

FCC PART 15 CLASS B EMI MEASUREMENT AND TEST REPORT

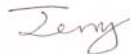

For

NMB TECHNOLOGIES INC.

9730 Independence Ave.,
Chatsworth, CA 91311

FCC ID: AQ6-2300

2003-12-18

| | |
|---|------------------------------------|
| This Report Concerns: <input checked="" type="checkbox"/> Original Report | Equipment Type: Keyboard |
| Test Engineer: Jerry Wang /  | |
| Report No.: R0312091 | |
| Test Date: 2003-12-09 | |
| Reviewed By: Ling Zhang /  | |
| Prepared By: Bay Area Compliance Laboratory Corporation (BACL) 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732-9164 | |

Note: This test report is specially limited to the use of the above client company and the product model only. It may not be duplicated without prior written consent of Bay Area Compliance Laboratory Corporation. This report **must not** be used by the client to claim product Endorsement by NVLAP or any agency of the U.S. Government.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The NMB TECHNOLOGIES INC.'s product, model AQ6-2300, or the "EUT" as referred to this report is a Keyboard which measures approximately 16.75" L x 6.75"W x 1.15"H, rated input voltage: DC 5V, PC input: 120 V/60Hz.

**The test data gathered are from production sample, serial number: 0000139, provided by the manufacturer.*

Objective

This test report is prepared on behalf of *NMB TECHNOLOGIES INC.* in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules and regulations and to ICES-003 of the Canadian Interference-Causing Equipment Regulations.

The objective is to determine compliance with FCC Class B limits for Information Technology Equipment.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2001, 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.

All radiated and conducted emissions measurements were performed at BACL. The radiated testing was performed at an antenna-to-EUT distance of 10 Meters.

Test Facility

The Open Area Test site used by BACL to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2001.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, CISPR 22: 1997: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

Host System Configuration List and Details

| Manufacturer | Description | Model | Serial Number | FCC ID |
|--------------|--------------|---------------|--------------------------|--------|
| Dell | Motherboard | E210882 | MY-07G535-12464-23G-00PC | DOC |
| Dell | POWER SUPPLY | HP-P2507F3P | TH-01E115-12782-17S-6294 | DOC |
| Seagate | Hard Drive | ST340016A | SG-03J670-12536-241-PN10 | DOC |
| Samsung | CD-ROM | SM-308 | KR-00J304-36521-21L-01DG | DOC |
| Sony | Floppy Drive | MPF920-F | 20080561 | DOC |
| Dell | Chassis | Mid Tower ATX | 162TD11 | None |
| Sony | Floppy | MPF-920-F | CN-02D067-12591-OIXV | DOC |

Local Support Equipment List and Details

| Manufacturer | Description | Model | Serial Number | FCC ID |
|--------------|------------------|---------------|--------------------------|--------------|
| Dell | Tower PC | Mid Tower ATX | X05-52710 | None |
| Dell | LCD Flat panel | 2000FP | TW-09E249-46635-2CJ-OGFL | DOC |
| Dell | Mouse | 63618-OEM | 8783844-7 | N/A |
| EVEREX | Modem | EV-945 | NONE | E3E5UVEV-945 |
| HP | ThinkJet Printer | 2225C+ | 2821S14783 | DS16XU2225 |

External I/O Cabling List and Details

| Cable Description | Length (M) | Port/From | To |
|----------------------|------------|-------------------|-----------------|
| Shielded Cable | 1.6 | Modem Port/Host | Everex Modem |
| Shielded Cable | 1.5 | Mouse Port/Host | Dell Mouse |
| Shielded Cable | 1.5 | KB Port/Host | EUT |
| Shielded Video Cable | 1.5 | VGA Port/Host | Dell Flat panel |
| Shielded Cable | 1.5 | Printer Port/Host | HP Printer |

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing according to ANSI C63.4-2001.

EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components.

Special Accessories

As shown in test setup block diagram, interface cable used for compliance testing are shielded and supplied by applicant and/or its respective support equipment manufacturers.

