EN 55022 CLASS B, EN 55024, EN 61000-3-2, AND EN 61000-3-3 TEST REPORT

for

PORTABLE COMPUTER

Model: GM-II

Prepared for

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GENERAL REPORT SUMMARY

This electromagnetic emission and immunity test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Device Tested:	Portable Computer Model: GM-II S/N: N/A
Product Description:	The EUT is a portable computer.
Modifications:	The EUT was not modified during the testing. ***or*** The EUT was modified in order to meet the specifications. Please see list located in Appendix B.
Manufacturer:	ACME Portable Machines, Inc. 14140 Live Oak Avenue #D Baldwin Park, California 91706
Test Dates:	November 19, 20 and 21, 2001
Test Specifications:	EMI and EMC requirements European Standards: EN 55022: 1998, EN 55024: 1998, EN 61000-3-2: 2000, and EN 61000-3-3: 1995 The specification EN 55024: 1998 is a product family EMC standard which references the following specifications: EN 61000-4-2: 1995 EN 61000-4-3: 1995 EN 61000-4-4: 1995 EN 61000-4-5: 1995 EN 61000-4-6: 1996 EN 61000-4-8: 1993 EN 61000-4-11: 1994

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz – 30 MHz to **Class B** Limits.	Complies with the **Class B** limits of EN 55022: 1998.
2	Radiated RF Emissions, 30 MHz – 1000 MHz to **Class B** Limits.	Complies with the **Class B** limits of EN 55022: 1998.
3	Quasi-Stationary Current Harmonics, to **Class A** and **Class D** Limits.	Complies with the relevant requirements of EN 61000-3-2: 2000. The unit operates within the specifications.
4	Limitation of Voltage Fluctuations and Flicker.	Complies with the relevant requirements of EN 61000-3-3: 1995. The unit operates within the specifications.
5	Direct ESD, Air Discharge, ±2.0 kV, ±4.0 kVand ±8.0 kV (insulated surfaces).	Complies with the relevant requirements of EN 55024: 1998. The unit operates within the specifications.
6	Direct ESD, Contact Discharge, ±2.0 kV and ±4.0 kV (conductive surfaces).	Complies with the relevant requirements of EN 55024: 1998. The unit operates within the specifications.
7	Indirect ESD, ±2.0 kV and ±4.0 kV (HCP and VCP).	Complies with the relevant requirements of EN 55024: 1998. The unit operates within the specifications.
8	Radiated RF Electromagnetic Field Test, 80 MHz to 1000 MHz, 3 V/m with an 80 % amplitude modulated 1 kHz sine wave.	Complies with the relevant requirements of EN 55024: 1998. The unit operates within the specifications.
9	Electrical Fast Transient / Burst Immunity, ±0.5 kV and ±1.0 kV on the power lines, and ±0.5 kV on the signal lines.	Complies with the relevant requirements of EN 55024: 1998. The unit operates within the specifications.
10	Surge Immunity ±0.5 kV and ±1.0 kV differential mode, and ±0.5 kV, ±1.0 kV, and ±2.0 kV common mode.	Complies with the relevant requirements of EN 55024: 1998. The unit operates within the specifications.
11	RF Common Mode Conducted Susceptibility, 150 kHz to 80 MHz, 3 Vrms with an 80% amplitude modulated 1 kHz sine wave on power lines and data lines.	Complies with the relevant requirements of EN 55024: 1998. The unit operates within the specifications.
12	Power Frequency Magnetic Field Test, 1 A/m @ 50 Hz.	Complies with the relevant requirements of EN 55024: 1998. The unit operates within the specifications.
13	Voltage Dips and Short Interruptions Test, >95 % reduction for 10 ms, 30 % reduction for 500 ms, and a >95 % reduction for 5 sec.	Complies with the relevant requirements of EN 55024: 1998. The unit operates within the specifications.

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC) tests performed on the Portable Computer Model: GM-II. The EMI measurements were performed according to the measurement procedures described in EN 55022: 1998, EN 61000-3-2: 2000, and EN 61000-3-3: 1995. The tests were performed in order to determine whether the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined in EN 55022: 1998 - "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement," the **Class A** and **Class D** limits of EN 61000-3-2: 2000 Electromagnetic Compatibility (EMC): “Part 3-2: Limits – Limits for harmonic current emissions (Equipment input current up to and including 16 A per phase,” and EN 61000-3-3: 1995 – “Part 3: Limits – Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A.”

The EMC tests were performed according to the measurement procedure described in EN 55024: 1998 - "Information technology equipment – Immunity characteristics – Limits and methods of measurement." These tests were performed in order to determine whether the EUT would accept any interference and still perform within the performance criteria described in section 4.2.1 of this report. The tests were performed by Compatible Electronics personnel, also the unit was operated and monitored for susceptibility by Compatible Electronics and ACME Portable Machines personnel.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI/EMC tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

ACME Portable Machines, Inc.

Martin Yen	R & D Manager
Terry Chung	Manager

Compatible Electronics, Inc.

Benigno Chavez	Test Technician
James Ross	Test Engineer
Scott McCutchan	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on November 19, 2001.

2.5 Disposition of the Test Sample

The test sample was returned to ACME Portable Machines, Inc. on November 21, 2001.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

Dc	Relat. Steady-State Voltage Change	RF	Radio Frequency
Dmax	Max. Relative Voltage Change	P/N	Part Number
Dt	Relat. Voltage Change Characteristics	EFT	Electrical Fast Transients
LISN	Line Impedance Stabilization Network	ESD	Electrostatic Discharge
ITE	Information Technology Equipment	HCP	Horizontal Coupling Plane
EMC	Electromagnetic Compatibility	GRP	Ground Reference Plane
EMI	Electromagnetic Interference	EUT	Equipment Under Test
S/N	Serial Number	VCP	Vertical Coupling Plane
AM	Amplitude Modulation	HP	Hewlett Packard
PC	Personal Computer	VP	Vice President
I/O	Input/Output	USB	Universal Serial Bus

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI/EMC Test Report.

SPEC	TITLE
EN 55024 1998	Information technology equipment – Immunity characteristics – Limits and methods of measurement
EN 55022 1998	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
CISPR 16 1993	Specification for radio disturbance and immunity measuring apparatus and methods
EN 61000-3-2 2000	Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)
EN 61000-3-3 1995	Electromagnetic compatibility (EMC) – Part 3: Limits – Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A
EN 61000-4-2 1995	Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test – Basic EMC Publication
EN 61000-4-3 1996	Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 3: Radiated, radio-frequency electromagnetic field immunity test
EN 61000-4-4 1995	Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test – Basic EMC Publication
EN 61000-4-5 1995	Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 5: Surge immunity test
EN 61000-4-6 1996	Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8 1993	Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 8: Power frequency magnetic field immunity test – Basic EMC Publication
EN 61000-4-11 1994	Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques. Section 11: Voltage dips, short interruptions and voltage variations immunity tests

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

The Portable Computer Model: GM-II (EUT) was connected to two modems, monitor, printer, keyboard, and two USB mice via its serial, video, parallel, keyboard, and USB ports, respectively. The EUT was running an EMI program that tested all ports and read from the hard drive on a continuous basis. Also, an "H" pattern was displayed on both the EUT's LCD and the external monitor.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The cables were moved to maximize the emissions. The final conducted as well as radiated data was taken in this mode of operation. All initial investigations were performed with the EMI receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix D.

4.1.1 Cable Construction and Termination

Cable 1

This is a 50 centimeter unshielded cable connecting the EUT to the keyboard. The cable has an RJ-45 connector at the EUT end and is hard wired into the keyboard.

Cable 2

This is a 1.8 meter foil shielded cable connecting the USB mouse #1 to the EUT. It has a USB Type "B" connector at the EUT end and is hard wired into the USB mouse #1. The shield of the cable was grounded to the chassis via the connector.

Cable 3

This is a 1.8 meter foil shielded cable connecting the USB mouse #2 to the EUT. It has a USB Type "B" connector at the EUT end and is hard wired into the USB mouse #2. The shield of the cable was grounded to the chassis via the connector.

Cable 4

This is a 1.5 meter braid and foil shielded cable connecting the EUT to modem #1. It has a D-9 pin metallic connector at the EUT end and a D-25 pin metallic connector at the modem #1 end. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 5

This is a 1 meter braid and foil shielded cable connecting the EUT to the monitor. It has a high density D-15 pin metallic connector at each end. The shield of the cable was grounded to the chassis via the connectors.

Cable 6

This is a 1.5 meter braid and foil shielded cable connecting the EUT to modem #2. It has a D-9 pin metallic connector at the EUT end and a D-25 pin metallic connector at the modem #2 end. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.

Cable 7

This is a 1.3 meter braid and foil shielded cable connecting the EUT to the printer. It has a Centronics metallic type connector at the printer end and a D-25 pin metallic connector at the EUT end. The cable was bundled to a length of 1 meter. The shield of the cable was grounded to the chassis via the connectors.

4.2 Description of the Test Configuration - EMC

The EUT was operating as described in section 4.1 of this report.

4.2.1 Susceptibility Criteria

TEST	PERFORMANCE CRITERIA
Electrostatic Discharge (ESD)	B
Radiated Radio-Frequency Electromagnetic Field Test	A
Electrical Fast Transient / Burst Immunity	B
Surge Immunity	B
RF Common Mode Conducted Susceptibility	A
Power Frequency Magnetic Fields	A
AC Voltage Dips and Interruptions, >95 % reduction for 10 ms	B
AC Voltage Dips and Interruptions, 30 % reduction for 500 ms and >95 % reduction for 5000 ms	C

Performance criteria A: The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

Performance criteria C: Temporary loss of function is allowed, provided the function is self recoverable or can be restored by the operation of the controls.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 Internal and External Components of the EUT List

Note: All items below are part of the EUT itself.

EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER
MOTHERBOARD	ACME PORTABLE MACHINES, INC.	BLS	001N/A
1 GHz CPUMICROVAX II SERVER	INTELDIGITAL	PENTIUM IIIVS21W-G2	N/AWF72009635
POWER SUPPLYKEYBOARD	SEASONICDIGITAL	SS-250U1LK201	N/AB012801549
CD-ROMTERMINAL	NECDIGITAL	CDR-2800CVT320-C2	9TA910R77269G44226111
FLOPPY DISK DRIVESCSI TERMINATOR	PANASONICN/A	JU-256A226PF2015 N/A	N/AN/A
HARD DISK DRIVE	QUANTUM	AS30A011-03-B	N/A
KEYBOARD	ACME PORTABLE MACHINES, INC.	GM-II KEYBOARD	N/A
VGA CARD	ACME PORTABLE MACHINES, INC.	ACME-M3	N/A
LCD	NEC	NL10276BC28-24F	N/A
GM-II CHASSIS	ACME PORTABLE MACHINES, INC.	CKD-GM-II	N/A

5.2 Accessories List

Note: All items below were connected to the EUT for the testing, but are NOT part of the EUT itself.

EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER
USB MOUSE	ACER	M-U48a	001LZE11651378
USB MOUSE	ACER	M-U48a	LZE11651387
PRINTER	CITIZEN	LSP-10	1184398-72
MODEM	HAYES	231AA	TA910R7726A05631003823
MODEM	HAYES	231AA	A07031003480
MONITOR	TWE	PX-14S	901105357

5.3 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Radiated Emissions Data Capture Program	Compatible Electronics, Inc.	2.0	N/A	N/A	N/A
Emissions Program	Compatible Electronics, Inc.	2.3 (SR19)	N/A	N/A	N/A
Harmonic/Flicker Test System Software	Agilent Technologies	B00.01	N/A	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	2727A04757	November 9, 2001	1 Year
Spectrum Analyzer – Display Section	Hewlett Packard	85650A	2648A15455	November 9, 2001	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	3303A01688	November 9, 2001	1 Year
Preamplifier	Com Power	PA-102	1202	October 17, 2001	1 Year
RF Attenuator	Weinschel Corp.	2	BJ6394	August 1, 2001	1 Year
LISN	Com Power	LI-215	12090	November 9, 2001	1 Year
LISN	Com Power	LI-215	12076	November 8, 2001	1 Year
Biconical Antenna	Com Power	AB-900	15011	July 9, 2001	1 Year
Log Periodic Antenna	Com Power	AL-100	1012	July 9, 2001	1 Year
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Printer	Hewlett Packard	C4568A	SG67N181BP	N/A	N/A
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
Harmonic/Flicker Test System	Hewlett Packard	6843A	3531A-00198	August 30, 2001	1 Year

5.4 EMC Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
GENERAL TEST EQUIPMENT USED FOR ALL TESTS					
Temp/Humidity Meter	Abbeon	HTAB 169B	N/A	April 14, 2001	1 Year
Barometer	Abbeon	BAR130B	N/A	N/A	N/A
ELECTROSTATIC DISCHARGE TEST EQUIPMENT					
ESD Generator	Schaffner	NSG 435	981028	November 9, 2001	1 Year
RF RADIATED ELECTROMAGNETIC FIELD TEST EQUIPMENT					
E-Field Software Program (Field Uniformity)	Compatible Electronics	1.5	N/A	N/A	N/A
RF Signal Generator	Giga-Tronics	6062A	9620906	July 13, 2001	1 Year
RF Power Amplifier	Kalmus	827FC / 1-60-685-102	8970-1	N/A	N/A
Combilog Antenna	Com Power	AC-22-	25510	N/A	N/A
Isotropic Field Monitor	Amplifier Research	FM 2000	18324	N/A	N/A
Isotropic Field Probe	Amplifier Research	FP 2000	18396	July 23, 2001	1 Year
Computer	Hewlett Packard	6330	US82812605	N/A	N/A
RF CONDUCTED SUSCEPTIBILITY TEST EQUIPMENT					
Conducted Immunity Test Level Calibration Software	Compatible Electronics	3CC31.1	N/A	N/A	N/A
Conducted Immunity Cable/Attenuator Calibration Software	Compatible Electronics	3CL31.1	N/A	N/A	N/A
Conducted Immunity Test Software	Compatible Electronics	3CT31.1	N/A	N/A	N/A
Computer	Hewlett Packard	4530	US92020578	N/A	N/A
RF Signal Generator	Hewlett Packard	8656B	2530A02271	January 15, 2001	1 Year
RF Power Amplifier	Amplifier Research	100A250	24426	N/A	N/A
RF Current Probe	Fischer	F-120-3	31	N/A	N/A
RF Injection Probe Calibration Fixture	Com-Power	PCF-100	N/A	Prior to Test	Prior to Test
Directional Coupler	Weerlatone	2962	3250	N/A	N/A
Coupling / Decoupling Network	Com-Power	CDN M3-25	53900	Prior to Test	Prior to Test

5.4.1 EMC Test Equipment Con't

ELECTRICAL FAST TRANSIENTS, SURGE, AND VOLTAGE DIPS TEST EQUIPMENT					
CEWare	Keytek	V1.02	N/A	N/A	N/A
E500 SurgeWare	Keytek	V4.19	N/A	N/A	N/A
E400 Burstware	Keytek	V4.19	N/A	N/A	N/A
Computer	Hewlett Packard	4530	US92020578	N/A	N/A
EMC Immunity Test System	Keytek	CEMASTER	9701335	March 10, 1998	1 Year
ECAT Control Center	Keytek	E103	9304471	September 18, 2001	1 Year
ECAT Combination Wave	Keytek	E501	9404177	May 2, 2001	1 Year
ECAT EFT Generator	Keytek	E411	9306408	May 2, 2001	1 Year
Capacitor Clamp	Keytek	CM-CCL	9804346	N/A	N/A
POWER FREQUENCY MAGNETIC FIELD TEST EQUIPMENT					
AC Power Source	Elgar Corporation	SW5250A-4-3-2 Rev. B	786	November 12, 2001	1 Year
Audio Isolation Transformer	Compatible Electronics, Inc.	6220-1A	N/A	N/A	N/A
Magnetic Field Meter	Holaday	HI-3624A	83981	May 7, 2001	1 Year
Magnetic Field Antenna	Compatible Electronics	MF-100	N/A	Prior to Test	Prior to Test

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

All immunity tests were performed in two shielded enclosures, one 20 feet wide, 20 feet long and 12 feet high, and the other 20 feet wide, 22 feet long and 12 feet high. Please refer to section 2.1 and 7.1.2 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

For all tests except for ESD, Conducted Susceptibility and Magnetic Susceptibility, the EUT was mounted on a 1.0 by 1.5 by 0.8 meter high non-conductive table, which was placed on the ground plane.

