

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

Submitter ID

Dealer Security Solutions Inc.
11379 Trade Center Dr.
Rancho Cordova, CA 95742

Report Issue Date: 03/27/2003

Sample S/N: NA

Sample Receipt Date: 03/17/2003

Sample Test Date: see data sheets

Test Report Number: 03F178B

Model Designation: 921300

Product Description: Handheld Transmitter

Marketing Approval _____

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

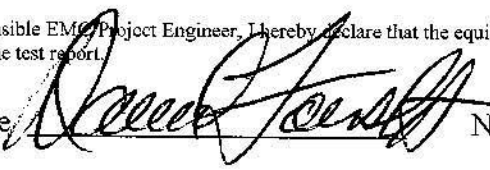
Estimated Measurement Uncertainty: *Not Applicable*

Special limitations of use: *None*

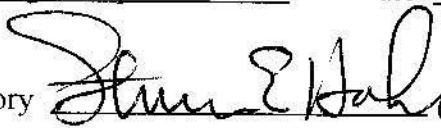
Traceability: *reference standards of measurement have been calibrated by a competent body using standards traceable to the NIST.*

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 27 MAR 03

Reviewed by: 
Approved Signatory John E. Hahn Date 27 MAR 03

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Test Report Number 03F178B

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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
 - ☐ - Class A
- ☐ - EN 55013 : 1990 / A12:1994 / A13:1996 / A14:1999
 - ☐ - Group 2
 - ☐ - Class B

- ☐ - EN 55014 : 1993 / A1:1997
 - ☐ - Household appliances and similar
 - ☐ - Portable tools
 - ☐ - Semiconductor devices

- ☐ - EN 55022 : 1998
 - ☐ - Class A
 - ☐ - Class B
- ☐ - AS/NZS 3540:1995
 - ☐ - Class A
 - ☐ - Class B
- ☐ - ICES-003
 - ☐ - Class A
 - ☐ - Class B
- ☐ - 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: **	_____	: _____

* The ambient temperature during the testing was within the range of (50° - 104° F) unless indicted above.

** The humidity levels during the testing was within the range of (10% - 90%) relative humidity unless indicated above.

Power supply system : _____ Volts _____ Hz SINGLE phase

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

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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
☒ - 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
☒ - 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
☐ - LPA30	Electro-Metrics	Log Periodic	2280
☐ - BIA 30	Electro-Metrics	Biconical Antenna	3852

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 - 4.5 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

Rationale for EUT setup / configuration:

Per ANSI

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Emission Test Results:

Conducted emissions 10/150/450 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 2.6 dB at 867.9 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 - 4.5 GHz

The requirements are ☒ - MET ☐ - NOT MET
Minimum limit margin 2.4 dB at 2.169 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 test sample was tested in (3) orthogonal planes and the data included within the report reflects the position which produced the highest emission levels.

The bandwidth plot on page (A5) clearly shows that the EUT meets the requirement of $< (0.25\%)$ of the center frequency. The center frequency is (433.9) MHz and the maximum allowable bandwidth would be (433,900,000) multiplied by (0.0025) or (1,085,000) Hz. The (20) dB down points on the plot show the bandwidth to be approximately (300) kHz.

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 02/26/2003

Testing End Date: 03/27/2003

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Test-setup photo(s):

