



## Measurement of RF Interference from a GLXD1 Bodypack Transceiver

For	Shure Incorporated 5800 West Touhy Niles, IL 60714
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**TABLE OF CONTENTS**

PARAGRAPH	DESCRIPTION OF CONTENTS	PAGE NO.
1	INTRODUCTION .....	5
1.1	Scope of Tests .....	5
1.2	Purpose.....	5
1.3	Deviations, Additions and Exclusions .....	5
1.4	EMC Laboratory Identification .....	5
1.5	Laboratory Conditions.....	5
2	APPLICABLE DOCUMENTS .....	6
3	EUT SET-UP AND OPERATION .....	6
3.1	General Description .....	6
3.1.1	Power Input .....	6
3.1.2	Peripheral Equipment.....	6
3.1.3	Interconnect Cables .....	6
3.1.4	Grounding.....	6
3.2	Operational Mode .....	6
3.3	EUT Modifications.....	7
4	TEST FACILITY AND TEST INSTRUMENTATION .....	7
4.1	Shielded Enclosure.....	7
4.2	Test Instrumentation .....	7
4.3	Calibration Traceability .....	7
4.4	Measurement Uncertainty.....	7
5	TEST PROCEDURES .....	8
5.1	Digital Device (Digital Apparatus).....	8
5.1.1	Powerline Conducted Emissions.....	8
5.1.1.1	Requirements .....	8
5.1.1.2	Procedures .....	8
5.1.1.3	Results.....	8
5.1.2	Radiated Measurements .....	9
5.1.2.1	Requirements .....	9
5.1.2.2	Procedures .....	9
5.1.2.3	Results.....	10
5.2	Receiver.....	10
5.2.1	Requirements .....	10
5.3	Transmitter.....	11
5.3.1	Powerline Conducted Emissions.....	11
5.3.1.1	Requirements .....	11
5.3.2	6dB Bandwidth .....	11
5.3.2.1	Requirements .....	11
5.3.2.2	Procedures .....	11
5.3.2.3	Results.....	11
5.3.3	Peak Output Power .....	11
5.3.3.1	Requirements .....	11
5.3.3.2	Procedures .....	11
5.3.3.2.1	Peak Output Power - Antenna conducted method .....	11
5.3.3.2.2	Peak Output Power – EIRP method .....	12
5.3.3.3	Results.....	12
5.3.4	Duty Cycle Factor Measurements .....	12
5.3.4.1	Requirement .....	12
5.3.4.2	Procedures .....	12
5.3.4.3	Results.....	13

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5.3.5 Radiated Spurious Emissions Measurements ..... 13  
    5.3.5.1 Requirements ..... 13  
    5.3.5.2 Procedures ..... 13  
    5.3.5.3 Results ..... 14  
5.3.6 Band Edge Compliance..... 15  
    5.3.6.1 Requirements ..... 15  
    5.3.6.2 Procedures ..... 15  
        5.3.6.2.1 Low Band Edge ..... 15  
        5.3.6.2.2 High Band Edge..... 15  
    5.3.6.3 Results ..... 15  
5.3.7 Power Spectral Density ..... 16  
    5.3.7.1 Requirement ..... 16  
    5.3.7.2 Procedures ..... 16  
    5.3.7.3 Results ..... 16  
6 CONCLUSIONS ..... 16  
7 CERTIFICATION ..... 16  
8 ENDORSEMENT DISCLAIMER ..... 17  
9 EQUIPMENT LIST ..... 18

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**REVISION HISTORY**

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—	5 Sept 2012	Initial release

## Measurement of RF Emissions from a Bodypack Transceiver, Part No. GLXD1

### 1 INTRODUCTION

#### 1.1 Scope of Tests

This document represents the results of the series of radio interference measurements performed on a Shure Incorporated Bodypack Transceiver, Part No. GLXD1, transceiver (hereinafter referred to as the EUT). Five (5) samples of the EUT were submitted for testing. Serial Nos. 1062 and 1697 had stock code installed so that it would operate in normal mode. Serial Nos. 120, 74, and 1688 had special test code installed so that it could be programmed to transmit or receive at discrete frequencies. The EUT with the stock code could also charge a Shure Model SA900 Rechargeable Lithium-Ion battery by inserting the battery into the EUT and connecting a Click Switching Power Supply to the USB port of the EUT via a standard USB cable. The power supply was used to output 5VDC to the EUT which was used to charge the SA900 battery.

The EUT was designed to transmit and receive in the 2404MHz to 2478MHz band using an internal non-removable antenna. For testing purposes only, the antenna was 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 digital devices and Subpart C, Sections 15.207 and 15.249 for Intentional Radiators Operating within the 2400-2483.5 MHz band. Testing was performed in accordance with ANSI C63.4-2003.

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.

The test series was also performed to determine if the EUT meets the conducted and radiated RF emission requirements of the Industry Canada ICES-003 Specification, Section 5 for digital apparatus.

#### 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"
- Industry Canada ICES-003, Issue 4, February 2004, "Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard"

## 3 EUT SET-UP AND OPERATION

### 3.1 General Description

The EUT is a Shure Incorporated Bodypack Transceiver, Part No. GLXD1. A block diagram of the EUT setup is shown as Figure 1 and Figure 2.

#### 3.1.1 Power Input

The EUT received 3.7VDC from an internal SA900 rechargeable Lithium-ion battery. The battery could be charged by connecting a Click Switching Power Supply, M/N: CPS008050100 to the USB port of the EUT via a standard 1 meter long USB cable. The Click Switching Power Supply was powered with 115V, 60Hz power. The power supply output 5.0 VDC. When the battery was being charged, the EUT could neither transmit nor receive and therefore acted as a digital device (digital apparatus) when charging the SA900 battery.

#### 3.1.2 Peripheral Equipment

The EUT was submitted for testing with no peripheral equipment.

#### 3.1.3 Interconnect Cables

The EUT was submitted for testing with no interconnect cables.

#### 3.1.4 Grounding

The EUT was ungrounded during testing.

### 3.2 Operational Mode

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

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



- charging SA900 battery (digital device)

### 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 Digital Device (Digital Apparatus)

#### 5.1.1 Powerline Conducted Emissions

##### 5.1.1.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Section 15.107 and Industry Canada ICES-003 Section 5.3, all radio frequency voltages on the power lines of a Class B digital device (digital apparatus) 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.

##### 5.1.1.2 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 Charging SA900 battery mode.
- b) Measurements were first made on the 115V, 50Hz high line of the Click Switching Power Supply.
- 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 of the Click Switching Power Supply.

##### 5.1.1.3 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 Charging SA900 battery mode are shown on pages 25 and 27. The tabular quasi-peak



and average results from each input power line are shown on pages 24 and 26. 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 545kHz. The emissions level at this frequency was 15.3dB within the limit.

5.1.2 Radiated Measurements

5.1.2.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Section 15.109(a), all radio frequency emissions from a Class B digital device shall be below the limits shown on the following table:

RADIATION LIMITS FOR A CLASS B

Frequency MHz	Distance between EUT And Antenna in Meters	Field Strength uV/m	Field Strength dBuV/m
30-88	3	100	40
88-216	3	150	43.5
216-960	3	200	46
Above 960	3	500	54

Note: The tighter limit shall apply at the edge between the two frequency bands.

Per the Industry Canada ICES-003 Section 5.5, the field intensity of radio noise emissions that are radiated from a Class B digital apparatus shall not exceed the following limits:

Frequency MHz	Measuring Distance (meters)	Quasi-peak limits (dBµV/m)	Receiver Bandwidth
30 to 230	10	30	120kHz
230 to 1000	10	37	120kHz

Note: The lower limit shall apply at the transition frequency.

5.1.2.2 Procedures

The EUT was operated in the Charging SA900 battery mode.

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

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

Since a quasi-peak detector requires long integration times, it is not practical to automatically sweep through the quasi-peak levels. Therefore, radiated emissions from the EUT were first scanned using a peak detector and automatically plotted. The frequencies where significant emission levels were noted were then remeasured using the quasi-peak detector.

The broadband measuring antenna was positioned at a 3 meter distance from the EUT. The frequency range from 30MHz to 1GHz was investigated using a peak detector function with the bilog antenna at several heights, horizontal and vertical polarization, and with several different orientations of the EUT with respect to the antenna. The data was then processed by the computer and the maximum levels for each antenna polarization were plotted.

For the ICES-003 radiated emissions data, the data was processed by the computer to equivalent field intensity at 10 meters using linear extrapolation. A -10.5dB (-10.5dB = 20 \* Log (3m/10m)) distance correction factor has automatically been applied to the plotted emissions data. The maximum levels for each antenna polarization were plotted. The resultant field strength (FS) is a summation in decibels (dB) of the receiver meter reading (MTR), the antenna correction factor (AF), and the cable loss factor (CF). If an external pre-amplifier is used, the total is reduced by its gain (-PA). If a distance correction (DC) is required, it is added to the total.

Formula 1: FS (dBuV/m) = MTR (dBuV) + AF (dB/m) + CF (dB) + (- PA (dB)) + DC (dB)

To convert the Field Strength dBuV/m term to uV/m, the dBuV/m is first divided by 20. The Base 10 AntiLog is taken of this quotient. The result is the Field Strength value in uV/m terms.

Formula 2: FS (uV/m) = AntiLog [(FS (dBuV/m))/20]

Final radiated emissions were performed on all significant broadband and narrowband emissions found in the preliminary sweeps using the following methods:

- 1) Measurements from 30MHz to 1GHz were made using a quasi-peak detector and a broadband bilog antenna
- 2) To ensure that maximum or worst case, emission levels were 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.

### 5.1.2.3 Results

The FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Section 15.109(a), preliminary radiated emissions plots are presented on pages 28 and 29. The plots are presented for a reference only, and are not used to determine compliance. The final radiated levels are presented on page 30. As can be seen from the data, all emissions measured from the EUT were within the specification limits. The emissions level closest to the limit (worst case) occurred at 58MHz. The emissions level at this frequency was 17.9dB within the limit. Photographs of the test configuration which yielded the highest or worst case, radiated emission levels are shown on Figure 3.

The Industry Canada ICES-003, section 5.5, preliminary radiated emissions plots are presented on pages 31 and 32. The plots are presented for a reference only, and are not used to determine compliance. The final radiated levels are presented on page 33. As can be seen from the data, all emissions measured from the EUT were within the specification limits. The emissions level closest to the limit (worst case) occurred at 53.99MHz. The emissions level at this frequency was 17.7dB within the limit. Photographs of the test configuration which yielded the highest or worst case, radiated emission levels are shown on Figure 3.

## 5.2 Receiver

### 5.2.1 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 excluded from testing.

### 5.3 Transmitter

#### 5.3.1 Powerline Conducted Emissions

##### 5.3.1.1 Requirements

Since the EUT was powered by internal batteries, no conducted emissions tests were performed.

#### 5.3.2 6dB Bandwidth

##### 5.3.2.1 Requirements

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

##### 5.3.2.2 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)  $\geq$  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.

##### 5.3.2.3 Results

The plots on pages 34 through 39 show that the minimum 6 dB bandwidth was 974kHz 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 4.0MHz.

#### 5.3.3 Peak Output Power

##### 5.3.3.1 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).

##### 5.3.3.2 Procedures

###### 5.3.3.2.1 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.

#### 5.3.3.2.2 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. The peak power output was measured 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.

#### 5.3.3.3 Results

The peak antenna conducted output power results are presented on pages 40 through 45. The maximum peak conducted output power from the transmitter was 0.01W (10.03dBm) which is below the 1 Watt limit.

The EIRP results are presented on page 46. The maximum EIRP measured from the transmitter was 0.0141W (11.5dBm) which is below the 4 Watt limit.

### 5.3.4 Duty Cycle Factor Measurements

#### 5.3.4.1 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.

#### 5.3.4.2 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)

5.3.4.3 Results

Duty cycle plots are shown on pages 47 through 50. In half bandwidth mode, the EUT transmits a 740.4usec pulse 39 times in a 100msec period. This results in a duty cycle correction factor of -10.7dB. In full bandwidth mode, the EUT transmits a 223usec pulse 101 times in a 100msec period. This results in a duty cycle correction factor of -13.1dB.

5.3.5 Radiated Spurious Emissions Measurements

5.3.5.1 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

5.3.5.2 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).

#### 5.3.5.3 Results

Preliminary radiated emissions plots with the EUT transmitting at 2404MHz, 2442MHz, and 2478MHz are shown

on pages 51 through 74. Final radiated emissions data are presented on data pages 75 through 80. 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.

### 5.3.6 Band Edge Compliance

#### 5.3.6.1 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).

#### 5.3.6.2 Procedures

##### 5.3.6.2.1 Low Band Edge

- 4) The output of the EUT was connected to the spectrum analyzer through 30dB of attenuation.
- 5) The EUT was set to transmit continuously at the channel closest to the low band-edge.
- 6) 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.

##### 5.3.6.2.2 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.

#### 5.3.6.3 Results

Pages 81 through 84 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.

### 5.3.7 Power Spectral Density

#### 5.3.7.1 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.

#### 5.3.7.2 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.
  - 7) 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)  $\geq$  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  $BWCF = 10\log(3\text{kHz}/100\text{kHz} = -15.2\text{dBm})$
    - v. The resulting peak PSD level must be  $\leq$  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.

#### 5.3.7.3 Results

Pages 85 through 90 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 Bodypack Transceiver, Part No. GLXD1, 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 digital devices 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 Bodypack Transceiver, Part No. GLXD1, 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.

It was also determined that the Shure Incorporated Bodypack Transceiver, Part No. GLXD1, when operated in the Charging SA900 batter mode did fully meet the conducted and radiated RF emission requirements of the Industry Canada ICES-003 Specification, Section 5 for digital apparatus.

## 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

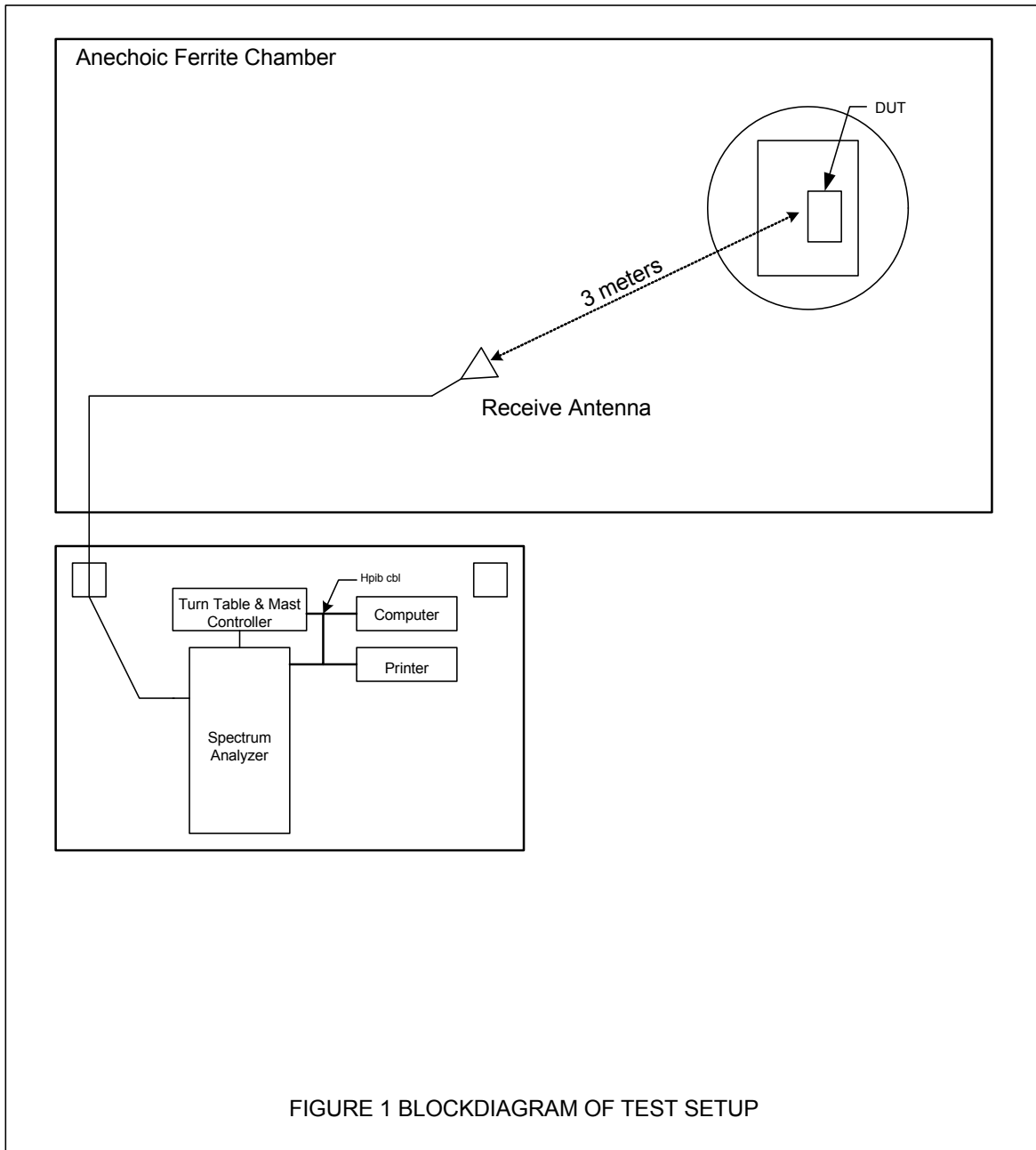
**Table 9-1 Equipment List**

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.



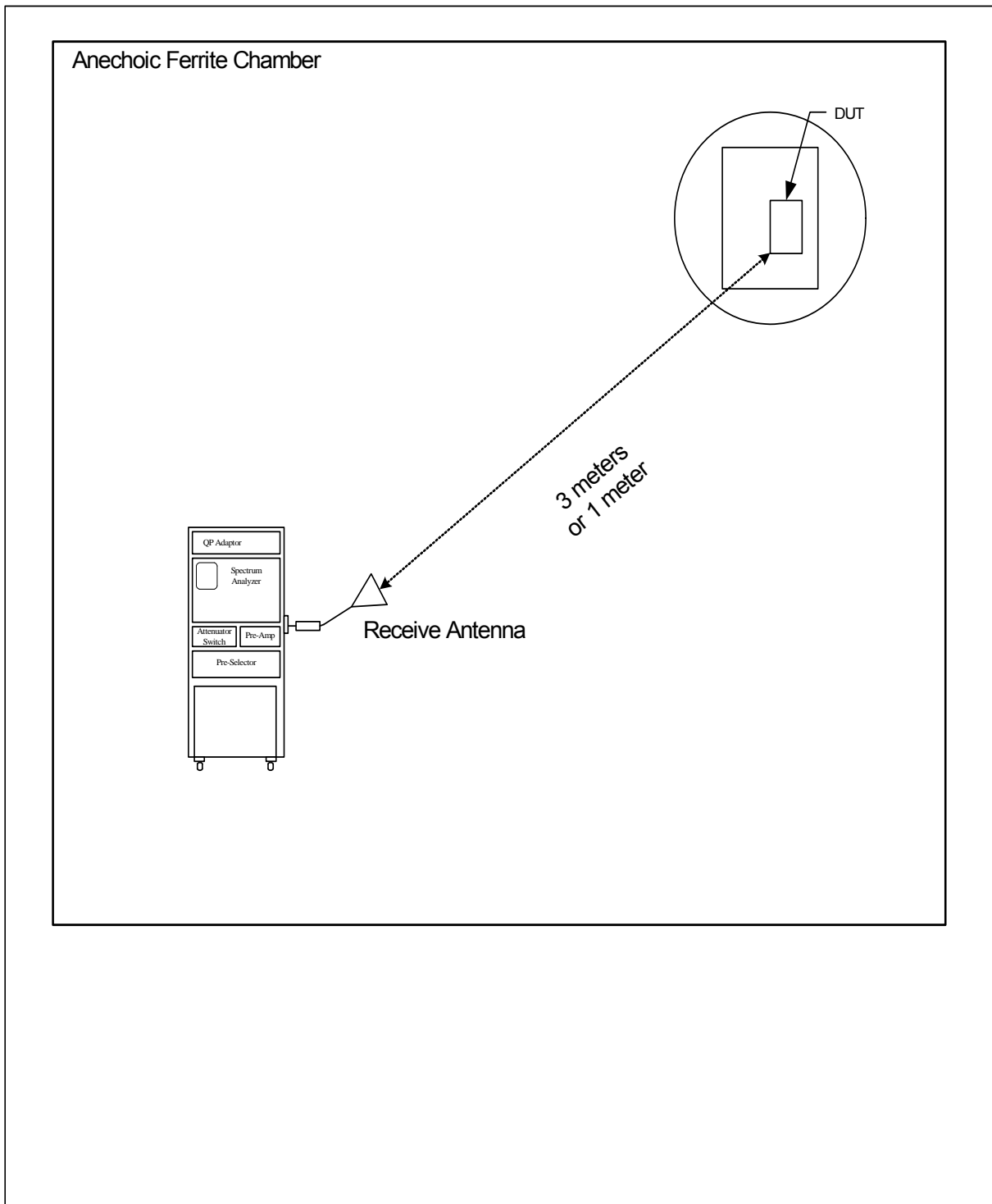
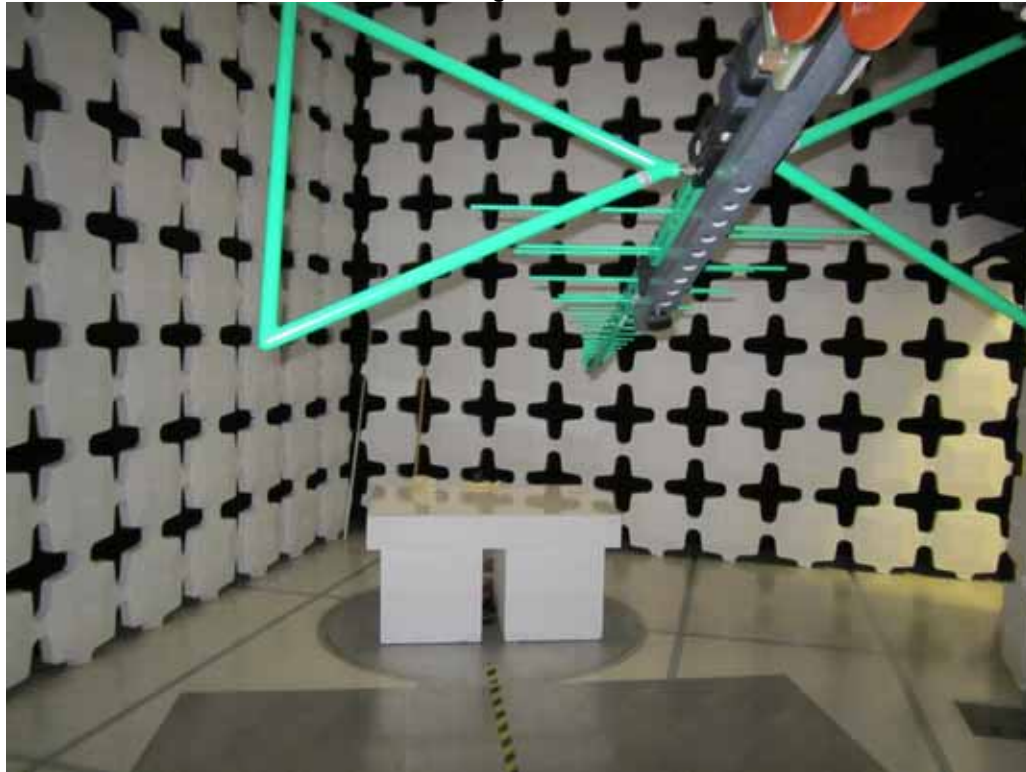


Figure 2: BLOCK DIAGRAM OF TEST SETUP FOR RADIATED EMISSIONS ABOVE 18GHZ

Figure 3

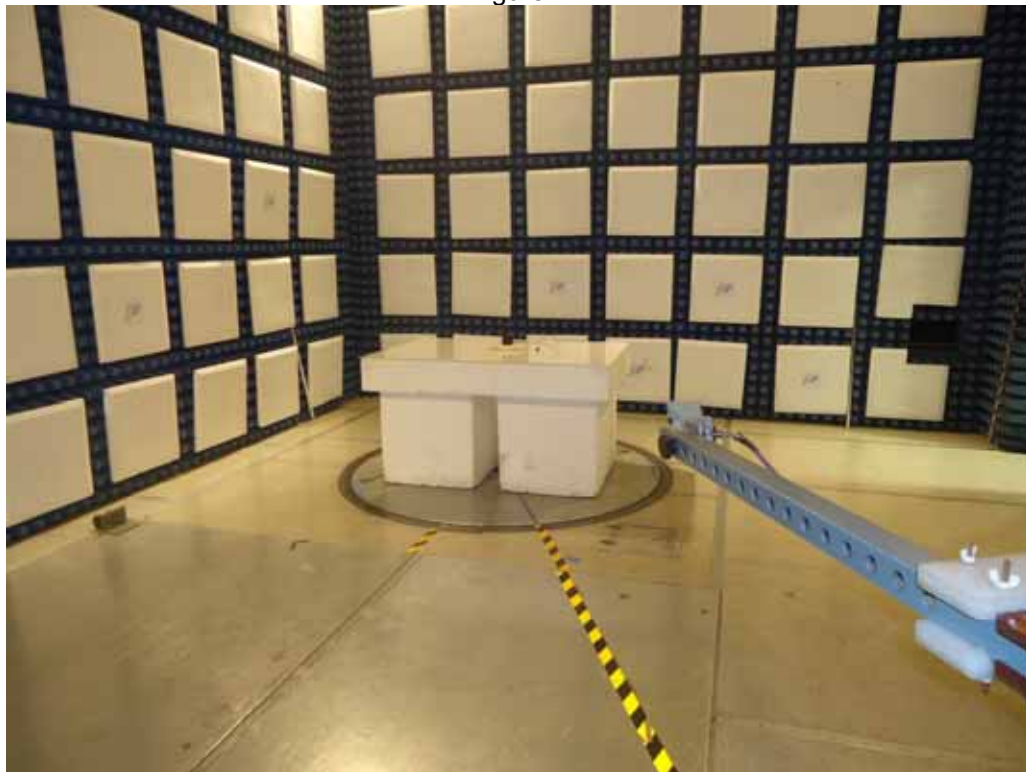


Test Setup for Radiated Emissions – 30MHz to 2GHz, Horizontal Polarization

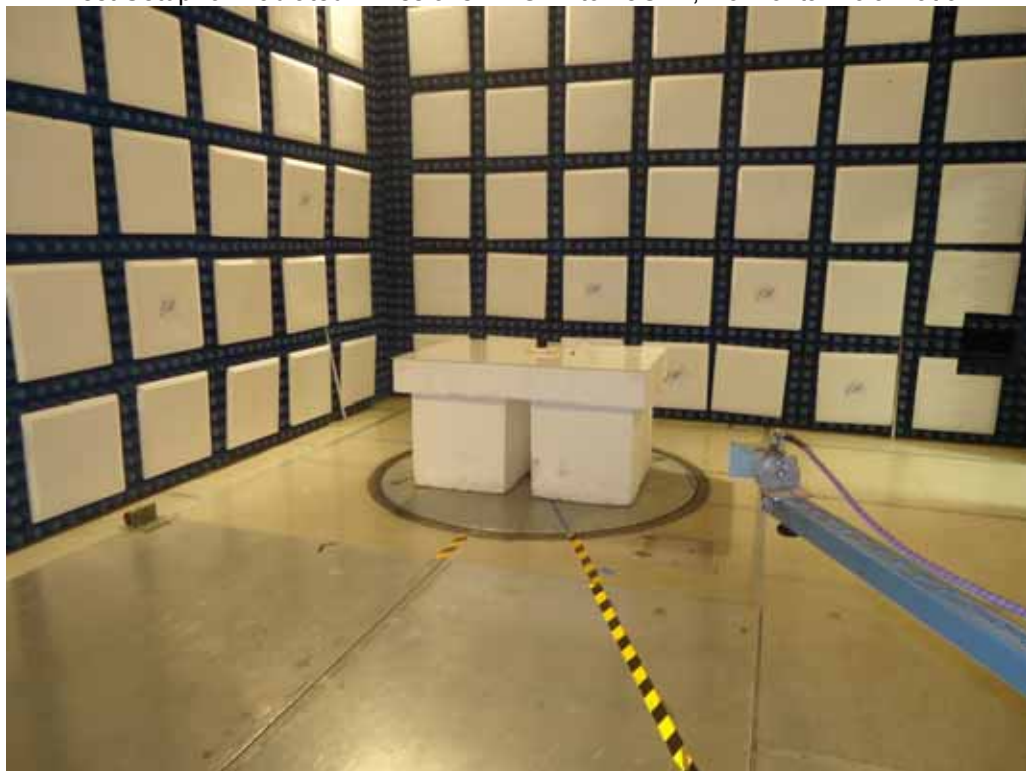


Test Setup for Radiated Emissions – 30MHz to 2GHz, Vertical Polarization

Figure 4

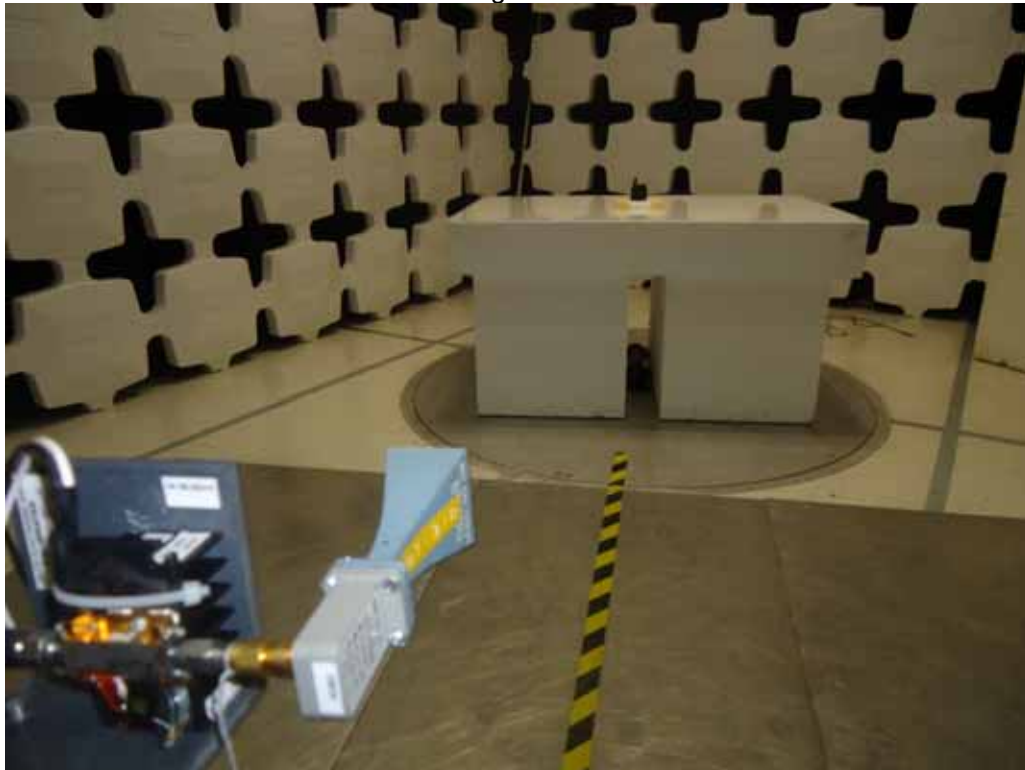


Test Setup for Radiated Emissions – 2GHz to 18GHz, Horizontal Polarization

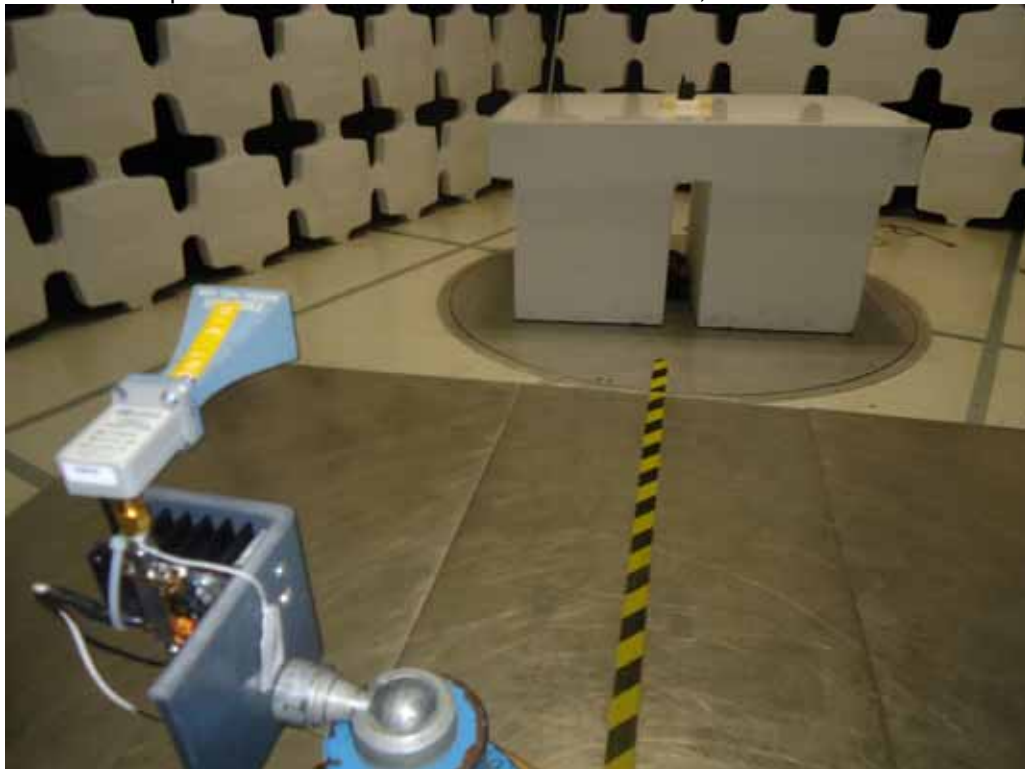


Test Setup for Radiated Emissions – 2GHz to 18GHz, Vertical Polarization

Figure 5



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



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



## FCC Part 15 Subpart B Conducted Emissions Test Significant Emissions Data

VB\*\* 02/09/2011

Manufacturer : Shure Inc.  
Model : GLXD1  
DUT Revision :  
Serial Number : 1062  
DUT Mode : Normal, Charging Battery  
Line Tested : Positive  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes : Stock Code Running (115V, 60Hz)  
Test Engineer : I. Carnegie  
Limit : Class B  
Test Date : Jul 09, 2012 12:53:51 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 dB $\mu$ V	Quasi-peak Limit dB $\mu$ V	Excessive Quasi-peak Emissions	Average Level dB $\mu$ V	Average Limit dB $\mu$ V	Excessive Average Emissions
0.263	33.0	61.4		23.3	51.4	
0.500	37.0	56.0		29.8	46.0	
0.795	37.2	56.0		28.7	46.0	
1.552	37.4	56.0		29.4	46.0	
2.565	36.8	56.0		28.6	46.0	
3.172	36.6	56.0		29.9	46.0	
5.266	34.1	60.0		25.9	50.0	
10.022	29.5	60.0		23.5	50.0	
18.977	25.0	60.0		18.3	50.0	

