



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

FCC Rules and Regulations / Intentional Radiators

Operational in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands

Part 15, Subpart C, Section 15.247

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

Formal Name: Zebra RFID Multiprotocol Encoder ZM4e
Kind of Equipment: Multiprotocol RFID Encoder
Test Configuration: Limited Modular Approval - Tested with 110XiIII, 170XiIII, Z4M, and 110PAX4 printers (Tested at 120 vac, 60 Hz)
Model Number(s): ZM4e
Model(s) Tested: ZM4e
Serial Number(s): 05234E000143
Date of Tests: June 14, 15, 16, & 17, 2005
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.



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

SIGNATURE PAGE

Report By:

Arnom C. Rowe
Test Engineer
EMC-001375-NE

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

Company Official:

Zebra Technologies Corporation



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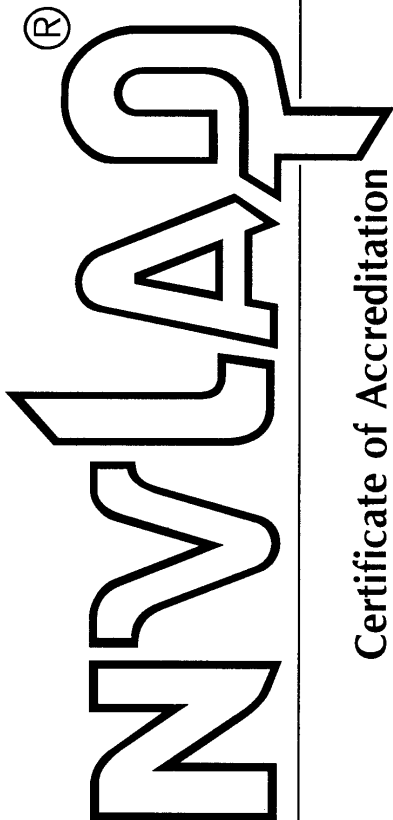
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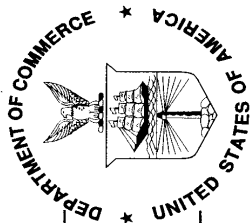
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United States Department of Commerce
National Institute of Standards and Technology



ISO/IEC 17025:1999
ISO 9002:1994

Certificate of Accreditation



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

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

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

September 30, 2005

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

NVLAP-01C (06-01)



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1250 Peterson Drive
Wheeling, IL 60090-6454
Mr. Brian J. Mattson
Phone: 847-537-6400 Fax: 847-537-6488
E-Mail: bmattson@dlsemc.com
URL: <http://www.dlsemc.com>

NVLAP Code Designation / Description

Emissions Test Methods:

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

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<i>NVLAP Code</i>	<i>Designation / Description</i>
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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 CISPR 11 (2002), and CNS 13803 (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 CISPR 13 (2003), 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 Similiar Electrical Apparatus - Part 1: Emissions
12/CIS14a	EN 55014-1 (1993), 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 15 (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) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)

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<i>NVLAP Code</i>	<i>Designation / Description</i>
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	IEC 61000-3-3(1995); EN 61000-3-3(1995); 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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<i>NVLAP Code</i>	<i>Designation / Description</i>
12/FCC15e	ANSI C63.4 (2001) with FCC Method 47 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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<i>NVLAP Code</i>	<i>Designation / Description</i>
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, Ed. 2.1 (2001), A1, A2; EN 61000-4-2: Electrostatic Discharge Immunity Test
12/I02	IEC 61000-4-3, Ed. 2.0 (2002-03); EN 61000-4-3 (2002): Radiated Radio-Frequency Electromagnetic Field Immunity Test
12/I03	IEC 61000-4-4(1995), A1(2000), A2(2001); EN 61000-4-4: Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test
12/I04	IEC 61000-4-5, Ed. 1.1 (2001-04); EN 61000-4-5: Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test

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NVLAP LAB CODE 100276-0

D.L.S. ELECTRONIC SYSTEMS, INC.

NVLAP Code Designation / Description

- | | |
|------------|--|
| 12/I05 | IEC 61000-4-6, Ed. 2.0 (2003-05); EN 61000-4-6: Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields |
| 12/I06 | IEC 61000-4-8, Ed. 1.1 (2001); EN 61000-4-8: Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test |
| 12/I07 | IEC 61000-4-11, Ed. 1.1 (2001-03); EN 61000-4-11: 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 |

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<i>NVLAP Code</i>	<i>Designation / Description</i>
12/RSS125	RSS-125 (March 25, 2000): Land Mobile and Fixed Radio Transmitters and Receivers, 1.705 to 50.0 MHz, Primarily Amplitude Modulated
12/RSS131	RSS-131, Issue 2 (July 2003): Zone Enhancers for the Land Mobile Service
12/RSS132	RSS-132, Issue 1 (August 2002): 800 MHz Cellular Telephones Employing New Technologies
12/RSS133	RSS-133, Issue 2, Rev. 1 (November 6, 1999): 2GHz Personal Communications Services
12/RSS134	RSS-134, Issue 1, Rev. 1 (March 25, 2000): 900 MHz Narrowband Personal Communication Service
12/RSS135	RSS-135, Issue 1 (October 26, 1996): Digital Scanner Receivers
12/RSS136	RSS-136, Issue 5 (October 2002): Land and Mobile Station Radiotelephone Transmitters and Receivers Operating in the 26.960 - 27.410 MHz General Radio Service Band
12/RSS137	RSS-137, Issue 1, Rev. 1 (September 25, 1999): Location and Monitoring Service (902 - 928 MHz)
12/RSS139	RSS-139, Issue 1 (February 5, 2000): Licensed Radiocommunications Devices in the Band 2400 - 2483.5 MHz

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<i>NVLAP Code</i>	<i>Designation / Description</i>
12/RSS141	RSS-141, Issue 1 (July 2003): Aeronautical Radiocommunication Equipment in the Frequency Band 117.975 - 137 MHz
12/RSS142	RSS-142, Issue 2 (August 2002): Narrowband Multipoint Communication Systems in the 1,427 - 1,430 MHz and 1,493.5 - 1,496.5 MHz Bands
12/RSS170	RSS-170, Issue 1, Rev. 1 (November 6, 1999): Satellite Mobile Earth Stations
12/RSS191	RSS-191, Issue 2 (August 2002): Local Multipoint Communication Systems in the 28 GHz Band; Point-to-Point and Point-to-Multipoint Broadband Communication Systems in the 24 GHz and 38 GHz Bands
12/RSS192	RSS-192, Issue 1 (November 6, 1999): Fixed Wireless Access Systems in the Band 3400 - 3700 MHz
12/RSS193	RSS-193, Issue 1 (July 2003): Multipoint and Point-to-Point Communication Systems (MCS) in the Fixed Service Operating in the 2,150 - 2,160 MHz, 2,500 - 2,596 MHz and 2,686 - 2,690 MHz Bands
12/RSS210	RSS-210, Issue 5 (November 2001): Low Power Licence-Exempt Radiocommunication Devices
12/RSS212	RSS-212, Issue 1 (February 27, 1999): Test Facilities and Test Methods for Radio Equipment

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12/RSS213	RSS-213, Issue 1 (April 24, 1999): 2 GHz Licence-Exempt Personal Communications Service Devices (PCS)
-----------	---

12/RSS215	RSS-215, Issue 1 (November 6, 1999): Analogue Scanner Receivers
-----------	---

Telecommunications Test Methods:

12/FCC2a2	TIA/EIA 603A (2001) with 47 CFR Part 2: Public Mobile Services in 47 CFR Part 22
-----------	--

12/FCC2b2	TIA/EIA 603A (2001) with 47 CFR Part 2: Private Land Mobile Radio Services in 47 CFR Part 90
-----------	--

12/FCC2d1	TIA/EIA 603A (2001) with 47 CFR Part 2: Experimental Radio, Auxiliary, Special Broadcast and Other Program Distributional Services in 47 CFR Part 74
-----------	--

12/FCC2e1	TIA/EIA 603A (2001) with 47 CFR Part 2: International Fixed Public Radiocommunication Services in 47 CFR Part 23
-----------	--

12/CIS15c	EN 55015 (2000) + A1 (2001): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
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D.L.S. ELECTRONIC SYSTEMS, INC.

NVLAP Code Designation / Description

MIL-STD-462 : Conducted Emissions:

12/A13	MIL-STD-462 Version D Method CE101
12/A14	MIL-STD-462 Version D Method CE102
12/A16	MIL-STD-461 Version E Method CE101
12/A17	MIL-STD-461 Version E Method CE102
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

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NVLAP Code Designation / Description

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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Company: Zebra Technologies Corporation
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1.0 SUMMARY OF TEST REPORT

It was found that the Zebra RFID Multiprotocol Encoder ZM4e, Model Number(s) ZM4e, "**meets**" the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.247 for operational in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz, Bands.

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

Text: 458

2.0 INTRODUCTION

On June 14, 15, 16, & 17, 2005, a series of radio frequency interference measurements was performed on Zebra RFID Multiprotocol Encoder ZM4e, Model Number(s) ZM4e, Serial Number: 05234E000143. The tests were performed according to the procedures of the FCC as stated in the "Methods of Measurement of Radio-Noise Emissions for Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" found in the American National Standards Institute, ANSI C63.4-2003. Tests were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

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 15.205, 15.209 & 15.247 for Intentional Radiators operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.



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4.0 TEST SET-UP

All emission tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the American National Standards Institute, ANSI C63.4-2003, Section 8, (Figures 11a and 11b).

All radiated emissions tests were performed with the test item placed on a 80 cm high rotating non-conductive table, located in the test room. Equipment normally operated on the floor was placed on a metal covered turntable which is flush with the surrounding conducting ground plane. The ground plane has an electrical isolation layer over its surface approximately 7 mm thick. The EUT is separated from the turntable ground plane by a non-conductive layer. The equipment under test was set up according to ANSI C63.4-2003, Sections 6 and 8.

5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the HP Spectrum Analyzer or ESI 26/40 Fixed Tuned Receiver. The data was taken using Peak, Quasi-Peak or the Average Detector Functions as required. This information was then used to determine the frequencies of maximum emissions. Above 1000 MHz, final data was taken using the Average Detector.

Below 1000 MHz, final data was taken using the HP Spectrum Analyzer and/or ESI 26/40 Fixed Tuned Receiver. These plots were made using the Peak or Quasi-Peak Detector functions, with manual measurements performed on the questionable frequencies using the Quasi-Peak or the Average Detector Function of the Analyzer or ESI 26/40 Fixed Tuned Receiver as required. Above 1000 MHz, final data was taken using the Average Detector on the Spectrum Analyzer.

The bandwidths shown below are specified by ANSI C63.4-2003, Section 4.2.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
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.



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

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6.0 AMBIENT MEASUREMENTS

For emissions measurements, broadband antennas and an EMI Test Receiver with a panoramic spectrum display are used. First the frequency range is scanned and displayed on the test receiver display. Next the scanned frequency range is divided into smaller ranges, and then it is manually tuned through to determine the emissions from the EUT. A headset or loudspeaker is connected to the test receiver's AM/FM demodulated output as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT. If there is any doubt as to the source of the emission, it is further investigated by rotating the EUT, or by disconnecting the power from the EUT.

The EUT is set up in its typical configuration and operated in its various modes. For tabletop systems, cables are manipulated within the range of likely configurations. For floor-standing equipment, the cables are located in the same manner as the user would install them and no further manipulation is made. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation, the frequency spectrum is monitored. Variations in antenna height, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) are explored to produce the emissions that have the highest amplitude relative to the limit. These methods are performed to the specifications in MP-5 or ANSI C63.4-2003, as appropriate.



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

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

7.1 Description:

Zebra ZM4e is a RFID multiprotocol encoder used for encoding RFID tags. The encoder is installed in the following Zebra tabletop printers:
110XiIII, 170XiIII, Z4M, and 110PAX4

7.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 4.63in x Width: 3.00in x Height: 1.1in

7.3 LINE FILTER USED:

DC powered device.

7.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

50KHz, 100KHz

Clock Frequencies:

20.000 MHz

7.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

- | | |
|--|----------------------|
| 1. Reader RFID UHF MP 1W | PN: 27085 Rev B |
| 2. PCB Adapter 1W MP RFID Reader | PN: 21160-100 Rev 0B |
| 3. Assy PCB Antenna UHF Type 1 Z4M | PN: 21052 r0101 |
| 4. Assy RFID UHF antenna 110PAX4 | PN: 58989 r0101 |
| 5. Assy PCB UHF antenna Array 170XiIII | PN: 27050 r0101 |
| 6. Assy PCB UHF antenna Array 110XiIII | PN: 27060 r0101 |



Company: Zebra Technologies Corporation
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8.0 ADDITIONAL DESCRIPTION OF TEST SAMPLE:
(See also Paragraph 7.0)

1: There were no additional descriptions noted at the time of test.

NOTE:

Software change to stop Local Oscillator in Stand-by Mode.

I certify that the above, as described in paragraph 7.0, describes the equipment tested and will be manufactured as stated.

By: _____
Signature Title

For: _____
Company Date



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

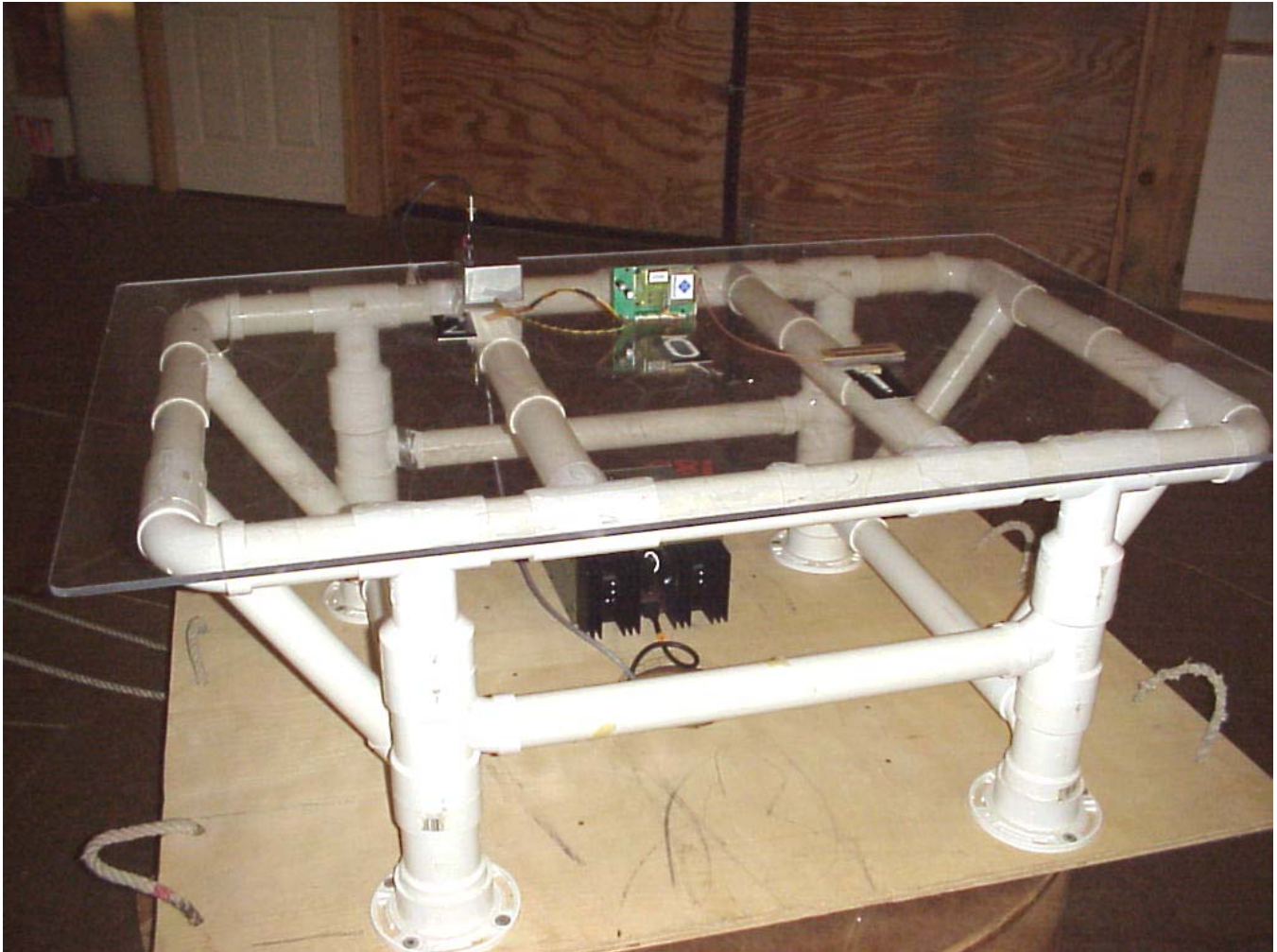
1250 Peterson Dr., Wheeling, IL 60090

9.0 PHOTO INFORMATION AND TEST SET-UP

- Item 0 Zebra RFID Multiprotocol Encoder ZM4e
Model Number: ZM4e Serial Number: 05234E000143
- Item 1 Antenna (EUT)
- Item 2 Interface Box (not part of EUT)
- Item 3 Topword Elec. Instruments Linear Power Supply
SN: 965190
- Item 4 Shielded RS-232 Null Modem COMM Cable with Metal Shells. 50'
- Item 5 BNC Coax Cable (for power)

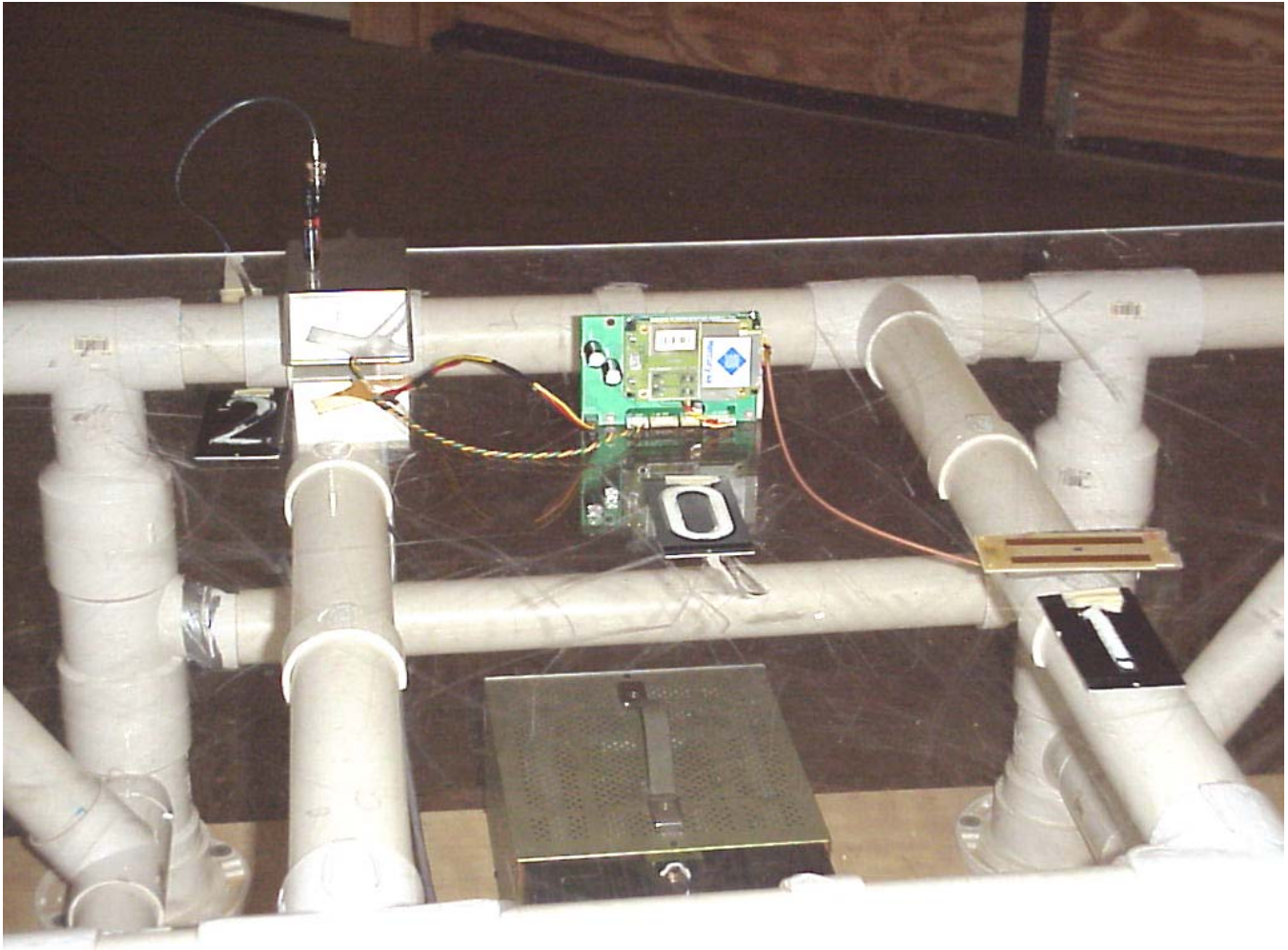
1250 Peterson Dr., Wheeling, IL 60090

10.0 RADIATED PHOTOS TAKEN DURING TESTING



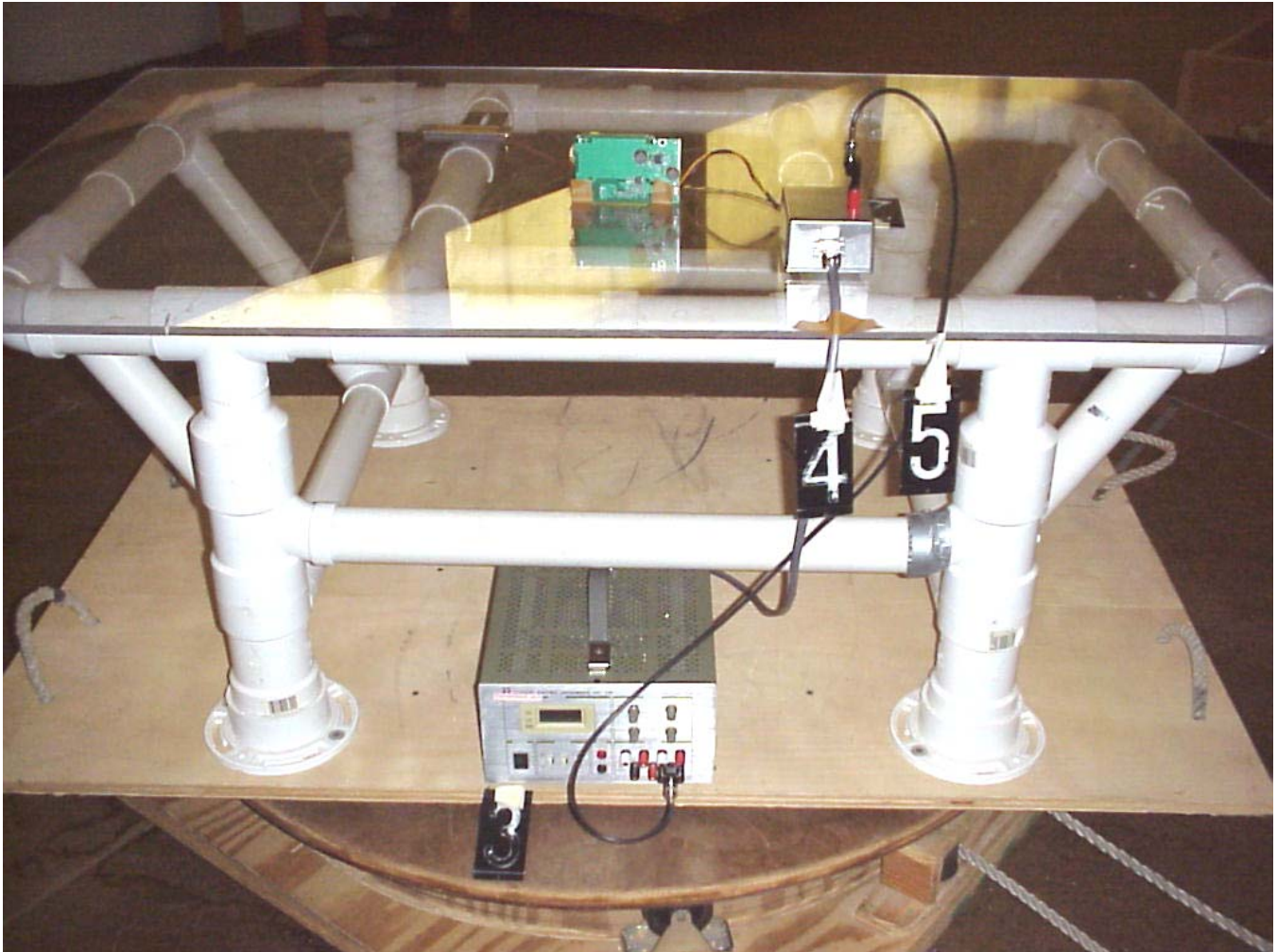
1250 Peterson Dr., Wheeling, IL 60090

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



1250 Peterson Dr., Wheeling, IL 60090

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

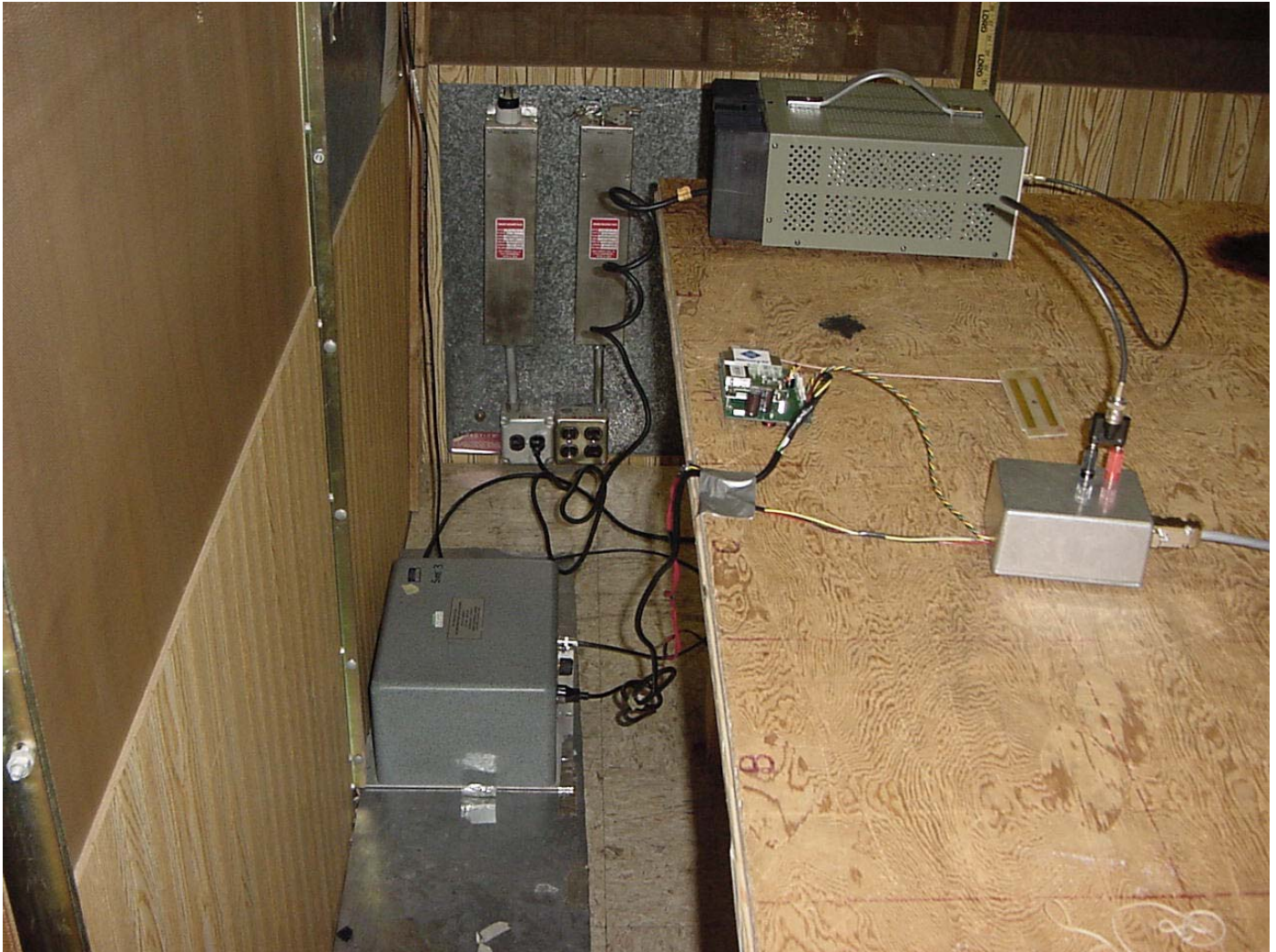




Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

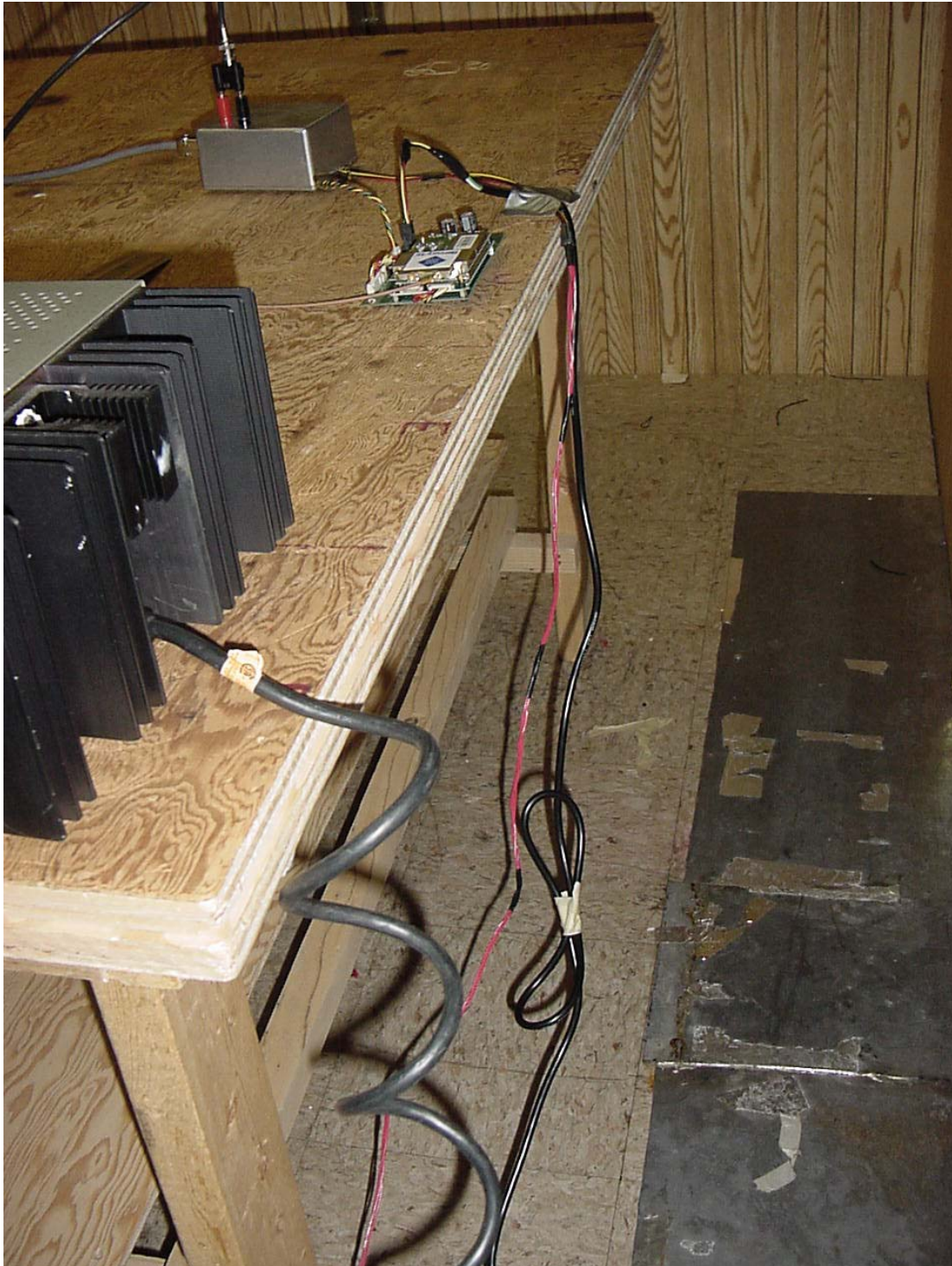
1250 Peterson Dr., Wheeling, IL 60090

10.0 CONDUCTED PHOTOS TAKEN DURING TESTING



1250 Peterson Dr., Wheeling, IL 60090

10.0 CONDUCTED PHOTOS TAKEN DURING TESTING: (CON'T)





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

11.0 RESULTS OF TESTS

The radio interference emission charts results can be seen on the pages at the end of this report. Data sheets indicating the test measurements taken during testing can also be found at the end of this report. Points on the emission charts shown with a yellow mark are background frequencies that were verified during testing.

12.0 CONCLUSION

It was found that the Zebra RFID Multiprotocol Encoder ZM4e, Model Number(s) ZM4e "**meets**" the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 15, Subpart C, Section 15.247 for operational in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz, Bands.



Company: Zebra Technologies Corporation
 Model Tested: ZM4e
 Report Number: 11475

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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	11/05
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	12/05
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	12/05
Antenna	EMCO	3104C	00054891	20 MHz – 200 MHz	2/06
Antenna	Electrometrics	LPA-25	1114	200 MHz – 1 GHz	3/06
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	3/06
Antenna	Electrometrics	3146	1205	200 MHz – 1 GHz	3/06
Antenna	EMCO	3104C	97014785	20 MHz – 200 MHz	2/06
Antenna	EMCO	3146	97024895	200 MHz – 1 GHz	3/06
Antenna	EMCO	3115	2479	1 GHz – 18 GHz	8/05
Antenna	EMCO	3115	99035731	1 GHz – 18 GHz	4/06
Antenna	Rohde & Schwarz	HUF-Z1	829381001	20 MHz – 1 GHz	2/06
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.



Company: Zebra Technologies Corporation
Model Tested: ZM4e
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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	12/05
LISN	Solar	9252-50-R-24-BNC	971612	10 MHz – 30 MHz	10/05
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.



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

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APPENDIX A

TEST PROCEDURE

Part 15, Subpart C, Section 15.247 (a-h)

**OPERATION WITHIN THE BAND 902-928 MHz, 2400-2483.5 MHz
AND 5725-5857 MHz**



Company: Zebra Technologies Corporation
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APPENDIX A

1.0 CONDUCTED EMISSION MEASUREMENTS

If applicable, the conducted emissions were measured over the frequency range from 150 kHz to 30 MHz in accordance with the power line measurements as specified in the American National Standards Institute, ANSI C63.4-2003, Section 12. Since the device is operated from the public utility lines, the 115 Vac 60 Hz power leads, high and low sides, were to be measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. All signals were then recorded. The allowed levels for Intentional Radiators cannot exceed 250 uV (47.96 dBuV) at any frequency between 150 kHz and 30 MHz, as stated in Section 15.207a.

All conducted emissions measurements were made at a test room temperature of **72°F** at **53%** relative humidity.



