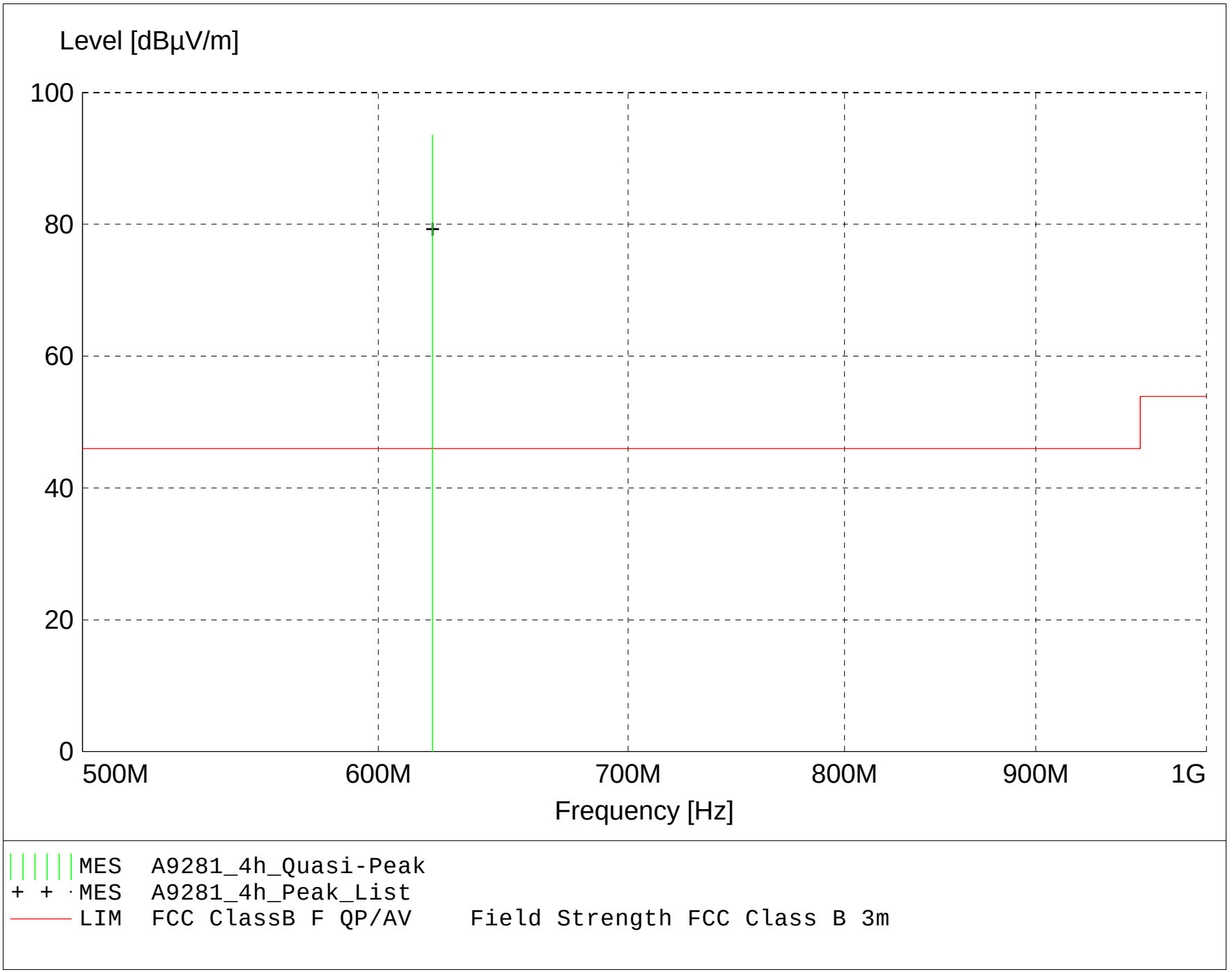
TEXT: "Site 3 MidH 3M"

```
  Short Description:            Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz       ESIB 26 SN: 100200

                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 Polarisation
```


Level [dBµV/m]
100
80
60
40
20
0
500M
600M
700M
800M
900M
1G
Frequency [Hz]
MES A9281_4h_Quasi-Peak
MES A9281_4h_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A9281_4h_Final"

9/28/2004 9:59AM

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		
620.480000	94.93	18.97	-20.3	93.6	106.0	12.4	1.10	0	QUASI-PEAK	Fundamental

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR

FUNDAMENTAL EMISSION MEASUREMENTS

631.52 MHz

PART 15.242

FCC Part 15 Class B

Electric Field Strength

```
EUT:                  X12 Plus
Manufacturer:         Mortara Instrument
Operating Condition:  68 deg. F; 49% R.H.
Test Site:            DLS OF Site 3
Operator:             Craig B
Test Specification:
Comment:              631.52 MHz
                      Date: 09/28/04
```