For ESD testing, the EUT was mounted 0.5 millimeters above the 0.8 meter by 1.6 meter horizontal coupling plane, which was placed on a 1.0 by 1.5 by 0.8 meter high non-conductive table.

For Conducted Susceptibility, the EUT was mounted on a 10 cm high wooden block that was placed on the ground plane.

For Magnetic Susceptibility, the EUT was mounted on a 10 cm high wooden block that was placed on a 1.0 meter by 1.0 meter horizontal coupling plane, which was placed on a 1.0 by 1.5 by 0.8 meter high non-conductive table.

The EUT was grounded only through the safety ground in its power cord.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 RF Emissions

7.1.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in EN 55022: 1998. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics Conducted Emissions software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

Test Results:

The EUT complies with the **Class B** limits of EN 55022: 1998 for conducted emissions.

7.1.2 Radiated Emissions Test

The spectrum analyzer was used as a measuring meter. A preamplifier was used to increase the sensitivity of the instrument. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps. The quasi-peak was used only for those readings which are marked accordingly on the data sheets. The following antennas and measurement bandwidths were used as specified in the following table.

FREQUENCY RANGE (MHz)	TRANSDUCER	EFFECTIVE MEASUREMENT BANDWIDTH
30 to 300	Biconical Antenna	120 kHz
300 to 1000	Log Periodic Antenna	120 kHz

The final data was taken with a frequency span of 1 MHz, but the frequency span was reduced during the preliminary investigations as deemed necessary to distinguish between emissions from the EUT and any ambients.

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to CISPR 16: 1993. Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength).

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 10 meter test distance to obtain final test data. The final qualification data is located in Appendix E.

Test Results:

The EUT complies with the **Class B** limits of EN 55022: 1998 for radiated emissions.

7.2 Quasi-Stationary Harmonics Test

The HP 6843A Harmonic/Flicker test system was used as a measuring meter. The EUT was powered by the Harmonic/Flicker test system while all accessories were powered from a separate power source. The final data was collected under program control by the HP software running the Harmonic/Flicker test system.

Under software control, the Harmonic/Flicker test system conducted a preliminary test to determine if the current input of the EUT was within the "special wave shape" envelope for **Class A** and **Class D** equipment.

Per EN 61000-3-2: 2000, the "special wave shape" has been withdrawn. Only personal computers, personal computer monitor/displays, and televisions need to be tested to the Class D limits. Since the EUT could, depending on marketing, be classified as either Class A or Class D equipment, it was tested to both Class A and Class D limits for harmonic current emissions. All data collections and mathematical analysis were performed by the test system software. Please see Appendix E for details of the test equipment settings and measurement details.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was operated and configured as described in section 4.1 of this report. Photographs of the test equipment and EUT setup during the test are located in Appendix D.

Test Results:

The EUT complies with the relevant requirements of EN 61000-3-2: 2000. The unit meets the **Class A** and **Class D** limits for harmonic current emissions.

7.3 Limitation of Voltage Fluctuations and Flicker Test

The HP 6843A Harmonic/Flicker test system was used as a measuring meter. The EUT was powered by the Harmonic/Flicker test system while all accessories were powered from a separate power source.

All data collections and mathematical analysis were performed by the test system software. Please see Appendix E for details of the test equipment settings and measurement details.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was operated and configured as described in section 4.1 of this report. Photographs of the test equipment and EUT setup during the test are located in Appendix D.

Test Results:

The EUT complies with the relevant requirements of EN 61000-3-3: 1995. The unit meets the limits described in section 5 of EN 61000-3-3: 1995.

7.4 Electrostatic Discharge Tests

An ESD Generator was used for this test. The characteristics consist of an energy storage capacitor: 150 pF; discharge resistance: 330 Ohms; charging resistor: 100 Megaohms; tolerance of voltage indication: ±5%; polarity of output voltage: positive and negative. The waveshape conforms to EN 61000-4-2: 1995.

7.4.1 Direct ESD - Air Discharge

In the Air ESD test, the EUT was exposed to a direct air discharge at all user accessible insulated surfaces. The ESD arc was drawn directly to any insulated point on the EUT. The test simulated a situation in which any person or object carrying an electrostatic charge discharges it to any insulated point on the equipment. The ground strap of the ESD generator was connected to the earth ground (shield room ground reference plane) and was a minimum of 0.2 m away from the EUT.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in figure 3 in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are located in Appendix D. The data sheets are located in Appendix E.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. A distance of 1 meter was maintained between the EUT and the shield room walls or any other metallic surfaces. The test point locations were selected based on an exploratory test of inducing 20 discharges per second onto all surfaces of the unit. The test point locations selected for the final test are listed in the data sheets attached in Appendix E.

The test voltages were increased from ±2.0 kV to ±8.0 kV in increments, in order to eliminate errors related to the "window" effect associated with ESD testing. Also, testing in increments helps determine the voltage threshold without severely damaging the unit. The final test was performed with 10 single shot discharges on each selected point in each polarity. The rounded discharge probe was used for the test. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-2: 1995. The unit operates within the specifications for air discharge at ±2.0 kV, ±4.0 kV and ±8.0 kV (insulated surfaces).

7.4.2 Direct ESD - Contact Discharge

In the contact ESD test, the EUT was exposed to a direct contact discharge on all conductive user accessible surfaces. The ESD arc was drawn directly to any conductive point on the equipment under test. The test provides a repeatable method to determine immunity of the EUT to electrostatic discharges. The ground strap of the ESD generator was connected to the earth ground (shield room ground reference plane) and was a minimum of 0.2 m away from the EUT.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in figure 3 in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are located in Appendix D. The data sheets are located in Appendix E.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. A distance of 1 meter was maintained between the EUT and the shield room walls or any other metallic surfaces. The test point locations were selected based on the exploratory test of inducing 20 discharges per second onto all surfaces of the unit. The test point locations selected for the final test are listed in the data sheets attached in Appendix E.

The test voltages were ±2.0 kV and ±4.0 kV in order to eliminate errors related to the "window" effect associated with ESD testing. Also, testing in increments helps determine the threshold without severely damaging the unit. The final test was performed with single shot discharges on all the selected points.

The pointed discharge probe was touching the conductive surface of the unit before initiating the discharge. For painted surfaces, the sharp tip of the probe was used to penetrate the paint before providing discharge to the EUT. At least four test points were selected, with the EUT receiving a minimum of 200 total discharges, 100 in each polarity. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-2: 1995. The unit operates within the specifications for contact discharge at ±2.0 kV and ±4.0 kV (conductive surfaces).

7.4.3 Indirect Electrostatic Discharge Test - Vertical Coupling Plane

For indirect electrostatic discharges, the vertical coupling plane (0.5 m x 0.5 m) was tied to the ground reference plane through braid and a series of two 470 kΩ resistors one at each end of the braid.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in figure 3 in Appendix D of this report. Photographs of the test equipment and EUT setup are located in Appendix D. The data sheets are located in Appendix E.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. A distance of one meter was maintained between the EUT and the shield room walls or any other metallic structures. The ground strap of the ESD generator was connected to the earth ground (shield room ground reference plane) and was a minimum of 0.2 m away from the EUT. The coupling plane was placed 0.1 meters from each side of the EUT, and at a height close to the center of the EUT. The discharges were applied to the edge of the VCP. Twenty-five discharges were applied to the VCP at each test level in each polarity on each side of the unit. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-2: 1995. The unit operates within the specifications for indirect discharges to the VCP at ±2.0 kV and ±4.0 kV.

7.4.4 Indirect Electrostatic Discharge Test - Horizontal Coupling Plane

For indirect electric discharges the horizontal coupling plane (1.6 m x 0.8 m) was tied to the ground reference plane through braid and a series of two 470 kΩ resistors at each end of the braid.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in figure 3 in Appendix D of this report. Photographs of the test equipment and EUT setup are located in Appendix D. The data sheets are located in Appendix E.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. A distance of one meter was maintained between the EUT and the shield room walls or any other metallic structures. The ground strap of the ESD generator was connected to the earth ground (shield room ground reference plane) and was a minimum of 0.2 m away from the EUT. Ten discharges were applied to the top of the HCP at each test level in each polarity on each side of the unit. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relative requirements of EN 55024: 1998 as per the test procedures in EN 61000-4-2: 1995. The unit operates within the specifications for indirect discharges to the HCP ±2.0 kV and ±4.0 kV.

7.5 Radio-Frequency Electromagnetic Field

For this test, a broadband Combilog antenna was used to radiate the energy onto the EUT at a field strength of 3 volts per meter. The field uniformity was established by means of the Compatible Electronics E-Field Software Program prior to injecting modulation. The transmitting antenna was placed 3 meter away from the EUT.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in figure 4 in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are included in Appendix D. The data sheets are located in Appendix E.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. The RF energy was radiated using the Combilog antenna from 80 MHz to 1000 MHz. The signal was modulated at 80% with a 1 kHz sine wave. The field presence was confirmed using a field strength probe placed near the EUT. The test was performed by the E-Field Software Program.

Test Results:

The EUT complies with the relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-3: 1995. The unit operates within the specifications.

7.6 Electrical Fast Transient Tests

The test was performed as per EN 61000-4-4: 1995. The burst duration was 15 ms, with 300 ms burst period. The individual impulse had a 5 nS rise time and a 50 nS decay time and a 5 kHz frequency up to 2 kV, and a 2.5 kHz frequency above 2 kV. The ECAT Control Center was used for the test. Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The coupling device was placed 1 meter away from the EUT. The EUT was set up as shown in figure 5 in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are included in Appendix D. The data sheets are located in Appendix E.

7.6.1 Power Lines

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. The transient energy was injected onto the power line through the use of a coupling/decoupling network. Bursts of pulse trains were injected onto the power line, in both positive and negative polarities. The test levels were ±0.5 kV and ±1.0 kV. The test was run for one minute on each lead and each lead combination. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-4: 1995. The unit operates within specifications during and after bursts of transients of ±0.5 kV and ±1.0 kV on power lines.

7.6.2 Signal Lines

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. The transient energy was coupled from the ECAT Control Center to the signal lines through the use of the capacitive coupling clamp. The clamp meets the requirements of EN 61000- 4-4: 1995. The clamp was placed on the ground plane, and the signal lines were placed inside the clamp. Bursts of pulse trains were injected onto the signal lines, in both positive and negative polarities. The test level was ±0.5 kV. The test was run for two minutes on each cable. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-4: 1995. The unit operates within specifications during and after bursts of transients of ±0.5 kV on signal lines.

7.7 Surge Immunity Tests

The ECAT Control Center was used to provide the "Combination Wave" as specified in EN 61000-4-5: 1995 Voltage waveform for high impedance - Rise time to crest voltage: 1.2 uS approx. and, Decay: 50 uS to 50% of peak voltage value. Current waveform for low impedance - Rise time to crest voltage: 8.0 uS approx. and, Decay: 20 uS to 50% of peak current value. See Figure 6 in Appendix D for an example of the waveforms. The amplitude was gradually increased using the ECAT Control Center software, which was installed on the Hewlett Packard computer. As per EN 61000-4-5: 1995, the selection of the voltage or current waveform depends on impedance offered by the EUT. Surges were initiated line synced. One surge per polarity and voltage level was applied in common and differential mode to the EUT at 0, 90, 180, 270, and 0 degree phase angles. The surges were applied at a rate of 1 surge per minute. The unit was monitored for any degradation of performance. The AC test was conducted for differential mode at ±0.5 kV and ±1.0 kV and common mode at ±0.5, ±1.0 kV, and ±2.0 kV. All tests were run in both the positive and negative polarity for differential and common modes. Photographs of the test equipment and the EUT setup during the test are located in Appendix D. The data sheets are located in Appendix E.

Test Results:

The EUT complies with relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-5: 1995. The unit operates within specifications during and after surges of ±0.5 kV and ±1.0 kV differential mode, and ±0.5 kV, ±1.0 kV and ±2.0 kV common mode.

7.8 RF Common Mode Conducted Susceptibility

7.8.1 Power Lines

The EUT was operating as described in section 4.2 of this report. The EUT was setup as shown in figure 7 located in Appendix D. Prior to the start of the test, Coupling/ Decoupling Network (CDN) calibration measurements were performed as described in EN 61000-4-6: 1996. Also, a functional test was performed on the EUT to ensure proper operation. The power leads were tested using a Coupling/ Decoupling Network (CDN). The injected noise was 3 Vrms (unmodulated) for 0.15 MHz – 80 MHz. The signal was AM modulated with a 1 kHz sine wave at 80%. The noise was injected from 0.15 MHz to 80 MHz. The photograph of the test set up is shown in Appendix D. After completion of the test, a functional test was performed on the EUT to ensure proper operation. The data sheets are located in Appendix E.

Test Results:

The EUT complies with relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-6: 1996. The EUT operates within its specifications during exposure from 0.15 MHz - 80 MHz, 3 Vrms with a 1 kHz sine wave AM modulation at 80% on the power lines.

7.8.2 Signal Lines

The EUT was operating as described in section 4.2 of this report. The EUT was setup as shown in figure 7 located in Appendix D. Prior to the start of the test, clamp injection (RF current probe) calibration measurements were performed as described in EN 61000-4-6: 1996. Also, a functional test was performed on the EUT to ensure proper operation. The signal lines were tested using an RF current probe. The injected noise was 3 Vrms (unmodulated) for 0.15 MHz – 80 MHz. The signal was AM modulated with a 1 kHz sine wave at 80%. The noise was injected from 0.15 MHz to 80 MHz. The photograph of the test set up is shown in Appendix D. The data sheets are located in Appendix E. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-6: 1996. The EUT operates within its specifications during exposure from 0.15 MHz - 80 MHz, 3 Vrms with a 1 kHz sine wave AM modulation at 80% on the signal lines.