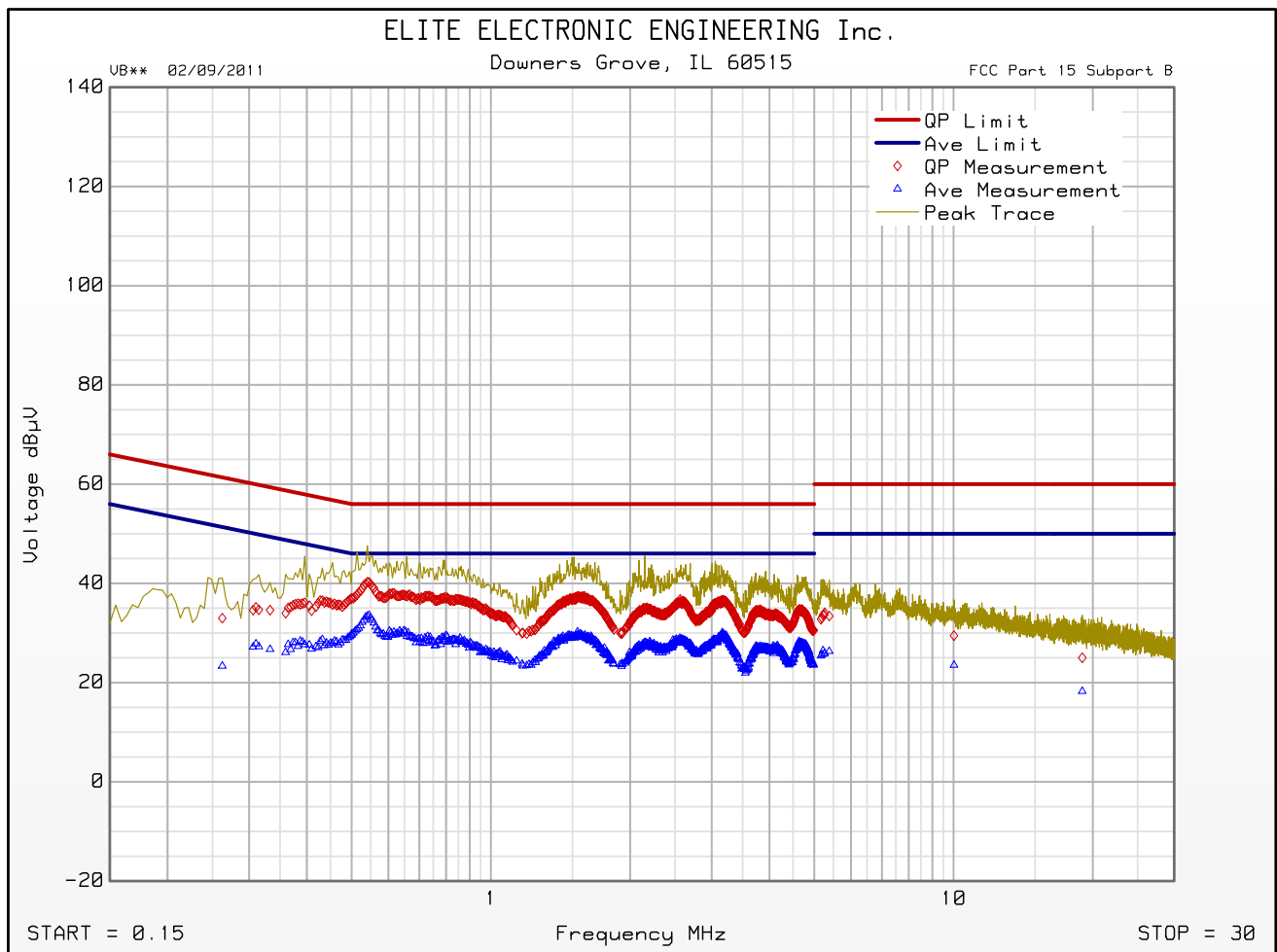




# FCC Part 15 Subpart B Conducted Emissions Test Cumulative Data

VB\*\* 02/09/2011

Manufacturer : Shure Inc.  
Model : GLXD1  
DUT Revision :  
Serial Number : 1062  
DUT Mode : Normal, Charging Battery  
Line Tested : Positive  
Scan Step Time [ms] : 30  
Meas. Threshold [dB] : -10  
Notes : Stock Code Running (115V, 60Hz)  
Test Engineer : I. Carnegie  
Limit : Class B  
Test Date : Jul 09, 2012 12:53:51 PM



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 : GLXD1  
DUT Revision :  
Serial Number : 1062  
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 : Class B  
Test Date : Jul 09, 2012 11:59:53 AM  
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

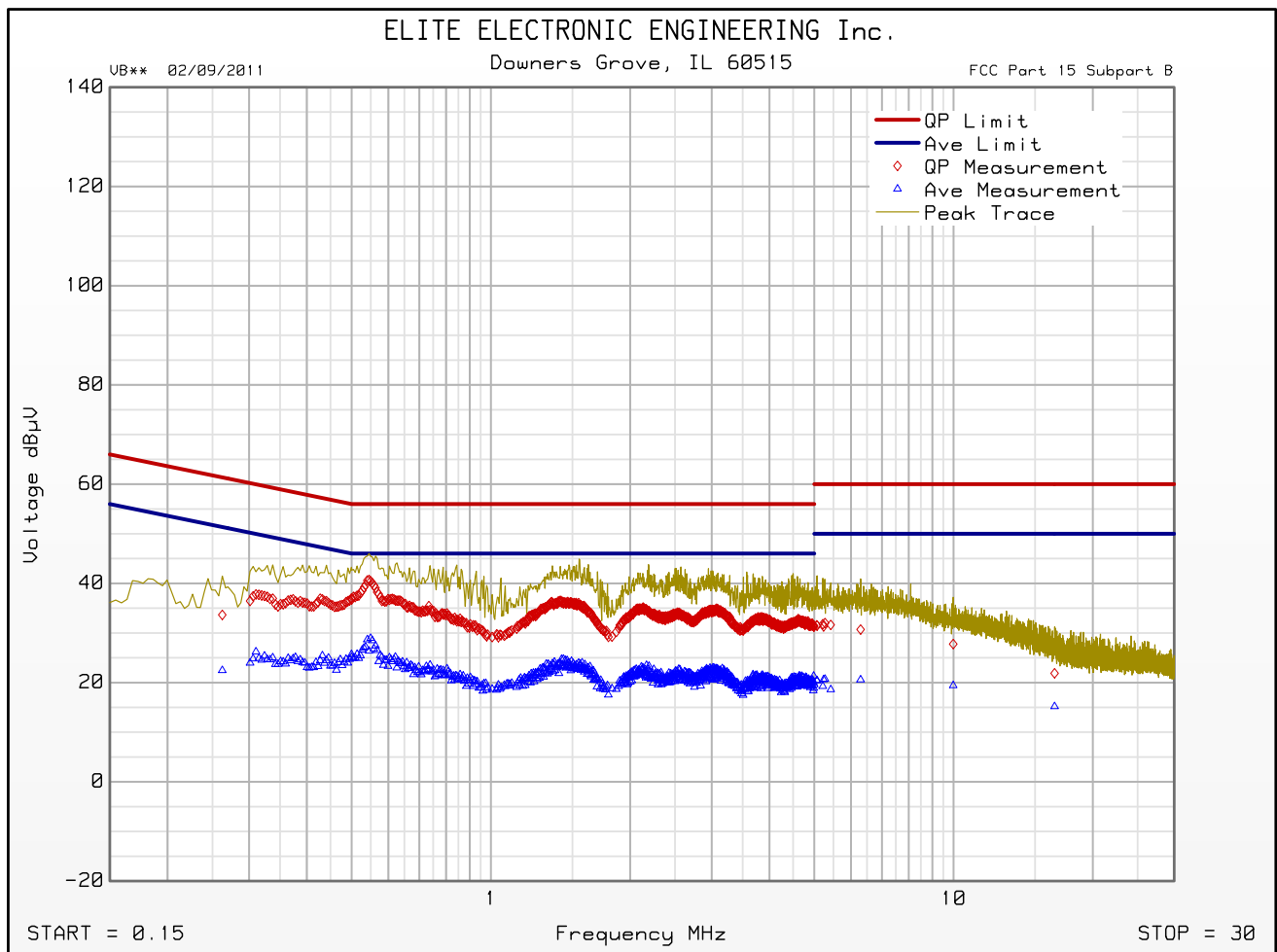
Freq MHz	Quasi-peak Level dB $\mu$ V	Quasi-peak Limit dB $\mu$ V	Excessive Quasi-peak Emissions	Average Level dB $\mu$ V	Average Limit dB $\mu$ V	Excessive Average Emissions
0.263	33.6	61.4		22.4	51.4	
0.500	37.0	56.0		25.7	46.0	
0.545	40.7	56.0		26.4	46.0	
0.804	34.0	56.0		22.8	46.0	
1.417	36.5	56.0		23.3	46.0	
2.133	35.1	56.0		21.6	46.0	
3.140	34.5	56.0		21.4	46.0	
5.275	32.0	60.0		20.7	50.0	
9.986	27.8	60.0		19.4	50.0	
16.538	21.9	60.0		15.2	50.0	



# FCC Part 15 Subpart B Conducted Emissions Test Cumulative Data

VB\*\* 02/09/2011

Manufacturer : Shure Inc.  
Model : GLXD1  
DUT Revision :  
Serial Number : 1062  
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 : Class B  
Test Date : Jul 09, 2012 11:59:53 AM



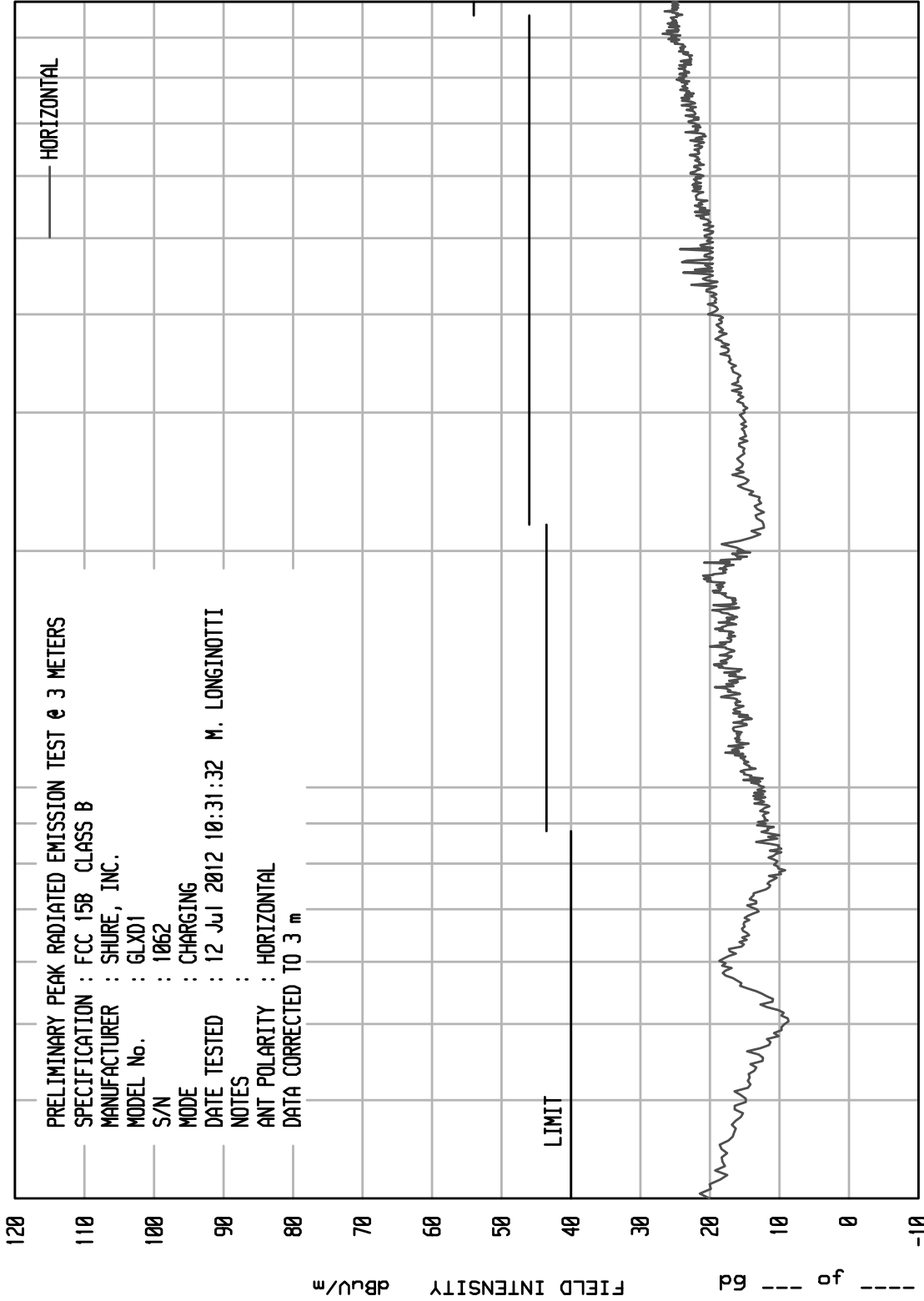
Emissions Meet QP Limit  
Emissions Meet Ave Limit

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

8546A RE RUN 3

W088 11/24/08

PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS  
 SPECIFICATION : FCC 15B CLASS B  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 S/N : 1062  
 MODE : CHARGING  
 DATE TESTED : 12 Jul 2012 10:31:32 M. LONGINOTTI  
 NOTES :  
 ANT POLARITY : HORIZONTAL  
 DATA CORRECTED TO 3 m



STOP = 1000

FREQUENCY - MHz

100

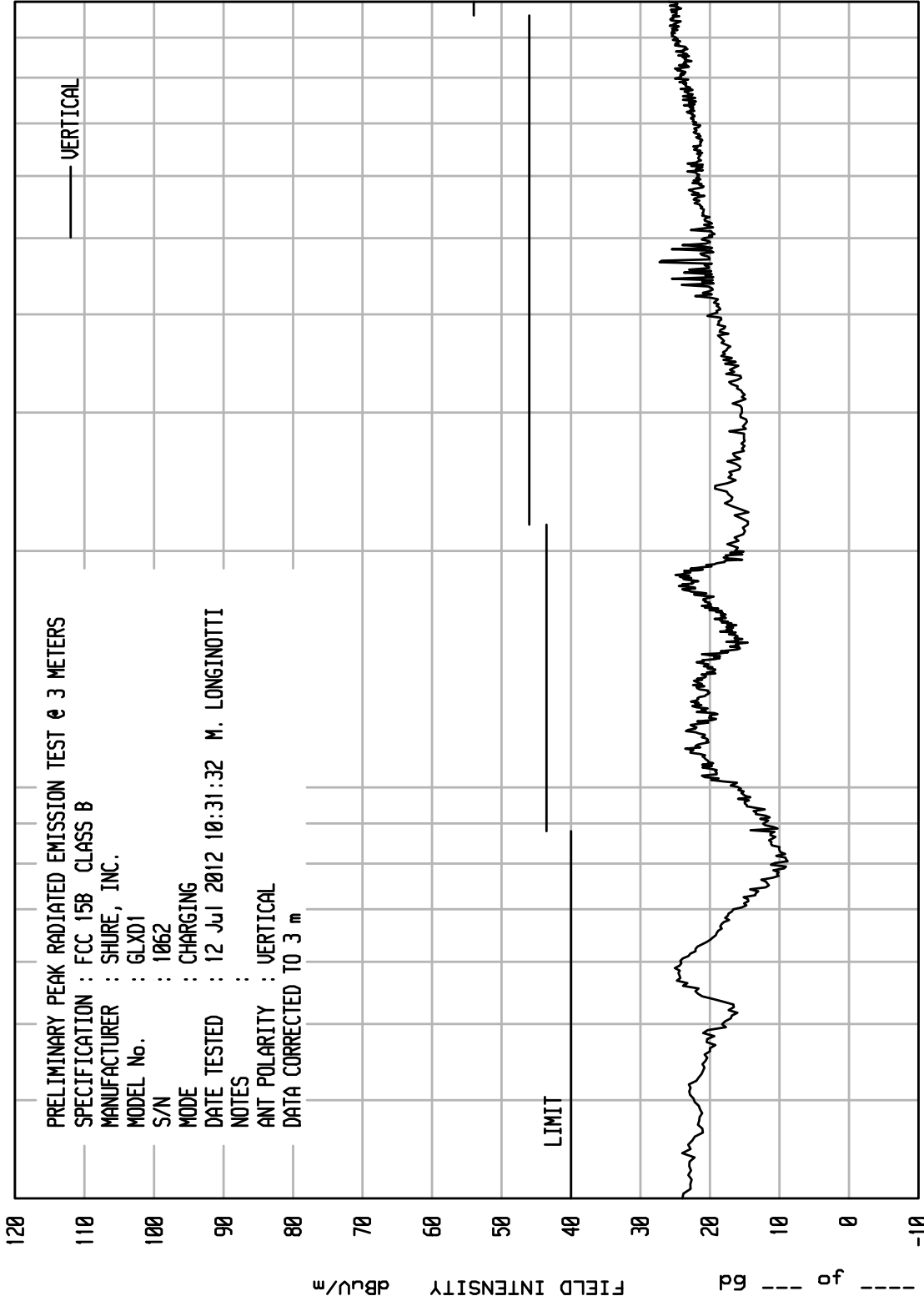
START = 30

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

8546A RE RUN 3

W088 11/24/08

PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS  
 SPECIFICATION : FCC 15B CLASS B  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 S/N : 1062  
 MODE : CHARGING  
 DATE TESTED : 12 Jul 2012 10:31:32 M. LONGINOTTI  
 NOTES :  
 ANT POLARITY : VERTICAL  
 DATA CORRECTED TO 3 m



STOP = 1000

FREQUENCY - MHz

100

START = 30



ETR No.  
DATA SHEET

8546A  
TEST NO. 3

RADIATED QP EMISSION MEASUREMENTS in a 3 m SEMI-ANECHOIC ROOM  
SPECIFICATION : FCC 15B CLASS B  
MANUFACTURER : SHURE, INC.  
MODEL NO. : GLXD1  
SERIAL NO. : 1062  
TEST MODE : CHARGING  
NOTES :  
TEST DATE : 12 Jul 2012 10:31:32  
TEST DISTANCE : 3 m (DATA EXTRAPOLATED TO 3 m)

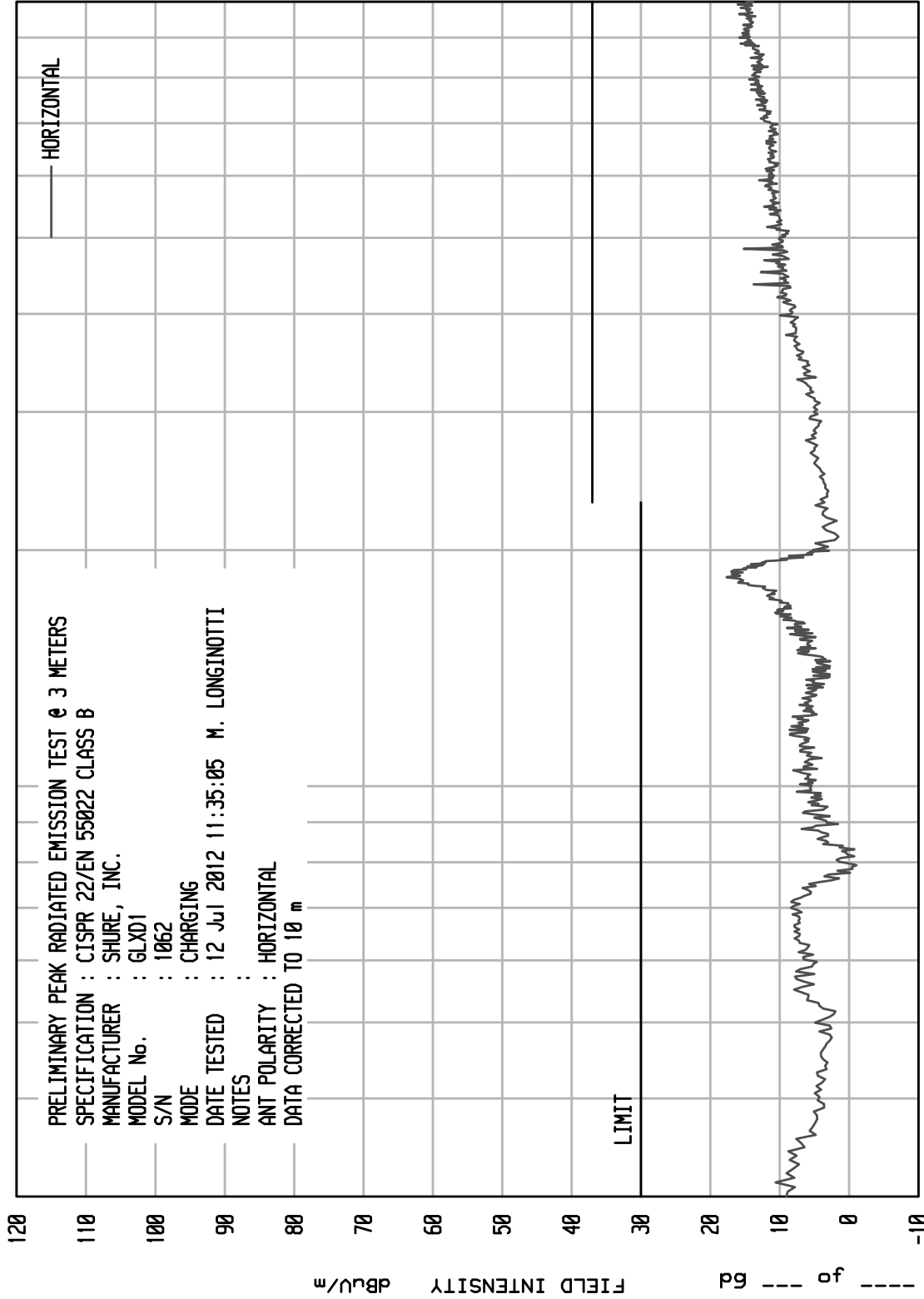
FREQUENCY MHz	QP READING dBuV	ANT FAC dB	CBL FAC dB	EXT ATTN dB	DIST FAC dB	TOTAL dBuV/m	QP LIMIT dBuV/m	AZ deg	ANT HT cm	POLAR
34.48	3.9	16.0	.4	0.0	0.0	20.2	40.0	180	120	V
58.00	15.5	6.3	.4	0.0	0.0	22.1	40.0	0	200	V
85.61	.5	8.3	.4	0.0	0.0	9.2	40.0	180	340	H
109.91	5.0	11.4	.4	0.0	0.0	16.9	43.5	315	120	V
127.63	4.8	11.8	.5	0.0	0.0	17.1	43.5	135	120	V
142.77	5.5	10.8	.6	0.0	0.0	16.9	43.5	45	120	V
185.34	9.1	9.5	.7	0.0	0.0	19.3	43.5	45	120	V
190.50	3.5	9.4	.7	0.0	0.0	13.7	43.5	45	200	V
357.45	.3	14.6	1.0	0.0	0.0	15.9	46.0	270	200	H
462.83	7.7	16.8	1.1	0.0	0.0	25.6	46.0	225	120	V
479.98	6.2	16.9	1.1	0.0	0.0	24.2	46.0	225	120	V
686.70	.8	18.5	1.3	0.0	0.0	20.6	46.0	0	200	H
789.32	1.0	20.1	1.5	0.0	0.0	22.6	46.0	270	120	V
888.45	1.4	20.7	1.5	0.0	0.0	23.6	46.0	0	200	H
911.78	1.4	21.0	1.5	0.0	0.0	23.8	46.0	90	120	H

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

8546A RE RUN 5

W088 11/24/08

PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS  
 SPECIFICATION : CISPR 22/EN 55022 CLASS B  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 S/N : 1062  
 MODE : CHARGING  
 DATE TESTED : 12 Jul 2012 11:35:05 M. LONGINOTTI  
 NOTES :  
 ANT POLARITY : HORIZONTAL  
 DATA CORRECTED TO 10 m



STOP = 1000

FREQUENCY - MHz

100

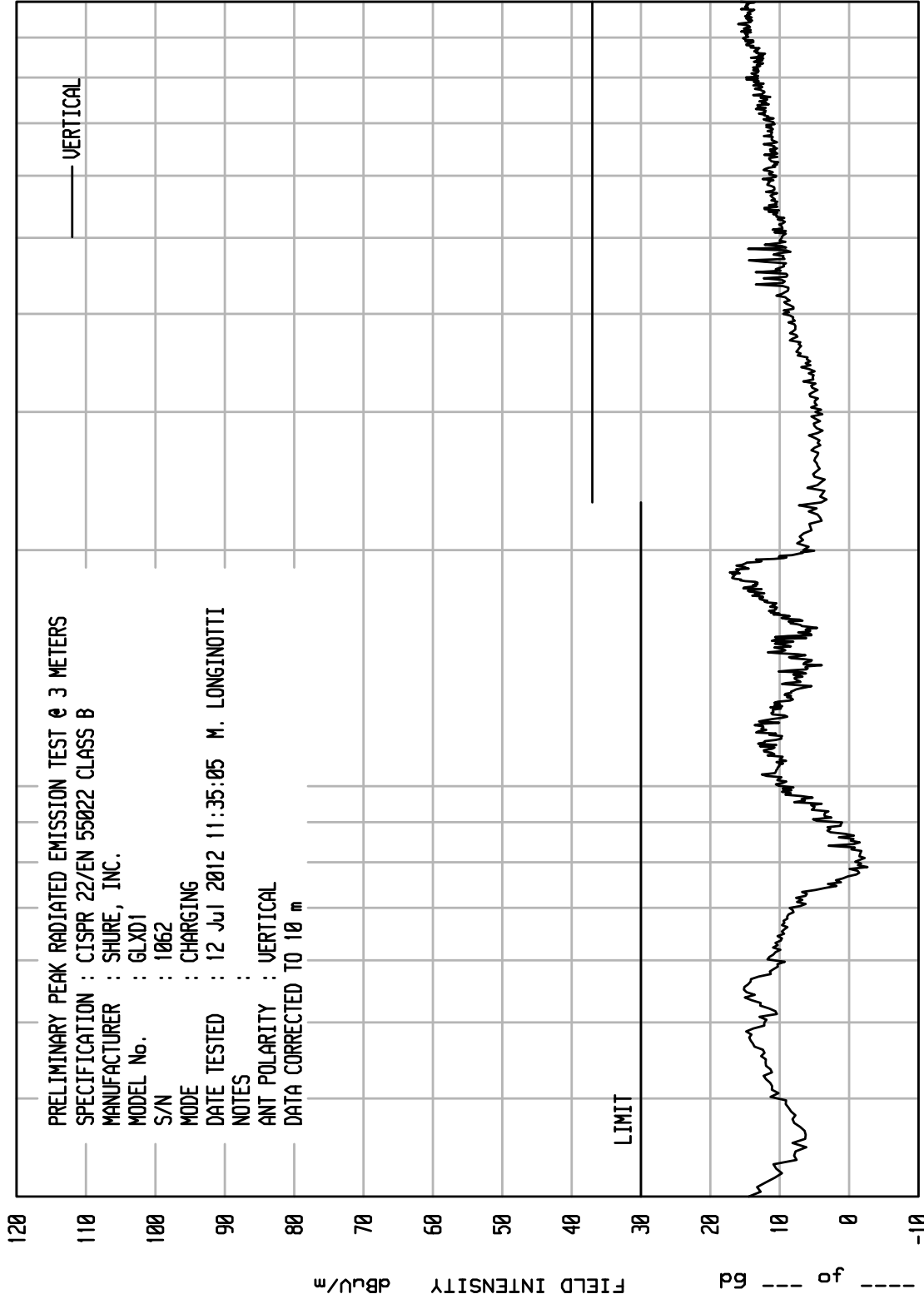
START = 30

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

8546A RE RUN 5

W088 11/24/08

PRELIMINARY PEAK RADIATED EMISSION TEST @ 3 METERS  
 SPECIFICATION : CISPR 22/EN 55022 CLASS B  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 S/N : 1062  
 MODE : CHARGING  
 DATE TESTED : 12 Jul 2012 11:35:05 M. LONGINOTTI  
 NOTES :  
 ANT POLARITY : VERTICAL  
 DATA CORRECTED TO 10 m



STOP = 1000

FREQUENCY - MHz

100

START = 30





ETR No.

8546A

DATA SHEET

TEST NO. 5

RADIATED QP EMISSION MEASUREMENTS in a 3 m SEMI-ANECHOIC ROOM

SPECIFICATION : CISPR 22/EN 55022 CLASS B

MANUFACTURER : SHURE, INC.

