



Electromagnetic Compatibility Tests on two
Antenna Combiners
Model Nos. PA421A and PA821A

For : Shure Inc.
5800 West Touhy Avenue
Niles, IL 60714

P.O. No. : 4500205105
Dates Tested : June 28 through September 28, 2011
Test Personnel : Richard E. King
Specification : FCC "Code of Federal Regulations" Title 47 Part 74
Industry Canada RSS-123

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REPORT REVISION HISTORY

Revision	Date	Description
--	17 October 2011	Initial release



Electromagnetic Compatibility Tests on Two Antenna Combiners, Part No. PA421A and PA821A

1. INTRODUCTION

1.1 Scope of Tests

This document presents the results of a series of electromagnetic compatibility (EMC) tests performed on two (2) Antenna Combiners, Model No. PA421A and PA821A, (hereinafter referred to as the EUTs). The EUTs were manufactured and submitted for testing by Shure Inc. located in Niles, IL.

The EUTs are designed to operate over the entire frequency range from 470MHz to 952MHz.

1.2 Purpose

The test series was performed to determine if the EUTs would meet selected requirements of the Code of Federal Regulations, Title 47, Part 74 for low power auxiliary station bands and Industry Canada RSS-123 Low Power Licensed Radio communication Devices.

1.3 Deviations, Additions, and Exclusions

There were no deviations, additions to, or exclusions from the test specification during this test series.

1.4 EMC Laboratory Identification

The electromagnetic compatibility tests were performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois.

1.5 Laboratory Conditions

The temperature at the time of the test was 22°C and the relative humidity was 21%.

2. APPLICABLE DOCUMENTS

The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 74, dated 1 October 2010
- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 2, dated 1 October 2010
- RSS-123, "Radio Standards Specification Low Power Licensed Radio communication Devices" Issue 2, February 2011
- TIA-603-C-2004, "Land Mobile FM or PM Communications Equipment Measurement and Performance Standard"

3. TEST ITEM SETUP AND OPERATION

3.1 General Description

The EUTs are two separate Antenna Combiners, Model Nos. PA421A and PA821A. The antenna combiner has either 4 (PA421A) or 8 (PA821A) RF input ports and a single RF output port that connects to a Shure model PA805WB unidirectional wideband antenna. These input ports are designed to connect to the RF output port of a separate transmitter then re-transmit all signals through a Shure model PA805WB unidirectional wideband antenna to receivers.



A block diagram of the EUTs setup is shown as Figure 1.

3.1.1 Power Input

The EUTs was powered with 115V, 60Hz power via a 1.8 meter long 3 wire power cord.

3.1.2 Peripheral Equipment

The EUTs were submitted for testing with eight PSM900 P9T transmitters covering the entire range from 470MHz to 952MHz.

3.1.3 Signal Input/Output Leads

The RF input ports EUTs were connected to the RF output ports of either four or eight Shure PSM900 P9T transmitters by a six inch cable. The EUTs RF output port was connected to a Shure model PA805WB unidirectional widband antenna through an eight inch cable. Three 1 meter cables were connected to the A IN, B IN and A+ B OUT ports of the EUTs during testing.

3.1.4 Grounding

The EUTs was grounded during testing through the third wire of the input power cord.

3.1.5 Frequency of Test Item

Per CFR Title 47, Section 2, part 1057, for spurious emissions measurements at the antenna terminal and for spurious radiated emissions measurements, the frequency spectrum shall be investigated up to at least the tenth harmonic of the highest fundamental frequency.

3.2 Operational Mode

The EUTs were connected to the the following transmitters set to their highest output power settings:

PA421A:

Four PSM900 P9T transmitters were set to the following frequencies and there RF output turned on:

Tx @ 470.125MHz, 100mW; Tx @ 596.875MHz, 10mW; Tx @ 692MHz, 100mW; Tx @ 951.875MHz 50mW (FCC only)

PA821A:

Eight PSM900 P9T transmitters were set to the following frequencies and there RF output turned on:

Tx @ 470.125MHz, 100mW; Tx @ 596.875MHz, 10mW; Tx @ 692MHz, 100mW; Tx @ 951.875MHz 50mW (FCC only)

Tx @ 500MHz, 100mW; Tx @ 790MHz, 10mW; Tx @ 814MHz, 10mW; Tx @ 830MHz 50mW

For PA421A and PA821A

All emissions measurements except the occupied bandwidth were taken at 470.125MHz, 596.875MHz 692MHz and 951.875MHz.

For the Occupied Bandwidth test the measurement was taken at 690.549MHz instead of 692MHz.

3.3 Test Item Modifications

No modifications were required for compliance.

4. TEST FACILITY AND TEST INSTRUMENTATION

4.1 Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2003 for site attenuation.

4.2 Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in **Table 10-1**.

4.3 Calibration Traceability

Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

4.4 Measurement Uncertainty

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty for these tests is presented below:

Radiated Emission Measurements		
Combined Standard Uncertainty	2.26	-2.18
Expanded Uncertainty (95% confidence)	4.5	-4.4

5. TEST PROCEDURES

5.1 RF POWER OUTPUT MEASUREMENTS

5.1.1 Requirements

In accordance with paragraph 74.861(e)(1)(ii), for low power auxiliary stations operating in the bands allocated for TV broadcasting, the power of the measured unmodulated carrier power at the output of the transmitter power amplifier (antenna input power) may not exceed 250 milliwatts in the 470-608 and 614-806MHz bands. In accordance with paragraph 74.861(d)(1), for low power auxiliary stations operating in the bands other than those allocated for TV broadcasting, the maximum transmitter power which will be authorized is 1 watt.

For certification to paragraph 6.2 of the Industry Canada’s RSS-123 requirement, the RF power output must not exceed 1 watt average power as listed in Table 1.

5.1.2 Procedures

One of the RF input ports of the EUTs were connected to the RF output port of the Shure PSM900 P9T transmitters. The output from the antenna port of the EUTs was connected to a spectrum analyzer through 40dB of attenuation. The output power was measured at the EUTs RF antenna port and compared to the output power delivered to the EUTs RF input port.

5.1.3 Results

The output power measurements of the EUT are presented on page 17. As can be seen from the data the output power from each EUT is within the requirements of Part 74.861 and RSS-123.

5.2 FREQUENCY STABILITY

5.2.1 Requirements

In accordance with paragraph 74.861(e)(4) and paragraph 7 of RSS-123 Table 1, for low power auxiliary stations operating in the bands allocated for TV broadcasting, the frequency tolerance of the transmitter shall be 0.005 percent.

5.2.2 Procedures

The EUTs RF output antenna port was connected to the input of the frequency counter. The EUTs RF input ports were connected to the RF output ports of the the Shure PSM900 P9T transmitters. Each transmitter was set to a separate frequency. The EUTs were then placed in a temperature chamber.

- a) The nominal frequency of the transmitter was measured and recorded.
- b) The temperature chamber was then set to -30°C.
- c) Once the temperature had reached -30°C the EUTs was allowed to soak for 30 minutes.
- d) After soaking at -30°C for thirty minutes the EUTs was turned on and the transmit frequency was measured and recorded.
- e) Steps (b) through (d) were repeated for each temperature in 10°C steps from -20°C to +50°C.
- f) The EUTs was then removed from the temperature chamber and allowed to adjust to nominal room temperature (22°C).
- g) The input voltage was checked and adjusted to the nominal level. The frequency was measured and recorded.
- h) The input voltage was then varied to 85% of its nominal level. The frequency was measured and recorded.
- i) The input voltage was then varied to 115% of its nominal level. The frequency was measured and recorded.

5.2.3 Results

The frequency stability measurements are presented on pages 18 and 19. As can be seen from the data the test frequency deviation was within the 0.005 percent limit.

5.3 OCCUPIED BANDWIDTH MEASUREMENTS

5.3.1 Requirements

In accordance with paragraph 74.861(e)(5) and (6), for low power auxiliary stations operating in the bands allocated for TV broadcasting, the following technical requirements apply:

- a) The operating bandwidth shall not exceed 200 kHz.
- b) The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- i. 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;
- ii. 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;
- iii. 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.

For certification to the RSS-123 paragraph 6.3.1, the power of unwanted emissions shall be attenuated below the mean transmitter power in accordance with the following schedule:

- a) On any frequency removed from the carrier frequency by more than 50% up to and including 100% of the authorized bandwidth: at least 25 dB.
- b) On any frequency removed from the carrier frequency by more than 100% up to and including 250% of the authorized bandwidth: at least 35 dB.
- c) On any frequency removed from the carrier frequency by more than 250% of the authorized bandwidth: at least $55 + 10 \text{ Log (P) dB}$.

5.3.2 Procedures

- a) A PSM900 P9T transmitter set to 470.125MHz and connected to a spectrum analyzer through 40 dB of attenuation. The unmodulated carrier signal level was measured and recorded.
- b) The bandwidth of the spectrum analyzer was set to 2kHz (1% of Authorized BW). The PSM900 P9T transmitter was then modulated with a 2500 Hz sine wave at an input level 16 dB greater than that necessary to produce 50% of the rated system deviation of the PSM900 P9T transmitter and the result recorded.
- c) The PSM900 P9T transmitters RF output port was connected to one of the RF input ports of the EUT PA421A and the EUTs RF Output was connected to a spectrum analyzer through 40 dB of attenuation.
- d) With the bandwidth of the spectrum analyzer still set to 2kHz and the PSM900 P9T transmitter still modulated the EUT was turned on and the result recorded.
- e) Steps (a) through (d) were repeated with the PSM900 P9T transmitter set to 596.875MHz, 690.549MHz and 951.875MHz.
- f) Steps (a) through (e) were repeated with the PSM900 P9T transmitters connected to EUT PA821A.

5.3.3 Results

The plots of the occupied bandwidth measured are presented on pages 20 through 31. The limits, shown on the plots, are referenced to the power measured from the un-modulated carrier, the power when modulated with a 2500 Hz sine wave at an input 16dB greater than that necessary to produce 50% of the rated deviation.

As can be seen from the data, the EUTs met all occupied bandwidth requirements.



5.4 SPURIOUS EMISSIONS AT ANTENNA TERMINAL

5.4.1 Requirements

This test determines whether the EUTs produce excessive spurious emissions.

In accordance with paragraph 74.861(e)(6)(iii), on any frequency remove from the operating frequency by more than 250 percent of the authorized bandwidth shall attenuated by at least $43 + 10 \log (P)$ dB which is equivalent to -13 dBm. The emissions shall be measured from 30MHz up to the 10th harmonic of the fundamental frequency.

In accordance with RSS-123 paragraph 6.3.1(3) on any frequency remove from the operating frequency by more than 250 percent of the authorized bandwidth: at least $55 + 10 \log (P)$ dB which is equivalent to -25 dBm. The emissions shall be measured from the fundamental minus 500 kHz up to the 5th harmonic of the fundamental frequency.

5.4.2 Procedures

A spectrum analyzer was connected to the RF output of the EUTs through 40 dB of external attenuation.

The out of band emissions were measured.

The spectrum analyzer was adjusted accordingly.

For the FCC measurements - the resolution bandwidth was set to 100kHz for spurious emissions below 1GHz and 1MHz for spurious emissions above 1GHz.

For the RSS-123 measurements - the resolution bandwidth was set to 30 kHz.

For the measurements - the EUTs was modulated with a 2500 Hz sine wave at an input level 16dB greater than that necessary to produce 50% of rated system deviation

The plots of the spectrum analyzer screens were recorded.

5.4.3 Results

The plots of the antenna conducted output measurements are presented on pages 32 through 35. As can be seen from the data, the EUTs did not produce spurious emissions in excess of the limit.

5.5 FIELD STRENGTH OF SPURIOUS EMISSIONS

5.5.1 Requirements

In accordance with paragraph 74.861 of CFR 47, the power of any emission on any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth shall be attenuated by at least $43 + 10 \log (P)$ dB.

In accordance with RSS-123 paragraph 6.3.1, the power of any emission on any frequency removed from the carrier frequency by more than 250% of the authorized bandwidth shall be attenuated by at least $55 + 10 \log (P)$ dB.

5.5.2 Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4 2003for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

1. Preliminary radiated measurements were performed to determine the frequencies where the significant emissions might be found. With the EUTs at one set position and the measurement antenna at a set height (i.e. without maximizing), the radiated emissions were measured using a peak detector and automatically plotted. The broadband measuring antenna was positioned at a 3 meter distance from the EUTs. This data was then automatically plotted. All preliminary tests were performed separately with the EUTs operating in the modes listed in Para. 3.2.
2. All significant broadband and narrowband signals found in the preliminary sweeps were then measured using a peak detector at a test distance of 3 meters. The measurements were made with a bilog antenna over the frequency range of 30MHz to 1GHz, and a double ridged waveguide antenna was used for frequencies above 1GHz.
3. To ensure that maximum emission levels were measured, the following steps were taken:
 - a. The EUTs was rotated so that all of its sides were exposed to the receiving antenna.
 - b. Since the measuring antennas are linearly polarized, both horizontal and vertical field components were measured.
 - c. The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power, another antenna was set in place of the EUTs and connected to a calibrated signal generator. (A tuned dipole was used for all measurements below 1GHz and a double ridged waveguide antenna was used for all measurements above 1GHz.) The output of the signal generator was adjusted to match the received level at the spectrum analyzer. The signal level was recorded. The reading was corrected to compensate for cable loss, as required, and for frequencies above 1GHz, increased by the gain of the waveguide.

5.5.3 Results

The preliminary plots peak levels are presented on pages 36 through 43. Factors for the antennas and cables were added to the data before it was plotted. This data is only presented for a reference, and is not used as official data. All significant radiated emissions were subsequently measured using the substitution method.

The final radiated levels are presented on pages 44 through 51. The radiated emissions were measured through the 10th harmonic. All emissions measured from the EUTs were within the specification limits. Photographs of the test setup are shown in Figure 2 and Figure 3.

6. OTHER TEST CONDITIONS

6.1 Test Personnel and Witnesses

All EMC tests were performed by qualified personnel from Elite Electronic Engineering Incorporated. The test series was partially witnessed by Shure Inc. personnel.

6.2 Disposition of the Test Item

The EUTs and all associated equipment were returned to Shure Inc. upon completion of the tests.



7. CONCLUSION

It was found that the Shure Inc., model PA421A and PA821A Antenna Combiners, did comply with the RF power output, the occupied bandwidth, the frequency stability, the spurious emissions at antenna terminal, and the field strength of spurious emissions requirements of FCC Part 74 for low power auxiliary station bands and Industry Canada RSS-123 Low Power Licensed Radio communication Devices.

8. CERTIFICATION

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specification. The data presented in this test report pertains only to the EUTs at the test date. Any electrical or mechanical modification made to the EUTs subsequent to the specified test date will serve to invalidate the data and void this certification.

9. ENDORSEMENT DISCLAIMER

This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.



10. EQUIPMENT LIST

Table 10-1

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	6/3/2011	6/3/2012
CDV0	DESKTOP COMPUTER	COMPAQ	PRESARIO	MXK3391BPJ	2.5GHZ	N/A	
ETD0	ENV Chambers For Auto Dept Use Only	Thermotron	S-8	15461	-70 to 150 degrees C	Note 1	
ETDA	HONEYWELL CHART RECORDER	HONEYWELL	DR45AT-1100	0825Y878133300009	PROGRAMMABLE	1/7/2011	1/7/2012
ETDC	Temperature Controller	Thermotron	2800	753726	Programmable	Note 1	
GBN2	SIGNAL GENERATOR	ROHDE & SCHWARZ	SMY 02	DE14046	9KHZ-2.080GHZ	4/11/2011	4/11/2012
GRE0	SIGNAL GENERATOR	AGILENT TECHNOLOGIES	E4438C	MY42083127	250KHZ-6GHZ	3/31/2011	3/31/2012
GWH5	DDS FUNCTION GENERATOR	WAVETEK	29	083773	.0001HZ-10MHZ	5/23/2011	5/23/2012
GXA1	MXG MW ANALOG SIGNAL GENERATOR	AGILENT TECHNOLOGIES	N5183A	MY47420353	250KHz-40GHz	3/11/2011	3/11/2012
HRE4	LASER JET 5P	HEWLETT PACKARD	C3150A	USHB080992	---	N/A	
MFC0	MICROWAVE FREQ. COUNTER	HEWLETT PACKARD	5343A	2133A00591	10HZ-26GHZ	8/30/2011	8/30/2012
NDQ0	TUNED DIPOLE ANTENNA	EMCO	3121C-DB4	311	400-1000MHZ	4/5/2011	4/5/2012
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	6/29/2011	6/29/2012
NWF0	RIDGED WAVE GUIDE	EMCO	3105	2035	1-12.4GHZ	1/29/2011	1/29/2012
RBA0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100145	20HZ-26.5GHZ	3/9/2011	3/9/2012
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/24/2011	3/24/2012
RYE0	MODULATION ANALYZER	HEWLETT PACKARD	8901B	3104A03410	0.15-1300MHZ	8/31/2011	8/31/2012
SAA1	AC POWER SOURCE/ANALYZER	HEWLETT PACKARD	6813A	3524A-00446	0-300VRMS, 1750VA	NOTE 1	
SDL0	POWER SUPPLY	HEWLETT PACKARD	6542A	243	0-20VDC; 0-10A	NOTE 1	
T1E1	10DB 25W ATTENUATOR	WEINSCHEL	46-10-43	AU1883	DC-18GHZ	8/4/2011	8/4/2012
T2D5	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-43	AY9244	DC-18GHZ	1/5/2011	1/5/2012
T2DL	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BS0910	DC-18GHZ	8/4/2011	8/4/2012
T2DM	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BS2141	DC-18GHZ	8/4/2011	8/4/2012
T2S4	20DB 25W ATTENUATOR	WEINSCHEL	46-20-24	BV1393	DC-18GHZ	1/3/2011	1/3/2012

