1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Incorporated
Model Tested: MX890 X1
Report Number: 14000

FCC Rules and Regulations / Intentional Radiators

Low Power Auxiliary Stations

Part 74, Subpart H, Sections 74.801 - 74.882

Part 74.861 (d) Other than TV Broadcasting

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name:	Wireless Boundary Microphone
Kind of Equipment:	Wireless Microphone Transmitter
Frequency Range:	944 MHz - 952 MHz
Test Configuration:	Stand Alone (Tested at 3 vdc)
Model Number(s):	MX890
Model(s) Tested:	MX890 X1
Serial Number(s):	N/A
Emission Designator:	DD4MX890A
Date of Tests:	March 12, 13, 17, 18, & 20, 2008
Test Conducted For:	Shure Incorporated 5800 W. Touhy Avenue Niles, Illinois 60714-4608

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.

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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

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United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

D.L.S. Electronic Systems, Inc.
Wheeling, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).

2007-10-01 through 2008-09-30
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

NVLAP-01C (REV. 2006-09-13)

1250 Peterson Dr., Wheeling, IL 60090

1.0 SUMMARY OF TEST REPORT

It was found that the Wireless Boundary Microphone, Model Number(s) MX890 X1, **meets** the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 74, Subpart H, Section 74.861 (d), for low power auxiliary stations. The AC Power Line conducted emissions test was not required because the Wireless Boundary Microphone is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.

2.0 INTRODUCTION

On March 12, 13, 17, 18, & 20, 2008, a series of radio frequency interference measurements was performed on Wireless Boundary Microphone, Model Number(s) MX890 X1, Serial Number: N/A. The tests were performed according to the procedures of the FCC as stated in Part 2 - Frequency Allocations and Radio Treaty Matters: General Rules and Regulations, Subpart J, Equipment Authorization Procedures of the Code of Federal Regulations 47. Tests were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO Guide 17025. NVLAP Certificate and Scope can be viewed at http://www.dlsemc.com/certificate. Our facilities are registered with the FCC, Industry Canada, and VCCI. All immunity tests were performed by personnel of D.L.S. Electronic Systems, Inc. at the following location(s):

Main Test Facility:
D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, Illinois 60090

O.A.T.S. Test Facility:
D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128

3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency interference requirements of the FCC "Rules and Regulations", Part 74, Subpart H, Section 74.861 (d), for low power auxiliary stations.

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4.0 TEST SET-UP

All tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the FCC and TIA-603C regulations. The conducted tests if required were performed with the test item placed on a non-conductive table (table top equipment), located in the test room. Equipment normally operated on the floor was tested by placing it on the metal ground plane. The ground plane has an electrical isolation layer over its surface approximately 7mm thick. The power line supplied was connected to a dual line impedance stabilization network electrically bonded to the ground plane, located on the floor. The networks were constructed per the requirements of the American National Standards Institute, ANSI C63.4-2003.

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 TIA Standard, TIA-603-C:2004, Section 2.2.12.

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5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the ESI 26/ESI 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 ESI 26/ESI 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/ESI 40 Receiver as required. Above 1000 MHz, final data was taken using the Average Detector on the ESI 26/ESI 40 Fixed Tuned Receiver.

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

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

A list of the equipment used can be found in Table 1. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.

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6.0 AMBIENT MEASUREMENTS

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

The EUT is set up in its typical configuration and operated in its various modes. For tabletop systems, cables are manipulated within the range of likely configurations. For floor-standing equipment, the cables or 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 emission that has the highest amplitude relative to the limit.

7.0 AC POWER LINE CONDUCTED EMISSION MEASUREMENTS – Part 15.207

The Wireless Boundary Microphone is powered from a D.C. power source and will not at any time be directly plugged into the public utility lines, therefore the conducted emissions test was not performed.

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8.0 DESCRIPTION OF TEST SAMPLE:

8.1 Description:

The Shure Model MX890 is a uP (microprocessor) controlled frequency agile UHF transmitter operating over the frequency range of 470 to 865 MHz and 944 to 952 MHz (in different frequency bands). The products are identical, with the exception of the frequency components needed for each range. The User Interface includes "mode", "set" and "mute" buttons, and an LCD that displays battery status, group/channel, and transmitter/receiver frequency synchronization. This product is intended for corporate boardroom, educational facilities and fixed installations.

8.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 148 mm x Width: 87mm x Height: 43 mm

8.3 LINE FILTER USED:

N/A

8.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

N/A

Clock Frequencies:

0.32768 MHz & 16 MHz

8.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. Printed Circuit Board 1 PN: 190-11080 rev.01
2. Printed Circuit Board 2 PN: 190A11076 rev.01

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

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

NOTE:

Low, Mid and High channels were tested.

10.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 Wireless Boundary Microphone
Model Number: MX890 X1, Serial Number: N/A

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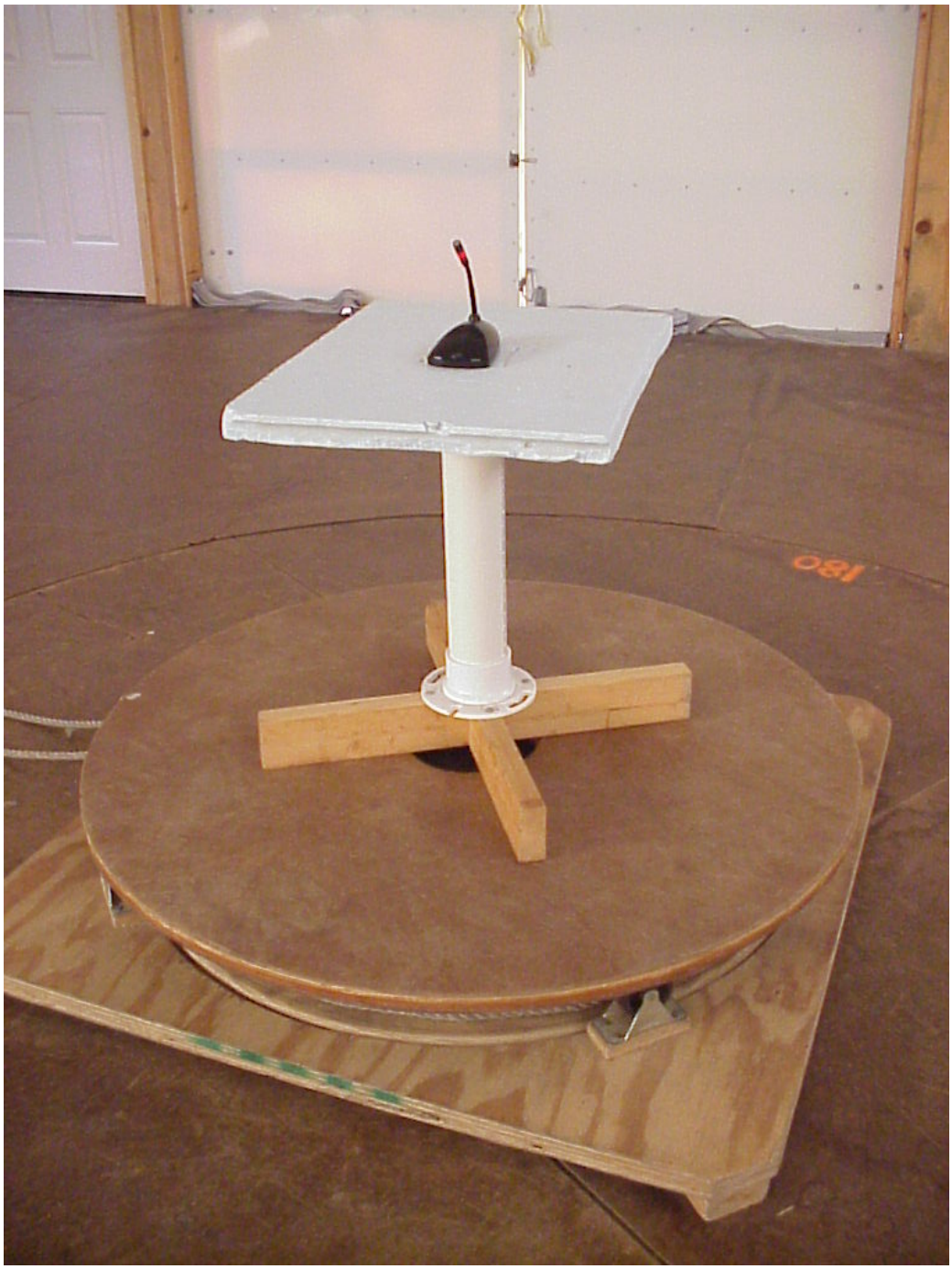
11.0 RADIATED PHOTOS TAKEN DURING TESTING



RAD FRONT 6 INCH BOOM

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11.0 RADIATED PHOTOS TAKEN DURING TESTING

RAD BACK 6 INCH BOOM

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11.0 RADIATED PHOTOS TAKEN DURING TESTING

RAD FRONT 10 INCH BOOM

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11.0 RADIATED PHOTOS TAKEN DURING TESTING

RAD BACK 10 INCH BOOM

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12.0 RESULTS OF TESTS

The radio interference emission charts 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.

13.0 CONCLUSION

It was found that the Wireless Boundary Microphone, Model Number(s) MX890 X1 **meets** the radio interference radiated emission requirements of the FCC "Rules and Regulations", Part 74, Subpart H, Section 74.861 (d), for low power auxiliary stations. The AC Power Line conducted emissions test was not required because the Wireless Boundary Microphone is powered from a D.C. power source. It does not have a line cord to plug into the A.C. power line.

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	11/08
Preamp	Miteq	AMF-6D-100200-50	313936	1 GHz-10 GHz	5/08
Antenna	EMCO	3104C	97014785	20 MHz – 200 MHz	2/08
Antenna	EMCO	3146	97024895	200 MHz – 1 GHz	3/08
Horn Antenna	EMCO	3115	5731	1-18 GHz	6/08
Function Generator	Hewlet-Packard	HP3312A	2501A18150		8/08
Attenuator-20dB Fixed	Aeroflex Weinschel	75A-20-12	1071	DC – 40GHz	7/08
Power Meter	Anritsu	ML2487A	6K00002069		10/08
Power Sensor	Anritsu	MA2490A		50MHz-8GHz	10/08
Filter- High-Pass	Q-Microwave	100460		1.1GHz	5/08
Filter- High-Pass	Mini Circuits	NHP-600	438727	600MHz-7GHz	9/08

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

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APPENDIX A

TEST PROCEDURE

SUBPART H

LOW POWER AUXILIARY STATIONS OPERATING IN THE BANDS OTHER THAN THOSE ALLOCATED FOR TV BROADCASTING

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APPENDIX A

1.0 TEST SET-UP

All radiated emission tests were performed at D.L.S. Electronic Systems, Inc. The radiated tests were made with the test item placed on a non-conductive turntable located in the Test Room with the receive antenna placed three or one meter(s) from the device under test.

2.0 RF-POWER OUTPUT – PART 2.1046 and EIA /TIA-603-C:2004, SECTION 2.2.17

As stated in PART 74.861 (d)(1), the RF output power should not exceed 1 watt(s). The RF output of the Wireless Boundary Microphone was connected to a Spectrum Analyzer or a Power Meter through suitable attenuation. All cables, connectors, and attenuators were calibrated prior to testing. The RF output power was measured using the following test method:

Actual Measurements Taken:

10.5 dBm Measured output of the transmitter

10.5 dBm equals 0.01122 watt(s)

LIMIT:

Manufacturer's rated output power = 9.1 dBm ±2.0 dBm

MARGIN:

1 - 0.01122 = 0.98878 watt(s)

APPENDIX A

DATA TAKEN OF THE RF POWER

OUTPUT MEASUREMENT

EIA /TIA-603-C:2004, SECTION 2.2.17

FCC Part 74.861 (d)(1) & PART 2.1046

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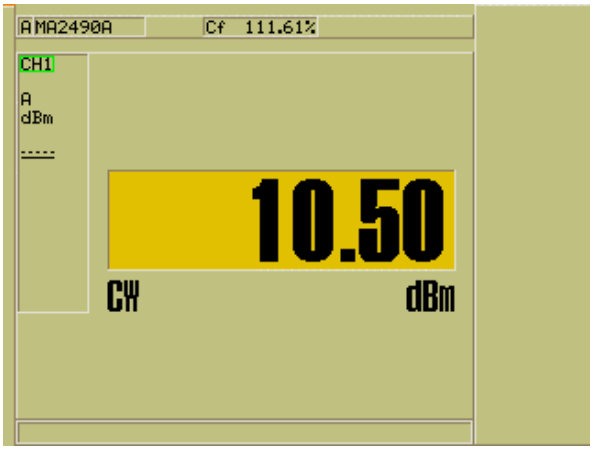
APPENDIX A

Test Date: 03-13-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Peak Power Output - Conducted
Rule part: FCC Part 74; FCC Part 2.1046
Operator: Craig B
Comment: Channel: 944.125 MHz

Peak Output Power = 10.50 dBm = 11.22 mW



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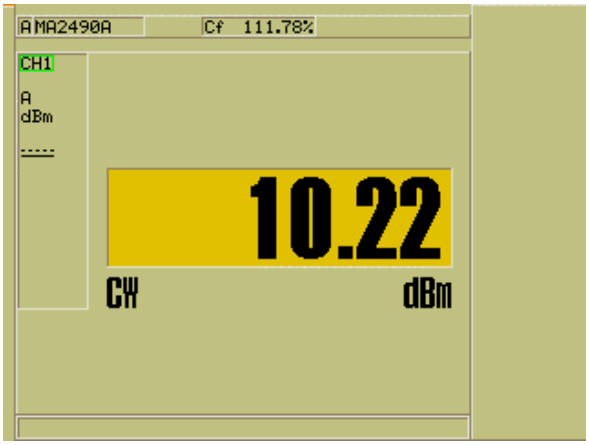
APPENDIX A

Test Date: 03-13-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Peak Power Output - Conducted
Rule part: FCC Part 74; FCC Part 2.1046
Operator: Craig B
Comment: Channel: 951.875 MHz

Peak Output Power = 10.22 dBm = 10.52 mW



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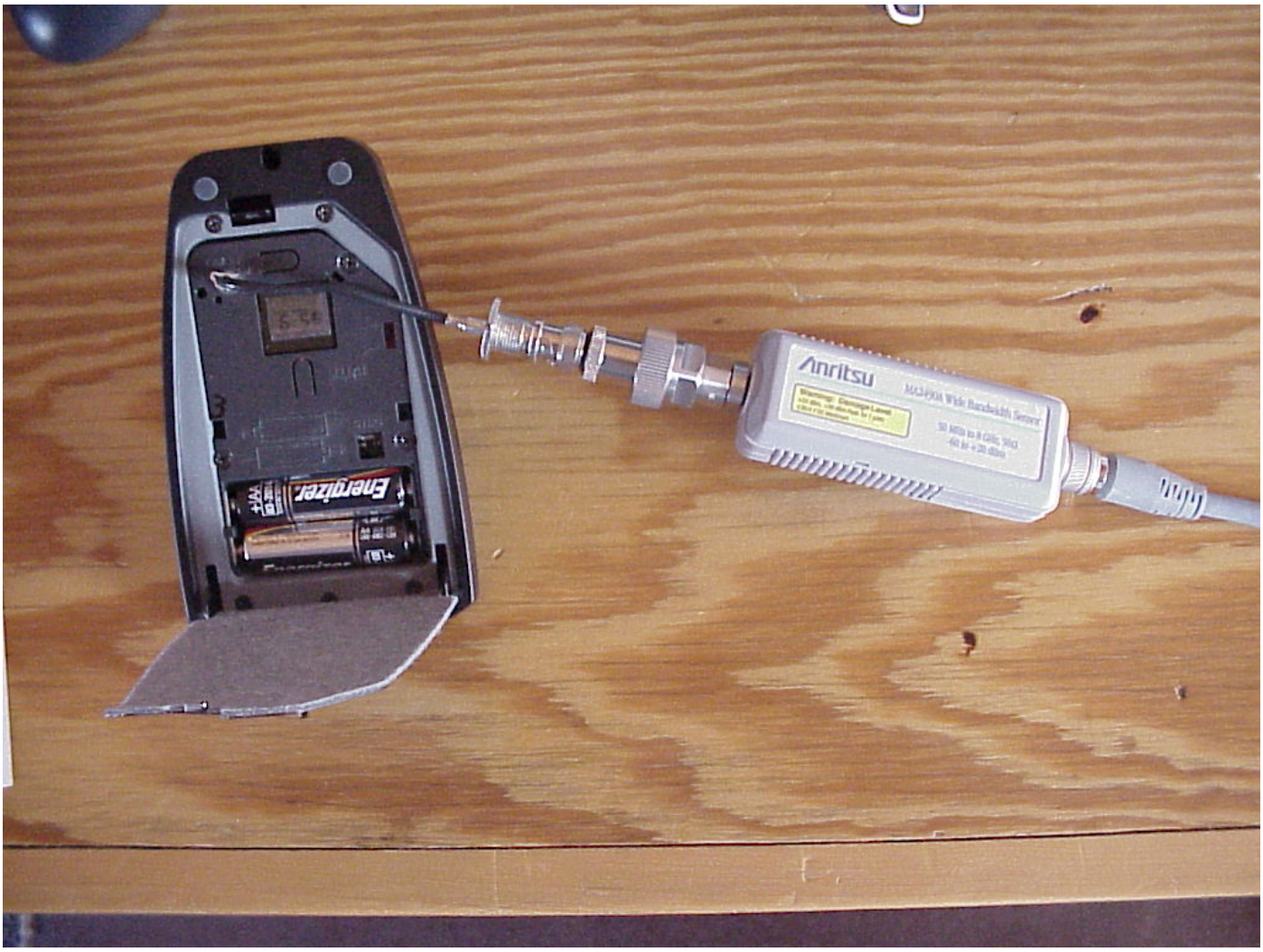
APPENDIX A

3.0 RF POWER OUTPUT PHOTOS TAKEN DURING TESTING



RF COND PEAK OUTPUT POWER

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APPENDIX A

4.0 MODULATION CHARACTERISTICS – PART 2.1047 and EIA /TIA-603-C:2004, SECTION 2.2.3

a. Voice modulated communication equipment.

