*Nemko USA, Inc.*
*11696 Sorrento Valley Rd., Suite F*
*San Diego, CA 92121-1024*
*Phone (858) 755-5525 Fax (858) 452-1810*

# CERTIFICATION TEST REPORT

## PART 15.247, SUBPART C

## RSS-210 - LOW POWER LICENSE EXEMPT RADIO-COMMUNICATION DEVICES (ALL FREQUENCY BANDS)

**DECLARATION OF CONFORMANCE PROCEDURES**
TEST REPORT

For The **Headset**

Model: **HS6000**

FCC ID#: BYMHS6000

PREPARED FOR:

**HME**
**14110 Stowe Drive**
**Poway, CA 92064**

PREPARED ON **8-25-05**

REPORT NUMBER: **2005 080643-FCC**

PROJECT NUMBER: **25-643-HME**

Total Pages: 35

# DOCUMENT HISTORY

| REVISION | DATE | COMMENTS |
|---|---|---|
| - | 8-25-05 | Prepared By: A. LAUDANI |
| - | 8-25-05 | Initial Release: F. Fleury |
| | | |

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (1992) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- The unit described in this report was received at Nemko USA, Inc.'s facilities on March 11, 2004. Testing was performed on the unit described in this report on March 11, 2004 to March 16, 2004.
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This report does not imply the endorsement of the Federal Communications Commission (FCC), NVLAP or any other government agency.

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# CERTIFICATION

Nemko USA, Inc., an independent Electromagnetic Compatibility (EMC) Test Laboratory, produced this Test Report and performed the Radio Frequency Interference (RFI) testing and data evaluation contained herein.

Nemko USA, Inc.'s measurement facility is currently registered with the United States Federal Communications Commission (FCC) in accordance with the provisions of 47 United States Code (CFR) Part 2, Subpart I, Section 2.948(a). A current description of Nemko USA, Inc.'s measurement facility is on file with the FCC. Nemko USA Inc. has additionally satisfied the FCC that it complies with the requirements set forth in 47 CFR Part 2, Subpart I, Section 2.948(d) regarding the accreditation of EMC laboratories.

The RFI testing, test data collection and test data evaluation were accomplished in accordance with the ANSI C63.4-1992 Standard, and in accordance with the applicable sections of the FCC rules (47 CFR Parts 2 and 15). The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). The administrative summary of this test report provides a description of the test sample.

I hereby certify that the test data, test data evaluation, and equipment configurations used to compile this test report are a true and accurate representation of the test sample's radio frequency interference characteristics as of the test date(s), and, for the design of the test sample.

**Test Supervisor:**

*Chip Fleury*

Frontlines Manager, Nemko USA, Inc.

# ADMINISTRATIVE DATA AND TEST SUMMARY

## 1.1. Administrative Data

CLIENT: **HME**
**14110 Stowe Drive**
**Poway, CA 92064**

CONTACT: Thomas Standford

DATE (S) OF TEST: August 24 to August 25, 2005

EQUIPMENT UNDER TEST (EUT): Headset

FCCID# BYMHS6000

Model HS6000

Condition Upon Receipt Suitable for Test

TEST SPECIFICATION: FCC, Part 15.247, Subpart C,

## 1.2. Test Summary

| ***Specification*** | ***Frequency Range*** | ***Compliance Status*** |
|---|---|---|
| FCC CFR 47, §15.247 Plus Bandedge | 2400-2483.5 MHz | PASS |
| RSS-210 - Low Power License Exempt Radio-communication Devices (All Frequency Bands) | 2400-2483.5 MHz | PASS |

# 2. SYSTEM CONFIGURATION

**The HS6000** is a **Headset**. Its function is to work as transceiver in communication with the base station (FCC ID: BYMBASE6000), a fully certified transceiver. The EUT was exercised by putting it into receive mode or linked with the base station. Its microphone modulates the RF output by digital means. It is powered by a battery which is charged by a previously qualified unit. It fails by allowing interruptions of communication with the base station. This is seen by a change in status LED on the headset or noted by loss of communication with the basestation.

## 2.1. System Components and Power Cables

| DEVICE | MANUFACTURER<br>MODEL #<br>SERIAL # | POWER CABLE |
|---|---|---|
| EUT - **Headset** | **HME**<br>**HS6000**<br>Serial #: F31G0018 | N/A |
| | | |
| | | |

## 2.2. Device Interconnection and I/O Cables

| CONNECTION | I/O CABLE |
|---|---|
| No connections | |

# 3. DESCRIPTION OF TEST SITE AND EQUIPMENT

## 3.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles Northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. This particular part of the valley tends to minimize ambient levels, i.e. radio and TV broadcast stations and land mobile communications. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022 (1987), CISPR 16 and 22 (1985) and ANSI C63.4-1992 documents. The OATS normalized site attenuation characteristics are verified for compliance every year.

# 4. DESCRIPTION OF TESTING METHODS

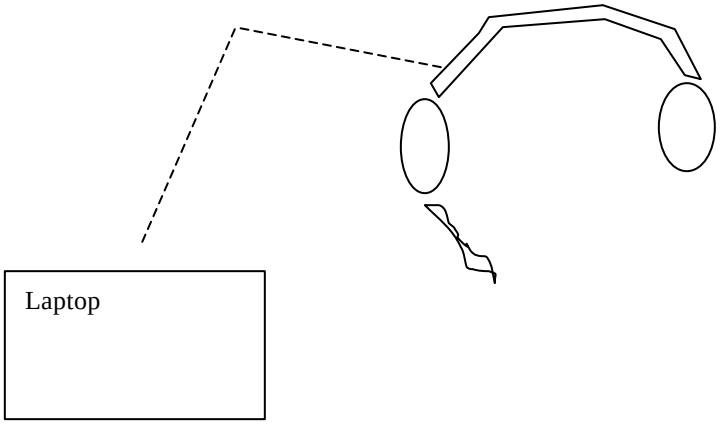
## 4.1. Introduction

As required in 47 CFR, Parts 2 and 15, the methods employed to test the radiated and conducted emissions (as applicable) of the EUT are those contained within the American National Standards Institute (ANSI) document C63.4-2003, titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." All applicable FCC Rule Sections that provide further guidance for performance of such testing are also observed.

For General Test Configuration please refer to Figure 1 on the following page.

Digital devices sold in Canada are required to comply with the Interference Causing Equipment Standard for Digital Apparatus, ICES-003. These test methods and limits are specified in the Canadian Standards Association's (CSA) Standard C108.8-M1983 (1-1-94 version) and are "essentially equivalent" with FCC, Part 15 and CISPR 22 (EN55022) rules for unintentional radiators per EMCAB-3, Issue 3 (May 1998). No further testing is required for compliance to ICES-003.

# Figure 1. General EUT Test Setup Diagram




*NOT TO SCALE*

**Laptop used to set individual channels and modes for testing, and then removed from test setup.**

## 4.2. Configuration and Methods of Measurements for Radiated Emissions

Section 8 of ANSI C63.4 determines the general configuration and procedures for measuring the radiated emissions of equipment under test. Initially, the primary emission frequencies are identified inside the test lab by positioning a broadband receive antenna one meter from the EUT to locate frequencies of significant radiation. Next, the EUT and associated system are placed on a turntable on a ten meter open area test site (registered with the FCC in accord with its Rules and ANSI C63.4) and the receive antenna is located at a distance of ten meters from the EUT.

The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. All significant radiated emissions are recorded when maximum radiation on each frequency is observed, in accordance with part 8 of ANSI C63.4-1992 and Section 15.33 of the FCC Rules. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance.

The numerical results that are applied to the emissions limits are arrived at by the following method:
Example: A=RR+CL+AF
A = Amplitude dBuV/M
RR = Receiver Reading dBuV
CL = cable loss dB
AF = antenna factor dBm-1

Example Frequency = 110MHz
18.5 dBuV (spectrum analyzer reading)
+3.0 dB (cable loss @ frequency)
21.5 dBuV
+15.4 dBm-1 (antenna factor @ frequency)
36.9 dBuV/M Final adjusted value

The final adjusted value is then compared to the appropriate emission limit to determine compliance.

# 5. CFR 47 Part 15c §15.247 Test Results

Notes:
Maximum Peak Output power was measured at 114.3 dBuV/m at 3m. This converts to 0.080 Watts EIRP.

Emissions were searched for between 30 MHz and 24,835 MHz. If emissions not reported, emissions found were more than 20 dB from the limit.

Bandedge was measured directly as band edge frequency was more than 2 bandwidths from the edge channels.

Average measurements were measured directly with the average detector of 10 Hz VBW –found to be the worst case as compared with average measurements by method of adding the duty cycle factor to the peak values.

Use of an unique antenna connector does not apply as antenna is integral with the headset.

Conductive Peak Output Power and conductive spurious were not performed as antenna is integral with the headset.

No measurements presented from 30 to 1000 MHz as no emissions were found in this range with the transceiver on, off (receive) or in standby.

## 5.1. Plots for Band-edge Compliance

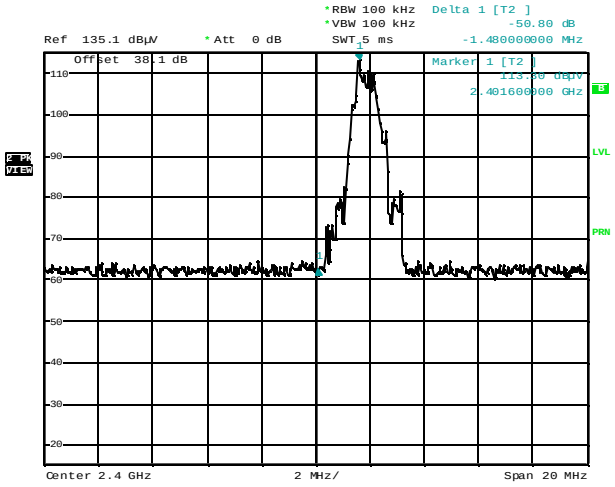
See Peak and Average levels from page 14.

