



Company: Shure, Inc.
Model Tested: PA821SWB
Report Number: 14157

1250 Peterson Dr., Wheeling, IL 60090

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

AND

Part 74.861 (e) TV Broadcasting

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name: PA821SWB Antenna Combiner
Kind of Equipment: Antenna Combiner for Wireless Transmitters
Frequency Range: 470 MHz - 952 MHz
Test Configuration: Combines the antenna outputs of 8 PSM transmitters into one output via shielded coaxial cables. (Tested at 120 vac, 60 Hz)
Model Number(s): PA821SWB
Model(s) Tested: PA821SWB
Serial Number(s): 73963600
Emission Designator: 81KF3E
Date of Tests: May 21 & 22, 2008
Test Conducted For: Shure, Inc.
5800 W. Touhy Ave.
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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United States Department of Commerce
National Institute of Standards and Technology



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

Dolly S. Bucci
For the National Institute of Standards and Technology



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Model Tested: PA821SWB
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1.0 SUMMARY OF TEST REPORT

It was found that the PA821SWB Antenna Combiner, Model Number(s) PA821SWB, **meets** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 74, Subpart H 861 (d) other than TV Broadcasting and Section 74.861 (e), for low power auxiliary stations.

2.0 INTRODUCTION

On May 21 & 22, 2008, a series of radio frequency interference measurements was performed on PA821SWB Antenna Combiner, Model Number(s) PA821SWB, Serial Number: 73963600. 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 Genoa City, Wisconsin 53128

O.A.T.S. Test Facility:

D.L.S. Electronic Systems, Inc.
166 S. Carter Street

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 (e), 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 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.



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7.0 AC POWER LINE CONDUCTED EMISSION MEASUREMENTS – Part 15.207

Conducted emissions were measured over the frequency range from 150 kHz to 30 MHz in accordance with the power line measurements as specified in FCC Part 15, Subpart C, Section 15.207 & ANSI C63.4-2003. Since the device is operated from the public utility lines, the 120 Vac, 60 Hz power leads, high (hot) and low (neutral) sides, were measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. During the test, the cables were placed and items moved (when appropriate) to maximize emissions. All signals were then recorded. The allowed levels for Intentional Radiators which is designed to connected to the public utility (AC) power line cannot exceed the following:

Frequency of Emissions (MHz)	Conducted Limits (dBuV)	
	Quasi Peak	Average
.15 to .5	66 to 56	56 to 46
.5 to 5	56	46
5 to 30	60	50

NOTE:

All test measurements were made at a screen room temperature of **74°F** at **52%** relative humidity.



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8.0 DESCRIPTION OF TEST SAMPLE:

8.1 Description:

The PA821SWB Antenna Combiner allows up to nine Shure PSM transmitters to use a single antenna. The transmitters may be from any PSM model series and any frequency between 470 and 952 MHz. The unit takes inputs from the transmitters and outputs them to a single antenna, eliminating stage clutter and significantly improving intermodulation distortion performance. This Antenna Combiner is designed to meet the needs of users with multiple systems, and will generally be rack-mounted.

The first three main inputs of the EUT will be connected to the antenna outputs of three PSM700 transmitters representing the lowest, middle and highest PSM700 transmitter frequencies. The transmitters will be driven by a Shure FP33 mixer producing a 1 kHz tone. The remaining five main inputs of the EUT will be loaded by five PSM700 transmitters with no input signal applied. The front panel auxiliary inputs and output of the EUT will be terminated by 50 ohm loads.

8.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 331.47 mm x Width: 401.32 mm x Height: 43.3832 mm

8.3 LINE FILTER USED:

N/A

8.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

60.0 kHz

Clock Frequencies:

260 kHz & 1.2 MHz

8.5 DESCRIPTION OF ALL CIRCUIT BOARDS:

1. PC Board Assy.

PN: 190-10132



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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:

Tested with 3 modulated transmitter inputs (524.2 MHz, 661.575 MHz, and 951.8 MHz), and 5 unmodulated transmitter inputs (634.8 MHz, 635.95 MHz, 639.0 MHz, 646.2 MHz, and 654.95 MHz).

10.0 PHOTO INFORMATION AND TEST SET-UP

Item 0 PA821SWB Antenna Combiner

Model Number: PA821SWB, Serial Number: 73963600

Item 1 Non-shielded AC Power cord. 2m

Item 2 Three shielded expansion port cables with terminations and Metal Shells. .6m

Item 3 Eight shielded Transmitter input cables with Metal Shells. .6m

Item 4 Eight Shure Transmitters

Model Number: P7T

Item 5 Shure Mixer

Model Number: FP33 Serial Number: 0007333 4276

Item 6 Eight non-shielded AC power cords for transmitters. 2m

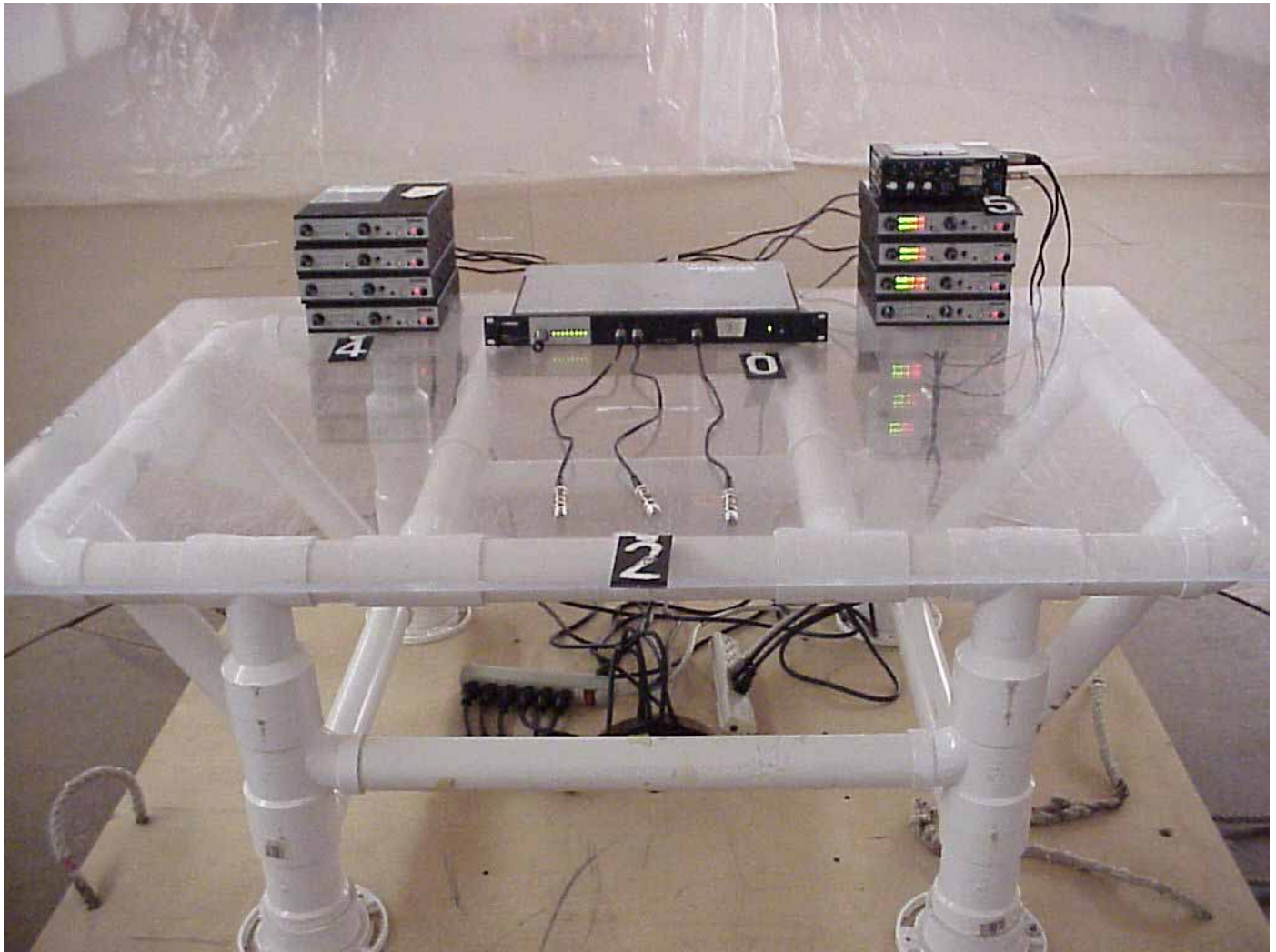
Item 7 Three shielded Audio cables from Mixer to Transmitters with Metal Shells. 1.1m



