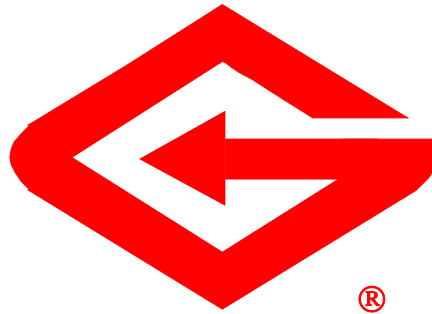




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**FCC TEST REPORT**  
*for*  
**FINEPOINT INNOVATIONS INC.**  
**CORDLESS PEN**  
**Model:**

**GARWOOD LABORATORIES, INC.**  
**TESTING AND ENGINEERING SERVICES**



**FCC TEST REPORT**  
**Certification for FCC Part 15**  
**Subpart C §15.209**

**Report for:**  
**FINEPOINT INNOVATIONS INC.**  
**CORDLESS PEN**  
**Model:**

*Prepared For: Finepoint Innovations Inc.  
1220 S. Park Lane, Suite 1  
Tempe, AZ 85281*

*Prepared By: Garwood Laboratories, Inc  
7829 Industry Avenue  
Pico Rivera, CA 90660*

*Issued: October 3, 2002*



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7829 Industry Avenue, Pico Rivera, CA 90660

"EXCELLENCE BUILT  
ON INTEGRITY"

Report No: FR25249-E

## FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.

### RESPONSIBLE SIGNATURES

*This report is intended for the use by the organization to whom it is addressed, and will not be made available to any other parties without the expressed written consent of the aforementioned organization. This report shall not be reproduced, except in full, without the written approval of Garwood Laboratories, Inc.*

WRITTEN BY:

**Arnulfo Tapia**  
EMC Test Engineer

REVIEWED BY:

**William Flower**  
Quality Assurance Manager

REVIEWED BY:

  
for Tony Masone

**Tony Masone**  
EMC Manager

### DOCUMENT HISTORY

Revision	Issue Date	Affected Page(s)	Description Of Modifications	Revised By	Approved By
N/C			Initial release		



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## **FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.**

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### ***CLIENT INFORMATION***

<b><i>Purchase Order</i></b>	COD
<b><i>EUT Arrival Date</i></b>	August 22, 2002
<b><i>Company Name</i></b>	Finepoint Innovations Inc.
<b><i>Address</i></b>	1220 S. Park Lane, Suite 1
<b><i>City, State Zip</i></b>	Tempe AZ 85281
<b><i>Contact Name</i></b>	Stephen Caldwell
<b><i>Phone</i></b>	602-325-2080
<b><i>Fax</i></b>	480-967-9427

### ***GARWOOD INFORMATION***

<b><i>EMC Test Laboratory</i></b>	Garwood Laboratories, Inc.
<b><i>Address</i></b>	7829 Industry Avenue
<b><i>City, State, Zip Code</i></b>	Pico Rivera, CA 90660
<b><i>Phone</i></b>	(562) 949-2727
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<b><i>Web Site</i></b>	www.garwoodtestlabs.com
<b><i>Contact Name</i></b>	Tony Masone
<b><i>Title</i></b>	EMC Manager

<b><i>Test Personnel</i></b>	<b><i>Test Dates</i></b>
Arnie Tapia – EMC Test Engineer	September 6, 2002



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### FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.

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## ACCREDITATIONS:

*The Open Area Test Site (OATS) and measurement facilities used to collect the test data are located at Garwood Laboratories, Incorporated test facility in Pico Rivera, California. This facility has been fully described in a report submitted to the FCC and accepted in a letter dated 22 April 2002, Registration Number 534174.*

*The test facility is also recognized, certified, or accredited by the following organizations:*



This site has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration #534174. Date of listing: April 22, 2002. **Garwood Laboratories** is an authorized test laboratory for the DoC process.



**Garwood Laboratories, Inc.** has been assessed in accordance with ISO 17025 and with ITI's assessment criteria. Based upon this assessment, Technology International (Europe), Ltd. has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC). The scope of the approval was provided on a Schedule of Assessment supplied with a certificate and is available upon request. Certificate #01-051, effective through August 5, 2002, or until the next agreed assessment date (October 11, 2002).



