

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: SLX1-X1 Wireless Bodypack Transmitter

Frequency Range: 944 MHz – 952 MHz

Kind of Equipment: Wireless Microphone Transmitter

Test Configuration: Connects to lavalier microphone or guitar as audio input. (Tested at 3 vdc)

Model Number(s): SLX1-X1

Model(s) Tested: SLX1-X1

Serial Number(s): N/A

Emission Designator: 97.8KF3E

Date of Tests: October 31, 2007, November 13, 14 & 15, 2007, & August 12 & 14, 2008

Test Conducted For: Shure Inc.

5800 W. Touhy Ave. Niles, IL 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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1250 Peterson Dr., Wheeling, IL 60090

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Company: Model Tested: Report Number:

Shure Inc. SLX1-X1 13809

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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 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). This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.

Sold State of So

For the National Institute of Standards and Technology

2007-10-01 through 2008-09-30

Effective dates

NVI AP-01C (REV 2006-09-13)



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1.0 SUMMARY OF TEST REPORT

It was found that the SLX1-X1 Wireless Bodypack Transmitter, Model Number(s) SLX1-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 <u>AC Power Line conducted</u> emissions test was not required because the SLX1-X1 Wireless Bodypack Transmitter 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 October 31, 2007, November 13, 14 & 15, 2007, & August 12 & 14, 2008, a series of radio frequency interference measurements was performed on SLX1-X1 Wireless Bodypack Transmitter, Model Number(s) SLX1-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

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 American National Standards Institute, ANSI C63.4-2003. 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 HP Spectrum Analyzer or 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 HP Spectrum Analyzer and or 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. These methods are performed to the specifications in ANSI C63.4: 2003.

7.0 AC POWER LINE CONDUCTED EMISSION MEASUREMENTS – Part 15.207

The SLX1-X1 Wireless Bodypack Transmitter 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.



8.0 DESCRIPTION OF TEST SAMPLE:

8.1 Description:

The Shure Model SLX1-X1 is a microprossesor controlled frequency agile UHF bodypack transmitter operating over the frequency range of 944MHz to 952MHz. The transmitter will operate for a minimum of 8 hours using two "AA" alkaline batteries. The user interface includes Mode and Set buttons, and an LCD that displays battery status, group/channel and transmitter/receiver frequency synchronization. The SLX1-X1 has a plastic enclosure. It utilizes an external flexible wire antenna (Exceltek 95D2426 ¼ Wave Antenna) for optimum range and reliability.

8.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 109.0mm x Width: 64.0mm x Height: 19.0mm

8.3 LINE FILTER USED:

N/A

8.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

N/A kHz

Clock Frequencies:

16 MHz, 0.32768 MHz

8.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. PC Board Assy. PN: 190-10300



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

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

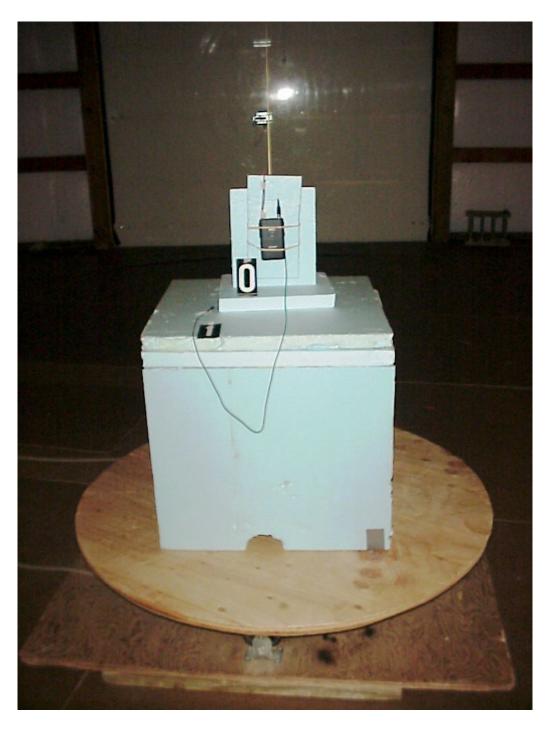
10.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 SLX1-X1 Wireless Bodypack Transmitter Model Number: SLX1-X1, Serial Number: N/A

Item 1 Shure Microphone Cable



11.0 RADIATED PHOTOS TAKEN DURING TESTING



ORIENTATION Y-AXIS



11.0 RADIATED PHOTOS TAKEN DURING TESTING



ORIENTATION X-AXIS



11.0 RADIATED PHOTOS TAKEN DURING TESTING



ORIENTATION Z-AXIS



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 SLX1-X1 Wireless Bodypack Transmitter, Model Number(s) SLX1-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 <u>AC Power Line conducted</u> emissions test was not required because the SLX1-X1 Wireless Bodypack Transmitter 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		Model	Serial	Frequency	Cal Due	
Equipment	Manufacturer	Number	Number	Range	Dates	
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	3/09	
Preamplifier	Rohde & Schwarz	TS-PR10	032001/004	9 kHz – 1 GHz	1/09	
Preamp	Ciao	CA118- 4010	101	1 GHz-18 GHz	1/09	
Signal Generator	Marconi	2022A	119026	10 kHz – 1 GHz	7/09	
Oscilloscope	Yukogawa	DL1720	R047912	1 Hz – 500 MHz	10/09	
Antenna	Electrometrics	3146	1205	200 MHz – 1 GHz	4/10	
Dipole Antenna	Com-Power	AD-100	40140	400 MHz – 1 GHz	N/A	
Horn Antenna	EMCO	3115	4451	1-18 GHz	5/09	
Power Meter	Anritsu	ML2487A	6K00002069	100 kHz – 65 GHz	10/09	
High Pass Filter	Mini-Circuits	NHP-600	10521	600 MHz	10/08	
High Pass Filter	Q-Microwave	100460	001	1.1 GHz	5/09	
Attenuator- 20dB Fixed	Aeroflex Weinschel	75A-20-12	1071	DC – 40GHz	7/09	
Power Sensor	Anritsu	MA2490A	031563	50 MHz – 8 GHz	10/09	

