Environmental Simulation

Report of Equipment Compliance

for the

Boeing 2-Way Switches, Part Number SWSH-810-2DR-IND-SMC

Tested Under

MIL-STD-202F; Methods 101, 106, 110, 204, and 214

MET Report Number: ESL12363

September 12, 2002

Prepared For:

American Microwave Corporation
7311-G Grove Road
Frederick, Maryland 21701

Prepared By:

MET Laboratories, Inc.
914 West Patapsco Avenue
Baltimore, Maryland 21230-3432
(410) 354-3300

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MET Report Number: ESL12363
September 12, 2002

Testing Performed For:

American Microwave Corporation

Testing Performed By:

Philip L. Layman
Project Engineer

Troy Franklin, Director
Environmental Testing

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I. Executive Summary

MET Laboratories, Inc. was contracted by American Microwave Corporation to perform Environmental Simulation Testing on Boeing 2-Way Switches, Part Number SWSH-810-2DR-IND-SMC. The tests were based on MIL-STD-202F and American Microwave Corporation Purchase Order Number 20500287.

The aforementioned equipment was subjected to the following tests with the following results:

Salt Fog, Method 101:

The switches were subjected to a 48 hour in accordance with the requirements of Method 101 of MIL-STD-202F, Test Condition B. The visual inspection of the switches revealed no anomalies. No performance testing was performed or witnessed by MET.

Moisture Resistance, Method 106:

The switches, while maintaining a constant humidity, where subjected to ten, 24 hour temperature cycles in accordance with the requirements of Method 106 of MIL-STD-202F. The visual inspection of the switches revealed no anomalies. No performance testing was performed or witnessed by MET.

Sand and Dust, Method 110:

The switches were subjected to a sand and dust test in accordance with the requirements of Method 110 of MIL-STD-202F, Test Condition A. The visual inspection of the switches revealed no anomalies. No performance testing was performed or witnessed by MET.

Vibration, Method 204:

The switches were subjected to a 20g, swept sine vibration for 4 hours per axis in accordance with the requirements of Method 204 of MIL-STD-202F, Test Condition D. The visual inspection of the switches revealed no anomalies. No performance testing was performed or witnessed by MET.

Shock, Method 213:

The switches were subjected to a 75g, 6ms, ½ sine shock test in accordance with the requirements of Method 204 of MIL-STD-202F, Test Condition B. The visual inspection of the switches revealed no anomalies. No performance testing was performed or witnessed by MET.

II. General

A. Overview

The tests described in this document were formal tests as described in MIL-STD-202F. The objective of the testing was to certify conformance of the Equipment Under Test to the requirements of the aforementioned specifications.

B. References

ISO 10012-1:1992(E)	Quality Assurance Requirements for Measuring Equipment
MIL-STD-202F	Department of Defense Test Method Standard, Electronic and Electrical Component Parts, 1 April 1980
MIL-STD-45662A	Calibration System Requirements

C. List of Abbreviations

EUT	Equipment Under Test
Hz	Hertz
g	Units of Gravity

°C	Degrees Centigrade
°F	Degrees Fahrenheit
kg	kilograms

D. Test Site

All testing under ESL12363 was conducted at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore Maryland 21230-3432 except for the Sand and Dust Test. This test was conducted at Dayton T. Brown, Inc. Engineering and Test Division, Church Street, Bohemia, Long Island, New York 11716.

All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

E. Description of Test Sample

The Boeing 2-Way Switches, Part Number SWSH-810-2DR-IND-SMC, will be referred to as Equipment Under Test (EUT) for the remainder of this document. No detailed description of the switches was supplied by American Microwave.

F. Modifications

Modifications to EUT

No modifications were made to the EUT.

Modifications to Test Standard

No functional verifications where performed during testing.

G. Method of Monitoring EUT Operation

All pre and post verification testing was performed by American Microwave at their facility. Therefore MET Laboratories, Inc. can not certify the proper performance of the equipment.

H. Disposition of Test Sample

Multiple EUT were submitted for Environmental testing. Upon completion of testing, all the were returned to American Microwave.

III. Environmental Test Procedures (MIL-STD-202F)

A. Salt-Fog (Method 101, Test Condition B)

Test Procedure

A. A 5% (by weight) non-iodized salt solution was prepared at least 24 hours before testing.

B. The pretest relative density (specific gravity) of the salt solution was checked to insure that it was between 1.023 and 1.036. The pH was measured and maintained between 6.5 and 7.2. A calibration run at 35°C was performed on the test chamber to insure a fog collection of 0.5 to 3.0 milliliters per hour for each 80 square centimeters of horizontal collection area.

C. Any surfaces scratches or nicks on the EUT were noted.

D. After the calibration was verified, the EUT was placed in the salt fog test chamber. See Photograph 1. The EUT was subjected to 48 hours of exposure to the salt fog conditions (Test Condition B).

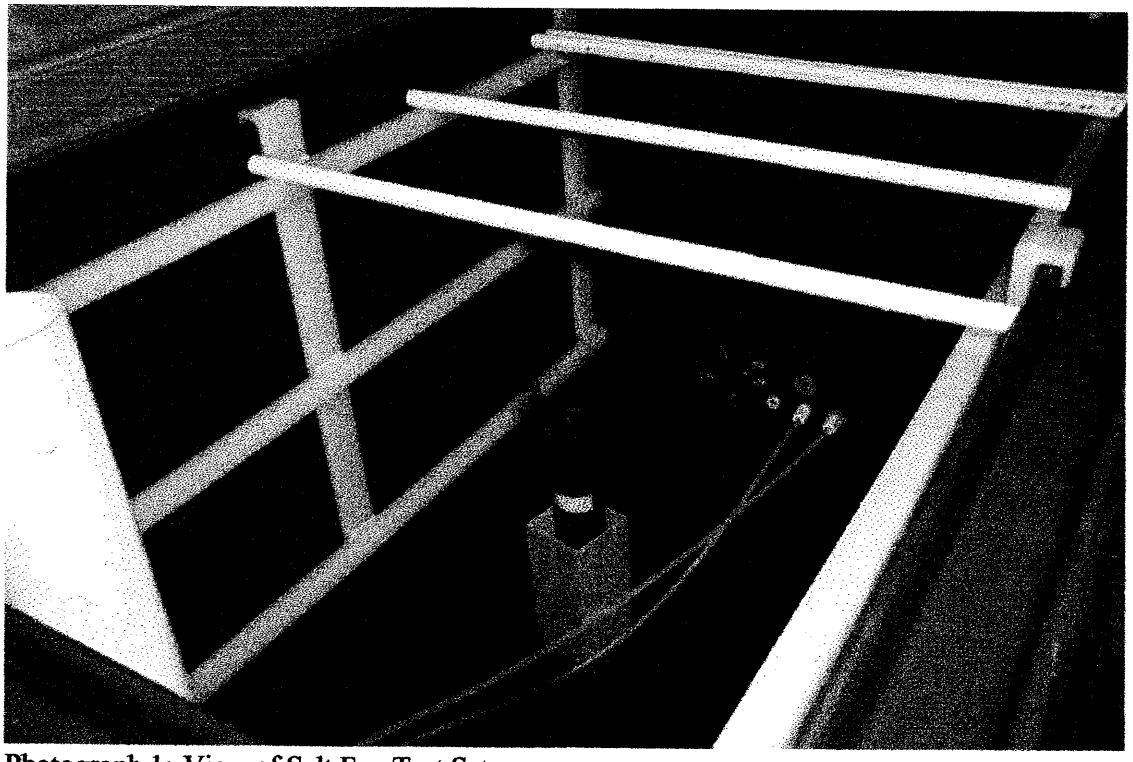
E. At the conclusion of the 48 hours of exposure the EUT was removed from the salt fog test chamber and allowed to dry.

F. The fog collection with-in the chamber was measured.

Test Results

The average measured fog collection within the test area was calculated to be equivalent to 2.81ml/80cm^2/hr. This is within the MIL-STD-202F requirements of 0.5 to 3.0 ml/80cm^2/hr. The visual inspection of the EUT revealed no anomalies. No performance testing was performed or witnessed by MET.

Test Date: 05/30/02- 06/03/02



Photograph 1: View of Salt Fog Test Set-up

B. Moisture Resistance (Method 106)

Test Procedure

A. The non-operational EUT was installed in the temperature chamber at 25°C (± 5°C) and a relative humidity between 20 and 55% (see Photograph 2).

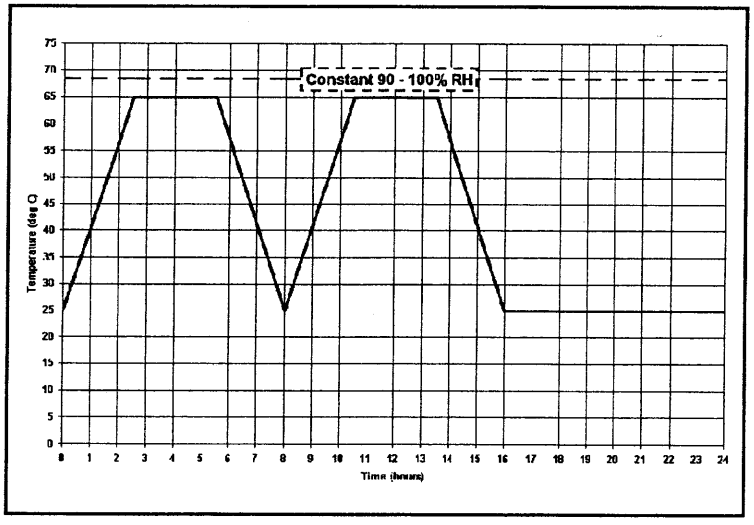


Figure 1: Moisture Resistance Profile (1 cycle)

