Measurement of RF Interference from an GLXD4 Transceiver

For	Shure Incorporated 5800 West Touhy Niles, IL 60714
P.O. Number	4500221175
Date Received	June 13, 2012
Date Tested	June 13, 2012 through August 14, 2012
Test Personnel	Mark Longinotti and Ian Carnegie
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: MARK E. LONGINOTTI

Mark Longinotti
EMC Engineer

Approved By: Raymond J Klouda

Raymond J. Klouda
Registered Professional
Engineer of Illinois - 44894

Elite Electronic Engineering Inc.
1516 Centre Circle
Downers Grove, IL 60515
Tel : (630) 495-9770
Fax: (630) 495-9785
www.elitetest.com

TABLE OF CONTENTS

REVISION HISTORY

Revision	Date	Description
—	5 Sept 2012	Initial release

Measurement of RF Emissions from a Transceiver, Part No. GLXD4 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. GLXD4, transceiver (hereinafter referred to as the Equipment under test (EUT). Two (2) samples of the EUT were submitted for testing. Serial No. 4121390862 had special test code installed so that it could be programmed to transmit or receive at discrete frequencies. Serial No. 4121390859 had stock code installed so that it would operate in normal mode. The EUT with the stock code could charge a Shure Model SA900 Rechargeable Lithium-Ion battery by placing the battery in the battery charging bay on the front panel of the EUT.

The EUT was designed to transmit and receive in the 2404MHz to 2478MHz band using two (2) each 9cm long external, non-removable antennas. For testing purposes only, the antennas were disconnected from the EUT and replaced with a coaxial connector. The EUT with the coaxial connector was used to perform the 6dB bandwidth test, the peak conducted output power test, the band edge compliance test, and the power spectral density test.

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

The receive portion of the EUT is a super-heterodyne type receiver designed to receive in the 2404MHz to 2478MHz band. The EUT contains a tuner which utilizes one local oscillator (LO) at 3MHz above the tuned frequency from 2404MHz to 2439MHz and 3MHz below the tuned frequency from 2440MHz to 2478MHz.

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 C63.4-2003.

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 22C and the relative humidity was 25%.

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 2011

- 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"

- Guidance for Performing Compliance Measurements on Digital Transmission Systems DTSI) Operating under §15.247, January 18, 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. GLXD4. 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: PS41R3. 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

The following peripheral equipment was submitted with the EUT:

Item	Description
SA900 battery	Shure model no. SA900 rechargeable lithium-Ion battery was inserted into the battery charging bay on the front panel of the EUT when testing in the Charging SA900 battery mode.

3.1.3 Interconnect Cables

The following interconnect cables were submitted with the EUT:

Item	Description
XLR Cable	The ‘MIC OUT’ port of the EUT was terminated with a 1 meter long XLR cable. The XLR cable was terminated with a shielded load.
¼” Jack Audio Cable	The ‘INSTR OUT’ port of the 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
- charging SA900 battery

(When the EUT is operated in the charging SA900 battery mode, the transceiver portion of the EUT continues to operate in the normal operation mode, meaning that it continues to transmit and receive while the battery is being charged.)

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 C63.4-2003 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 is exempt from complying with 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.

h) Steps (b) through (g) were repeated with the EUT operated in the Charging SA900 battery mode.

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 23 and 25. 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 22 and 24. All power line conducted emissions measured from the EUT were within the specification limits. The emissions level closest to the limit (worst case) occurred at 155kHz. The emissions level at this frequency was 14.2dB within the limit. Photographs of the test configuration which yielded the highest or worst case, conducted emission levels are shown on Figure 3.

The plots of the peak, quasi-peak, and average conducted voltage levels acquired from each input power line with the EUT operated in the Charging SA900 battery mode are shown on pages 27 and 29. The tabular quasi-peak and average results from each input power line with the EUT operated in the Normal Operation, Charging SA900 battery mode are shown on pages 22 and 24. All power line conducted emissions measured from the EUT were within the specification limits. The emissions level closest to the limit (worst case) occurred at 164kHz. The emissions level at this frequency was 10.4dB within the limit. 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 30dB 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) ≥ 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 30 through 35 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 3.8MHz.

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 (30dBm). 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 30dB 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 36 through 41. The maximum peak conducted output power from the transmitter was 0.0083W (9.2dBm) which is below the 1 Watt limit.

The EIRP results are presented on page 42. The maximum EIRP measured from the transmitter was 0.0085W (9.3dBm) 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 placed on the non-conductive stand and set to transmit continuously.
b. A double ridged waveguide antenna was positioned at a 3 meter distance from the EUT. The output of the antenna was connected to the input of a spectrum analyzer.
c. The center frequency of the spectrum analyzer was set to the transmit frequency of the EUT.
d. 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.
e. 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.
f. The single sweep function of the spectrum analyzer was used multiple times to determine the maximum pulse width of the EUT.
g. The maximum pulse width display of the spectrum analyzer was recorded and then plotted using a 'screen dump' utility.
h. The sweep time of the spectrum analyzer was then adjusted to 100msec.
i. 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.
j. The maximum number of pulses transmitted in a 100msec time period was recorded and then plotted using a ‘screen dump’ utility.
k. The duty cycle correction was calculated using the following equation:

Duty Cycle Correction Factor (dB) = D.C. (dB)
D.C. (dB) = 20 x log ((pulse width (msec)) x (#pulses in a 100msecperiod) / 100msec)

5.2.4.3 Results

Duty cycle plots are shown on pages 43 through 46. In half bandwidth mode, the EUT transmits a 312usec pulse 1 time in a 100msec period. This results in a duty cycle correction factor of -50.17dB. In full bandwidth mode, the EUT transmits a 314usec pulse 2 times in a 100msec period. This results in a duty cycle correction factor or -44.2dB.

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*log(on time/100msec). 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 47 through 70. Final radiated emissions data are presented on data pages 71 through 76. 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 Figures 4 and 5.

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 30dB 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) ≥ 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 77 through 80 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

4) The output of the EUT was connected to the spectrum analyzer through 30dB of attenuation.
5) The EUT was set to transmit at 2404MHz.
    4) To determine the power spectral density, the following spectrum analyzer settings were used:

    l. Center frequency = transmit frequency
    m. Span = 5 – 30% greater than the 6dB bandwidth of the EUT.
    n. Resolution bandwidth (RBW) = 100kHz
    o. Video bandwidth (VBW) ≥ 300kHz
    p. Sweep time = auto
    q. Detector = peak
    r. Trace = max hold
    s. Allow trace to fully stabilize
    t. Use the peak marker function to determine the maximum power level in any 100kHz band segment within the 6dB bandwidth.
    u. Scale the observed power level to an equivalent value in 3kHz by reducing the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(3kHz/100kHz = -15.2dBm)
    v. The resulting peak PSD level must be ≤ 8dBm.
    w. Steps a) through k) were repeated with the EUT set to transmit at 2442MHz.
    x. Steps a) through k) were repeated with the EUT set to transmit at 2478MHz.

5.2.7.3 Results

Pages 81 through 86 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. GLXD4, 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 C63.4-2003.

It was also determined that the Shure Incorporated Transceiver, Part No. GLXD4, 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 C63.4-2003.

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	8/9/2012	8/9/2013
APW11	PREAMPLIFIER	PMI	PE2-35-120-5R0-10-12-SFF	PL9609/1139	1GHZ-20GHZ	1/25/2012	1/25/2013
CDW8	DESKTOP COMPUTER	ELITE ELECTRONIC ENG	PENTIUM 4	009	3.8GHZ	N/A	
CMA1	Controllers	EMCO	2090	9701-1213	---	N/A	
GBX1	SYNTHESIZED SWEEPER	HEWLETT PACKARD	83630A	3420A00857	10MHZ-26.5GHZ	8/10/2012	8/10/2013
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
NWI0	RIDGED WAVE GUIDE	AEL	H1498	153	2-18GHZ	1/28/2012	1/28/2013
NWI1	RIDGED WAVE GUIDE	AEL	H1498	154	2-18GHZ	1/28/2012	1/28/2013
PLF5	CISPR16 50UH LISN	ELITE	CISPR16/15A	006	.15-30MHz	6/25/2012	6/25/2013
PLF6	CISPR16 50UH LISN	ELITE	CISPR16/15A	007	.15-30MHz	6/12/2012	6/12/2013
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/5/2012	3/5/2013
RBE0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU26	100095	20Hz-26GHz	2/28/2012	2/28/2013
T1E7	10DB 25W ATTENUATOR	WEINSCHEL	46-10-34	BG3489	DC-18GHZ	8/6/2012	8/6/2013
T1EE	10DB 25W ATTENUATOR	WEINSCHEL	46-10-34	BN2321	DC-18GHZ	8/6/2012	8/6/2013
T2S0	20DB 25W ATTENUATOR	WEINSCHEL	46-20-34	BV3545	DC-18GHZ	1/3/2012	1/3/2013
XLT3	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	004	DC-2GHZ	1/6/2012	1/6/2013

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.

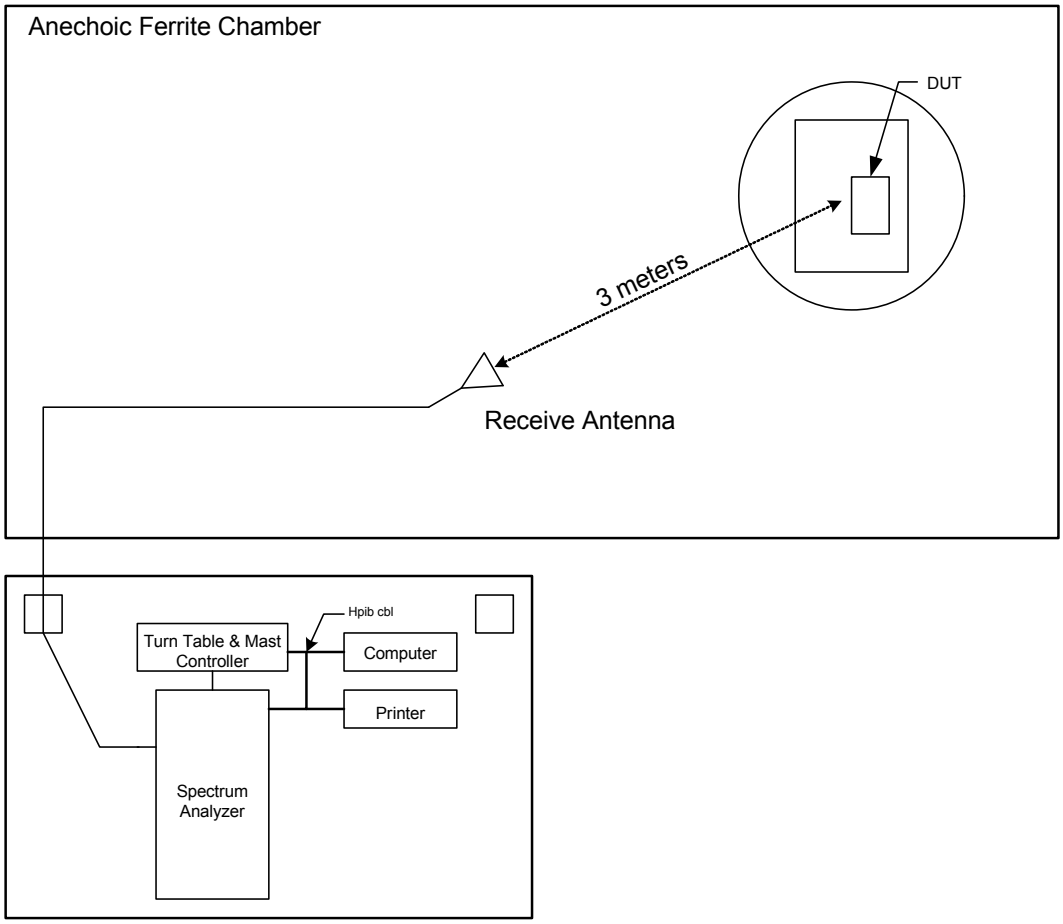


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

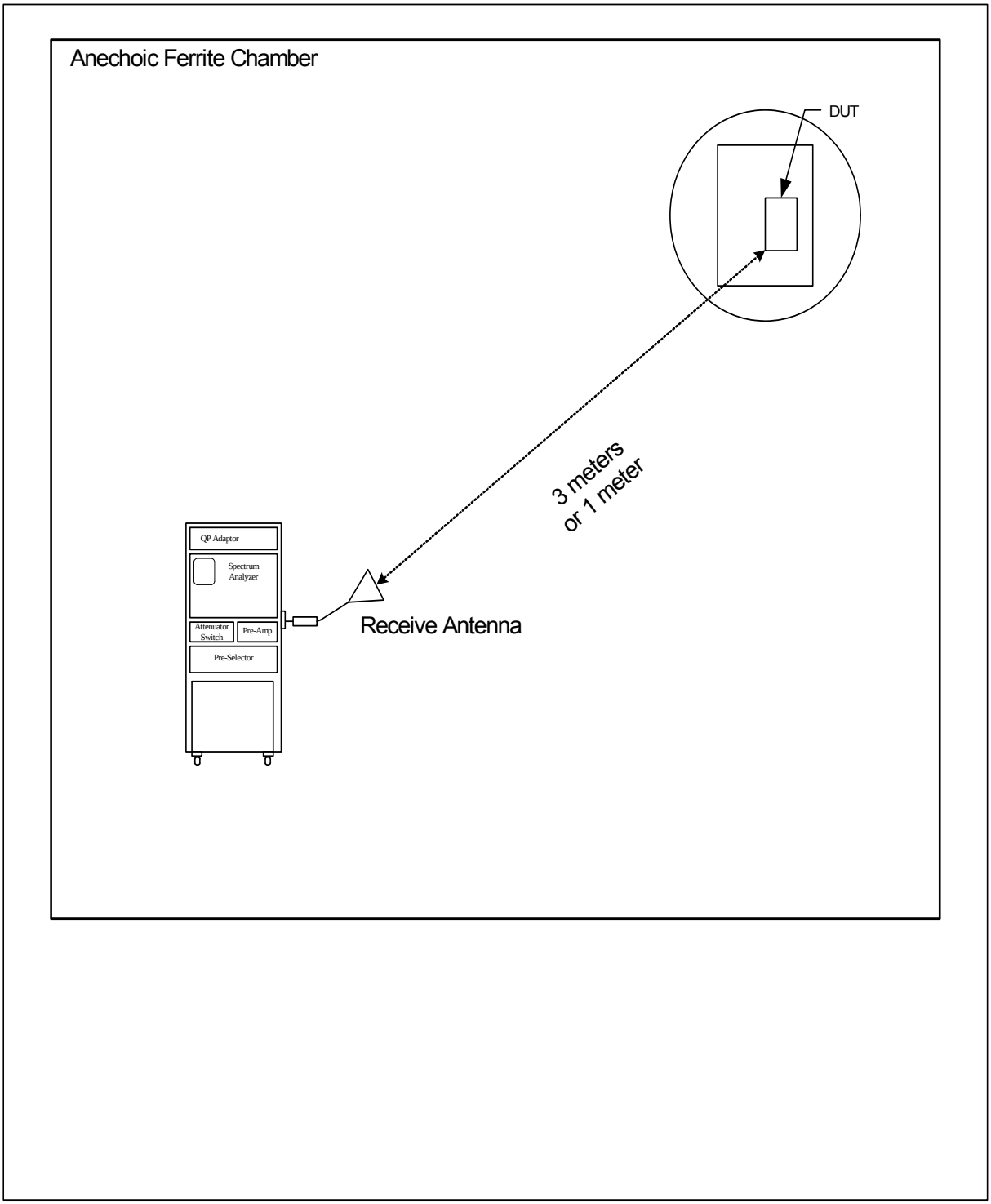
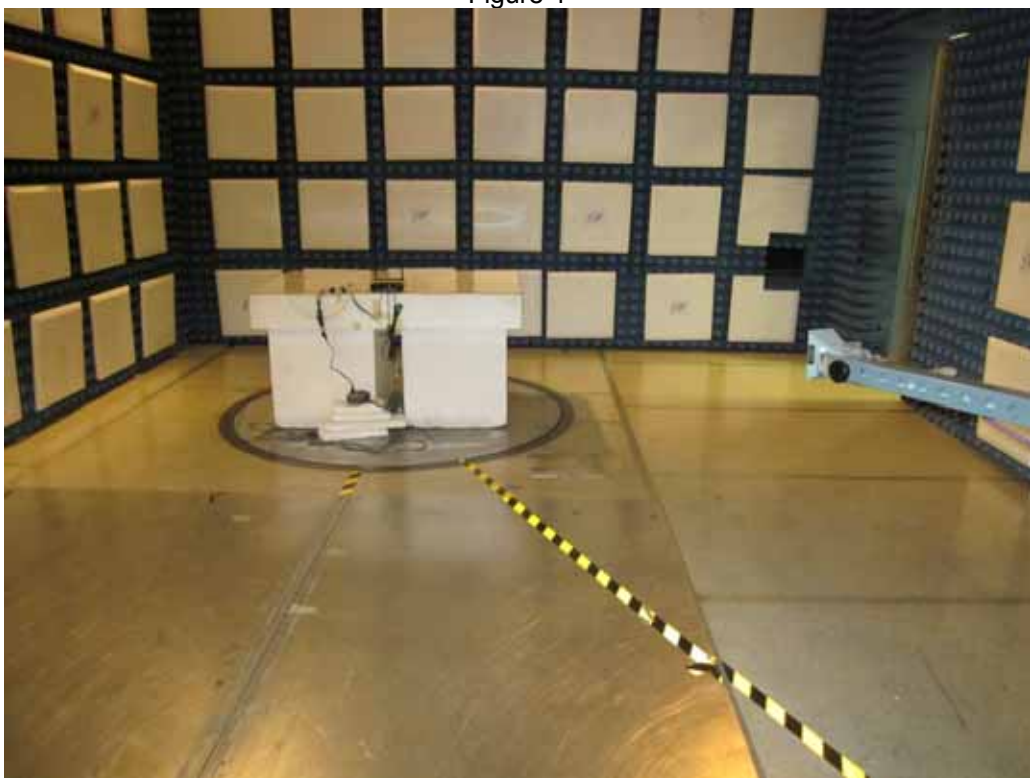


Figure 2: BLOCK DIAGRAM OF TEST SETUP FOR RADIATED EMISSIONS ABOVE 18GHZ

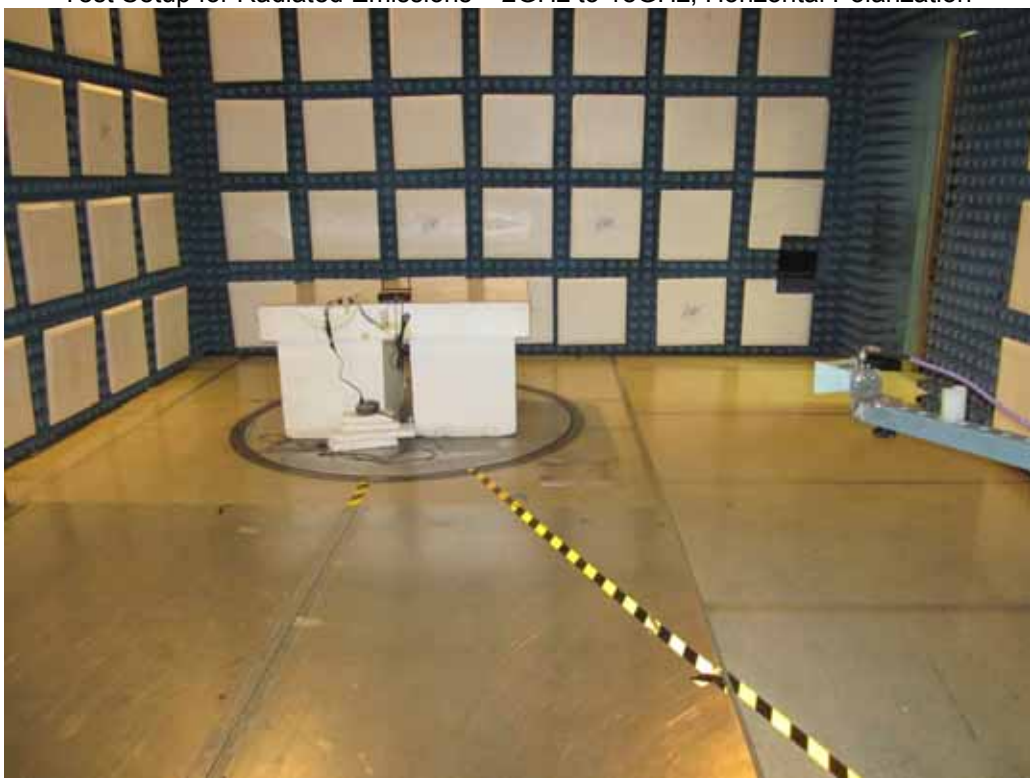
Figure 3

Test Setup for Conducted Emissions

Figure 4

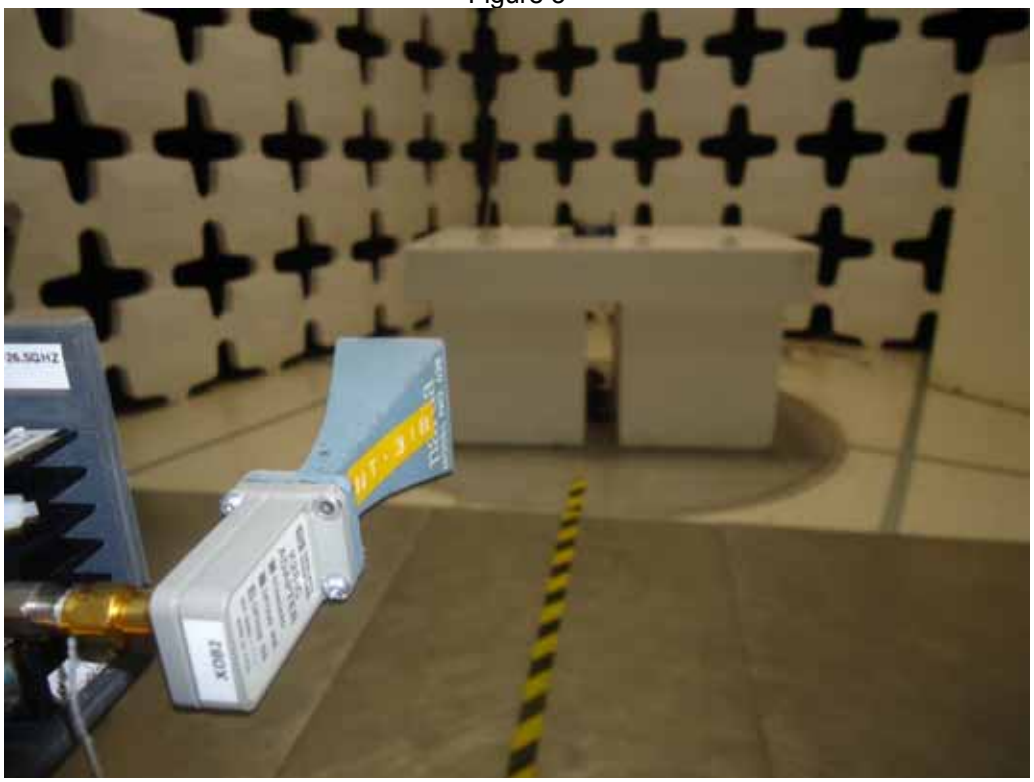


Test Setup for Radiated Emissions – 2GHz to 18GHz, Horizontal Polarization



Test Setup for Radiated Emissions – 2GHz to 18GHz, Vertical Polarization

Figure 5



Test Setup for Radiated Emissions – 18GHz to 25GHz, Horizontal Polarization

Test Setup for Radiated Emissions – 18GHz to 25GHz, Vertical Polarization

Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

Manufacturer	:	Shure
Model	:	GLXD4
DUT Revision	:	
Serial Number	:	4121390862
DUT Mode	:	Tx 2442MHz @ 115VAC (60Hz)
Line Tested	:	High
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	No Battery
Test Engineer	:	I. Carnegie
Limit	:	Transmitter
Test Date	:	Jun 15, 2012 11:02:20 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

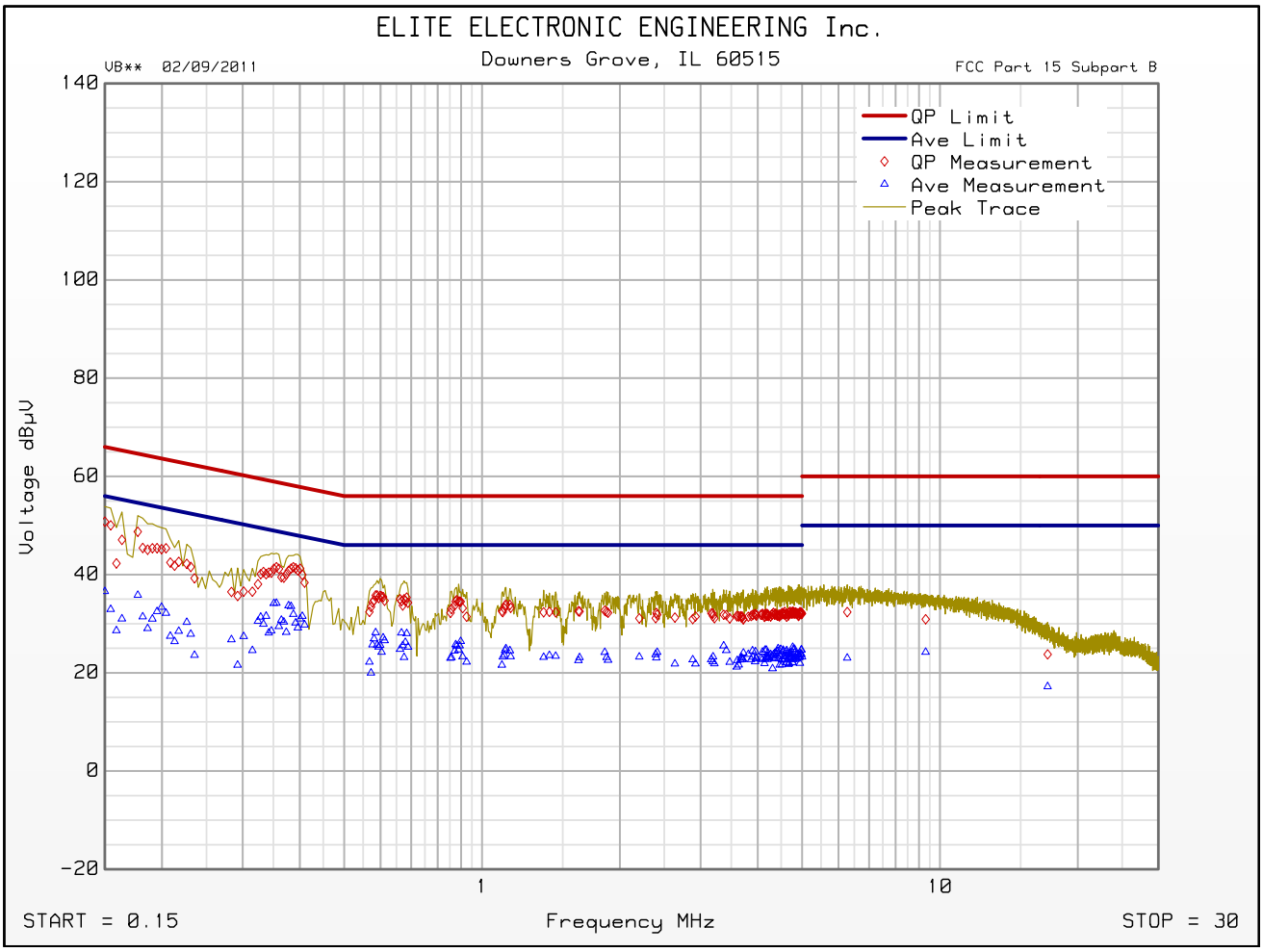
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.150	50.8	66.0		36.6	56.0	
0.387	41.5	58.1		31.9	48.1	
0.586	35.8	56.0		28.2	46.0	
0.880	34.8	56.0		25.5	46.0	
1.853	32.7	56.0		24.2	46.0	
2.403	32.2	56.0		23.0	46.0	
4.706	32.4	56.0		23.8	46.0	
6.274	32.4	60.0		23.0	50.0	
9.306	30.9	60.0		24.2	50.0	
17.186	23.8	60.0		17.2	50.0	

Conducted Emissions Test

Cumulative Data

VB** 02/09/2011

Manufacturer	:	Shure
Model	:	GLXD4
DUT Revision	:	
Serial Number	:	4121390862
DUT Mode	:	Tx 2442MHz @ 115VAC (60Hz)
Line Tested	:	High
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	No Battery
Test Engineer	:	I. Carnegie
Limit	:	Transmitter
Test Date	:	Jun 15, 2012 11:02:20 AM



Emissions Meet QP Limit
Emissions Meet Ave Limit
(Test not completed)

Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

Manufacturer	:	Shure
Model	:	GLXD4
DUT Revision	:	
Serial Number	:	4121390862
DUT Mode	:	Tx 2442MHz @ 115VAC (60Hz)
Line Tested	:	Return
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	No Battery
Test Engineer	:	I. Carnegie
Limit	:	Transmitter
Test Date	:	Jun 15, 2012 10:18:44 AM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

