



Inchcape Testing Services

Dash, Straus & Goodhue

Dash, Straus & Goodhue, Inc.
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American Power Conversion

Emissions Testing
Performed
on the
Remote Management Device
Model: AP9608
EN 55022 Class B

Date of Test: December 7, 1994

WO#2297B
JM/Dal
APC2297B.JM
December 8, 1994
DOT: December 7, 1994
Contact: Mr. Joe Pomata

Total No. of Pages Contained in this Report: 26

All services undertaken are subject to the following general policy:
Reports are submitted for exclusive use of the client to whom they are addressed. Their significance is subject to the adequacy and representative character of the samples and to the comprehensiveness of the tests, examinations or surveys made. No quotations from reports or use of Dash, Straus & Goodhue's name is permitted except as expressly authorized by Dash, Straus & Goodhue in writing.

DASH, STRAUS & GOODHUE, INC.
593 Massachusetts Avenue
Boxborough, MA 01719

VERIFICATION

American Power Conversion
9 Executive Park Drive
Billerica, MA 01862

December 7, 1994

NOT TRANSFERABLE

Verification is hereby issued to the named GRANTEE and is VALID ONLY for the equipment identified hereon for use under the rules and regulations listed below.

| | |
|-------------------------------|---|
| Name of Grantee | American Power Conversion |
| Model Number: | AP9608 |
| Applicable Regulation: | Applicable to EC Directive 89/336/EEC |
| Equipment Class: | Class B |
| Note(s): | (1) See attached Report dated December 7, 1994 for details and/or conditions of this Verification. (2) Test methods employed conform to the Standard Operating Procedures of Dash, Straus & Goodhue, Inc. (3) Verified to the limits and methods of EN 55022. |

Accredited by the National Institute of Standards and Technology
for Emissions and Telecommunications Testing
Approved by the Canadian Department of Communications for Telecom Testing

In correspondence concerning this Verification,
please refer to the date, Grantee Name and Model No

DASH, STRAUS & GOODHUE, INC.

TO: American Power Conversion
Mr. Joe Pomata
FROM: Jeffrey Mapes
DATE: December 7, 1994

RE: Emissions Testing Performed On The Remote Management Device, Model:
AP9608

On December 7, 1994, we tested the Remote Management Device, Model: AP9608, to determine if it was in compliance with the EN 55022 Class B emissions limits. A production version of the sample was received on December 7, 1994 in good condition. Present during the testing from American Power Conversion were Mr. Joe Pomata and Mr. Dave Colucci. The EUT is tested in a host UPS M/N: 1400I. We found that the unit met the EN 55022 Class B requirements when tested as received.

Initial radiated emissions results showed the system to be 3 dB below the EN 55022 Class B radiated emissions limit at 50.8 MHz (see Table 1). All other radiated emissions were at least 7 dB below the applicable limits.

Table 2 shows the unit's initial line-conducted emissions. Note that the worst-case line-conducted emission was 3 dB below the EN 55022 Class B conducted limit at .5 MHz. All other line-conducted emissions were at least 6 dB below the applicable limits.

In summary, this report verifies that the Remote Management Device, Model: AP9608, is compliant with the EN 55022 Class B requirements when production units conform to the initial sample. Please address all questions and comments concerning this report to Joseph B. Woodworth, EMI Section Manager.

DASH, STRAUS & GOODHUE, INC.

LABORATORY MEASUREMENTS

Pursuant To
CISPR 22:1985, EN55022:1987
and
Vfg 243/1991

Company Name: American Power Conversion

Model: AP9608

Date of Test(s): December 7, 1994

Test Site Location: DASH, STRAUS & GOODHUE, INC.
593 Massachusetts Avenue
Boxborough, Massachusetts 01719

Site: West

We attest to the accuracy of this report:



Jeffrey Mapes
Compliance Engineer



Joseph B. Woodworth
EMI Section Manager

DASH, STRAUS & GOODHUE, INC.

Introduction

This report is designed to show compliance with the CISPR, CENELEC and German BZT Specifications for computing devices and similar scientific equipment. The requirements of these rules, and the measurement methods used for assessing equipment compliance to these rules, are discussed below.

