



Transmitter Tests  
For a  
UR1A Wireless Microphone

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For : Shure Inc.  
Niles, IL

P.O. No. : 4500118433

Date Received : April 4, 2007

Dates Tested : April 4 through 25, 2007

Test Personnel : Richard E. King, EMC Engineer

Specification : FCC "Code of Federal Regulations" Title 47  
Part 74 and Industry Canada RSS-123

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THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE  
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**REPORT REVISION HISTORY**

Revision	Date	Description
--	05/25/2007	Initial release



## Transmitter Tests for a Wireless Microphone

### **1.0 INTRODUCTION:**

**1.1 DESCRIPTION OF TEST ITEM:** This report presents the results of a series of transmitter tests were performed on a Shure Inc. Wireless Microphone, (hereinafter referred to as the test item). Serial number 6 was assigned to the test item. The tests were performed for Shure Inc. of Niles, IL.

The test item is a Wireless Microphone that operates in low power auxiliary station bands, 470 to 530MHz.

One transmitter with two power settings was submitted for testing.

Model No.	Serial Nos.	Rated Power (Watts)	Frequency (MHz)
UR1A	6	.010	500 MHz
UR1A	6	.100	500 MHz

**1.2 PURPOSE:** The test series was performed to determine if the test item meets the technical requirements of FCC Part 74 for low power auxiliary station bands 470MHz to 530MHz and Industry Canada RSS-123 Low Power Licensed Radiocommunication 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 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 2006
- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 2, dated 1 October 2006
- RSS-123, "Radio Standards Specification Low Power Licensed Radiocommunication Devices" Issue 1, Rev. 2 November 6, 1999
- ANSI C63.4-2003, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"

**1.5 SUBCONTRACTOR IDENTIFICATION:** This series of tests was performed

by Elite Electronic Engineering Incorporated, of Downers Grove, Illinois. The laboratory is accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP Lab Code: 100278-0.

**1.6 LABORATORY CONDITIONS:** The temperature at the time of the test was 21.2°C and the relative humidity was 32%.

**2.0 TEST ITEM SETUP AND OPERATION:**

**2.1 POWER INPUT:** The test item obtained 3.0 VDC from two 1.5VDC batteries.

**2.2 GROUNDING:** The test item was ungrounded during the tests.

**2.3 PERIPHERAL EQUIPMENT:** No peripheral equipment was submitted with the test item.

**3.0 TEST EQUIPMENT:**

**3.1 TEST EQUIPMENT LIST:** A list of the test equipment used can be found on Table I. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

**3.2 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).

**4.0 REQUIREMENTS, PROCEDURES AND RESULTS:**

**4.1 RF POWER OUTPUT MEASUREMENTS:**

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

**4.1.2 PROCEDURES:** The output from the antenna port of the test item was connected to spectrum analyzer through 40 dB of attenuation. The output of the each test item was then measured.

**4.1.3 RESULTS:** The output power measurements are presented on page

18. As can be seen from the data, the power output of each transmitter is within the 1 watt requirement of Part 74.861(e)(1)(ii) and RSS-123.

#### **4.2 MODULATION CHARACTERISTICS:**

**4.2.1 REQUIREMENTS:** In accordance with paragraph 74.861(e)(3) and paragraph 5.5 of RSS-123, for low power auxiliary stations operating in the bands allocated for TV broadcasting, any form of modulation may be used. A maximum deviation of  $\pm 75\text{kHz}$  is permitted when frequency modulation is employed.

**4.2.2 PROCEDURES:** The output of the antenna port of the test item was connected to modulation analyzer. An audio generator was connected to an audio input of the test item.

- (a) The test item was modulated with a 1000 Hz modulating signal at 60% of the test items rated frequency deviation.
- (b) The level of the audio generator was increased by 20 dB in one step.
- (c) The instantaneous and steady state positive peak deviations were recorded.
- (d) Using the audio generator level obtained in step (b) the frequency range from 20Hz to 20000 Hz was slowly swept and the maximum frequency deviation recorded at several frequencies.
- (e) Steps (a) through (d) were repeated for the negative peak deviations.

**4.2.3 RESULTS:** The plots of the modulation characteristics are presented on page 19 and 20.

#### **4.3 FREQUENCY STABILITY:**

**4.3.1 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.

**4.3.2 PROCEDURES:** The test item was connected to a frequency counter through the antenna output of each transmitter. The test item was then placed in a humidity temperature chamber.

- (a) The nominal frequency of each transmitter was measured and recorded.
- (b) The temperature chamber was then set to  $-30^\circ\text{C}$ .
- (c) Once the temperature had reached  $-30^\circ\text{C}$  the test item was allowed to soak for 30 minutes.
- (d) After soaking at  $-30^\circ\text{C}$  for thirty minutes the test item 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) Steps (b) and (e) were repeated for each transmitter.
- (g) The test item was then removed from the temperature chamber and allowed to adjust to nominal room temperature (20°C).
- (h) The battery voltage was checked and adjusted to the nominal level. The frequency was measured and recorded.
- (i) The battery voltage was then varied to 85% of its nominal level. The frequency was measured and recorded.
- (j) The battery voltage was then varied to 115% of its nominal level. The frequency was measured and recorded.
- (k) Steps (h) through (j) were repeated for each transmitter.

**4.3.3 RESULTS:** The frequency stability measurements are presented on pages 21 and 22. As can be seen from the data the test frequency deviation was within the 0.005 percent limit.

#### **4.4 OCCUPIED BANDWIDTH MEASUREMENTS:**

**4.4.1 REQUIREMENTS:** In accordance with paragraph 74.861(d)(3), for low power auxiliary stations operating in the bands allocated for TV broadcasting, the occupied bandwidth shall not be greater than that necessary for satisfactory transmission and, in any event, an emissions appearing on any discrete frequency outside the authorized band shall be attenuated, at least,  $43 + 10 \log(P)$  dB below the mean output power of the transmitting unit. In addition to paragraph 74.861(d)(3) the test item must also meet the requirements of paragraph 74.861(e)(5), the operating bandwidth shall not exceed 200kHz.

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:

- (1) 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.
- (2) 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.
- (3) On any frequency removed from the carrier frequency by more than 250% of the authorized bandwidth: at least  $55 + 10 \log(P)$  dB.

#### **4.4.2 PROCEDURES:**

- (a) The test item was connected to a spectrum analyzer through 40 dB of attenuation. The unmodulated carrier signal level was measured and recorded.
- (b) The test item was modulated with a 15 kHz sine wave at an input level necessary to produce 85% of the rated system deviation.
- (c) The test item was 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.
- (d) Steps (a) through (c) were repeated separately for each of the remaining 11 transmitters. The bandwidth of the spectrum analyzer was set to 2kHz (1% of Authorized BW).

**4.4.3 RESULTS:** The plots of the occupied bandwidth measured are presented on pages 23 through 28. The limits, shown on the plots, are referenced to the power measured from the unmodulated carrier, the power when modulated with the 15 kHz sine wave at 85% of the maximum deviation and when modulated with a 2500 Hz sine wave at an input 16dB greater than that necessary to produce 50% of the rated deviation.

The operating bandwidth was determined using Carson's rule:

$B_n = 2M + 2DK$  where  $B_n$  = bandwidth,  $M$  = Maximum modulating frequency and  $D$  = Peak Deviation. With  $K = 1$ ,  $M = 10\text{kHz}$  and  $D = 55\text{kHz}$  resulting in an operating bandwidth of  $130\text{kHz}$ .

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

#### **4.5 SPURIOUS EMISSIONS AT ANTENNA TERMINAL:**

**4.5.1 REQUIREMENTS:** This test determines whether the test item produces 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.

**4.5.2 PROCEDURES:** In general, this test will measure spurious emissions at the antenna terminals.

- (a) A spectrum analyzer was connected to the output of the test item. The out of band emissions were measured.
- (b) The spectrum analyzer was adjusted accordingly.
  - (1) For the FCC measurements, the resolution bandwidth was set to 100kHz for spurious emissions below 1GHz and 1MHz for spurious emissions above 1GHz.
  - (2) For the RSS-123 measurements, the resolution bandwidth was set to 30 kHz.
- (c) The plots of the spectrum analyzer screens were recorded.

**4.5.3 RESULTS:** The plots of the antenna conducted output measurements are presented on pages 29 through 36. As can be seen from the data, the test item did not produce spurious emissions in excess of the limit.

## 4.6 FIELD STRENGTH OF SPURIOUS EMISSIONS:

### 4.6.1 PRELIMINARY RADIATED MEASUREMENTS:

**4.6.1.1 REQUIREMENTS:** Because emission levels in the open field may be masked by interference from sources other than the test item, preliminary radiated measurements are first performed in the low ambient environment of a shielded enclosure. The radiated emissions from the test item were first measured using peak detection. This data was then automatically plotted

**4.6.1.2 PROCEDURES:** All preliminary 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 2003 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All power lines and signal lines entering the enclosure pass through filters on the enclosure wall. The power line filters prevent

extraneous signals from entering the enclosure on these leads.

The test was performed on each transmitter separately.

The preliminary measurements were performed with each test item operating with the input signal unmodulated. The broadband measuring antennas were positioned at a 3 meter distance from the test item. The frequency range from 30MHz to 10<sup>th</sup> harmonic was investigated. The readings were taken with a peak detector function and recorded.

**4.6.1.3 RESULTS:** The preliminary plots are presented on pages 37 through 44. 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 at an open field test site.

#### **4.6.2 FINAL RADIATED EMISSIONS:**

**4.6.2.1 REQUIREMENTS:** The field strength of any emission on any frequency remove from the operating frequency by more than 250 percent of the authorized bandwidth: shall be attenuated by at least  $43 + 10 \log (P)$  dB for the FCC and at least  $55 + 10 \log (P)$  dB for RS-123.

**4.6.2.2 PROCEDURES:** Final open field measurements 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 2003 for site attenuation.

The final open field emission test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output of the test item was terminated in 50 ohms for the tests.
- c) A double ridged waveguide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization.
- e) The maximum meter reading was recorded.
- f) Measurements were performed with the input signal unmodulated.
- g) Measurements were performed separately at each frequency used during the preliminary measurements.

The equivalent power into a dipole antenna was determined from the field intensity levels

measured at 3 meters using the substitution method. To determine the emission power another tuned dipole antenna or double ridged waveguide antenna was set in place of the test item and connected to a calibrated signal generator. 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 when the ridged waveguide antenna was used increased by the difference in gain between the dipole and the waveguide antenna.

**4.6.2.3 RESULTS OF OPEN FIELD RADIATED TEST:** The final open field radiated levels are presented on pages 45 through 50. The radiated emissions were measured through the 10th harmonic. All emissions measured from the test item were within the specification limits.

## **5.0 CONCLUSION:**

It was found that the Shure Inc., model UR1A Wireless Microphone, 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 470MHz to 530MHz and Industry Canada RSS-123 Low Power Licensed Radiocommunication Devices.

## **6.0 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 test item at the test date as operated by Shure Incorporated personnel. Any electrical or mechanical modification made to the test item subsequent to the specified test date will serve to invalidate the data and void this certification.

## **7.0 ENDORSEMENT DISCLAIMER:**

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



TABLE I: TEST EQUIPMENT LIST

ELITE ELECTRONIC ENG. INC.							Page:		
1	Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Cal Inv	Due
<hr/>									
==									
XLJ5	5W, 50 OHM TERMINATION 05/12/07	JFW INDUSTRIES	50T-052	6	DC-2GHZ	05/12/06	12		
XZG3	ATTENUATOR/SWITCH DRIVER 06/12/07	HEWLETT PACKARD	11713A	2421A03059	---			N/A	
Equipment Type: AMPLIFIERS									
APK3	PREAMPLIFIER 06/12/07	AGILENT TECHNOL	8449B	3008A01593	1-26.5GHZ	06/12/06	12		
Equipment Type: ANTENNAS									
NTAO	BILOG ANTENNA 08/21/07	CHASE EMC LTD.	BILOG CBL611	2057	0.03-2GHZ	08/21/06	12		
NWHO	RIDGED WAVE GUIDE 10/09/07	TENSOR	4105	2081	1-12.4GHZ	10/09/06	12		
NWPO	DOUBLE RIDGED WAVEGUIDE AN EATON 10/09/07		3115	2099	1GHZ-18GHZ	10/09/06	12		
Equipment Type: ATTENUATORS									
T1EA	10DB, 25W ATTENUATOR 03/22/08	WEINSCHEL	46-10-34	BN2316	DC-18GHZ	03/22/07	12		
T2D5	20DB, 25W ATTENUATOR 02/22/08	WEINSCHEL	46-20-43	AY9244	DC-18GHZ	02/22/07	12		
T2D7	20DB, 25W ATTENUATOR 10/04/07	WEINSCHEL	46-20-43	AY9246	DC-18GHZ	10/04/06	12		
Equipment Type: CONTROLLERS									
CDS2	COMPUTER	GATEWAY	MFATXPNT NMZ	0028483108	1.8GHZ			N/A	
CMA0	MULTI-DEVICE CONTROLLER	EMCO	2090	9701-1213	---			N/A	
Equipment Type: METERS									
MFC0	MICROWAVE FREQ. COUNTER 05/17/07	HEWLETT PACKARD	5343A	2133A00591	10HZ-26GHZ	05/17/06	12		
Equipment Type: PROBES; CLAMP-ON & LISNS									
PLL2	50UH LISN 462D 02/12/08	ELITE	462D/70A	003	0.01-400MHZ	02/12/07	12		
PLLA	50UH LISN 462D 03/08/08	ELITE	462D/70A	011	0.01-400MHZ	03/08/07	12		
Equipment Type: POWER SUPPLIES									
SBA4	DC POWER SUPPLY	APLAB	ZS3205	99071028	0-32V;0-5A			NOTE 1	
Equipment Type: PRINTERS AND PLOTTERS									
HRE1	LASER JET 5P	HEWLETT PACKARD	C3150A	USHB061052	---			N/A	
Equipment Type: RECEIVERS									
RAC2	SPECTRUM ANALYZER 08/24/07	HEWLETT PACKARD	85660B	2504A01234	100HZ-22GHZ	08/24/06	12		
RACD	RF PRESELECTOR 02/16/08	HEWLETT PACKARD	85685A	3010A01205	20HZ-2GHZ	02/16/07	12		
RAFO	QUASIEPEAK ADAPTER W/ RECI	HEWLETT PACKARD	85650A	2043A00115	0.01-1000MHZ	02/01/05	12		
RAKG	RF SECTION 11/27/07	HEWLETT PACKARD	85462A	3549A00284	0.009-6500MHZ	11/27/06	12		
RAKH	RF FILTER SECTION 11/27/07	HEWLETT PACKARD	85460A	3448A00324	---	11/27/06	12		
RBB0	EMI TEST RECEIVER 20HZ TO	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	09/29/06	12		
RYEO	MODULATION ANALYZER 05/04/08	HEWLETT PACKARD	8901B	3104A03410	0.15-1300MHZ	05/04/07	12		
Equipment Type: SIGNAL GENERATORS									
GRD0	SIGNAL GENERATOR 08/28/07	HEWLETT PACKARD	E4432B	US38080222	250KHZ-3.0GHZ	08/28/06	12		
GWHL	DDS FUNCTION GENERATOR 04/15/08	WAVETEK	29	071747	0.0001HZ-10MHZ	03/15/07	13		



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Cal. Interval: Listed in Months 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.