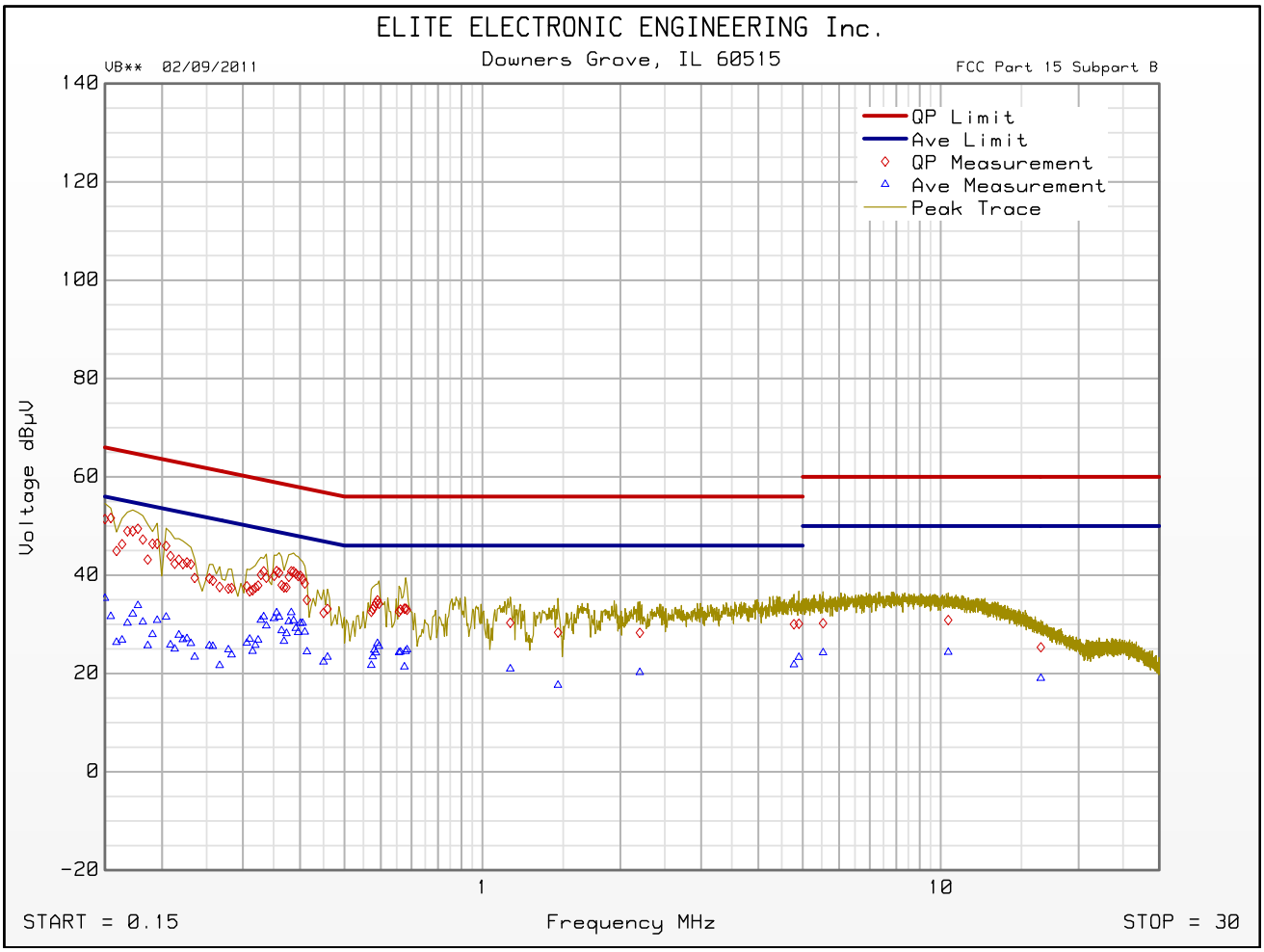
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.155	51.6	65.8		31.6	55.8	
0.387	40.7	58.1		30.8	48.1	
0.590	34.9	56.0		26.1	46.0	
1.150	30.3	56.0		20.9	46.0	
1.462	28.4	56.0		17.6	46.0	
2.205	28.3	56.0		20.2	46.0	
4.904	30.1	56.0		23.3	46.0	
5.536	30.2	60.0		24.3	50.0	
10.386	30.9	60.0		24.3	50.0	
16.538	25.3	60.0		19.1	50.0	

Conducted Emissions Test

Cumulative Data

VB** 02/09/2011

Manufacturer	:	Shure
Model	:	GLXD4
DUT Revision	:	
Serial Number	:	4121390862
DUT Mode	:	Tx 2442MHz @ 115VAC (60Hz)
Line Tested	:	Return
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	No Battery
Test Engineer	:	I. Carnegie
Limit	:	Transmitter
Test Date	:	Jun 15, 2012 10:18:44 AM



Emissions Meet QP Limit
Emissions Meet Ave Limit

Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

Manufacturer	:	Shure Inc.
Model	:	GLXD4
DUT Revision	:	
Serial Number	:	4124390859
DUT Mode	:	Normal, Charging Battery
Line Tested	:	High
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	Stock Code Running (115V, 60Hz)
Test Engineer	:	I. Carnegie
Limit	:	Transmitter
Test Date	:	Jul 09, 2012 03:25:45 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

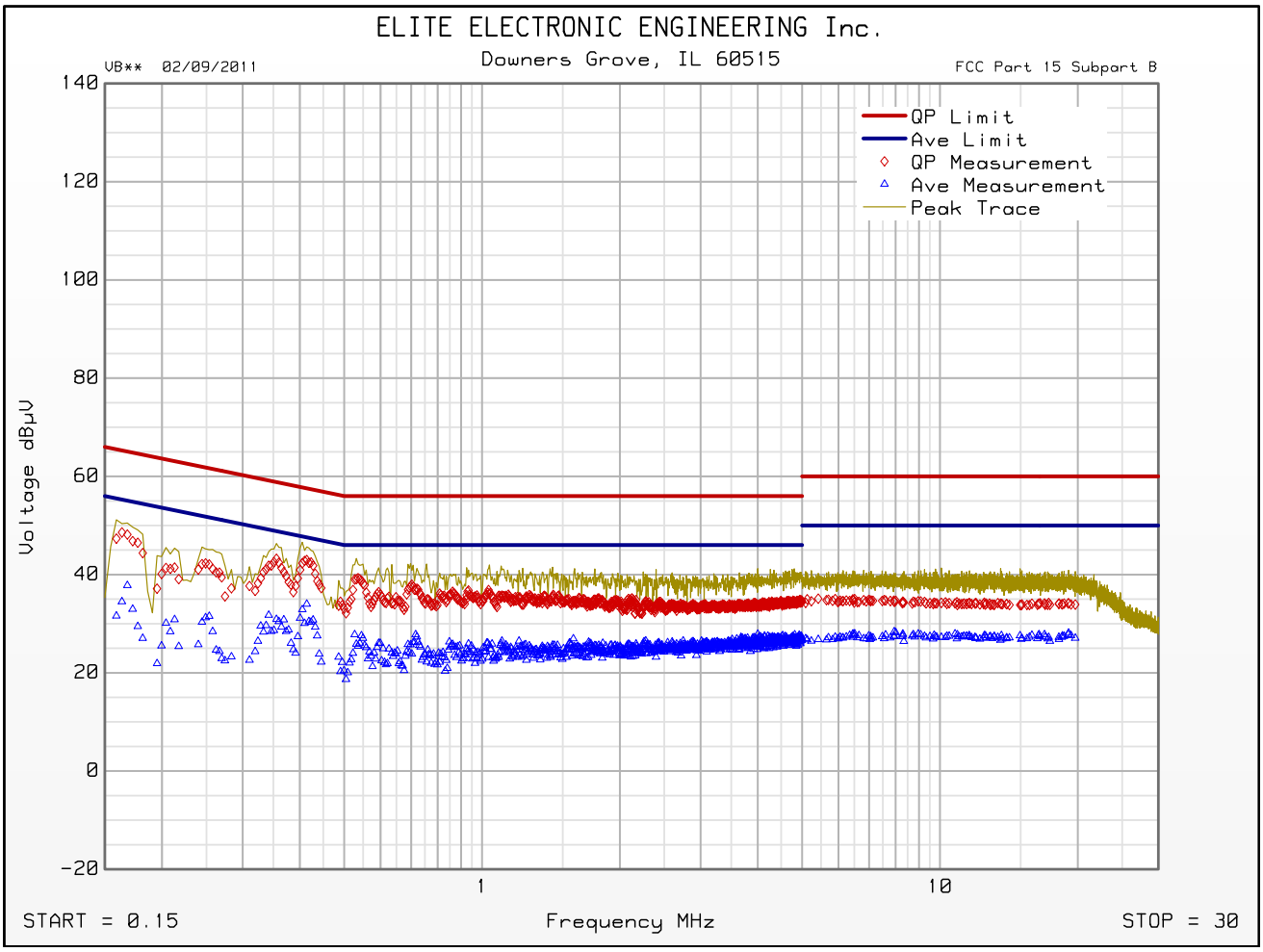
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.164	48.6	65.3		34.5	55.3	
0.414	43.0	57.6		34.0	47.6	
0.536	39.3	56.0		25.4	46.0	
1.033	36.9	56.0		23.1	46.0	
1.430	35.9	56.0		23.7	46.0	
2.124	35.2	56.0		24.4	46.0	
4.945	34.8	56.0		26.7	46.0	
5.423	35.1	60.0		26.8	50.0	
9.252	34.4	60.0		27.4	50.0	
17.276	34.2	60.0		27.2	50.0	

Conducted Emissions Test

Cumulative Data

VB** 02/09/2011

Manufacturer	:	Shure Inc.
Model	:	GLXD4
DUT Revision	:	
Serial Number	:	4124390859
DUT Mode	:	Normal, Charging Battery
Line Tested	:	High
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	Stock Code Running (115V, 60Hz)
Test Engineer	:	I. Carnegie
Limit	:	Transmitter
Test Date	:	Jul 09, 2012 03:25:45 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit

Conducted Emissions Test

Significant Emissions Data

VB** 02/09/2011

Manufacturer	:	Shure Inc.
Model	:	GLXD4
DUT Revision	:	
Serial Number	:	4124390859
DUT Mode	:	Normal, Charging Battery
Line Tested	:	Return
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	Stock Code Running (115V, 60Hz)
Test Engineer	:	I. Carnegie
Limit	:	Transmitter
Test Date	:	Jul 09, 2012 02:44:25 PM
Data Filter	:	Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

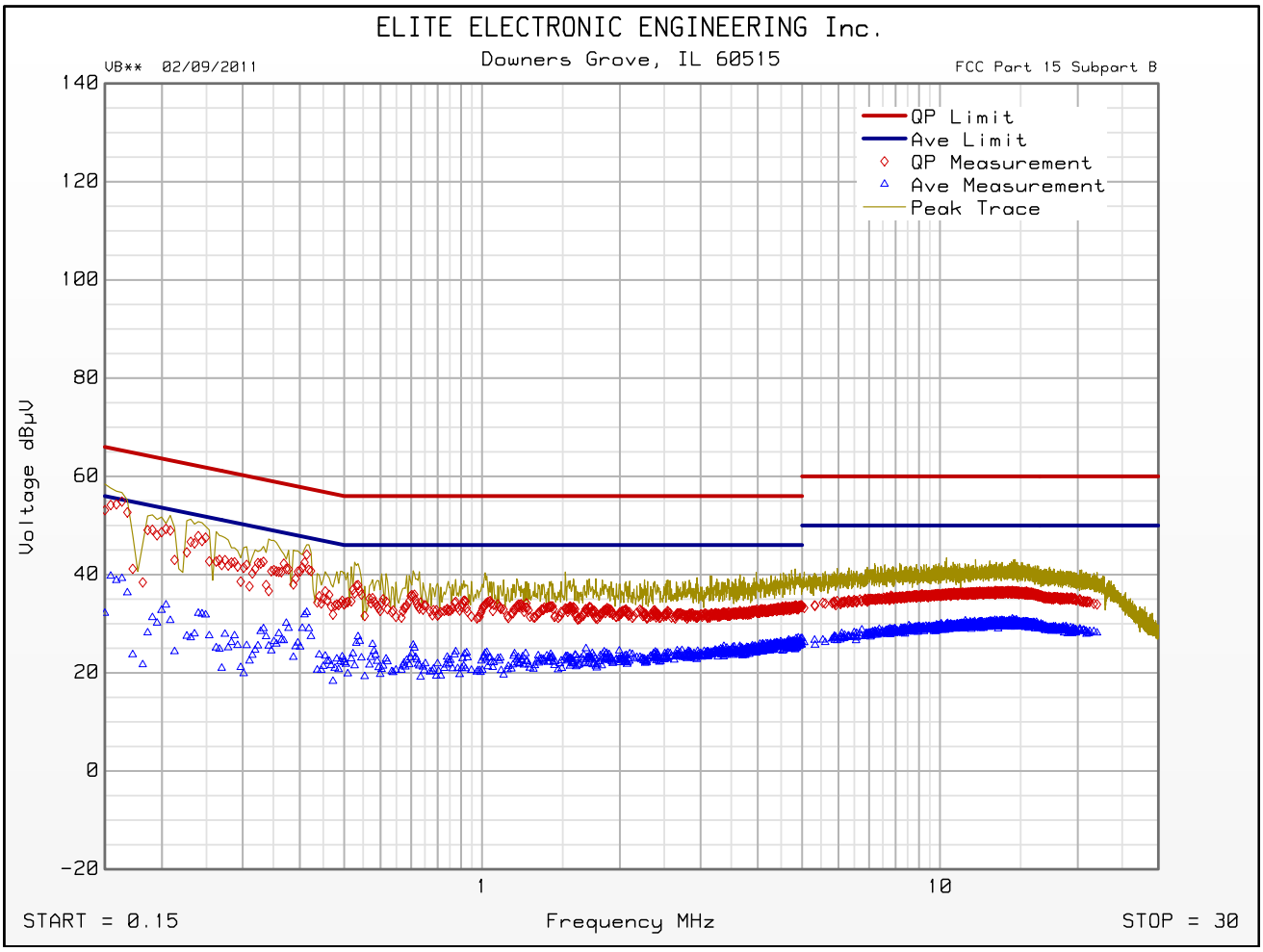
Freq MHz	Quasi-peak Level dBµV	Quasi-peak Limit dBµV	Excessive Quasi-peak Emissions	Average Level dBµV	Average Limit dBµV	Excessive Average Emissions
0.164	54.9	65.3		39.3	55.3	
0.414	44.1	57.6		32.3	47.6	
0.536	37.9	56.0		27.4	46.0	
0.916	34.7	56.0		23.8	46.0	
1.250	34.2	56.0		22.3	46.0	
2.061	32.9	56.0		22.6	46.0	
4.972	33.7	56.0		27.0	46.0	
8.870	35.8	60.0		28.7	50.0	
13.217	36.7	60.0		29.5	50.0	
16.520	35.7	60.0		29.5	50.0	

Conducted Emissions Test

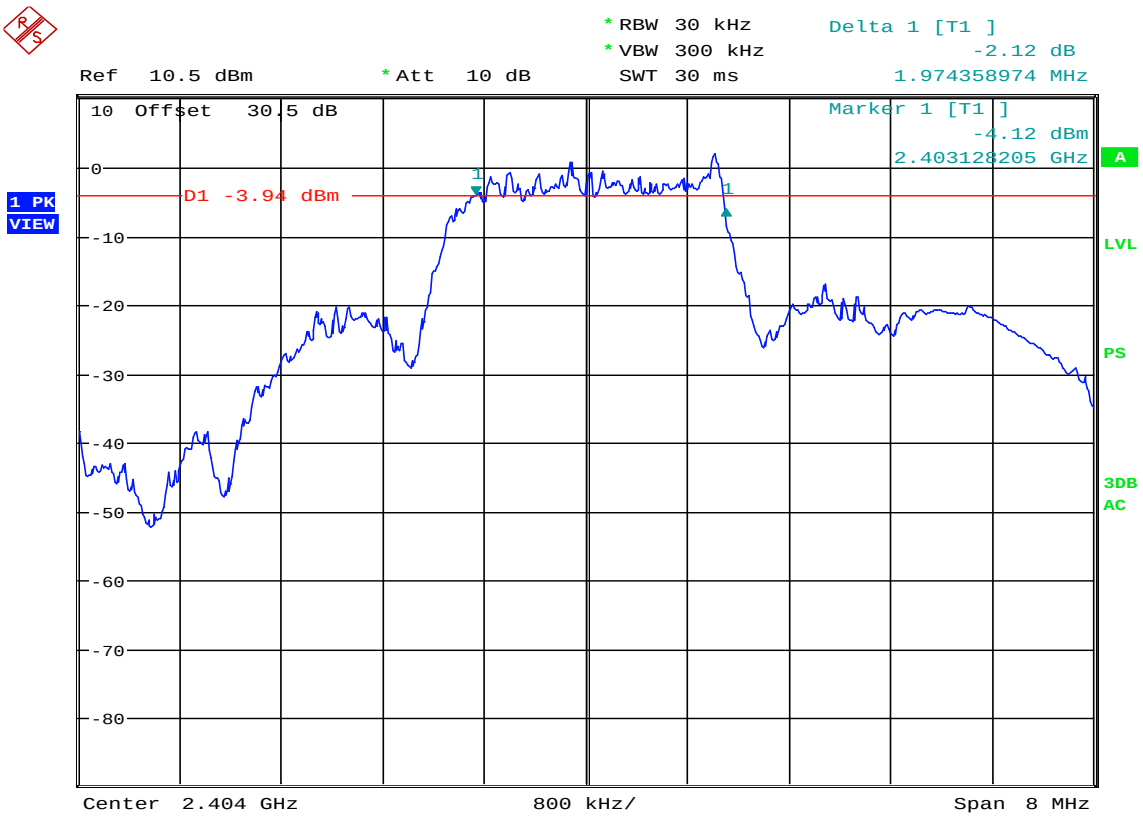
Cumulative Data

VB** 02/09/2011

Manufacturer	:	Shure Inc.
Model	:	GLXD4
DUT Revision	:	
Serial Number	:	4124390859
DUT Mode	:	Normal, Charging Battery
Line Tested	:	Return
Scan Step Time [ms]	:	30
Meas. Threshold [dB]	:	-10
Notes	:	Stock Code Running (115V, 60Hz)
Test Engineer	:	I. Carnegie
Limit	:	Transmitter
Test Date	:	Jul 09, 2012 02:44:25 PM

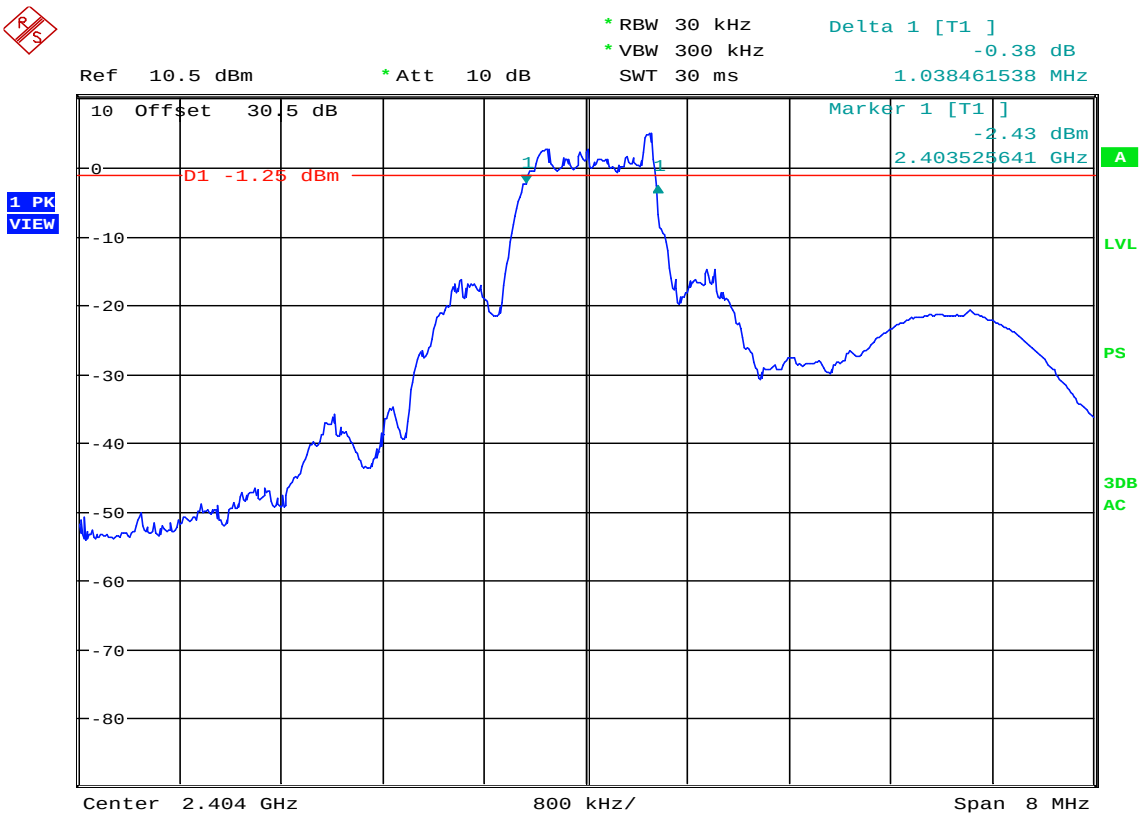


Emissions Meet QP Limit
Emissions Meet Ave Limit



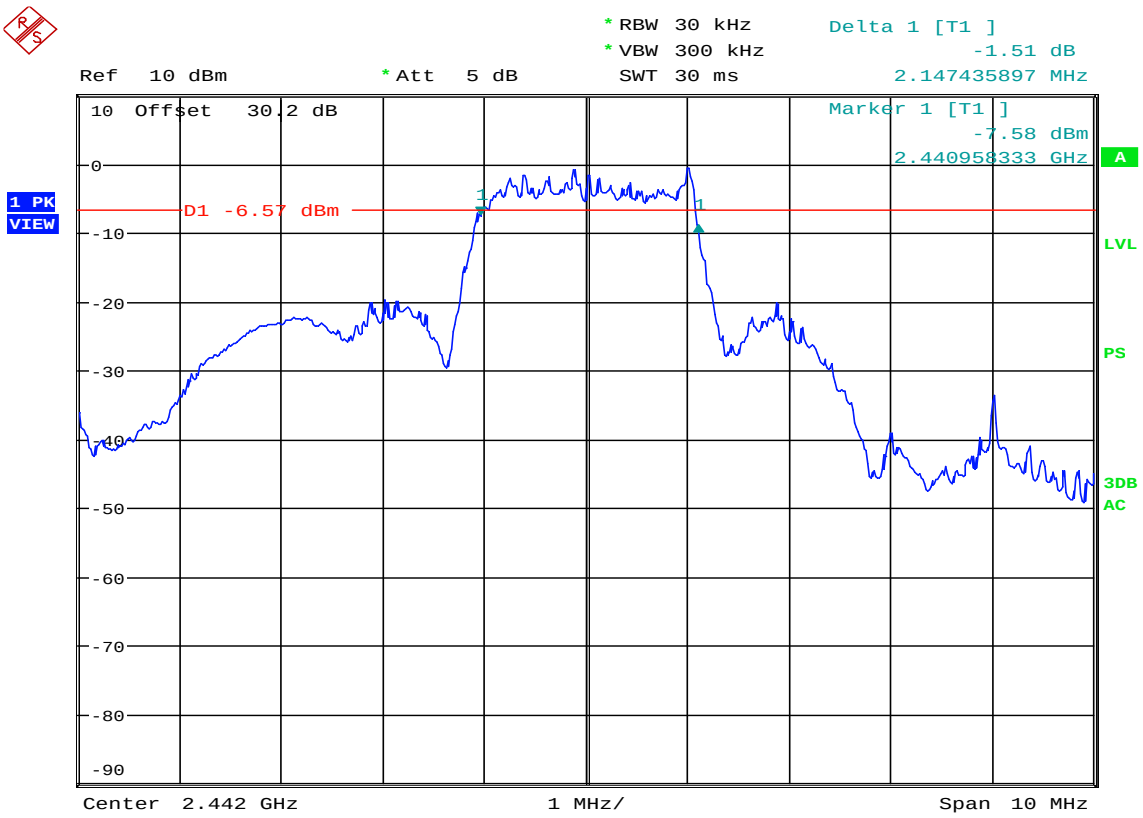
FCC 15.247(a)(2) 6dB Bandwidth

MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD4
SERIAL NUMBER	: 4121390862
TEST MODE	: Tx @ 2404MHz, full bandwidth
TEST DATE	: June 22, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB bandwidth = 2MHz
EQUIPMENT USED	: RBE0, T1E7,T2S0



FCC 15.247(a)(2) 6dB Bandwidth

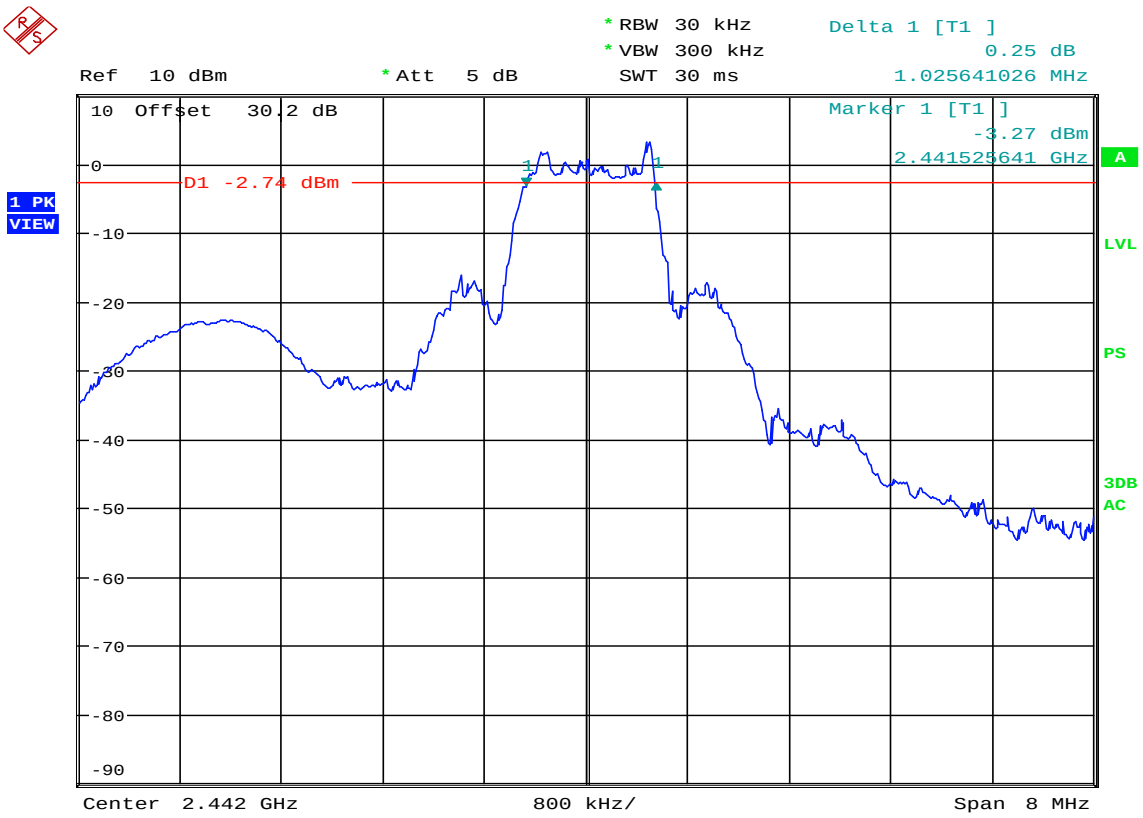
MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD4
SERIAL NUMBER	: 4121390862
TEST MODE	: Tx @ 2404MHz, full bandwidth
TEST DATE	: June 22, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB bandwidth = 1MHz
EQUIPMENT USED	: RBE0, T1E7,T2S0



