



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

1250 Peterson Dr., Wheeling, IL 60090

LOW POWER LICENCE-EXEMPT RADIO COMMUNICATION DEVICES
(ALL FREQUENCY BANDS)

RADIO STANDARDS SPECIFICATION
RSS-210, ISSUE 5
NOVEMBER 2001

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

Formal Name: R110XiIII Plus
Kind of Equipment: Thermal Transfer on demand bar code printer
Test Configuration: RFID - HF 13.56 MHz (Tested at 120 vac, 60 Hz)
Model Number(s): 110XiIII
Model(s) Tested: 110XiIII
Serial Number(s): 91C04220027
Date of Tests: July 8, 9, 27 & September 7, 2004
Test Conducted For: Zebra Technologies Corporation
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061

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



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Model Tested: 110XiIII
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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

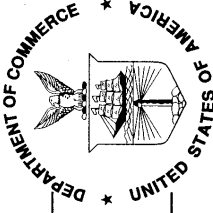
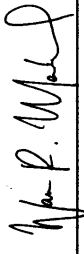
Company Official:

Zebra Technologies Corporation



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United States Department of Commerce National Institute of Standards and Technology NVLAP[®] Certificate of Accreditation ISO/IEC 17025:1999 ISO 9002:1994		 D.L.S. ELECTRONIC SYSTEMS, INC. WHEELING, IL <i>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:</i> ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS
September 30, 2004 Effective through	 For the National Institute of Standards and Technology NVLAP Lab Code: 100276-0	

NVLAP-OTC (06-01)



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D.L.S. ELECTRONIC SYSTEMS, INC.

1250 Peterson Drive
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URL: <http://www.dlsemc.com>

NVLAP Code Designation / Description

Emissions Test Methods:

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

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

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

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

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

Immunity Test Methods:

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

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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 Discharge (ESD)
12/I01	IEC 61000-4-2 (1995) and Amendment 1 (1998) and EN 61000-4-2: Electrostatic Discharge Immunity Test
12/I02	IEC 61000-4-3 (1995) and Amendment 1 (1998) and EN 61000-4-3: Radiated, Radio-Frequency Electromagnetic Field Immunity Test
12/I03	IEC 61000-4-4 (1995) and EN 61000-4-4: Electrical Fast Transient/Burst Immunity Test
12/I04	IEC 61000-4-5 (1995) and EN 61000-4-5: Surge Immunity Test

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

Radio Test Methods

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

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12/RSS139 RSS-139, Issue 1 (February 5, 2000): Licensed Radiocommunications Devices in the Band 2400 - 2483.5 MHz

12/CIS15c EN 55015 (2000) + A1 (2001): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment

MIL-STD-462 : Conducted Emissions:

12/A18 MIL-STD-461 Version E Method CE106

MIL-STD-462 : Conducted Susceptibility:

12/B12 MIL-STD-462 Version D Method CS101

12/B13 MIL-STD-462 Version D Method CS103

12/B25 MIL-STD-461 Version E Method CS114

12/B26 MIL-STD-461 Version E Method CS115

12/B27 MIL-STD-461 Version E Method CS116

MIL-STD-462 : Radiated Emissions:

12/D04 MIL-STD-462 Version D Method RE101

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<i>NVLAP Code</i>	<i>Designation / Description</i>
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 R110XiIII Plus, Model Number(s) 110XiIII, **"meets"** the radio interference conducted and radiated emission requirements of the Radio Standards Specification for Low Power Licence-Exempt Radio Communication Devices (All Frequency Bands).

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

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2.0 INTRODUCTION

On July 8 & 9, 2004, a series of radio frequency interference measurements was performed on R110XiIII Plus, Model Number(s) 110XiIII, Serial Number: 91C04220027. The tests were performed according to the procedures of the Industry Canada, Radio Standards Specification as stated in RSS-210, Issue 5, November 2001. Tests were completed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

3.0 TEST SET-UP

All emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to RSS-212, Issue 1 (Provisional), February 27, 1999. All conducted emissions tests (if required) were performed in a shield enclosure at D.L.S. Electronic Systems, Inc. as stated in Section 5. The power line supplied was connected to a dual line impedance network located on the floor, a ground plane. The only ground supplied to the unit was through the third wire of the standard power cord when supplied.

All radiated emission tests were performed with the test item placed on a rotating wooden table, located in the Test Room as stated in RSS-212, Issue 1 (Provisional), February 27, 1999, Section 3. Equipment normally operated on the floor was placed on top of the rotating platform, less than 30 centimeters above the floor.



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4.0 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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5.0 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 6.0)

5.1 Description:

Zebra R110XiIII is a RFID Thermal Transfer on demand printer. Capable of printing RFID labels. Printer powered through an IEC 320 connector, from 90-264 VAC, 47-63 Hz. Printer uses ZPL programming language, capable of receiving data via Serial connector, Parallel connector (covered when other communications options are installed). For this test the Ethernet print server option is installed and used for sending data packets of label data to the printer, from a Dell Laptop Computer.

5.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Long 49.5cm x Width: 26.3 cm x High: 39.5 cm

5.3 LINE FILTER USED:

Yunpen YL06T1, Corcom 6EGG
High - Low 06SS3-SR-Q

5.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

46 KHz, 56 KHz, 100 kHz

Clock Frequencies:

3.6469 MHz, 8.0 MHz, 13.56 MHz, 16.0 MHz, 25.0 MHz
27.12 MHz, 32 MHz, 33 MHz, 66 MHz, & 133 MHz



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5.0 DESCRIPTION OF TEST SAMPLE: (CON'T)

5.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

- | | |
|-------------------------------------|----------------------|
| 1. CPU Board Assy | PN: 33008 Rev 4 |
| 2. Control Panel Board Assy | PN: 49750, Rev 1 |
| 3. AC Power supply board Assy | PN: 33050 rev 1 |
| 4. DC Power supply board Assy | PN: 49795 Rev 3 |
| 5. Print server, 10 Base T Ethernet | PN: 46686A-001 Rev 1 |
| 6. ASM PCB Antenna HF | PN: 21098, Rev 1 |
| 7. ASM PCB INTF RFID R110XiIII HF | PN: 21095, Rev 1 |



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6.0 ADDITIONAL DESCRIPTION OF TEST SAMPLE:
(See also Paragraph 5.0)

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

I certify that the above, as described in paragraph 5.0, describes the equipment tested and will be manufactured as stated.

By: _____
Signature Title

For: _____
Company Date



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7.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 R110XiIII Plus

Model Number: 110XiIII Serial Number: 91C04220027

Item 1 Non-shielded AC Power Line Cord. 2m

Item 2 Shielded USB Cable with Metal Shells. 3m

Item 3 Dell Laptop PP05L Computer, SN: 034652-486433763

Item 4 Non-shielded Ethernet Category 5 Cable with Plastic Shells. 1m

Item 5 Shielded Serial Cable with Metal Shells. 3m

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8.0 RADIATED PHOTOS TAKEN DURING TESTING



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8.0 RADIATED PHOTOS TAKEN DURING TESTING (CON'T)

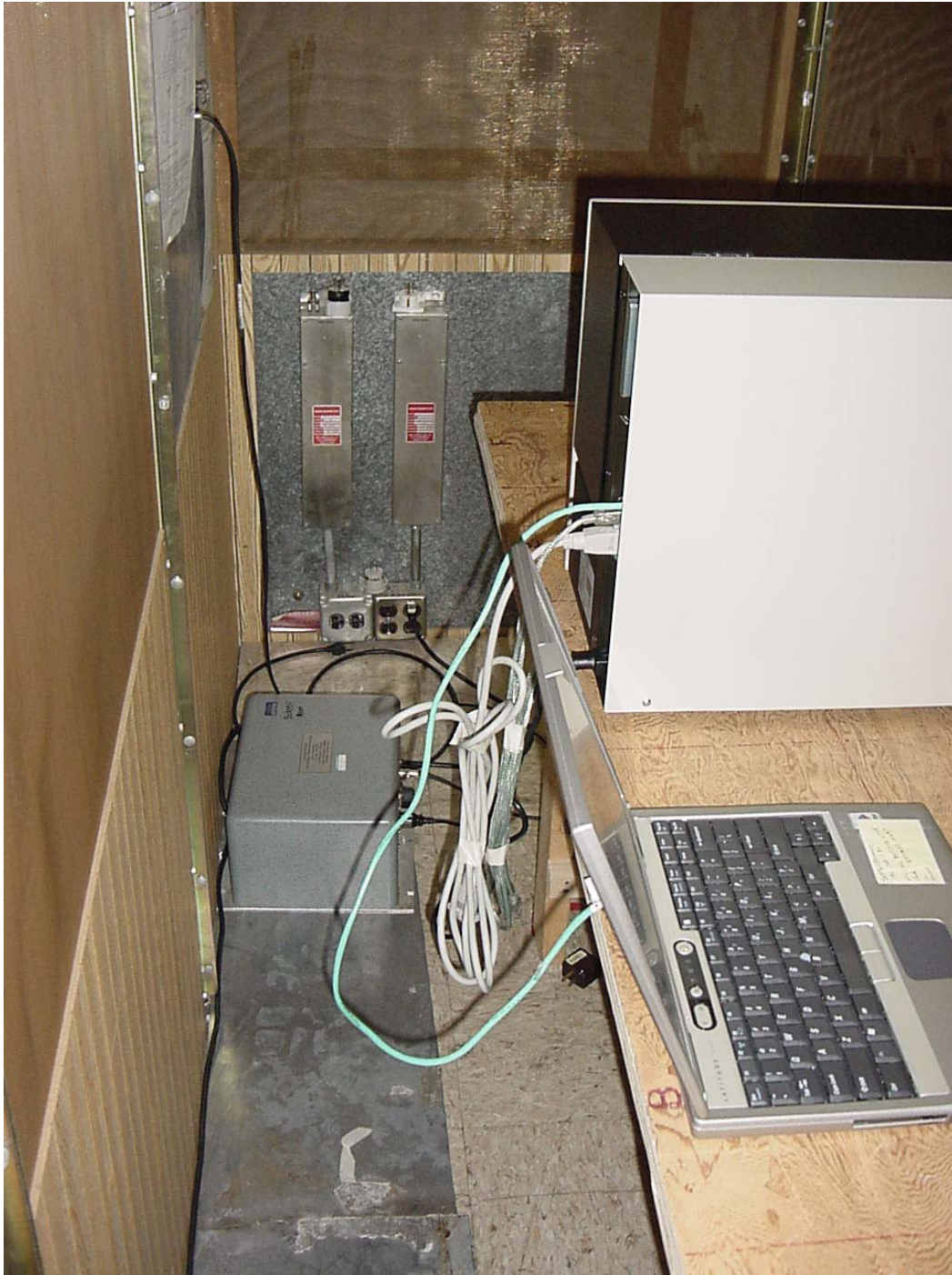




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8.0 CONDUCTED PHOTOS TAKEN DURING TESTING





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9.0 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.

10.0 CONCLUSION

It was found that the R110XiIII Plus, Model Number(s) 110XiIII **"meets"** the radio interference conducted and radiated emission requirements of the Radio Standards Specification RSS-210, Issue 5, for Low Power Licence-Exempt Radio Communication Devices (All Frequency Bands).



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APPENDIX A

TEST PROCEDURE

ELECTRIC FIELD RADIATED EMISSIONS TEST



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APPENDIX A

1.0 SUPPLY VOLTAGE – (Section 5.2)

Tests were performed with the test sample's supply voltage set at **120 vac.**

2.0 TYPES OF MODULATION – (Section 5.4)

Modulation used: **NA (This is a Spread Spectrum Transmitter)**

3.0 EMISSION BANDWIDTH - (Section 5.9)

Where indicated, the 20 dB bandwidth is measured at the points when the spectral density of the signal is 20 dB down from the inband spectral density of the modulated signal, with the transmitter modulated by a representative signal. An alternative to the 20 dB bandwidth is the 99% emission bandwidth is determined such that below the lower and above its upper frequency limits, the mean powers emitted are each equal to .5% of the total mean power of the emission.

See the following graphs for actual measurements made:

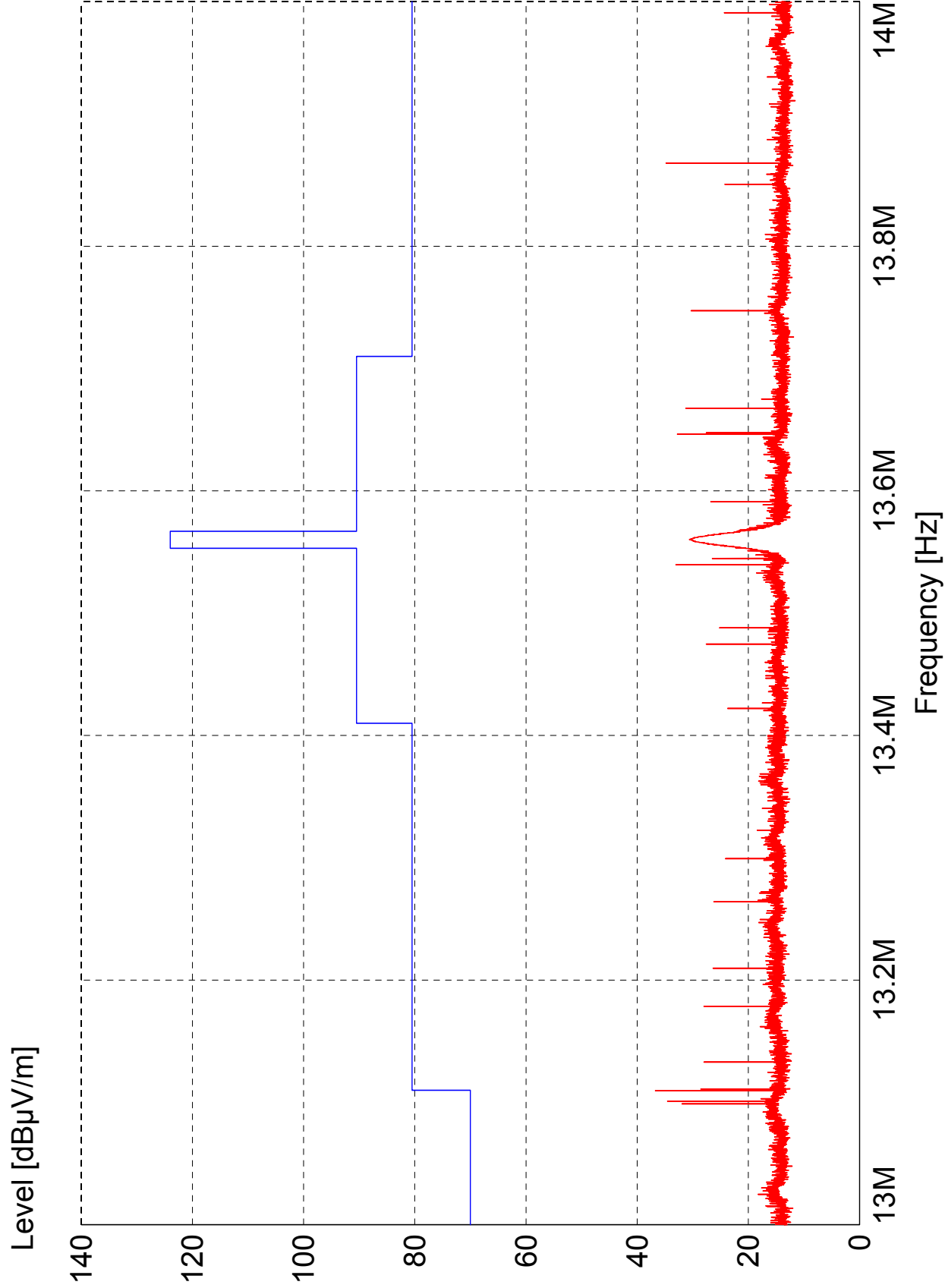


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APPENDIX A

GRAPH(S) TAKEN OF THE EMISSION BANDWIDTH



MES zeblowfcc1mpk
LIM fcc 15.225 3m
Fcc 15.225&Rss210 6.2.2(e)@3m



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APPENDIX A

4.0 FREQUENCY RANGE - (Section 6.2)

The measured frequency range of the R110XiIII Plus is **9 kHz TO 2000 MHz**, using the Hewlett/Packard 8566B Spectrum Analyzer.

5.0 DC POWER CONSUMPTION METHOD - (Section 12)

As stated in Section 12, an indirect transmitter mean output power measurement can be made if the transmission is continuous during the measurement. The average input power into the final RF stage is to be measured, i.e. measure the DC input power. The transmitter mean output power is then taken as 50% of this input power.

DC Voltages and Currents for the final RF Stage:

NOTE:

This measurement was not made at D.L.S. Electronic Systems, Inc.



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

6.0 TRANSMITTER AC WIRELINE CONDUCTED EMISSIONS (Section 6.6)

Name of Test:

RSS-210 Section Number: Section 6.6

Minimum Standard:

On any frequency or frequencies within the band of .45-30 MHz, the measured RF voltage shall not exceed 250 microvolts across 50 ohms.