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11.0 RADIATED PHOTOS TAKEN DURING TESTING

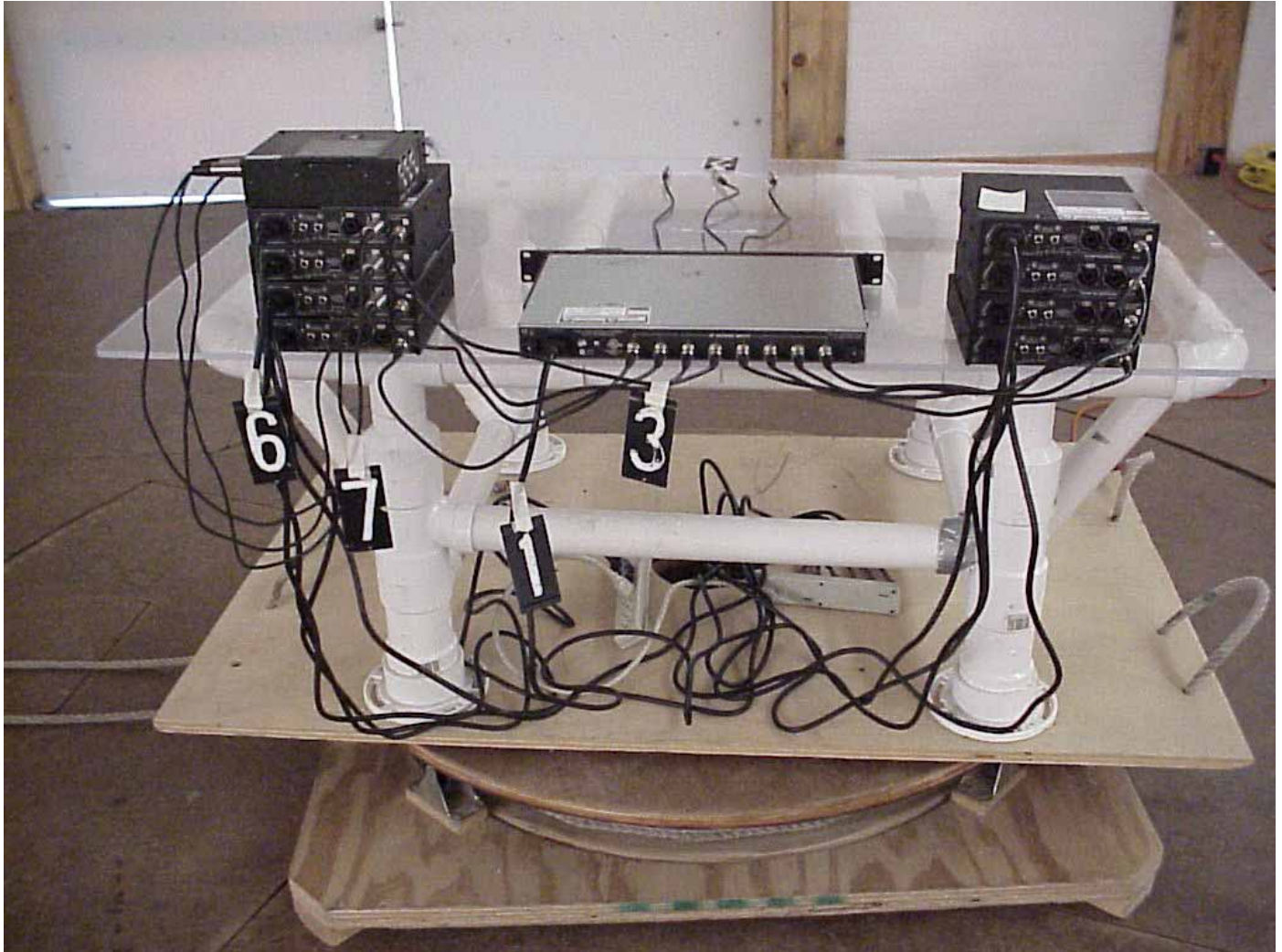




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11.0 RADIATED PHOTOS TAKEN DURING TESTING





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11.0 AC POWER LINE CONDUCTED PHOTOS TAKEN DURING TESTING



LINE CONDUCTED 1



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11.0 AC POWER LINE CONDUCTED PHOTOS TAKEN DURING TESTING (CON'T)



LINE CONDUCTED 2



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11.0 AC POWER LINE CONDUCTED PHOTOS TAKEN DURING TESTING (CON'T)



LINE CONDUCTED 3



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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 PA821SWB Antenna Combiner, Model Number(s) PA821SWB **meets** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 74, Subpart H 861 (d) other than TV Broadcasting and Section 74.861 (e), for low power auxiliary stations.



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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	12/08
Preamp	Rohde & Schwarz	TS-PR10	032001/005	1 GHz-10 GHz	3/09
Preamp	Miteq	AMF-6D-100200-50	313936	1 GHz-10 GHz	5/09
Antenna	EMCO	3104C	9701-4785	20 MHz – 200 MHz	3/09
Antenna	EMCO	3146	9702-4895	200 MHz – 1 GHz	3/09
Horn Antenna	EMCO	3115	9903-5731	1-18 GHz	6/08
RF Limiter	Electro-Metrics	EM-7600	706	N/A	1/09
LISN	Solar Electronics	9252-50-R-24-BNC	961019	N/A	7/08

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

OPERATING IN THE BANDS OTHER THAN THOSE
ALLOCATED FOR TV BROADCASTING

AND

LOW POWER AUXILIARY STATIONS OPERATING
IN THE BANDS 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) and PART 74.861 (e)(1)(ii), the RF output power should not exceed .25 watt(s). The RF output power was measured with the transmitter unmodulated using the following test method:

Actual Measurements Taken:

20.02 dBm Measured output of the transmitter

20.02 dBm equals 0.1 watt(s)

LIMIT:

Manufacturer's rated output power = 250mW (Unity Gain. Output = Input or less)

MARGIN:

.25 - 0.1 = 0.15 watt(s)



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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), (e)(1) & PART 2.1046

SIGNAL IN VERSUS SIGNAL OUT



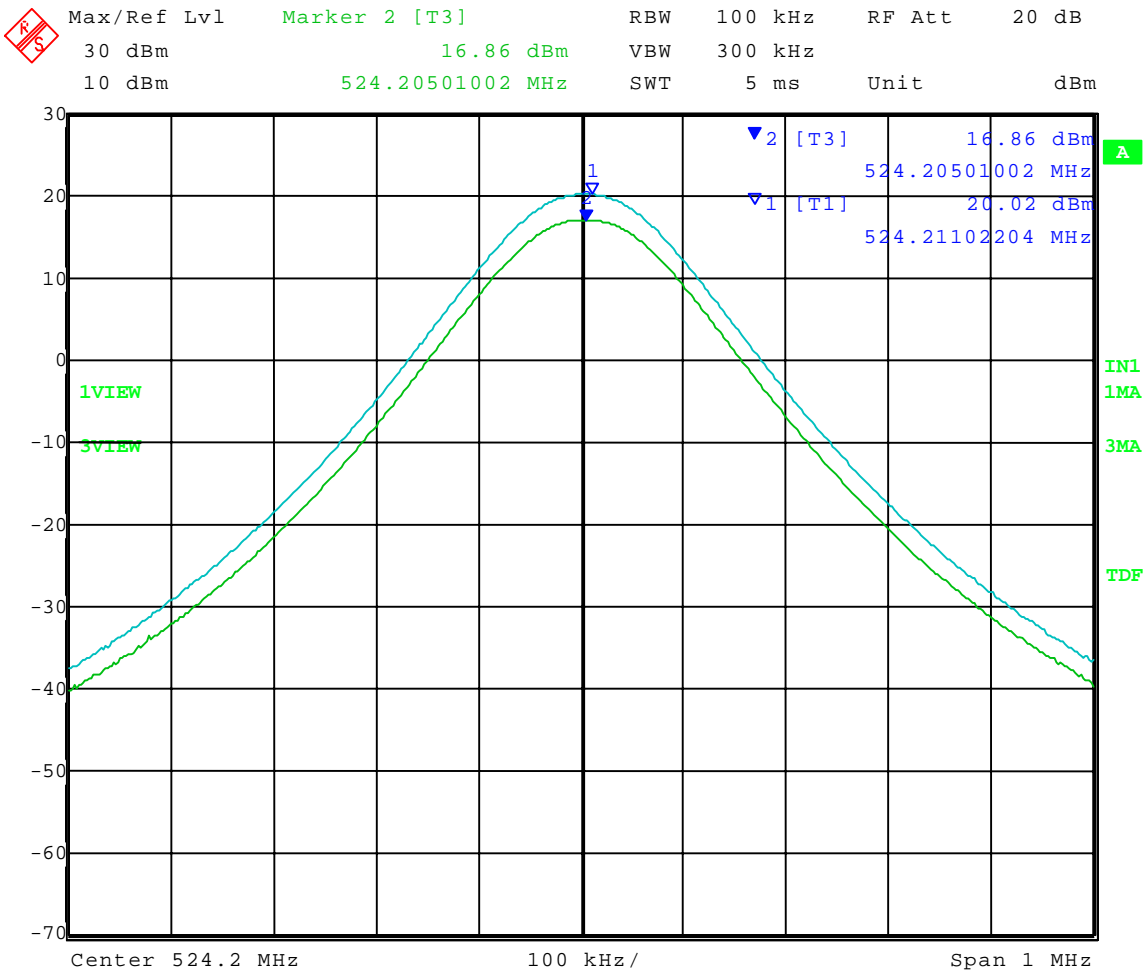
Company: Shure, Inc.
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Test Date: 05-21-2008
 Company: Shure, Inc.
 EUT: PA821SWB Antenna Combiner
 Test: Peak Power Output - Conducted
 Rule part: FCC Part 74; FCC Part 2.1046
 Operator: Craig B
 Comment: Channel: 524.2 MHz

Blue = Input = 20.02 dBm
 Green = Output = 16.86 dBm

Change in Output Power = -3.16 dBm



Date: 21.MAY.2008 12:38:45



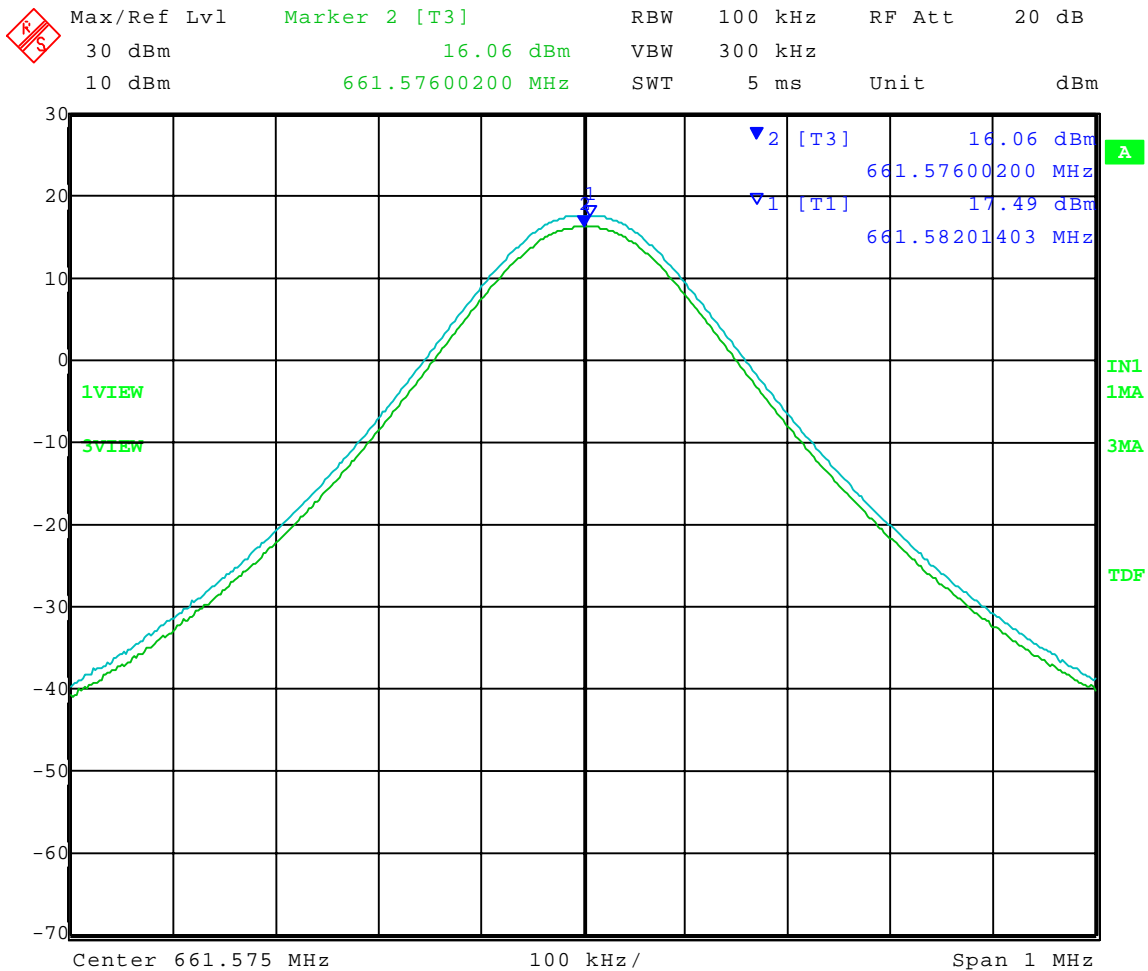
Company: Shure, Inc.
 Model Tested: PA821SWB
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Test Date: 05-21-2008
 Company: Shure, Inc.
 EUT: PA821SWB Antenna Combiner
 Test: Peak Power Output - Conducted
 Rule part: FCC Part 74; FCC Part 2.1046
 Operator: Craig B
 Comment: Channel: 661.56 MHz

