TEST REPORT FROM:

COMMUNICATION CERTIFICATION LABORATORY
1940 W. Alexander Street
Salt Lake City, Utah
84119-2039

Type of Report: Certification

TEST OF: MicroFET3

FCC ID: P9V-1001

To FCC PART 15, Subpart C
Section 15.249

Test Report Serial No: 73-7722

Applicant:

Hoggan Health Industries
12411 South 265 West
Draper, UT 84020

Date of Test: April 12, 2002

Issue Date: April 15, 2002

CERTIFICATION OF ENGINEERING REPORT

This report has been prepared by Communication Certification Laboratory to determine compliance of the device described below with the certification requirements of FCC Part 15, Subpart C Section 15.249. This report may be reproduced in full, partial reproduction may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

- Applicant: Hoggan Health Industries
- Manufacturer: Hoggan Health Industries
- Trade Name: Hoggan
- Model Number: MicroFET3
- FCC ID: P9V-1001

On this 15th day of April 2002, I, individually, and for Communication Certification Laboratory, certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge, and are made in good faith.

Although NVLAP has recognized that the Communication Certification Laboratory EMC testing facilities are in good standing, NVLAP does not endorse the product described in this report.

COMMUNICATION CERTIFICATION LABORATORY

_____

Tested by: Kirk P. Thomas
Project Engineer

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SECTION 1.0 CLIENT INFORMATION

1.1 Client Information:

Company Name: Hoggan Health Industries
12411 South 265 West
Draper, UT 84020

Contact Name: Clair Oldroyd
Title: Purchasing Manager

SECTION 2.0 EQUIPMENT UNDER TEST (EUT)

2.1 Identification of EUT:

Trade Name: Hoggan
Model Name or Number: MicroFET3
Serial Number: None
Options Fitted: N/A
Country of Manufacture: U.S.A.

2.2 Description of EUT:

The MicroFET3 is a medical device used for muscle and range of motion testing. The MicroFET3 can transmit on one of eight channels. The channel of operation is selected by the manufacturer.

Channel	Frequency MHz
0	903.37
1	906.37
2	907.87
3	909.37
4	912.37
5	915.37
6	919.87
7	921.37

This application is for the transmitter portions only; the receiver and digital circuitry is covered under a separate declaration of conformity report.

2.3 Modification Incorporated/Special Accessories on EUT:

There were no modifications or special accessories required to comply with the specification.

Signature: _____

Typed Name: Clair Oldroyd

Title: Purchasing Manager

SECTION 3.0 TEST SPECIFICATION, METHODS & PROCEDURES

3.1 Test Specification:

Title: FCC PART 15, Subpart C (47 CFR 15).
Section 15.249

Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz and 24.0-24.25 GHz.

Purpose of Test: The tests were performed to demonstrate Initial compliance.

3.2 Methods & Procedures:

3.2.1 § 15.249

(a) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902 – 902 MHz	50	500
2400 – 2483.5 MHz	50	500
5725 – 5875 MHz	50	500
24.0 – 24.25 GHz	250	2500

(b) Field strength limits are specified at a distance of 3 meters.

(c) Emissions radiated outside of the specified frequency bands, except for harmonics; shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

(d) As shown in § 15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

(e) Parties considering the manufacture, importation, marketing or operation of equipment under this section should also not the requirements in § 15.37(d).

3.2.2 § 15.207 Conducted Limits

(a) For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 450 kHz to 30 MHz shall not exceed 250 microvolts. Compliance with the provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

3.3 Test Procedure

The line conducted and radiated emissions testing was performed according to the procedures in ANSI C63.4 (2000). Line conducted and radiated emissions testing was performed at CCL's anechoic chamber located at 1940 W. Alexander Street in Salt Lake City, Utah. This site has been fully described in a report submitted to the FCC, and was accepted in a letter dated March 11, 2002 (90502).

CCL participates in the National Voluntary Laboratory Accreditation Program (NVLAP) and has been accepted under NVLAP Lab Code:100272-0, which is effective until September 30,2002.

For radiated emissions testing above 30 MHz that is performed at distances closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

SECTION 4.0 OPERATION OF EUT DURING TESTING

4.1 Operating Environment:

Power Supply: 9 volt battery
AC Mains Frequency: N/A
Current Rating: N/A

4.2 Operating Modes:

Each mode of operation was exercised to produce worst-case emissions. The worst-case emissions were with the MicroFET3 transmitting with the same type of modulation that would be used under normal operation.

The MicroFET3 operates on a 9 volt battery; therefore, conducted emissions testing is not applicable.

4.3 EUT Exercise Software:

No exercise software was required to produce the worst-case emissions.

SECTION 5.0 SUMMARY OF TEST RESULTS

5.1 FCC PART 15, Subpart C Sections 15.249

5.1.1 Summary of Tests:

Section	Test Performed	Frequency Range (MHz)	Result
15.249 (a)	Radiated Emissions – Transmitting at 916.5 MHz	30 to 10,000	Complied
15.207	Line Conducted Emissions (Hot Lead to Ground)	0.45 to 30	Not Applicable
15.207	Line Conducted Emissions (Neutral Lead to Ground)	0.45 to 30	Not Applicable

5.2 Result

In the configuration tested, the EUT complied with the requirements of the specification.

SECTION 6.0 MEASUREMENTS, EXAMINATIONS AND DERIVED RESUTLS

6.1 General Comments:

This section contains the test results only. Details of the test methods used and a list of the test equipment used during the measurements can be found in Appendix 1 of this report.

6.2 Test Results:

6.2.1 Radiated Interference Level Data - (Vertical Polarity) (Transmitting at 903.37 MHz)

Frequency MHz	Detector	Receiver Reading dBμV	Correction Factor dB	Field Strength dBμV/m	Limit dBμV/m
903.37	Quasi-Peak	77.6	8.5	86.1	94.0
1806.74	Peak	58.9	-6.3	52.6	74.0
1806.74	Average	55.2	-6.3	48.9	54.0
2710.11*	Peak	49.6	-3.1	46.4	74.0
2710.11*	Average	43.2	-3.1	40.0	54.0
3613.48*	Peak	44.6	-0.8	43.8	74.0
3613.48*	Average	31.0	-0.8	30.2	54.0
4516.85*	Peak	45.6**	0.8	46.4	74.0
4516.85*	Average	32.0**	0.8	32.8	54.0
5420.22*	Peak	44.7**	3.0	47.7	74.0
5420.22*	Average	31.0**	3.0	34.0	54.0
6323.59	Peak	46.7**	3.5	50.2	74.0
6323.59	Average	34.2**	3.5	37.7	54.0
7226.96	Peak	46.7**	4.8	51.5	74.0
7226.96	Average	34.6**	4.8	39.4	54.0
8130.33*	Peak	46.5**	4.8	51.3	74.0
8130.33*	Average	34.6**	4.8	39.4	54.0
9033.7*	Peak	45.9**	5.4	51.3	74.0
9033.7*	Average	34.6**	5.4	40.0	54.0