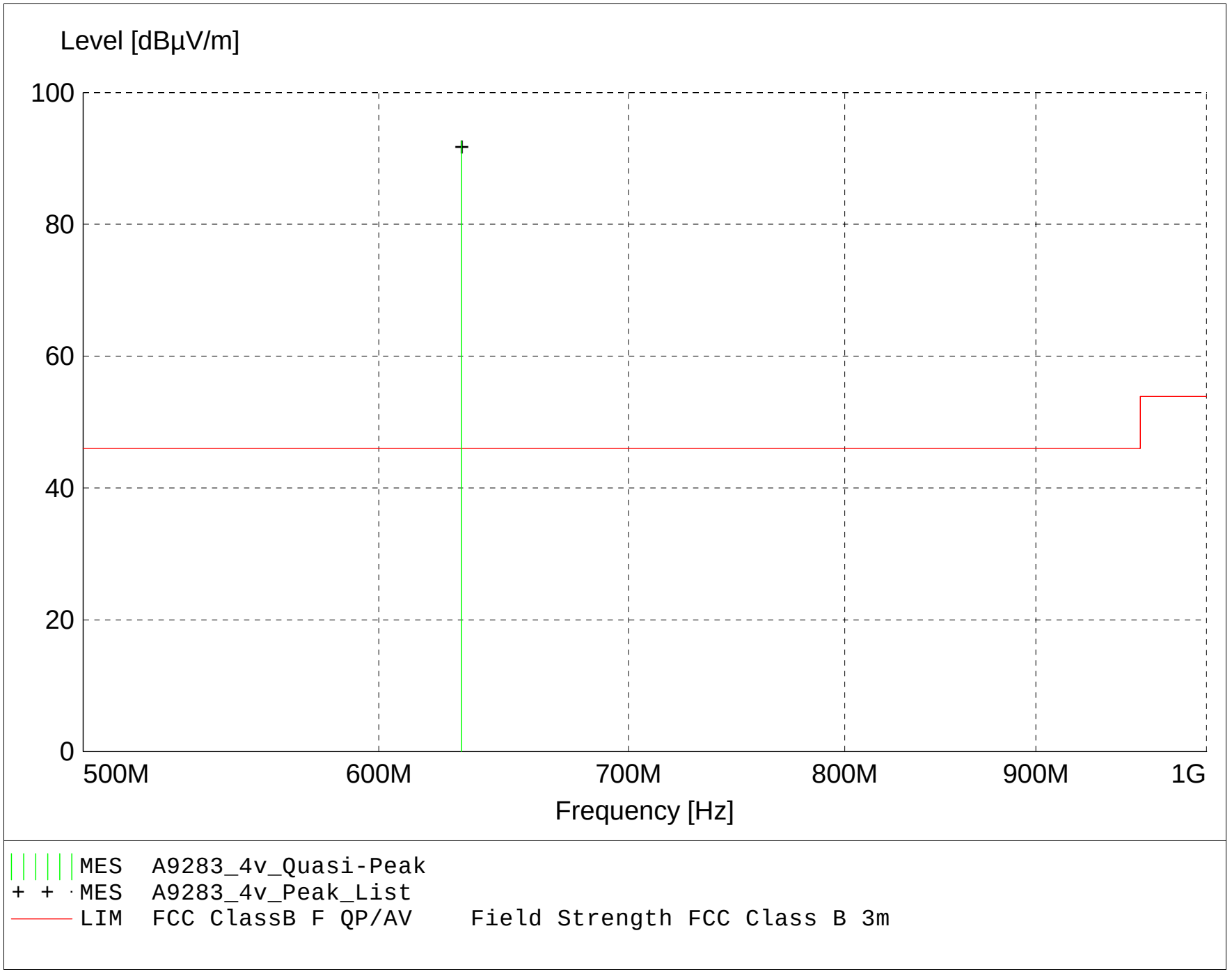
TEXT: "Site 3 MidV 3M"

```
  Short Description:            Test Set-up Vert30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz   ESIB 26 SN: 100200

                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 Polarisation
```


Level [dBµV/m]
100
80
60
40
20
0
500M
600M
700M
800M
900M
1G
Frequency [Hz]
MES A9283_4v_Quasi-Peak
MES A9283_4v_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A9283_4v_Final"

9/28/2004 10:01AM

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		
631.520000	93.95	18.99	-20.3	92.7	106.0	13.3	1.00	315	QUASI-PEAK	Fundamental

FCC Part 15 Class B

Electric Field Strength

EUT:	X12 Plus
Manufacturer:	Mortara Instrument
Operating Condition:	68 deg. F; 49% R.H.
Test Site:	DLS OF Site 3
Operator:	Craig B
Test Specification:	
Comment:	631.52 MHz
	Date: 09/28/04

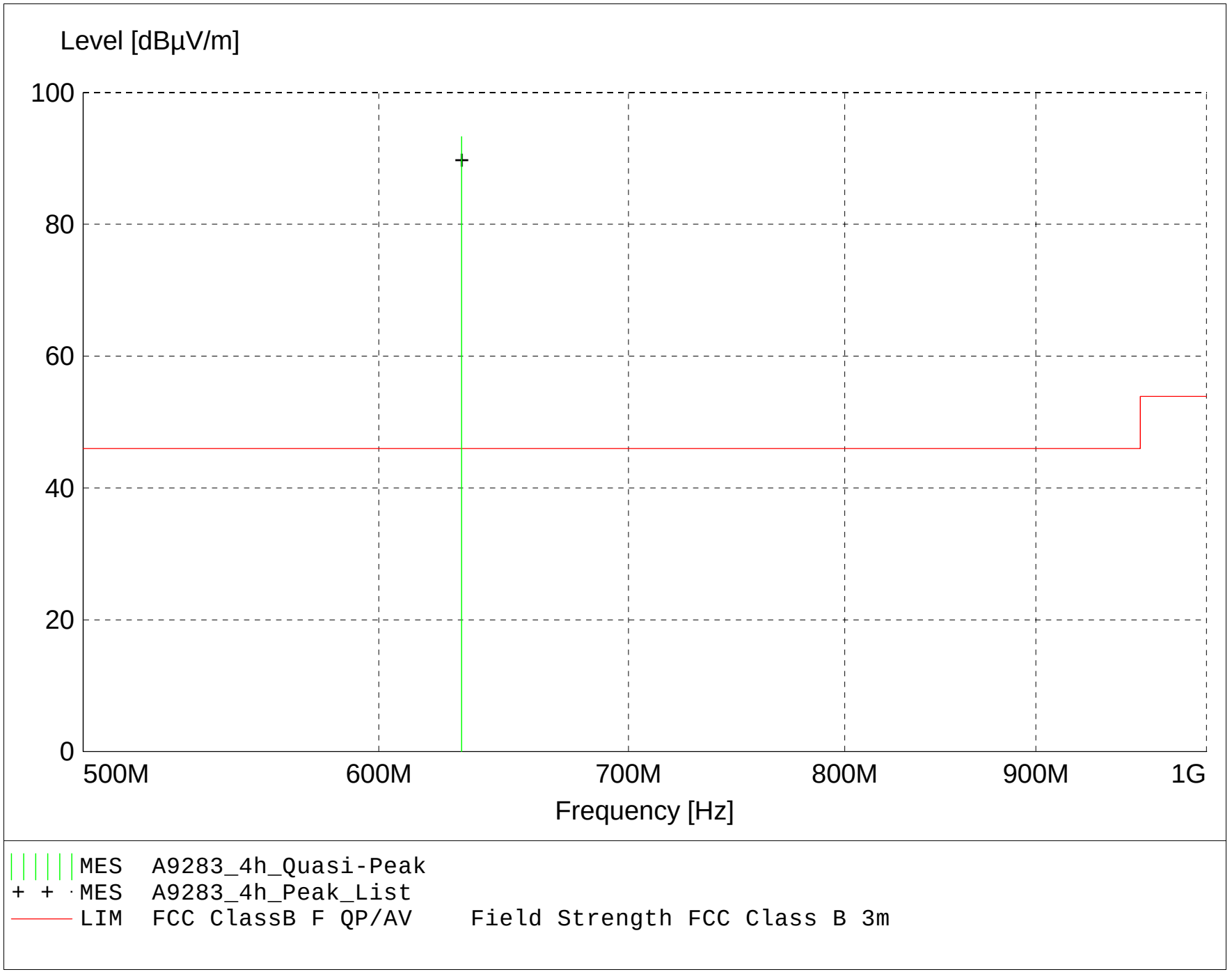
TEXT: "Site 3 MidH 3M"

```
  Short Description:            Test Set-up Horz30-1000MHz
TEST EQUIPMENT: Receiver --- Rohde&Schwarz   ESIB 26 SN: 100200

                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 Polarisation
```


