dBi Corporation
FCC Certification Test Report

Point Six, Inc.
Point Sensor IR Counter
FCC ID M5ZIRPC2
Report Number 03dBi004

Laboratory

ADMINISTRATIVE INFORMATION

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

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

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

Ongoing Compliance:
The data contained in this test report applies only to the specific sample(s) tested, under the test conditions described herein. The manufacturer must ensure that all additional units have similar performance, by assembling them from components with identical electrical and mechanical characteristics. The manufacturer must also ensure that any modifications made to bring the test sample(s) into compliance are implemented on all production units.

The manufacturer has full responsibility for ensuring that the product continues to comply with the FCC requirements throughout its manufacturing life. The manufacturer should check all changes to the product that could change its interference profile.

A2LA Approval:
dBi Corporation has been accredited by the American Association for Laboratory Accreditation (A2LA) for Radiated Emissions and Conducted Emissions 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.

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. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002 (1994).

Presented this 14th day of June, 2002.

President
For the Accreditation Council
Certificate Number 1985-01
Valid to September 30, 2004

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

dBi CORPORATION[1]
216 Hillsboro Avenue
Lexington, KY 40511-2105
John R. Barnes Phone: 859 253 1178

ELECTRICAL (EMC)

Valid To: September 30, 2004 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:

Test Technology	Test Method(s)
Radiated Emissions	CFR 47, FCC Method Part 15, Class A and B (using ANSI: C63.4-1992, C63.4-2000, C63.4-2001) AS/NZS 3548-1995, AS/NZS CISPR 22:2002 CISPR 22-1985, 1993, 1997 EN 55022-1994, 1998 VCCI 1997, 2002
Conducted Emissions	CFR 47, FCC Method Part 15, Class A and B (using ANSI C63.4-1992, C63.4-2000, C63.4-2001) AS/NZS 3548-1995, AS/NZS CISPR 22:2002 CISPR 22-1985, 1993, 1997 EN 55022-1994, 1998 VCCI 1997, 2002

On materials and products related to the following:

Information Technology Equipment - Computers, Printers, Peripheral Devices

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

(A2LA Cert. No. 1985.01) 06/14/02 Page 1 of 1

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

ADMINISTRATIVE DATA

Manufacturer:
Point Six, Inc.
391 Codell Dr
Lexington, KY 40509 USA

Product: Point Sensor IR Counter
Model/Type Number: None
FCC ID: M5ZIRPC2
Rating: Not applicable (internal batteries).

Summary of Testing: The test data in this report shows that the Point Sensor IR Counter complies with FCC 47 CFR Part 15, specifically with Section 15.231(e) for operation in the 418MHz band.

Modifications Made to the Equipment Under Test (EUT) in Order to Comply:
Shortened antenna wire to 0.75 inches.

Measurement Equipment Used: see attached data sheets.

Measurements According to: FCC 47 CFR Part 15, using ANSI C63.4:1992

Report Prepared by:
John R. Barnes KS4GL, PE, NCE, ESDC Eng, SM IEEE

Testing Performed by:
dBi Corporation
216 Hillsboro Ave
Lexington, KY 40511-2105, USA

Testing Performed on:
February 25-26, 2003

Testing Performed at:
Lexmark International, Inc.
Development Lab
Lexington, KY 40550 USA

INFORMATION RELATING TO PRODUCT RF INTERFERENCE

Product: Point Sensor IR Counter
Model/Type Number: None
FCC ID: M5ZIRPC2
Rating: Not applicable (internal batteries).

Suppression Components: none.

Clock Frequencies: 32.768kHz, 4MHz, 418MHz.

Cables: None.

Electronic Circuit Boards: IR Counter PC Board, part number P1563

Size of Device: 22 mm high by 138 mm wide by 50 mm deep. Weight 0.2 kg.

Radiated Emissions 30-4180 MHz

Radiated Emission Standards: FCC 47 CFR Part 15, using ANSI C63.4:1992 (Section 15.231(e) limits for operation in the 418MHz band).