Company: Zebra Technologies Corporation
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APPENDIX A

DATA AND GRAPH(S) TAKEN DURING TESTING

PART 15.207

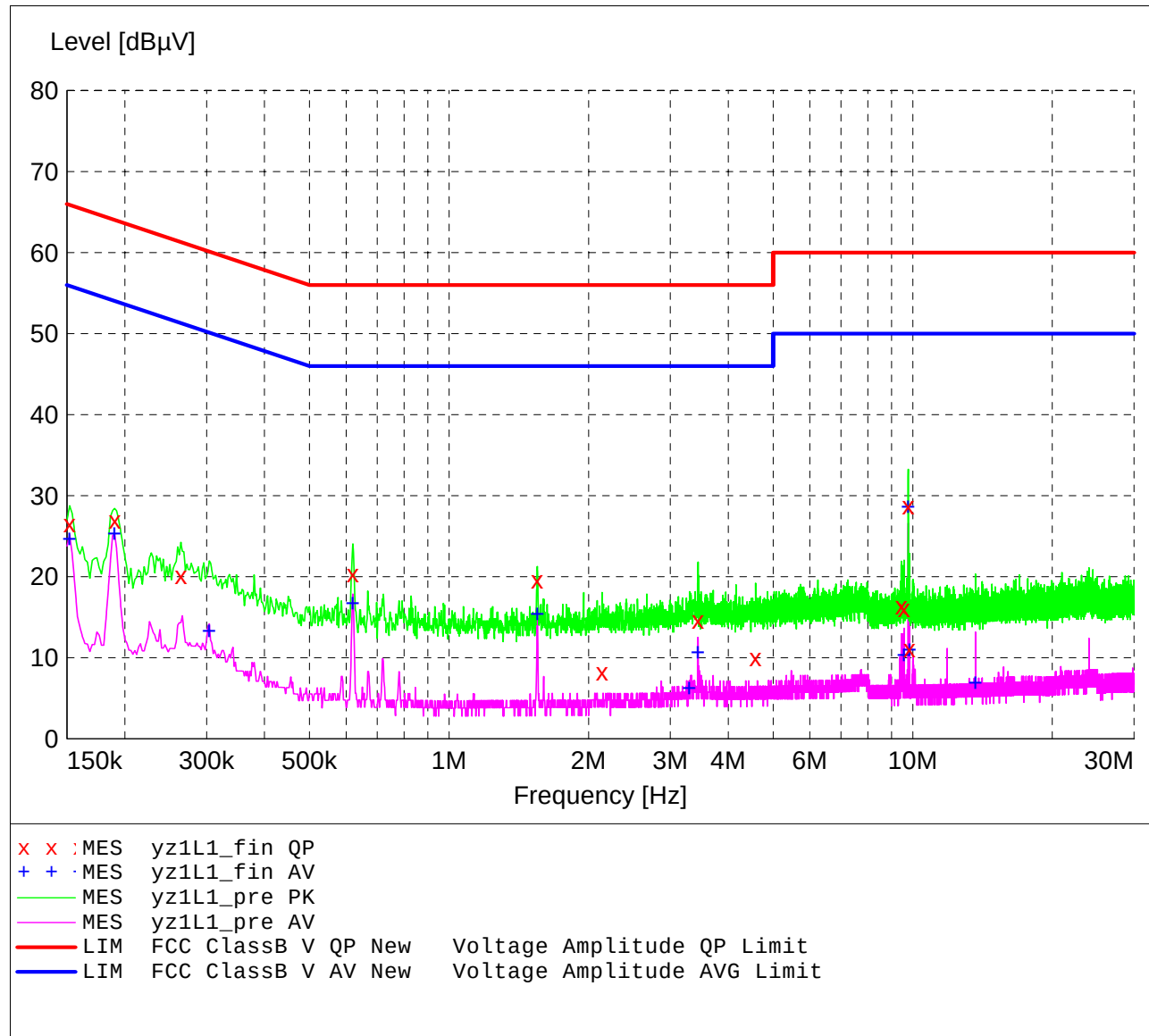
FCC Part 15 Class B

Voltage Mains Test

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F, 53% R.H.
Test Site: DLS O.F. Site 1(Screenroom)
Operator: Craig Brandt
Test Specification: 120 VAC; 60 Hz
Comment: Line 1; Max output power
Date: 06-14-2005

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	2.0 kHz	MaxPeak	10.0 ms	9 kHz	LISN DLS#126
			Average			



MEASUREMENT RESULT: "yz1L1_fin QP"

6/14/2005 8:26AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.152000	26.60	11.5	66	39.2	---	---
0.190000	27.00	11.0	64	37.1	---	---
0.264000	20.20	10.6	61	41.1	---	---
0.620000	20.40	10.4	56	35.6	---	---
1.550000	19.60	10.3	56	36.4	---	---
2.138000	8.30	10.4	56	47.7	---	---
3.444000	14.70	10.5	56	41.3	---	---
4.584000	10.00	10.5	56	46.0	---	---
9.454000	16.40	10.6	60	43.6	---	---
9.580000	16.10	10.6	60	43.9	---	---
9.776000	28.80	10.6	60	31.2	---	---
9.840000	11.10	10.6	60	48.9	---	---

MEASUREMENT RESULT: "yz1L1_fin AV"

6/14/2005 8:26AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.152000	24.70	11.5	56	31.1	---	---
0.190000	25.30	11.0	54	28.7	---	---
0.304000	13.30	10.5	50	36.9	---	---
0.620000	16.70	10.4	46	29.3	---	---
1.550000	15.40	10.3	46	30.6	---	---
3.296000	6.30	10.5	46	39.7	---	---
3.442000	10.70	10.5	46	35.3	---	---
9.580000	10.40	10.6	50	39.6	---	---
9.776000	28.70	10.6	50	21.3	---	---
9.840000	11.00	10.6	50	39.0	---	---
13.656000	6.90	10.8	50	43.1	---	---

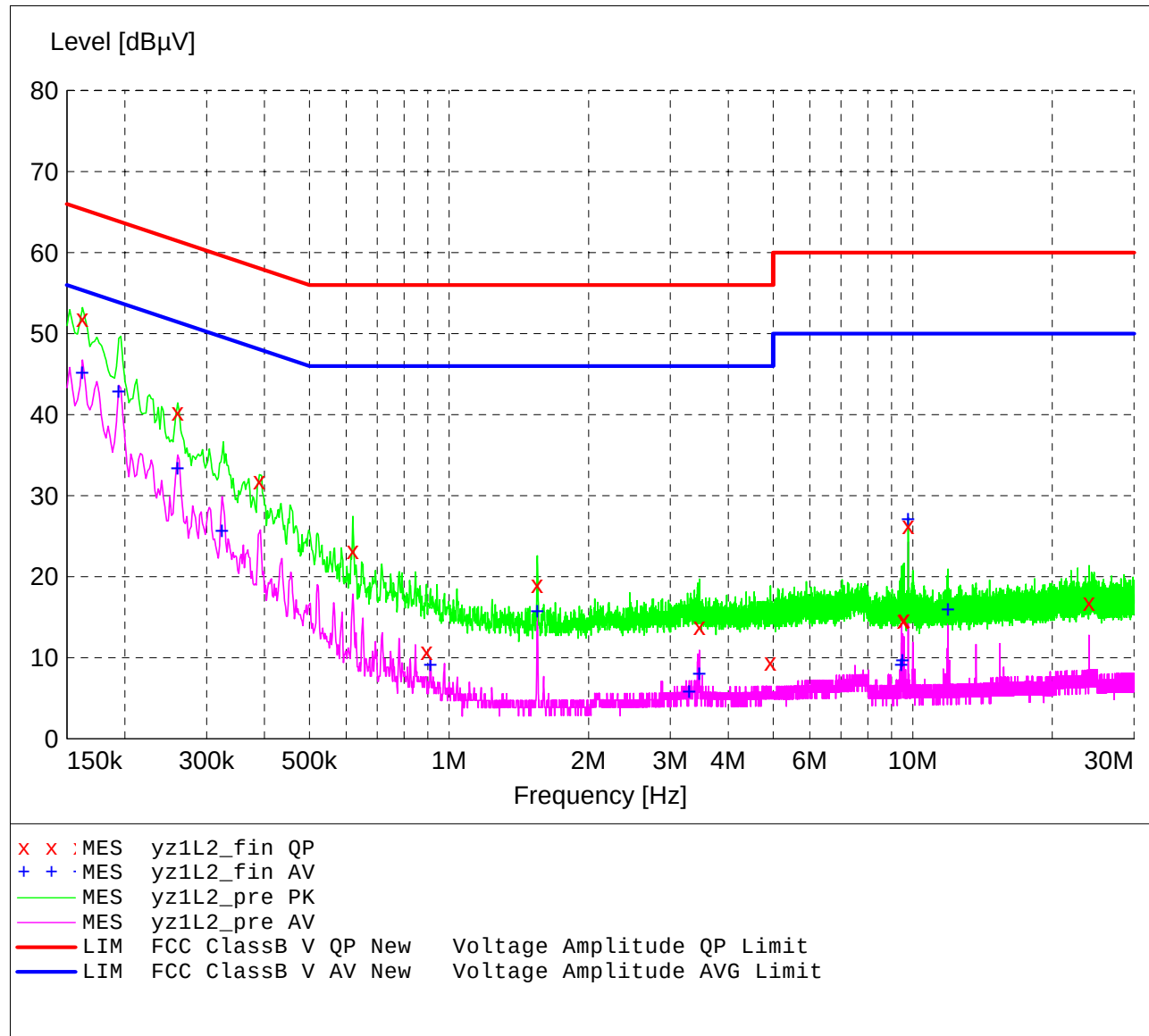
FCC Part 15 Class B

Voltage Mains Test

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F, 53% R.H.
Test Site: DLS O.F. Site 1(Screenroom)
Operator: Craig Brandt
Test Specification: 120 VAC; 60 Hz
Comment: Line 2 max output power
Date: 06-14-2005

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	2.0 kHz	MaxPeak	10.0 ms	9 kHz	LISN DLS#126
			Average			



MEASUREMENT RESULT: "yz1L2_fin QP"

6/14/2005 8:34AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.162000	51.90	11.3	65	13.4	---	---
0.260000	40.30	10.7	61	21.1	---	---
0.390000	31.90	10.4	58	26.2	---	---
0.620000	23.30	10.4	56	32.7	---	---
0.894000	10.80	10.3	56	45.2	---	---
1.550000	19.10	10.3	56	36.9	---	---
3.466000	13.90	10.5	56	42.1	---	---
4.934000	9.50	10.5	56	46.5	---	---
9.532000	14.60	10.6	60	45.4	---	---
9.580000	14.80	10.6	60	45.2	---	---
9.778000	26.30	10.6	60	33.7	---	---
24.002000	16.90	11.1	60	43.1	---	---

MEASUREMENT RESULT: "yz1L2_fin AV"

6/14/2005 8:34AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.162000	45.20	11.3	55	10.1	---	---
0.194000	42.90	11.0	54	10.9	---	---
0.260000	33.40	10.7	51	18.0	---	---
0.324000	25.70	10.4	50	23.9	---	---
0.912000	9.20	10.3	46	36.8	---	---
1.550000	15.70	10.3	46	30.3	---	---
3.298000	5.90	10.5	46	40.1	---	---
3.466000	8.00	10.5	46	38.0	---	---
9.452000	9.20	10.6	50	40.8	---	---
9.518000	9.70	10.6	50	40.3	---	---
9.776000	27.10	10.6	50	22.9	---	---
11.910000	16.00	10.7	50	34.0	---	---



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

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APPENDIX A

2.0 SPURIOUS EMISSIONS AT ANTENNA TERMINALS – PART 15.247(c)

Spurious conducted emissions were measured at the antenna terminals. Plots were made showing the amplitude of each harmonic emission with the equipment operated. As shown by the radiated charts there was no reason to believe that there were any spurious emissions other than the harmonics that were than individually investigated when doing the conducted test at the antenna terminals. Measurements were made up to the 10th harmonic of the fundamental.

The allowed emissions for transmitters operating in the 902 MHz to 928 MHz bands for Zebra RFID Multiprotocol Encoder ZM4e equipment are found under Part 15, Section 15.247(c). This paragraph states that in any 100 kHz bandwidth outside the frequency band which the spread spectrum intentional radiator is operating, the radio frequency power produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

NOTE: See the following pages for the data ad graphs of the actual measurements made:



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Model Tested: ZM4e
Report Number: 11475

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APPENDIX A

CONDUCTED EMISSION DATA AND GRAPH(S) TAKEN FOR SPURIOUS EMISSION MEASUREMENTS MADE AT THE ANTENNA TERMINALS

PART 15.247(c)



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

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APPENDIX A

RF CONDUCTED 20 dBm

CONDUCTED SPURIOUS



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

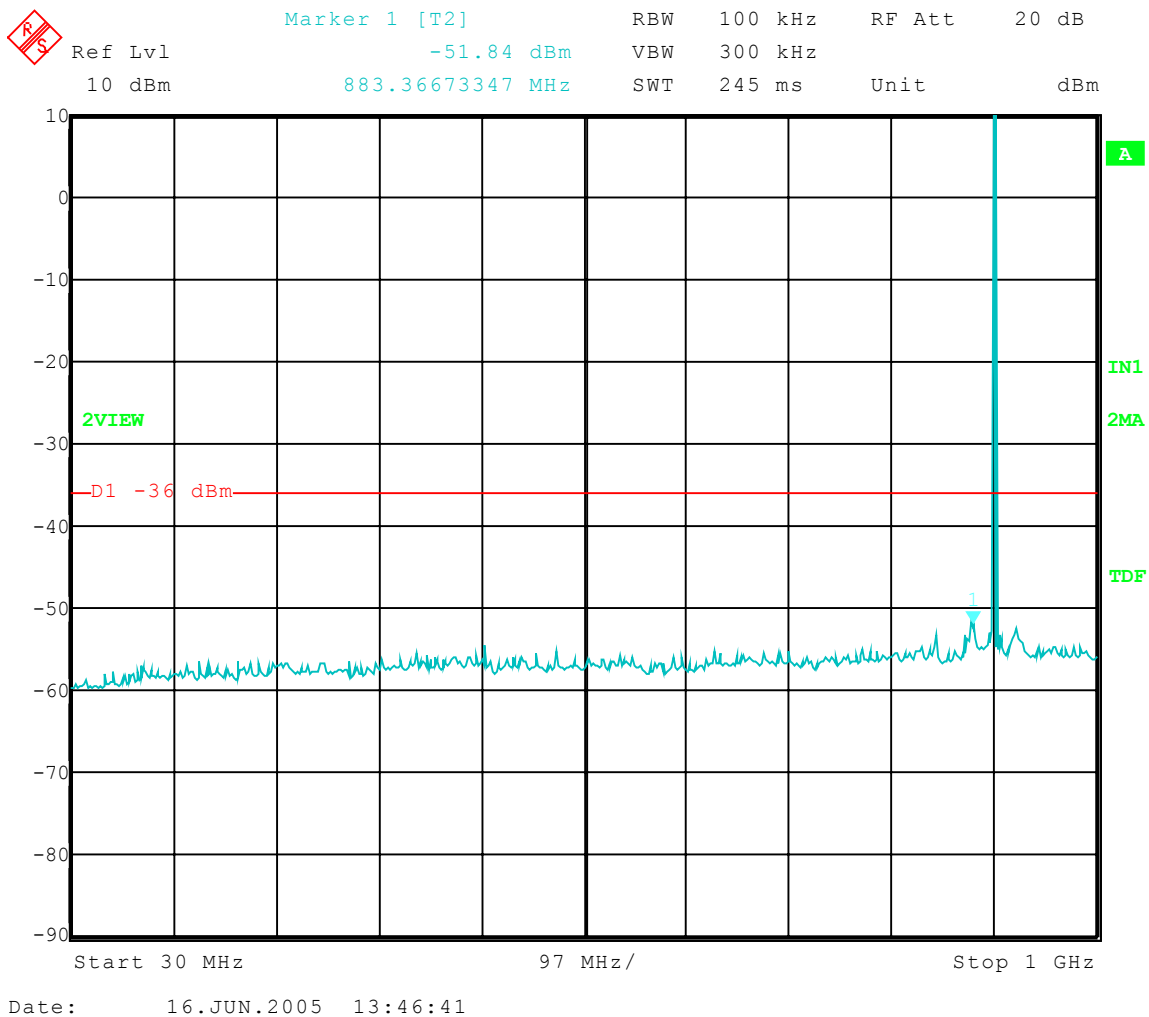
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Low Channel** Transmit = 902.967 MHz
Frequency Range: 30 to 1000 MHz
Limit = -0.1 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

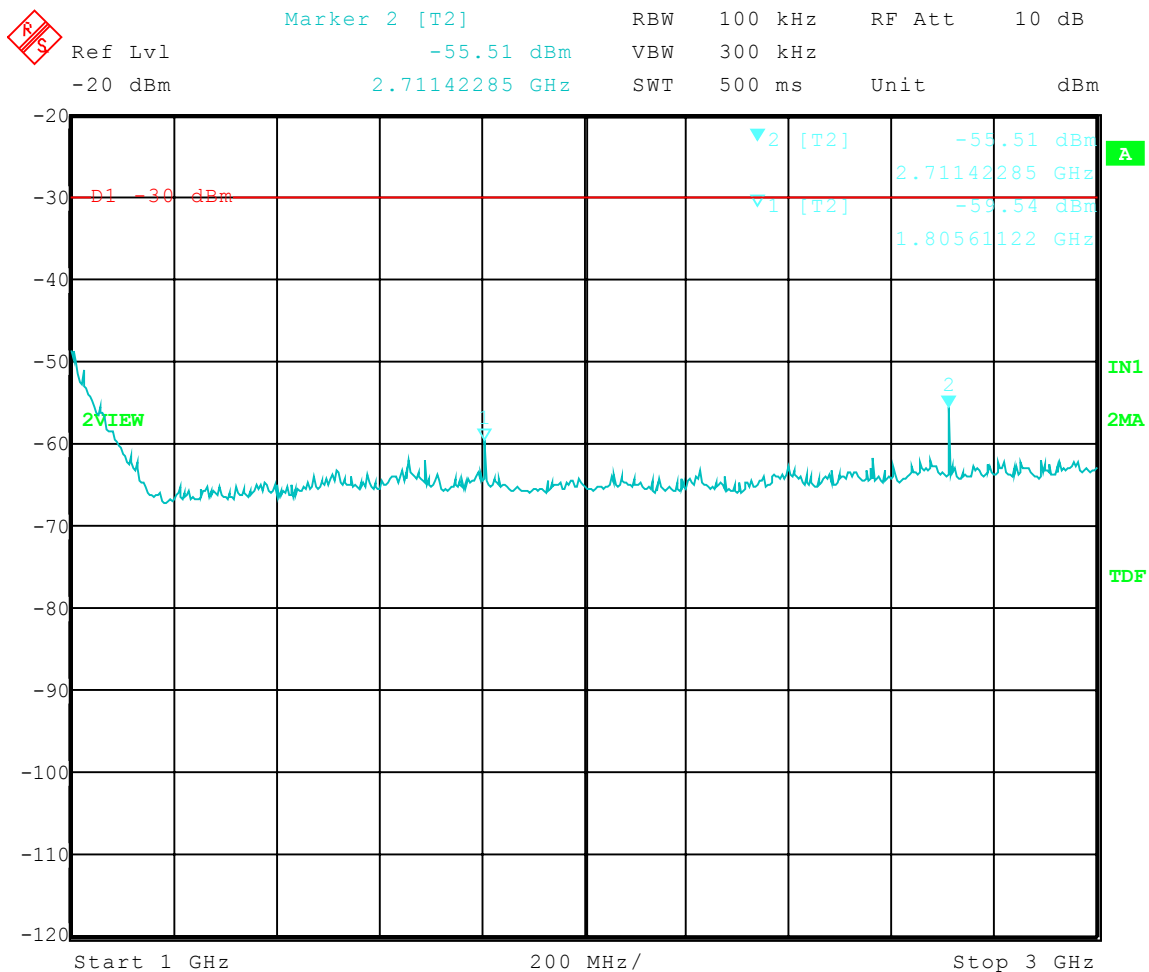
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Low Channel** Transmit = 902.967 MHz
Frequency Range: 1 to 3 GHz
Limit = -0.10 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 16.JUN.2005 14:51:33



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

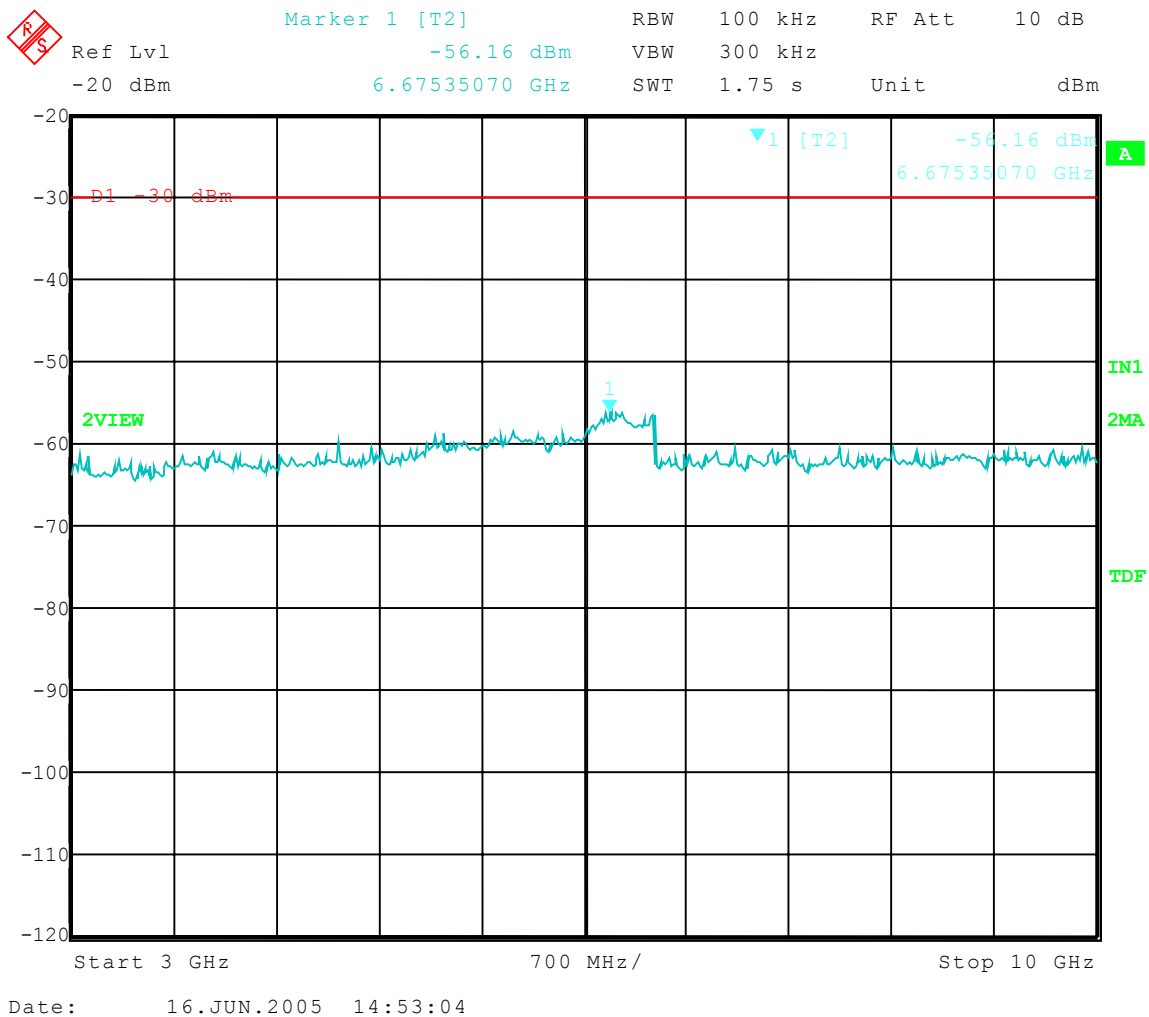
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Low Channel** Transmit = 902.967 MHz
Frequency Range: 3 to 10 GHz
Limit = -0.10 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

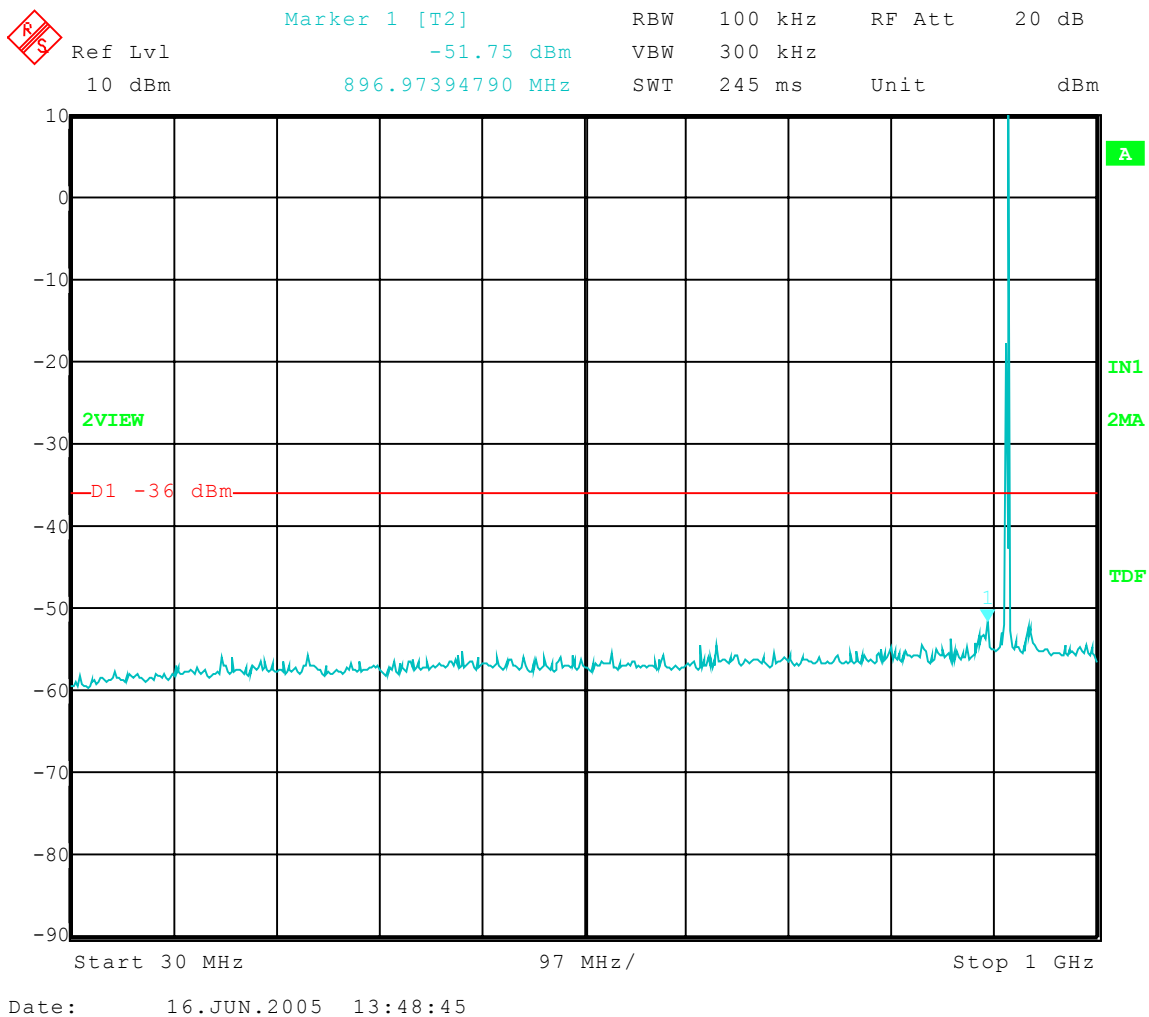
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Middle Channel** Transmit = 915.101 MHz
Frequency Range: 30 to 1000 MHz
Limit = -0.22 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

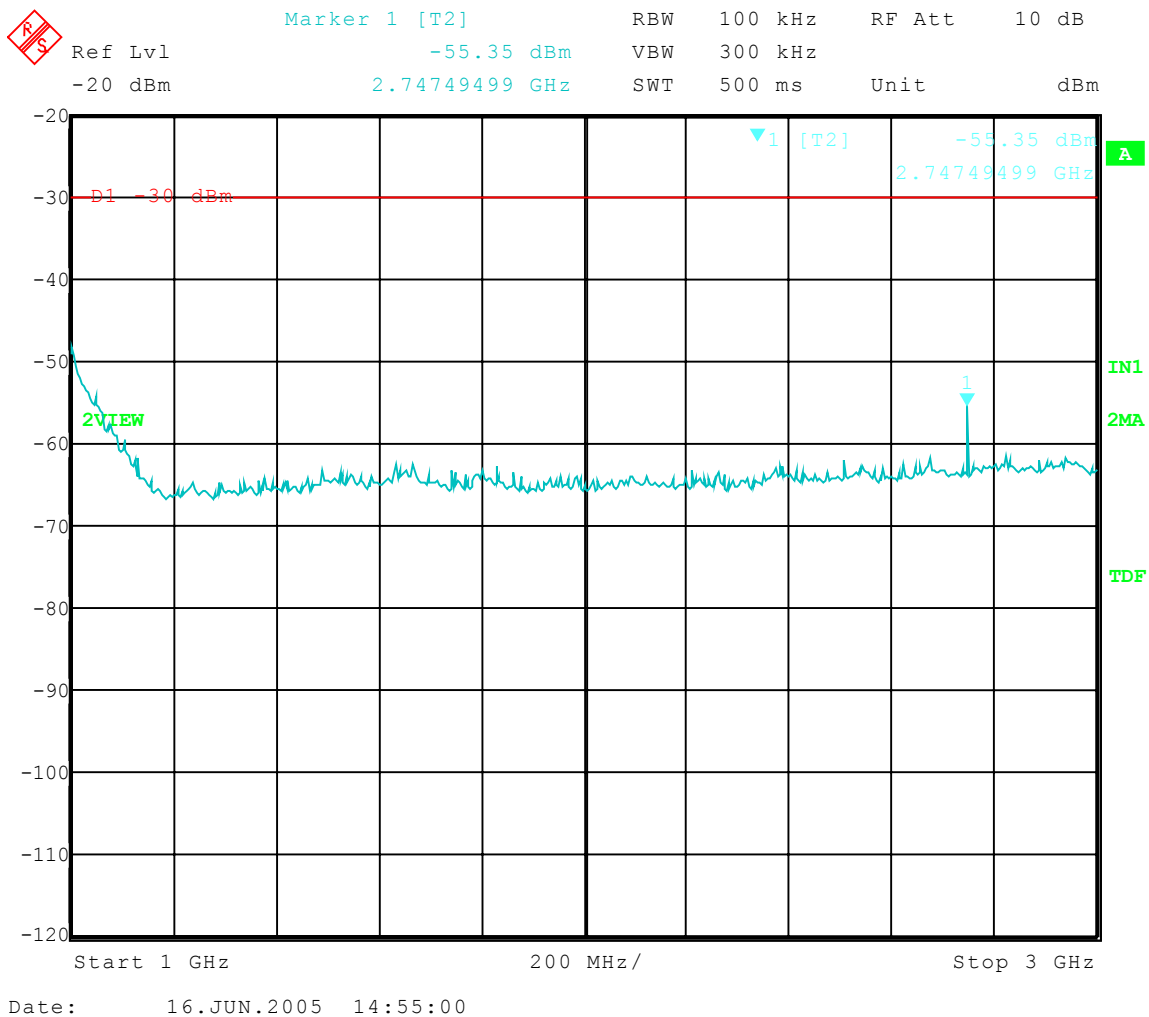
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Middle Channel** Transmit = 915.101 MHz
Frequency Range: 1 to 3 GHz
Limit = -0.22 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

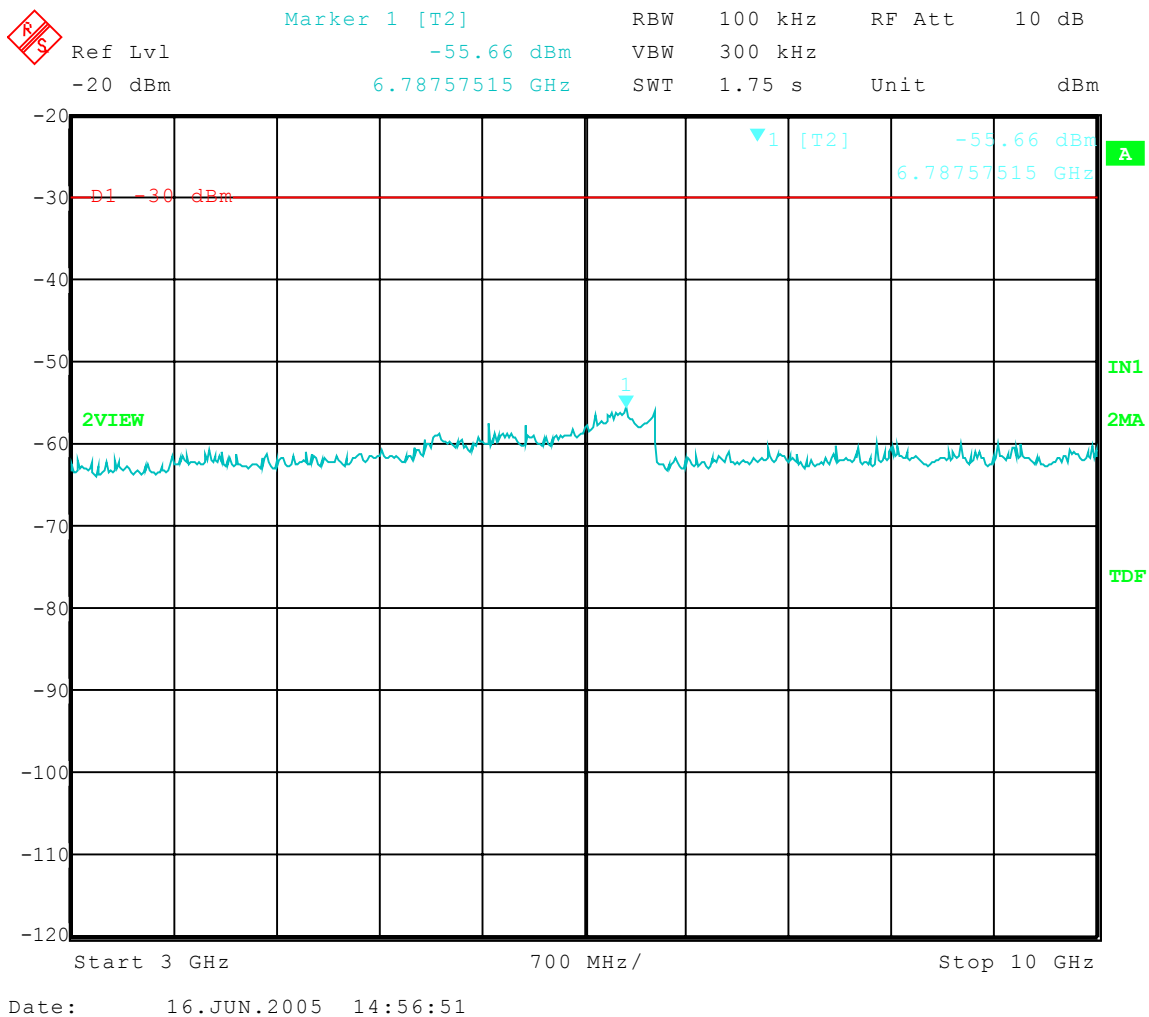
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Middle Channel** Transmit = 915.101 MHz
Frequency Range: 3 to 10 GHz
Limit = -0.22 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

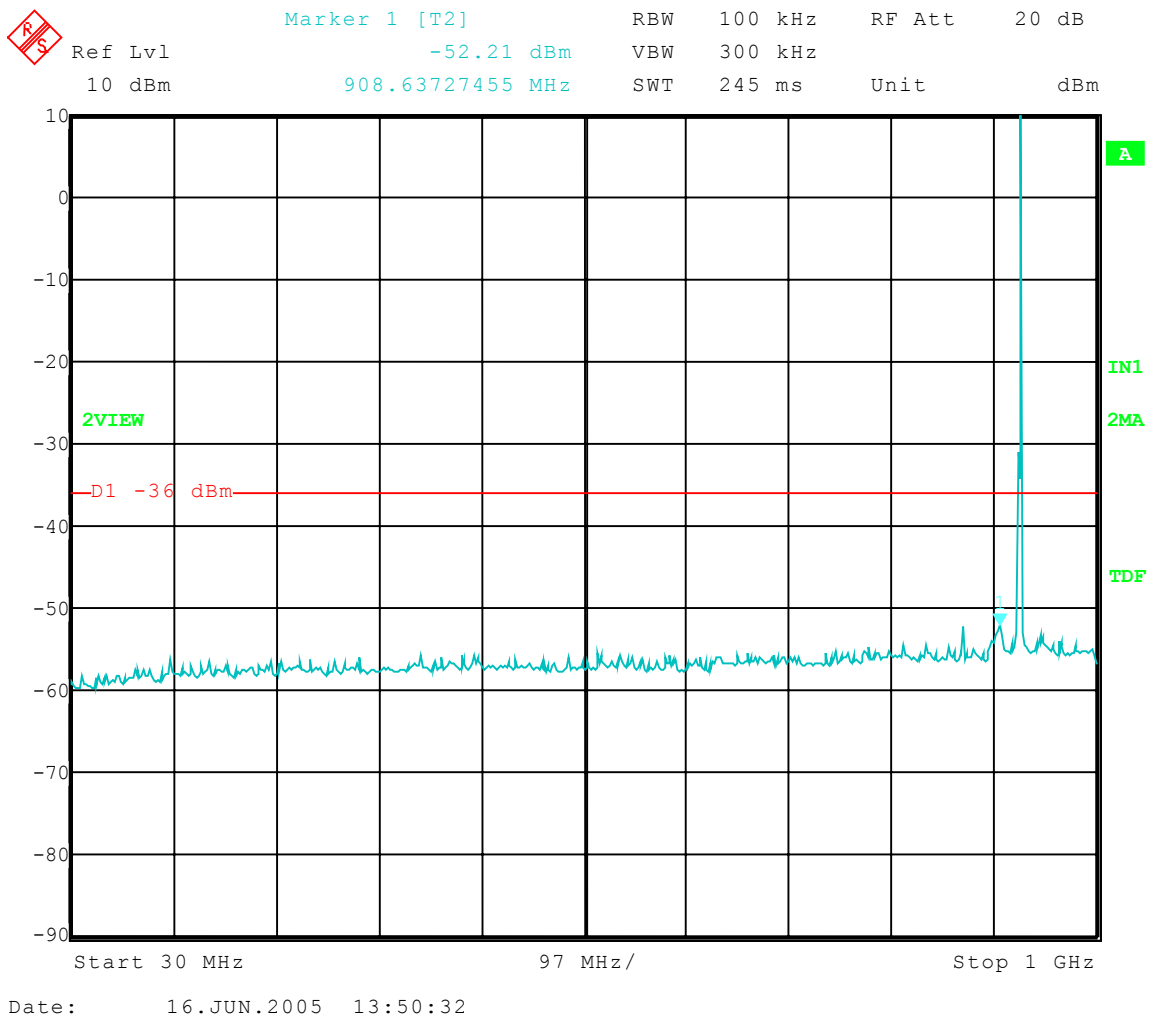
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **High Channel** Transmit = 927.233 MHz
Frequency Range: 30 to 1000 MHz
Limit = -0.30 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