Conducted emission 450/150 kHz - 30 MHz

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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	08/22/03
Hewlett Packard	85662A	Display	2403A07352	08/22/03
Hewlett Packard	85650A	Quasi-Peak Adapter	2043A00209	08/22/03
Hewlett Packard	8447D	Preamplifier 0.1 - 1,000 MHz	2944A06832	11/13/03
Hewlett Packard	8568B	Spectrum Analyzer	2407A03213	08/22/03
Hewlett Packard	85662A	Display	2340A05806	08/22/03
Hewlett Packard	85650A	Quasi-Peak Adapter	2043A00358	08/22/03
Hewlett Packard	8447D	Preamplifier 0.1 - 1,000 MHz	2944A06901	08/02/03
Hewlett Packard	8447D	Preamplifier 0.1 - 1,000 MHz	1937A03247	07/19/03
Hewlett Packard	8449B	Preamplifier 1 - 26.5 GHz	3008A00320	11/08/03
Hewlett Packard	8648B	Signal Generator	3443U00312	04/25/03
Hewlett Packard	8672A	Signal Generator	2211A02426	11/14/03
Eaton	96005	Log Periodic Antenna	1099	01/24/04
Electro-Metrics	LPA 30	Log Periodic Antenna	2280	12/06/03
Electro-Metrics	BIA 30	Biconical Antenna	3852	12/05/03
Electro-Metrics	BIA 25	Biconical Antenna	4283	01/22/04
Electro-Mechanics	3115	Double Ridge Guide Ant.	3810	11/07/03
Electro-Metrics	ALR30M	Magnetic Loop Antenna	824	12/12/03
Solar	8012	LISN	924840	12/29/03
Solar	8028	LISN	829012/809022	12/19/03
Solar	8028	LISN	903725/903726	11/18/03
Schwartzbeck	MDS-21	Absorbing Clamp	02581	09/13/03
Leader	LFG1310	Function Generator	8060233	04/23/03
Holaday Ind.	HI 4422	Isotropic Probe	90310	05/22/03
IFR Systems	A-8000	Spectrum Analyzer	1306	11/13/03
Fischer Custom	F-33-1	RF Current Probe	360	11/20/03
Electro-Metrics	EMC-30	EMI Receiver	191	04/23/03
Boonton	4220A	RF Power Meter	204103AA	11/08/03
Boonton	51011	RF Power Meter	28823	11/08/03

Radiated Emissions Test Data

FCC ID:QY7ADM625

Freq MHz	Level RAW dBuV	Preamp Gain & Cable Losses	ACF	dBuV/ m	Avg Adj.	Adj dBuV/ m	Limit	Delta Limit (DB)
433.9	69.0	-24.5	16.5	61.0	-3.0	58.0	72.8	-14.8
867.9	52.7	-22.3	22.8	53.2	-3.0	50.2	52.8	-2.6
1,301	50.8	-28.3	26.9	49.4	-3.0	46.4	52.8	-6.4
1,735	46.5	-26.9	28.0	47.6	-3.0	44.6	52.8	-8.2
2,169	50.1	-26.1	29.4	53.4	-3.0	50.4	52.8	-2.4
2,602	33.2	-24.1	31.0	40.1	-3.0	37.1	52.8	-15.7
3,036	35.0	-23.9	31.7	42.8	-3.0	39.8	52.8	-13.0
3,470	37.0	-20.7	32.8	49.1	-3.0	46.1	52.8	-6.7
3,904	35.0	-21.6	34.4	47.8	-3.0	44.8	52.8	-8.0
4,338	35.5	-20.4	33.7	48.8	-3.0	45.8	52.8	-7.0

Method of calculating the average field strength

The FCC rules state the following in Part 15.35(C):

“(c) Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to Declaration of Conformity or verification.”

The formula for calculating the average field strength level when compared to a peak field strength level is: $(20 \log (\text{peak on time} / \text{total pulse train}))$

The calculations we used were based on the following (5) pulse train plots.

The length of the entire pulse train is (61.6) ms as shown in plot # 1.

Plot # 1 also shows a large “on” pulse which is approximately (10) ms followed by a short “off” pulse approximately (2) ms in duration.

The largest “off” portion of the pulse train is (7.8) ms as shown in plot # 2.

The portion of the pulse train with approximately (67) pulses is shown in plot # 3.

The largest “on” pulse of the (67) pulses is shown in plot # 4 at (440) us.

The smallest “off” pulse of the (67) pulses is shown in plot # 5 at (180) us.

To calculate the total on time within the (61.6) ms pulse train, we start by multiplying the (67) “on” pulses of (440) us and get (29.5) ms. We then add the (10) ms large “on” pulse and get a total of (39.5) ms of “on” time.

$$(20 \log(39.5 / 61.6)) = (-3.859) \text{ dB}$$

The average field strength levels were adjusted by subtracting (3.9) dB from the peak field strength level.

