

EXHIBIT 6

TECHNICAL REPORT

Product Safety Engineering, Inc.
12955 Bellamy Bros. Blvd.
Dade City, FL 33525

FCC ID # NTX100

TEST REPORT



Accredited by the National Voluntary
Laboratory Accreditation Program for the
specific scope of accreditation under
Lab Code 200074-0

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

Custom Manufacturing & Engineering
7887 Bryan Dairy Road
Suite 110
Largo, FL 33777

Report Issue Date: 23 APR 98
Sample S/N: NONE
Sample Receipt Date: March 31, 1998

Test Report Number: 98F001B
Model Designation: NTX100
Product Description: Transmitter (418
MHz)

Sample Test Date: see data sheets

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 David Foerstner Name David Foerstner

Title Engineering Group Leader Date 23 APRIL 98

Reviewed by: Steve El-Hadi Date 23 APR 98
Approved Signatory

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

Test Report Number 98F001B

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 : 1991

☐ - Group 1

☐ - Group 2

☐ - Class A

☐ - Class B

☐ - EN 55014 : 1993

☐ - Household appliances and similar

☐ - Portable tools

☐ - Semiconductor devices

☐ - EN 55022 : 1994 / A1:1995

☐ - Class A

☐ - Class B

☐ - AS/NZS 3548:1992

☐ - Class A

☐ - Class B

☐ - VCCI : 1986

☐ - Class A

☐ - Class B

☒ - FCC Part 15

☐ - Class A

☒ - Class B

☒ - Certification

☐ - Verification

☐ - Notification

☐ - Declaration of Conformity

☐ - FCC Part 18

Test Report Number 98F001B

Environmental conditions during testing:

LAB

OATS

Temperature:

_____ : _____

Relative Humidity

_____ : _____

Atmospheric pressure

_____ : _____ millibars

Power supply system

: N/A Volts N/A Hz SINGLE phase

BATTERY POWERED ONLY

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
☐ -				

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	EM LPA	Log Periodic	2280

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

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The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1GHz - 5GHz 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
☒ -	8586B	Hewlett-Packard	Spectrum Analyzer	2618A02898
☒ -	85862A	Hewlett-Packard	Analyzer Display	2542A11984
☒ -	85850A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
☒ -	8449B	Hewlett-Packard	Preamplifier	3008A00320
☒ -	3115	Electro-Mechanics	Double Ridge Guide Horn	3810

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Product Safety Engineering, Inc 12955 Bellamy Brothers Blvd. Dade City, FL 33525
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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

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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
Maximum limit exceeding	dB	at	MHz

Remarks:

Radiated emissions (magnetic field) 10 kHz - 30 MHz

The requirements are ☐ - MET ☐ - NOT MET

Minimum limit margin	dB	at	MHz
Maximum limit exceeding	dB	at	MHz

Remarks:

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are ☒ - MET ☐ - NOT MET

Minimum limit margin	1.1 dB	at	417.9 MHz
Maximum limit exceeding	dB	at	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
Maximum limit exceeding	dB	at	MHz

Remarks:

Radiated emissions 1 GHz - 5 GHz

The requirements are ☒ - MET ☐ - NOT MET

Minimum limit margin	1.9 dB	at	3.762 GHz
Maximum limit exceeding	dB	at	GHz

Remarks: AVERAGE DETECTOR USED

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GENERAL REMARKS:

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

March 31, 1998

Testing End Date:

March 31, 1998

- PRODUCT SAFETY ENGINEERING INC -

Test Report Number 98F001B

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Test-setup photo(s):