B. The chamber temperature was increased to 25°C and 95% RH before the start of the first cycle (see Figure 1).

C. The chamber temperature was increased to 65°C in 2.5 hours while the RH was maintained between 90 and 100%.

D. The chamber temperature and RH were held for 3 hours.

E. The chamber temperature was decreased to 25°C in 2.5 hour while the RH was maintained between 90 and 100%.

F. The chamber temperature and RH were held for 3 hours.

G. The chamber temperature was decreased to 25°C in 2.5 hour while the RH was maintained between 90 and 100%.

H. The chamber temperature and RH were held for 8 hours.

Y. Steps C through H were repeated 9 times (10 cycles).

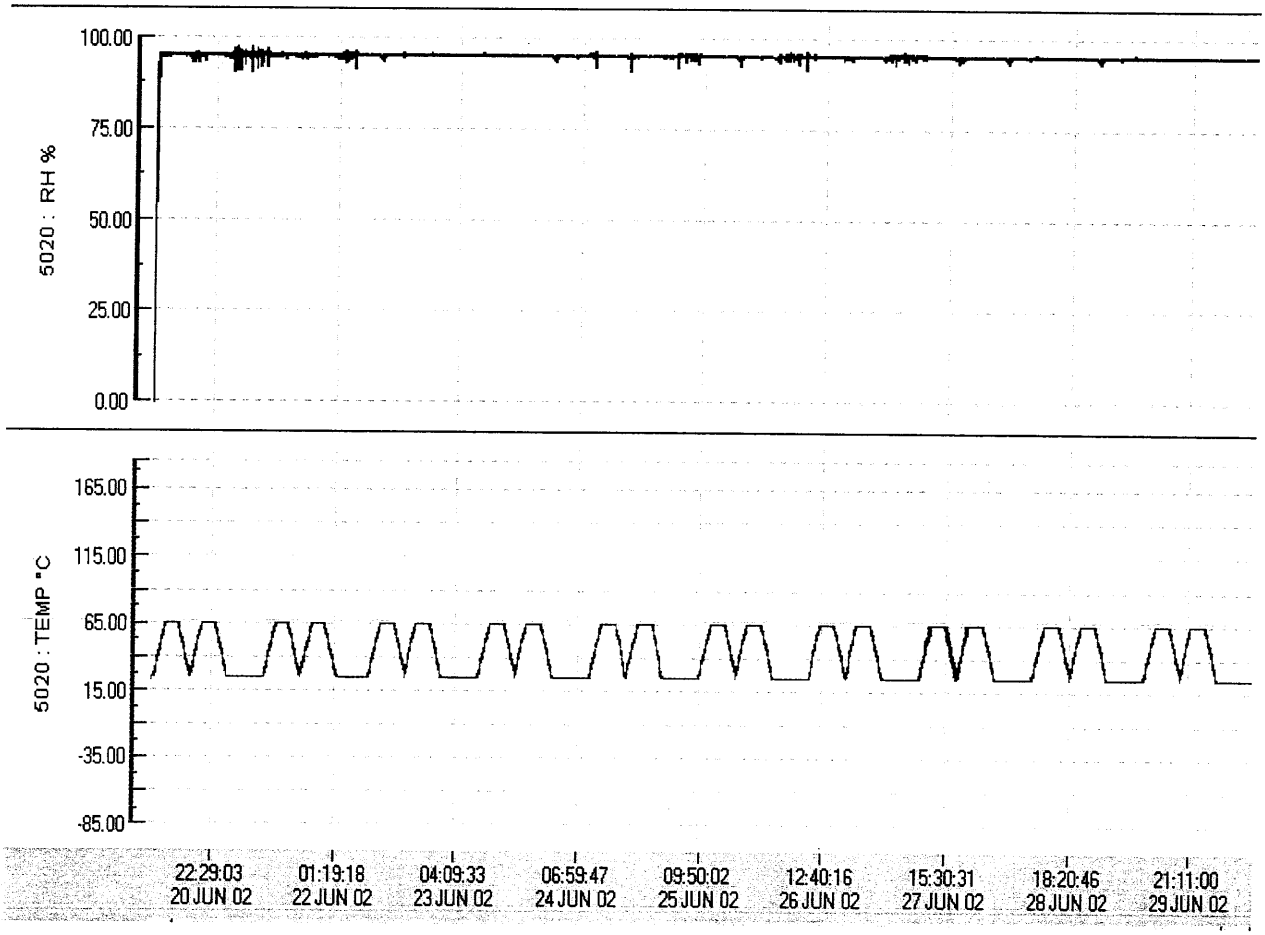
Test Results

The visual inspection of the EUT revealed no anomalies. No performance testing was performed or witnessed by MET.

Test Dates: 06/11/02 - 06/29/02

Photograph 2: View of Moisture Resistance Test Set-up

Moisture Resistance Test Data



C. Sand and Dust (Method 110, Test Condition A)

This test was conducted at Dayton T. Brown, Inc. Engineering and Test Division, Church Street, Bohemia, Long Island, New York 11716. A copy of the test report is included in the Appendix of this document.

D. Vibration (Method 204, Test Condition D)

Test Procedure

A. The non-operational EUT were installed on the vibration test fixture (see Photograph 3, Photograph 4, and Photograph 5). See Figure 3 and Figure 4 for test set-up.

B. An input (control) accelerometer was mounted to the base of the test fixture.

C. The EUT was subjected to a swept sine test, in each axis, at the following test levels (see Figure 2);

Input Frequency (Hertz)	Input Acceleration
10 - 80.85	0.06"DA
80.85 - 2000	20g

Sweep Time (10-2000-10Hz): 20 minutes
Sweep Type: Logarithmic
Number of Sweeps: 12 per Axis

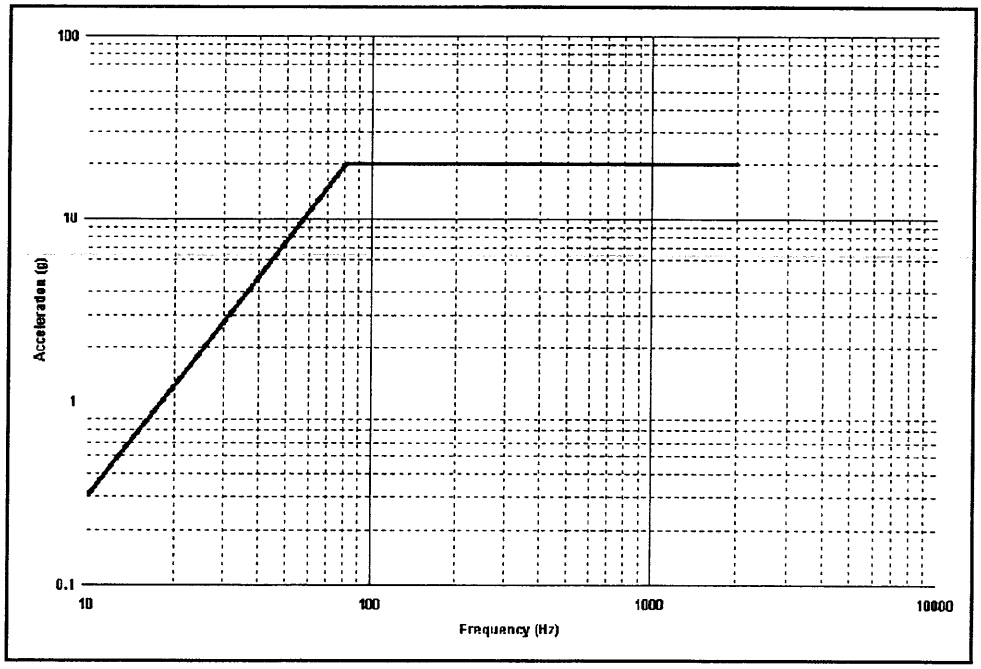


Figure 2: Random Vibration

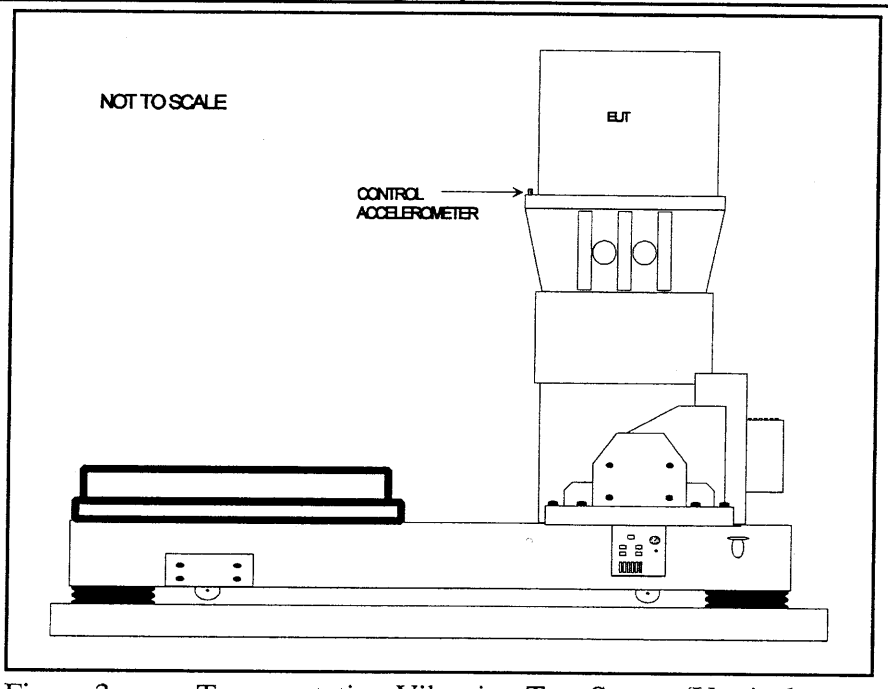


Figure 3: Transportation Vibration Test Set-up (Vertical Axis)

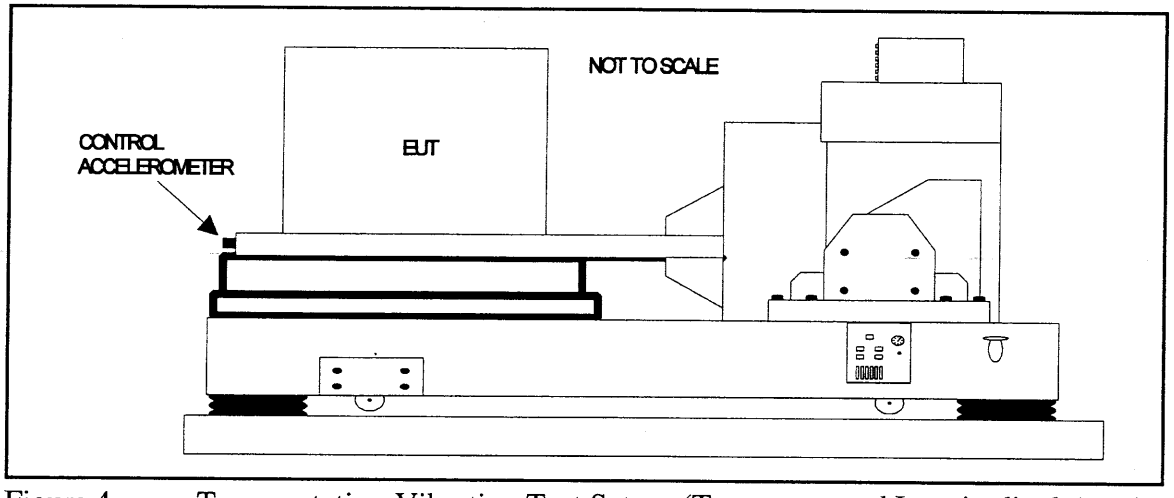


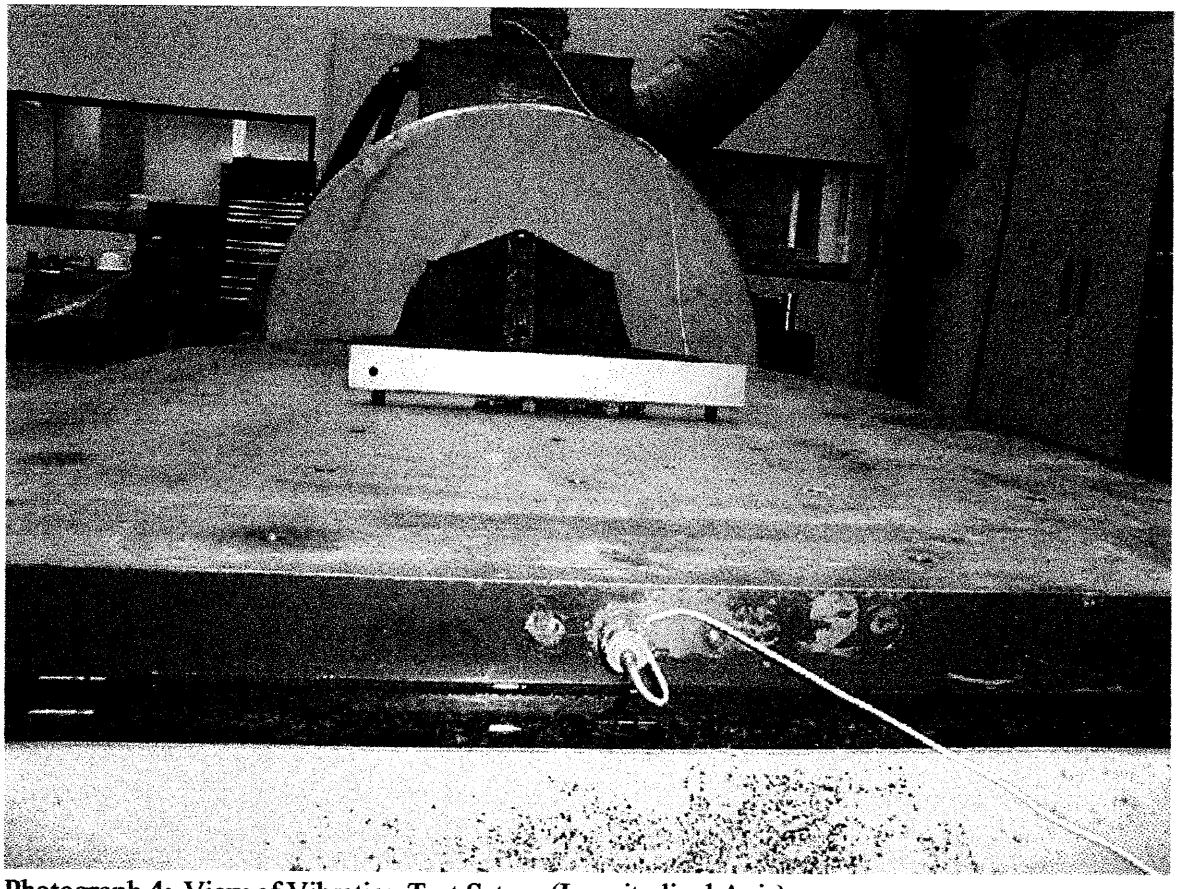
Figure 4: Transportation Vibration Test Set-up (Transverse and Longitudinal Axes)