7.9 Power Frequency Magnetic Field Test

The EUT was operating as described in section 4.2 of this report. The EUT was setup as shown in figure 8 located in Appendix D. Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. By use of an induction coil, the EUT was exposed to a 1 A/m, 50 Hz magnetic field in all three orthogonal directions. The induction coil was moved along the sides of the EUT in order to detect particularly sensitive areas. The dimensions of the induction coil were adjusted for the size of the EUT in accordance with EN 61000-4-8: 1993. Prior to placing the EUT in the induction coil, the level of the field was verified through use of an Electromagnetic Field Survey Meter. The field was created by an Elgar AC Power Source, and was amplified by an audio isolation transformer. After completion of the test, a functional test was performed on the EUT to ensure proper operation. Photographs of the test setup are located in Appendix D of this report. The data sheets are located in Appendix E.

Test Results:

The EUT complies with relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-8: 1993. The unit operates within the specifications during and after the Power Frequency Magnetic Field Test.

7.10 AC Voltage Dips and Short Interruptions

The EMC Immunity Test System was used to dip and interrupt the AC power to the EUT. The L1, L2 and PE leads of the EUT were connected to the EMC Immunity Test System. The EUT was operational as described in section 4.2 of this report. The photograph of the test setup is shown in Appendix D. the data sheets are located in Appendix E.

Voltage dips of >95 % for 10 msec and 30 % for 500 msec were applied to the EUT 3 times with 10 sec intervals between dips. A power interruption of 100 % for 5000 msec (5 sec) was applied to the EUT 3 times with 60 second intervals between interruptions.

Test Results:

The EUT complies with relevant requirements of EN 55024: 1998 as per the test procedures described in EN 61000-4-11: 1994. The unit operates within the specifications during and after the Voltage Dips and Short Interruptions.

8. CONCLUSIONS

The Portable Computer Model: GM-II meets all of the **Class B** requirements of the European Standard EN 55022: 1998 – "Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement," the **Class A** and **Class D** limits of EN 61000-3-2: 2000 – Electromagnetic compatibility (EMC): "Part 3-2: Limits – Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)," EN 61000-3-3: 1995 – Electromagnetic Compatibility (EMC) – "Part 3: Limits – Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A," and EN 55024: 1998 - "Information technology equipment – Immunity characteristics – Limits and methods of measurement."

APPENDIX A

LABORATORY RECOGNITIONS

LABORATORY RECOGNITIONS

Compatible Electronics has the following agency accreditations:

National Voluntary Laboratory Accreditation Program - Lab Code: 200063-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Compatible Electronics is recognized or on file with the following agencies:

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)

Technology International (Europe) Ltd.

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass EN 55022: 1998 or EN 55024: 1998 specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT during the testing.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST	Portable Computer Model: GM-II S/N: N/A