Date: 22.JUN.2012 13:49:49

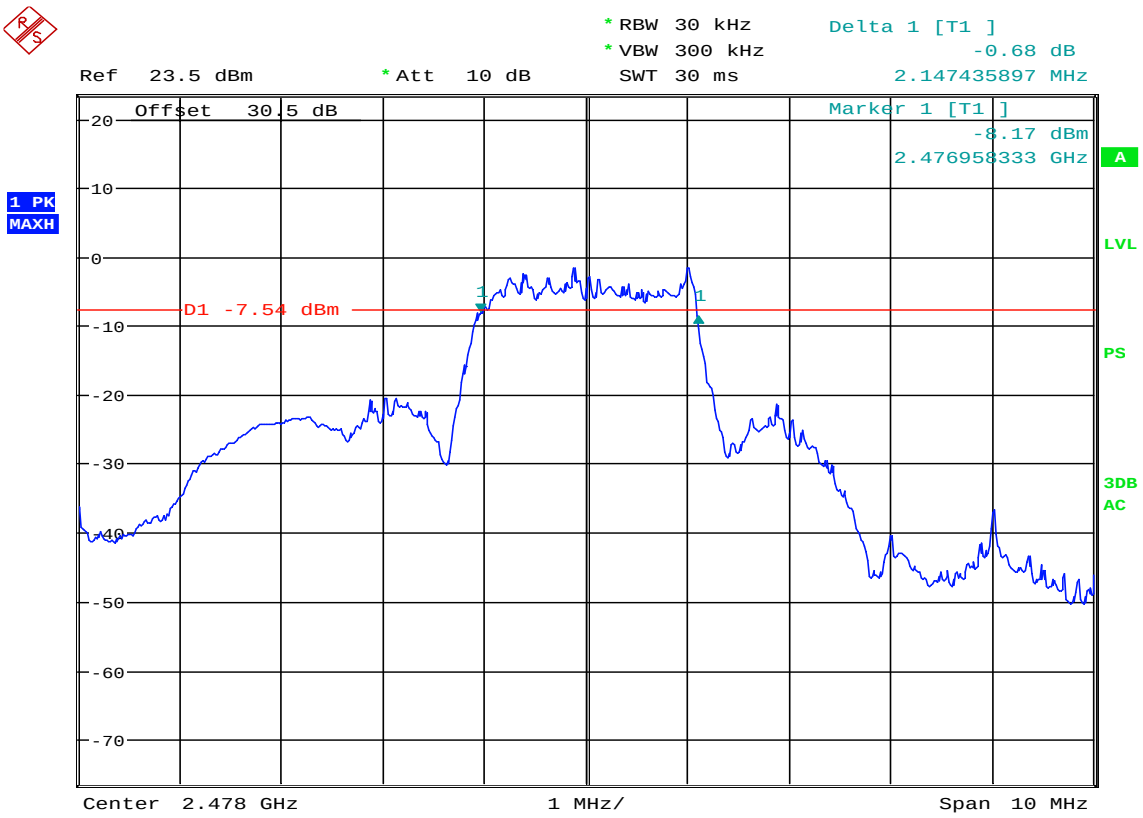
FCC 15.247(a)(2) 6dB Bandwidth

MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD4
SERIAL NUMBER	: 4121390862
TEST MODE	: Tx @ 2442MHz, full bandwidth
TEST DATE	: June 22, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB bandwidth = 2.1MHz
EQUIPMENT USED	: RBE0, T1E7,T2S0



FCC 15.247(a)(2) 6dB Bandwidth

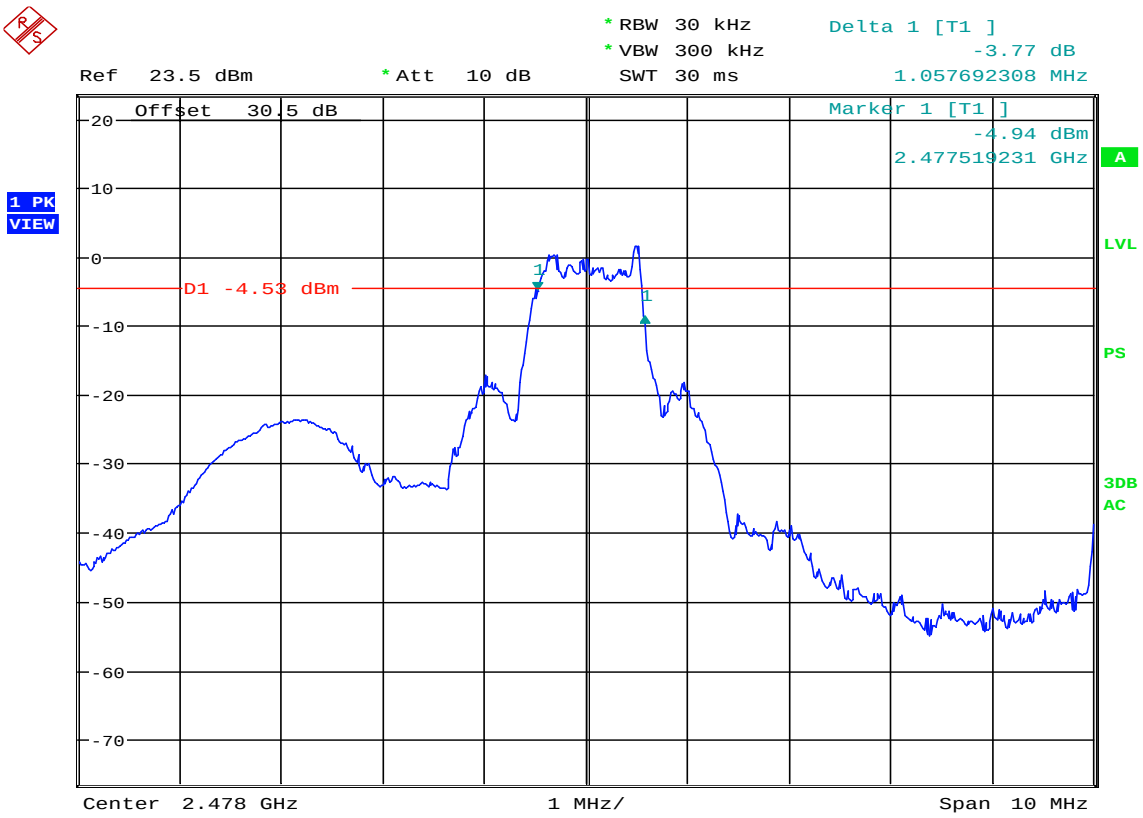
MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD4
SERIAL NUMBER	: 4121390862
TEST MODE	: Tx @ 2442MHz, half bandwidth
TEST DATE	: June 22, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB bandwidth = 1MHz
EQUIPMENT USED	: RBE0, T1E7,T2S0



Date: 22.JUN.2012 12:49:57

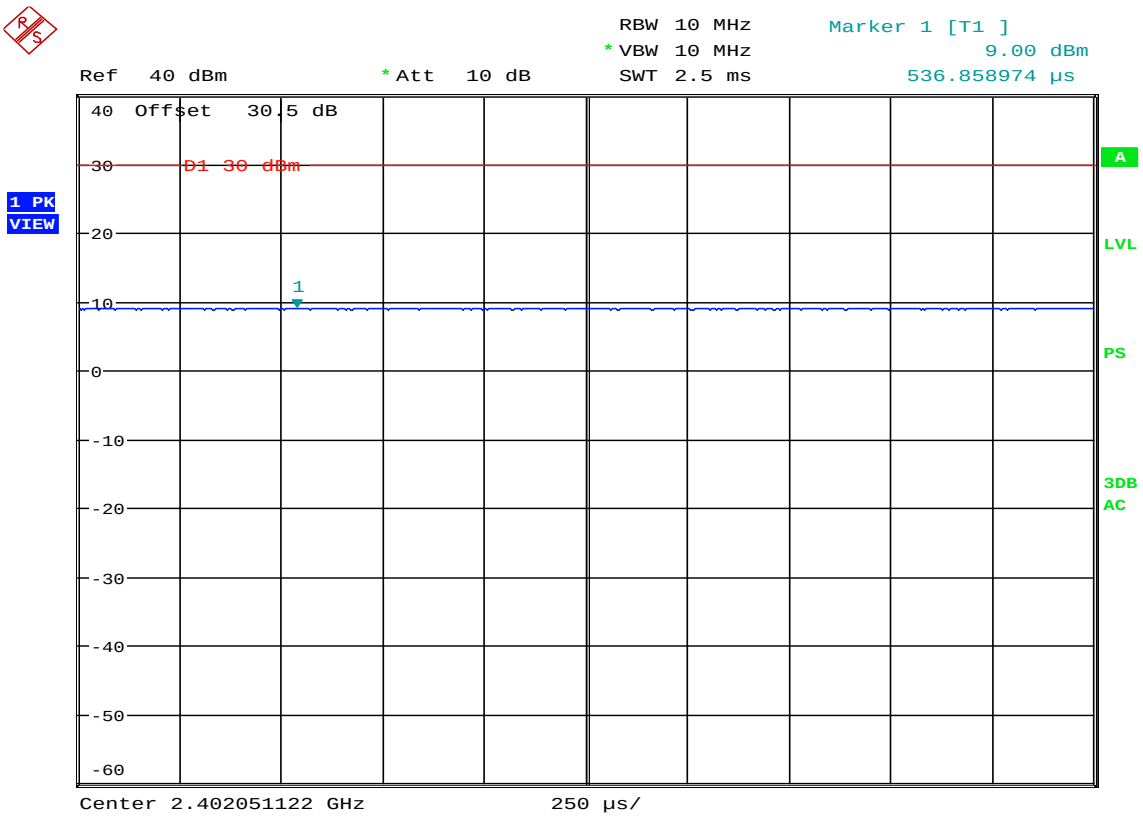
FCC 15.247(a)(2) 6dB Bandwidth

MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD4
SERIAL NUMBER	: 4121390862
TEST MODE	: Tx @ 2478MHz, full bandwidth
TEST DATE	: June 22, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB bandwidth = 2.1MHz
EQUIPMENT USED	: RBE0, T1E7,T2S0



FCC 15.247(a)(2) 6dB Bandwidth

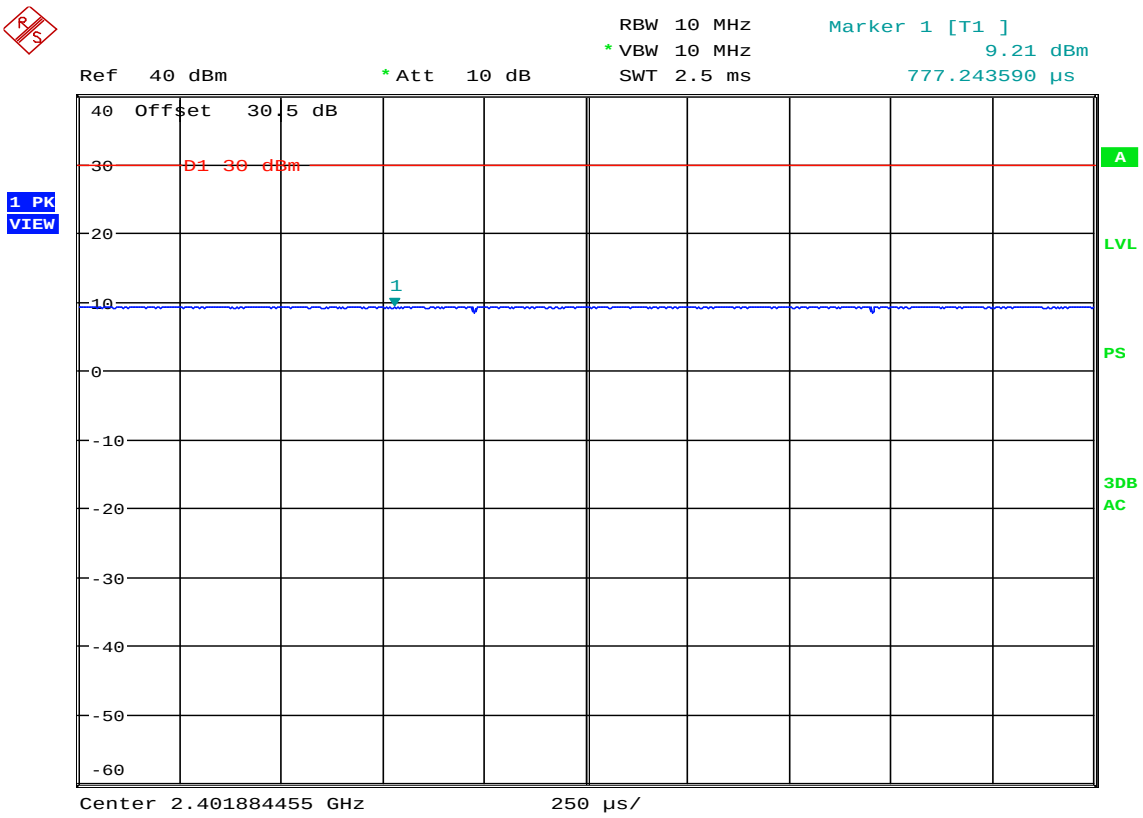
MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD4
SERIAL NUMBER	: 4121390862
TEST MODE	: Tx @ 2478MHz, half bandwidth
TEST DATE	: June 22, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB bandwidth = 1MHz
EQUIPMENT USED	: RBE0, T1E7,T2S0



Date: 22.JUN.2012 15:05:27

FCC 15.247(b)(3) Maximum Peak Conducted Output Power

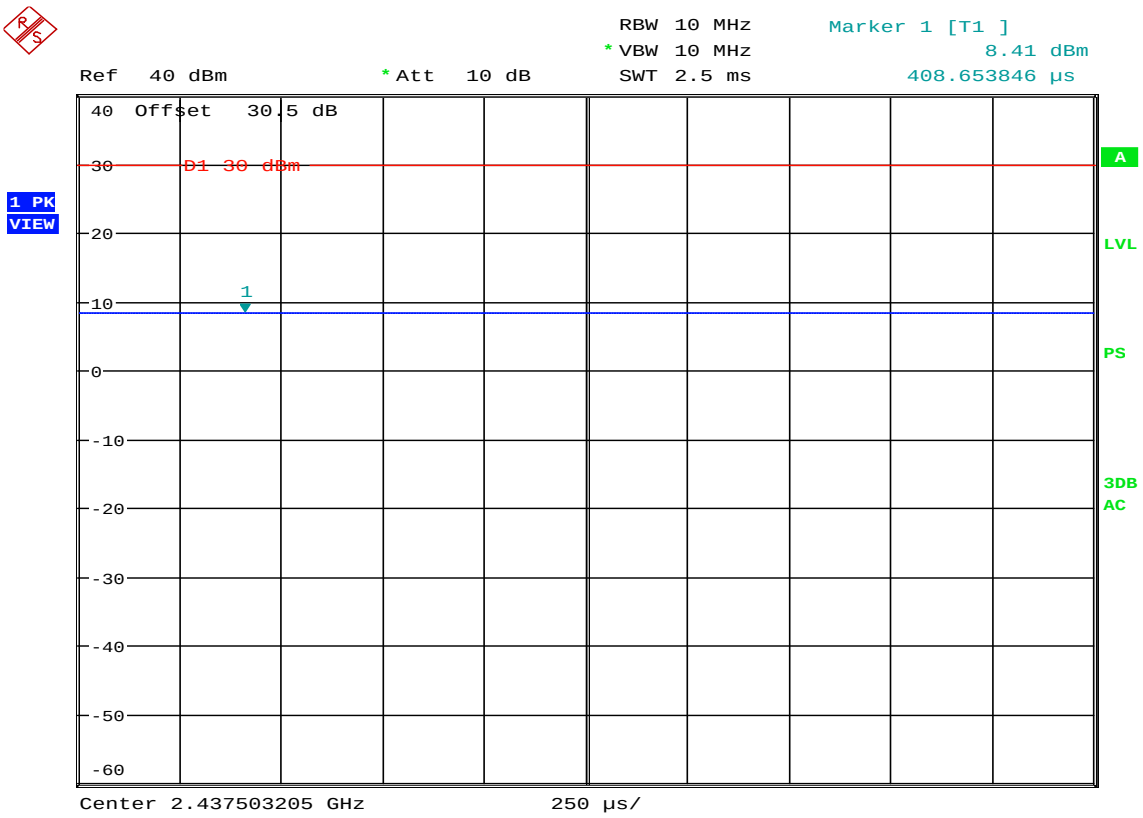
MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD4
SERIAL NUMBER	: 4121390862
TEST MODE	: Tx @ 2404MHz, full bandwidth
TEST DATE	: June 22, 2012
TEST PARAMETER	: Peak Conducted Output Power
NOTES	: Peak Conducted Output Power = 9.0dBm = 7.9mW
METHOD	:
EQUIPMENT USED	: RBE0, T1E7,T2S0



Date: 22.JUN.2012 15:10:29

FCC 15.247(b)(3) Maximum Peak Conducted Output Power

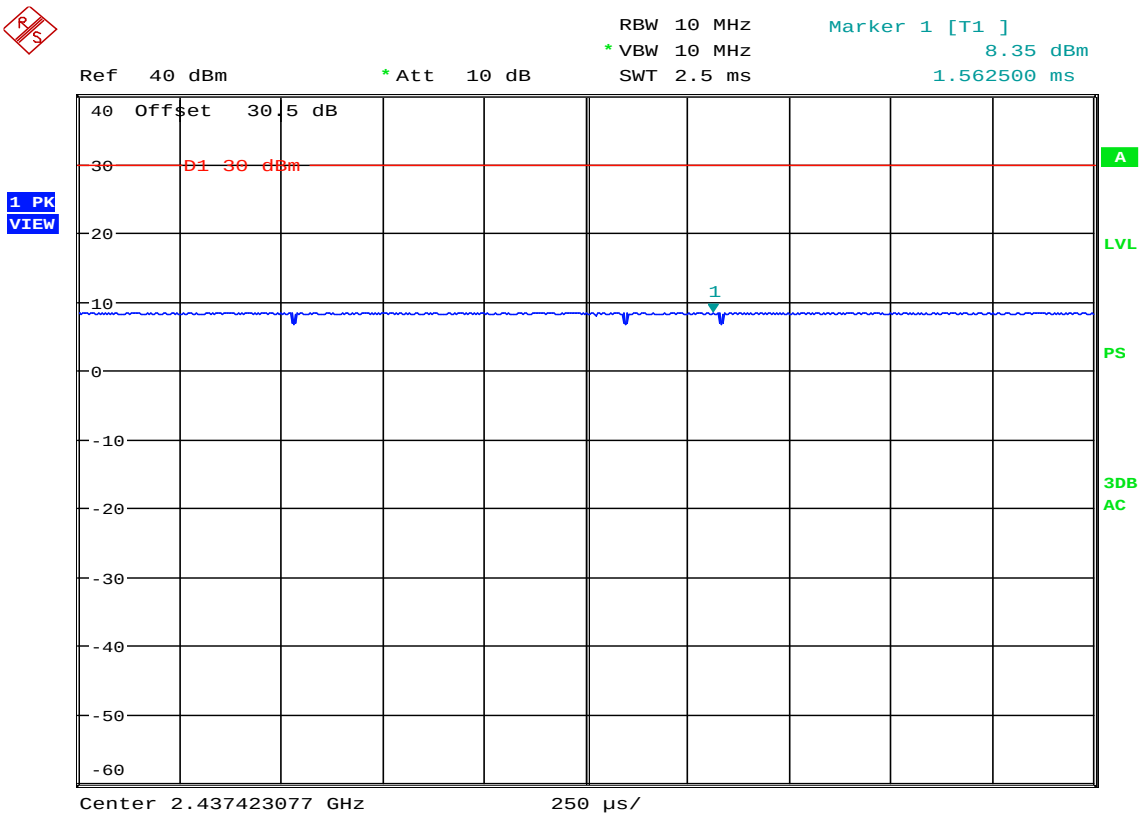
MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2404MHz, half bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Peak Conducted Output Power
NOTES	:	Peak Conducted Output Power = 9.2dBm = 8.3mW
METHOD	:	
EQUIPMENT USED	:	RBE0, T1E7,T2S0



Date: 22.JUN.2012 15:19:08

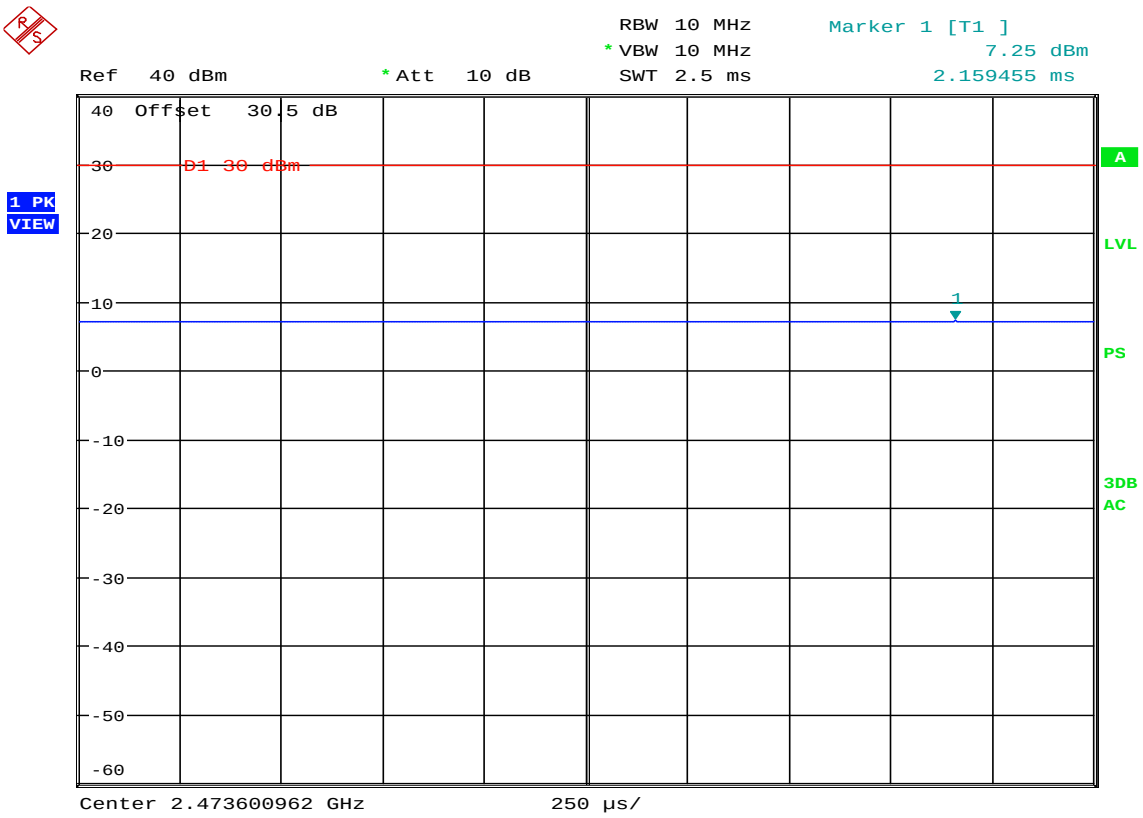
FCC 15.247(b)(3) Maximum Peak Conducted Output Power

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2442MHz, full bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Peak Conducted Output Power
NOTES	:	Peak Conducted Output Power = 8.41dBm = 6.9mW
METHOD	:	
EQUIPMENT USED	:	RBE0, T1E7,T2S0



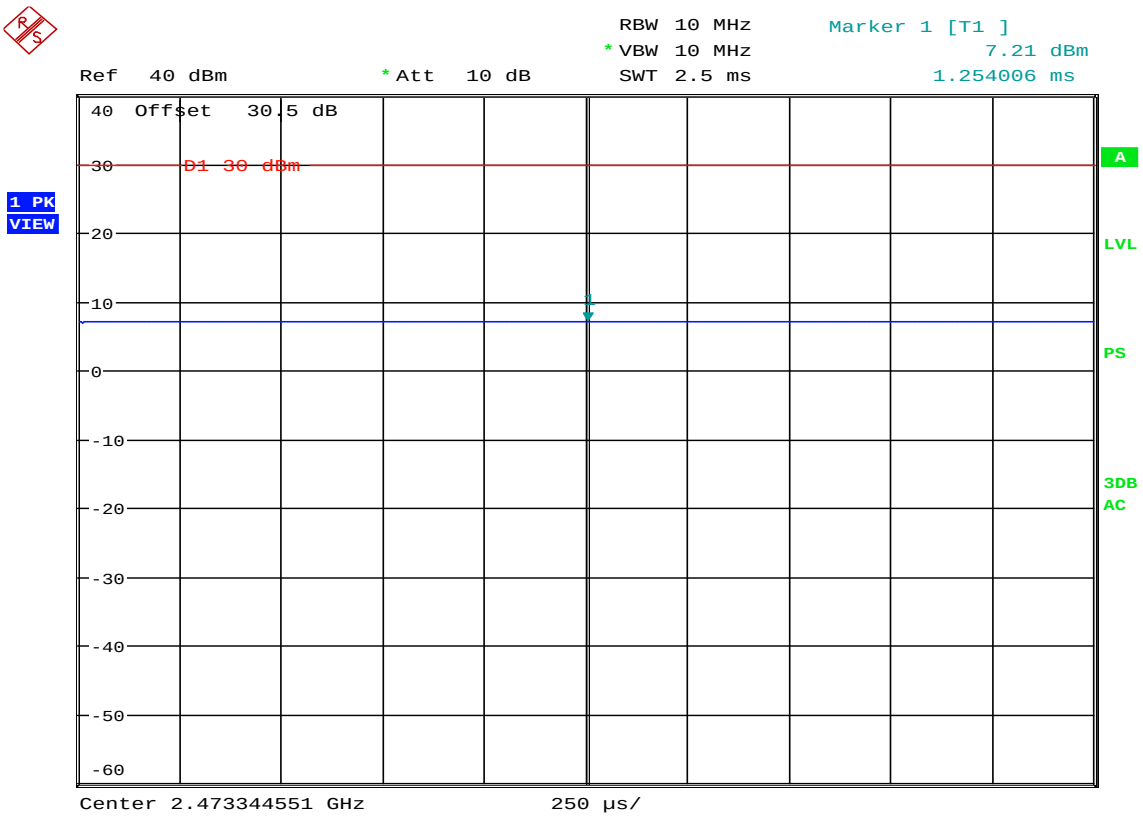
FCC 15.247(b)(3) Maximum Peak Conducted Output Power

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2442MHz, half bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Peak Conducted Output Power
NOTES	:	Peak Conducted Output Power = 8.35dBm = 6.8mW
METHOD	:	
EQUIPMENT USED	:	RBE0, T1E7,T2S0



FCC 15.247(b)(3) Maximum Peak Conducted Output Power

MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD4
SERIAL NUMBER	: 4121390862
TEST MODE	: Tx @ 2478MHz, full bandwidth
TEST DATE	: June 22, 2012
TEST PARAMETER	: Peak Conducted Output Power
NOTES	: Peak Conducted Output Power = 7.25dBm = 5.3mW
METHOD	:
EQUIPMENT USED	: RBE0, T1E7,T2S0

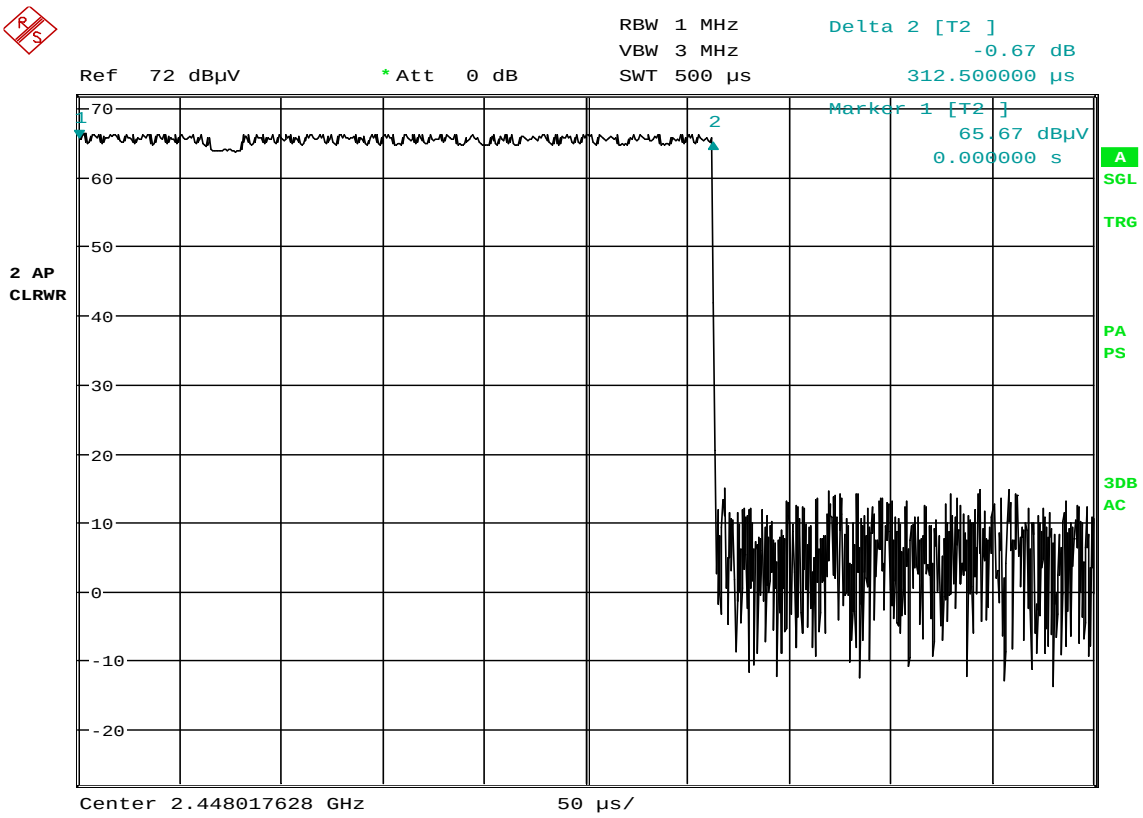


FCC 15.247(b)(3) Maximum Peak Conducted Output Power

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2478MHz, half bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Peak Conducted Output Power
NOTES	:	Peak Conducted Output Power = 7.21dBm = 5.3mW
METHOD	:	
EQUIPMENT USED	:	RBE0, T1E7,T2S0