Product: Point Sensor IR Counter
Model/Type Number: None
FCC ID: M5ZIRPC2
Rating: Not applicable (internal batteries)
Serial Number: 001

Host and Other Peripherals: None

Name of Test: Radiated Interference
Test Procedure: ANSI C63.4:1992
Test Location: 10m & 3m Semianechoic chambers, Lexmark test facility, located in Lexington, KY
Test Distance: 3m
Test Instrumentation: See attached sheet

Note: Transmitting at 1 second intervals to speed up testing. Shortened antenna wire to 0.75 inches.

Test Results: Tables 1, 2, and 3, and the Transmitted Bandwidth measurements show that this unit meets the radiated interference requirements of FCC Part 15, for an intentional radiator licensed to operate at 418MHz under Section 15.231(e).

For the fundamental, under Section 15.231(e), the average limit is calculated by linear interpolation from 1500uV/m at 260MHz, to 5000uV/m at 470MHz when measured at 3m. Average limit = ((5000uV/m-1500uV/m)*(418MHz-260MHz)/(470MHz-260MHz))+1500uV/m = 4133uV/m = 20*log(4133) dB(uV/m) = 72.33dB(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).

For spurious emissions, Section 15.231(e) sets the average limit to 20dB below the maximum permitted fundamental level, or 52.33dB(uV/m). Section 15.231(b)(2) permits this same limit of 52.33dB(uV/m) to be used for quasipeak measurements. Section 15.35(b) sets the peak limit to 20dB above the average limit, or 72.33dB(uV/m). Section 15.209 permits 53.98dB(uV/m) quasipeak from 960-1000MHz, 53.98dB(uV/m) average above 1000MHz, and with Section 15.35(b), 73.98dB(uV/m) peak above 1000MHz when measured at 3m.

SIGNED_____**DATE** February 27, 2003

John R. Barnes KS4GL, PE, NCE, ESDC Eng, SM IEEE, PRESIDENT dBi Corp.

Radiated Emissions Data 30-4180 MHz

TABLE 1 Quasipeak Measurements

Receiver Meas. Freq. MHz	Vertical Reading dB(uV)*	Horizontal Reading dB(uV)*	Cable Factor dB	Antenna Factor dB(1/m)	Vertical Field Str. dB(uV/m)	Horizontal Field Str. dB(uV/m)	15.231(e) Limit dB(uV/m)
418.04	53.03	65.02	1.11	17.19	71.33	83.32	-----
836.07	9.08	24.91	1.69	22.46	33.23	49.06	52.33

Sample Calculation: Receiver reading dB(uV) plus Cable factor dB plus Antenna correction factor dB(1/m) equals Radiated Field Strength dB(uV/m).

* Checked in three orthogonal axes—see pictures of test setups.

TABLE 2 Average Measurements

Receiver Meas. Freq. MHz	Vertical Reading dB(uV)	Horizontal Reading dB(uV)	Cable Factor dB	Antenna Factor dB(1/m)	Vertical Field Str. dB(uV/m)	Horizontal Field Str. dB(uV/m)	15.231(e) Limit dB(uV/m)
418.04	15.38	26.57	1.11	17.19	33.68	44.87	72.33
836.07	2.31	3.34	1.69	22.46	26.46	27.49	52.33
1253.95	11.68	12.43	2.13	24.06	37.87	38.62	53.98
1671.94	13.18	12.94	2.42	25.48	41.08	40.84	53.98
2089.92	14.76	14.76	2.89	26.90	44.55	44.55	53.98
2507.90	12.36	12.37	3.15	28.28	43.79	43.80	53.98
2925.89	13.07	13.06	3.63	29.66	46.36	46.35	53.98
3343.87	12.05	12.04	4.09	30.21	46.35	46.34	53.98
3761.85	13.09	13.09	4.07	30.59	47.75	47.75	53.98
4179.84	11.66	11.65	4.20	31.34	47.20	47.19	53.98

Sample Calculation: Receiver reading dB(uV) plus Cable factor dB plus Antenna correction factor dB(1/m) equals Radiated Field Strength dB(uV/m).