A curve showing the frequency response of the audio modulating circuit over a range of 50 Hz to 20 kHz ±3.0 dB Hz is submitted with this report.

b. Equipment which employs modulation limiting

A family of curves showing the percentage of modulation versus the modulation input voltage with sufficient information showing the modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

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APPENDIX A

GRAPH(S) TAKEN SHOWING THE FREQUENCY RESPONSE OF THE AUDIO MODULATING CIRCUIT

EIA /TIA-603-C:2004, SECTION 2.2.3

PART 2.1047

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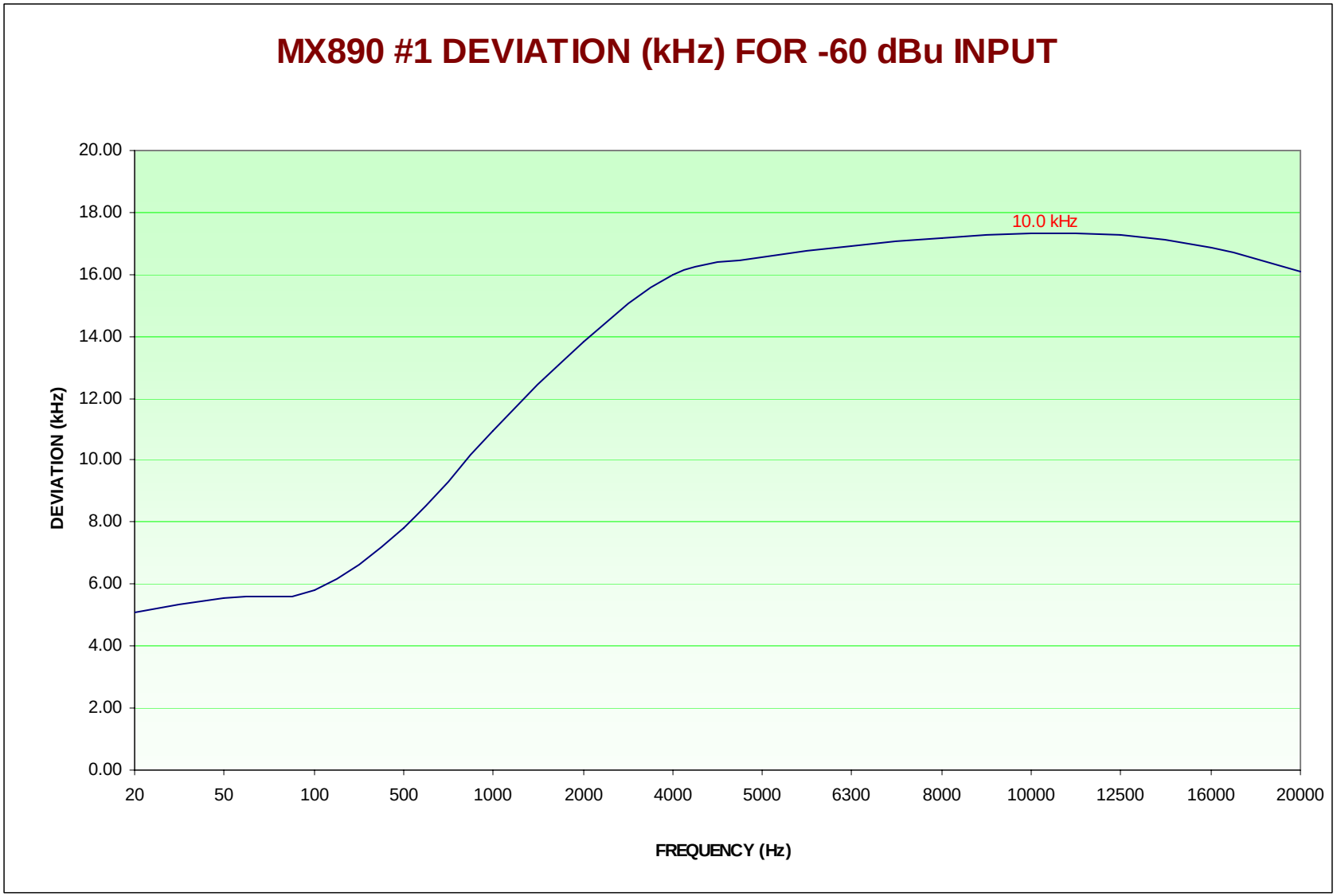
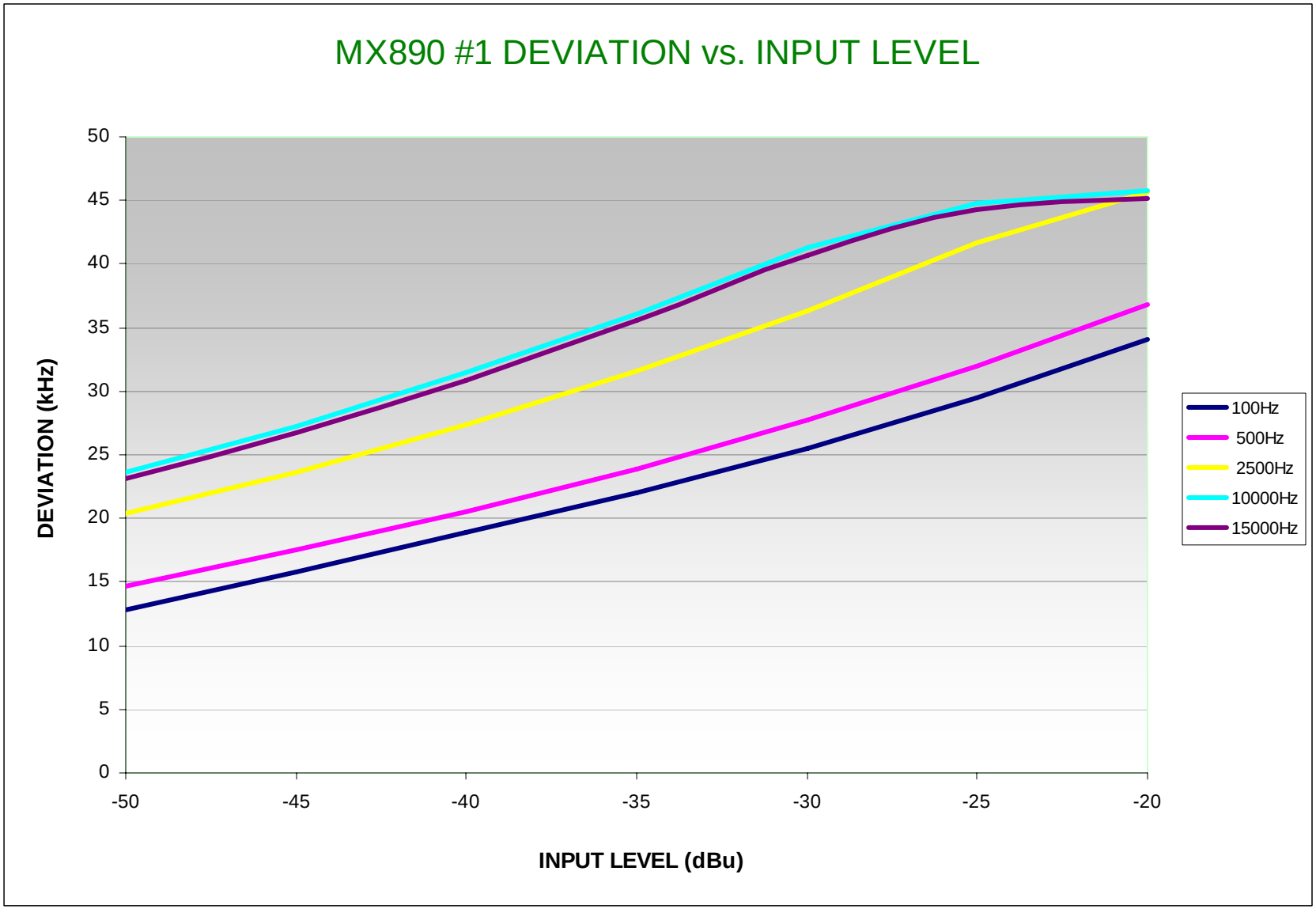
Company: Shure Incorporated
Model Tested: MX890 X1
Report Number: 14000



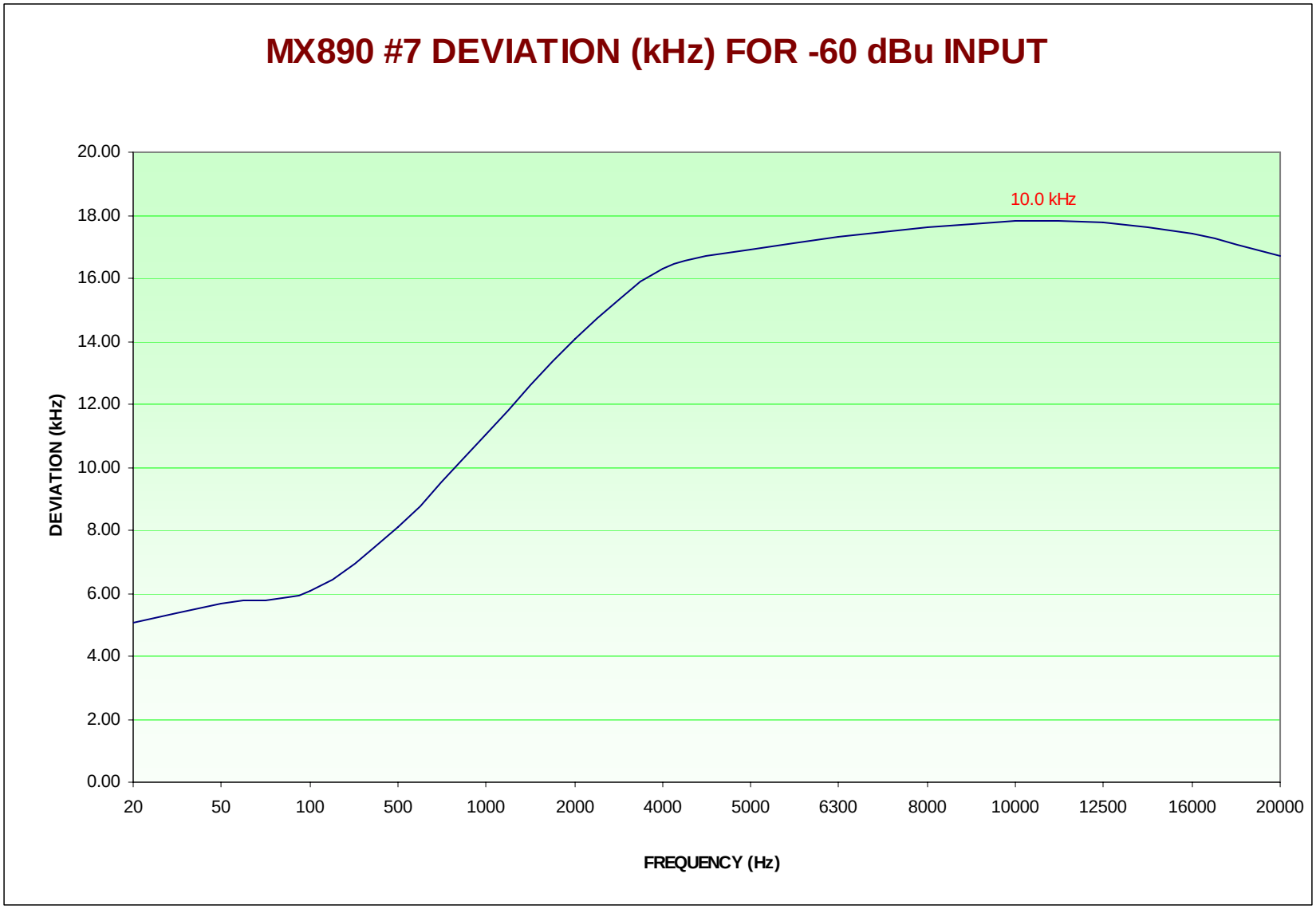
1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Incorporated
Model Tested: MX890 X1
Report Number: 14000



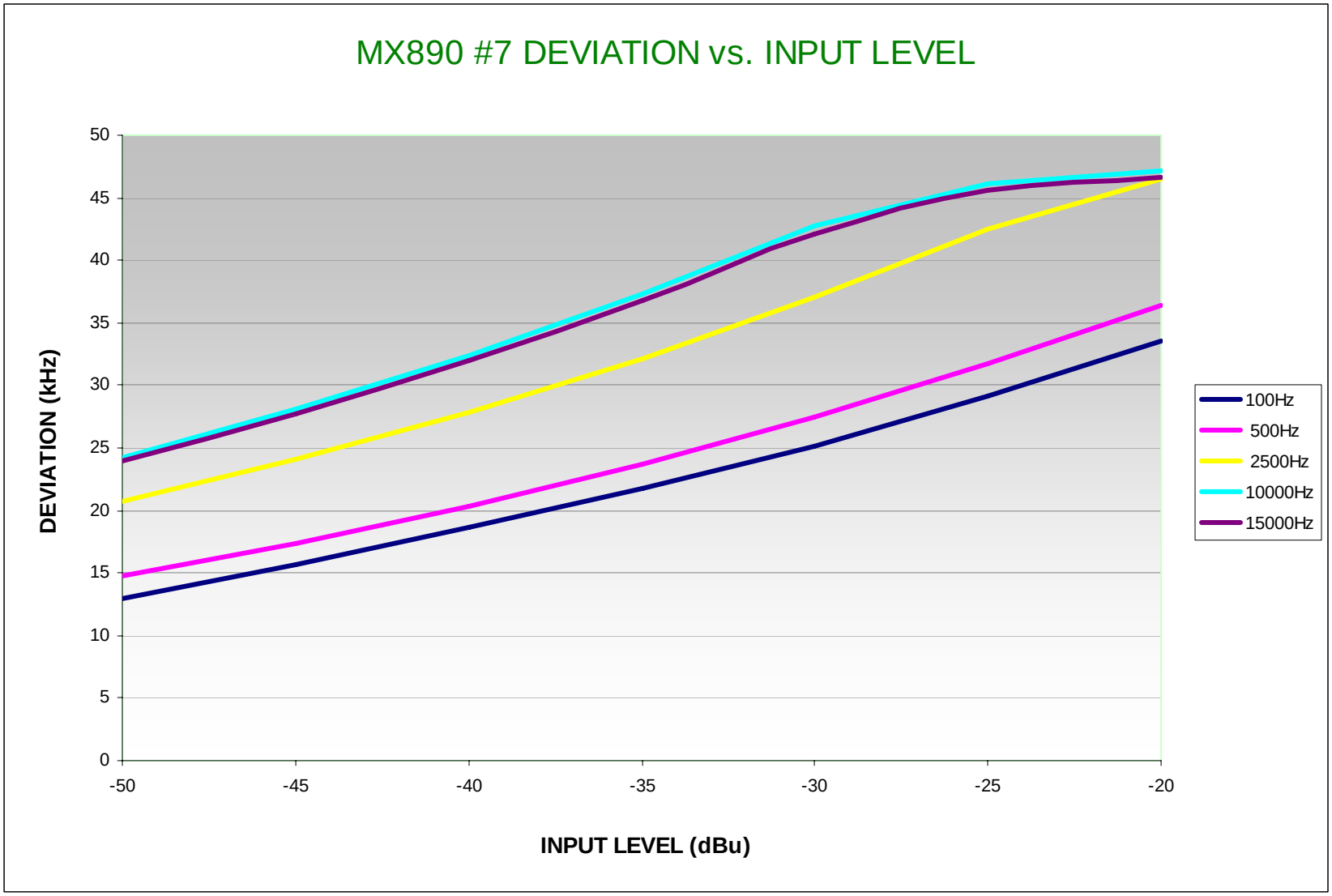
1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Incorporated
Model Tested: MX890 X1
Report Number: 14000



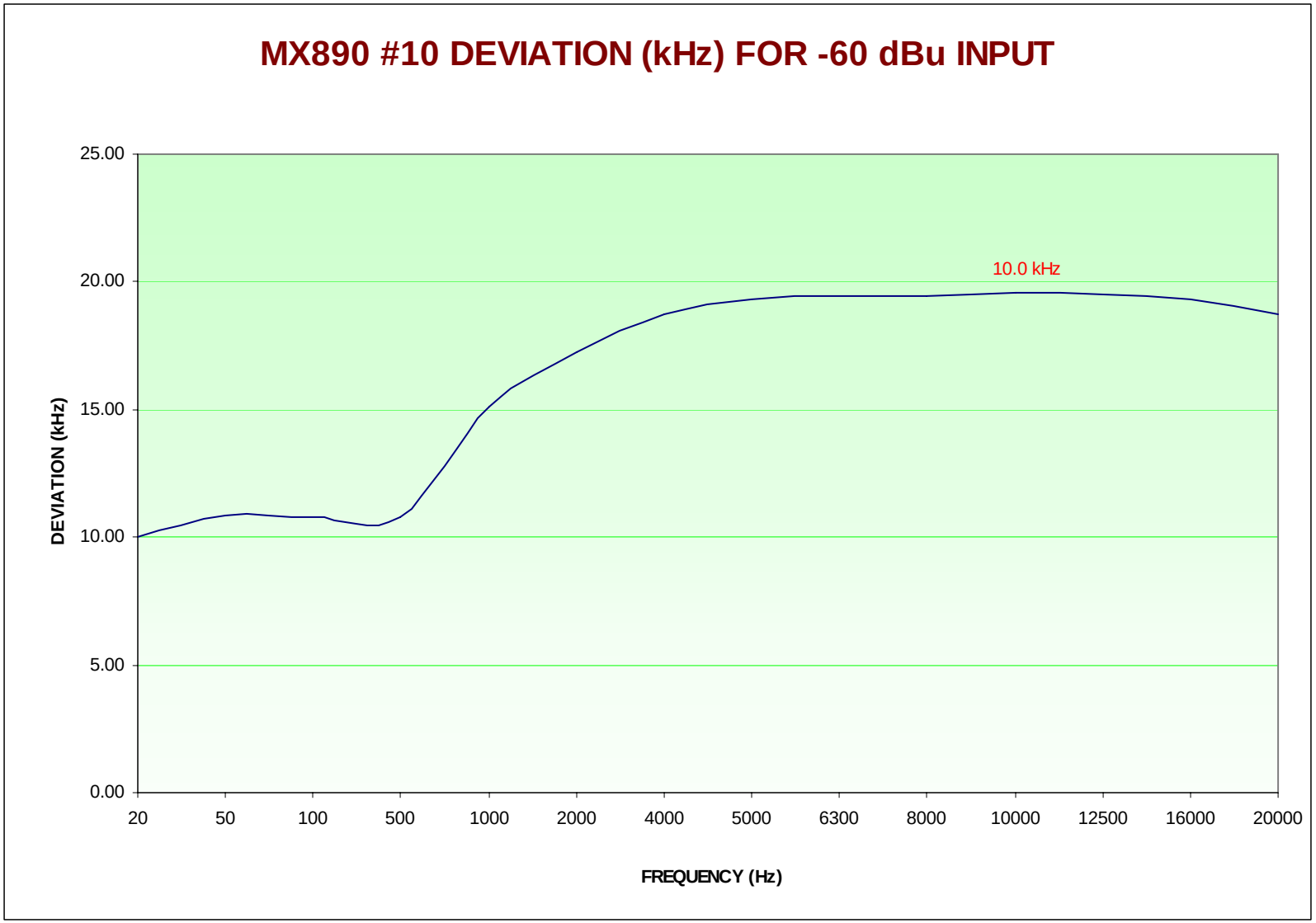
1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Incorporated
Model Tested: MX890 X1
Report Number: 14000