Lower BANDEDGE:

Use of Delta Method for bandedge with the 1MHz/100kHz ratio delta to offset modulation effects.

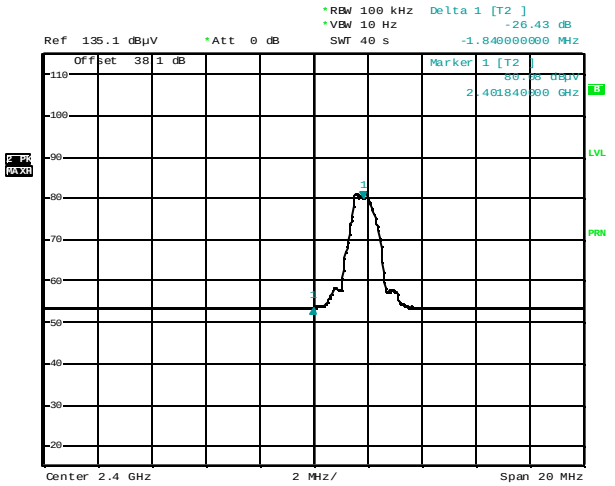
Peak at 1 MHz RBW = 114.1 dBuV/m - 50.8 dB Delta = 63.3

which is less than 74, therefore Peak Complies.




Date: 30.SEP.2005 09:17:00

Average at 1 MHz/10 Hz = 15 dBuV/m – 26.4 dB Delta = -11.4 which is less than 54, therefore Average Complies.

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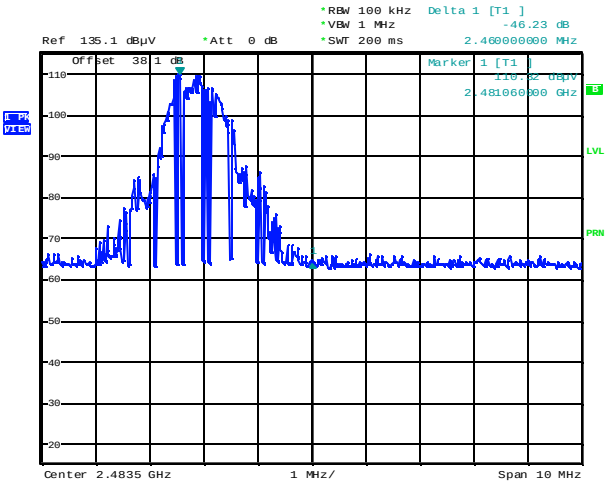
Lower BANDEDGE:

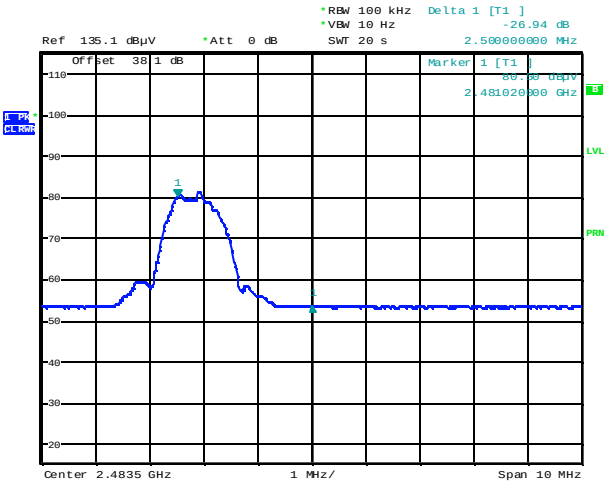
Peak at 1 MHz RBW = 114.3 dBuV/m - 45.2 dB Delta = 69.1

which is less than 74, therefore Peak Complies.




Date: 30.SEP.2005 09:01:29

Average at 1 MHz/10 Hz = 14.3 dBuV/m – 26.9 dB Delta = -12.6 which is less than 54, therefore Average Complies.




Date: 30.SEP.2005 09:05:31

Test equipment: Spectrum analyzer #897

## 5.2. Radiated Emissions

Peak output power 114.3 dBuV/m @ 3m results in 19.03 dBm

$10^{[(\text{Field Strength in dBuV/m} - 120)/20]}$ = Field Strength in V/m

$[(\text{Field Strength in V/m} \times 3\text{m})/5.48]^2$ = Power in Watts 0.08 W

10 x log (Power in Wattts) + 30 = dBm

**Radiated Emissions Data**

Complete: YES
Preliminary:
Job # : 25-643-HME Test # : 1
Page 1 of 1

Client Name : HM Electronics
EUT Name : Head Set
EUT Model # : HS6000
EUT ANTENNA Part # :
EUT Serial # : F31G0018
EUT Config. :
Limit for FCC Part 15.247 is 125 mW, For EN 300 328, limit is 100 mW
Specification : FCC Part 15.247C, 15.209, 15.205(a) Reference :

| | | | | | |
|---|---|---|---|---|---|
| Rod. Ant. #: | NA | Temp. (deg. C) : | 23 | Date : | 8/22/2005 |
| Bicon Ant.#: | NA | Humidity (%) : | 73 | Time : | |
| Log Ant.#: | NA | EUT Voltage : | batt | Staff : | A. Laudani |
| DRG Ant. # | 752 | EUT Frequency : | na | Photo ID: | |
| Dipole Ant.#: | NA | Phase: | na | Peak Res Bandwidth: | 1 MHz |
| Cable#: | 40ft | Location: | SOATS | Peak Video Bandwidth | 1 MHz |
| Preamp#: | 842 | Distance: | 3M | AVE Res Bandwidth: | 1 MHz |
| Spec An.#: | 835 | | | AVE Video Bandwidth | 10 Hz |
| QP #: | NA | | | | |
| PreSelect#: | NA | | | | |

| Meas. Freq. (MHz) | Vertical (dBuV) pk | Vertical (dBuV) av | Horizontal (dBuV) pk | Horizontal (dBuV) av | CF (db) | Max Level (dBuV/m) pk | Max Level (dBuV/m) av | Spec. Limit (dBuV/m) pk | Spec. Limit (dBuV/m) av | Margin dB pk | Margin dB av | EUT Rotation | Ant. Height | Pass Fail Unc. | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2401.8 | 78.6 | -20.0 | 79.9 | -19.2 | 34.2 | 114.1 | 15.0 | 115.3 | | -1.2 | | | 1.0 | Pass | 100mW Limit |
| 4803.6 | 59.9 | 26.6 | 57.2 | 27.1 | -5.4 | 54.5 | 21.7 | 74.0 | 54.0 | -19.5 | -32.3 | | 1.0 | Pass | |
| 7205.4 | 49.6 | 25.9 | 59.6 | 25.6 | 3.7 | 63.3 | 29.6 | 94.1 | 74.1 | -30.8 | -44.5 | | 1.0 | Pass | |
| 9607.2 | 37.7 | 21.8 | 41.2 | 21.7 | 10.2 | 51.4 | 32.0 | 74.0 | 54.0 | -22.6 | -22.0 | | 1.0 | Pass | noise floor |
| 12009.0 | 32.9 | 21.8 | 32.2 | 22.0 | 17.1 | 50.0 | 39.1 | 74.0 | 54.0 | -24.0 | -14.9 | | 1.0 | Pass | noise floor |
| 14410.8 | 31.1 | 21.6 | 32.0 | 21.6 | 22.2 | 54.2 | 43.8 | 94.1 | 74.1 | -39.9 | -30.3 | | 1.0 | Pass | noise floor |
| 16812.6 | 26.6 | 18.8 | 29.6 | 18.9 | 23.9 | 53.5 | 42.8 | 94.1 | 74.1 | -40.7 | -31.4 | | 1.0 | Pass | noise floor |
| 19214.4 | 16.5 | 6.4 | 12.4 | 6.4 | 40.5 | 57.0 | 46.9 | 74.0 | 54.0 | -17.0 | -7.1 | | 1.0 | Pass | noise floor (10 kHz BW) |
| | | | | | | | | | | | | | | | |
| 2441.66 | 77.7 | | 80.1 | | 34.2 | 114.3 | | 115.3 | | -1.0 | | | 1.0 | Pass | 100mW Limit |
| 4883.32 | 59.3 | 36.5 | 55.0 | 36.4 | -5.4 | 53.9 | 31.1 | 74.0 | 54.0 | -20.1 | -22.9 | | 1.0 | Pass | |
| 7324.98 | 46.5 | 35.5 | 49.4 | 35.5 | 3.7 | 53.1 | 39.2 | 74.0 | 54.0 | -20.9 | -14.8 | | 1.0 | Pass | |
| 9766.64 | 31.2 | 30.6 | 29.7 | 21.3 | 10.2 | 41.4 | 40.8 | 94.3 | 74.3 | -52.9 | -33.5 | | 1.0 | Pass | noise floor |
| 12208.3 | 34.5 | 22.6 | 33.8 | 22.5 | 17.1 | 51.6 | 39.7 | 74.0 | 54.0 | -22.4 | -14.3 | | 1.0 | Pass | noise floor |
| 14649.96 | 32.8 | 21.5 | 32.2 | 21.5 | 21.5 | 54.3 | 43.0 | 94.3 | 74.3 | -40.0 | -31.3 | | 1.0 | Pass | noise floor |
| 17091.62 | 19.8 | 12.5 | 19.6 | 11.1 | 31.0 | 50.8 | 43.5 | 94.3 | 74.3 | -43.5 | -30.8 | | 1.0 | Pass | noise floor (30 kHz BW) |
| 19533.28 | 16.5 | 6.4 | 12.4 | 6.4 | 40.5 | 57.0 | 46.9 | 74.0 | 54.0 | -17.0 | -7.1 | | 1.0 | Pass | noise floor (10 kHz BW) |
| | | | | | | | | | | | | | | | |
| 2481.4 | 79.1 | -21.2 | 80.1 | -19.9 | 34.2 | 114.3 | 14.3 | 115.3 | | -1.0 | | | 1.0 | Pass | 100mW Limit |
| 4962.8 | 50.9 | 27.1 | 50.9 | 27.1 | -5.4 | 45.5 | 21.7 | 74.0 | 54.0 | -28.5 | -32.3 | | 1.0 | Pass | |
| 7444.2 | 44.3 | 25.2 | 40.7 | 25.1 | 3.7 | 48.0 | 28.9 | 74.0 | 54.0 | -26.0 | -25.1 | | 1.0 | Pass | |
| 9925.6 | 30.8 | 20.6 | 31.2 | 20.7 | 10.2 | 41.4 | 30.9 | 74.0 | 54.0 | -32.6 | -23.1 | | 1.0 | Pass | noise floor |
| 12407 | 32.3 | 22.2 | 34.0 | 22.0 | 17.1 | 51.1 | 39.3 | 74.0 | 54.0 | -22.9 | -14.7 | | 1.0 | Pass | noise floor |
| 14888.4 | 30.0 | 21.1 | 30.7 | 21.1 | 21.5 | 52.2 | 42.6 | 74.0 | 54.0 | -21.8 | -11.4 | | 1.0 | Pass | noise floor |
| 17369.8 | 20.1 | 11.5 | 19.9 | 11.3 | 31.0 | 51.1 | 42.5 | 74.0 | 54.0 | -22.9 | -11.5 | | 1.0 | Pass | noise floor (30 kHz BW) |
| 19851.2 | 15.7 | 6.6 | 15.9 | 6.8 | 40.5 | 56.4 | 47.3 | 74.0 | 54.0 | -17.6 | -6.7 | | 1.0 | Pass | noise floor (10 kHz BW) |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

