



Transmitter Tests  
for  
Three (3) Wireless Handheld Microphones

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For : Shure Inc.  
Niles, IL

P.O. No. : 4500092965  
Dates Tested : November 21 through December 31, 2005.  
Test Personnel : Richard E. King, EMC Engineer  
Specification : FCC "Code of Federal Regulations" Title 47  
Part 74 and Industry Canada RSS-123

Test Report By : *Richard E. King*  
Richard E. King  
EMC Engineer

Witnessed By : Juan Casttrejon  
Shure Inc.

Approved By : *Raymond J. Klouda*  
Raymond J. Klouda  
Registered Professional Engineer of  
Illinois - 44894

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**THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE  
WRITTEN APPROVAL OF ELITE ELECTRONIC ENGINEERING INCORPORATED.**



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REVISION HISTORY

Revision	Date	Description
—		Initial release

## Transmitter Tests for Three (3) Wireless Handheld Microphones

### 1.0 INTRODUCTION:

**1.1 DESCRIPTION OF TEST ITEM:** This report presents the results of a series of transmitter tests were performed on three Shure Inc. wireless handheld microphones, (hereinafter referred to as the test items). No serial numbers were assigned to the test items. The tests were performed for Shure Incorporated of Niles, IL.

The test items are wireless microphones that operate in low power auxiliary station bands 518 to 806MHz.

Type of Equipment	Bodypack wireless microphones	
Equipment Designation	PG2-H7	
	PG2-M7	
	PG2-R12	
Test Specification Range	Low power auxiliary band 518-865MHz	
Test Item Frequency Range	PG2-H7	536.05 MHz lowest channel available.
	PG2-M7	671.175 MHz
	PG2-R12	805.85 MHz
Number of Channels	21	
Type of Modulation	FM	
Type of Antenna	Integral antenna	
Rated Output Power	10dBm $\pm$ 3dB	
Occupied Bandwidth	max 200 kHz	
Operating Voltage	9.0 VDC	
Maximum Deviation	33kHz	
Declared Audio Input Limiting Threshold	10mV	

**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 518MHz to 806MHz 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 2004
- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 2, dated 1 October 2004

- 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 LABORTORY 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 22°C and the relative humidity was 11%.

## **2.0 TEST ITEM SETUP AND OPERATION:**

**2.1 POWER INPUT:** The test item obtained 9.0VDC from a 9VDC battery.

**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.

**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:** Since the test item has an integral antenna, the equivalent radiated power into a dipole antenna (ERP) was determined from the field intensity levels measured at

3 meters using the substitution method. To determine the emission power another tuned dipole 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.

The 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 radiated 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) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization.
- c) The maximum meter reading was recorded.
- d) A dipole antenna tuned to the transmit frequency was placed on an adjustable height antenna mast 3 meters from the test item.
- e) The signal level was adjusted to match the meter reading.
- f) Measurements were performed with the input signal unmodulated.

**4.1.3 RESULTS:** The output power measurements are presented on page 16. As can be seen from the data, the power output of each transmitter is within the 250 milliwatt requirement of Part 74.861(e)(1)(ii) and the 1 watt requirement of 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:** For the purposes of this test the test item was equipped with a temporary antenna port. The output of the antenna port of the test item was connected to a 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 pages 17 through 19.

#### **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:** For the purposes of this test the test item was equipped with a temporary antenna port. 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 at nominal room temperature (23°C).
- (b) The temperature chamber was then set to -30°C.
- (c) Once the temperature had reached -30°C the test item was allowed to soak for 30 minutes.
- (d) After soaking at -30°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 -30°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 (23°C).
- (h) The input voltage was checked and adjusted to the nominal level. The frequency was measured and recorded.
- (i) The input voltage was then varied to 85% of its nominal level. The frequency was measured and recorded.
- (j) The input 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 20 through 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) For the purpose of this test the test items were equipped with a temporary antenna port. 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. A plot of the test items response was recorded.
- (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. A plot of the test items response was recorded.
- (d) Steps (a) through (c) were repeated separately for each of the remaining transmitters. The bandwidth of the spectrum analyzer was set to 3kHz ( greater than 1% of Authorized BW).

**4.4.3 RESULTS:** The plots of the occupied bandwidth measured are presented on pages 23 through 31. 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  $K = 1$ ,  $M = 500\text{Hz}$  and  $D = 60\text{kHz}$  resulting in an operating bandwidth of 121kHz.

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:** Since the test item was supplied with an integral antenna, radiated spurious emissions measurements were performed in lieu of antenna terminal measurements.

#### **4.6 FIELD STRENGTH OF SPURIOUS EMISSIONS:**

#### **4.6.1 PRELIMINARY RADIATED MEASUREMENTS:**

**4.6.1.1 REQUIREMENTS:** Radiated emission measurements first measured using peak detection. This data will show where significant emissions are present.

**4.6.1.2 PROCEDURES:** The preliminary test was 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 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 measurements were taken with a peak detector function employed.

**4.6.1.3 RESULTS:** The preliminary plots are presented on pages 32 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 to demonstrate compliance. All significant radiated emissions were subsequently re-measured using manual techniques.

#### **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 radiated emission 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 radiated 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 test item was tested with an integral antenna.
- c) The measurement antenna was placed on an adjustable height antenna mast 3 meters from the test item.
- d) A double-ridged waveguide antenna was used above 1 GHz.
- e) The emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization.