Test Results:

The R110XiIII Plus **"meets"** the minimum requirements of RSS-210, Section 6.6 (a)

Test Conditions:

The emissions were measured with a 50 ohm/50 microhenry line impedance stabilization network, Section 9

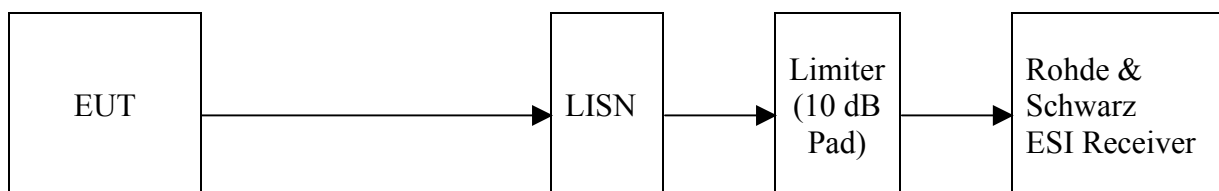
NOTE:

All test measurements were made at a screen room temperature of **71°F** at **602%** relative humidity.

Test Equipment:

Rohde & Schwarz Receiver
Solar LISN (50 ohm/50 Microhenry)
Electrometrics Limiter with internal 10 dB Pad

Block Diagram of Test Set-Up



Measurement Data:

See the following pages for the data and graphs of the actual measurements that were made:



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

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APPENDIX A

AC POWER LINE CONDUCTED EMISSIONS

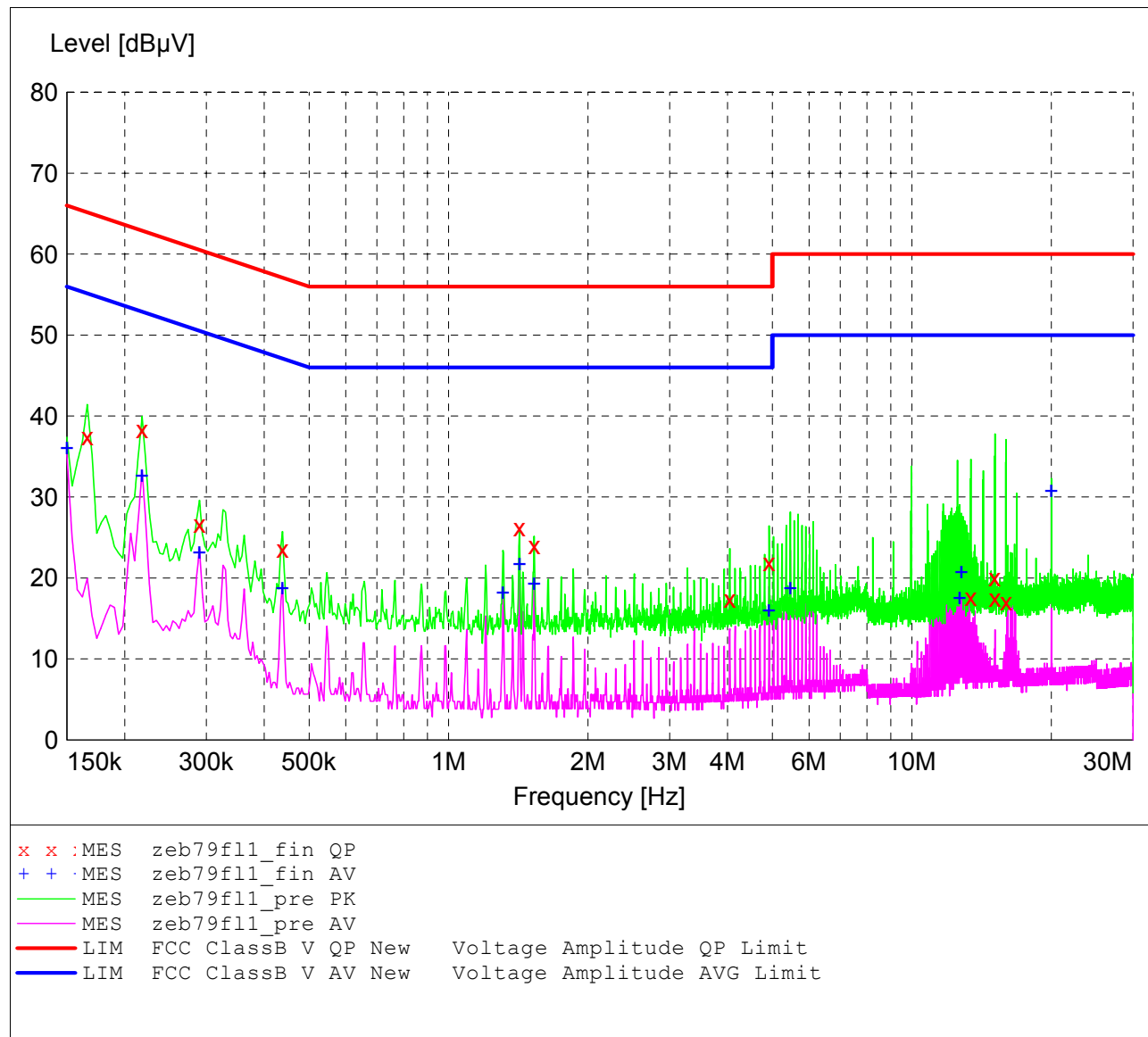
DATA AND CHARTS

Voltage Mains Test

EUT: R110 XiIII Plus HF
 Manufacturer: Zebra
 Operating Condition: 71 deg. F, 60% R.H.
 Test Site: DLS OF Screen Room
 Operator: Jason L
 Test Specification: 120 VAC, 60 Hz
 Comment: Line 1
 Date: 07/9/04

SCAN TABLE: "FCC ClassB Voltage"

Short Description:			FCC Class B Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	LISN DLS#128
Average						



MEASUREMENT RESULT: "zeb79f11_fin QP"

7/9/2004 8:49AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.166000	37.50	11.4	65	27.7	1	---
0.218000	38.40	10.8	63	24.5	1	---
0.290000	26.60	10.6	61	34.0	1	---
0.438000	23.60	10.4	57	33.5	1	---
1.422000	26.20	10.3	56	29.8	1	---
1.530000	24.00	10.3	56	32.0	1	---
4.046000	17.40	10.3	56	38.6	1	---
4.918000	21.90	10.6	56	34.1	1	---
13.402000	17.60	11.1	60	42.4	1	---
15.090000	20.10	11.2	60	39.9	1	---
15.114000	17.50	11.2	60	42.5	1	---
15.970000	17.10	11.3	60	42.9	1	---

MEASUREMENT RESULT: "zeb79f11_fin AV"

7/9/2004 8:49AM

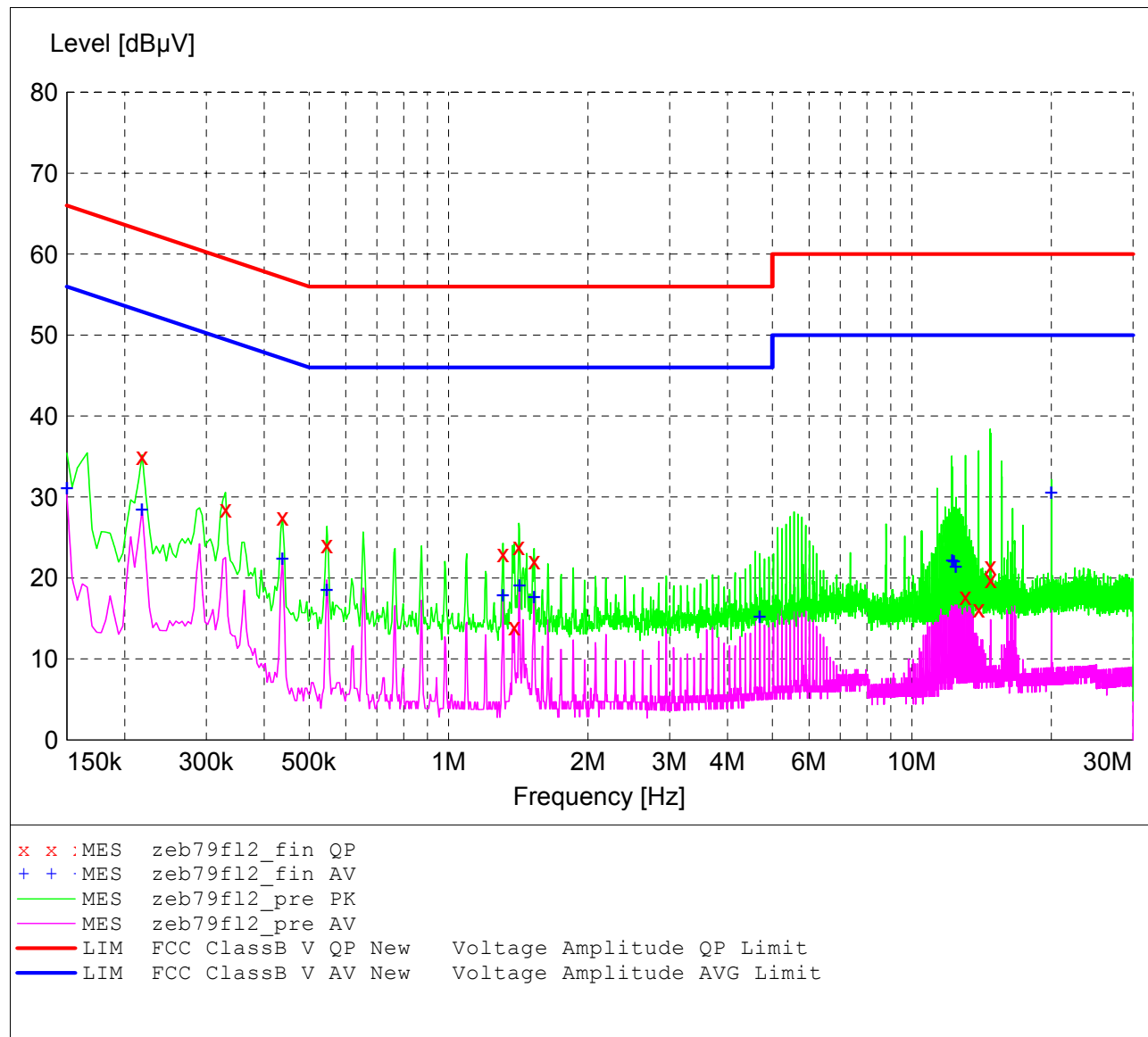
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150000	36.00	11.6	56	20.0	1	---
0.218000	32.60	10.8	53	20.3	1	---
0.290000	23.20	10.6	51	27.3	1	---
0.438000	18.70	10.4	47	28.4	1	---
1.310000	18.20	10.3	46	27.8	1	---
1.422000	21.70	10.3	46	24.3	1	---
1.530000	19.30	10.3	46	26.7	1	---
4.918000	16.00	10.6	46	30.0	1	---
5.466000	18.70	10.6	50	31.3	1	---
12.682000	17.50	11.0	50	32.5	1	---
12.786000	20.70	11.0	50	29.3	1	---
19.998000	30.70	11.5	50	19.3	1	---

Voltage Mains Test

EUT: R110 XiIII Plus HF
 Manufacturer: Zebra
 Operating Condition: 71 deg. F, 60% R.H.
 Test Site: DLS OF Screen Room
 Operator: Jason L
 Test Specification: 120 VAC, 60 Hz
 Comment: Line 2
 Date: 07/9/04

SCAN TABLE: "FCC ClassB Voltage"

Short Description:			FCC Class B Voltage			
Start	Stop	Step	Detector	Meas.	IF	Transducer
Frequency	Frequency	Width		Time	Bandw.	
150.0 kHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	LISN DLS#128
			Average			



MEASUREMENT RESULT: "zeb79f12_fin QP"

7/9/2004 8:55AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.218000	35.10	10.8	63	27.8	1	---
0.330000	28.50	10.5	60	30.9	1	---
0.438000	27.60	10.4	57	29.5	1	---
0.546000	24.10	10.4	56	31.9	1	---
1.310000	23.00	10.3	56	33.0	1	---
1.386000	14.00	10.3	56	42.0	1	---
1.418000	23.90	10.3	56	32.1	1	---
1.530000	22.10	10.3	56	33.9	1	---
13.050000	17.70	11.0	60	42.3	1	---
13.934000	16.20	11.1	60	43.8	1	---
14.762000	21.50	11.2	60	38.5	1	---
14.790000	19.80	11.2	60	40.2	1	---

MEASUREMENT RESULT: "zeb79f12_fin AV"

7/9/2004 8:55AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150000	31.10	11.6	56	24.9	1	---
0.218000	28.40	10.8	53	24.5	1	---
0.438000	22.40	10.4	47	24.7	1	---
0.546000	18.50	10.4	46	27.5	1	---
1.310000	17.80	10.3	46	28.2	1	---
1.422000	19.00	10.3	46	27.0	1	---
1.530000	17.60	10.3	46	28.4	1	---
4.698000	15.20	10.5	46	30.8	1	---
12.234000	22.10	11.0	50	27.9	1	---
12.342000	22.00	11.0	50	28.0	1	---
12.454000	21.40	11.0	50	28.6	1	---
19.998000	30.50	11.5	50	19.5	1	---



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

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APPENDIX A

7.0 RESTRICTED BANDS

As stated in Section 6.3, the fundamental emission from the R110XiIII Plus shall not fall within any of the bands listed below:

Frequency in MHz	Frequency in MHz	Frequency in MHz	Frequency in GHz
.0900 to .1100	162.0125 to 167.17	2310.0 to 2390	9.30 to 9.50
.4900 to .5100	167.7200 to 173.20	2483.5 to 2500	10.60 to 12.70
2.1735 to 2.1905	240.000 to 285.00	2655.0 to 2900	13.25 to 13.40
8.362 to 8.3660	322.200 to 335.40	3260.0 to 3267	14.47 to 14.50
13.36 to 13.410	399.900 to 410.00	3332.0 to 3339	15.35 to 16.20
25.50 to 25.670	608.000 to 614.00	3345.8 to 3358	17.70 to 21.40
37.50 to 38.250	960.000 to 1240.00	3600.0 to 4400	22.01 to 23.13
73.00 to 75.500	1300.000 to 1427.00	4500.0 to 5250	23.60 to 24.00
108.00 to 121.94	1435.000 to 1626.50	5350.0 to 5450	31.20 to 31.80
123.00 to 138.00	1660.000 to 1710.00	7250.0 to 7750	36.43 to 36.50
149.90 to 150.00	1718.800 to 1722.20	8025.0 to 8500	ABOVE 38.60
156.70 to 156.90	2200.000 to 2300.00	9000.0 to 9200	

NOTE:

The noise floor within the Restricted Bands for the EMC Receiver and HP Spectrum Analyzer will typically lay 20 dB below the limit.

8.0 BAND EDGE AND RESTRICT BAND COMPLIANCE

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the attenuation below the general limits specified in Tables 3 & 7 are not required.

The field strength of any **radiated emissions** which fall within the restricted bands shall not exceed the general radiated emissions limits as stated Section 6.3.

NOTE: All emissions from the R110XiIII Plus are under the limits of Tables 3 & 7 and comply with the Restrict Band requirements of Table 2:



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

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APPENDIX A

9.0 CONDUCTED SPURIOUS EMISSIONS MEASUREMENTS MADE AT ANTENNA TERMINALS (Section 10.0).

Name of Test:

RSS-210 Section Number: Section 10.0

Minimum Standard:

The measured RF emissions shall not exceed the required levels stated in Section 6.

Test Results:

The R110XiIII Plus **"meets"** the minimum requirements of RSS-210, Section 6.1.1 (b)

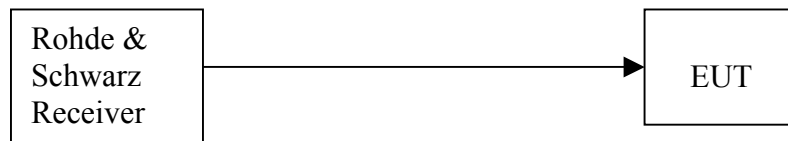
Test Conditions:

The emissions were measured at the antenna terminals by replacing the antenna with a spectrum analyzer of internal resistance equal to the impedance specified for the antenna using the test procedures from RSS-210, Section 10.

Test Equipment:

Rohde & Schwarz Receiver

Block Diagram of Test Set-Up



Measurement Data:

See the following pages for the graphs of the actual measurements that were made:

NOTE: This test was not run because there is no Antenna Port.



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

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APPENDIX A

CONDUCTED SPURIOUS EMISSION DATA AND CHARTS

MADE AT THE ANTENNA TERMINAL

NOTE: This test was not run because there is no Antenna Port.



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

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APPENDIX A

10.0 RADIATED SPURIOUS EMISSIONS - (Section 6.2.2)

Name of Test:

RSS-210 Section Number: Section 6.2.2

Minimum Standard:

The measured RF emissions shall not exceed the required levels stated in Section 6.2.2, Table 3

Test Results:

The R110XiIII Plus "**meets**" the minimum requirements of RSS-210, Section 6.2.2 (e)

Test Conditions:

The emissions were measured in an open field test site located at Genoa City, Wisconsin, Industry Canada File Number: IC 2060-1 (Site #1), IC 2060-2 (Site #2), & IC 2060-3 (Site #3), with the R110XiIII Plus set at 3 meters from the antenna using the test procedures from RSS-210, Section 6.1.1 (b) and RSS-210, Section 11.