PRODUCT SAFETY ENGINEERING

MKR Δ 297.0 KHZ
0.00 DB

hpa

REF 72.7 dB μ V ATTN 0 DB

5 DB/

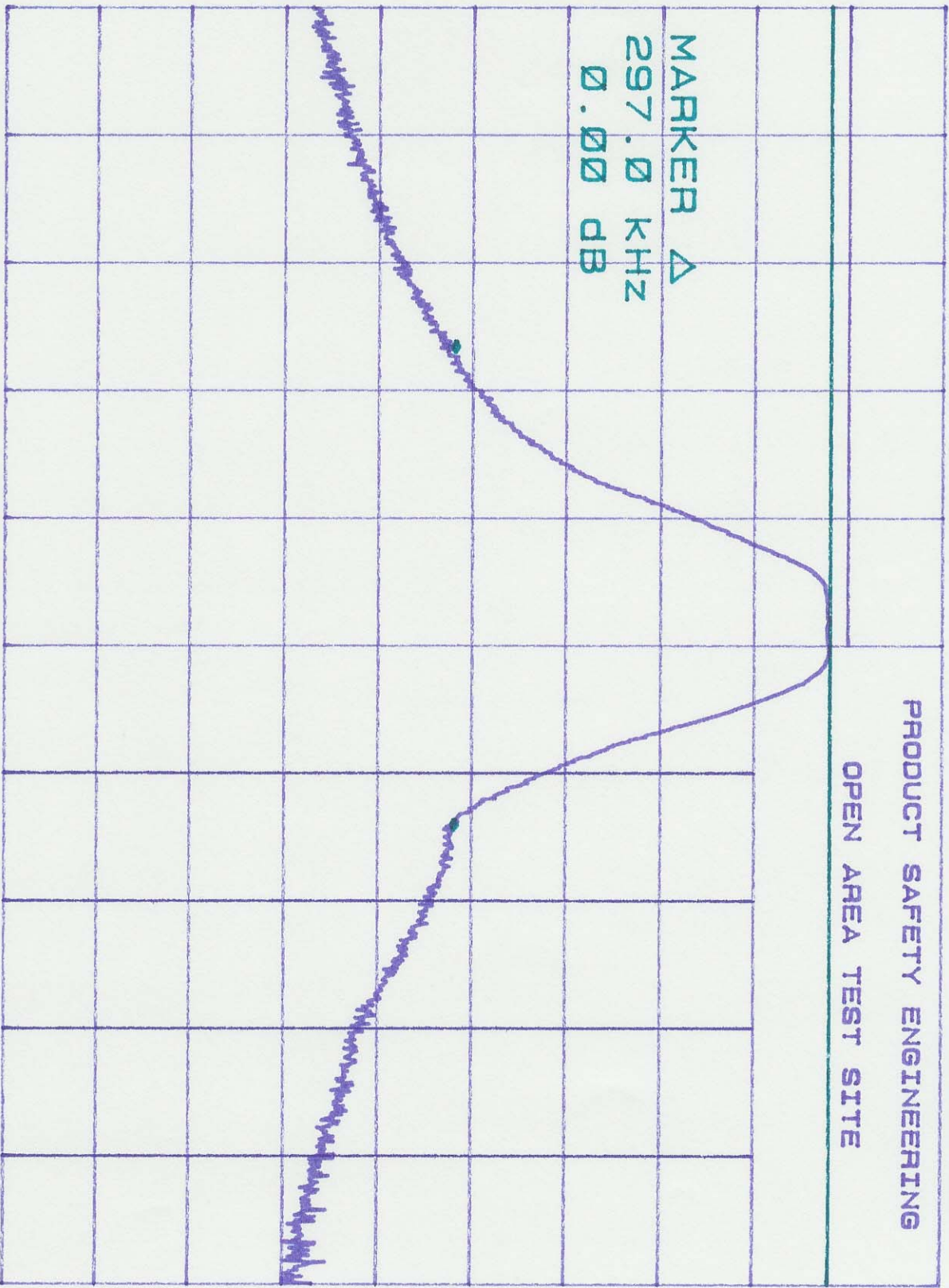
POS PK

PRODUCT SAFETY ENGINEERING

OPEN AREA TEST SITE

DL
66.7
dB μ V

MARKER Δ
297.0 KHZ
0.00 DB



CENTER 433.966 MHZ
RES BW 1 MHZ

VBW 1 MHZ

SPAN 792 KHZ
SWP 100 msec

AS

APPENDIX

B

System Under Test Description

SYSTEM COMPONENTS

DEVICE TYPE: EUT, model 921300

DEVICE TYPE:

DEVICE TYPE:

DEVICE TYPE:

FCC ID#:

DEVICE TYPE:

DEVICE TYPE:

FCC ID#:

DEVICE TYPE:
