# FCC CFR47 PART 15 SUBPART C
# CERTIFICATION
# TEST REPORT

**FOR**

**LONG RANGE 2-WAY RF LASER BARCODE SCANNER**

**MODEL NUMBER: LZ400-RF**

**FCC ID: JWSLZ400RF**

**REPORT NUMBER: 05U3728-3B**

**ISSUE DATE: JANUARY 19, 2006**

*Prepared for*
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**LAB CODE:200065-0**

Revision History

| Rev. | Issue Date | Revisions | Revised By |
|---|---|---|---|
| A | 12/19/05 | Initial Issue | Thu |
| B | 01/19/06 | Revised Sections 5.5 & 5.6 investigated with X,Y, & Z Positions | Thu |
| | 01/19/06 | Added Limit & Margin in Sections 7.1.1, 7.1.2, & 7.1.4 | Thu |
| | 01/19/06 | Revised Section 7.1.5 used with Peak Power Meter & Inserted the corrected plot on page 27 | Thu |

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** WORTH DATA, INC.
623 SWIFT ST.
SANTA CRUZ, CA 95060 U.S.A

**EUT DESCRIPTION:** LONG RANGE 2-WAY 900MHz RF LASER BARCODE SCANNER

**MODEL:** LZ400-RF

**SERIAL NUMBER:** 01631

**DATE TESTED:** NOVEMBER 14-17, 2005

| APPLICABLE STANDARDS | |
|---|---|
| **STANDARD** | **TEST RESULTS** |
| FCC PART 15 SUBPART C | NO NON-COMPLIANCE NOTED |

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note**: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHIN PANG
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

# 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

# 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

# 4. CALIBRATION AND UNCERTAINTY

## 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

| PARAMETER | UNCERTAINTY |
|---|---|
| Radiated Emission, 30 to 200 MHz | +/- 3.3 dB |
| Radiated Emission, 200 to 1000 MHz | +4.5 / -2.9 dB |
| Radiated Emission, 1000 to 2000 MHz | +4.5 / -2.9 dB |
| Power Line Conducted Emission | +/- 2.9 dB |

Uncertainty figures are valid to a confidence level of 95%.

# 5. EQUIPMENT UNDER TEST

## 5.1. DESCRIPTION OF EUT

The EUT is a long range two way 900MHz RF laser barcode scanner operating in the 902-928 MHz band with 25 channels. The EUT has a peak output power of 12.64Bm (18.40 mW) and an antenna gain of -1 dBi.

## 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

RF LASER

| Channel | Frequency (MHz) | Power (dBm) | Power (mW) |
|---|---|---|---|
| Low | 903 | 11.58 | 14.4 |
| Middle | 915 | 12.12 | 16.3 |
| High | 927 | 12.64 | 18.4 |

## 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a monopole JJB antenna, with a maximum gain of -1dBi.

## 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was RFL for Main FW and PICL0 for Radio FW

The test utility software used during testing was diagnostic mode selected by switches

## 5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 927MHz. The EUT X, Y, and Z positions were investigated; “X” position was seemed worst case.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| PERIPHERAL SUPPORT EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **FCC ID** |
| AC Adapter | Worth Data | AUT-05-1000 | NA | NA |

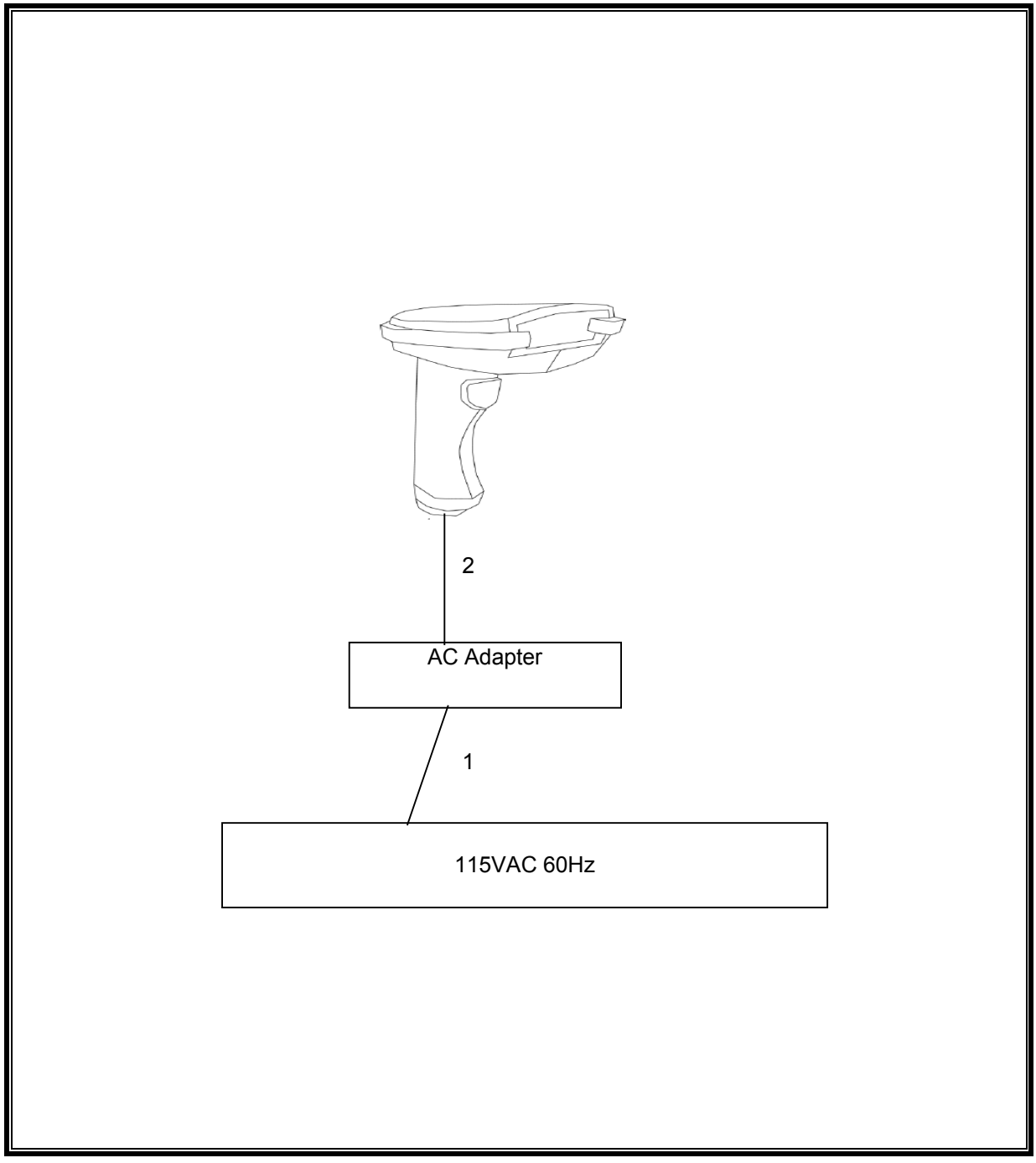
### I/O CABLES

| I/O CABLE LIST | | | | | | |
|---|---|---|---|---|---|---|
| **Cable No.** | **Port** | **# of Identical Ports** | **Connector Type** | **Cable Type** | **Cable Length** | **Remarks** |
| 1 | AC | 1 | US 115V | Un-shielded | 2m | NA |
| 2 | DC | 1 | DC | Un-shielded | 1m | NA |

### TEST SETUP

The EUT is installed as a stand-alone device during the tests. Test software exercised the RF Laser Scanner was set in continuous transmit mode. X, Y, and Z positions were investigated; "X" position was seemed worst case. High channel was deemed worst case due to the highest output power.