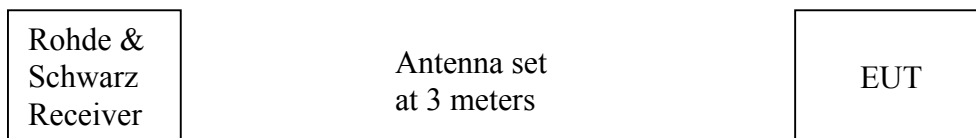
NOTE:

All radiated emissions measurements were made at a test room temperature of **64°F** at **66%** relative humidity.

Test Equipment:

Rohde & Schwarz Receiver
Electro Mechanics Company 3115 Antenna

Block Diagram of Test Set-Up



Measurement Data:

See the following pages for the graphs of the actual measurements that were made:



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

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APPENDIX A

RADIATED DATA AND CHARTS TAKEN OF THE FUNDAMENTAL SPURIOUS EMISSIONS

Section 6.2.2

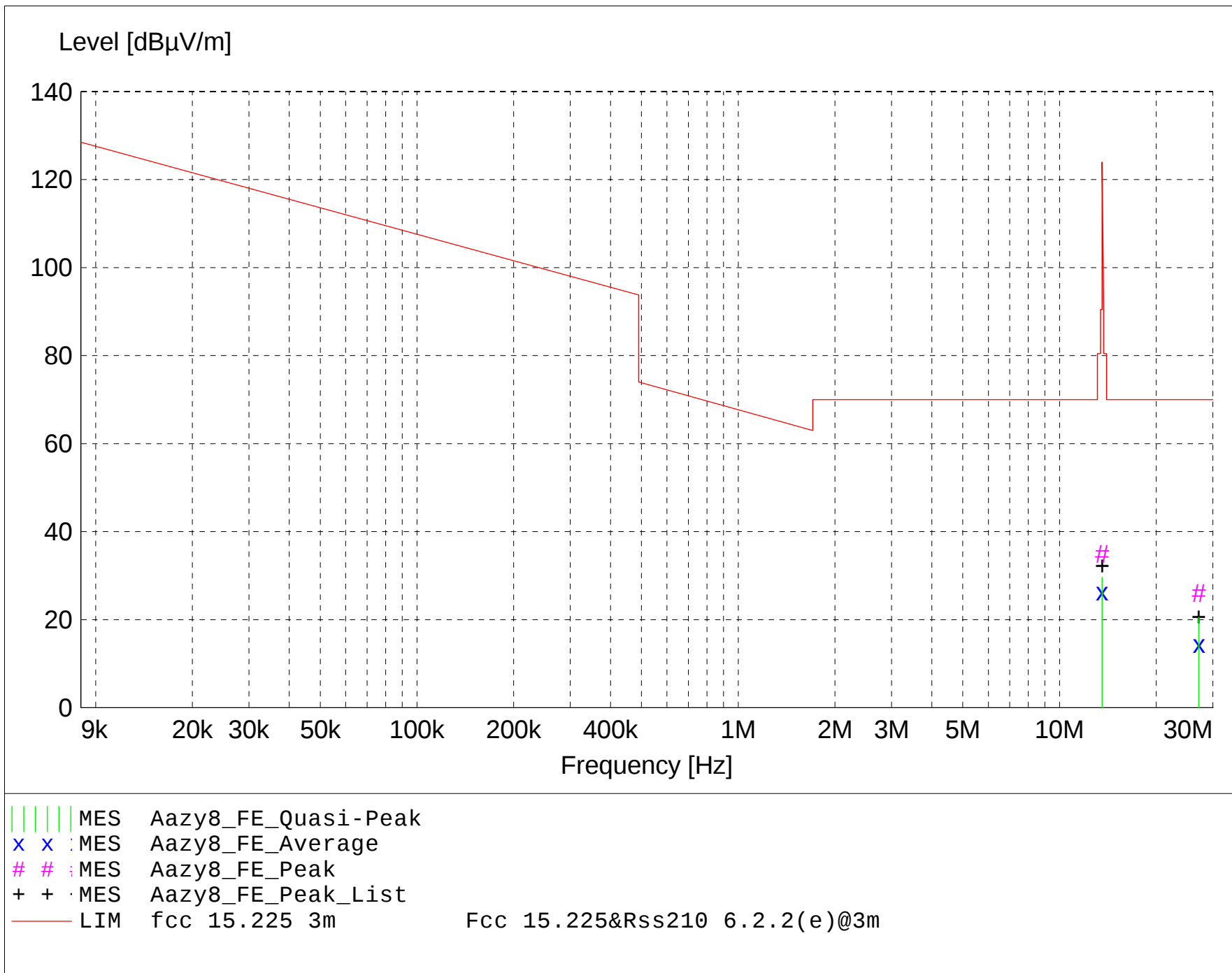
FCC Part 15.225

Radiated Field Strength

EUT: R110XiIII Plus HF
Manufacturer: Zebra Technologies
Operating Condition: 75 deg F; 54% R.H.
Test Site: DLS O.F. Site 3
Operator: Jason L
Test Specification: 120 V; 60 Hz
Comment: 13.56 Mhz Transmit and Receive
DATE: 09/7/2004

TEXT: "Site 3 LowH 3M"

Short Description: Test Set-up 10kHz to 30MHz H
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI40 SN: 837808/006
Antennas --- EMC0 Active Loop Model: 6502 SN: 2038
Pre-Amp --- Rohde&Schwarz TS-PR10 SN: 032001/005
TEST SET-UP: EuT Measured at 3 Meters with H-FIELD Antenna



MEASUREMENT RESULT: "Aazy8_FE_Final"

9/7/2004 12:59PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBμV	dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
27.120000	42.32	8.58	-24.8	26.1	70.0	43.9	1.00	180	MAX PEAK	2nd Harmonic
27.120000	36.80	8.58	-24.8	20.5	70.0	49.5	1.00	180	QUASI-PEAK	2nd Harmonic
27.120000	30.73	8.58	-24.8	14.5	70.0	55.5	1.00	180	AVERAGE	2nd Harmonic
13.560000	49.80	10.41	-25.4	34.9	124.0	89.1	1.00	180	MAX PEAK	Fundamental
13.560000	44.59	10.41	-25.4	29.6	124.0	94.4	1.00	180	QUASI-PEAK	Fundamental
13.560000	41.33	10.41	-25.4	26.4	124.0	97.6	1.00	180	AVERAGE	Fundamental



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

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APPENDIX A

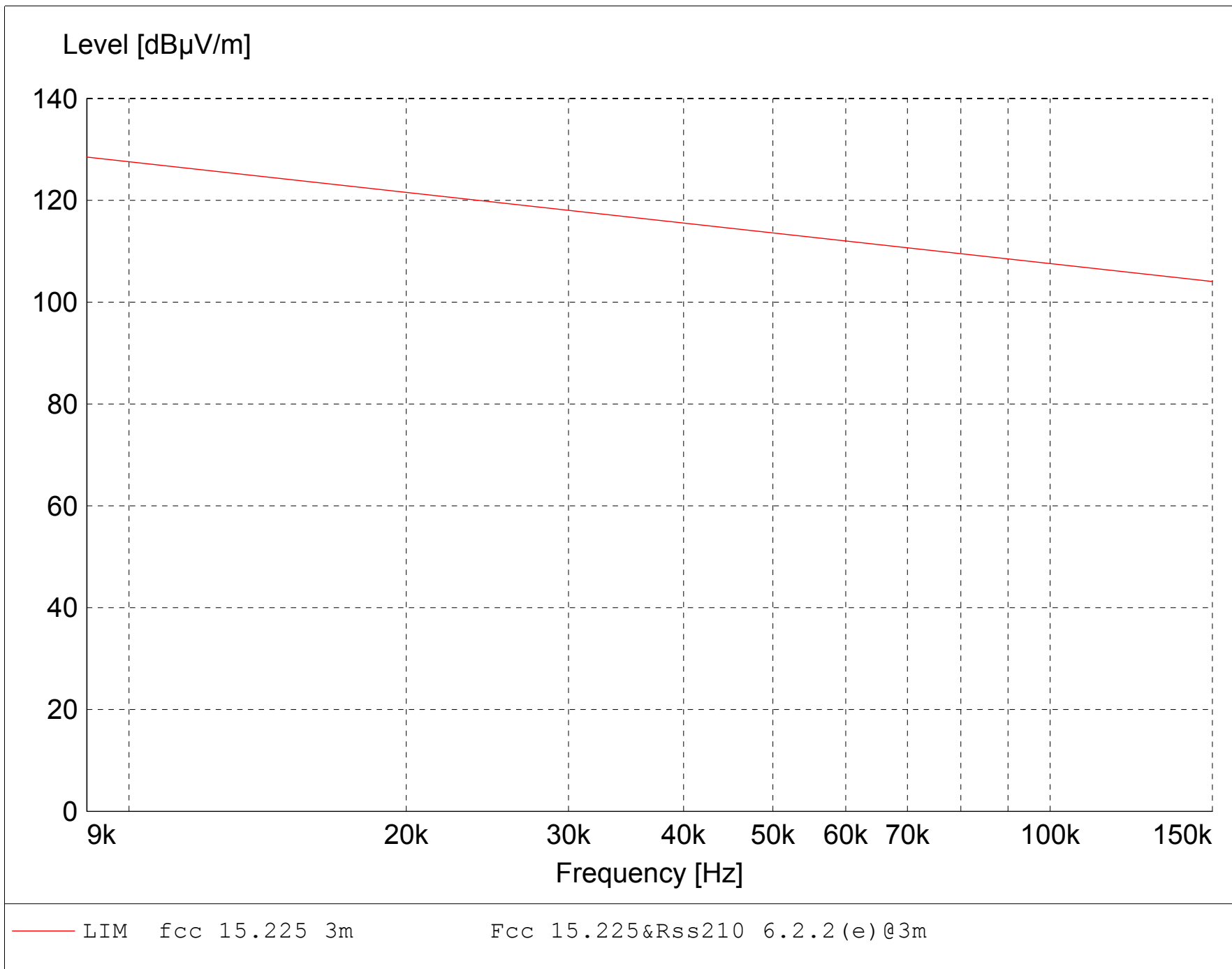
RADIATED DATA AND CHARTS TAKEN DURING TESTING FOR FIELD STRENGTH SPURIOUS EMISSION MEASUREMENTS

Section 6

RSS-210

Electric Field Strength

EUT: R110XiIII Plus HF
Manufacturer: Zebra
Operating Condition: 68 degF; 61% R.H.
Test Site: D.L.S. O.F. Site 2
Operator: Jason L
Test Specification: 120 Volts; 60 Hz
Comment:
Date: 7/8/2004



FCC Part 15 Class B

Electric Field Strength

EUT: R110XiIII Plus HF
Manufacturer: Zebra Technologies
Operating Condition: 75 deg. F; 55% R.H.
Test Site: DLS OF Site 3
Operator: Jason L
Test Specification: 120 VAC; 60 Hz
Comment: Transmit and Receive at 13.56 MHz
Date: 09/07/04

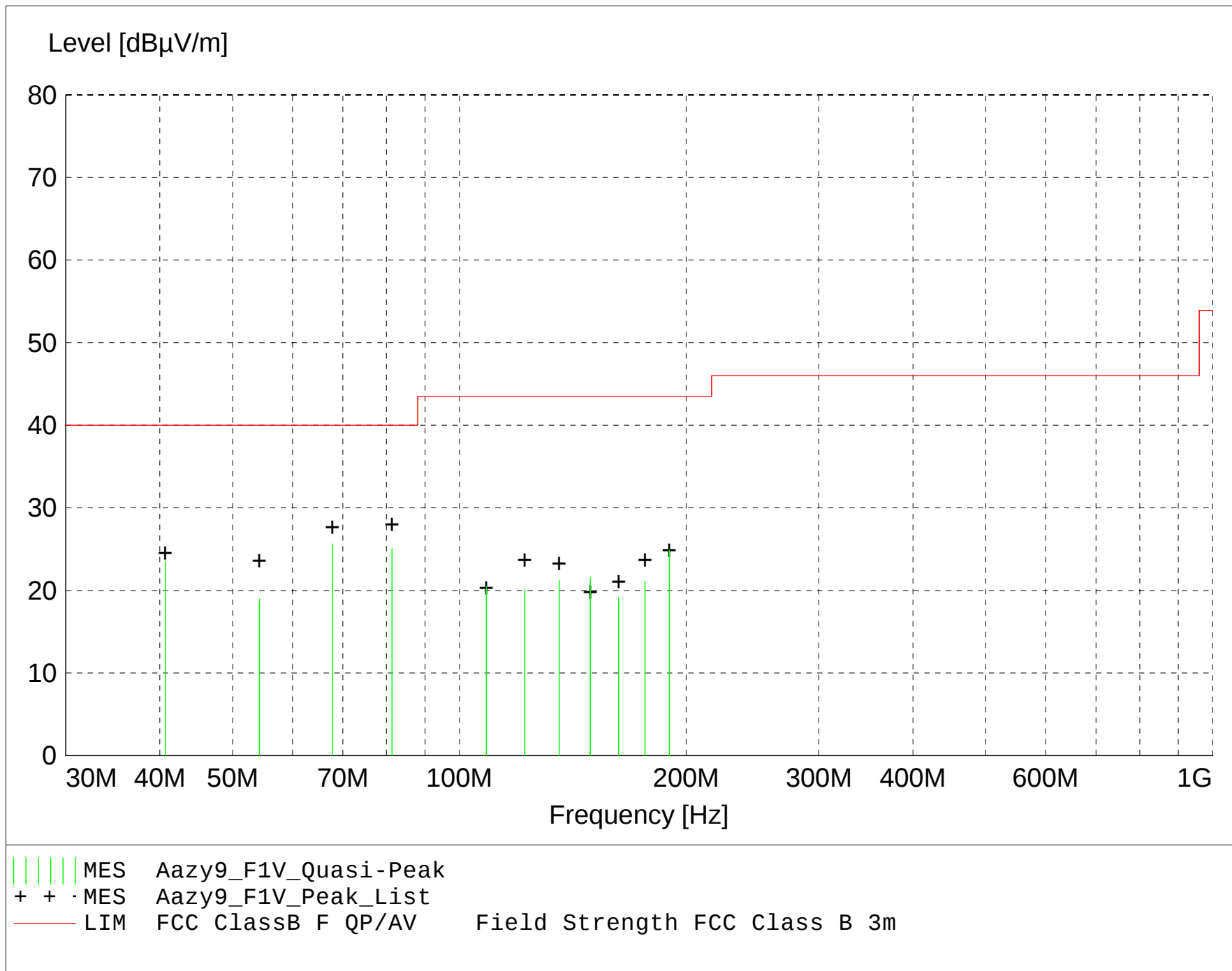
TEXT: "Site 3 MidV 3M"

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

Antennas ---
Biconical -- EMC0 3104C SN: 9701-4785
Log Periodic -- EMC0 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



MEASUREMENT RESULT: "Aazy9_F1V_Final"

9/7/2004 2:08PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
67.800000	42.02	7.58	-24.0	25.6	40.0	14.4	1.00	90	QUASI-PEAK	None
81.360000	41.77	7.17	-23.9	25.1	40.0	14.9	1.00	0	QUASI-PEAK	None
40.680000	36.28	11.65	-24.4	23.5	40.0	16.5	1.00	0	QUASI-PEAK	None
189.840000	31.02	16.63	-22.8	24.9	43.5	18.6	1.00	225	QUASI-PEAK	None
54.240000	32.11	10.93	-24.1	19.0	40.0	21.0	1.00	0	QUASI-PEAK	None
149.160000	32.48	12.10	-23.0	21.6	43.5	21.9	1.00	180	QUASI-PEAK	None
135.600000	32.26	12.20	-23.2	21.3	43.5	22.2	1.00	325	QUASI-PEAK	None
176.280000	28.17	15.62	-22.6	21.1	43.5	22.4	1.00	225	QUASI-PEAK	None
108.480000	31.27	12.54	-23.3	20.5	43.5	23.0	1.00	0	QUASI-PEAK	None
122.040000	30.37	12.98	-23.2	20.1	43.5	23.4	1.00	0	QUASI-PEAK	None
162.720000	28.46	13.44	-22.8	19.1	43.5	24.4	1.00	0	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: R110XiIII Plus HF
Manufacturer: Zebra Technologies
Operating Condition: 75 deg. F; 55% R.H.
Test Site: DLS OF Site 3
Operator: Jason L
Test Specification: 120 VAC; 60 Hz
Comment: Transmit and Receive at 13.56 MHz
Date: 09/07/04

