DLS ELECTRONIC SYSTEMS, INC.

1250 Peterson Dr., Wheeling, IL 60090

Company: Carematix Inc.
Model Tested: 101
Report Number: 10163

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:	Carematix Blood Pressure Monitor
Kind of Equipment:	Modem (HUB)
Test Configuration:	Stand alone phone modem with a transceiver (Tested at 120 vac, 60 Hz)
Model Number(s):	101
Model(s) Tested:	101
Serial Number(s):	1048603
Date of Tests:	April 14, 2003
Test Conducted For:	Carematix Inc. 2 North LaSalle Street, Suite 1904 Chicago, Illinois 60602

NOTICE: "This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report. This report must not be reproduced (except in full), without the approval of D.L.S. Electronic Systems.

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SIGNATURE PAGE

Report By:

Arnom C. Rowe
Test Engineer
EMC-001375-NE

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

Company Official:

Carematix Inc.

1250 Peterson Dr., Wheeling, IL 6009

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

DEPARTMENT OF COMMERCE ★ UNITED STATES OF AMERICA ★

Certificate of Accreditation

ISO/IEC 17025:1999
ISO 9002:1994

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, 2003
Effective through

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

NVLAP-01C (06-01)

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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
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URL: http://www.dlsemc.com

NVLAP Code	*Designation / Description*
Emissions Test Methods:	
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/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

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NVLAP Code	*Designation / Description*
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
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 (2000-08), 6th edition, EN 55015 (2000), AS/NZS 4051 (2000), and CNS 14115 (2000): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

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NVLAP Code	*Designation / Description*
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.
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

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NVLAP Code	*Designation / Description*
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
12/FCC15e	ANSI C63.4 (2001) with FCC Method - CFR Part 15, Subpart E: Unlicensed National Information Infrastructure Service Devices
12/J111341	SAE J1113/41: Limits and methods of measurement of radio disturbance characteristics of components and modules for the protection of receivers used on board vehicles
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

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NVLAP Code	*Designation / Description*
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
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

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NVLAP Code	*Designation / Description*
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
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

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NVLAP Code	*Designation / Description*
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)
12/RSS139	RSS-139, Isssue 1 (February 5, 2000): Licensed Radiocommunications Devices in the Band 2400 - 2483.5 MHz
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

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NVLAP Code	*Designation / Description*
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
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 Carematix Blood Pressure Monitor, Model Number(s) 101, **"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. It should be noted that the amount of margin was only 2.3 dB at 1830 MHz, radiated. The normal tolerance of the test equipment is ±3 dB. Due to this tolerance and the variation in normal production, a margin of at least 6 dB is recommended. With only a 2.3 dB in margin, there is a probability that if this or another unit were tested by the Domestic or Foreign Compliance Regulatory Agency using similar test equipment, it could be found to not meet the above requirement.

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

Text:	66
Charts:	12

2.0 INTRODUCTION

On April 14, 2003, a series of radio frequency interference measurements was performed on Carematix Blood Pressure Monitor, Model Number(s) 101, Serial Number: 1048603. 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 C63.4-2000. 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.

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4.0 TEST SET-UP

All emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the American National Standards Institute, ANSI C63.4-2000, Section 8, (Figures 11a and 11b). The conducted tests were performed with the test item placed on a non-conductive table located in the test room. The power line supplied was connected to a dual line impedance stabilization network located on the floor, a ground plane. The networks were constructed power the requirements of the American National Standards Institute, ANSI C63.4-2000, Section 4, (Figure 2). The only ground plane supplied to the unit was through the third wire of the standard power cord when supplied.

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 C63.4-2000, 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 C63.4-2000, 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 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 7.0)

6.1 Description:

Permanently stays in transmit only mode. Transmits FSK at 915.05 MHz at 10 kbps (Manchester encoded)

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6.0 DESCRIPTION OF TEST SAMPLE: (CON'T)

6.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 6.56" Width: 4.188" Height: 2.098"

6.3 LINE FILTER USED:

NA

6.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

NA

Clock Frequencies:

16 MHz & 32.768 kHz

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6.0 DESCRIPTION OF TEST SAMPLE: (CON'T)

6.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. Hub Board	PN: HUB4 Rev. 4.0
2. Communication Processor Board	PN: Komp2 Rev. 2.0
3. Socket Modem	PN: SM-SF336D Rev. 1.0
4. Modem Main Board	PN: MBRD-2020 Rev. 1.0

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7.0 ADDITIONAL DESCRIPTION OF TEST SAMPLE:
(See also Paragraph 6.0)

1: Added Fair-Rite PN: 0443625006 with one turn (2 passes) on power cord inside chassis.

I certify that the above, as described in paragraph 8.0, describes the equipment tested and will be manufactured as stated.

By: Sukhwant Khanuja

CEO
Title

For: Carematix Inc
Company

August 28th 2003
Date

8/29/2003 15:42 3123320100 CAREMATIX INC PAGE 02

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8.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 Carematix Blood Pressure Monitor
Model Number: 101 Serial Number: 1048603

Item 1 Power Cube (CUISTACK-DPD090050-P5) with non-shielded 9 volt DC power cord. 2m

Item 2 Non-shielded 4-wire Telecom Cable with RJ-11 Connectors and plastic shells. 2m

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9.0 RADIATED PHOTOS TAKEN DURING TESTING

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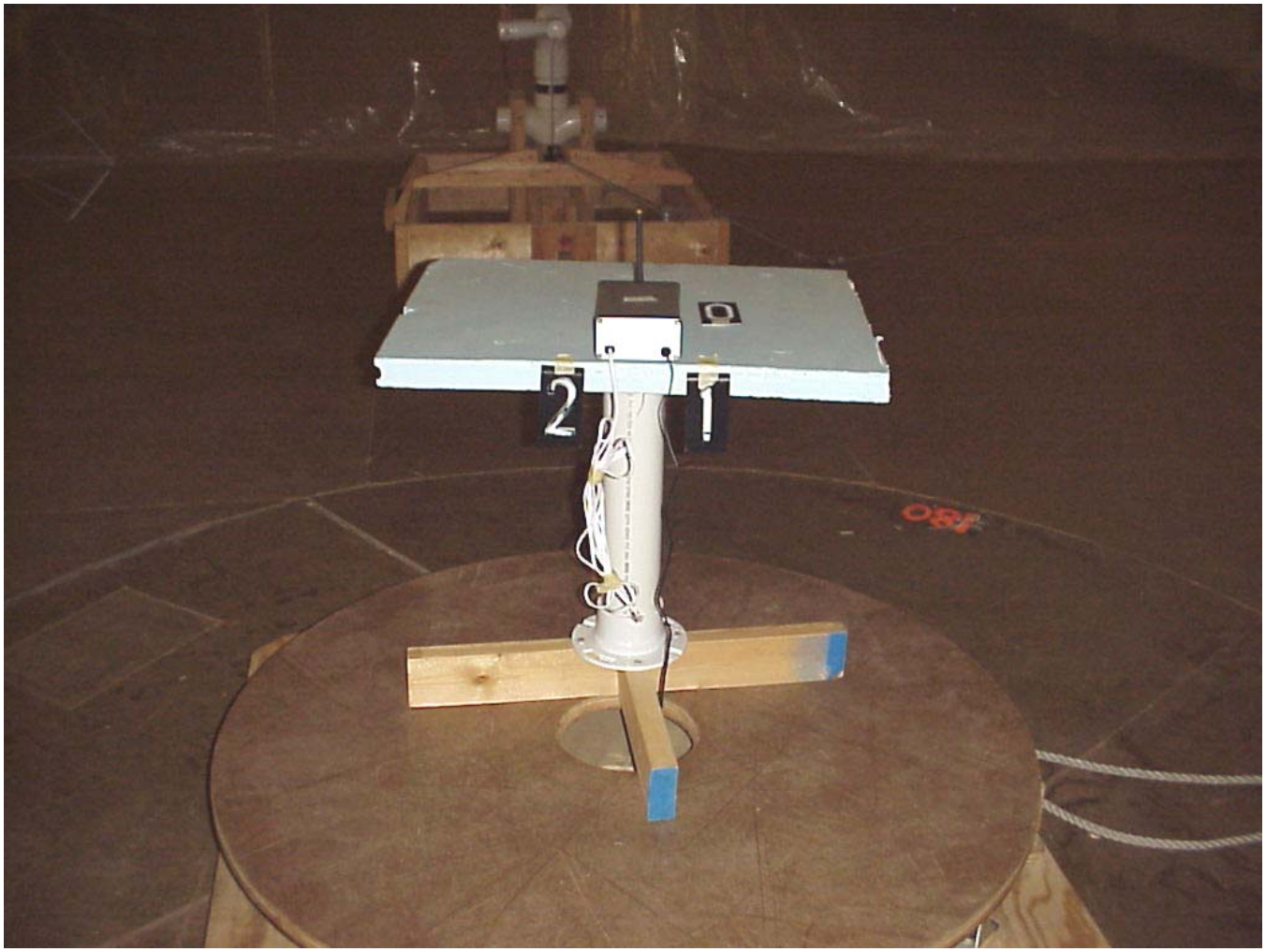
9.0 RADIATED PHOTOS TAKEN DURING TESTING



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9.0 CONDUCTED PHOTOS TAKEN DURING TESTING

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10.0 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. Those points on the emission charts shown with a yellow mark are background frequencies which were verified during testing.

11.0 CONCLUSION

It was found that the Carematix Blood Pressure Monitor, Model Number(s) 101 **"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. It should be noted that the amount of margin was only 2.3 dB at 1830 MHz, radiated. The normal tolerance of the test equipment is ±3 dB. Due to this tolerance and the variation in normal production, a margin of at least 6 dB is recommended. With only a 2.3 dB in margin, there is a probability that if this or another unit were tested by the Domestic or Foreign Compliance Regulatory Agency using similar test equipment, it could be found to not meet the above requirement.

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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	10/03
Quasi-Peak Adapter	Hewlett/ Packard	85650A	2043A00121	10 kHz – 1 GHz	10/03
Spectrum Analyzer	Hewlett/ Packard	8566B	2421A00452	100 Hz – 22 GHz	2/04
Quasi-Peak Adapter	Hewlett/ Packard	85650A	2043A00450	10 kHz – 1 GHz	2/04
Spectrum Analyzer	Hewlett/ Packard	8591A	3009A00700	9 kHz – 1.8 GHz	3/04
Receiver	Electrometrics	EMC-30	44168	10 kHz – 1 GHz	9/03
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	11/03
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	12/03
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	12/03
Antenna	EMCO	3104C	00054891	20 MHz – 200 MHz	2/04
Antenna	Electrometrics	LPA-25	1114	200 MHz – 1 GHz	3/04
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	3/04

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	3/04
Antenna	EMCO	3104C	97014785	20 MHz – 200 MHz	2/04
Antenna	EMCO	3146	97024895	200 MHz – 1 GHz	3/04
Antenna	EMCO	3115	2479	1 GHz – 18 GHz	8/03
Antenna	EMCO	3115	99035731	1 GHz – 18 GHz	4/03
Antenna	Rohde & Schwarz	HUF-Z1	829381001	20 MHz – 1 GHz	2/04
Antenna	Rohde & Schwarz	HUF-Z1	829381005	20 MHz – 1 GHz	8/03
LISN	Solar	8012-50-R-24-BNC	8305116	10 MHz – 30 MHz	8/03
LISN	Solar	8012-50-R-24-BNC	814548	10 MHz – 30 MHz	8/03
LISN	Solar	9252-50-R-24-BNC	961019	10 MHz – 30 MHz	12/03
LISN	Solar	9252-50-R-24-BNC	971612	10 MHz – 30 MHz	10/03
LISN	Solar	9252-50-R-24-BNC	92710620	10 MHz – 30 MHz	7/03

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

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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

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APPENDIX A

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST

1.0 CONDUCTED EMISSION MEASUREMENTS

Conducted emissions were measured over the frequency range from .150 MHz 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 MHz to 30 MHz.

NOTE:

All test measurements were made at a screen room temperature of **75°F** at **25%** relative humidity.

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APPENDIX A

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST

CONDUCTED DATA AND GRAPH(S) TAKEN DURING TESTING

PART 15.207

FCC Part 15 Class B

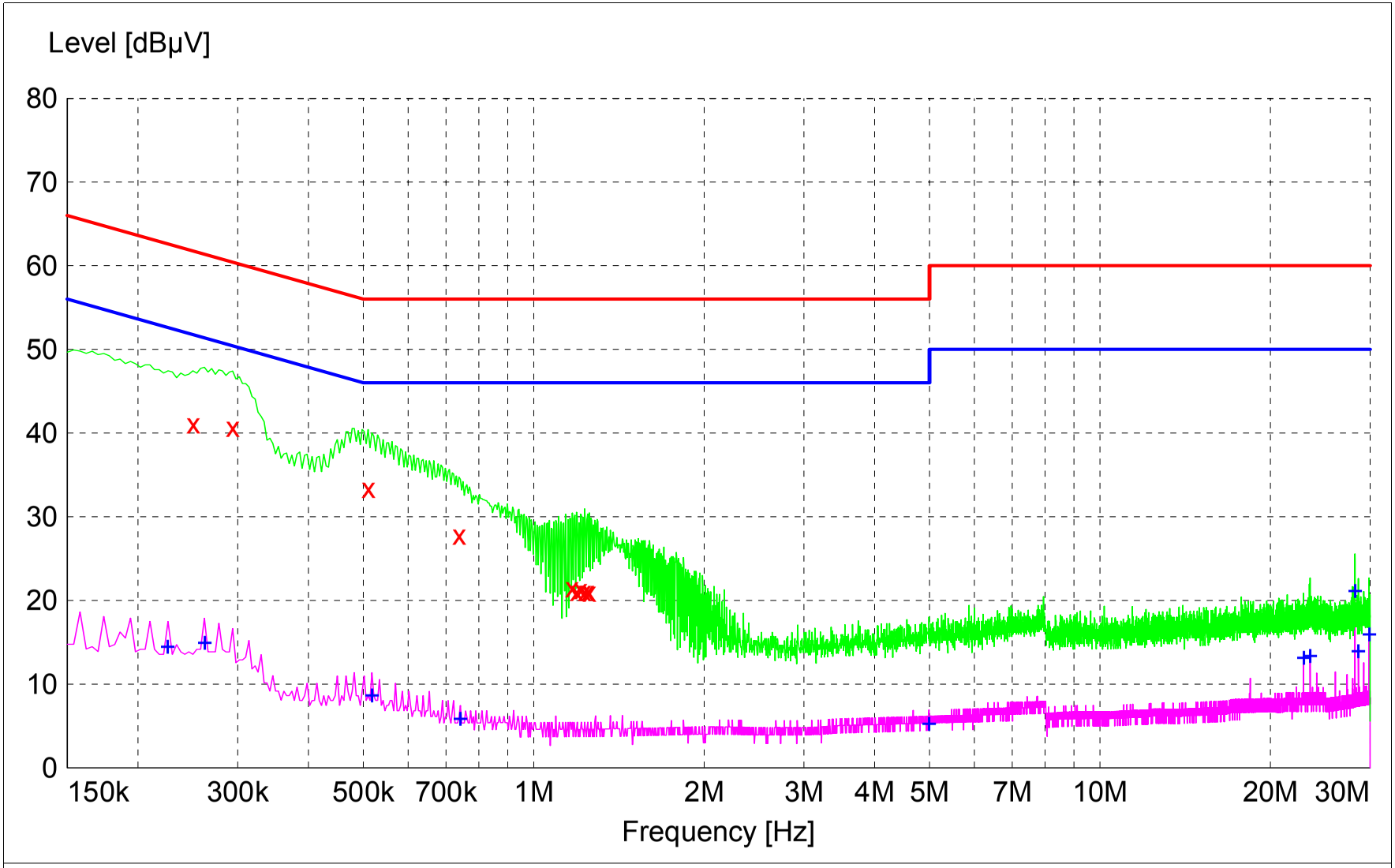
Voltage Mains Test

EUT:	Carematix HUB (Transmit Mode)
Manufacturer:	Carematix
Operating Condition:	71 deg. F, 32 % R.H.
Test Site:	DLS OF Screen Room
Operator:	Jason L
Test Specification:	120 VAC, 60 Hz
Comment:	Line 1
Start of Test:	4/17/2003 / 1:23:05PM

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 Average	10.0 ms	9 kHz	LISN 971612



x x : MES CareHubTx1_fin QP
+ + : MES CareHubTx1_fin AV
MES CareHubTx1_pre PK
MES CareHubTx1_pre AV
LIM FCC ClassB V QP New Voltage Amplitude QP Limit
LIM FCC ClassB V AV New Voltage Amplitude AVG Limit

MEASUREMENT RESULT: "CareHubTx1_fin QP"

4/17/2003 1:26PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.250000	41.10	10.2	62	20.6	1	---
0.294000	40.70	10.2	60	19.7	1	---
0.510000	33.40	10.1	56	22.6	1	---
0.738000	27.80	10.1	56	28.2	1	---
1.170000	21.50	10.2	56	34.5	1	---
1.190000	21.10	10.2	56	34.9	1	---
1.210000	21.30	10.2	56	34.7	1	---
1.230000	21.10	10.2	56	34.9	1	---
1.246000	21.10	10.2	56	34.9	1	---
1.254000	21.00	10.2	56	35.0	1	---