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



APPENDIX A

TEST PROCEDURE

SUBPART H

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



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 SLX1-X1 Wireless Bodypack Transmitter was connected to 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:

13.02 dBm Measured output of the transmitter

13.02 dBm equals 0.0200447 watt(s)

LIMIT:

Manufacturer's rated output power = $14 \text{ dBm} \pm 2 \text{ dB}$

MARGIN:

1 - 0.0200447 = 0.979955 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



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.
Model Tested: SLX1-X1
Report Number: 13809

APPENDIX A

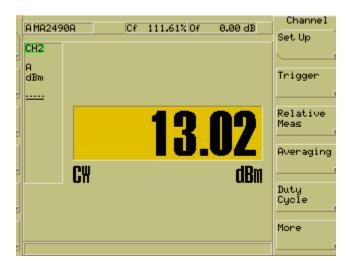
Test Date: 11-13-2007 Company: Shure, Inc. EUT: SLX1-X1

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 = 13.02 dBm = 20.04 mW





1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.
Model Tested: SLX1-X1
Report Number: 13809

APPENDIX A

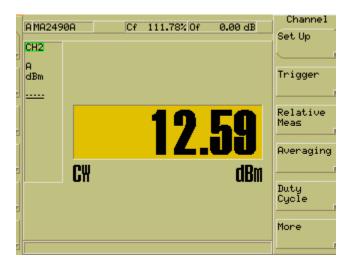
Test Date: 11-13-2007 Company: Shure, Inc. EUT: SLX1-X1

Test: Peak Power Output - Conducted Rule part: FCC Part 74; FCC Part 2.1046

Operator: Craig B

Comment: Channel: 951.875 MHz

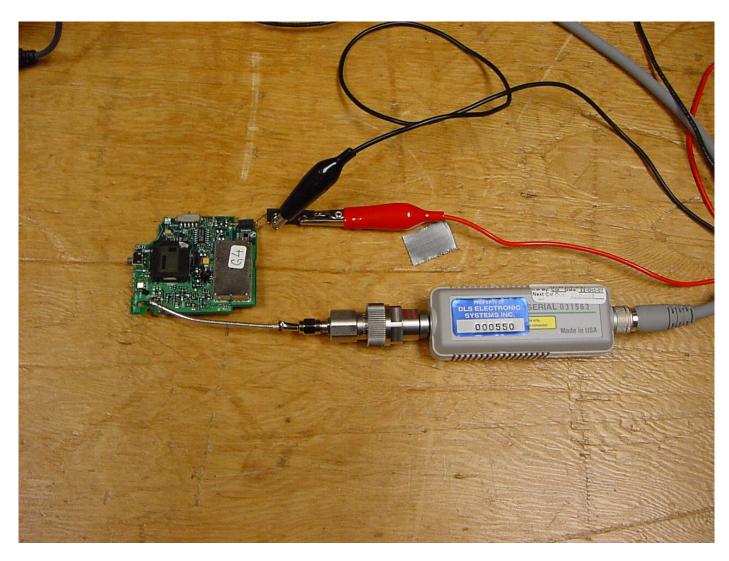
Peak Output Power = 12.59 dBm = 18.16 mW





APPENDIX A

3.0 RF POWER OUTPUT PHOTOS TAKEN DURING TESTING





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 45 Hz to 15 kHz 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.



APPENDIX A

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

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

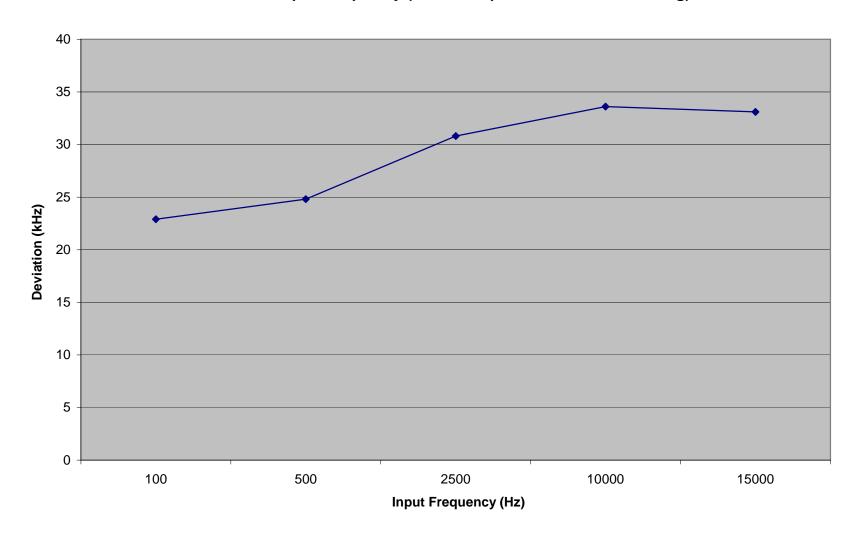
PART 2.1047



SLX1 X1 Deviation vs. Input Level For Different Input Frequencies 90 80 70 Deviation (kHz) **→** 100 60 -- 500 50 2500 40 10000 30 **→** 15000 20 10 0 -20 -10 -40 -30 0 10 20 Input Level (dBu) 0dB Gain Setting



Deviation vs. Input Frequency (-40 dBu Input with 0dB Gain Setting)





1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc. Model Tested: SLX1-X1 Report Number: 13809

		100	500	2500	10000	15000	(Hz)
	-40	22.9	24.8	30.8	33.6	33.1	
	-30	29.3	31.5	38.9	42.4	41.8	
(dBu)	-20	37.3	39.9	47.9	48	47.5	
	-10	47.1	49.9	50.3	49	48.4	
	0	60.5	62.5	65.5	49.3	47.6	
	10	81.4	78.4	63.2	52.8	49	
	20	81.1	78.4	78	50.8	45.6	



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 log¹⁰ (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 ± 75 kHz deviation is permitted when frequency modulation is used.

Carson's Rule:

Section 2.202 (g)

Bn = 2M+2DK, K=1 Bn = Bandwidth

M = 15 kHz, M = Maximum Modulating Frequency

D = 49 kHz, D = Peak Deviation

Bn = 2(15) + 2(49)(1) = 128 kHz

NOTE:

The modulation will not exceed 75 kHz as describes in the Operation Description.



DATA AND GRAPH(S) TAKEN OF THE

99% OCCUPIED BANDWIDTH

Part 74.861 (d)(3) & PART 2.1049



1250 Peterson Dr., Wheeling, IL 60090

Test Date: 11-14-2007 Company: Shure, Inc. EUT: SLX1-X1

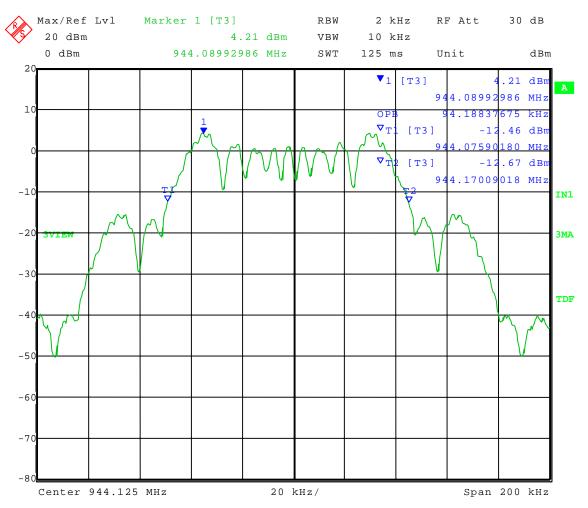
Test: Occupied Bandwidth; 99% bandwidth

Rule part: FCC Part 74; FCC Part 2.1049

Operator: Craig B

Frequency: 944.125 MHz

99% power bandwidth = 94.2 kHz



Date: 14.NOV.2007 15:05:33



1250 Peterson Dr., Wheeling, IL 60090

Test Date: 11-14-2007 Company: Shure, Inc. EUT: SLX1-X1

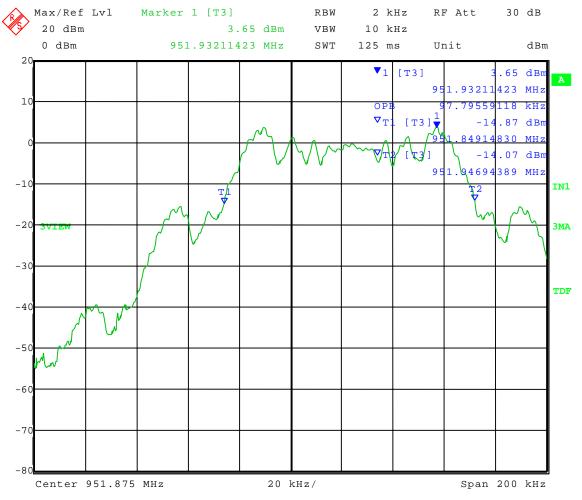
Test: Occupied Bandwidth; 99% bandwidth

Rule part: FCC Part 74; FCC Part 2.1049

Operator: Craig B

Frequency: 951.875 MHz

99% power bandwidth = 97.8 kHz



Date: 14.NOV.2007 15:16:05



1250 Peterson Dr., Wheeling, IL 60090

6.0 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 10th harmonic of the fundamental frequency.

For the SLX1-X1 Wireless Bodypack Transmitter, the highest fundamental frequency is 951.875 MHz 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 MHzbands for SLX1-X1 Wireless Bodypack Transmitter 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+10Log¹⁰ (mean output power, in watts) dB below the mean output power of the transmitting unit.



6.0 FIELD STRENGTH OF SPURIOUS EMISSION MEASUREMENTS (CON'T) – PART 2.1053

On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth, he mean power of emissions shall be attenuated below the mean output power of the transmitter at least 43+10log₁₀ (mean output power in watts) dB.

To determine the **LIMIT** for Spurious Emissions the following method was used:

Measured output power = 13.02 dBm = 0.02004 Watts

The emissions must be reduced by:

 $43 + 10\log_{10} (0.02004 \text{ Watts}) = 26.02 \text{ dB}$

Therefore, the **LIMIT** at three/ten meters equals:

Limit = 13.02 dBm - 26.02 dB = -13 dBm



RADIATED EMISSION <u>DATA</u> & <u>CHARTS</u> TAKEN FOR

FUNDAMENTAL EMISSION MEASUREMENTS USING THE SUBSTITUTION METHOD

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



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure Inc.
Model Tested: SLX1-X1
Report Number: 13809

DLS Electronic Systems, Inc.

Company: Shure, Inc.
Operator: Craig B

Date of test: 10-31-2007 Temperature: 70 deg. F Humidity: 40% R.H.