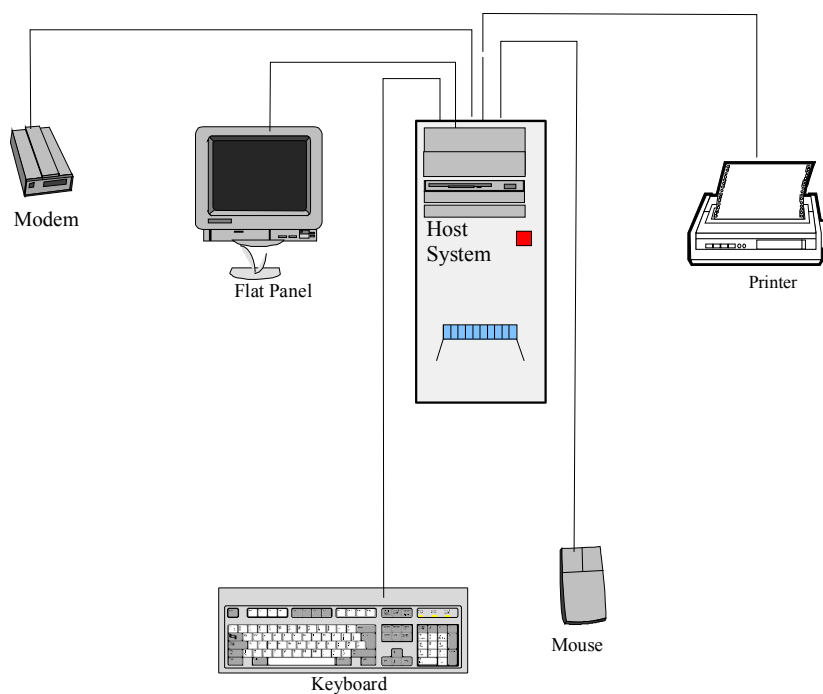
Schematics / Block Diagram

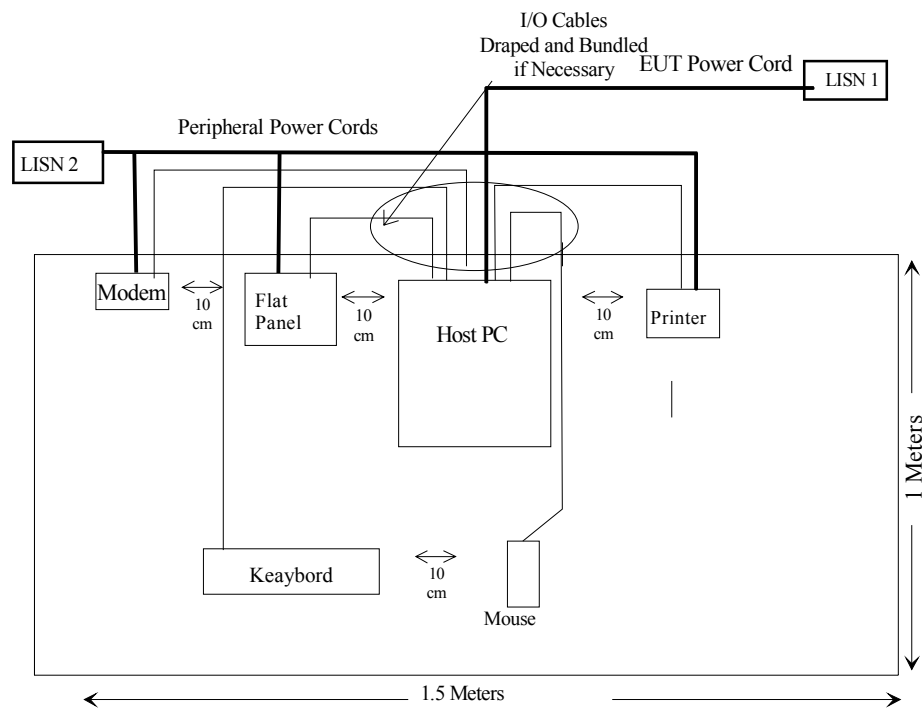
Please refer to Exhibit C.