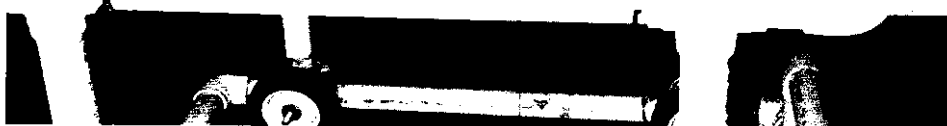
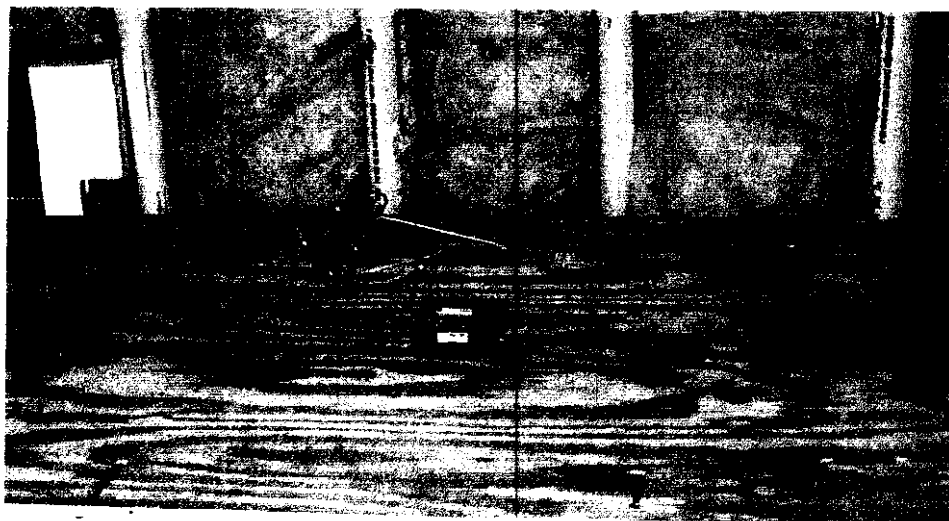
Conducted emission 450/150 kHz - 30 MHz

N/A

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



Test Report Number 98F001B

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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	12/29/98
Hewlett Packard	85662A	Display	2403A07352	12/29/98
Hewlett Packard	85650A	Quasi-Peak Adapter	2043A00209	12/29/98
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	2944A06832	06/30/98
Hewlett Packard	8568B	Spectrum Analyzer	2407A03213	05/13/98
Hewlett Packard	85662A	Display	2340A05806	05/13/98
Hewlett Packard	85650A	Quasi-Peak Adapter	2043A00358	04/14/98
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	2944A06901	10/08/98
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	1937A03247	10/16/98
Hewlett Packard	8449B	Preamp 1 - 26.5 GHz	3008A00320	12/02/98
Hewlett Packard	8648B	Signal Generator	3443U00312	04/29/98
Hewlett Packard	8672A	Signal Generator	2211A02426	05/11/98
Hewlett Packard	6842A	Harmonic / Flicker Tester	3531A00149	12/19/98
Eaton	96005	Log Periodic Antenna	1099	09/16/98
Electro-Metrics	LPA 30	Log Periodic Antenna	2280	08/25/98
Electro-Metrics	BIA 30	Biconical Antenna	3852	08/25/98
Electro-Metrics	BIA 25	Biconical Antenna	4283	09/16/98
Electro-Mechanics	3115	Double Ridge Guide Ant.	3810	04/15/99
Electro-Metrics	ALR30M	Magnetic Loop Antenna	824	10/13/98
Solar	8012	LISN	924840	09/14/98
Solar	8028	LISN	829012/809022	09/01/98
Solar	8028	LISN	903725/903726	08/14/98
Schwartzbeck	MDS-21	Absorbing Clamp	02581	10/02/98
Haefely-Trench	PSD25B	ESD Tester	082999-38	01/06/99
Haefely-Trench	PEFT-1	EFT/B Tester	082628-29	01/13/99
Leader	LFG1310	Function Generator	8060233	10/03/98
Haefely-Trench	Psurge 4	Surge Tester	083372-13	10/08/98
Holaday Ind.	HI 4422	Isotropic Probe	90310	03/17/99
IFR Systems	A-8000	Spectrum Analyzer	1306	04/09/98
Fischer Custom	F-33-1	RF Current Probe	360	09/30/99
Electro-Metrics	EMC-30	EMI Receiver	191	09/22/98
Boonton	4220A	RF Power Meter	204103AA	10/15/98
Boonton	51011	RF Power Meter	28823	10/15/98