Test Results

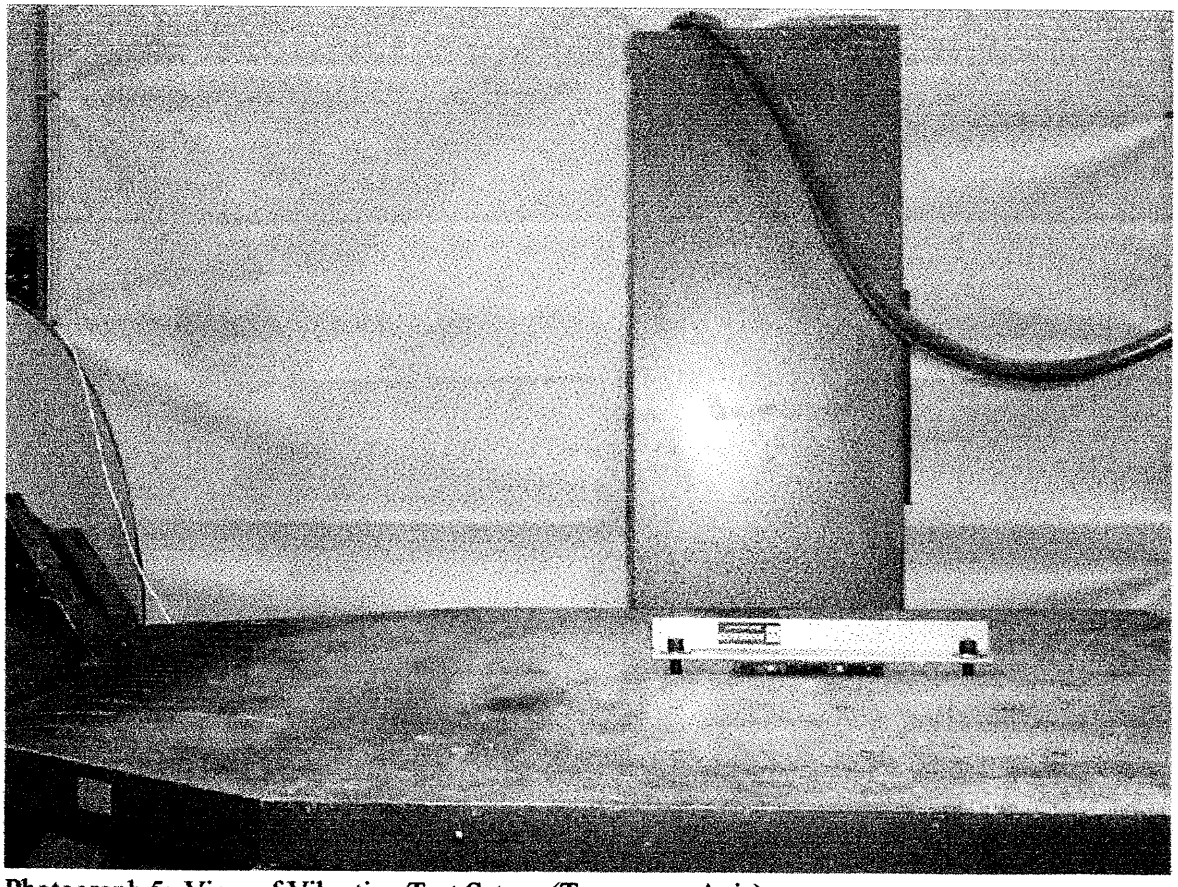
No structural or mechanical damage was noted as a result of this test. No performance testing was performed or witnessed by MET.

Test Dates: 05/29/02 - 06/19/02

Photograph 3: View of Vibration Test Set-up (Vertical Axis)

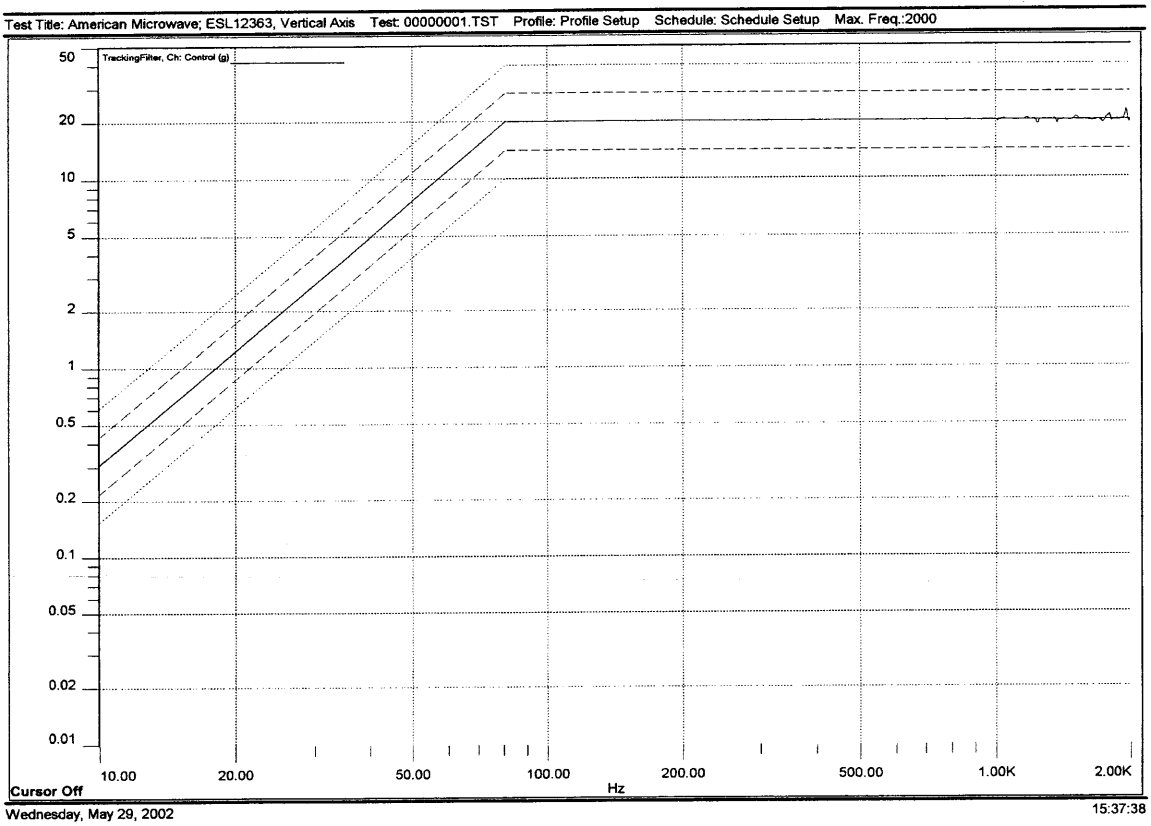


Photograph 4: View of Vibration Test Set-up (Longitudinal Axis)

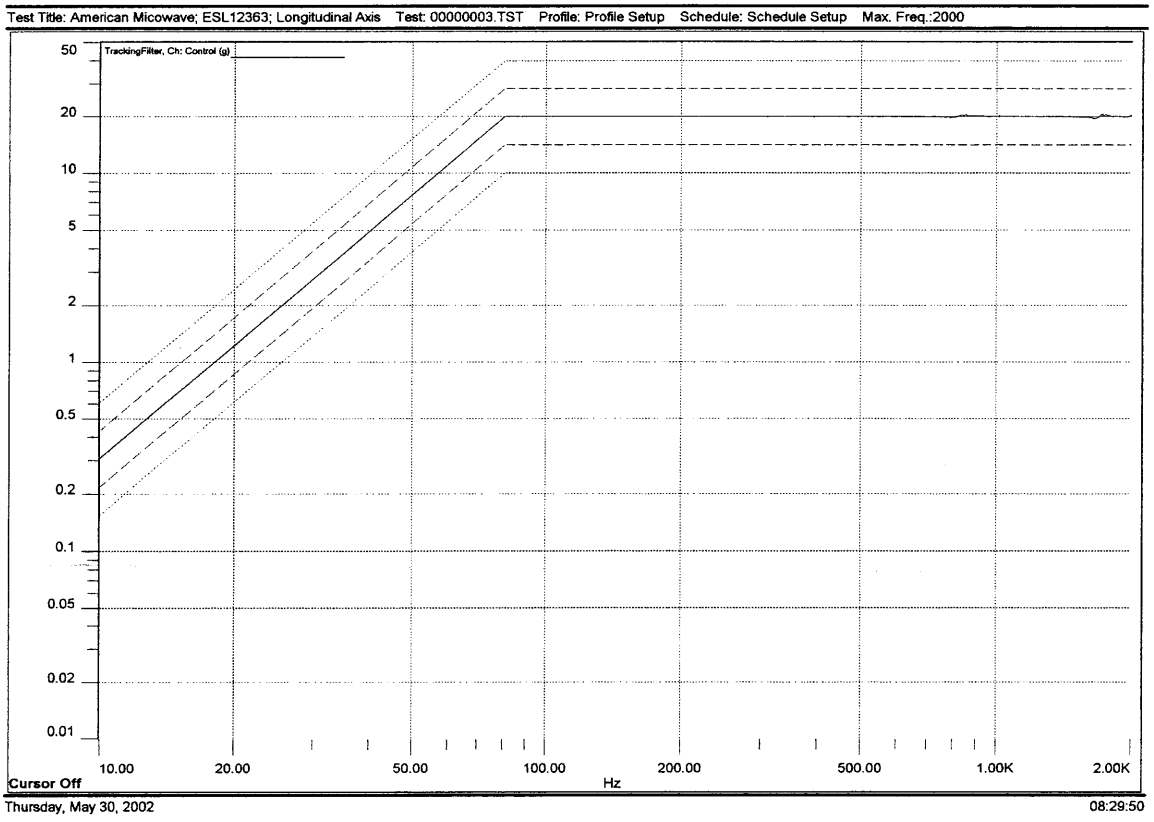


Photograph 5: View of Vibration Test Set-up (Transverse Axis)