Level [dBµV/m]
100
80
60
40
20
0
500M
600M
700M
800M
900M
1G
Frequency [Hz]
MES A9283_4h_Quasi-Peak
MES A9283_4h_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A9283_4h_Final"

9/28/2004 10:00AM

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		
631.520000	94.60	18.99	-20.3	93.3	106.0	12.7	1.20	0	QUASI-PEAK	None

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR

FIELD STRENGTH HARMONIC AND

SPURIOUS EMISSION MEASUREMENTS

608.48 MHz

PART 15.209

FCC Part 15 Class B

Electric Field Strength

EUT: X12+(600)
Manufacturer: Mortara
Operating Condition: 70 deg F; 62% R.H.
Test Site: DLS Site 3
Operator: Craig Brandt
Test Specification:
Comment: low channel 608.48 MHz
Date: 08/18/04

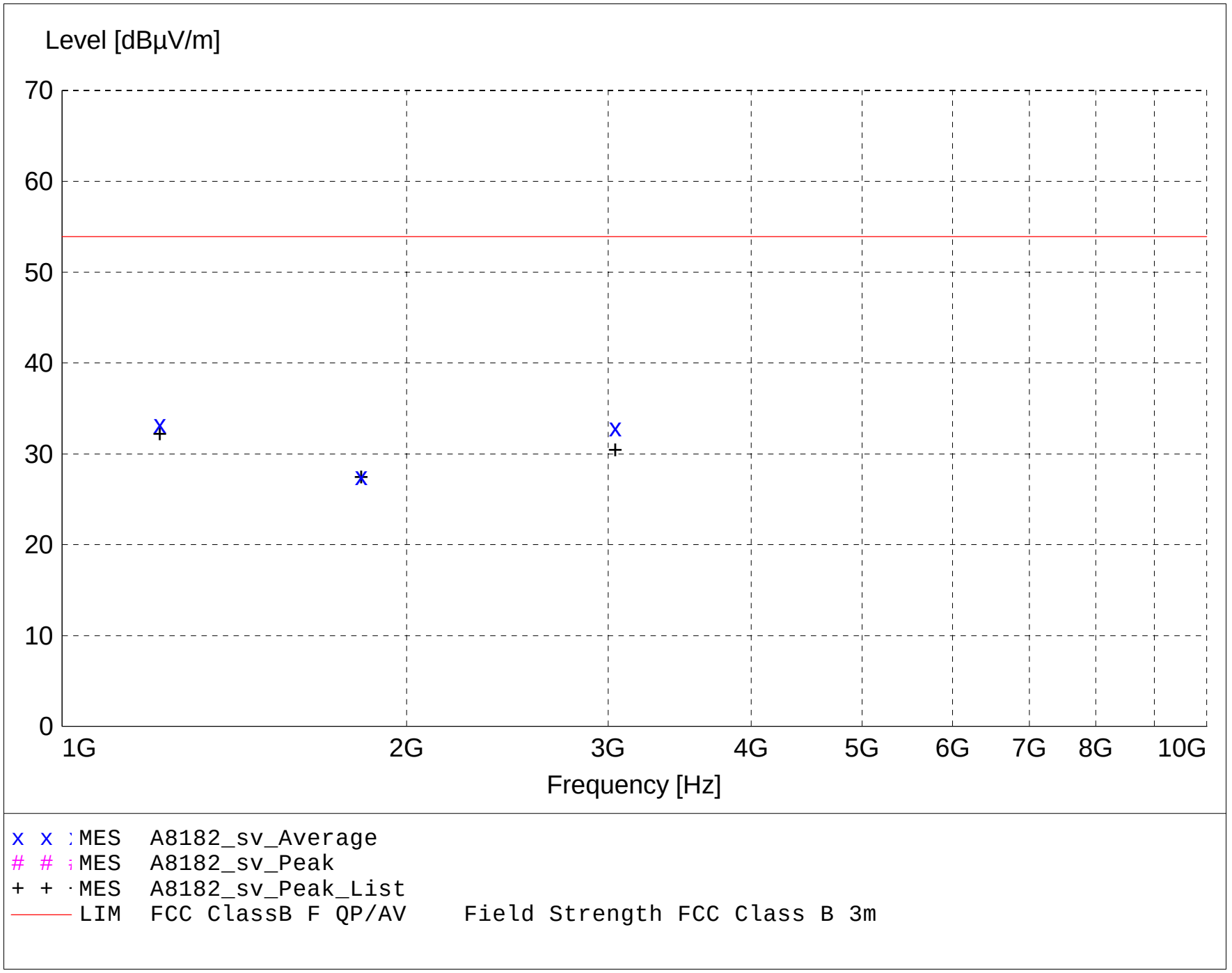
TEXT: "Site 3 5731&184 V3M"

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

Horn Antenna --- EMCO 3115 SN: 9903-5731

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 Polarisation


Level [dBµV/m]
70
60
50
40
30
20
10
0
1G
2G
3G
4G
5G
6G
7G
8G
10G
Frequency [Hz]
x x MES A8182_sv_Average
MES A8182_sv_Peak
+ + MES A8182_sv_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A8182_sv_Final"

8/18/2004 11:26AM

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		
1216.960000	48.30	24.78	-39.8	33.3	53.9	20.6	1.00	180	AVERAGE	None
3042.360000	41.62	30.19	-38.9	32.9	53.9	21.0	1.20	225	AVERAGE	None
1825.440000	39.68	26.83	-39.0	27.5	53.9	26.4	1.20	180	AVERAGE	None

FCC Part 15 Class B

Electric Field Strength

EUT: X12+(600)
Manufacturer: Mortara
Operating Condition: 70 deg F; 62% R.H.
Test Site: DLS Site 3
Operator: Craig Brandt
Test Specification:
Comment: low channel 608.48 MHz
Date: 08/18/04