- f) Measurements were performed with the input signal unmodulated.
- g) The maximum meter reading was recorded.
- h) The substitution method was used to measure the equivalent power into a dipole antenna. To determine the power level, 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 44 through 49. 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 Incorporated, wireless handheld microphones, did comply with the RF power output, the modulation characteristics, the frequency stability, the occupied bandwidth, and the field strength of spurious emissions requirements of FCC Part 74 for low power auxiliary station bands 518MHz to 806MHz 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 Date
Equipment Type: ACCESSORIES, MISCELLANEOUS								
XCN0	1000 PF CAPACITOR (1000V)	MICROLAB	HR-10N	001	100M-4GHZ		12	
XCN1	1000 PF CAPACITOR (1000V)	MICROLAB	HR-10N	002	100M-4GHZ		12	
XDY0	HIGH POWER DIRECTIONAL COU	WERLATONE	C6934	14801	.1-1000MHZ	02/08/06	12	02/08/07
XTR2	ESD SIMULATOR (SIEMENS)	NOISE LABORATOR	ESS-100L	DX65088	0.2-25KV	07/19/05	12	07/19/06
XTRD	ESD GUN (SIEMENS)	NOISE LABORATOR	TC-815D	DX65113	0.2-30KV	07/19/05	12	07/19/06
XZG2	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	2223A01751	---		N/A	
Equipment Type: AMPLIFIERS								
ADF0	WIDE BAND RF AMP	IFI	CMX5001	F075-0401	.01-1000MHZ		N/A	
APK2	PREAMPLIFIER	AGILENT TECHNOL	8449B	3008A01595	1-26.5GHZ	02/11/05	12	02/11/06
ATU0	TWT AMPLIFIER	HUGHES AIRCRAFT	1177H09R000	004	1-2GHZ		NOTE 1	
Equipment Type: ANTENNAS								
NDQ1	TUNED DIPOLE ANTENNA	EMCO	3121C-DB4	313	400-1000MHZ	03/02/05	12	03/02/06
NSA4	LOG-PERIODIC ANTENNA	AMPLIFIER RESEA	AT1080	13264	80-1000MHZ		NOTE 1	
NTA0	BILOG ANTENNA	CHASE EMC LTD.	BILOG CBL611	2057	0.03-2GHZ	08/15/05	12	08/15/06
NWH0	RIDGED WAVE GUIDE	SENSOR	4105	2081	1-12.4GHZ	10/01/05	12	10/01/06
Equipment Type: ATTENUATORS								
T1N1	10DB 20W ATTENUATOR	NARDA	766-10		DC-4GHZ	09/07/05	12	09/07/06
T2D9	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BH5445	DC-18HGZ	12/05/05	12	12/05/06
T2DE	20DB 25W ATTENUATOR	WEINSCHEL	46-20-34	BN1032	DC-18GHZ	03/10/05	12	03/10/06
Equipment Type: CHAMBERS (ENV)								
ETC0	TEMPERATURE CHAMBER	TENNEY	BTR-100350	9145-17	-60C TO 100C		NOTE 1	
ETCC	SINGLE CHANNEL TEMPERATURE	WATLOW	F4SH-CCA0-01	008389-0339	PROGRAMMABLE		NOTE 1	
Equipment Type: CONTROLLERS								
CDV0	REPLACEMENT FOR CDD0	COMPAQ	PRESARIO	MXK3391BPJ	2.5GHZ		N/A	
Equipment Type: METERS								
MFC0	MICROWAVE FREQ. COUNTER	HEWLETT PACKARD	5343A	2133A00591	10HZ-26GHZ	05/31/05	12	05/31/06
MPC2	DUAL POWER METER	HEWLETT PACKARD	EPM-442A	US37480150	0.1MHZ-50GHZ	11/18/05	12	11/18/06
MPCC	POWER SENSOR	HEWLETT PACKARD	8482A	2652A13499	0.1-4200MHZ	03/17/05	12	03/17/06
MPCD	POWER SENSOR	HEWLETT PACKARD	8482A	3318A28808	0.1-4200MHZ	03/17/05	12	03/17/06
Equipment Type: POWER SUPPLIES								
SIB0	DC POWER SUPPLY	INSTEK	PC-3030	PC303RP1			NOTE 1	
Equipment Type: PRINTERS AND PLOTTERS								
HRE5	LASER JET 5P (DCC-DRFI)	HEWLETT PACKARD	LJ 6P	SUSBB43325	---		N/A	
Equipment Type: RECEIVERS								
RAC0	SPECTRUM ANALYZER	HEWLETT PACKARD	85660B	2449A01117	100HZ-22GHZ	02/07/05	12	02/07/06
RACE	RF PRESELECTOR W/ RECEIVER	HEWLETT PACKARD	85685A	3010A01194	20HZ-2GHZ	08/26/05	12	08/26/06
RAF1	QUASISPEAK ADAPTER	HEWLETT PACKARD	85650A	2043A00271	0.01-1000MHZ	02/07/05	12	02/07/06
RYE0	MODULATION ANALYZER	HEWLETT PACKARD	8901B	3104A03410	0.15-1300MHZ	12/09/04	14	02/09/06
Equipment Type: SIGNAL GENERATORS								
GRD0	SIGNAL GENERATOR	HEWLETT PACKARD	E4432B	US38080222	250KHZ-3.0GHZ	09/28/05	12	09/28/06
GWH1	DDS FUNCTION GENERATOR	WAVETEK	29	071747	0.0001HZ-10MHZ	02/15/05	12	02/15/06

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.