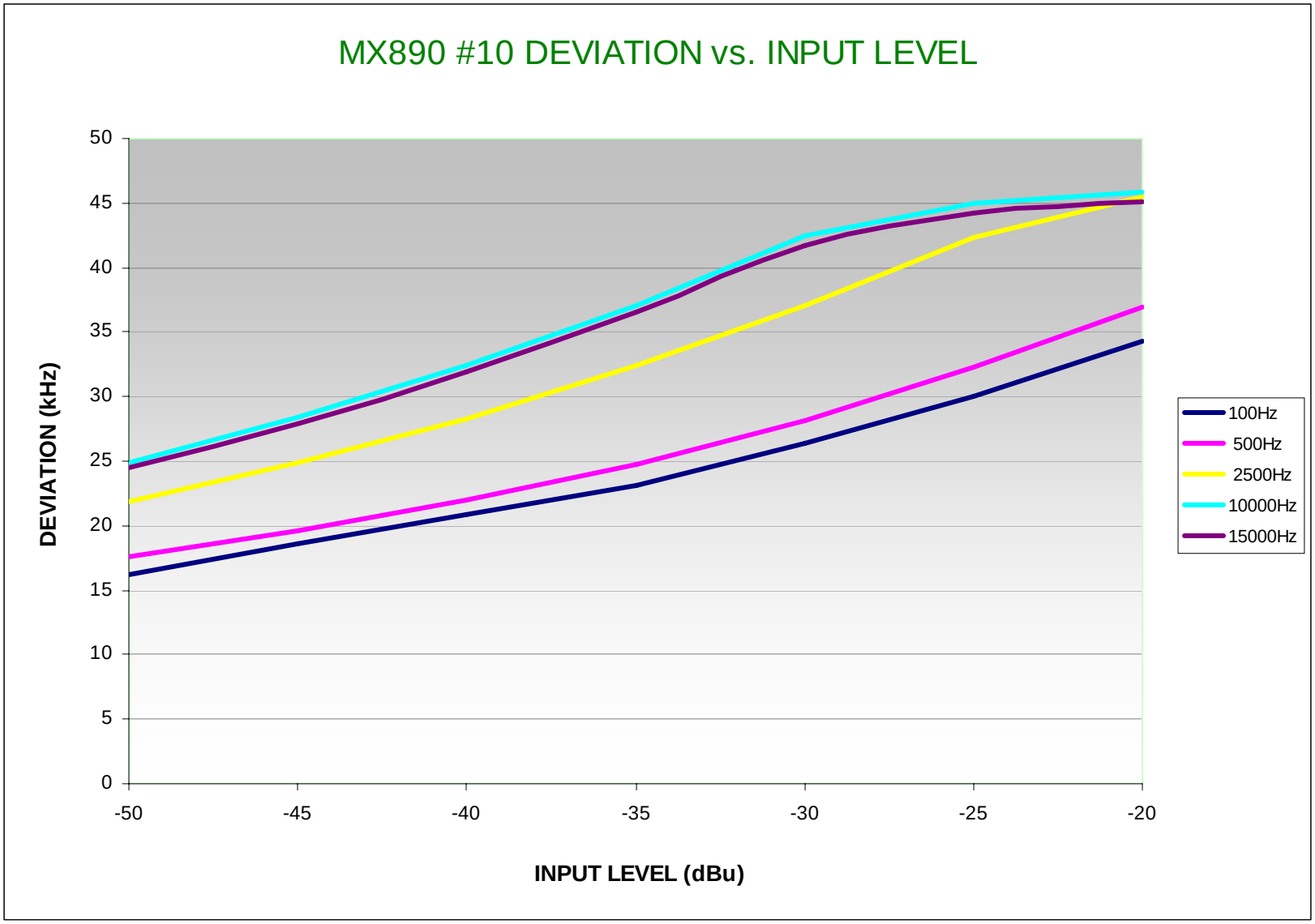
1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Incorporated
Model Tested: MX890 X1
Report Number: 14000



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Incorporated
Model Tested: MX890 X1
Report Number: 14000



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APPENDIX A

5.0 OCCUPIED BANDWIDTH - PART 2.1049

The occupied bandwidth is that between the lower and upper limits of the signal where the mean power is 99.0% of the total mean power and measured under the following conditions:

For low power auxiliary stations operating in the bands other than those allocated for TV broadcasting, the occupied bandwidth shall not be greater than that necessary for satisfactory transmission and emissions appearing on any discrete frequency outside the authorize band shall be attenuated $43+10 \log^{10}$ (mean output power, in watts) dB below the mean output power of the transmitting unit (device under test).

For low power auxiliary stations operating in the bands allocated for TV broadcasting, any form of modulation may be used. A maximum of ±75 kHz is permitted when frequency modulation is used. The operating bandwidth shall not exceed 200 kHz.

Carson's Rule:

Section 2.202 (g)

Bn = 2M+2DK, K=1	Bn = Bandwidth
M = 15 kHz,	M = Maximum Modulating Frequency
D = 45 kHz,	D = Peak Deviation

Bn = 2(15) + 2(45)(1) = 120 kHz

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APPENDIX A

DATA AND GRAPH(S) TAKEN OF THE

99% OCCUPIED BANDWIDTH

Part 74.861 (d)(3) & PART 2.1049

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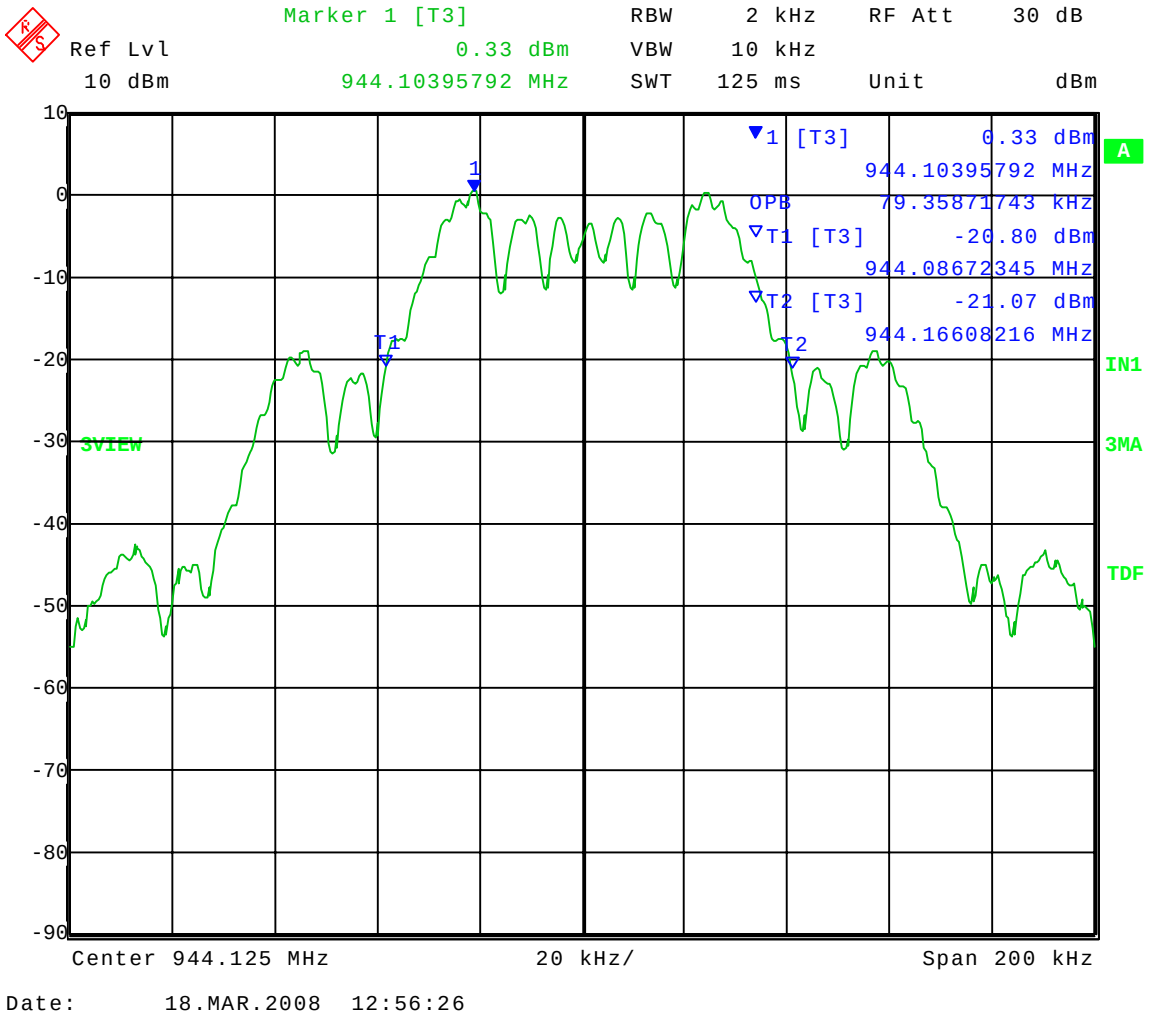
APPENDIX A

Test Date: 03-18-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Occupied Bandwidth; 99% bandwidth
Rule part: FCC Part 74; FCC Part 2.1049
Operator: Craig B

Frequency: 944.125 MHz

99% power bandwidth = 79.4 kHz



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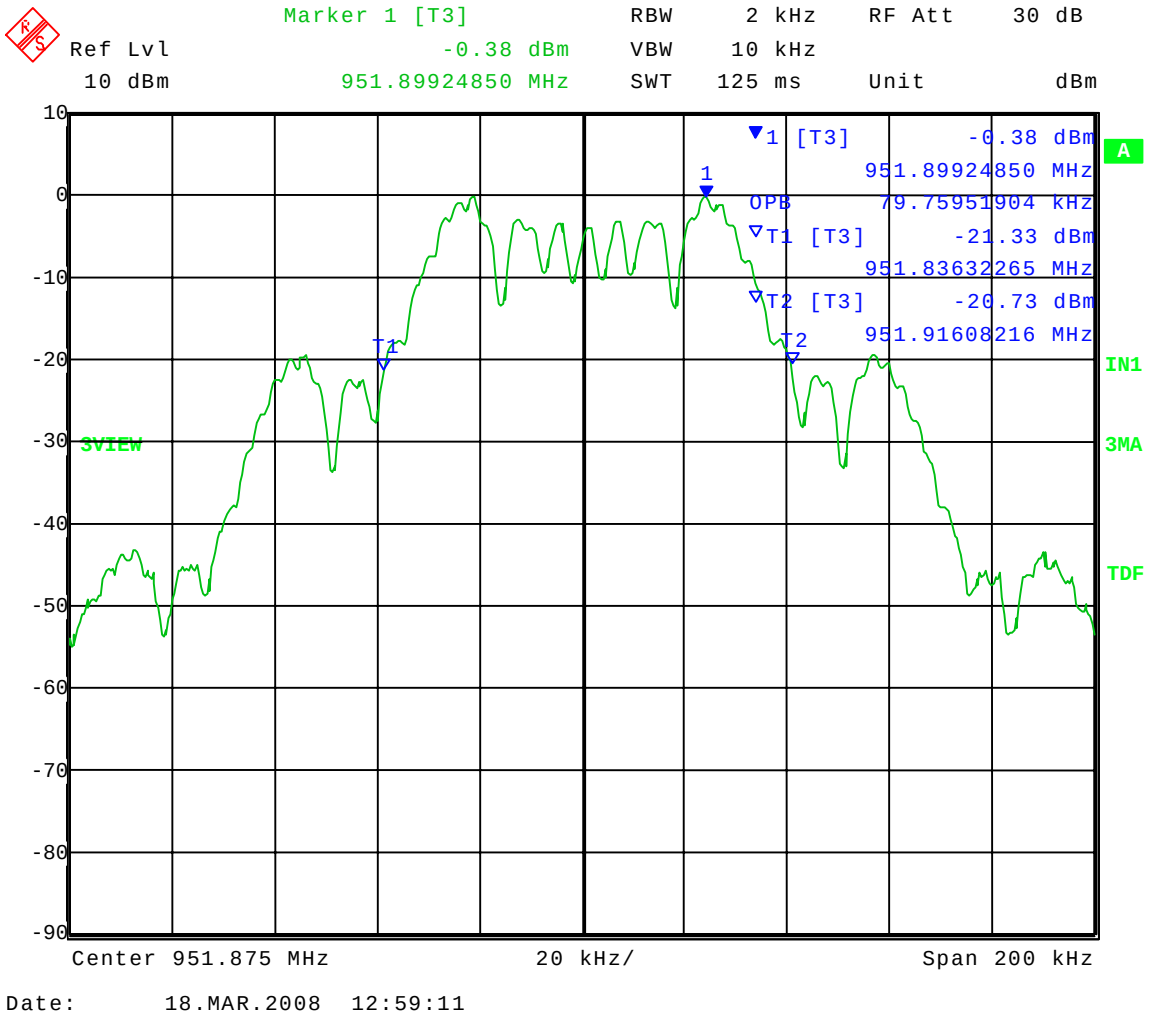
Company: Shure Incorporated
Model Tested: MX890 X1
Report Number: 14000

APPENDIX A

Test Date: 03-18-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Occupied Bandwidth; 99% bandwidth
Rule part: FCC Part 74; FCC Part 2.1049
Operator: Craig B

Frequency: 951.875 MHz

99% power bandwidth = 79.8 kHz



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APPENDIX A

DATA AND GRAPH(S) TAKEN OF THE

BAND EDGE COMPLIANCE

Part 74.861 (e)(5) & PART 2.1051

LOW CHANNEL

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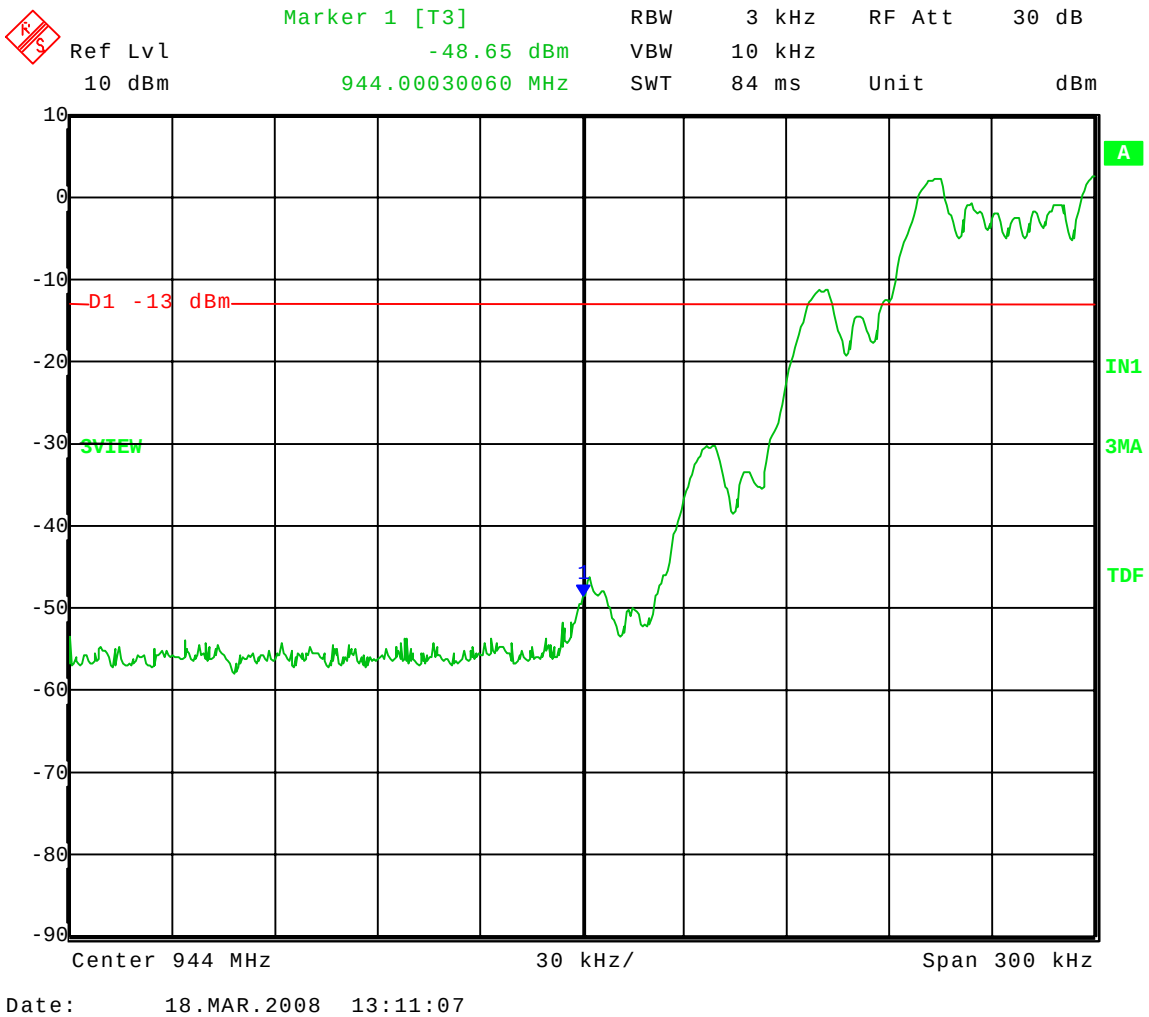
APPENDIX A