Note 1: * Emissions within restricted bands of § 15.205

Note 2: ** No emission detected, noise floor reading from spectrum analyzer

6.2.2 Radiated Interference Level Data - (Horizontal Polarity) (Transmitting at 903.37.0 MHz)

Frequency MHz	Detector	Receiver Reading dBμV	Correction Factor dB	Field Strength dBμV/m	Limit dBμV/m
903.37	Quasi-Peak	82.8	8.5	91.3	94.0
1806.74	Peak	57.4	-6.3	51.1	74.0
1806.74	Average	55.1	-6.3	48.8	54.0
2710.11*	Peak	51.2	-3.1	48.1	74.0
2710.11*	Average	46.8	-3.1	43.7	54.0
3613.48*	Peak	45.2	-0.8	44.4	74.0
3613.48*	Average	31.0	-0.8	30.2	54.0
4516.85*	Peak	45.6**	0.8	46.4	74.0
4516.85*	Average	32.0**	0.8	32.8	54.0
5420.22*	Peak	44.7**	3.0	47.7	74.0
5420.22*	Average	31.0**	3.0	34.0	54.0
6323.59	Peak	46.7**	3.5	50.2	74.0
6323.59	Average	34.2**	3.5	37.7	54.0
7226.96	Peak	46.7**	4.8	51.5	74.0
7226.96	Average	34.6**	4.8	39.4	54.0
8130.33*	Peak	46.5**	4.8	51.3	74.0
8130.33*	Average	34.6**	4.8	39.4	54.0
9033.7*	Peak	45.9**	5.4	51.3	74.0
9033.7*	Average	34.6**	5.4	40.0	54.0

Note 1: * Emissions within restricted bands of § 15.205

Note 2: ** No emission detected, noise floor reading from spectrum analyzer

6.2.3 Radiated Interference Level Data - (Vertical Polarity) (Transmitting at 909.37 MHz)

Frequency MHz	Detector	Receiver Reading dBμV	Correction Factor dB	Field Strength dBμV/m	Limit dBμV/m
909.37	Quasi-Peak	76.6	8.5	85.1	94.0
1818.74	Peak	58.7	-6.2	52.5	74.0
1818.74	Average	56.2	-6.2	50.0	54.0
2728.11*	Peak	47.4	-3.1	44.3	74.0
2728.11*	Average	44.0	-3.1	40.9	54.0
3637.48*	Peak	46.3	-0.6	45.7	74.0
3637.48*	Average	33.5	-0.6	32.9	54.0
4546.85*	Peak	45.6**	0.8	46.4	74.0
4546.85*	Average	32.0**	0.8	32.8	54.0
5456.22*	Peak	44.7**	3.0	47.7	74.0
5456.22*	Average	31.0**	3.0	34.0	54.0
6365.59	Peak	46.7**	3.5	50.2	74.0
6365.59	Average	34.2**	3.5	37.7	54.0
7274.96*	Peak	46.7**	4.8	51.5	74.0
7274.96*	Average	34.6**	4.8	39.4	54.0
8184.33*	Peak	46.5**	4.8	51.3	74.0
8184.33*	Average	34.6**	4.8	39.4	54.0
9093.7*	Peak	45.9**	5.4	51.3	74.0
9093.7*	Average	34.6**	5.4	40.0	54.0

Note 1: * Emissions within restricted bands of § 15.205

Note 2: ** No emission detected, noise floor reading from spectrum analyzer

6.2.4 Radiated Interference Level Data - (Horizontal Polarity) (Transmitting at 909.37.0 MHz)

Frequency MHz	Detector	Receiver Reading dBμV	Correction Factor dB	Field Strength dBμV/m	Limit dBμV/m
909.37	Quasi-Peak	82.3	8.5	90.8	94.0
1818.74	Peak	55.5	-6.2	49.3	74.0
1818.74	Average	51.5	-6.2	45.3	54.0
2728.11*	Peak	53.0	-3.1	49.9	74.0
2728.11*	Average	47.5	-3.1	44.4	54.0
3637.48*	Peak	45.7	-0.6	45.1	74.0
3637.48*	Average	33.5	-0.6	32.9	54.0
4546.85*	Peak	45.6**	0.8	46.4	74.0
4546.85*	Average	32.0**	0.8	32.8	54.0
5456.22*	Peak	44.7**	3.0	47.7	74.0
5456.22*	Average	31.0**	3.0	34.0	54.0
6365.59	Peak	46.7**	3.5	50.2	74.0
6365.59	Average	34.2**	3.5	37.7	54.0
7274.96*	Peak	46.7**	4.8	51.5	74.0
7274.96*	Average	34.6**	4.8	39.4	54.0
8184.33*	Peak	46.5**	4.8	51.3	74.0
8184.33*	Average	34.6**	4.8	39.4	54.0
9093.7*	Peak	45.9**	5.4	51.3	74.0
9093.7*	Average	34.6**	5.4	40.0	54.0

Note 1: * Emissions within restricted bands of § 15.205

Note 2: ** No emission detected, noise floor reading from spectrum analyzer

6.2.5 Radiated Interference Level Data - (Vertical Polarity) (Transmitting at 921.37 MHz)

Frequency MHz	Detector	Receiver Reading dBμV	Correction Factor dB	Field Strength dBμV/m	Limit dBμV/m
921.37	Quasi-Peak	75.2	8.5	83.7	94.0
1842.74	Peak	57.6	-6.0	51.6	74.0
1842.74	Average	53.1	-6.0	47.1	54.0
2764.11*	Peak	53.2	-3.0	50.2	74.0
2764.11*	Average	48.5	-3.0	45.5	54.0
3685.48*	Peak	48.0	-0.5	47.5	74.0
3685.48*	Average	41.2	-0.5	40.7	54.0
4606.85*	Peak	45.6**	0.8	46.4	74.0
4606.85*	Average	32.0**	0.8	32.8	54.0
5528.22	Peak	44.7**	3.0	47.7	74.0
5528.22	Average	31.0**	3.0	34.0	54.0
6449.59	Peak	46.7**	3.5	50.2	74.0
6449.59	Average	34.2**	3.5	37.7	54.0
7370.96*	Peak	46.7**	4.8	51.5	74.0
7370.96*	Average	34.6**	4.8	39.4	54.0
8292.33*	Peak	46.5**	4.8	51.3	74.0
8292.33*	Average	34.6**	4.8	39.4	54.0
9213.7	Peak	45.9**	5.4	51.3	74.0
9213.7	Average	34.6**	5.4	40.0	54.0