# Emissions Test Equipment

| | | | |
|---|---|---|---|
| Client | **HME** | EUT Name | **Headset** |
| PAN # | 25-643-HME | EUT Model | **HS6000** |

| Asset Number | Description | Model Number | Serial Number | Last Cal | Cal Due |
|---|---|---|---|---|---|
| | | | | | |
| 835 | Spectrum Analyzer, Rhode & Schwartz | RHDFSEK | 829058/005 | 12/30/04 | 12/30/05 |
| 752 | Antenna, DRWG, EMCO | 3115 | 4943 | 12/29/04 | 12/29/05 |
| 842 | Preamp | Nemko | na | 5/19/05 | verified |
| 110 | Antenna, LPA, Electrometrics | LPA-25 | 1217 | 10/4/04 | 10/4/05 |
| 114 | Antenna, Bicon, EMCO | 3104 | 2997 | 9/30/04 | 9/30/05 |
| 897 | Rohde & Schwartz, Spectrum Analyzer | FSP7 | 837620/009 | 4/18/05 | 4/18/06 |
| | | | | | |
| | | | | | |
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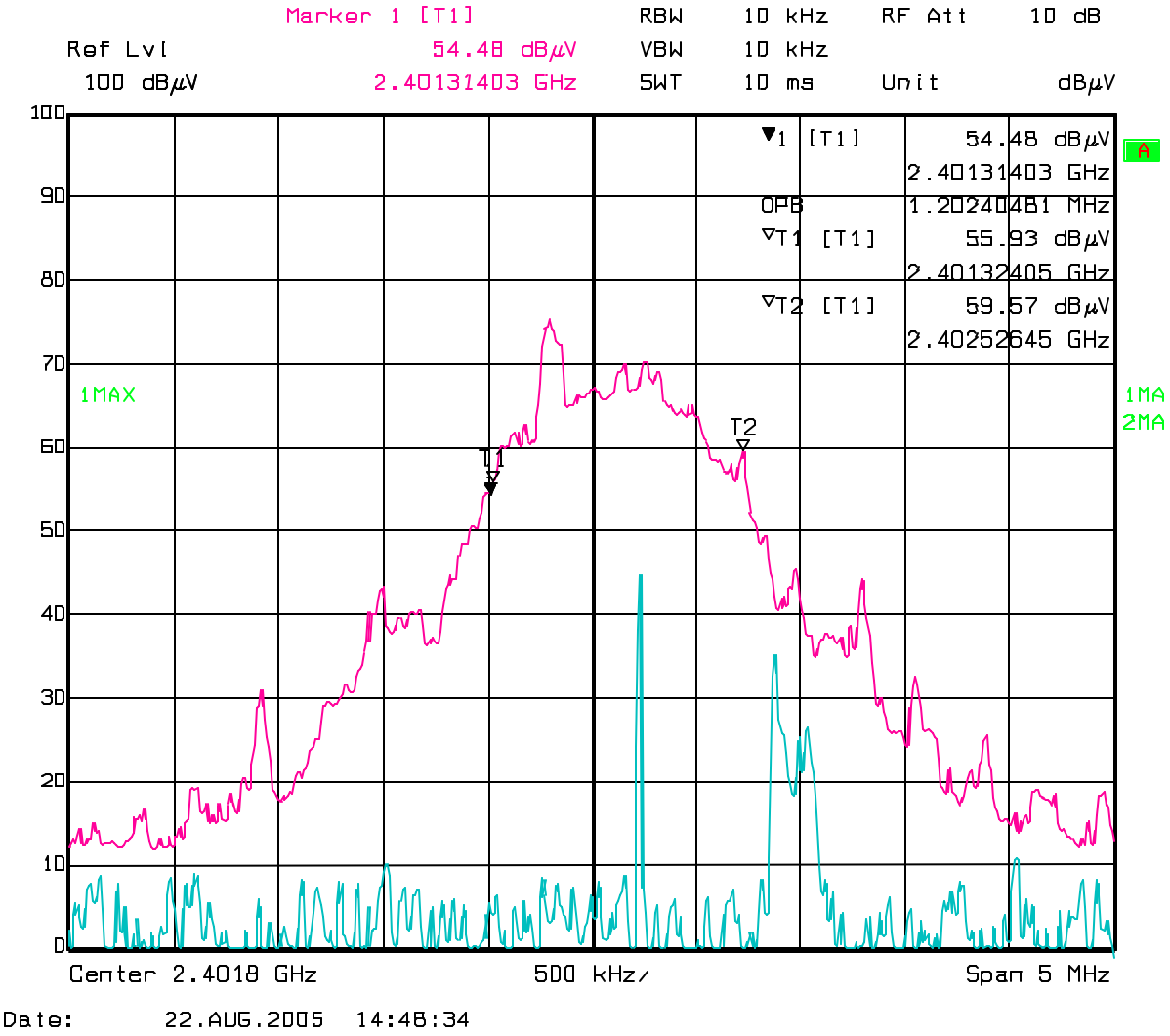
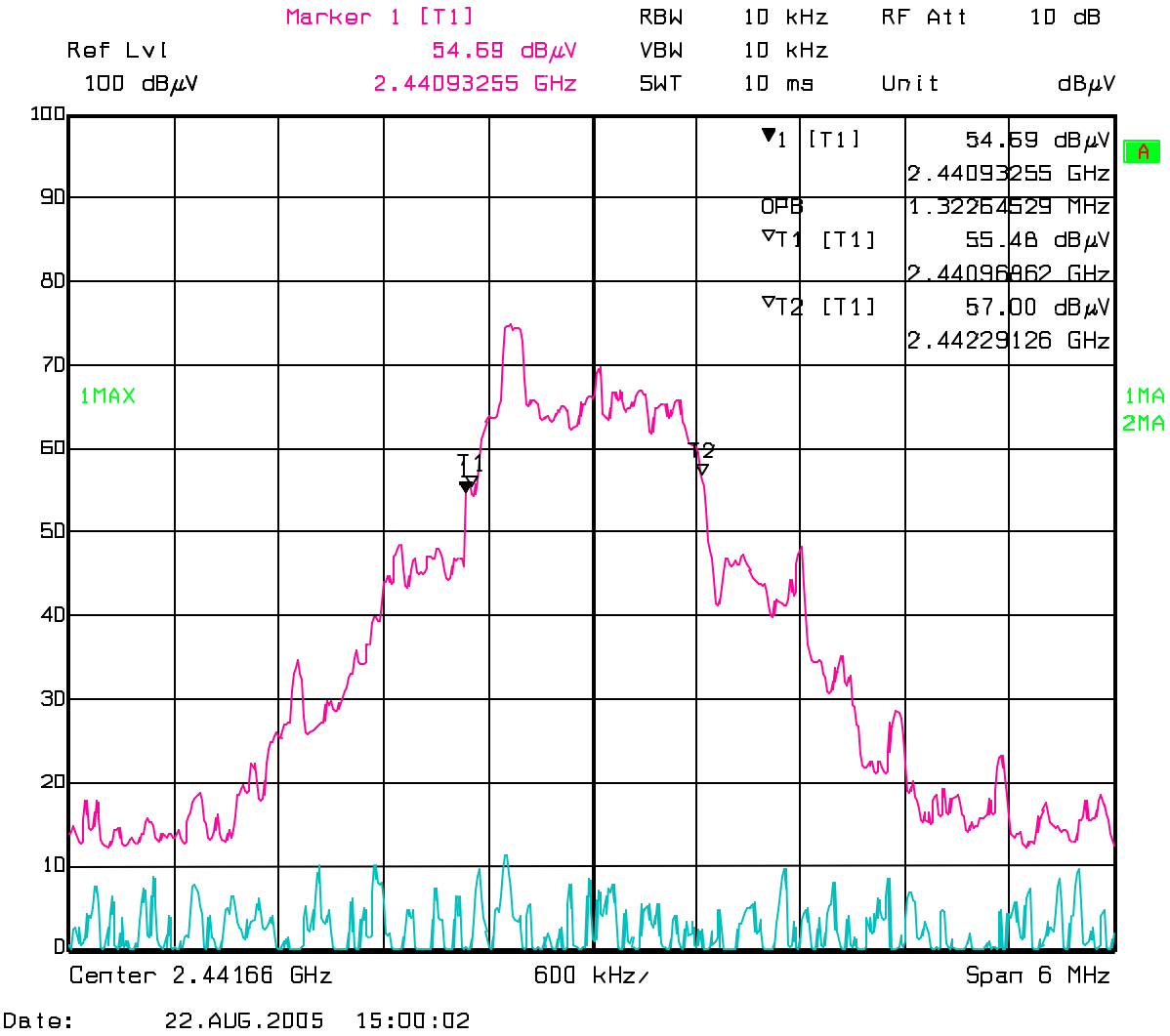
| | | | | | |
| | | | | | |