MEASUREMENT RESULT: "CareHubTx1_fin AV"

4/17/2003 1:26PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.226000	14.40	10.2	53	38.2	1	---
0.262000	14.90	10.2	51	36.4	1	---
0.518000	8.60	10.1	46	37.4	1	---
0.742000	5.80	10.1	46	40.2	1	---
4.990000	5.20	10.9	46	40.8	1	---
22.882000	13.10	12.3	50	36.9	1	---
23.518000	13.30	12.3	50	36.7	1	---
28.222000	21.10	12.9	50	28.9	1	---
28.606000	13.90	12.9	50	36.1	1	---
29.874000	15.90	13.1	50	34.1	1	---

FCC Part 15 Class B

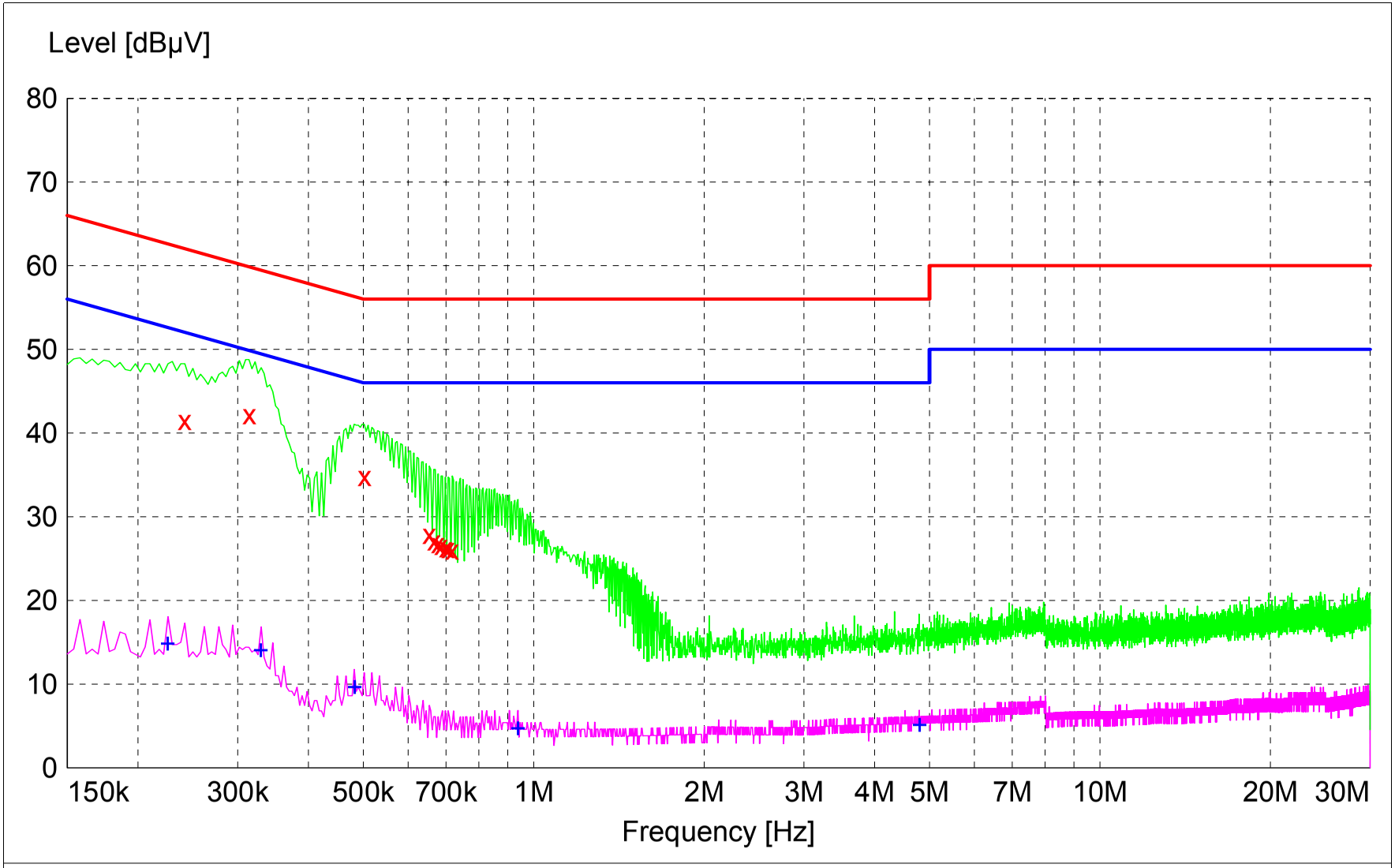
Voltage Mains Test

EUT:	Carematix HUB (Receive Mode)
Manufacturer:	Carematix
Operating Condition:	71 deg. F, 32 % R.H.
Test Site:	DLS OF Screen Room
Operator:	Jason L
Test Specification:	120 VAC, 60 Hz
Comment:	Line 2
Start of Test:	4/17/2003 / 1:39:30PM

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 Average	10.0 ms	9 kHz	LISN 971612



x x : MES CareHubRx2_fin QP
+ + : MES CareHubRx2_fin AV
MES CareHubRx2_pre PK
MES CareHubRx2_pre AV
LIM FCC ClassB V QP New Voltage Amplitude QP Limit
LIM FCC ClassB V AV New Voltage Amplitude AVG Limit

MEASUREMENT RESULT: "CareHubRx2_fin QP"

4/17/2003 1:44PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.242000	41.50	10.2	62	20.5	1	---
0.314000	42.20	10.1	60	17.7	1	---
0.502000	34.80	10.1	56	21.2	1	---
0.654000	27.90	10.1	56	28.1	1	---
0.666000	27.10	10.1	56	28.9	1	---
0.678000	26.80	10.1	56	29.2	1	---
0.686000	26.60	10.1	56	29.4	1	---
0.698000	26.30	10.1	56	29.7	1	---
0.706000	26.20	10.1	56	29.8	1	---
0.718000	26.00	10.1	56	30.0	1	---

MEASUREMENT RESULT: "CareHubRx2_fin AV"

4/17/2003 1:44PM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.226000	14.80	10.2	53	37.8	1	---
0.330000	14.00	10.1	50	35.4	1	---
0.482000	9.60	10.1	46	36.7	1	---
0.938000	4.70	10.1	46	41.3	1	---
4.798000	5.10	10.9	46	40.9	1	---

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST

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 Carematix Blood Pressure Monitor transmitter shall not be inside the restrict band 960 to 1240 MHz.

NOTE: See the following page (s) for the graph (s) made showing compliance for Band Edge and Restrict Band:

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APPENDIX A

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST

DATA AND GRAPH(s) TAKEN SHOWING THE BAND EDGE AND RESTRICT BAND COMPLIANCE

PART 15.249

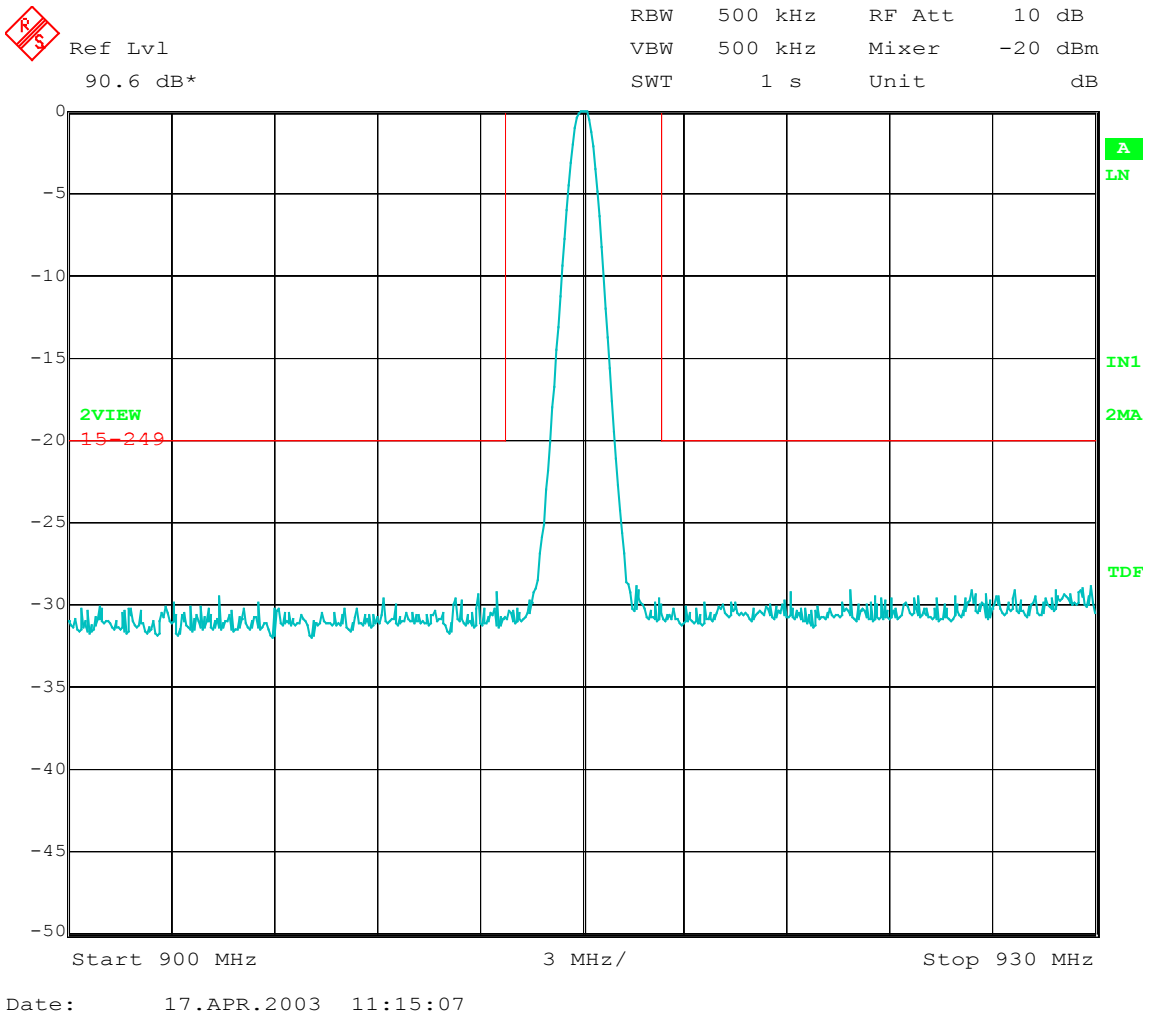
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST

Transmit Frequency: 915 MHz
Date: 4-17-2003
Bandwidth Limit = 915 MHz x 0.5% = 4.575 MHz
Level must be 20 dB lower outside the 4.575 MHz Bandwidth
Result: PASSED



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APPENDIX A

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST

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 Carematix Blood Pressure Monitor, Model Number: 101, 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 Carematix Blood Pressure Monitor were made up to 10000 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 915 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

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST

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 **32%** relative humidity.

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APPENDIX A

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST

RADIATED DATA AND GRAPH(s) TAKEN FOR

FUNDAMENTAL EMISSION MEASUREMENTS

PART 15.249

FCC Part 15.249

Radiated Field Strength

```
EUT:                  Carematix HUB
Manufacturer:         Carematix
Operating Condition:  72 degF; 32%R.H.
Test Site:            DLS OF Site 3
Operator:             Jason L
Test Specification:   Transmit Mode
Comment:              Tx Frequency = 915 MHz
                      Date: 04/14/2003
```

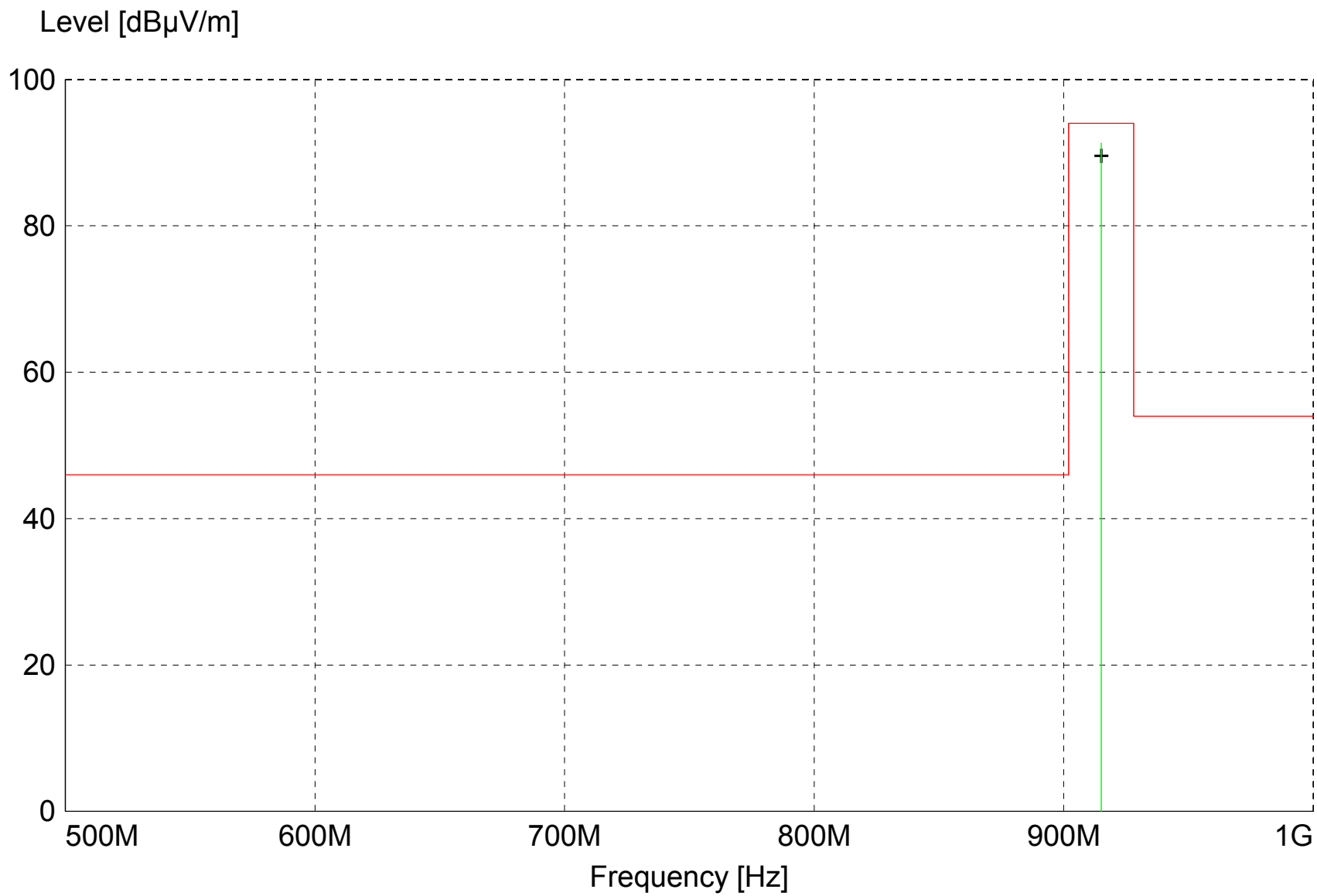
TEXT: "Site 3 MidV 3Mnp"

```
  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  --- NONE

TEST SET-UP:    EuT Measured at 3 Meters with VERTICAL Antenna Polarisation
```



MES Ac02a_sv_Quasi-Peak
MES Ac02a_sv_Peak_List
LIM FCC Part 15.249 FCC Part 15.249 for 915 MHz Fo

MEASUREMENT RESULT: "Ac02a_sv_Final"

4/14/2003 10:36AM

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		
915.020000	62.18	22.36	6.8	91.3	94.0	2.7	1.00	280	QUASI-PEAK	Fundamental

FCC Part 15.249

Radiated Field Strength

```
EUT:                  Carematix HUB
Manufacturer:         Carematix
Operating Condition:  72 degF; 32%R.H.
Test Site:            DLS OF Site 3
Operator:             Jason L
Test Specification:   Transmit Mode
Comment:              Tx Frequency = 915 MHz
                      Date: 04/14/2003
```