Note 1: * Emissions within restricted bands of § 15.205

Note 2: ** No emission detected, noise floor reading from spectrum analyzer

6.2.6 Radiated Interference Level Data - (Horizontal Polarity) (Transmitting at 921.37.0 MHz)

Frequency MHz	Detector	Receiver Reading dBμV	Correction Factor dB	Field Strength dBμV/m	Limit dBμV/m
921.37	Quasi-Peak	81.7	8.5	90.2	94.0
1842.74	Peak	56.1	-6.0	50.1	74.0
1842.74	Average	50.9	-6.0	44.9	54.0
2764.11*	Peak	49.5	-3.0	46.5	74.0
2764.11*	Average	47.5	-3.0	44.5	54.0
3685.48*	Peak	46.8	-0.5	46.3	74.0
3685.48*	Average	38.9	-0.5	38.4	54.0
4606.85*	Peak	45.6**	0.8	46.4	74.0
4606.85*	Average	32.0**	0.8	32.8	54.0
5528.22	Peak	44.7**	3.0	47.7	74.0
5528.22	Average	31.0**	3.0	34.0	54.0
6449.59	Peak	46.7**	3.5	50.2	74.0
6449.59	Average	34.2**	3.5	37.7	54.0
7370.96*	Peak	46.7**	4.8	51.5	74.0
7370.96*	Average	34.6**	4.8	39.4	54.0
8292.33*	Peak	46.5**	4.8	51.3	74.0
8292.33*	Average	34.6**	4.8	39.4	54.0
9213.7	Peak	45.9**	5.4	51.3	74.0
9213.7	Average	34.6**	5.4	40.0	54.0

Note 1: * Emissions within restricted bands of § 15.205

Note 2: ** No emission detected, noise floor reading from spectrum analyzer

6.3 Sample Field Strength Calculation:

The field strength is calculated by adding the Correction Factor (Antenna Factor + Cable Factor), to the measured level from the receiver. The receiver amplitude reading is compensated for any amplifier gain. The basic equation with a sample calculation is shown below:

FS = RA + CF Where

FS = Field Strength
RA = Receiver Amplitude Reading (Receiver Reading - Amplifier Gain)
CF = Correction Factor (Antenna Factor + Cable Factor)

Assume a receiver reading of 42.5 $dB\mu V$ is obtained from the receiver, an amplifier gain of 26.5 dB and a correction factor of 8.5 dB. The field strength is calculated by subtracting the amplifier gain and adding the correction factor, giving a field strength of 24.5 $dB\mu V/m$, FS = (42.5 - 26.5) + 8.5 = 24.5 $dB\mu V/m$

APPENDIX A TEST PROCEDURES AND TEST EQUIPMENT

Radiated Interference Emissions:

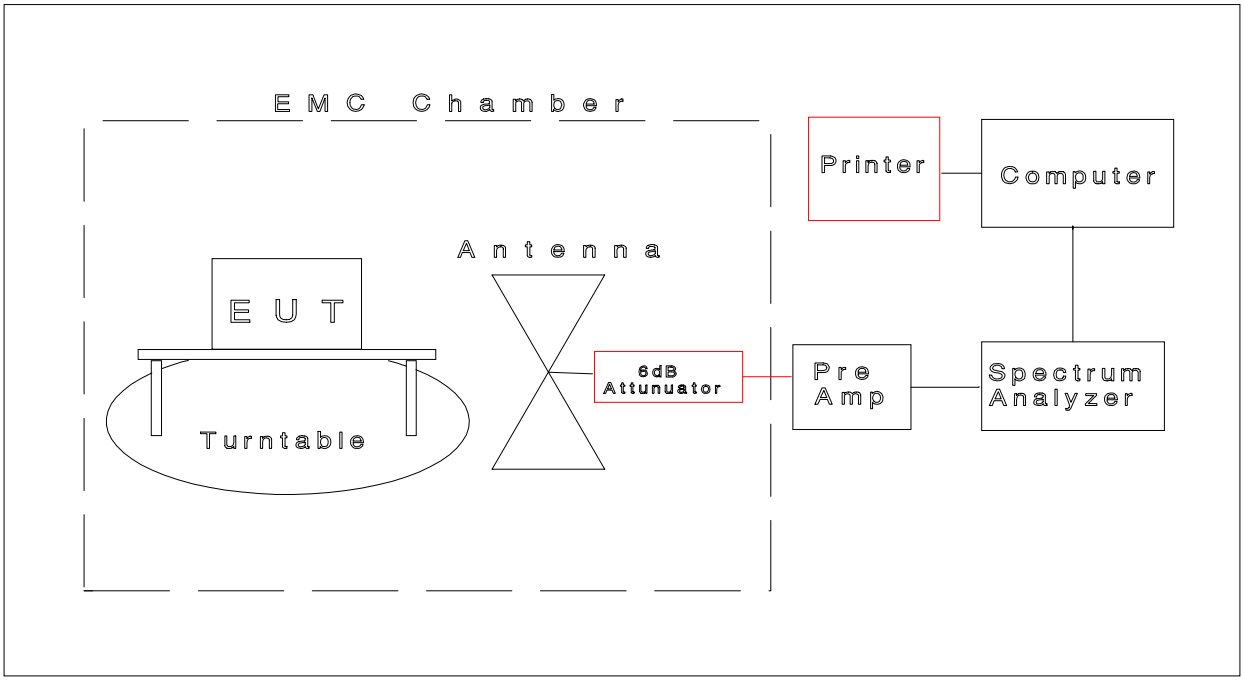
The radiated emission from the intentional radiator was measured using a spectrum analyzer with a quasi-peak adapter for peak and quasi-peak readings. A preamplifier with a fixed gain of 26 dB and a power amplifier with a fixed gain of 22 dB were used to increase the sensitivity of the measuring instrumentation. The quasi-peak adapter uses a bandwidth of 120 kHz, with the spectrum analyzer's resolution bandwidth set at 1 MHz, for readings in the 30 to 1000 MHz frequency range. For peak emissions above 1000 MHz the spectrum analyzer’s resolution bandwidth was set to 1 MHz and the video bandwidth was set to 3 MHz. For average emissions above 1000 MHz the spectrum analyzer’s resolution bandwidth was set to 1 MHz and the video bandwidth was set to 1 Hz.