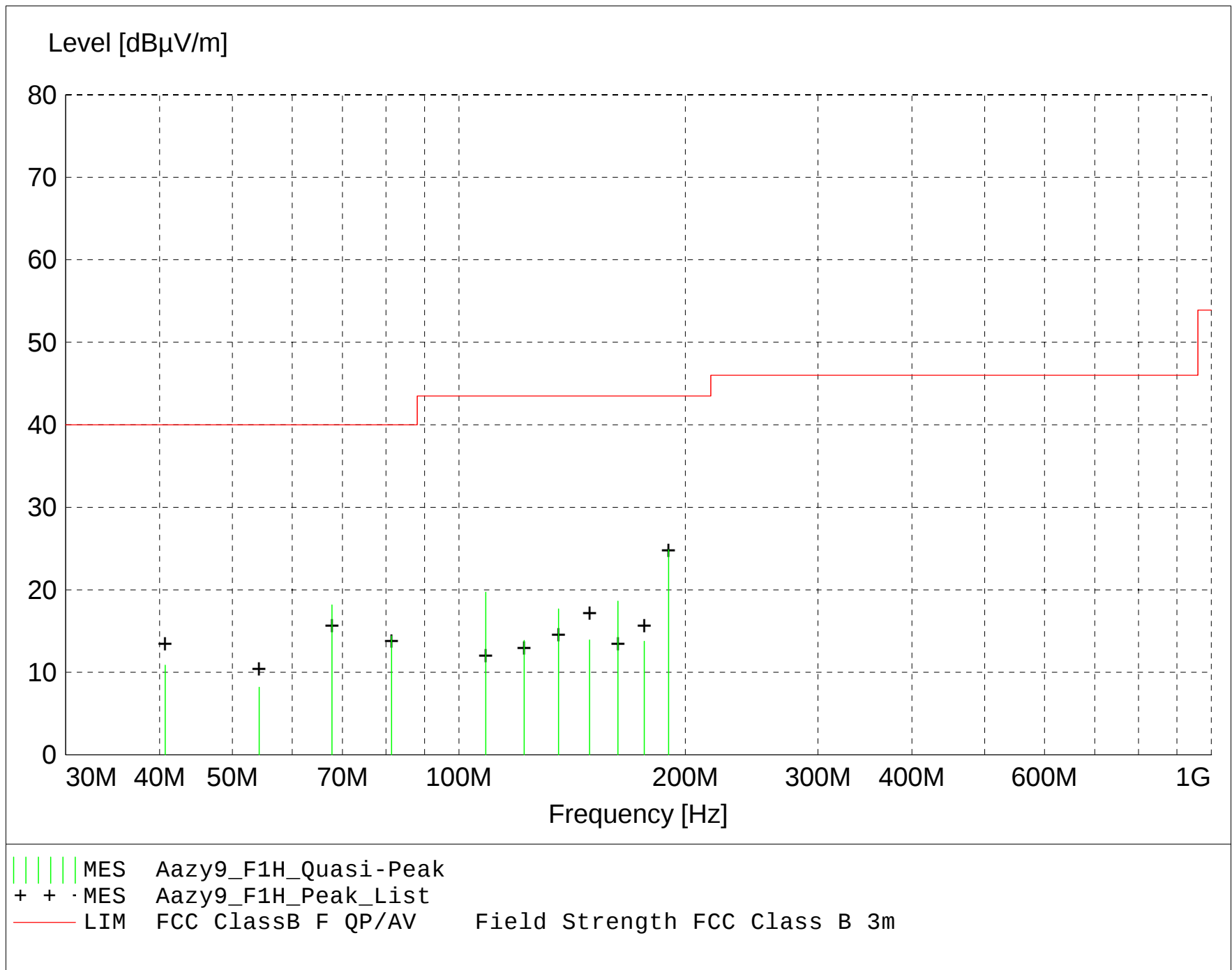
TEXT: "Site 3 MidH 3M"

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

Antennas ---
Biconical -- EMC0 3104C SN: 9701-4785
Log Periodic -- EMC0 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



MEASUREMENT RESULT: "Aazy9_F1H_Final"

9/7/2004 2:01PM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
189.840000	31.00	16.63	-22.8	24.9	43.5	18.6	1.50	0	QUASI-PEAK	None
67.800000	34.56	7.58	-24.0	18.2	40.0	21.8	2.20	45	QUASI-PEAK	None
108.480000	30.48	12.54	-23.3	19.7	43.5	23.8	2.00	270	QUASI-PEAK	None
162.720000	27.95	13.44	-22.8	18.6	43.5	24.9	2.00	90	QUASI-PEAK	None
81.360000	31.12	7.17	-23.9	14.4	40.0	25.6	2.00	325	QUASI-PEAK	None
135.600000	28.71	12.20	-23.2	17.7	43.5	25.8	2.30	90	QUASI-PEAK	None
40.680000	23.63	11.65	-24.4	10.9	40.0	29.1	2.00	0	QUASI-PEAK	None
149.160000	24.85	12.10	-23.0	13.9	43.5	29.6	2.00	45	QUASI-PEAK	None
122.040000	24.13	12.98	-23.2	13.9	43.5	29.6	1.80	270	QUASI-PEAK	None
176.280000	20.79	15.62	-22.6	13.8	43.5	29.7	2.00	0	QUASI-PEAK	None
54.240000	21.34	10.93	-24.1	8.2	40.0	31.8	2.00	0	QUASI-PEAK	None

RSS-210

Electric Field Strength

EUT: R110XiIII Plus HF
Manufacturer: Zebra
Operating Condition: 66 degF; 63% R.H.
Test Site: D.L.S. O.F. Site 2
Operator: Jason L
Test Specification: 120 Volts; 60 Hz
Comment:
Date: 7/8/2004

TEXT: "Site 2 6204&106 V3M"

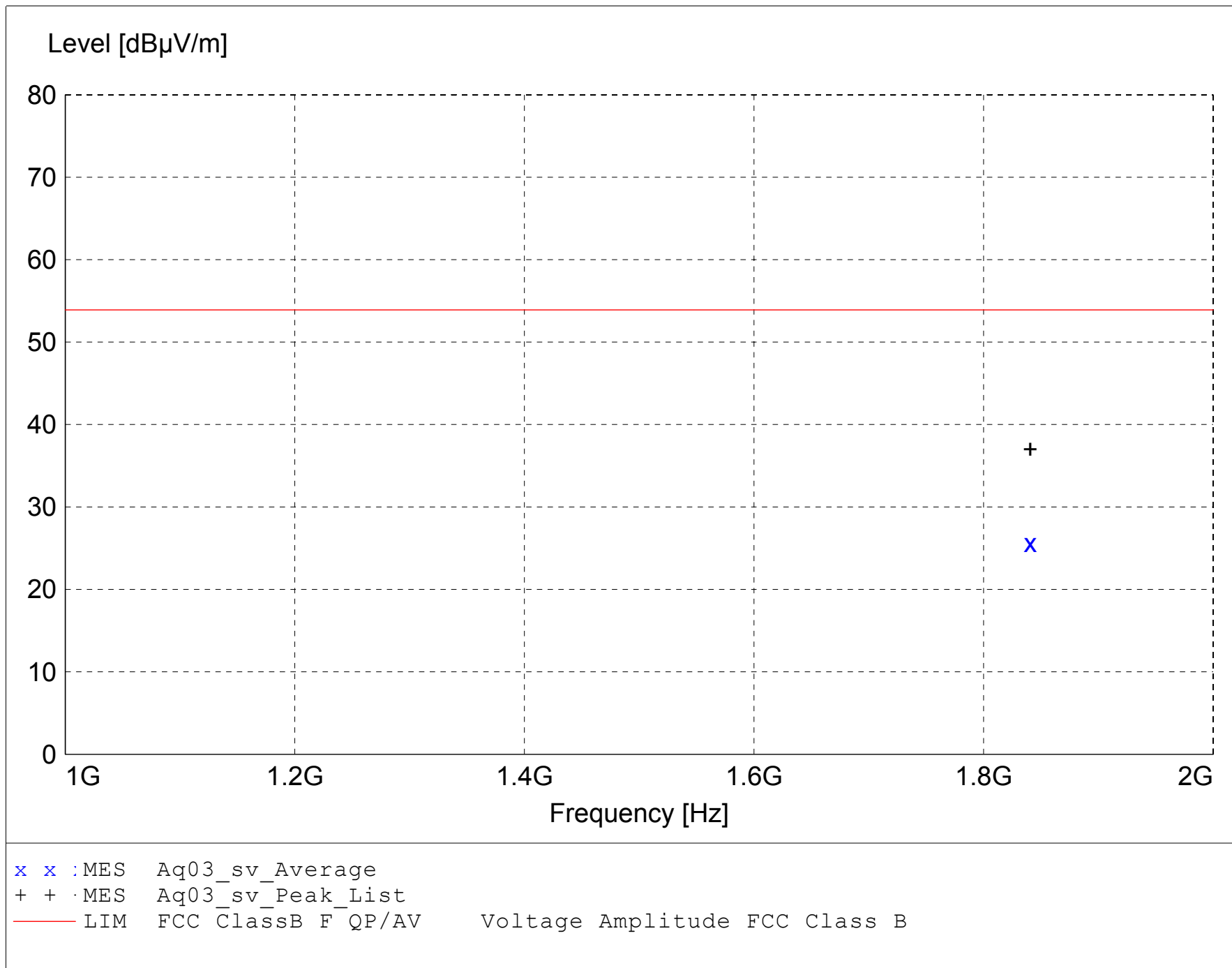
Short Description: Test Set-up Vert1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005

Horn Antenna --- ETS 3115 SN: 6204

Pre-Amps ---

1 - 18 GHz -- Miteq AMF-6D-010100-50 SN: 213976
18 - 26 GHz -- Miteq AMF-6B-100200-50 SN: 313936

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



MEASUREMENT RESULT: "Aq03_sv_Final"

7/8/2004 10:10AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
1840.600000	36.12	26.60	-37.1	25.7	53.9	28.2	1.00	45	AVERAGE	None

RSS-210

Electric Field Strength

EUT: R110XiIII Plus HF
Manufacturer: Zebra
Operating Condition: 66 degF; 63% R.H.
Test Site: D.L.S. O.F. Site 2
Operator: Jason L
Test Specification: 120 Volts; 60 Hz
Comment:
Date: 7/8/2004

TEXT: "Site 2 6204&106 H3M"

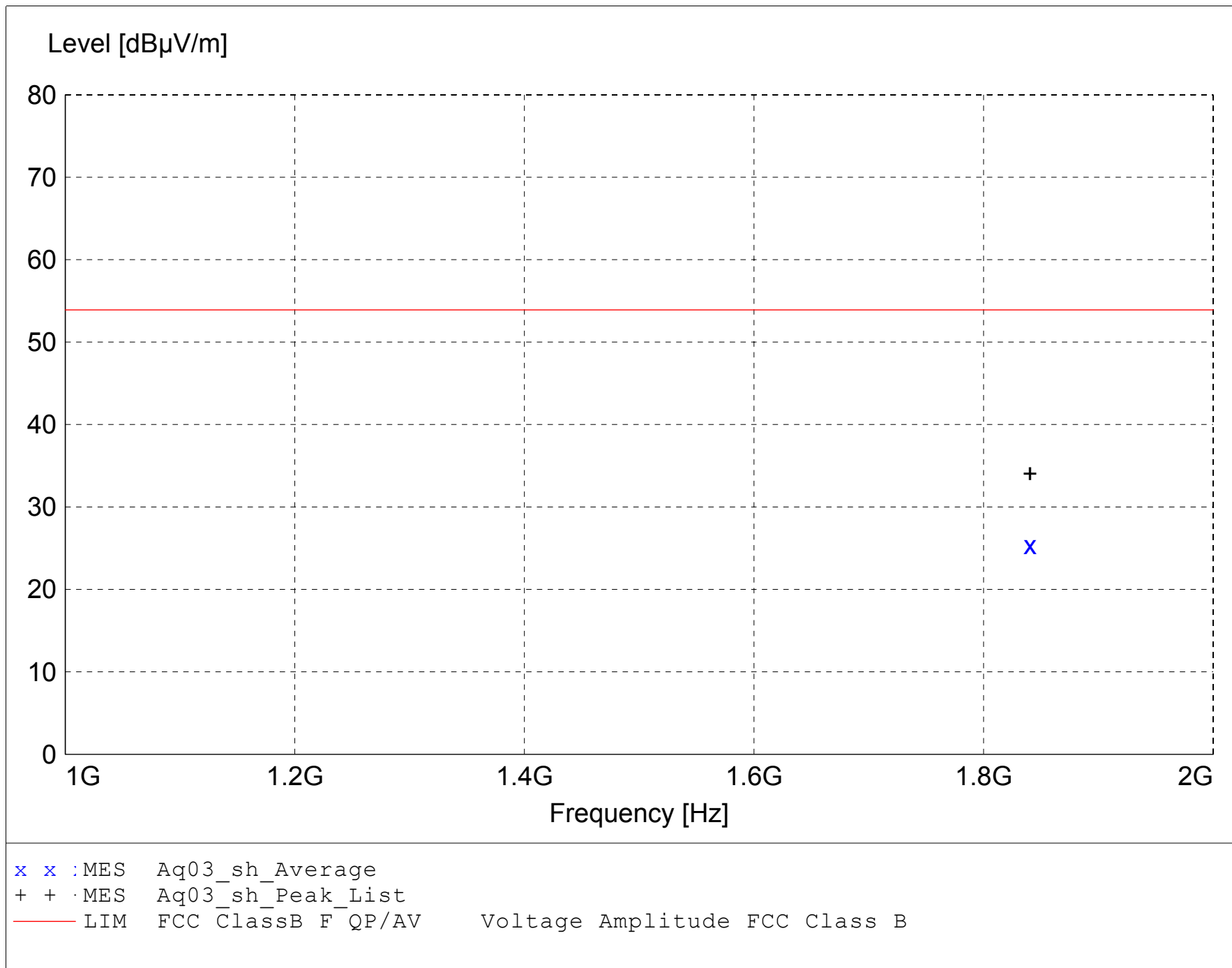
Short Description: Test Set-up Horz1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/005

Horn Antenna --- ETS 3115 SN: 6204

Pre-Amps ---

1 - 18 GHz -- Miteq AMF-6D-010100-50 SN: 213976
18 - 26 GHz -- Miteq AMF-6B-100200-50 SN: 313936

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



MEASUREMENT RESULT: "Aq03_sh_Final"

7/8/2004 10:14AM

Frequency	Level	Antenna	System	Total	Limit	Margin	Height	EuT	Final	Comment
MHz	dBμV	Factor	Loss	Level			Ant.	Angle	Detector	
		dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
1840.500000	35.81	26.60	-37.1	25.4	53.9	28.5	1.00	0	AVERAGE	None



Company: Zebra Technologies Corporation
Model Tested: 110XiIII
Report Number: 10928

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APPENDIX A

11.0 FREQUENCY STABILITY (Temperature) - (Section 6.4)

The frequency stability was measured from -20° to $+50^{\circ}$ centigrade at intervals of 10° centigrade throughout the range. Prior to each frequency measurement, the equipment was left alone for a sufficient period of time (approximately 30 minutes or more) to allow the components of the R110XiIII Plus oscillator circuitry to stabilize. The following information was taken:

FREQUENCY STABILITY FOR TEMPERATURE VARIATION IN MHz (Section 6.4a):

-20°	13.560501
-10°	13.560501
0°	13.560501
$+10^{\circ}$	13.560501
$+20^{\circ}$	13.560501
$+30^{\circ}$	13.560501
$+40^{\circ}$	13.560501
$+50^{\circ}$	13.560501

Worst Case Variance: = 0 Hz

As stated in RSS-210, Issue 5, Section 6.4, the Frequency Tolerance for this frequency range are as follows:

Frequency Tolerance: = 0

Ambient Frequency: = 0 Hz

Limit = $0 * \underline{0}$ = 0.0 Hz

Margin: $0 - 0.0$ = **0.0 Hz**

This is well within the specified limits.

NOTE:

See the following page(s) for the graph(s) of the actual measurement made:



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GRAPH(S) TAKEN FOR FREQUENCY

STABILITY WHEN VARYING THE TEMPERATURE

SECTION 6.4(a)

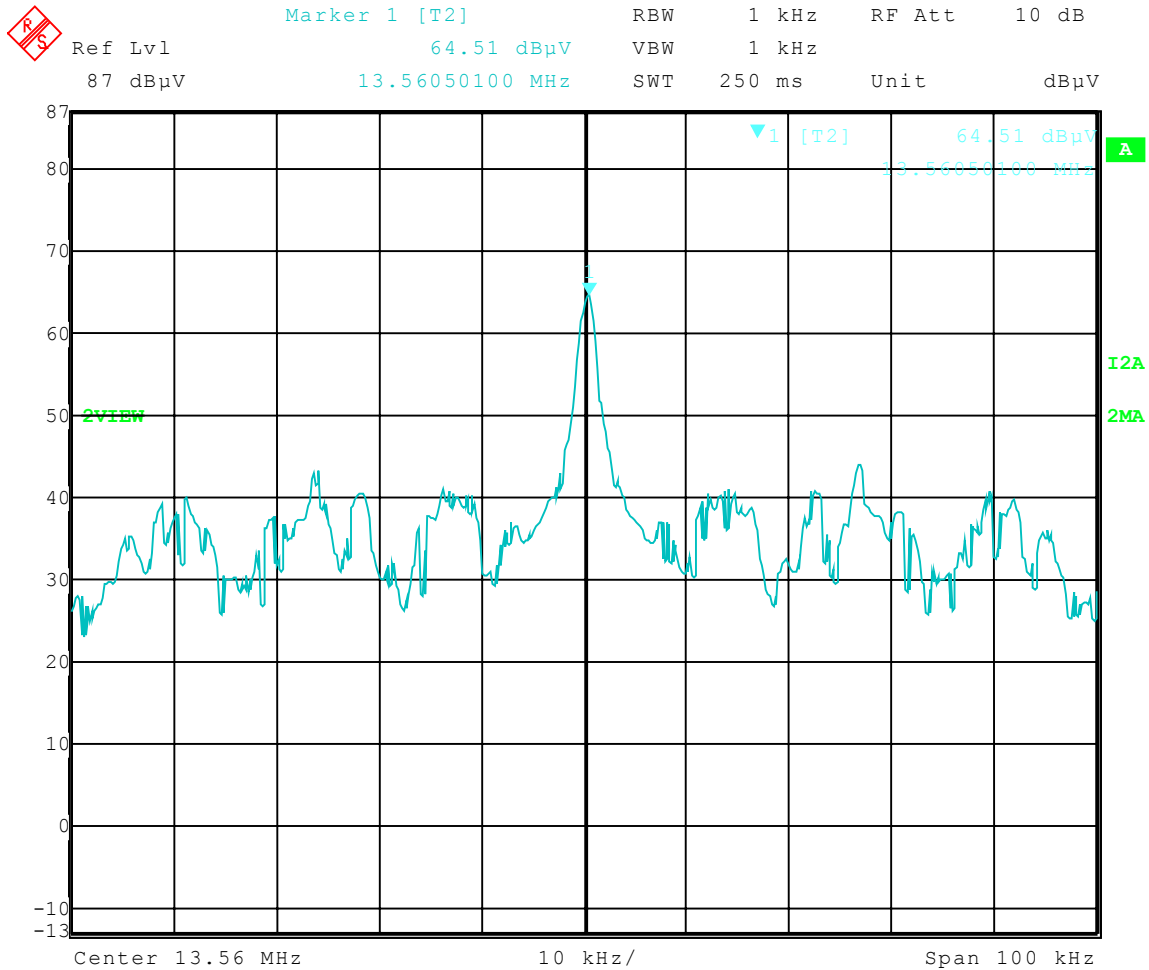
This is well within the specified limits.



