

dBi Corporation
FCC Certification Test Report
Point Six P6EZIO
Report Number 06dBi007a
(this test report replaces test report 06dBi007)



Laboratory
Certificate Number 1985-01

ADMINISTRATIVE INFORMATION

Historical record:

Because dBi Corporation is a testing entity, and not a manufacturer, this original test report of the P6EZIO is being transmitted to the manufacturer, Point Six. dBi will keep a copy for its historical records and to satisfy A2LA-Audit requirements. We strongly recommend archiving the unit that we tested to facilitate answering future inquiries regarding this product.

Retention of records:

The FCC requires the records for a Class A or Class B product to be retained by the responsible party for at least two years after the manufacture of said product has been permanently discontinued. These records should include the original certification or verification product report, quality audit data, and the test procedures used.

The European Union requires the Declaration of Conformity (DoC) and all supporting data for a product bearing the CE Mark to be retained, and available for inspection by enforcement authorities, for 10 years after placing the product on the market.

Australia and New Zealand require the Declaration of Conformity, test reports, a description of the product, documentation that clearly identifies the product, and paperwork showing the product's brand name, model number, etc. to be kept for at least five years after the product ceases to be supplied to Australia or New Zealand.

Measurement uncertainties:

The Lexmark Electromagnetic Compatibility Laboratory (EMC Lab) has a documented calculation of the measurement uncertainties associated with tests performed at the Lexmark site.

Ongoing compliance:

This report applies only to the sample tested. The manufacturer has full responsibility for ensuring that the production models of the P6EZIO comply with the FCC and CE Mark requirements, and continue to comply throughout their manufacturing life. The manufacturer should check all changes to the product that could change its interference profiles.

A2LA approval:

dBi Corporation has been accredited by the American Association for Laboratory Accreditation (A2LA) for Radiated Emissions and Conducted Emissions, Electromagnetic Interference, and Electrostatic Discharge testing. Copies of our Accreditation Certificate and Scope of Accreditation follow.

The Federal Communications Commission (FCC) recognized the Lexmark site as meeting the requirements of section 2.948 of the FCC Rules in a letter dated December 10, 2001. This information is on file with the FCC under Registration No. 949691.

Please note: This report may be copied as needed, as long as it is copied in its entirety.



THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

DBI CORPORATION
Lexington, KY

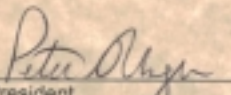
for technical competence in the field of

Electrical Testing

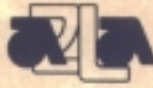
The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing.

Presented this 21st day of September 2004.




President
For the Accreditation Council
Certificate Number 1985-01
Valid to September 30, 2006

For tests or types of tests to which this accreditation applies,
please refer to the laboratory's Electrical Scope of Accreditation.



American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

dBİ CORPORATION¹
216 Hillsboro Avenue
Lexington, KY 40511-2105
John R. Barnes Phone: 859 253 1178

ELECTRICAL (EMC)

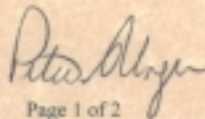
Valid To: September 30, 2006

Certificate Number: 1985-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests:

<u>Test Technology</u>	<u>Test Method(s)</u>
Radiated Emissions	CFR 47, FCC Method Part 15, Class A and B (using ANSI C63.4-2001) AS/NZS 3548-1995, AS/NZS CISPR 22:2002 CISPR 22-2003, 1997, 1993 EN 55022-1994, 1998 VCCI 2002
Conducted Emissions	CFR 47, FCC Method Part 15, Class A and B (using ANSI C63.4-2001) AS/NZS 3548-1995, CISPR 14-1:2000; EN 55014-1:2000; AS/NZS CISPR 22:2002; CISPR 22-2003, 1997, 1993 EN 55022-1994, 1998 VCCI 2002
Harmonics	IEC 61000-3-2:1995, 2001, EN 61000-3-2:1995, 2000
Flicker	IEC 61000-3-3:1994, 2002; EN 61000-3-3:1995
<u>Immunity</u>	
Electrostatic Discharge (ESD)	IEC 61000-4-2:1995 EN 61000-4-2:1995
Radiated Immunity	IEC 61000-4-3:1995, 2002 EN 61000-4-3:1996
Electrical Fast Transient/Burst	IEC 61000-4-4:1995 EN 61000-4-4:1995

(A2LA Cert. No. 1985-01) 09/21/01


Page 1 of 2

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974

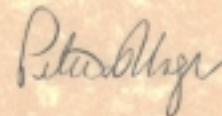


Test Technology	Test Method(s)
Surge Immunity	IEC 61000-4-5:1995 EN 61000-4-5:1995
Conducted Immunity	IEC 61000-4-6:1996 EN 61000-4-6:1996
Magnetic Field Immunity	IEC 61000-4-8:1993, 2001 EN 61000-4-8:1993
Voltage Dips/Interruption Immunity	IEC 61000-4-11:1994, 2001 EN 61000-4-11:1994
ITE Product Family	CISPR 24:1997 EN 55024:1998
Generic Devices for Residential, Commercial, and Light Industrial Use	EN 61000-6-1:2001; EN 61000-6-3:2001; AS/NZS 4251.1-1999
Generic Devices for Industrial Use	EN 61000-6-2:1999, 2001
Electrical Equipment for Measurement, Control, and Laboratory Use	IEC 61326:1997, 2002 EN 61326:1997

On materials and products related to the following:

Information Technology Equipment - Computers, Printers, Peripheral Devices;
Generic Devices for residential, commercial, and light industrial use;
Generic Devices for industrial use;
Electrical equipment for measurement, control and laboratory use

¹ NOTE: Testing is performed using the equipment and facilities at Lexmark International EMC Laboratory (A2LA Accreditation Certificate 0872-01)



ADMINISTRATIVE DATA

Manufacturer:

Point Six Wireless LLC
2333 Alumni Park Plaza, Suite 305
Lexington, KY 40517

Appliance/Product: P6EZIO

Model/Type Number: P6EZIO

FCC ID: M5ZP6EZIO

Rating: 3.6Vdc (Lithium battery)

Measurement Equipment used: see attached sheets.

Measurements According to, and Sample Unit Complies with:

FCC 47 CFR Part 15-2005, using ANSI C63.4-2003

Report Prepared By: John R. Barnes KS4GL, PE, NCE, NCT, ESDC Eng, ESDC Tech, PSE,
SM IEEE

Testing Performed by:

dBi Corporation
216 Hillsboro Avenue
Lexington, KY 40511-2105, USA

Testing Performed on:

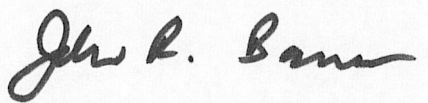
May 10, 2006

Testing Performed at:

Lexmark International, Inc.
Development Lab.
Lexington, KY 40550, USA

Suppression Components: see attached sheet.