Blue = Input = 17.49 dBm
 Green = Output = 16.06 dBm

Change in Output Power = -1.43 dBm



Date: 21.MAY.2008 12:34:47



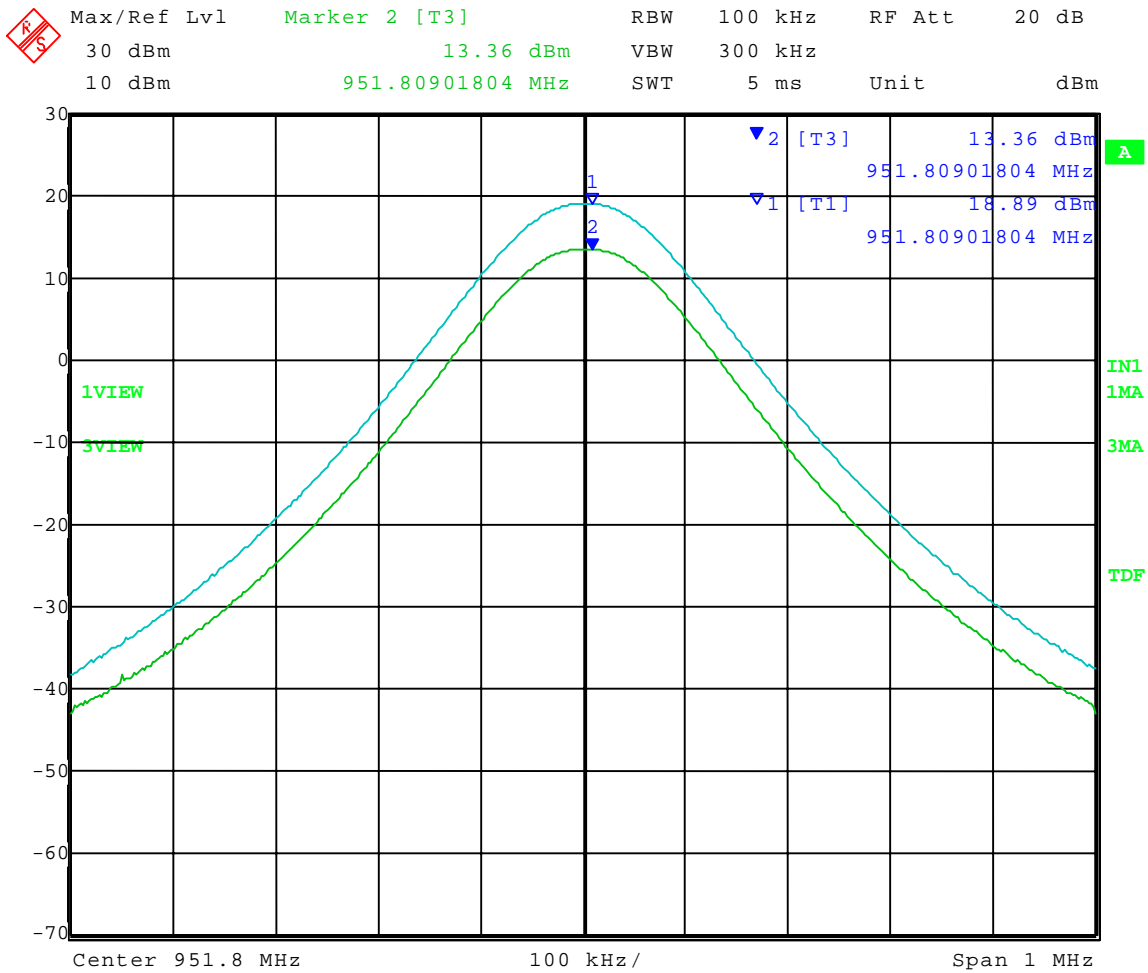
Company: Shure, Inc.
 Model Tested: PA821SWB
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Test Date: 05-21-2008
 Company: Shure, Inc.
 EUT: PA821SWB Antenna Combiner
 Test: Peak Power Output - Conducted
 Rule part: FCC Part 74; FCC Part 2.1046
 Operator: Craig B
 Comment: Channel: **951.8 MHz**

Blue = Input = 18.89 dBm
 Green = Output = 13.36 dBm

Change in Output Power = -5.53 dBm



Date: 21.MAY.2008 12:31:45



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3.0 RF POWER OUTPUT PHOTOS TAKEN DURING TESTING





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

- a. Voice modulated communication equipment.
- b. Equipment which employs modulation limiting

NOTE:

This test is not required because the PA821SWB is a Antenna Combiner, which does not generate a fundamental frequency.



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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)

$$B_n = 2M + 2DK, \quad K=1$$

B_n = Bandwidth

$$M = 15 \text{ kHz,}$$

M = Maximum Modulating Frequency

$$D = 45 \text{ kHz,}$$

D = Peak Deviation

$$B_n = 2(15) + 2(45)(1) = 120 \text{ kHz}$$



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**DATA AND GRAPH(S) TAKEN OF THE
99% OCCUPIED BANDWIDTH
Part 74.861 (d)(3), (e)(5) & PART 2.1049
SIGNAL IN VERSUS SIGNAL OUT**



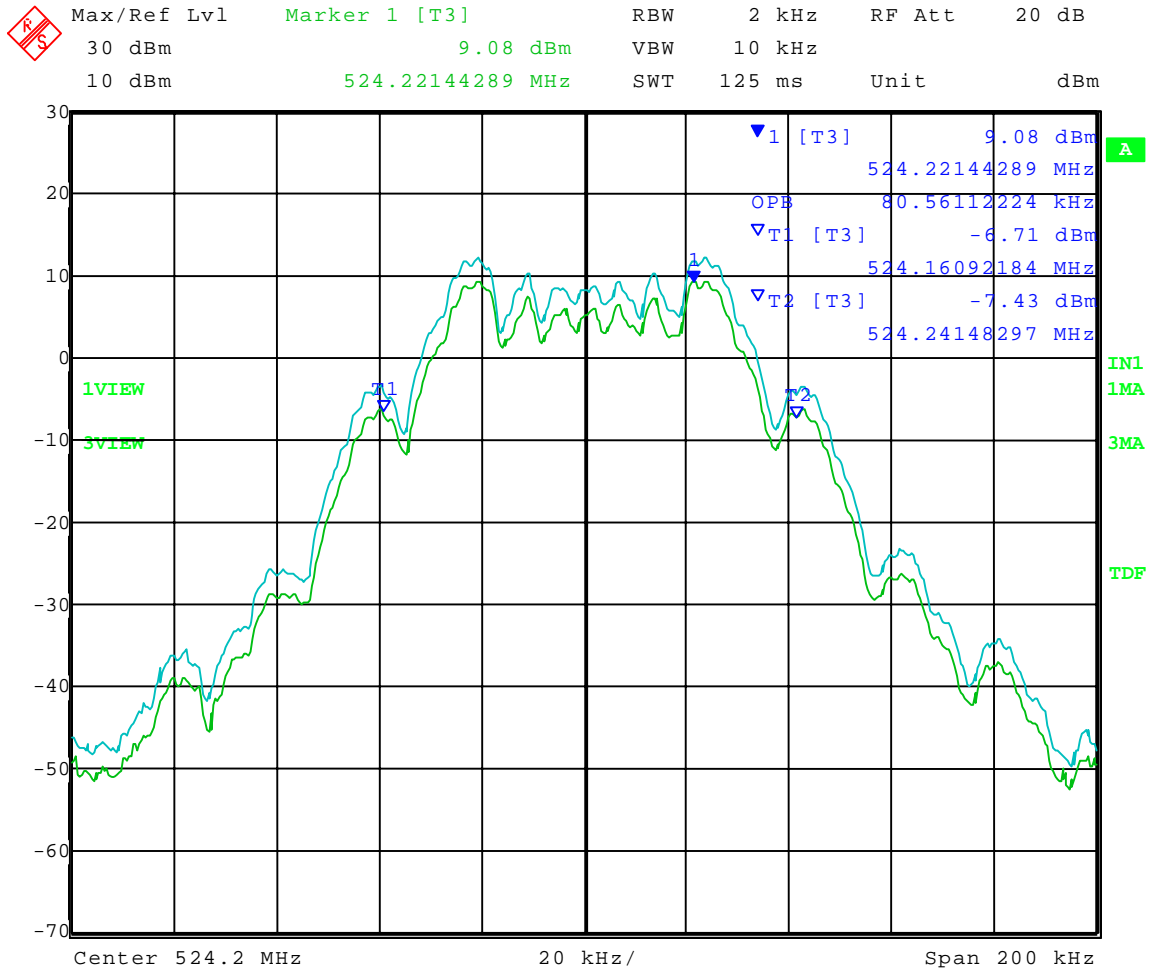
Company: Shure, Inc.
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Test Date: 05-21-2008
 Company: Shure, Inc.
 EUT: PA821SWB Antenna Combiner
 Test: Occupied Bandwidth; 99% bandwidth
 Rule part: FCC Part 74; FCC Part 2.1049
 Operator: Craig B
 Frequency: 524.2 MHz