Test Date: 03-18-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 2.1 V 20° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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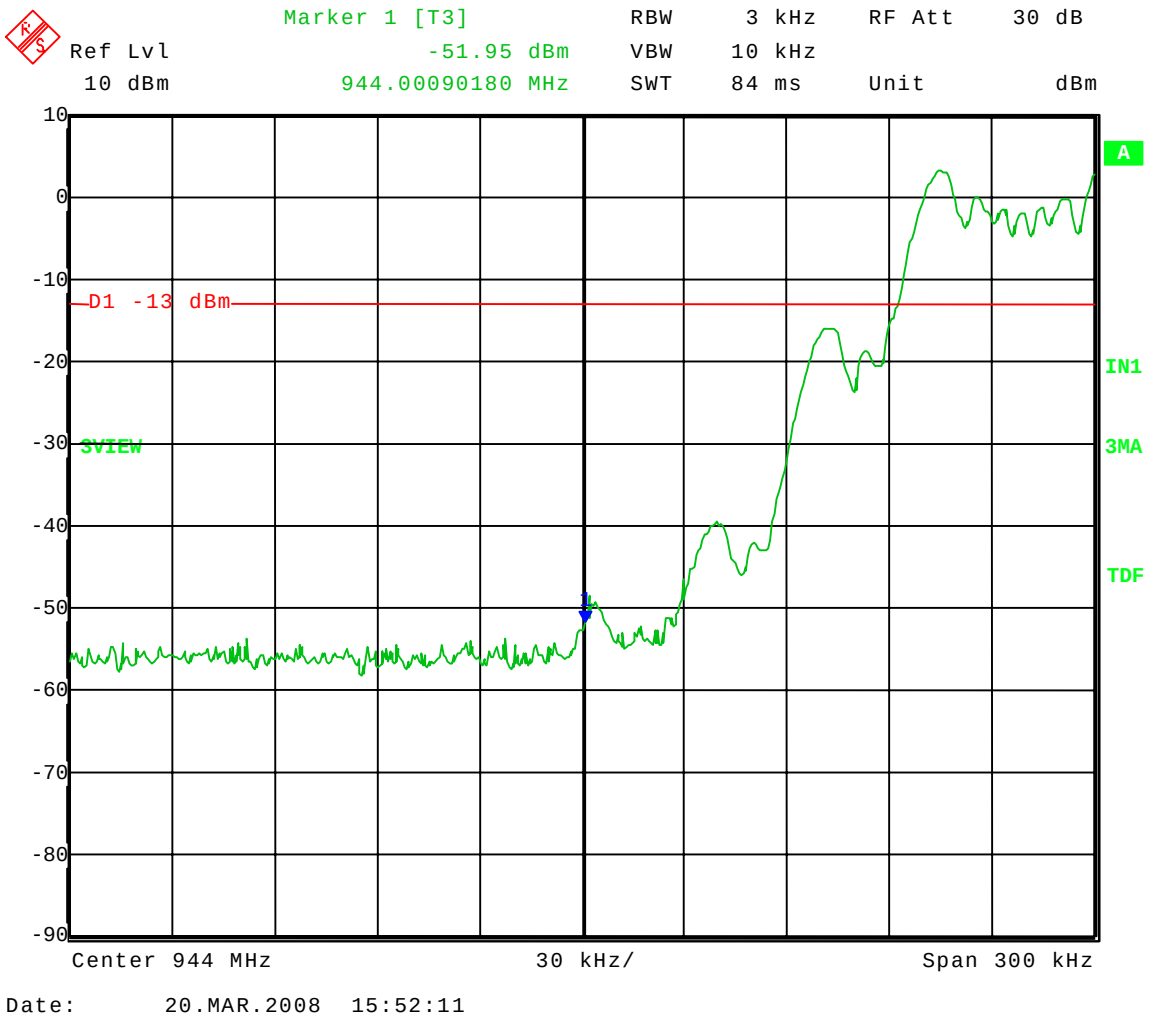
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 3.0 V -30° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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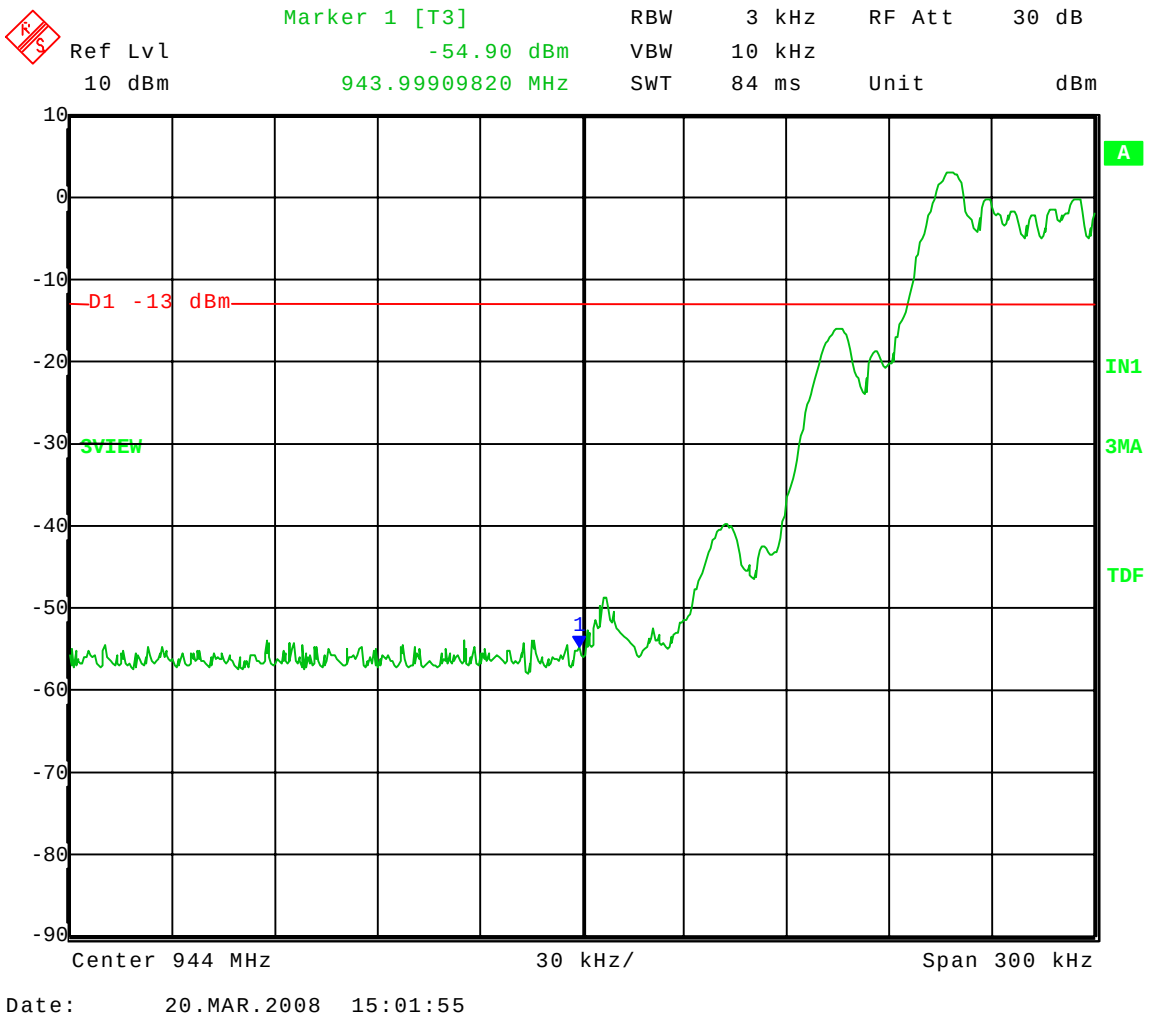
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 3.0 V -20° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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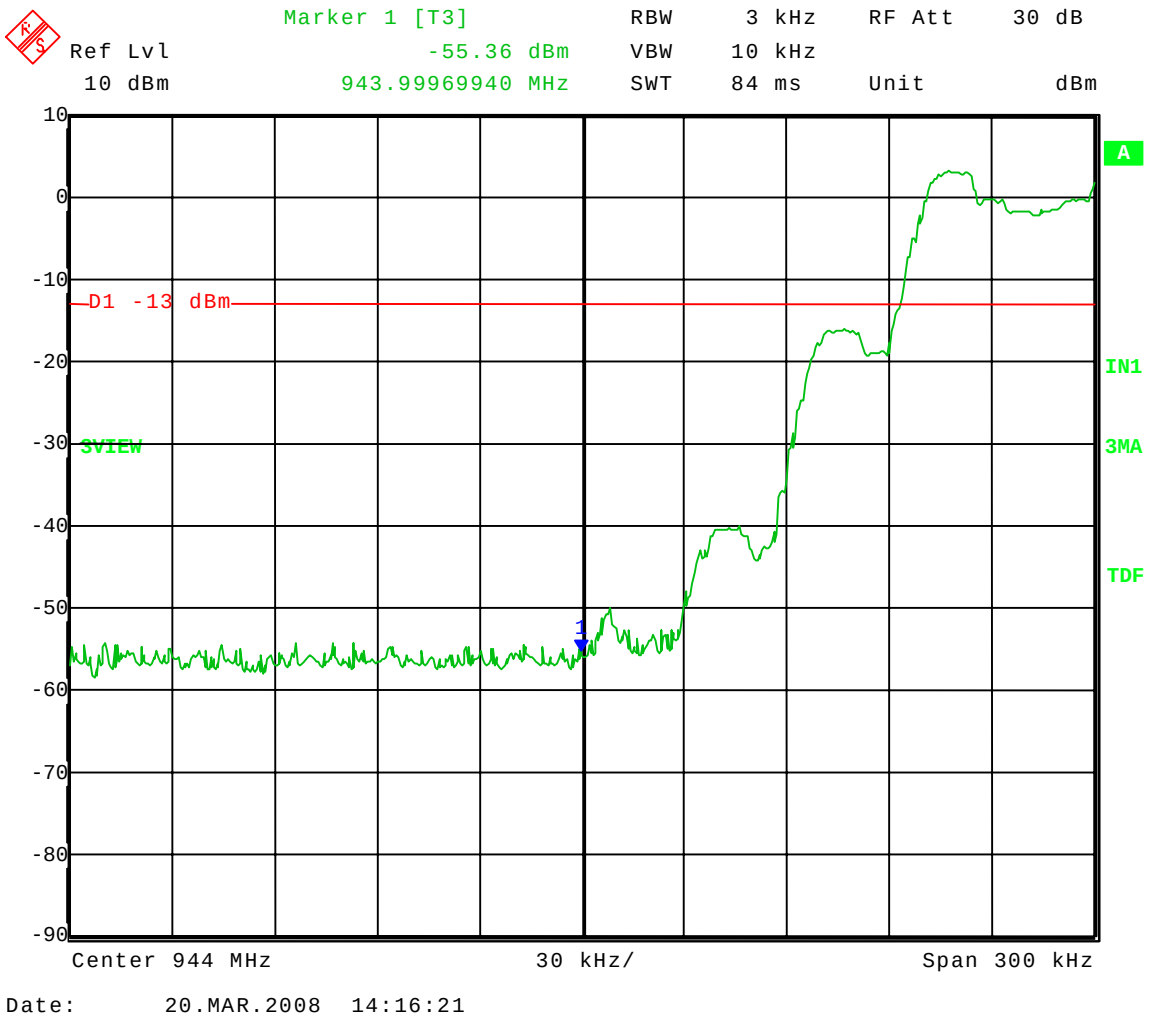
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 3.0 V -10° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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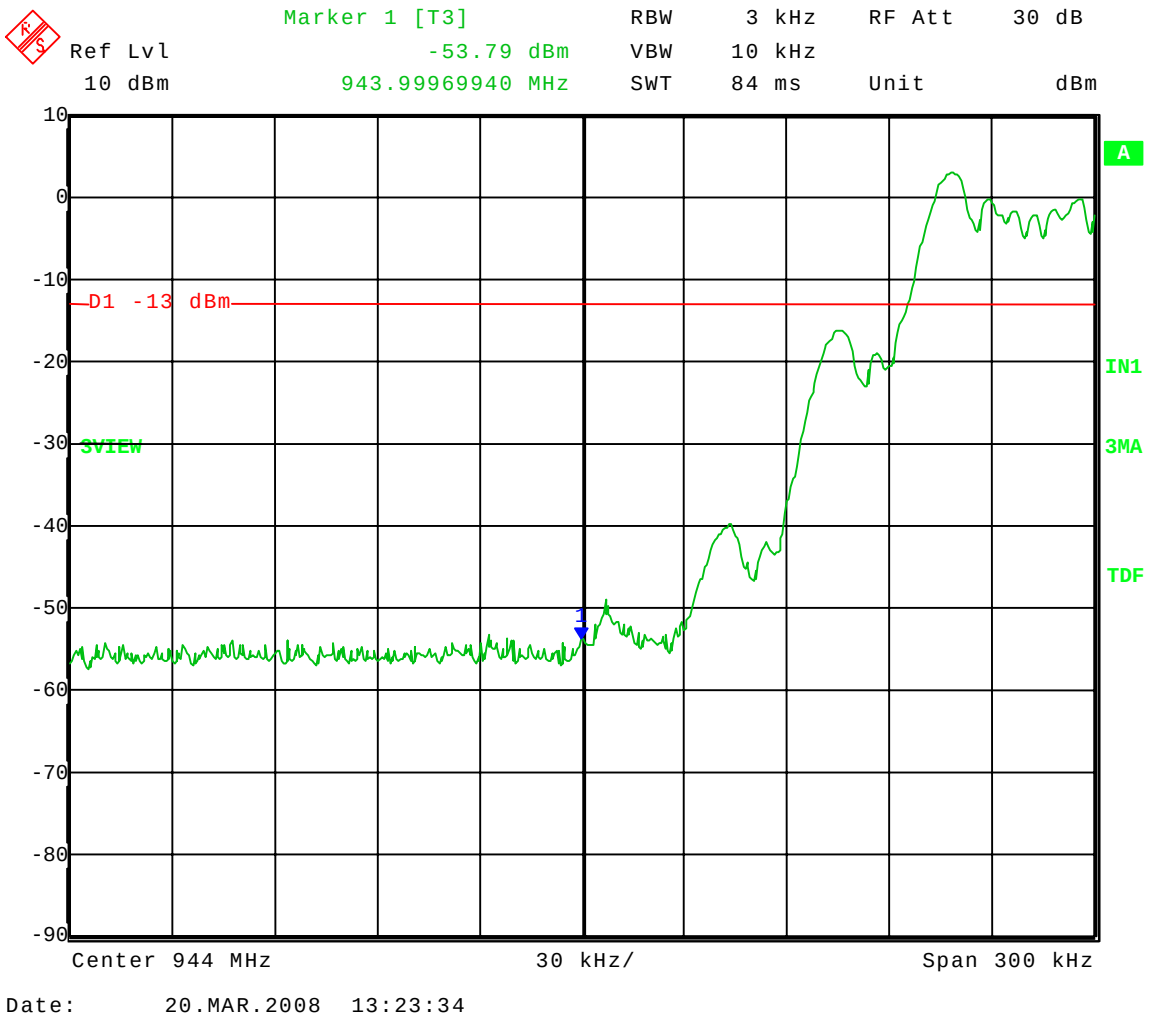
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 3.0 V 0° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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APPENDIX A