Equipment Modifications

No modifications were made to the EUT.

Configuration of Test System



Test Setup Block Diagram

§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ± 2.4 dB.

EUT Setup

The measurement was performed in the shield room, using the same setup per ANSI C63.4-2001 measurement procedure. The specification used was the FCC15 Class B limits.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

The host PC was connected to 120Vac/60Hz power source.

Spectrum Analyzer Setup

The spectrum analyzer was set to investigate the spectrum from 150 kHz to 30Mhz.

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Cal. Date |
|-----------------|-------------------|---------|---------------|------------|
| Rohde & Schwarz | Artificial LISN | ESH2-Z5 | 871884/039 | 2003-03-28 |
| Rohde & Schwarz | EMI Test Receiver | ESCS30 | 100176 | 2003-05-06 |

* **Statement of Traceability:** BACL Corp. certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure were performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Average readings are distinguished with an "Ave". Quasi-peak readings are distinguished with an "Qp".

Environmental Conditions

| | |
|--------------------|-----------|
| Temperature: | 14.44 ° C |
| Relative Humidity: | 56% |
| ATM Pressure: | 1024 mbar |

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Conducted limits for a Class B device, with the worst margin reading of:

-11.7 dB at 0.19 MHz on the Line conductor.

Conducted Emissions Test Data

| LINE CONDUCTED EMISSIONS | | | | FCC CLASS B | |
|--------------------------|-------------------------|-------------------------|-----------------------|---------------------|--------------|
| Frequency MHz | Amplitude dB μ V | Detector Qp/Ave/Peak | Phase Line/Neutral | Limit dB μ V | Margin dB |
| 0.19 | 42.6 | Ave | Line | 54.3 | -11.7 |
| 10.00 | 34.3 | Ave | Line | 50.0 | -15.7 |
| 2.50 | 29.7 | Ave | Neutral | 46.0 | -16.3 |
| 0.31 | 33.5 | Ave | Line | 50.0 | -16.5 |
| 0.19 | 33.0 | Ave | Neutral | 54.3 | -21.3 |
| 0.31 | 28.7 | Ave | Neutral | 50.0 | -21.3 |
| 0.19 | 41.8 | QP | Line | 64.3 | -22.5 |
| 2.50 | 30.8 | QP | Neutral | 56.0 | -25.2 |
| 10.00 | 33.0 | QP | Line | 60.0 | -27.0 |
| 0.31 | 32.8 | QP | Line | 60.0 | -27.2 |
| 0.19 | 33.1 | QP | Neutral | 64.3 | -31.2 |
| 0.31 | 28.1 | QP | Neutral | 60.0 | -31.9 |

Plots of Conducted Emission

The plots of conducted emission are presented hereinafter as reference.