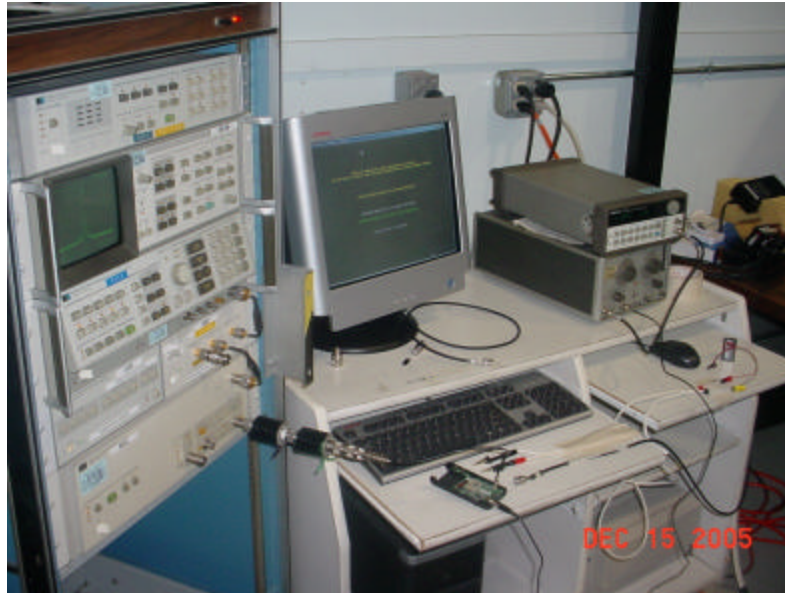
Photographs of the Specific Test Setups



Output Power and Spurious Emissions Test Setup



Frequency Stability vs. Temperature



Occupied Bandwidth Test Setup



**MANUFACTURER** : Shure Inc.  
**MODEL NO.** : Handheld Wireless Microphones  
**SERIAL NO.** : None assigned  
**SPECIFICATION** : FCC-74 and RSS-123  
**TEST PERFORMED** : RF Output Power  
**DATE** : November 22, 2005  
**NOTES** : Test Distance is 3 Meters

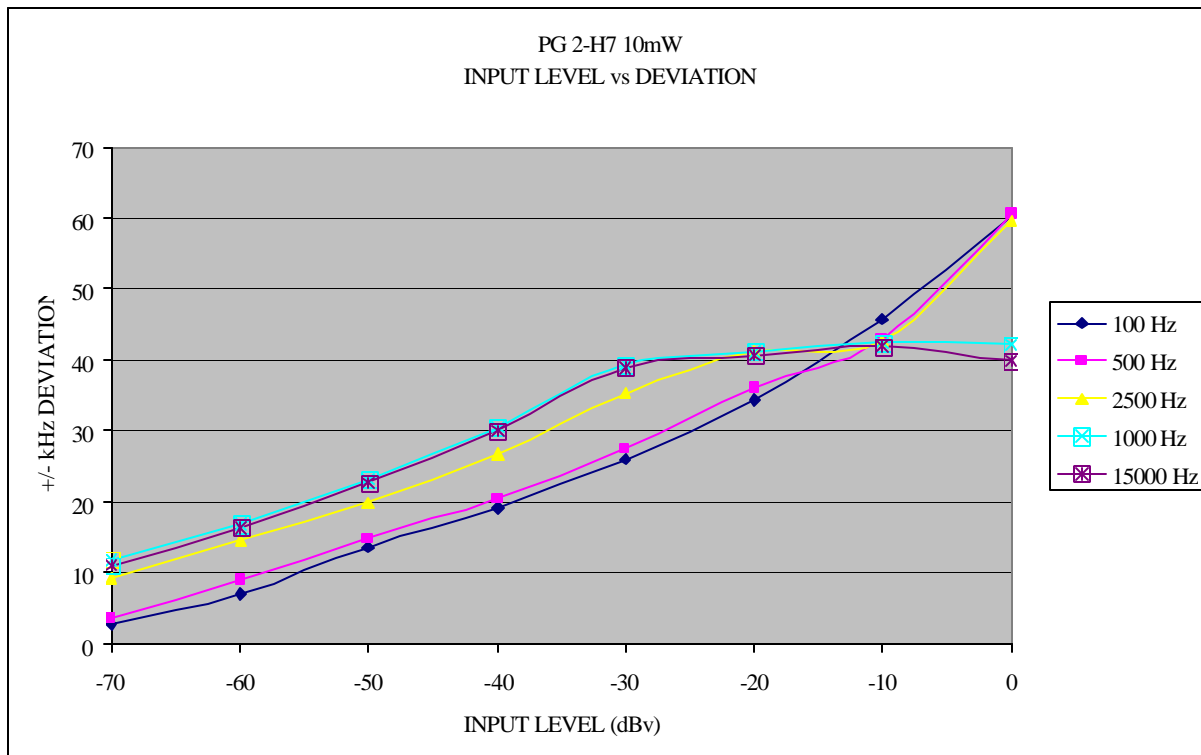
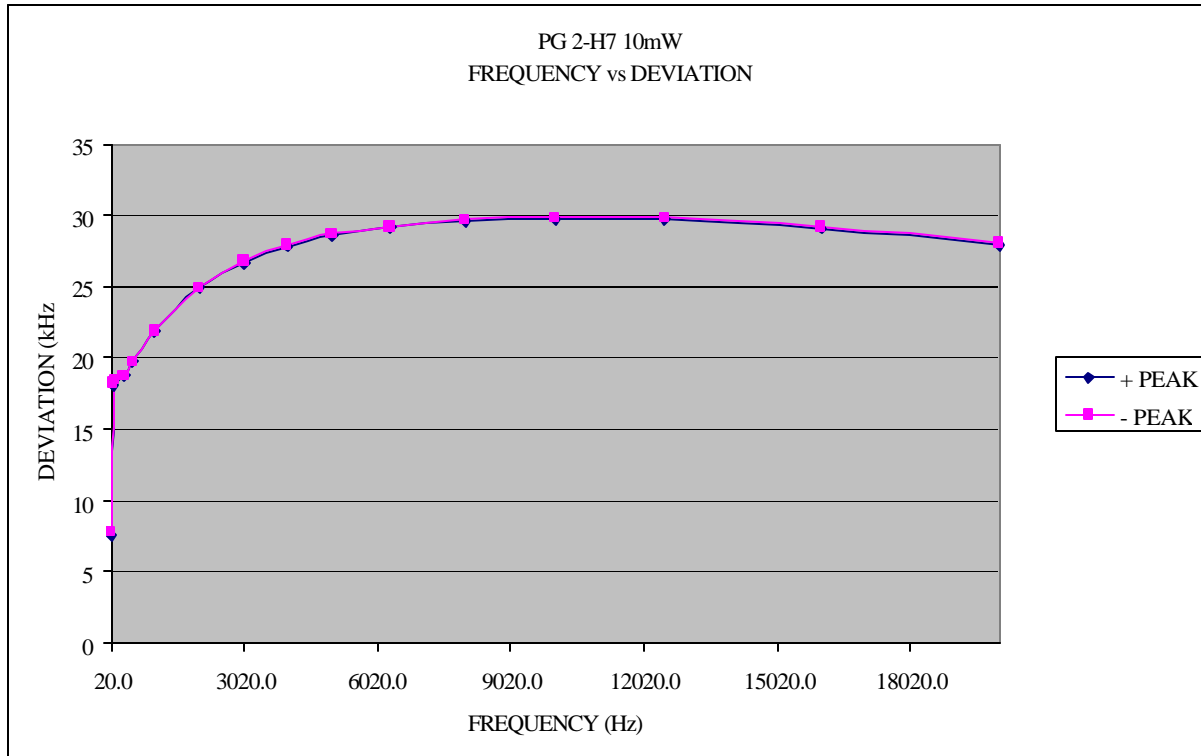
UNIT	Rated Power* (Watts)	Frequency (MHz)	Matched Sig. Gen Reading (dBm)	ERP (dBm)	Limit* (dBm)	ERP (Watts)	Limit* (Watts)
PG2-H7	.010	536.05	10.2	8.7	24.0	0.0074	0.250
PG2-M7	.010	671.18	9.1	7.3	24.0	0.0054	0.250
PG2-R12	.010	805.85	8.3	6.4	24.0	0.0043	0.250

