

TEST REPORT



Certification # 1367-01

Laboratory ID

PRODUCT SAFETY ENGINEERING, INC.
12955 Bellamy Brothers Boulevard
Dade City, Florida 33525 USA
PH (352) 588-2209 FX (352) 588-2544

Report Issue Date: 21 July 04

Sample S/N: NA 0

Sample Receipt Date: 09 APR 04

Sample Test Date: see data sheets

Description of non-standard test method or test practice: *None*

Estimated Measurement Uncertainty: *Not Applicable*

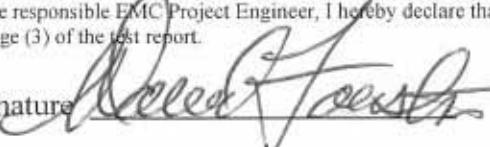
Special limitations of use: *None*

Traceability: *reference standards of measurement have been calibrated by a competent body using standards traceable to the NIST.*

According to testing performed at Product Safety Engineering, Inc., the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in regulations indicated on page (3) of the test report. The test results contained herein relate only to the model(s) identified above. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Project Engineer, I hereby declare that the equipment tested as specified above conforms to the requirements indicated on page (3) of the test report.

Signature

 Name David Foerstner

Title

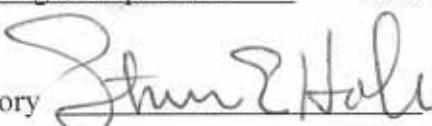
Engineering Group Leader

Date

21 July 04

Reviewed by:

Approved Signatory



Date 21 Jul 04

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Test Report Number 04F370B

Product Safety Engineering, Inc 12955 Bellamy Brothers Blvd. Dade City, FL 33525
Tel (352) 588-2209 Fax (352) 588-2544

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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

- EN 50081-1 : 1992

- EN 50081-2 : 1995

- EN 55011 : 1998 / A1:1999

- Group 1

- Group 2

- Class A

- Class B

- EN 55013 : 1990 / A12:1994 / A13:1996 / A14:1999

- EN 55014 -1: 2001

- Household appliances and similar

- Portable tools

- Semiconductor devices

- EN 55022 : 1998

- Class A

- Class B

- AS/NZS 3548:1995

- Class A

- Class B

- RSS-210

- Certification

- CNS 13438

- Class A

- Class B

- VCCI : 1999

- Class A

- Class B

- FCC Part 15

- Class A

- Class B

- Certification

- Verification

- Declaration of Conformity

- FCC Part 18

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Environmental conditions during testing:

	LAB	OATS
Temperature: *	_____	_____
Relative Humidity: **	_____	_____
Power supply system	: _____	Volts _____ Hz <u>SINGLE</u> phase

* Battery Operated

Sign Explanations:

- not applicable
- applicable

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Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The **CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)** measurements were performed at the following test location:

■ - Test not applicable

- Darby Test Site (Open Area Test Site)
- Darby Laboratory

Test equipment used :

Model Number	Manufacturer	Description	Serial Number
□ - 8028-50	Solar	50 Ω LISN	829012, 829022
□ - 3825/2	Solar	50 Ω LISN	924840
□ - EMC-30	Electro-Metrics	EMI Receiver	191
□ - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
□ - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
□ - 85662A	Hewlett Packard	Analyzer Display	2403A07352
□ - 8028-50	Solar	50 Ω LISN	903725, 903726
□ - FCC-TLISN-T4	Fisher Custom Com.	Telecom ISN	20072

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The **RADIATED EMISSIONS (MAGNETIC FIELD)** measurements were performed at the following test location:

- Darby Test Site (Open Area Test Site)
-
-

at a test distance of :

- 3 meters
- 30 meters

■ - Test not applicable

Test equipment used :

Model Number	Manufacturer	Description	Serial Number
□ - 96005	Eaton	Log Periodic Antenna	1099
□ - BIA-25	Electro-Metrics	Biconical Antenna	4283
□ - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
□ - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
□ - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
□ - ALR-30M	Electro-Metrics	Loop Antenna	824
□ - 8447D	Hewlett Packard	Preamplifier	2944A06832
□ - EMC-30	Electro-Metrics	EMI Receiver	191
□ - ALA-130/A	Antenna Research	Loop Antenna	106

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Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The **RADIATED EMISSIONS (ELECTRIC FIELD)** measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location :

- Test not applicable

- Darby Site (Open Area Test Site)
- Darby Lab
-

at a test distance of :

- 3 meters
- 10 meters
- 30 meters

Test equipment used :