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Radiated Emissions Data 30-4180 MHz (continued)

TABLE 3 Peak Measurements

Receiver Meas. Freq. MHz	Vertical Reading dB(uV)	Horizontal Reading dB(uV)	Cable Factor dB	Antenna Factor dB(1/m)	Vertical Field Str. dB(uV/m)	Horizontal Field Str. dB(uV/m)	15.231(e) Limit dB(uV/m)
418.04	57.09	69.03	1.11	17.19	75.39	87.33	92.33
836.07	15.10	29.87	1.69	22.46	39.25	54.02	72.33
1253.95	31.59	35.96	2.13	24.06	57.78	62.15	73.98
1671.94	31.71	28.01	2.42	25.48	59.61	55.91	73.98
2089.92	30.54	31.44	2.89	26.90	60.33	61.23	73.98
2507.90	26.16	26.16	3.15	28.28	57.59	57.59	73.98
2925.89	26.85	26.71	3.63	29.66	60.14	60.00	73.98
3343.87	26.16	25.65	4.09	30.21	60.46	59.95	73.98
3761.85	26.44	27.11	4.07	30.59	61.10	61.77	73.98
4179.84	25.80	25.34	4.20	31.34	61.34	60.88	73.98

Sample Calculation: Receiver reading dB(uV) plus Cable factor dB plus Antenna correction factor dB(1/m) equals Radiated Field Strength dB(uV/m).