Reviewed and Approved by: John R. Barnes KS4GL, PE, NCE, NCT, ESDC Eng, ESDC Tech,
PSE, SM IEEE



SIGNED _____ **DATE** May 16, 2006
John R. Barnes, PRESIDENT dBi Corp.

INFORMATION RELATING TO PRODUCT RF INTERFERENCE
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Appliance/Product: P6EZIO

Model/Type Number: P6EZIO

FCC ID: M5ZP6EZIO

Rating: 3.6Vdc (Lithium battery)

Suppression Components: none

Clock Frequencies: 8MHz, and 418MHz

Cables: 2-wire switch cable, unshielded, 1.65m

Electronic Printed Circuit Boards:

XL-418-A1

Size of Product: 78mm x 49mm x 24mm high

Weight of Product: 60g

Radiated Emissions 30-4,180 MHz (Internal Battery)

Radiated Emission Standards:

FCC 47 CFR Part 15-2005, using ANSI C63.4-2003; section 15.231(e) limits for 418MHz.

Appliance/Product: P6EZIO

Model/Type Number: P6EZIO

FCC ID: M5ZP6EZIO

Rating: 3.6Vdc (Lithium battery)

Serial Number: 60509000

Host and Other Peripherals: None

Name of Test: Radiated Interference

Test Procedure: ANSI C63.4-2003

Test Location: 10m and 5m semianechoic chambers

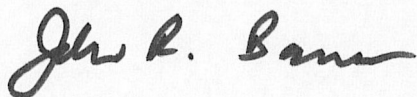
Test Distance: 3m

Test Instrumentation: See attached sheets

Notes: Transmitting at 1 second intervals to speed up testing. We measured peak (PK+), quasi-Peak (QP), and average (AVE) at 418MHz with 20dB and 20dB+10dB attenuators at the antenna, to make sure that we didn't have errors from signal compression. Below 1000MHz we measured PK+, QP, and AVE in manual mode after maximizing QP emissions. For PK+ and QP measurements we were able to read values to 0.01dB by using an 0.5 second sample time. For AVE measurements we used the 0.1 second sample time of Section 15.35(c)). Since we were only able to read AVE values to 1dB, we added 0.99dB to the highest reading we saw. For measurements from 30MHz-1,000 MHz the 6dB resolution bandwidth (RBW) was 120kHz. Above 1,000MHz the 6dB RBW was 1MHz. All measurements were made in EMI Receiver mode, so video bandwidth (VBW) didn't apply, the bandwidth error is under 10% and the shape factor (B(60dB) / B (6dB)) is under 10.

Under Section 15.231(e), the average limit for the fundamental is calculated by linear interpolation from 1500uV/m at 260MHz to 5000uV/m at 470MHz when measured at 3m. Average limit = $((5000\text{uV/m}-1500\text{uV/m}) \cdot (418\text{MHz}-260\text{MHz}) / (470\text{MHz}-260\text{MHz})) + 1500\text{uV/m} = 4133\text{uV/m}$
 $= 20 \cdot \log(4133) \text{ dB(uV/m)} = 72.33\text{dB(uV/m)}$. Section 15.35(b) sets the peak limit for the fundamental to 20 dB above the average limit, or 92.33dB(uV/m) at 3m. For spurious emissions, Section 15.231(e) sets the average limit to 20dB below the maximum permitted fundamental level, or 52.33dB(uV/m) at 3m, with the peak limit 20dB higher at 72.33dB(uV/m).

Test Results: Tables 1 through 4, and the Transmitted Bandwidth Data show that this unit meets the radiated interference requirements of FCC Part 15 Section 15.231(e).



SIGNED _____ DATE May 16, 2006

John R. Barnes, PRESIDENT dBi Corp.

Radiated Emissions Data 30-4,180MHz (Internal Battery)

Appliance/Product: P6EZIO
Model/Type Number: P6EZIO
FCC ID: M5ZP6EZIO
Rating: 3.6Vdc (Lithium battery)
Serial Number: 60509000

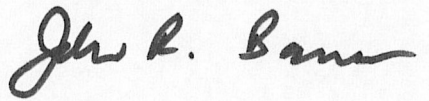
TABLE 1 PEAK EMISSIONS

Receiver Meas. Freq. MHz	Receiver Reading		Cable Correction Factor dB	Antenna Correction Factor dB(/m)	Radiated Interference Field Strength		15.231e Peak Limit dB(uV/m)
	Vert. dB(uV)*	Horiz. dB(uV)*			Vert. dB(uV/m)	Horiz. dB(uV/m)	
418.1	87.135	93.455	-24.962	16.531	78.704	85.024	92.33
836.1	41.598	44.508	-23.121	22.813	41.290	44.200	72.33
1254.2	52.552	46.626	-28.998	24.064	47.618	41.692	72.33
1672.2	50.771	49.881	-27.190	25.485	49.066	48.176	72.33
2090.2	42.647	43.558	-26.226	26.898	43.319	44.230	72.33
2508.4	39.289	39.552	-25.151	28.278	42.416	42.679	72.33
2926.4	38.483	39.688	-24.502	29.657	43.638	44.843	72.33
3344.4	37.145	37.614	-23.450	30.210	43.905	44.374	72.33
3762.5	39.689	39.430	-21.171	30.586	49.104	48.845	72.33
4180.5	38.362	37.858	-21.193	31.342	48.511	48.007	72.33

Sample Calculation: Receiver reading dB(uV) plus cable correction factor (dB) plus antenna correction factor dB(/m) equals Radiated Interference Field Strength dB(uV/m).

* The unit was checked flat, on its narrow edge, and on its wide edge in both vertical and horizontal polarizations to find the orientation for maximum emissions in quasipeak mode.

PROCEDURE: Test Performed Per ANSI 63.4 – 2003.



Signed _____ **Date** May 16, 2006
John R. Barnes, PRESIDENT dBi Corporation

Radiated Emissions Data 30-4,180MHz (Internal Battery, continued)
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TABLE 2 QUASI-PEAK EMISSIONS

Receiver Meas.	Receiver Reading		Cable Correction	Antenna Correction	Radiated Interference Field Strength		15.231e QP
Freq. MHz	Vert. dB(uV)*	Horiz. dB(uV)*	Factor dB	Factor dB/(m)	Vert. dB(uV/m)	Horiz. dB(uV/m)	Limit dB(uV/m)
418.1	82.845	89.205	-24.962	16.531	74.414	80.774	
836.1	36.338	39.218	-23.121	22.813	36.030	38.910	

Sample Calculation: Receiver reading dB(uV) plus cable correction factor (dB) plus antenna correction factor dB/(m) equals Radiated Interference Field Strength dB(uV/m).

