

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

Spec Tec Mfg. Inc.
10794 NW 53rd Street
Sunrise, FL 33351

Report Issue Date: 06 Jul 04
Sample S/N: N-A
Sample Receipt Date: 21 May 04
Sample Test Date: see data sheets

Test Report Number: 04F327B
Model Designation: 120A, 510, 302
Product Description: Alarm Transmitters
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 06 Jul 04

Reviewed by: 
Approved Signatory _____ Date 06 Jul 04

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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

☐ - 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 _____ 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
<input type="checkbox"/> - 8028-50	Solar	50 Ω LISN	829012, 829022
<input type="checkbox"/> - 3825/2	Solar	50 Ω LISN	924840
<input type="checkbox"/> - EMC-30	Electro-Metrics	EMI Receiver	191
<input type="checkbox"/> - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
<input type="checkbox"/> - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
<input type="checkbox"/> - 85662A	Hewlett Packard	Analyzer Display	2403A07352
<input type="checkbox"/> - 8028-50	Solar	50 Ω LISN	903725, 903726
<input type="checkbox"/> - 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
<input type="checkbox"/> - 96005	Eaton	Log Periodic Antenna	1099
<input type="checkbox"/> - BIA-25	Electro-Metrics	Biconical Antenna	4283
<input type="checkbox"/> - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
<input type="checkbox"/> - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
<input type="checkbox"/> - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
<input type="checkbox"/> - ALR-30M	Electro-Metrics	Loop Antenna	824
<input type="checkbox"/> - 8447D	Hewlett Packard	Preamplifier	2944A06832
<input type="checkbox"/> - EMC-30	Electro-Metrics	EMI Receiver	191
<input type="checkbox"/> - 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
<input checked="" type="checkbox"/> - LPA30	eElectro-Metrics	Log Periodic Antenna	2280
<input checked="" type="checkbox"/> - BIA-30	Electro-Metrics	Biconical Antenna	3852
<input checked="" type="checkbox"/> - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
<input checked="" type="checkbox"/> - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
<input checked="" type="checkbox"/> - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
<input checked="" type="checkbox"/> - 8447D	Hewlett-Packard	Preamplifier (26dB)	2944A06832
<input type="checkbox"/> - EMC-30	Electro-Metrics	EMI Receiver	191
<input type="checkbox"/> - 8568B	Hewlett Packard	Spectrum Analyzer	2407A03213
<input type="checkbox"/> - 85650A	Hewlett Packard	Quasi-Peak Adapter	2043A00358
<input type="checkbox"/> - 85662A	Hewlett Packard	Analyzer Display	2340A05806
<input type="checkbox"/> - 96005	Eaton	Log Periodic	1099
<input type="checkbox"/> - 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
<input type="checkbox"/> - MDS-21	Rhode&Schwarz	Absorbing Clamp	8608447020
<input type="checkbox"/> - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
<input type="checkbox"/> - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
<input type="checkbox"/> - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
<input type="checkbox"/> - 8447D	Hewlett-Packard	Amplifier (26 dB)	2944A06832
<input type="checkbox"/> - EMC-30	Electro-Metrics	EMI Receiver	191

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The **EQUIVALENT RADIATED EMISSIONS** measurements in the frequency range **1 GHz - 3 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
<input checked="" type="checkbox"/> - 8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
<input checked="" type="checkbox"/> - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
<input checked="" type="checkbox"/> - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
<input checked="" type="checkbox"/> - 8449B	Hewlett-Packard	Preamplifier	3008A00320
<input checked="" type="checkbox"/> - 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
<input type="checkbox"/> - 2F9-3C4-3C5	Wavecom	UHF PAL TV Modulator	185879
<input type="checkbox"/> - 2F1-3C4-3C5	Wavecom	VHF PAL TV Modulator	157728
<input type="checkbox"/> - A-8000	IFR	Spectrum Analyzer	1306
<input type="checkbox"/> - 8648B	Hewlett-Packard	Signal Generator	3623A01433
<input type="checkbox"/> - 8648B	Hewlett-Packard	Signal Generator	3623A01477
<input type="checkbox"/> - LMV-182A	Leader	RMS Milli-Voltmeter	8010091
<input type="checkbox"/> - 3202	Krhon-Hite	Active filter	5899
<input type="checkbox"/> - FMT115	Leaming	FM Modulator	NONE
<input type="checkbox"/> - 371	UDT	Optical power meter	06657
<input type="checkbox"/> - TSG95	Tektronix	PAL video / Audio generator	B028883
<input type="checkbox"/> -			