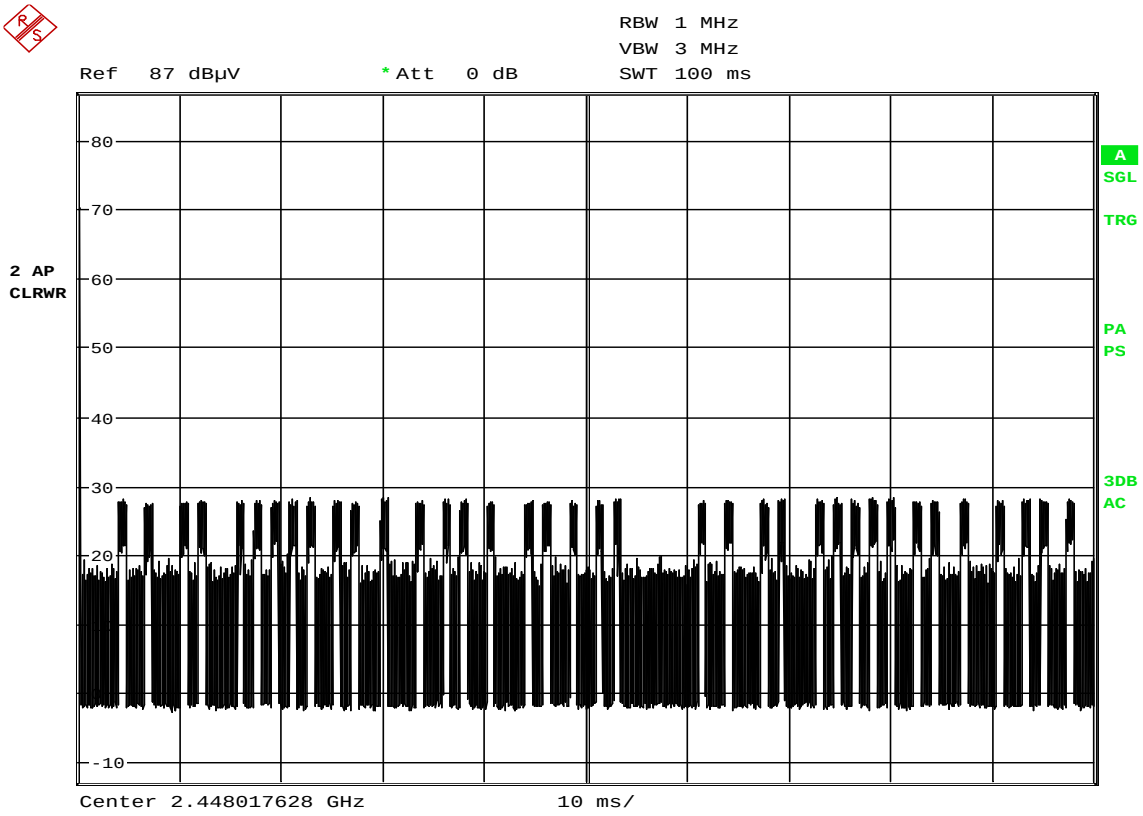
MANUFACTURER	Shure Incorporated
EUT	Transceiver
MODEL NO.	GLXD4
SERIAL NO.	4121390862
SPECIFICATION	FCC 15.247(b) and RSS-210 A8.4
TEST	Equivalent Isotropic Radiated Power
MODE	Transmitting
DATE TESTED	July 10, 2012
NOTES	
TEST EQUIPMENT	RBB0,NWI0,NWI1,GBX1

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	66.1	-4.0	8.0	2.7	1.3	36.0	-34.7
2404.00	V	72.3	4.0	8.0	2.7	9.3	36.0	-26.7
2442.00	H	62.2	-7.9	8.1	2.8	-2.6	36.0	-38.6
2442.00	V	72.1	3.9	8.1	2.8	9.2	36.0	-26.8
2478.00	H	64.4	-5.6	8.1	2.8	-0.3	36.0	-36.3
2478.00	V	68.2	0.1	8.1	2.8	5.4	36.0	-30.6



FCC 15.35 Duty Cycle Factor

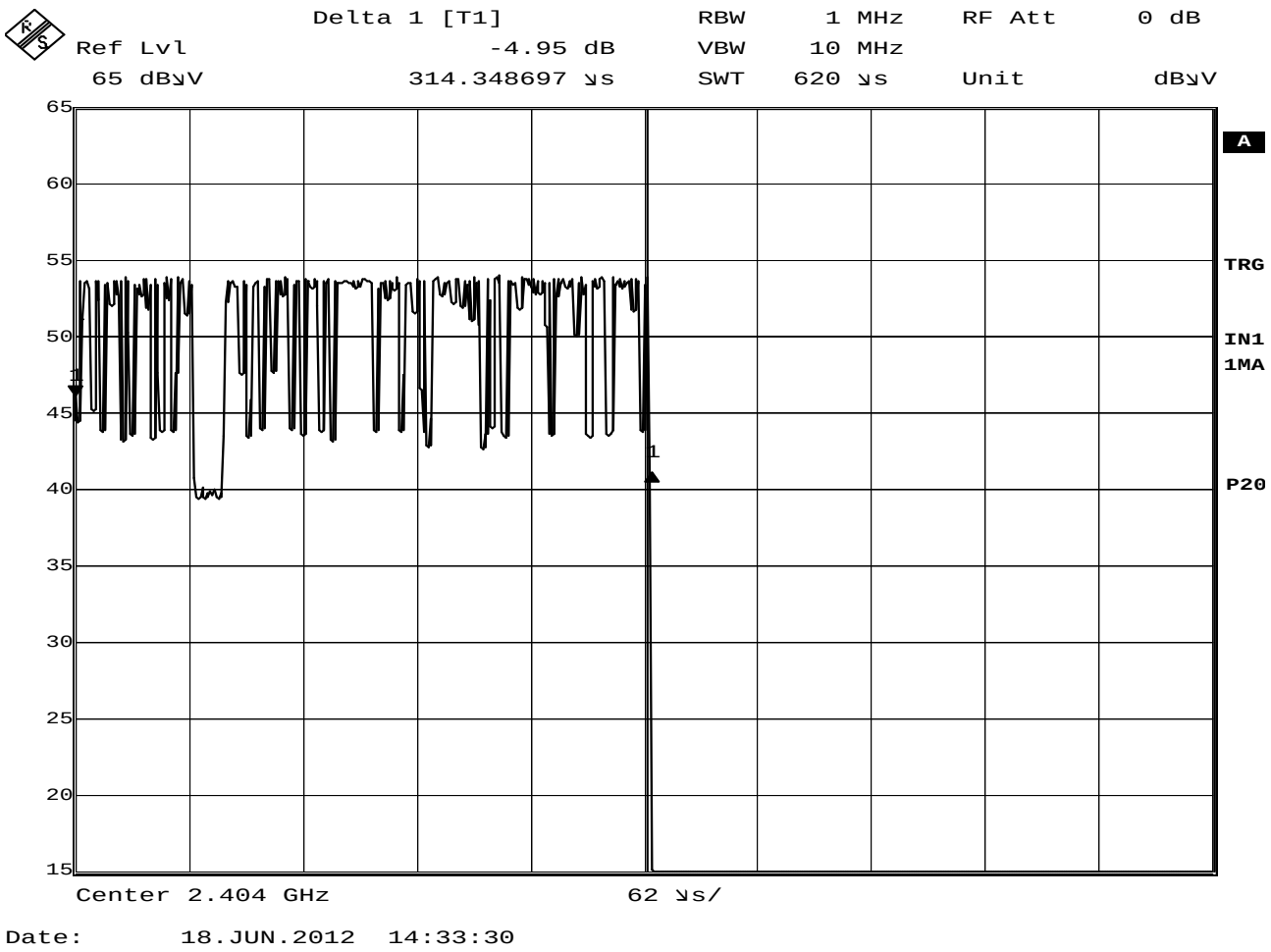
MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD4
SERIAL NUMBER	: 4121534056
TEST MODE	: Half Bandwidth, Communicating with GLXD2 (Group 1, Ch.3)
TEST DATE	: June 26, 2012
TEST PARAMETER	: Duty Cycle Factor
NOTES	: Pulse width = 312µs
EQUIPMENT USED	: RBE0, T2S0



Date: 26.JUN.2012 10:13:01

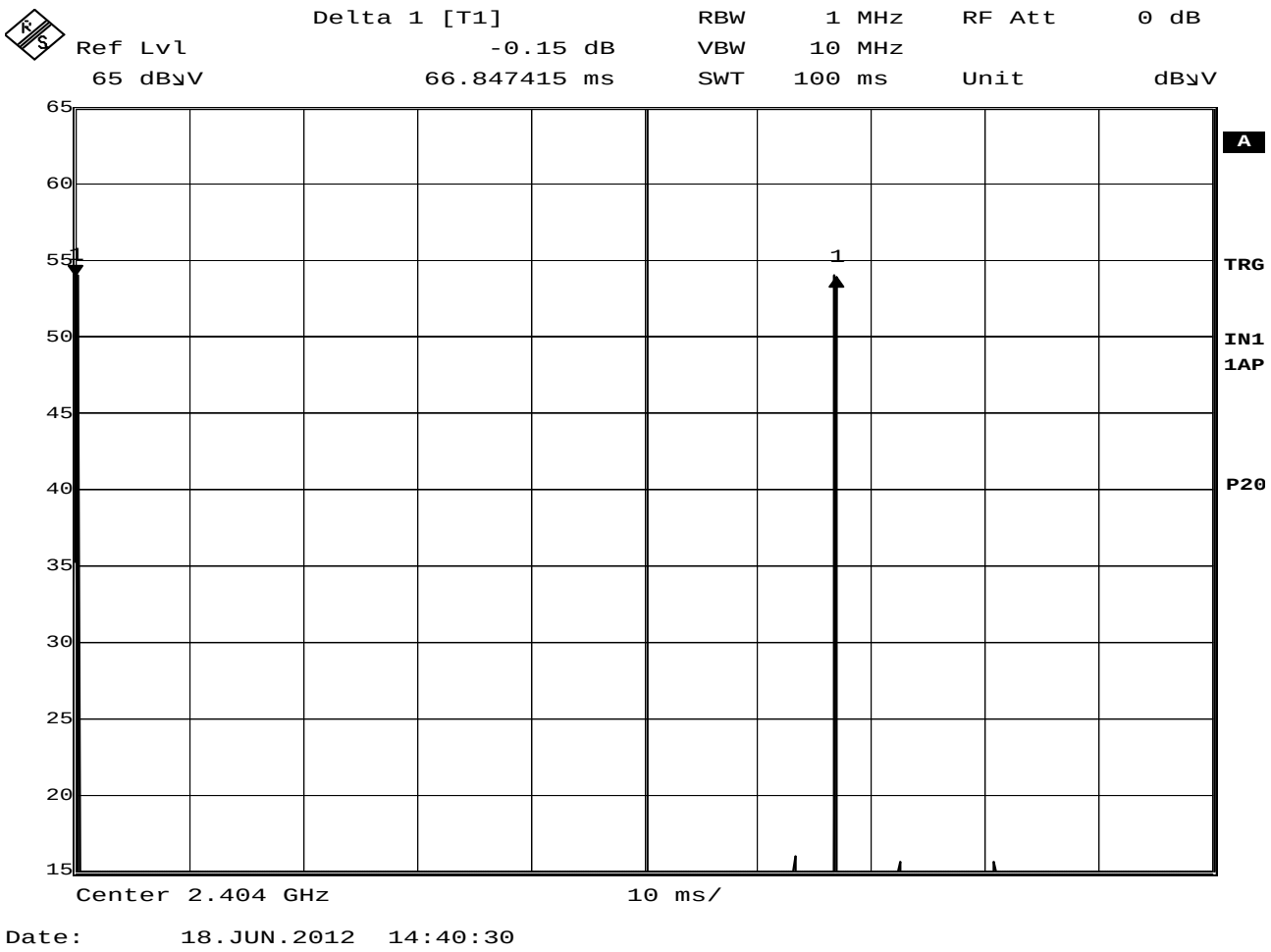
FCC 15.35 Duty Cycle Factor

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390859
TEST MODE	:	Half Bandwidth, Communicating with GLXD2 (Group 1, Ch.3)
TEST DATE	:	June 26, 2012
TEST PARAMETER	:	Duty Cycle Factor
NOTES	:	Number of Pulses in 100msec period = 1
NOTES	:	Duty Cycle Factor = 20 x log(((Pulse width)x (# pulses in 100msec))/100msec)
	:	Duty Cycle Factor = 20 x log (((312usec)x (1pulse in 100msec))/100msec
	:	Duty Cycle Factor = 20 x log (0.312msec)/100msec)
	:	Duty Cycle Factor = -50.17dB
	:	Pulses with smaller amplitude are from GLXD2
EQUIPMENT USED	:	RBE0, T2S0



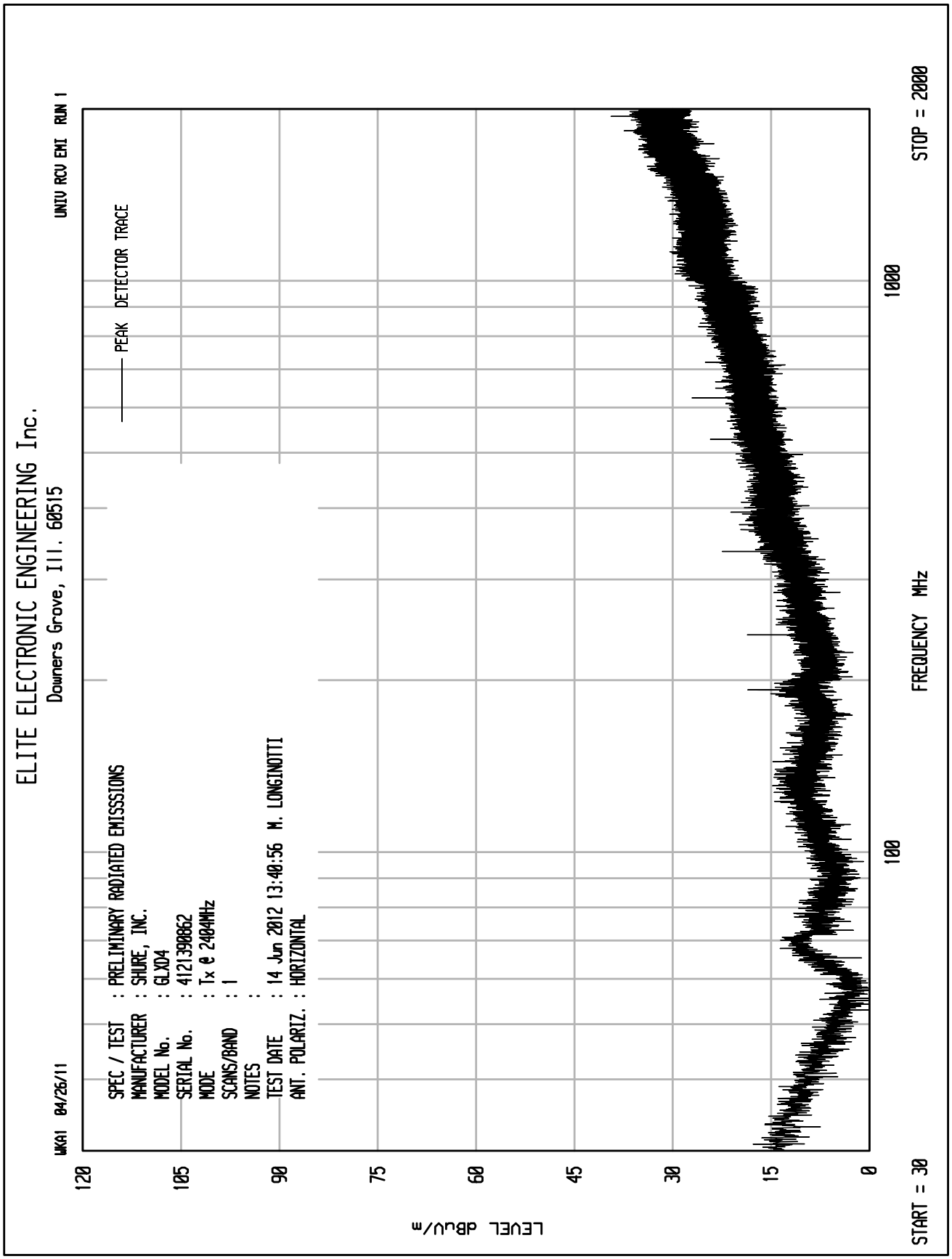
ADD TEST DESCRIPTION/SPEC HERE. Remove any unused lines.

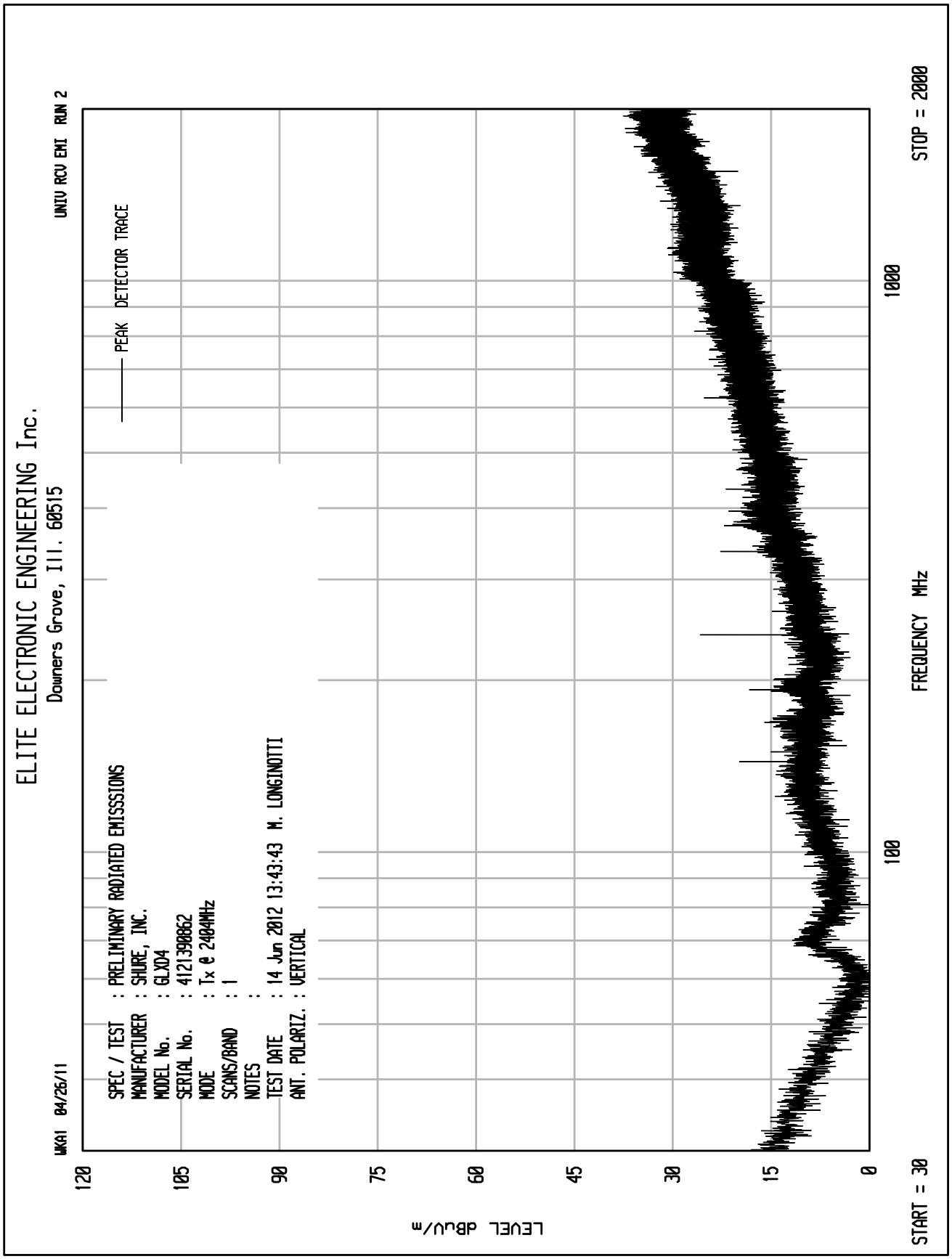
MANUFACTURER : Shure
MODEL NUMBER : GLXD4
SERIAL NUMBER : 4121390862
TEST MODE : TX 2404MHz @115V
TEST PARAMETERS : duty cycle factor measurements
NOTES : Pulse on time = 314µs
EQUIPMENT USED : RBB0, NWI0

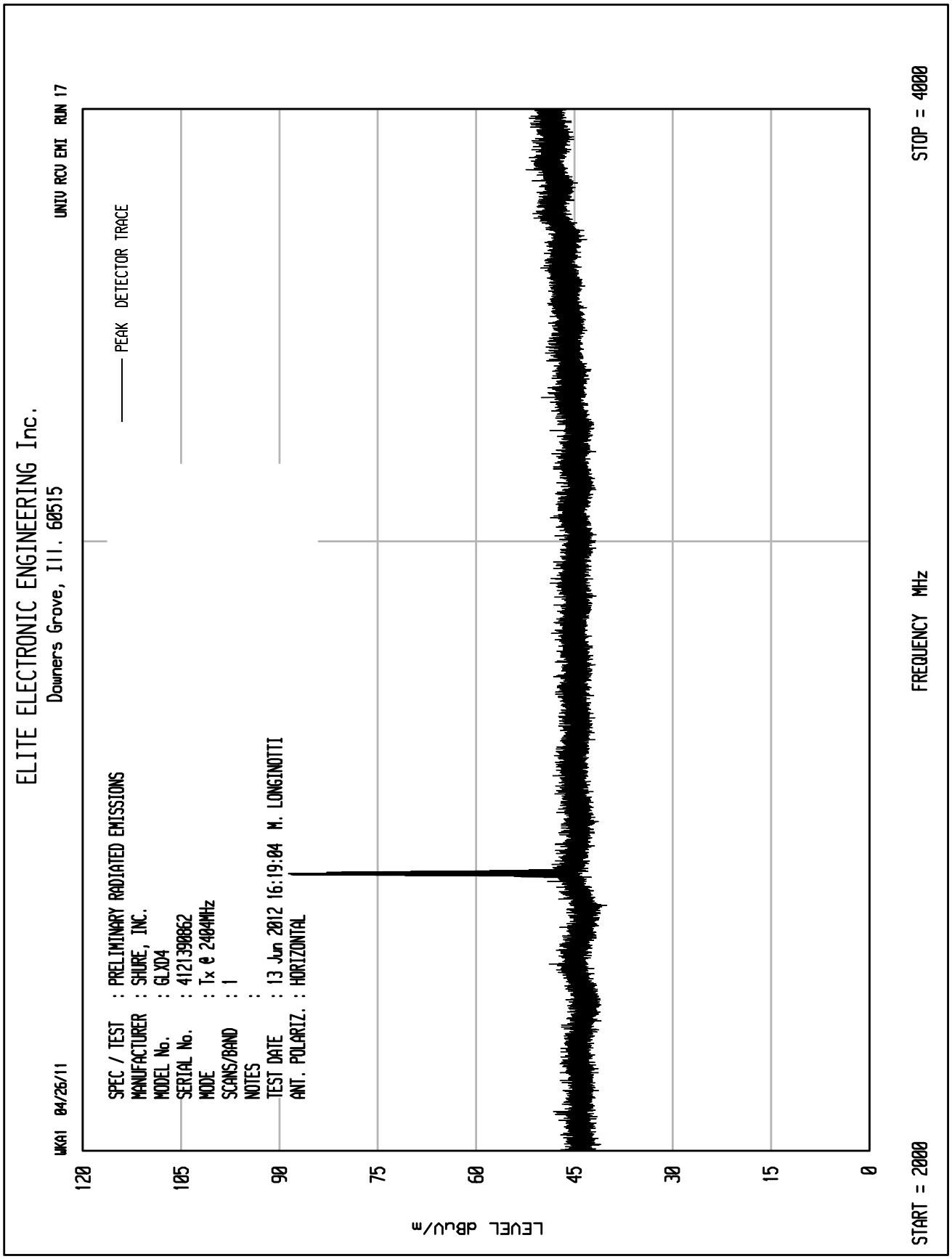


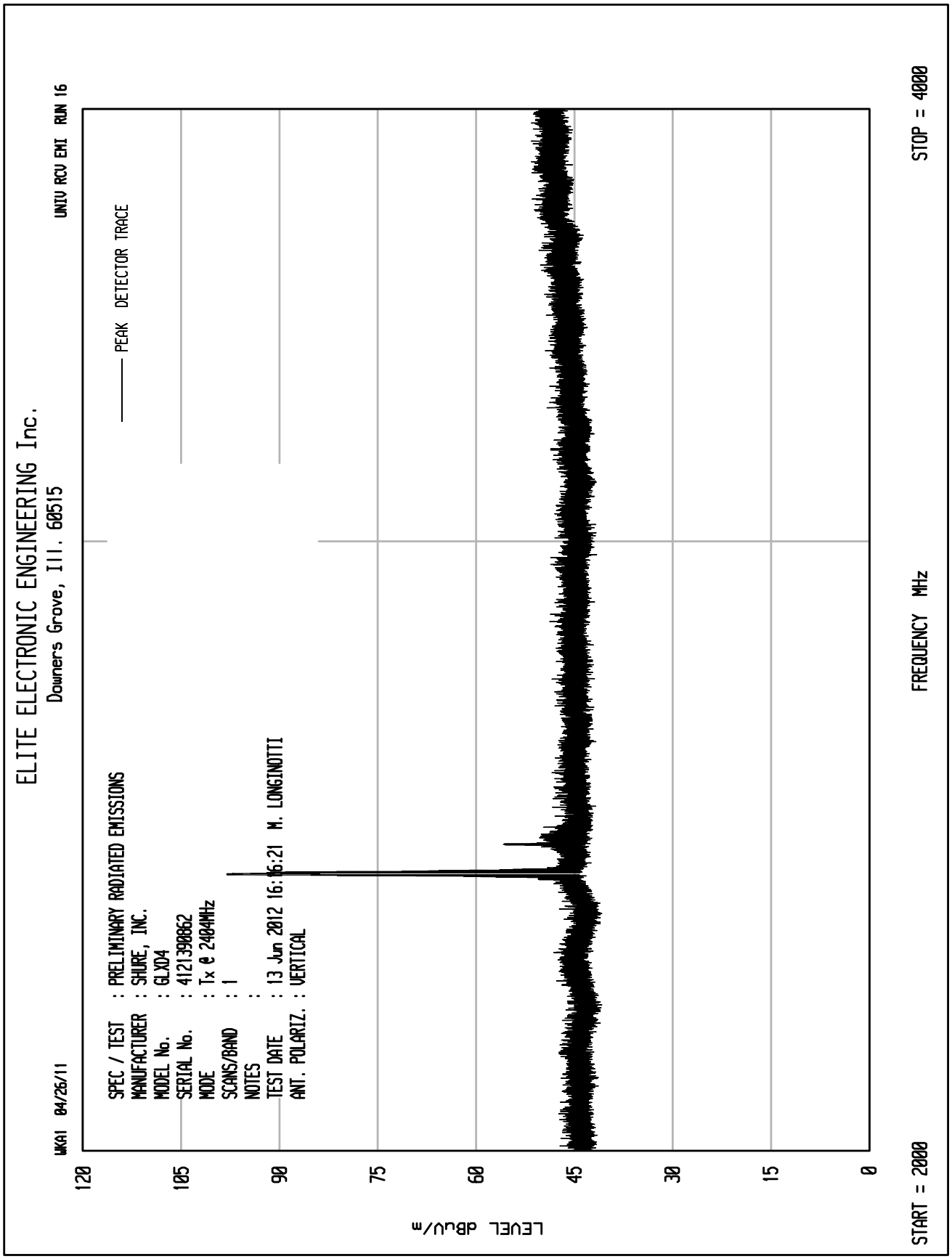
FCC 15.35 Duty Cycle Correction Factor

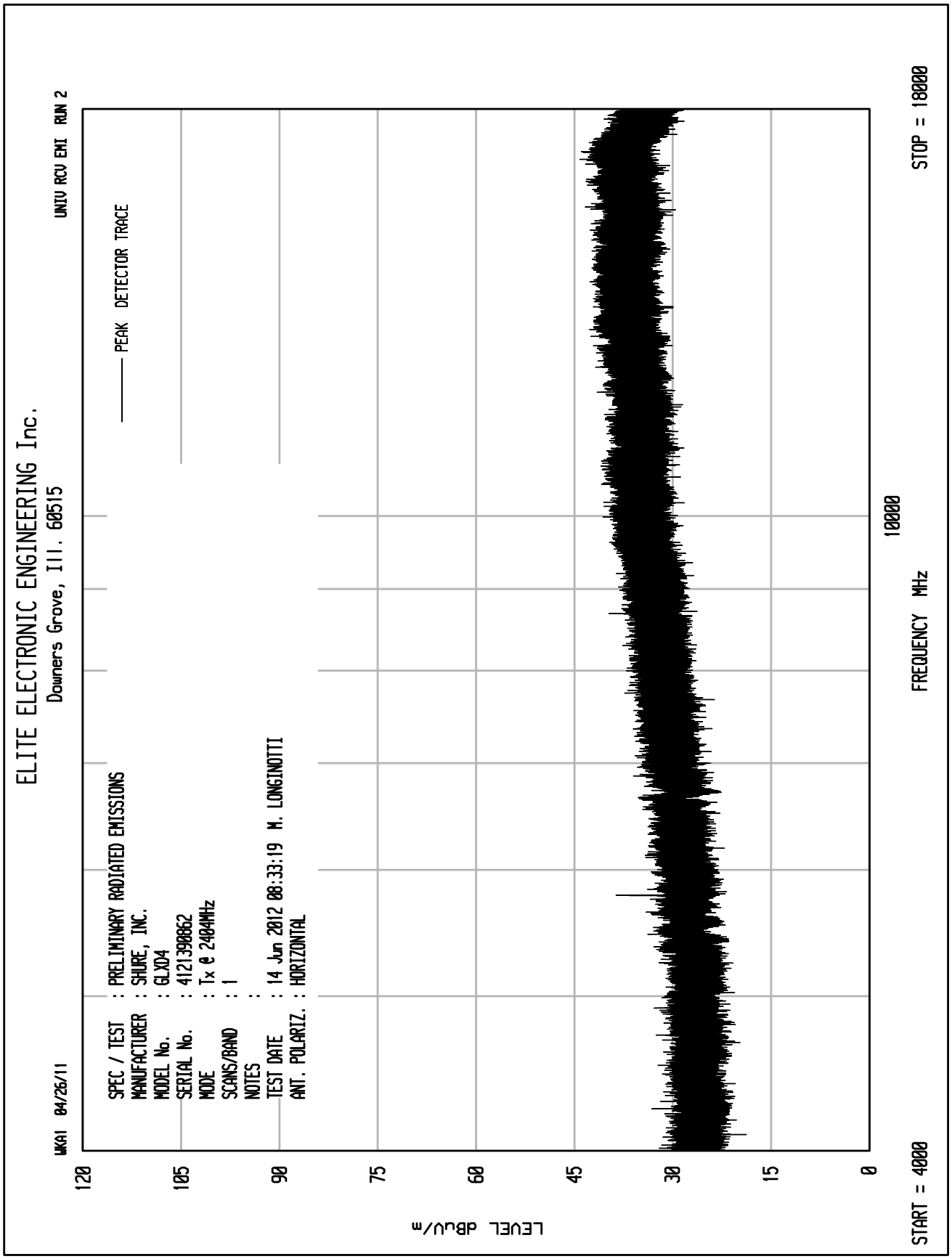
MANUFACTURER	:	Shure
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	TX 2404MHz @115V (Full Bandwidth Mode)
TEST PARAMETERS	:	duty cycle factor measurements
NOTES	:	2 pulses every 100ms. Duty Cycle Factor = 20*log(ON time/100ms)
Duty Cycle Factor	:	20*log(2*314us/100ms) = -44.2dB
EQUIPMENT USED	:	RBB0, NWI0