**SETUP DIAGRAM FOR TESTS**



# 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

| TEST EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| **Description** | **Manufacturer** | **Model** | **Serial Number** | **Cal Due** |
| Spectrum Analyzer 3 Hz ~ 44 GHz | Agilent | E4446A | MY43360112 | 3/28/2006 |
| Antenna, Bilog 30MHz ~ 2Ghz | Solar | JB1 | A121003 | 3/3/06 |
| EMI Receiver, 9 kHz ~ 2.9 GHz | HP | 8542E | 3942A00286 | 3/29/06 |
| RF Filter Section | HP | 85420E | 3705A00256 | 3/29/06 |
| Antenna, Horn 1 ~ 18 GHz | Ertco | 3115 | 6717 | 4/22/06 |
| Preamplifier, 1 ~ 26.5 GHz | HP | 8449B | 3008A00369 | 8/17/06 |
| EMI Test Receiver | R & S | ESHS 20 | 827129/006 | 6/3/06 |
| Line Filter | Lindgren | LMF-3489 | 497 | CNR |
| LISN, 10 kHz ~ 30 MHz | Simpson | 8012-50-R-24-BNC | 837990 | 8/30/06 |
| Peak / Average Power Sensor | Agilent | E9327A | US40440755 | 2/10/06 |
| Peak Power Meter | Agilent | E4416A | GB41291160 | 2/9/06 |
| 1.5GHz HPF | Micro Tronics | HPM13190 | 1 | CNR |

# 7. LIMITS AND RESULTS

## 7.1. ANTENNA PORT CHANNEL TESTS

### 7.1.1. 20 dB BANDWIDTH

**LIMIT**

The system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% to 3% of the 20 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

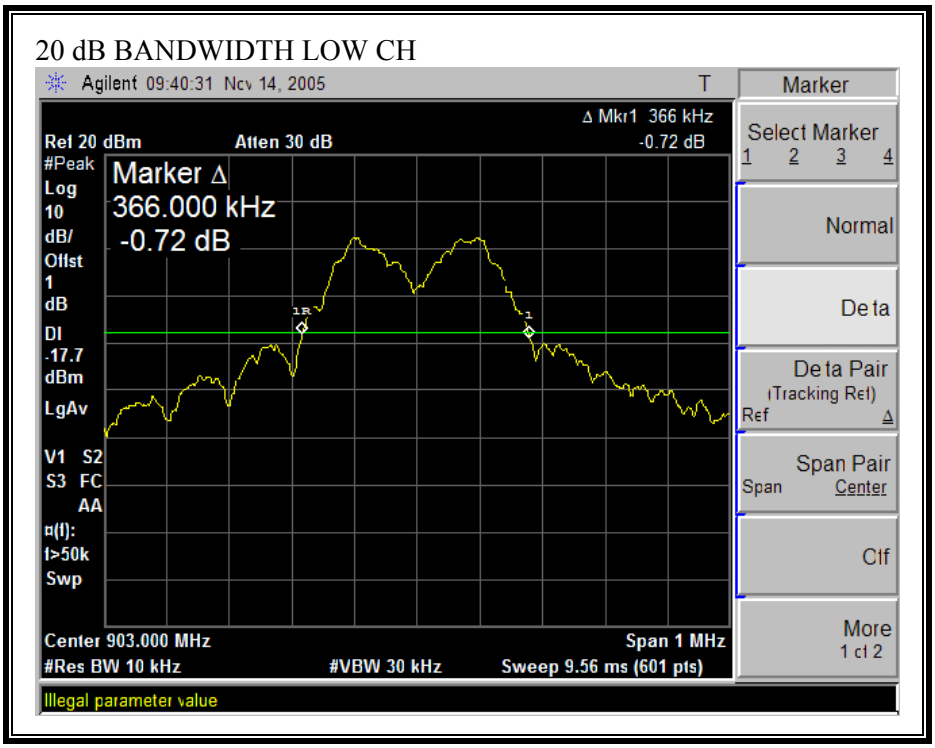
**RESULTS**

No non-compliance noted:

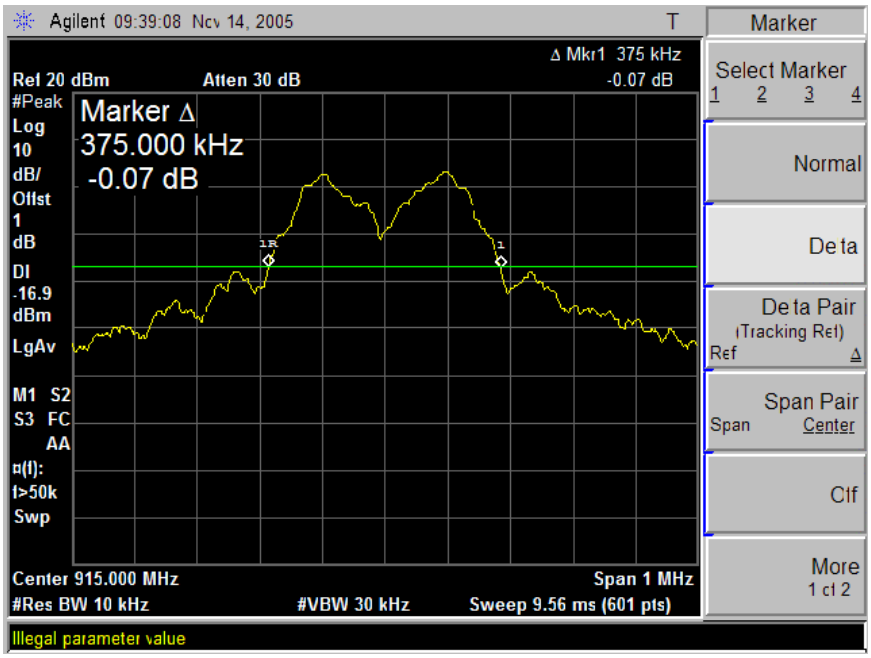
RF LASER

| Channel | Frequency (MHz) | 20 dB Bandwidth (kHz) | Limit (kHz) | Margin (kHz) |
|---|---|---|---|---|
| Low | 903 | 366 | 500 | 134 |
| Middle | 915 | 375 | 500 | 125 |
| High | 927 | 500 | 500 | 0 |

**RF LASER, 20 dB BANDWIDTH**



20 dB BANDWIDTH MID CH



20 dB BANDWIDTH HIGH CH

## 7.1.2. HOPPING FREQUENCY SEPARATION

**LIMIT**

§15.247 (a) (1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

**RESULTS**

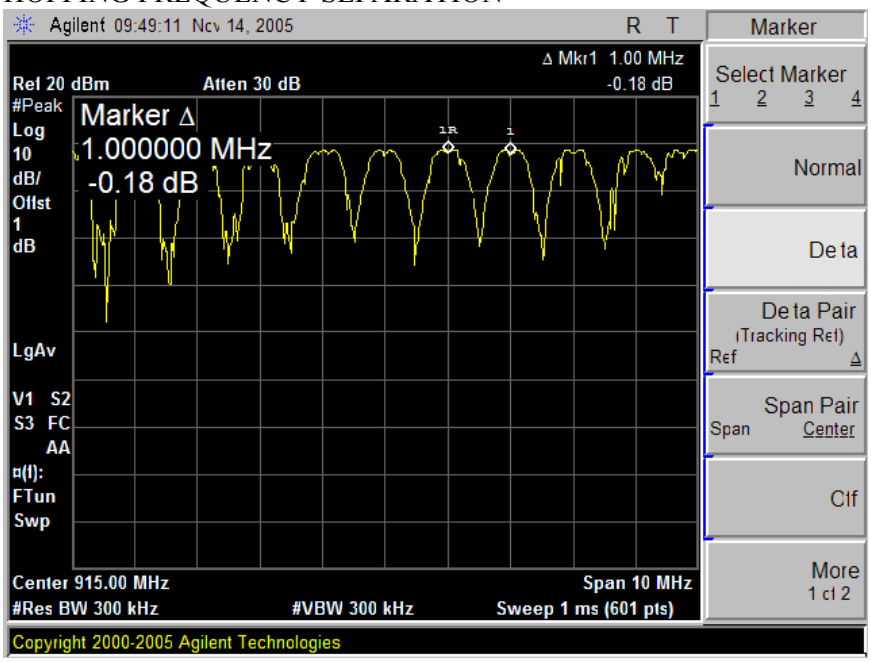
No non-compliance noted:

RF LASER

| Channel | Frequency (MHz) | Hopping Separation (kHz) | >=25kHz or 20 dB BW (kHz) | Margin (kHz) |
|---|---|---|---|---|
| Low | 903 | 1000 | 500 | 500 |

## HOPPING FREQUENCY SEPARATION

HOPPING FREQUENCY SEPARATION



## 7.1.3. NUMBER OF HOPPING CHANNELS

**LIMIT**

§15.247 (a) (1) (i ) For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to 1 % of the span. The analyzer is set to Max Hold.