Bay Area Compliance Laboratory Corp
Class B

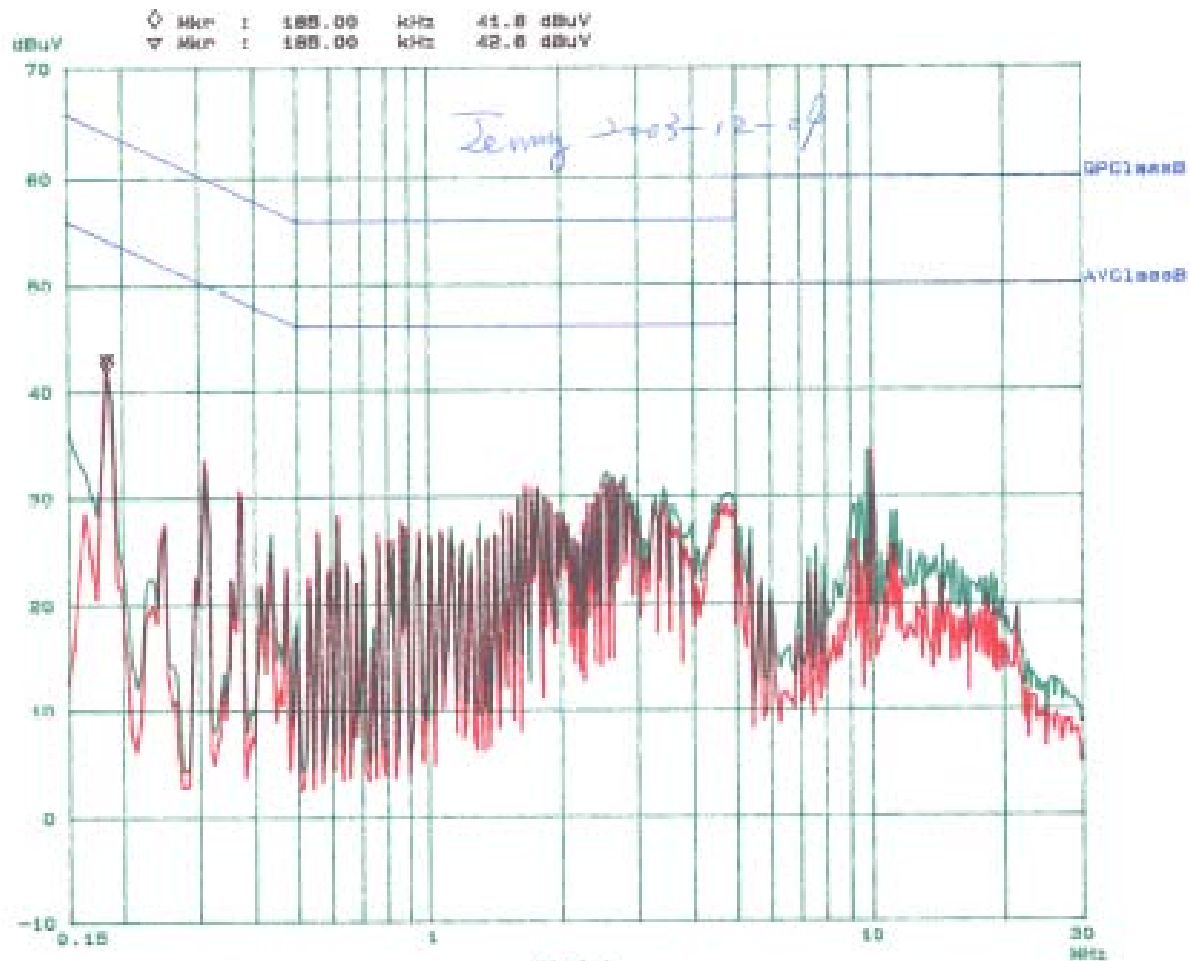
09. Dec 03 15:04

DUT: RT2200
Rev#: NMB
Op Cond: Normal
Operator: Jenny
Comment: L

Scan Settings (3 Ranges)

| Frequencies | | | Receiver Settings | | | | |
|-------------|------|------|-------------------|----------|--------|---------|--------|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp |
| 150k | 1M | 5k | 9k | GP+AV | 20ms | 15dB LN | OFF |
| 1M | 5M | 10k | 9k | GP+AV | 1ms | 15dB LN | OFF |
| 5M | 30M | 100k | 9k | GP+AV | 1ms | 15dB LN | OFF |

