



Measurement of RF Interference from a GLXD6 Transceiver

For Shure Incorporated
5800 West Touhy
Niles, IL 60714

P.O. Number 4500236370
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Test Personnel Richard E. King
Specification FCC "Code of Federal Regulations" Title 47, Part 15,
Subpart C, Sections 15.207 and 15.247 for
Digital Modulation Intentional Radiators Operating within
the band 2400-2483.5MHz
FCC "Code of Federal Regulations" Title 47, Part15,
Subpart 15B, Section 15.107 and 15.109 for Receivers
Industry Canada RSS-210
Industry Canada RSS-GEN

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

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



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REVISION HISTORY

Revision	Date	Description
—	March 26,2013	Initial release



Measurement of RF Emissions from a Transceiver, Part No. GLXD6 Transceiver

1 INTRODUCTION

1.1 Scope of Tests

This document represents the results of the series of radio interference measurements performed on a Shure Incorporated Transceiver, Part No. GLXD6, transceiver (hereinafter referred to as the Equipment under test (EUT)). Two (2) samples of the EUT were submitted for testing. No serial numbers were given.

The EUTs were designed to transmit and receive in the 2404MHz to 2478MHz band using internal antennas. For testing purposes only, one EUT was modified with an external antenna port.

The EUT transmitted using digital transmission system (DTS) techniques. The EUT was manufactured and submitted for testing by Shure Incorporated located in Niles, IL.

1.2 Purpose

The test series was performed to determine if the EUT meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109, for receivers and Subpart C, Sections 15.207 and 15.249 for Intentional Radiators Operating within the 2400-2483.5 MHz band.

The test series was also performed to determine if the EUT meets the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.4 and Section 6.1 for receivers and the Industry Canada Radio Standards Specification RSS-Gen Section 7.2.4 and RSS-210 Annex 8 for Transmitters.

Testing was performed in accordance with ANSI C63.4-2009.

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

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.

1.5 Laboratory Conditions

The temperature at the time of the test was 23C and the relative humidity was 23%.

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 15, Subparts B and C, dated 1 October 2012
- ANSI C63.4-2009, "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"
- Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating under §15.247, Publication 558074, September 4, 2012
- Industry Canada RSS-210, Issue 8, December 2010, "Spectrum Management and

Telecommunications Radio Standards Specification, Low-power License-exempt radio communication devices (All Frequency Bands): Category I Equipment”

- Industry Canada RSS-GEN, Issue 3, December 2010, “Spectrum Management and Telecommunications Radio Standards Specification, General Requirements and Information for the Certification of radio communication equipment”

3 EUT SET-UP AND OPERATION

3.1 General Description

The EUT is a Shure Incorporated Transceiver, Part No. GLXD6. A block diagram of the EUT setup is shown as Figure 1 and Figure 2.

3.1.1 Power Input

The EUT receives 15VDC from the output of a Shure AC adapter M/N: PS42. The AC adapter is connected to the EUT via a 1.85 meter-long 2 wire power cord. The AC adapter was powered with 115V, 60Hz via a 1.85 meter long 2 wire power cord.

3.1.2 Peripheral Equipment

No peripheral equipment was submitted with the EUT.

3.1.3 Interconnect Cables

The following interconnect cables were submitted with the EUT:

Item	Description
¼” Jack Audio Cable	EUT was terminated with a 1 meter long ¼” jack audio cable to XLR cable. The cable was terminated with a shielded load.
USB Cable	The USB port of the EUT was terminated with a 1 meter long USB cable. The USB cable was not terminated.

3.1.4 Grounding

The EUT was not grounded during testing.

3.2 Operational Mode

For all tests the EUT was placed on an 80cm high non-conductive stand. The EUT was energized. For tests, the EUT was programmed to operate in one of the following modes:

- transmit @ 2404MHz
- transmit @ 2442MHz
- transmit @ 2478MHz

3.3 EUT 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 C63.4-2009 for site attenuation.



4.2 Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

Conducted emission tests were performed with a spectrum analyzer in conjunction with a quasi-peak adapter. Radiated emissions were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths specified by the FCC and with the quasi-peak and average detector functions. The spectrum analyzer bandwidth was 120kHz for the 30MHz to 1000MHz radiated emissions data.

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:

Conducted Emission Measurements		
Combined Standard Uncertainty	1.07	-1.07
Expanded Uncertainty (95% confidence)	2.1	-2.1
Radiated Emission Measurements		
Combined Standard Uncertainty	2.26	-2.18
Expanded Uncertainty (95% confidence)	4.5	-4.4

5 TEST PROCEDURES

5.1 Receiver

5.1.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Section 15.101(b), receivers operating above 960MHz are exempt from complying with the technical provisions of part 15.

Per Industry Notice 2012-DRS0126, Regulatory Standards Notice – Changes to RSS-Gen Issue 3 and RSS-310 Issue 3, section 2.2.3 of RSS-Gen Issue 3 now states that: "Only radiocommunication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to Industry Canada requirements, as described above. All other receivers are excluded from any Industry Canada certification, testing, labeling and reporting requirements." Since the receiver operates above 960MHz, the receiver portion is subject to the technical provisions of the RSS standards.

5.2 Transmitter

5.2.1 Powerline Conducted Emissions

5.2.1.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Per 15.207(a) and Industry Canada RSS-Gen section 7.2.4, all radio frequency voltages on the power lines of a transmitter shall be below the values shown below when using a quasi-peak or average detector:

Frequency MHz	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 – 0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5 - 5	56	46
5 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: If the levels measured using the QP detector meet both the QP and the Average limits, the EUT is considered to have met both requirements and measurements do not need to be performed using the Average detector.

5.2.1.1 Procedures

The interference on each power lead of the EUT was measured by connecting the measuring equipment to the appropriate meter terminal of the Line Impedance Stabilization Network (LISN). The meter terminal of the LISN not under test was terminated with 50 ohms.

- a) The EUT was operated in the Transmit at 2442MHz mode.
- b) Measurements were first made on the 115V, 60Hz high line.
- c) The frequency range from 150 kHz to 30 MHz was broken up into smaller frequency sub-bands.
- d) Conducted emissions measurements were taken on the first frequency sub-band using a peak detector.
- e) The data thus obtained was then searched by the computer for the highest levels. Any emissions levels that were within 10dB of the average limit were then measured again using both a quasi-peak detector and an average detector. (If no peak readings were within 10dB of the average limit, quasi-peak and average readings were taken on the highest emissions levels measured during the peak detector scan.)
- f) Steps (d) and (e) were repeated for the remainder of the frequency sub-bands until the entire frequency range from 150kHz to 30MHz was investigated. The peak trace was automatically plotted. The plot also shows quasi-peak and average readings that were taken on discrete frequencies. A table showing the quasi-peak and average readings was also generated. This tabular data compares the quasi-peak and average conducted emissions to the applicable conducted emissions limits.
- g) Steps (c) through (f) were repeated on the 115V, 60Hz return line.

5.2.1.1 Results

The plots of the peak, quasi-peak, and average conducted voltage levels acquired from each input power line with the EUT operated in the Transmit at 2442MHz mode are shown on pages 21 and 23. The tabular quasi-peak and average results from each input power line with the EUT operated in the Transmit at 2442MHz mode are shown on pages 20 and 22. All power line conducted emissions measured from the EUT were within the specification limits. Photographs of the test configuration which yielded the highest or worst case, conducted emission levels are shown on Figure 3.

5.2.2 6dB Bandwidth

5.2.2.1 Requirements

Per 15.247(a)(2), the minimum 6dB bandwidth shall be at least 500kHz for all systems using digital modulation techniques.

5.2.2.2 Procedures

- 1) The output of the EUT was connected to the spectrum analyzer through 40dB of attenuation.
- 2) The EUT was set to transmit at 2404MHz.

- 3) To determine the 6dB bandwidth, the following spectrum analyzer settings were used:
- a. Center frequency = transmit frequency
 - b. Span = Wide enough to capture the 6dB bandwidth.
 - c. Resolution bandwidth (RBW) = 100kHz
 - d. Video bandwidth (VBW) \geq 300kHz
 - e. Sweep time = auto
 - f. Detector = peak
 - g. Trace = max hold
 - h. Allow trace to fully stabilize
 - i. The maximum width of the emission that was constrained by the frequencies associated with the two outermost amplitude points that were attenuated by 6dB relative to the maximum level measured in the fundamental emissions was measured and plotted.
 - j. Steps a) through i) were repeated with the EUT set to transmit at 2442MHz.
 - k. Steps a) through i) were repeated with the EUT set to transmit at 2478MHz.

5.2.2.3 Results

The plots on pages 24 through 29 show that the minimum 6 dB bandwidth was 1MHz which is greater than the minimum allowable 6dB bandwidth requirement of 500kHz for systems using digital modulation techniques. The 99% bandwidth was measured to be 2.2MHz.

5.2.3 Peak Output Power

5.2.3.1 Requirements

Per section 15.247(b)(3), for systems using digital modulation the maximum peak output conducted power shall not be greater than 1.0W (40dBm). Per section 15.247(b)(4), this limit is based on the use of antennas with directional gains that do not exceed 6dBi. Since the limit allows for a 6dBi antenna gain, the maximum EIRP can be increased by 6dB to 4 Watt (36dBm).

5.2.3.2 Procedures

5.2.3.2.1 Peak Output Power - Antenna conducted method

The output of the EUT was connected to the spectrum analyzer through 40dB of attenuation. The EUT was set to transmit separately at the low, middle, and high channels. The resolution bandwidth (RBW) was set to greater than the 6dB bandwidth. The 'Max-Hold' function was engaged. The maximum meter reading was recorded. The peak power output was calculated for the low, middle and high channels.

5.2.3.2.2 Peak Output Power – EIRP method

The EUT was placed on the non-conductive stand and set to transmit. A double ridged waveguide antenna was placed at a test distance of 3 meters from the EUT. The resolution bandwidth (RBW) of the spectrum analyzer was set to greater than the 6dB bandwidth. The EUT was maximized for worst case emissions (or maximum output power) at the measuring antenna. The maximum meter reading was recorded for the low, middle and high channels.

The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power, a second double ridged waveguide antenna was then set in place of the EUT 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 then corrected to compensate for cable loss and antenna gain, as required. The peak power output was calculated for low, middle, and high hopping frequencies.

5.2.3.3 Results

The peak antenna conducted output power results are presented on pages 30 through 35. The maximum peak conducted output power from the transmitter was 0.0051W (7.06dBm) which is below the 1 Watt limit.

The EIRP results are presented on page 36. The maximum EIRP measured from the transmitter was 0.0079W (9.0dBm) which is below the 4 Watt limit.

5.2.4 Duty Cycle Factor Measurements

5.2.4.1 Requirement

Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

5.2.4.2 Procedures

- a. The EUT was connected to the receiver through 40dB of attenuation and set to transmit continuously.
- b. The center frequency of the spectrum analyzer was set to the transmit frequency of the EUT.
- c. The frequency span of the spectrum analyzer was set to 0Hz so that the time domain trace of the transmitted pulse of the EUT was displayed on the spectrum analyzer.
- d. The sweep time of the spectrum analyzer was adjusted so that the beginning and end of a single pulse could be seen on the display of the spectrum analyzer.
- e. The single sweep function of the spectrum analyzer was used multiple times to determine the maximum pulse width of the EUT.
- f. The maximum pulse width display of the spectrum analyzer was recorded and then plotted using a 'screen dump' utility.
- g. The sweep time of the spectrum analyzer was then adjusted to 100msec.
- h. The single sweep function of the spectrum analyzer was used multiple times to determine the maximum number of transmitted pulses that occurred in a 100msec time period.
- i. The maximum number of pulses transmitted in a 100msec time period was recorded and then plotted using a 'screen dump' utility.
- j. The duty cycle correction was calculated using the following equation:

$$\text{Duty Cycle Correction Factor (dB)} = \text{D.C. (dB)}$$

$$\text{D.C. (dB)} = 20 \times \log ((\text{pulse width (msec)}) \times (\#\text{pulses in a 100msecperiod}) / 100\text{msec})$$

5.2.4.3 Results

Duty cycle plots are shown on pages 37 through 40. The result for the duty cycle correction factor worst case is -2dB.

5.2.5 Radiated Spurious Emissions Measurements

5.2.5.1 Requirements

Per section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated emissions measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

Paragraph 15.209(a) has the following radiated emission limits:

Frequency MHz	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	3
30.0-88.0	100	3
88.0-216.0	150	3
216.0-960.0	200	3
Above 960	500	3

5.2.5.2 Procedures

Radiated measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. 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.

Preliminary radiated emissions tests were performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 30MHz to 25GHz was investigated using a peak detector function.

The final open field emission tests were then manually performed over the frequency range of 30MHz to 25GHz.

- 1) For all harmonics not in the restricted bands, the following procedure was used:
 - a) The field strength of the fundamental was measured using a double ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.
 - b) The field strengths of all of the harmonics not in the restricted band were then measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.
 - c) To ensure that maximum or worst case emission levels at the fundamental and harmonics were measured, the following steps were taken when measuring the fundamental emissions and the spurious emissions:
 - i) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
 - iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
 - iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer. The measuring antenna was not raised or lowered to ensure maximized readings, instead the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.
 - d) All harmonics not in the restricted bands must be at least 20 dB below levels measured at the fundamental. However, attenuation below the general limits specified in §15.209(a) is not required.
- 2) For all emissions in the restricted bands, the following procedure was used:
 - a) The field strengths of all emissions below 1 GHz were measured using a bi-log antenna. The bi-log antenna was positioned at a 3 meter distance from the EUT. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.

- b) The field strengths of all emissions above 1 GHz were measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. A peak detector with a resolution bandwidth of 1 MHz was used on the spectrum analyzer.
- c) To ensure that maximum or worst case emission levels were measured, the following steps were taken when taking all measurements:
 - i) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
 - iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the readings.
 - iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer. The measuring antenna was not raised or lowered to ensure maximized readings, instead the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.
- d) For all radiated emissions measurements below 1 GHz, if the peak reading is below the limits listed in 15.209(a), no further measurements are required. If however, the peak readings exceed the limits listed in 15.209(a), then the emissions are remeasured using a quasi-peak detector.
- e) For all radiated emissions measurements above 1 GHz, the peak readings must comply with the 15.35(b) limits. 15.35(b) states that when average radiated emissions measurements are specified, there also is a limit on the peak level of the radiated emissions. The limit on the peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, all peak readings above 1 GHz must be no greater than 20 dB above the limits specified in 15.209(a).
- f) Next, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector. An average reading was taken. If the emission is pulsed, the reading can be adjusted by a “duty cycle correction factor” derived from $20 \cdot \log(\text{on time}/100\text{msec})$. These readings must be no greater than the limits specified in 15.209(a).

5.2.5.3 Results

Preliminary radiated emissions plots with the EUT transmitting at 2404MHz, 2442MHz, and 2478MHz are shown on pages 41 through 64. Final radiated emissions data are presented on data pages 65 through 70. As can be seen from the data, all emissions measured from the EUT were within the specification limits.

Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figure 4.

5.2.6 Band Edge Compliance

5.2.6.1 Requirements

Per section 15.247(d), the emissions at the band-edges must be at least 20dB below the highest level measured within the band but attenuation below the general limits listed in 15.209(a) is not required.

In addition, the radiated emissions which fall in the restricted band beginning at 2483.5 MHz must meet the general limits of 15.209(a).

5.2.6.2 Procedures

5.2.6.2.1 Low Band Edge

- 1) The output of the EUT was connected to the spectrum analyzer through 40dB of attenuation.
- 2) The EUT was set to transmit continuously at the channel closest to the low band-edge.
- 3) To determine the band edge compliance, the following spectrum analyzer settings were used:

- a. Center frequency = low band-edge frequency.
- b. Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.
- c. Resolution bandwidth (RBW) \geq 1% of the span.
- d. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined.
- e. The marker was set on the peak of the in-band emissions. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down display line. (All emissions to the left of the center frequency (band-edge) must be below the display line.)
- f. The analyzer's display was plotted using a 'screen dump' utility.

5.2.6.2.2 High Band Edge

- 1) The EUT was set to transmit continuously at the channel closest to the high band-edge.
- 2) A double ridged waveguide was placed 3 meters away from the EUT. The antenna was connected to the input of a spectrum analyzer.
- 3) The center frequency of the analyzer was set to the high band edge (2483.5MHz)
- 4) The resolution bandwidth was set to 1MHz.
- 5) To ensure that the maximum or worst case emission level was measured, the following steps were taken:
 - a. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
 - b. Since the measuring antenna is 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.
- 6) The highest measured peak reading was recorded.
- 7) The highest measured average reading was recorded.

5.2.6.3 Results

Pages 71 through 74 show the band-edge compliance results. As can be seen from these plots, the conducted emissions at the low end band edge are within the 20 dB down limits. The radiated emissions at the high end band edge are within the general limits.

5.2.7 Power Spectral Density

5.2.7.1 Requirement

Per section 15.247(e), the peak power spectral density from the intentional radiator shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2.7.2 Procedures

- a) The output of the EUT was connected to the spectrum analyzer through 40dB of attenuation.
- b) The EUT was set to transmit at 2404MHz.
- c) Set the span to 1.5 times the DTS channel bandwidth.
- d) Set the RBW \geq 3 kHz.
- e) Set the VBW \geq 3 x RBW.
- f) Detector = peak.
- g) Sweep time = auto couple.
- h) Trace mode = max hold.
- i) Allow trace to fully stabilize.
- j) Use the peak marker function to determine the maximum amplitude level.



- k) Record this plot.

5.2.7.3 Results

Pages 75 through 80 show the power spectral density results. As can be seen from the plots, the peak power spectral density is less than 8dBm in a 3kHz band during any time interval of continuous transmission.

6 CONCLUSIONS

It was determined that the Shure Incorporated Transceiver, Part No. GLXD6, digital modulated transceiver did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109 for receivers and Subpart C, Sections 15.207 and 15.247 for Intentional Radiators Operating within the 2400-2483.5 MHz band, when tested per ANSI C63.4-2009.

It was also determined that the Shure Incorporated Transceiver, Part No. GLXD6, digital modulated transceiver did fully meet the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.4 and Section 6.1 for receivers and the Industry Canada Radio Standards Specification RSS-Gen Section 7.2.4 and RSS-210 Annex 8 for Transmitters when tested per ANSI C63.4-2009.

7 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 specifications.

The data presented in this test report pertains to the EUT at the test date. Any electrical or mechanical modification made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

8 ENDORSEMENT DISCLAIMER

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



9 EQUIPMENT LIST

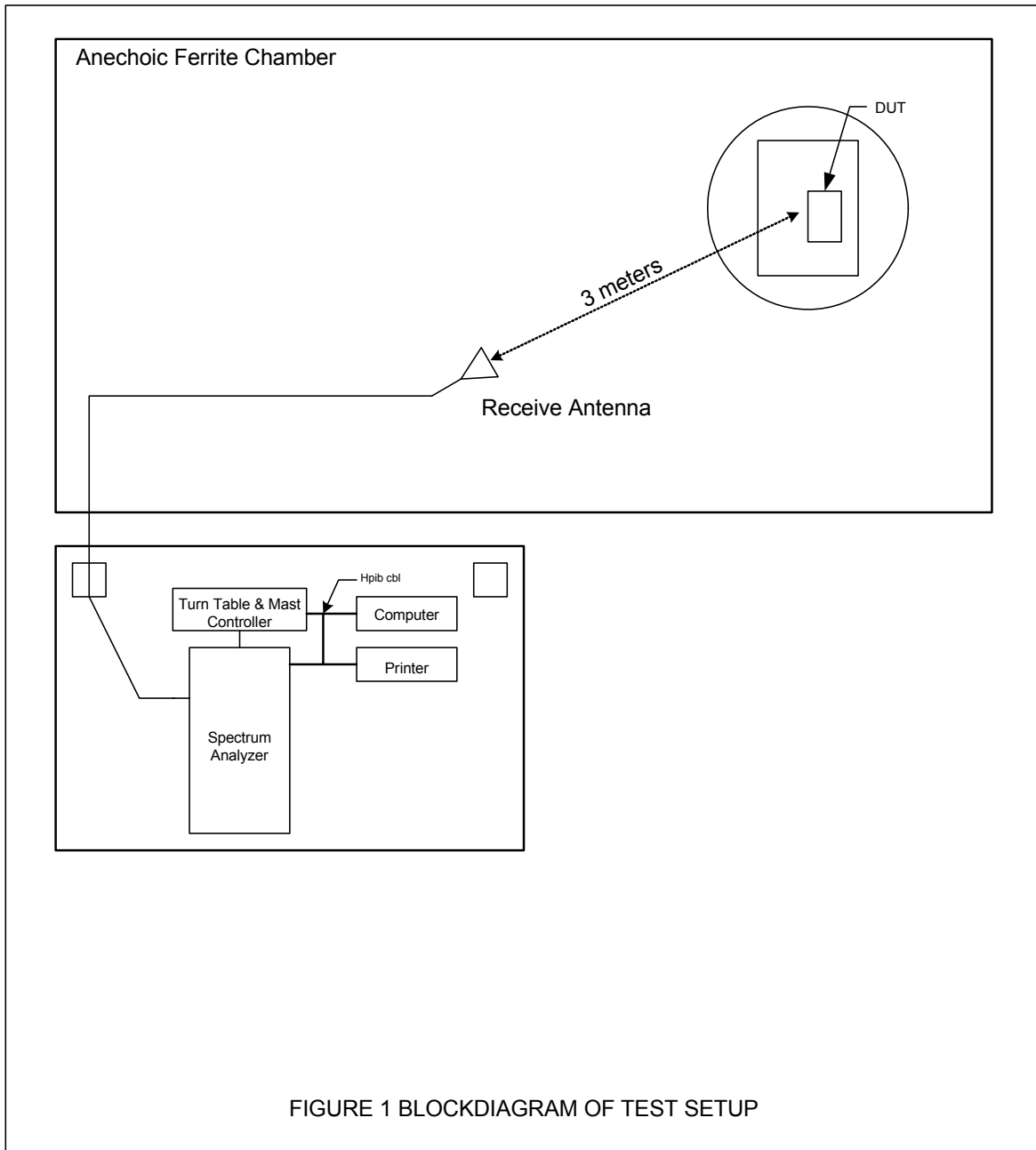
Table 9-1 Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW1	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-30-20G20R6G-3R0	PL2927/0646	20GHZ-26.5GHZ	3/8/2013	3/8/2014
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	8/22/2012	8/22/2013
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NTA2	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	7/30/2012	7/30/2013
NWF0	RIDGED WAVE GUIDE	EMCO	3105	2035	1-12.4GHZ	1/26/2013	1/26/2014
NWH0	RIDGED WAVE GUIDE	TENSOR	4105	2081	1-12.4GHZ	12/5/2012	12/5/2013
NW11	RIDGED WAVE GUIDE	AEL	H1498	154	2-18GHZ	1/26/2013	1/26/2014
PLF1	CISPR16 50UH LISN	ELITE	CISPR16/70A	001	.15-30MHz	6/20/2012	6/20/2013
PLF3	CISPR16 50UH LISN	ELITE	CISPR16/70A	003	.15-30MHz	6/20/2012	6/20/2013
RBA0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100145	20HZ-26.5GHZ	3/12/2013	3/12/2014
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/7/2013	3/7/2014
XLJE	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	15	DC-2GHZ	8/6/2012	8/6/2013

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.



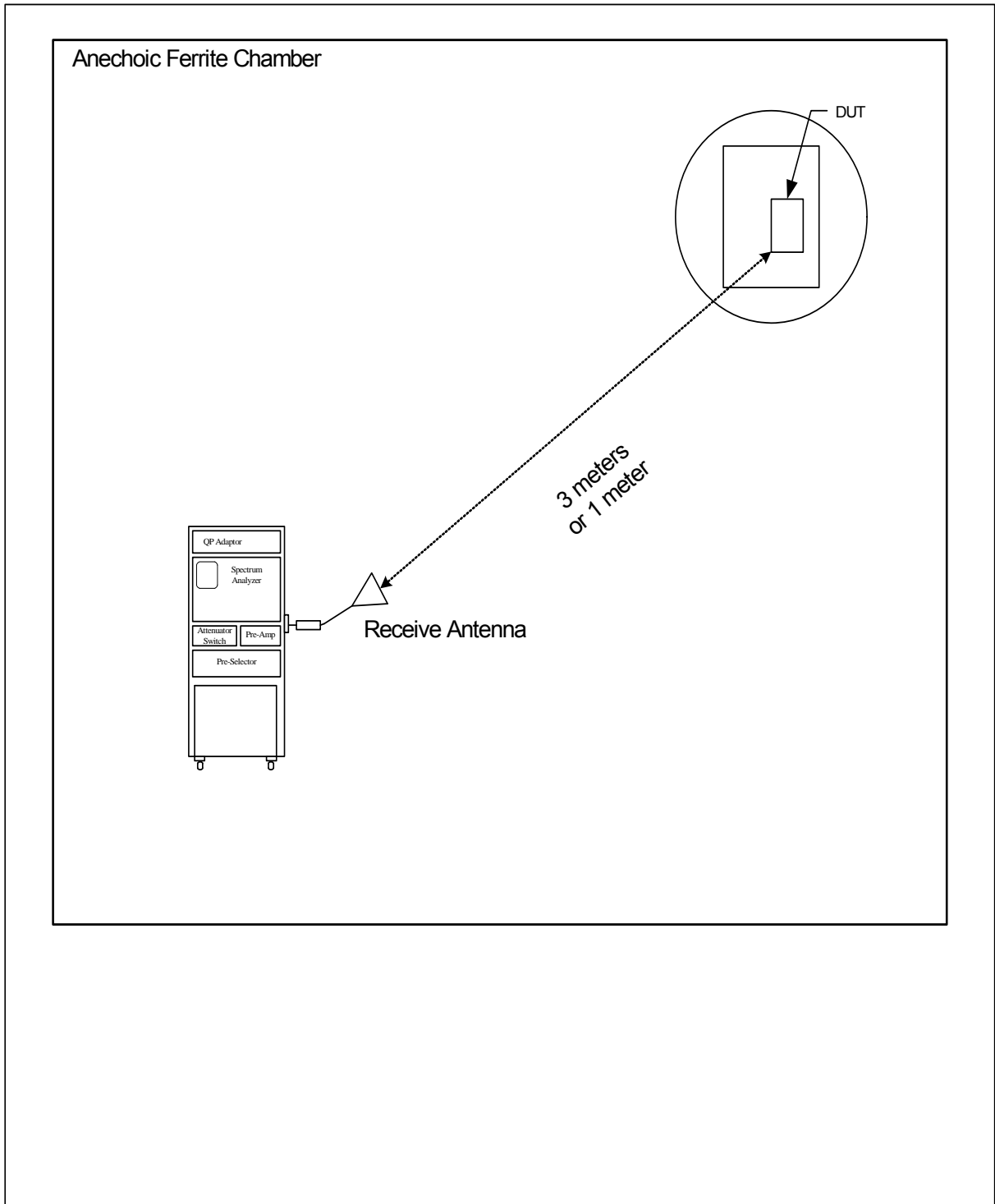


Figure 2: BLOCK DIAGRAM OF TEST SETUP FOR RADIATED EMISSIONS ABOVE 18GHZ

Figure 3

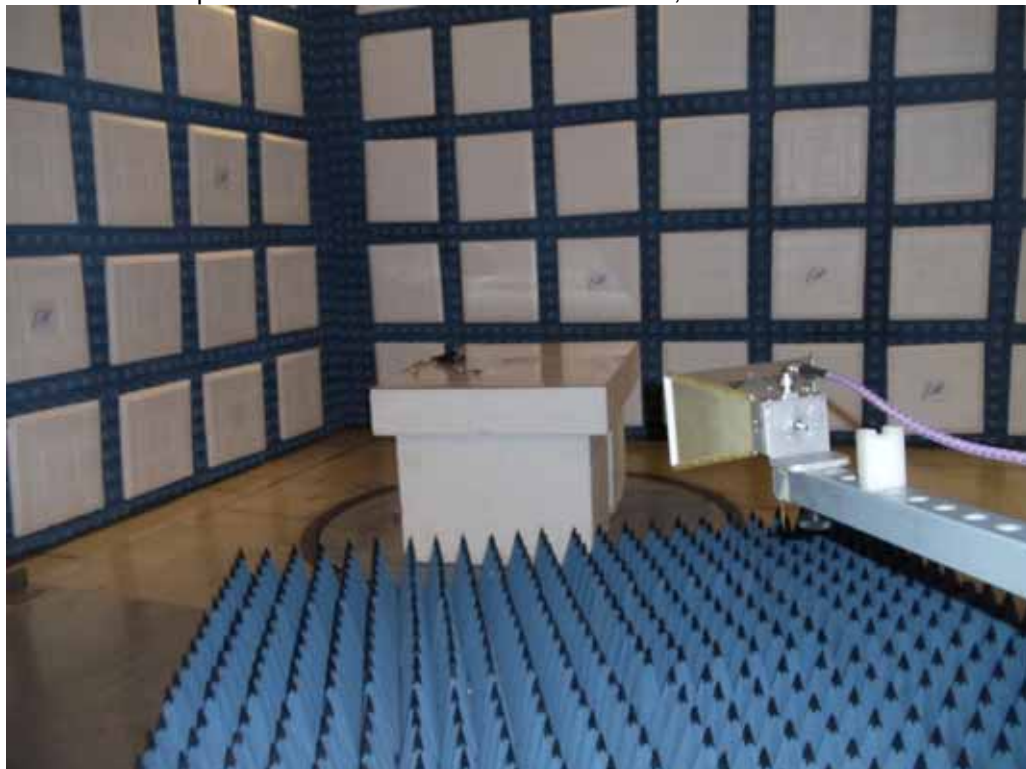


Test Setup for Conducted Emissions

Figure 4



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



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



FCC Part 15 Subpart B Conducted Emissions Test Significant Emissions Data

VB** 02/09/2011

Manufacturer : SHURE INC.
Model : GLXD6
DUT Mode : TRANSMIT / RECEIVE
Line Tested : L1
Scan Step Time [ms] : 30
Meas. Threshold [dB] : -10
Notes :
Test Engineer : R. King
Limit : Class B
Test Date : Mar 12, 2013 10:50:55 AM
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