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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
- ☒ - Stand alone testing

Rationale for EUT setup / configuration:

ANSI C63.4

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Emission Test Results:

Conducted emissions 150 kHz - 30 MHz

The requirements are	<input type="checkbox"/> - MET	<input type="checkbox"/> - NOT MET
Minimum limit margin	dB	at MHz
Remarks:		

Radiated emissions (magnetic field) 10 kHz - 30 MHz
--

The requirements are	<input type="checkbox"/> - MET	<input type="checkbox"/> - NOT MET
Minimum limit margin	dB	at MHz
Remarks:		

Radiated emissions (electric field) 30 MHz - 1000 MHz
--

The requirements are	<input checked="" type="checkbox"/> - MET	<input type="checkbox"/> - NOT MET
Minimum limit margin	3.5 dB	at 294 MHz
Remarks:		

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

The requirements are	<input type="checkbox"/> - MET	<input type="checkbox"/> - NOT MET
Minimum limit margin	dB	at MHz
Remarks:		

Radiated emissions 1 GHz - 3 GHz

The requirements are	<input checked="" type="checkbox"/> - MET	<input type="checkbox"/> - NOT MET
Minimum limit margin	>10 dB	at GHz
Remarks:		

Antenna Terminal Disturbance Voltage 30 MHz - 1,000 MHz
--

The requirements are	<input type="checkbox"/> - MET	<input type="checkbox"/> - NOT MET
Minimum limit margin	dB	at MHz
Remarks:		

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GENERAL REMARKS:

The EUT's were tested in (3) orthogonal positions. The EUT automatically transmits less than (2) seconds per hour unless there is a pending emergency. There are (3) models being submitted under one application. All (3) models are schematically identical with respect to the transmitter. They will share a single FCC identifier.

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 05/24/2004

Testing End Date: 05/24/2004

- 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
292.5	94.3	26.0	2.0	14.2	84.5	73.5	77.3	-3.8
294.3	94.6	26.0	2.0	14.2	84.8	73.8	77.3	-3.5
295.6	93.6	26.0	2.0	14.2	83.8	72.8	77.3	-4.5
296.3	93.3	26.0	2.0	14.3	83.6	72.6	77.3	-4.7
585.1	48.0	26.0	2.7	19.0	43.7	32.7	57.3	-24.6
588.6	44.0	26.0	2.7	19.3	40.0	29.0	57.3	-28.3
591.3	41.7	26.0	2.7	19.3	37.7	26.7	57.3	-30.6
592.6	40.8	26.0	2.7	19.3	36.8	25.8	57.3	-31.5
877.7	47.6	26.0	3.4	22.8	47.8	36.8	57.3	-20.5
883.0	48.5	26.0	3.4	22.9	48.4	37.4	57.3	-19.9
886.9	47.2	26.0	3.4	22.9	47.5	36.5	57.3	-20.8
889.0	47.9	26.0	3.4	23.0	48.3	37.3	57.3	-10.0
1,169	40	30.0	4.1	25.8	39.9	28.9	57.3	-28.4
1,176	38	30.0	4.1	25.8	37.9	26.9	57.3	-30.4
1,755	37	30.0	6.3	26.3	39.6	28.6	57.3	-28.7

Average calculation - Duty cycle is (28%). [20 Log 0.28 = -11.05]

Bandwidth Plots

Per 15.231(3)(c)