A biconilog antenna was used to measure the frequency range of 30 to 1000 MHz and a Double Ridge Guide Horn antenna was used to measure the frequency range 1 GHz to 10 GHz, at a distance of 3 meters from the EUT. The readings obtained by these antennas are correlated to the levels obtained with a tuned dipole antenna by adding antenna factors.

Type of Equipment	Manufacturer	Model Number	Serial Number
Anechoic Chamber Test Site #2	CCL	N/A	N/A
Test Software	CCL	Radiated Emissions	Revision 1.3
Spectrum Analyzer	Hewlett Packard	8566B	2230A01711
Quasi-Peak Detector	Hewlett Packard	8565A	3107A01582
Biconilog Antenna	EMCO	3141	1045
Double Ridged Guide Antenna	EMCO	3115	9409-4355
3 Meter Radiated Emissions Cable Anechoic Chamber	CCL	Cable B	N/A
Pre-Amplifier	Hewlett Packard	8447D	1937A03151
Power-Amplifier	Hewlett Packard	8447E	2434A01975
6 dB Attenuator	Hewlett Packard	8491A	32835

An independent calibration laboratory or CCL personal calibrates all the equipment listed above every 12 months following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to tractability is on file and is available for examination upon request.

Radiated Emissions Test



Conducted Disturbance at Mains Ports:

The conducted disturbance at mains ports from the intentional radiator was measured using a spectrum analyzer with a quasi-peak adapter for peak, quasi-peak and average readings. The quasi-peak adapter uses a bandwidth of 9 kHz, with the spectrum analyzer's resolution bandwidth set at 100 kHz, for readings in the 450 kHz to 30 MHz frequency ranges.

The conducted disturbance at mains ports measurements are performed in a screen room using a (50 Ω/50 μH) Line Impedance Stabilization Network (LISN).

Where mains flexible power cords are longer than 1 m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

Where the EUT is a collection of intentional radiator with each intentional radiator having its own power cord, the point of connection for the LISN is determined from the following rules:

a) Each power cord, which is terminated in a mains supply plug, shall be tested separately.

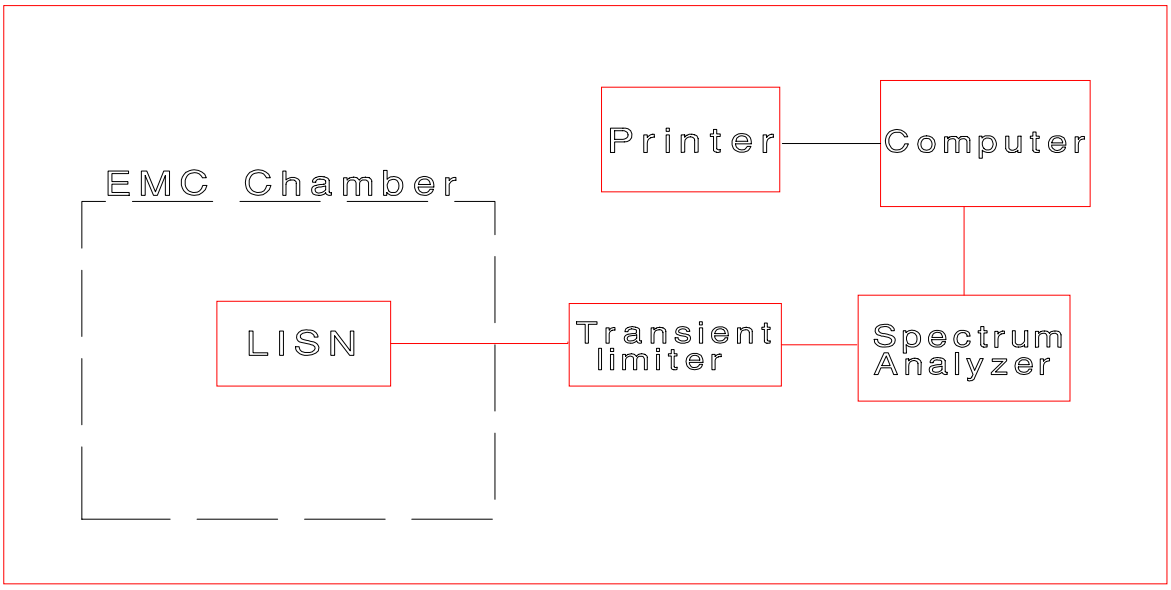
b) Power cords, which are not specified by the manufacturer to be connected via a host unit, shall be tested separately.
c) Power cords which the manufacturer to be connected via a host unit specifies or other power supplying equipment shall be connected to that host unit and the power cords of that host unit connected to the LISN and tested.
d) Where a special connection is specified, the necessary hardware to effect the connection is supplied by the manufacturer for the testing purpose.
e) When testing equipment with multiple mains cords, those cords not under test are connected to an artificial mains network (AMN) different than the AMN used for the mains cord under test.

Desktop intentional radiators are placed on a non-conducting table at least 0.8 meters from the metallic floor. The equipment is placed a minimum of 40 cm from all walls. Floor standing equipment is placed directly on the earth grounded floor.

Type of Equipment	Manufacturer	Model Number	Serial Number
Anechoic Chamber Test Site #2	CCL	N/A	N/A
Test Software	CCL	Conducted Emissions	Revision 1.2
Spectrum Analyzer	Hewlett Packard	8566B	2230A01711
Quasi-Peak Detector	Hewlett Packard	8565A	3107A01582
LISN	EMCO	3825/2	9307-1893
Conductance Cable Anechoic Chamber	CCL	Cable A	N/A
Transient Limiter	Hewlett Packard	11947A	3107A00895