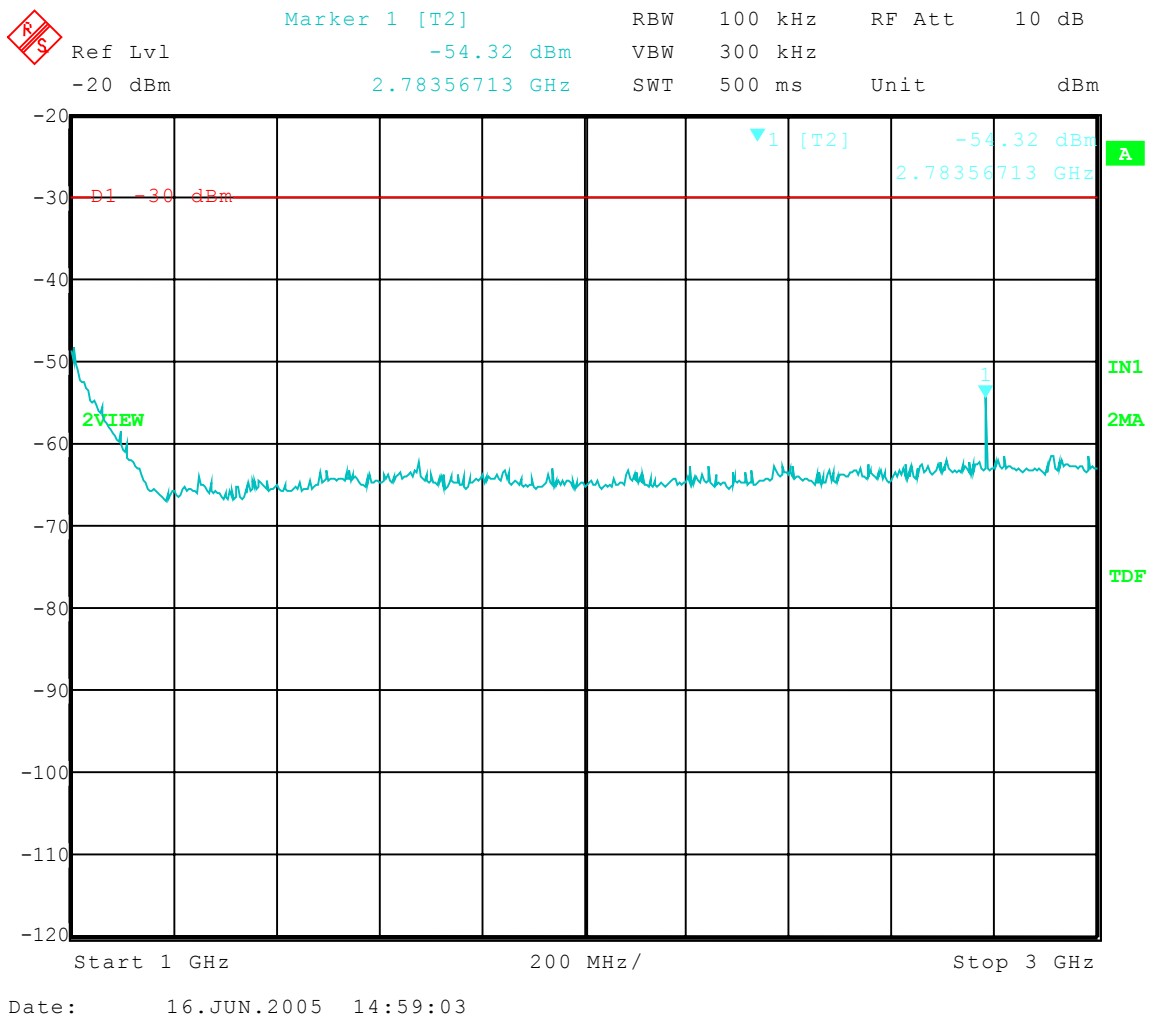
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **High Channel** Transmit = 927.233 MHz
Frequency Range: 1 to 3 GHz
Limit = -0.30 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

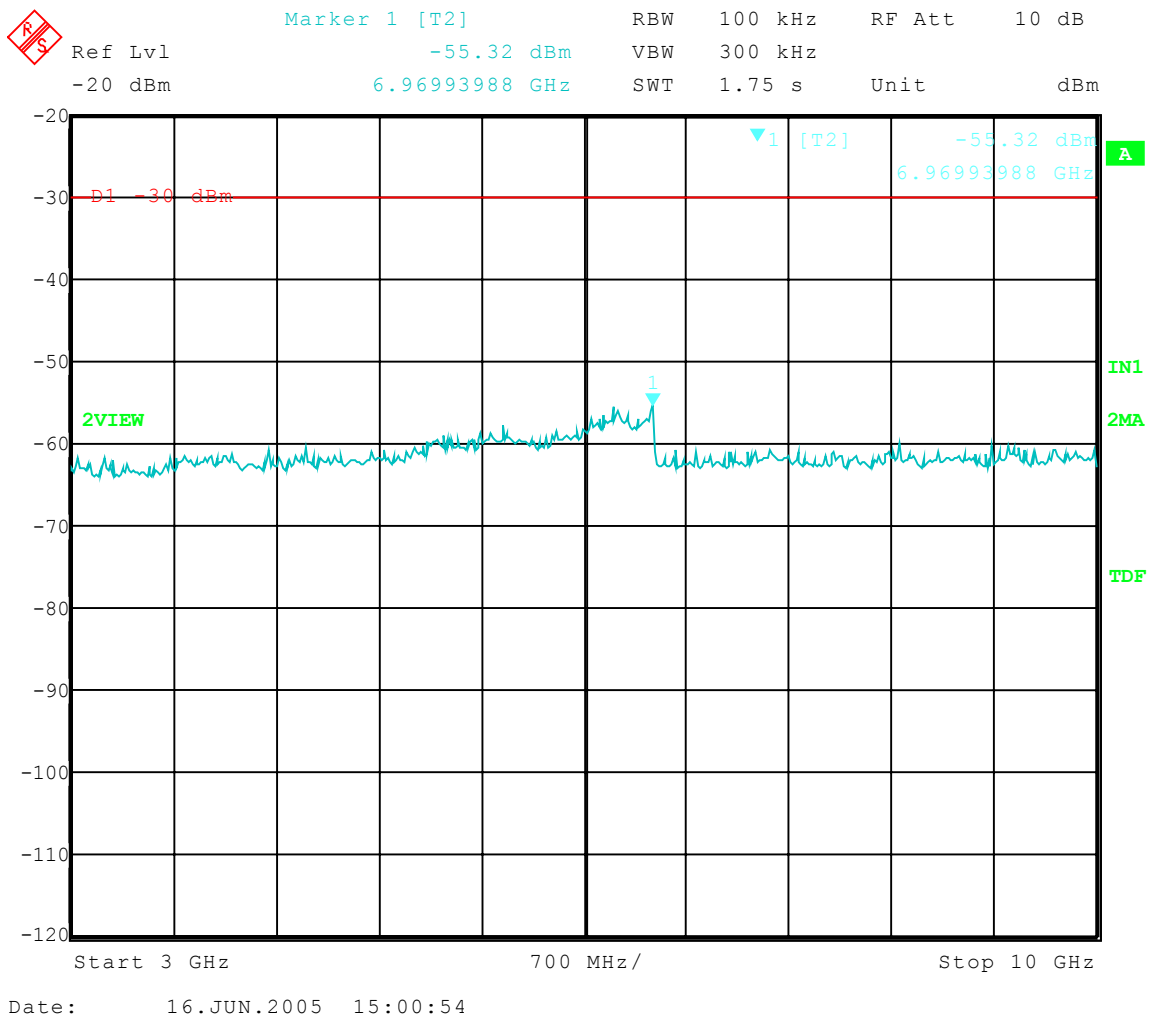
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **High Channel** Transmit = 927.233 MHz
Frequency Range: 3 to 10 GHz
Limit = -0.30 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

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APPENDIX A

RF Conducted 20 dBm

CONDUCTED SPURIOUS

FREQUENCY HOPPING ON



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

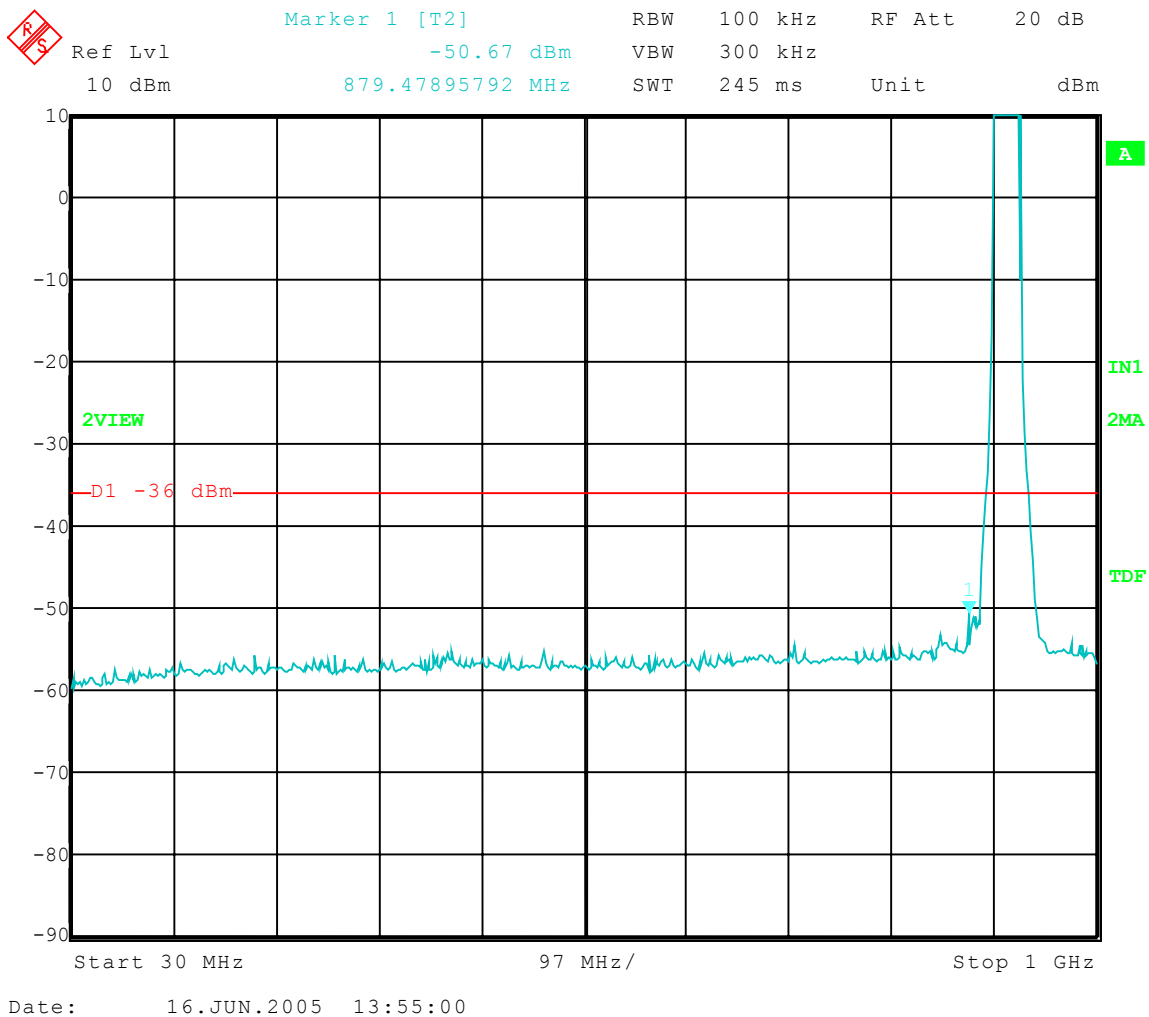
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC C1
Frequency Range: 30 to 1000 MHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

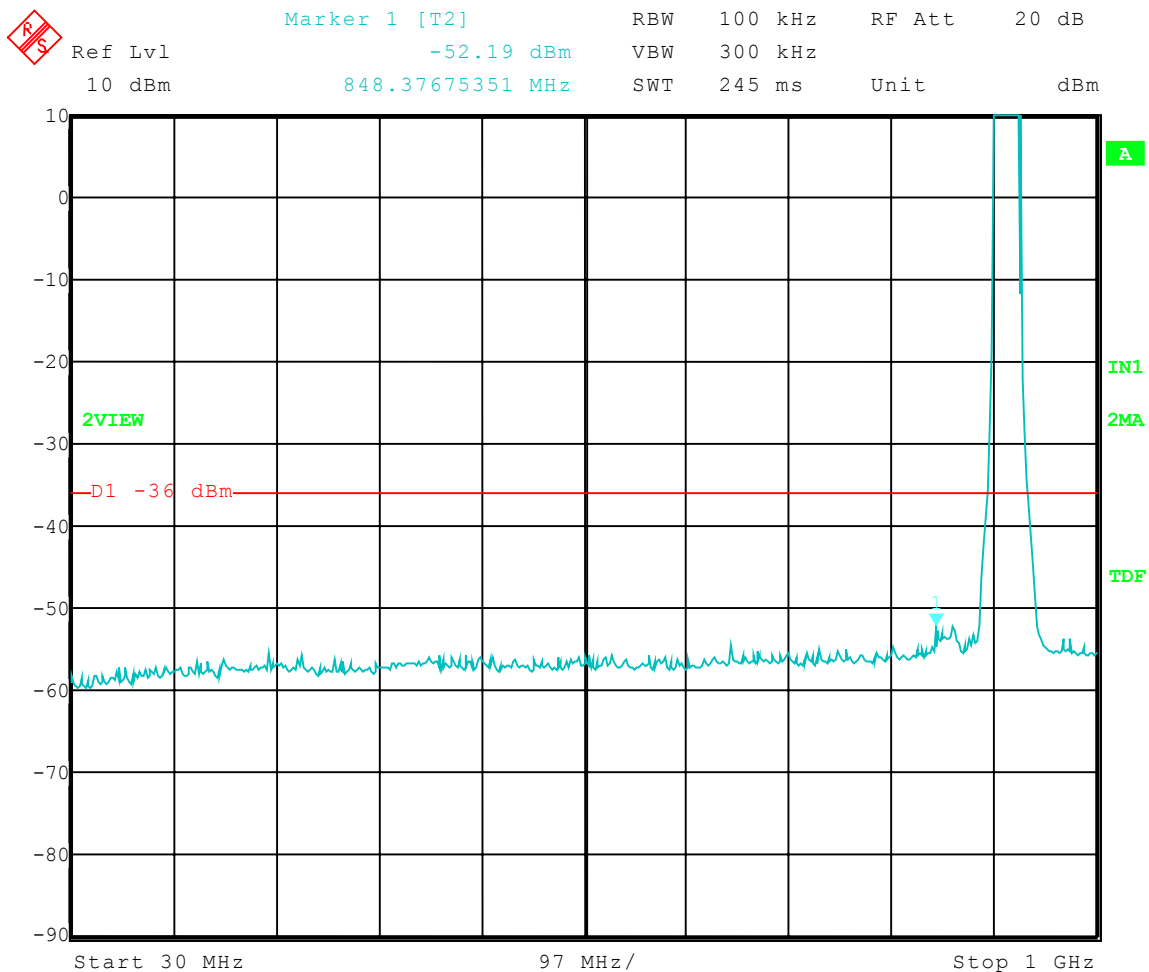
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC C0+
Frequency Range: 30 to 1000 MHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 16.JUN.2005 13:56:48



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

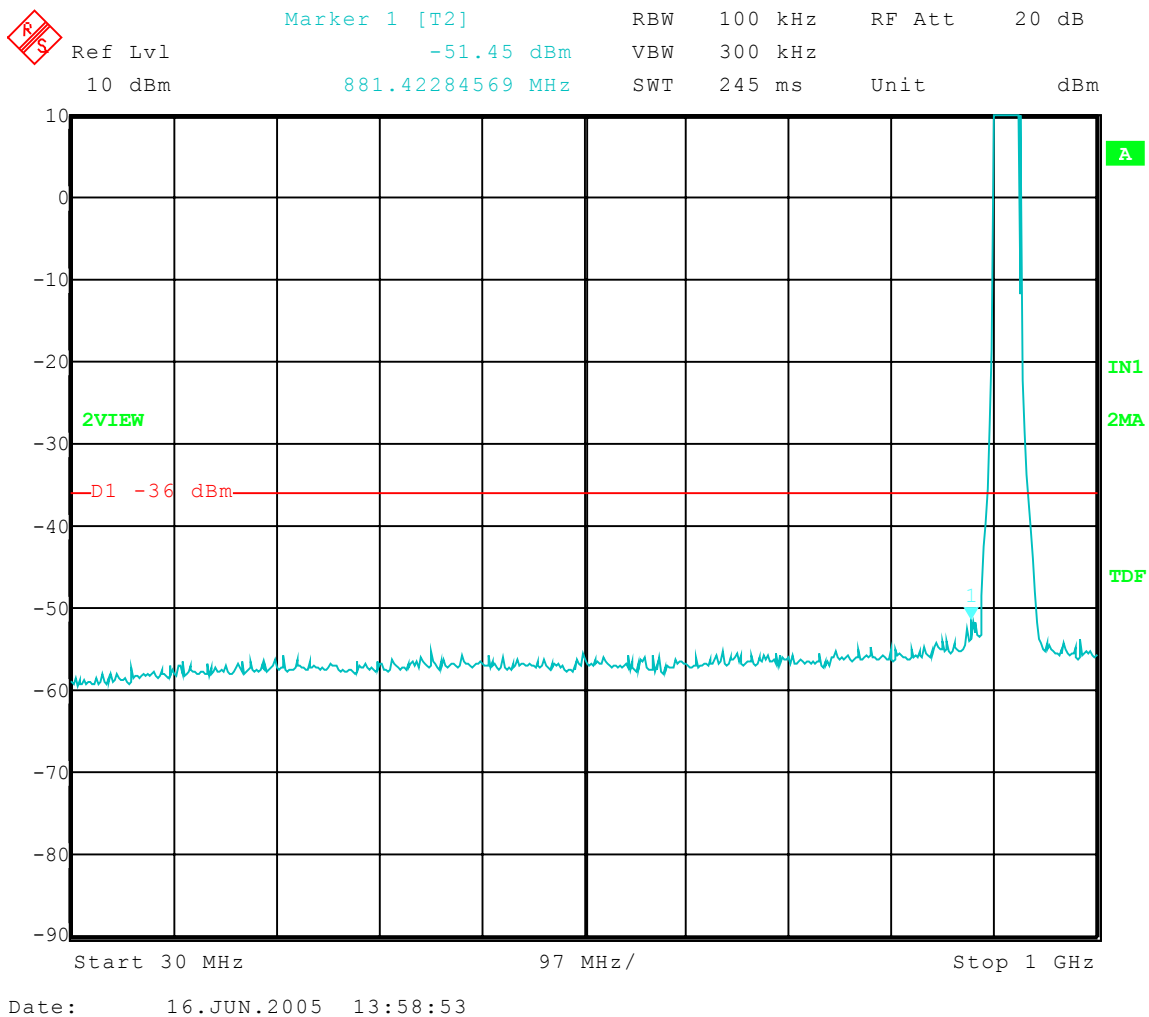
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC ISO18000-6B
Frequency Range: 30 to 1000 MHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

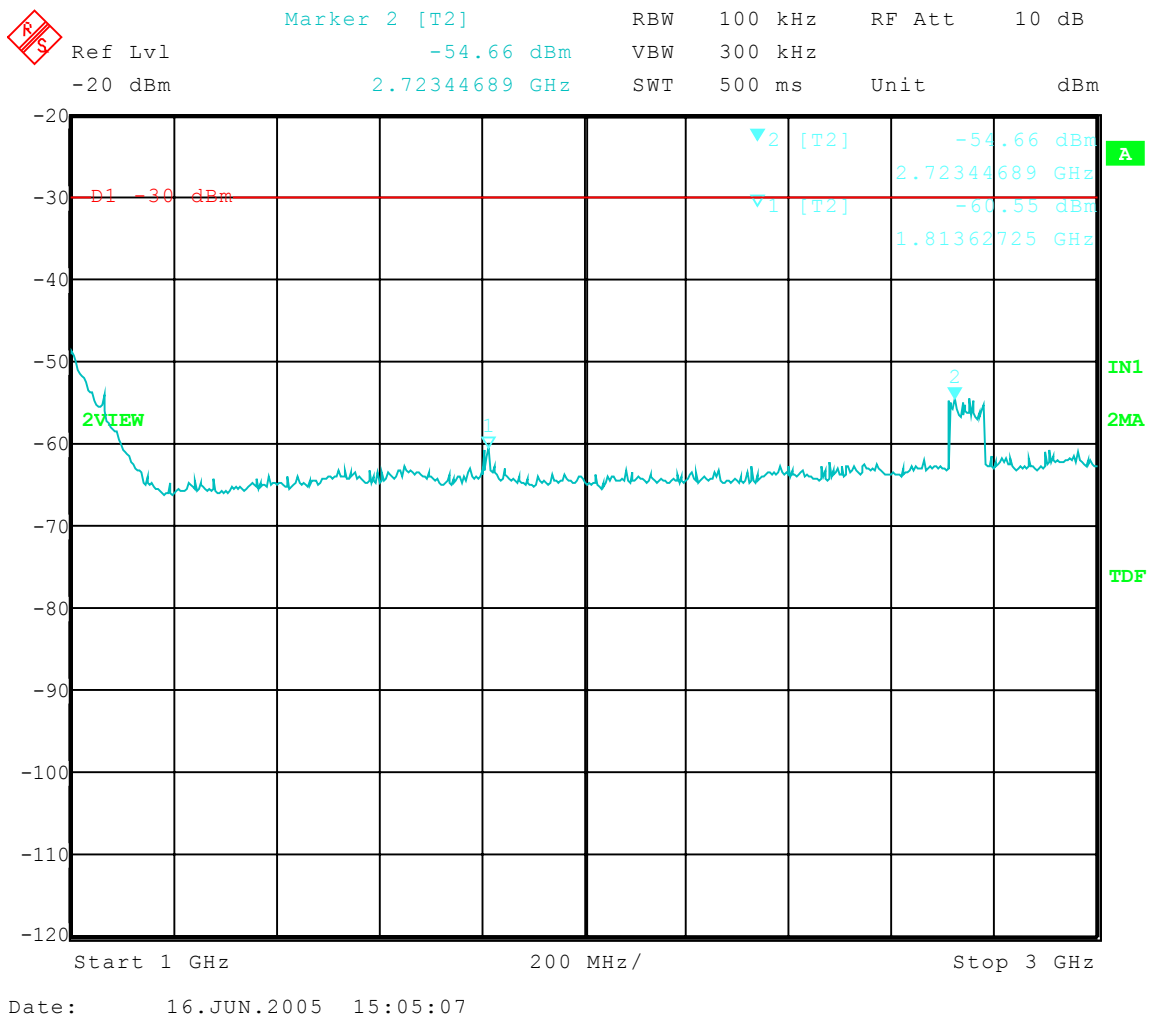
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC C1
Frequency Range: 1 to 3 GHz
Limit = -0.10 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

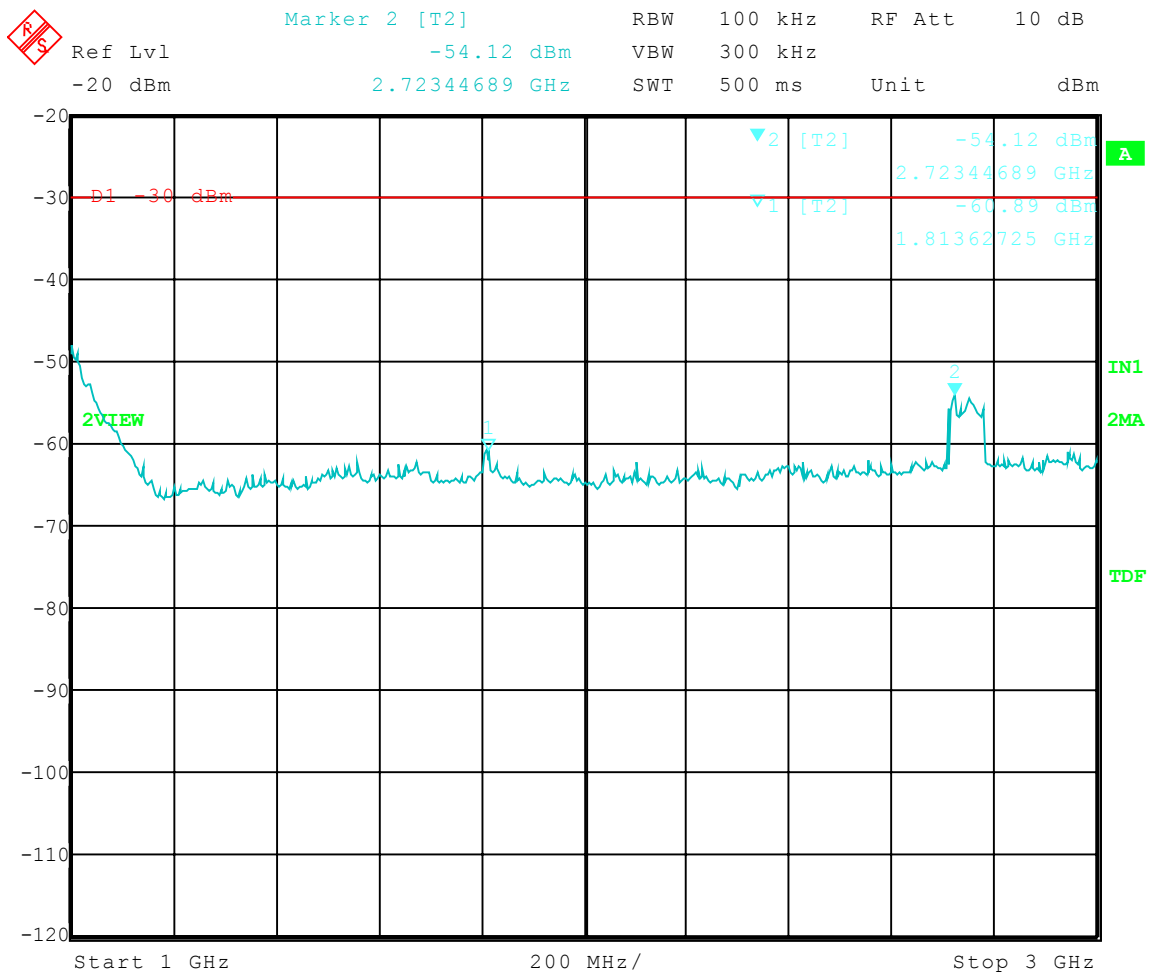
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC C0+
Frequency Range: 1 to 3 GHz
Limit = -0.10 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 16.JUN.2005 15:12:26



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

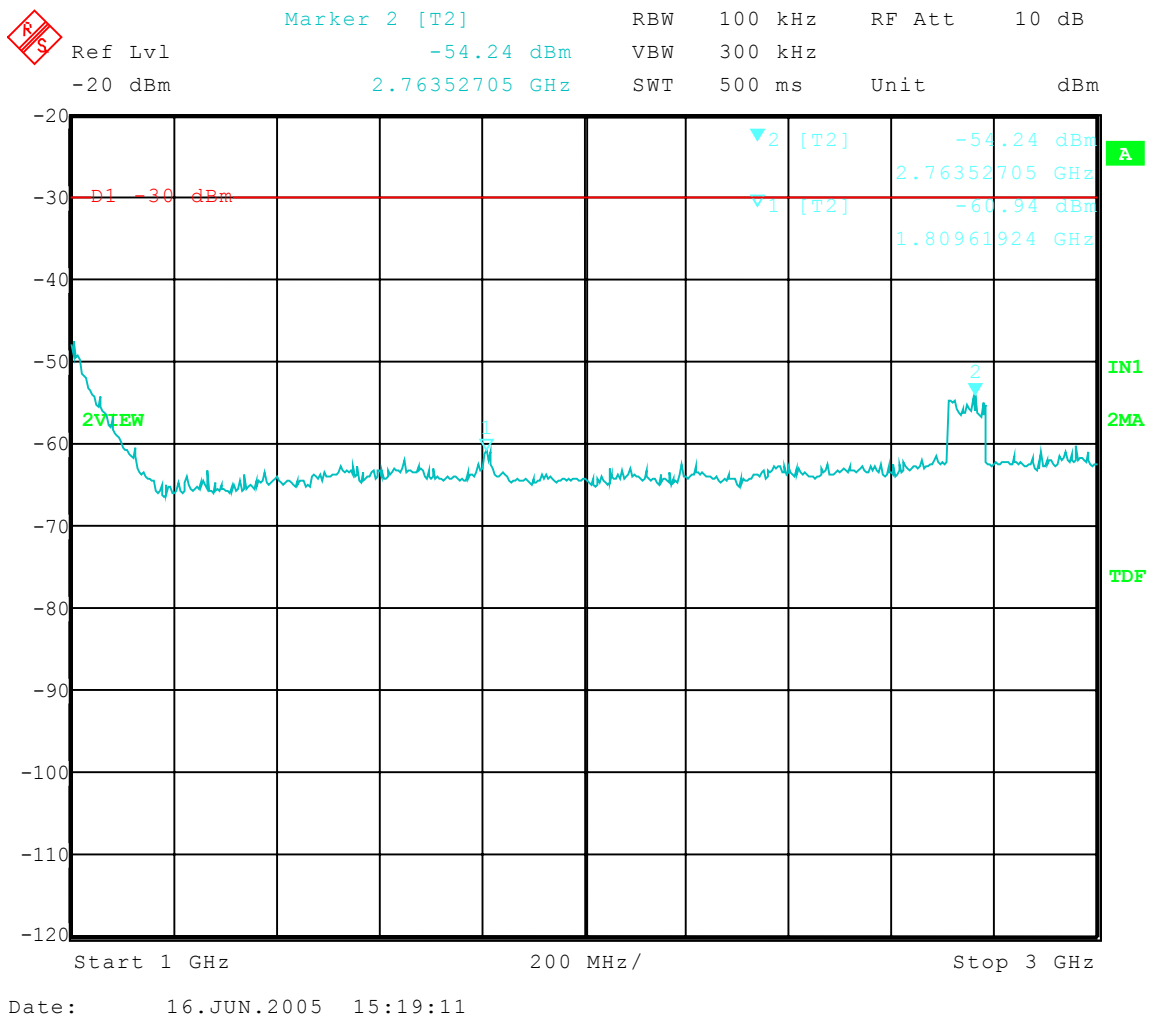
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC ISO18000-6B
Frequency Range: 1 to 3 GHz
Limit = -0.10 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

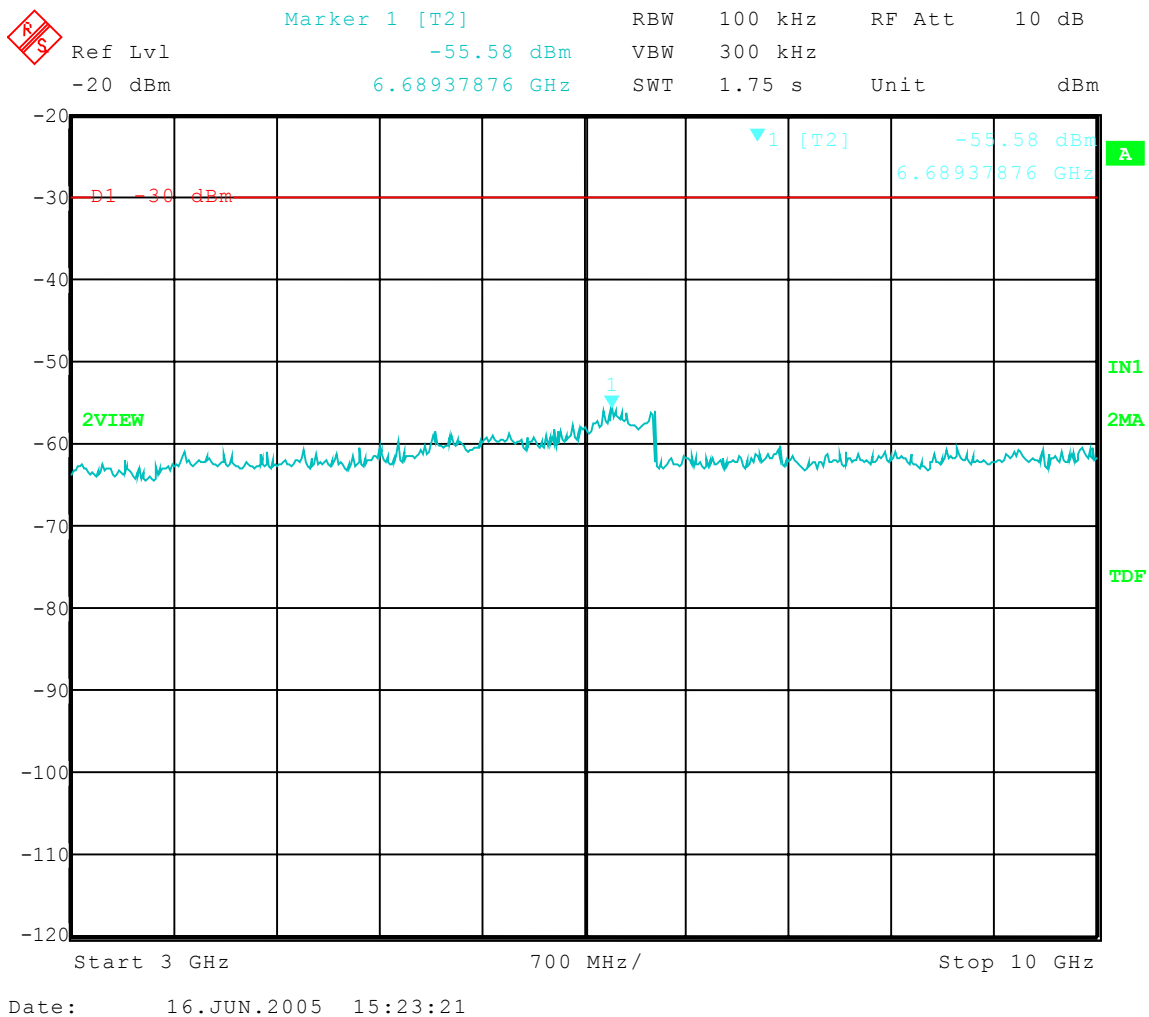
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC C1
Frequency Range: 3 to 10 GHz
Limit = -0.10 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

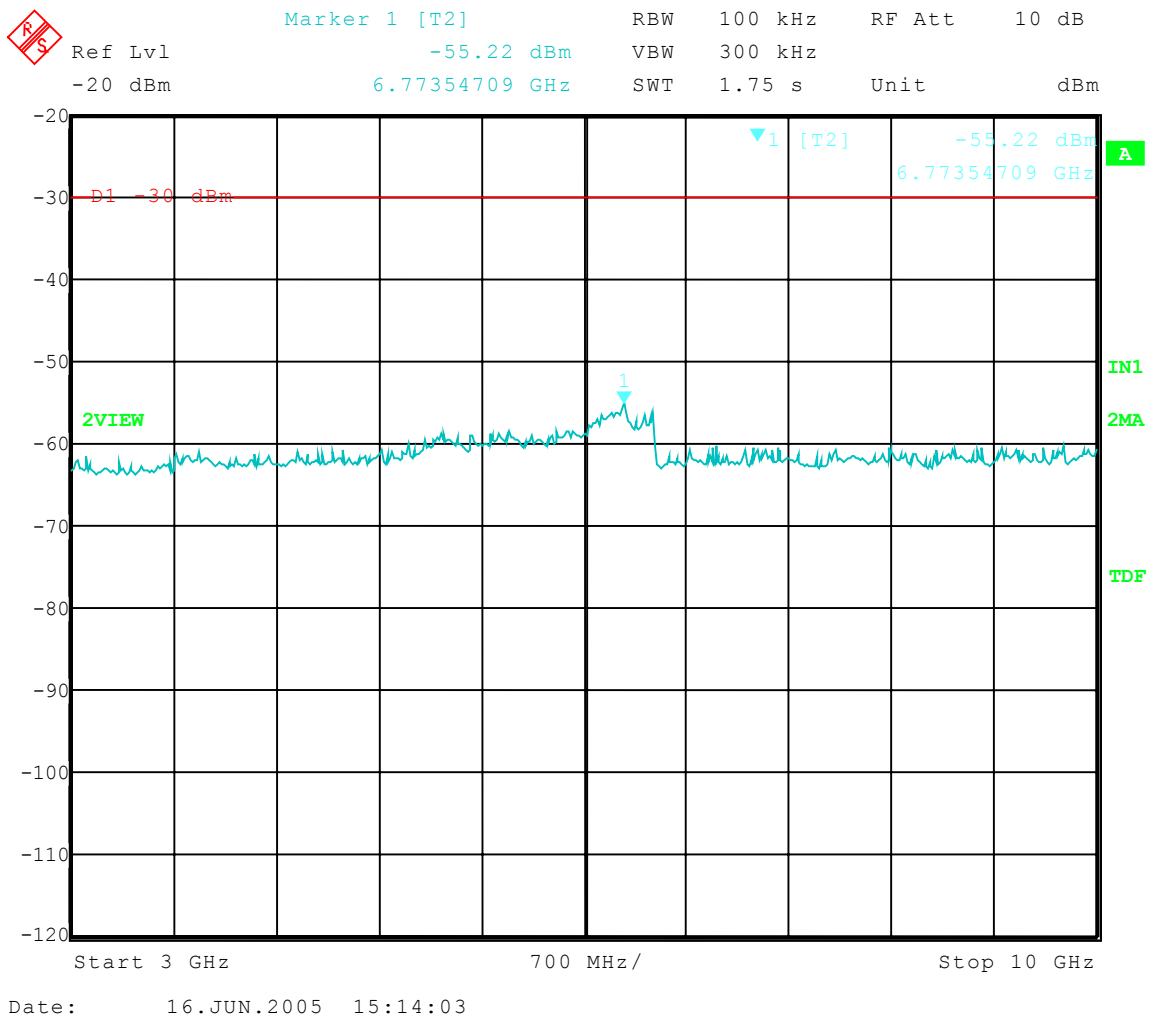
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC C0+
Frequency Range: 3 to 10 GHz
Limit = -0.10 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