Blue = INPUT
 Green = OUTPUT

99% power bandwidth = 80.56 kHz
 Input = Output



Date: 21.MAY.2008 12:12:21



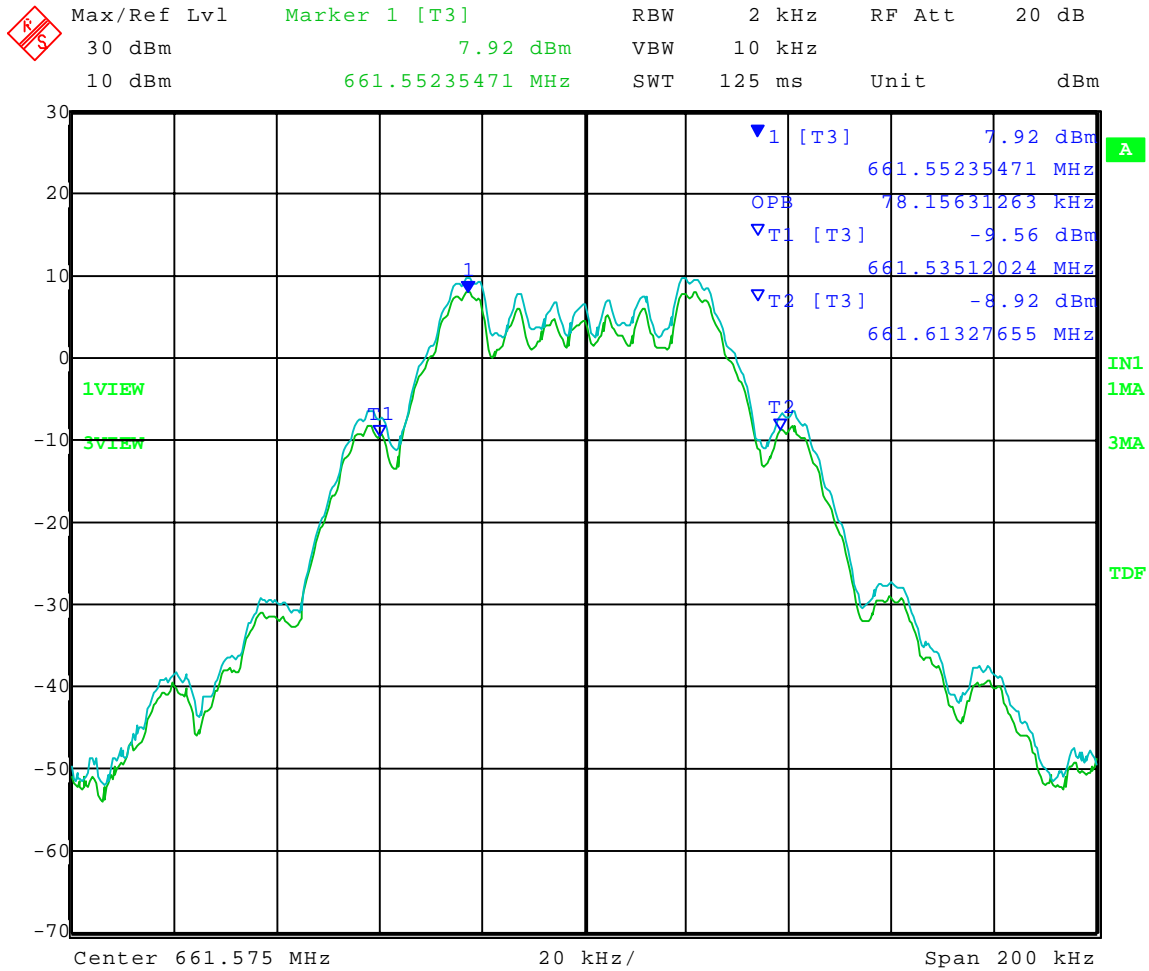
Company: Shure, Inc.
 Model Tested: PA821SWB
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Test Date: 05-21-2008
 Company: Shure, Inc.
 EUT: PA821SWB Antenna Combiner
 Test: Occupied Bandwidth; 99% bandwidth
 Rule part: FCC Part 74; FCC Part 2.1049
 Operator: Craig B
 Frequency: 661.575 MHz

Blue = INPUT
 Green = OUTPUT

99% power bandwidth = 78.16 kHz
 Input = Output



Date: 21.MAY.2008 12:18:43



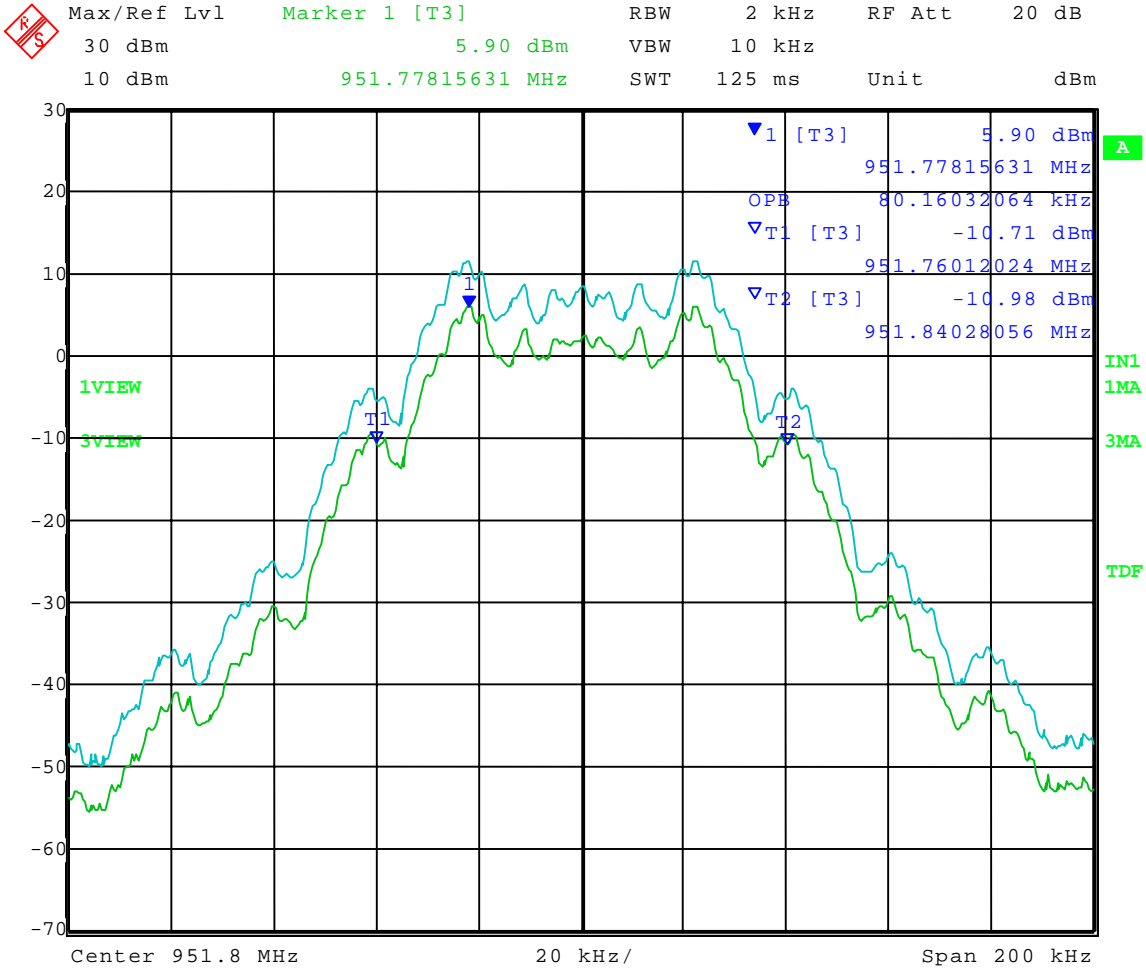
Company: Shure, Inc.
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Test Date: 05-21-2008
 Company: Shure, Inc.
 EUT: PA821SWB Antenna Combiner
 Test: Occupied Bandwidth; 99% bandwidth
 Rule part: FCC Part 74; FCC Part 2.1049
 Operator: Craig B
 Frequency: **951.8 MHz**

Blue = INPUT
 Green = OUTPUT

99% power bandwidth = 80.16 kHz
 Input = Output



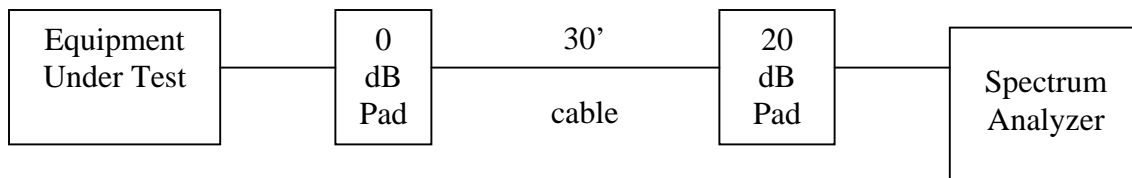
Date: 21.MAY.2008 12:24:49



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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 608 MHz – 614 MHz & 944 MHz – 952 MHz bands for PA821SWB Antenna Combiner 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.