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Date: 8.JUL.2004 18:39:22

Frequency Stability – Temperature

Temperature: -20 deg C

Frequency: 13.560501 MHz

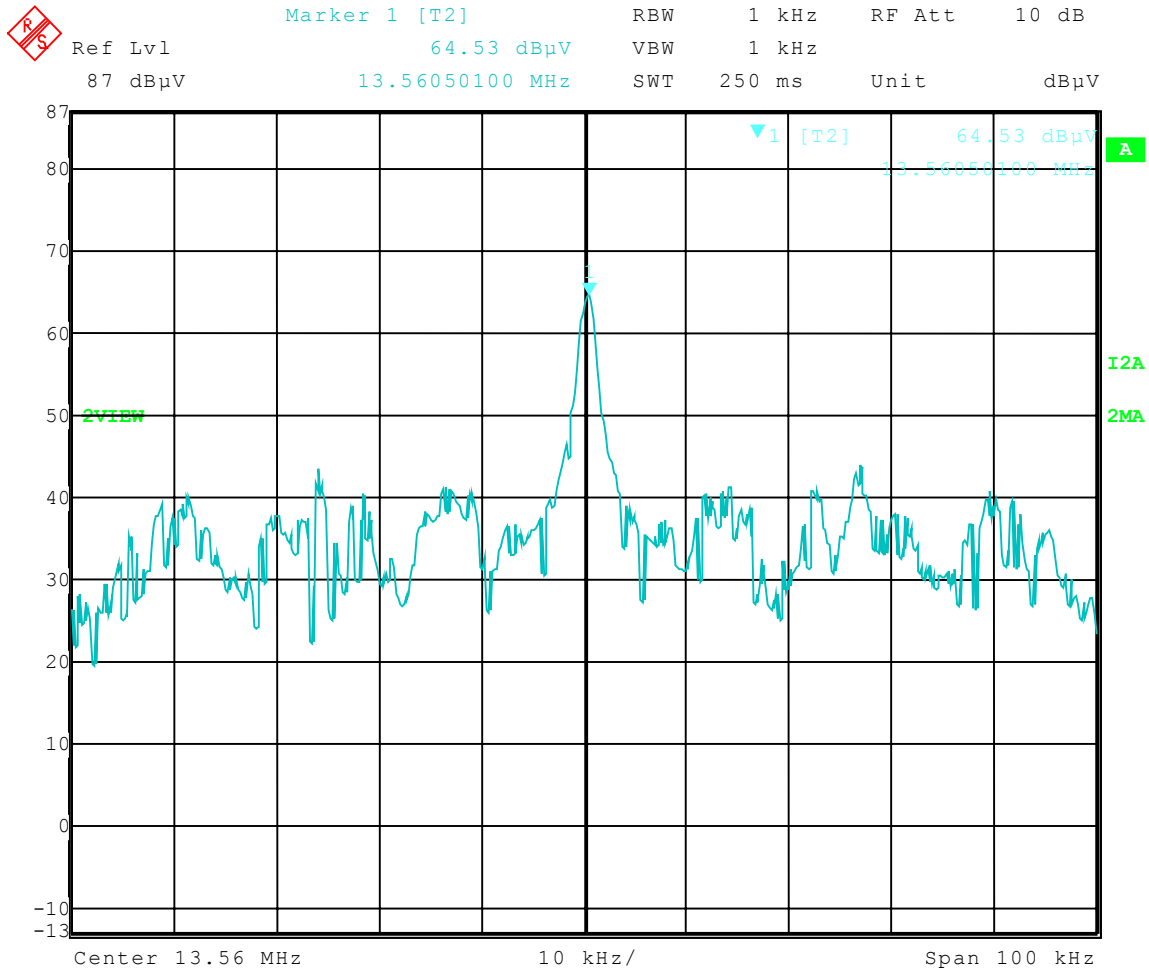
Deviation: 501 Hz



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Date: 8.JUL.2004 18:43:11

Frequency Stability – Temperature

Temperature: -15 deg C

Frequency: 13.560501 MHz

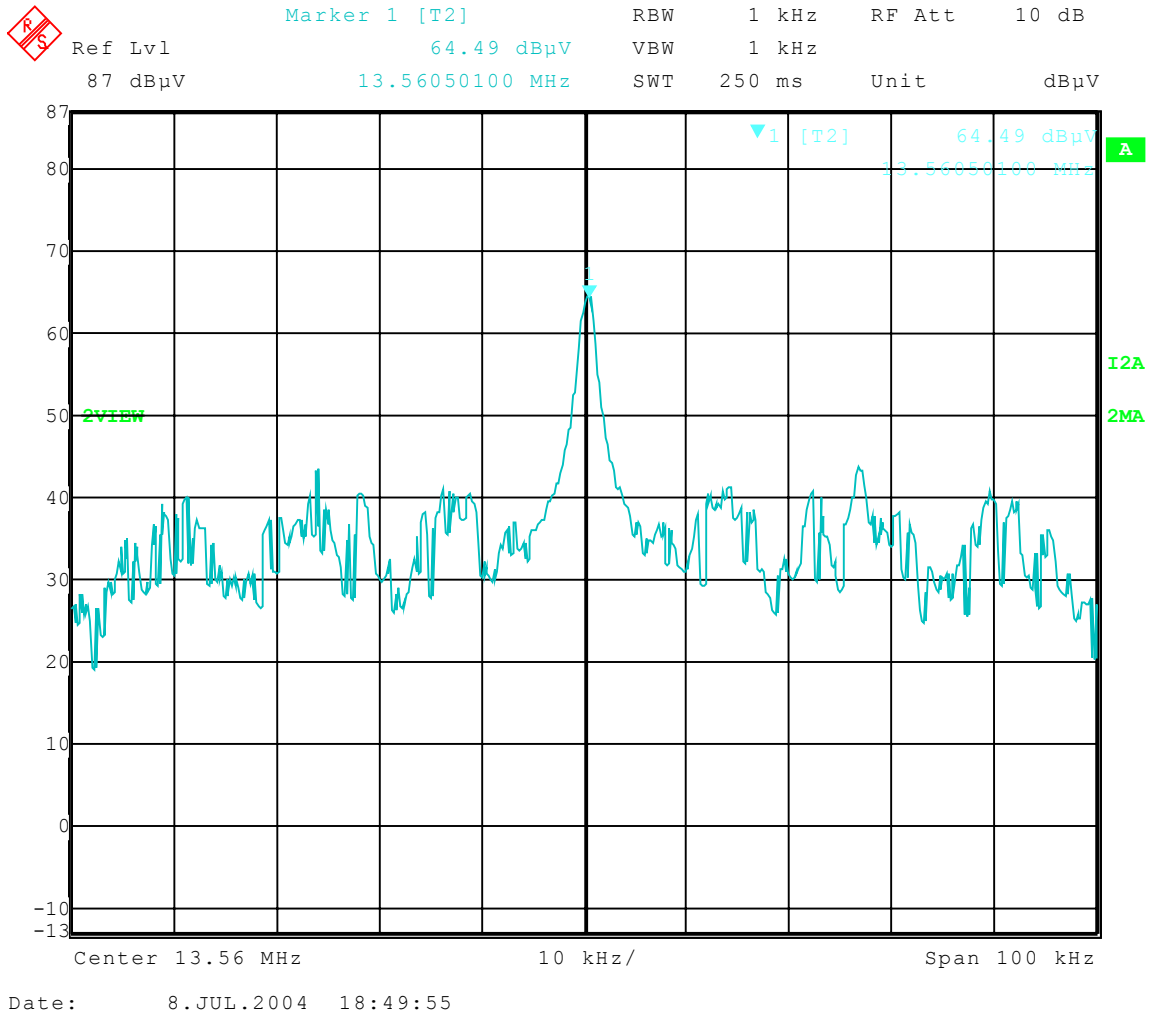
Deviation: 501 Hz



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Frequency Stability – Temperature

Temperature: -10 deg C

Frequency: 13.560501 MHz

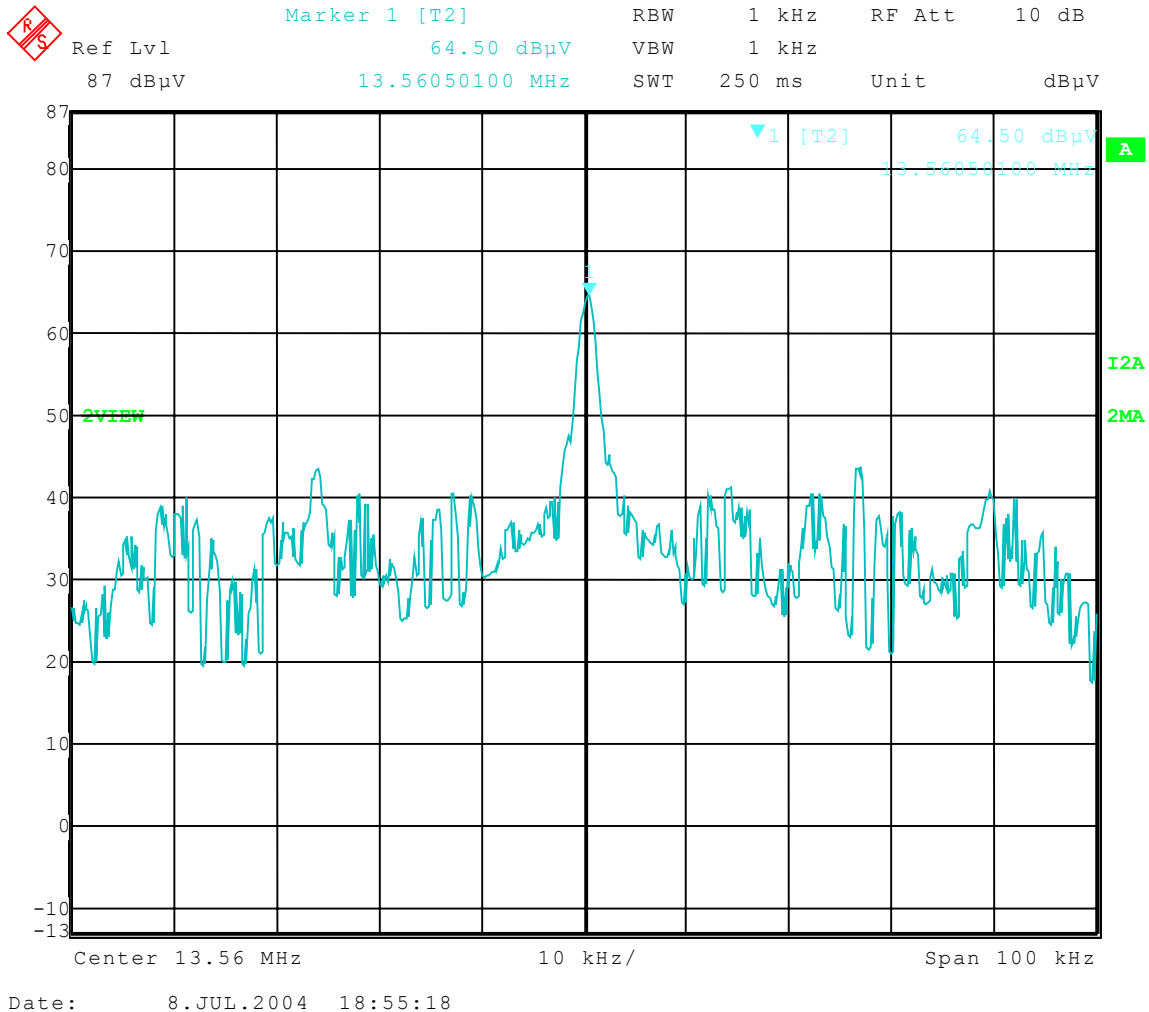
Deviation: 501 Hz



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Frequency Stability – Temperature