MODEL NO. : GLXD1

SERIAL NO. : 1062

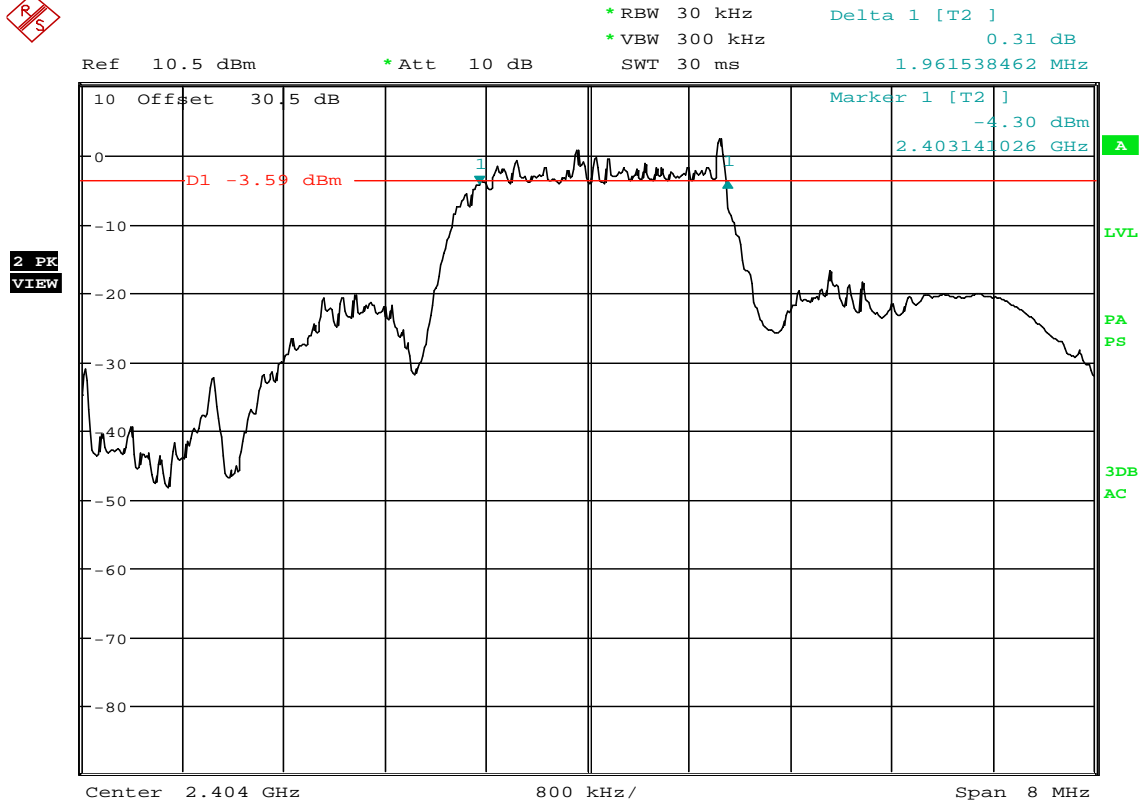
TEST MODE : CHARGING

NOTES :

TEST DATE : 12 Jul 2012 11:35:05

TEST DISTANCE : 3 m (DATA EXTRAPOLATED TO 10 m)

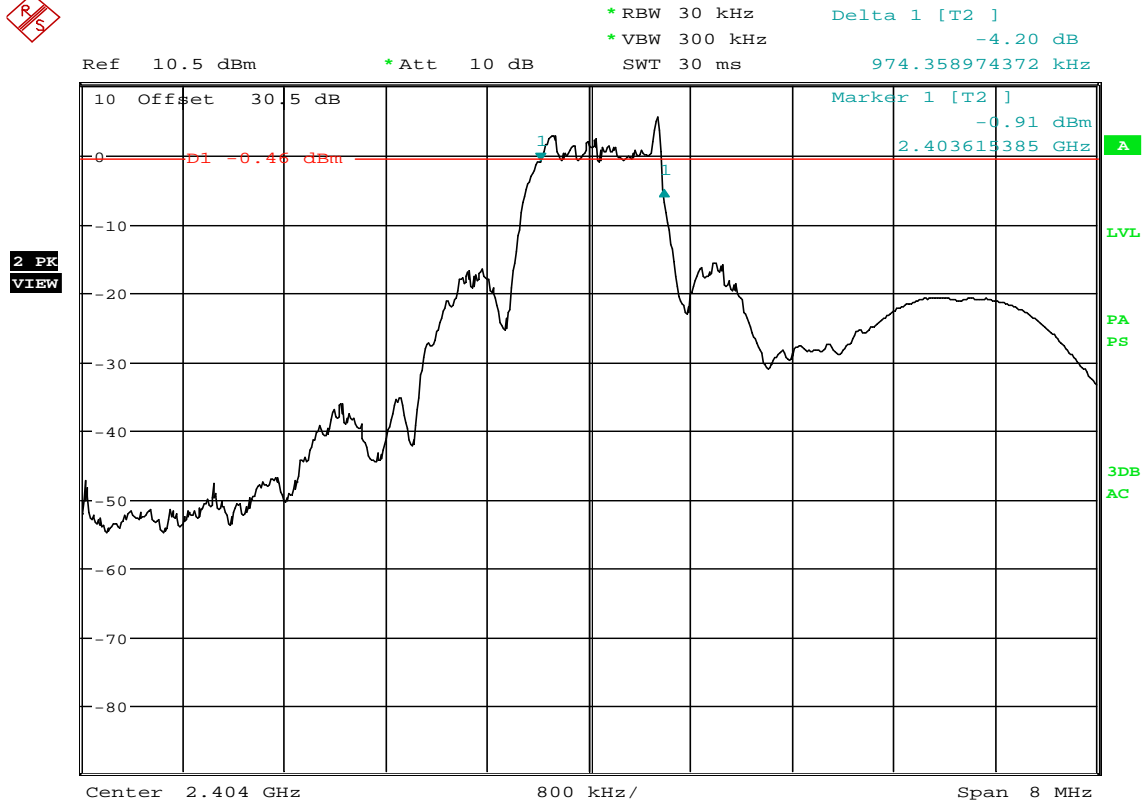
FREQUENCY MHZ	QP READING dBuV	ANT FAC dB	CBL FAC dB	EXT ATTN dB	DIST FAC dB	TOTAL dBuV/m	QP LIMIT dBuV/m	AZ deg	ANT HT cm	POLAR
47.18	11.8	9.2	.4	0.0	-10.5	10.8	30.0	90	120	V
53.99	15.6	6.7	.4	0.0	-10.5	12.3	30.0	135	120	V
96.19	4.4	10.3	.4	0.0	-10.5	4.6	30.0	180	120	V
118.94	6.3	11.8	.5	0.0	-10.5	8.1	30.0	0	120	V
122.59	4.2	11.9	.5	0.0	-10.5	6.1	30.0	180	120	V
147.89	4.7	10.5	.6	0.0	-10.5	5.3	30.0	45	120	V
182.59	14.2	9.5	.7	0.0	-10.5	13.9	30.0	135	200	H
188.94	13.8	9.4	.7	0.0	-10.5	13.5	30.0	45	120	V
357.89	.2	14.6	1.0	0.0	-10.5	5.3	37.0	270	200	H
471.41	.3	16.8	1.1	0.0	-10.5	7.7	37.0	45	120	V
479.98	6.0	16.9	1.1	0.0	-10.5	13.5	37.0	90	120	H
591.92	.7	18.6	1.1	0.0	-10.5	9.9	37.0	90	340	H
791.16	2.7	20.2	1.5	0.0	-10.5	13.9	37.0	315	340	V
904.95	1.3	21.0	1.5	0.0	-10.5	13.3	37.0	45	120	H
987.10	1.2	20.9	1.5	0.0	-10.5	13.2	37.0	0	200	H



Date: 27.JUN.2012 17:39:19

### FCC 15.247(a)(2) 6dB Bandwidth

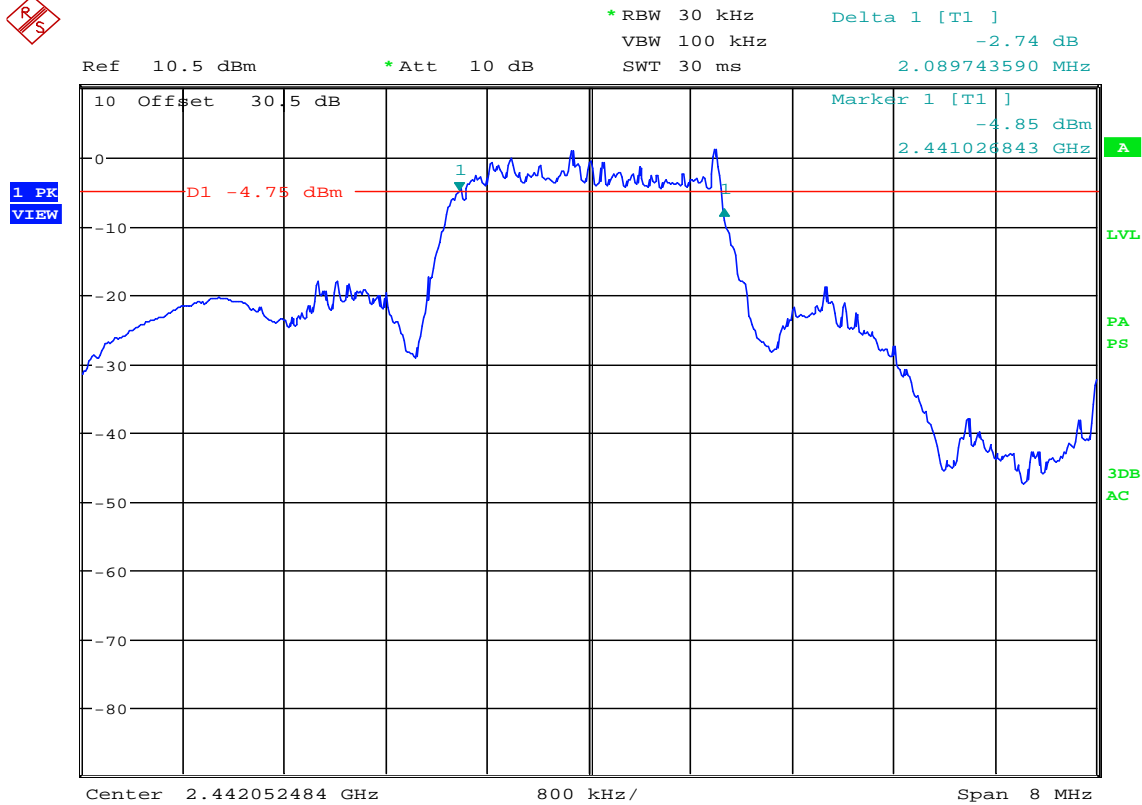
MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD1
SERIAL NUMBER	: 074
TEST MODE	: Tx @ 2404MHz, full bandwidth
TEST DATE	: June 27, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB band width = 1.96MHz
EQUIPMENT USED	: RBA0, T1E7,T2S0



Date: 27.JUN.2012 17:25:45

**FCC 15.247(a)(2) 6dB Bandwidth**

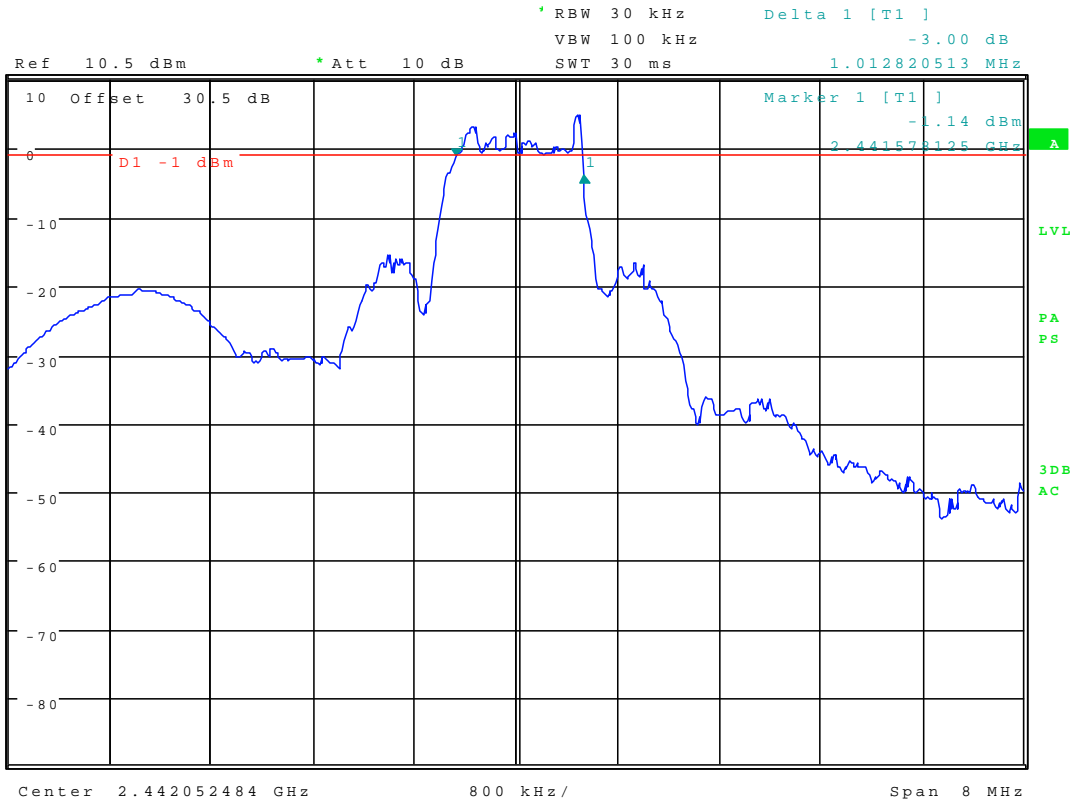
MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD1
SERIAL NUMBER	: 074
TEST MODE	: Tx @ 2404MHz, half bandwidth
TEST DATE	: June 27, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB band width = 974kHz
EQUIPMENT USED	: RBA0, T1E7,T2S0



Date: 2.JUL.2012 17:04:51

**FCC 15.247(a)(2) 6dB Bandwidth**

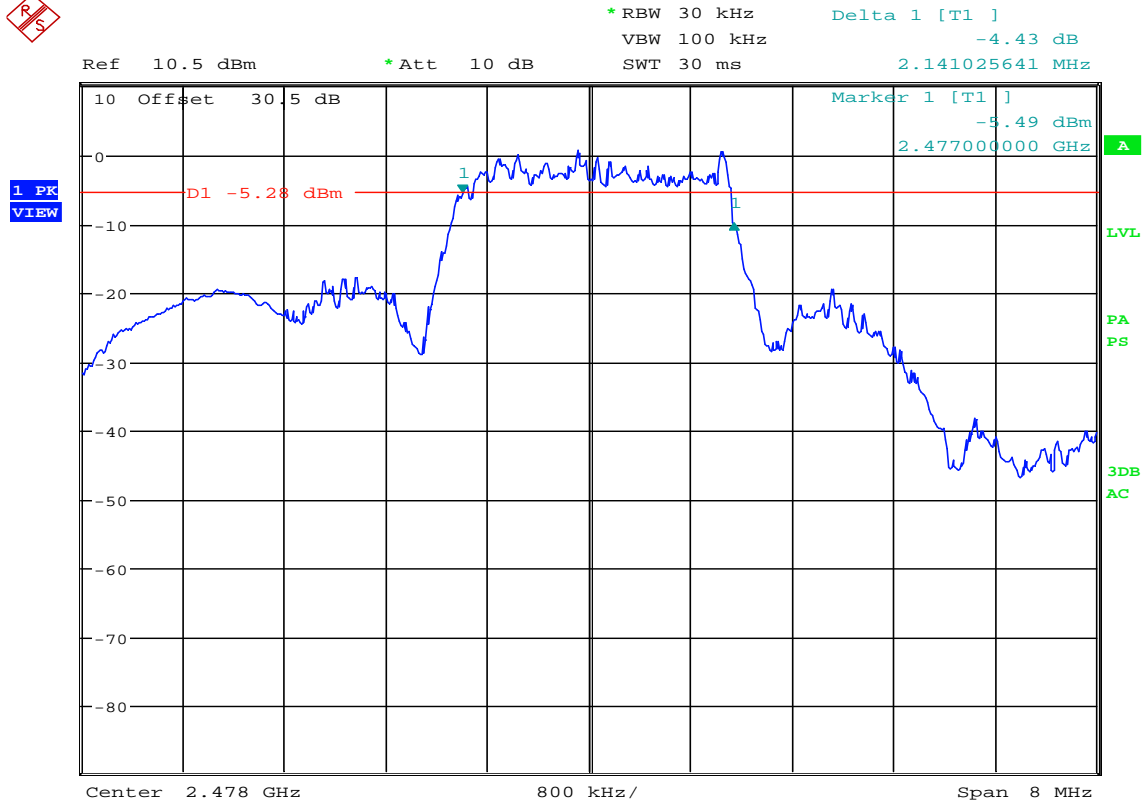
MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2442MHz, full bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : 6dB bandwidth  
 NOTES : 6dB band width = 2.09MHz  
 EQUIPMENT USED : RBE0, T1E7,T2S0



Date: 2.JUL.2012 17:15:46

### FCC 15.247(a)(2) 6dB Bandwidth

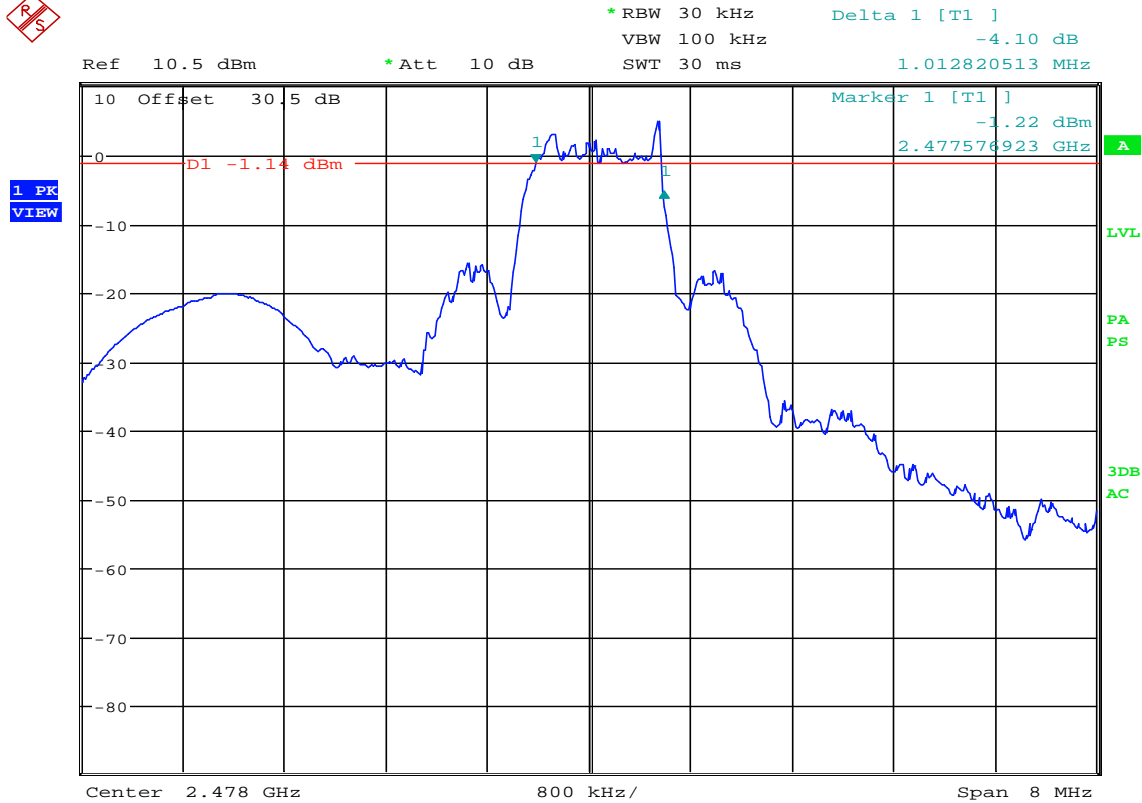
MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD1
SERIAL NUMBER	: 74
TEST MODE	: Tx @ 2442MHz, half bandwidth
TEST DATE	: July 2, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB band width = 1.0MHz
EQUIPMENT USED	: RBE0, T1E7,T2S0



Date: 2.JUL.2012 17:27:03

**FCC 15.247(a)(2) 6dB Bandwidth**

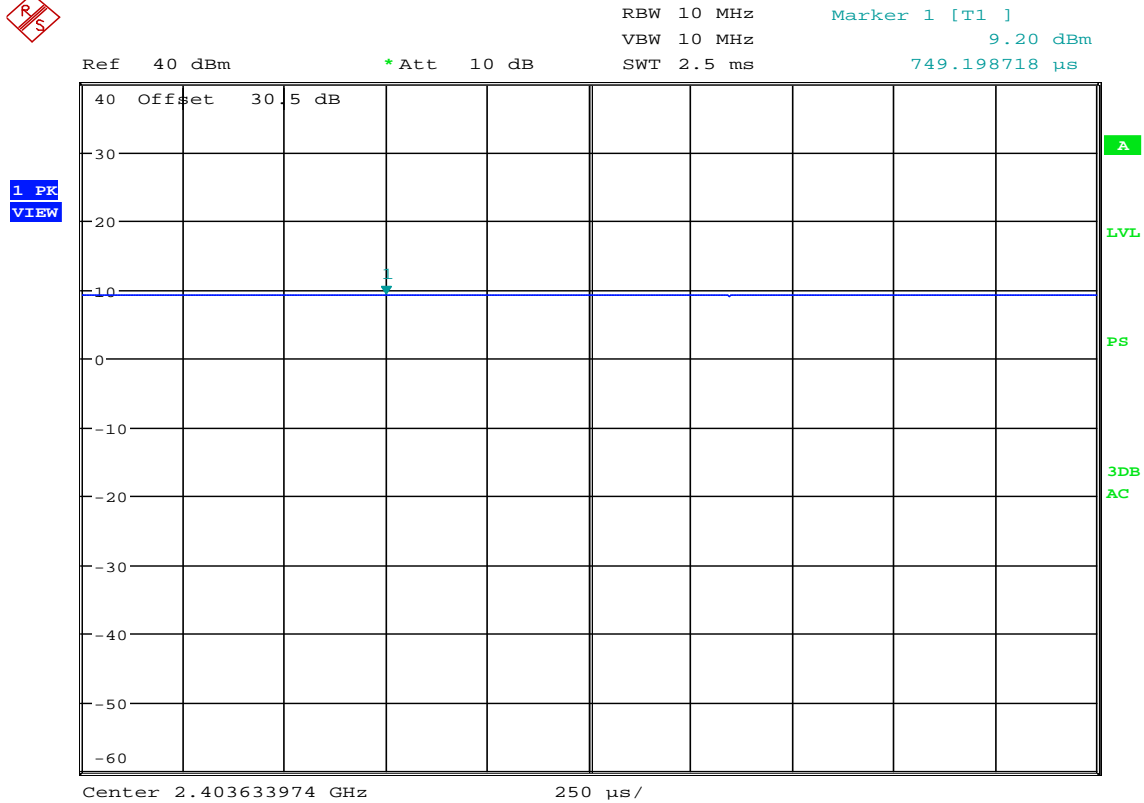
MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2478MHz, full bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : 6dB bandwidth  
 NOTES : 6dB band width = 2.14MHz  
 EQUIPMENT USED : RBE0, T1E7,T2S0



Date: 2.JUL.2012 17:19:45

### FCC 15.247(a)(2) 6dB Bandwidth

MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD1
SERIAL NUMBER	: 74
TEST MODE	: Tx @ 2478MHz, half bandwidth
TEST DATE	: July 2, 2012
TEST PARAMETER	: 6dB bandwidth
NOTES	: 6dB band width = 1.0MHz
EQUIPMENT USED	: RBE0, T1E7,T2S0

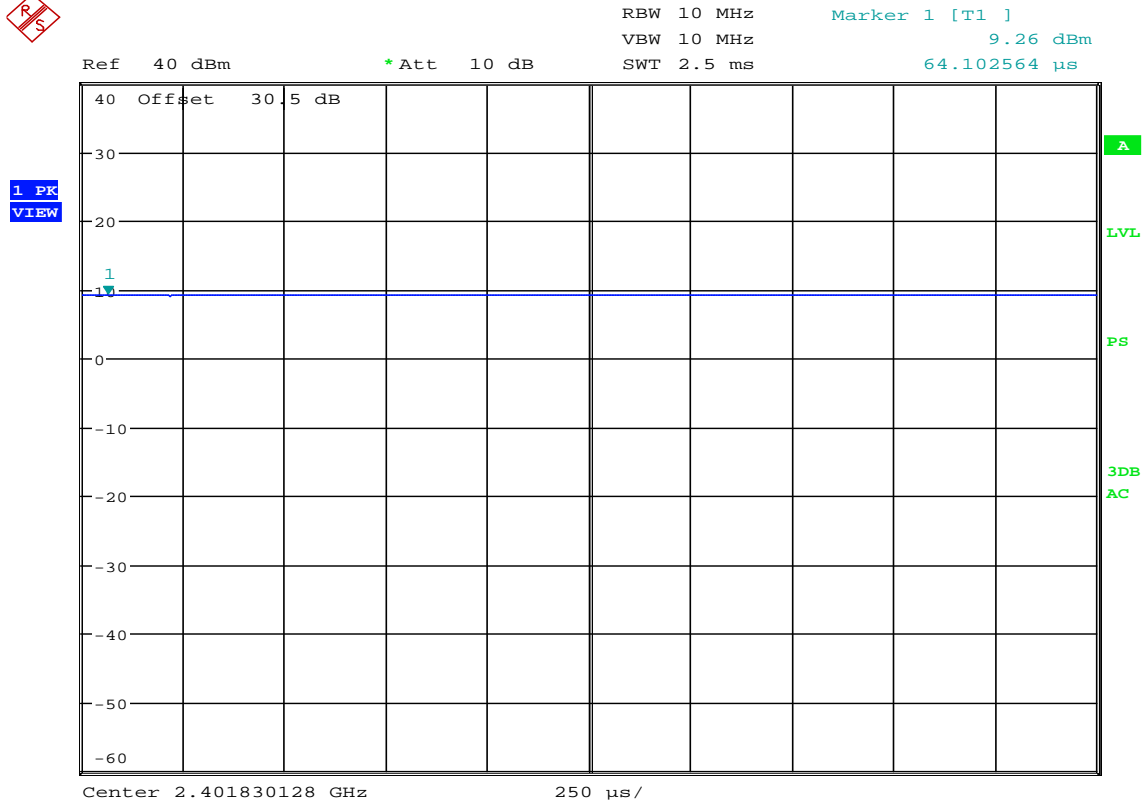


Date: 2.JUL.2012 11:15:27

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

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2404MHz, full bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : Peak Conducted Output Power  
 NOTES : Peak Conducted Output Power = 9.2dBm = 8.3mW  
 METHOD : PK1  
 EQUIPMENT USED : RBE0, T1E7,T2S0

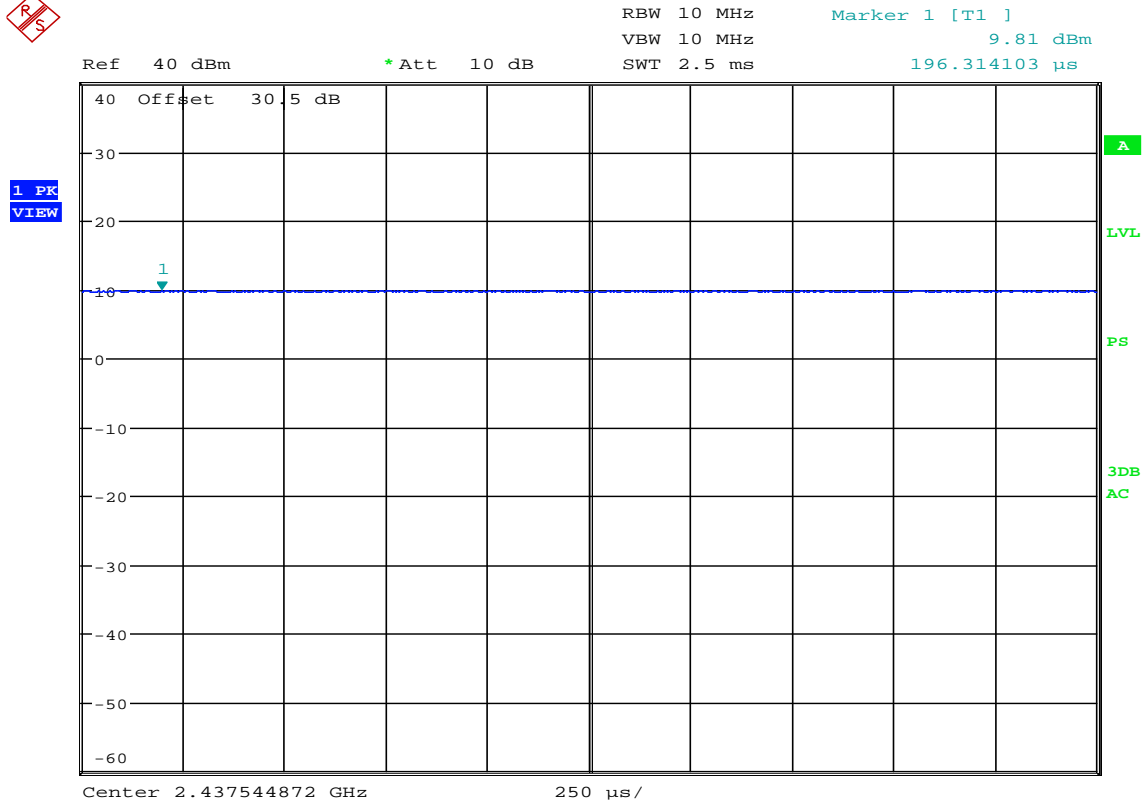




Date: 2.JUL.2012 12:00:54

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

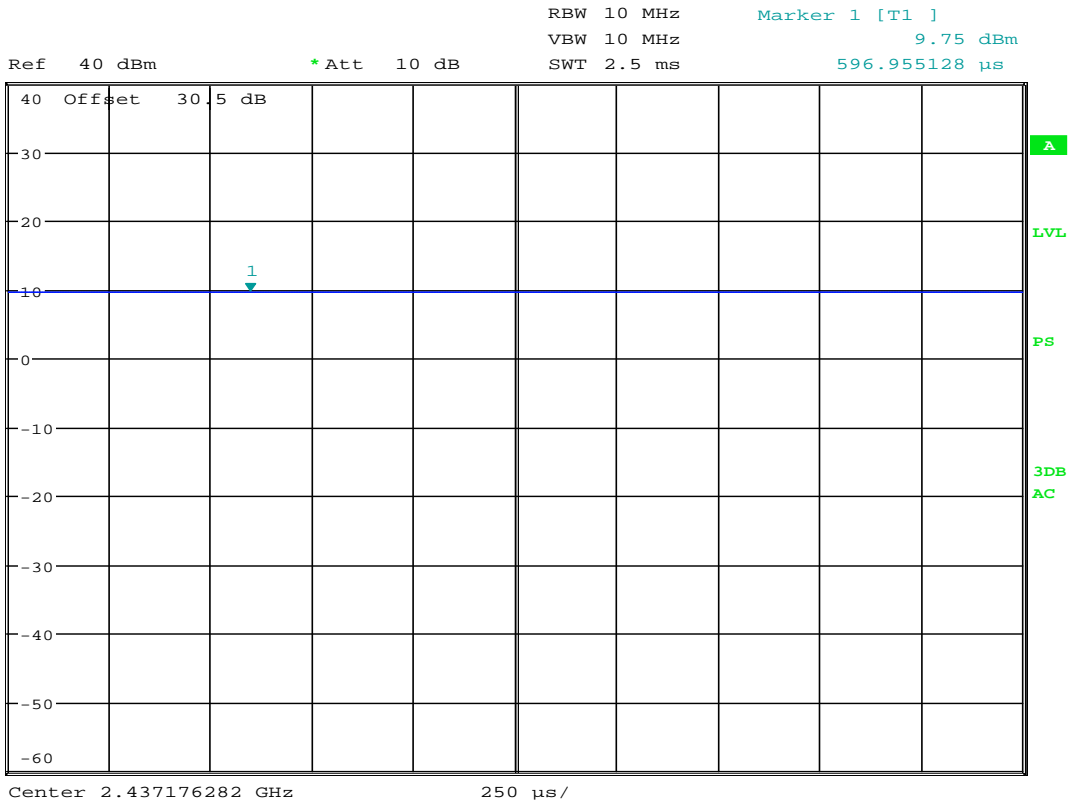
MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2404MHz, half bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : Peak Conducted Output Power  
 NOTES : Peak Conducted Output Power = 9.26dBm = 8.4mW  
 METHOD : PK1  
 EQUIPMENT USED : RBE0, T1E7,T2S0