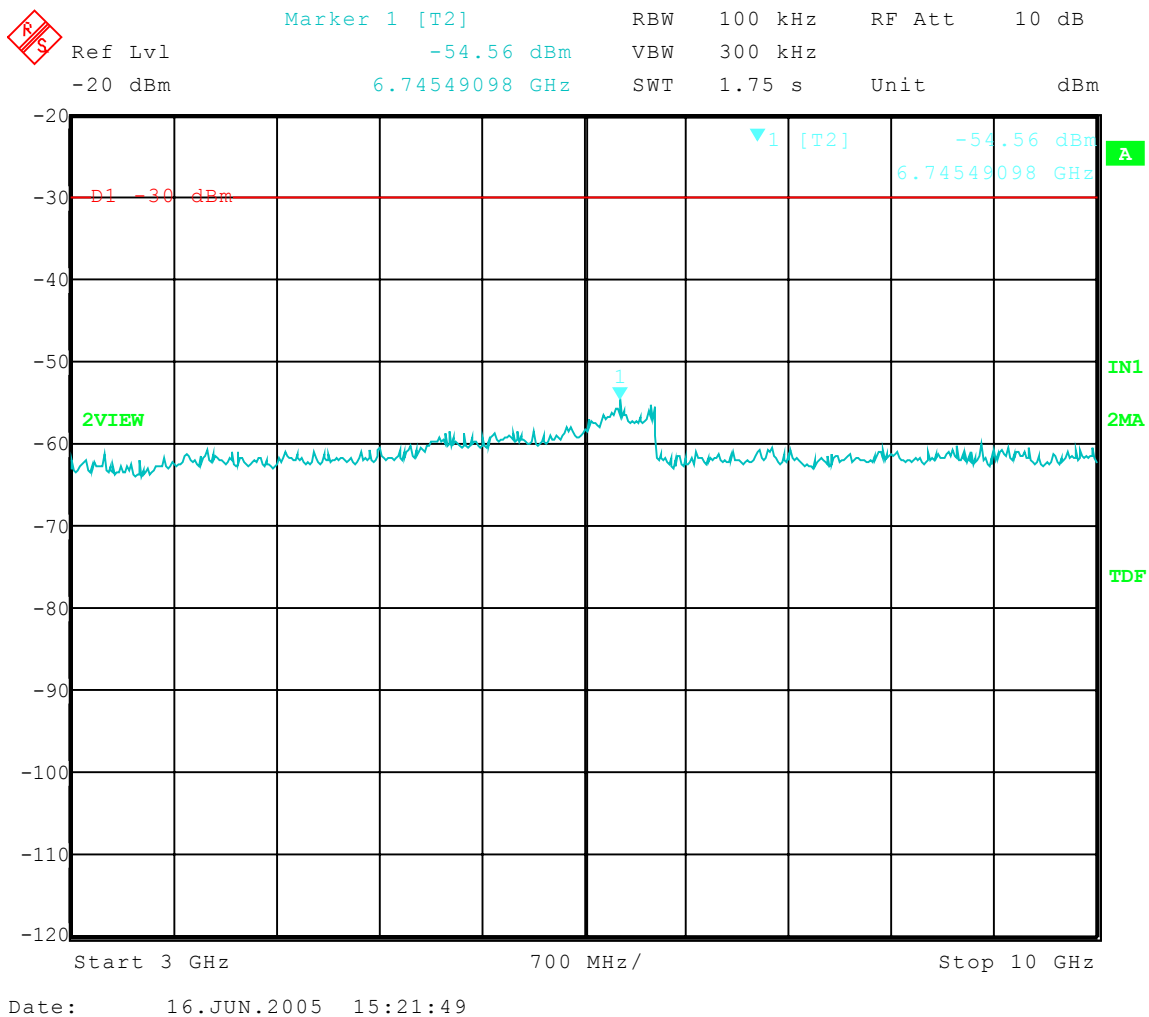
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC ISO18000-6B
Frequency Range: 3 to 10 GHz
Limit = -0.10 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RF CONDUCTED 30 dBm

CONDUCTED SPURIOUS



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

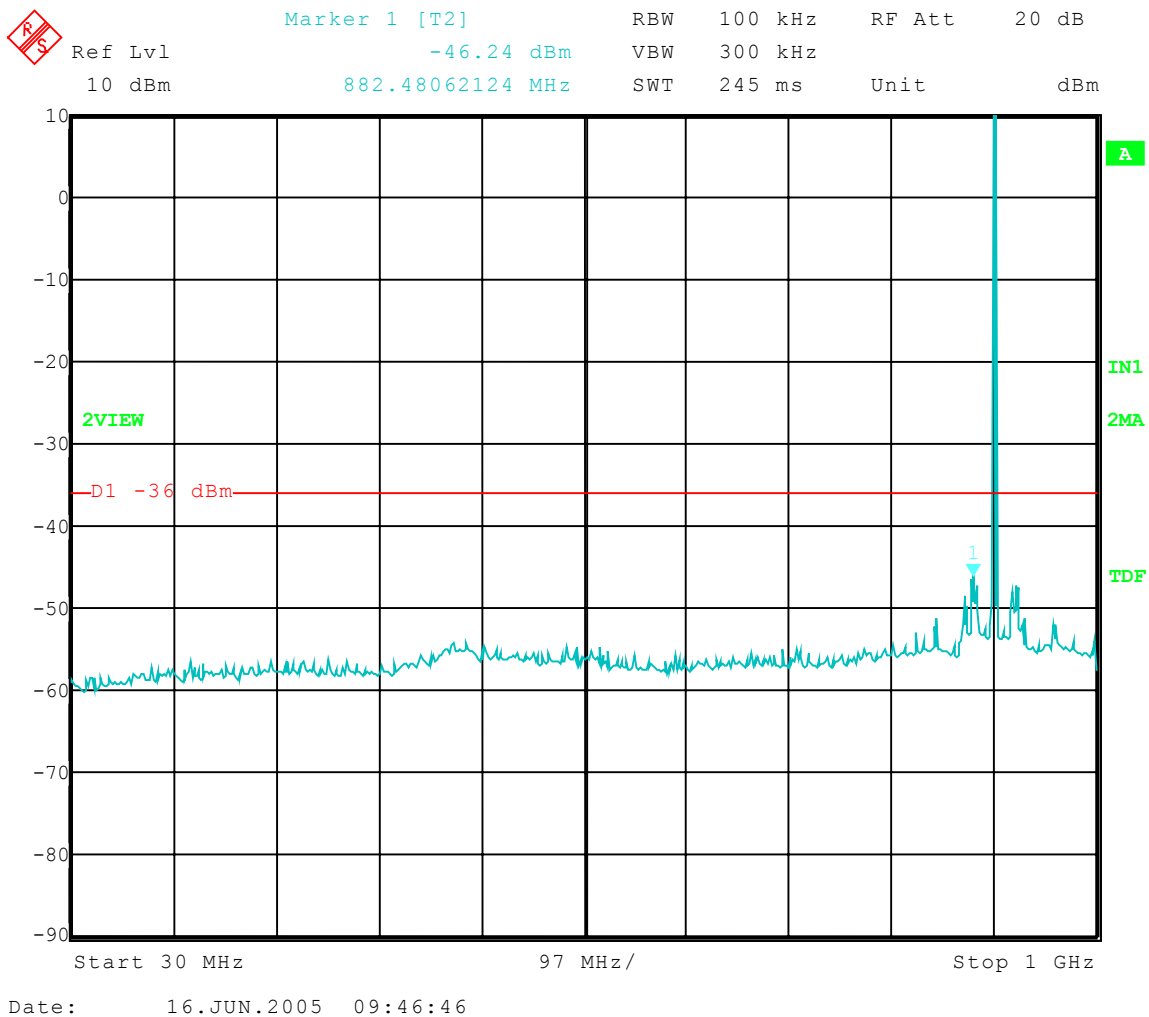
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Low Channel** Transmit = 902.967 MHz
Frequency Range: 30 to 1000 MHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

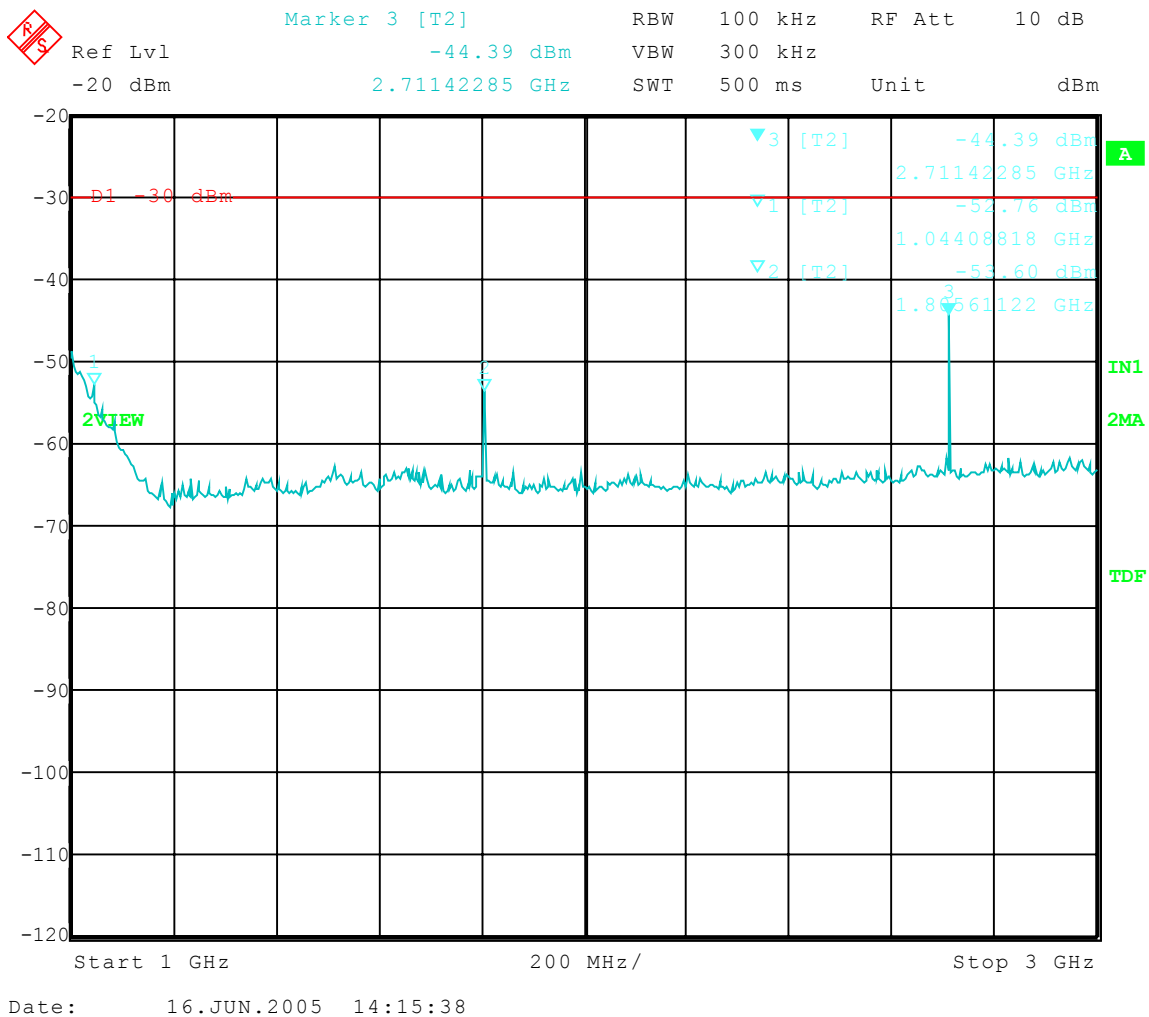
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Low Channel** Transmit = 902.967 MHz
Frequency Range: 1 to 3 GHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

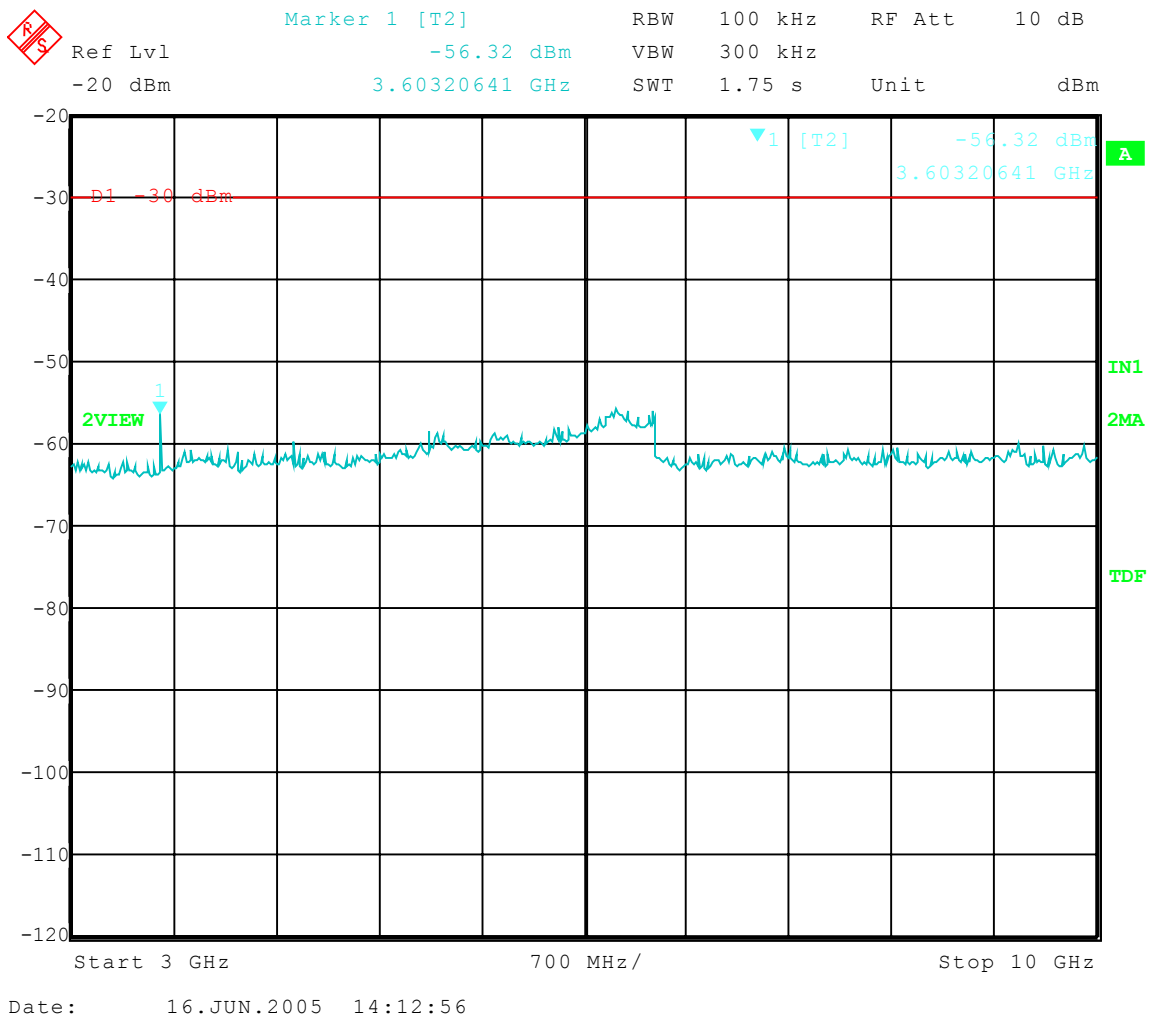
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Low Channel** Transmit = 902.967 MHz
Frequency Range: 3 to 10 GHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

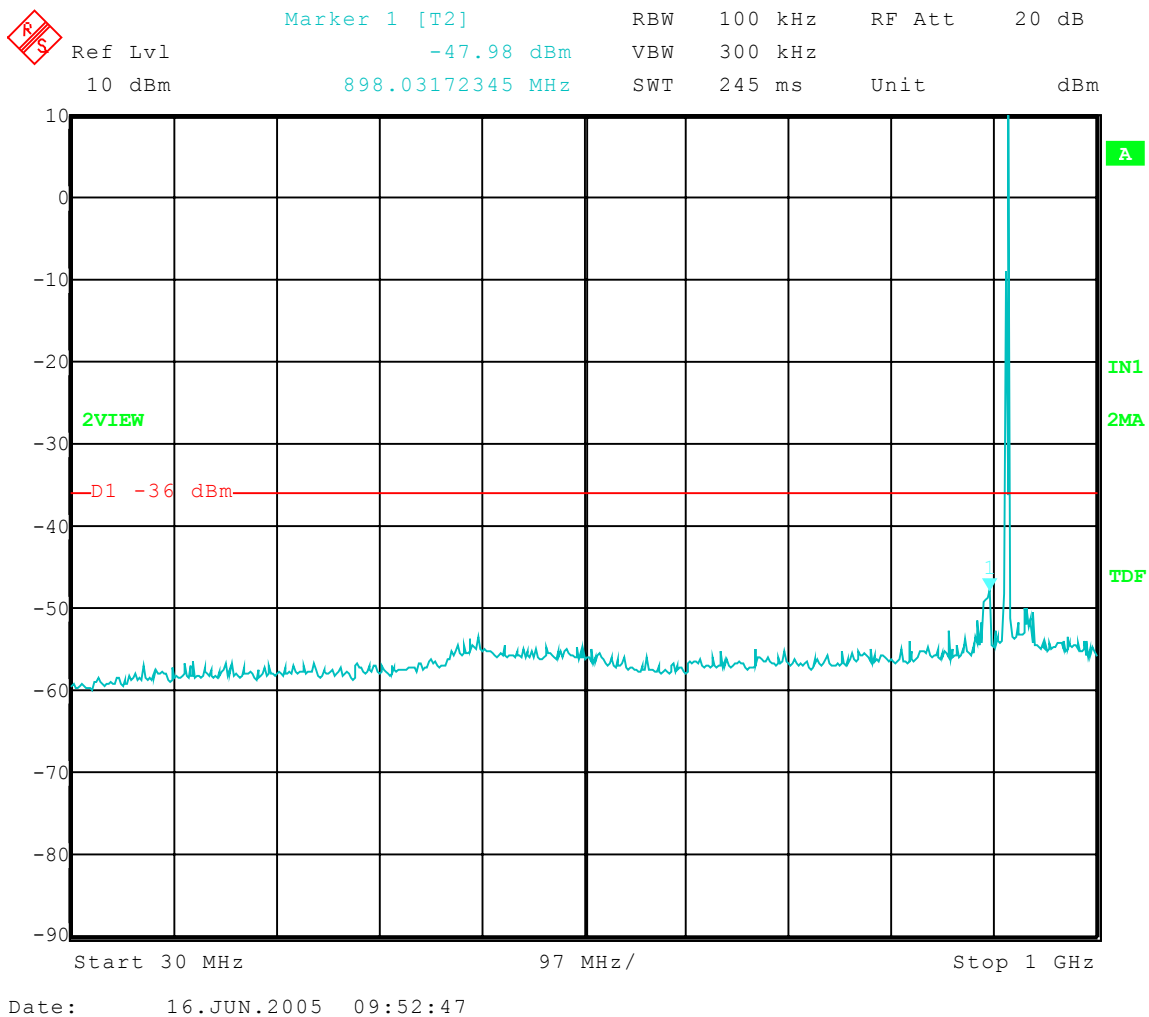
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Middle Channel** Transmit = 915.101 MHz
Frequency Range: 30 to 1000 MHz
Limit = 9.09 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

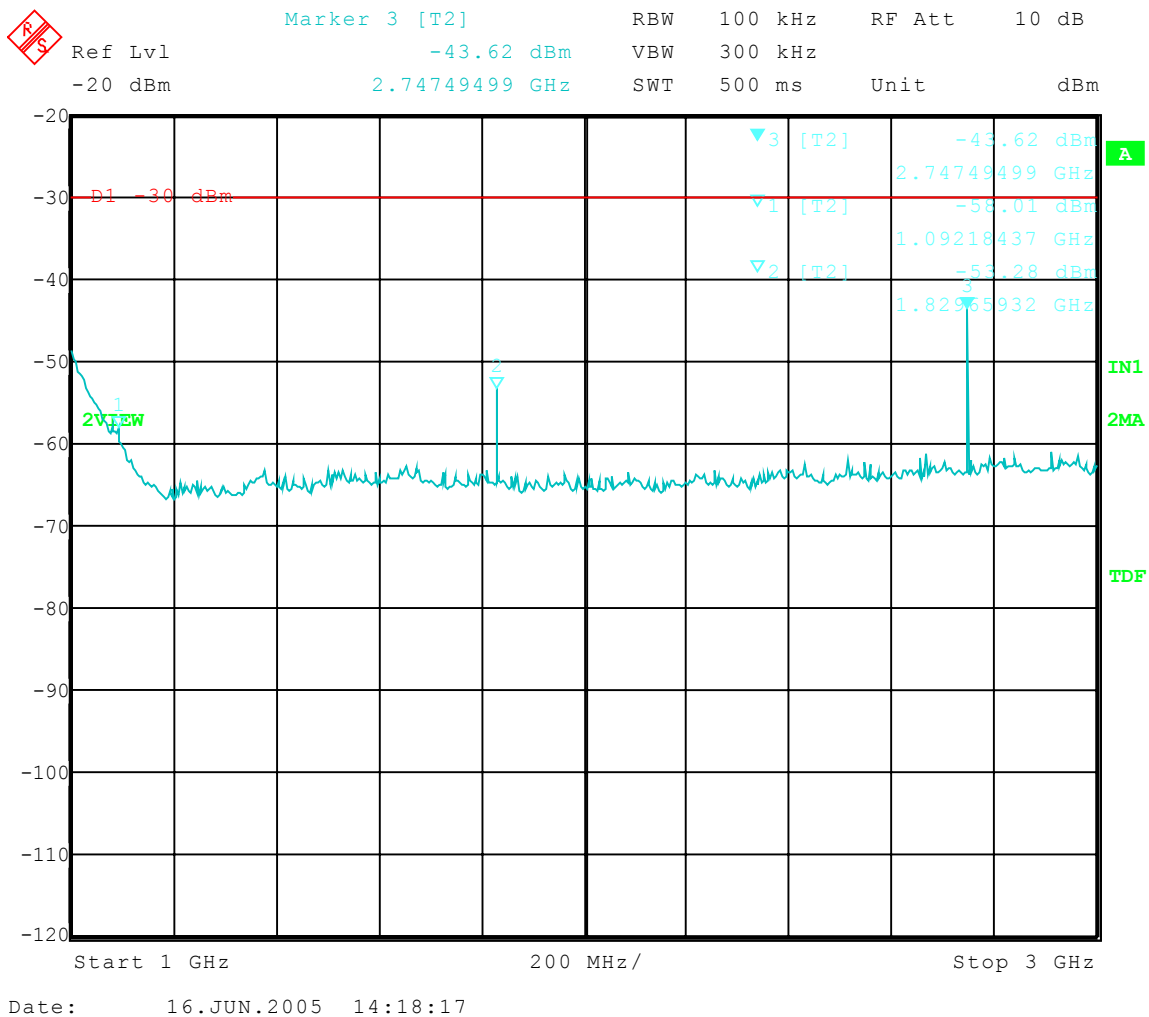
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Middle Channel** Transmit = 915.101 MHz
Frequency Range: 1 to 3 GHz
Limit = 9.09 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

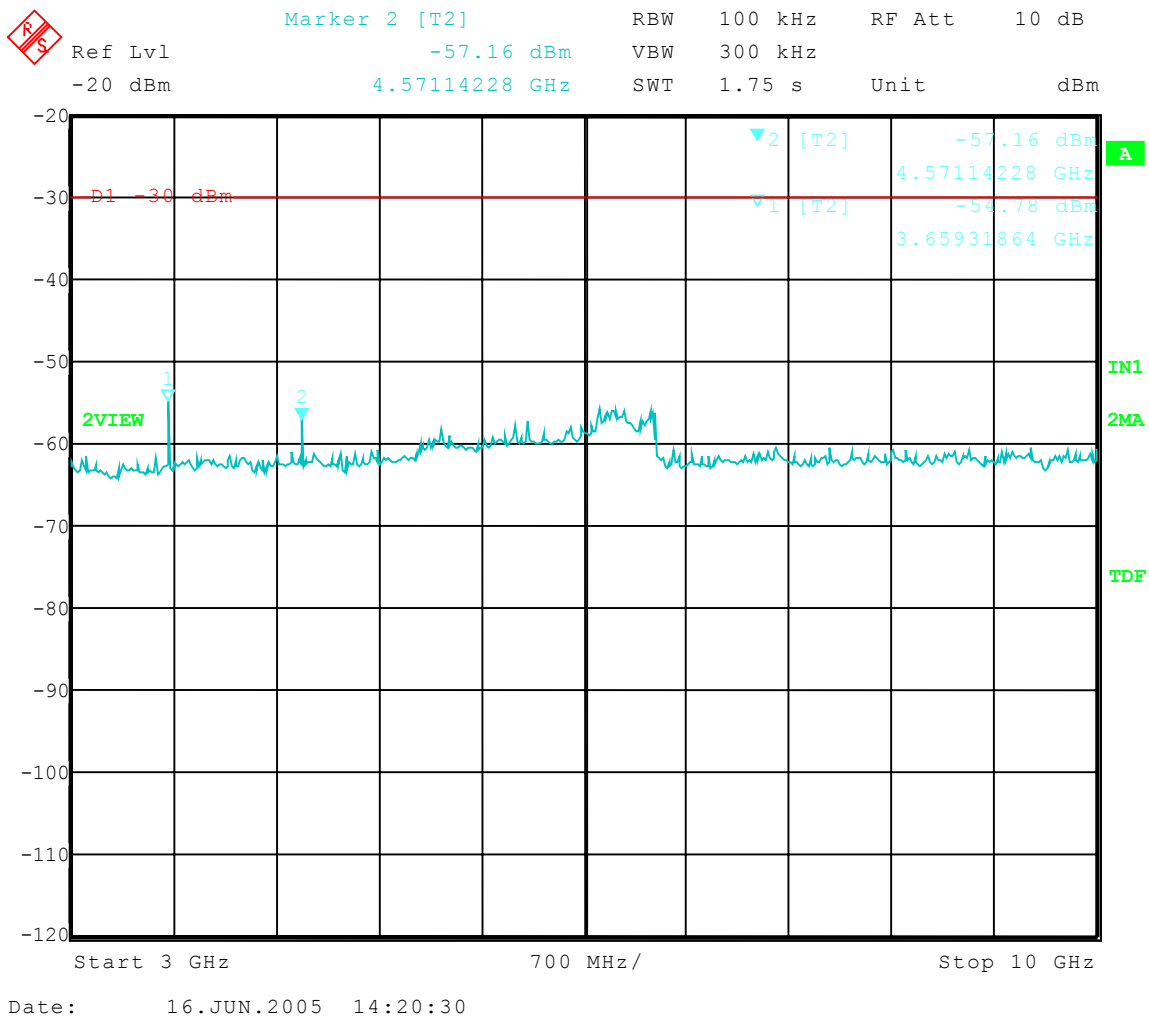
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **Middle Channel** Transmit = 915.101 MHz
Frequency Range: 3 to 10 GHz
Limit = 9.09 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

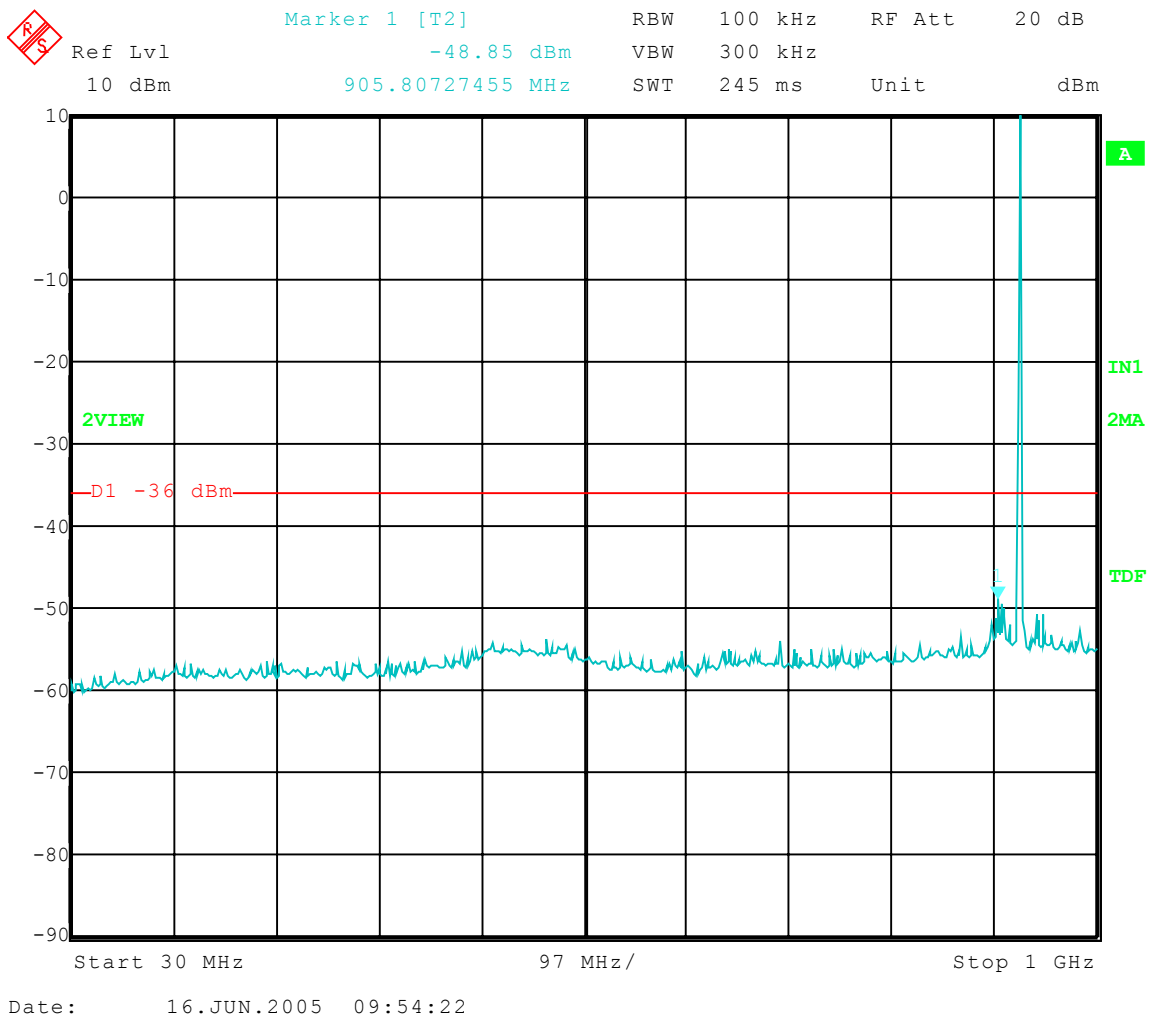
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **High Channel** Transmit = 927.233 MHz
Frequency Range: 30 to 1000 MHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

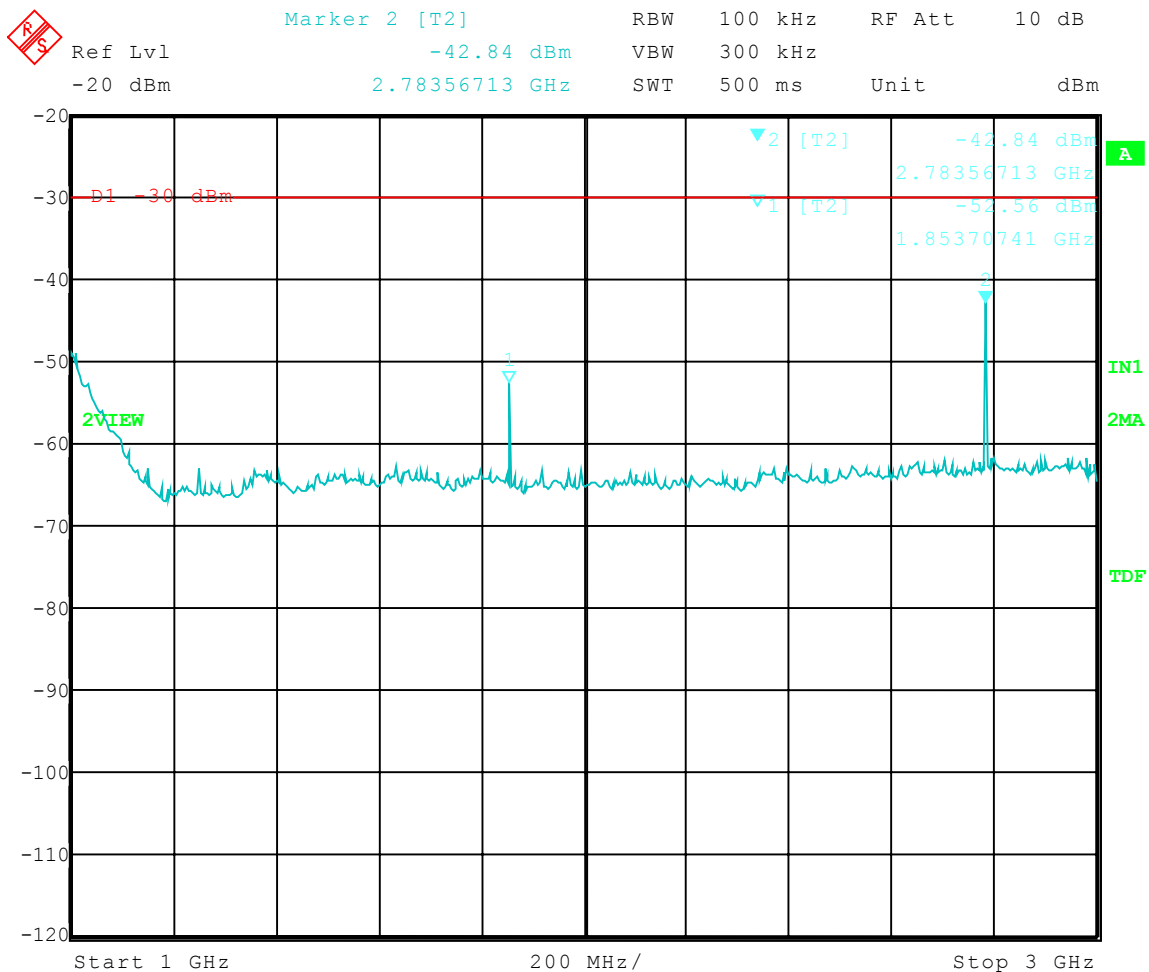
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **High Channel** Transmit = 927.233 MHz
Frequency Range: 1 to 3 GHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 16.JUN.2005 14:23:22



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

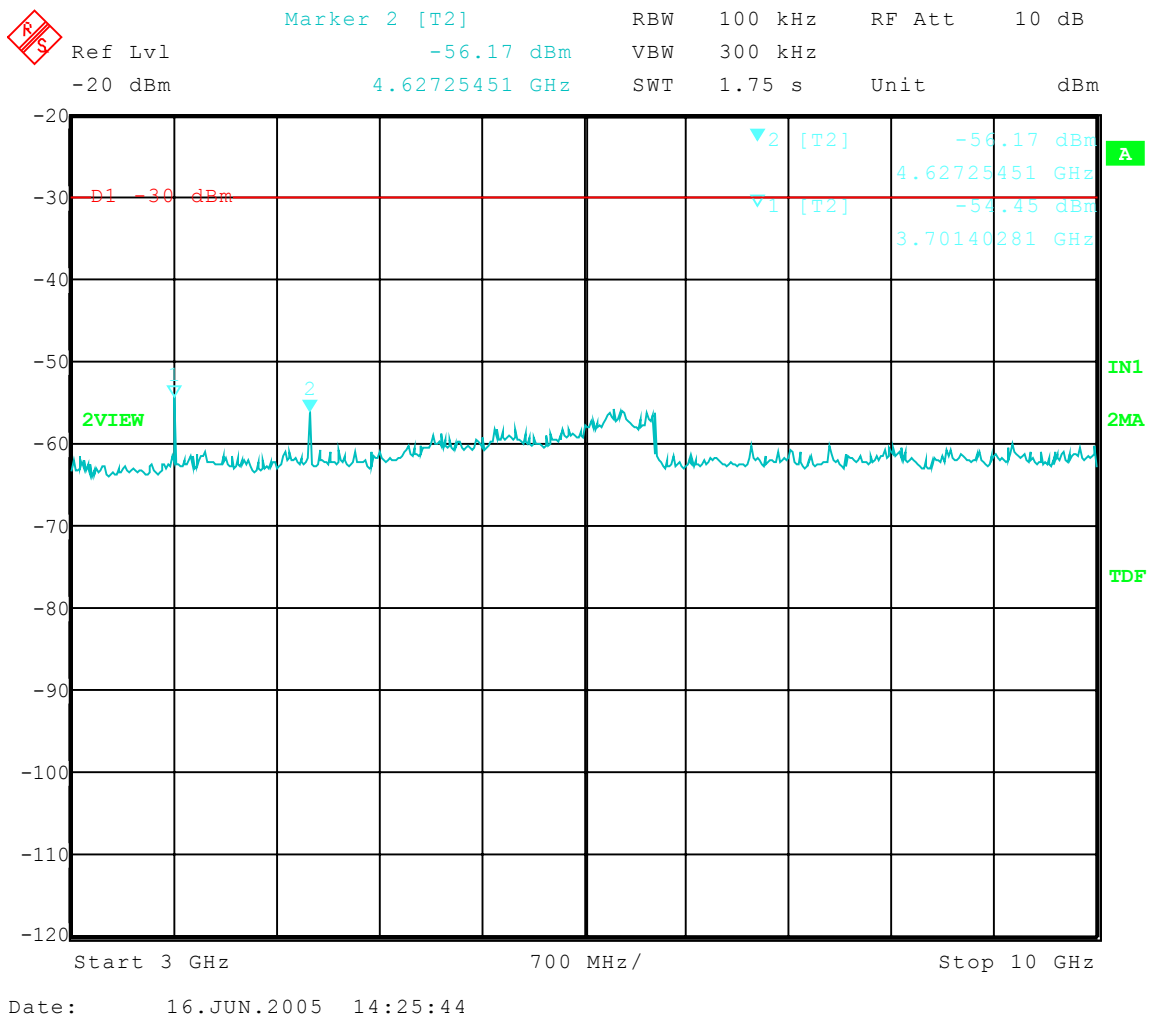
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: **High Channel** Transmit = 927.233 MHz
Frequency Range: 3 to 10 GHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RF Conducted 30 dBm