The allowed emissions for transmitters operating in the 470 MHz - 608 MHz and 614 MHz – 806 MHz bands for PA821SWB Antenna Combiner equipment are found under Part 74, Section 74.861, Paragraph e-6 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) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB.
- (2) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB.
- (3) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43+10\text{Log}10$ (mean output power in watts) dB.

NOTE:

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



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Model Tested: PA821SWB
Report Number: 14157

CONDUCTED EMISSION DATA & CHARTS
TAKEN FOR
SPURIOUS EMISSION MEASUREMENTS MADE
AT THE ANTENNA TERMINALS
EIA /TIA-603-C:2004, SECTION 2.2.13
PART 2.1051

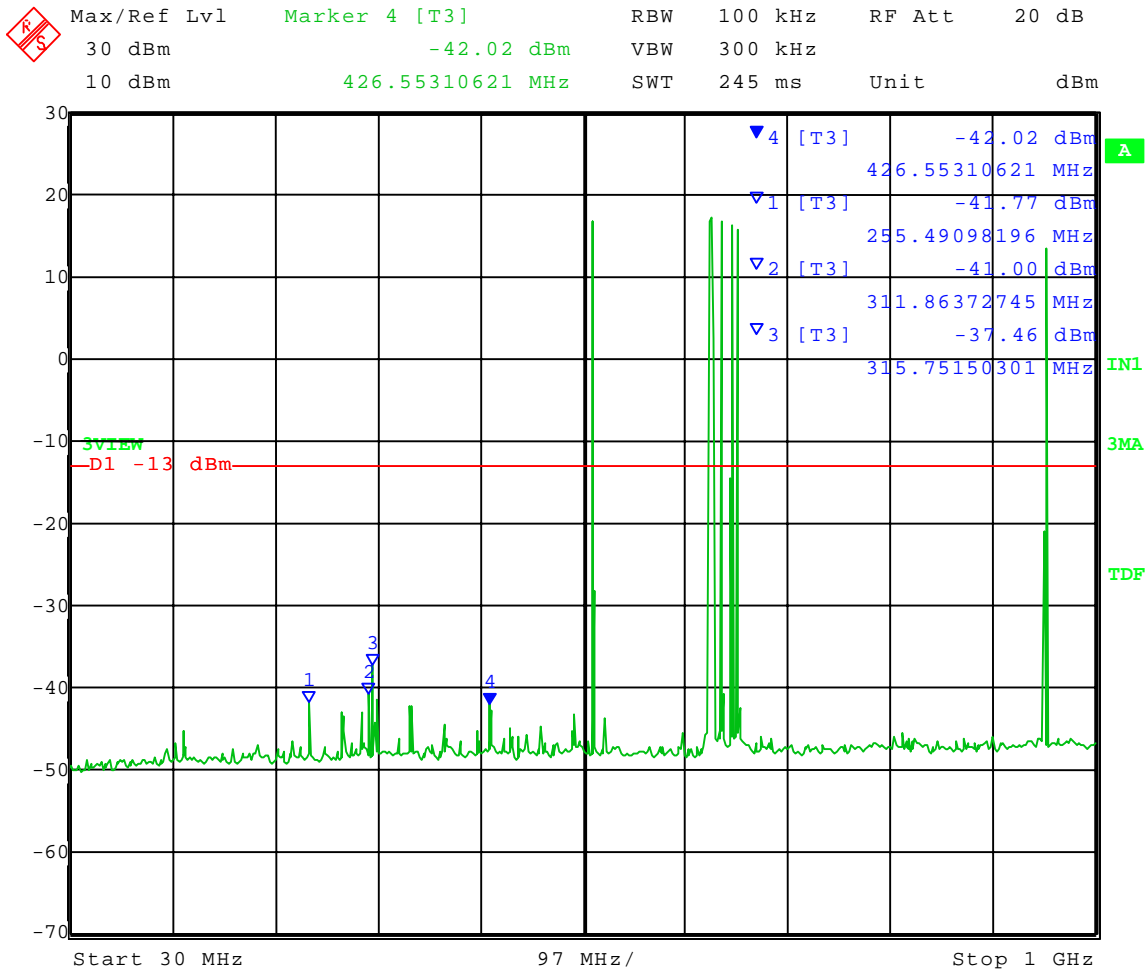


Company: Shure, Inc.
 Model Tested: PA821SWB
 Report Number: 14157

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 05-21-2008
 Company: Shure, Inc.
 EUT: PA821SWB Antenna Combiner
 Test: Spurious Emissions - Conducted
 Rule part: FCC Part 74; FCC Part 2.1051
 Operator: Craig B
 Comment: Inputs: 524.2 MHz
 661.575 MHz
 951.8 MHz
 Other inputs: 634.8, 635.95, 639.0, 646.2, and 654.95 MHz

Frequency Range: 30 to 1000 MHz
 Limit = -13 dBm



Date: 21.MAY.2008 11:45:18

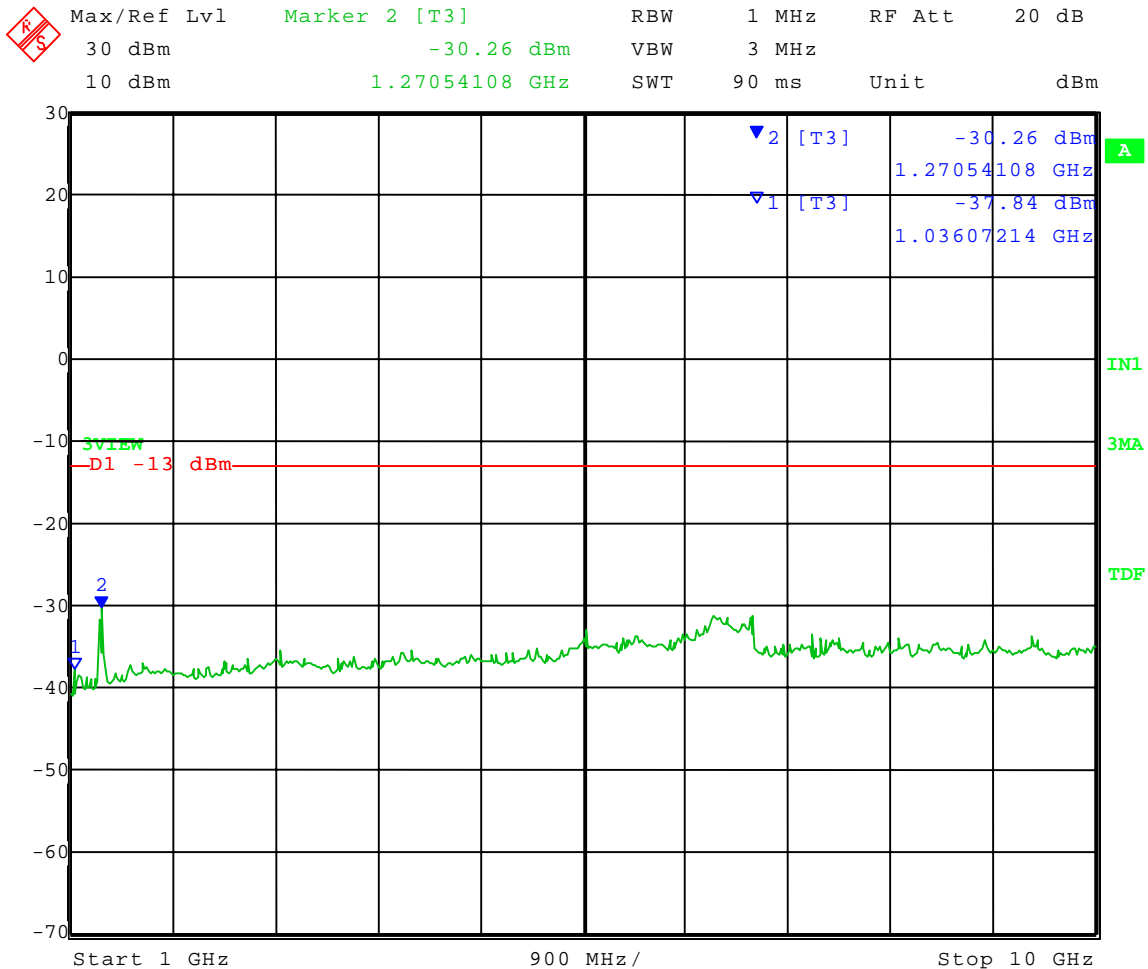


Company: Shure, Inc.
Model Tested: PA821SWB
Report Number: 14157

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 05-21-2008
Company: Shure, Inc.
EUT: PA821SWB Antenna Combiner
Test: Spurious Emissions - Conducted
Rule part: FCC Part 74; FCC Part 2.1051
Operator: Craig B
Comment: Inputs: 524.2 MHz
661.575 MHz
951.8 MHz
Other inputs: 634.8, 635.95, 639.0, 646.2, and 654.95 MHz

Frequency Range: 1 to 10 GHz
Limit = -13 dBm



Date: 21.MAY.2008 11:42:45



Company: Shure, Inc.
Model Tested: PA821SWB
Report Number: 14157

1250 Peterson Dr., Wheeling, IL 60090

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 10th harmonic of the fundamental frequency.