Output Power Test Setup



Frequency Stability vs. Temperature



Modulation Characteristics Test Setup



Occupied Bandwidth Test Setup



Antenna Conducted Emissions Test Setup



## Data Page

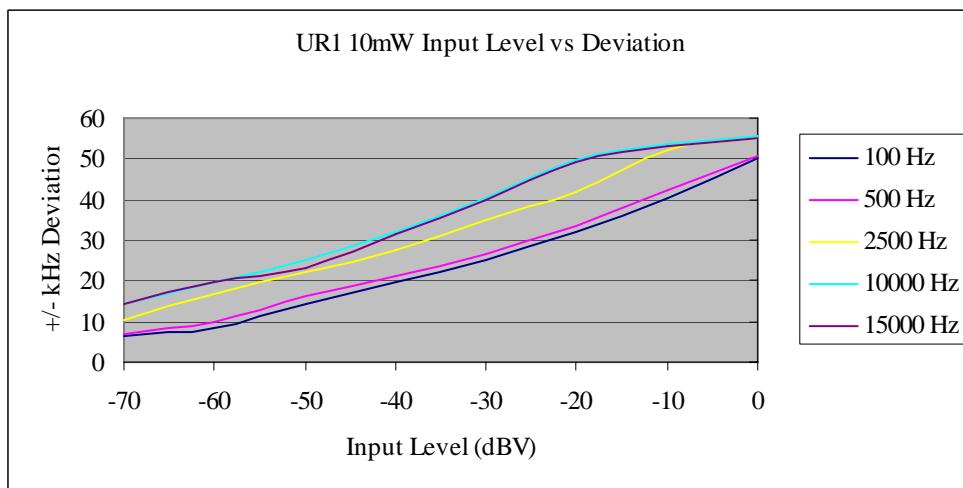
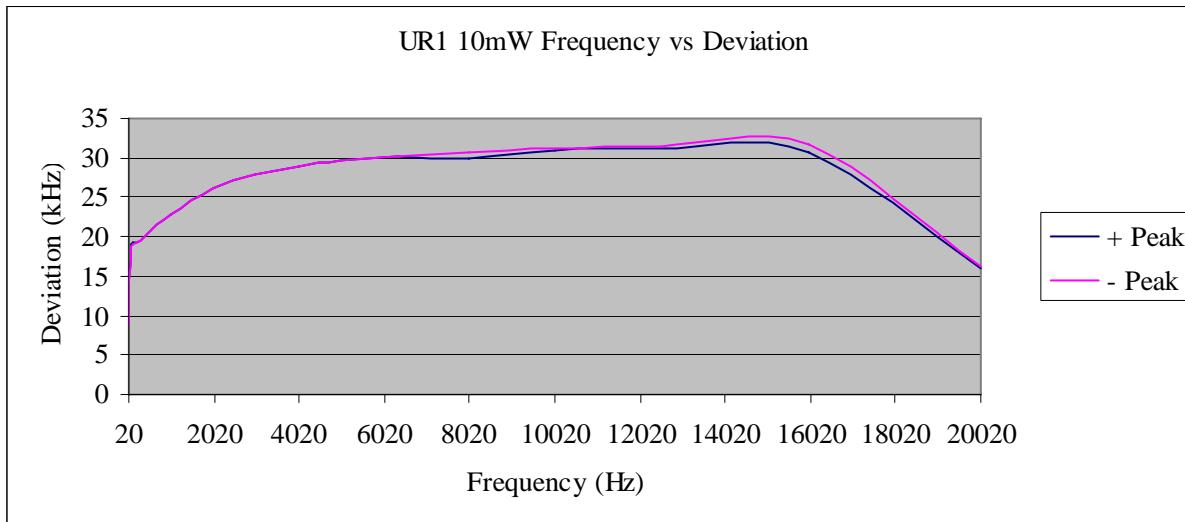
**MANUFACTURER** : Shure Inc.  
**MODEL NO.** : All Transmitters  
**SERIAL NO.** : None assigned  
**SPECIFICATION** : FCC-74 and RSS-123  
**TEST PERFORMED** : RF Output Power  
**DATE** : April 5, 2007  
**NOTES** :

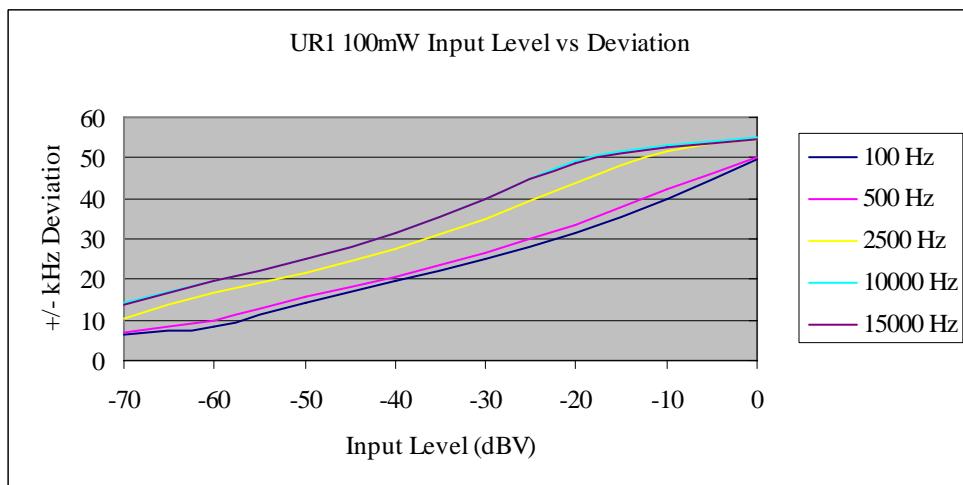
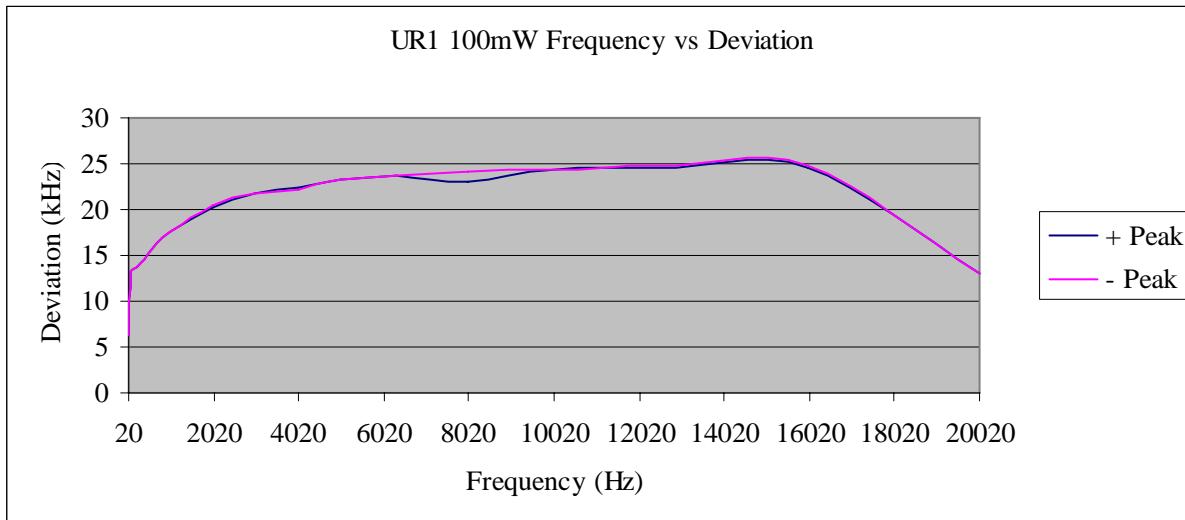
UNIT	Rated Power (Watts)	Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Total (dBm)	Limit (dBm)	Total (Watts)	Limit (Watts)
UR1	.010	500.0	-29.52	40.0	10.48	30.0	0.011	1.000
UR1	.100	500.0	-18.81	40.0	21.19	30.0	0.132	1.000

Checked BY : *Richard E. King*

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Richard E. King







## Data Page

**MANUFACTURER** : Shure Inc.  
**MODEL NO.** : UR1  
**TEST ITEM POWER** : 10mW  
**TEST ITEM FREQUENCY** : 500MHz  
**SERIAL NO.** : None assigned  
**SPECIFICATION** : FCC-74 and RSS-123  
**TEST PERFORMED** : Frequency Stability vs. Temperature  
**DATE** : April 2, 2007  
**NOTES** : @ -30°C the test item did not work

**UR1 10mW 500MHz**

Temperature	Measured Frequency (MHz)	Nominal Frequency (MHz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
+50°C	500000293	500000315	0.0000044	0.005	22	25000
+40°C	500000007	500000315	0.0000616	0.005	308	25000
+30°C	500000202	500000315	0.0000226	0.005	113	25000
+20°C	500000412	500000315	0.0000194	0.005	-97	25000
+10°C	499999918	500000315	0.0000794	0.005	397	25000
+0°C	499999859	500000315	0.0000912	0.005	456	25000
-10°C	499998847	500000315	0.0002936	0.005	1468	25000
-20°C	499998825	500000315	0.0002980	0.005	1490	25000
-30°C	N/A	N/A	N/A	N/A	N/A	N/A

Checked BY : *Richard E. King*

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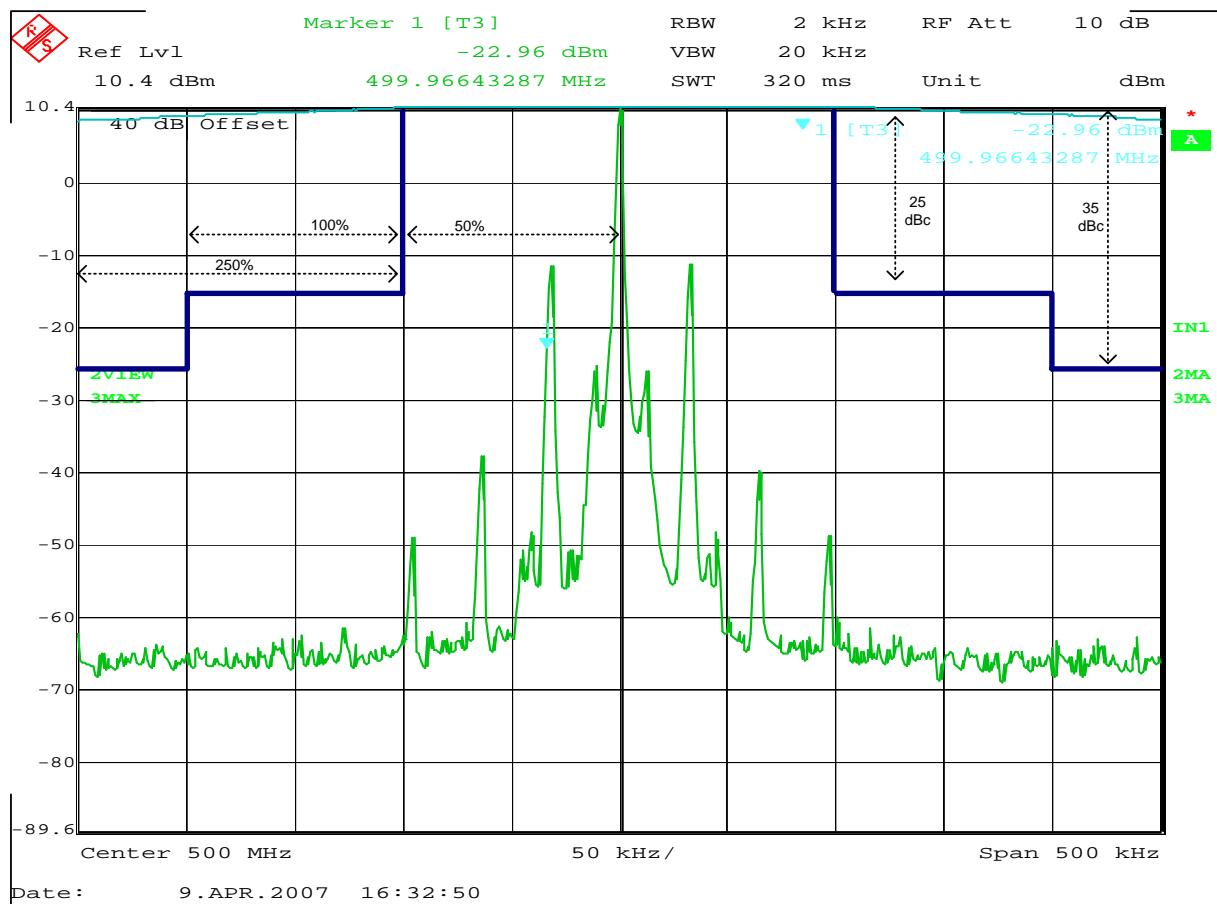
## Data Page

**MANUFACTURER** : Shure Inc.  
**MODEL NO.** : UR1  
**TEST ITEM POWER** : 10mW  
**TEST ITEM FREQUENCY** : 500MHz  
**SERIAL NO.** : None assigned  
**SPECIFICATION** : FCC-74 and RSS-123  
**TEST PERFORMED** : Frequency Stability vs. Voltage  
**DATE** : April 11, 2007  
**NOTES** : N/A Indicates test item did not operate

Test Item	Nominal Frequency (Hz)	3.4VDC Measured Frequency (Hz)	2.55VDC Measured Frequency (Hz)	3.4VDC Deviation (%)	2.55VDC Deviation (%)	Limit (%)
UR1	500.000315	500.000050	500.000086	0.0000530	0.0000458	0.005

