

TEST REPORT



Testing 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

Freedom Scientific Inc.
11800 31st Court N
St Petersburg, FL 33716

Report Issue Date: 11 Jul 07
Sample S/N: None
Sample Receipt Date: 30 mar 07
Sample Test Date: see data sheets

Test Report Number: 07F169
Model Designation: 10 Button Remote
Product Description: 433 MHz Transmitter

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 11 Jul 07

Reviewed by:
Approved Signatory  Date 11 Jul 07

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Product Safety Engineering, Inc 12955 Bellamy Brothers Blvd. Dade City, FL 33525
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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

- EN 61000-6-3:2001
- EN 61000-6-4:2001

- EN 55011 : 1998 / A1:1999
 - Group 1
 - Class A
- EN 55013 : 1990 / A12:1994 / A13:1996 / A14:1999
 - Group 2
 - Class B

- EN 55014 -1: 2001
 - Household appliances and similar
 - Portable tools
 - Semiconductor devices

- EN 55022 (1998) /A1:2001 /A2:2003
 - 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 : 2x AAA Batteries Volts

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"/>	3148	EMCO	Log Periodic Antenna	00044783
<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 type="checkbox"/>	3148	EMCO	Log Periodic Antenna	00044783
■	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
<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
■	LPA30	Electro-Metrics	Log Periodic	2280
<input type="checkbox"/>	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
<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 -4.4 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:

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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 8.9 dB at 433.2 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 - 4.4 GHz

The requirements are - MET - NOT MET
Minimum limit margin 1.8 dB at 1.3 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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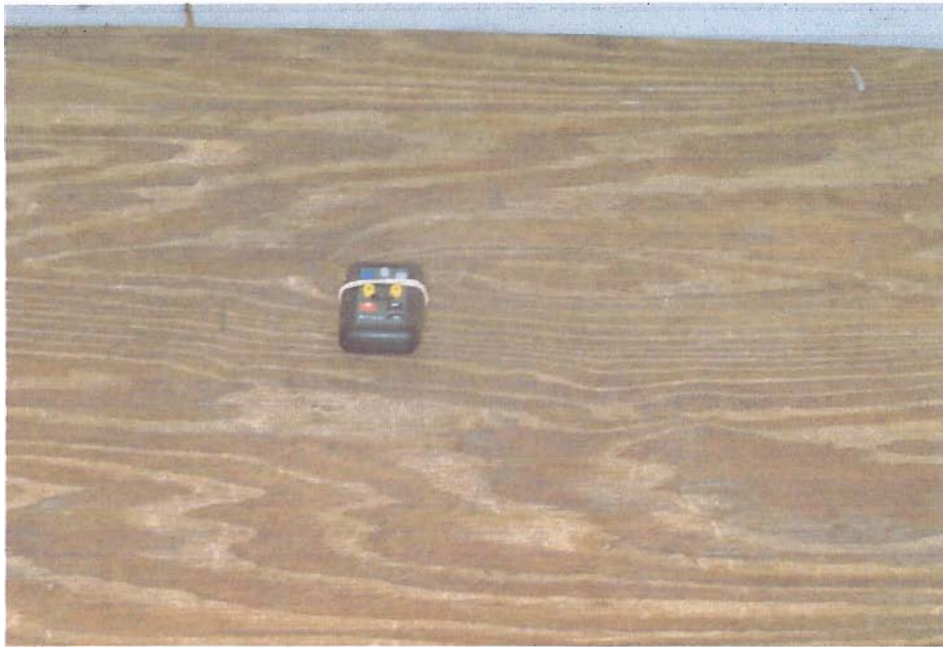
Test-setup photo(s):
Conducted emission 150 kHz - 30 MHz