Test Date: 03-20-2008
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Test: Band-Edge Compliance - Conducted
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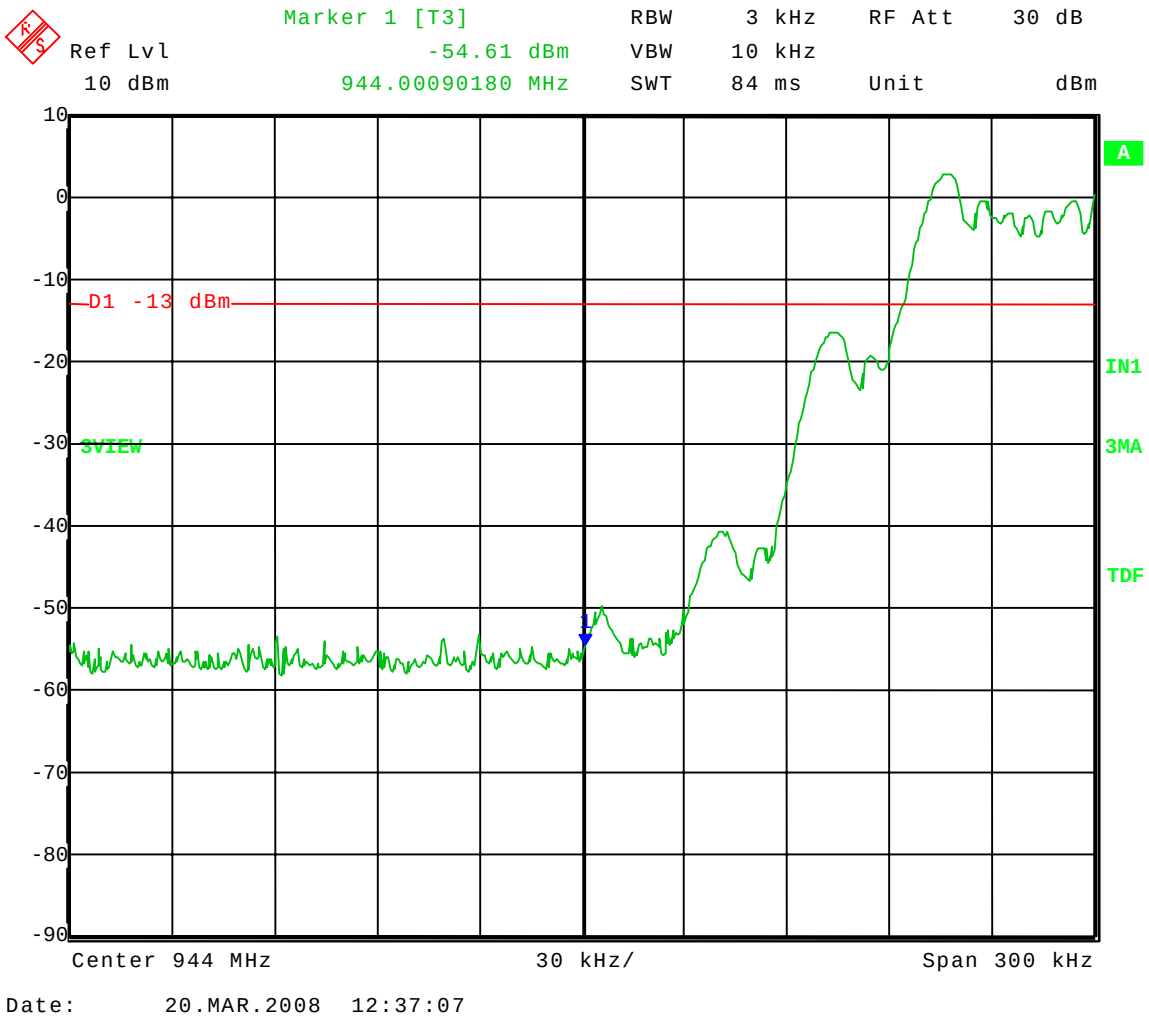
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 3.0 V 10° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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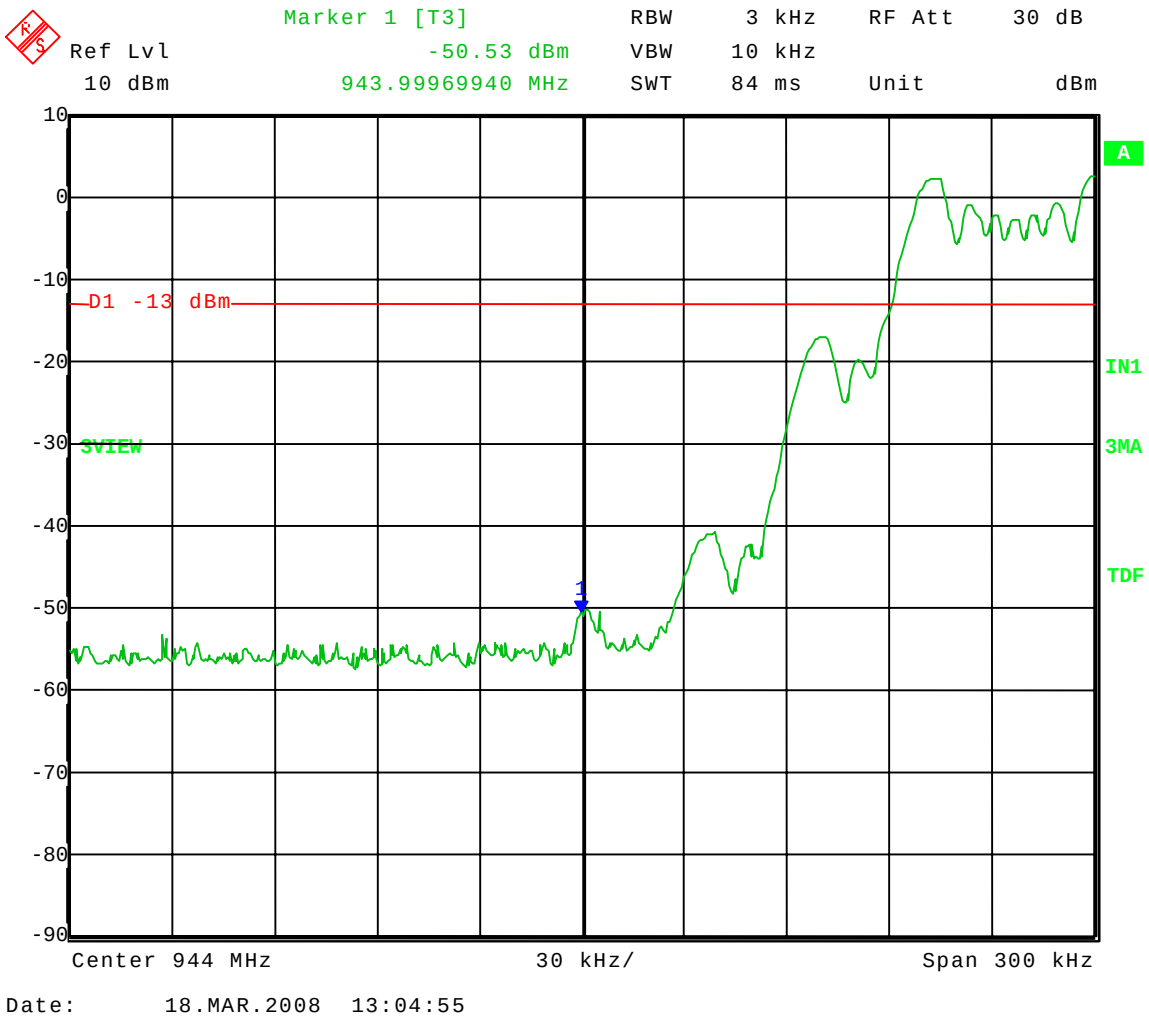
APPENDIX A

Test Date: 03-18-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 3.0 V 20° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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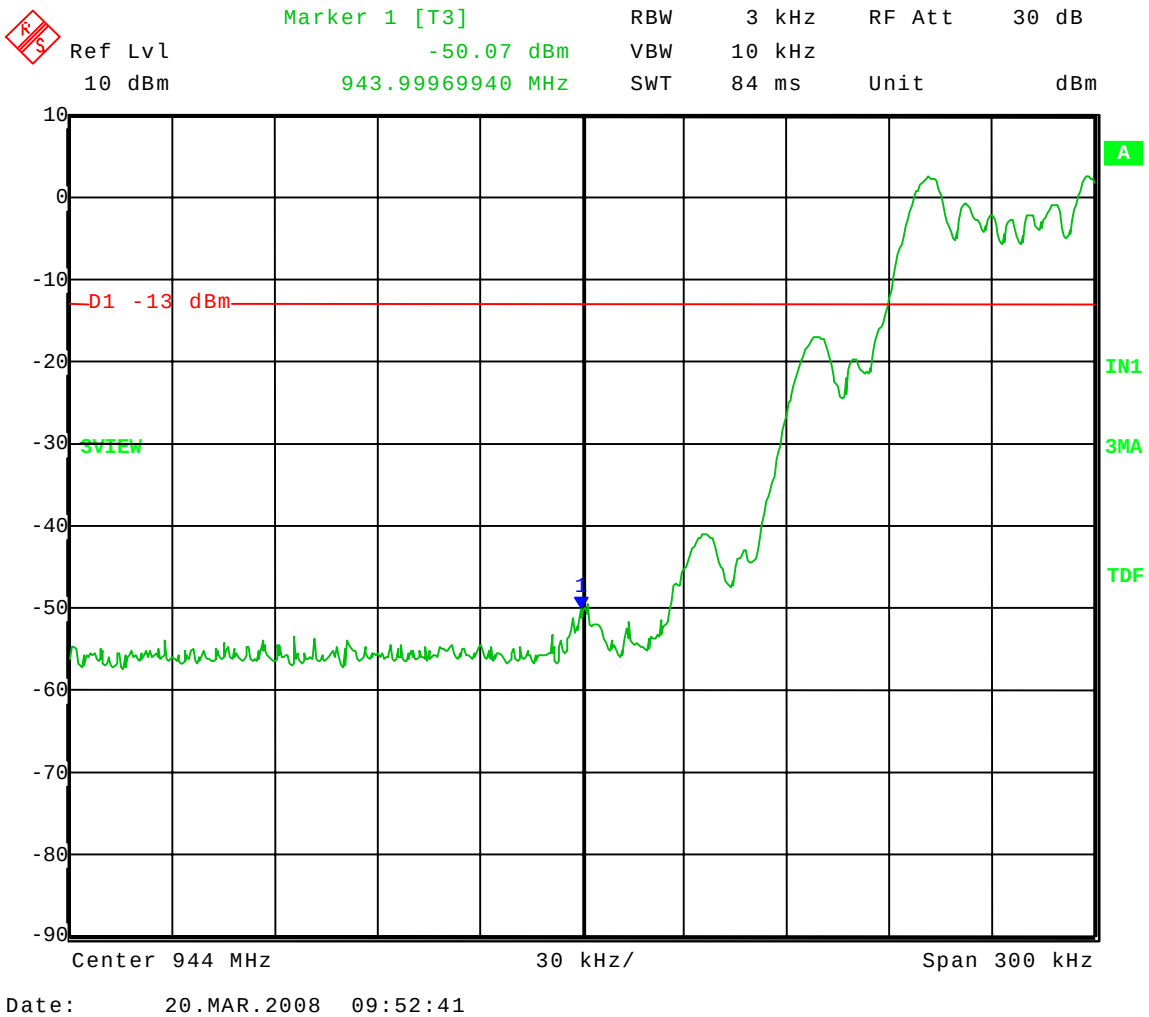
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 3.0 V 30° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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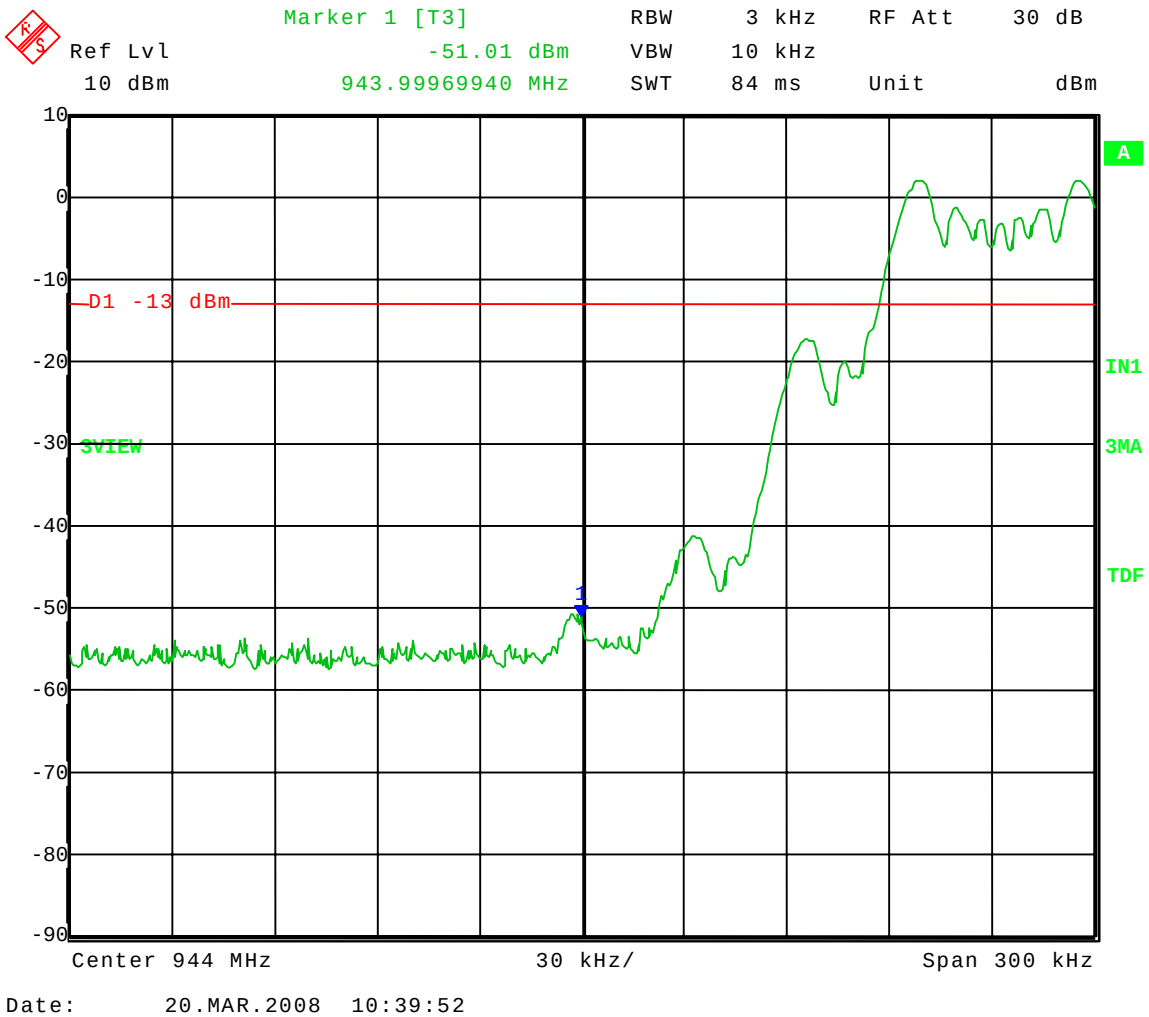
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 3.0 V 40° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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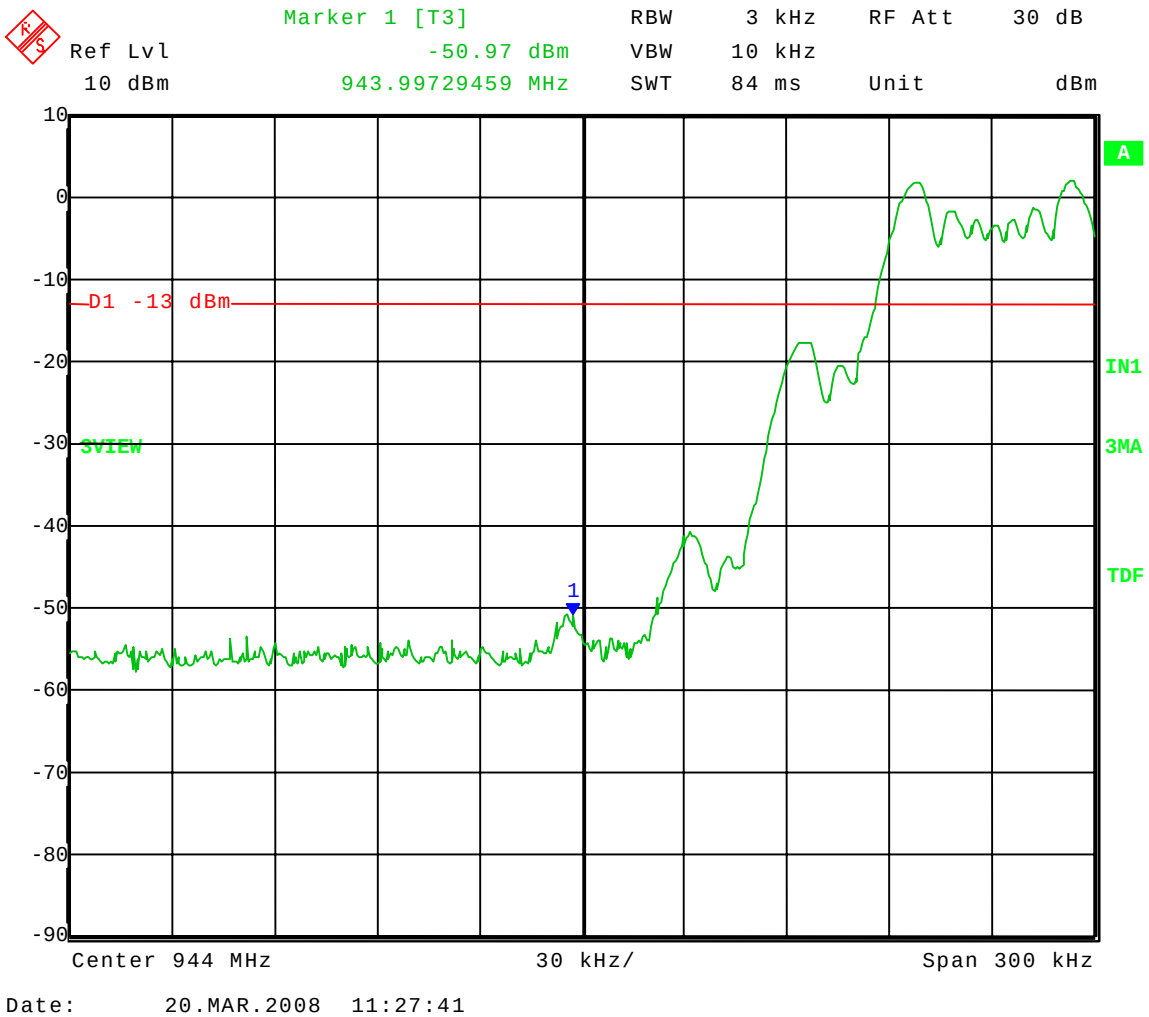
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 944.125 MHz