* The unit was checked flat, on its narrow edge, and on its wide edge in both vertical and horizontal polarizations to find the orientation for maximum emissions in quasipeak mode.

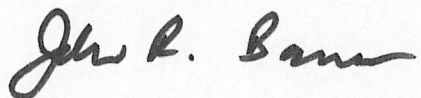
TABLE 3 MEASURED AVERAGE EMISSIONS

Receiver Meas.	Receiver Reading		Cable Correction	Antenna Correction	Radiated Interference Field Strength		15.231e Average
Freq. MHz	Vert. dB(uV)*	Horiz. dB(uV)*	Factor dB	Factor dB/(m)	Vert. dB(uV/m)	Horiz. dB(uV/m)	Limit dB(uV/m)
418.1	66.375	72.375	-24.962	16.531	57.944	63.944	72.33
836.1	24.298	26.298	-23.121	22.813	23.990	25.990	52.33
1254.2	33.044	28.917	-28.998	24.064	28.110	23.983	52.33
1672.2	31.608	31.212	-27.190	25.485	29.903	29.507	52.33
2090.2	26.663	26.672	-26.226	26.898	27.335	27.344	52.33
2508.4	24.635	24.838	-25.151	28.278	27.762	27.965	52.33
2926.4	24.612	25.040	-24.502	29.657	29.767	30.195	52.33
3344.4	23.211	23.574	-23.450	30.210	29.971	30.334	52.33
3762.5	25.446	25.057	-21.171	30.586	34.861	34.472	52.33
4180.5	23.558	23.519	-21.193	31.342	33.707	33.668	52.33

Sample Calculation: Receiver reading dB(uV) plus cable correction factor (dB) plus antenna correction factor dB/(m) equals Radiated Interference Field Strength dB(uV/m).

* The unit was checked flat, on its narrow edge, and on its wide edge in both vertical and horizontal polarizations to find the orientation for maximum emissions in quasipeak mode.

PROCEDURE: Test Performed Per ANSI 63.4 – 2003.



Signed _____ Date May 16, 2006
John R. Barnes, PRESIDENT dBi Corporation

Radiated Emissions Data 30-4,180MHz (Internal Battery, continued)
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TABLE 4 CALCULATED AVERAGE EMISSIONS

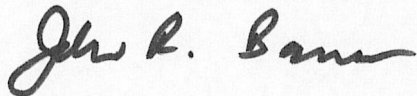
Receiver Meas. Freq. MHz	Receiver Reading		Cable Corr. Factor	Antenna Corr. Factor	Duty-cyc. Corr. Factor	Radiated Interf. Field Strength		15.231e Average Limit
	Vert. dB(uV)*	Horiz. dB(uV)*	dB	dB(/m)	dB**	Vert. dB(uV/m)	Horiz. dB(uV/m)	dB(uV/m)
418.1	87.135	93.455	-24.962	16.531	-20.000	58.704	65.024	72.33
836.1	41.598	44.508	-23.121	22.813	-20.000	21.290	24.200	52.33
1254.2	52.552	46.626	-28.998	24.064	-20.000	27.618	21.692	52.33
1672.2	50.771	49.881	-27.190	25.485	-20.000	29.066	28.176	52.33
2090.2	42.647	43.558	-26.226	26.898	-20.000	23.319	24.230	52.33
2508.4	39.289	39.552	-25.151	28.278	-20.000	22.416	22.679	52.33
2926.4	38.483	39.688	-24.502	29.657	-20.000	23.638	24.843	52.33
3344.4	37.145	37.614	-23.450	30.210	-20.000	23.905	24.374	52.33
3762.5	39.689	39.430	-21.171	30.586	-20.000	29.104	28.845	52.33
4180.5	38.362	37.858	-21.193	31.342	-20.000	28.511	28.007	52.33

Sample Calculation: Receiver reading dB(uV) plus cable correction factor (dB) plus antenna correction factor dB(/m) plus duty-cycle correction factor equals Radiated Interference Field Strength dB(uV/m).

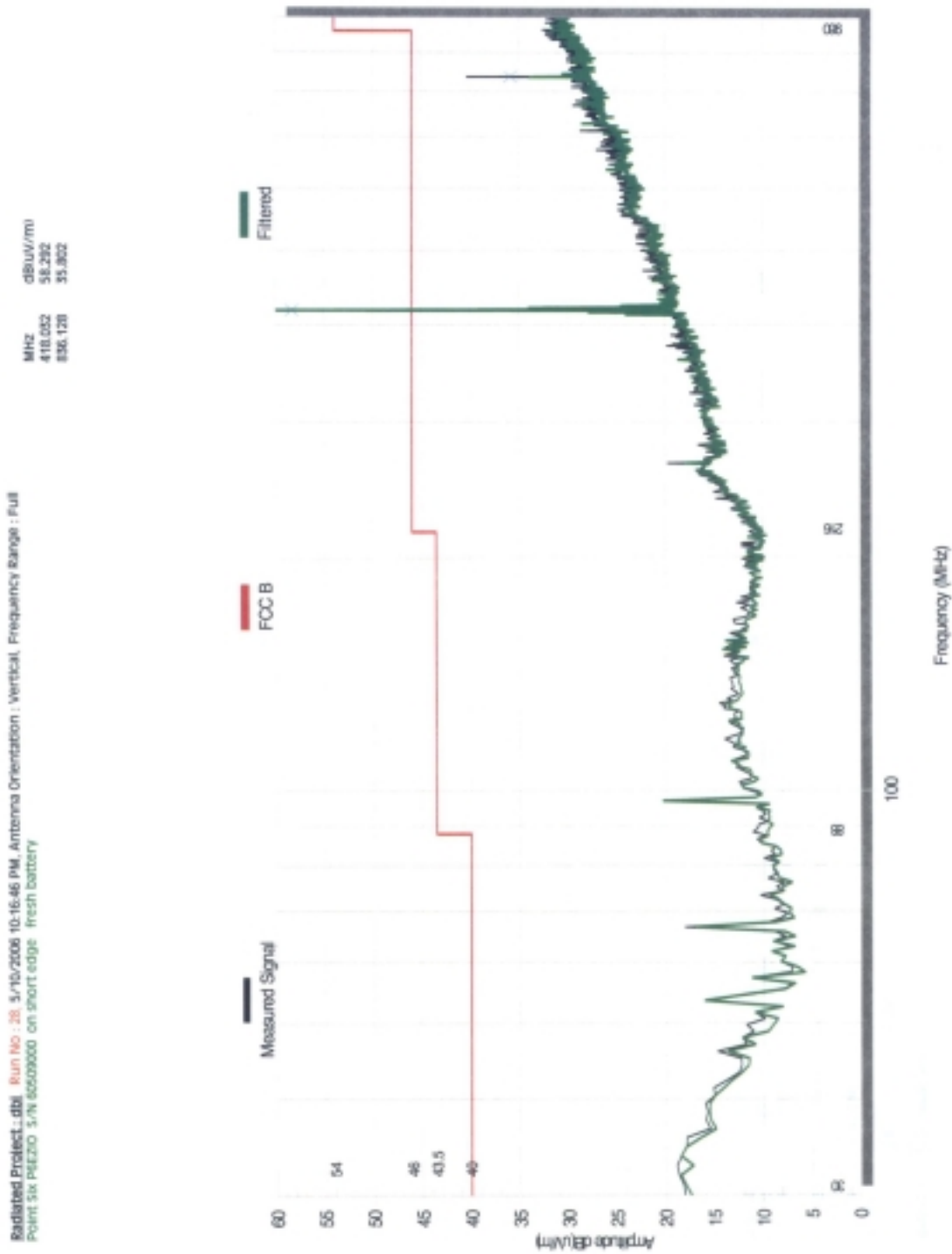
* The unit was checked flat, on its narrow edge, and on its wide edge in both vertical and horizontal polarizations to find the orientation for maximum emissions in quasipeak mode.