Date: 2.JUL.2012 12:13:32

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

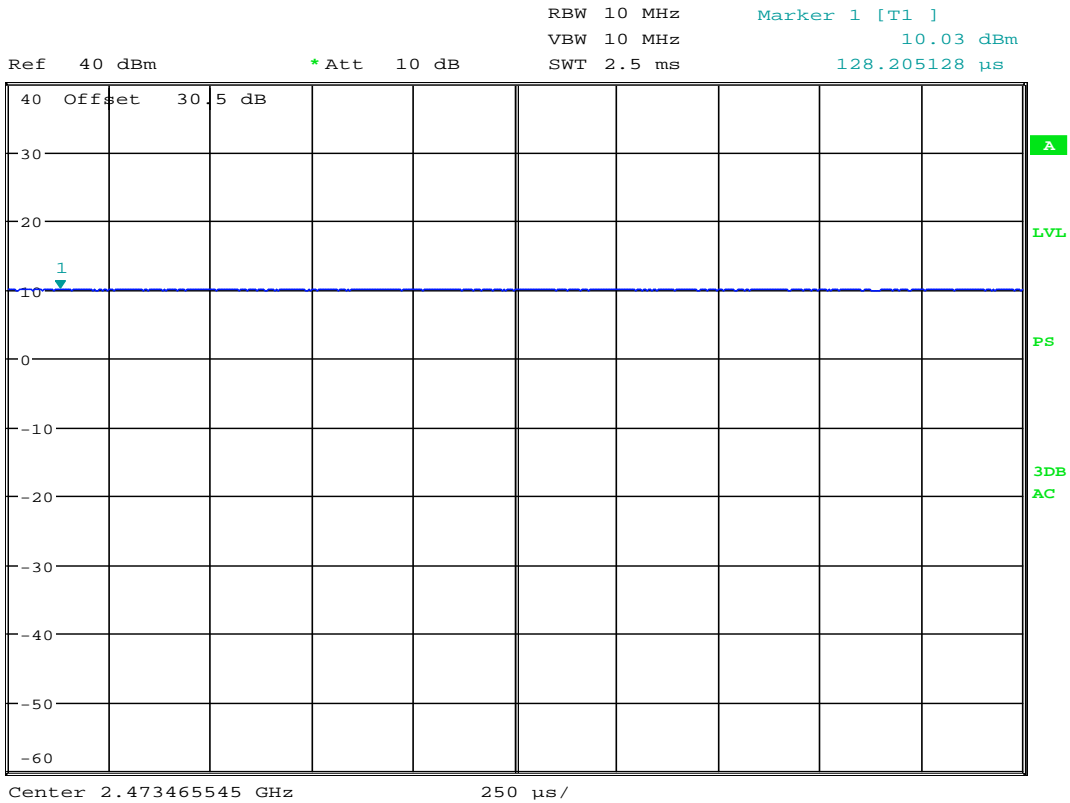
MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2442MHz, full bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : Peak Conducted Output Power  
 NOTES : Peak Conducted Output Power = 9.81dBm = 9.6mW  
 METHOD : PK1  
 EQUIPMENT USED : RBE0, T1E7,T2S0



Date: 2.JUL.2012 12:08:19

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

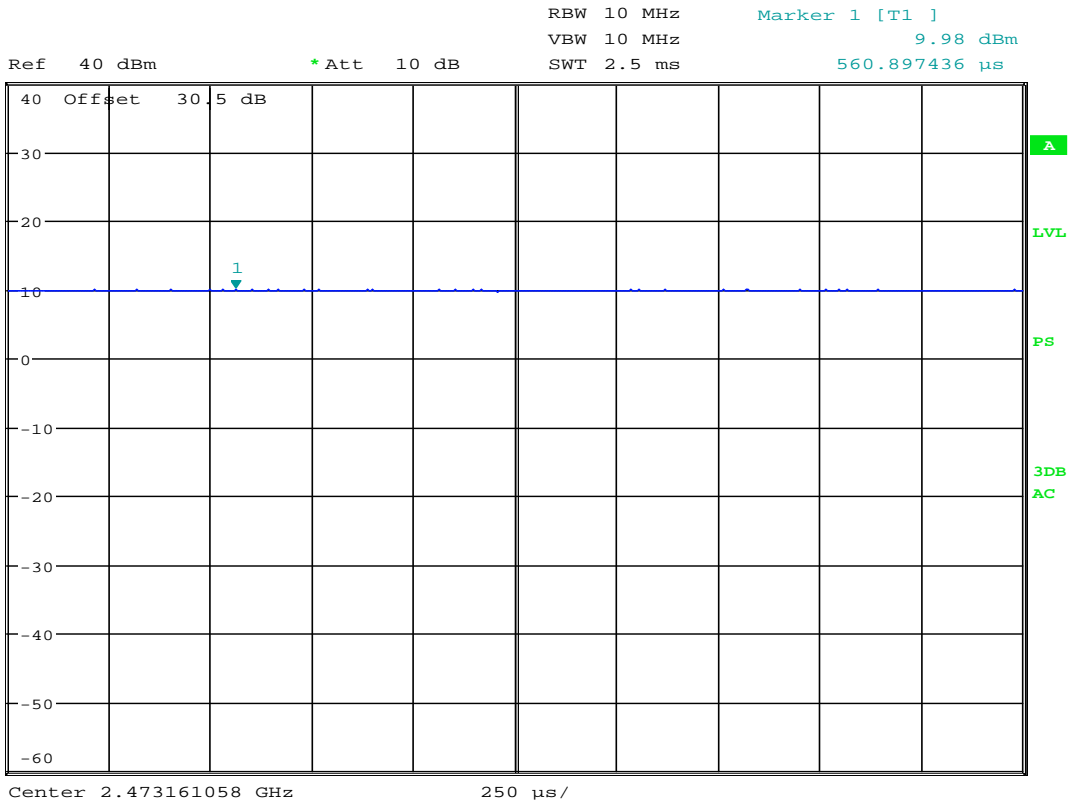
MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2404MHz, half bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : Peak Conducted Output Power  
 NOTES : Peak Conducted Output Power = 9.75dBm = 9.4mW  
 METHOD : PK1  
 EQUIPMENT USED : RBE0, T1E7,T2S0



Date: 2.JUL.2012 12:28:56

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

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2478MHz, full bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : Peak Conducted Output Power  
 NOTES : Peak Conducted Output Power = 10.03dBm = 10.1mW  
 METHOD : PK1  
 EQUIPMENT USED : RBE0, T1E7,T2S0



Date: 2.JUL.2012 12:36:34

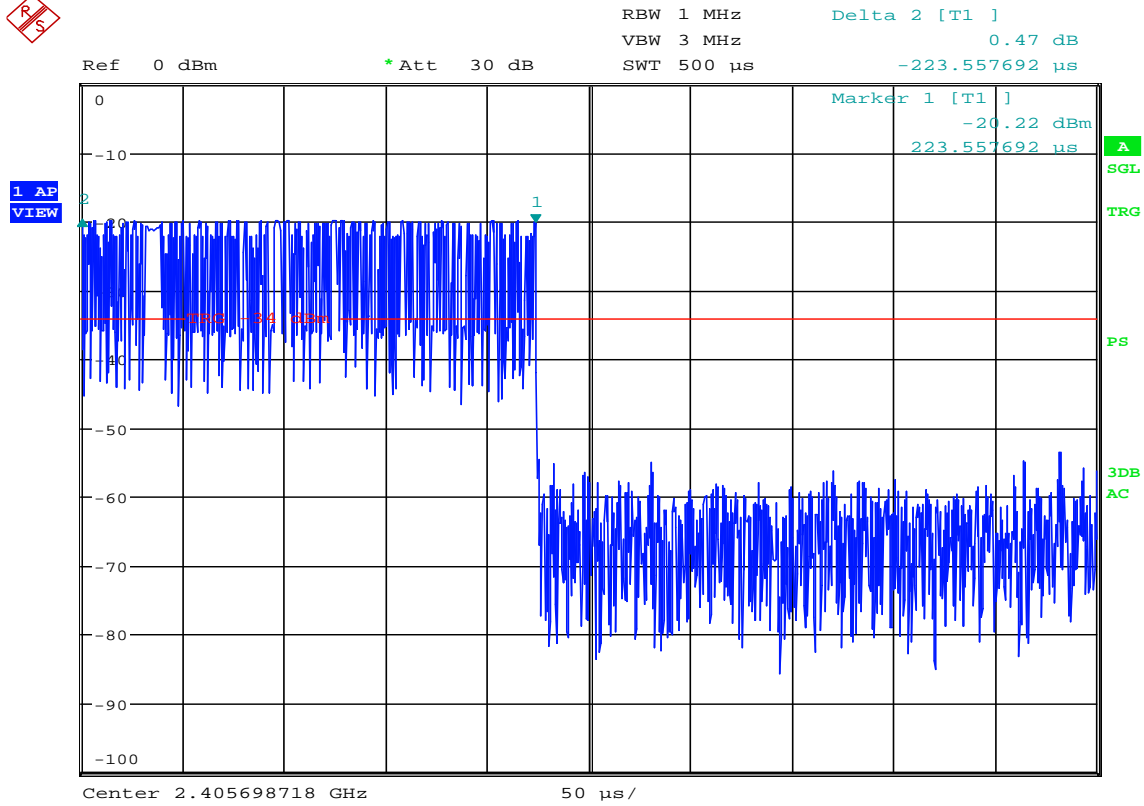
**FCC 15.247(b)(3) Maximum Peak Conducted Output Power**

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2478MHz, half bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : Peak Conducted Output Power  
 NOTES : Peak Conducted Output Power = 9.98dBm = 10.0mW  
 METHOD : PK1  
 EQUIPMENT USED : RBE0, T1E7,T2S0



MANUFACTURER Shure Incorporated  
EUT Bodypack Transceiver  
MODEL NO. GLXD1  
SERIAL NO. 1688  
SPECIFICATION FCC 15.247(b) and RSS-210 A8.4  
TEST Equivalent Isotropic Radiated Power  
MODE Transmitting  
DATE TESTED August 9, 2012  
NOTES  
TEST EQUIPMENT RBB0,NWI0,NWI1,GBX1

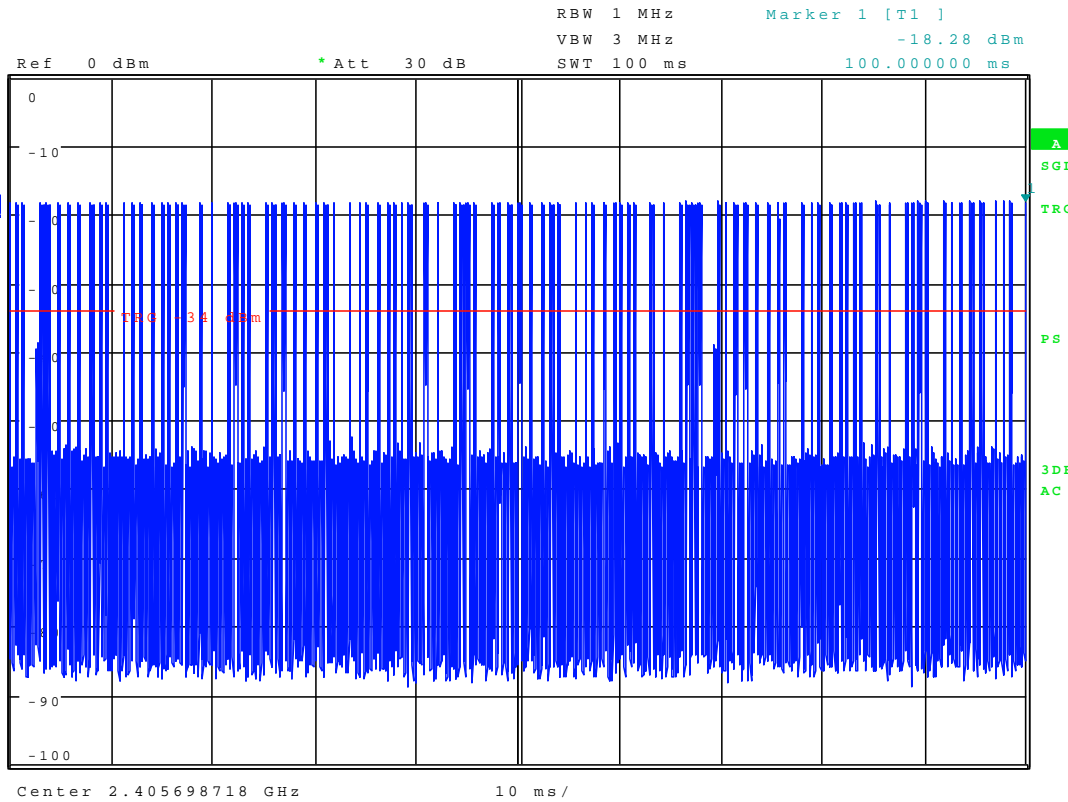
Freq. (MHz)	Ant Pol	10MHz BW Meter Reading (dBuV)	Matched Sig. Gen. Reading (dB)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)	Margin (dB)
2404.00	H	68.6	0.2	8.0	3.2	5.0	36.0	-31.0
2404.00	V	71.5	4.8	8.0	3.2	9.6	36.0	-26.4
2442.00	H	69.0	2.2	8.1	3.2	7.0	36.0	-29.0
2442.00	V	70.0	5.2	8.1	3.2	10.0	36.0	-26.0
2478.00	H	71.2	1.2	8.1	3.3	6.1	36.0	-29.9
2478.00	V	73.2	6.6	8.1	3.3	11.5	36.0	-24.5



Date: 29.JUN.2012 16:22:54

### FCC 15.35 Duty Cycle Factor

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 120  
 TEST MODE : Full Bandwidth, Communicating with GLXD4 (Group A, Ch.1)  
 TEST DATE : June 29, 2012  
 TEST PARAMETER : Duty Cycle Factor  
 NOTES : Pulse Width = 223usec  
 EQUIPMENT USED : RBE0

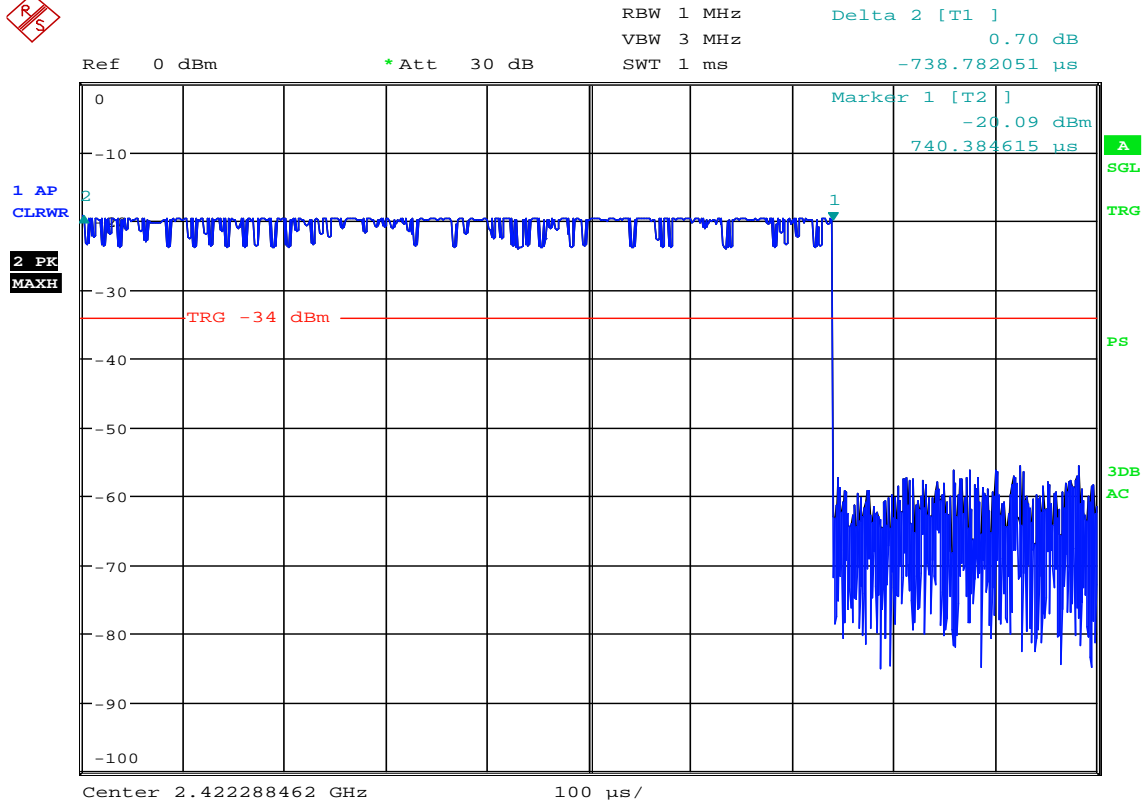


Date: 29.JUN.2012 16:35:11

### FCC 15.35 Duty Cycle Factor

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 120  
 TEST MODE : Full Bandwidth, Communicating with GLXD4 (Group A, Ch.1)  
 TEST DATE : June 29, 2012  
 TEST PARAMETER : Duty Cycle Factor  
 TEST PARAMETER : Duty Cycle Factor  
 NOTES : Duty Cycle Factor =  $20 \times \log(((\text{Pulse width}) \times (\# \text{ pulses in } 100\text{msec}))/100\text{msec})$   
 : Duty Cycle Factor =  $20 \times \log(((220\text{usec}) \times (101 \text{ pulses in } 100\text{msec}))/100\text{msec})$   
 : Duty Cycle Factor =  $20 \times \log((21.12\text{msec})/(100\text{msec}))$   
 : Duty Cycle Factor = -13.07dB  
 : The 2 pulses with a smaller amplitude are from the GLXD4  
 EQUIPMENT USED : RBE0

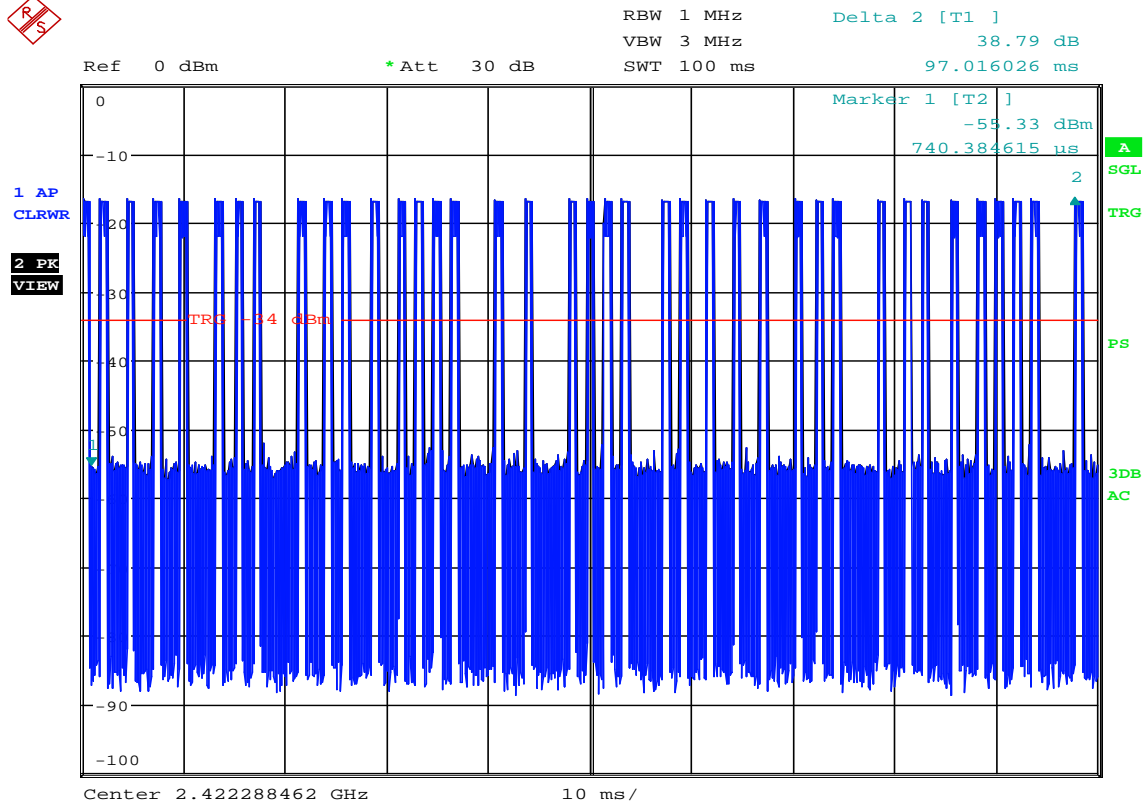




Date: 29.JUN.2012 16:53:26

### FCC 15.35 Duty Cycle Factor

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 120  
 TEST MODE : Half Bandwidth, Communicating with GLXD1 (Group 1, Ch.1)  
 TEST DATE : June 29, 2012  
 TEST PARAMETER : Duty Cycle Factor  
 NOTES : Pulse Width =740.4usec  
 EQUIPMENT USED : RBE0



Date: 29.JUN.2012 17:00:04

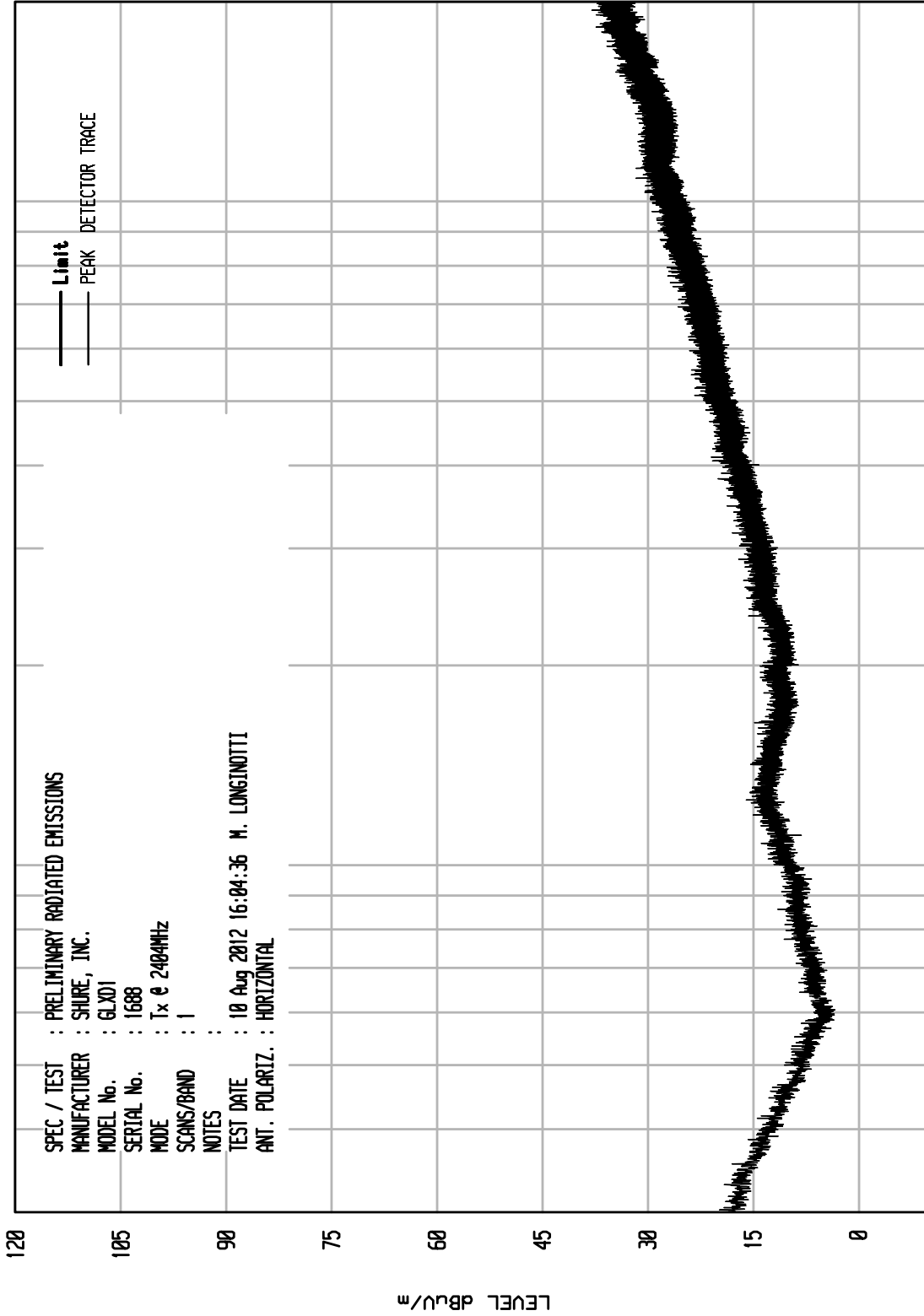
### FCC 15.35 Duty Cycle Factor

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 120  
 TEST MODE : Half Bandwidth, Communicating with GLXD4 (Group 1, Ch.1)  
 TEST DATE : June 29, 2012  
 TEST PARAMETER : Duty Cycle Factor  
 NOTES : Number of Pulses in 100msec period = 39  
 NOTES : Duty Cycle Factor =  $20 \times \log(((\text{Pulse width}) \times (\# \text{ pulses in } 100\text{msec}))/100\text{msec})$   
 : Duty Cycle Factor =  $20 \times \log(((750\text{usec}) \times (39\text{pulses in } 100\text{msec}))/100\text{msec})$   
 : Duty Cycle Factor =  $20 \times \log((29.25\text{msec})/100\text{msec})$   
 : Duty Cycle Factor = -10.7dB  
 EQUIPMENT USED : RBE0

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIU RCU EMI RUN 52

UKA1 04/26/11

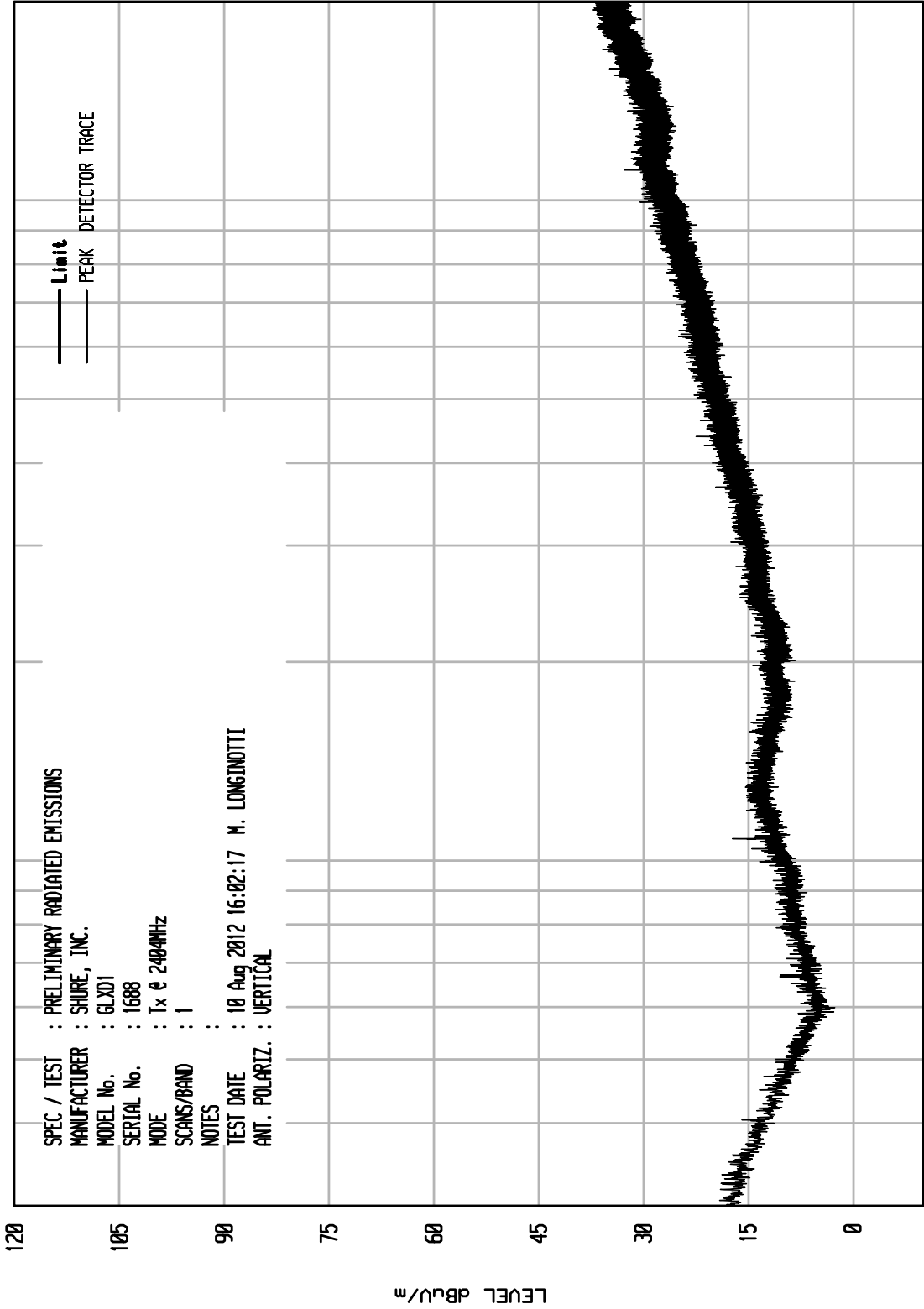


START = 30      STOP = 2000  
 FREQUENCY MHz

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCU EMI RUN 51

UKA1 04/26/11



SPEC / TEST : PRELIMINARY RADIATED EMISSIONS

MANUFACTURER : SHURE, INC.