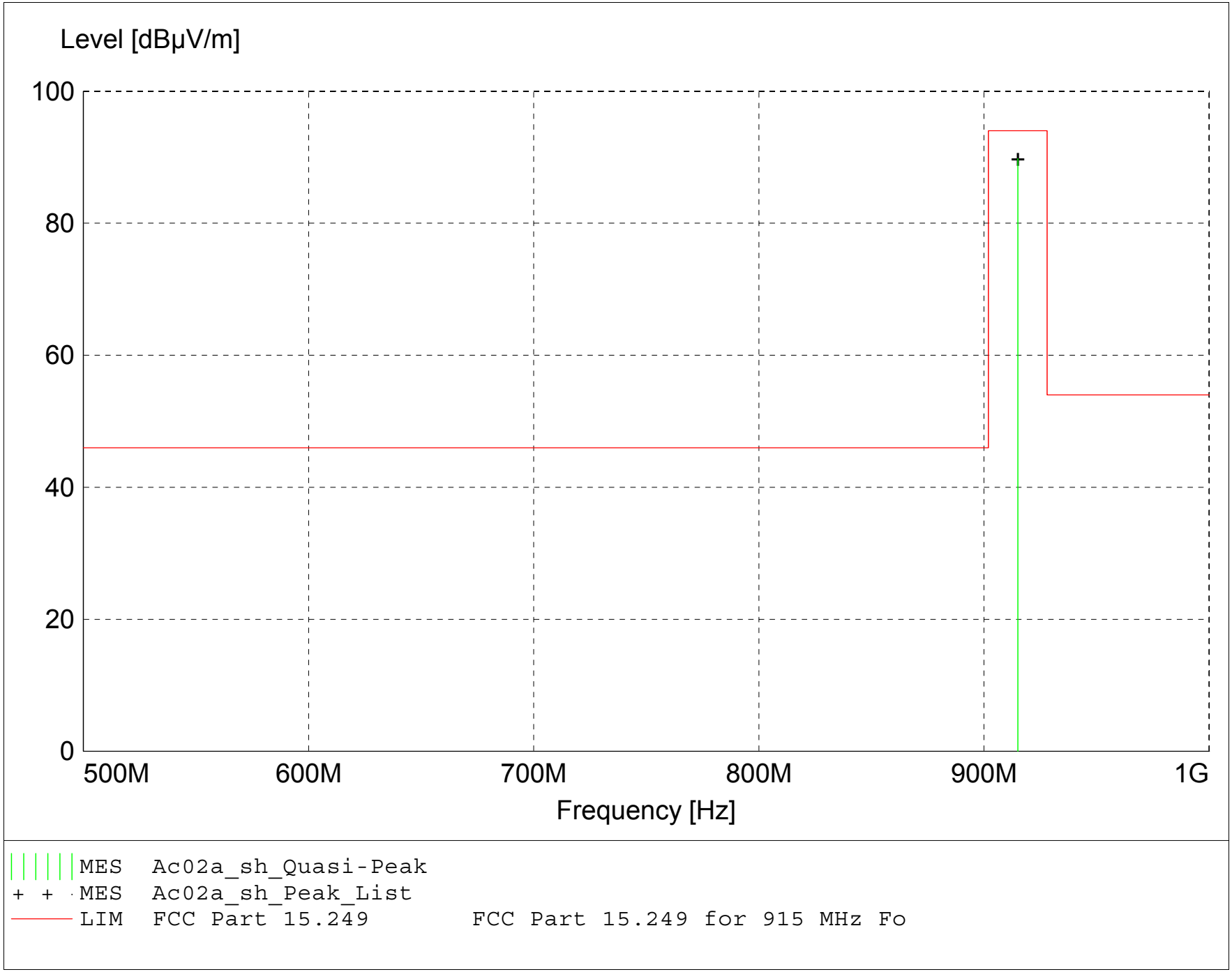
TEXT: "Site 3 MidH 3Mnp"

```
  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  --- NONE

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 Ac02a_sh_Quasi-Peak
MES Ac02a_sh_Peak_List
LIM FCC Part 15.249 FCC Part 15.249 for 915 MHz Fo

MEASUREMENT RESULT: "Ac02a_sh_Final"

4/14/2003 10:33AM

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
915.020000	60.64	22.36	6.8	89.8	94.0	4.2	1.00	100	QUASI-PEAK	Fundamental

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APPENDIX A

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST

RADIATED DATA AND GRAPH(s) TAKEN FOR

FIELD STRENGTH

SPURIOUS EMISSION MEASUREMENTS

PART 15.209

FCC Part 15 Class B

Electric Field Strength

```
EUT:                  Carematix HUB
Manufacturer:         Carematix
Operating Condition:  73 degF; 33%R.H.
Test Site:            DLS OF Site 3
Operator:             Jason L
Test Specification:   Transmit and Receive Modes
Comment:              Frequency = 915 MHz
                      Date: 04/14/2003
```

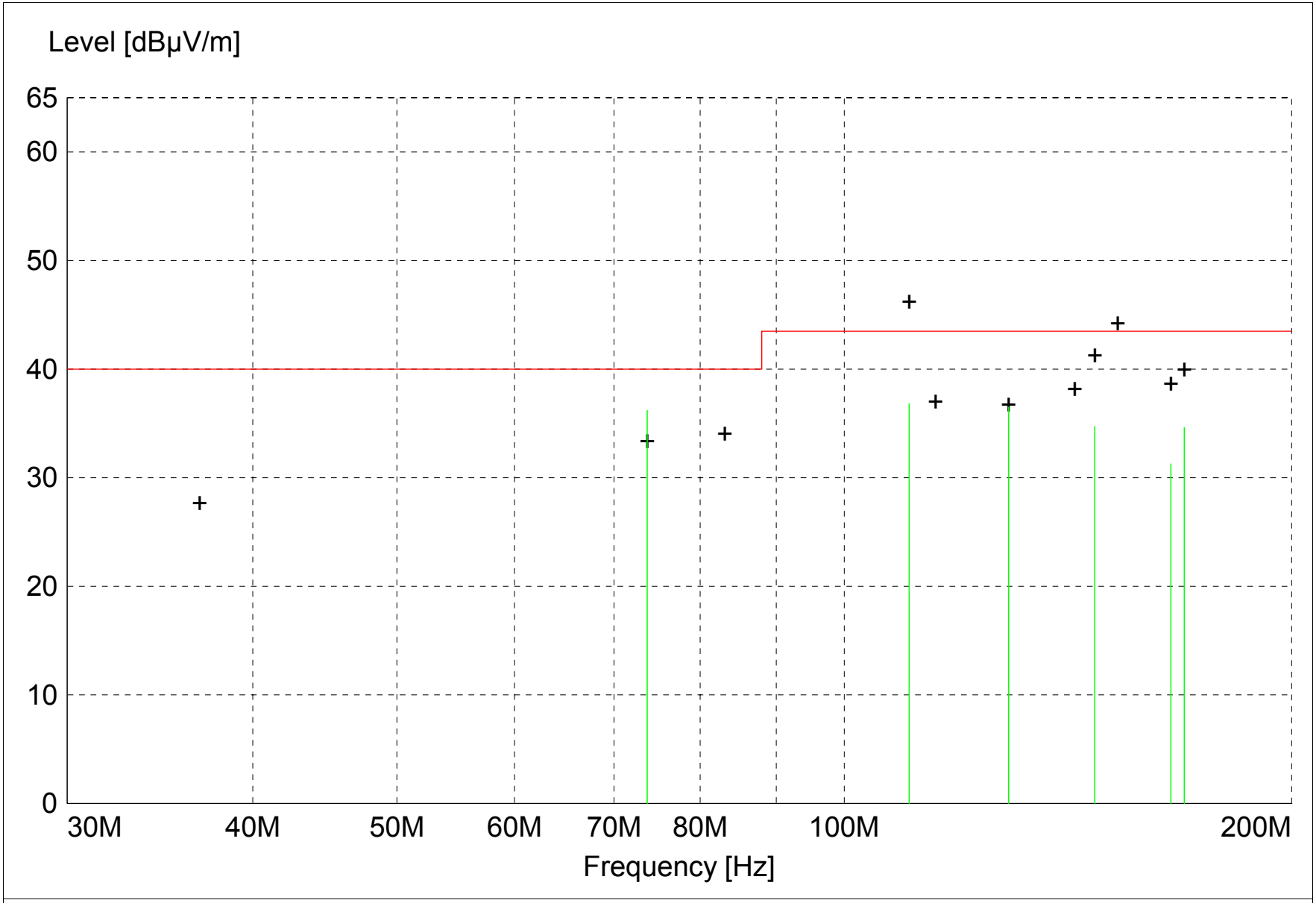
TEXT: "Site 3 MidV 3M"

```
  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
```



MES Ac02c_2v_Quasi-Peak
MES Ac02c_2v_Peak_List
LIM FCC ClassB F QP/AV Voltage Amplitude FCC Class B

MEASUREMENT RESULT: "Ac02c_2v_Final"

4/15/2003 9:57AM

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
73.700000	53.67	6.41	-23.9	36.2	40.0	3.8	1.00	0	QUASI-PEAK	None
110.580000	47.36	12.70	-23.2	36.8	43.5	6.7	1.00	0	QUASI-PEAK	None
129.040000	47.26	12.39	-23.1	36.5	43.5	7.0	1.00	340	QUASI-PEAK	None
147.440000	45.78	11.94	-23.0	34.7	43.5	8.8	1.00	60	QUASI-PEAK	None
169.340000	43.05	14.31	-22.7	34.6	43.5	8.9	1.00	0	QUASI-PEAK	None
165.870000	40.13	13.90	-22.8	31.3	43.5	12.2	1.00	325	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