CONDUCTED SPURIOUS

FREQUENCY HOPPING ON



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

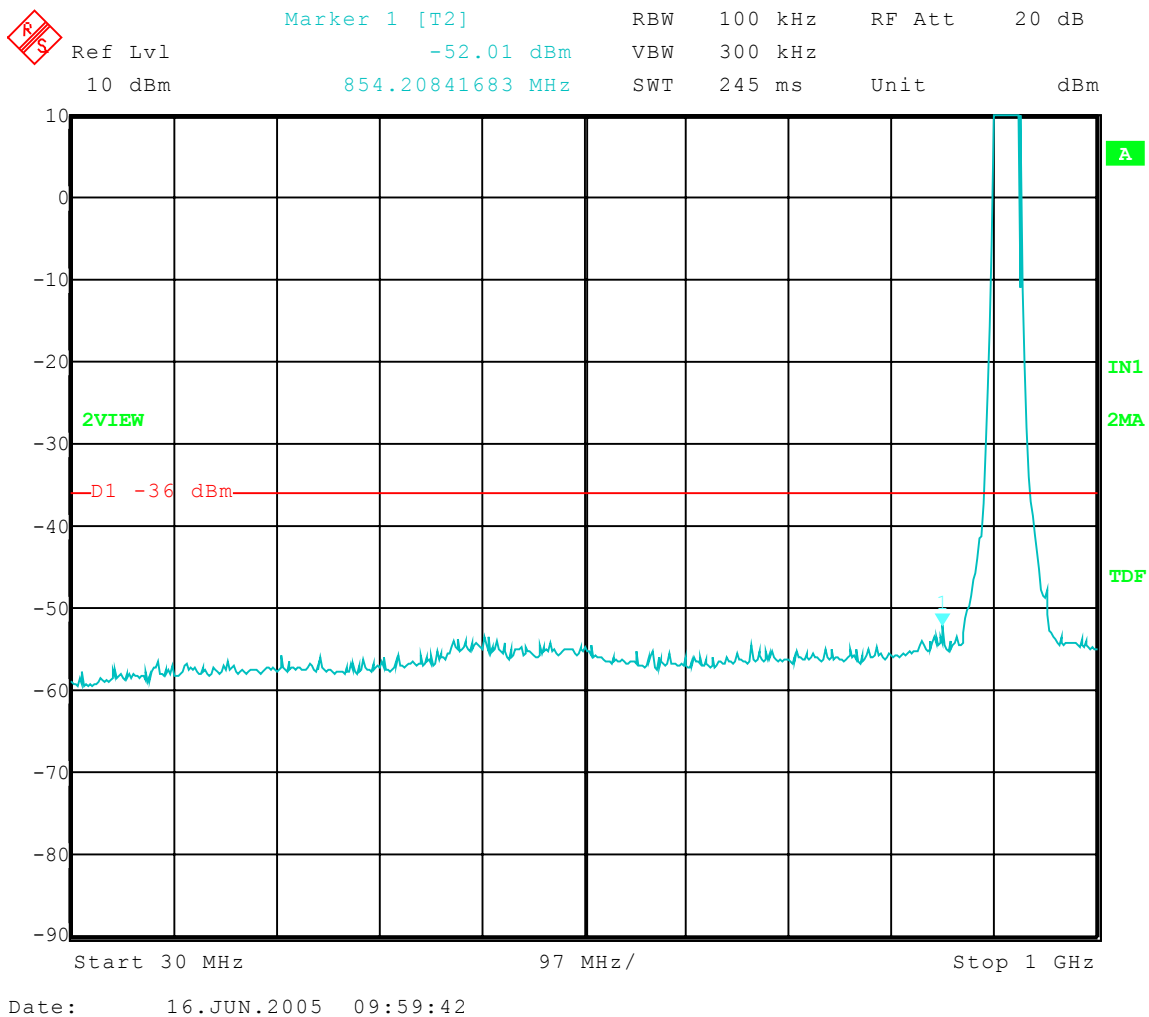
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC C1
Frequency Range: 30 to 1000 MHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

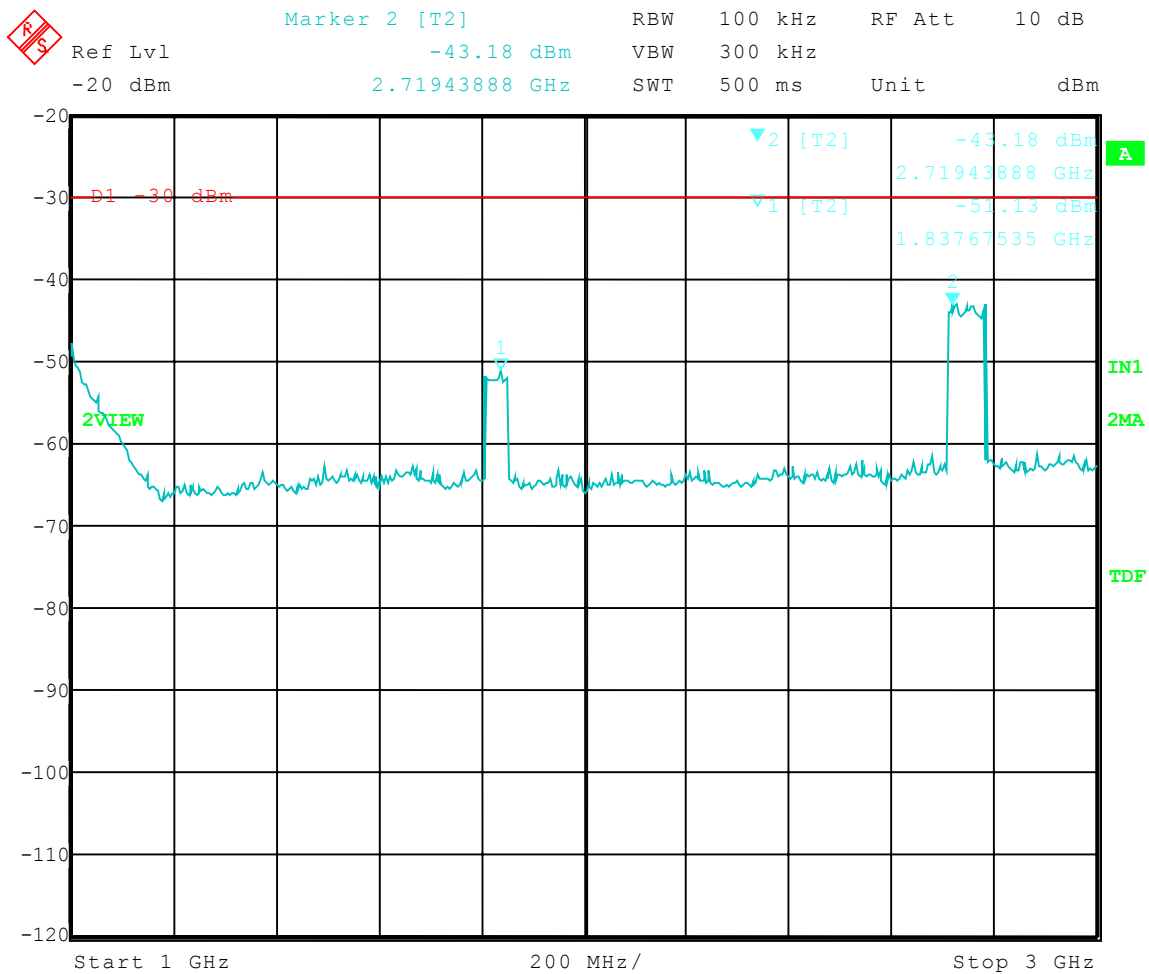
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC C0+
Frequency Range: 1 to 3 GHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



Date: 16.JUN.2005 14:41:20



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

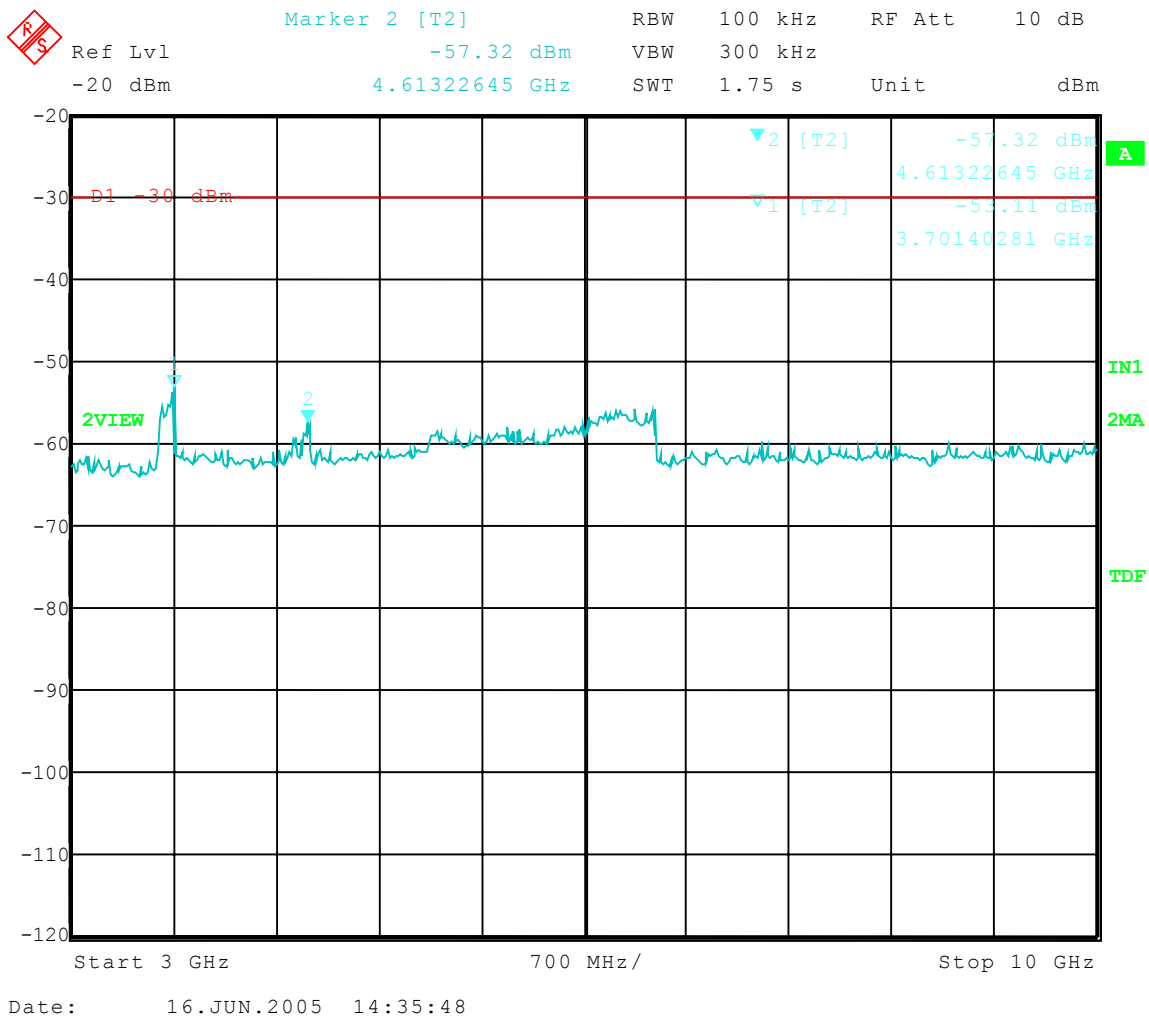
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Spurious Emissions - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Hopping On Modulation: EPC C1
Frequency Range: 3 to 10 GHz
Limit = 9.13 dBm

All Spurious Emissions at Least 20 dB below Peak Level of In Band Frequency



1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

3.0 CONDUCTED EMISSIONS (ANTENNA TERMINAL) PHOTOS TAKEN DURING TESTING





Company: Zebra Technologies Corporation
 Model Tested: ZM4e
 Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

4.0 RESTRICTED BANDS

As stated in Section 15.205a, the fundamental emission from the Zebra RFID Multiprotocol Encoder ZM4e 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.

5.0 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 15.209 is 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 15.209.

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



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

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

PART 15.247(c)



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RF CONDUCTED 20 dBm

BAND EDGE COMPLIANCE



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

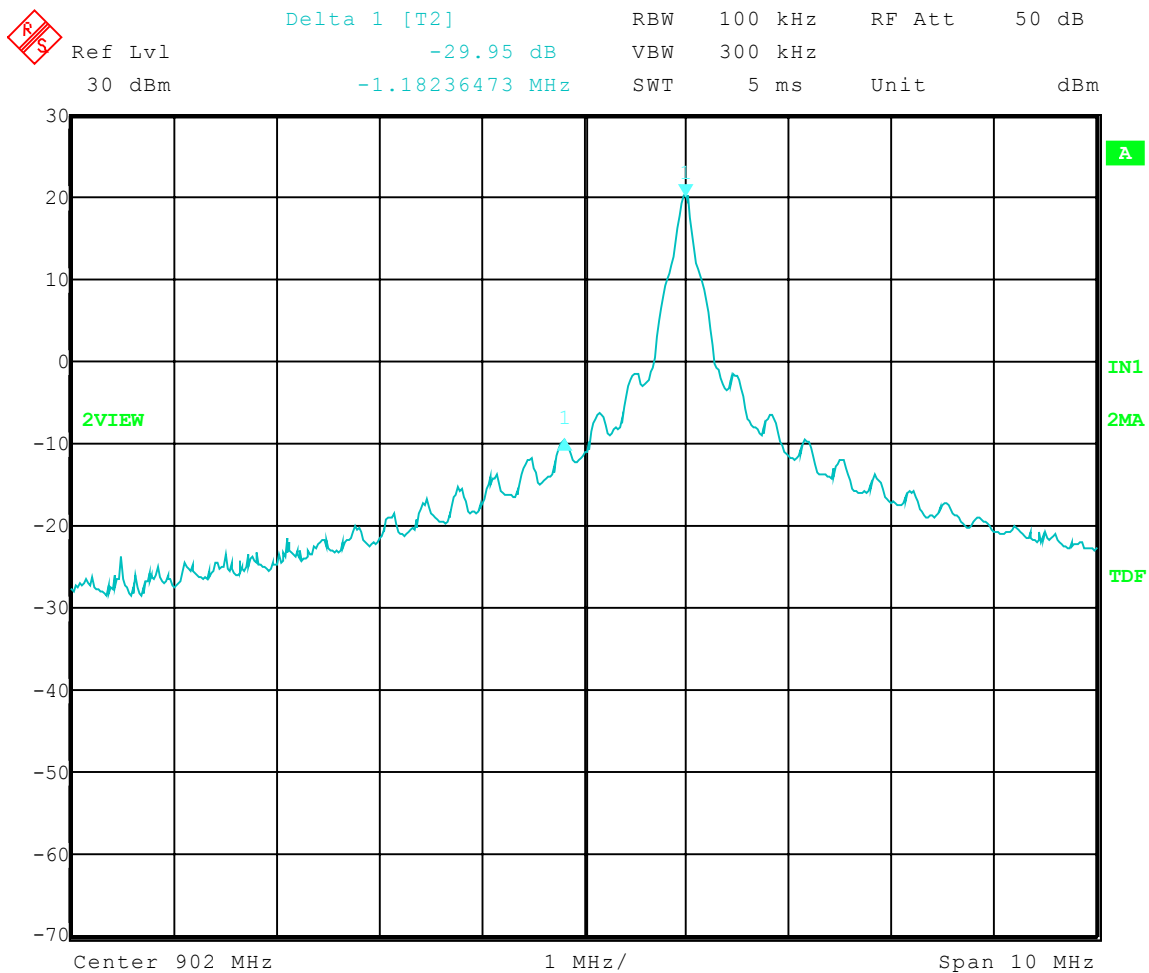
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Low Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **Low Channel**: Frequency – 902.967 MHz
Modulation: EPC C1

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 12:53:00



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

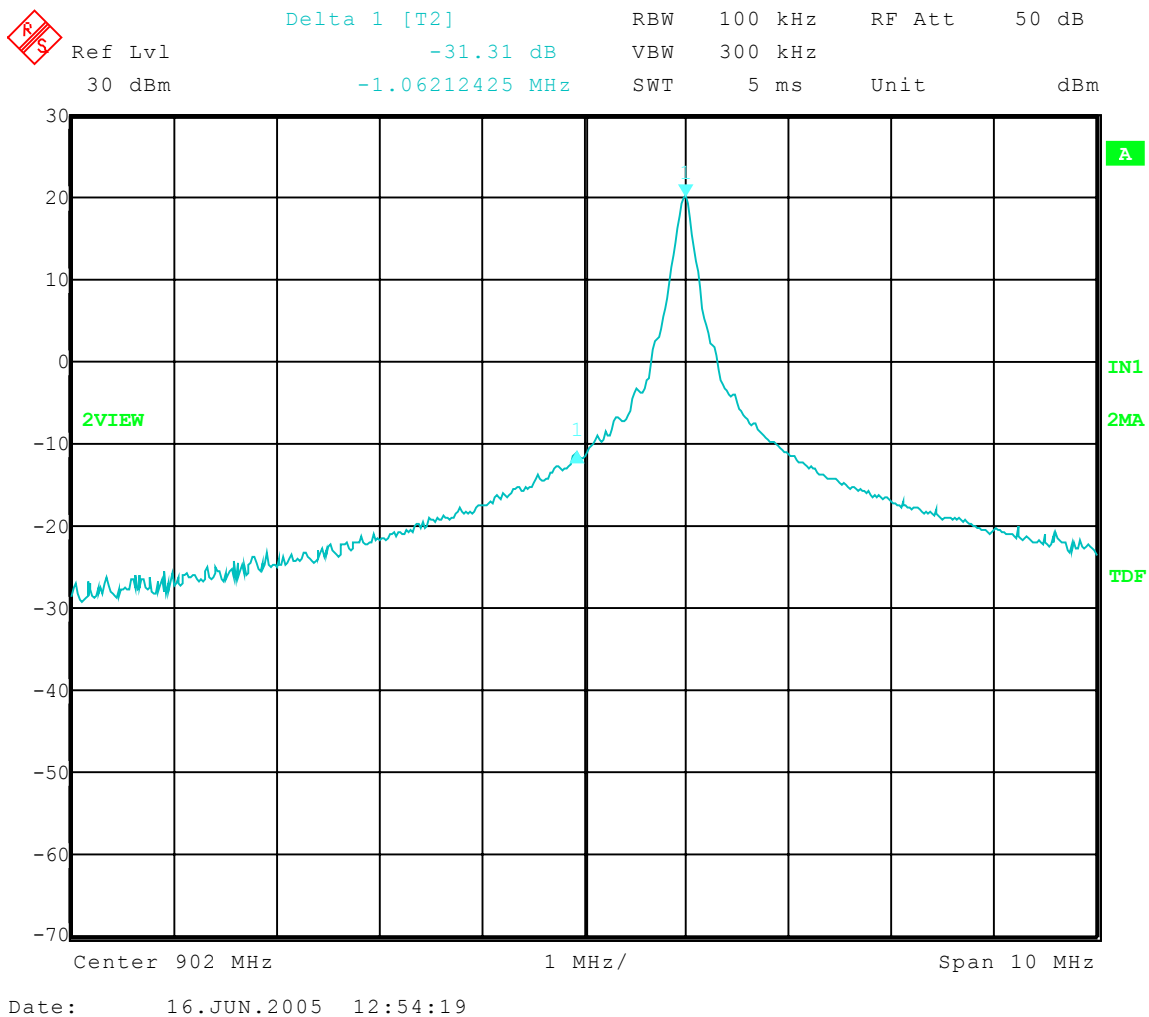
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Low Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **Low Channel**: Frequency – 902.967 MHz
Modulation: EPC C0+

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

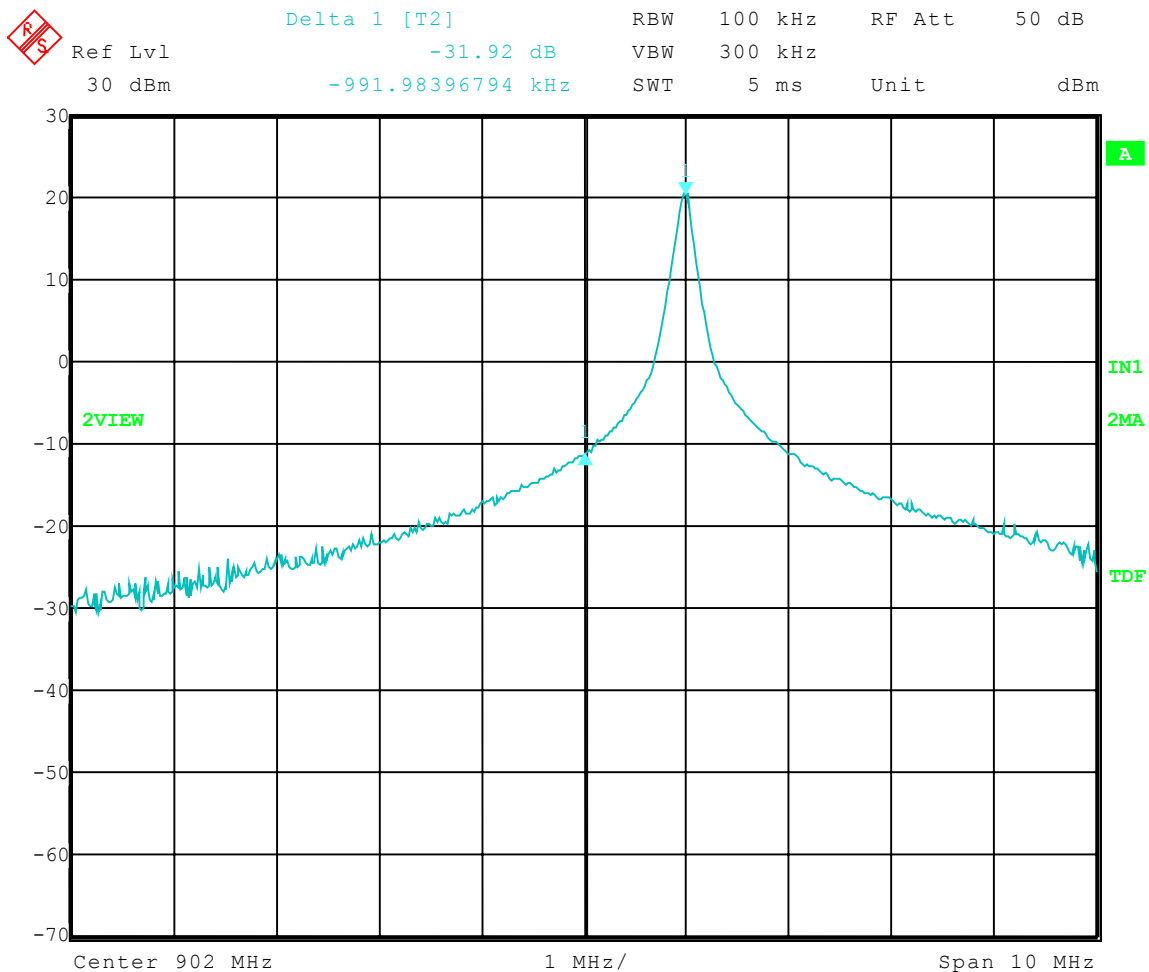
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Low Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **Low Channel**: Frequency – 902.967 MHz
Modulation: EPC ISO18000-6B

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 12:55:42



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

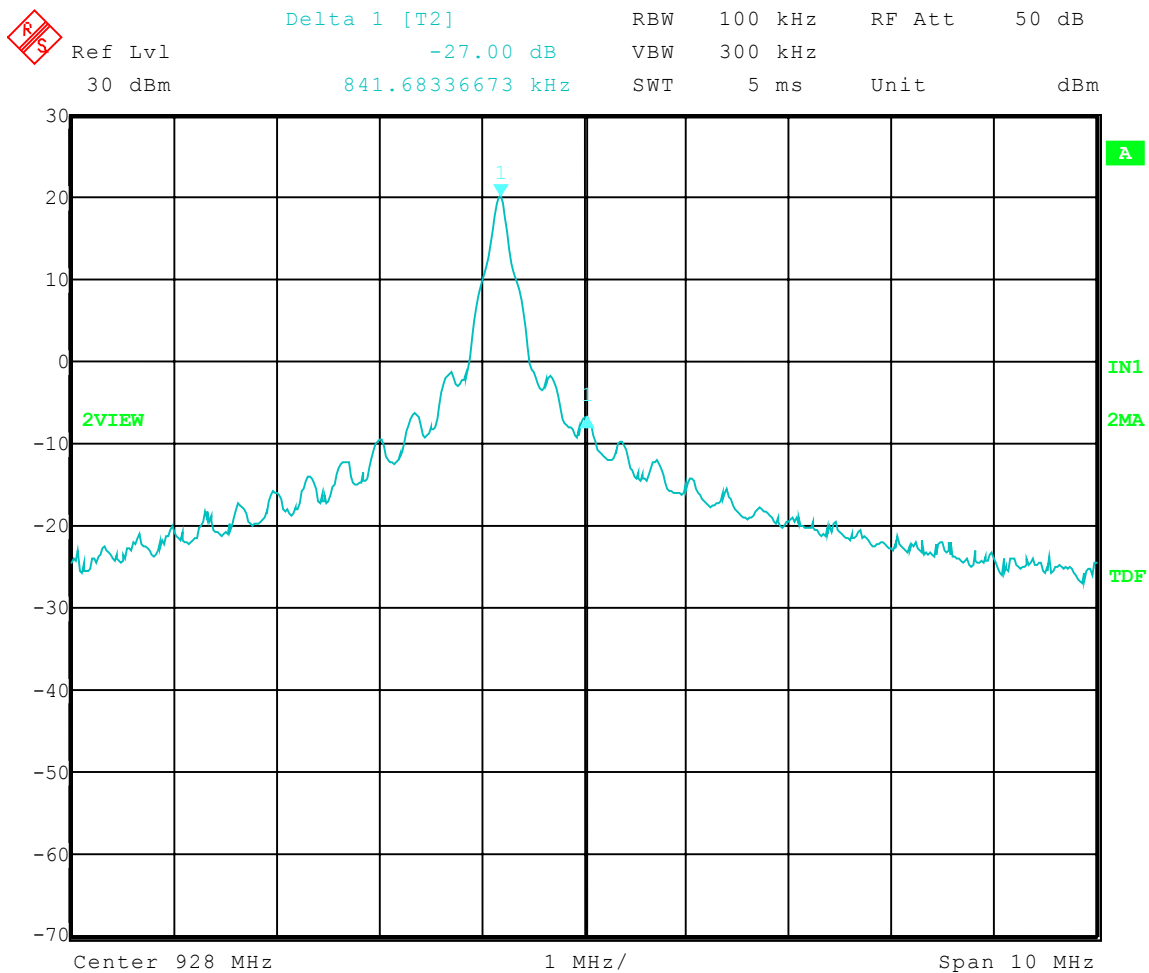
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: High Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **High Channel**: Frequency – 927.223 MHz
Modulation: EPC C1

Band-Edge Frequency = 928 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 13:31:38



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

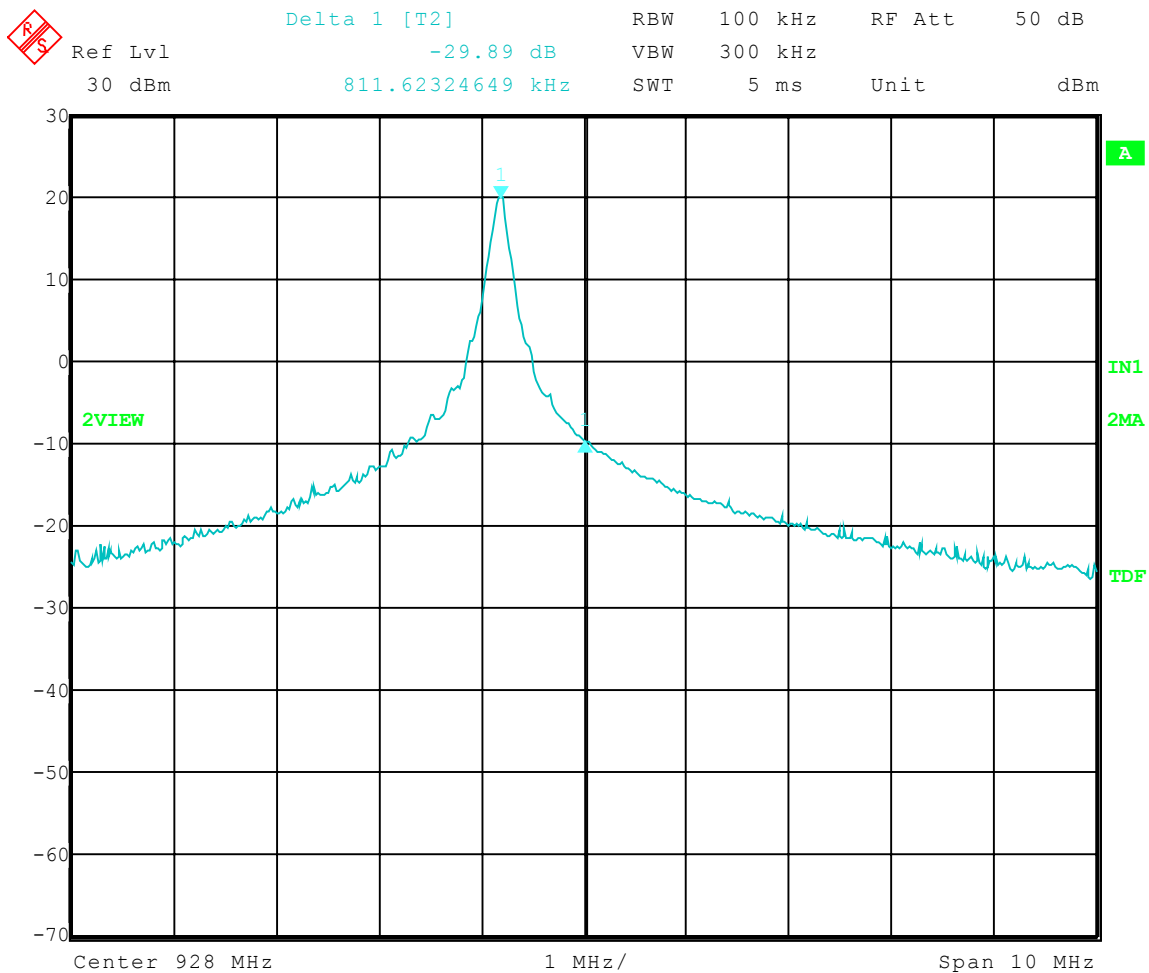
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: High Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **High Channel**: Frequency – 927.223 MHz
Modulation: EPC C0+

Band-Edge Frequency = 928 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 13:33:27



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

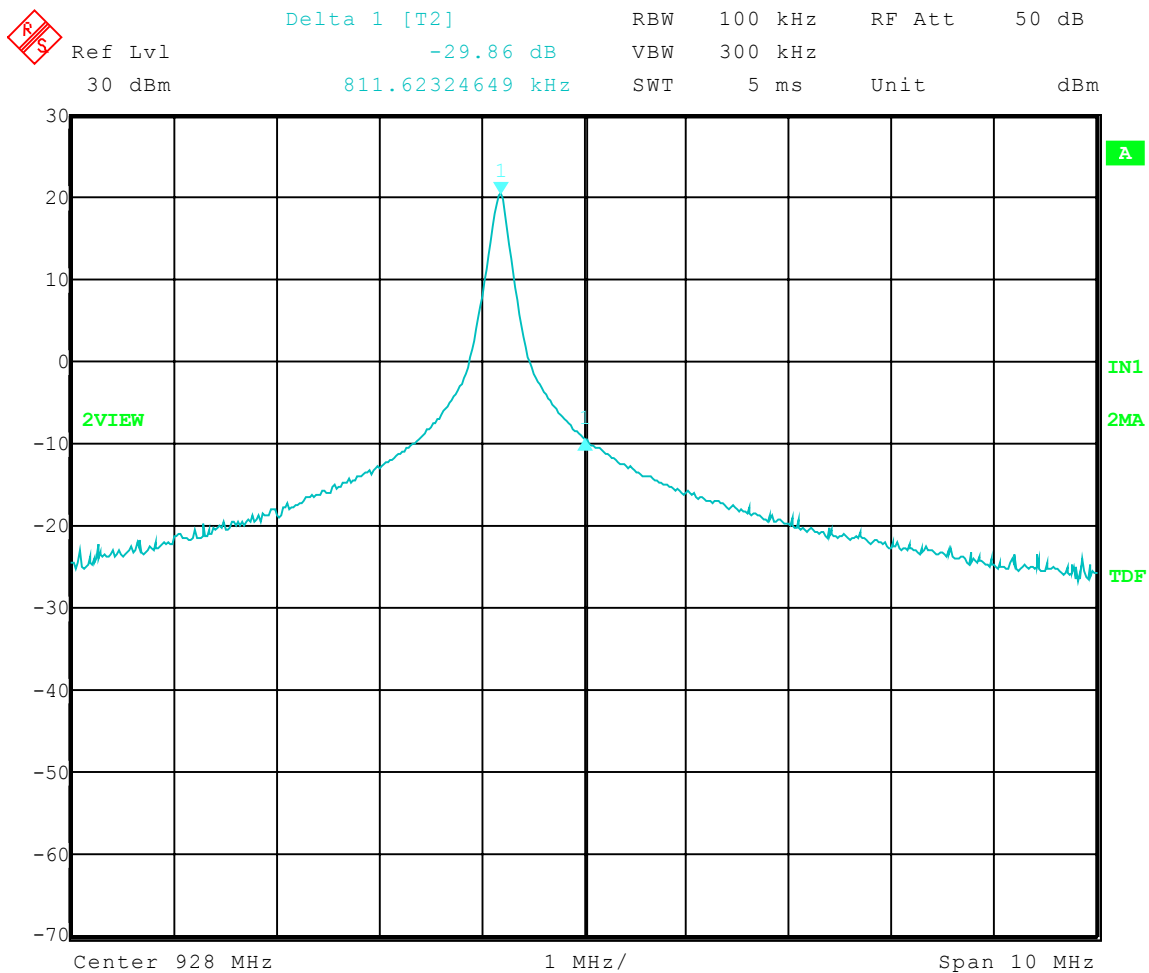
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: High Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **High Channel**: Frequency – 927.223 MHz
Modulation: EPC ISO18000-6B

Band-Edge Frequency = 928 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 13:35:01



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RF CONDUCTED 20 dBm

BAND EDGE COMPLIANCE

FREQUENCY HOPPING ON



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

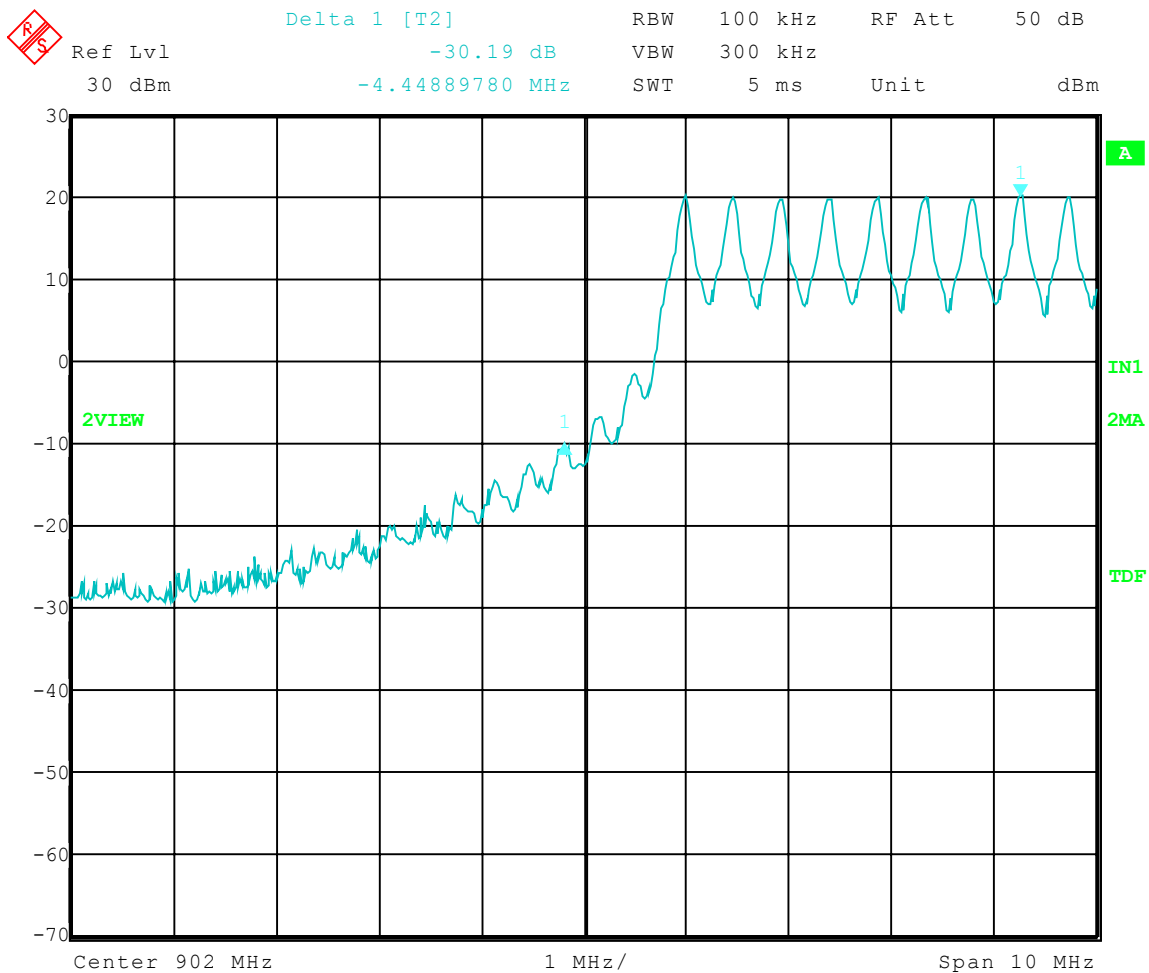
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **Low Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC C1