Part 74.861(d)

Rated Power = 35 mW = 15.44 dBm

Spurious Emissions - ERP - Substitution Method

Model: SLX1-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)	Signal Gen.	Gain of subst. antenna (dBi)	Strength of emission [ERP] (dBm)	Limit (dBm)	Margin (dB)	Strength of emission [ERP] (mW)	
944.125 vertical	110.36	23.50	7.10	2.15	16.4	30.0	13.6	43.65	
944.125 horizontal	110.28	22.70	7.10	2.15	15.6	30.0	14.4	36.31	
951.875 vertical	109.74	23.50	7.14	2.15	16.4	30.0	13.6	43.25	
951.875 horizontal	110.83	23.90	7.14	2.15	16.8	30.0	13.2	47.42	

EIRP = Signal generator output - cable loss + antenna gain

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



RADIATED EMISSION <u>DATA</u> AND <u>GRAPH(S)</u> 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

Company: Shure Inc.
Model Tested: SLX1-X1
Report Number: 13809

DLS Electronic Systems, Inc.

Company: Shure, Inc. Operator: Craig B

Date of test: 10-31-2007 Temperature: 70 deg. F. Humidity: 42% R.H.

Radiated Spurious Emissions (e.r.p. substitution method) FCC Part 74; FCC Part 2.1053								
Model: SLX1-X1 Transmit Frequency: 944.125 MHz								
Frequency	Field Strength	Factor to	Power	Limit	Margin	Receive	EUT	Receive
	Level	Convert to	ERP		_	Antenna	Antenna	Antenna
GHz	dBuV/m	dBm	dBm	dBm	dB	Polarization	Orientation	Height (m)
1.88825	74.0	99.0	-25.0	-13	12.0	Horizontal	0	1.5
2.83238	76.3	101.0	-24.7	-13	11.7	Horizontal	0	1.1
3.77650	71.2	100.1	-28.9	-13	15.9	Horizontal	35	1.1
4.72063	62.6	98.6	-36.0	-13	23.0	Horizontal	20	1.0
5.66475	74.6	98.5	-23.9	-13	10.9	Horizontal	60	1.1
6.60888	67.4	98.1	-30.7	-13	17.7	Horizontal	60	1.1
7.55300	66.9	98.7	-31.8	-13	18.8	Horizontal	50	1.4
8.49713	54.0	99.2	-45.2	-13	32.2	Horizontal	0	1.4
9.44125	68.1	98.3	-30.2	-13	17.2	Horizontal	45	1.6
1.88825	75.0	98.5	-23.5	-13	10.5	Vertical	315	1.0
2.83238	74.5	99.0	-24.5	-13	11.5	Vertical	0	1.2
3.77650	70.2	99.5	-29.3	-13	16.3	Vertical	0	1.0
4.72063	60.5	99.6	-39.1	-13	26.1	Vertical	300	1.0
5.66475	79.0	100.0	-21.0	-13	8.0	Vertical	15	1.1
6.60888	68.2	99.2	-31.0	-13	18.0	Vertical	0	1.3
7.55300	72.1	100.3	-28.2	-13	15.2	Vertical	0	1.1
8.49713	54.1	101.5	-47.4	-13	34.4	Vertical	0	1.0
9.44125	66.1	100.3	-34.2	-13	21.2	Vertical	10	1.5



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DLS Electronic Systems, Inc.

Company: Shure, Inc. Operator: Craig B

Date of test: 10-31-2007 Temperature: 70 deg. F. Humidity: 42% R.H.

Radiated Spurious Emissions (e.r.p. substitution method) FCC Part 74; FCC Part 2.1053										
Model: SLX1-X1 Transmit Frequency 951.875 MHz										
Frequency	Field Strength	Factor to	Power	Limit	Margin	Receive	EUT	Receive		
	Level	Convert to	ERP			Antenna	Antenna	Antenna		
GHz	dBuV/m	dBm	dBm	dBm	dB	Polarization	Orientation	Height (m		
1.90375	74.3	99.7	-25.4	-13	12.4	Horizontal	0	1.2		
2.85563	76.3	101.1	-24.8	-13	11.8	Horizontal	20	1.4		
3.80750	72.4	99.7	-27.3	-13	14.3	Horizontal	45	1.1		
4.75938	66.0	98.3	-32.3	-13	19.3	Horizontal	45	1.1		
5.71125	74.4	98.9	-24.5	-13	11.5	Horizontal	315	1.1		
6.66313	64.0	97.9	-33.9	-13	20.9	Horizontal	80	1.2		
7.61500	72.6	98.9	-26.3	-13	13.3	Horizontal	0	1.3		
8.56688	48.1	99.1	-51.0	-13	38.0	Horizontal	0	1.0		
9.51875	68.7	98.0	-29.3	-13	16.3	Horizontal	80	1.0		
1.90375	74.1	100.1	-26.0	-13	13.0	Vertical	340	1.0		
2.85563	74.3	99.3	-25.0	-13	12.0	Vertical	0	1.0		
3.80750	69.6	99.0	-29.4	-13	16.4	Vertical	0	1.0		
4.75938	65.9	99.3	-33.4	-13	20.4	Vertical	0	1.1		
5.71125	76.8	100.3	-23.5	-13	10.5	Vertical	0	1.0		
6.66313	68.8	99.1	-30.3	-13	17.3	Vertical	350	1.1		
7.61500	72.6	100.4	-27.8	-13	14.8	Vertical	0	1.0		
8.56688	47.0	101.3	-54.3	-13	41.3	Vertical	315	1.0		
9.51875	64.1	100.4	-36.3	-13	23.3	Vertical	90	1.2		



7.0 FREQUENCY STABILITY (TEMPERATURE)—PART 2.1055(a1)

The band-edge compliance / frequency stability was measured from -30° to +50° centigrade at intervals of 10° centigrade throughout the range. With power to the transmitter removed, the equipment was left alone for a sufficient period of time (approximately 30 minutes or more) to allow the temperature inside the transmitter to stabilize. Power was then applied to the unit. Prior to each frequency measurement, the unit was operated for a period of time sufficient to stabilize all of the components of the oscillator circuit.