Model Number	Manufacturer	Description	Serial Number
■ - LPA30	eElectro-Metrics	Log Periodic Antenna	2280
■ - BIA-30	Electro-Metrics	Biconical Antenna	3852
■ - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
■ - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
■ - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
■ - 8447D	Hewlett-Packard	Preamplifier (26dB)	2944A06832
□ - EMC-30	Electro-Metrics	EMI Receiver	191
□ - 8568B	Hewlett Packard	Spectrum Analyzer	2407A03213
□ - 85650A	Hewlett Packard	Quasi-Peak Adapter	2043A00358
□ - 85662A	Hewlett Packard	Analyzer Display	2340A05806
□ - 96005	Eaton	Log Periodic	1099
□ - BIA 25	Electro-Metrics	Biconical Antenna	4283

Emissions Test Conditions): INTERFERENCE POWER

The **INTERFERENCE POWER** measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location :

- Test not applicable

- Darby Lab
-

Test equipment used :

Model Number	Manufacturer	Description	Serial Number
□ - MDS-21	Rhode&Schwarz	Absorbing Clamp	8608447020
□ - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
□ - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
□ - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
□ - 8447D	Hewlett-Packard	Amplifier (26 dB)	2944A06832
□ - EMC-30	Electro-Metrics	EMI Receiver	191

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The **EQUIVALENT RADIATED EMISSIONS** measurements in the frequency range **1 GHz - 5 GHz**
were performed in a horizontal and vertical polarization at the following test location :

- - Darby Test Site (Open Area Test Site)
- -
- -
- -

at a test distance of:

- - 1 meters
- - 3 meters
- - 10 meters

- **Test not applicable**

Test equipment used :

Model Number	Manufacturer	Description	Serial Number
■ - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
■ - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
■ - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
■ - 8449B	Hewlett-Packard	Preamplifier	3008A00320
■ - 3115	Electro-Mechanics	Double Ridge Guide Horn	3810

The **ANTENNA TERMINAL DISTURBANCE VOLTAGE** in the frequency range **30 MHz - 1,000 MHz** were performed.

- - Darby Test Site (Open Area Test Site)
- - Laboratory
- -
- -

- **Test not applicable**

Model Number	Manufacturer	Description	Serial Number
□ - 2F9-3C4-3C5	Wavecom	UHF PAL TV Modulator	185879
□ - 2F1-3C4-3C5	Wavecom	VHF PAL TV Modulator	157728
□ - A-8000	IFR	Spectrum Analyzer	1306
□ - 8648B	Hewlett-Packard	Signal Generator	3623A01433
□ - 8648B	Hewlett-Packard	Signal Generator	3623A01477
□ - LMV-182A	Leader	RMS Milli-Voltmeter	8010091
□ - 3202	Krhon-Hite	Active filter	5899
□ - FMT115	Leaming	FM Modulator	NONE
□ - 371	UDT	Optical power meter	06657
□ - TSG95	Tektronix	PAL video / Audio generator	B028883
□ -			

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Equipment Under Test (EUT) Test Operation Mode - Emission tests :

The device under test was operated under the following conditions during emissions testing:

- Standby
- Test program (H - Pattern)
- Test program (color bar)
- Test program (customer specific)
- Practice operation
- Normal Operating Mode
-

Configuration of the device under test:

- See System Under Test Information in Appendix B
- The EUT was tested in a typical IR remote control. It replaces one of the normally installed batteries.

Rationale for EUT setup / configuration:

The EUT was tested per ANSI C63.4.

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Emission Test Results:

Conducted emissions 150 kHz - 30 MHz

The requirements are

- MET

- NOT MET

Minimum limit margin

dB

at

MHz

Remarks:

Radiated emissions (magnetic field) 10 kHz - 30 MHz

The requirements are

- MET

- NOT MET

Minimum limit margin

dB

at

MHz

Remarks:

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are

- MET

- NOT MET

Minimum limit margin

4.5 dB

at

433.9 MHz

Remarks:

Interference Power at the mains and interface cables 30 MHz - 300 MHz

The requirements are

- MET

- NOT MET

Minimum limit margin

dB

at

MHz

Remarks:

Radiated emissions 1 GHz - 5 GHz

The requirements are

- MET

- NOT MET

Minimum limit margin

6.1 dB

at

1.736 GHz

Remarks:

Antenna Terminal Disturbance Voltage 30 MHz - 1,000 MHz

The requirements are

- MET

- NOT MET

Minimum limit margin

dB

at

MHz

Remarks:

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GENERAL REMARKS:

The EUT was tested with a fresh battery and was tested in (3) orthogonal positions. The highest observed levels are recorded in the test report. The transmitter stops transmitting within (5) seconds of the button being released.

SUMMARY:

The requirements according to the technical regulations are

■ - met

□ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

□ - **not** fulfill the general approval requirements mentioned on page 3.