I/O: Initial Only

N/A: Not Applicable

Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

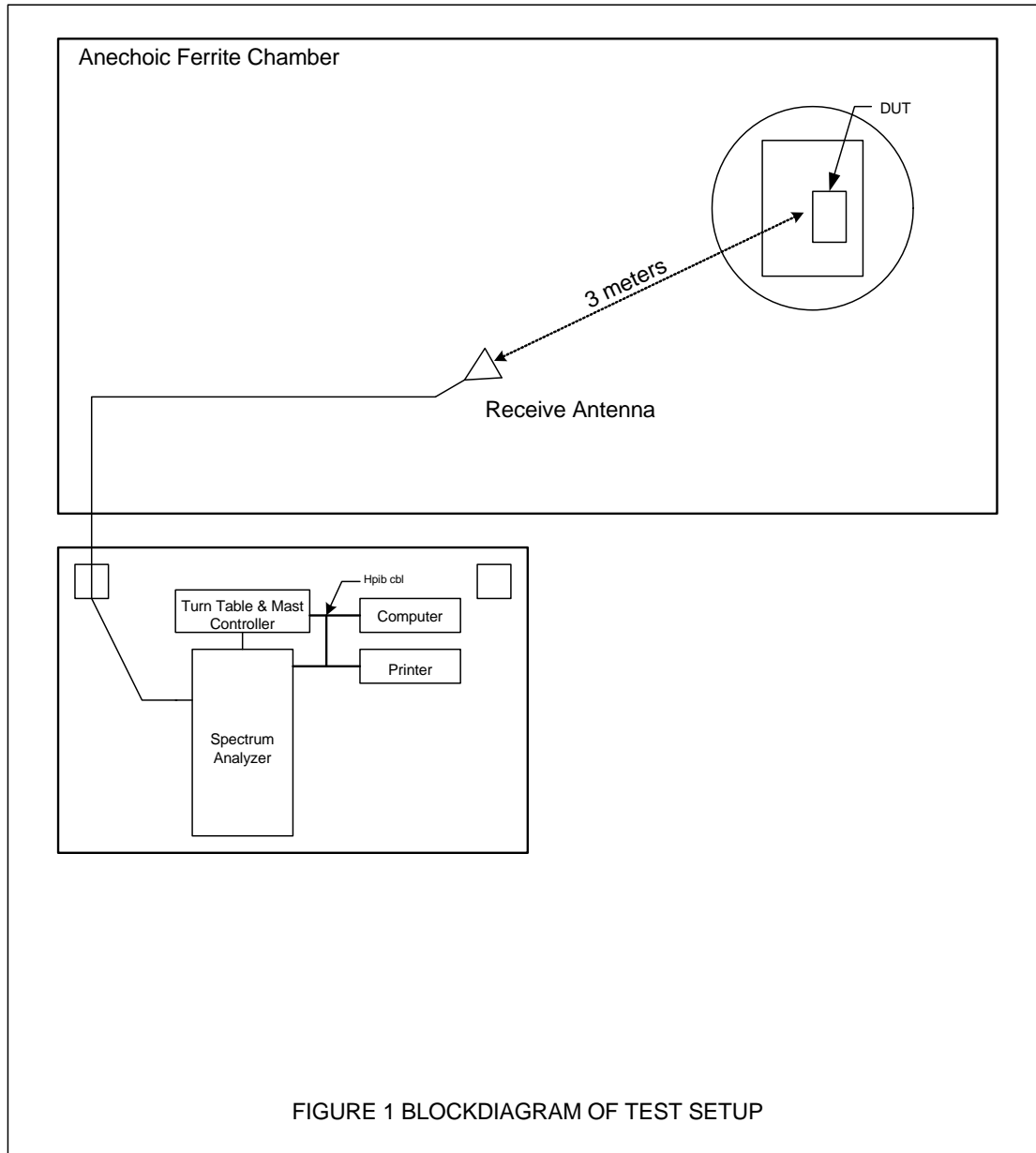
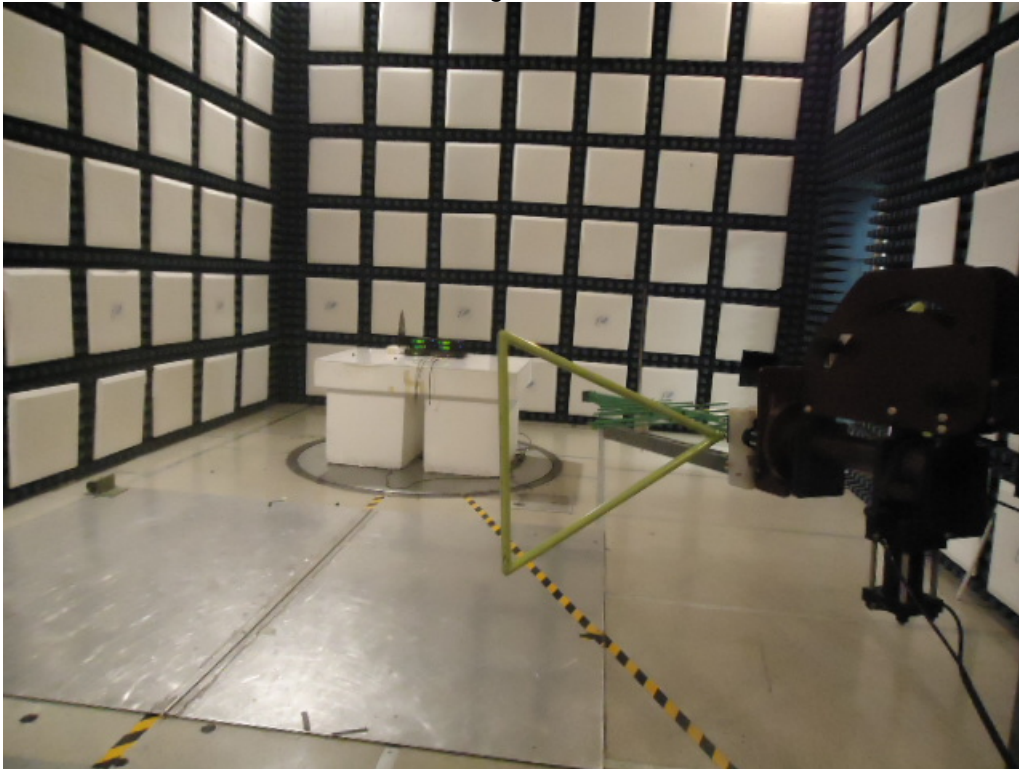
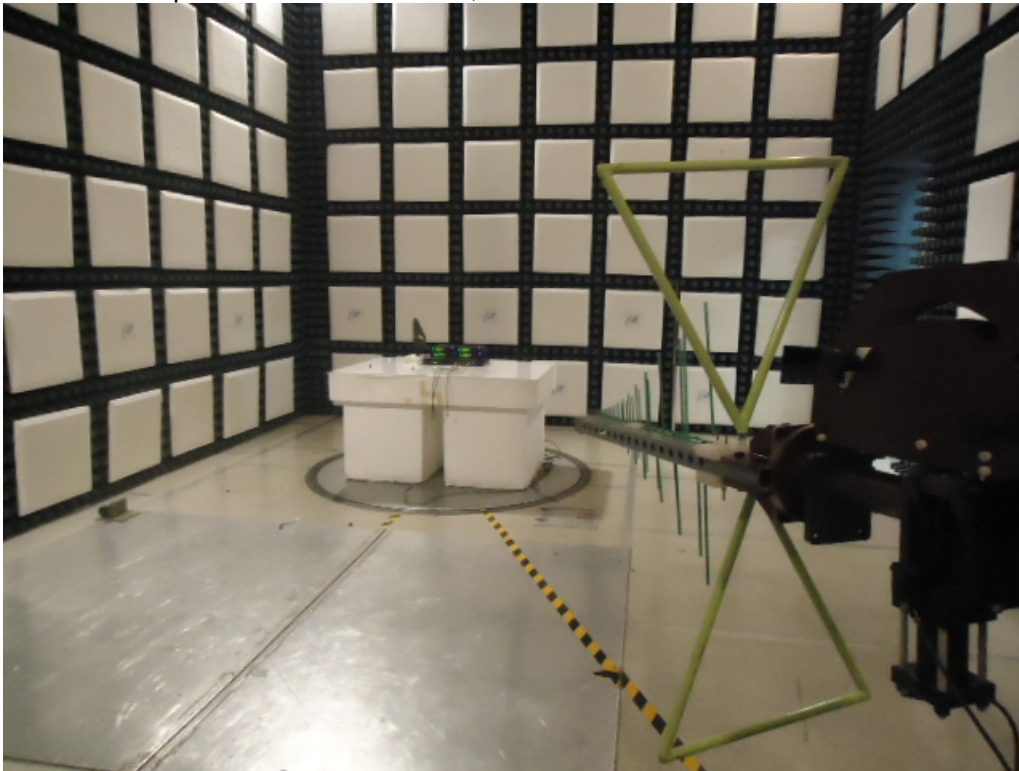


Figure 2

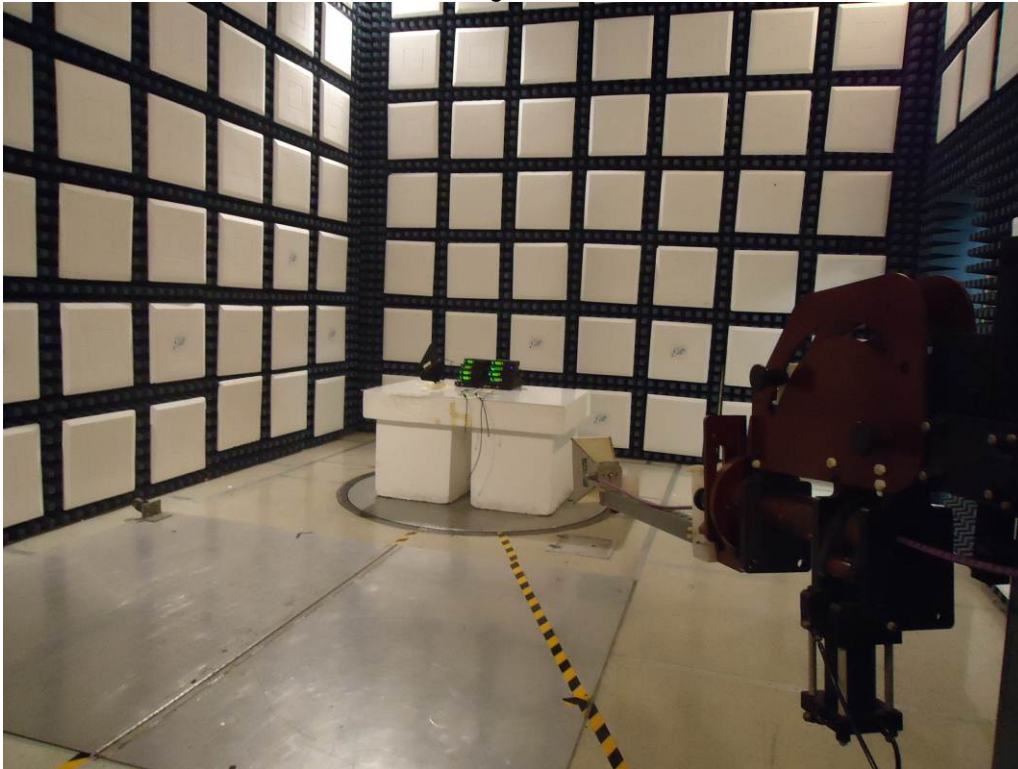


Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization



Test Setup for Radiated Emissions, 30MHz to 1GHz – Vertical Polarization

Figure 4



Test Setup for Radiated Emissions, Above 1GHz – Horizontal Polarization



Test Setup for Radiated Emissions, Above 1GHz – Vertical Polarization



MANUFACTURER : Shure Inc.
MODEL : PA421A and PA821A
SPECIFICATION : FCC-74 and RSS-123 RF Power Output
DATE : June 30 through Septmber 28, 2011

PA421A

Frequency MHz	Measured Input Power into Combiner mW	Measured output Power out of the Combiner mW	FCC-74 Limit mW	RSS-123 Limit mW
470.125	98	51	250	1000
596.875	9	5	250	1000
692	98	52	250	1000
951.875	49	25	250	-----

PA821A

Frequency MHz	Measured Input Power into Combiner mW	Measured output Power out of the Combiner mW	FCC-74 Limit mW	RSS-123 Limit mW
470.125	98	52	250	1000
596.875	9	5	250	1000
692	98	50	250	1000
951.875	49	26	250	-----

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : Shure Inc.
 MODEL : PA421A and PA821A Antenna Combiners
 SERIAL NO. : None Assigned
 SPECIFICATION : FCC-74 and RSS-123 Frequency Stability vs. Temperature
 DATE : September 28, 2011
 MODE : Transmit at 692MHz, 100mW

PA421A

Temperature °C	Nominal Frequency MHz	Measured Frequency MHz	Deviation %	Deviation Limit %	Deviation Hz	Limit Hz
-30	692.000000	691.999933	-0.0000097	0.005	-67.000000	34600
-20	692.000000	691.999407	-0.0000857	0.005	-593.000000	34600
-10	692.000000	691.999902	-0.0000142	0.005	-98.000000	34600
0	692.000000	691.999979	-0.0000030	0.005	-21.000000	34600
10	692.000000	691.999937	-0.0000091	0.005	-63.000000	34600
20	692.000000	691.999971	-0.0000042	0.005	-29.000000	34600
30	692.000000	691.999735	-0.0000383	0.005	-265.000000	34600
40	692.000000	691.999610	-0.0000564	0.005	-390.000000	34600
50	692.000000	691.999597	-0.0000582	0.005	-403.000000	34600

PA821A

Temperature °C	Nominal Frequency MHz	Measured Frequency MHz	Deviation %	Deviation Limit %	Deviation Hz	Limit Hz
-30	692.000000	691.999931	-0.0000100	0.005	-69.000000	34600
-20	692.000000	691.999417	-0.0000842	0.005	-583.000000	34600
-10	692.000000	691.999912	-0.0000127	0.005	-88.000000	34600
0	692.000000	691.999980	-0.0000029	0.005	-20.000000	34600
10	692.000000	691.999942	-0.0000084	0.005	-58.000000	34600
20	692.000000	691.999961	-0.0000056	0.005	-39.000000	34600
30	692.000000	691.999758	-0.0000350	0.005	-242.000000	34600
40	692.000000	691.999860	-0.0000202	0.005	-140.000000	34600
50	692.000000	691.999581	-0.0000605	0.005	-419.000000	34600

Checked BY Richard E. King :

Richard E. King



MANUFACTURER : Shure Inc.
MODEL : PA421A and PA821A Antenna Combiners
SPECIFICATION : FCC-74 and RSS-123 Frequency Stability vs. Voltage
DATE : September 28, 2011
MODE : Transmit at 692MHz, 100mW

PA421A

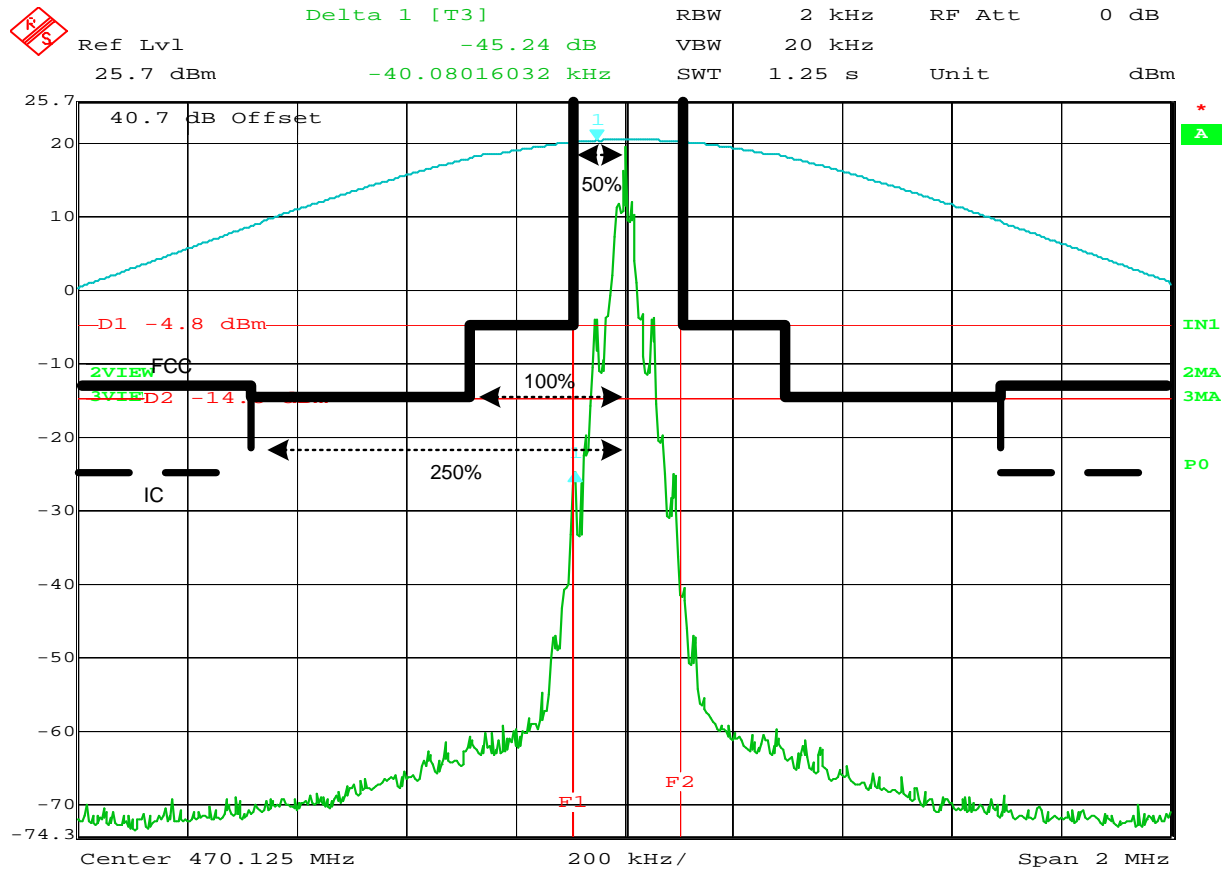
Input Voltage VAC	Nominal Frequency MHz	Measured Frequency MHz	Deviation %	Deviation Limit %	Deviation Hz	Limit Hz
115VAC,60Hz (100%)	692.000000	691.999971	-0.0000042	0.005	-29.000000	34600
97.75VAC,60Hz (85%)	692.000000	691.999576	-0.0000613	0.005	-424.000000	34600
132.25VAC,60Hz (115%)	692.000000	691.999562	-0.0000633	0.005	-438.000000	34600