## 5.3. Bandwidth

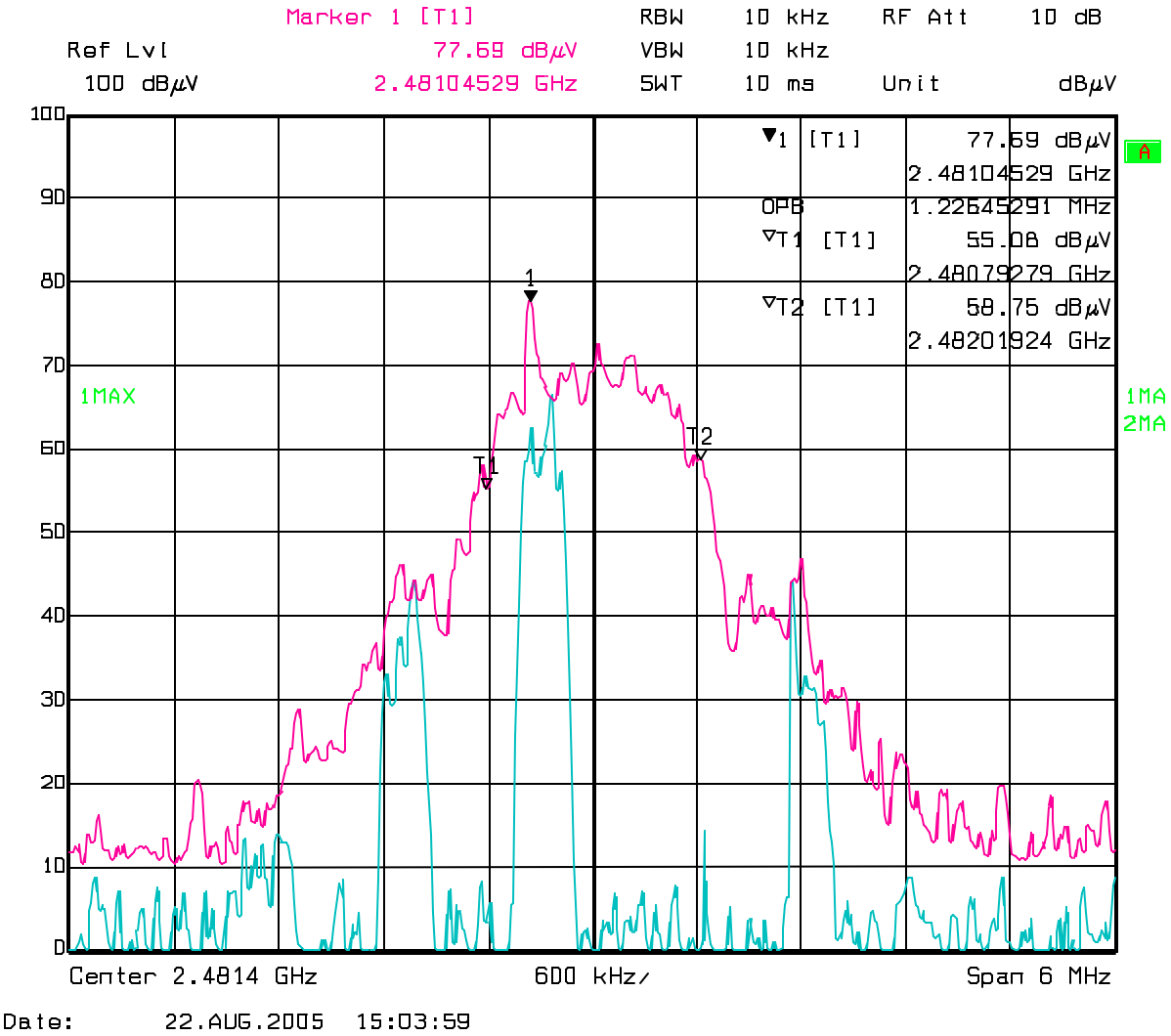
Low channel 1.202 MHz



Mid channel 1.323 MHz



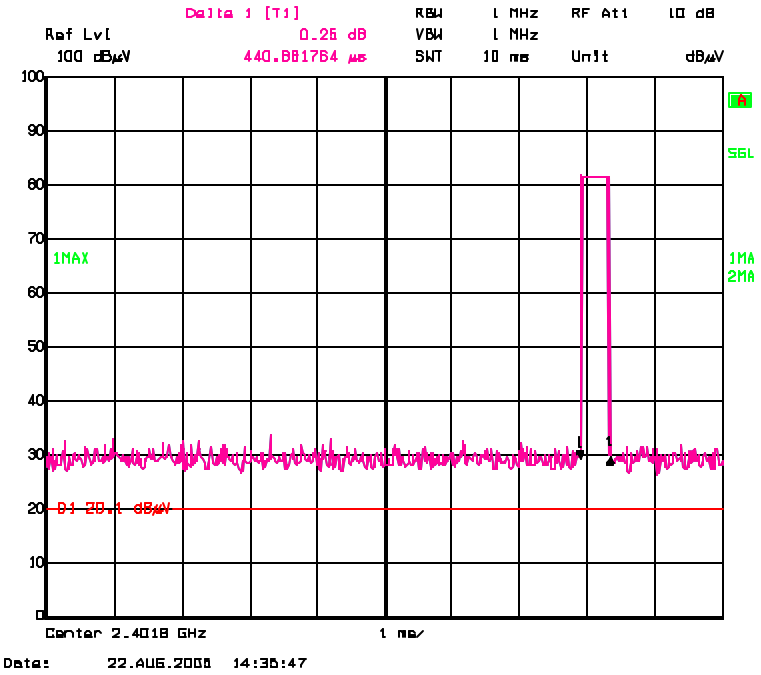
High channel 1.226 MHz



## 5.4. Duty cycle

Duty cycle; x = 440 us on in 10 ms = 0.044

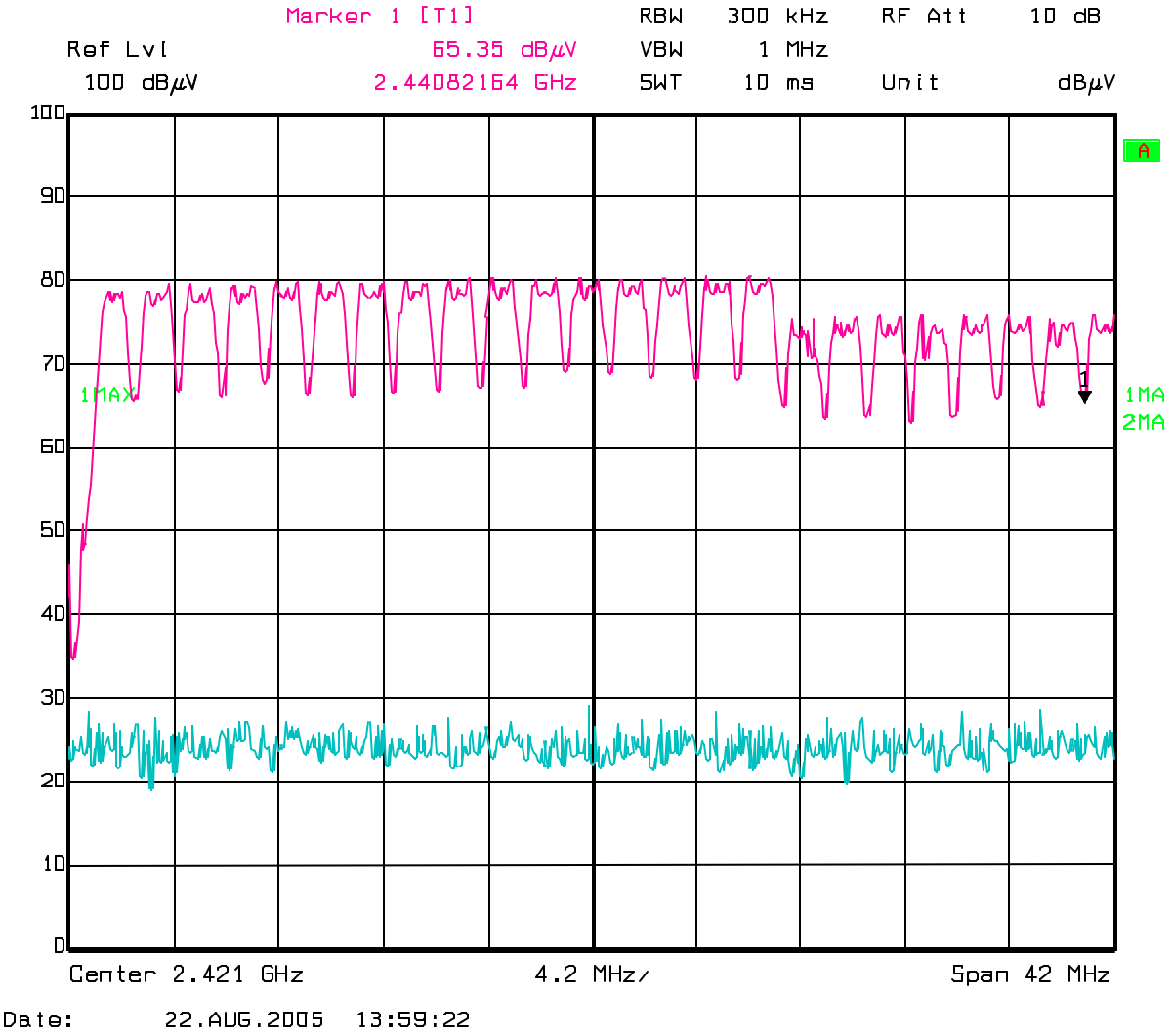