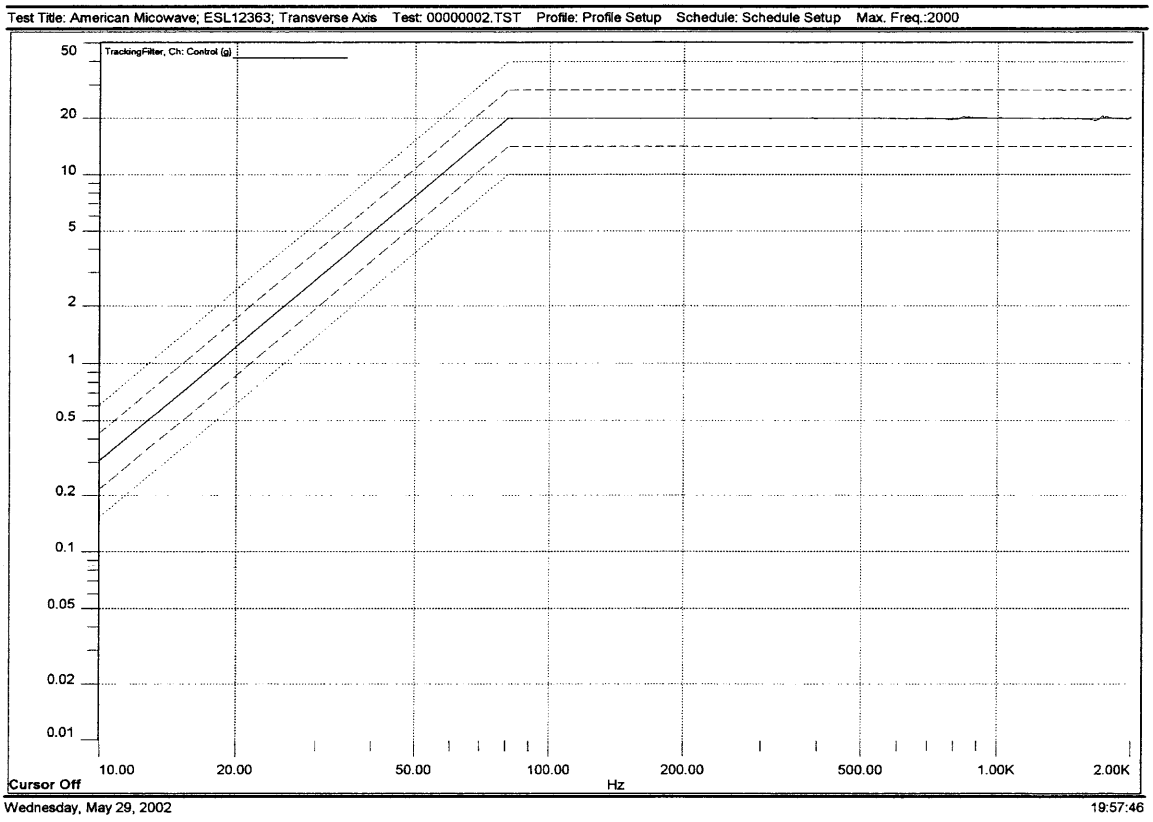
Vibration: Vertical Axis, Control Signal



Vibration: Longitudinal Axis, Control Signal



Vibration: Transverse Axis, Control Signal



E. Shock (Method 213, Test Condition B)
Test Procedure

A. The non-operational, packaged EUT was installed on the vibration test fixture (see Photograph 6, Photograph 7, and Photograph 8). See Figure 5 and Figure 6 for test set-up.

B. An input (control) accelerometer was mounted to the base of the test fixture.

C. The EUT was subjected to 3 half-sine shock pulses in each direction, per axis, at the following test levels;

Duration (ms)	Input Acceleration
6	75g

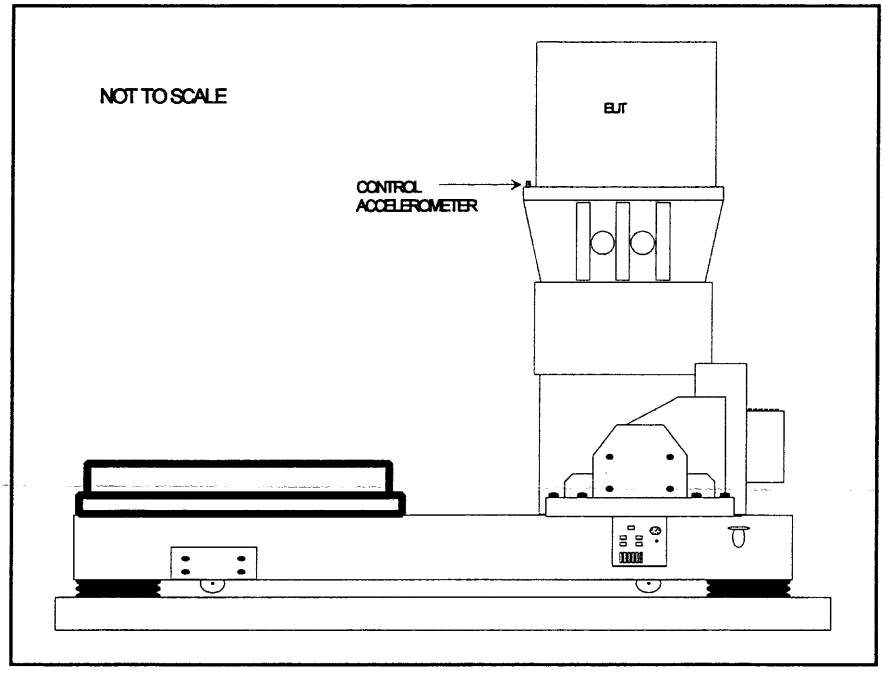


Figure 5: Transportation Shock Test Set-up (Vertical Axis)

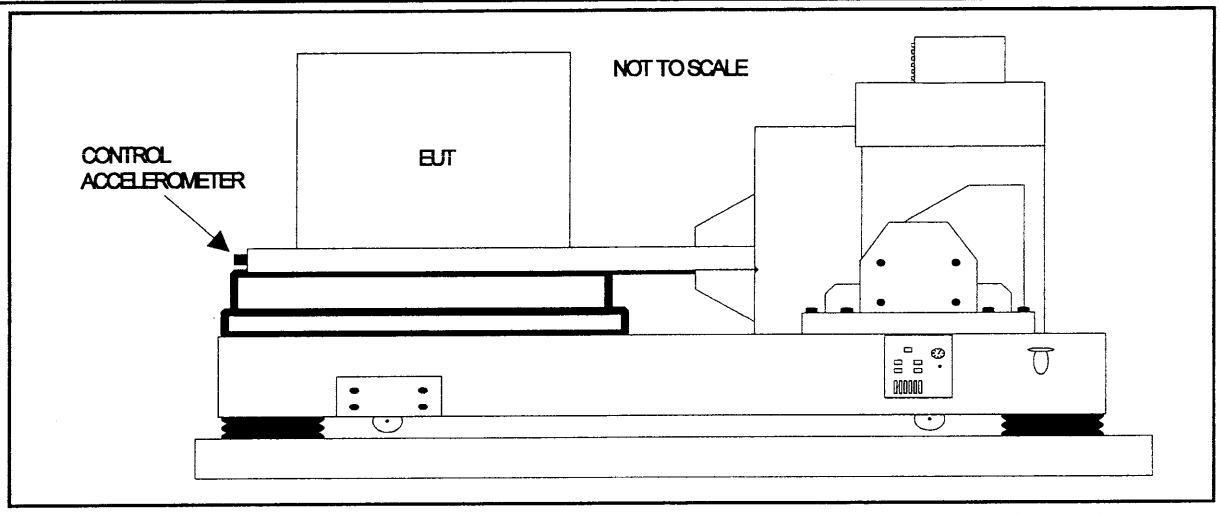
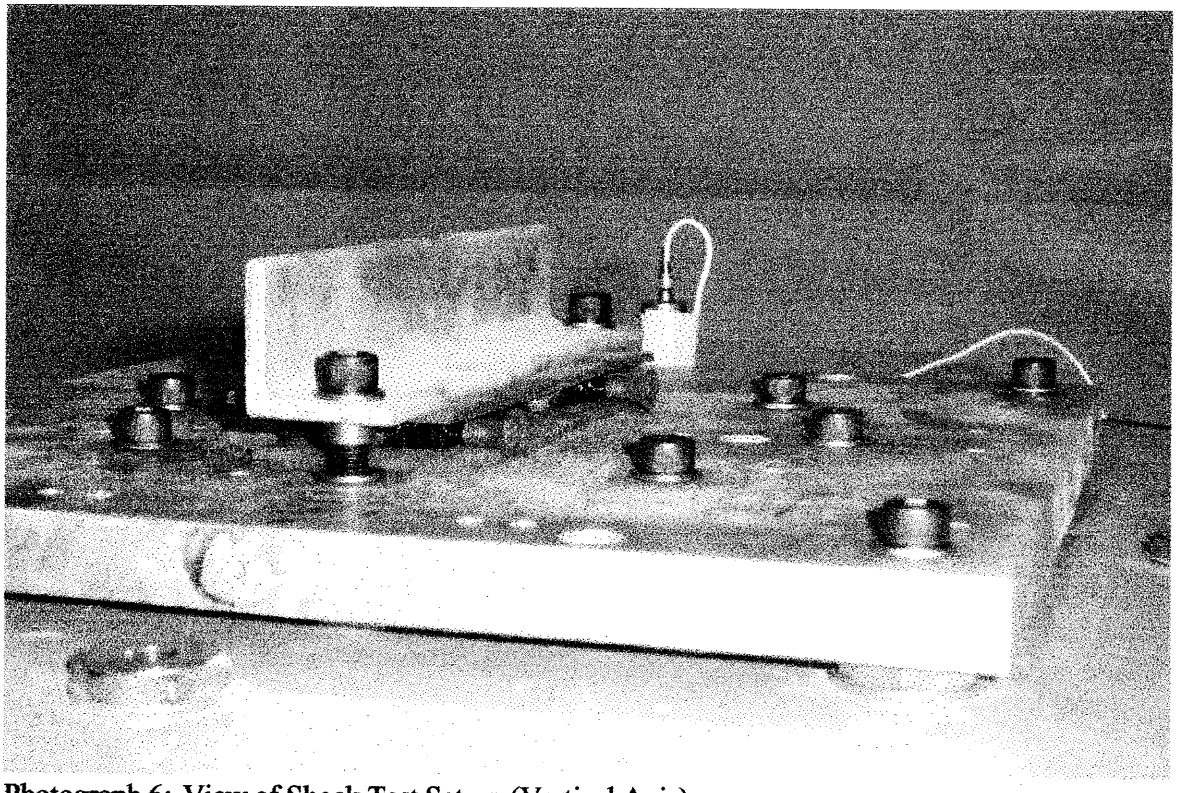


Figure 6: Transportation Shock Test Set-up (Transverse and Longitudinal Axes)

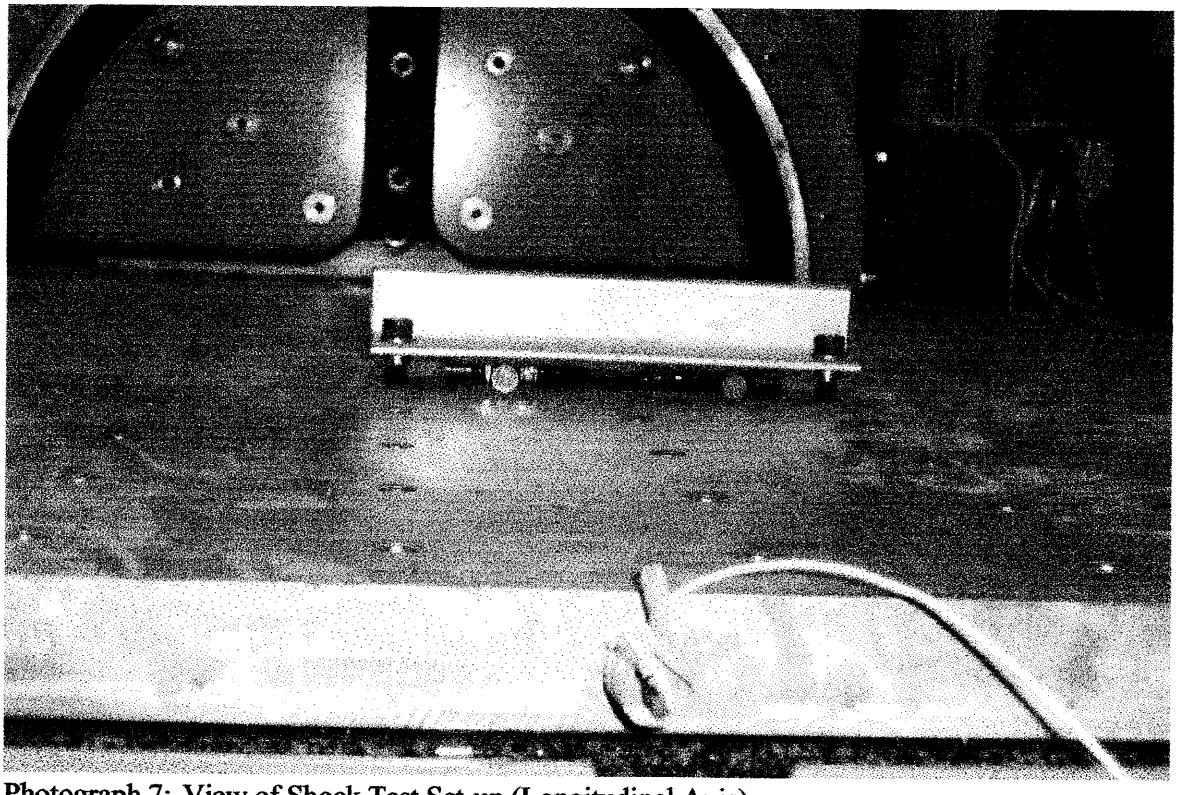
Test Results

No structural or mechanical damage was noted as a result of this test. No performance testing was performed or witnessed by MET.