For the PA821SWB Antenna Combiner, the highest fundamental frequency is N/A 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 470 MHz - 952 MHz bands for PA821SWB Antenna Combiner are found under Part 74, Section 74.861, Paragraph e-6 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) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB.
- (2) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB.
- (3) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least $43 + 10 \log_{10}$ (mean output power in watts) dB.



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure, Inc.
Model Tested: PA821SWB
Report Number: 14157

**RADIATED EMISSION DATA & CHARTS TAKEN
FOR FUNDAMENTAL EMISSIONS
USING THE SUBSTITUTION METHOD**

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

NOTE:

This test is not required because the PA821SWB is a Antenna Combiner, which does not generate a fundamental frequency.



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Company: Shure, Inc.
Model Tested: PA821SWB
Report Number: 14157

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



Company: Shure, Inc.
 Model Tested: PA821SWB
 Report Number: 14157

1250 Peterson Dr., Wheeling, IL 60090

DLS Electronic Systems, Inc.

Company: Shure, Inc.
 Operator: Craig B
 Date of test: 05-22-2008
 Temperature: 72 deg. F.
 Humidity: 35% R.H.

Radiated Spurious Emissions 470 MHz to 10 GHz (e.r.p. substitution method) FCC Part 74; FCC Part 2.1053								
Model: PA821SWB Transmit Frequencies: 524.2, 634.8, 635.95, 639.0, 646.2, 654.95, 661.575, and 951.8 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)
1.32310	46.0	100.0	-54.0	-13	41.0	Horizontal	170	1.0
1.90360	69.1	99.9	-30.8	-13	17.8	Horizontal	160	1.0
2.54390	49.4	101.1	-51.7	-13	38.7	Horizontal	140	1.1
2.62095	47.1	100.6	-53.5	-13	40.5	Horizontal	190	1.2
2.85535	53.8	100.7	-46.9	-13	33.9	Horizontal	170	1.1
3.17405	53.0	101.1	-48.1	-13	35.1	Horizontal	100	1.1
3.80720	58.1	100.6	-42.5	-13	29.5	Horizontal	135	1.1
4.75900	60.6	100.0	-39.4	-13	26.4	Horizontal	180	1.0
5.71080	58.6	100.3	-41.7	-13	28.7	Horizontal	150	1.2
7.61440	64.1	100.7	-36.6	-13	23.6	Horizontal	170	1.0
9.51795	59.4	99.3	-39.9	-13	26.9	Horizontal	150	1.2
1.26970	45.5	99.6	-54.1	-13	41.1	Vertical	45	1.2
1.32310	45.7	100.2	-54.5	-13	41.5	Vertical	180	1.2
1.90355	62.8	99.6	-36.8	-13	23.8	Vertical	45	1.6
2.53930	51.2	99.3	-48.1	-13	35.1	Vertical	135	1.0
2.85535	50.3	101.1	-50.8	-13	37.8	Vertical	290	1.1
3.80725	53.4	100.2	-46.8	-13	33.8	Vertical	180	1.3
4.75905	55.1	100.1	-45.0	-13	32.0	Vertical	225	1.2
5.71080	59.3	100.8	-41.5	-13	28.5	Vertical	160	1.2
6.66235	56.1	100.1	-44.0	-13	31.0	Vertical	180	1.5
7.61420	65.3	101.9	-36.6	-13	23.6	Vertical	150	1.6
9.51770	59.8	101.1	-41.3	-13	28.3	Vertical	180	1.1



Company: Shure, Inc.
Model Tested: PA821SWB
Report Number: 14157

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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.

NOTE:

This test is not required because the PA821SWB is a Antenna Combiner, which does not generate a fundamental frequency.

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

The frequency stability of PA821SWB Antenna Combiner was measured by reducing the primary supply voltage to the battery end point specified by the manufacturer.

NOTE:

This test is not required because the PA821SWB is a Antenna Combiner, which does not generate a fundamental frequency.



1250 Peterson Dr., Wheeling, IL 60090

Company: Shure, Inc.
Model Tested: PA821SWB
Report Number: 14157

APPENDIX B

AC LINE CONDUCTED DATA

AND

CHARTS TAKEN DURING TESTING

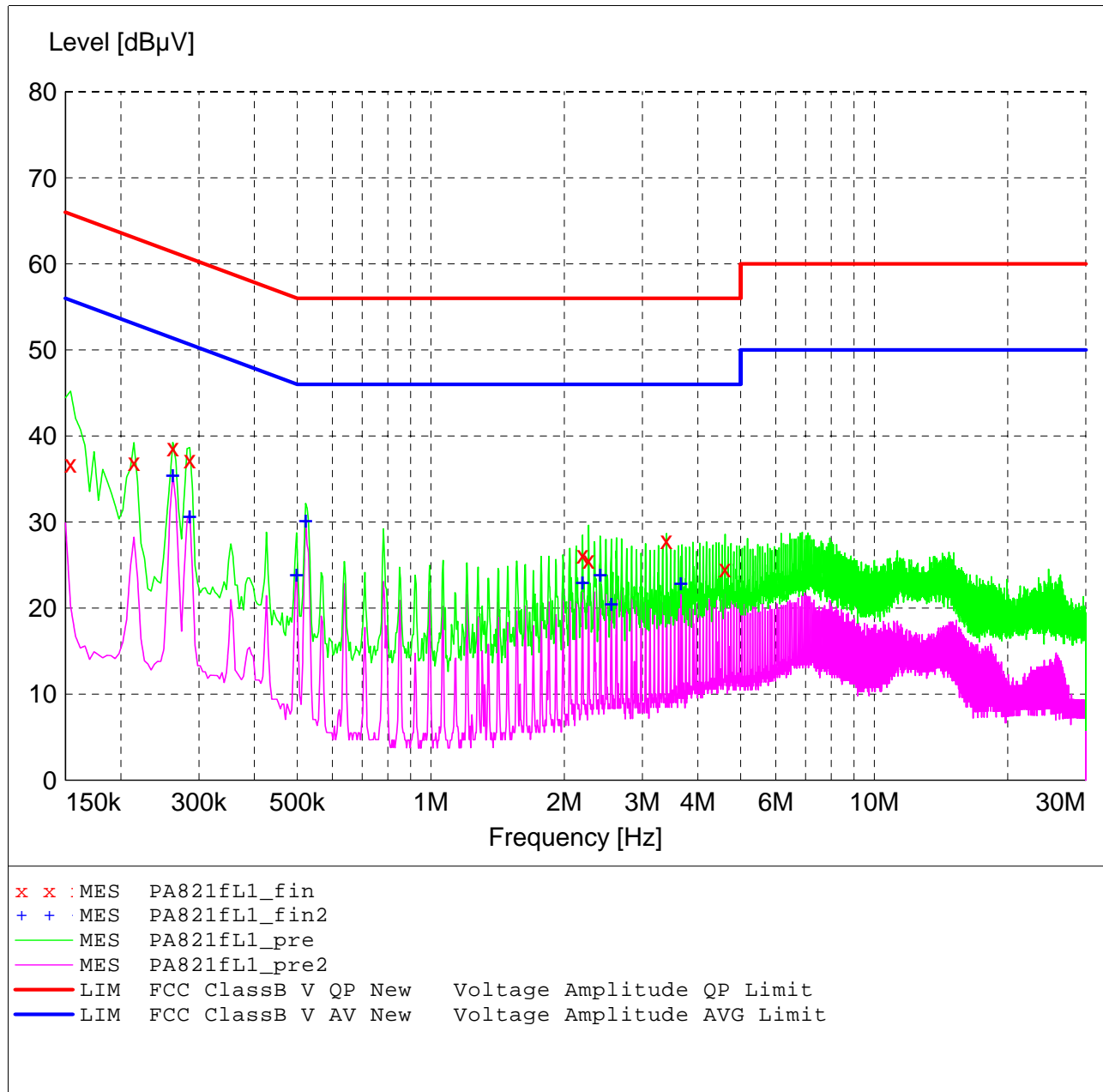
FCC Part 15 Class B

Voltage Mains Test

EUT: PA821SWB
 Manufacturer: Shure, Inc.
 Operating Condition: 70 deg. F, 36% R.H.
 Test Site: DLS O.F. Site 1 (Screenroom)
 Operator: Craig B
 Test Specification: 120 V 60 Hz
 Comment: Line 1
 Date: 05-21-2008