PRODUCT EMISSIONS

PRODUCT SAFETY ENGINEERING Data File: 418MHZ TRANS. FCC-B FINAL 3-31-98

No	EMISSION	SPEC	MEASUREMENTS	SITE	CORR	COMMENTS					
	FREQUENCY	LIMIT	ABS	DLIM	MODE	POL	HGT	AZM	cm	deg	db
1	205.23	43.5	10.8	-32.7	PK	H	150	315			
2	320.33	46.0	18.7	-27.3	PK	H	150	315			
3	413.948	46.0	33.2	-12.8	PK	V	100	1			
4	417.979	46.0	91.2	45.2	PK	V	100	90			
5	421.973	46.0	28.3	-17.7	PK	V	100	90			
6	452.68	46.0	29.8	-16.2	PK	V	100	90			
7	464.62	46.0	28.1	-17.9	PK	H	150	45			
8	835.921	46.0	49.7	3.7	PK	V	100	90			

2.6 db under 4 ←											
1.1 db under 4 ←											

← 2.6 dB under *

← 1.1 dB under *

* 15.231 (2)

Limit @ 418 MHz = 72.3 dBu/m + 20 dB duty cycle reduction = 92.3 dBu/m

Limit @ 836 MHz = 52.3 dBu/m

026
3-31-98

Custom Manufacturing & Engineering Transmitter (418 MHz)

Measured @ 3 Meters

Frequency (GHz)	Spec Limit (dB μ V/M)	Measurement (dB μ V/M)	Δ Limit	Polarity	Mode	Height (cm)
1.253	54.0	53.3	-3.7	Horizontal	PK	150
1.671	54.0	46.5	-7.5	Horizontal	PK	200
2.089	54.0	52.9	-1.1	Horizontal	PK	300
2.507	54.0	42.7	-11.3	Horizontal	PK	150
2.936	54.0	39.1	-14.9	Vertical	PK	100
3.343	54.0	51.3	-2.7	Horizontal	PK	100
3.762	54.0	52.1	-1.9	Vertical	AVG	100
4.180	54.0	44.7	-9.3	Vertical	PK	150