MODEL No. : GLXD1

SERIAL No. : 1688

MODE : Tx @ 2404MHz

SCANS/BAND : 1

NOTES :

TEST DATE : 10 Aug 2012 16:02:17 M. LONGINOTTI

ANT. POLARIZ. : VERTICAL

START = 30

100

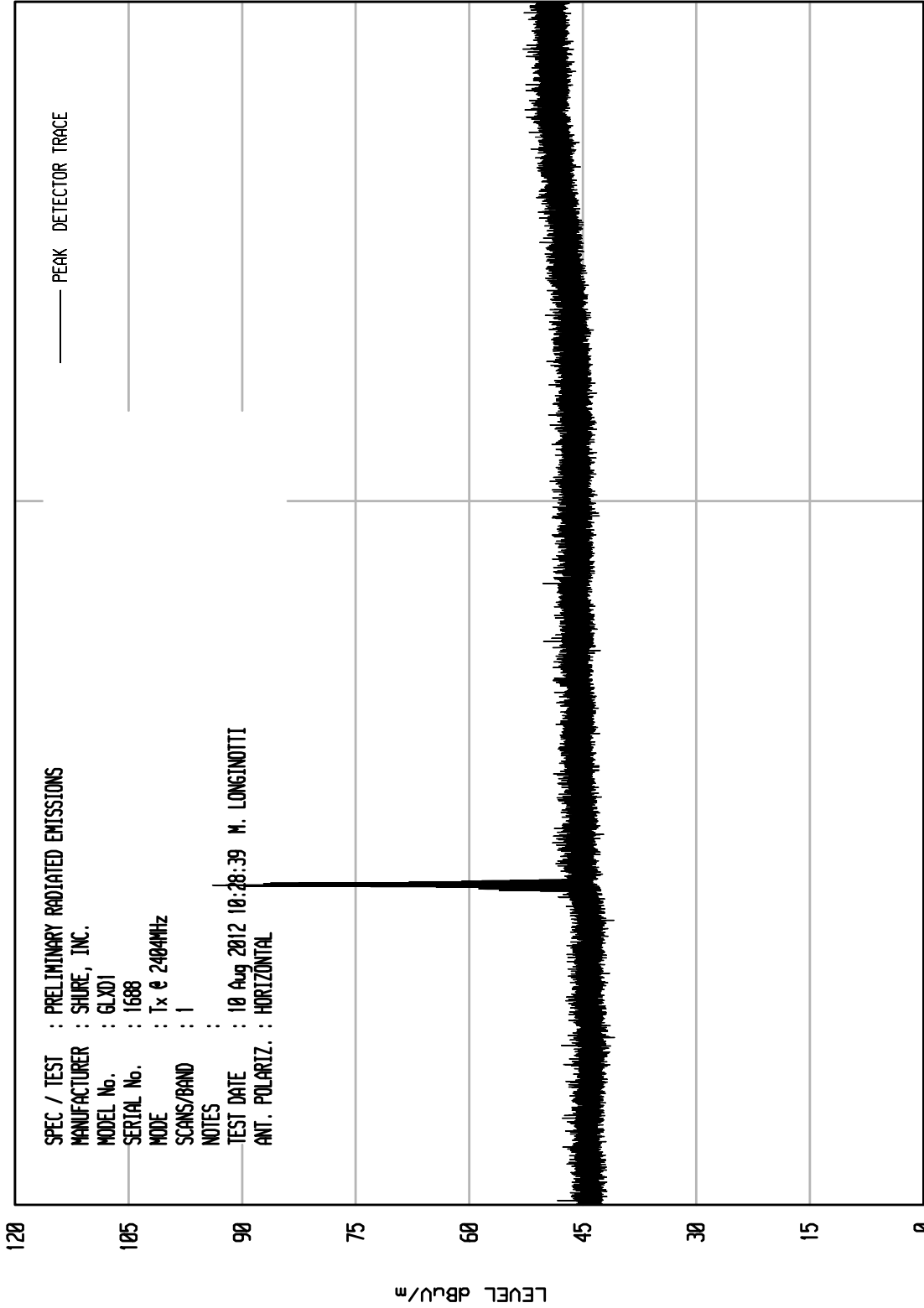
1000

STOP = 2000

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. : GLXD1

SERIAL No. : 1688

MODE : Tx @ 2404MHz

SCANS/BAND : 1

NOTES :

TEST DATE : 10 Aug 2012 10:28:39 M. LONGINOTTI

ANT. POLARIZ. : HORIZONTAL

START = 2000

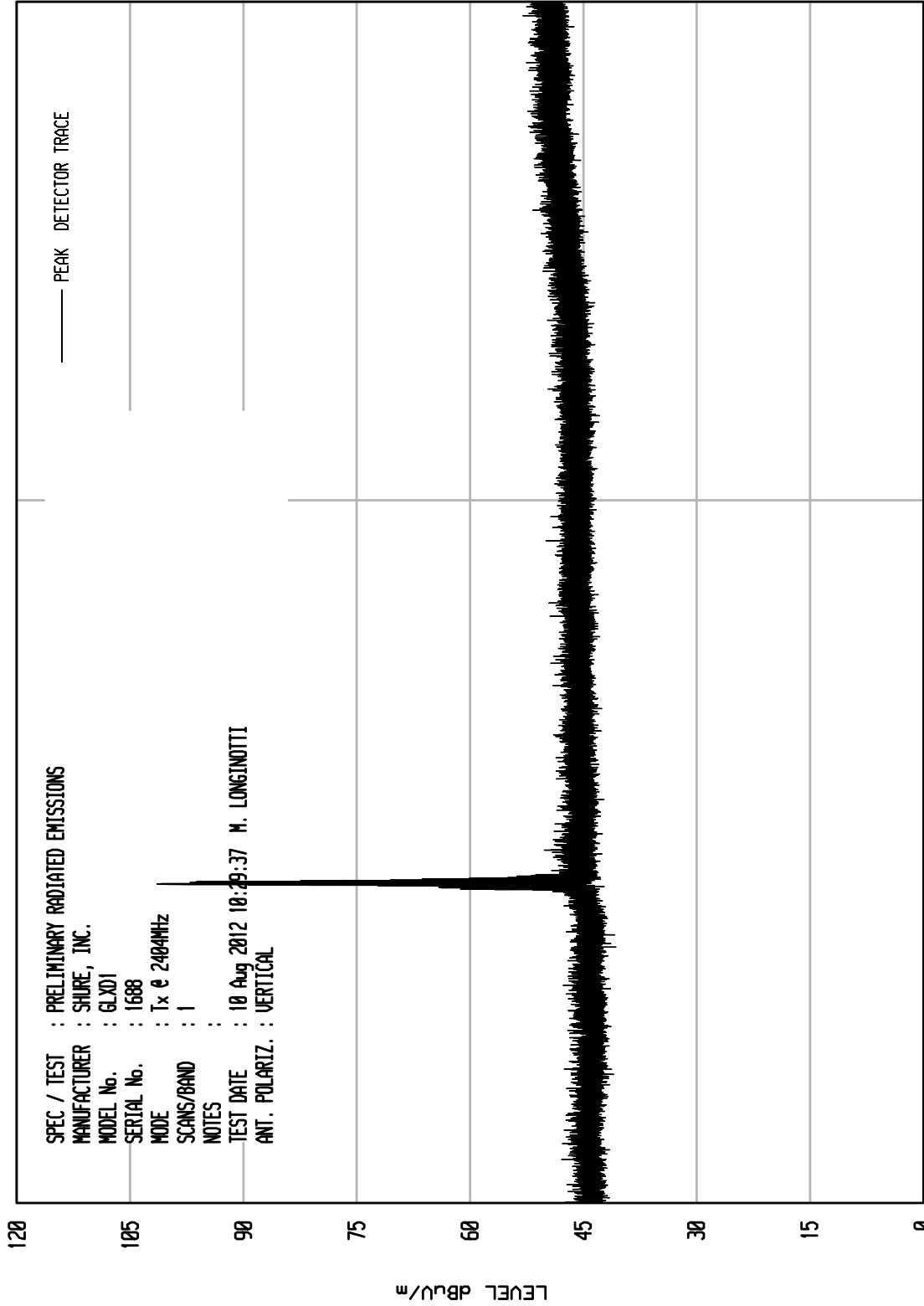
FREQUENCY MHz

STOP = 4000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCU EMI RUN 4

UKA1 04/26/11



SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 1688  
 MODE : Tx @ 2404MHz  
 SCANS/BAND : 1  
 NOTES :  
 TEST DATE : 10 Aug 2012 10:29:37 M. LONGINOTTI  
 ANT. POLARIZ. : VERTICAL

STOP = 4000

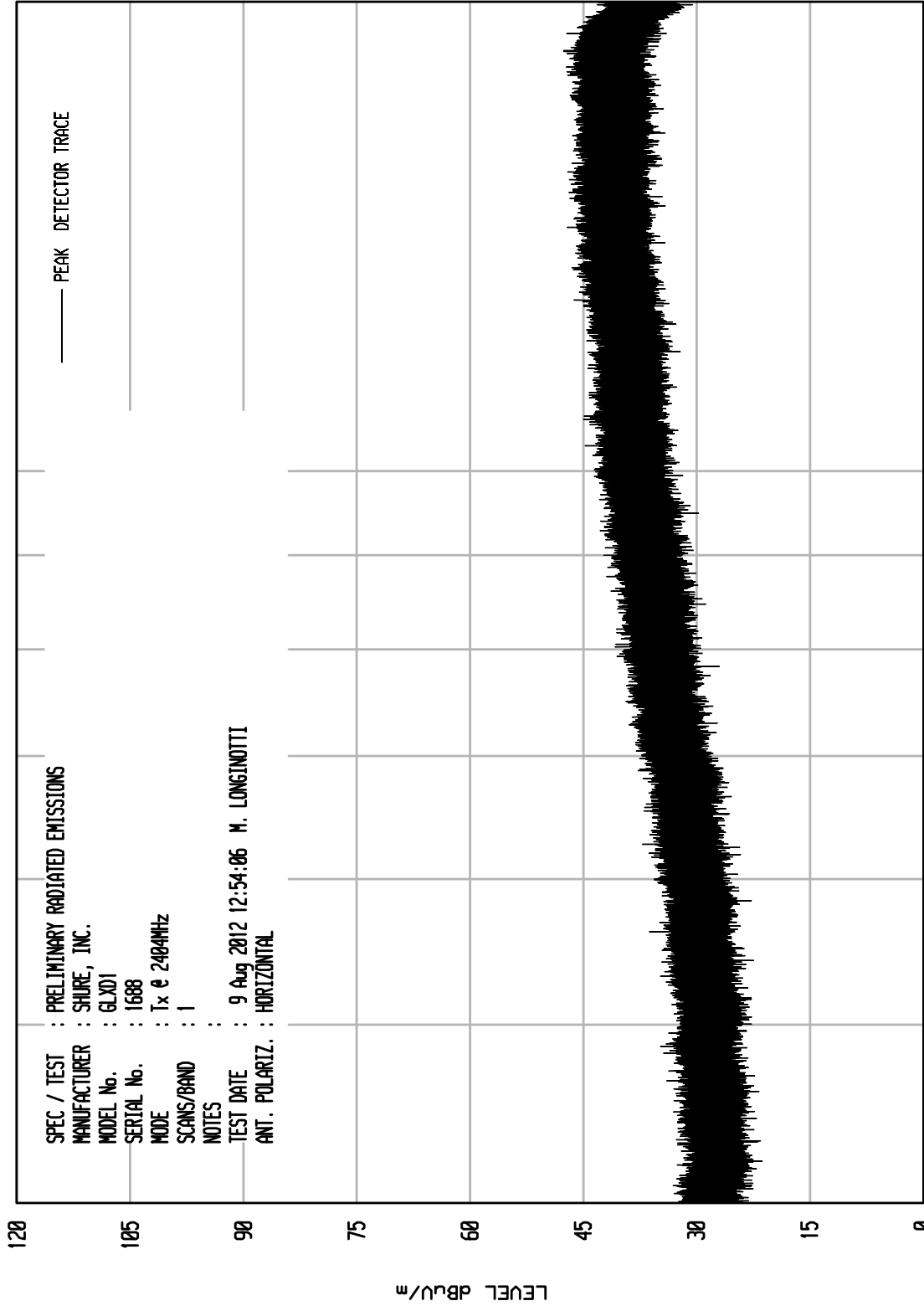
FREQUENCY MHz

START = 2000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCV ENI RUN 14

UKA1 04/26/11



120  
105  
90  
75  
60  
45  
30  
15  
0

LEVEL dBu/m

10000

FREQUENCY MHz

STOP = 18000

START = 4000

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS

MANUFACTURER : SHURE, INC.

MODEL No. : GLXD1

SERIAL No. : 1688

MODE : Tx @ 2404MHz

SCANS/BAND : 1

NOTES :

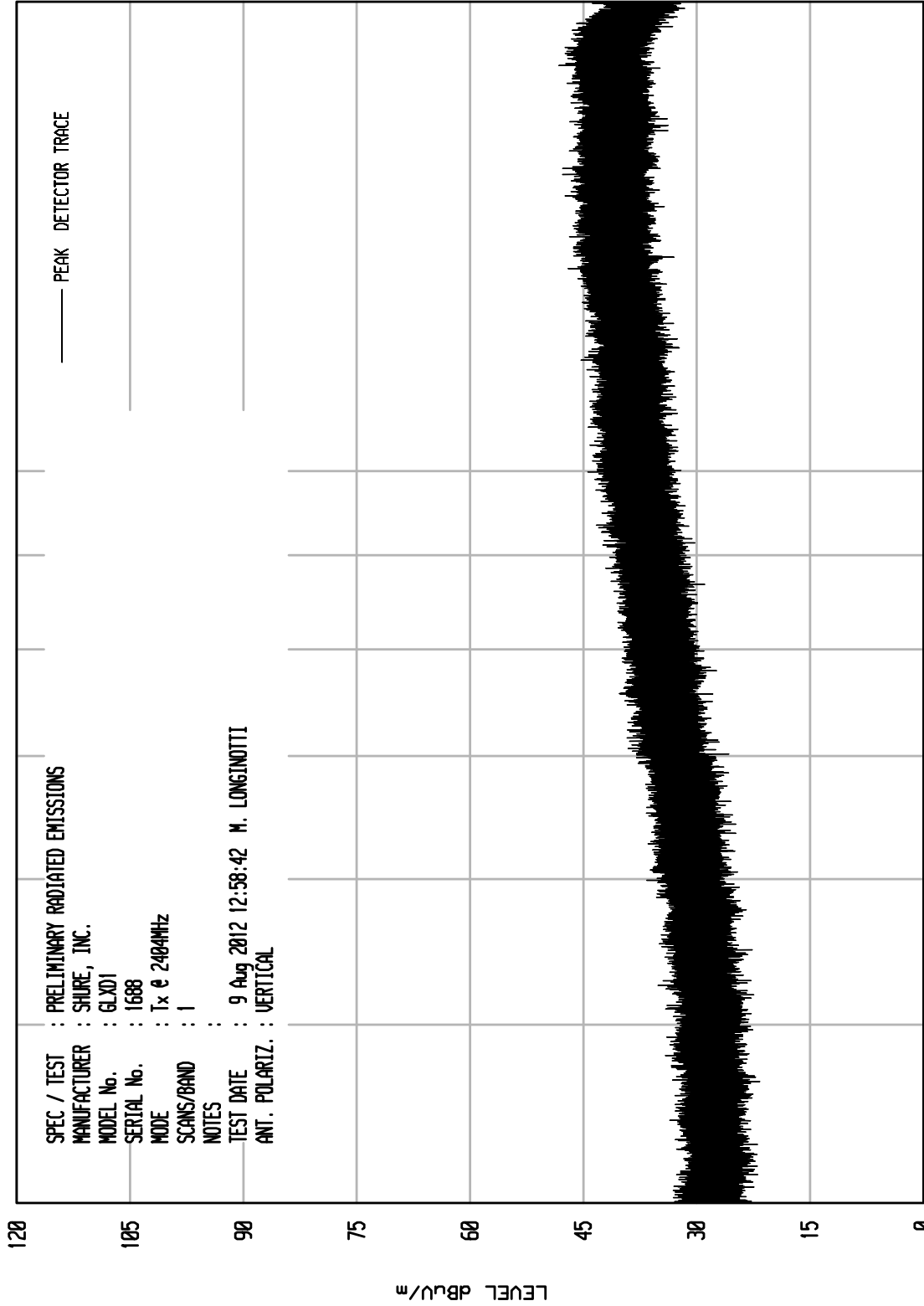
TEST DATE : 9 Aug 2012 12:54:06 M. LONGINOTTI

ANT. POLARIZ. : HORIZONTAL

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCV ENI RUN 15

UKA1 04/26/11



SPEC / TEST : PRELIMINARY RADIATED EMISSIONS

MANUFACTURER : SHURE, INC.

MODEL No. : GLXD1

SERIAL No. : 1688

MODE : Tx @ 2404MHz

SCANS/BAND : 1

NOTES :

TEST DATE : 9 Aug 2012 12:58:42 M. LONGINOTTI

ANT. POLARIZ. : VERTICAL

START = 4000

FREQUENCY MHz

STOP = 18000

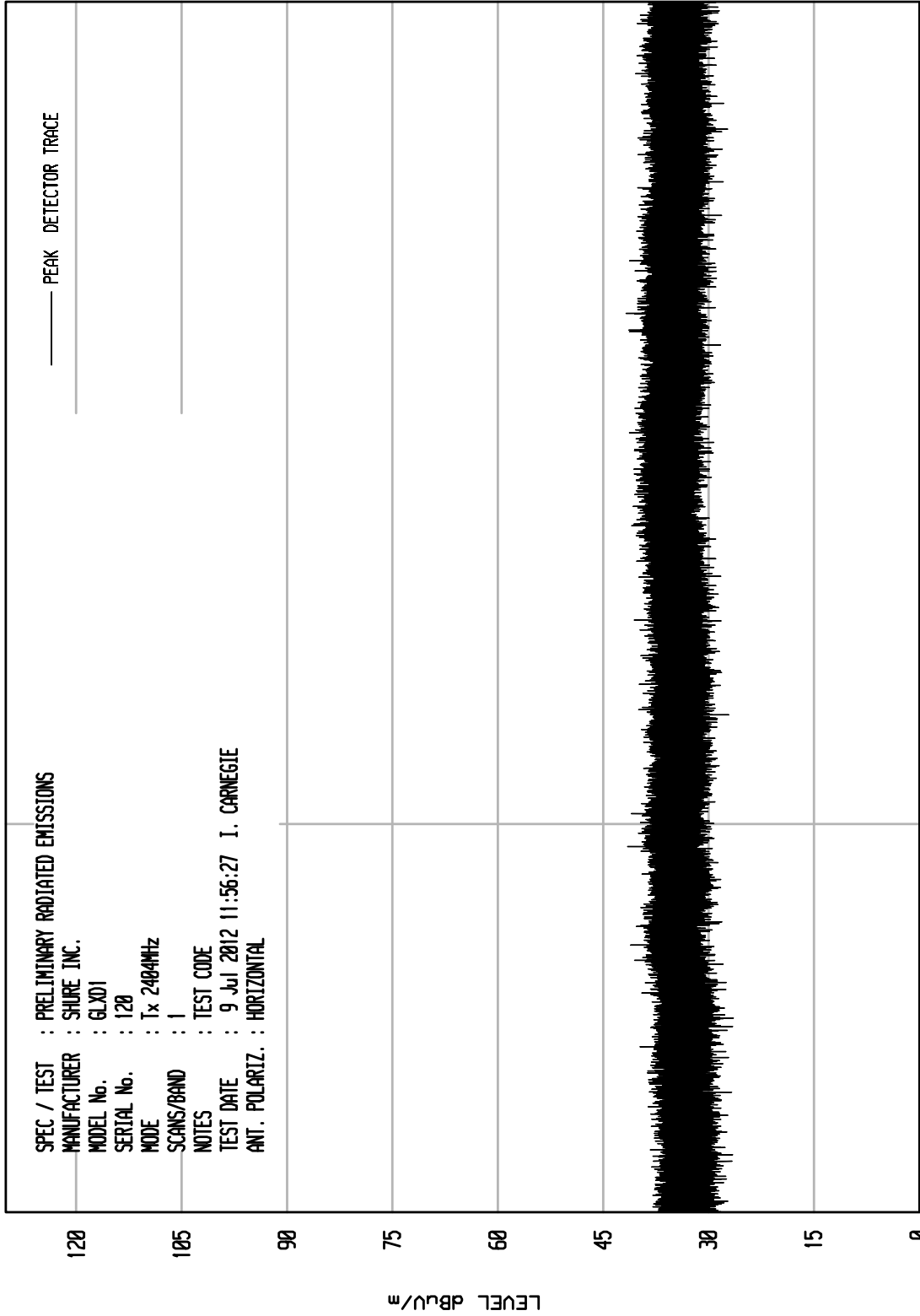


ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

UNIV RCU ENI RUN 14

UKA1 04/26/11



SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 120  
 MODE : Tx 2404MHz  
 SCANS/BAND : 1  
 NOTES : TEST CODE  
 TEST DATE : 9 Jul 2012 11:56:27 I. CARNEGIE  
 ANT. POLARIZ. : HORIZONTAL

STOP = 25000

FREQUENCY MHz

START = 18000



ELITE ELECTRONIC ENGINEERING Inc.

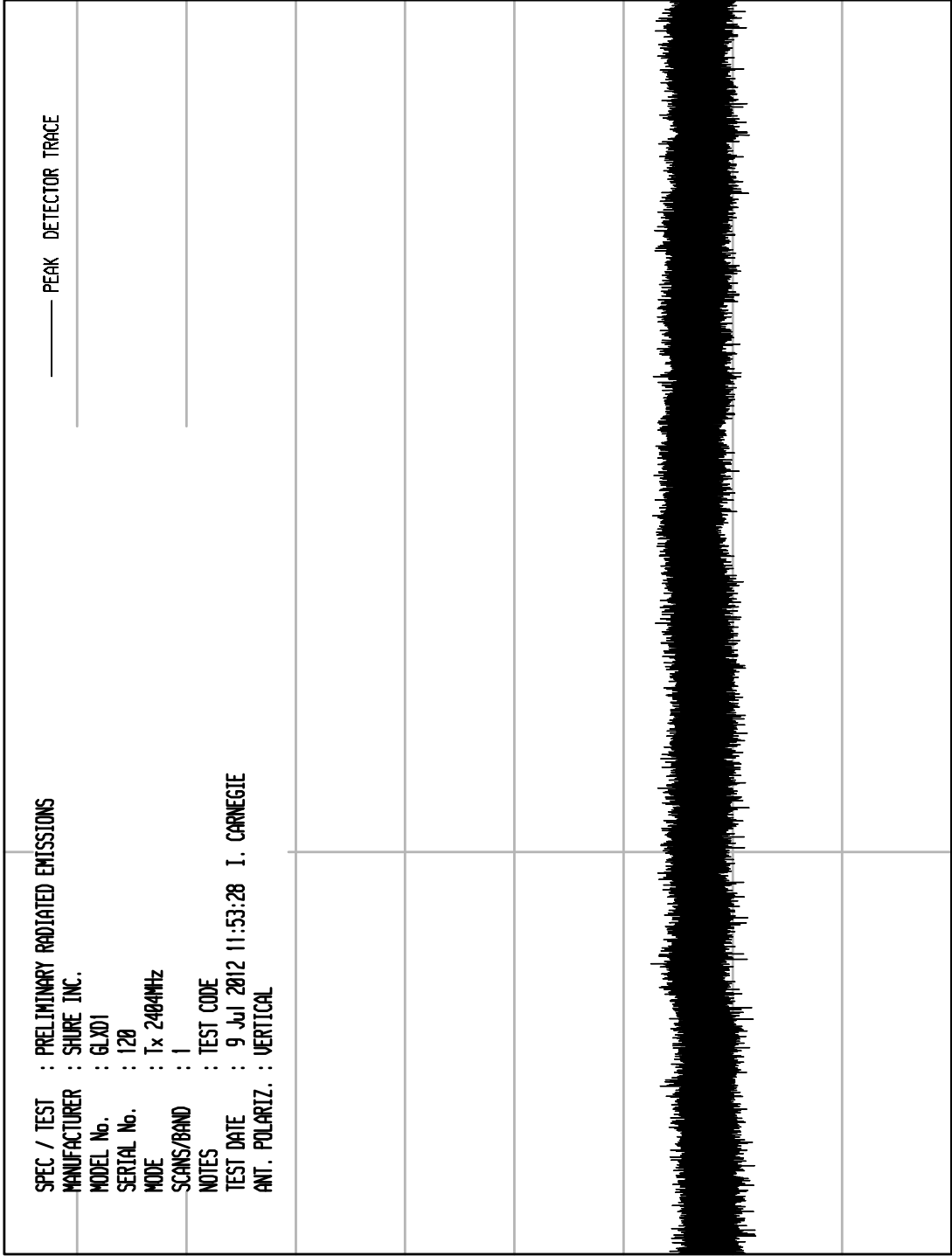
Downers Grove, Ill. 60515

UNIV RCU ENI RUN 13

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 120  
 MODE : Tx 2404MHz  
 SCANS/BAND : 1  
 NOTES : TEST CODE  
 TEST DATE : 9 Jul 2012 11:53:28 I. CARNEGIE  
 ANT. POLARIZ. : VERTICAL

— PEAK DETECTOR TRACE



START = 18000

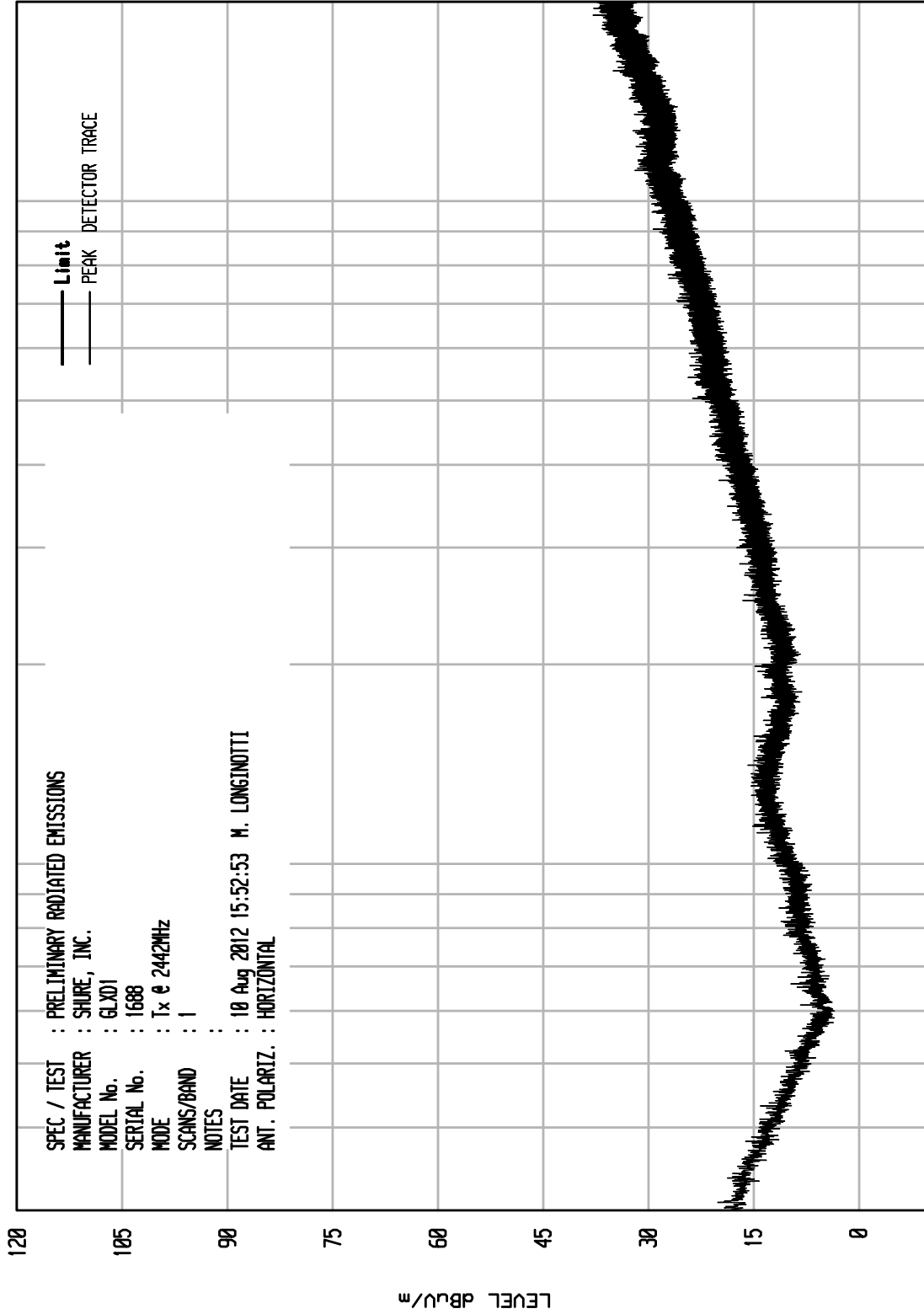
FREQUENCY MHz

STOP = 25000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIU RCU EMI RUN 49

UKA1 04/26/11



STOP = 2000

1000

FREQUENCY MHz

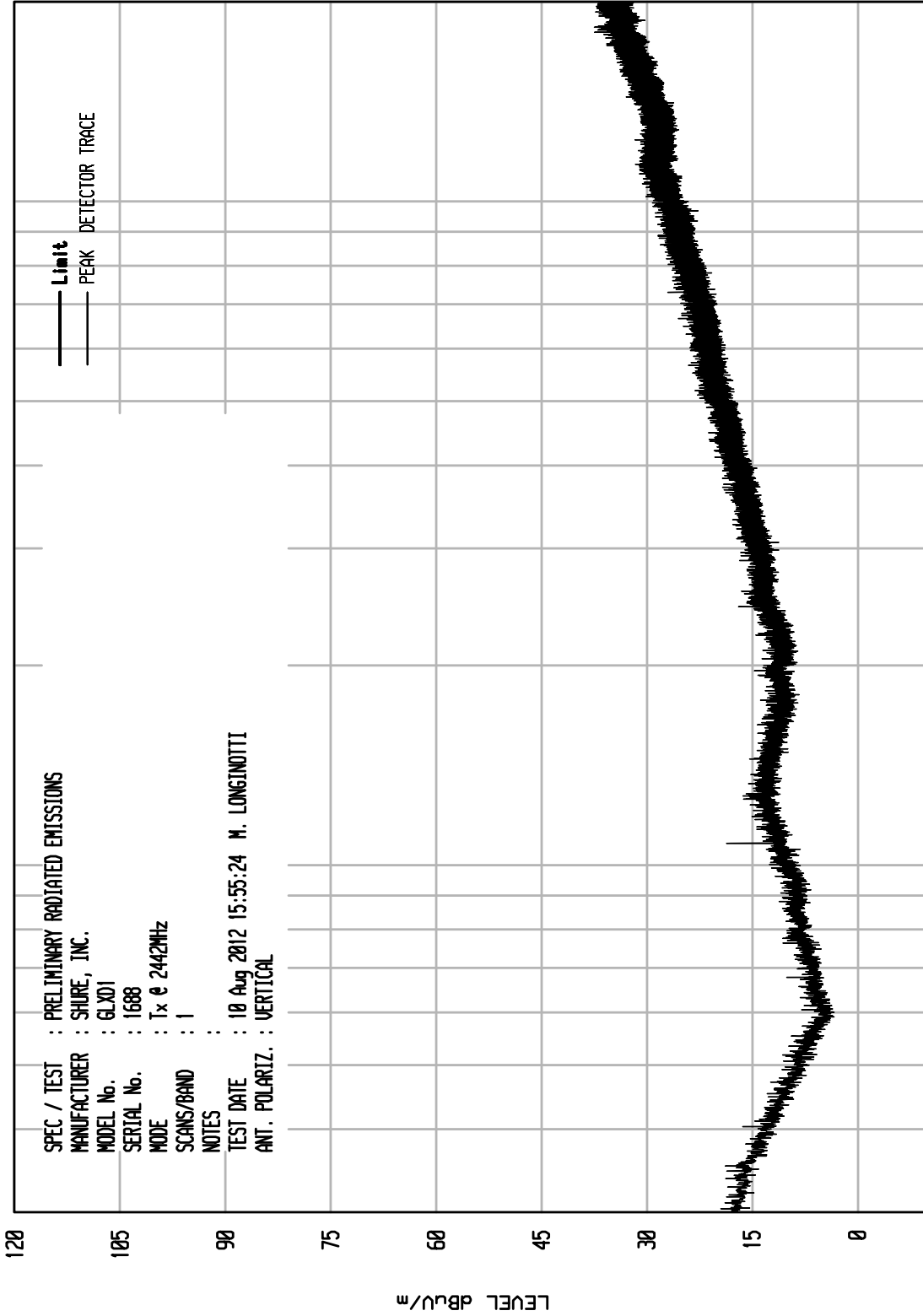
100

START = 30

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCU EMI RUN 50

UKA1 04/26/11



120

105

90

75

60

45

30

15

0

LEVEL dBu/m

100

1000

FREQUENCY MHz

STOP = 2000

START = 30

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS

MANUFACTURER : SHURE, INC.