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

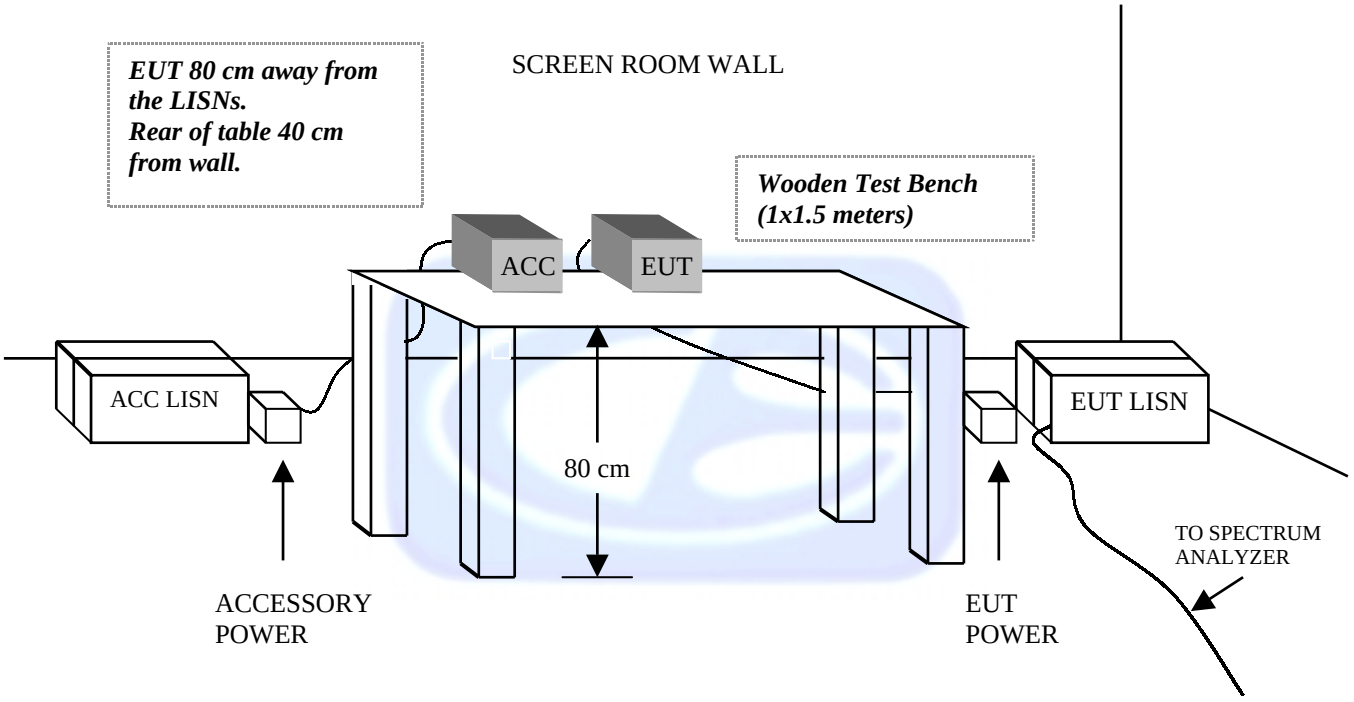


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED TEST SITE

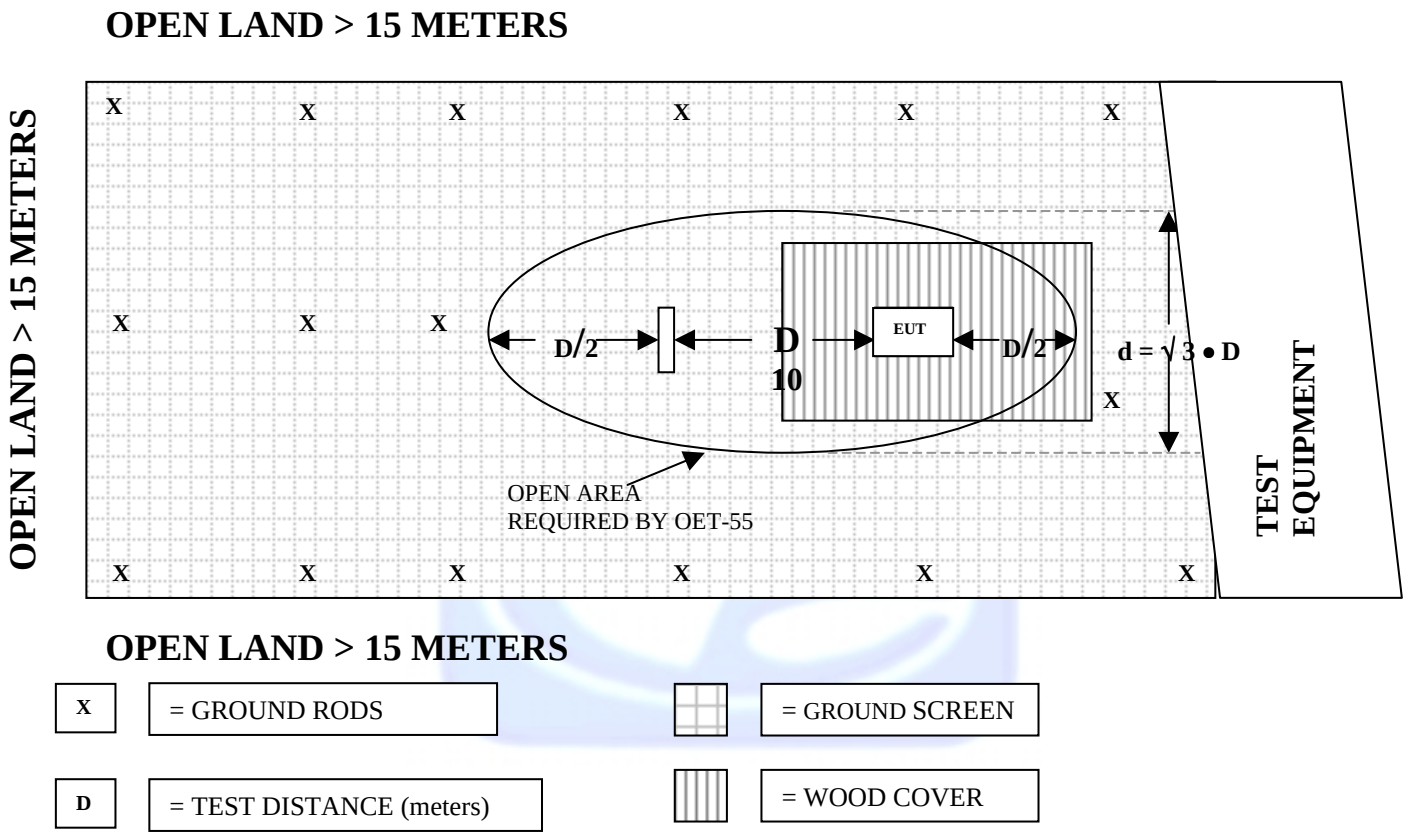


FIGURE 3: ELECTROSTATIC DISCHARGE TEST SETUP

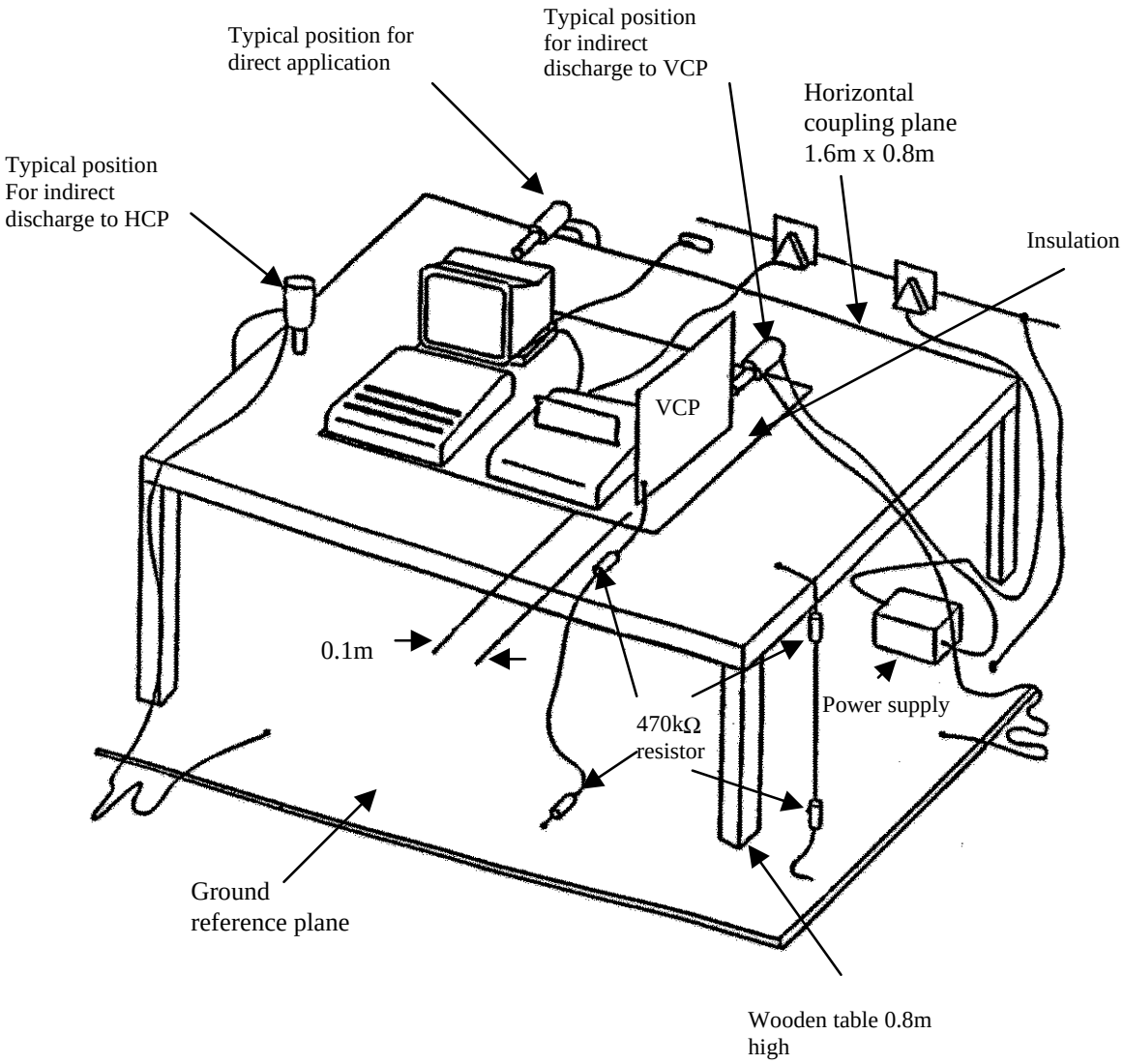


FIGURE 4: RADIO-FREQUENCY ELECTROMAGNETIC FIELD TEST SETUP

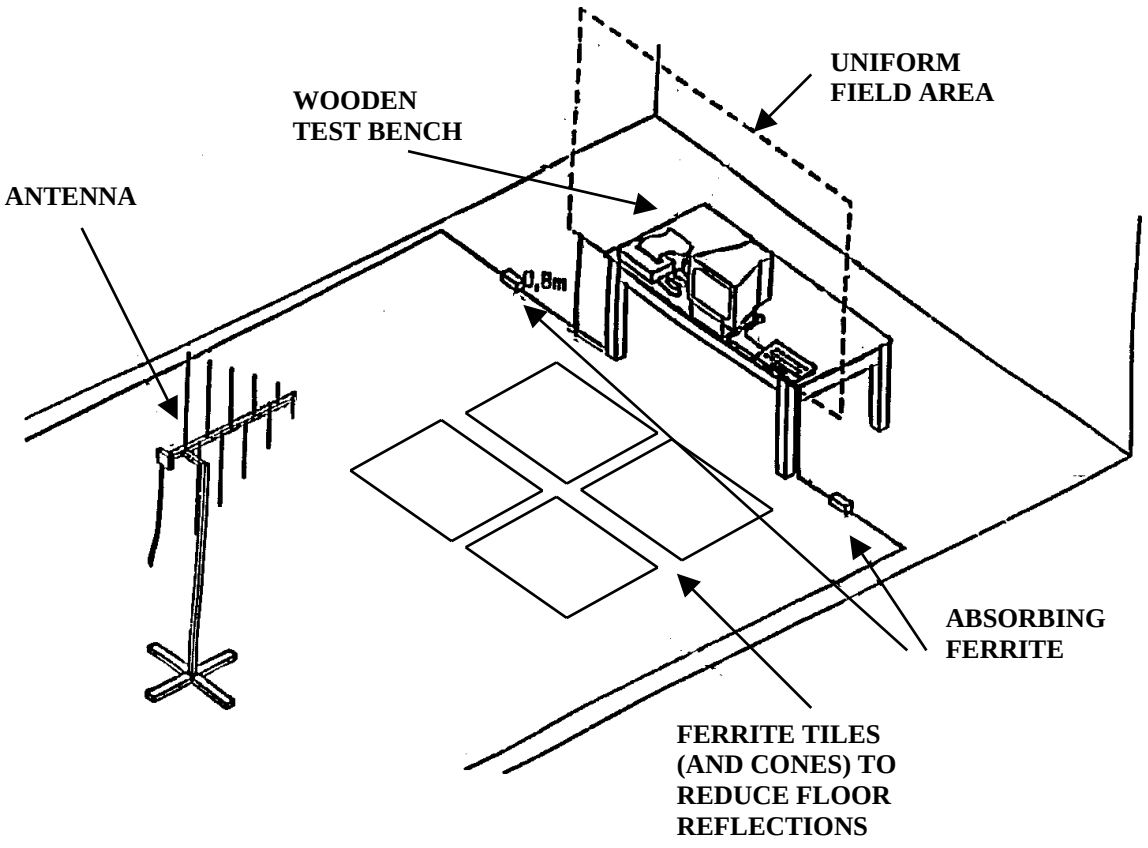


FIGURE 5: FAST TRANSIENTS COMMON MODE TEST SETUP

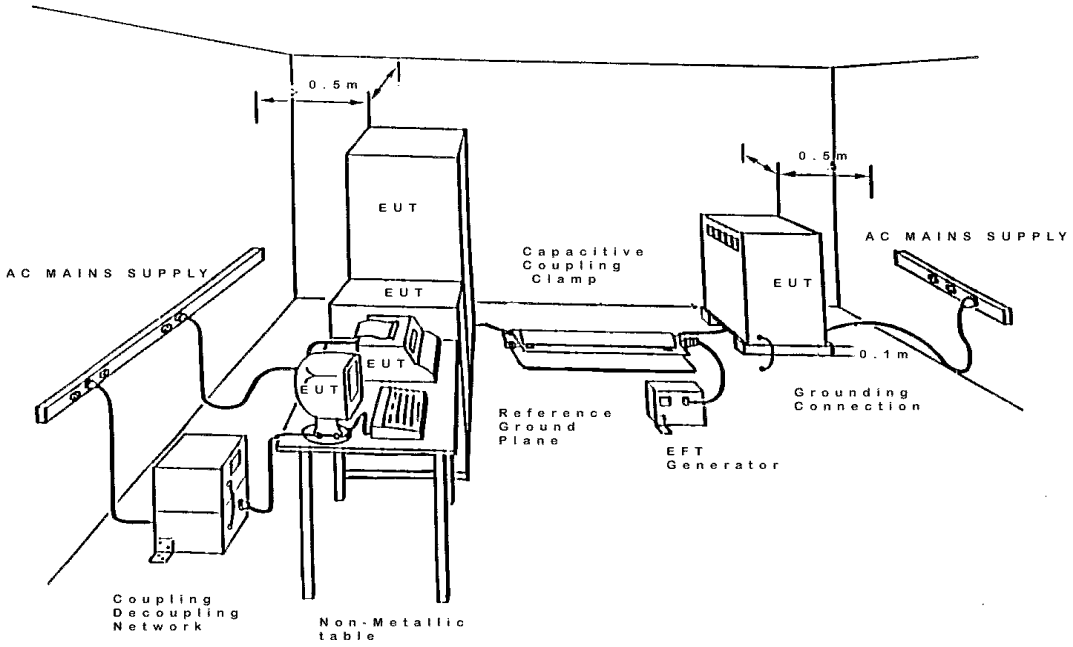


FIGURE 6: FAST SURGES COMMON AND DIFFERENTIAL MODE WAVEFORMS

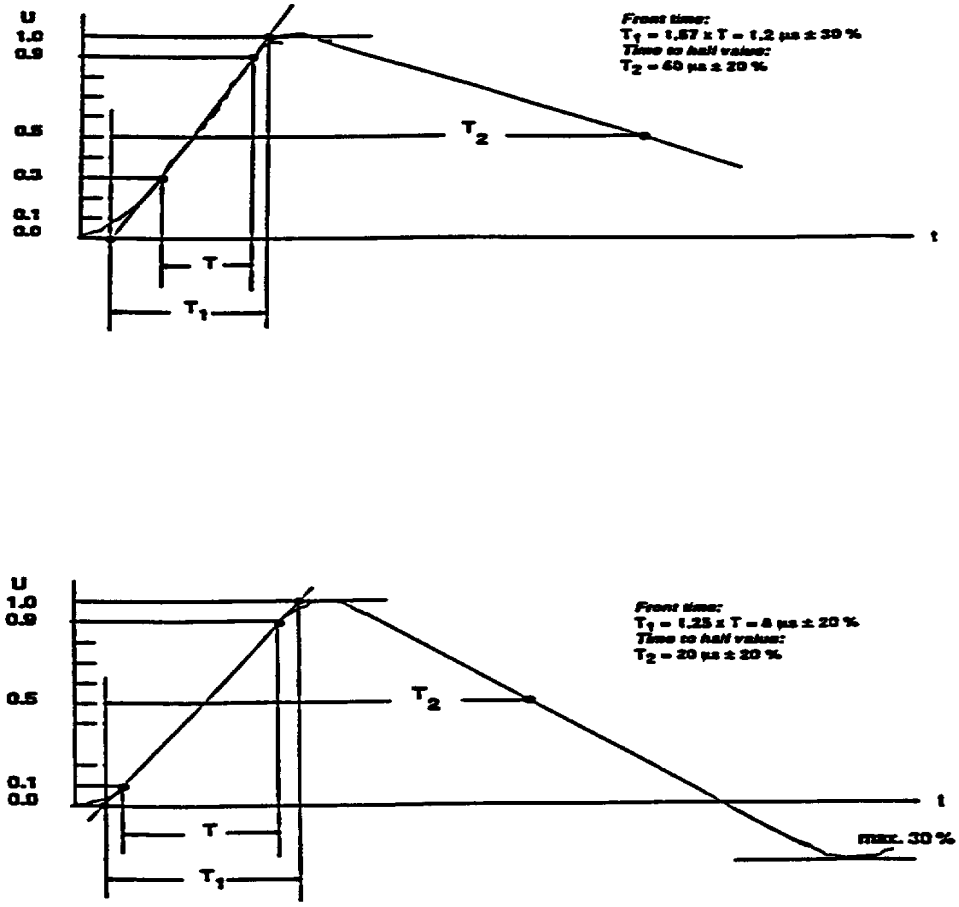
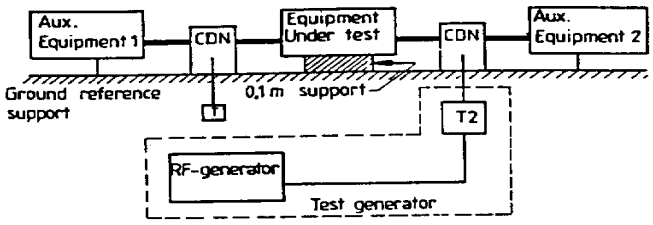


FIGURE 7: RF COMMON MODE CONDUCTED SUSCEPTIBILITY TEST SETUP



T = 50 Ω terminator, T2 = Power attenuator (≥ 6 dB),
CDN = coupling and decoupling network

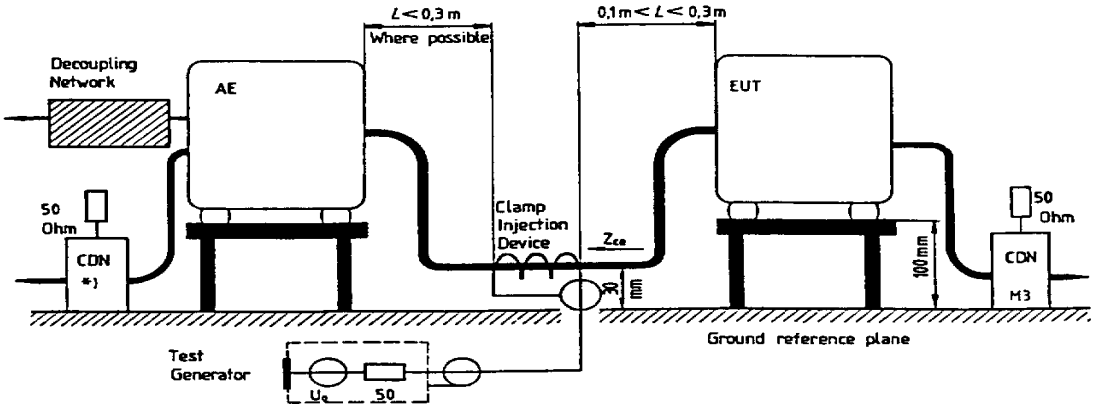
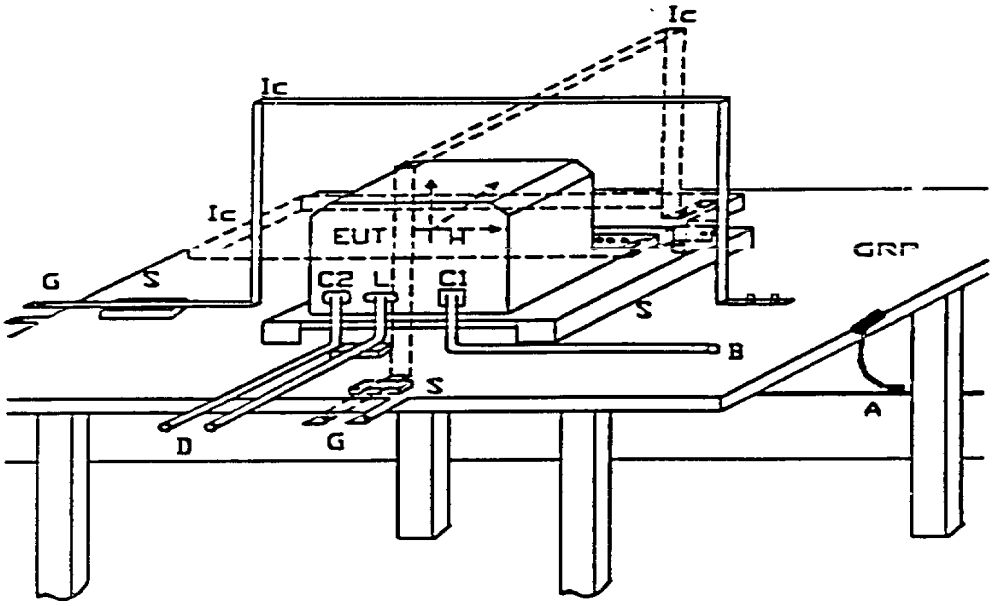


FIGURE 8: POWER FREQUENCY MAGNETIC FIELD TEST SETUP



COM-POWER AB-900

BICONICAL ANTENNA

S/N: 15011

CALIBRATION DATE: JULY 9, 2001

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	11.20	120	13.40
35	10.80	125	12.50
40	12.20	140	11.80
45	11.00	150	11.70
50	10.90	160	12.90
60	10.90	175	14.80
70	7.90	180	16.10
80	6.30	200	16.10
90	9.00	250	15.60
100	11.50	300	18.60

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 1012

CALIBRATION DATE: JULY 9, 2001

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	15.70	700	23.50
400	13.20	800	22.70
500	16.20	900	23.20
600	18.60	1000	25.30

COM-POWER PA-102

PREAMPLIFIER

S/N: 1202

CALIBRATION DATE: OCTOBER 17, 2001

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	35.8	300	35.7
40	36.0	350	35.4
50	36.1	400	35.5
60	36.0	450	35.4
70	35.9	500	34.9
80	35.5	550	35.4
90	35.4	600	35.1
100	36.0	650	35.3
125	36.0	700	34.6
150	35.8	750	34.8
175	35.5	800	34.5
200	35.7	850	34.9
225	35.9	900	33.8
250	35.6	950	33.4
275	35.5	1000	34.5

FRONT VIEW

ACME PORTABLE MACHINES, INC.
PORTABLE COMPUTER
Model: GM-II
EN 55022 CLASS B - RADIATED EMISSIONS – 11-19-01

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

ACME PORTABLE MACHINES, INC.
PORTABLE COMPUTER
Model: GM-II
EN 55022 CLASS B - RADIATED EMISSIONS – 11-19-01

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

ACME PORTABLE MACHINES, INC.
PORTABLE COMPUTER
Model: GM-II
EN 55022 CLASS B - CONDUCTED EMISSIONS – 11-19-01

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

ACME PORTABLE MACHINES, INC.
PORTABLE COMPUTER
Model: GM-II
EN 55022 CLASS B - CONDUCTED EMISSIONS – 11-19-01

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

HARMONIC AND FLICKER

COMPANY:	ACME PORTABLE MACHINES, INC..	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A

PHOTOGRAPH OF THE TEST SETUP FOR
HARMONIC AND FLICKER TEST

ELECTROSTATIC DISCHARGE

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A

PHOTOGRAPH OF THE TEST SETUP FOR
DIRECT ELECTROSTATIC DISCHARGE TEST
(AIR DISCHARGE)

ELECTROSTATIC DISCHARGE

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A

PHOTOGRAPH OF THE TEST SETUP FOR
DIRECT ELECTROSTATIC DISCHARGE TEST
(CONTACT DISCHARGE)