See the following page for the data taken during testing.

8.0 FREQUENCY STABILITY (VOLTAGE VARIATION)—PART 2.1055(d2)

The band-edge compliance / 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.



DATA TAKEN FOR **BAND-EDGE** 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

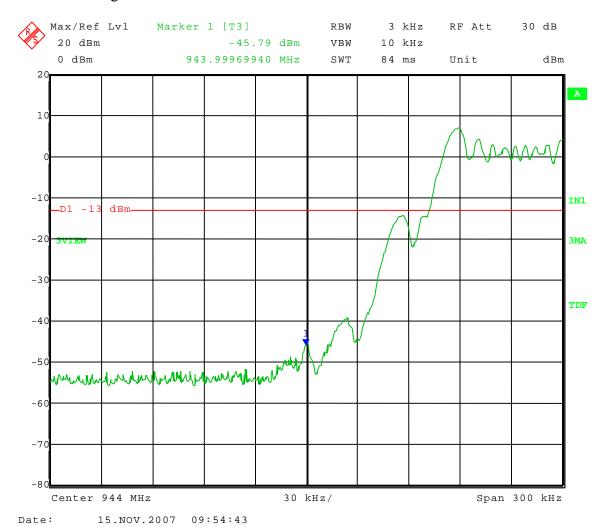
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

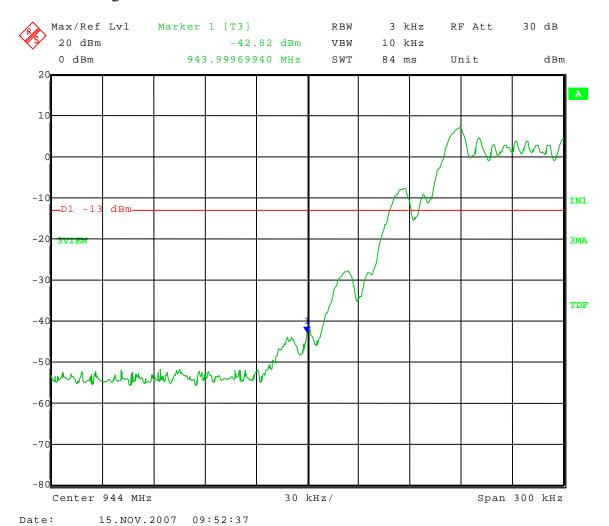
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

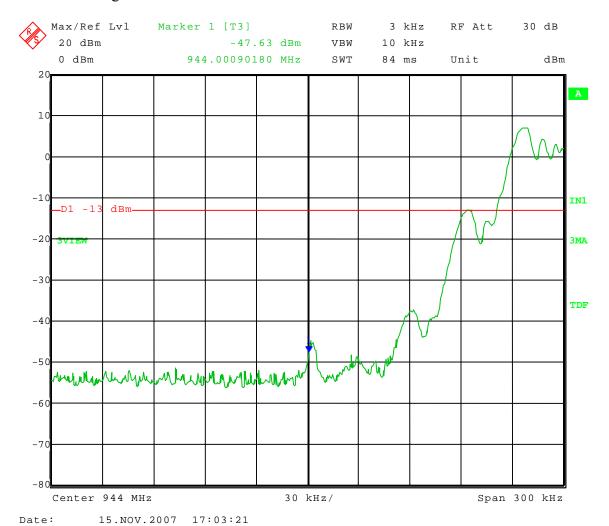
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

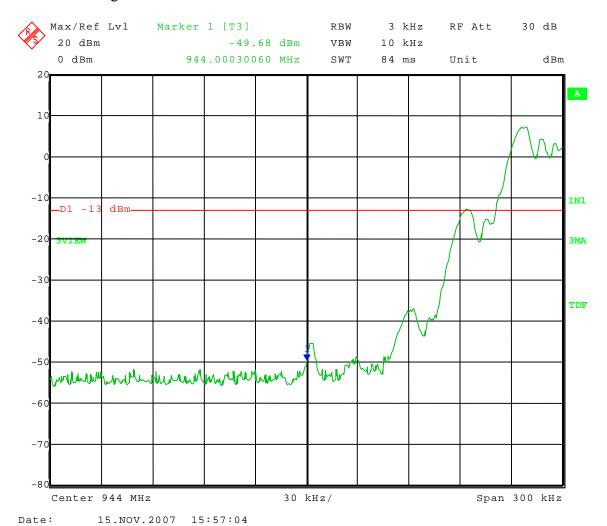
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

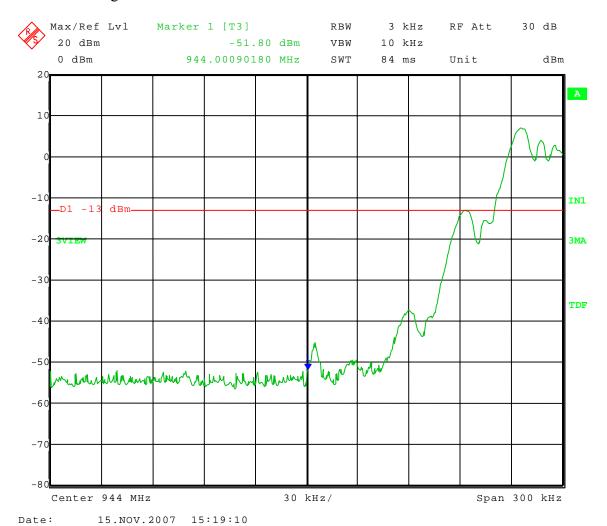
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