```
EUT:                  Carematix HUB
Manufacturer:         Carematix
Operating Condition:  73 degF; 33%R.H.
Test Site:            DLS OF Site 3
Operator:             Jason L
Test Specification:   Transmit and Receive Modes
Comment:              Frequency = 915 MHz
                      Date: 04/14/2003
```

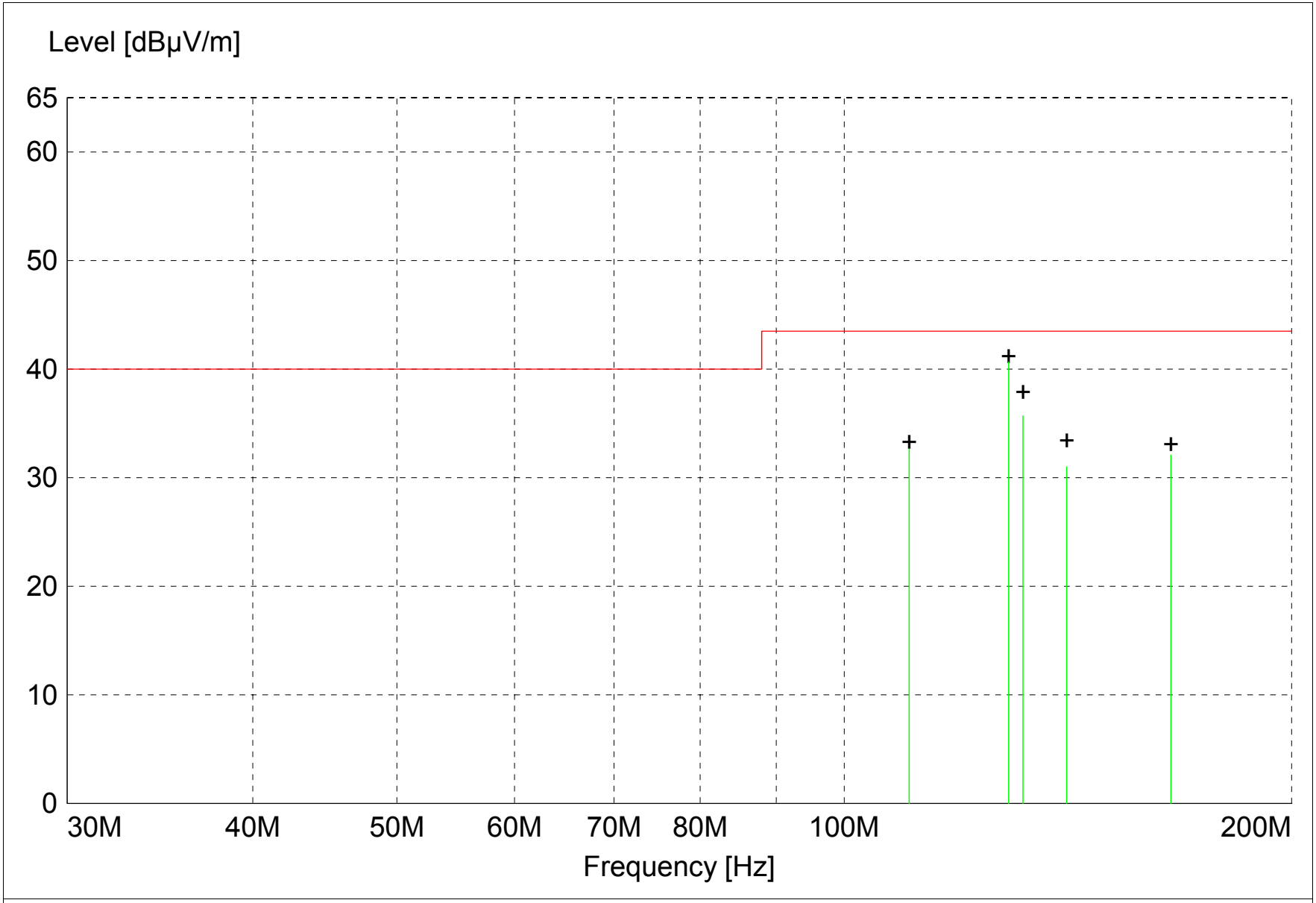
TEXT: "Site 3 MidH 3M"

```
  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
```



MES Ac02c_2h_Quasi-Peak
MES Ac02c_2h_Peak_List
LIM FCC ClassB F QP/AV Voltage Amplitude FCC Class B

MEASUREMENT RESULT: "Ac02c_2h_Final"

4/15/2003 10:07AM

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
129.040000	51.42	12.39	-23.1	40.7	43.5	2.8	2.40	270	QUASI-PEAK	None
131.910000	46.83	11.98	-23.1	35.7	43.5	7.8	2.40	270	QUASI-PEAK	None
110.600000	43.19	12.70	-23.2	32.6	43.5	10.9	2.20	270	QUASI-PEAK	None
165.900000	40.94	13.91	-22.8	32.1	43.5	11.4	2.20	270	QUASI-PEAK	None
141.140000	42.19	11.86	-23.0	31.0	43.5	12.5	2.20	90	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

```
EUT:                  Carematix HUB
Manufacturer:         Carematix
Operating Condition:  73 degF; 33%R.H.
Test Site:            DLS OF Site 3
Operator:             Jason L
Test Specification:   Transmit and Receive Modes
Comment:              Frequency = 915 MHz
                      Date: 04/14/2003
```

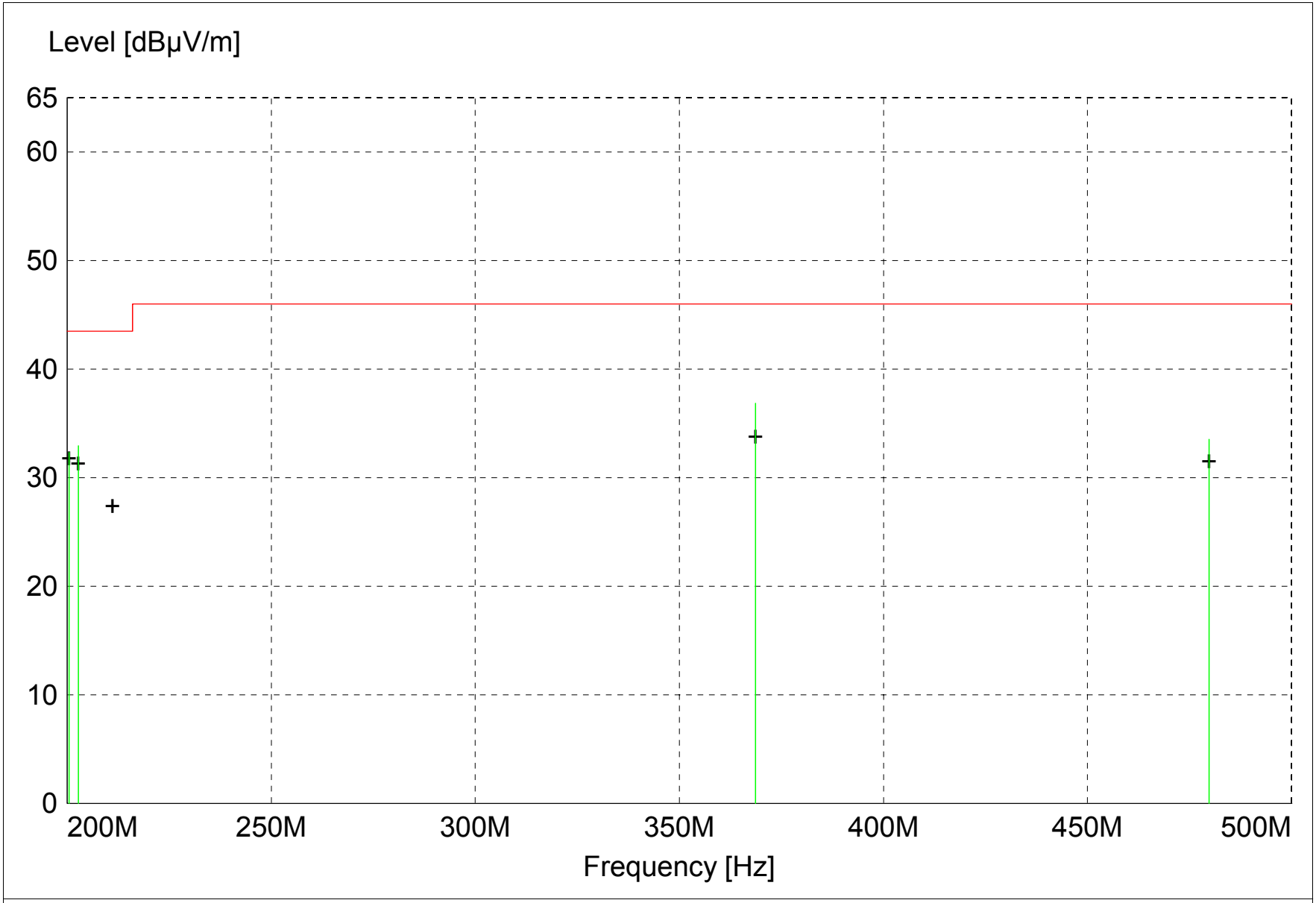
TEXT: "Site 3 MidV 3M"