**Garwood Laboratories, Inc.** is authorized, by joint agreement with Korea Electric Testing Institute (KETI), to perform required and necessary South Korean Product Safety and EMC testing (including reports) according to the IEC and CISPR standards.

### Nmi (Nederlands Meetinstituut)

**Garwood Laboratories, Inc.** has entered into a cooperative agreement with Nmi Certin B.V. of the Netherlands. This is a Notified Body for the RATTE Directive and Maritime Directive as well as a Competent Body for the EMC Directive.



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## FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.

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### MEASUREMENT / TECHNICAL REPORT SUMMARY

<b><i>Type of Authorization</i></b>	Certification
<b><i>Applicable FCC Rules</i></b>	<p>Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 0 to 19 (10-1-98 Edition). The following subparts are applicable to the results in this test report:</p> <p>Part 15, Subpart C – Intentional Radiators § 15.209 Radiated emission limits; general requirements</p> <p>Part 2, Subpart J – Equipment Authorization Procedures Certification sections</p>
<b><i>Summary of Data</i></b>	<p>The EUT complied with all the applicable FCC rules as listed above.</p> <p>Note:</p> <ol style="list-style-type: none"><li>1. The conducted emissions test was not performed and does not apply since the EUT is battery operated.</li></ol>



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## FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.

### 1.0 GENERAL INFORMATION

#### 1.1 Product Description

<i>Equipment Under Test</i>	Cordless Pen																				
<i>Model Number</i>																					
<i>Proposed FCC ID</i>	NEJNT2																				
<i>Description of EUT</i>	<p>The Finepoint Innovations cordless pen system looks like a typical pen used for writing on paper.</p> <p>The FPI digitizer converts the physical position of the cordless pen on the digitizer surface into corresponding digital codes suitable for processing by a host computer. In operation, the cordless pen sends a signal to the digitizer sensor grid loops. Signals from these loops are selected, or multiplexed, one at a time and sent to the Pen System Controller. A micro-controller in the Pen System Controller interprets the data and translates it into corresponding digital codes that identify the pen position for the host computer system.</p>																				
<i>Description of Circuit Operation</i>	<p>The pen consists of an ASIC and some additional circuitry. A 1.5V battery powers the ASIC. The ASIC contains an oscillator that drives the pen coil. This coil is the transmitter coil that sends the pen signals to the sensor grid. The pen coil is a parallel-tuned circuit whose frequency is controlled by switching tuning capacitors into and out of the tuned circuit. These switches include the tip switch, activated when the pen tip is pressed onto the digitizer surface, and side switches, activated by the user pressing the switch.</p>																				
<i>Clock Frequencies</i>	<p>The normal operating frequencies for the EUT are listed below:</p> <table><tr><td><u>Switch Status</u></td><td><u>Nominal Limits</u></td><td><u>Absolute Limits</u></td></tr><tr><td></td><td><u>Frequency (kHz)</u></td><td><u>Frequency (kHz)</u></td></tr><tr><td>SW1 (Pen Down)</td><td>482.0 - 494.0</td><td>475.6 – 498.0</td></tr><tr><td>No Switches Idle</td><td>458.0 – 465.0</td><td>454.0 – 469.6</td></tr><tr><td>SW1 + SW2</td><td>433.8 – 445.4</td><td>431.0 – 447.6</td></tr><tr><td>SW2 (1<sup>st</sup> Side SW)</td><td>415.0 – 424.0</td><td>410.0 – 425.0</td></tr></table>			<u>Switch Status</u>	<u>Nominal Limits</u>	<u>Absolute Limits</u>		<u>Frequency (kHz)</u>	<u>Frequency (kHz)</u>	SW1 (Pen Down)	482.0 - 494.0	475.6 – 498.0	No Switches Idle	458.0 – 465.0	454.0 – 469.6	SW1 + SW2	433.8 – 445.4	431.0 – 447.6	SW2 (1 <sup>st</sup> Side SW)	415.0 – 424.0	410.0 – 425.0
<u>Switch Status</u>	<u>Nominal Limits</u>	<u>Absolute Limits</u>																			
	<u>Frequency (kHz)</u>	<u>Frequency (kHz)</u>																			
SW1 (Pen Down)	482.0 - 494.0	475.6 – 498.0																			
No Switches Idle	458.0 – 465.0	454.0 – 469.6																			
SW1 + SW2	433.8 – 445.4	431.0 – 447.6																			
SW2 (1 <sup>st</sup> Side SW)	415.0 – 424.0	410.0 – 425.0																			