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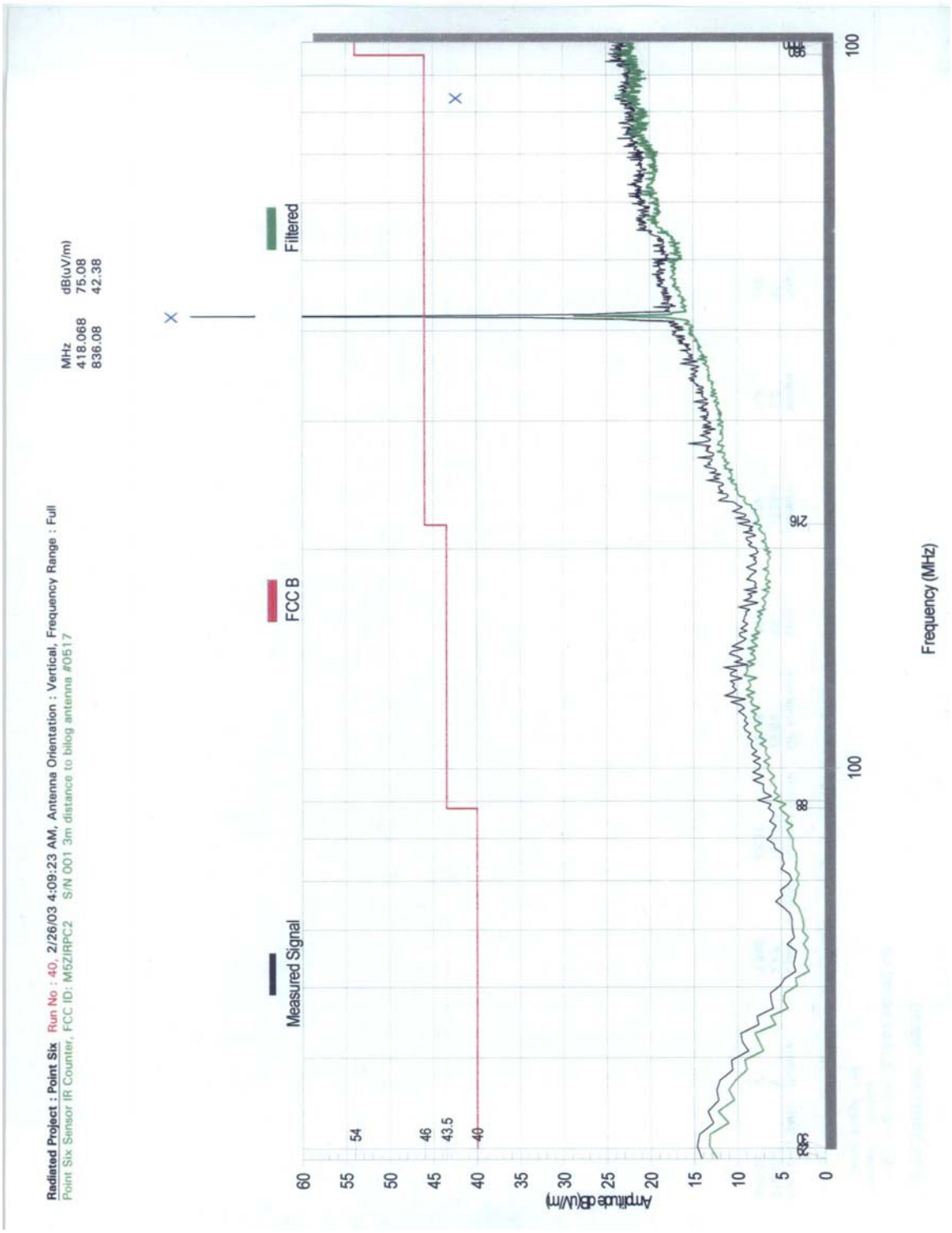
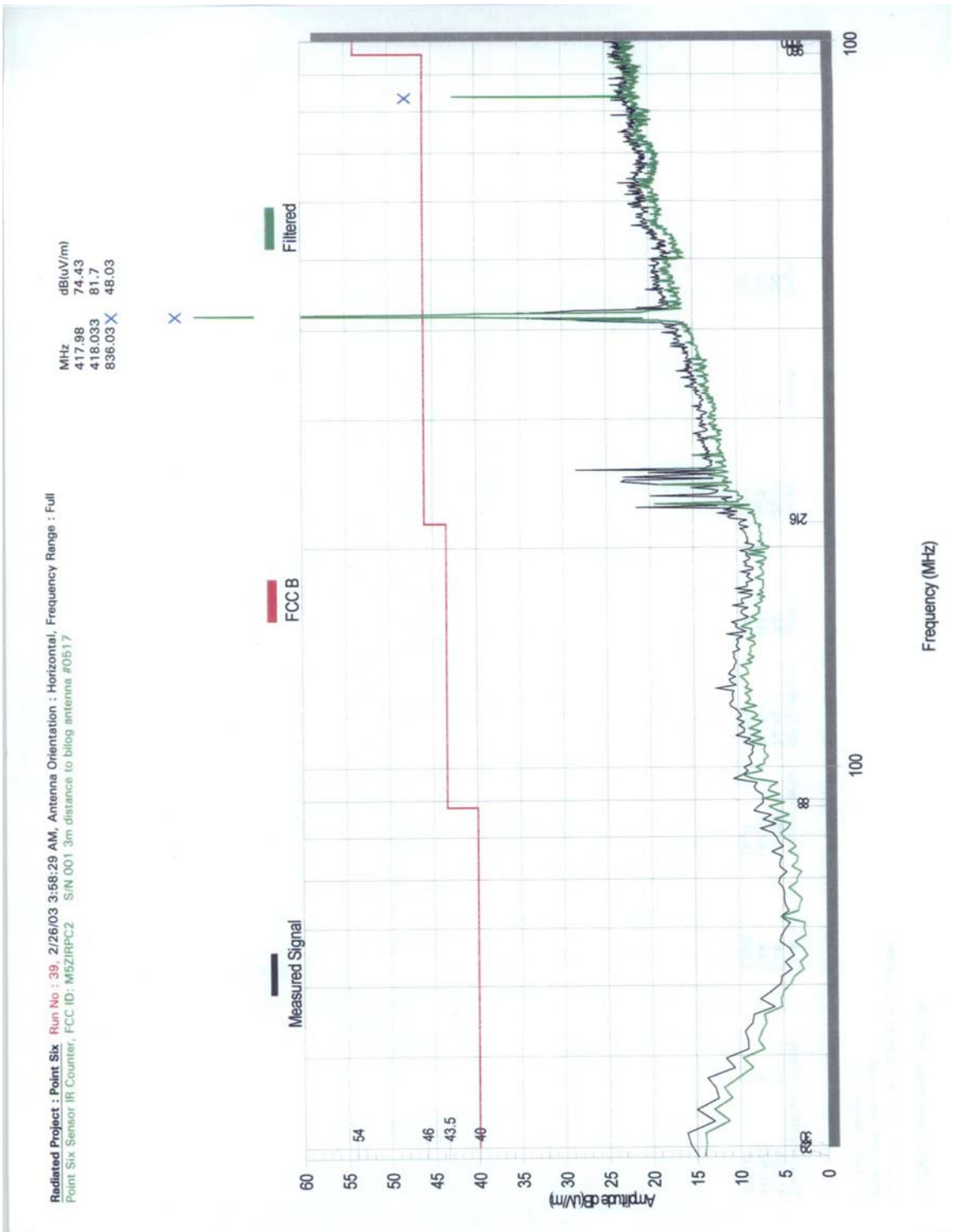

Radiated Project : Point Six Run No : 40, 2/26/03 4:09:23 AM, Antenna Orientation : Vertical, Frequency Range : Full
Point Six Sensor IR Counter, FCC ID: M5ZIRPC2 S/N 001 3m distance to bilog antenna #0517
MHz dB(uV/m)
418.088 75.08
836.08 42.38
Measured Signal
Filtered
FCC B
Amplitude dB(uV/m)
Frequency (MHz)
54
46
43.5
40
88
216
100
100
60
55
50
45
40
35
30
25
20
15
10
5
0


Radiated Project : Point Six Run No : 39, 2/26/03 3:58:29 AM, Antenna Orientation : Horizontal, Frequency Range : Full
Point Six Sensor IR Counter, FCC ID: M5ZIRPC2 S/N 001 3m distance to bilog antenna #0517
MHz dB(uV/m)
417.98 74.43
418.033 81.7
836.03 48.03
Filtered
FCC B
Measured Signal
Amplitude dB(uV/m)
Frequency (MHz)
60
55
50
45
40
35
30
25
20
15
10
5
0
54
46
43.5
40
88
216
100
100

Transmitted Bandwidth Data

Product: Point Sensor IR Counter
Model/Type Number: None
FCC ID: M5ZIRPC2
Rating: Not applicable (internal battery)
Serial Number: 001

Test Results: The 20dB transmitted bandwidth of the Point Six Wireless Infra-Red Counter Transmitter is 20kHz (418.0256MHz to 418.0456MHz), 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 25kHz, and each vertical division is 10dB. The IF bandwidth was 3kHz, and the AVG bandwidth was 3kHz for this measurement.

SIGNED_____**DATE** February 27, 2003
John R. Barnes KS4GL, PE, NCE, ESDC Eng, SM IEEE, PRESIDENT dBi Corp.

Conducted Emissions 0.15-30 MHz

Conducted Emission Standards:
FCC 47 CFR Part 15, using ANSI C63.4:1992 (Section 15.231(e) limits for operation in the 418MHz band).

Product: Point Sensor IR Counter
Model/Type Number: None
FCC ID: M5ZIRPC2
Rating: Not applicable (internal battery)
Serial Number: 001

Host and Other Peripherals: None

Name of Test: Powerline Conducted Interference
Test Procedure: ANSI C63.4:1992
Test Location: All welded shielded enclosure (18 ft x 18ft), Lexmark test facility, located at Lexington Kentucky.
Test Instrumentation: See attached sheet

Note: Transmitting at 1 second intervals to speed up testing. Shortened antenna wire to 0.75 inches.

Test Results: This unit operates off an internal battery, and has no mains port. Therefore it passes the conducted interference requirements of FCC Part 15 Section 15.207(d) without testing.

SIGNED_____**DATE** February 27, 2003
John R. Barnes KS4GL, PE, NCE, ESDC Eng, SM IEEE, PRESIDENT dBi Corp.

TESTING AND MEASURING EQUIPMENT USED AT LEXMARK

Radiated Interference Plots 30...1,000 MHz and Transmitted Bandwidth Measurements:

Hewlett Packard	85462A/85460A, S/N 3807A00454/3704A00416
EMI Test Receiver & RF Filter Section #0413	(Cal date: 4/30/2002, Cal due date: 4/30/2003)
Schaffner-Chase	CBL6111C, S/N 2580
BI-Log Antenna 30 to 1000 MHz #0517	(Cal date: 10/9/2002, Cal due date: 10/9/2003)

Radiated Interference Measurements 30...1,000 MHz:

Rohde & Schwarz	ESIB7, S/N 100093
EMI Test Receiver #0632	(Cal date:9/6/02, Cal due date:9/6/03)
Schaffner-Chase	CBL6111C, S/N 2460
BI-Log Antenna 30 to 1000 MHz #0507	(Cal date: 10/9/2002, Cal due date: 10/9/2003)

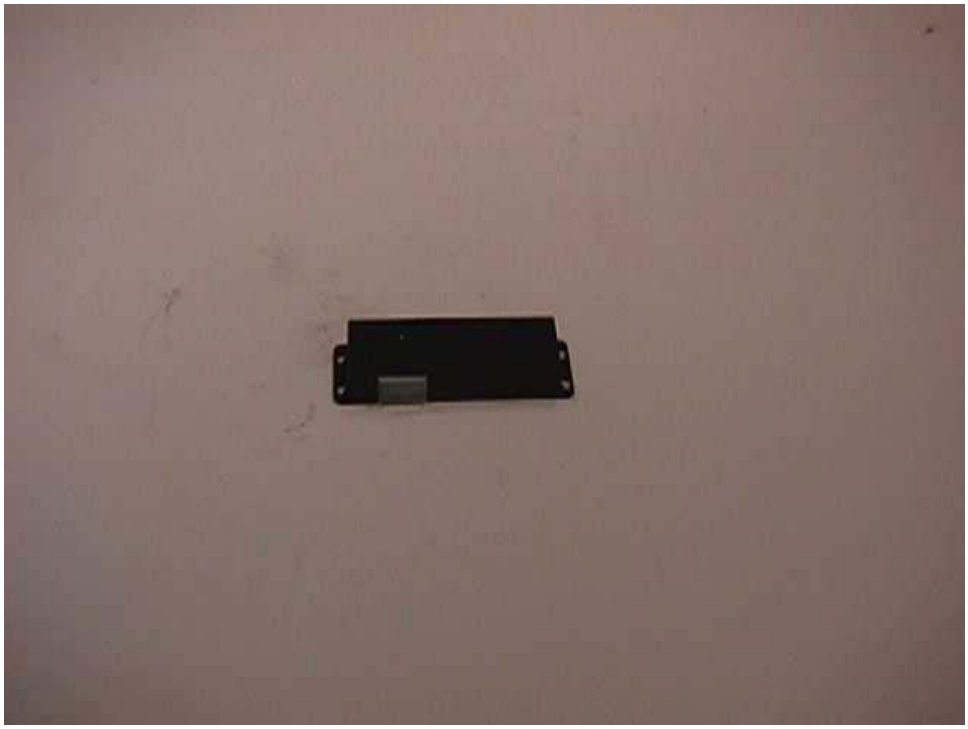
Radiated Interference Measurements 1GHz and up:

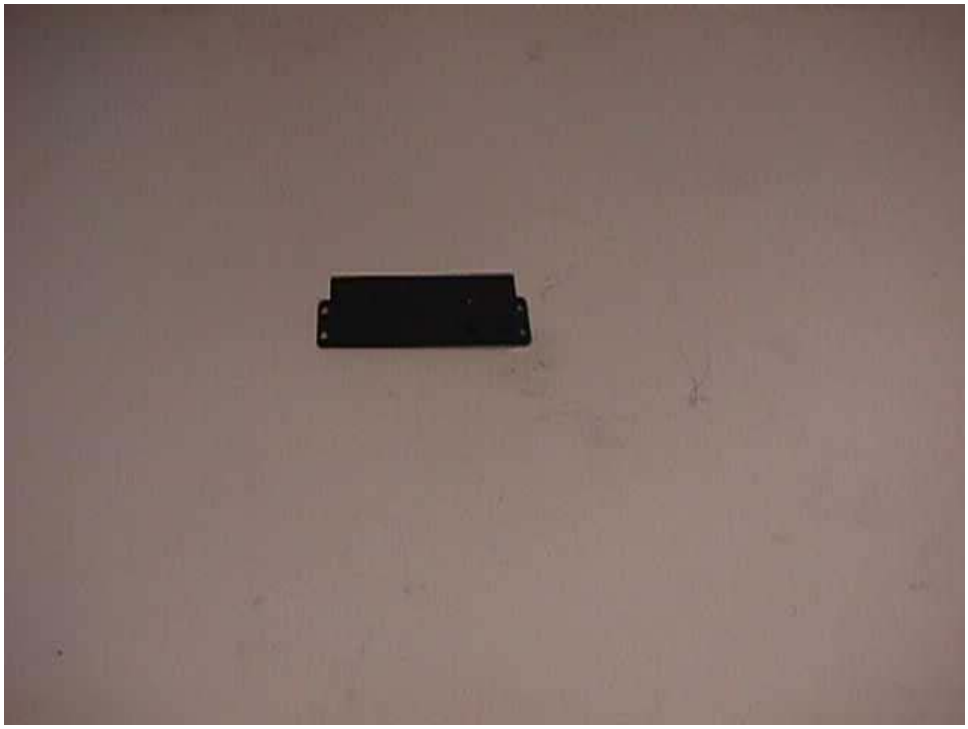
Rohde & Schwarz	ESIB7, S/N 100093
EMI Test Receiver #0632	(Cal date:9/6/02, Cal due date:9/6/03)
ARA	DRG-118/A, S/N 1091
Horn Antenna, 1GHz to 18GHz #0389	(Cal date: 12/1997, Cal due date: not needed)

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 portion and a synthesized signal generator for the conducted measurements.

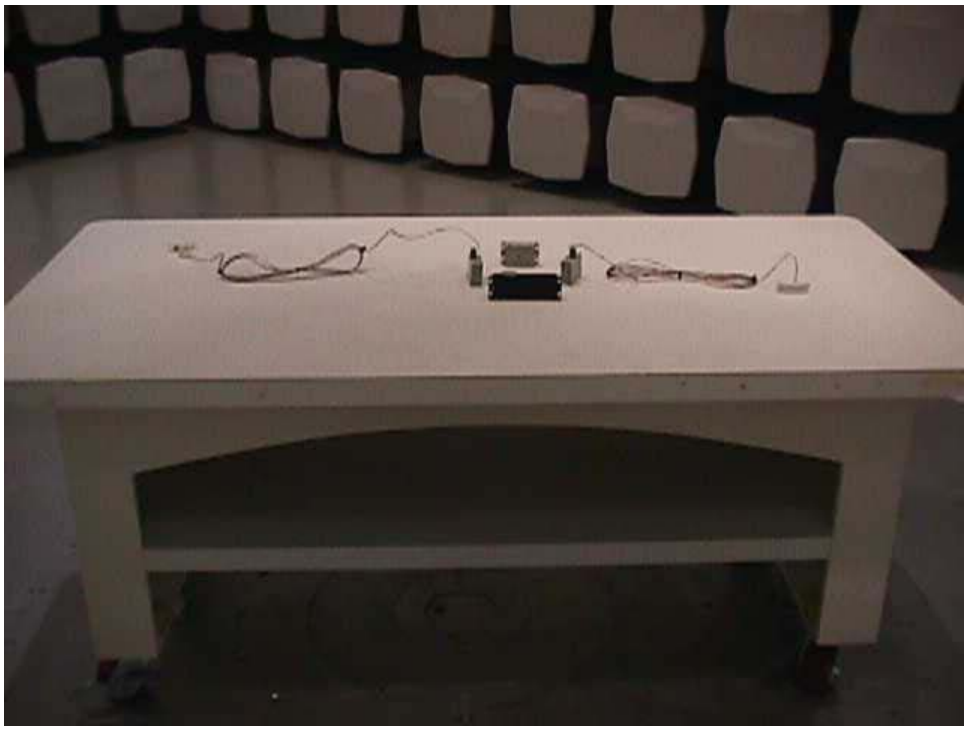
Please note, all of the above equipment and all associated accessories are verified by Lexmark International.

TEST SETUPS

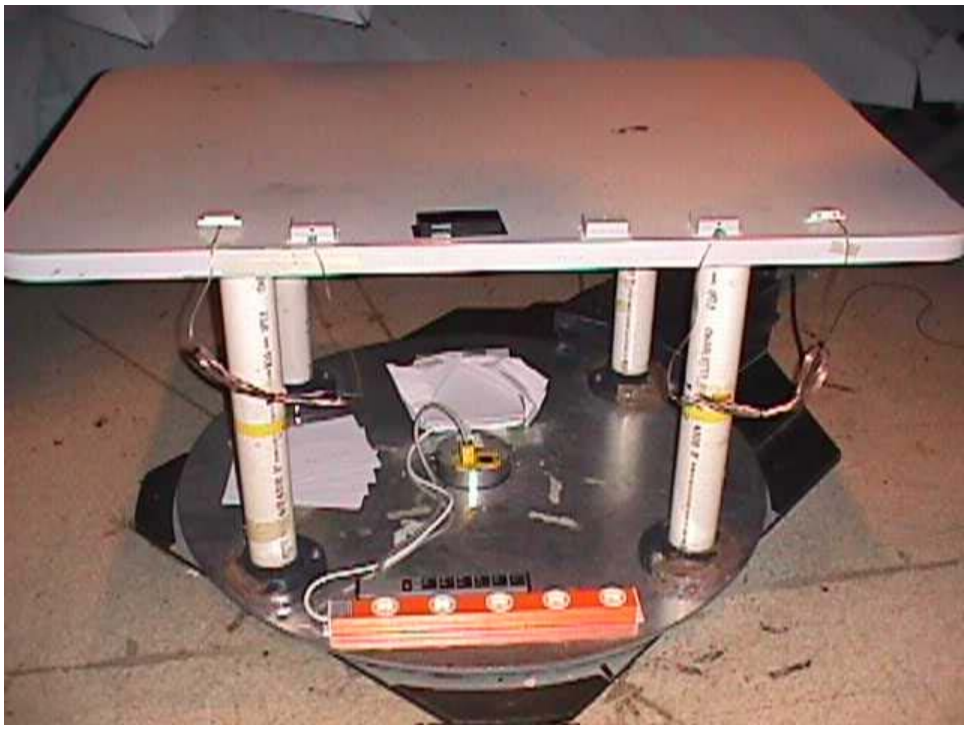


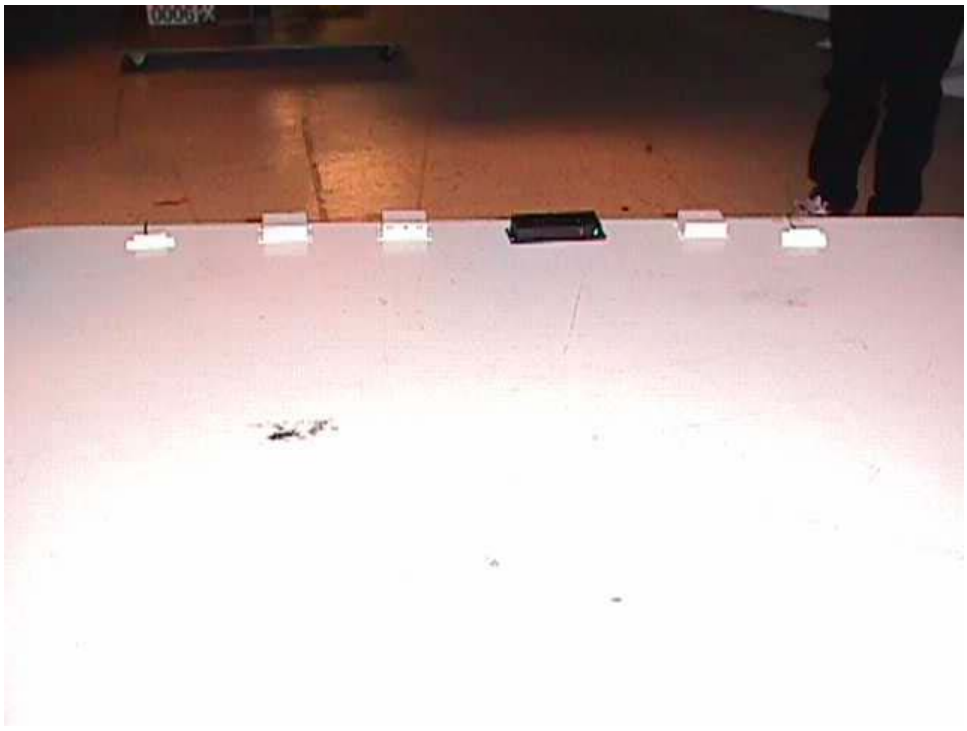


RADIATED TEST CONFIGURATION 30-1000MHz



RADIATED TEST CONFIGURATION 30-1000MHz Three Orthogonal Axes





RADIATED TEST CONFIGURATION 1000-4180MHz