Duty cycle = 10 log (0.044) = -13.56



## 5.5. Number of hopping frequencies

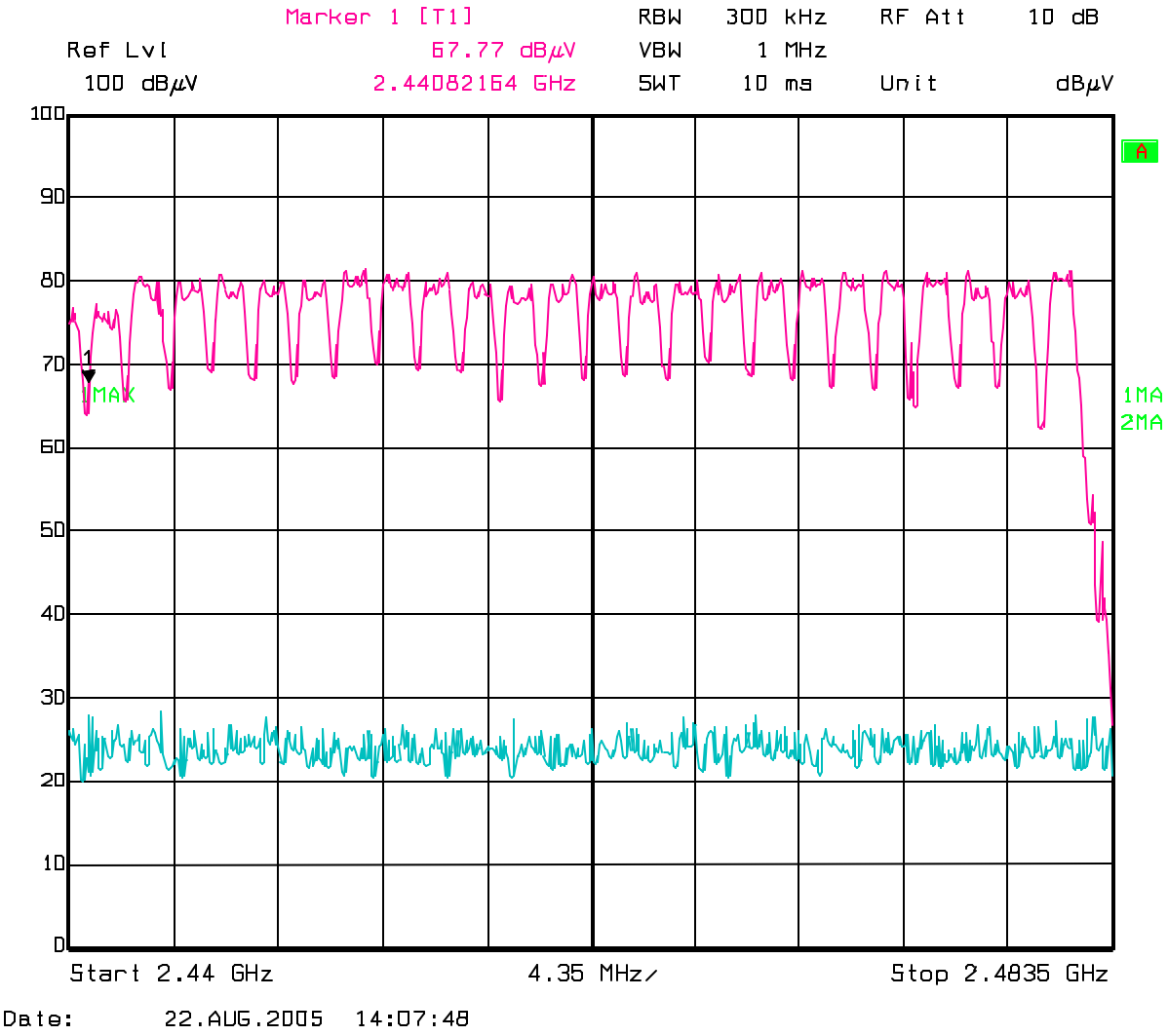
Part 1 of 2 parts = 23 frequencies

Note marker at 2.44, next plot starts at 2.44 GHz marker.

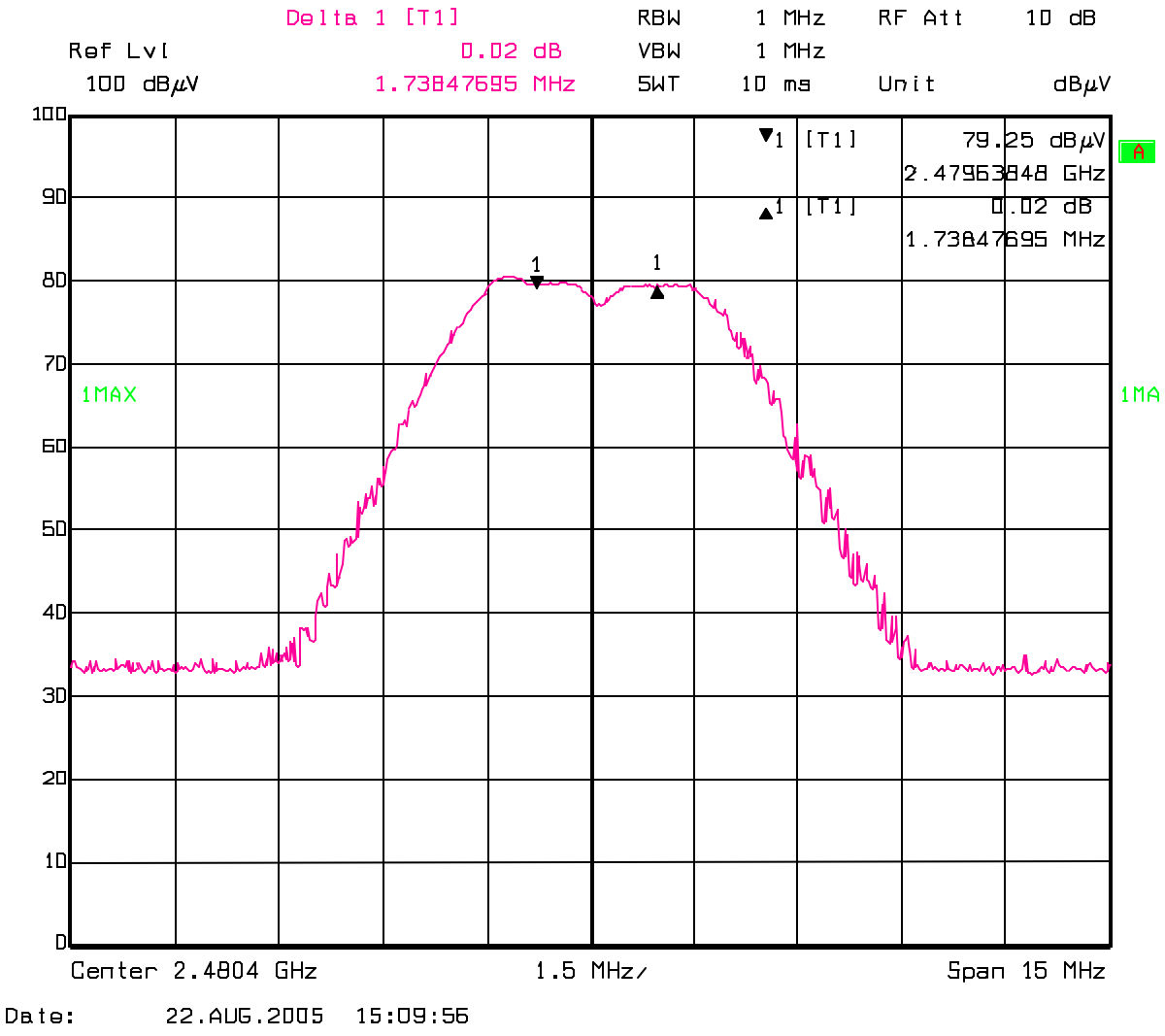


Part 2 of 2 parts = 24 frequencies.

23 + 24 = 47 frequencies

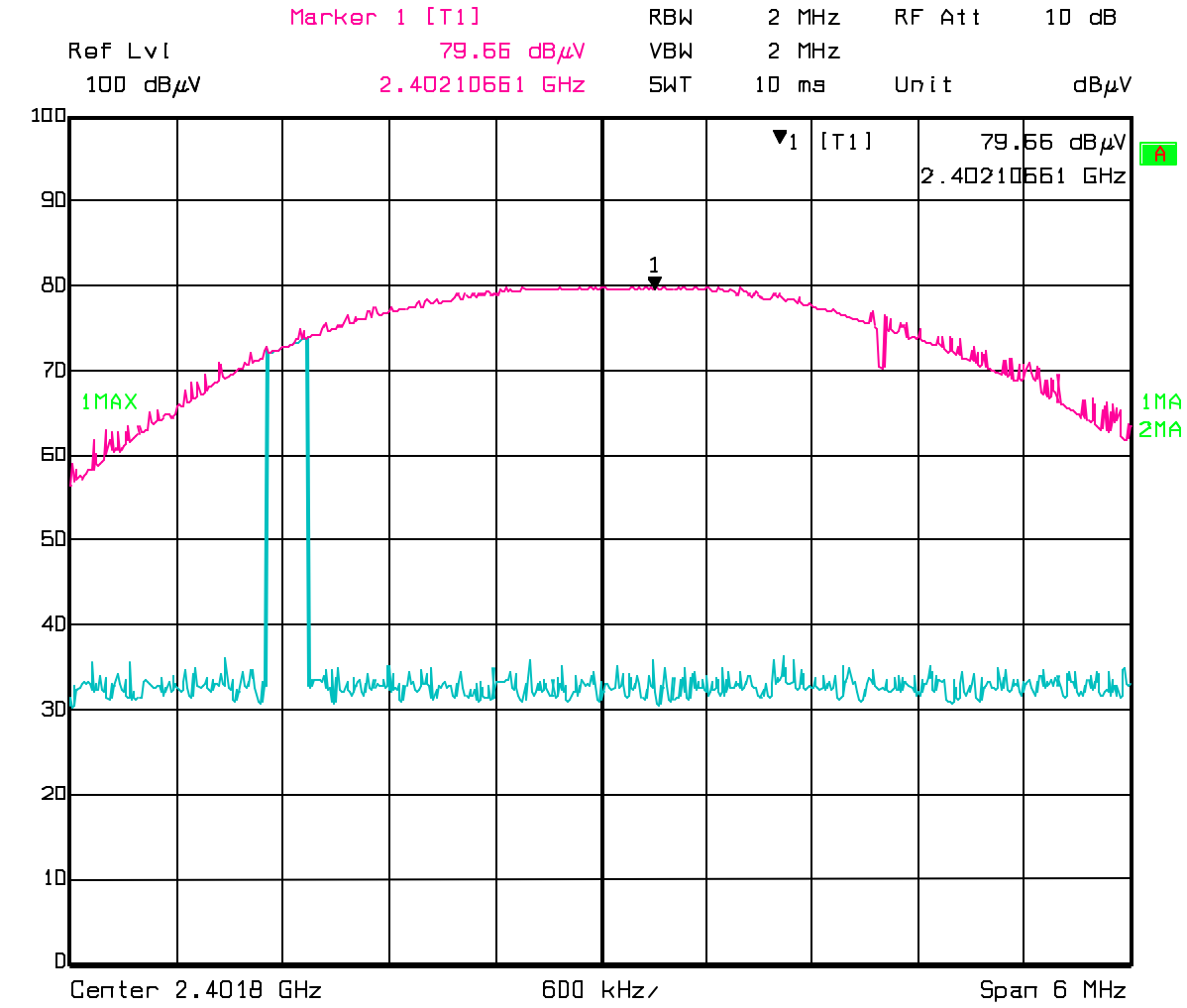


## 5.6. Channel separation Delta = 1.738 MHz

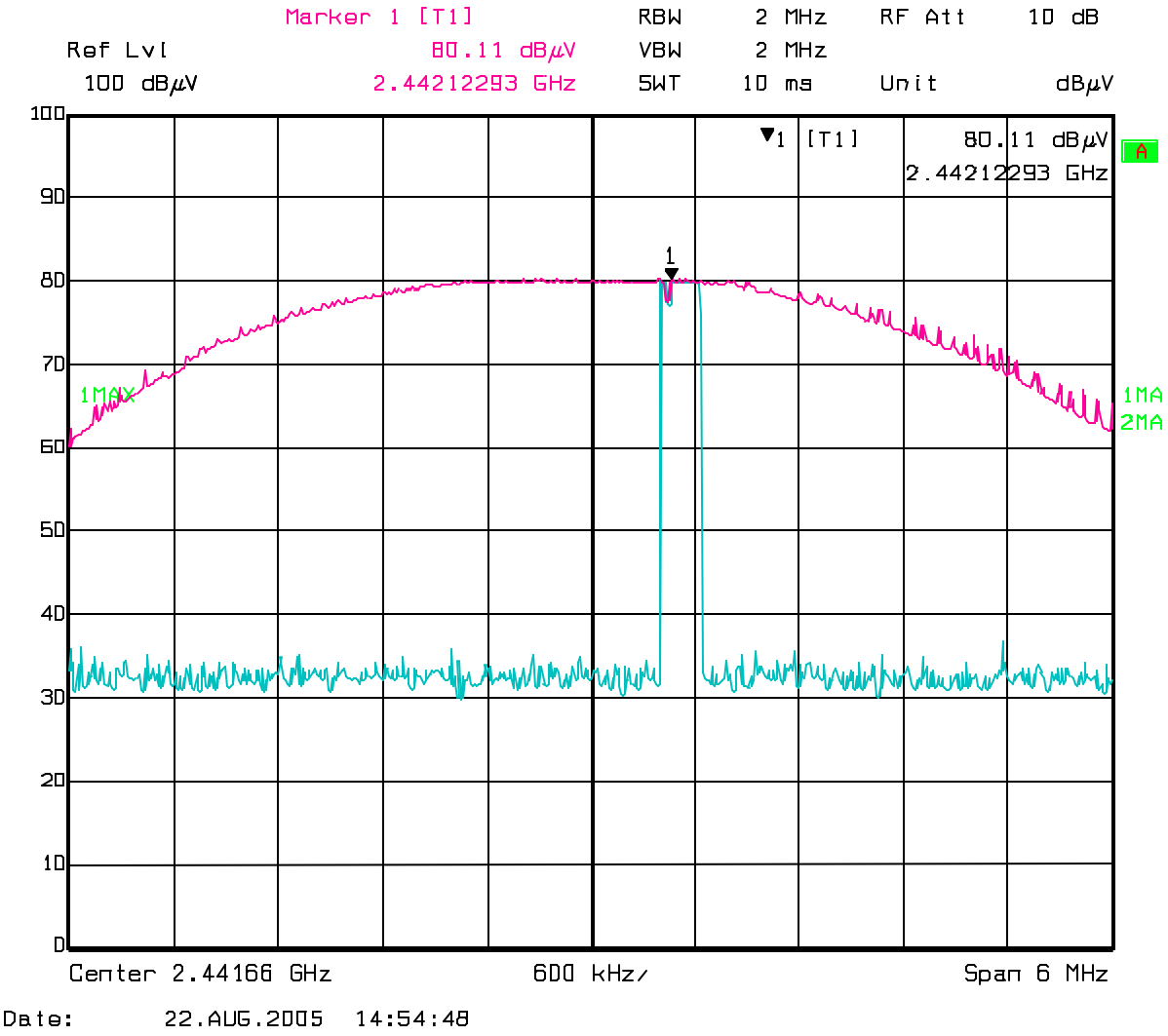


## 5.7. Peak Output Power Plots

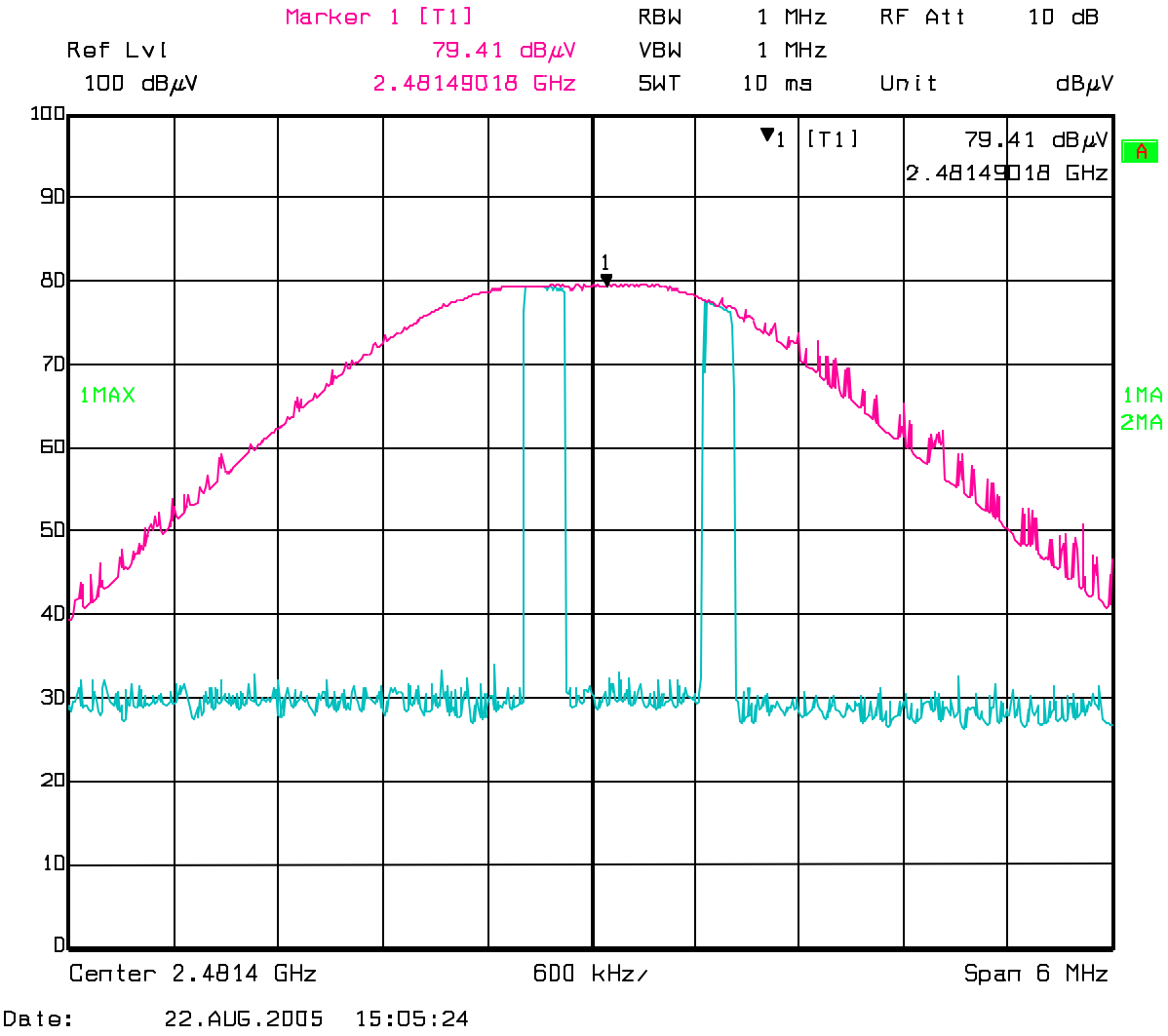
Low Channel = 2.402 GHz 79.66 dBuV/m plus 34.2 correction factor = 113.9 dBuV/m