```
  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
```



MES Ac02c_3v_Quasi-Peak
MES Ac02c_3v_Peak_List
LIM FCC ClassB F QP/AV Voltage Amplitude FCC Class B

MEASUREMENT RESULT: "Ac02c_3v_Final"

4/14/2003 3:19PM

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
368.650000	43.28	15.01	-21.4	36.8	46.0	9.2	1.50	180	QUASI-PEAK	None
202.750000	43.55	11.84	-22.5	32.9	43.5	10.6	1.00	45	QUASI-PEAK	None
200.420000	42.91	11.91	-22.5	32.3	43.5	11.2	1.00	30	QUASI-PEAK	None
479.780000	37.54	16.99	-21.0	33.5	46.0	12.5	1.00	45	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

```
EUT:                  Carematix HUB
Manufacturer:         Carematix
Operating Condition:  73 degF; 33%R.H.
Test Site:            DLS OF Site 3
Operator:             Jason L
Test Specification:   Transmit and Receive Modes
Comment:              Frequency = 915 MHz
                      Date: 04/14/2003
```

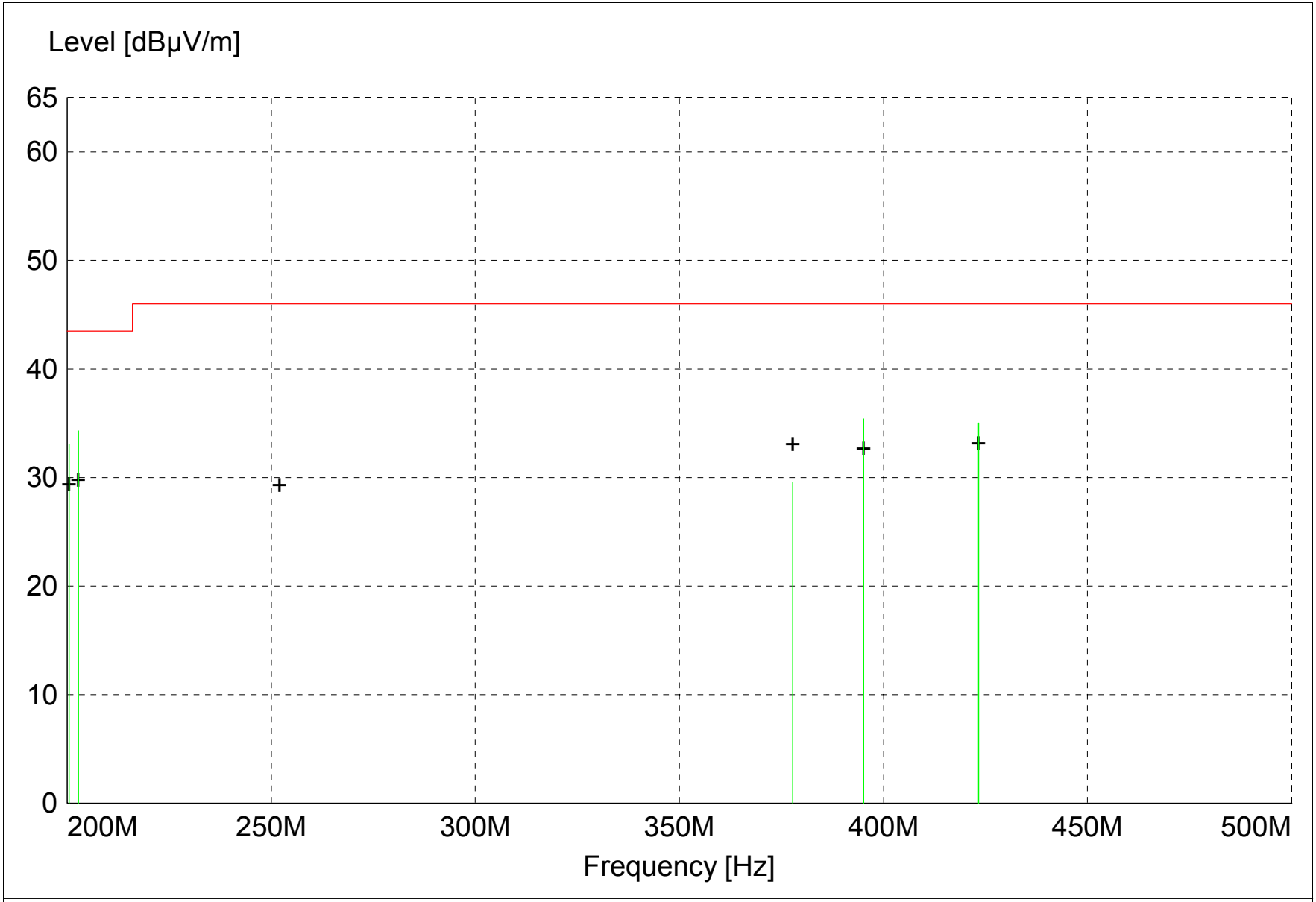
TEXT: "Site 3 MidH 3M"