Temperature: -5 deg C

Frequency: 13.560501 MHz

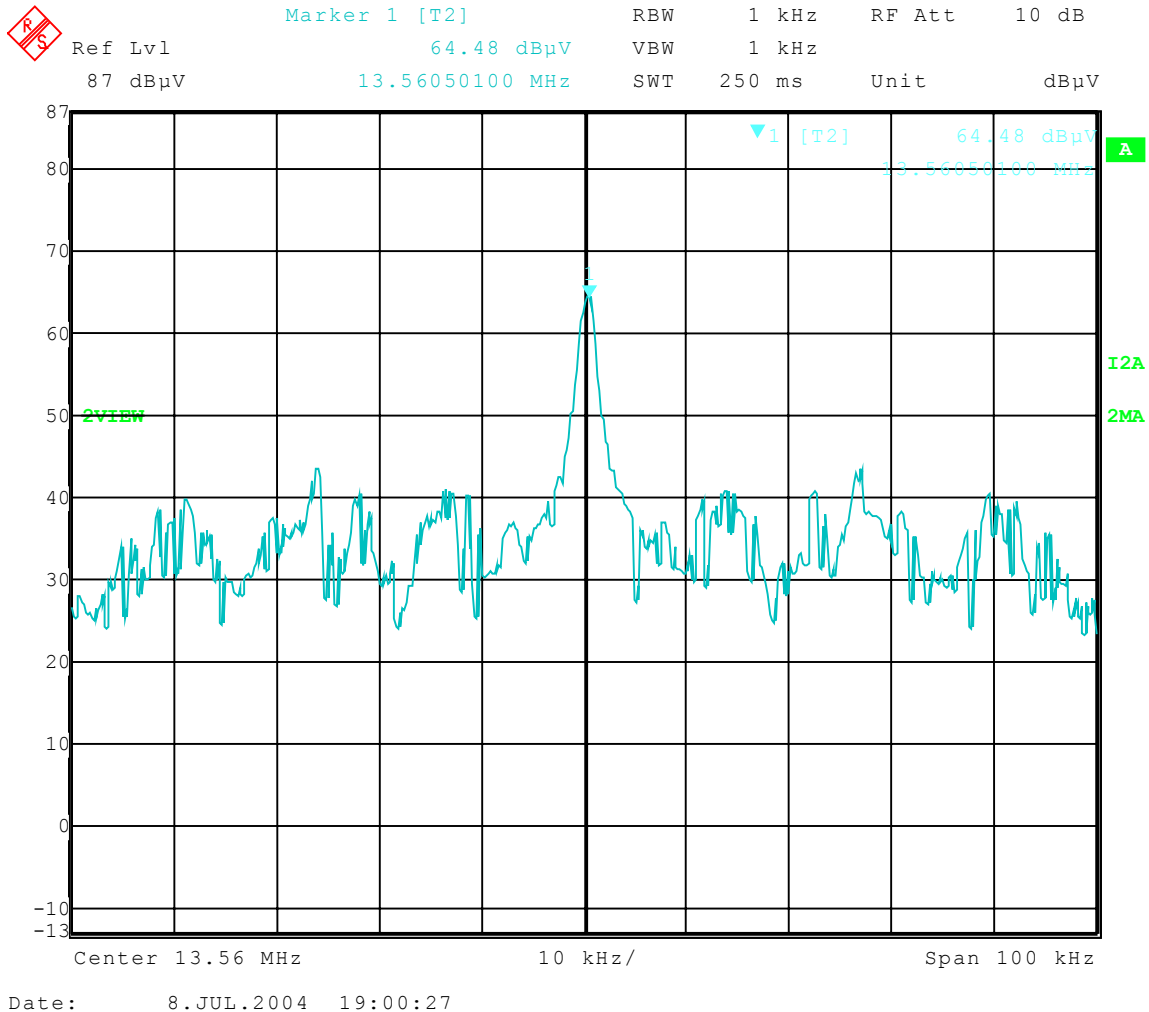
Deviation: 501 Hz



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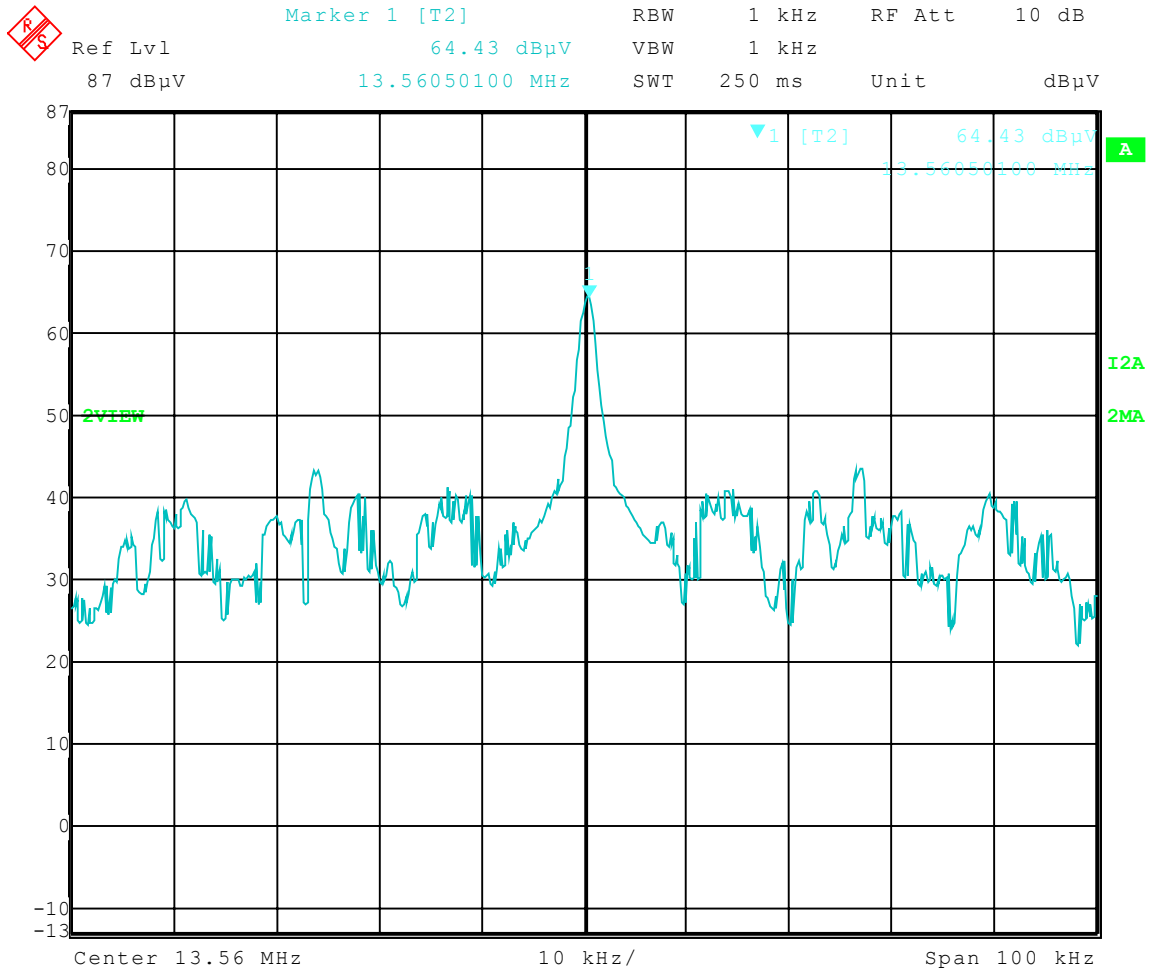
Frequency Stability – Temperature
Temperature: 0 deg C
Frequency: 13.560501 MHz
Deviation: 501 Hz



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Date: 8.JUL.2004 19:03:34

Frequency Stability – Temperature

Temperature: +5 deg C

Frequency: 13.560501 MHz

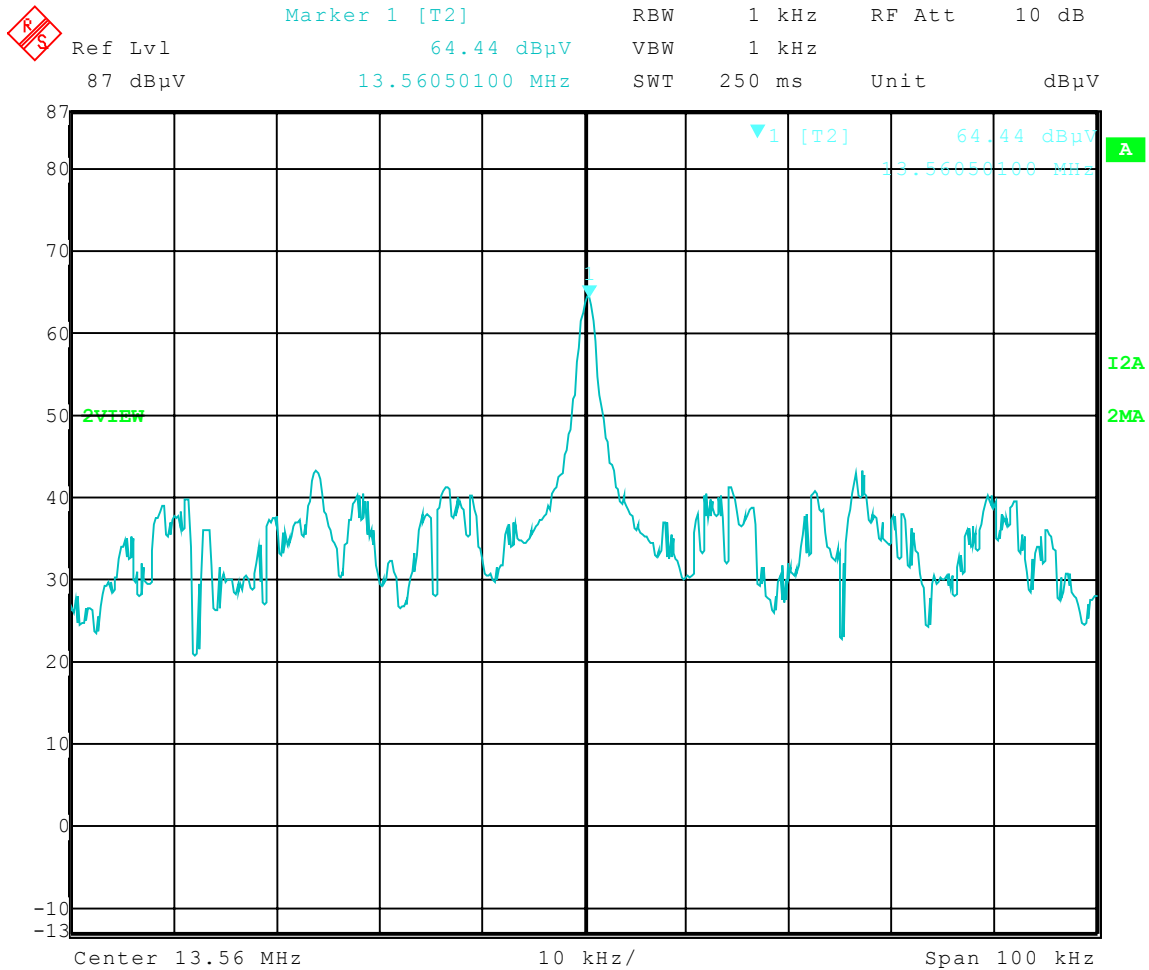
Deviation: 501 Hz



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Date: 8.JUL.2004 19:07:35

Frequency Stability – Temperature

Temperature: +10 deg C

Frequency: 13.560501 MHz

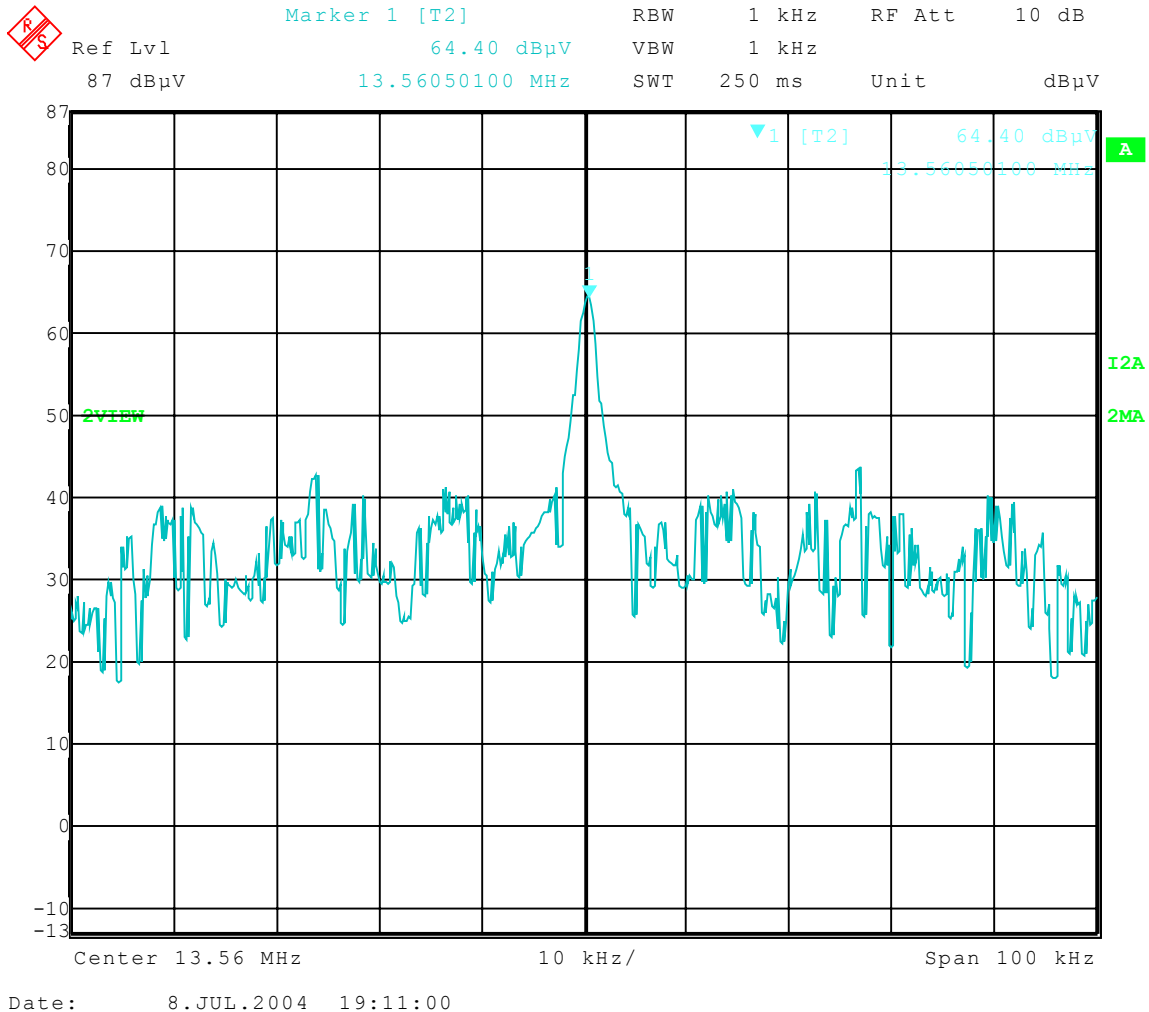
Deviation: 501 Hz



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Frequency Stability – Temperature

Temperature: +15 deg C

Frequency: 13.560501 MHz

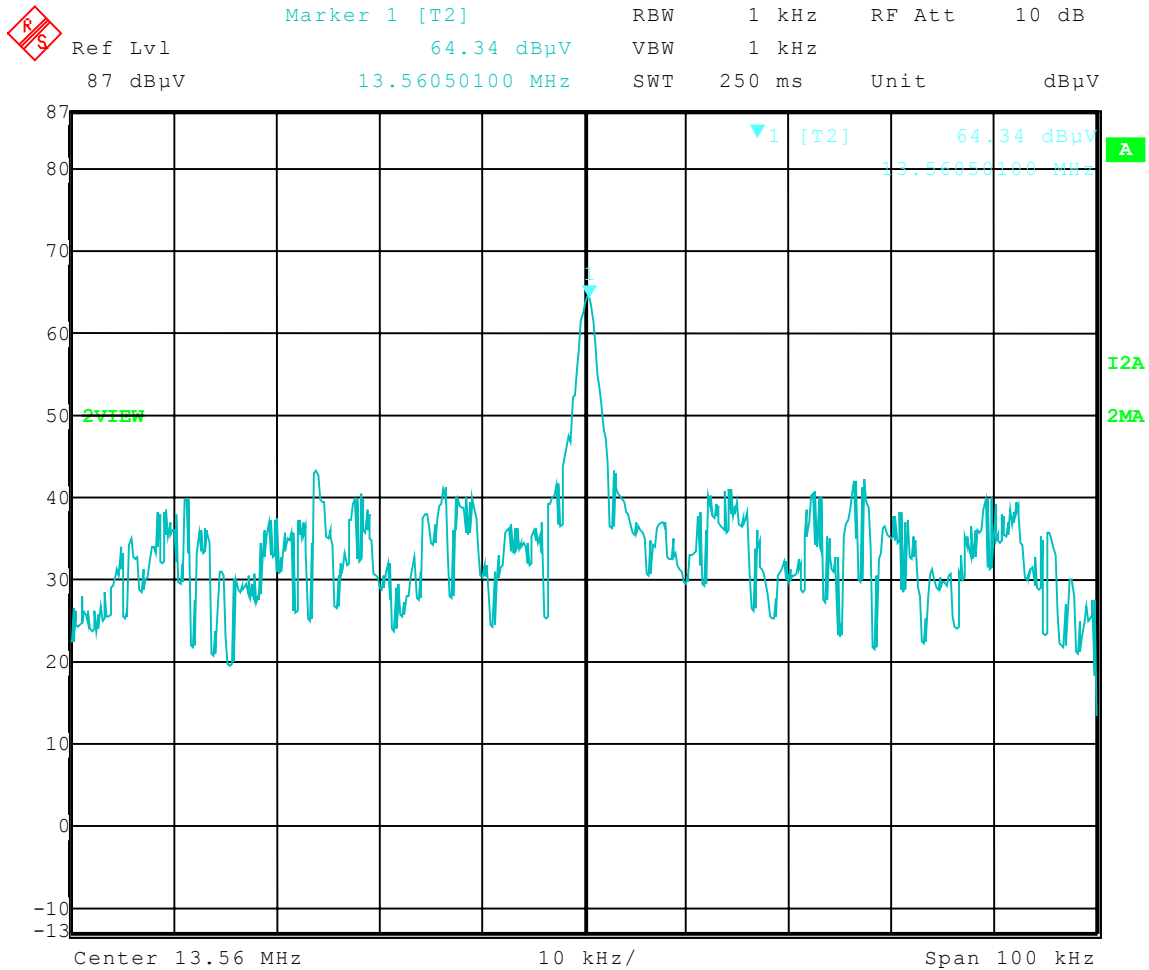
Deviation: 501 Hz



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Date: 8.JUL.2004 19:15:52

Frequency Stability – Temperature

Temperature: +20 deg C

Frequency: 13.560501 MHz

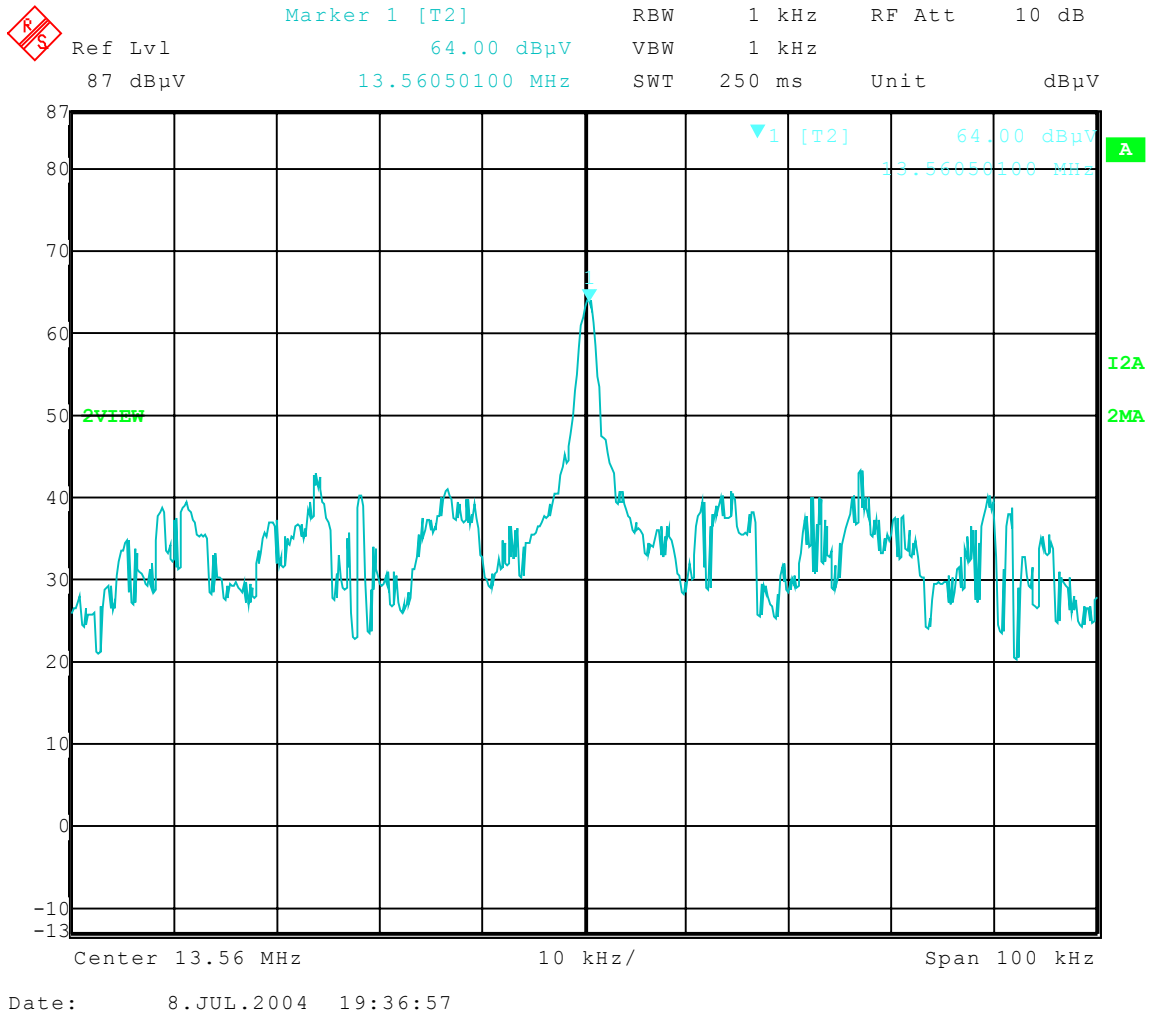
Deviation: 501 Hz



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Frequency Stability – Temperature