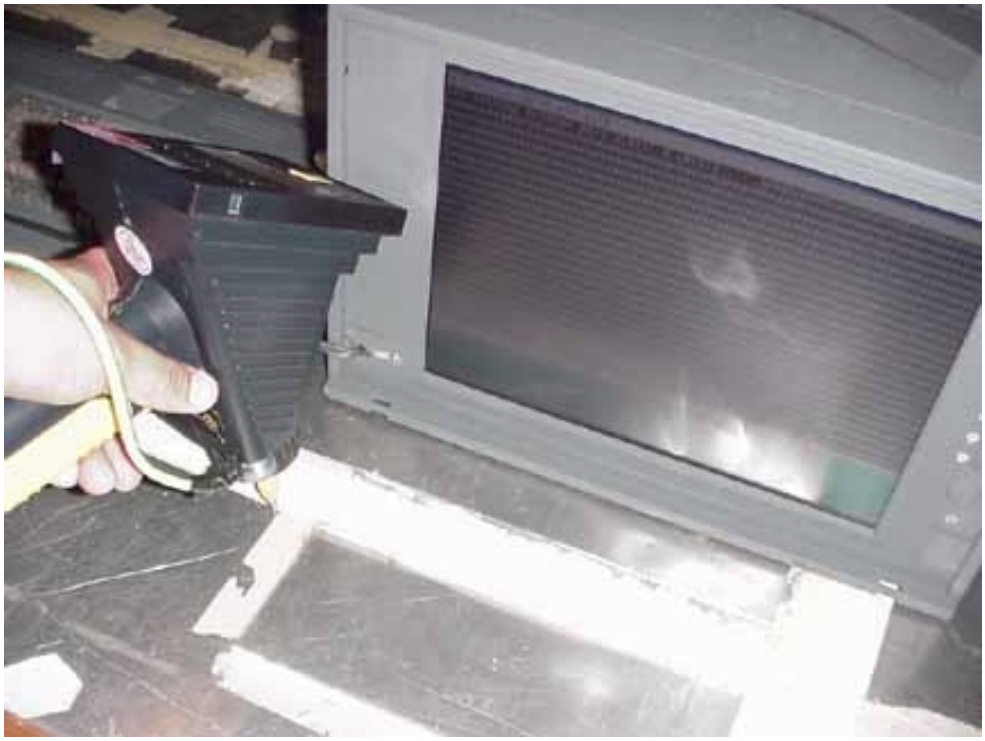
ELECTROSTATIC DISCHARGE

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A

PHOTOGRAPH OF THE TEST SETUP FOR
INDIRECT ELECTROSTATIC DISCHARGE TEST
(VERTICAL COUPLING PLANE)

ELECTROSTATIC DISCHARGE

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A



PHOTOGRAPH OF THE TEST SETUP FOR
INDIRECT ELECTROSTATIC DISCHARGE TEST
(HORIZONTAL COUPLING PLANE)

RADIO-FREQUENCY ELECTROMAGNETIC FIELD

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-20-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A

PHOTOGRAPH OF THE TEST SETUP FOR
RADIO-FREQUENCY ELECTROMAGNETIC FIELDS TEST

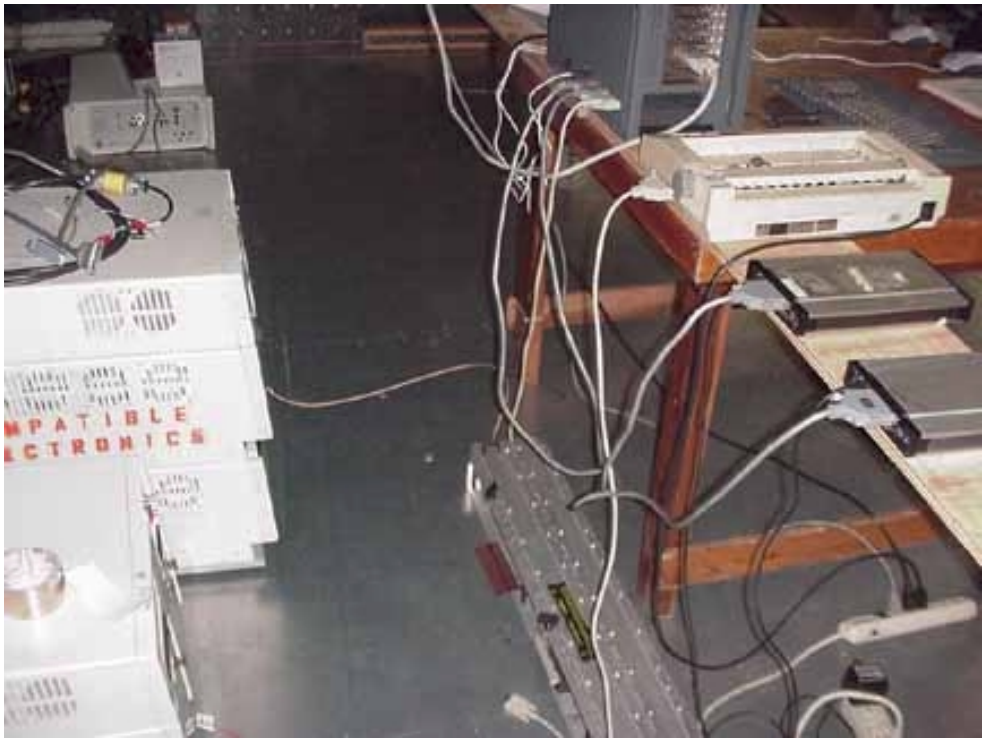
FAST TRANSIENTS

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A

PHOTOGRAPH OF THE TEST SETUP FOR
FAST TRANSIENT COMMON MODE TEST
(POWER LINES)

FAST TRANSIENTS

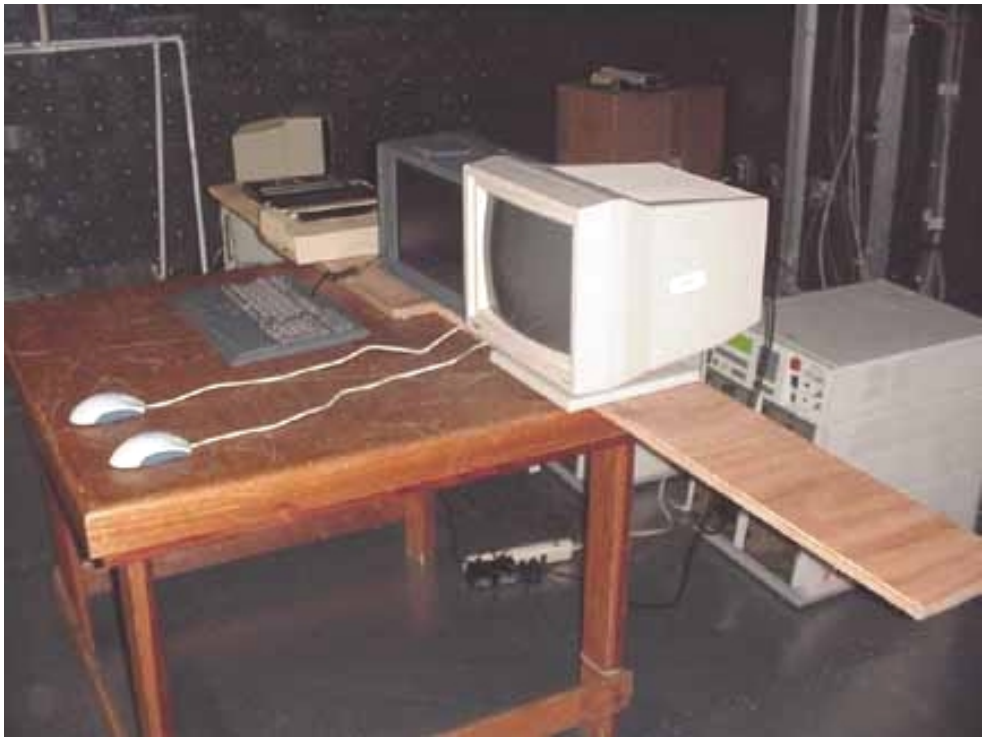
COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-20-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A



PHOTOGRAPH OF THE TEST SETUP FOR
FAST TRANSIENT COMMON MODE TEST
(SIGNAL LINES)

FAST SURGES

COMPANY:	ACME PORTABLE MACHINES, INC..	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A



PHOTOGRAPH OF THE TEST SETUP FOR
FAST SURGES
(COMMON AND DIFFERENTIAL MODE)

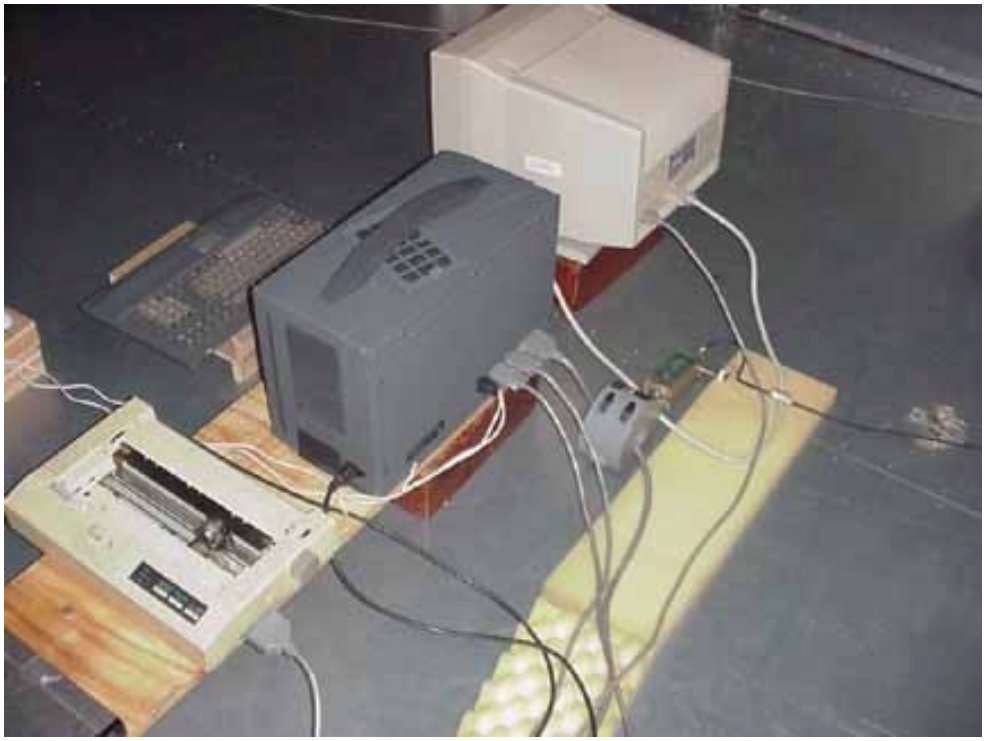
RF COMMON MODE CONDUCTED SUSCEPTIBILITY TEST

COMPANY:	ACME PORTABLE MACHINES, INC..	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A

PHOTOGRAPH OF THE TEST SETUP FOR
RF COMMON MODE CONDUCTED SUSCEPTIBILITY TEST
(POWER LINES)

RF COMMON MODE CONDUCTED SUSCEPTIBILITY TEST

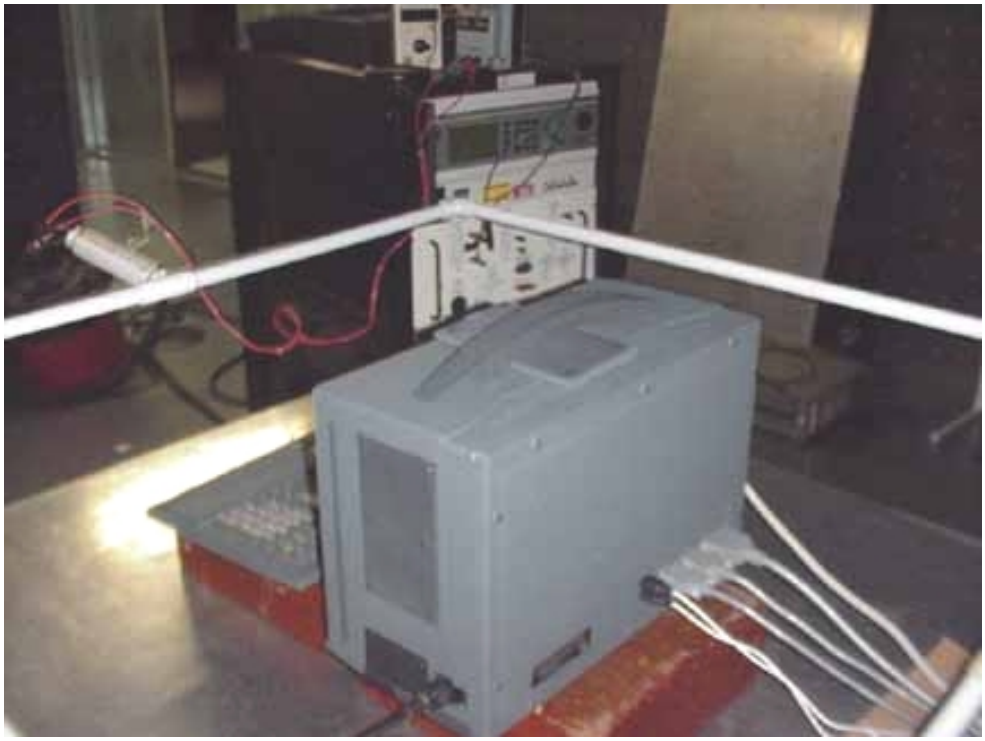
COMPANY:	ACME PORTABLE MACHINES, INC..	**DATE:**	11-20-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A



PHOTOGRAPH OF THE TEST SETUP FOR
RF COMMON MODE CONDUCTED SUSCEPTIBILITY TEST
(SIGNAL LINES)

POWER FREQUENCY MAGNETIC FIELD

COMPANY:	ACME PORTABLE MACHINES, INC..	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A



PHOTOGRAPH OF THE TEST SETUP FOR
POWER FREQUENCY MAGNETIC FIELD TEST

AC VOLTAGE DIPS AND INTERRUPTIONS

COMPANY:	ACME PORTABLE MACHINES, INC..	**DATE:**	11-21-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	JAMES ROSS
MODEL:	GM-II	**S/N:**	N/A

PHOTOGRAPH OF THE TEST SETUP FOR
VOLTAGE DIPS AND INTERRUPTIONS SUSCEPTIBILITY

APPENDIX E

DATA SHEETS

ELECTROSTATIC DISCHARGE

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A
TEST PROC.: SPEC.:	EN 61000-4-2: 1995 EN 55024: 1998	**AIR TEMPERATURE:**	22 ° C
LEVEL:	±2.0 kV, ±4.0 kV and ±8.0 kV Direct Air Discharge	**BAROMETRIC PRESSURE:**	102.3 kPa
PERFORMANCE CRITERIA:	B	**RELATIVE HUMIDITY:**	50 %

TEST POINT	TEST POINT DESCRIPTION	TEST POINT	TEST POINT DESCRIPTION
1	Top right corner of display	2	Bottom left corner of display
3	Center of rubber insert on left side	4	Center of rubber insert on right side
5	Eject button under CDROM	6	Bottom center portion of 3.5 disk border

TEST POINTS	LEVEL (kV)	DISCHARGES PER POLARITY	NO. OF FAILURES	COMMENTS
1 – 6	±2.0	10	0	No discharges
1 – 6	±4.0	10	0	“
1 – 6	±8.0	10	0	No susceptibility