Applicable Rules

European Community (EC) electromagnetic emissions standards are formulated by CENELEC, drawing upon international CISPR standards and German VDE documents. Germany, in turn, is harmonizing its EMC laws to comply with the EC EMC Directive. The result is a series of similar standards listed below:

| | |
|-----------------------|---|
| CISPR 22:1985: | Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment (CISPR Standard). |
| EN55022:1987: | Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment (CENELEC Standard). |
| VDE 0871/6.78: | Specification of Radio Frequency Interference Suppression for Radio Frequency Equipment for Industrial, Scientific and Medical Use and Similar Purposes (VDE Standard). |
| Vfg 243/1991: | Radio Interference Suppression of Radio Frequency Equipment for Industrial, Scientific, Medical (ISM) and Similar Purposes and Equipment Used in Information Processing Systems; General License (German General Permit Law). |
| Vfg 46/1992: | Assorted modifications to Vfg 243/1991. |

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Within the EC, EN55022:1987 has the force of law; it was published in the *Official Journal of the EC* February 19, 1992, in accordance with the EMC Directive 89/336/EEC. In Germany, there are currently two parallel paths to EMC compliance for computing and ISM devices:

1. Declaration of Conformity citing compliance to EN55022 or,
2. Notification to BZT (Federal Ministry for Telecommunications Approvals) of conformity to Vfg 243/1991.

Note, that while VDE 0871 is a German standard for emissions, its limits do not form the legal requirements of the BZT; rather, it is Vfg 243/1991, as amended by Vfg 46/1992, which is enforced.

CISPR 22 and EN55022 specify Class A and Class B limits, appropriate to commercial/industrial and residential environments, respectively. Vfg 243 specifies only one set of limits which must be generally met for all intended environments. It corresponds to the EN55022 Class B limits, but with lower frequency limits. The major differences among these standards are:

| Environment | CISPR 22/EN55022 | Vfg 243 |
|-------------------------------------|---------------------------------------|--------------------------------|
| Radiated Emissions | Classes A and B 30 MHz to 1000 MHz | One Limit* 30 MHz to 18 GHz |
| Mains Conducted Emissions | Classes A and B 150 kHz to 30 MHz | One Limit 9 kHz to 30 MHz |
| Unshielded Line Conducted Emissions | No Limits | One Limit 9 kHz to 30 MHz |
| Magnetic Emissions | No Limits | One Limit 9 kHz to 30 MHz |

*Vfg 243 permits the measurement of noise power, as proxy for radiated emissions; the range of noise power measurement is 30 MHz to 300 MHz.

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Technical Requirements CISPR 22 and EN55022

Two types of restrictions are placed on conducted emissions. They must meet standards when measured both with quasi-peak and average detection. If a system meets the average limits when measured with quasi-peak detection, it is presumed to meet the higher limit.

| Class A Line-Conducted Emissions | | |
|-------------------------------------|--------------------|---------|
| Frequency (MHz) | Limit (dB μ V) | |
| | Quasi-Peak | Average |
| 0.15 to 0.50 | 79 | 66 |
| 0.50 to 30.0 | 73 | 60 |

| Class B Line-Conducted Emissions | | |
|-------------------------------------|--------------------|------------|
| Frequency (MHz) | Limit (dB μ V) | |
| | Quasi-Peak | Average |
| 0.15 to 0.50 | 66 to 56 * | 56 to 46 * |
| 0.50 to 5.00 | 56 | 46 |
| 5.00 to 30.00 | 60 | 50 |

* Limit decreases linearly with logarithm of frequency in this range.

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Radiated limits are given below. There is no average requirement. Readings are taken in quasi-peak for comparison to the limits. Inverse scaling is recognized for correlation of readings at various distances, hence the limits are shown for several distances.

| Class A Radiated Emissions | | | |
|-------------------------------|----------------------|--------|-------|
| Frequency (MHz) | Limit (dB μ V/m) | | |
| | At 30m | At 10m | At 3m |
| 30 to 230 | 30.0 | 39.5 | 50.0 |
| 230 to 1000 | 37.0 | 46.5 | 57.0 |

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Vfg 243/1991

The measurement of mains-conducted emissions extends down to 10 kHz in accordance with Vfg 46/1992. From 150 kHz to 30 MHz, the limit is identical to EN55022 Class B and emissions must meet both the quasi-peak and average limits. If a system meets the average limits when measured with quasi-peak detection, it is presumed to meet the higher limit.

| Vfg 243 Mains Conducted Emissions | | |
|--------------------------------------|--------------------|-----------|
| Frequency | Limit (dB μ V) | |
| | Quasi-Peak | Average |
| 10 kHz to 50 kHz | 110 | 100 |
| 50 kHz to 150 kHz | 90 to 80* | 80 to 70* |
| 150 kHz to 0.5 MHz | 66 to 56* | 56 to 46* |
| 0.5 MHz to 5 MHz | 56 | 46 |
| 5 MHz to 30 MHz | 60 | 50 |

*Limit decreases linearly with logarithm of frequency in this range.

Vfg 243 Noise on Unshielded Lines

In addition to the measurement of noise on the AC mains, Vfg 243 requires the measurement of conducted emissions on all unshielded signal lines which interconnect the parts of the system under test. This measurement is not required for shielded cables whose shields are interconnected. The limits are given in both quasi-peak and average values.

| Signal and Control Line-Conducted Emissions | | |
|--|------------------------------------|----------------|
| Frequency | Limit (dBμV) | |
| | Quasi-Peak | Average |
| 10 kHz to 50 kHz | 110 | 100 |
| 50 kHz to 150 kHz | 90 to 80* | 80 to 70* |
| 150 kHz to 0.5 MHz | 80 | 70 |
| 0.5 MHz to 30 MHz | 74 | 64 |

*Limit decreases linearly with logarithm of frequency in this range.

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Vfg 243 Field Strength Limits

The radiated emissions limits are specified as quasi-peak at a measuring distance of 10m. From 30 MHz to 1000 MHz, they are specified in units of electric field strength, dB μ V/m. From 1 to 18 GHz, field strength is measured as radio interference power in dBpW. The limit from 230 to 470 MHz is identical to the EN55022 Class B limit.

| Field Strength Limits | |
|-----------------------|---------------|
| Frequency | Limit @ 10m |
| 30 MHz to 230 MHz | 34 dB μ V |
| 230 MHz to 470 MHz | 37 dB μ V |
| 470 MHz to 1 GHz | 46 dB μ V |
| 1 GHz to 18 GHz | 57 dBpW |

For equipment with edge lengths smaller than 1m, and installations smaller than 1m (connecting lines fully extended), noise power from 30 to 300 MHz on all I/O lines may be measured instead of field strength. The limits for noise power are average values as below:

| Noise Power Limits | | |
|--------------------|--------------|-----------|
| Frequency | Limit (dBpW) | |
| | Quasi-Peak | Average |
| 30 MHz to 300 MHz | 45 to 55* | 35 to 45* |

*Limit increases linearly with logarithm of frequency.

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Vfg 243 Magnetic Field Strength Limits

Magnetic emissions are measured at a distance of 3m over the frequency range 10 kHz to 30 MHz. The limits are expressed in units of dB μ A/m, which is converted to dB μ V/m by the free space impedance 377 Ω or 51.5 dB. The original low-frequency limit of 9 kHz in Vfg 243/1991 was amended to 10 kHz by Vfg 46/1992.

| Magnetic Field Strength Limits | | |
|--------------------------------|--------------|--------------|
| Frequency | Limit @ 3m | |
| | dB μ A/m | dB μ V/m |
| 10 kHz to 70 kHz | 68 | 119 |
| 70 kHz to 150 kHz | 68 to 38* | 119 to 89* |
| 150 kHz to 2 MHz | 38 | 89 |
| 2 MHz to 3.95 MHz | 38 to 26* | 89 to 77* |
| 3.95 MHz to 5 MHz | 26 to 22* | 77 to 73* |
| 5 MHz to 16 MHz | 22 to 2* | 73 to 53* |
| 16 MHz to 30 MHz | 2 | 53 |

*Limit increases linearly with logarithm of frequency.

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Test Procedure General Testing Conditions Test Site

Two sites are used for BZT/CISPR testing. The East Site is a 3 meter/10 meter site consisting of a wooden building with approximately 6 meter x 7 meter inside dimensions. The North Site is a 3 meter/10 meter/30 meter site consisting of a wooden building approximately 6 meters x 14 meters inside dimensions. The building floors are metal groundplane.

Non-conductive construction is used throughout. Insulation is paper-backed. All lighting and wiring is done at floor level around the building periphery. Three meter measurements are taken entirely inside these buildings.

In the East Site, to ensure adequate height for antenna movement, the building is sloped. At the equipment side, the roof starts at 12 feet. At the antenna side, the building inside height is approximately 18 feet to allow clearance for the measuring antenna and mast in vertical polarization. At this side of the building are a pair of large doors, 11 feet high by 10 feet wide. For measurements at 10 meters, these doors are opened, and the mast and antenna are moved to 10 meters. These doors are large enough that the EUT-to-antenna path is completely unobstructed. The range extending outside of the building utilizes a 1/4" screen mesh which extends 2 meters past the mast and exceeds the width requirements of CISPR 16.

In the North Site, to ensure adequate height for antenna movement, the roof is located at a height of 5 meters. On one side of the building is a large set of doors 11 feet high by 10 feet wide. For measurements at 10 and 30 meters these doors are opened, and the mast and antenna are moved to the measurement distance. These doors are large enough so that the EUT-to-antenna path is totally unobstructed. The range extending out of the building utilizes a 1/4" metal screen mesh which extends 2 meters past the mast and exceeds the width requirements of CISPR 16.

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Measurements are taken with dipoles (Compliance Design A100) and with biconicals (Compliance Design B1000) which have been correlated to dipoles from 30 MHz to 1000 MHz.

The mast to support the antennas is capable of a 1 meter to 4 meter height range, which meets both BZT and CISPR requirements. It is non-conductive and remotely controllable. Radiated emissions measurements are usually taken first at 3 meters. Signals which are within 6 dB of the limit are remeasured at 10 meters.