Operating conditions: 3.0 V 50° C

Band-Edge Frequency = 944 MHz
Band-Edge limit = -13 dBm



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APPENDIX A

DATA AND GRAPH(S) TAKEN OF THE

BAND EDGE COMPLIANCE

Part 74.861 (e)(5) & PART 2.1051

HIGH CHANNEL

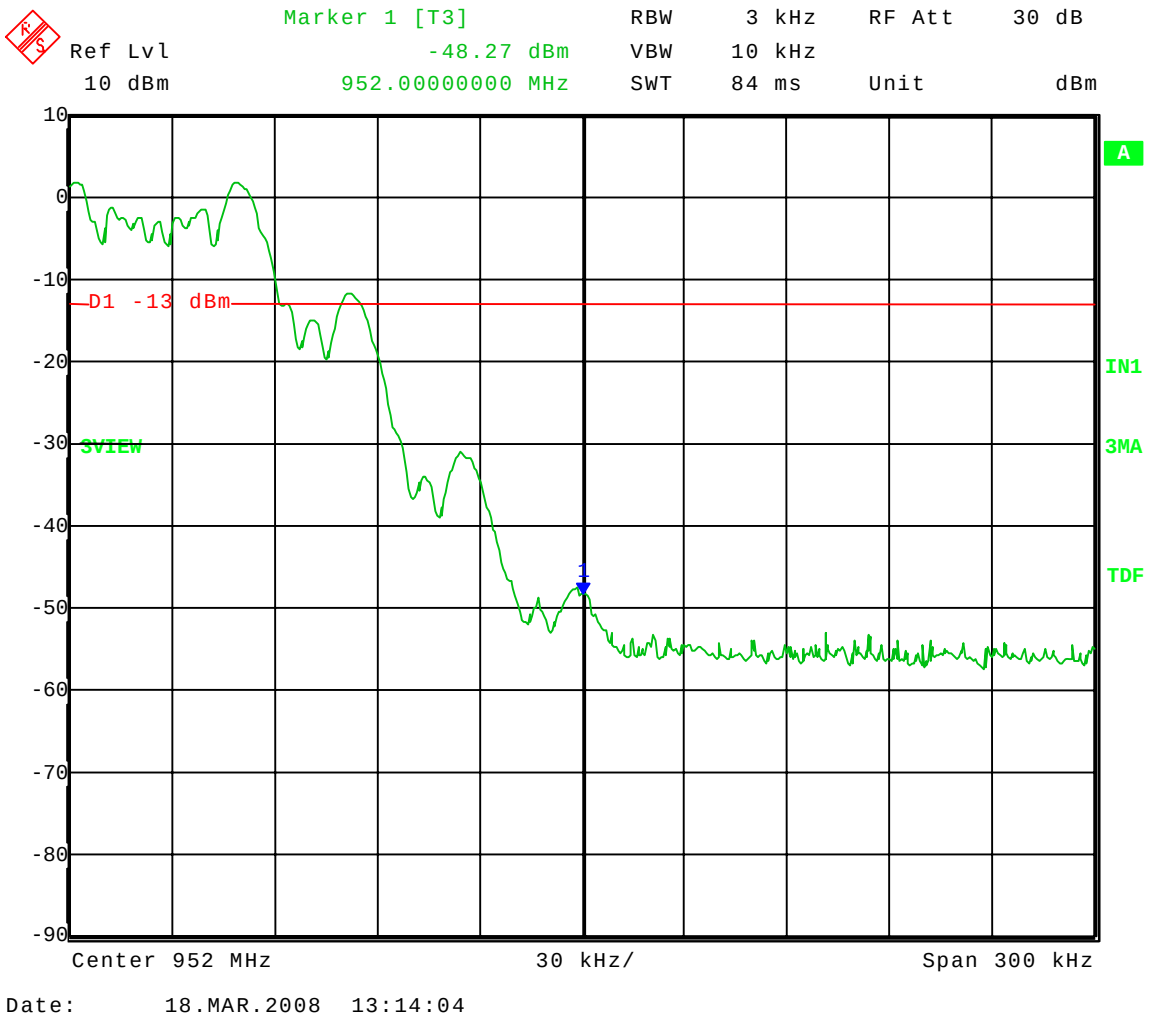
1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

Test Date: 03-18-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 2.1 V 20° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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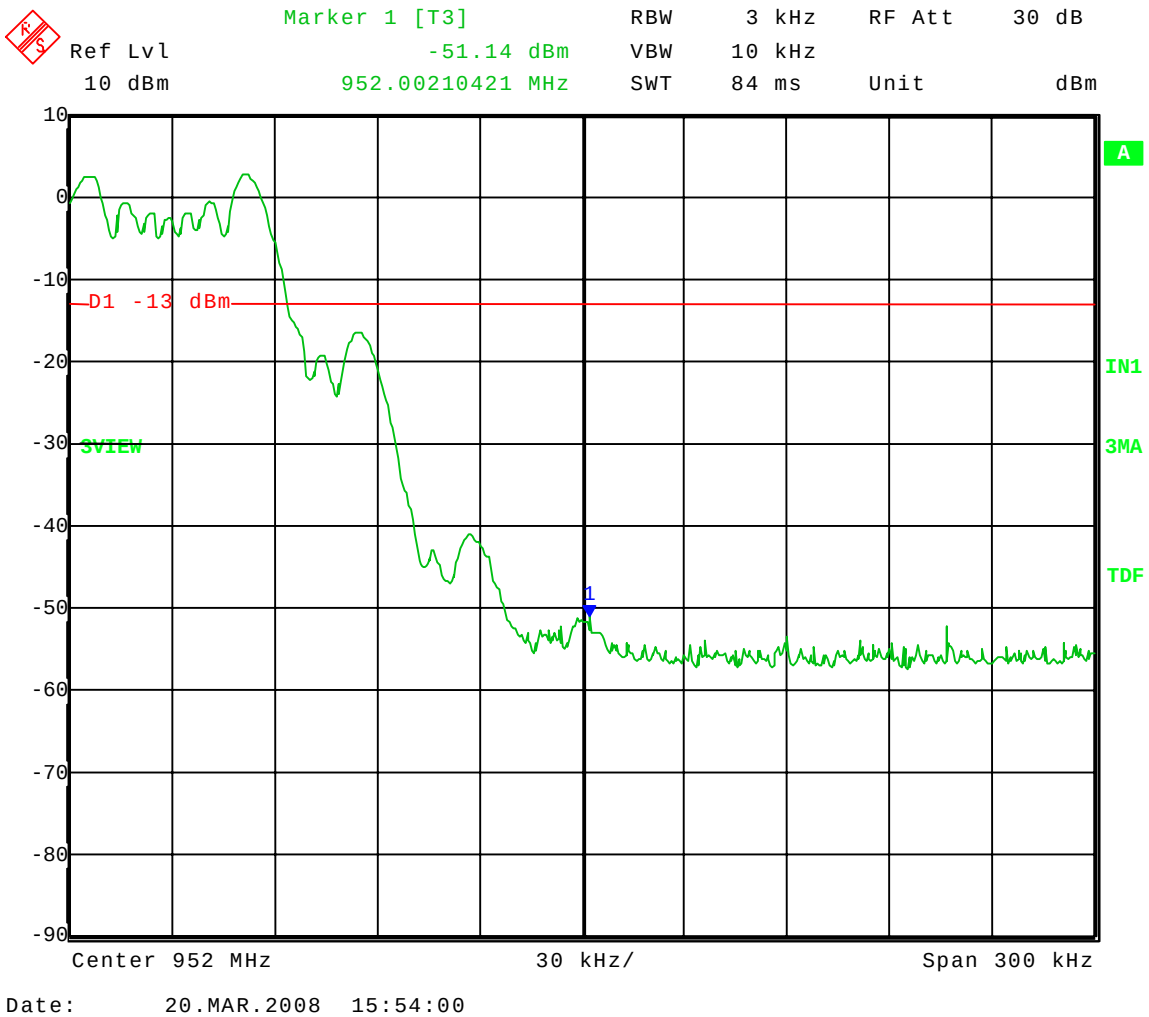
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 3.0 V -30° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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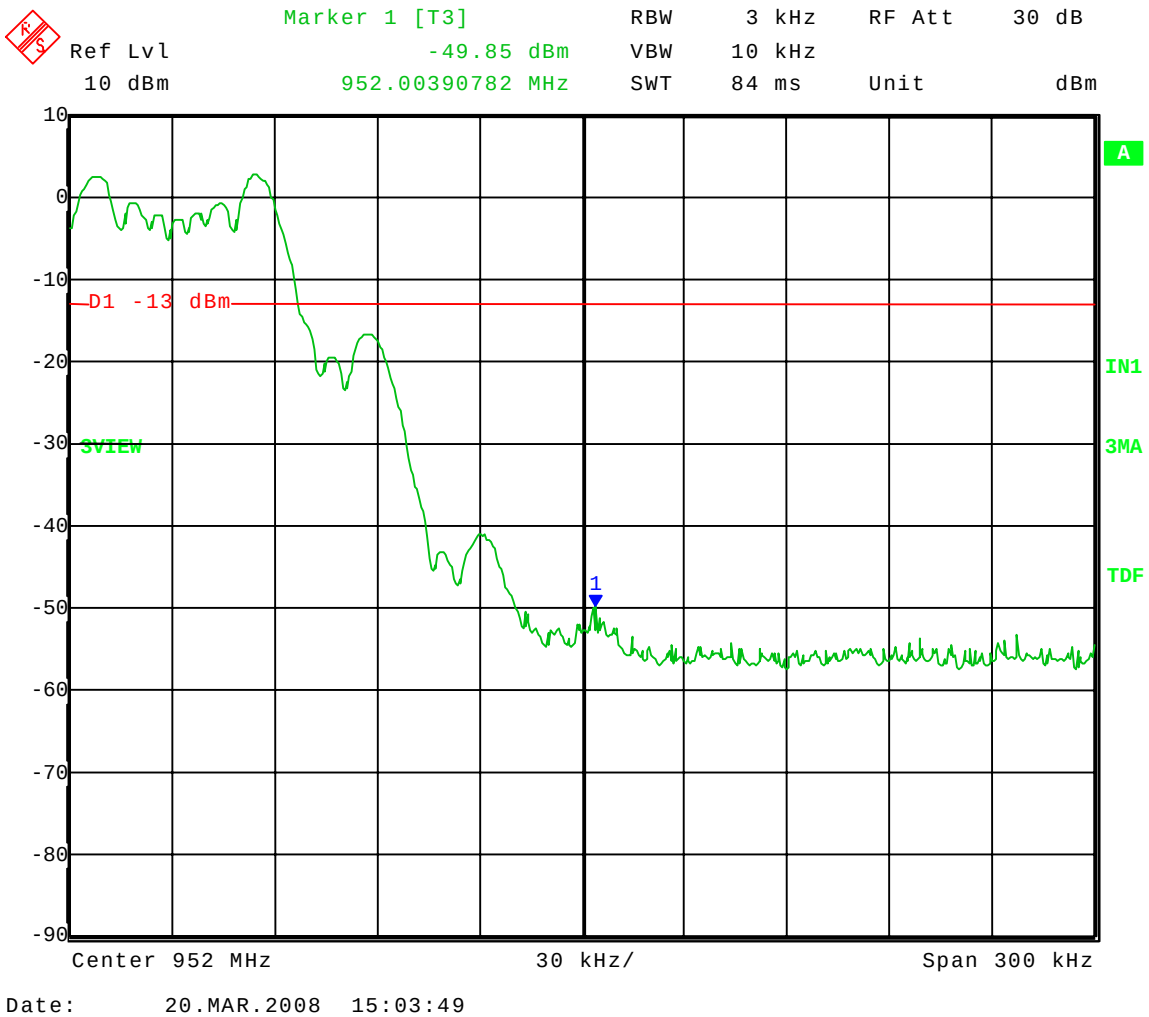
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 3.0 V -20° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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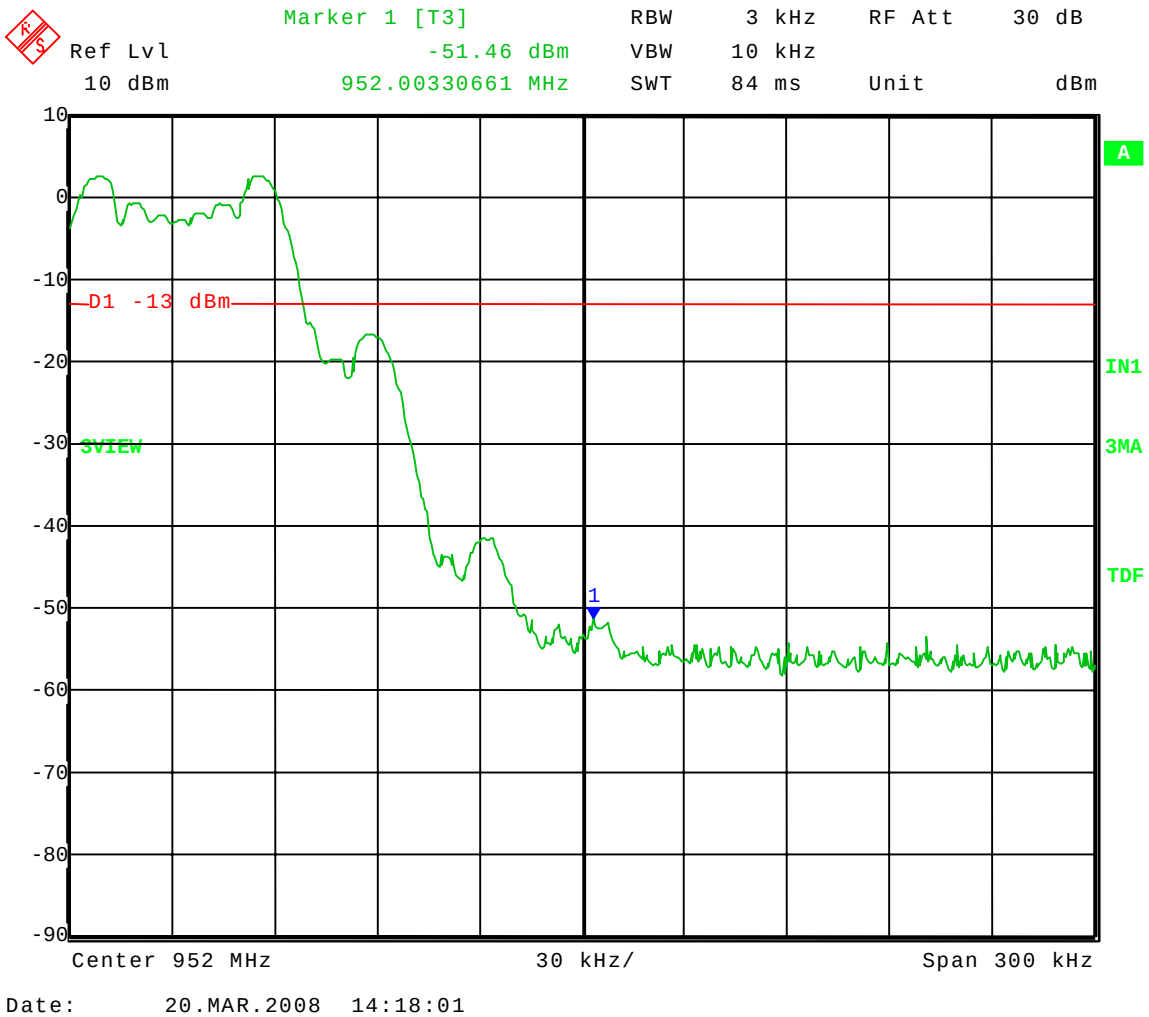
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 3.0 V -10° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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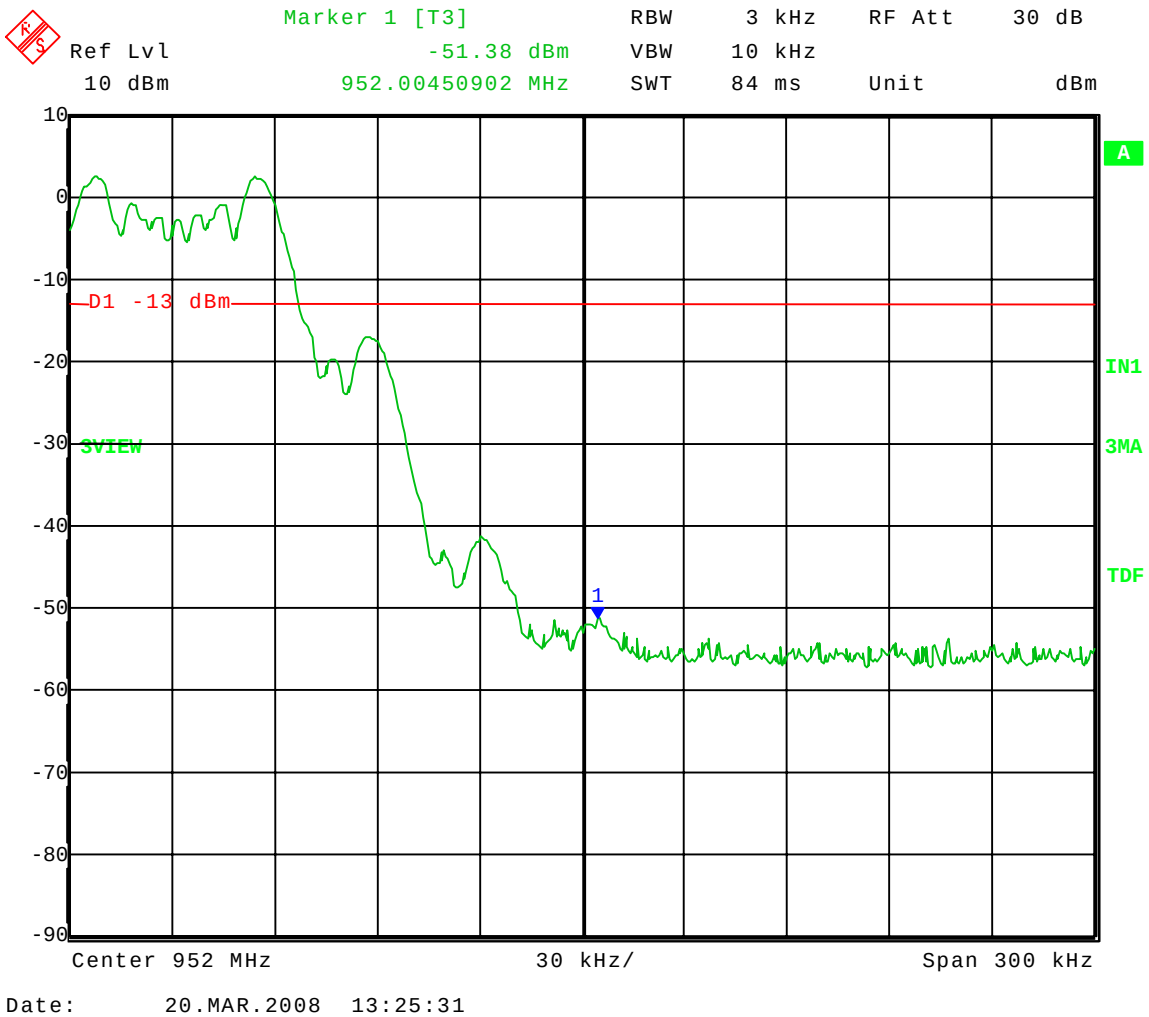
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 3.0 V 0° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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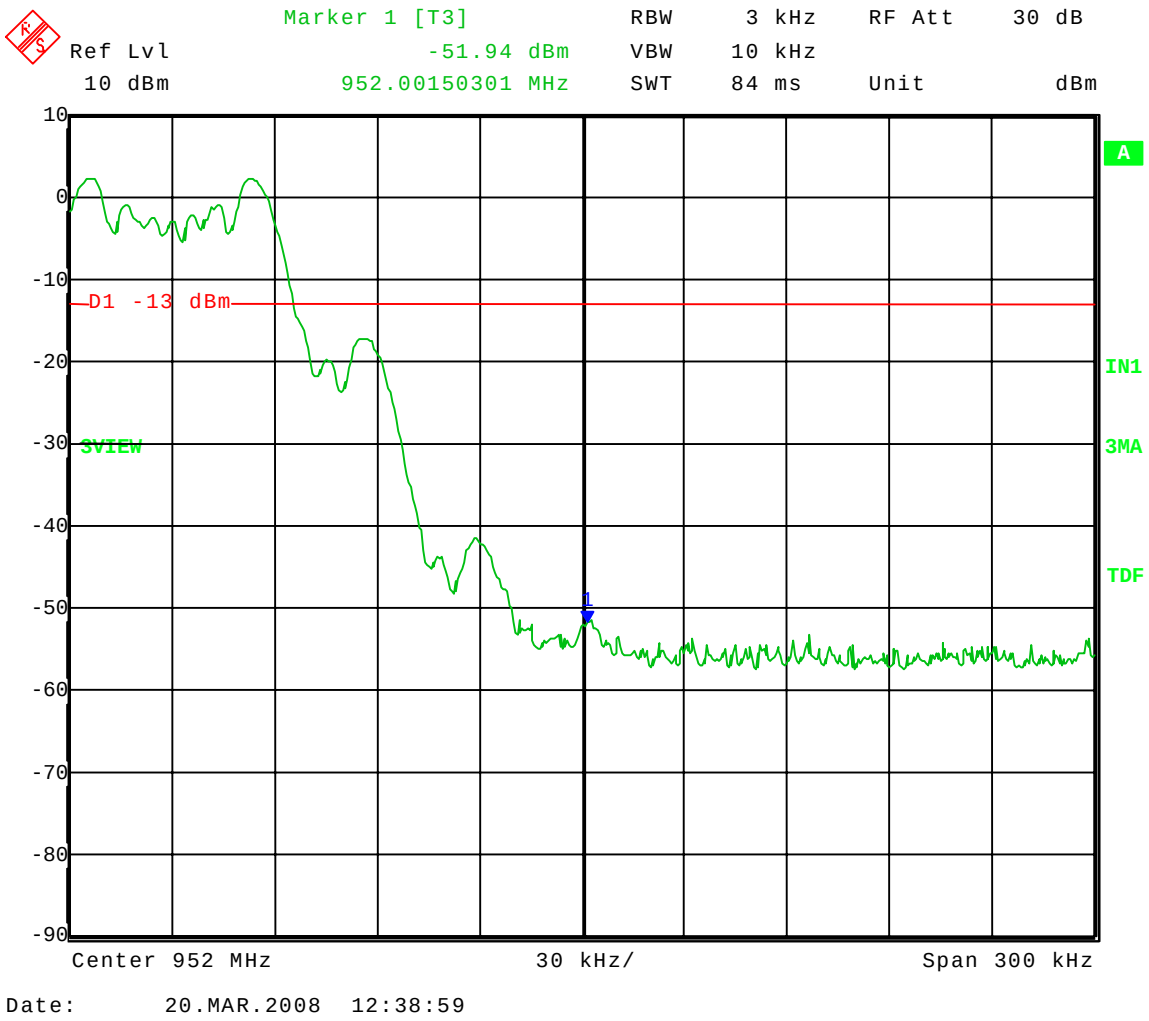
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 3.0 V 10° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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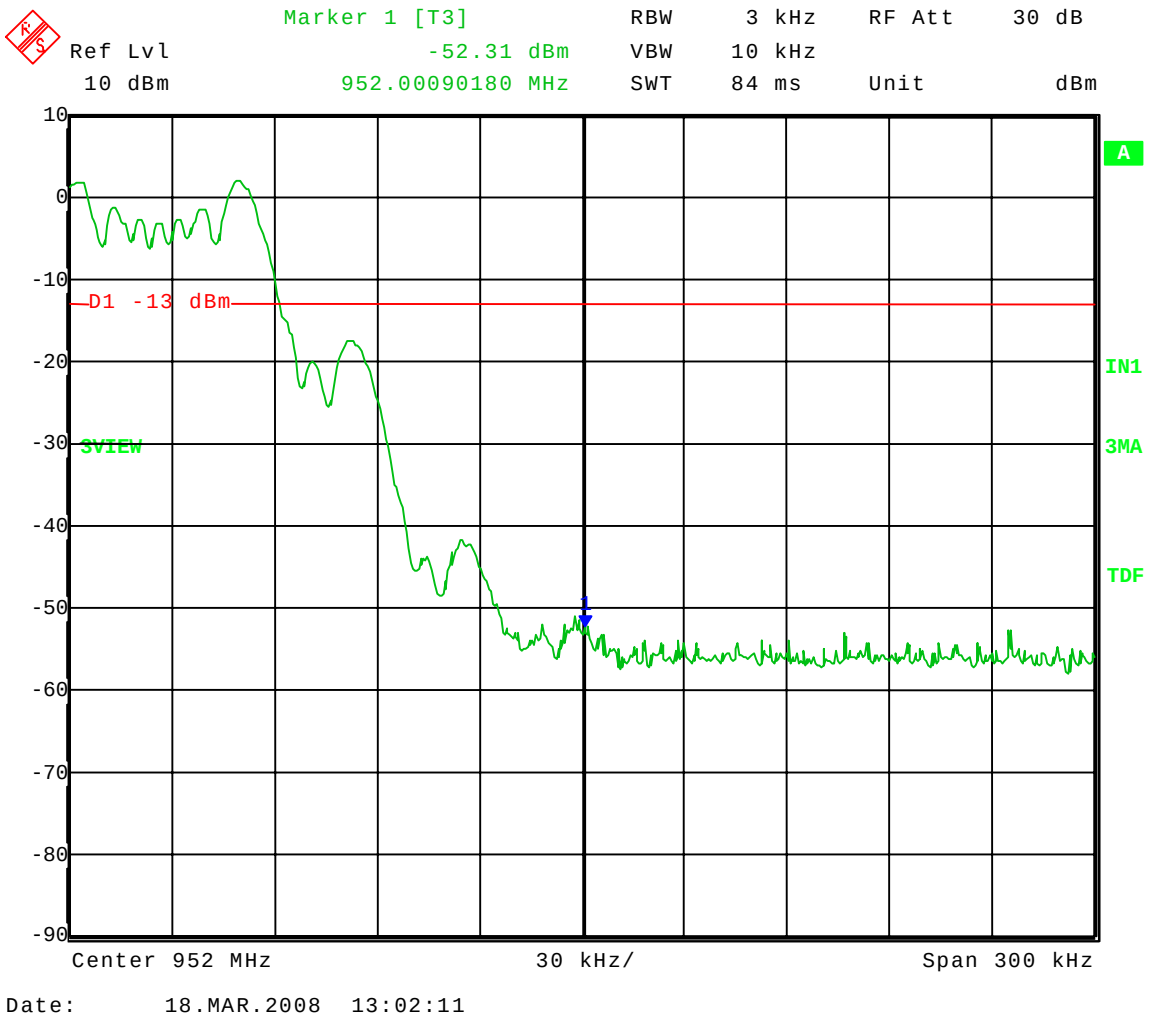
APPENDIX A