#### 1.2 Related Submittal(s)/ Grant(s)

Peripherals tested with the EUT, which contain FCC ID numbers, are located in the table in Section 3.6 of this report, if applicable.

#### 1.3 Tested System Description

The Tested System was configured with all typical peripherals (or terminations) and operated to generate the maximum emissions during the test. Refer to Section 3.5 Tested System configuration and Section 3.6 table lists all the details for the tested system components and cabling information. FCC ID numbers are included if available for a tested system component.





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### 1.4 Test Methodology

Conducted emissions tests were performed according to the general provisions of ANSI C63.4-2000 (American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz).

The Equipment Under Test (EUT) was setup in a shielded enclosure to perform the conducted emissions measurements in a typical installation configuration. The EUT was powered from the 50 $\mu$ H/50 $\Omega$  Line Impedance Stabilization Networks (LISN). The LISN's unused connections were terminated with a 50-ohm load. The amplitude level (dB $\mu$ V) of the emissions were maximized by varying the modes of operation of the EUT and its cables. The frequency range of 150 kHz to 30 MHz was measured with the receiver in peak detection. The peak measurements within 5 dB of the specification limits were re-measured with the receiver in either quasi-peak or average detection as required.

As a result of the operating frequencies of the EUT, 410-498kHz, electric field measurements had to be performed below 30MHz. A calibrated monopole (rod) antenna as specified in ANSI C63.2-1996 and ANSI C63.5-1988 was used to measure electric fields in the frequency range of 9kHz to 30MHz. The length of the rod antenna was 41 inches and it was used with a counterpoise, as specified by the manufacturer. The frequency range measured during the test was from the fundamental frequency up to the 10<sup>th</sup> harmonic. Measurements of the EUT were performed with the EUT in 3 different orientations (x, y, and z-axis).



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### 2.0 PRODUCT LABELING

#### 2.1 FCC ID Label

All devices authorized under the certification procedures are required to display an identification label showing the FCC Identifier (FCC ID) under which they are authorized.

Example:

**FCC ID: XXX-12345**

In addition, the manufacturer (or importer) is responsible for having the compliance label produced, and for having it affixed to each unit that is marketed or imported.

FCC Compliance Label:

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference including interference that may cause undesired operation.

#### 2.2 Location of Labels on the EUT

The FCC ID label shall be located in a conspicuous location on the device where it is readily visible. As used here, readily visible means that the nameplate or nameplate data must be visible from the outside of the equipment enclosure (Ref §2.925(d2)).

For the FCC Compliance Label, when the device is so small or for such use that it is not practicable to place the statement specified above, the information should be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, should be placed on the container in which the device is marketed (Ref §15.19(a5)). However, the FCC identifier must be displayed on the device.

#### 2.3 Information to user

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



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## **FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.**

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### **3.0 SYSTEM TEST CONFIGURATION**

#### **3.1 Justification**

The EUT was used in a system configured for testing in a typical fashion, as a customer would normally use it.

#### **3.2 EUT Exercise Software/Equipment**

The following operating mode was used during testing to exercise the functions of the EUT:

- The transmitting function of the EUT was activated when the pen was either press down (SW1) or the side switch was pressed (SW2). During testing, no switches were pressed and in this condition the pen was transmitting at 460kHz for approximately 10 minutes.

#### **3.3 Special Accessories**

The EUT requires no special accessories to comply with the required limits.

#### **3.4 Equipment Modifications**

No modifications were made to achieve the required specification limit.