For measurement of magnetic field strength below 30 MHz (only required by VDE/BZT), loop antennas are employed.

Reporting Format

Measurements are reported in graphic and/or tabular form. The graphic format is especially useful for those standards where the limits vary as a function of frequency.

**Configuration
of
Unit, Cables and Peripherals**

Since radiated emissions, and to a lesser extent, conducted emissions, are a function of cable placement, the cable placement is varied to encompass all configurations that an end user would encounter to determine that configuration resulting in maximum emissions. CISPR Publication 22 specifically states that emissions be maximized by variation of configuration. At least one cable for each I/O port type will be attached to the EUT. If peripherals or modules are available, at least one of each available type will be installed and noted in the report.

For VDE testing, an alternative is available. In some cases, the I/O cables can be brought out 1.5 meters from the EUT and dropped to the floor (VDE 0877, Part 2).

Generally, only one of each type will be used unless good engineering judgment dictates that the use of more will affect emission levels. Excess cable lengths will be bundled in the center into a 30 x 40 cm bundle. Cables requiring non-standard lead dress will be recorded in the report.

Where an EUT is a peripheral designed to be used with a specific host computer, that computer was attached. Simulators are used for peripherals only where a satisfactory host is not available.

The unit is grounded and supplied power according to normal usage.

Test Environment

When ambient levels of emissions are within 6 dB of the appropriate limit, the following steps are taken to assure compliance:

1. On the outdoor site, the measurement bandwidth is reduced. A check is made to see that peak readings are not affected. The use of narrower bandwidths allows examination of emissions close to local ambient signals.
2. The antenna is brought close to the EUT to increase signal-to-ambient signal strength.
3. In severe cases, the unit is moved to a 12' x 22' screen room. The critical frequencies are checked to see if the EUT has any emissions which may be obscured by the ambient. If it does, testing at the critical frequencies is performed again at night or at another time when the offending signal is off the air.

The test site is maintained at a temperature of approximately 70°F (20°C), and equipment under test is brought to operating temperature before testing.

Test Platform

Radiated tests are either conducted on a 0.8 meter high, non-conductive platform, or, for larger equipment, a 2.4 meter diameter flush rotatable platform. In some cases, large equipment on its own casters is tested without a platform.

Line-conducted emissions are measured with the non-floor-standing EUT at a 40 cm height above the groundplane. Floor-standing apparatus is insulated from the groundplane.

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Configuration Information

| | |
|------------------------------|--------------------------|
| Equipment Under Test: | Remote Management Device |
| Model: | AP9608 |
| Serial No.: | Not Labeled |
| FCC Identifier: | Not Applicable |
| Support Equipment: | |

| | |
|-------------|---|
| CPU: | ZEOS M/N: 486DX2-66DT S/N: B5032130 FCC ID: BYDPCT486UDT |
|-------------|---|

| | |
|---------------|--|
| Mouse: | LOGITEC M/N: M-PK32 S/N: LT313C03238 FCC ID: DZLMPK32 |
|---------------|--|

| | |
|-----------------|--|
| Monitor: | NEC M/N: JC-153VMA-Z S/N: 3400923MA FCC ID: A3DJC-1532VMA |
|-----------------|--|