```
  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
```



MES Ac02c_3h_Quasi-Peak
MES Ac02c_3h_Peak_List
LIM FCC ClassB F QP/AV Voltage Amplitude FCC Class B

MEASUREMENT RESULT: "Ac02c_3h_Final"

4/14/2003 3:27PM

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
202.760000	44.92	11.84	-22.5	34.3	43.5	9.2	1.00	270	QUASI-PEAK	None
200.440000	43.67	11.91	-22.5	33.1	43.5	10.4	1.00	270	QUASI-PEAK	None
395.100000	40.79	15.72	-21.1	35.4	46.0	10.6	1.00	270	QUASI-PEAK	None
423.320000	40.30	15.92	-21.2	35.0	46.0	11.0	1.00	270	QUASI-PEAK	None
377.780000	35.51	15.30	-21.3	29.6	46.0	16.4	1.00	225	QUASI-PEAK	None

FCC Part 15.249

Radiated Field Strength

EUT: Carematix HUB
Manufacturer: Carematix
Operating Condition: 72 degF; 32%R.H.
Test Site: DLS OF Site 3
Operator: Jason L
Test Specification: Transmit Mode
Comment: Tx Frequency = 915 MHz
Date: 04/14/2003

TEXT: "Site 3 6204&184 V3MF"

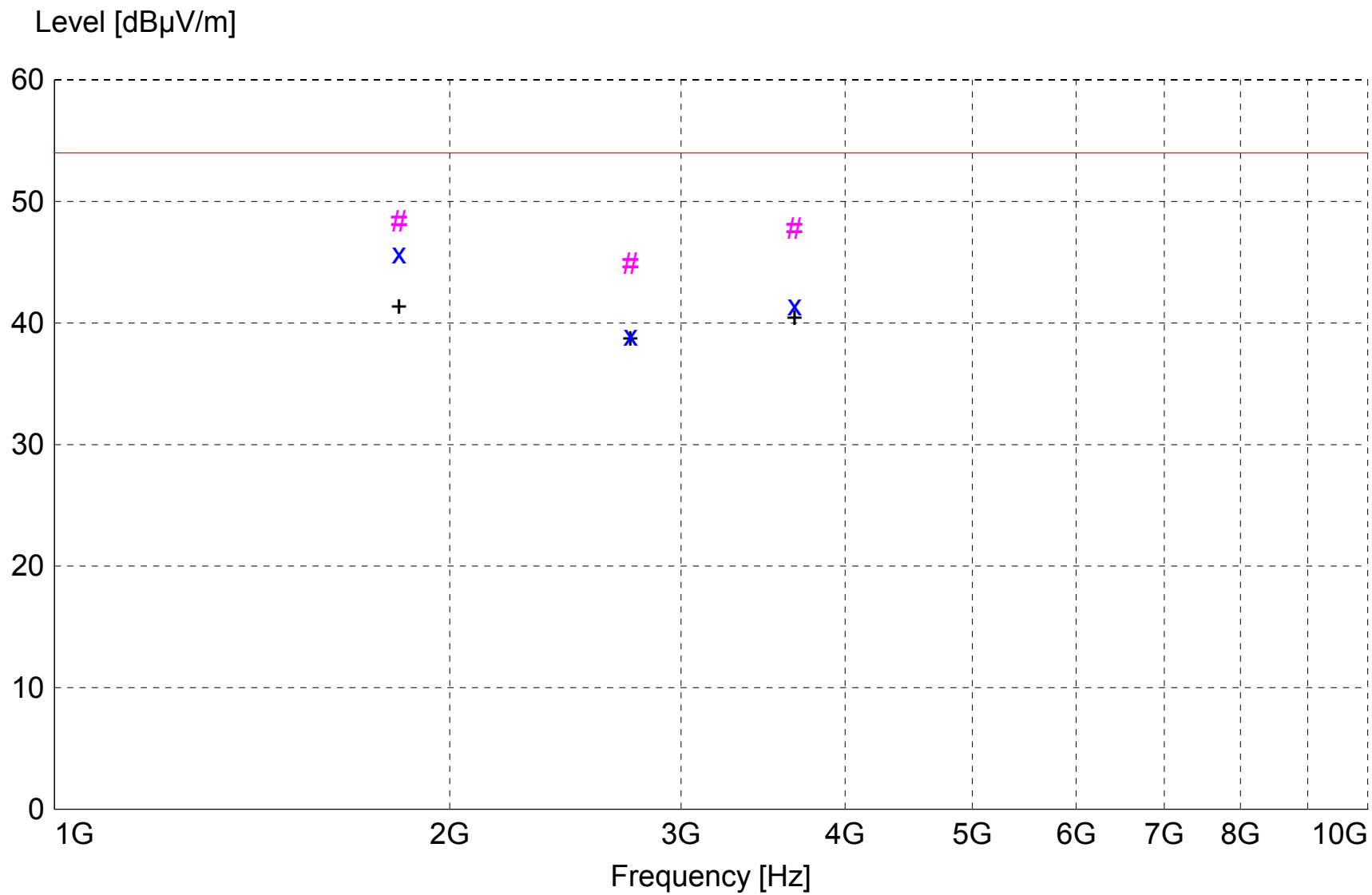
Short Description: Test Set-up Vert1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/006

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

High Pass Filter -- Q Microwave 100460 SN: 001

TEST SET-UP: EuT Measured at 3 Meters with VERTICAL Antenna Polarisation



x x : MES Ac02b_sv_Average
: MES Ac02b_sv_Peak
+ + : MES Ac02b_sv_Peak_List
——— LIM FCC Part 15.249 FCC Part 15.249 for 915 MHz Fo

MEASUREMENT RESULT: "Ac02b_sv_Final"

4/14/2003 1:11PM

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
1830.000000	60.23	28.12	-40.0	48.3	54.0	5.7	1.20	45	MAX PEAK	2nd Harmonic
3660.200000	53.16	33.45	-38.9	47.7	54.0	6.3	1.20	0	MAX PEAK	4th Harmonic
1830.000000	57.56	28.12	-40.0	45.7	54.0	8.3	1.20	45	AVERAGE	2nd Harmonic
2745.200000	53.70	31.14	-40.0	44.9	54.0	9.1	1.20	270	MAX PEAK	3rd Harmonic
3660.200000	46.88	33.45	-38.9	41.4	54.0	12.6	1.20	0	AVERAGE	4th Harmonic
2745.200000	47.80	31.14	-40.0	38.9	54.0	15.1	1.20	270	AVERAGE	3rd Harmonic

FCC Part 15.249

Radiated Field Strength

EUT: Carematix HUB
Manufacturer: Carematix
Operating Condition: 72 degF; 32%R.H.
Test Site: DLS OF Site 3
Operator: Jason L
Test Specification: Transmit Mode
Comment: Tx Frequency = 915 MHz
Date: 04/14/2003

TEXT: "Site 3 6204&184 H3MF"

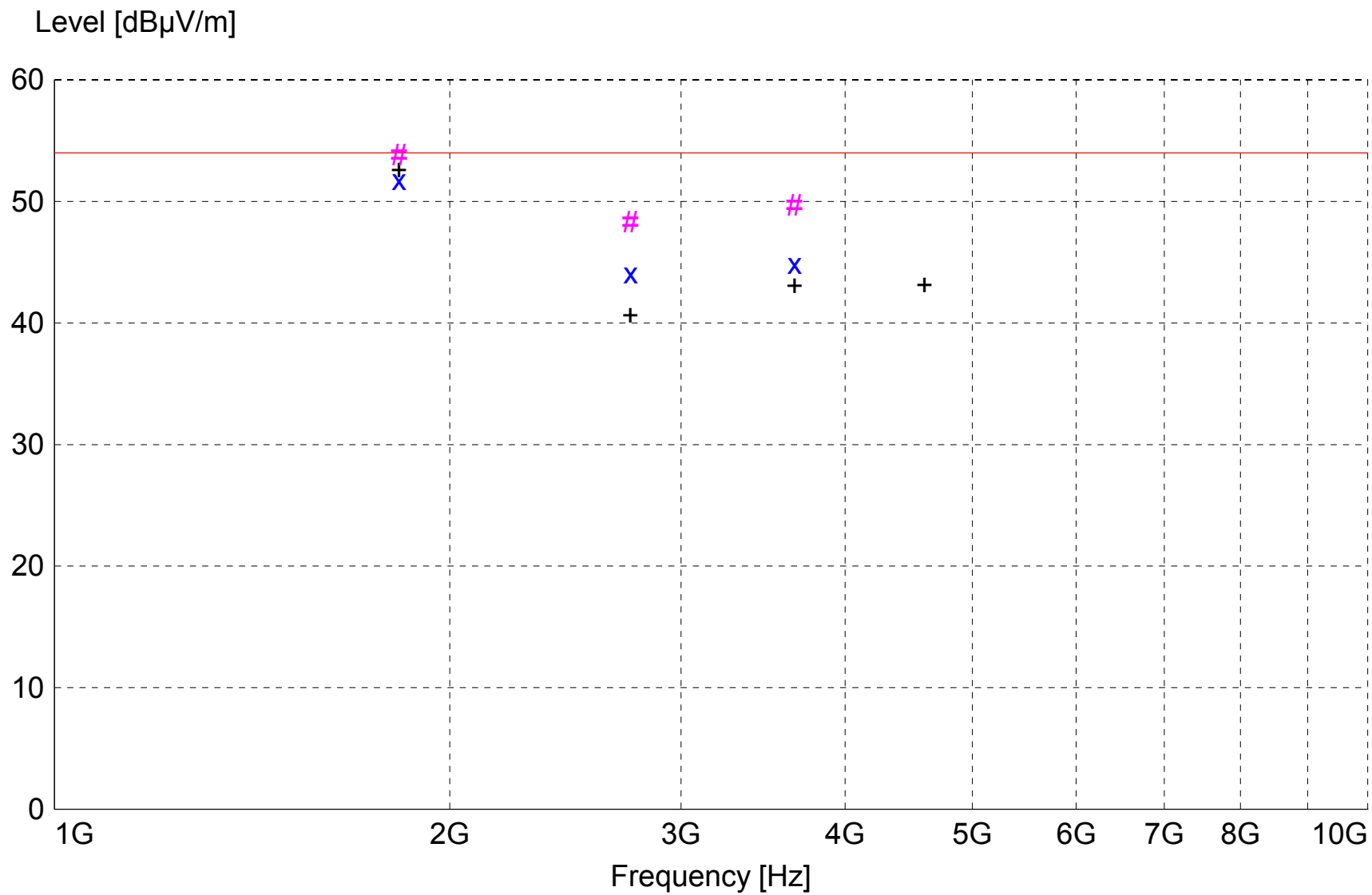
Short Description: Test Set-up Horz1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/006

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

High Pass Filter -- Q Microwave 100460 SN: 001

TEST SET-UP: EuT Measured at 3 Meters with HORIZONTAL Antenna Polarisation



x x : MES Ac02b_sh_Average
: MES Ac02b_sh_Peak
+ + : MES Ac02b_sh_Peak_List
——— LIM FCC Part 15.249 FCC Part 15.249 for 915 MHz Fo

MEASUREMENT RESULT: "Ac02b_sh_Final"

4/14/2003 1:02PM

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
1830.000000	65.67	28.12	-40.0	53.8	54.0	0.2	1.20	45	MAX PEAK	2nd Harmonic
1830.000000	63.63	28.12	-40.0	51.7	54.0	2.3	1.20	45	AVERAGE	2nd Harmonic
3660.200000	55.08	33.45	-38.9	49.6	54.0	4.4	1.00	250	MAX PEAK	4th Harmonic
2745.200000	57.09	31.14	-40.0	48.2	54.0	5.8	1.00	160	MAX PEAK	3rd Harmonic
3660.200000	50.30	33.45	-38.9	44.9	54.0	9.1	1.00	250	AVERAGE	4th Harmonic
2745.200000	52.90	31.14	-40.0	44.1	54.0	9.9	1.00	160	AVERAGE	3rd Harmonic