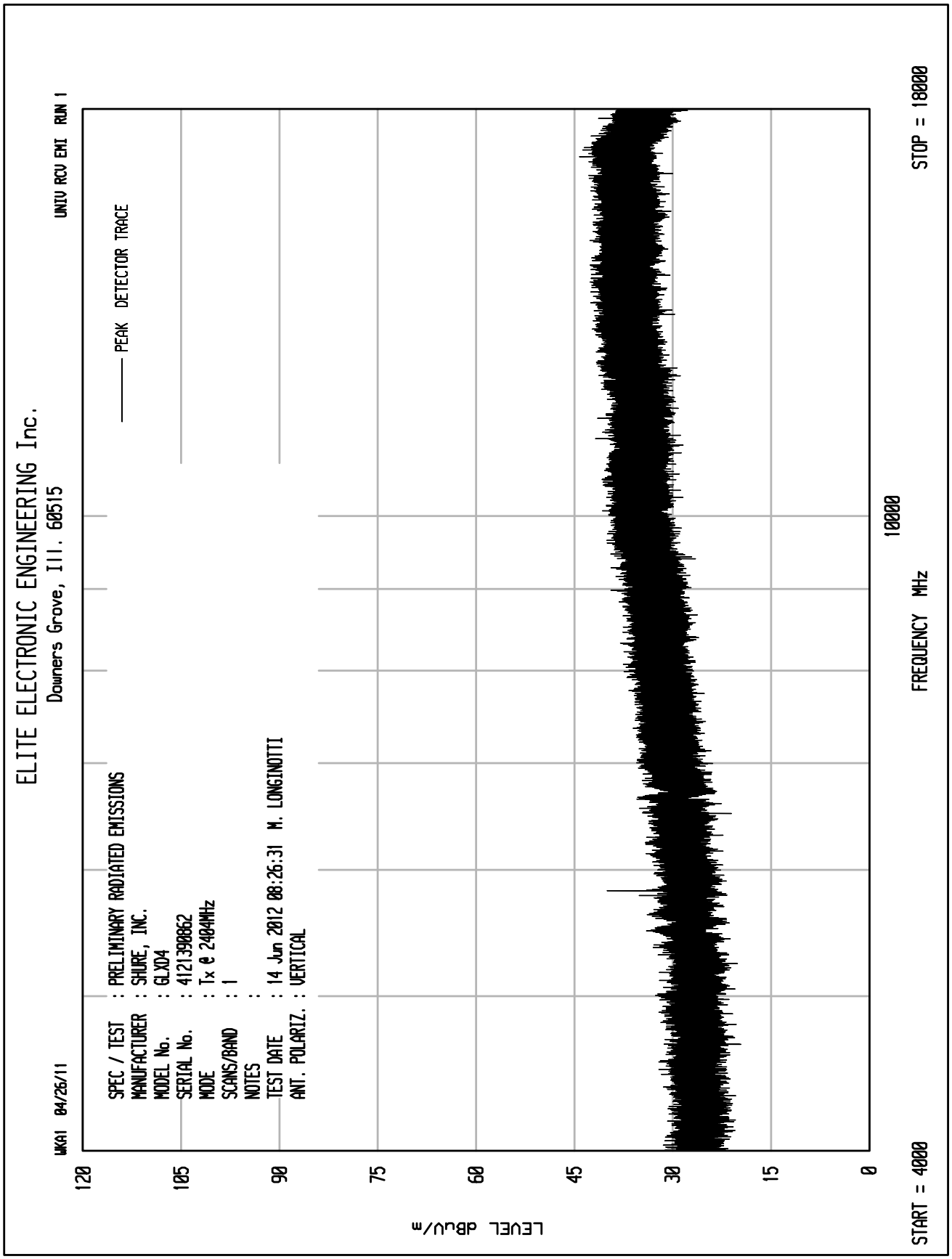

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 1
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2404MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 13:40:56 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
1000
STOP = 2000
FREQUENCY MHz

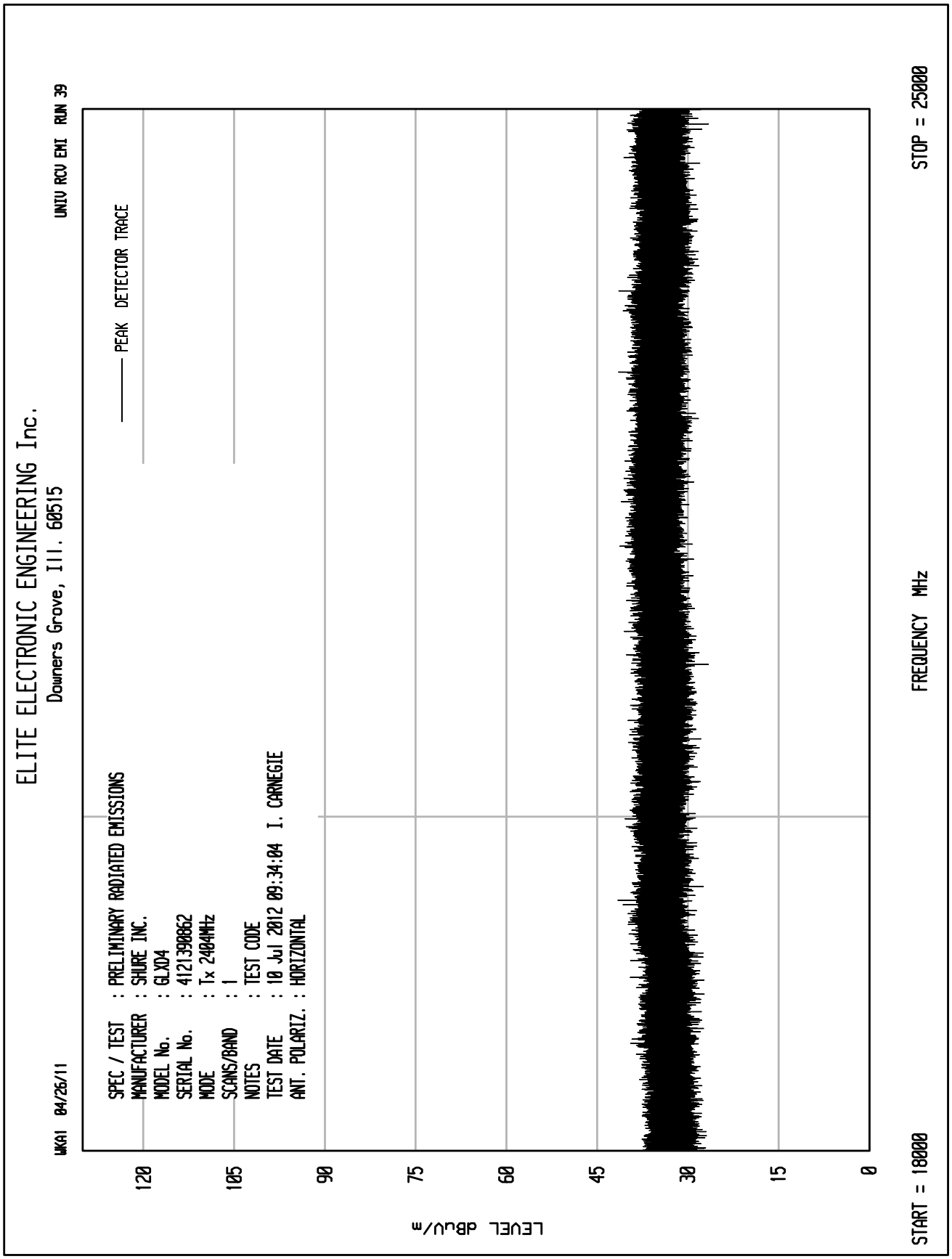

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2404MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 13:43:43 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
1000
STOP = 2000
FREQUENCY MHz

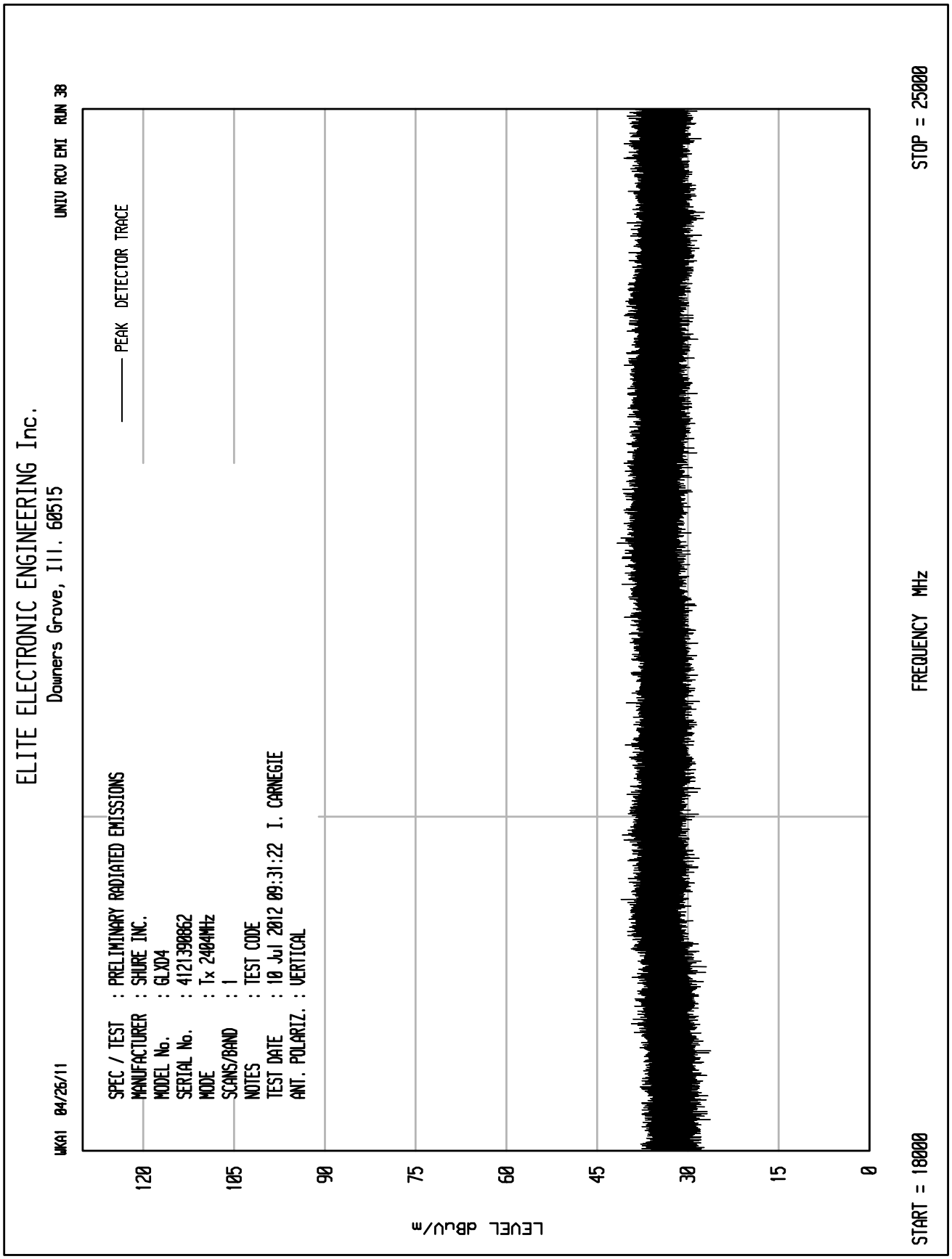

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 17
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx @ 2404MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 13 Jun 2012 16:19:04 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
FREQUENCY MHz
STOP = 4000

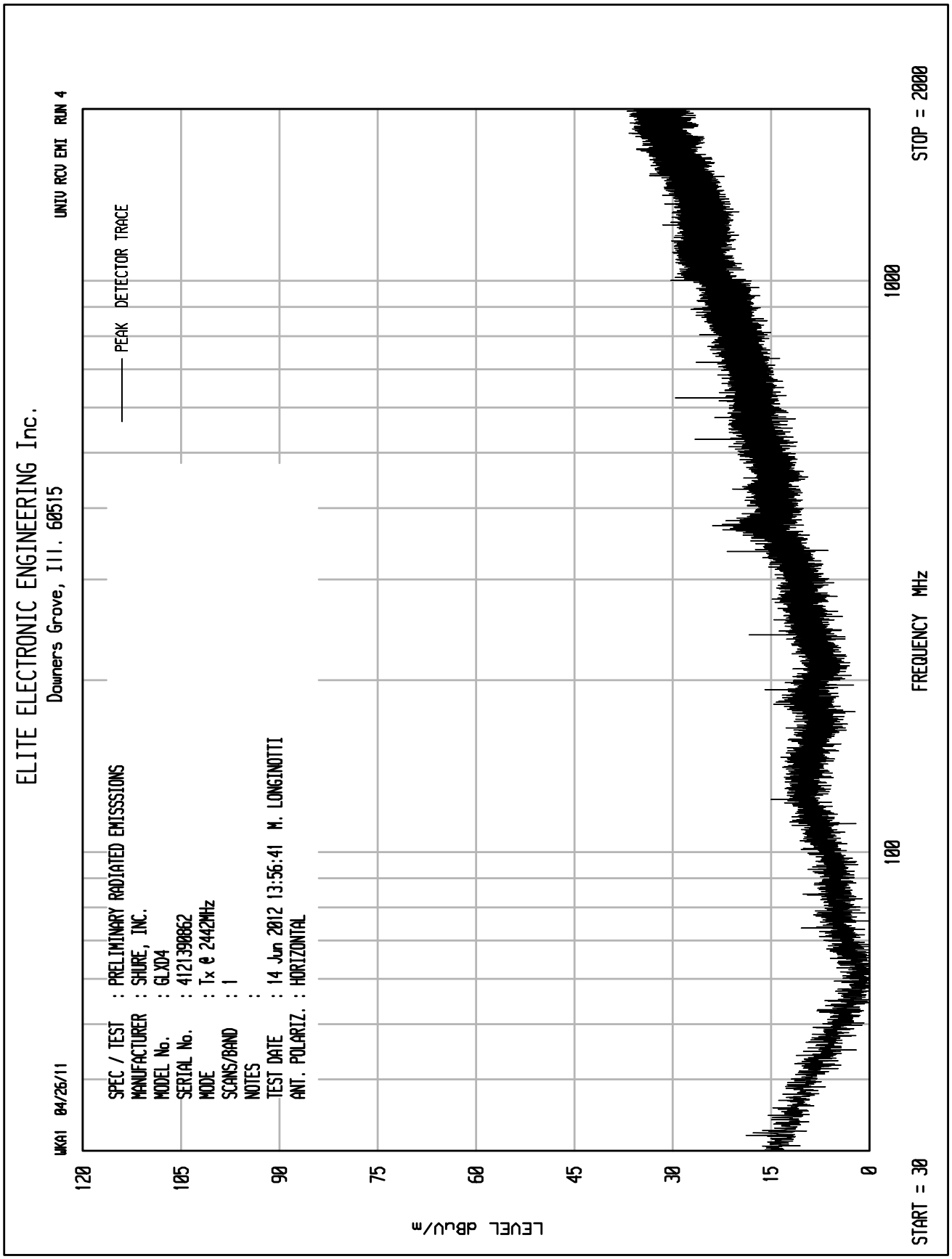

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 16
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2404MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 13 Jun 2012 16:16:21 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
FREQUENCY MHz
STOP = 4000

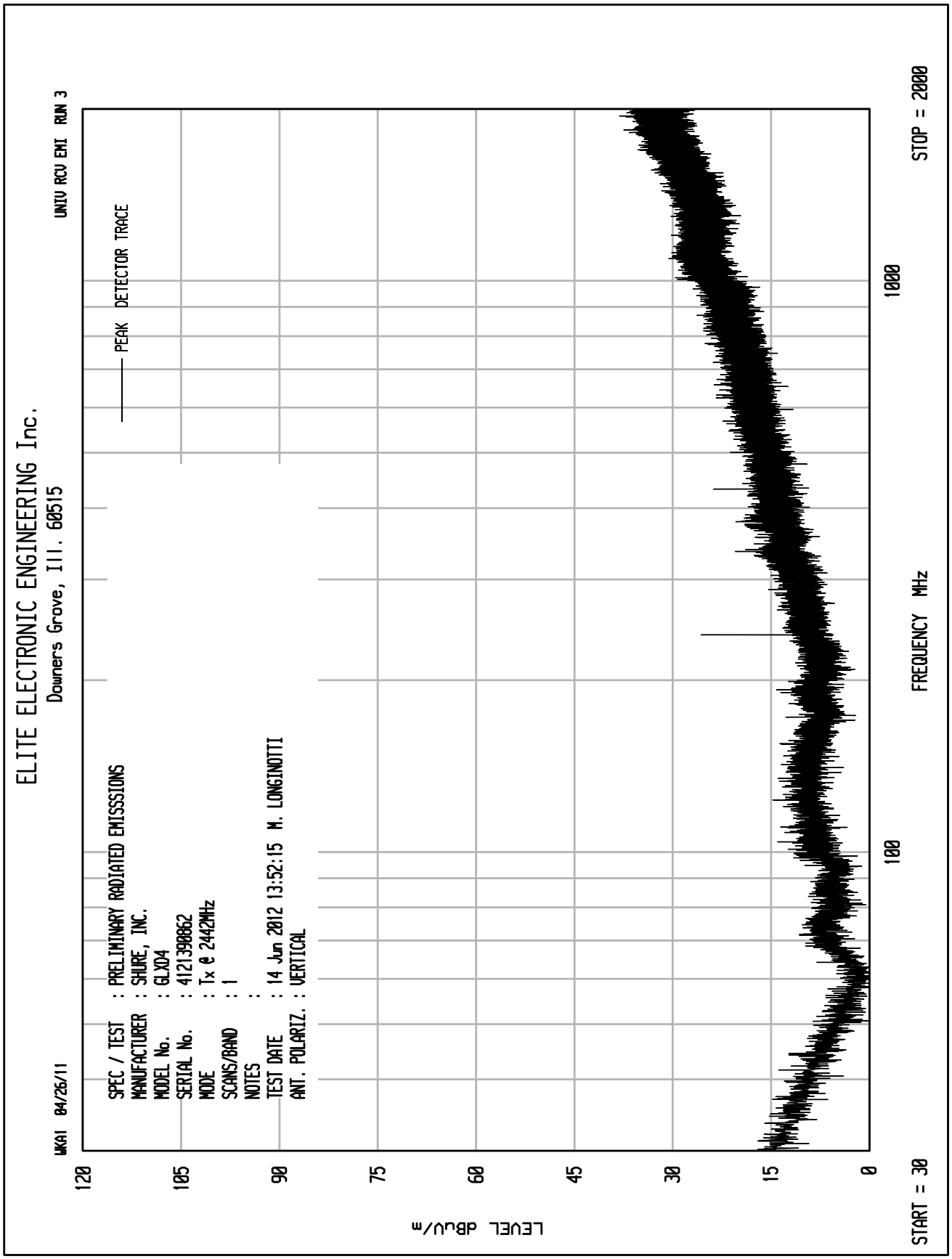

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2404MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 08:33:19 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 4000
10000
FREQUENCY MHz
STOP = 18000

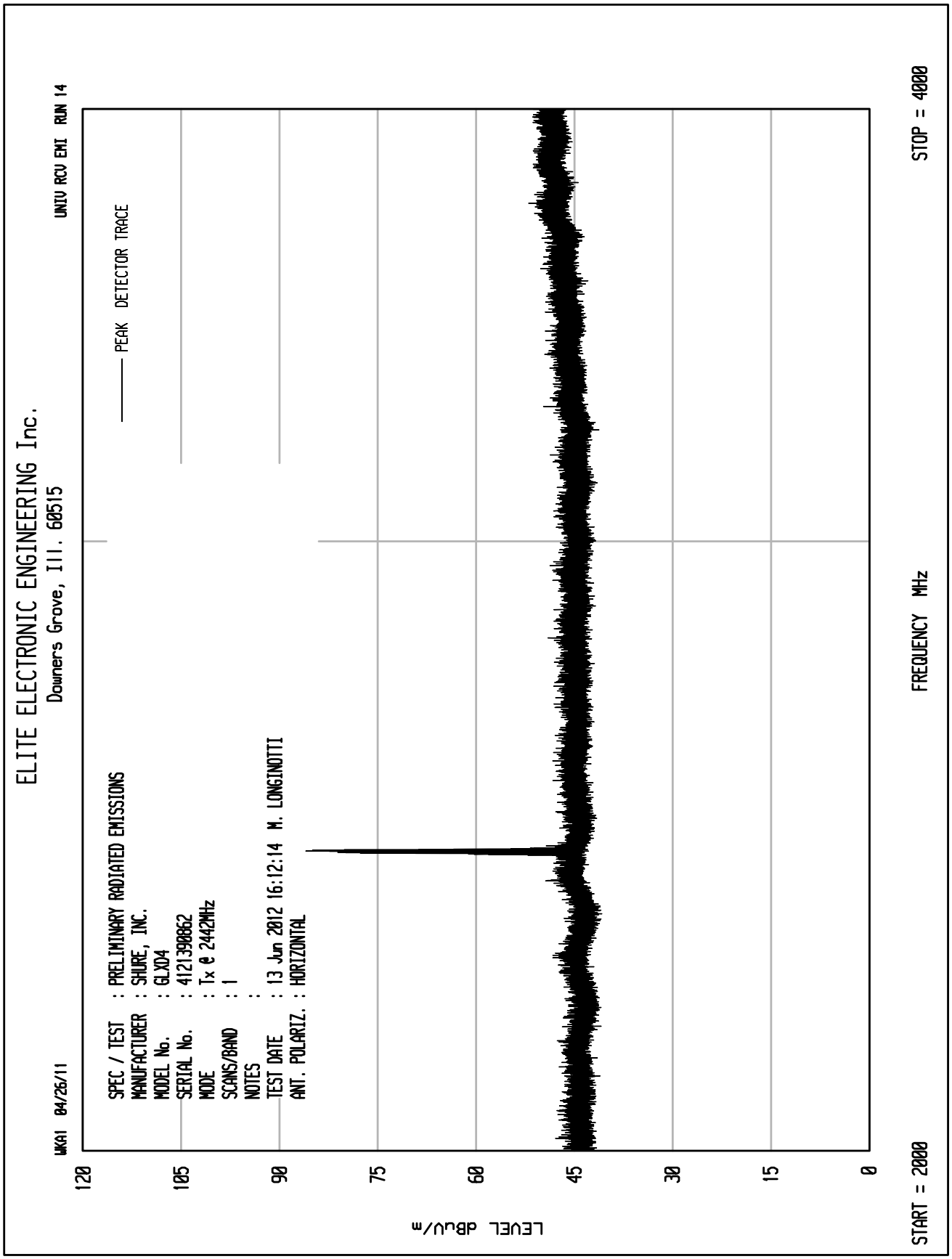

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 1
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2404MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 08:26:31 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 4000
10000
FREQUENCY MHz
STOP = 18000

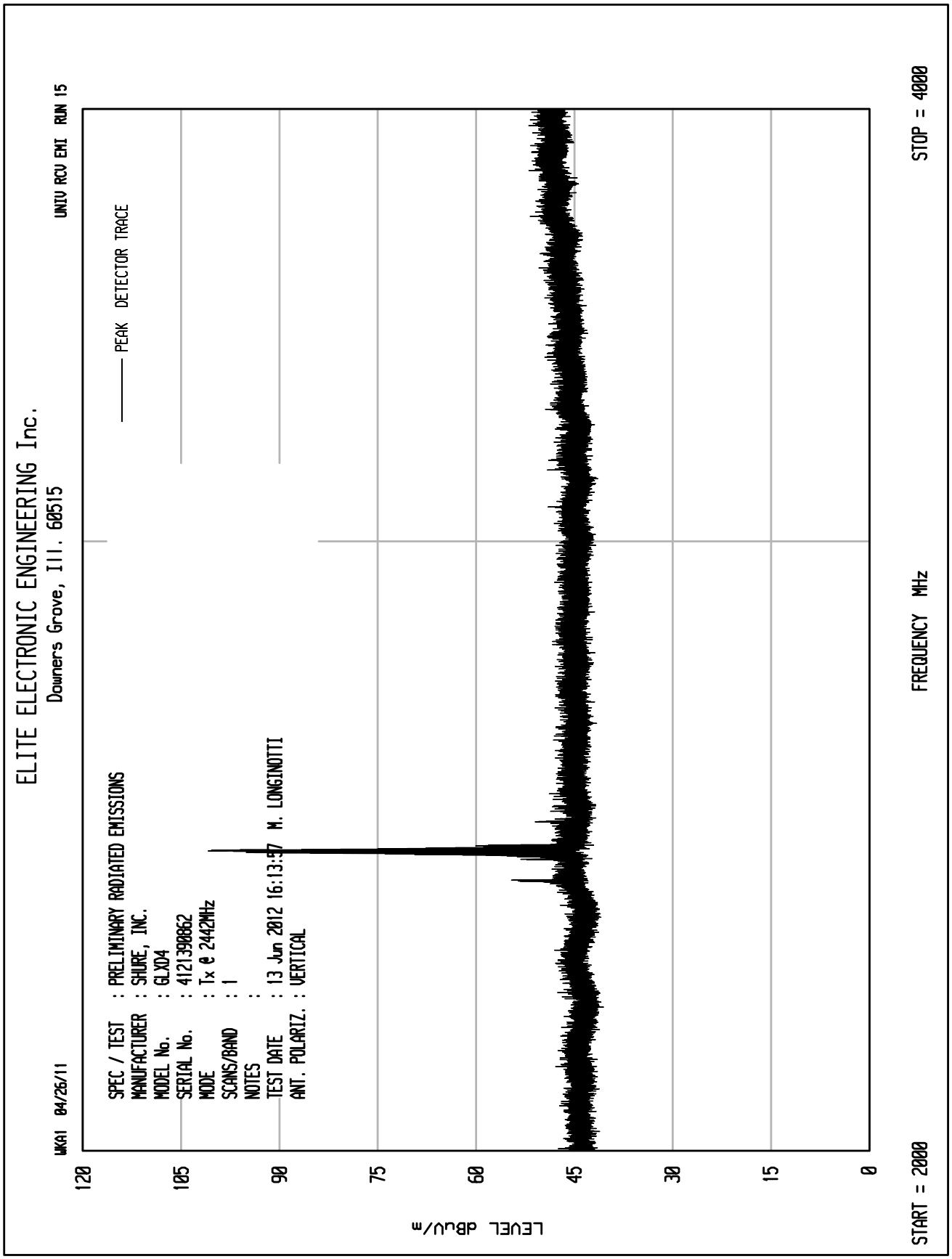

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 39
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx 2404MHz
SCANS/BAND : 1
NOTES : TEST CODE
TEST DATE : 10 Jul 2012 09:34:04 I. CARNEGIE
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