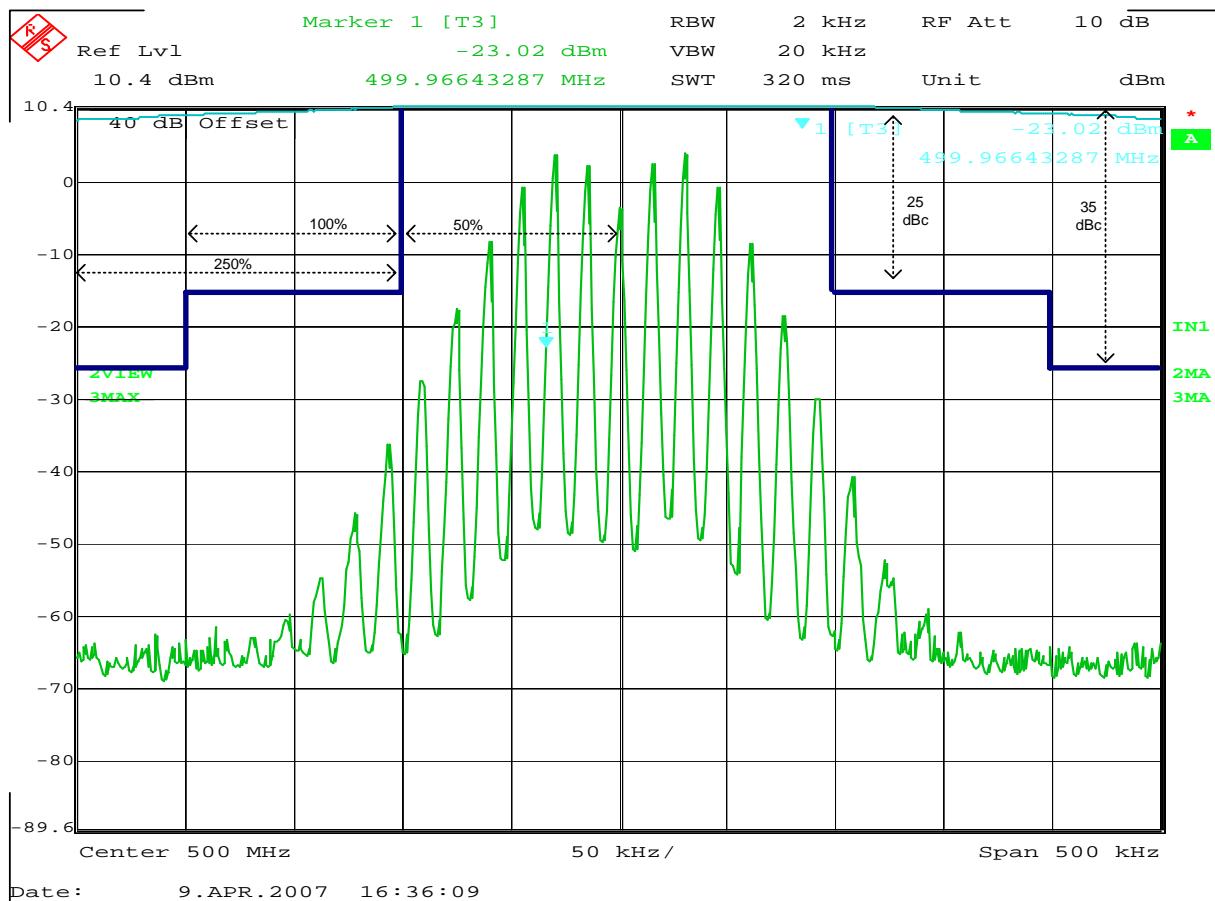
Checked BY : *Richard E. King*

Richard E. King



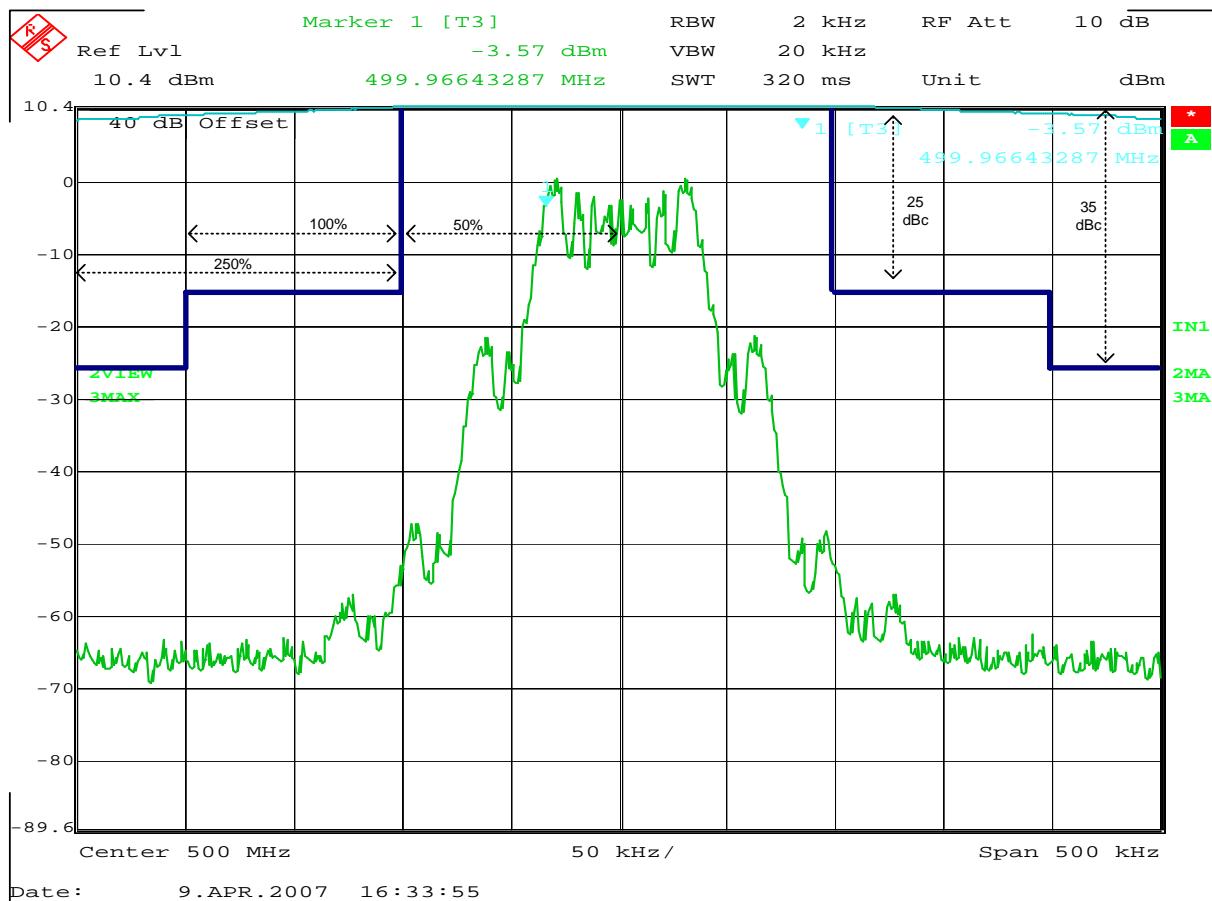
### CFR 47 Part 74 and RSS - 123 Occupied Bandwidth

MANUFACTURER : Shure Inc.  
 MODEL NUMBER : UR1  
 SERIAL NUMBER : 6  
 TEST MODE : Tx 10mW @ 500.0MHz  
 TEST PARAMETERS : Unmodulated Carrier



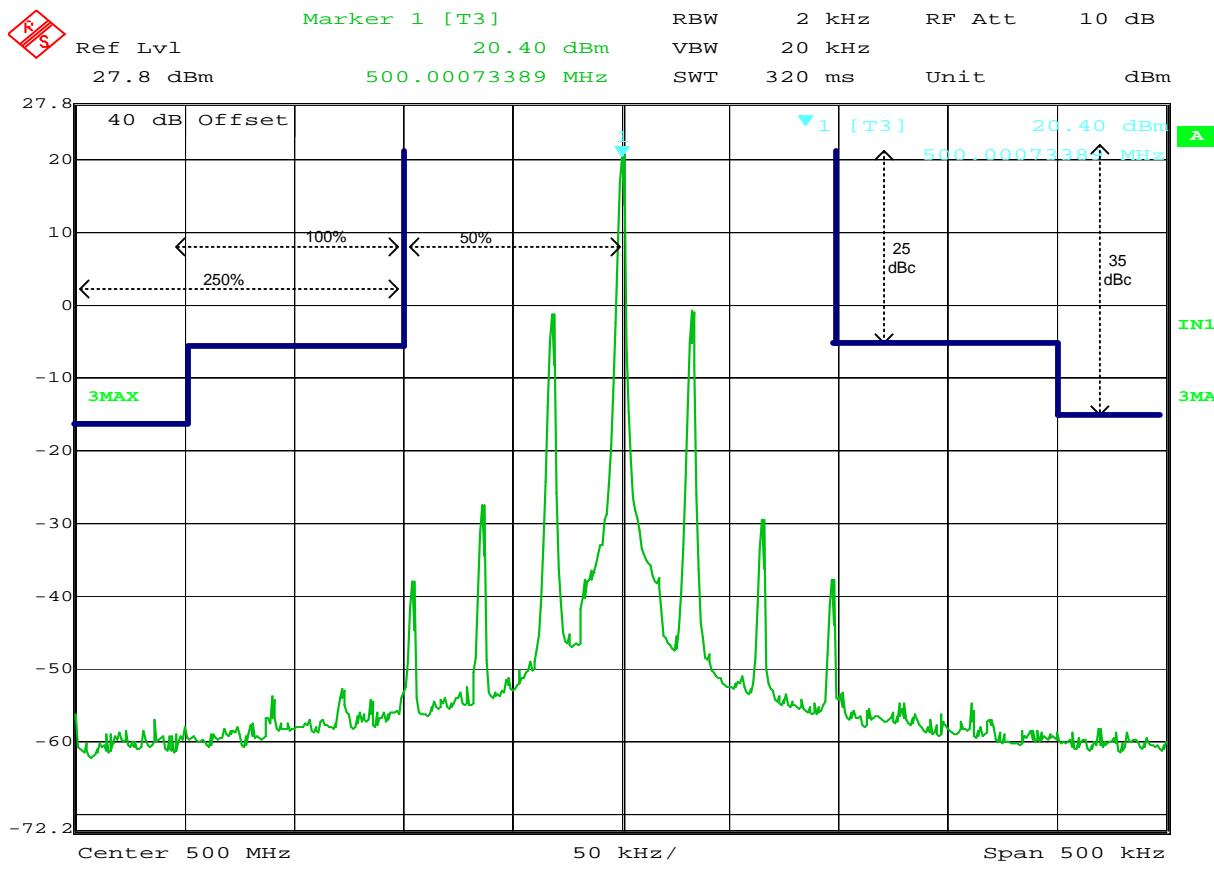
### CFR 47 Part 74 RSS - 123 Occupied Bandwidth

**MANUFACTURER** : Shure Inc.  
**MODEL NUMBER** : UR1  
**SERIAL NUMBER** : 6  
**TEST MODE** : Tx 10mW @ 500.0 MHz  
**TEST PARAMETERS** : 15kHz @ 85% Modulation



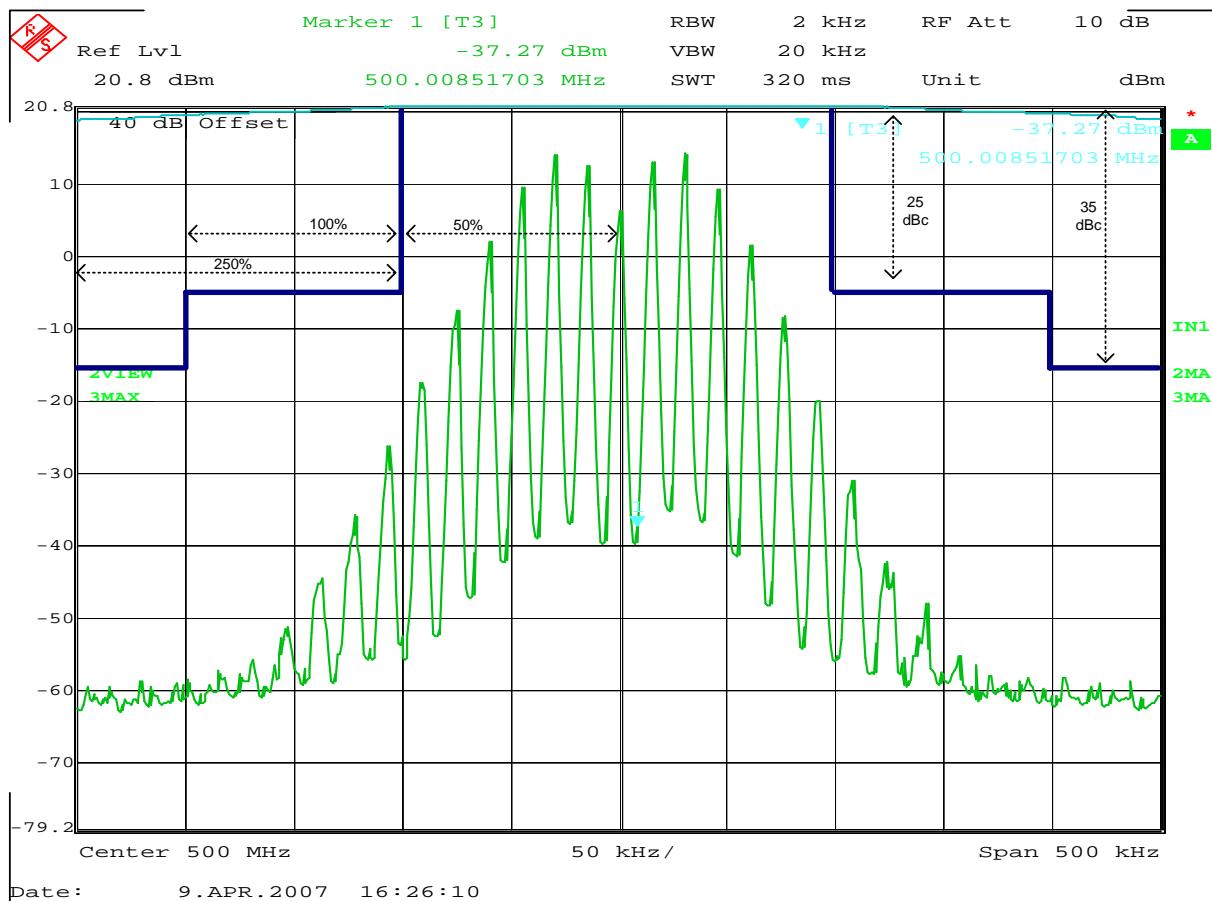
### CFR 47 Part 74 RSS - 123 Occupied Bandwidth

MANUFACTURER : Shure Inc.  
 MODEL NUMBER : UR1  
 SERIAL NUMBER : 6  
 TEST MODE : Tx 10mW @ 500.0 MHz  
 TEST PARAMETERS : 16dB > 50% Modulation