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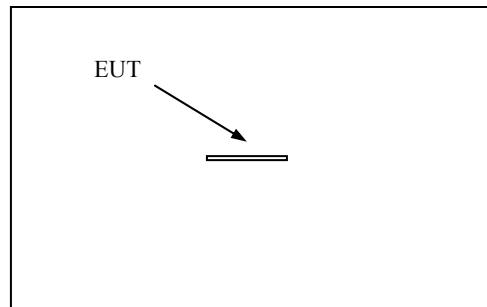
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## FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.

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### 3.5 Configuration of Tested System



The EUT was tested as a standalone unit.

### 3.6 Details of Tested System

The following table lists all of the components of the tested system. FCC ID numbers are included if available for a tested system component. Refer to the table following Tested System Details for cabling information.

The following table lists all of the support equipment used during testing of the EUT.

<i>Item No.</i>	<i>Manufacturer</i>	<i>Description</i>	<i>Identification Numbers</i>
1.	Not Applicable	Not Applicable	Model No: ----- Serial No.: -----

The following table lists all of the cabling details for the tested system.

<i>Cabling of The Tested System</i>					
<i>Item No.</i>	<i>Description</i>	<i>Length (m)</i>	<i>Type (Shielded / Unshielded)</i>	<i>Connected From</i>	<i>Connected To</i>
A.	Not Applicable	N/A	N/A	Not Applicable	Not Applicable



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### **4.0 BLOCK DIAGRAM(S) OF THE EUT**

The block diagram for the EUT is shown below.

Please Refer to Exhibit



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## **FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.**

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### **5.0 TEST MEASUREMENT PHOTOS**

Please Refer to Exhibit

Photo: Radiated Emissions

Please Refer to Exhibit

Photo: Radiated Emissions



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### 6.0 TEST DATA

#### 6.1 Conducted Emissions Limits

<i>FCC Part 15, Subpart C, §15.207</i>	
<i>Frequency Range (MHz)</i>	<i>Class B Limit (dB<math>\mu</math>V)</i>
0.45 to 1.705	48
1.705 to 30.0	48

#### 6.2 Summary Table for Highest Conducted Emissions Levels

<i>Sensor Location</i>	<i>Frequency Band (MHz)</i>	<i>Measured* (dB<math>\mu</math>V)</i>	<i>Delta To Limit (dB)</i>
AC Line	---	---	---
AC Neutral	---	---	---

\* All readings are peak with specified CISPR bandwidth unless stated otherwise.

**Note:** The EUT was battery operated; therefore, the conducted emissions test was not applicable.



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#### 6.3 Radiated Emissions Limits

The following table contains the general radiated emission requirements for an intentional radiator. The requirement shown applies to the fundamental frequency and any unwanted emission.

<i>FCC Part 15, Subpart C, § 15.209</i>		
<i>Frequency (MHz)</i>	<i>Field Strength (<math>\mu</math>V/meter)</i>	<i>Measurement Distance (meter)</i>
0.009 - 0.490	2400 / F (kHz)	300
0.490 - 1.705	24000 / F (kHz)	30
1.705 - 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

For the operating frequency band of the EUT, there were no additional radiated emission provisions applicable under Part 15 Subpart C.

The limit for the fundamental frequency of the Cordless Pen is that listed in the table above for devices with a fundamental frequency of 460kHz and at the measurement distance shown. As indicated in §15.31(m), if the frequency band over which the device operates is less than 1MHz, only one frequency is required to be measured and the frequency measured should be in the middle of the operating frequency band of the EUT. The operating frequency band of the Cordless Pen is less than 1MHz (410-498kHz) and therefore, the fundamental frequency measurements were performed at 460kHz.

The limits for any unwanted emissions are listed in the table above. The limits are based on the frequency of the unwanted emission. In addition, the level of any unwanted emissions should not exceed the level of the fundamental frequency.