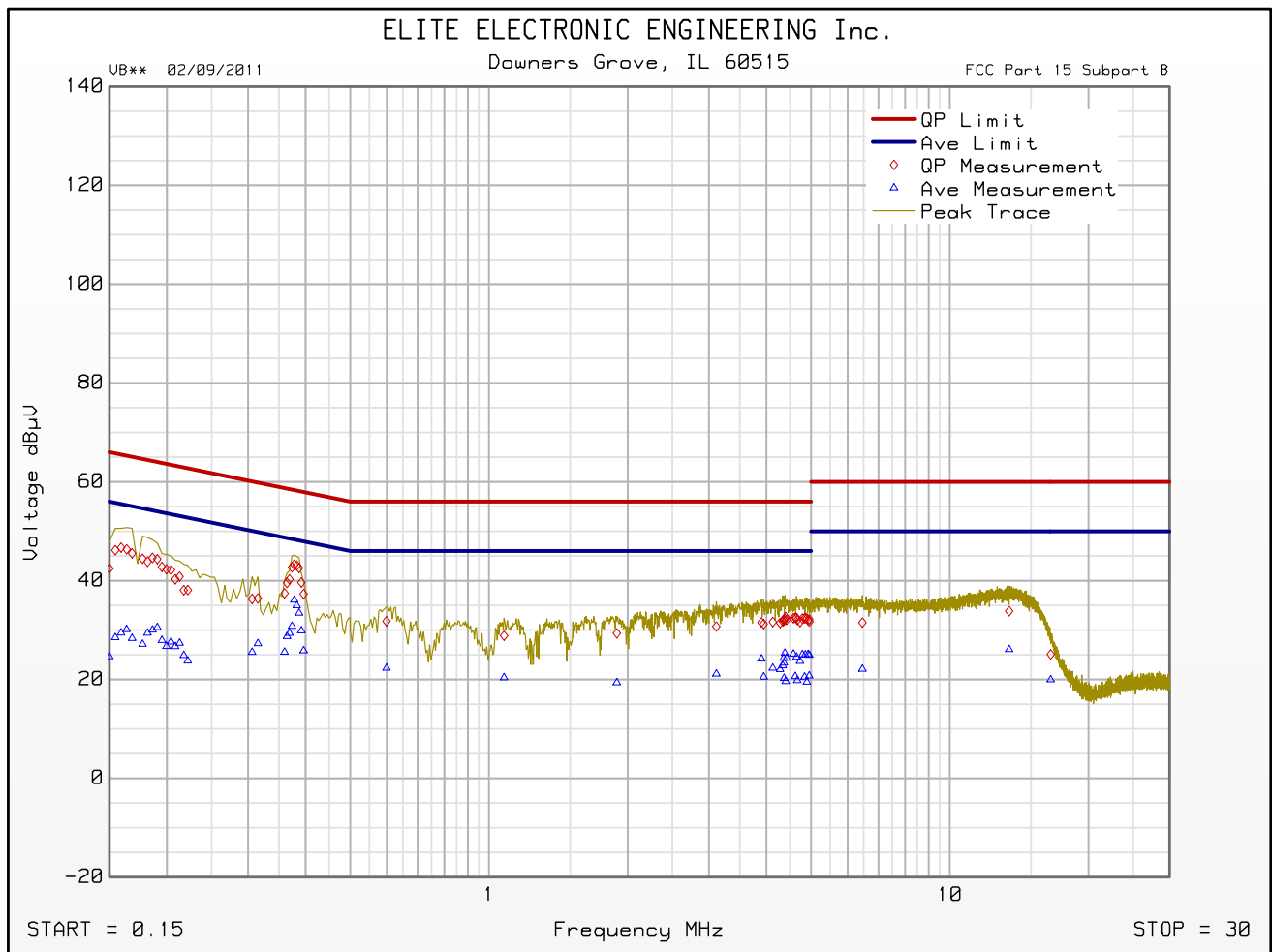
Freq MHz	Quasi-peak Level dB μ V	Quasi-peak Limit dB μ V	Excessive Quasi-peak Emissions	Average Level dB μ V	Average Limit dB μ V	Excessive Average Emissions
0.159	46.7	65.5		29.4	55.5	
0.378	43.2	58.3		36.1	48.3	
0.599	31.8	56.0		22.3	46.0	
1.078	28.9	56.0		20.4	46.0	
1.894	29.3	56.0		19.4	46.0	
3.114	30.7	56.0		21.1	46.0	
4.405	32.7	56.0		19.6	46.0	
6.463	31.5	60.0		22.1	50.0	
13.451	33.8	60.0		26.1	50.0	
16.561	25.1	60.0		20.0	50.0	



FCC Part 15 Subpart B Conducted Emissions Test Cumulative Data

VB** 02/09/2011

Manufacturer : SHURE INC.
Model : GLXD6
DUT Mode : TRANSMIT / RECEIVE
Line Tested : L1
Scan Step Time [ms] : 30
Meas. Threshold [dB] : -10
Notes :
Test Engineer : R. King
Limit : Class B
Test Date : Mar 12, 2013 10:50:55 AM



Emissions Meet QP Limit
Emissions Meet Ave Limit



FCC Part 15 Subpart B Conducted Emissions Test Significant Emissions Data

VB** 02/09/2011

Manufacturer : SHURE INC.
Model : GLXD6
DUT Mode : TRANSMIT / RECEIVE
Line Tested : L2
Scan Step Time [ms] : 30
Meas. Threshold [dB] : -10
Notes :
Test Engineer : R. King
Limit : Class B
Test Date : Mar 12, 2013 10:57:03 AM
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

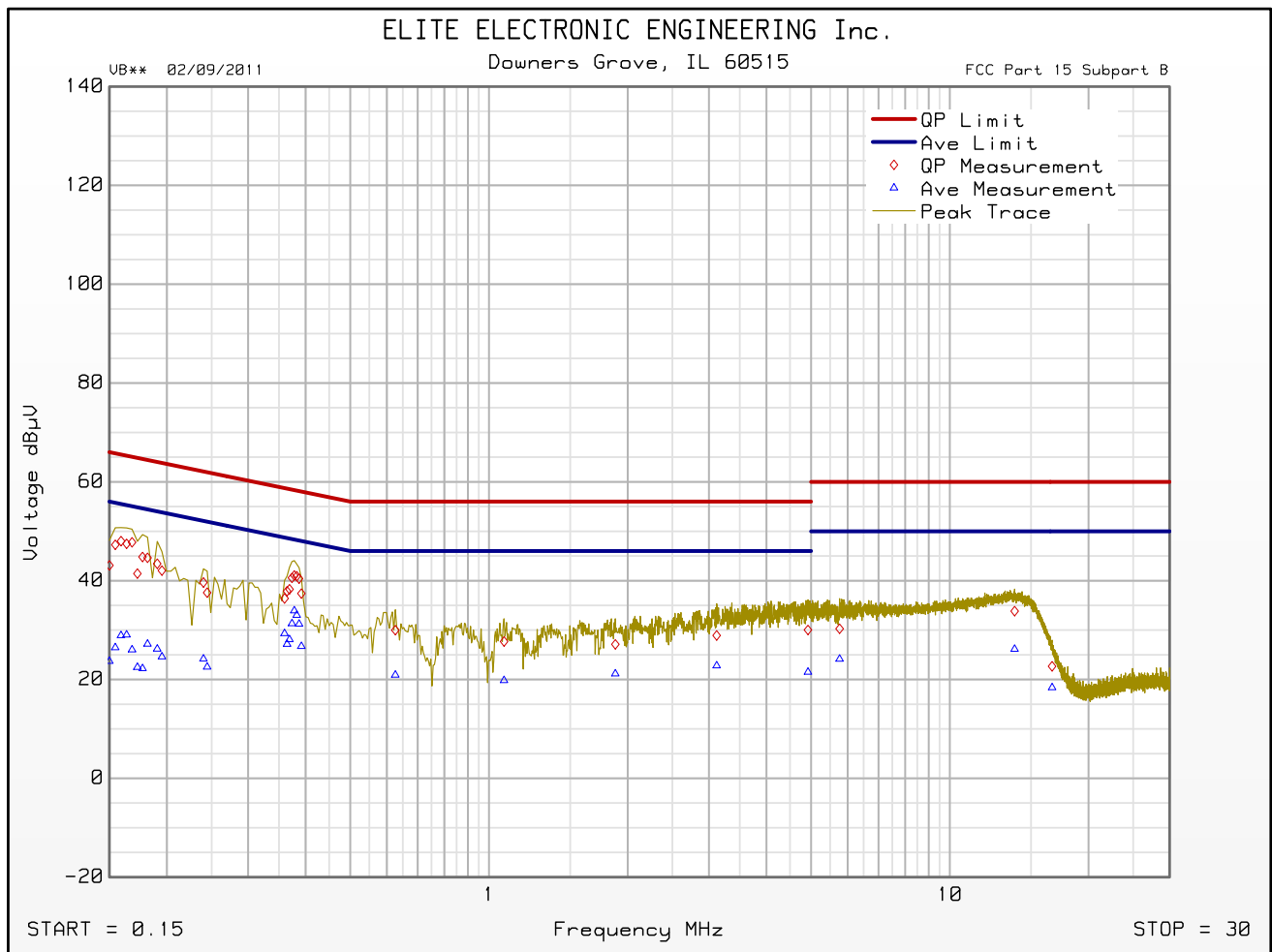
Freq MHz	Quasi-peak Level dB μ V	Quasi-peak Limit dB μ V	Excessive Quasi-peak Emissions	Average Level dB μ V	Average Limit dB μ V	Excessive Average Emissions
0.168	47.8	65.1		26.0	55.1	
0.378	41.1	58.3		33.9	48.3	
0.626	30.0	56.0		20.9	46.0	
1.078	27.7	56.0		19.8	46.0	
1.880	27.1	56.0		21.2	46.0	
3.119	28.9	56.0		22.8	46.0	
4.922	30.0	56.0		21.5	46.0	
5.765	30.3	60.0		24.2	50.0	
13.824	33.8	60.0		26.2	50.0	
16.669	22.7	60.0		18.4	50.0	



FCC Part 15 Subpart B Conducted Emissions Test Cumulative Data

VB** 02/09/2011

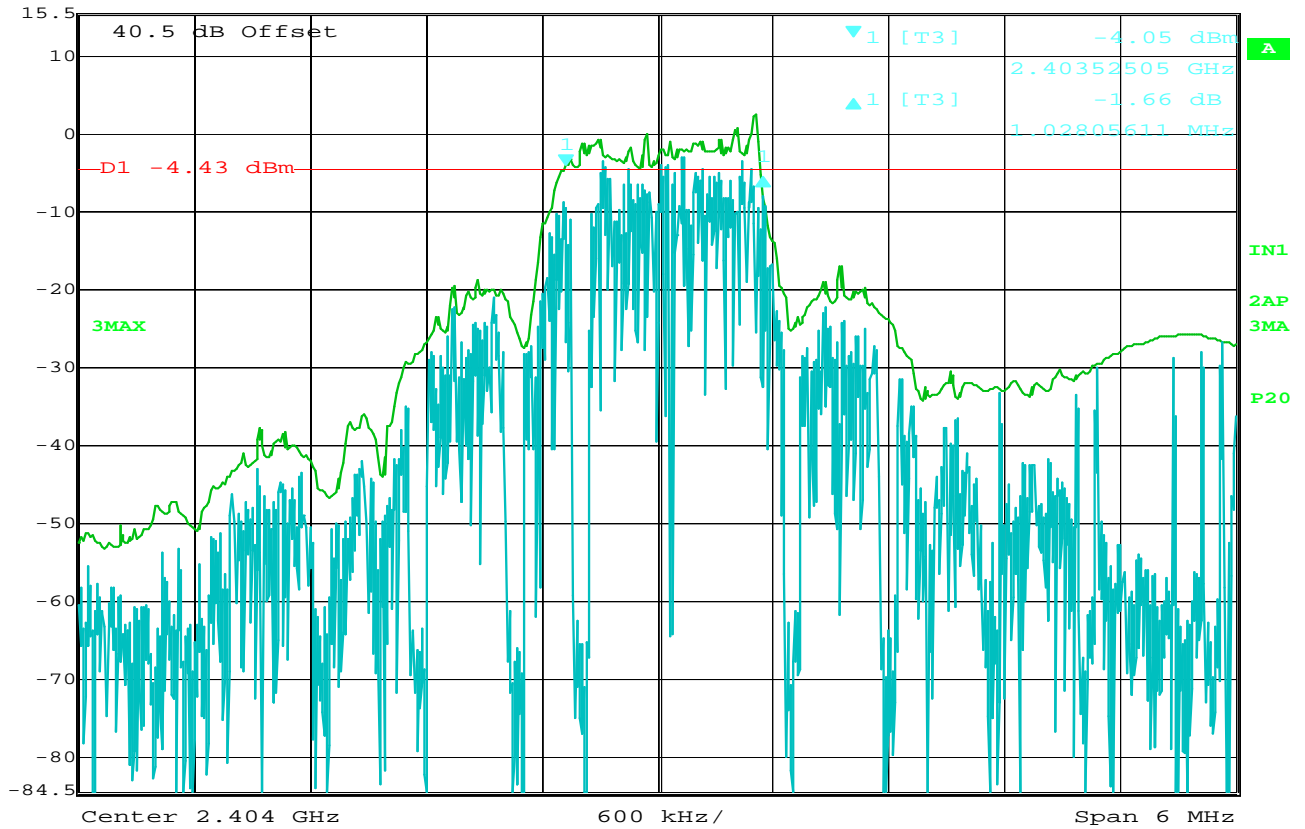
Manufacturer : SHURE INC.
Model : GLXD6
DUT Mode : TRANSMIT / RECEIVE
Line Tested : L2
Scan Step Time [ms] : 30
Meas. Threshold [dB] : -10
Notes :
Test Engineer : R. King
Limit : Class B
Test Date : Mar 12, 2013 10:57:03 AM



Emissions Meet QP Limit
Emissions Meet Ave Limit



Delta 1 [T3] RBW 30 kHz RF Att 10 dB
 Ref Lvl -1.66 dB VBW 300 kHz
 15.5 dBm 1.02805611 MHz SWT 17 ms Unit dBm



Date: 8.MAR.2013 14:38:41

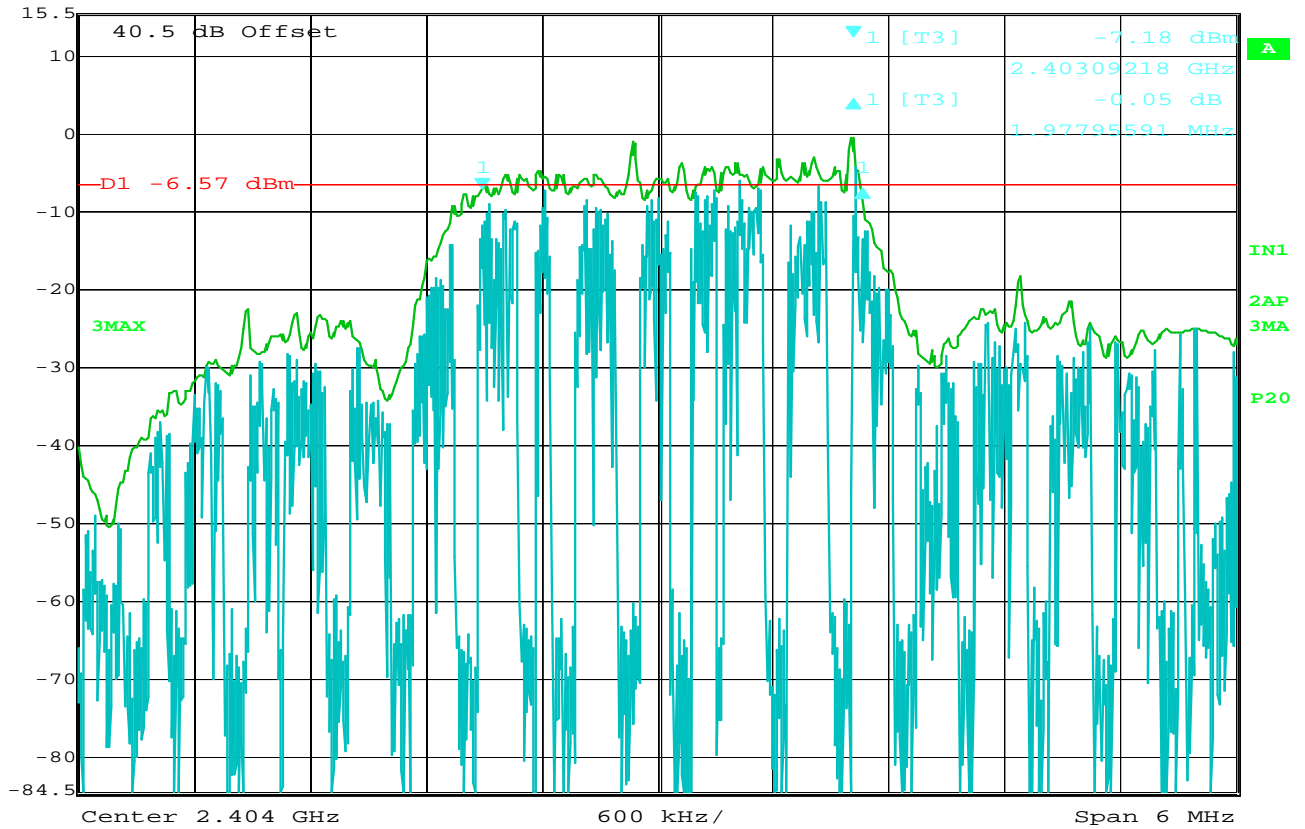
FCC 15.247 6dB Bandwidth

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2404MHz, half bandwidth
 NOTES :

NOTES



Delta 1 [T3] RBW 30 kHz RF Att 10 dB
 Ref Lvl -0.05 dB VBW 300 kHz
 15.5 dBm 1.97795591 MHz SWT 17 ms Unit dBm



Date: 8.MAR.2013 14:59:38

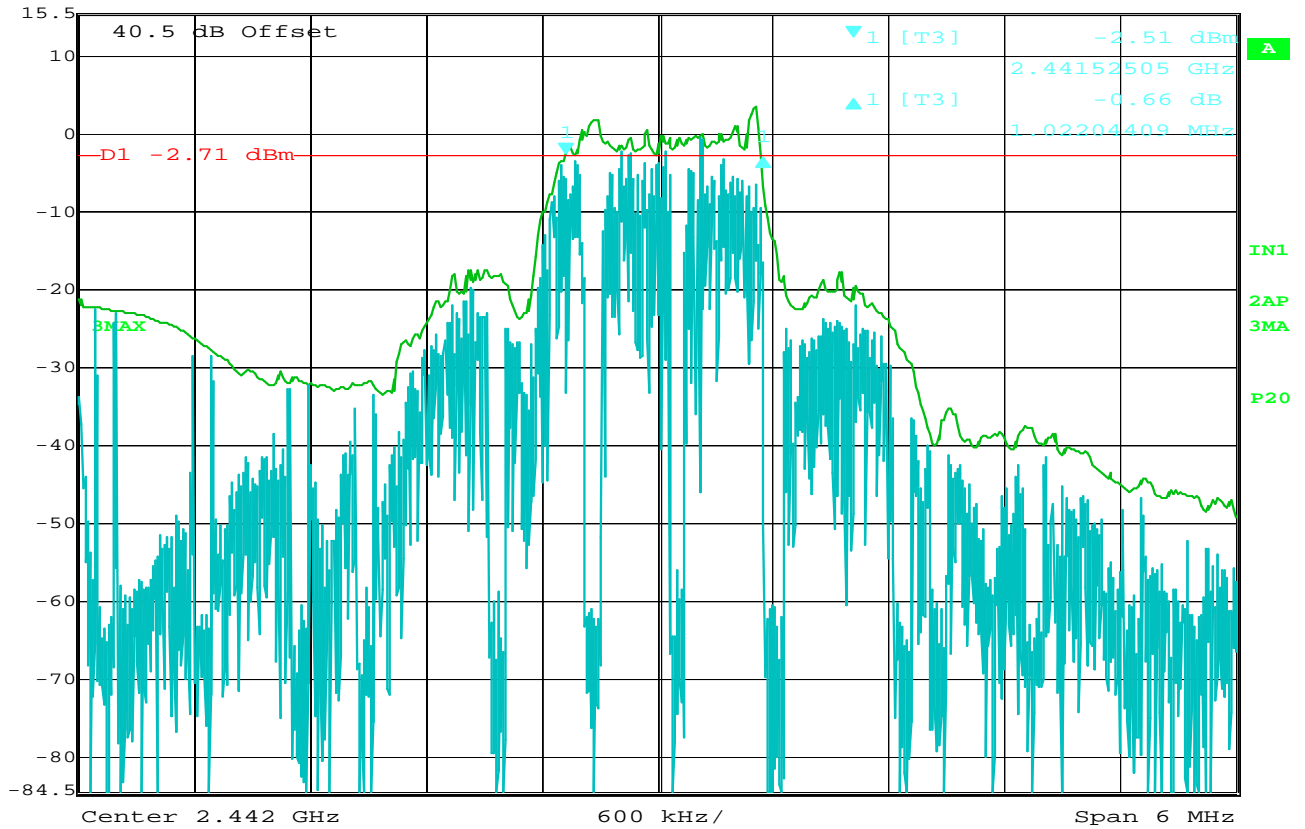
FCC 15.247 6dB Bandwidth

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2404MHz, full bandwidth
 NOTES :

NOTES



Ref Lvl	Delta 1 [T3]	RBW	30 kHz	RF Att	10 dB
15.5 dBm	-0.66 dB	VBW	300 kHz		
	1.02204409 MHz	SWT	17 ms	Unit	dBm



Date: 8.MAR.2013 15:34:22

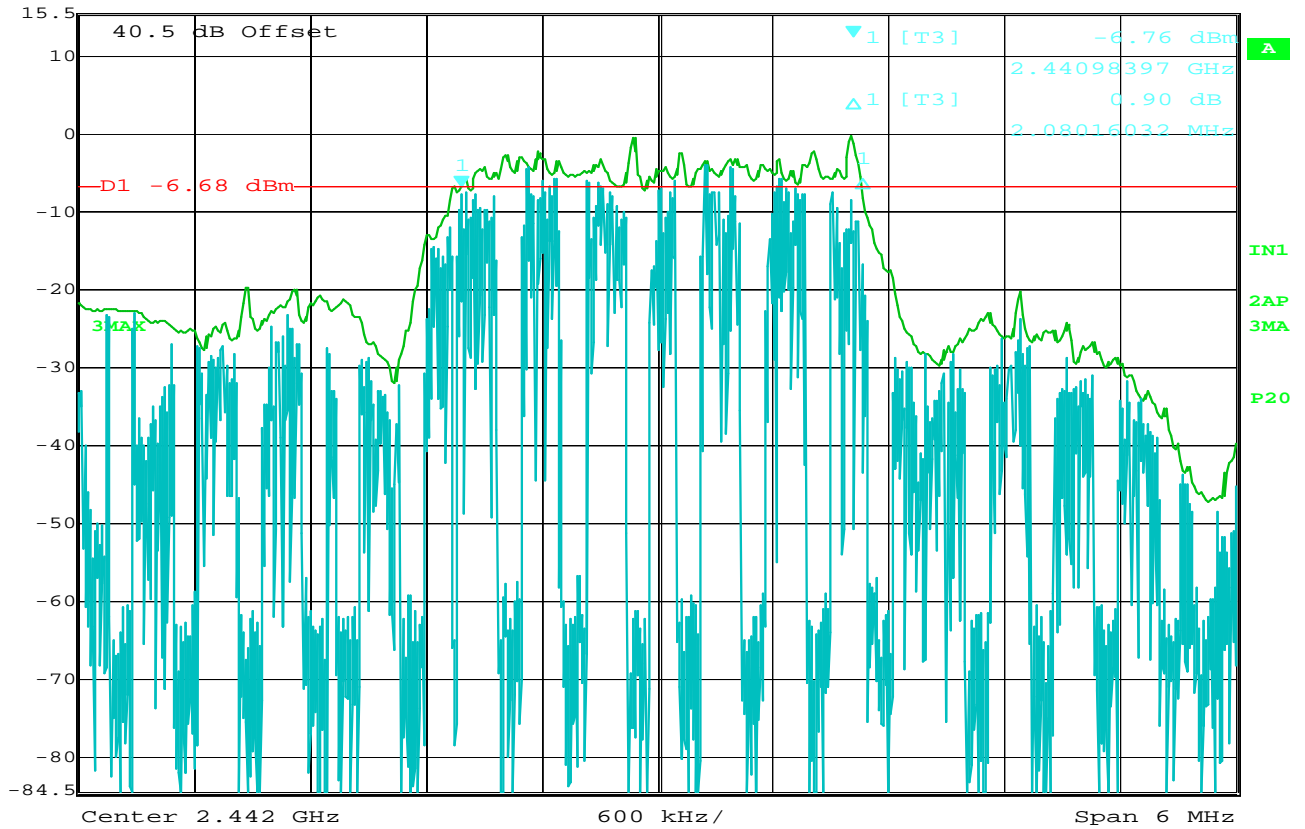
FCC 15.247 6dB Bandwidth

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2442MHz, half bandwidth
 NOTES :

NOTES



Marker 1 [T3] RBW 30 kHz RF Att 10 dB
 Ref Lvl -6.76 dBm VBW 300 kHz
 15.5 dBm 2.44098397 GHz SWT 17 ms Unit dBm



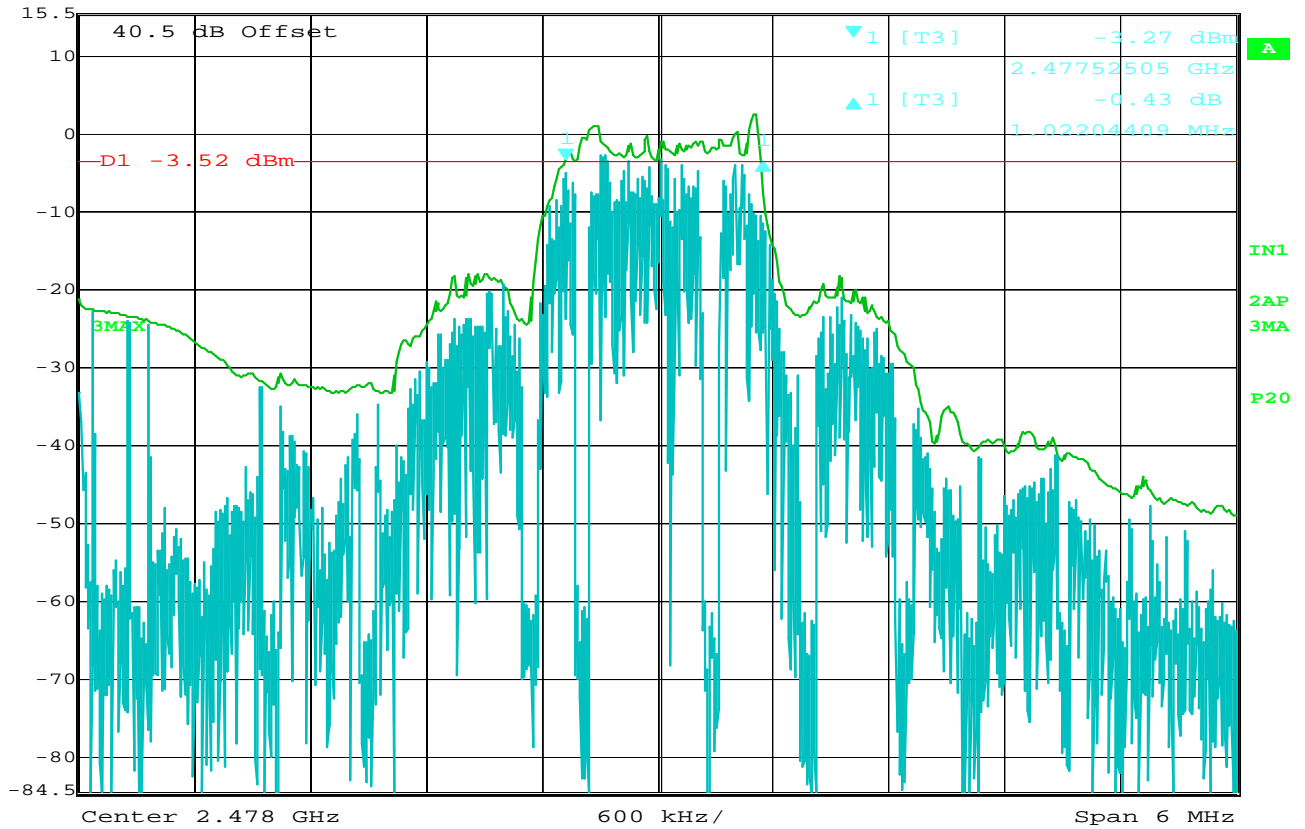
FCC 15.247 6dB Bandwidth

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2442MHz, full bandwidth
 NOTES :

NOTES



Ref Lvl	Delta 1 [T3]	RBW	30 kHz	RF Att	10 dB
15.5 dBm	-0.43 dB	VBW	300 kHz		
	1.02204409 MHz	SWT	17 ms	Unit	dBm