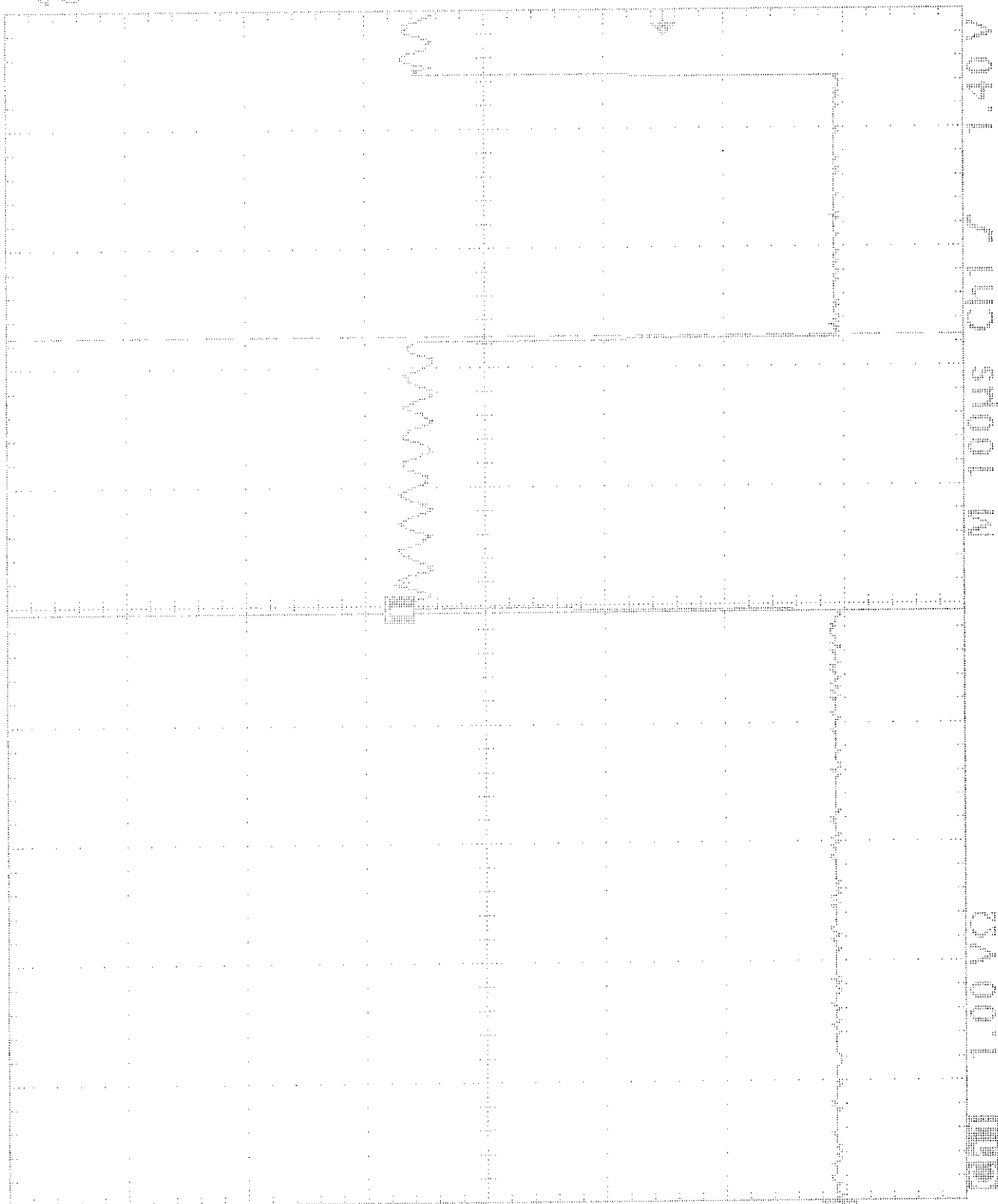
* NOTE: CW and Pulsed Operation Both Investigated. Highest Level Noted.