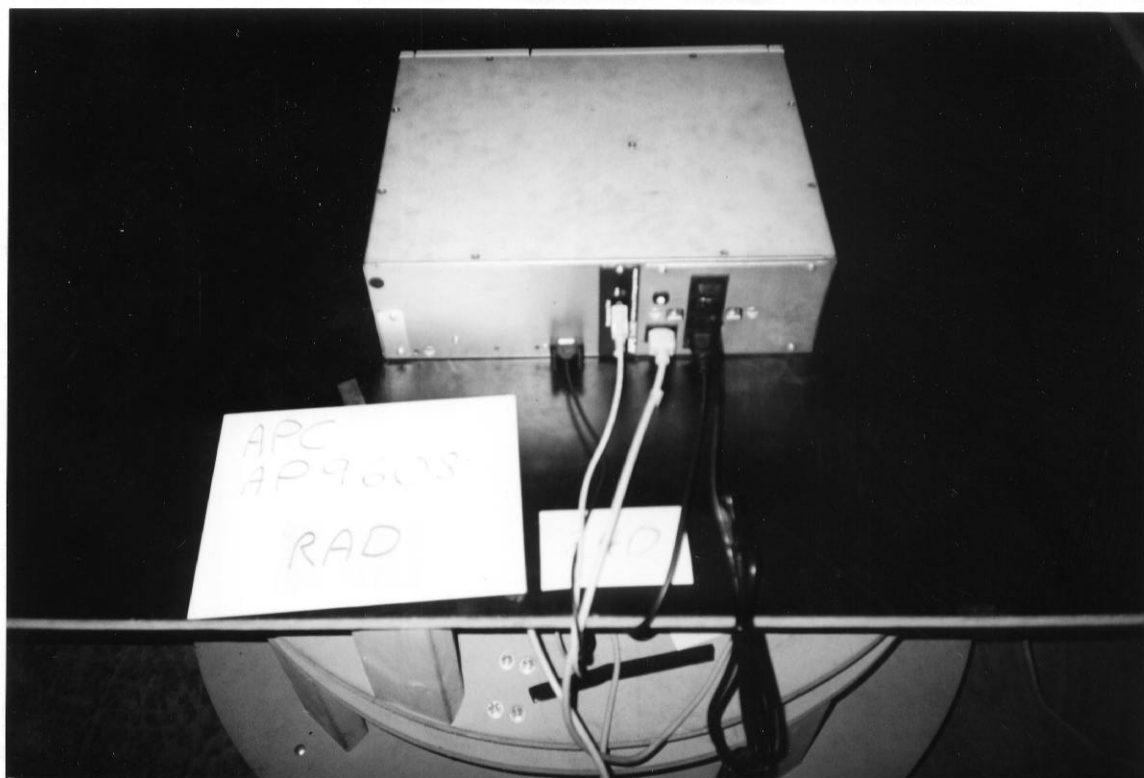
| | |
|-------------------|--|
| UPS 1400I: | APC M/N: Not Labeled S/N: DVT 12 FCC ID: Not Applicable |
|-------------------|--|

Cables:

- (2) Line, 2m, shielded
- (2) Serial, 5m, shielded, metal hood

Configuration Photographs

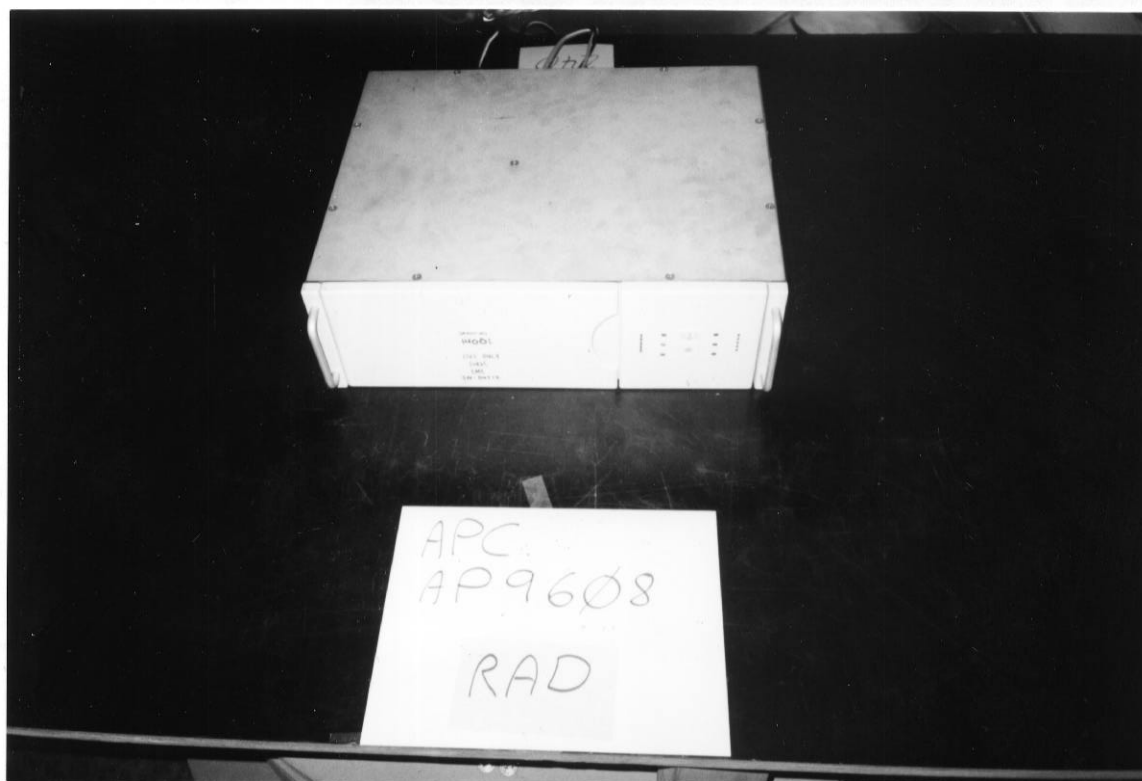
**Worst-Case Radiated Emissions
at 50.8 MHz**