N/A

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



Test Report Number 07F169B

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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	07/18/07
Hewlett Packard	85662A	Display	2403A07352	07/18/07
Hewlett Packard	85650A	Quasi-Peak Adapter	2043A00209	07/18/07
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	2944A06832	12/04/07
Hewlett Packard	8568B	Spectrum Analyzer	2407A03213	07/18/07
Hewlett Packard	85662A	Display	2340A05806	07/18/07
Hewlett Packard	85650A	Quasi-Peak Adapter	2043A00358	07/18/07
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	2944A06901	07/18/07
Hewlett Packard	8447D	Preamp 0.1 - 1,000 MHz	1937A03247	05/11/07
Hewlett Packard	8449B	Preamp 1 - 26.5 GHz	3008A00320	05/11/07
Hewlett Packard	8648B	Signal Generator	3443U00312	05/24/07
Hewlett Packard	8672A	Signal Generator	2211A02426	12/04/07
EMCO	3148	Log Periodic Antenna	00044783	03/24/07
Electro-Metrics	LPA 30	Log Periodic Antenna	2280	12/22/07
Electro-Metrics	BIA 30	Biconical Antenna	3852	12/28/07
Electro-Metrics	BIA 25	Biconical Antenna	4283	04/10/07
Electro-Mechanics	3115	Double Ridge Guide Ant.	3810	11/28/07
Electro-Metrics	ALR30M	Magnetic Loop Antenna	824	12/27/07
Solar	8012	LISN	924840	04/06/07
Solar	8028	LISN	829012/809022	01/05/08
Solar	8028	LISN	903725/903726	12/13/07
Schwartzbeck	MDS-21	Absorbing Clamp	02581	04/27/07
Leader	LFG1310	Function Generator	8060233	05/24/07
Electro-Metrics	EMC-30	EMI Receiver	191	05/24/07
Antenna Research	ALA-130/A	Loop Antenna	106	06/06/07
Cole-Palmer	9970-00	Digital Barometer	61493735	03/13/07
EMC Automation	HLP3003C	Hybrid Log Periodic	017501	05/02/07

Frequency (GHz)	Spec Limit (dB μ V/M)	Measurement (dB μ V/M)	Δ Limit	Polarity	Height (cm)
433.2	80.8	71.9	-8.9	Vertical	100
866.3	60.8	51.0	-9.8	Vertical	100
*** 1.300	54.0	52.2	-1.8	Horizontal	100
1.733	60.8	44.4	-16.4	Horizontal	100
2.166	60.8	49.8	-11.0	Horizontal	100
2.600	60.8	46.1	-14.7	Vertical	100
3.032	60.8	37.5	-23.3	Vertical	100
3.466	60.8	36.0	-24.8	Vertical	100
*** 3.899	54.0	41.2	-12.8	Horizontal	100
*** 4.332	54.0	43.1	-10.9	Horizontal	100

Frequency (GHz)	Spec Limit (dB μ V/M)	Measurement (dB μ V/M)	Δ Limit	Polarity	Height (cm)
434.5	80.8	71.6	-9.2	Vertical	100
869	60.8	51.2	-9.6	Vertical	100
*** 1.303.6	54.0	52.0	-2.0	Horizontal	100
1.738	60.8	43.9	-16.9	Horizontal	100
2.172	60.8	49.2	-11.6	Horizontal	100
2.607	60.8	46.5	-14.3	Vertical	100
3.041	60.8	37.0	-23.8	Vertical	100
3.476	60.8	35.7	-25.1	Vertical	100
*** 3.910	54.0	41.6	-12.4	Horizontal	100
*** 4.345	54.0	43.8	-10.2	Horizontal	100