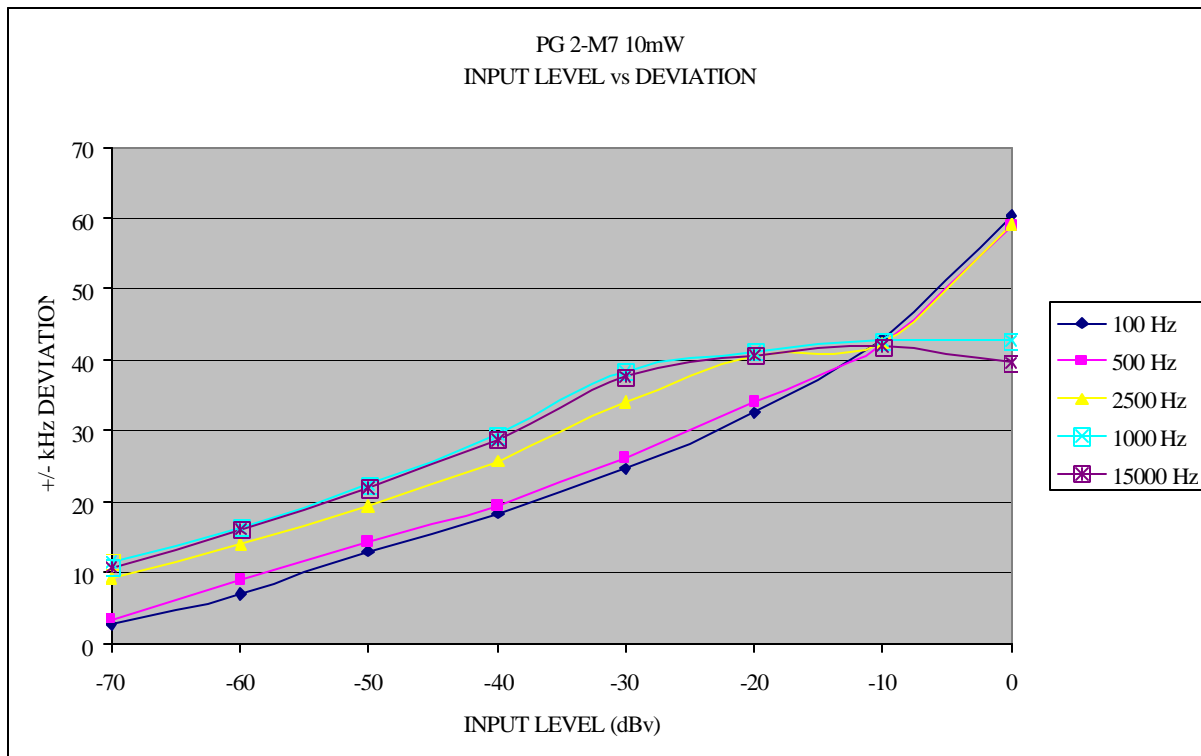
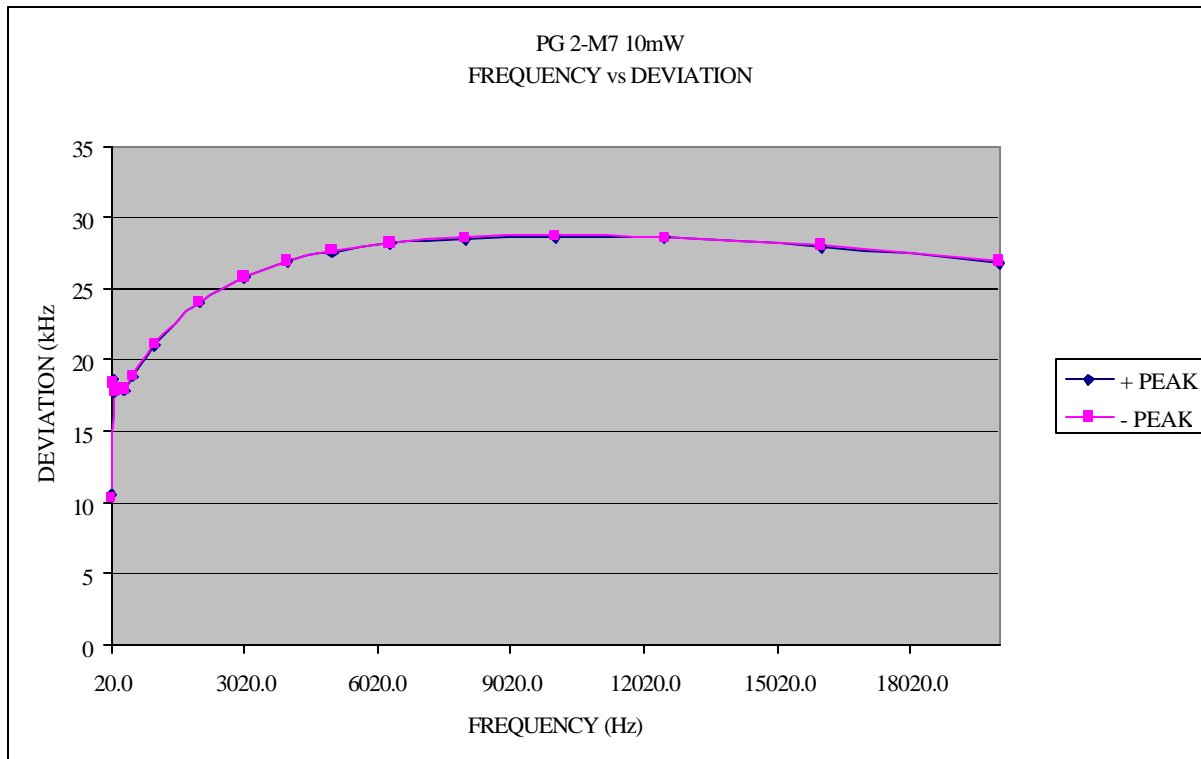
\* Limit and rated power listed are for conducted power at the antenna port. Since the measurements are effective radiated power (ERP) measurements, they include the integral antenna gain (loss).