Date: 8.MAR.2013 16:02:00

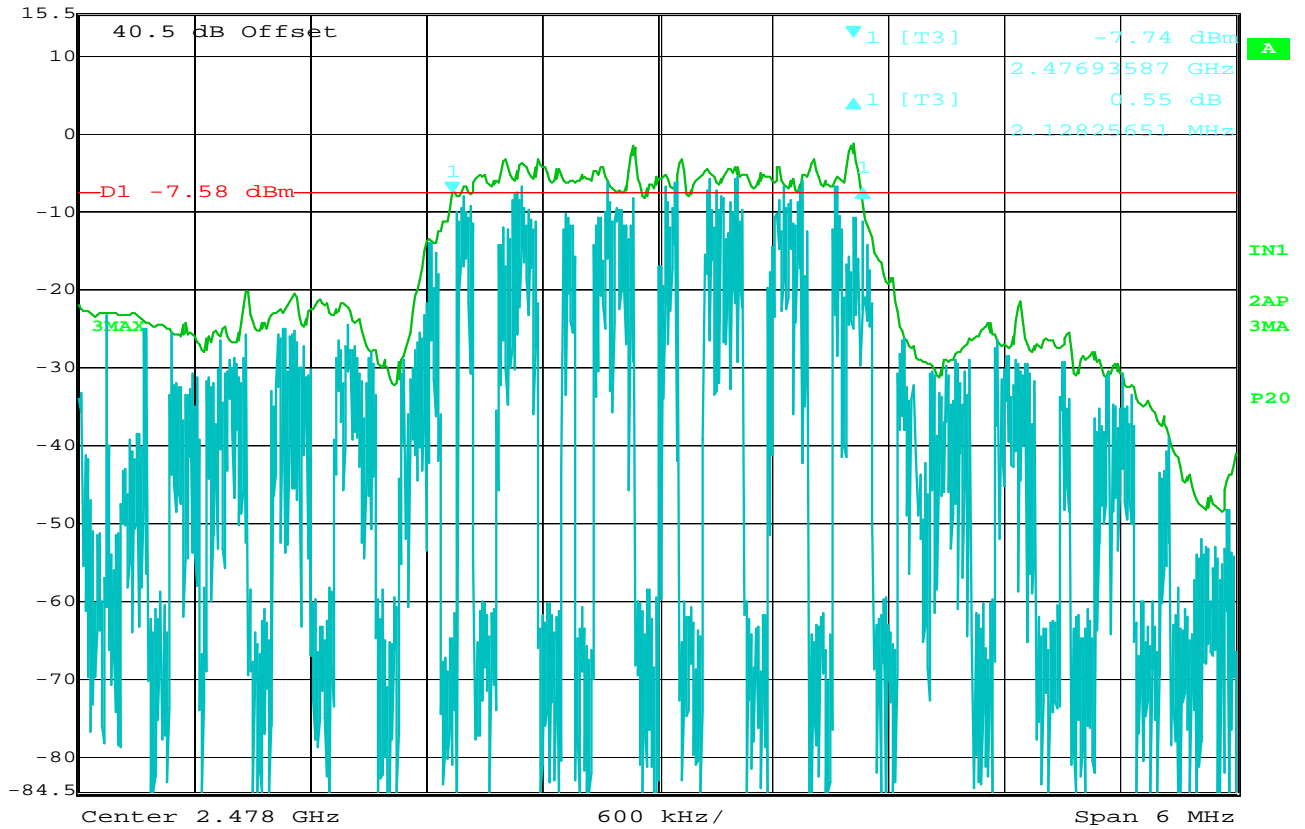
FCC 15.247 6dB Bandwidth

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2478MHz, half bandwidth
 NOTES :

NOTES



Delta 1 [T3] RBW 30 kHz RF Att 10 dB
 Ref Lvl 0.55 dB VBW 300 kHz
 15.5 dBm 2.12825651 MHz SWT 17 ms Unit dBm



Date: 8.MAR.2013 16:05:08

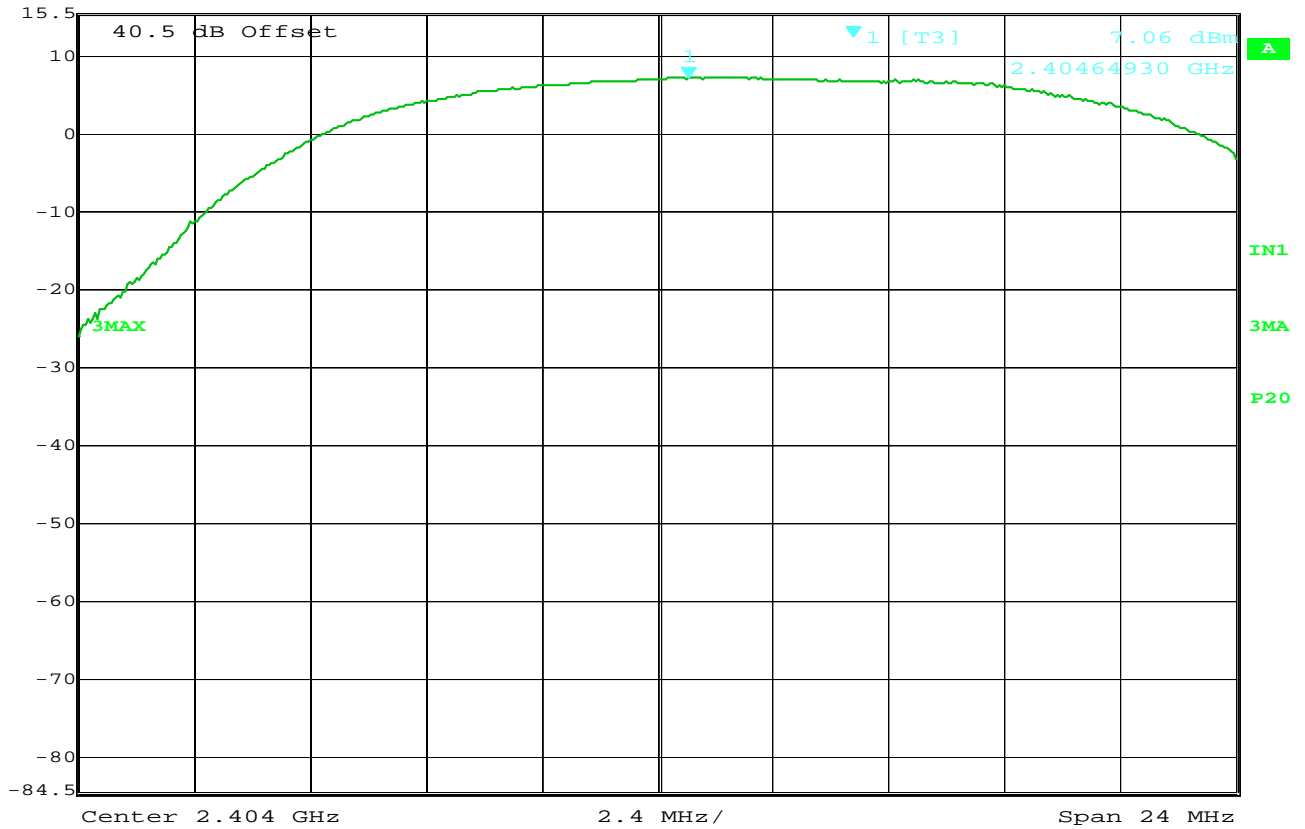
FCC 15.247 6dB Bandwidth

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2478MHz, full bandwidth
 NOTES :

NOTES



Marker 1 [T3] RBW 10 MHz RF Att 10 dB
 Ref Lvl 7.06 dBm VBW 10 MHz
 15.5 dBm 2.40464930 GHz SWT 5 ms Unit dBm



Date: 8.MAR.2013 16:40:44

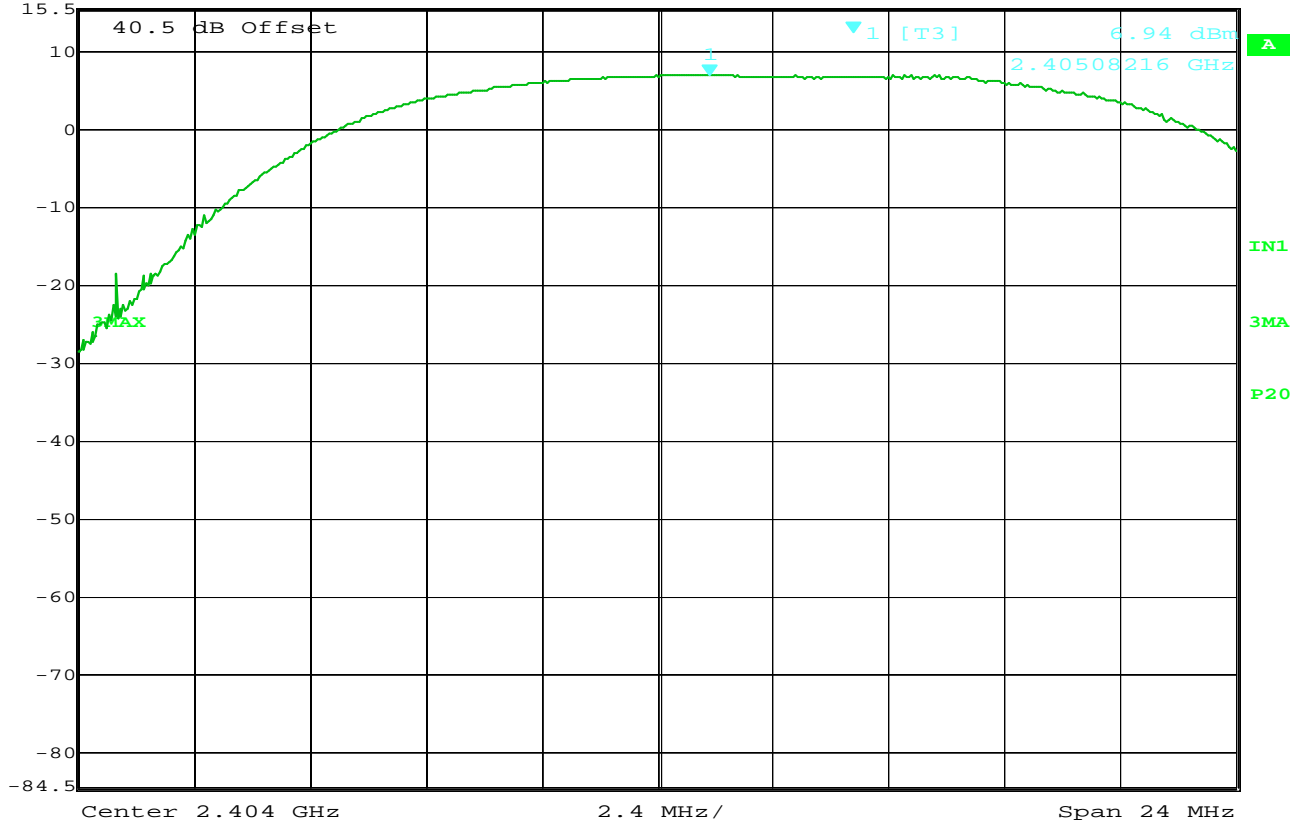
FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 240MHz, full bandwidth
 NOTES : Peak Conducted Output Power = 7.06dBm = 5.08mW

NOTES



Ref Lvl 15.5 dBm
 Marker 1 [T3] 6.94 dBm
 2.40508216 GHz
 RBW 10 MHz
 VBW 10 MHz
 RF Att 10 dB
 SWT 5 ms
 Unit dBm



Date: 8.MAR.2013 16:39:15

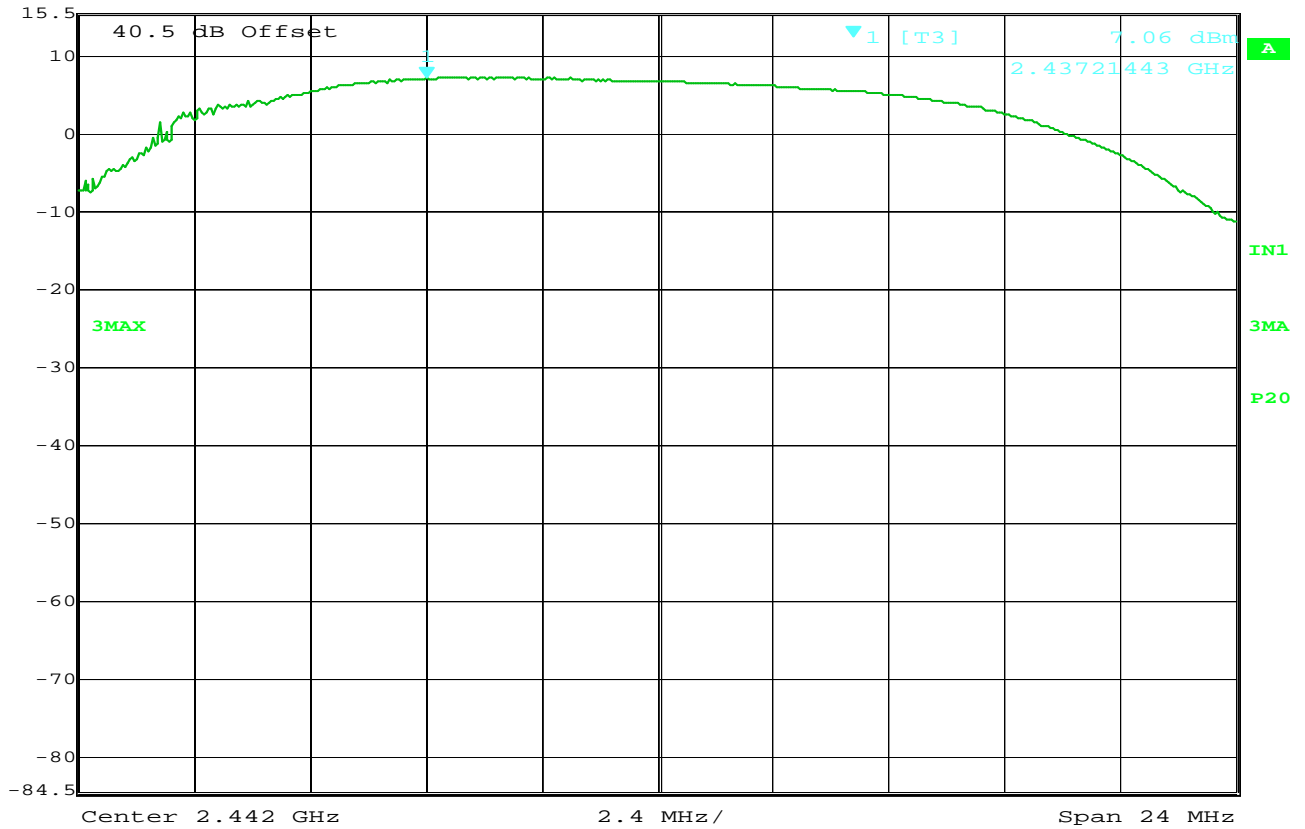
FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2404MHz, half bandwidth
 NOTES : Peak Conducted Output Power = 6.94dBm = 4.94mW

NOTES



Marker 1 [T3] RBW 10 MHz RF Att 10 dB
 Ref Lvl 7.06 dBm VBW 10 MHz
 15.5 dBm 2.43721443 GHz SWT 5 ms Unit dBm

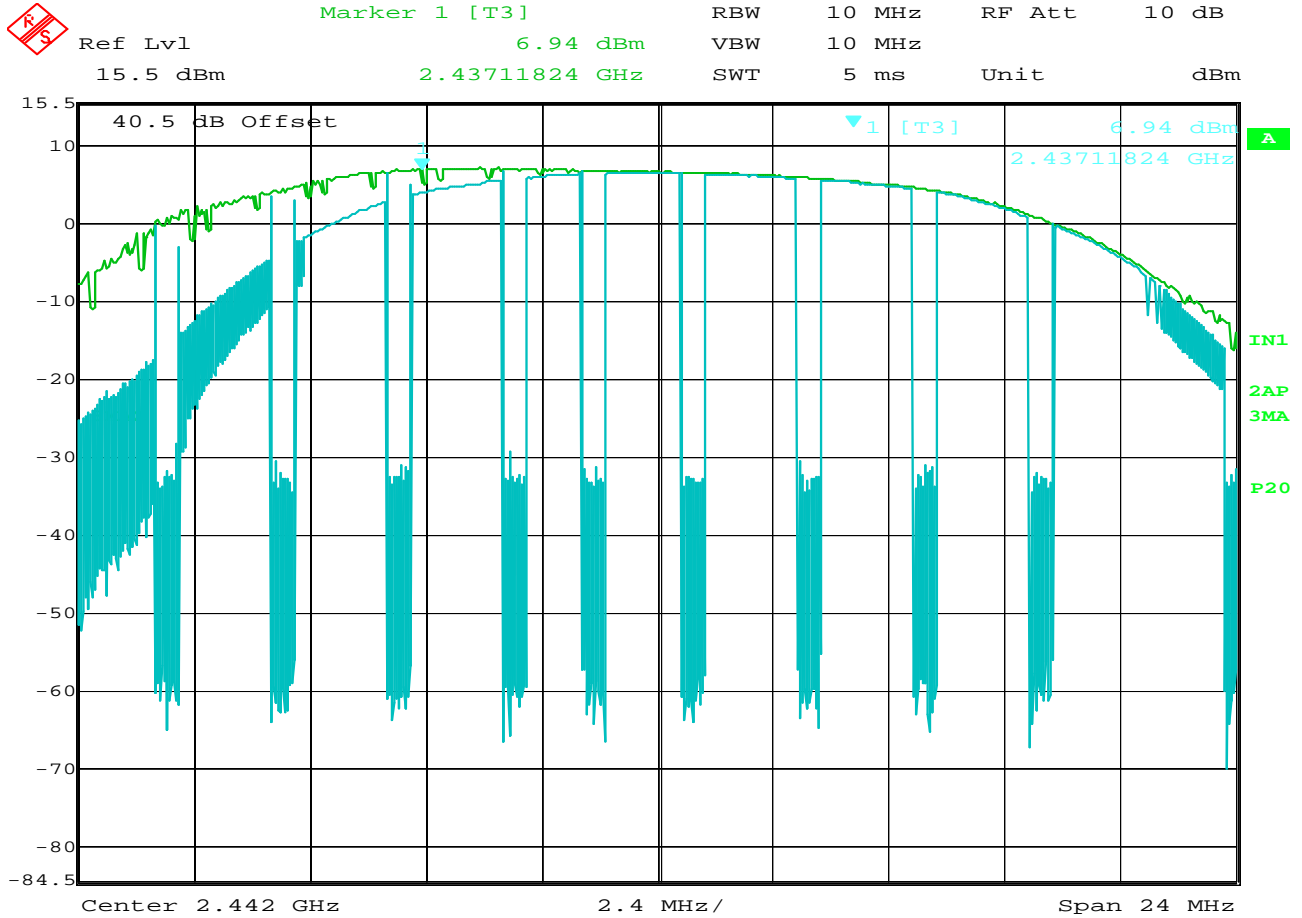


Date: 8.MAR.2013 16:36:25

FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2442MHz, full bandwidth
 NOTES : Peak Conducted Output Power = 7.06dBm = 5.08mW

NOTES



Date: 8.MAR.2013 16:37:33

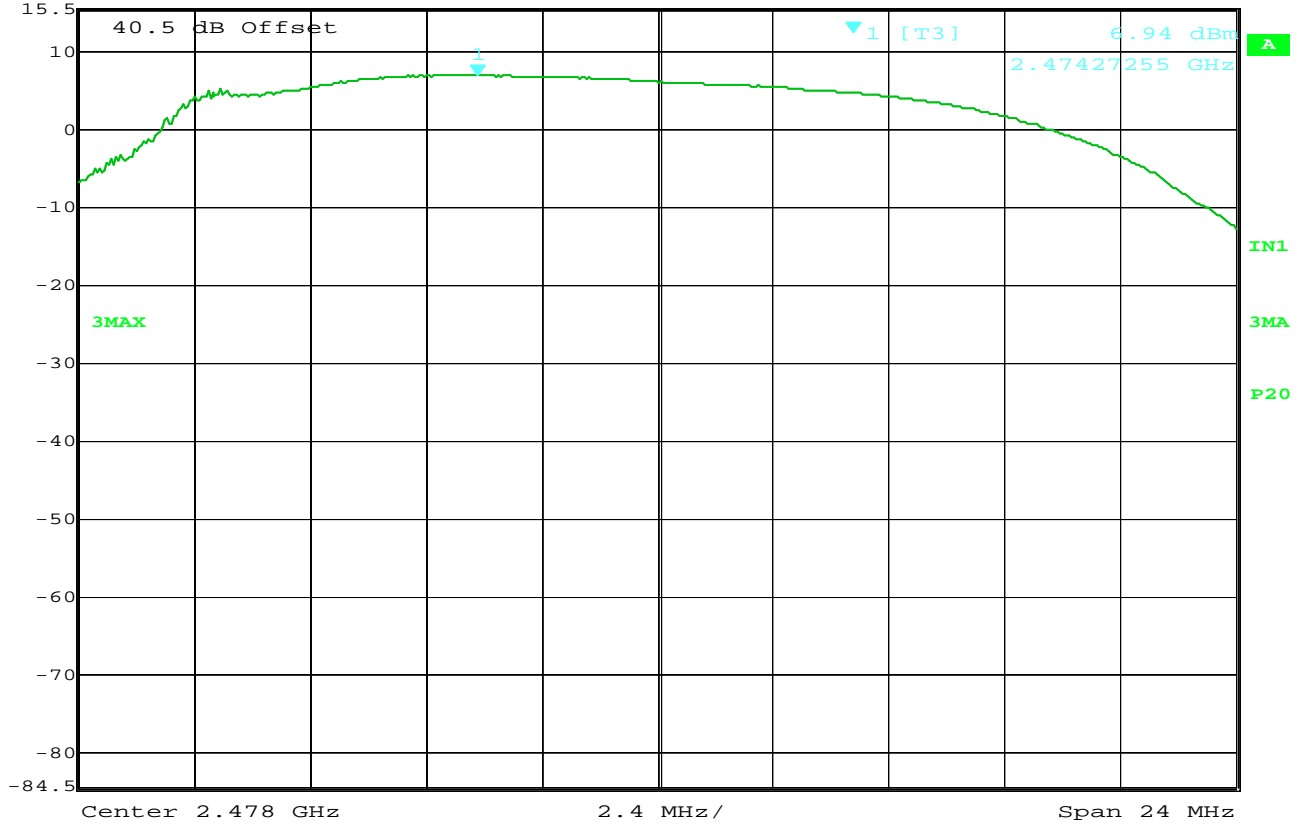
FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER : Shure Inc.
MODEL NUMBER : GLXD6
TEST MODE : Tx @ 2442MHz, half bandwidth
NOTE : Peak Conducted Output Power = 6.94dBm = 4.94mW

NOTES



Marker 1 [T3] RBW 10 MHz RF Att 10 dB
 Ref Lvl 6.94 dBm VBW 10 MHz
 15.5 dBm 2.47427255 GHz SWT 5 ms Unit dBm



Date: 8.MAR.2013 16:32:34

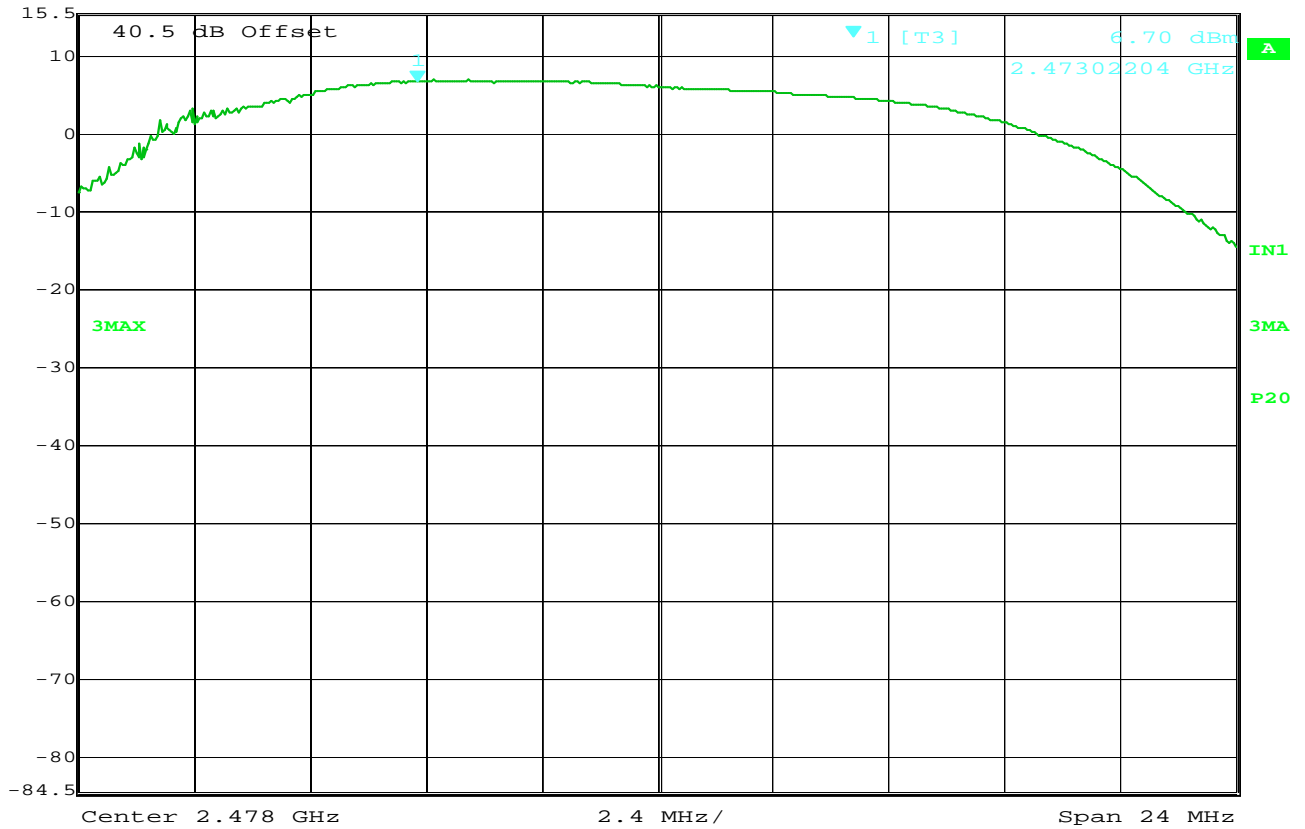
FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2478MHz, full bandwidth
 NOTES : Peak Conducted Output Power = 6.94dBm = 4.94mW

NOTES



Marker 1 [T3] RBW 10 MHz RF Att 10 dB
 Ref Lvl 6.70 dBm VBW 10 MHz
 15.5 dBm 2.47302204 GHz SWT 5 ms Unit dBm



Date: 8.MAR.2013 16:17:36

FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2478MHz, half bandwidth
 NOTES : Peak Conducted Output Power = 6.7dBm = 4.67mW

NOTES

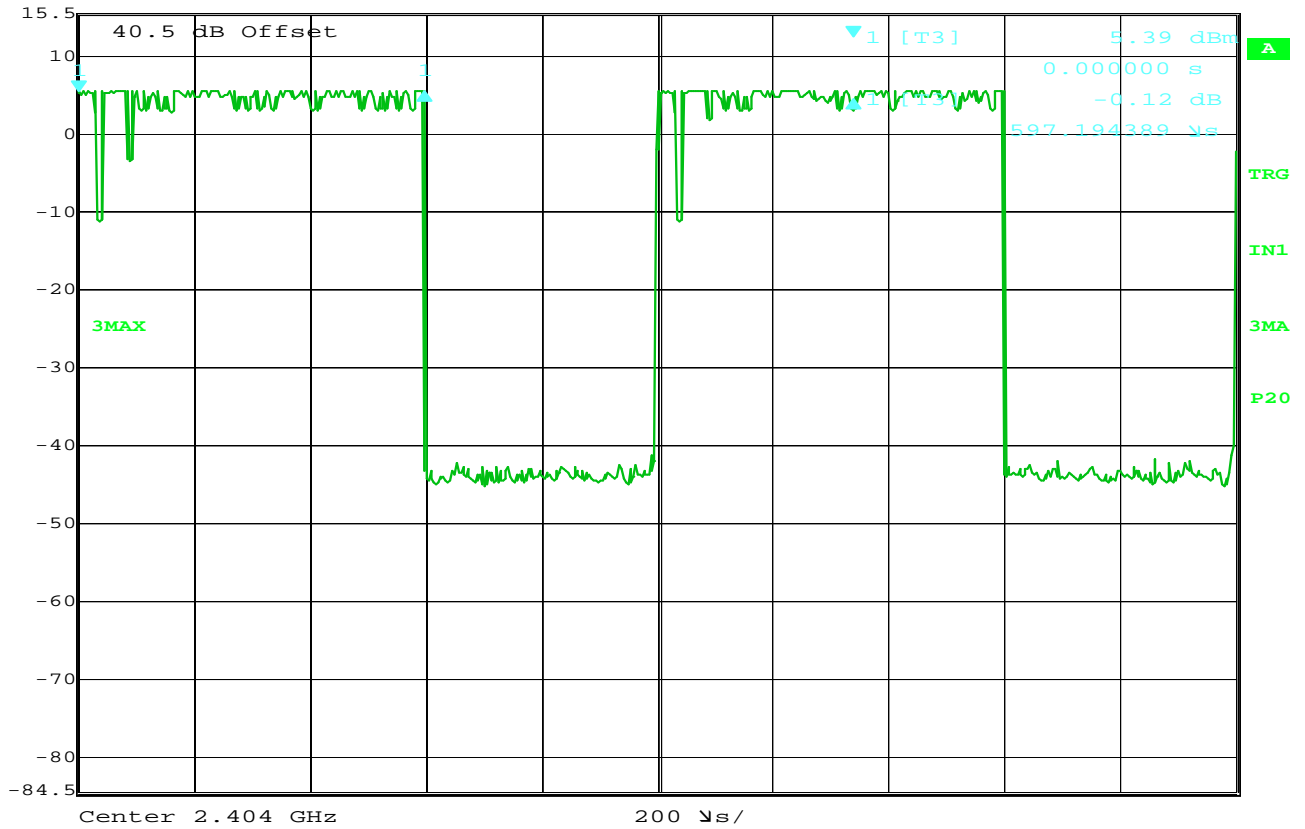


MANUFACTURER Shure Incorporated
EUT Transceiver
MODEL NO. GLXD6
SPECIFICATION FCC 15.247(b) and RSS-210 A8.4
TEST Equivalent Isotropic Radiated Power
MODE Transmitting
DATE TESTED 2/27/2013
NOTES

Freq. (MHz)	Ant Pol	1MHz BW Meter Reading (dBuV)	Matched Sig. Gen. Reading (dB)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
2404.00	H	63.4	-4.6	8.0	3.4	0.0	36.0	-36.0
2404.00	V	70.0	4.4	8.0	3.4	9.0	36.0	-27.0
2442.00	H	63.9	-4.7	8.1	3.5	-0.1	36.0	-36.1
2442.00	V	68.5	2.4	8.1	3.5	7.0	36.0	-29.0
2478.00	H	62.4	-5.6	8.1	3.5	-1.0	36.0	-37.0
2478.00	V	68.3	2.3	8.1	3.5	6.9	36.0	-29.1