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Configuration Photographs

Worst-Case Radiated Emissions at 50.8 MHz



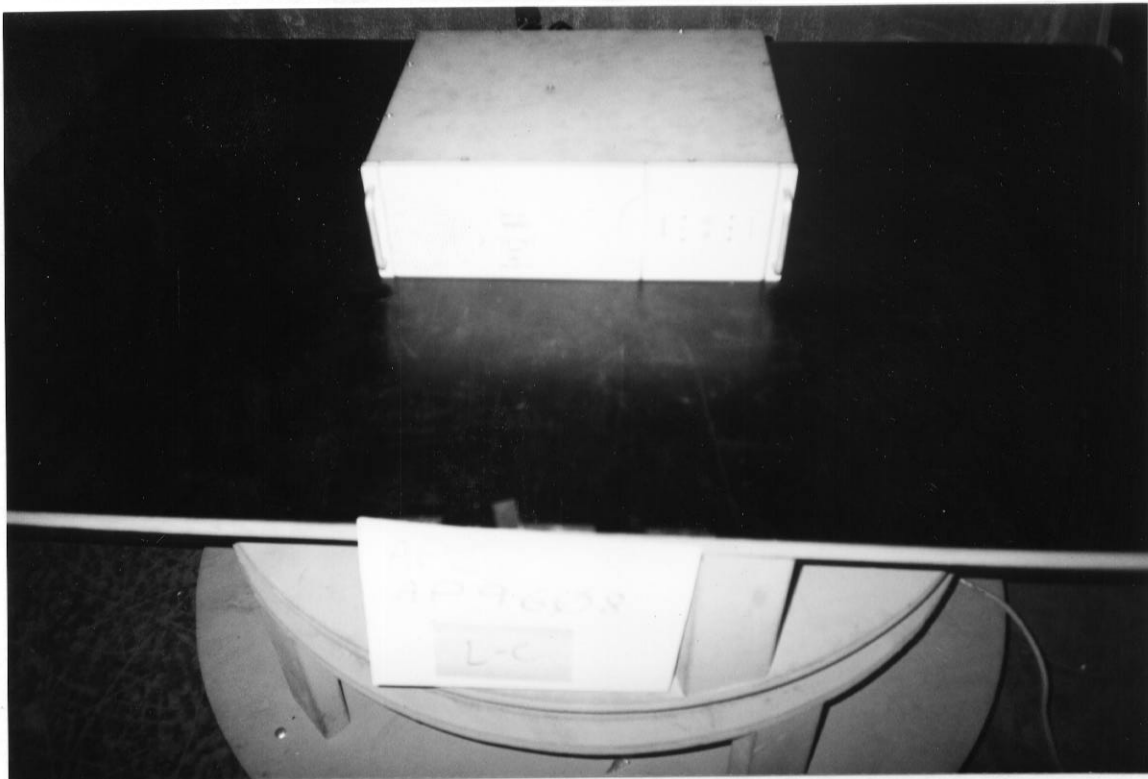
Configuration Photographs

**Worst-Case Line-Conducted Emissions
at .5 MHz**



Configuration Photographs

**Worst-Case Line-Conducted Emissions
at .5 MHz**



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Test Data Radiated and Conducted Emissions

I. Instrumentation

A. Antennas

☒ Compliance Design B1000, 30 MHz to 1000 MHz

☐ Compliance Design A100 Dipoles, 30 MHz to 1000 MHz

☐ Other _____

B. Spectrum Analyzer or Receiver

☒ HP8558B with 182T or 853A Mainframe

☒ HP8593A with Quasi-Peak and Average Measurement Detectors

☐ Other _____

C. Bandwidth

Radiated

Conducted

☒ 120 kHz

☒ 9 kHz

☐ 9 kHz

☐ Other _____

☐ Other _____

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I. Instrumentation (cont'd)

D. Video Filter

☒ Off

☐ Other _____

E. Attenuator Setting on Receiver or Spectrum Analyzer

☒ 0

☐ 10 dB

☐ 20 dB

☐ Other _____

II. Client Information

A. Name and Address:

American Power Conversion
9 Executive Park Drive
Billerica, MA 01862

Attention:

Mr. Joe Pomata

B. Model:

AP9608

C. Date of Test(s):

December 7, 1994

DASH, STRAUS & GOODHUE, INC.

III. A Sample Calculation, Radiated Emissions

The signal detected on the spectrum analyzer or receiver at 50.8 MHz was 26 dB μ V. The antenna factor applied, including cable loss, was 11 dB, resulting in a signal level of 37 dB μ V/m or 71 μ V/m at 3 meters.