Testing Start Date 04/09/2004

Testing End Date: 04/09/2004

- PRODUCT SAFETY ENGINEERING INC -

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Test-setup photo(s):

Conducted emission 450/150 kHz - 30 MHz

NA

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Test-setup photo(s):
Radiated emission 30 MHz - 1000 MHz



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APPENDIX

A

Test Equipment Calibration Information

&

Test Data Sheets

TEST EQUIPMENT CALIBRATION INFORMATION

Manufacturer	Model	Description	Serial Number	Cal Due
Hewlett Packard	8566B	Spectrum Analyzer	2421A00526	08/14/04
Hewlett Packard	85662A	Display	2403A07352	08/14/04
Hewlett Packard	85650A	Quasi-Peak Adapter	2043A00209	08/14/04
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	2944A06832	12/10/04
Hewlett Packard	8568B	Spectrum Analyzer	2407A03213	08/14/04
Hewlett Packard	85662A	Display	2340A05806	08/14/04
Hewlett Packard	85650A	Quasi-Peak Adapter	2043A00358	08/14/04
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	2944A06901	08/14/04
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	1937A03247	07/17/04
Hewlett Packard	8449B	Preamp 1 - 26.5 GHz	3008A00320	12/02/04
Hewlett Packard	8648B	Signal Generator	3443U00312	05/04/05
Hewlett Packard	8672A	Signal Generator	2211A02426	10/17/04
Eaton	96005	Log Periodic Antenna	1099	02/05/05
Electro-Metrics	LPA 30	Log Periodic Antenna	2280	01/12/05
Electro-Metrics	BIA 30	Biconical Antenna	3852	01/13/05
Electro-Metrics	BIA 25	Biconical Antenna	4283	02/04/05
Electro-Mechanics	3115	Double Ridge Guide Ant.	3810	11/25/05
Electro-Metrics	ALR30M	Magnetic Loop Antenna	824	01/12/05
Solar	8012	LISN	924840	12/24/04
Solar	8028	LISN	829012/809022	12/12/04
Solar	8028	LISN	903725/903726	12/01/04
Schwartzbeck	MDS-21	Absorbing Clamp	02581	09/18/04
Leader	LFG1310	Function Generator	8060233	05/04/05
IFR Systems	A-8000	Spectrum Analyzer	1306	12/08/04
Electro-Metrics	EMC-30	EMI Receiver	191	05/04/05
Antenna Research	ALA-130/A	Loop Antenna	106	03/14/04
Radio Shack	63-867	Temp/Hygrometer	N/A	05/04/05
Radio Shack	63-867A	Temp/Hygrometer	N/A	05/04/05

Radiated Emissions Data

Frequency MHz	Amplitude dBuV	Preamp Gain dB	Cable Loss dB	ACF dBuV/m	Field Strength dBuV/M	Field Strength Average Corrected	Limit dBuV/M	Margin dB
433.9	95.7	26.0	2.2	16.3	88.2	76.3	80.8	4.5
867.9	64.6	26.0	3.7	22.8	65.1	53.2	60.8	11.9
1,302	56.0	30	1.5	25.5	53.0	41.1	53.9	12.8
1,736	66.6	30	3.1	26.9	66.6	54.7	60.8	6.1
2,170	60.6	30	3.9	27.8	62.3	50.6	60.8	10.2
2,604	51.9	30	5.9	28.7	56.5	44.6	60.8	16.2
3,038	46.7	30	6.1	30.2	53.0	41.1	60.8	19.7
3,471	41.4	30	9.3	31.3	52.0	40.1	60.8	20.7
3,905	40.1	30	8.4	32.3	50.8	38.9	53.9	15.0
4,339	41.0	30	9.1	32.2	52.3	40.4	53.9	13.5

Average calculation - Duty cycle is (25.4 %). [$20 \log 0.254 = -11.9$]

A3

Bandwidth Plot

Per 15.231 (3)(c)

Bandwidth is no wider than 0.25% of center frequency

Center Frequency = 434 MHz

$434,000,000 \times 0.0025 = 1,085,000 \text{ Hz}$

Widest bandwidth = 360,000 Hz



APPENDIX

B

Measurement Protocol

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The test methodology followed during the collection of the data included within this technical report was ANSI C63.4:2001.

The EUT was powered with a fresh battery during the collection of data included within.

The data is compared to the FCC Part 15 limits stated in 15.231.

The "EMI" instrumentation is capable of calculating the final emission level based on the following formula:

Level at the receiver (dB μ V) + Antenna Correction Factor (dB/M) + Cable Loss (dB) - Preamp Gain (dB) = Actual Level in dB μ V/M.

The sample calculation below is based on the actual test data collected:

Observed Level	95.7	dB μ V
ACF	+	16.3 dB/M
Cable Loss	+	2.2 dB
Preamp Gain	-	26.0 dB
Actual Level	88.2	dB μ V/M @ 433.9 MHz

Please have a company official review this report and sign.