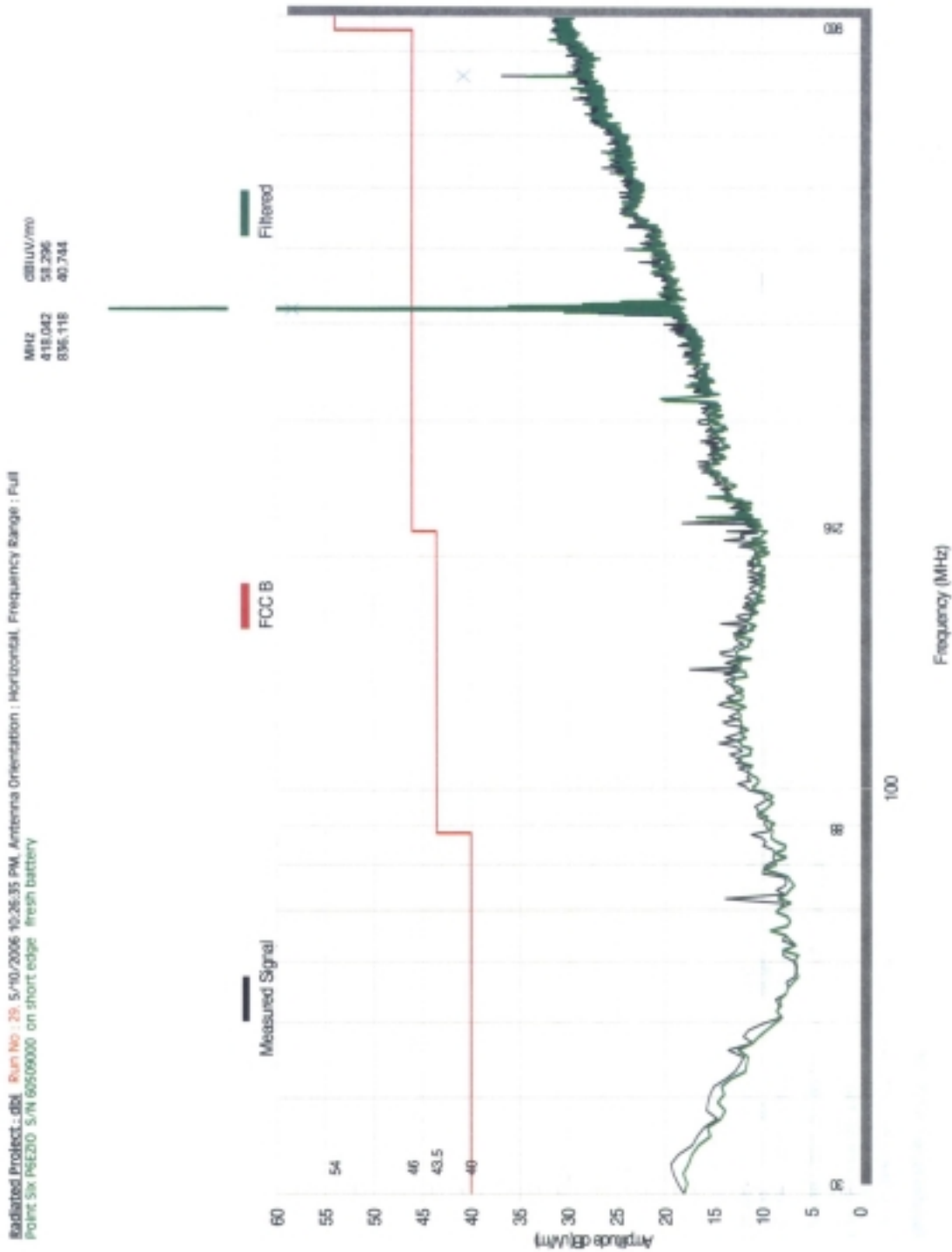
** The maximum total ON-time in any 100ms interval is 8ms. This would give us a duty-cycle correction factor of $20 \cdot \log(8\text{ms}/100\text{ms}) \geq -21.938\text{dB}$. But according to the TCB, when calculating average emissions for pulsed signals, the duty-cycle correction factor is limited to the range 0dB to -20dB.