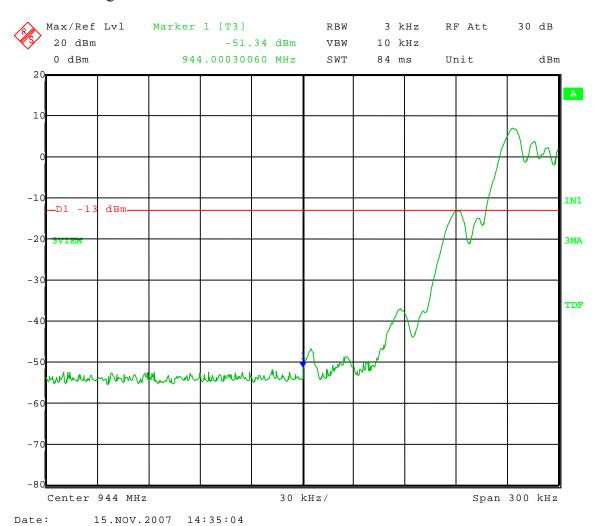
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

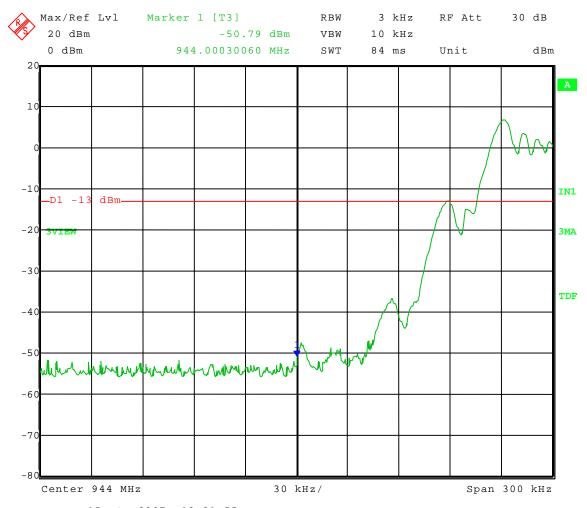
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

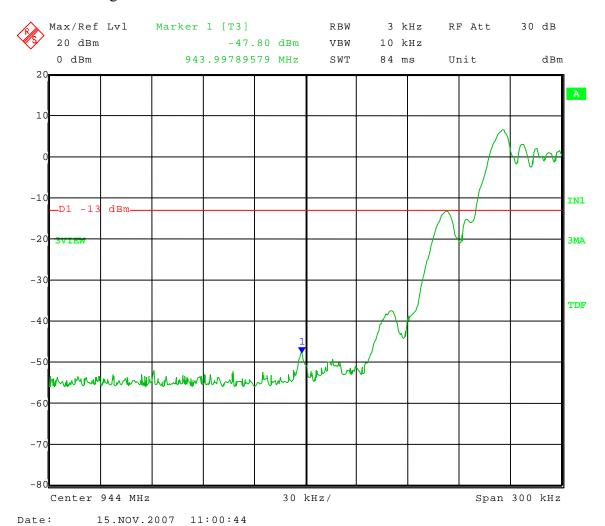
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

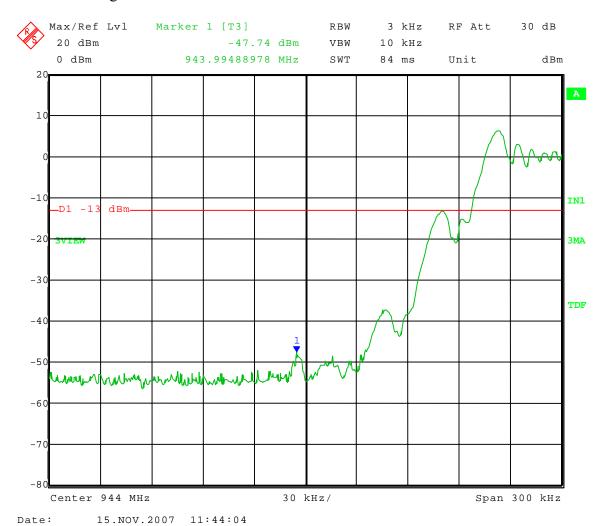
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

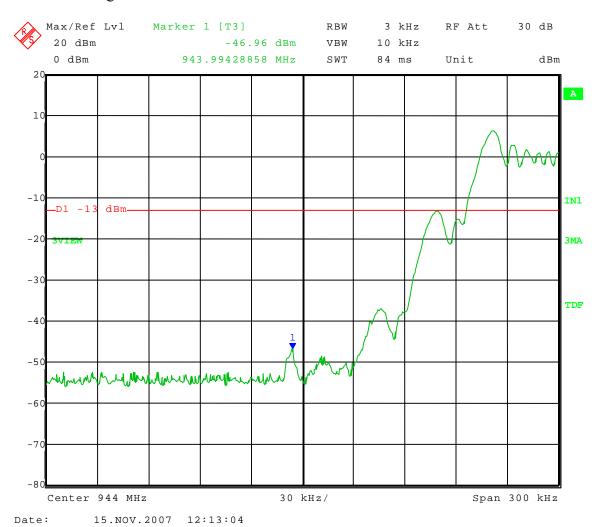
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

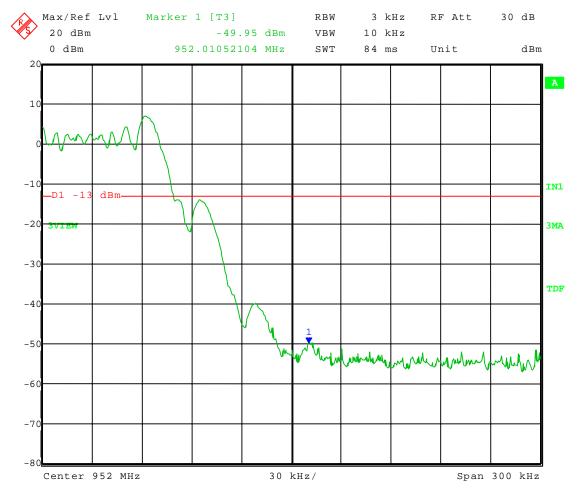
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