PA821A

Input Voltage VAC	Nominal Frequency MHz	Measured Frequency MHz	Deviation %	Deviation Limit %	Deviation Hz	Limit Hz
115VAC,60Hz (100%)	692.000000	691.999961	-0.0000056	0.005	-39.000000	34600
97.75VAC,60Hz (85%)	692.000000	691.999579	-0.0000608	0.005	-421.000000	34600
132.25VAC,60Hz (115%)	692.000000	691.999573	-0.0000617	0.005	-427.000000	34600

Checked BY Richard E. King :

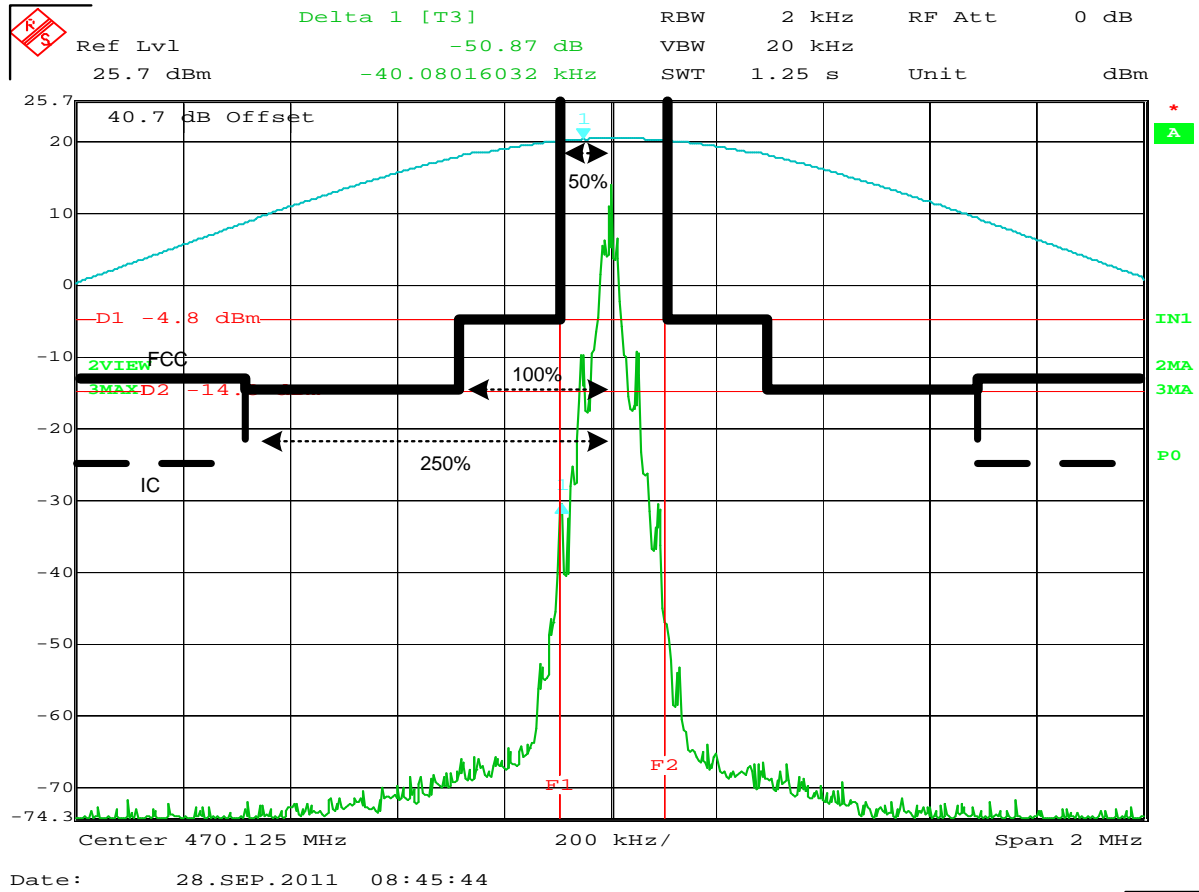
Richard E. King



Date: 28.SEP.2011 08:43:10

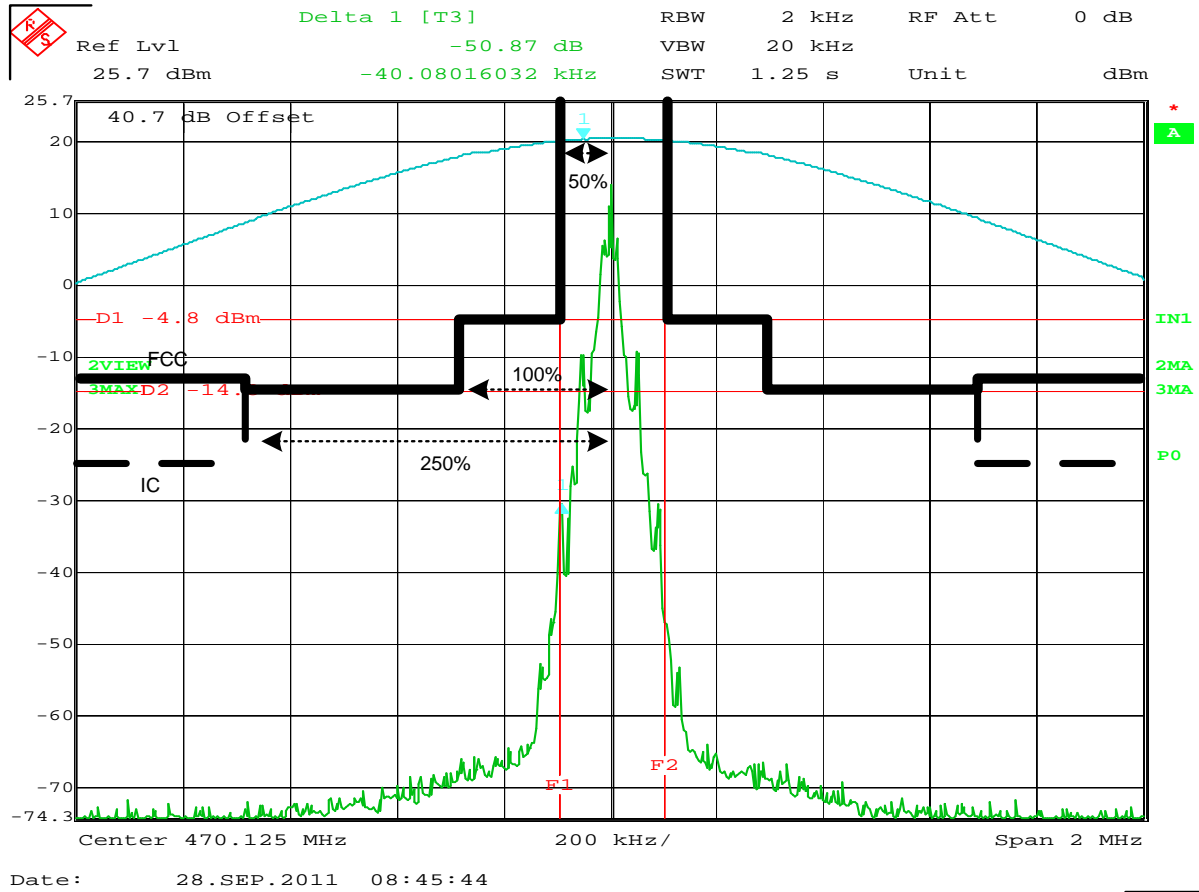
IC/FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
 TEST MODE : Input to the Antenna Combiner
 TEST POWER : 100mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 470.125MHz



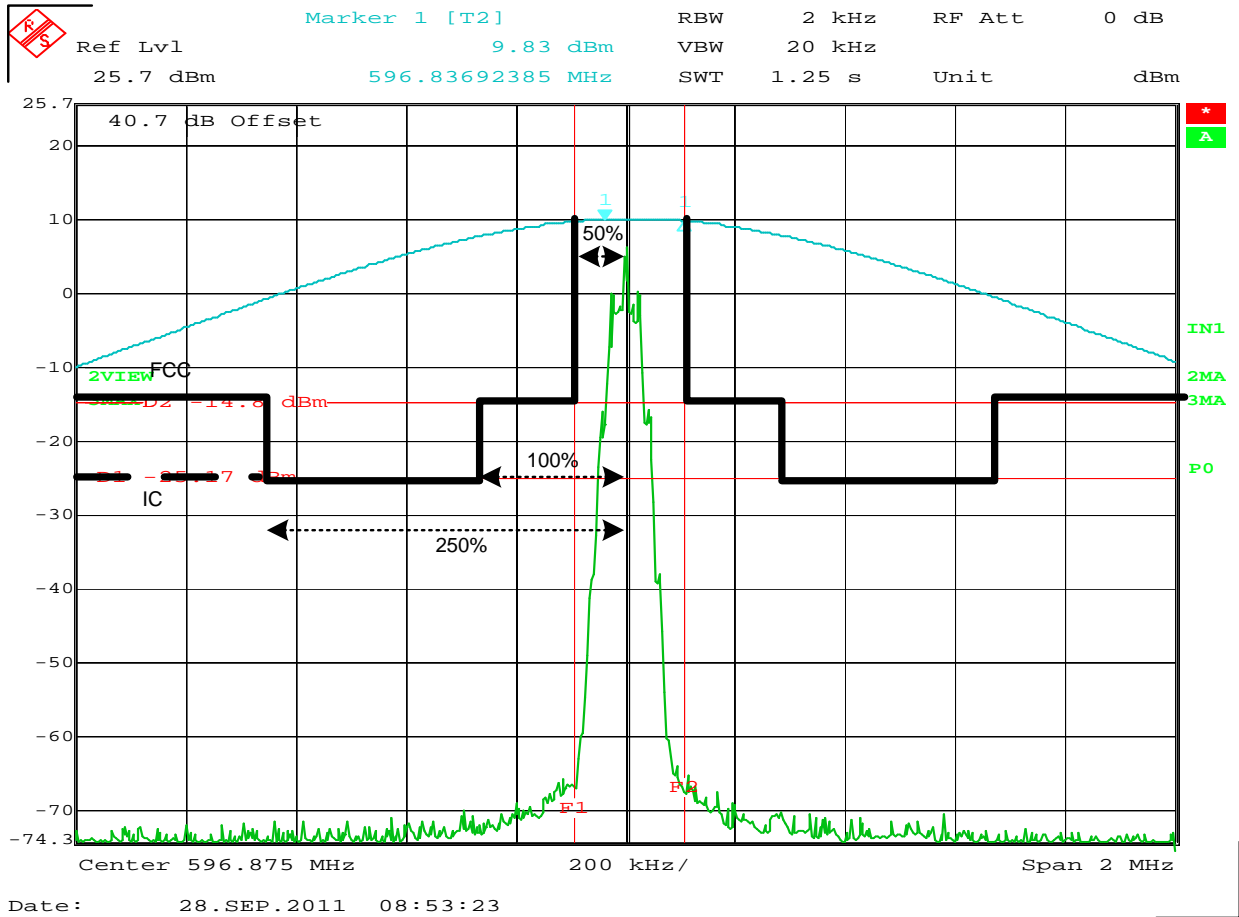
IC/FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
 MODEL NUMBER : PA421A
 TEST MODE : Output of the Antenna Combiner
 TEST POWER : 100mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 470.125MHz



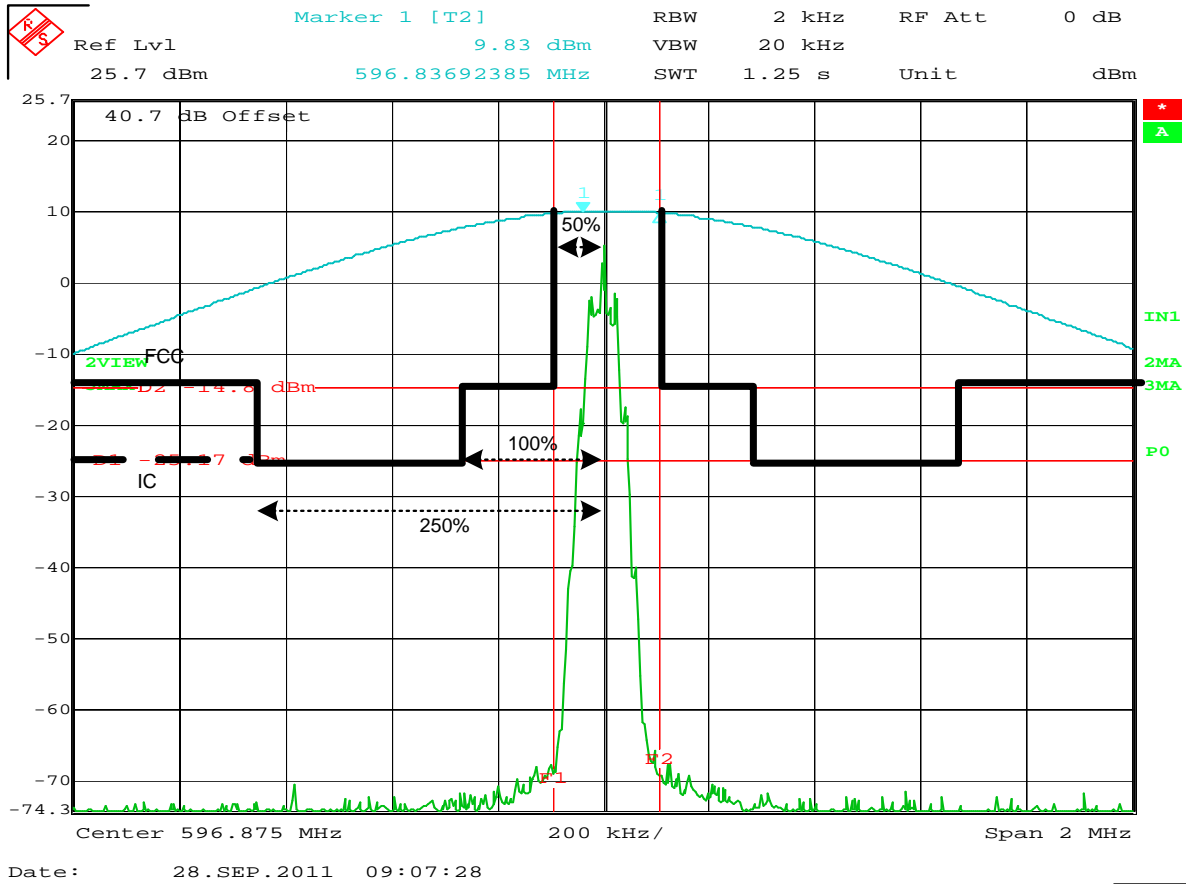
IC/FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
 MODEL NUMBER : PA821A
 TEST MODE : Output of the Antenna Combiner
 TEST POWER : 100mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 470.125MHz