Test Date: 03-18-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 3.0 V 20° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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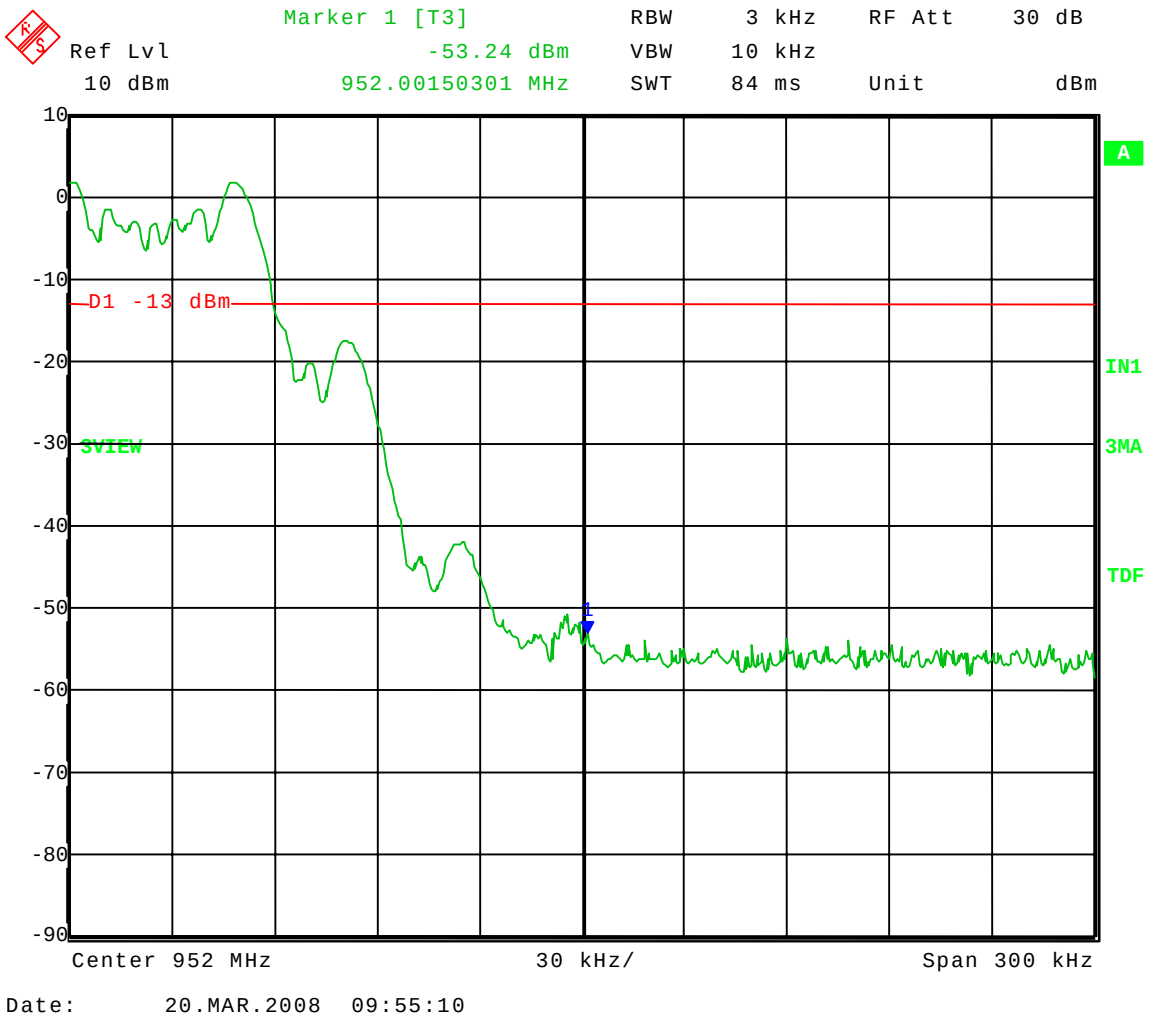
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 3.0 V 30° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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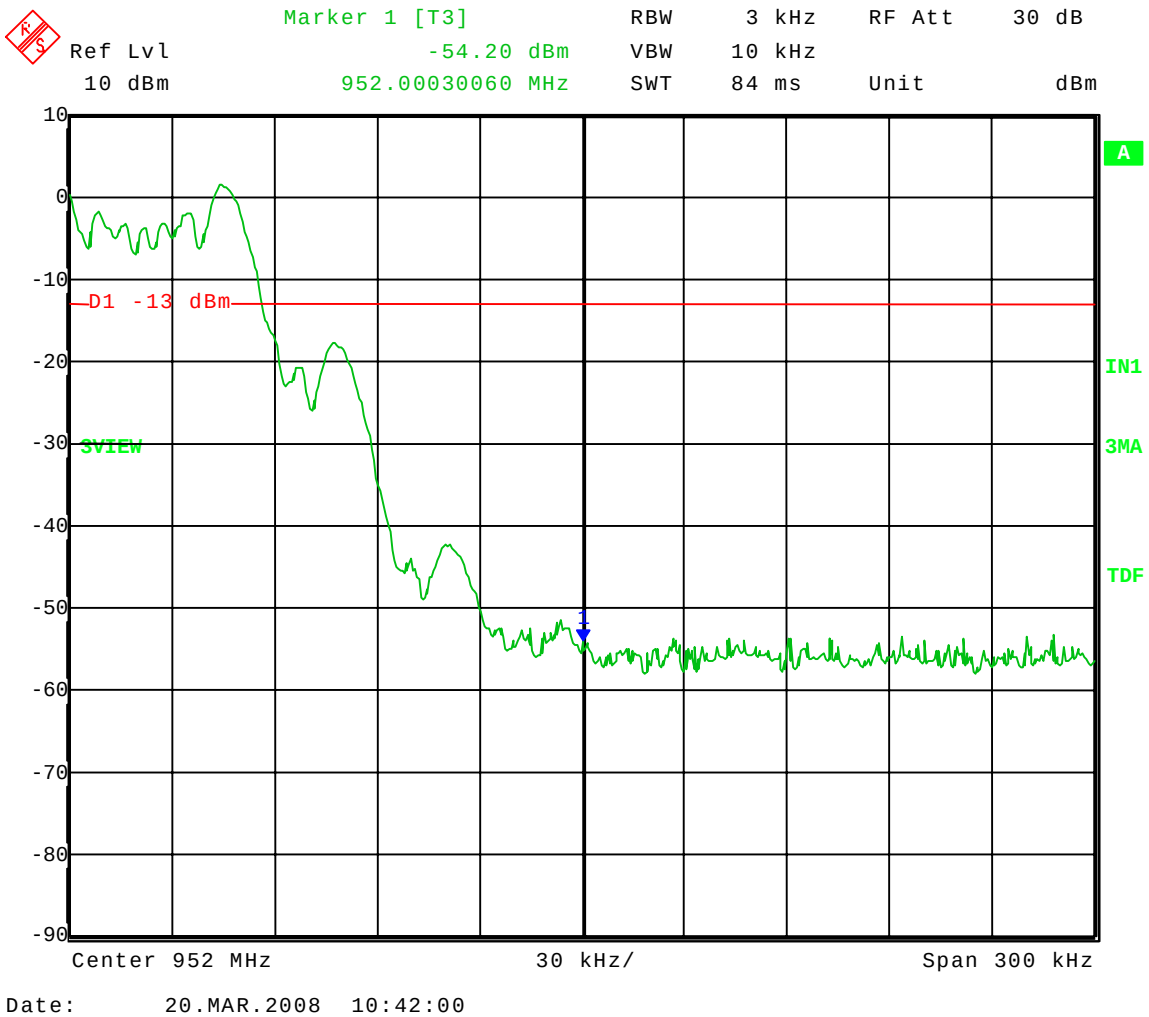
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 3.0 V 40° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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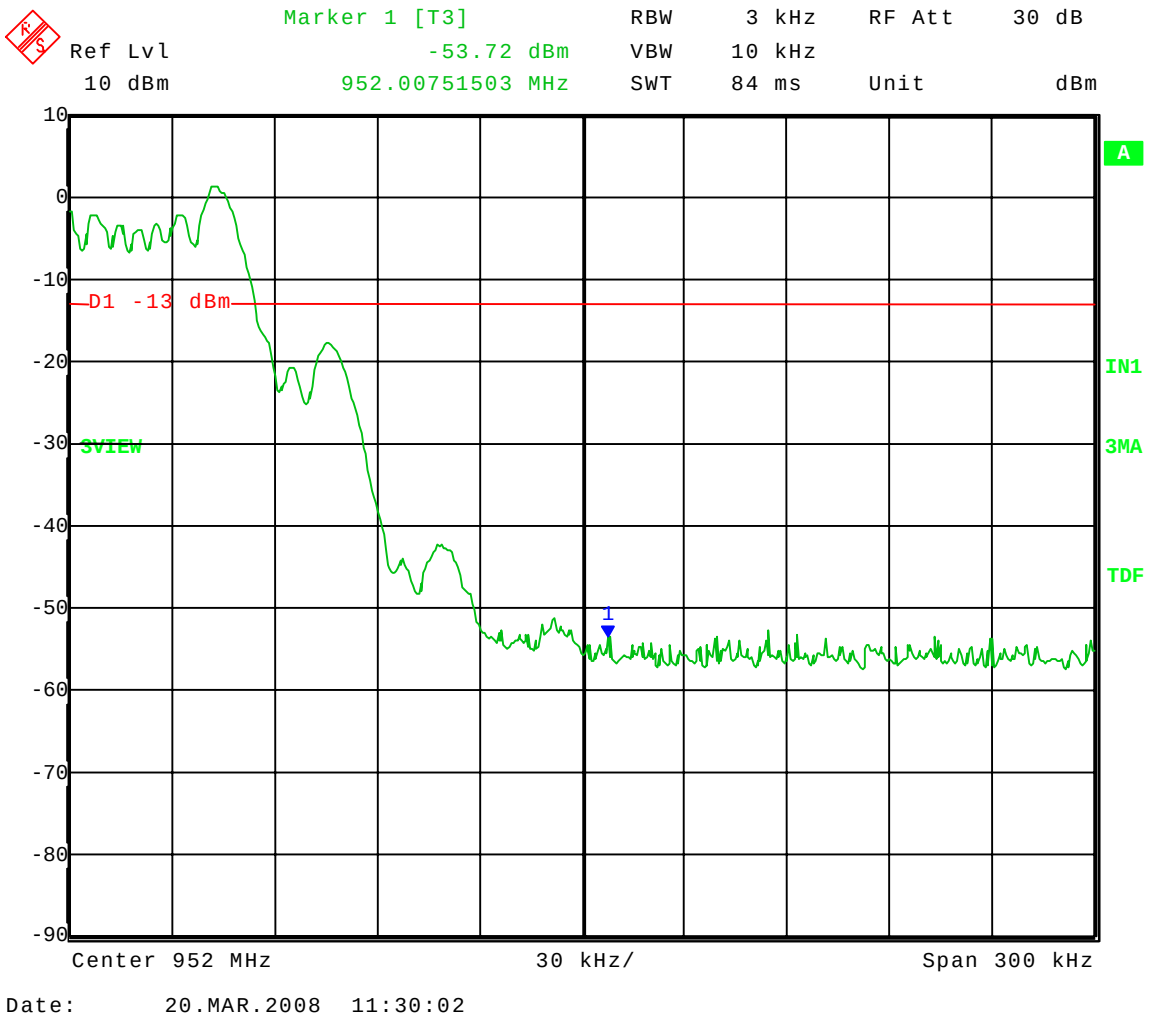
APPENDIX A