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Table:1

Company: APC

Model: 9608

Notes: Initial scan EUT installed in 1400I

CISPR 22 Class B Radiated Emissions

| Antenna Polarity | Frequency (MHz) | Reading (dBuV) | Antenna Factor (dB) | Net at 3 meter (dBuV/m) | Class B Limit (dBuV/m) | Margin (dB) |
|---------------------|--------------------|-------------------|---------------------------|-------------------------------|------------------------------|----------------|
| V | 50.80 | 26.0 | 11 | 37 | 40 | -3 |
| H | 75.50 | 16.0 | 6 | 22 | 40 | -18 |
| H | 96.20 | 6.0 | 11 | 17 | 40 | -23 |
| H | 100.2 | 22.0 | 11 | 33 | 40 | -7 |
| H | 114.0 | 20.0 | 13 | 33 | 40 | -7 |
| H | 129.0 | 14.0 | 13 | 27 | 40 | -13 |
| H | 133.0 | 16.0 | 13 | 29 | 40 | -11 |
| H | 143.0 | 18.0 | 13 | 31 | 40 | -9 |
| H | 159.0 | 17.0 | 15 | 32 | 40 | -8 |
| H | 186.0 | 12.0 | 16 | 28 | 40 | -12 |
| H | 200.0 | 4.0 | 16 | 20 | 40 | -20 |
| H | 240.0 | 8.0 | 19 | 27 | 47 | -20 |
| H | 244.0 | 6.0 | 20 | 26 | 47 | -21 |

Test Engineer: Jeffrey Mapes

Test Date: 12-07-1994

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Table:2

Company: APC

Model: 9608

Notes: Initial scan in 1400I

CISPR 22 Class B Conducted Emissions

| Frequency (MHz) | Reading Side A (dBuV) | Reading Side B (dBuV) | Class B Average Limit (dBuV) | Margin (dB) |
|--------------------|-----------------------------|-----------------------------|------------------------------------|----------------|
| 0.500 | 43 | 43 | 46 | -3 |
| 1.200 | 15 | 15 | 46 | -31 |
| 15.90 | 44 | 44 | 50 | -6 |
| 25.80 | 40 | 40 | 50 | -10 |

Test Engineer: Jeffrey Mapes

Test Date: 12-07-1994

Article 1 - Services, LABORATORY will:

- 1.1 Act for CLIENT in a professional manner, using the degree of care and skill ordinarily exercised by and consistent with the standards of the profession.
- 1.2 Provide only those services that lie within the technical and professional areas of expertise of LABORATORY and which LABORATORY is adequately staffed and equipped to perform.
- 1.3 Perform all technical services in substantial accordance with the generally accepted laboratory testing principles and practices.
- 1.4 Promptly submit formal reports of technical services performed indicating, where applicable, compliance with specification or other contract documents. Such reports shall be complete and factual, citing where appropriate the technical services performed, methods employed, and values obtained.
- 1.5 Employ instrumentation which has been calibrated within a period not exceeding twelve (12) months from the time of use by devices of accuracy traceable to the National Institute of Standards and Technology of the United States Department of Commerce.
- 1.6 Consider all reports to be the confidential property of client, and distribute reports only to those persons, organizations or agencies designated by CLIENT or his authorized representative.
- 1.7 Retain all pertinent records relating to the services performed for a period of three (3) years following submission of the report or the suspension of manufacturing of product subject to follow-up services, whichever is later, during which period the records will be made available to CLIENT upon reasonable request.

Article 2 - Client's Responsibilities, CLIENT or his authorized representative will:

- 2.1 Provide LABORATORY with all plans, schematics, specifications, addenda, change orders, drawings and other information for the proper performance of technical services.
- 2.2 Designate a person to act as CLIENT's representative with respect to LABORATORY's services to be performed under this Agreement; such person or firm to have complete authority to transmit instructions, receive information and data, interpret and define CLIENT's policies and decisions with respect to the project and to order, at CLIENT's expense, such technical services as may be required.
- 2.3 Designate a person who is authorized to receive copies of LABORATORY's test reports.
- 2.4 To undertake the following:
 - (a) Secure and deliver to LABORATORY, without cost to LABORATORY, preliminary representative samples of that equipment proposed to require technical analysis, together with any relevant data.
 - (b) Furnish such labor and equipment needed by LABORATORY to handle samples at the LABORATORY and to facilitate the specified technical analysis.