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 12:58:15



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

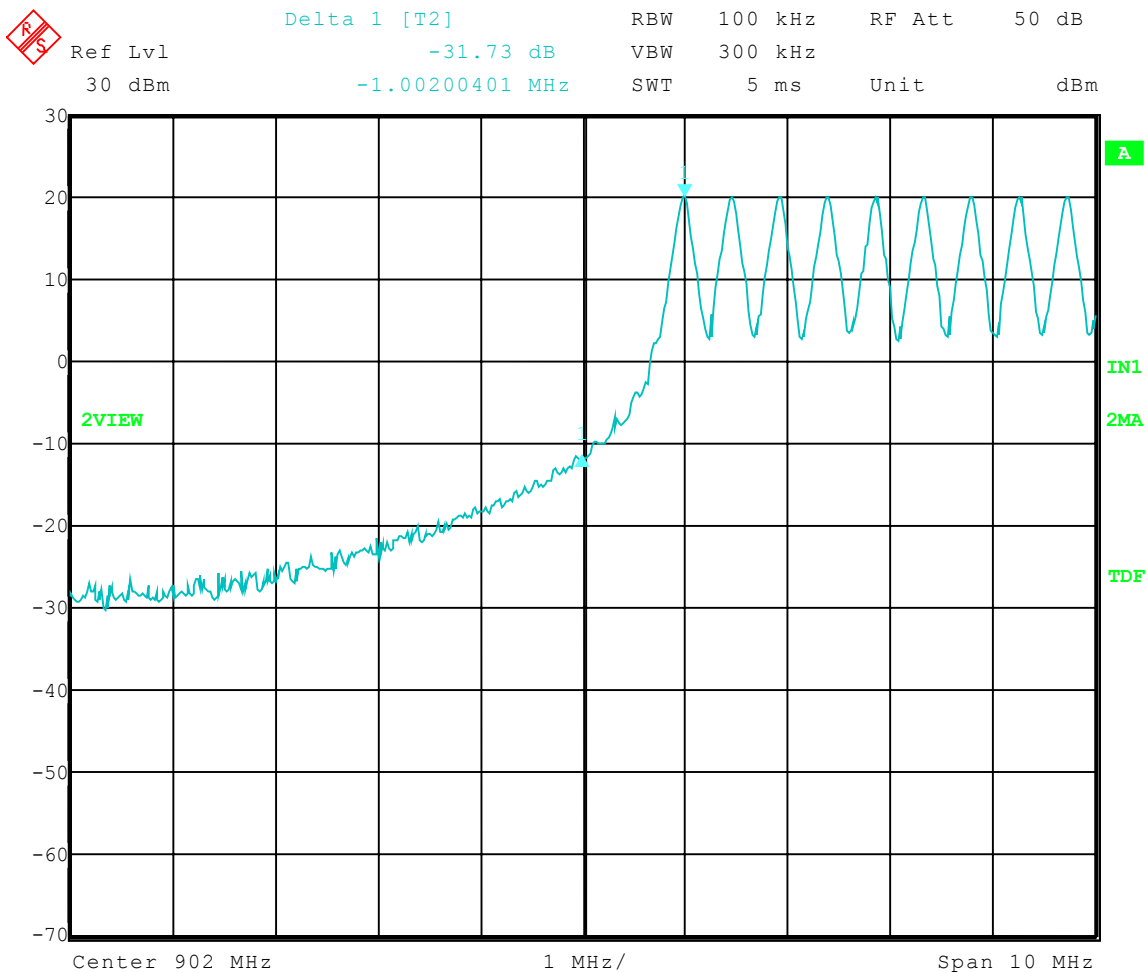
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **Low Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC C0+

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 12:59:57



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

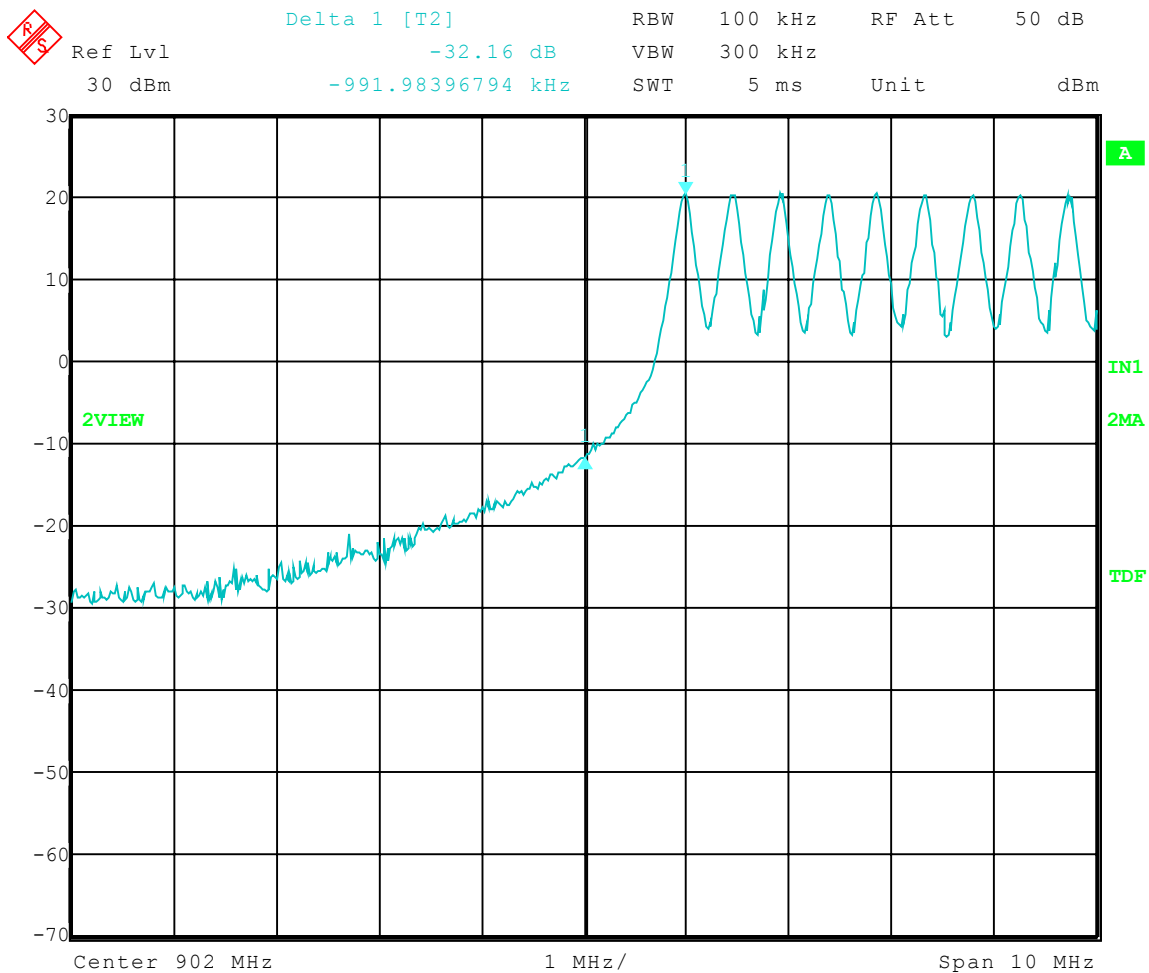
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **Low Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC ISO18000-6B

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 13:01:44



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

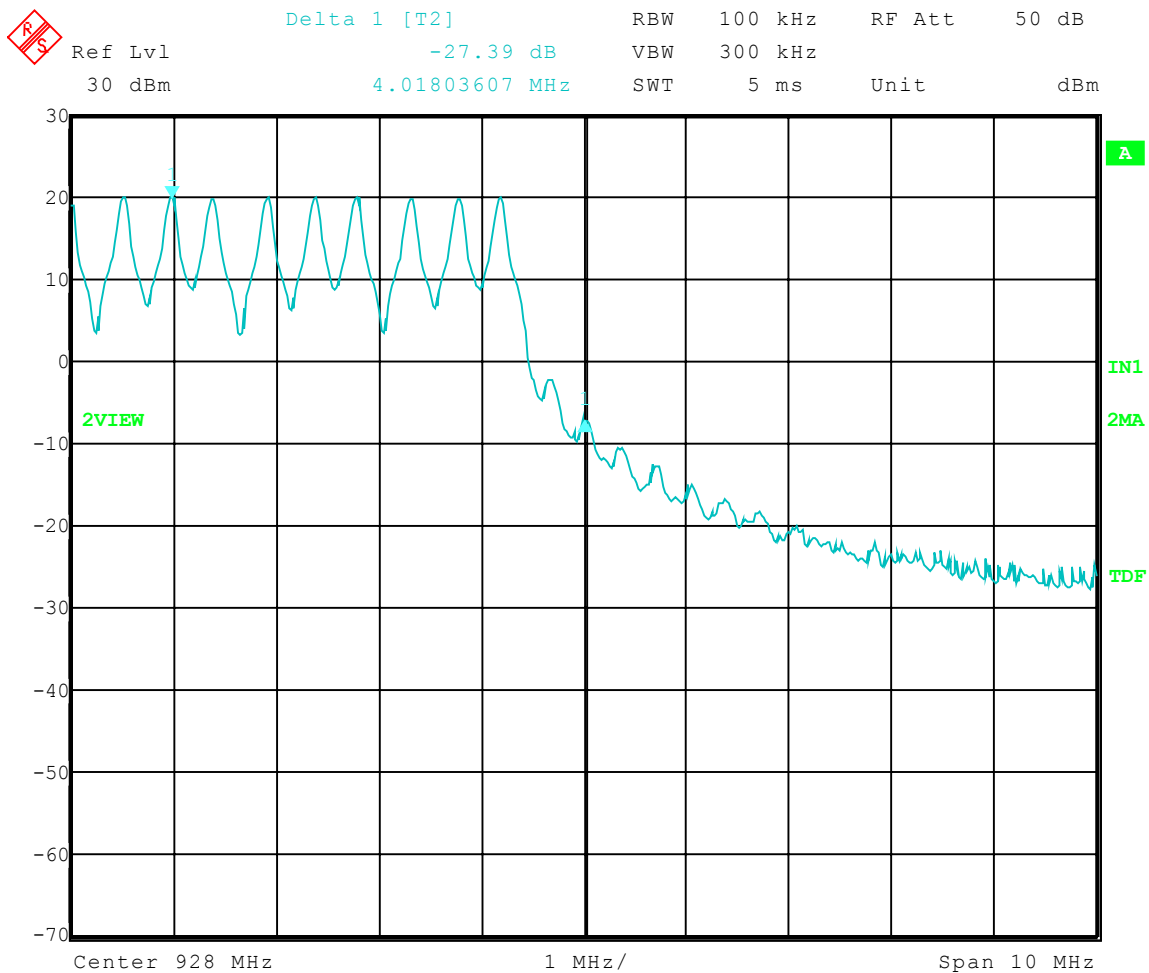
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **High Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC C1

Band-Edge Frequency = 928 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 13:38:41



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

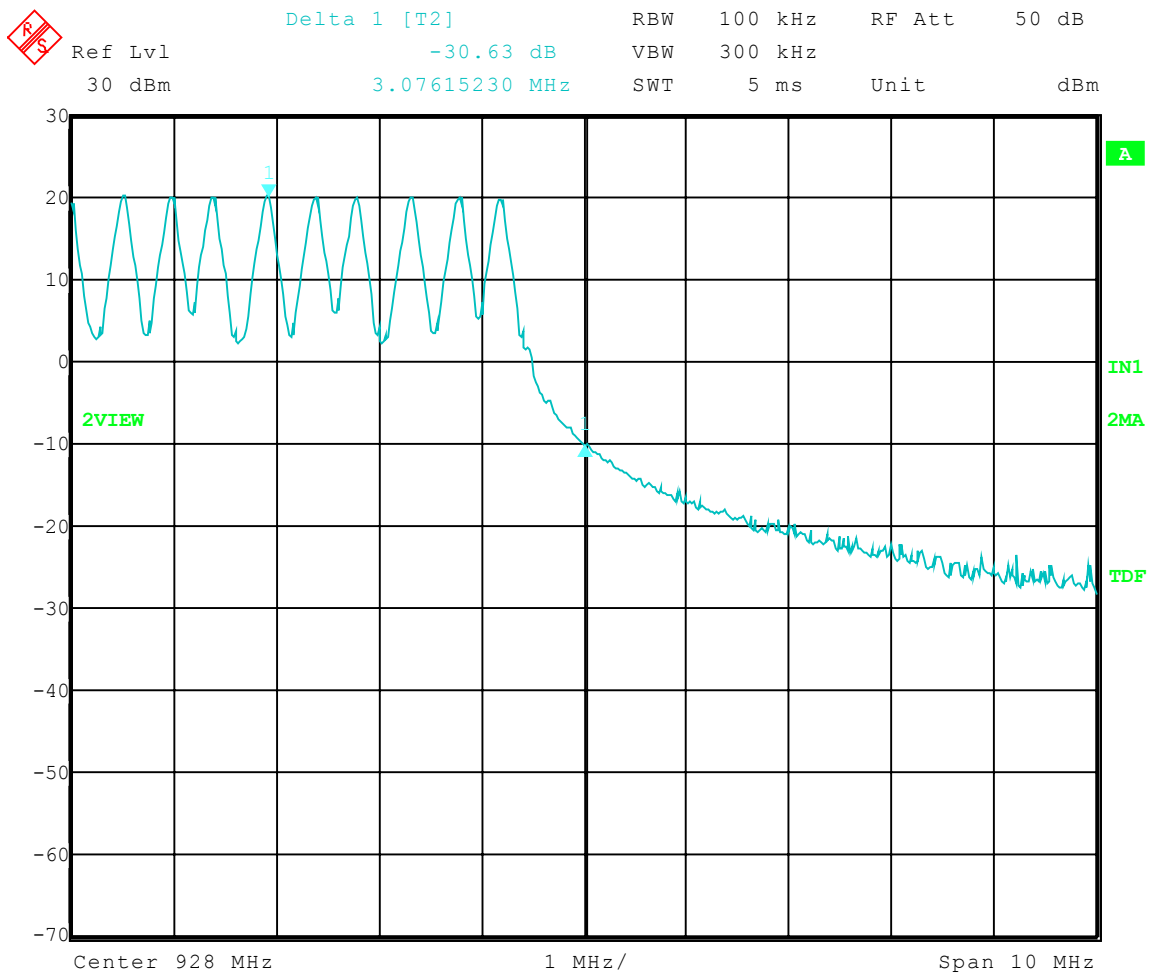
APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **High Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC C0+

Band-Edge Frequency = 928 MHz

Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 13:40:28



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

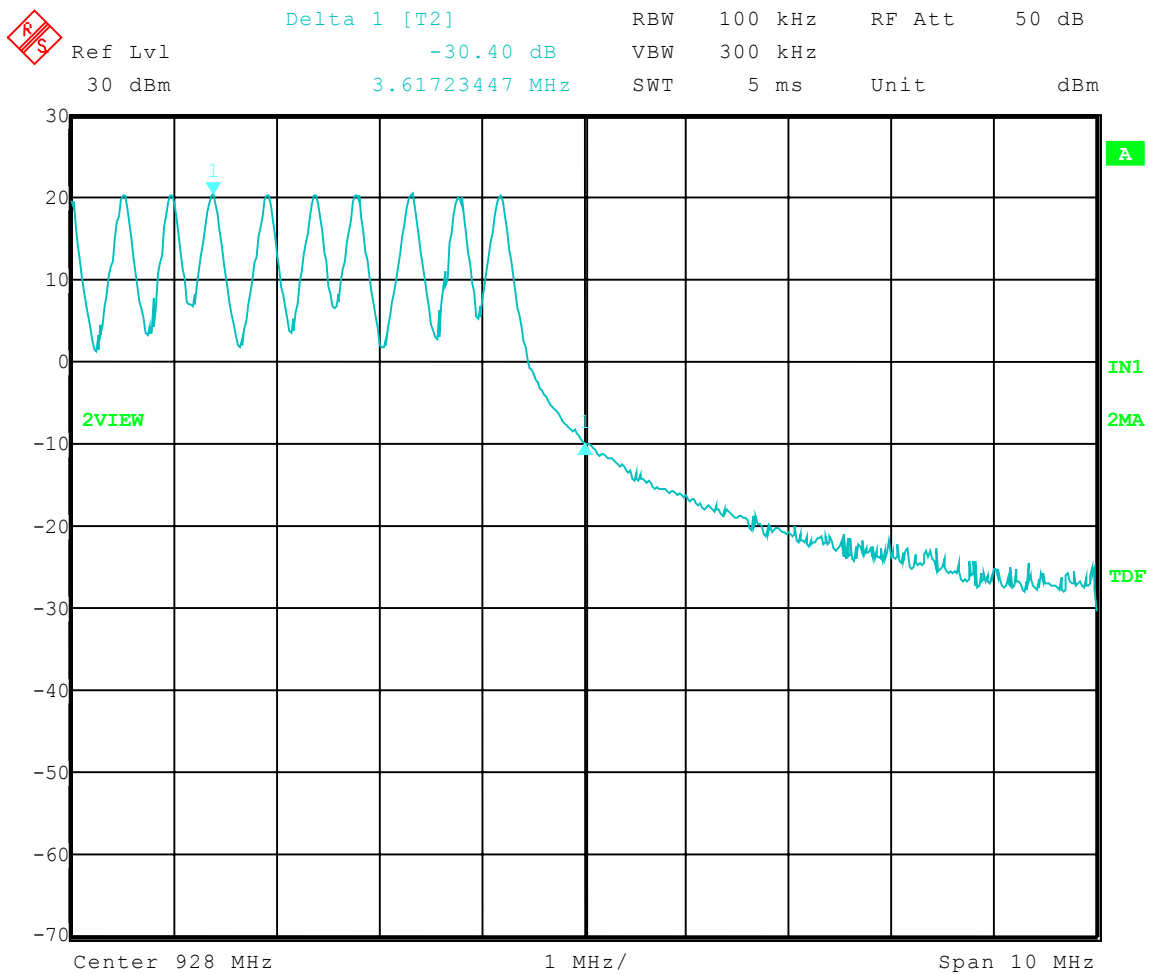
APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **High Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC ISO18000-6B

Band-Edge Frequency = 928 MHz

Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 13:42:41



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RF CONDUCTED 30 dBm

BAND EDGE COMPLIANCE



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

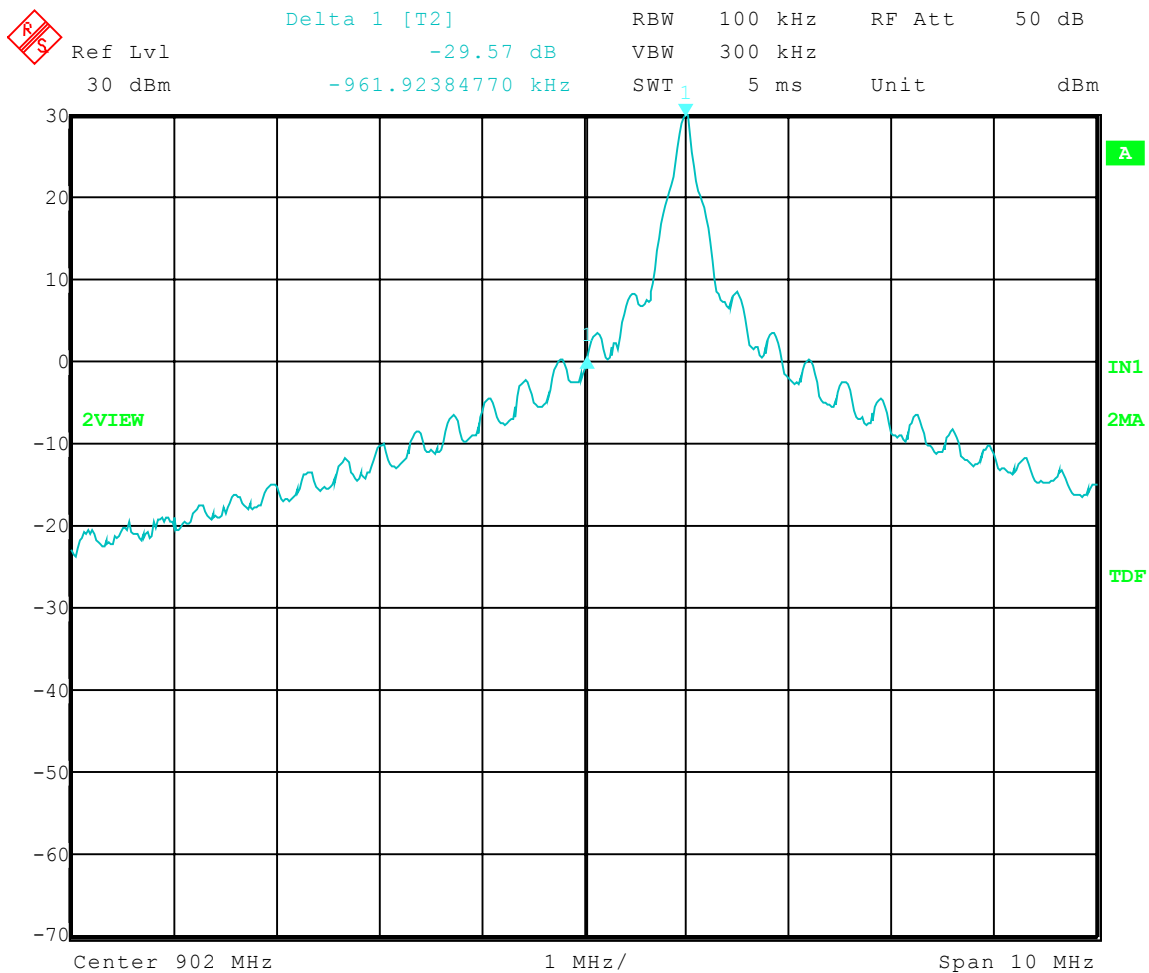
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Low Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **Low Channel**: Frequency – 902.967 MHz
Modulation: EPC C1

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 10:57:33



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

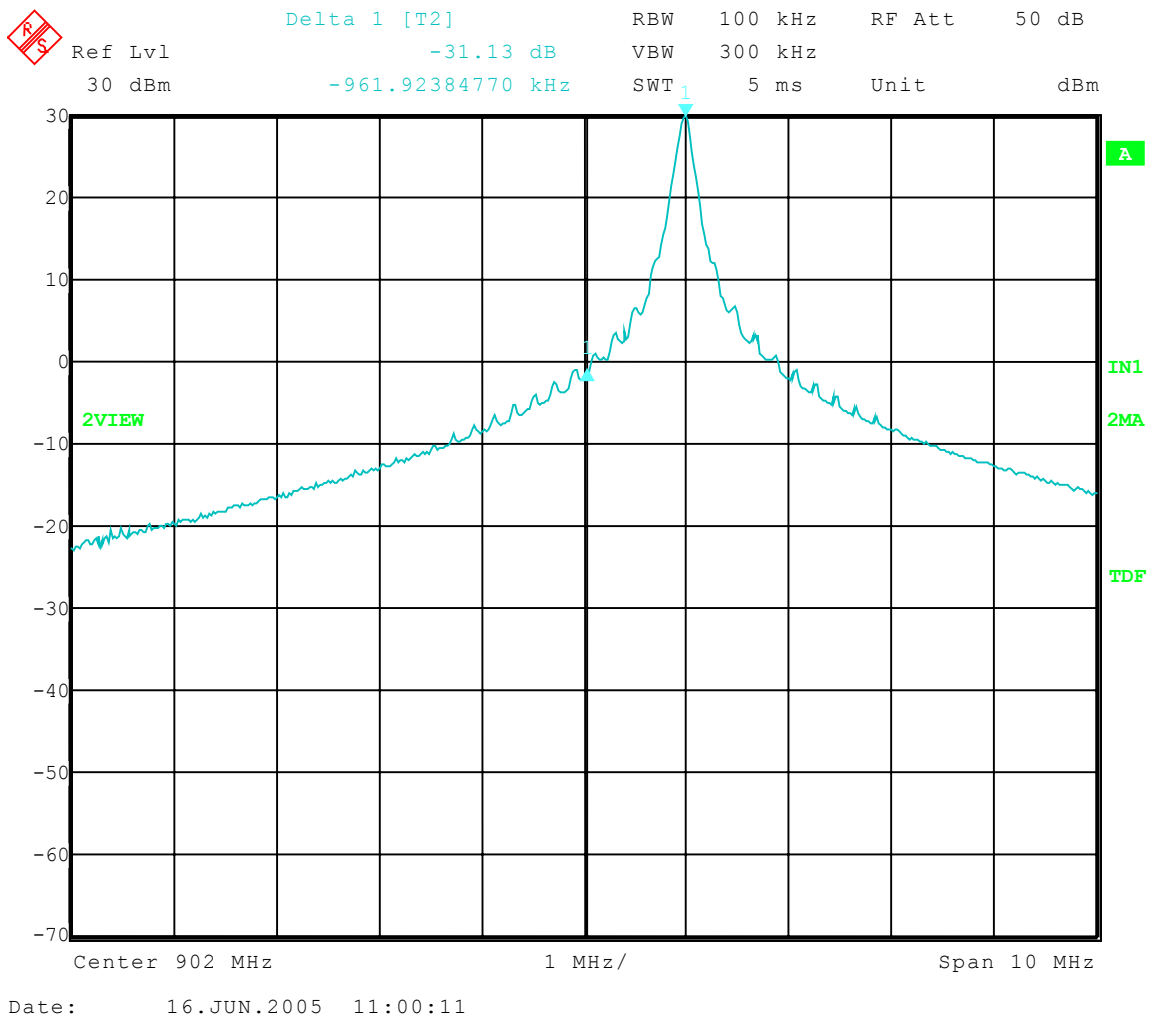
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Low Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **Low Channel**: Frequency – 902.967 MHz
Modulation: EPC C0+

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission





Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

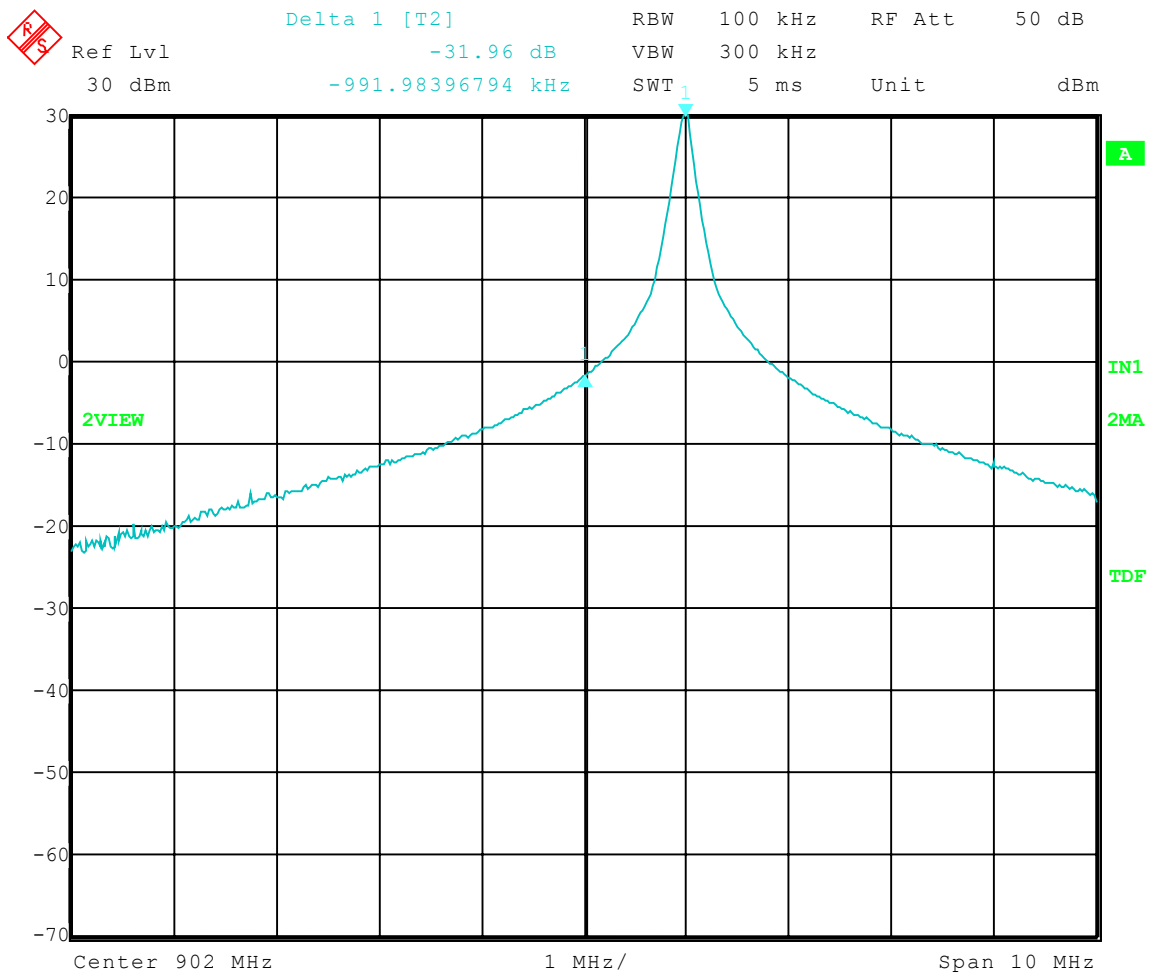
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: Low Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **Low Channel**: Frequency – 902.967 MHz
Modulation: EPC ISO18000-6B

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 11:02:36



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

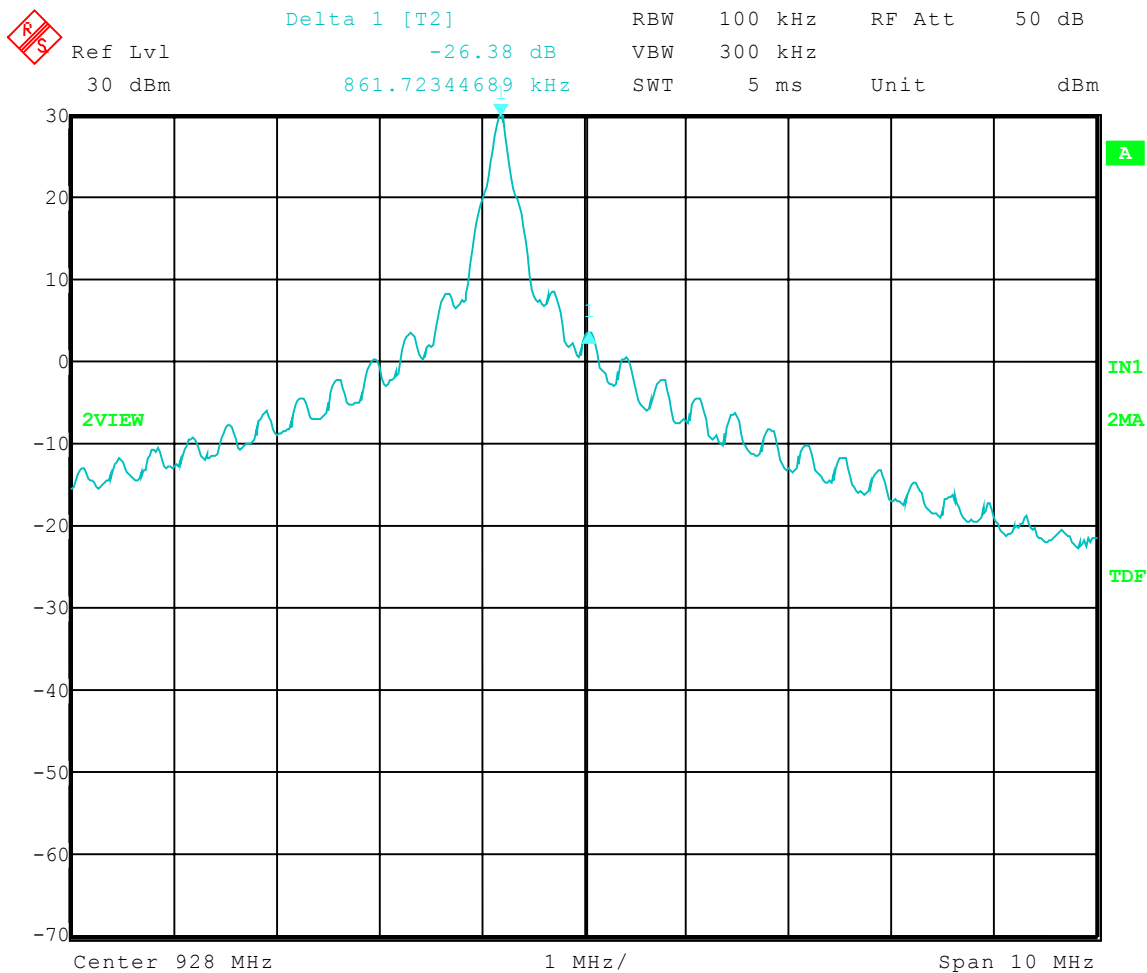
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: High Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **High Channel**: Frequency – 927.223 MHz
Modulation: EPC C1

Band-Edge Frequency = 928 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 11:14:19



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

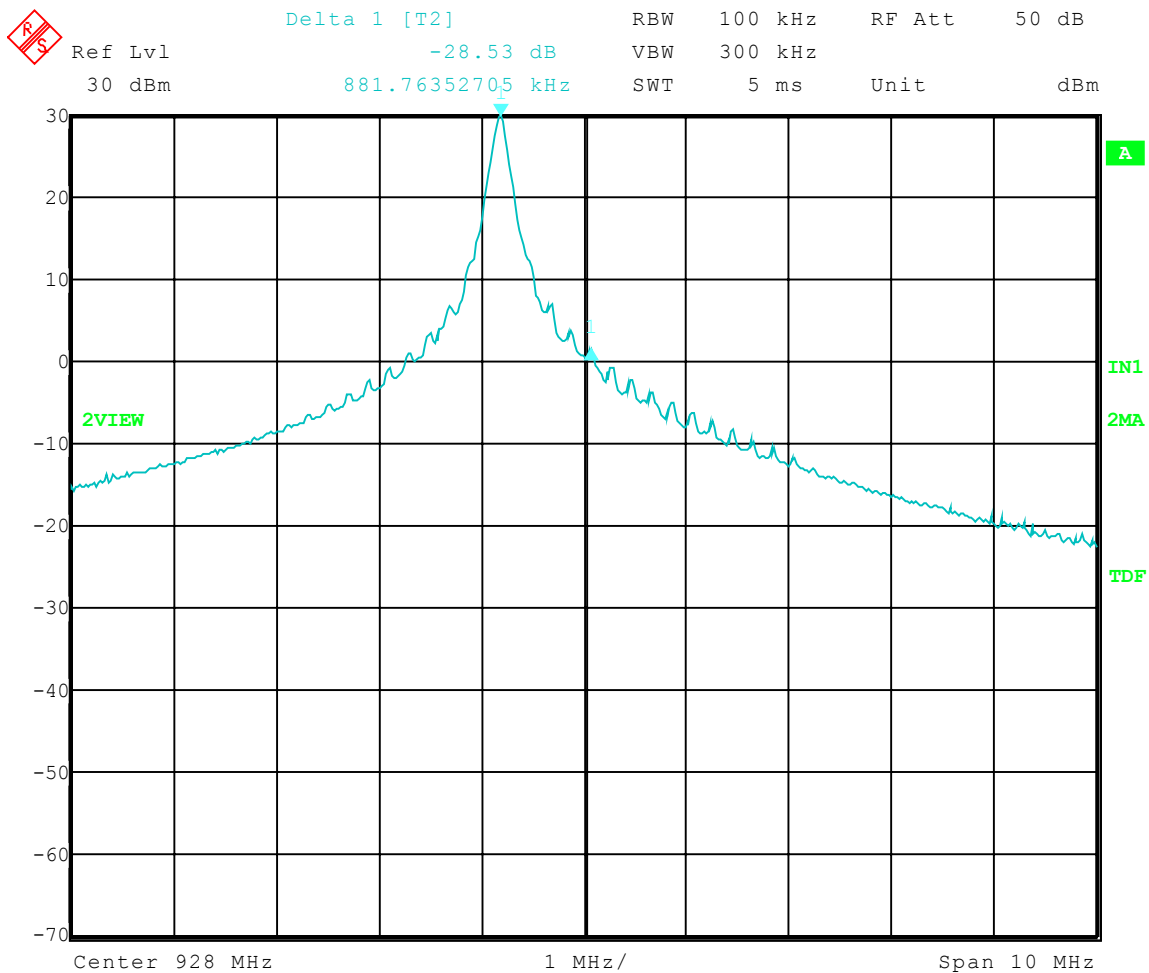
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: High Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **High Channel**: Frequency – 927.223 MHz
Modulation: EPC C0+

Band-Edge Frequency = 928 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 11:16:42