932
3-31-98

14



Δ: 232ns
Θ: 4ns



31 Mar 1998
12:37:22

TRANSMITTER

AC

PRODUCT SAFETY ENGINEERING

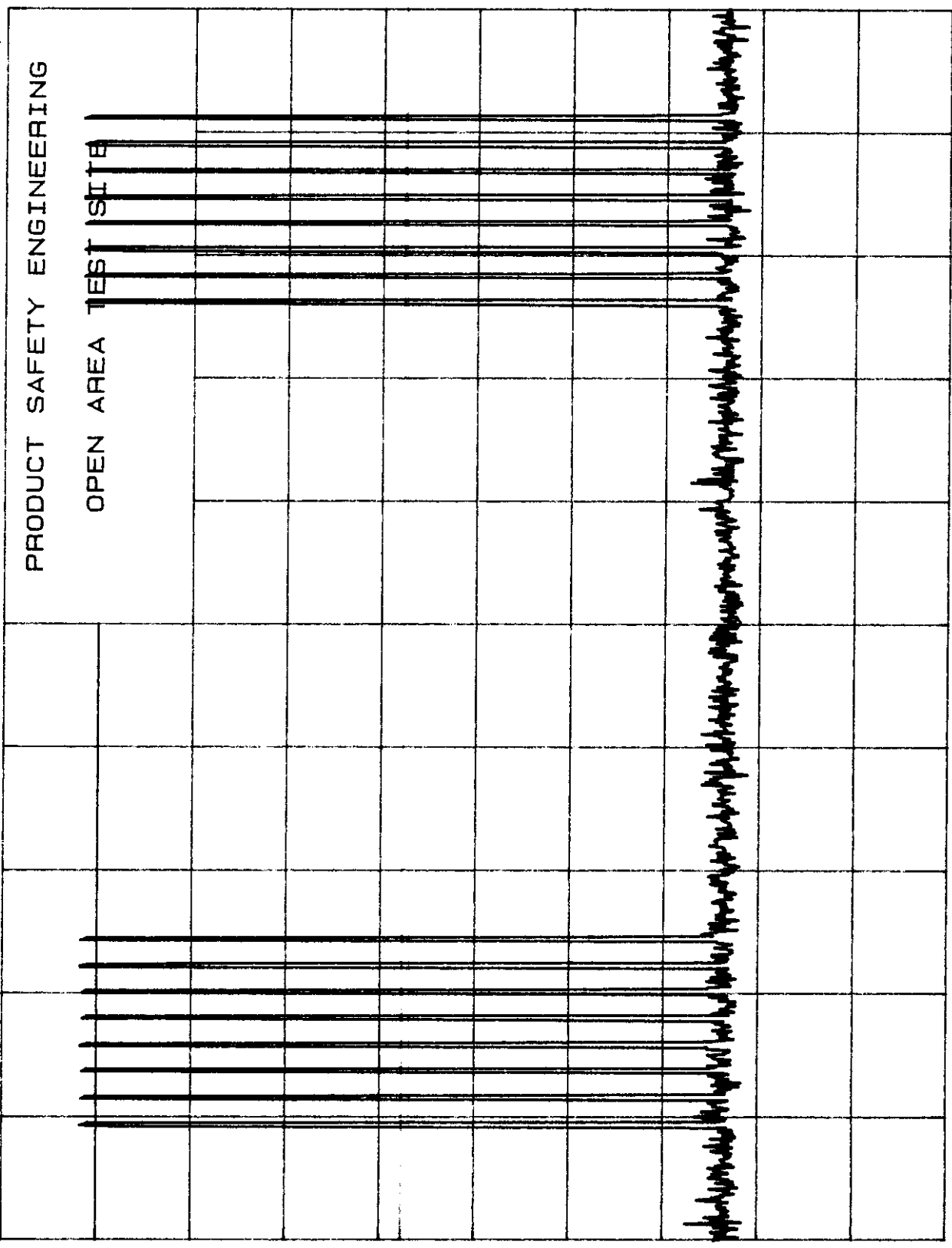
MKR 50.00 msec
29.30 dBμV

REF 107.0 dBμV ATTN 10 dB

hp

10 dB/

POS PK



CENTER 417.997 420 MHz

SPAN 0 Hz

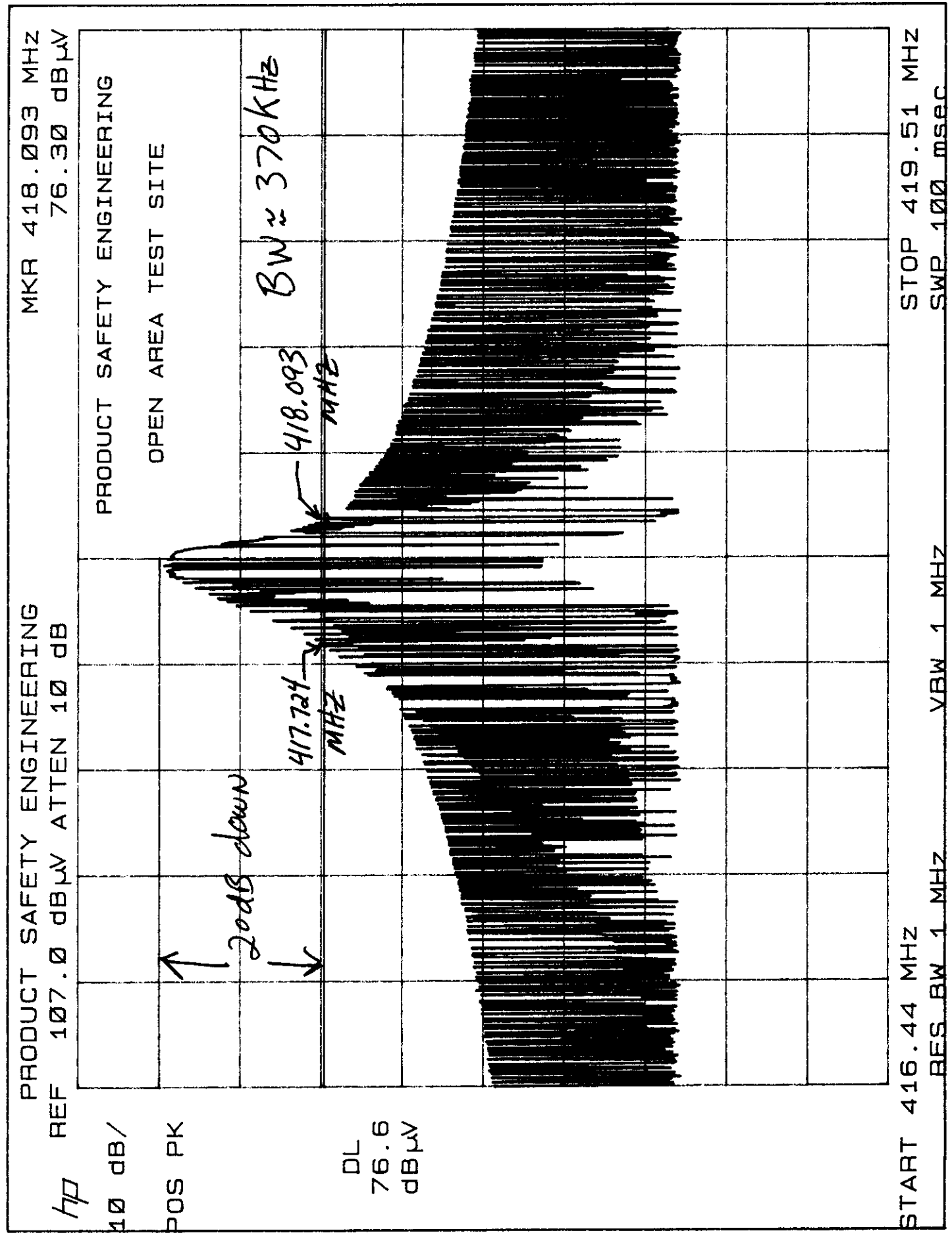
RES BW 1 MHz

VBW 1 MHz

SWP 100 msec

31 MARCH 90

418TX



APPENDIX

B

System Under Test Description

SYSTEM COMPONENTS

DEVICE TYPE:EUT CUSTOM MANUFACTURING AND ENGINEERING 418MHZ
TRANSMITTER M/N:NTX100

DEVICE TYPE:
FCC ID#:

DEVICE TYPE:
FCC ID#:

DEVICE TYPE:
FCC ID#:

DEVICE TYPE:
FCC ID#:

DEVICE TYPE:
FCC ID#:

DEVICE TYPE:
FCC ID#:

DEVICE TYPE:
FCC ID#:

DEVICE TYPE:
FCC ID#:

DEVICE TYPE:
FCC ID#:

INTERFACE CABLES

DEVICE TYPE:EUT
SHIELD:NO (UNTERMINATED)
LENGTH:1 METER
CONNECTOR TYPE:DEDICATED TO UNTERMINATED
PORT:

DEVICE TYPE:
SHIELD:
LENGTH:
CONNECTOR TYPE:
PORT:

DEVICE TYPE:
SHIELD:
LENGTH:
CONNECTOR TYPE:
PORT:

DEVICE TYPE:
SHIELD:
LENGTH:
CONNECTOR TYPE:
PORT:

DEVICE TYPE:
SHIELD:
LENGTH:
CONNECTOR TYPE:
PORT:

DEVICE TYPE:
SHIELD:
LENGTH:
CONNECTOR TYPE:
PORT:

AC LINE CORDS

DEVICE TYPE: EUT (BATTERY ONLY)
SHIELD: N/A
LENGTH: N/A
CONNECTOR TYPE: N/A

DEVICE TYPE:
SHIELD:
LENGTH:
CONNECTOR TYPE:

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DEVICE TYPE:
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DEVICE TYPE:
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LENGTH:
CONNECTOR TYPE:

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 with (120) VAC / (60) Hz during the collection of data included within.