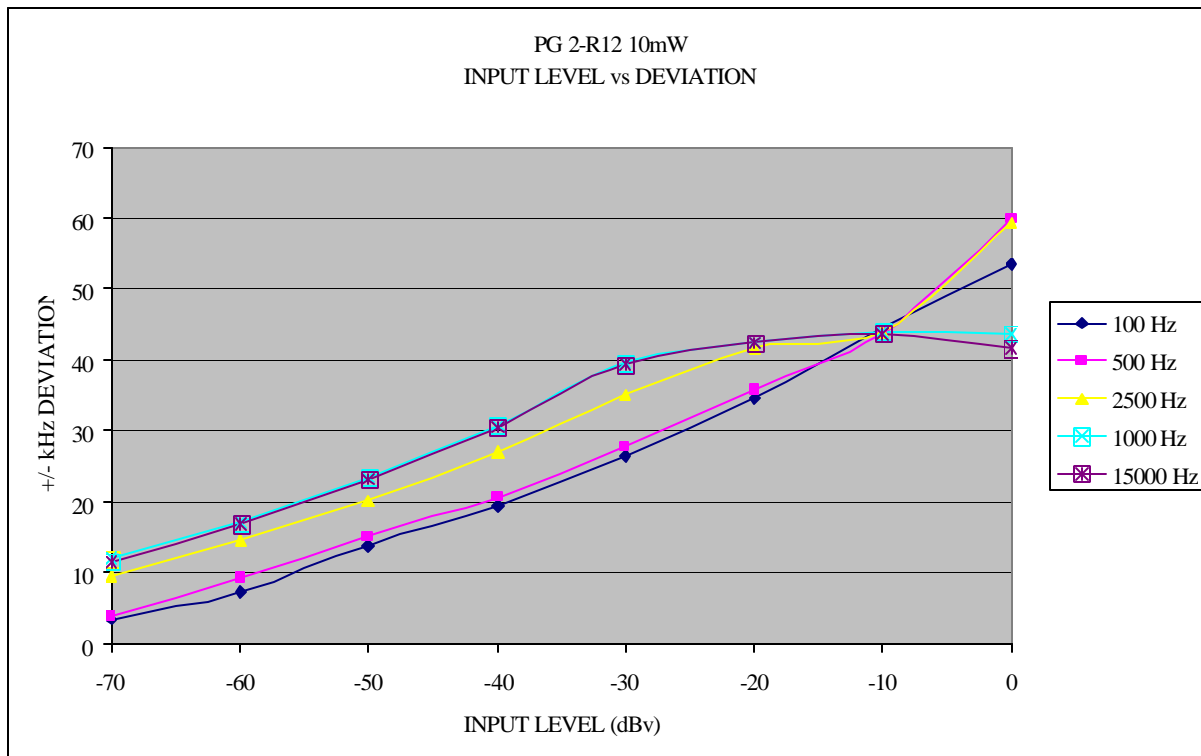
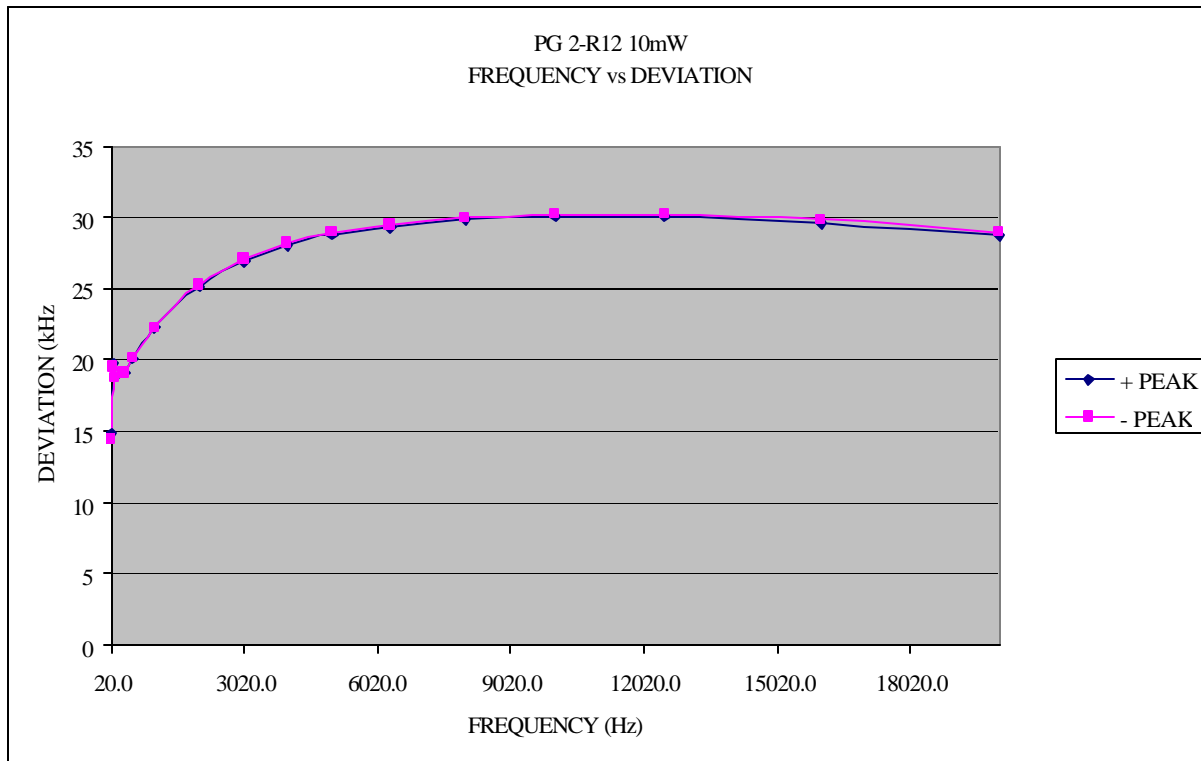
Checked BY :

*RICHARD E. KING*

Richard E. King









MANUFACTURER : Shure Inc.  
MODEL NO. : PG2-H7 and PG2-M7  
SERIAL NO. : None assigned  
SPECIFICATION : FCC-74 and RSS-123  
TEST PERFORMED : Frequency Stability vs. Temperature  
DATE : December 12, 2005  
NOTES :

**PG2-H7 10mW**

Temperature	Measured Frequency (MHz)	Nominal Frequency (MHz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
+50°C	53604902	53605055	0.00029	0.005	-153	2680
+40°C	53604972	53605055	0.00015	0.005	-83	2680
+30°C	53605049	53605055	0.00001	0.005	-6	2680
+20°C	53605128	53605055	-0.00014	0.005	73	2680
+10°C	53605155	53605055	-0.00019	0.005	100	2680
+0°C	53605221	53605055	-0.00031	0.005	166	2680
-10°C	53605196	53605055	-0.00026	0.005	141	2680
-20°C	53605016	53605055	0.00007	0.005	-39	2680
-30°C	53605035	53605055	0.00004	0.005	-20	2680

**PG2-M7 10mW**

Temperature	Measured Frequency (Hz)	Nominal Frequency (Hz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
+50°C	67117430	67117567	0.00020	0.005	-137	3355
+40°C	67117476	67117567	0.00014	0.005	-91	3355
+30°C	67117563	67117567	0.00001	0.005	-4	3355
+20°C	67117637	67117567	-0.00010	0.005	70	3355
+10°C	67117654	67117567	-0.00013	0.005	87	3355
+0°C	67117657	67117567	-0.00013	0.005	90	3355
-10°C	67117661	67117567	-0.00014	0.005	94	3355
-20°C	67117286	67117567	0.00042	0.005	-281	3355
-30°C	67117364	67117567	0.00030	0.005	-203	3355

Checked BY :

*RICHARD E. KING*

Richard E. King



MANUFACTURER : Shure Inc.  
MODEL NO. : PG1-R12  
SERIAL NO. : None assigned  
SPECIFICATION : FCC-74 and RSS-123  
TEST PERFORMED : Frequency Stability vs. Temperature  
DATE : December 12, 2005  
NOTES :

**PG2-R12 10mW**

Temperature	Measured Frequency (Hz)	Nominal Frequency (Hz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
+50°C	80584935	80585074	0.00017	0.005	-139	4029
+40°C	80585056	80585074	0.00002	0.005	-18	4029
+30°C	80585164	80585074	-0.00011	0.005	90	4029
+20°C	80585205	80585074	-0.00016	0.005	131	4029
+10°C	80585283	80585074	-0.00026	0.005	209	4029
+0°C	80585140	80585074	-0.00008	0.005	66	4029
-10°C	80584973	80585074	0.00013	0.005	-101	4029
-20°C	80584969	80585074	0.00012	0.005	-105	4029
-30°C	80584985	80585074	0.00011	0.005	-89	4029

Checked BY :

*RICHARD E. KING*

Richard E. King



MANUFACTURER : Shure Inc.  
MODEL NO. : Wireless Handheld Microphones  
SERIAL NOs. : None assigned  
SPECIFICATION : FCC-74 and RSS-123  
TEST PERFORMED : Frequency Stability vs. Voltage  
DATE : December 12, 2005  
NOTES :

Test Item	Nominal Frequency (Hz)	7.7VDC Measured Frequency (Hz)	10.3VDC Measured Frequency (Hz)	7.7VDC Deviation (%)	10.3VDC Deviation (%)	Limit (%)
PG2-H7	53605055	53605072	53605076	-0.00003	-0.00004	0.005
PG2-M7	67117567	67117574	67117572	-0.00001	-0.00001	0.005
PG2-R12	80585074	80585070	80585067	0.00000	0.00001	0.005

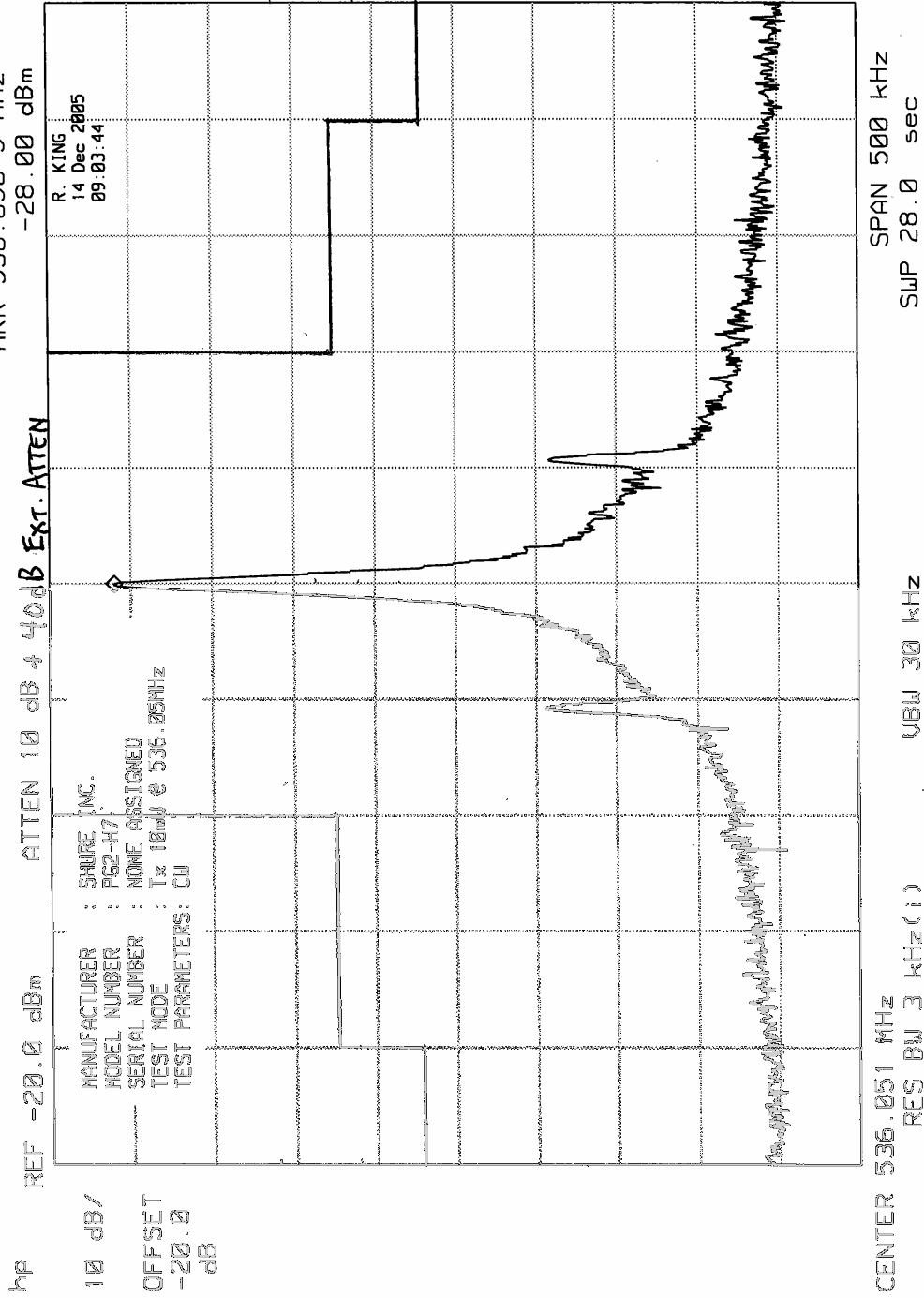
Test Item	Nominal Frequency (Hz)	7.7VDC Measured Frequency (Hz)	10.3VDC Measured Frequency (Hz)	7.7VDC Deviation (Hz)	10.3VDC Deviation (Hz)	Limit (Hz)
PG2-H7	53605055	53605072	53605076	17	21	2680
PG2-M7	67117567	67117574	67117572	7	5	3355
PG2-R12	80585074	80585070	80585067	-4	-7	4029

Checked BY : RICHARD E. KING

Richard E. King

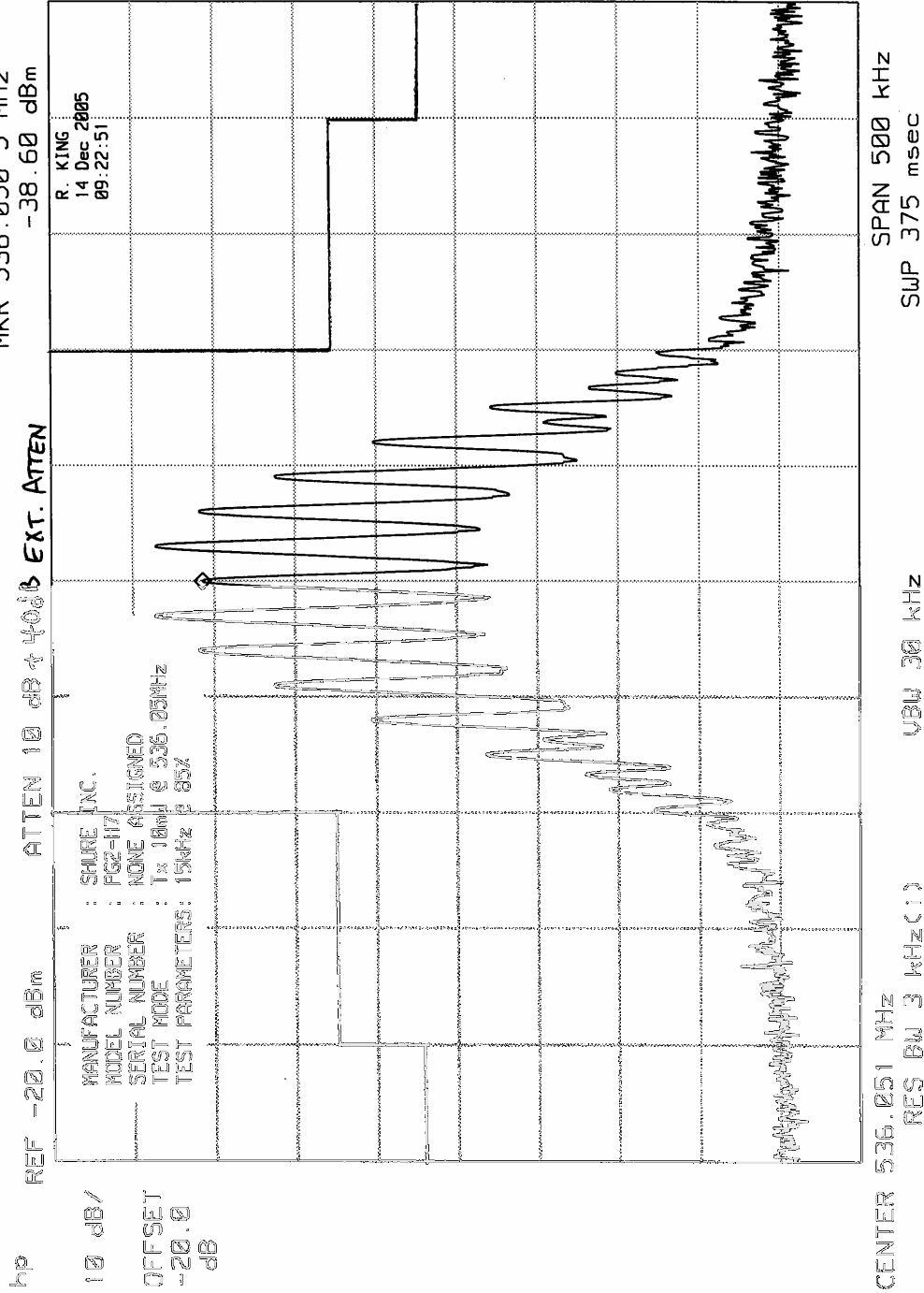
ELITE ELECTRONIC ENGINEERING INC.