Temperature: +25 deg C

Frequency: 13.560501 MHz

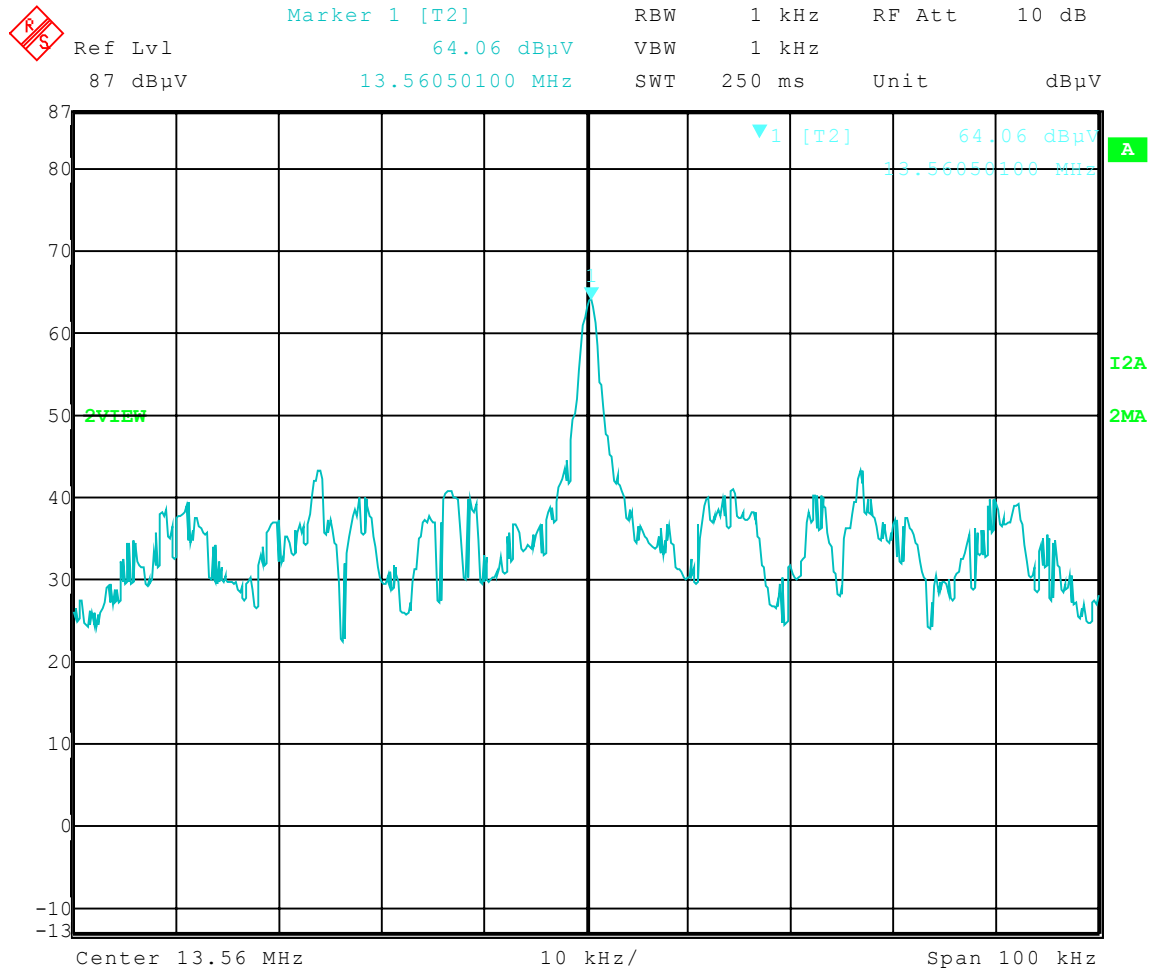
Deviation: 501 Hz



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Date: 8.JUL.2004 19:39:26

Frequency Stability – Temperature

Temperature: +30 deg C

Frequency: 13.560501 MHz

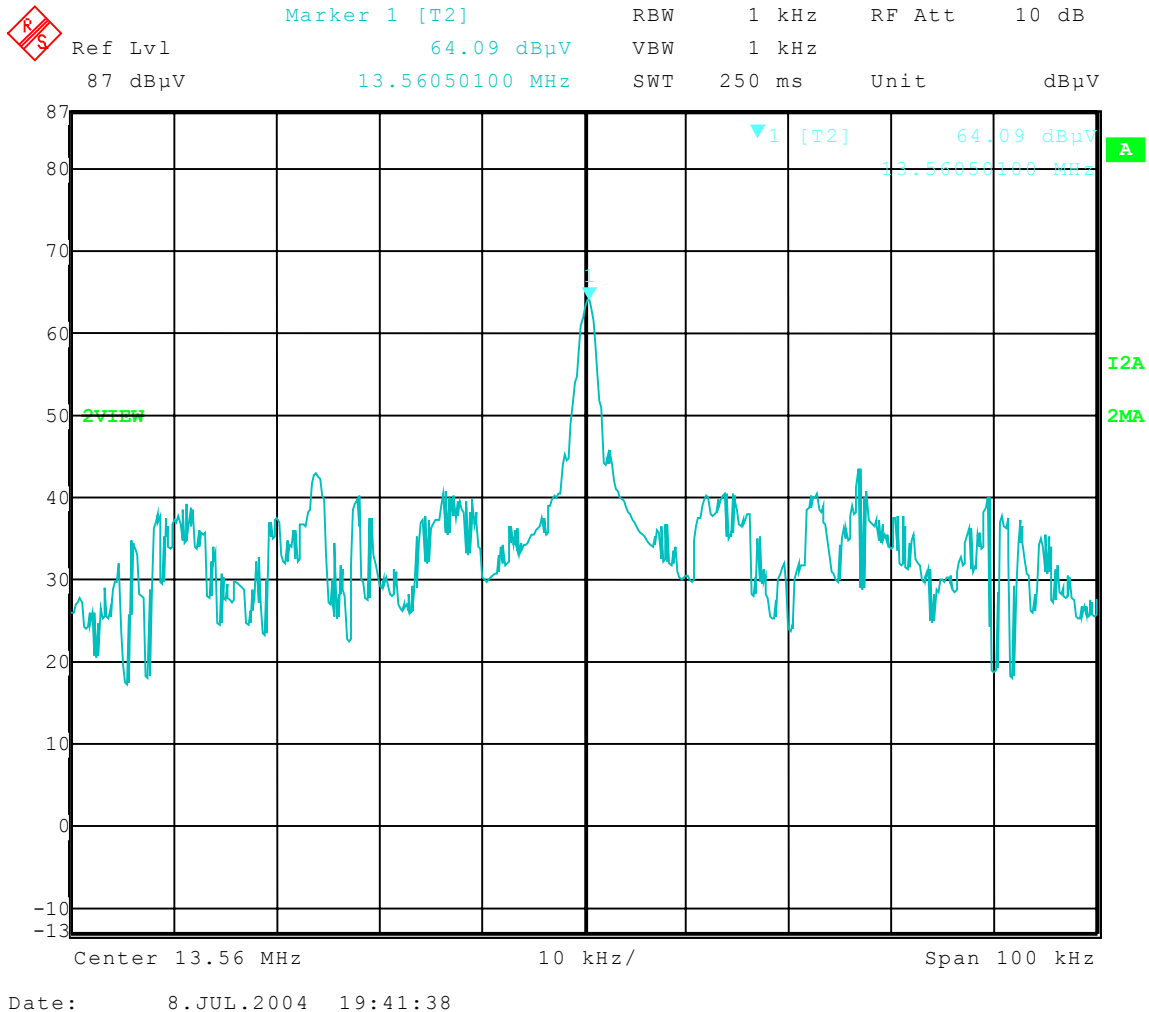
Deviation: 501 Hz



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Frequency Stability – Temperature

Temperature: +35 deg C

Frequency: 13.560501 MHz

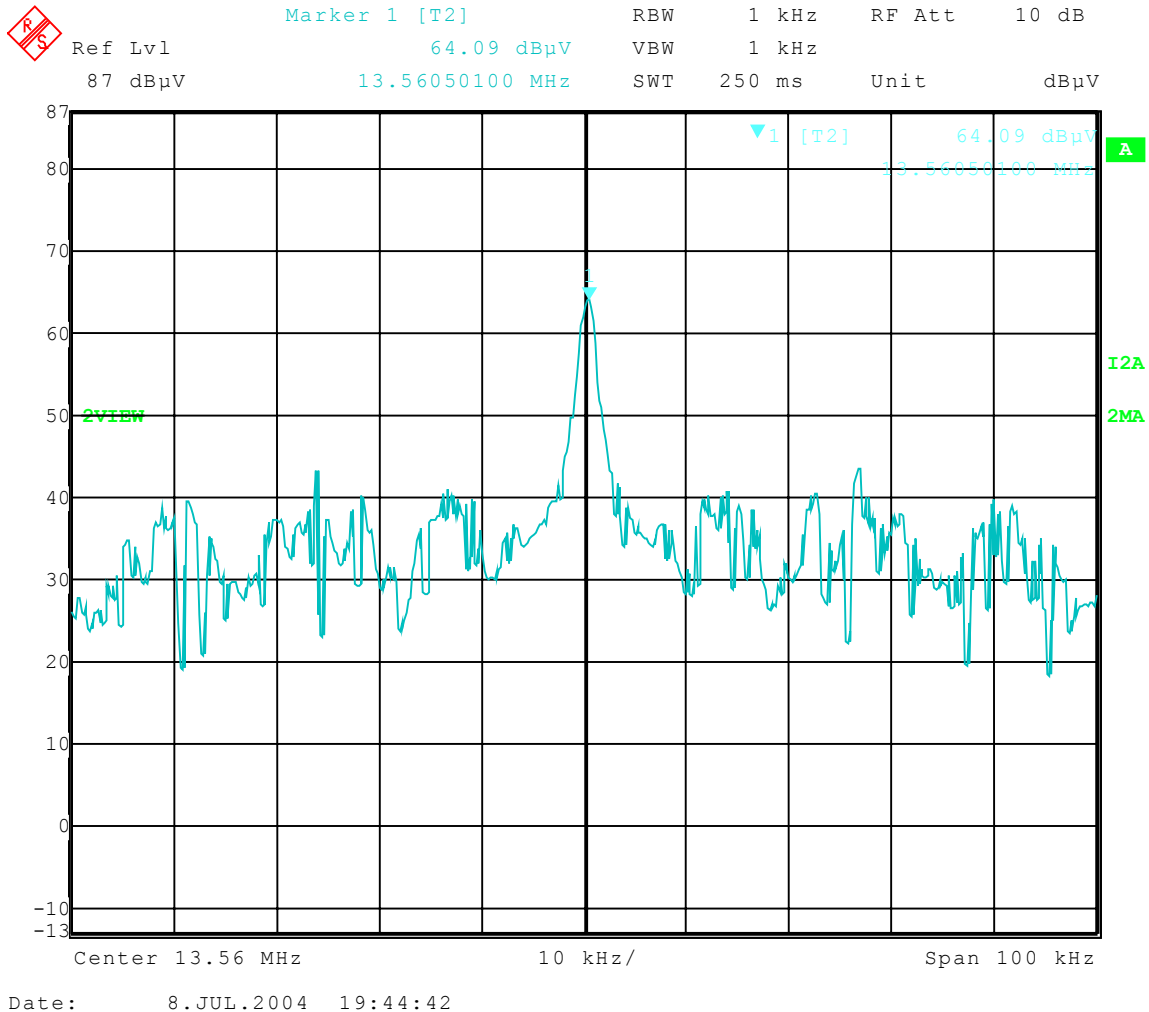
Deviation: 501 Hz



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Frequency Stability – Temperature

Temperature: +40 deg C

Frequency: 13.560501 MHz

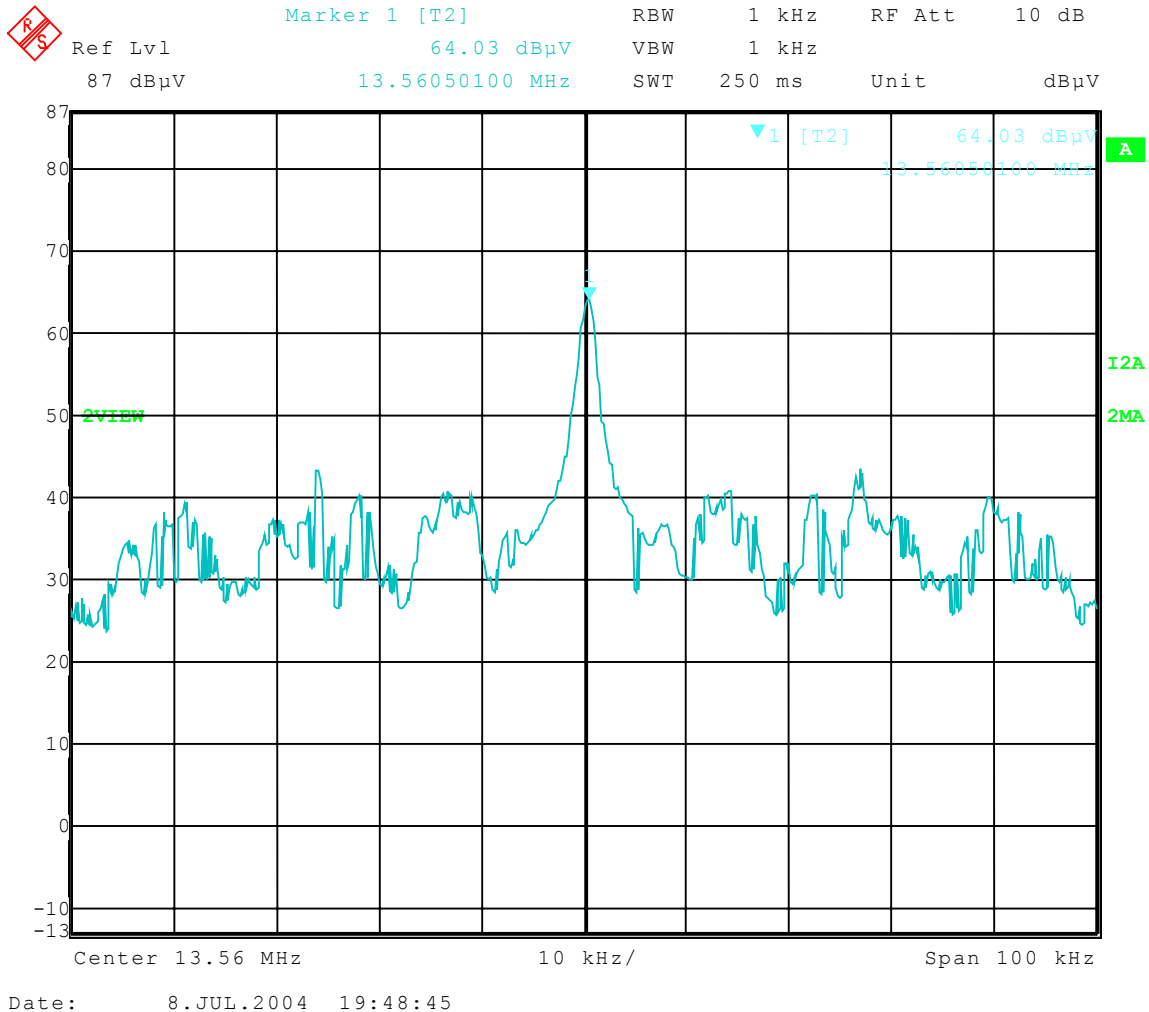
Deviation: 501 Hz



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Frequency Stability – Temperature