MODEL No. : GLXD1

SERIAL No. : 1688

MODE : Tx @ 2442MHz

SCANS/BAND : 1

NOTES :

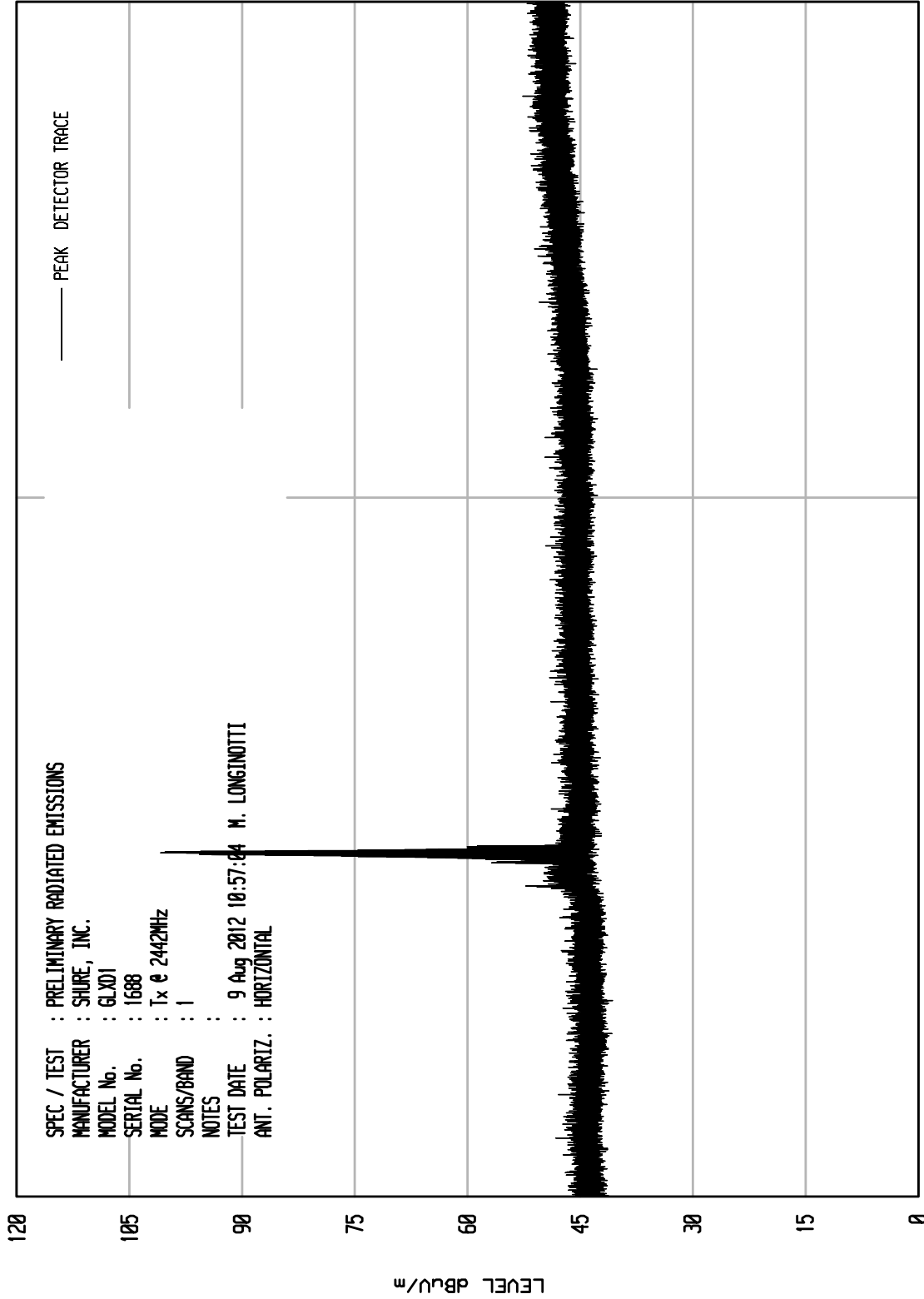
TEST DATE : 10 Aug 2012 15:55:24 M. LONGINOTTI

ANT. POLARIZ. : VERTICAL

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 10

UKA1 04/26/11



SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 1688  
 MODE : Tx @ 2442MHz  
 SCANS/BAND : 1  
 NOTES :  
 TEST DATE : 9 Aug 2012 10:57:04 M. LONGINOTTI  
 ANT. POLARIZ. : HORIZONTAL

STOP = 4000

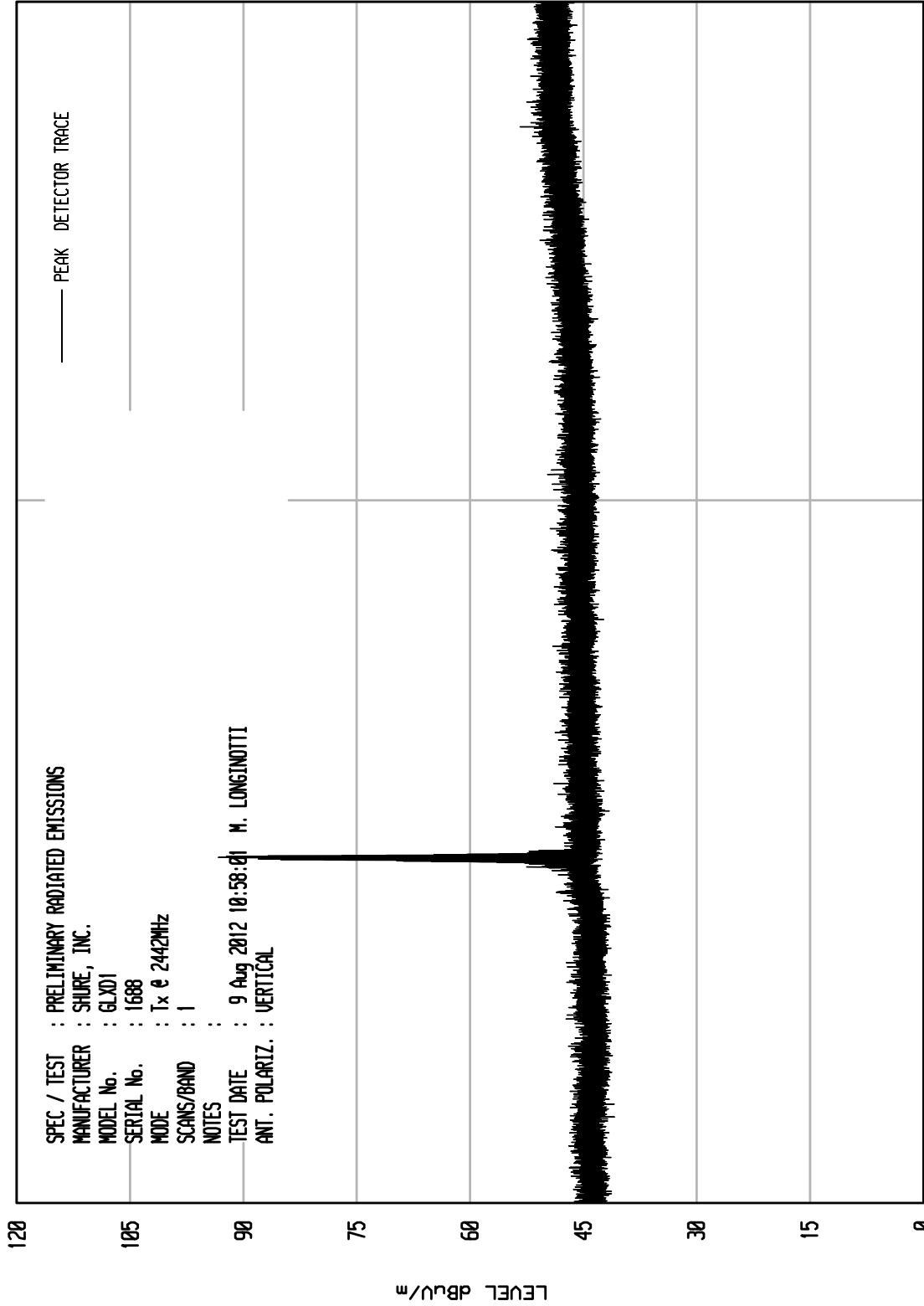
FREQUENCY MHz

START = 2000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 11

UKA1 04/26/11



SPEC / TEST : PRELIMINARY RADIATED EMISSIONS

MANUFACTURER : SHURE, INC.

MODEL No. : GLXD1

SERIAL No. : 1688

MODE : Tx @ 2442MHz

SCANS/BAND : 1

NOTES :

TEST DATE : 9 Aug 2012 10:58:01 M. LONGINOTTI

ANT. POLARIZ. : VERTICAL

START = 2000

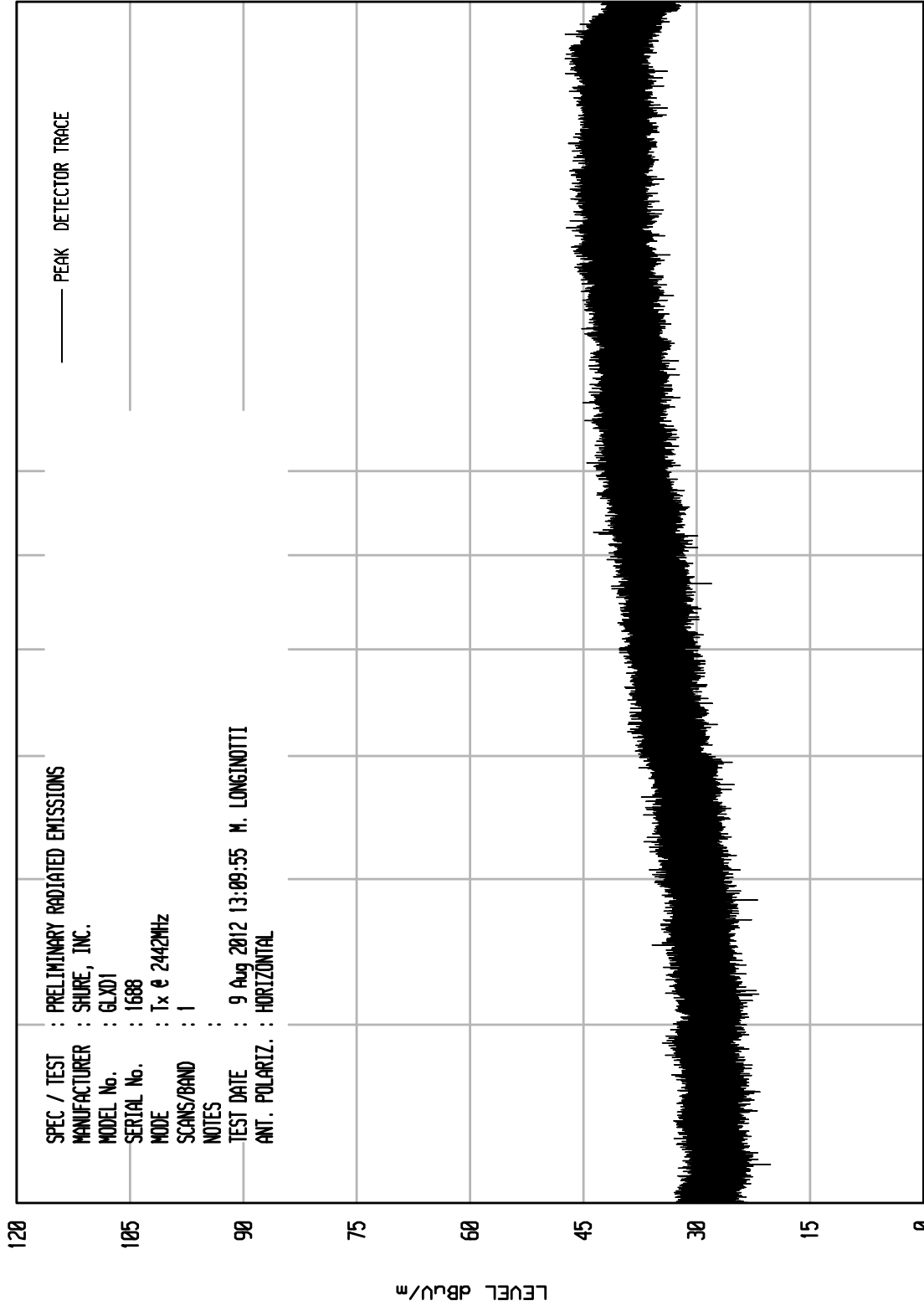
FREQUENCY MHz

STOP = 4000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCV ENI RUN 17

UKA1 04/26/11



10000

FREQUENCY MHz

STOP = 18000

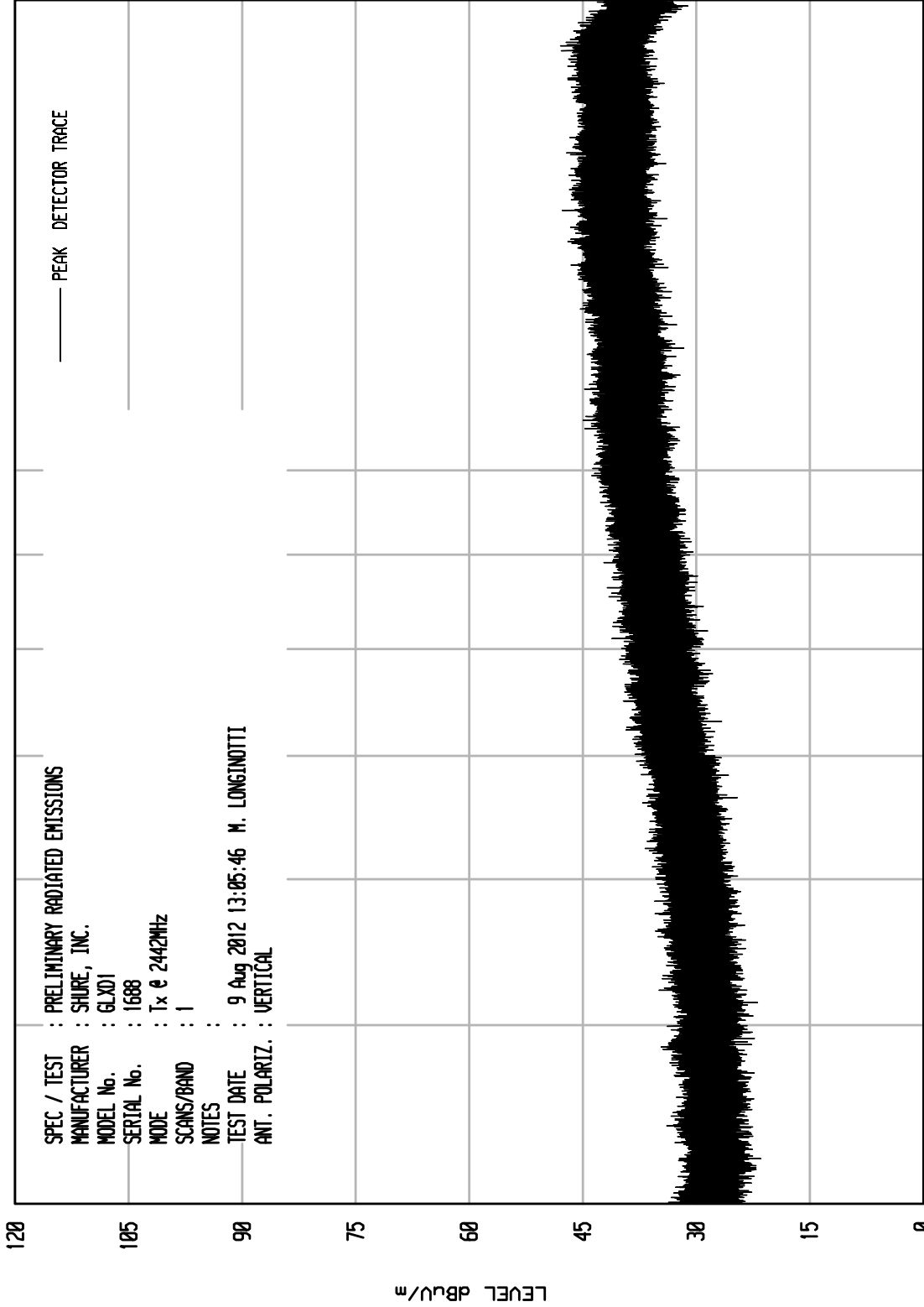
START = 4000

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 1688  
 MODE : Tx @ 2442MHz  
 SCANS/BAND : 1  
 NOTES :  
 TEST DATE : 9 Aug 2012 13:09:55 M. LONGINOTTI  
 ANT. POLARIZ. : HORIZONTAL

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCV ENI RUN 16

UKA1 04/26/11



SPEC / TEST : PRELIMINARY RADIATED EMISSIONS

MANUFACTURER : SHURE, INC.

MODEL No. : GLXD1

SERIAL No. : 1688

MODE : Tx @ 2442MHz

SCANS/BAND : 1

NOTES :

TEST DATE : 9 Aug 2012 13:05:46 M. LONGINOTTI

ANT. POLARIZ. : VERTICAL

START = 4000

10000

FREQUENCY MHz

STOP = 18000





ELITE ELECTRONIC ENGINEERING Inc.

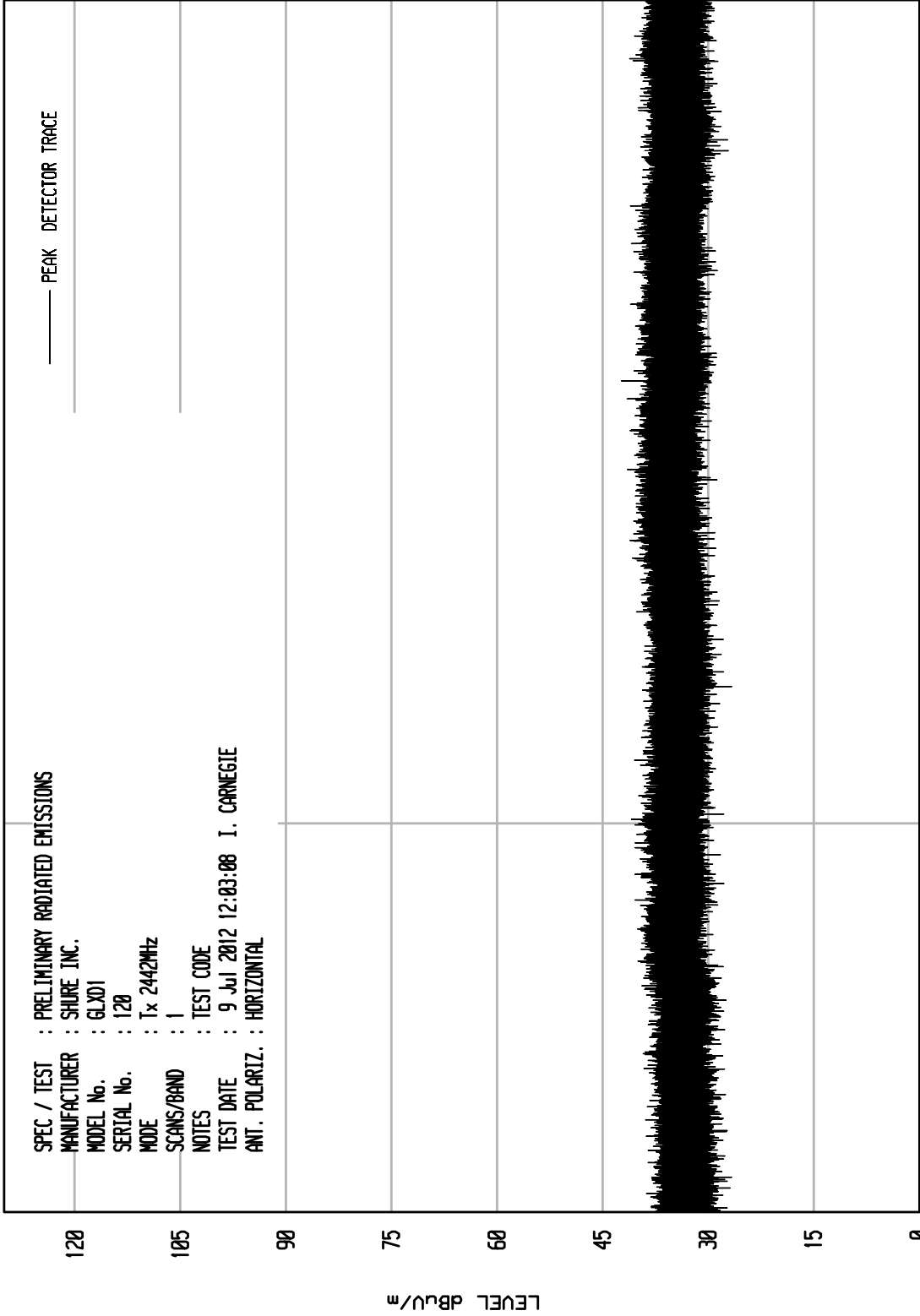
Downers Grove, Ill. 60515

UNIU RCU EMI RUN 15

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 120  
 MODE : Tx 2442MHz  
 SCANS/BAND : 1  
 NOTES : TEST CODE  
 TEST DATE : 9 Jul 2012 12:03:08 I. CARNEGIE  
 ANT. POLARIZ. : HORIZONTAL

— PEAK DETECTOR TRACE



START = 18000

FREQUENCY MHz

STOP = 25000



ELITE ELECTRONIC ENGINEERING Inc.

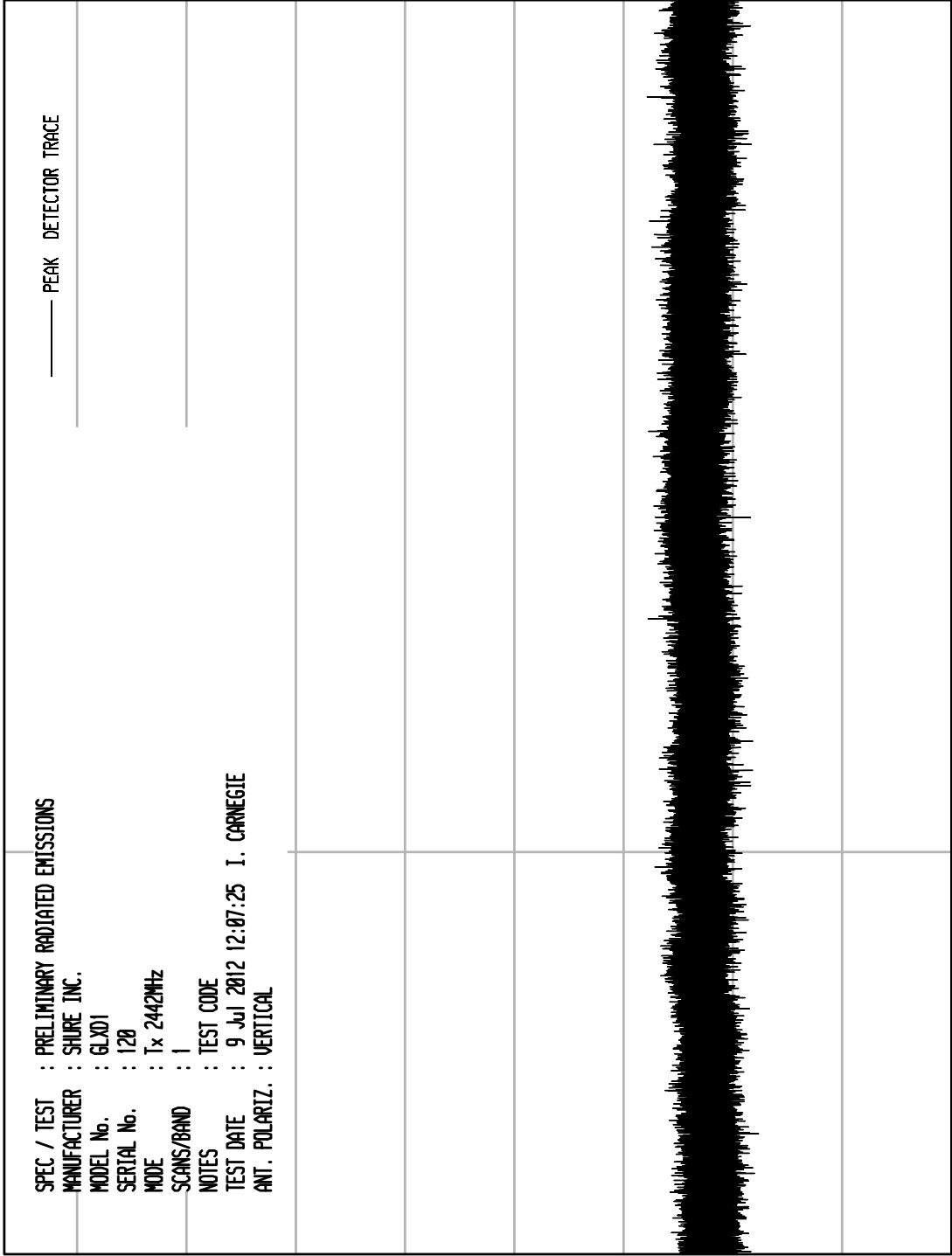
Downers Grove, Ill. 60515

UNIU RCU ENI RUN 16

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 120  
 MODE : Tx 2442MHz  
 SCANS/BAND : 1  
 NOTES : TEST CODE  
 TEST DATE : 9 Jul 2012 12:07:25 I. CARNEGIE  
 ANT. POLARIZ. : VERTICAL

— PEAK DETECTOR TRACE



START = 18000

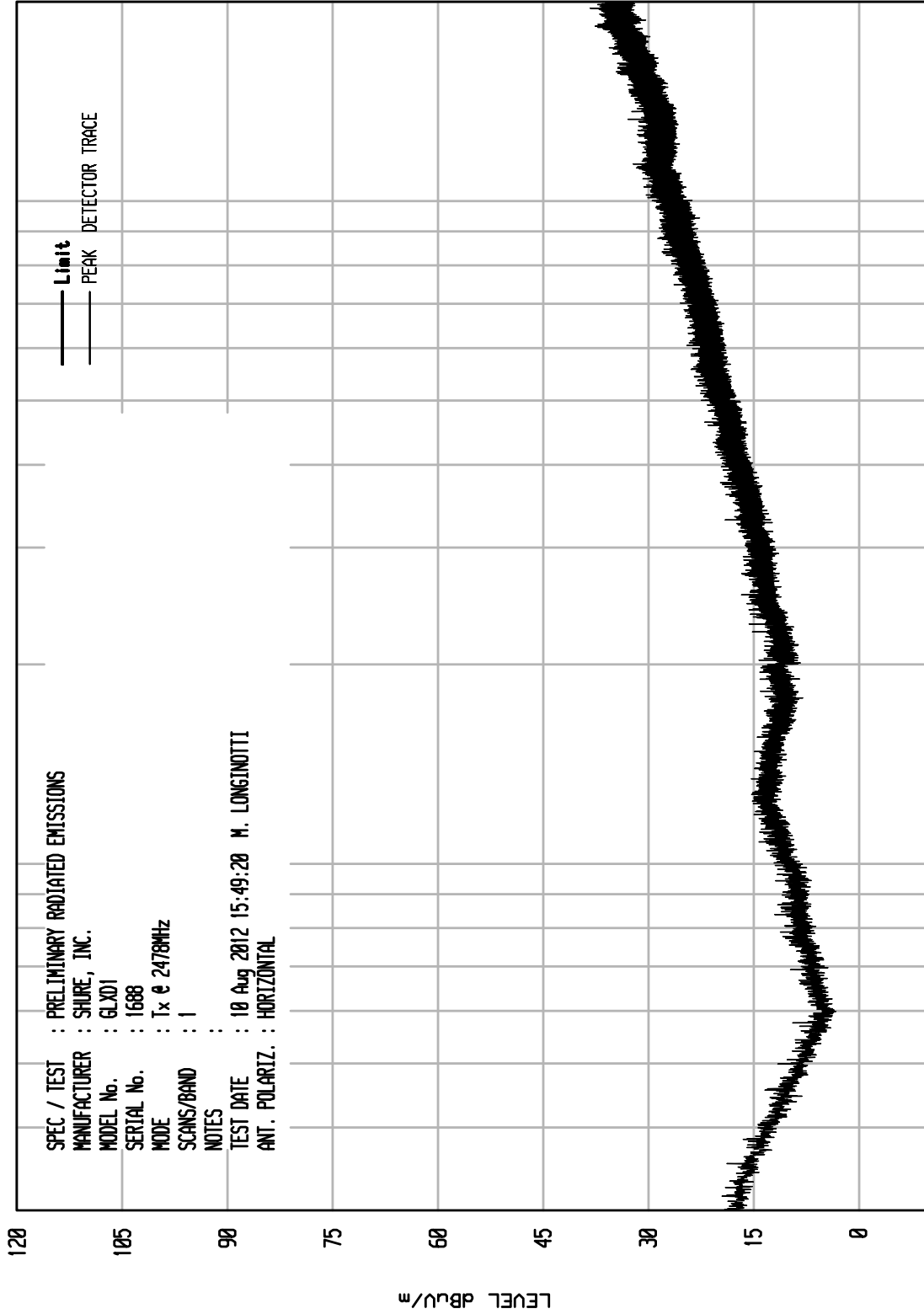
FREQUENCY MHz

STOP = 25000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIU RCU EMI RUN 48

UKA1 04/26/11

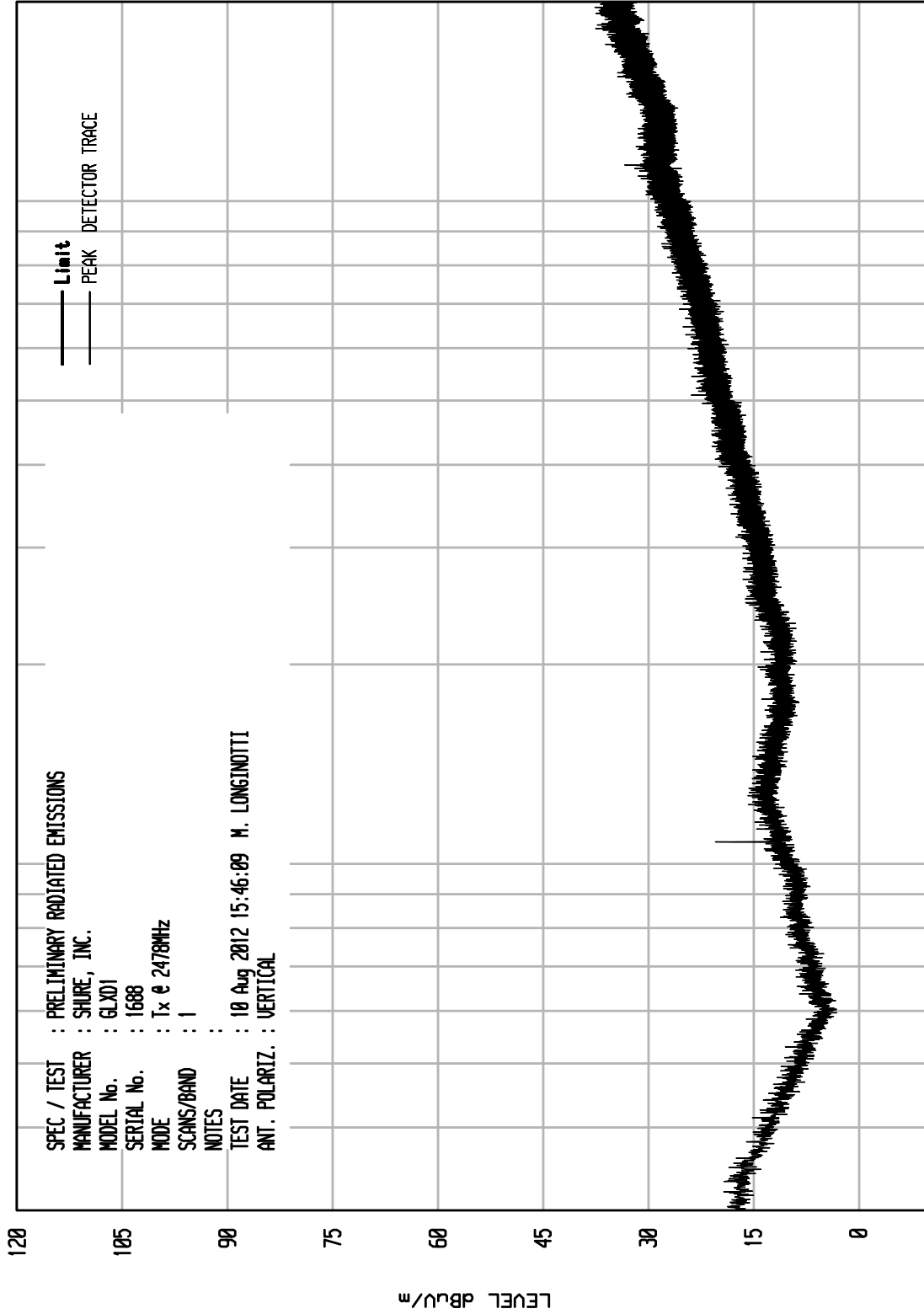


START = 30      STOP = 2000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIU RCU EMI RUN 47