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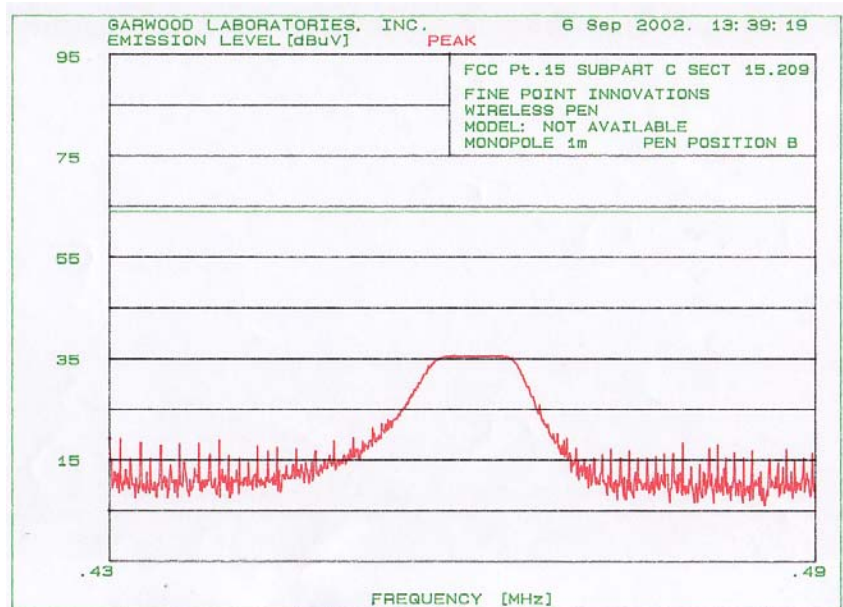
## FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.

### 6.4 Radiated Emissions Results

The following tables list the radiated emissions test results.

#### Field Strength of the Fundamental:

The EUT was tested in 3 positions (x, y & z-axis), and only the worst-case measurement is shown.



Test Requirement: Field Strength of Emissions from Intentional Radiators (Reference: FCC PT.15, Subpart C, §15.209)

Frequency (MHz)	Antenna Polarity (V or H)	Corrected Reading (dBμV/m)	Corrected Reading (μV/m)	FCC Limit 1 meter (μV/m)
0.460	N/A	35.7	60.95	1565

**Judgment:** The EUT, Cordless Pen, complied with the specification requirements.

#### Test Details:

For EUT operating frequency 460kHz:

Limit (μV/m) =  $2400 / 460 = 5.22\mu\text{V/m}$  @ 300m

Measurements were performed at close-in distances and the limit L2 corresponding to the close-in distance d2 was determined by applying the following relation:

$$L2 = L1 (d1 / d2)$$

Where L1 is the specified limit in μV/m at the distance d1.

Close in Limit (μV/m) =  $5.22\mu\text{V/m} (300\text{m} / 1\text{m}) = 1565\mu\text{V/m}$  @ 1m

Close in Limit (dBμV/m) = 63.9dBμV/m @ 1m



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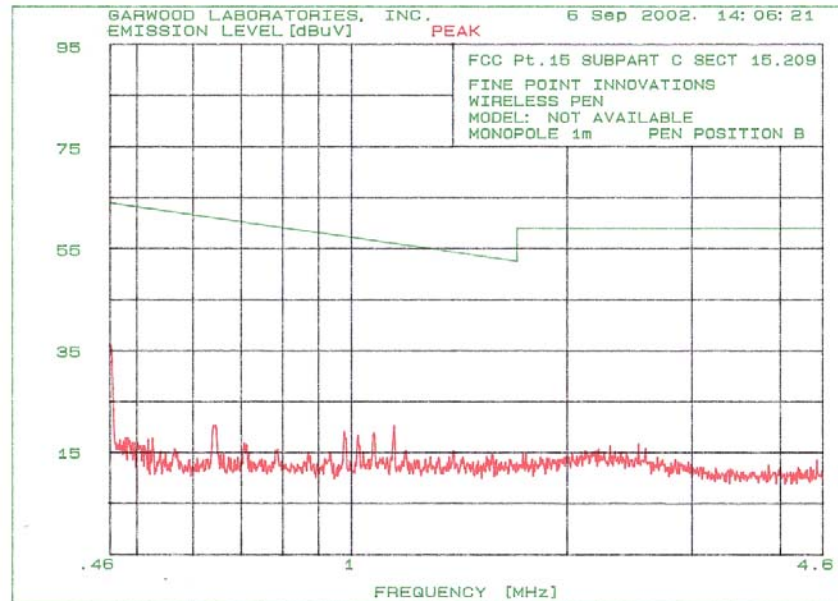
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### Field Strength of any Unwanted Emissions:

The EUT was tested in 3 positions (x, y & z-axis), and only the worst-case measurement is shown.