ELECTROSTATIC DISCHARGE

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A
TEST PROC.: SPEC.:	EN 61000-4-2: 1995 EN 55024: 1998	**AIR TEMPERATURE:**	22 ° C
LEVEL:	±2.0 kV and ±4.0 kV Direct and Indirect Contact Discharges	**BAROMETRIC PRESSURE:**	102.3 kPa
PERFORMANCE CRITERIA:	B	**RELATIVE HUMIDITY:**	50 %

TEST POINT	TEST POINT DESCRIPTION	TEST POINT	TEST POINT DESCRIPTION
1	External monitor connector screw	2	Connector screw of serial port #1
3	Top center screw of rear panel	4	Bottom left screw of rear panel
5	Top right screw of rear panel	6	Top right screw of large grill on left side
7	Bottom left screw of small grill on right side	8	Top right screw of small grill on right side

TEST POINTS	LEVEL (kV)	DISCHARGES PER POLARITY	NO. OF FAILURES	COMMENTS
1 – 8	±2.0	25	0	No susceptibility
"	±4.0	25	0	"
Vertical	±2.0	25	0	No susceptibility
Coupling Plane	±4.0	25	0	"
Horizontal	±2.0	25	0	No susceptibility
Coupling Plane	±4.0	25	0	"

RADIO-FREQUENCY ELECTROMAGNETIC FIELD

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-20-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A
SPEC.: **TEST PROC.:**	EN 61000-4-3: 1995 EN 55024: 1998	**AIR TEMPERATURE:**	22 ° C
LEVEL:	3 V/m, 1 kHz AM sine wave at 80%.	**BAROMETRIC PRESSURE:**	102.6 kPa
PERFORMANCE CRITERIA:	A	**RELATIVE HUMIDITY:**	52 %

FOUR SIDES OF THE EUT WERE EXPOSED TO THE FIELD

FREQ. RANGE (MHz)	POLAR-. IZATION	RESULT	THRESHOLD (V/m)	COMMENTS
80 - 1000	Horizontal	Passed	> 3.0 V/m	No Susceptibility
80 - 1000	Vertical	Passed	> 3.0 V/m	No Susceptibility

FAST TRANSIENTS

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A
TEST PROC.: SPEC.:	EN 61000-4-4: 1995 EN 55024: 1998	**AIR TEMPERATURE:**	21 ° C
LEVEL:	±0.5 kV and ±1.0 kV on Power Lines	**BAROMETRIC PRESSURE:**	102.3 kPa
PERFORMANCE CRITERIA:	B	**RELATIVE HUMIDITY:**	50 %

AC ENTRY DESIGNATION	LEVEL (kV)	RESULT	COMMENTS
L1	±0.5 and ±1.0	Passed	No susceptibility
L2	±0.5 and ±1.0	Passed	No susceptibility
PE	±0.5 and ±1.0	Passed	No susceptibility
L1 to PE	±0.5 and ±1.0	Passed	No susceptibility
		“	“
L2 to PE	±0.5 and ±1.0	Passed	No susceptibility
	“	“	“
L1 & L2 to PE	±0.5 and ±1.0	Passed	No susceptibility
L1 to L2	±0.5 and ±1.0	Passed	No susceptibility

FAST TRANSIENTS

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-20-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A
TEST PROC.: SPEC.:	EN 61000-4-4: 1995 EN 55024: 1998	**AIR TEMPERATURE:**	22 ° C
LEVEL:	±0.5 kV Data Lines	**BAROMETRIC PRESSURE:**	102.6 kPa
PERFORMANCE CRITERIA:	B	**RELATIVE HUMIDITY:**	54 %

PORT DESCRIPTION	LEVEL (kV)	RESULT	COMMENTS
PARALLEL	± 0.5	Passed	No susceptibility
SERIAL 1	± 0.5	Passed	“
SERIAL 2	± 0.5	Passed	“

FAST SURGES

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A
TEST PROC.: SPEC.:	EN 61000-4-5: 1995 EN 55024: 1998	**AIR TEMPERATURE:**	21 ° C
LEVEL:	±0.5 kV and ±1.0 kV Differential Mode and ±0.5 kV, ±1.0 kV and ±2.0 kV Common Mode	**BAROMETRIC PRESSURE:**	102.3 kPa
PERFORMANCE CRITERIA:	B	**RELATIVE HUMIDITY:**	50 %

AC ENTRY DESIGNATION	LEVEL (kV)	Phase Angles	RESULT	COMMENTS
L1 to PE	± 0.5	0^o 90^o 180^o 270^o 0^o	Passed	No susceptibility
L1 to PE	± 1.0	0^o 90^o 180^o 270^o 0^o	Passed	“
L1 to PE	± 2.0	0^o 90^o 180^o 270^o 0^o	Passed	“
L2 to PE	± 0.5	0^o 90^o 180^o 270^o 0^o	Passed	No susceptibility
L2 to PE	± 1.0	0^o 90^o 180^o 270^o 0^o	Passed	“
L2 to PE	± 2.0	0^o 90^o 180^o 270^o 0^o	Passed	“
L1 to L2	± 0.5	0^o 90^o 180^o 270^o 0^o	Passed	No susceptibility
L1 to L2	± 1.0	0^o 90^o 180^o 270^o 0^o	Passed	“

RF COMMON MODE CONDUCTED SUSCEPTIBILITY TEST

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01 and 11-20-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A
TEST PROC.: SPEC.:	EN 61000-4-6: 1996 EN 55024: 1998	**AIR TEMPERATURE:**	22 ° C and 22 ° C
LEVEL:	0.15 MHz – 80 MHz, 3 Vrms with a 1 kHz sine wave Amplitude Modulated to a depth of 80%.	**BAROMETRIC PRESSURE:**	102.3 kPa and 102.6 kPa
PERFORMANCE CRITERIA:	A	**RELATIVE HUMIDITY:**	50 % and 54 %

FREQ. RANGE (MHz)	PORT	LEVEL (Vrms)	RESULT	COMMENTS
0.15-80	AC INPUT	3	Passed	No susceptibility
0.15-80	PARALLEL	3	Passed	“
0.15-80	SERIAL 1	3	Passed	“
0.15-80	SERIAL 2	3	Passed	“

POWER FREQUENCY MAGNETIC FIELD TEST

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-19-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	BENIGNO CHAVEZ
MODEL:	GM-II	**S/N:**	N/A
TEST PROC.: SPEC.:	EN 61000-4-8: 1993 EN 55024: 1998	**AIR TEMPERATURE:**	22 ° C
LEVEL:	1 A/m @ 50 Hz	**BAROMETRIC PRESSURE:**	102.3 kPa
PERFORMANCE CRITERIA:	A	**RELATIVE HUMIDITY:**	50 %

AXIS	LEVEL	DURATION (Seconds)	COMMENTS
X	1 A/m	120	No susceptibility
Y	1 A/m	120	“
Z	1 A/m	120	“

AC VOLTAGE DIPS AND INTERRUPTIONS

COMPANY:	ACME PORTABLE MACHINES, INC.	**DATE:**	11-21-01
EUT:	PORTABLE COMPUTER	**ENGINEER:**	JAMES ROSS
MODEL:	GM-II	**S/N:**	N/A
TEST PROC.: SPEC.:	EN 61000-4-11: 1994 EN 55024: 1998	**AIR TEMPERATURE:**	20 ° C
LEVEL:	See data below	**BAROMETRIC PRESSURE:**	102.4 kPa
PERFORMANCE CRITERIA:	B (100 % reduction for 10 ms), C (30 % reduction for 500 ms and 100 % reduction for 5 seconds)	**RELATIVE HUMIDITY:**	53 %

	VOLTAGE DIPS		**DIP APPLICATION**				
START VOLTAGE	% REDUCTION	DURATION (ms)	# OF DIPS	VOLTAGE SHIFT AT (degrees)	INTERVAL BETWEEN DIPS	PERFORMANCE CRITERIA	COMMENTS
230 V	100	10	3	0	10 sec	B	No susceptibility
230 V	30	500	3	0	10 sec	C	“

	VOLTAGE INTERRUPTIONS		**INTERRUPTION APPLICATION**				
START VOLTAGE	% REDUCTION	DURATION (s)	# OF INTERRUPTIONS	VOLTAGE SHIFT AT (degrees)	INTERVAL BETWEEN DIPS	PERFORMANCE CRITERIA	COMMENTS
230 V	100 open circuit	5	3	0	60 sec	C	Pass, The EUT shut off during the interruption, but was able to go back to normal operation with some user intervention.
230 V	100 short circuit	5	3	0	60 sec	C	

IEC 1000-3-2/EN 61000-3-2 Quasi-stationary Current Harmonics Test E11
Date Performed: 11/19/01

Test Executed By: Benigno Chavez
Company Name: ACME Portable Machines, Inc.
Test Description: Portable Computer
Device Under Test ID: M/N: GM-II
Test ID: N/A

Approved by: Scott McCutchan

Final Test Result: PASS

Settings and Test Conditions Compliant to the Standard: Yes

Test Equipment Used:

HP 6843A Harmonic/Flicker Test System with serial number:
HFTS Software Version: A.05.01
Date Last Calibrated:

Test Equipment Settings:

Line Voltage: 230.00 V	Current Measurement Range: High
Line Frequency: 50 Hz	Measurement Window Type: Rectangular
Device Class: A	Measurement Delay: 10 seconds
RMS Current Limit: 16.2 A	Quasi-stationary Test Duration: 15.00 minutes
Peak Current Limit: 0.0 A	Class Determination Pre-test Duration: 10.00 seconds
Number of Records: 2812	

Overrides:
Test Limit Source (Power Measurements/Statistics): N/A
Power Overrides: N/A
Test Limit Overrides: None

Pre-test Results for Class Determination:

Percent in Envelope: 68.0% Voltage THD Out-of-Specification?: No
Class D Equipment?: No Fundamental Current: 0.326 A

RMS Voltage: 230.0 V	RMS Current: 0.3 A	Real Power: 67.2 W
Frequency: 50.0 Hz	Peak Current: 0.5 A	Apparent Power: 76.0 VA
Voltage THD: 0.12%	Current THD: 15.38%	Power Factor: 0.885
Maximum Power: 71.1 W	Mean Power: 67.2 W	

Active Power Statistics:

100th Percentile: 71.1 W	99th Percentile: 68.6 W	95th Percentile: 68.6
90th Percentile: 68.6 W	50th Percentile: 66.6 W	

Total Number of Failures:	Total Number of Errors:
None	None

Pre-Test Source Voltage Harmonics Data: E12

Harmonic Number	Limit (%)	Limit (Volts)	Max (%)	Max (Volts)
Fund.			100.0	230.010
2	0.20	0.460	0.013	0.030
3	0.90	2.070	0.111	0.256
4	0.20	0.460	0.006	0.014
5	0.40	0.920	0.020	0.045
6	0.20	0.460	0.003	0.007
7	0.30	0.690	0.007	0.016
8	0.20	0.460	0.001	0.003
9	0.20	0.460	0.006	0.014
10	0.20	0.460	0.004	0.009
11	0.10	0.230	0.005	0.012
12	0.10	0.230	0.005	0.012
13	0.10	0.230	0.003	0.007
14	0.10	0.230	0.006	0.015
15	0.10	0.230	0.004	0.009
16	0.10	0.230	0.005	0.011
17	0.10	0.230	0.003	0.006
18	0.10	0.230	0.002	0.005
19	0.10	0.230	0.004	0.008
20	0.10	0.230	0.003	0.006
21	0.10	0.230	0.003	0.007
22	0.10	0.230	0.002	0.005
23	0.10	0.230	0.004	0.008
24	0.10	0.230	0.002	0.005
25	0.10	0.230	0.003	0.006
26	0.10	0.230	0.002	0.004
27	0.10	0.230	0.003	0.006
28	0.10	0.230	0.002	0.006
29	0.10	0.230	0.004	0.010
30	0.10	0.230	0.003	0.008
31	0.10	0.230	0.005	0.011
32	0.10	0.230	0.003	0.006
33	0.10	0.230	0.004	0.008
34	0.10	0.230	0.003	0.007
35	0.10	0.230	0.003	0.007
36	0.10	0.230	0.002	0.005
37	0.10	0.230	0.004	0.010
38	0.10	0.230	0.002	0.004
39	0.10	0.230	0.003	0.007
40	0.10	0.230	0.003	0.007

Final Test Data: E13

Harmonic Number	Standard Limit (A rms)	Maximum Value (A rms)	Maximum Value (% Limit)	Mean Value (A rms)	Mean Value (% Limit)	Standard Deviation (A rms)	Standard Deviation (% Limit)	Pass (P) or Fail (F)
Fund.		0.3431		0.3255		0.0055		
2	1.0800	0.0010	0.1	0.0006	0.1	0.0001	0.0	P
3	2.3000	0.0462	2.0	0.0448	1.9	0.0004	0.0	P
4	0.4300	0.0008	0.2	0.0006	0.1	0.0001	0.0	P
5	1.1400	0.0096	0.8	0.0085	0.7	0.0004	0.0	P
6	0.3000	0.0007	0.2	0.0005	0.2	0.0001	0.0	P
7	0.7700	0.0094	1.2	0.0090	1.2	0.0003	0.0	P
8	0.2300	0.0007	0.3	0.0005	0.2	0.0001	0.0	P
9	0.4000	0.0095	2.4	0.0092	2.3	0.0001	0.0	P
10	0.1840	0.0007	0.4	0.0006	0.3	0.0000	0.0	P
11	0.3300	0.0091	2.8	0.0089	2.7	0.0001	0.0	P
12	0.1533	0.0008	0.5	0.0005	0.3	0.0001	0.1	P
13	0.2100	0.0065	3.1	0.0048	2.3	0.0006	0.3	P
14	0.1314	0.0007	0.5	0.0005	0.4	0.0000	0.0	P
15	0.1500	0.0032	2.1	0.0028	1.9	0.0002	0.1	P
16	0.1150	0.0007	0.6	0.0005	0.5	0.0000	0.0	P
17	0.1324	0.0038	2.9	0.0037	2.8	0.0000	0.0	P
18	0.1022	0.0006	0.6	0.0004	0.4	0.0000	0.0	P
19	0.1184	0.0038	3.2	0.0036	3.0	0.0001	0.1	P
20	0.0920	0.0006	0.7	0.0005	0.5	0.0000	0.0	P
21	0.1071	0.0038	3.6	0.0036	3.4	0.0000	0.0	P
22	0.0836	0.0006	0.7	0.0005	0.5	0.0000	0.0	P
23	0.0978	0.0051	5.3	0.0048	5.0	0.0003	0.3	P
24	0.0767	0.0006	0.8	0.0004	0.6	0.0001	0.1	P
25	0.0900	0.0033	3.7	0.0013	1.5	0.0006	0.7	P
26	0.0708	0.0006	0.8	0.0004	0.6	0.0000	0.1	P
27	0.0833	0.0020	2.4	0.0016	1.9	0.0004	0.5	P
28	0.0657	0.0005	0.8	0.0004	0.6	0.0000	0.1	P
29	0.0776	0.0036	4.6	0.0031	4.1	0.0001	0.1	P
30	0.0613	0.0006	0.9	0.0004	0.6	0.0001	0.1	P
31	0.0726	0.0027	3.7	0.0022	3.0	0.0001	0.2	P
32	0.0575	0.0005	0.8	0.0003	0.6	0.0000	0.1	P
33	0.0682	0.0028	4.1	0.0026	3.9	0.0001	0.1	P
34	0.0541	0.0005	0.9	0.0004	0.7	0.0000	0.1	P
35	0.0643	0.0026	4.1	0.0025	3.9	0.0001	0.1	P
36	0.0511	0.0005	0.9	0.0003	0.6	0.0001	0.1	P
37	0.0608	0.0024	4.0	0.0022	3.7	0.0001	0.1	P
38	0.0484	0.0004	0.8	0.0002	0.5	0.0000	0.1	P
39	0.0577	0.0021	3.6	0.0019	3.2	0.0001	0.2	P
40	0.0460	0.0004	1.0	0.0003	0.6	0.0001	0.1	P