Final Measurement: x GP / + AV
Meas Time: 1 ms



Bay Area Compliance Laboratory Corp Class B

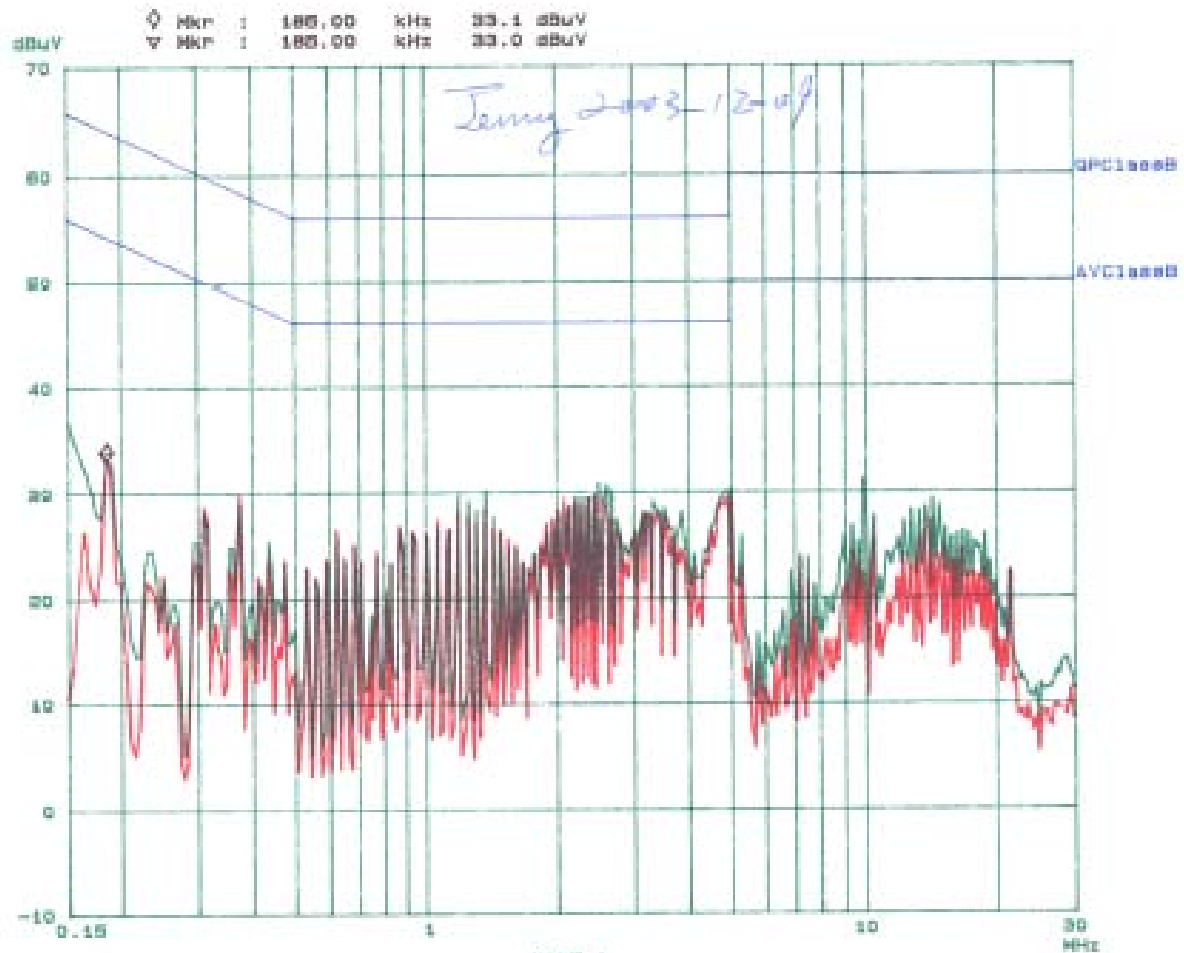
09. Dec 03 15:23

EUT: RT2300
 Manuf: NMB
 Op Cond: Normal
 Operator: Jenny
 Comment: N

Scan Settings (3 Ranges)

| Frequencies | | | Receiver Settings | | | | |
|-------------|------|------|-------------------|----------|--------|---------|--------|
| Start | Stop | Step | IF BW | Detector | M-Time | Atten | Preamp |
| 150k | 1M | 5k | 5k | QP+AV | 20ms | 10dB LN | OFF |
| 1M | 5M | 10k | 5k | QP+AV | 1ms | 10dB LN | OFF |
| 5M | 30M | 100k | 5k | QP+AV | 1ms | 10dB LN | OFF |

Final Measurement: x QP / + AV
 Noise Time: 1 ms



§15.109 - RADIATED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is ± 4.0 dB.

EUT Setup

The radiated emission tests were performed in the open area 10-meter test site, using the setup in accordance with ANSI C63.4-2001. The specification used in this report was the EN 55022: 1998 + A1: 2000 Class B limits.