Bandwidth is no wider than 0.25% of center frequency

Center frequency = 295 MHz

$$295,000,000 \text{ Hz} \times 0.0025 = 737,500 \text{ Hz}$$

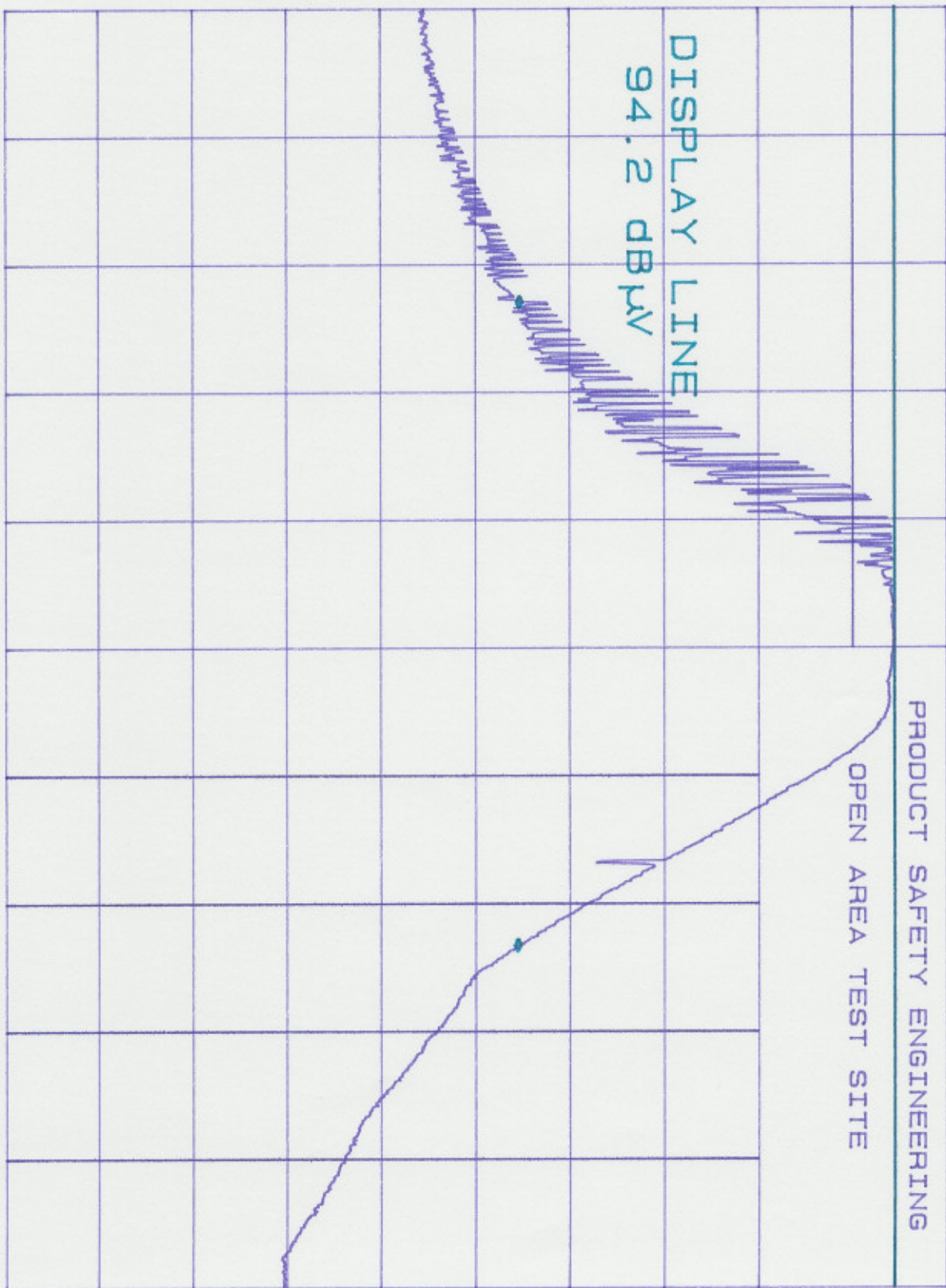
Widest bandwidth = 632,800 Hz

PRODUCT SAFETY ENGINEERING