MR 536.050 5 MHz  
-28.00 dBm



ELITE ELECTRONIC ENGINEERING INC.

MR 536.050 5 MHz  
-38.60 dBm





ELITE ELECTRONIC ENGINEERING INC.

MR 536.050 5 MHz  
-40.00 dBm

hp

REF -20.0 dBm

ATTEN 10 dB +40dB EXT. ATTN

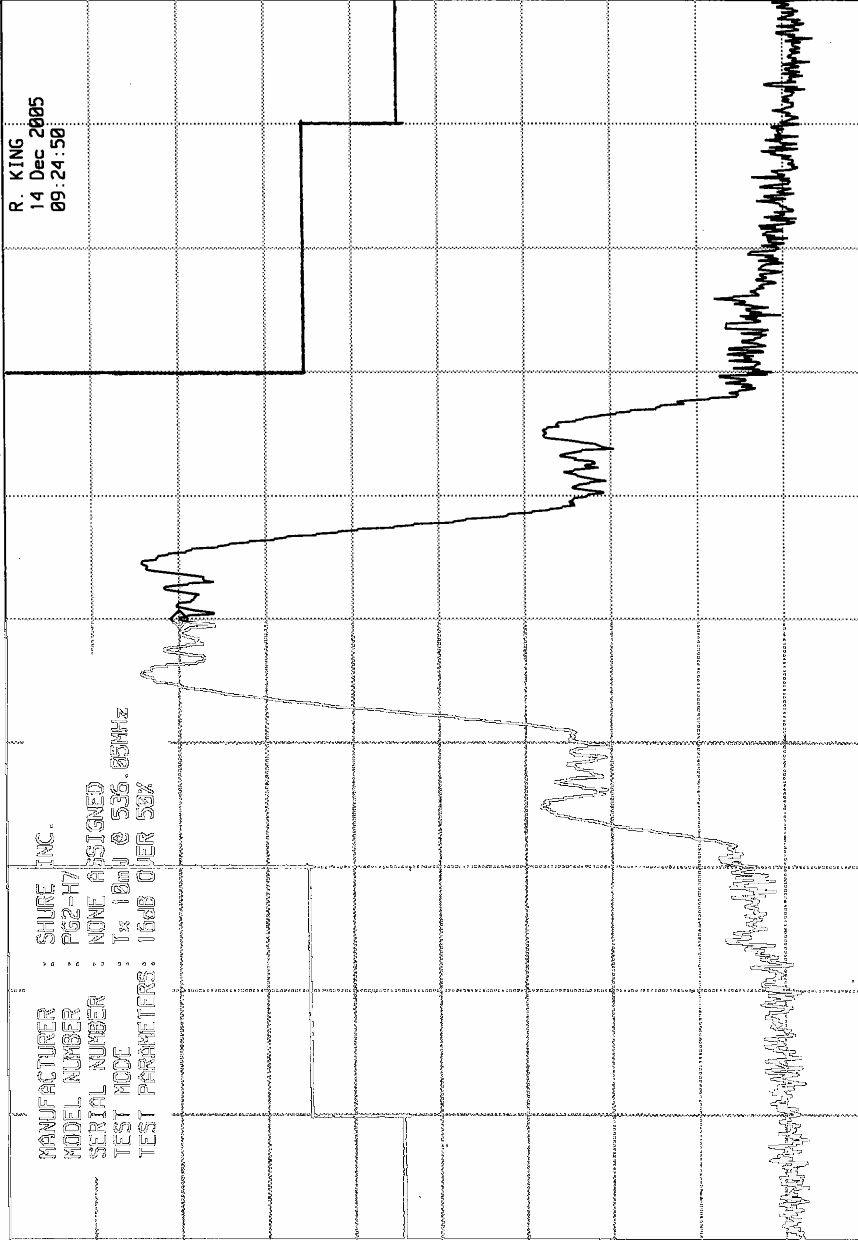
10 dB/

OFFSET

-20.0

dB

MANUFACTURER : SURE INC.  
MODEL NUMBER : P62-H7  
SERIAL NUMBER : NONE ASSIGNED  
TEST MODE : 1x 10mJ @ 536.05MHz  
TEST PERMITS: 10dB OVER 52K



CENTER 536.051 MHz

RES BW 3 kHz(1)

VBW 30 kHz

SPAN 500 kHz

SWP 375 msec