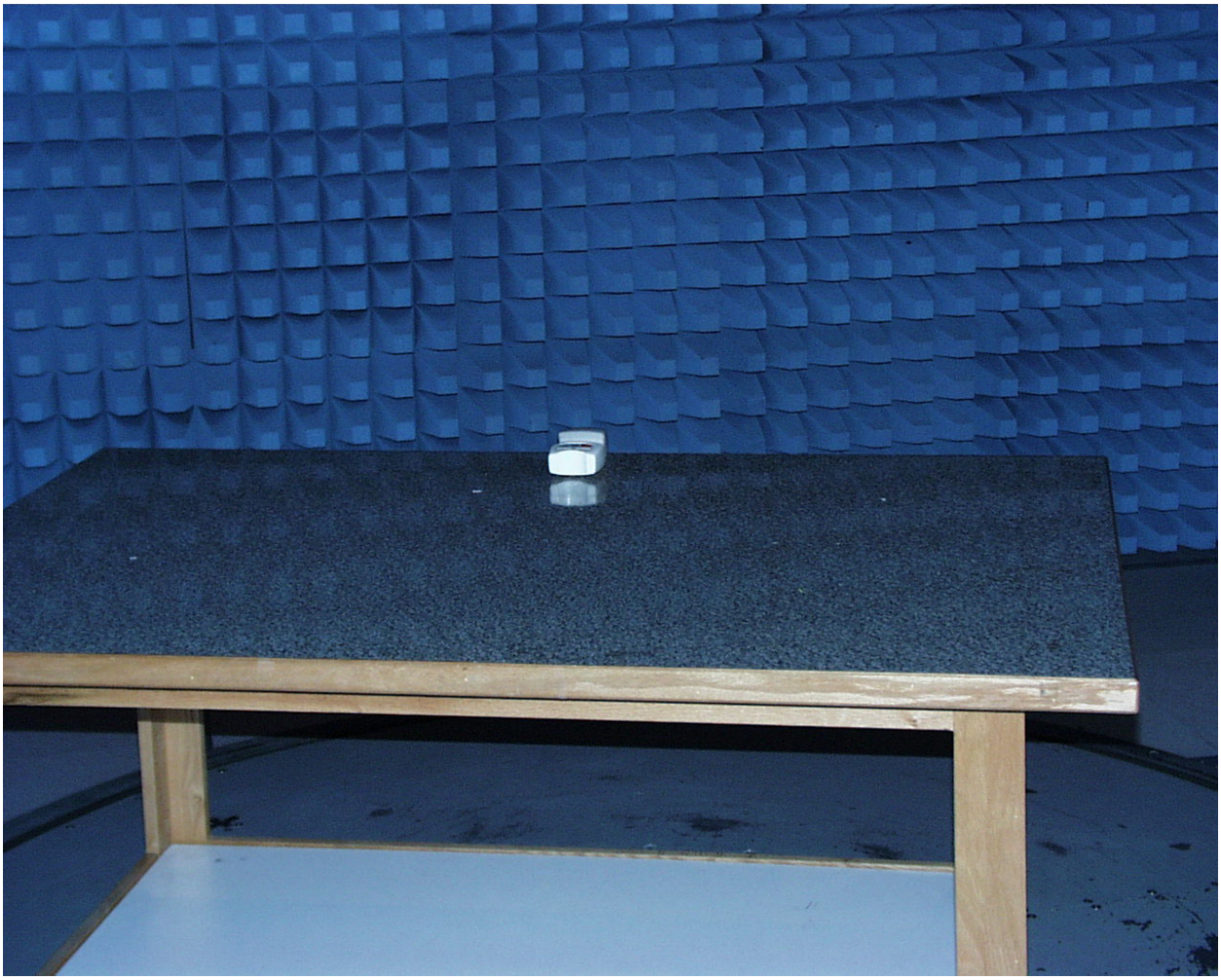
An independent calibration laboratory or CCL personal calibrates all the equipment listed above every 12 months following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to tractability is on file and is available for examination upon request.

Line Conducted Emissions Test



APPENDIX B PHOTOGRAPHS:

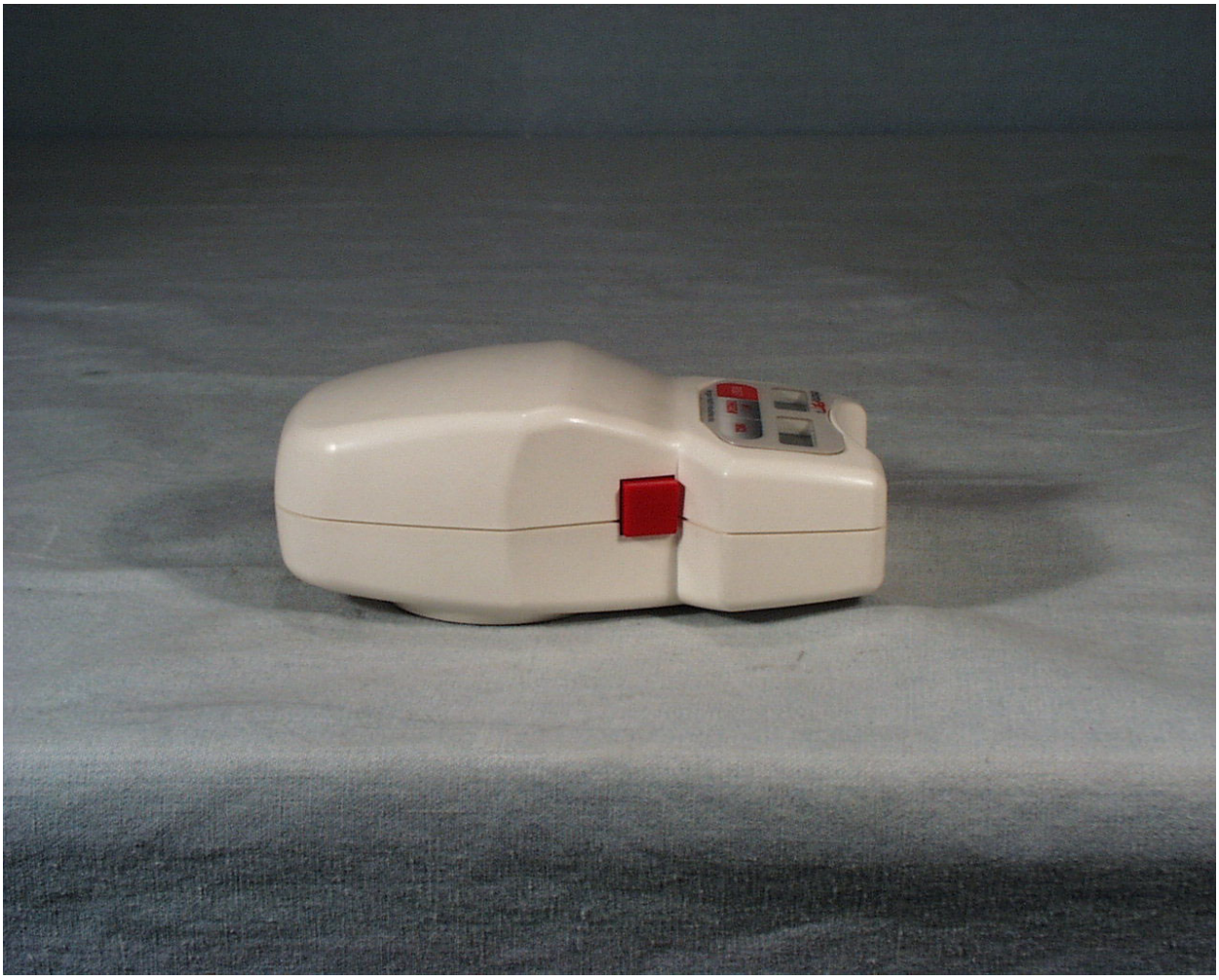
Front view of the Test Setup



Back View of the Test Setup

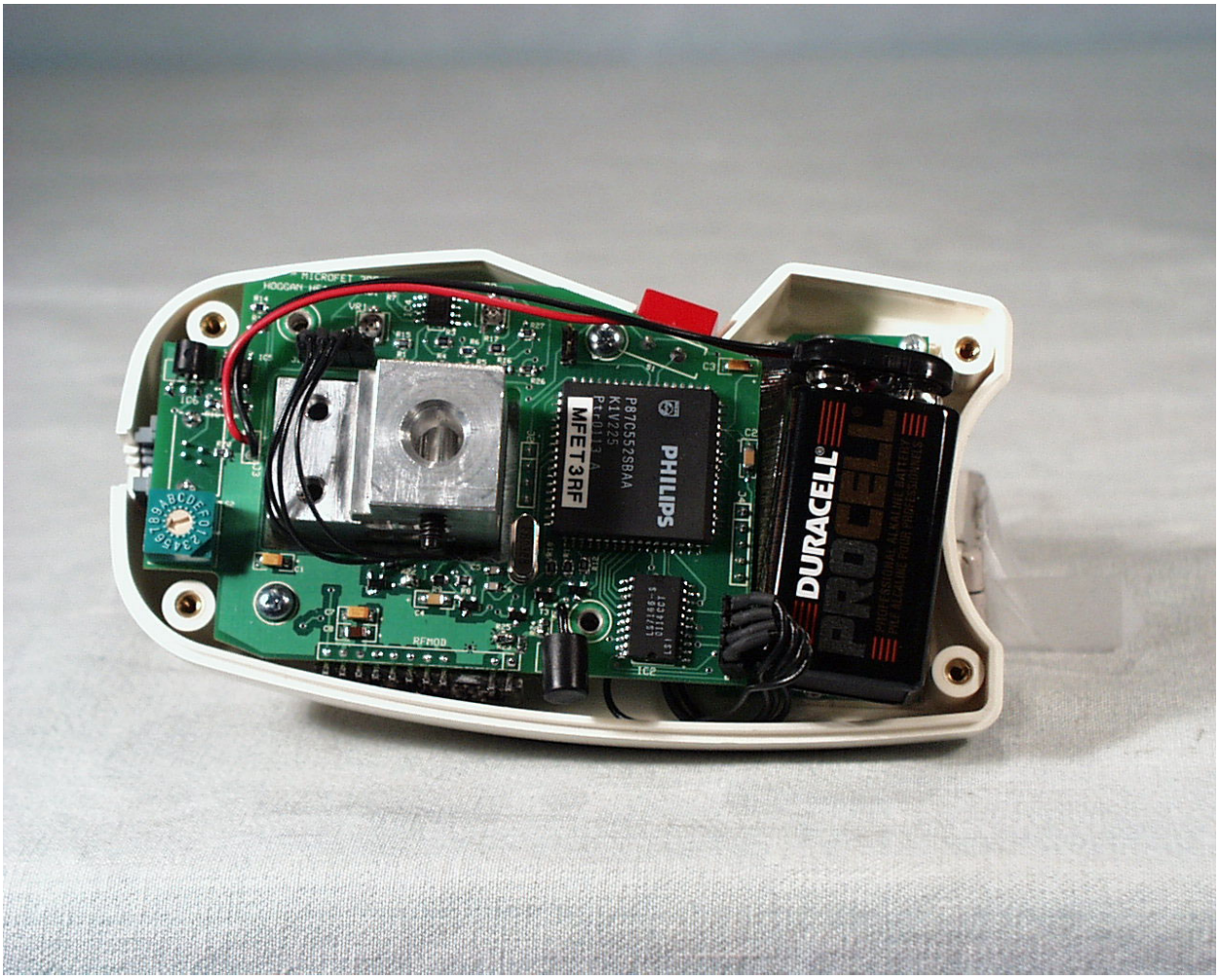
Front View of the EUT

Back View of the EUT