Temperature: +45 deg C

Frequency: 13.560501 MHz

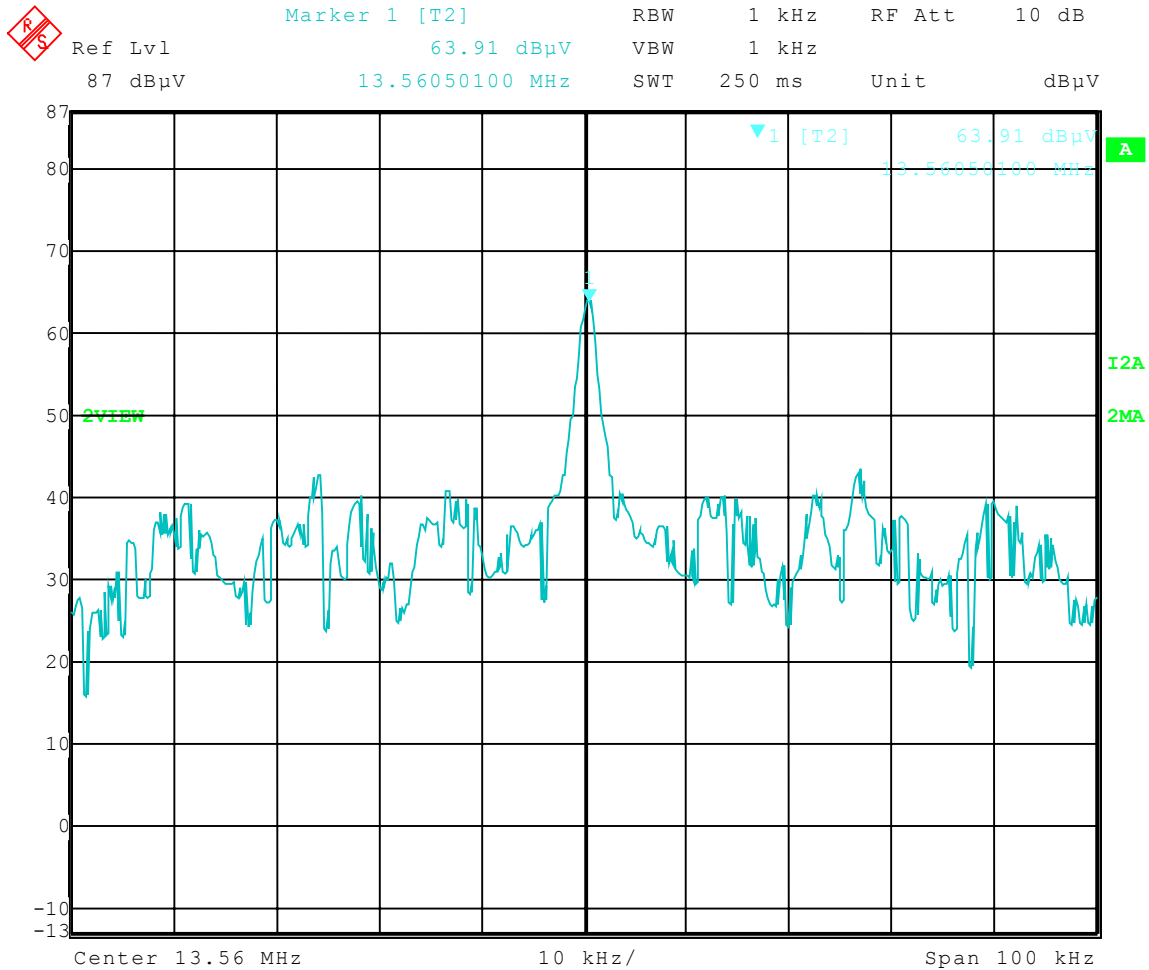
Deviation: 501 Hz



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Date: 8.JUL.2004 19:52:26

Frequency Stability – Temperature

Temperature: +50 deg C

Frequency: 13.560501 MHz

Deviation: 501 Hz



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12.0 FREQUENCY STABILITY (Voltage Variation) - (Section 6.4)

The frequency stability was measured at +20° centigrade by varying the primary supply voltage from 85% to 115% of nominal value for all equipment other than hand carried battery equipment.

FREQUENCY STABILITY FOR VOLTAGE VARIATION (Section 6.4b):

85%	13.560501
100%	13.560501
115%	13.560501

NOTE: This is well inside the specified limits.

FREQUENCY STABILITY FOR HAND HELD DEVICES:

For handheld battery operated equipment (cannot be plugged into the power mains), the frequency stability tests were made using a new battery, eliminating the need to vary the power supply by $\pm 15\%$.

Fresh Battery versus Battery end point:

Frequency #1
Frequency #2
Frequency #3

As stated in RSS-210, Section 6.4 the Frequency Tolerance for this frequency range is:

Frequency Tolerance: = **0**

Limit: = **0.0**

This test was not run since the device is connect to the AC power line.

NOTE:

See the following page(s) for the graph(s) of the actual measurement made:



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GRAPH(S) TAKEN FOR FREQUENCY

STABILITY WHEN VARYING THE

PRIMARY SUPPLY VOLTAGE

SECTION 6.4(b)

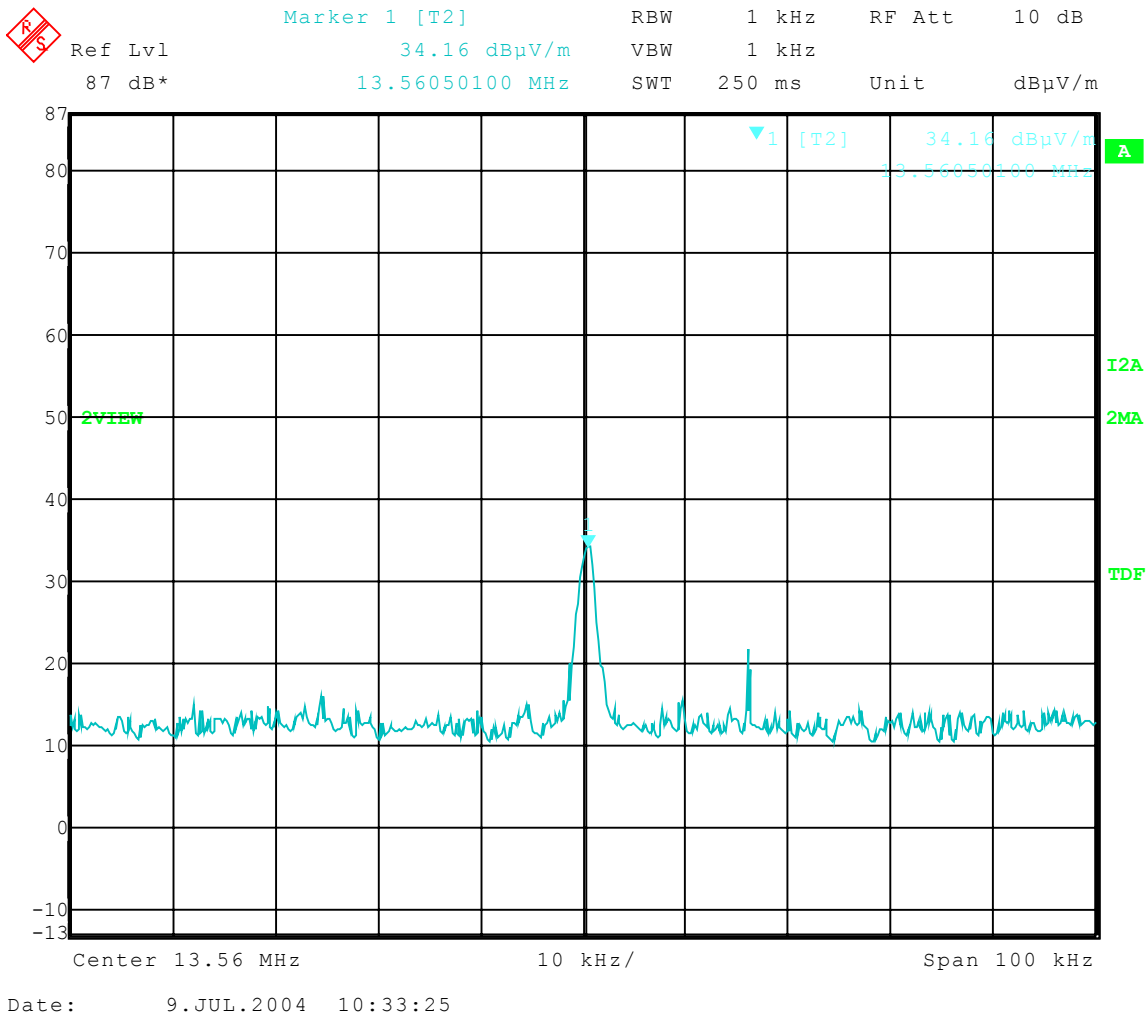
NOTE: This is well inside the specified limits.



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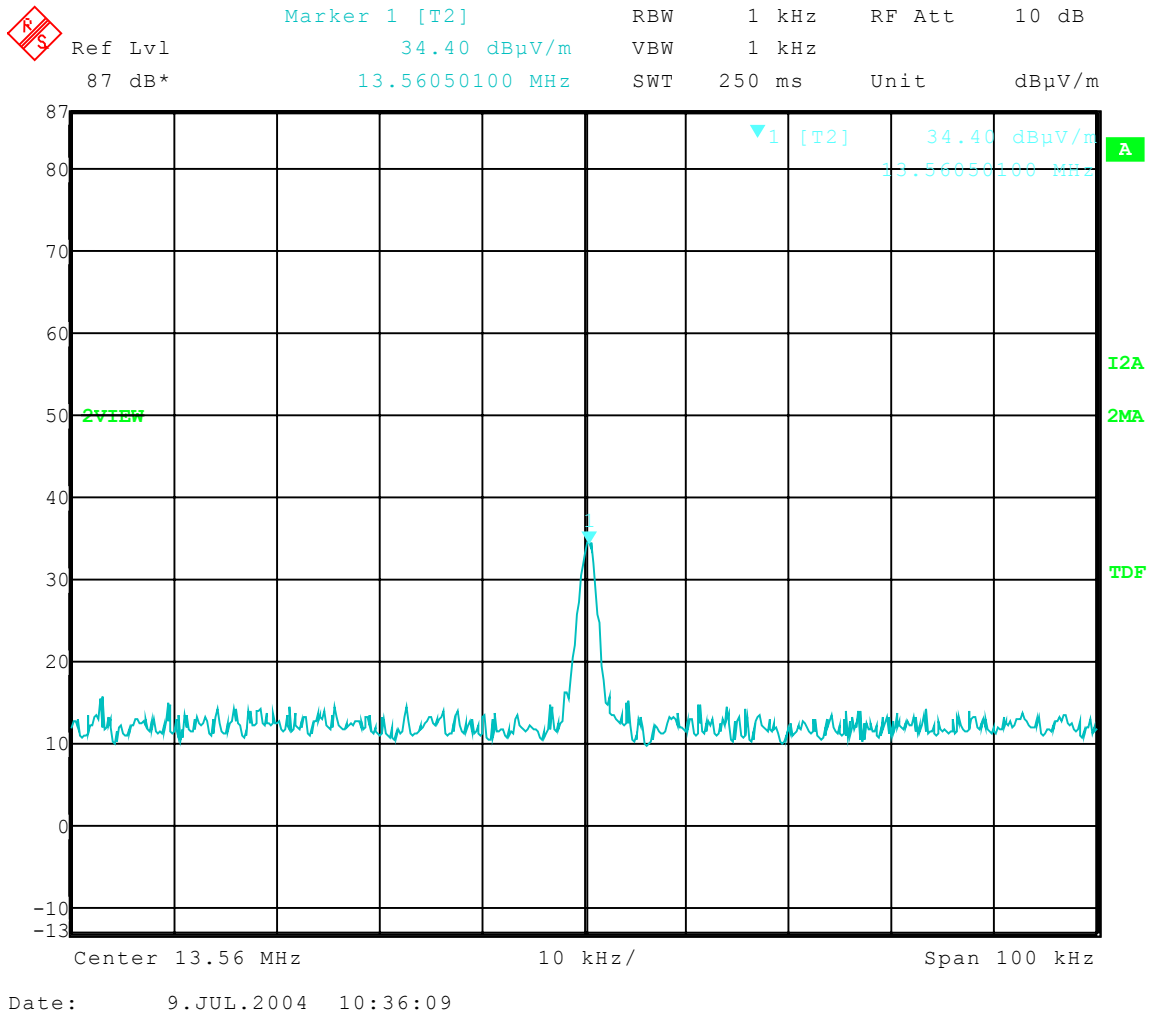
Frequency Stability – Voltage
Voltage: 120 Vac; 60 Hz
Frequency: 13.560501 MHz
Deviation: 501 Hz



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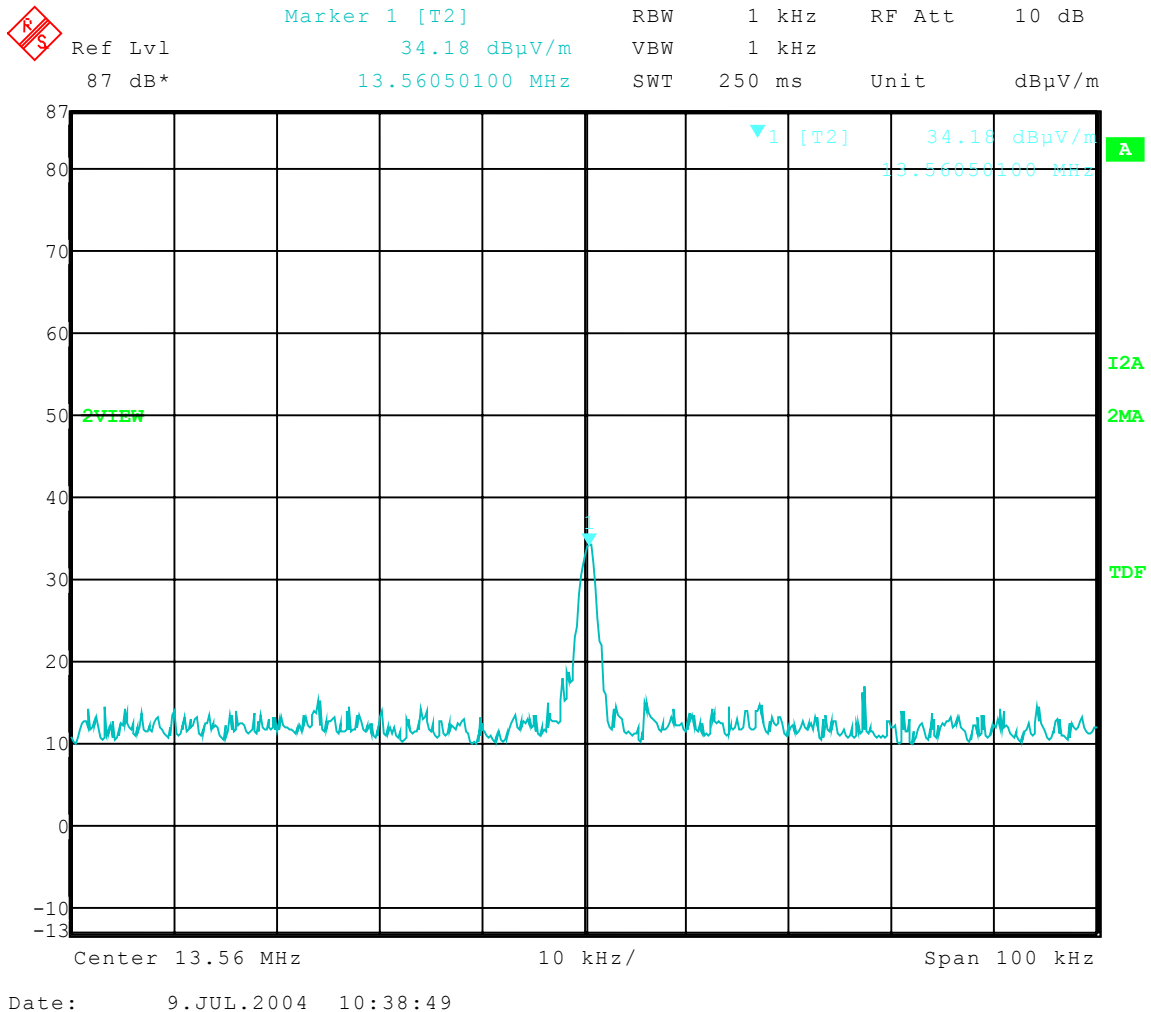
Frequency Stability – Voltage
Voltage: 108 Vac; 60 Hz
Frequency: 13.560501 MHz
Deviation: 501 Hz



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Frequency Stability – Voltage
Voltage: 132 Vac; 60 Hz
Frequency: 13.560501 MHz
Deviation: 501 Hz



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TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	11/04
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
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

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
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.