REF 97.0 dBμV ATTN 0 dB

MKR Δ 503 KHZ
-0.10 dB

5 dB/
POS PK

DL
94.2
dBμV



CENTER 292.52 MHZ
RES BW 1 MHZ
VBW 1 MHZ
SPAN 1.00 MHZ
SWP 100 msec

PRODUCT SAFETY ENGINEERING
REF 97.0 dBμV ATTN 0 dB

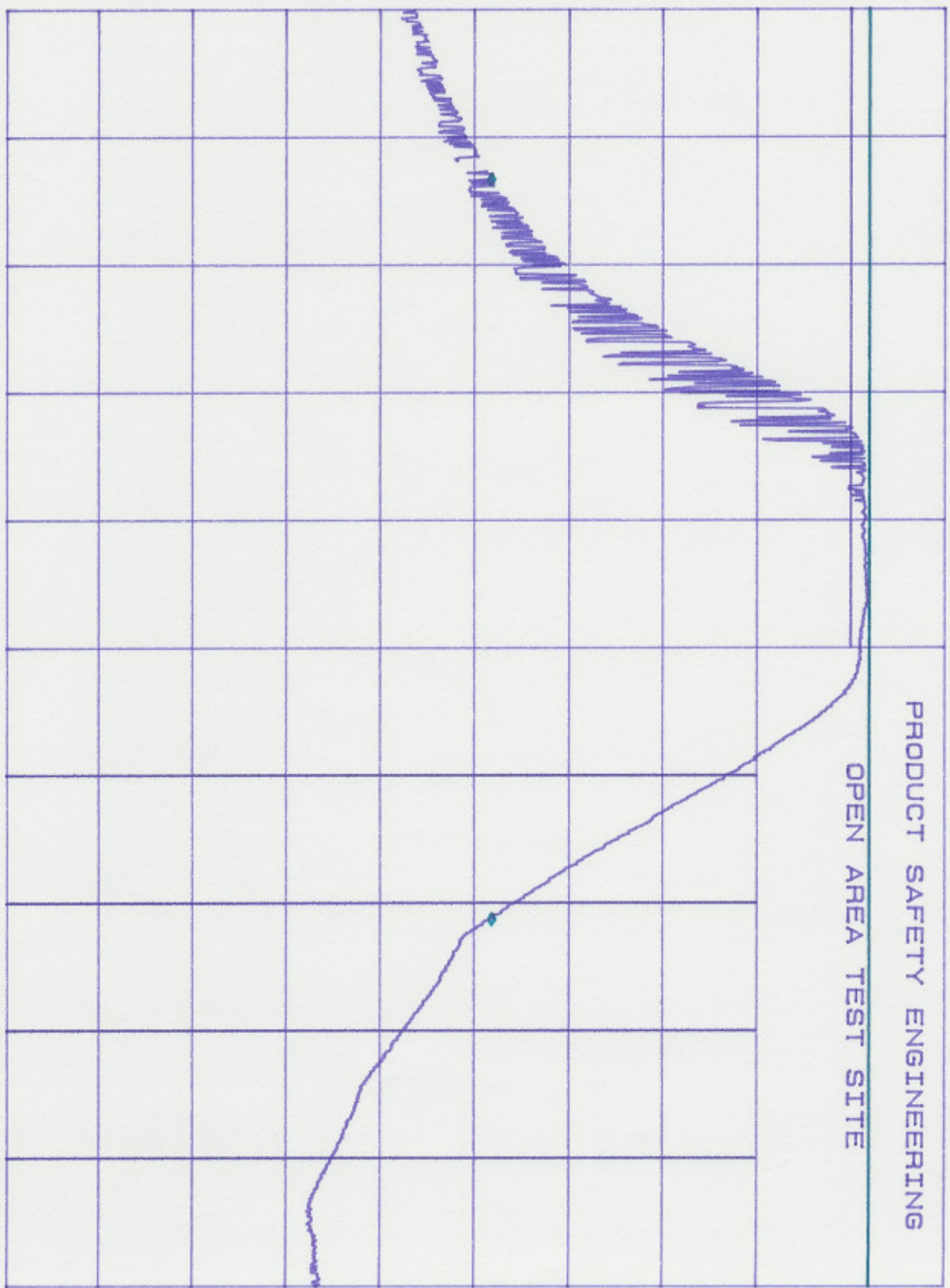