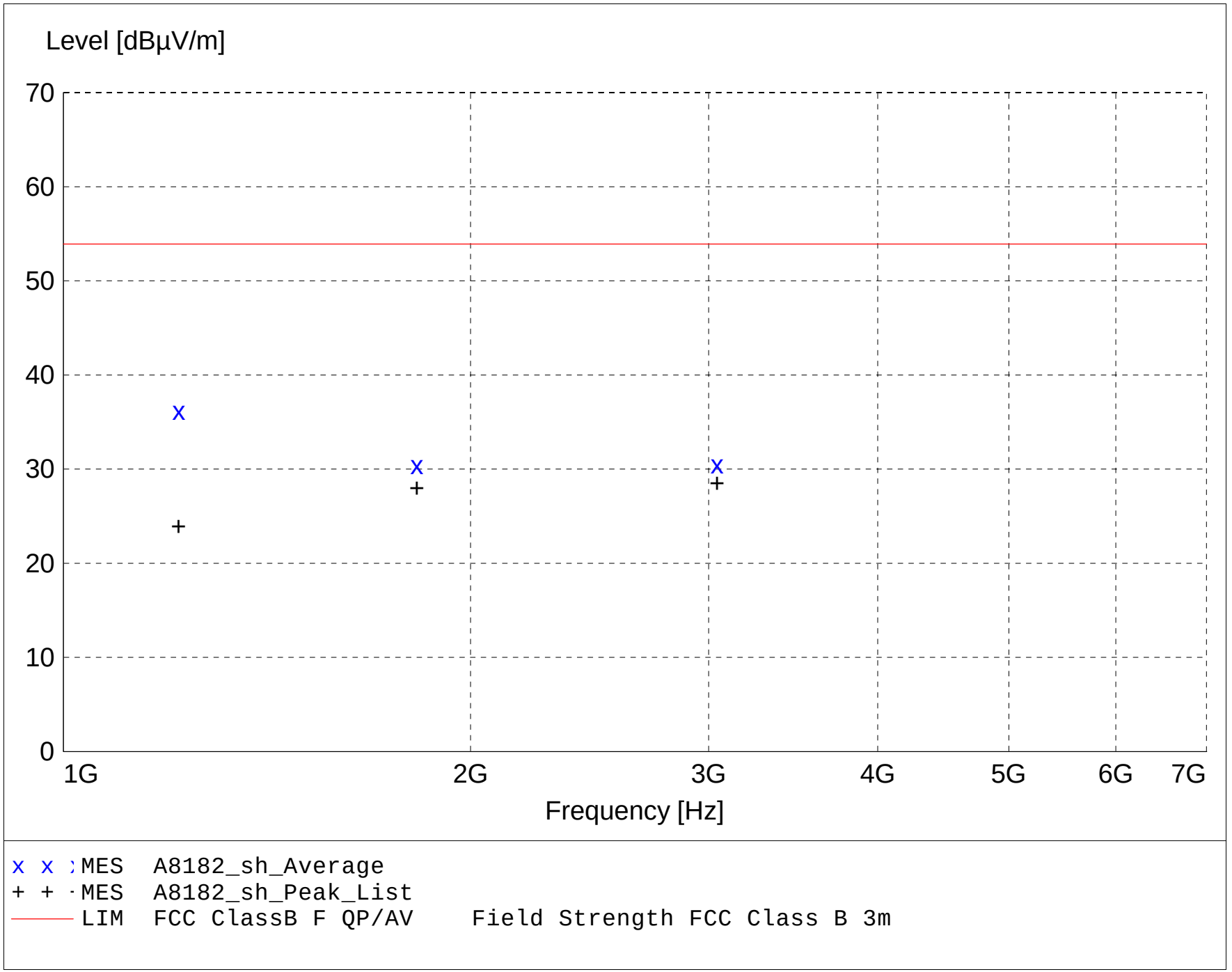
TEXT: "Site 3 5731&184 H3M"

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

Horn Antenna --- EMCO 3115 SN: 9903-5731

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 Polarisation


Level [dBµV/m]
70
60
50
40
30
20
10
0
1G
2G
3G
4G
5G
6G
7G
Frequency [Hz]
x x :MES A8182_sh_Average
+ + :MES A8182_sh_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A8182_sh_Final"

8/18/2004 9:00AM

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		
1216.960000	51.21	24.78	-39.8	36.2	53.9	17.7	1.00	0	AVERAGE	None
3042.400000	39.21	30.19	-38.9	30.5	53.9	23.4	1.00	225	AVERAGE	None
1825.440000	42.56	26.83	-39.0	30.4	53.9	23.5	1.30	180	AVERAGE	None

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR

FIELD STRENGTH HARMONIC AND

SPURIOUS EMISSION MEASUREMENTS

613.52 MHz

PART 15.209

FCC Part 15 Class B

Electric Field Strength

EUT: X12+(600)
Manufacturer: Mortara
Operating Condition: 70 deg F; 62% R.H.
Test Site: DLS Site 3
Operator: Craig Brandt
Test Specification:
Comment: high channel 613.52 MHz
Date: 08/18/04

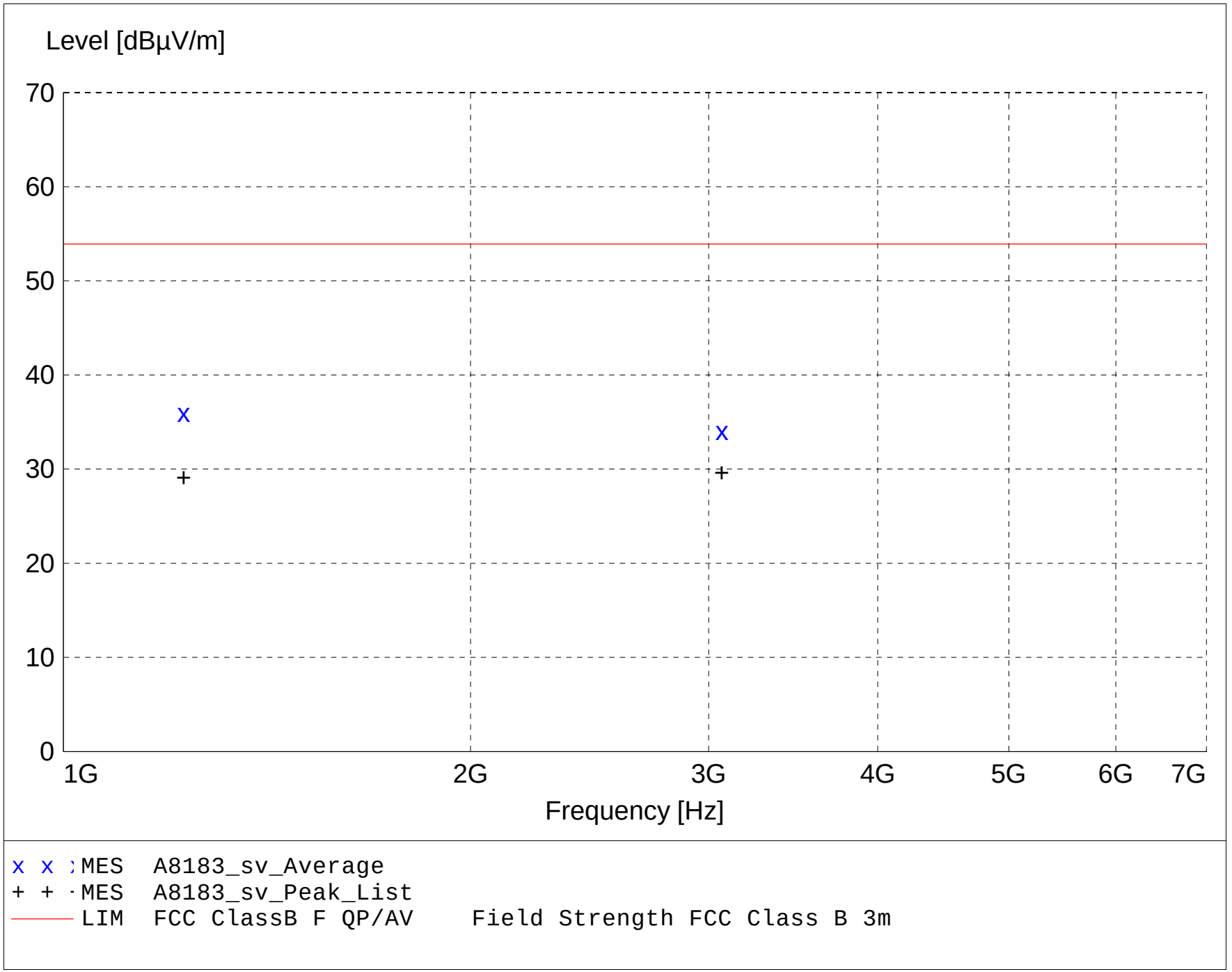
TEXT: "Site 3 5731&184 V3M"