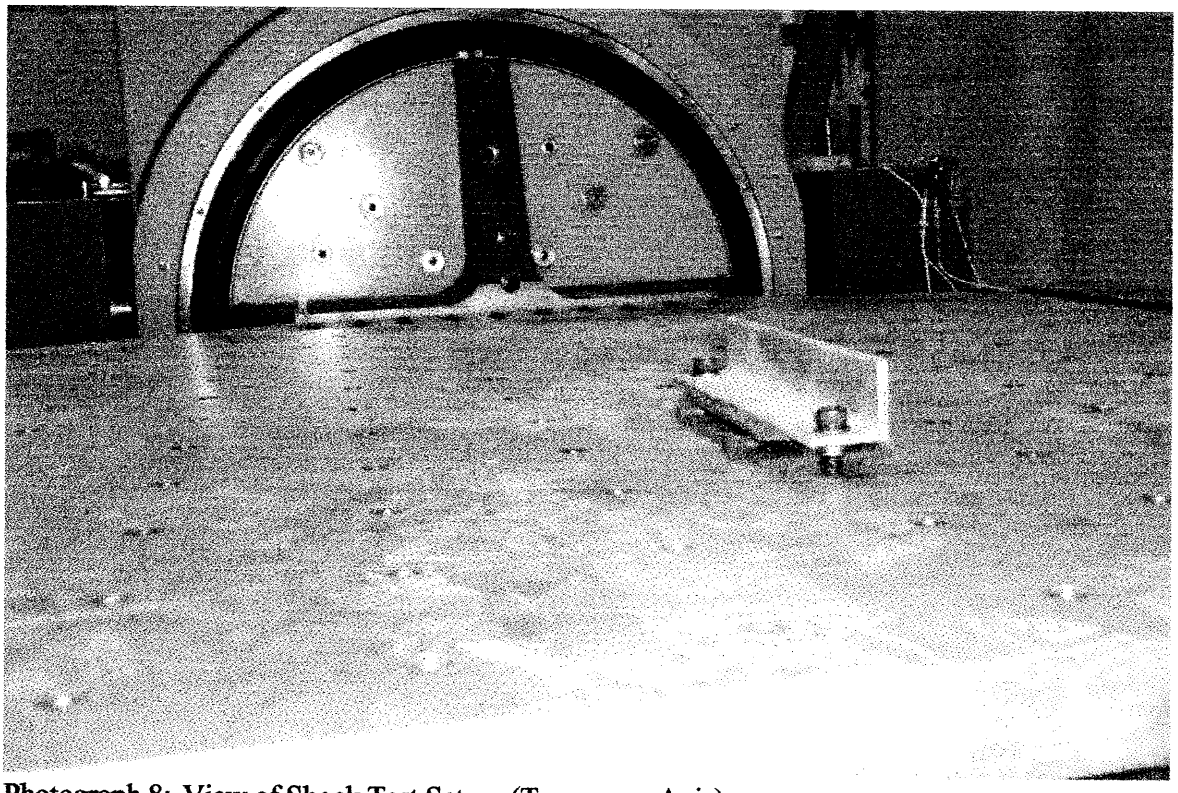
Test Dates: 06/12/02 - 06/17/02



Photograph 6: View of Shock Test Set-up (Vertical Axis)

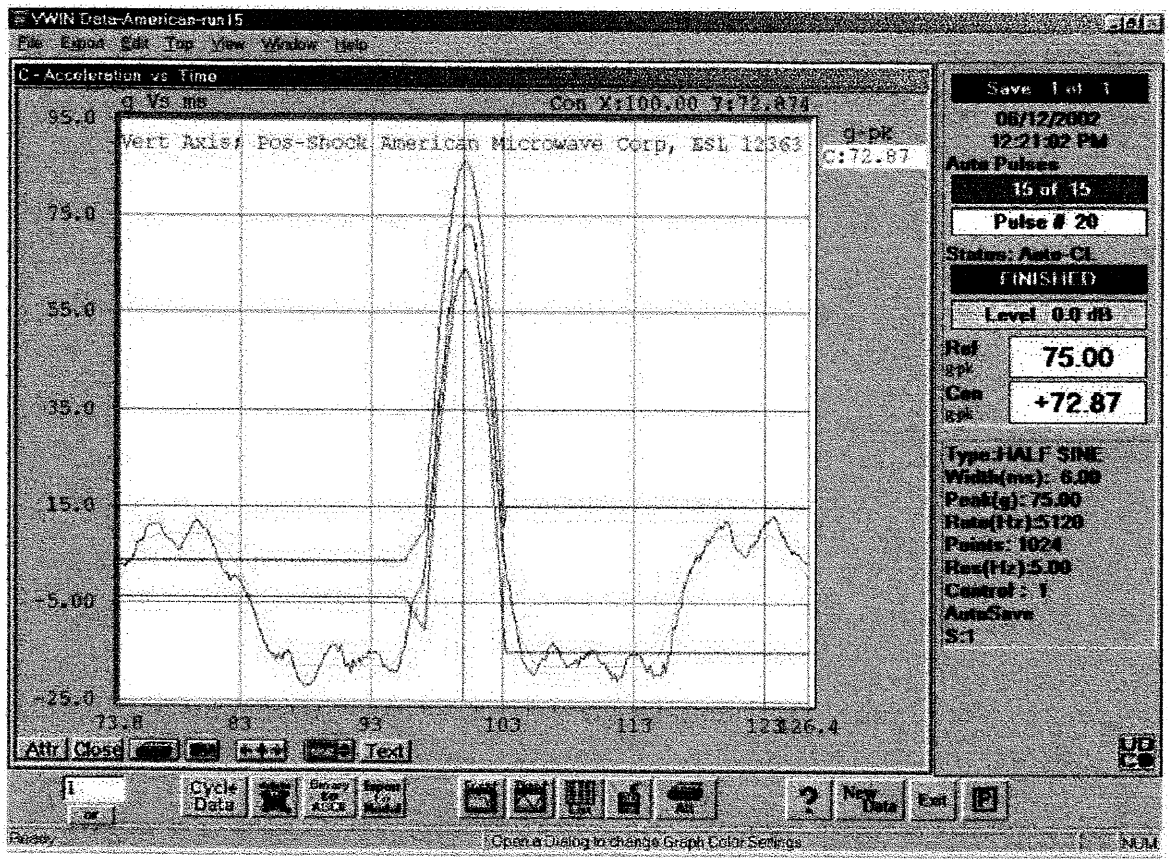


Photograph 7: View of Shock Test Set-up (Longitudinal Axis)

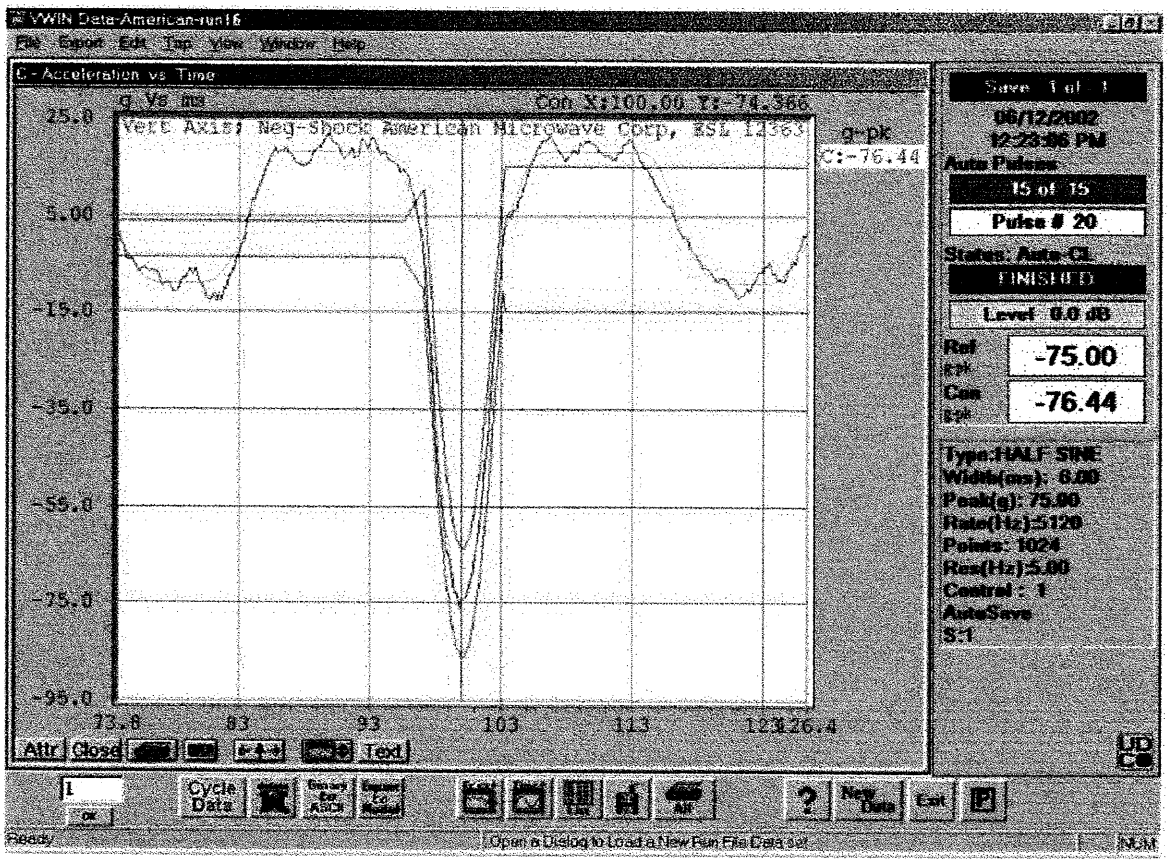


Photograph 8: View of Shock Test Set-up (Transverse Axis)