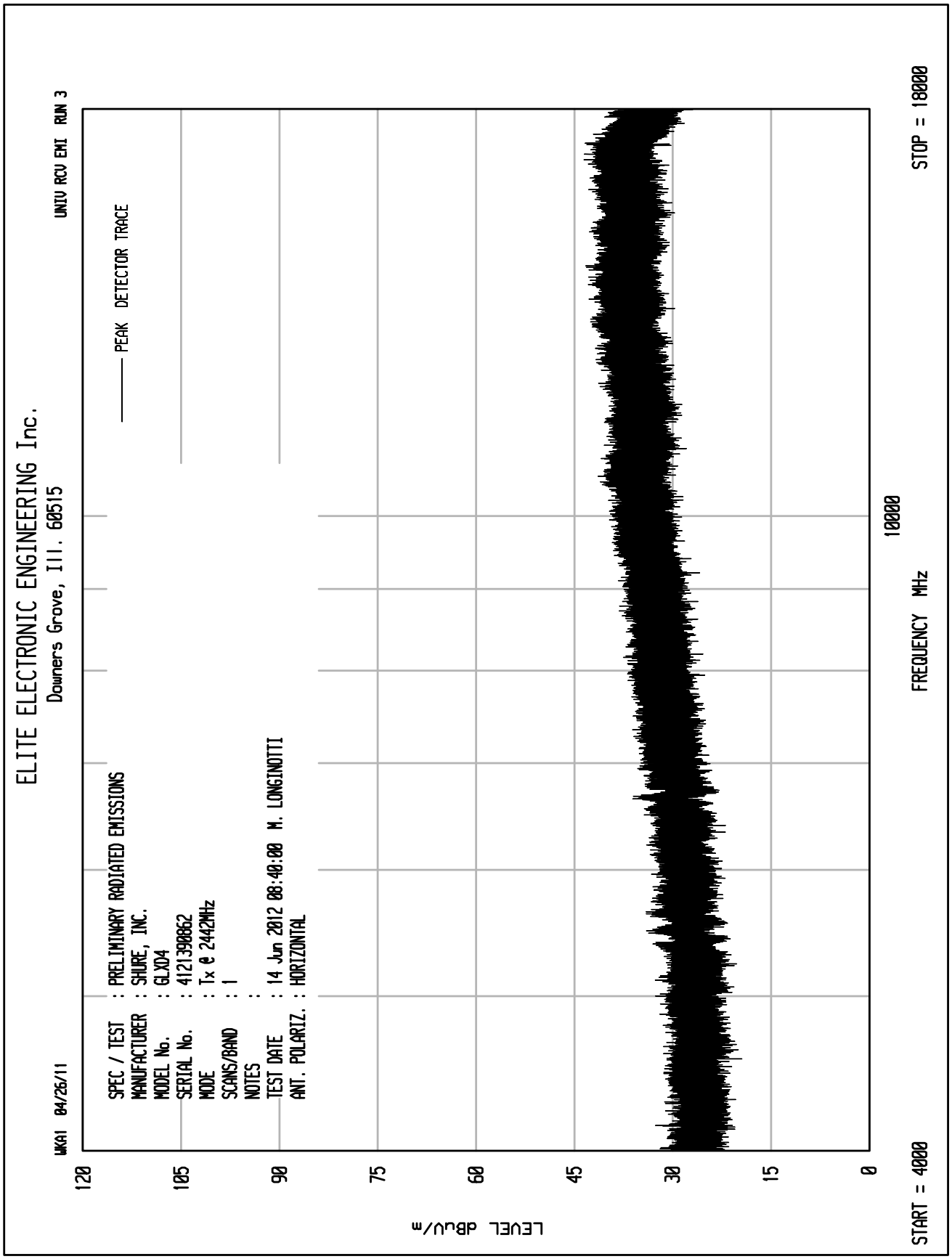

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 38
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx 2404MHz
SCANS/BAND : 1
NOTES : TEST CODE
TEST DATE : 10 Jul 2012 09:31:22 I. CARNEGIE
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

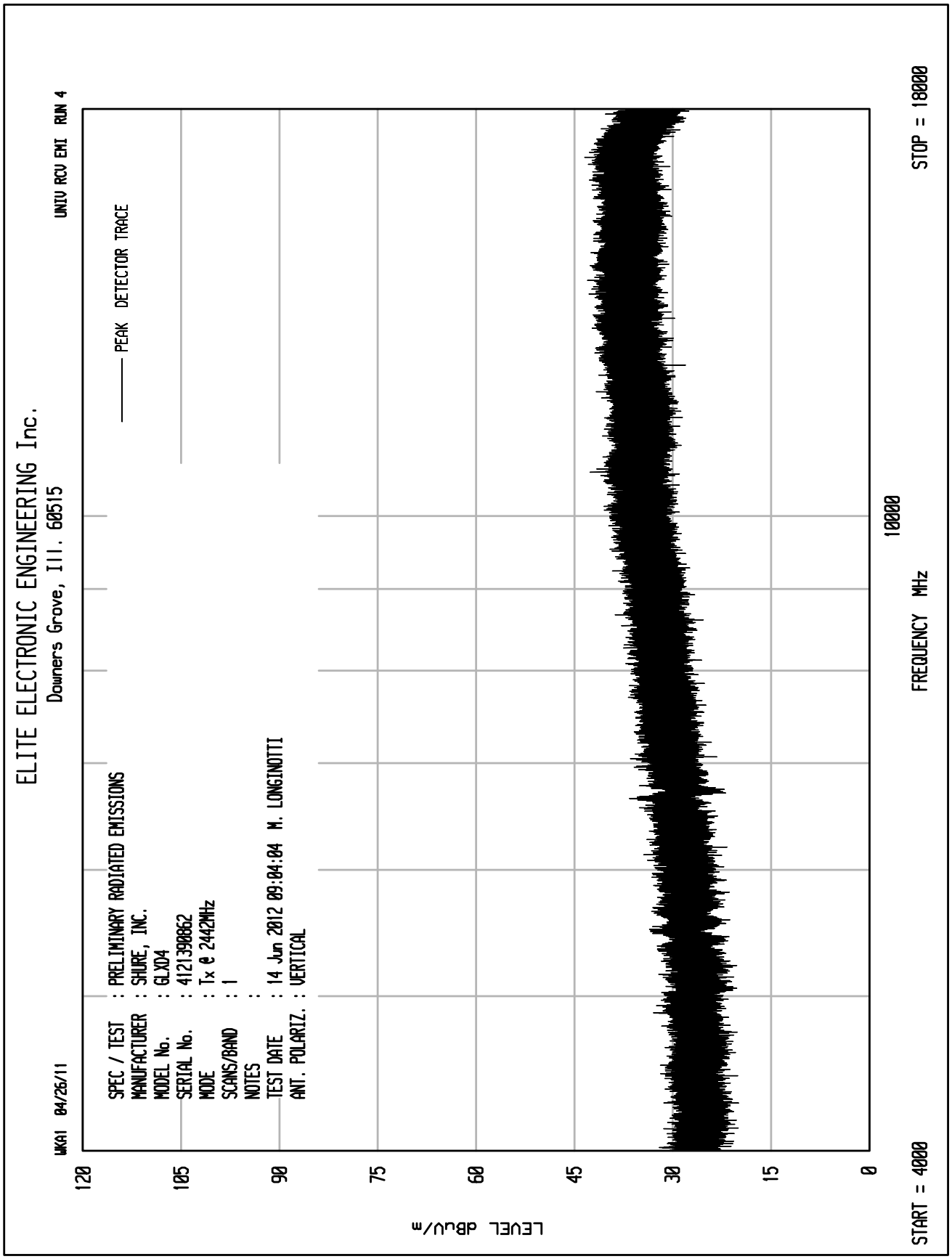

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2442MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 13:56:41 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
1000
STOP = 2000
FREQUENCY MHz

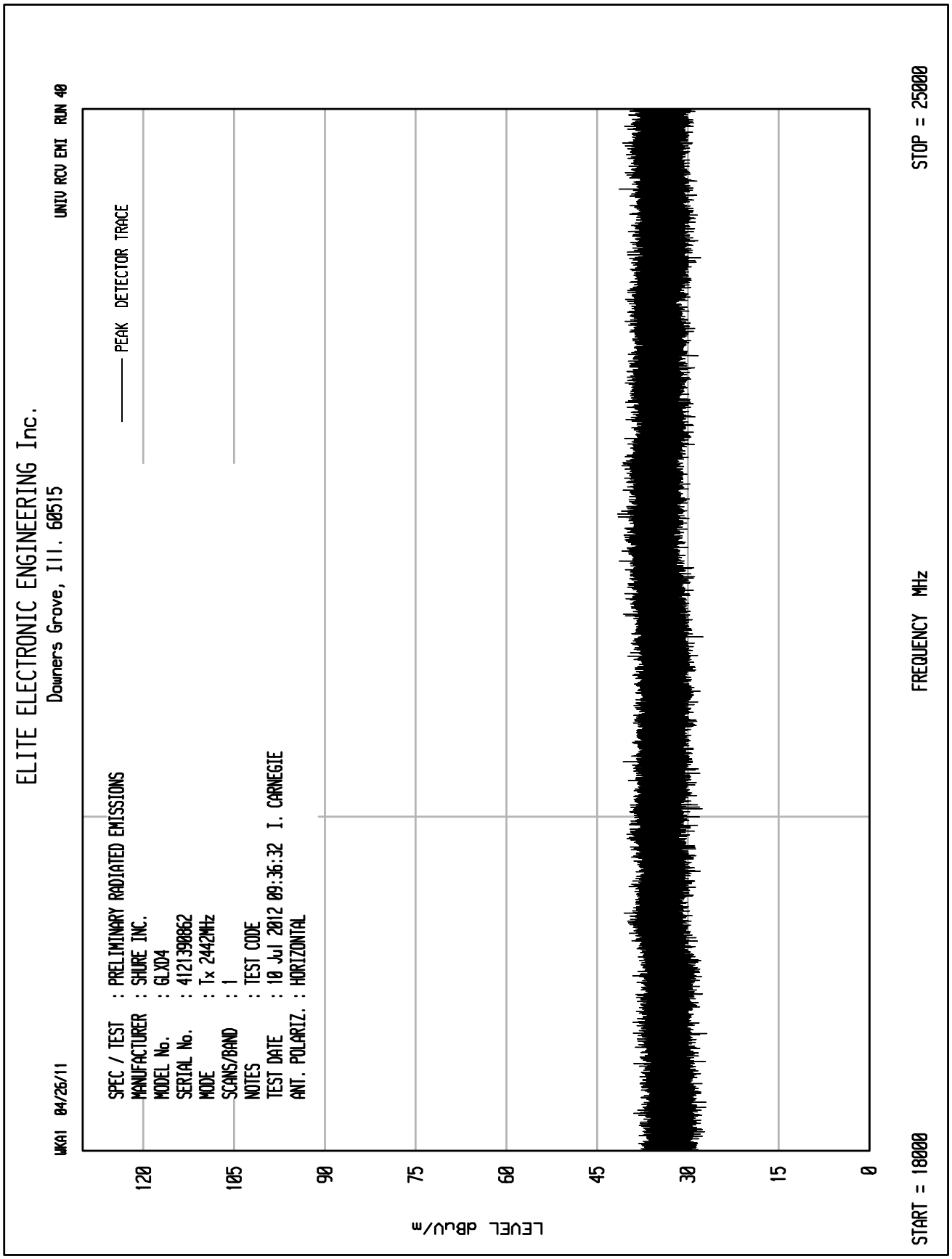

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2442MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 13:52:15 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
1000
STOP = 2000
FREQUENCY MHz

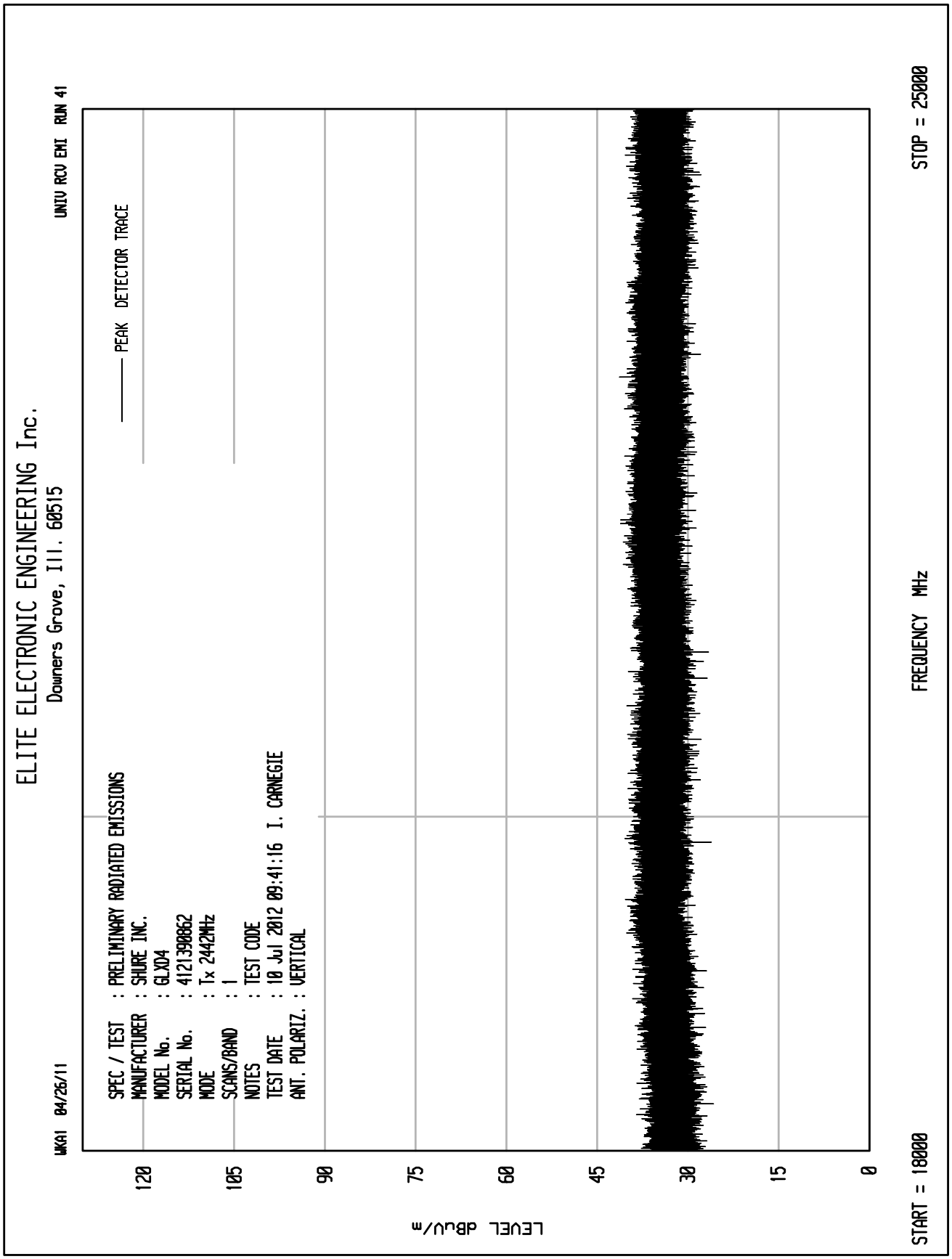

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 14
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx @ 2442MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 13 Jun 2012 16:12:14 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
FREQUENCY MHz
STOP = 4000

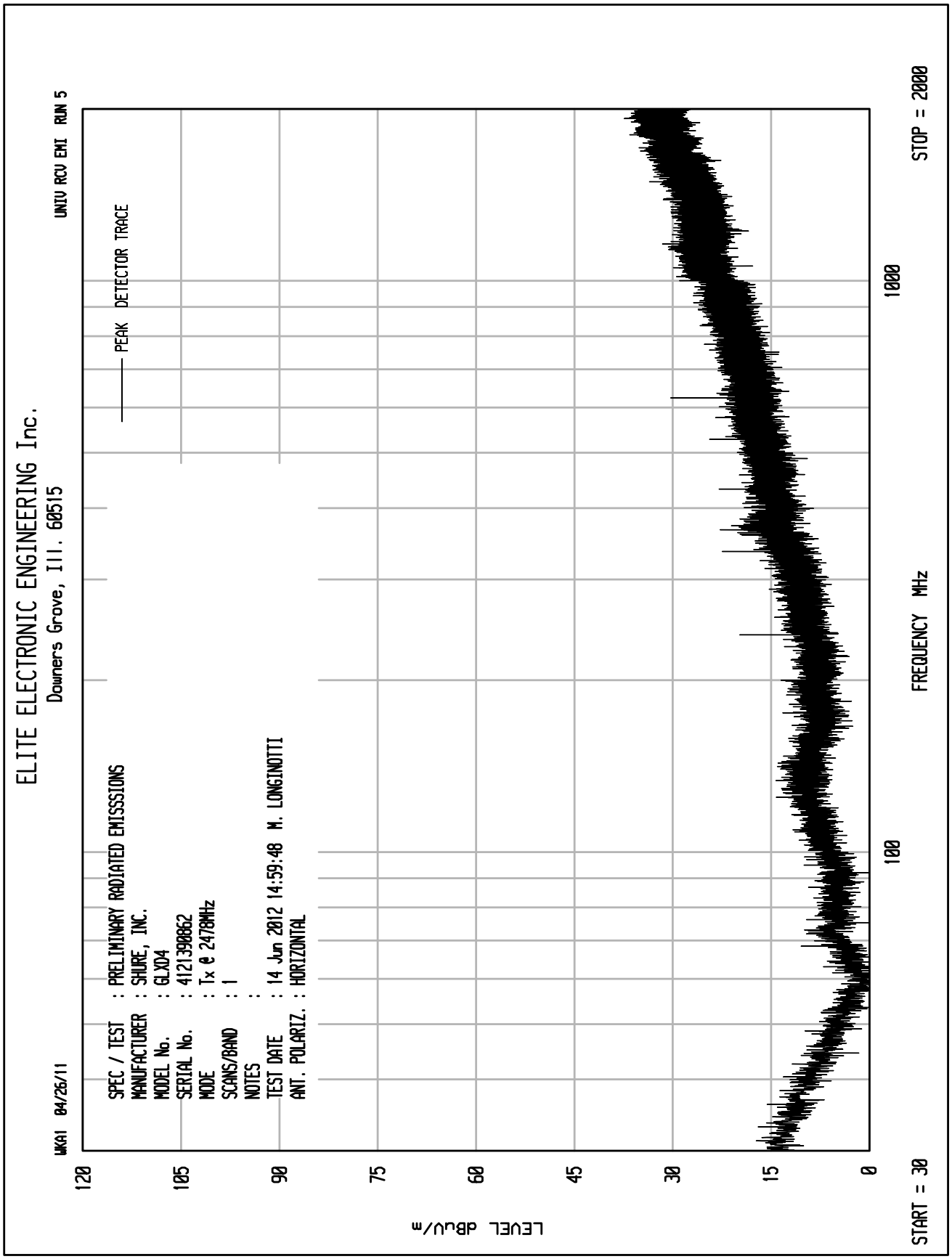

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 15
WKAI 04/26/11
PEAK DETECTOR TRACE
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx @ 2442MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 13 Jun 2012 16:13:57 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
FREQUENCY MHz
STOP = 4000

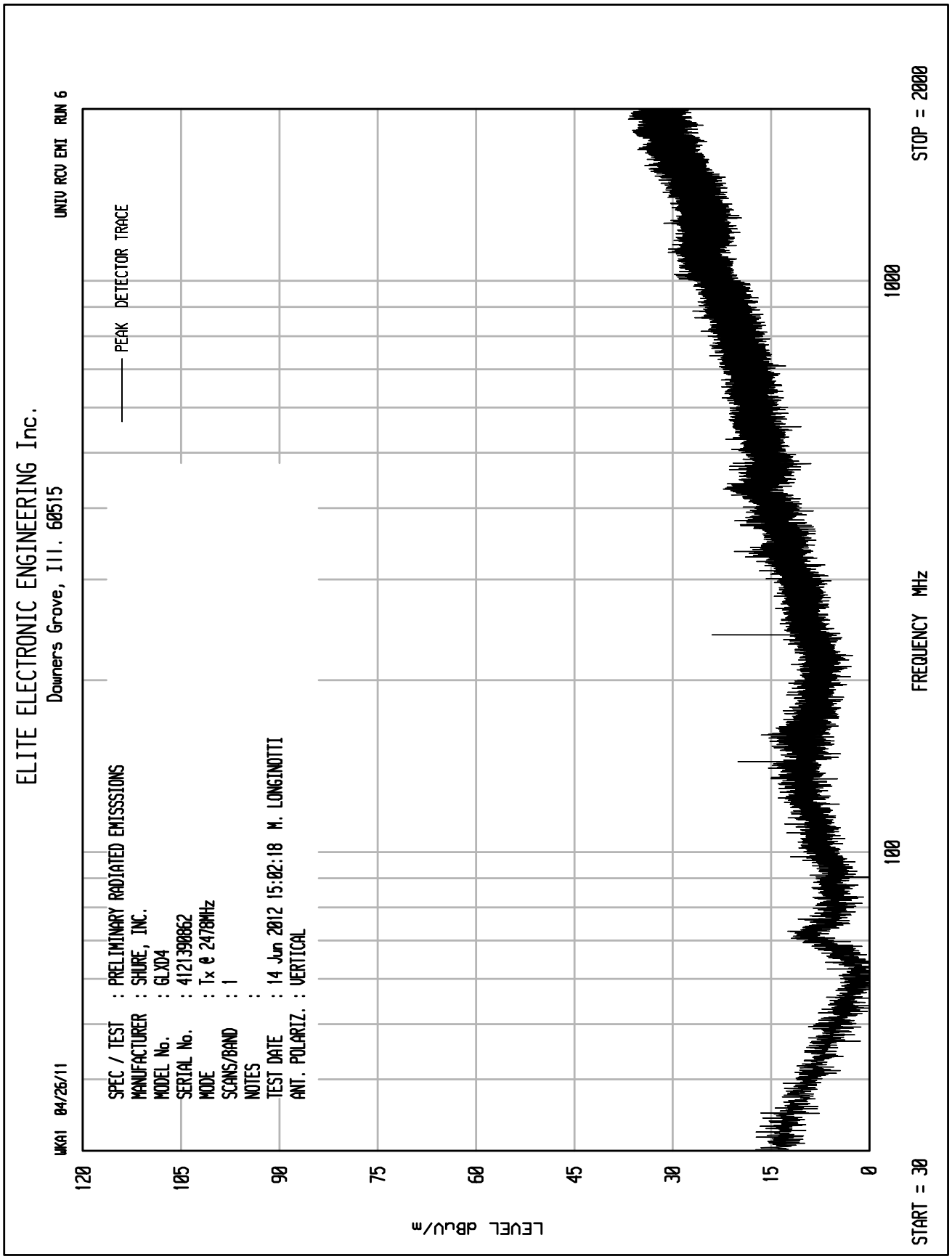

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx @ 2442MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 08:40:00 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 4000
10000
FREQUENCY MHz
STOP = 18000

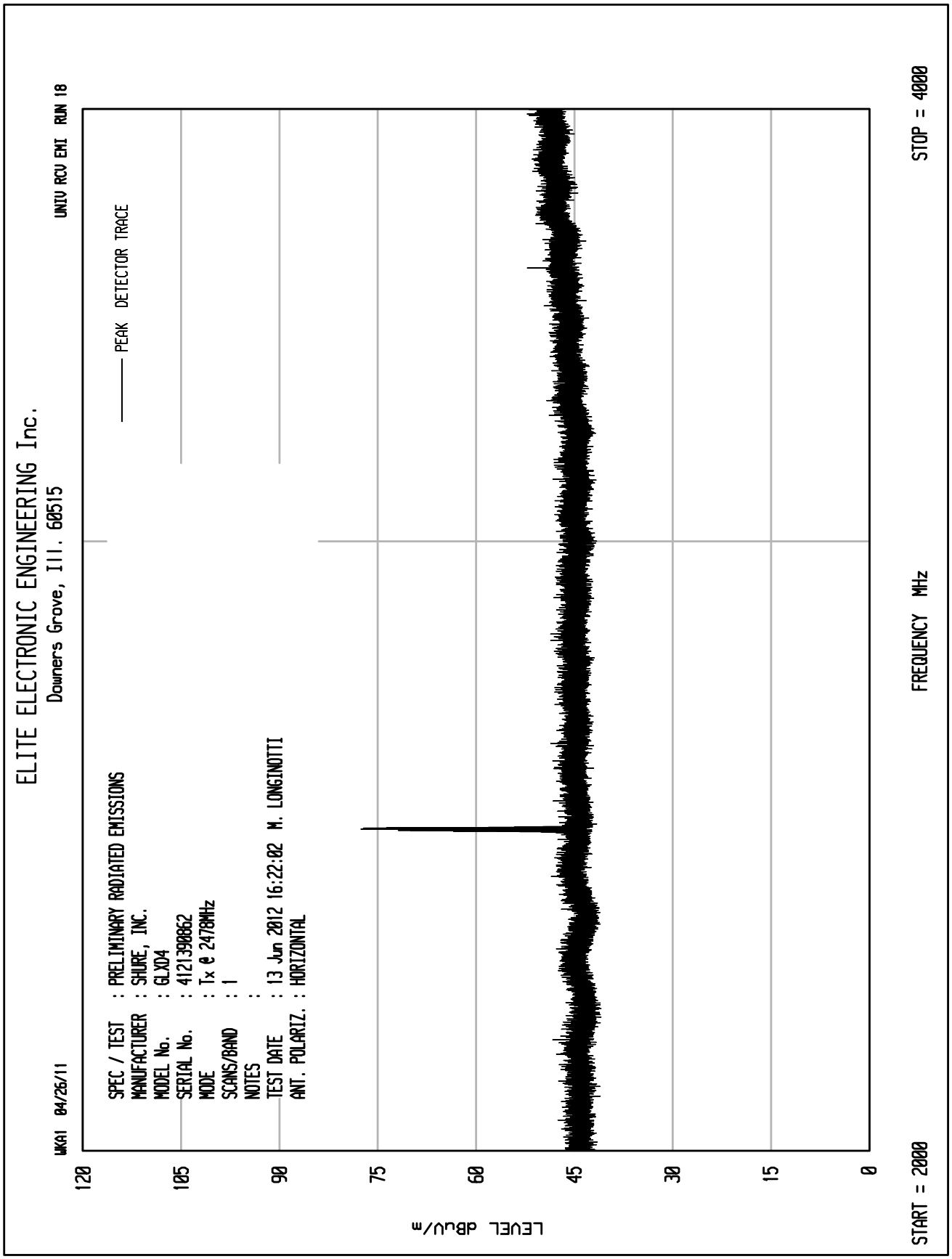

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKAI 04/26/11
PEAK DETECTOR TRACE
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2442MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 09:04:04 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 4000
10000
STOP = 18000
FREQUENCY MHz

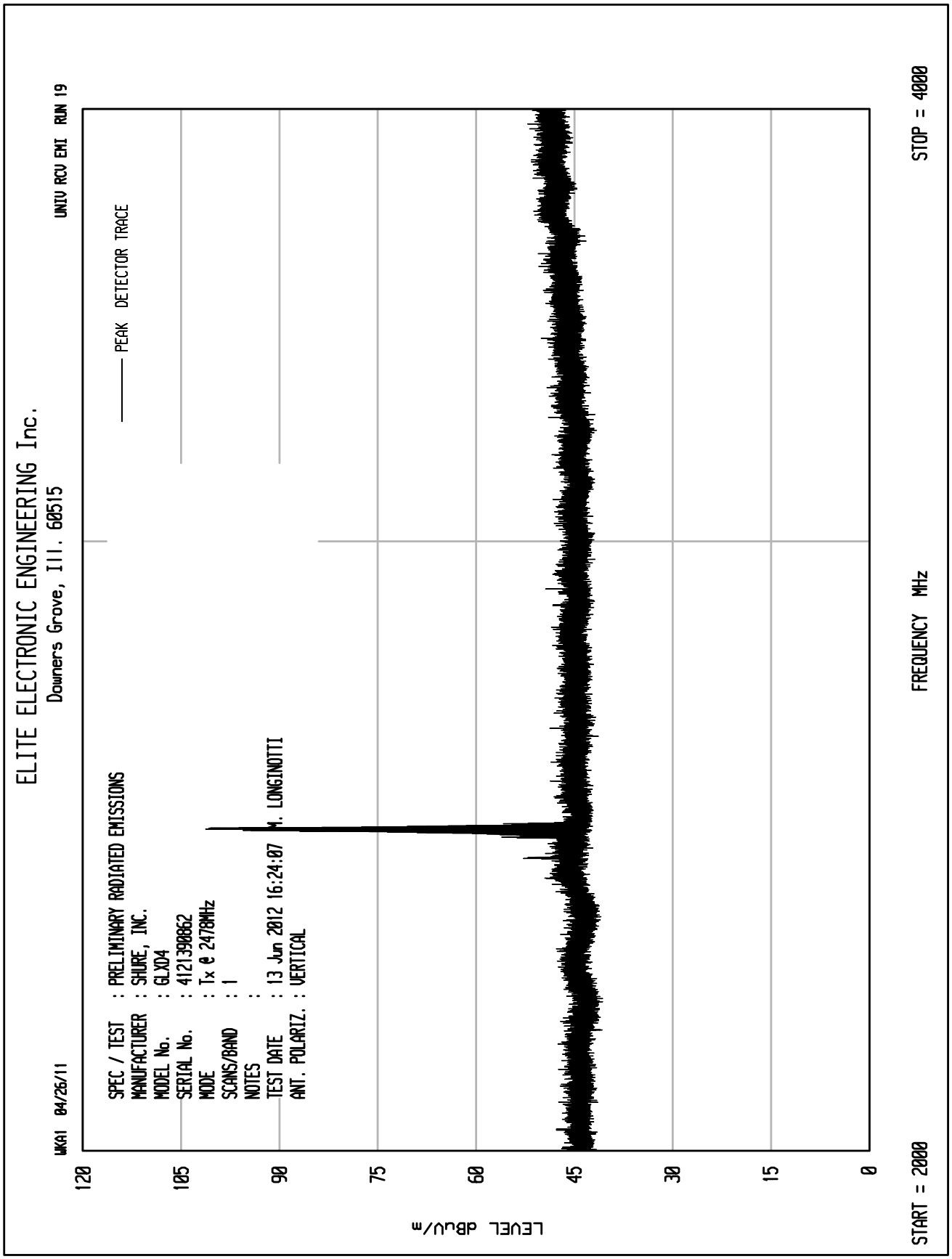

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 40
WKAI 04/26/11
PEAK DETECTOR TRACE
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx 2442MHz
SCANS/BAND : 1
NOTES : TEST CODE
TEST DATE : 10 Jul 2012 09:36:32 I. CARNEGIE
ANT. POLARIZ. : HORIZONTAL
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