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

Horn Antenna --- EMCO 3115 SN: 9903-5731

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 Polarisation


Level [dBµV/m]
70
60
50
40
30
20
10
0
1G
2G
3G
4G
5G
6G
7G
Frequency [Hz]
x x :MES A8183_sv_Average
+ + ·MES A8183_sv_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A8183_sv_Final"

8/18/2004 9:10AM

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		
1227.040000	51.04	24.80	-39.9	35.9	53.9	18.0	1.20	135	AVERAGE	None
3067.600000	42.50	30.25	-38.7	34.0	53.9	19.9	1.20	180	AVERAGE	None

FCC Part 15 Class B

Electric Field Strength

EUT: X12+(600)
Manufacturer: Mortara
Operating Condition: 70 deg F; 62% R.H.
Test Site: DLS Site 3
Operator: Craig Brandt
Test Specification:
Comment: high channel 613.52 MHz
Date: 08/18/04

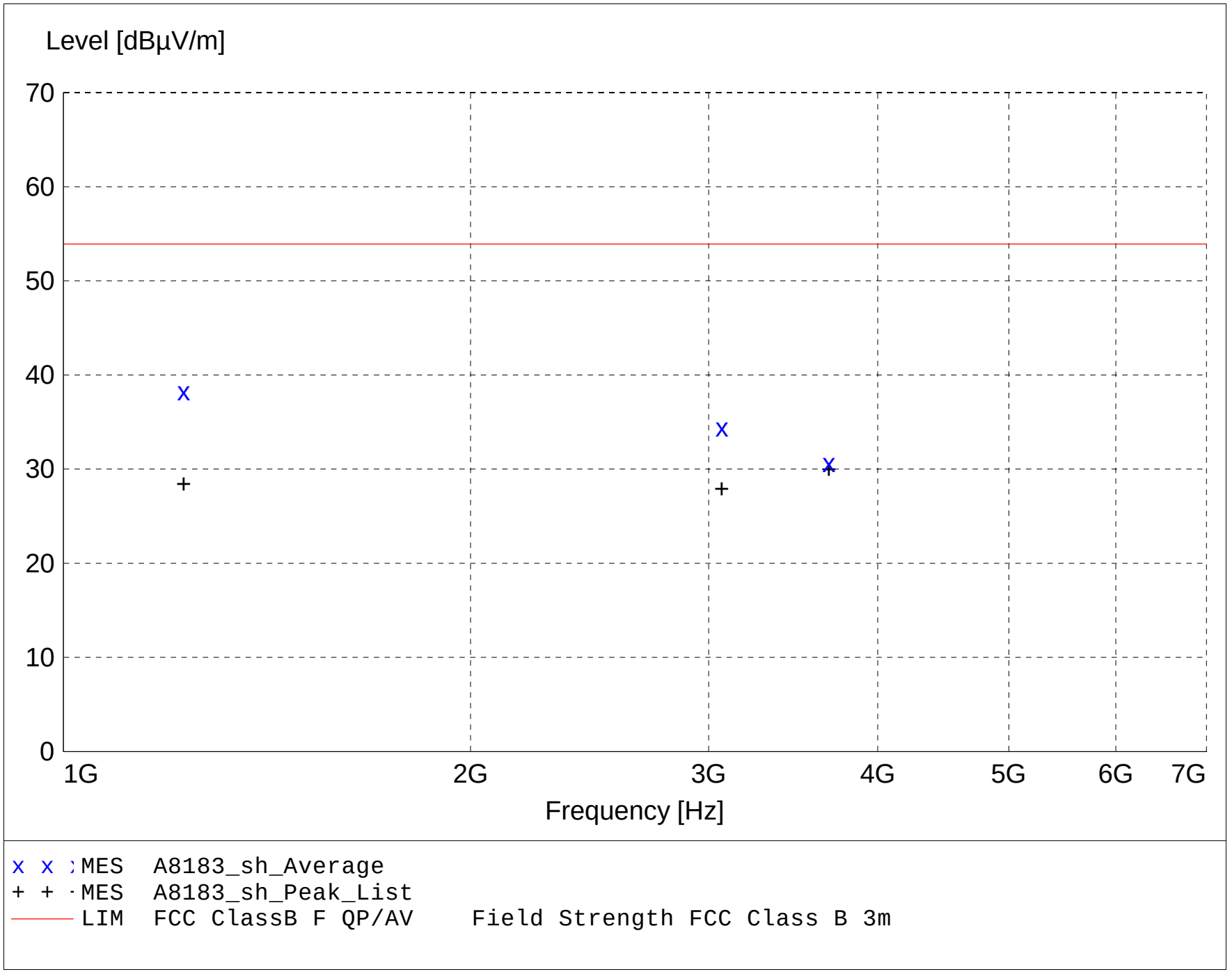
TEXT: "Site 3 5731&184 H3M"

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

Horn Antenna --- EMCO 3115 SN: 9903-5731

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 Polarisation


Level [dBµV/m]
70
60
50
40
30
20
10
0
1G
2G
3G
4G
5G
6G
7G
Frequency [Hz]
x x :MES A8183_sh_Average
+ + ·MES A8183_sh_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A8183_sh_Final"

8/18/2004 9:24AM

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		
1227.040000	53.33	24.80	-39.9	38.2	53.9	15.7	1.00	30	AVERAGE	None
3067.600000	42.84	30.25	-38.7	34.4	53.9	19.5	1.30	180	AVERAGE	None
3681.120000	36.69	31.71	-37.8	30.6	53.9	23.3	1.00	180	AVERAGE	None