Delta 1 [T3] RBW 1 MHz RF Att 10 dB
 Ref Lvl -0.12 dB VBW 10 MHz
 15.5 dBm 597.194389 μ s SWT 2 ms Unit dBm



Date: 11.MAR.2013 09:14:10

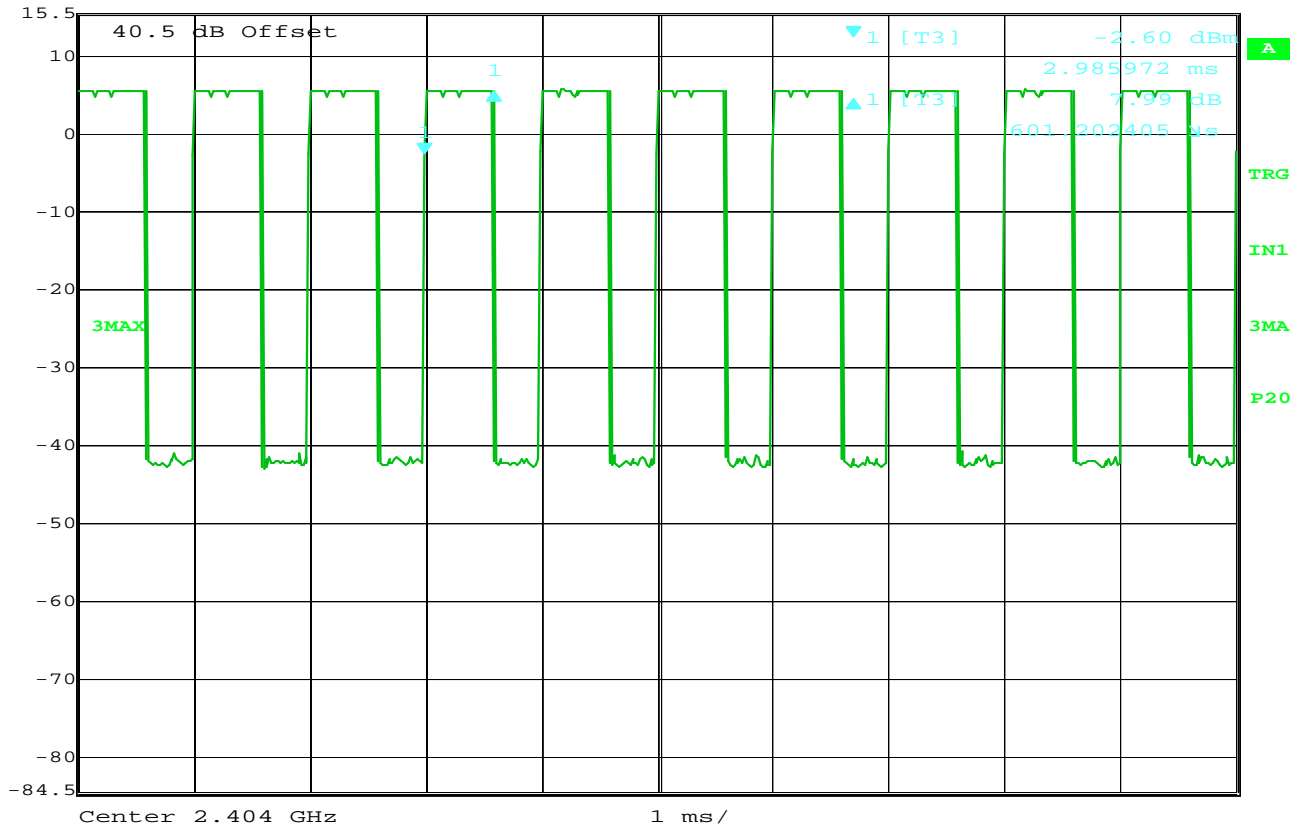
FCC 15.35 Duty Cycle Factor

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 240MHz, full bandwidth
 NOTES : Pulse Width = 1.19 mS

NOTES



Delta 1 [T3] RBW 1 MHz RF Att 10 dB
 Ref Lvl 7.99 dB VBW 10 MHz
 15.5 dBm 601.202405 μ s SWT 10 ms Unit dBm



Date: 11.MAR.2013 10:31:19

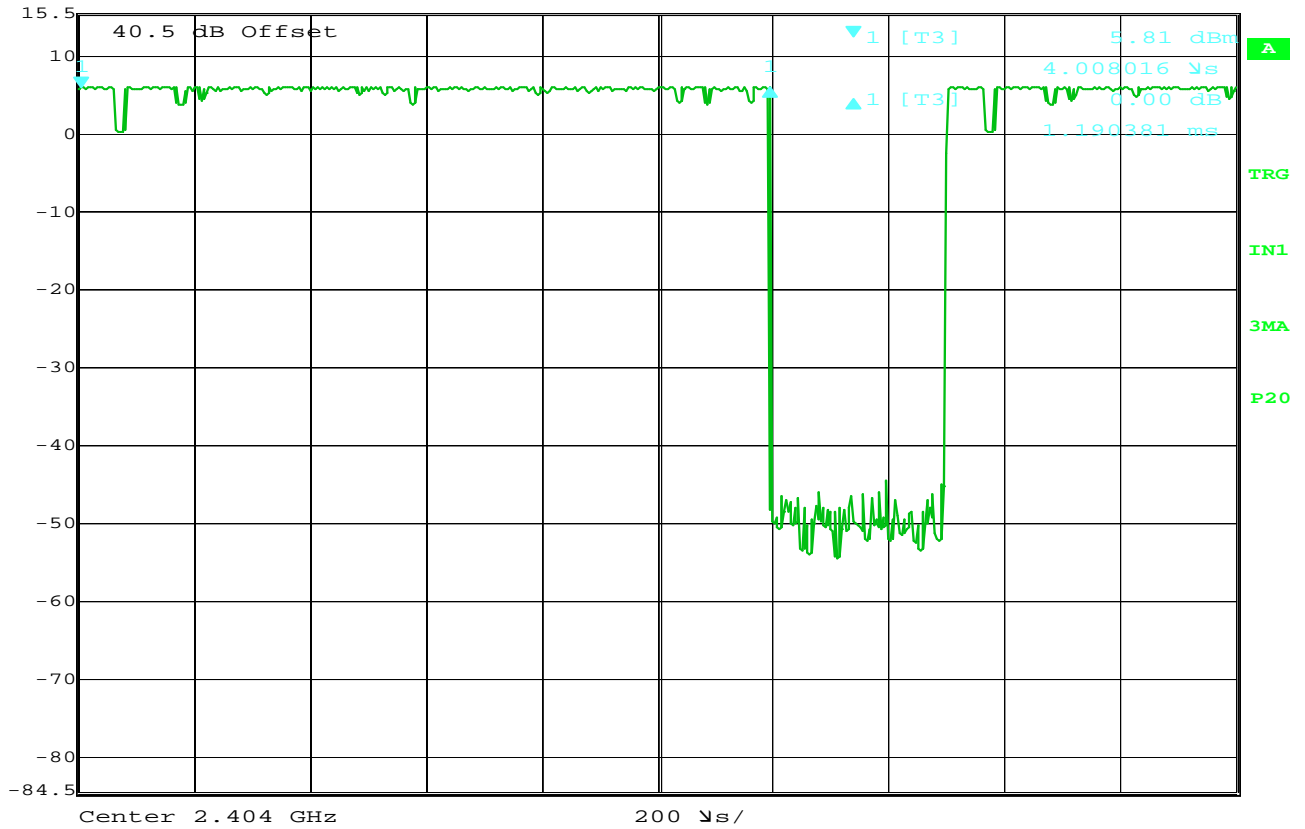
FCC 15.35 Duty Cycle Factor

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2404MHz, full bandwidth
 NOTES : Pulse Width = 597.2 μ S
 : Number of pulses in 10 mS = 10
 : $10 \times 10 = 100$ pulses in 100 mS
 : ON time in 100mS; $597.2 \mu\text{S} \times 100 = 0.05972$ or 59.7mS
 : duty cycle = $20 \times \log(59.7\text{mS}/100\text{mS}) = -4.48$ dB

NOTES



Delta 1 [T3] RBW 1 MHz RF Att 10 dB
 Ref Lvl 0.00 dB VBW 10 MHz
 15.5 dBm 1.190381 ms SWT 2 ms Unit dBm



Date: 11.MAR.2013 09:10:54

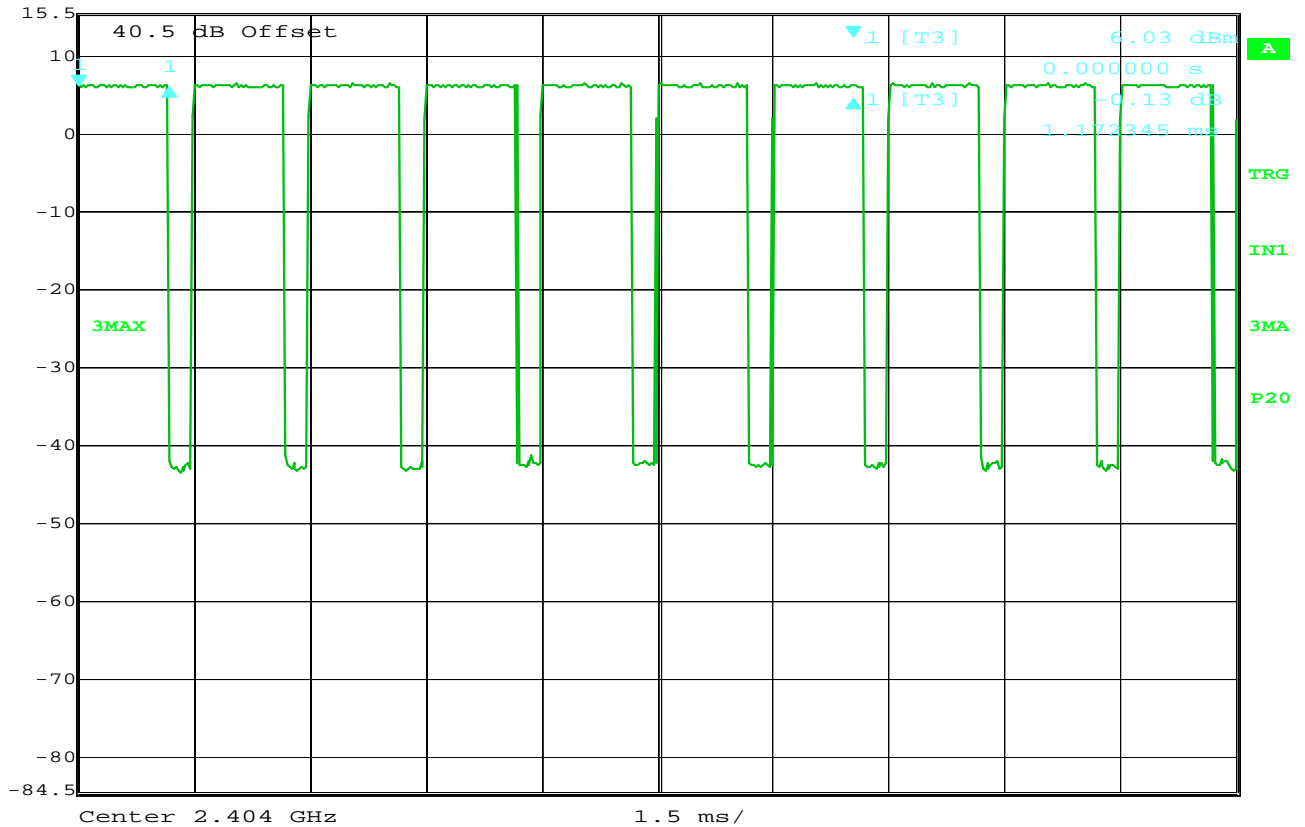
FCC 15.35 Duty Cycle Factor

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2404MHz, half bandwidth
 NOTES : Pulse Width = 1.19 mS

NOTES



Delta 1 [T3] RBW 1 MHz RF Att 10 dB
 Ref Lvl -0.13 dB VBW 10 MHz
 15.5 dBm 1.172345 ms SWT 15 ms Unit dBm

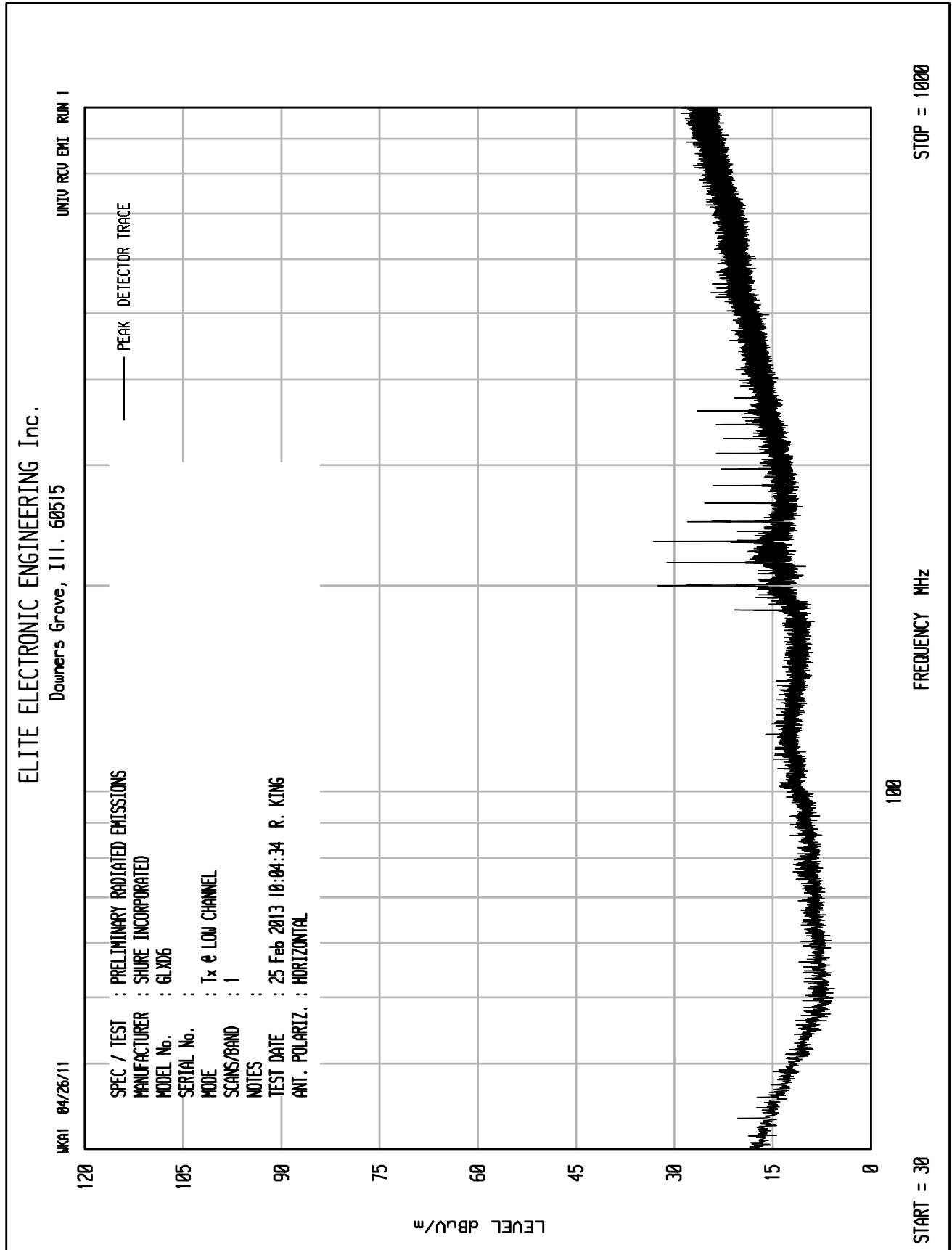


Date: 11.MAR.2013 10:48:39

FCC 15.35 Duty Cycle Factor

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 240MHz, half bandwidth
 NOTES : Pulse Width = 1.19 mS
 : Number of pulses in 15 mS = 10
 : 100mS/15mS = number of 15 mS time frames in 100 mS = 6.67
 : 6.67*10=66.7 pulses in 100mS
 : ON time in 100mS; 1.19mS * 66.7 = 0.079373 or 79.3mS
 : duty cycle = 20*log(79.3mS/100mS) = -2.006 dB

NOTES



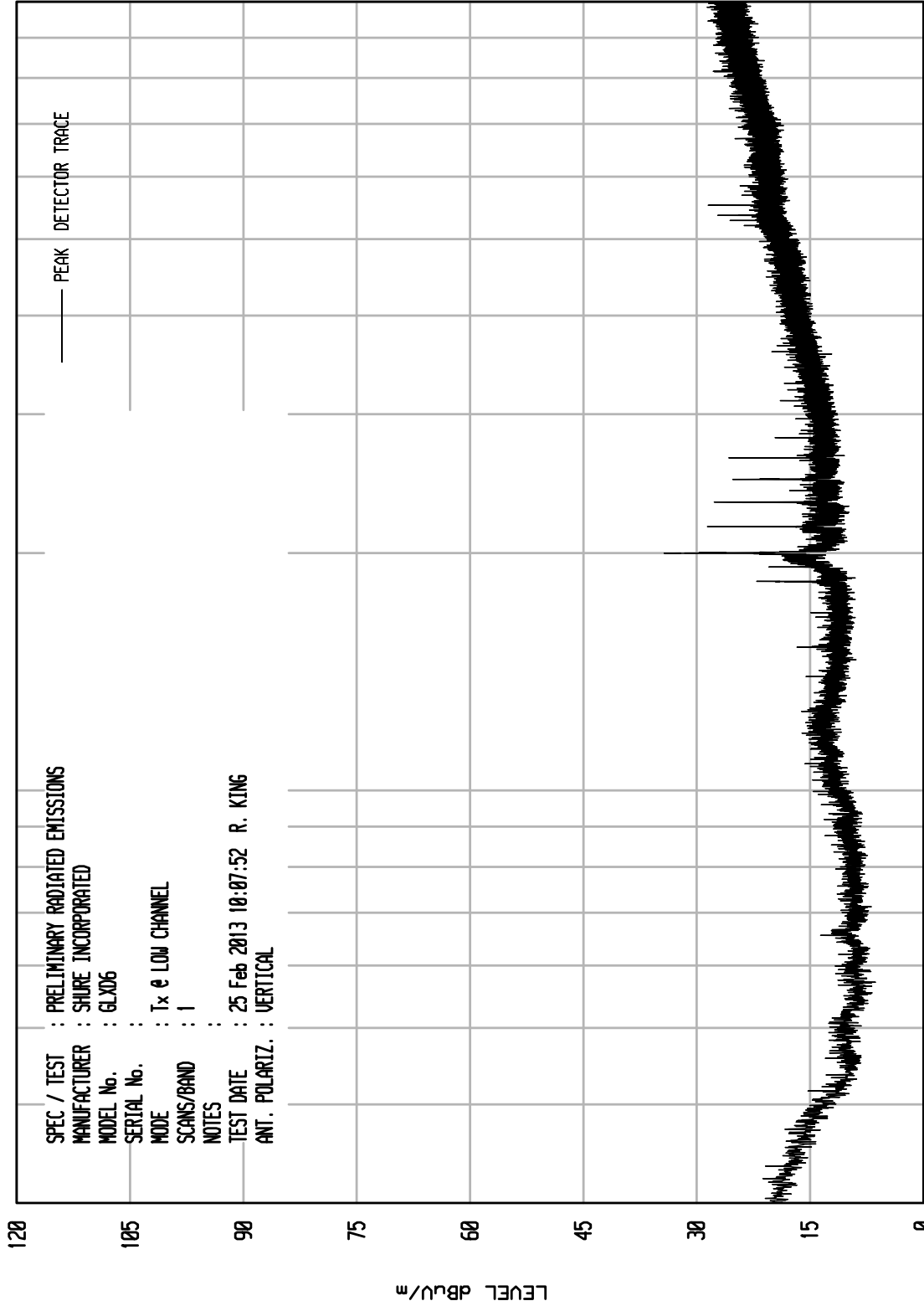


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 2

UKA1 04/26/11

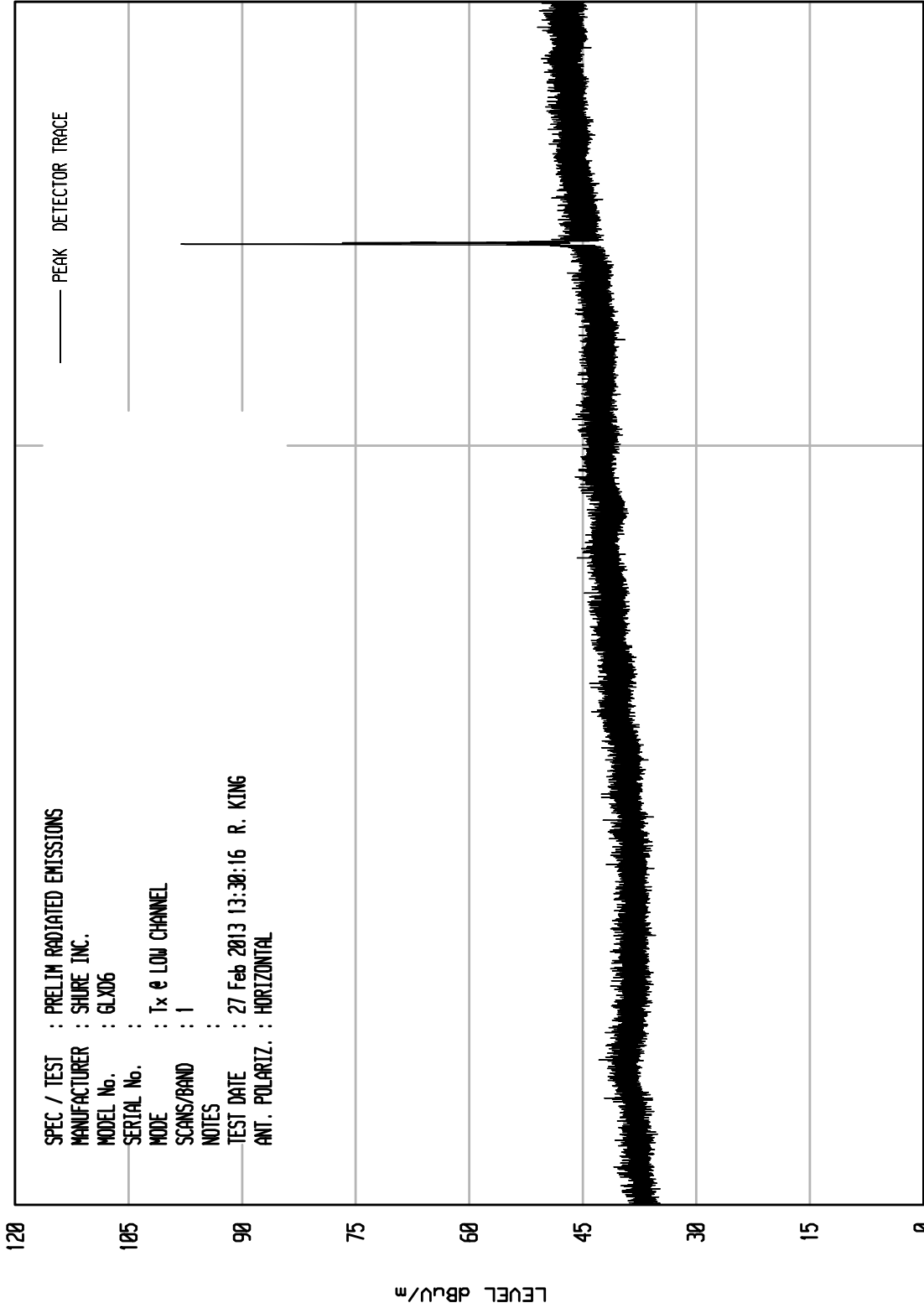
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INCORPORATED
MODEL No. : GLXD6
SERIAL No. :
MODE : Tx e LOW CHANNEL
SCANS/BAND : 1
NOTES :
TEST DATE : 25 Feb 2013 10:07:52 R. KING
ANT. POLARIZ. : VERTICAL



ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 9

UKA1 04/26/11



SPEC / TEST : PRELIM RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e LOW CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 27 Feb 2013 13:30:16 R. KING
 ANT. POLARIZ. : HORIZONTAL

STOP = 3000

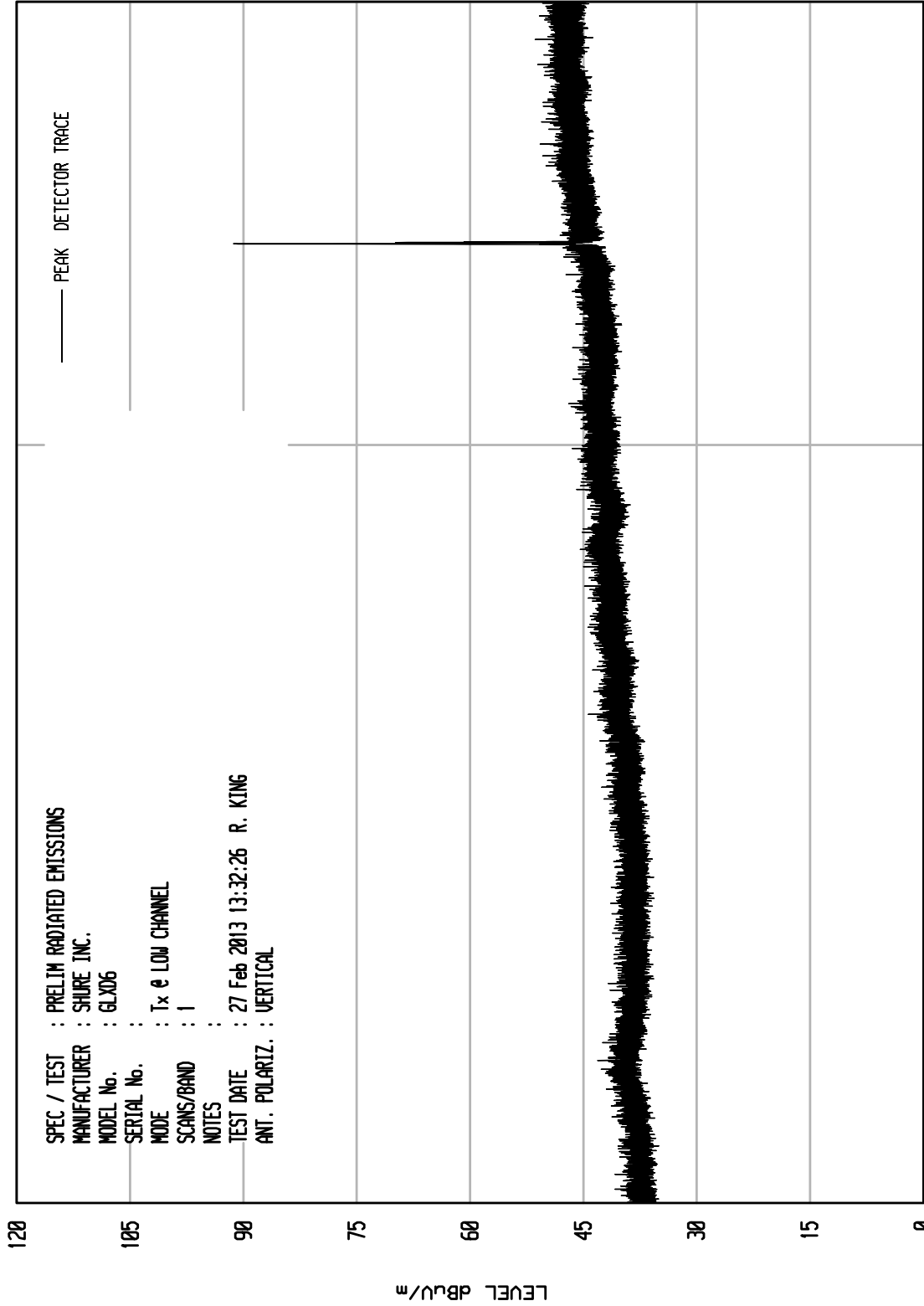
FREQUENCY MHz

START = 1000

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 10

UKA1 04/26/11

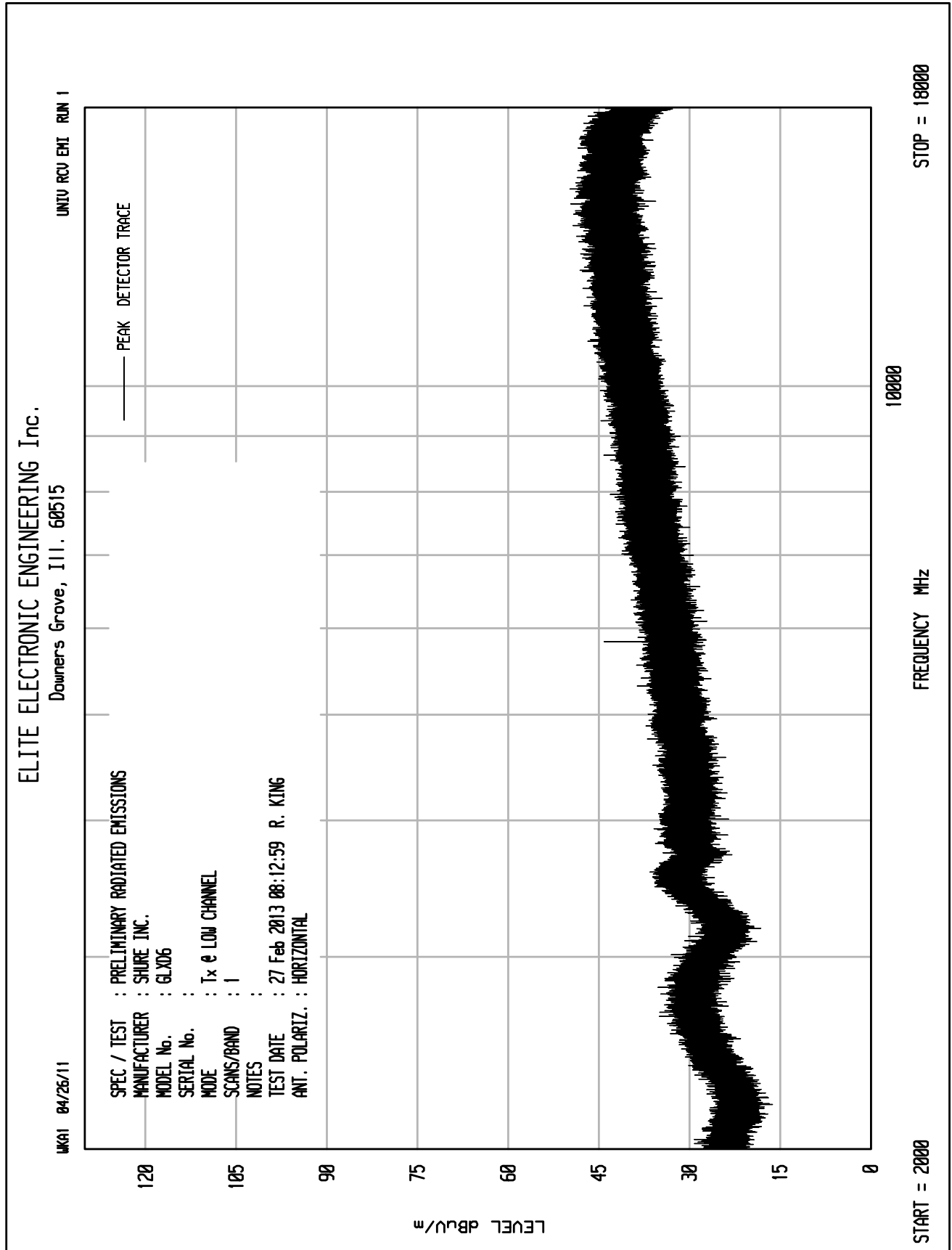


SPEC / TEST : PRELIM RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e LOW CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 27 Feb 2013 13:32:26 R. KING
 ANT. POLARIZ. : VERTICAL