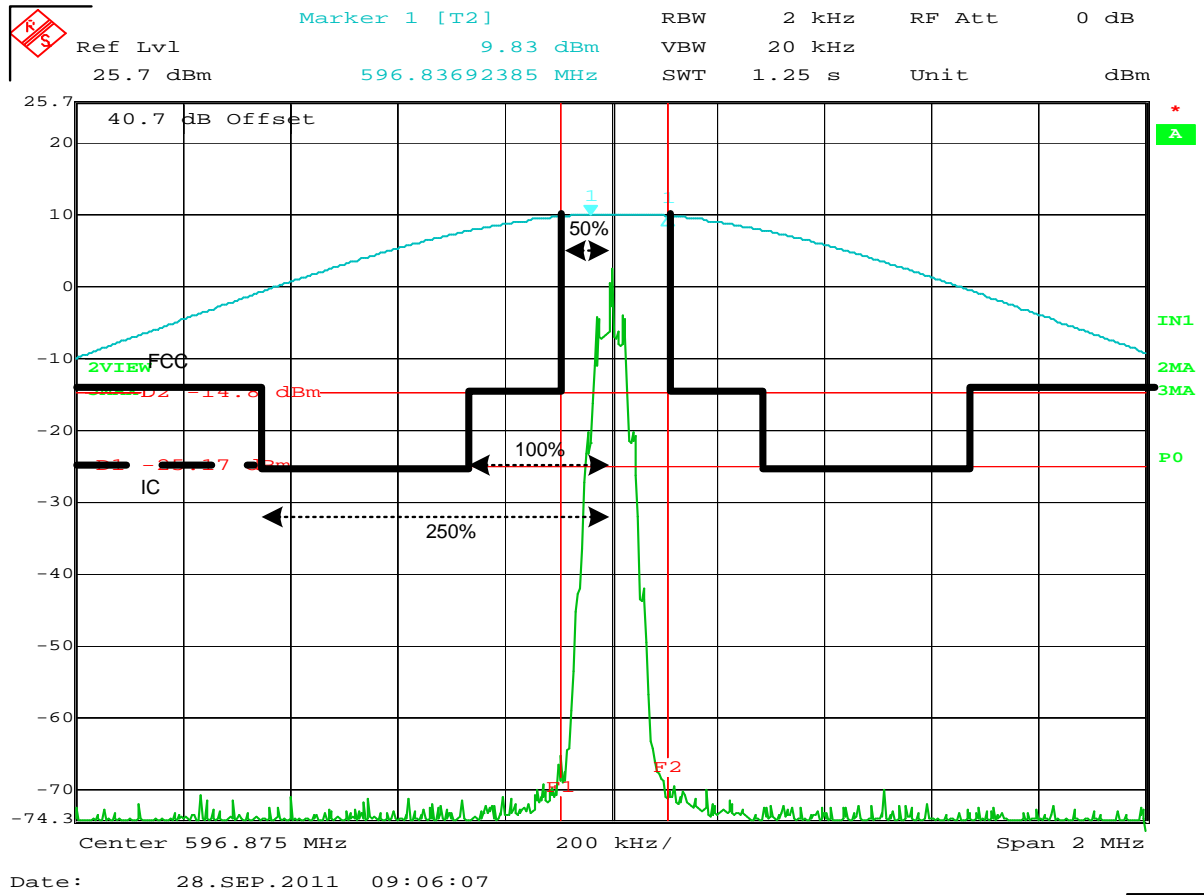
IC/FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
 TEST MODE : Input to the Antenna Combiner
 TEST POWER : 10mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 596.875MHz



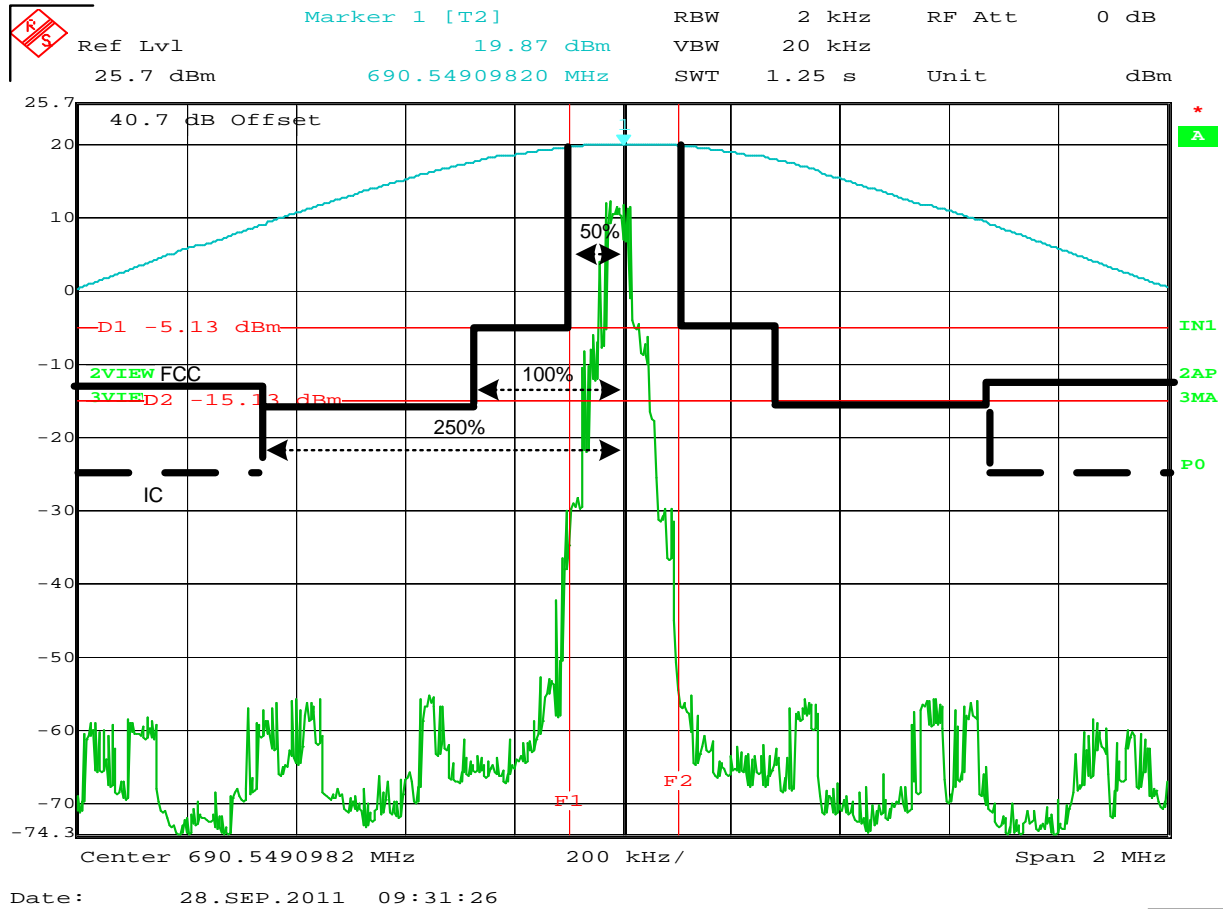
IC/FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
 MODEL NUMBER : PA421A
 TEST MODE : Output of the Antenna Combiner
 TEST POWER : 10mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 596.875MHz



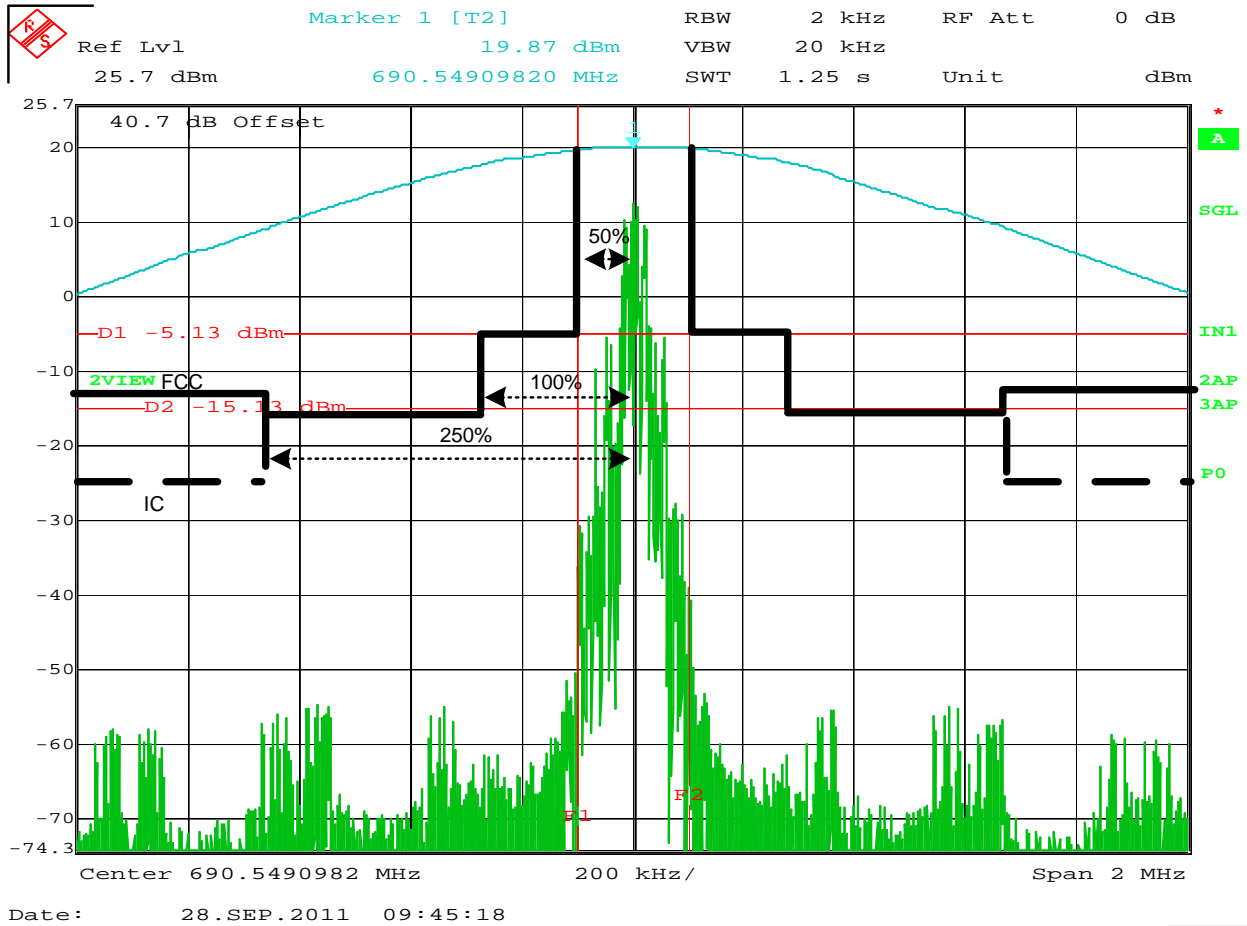
IC/FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
 MODEL NUMBER : PA821A
 TEST MODE : Output of the Antenna Combiner
 TEST POWER : 10mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 596.875MHz



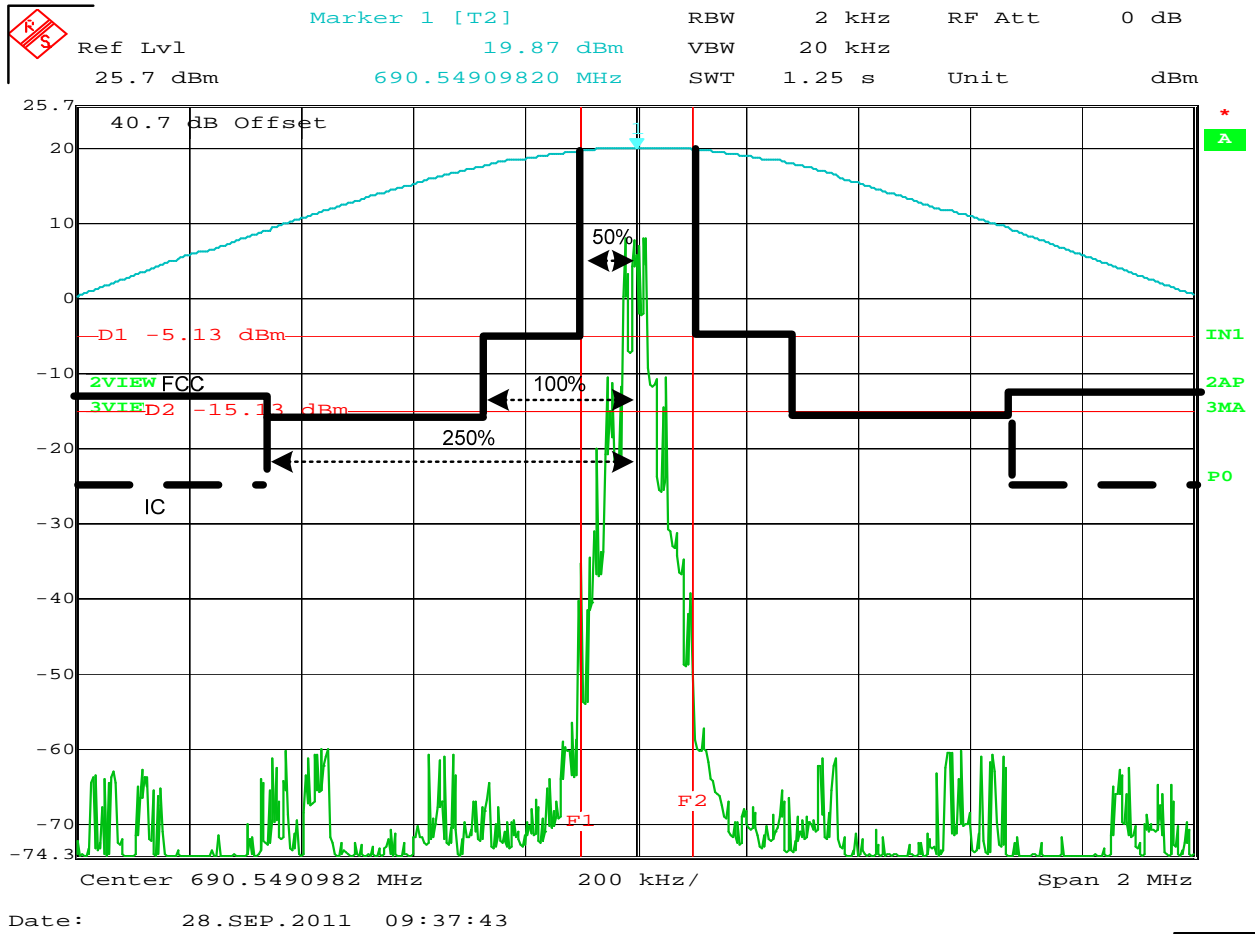
IC/FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
 TEST MODE : Input to the Antenna Combiner
 TEST POWER : 100mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 690.549MHz



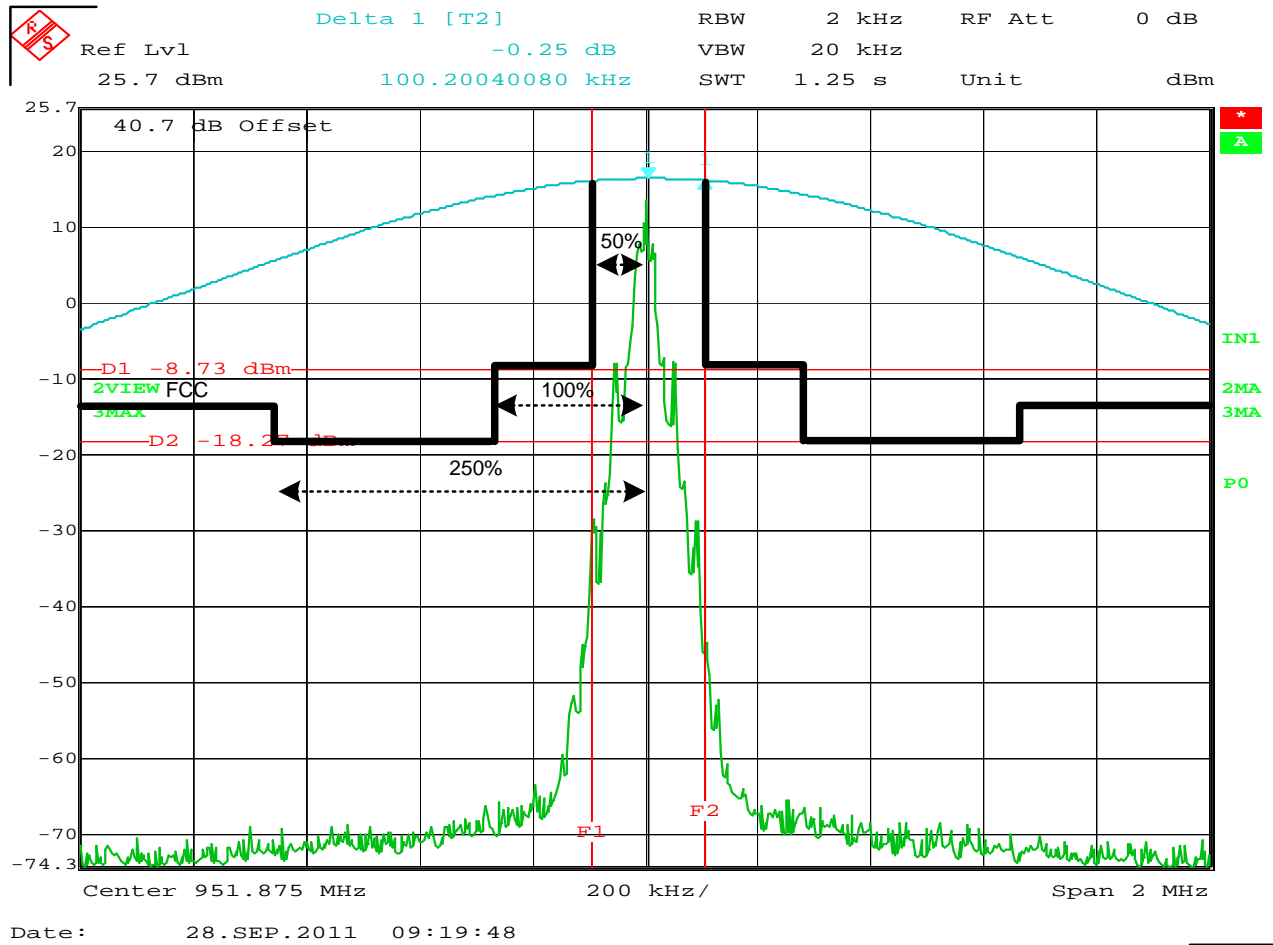
IC/FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
MODEL NUMBER : PA421A
TEST MODE : Output of the Antenna Combiner
TEST POWER : 100mW
NOTES : 2500Hz at 16dB over 50%
NOTES : Tx at 690.54MHz