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR

FIELD STRENGTH HARMONIC AND

SPURIOUS EMISSION MEASUREMENTS

620.48 MHz

PART 15.209

FCC Part 15 Class B

Electric Field Strength

EUT: X12 Plus
Manufacturer: Mortara Instrument
Operating Condition: 68 deg. F; 49% R.H.
Test Site: DLS OF Site 3
Operator: Craig B
Test Specification:
Comment: 620.48 MHz
Date: 09/28/04

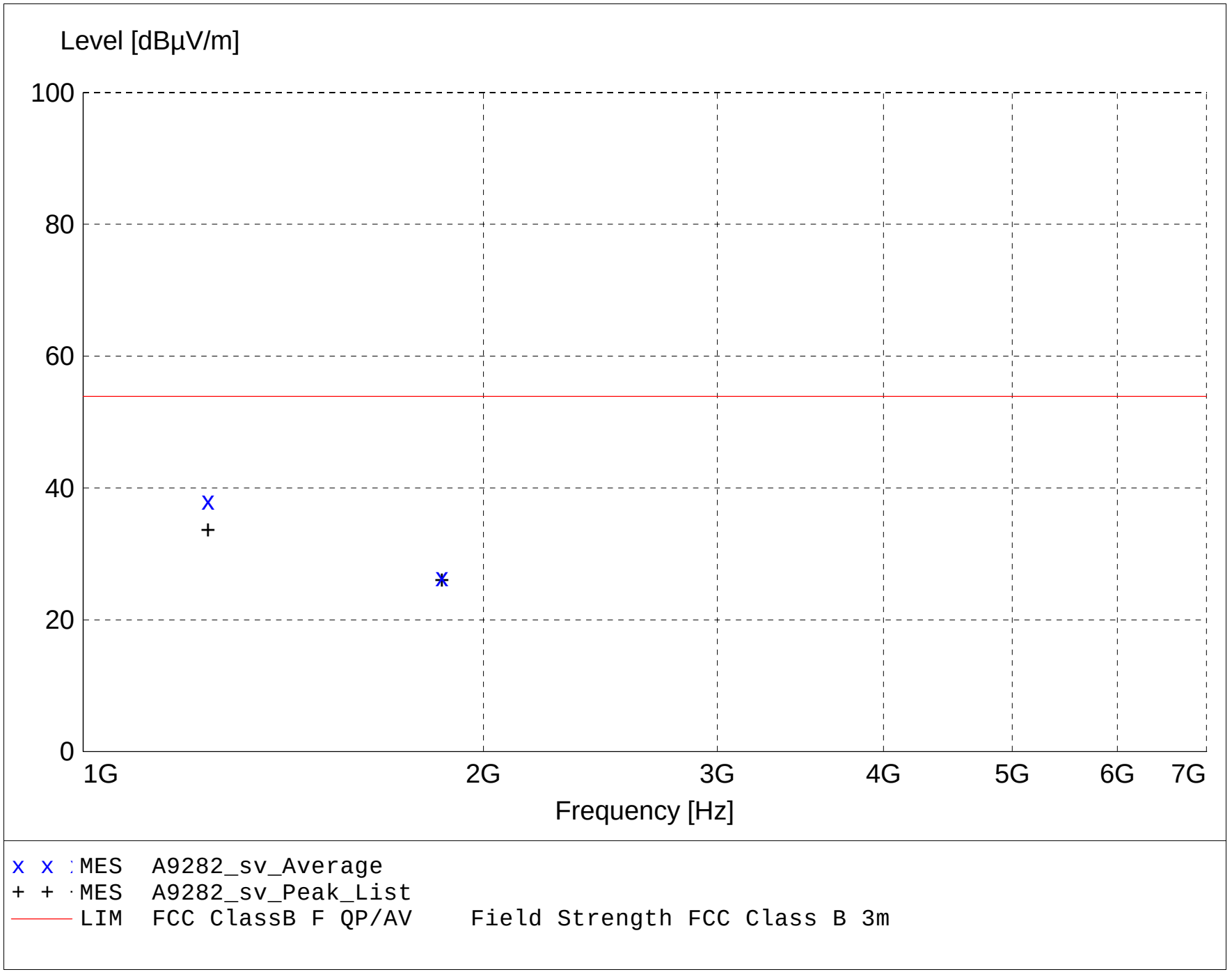
TEXT: "Site 3 5731&184 V3M"

Short Description: Test Set-up Vert1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESIB 26 SN: 100200

Horn Antenna --- EMCO 3115 SN: 9903-5731

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 Polarisation


Level [dBµV/m]
100
80
60
40
20
0
1G
2G
3G
4G
5G
6G
7G
Frequency [Hz]
x x : MES A9282_sv_Average
+ + · MES A9282_sv_Peak_List
——— LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A9282_sv_Final"

9/28/2004 10:02AM

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		
1240.960000	53.43	24.83	-40.2	38.1	53.9	15.8	1.70	0	AVERAGE	None
1861.440000	38.79	26.99	-39.3	26.5	53.9	27.4	1.00	180	AVERAGE	None

FCC Part 15 Class B

Electric Field Strength

EUT: X12 Plus
Manufacturer: Mortara Instrument
Operating Condition: 68 deg. F; 49% R.H.
Test Site: DLS OF Site 3
Operator: Craig B
Test Specification:
Comment: 620.48 MHz
Date: 09/28/04