UKA1 04/26/11

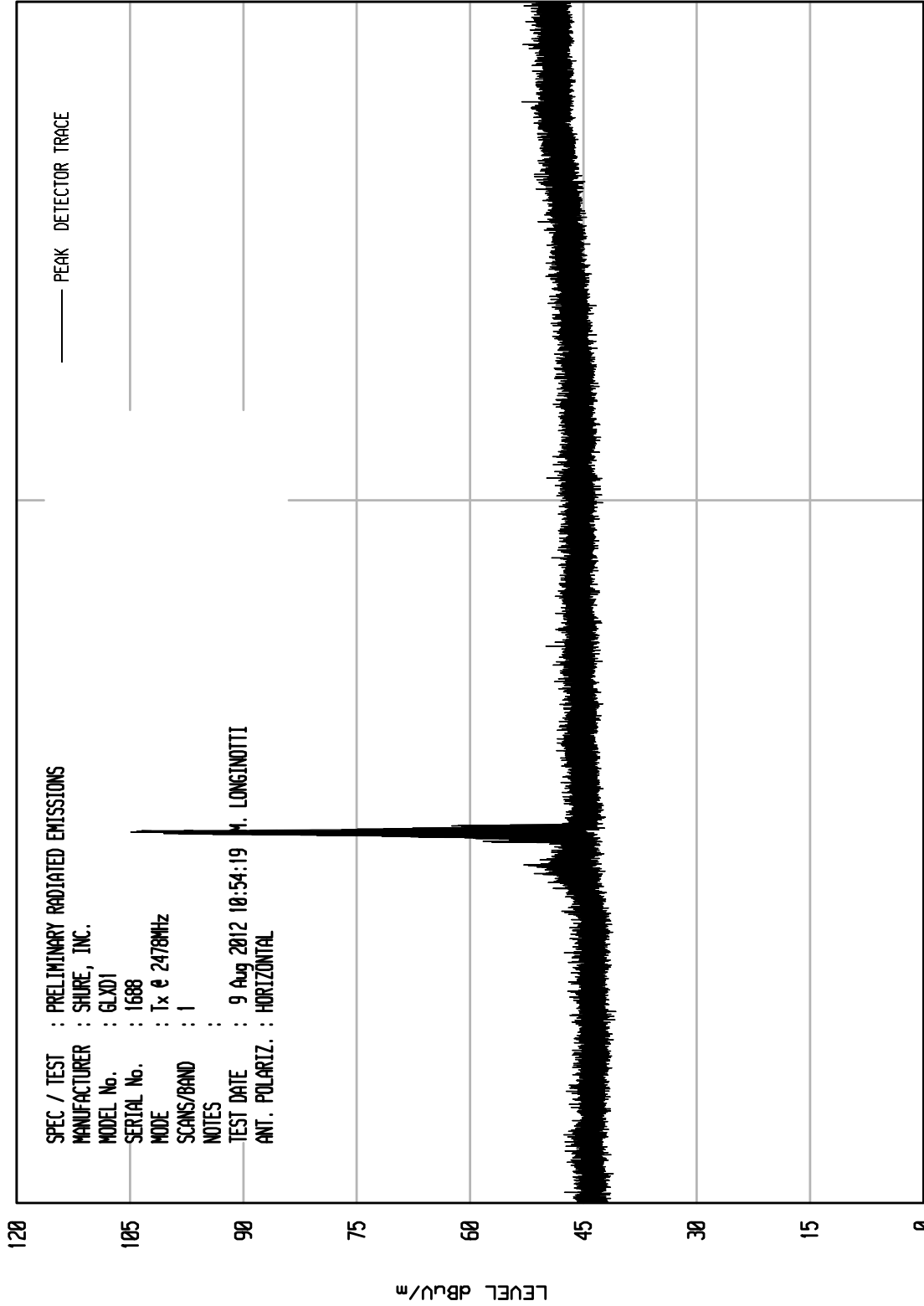


START = 30      STOP = 2000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCU EMI RUN 9

UKA1 04/26/11



PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 1688  
 MODE : Tx @ 2478MHz  
 SCANS/BAND : 1  
 NOTES :  
 TEST DATE : 9 Aug 2012 10:54:19 M. LONGINOTTI  
 ANT. POLARIZ. : HORIZONTAL

STOP = 4000

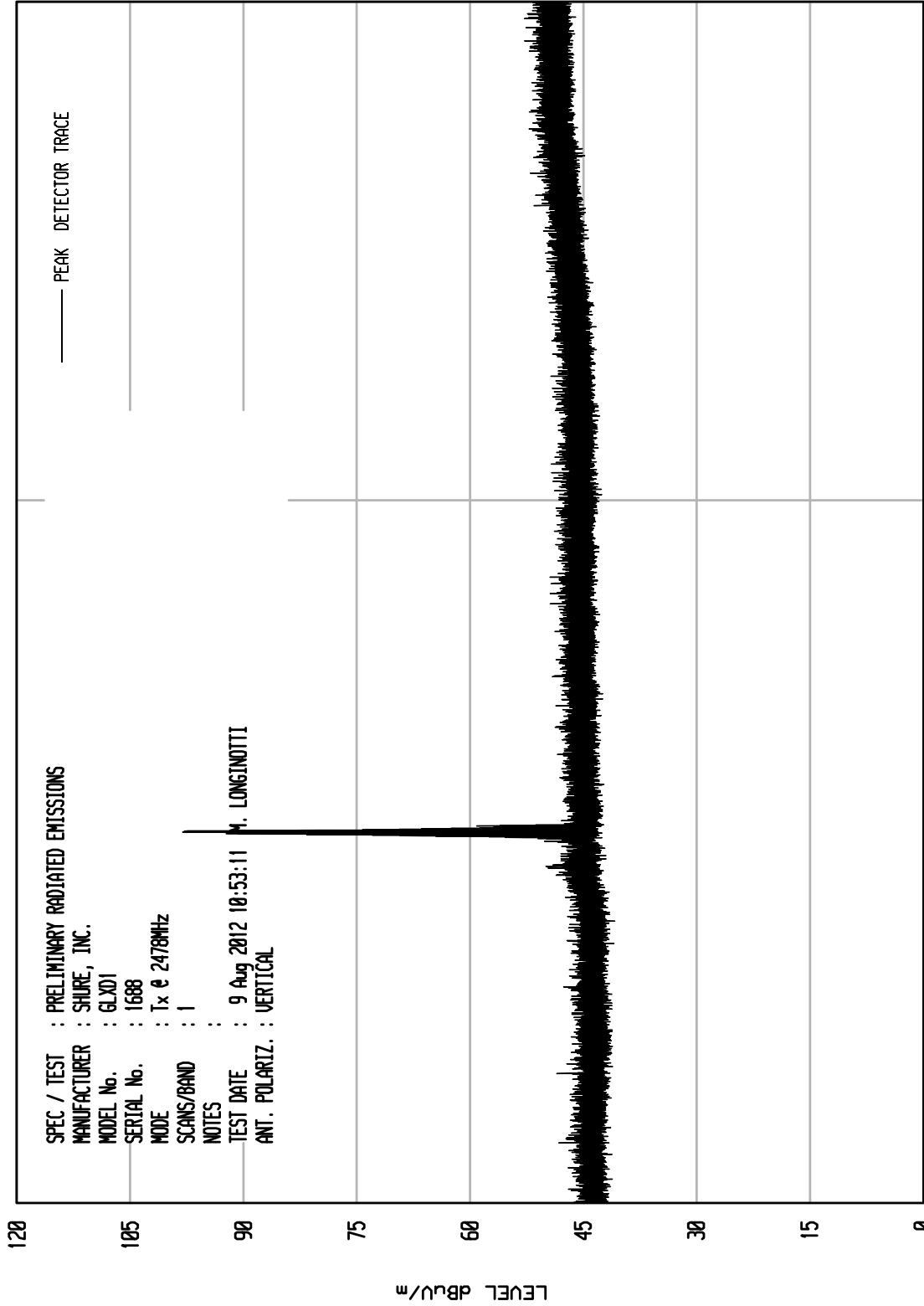
FREQUENCY MHz

START = 2000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCU EMI RUN 8

UKA1 04/26/11



SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 1688  
 MODE : Tx @ 2478MHz  
 SCANS/BAND : 1  
 NOTES :  
 TEST DATE : 9 Aug 2012 10:53:11 M. LONGINOTTI  
 ANT. POLARIZ. : VERTICAL

STOP = 4000

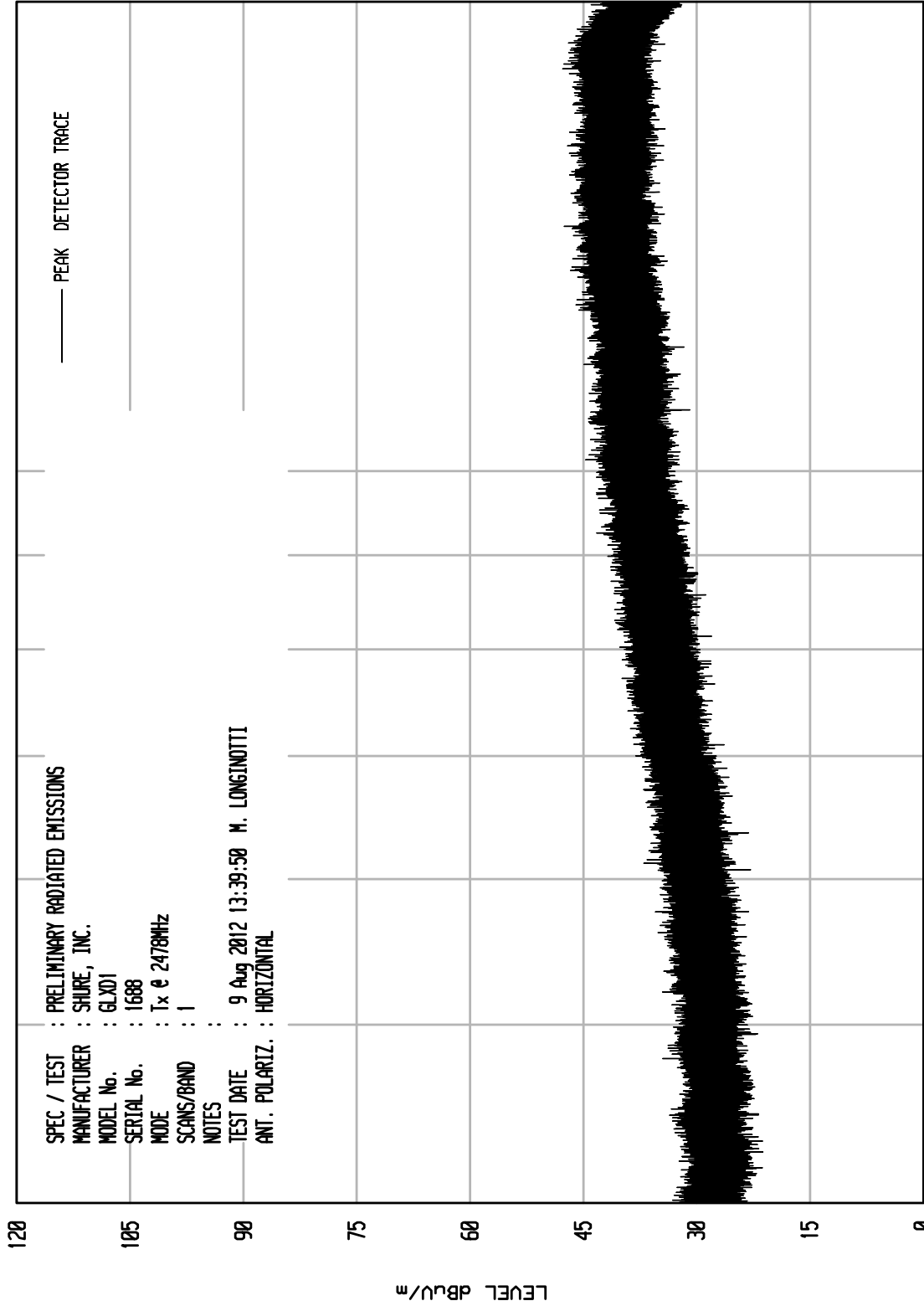
FREQUENCY MHz

START = 2000

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCU EMI RUN 18

UKA1 04/26/11



10000

FREQUENCY MHz

STOP = 18000

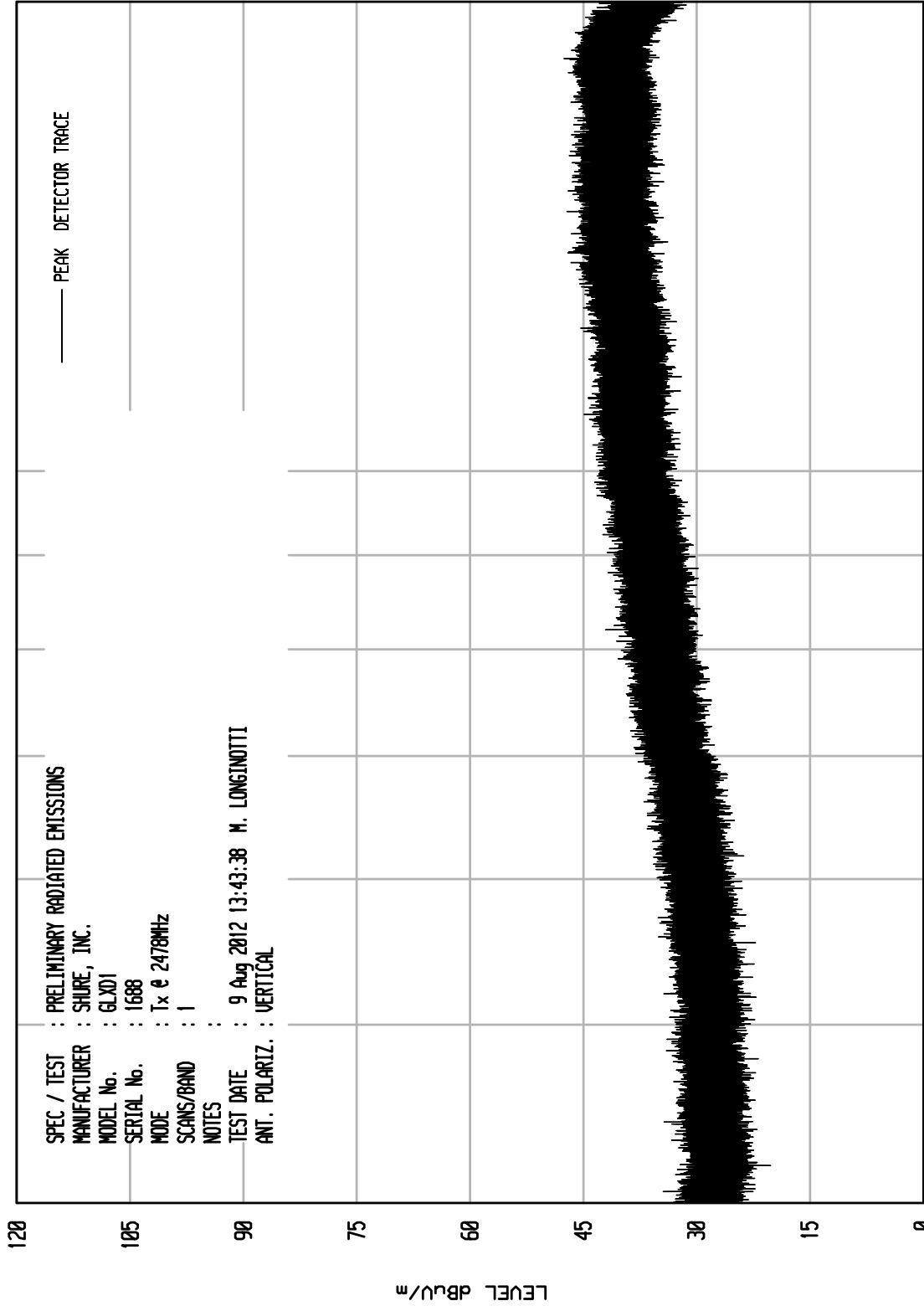
START = 4000

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE, INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 1688  
 MODE : Tx @ 2478MHz  
 SCANS/BAND : 1  
 NOTES :  
 TEST DATE : 9 Aug 2012 13:39:50 M. LONGINOTTI  
 ANT. POLARIZ. : HORIZONTAL

ELITE ELECTRONIC ENGINEERING Inc.  
Downers Grove, Ill. 60515

UNIV RCV EMI RUN 19

UKA1 04/26/11



10000

FREQUENCY MHz

STOP = 18000

START = 4000

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS

MANUFACTURER : SHURE, INC.

MODEL No. : GLXD1

SERIAL No. : 1688

MODE : Tx @ 2478MHz

SCANS/BAND : 1

NOTES :

TEST DATE : 9 Aug 2012 13:43:38 M. LONGINOTTI

ANT. POLARIZ. : VERTICAL



ELITE ELECTRONIC ENGINEERING Inc.

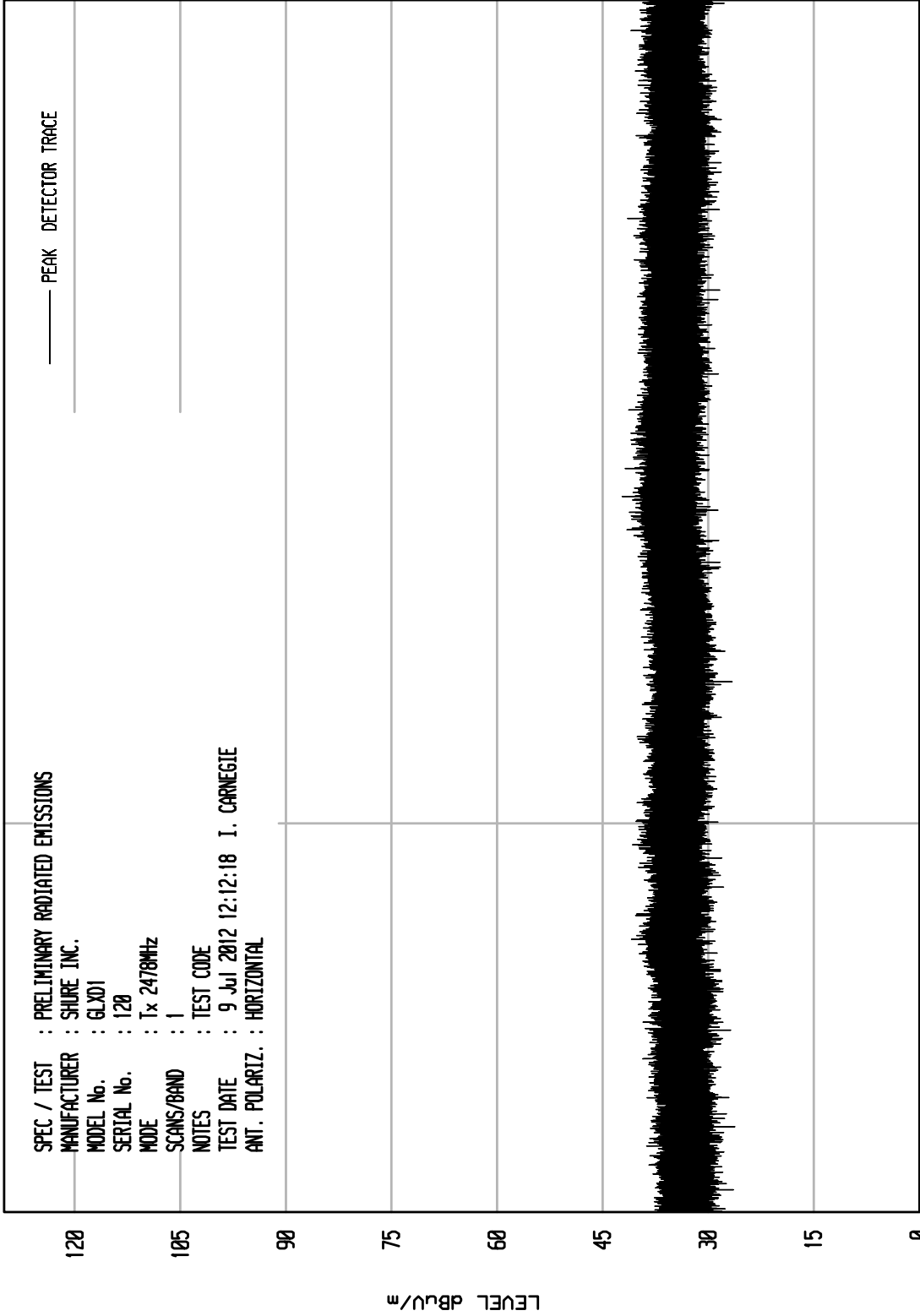
Downers Grove, Ill. 60515

UNIV RCV ENI RUN 18

UKA1 04/26/11

SPEC / TEST : PRELIMINARY RADIATED EMISSIONS  
 MANUFACTURER : SHURE INC.  
 MODEL No. : GLXD1  
 SERIAL No. : 120  
 MODE : Tx 2478MHz  
 SCANS/BAND : 1  
 NOTES : TEST CODE  
 TEST DATE : 9 Jul 2012 12:12:18 I. CARNEGIE  
 ANT. POLARIZ. : HORIZONTAL

— PEAK DETECTOR TRACE



START = 18000

FREQUENCY MHz

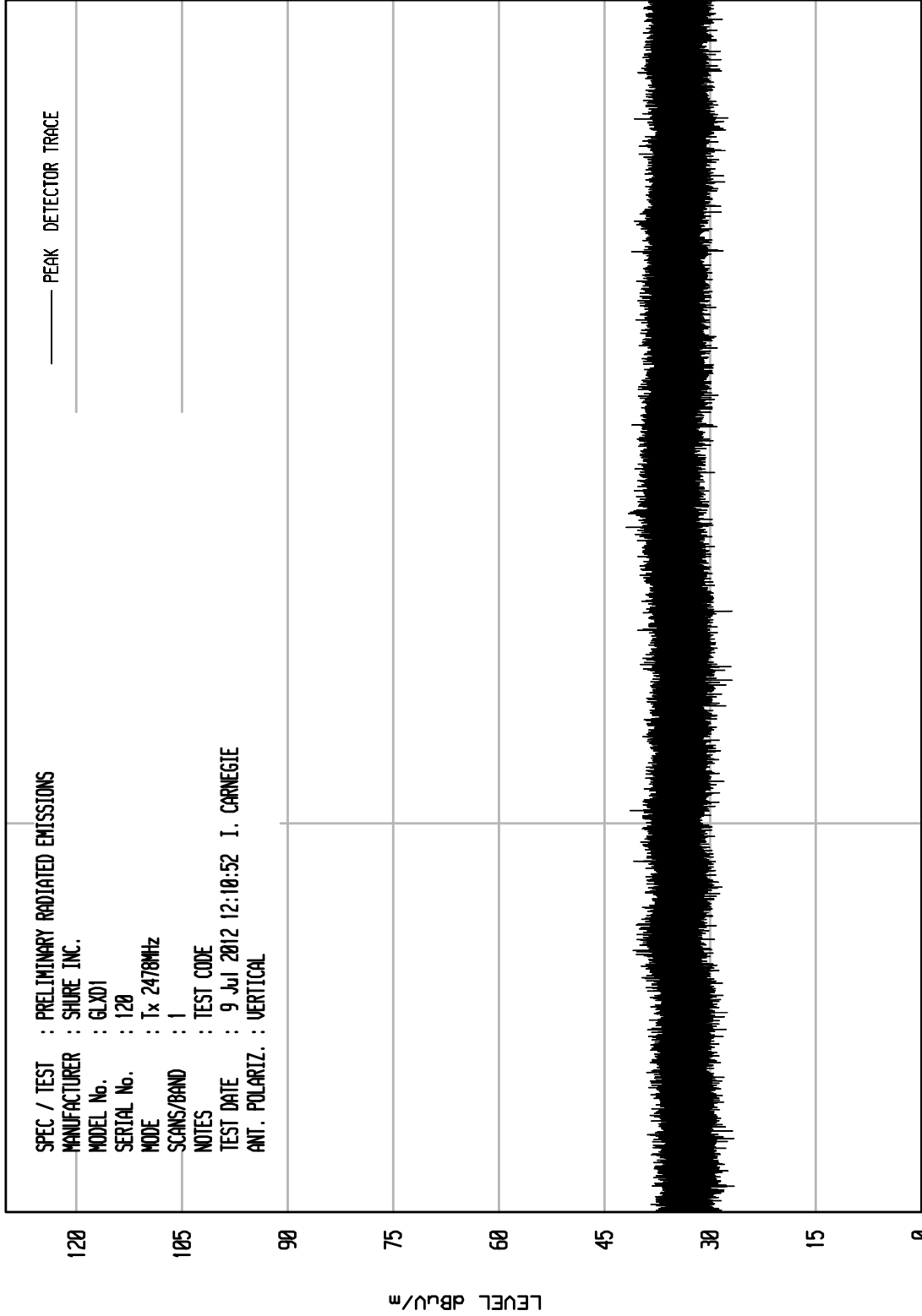
STOP = 25000

ELITE ELECTRONIC ENGINEERING Inc.

Downers Grove, Ill. 60515

UNIU RCU EMI RUN 17

UKA1 04/26/11



START = 18000

FREQUENCY MHz

STOP = 25000



MANUFACTURER Shure Incorporated  
 EUT Bodypack Transceiver  
 MODEL NO. GLXD1  
 SERIAL NO. 120 and 1688  
 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	Limit uV/m at 3 m	Margin (dB)
2404.00	H	67.7		3.4	31.5	0.0	102.6	134420.3		
2404.00	V	71.9		3.4	31.5	0.0	106.8	218004.2		
4808.00	H	47.3	Ambient	4.8	34.7	-40.1	46.8	217.9	5000.0	-27.2
4808.00	V	47.1	Ambient	4.8	34.7	-40.1	46.6	212.9	5000.0	-27.4
7212.00	H	38.1	Ambient	6.1	37.8	-39.8	42.2	129.4	21800.4	-44.5
7212.00	V	38.4	Ambient	6.1	37.8	-39.8	42.6	134.6	21800.4	-44.2
9616.00	H	38.3	Ambient	6.8	39.7	-38.8	46.0	199.2	21800.4	-40.8
9616.00	V	38.0	Ambient	6.8	39.7	-38.8	45.7	192.0	21800.4	-41.1
12020.00	H	48.7	Ambient	8.0	41.2	-39.6	58.3	820.1	5000.0	-15.7
12020.00	V	49.1	Ambient	8.0	41.2	-39.6	58.7	865.7	5000.0	-15.2
14424.00	H	39.1	Ambient	8.7	42.3	-39.9	50.2	322.7	21800.4	-36.6
14424.00	V	39.1	Ambient	8.7	42.3	-39.9	50.2	322.7	21800.4	-36.6
16828.00	H	38.8	Ambient	9.4	41.2	-38.7	50.7	341.9	21800.4	-36.1
16828.00	V	38.3	Ambient	9.4	41.2	-38.7	50.2	322.4	21800.4	-36.6
19232.00	H	46.2	Ambient	2.2	40.4	-28.3	60.4	1048.4	5000.0	-13.6
19232.00	V	45.4	Ambient	2.2	40.4	-28.3	59.7	963.9	5000.0	-14.3
21636.00	H	45.3	Ambient	2.2	40.6	-27.1	61.1	1133.9	21800.4	-25.7
21636.00	V	45.8	Ambient	2.2	40.6	-27.1	61.6	1201.0	21800.4	-25.2
24040.00	H	46.8	Ambient	2.2	40.6	-28.0	61.7	1212.1	21800.4	-25.1
24040.00	V	47.0	Ambient	2.2	40.6	-28.0	61.9	1238.9	21800.4	-24.9



MANUFACTURER Shure Incorporated  
 EUT Bodypack Transceiver  
 MODEL NO. GLXD1  
 SERIAL NO. 120 and 1688  
 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  
 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	34.2	Ambient	4.8	34.7	-40.1	-10.7	23.0	217.9	500.0	-31.0
4808.00	V	34.3	Ambient	4.8	34.7	-40.1	-10.7	23.1	212.9	500.0	-30.9
12020.00	H	34.9	Ambient	8.0	41.2	-39.6	-10.7	33.8	49.1	500.0	-20.2
12020.00	V	34.9	Ambient	8.0	41.2	-39.6	-10.7	33.8	49.0	500.0	-20.2
19232.00	H	33.9	Ambient	2.2	40.4	-28.3	-10.7	37.5	74.6	500.0	-16.5
19232.00	V	33.1	Ambient	2.2	40.4	-28.3	-10.7	36.7	68.1	500.0	-17.3



MANUFACTURER Shure Incorporated  
 EUT Bodypack Transceiver  
 MODEL NO. GLXD1  
 SERIAL NO. 120 and 1688  
 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	Limit uV/m at 3 m	Margin (dB)
2442.00	H	66.0		3.5	31.5	0.0	100.9	111355.4		
2442.00	V	71.1		3.5	31.5	0.0	106.0	200313.9		
4956.00	H	45.3	Ambient	4.9	34.8	-40.2	44.8	174.2	5000.0	-29.2
4956.00	V	47.0	Ambient	4.9	34.8	-40.2	46.5	211.8	5000.0	-27.5
7326.00	H	49.2	Ambient	6.2	37.9	-39.7	53.5	475.1	5000.0	-20.4
7326.00	V	48.9	Ambient	6.2	37.9	-39.7	53.2	457.4	5000.0	-20.8
9768.00	H	39.4	Ambient	6.9	39.8	-38.7	47.4	234.0	20031.4	-38.7
9768.00	V	39.3	Ambient	6.9	39.8	-38.7	47.3	232.9	20031.4	-38.7
12210.00	H	49.4	Ambient	8.0	41.4	-39.4	59.3	920.2	5000.0	-14.7
12210.00	V	49.2	Ambient	8.0	41.4	-39.4	59.2	907.6	5000.0	-14.8
14652.00	H	39.4	Ambient	8.8	42.3	-40.1	50.4	332.4	20031.4	-35.6
14652.00	V	38.9	Ambient	8.8	42.3	-40.1	50.0	315.3	20031.4	-36.1
17094.00	H	38.7	Ambient	9.5	40.8	-38.7	50.3	329.2	20031.4	-35.7
17094.00	V	39.3	Ambient	9.5	40.8	-38.7	50.9	349.9	20031.4	-35.2
19536.00	H	45.2	Ambient	2.2	40.4	-27.8	59.9	992.8	5000.0	-14.0
19536.00	V	45.6	Ambient	2.2	40.4	-27.8	60.4	1042.0	5000.0	-13.6
21978.00	H	45.4	Ambient	2.2	40.6	-27.1	61.1	1131.3	20031.4	-25.0
21978.00	V	45.3	Ambient	2.2	40.6	-27.1	60.9	1109.4	20031.4	-25.1
24420.00	H	46.8	Ambient	2.2	40.6	-28.6	61.1	1135.7	20031.4	-24.9
24420.00	V	46.9	Ambient	2.2	40.6	-28.6	61.2	1148.8	20031.4	-24.8