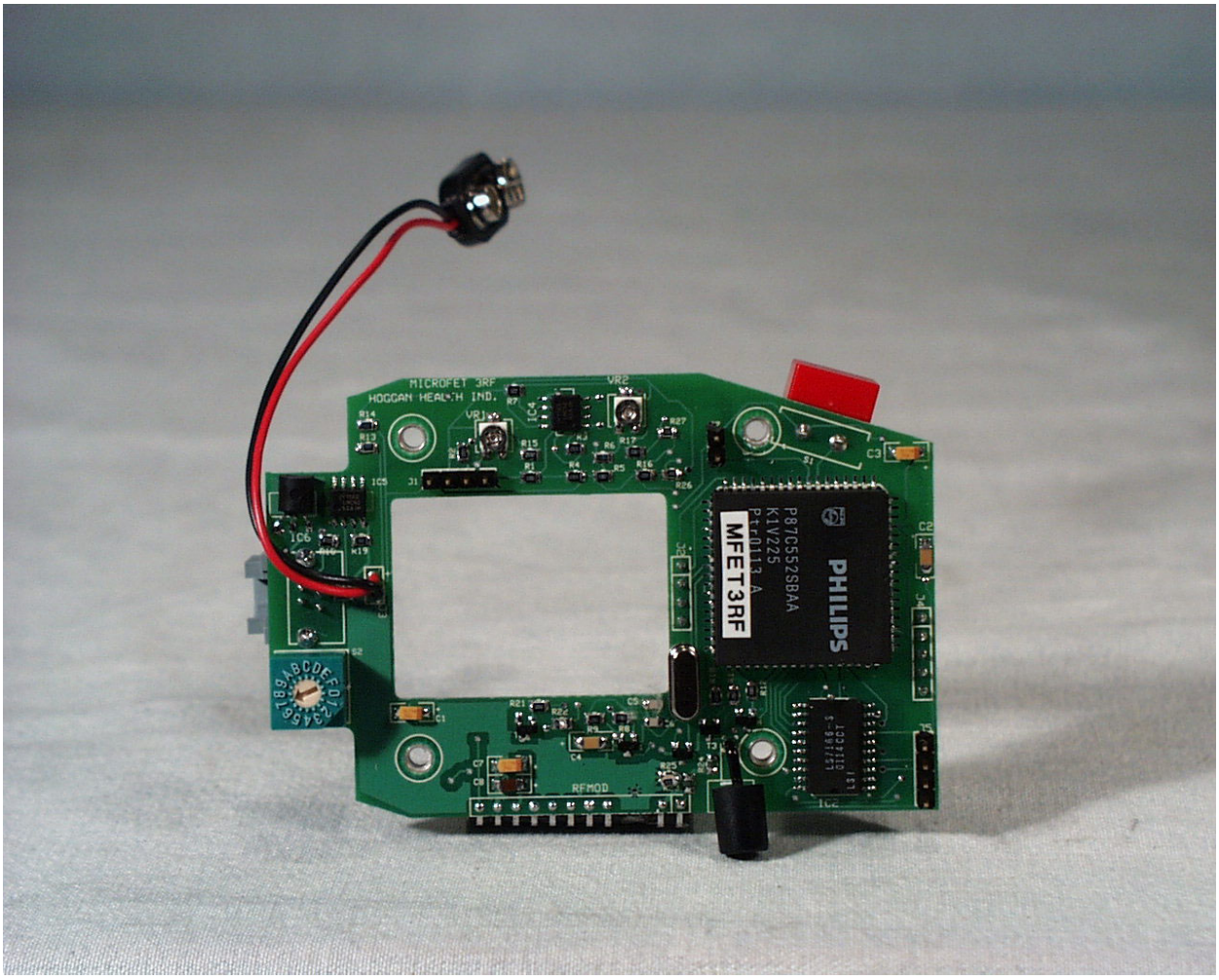


Side View of the EUT

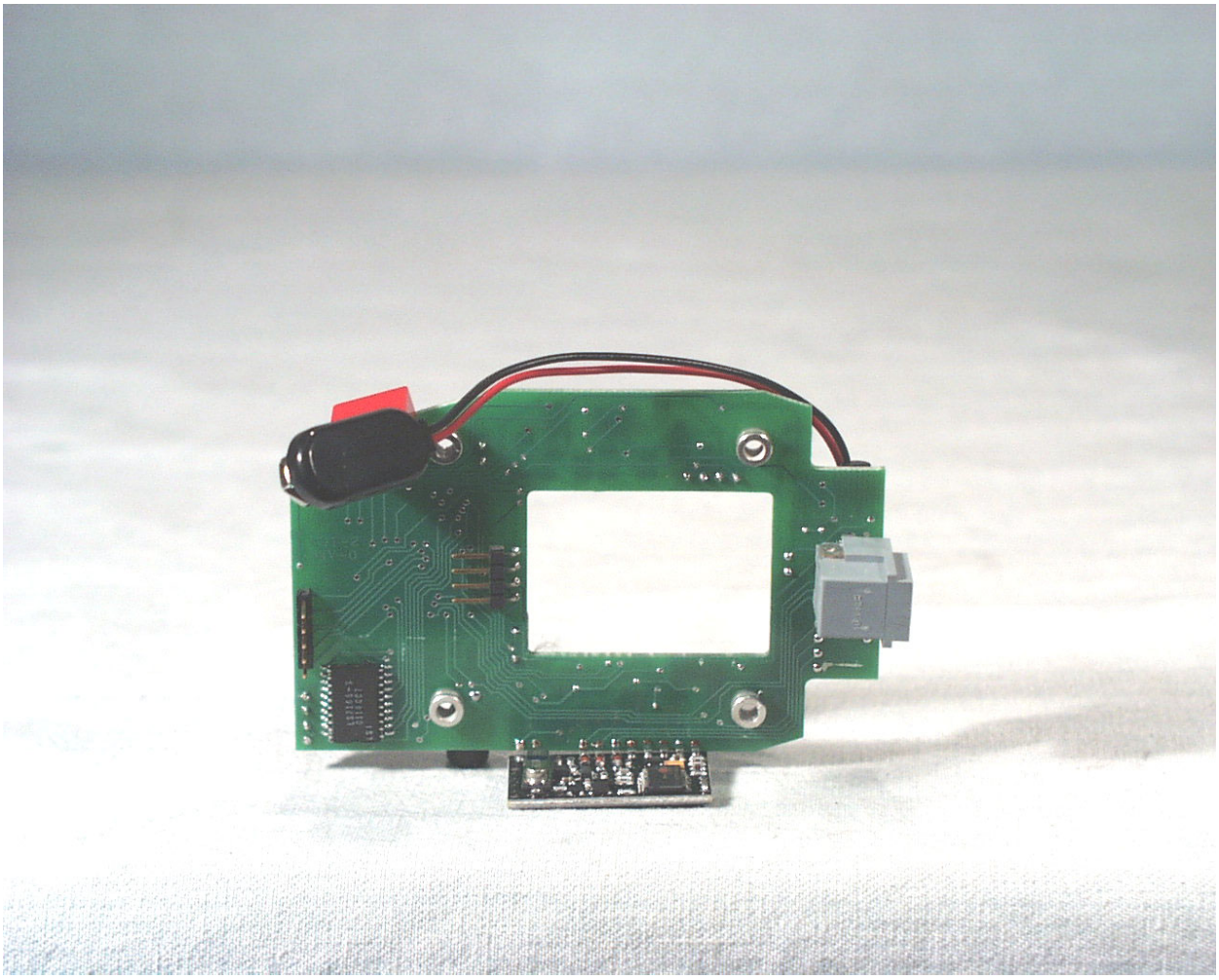
Bottom View of the EUT



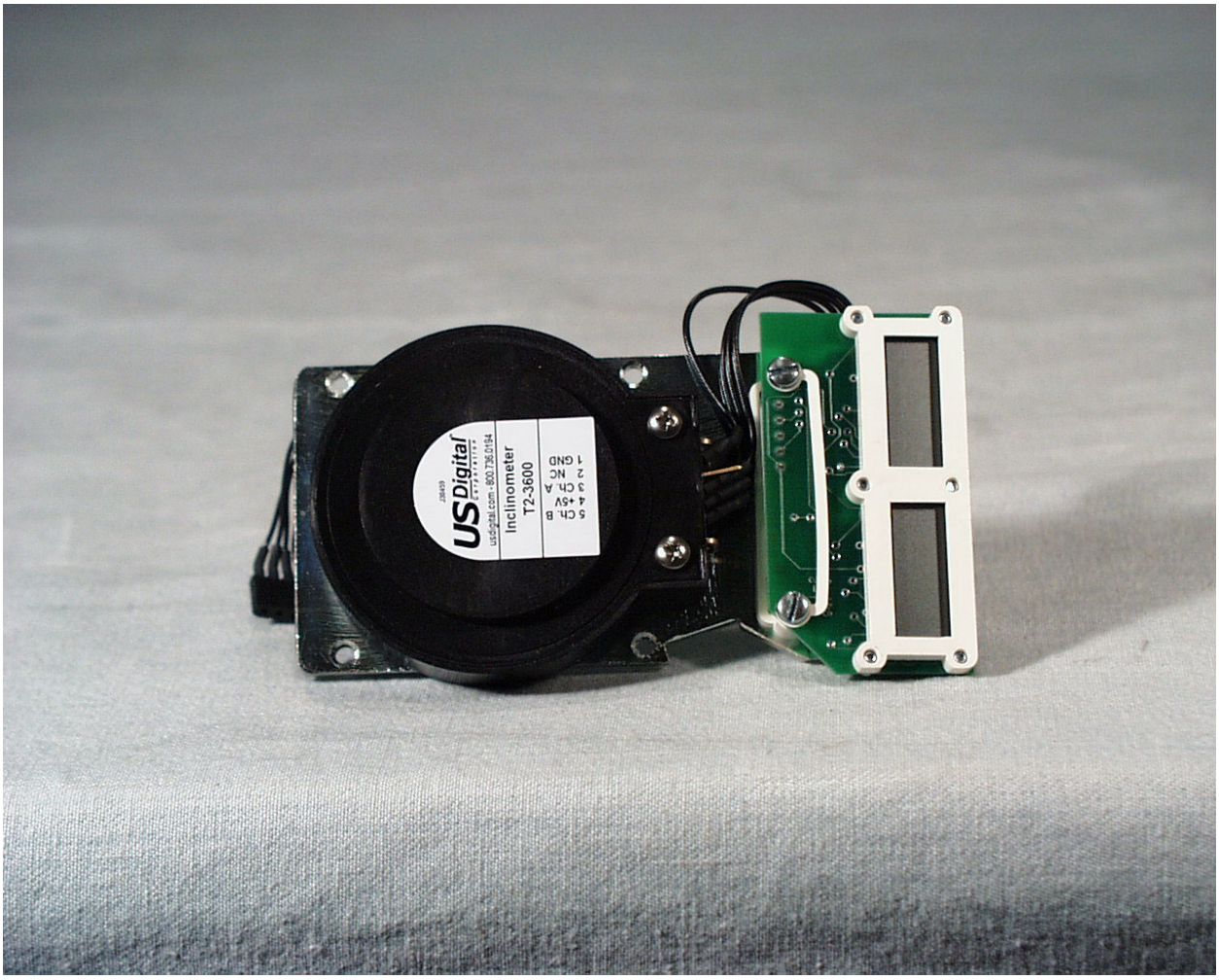
Inside View of the EUT