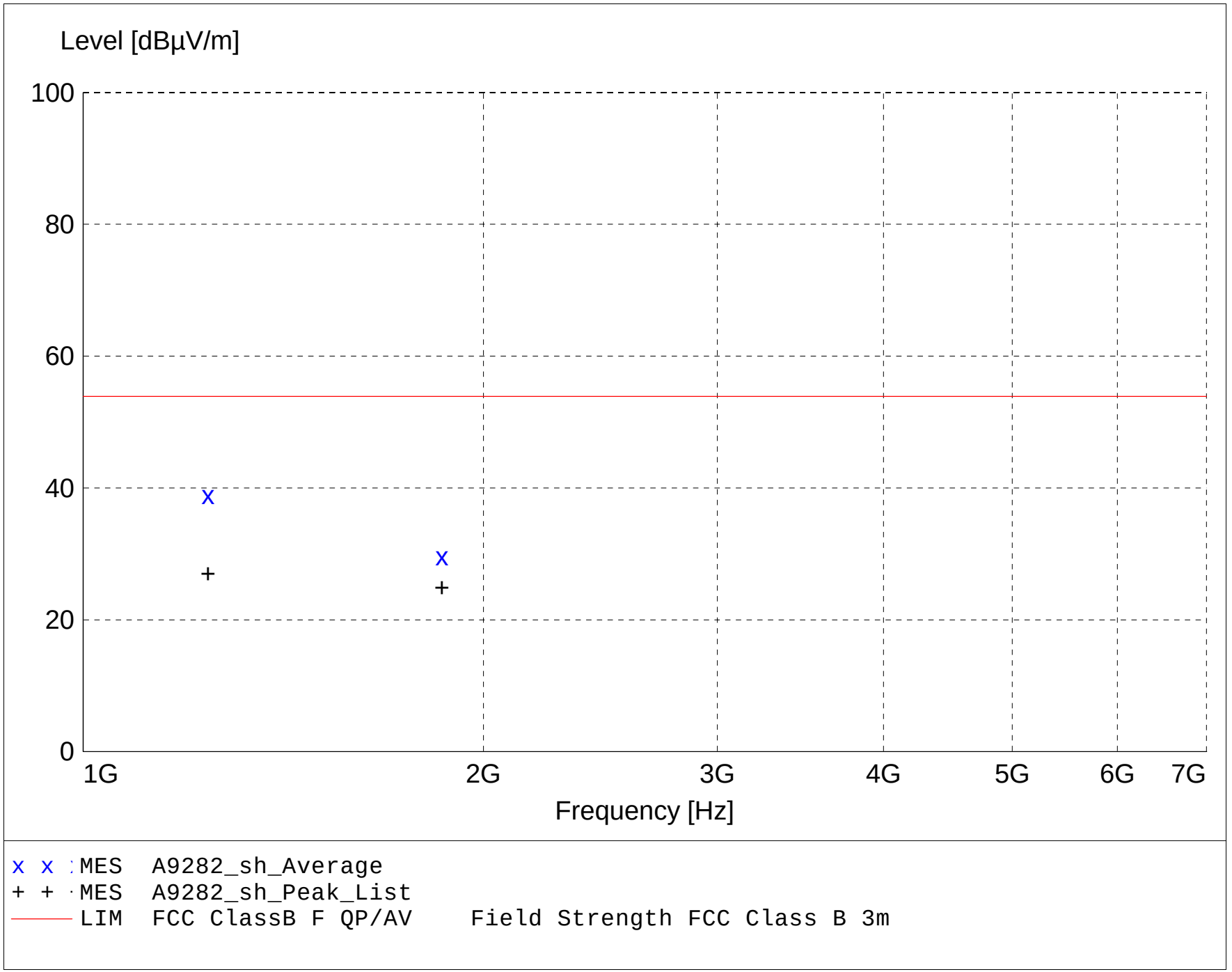
TEXT: "Site 3 5731&184 H3M"

Short Description: Test Set-up Horz1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESIB 26 SN: 100200

Horn Antenna --- EMCO 3115 SN: 9903-5731

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 Polarisation


Level [dBµV/m]
100
80
60
40
20
0
1G
2G
3G
4G
5G
6G
7G
Frequency [Hz]
x x : MES A9282_sh_Average
+ + : MES A9282_sh_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A9282_sh_Final"

9/28/2004 9:12AM

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		
1240.960000	54.26	24.83	-40.2	38.9	53.9	15.0	1.10	0	AVERAGE	None
1861.440000	41.96	26.99	-39.3	29.7	53.9	24.2	2.00	45	AVERAGE	None

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR

FIELD STRENGTH HARMONIC AND

SPURIOUS EMISSION MEASUREMENTS

631.52 MHz

PART 15.209

FCC Part 15 Class B

Electric Field Strength

EUT: X12 Plus
Manufacturer: Mortara Instrument
Operating Condition: 68 deg. F; 49% R.H.
Test Site: DLS OF Site 3
Operator: Craig B
Test Specification:
Comment: 631.52 MHz
Date: 09/28/04

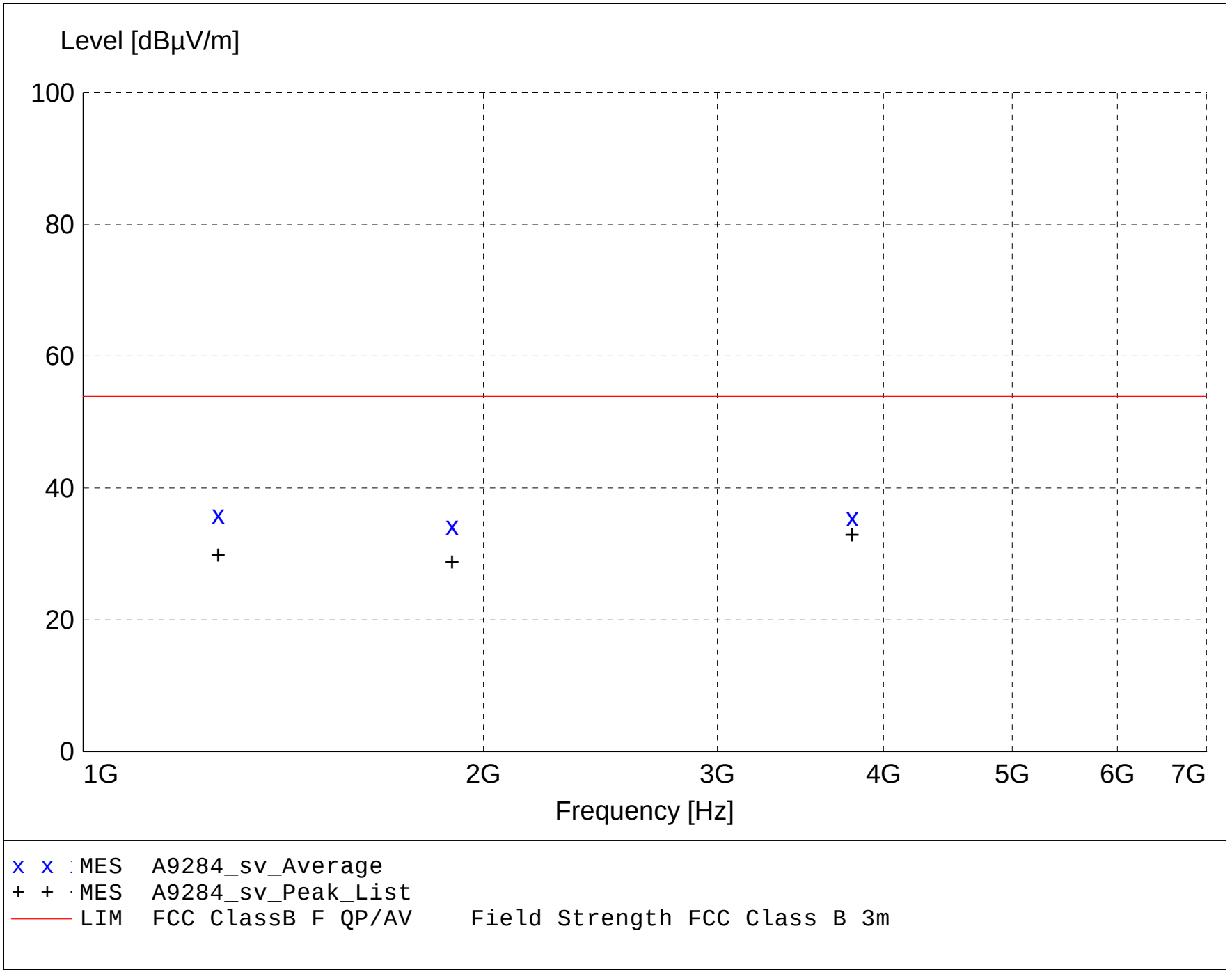
TEXT: "Site 3 5731&184 V3M"