Article 3 - General Conditions

- 3.1 LABORATORY, by the performance of services covered hereunder, does not in any way assume any of those duties or responsibilities customarily vested in the CLIENT's employees, or any other party, agency or authority.
- 3.2 LABORATORY shall not be responsible for acts or omissions of any other party or parties involved in the design, manufacture or maintenance of the equipment or the failure of any employee, contractor or subcontractor to undertake any aspect of equipment's design, manufacture or maintenance.
- 3.3 LABORATORY is not authorized to revoke, alter, relax, enlarge or release any requirement of the equipment's design, manufacture or maintenance unless specifically authorized by CLIENT or his authorized representative.
- 3.4 This Agreement may be terminated by either party on ten (10) days written notice or by mutual agreement. If this Agreement is terminated by either party, LABORATORY shall be paid in full for all services performed through the termination date, and the CLIENT shall be provided with a complete report of the results of technical analysis conducted prior to termination.
- 3.5 Neither CLIENT nor LABORATORY may delegate, assign, sublet or transfer his duties or interest in this Agreement without the written consent of the other party.
- 3.6 *The only warranty made by LABORATORY in connection with its service performed hereunder is that it will use that degree of care and skill as set forth in Article 1.1 and 1.3 above. No other warranty, expressed or implied, is made or intended for services provided hereunder.*
- 3.7 Where the LABORATORY indicates that additional testing is advisable to obtain more valid or useful data, and where such testing has not been authorized in writing, CLIENT agrees to view such test reports as inconclusive and preliminary.
- 3.8 The LABORATORY shall supply technical service and prepare a report based solely on the sample submitted to the LABORATORY by the CLIENT. The CLIENT understands that application of the data to other devices is highly speculative and should be applied with extreme caution.

- 3.9 The LABORATORY agrees to exercise ordinary care in receiving, preserving and shipping (F.O.B. Boxborough, Mass.) any sample to be tested, but assumes no responsibility for damages, either direct or consequential, which arise or are alleged to arise from loss, damage or destruction of the samples due to the act of examination, modification or testing, or technical analysis, or circumstances beyond LABORATORY's control.
- 3.10 The LABORATORY will hold samples for thirty (30) days after tests are completed, or until the CLIENT's outstanding debts to the LABORATORY are satisfied, whichever is later.
- 3.11 The client recognizes that samples of products subject to LABORATORY's review and test procedures may be damaged or destroyed.
- 3.12 The CLIENT recognizes that generally accepted error variances apply and agrees to consider such error variances in its use of test data.
- 3.13 It is agreed between LABORATORY and CLIENT that no distribution of any test, reports or analysis shall be made to any third party without the prior written consent of both parties. The content of a reports, analysis and tests is strictly confidential and shall not be released to any third party without the written consent of the other party.
- 3.14 The CLIENT acknowledges that all employees of LABORATORY operate under employment contracts with the LABORATORY, and CLIENT agrees not to solicit employment of such employees, or solicit information related to other clients from said employees.

Article 4 - Follow-Up Services (for listed products only)

- 4.1 If the product is found to be in compliance with the review and test requirements, it is agreed that CLIENT will abide by the Follow-Up Service Procedure.
- 4.2 It is understood and agreed by the CLIENT that the LABORATORY name or listing mark will not be applied or utilized until authorized representatives of LABORATORY have concluded the procedure set forth in Article 4.1.
- 4.3 All costs associated with the Follow-Up Service Procedure will be the responsibility of CLIENT. CLIENT's failure to pay these charges will result in the revocation of authorization to use the LABORATORY listing mark.

Article 5 - Insurance

- 5.1 LABORATORY shall secure and maintain throughout the full period of this Agreement sufficient insurance to protect it adequately from claims under applicable Workmen's Compensation Acts and from claims for bodily injury, death or property damage as may arise from the performance of services under this Agreement.
- 5.2 The CLIENT hereby warrants that it has sufficient insurance to protect its employees adequately under applicable Workmen's Compensation Acts and for bodily injury, death or property damage as may arise from the acts of its employees pursuant to the Agreement.
- 5.3 No insurance, of whatever kind or type, which may be carried by LABORATORY is to be considered as in any way limiting any other party's responsibility for damages resulting from their operations or for furnishing work and materials related to the project.

Article 6 - Payment

- 6.1 CLIENT will pay LABORATORY for services and expenses. LABORATORY's invoices will be presented at the completion of its work or monthly and will be paid within thirty (30) days of receipt by CLIENT or his authorized representative.
- 6.2 LABORATORY shall be paid in full as described in Article 6.1 and, in addition, shall be paid in full for any services authorized orally or in writing by an employee or agent of the CLIENT pursuant to Article 2.2.

Article 7 - Extent of Agreement

The Agreement, including these Terms and Conditions and the Schedules attached hereto, represent the entire agreement between CLIENT and LABORATORY and supersedes all prior negotiations, representations or agreements, written or oral. The Agreement may be amended only in accordance with this Agreement or by written instrument signed by CLIENT and LABORATORY.

Article 8 - Collection

- 8.1 CLIENT shall pay LABORATORY interest in the amount of one and one half percent (1.5%) per month on amounts invoiced which are overdue. Invoices which are overdue are defined as those which remain unpaid more than thirty (30) days after presentation.
- 8.2 CLIENT agrees to pay LABORATORY all amounts incurred by LABORATORY in collecting on invoices which are overdue. Such amounts shall include, but shall not be limited to, reasonable attorneys' fees and court costs.