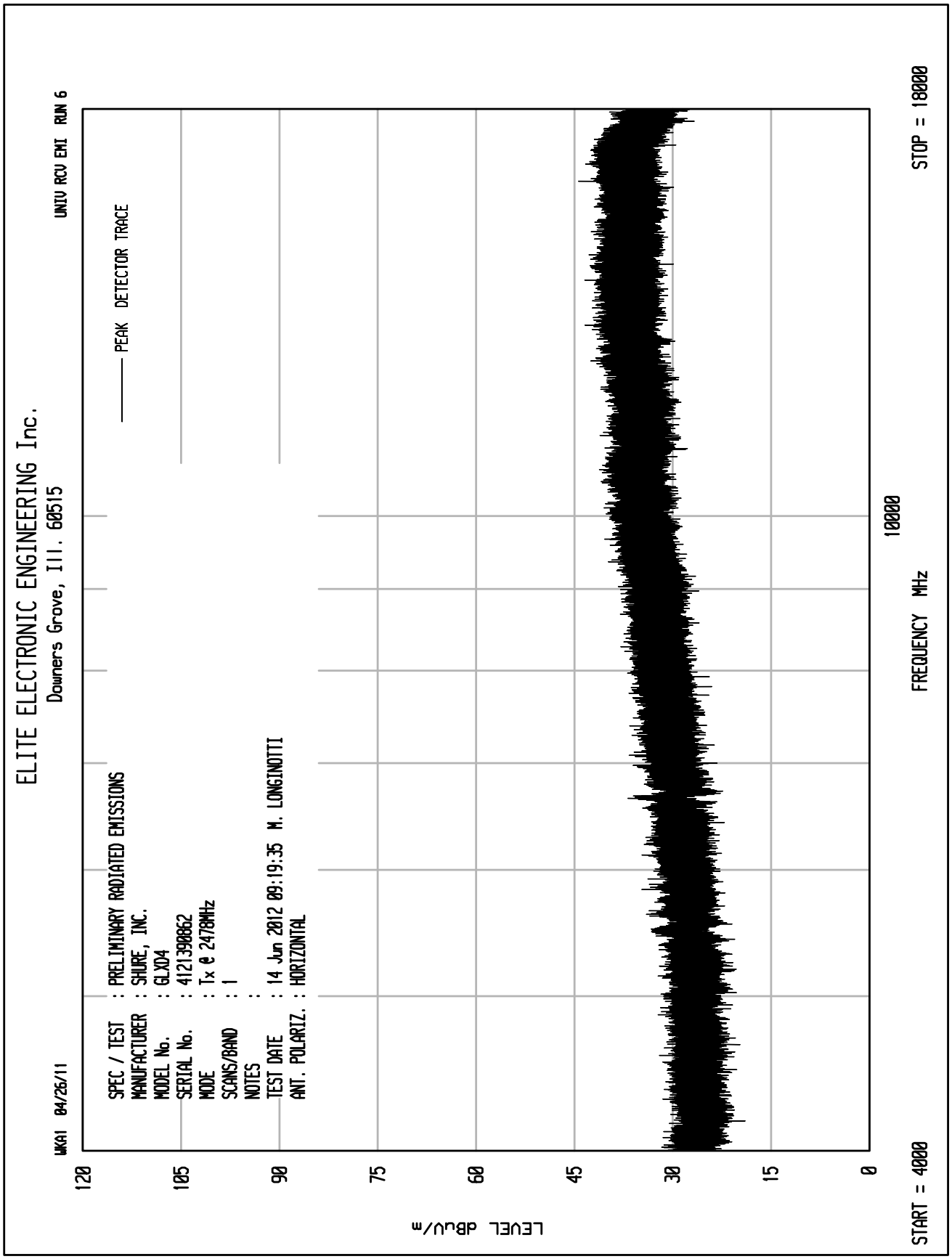

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 41
WKAI 04/26/11
PEAK DETECTOR TRACE
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx 2442MHz
SCANS/BAND : 1
NOTES : TEST CODE
TEST DATE : 10 Jul 2012 09:41:16 I. CARNEGIE
ANT. POLARIZ. : VERTICAL
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

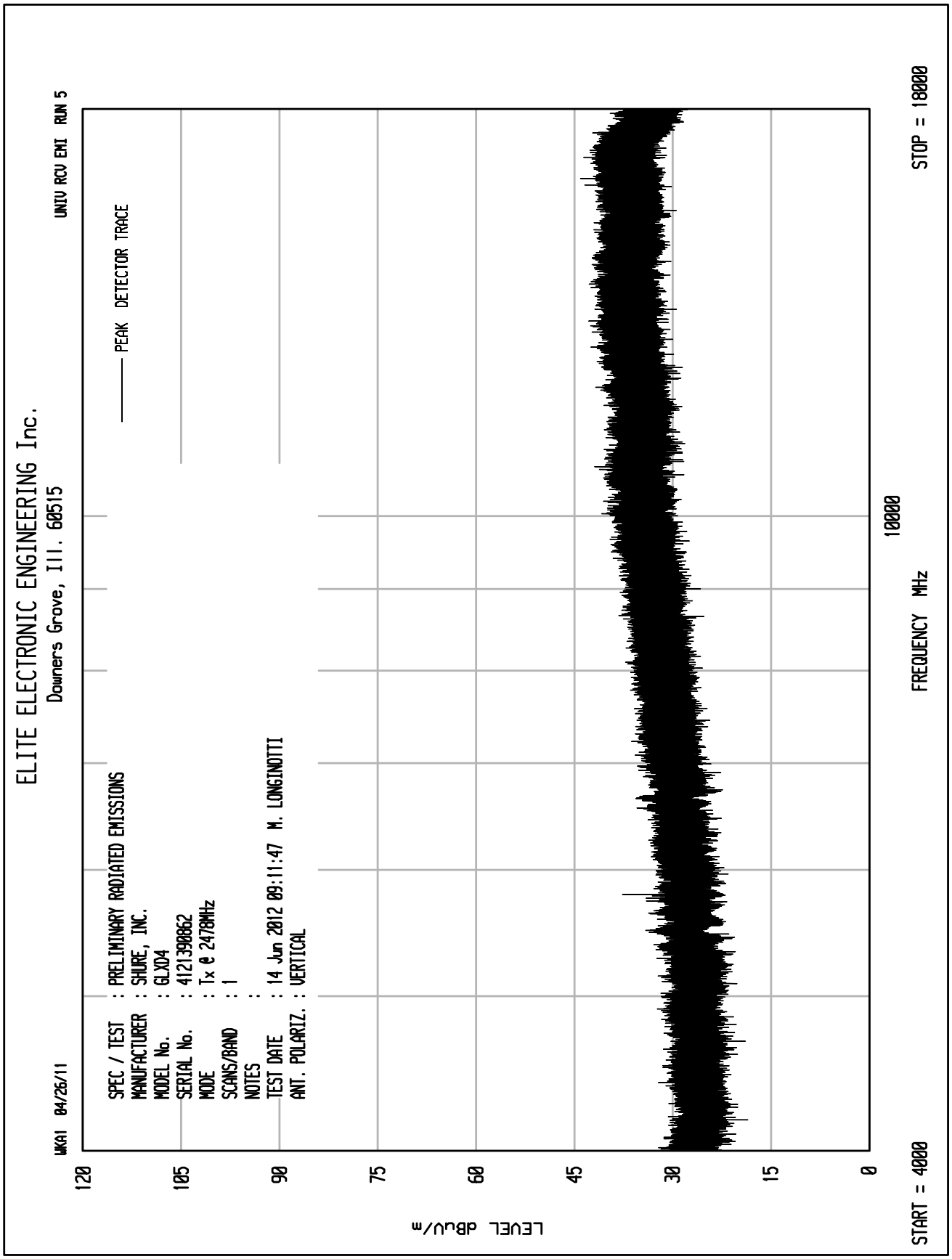

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx @ 2478MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 14:59:48 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
1000
STOP = 2000
FREQUENCY MHz

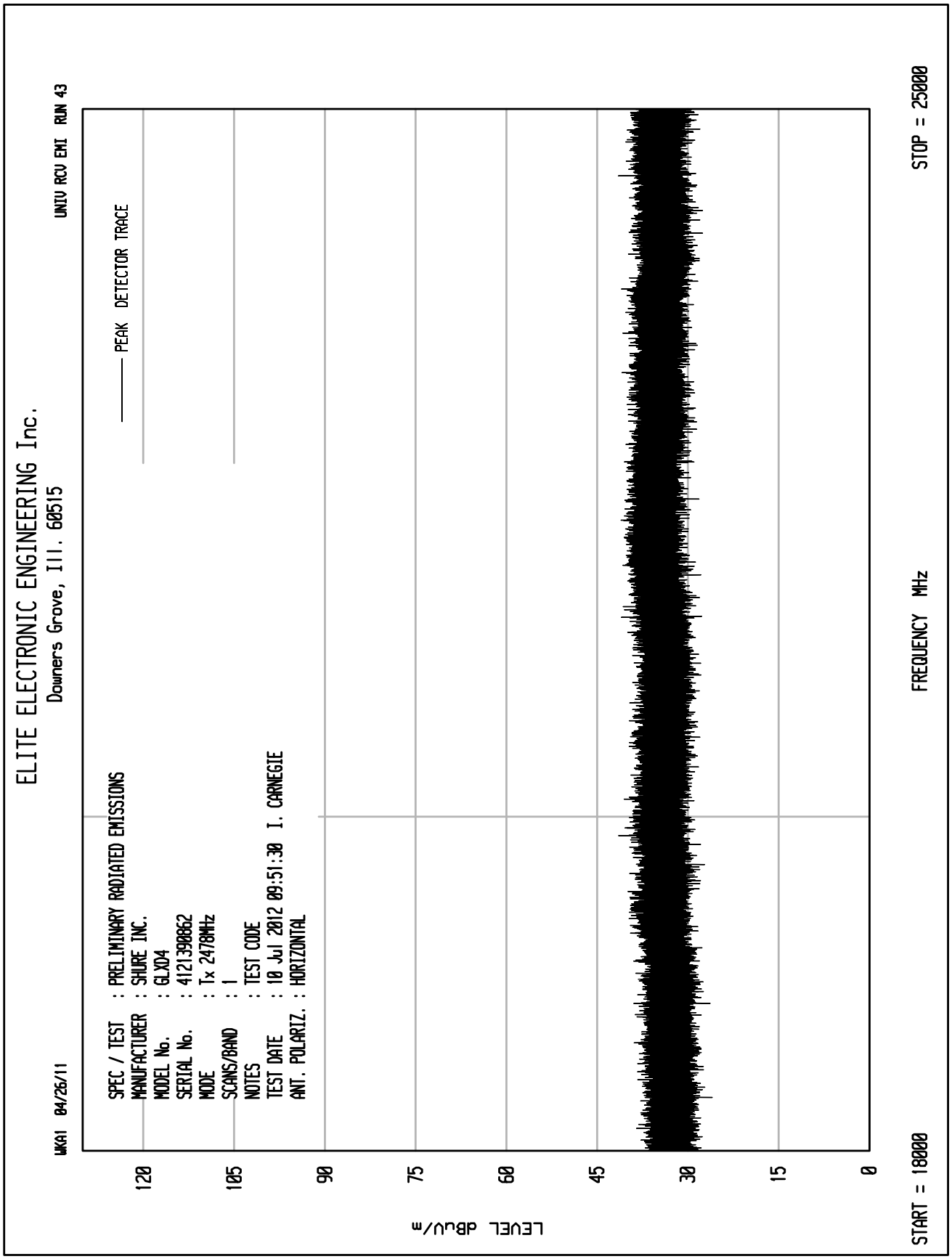

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2478MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 15:02:18 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 30
100
1000
STOP = 2000
FREQUENCY MHz

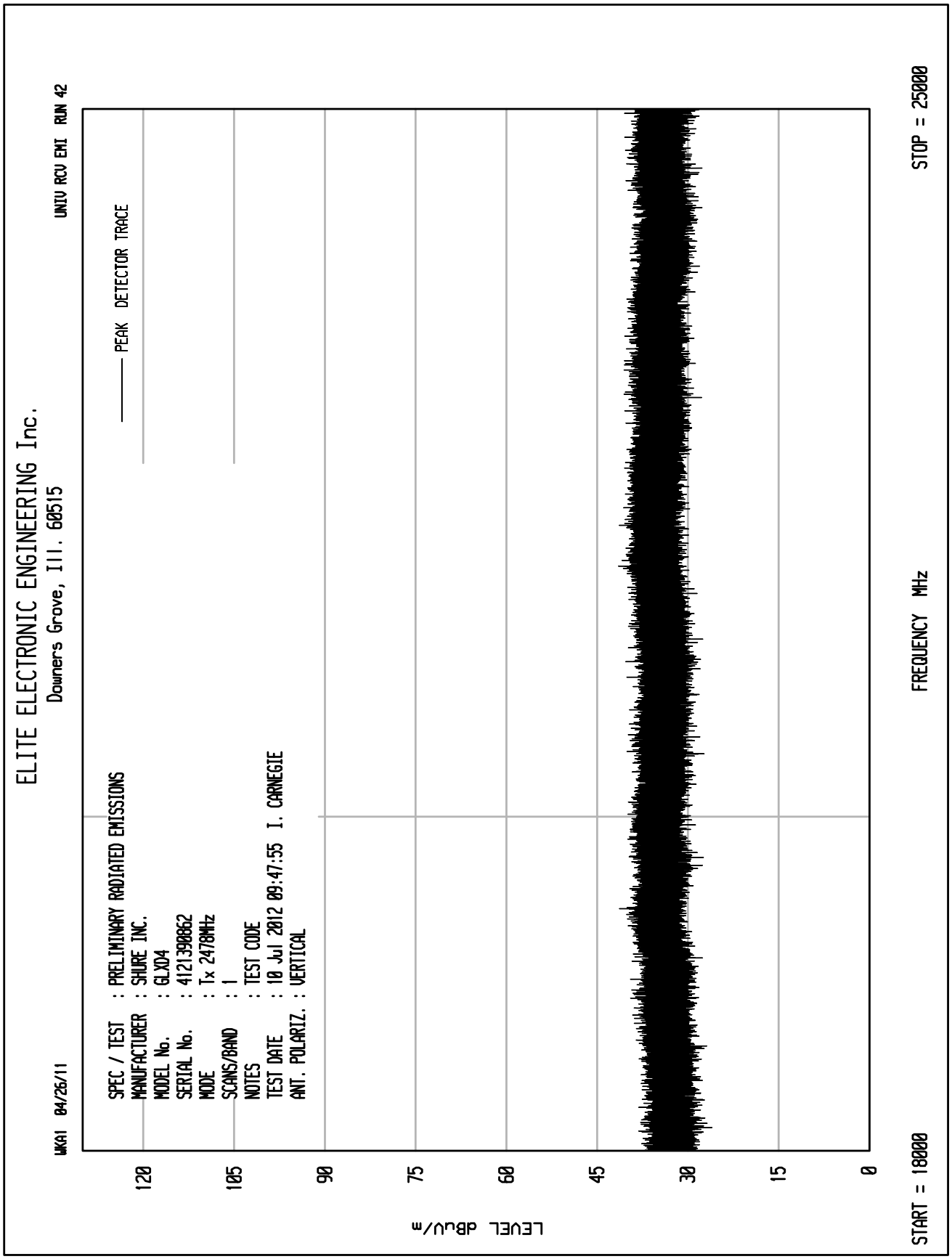

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 18
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2478MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 13 Jun 2012 16:22:02 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
FREQUENCY MHz
STOP = 4000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 19
WKAI 04/26/11
PEAK DETECTOR TRACE
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx @ 2478MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 13 Jun 2012 16:24:07 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 2000
FREQUENCY MHz
STOP = 4000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx @ 2478MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 09:19:35 M. LONGINOTTI
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 4000
10000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKAI 04/26/11
PEAK DETECTOR TRACE
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE, INC.
MODEL No. : GLXD4
SERIAL No. : 412139086Z
MODE : Tx @ 2478MHz
SCANS/BAND : 1
NOTES :
TEST DATE : 14 Jun 2012 09:11:47 M. LONGINOTTI
ANT. POLARIZ. : VERTICAL
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 4000
10000
STOP = 18000
FREQUENCY MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 43
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx 2478MHz
SCANS/BAND : 1
NOTES : TEST CODE
TEST DATE : 10 Jul 2012 09:51:30 I. CARNEGIE
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 42
WKAI 04/26/11
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : SHURE INC.
MODEL No. : GLXD4
SERIAL No. : 412139D862
MODE : Tx 2478MHz
SCANS/BAND : 1
NOTES : TEST CODE
TEST DATE : 10 Jul 2012 09:47:55 I. CARNEGIE
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

MANUFACTURER	Shure Incorporated
EUT	Transceiver
MODEL NO.	GLXD4
SERIAL NO.	4121390862
SPECIFICATION	FCC 15.247 and RSS-210 Annex 8
TEST	Spurious Radiated Emissions
MODE	Transmit at 2404MHz
DATE TESTED	June 13, 2012 through August 9, 2012
NOTES	Peak Readings
TEST EQUIPMENT	RBB0, NWI0,APW11,NHG1,APW1

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	64.3		3.4	31.5	0.0	99.2	91193.7		
2404.00	V	71.4		3.4	31.5	0.0	106.3	206521.3		
4808.00	H	48.5	Ambient	4.8	34.7	-39.3	48.8	273.9	5000.0	-25.2
4808.00	V	48.8	Ambient	4.8	34.7	-39.3	49.1	283.5	5000.0	-24.9
7212.00	H	38.7	Ambient	6.1	37.8	-39.4	43.2	144.3	20652.1	-43.1
7212.00	V	40.0	Ambient	6.1	37.8	-39.4	44.5	167.6	20652.1	-41.8
9616.00	H	38.0	Ambient	6.8	39.7	-39.3	45.2	182.5	20652.1	-41.1
9616.00	V	37.5	Ambient	6.8	39.7	-39.3	44.7	172.3	20652.1	-41.6
12020.00	H	48.2	Ambient	8.0	41.2	-39.2	58.3	821.7	5000.0	-15.7
12020.00	V	48.0	Ambient	8.0	41.2	-39.2	58.1	803.0	5000.0	-15.9
14424.00	H	38.0	Ambient	8.7	42.3	-38.3	50.7	343.0	20652.1	-35.6
14424.00	V	37.6	Ambient	8.7	42.3	-38.3	50.3	327.6	20652.1	-36.0
16828.00	H	36.9	Ambient	9.4	41.2	-37.5	50.0	317.7	20652.1	-36.3
16828.00	V	36.7	Ambient	9.4	41.2	-37.5	49.8	310.5	20652.1	-36.5
19232.00	H	47.0	Ambient	2.2	40.4	-28.3	61.3	1157.5	5000.0	-12.7
19232.00	V	46.7	Ambient	2.2	40.4	-28.3	60.9	1113.1	5000.0	-13.0
21636.00	H	45.5	Ambient	2.2	40.6	-27.1	61.3	1156.3	20652.1	-25.0
21636.00	V	45.5	Ambient	2.2	40.6	-27.1	61.3	1156.3	20652.1	-25.0
24040.00	H	46.6	Ambient	2.2	40.6	-28.0	61.4	1180.4	20652.1	-24.9
24040.00	V	46.4	Ambient	2.2	40.6	-28.0	61.3	1154.9	20652.1	-25.0

MANUFACTURER	Shure Incorporated
EUT	Transceiver
MODEL NO.	GLXD4
SERIAL NO.	4121390862
SPECIFICATION	FCC 15.247 and RSS-210 Annex 8
TEST	Spurious Radiated Emissions
MODE	Transmit at 2404MHz
DATE TESTED	June 13, 2012 through August 9, 2012
NOTES	Average Readings In Restricted Bands
TEST EQUIPMENT	RBB0, NWI0,APW11,NHG1,APW1

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	35.8		4.8	34.7	-39.3	-44.2	-8.1	273.9	500.0	-62.1
4808.00	V	35.5		4.8	34.7	-39.3	-44.2	-8.4	283.5	500.0	-62.4
12020.00	H	34.5		8.0	41.2	-39.2	-44.2	0.4	1.0	500.0	-53.6
12020.00	V	34.5		8.0	41.2	-39.2	-44.2	0.4	1.0	500.0	-53.6
19232.00	H	34.7	Ambient	2.2	40.4	-28.3	-44.2	4.8	1.7	500.0	-49.2
19232.00	V	34.4	Ambient	2.2	40.4	-28.3	-44.2	4.5	1.7	500.0	-49.5

MANUFACTURER	Shure Incorporated
EUT	Transceiver
MODEL NO.	GLXD4
SERIAL NO.	4121390862
SPECIFICATION	FCC 15.247 and RSS-210 Annex 8
TEST	Spurious Radiated Emissions
MODE	Transmit at 2442MHz
DATE TESTED	June 13, 2012 through August 9, 2012
NOTES	Peak Readings
TEST EQUIPMENT	RBB0, NWI0,APW11,NHG1,APW1

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)
2442.00	H	63.9		3.5	31.5	0.0	98.8	87540.9		
2442.00	V	69.7		3.5	31.5	0.0	104.6	170691.2		
4884.00	H	48.9	Ambient	4.9	34.7	-39.3	49.2	288.2	5000.0	-24.8
4884.00	V	49.1	Ambient	4.9	34.7	-39.3	49.4	294.9	5000.0	-24.6
7326.00	H	47.9	Ambient	6.2	37.9	-39.4	52.5	423.7	5000.0	-21.4
7326.00	V	48.6	Ambient	6.2	37.9	-39.4	53.2	459.2	5000.0	-20.7
9768.00	H	38.2	Ambient	6.9	39.8	-39.3	45.7	191.7	17069.1	-39.0
9768.00	V	37.8	Ambient	6.9	39.8	-39.3	45.3	183.1	17069.1	-39.4
12210.00	H	48.2	Ambient	8.0	41.4	-39.1	58.5	841.9	5000.0	-15.5
12210.00	V	48.3	Ambient	8.0	41.4	-39.1	58.6	848.8	5000.0	-15.4
14652.00	H	36.9	Ambient	8.8	42.3	-38.2	49.8	308.7	17069.1	-34.9
14652.00	V	36.8	Ambient	8.8	42.3	-38.2	49.7	305.2	17069.1	-35.0
17094.00	H	36.6	Ambient	9.5	40.8	-37.6	49.4	293.9	17069.1	-35.3
17094.00	V	36.5	Ambient	9.5	40.8	-37.6	49.3	290.6	17069.1	-35.4
19536.00	H	45.3	Ambient	2.2	40.4	-27.8	60.1	1007.8	5000.0	-13.9
19536.00	V	44.8	Ambient	2.2	40.4	-27.8	59.5	949.2	5000.0	-14.4
21978.00	H	45.1	Ambient	2.2	40.6	-27.1	60.7	1087.9	17069.1	-23.9
21978.00	V	45.5	Ambient	2.2	40.6	-27.1	61.1	1139.2	17069.1	-23.5
24420.00	H	47.1	Ambient	2.2	40.6	-28.6	61.3	1166.2	17069.1	-23.3
24420.00	V	47.1	Ambient	2.2	40.6	-28.6	61.4	1175.6	17069.1	-23.2

MANUFACTURER	Shure Incorporated
EUT	Transceiver
MODEL NO.	GLXD4
SERIAL NO.	4121390862
SPECIFICATION	FCC 15.247 and RSS-210 Annex 8
TEST	Spurious Radiated Emissions
MODE	Transmit at 2442MHz
DATE TESTED	June 13, 2012 through August 9, 2012
NOTES	Average Readings In Restricted Bands
TEST EQUIPMENT	RBB0, NWI0,APW11,NHG1,APW1

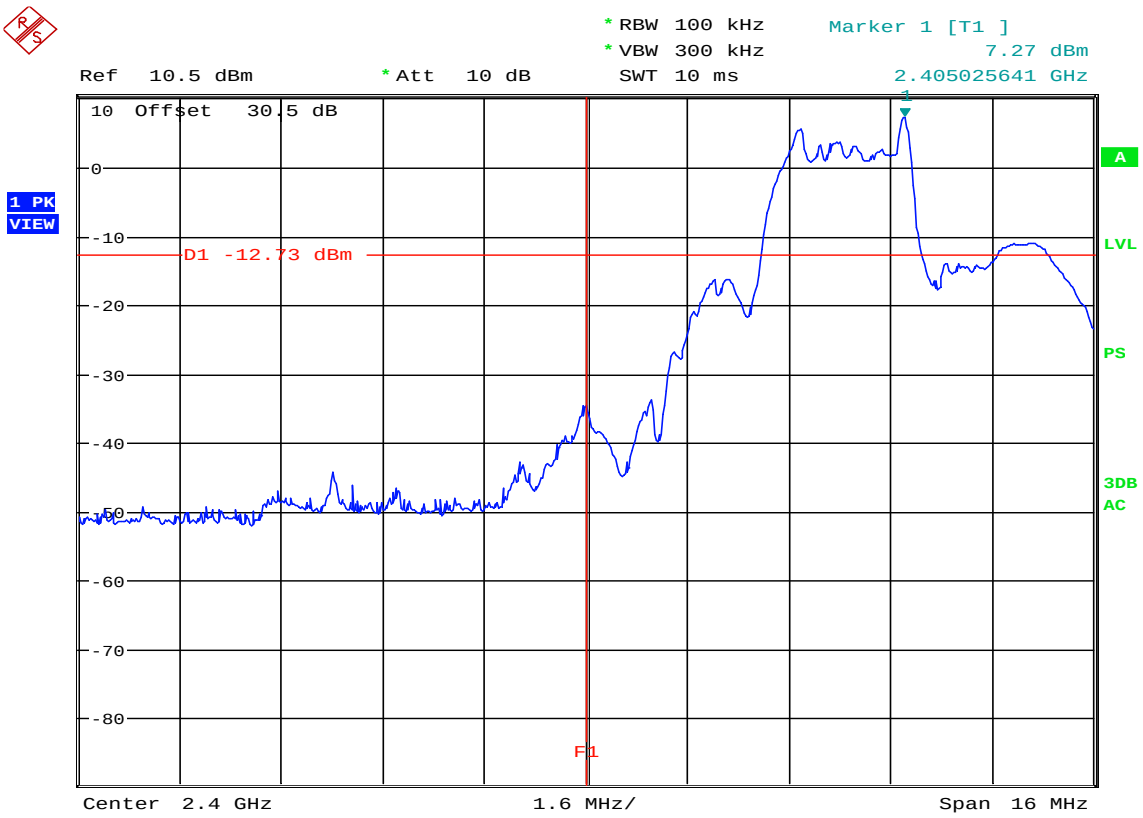
Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
4884.00	H	35.2		4.9	34.7	-39.3	-44.2	-8.7	288.2	500.0	-62.7
4884.00	V	35.2		4.9	34.7	-39.3	-44.2	-8.7	294.9	500.0	-62.7
7326.00	H	34.7		6.2	37.9	-39.4	-44.2	-4.9	0.6	500.0	-58.8
7326.00	V	35.4		6.2	37.9	-39.4	-44.2	-4.2	0.6	500.0	-58.1
12210.00	H	34.8		8.0	41.4	-39.1	-44.2	0.8	1.1	500.0	-53.2
12210.00	V	34.7		8.0	41.4	-39.1	-44.2	0.8	1.1	500.0	-53.2
19536.00	H	33.7	Ambient	2.2	40.4	-27.8	-44.2	4.3	1.6	500.0	-49.7
19536.00	V	33.2	Ambient	2.2	40.4	-27.8	-44.2	3.8	1.5	500.0	-50.2

MANUFACTURER	Shure Incorporated
EUT	Transceiver
MODEL NO.	GLXD4
SERIAL NO.	4121390862
SPECIFICATION	FCC 15.247 and RSS-210 Annex 8
TEST	Spurious Radiated Emissions
MODE	Transmit at 2478MHz
DATE TESTED	June 13, 2012 through August 9, 2012
NOTES	Peak Readings
TEST EQUIPMENT	RBB0, NWI0,APW11,NHG1,APW1