The data is compared to the FCC Class B limits.

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

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

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

Observed Level	<u>97.0</u>	dBuV	
ACF	<u>17.2</u>	dB/M	
Cable Loss	<u>3.0</u>	dB	
Preamp Gain	<u>26.0</u>	dB	
Actual Level	<u>91.2</u>	dBuV/M	@ <u>418</u> MHz

Please have a company official review this report and sign.

06-22-1998 09:44AM FROM 4MBC LARGO, FL

TO

913525882544 P.02



**CUSTOM MANUFACTURING
& ENGINEERING, INC.**

7087 Bryan Dairy Road - Suite 110
Largo, Florida 33779-1442
(813) 547-0709
1-800-845-8811
FAX #: (813) 541-8822

Description of the Transmission Timing in the RF Meter Read System

Reference: FCC ID: NTK100 and NTK200.

The Transmitter and Repeater (Collector) components of the RF Meter Read system intermittently transmit variable data. Our transmissions are On-Off Keyed (OOK), where a transmitted "zero" is represented by zero output power. Since our intent was to maximize the range of the transmitters, we employed the averaging rules to allow us the 20dB relaxation defined in the FCC rules (see Part 15.35). To successfully obtain FCC certification under Part 15.231(d), we acknowledged the following:

1. the silent period between transmissions must be 30 times the duration of the transmission,
2. the transmission duration must be less than one (1) second, and
3. the "duty cycle", or on/off ratio, over any 100 millisecond period, must be less than 10%.

These requirements were met as follows (the following comments apply to both the Transmitter and Repeater components, except where noted):

1. The Transmitter transmits every 5 to 6 hours. The exact period is randomized, but never less than 5 hours. The Repeater will not transmit more than once per 91 second period. This is guaranteed by the firmware in the Repeater, in conjunction with an internal real-time clock.
2. The amount of data being transmitted is fixed; therefore, the duration of the transmissions are fixed. This duration is always less than one second.
3. The "duty cycle", or on/off ratio, over any 100 millisecond period is always less than 10%. This is guaranteed by the encoding scheme used by the system. A transmission consists of a maximum of 236 "on" pulses. This is a theoretical maximum, and would never be realized in actual use, but is determined to derive worst-case conditions. The duration of each pulse is approximately 250 microseconds (this is dependent on the tolerance of the oscillator, which is 5%). There is a 50 millisecond blank period after each 16 pulses; no pulses are transmitted during this period. Therefore, the maximum number of pulses during a 100 millisecond period would be two 16-bit pulse trains, or 32 pulses. At 250 microseconds per pulse, this amounts to a total ON time of 8 milliseconds. Thus, the On/Off ratio is 8%. A ratio of 10% or less allows the 20dB relaxation on the power limitations.

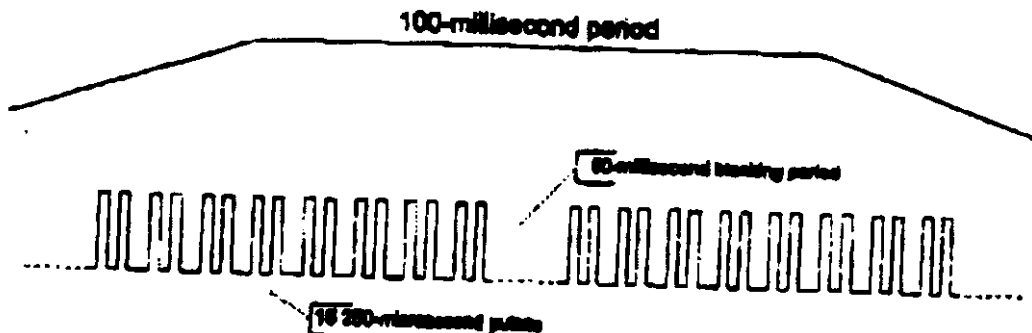


Figure 1.