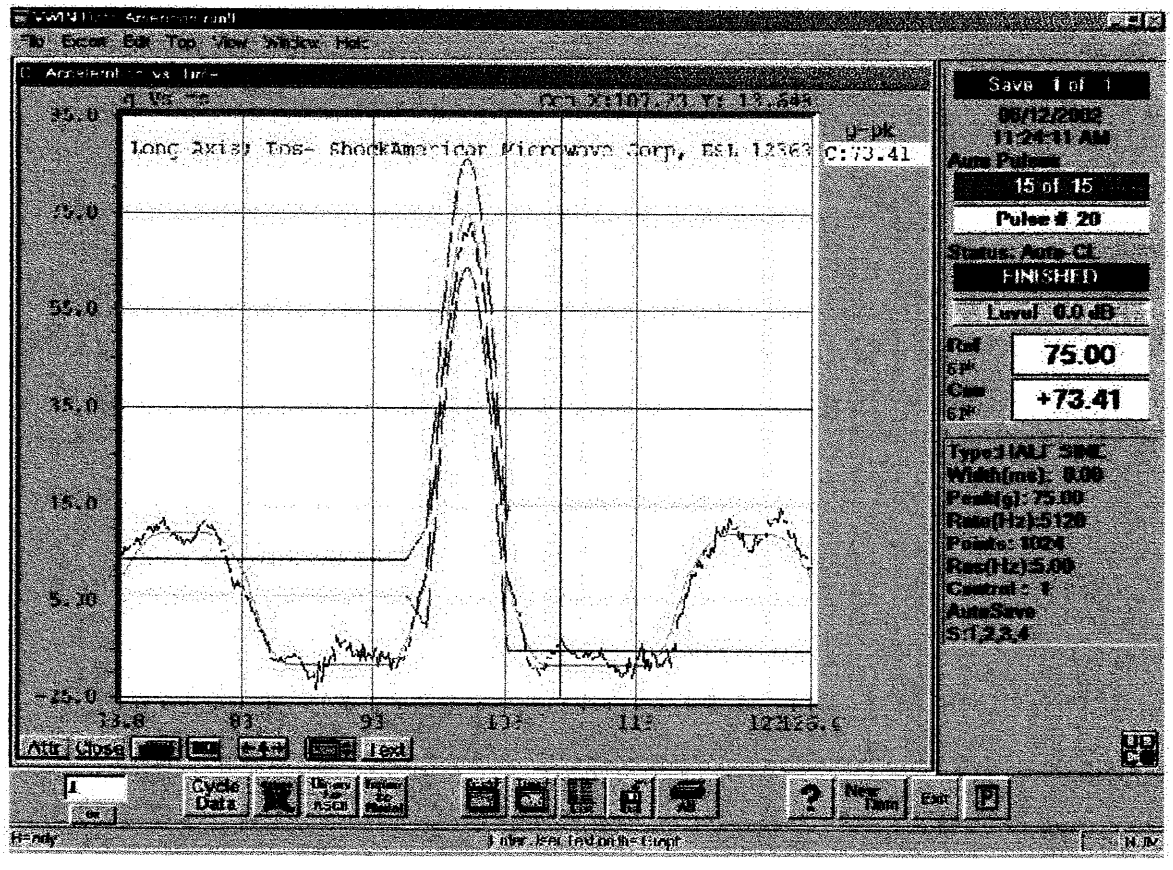
Shock Test, Positive Pulse: Vertical Axis, Control Signal



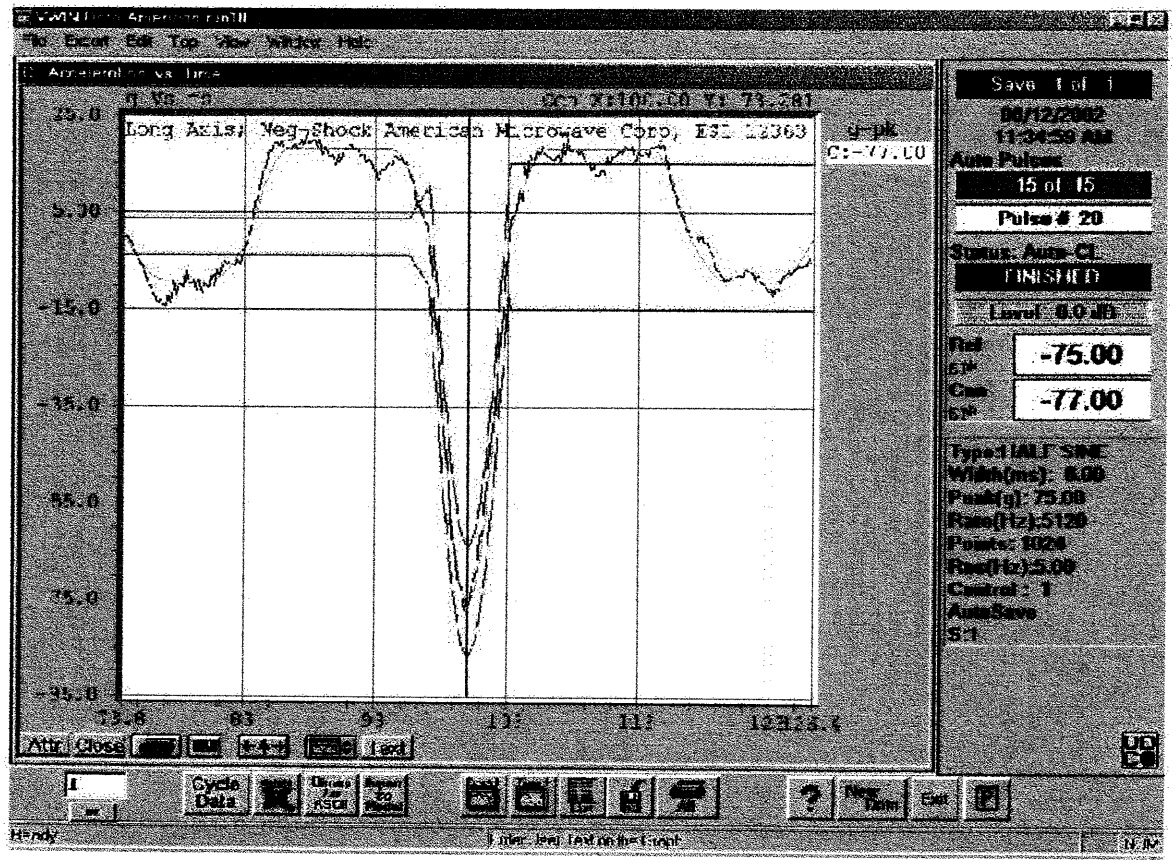
Shock Test, Negative Pulse: Vertical Axis, Control Signal



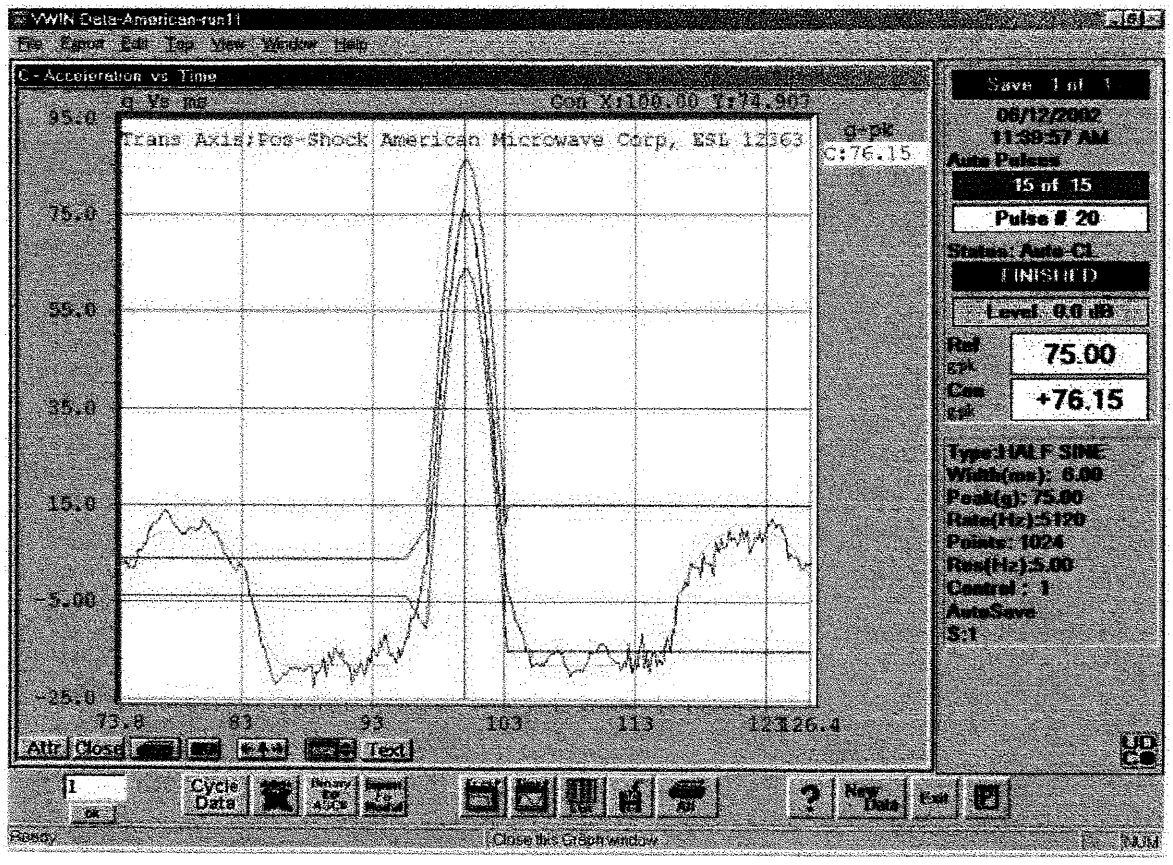
Shock Test, Positive Pulse: Longitudinal Axis, Control Signal



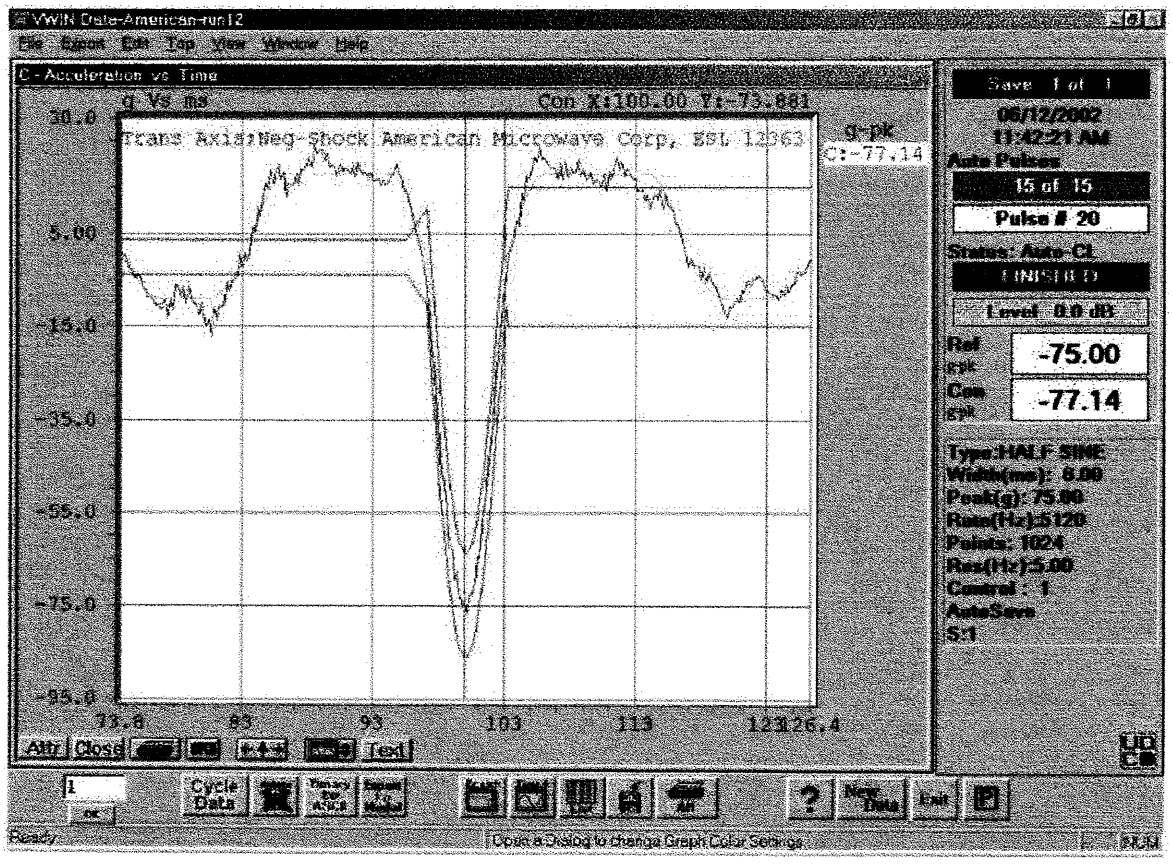
Shock Test, Negative Pulse: Longitudinal Axis, Control Signal



Shock Test, Positive Pulse: Transverse Axis, Control Signal



Shock Test, Negative Pulse: Transverse Axis, Control Signal



IV. Test Equipment

Test equipment utilized during testing was maintained in a current state of calibration per the requirements of MIL-STD-45662A and ISO 10012-1:1992(E).