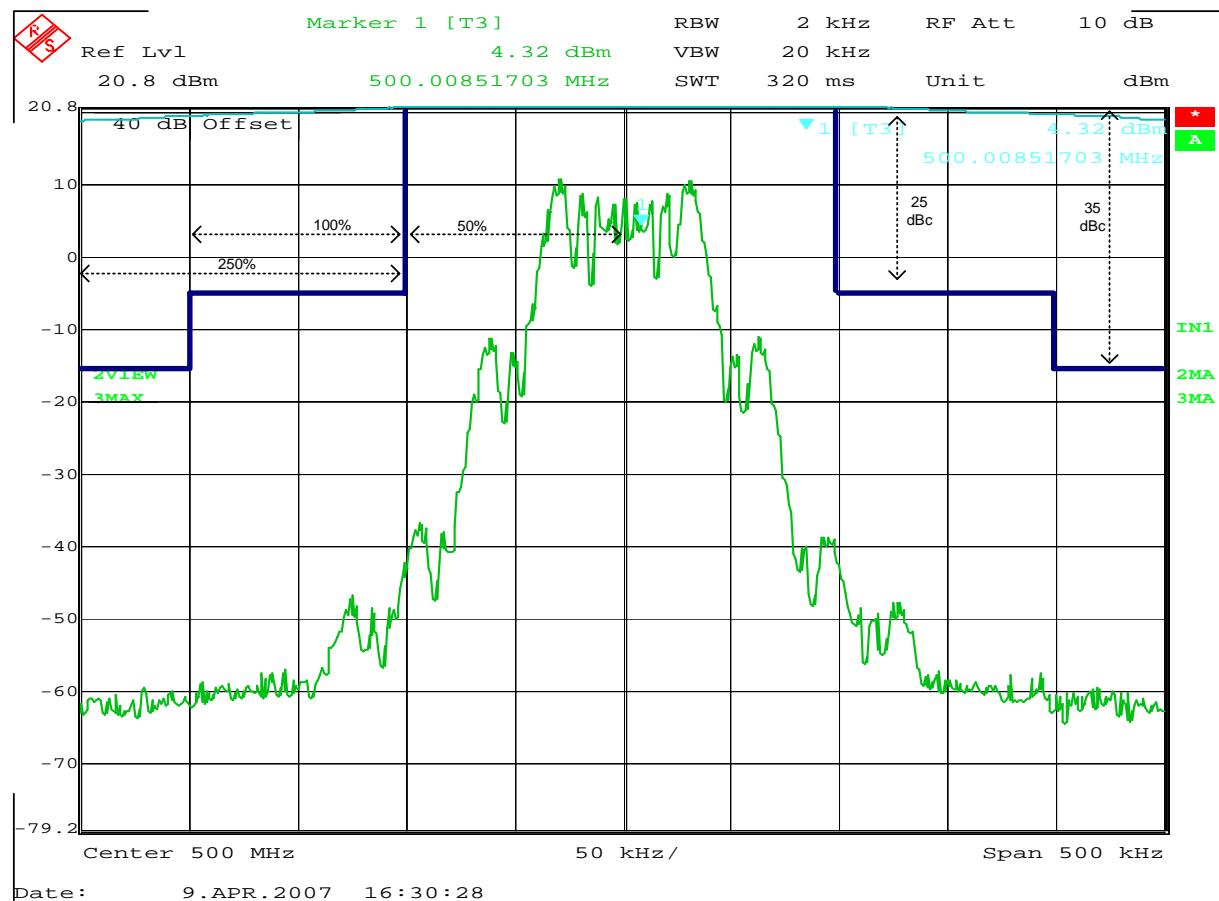
CFR 47 Part 74 RSS - 123 Occupied Bandwidth

MANUFACTURER : Shure Inc.  
MODEL NUMBER : UR1  
SERIAL NUMBER : 6  
TEST MODE : Tx 100mW @ 500.0 MHz  
TEST PARAMETERS : Unmodulated carrier



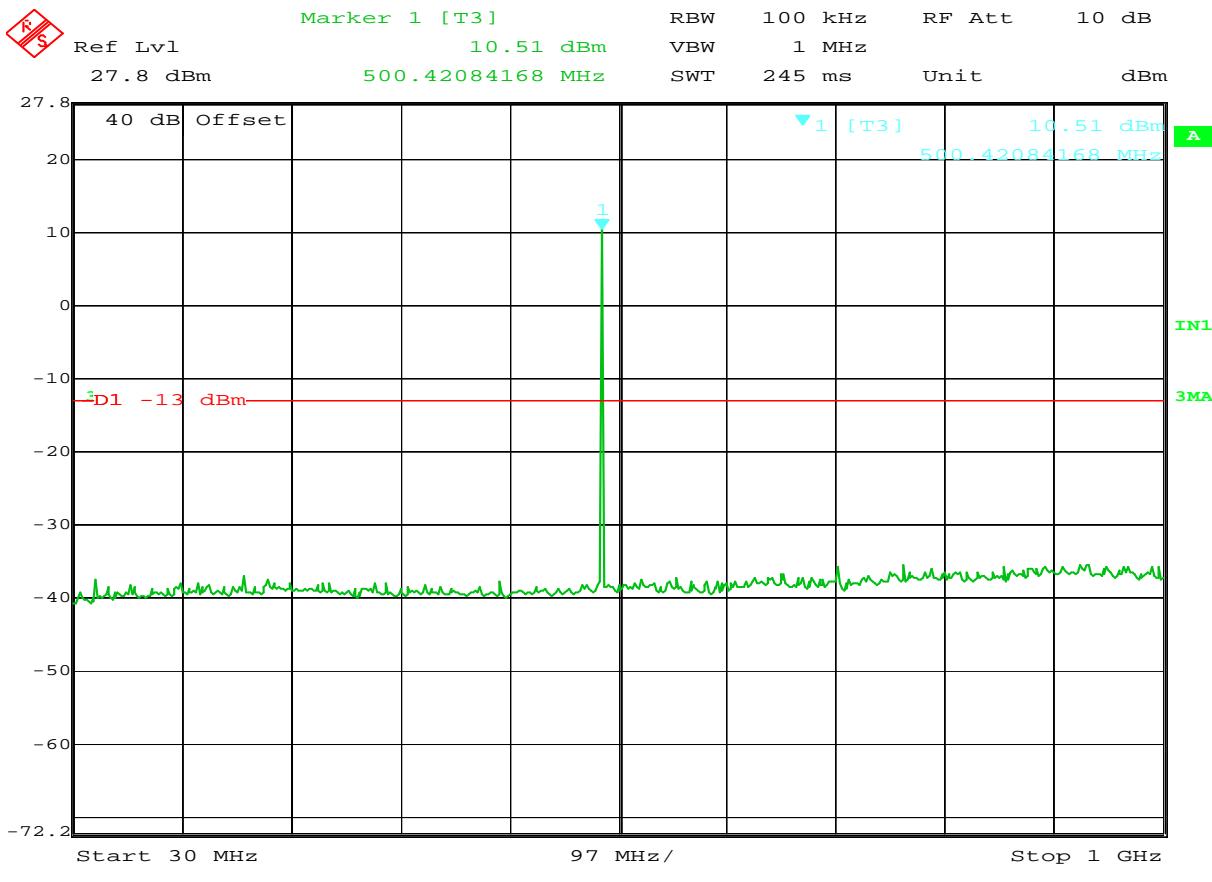
### CFR 47 Part 74 RSS - 123 Occupied Bandwidth

MANUFACTURER : Shure Inc.  
 MODEL NUMBER : UR1  
 SERIAL NUMBER : 6  
 TEST MODE : Tx 100mW @ 500.0 MHz  
 TEST PARAMETERS : 15kHz @ 85% Modulation



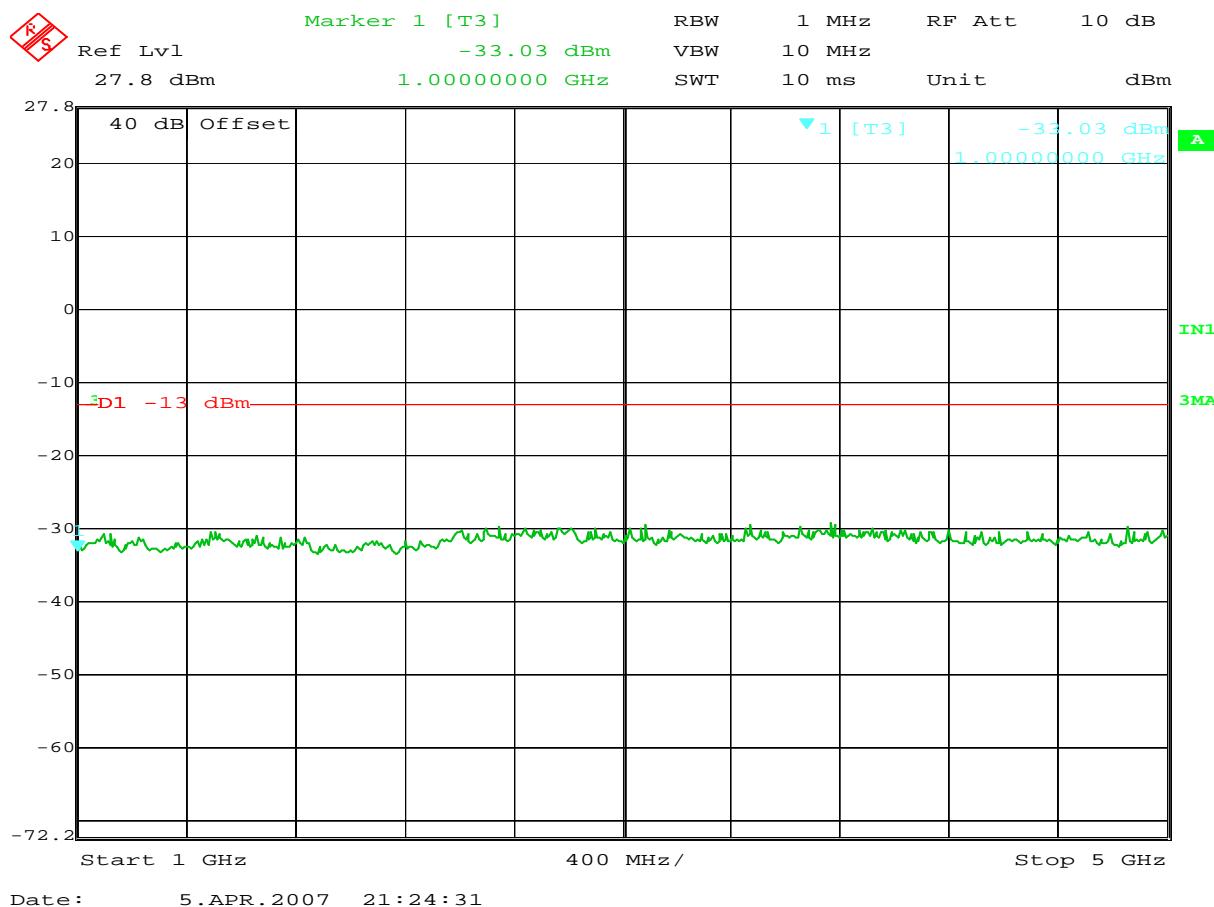
### CFR 47 Part 74 RSS - 123 Occupied Bandwidth

MANUFACTURER : Shure Inc.  
 MODEL NUMBER : UR1  
 SERIAL NUMBER : 6  
 TEST MODE : Tx 100mW @ 500.0 MHz  
 TEST PARAMETERS : 16dB > 50% Modulation



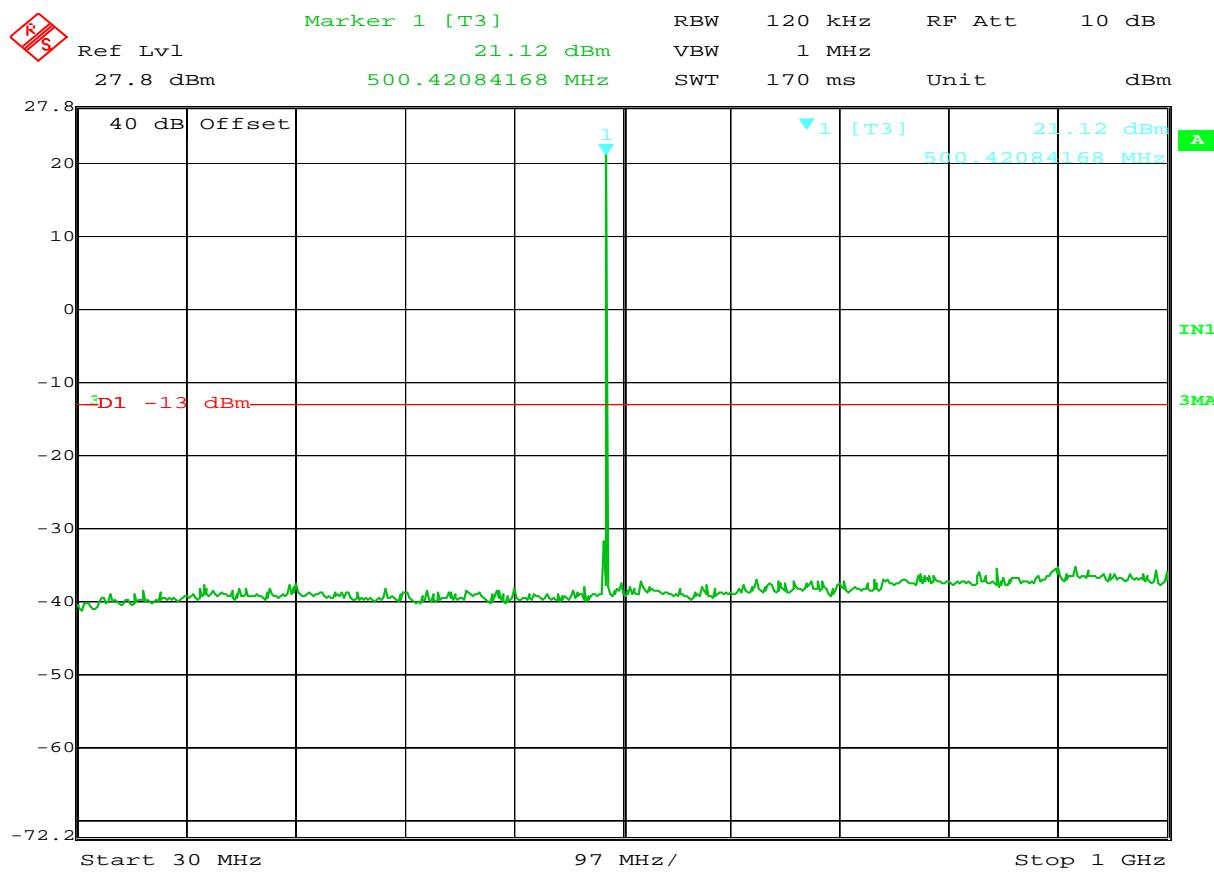
### CFR 47 Part 74 Antenna Conducted Emissions