PRODUCT SAFETY ENGINEERING

MR 50.00 msec
29.30 dBμV

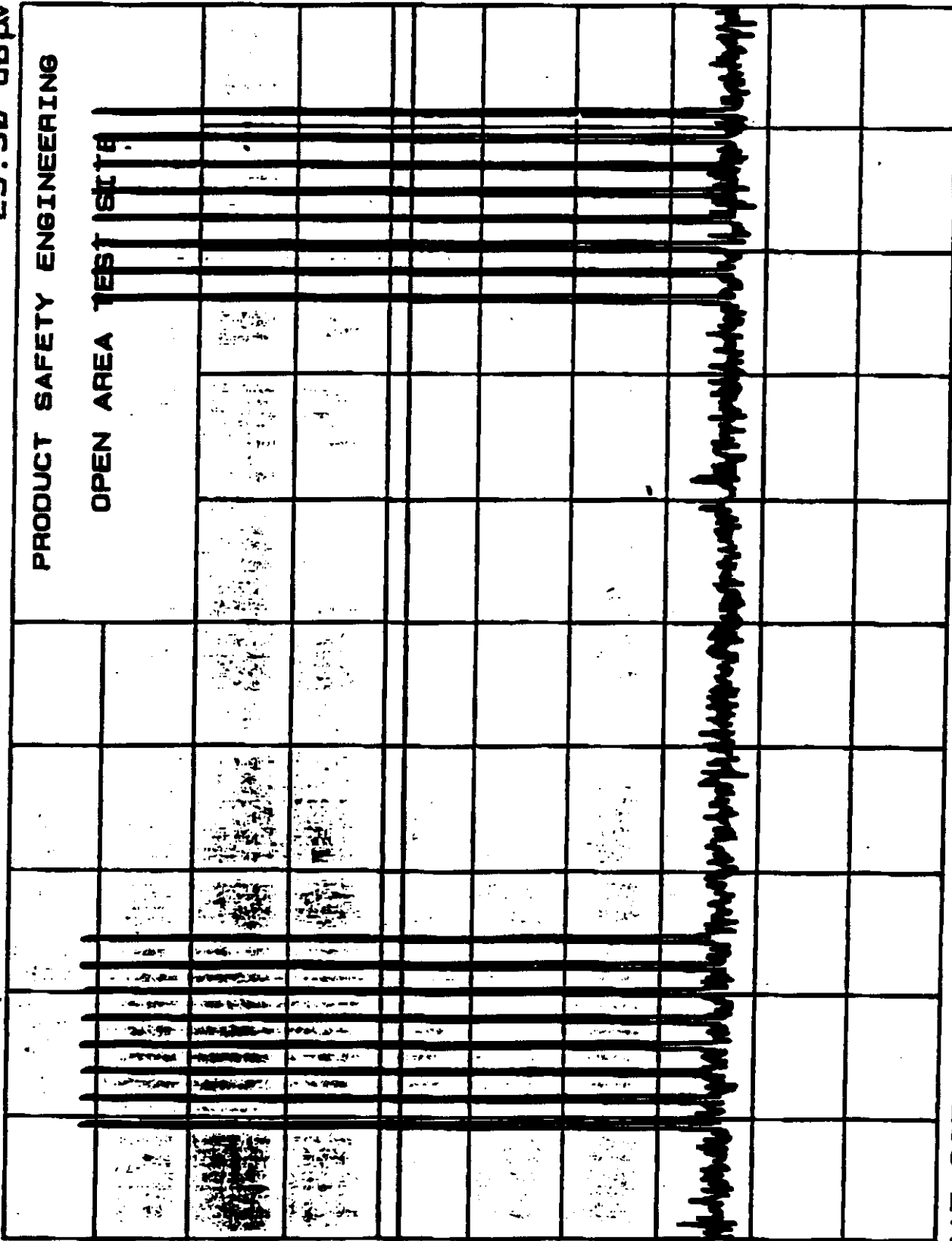
REF 107.0 dBμV ATTN 10 dB

10 dB/

POS PK

PRODUCT SAFETY ENGINEERING

OPEN AREA TEST



CENTER 417.997 420 MHz

SPAN 100 MHz

BW 1 MHz

VBW 1 MHz

SWP 100 msec