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	61.9		3.5	31.5	0.0	96.9	69631.7		
2478.00	V	65.1		3.5	31.5	0.0	100.1	100996.7		
4956.00	H	46.8	Ambient	4.9	34.8	-39.3	47.1	227.3	5000.0	-26.8
4956.00	V	47.7	Ambient	4.9	34.8	-39.3	48.0	250.7	5000.0	-26.0
7434.00	H	47.7	Ambient	6.2	38.0	-39.4	52.4	418.7	5000.0	-21.5
7434.00	V	48.7	Ambient	6.2	38.0	-39.4	53.5	471.9	5000.0	-20.5
9912.00	H	36.9	Ambient	7.0	39.9	-39.2	44.5	168.7	10099.7	-35.5
9912.00	V	37.9	Ambient	7.0	39.9	-39.2	45.5	188.7	10099.7	-34.6
12390.00	H	47.8	Ambient	8.0	41.5	-39.0	58.2	814.2	5000.0	-15.8
12390.00	V	47.5	Ambient	8.0	41.5	-39.0	58.0	792.0	5000.0	-16.0
14868.00	H	36.9	Ambient	8.9	42.3	-38.2	49.9	314.2	10099.7	-30.1
14868.00	V	36.2	Ambient	8.9	42.3	-38.2	49.2	288.8	10099.7	-30.9
17346.00	H	35.6	Ambient	9.7	39.8	-37.7	47.4	233.2	10099.7	-32.7
17346.00	V	35.7	Ambient	9.7	39.8	-37.7	47.4	235.1	10099.7	-32.7
19824.00	H	45.2	Ambient	2.2	40.4	-27.3	60.6	1066.8	5000.0	-13.4
19824.00	V	45.7	Ambient	2.2	40.4	-27.3	61.0	1126.1	5000.0	-12.9
22302.00	H	45.5	Ambient	2.2	40.6	-27.5	60.8	1095.1	5000.0	-13.2
22302.00	V	44.2	Ambient	2.2	40.6	-27.5	59.5	949.4	5000.0	-14.4
24780.00	H	47.0	Ambient	2.2	40.6	-28.5	61.3	1165.7	10099.7	-18.8
24780.00	V	46.5	Ambient	2.2	40.6	-28.5	60.8	1091.6	10099.7	-19.3

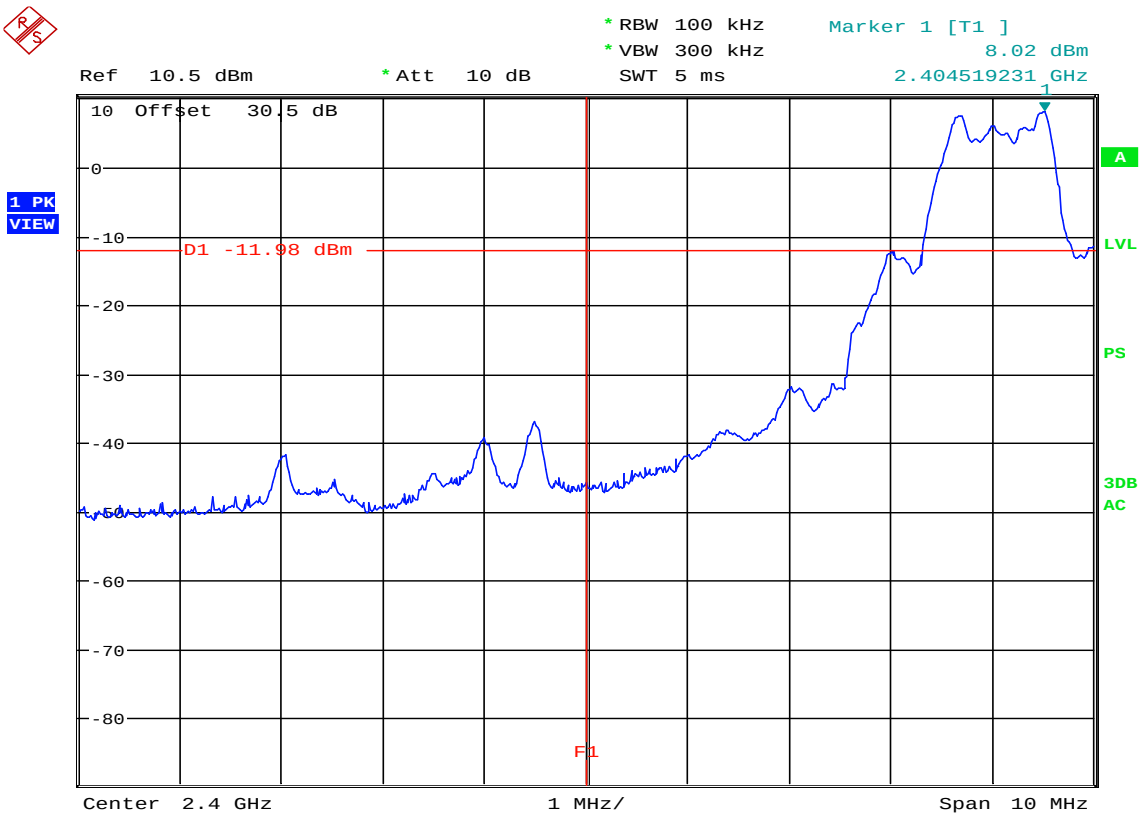
MANUFACTURER	Shure Incorporated
EUT	Transceiver
MODEL NO.	GLXD4
SERIAL NO.	4121390862
SPECIFICATION	FCC 15.247 and RSS-210 Annex 8
TEST	Spurious Radiated Emissions
MODE	Transmit at 2478MHz
DATE TESTED	June 13, 2012 through August 9, 2012
NOTES	Average Readings in Restricted Bands
TEST EQUIPMENT	RBB0, NWI0,APW11,NHG1,APW1

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	32.7	Ambient	4.9	34.8	-39.3	-44.2	-11.2	227.3	500.0	-65.2
4956.00	V	34.2	Ambient	4.9	34.8	-39.3	-44.2	-9.7	250.7	500.0	-63.7
7434.00	H	34.3	Ambient	6.2	38.0	-39.4	-44.2	-5.1	0.6	500.0	-59.1
7434.00	V	36.3	Ambient	6.2	38.0	-39.4	-44.2	-3.2	0.7	500.0	-57.1
12390.00	H	34.3	Ambient	8.0	41.5	-39.0	-44.2	0.5	1.1	500.0	-53.5
12390.00	V	34.3	Ambient	8.0	41.5	-39.0	-44.2	0.5	1.1	500.0	-53.5
19824.00	H	33.0	Ambient	2.2	40.4	-27.3	-44.2	4.1	1.6	500.0	-49.8
19824.00	V	33.2	Ambient	2.2	40.4	-27.3	-44.2	4.3	1.6	500.0	-49.6
22302.00	H	32.6	Ambient	2.2	40.6	-27.5	-44.2	3.7	1.5	500.0	-50.2
22302.00	V	31.3	Ambient	2.2	40.6	-27.5	-44.2	2.4	1.3	500.0	-51.5



FCC 15.247(d) Band Edge Compliance

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2404MHz, full bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Band Edge compliance
NOTES	:	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
EQUIPMENT USED	:	RBE0, T1E7,T2S0



Date: 22.JUN.2012 14:42:19

FCC 15.247(d) Band Edge Compliance

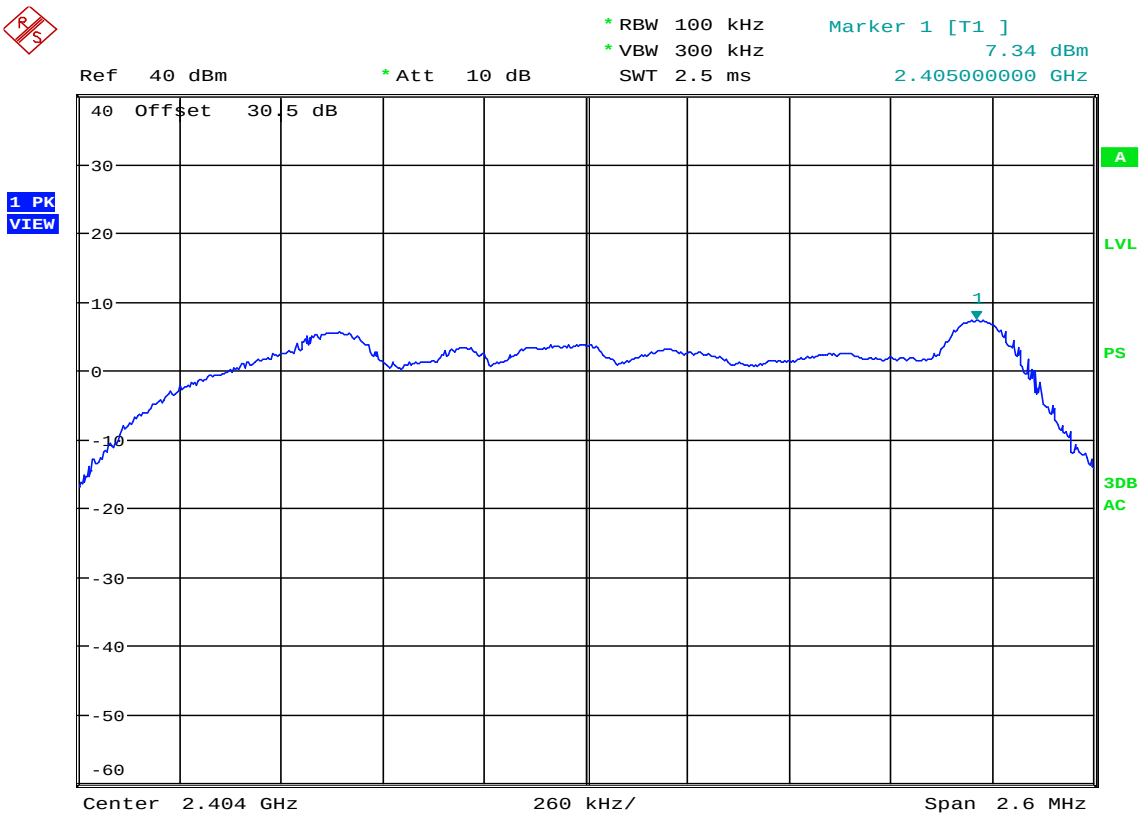
MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2404MHz, half bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Band Edge compliance
NOTES	:	Display Line (F1) represents the band edge (2400MHz). Display line (D1)
	:	represents 20 dB down from the peak of the transmitter in a 100kHz bandwidth
EQUIPMENT USED	:	RBE0, T1E7,T2S0

MANUFACTURER	Shure Incorporated
EUT	Transceiver
MODEL NO.	GLXD4
SERIAL NO.	4121390862
SPECIFICATION	FCC 15.247 and RSS-210 Annex 8
TEST	Spurious Radiated Emissions at 2483.5MHz band edge
MODE	Transmit at 2478MHz
DATE TESTED	June 13, 2012 through August 9, 2012
NOTES	Peak Readings
TEST EQUIPMENT	RBB0, NWI0,APW11

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	17.1	Ambient	3.5	31.5	0.0	52.1	403.8	5000.0	-21.9
2483.50	V	26.7		3.5	31.5	0.0	61.7	1210.9	5000.0	-12.3

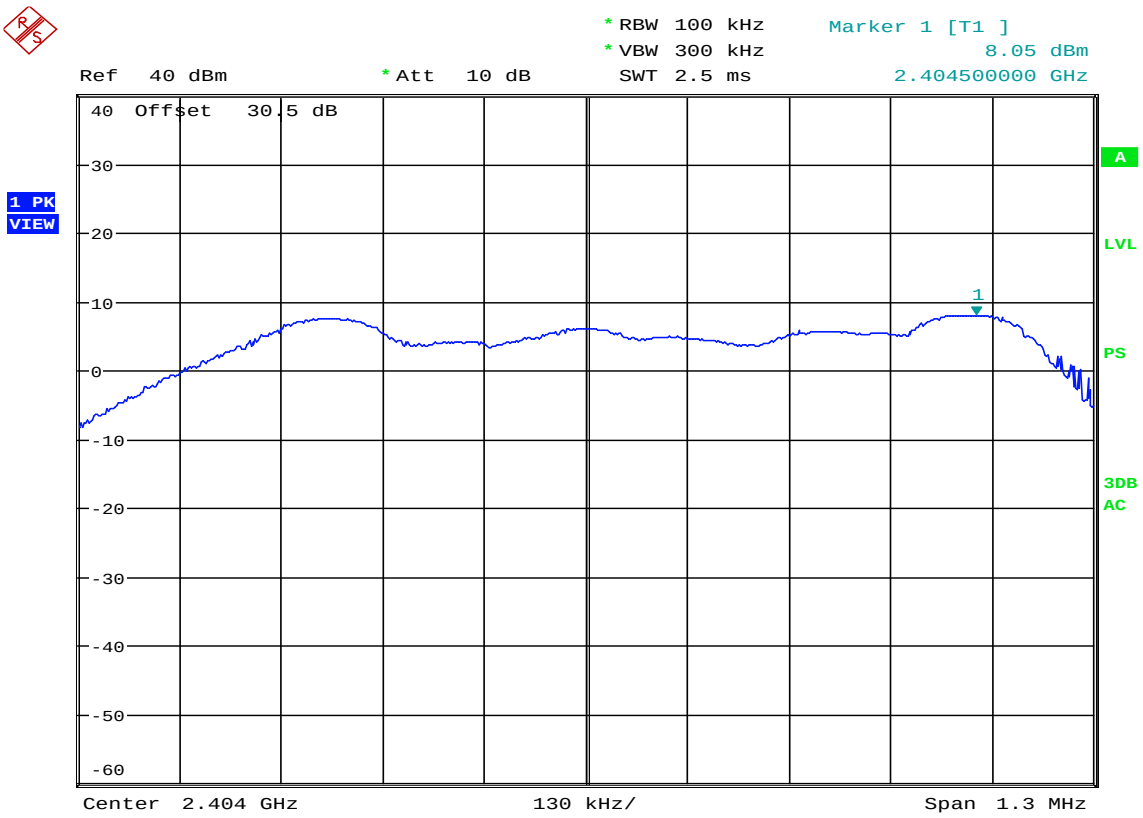
MANUFACTURER	Shure Incorporated
EUT	Transceiver
MODEL NO.	GLXD4
SERIAL NO.	4121390862
SPECIFICATION	FCC 15.247 and RSS-210 Annex 8
TEST	Spurious Radiated Emissions at 2483.5MHz band edge
MODE	Transmit at 2478MHz
DATE TESTED	June 13, 2012 through August 9, 2012
NOTES	Average Readings
TEST EQUIPMENT	RBB0, NWI0,APW11

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)
2483.50	H	2.8	Ambient	3.5	31.5	0.0	-44.2	-6.5	0.5	500.0	-60.4
2483.50	V	12.5		3.5	31.5	0.0	-44.2	3.2	1.5	500.0	-50.7



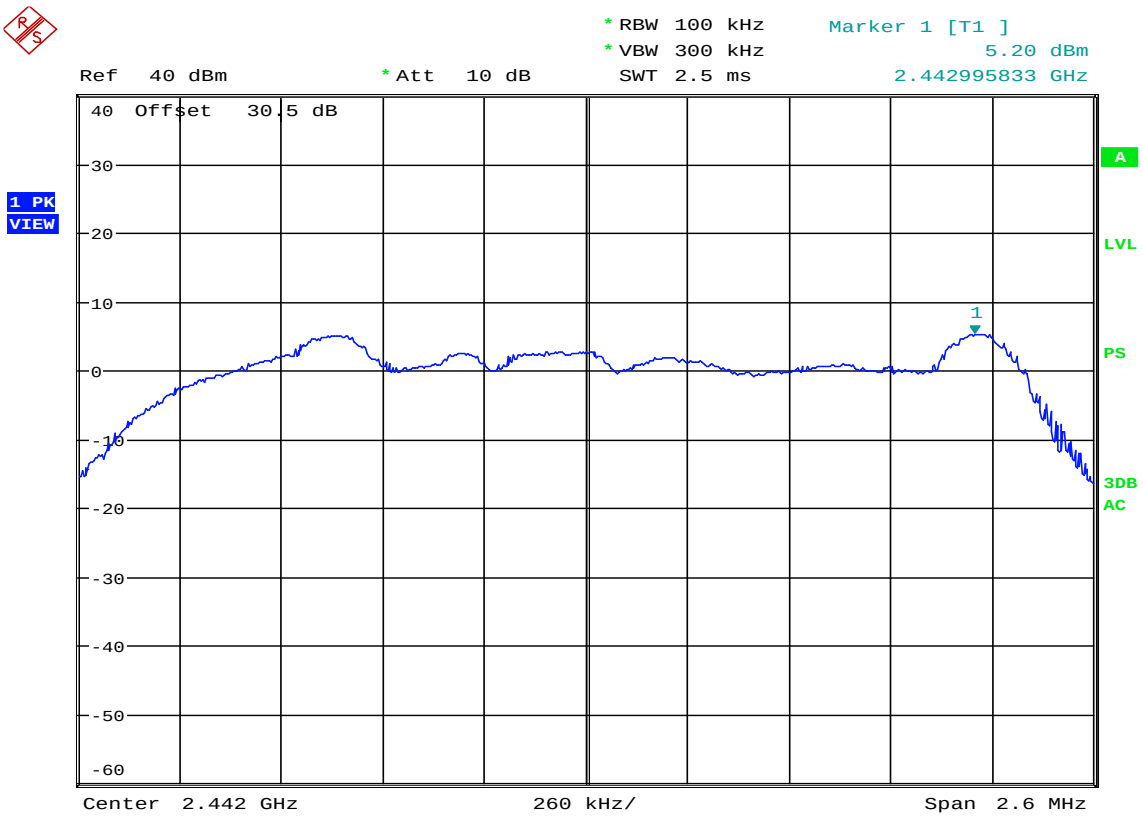
FCC 15.247(e) Maximum Conducted Peak Power Spectral Density

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2404MHz, full bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Maximum Conducted Peak Power Spectral Density
NOTES	:	Maximum Conducted Peak Power Spectral Density = maximum power level in
	:	a (100kHz BW) - (bandwidth correction factor) = 7.34dBm -15.2dB = -7.86dBm
EQUIPMENT USED	:	RBE0, T1E7, T2S0



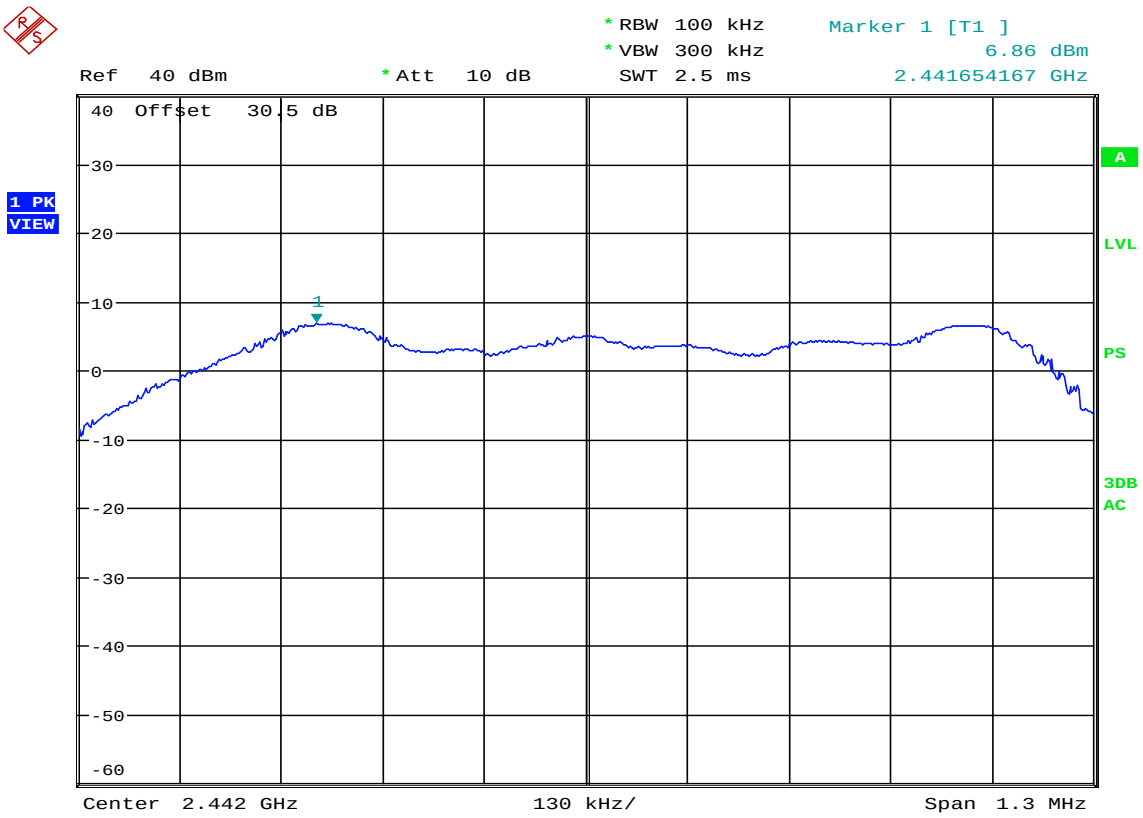
FCC 15.247(e) Maximum Conducted Peak Power Spectral Density

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2404MHz, half bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Maximum Conducted Peak Power Spectral Density
NOTES	:	Maximum Conducted Peak Power Spectral Density = maximum power level in
	:	a (100kHz BW) - (bandwidth correction factor) = 8.05dBm -15.2dB = -7.15dBm
EQUIPMENT USED	:	RBE0, T1E7,T2S0



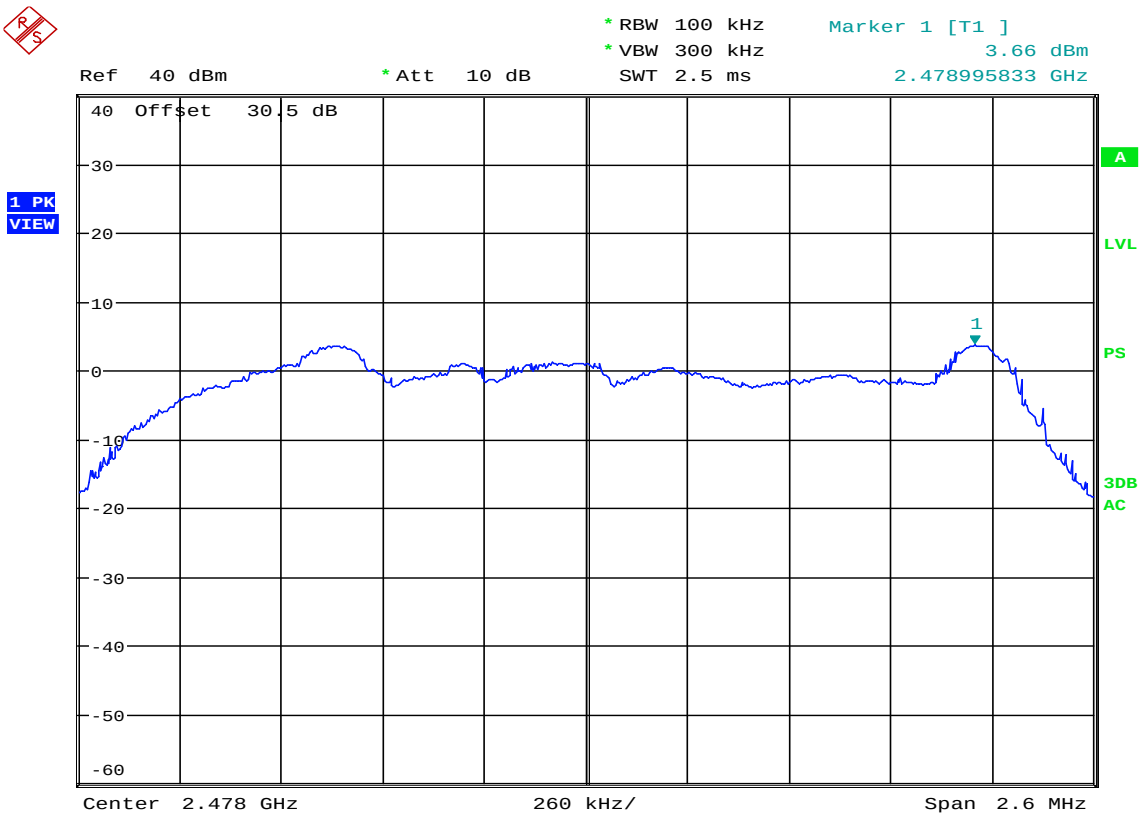
FCC 15.247(e) Maximum Conducted Peak Power Spectral Density

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2442MHz, full bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Maximum Conducted Peak Power Spectral Density
NOTES	:	Maximum Conducted Peak Power Spectral Density = maximum power level in
	:	a (100kHz BW) - (bandwidth correction factor) = 5.2dBm -15.2dB = -10.0dBm
EQUIPMENT USED	:	RBE0, T1E7,T2S0



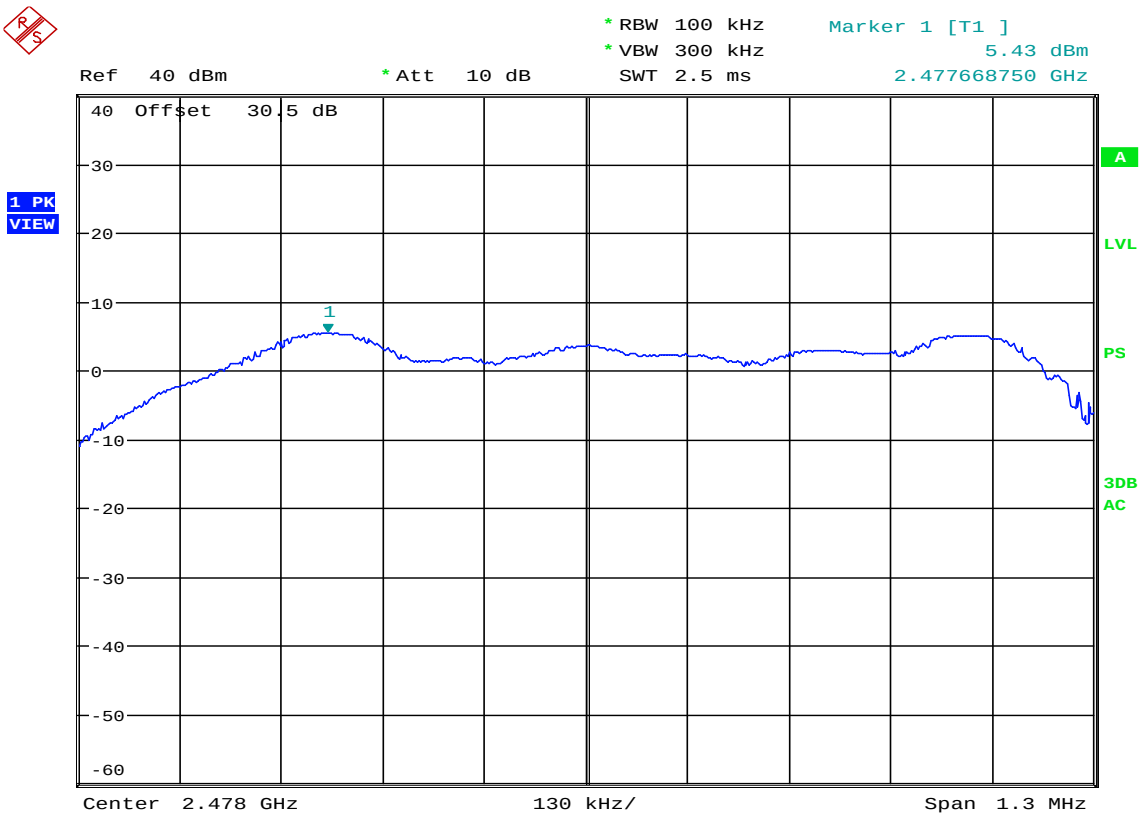
FCC 15.247(e) Maximum Conducted Peak Power Spectral Density

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2442MHz, half bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Maximum Conducted Peak Power Spectral Density
NOTES	:	Maximum Conducted Peak Power Spectral Density = maximum power level in
	:	a (100kHz BW) - (bandwidth correction factor) = 6.86dBm -15.2dB = -8.34dBm
EQUIPMENT USED	:	RBE0, T1E7,T2S0



FCC 15.247(e) Maximum Conducted Peak Power Spectral Density

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2478MHz, full bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Maximum Conducted Peak Power Spectral Density
NOTES	:	Maximum Conducted Peak Power Spectral Density = maximum power level in
	:	a (100kHz BW) - (bandwidth correction factor) = 3.66dBm -15.2dB = -11.54dBm
EQUIPMENT USED	:	RBE0, T1E7,T2S0



Date: 22.JUN.2012 15:34:39

FCC 15.247(e) Maximum Conducted Peak Power Spectral Density

MANUFACTURER	:	Shure, Inc.
MODEL NUMBER	:	GLXD4
SERIAL NUMBER	:	4121390862
TEST MODE	:	Tx @ 2478MHz, half bandwidth
TEST DATE	:	June 22, 2012
TEST PARAMETER	:	Maximum Conducted Peak Power Spectral Density
NOTES	:	Maximum Conducted Peak Power Spectral Density = maximum power level in
	:	a (100kHz BW) - (bandwidth correction factor) = 5.43dBm -15.2dB = -9.77dBm
EQUIPMENT USED	:	RBE0, T1E7,T2S0