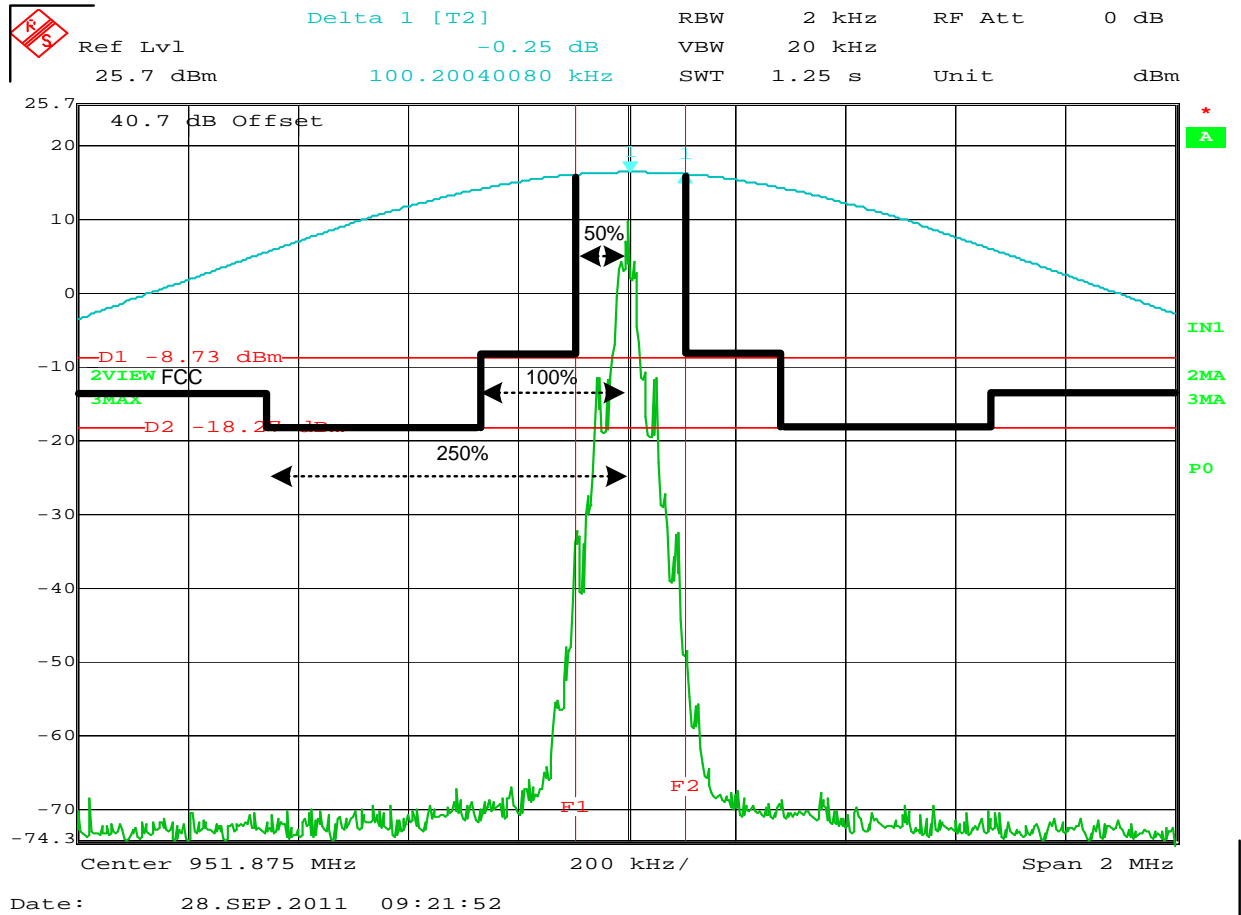
IC/FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
 MODEL NUMBER : PA821A
 TEST MODE : Output of the Antenna Combiner
 TEST POWER : 100mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 690.54MHz



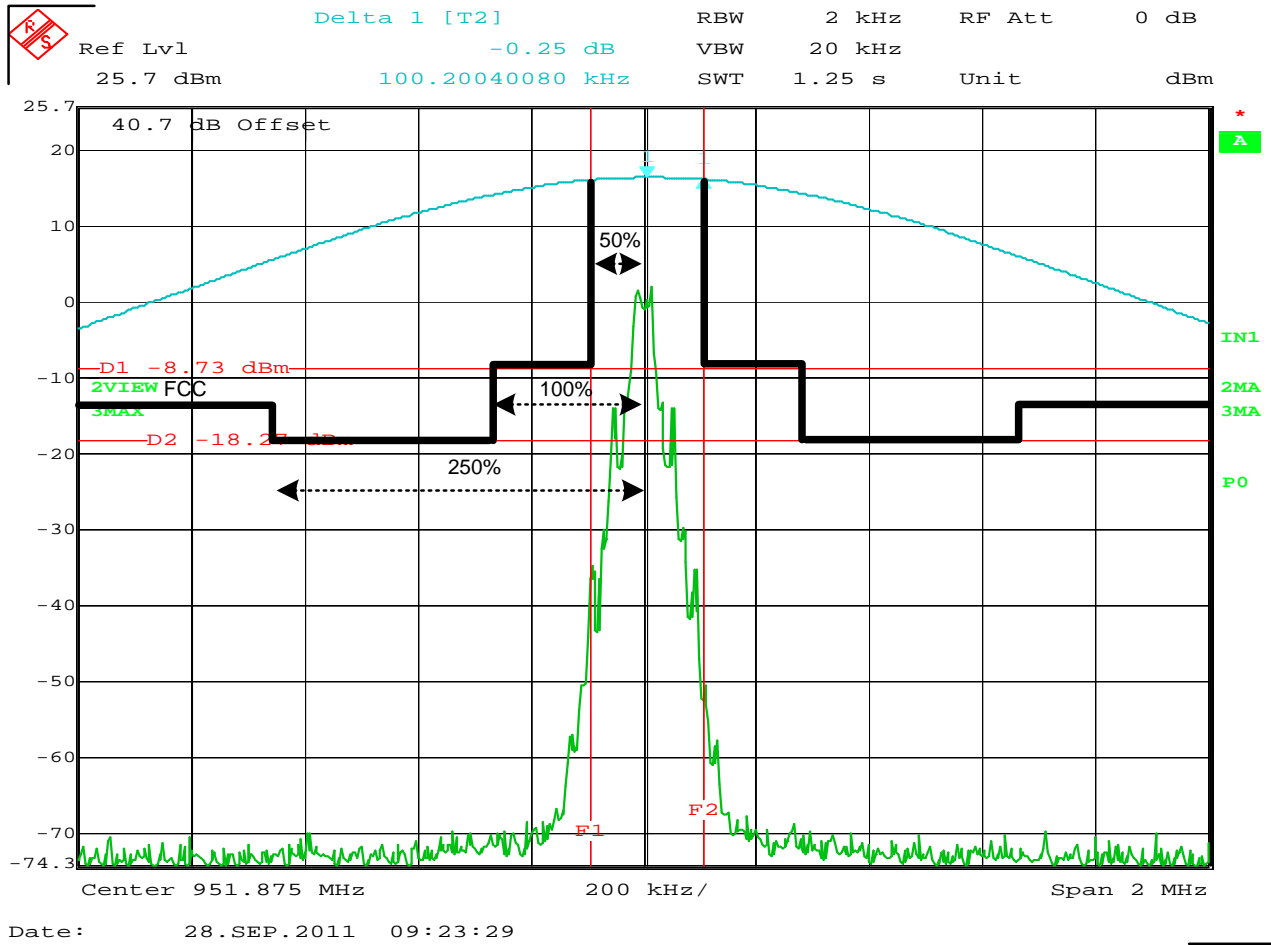
FCC Occupied Bandwidth

MANUFACTURER : Shure, Inc.
 TEST MODE : Input to the Antenna Combiner
 TEST POWER : 50mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 951.875MHz



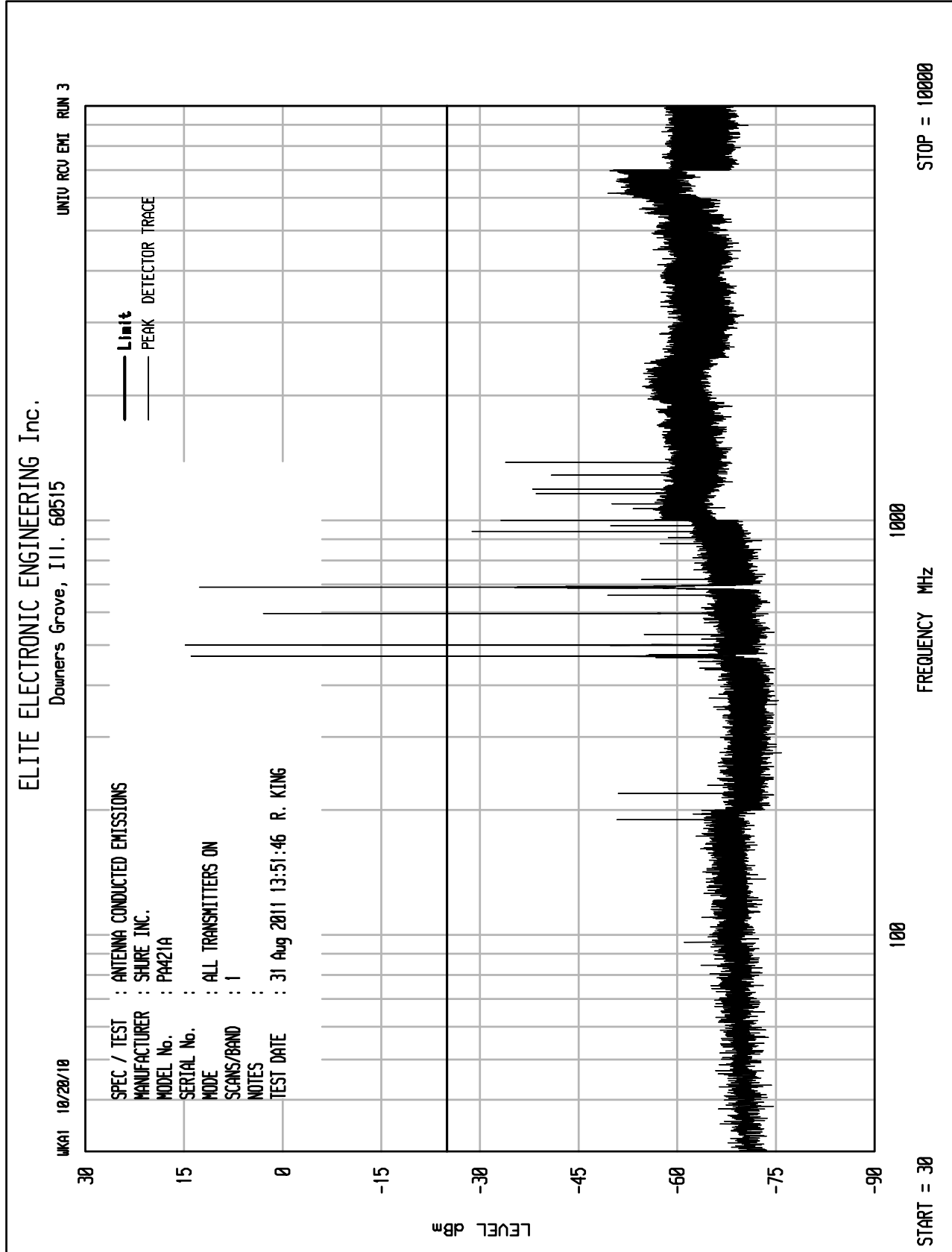
FCC Occupied Bandwidth

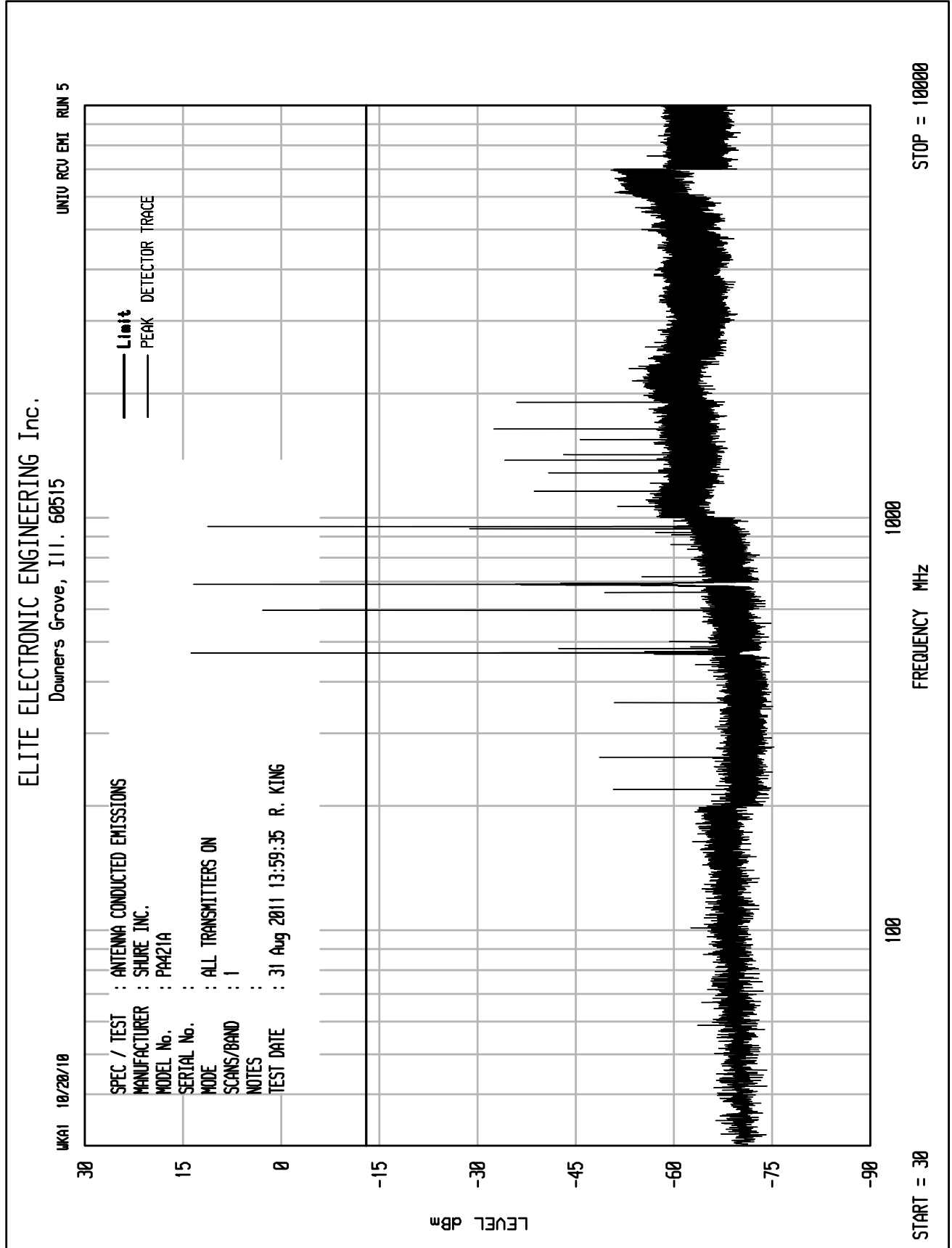
MANUFACTURER : Shure, Inc.
 MODEL NUMBER : PA421A
 TEST MODE : Output of the Antenna Combiner
 TEST POWER : 50mW
 NOTES : 2500Hz at 16dB over 50%
 NOTES : Tx at 951.875MHz