Final Test Statistics: E14

Harmonic Number	Standard Limit (A rms)	Maximum Value (A rms)	Maximum Value (% Limit)	>50% of Limit (Count)	>75% of Limit (Count)	>90% of Limit (Count)	>95% of Limit (Count)	>100% of Limit (Count)	Pass(P) or Fail(F)
Fund.		0.3431							
2	1.0800	0.0010	0.1	0	0	0	0	0	P
3	2.3000	0.0462	2.0	0	0	0	0	0	P
4	0.4300	0.0008	0.2	0	0	0	0	0	P
5	1.1400	0.0096	0.8	0	0	0	0	0	P
6	0.3000	0.0007	0.2	0	0	0	0	0	P
7	0.7700	0.0094	1.2	0	0	0	0	0	P
8	0.2300	0.0007	0.3	0	0	0	0	0	P
9	0.4000	0.0095	2.4	0	0	0	0	0	P
10	0.1840	0.0007	0.4	0	0	0	0	0	P
11	0.3300	0.0091	2.8	0	0	0	0	0	P
12	0.1533	0.0008	0.5	0	0	0	0	0	P
13	0.2100	0.0065	3.1	0	0	0	0	0	P
14	0.1314	0.0007	0.5	0	0	0	0	0	P
15	0.1500	0.0032	2.1	0	0	0	0	0	P
16	0.1150	0.0007	0.6	0	0	0	0	0	P
17	0.1324	0.0038	2.9	0	0	0	0	0	P
18	0.1022	0.0006	0.6	0	0	0	0	0	P
19	0.1184	0.0038	3.2	0	0	0	0	0	P
20	0.0920	0.0006	0.7	0	0	0	0	0	P
21	0.1071	0.0038	3.6	0	0	0	0	0	P
22	0.0836	0.0006	0.7	0	0	0	0	0	P
23	0.0978	0.0051	5.3	0	0	0	0	0	P
24	0.0767	0.0006	0.8	0	0	0	0	0	P
25	0.0900	0.0033	3.7	0	0	0	0	0	P
26	0.0708	0.0006	0.8	0	0	0	0	0	P
27	0.0833	0.0020	2.4	0	0	0	0	0	P
28	0.0657	0.0005	0.8	0	0	0	0	0	P
29	0.0776	0.0036	4.6	0	0	0	0	0	P
30	0.0613	0.0006	0.9	0	0	0	0	0	P
31	0.0726	0.0027	3.7	0	0	0	0	0	P
32	0.0575	0.0005	0.8	0	0	0	0	0	P
33	0.0682	0.0028	4.1	0	0	0	0	0	P
34	0.0541	0.0005	0.9	0	0	0	0	0	P
35	0.0643	0.0026	4.1	0	0	0	0	0	P
36	0.0511	0.0005	0.9	0	0	0	0	0	P
37	0.0608	0.0024	4.0	0	0	0	0	0	P
38	0.0484	0.0004	0.8	0	0	0	0	0	P
39	0.0577	0.0021	3.6	0	0	0	0	0	P
40	0.0460	0.0004	1.0	0	0	0	0	0	P

Remarks

IEC 1000-3-2/EN 61000-3-2 Quasi-stationary Current Harmonics Test E15
Date Performed: 11/19/01

Test Executed By: Benigno Chavez
Company Name: ACME Portable Machines, Inc.
Test Description: Portable Computer
Device Under Test ID: M/N: GM-II
Test ID: N/A

Approved by: Scott McCutchan

Final Test Result: PASS

Settings and Test Conditions Compliant to the Standard: Yes

Test Equipment Used:

HP 6843A Harmonic/Flicker Test System with serial number:
HFTS Software Version: A.05.01
Date Last Calibrated:

Test Equipment Settings:

Line Voltage: 230.00 V	Current Measurement Range: High
Line Frequency: 50 Hz	Measurement Window Type: Rectangular
Device Class: D	Measurement Delay: 10 seconds
RMS Current Limit: 16.2 A	Quasi-stationary Test Duration: 15.00 minutes
Peak Current Limit: 0.0 A	Class Determination Pre-test Duration: 10.00 seconds
Number of Records: 2812	

Overrides:
Test Limit Source (Power Measurements/Statistics): Maximum
Power Overrides: None
Test Limit Overrides: None

Pre-test Results for Class Determination:

Percent in Envelope: 68.2% Voltage THD Out-of-Specification?: No
Class D Equipment?: No Fundamental Current: 0.329 A

RMS Voltage: 230.0 V	RMS Current: 0.3 A	Real Power: 70.2 W
Frequency: 50.0 Hz	Peak Current: 0.5 A	Apparent Power: 78.7 VA
Voltage THD: 0.12%	Current THD: 15.92%	Power Factor: 0.891
Maximum Power: 70.2 W	Mean Power: 66.5 W	

Active Power Statistics:

100th Percentile: 70.2 W	99th Percentile: 69.6 W	95th Percentile: 69.6
90th Percentile: 68.6 W	50th Percentile: 65.6 W	

Total Number of Failures:	Total Number of Errors:
None	None

Pre-Test Source Voltage Harmonics Data: E16

Harmonic Number	Limit (%)	Limit (Volts)	Max (%)	Max (Volts)
Fund.			100.0	230.019
2	0.20	0.460	0.013	0.029
3	0.90	2.070	0.111	0.255
4	0.20	0.460	0.007	0.015
5	0.40	0.920	0.020	0.045
6	0.20	0.460	0.003	0.007
7	0.30	0.690	0.007	0.015
8	0.20	0.460	0.002	0.004
9	0.20	0.460	0.005	0.012
10	0.20	0.460	0.003	0.008
11	0.10	0.230	0.006	0.014
12	0.10	0.230	0.004	0.010
13	0.10	0.230	0.002	0.005
14	0.10	0.230	0.008	0.018
15	0.10	0.230	0.003	0.007
16	0.10	0.230	0.005	0.011
17	0.10	0.230	0.003	0.006
18	0.10	0.230	0.002	0.005
19	0.10	0.230	0.002	0.004
20	0.10	0.230	0.002	0.004
21	0.10	0.230	0.004	0.009
22	0.10	0.230	0.002	0.005
23	0.10	0.230	0.004	0.010
24	0.10	0.230	0.002	0.004
25	0.10	0.230	0.002	0.005
26	0.10	0.230	0.003	0.007
27	0.10	0.230	0.003	0.006
28	0.10	0.230	0.003	0.007
29	0.10	0.230	0.003	0.008
30	0.10	0.230	0.003	0.007
31	0.10	0.230	0.003	0.006
32	0.10	0.230	0.001	0.003
33	0.10	0.230	0.003	0.007
34	0.10	0.230	0.002	0.004
35	0.10	0.230	0.004	0.010
36	0.10	0.230	0.002	0.004
37	0.10	0.230	0.003	0.007
38	0.10	0.230	0.002	0.005
39	0.10	0.230	0.003	0.007
40	0.10	0.230	0.003	0.006

Final Test Data:

Harmonic Number	Standard Limit (A rms)	Maximum Value (A rms)	Maximum Value (% Limit)	Mean Value (A rms)	Mean Value (% Limit)	Standard Deviation (A rms)	Standard Deviation (% Limit)	Pass (P) or Fail (F)
Fund.		0.3407		0.3245		0.0055		
2	1.0800	0.0010	0.1	0.0007	0.1	0.0001	0.0	P
3	2.3000	0.0455	2.0	0.0444	1.9	0.0003	0.0	P
4	0.4300	0.0008	0.2	0.0006	0.1	0.0001	0.0	P
5	1.1400	0.0096	0.8	0.0086	0.8	0.0003	0.0	P
6	0.3000	0.0007	0.2	0.0005	0.2	0.0001	0.0	P
7	0.7700	0.0093	1.2	0.0090	1.2	0.0002	0.0	P
8	0.2300	0.0007	0.3	0.0005	0.2	0.0001	0.0	P
9	0.4000	0.0095	2.4	0.0092	2.3	0.0001	0.0	P
10	0.1840	0.0007	0.4	0.0005	0.3	0.0000	0.0	P
11	0.3300	0.0092	2.8	0.0090	2.7	0.0002	0.0	P
12	0.1533	0.0008	0.5	0.0005	0.3	0.0002	0.1	P
13	0.2100	0.0065	3.1	0.0048	2.3	0.0005	0.3	P
14	0.1314	0.0007	0.5	0.0005	0.4	0.0000	0.0	P
15	0.1500	0.0031	2.1	0.0028	1.9	0.0002	0.1	P
16	0.1150	0.0007	0.6	0.0006	0.5	0.0000	0.0	P
17	0.1324	0.0039	2.9	0.0037	2.8	0.0000	0.0	P
18	0.1022	0.0006	0.6	0.0004	0.4	0.0000	0.0	P
19	0.1184	0.0037	3.2	0.0036	3.0	0.0001	0.1	P
20	0.0920	0.0005	0.6	0.0004	0.5	0.0000	0.0	P
21	0.1071	0.0039	3.6	0.0036	3.4	0.0001	0.0	P
22	0.0836	0.0006	0.7	0.0005	0.6	0.0000	0.0	P
23	0.0978	0.0052	5.3	0.0048	4.9	0.0003	0.3	P
24	0.0767	0.0006	0.8	0.0004	0.6	0.0000	0.1	P
25	0.0900	0.0033	3.7	0.0013	1.5	0.0007	0.7	P
26	0.0708	0.0005	0.7	0.0004	0.6	0.0000	0.1	P
27	0.0833	0.0019	2.3	0.0015	1.9	0.0004	0.5	P
28	0.0657	0.0005	0.8	0.0004	0.6	0.0000	0.1	P
29	0.0776	0.0036	4.6	0.0032	4.1	0.0001	0.1	P
30	0.0613	0.0006	0.9	0.0004	0.6	0.0001	0.1	P
31	0.0726	0.0028	3.8	0.0022	3.0	0.0002	0.2	P
32	0.0575	0.0005	0.8	0.0003	0.6	0.0000	0.1	P
33	0.0682	0.0028	4.1	0.0027	3.9	0.0000	0.1	P
34	0.0541	0.0005	0.9	0.0003	0.6	0.0000	0.1	P
35	0.0643	0.0027	4.1	0.0025	3.9	0.0001	0.1	P
36	0.0511	0.0005	1.0	0.0003	0.6	0.0000	0.1	P
37	0.0608	0.0024	3.9	0.0022	3.6	0.0001	0.1	P
38	0.0484	0.0004	0.8	0.0002	0.5	0.0000	0.1	P
39	0.0577	0.0020	3.5	0.0018	3.2	0.0001	0.2	P
40	0.0460	0.0004	0.9	0.0003	0.6	0.0000	0.1	P

Final Test Statistics: E18

Harmonic Number	Standard Limit (A rms)	Maximum Value (A rms)	Maximum Value (% Limit)	>50% of Limit (Count)	>75% of Limit (Count)	>90% of Limit (Count)	>95% of Limit (Count)	>100% of Limit (Count)	Pass(P) or Fail(F)
Fund.		0.3407							
2	1.0800	0.0010	0.1	0	0	0	0	0	P
3	2.3000	0.0455	2.0	0	0	0	0	0	P
4	0.4300	0.0008	0.2	0	0	0	0	0	P
5	1.1400	0.0096	0.8	0	0	0	0	0	P
6	0.3000	0.0007	0.2	0	0	0	0	0	P
7	0.7700	0.0093	1.2	0	0	0	0	0	P
8	0.2300	0.0007	0.3	0	0	0	0	0	P
9	0.4000	0.0095	2.4	0	0	0	0	0	P
10	0.1840	0.0007	0.4	0	0	0	0	0	P
11	0.3300	0.0092	2.8	0	0	0	0	0	P
12	0.1533	0.0008	0.5	0	0	0	0	0	P
13	0.2100	0.0065	3.1	0	0	0	0	0	P
14	0.1314	0.0007	0.5	0	0	0	0	0	P
15	0.1500	0.0031	2.1	0	0	0	0	0	P
16	0.1150	0.0007	0.6	0	0	0	0	0	P
17	0.1324	0.0039	2.9	0	0	0	0	0	P
18	0.1022	0.0006	0.6	0	0	0	0	0	P
19	0.1184	0.0037	3.2	0	0	0	0	0	P
20	0.0920	0.0005	0.6	0	0	0	0	0	P
21	0.1071	0.0039	3.6	0	0	0	0	0	P
22	0.0836	0.0006	0.7	0	0	0	0	0	P
23	0.0978	0.0052	5.3	0	0	0	0	0	P
24	0.0767	0.0006	0.8	0	0	0	0	0	P
25	0.0900	0.0033	3.7	0	0	0	0	0	P
26	0.0708	0.0005	0.7	0	0	0	0	0	P
27	0.0833	0.0019	2.3	0	0	0	0	0	P
28	0.0657	0.0005	0.8	0	0	0	0	0	P
29	0.0776	0.0036	4.6	0	0	0	0	0	P
30	0.0613	0.0006	0.9	0	0	0	0	0	P
31	0.0726	0.0028	3.8	0	0	0	0	0	P
32	0.0575	0.0005	0.8	0	0	0	0	0	P
33	0.0682	0.0028	4.1	0	0	0	0	0	P
34	0.0541	0.0005	0.9	0	0	0	0	0	P
35	0.0643	0.0027	4.1	0	0	0	0	0	P
36	0.0511	0.0005	1.0	0	0	0	0	0	P
37	0.0608	0.0024	3.9	0	0	0	0	0	P
38	0.0484	0.0004	0.8	0	0	0	0	0	P
39	0.0577	0.0020	3.5	0	0	0	0	0	P
40	0.0460	0.0004	0.9	0	0	0	0	0	P

Remarks

IEC 1000-3-3/EN 61000-3-3 Voltage Fluctuation and Flicker Test E19
Date Performed: 11/19/01

Test Executed By: Benigno Chavez
Company Name: ACME Portable Machines, Inc.
Test Description: Portable Computer
Device Under Test ID: M/N: GM-II
Test ID: S/N: N/A