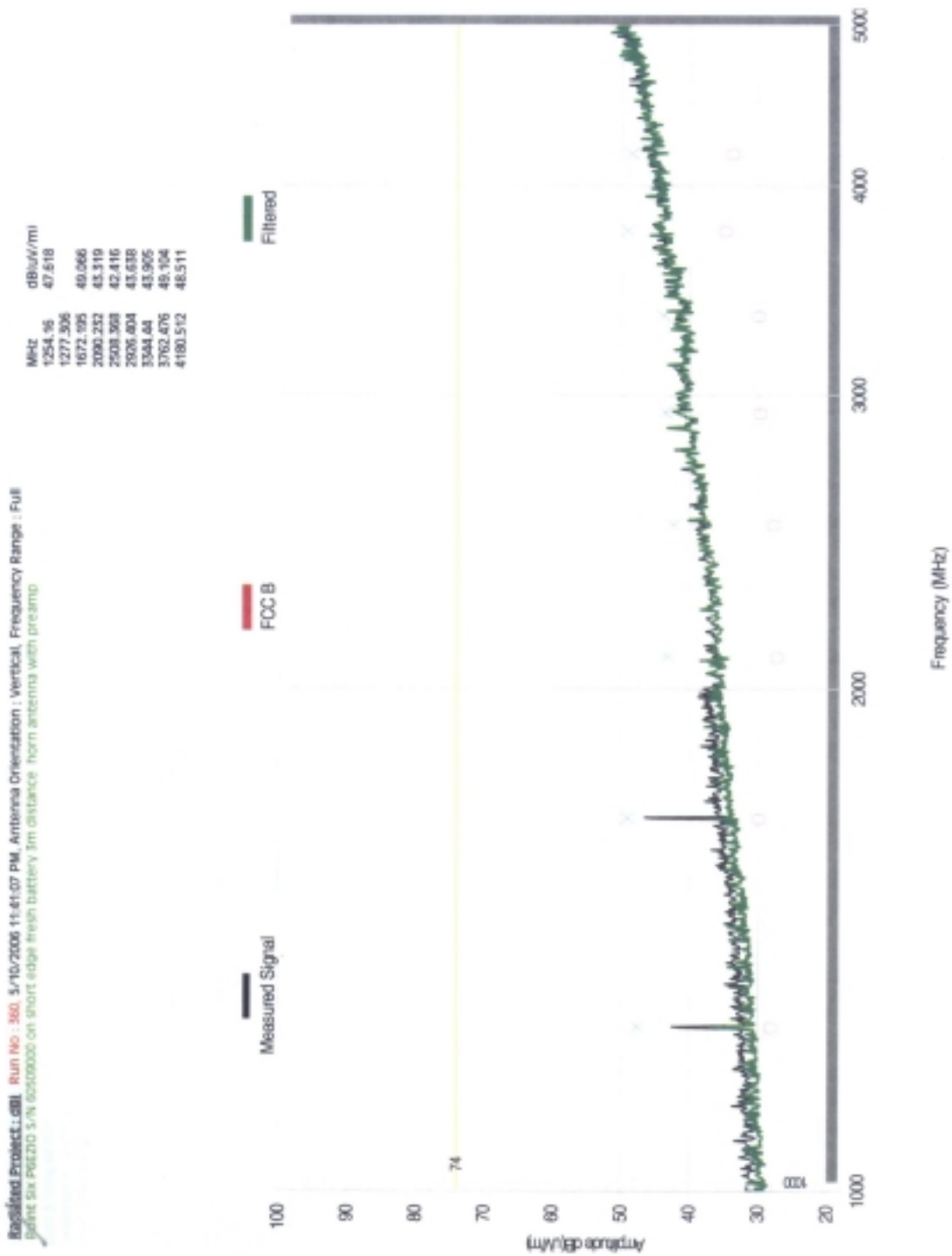
PROCEDURE: Test Performed Per ANSI 63.4 – 2003.

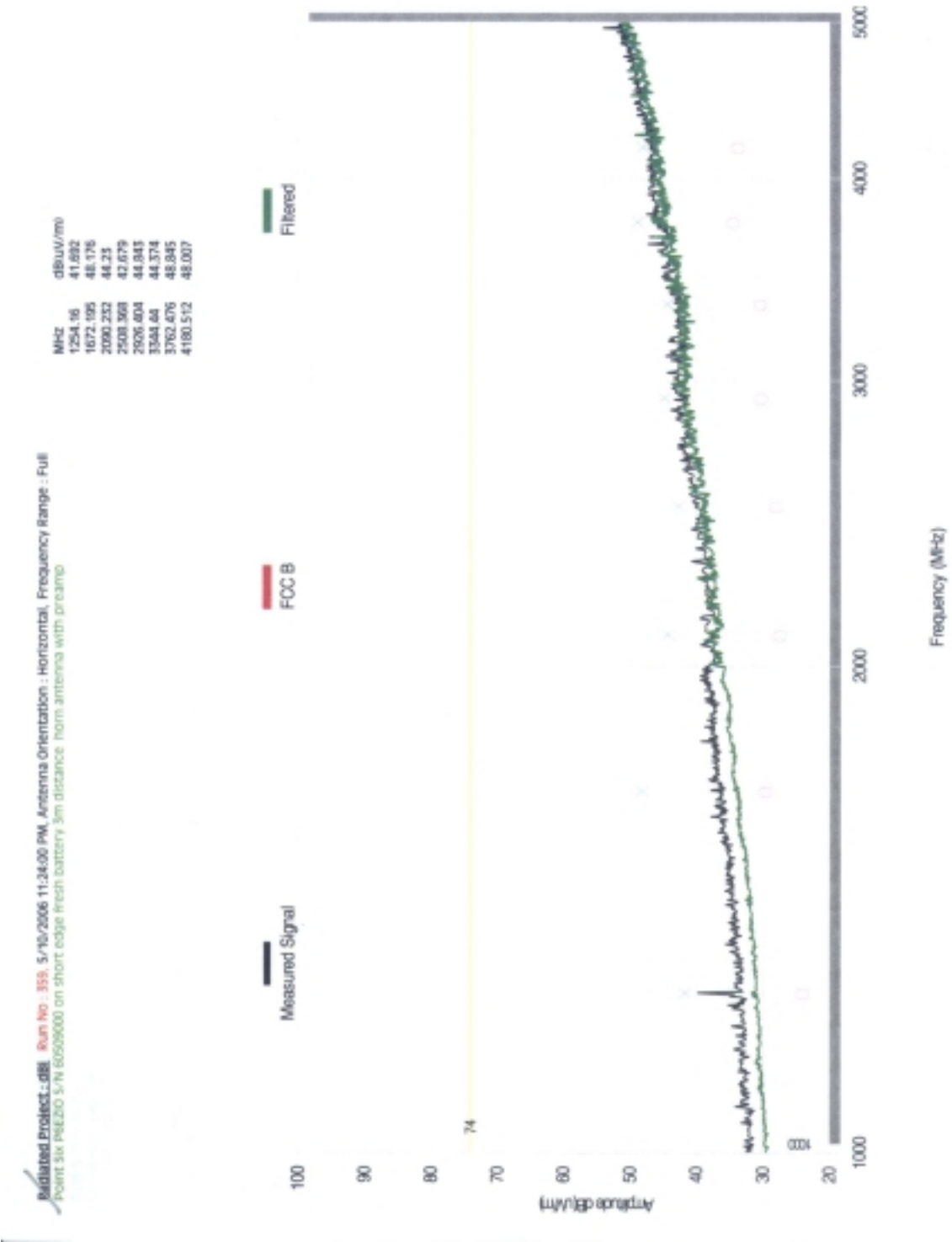


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John R. Barnes, PRESIDENT dBi Corporation





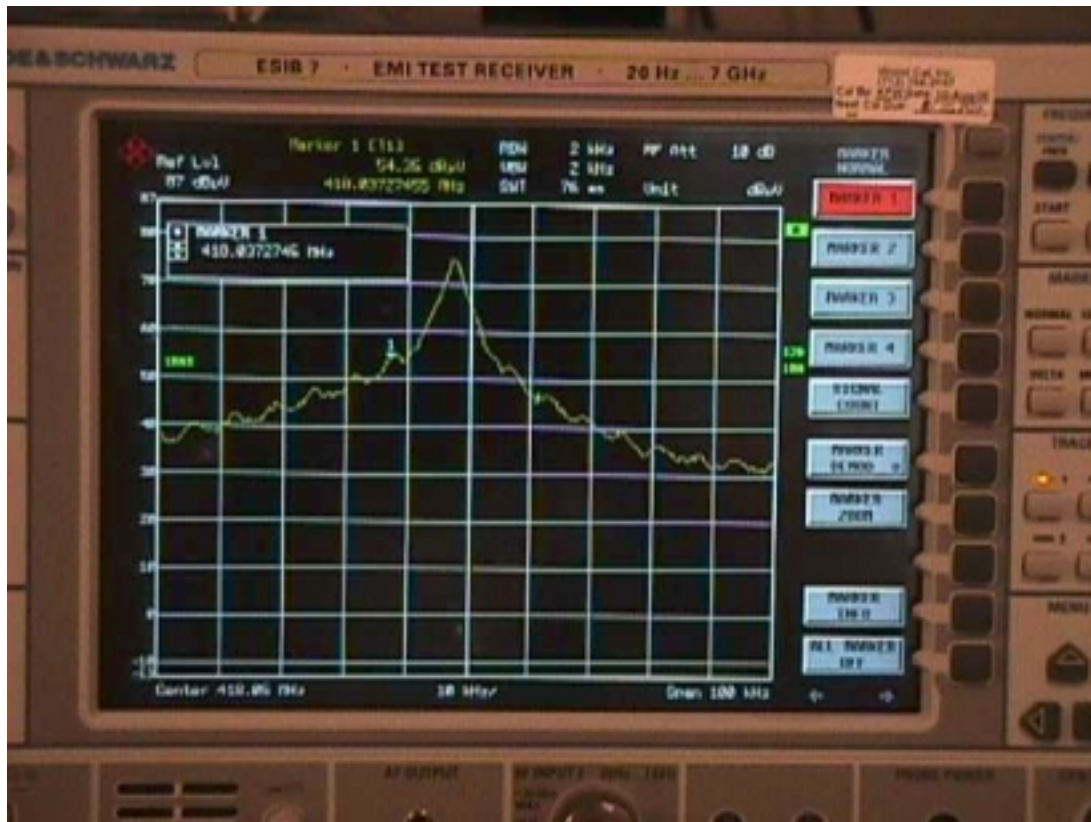




Transmitted Bandwidth Data

Appliance/Product: P6EZIO
Model/Type Number: P6EZIO
FCC ID: M5ZP6EZIO
Rating: 3.6Vdc (Lithium battery)
Serial Number: 60509000

Test Results: The 20dB transmitted bandwidth of the P6EZIO is 16.8kHz (418.0541 MHz to 418.0373 MHz), well within the 1045kHz (0.25% of 418MHz) maximum bandwidth permitted by FCC Part 15 Section 15.231(c). In the photo, each horizontal division is 10kHz, and each vertical division is 10dB. The RBW bandwidth was 2kHz, and the VBW bandwidth was 2kHz, with a sweep time of 76ms.



PROCEDURE: Test Performed Per ANSI 63.4 – 2003.

John R. Barnes

Signed _____ Date May 16, 2006
 John R. Barnes, PRESIDENT dBi Corporation

Conducted Emissions 150 kHz-30 MHz (Internal Battery)

Conducted Emission Standards:

FCC 47 CFR Part 15-2005, using ANSI C63.4-2003

Appliance/Product: P6EZIO

Model/Type Number: P6EZIO

FCC ID: M5ZP6EZIO

Rating: 3.6Vdc (Lithium battery)

Serial Number: 60509000

Host and Other Peripherals: None

Name of Test: Powerline Conducted Interference

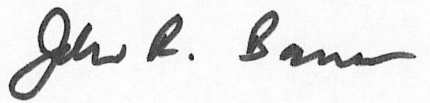
Test Procedure: ANSI C63.4-2003

Test Location: All welded 18 ft x 18 ft shielded enclosure, Lexmark test facility, located in
Lexington, Kentucky

Test Instrumentation: See attached sheets

Note: none

Test Results: This unit gets power from an internal battery. Therefore it meets the Class B conducted interference requirements of FCC Part 15 without testing.



SIGNED _____ DATE May 16, 2006
John R. Barnes, PRESIDENT dBi Corp.

TESTING AND MEASURING EQUIPMENT USED AT LEXMARK
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Radiated Interference and Bandwidth Measurements 30-1,000MHz:

Rohde & Schwarz	ESIB7, S/N 100092
EMI Test Receiver #0631	(Cal date: 8/10/05, Cal due date: 8/10/07)

Schaffner-Chase	CBL6111C, S/N 2460
BI-Log Antenna 30 to 1000 MHz #0507	(Cal date: 9/12/05, Cal due date: 9/12/07)

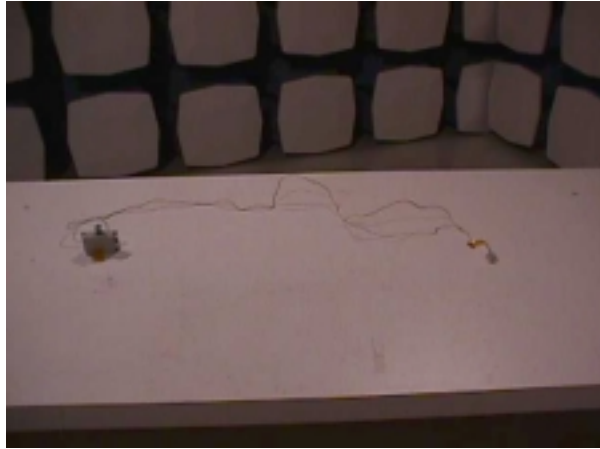
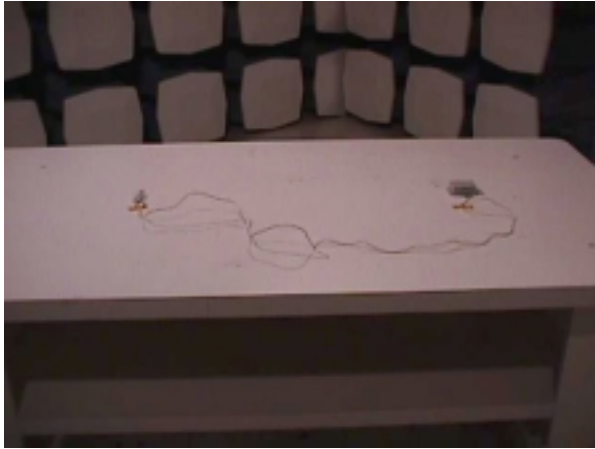
Radiated Interference Measurements 1,000-5,000MHz:

Rohde & Schwarz	ESIB40, S/N 100148
EMI Test Receiver #0700	(Cal date: 5/5/05, Cal due date: 5/5/07)

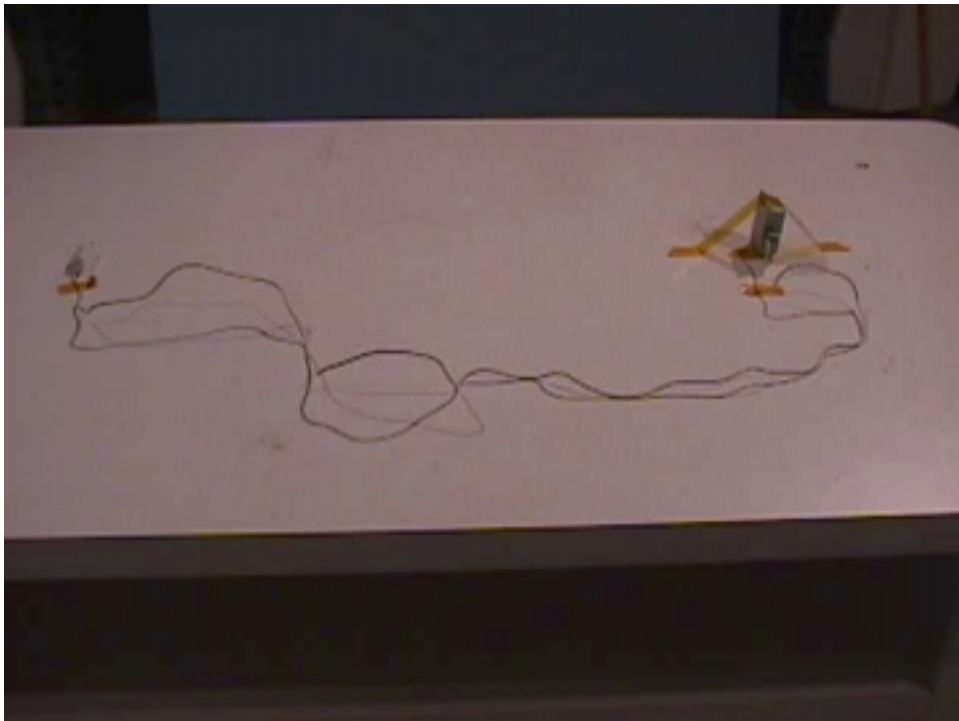
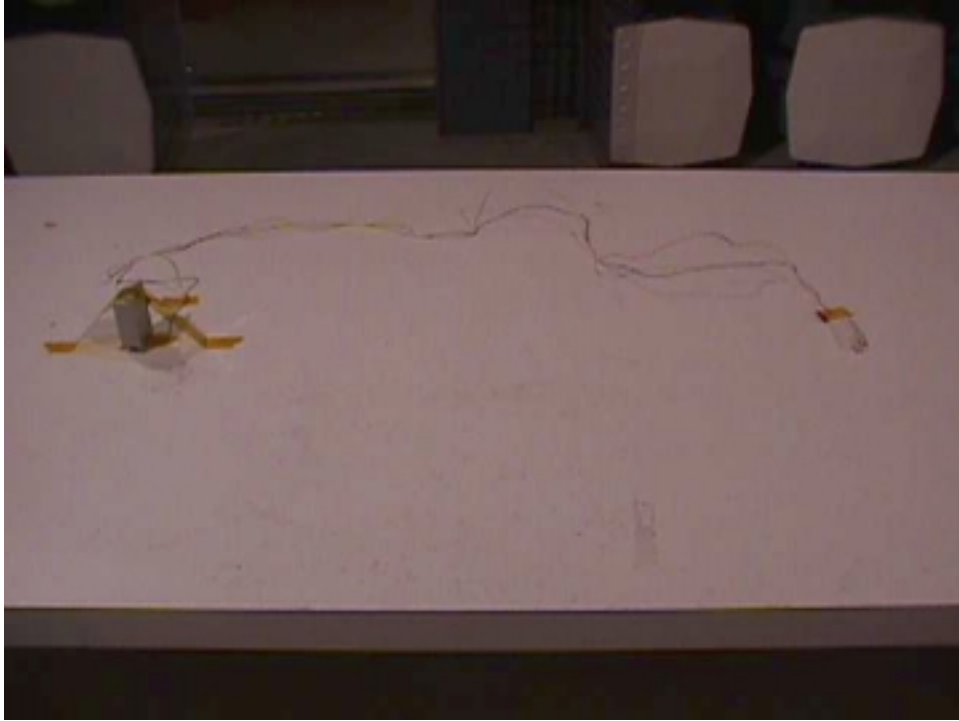
Rohde & Schwarz	ESI7, S/N 100009
EMI Test Receiver #0549	(Cal date: 6/14/05, Cal due date: 6/14/06)

ARA	DRG-118/A, S/N 1091
Horn Antenna, 1GHz to 18GHz #0389	(Cal date: 12/1997, Cal due date: not needed)