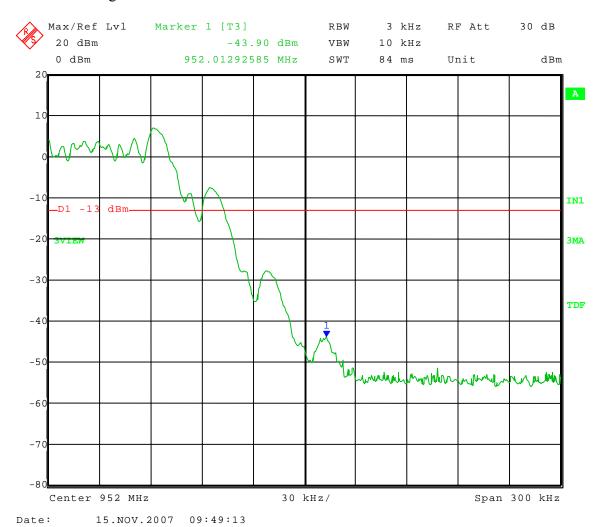
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

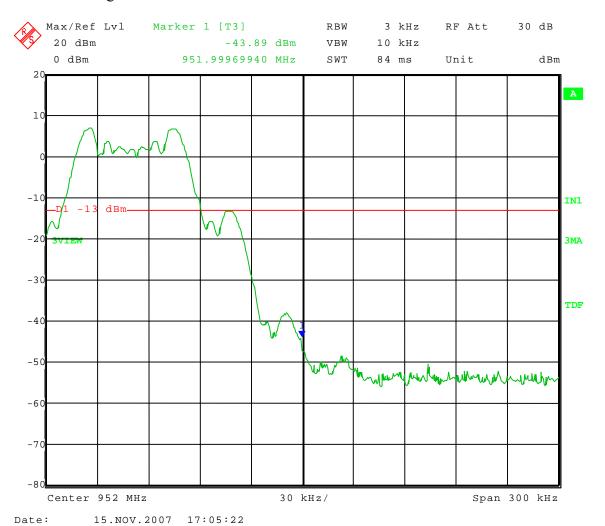
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

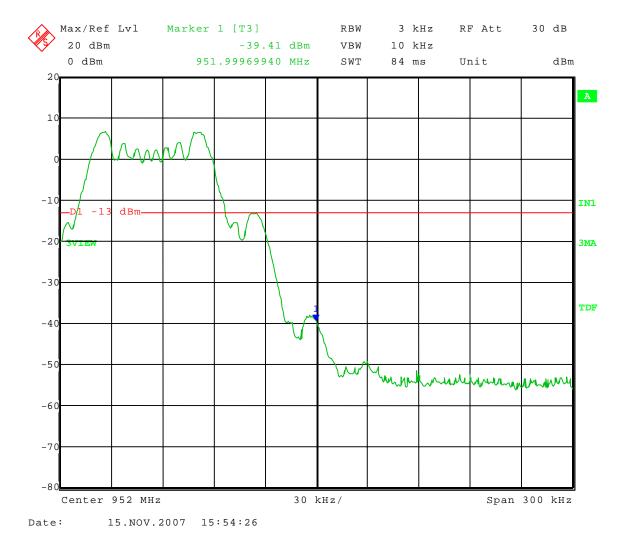
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

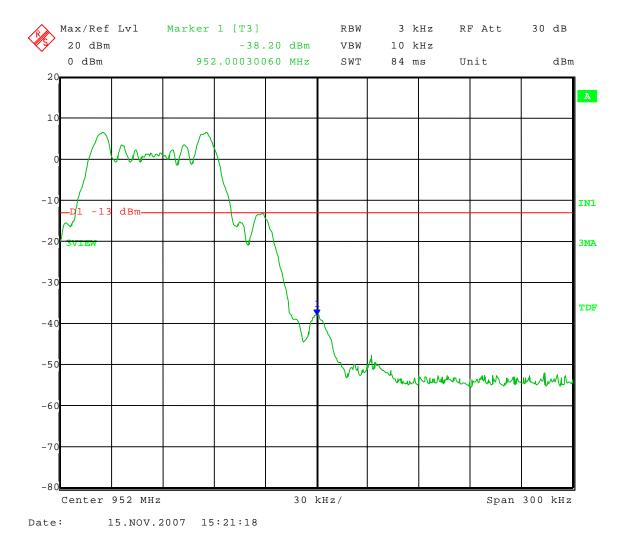
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

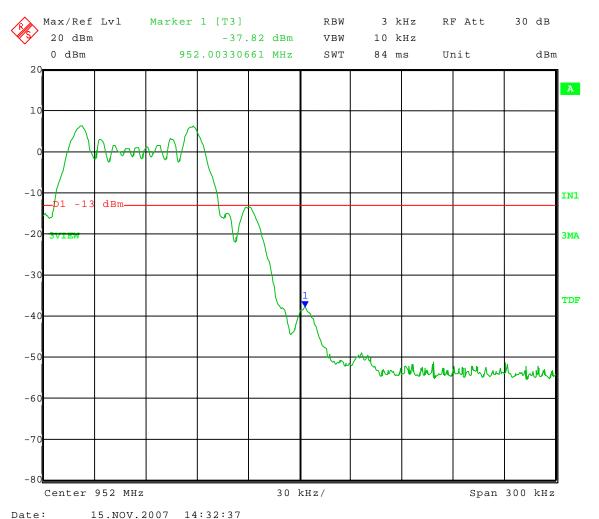
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