******* Restricted Band / All measurements are quasi-peak / Measured @ 3 Meters

PRODUCT SAFETY ENGINEERING
MKR Δ 301.9 KHZ
-0.30 dB

PRODUCT SAFETY ENGINEERING
ATTEN 0 dB

PRODUCT SAFETY ENGINEERING
REF 77.0 dB μ V

HP

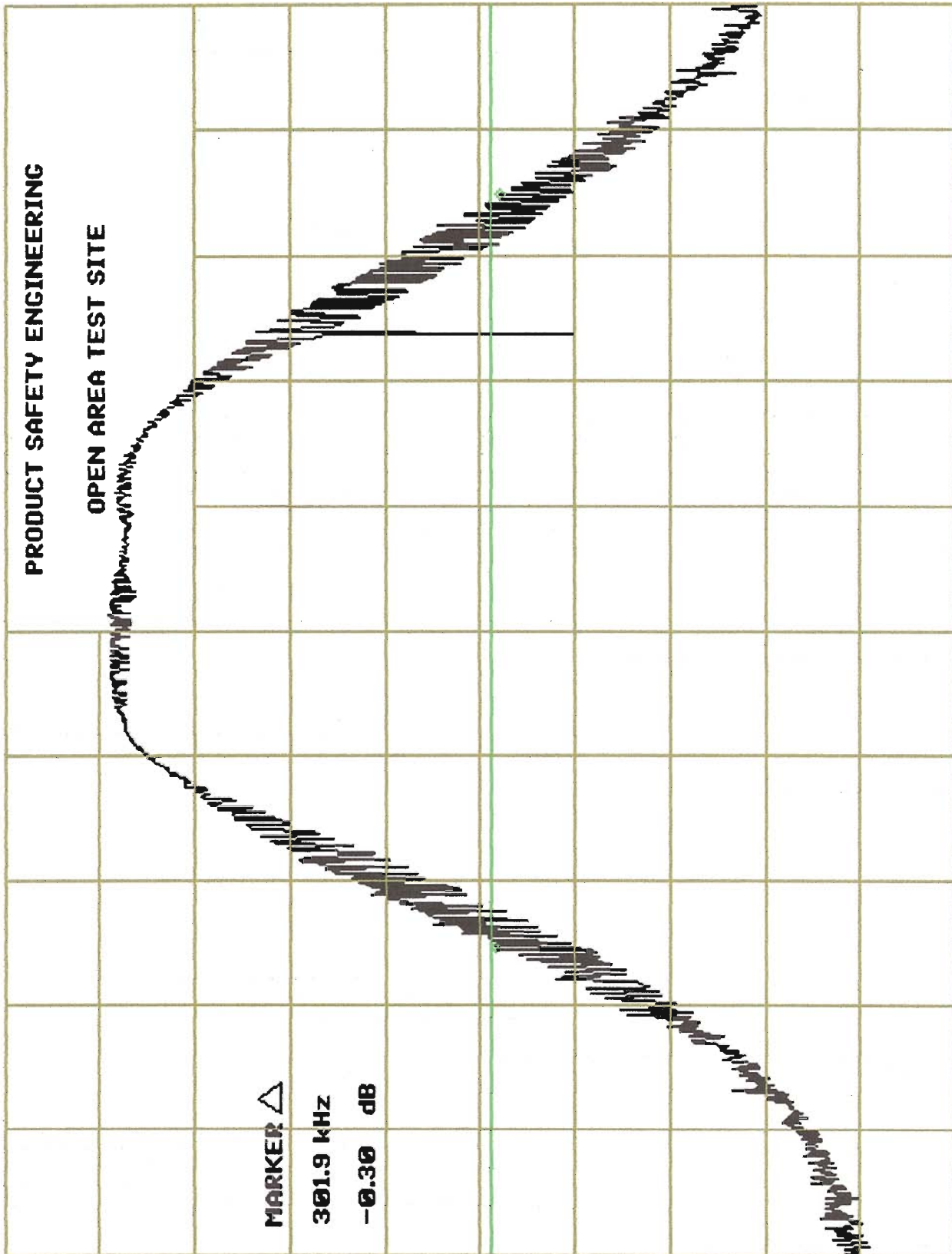
5 dB/

POS PK

PROJECT 87F169

DL
51.4
dB μ V

MARKER Δ
301.9 KHZ
-0.30 dB



CENTER 434.584 MHZ
RES BW 1 MHZ

UBW 1 MHZ

SPAN 499 KHZ
SWP 100 msec

A4 OF A6

PRODUCT SAFETY ENGINEERING
MKR 434.585 MHz
72.65 dBμV

PRODUCT SAFETY ENGINEERING
ATTEN 0 dB

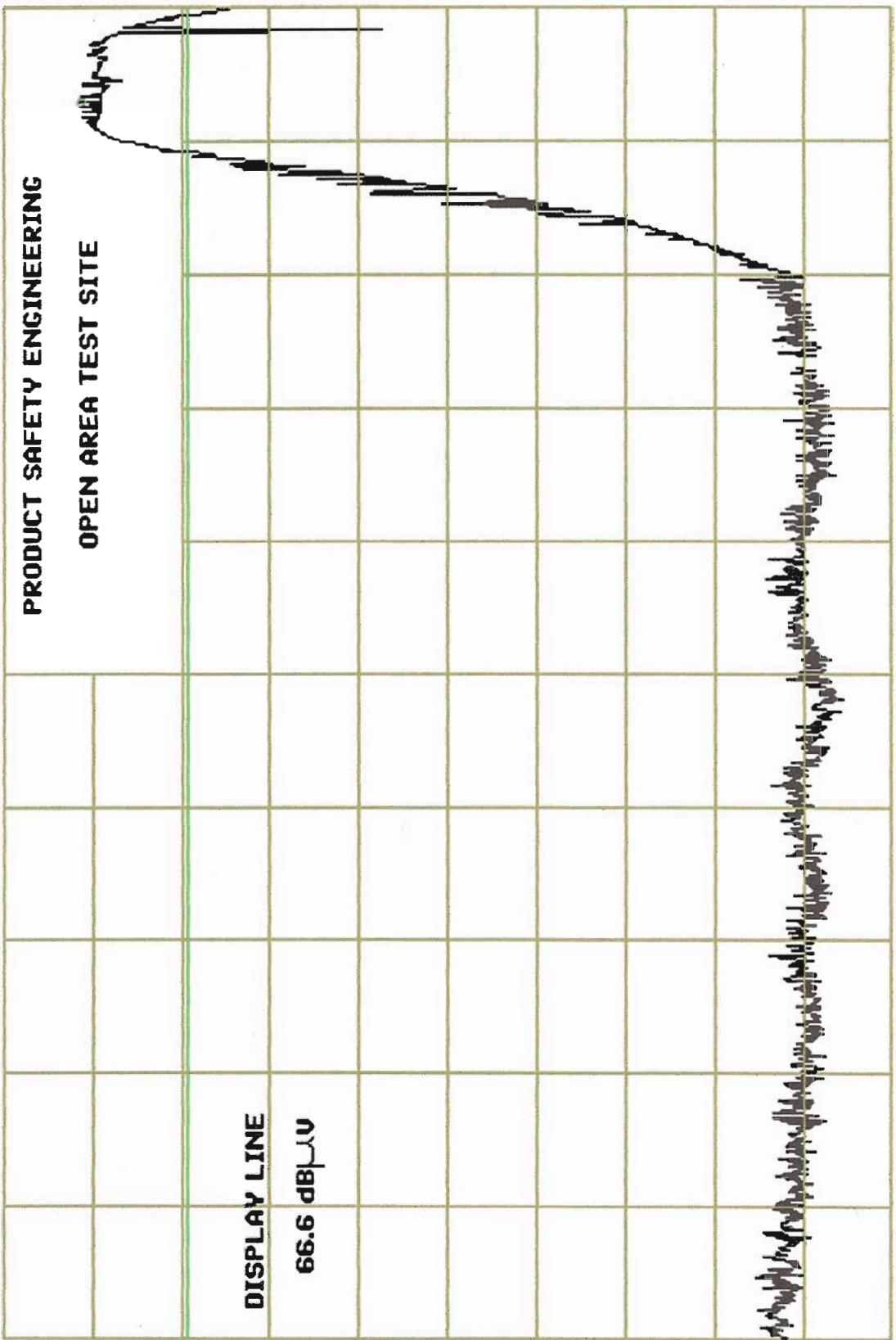
REF 77.0 dBμV

5 dB/

hp

POS PK

DL
66.6
dBμV



DISPLAY LINE
66.6 dBμV

PRODUCT 434.585

A6 of A6

START 433.05 MHz
RES BW 1 MHz
UBW 1 MHz

STOP 434.70 MHz
SWP 100 msec

APPENDIX

B

System Under Test Description

SYSTEM COMPONENTS

DEVICE TYPE: EUT, FREEDOM SCIENTIFIC 10 BUTTON REMOTE

INTERFACE CABLES

DEVICE TYPE: **NONE**

SHIELD:

LENGTH:

CONNECTOR TYPE:

PORT:

AC LINE CORDS

DEVICE TYPE: **NONE**

SHIELD:

LENGTH:

CONNECTOR TYPE:

APPENDIX

C

Measurement Protocol

The test methodology followed during the collection of the data included within this technical report was ANSI C63.4:2003.

The EUT was powered with (3) VDC during the collection of data included within.

The data is compared to the FCC Part 15 Class B 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		73.0	dB μ V	
ACF	+	17.2	dB/M	
Cable Loss	+	7.7	dB	
Preamp Gain	-	<u>26.0</u>	dB	
Actual Level		71.9	dB μ V/M	@ 433.2 MHz

Please have a company official review this report and sign.