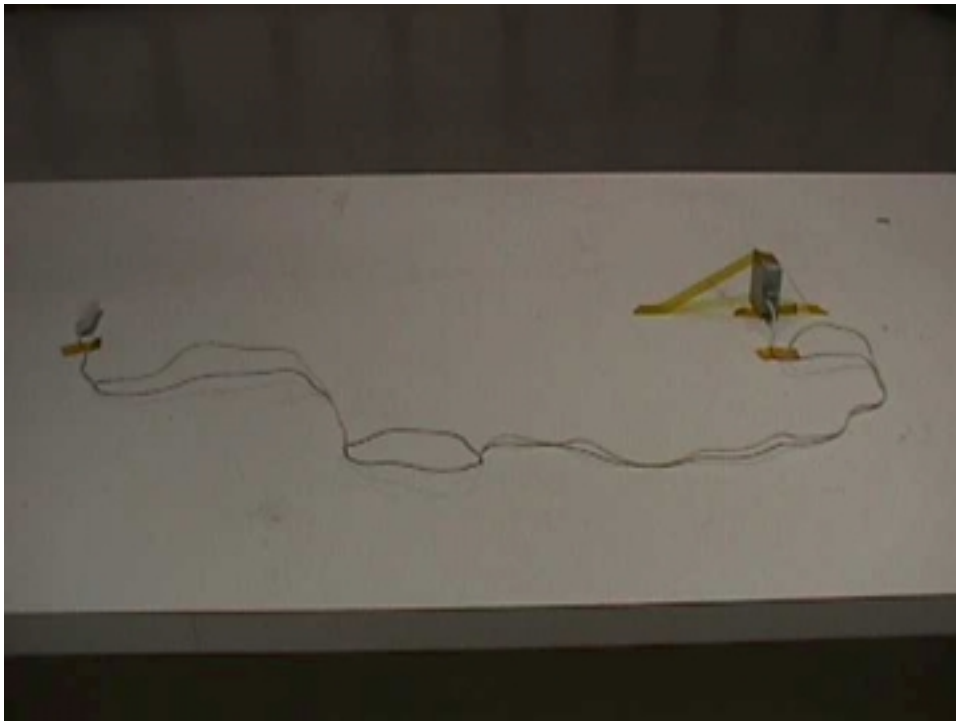
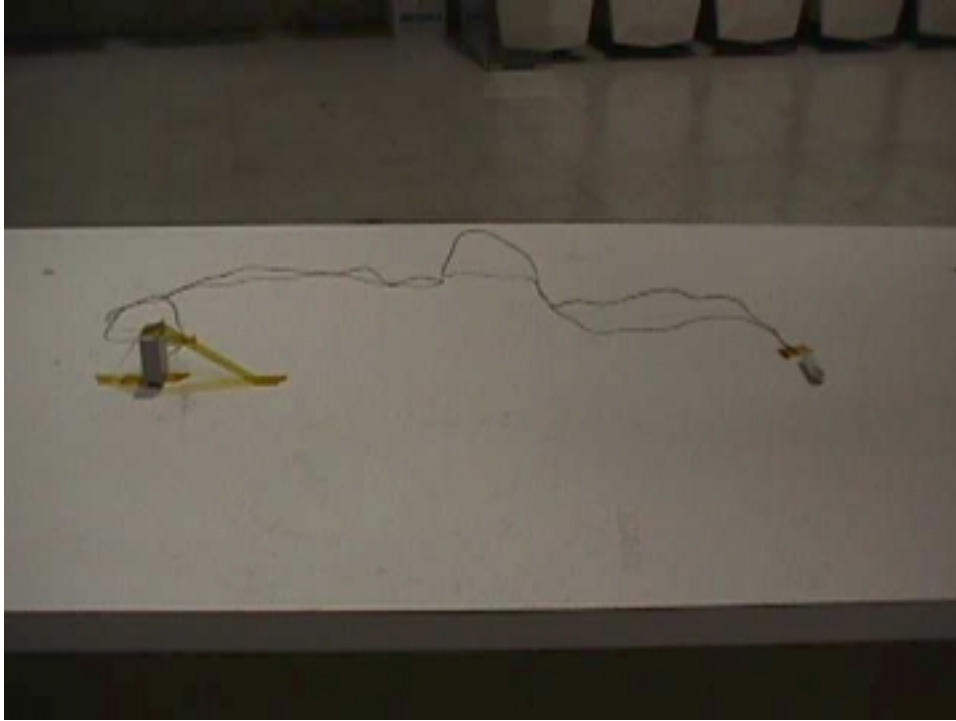
Calibration: The measuring equipment used at Lexmark is calibrated according to the instruction manual once a day. Once a week the accuracy of the test system is checked. This includes the test equipment, associated cables, and antennas. This is accomplished with a calibrated radiating source for the radiated measurements, and a synthesized signal generator for the conducted measurements.



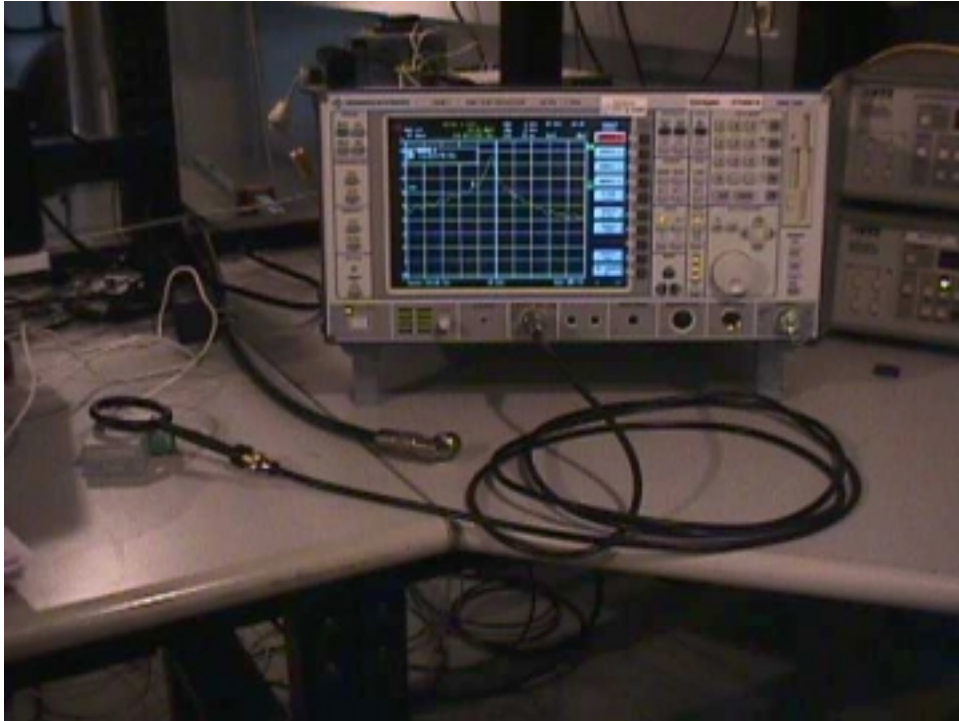
**FCC MAXIMUM-RADIATED-EMISSIONS TEST CONFIGURATIONS
P6EZIO
5m SEMIANECHOIC CHAMBER
LEXMARK INTERNATIONAL, LEXINGTON KY.**



**FCC 30-1,000MHz RADIATED EMISSIONS TEST CONFIGURATION
P6EZIO
5m SEMIANECHOIC CHAMBER
LEXMARK INTERNATIONAL, LEXINGTON KY.**



**FCC 1,000-4,180MHz RADIATED EMISSIONS TEST CONFIGURATION
P6EZIO
10m SEMIANECHOIC CHAMBER
LEXMARK INTERNATIONAL, LEXINGTON KY.**



**FCC TRANSMITTED BANDWIDTH TEST CONFIGURATION
P6EZIO
10m/5m SEMIANECHOIC CHAMBER CONTROL ROOM
LEXMARK INTERNATIONAL, LEXINGTON KY.**