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

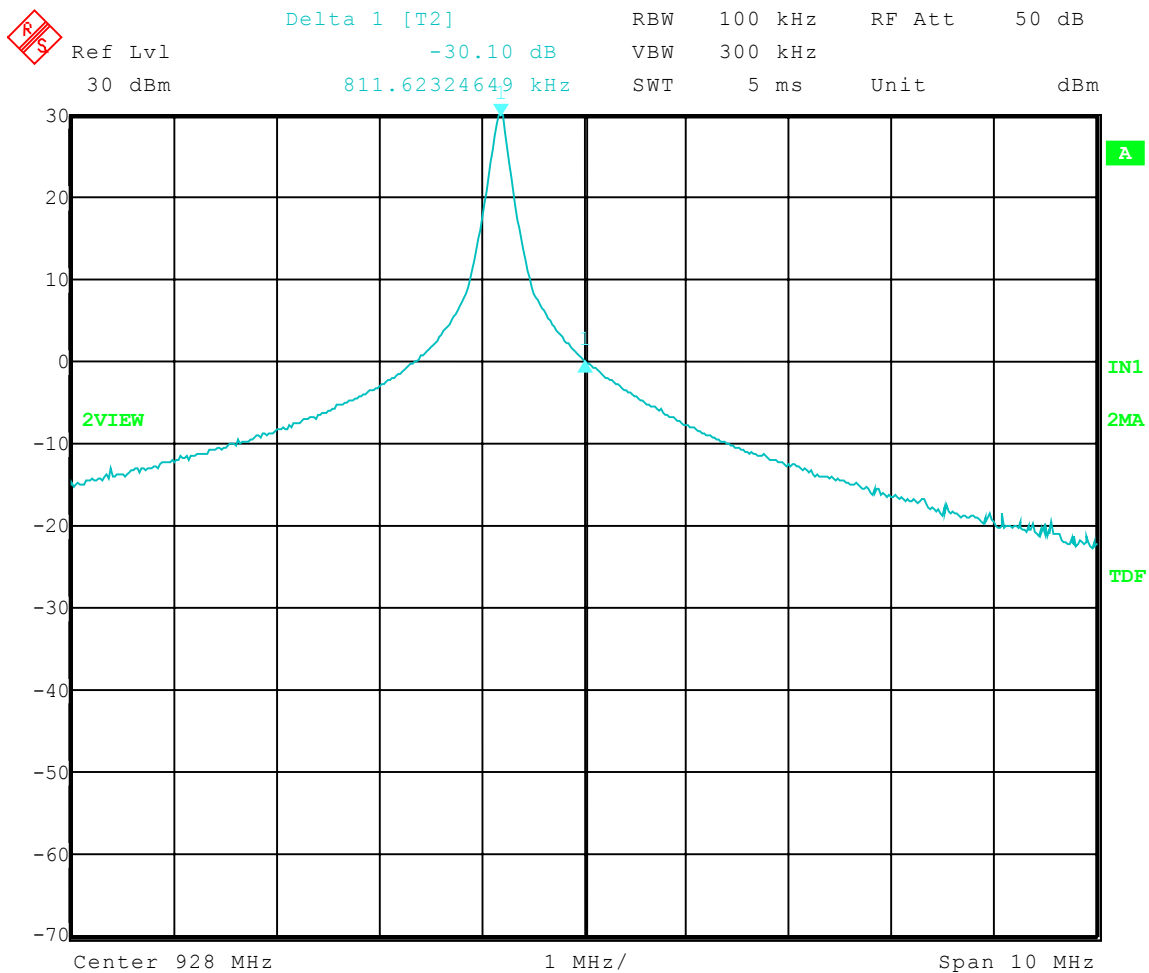
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: High Band-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: **High Channel**: Frequency – 927.223 MHz
Modulation: EPC ISO18000-6B

Band-Edge Frequency = 928 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 11:19:01



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RF CONDUCTED 30 dBm

BAND EDGE COMPLIANCE

FREQUENCY HOPPING ON



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

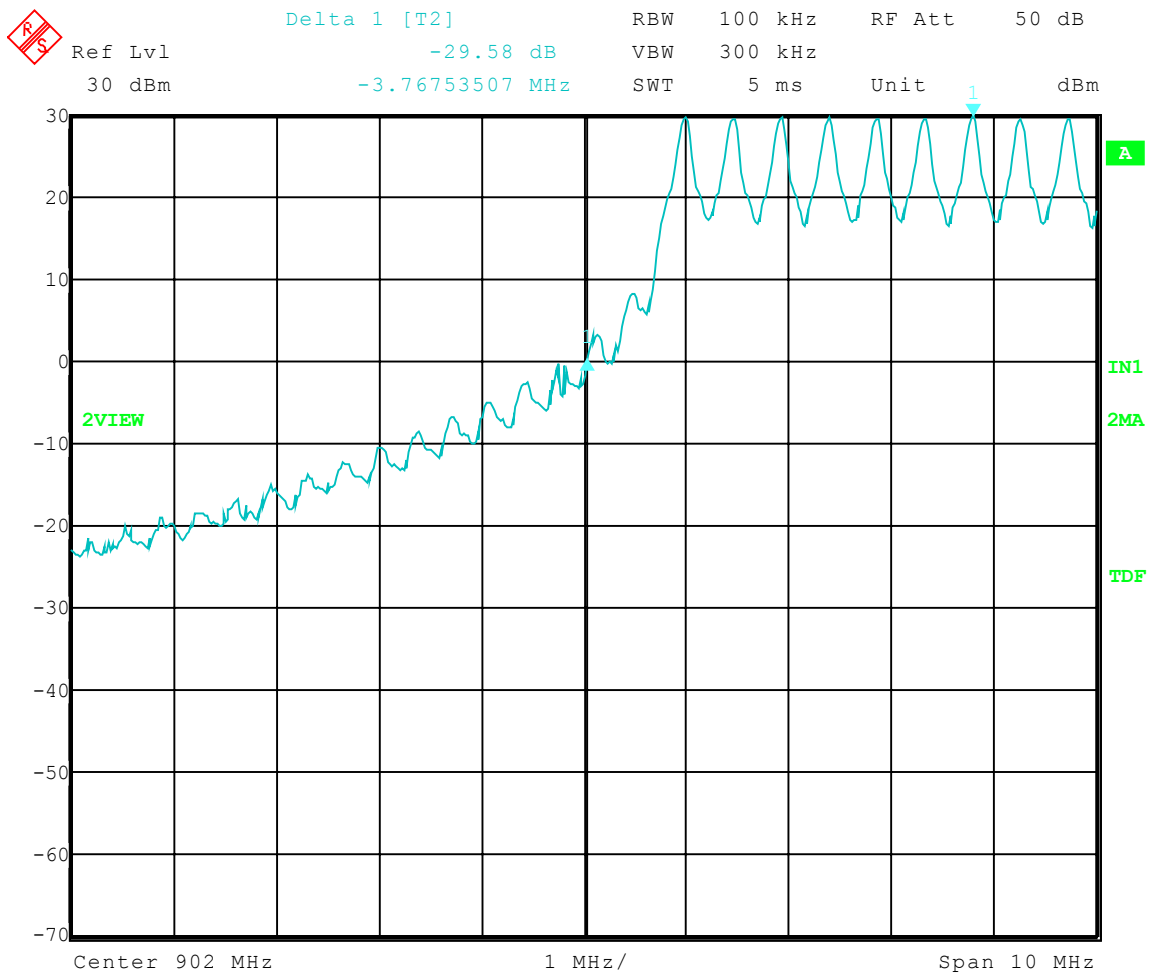
APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **Low Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC C1

Band-Edge Frequency = 902 MHz

Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 10:41:27



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

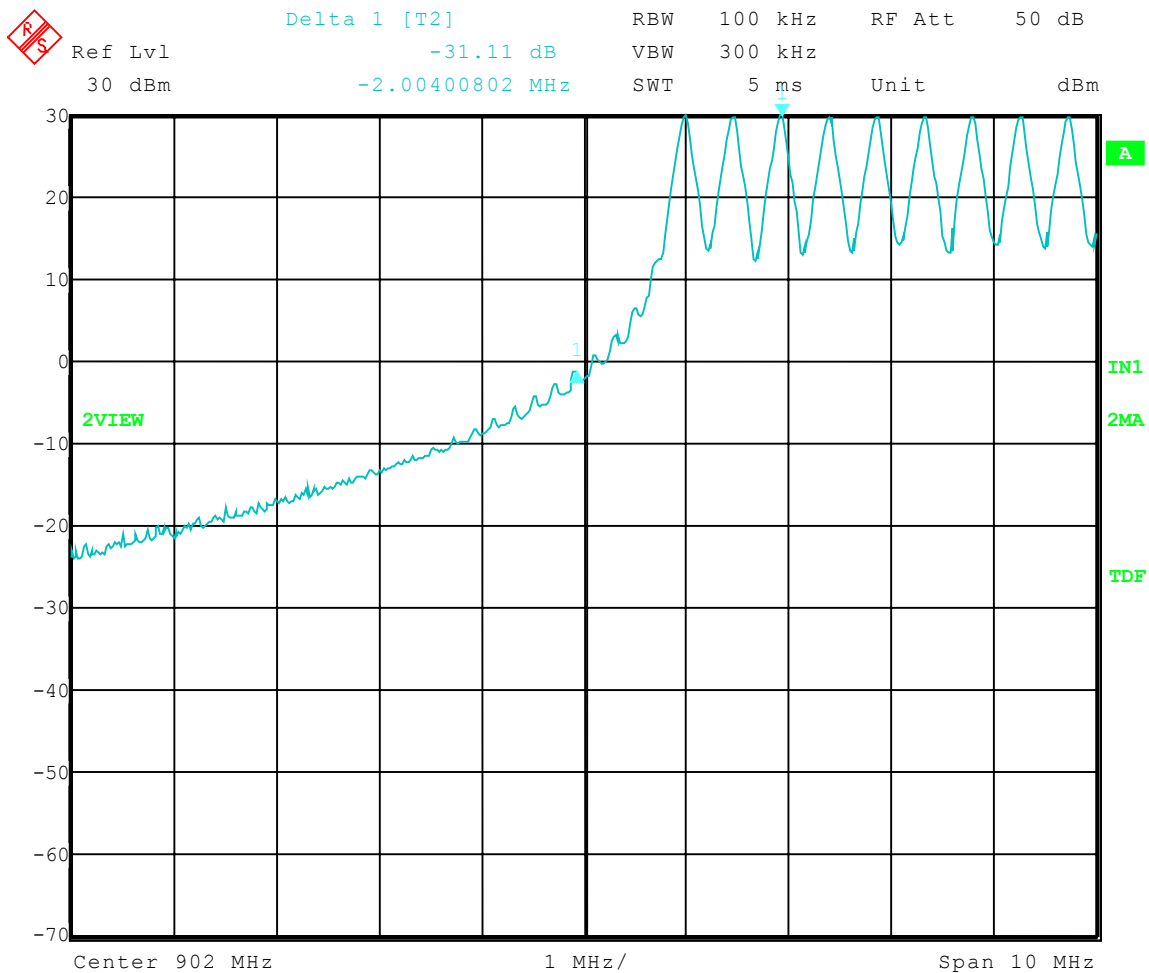
APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **Low Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC C0+

Band-Edge Frequency = 902 MHz

Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 10:37:59



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

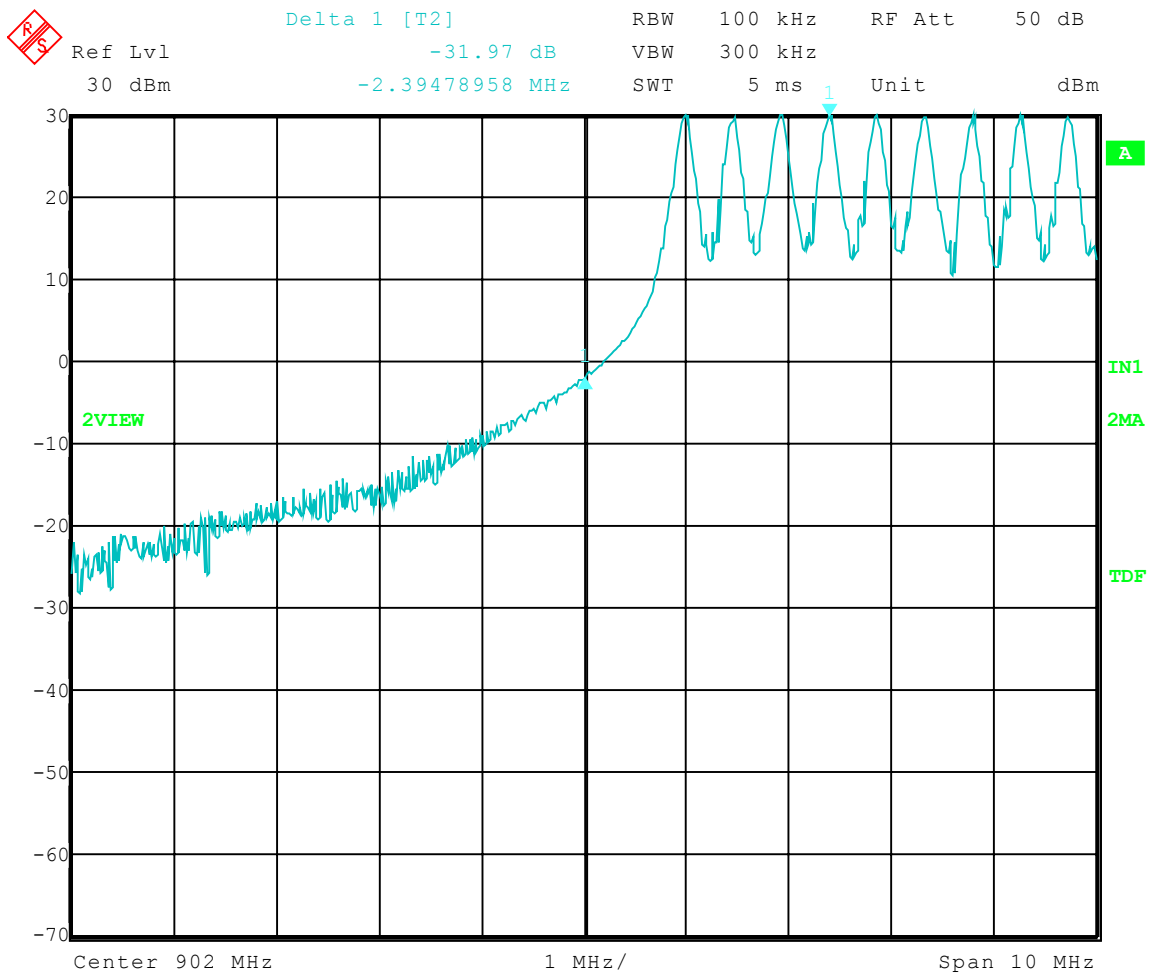
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **Low Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC ISO18000-6B

Band-Edge Frequency = 902 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 10:34:28



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

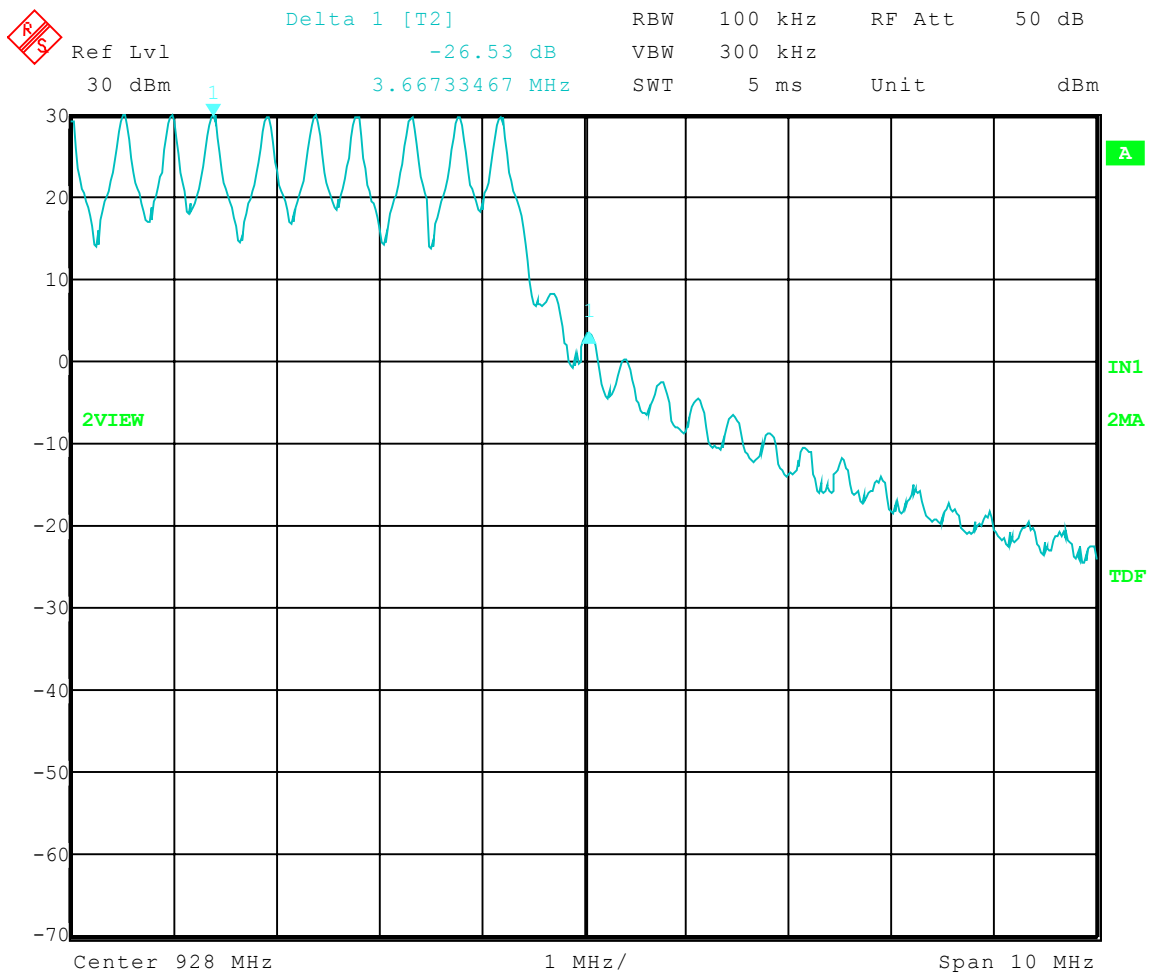
APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **High Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC C1

Band-Edge Frequency = 928 MHz

Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 11:24:45



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

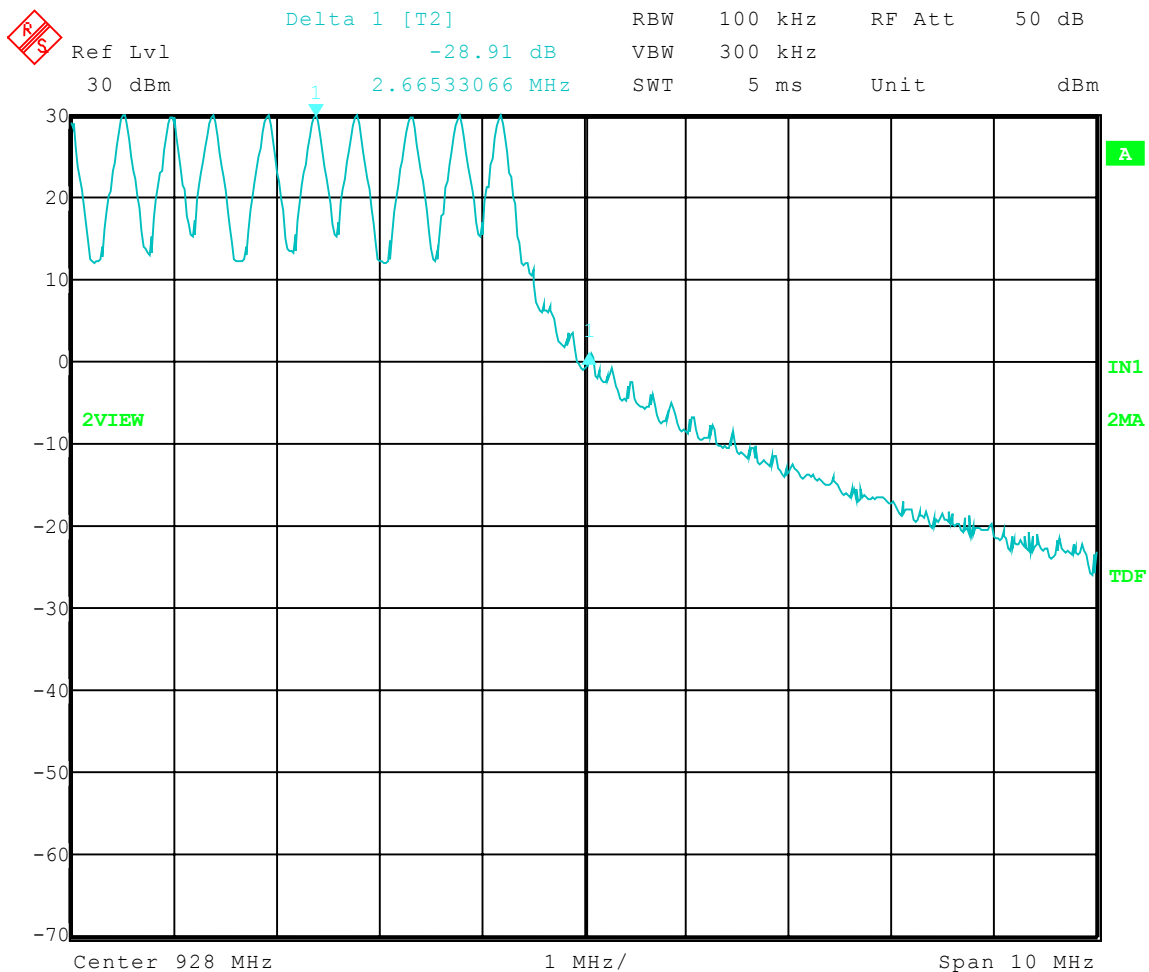
APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **High Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC C0+

Band-Edge Frequency = 928 MHz

Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 11:27:19



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

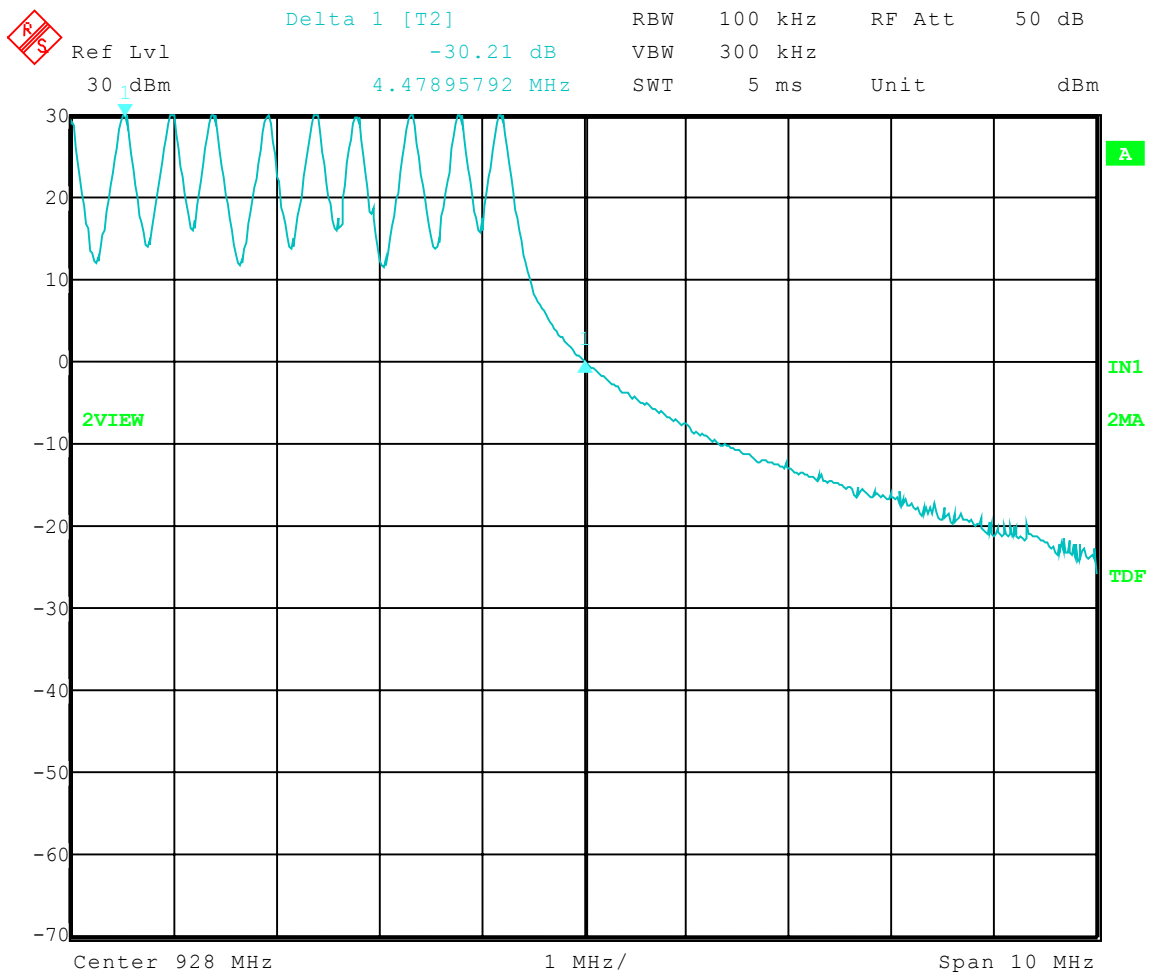
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 06-16-2005
Company: Zebra Technologies
EUT: ZM4e
Test: **High Band**-Edge Compliance - Conducted
Operator: Craig Brandt

Comment: Spread Spectrum Frequency Hopping On
Modulation: EPC ISO18000-6B

Band-Edge Frequency = 928 MHz
Band-Edge > 20 dB Below Peak In-Band Emission



Date: 16.JUN.2005 11:31:50



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

6.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS

The radiated measurements made at D.L.S. Electronic Systems, Inc., for the Zebra RFID Multiprotocol Encoder ZM4e, Model Number: ZM4e, 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 Zebra RFID Multiprotocol Encoder ZM4e were made up to 10000 MHz, in accordance with Section 15.33a for Intentional Radiators with a fundamental frequency of 928 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 15.247 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 25 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 C63.4-2003, 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.



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

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

As stated in Section 15.247(b) the allowed maximum peak output power of the transmitter shall not exceed 1 Watt. In any 100 kHz bandwidth outside these frequency bands (the power that is produced by the modulation products of the spreading sequence), the information sequence and the carrier frequency shall be either at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Attenuation below the general limits specified in 15.209 is not required.

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 **73°F** at **66%** relative humidity.



Company: Zebra Technologies Corporation
Model Tested: ZM4e
Report Number: 11475

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RADIATED DATA AND GRAPH(S) TAKEN FOR

FIELD STRENGTH

SPURIOUS EMISSION MEASUREMENTS

PART 15.247

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 63% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: R4M Coupler ZPN: 21052
Comment: Tx mode; Rx mode; Low, Mid, High channels
Date: 06-15-2005

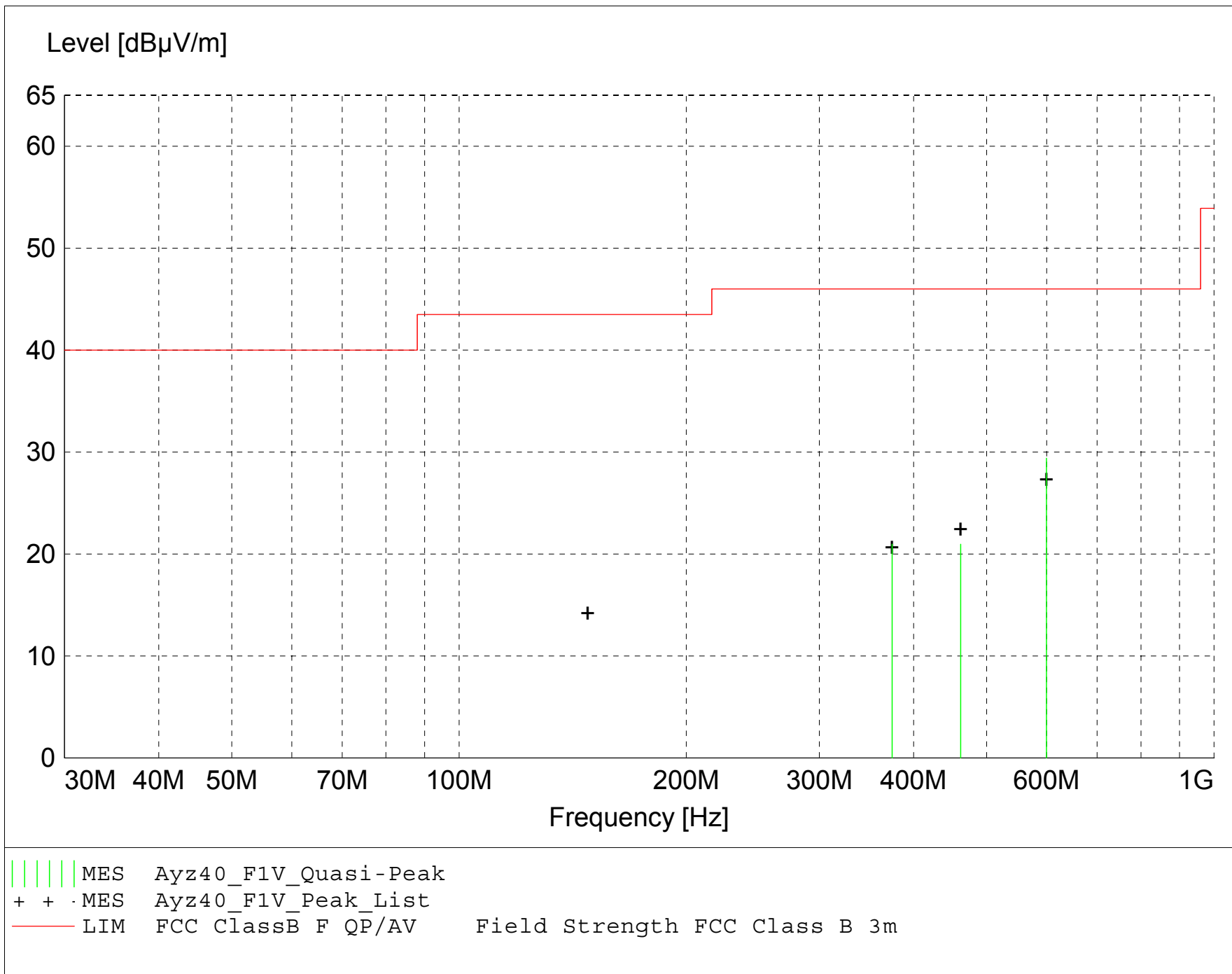
TEXT: "Site 3 MidV 3M"

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



MEASUREMENT RESULT: "Ayz40_F1V_Final"

6/15/2005 1:00PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant. m	EuT Angle deg	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB				
0.000000	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0		
599.990000	30.75	18.95	-20.3	29.4	46.0	16.6	1.00	90	QUASI-PEAK	None
461.440000	25.40	16.70	-21.1	21.0	46.0	25.0	1.00	225	QUASI-PEAK	None
374.650000	27.43	15.11	-21.6	21.0	46.0	25.0	1.00	225	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 63% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: R4M Coupler ZPN: 21052
Comment: Tx mode; Rx mode; Low, Mid, High channels
Date: 06-15-2005

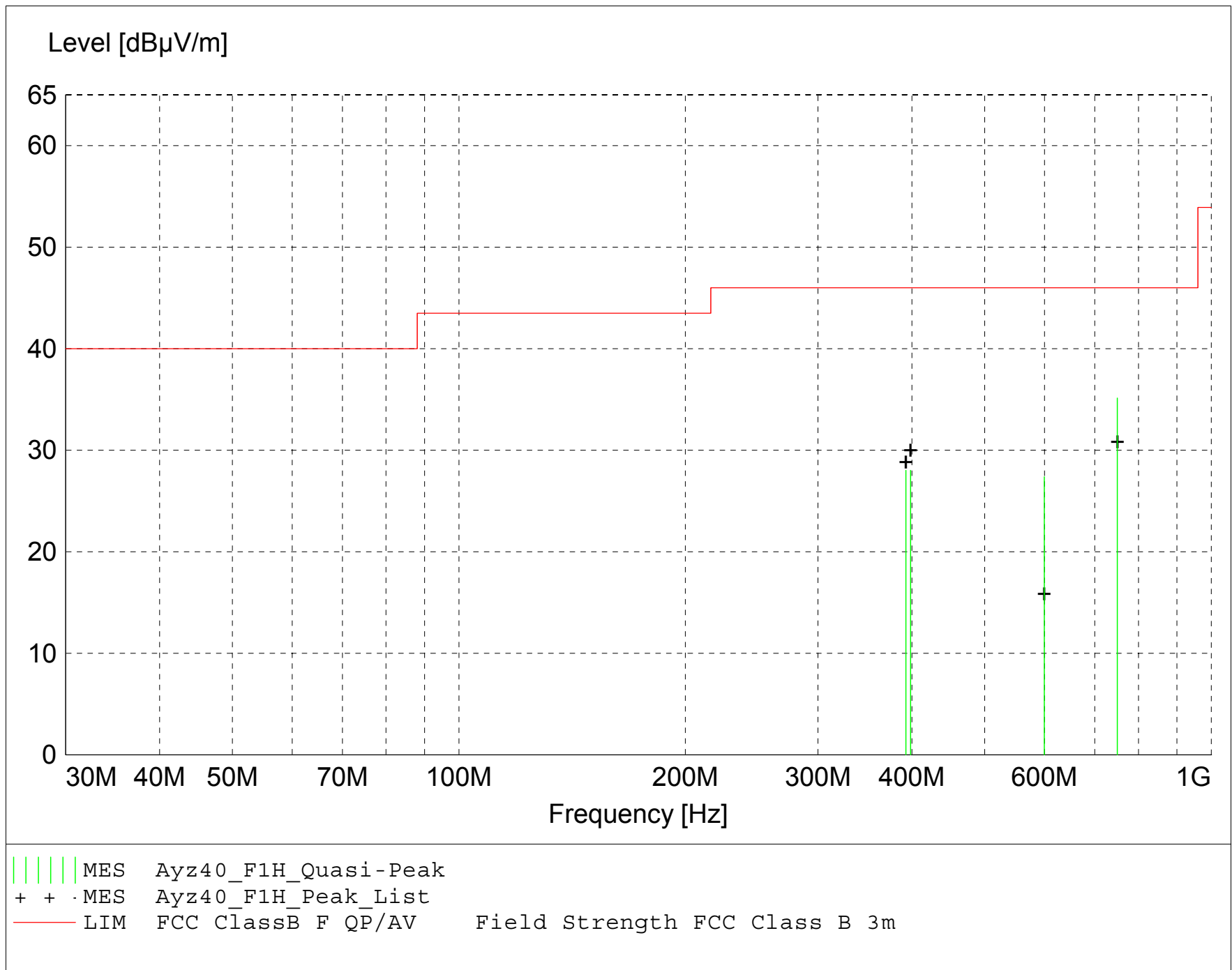
TEXT: "Site 3 MidH 3M"

Short Description: Test Set-up Horz30-1000MHz
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 HORIZONTAL Antenna Polarisation



MEASUREMENT RESULT: "Ayz40_F1H_Final"

6/15/2005 1:04PM

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		
749.990000	31.57	21.36	-17.8	35.1	46.0	10.9	1.20	135	QUASI-PEAK	None
398.270000	33.76	15.67	-21.4	28.0	46.0	18.0	2.20	135	QUASI-PEAK	None
392.690000	33.98	15.50	-21.5	28.0	46.0	18.0	2.20	135	QUASI-PEAK	None
599.990000	28.74	18.95	-20.3	27.4	46.0	18.6	1.60	135	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 63% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: R170XiIII Coupler ZPN: 27050
Comment: Tx mode; Rx mode; Low, Mid, High channels
Date: 06-15-2005

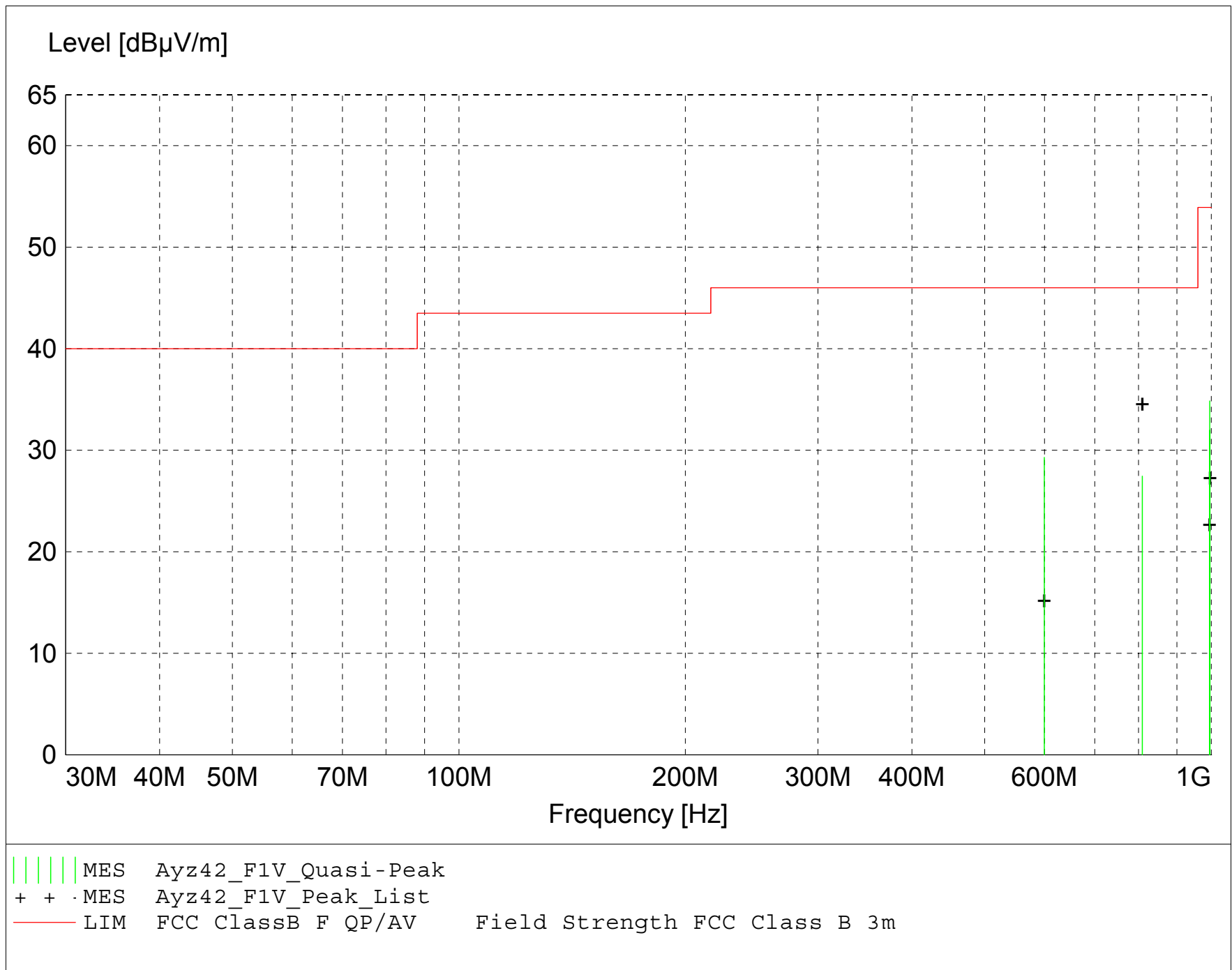
TEXT: "Site 3 MidV 3M"