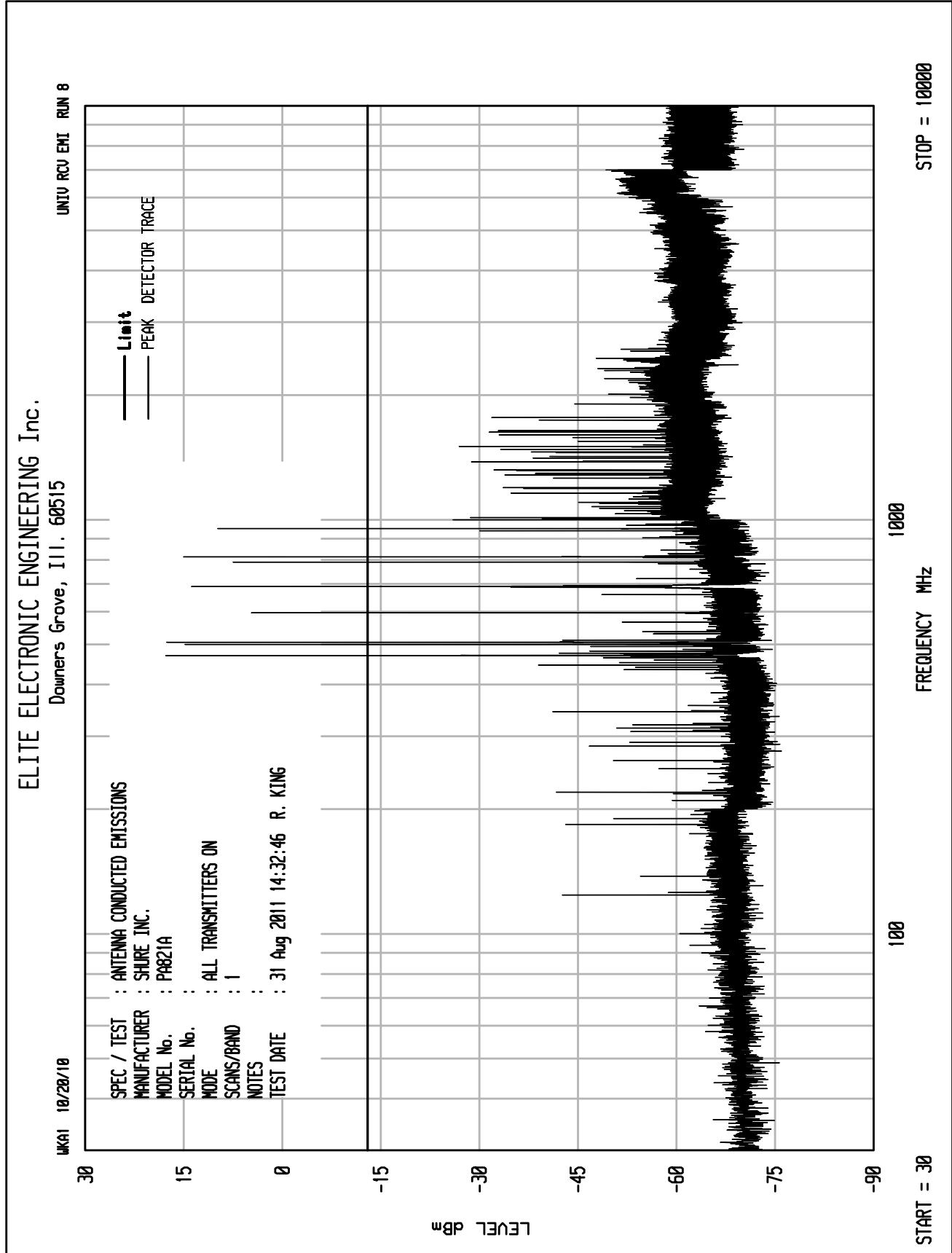


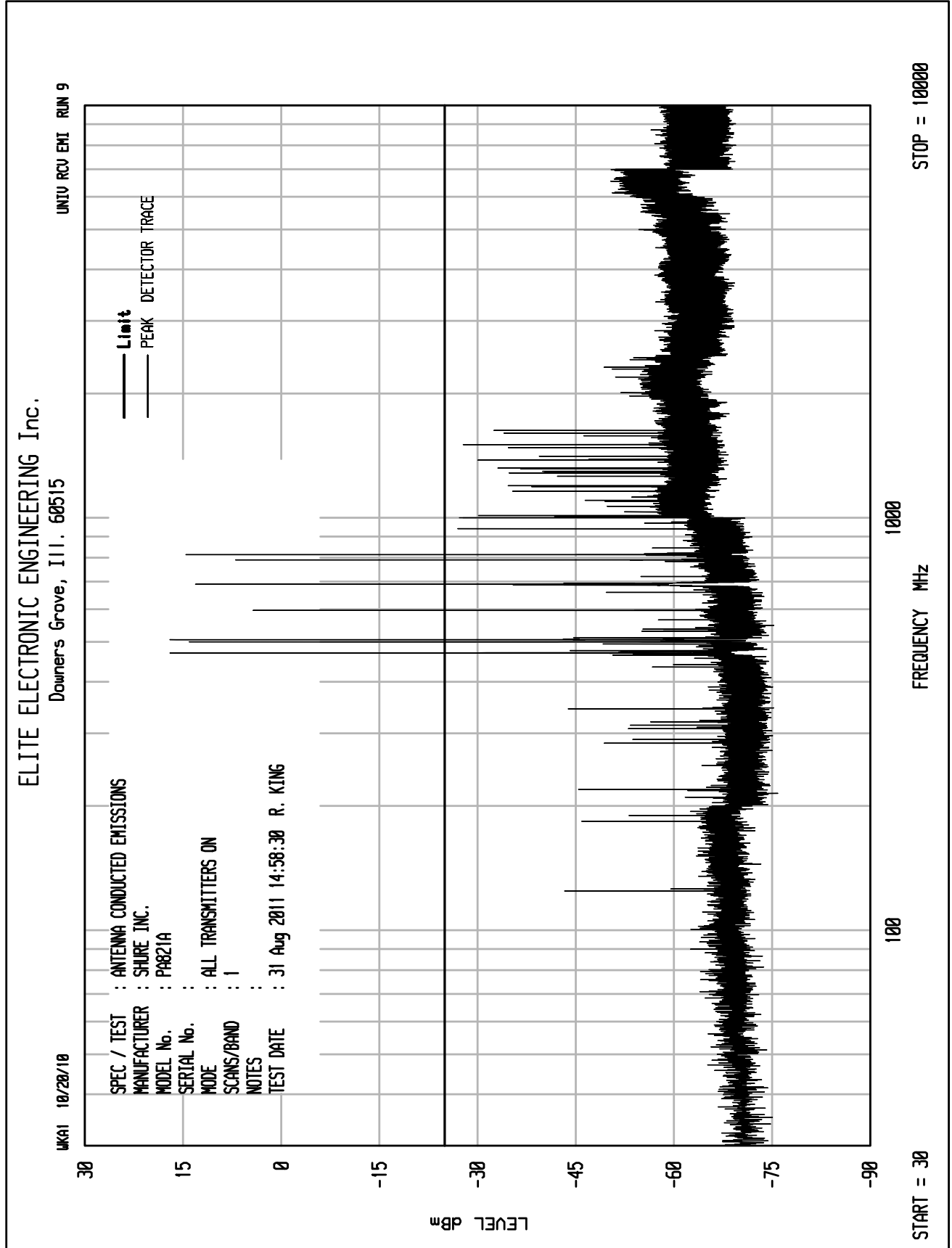
FCC Occupied Bandwidth

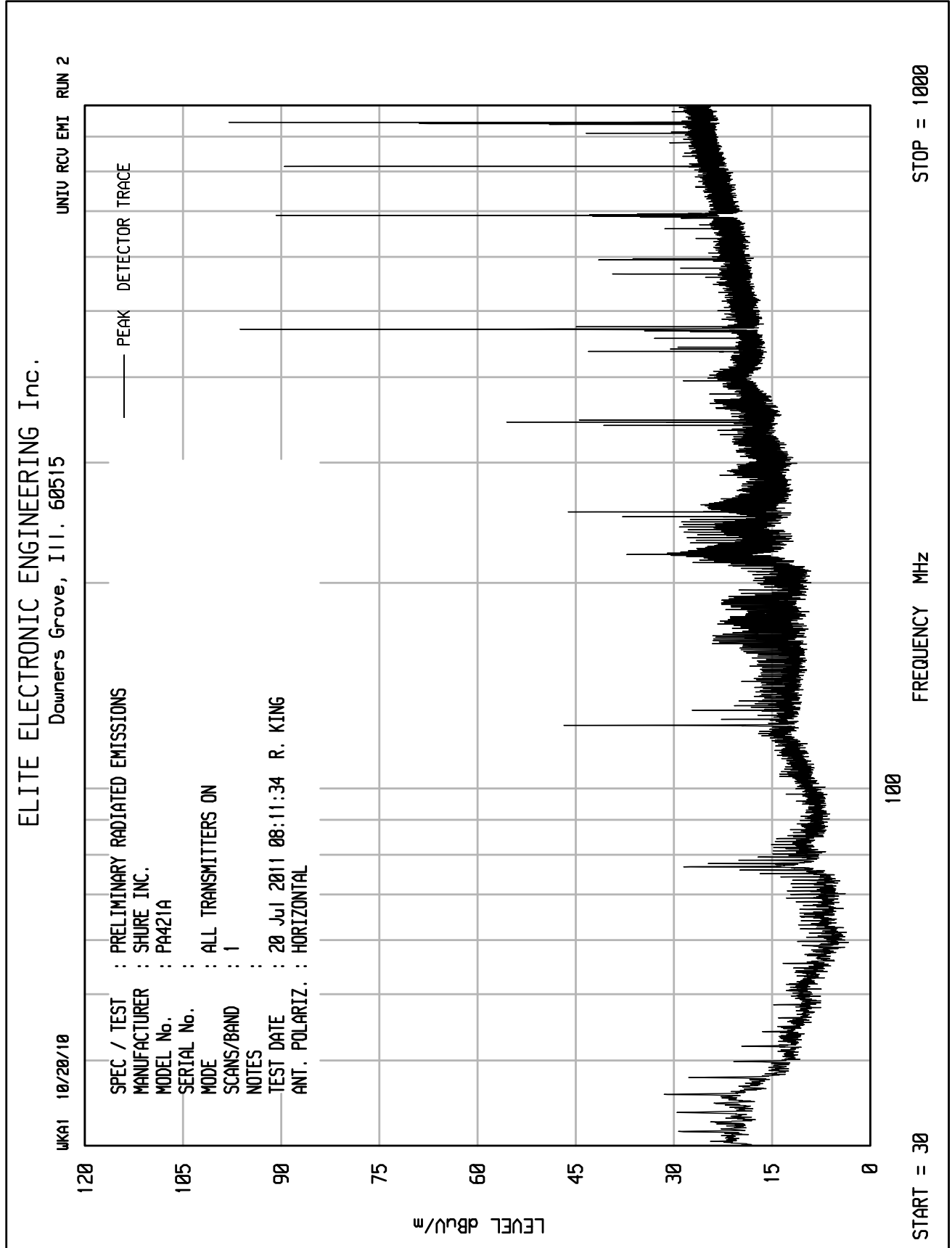
MANUFACTURER : Shure, Inc.
MODEL NUMBER : PA821A
TEST MODE : Output of the Antenna Combiner
TEST POWER : 50mW
NOTES : 2500Hz at 16dB over 50%
NOTES : Tx at 951.875MHz