Short Description: Test Set-up Vert1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESIB 26 SN: 100200

Horn Antenna --- EMCO 3115 SN: 9903-5731

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 Polarisation


Level [dBµV/m]
100
80
60
40
20
0
1G
2G
3G
4G
5G
6G
7G
Frequency [Hz]
x x : MES A9284_sv_Average
+ + : MES A9284_sv_Peak_List
LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A9284_sv_Final"

9/28/2004 9:26AM

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		
1263.040000	51.12	24.88	-40.1	35.9	53.9	18.0	1.30	270	AVERAGE	None
3789.100000	41.14	32.01	-37.6	35.5	53.9	18.4	1.80	180	AVERAGE	None
1894.560000	46.27	27.14	-39.1	34.3	53.9	19.6	1.30	225	AVERAGE	None

FCC Part 15 Class B

Electric Field Strength

EUT: X12 Plus
Manufacturer: Mortara Instrument
Operating Condition: 68 deg. F; 49% R.H.
Test Site: DLS OF Site 3
Operator: Craig B
Test Specification:
Comment: 631.52 MHz
Date: 09/28/04

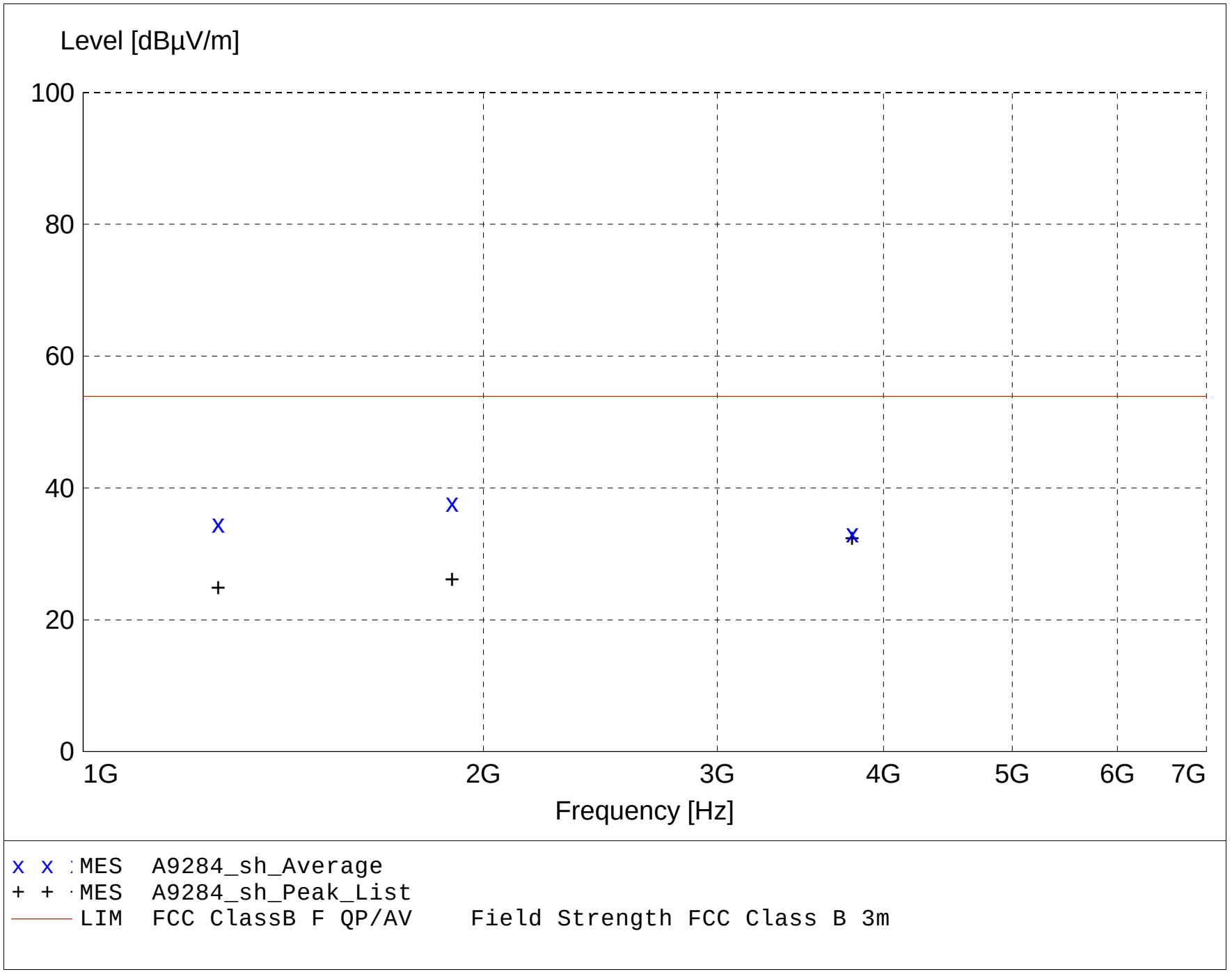
TEXT: "Site 3 5731&184 H3M"

Short Description: Test Set-up Horz1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESIB 26 SN: 100200

Horn Antenna --- EMCO 3115 SN: 9903-5731

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 Polarisation


Level [dBµV/m]
100
80
60
40
20
0
1G
2G
3G
4G
5G
6G
7G
Frequency [Hz]
x x : MES A9284_sh_Average
+ + : MES A9284_sh_Peak_List
——— LIM FCC ClassB F QP/AV Field Strength FCC Class B 3m

MEASUREMENT RESULT: "A9284_sh_Final"

9/28/2004 9:41AM

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		
1894.560000	49.69	27.14	-39.1	37.7	53.9	16.2	1.80	180	AVERAGE	None
1263.040000	49.81	24.88	-40.1	34.6	53.9	19.3	1.00	225	AVERAGE	None
3789.100000	38.75	32.01	-37.6	33.1	53.9	20.8	1.60	30	AVERAGE	None