Mid Channel = 2.442 GHz 80.11 dBuV/m plus 34.2 correction factor = 114.3 dBuV/m



Low Channel = 2.481 GHz 79.41 dBuV/m plus 34.2 correction factor = 113.6 dBuV/m

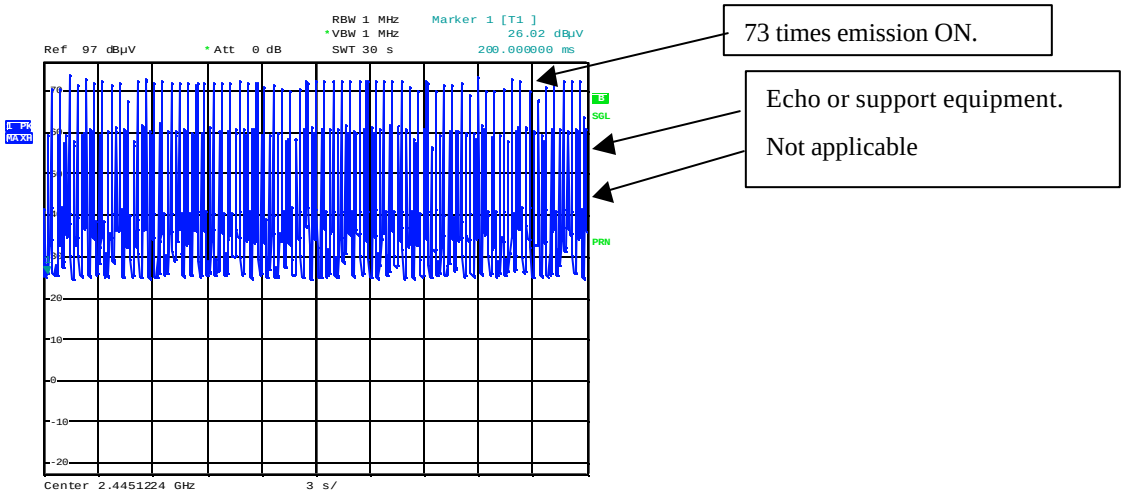


## 5.8. Time of occupancy

No less than 0.4 seconds on in 30 seconds.

73 times on.

Note: lines not in top section of plot are echoes in test chamber or emissions from support radio required to be on in order to allow the EUT to frequency hop.

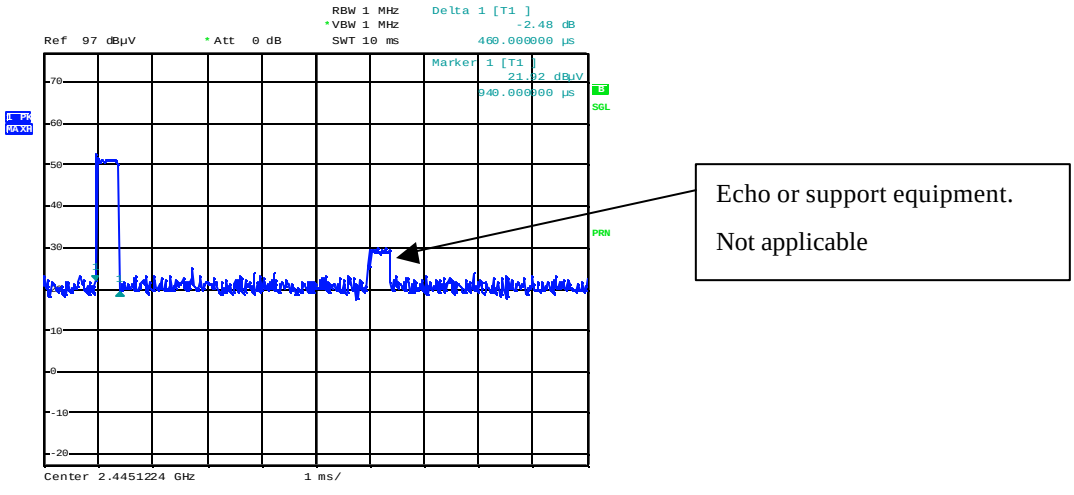



Date: 30.SEP.2005 09:25:15

Width of typical emission (above) = 460 microseconds

73 x 460 microseconds = 0.03358 seconds which is less than 0.4 seconds

EUT Complies.




Date: 30.SEP.2005 09:28:49

Test equipment: Spectrum analyzer #897

# APPENDIX A

# A Conducted & Radiated Emissions Measurement Uncertainties

## 1. Introduction

ISO Standard 17025 and ANSI/NCSL Z540-1(1994) require that all measurements contained in a test report be "traceable". "Traceability" is defined in the *International Vocabulary of Basic and General Terms in Metrology* (ISO: 1993) as: "the property of the result of a measurement... whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons, *all having stated uncertainties*".

The purposes of this Appendix are to "state the *Measurement Uncertainties*" of the conducted emissions and radiated emissions measurements contained in Section 5 of this Test Report, and to provide a practical explanation of the meaning of these measurement uncertainties.

## 2. Statement of the Worst-Case Measurement Uncertainties for the Conducted and Radiated Emissions Measurements Contained in This Test Report

**Table 1: Worst-Case Expanded Uncertainty "U" of Measurement for a k=2 Coverage Factor**

| Conducted Emissions Measurement Detection Systems | Applicable Frequency Range | "U" for a k=2 Coverage Factor |
|---|---|---|
| HP8568B Spectrum Analyzer with QPA and HP8447F Preamplifier | 150 kHz - 30 MHz | +/- 3.0 dB |
| HP8566B Spectrum Analyzer with QPA and Preselector | 9 kHz - 30 MHz | +/- 2.9 dB |
| | | |
| **Radiated Emissions Measurement Detection Systems** | **Applicable Frequency Range** | **"U" for a k=2 Coverage Factor** |
| HP8568B Spectrum Analyzer with QPA & HP8447F Preamplifier | 30 MHz - 200 MHz | +4.0 dB, -4.1 dB |
| HP8568B Spectrum Analyzer with QPA & HP8447F Preamplifier | 200 MHz-1000 MHz | +/- 3.5 dB |
| HP8566B Spectrum Analyzer with QPA & Preselector | 30 MHz - 200 MHz | +3.9 dB, -4.0 dB |
| HP8566B Spectrum Analyzer with QPA & Preselector | 200 MHz-1000 MHz | +/- 3.4 dB |
| HP8566B Spectrum Analyzer with QPA & HP 8449A Preamplifier | 1 GHz - 18 GHz | +2.5 dB, -2.6 dB |
| HP8566B Spectrum Analyzer with QPA & HP8449A Preamplifier | 18 GHz - 40 GHz | +/- 3.4 dB |

NOTES:
1. Applies to 3 and 10 meter measurement distances
2. Applies to all valid combinations of Transducers (i.e. LISNs, Line Voltage Probes, and Antennas, as appropriate)
3. Excludes the Repeatability of the EUT

## 3. Practical Explanation of the Meaning of the Conducted and Radiated Emissions Measurement Uncertainties

In general, a "Statement of Measurement Uncertainty" means that with a certain (specified) confidence level, the "true" value of a measurand will be between a (stated) upper bound and a (stated) lower bound.

In the specific case of EMC Measurements in this test report, the measurement uncertainties of the conducted emissions measurements and the radiated emissions measurements have been calculated in accordance with the method detailed in the following documents:

- *ISO Guide to the Expression of Uncertainty in Measurement* (ISO, 1993)
- NIS 81:1994, *The Treatment of Uncertainty in EMC Measurements* (NAMAS, 1994)
- NIST Technical Note 1297(1994), *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results* (NIST, 1994)

The calculation method used in these documents requires that the stated uncertainty of the measurements be expressed as *an "expanded uncertainty", U, with a k=2 coverage factor.* The practical interpretation of this method of expressing measurement uncertainty is shown in the following example:

EXAMPLE: Assume that at 39.51 MHz, the (measured) radiated emissions level was equal to +26.5 dBuV/m, and that the +/- 2 standard deviations (i.e. 95% confidence level) measurement uncertainty was +/- 3.4 dB.

In the example above, the phrase "k = 2 Coverage Factor" simply means that the measurement uncertainty is stated to cover +/-2 standard deviations (i.e. a 95% confidence interval) about the measurand. The measurand is the radiated emissions measurement of +26.5 dBuV/m at 39.51 MHz, and the 95% bounds for the uncertainty are –3.4 dB to + 3.4 dB. One can thus be 95% confident that the "true" value of the radiated emissions measurement is between +23.1 dBuV/m and +29.5 dBuV/m. *In effect, this means that in the above example there is only a 2.5% chance that the "true" radiated emissions value exceeds +29.5 dBuV/m.*

# APPENDIX B
# Nemko USA, Inc.'s Test Equipment & Facilities Calibration Program

Nemko USA, Inc. operates a comprehensive Periodic Calibration Program in order to ensure the validity of all test data. Nemko USA's Periodic Calibration Program is fully compliant to the requirements of NVLAP Policy Guide PG-1-1988, ANSI/NCSL Z540-1 (1994), ISO 10012-1 (1993-05-01), ISO Standard 17025, ISO-9000 and EN 45001. Nemko USA, Inc.'s calibrations program therefore meets or exceed the US national commercial and military requirements [N.B. ANSI/NCSL Z540-1 (1994) replaces MIL-STD-45662A].

Specifically, all of Nemko USA's *primary reference standard devices* (e.g. vector voltmeters, multimeters, attenuators and terminations, RF power meters and their detector heads, oscilloscope mainframes and plug-ins, spectrum analyzers, RF preselectors, quasi-peak adapters, interference analyzers, impulse generators, signal generators and pulse/function generators, field-strength meters and their detector heads, etc.) and certain *secondary standard devices* (e.g. RF Preamplifiers used in CISPR 11/22 and FCC Part 15/18 tests) are periodically recalibrated by:

- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratories by NIST; or,
- A Nemko USA-approved independent (third party) metrology laboratory that uses NIST-traceable standards and that is ISO Guide 25-accredited as a calibration laboratory by another accreditation body (such as A2LA) that is mutually recognized by NIST; or,
- A manufacturer of Measurement and Test Equipment (M&TE), if the manufacturer uses NIST-traceable standards and is ISO Guide 25-accredited as calibration laboratory either by NIST or by another accreditation body (such as A2LA) that is mutually recognized by NIST; or
- A manufacturer of M&TE (or by a Nemko USA-approved independent third party metrology laboratory) that is not ISO Guide 25-accredited. (In these cases, Nemko USA conducts an annual audit of the manufacturer or metrology laboratory for the purposes of proving traceabilty to NIST, ensuring that adequate and repeatable calibration procedures are being applied, and verifying conformity with the other requirements of ISO Guide 25).