STOP = 3000

FREQUENCY MHz

START = 1000

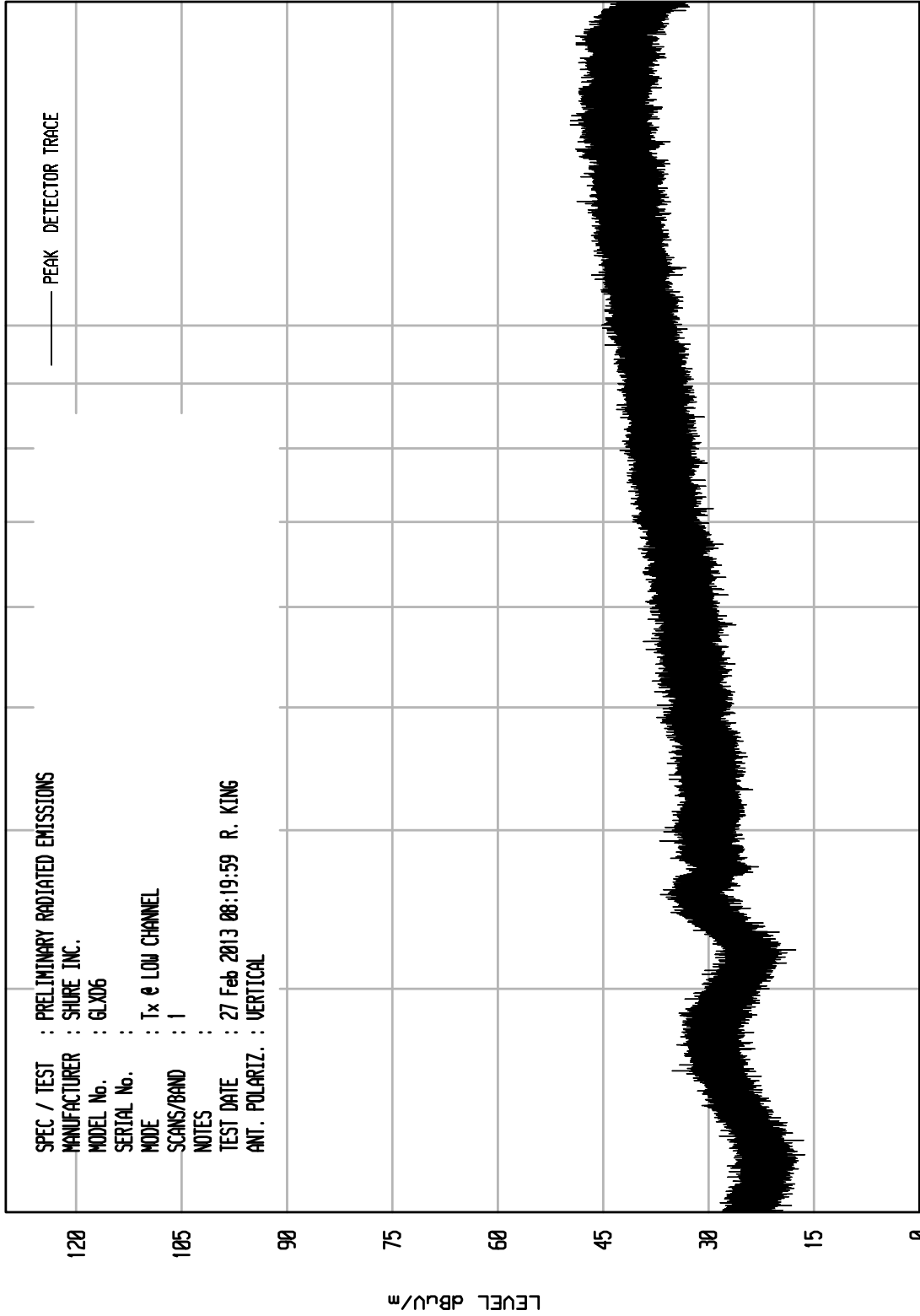


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 2

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : GLXD6
 SERIAL No. :
 MODE : Tx e LOW CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 27 Feb 2013 08:19:59 R. KING
 ANT. POLARIZ. : VERTICAL



START = 2000 STOP = 18000

ELITE ELECTRONIC ENGINEERING Inc.

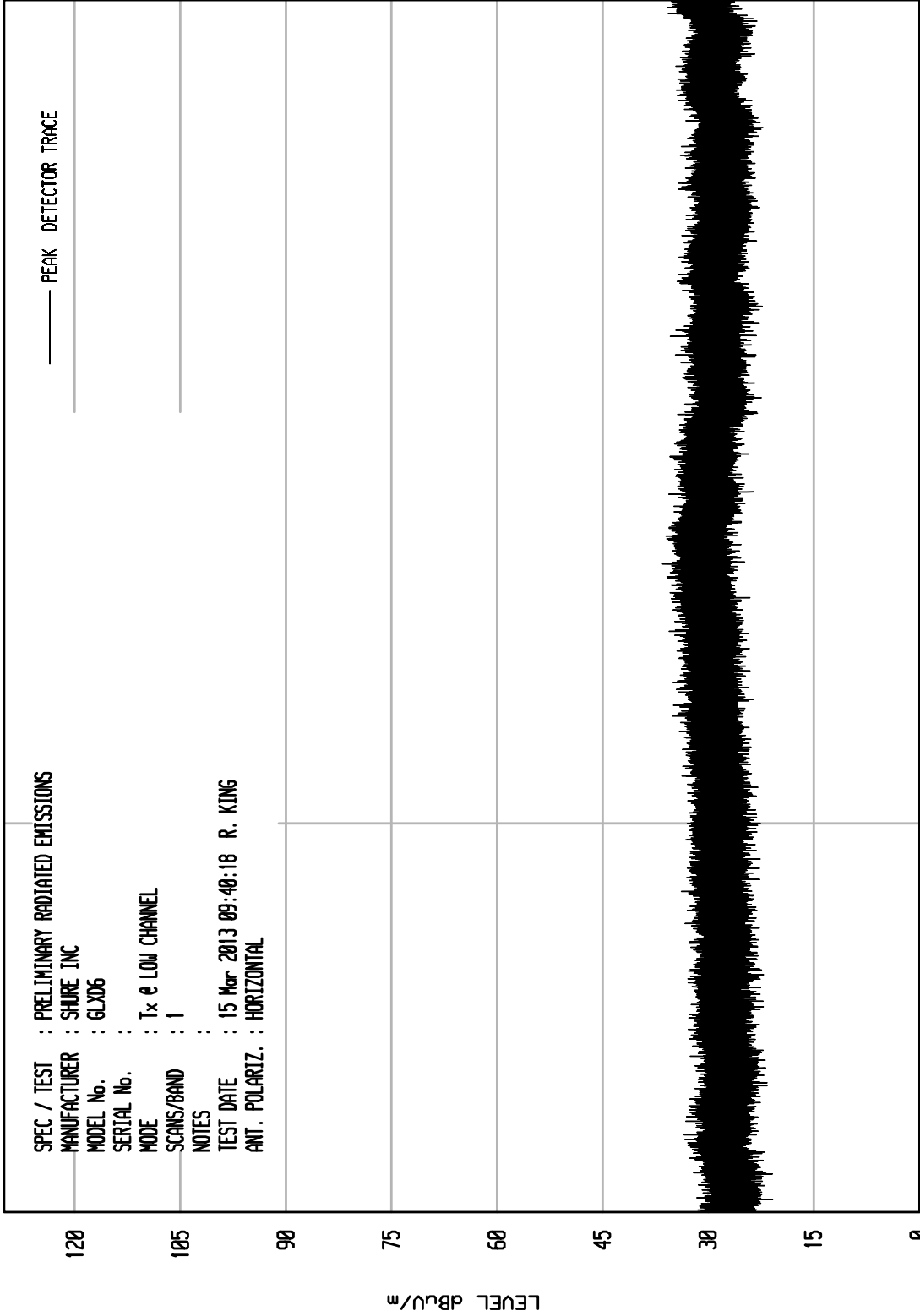
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 1

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INC
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e LOW CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 15 Mar 2013 09:40:18 R. KING
 ANT. POLARIZ. : HORIZONTAL

— PEAK DETECTOR TRACE



START = 18000

FREQUENCY MHz

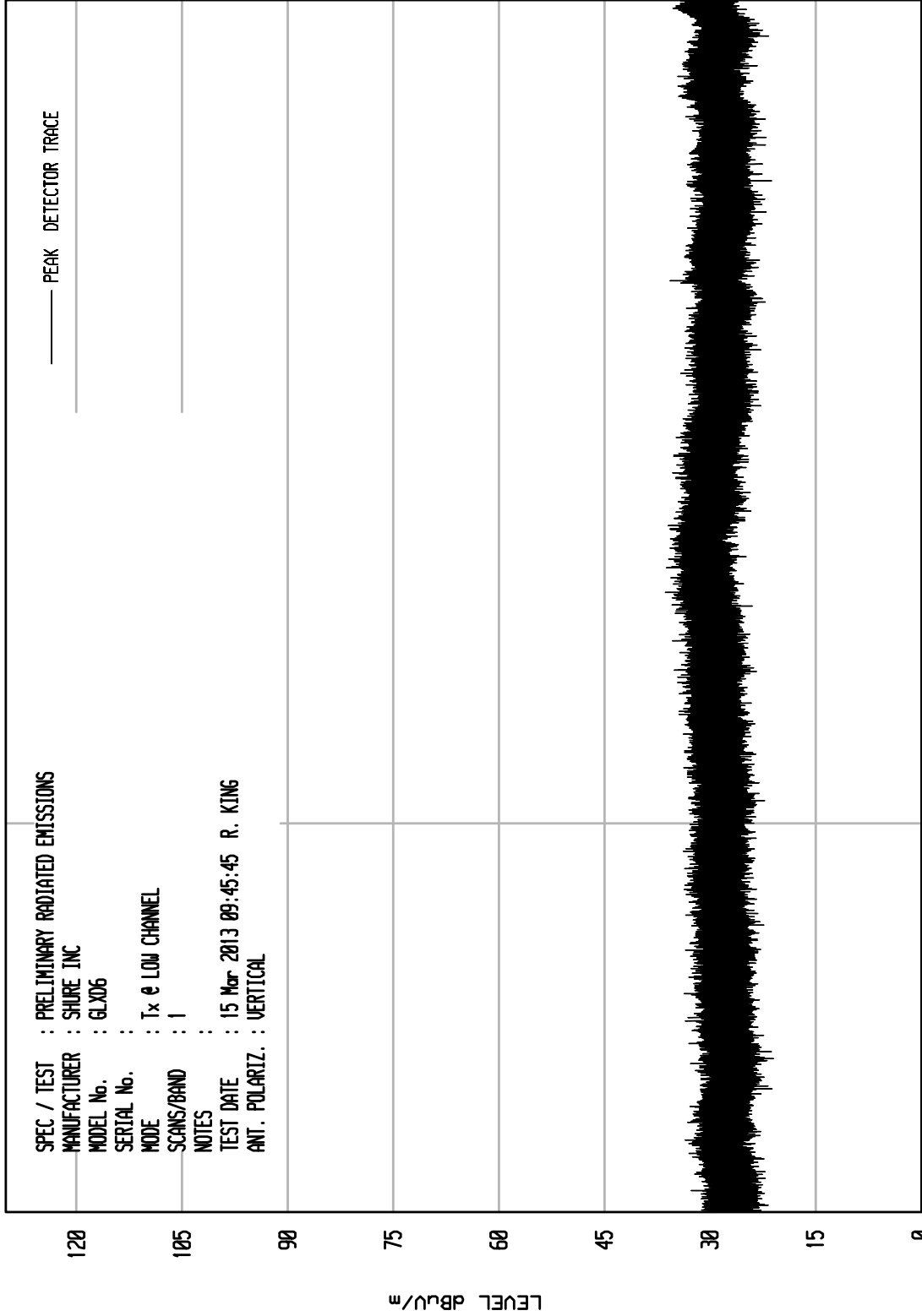
STOP = 25000

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

UNIV RCV ENI RUN 2

UKA1 04/26/11



STOP = 25000

FREQUENCY MHz

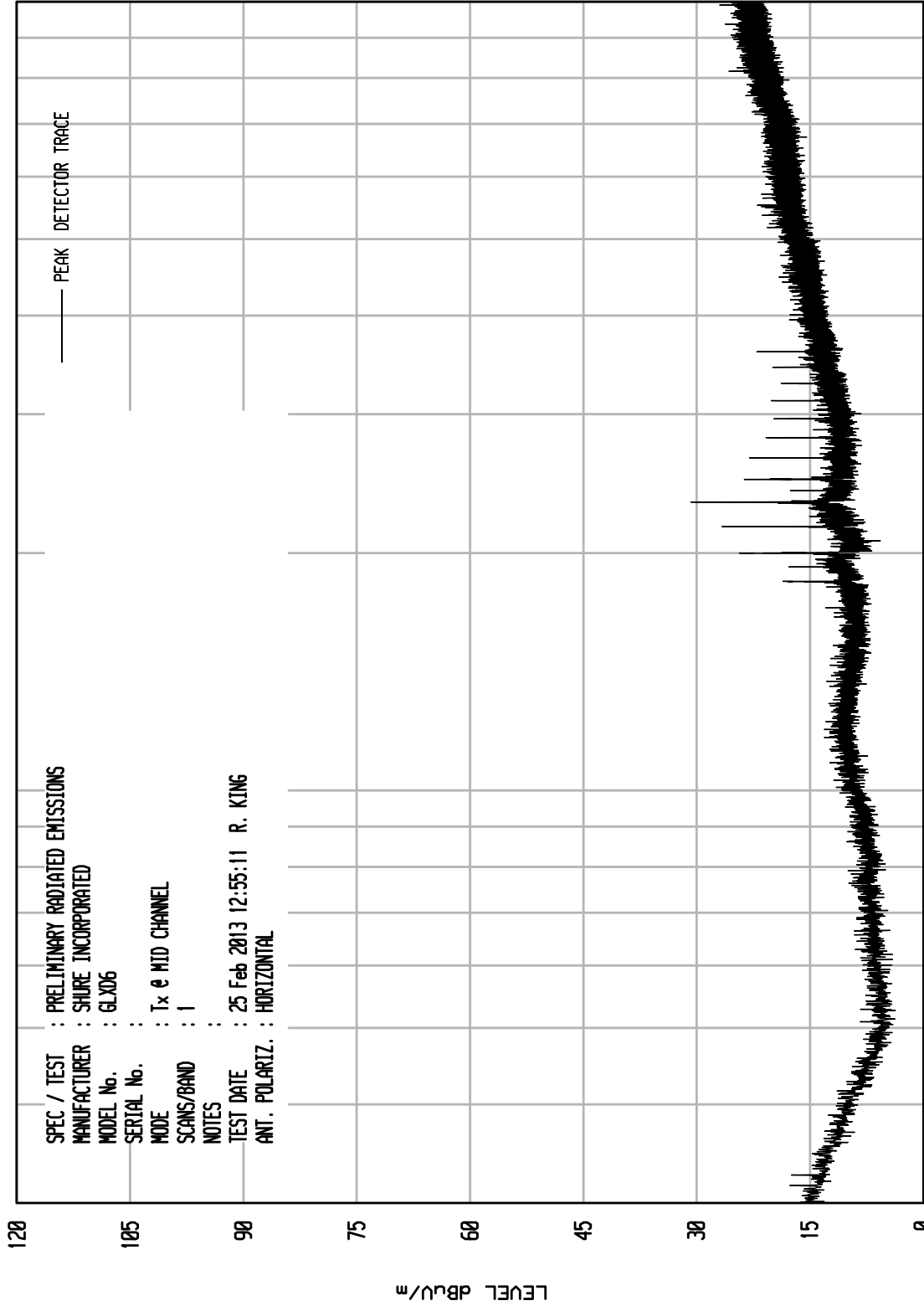
START = 18000

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 4

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INCORPORATED
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e MID CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 25 Feb 2013 12:55:11 R. KING
 ANT. POLARIZ. : HORIZONTAL



STOP = 1000

FREQUENCY MHz

100

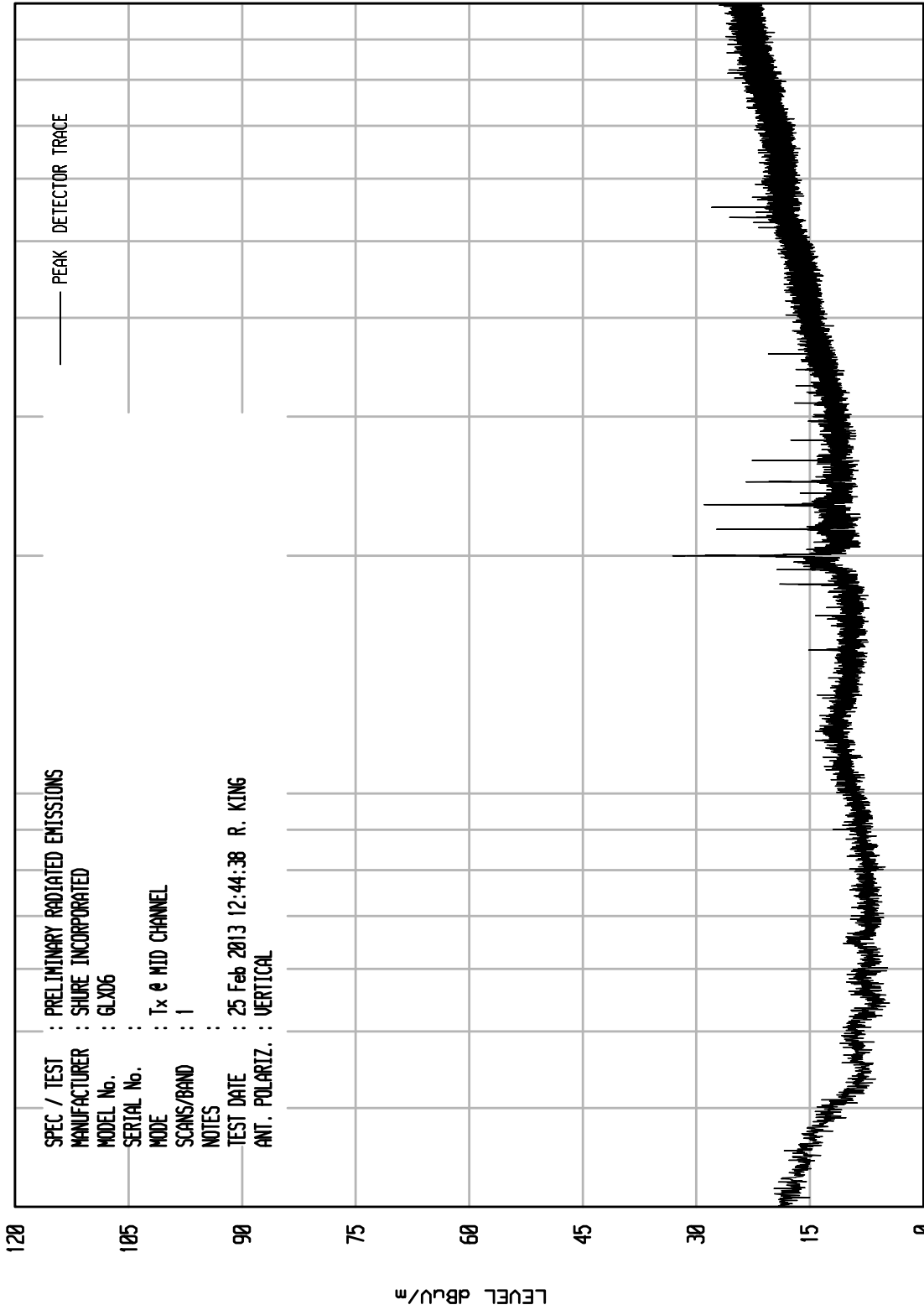
START = 30

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 3

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INCORPORATED
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e MID CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 25 Feb 2013 12:44:38 R. KING
 ANT. POLARIZ. : VERTICAL



STOP = 1000

FREQUENCY MHz

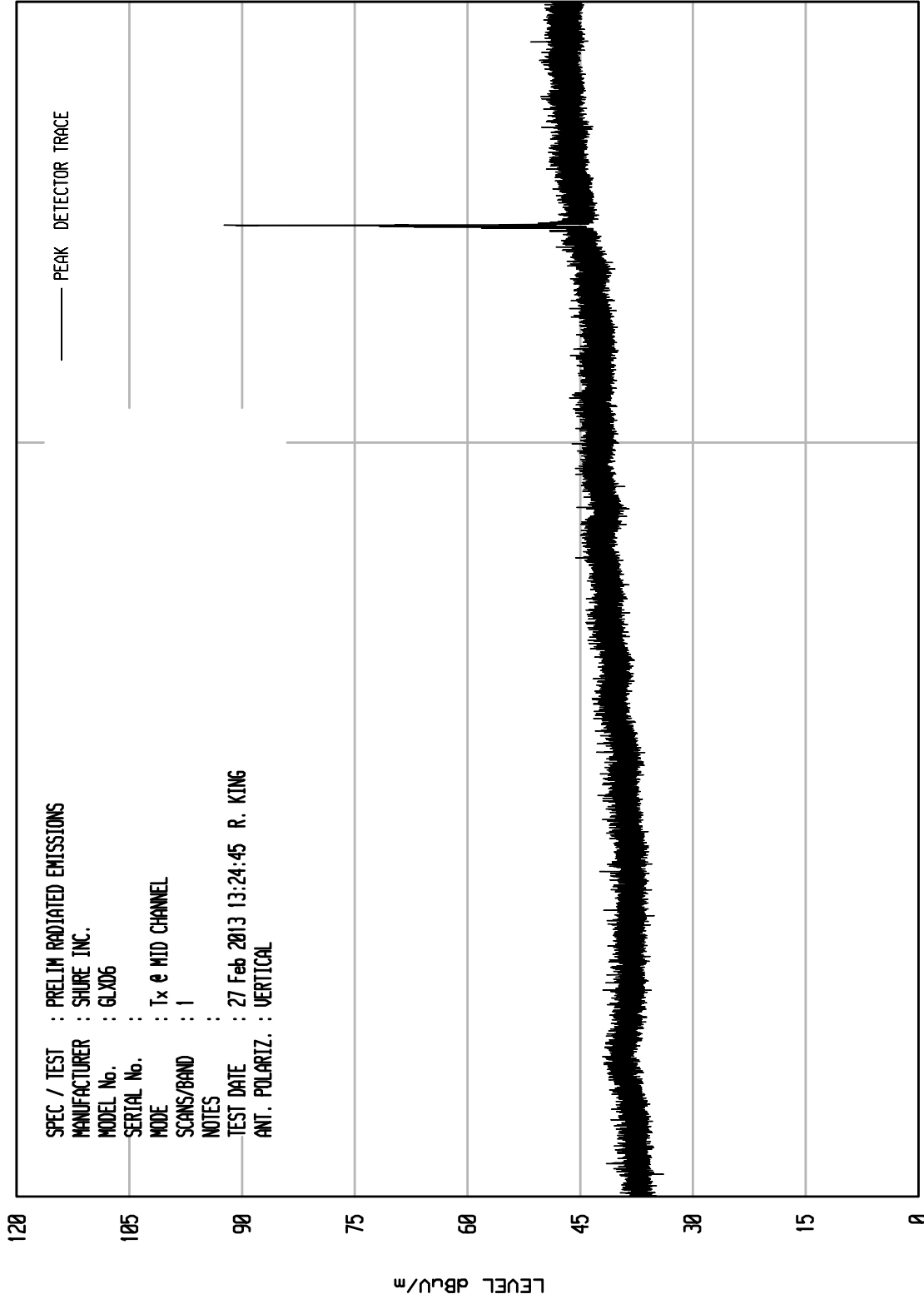
100

START = 30

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 7

UKA1 04/26/11



SPEC / TEST : PRELIM RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e MID CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 27 Feb 2013 13:24:45 R. KING
 ANT. POLARIZ. : VERTICAL

STOP = 3000

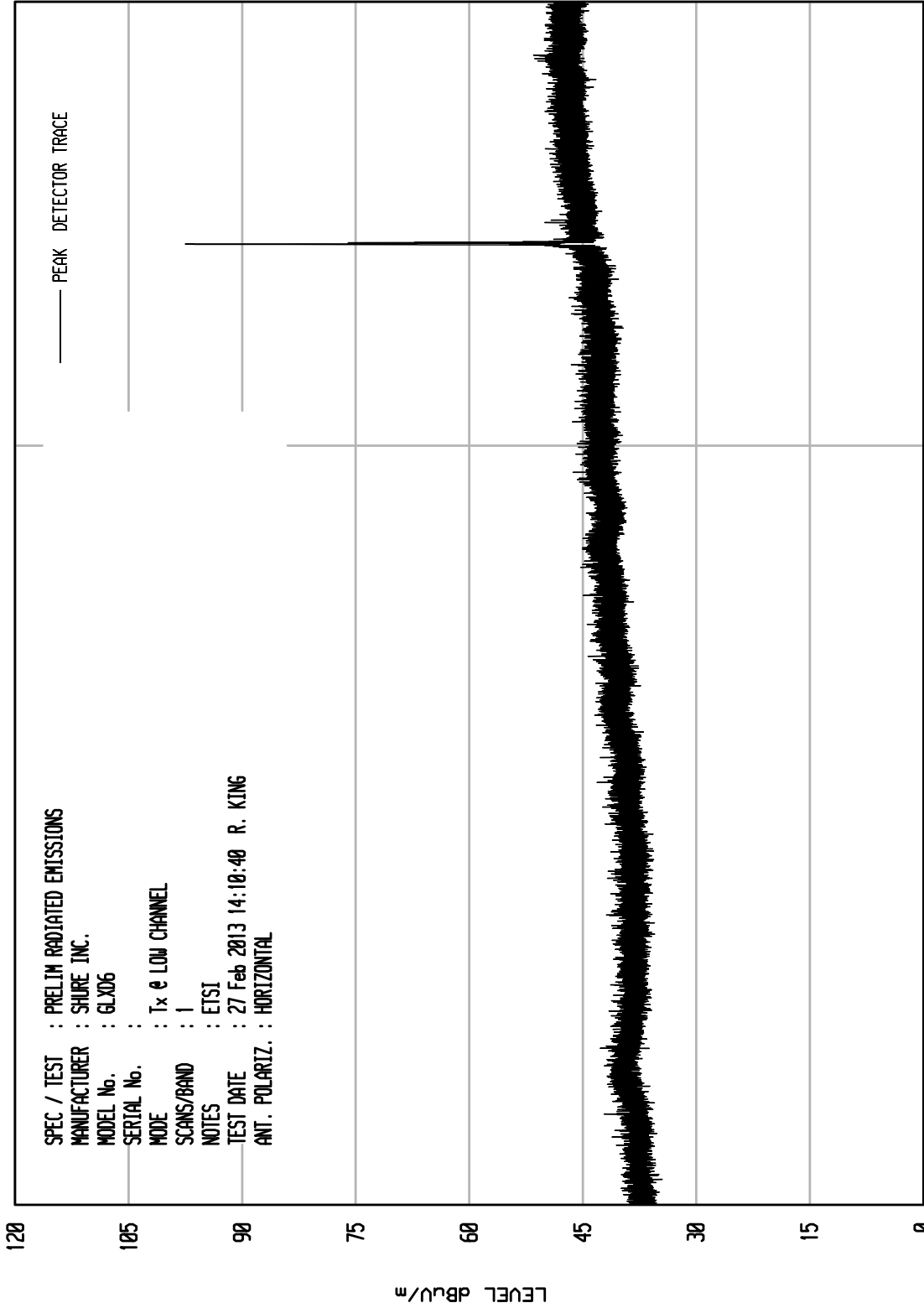
FREQUENCY MHz

START = 1000

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 12

UKA1 04/26/11



SPEC / TEST : PRELIM RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e LOW CHANNEL
 SCANS/BAND : 1
 NOTES : ETSI
 TEST DATE : 27 Feb 2013 14:10:40 R. KING
 ANT. POLARIZ. : HORIZONTAL