Test Requirement: Field Strength of Emissions from Intentional Radiators (Reference: FCC PT.15, Subpart C, §15.209)

Frequency (MHz)	Antenna Polarity (V or H)	Corrected Reading (dBμV/m)	Corrected Reading (μV/m)	FCC Limit 1 meter (μV/m)
1.149	N/A	20.2	10.23	626.6
1.075	N/A	18.8	8.71	669.8
0.9782	N/A	19.1	9.01	736.0
1.022	N/A	18.3	8.22	704.5

**Judgment:** The EUT, Cordless Pen, complied with the specification requirements.

### Test Details:

For unwanted emission frequency 1149kHz:

Limit (μV/m) =  $24000 / 1149 = 20.88 \mu\text{V/m}$  @ 300m

The limit for the other unwanted emissions was derived in a similar fashion.

Measurements were performed at close-in distances and the limit L2 corresponding to the close-in distance d2 was determined by applying the following relation:

$$L2 = L1 (d1 / d2)$$

Where L1 is the specified limit in μV/m at the distance d1.

Close in Limit (μV/m) =  $20.88 \mu\text{V/m} (30\text{m} / 1\text{m}) = 626.6 \mu\text{V/m}$  @ 1m

Close in Limit (dBμV/m) = 55.9dBμV/m @ 1m

The limit for other unwanted emissions was derived in a similar fashion.



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## FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.

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### APPENDIX A - TEST EQUIPMENT USED

The absolute performance calibration of equipment requiring calibration is performed on an as needed basis in accordance with ANSI/NCSL Z540-1-1994. However, calibration periods do not exceed one (1) year. The test equipment is capable of making measurements within tolerances of at least +/- 2dB amplitude and +/- 2% frequency deviation. Equipment certifications showing traceability to NIST (National Institute of Standards and Technology) are maintained on file at Garwood Laboratories, Inc. Pico Rivera, California. All equipment is checked and verified for proper operation before and after each series of tests.

#### A.1 Specific Equipment Used

<i>Test</i>	<i>Instrument</i>	<i>MFG / Model No.</i>	<i>Asset No.</i>	<i>CAL. Due Date</i>
<b><i>Radiated Emission Test</i></b>				
	Quasi-Peak	Hewlett Packard	20021	10/20/02
	SA Display	Hewlett Packard	20020	1/15/03
	8568B SA	Hewlett Packard	20019	1/15/03
	85685A RF Pre-selector	Hewlett Packard	20022	10/12/02
	Active Monopole Antenna	AH Systems / SAS-200/550-1	8524	9/28/02



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### APPENDIX B – SUPPLEMENTAL TEST DATA

<i>Basic Standard</i>	<i>Test Type</i>	<i>Details</i>	<i>Data Format</i>	<i>Page No.</i>
FCC Pt.15 Subpart C §15.209	No Supplemental Test Data	---	---	---
		---	---	---



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### ATTACHMENTS

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*Testing Services  
Since 1954*

# **GARWOOD LABORATORIES, INC.**

*7829 Industry Avenue, Pico Rivera, CA 90660*

*"EXCELLENCE BUILT  
ON INTEGRITY"*

Report No: FR25249-E

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FCC TEST REPORT FOR FINEPOINT INNOVATIONS INC.

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## *Circuit Schematics*

Please Refer to Exhibit

*Date: October 3, 2002*

*EUT: Cordless Pen*

*Page A1 of A4*



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### ***Internal Pictures***

Please Refer to Exhibit

Cordless Pen Disassembled



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### ***Internal Pictures***

Please Refer to Exhibit

Top Side of PCB

Please Refer to Exhibit

Bottom Side of PCB

*Date: October 3, 2002*

*EUT: Cordless Pen*

*Page A3 of A4*





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### ***External Picture – EUT***

Please Refer to Exhibit