MET ID #	EQUIPMENT	MANUFACTURER	MODEL #	LAST CAL	CAL DUE
2T5448	VIBRATION CONTROLLER	UNIDYN CORP	DSP-400 8CH/16BIT	05-DEC-01	05-DEC-02
2T5486	ACCELEROMETER	PCB	J353B32	06-AUG-01	06-AUG-02
2T5605	CURRENT SOURE 12 CHANNEL LINE POWERED	DYTRAN	4121	17-APR-02	17-APR-03
2T5617	SALT FOG CHAMBER/CONTROLLER	SINGLETON CORP/THERMOLOGIC	DINFJ32H1-N-N-23	27-MAR-02	27-MAR-03
2T5650	ACCELEROMETER	UNHOLTZ DICKIE	10B10T	14-DEC-01	14-DEC-02
2T5663	UD SHAKER SYSTEM	UNIHOLTZ DICKIE	R24C	FUNCTIONAL	FUNCTIONAL
3T6381	TEMP/HUMIDITY CHAMBER	THERMOTRON	SM-3.5, 5S or SM5.5C	20-AUG-01	20-AUG-02
3T6386	CONTROLLER; PROGRAMMABLE	THERMOTRON	2800	20-AUG-01	20-AUG-02
3T6387	THERM-ALARM	THERMOTRON	FOR SM3.5S	20-AUG-01	20-AUG-02
3T6456	TEMPERATURE RECORDER	PENNY & GILES	D53087/C6S00PAO	28-DEC-01	28-DEC-02

V. Appendix (Sand and Dust Test Report)

DAYTON T. BROWN INC.
Founded 1950

ENGINEERING AND TEST DIVISION
CHURCH STREET, BOHEMIA, LONG ISLAND, NEW YORK 11716 (631) 589-6300

TEST REPORT NO.: DTB04R02-0479

DAYTON T. BROWN, INC. JOB NO.: 402731-00-000

CUSTOMER: MET LABORATORIES, INC.
914 W. PATAPSCO AVENUE
BALTIMORE, MD 21230

SUBJECT: DUST TEST PROGRAM CONDUCTED ON TWO BOEING TWO-WAY SWITCHES, PART NO. SMSH-810-2DR-IND-SMC, SERIAL NOS. 30 AND 31

PURCHASE ORDER NO.: 18661

ATTENTION: MR. P. LAYMAN

THIS REPORT CONTAINS: FIVE PAGES AND TWO ENCLOSURES

PREPARED BY	P. B. McNALLY
TEST ENGINEER	G. HYLAND
OPERATIONS MANAGER	T. ZIMOULIS
QUALITY DEPARTMENT	
DATE	13 JUNE 2002

THE DATA CONTAINED IN THIS REPORT WAS OBTAINED BY TESTING IN COMPLIANCE WITH THE APPLICABLE TEST SPECIFICATION AS NOTED

DAYTON T. BROWN, INC.
Founded 1950

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1.0 ABSTRACT

This test report details the results of the dust test program conducted on two Boeing Two-Way Switches, Part No. SMSH-810-2DR-IND-SMC, Serial Nos. 30 and 31 under reference (a) to the requirements of reference (c).

Results of the test are detailed in the following text.

The test items were non-operating during testing.

Test data pertinent to this program will remain on file at Dayton T. Brown, Inc. for 90 days.

The test results recorded in this report relate only to those items tested.

This test report shall not be reproduced, except in full, without the written approval of Dayton T. Brown, Inc.

2.0 REFERENCES

(a)	Customer Purchase Order No.:	18661
(b)	Dayton T. Brown, Inc. Job No.:	402731-00-000
(c)	Test Specifications:	MET Laboratories, Inc. RFQ and E-Mail dated 5 June 2002

3.0 ADMINISTRATIVE INFORMATION

Customer: MET Laboratories, Inc.
914 W. Patapsco Avenue
Baltimore, MD 21230

Test Item Description: Boeing Two-Way Switches

Quantity Received: Two

Part No.: SMSH-810-2DR-IND-SMC

Serial Nos.: 30 and 31

Date Received: 4 June 2002

Program Test Date: 5 June 2002

Date Shipped: 6 June 2002

DAYTON T. BROWN INC.
Founded 1950

4.0 TEST PROGRAM OUTLINE

Test	Test Item Description	Results
Dust	Two Boeing Two-Way Switches	No anomalies noted.

DAYTON T. BROWN INC.

Founded 1950

Enclosure 1

Dust Test and Results

DAYTON T. BROWN INC.
Founded 1950

TEST REQUIREMENT

The dust test shall be conducted in accordance with reference (c).

TEST RESULTS

A pretest visual inspection of the test items revealed no anomalies.

All testing was performed in accordance with the referenced specification.

Refer to the following page of this enclosure for the test data.

The test items completed all phases of testing.

A post-test visual inspection of the test items revealed no anomalies due to testing.

DAYTON T. BROWN, INC.

Founded 1950

MET LABS
DUST TEST DATA
J/N 402731-01-000

REQUIRED CONDITIONS:

Temperature:	73°F ± 3.6°F (23°C ± 2.0°C)
Relative Humidity:	Less than 22%
Air Velocity:	1750 ± 250 ft/min
Dust Density:	0.3 ± 0.2 gms/ft^3
Test Duration:	30 min

ACTUAL CONDITIONS:

TIME	TEST TEMP °F	REL HUMID %	AIR VEL FT/MIN	DUST DEN GRMS/FT^3	REMARKS
1700	74.2	16.5	1783	0.190	START 30MIN RUN
1730	73.0	17.1	1812	0.195	END OF RUN

DATE: 5 JUN 02

TECH: [signature]

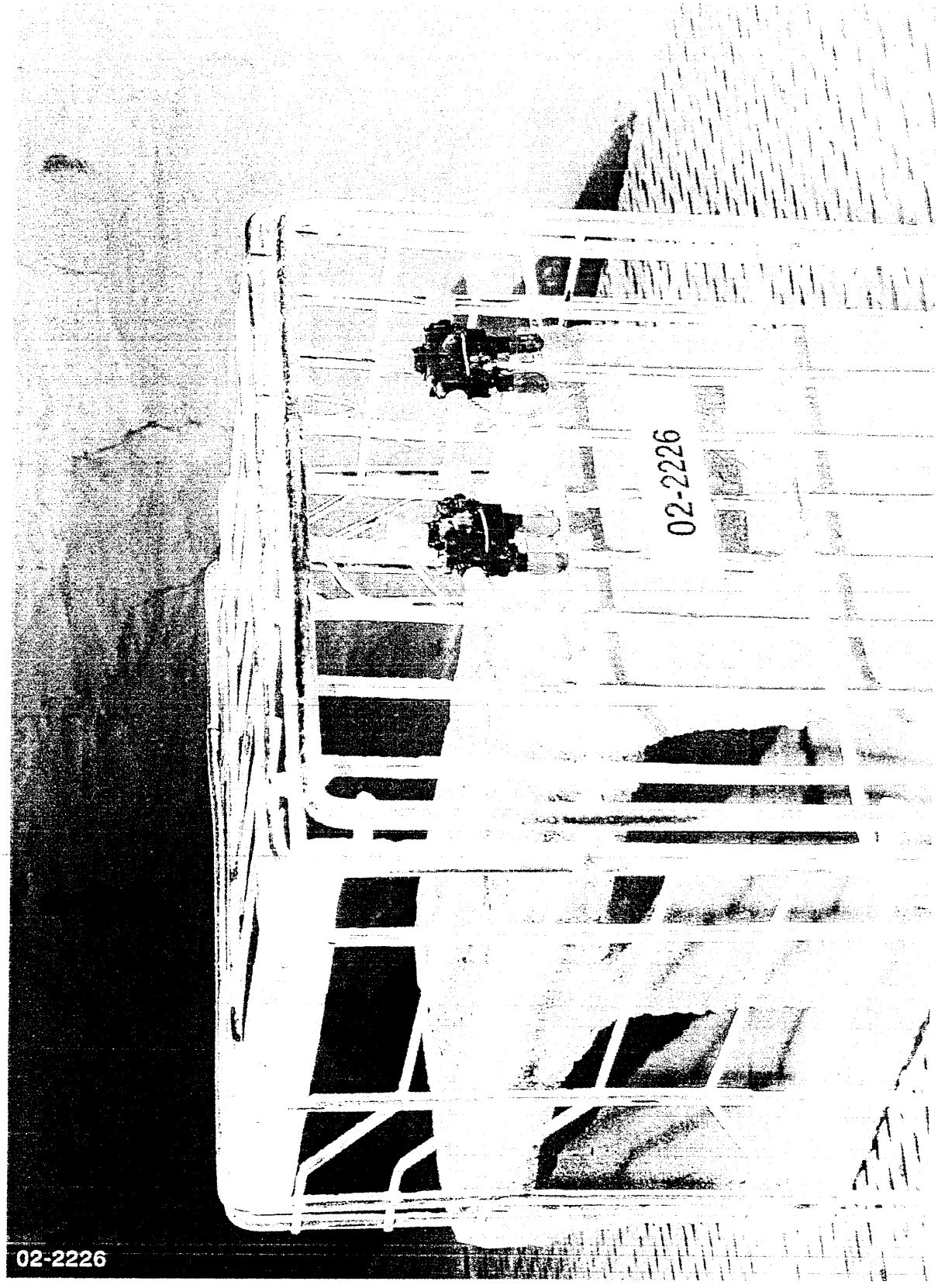
ENGR: [signature]

Test equipment utilized for the program reported herein was within its assigned interval of calibration. Details are on file at Dayton T. Brown, Inc. and will be made available upon request.

DAYTON T. BROWN INC.
Founded 1950

TEST: DUST

ITEM	MANUFACTURER	MODEL	DTB NO.	ACCURACY	CAL DUE DATE
Sand & Dust Chamber 13 Ft Dust	Tenney	4 Ft x 13 Ft	-	-	-
Temperature Controller	Honeywell	UDC5000	25-70	±1°F	8/25/2002
Humidity Controller	Honeywell	UDC5000	25-44	±0.05% FS	8/25/2002
Humidity Transmitter	Rotronic	HT255D	31-15	±2% RH	1/5/2003
Air Velocity Meter	Kurz	455-08	43-63	±2% of RDG + 0.5% FS	3/2/2003
Air Velocity Meter	Kurz	443	43-2	2% FS	-
Chart Recorder	Honeywell	DR4500	12-2	Data	8/4/2002



TESTED FOR MET LABORATORIES, INC.
ITEM: BOEING TWO-WAY SWITCHES
SETUP FOR THE DUST TEST

S/N: 0 AND 31
P/N: SMSH-830-2DR-ND-SMC

JOB NO. 402731-00-000
DTB04R02-0479

FILE NO. 02-2226
ENCLOSURE 1

5 JUNE 2002
PHOTO 7

DAYTON T. BROWN, INC.
Founded 1950

Enclosure 2

A2LA Scope of Accreditation

American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

DAYTON T. BROWN, INC.
Church Street
Bohemia, NY 11716-5031
Charles Gortakowski - Phone: 631 244 6315 / 1 800 TEST456 – Fax: 631 589 4046
Email: [illegible] / www.[illegible]

MECHANICAL

Valid To: December 31, 2002 Certificate Number: 0767-03

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

Altitude - 14.1 meters (-282 feet to 122,000 meters); 400,000 feet or 1x10E-3 TORR
Chamber volumes up to 745 cubic ft
Burst Test - High Pressure Air to 5000psi
Coating/Plating Thickness
Combined Environments - Vibration and Temperature
Dimensional - CMM – X-1200mm (±0.001mm); Y-100mm (±0.001mm); Z-600mm (±0.001mm)
Durability
Durometer Hardness
Dye Penetrant
Explosive Environment - Chamber Volume 75 cubic ft, Altitudes up-to 50,000ft
Fungus Test Area Size 36" x 36"
Hardness
Humidity - Relative humidity range from desert (2%) to a tropical forest (100%).
Chamber volumes up-to 3500 cubic ft
Magnetic Particle Inspection
Material Cleanliness
Metallographic Analysis
Microhardness
Salt Fog/Spray Chamber up-to a Chamber volume of 2500 cubic ft
Sand & Dust Chamber volumes up-to 200 cubic ft; velocities up-to 5700ft/min
Seat Belt Assembly testing
Thermal Shock
Sun/Solar Radiation
Surface Temperature Profilometer
Temperature - Chambers from 64 cubic ft to 3500 cubic ft; Ambient temperatures from –300°F to +350°F
Tensile Testing
Water Immersion
Wind & Rain