STOP = 3000

FREQUENCY MHz

START = 1000

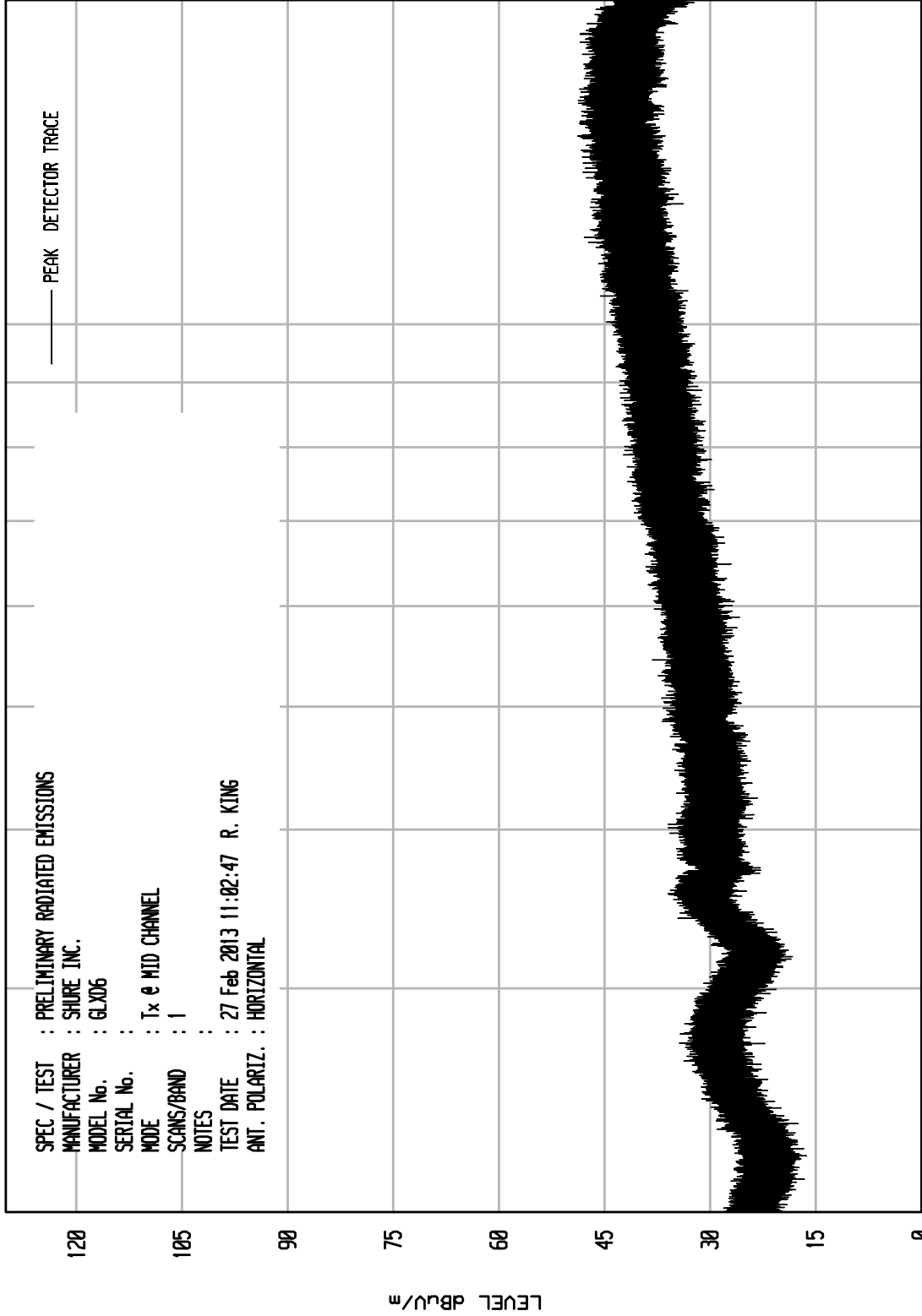
ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV ENI RUN 4

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e MID CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 27 Feb 2013 11:02:47 R. KING
 ANT. POLARIZ. : HORIZONTAL

— PEAK DETECTOR TRACE

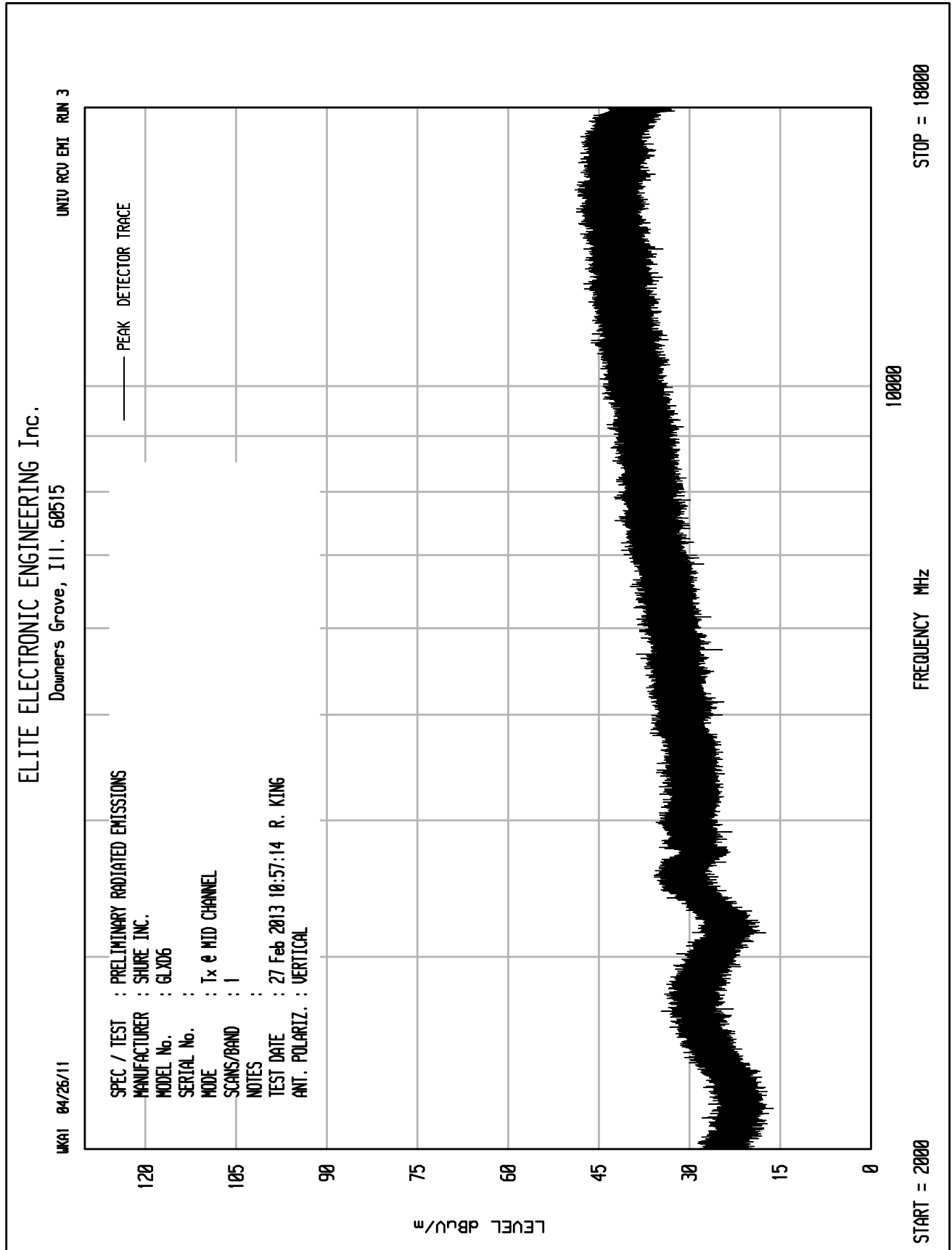


START = 2000

10000

FREQUENCY MHz

STOP = 18000

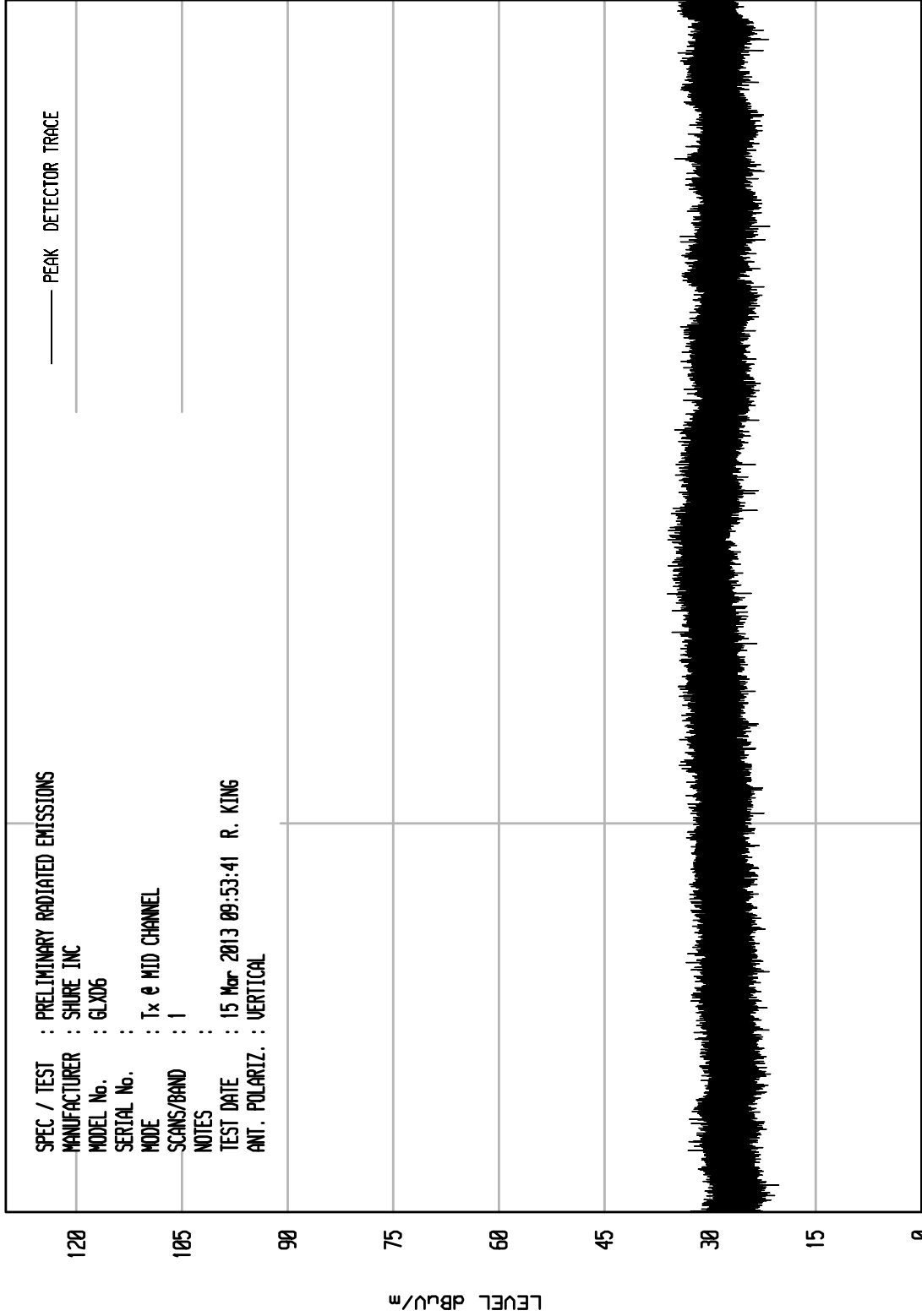


ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

UNIV RCU EMI RUN 3

UKA1 04/26/11



SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INC
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e MID CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 15 Mar 2013 09:53:41 R. KING
 ANT. POLARIZ. : VERTICAL

STOP = 25000

FREQUENCY MHz

START = 18000

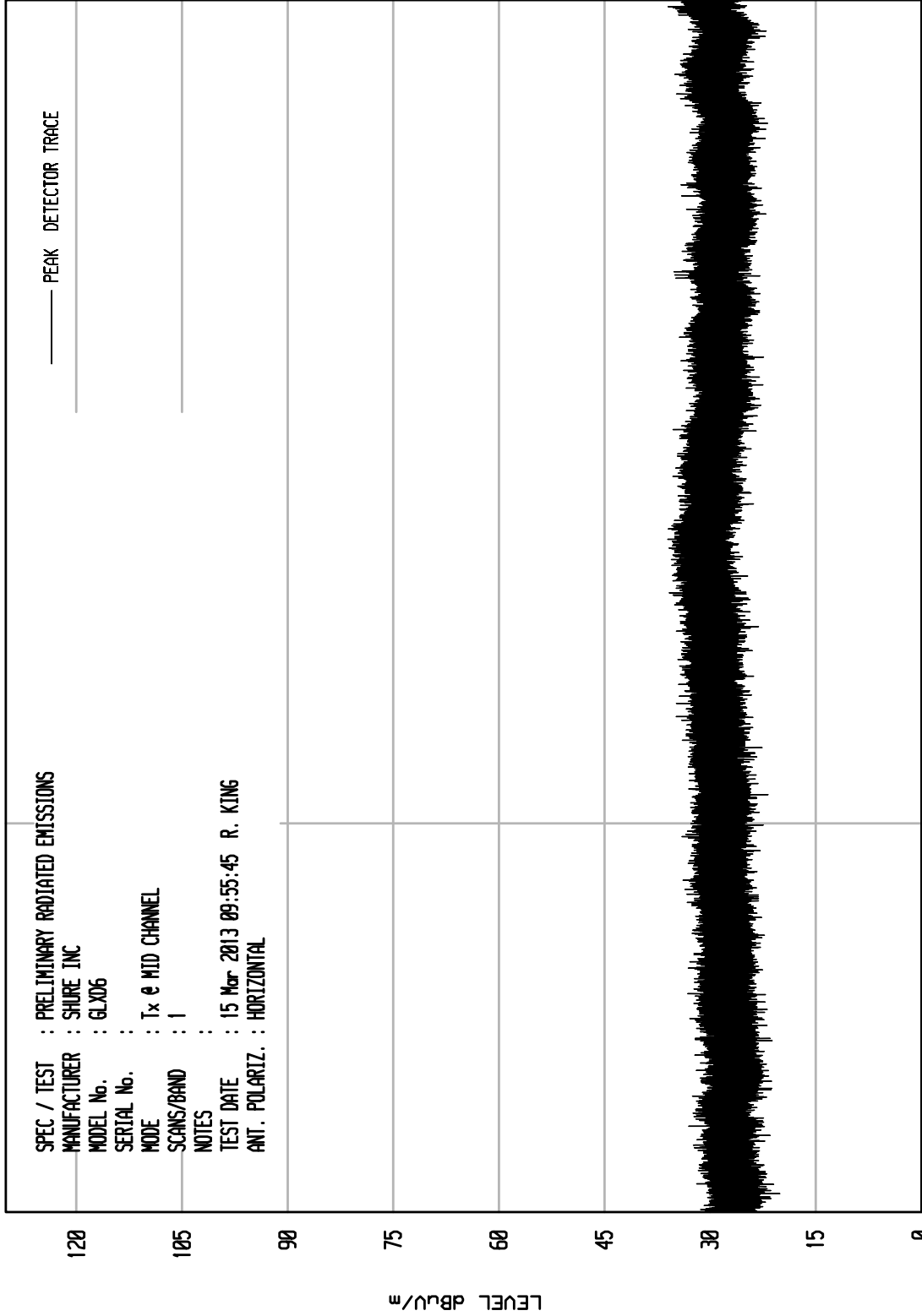


ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

UNIV RCV EMI RUN 4

UKA1 04/26/11



STOP = 25000

FREQUENCY MHz

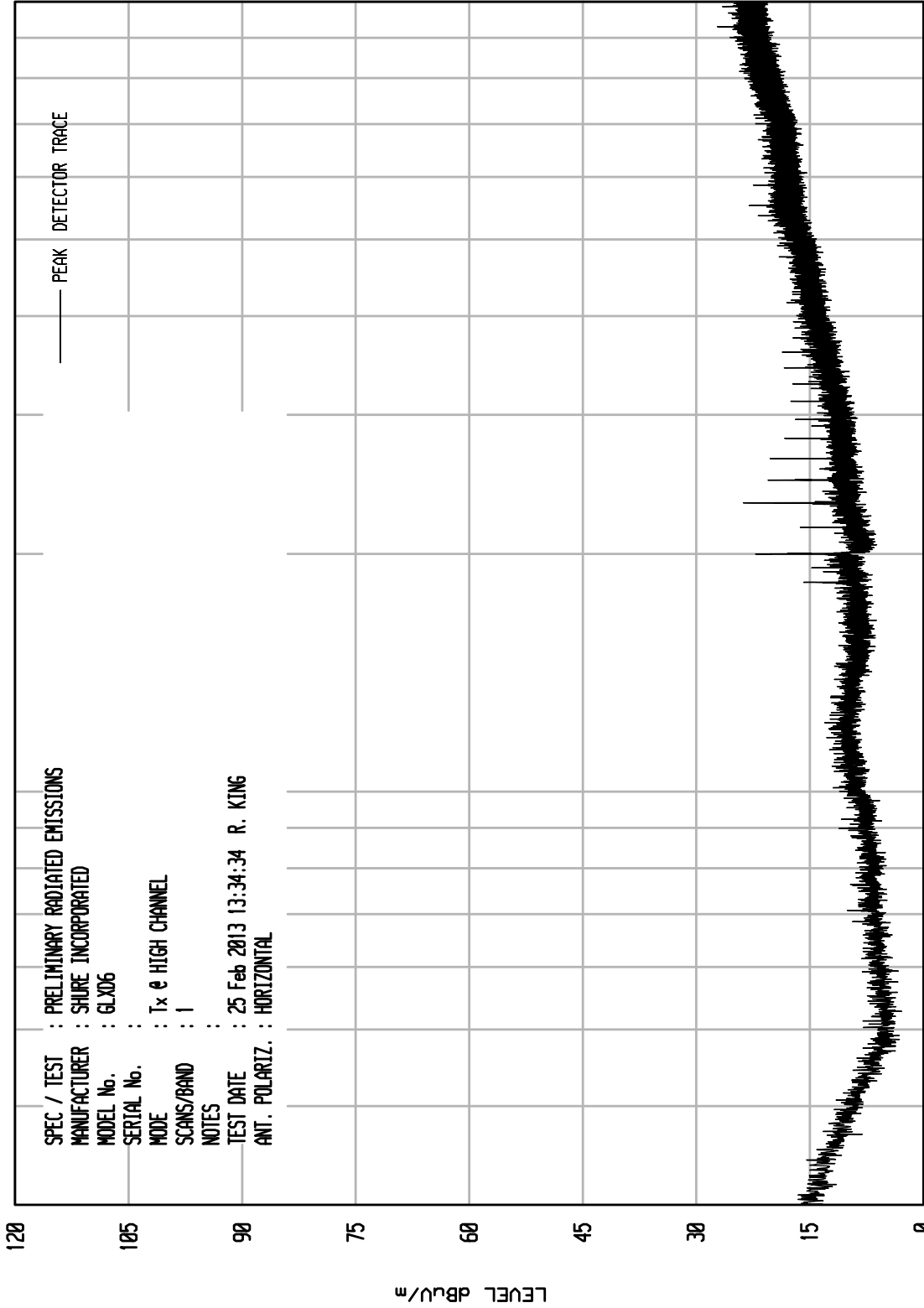
START = 18000

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIU RCV EMI RUN 5

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INCORPORATED
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e HIGH CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 25 Feb 2013 13:34:34 R. KING
 ANT. POLARIZ. : HORIZONTAL



STOP = 1000

FREQUENCY MHz

100

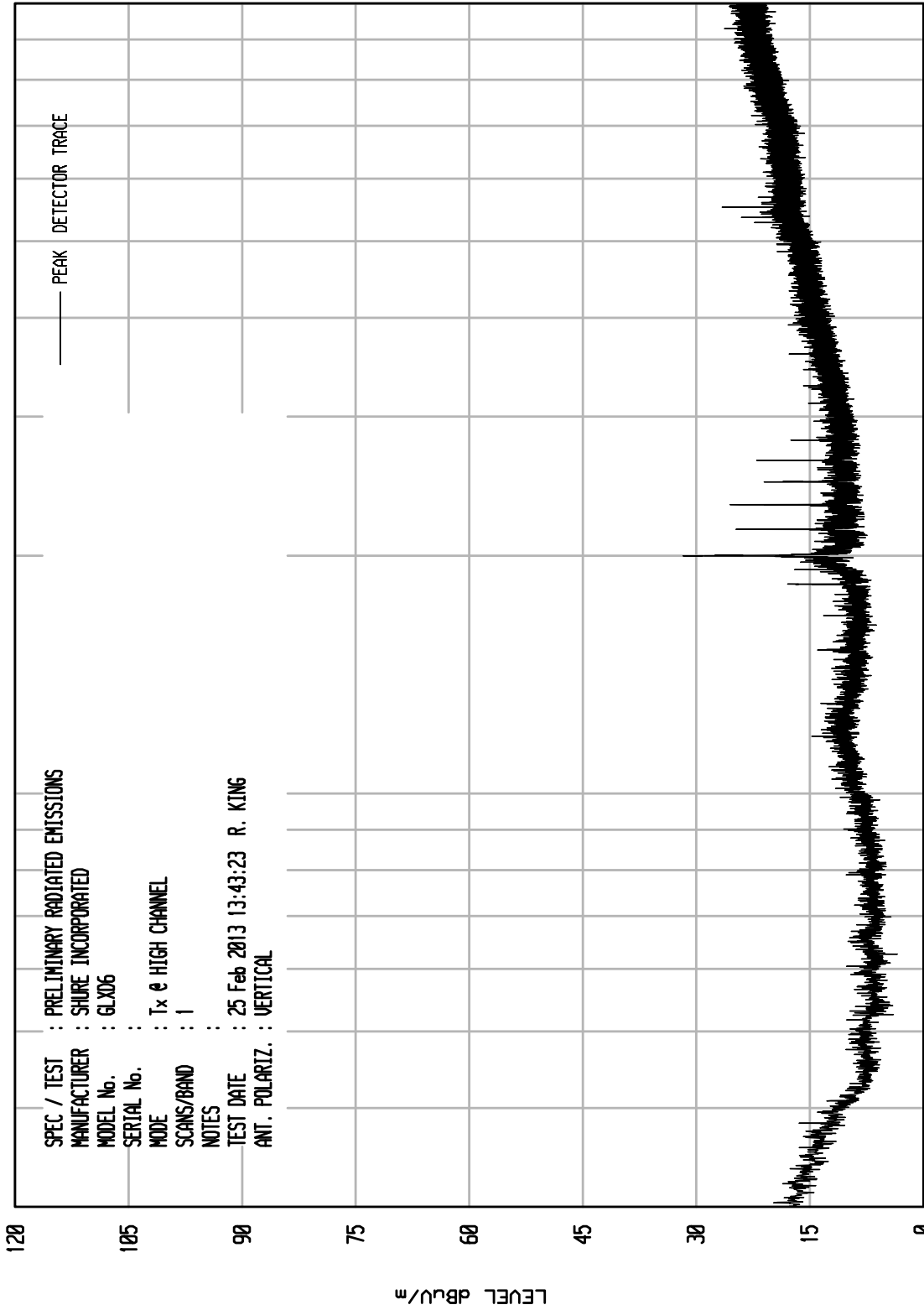
START = 30

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 6

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INCORPORATED
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e HIGH CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 25 Feb 2013 13:43:23 R. KING
 ANT. POLARIZ. : VERTICAL



STOP = 1000

FREQUENCY MHz

100

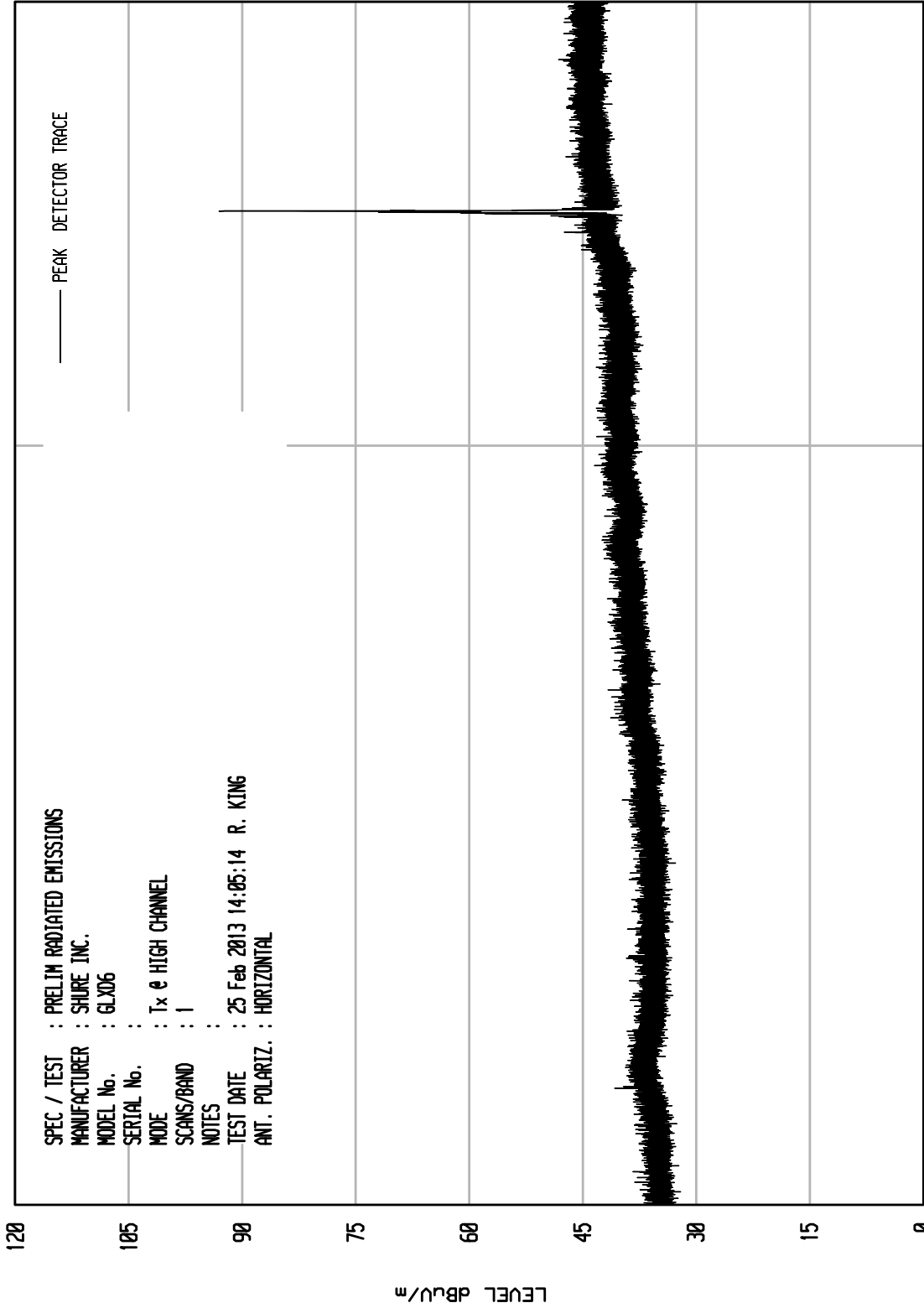
START = 30

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

UNIV RCV EMI RUN 9

UKA1 04/26/11



SPEC / TEST : PRELIM RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e HIGH CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 25 Feb 2013 14:05:14 R. KING
 ANT. POLARIZ. : HORIZONTAL