MKR Δ 580 KHZ
0.05 dB

A6

5 dB/

POS PK

DL
92.9
dBμV



CENTER 294.31 MHz
RES BW 1 MHz
VBW 1 MHz
SPAN 1.00 MHz
SWP 100 msec

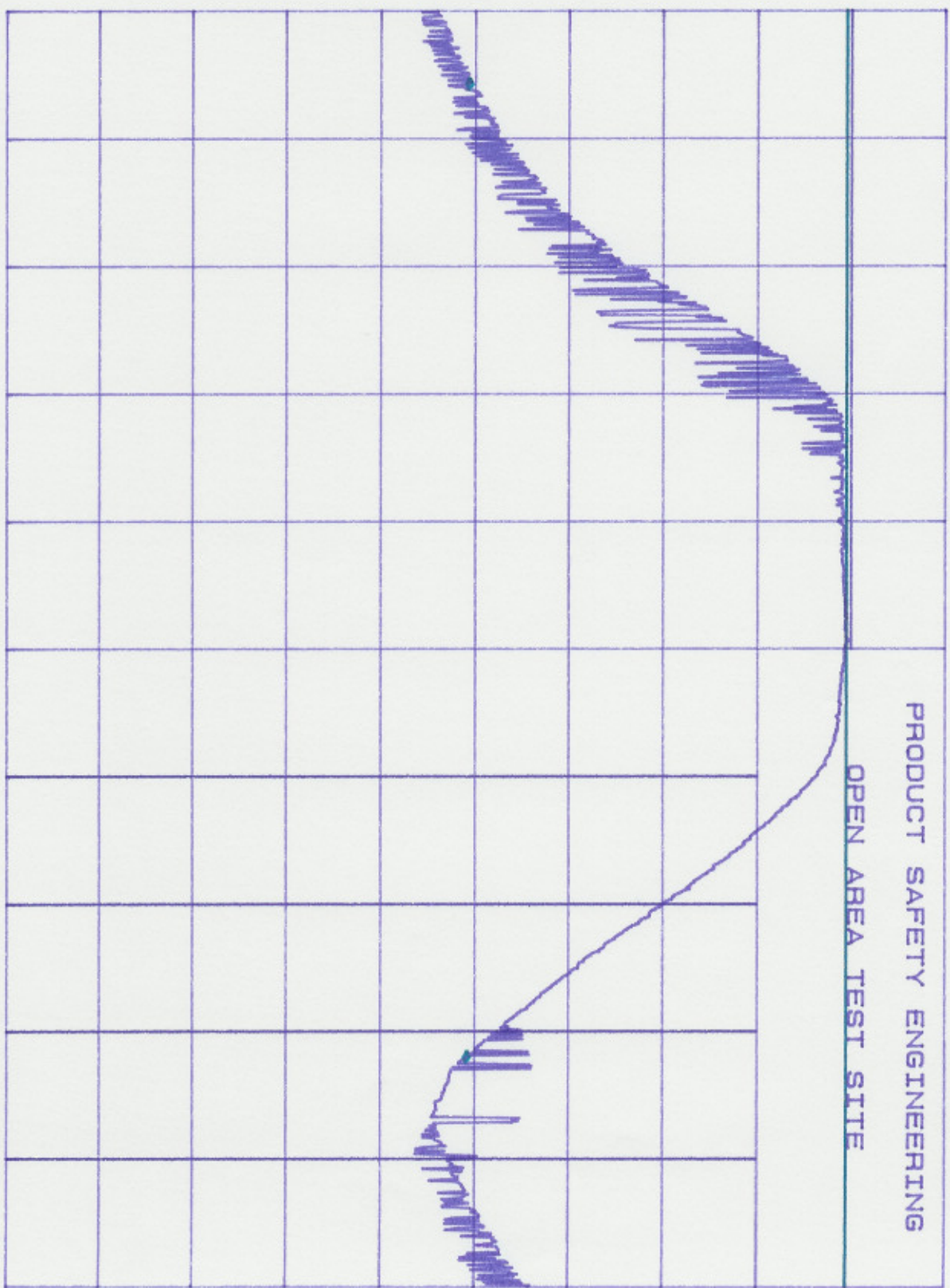
PRODUCT SAFETY ENGINEERING
hpa REF 97.0 dBμV ATTN 0 dB

MKR Δ 615.0 KHZ
-0.10 dB

A7

5 dB/
POS PK

DL
91.7
dBμV



CENTER 295.600 MHZ
RES BW 1 MHZ
VBW 1 MHZ
SPAN 806 KHZ
SWP 100 msec

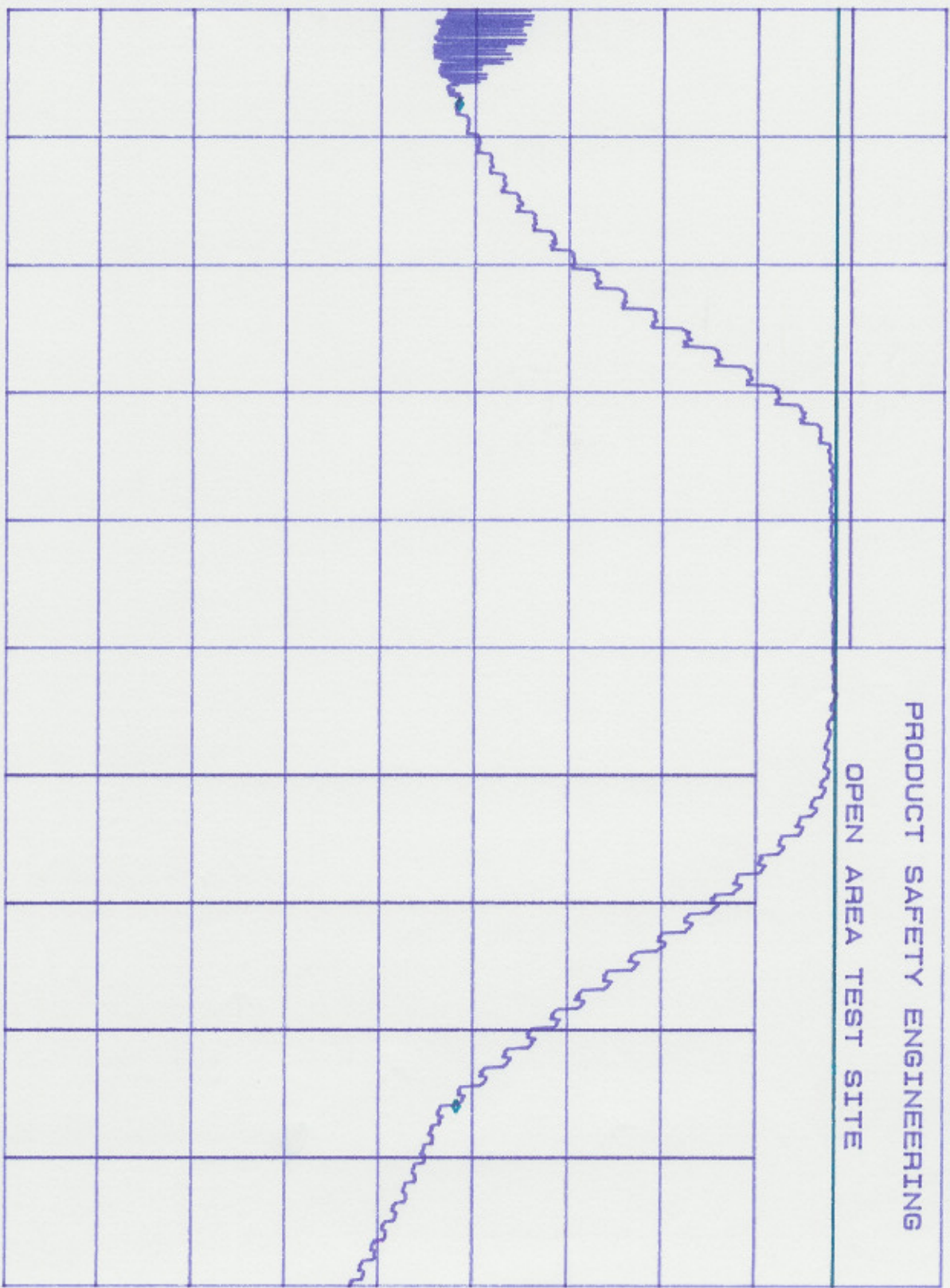
PRODUCT SAFETY ENGINEERING
REF 97.0 dBμV ATTN 0 dB

MKR Δ 632.8 KHz
0.00 dB

A8

5 dB/
POS PK

DL
91.2
dBμV



CENTER 296.254 MHz
RES BW 1 MHz
VBW 1 MHz
SPAN 805 KHz
SWP 100 sec

APPENDIX

B

System Under Test Description

APPENDIX

C

Measurement Protocol

The test methodology followed during the collection of the data included within this technical report was ANSI C63.4:1992.

The EUT was powered from internal battery during the collection of data included within.

The "unintentional radiator" data below is compared to the FCC Part 15 Class B "digital device" limits.

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		94.3	dB μ V	
ACF	+	14.3	dB/M	
Cable Loss	+	2.0	dB	
Preamp Gain	-	26.0	dB	
Actual Level		84.5	dB μ V/M	@ 292.5 MHz

Please have a company official review this report and sign.