MANUFACTURER : Shure Inc.  
MODEL NUMBER : UR1  
SERIAL NUMBER : None Assigned  
TEST MODE : Tx 10mW @ 500.0 MHz  
NOTES :



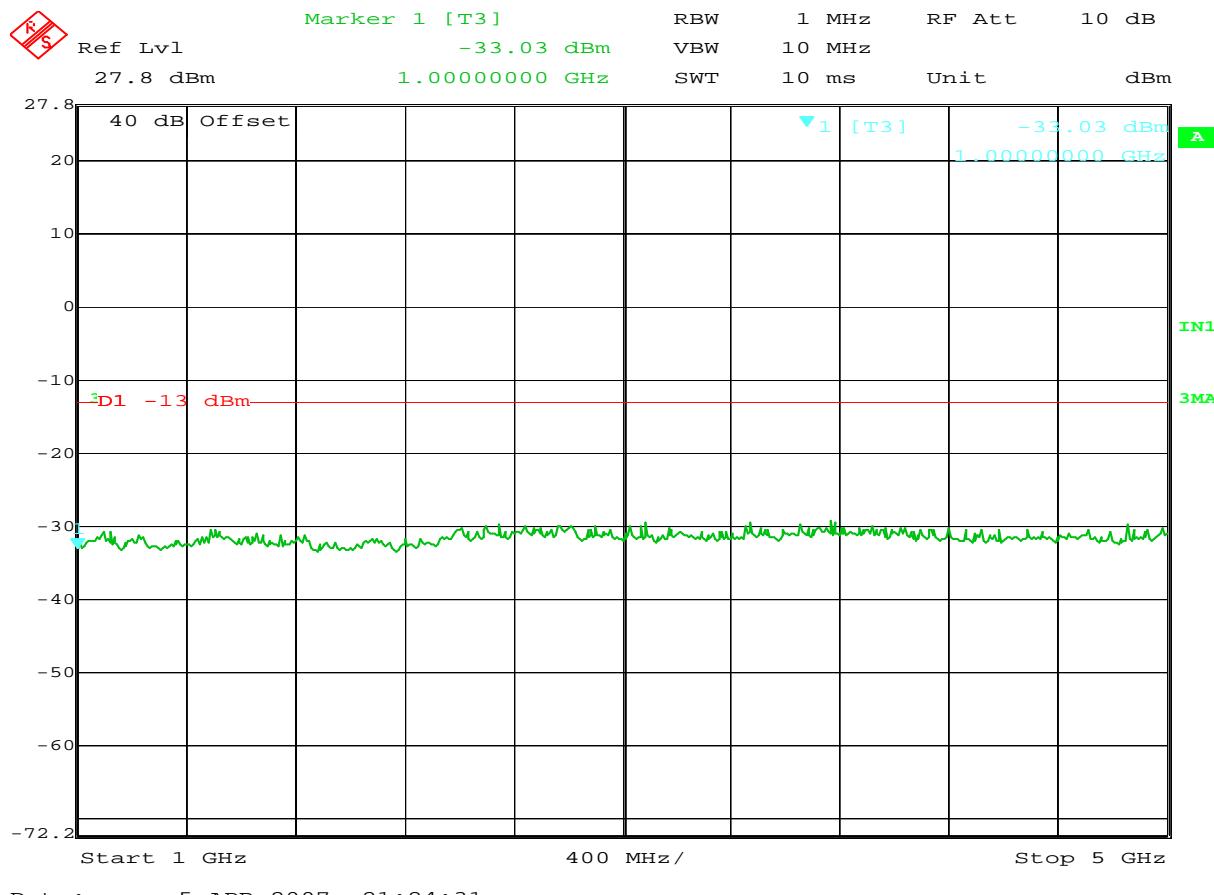
### CFR 47 Part 74 Antenna Conducted Emissions

MANUFACTURER : Shure Inc.  
MODEL NUMBER : UR1  
SERIAL NUMBER : None Assigned  
TEST MODE : Tx 10mW @ 500.0 MHz  
NOTES :



## CFR 47 Part 74 Antenna Conducted Emissions

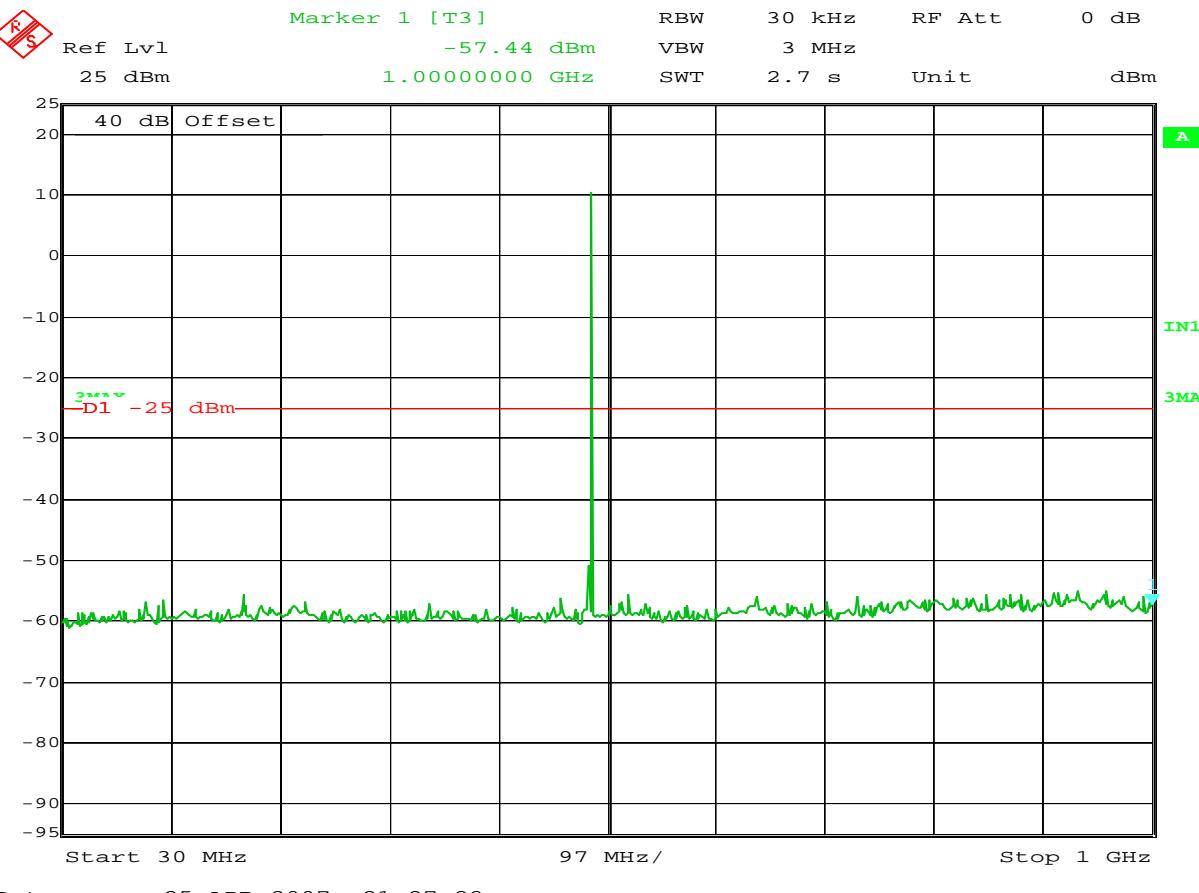
MANUFACTURER : Shure Inc.  
MODEL NUMBER : UR1  
SERIAL NUMBER : None Assigned  
TEST MODE : Tx 100mW @ 500.0 MHz  
NOTES :



Date: 5.APR.2007 21:24:31

### CFR 47 Part 74 Antenna Conducted Emissions

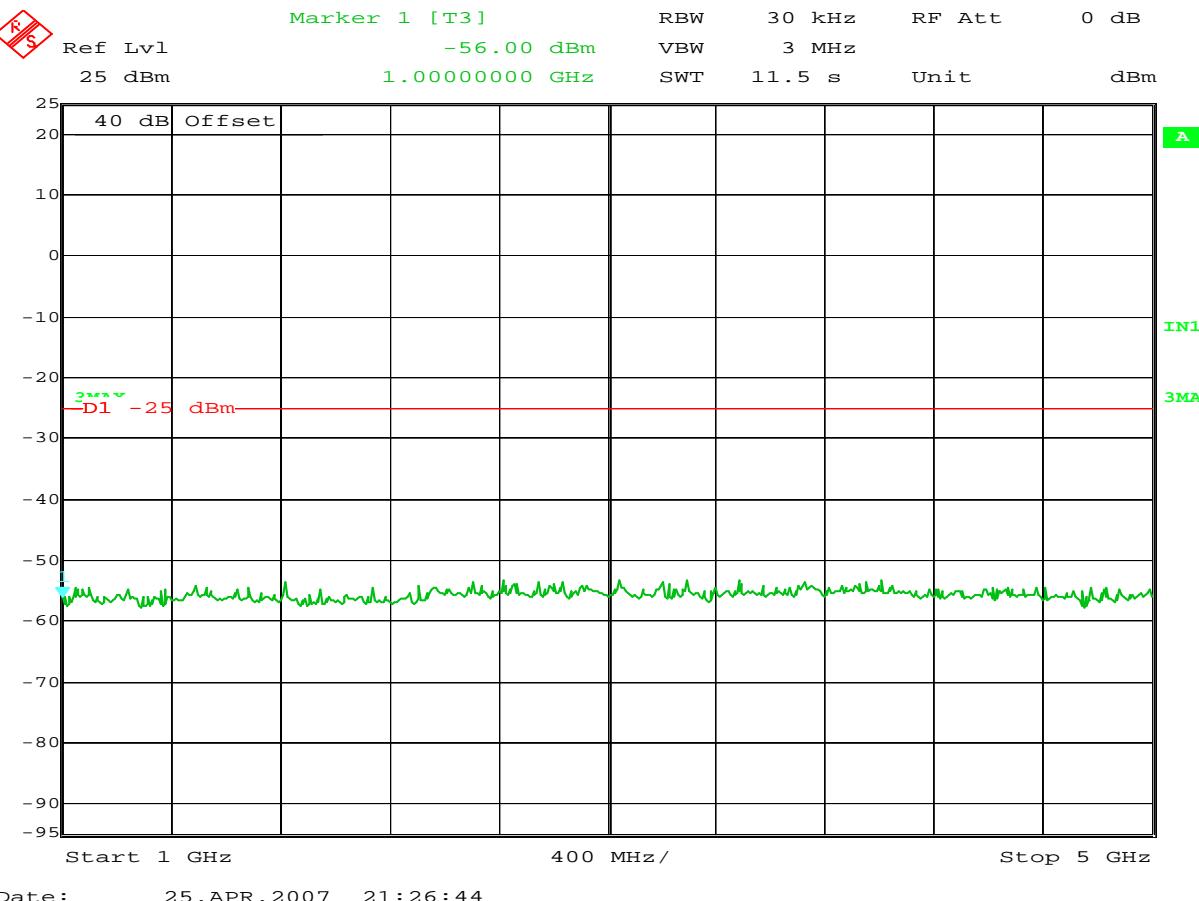
MANUFACTURER : Shure Inc.  
MODEL NUMBER : UR1  
SERIAL NUMBER : None Assigned  
TEST MODE : Tx 100mW @ 500.0 MHz  
NOTES :



Date: 25.APR.2007 21:27:28

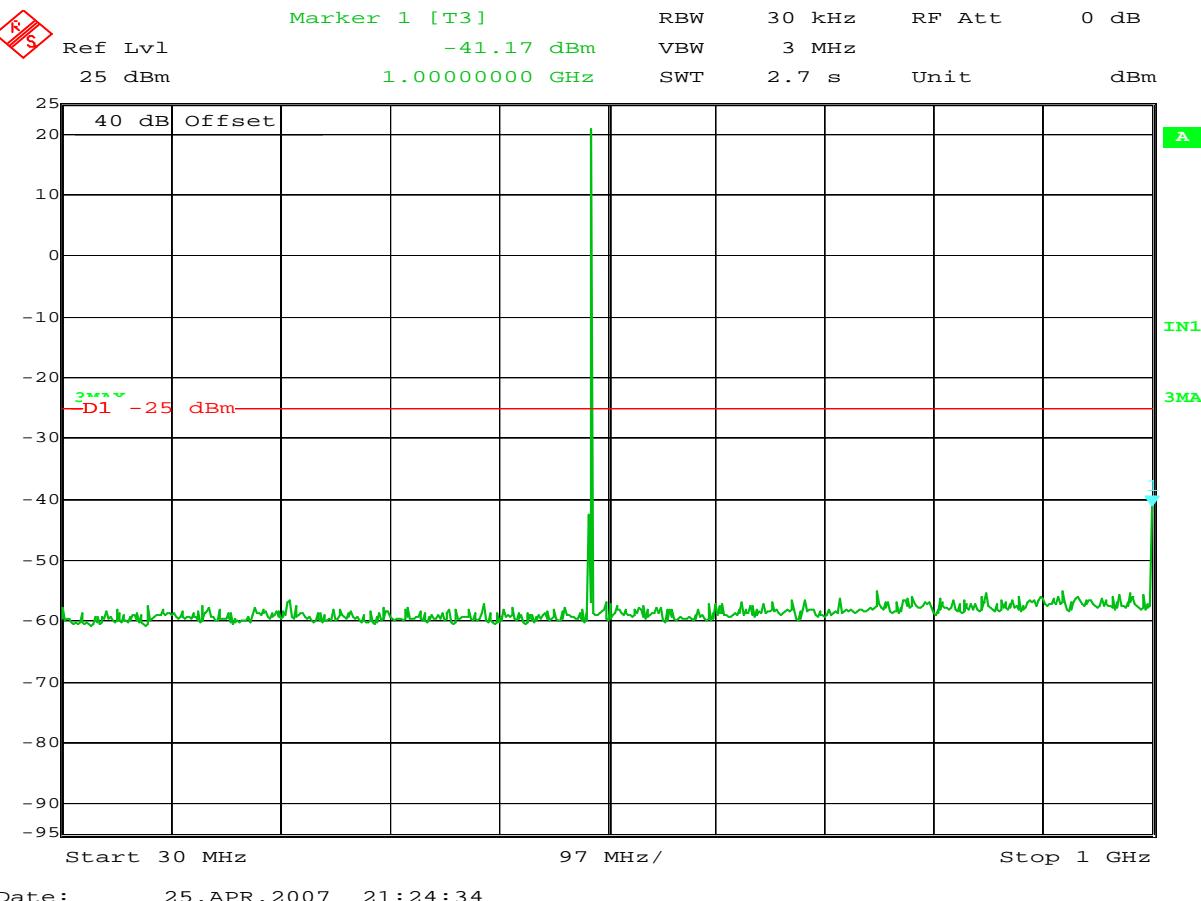
### RSS - 123 Antenna Conducted Emissions