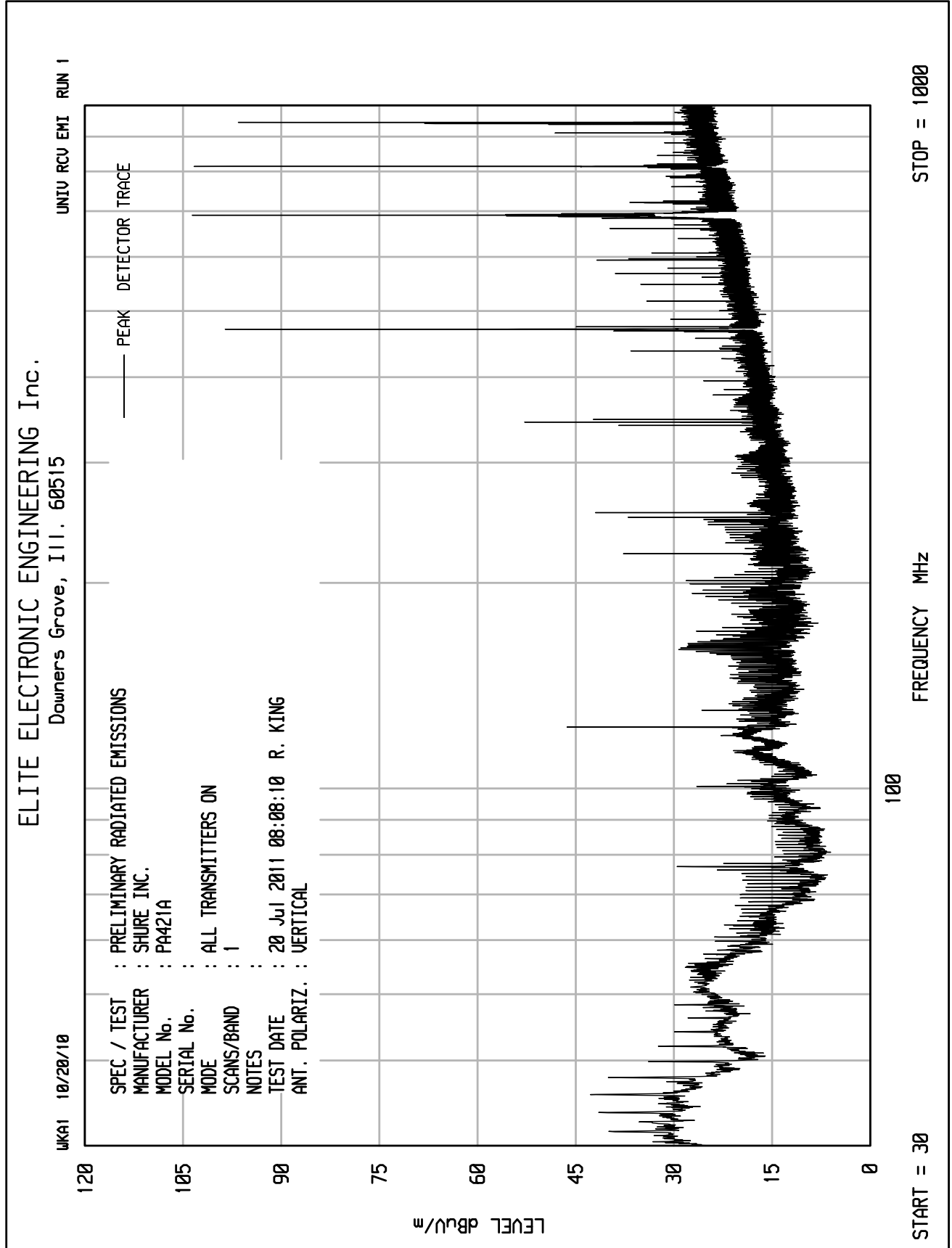


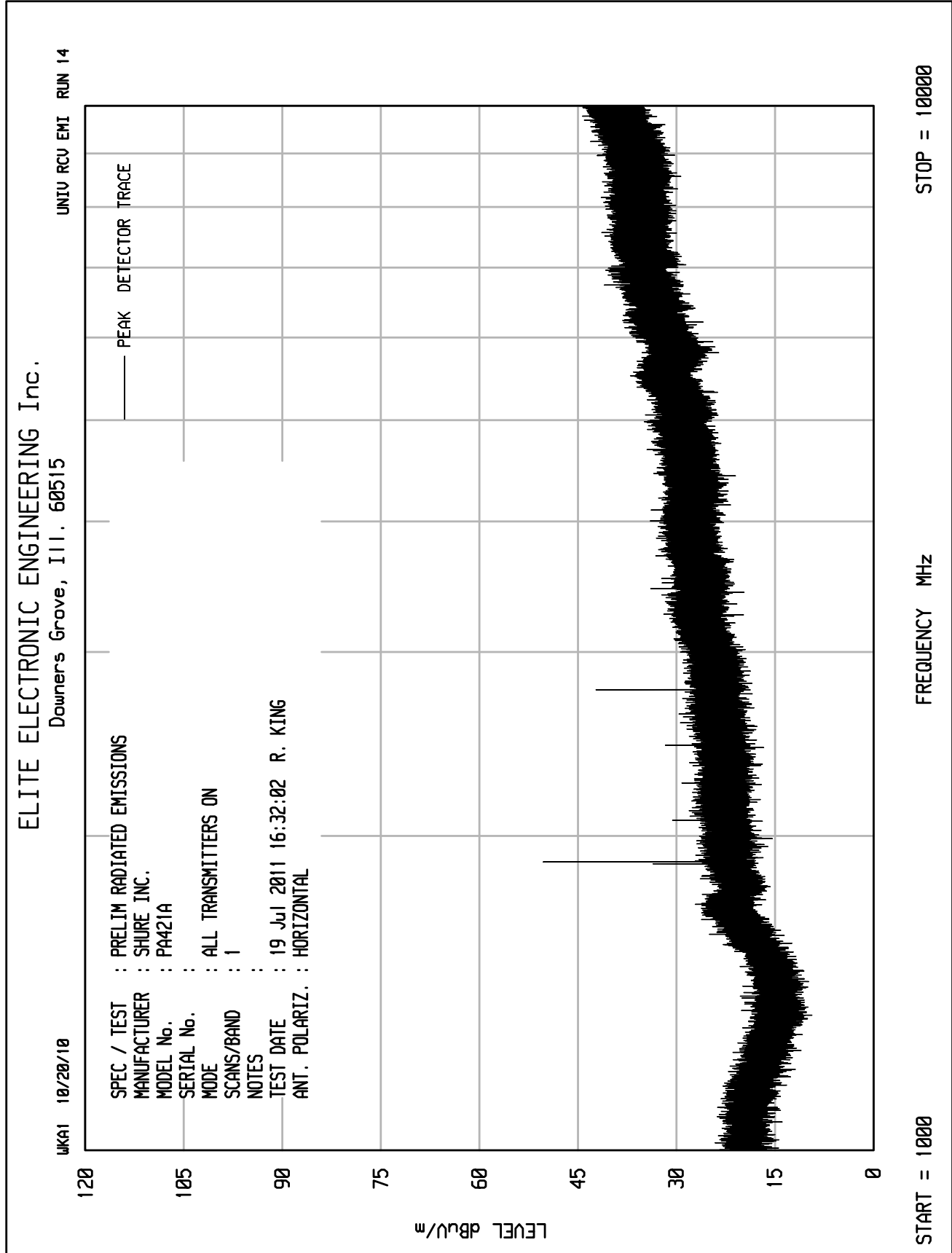


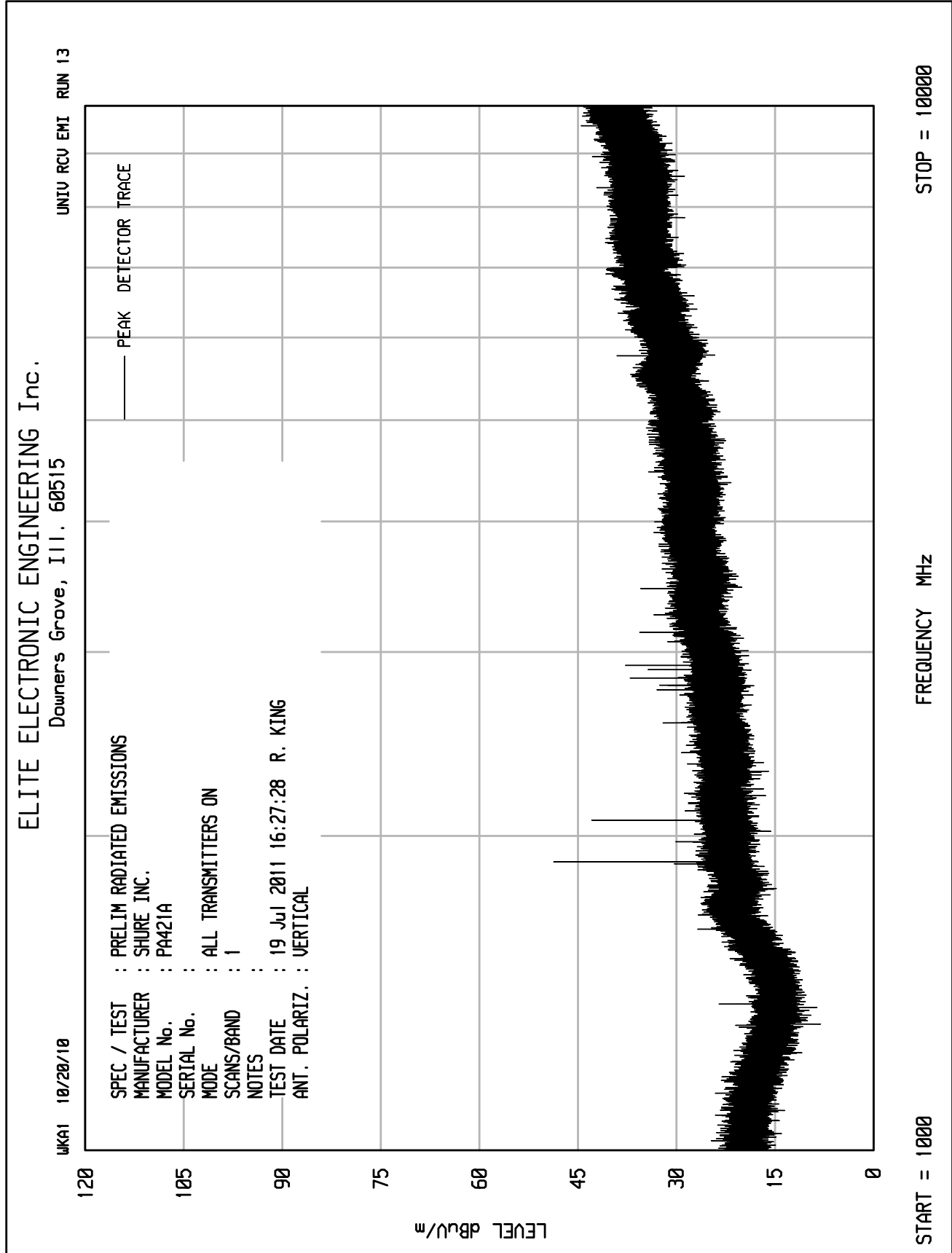












ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

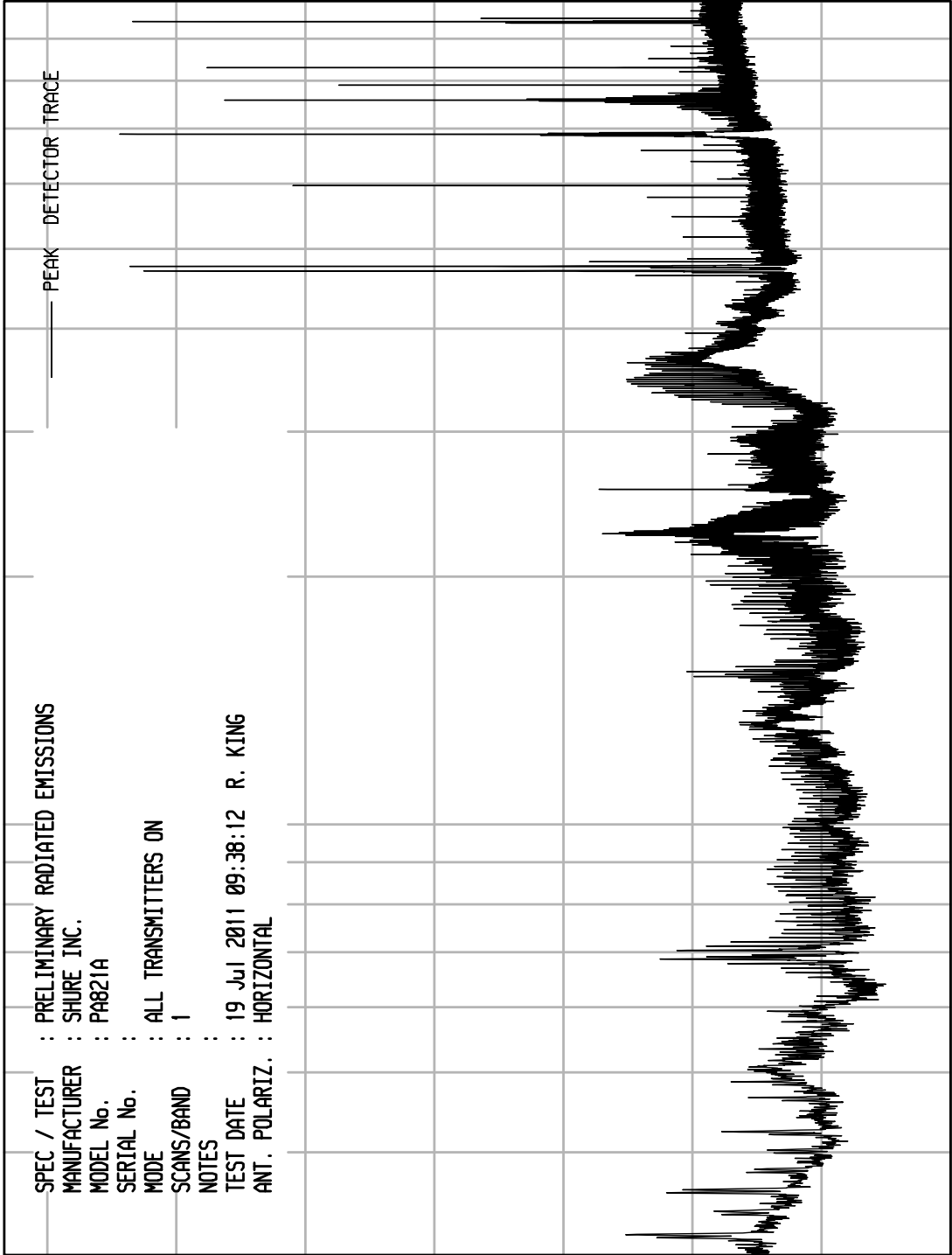
UNIV RCU EMI RUN 2

UKA1 10/20/10

105
 90
 75
 60
 45
 30
 15
 0

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : PA821A
 SERIAL No. :
 MODE : ALL TRANSMITTERS ON
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 19 Jul 2011 09:38:12 R. KING
 ANT. POLARIZ. : HORIZONTAL

— PEAK DETECTOR TRACE

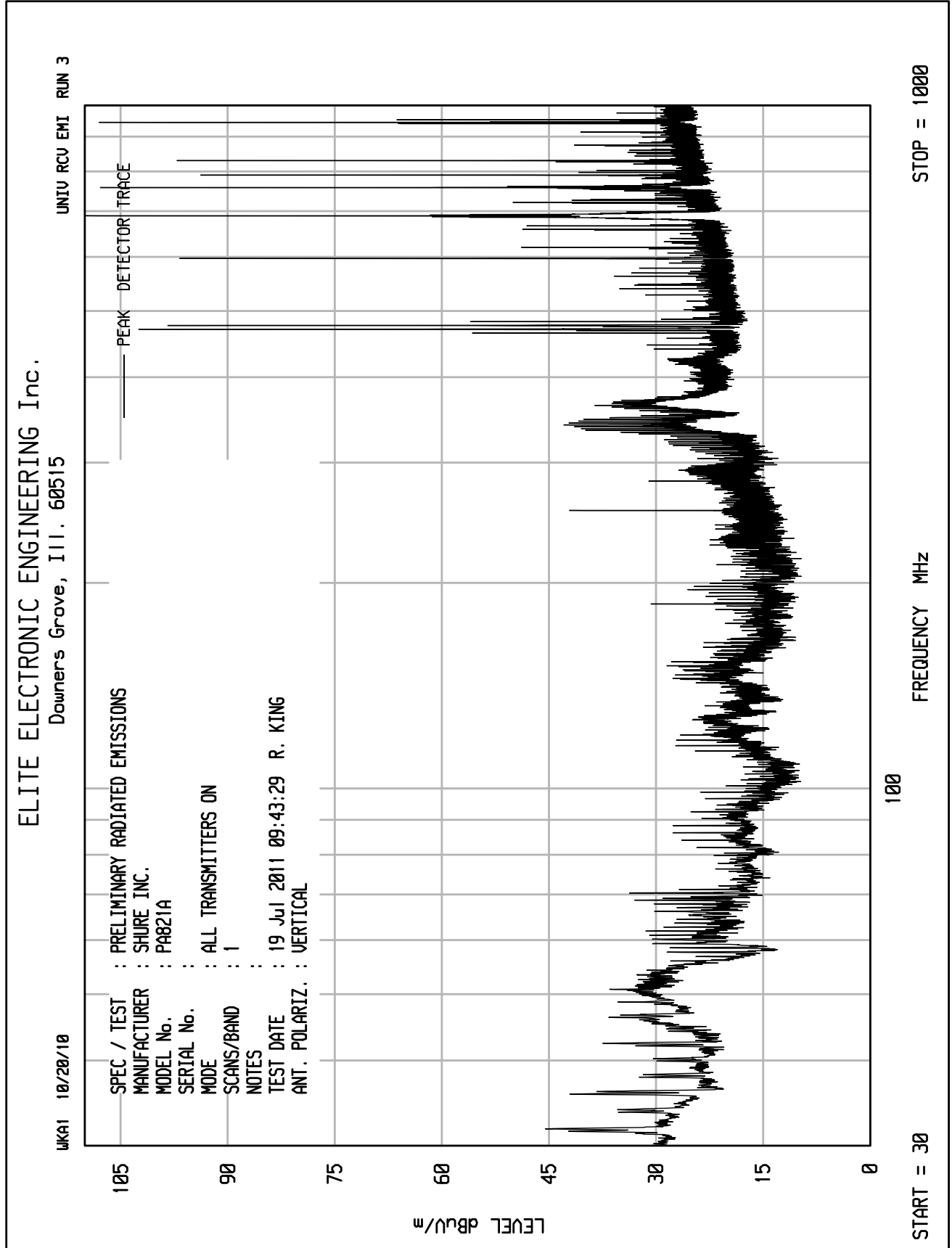


100

STOP = 1000

FREQUENCY MHz

START = 30

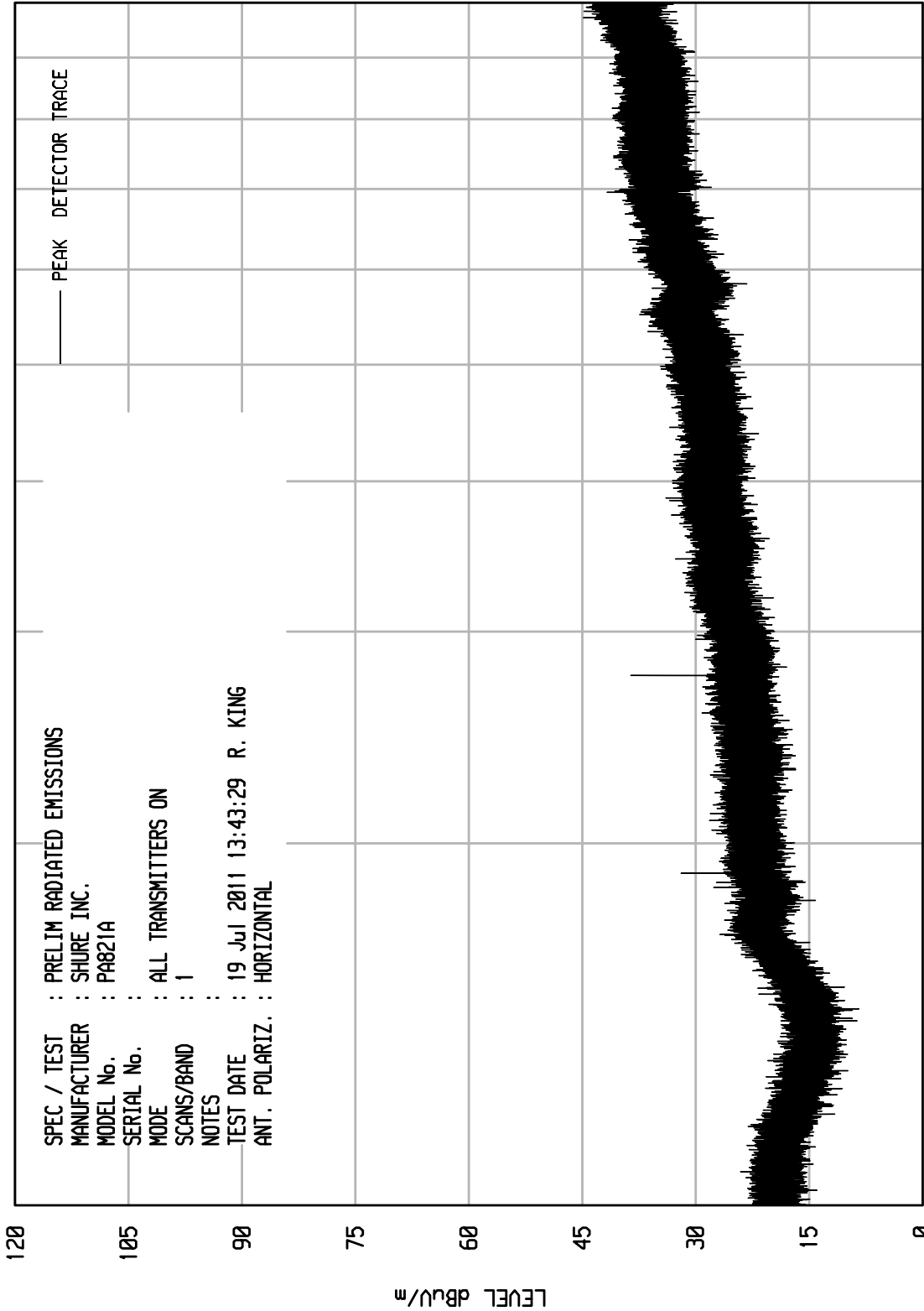




ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNITV RCU EMI RUN 11

UKA1 10/20/10



SPEC / TEST : PRELIM RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : PA821A
 SERIAL No. :
 MODE : ALL TRANSMITTERS ON
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 19 Jul 2011 13:43:29 R. KING
 ANT. POLARIZ. : HORIZONTAL

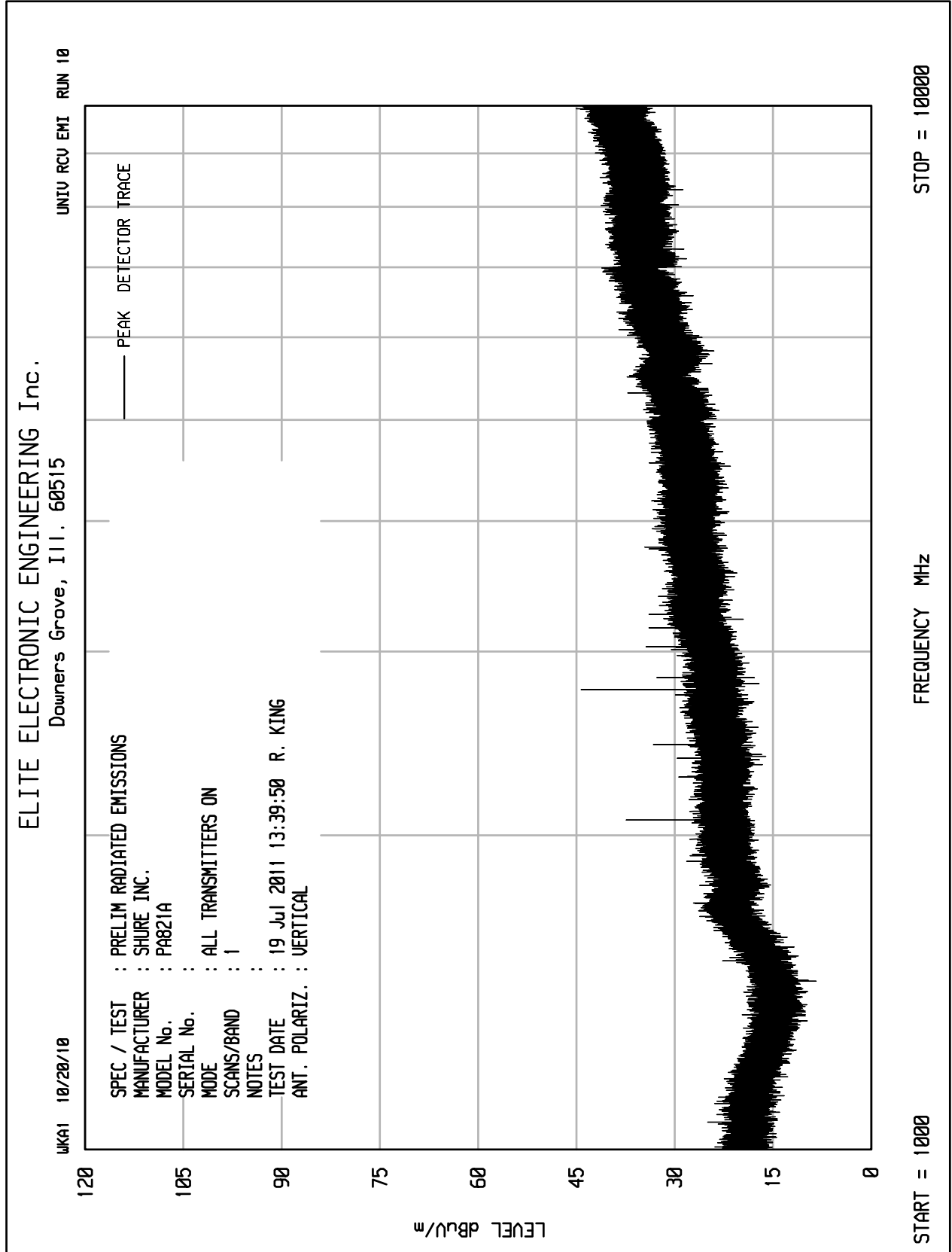
120
 105
 90
 75
 60
 45
 30
 15
 0

LEVEL dBu/m

STOP = 10000

FREQUENCY MHz

START = 1000





MANUFACTURER : Shure Inc.
 MODEL : PA421A Antenna Combiners
 SERIAL NO. : None Assigned
 SPECIFICATION : Spurious Radiated Emissions
 DATE : June 30 through September 28, 2011
 MODE : Transmit at 470.125MHz, 100mW (20dBm)