Approved by: Scott McCutchan

Final Test Result: PASS

Settings and Test Conditions Compliant to the Standard: Yes

Test Equipment Used:

HP 6843A Harmonic/Flicker Test System with serial number:
HFTS Software Version: A.05.01
Date Last Calibrated:

Test Equipment Settings:

Line Voltage: 230.00 V	Pst Integration Time: 10 minutes
Line Frequency: 50 Hz	Pst Integration Periods: 12
Measurement Delay: 10.0 seconds	Test Duration: 02:00:00
RMS Current Limit: 16.2 A	Peak Current Limit: 0.0 A

Overrides:

Pst/Plt Test Limit Overrides: None
RMS Test Limit Overrides: None

Equipment Under Test Pre-test Results:

RMS Voltage: 230.0 V	RMS Current: 0.3 A	Real Power: 66.6 W
Frequency: 50.0 Hz	Peak Current: 0.5 A	Apparent Power: 75.3 VA
Voltage THD: 0.12%	Current THD: 15	Power Factor: 0.884

Total Number of Failures:			Total Number of Errors:
Pst: 0	Dc: 0		None
Plt: 0	Dmax: 0		
	Dt: 0		

Final Test Summary: E20

Dmax: 0.0 Pst: 0.07 P_0.1: 0.01
Dc: 0.0 Plt: 0.07 P_1s: 0.01
Dt: 0.00 Plt Threshold: 0.65 P_3s: 0.01
P_10s: 0.01
P_50s: 0.01

Final Test Data by Integration Period:

Number of Integration Periods: 12

Integration Periods	Pst (P.U.)	P_0.1 (P.U.)	P_1.0s (P.U.)	P_3.0s (P.U.)	P_10s (P.U.)	P_50s (P.U.)	Dc (%)	Dmax (%)	Dt (seconds)	Pass(P) or Fail(F)
1	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
2	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
3	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
4	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
5	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
6	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
7	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
8	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
9	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
10	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
11	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
12	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A

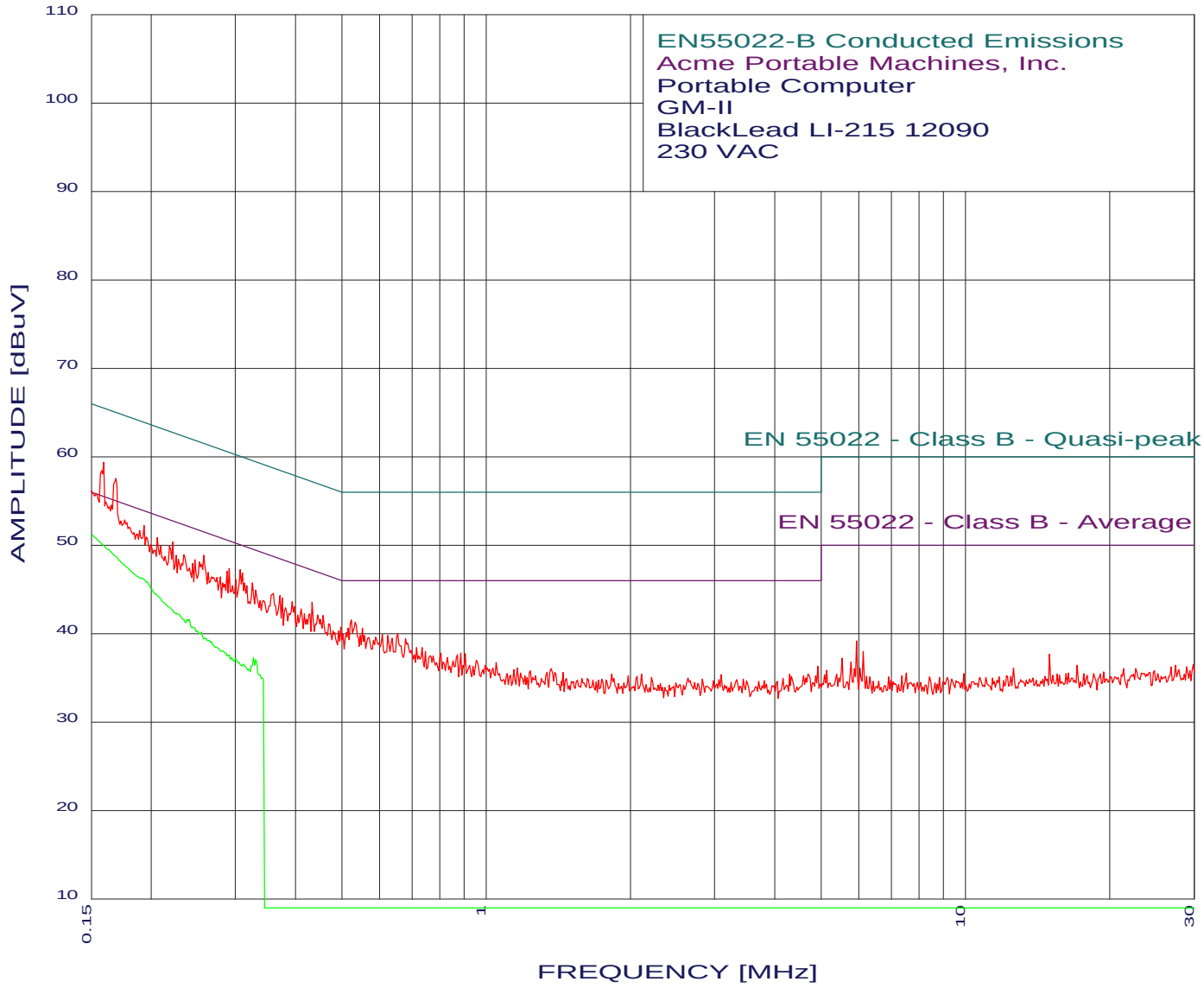
Remarks

Test Location : Compatible Electronics Page : E21
Customer : Acme Portable Machines, Inc. Date : 11/19/2001
Manufacturer : Acme Portable Machines, Inc. Time : 10:03:54
Eut name : Portable Computer Lab : A
Model : GM-II Test Distance : 10.0
Serial # : N/A
Specification : EN 55022 Class B
Distance correction factor (20 * log(test/spec) : 0.00
Test Mode : Tested by: James Ross
30 MHz to 1 GHz - Vertical and Horizontal Polarization

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	Limit = L dBuV/m	Delta R-L dB
V	80.096	48.20	1.10	6.33	35.50	20.13	30.00	-9.87
V	115.100	47.40	1.40	12.97	36.00	25.77	30.00	-4.23
V	120.155	42.00	1.40	13.37	36.00	20.77	30.00	-9.23
V	140.099	47.70	1.59	11.80	35.87	25.21	30.00	-4.79
H	145.132	46.40	1.65	11.75	35.84	23.96	30.00	-6.04
V	155.119	44.30	1.72	12.32	35.73	22.61	30.00	-7.39
H	155.134	43.50	1.72	12.33	35.73	21.81	30.00	-8.19
V	170.104	44.40	1.78	14.20	35.56	24.82	30.00	-5.18
V	180.129	44.10	1.84	16.10	35.54	26.50	30.00	-3.50
V	197.649	41.70	1.98	16.10	35.68	24.10	30.00	-5.90
H	210.190	39.90	2.08	15.99	35.78	22.19	30.00	-7.81
V	398.152	42.40	3.19	13.24	35.50	23.33	37.00	-13.67
H	398.200	42.40	3.19	13.24	35.50	23.33	37.00	-13.67
V	401.991	42.50	3.22	13.27	35.50	23.49	37.00	-13.51
H	402.004	42.70	3.22	13.27	35.50	23.69	37.00	-13.31
H	455.266	43.00	3.61	14.94	35.34	26.21	37.00	-10.79

EMISSION LEVEL [dBuV] PEAK 11/19/2001 16:11:21 E22

Graph forPeak& Average



COMPATIBLE ELECTRONICS

COMPATIBLE ELECTRONICS

11/19/2001 16:11:21

Acme Portable Machines, Inc.
Portable Computer
GM-II
Black Lead - 230 VAC
TEST ENGINEER : James Ross

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11 highest peaks above -50.00 dB of EN 55022 - Class B - Average limit line
Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.159	59.33	55.51	3.82
2	0.169	57.53	55.03	2.50
3	0.150	56.14	56.00	0.14
4	0.307	47.22	50.05	-2.84
5	0.291	47.32	50.49	-3.18
6	0.433	43.51	47.19	-3.69
7	0.524	41.50	46.00	-4.50
8	5.933	39.17	50.00	-10.83
9	6.123	37.98	50.00	-12.02
10	14.991	37.66	50.00	-12.34
11	5.538	37.24	50.00	-12.76

COMPATIBLE ELECTRONICS

11/19/2001 16:11:21

Acme Portable Machines, Inc.
Portable Computer
GM-II
Black Lead - 230 VAC
TEST ENGINEER : James Ross

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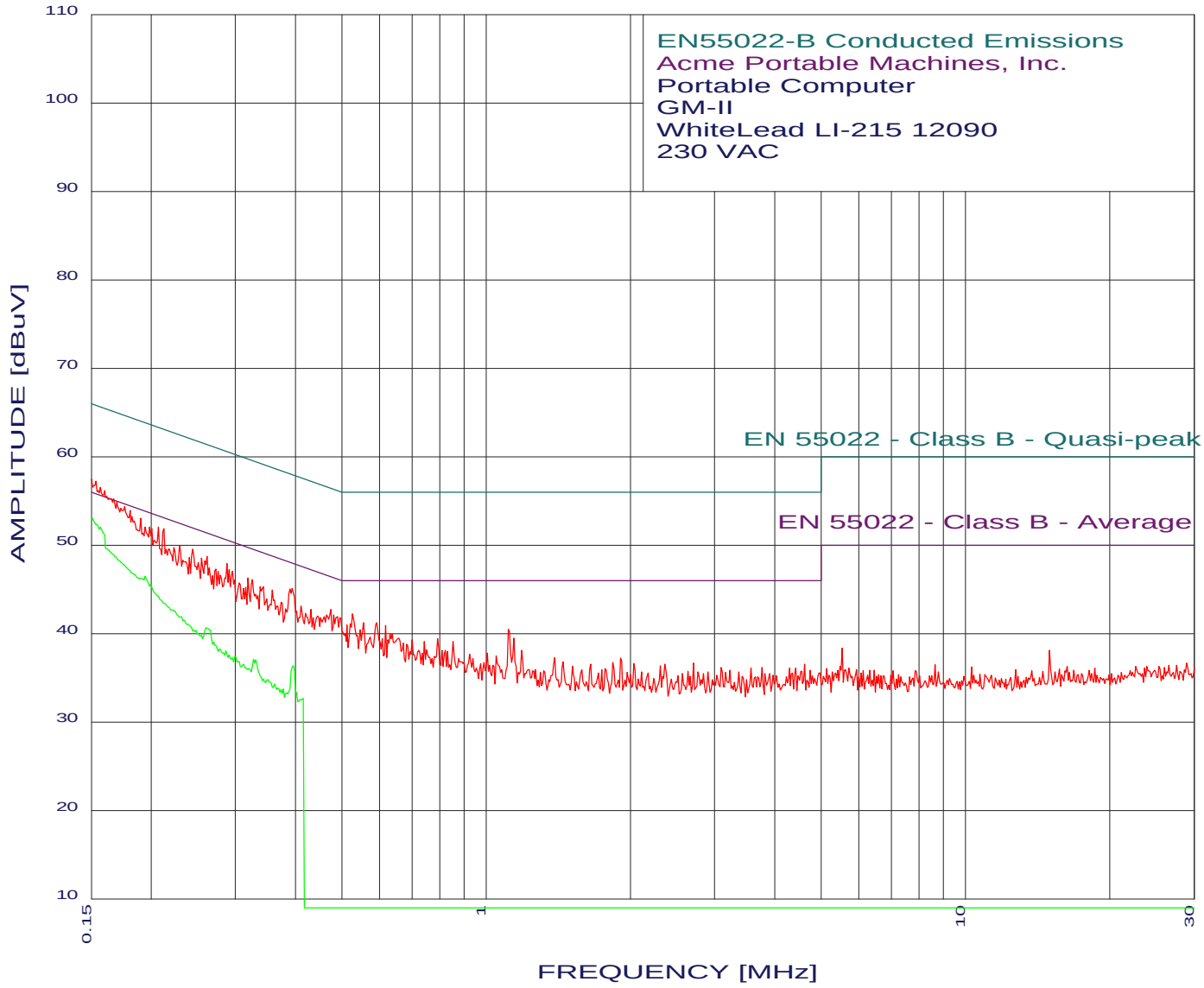
3 highest peaks above -50.00 dB of EN 55022 - Class B - Average limit line
Peak criteria : 0.50 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.150	51.19	56.00	-4.81
2	0.327	37.30	49.53	-12.22
3	0.331	37.00	49.44	-12.43

COMPATIBLE ELECTRONICS

EMISSION LEVEL [dBuV] PEAK
Graph forPeak& Average



COMPATIBLE ELECTRONICS

11/19/2001 16:01:05

Acme Portable Machines, Inc.
Portable Computer
GM-II
White Lead - 230 VAC
TEST ENGINEER : James Ross

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20 highest peaks above -50.00 dB of EN 55022 - Class B - Average limit line
Peak criteria : 3.00 dB, Curve : Peak

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.150	57.45	56.00	1.45
2	0.393	45.10	47.99	-2.89
3	0.527	42.19	46.00	-3.81
4	0.592	41.19	46.00	-4.81
5	0.618	40.89	46.00	-5.11
6	1.112	40.49	46.00	-5.51
7	0.792	39.38	46.00	-6.62
8	0.853	39.08	46.00	-6.92
9	1.184	38.09	46.00	-7.91
10	1.006	37.79	46.00	-8.21
11	1.389	37.30	46.00	-8.70
12	1.908	37.22	46.00	-8.78
13	2.707	36.65	46.00	-9.35
14	2.034	36.62	46.00	-9.38
15	2.358	36.54	46.00	-9.46
16	4.624	36.52	46.00	-9.48
17	1.654	36.51	46.00	-9.49
18	3.761	36.18	46.00	-9.82
19	5.538	38.37	50.00	-11.63
20	14.991	38.09	50.00	-11.91

COMPATIBLE ELECTRONICS

11/19/2001 16:01:05

Acme Portable Machines, Inc.
Portable Computer
GM-II
White Lead - 230 VAC
TEST ENGINEER : James Ross

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7 highest peaks above -50.00 dB of EN 55022 - Class B - Average limit line
Peak criteria : 0.50 dB, Curve : Average

Peak#	Freq(MHz)	Amp(dBuV)	Limit(dB)	Delta(dB)
1	0.150	52.96	56.00	-3.04
2	0.260	40.68	51.42	-10.74
3	0.396	36.32	47.95	-11.62
4	0.327	37.06	49.53	-12.46
5	0.286	38.04	50.63	-12.59
6	0.299	37.42	50.28	-12.86
7	0.377	33.74	48.34	-14.60