Test Date: 03-20-2008
Company: Shure, Inc.
EUT: MX890-X1
Test: Band-Edge Compliance - Conducted
Rule part: FCC Part 74.861(d); FCC Part 2.1051
Operator: Craig B
Comment: Channel; 951.875 MHz

Operating conditions: 3.0 V 50° C

Band-Edge Frequency = 952 MHz
Band-Edge limit = -13 dBm



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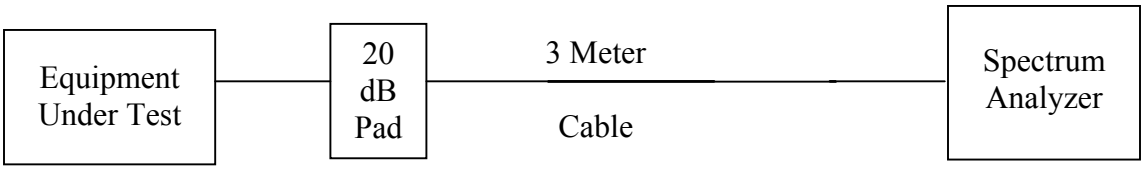
APPENDIX A

6.0 SPURIOUS EMISSIONS AT ANTENNA TERMINALS – PART 2.1051 and EIA /TIA-603-C:2004, SECTION 2.2.13

Spurious conducted emissions were measured at the antenna terminals using an artificial load. Plots were made showing the amplitude of each harmonic emission with the equipment operated as specified in 2.989. Measurements were made up to the 10th harmonic of the fundamental. The following setup was used showing placement of the attenuators:



The allowed emissions for transmitters operating in the 944 MHz - 952 MHz bands for Wireless Boundary Microphone equipment are found under Part 74, Section 74.861, Paragraph d-3 for Low Power Auxiliary Stations. This paragraph states the mean power of the emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) any discrete frequency outside the authorized band shall be attenuated, at least, $43+10\text{Log}^{10}$ (mean output power, in watts) dB below the mean output power of the transmitting unit.

NOTE:

The Wireless Boundary Microphone uses the **Bent Monopole on Flex PCB (non-removeable).**

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

7.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS – PART 2.1053 and EIA /TIA-603-C:2004, SECTION 2.2.12

Radiated measurements were performed scanning the frequency range from 200 MHz to at least the 10^{th} harmonic of the fundamental frequency.

For the Wireless Boundary Microphone, the highest fundamental frequency is 951.875 so the scans were made up to 10000 MHz, to cover the tenth harmonic.

All signals in the frequency range of 30 MHz to 200 MHz were measured with a Biconical Antenna and from 200 MHz to 1000 MHz a Log Periodic Antenna was used as the pickup devices. From 1000 MHz to 10000 MHz, a Double Ridge Horn Antenna was used. The cables and equipment were placed and moved within the range of positions likely to find their maximum emissions. Tests were made in both the horizontal and vertical planes of polarization.

The allowed emissions for transmitters operating in the 944 MHz - 952 MHz bands for Wireless Boundary Microphone are found under Part 74, Section 74.861, Paragraph d-3 for Low Power Auxiliary Stations. This paragraph states that the mean power of the emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) any discrete frequency outside the authorized band shall be attenuated, at least, $43+10Log^{10}$ (mean output power, in watts) dB below the mean output power of the transmitting unit.

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RADIATED EMISSION DATA & CHARTS TAKEN

FOR FUNDAMENTAL EMISSIONS

USING THE SUBSTITUTION METHOD

EIA /TIA-603-C:2004, SECTION 2.2.12

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

DLS Electronic Systems, Inc.

Company: Shure, Inc.
Operator: Craig B
Date of test: 03-12-2008
Temperature: 70 deg. F
Humidity: 23% R.H.
Part 74.861(d)
Rated Power = 9.1 dBm (conducted)

Spurious Emissions - ERP - Substitution Method

Model: **MX890-X1**

Channels: **944.125 MHz, and 951.875 MHz**

Frequency and Polarization (MHz)	Max. Field Strength of EUT @ 3 meters (dBuV/m)	Output of Signal Generator when field strength equals that of EUT (dBm)	Correction factor for cable between Signal Gen. and subst. antenna (dB)	Gain of subst. antenna (dBi)	Strength of emission [ERP] (dBm)	Limit (dBm)	Margin (dB)	Strength of emission [ERP] (mW)
944.125 vertical	88.58	-2.36	7.06	2.15	-9.4	30.0	39.4	0.11
944.125 horizontal	95.12	3.46	7.06	2.15	-3.6	30.0	33.6	0.44
951.875 vertical	87.14	-2.97	7.10	2.15	-10.1	30.0	40.1	0.10
951.875 horizontal	94.84	2.07	7.10	2.15	-5.0	30.0	35.0	0.31

EIRP = Signal generator output - cable loss + antenna gain

$ERP_{(ref.\ to\ \frac{1}{2}\lambda\ dipole)}$ = Signal generator output - cable loss + antenna gain - 2.15

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

RADIATED EMISSION DATA AND GRAPH(S)

TAKEN FOR

SPURIOUS EMISSION MEASUREMENTS

USING THE SUBSTITUTION METHOD

EIA /TIA-603-C:2004, SECTION 2.2.12

PART 2.1053

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

DLS Electronic Systems, Inc.

Company: Shure, Inc.
Operator: Craig B
Date of test: 03-17-2008
Temperature: 70 deg. F.
Humidity: 25% R.H.

Radiated Spurious Emissions (e.r.p. substitution method) FCC Part 74; FCC Part 2.1053

Model: **MX890-X1** Transmit Frequency: **944.125 MHz**

Frequency GHz	Field Strength Level dBuV/m	Factor to Convert to dBm	Power ERP dBm	Limit dBm	Margin dB	Receive Antenna Polarization	EUT Orientation (degrees)	Receive Antenna Height (m)
1.88825	50.8	99.8	-49.0	-13	36.0	Horizontal	135	1.1
2.83238	56.6	101.4	-44.8	-13	31.8	Horizontal	225	1.1
3.77650	50.3	100.7	-50.4	-13	37.4	Horizontal	270	1.0
4.72063	39.8	100.2	-60.4	-13	47.4	Horizontal	200	1.0
5.66475	51.9	100.7	-48.8	-13	35.8	Horizontal	200	1.0
6.60888	54.5	99.5	-45.0	-13	32.0	Horizontal	315	1.0
7.55300	43.1	100.1	-57.0	-13	44.0	Horizontal	315	1.0
8.49713	45.5	100.5	-55.0	-13	42.0	Horizontal	315	1.1
9.44125	noise floor			-13		Horizontal		
1.88825	49.6	98.9	-49.3	-13	36.3	Vertical	90	1.2
2.83238	59.5	100.9	-41.4	-13	28.4	Vertical	180	1.0
3.77650	52.2	100.3	-48.1	-13	35.1	Vertical	340	1.4
4.72063	45.3	100.5	-55.2	-13	42.2	Vertical	60	1.0
5.66475	58.2	101.0	-42.8	-13	29.8	Vertical	130	1.0
6.60888	59.9	100.1	-40.3	-13	27.3	Vertical	120	1.1
7.55300	53.8	101.7	-47.9	-13	34.9	Vertical	10	1.7
8.49713	53.3	101.9	-48.6	-13	35.6	Vertical	10	1.8
9.44125	noise floor			-13		Vertical		

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

DLS Electronic Systems, Inc.

Company: Shure, Inc.
Operator: Craig B
Date of test: 03-17-2008
Temperature: 70 deg. F.
Humidity: 25% R.H.

Radiated Spurious Emissions (e.r.p. substitution method) FCC Part 74; FCC Part 2.1053

Model: **MX890-X1** Transmit Frequency: **951.875 MHz**

Frequency GHz	Field Strength Level dBuV/m	Factor to Convert to dBm	Power ERP dBm	Limit dBm	Margin dB	Receive Antenna Polarization	EUT Orientation (degrees)	Receive Antenna Height (m)
1.90375	49.2	99.9	-50.7	-13	37.7	Horizontal	150	1.1
2.85563	58.3	100.7	-42.4	-13	29.4	Horizontal	315	1.5
3.80750	50.3	100.5	-50.2	-13	37.2	Horizontal	315	1.1
4.75938	42.2	100.0	-57.8	-13	44.8	Horizontal	225	1.0
5.71125	52.1	100.3	-48.2	-13	35.2	Horizontal	35	1.0
6.66313	53.7	99.4	-45.7	-13	32.7	Horizontal	330	1.0
7.61500	43.4	100.7	-57.3	-13	44.3	Horizontal	315	1.0
8.56688	45.3	100.2	-54.9	-13	41.9	Horizontal	340	1.2
9.51875	noise floor			-13		Horizontal		
1.90375	49.3	99.6	-50.4	-13	37.4	Vertical	90	2.1
2.85563	59.5	101.1	-41.6	-13	28.6	Vertical	180	1.0
3.80750	50.4	100.3	-49.9	-13	36.9	Vertical	350	1.2
4.75938	46.4	100.1	-53.7	-13	40.7	Vertical	75	1.0
5.71125	54.9	100.8	-45.9	-13	32.9	Vertical	135	1.0
6.66313	58.2	100.0	-41.8	-13	28.8	Vertical	315	1.0
7.61500	55.1	101.9	-46.8	-13	33.8	Vertical	0	2.3
8.56688	47.5	101.5	-54.0	-13	41.0	Vertical	35	1.6
9.51875	noise floor			-13		Vertical		

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APPENDIX A

8.0 FREQUENCY STABILITY (TEMPERATURE)– PART 2.1055(a1)

The frequency stability was measured from -30° to +50° 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 Wireless Boundary Microphone oscillator circuitry to stabilize.

See the following page for the data taken during testing.

9.0 FREQUENCY STABILITY (VOLTAGE VARIATION)– PART 2.1055(d2)

The frequency stability of Wireless Boundary Microphone was measured by reducing the primary supply voltage to the battery end point specified by the manufacturer**.**

See the following page for the data taken during testing.

1250 Peterson Dr., Wheeling, IL 60090

APPENDIX A

DATA TAKEN FOR FREQUENCY

STABILITY WHEN VARYING THE TEMPERATURE

AND

PRIMARY SUPPLY VOLTAGE VARIATION

PART 2.1055a(1) & PART 2.1055d(d2)

1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Incorporated
Model Tested: MX890 X1
Report Number: 14000

DLS Electronic Systems, Inc.

Company: Shure, Inc.
Operator: Craig B
Date of test: 03-20-2008

Radted frequency tolerance = +/- 10 ppm (9.4 kHz)

Frequency Stability FCC Part 74; FCC Part 2.1055

Model	Nominal Frequency (MHz)	Measured Frequency									
		+50 deg. C	Error (kHz)	+40 deg. C	Error (kHz)	+30 deg. C	Error (kHz)	+20 deg. C	Error (kHz)	+10 deg. C	Error (kHz)
MX890-X1	944.125	944.11905	**-5.950**	944.12095	**-4.050**	944.12410	**-0.900**	944.12430	**-0.700**	944.12900	**4.000**
MX890-X1	951.875	951.86855	**-6.450**	951.87005	**-4.950**	951.87315	**-1.850**	951.87410	**-0.900**	951.87835	**3.350**

Frequency Stability FCC Part 74; FCC Part 2.1055

Model	Nominal Frequency (MHz)	Measured Frequency									
		0 deg. C	Error (kHz)	-10 deg. C	Error (kHz)	-20 deg. C	Error (kHz)	-30 deg. C	Error (kHz)	2.1 Volts	Error (kHz)
MX890-X1	944.125	944.13035	**5.350**	944.13060	**5.600**	944.12980	**4.800**	944.12655	**1.550**	944.12420	**-0.800**
MX890-X1	951.875	951.88000	**5.000**	951.88065	**5.650**	951.87995	**4.950**	951.87725	**2.250**	951.87375	**-1.250**

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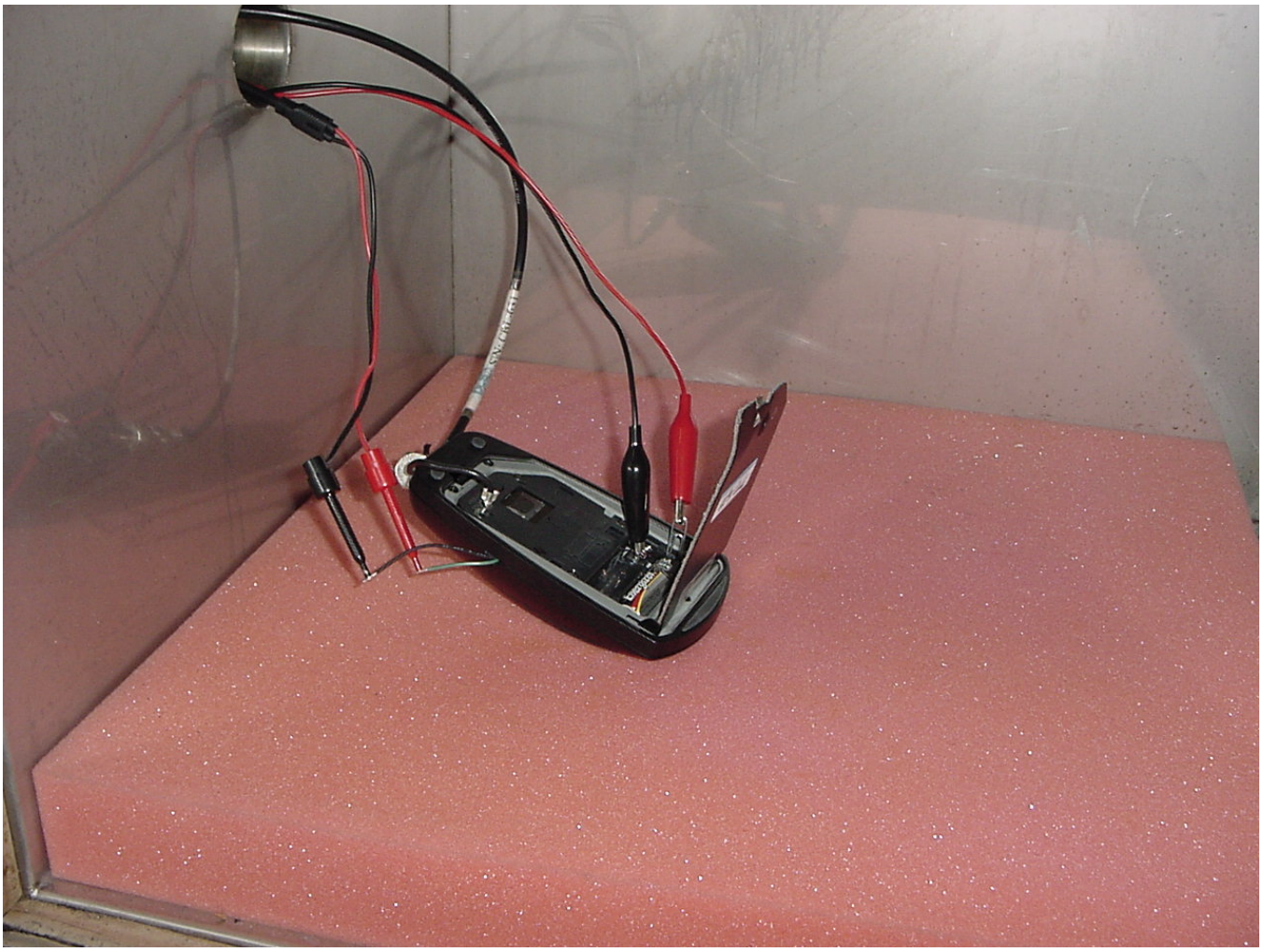
10.0 FREQUENCY STABILITY PHOTOS TAKEN DURING TESTING



RF CONDUCTED