MANUFACTURER : Shure Inc.  
MODEL NUMBER : UR1  
SERIAL NUMBER : None Assigned  
TEST MODE : Tx 10mW @ 500.0 MHz  
NOTES :



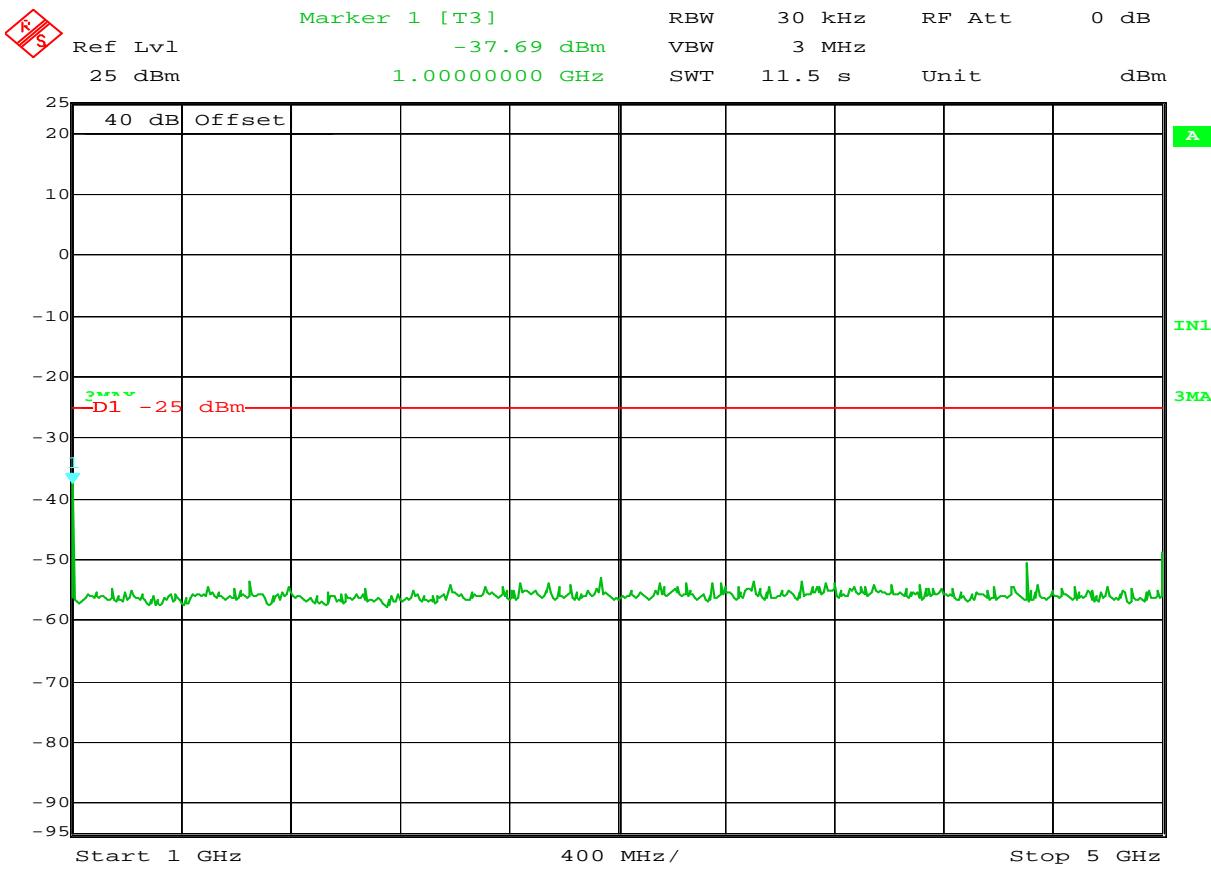
### RSS - 123 Antenna Conducted Emissions

MANUFACTURER : Shure Inc.  
MODEL NUMBER : UR1  
SERIAL NUMBER : None Assigned  
TEST MODE : Tx 10mW @ 500.0 MHz  
NOTES :



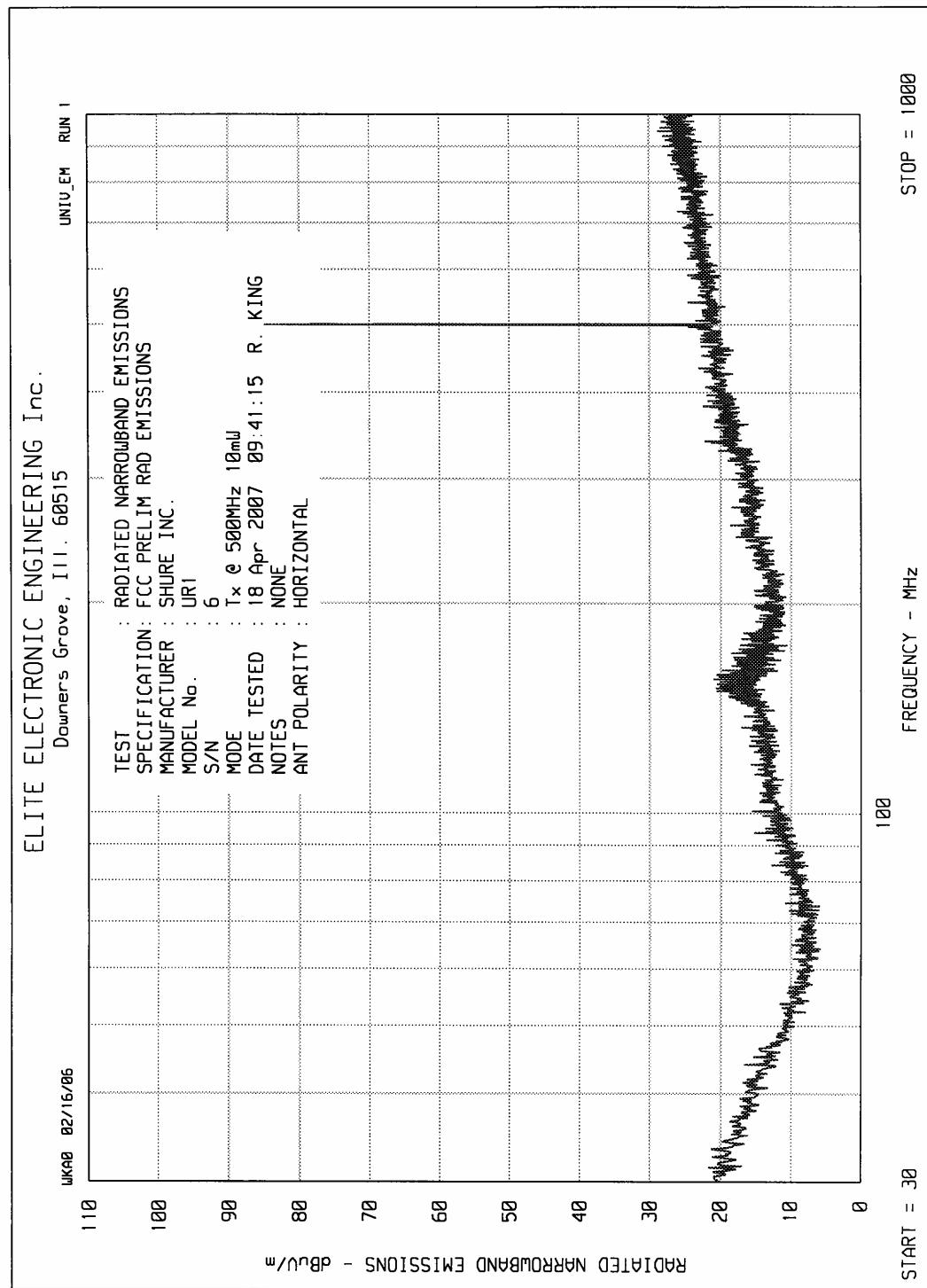
### RSS - 123 Antenna Conducted Emissions

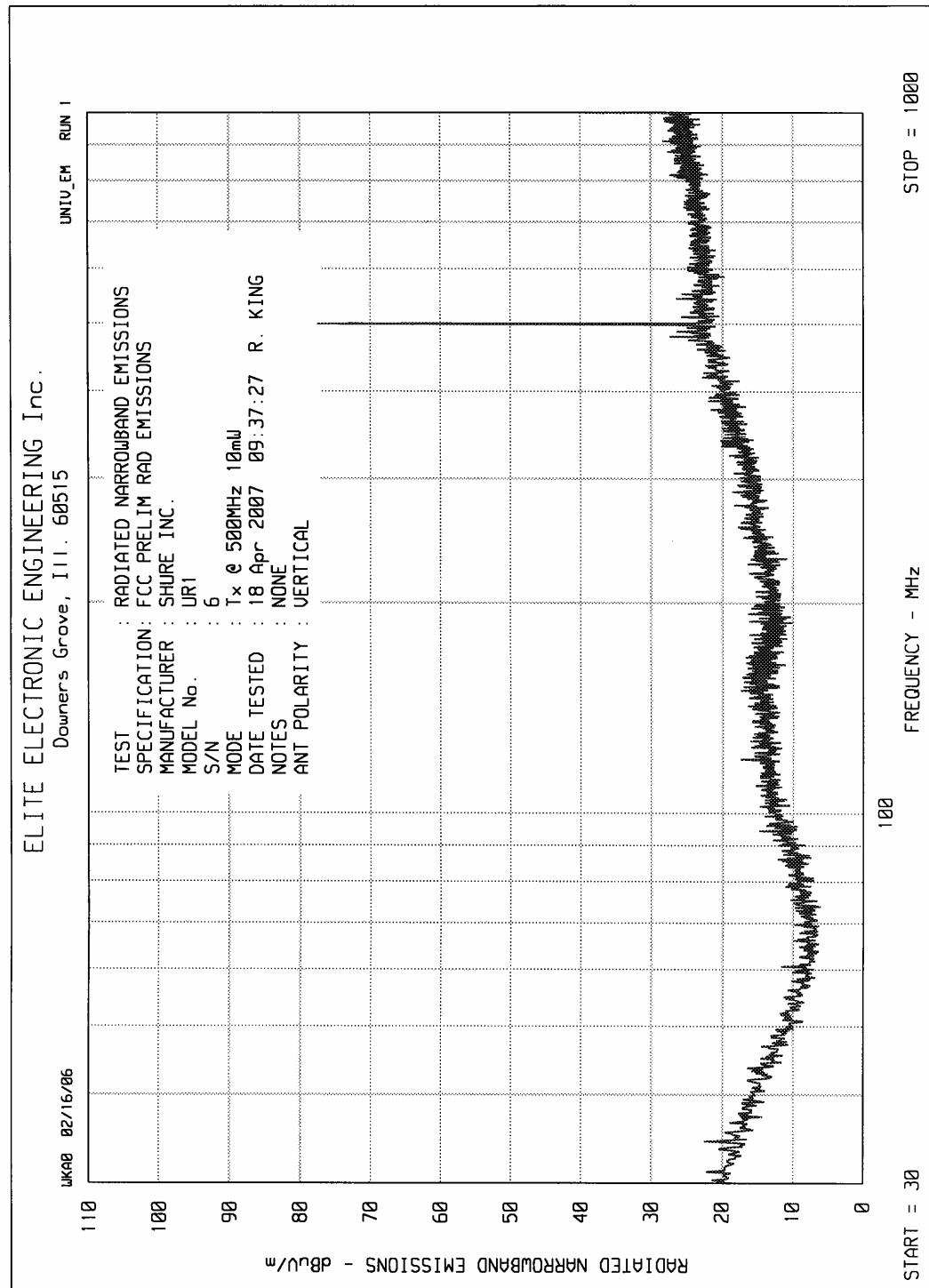
MANUFACTURER : Shure Inc.  
MODEL NUMBER : UR1  
SERIAL NUMBER : None Assigned  
TEST MODE : Tx 100mW @ 500.0 MHz  
NOTES :

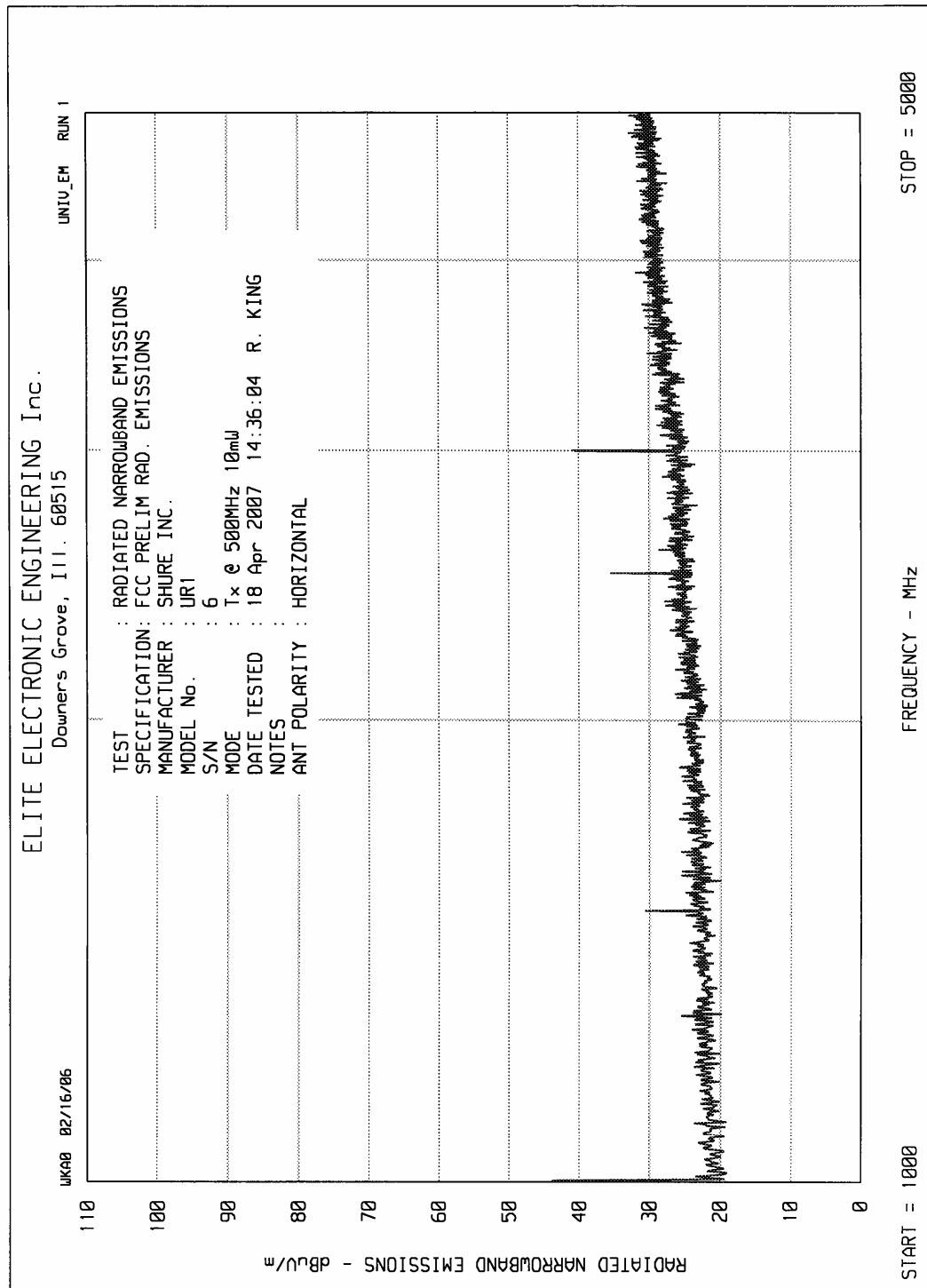


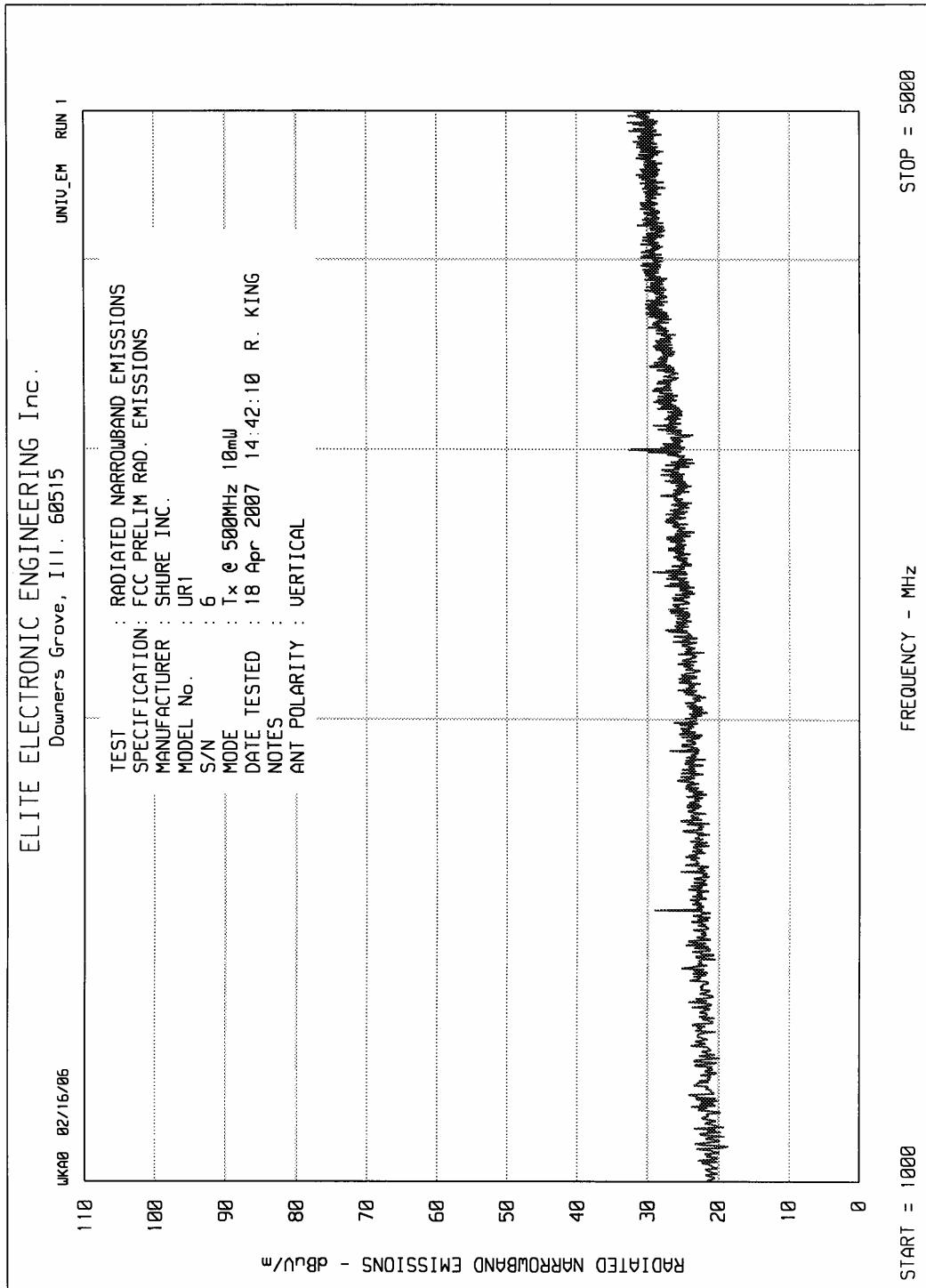
## CFR 47 Part 74 RSS - 123 Antenna Conducted Emissions

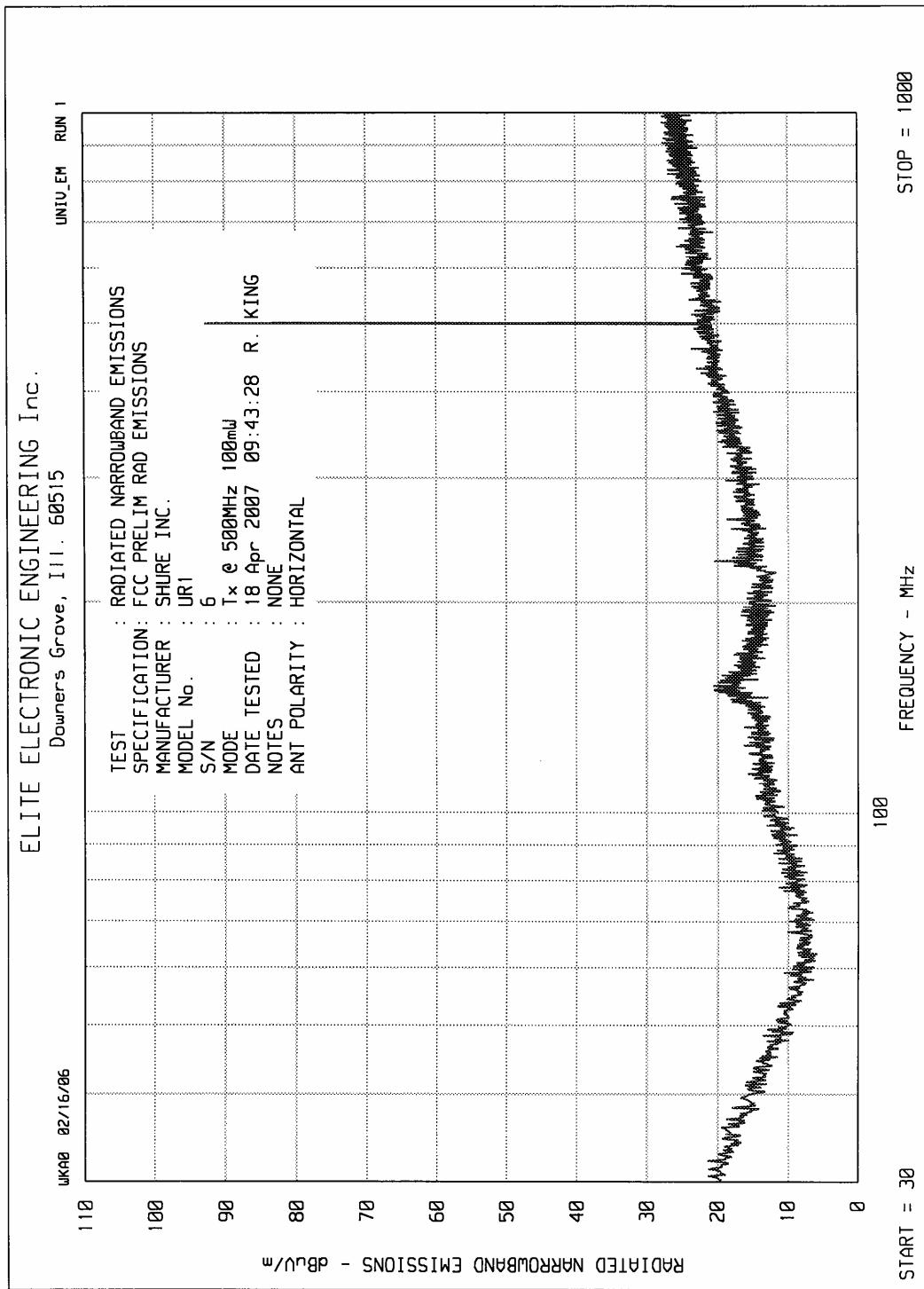
MANUFACTURER : Shure Inc.  
MODEL NUMBER : UR1  
SERIAL NUMBER : None Assigned  
TEST MODE : Tx 100mW @ 500.0 MHz  
NOTES :