The spacing between the peripherals was 10 cm.

The external I/O cables were draped along the test table and bundled as required.

The host PC was connected to 120Vac/60Hz power source.

Spectrum Analyzer Setup

The system was tested to 1000 MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

| <i>Frequency Range</i> | <i>RBW</i> | <i>Video B/W</i> |
|-------------------------------|-------------------|-------------------------|
| Below 30MHz | 10kHz | 10kHz |
| 30 – 1000MHz | 100kHz | 100kHz |
| Above 1000MHz | 1MHz | 1MHz |

Test Equipment List and Details

| Manufacturer | Description | Model | Serial Number | Cal. Date |
|---------------------|----------------------|--------------|----------------------|------------------|
| HP | Spectrum Analyzer | 8568B | 2601A02165 | 2003-07-03 |
| HP | Amplifier | 8447E | 2944A10187 | 2003-09-23 |
| HP | Quasi-Peak Adapter | 85650A | 3019A05393 | 2003-06-13 |
| EMCO | Biconical Antenna | 3110B | 9309-1165 | 2003-10-11 |
| EMCO | Log Periodic Antenna | 3146 | 2101 | 2003-10-11 |

* **Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the power cord of the host system and all support equipment were connected to the AC floor outlet.

Maximizing procedure was performed on the six (6) highest emissions in the described configurations.

All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB μ V of specification limits), and are distinguished with a "Qp" in the data table.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB μ V means the emission is 7dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

Summary of Test Results

According to the data in following tables, the EUT complied with the FCC 15 Class B standards, and had the worst margin of:

-7.2 dB at 128.00 MHz in the Horizontal polarization

Testing performed by Jerry Wang on 2003-12-09, originally saved on server.

Radiated Emissions Test Data

| INDICATED | | TABLE | ANTENNA | | CORRECTION FACTOR | | | CORRECTED AMPLITUDE | EN 55022: 1998 +A1: 2000 CLASS B | |
|--------------|-----------------------|-----------------|-----------------|---------------|-------------------------|-------------|------------|-----------------------------|-------------------------------------|--------------|
| Freq. MHz | Ampl. dB μ V/m | Angle Degree | Height Meter | Polar H/ V | Antenna dB μ V/m | Cable dB | Amp. dB | Corr. Ampl. dB μ V/m | Limit dB μ V/m | Margin dB |
| 128.00 | 34.5 | 300 | 2.5 | H | 12.3 | 3.5 | 27.5 | 22.8 | 30 | -7.2 |
| 144.00 | 33.1 | 30 | 1.2 | V | 13.2 | 3.6 | 27.5 | 22.4 | 30 | -7.6 |
| 00 | 32.8 | 0 | 1.2 | V | 13.0 | 3.8 | 27.5 | 22.1 | 30 | -7.9 |
| 144.00 | 32.6 | 270 | 3.0 | H | 13.2 | 3.6 | 27.5 | 21.9 | 30 | -8.1 |
| 128.00 | 33.5 | 30 | 1.2 | V | 12.3 | 3.5 | 27.5 | 21.8 | 30 | -8.2 |
| 76.02 | 36.9 | 30 | 1.2 | V | 9.5 | 2.8 | 27.5 | 21.7 | 30 | -8.3 |
| 54.00 | 35.7 | 0 | 1.2 | V | 10.5 | 2.0 | 27.3 | 20.9 | 30 | -9.1 |
| 180.00 | 30.4 | 330 | 1.2 | V | 13.6 | 3.9 | 27.1 | 20.8 | 30 | -9.2 |
| 150.00 | 30.6 | 200 | 2.5 | H | 13.0 | 3.8 | 27.5 | 19.9 | 30 | -10.1 |
| 60.02 | 35.4 | 180 | 2.0 | H | 9.6 | 2.2 | 27.5 | 19.7 | 30 | -10.3 |
| 76.01 | 32.3 | 270 | 2.5 | H | 9.5 | 2.8 | 27.5 | 17.1 | 30 | -12.9 |