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



MEASUREMENT RESULT: "Ayz42_F1V_Final"

6/15/2005 2:47PM

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		
599.990000	30.65	18.95	-20.3	29.3	46.0	16.7	1.00	135	QUASI-PEAK	None
809.690000	25.05	21.57	-19.2	27.5	46.0	18.5	1.00	45	QUASI-PEAK	None
994.690000	28.40	23.93	-17.5	34.9	53.9	19.0	1.00	45	QUASI-PEAK	None
995.920000	25.50	23.92	-17.5	32.0	53.9	21.9	1.00	45	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 63% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: R170XiIII Coupler ZPN: 27050
Comment: Tx mode; Rx mode; Low, Mid, High channels
Date: 06-15-2005

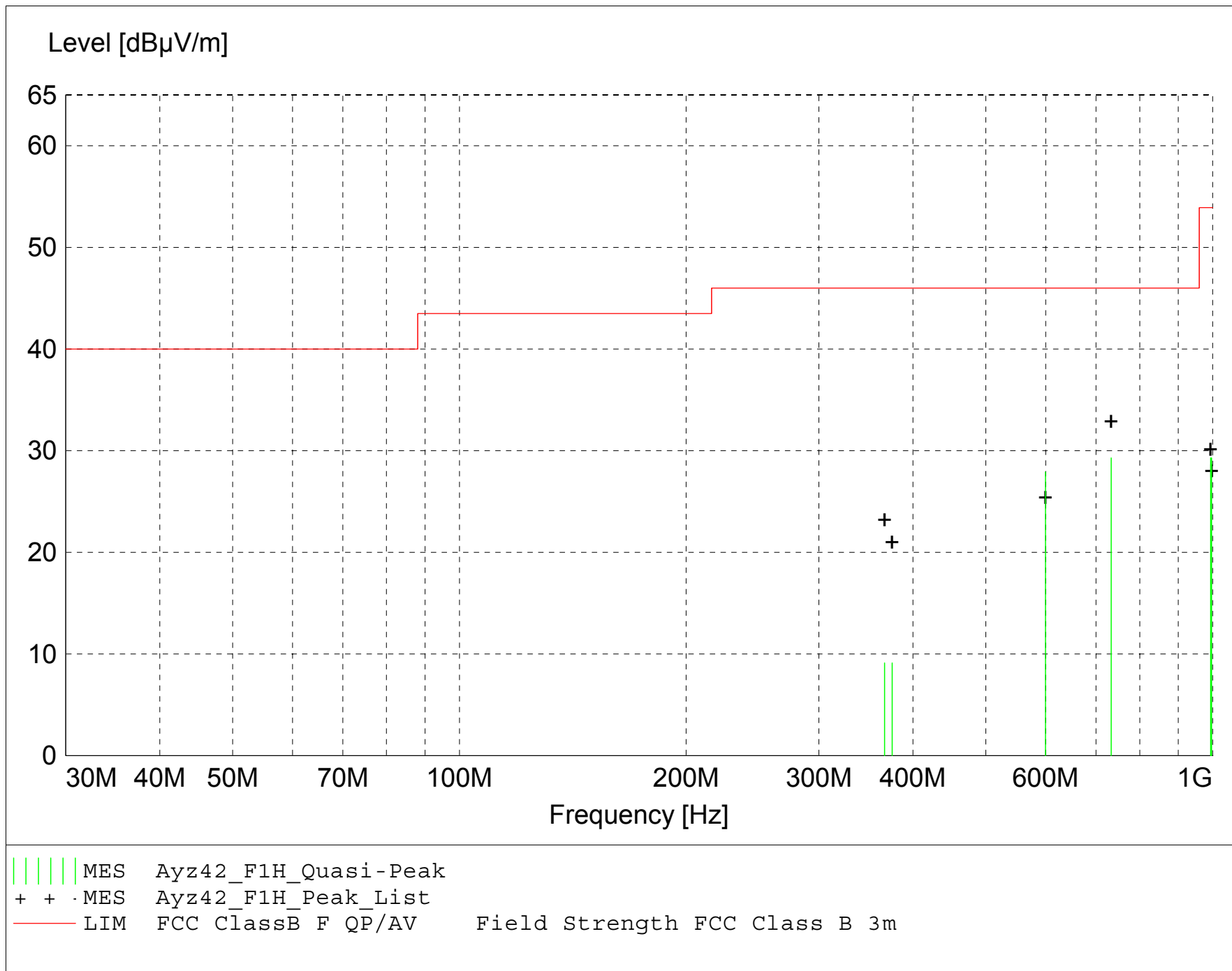
TEXT: "Site 3 MidH 3M"

Short Description: Test Set-up Horz30-1000MHz
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 HORIZONTAL Antenna Polarisation



MEASUREMENT RESULT: "Ayz42_F1H_Final"

6/15/2005 2:47PM

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		
732.850000	25.38	21.35	-17.4	29.3	46.0	16.7	1.00	0	QUASI-PEAK	None
599.990000	29.27	18.95	-20.3	27.9	46.0	18.1	2.00	135	QUASI-PEAK	None
996.990000	22.85	23.88	-17.4	29.3	53.9	24.6	1.00	0	QUASI-PEAK	None
993.620000	22.86	23.90	-17.5	29.3	53.9	24.6	1.00	0	QUASI-PEAK	None
375.180000	15.56	15.14	-21.6	9.1	46.0	36.9	2.00	45	QUASI-PEAK	None
366.710000	15.80	14.95	-21.6	9.1	46.0	36.9	2.00	45	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 63% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: R110XiIII Coupler ZPN: 27060
Comment: Tx mode; Rx mode; Low, Mid, High channels
Date: 06-15-2005

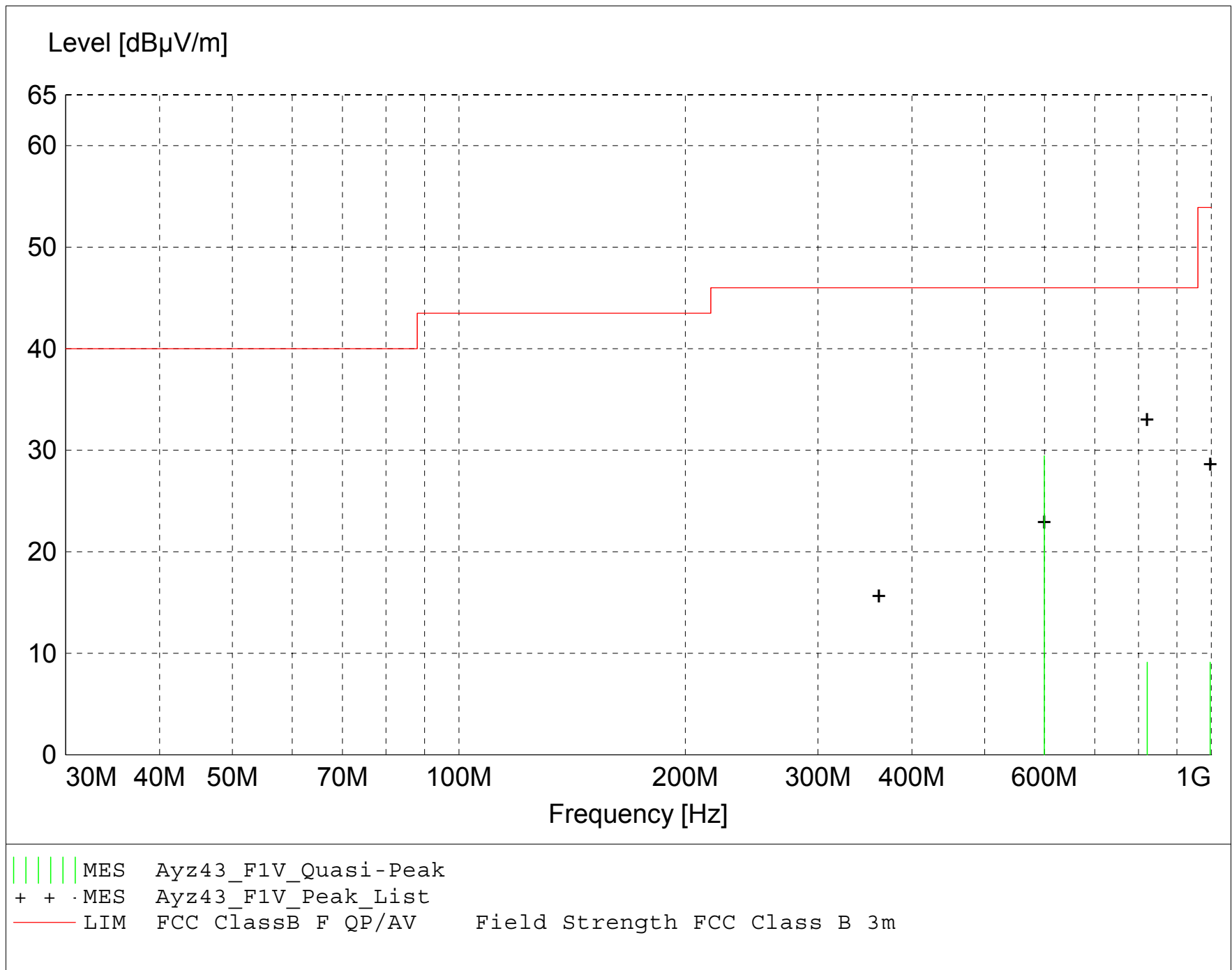
TEXT: "Site 3 MidV 3M"

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



MEASUREMENT RESULT: "Ayz43_F1V_Final"

6/15/2005 3:24PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant. m	EuT Angle deg	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB				
0.000000	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0		
599.990000	30.80	18.95	-20.3	29.4	46.0	16.6	1.00	135	QUASI-PEAK	None
822.070000	6.34	21.88	-19.1	9.1	46.0	36.9	2.20	45	QUASI-PEAK	None
996.950000	2.67	23.88	-17.4	9.1	53.9	44.8	1.00	45	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 63% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: R110XiIII Coupler ZPN: 27060
Comment: Tx mode; Rx mode; Low, Mid, High channels
Date: 06-15-2005

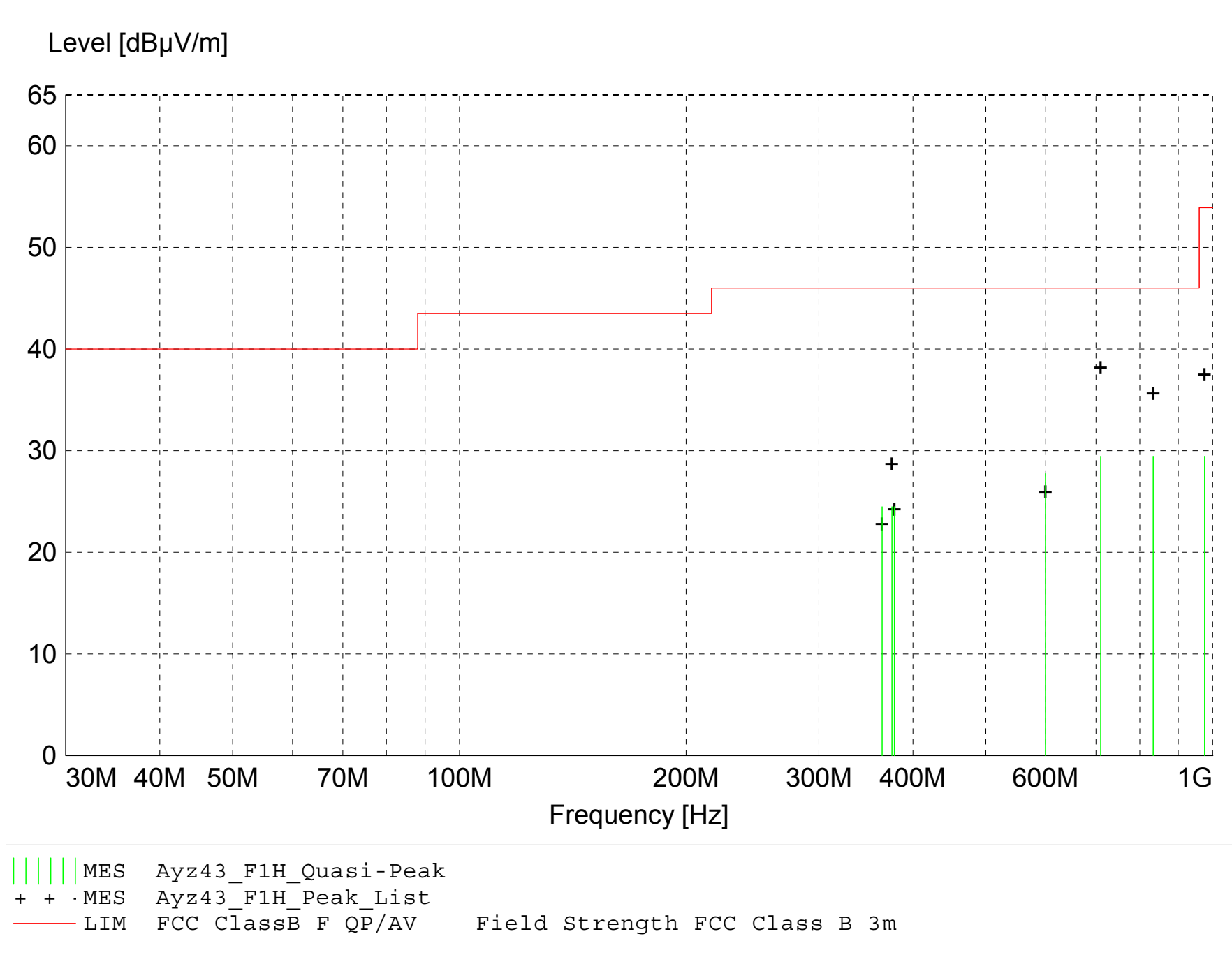
TEXT: "Site 3 MidH 3M"

Short Description: Test Set-up Horz30-1000MHz
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 HORIZONTAL Antenna Polarisation



MEASUREMENT RESULT: "Ayz43_F1H_Final"

6/15/2005 3:27PM

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		
833.670000	26.32	22.17	-19.0	29.4	46.0	16.6	2.00	0	QUASI-PEAK	None
709.950000	26.54	21.33	-18.4	29.4	46.0	16.6	2.00	315	QUASI-PEAK	None
599.990000	29.10	18.95	-20.3	27.7	46.0	18.3	1.80	135	QUASI-PEAK	None
377.950000	30.87	15.16	-21.6	24.5	46.0	21.5	2.00	45	QUASI-PEAK	None
375.115000	30.92	15.13	-21.6	24.5	46.0	21.5	2.00	0	QUASI-PEAK	None
363.910000	31.16	14.96	-21.6	24.5	46.0	21.5	2.00	45	QUASI-PEAK	None
975.370000	23.65	23.47	-17.7	29.4	53.9	24.5	2.00	0	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 63% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: Rpax110 Coupler ZPN: 58989
Comment: Tx mode; Rx mode; Low, Mid, High channels
Date: 06-15-2005

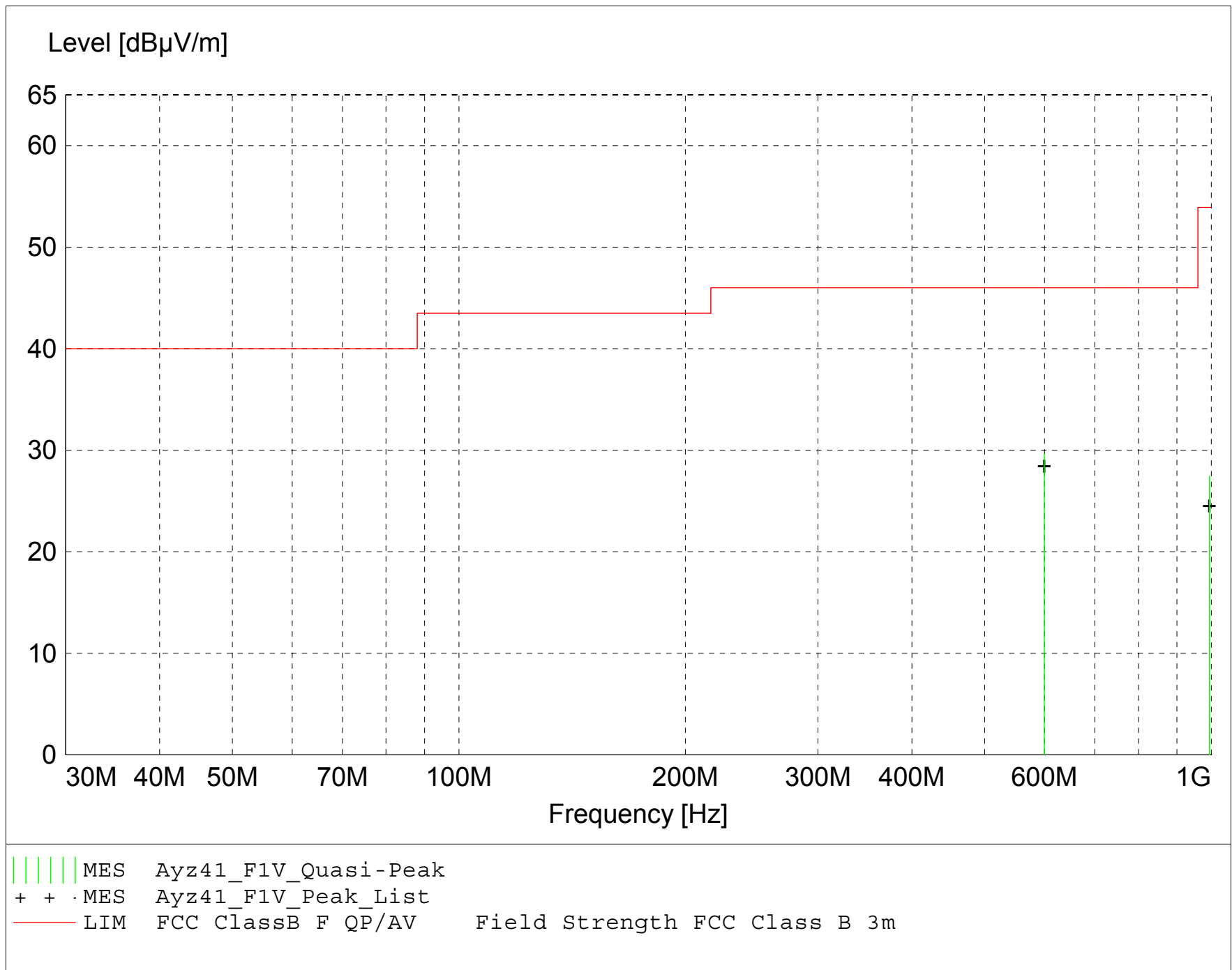
TEXT: "Site 3 MidV 3M"

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



MEASUREMENT RESULT: "Ayz41_F1V_Final"

6/15/2005 2:06PM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant. m	EuT Angle deg	Final Detector	Comment
MHz	dBµV	dBµV/m	dB	dBµV/m	dBµV/m	dB				
599.990000	30.98	18.95	-20.3	29.6	46.0	16.4	1.00	135	QUASI-PEAK	None
994.210000	20.99	23.93	-17.5	27.5	53.9	26.4	1.00	225	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 72 deg. F; 63% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: Rpax110 Coupler ZPN: 58989
Comment: Tx mode; Rx mode; Low, Mid, High channels
Date: 06-15-2005

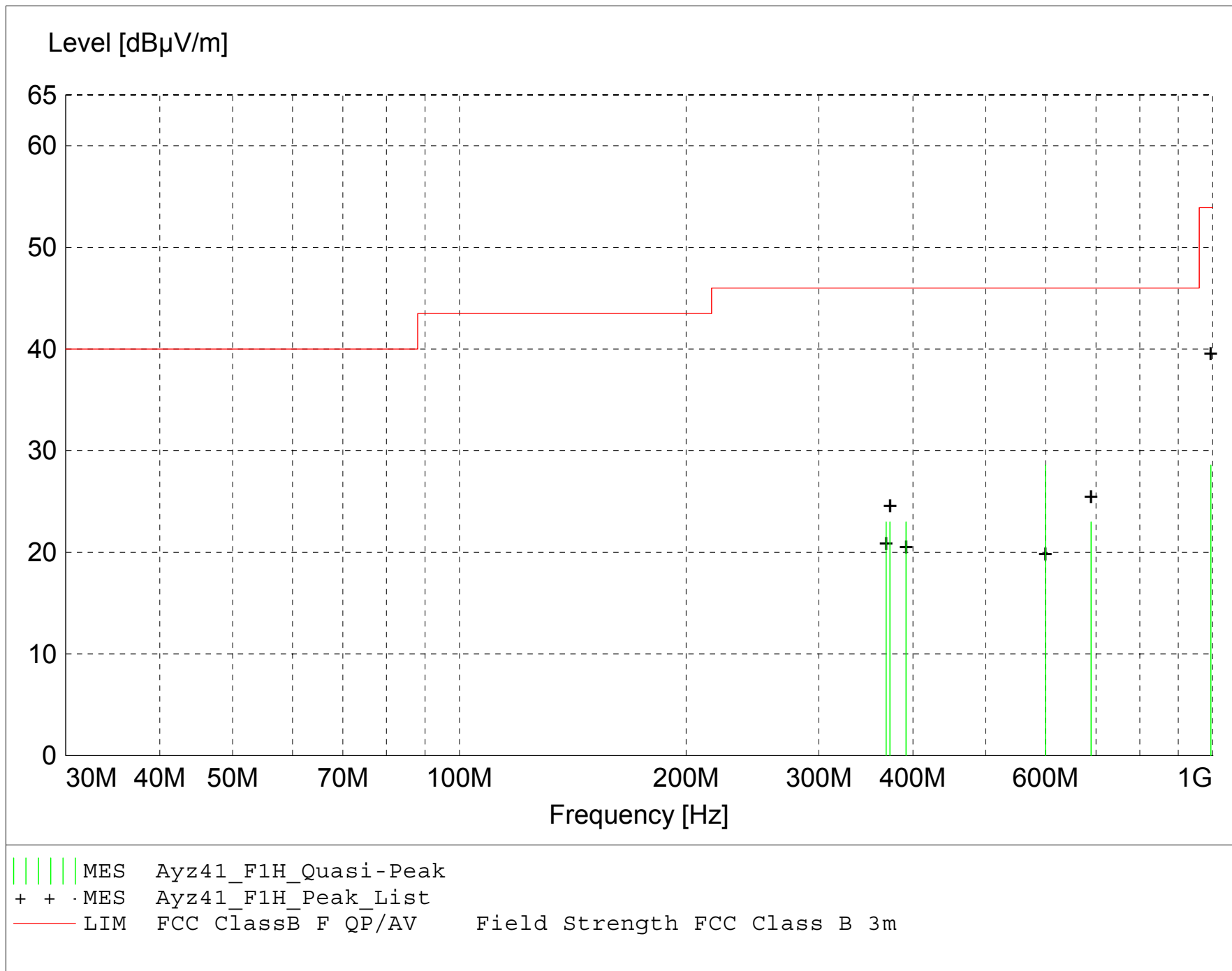
TEXT: "Site 3 MidH 3M"

Short Description: Test Set-up Horz30-1000MHz
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 HORIZONTAL Antenna Polarisation



MEASUREMENT RESULT: "Ayz41_F1H_Final"

6/15/2005 1:54PM

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		
599.990000	29.97	18.95	-20.3	28.6	46.0	17.4	1.70	135	QUASI-PEAK	None
689.560000	21.07	21.22	-19.3	23.0	46.0	23.0	2.00	10	QUASI-PEAK	None
391.700000	28.96	15.48	-21.5	23.0	46.0	23.0	2.00	135	QUASI-PEAK	None
372.800000	29.52	15.06	-21.6	23.0	46.0	23.0	2.00	135	QUASI-PEAK	None
368.485000	29.64	14.97	-21.6	23.0	46.0	23.0	2.00	135	QUASI-PEAK	None
994.140000	22.15	23.93	-17.5	28.6	53.9	25.3	1.00	135	QUASI-PEAK	None
391.700000	26.36	15.48	-21.5	20.4	46.0	25.6	2.00	135	QUASI-PEAK	None
994.140000	16.53	23.93	-17.5	23.0	53.9	30.9	1.00	10	QUASI-PEAK	None
372.800000	*	15.06	-21.6	*	46.0	#####	2.00	135	QUASI-PEAK	None
368.485000	*	14.97	-21.6	*	46.0	#####	2.00	135	QUASI-PEAK	None

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 73 deg. F; 66% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: R110XiIII Coupler ZPN: 27060
Comment: Max Power; Low Channel
Date: 06-14-2005

TEXT: "Site 3 6204&184 V3M"

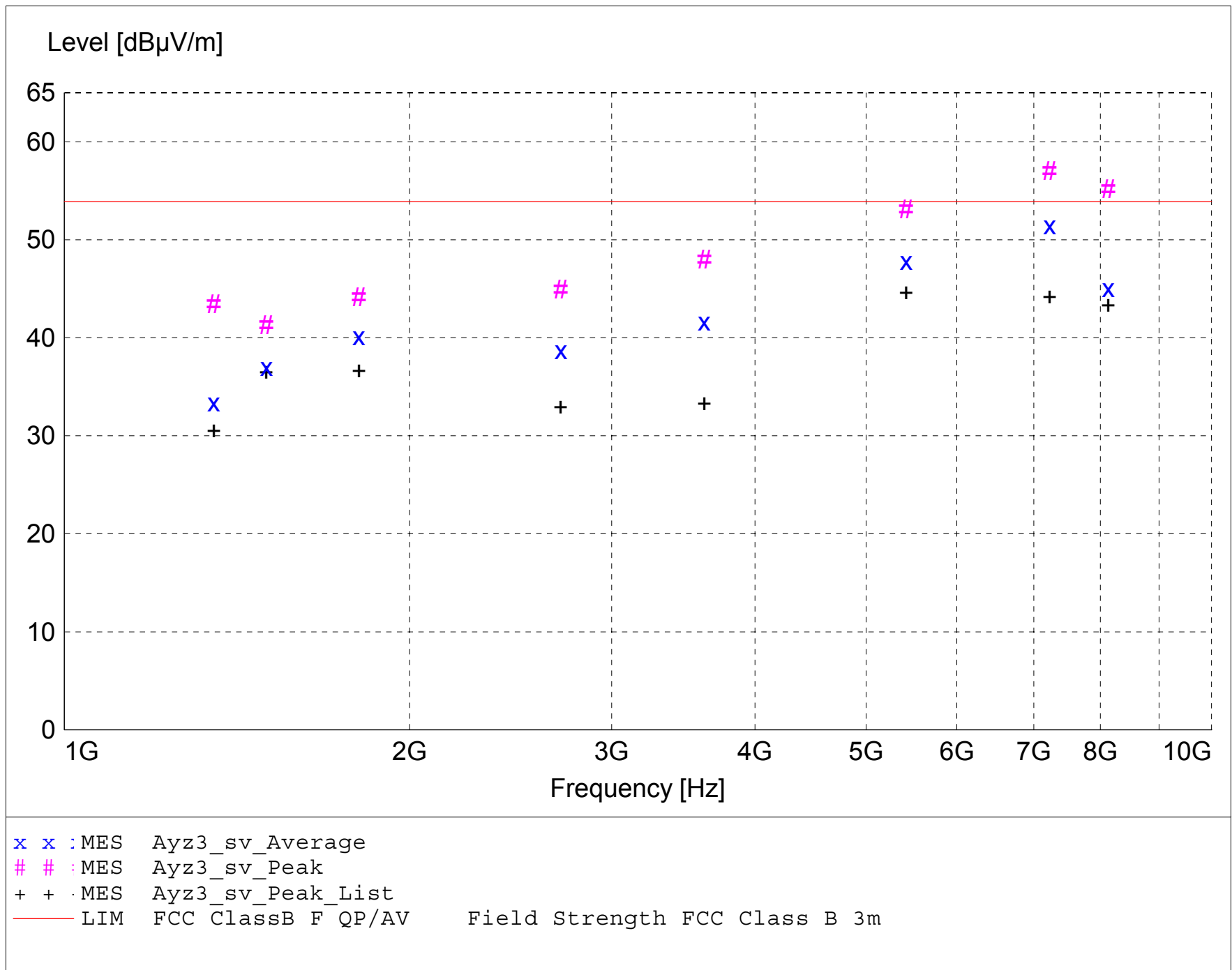
Short Description: Test Set-up Vert1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/006

Horn Antenna --- ETS 3115 SN: 6204

Pre-Amps ---

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

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



MEASUREMENT RESULT: "Ayz3_sv_Final"

6/14/2005 9:31AM

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		
7223.900000	55.08	35.84	-33.9	57.0	53.9	-3.1	1.20	0	MAX PEAK	None
8126.900000	50.84	36.98	-32.7	55.1	53.9	-1.2	1.30	315	MAX PEAK	None
5417.900000	54.26	33.97	-35.2	53.1	53.9	0.8	1.20	0	MAX PEAK	None
7223.900000	49.56	35.84	-33.9	51.5	53.9	2.4	1.20	0	AVERAGE	None
3611.950000	53.05	31.49	-36.6	47.9	53.9	6.0	2.00	45	MAX PEAK	None
5417.900000	49.00	33.97	-35.2	47.8	53.9	6.1	1.20	0	AVERAGE	None
8126.900000	40.72	36.98	-32.7	45.0	53.9	8.9	1.30	315	AVERAGE	None
2709.000000	53.85	29.28	-38.3	44.9	53.9	9.0	1.10	90	MAX PEAK	None
1805.900000	56.14	26.50	-38.5	44.1	53.9	9.8	1.00	30	MAX PEAK	None
1350.050000	58.21	24.85	-39.6	43.4	53.9	10.5	1.00	90	MAX PEAK	None
3611.950000	46.69	31.49	-36.6	41.6	53.9	12.3	2.00	45	AVERAGE	None
1500.000000	55.22	25.19	-39.2	41.2	53.9	12.7	1.00	135	MAX PEAK	None
1805.900000	52.16	26.50	-38.5	40.1	53.9	13.8	1.00	30	AVERAGE	None
2709.000000	47.66	29.28	-38.3	38.7	53.9	15.2	1.10	90	AVERAGE	None
1500.000000	50.95	25.19	-39.2	37.0	53.9	16.9	1.00	135	AVERAGE	None
1350.050000	48.14	24.85	-39.6	33.4	53.9	20.5	1.00	90	AVERAGE	None

FCC Part 15 Class B

Electric Field Strength

EUT: ZM4e
Manufacturer: Zebra Technologies
Operating Condition: 73 deg. F; 66% R.H.
Test Site: DLS OF Site 3
Operator: Craig Brandt
Test Specification: R110XiIII Coupler ZPN: 27060
Comment: Max Power; Low Channel
Date: 06-14-2005

TEXT: "Site 3 6204&184 H3M"

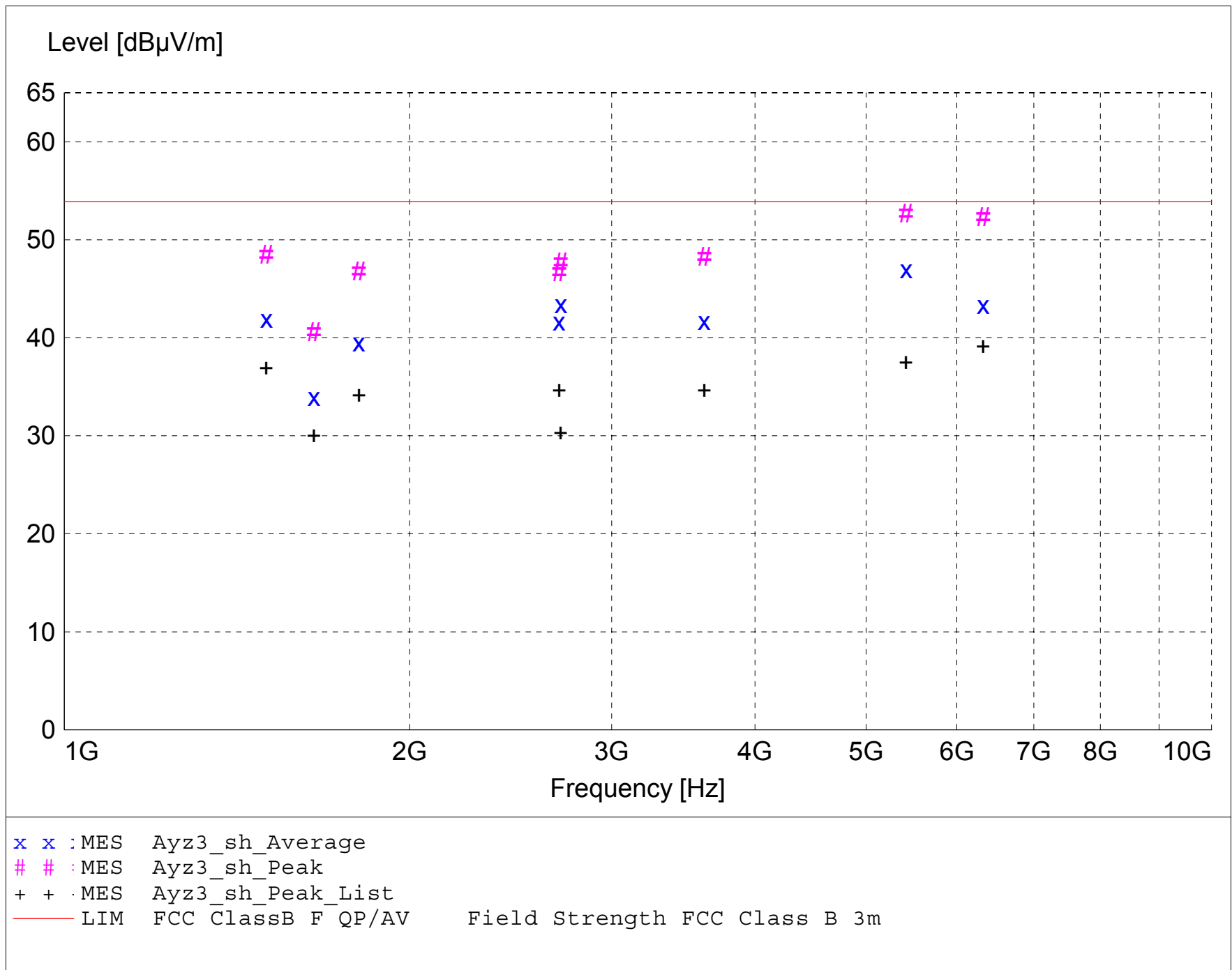
Short Description: Test Set-up Horz1GHz-
TEST EQUIPMENT: Receiver --- Rohde&Schwarz ESI 40 SN: 837808/006

Horn Antenna --- ETS 3115 SN: 6204

Pre-Amps ---

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

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



MEASUREMENT RESULT: "Ayz3_sh_Final"

6/14/2005 9:46AM

Frequency	Level	Antenna Factor	System Loss	Total Level	Limit	Margin	Height Ant.	EuT Angle	Final Detector	Comment
MHz	dBμV	dBμV/m	dB	dBμV/m	dBμV/m	dB	m	deg		
5417.950000	53.85	33.97	-35.2	52.6	53.9	1.3	2.10	90	MAX PEAK	None
6321.000000	52.12	34.40	-34.3	52.3	53.9	1.6	2.20	45	MAX PEAK	None
1500.000000	62.45	25.19	-39.2	48.5	53.9	5.4	1.00	90	MAX PEAK	None
3611.950000	53.32	31.49	-36.6	48.2	53.9	5.7	1.20	0	MAX PEAK	None
2709.000000	56.67	29.28	-38.3	47.7	53.9	6.2	1.10	180	MAX PEAK	None
5417.950000	48.16	33.97	-35.2	47.0	53.9	6.9	2.10	90	AVERAGE	None
1805.950000	58.76	26.50	-38.5	46.7	53.9	7.2	1.00	60	MAX PEAK	None
2700.000000	55.75	29.26	-38.3	46.7	53.9	7.2	1.30	0	MAX PEAK	None
2709.000000	52.35	29.28	-38.3	43.4	53.9	10.5	1.10	180	AVERAGE	None
6321.000000	43.17	34.40	-34.3	43.3	53.9	10.6	2.20	45	AVERAGE	None
1500.000000	55.88	25.19	-39.2	41.9	53.9	12.0	1.00	90	AVERAGE	None
3611.950000	46.80	31.49	-36.6	41.7	53.9	12.2	1.20	0	AVERAGE	None
2700.000000	50.67	29.26	-38.3	41.6	53.9	12.3	1.30	0	AVERAGE	None
1650.000000	53.98	25.83	-39.3	40.5	53.9	13.4	1.00	45	MAX PEAK	None
1805.950000	51.57	26.50	-38.5	39.5	53.9	14.4	1.00	60	AVERAGE	None
1650.000000	47.40	25.83	-39.3	33.9	53.9	20.0	1.00	45	AVERAGE	None