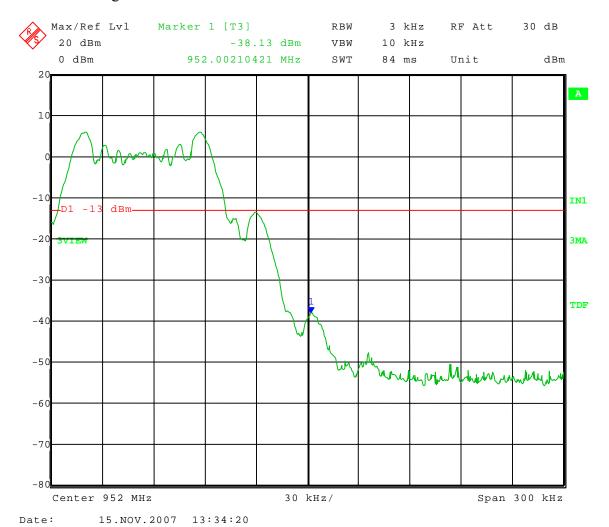
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

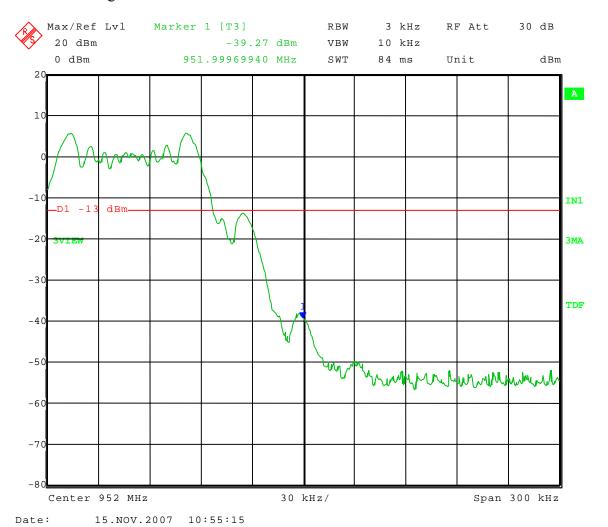
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

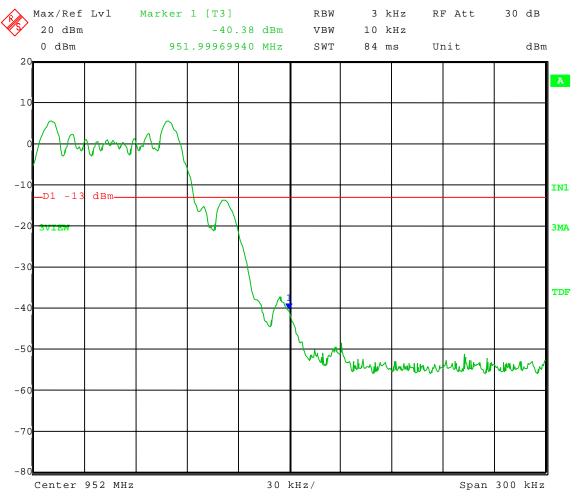
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





1250 Peterson Dr., Wheeling, IL 60090

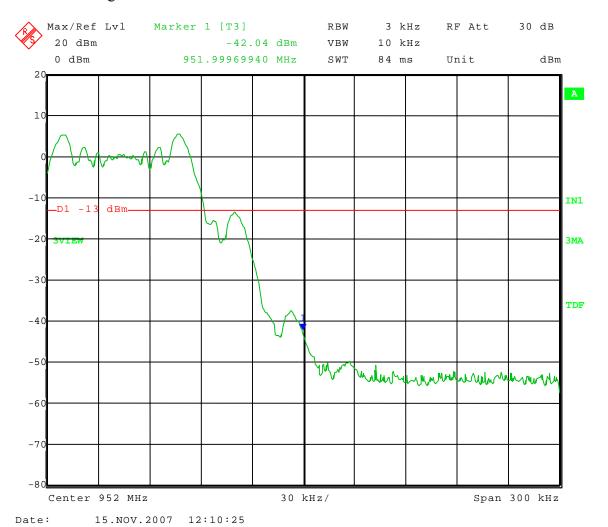
Test Date: 11-15-2007 Company: Shure, Inc. EUT: SLX1-X1

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





DATA TAKEN FOR FREQUENCY TOLERANCE WHEN VARYING THE TEMPERATURE AND PRIMARY SUPPLY VOLTAGE

PART 2.1055



DLS Electronic Systems, Inc.

Company: Shure, Inc. Operator: Craig B

Date of test: 08-12-2008 and 08-14-2008

Limit = \pm -9.4 kHz (\pm -10 ppm as stated by Shure, Inc.)

Frequency Stability FCC Part 74; FCC Part 2.1055

Model	Nominal	Measured Frequency									
Model	Frequency (MHz)	+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)
SLX1-X1	944.125	944.118437	-6.563	944.119128	-5.872	944.121764	-3.236	944.123154	-1.846	944.129158	4.158
SLX1-X1	951.875	951.868437	-6.563	951.869128	-5.872	951.871525	-3.475	951.872771	-2.229	951.878858	3.858

Frequency Stability FCC Part 74; FCC Part 2.1055

Model	Nominal	Measured Frequency									
Model	Frequency (MHz)	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)
SLX1-X1	944.125	944.131162	6.162	944.132565	7.565	944.132565	7.565	944.130661	5.661	944.122579	-2.421
SLX1-X1	951.875	951.881463	6.463	951.882866	7.866	951.882365	7.365	951.881563	6.563	951.872819	-2.181



APPENDIX A

).0 FREQUENCY STABILITY PHOTOS TAKEN DURING TESTING