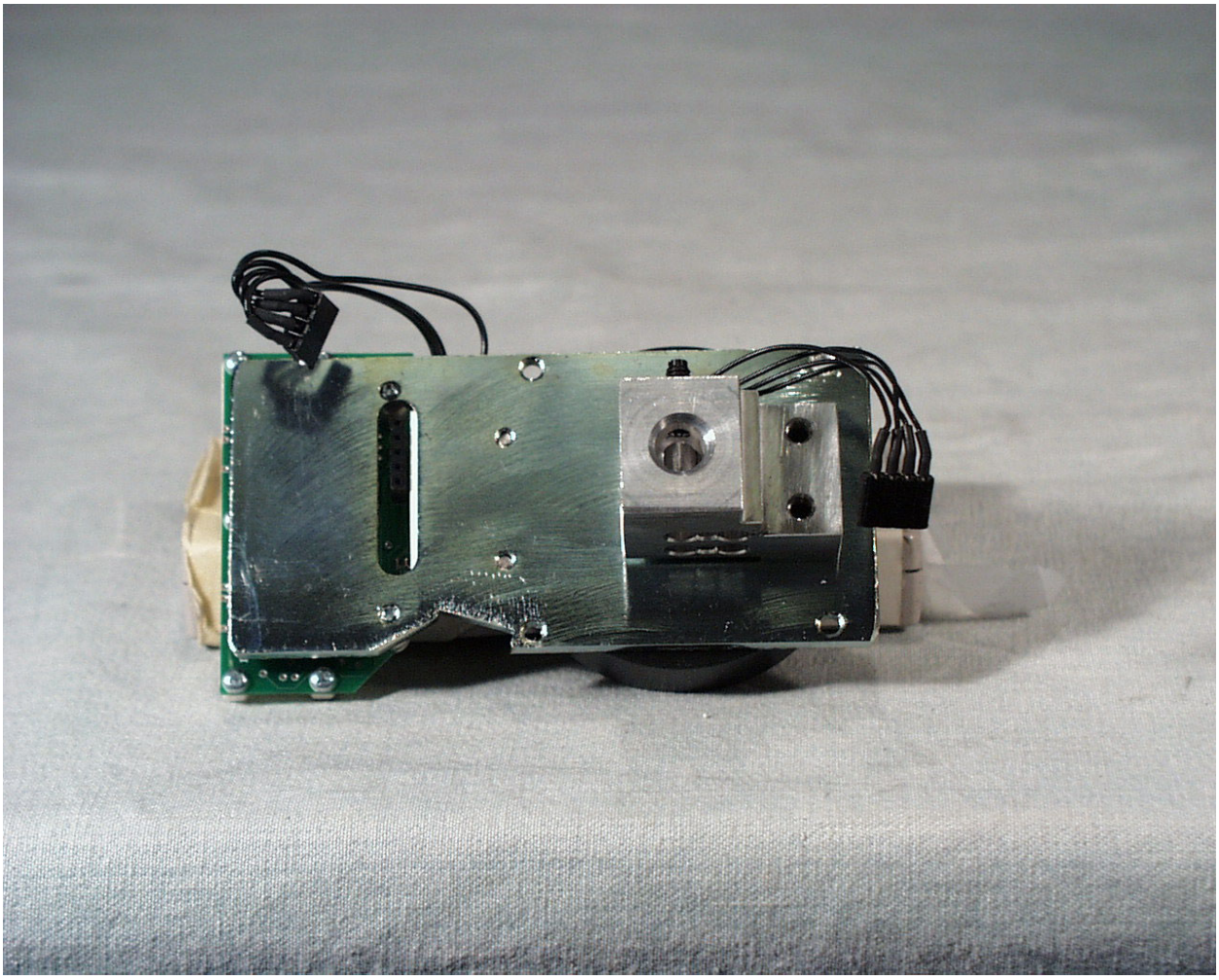
Top View of the Main PCB



Bottom View of the Main PCB



Top View of the Display/Dynamometer



Bottom View of the Display/Dynamometer