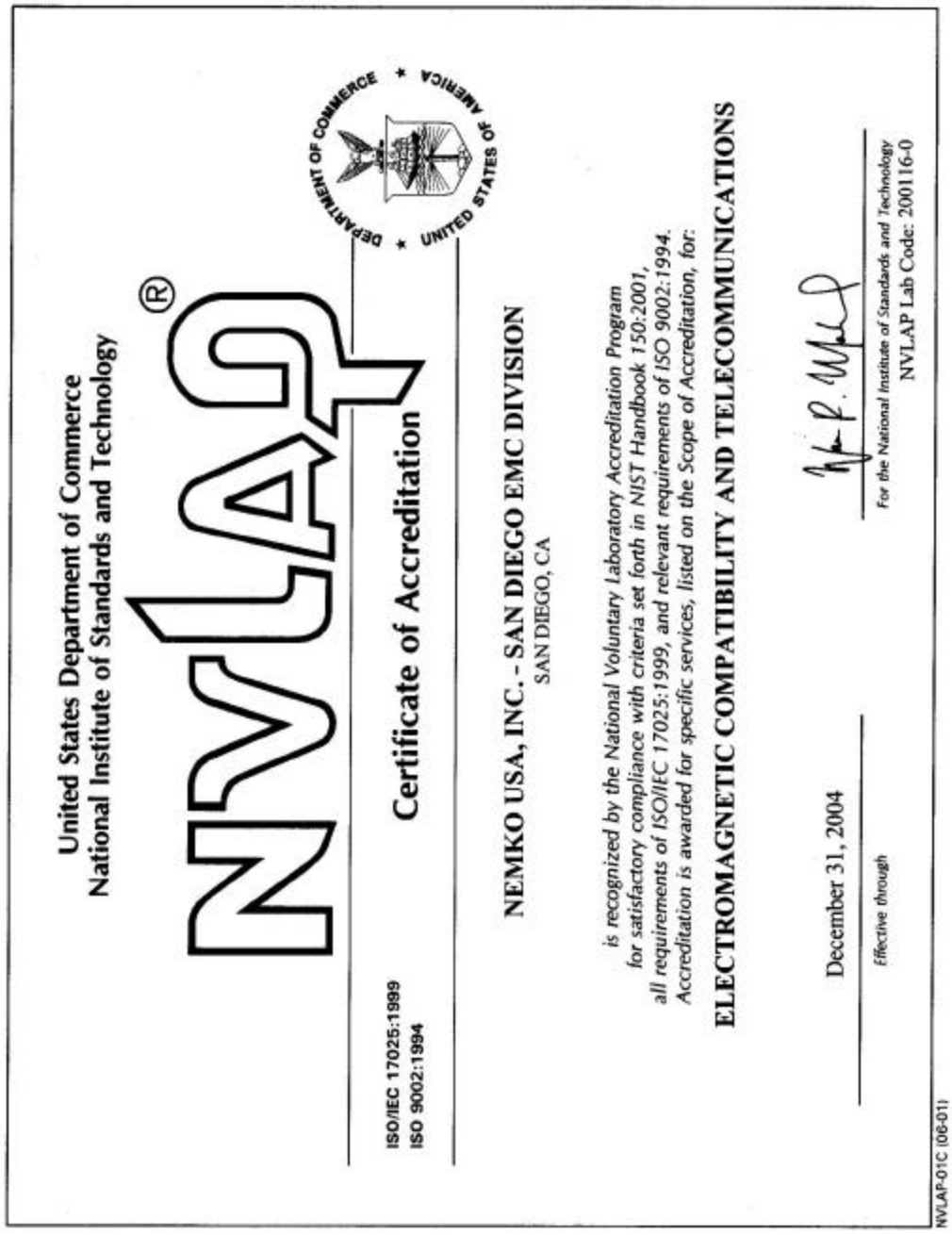
In all cases, the entity performing the Calibration is required to furnish Nemko USA with a calibration test report and/or certificate of calibration, and a "calibration sticker" on each item of M&TE that is successfully calibrated.

Calibration intervals are normally one year, except when the manufacture advises a shorter interval (e.g. the HP 8568B Spectrum Analyzer is recalibrated every six months) or if US Government directives or client requirements demand a shorter interval. Items of instrumentation/related equipment which fail during routine use, or which suffer visible mechanical damage (during use or while in transit), are sidelined pending repair and recalibration. (Repairs are carried out either in-house [if minor] or by a Nemko USA-approved independent [third party] metrology laboratory, or by the manufacturer of the item of M&TE).

Each antenna used for CISPR 11 and CISPR 22 and FCC Part 15 and Part 18 radiated emissions testing (and for testing to the equivalent European Norms) is calibrated annually by either a NIST (or A2LA) ISO Standard 17025-Accredited third-party Antenna Calibration Laboratory or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory. The antenna calibrations are performed using the methods specified in Annex G.5 of CISPR 16-1(1993) or ANSI C63.5-1991, including the "Three-Antenna Method". Certain other kinds of antennas (e.g. magnetic-shielded loop antennas) are calibrated annually by either a NIST (or A2LA) ISO Standard 17025-accredited third-party antenna calibration laboratory, or by the antenna's OEM if the OEM is NIST or A2LA ISO Standard 17025-accredited as an antenna calibration laboratory using the procedures specified in the latest version of SAE ARP-958.

In accordance with FCC and other regulations, Nemko USA recalibrates its suite of antennas used for radiated emissions tests on an annual basis. These calibrations are performed as a precursor to the FCC-required annual revalidation of the Normalized Site Attenuation properties of Nemko USA's Open Area Test Site. Nemko USA, Inc. uses the procedures given in both Subclause 16.6 and Annex G.2 of CISPR 16-1 (1993), and, ANSI C63.4-1992 when performing the normalized site attenuation measurements.

# APPENDIX C
# FCC and NVLAP Accreditation



United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation

ISO/IEC 17025:1999
ISO 9002:1994

NEMKO USA, INC. - SAN DIEGO EMC DIVISION
SAN DIEGO, CA

*is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994. Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:*

**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

December 31, 2004
*Effective through*

*For the National Institute of Standards and Technology*
NVLAP Lab Code: 200116-0

NVLAP-01C (06-01)

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# Scope of Accreditation

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**NVLAP LAB CODE 200116-0**


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URL: http://www.nemko.com


| *NVLAP Code* | *Designation / Description* |
|---|---|
| **Emissions Test Methods:** | |
| 12/CIS14 | CISPR 14-1 (March 30, 2000): Limits and Methods of Measurement of Radio interference Characteristics of Household Electrical Appliances, Portable Tools and Similiar Electrical Apparatus - Part 1: Emissions |
| 12/CIS14a | EN 55014-1 (1993) with Amendments A1 (1997) & A2 (1999) |
| 12/CIS14b | AS/NZS 1044 (1995) |
| 12/CIS14c | CNS 13783-1 |
| 12/CIS22 | IEC/CISPR 22 (1997) and EN 55022 (1998): Limits and methods of measurement of radio disturbance characteristics of information technology equipment |
| 12/CIS22a | IEC/CISPR 22 (1993): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996) |

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**NEMKO USA, INC. - SAN DIEGO EMC DIVISION**

| *NVLAP Code* | *Designation / Description* |
|---|---|
| 12/CIS22b | CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment |
| 12/EM02a | IEC 61000-3-2, Edition 2.1 (2001-10), EN 61000-3-2 (2000), and AS/NZS 2279.1 (2000): Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A) |
| 12/EM03b | IEC 61000-3-3 (2002-03), edition 1.1: EMC - Part 3-3: Limits - Limitations of voltage changes, voltage flucuations and flicker, in public low-voltage supply-systems, for equipment with rated current <=16 A per phase and not subject to conditional connections |
| 12/F18 | FCC OST/MP-5 (1986): FCC Methods of Measurement of Radio Noise Emissions for ISM Equipment (cited in FCC Method 47 CFR Part 18 - Industrial, Scientific, and Medical Equipment) |
| 12/FCC15b | ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart B: Unintentional Radiators |
| 12/T51 | AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment |

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**ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS**

**NVLAP LAB CODE 200116-0**

**NEMKO USA, INC. - SAN DIEGO EMC DIVISION**

| *NVLAP Code* | *Designation / Description* |
|---|---|
| **Immunity Test Methods:** | |
| 12/I01 | IEC 61000-4-2, Edition 2.1 (2001) including Amds. 1 & 2 and EN 61000-4-2: Electrostatic Discharge Immunity Test |
| 12/I02 | IEC 61000-4-3 (2002) and EN 61000-4-3: Radiated Radio-Frequency Electromagnetic Field Immunity Test |
| 12/I03 | IEC 61000-4-4 (1995) + Amd. 1 (2000) & Amd. 2 (2001) and EN 61000-4-4: Electrical Fast Transient/Burst Immunity Test |
| 12/I04 | IEC 61000-4-5 (1995) + Amd. 1 (2000) and EN 61000-4-5: Surge Immunity Test |
| 12/I05 | IEC 61000-4-6, Edition 2.0 (2003) and EN 61000-4-6: Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields |
| 12/I06 | IEC 61000-4-8, Edition 1.1 (2001) and EN 61000-4-8: Power Frequency Magnetic Field Immunity Test |
| 12/I07 | IEC 61000-4-11 (1994) + Amd. 1 (2000) and EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests |

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