STOP = 3000

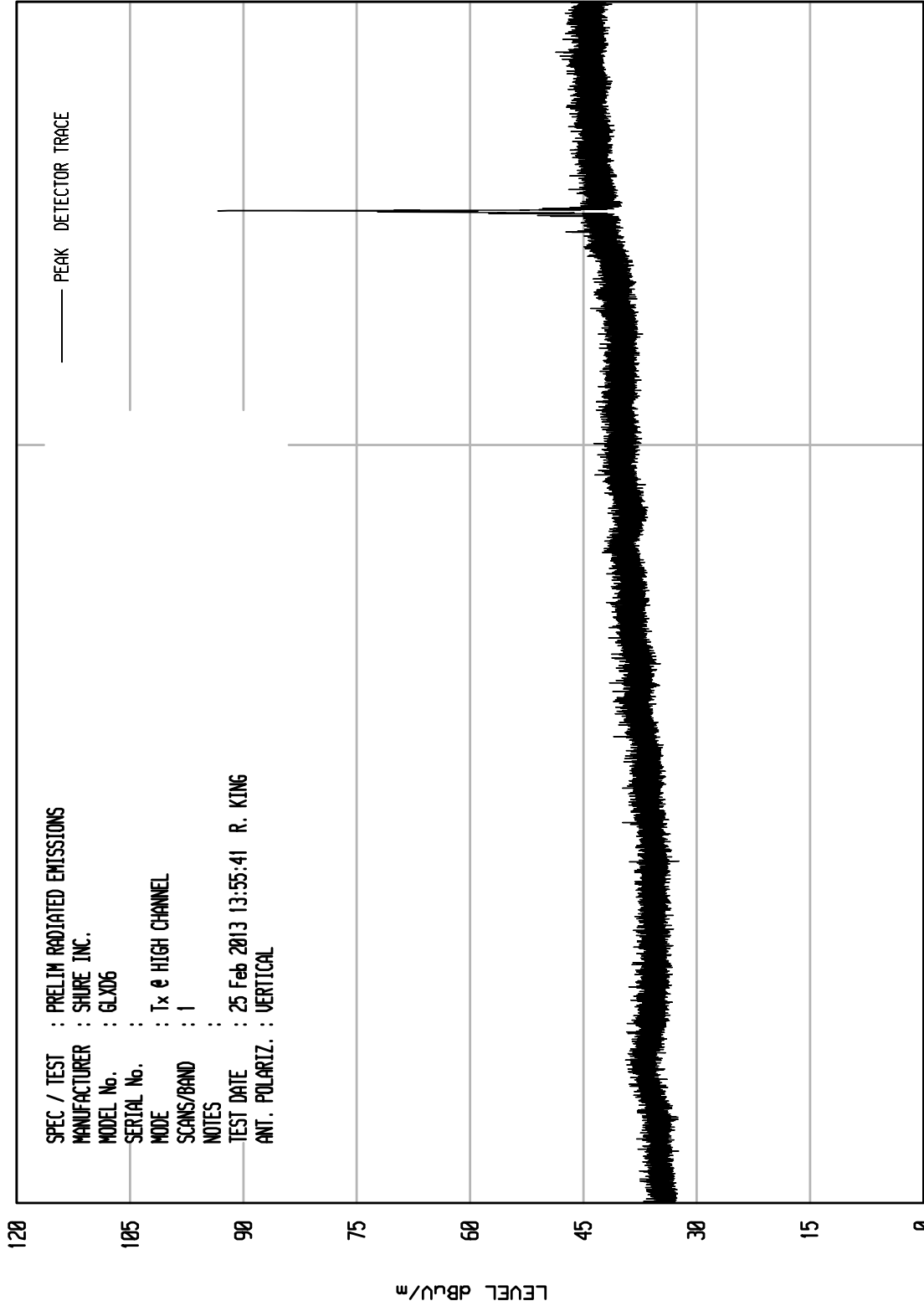
FREQUENCY MHz

START = 1000

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 7

UKA1 04/26/11

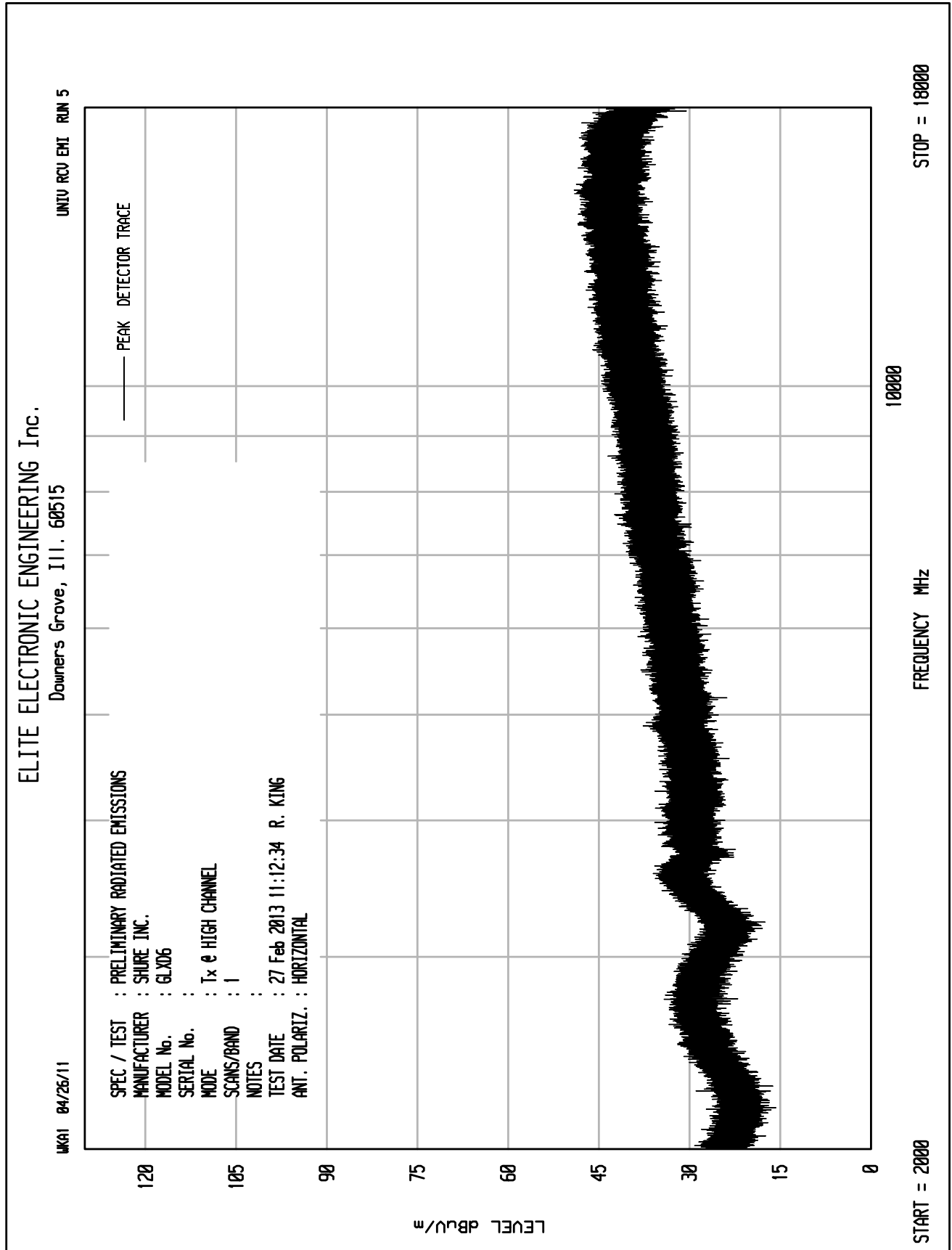


SPEC / TEST : PRELIM RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e HIGH CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 25 Feb 2013 13:55:41 R. KING
 ANT. POLARIZ. : VERTICAL

STOP = 3000

FREQUENCY MHz

START = 1000



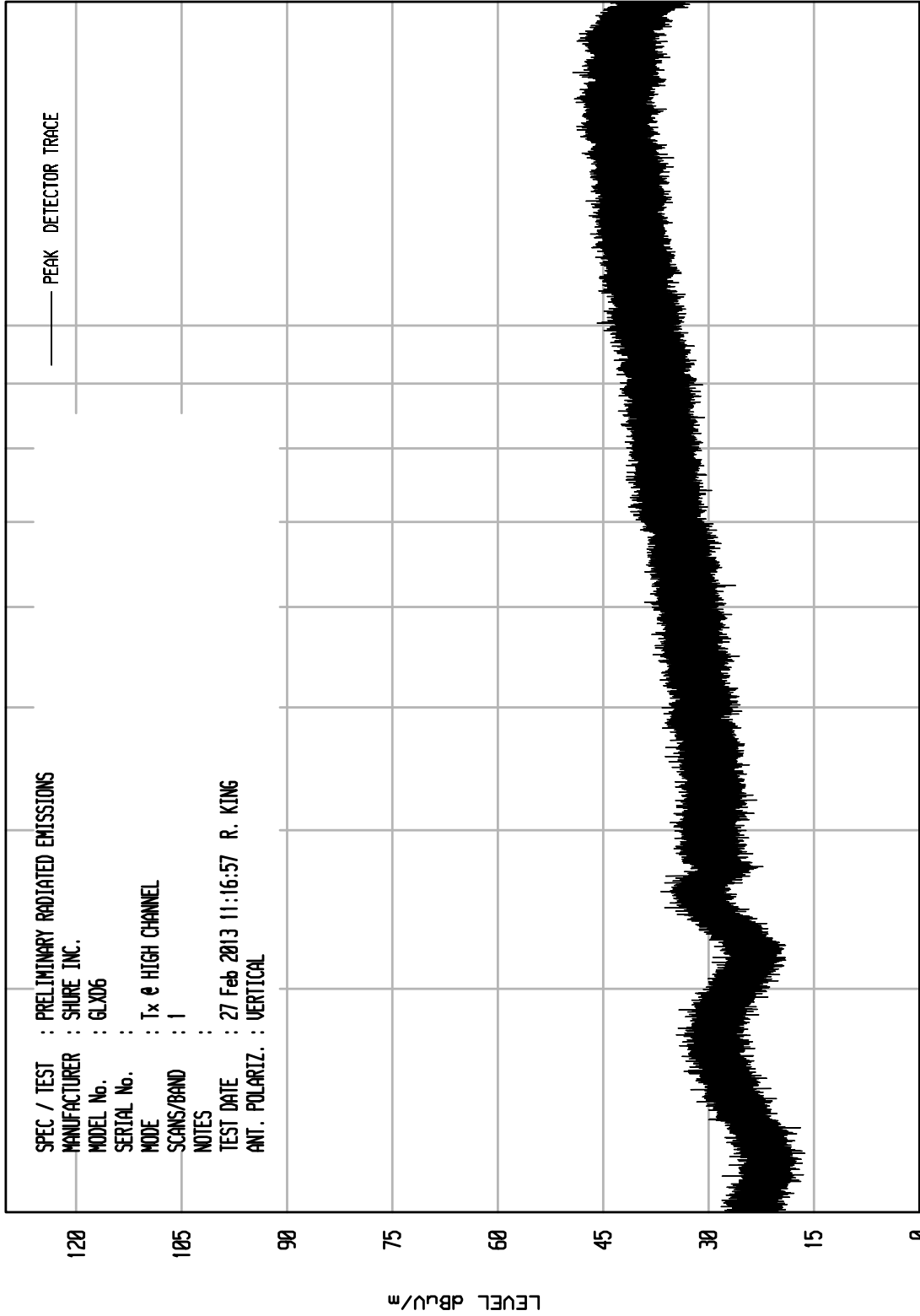
ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 6

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INC.
 MODEL No. : GLXD6
 SERIAL No. :
 MODE : Tx e HIGH CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 27 Feb 2013 11:16:57 R. KING
 ANT. POLARIZ. : VERTICAL

— PEAK DETECTOR TRACE



STOP = 18000

10000

FREQUENCY MHz

START = 2000

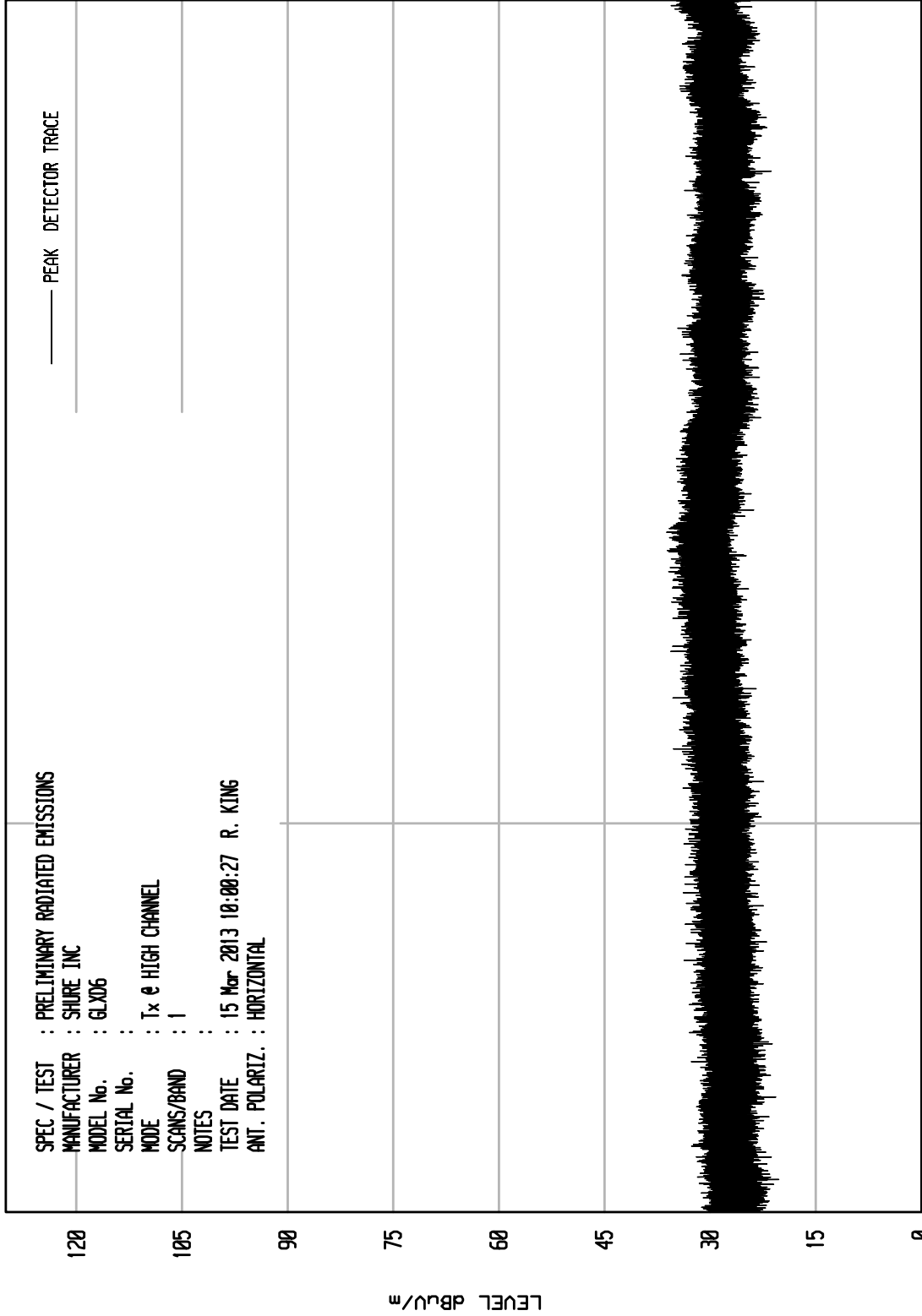


ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

UNIV RCV EMI RUN 5

UKA1 04/26/11



STOP = 25000

FREQUENCY MHz

START = 18000



ELITE ELECTRONIC ENGINEERING Inc.

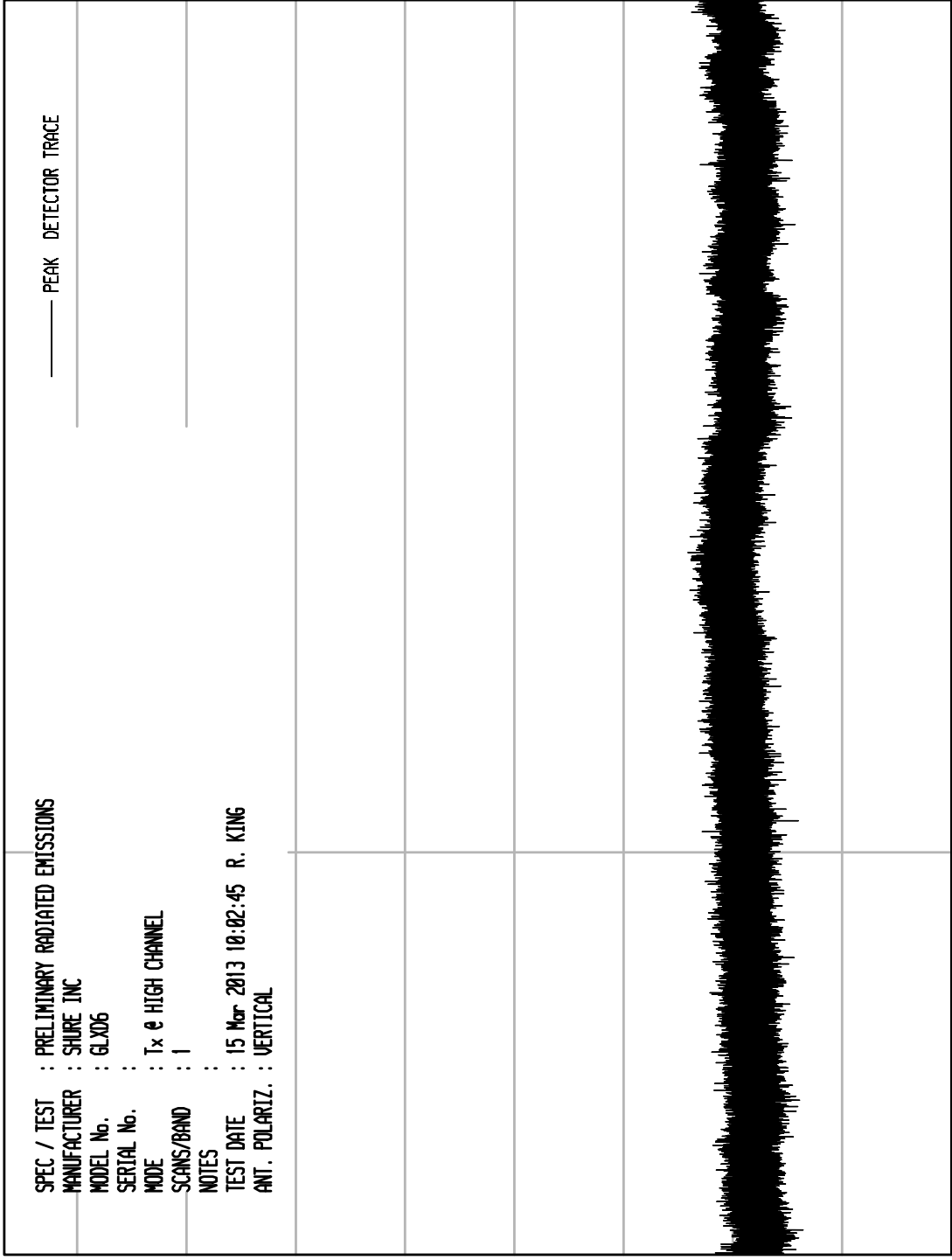
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 6

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
 MANUFACTURER : SHURE INC
 MODEL No. : GLX06
 SERIAL No. :
 MODE : Tx e HIGH CHANNEL
 SCANS/BAND : 1
 NOTES :
 TEST DATE : 15 Mar 2013 10:02:45 R. KING
 ANT. POLARIZ. : VERTICAL

— PEAK DETECTOR TRACE



START = 18000

FREQUENCY MHz

STOP = 25000



MANUFACTURER Shure Incorporated
 EUT Transceiver
 MODEL NO. GLXD6
 SPECIFICATION FCC 15.247 and RSS-210 Annex 8
 TEST Spurious Radiated Emissions
 MODE Transmit at 2404MHz
 DATE TESTED 2/27/2013
 NOTES Peak Readings

Freq. MHz	Ant Pol	Meter Reading (dBUV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2404.00	H	63.0		3.4	31.5	0.0	97.9	78517.2		
2404.00	V	69.5		3.4	31.5	0.0	104.3	164992.7		
4808.00	H	48.0		4.8	34.7	-39.3	48.3	259.8	5000.0	-25.7
4808.00	V	47.8		4.8	34.7	-39.3	48.1	253.0	5000.0	-25.9
7212.00	H	37.9	*	6.1	37.8	-39.4	42.4	131.1	16499.3	-42.0
7212.00	V	36.8	*	6.1	37.8	-39.4	41.3	116.5	16499.3	-43.0
9616.00	H	37.4	*	6.8	39.7	-39.3	44.6	170.1	16499.3	-39.7
9616.00	V	37.6	*	6.8	39.7	-39.3	44.8	174.1	16499.3	-39.5
12020.00	H	47.7	*	8.0	41.2	-39.2	57.8	779.4	5000.0	-16.1
12020.00	V	47.6	*	8.0	41.2	-39.2	57.7	765.1	5000.0	-16.3
14424.00	H	37.4	*	8.7	42.3	-38.3	50.1	318.7	16499.3	-34.3
14424.00	V	37.4	*	8.7	42.3	-38.3	50.1	318.7	16499.3	-34.3
16828.00	H	36.9	*	9.4	41.2	-37.5	50.0	315.9	16499.3	-34.4
16828.00	V	36.7	*	9.4	41.2	-37.5	49.8	309.8	16499.3	-34.5
19232.00	H	47.0	*	2.2	40.4	-28.3	61.3	1157.5	5000.0	-12.7
19232.00	V	46.7	*	2.2	40.4	-28.3	60.9	1113.1	5000.0	-13.0
21636.00	H	45.5	*	2.2	40.6	-27.1	61.3	1156.3	16499.3	-23.1
21636.00	V	45.5	*	2.2	40.6	-27.1	61.3	1156.3	16499.3	-23.1
24040.00	H	46.6	*	2.2	40.6	-28.0	61.4	1180.4	16499.3	-22.9
24040.00	V	46.4	*	2.2	40.6	-28.0	61.3	1154.9	16499.3	-23.1

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER Shure Incorporated
 EUT Transceiver
 MODEL NO. GLXD6
 SPECIFICATION FCC 15.247 and RSS-210 Annex 8
 TEST Spurious Radiated Emissions
 MODE Transmit at 2404MHz
 DATE TESTED 2/27/2013
 NOTES Average Readings In Restricted Bands

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
4808.00	H	36.7		4.8	34.7	-39.3	-2.0	35.0	56.1	500.0	-19.0
4808.00	V	34.7		4.8	34.7	-39.3	-2.0	32.9	44.3	500.0	-21.1
12020.00	H	33.9	*	8.0	41.2	-39.2	-2.0	42.0	126.1	500.0	-12.0
12020.00	V	33.9	*	8.0	41.2	-39.2	-2.0	42.0	126.4	500.0	-11.9
19232.00	H	34.7	*	2.2	40.4	-28.3	-2.0	47.0	222.9	500.0	-7.0
19232.00	V	34.4	*	2.2	40.4	-28.3	-2.0	46.7	215.3	500.0	-7.3

Checked BY Richard E. King :

Richard E. King



MANUFACTURER Shure Incorporated
 EUT Transceiver
 MODEL NO. GLXD6
 SPECIFICATION FCC 15.247 and RSS-210 Annex 8
 TEST Spurious Radiated Emissions
 MODE Transmit at 2442MHz
 DATE TESTED 2/27/2013
 NOTES Peak Readings

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2404.00	H	63.0		3.4	31.5	0.0	97.9	78517.2		
2404.00	V	69.5		3.4	31.5	0.0	104.3	164992.7		
4808.00	H	48.0		4.8	34.7	-39.3	48.3	259.8	5000.0	-25.7
4808.00	V	47.8		4.8	34.7	-39.3	48.1	253.0	5000.0	-25.9
7212.00	H	37.9	*	6.1	37.8	-39.4	42.4	131.1	16499.3	-42.0
7212.00	V	36.8	*	6.1	37.8	-39.4	41.3	116.5	16499.3	-43.0
9616.00	H	37.4	*	6.8	39.7	-39.3	44.6	170.1	16499.3	-39.7
9616.00	V	37.6	*	6.8	39.7	-39.3	44.8	174.1	16499.3	-39.5
12020.00	H	47.7	*	8.0	41.2	-39.2	57.8	779.4	5000.0	-16.1
12020.00	V	47.6	*	8.0	41.2	-39.2	57.7	765.1	5000.0	-16.3
14424.00	H	37.4	*	8.7	42.3	-38.3	50.1	318.7	16499.3	-34.3
14424.00	V	37.4	*	8.7	42.3	-38.3	50.1	318.7	16499.3	-34.3
16828.00	H	36.9	*	9.4	41.2	-37.5	50.0	315.9	16499.3	-34.4
16828.00	V	36.7	*	9.4	41.2	-37.5	49.8	309.8	16499.3	-34.5
19232.00	H	47.0	*	2.2	40.4	-28.3	61.3	1157.5	5000.0	-12.7
19232.00	V	46.7	*	2.2	40.4	-28.3	60.9	1113.1	5000.0	-13.0
21636.00	H	45.5	*	2.2	40.6	-27.1	61.3	1156.3	16499.3	-23.1
21636.00	V	45.5	*	2.2	40.6	-27.1	61.3	1156.3	16499.3	-23.1
24040.00	H	46.6	*	2.2	40.6	-28.0	61.4	1180.4	16499.3	-22.9
24040.00	V	46.4	*	2.2	40.6	-28.0	61.3	1154.9	16499.3	-23.1

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER Shure Incorporated
 EUT Transceiver
 MODEL NO. GLXD6
 SPECIFICATION FCC 15.247 and RSS-210 Annex 8
 TEST Spurious Radiated Emissions
 MODE Transmit at 2445MHz
 DATE TESTED 2/27/2013
 NOTES Average Readings In Restricted Bands

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
4884.00	H	40.8		4.9	34.7	-39.3	-2.0	39.1	90.3	500.0	-14.9
4884.00	V	40.9		4.9	34.7	-39.3	-2.0	39.2	90.7	500.0	-14.8
7326.00	H	34.38	*	6.2	37.9	-39.4	-2.0	37.0	71.0	500.0	-17.0
7326.00	V	34.4	*	6.2	37.9	-39.4	-2.0	37.1	71.2	500.0	-16.9
12210.00	H	34.4	*	8.0	41.4	-39.1	-2.0	42.7	135.9	500.0	-11.3
12210.00	V	34.3	*	8.0	41.4	-39.1	-2.0	42.6	134.4	500.0	-11.4
19536.00	H	33.7	*	2.2	40.4	-27.8	-2.0	46.5	210.6	500.0	-7.5
19536.00	V	33.2	*	2.2	40.4	-27.8	-2.0	46.0	198.8	500.0	-8.0

Checked BY Richard E. King :

Richard E. King



MANUFACTURER Shure Incorporated
 EUT Transceiver
 MODEL NO. GLXD6
 SPECIFICATION FCC 15.247 and RSS-210 Annex 8
 TEST Spurious Radiated Emissions
 MODE Transmit at 2478MHz
 DATE TESTED 2/27/2013
 NOTES Peak Readings

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2478.00	H	61.4		3.5	31.5	0.0	96.4	66116.1		
2478.00	V	67.2		3.5	31.5	0.0	102.1	128028.7		
4956.00	H	47.6		4.9	34.8	-39.3	47.9	248.6	5000.0	-26.1
4956.00	V	50.7		4.9	34.8	-39.3	51.0	356.1	5000.0	-22.9
7434.00	H	47.6	*	6.2	38.0	-39.4	52.4	415.3	5000.0	-21.6
7434.00	V	47.6	*	6.2	38.0	-39.4	52.4	416.3	5000.0	-21.6
9912.00	H	38.9	*	7.0	39.9	-39.2	46.5	211.7	12802.9	-35.6
9912.00	V	38.4	*	7.0	39.9	-39.2	46.1	200.8	12802.9	-36.1
12390.00	H	47.3	*	8.0	41.5	-39.0	57.7	769.5	5000.0	-16.3
12390.00	V	47.9	*	8.0	41.5	-39.0	58.4	829.3	5000.0	-15.6
14868.00	H	34.9	*	8.9	42.3	-38.2	48.0	251.3	12802.9	-34.1
14868.00	V	36.2	*	8.9	42.3	-38.2	49.2	289.5	12802.9	-32.9
17346.00	H	36.6	*	9.7	39.8	-37.7	48.3	260.4	12802.9	-33.8
17346.00	V	37.1	*	9.7	39.8	-37.7	48.8	275.5	12802.9	-33.3
19824.00	H	45.2	*	2.2	40.4	-27.3	60.6	1066.8	5000.0	-13.4
19824.00	V	45.7	*	2.2	40.4	-27.3	61.0	1126.1	5000.0	-12.9
22302.00	H	45.5	*	2.2	40.6	-27.5	60.8	1095.1	5000.0	-13.2
22302.00	V	44.2	*	2.2	40.6	-27.5	59.5	949.4	5000.0	-14.4
24780.00	H	47.0	*	2.2	40.6	-28.5	61.3	1165.7	12802.9	-20.8
24780.00	V	46.5	*	2.2	40.6	-28.5	60.8	1091.6	12802.9	-21.4

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER Shure Incorporated
 EUT Transceiver
 MODEL NO. GLXD6
 SPECIFICATION FCC 15.247 and RSS-210 Annex 8
 TEST Spurious Radiated Emissions
 MODE Transmit at 2478MHz
 DATE TESTED 2/27/2013
 NOTES Average Readings In Restricted Bands

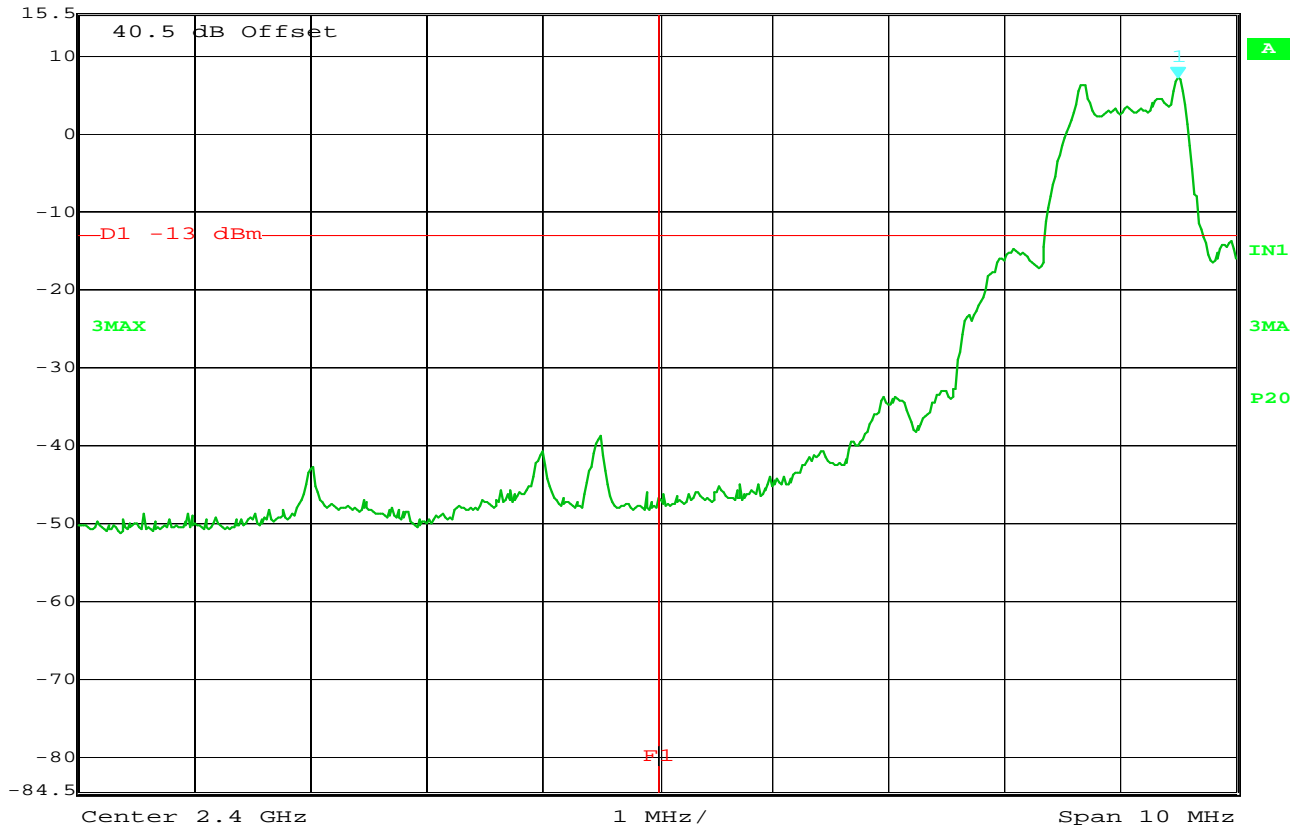
Freq. MHz	Ant Pol	Meter Reading (dBUV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBUV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
4956.00	H	34.2		4.9	34.8	-39.3	-2.0	32.6	42.4	500.0	-21.4
4956.00	V	38.7		4.9	34.8	-39.3	-2.0	37.1	71.3	500.0	-16.9
7434.00	H	34.13	*	6.2	38.0	-39.4	-2.0	36.9	70.1	500.0	-17.1
7434.00	V	34.2	*	6.2	38.0	-39.4	-2.0	37.0	70.7	500.0	-17.0
12390.00	H	34.3	*	8.0	41.5	-39.0	-2.0	42.8	137.5	500.0	-11.2
12390.00	V	34.3	*	8.0	41.5	-39.0	-2.0	42.8	137.3	500.0	-11.2
19824.00	H	33.0	*	2.2	40.4	-27.3	-2.0	46.3	207.3	500.0	-7.6
19824.00	V	33.2	*	2.2	40.4	-27.3	-2.0	46.5	212.1	500.0	-7.4
22302.00	H	32.6	*	2.2	40.6	-27.5	-2.0	45.9	198.1	500.0	-8.0
22302.00	V	31.3	*	2.2	40.6	-27.5	-2.0	44.6	170.6	500.0	-9.3

Checked BY RICHARD E. KING :

Richard E. King



Marker 1 [T3] RBW 100 kHz RF Att 10 dB
 Ref Lvl 7.02 dBm VBW 1 MHz
 15.5 dBm 2.40449900 GHz SWT 5 ms Unit dBm



Date: 11.MAR.2013 12:25:50

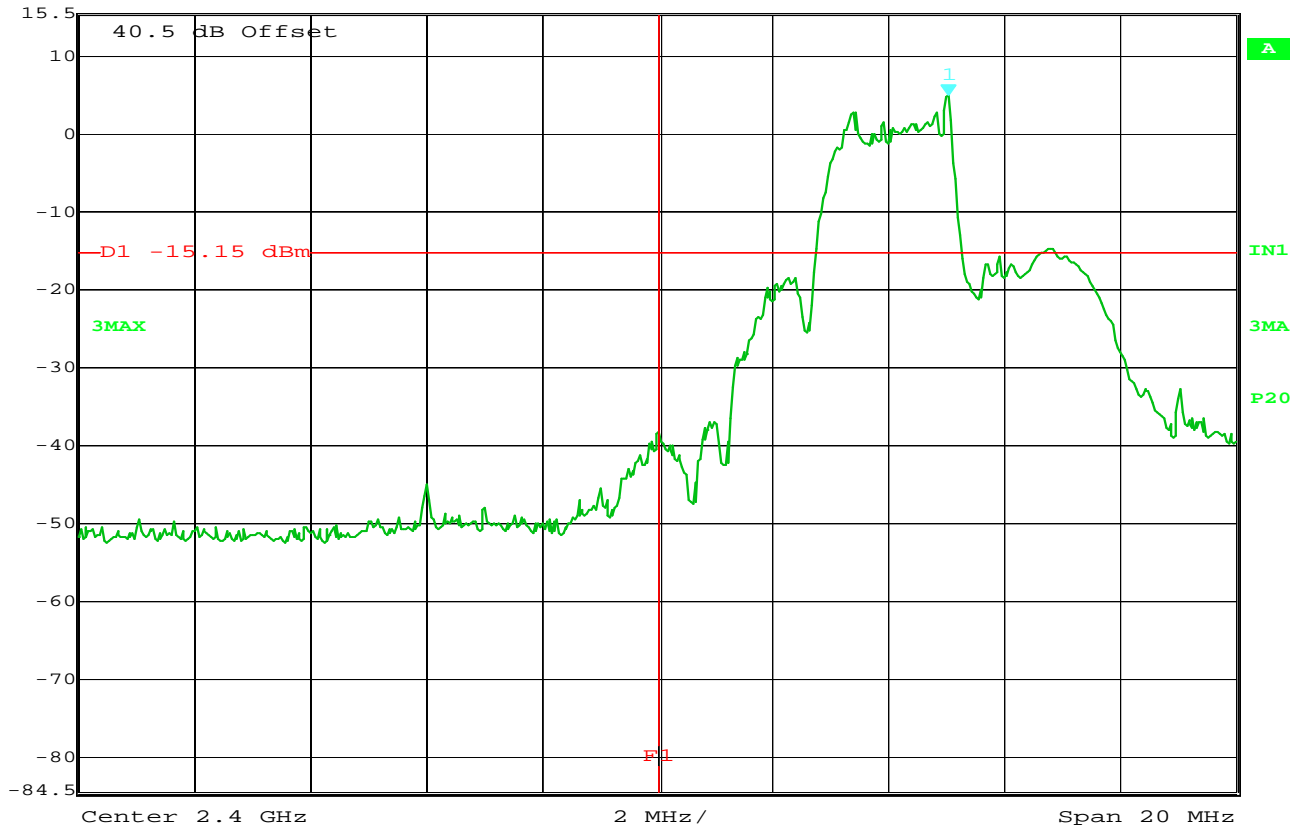
FCC 15.247 Bandedge Compliance

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 240MHz, half bandwidth
 NOTES : Bandedge Compliance
 : Display Line (F1) represents the band edge (2400MHz).
 : Display line (D1) represents 20 dB down from the peak
 : of the transmitter in a 100kHz bandwidth.

NOTES



Marker 1 [T3] RBW 100 kHz RF Att 10 dB
 Ref Lvl 4.92 dBm VBW 1 MHz
 15.5 dBm 2.40503006 GHz SWT 5 ms Unit dBm



Date: 11.MAR.2013 12:30:16

FCC 15.247 Bandedge Compliance

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 240MHz, full bandwidth
 NOTES : Bandedge Compliance
 : Display Line (F1) represents the band edge (2400MHz).
 : Display line (D1) represents 20 dB down from the peak
 : of the transmitter in a 100kHz bandwidth.

NOTES



MANUFACTURER Shure Incorporated
 EUT Transceiver
 MODEL NO. GLXD6
 SPECIFICATION FCC 15.247 and RSS-210 Annex 8
 TEST Spurious Radiated Emissions at 2483.5MHz band edge
 MODE Transmit at 2478MHz
 DATE TESTED 2/27/2013
 NOTES Peak Readings

Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2483.50	H	17.8	*	3.5	31.5	0.0	52.8	436.1	5000.0	-21.2
2483.50	V	24.3		3.5	31.5	0.0	59.3	921.8	5000.0	-14.7

Checked BY Richard E. King :

Richard E. King



MANUFACTURER Shure Incorporated
 EUT Transceiver
 MODEL NO. GLXD6
 SPECIFICATION FCC 15.247 and RSS-210 Annex 8
 TEST Spurious Radiated Emissions at 2483.5MHz band edge
 MODE Transmit at 2478MHz
 DATE TESTED 2/27/2013
 NOTES Average Readings

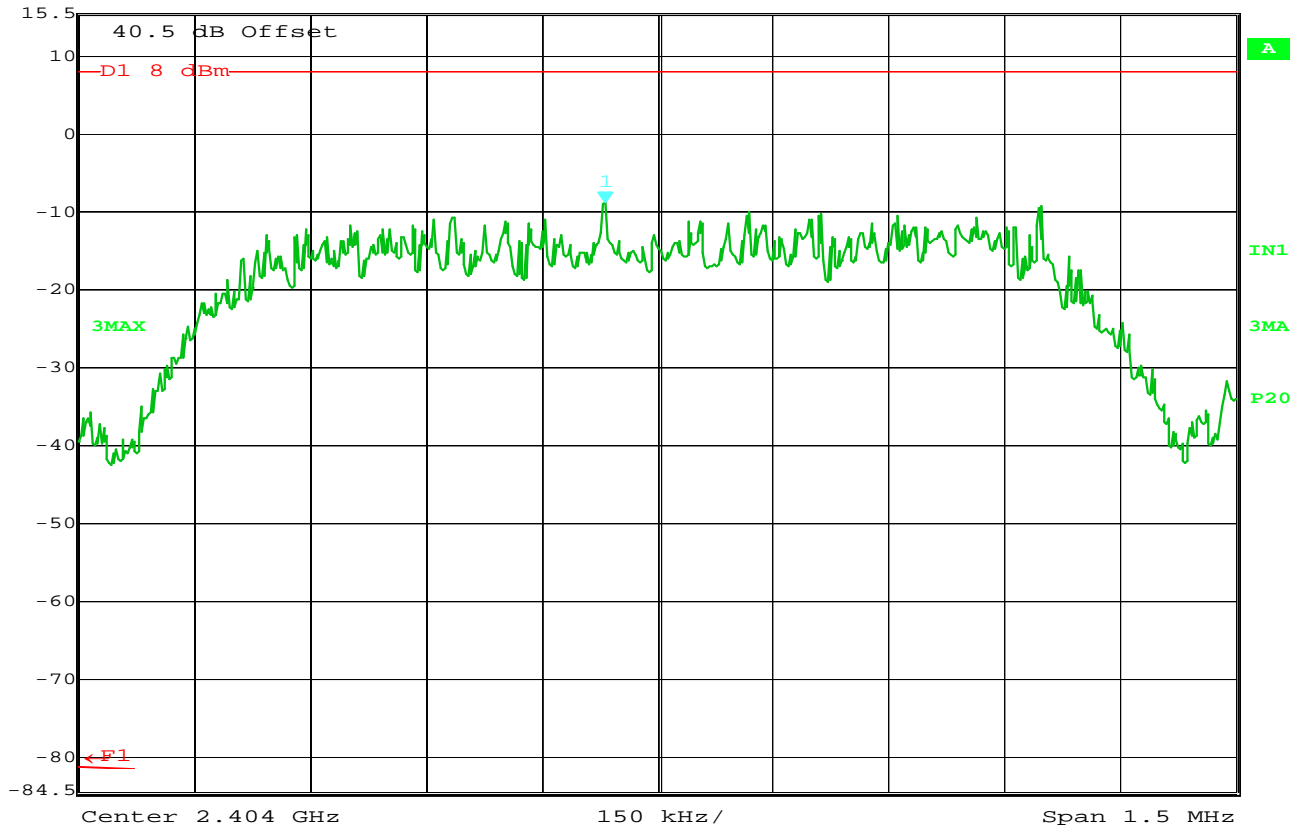
Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Peak Limit uV/m at 3 m	Margin (dB)
2483.50	H	2.6	*	3.5	31.5	0.0	37.6	75.8	5000.0	-36.4
2483.50	V	11.4		3.5	31.5	0.0	46.4	208.7	5000.0	-27.6

Checked BY Richard E. King :

Richard E. King



Marker 1 [T3] RBW 3 kHz RF Att 10 dB
 Ref Lvl -8.80 dBm VBW 30 kHz
 15.5 dBm 2.40393236 GHz SWT 420 ms Unit dBm



Date: 11.MAR.2013 12:58:11

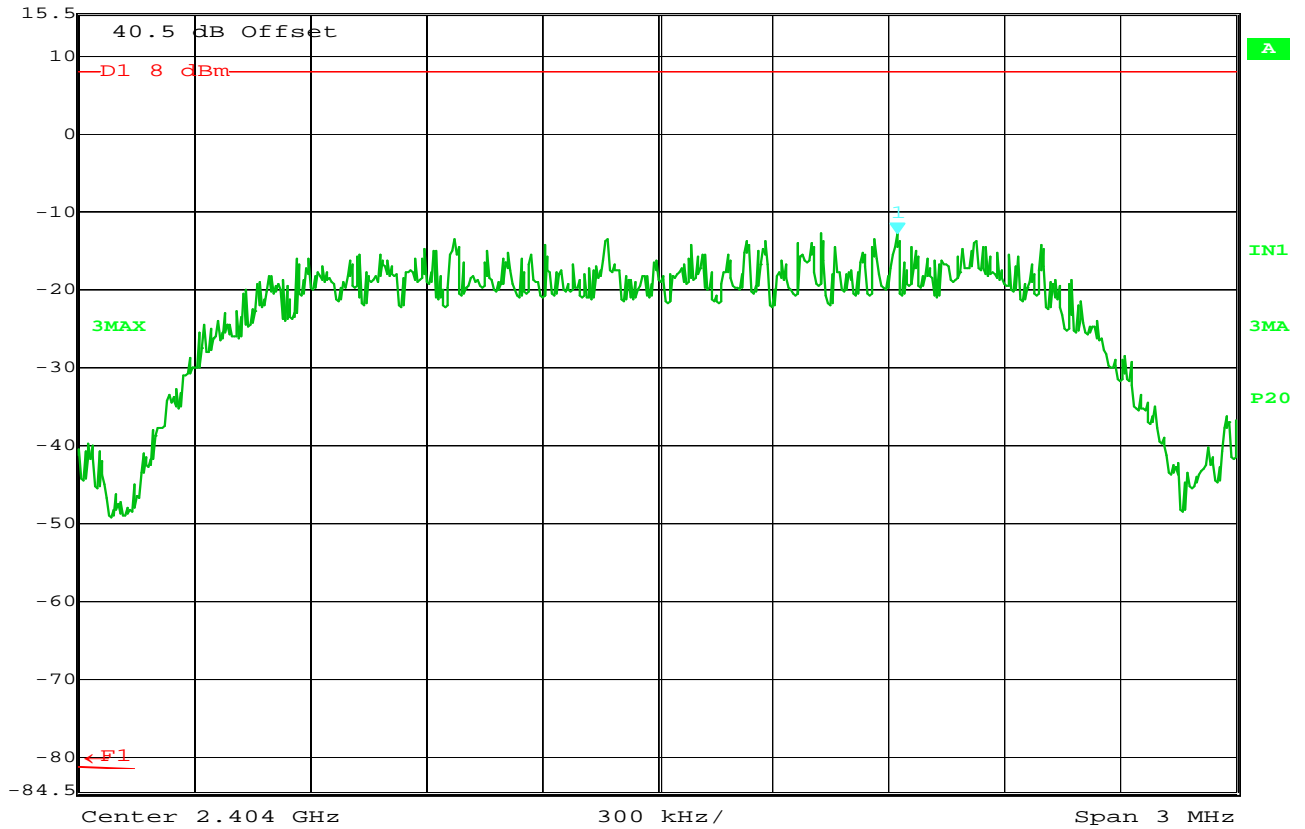
FCC 15.247 Maximum Conducted Peak Power Spectral Density

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 240MHz, half bandwidth
 NOTES : Conducted Peak Power Spectral Density
 :

NOTES



Marker 1 [T3] RBW 3 kHz RF Att 10 dB
 Ref Lvl -12.93 dBm VBW 30 kHz
 15.5 dBm 2.40462224 GHz SWT 840 ms Unit dBm



Date: 11.MAR.2013 13:00:26

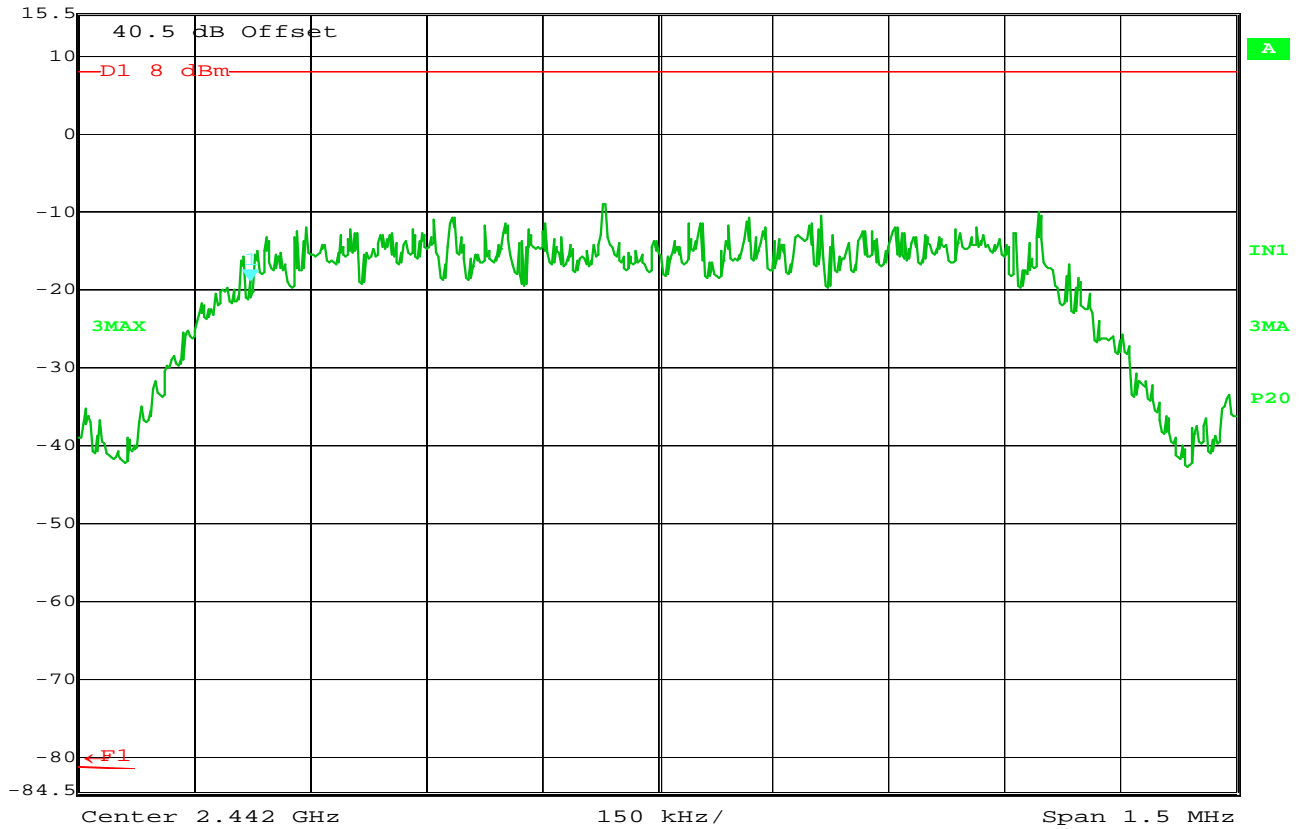
FCC 15.247 Maximum Conducted Peak Power Spectral Density

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2404MHz, full bandwidth
 NOTES : Conducted Peak Power Spectral Density
 :

NOTES



Marker 1 [T3] RBW 3 kHz RF Att 10 dB
 Ref Lvl -18.97 dBm VBW 30 kHz
 15.5 dBm 2.44147395 GHz SWT 420 ms Unit dBm



Date: 11.MAR.2013 12:55:38

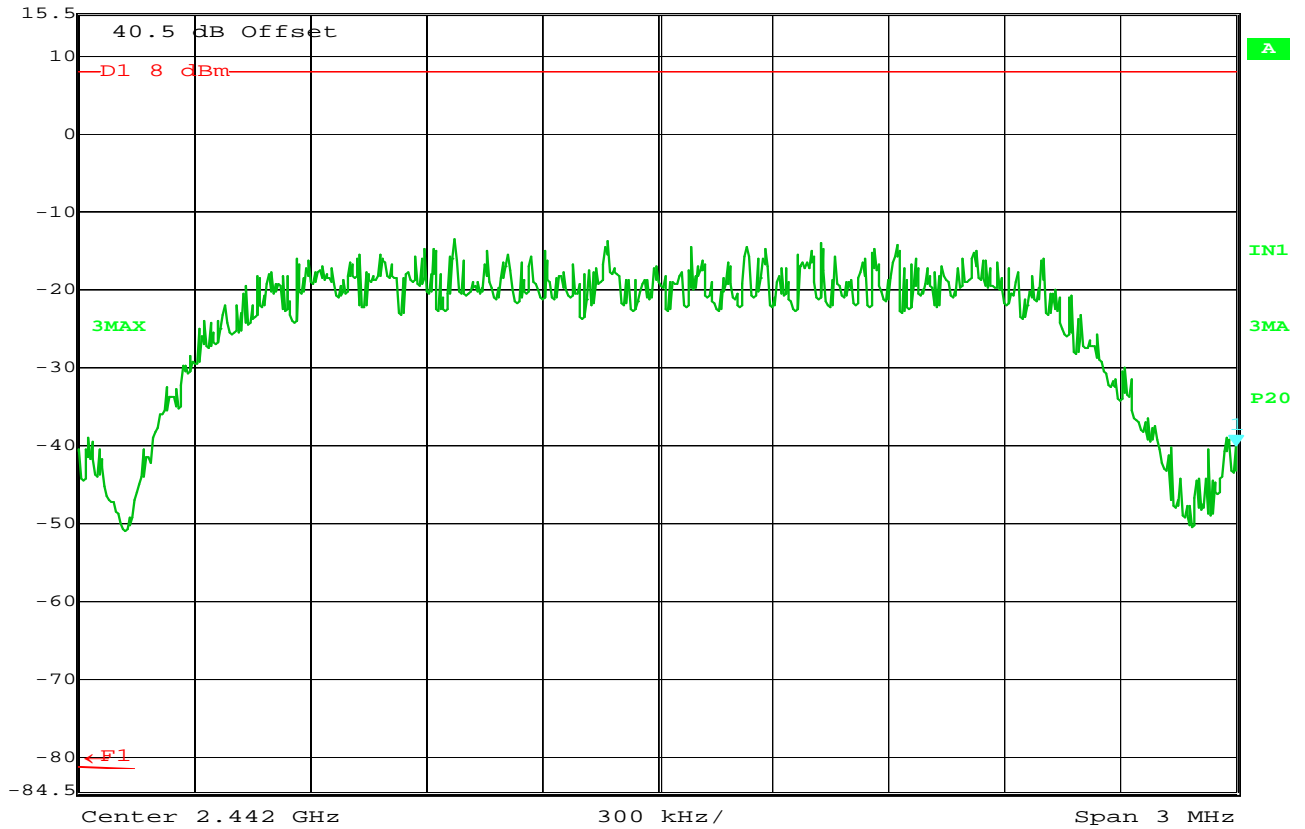
FCC 15.247 Maximum Conducted Peak Power Spectral Density

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2442MHz, half bandwidth
 NOTES : Conducted Peak Power Spectral Density
 :

NOTES



Marker 1 [T3] RBW 3 kHz RF Att 10 dB
 Ref Lvl -40.22 dBm VBW 30 kHz
 15.5 dBm 2.44350000 GHz SWT 840 ms Unit dBm



Date: 11.MAR.2013 12:52:00

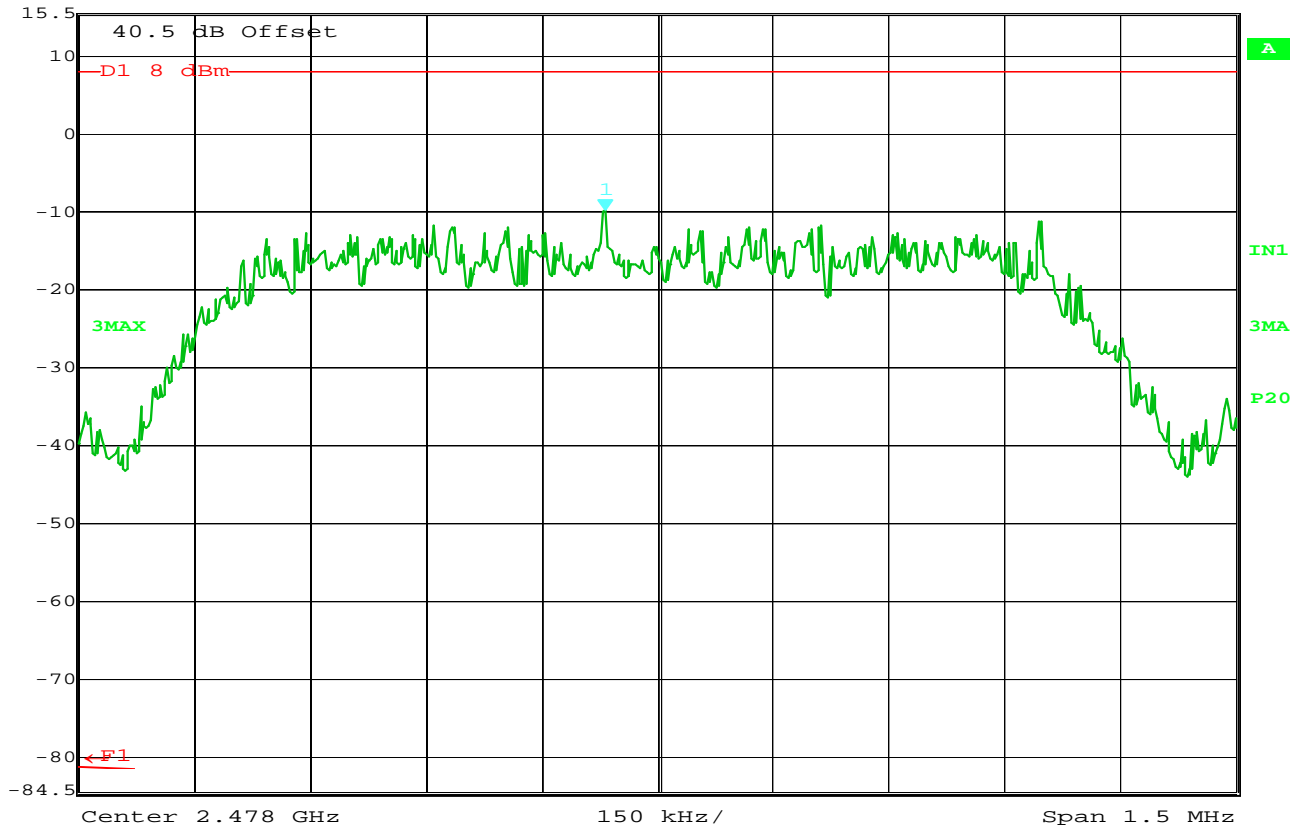
FCC 15.247 Maximum Conducted Peak Power Spectral Density

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2442MHz, FULL bandwidth
 NOTES : Conducted Peak Power Spectral Density
 :

NOTES



Ref Lvl 15.5 dBm
 Marker 1 [T3] -9.79 dBm
 2.47793236 GHz
 RBW 3 kHz
 RF Att 10 dB
 VBW 30 kHz
 SWT 420 ms
 Unit dBm



Date: 11.MAR.2013 13:07:28

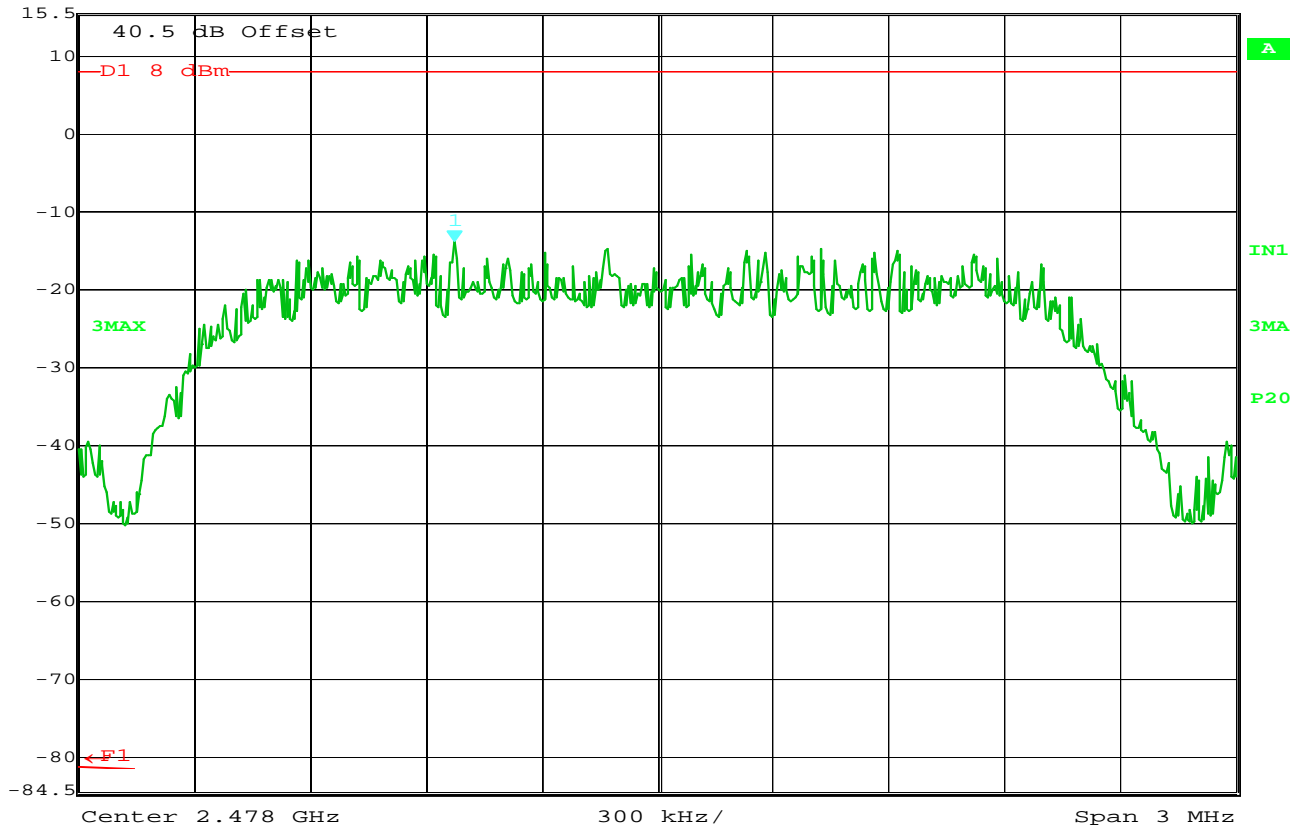
FCC 15.247 Maximum Conducted Peak Power Spectral Density

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2478MHz, half bandwidth
 NOTES : Conducted Peak Power Spectral Density
 :

NOTES



Marker 1 [T3] RBW 3 kHz RF Att 10 dB
 Ref Lvl -13.99 dBm VBW 30 kHz
 15.5 dBm 2.47747395 GHz SWT 840 ms Unit dBm



Date: 11.MAR.2013 13:06:07

FCC 15.247 Maximum Conducted Peak Power Spectral Density

MANUFACTURER : Shure Inc.
 MODEL NUMBER : GLXD6
 TEST MODE : Tx @ 2478MHz, full bandwidth
 NOTES : Conducted Peak Power Spectral Density
 :

NOTES