SCAN TABLE: "Line Cond Scrn RmFin"

Short Description:		Line Conducted Emissions					Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.		
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak	2.0 s	9 kHz	LISN DLS#128	
CISPR AV							



MEASUREMENT RESULT: "PA821fL1_fin"

5/21/2008 12:52PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154000	36.80	11.5	66	29.0	QP	---	---
0.214000	37.00	10.9	63	26.0	QP	---	---
0.262000	38.70	10.6	61	22.7	QP	---	---
0.286000	37.20	10.6	61	23.4	QP	---	---
2.198000	26.20	10.3	56	29.8	QP	---	---
2.270000	25.60	10.3	56	30.4	QP	---	---
3.402000	27.90	10.5	56	28.1	QP	---	---
4.610000	24.60	10.5	56	31.4	QP	---	---

MEASUREMENT RESULT: "PA821fL1_fin2"

5/21/2008 12:52PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.262000	35.60	10.6	51	15.8	CAV	---	---
0.286000	30.80	10.6	51	19.8	CAV	---	---
0.498000	24.00	10.3	46	22.0	CAV	---	---
0.522000	30.30	10.3	46	15.7	CAV	---	---
2.198000	23.10	10.3	46	22.9	CAV	---	---
2.410000	24.00	10.3	46	22.0	CAV	---	---
2.554000	20.60	10.4	46	25.4	CAV	---	---
3.662000	23.00	10.5	46	23.0	CAV	---	---

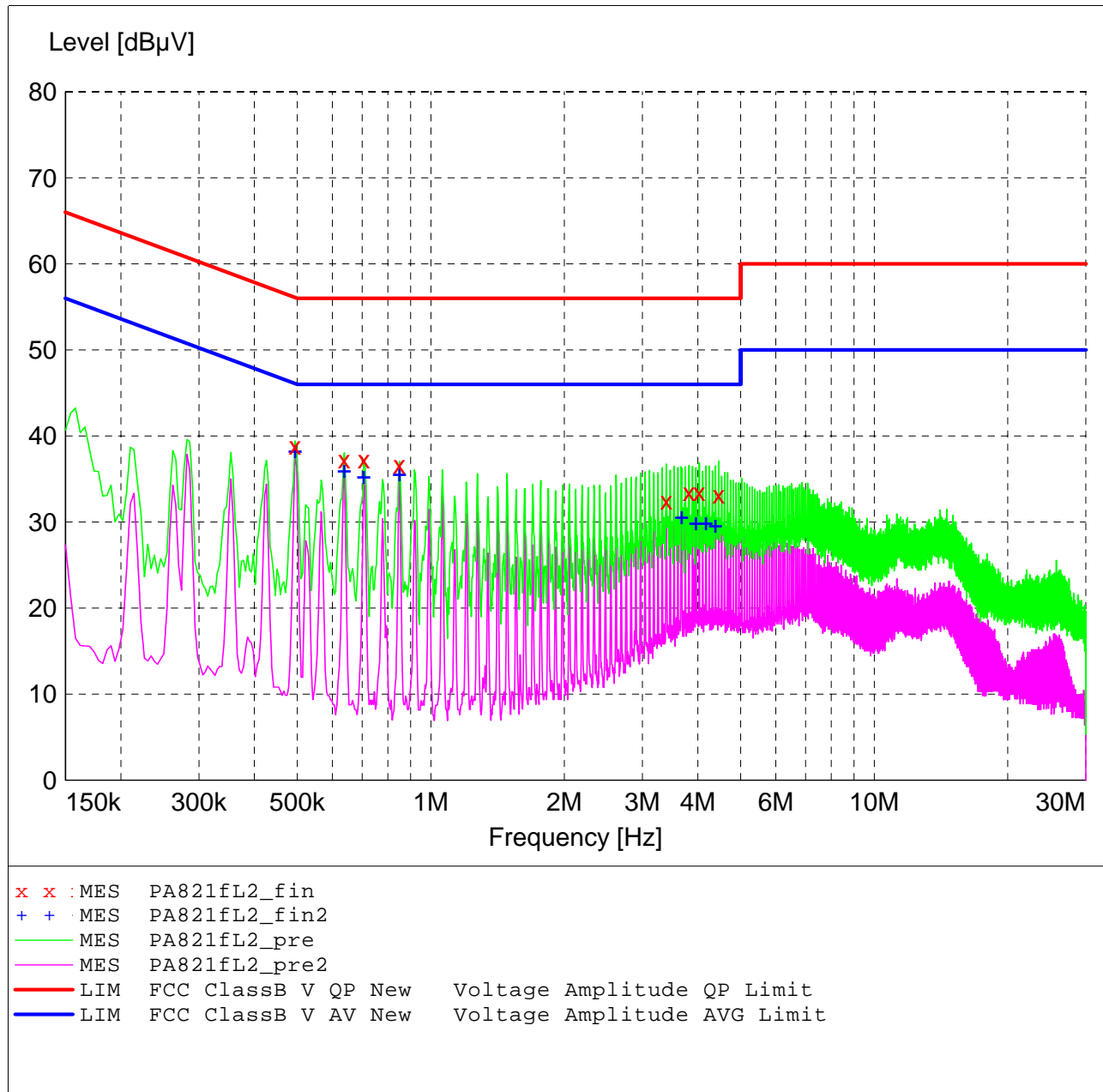
FCC Part 15 Class B

Voltage Mains Test

EUT: PA821SWB
 Manufacturer: Shure, Inc.
 Operating Condition: 70 deg. F, 36% R.H.
 Test Site: DLS O.F. Site 1 (Screenroom)
 Operator: Craig B
 Test Specification: 120 V 60 Hz
 Comment: Line 2
 Date: 05-21-2008

SCAN TABLE: "Line Cond Scrn RmFin"

Short Description:			Line Conducted Emissions				Transducer
Start	Stop	Step	Detector	Meas. Time	IF Bandw.		
150.0 kHz	30.0 MHz	4.0 kHz	QuasiPeak	2.0 s	9 kHz	LISN DLS#128	
							CISPR AV



MEASUREMENT RESULT: "PA821fL2_fin"

5/21/2008 12:57PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.494000	38.90	10.3	56	17.2	QP	---	---
0.638000	37.20	10.2	56	18.8	QP	---	---
0.706000	37.20	10.3	56	18.8	QP	---	---
0.850000	36.70	10.2	56	19.3	QP	---	---
3.398000	32.50	10.5	56	23.5	QP	---	---
3.822000	33.50	10.5	56	22.5	QP	---	---
4.034000	33.50	10.5	56	22.5	QP	---	---
4.458000	33.20	10.6	56	22.8	QP	---	---

MEASUREMENT RESULT: "PA821fL2_fin2"

5/21/2008 12:57PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.494000	38.30	10.3	46	7.8	CAV	---	---
0.638000	36.10	10.2	46	9.9	CAV	---	---
0.706000	35.40	10.3	46	10.6	CAV	---	---
0.850000	35.70	10.2	46	10.3	CAV	---	---
3.678000	30.70	10.5	46	15.3	CAV	---	---
3.962000	30.00	10.5	46	16.0	CAV	---	---
4.174000	30.00	10.5	46	16.0	CAV	---	---
4.386000	29.70	10.6	46	16.3	CAV	---	---