MANUFACTURER Shure Incorporated  
 EUT Bodypack Transceiver  
 MODEL NO. GLXD1  
 SERIAL NO. 120 and 1688  
 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  
 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	33.6	Ambient	4.9	34.8	-40.2	-10.7	22.4	174.2	500.0	-31.6
4956.00	V	33.6	Ambient	4.9	34.8	-40.2	-10.7	22.4	211.8	500.0	-31.6
7434.00	H	35.5	Ambient	6.2	38.0	-39.7	-10.7	29.3	29.0	500.0	-24.7
7434.00	V	35.5	Ambient	6.2	38.0	-39.7	-10.7	29.3	29.0	500.0	-24.7
12390.00	H	35.8	Ambient	8.0	41.5	-39.3	-10.7	35.3	58.4	500.0	-18.7
12390.00	V	35.8	Ambient	8.0	41.5	-39.3	-10.7	35.3	58.3	500.0	-18.7
19536.00	H	33.6	Ambient	2.2	40.4	-27.8	-10.7	37.7	76.5	500.0	-16.3
19536.00	V	33.7	Ambient	2.2	40.4	-27.8	-10.7	37.8	77.3	500.0	-16.2



MANUFACTURER Shure Incorporated  
 EUT Bodypack Transceiver  
 MODEL NO. GLXD1  
 SERIAL NO. 120 and 1688  
 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

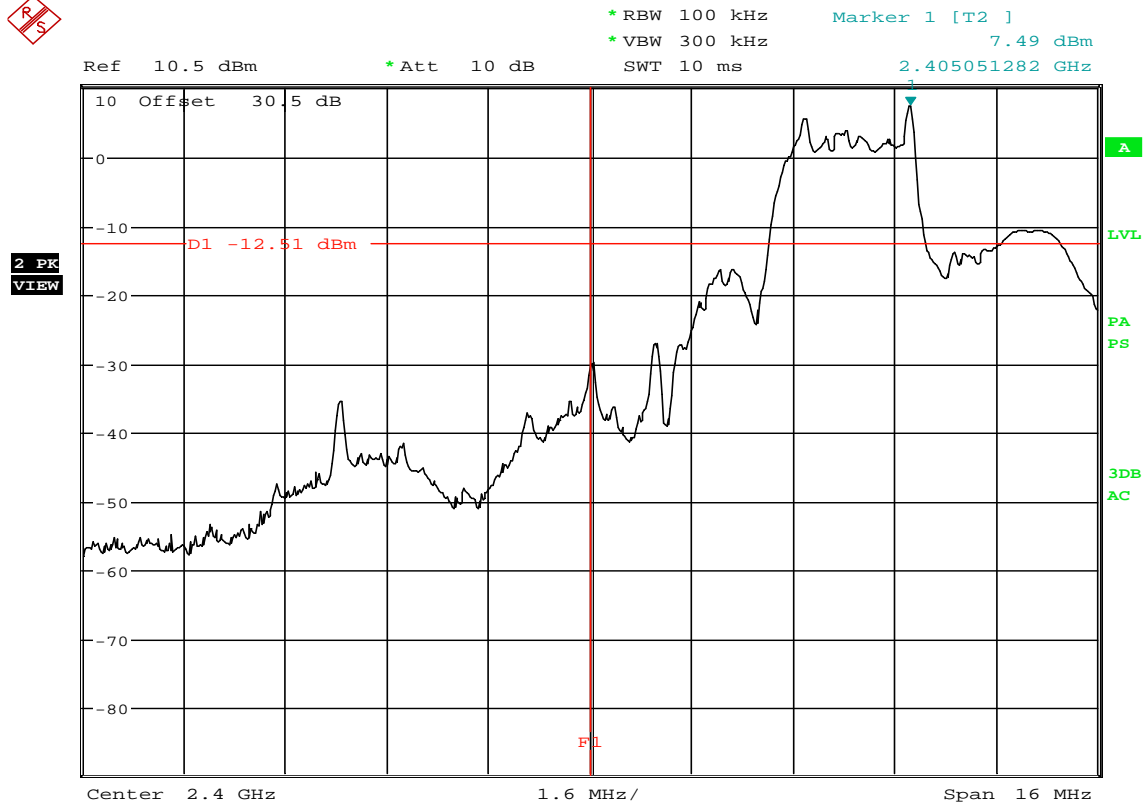
Freq. MHz	Ant Pol	Meter Reading (dBUV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Peak Total dBuV/m at 3m	Peak Total uV/m at 3 m	Limit uV/m at 3 m	Margin (dB)
2478.00	H	65.5		3.5	31.5	0.0	100.4	105149.5		
2478.00	V	68.6		3.5	31.5	0.0	103.6	150593.9		
4956.00	H	45.3	Ambient	4.9	34.8	-40.2	44.8	174.2	5000.0	-29.2
4956.00	V	47.0	Ambient	4.9	34.8	-40.2	46.5	211.8	5000.0	-27.5
7434.00	H	48.7	Ambient	6.2	38.0	-39.7	53.2	457.7	5000.0	-20.8
7434.00	V	49.1	Ambient	6.2	38.0	-39.7	53.6	479.3	5000.0	-20.4
9912.00	H	39.6	Ambient	7.0	39.9	-38.6	47.8	246.7	15059.4	-35.7
9912.00	V	39.3	Ambient	7.0	39.9	-38.6	47.5	238.3	15059.4	-36.0
12390.00	H	49.1	Ambient	8.0	41.5	-39.3	59.3	923.4	5000.0	-14.7
12390.00	V	49.1	Ambient	8.0	41.5	-39.3	59.2	917.0	5000.0	-14.7
14868.00	H	39.0	Ambient	8.9	42.3	-40.3	50.0	314.7	15059.4	-33.6
14868.00	V	39.2	Ambient	8.9	42.3	-40.3	50.2	322.0	15059.4	-33.4
17346.00	H	39.6	Ambient	9.7	39.8	-39.0	50.0	317.4	15059.4	-33.5
17346.00	V	39.6	Ambient	9.7	39.8	-39.0	50.1	318.2	15059.4	-33.5
19824.00	H	45.2	Ambient	2.2	40.4	-27.3	60.6	1068.0	5000.0	-13.4
19824.00	V	45.5	Ambient	2.2	40.4	-27.3	60.8	1097.9	5000.0	-13.2
22302.00	H	45.5	Ambient	2.2	40.6	-27.5	60.8	1098.9	5000.0	-13.2
22302.00	V	45.6	Ambient	2.2	40.6	-27.5	60.9	1111.6	5000.0	-13.1
24780.00	H	46.1	Ambient	2.2	40.6	-28.5	60.4	1047.3	15059.4	-23.2
24780.00	V	46.7	Ambient	2.2	40.6	-28.5	61.0	1124.8	15059.4	-22.5



MANUFACTURER Shure Incorporated  
 EUT Bodypack Transceiver  
 MODEL NO. GLXD1  
 SERIAL NO. 120 and 1688  
 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  
 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	33.6	Ambient	4.9	34.8	-40.2	-10.7	22.4	174.2	500.0	-31.6
4956.00	V	33.6	Ambient	4.9	34.8	-40.2	-10.7	22.4	211.8	500.0	-31.6
7434.00	H	35.5	Ambient	6.2	38.0	-39.7	-10.7	29.3	29.0	500.0	-24.7
7434.00	V	35.5	Ambient	6.2	38.0	-39.7	-10.7	29.3	29.0	500.0	-24.7
12390.00	H	35.8	Ambient	8.0	41.5	-39.3	-10.7	35.3	58.4	500.0	-18.7
12390.00	V	35.8	Ambient	8.0	41.5	-39.3	-10.7	35.3	58.3	500.0	-18.7
19824.00	H	32.7	Ambient	2.2	40.4	-27.3	-10.7	37.3	73.5	500.0	-16.6
19824.00	V	33.0	Ambient	2.2	40.4	-27.3	-10.7	37.6	76.1	500.0	-16.3
22302.00	H	32.6	Ambient	2.2	40.6	-27.5	-10.7	37.2	72.8	500.0	-16.7
22302.00	V	32.7	Ambient	2.2	40.6	-27.5	-10.7	37.3	73.6	500.0	-16.6

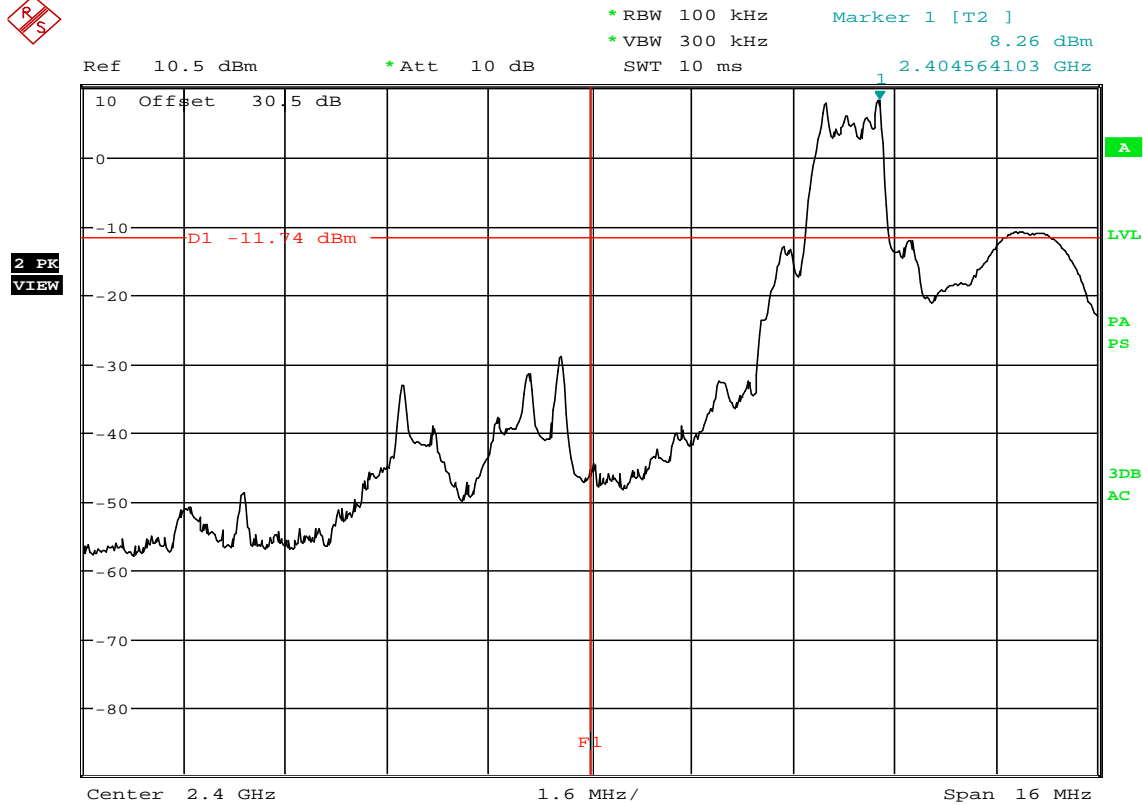




Date: 27.JUN.2012 17:34:27

### FCC 15.247(d) Band Edge Compliance

MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD1
SERIAL NUMBER	: 074
TEST MODE	: Tx @ 2404MHz, full bandwidth
TEST DATE	: June 27, 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	: RBA0, T1E7,T2S0



Date: 27.JUN.2012 17:32:08

### FCC 15.247(d) Band Edge Compliance

MANUFACTURER	: Shure, Inc.
MODEL NUMBER	: GLXD1
SERIAL NUMBER	: 074
TEST MODE	: Tx @ 2404MHz, half bandwidth
TEST DATE	: June 27, 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	: RBA0, T1E7,T2S0



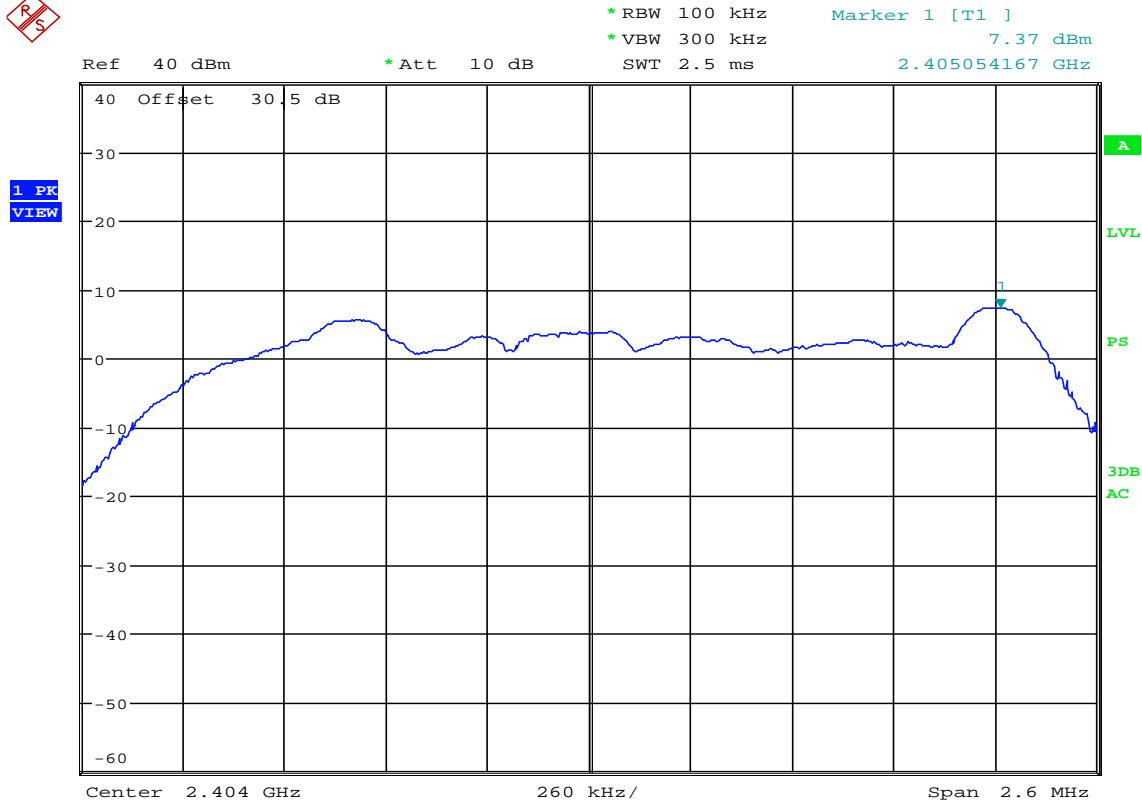
MANUFACTURER Shure Incorporated  
EUT Bodypack Transceiver  
MODEL NO. GLXD1  
SERIAL NO. 120  
SPECIFICATION FCC 15.247 and RSS-210 Annex 8  
TEST Spurious Radiated Emissions at 2483.5MHz band edge  
MODE Transmit at 2478MHz  
DATE TESTED June 13, 2012 through August 9, 2012  
NOTES Peak Readings  
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	Limit uV/m at 3 m	Margin (dB)
2483.50	H	18.8		3.5	31.5	0.0	53.8	488.2	5000.0	-20.2
2483.50	V	30.2		3.5	31.5	0.0	65.2	1824.4	5000.0	-8.8



MANUFACTURER Shure Incorporated  
EUT Bodypack Transceiver  
MODEL NO. GLXD1  
SERIAL NO. 120  
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

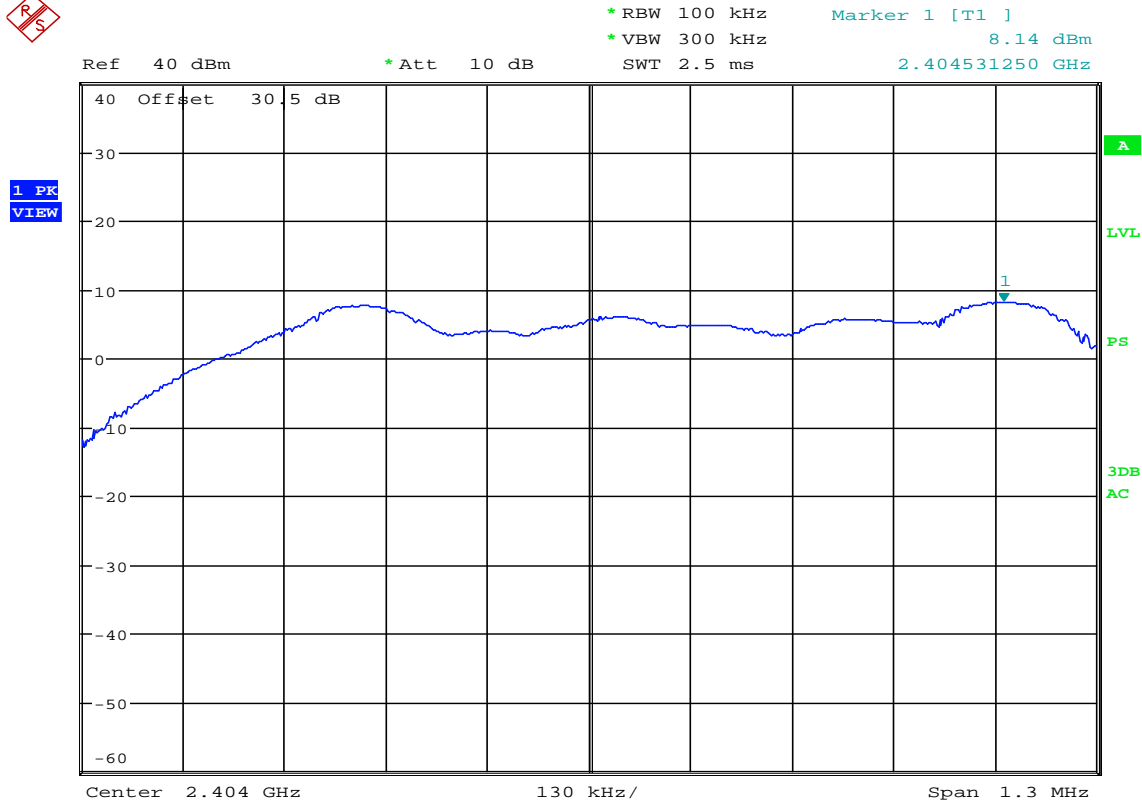
Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
2483.50	H	10.6		3.5	31.5	0.0	-10.7	34.9	55.8	500.0	-19.0
2483.50	V	9.0		3.5	31.5	0.0	-10.7	33.3	46.2	500.0	-20.7



Date: 2.JUL.2012 14:27:19

**FCC 15.247(e) Maximum Conducted Peak Power Spectral Density**

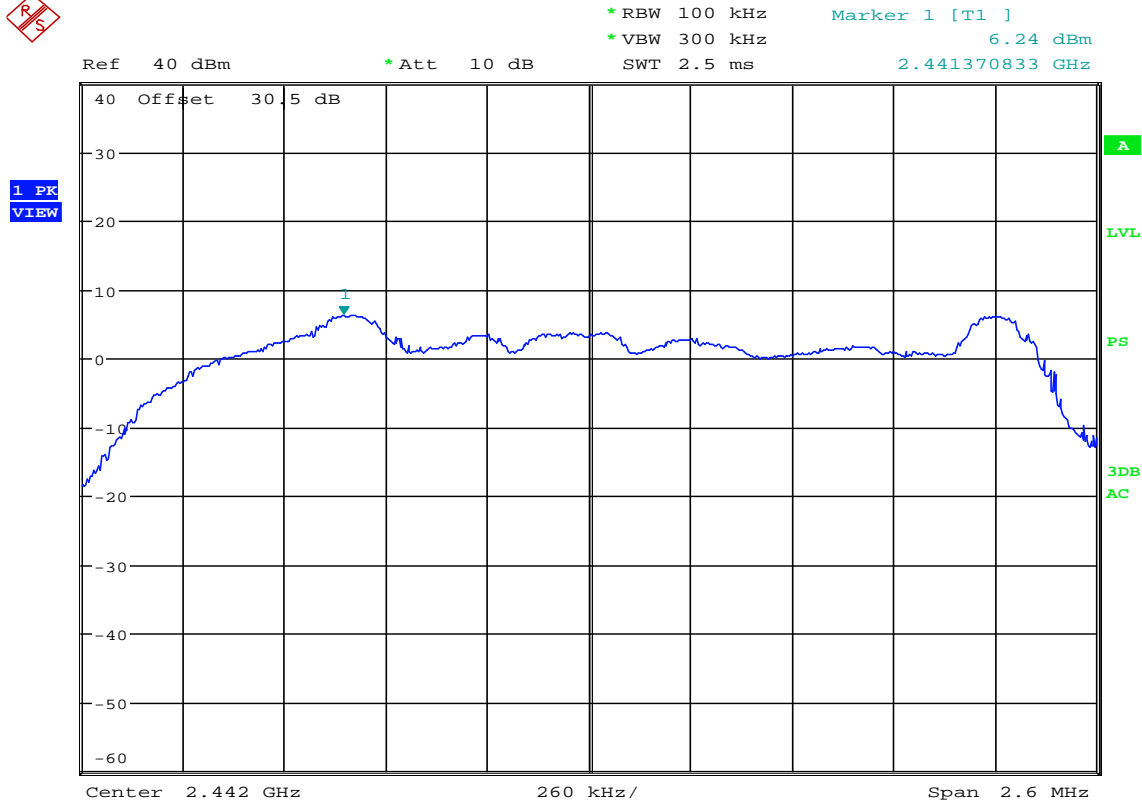
MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2404MHz, full bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : Maximum Conducted Peak Power Spectral Density  
 NOTES : Maximum Conducted Peak Power Spectral Density = maximum power level in  
 : a (100kHz BW) - (bandwidth correction factor) = 7.37dBm -15.2dB = -7.83dBm  
 EQUIPMENT USED : RBE0, T1E7,T2S0



Date: 2.JUL.2012 14:18:00

**FCC 15.247(e) Maximum Conducted Peak Power Spectral Density**

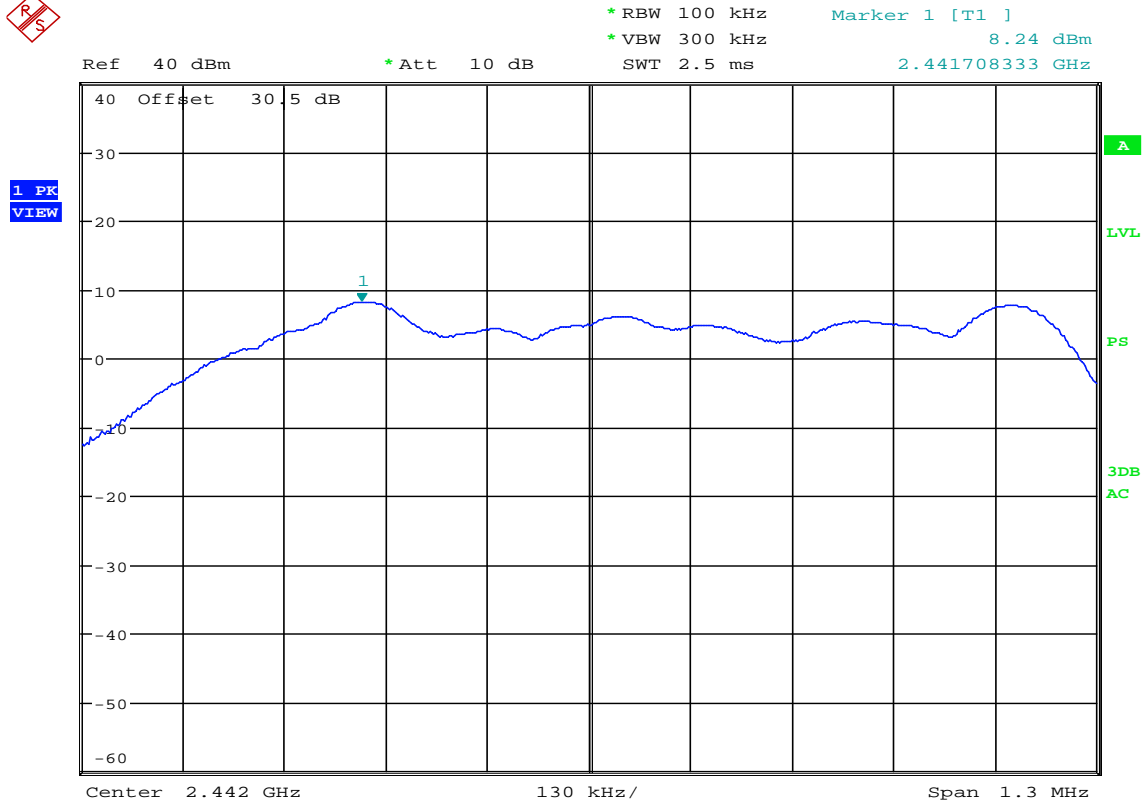
MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2404MHz, half bandwidth  
 TEST DATE : July 2, 2012  
 TEST PARAMETER : Maximum Conducted Peak Power Spectral Density  
 NOTES : Maximum Conducted Peak Power Spectral Density = maximum power level in  
 : a (100kHz BW) - (bandwidth correction factor) = 8.14dBm -15.2dB = -7.06dBm  
 EQUIPMENT USED : RBE0, T1E7,T2S0



Date: 2.JUL.2012 12:48:37

**FCC 15.247(e) Maximum Conducted Peak Power Spectral Density**

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2442MHz, full bandwidth  
 TEST DATE : July 2, 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) = 6.24dBm -15.2dB = -8.96dBm  
 EQUIPMENT USED : RBE0, T1E7,T2S0

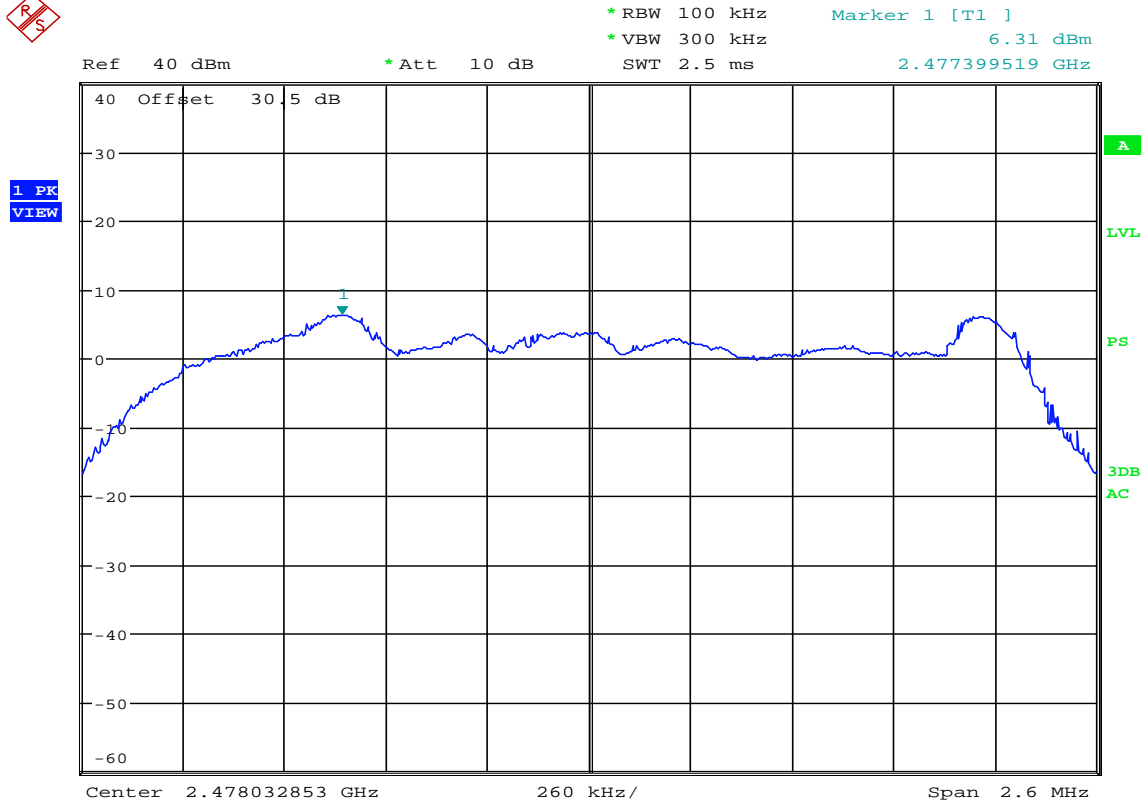


Date: 2.JUL.2012 14:12:25

### FCC 15.247(e) Maximum Conducted Peak Power Spectral Density

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2442MHz, half bandwidth  
 TEST DATE : July 2, 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) = 8.24dBm -15.2dB = -6.96dBm  
 EQUIPMENT USED : RBE0, T1E7,T2S0

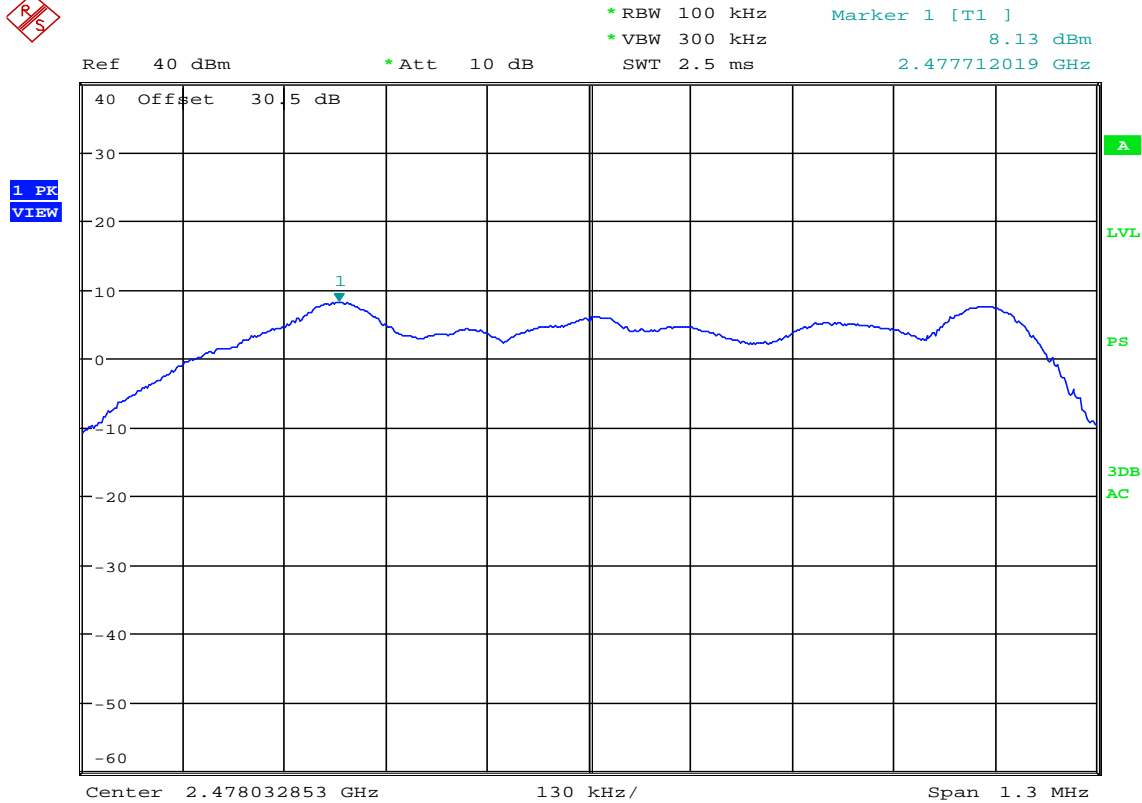




Date: 2.JUL.2012 12:45:42

**FCC 15.247(e) Maximum Conducted Peak Power Spectral Density**

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2478MHz, full bandwidth  
 TEST DATE : July 2, 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) = 6.31dBm -15.2dB = -8.89dBm  
 EQUIPMENT USED : RBE0, T1E7,T2S0



Date: 2.JUL.2012 12:42:01

**FCC 15.247(e) Maximum Conducted Peak Power Spectral Density**

MANUFACTURER : Shure, Inc.  
 MODEL NUMBER : GLXD1  
 SERIAL NUMBER : 74  
 TEST MODE : Tx @ 2478MHz, half bandwidth  
 TEST DATE : July 2, 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) = 8.13dBm -15.2dB = -7.07dBm  
 EQUIPMENT USED : RBE0, T1E7,T2S0