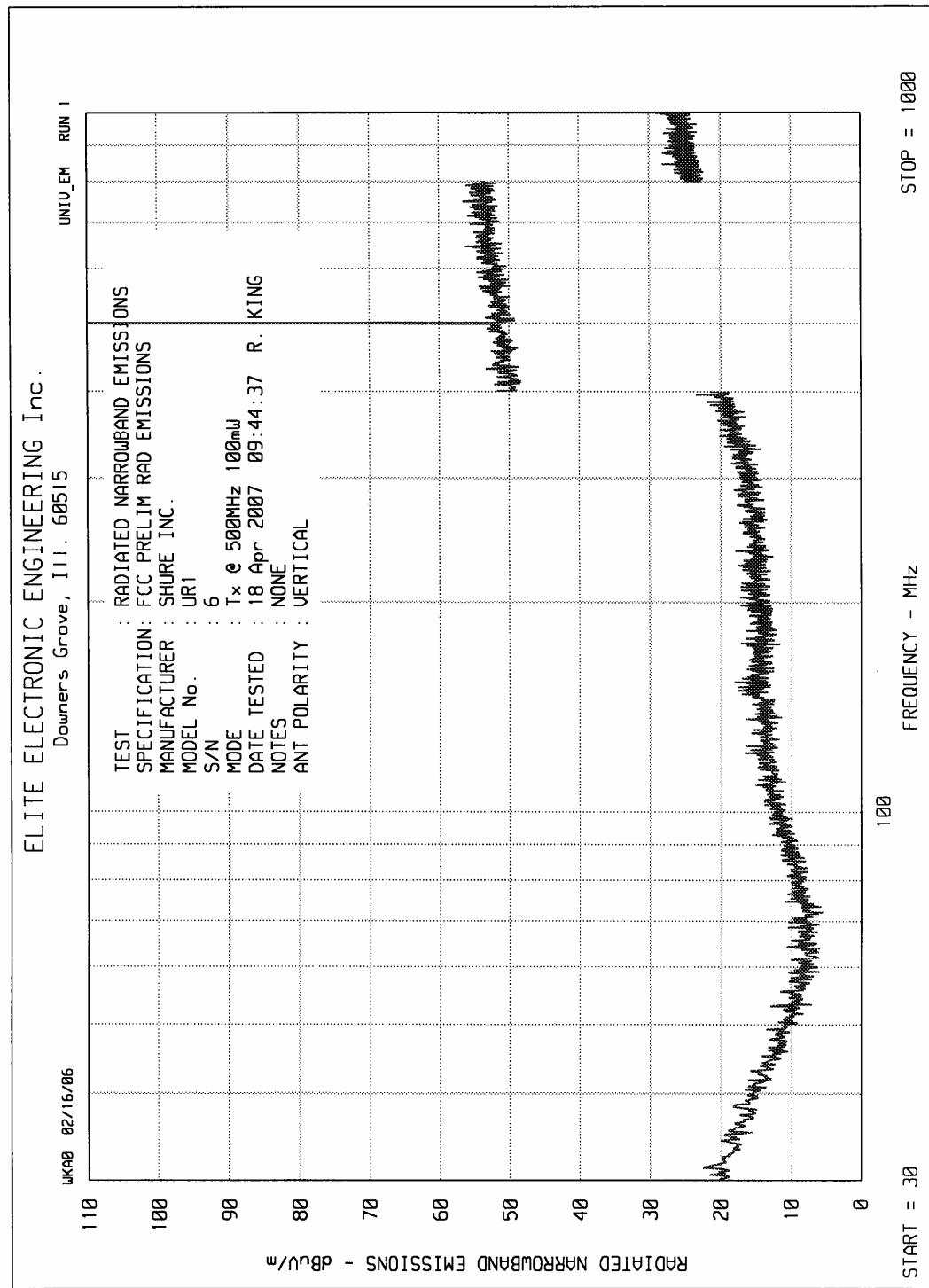


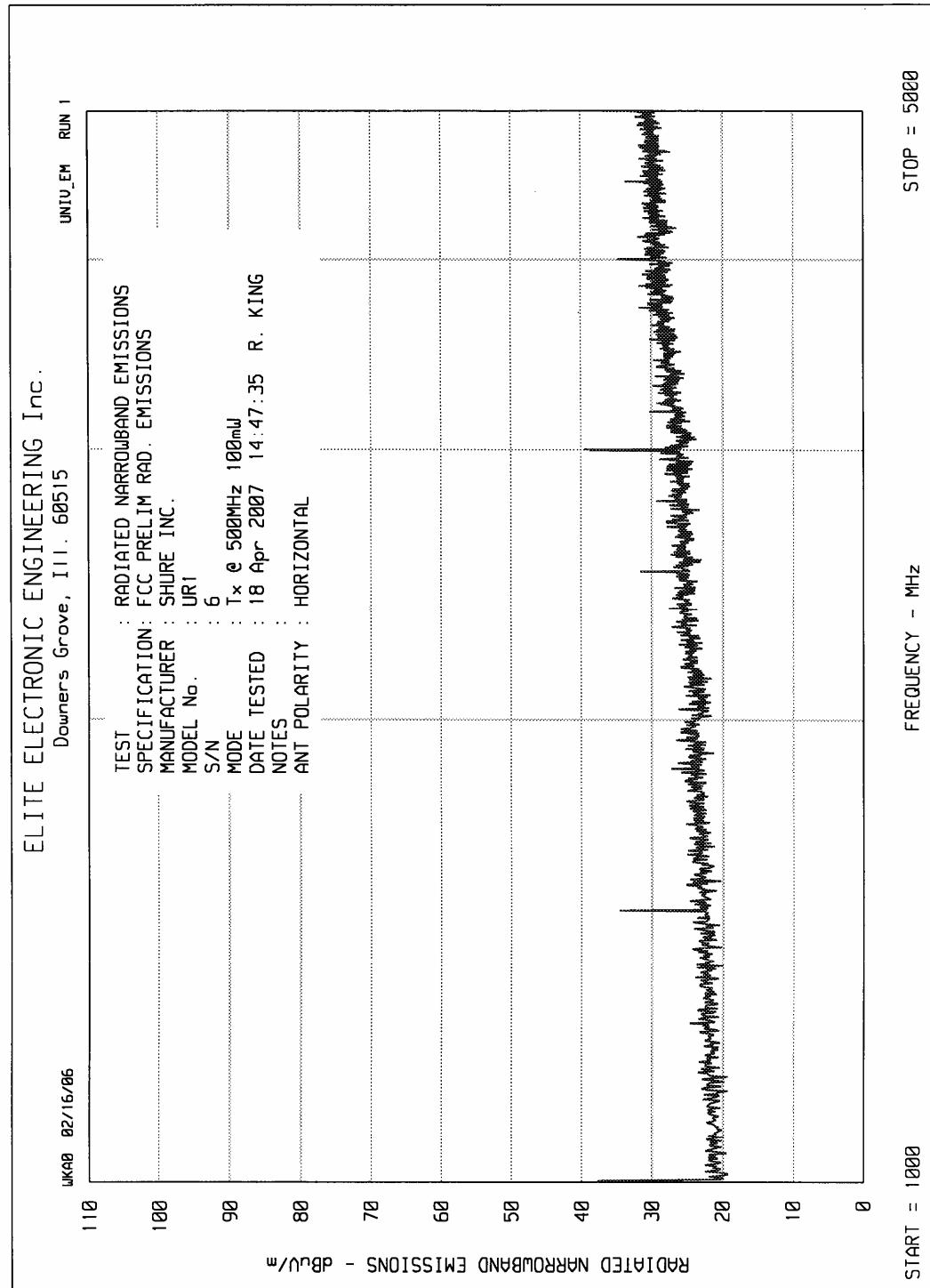


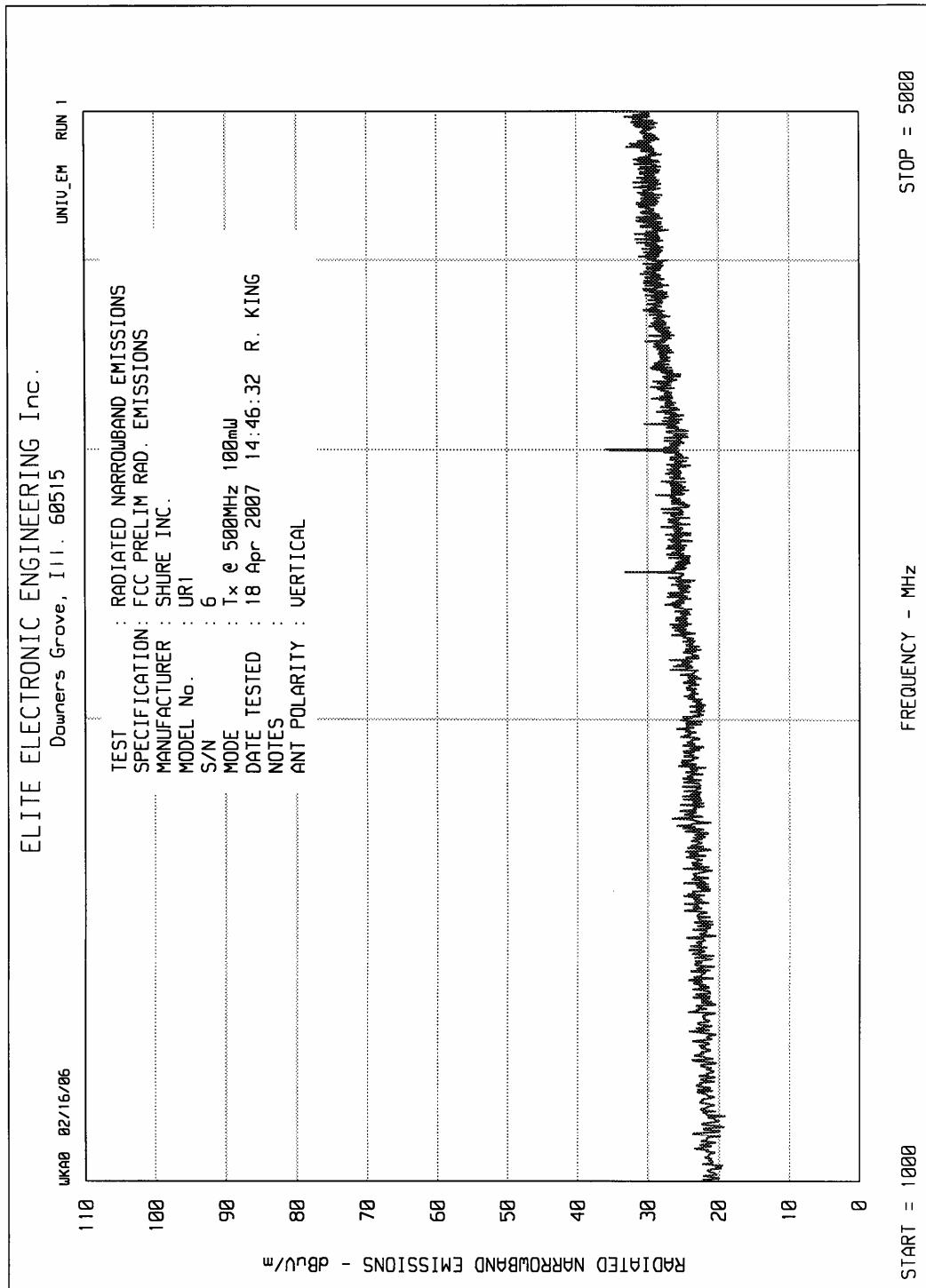














## Data Page

**MANUFACTURER** : Shure Inc.  
**MODEL NO.** : UR1 10 mW  
**SERIAL NO.** : None assigned  
**SPECIFICATION** : FCC-74 Spurious Radiated Emissions  
**DATE** : April 18, 2007  
**NOTES** : Test Distance is 3 Meters

		Meter Readin		Matched	Antenna	Cable	ERP	Part 74	Part 74 Min.
Freq. (MHz)	Ant Pol	g (dBuV)	Amb.	Sig Gen (dBm)	Gain (dB)	Factor (dB)	Total (dBm)	Atten. (dB)	Atten. (dB)
1000.0	H	48.6		-62.5	3.2	2.5	-61.8	71.8	23.0
1000.0	V	46.8		-66.4	3.2	2.5	-65.8	75.8	23.0
1500.0	H	46.7		-61.6	5.5	3.3	-59.4	69.4	23.0
1500.0	V	46.4		-58.2	5.5	3.3	-56.0	66.0	23.0
2000.0	H	45.5	*	-55.6	5.3	4.0	-54.2	64.2	23.0
2000.0	V	44.2	*	-62.5	5.3	4.0	-61.1	71.1	23.0
2500.0	H	44.2	*	-57.8	6.4	4.7	-56.0	66.0	23.0
2500.0	V	45.3		-56.7	6.4	4.7	-55.0	65.0	23.0
3000.0	H	44.1		-55.8	6.5	5.3	-54.5	64.5	23.0
3000.0	V	44.2		-55.5	6.5	5.3	-54.2	64.2	23.0
3500.0	H	42.9	*	-57.1	6.2	5.7	-56.5	66.5	23.0
3500.0	V	42.7	*	-56.2	6.2	5.7	-55.6	65.6	23.0
4000.0	H	41.7	*	-52.1	6.1	6.2	-52.2	62.2	23.0
4000.0	V	41.1	*	-57.0	6.1	6.2	-57.1	67.1	23.0
4500.0	H	42.3	*	-52.4	7.6	6.8	-51.7	61.7	23.0
4500.0	V	42.8	*	-52.4	7.6	6.8	-51.7	61.7	23.0
5000.0	H	41.9	*	-48.9	7.5	7.3	-48.7	58.7	23.0
5000.0	V	43.2	*	-48.9	7.5	7.3	-48.7	58.7	23.0



Checked BY : RICHARD E. KING

Richard E. King



## Data Page

**MANUFACTURER** : Shure Inc.  
**MODEL NO.** : UR1 10 mW  
**SERIAL NO.** : None assigned  
**SPECIFICATION** : RSS-123 Spurious Radiated Emissions  
**DATE** : April 18, 2007  
**NOTES** : Test Distance is 3 Meters

Freq. (MHz)	Pol	Meter Readin g	Antenn a	Antenn a			ERP	RSS- 123	RSS-123
				Matched Sig Gen	Gain	Cable Factor			
1000.0	H	48.6	Ambient	-62.5	3.2	2.5	-61.8	71.8	35
1000.0	V	46.8		-66.4	3.2	2.5	-65.8	75.8	35
1500.0	H	46.7		-61.6	5.5	3.3	-59.4	69.4	35
1500.0	V	46.4		-58.2	5.5	3.3	-56.0	66.0	35
2000.0	H	45.5	*	-55.6	5.3	4.0	-54.2	64.2	35
2000.0	V	44.2	*	-62.5	5.3	4.0	-61.1	71.1	35
2500.0	H	44.2	*	-57.8	6.4	4.7	-56.0	66.0	35
2500.0	V	45.3		-56.7	6.4	4.7	-55.0	65.0	35
3000.0	H	44.1		-55.8	6.5	5.3	-54.5	64.5	35
3000.0	V	44.2		-55.5	6.5	5.3	-54.2	64.2	35
3500.0	H	42.9	*	-57.1	6.2	5.7	-56.5	66.5	35
3500.0	V	42.7	*	-56.2	6.2	5.7	-55.6	65.6	35
4000.0	H	41.7	*	-52.1	6.1	6.2	-52.2	62.2	35
4000.0	V	41.1	*	-57.0	6.1	6.2	-57.1	67.1	35
4500.0	H	42.3	*	-52.4	7.6	6.8	-51.7	61.7	35
4500.0	V	42.8	*	-52.4	7.6	6.8	-51.7	61.7	35
5000.0	H	41.9	*	-48.9	7.5	7.3	-48.7	58.7	35
5000.0	V	43.2	*	-48.9	7.5	7.3	-48.7	58.7	35



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## Data Page

**MANUFACTURER** : Shure Inc.  
**MODEL NO.** : UR1 100mW  
**SERIAL NO.** : None assigned  
**SPECIFICATION** : FCC-74 Spurious Radiated Emissions  
**DATE** : April 18, 2007  
**NOTES** : Test Distance is 3 Meters

Freq. (MHz)	Ant	Meter		Matched Sig Gen (dBm)	Antenna Gain (dB)	Cable Factor (dB)	ERP Total (dBm)	Part 74 Atten. (dB)	Part 74 Min. Atten. (dB)
		Pol	Reading (dBuV)						
1000.0	H		54.5	-55.4	3.2	2.5	-54.7	74.7	33.0
1000.0	V		60.2	-49.9	3.2	2.5	-49.3	69.3	33.0
1500.0	H		47.4	-61.6	5.5	3.3	-59.4	79.4	33.0
1500.0	V		46.4	-58.2	5.5	3.3	-56.0	76.0	33.0
2000.0	H		46.6	-54.4	5.3	4.0	-53.0	73.0	33.0
2000.0	V		44.5	-61.6	5.3	4.0	-60.2	80.2	33.0
2500.0	H		43.0	*	-60.4	6.4	-58.6	78.6	33.0
2500.0	V		49.6		-49.9	6.4	-48.1	68.1	33.0
3000.0	H		44.9	*	-53.5	6.5	-52.2	72.2	33.0
3000.0	V		47.2		-51.3	6.5	-50.0	70.0	33.0
3500.0	H		43.0	*	-57.0	6.2	-56.4	76.4	33.0
3500.0	V		43.0	*	-56.2	6.2	-55.6	75.6	33.0
4000.0	H		41.4	*	-52.4	6.1	-52.5	72.5	33.0
4000.0	V		42.1	*	-54.3	6.1	-54.4	74.4	33.0
4500.0	H		42.2	*	-50.8	7.6	-60.0	70.0	33.0
4500.0	V		43.6	*	-50.8	7.6	-60.0	70.0	33.0
5000.0	H		43.6	*	-47.6	7.5	-47.4	67.4	33.0
5000.0	V		44.4	*	-47.6	7.5	-47.4	67.4	33.0

Checked BY : *Richard E. King*

Richard E. King



## Data Page

**MANUFACTURER** : Shure Inc.  
**MODEL NO.** : UR1  
**SERIAL NO.** : None assigned  
**SPECIFICATION** : RSS-123 Spurious Radiated Emissions  
**DATE** : April 18, 2007  
**NOTES** : Test Distance is 3 Meters

Freq. (MHz)	An t	Meter Readin g	Ambient	Antenn		ERP	RSS- 123	RSS-123
				Matched (dBm)	a (dB)		Atten. (dB)	Min. Atten. (dB)
1000.0	H	54.5		-55.4	3.2	2.5	-54.7	74.7
1000.0	V	60.2		-49.9	3.2	2.5	-49.3	69.3
1500.0	H	47.4		-61.6	5.5	3.3	-59.4	79.4
1500.0	V	46.4		-58.2	5.5	3.3	-56.0	76.0
2000.0	H	46.6		-54.4	5.3	4.0	-53.0	73.0
2000.0	V	44.5		-61.6	5.3	4.0	-60.2	80.2
2500.0	H	43.0	*	-60.4	6.4	4.7	-58.6	78.6
2500.0	V	49.6		-49.9	6.4	4.7	-48.1	68.1
3000.0	H	44.9	*	-53.5	6.5	5.3	-52.2	72.2
3000.0	V	47.2		-51.3	6.5	5.3	-50.0	70.0
3500.0	H	43.0	*	-57.0	6.2	5.7	-56.4	76.4
3500.0	V	43.0	*	-56.2	6.2	5.7	-55.6	75.6
4000.0	H	41.4	*	-52.4	6.1	6.2	-52.5	72.5
4000.0	V	42.1	*	-54.3	6.1	6.2	-54.4	74.4
4500.0	H	42.2	*	-50.8	7.6	6.8	-50.0	70.0
4500.0	V	43.6	*	-50.8	7.6	6.8	-50.0	70.0
5000.0	H	43.6	*	-47.6	7.5	7.3	-47.4	67.4
5000.0	V	44.4	*	-47.6	7.5	7.3	-47.4	67.4

Checked BY : *Richard E. King*

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Richard E. King