Freq. MHz	Ant Pol	Meter Reading dBuV	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB	RSS-123 Min. Attn. dB
940.25	H	29.7	-44.1	-0.8	1.9	-46.9	66.9	33	45
940.25	V	47.2	-24.5	-0.8	1.9	-27.3	47.3	33	45
1410.38	H	42.8	-73.6	4.6	2.4	-71.5	91.5	33	45
1410.38	V	43.3	-72.9	4.6	2.4	-70.8	90.8	33	45
1880.50	H	47.0	-67.1	5.2	2.8	-64.6	84.6	33	45
1880.50	V	48.2	-65.1	5.2	2.8	-62.7	82.7	33	45
2350.63	H	46.6	-65.6	5.7	3.0	-63.0	83.0	33	45
2350.63	V	46.9	-63.3	5.7	3.0	-60.7	80.7	33	45
2820.75	H	45.7	-64.4	5.8	3.2	-61.7	81.7	33	45
2820.75	V	45.9	-61.7	5.8	3.2	-59.1	79.1	33	45
3290.88	H	44.8	-63.0	6.3	3.5	-60.1	80.1	33	45
3290.88	V	43.9	-62.0	6.3	3.5	-59.2	79.2	33	45
3761.00	H	44.9	-60.1	6.8	3.9	-57.1	77.1	33	45
3761.00	V	45.2	-58.8	6.8	3.9	-55.9	75.9	33	45
4231.13	H	45.2	-57.9	7.6	4.2	-54.5	74.5	33	45
4231.13	V	45.2	-57.9	7.6	4.2	-54.5	74.5	33	45
4701.25	H	45.4	-56.1	8.1	4.5	-52.5	72.5	33	45
4701.25	V	45.7	-56.2	8.1	4.5	-52.6	72.6	33	45

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : Shure Inc.
 MODEL : PA421A Antenna Combiners
 SERIAL NO. : None Assigned
 SPECIFICATION : Spurious Radiated Emissions
 DATE : June 30 through September 28, 2011
 MODE : Transmit at 596.875MHz, 10mW (10dBm)

Freq. MHz	Ant Pol	Meter Reading dBuV	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB	RSS-123 Min. Attn. dB
1193.75	H	46.9	-69.8	3.6	2.2	-68.3	68.3	23.0	35.0
1193.75	V	47.4	-68.6	3.6	2.2	-67.2	67.2	23.0	35.0
1790.63	H	48.3	-66.1	5.2	2.7	-63.7	63.7	23.0	35.0
1790.63	V	48.3	-65.5	5.2	2.7	-63.0	63.0	23.0	35.0
2387.50	H	46.5	-65.6	5.7	3.0	-62.9	62.9	23.0	35.0
2387.50	V	45.2	-64.8	5.7	3.0	-62.1	62.1	23.0	35.0
2984.38	H	43.4	-65.8	5.8	3.2	-63.3	63.3	23.0	35.0
2984.38	V	46.0	-60.8	5.8	3.2	-58.3	58.3	23.0	35.0
3581.25	H	45.2	-61.1	6.7	3.7	-58.1	58.1	23.0	35.0
3581.25	V	44.8	-60.1	6.7	3.7	-57.1	57.1	23.0	35.0
4178.13	H	45.4	-57.8	7.5	4.2	-54.5	54.5	23.0	35.0
4178.13	V	45.4	-57.6	7.5	4.2	-54.3	54.3	23.0	35.0
4775.00	H	44.3	-56.8	8.1	4.5	-53.3	53.3	23.0	35.0
4775.00	V	45.8	-55.6	8.1	4.5	-52.1	52.1	23.0	35.0
5371.88	H	45.6	-54.3	7.2	4.9	-52.0	52.0	23.0	35.0
5371.88	V	45.1	-55.1	7.2	4.9	-52.8	52.8	23.0	35.0
5968.75	H	45.2	-53.9	7.8	5.3	-51.3	51.3	23.0	35.0
5968.75	V	44.8	-54.6	7.8	5.3	-52.0	52.0	23.0	35.0

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : Shure Inc.
 MODEL : PA421A Antenna Combiners
 SERIAL NO. : None Assigned
 SPECIFICATION : Spurious Radiated Emissions
 DATE : June 30 through September 28, 2011
 MODE : Transmit at 692MHz, 100mW (20dBm)

Freq. MHz	Ant Pol	Meter Reading dBuV	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB	RSS-123 Min. Attn. dB
1384.00	H	50.4	-66.0	4.5	2.4	-64.0	84.0	33	45
1384.00	V	60.4	-55.8	4.5	2.4	-53.8	73.8	33	45
2076.00	H	47.4	-66.0	5.4	2.9	-63.5	83.5	33	45
2076.00	V	47.1	-65.1	5.4	2.9	-62.6	82.6	33	45
2768.00	H	46.5	-63.8	5.8	3.2	-61.2	81.2	33	45
2768.00	V	47.3	-60.6	5.8	3.2	-58.0	78.0	33	45
3460.00	H	45.4	-61.6	6.6	3.6	-58.6	78.6	33	45
3460.00	V	45.9	-59.5	6.6	3.6	-56.6	76.6	33	45
4152.00	H	44.0	-59.3	7.4	4.1	-56.0	76.0	33	45
4152.00	V	44.6	-58.4	7.4	4.1	-55.2	75.2	33	45
4844.00	H	45.2	-55.5	8.0	4.6	-52.1	72.1	33	45
4844.00	V	44.8	-56.1	8.0	4.6	-52.7	72.7	33	45
5536.00	H	45.2	-54.7	7.1	5.0	-52.6	72.6	33	45
5536.00	V	43.8	-56.3	7.1	5.0	-54.2	74.2	33	45
6228.00	H	44.8	-53.8	8.3	5.5	-51.0	71.0	33	45
6228.00	V	43.0	-56.1	8.3	5.5	-53.3	73.3	33	45
6920.00	H	44.6	-53.0	8.2	6.0	-50.9	70.9	33	45
6920.00	V	44.8	-54.2	8.2	6.0	-52.0	72.0	33	45

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : Shure Inc.
 MODEL : PA421A Antenna Combiners
 SERIAL NO. : None Assigned
 SPECIFICATION : Spurious Radiated Emissions
 DATE : June 30 through September 28, 2011
 MODE : Transmit at 951.875MHz, 50mW (17dBm)

Freq. MHz	Ant Pol	Meter Reading dBuV	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1903.75	H	47.8	-66.2	5.3	2.8	-63.8	80.8	30
1903.75	V	47.5	-65.7	5.3	2.8	-63.3	80.3	30
2855.63	H	45.9	-63.9	5.8	3.2	-61.3	78.3	30
2855.63	V	45.9	-61.5	5.8	3.2	-58.9	75.9	30
3807.50	H	45.5	-59.2	6.9	3.9	-56.2	73.2	30
3807.50	V	45.9	-57.8	6.9	3.9	-54.9	71.9	30
4759.38	H	45.1	-56.1	8.1	4.5	-52.5	69.5	30
4759.38	V	45.7	-55.8	8.1	4.5	-52.3	69.3	30
5711.25	H	44.9	-54.7	7.4	5.1	-52.4	69.4	30
5711.25	V	44.7	-55.1	7.4	5.1	-52.8	69.8	30
6663.13	H	43.5	-54.4	8.5	5.8	-51.7	68.7	30
6663.13	V	44.1	-54.9	8.5	5.8	-52.2	69.2	30
7615.00	H	45.5	-50.7	7.9	6.2	-48.9	65.9	30
7615.00	V	45.7	-51.3	7.9	6.2	-49.6	66.6	30
8566.88	H	41.7	-54.4	8.8	6.7	-52.4	69.4	30
8566.88	V	46.5	-50.5	8.8	6.7	-48.5	65.4	30
9518.75	H	45.5	-48.9	9.1	6.9	-46.7	63.7	30
9518.75	V	45.9	-49.4	9.1	6.9	-47.1	64.1	30

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : Shure Inc.
 MODEL : PA821A Antenna Combiners
 SERIAL NO. : None Assigned
 SPECIFICATION : Spurious Radiated Emissions
 DATE : June 30 through September 28, 2011
 MODE : Transmit at 470.125MHz, 100mW (20dBm)

Freq. MHz	Ant Pol	Meter Reading dBuV	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB	RSS-123 Min. Attn. dB
940.25	H	29.7	-44.1	0.0	1.9	-46.0	66.0	33	45
940.25	V	47.2	-24.5	0.0	1.9	-26.4	46.4	33	45
1410.38	H	50.8	-65.6	4.6	2.4	-63.5	83.5	33	45
1410.38	V	56.9	-59.3	4.6	2.4	-57.2	77.2	33	45
1880.50	H	47.7	-66.4	5.2	2.8	-64.0	84.0	33	45
1880.50	V	52.0	-61.3	5.2	2.8	-58.9	78.9	33	45
2350.63	H	47.5	-64.7	5.7	3.0	-62.0	82.0	33	45
2350.63	V	47.9	-62.3	5.7	3.0	-59.7	79.7	33	45
2820.75	H	44.6	-65.4	5.8	3.2	-62.8	82.8	33	45
2820.75	V	46.2	-61.4	5.8	3.2	-58.8	78.8	33	45
3290.88	H	43.3	-64.5	6.3	3.5	-61.6	81.6	33	45
3290.88	V	46.6	-59.3	6.3	3.5	-56.5	76.5	33	45
3761.00	H	44.9	-60.1	6.8	3.9	-57.1	77.1	33	45
3761.00	V	45.4	-58.6	6.8	3.9	-55.6	75.6	33	45
4231.13	H	46.4	-56.8	7.6	4.2	-53.4	73.4	33	45
4231.13	V	46.2	-56.9	7.6	4.2	-53.5	73.5	33	45
4701.25	H	44.6	-56.9	8.1	4.5	-53.3	73.3	33	45
4701.25	V	44.8	-57.1	8.1	4.5	-53.5	73.5	33	45

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Factor (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : Shure Inc.
 MODEL : PA821A Antenna Combiners
 SERIAL NO. : None Assigned
 SPECIFICATION : Spurious Radiated Emissions
 DATE : June 30 through September 28, 2011
 MODE : Transmit at 596.875MHz, 10mW (10dBm)

Freq. MHz	Ant Pol	Meter Reading dBuV	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB	RSS-123 Min. Attn. dB
1193.75	H	46.9	-69.8	3.6	2.2	-68.3	68.3	23.0	35.0
1193.75	V	56.1	-59.9	3.6	2.2	-58.4	58.4	23.0	35.0
1790.63	H	48.0	-66.4	5.2	2.7	-64.0	64.0	23.0	35.0
1790.63	V	48.5	-65.3	5.2	2.7	-62.8	62.8	23.0	35.0
2387.50	H	48.2	-63.9	5.7	3.0	-61.2	61.2	23.0	35.0
2387.50	V	47.2	-62.8	5.7	3.0	-60.1	60.1	23.0	35.0
2984.38	H	46.5	-62.8	5.8	3.2	-60.2	60.2	23.0	35.0
2984.38	V	46.2	-60.7	5.8	3.2	-58.1	58.1	23.0	35.0
3581.25	H	46.0	-60.3	6.7	3.7	-57.3	57.3	23.0	35.0
3581.25	V	45.5	-59.4	6.7	3.7	-56.4	56.4	23.0	35.0
4178.13	H	46.5	-56.7	7.5	4.2	-53.4	53.4	23.0	35.0
4178.13	V	46.4	-56.6	7.5	4.2	-53.3	53.3	23.0	35.0
4775.00	H	45.5	-55.6	8.1	4.5	-52.1	52.1	23.0	35.0
4775.00	V	45.5	-55.9	8.1	4.5	-52.4	52.4	23.0	35.0
5371.88	H	45.5	-54.4	7.2	4.9	-52.1	52.1	23.0	35.0
5371.88	V	45.1	-55.1	7.2	4.9	-52.8	52.8	23.0	35.0
5968.75	H	44.2	-54.9	7.8	5.3	-52.3	52.3	23.0	35.0
5968.75	V	44.1	-55.3	7.8	5.3	-52.7	52.7	23.0	35.0

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : Shure Inc.
 MODEL : PA821A Antenna Combiners
 SERIAL NO. : None Assigned
 SPECIFICATION : Spurious Radiated Emissions
 DATE : June 30 through September 28, 2011
 MODE : Transmit at 692MHz, 100mW (20dBm)

Freq. MHz	Ant Pol	Meter Reading dBuV	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB	RSS-123 Min. Attn. dB
1384.00	H	44.1	-72.3	4.5	2.4	-70.3	90.3	33	45
1384.00	V	60.0	-56.2	4.5	2.4	-54.1	74.1	33	45
2076.00	H	48.8	-64.5	5.4	2.9	-62.0	82.0	33	45
2076.00	V	49.1	-63.1	5.4	2.9	-60.6	80.6	33	45
2768.00	H	46.8	-63.5	5.8	3.2	-60.9	80.9	33	45
2768.00	V	46.8	-61.1	5.8	3.2	-58.5	78.5	33	45
3460.00	H	45.5	-61.5	6.6	3.6	-58.5	78.5	33	45
3460.00	V	46.2	-59.3	6.6	3.6	-56.3	76.3	33	45
4152.00	H	46.7	-56.6	7.4	4.1	-53.3	73.3	33	45
4152.00	V	46.2	-56.8	7.4	4.1	-53.6	73.6	33	45
4844.00	H	45.3	-55.4	8.0	4.6	-52.0	72.0	33	45
4844.00	V	44.9	-56.0	8.0	4.6	-52.6	72.6	33	45
5536.00	H	46.2	-53.7	7.1	5.0	-51.6	71.6	33	45
5536.00	V	45.9	-54.2	7.1	5.0	-52.2	72.2	33	45
6228.00	H	45.0	-53.5	8.3	5.5	-50.7	70.7	33	45
6228.00	V	44.8	-54.4	8.3	5.5	-51.6	71.6	33	45
6920.00	H	45.4	-52.2	8.2	6.0	-50.0	70.0	33	45
6920.00	V	45.4	-53.6	8.2	6.0	-51.4	71.4	33	45

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : Shure Inc.
 MODEL : PA821A Antenna Combiners
 SERIAL NO. : None Assigned
 SPECIFICATION : Spurious Radiated Emissions
 DATE : June 30 through September 28, 2011
 MODE : Transmit at 951.875MHz, 50mW (17dBm)

Freq. MHz	Ant Pol	Meter Reading dBuV	Matched Sig Gen dBm	Antenna Gain dB	Cable Factor dB	ERP Total dBm	Atten. dB	Part 74 Min. Attn. dB
1903.75	H	53.1	-60.9	5.3	2.8	-58.4	75.4	30
1903.75	V	47.5	-65.7	5.3	2.8	-63.3	80.3	30
2855.63	H	45.9	-63.9	5.8	3.2	-61.3	78.3	30
2855.63	V	60.6	-46.9	5.8	3.2	-44.3	61.2	30
3807.50	H	45.5	-59.2	6.9	3.9	-56.2	73.2	30
3807.50	V	45.9	-57.8	6.9	3.9	-54.9	71.9	30
4759.38	H	45.1	-56.1	8.1	4.5	-52.5	69.5	30
4759.38	V	45.7	-55.8	8.1	4.5	-52.3	69.3	30
5711.25	H	44.9	-54.7	7.4	5.1	-52.4	69.4	30
5711.25	V	44.7	-55.1	7.4	5.1	-52.8	69.8	30
6663.13	H	43.5	-54.4	8.5	5.8	-51.7	68.7	30
6663.13	V	44.1	-54.9	8.5	5.8	-52.2	69.2	30
7615.00	H	45.5	-50.7	7.9	6.2	-48.9	65.9	30
7615.00	V	45.7	-51.3	7.9	6.2	-49.6	66.6	30
8566.88	H	41.7	-54.4	8.8	6.7	-52.4	69.4	30
8566.88	V	46.5	-50.5	8.8	6.7	-48.5	65.4	30
9518.75	H	45.5	-48.9	9.1	6.9	-46.7	63.7	30
9518.75	V	45.9	-49.4	9.1	6.9	-47.1	64.1	30

ERP Total (dBm) = Matched Sig Gen (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Atten. (dB) = Output Power (dBm) – ERP (dBm)

Checked BY RICHARD E. KING :

Richard E. King