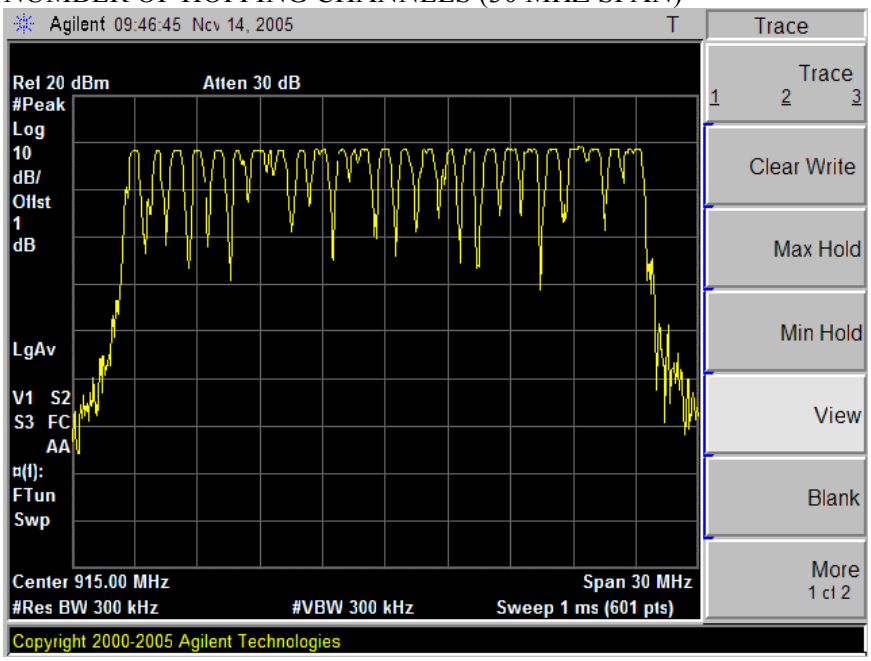
**RESULTS**

No non-compliance noted:

25 Channels observed.

## NUMBER OF HOPPING CHANNELS

NUMBER OF HOPPING CHANNELS (30 MHZ SPAN)



## 7.1.4. AVERAGE TIME OF OCCUPANCY

**LIMIT**

§15.247 (a) (1) (i) For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a slow scan.

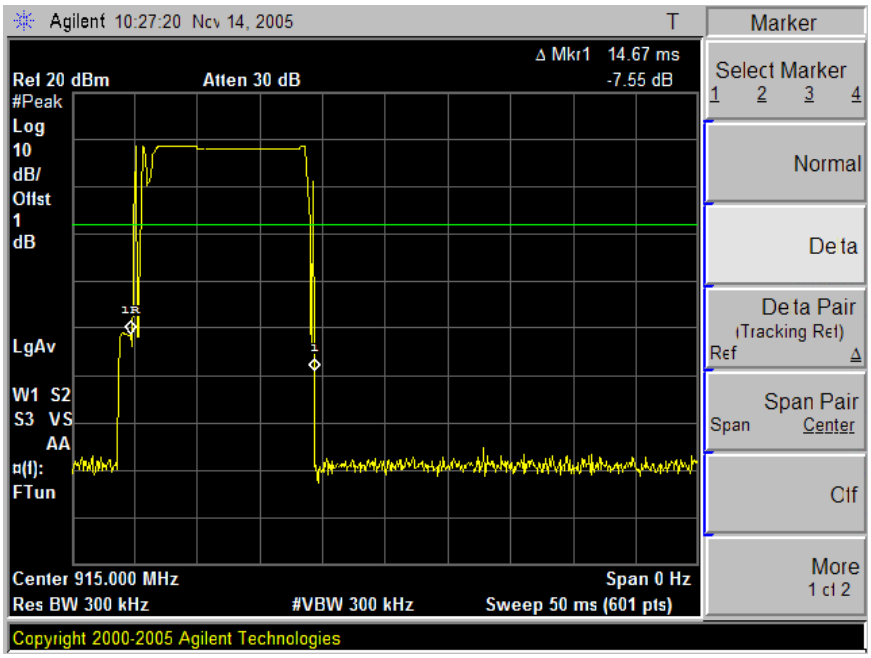
**RESULTS**

No non-compliance noted:

| Pulse Width (msec) | Number of Pulses in 10 seconds | Average Time of Occupancy (sec) | Limit (sec) | Margin (sec) |
|---|---|---|---|---|
| 14.67 | 17 | 0.249 | 0.4 | 0.151 |

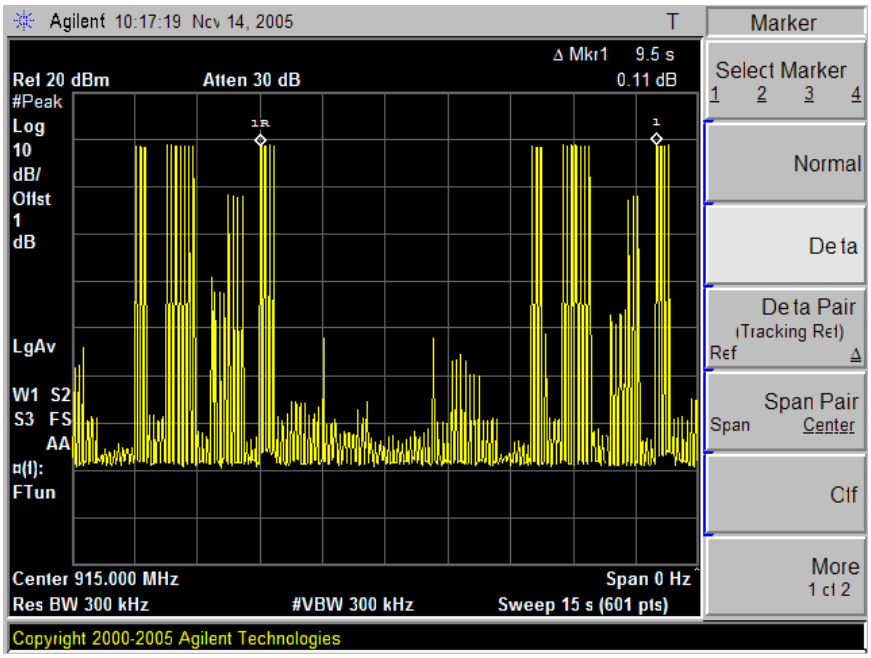
**PULSE WIDTH**

PULSE WIDTH



## NUMBER OF PULSES IN 15 SECOND OBSERVATION PERIOD

NUMBER OF PULSES



## 7.1.5. PEAK OUTPUT POWER

**PEAK POWER LIMIT**

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (b) (2) For frequency hopping systems operating in the 902-928 MHz band , employing at least 50 hopping channels: 1 watt; and employing less than 50 hopping channels, but at least 25 hopping channels: 0.25 watt.

§15.247 (b) (4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is -1 dBi, therefore the limit is 24dBm.

**TEST PROCEDURE**

The transmitter output is connected to a power meter.

**RESULTS**

No non-compliance noted:

The cable assembly insertion loss of 1dB was entered as an offset in the power meter to allow for direct reading of power.

| Channel | Frequency (MHz) | Peak Power (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|
| Low | 903 | 11.58 | 24 | -12.42 |
| Middle | 915 | 12.12 | 24 | -11.88 |
| High | 927 | 12.64 | 24 | -11.36 |

## 7.1.6. AVERAGE POWER

### AVERAGE POWER LIMIT

None: for reporting purposes only.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

### RESULTS

No non-compliance noted:

The cable assembly insertion loss of 1dB was entered as an offset in the power meter to allow for direct reading of power.

RF LASER

| Channel | Frequency (MHz) | Average Power (dBm) |
|---|---|---|
| Low | 903 | 11.53 |
| Middle | 915 | 12.07 |
| High | 927 | 12.59 |

## 7.1.7. CONDUCTED SPURIOUS EMISSIONS

**LIMITS**

§15.247 (c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated 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 also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

**TEST PROCEDURE**

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

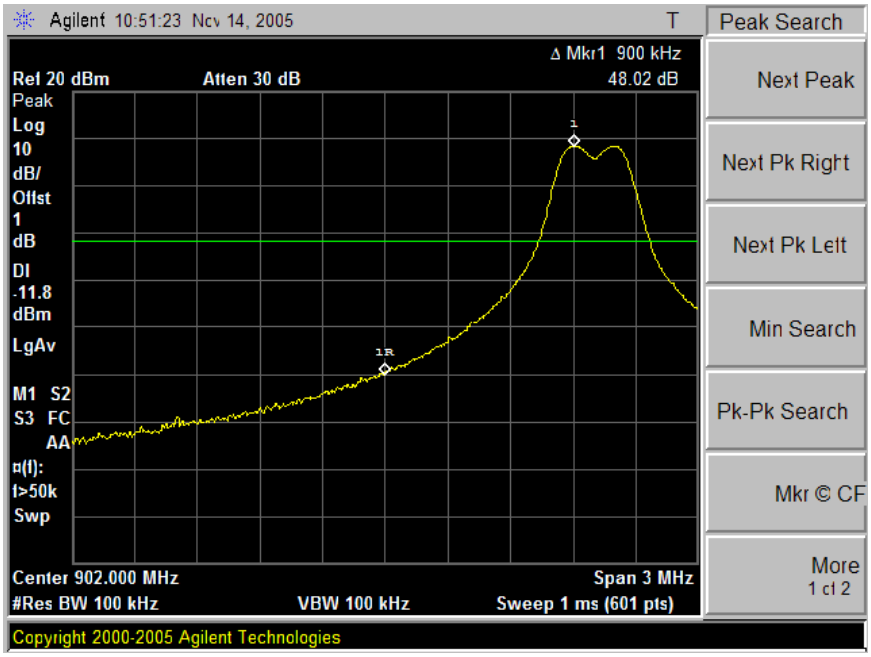
The spectrum from 30 MHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

**RESULTS**

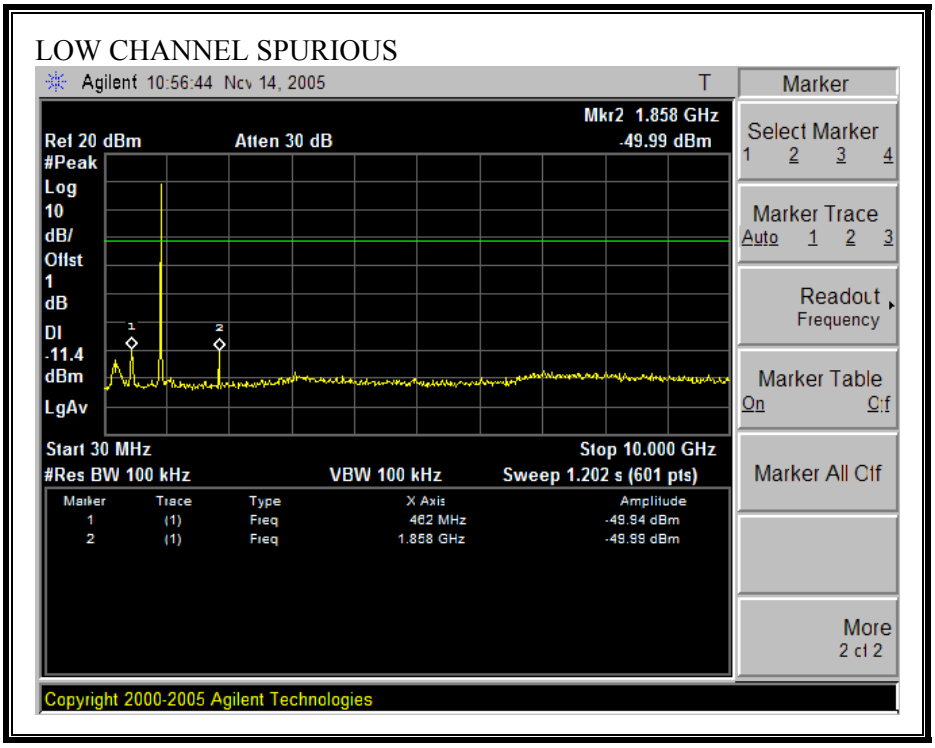
No non-compliance noted:

**RF LASER, SPURIOUS EMISSIONS, LOW CHANNEL**

LOW CHANNEL BANDEDGE

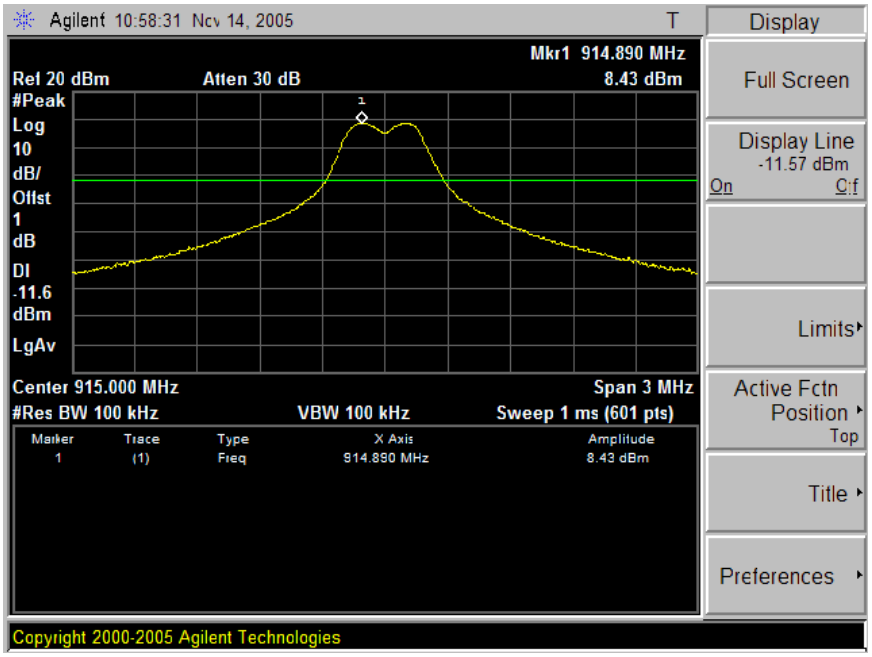


LOW CHANNEL SPURIOUS

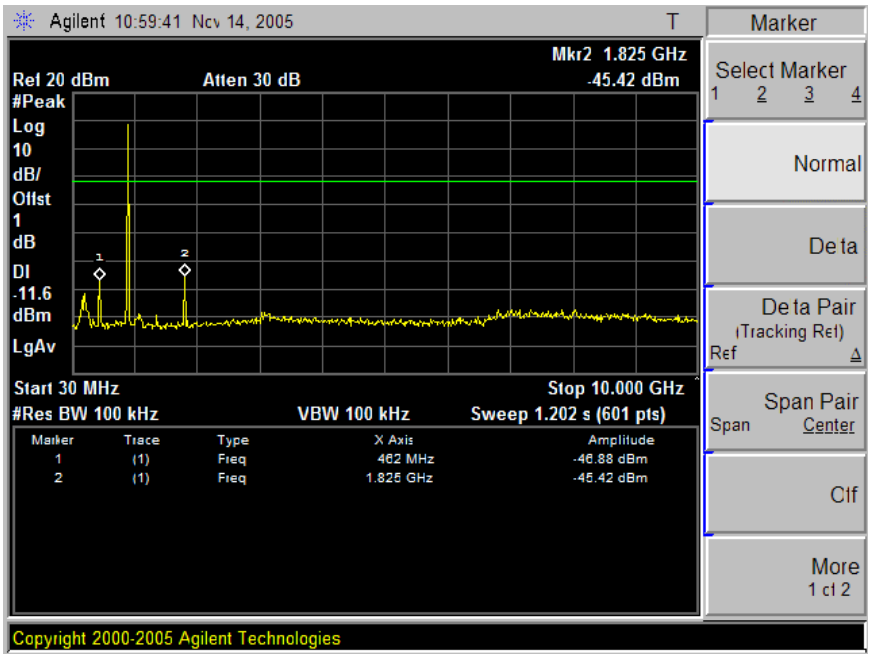


**SPURIOUS EMISSIONS, MID CHANNEL**

MID CHANNEL REFERENCE

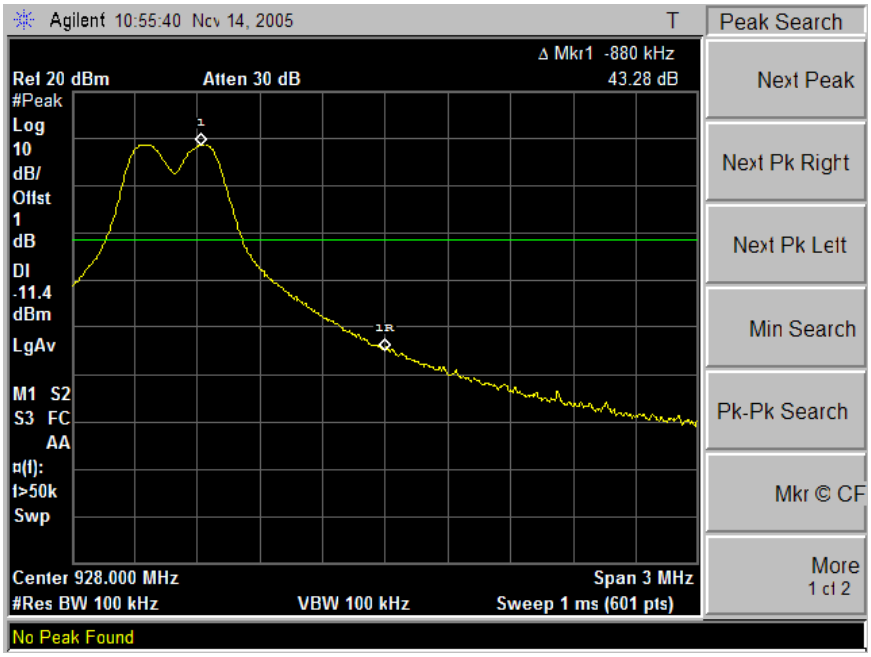


MID CHANNEL SPURIOUS

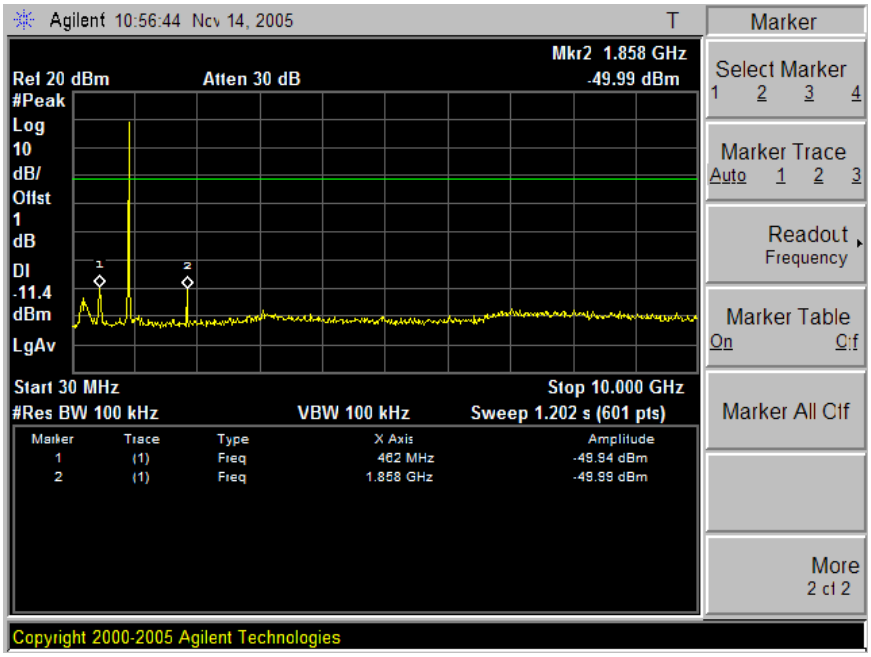


**SPURIOUS EMISSIONS, HIGH CHANNEL**

HIGH CHANNEL BANDEDGE

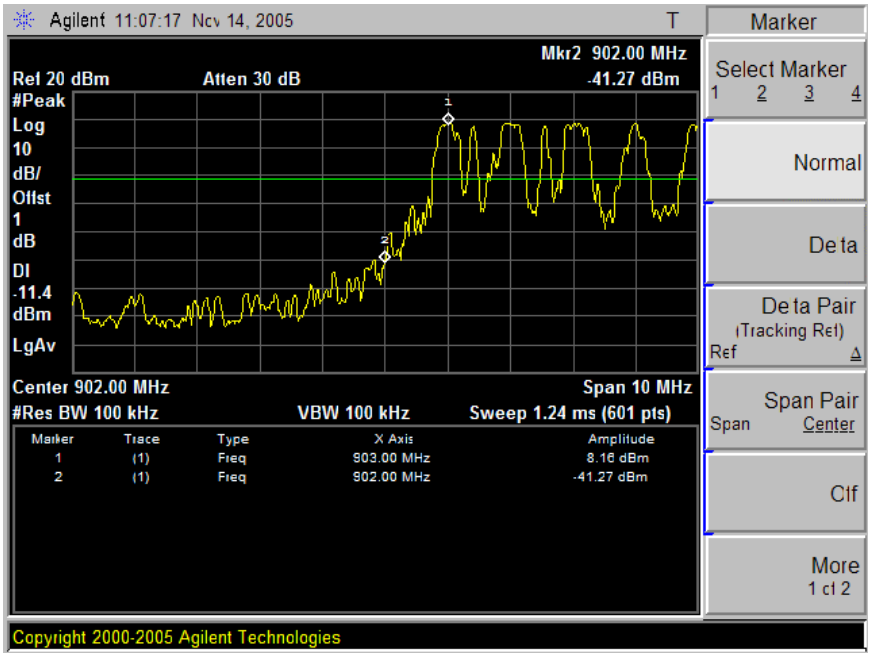


HIGH CHANNEL SPURIOUS

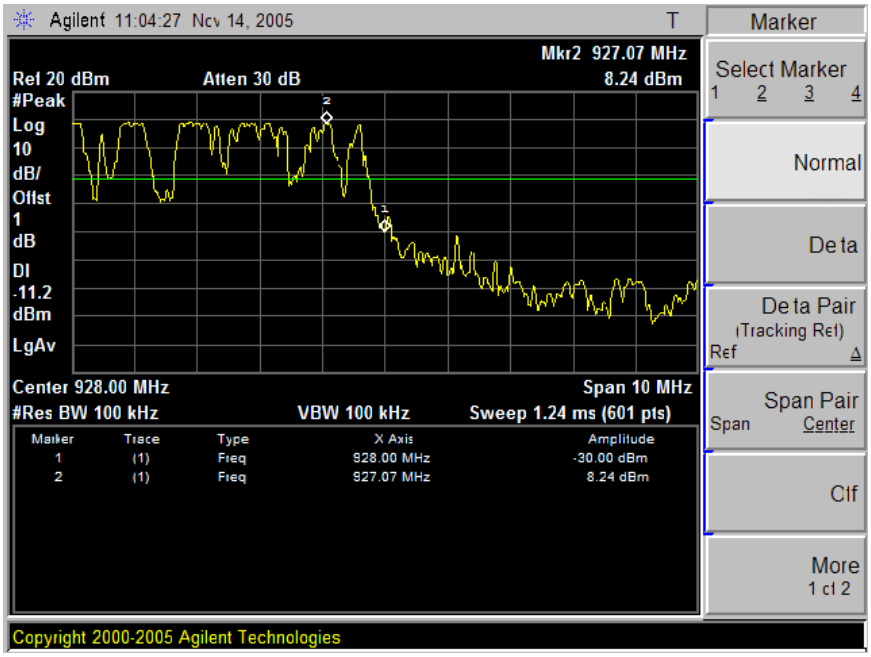


**SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON**

LOW BANDEDGE WITH HOPPING ON



HIGH BANDEDGE WITH HOPPING ON



# 7.2. RADIATED EMISSIONS

## 7.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

**LIMITS**

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - 156.52525 | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.7 - 156.9 | 2655 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 162.0125 - 167.17 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 167.72 - 173.2 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 240 - 285 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 322 - 335.4 | 3600 - 4400 | ([2]) |
| 13.36 - 13.41 | | | |

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (microvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 30 - 88 | 100 ** | 3 |
| 88 - 216 | 150 ** | 3 |
| 216 - 960 | 200 ** | 3 |
| Above 960 | 500 | 3 |

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

## TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each 5 GHz band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

## 7.2.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ

### HARMONICS AND SPURIOUS EMISSIONS WITH LINX 869 JJB ANTENNA

11/16/05 **High Frequency Measurement**
**Compliance Certification Services, Morgan Hill Open Field Site**

**Test Engr:Chin Pang**
**Project #:05U3728-1**
**Company:Worth Data**
**EUT Descrip.:Low Range 2 Way 900MHz RF Laser Barcode Scanner**
**EUT M/N:LZ400-RF**
**Test Target:FCC 15.247**
**Mode Oper:TX**

**Test Equipment:**

| Horn 1-18GHz | Pre-amplifer 1-26GHz | Pre-amplifer 26-40GHz | Horn > 18GHz | Limit |
|---|---|---|---|---|
| T59; S/N: 3245 @3m | T34 HP 8449B | | | FCC 15.205 |

Hi Frequency Cables

| 2 foot cable | 3 foot cable | 12 foot cable | HPF | Reject Filter |
|---|---|---|---|---|
| | Chin 197538001 | Chin 200354001 | HPF_1.5GHz | |

**Peak Measurements** RBW=VBW=1MHz
**Average Measurements** RBW=1MHz ; VBW=10Hz

| f GHz | Dist (m) | Read Pk dBuV | Read Avg. dBuV | AF dB/m | CL dB | Amp dB | D Corr dB | Fltr dB | Peak dBuV/m | Avg dBuV/m | Pk Lim dBuV/m | Avg Lim dBuV/m | Pk Mar dB | Avg Mar dB | Notes (V/H) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Low ch, 903MHz** | | | | | | | | | | | | | | | |
| 1.806 | 3.0 | 60.0 | 58.0 | 26.9 | 1.9 | -37.1 | 0.0 | 0.3 | 52.0 | 50.0 | 74.0 | 54.0 | -22.0 | -4.0 | V |
| 2.709 | 3.0 | 56.0 | 53.0 | 29.3 | 2.3 | -36.1 | 0.0 | 0.6 | 52.1 | 49.1 | 74.0 | 54.0 | -21.9 | -4.9 | V |
| 3.612 | 3.0 | 50.3 | 46.0 | 31.6 | 2.7 | -35.3 | 0.0 | 0.6 | 49.9 | 45.6 | 74.0 | 54.0 | -24.1 | -8.4 | V |
| 1.806 | 3.0 | 63.2 | 61.1 | 26.9 | 1.9 | -37.1 | 0.0 | 0.3 | 55.2 | 53.1 | 74.0 | 54.0 | -18.8 | -0.9 | H |
| 2.709 | 3.0 | 58.0 | 55.5 | 29.3 | 2.3 | -36.1 | 0.0 | 0.6 | 54.1 | 51.6 | 74.0 | 54.0 | -19.9 | -2.4 | H |
| 3.612 | 3.0 | 49.0 | 43.2 | 31.6 | 2.7 | -35.3 | 0.0 | 0.6 | 48.6 | 42.8 | 74.0 | 54.0 | -25.4 | -11.2 | H |
| **Mid Ch, 915MHz** | | | | | | | | | | | | | | | |
| 1.830 | 3.0 | 58.9 | 57.4 | 27.0 | 1.9 | -37.1 | 0.0 | 0.3 | 51.0 | 49.5 | 74.0 | 54.0 | -23.0 | -4.5 | V |
| 2.745 | 3.0 | 54.7 | 50.0 | 29.4 | 2.3 | -36.1 | 0.0 | 0.6 | 50.9 | 46.2 | 74.0 | 54.0 | -23.1 | -7.8 | V |
| 3.660 | 3.0 | 46.4 | 37.0 | 31.7 | 2.7 | -35.3 | 0.0 | 0.6 | 46.1 | 36.7 | 74.0 | 54.0 | -27.9 | -17.3 | V |
| 1.830 | 3.0 | 62.5 | 61.1 | 27.0 | 1.9 | -37.1 | 0.0 | 0.3 | 54.6 | 53.2 | 74.0 | 54.0 | -19.4 | -0.8 | H |
| 2.745 | 3.0 | 57.0 | 55.3 | 29.4 | 2.3 | -36.1 | 0.0 | 0.6 | 53.2 | 51.5 | 74.0 | 54.0 | -20.8 | -2.5 | H |
| 3.660 | 3.0 | 45.5 | 36.4 | 31.7 | 2.7 | -35.3 | 0.0 | 0.6 | 45.2 | 36.1 | 74.0 | 54.0 | -28.8 | -17.9 | H |
| **Hig Hc, 927MHz** | | | | | | | | | | | | | | | |
| 1.854 | 3.0 | 63.7 | 58.2 | 27.1 | 1.9 | -37.1 | 0.0 | 0.3 | 56.0 | 50.5 | 74.0 | 54.0 | -18.0 | -3.5 | V |
| 2.781 | 3.0 | 56.2 | 53.2 | 29.5 | 2.4 | -36.1 | 0.0 | 0.6 | 52.6 | 49.6 | 74.0 | 54.0 | -21.4 | -4.4 | V |
| 3.708 | 3.0 | 46.4 | 37.0 | 31.9 | 2.7 | -35.2 | 0.0 | 0.6 | 46.3 | 36.9 | 74.0 | 54.0 | -27.7 | -17.1 | V |
| 1.854 | 3.0 | 64.8 | 60.4 | 27.1 | 1.9 | -37.1 | 0.0 | 0.3 | 57.1 | 52.7 | 74.0 | 54.0 | -16.9 | -1.3 | H |
| 2.781 | 3.0 | 56.1 | 55.3 | 29.5 | 2.4 | -36.1 | 0.0 | 0.6 | 52.4 | 51.7 | 74.0 | 54.0 | -21.6 | -2.3 | H |
| 3.708 | 3.0 | 50.5 | 43.1 | 31.9 | 2.7 | -35.2 | 0.0 | 0.6 | 50.4 | 43.0 | 74.0 | 54.0 | -23.6 | -11.0 | H |

**Note: No other emissions were detected above the system noise floor.**

| | | | | | |
|---|---|---|---|---|---|
| f | Measurement Frequency | Amp | Preamp Gain | Avg Lim | Average Field Strength Limit |
| Dist | Distance to Antenna | D Corr | Distance Correct to 3 meters | Pk Lim | Peak Field Strength Limit |
| Read | Analyzer Reading | Avg | Average Field Strength @ 3 m | Avg Mar | Margin vs. Average Limit |
| AF | Antenna Factor | Peak | Calculated Peak Field Strength | Pk Mar | Margin vs. Peak Limit |
| CL | Cable Loss | HPF | High Pass Filter | | |

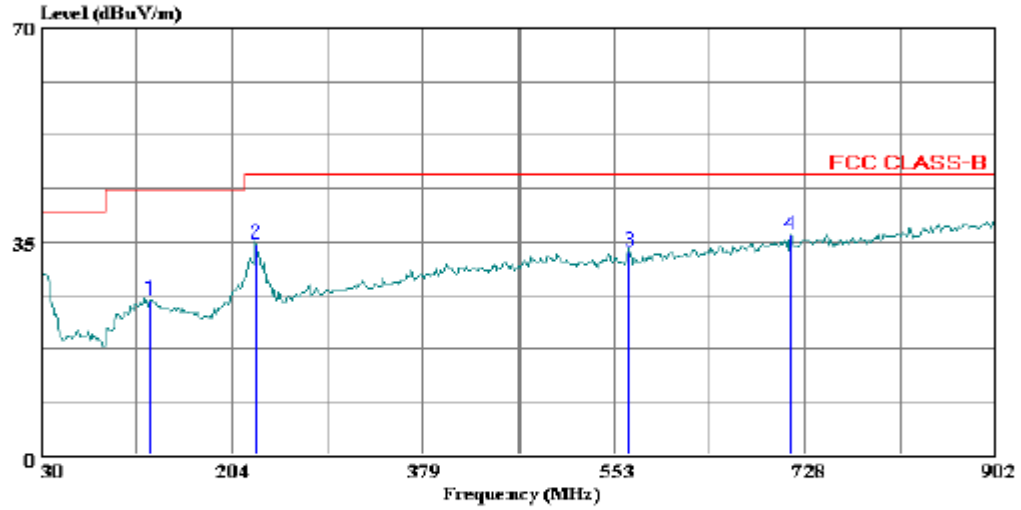
## 7.2.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

**SPURIOUS EMISSIONS 30 TO 902 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)**

HORIZONTAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 28 File#: worthdata 3728.EMI Date: 11-14-2005 Time: 15:48:52




(Audix ATC)

Trace: 27 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: : Chin Pang
Project #: : 05U3728-1
Company: : Worth Data Inc.
EUT: : RF Lasor
Model No. : LZ400-RF
Configuration : EUT Only
Target of Test : FCC Class B
Mode of Operation: TX ON

HORIZONTAL DATA

Page: 1

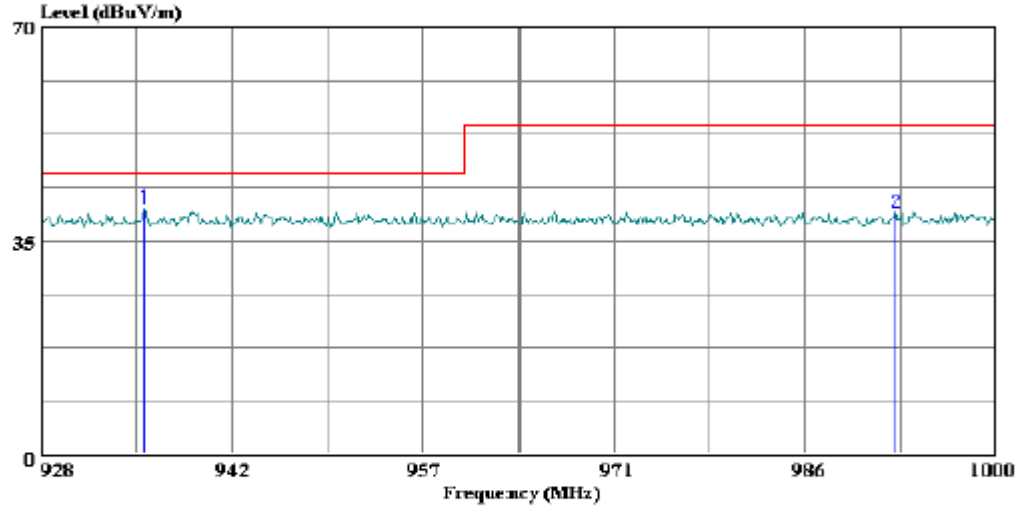
| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 129.408 | 10.38 | 15.16 | 25.54 | 43.50 | -17.96 | Peak |
| 2 | 227.072 | 21.68 | 12.93 | 34.61 | 46.00 | -11.39 | Peak |
| 3 | 566.280 | 12.40 | 21.05 | 33.45 | 46.00 | -12.55 | Peak |
| 4 | 713.648 | 12.85 | 23.30 | 36.15 | 46.00 | -9.85 | Peak |

**SPURIOUS EMISSIONS 928-1000 MHz (WORST-CASE CONFIGURATION ( HORIZONTAL)**

HORIZONTAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 26 File#: worthdata 3728.EMI Date: 11-14-2005 Time: 15:45:32




(Audix ATC)

Trace: 25 Ref Trace:

Condition: FCC CLASS-B HORIZONTAL
Test Operator: : Chin Pang
Project #: : 05U3728-1
Company: : Worth Data Inc.
EUT: : RF Lasor
Model No. : LZ400-RF
Configuration : EUT Only
Target of Test : FCC Class B
Mode of Operation: TX ON

HORIZONTAL DATA

Page: 1

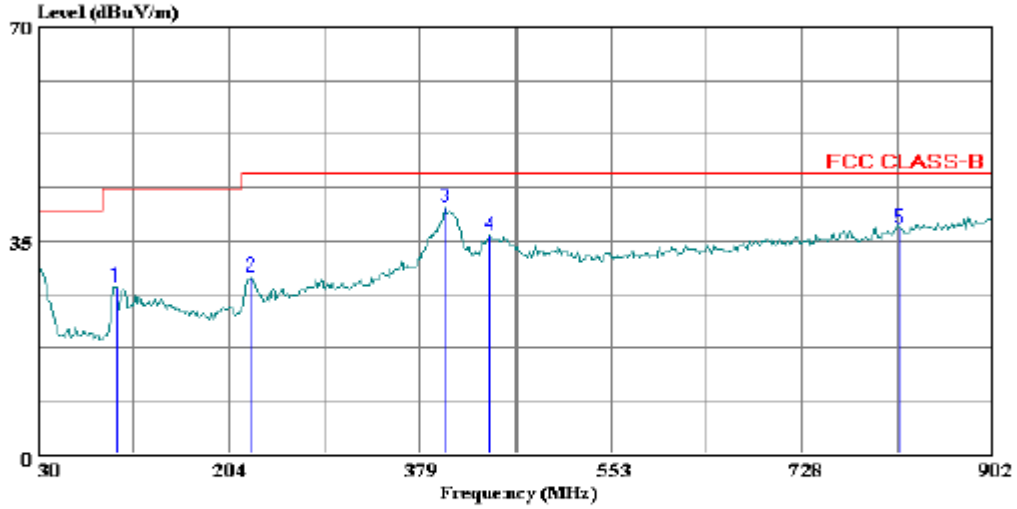
| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 935.848 | 13.93 | 26.34 | 40.27 | 46.00 | -5.73 | Peak |
| 2 | 992.440 | 12.67 | 26.93 | 39.60 | 54.00 | -14.40 | Peak |

**SPURIOUS EMISSIONS 30 TO 902 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 22 File#: worthdata 3728.EMI Date: 11-14-2005 Time: 15:38:38




(Audix ATC)

Trace: 21 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : Chin Pang
Project #: : 05U3728-1
Company: : Worth Data Inc.
EUT: : RF Lasor
Model No. : LZ400-RF
Configuration : EUT Only
Target of Test : FCC Class B
Mode of Operation: TX ON

VERTICAL DATA

Page: 1

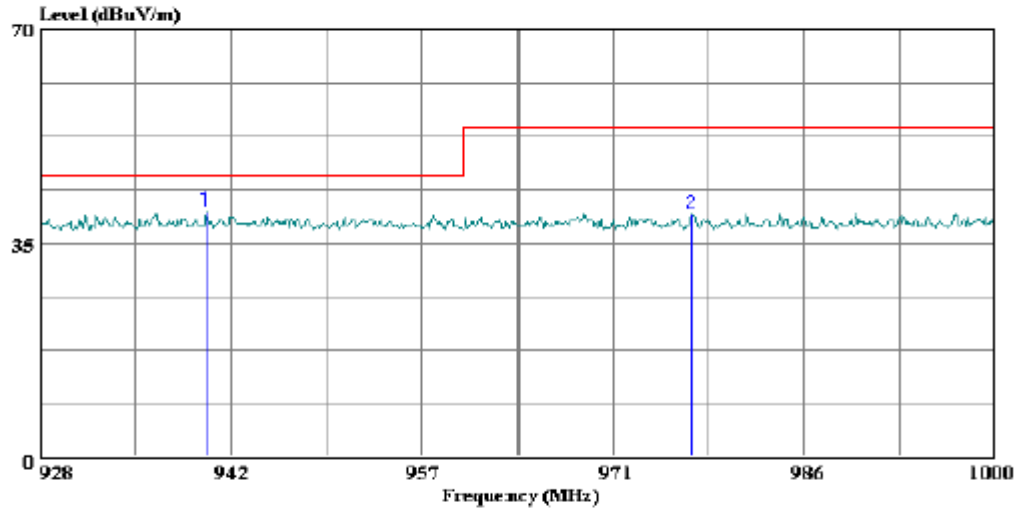
| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 101.504 | 15.92 | 11.54 | 27.46 | 43.50 | -16.04 | Peak |
| 2 | 225.328 | 16.23 | 12.86 | 29.09 | 46.00 | -16.91 | Peak |
| 3 | 402.344 | 22.42 | 18.11 | 40.53 | 46.00 | -5.47 | Peak |
| 4 | 443.328 | 16.72 | 19.03 | 35.75 | 46.00 | -10.25 | Peak |
| 5 | 816.544 | 12.27 | 24.80 | 37.07 | 46.00 | -8.93 | Peak |

**SPURIOUS EMISSIONS 928-1000 MHz (WORST-CASE CONFIGURATION ( VERTICAL)**

VERTICAL PLOT

561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 24 File#: worthdata 3728.EMI Date: 11-14-2005 Time: 15:41:28




(Audix ATC)

Trace: 23 Ref Trace:

Condition: FCC CLASS-B VERTICAL
Test Operator: : Chin Pang
Project #: : 05U3728-1
Company: : Worth Data Inc.
EUT: : RF Lasor
Model No. : LZ400-RF
Configuration : EUT Only
Target of Test : FCC Class B
Mode of Operation: TX ON

VERTICAL DATA

Page: 1

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | |
| 1 | 940.528 | 13.76 | 26.44 | 40.20 | 46.00 | -5.80 | Peak |
| 2 | 977.104 | 12.87 | 26.75 | 39.62 | 54.00 | -14.38 | Peak |

## 7.3. POWERLINE CONDUCTED EMISSIONS

**LIMIT**

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

| Frequency of Emission (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56 * | 56 to 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

**TEST PROCEDURE**

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

**RESULTS**

No non-compliance noted:

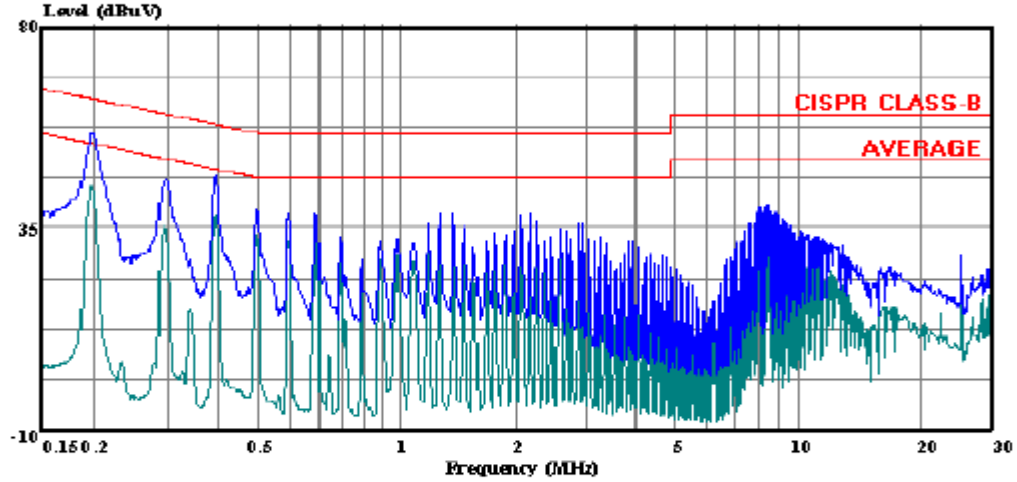
## 6 WORST EMISSIONS

| CONDUCTED EMISSIONS DATA (115VAC 60Hz) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Freq. | Reading | | | Closs | Limit | EN_B | Margin | | Remark |
| (MHz) | PK (dBuV) | QP (dBuV) | AV (dBuV) | (dB) | QP | AV | QP (dB) | AV (dB) | L1 / L2 |
| 0.20 | 52.86 | -- | 42.11 | 0.00 | 63.82 | 53.82 | -10.96 | -11.71 | L1 |
| 0.49 | 48.16 | -- | 42.00 | 0.00 | 56.24 | 46.24 | -8.08 | -4.24 | L1 |
| 8.82 | 49.88 | -- | 47.28 | 0.00 | 60.00 | 50.00 | -10.12 | -2.72 | L1 |
| 0.20 | 51.46 | -- | 41.07 | 0.00 | 63.69 | 53.69 | -12.23 | -12.62 | L2 |
| 0.49 | 47.64 | -- | 42.44 | 0.00 | 56.15 | 46.15 | -8.51 | -3.71 | L2 |
| 8.82 | 51.14 | -- | 48.90 | 0.00 | 60.00 | 50.00 | -8.86 | -1.10 | L2 |
| 6 Worst Data<br>RF LASER | | | | | | | | | |

**LINE 1 RESULTS**

Compliance Certification Services
561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 21 File#: worth data BS.EMIDate: 11-16-2005 Time: 09:51:24




(Audix A TC)

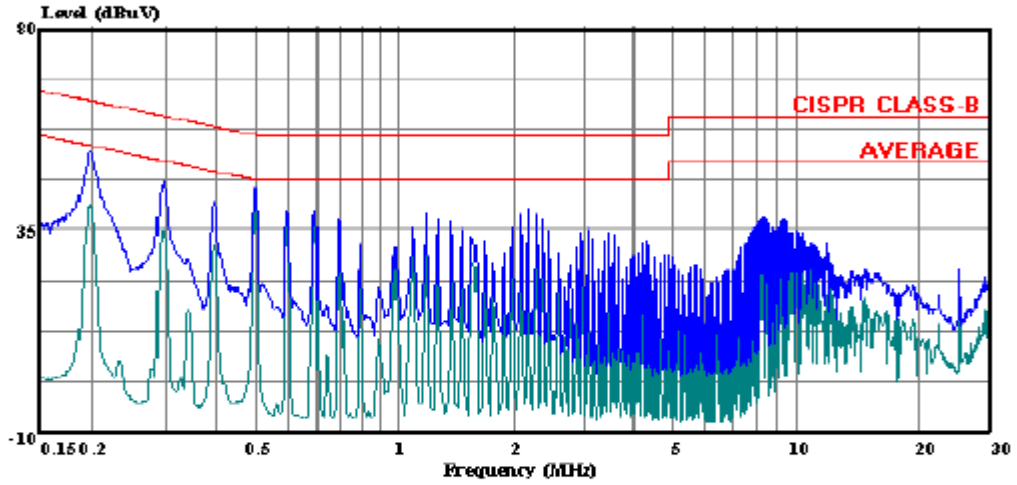
Trace: 19 Ref Trace:

Condition: CISPR CLASS-B
Project # : 05U3728-1
Company : Worth Data
EUT Descrip : RF LASER
Model : LZ400-RF
EUT Config : EUT/AC Adapter
Mode Of Oper : Charging Mode
Target of Test: FCC Class B
Power Source: : 115 VAC, 60 Hz
: L1: PK(Black), AV(Green)
Test Operator : Chin Pang

**LINE 2 RESULTS**

Compliance Certification Services
561F Monterey Road
Morgan Hill, CA 95037
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 28 File#: worth data BS.EMIDate: 11-16-2005 Time: 10:06:05



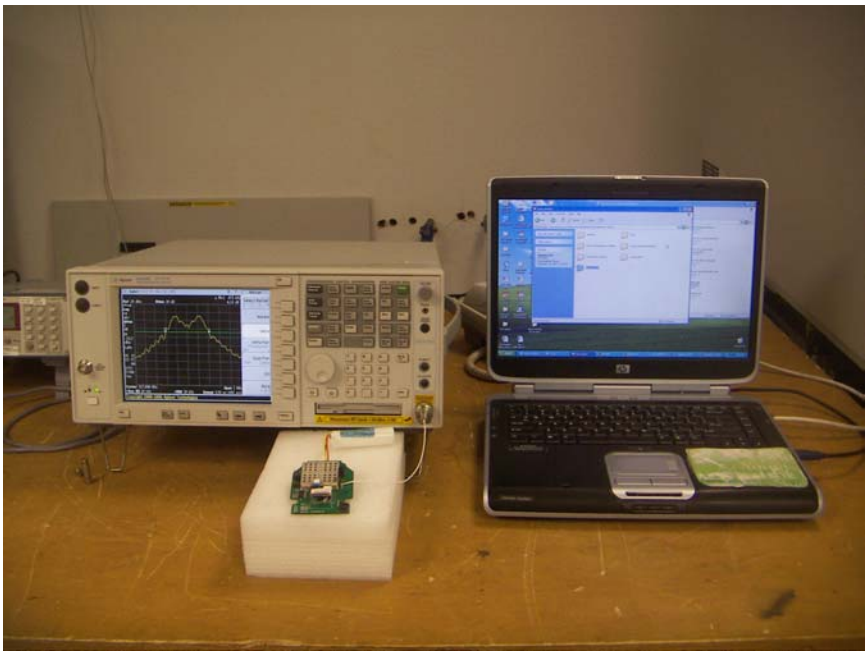

Trace: 26 Ref Trace:

Condition: CISPR CLASS-B
Project # : 05U3728-1
Company : Worth Data
EUT Descrip : RF LASER
Model : LZ400-RF
EUT Config : EUT/AC Adapter
Mode Of Oper : Charging Mode
Target of Test: FCC Class B
Power Source: : 115 VAC, 60 Hz
: L2: PK(Black), AV(Green)
Test Operator : Chin Pang

# 8. SETUP PHOTOS

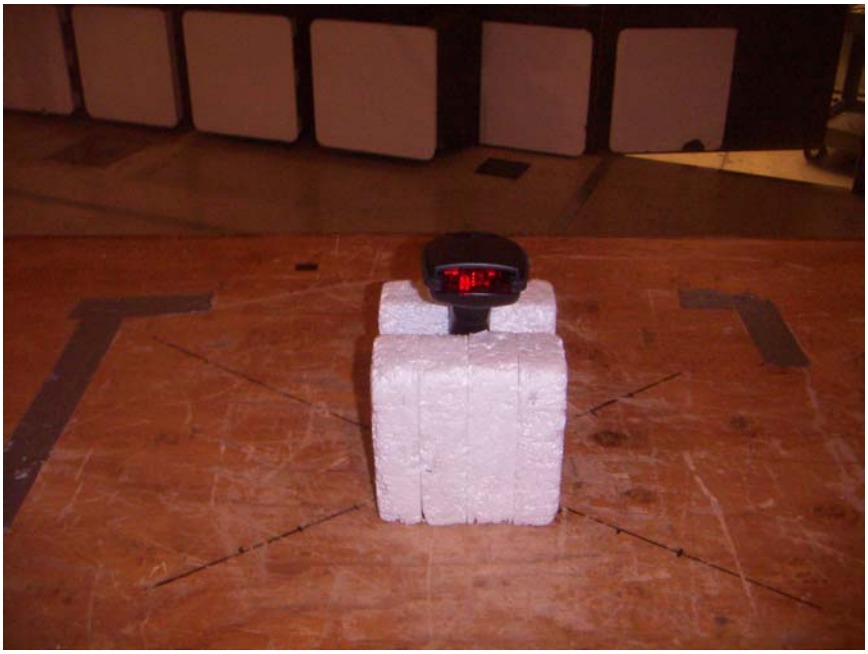
**ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP**

ANTENNA PORT CONDUCTED PHOTO

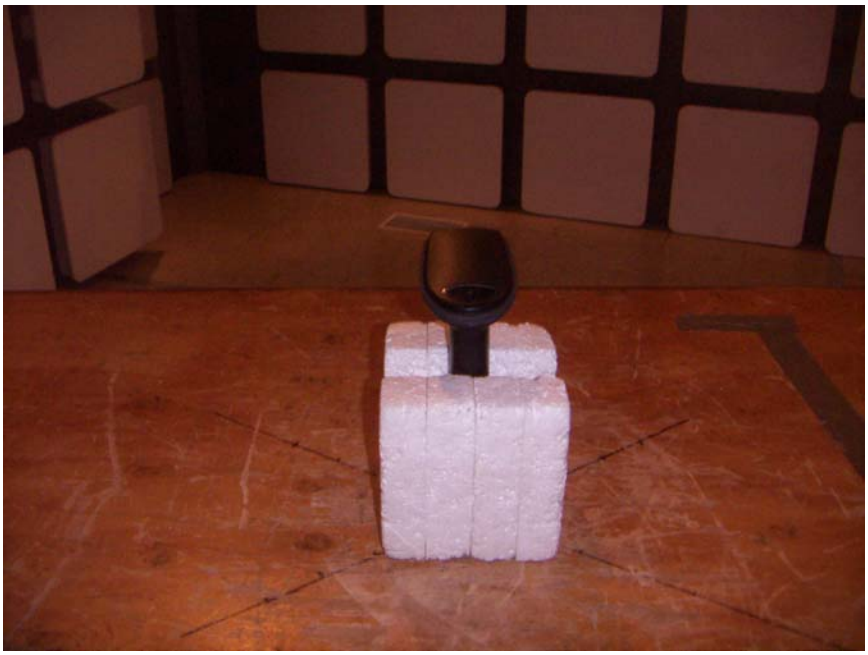


## RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO



RADIATED BACK PHOTO



## POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO


# END OF REPORT