(A2LA Certificate No. 767.03) 01/12/01 Page 1 of 2

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Using the following specifications directly related to the above listed testing technologies:

Test Technology	Test Method(s)
Low Pressure (Altitude)	MIL-STD-810: C (500.1), D (500.2), E (500.3), F (500.4)
High Temperature	MIL-STD-810: C (501.1), D (501.2), E (501.3), F (501.4); GR-63-CORE (5.1.1.2)
Low Temperature	MIL-STD-810: C (502.1), D (502.2), E (502.3), F (502.4), GR-63-CORE (5.1.1.1)
Temperature Shock	MIL-STD-810: C (503.1), D (503.2), E (503.3), F (503.4); GR-63-CORE (5.1.1.4, 5.1.1.2); MIL-STD-202 (107G)
Temperature/Altitude	MIL-STD-810 C (504.1); RTCA/DO-160C (4.0)
Temperature Variation	RTCA/DO-160C (5.0)
Solar Radiation (Sunshine)	MIL-STD-810: C (505.1), D (505.2), E (505.3), F (505.4)
Rain	MIL-STD-810: C (506.1), D (506.2), E (506.3), F (506.4)
Humidity	MIL-STD-810: C (507.1), D (507.2), E (507.3), F (507.4); GR-63-CORE (5.1.1.3); MIL-STD-202 (103B); RTCA/DO-160C (6.0)
Fungus	MIL-STD-810: C (508.1), D (508.2), E (508.4), F (508.5); RTCA/DO-160C (13.0)
Salt Fog	MIL-STD-810: C (509.1), D (509.2), E (509.3), F (509.4); MIL-STD-202 (101D)
Dust (Fine Sand)	MIL-STD-810: C (510.1), D (510.2), E (510.3), F (510.4); MIL-STD-202 (110A); RTCA/DO-160C (12.0)
Explosive Atmosphere	MIL-STD-810: C (511.1), D (511.2), E (511.3), F (511.4); MIL-STD-202 (109D); RTCA/DO-160C (9.0)
Leakage (Immersion)	MIL-STD-810: C (512.1), D (512.2), E (512.3), F (512.4)
Space Simulation (Unmanned Test)	MIL-STD-810 C (517.2)
Temperature/Humidity/Altitude	MIL-STD-810 C (518.1)
Temperature/Humidity/Vibration	MIL-STD-810: D (520.0), E (520.1), F (520.2)
Icing/Freezing Rain	MIL-STD-810: D (521.0), E (521.1), F (521.2)
Packaged Drop Test	GR-63-CORE (5.3.1)
Unpackaged Equipment Drop	GR-63-CORE (5.3.2)
Coating/Plating Thickness	ASTM F376
Tensile Testing	ASTM B557, E8
Material Cleanliness	ASTM F86
Magnetic Particle	ASTM E1444
Dye Penetrant	ASTM E1417
Micro-hardness	ASTM E384-89
Hardness	ASTM D2240, E18
Dimensional – CMM	ASME Y14.5M, B46.1
Durability	Customer Supplied Procedure
Environmental Tests	ETS 300 019 Part: 1-1 Storage, 1-2 Transportation, 2-1 Storage
Durometer Hardness	ASTM D2240
Shock & Crash Safety	RTCA/DO-160C (7.0)
Waterproofness	RTCA/DO-160C (10.0)
Fluid Susceptibility	RTCA/DO-160C (11.0)
Salt Spray	RTCA/DO-160C (14.0)
Seat Belt Testing	FMVSS 209: S4.1 (Paragraphs (d) Hardware, (h) Webbing, (i) Strap, (j) Marking and (m) Workmanship), S4.2 (Requirements For Webbing, excluding paragraph (f) Resistance to Micro-Organisms), S4.3 (Requirements for Hardware, all paragraphs), S4.4 (Requirements for Assembly Performance, all paragraphs)

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American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

DAYTON T. BROWN, INC.
Church Street
Bohemia, NY 11716-5031
Charles Gortakowski – Phone: 631 244 6315 / 1 800 TEST456 – Fax: 631 589 4046
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ACOUSTICS & VIBRATION

Valid To: December 31, 2002 Certificate Number: 0767-01

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

Vibration (Sine, Random, Sine on Random, Gunfire, Shipboard), Buzz, Squeak and Rattle, Combined Environments and Reliability (Temperature, Humidity and Vibration), Classical Shock (Half Sine, Sawtooth, Square Wave), Pyroshock, Airborne and Structureborne Noise Measurements.

VIBRATION/SHOCK CAPABILITIES UP TO THE FOLLOWING:

Random

Force Rating	40,000 lb
Frequency Range	4 to 3000 Hertz
Maximum Level	200 grms
Displacement	2 inches Peak-to-Peak

Sinusoidal

Force Rating	40,000 lb
Frequency Range	4 to 3000 Hertz
Sine Velocity Continuous Duty	125 in/sec
Sine Velocity Intermittent Duty	135 in/sec
Maximum Level	200 g's
Displacement	2 inches Peak-to-Peak

Classical Shock

Force	80,000 lb
Waveforms	Sine, Sawtooth, Trapezoid
Maximum Level	600 to 2000 g's

Pyroshock

Level	5000 to 52,00 g's
Frequency Range	100 to 10,000 Hertz

Displacement 2 inches Peak-to-Peak

Airborne and Structureborne Noise Measurements

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Testing Criteria	*Specification (s)*
Airborne And Structure Borne Noise Measurement	MIL-STD-740-1/2
Acceleration (Centrifuge)	MIL-STD-810C 513.2, 810D 513.3, 810E 513.4 810F 513.5, RTCA/DO-160
Buzz, Squeak And Rattle	Automotive Requirements
Pyro Shock	MIL-STD-1540, MIL-STD-810F 517
Sound And Power	ANSI S1.2, S1.35
Shock Test, High Impact on Shipboard Mechanery, Equipment And Systems	MIL-S-901D (LWH and MWH)
Reliability	MIL-STD-781, NAVMAT P-9492
Automotive	FORD: DVT.12.00.007-AC, ES-7Svb-54043B13-AA, OM: 9103P, 9104P, 9110P, 9125P, 9140P, 9144P, 9154P, 9163P, 9175P, CHRYSLER: PF-9007, PF-9511, PF-6897, PF-8243, PF-9164
Telephony	Bellcore GR-13, GR-63, GR-487, GR-2814 TR-NWT-000063

ANSI S12.35 - Precision Methods for the Determination of Sound Power Levels of Noise Sources in Anechoic and Semi-Anechoic Rooms
ANSI S1.2 - Method for the Physical Measurement of Sound
ANSI S1.35 - Sound Power Levels of Noise Sources in Anechoic and Semi-Anechoic Rooms.
MIL-STD-810 (Vibration: 810C 514.2, 810D 514.3, 810E 514.4, 810F 514.5; Acoustical Noise: 810C 515.2, 810D 515.3, 810E 515.4, 810F 515.5; Gunfire Vibration, Aircraft: 810C 519.2, 810D 519.3, 810E 519.4, 810F 519.5)
Bellcore GR-63-Core (Office Vibration 5.4.2; Transportation Vibration 5.4.3)
MIL-STD-202 201A Vibration, 202D, 203B Random Drop, 204D Vibration High frequency, 205E, 207A high-impact shock, 212A Acceleration, 213B Shock (specified pulse), 214A Random Vibration
RTCA/DO-160C (Sections 7.0 Operational Shocks and Crash Safety, 8.0 Vibration)
MIL-STD-167-1 Shipboard vibration
NAVMAT P-9492 Environmental Stress Screening for Navy Components

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ELECTRICAL (AEMCLAP/EMC)

Valid To: December 31, 2002 Certificate Number: 0757.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electrical, electromagnetic compatibility (EMC) and telecommunications tests:

Capacitance	Impedance
AC Capacitance	Inductance
AC Loss Characteristics	Power Factor
Conductivity	Resistance (Dielectric Constant, Insulation Resistance)
Current (AC/DC)	Voltage (AC/DC)

EMI/RFI

Conducted Emissions	Surge Immunity
Conducted Transient Susceptibility	Input Power Variations
Conducted Immunity	Magnetic Field Emission
Radiated Emissions (3m & 10m Sites)	Magnetic Field Susceptibility
Radiated Emissions	Harmonics – Powerline & RF
Shielded Room, Mode Stirring	RF Power Handling
Radiated Susceptibility (Immunity)	Shielding Effectiveness
Radiated Transient Susceptibility	Electrical Fast Transient (EFT)
Electrostatic Discharge (ESD)	Transmissibility
Electromagnetic Pulse (EMP)	Electromagnetic Site Survey

Automotive EMC (AEMCLAP)

Electrostatic Discharge (ESD)	Absorption Chamber
Transverse Electromagnetic (TEM) Cell	Conducted Emissions
Audio Frequency Conducted Immunity	

On the following types of materials and products:
Aerospace Components & Systems; Automotive Components & Systems; Shipboard Components & Systems; Railroad & Industrial Vehicle Components & Systems; Information Technology & Telecommunication Equipment & Systems; Electrical & Electronic Components & Systems; Medical Electronic Equipment; Military Equipment & Hardware.

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Using the following sources of standards:

Test Technology	Test Method(s)
EMC Emissions and Immunity	EN 50091-2, EN 60601-1-2, IEC 601-1-2
EMC Emissions	Code of Federal Regulations (CFR) 47, FCC Method Part 15 using
Harmonic Current Emissions	IEC 1000-3-2,EN 60555-2
Voltage Fluctuation and Flicker	IEC1000-3-3, EN 60555-3
EMC Immunity	EN 50082-1, EN 50082-2
Electrostatic Discharge	EN 61000-4-2, IEC 1000-4-2, IEC 801-2
Radiated Field Immunity	IEC 1000-4-3, IEC801-3, ENV 50141, ENV 50140, ENV 50204
Electrical Fast Transient	EN 61000-4-4, IEC 1000-4-4, IEC 801-4
Surge Immunity	EN 61000-4-5, IEC 1000-4-5, IEC 801-5, ENV 50124 IEEE-587-1980, ANSI C62.41, ANSI C62.32
Conducted Immunity	EN 61000-4-6, IEC 1000-4-6, IEC 801-6
Harmonic Immunity	EN 61000-4-7, IEC 1000-4-7
Magnetic Field Immunity	EN 61000-4-8, IEC 1000-4-8
VoltageDips, Interruptions and Variations	EN61000-4- , IEC 1000-4-
Telecom	Code of Federal Regulations (CFR) 47, FCC Method Part 68
Commercial Aviation	RTCA/DO-160, FAA Advisory Circular 20-136, Boeing D2000301, Boeing WZ27000
Military	MIL-STD-461 (A, B, C & D), MIL-STD-462, MIL-STD-1399, MIL-STD-704, MIL-E-16400, MIL-STD-2036, MIL-STD-1275A (AT), MIL-STD-202
Automotive	GM: 9100P, 9105P, 9109P, 9110 P, 9112 P, 9113 P, 9114 P, 9115 P, 9116 P, 9117 P, 9119 P, 9120 P, 9103-P, 9104-P, 9125P, 9128P, 9140P, 9144P, 9154P, 9161P, 9175P Chrysler: PF-9164M, PF-9326
Safety	EN 50091-1

In recognition of the successful completion of the A2LA and the Automotive EMC Laboratory Accreditation Program (AEMCLAP) evaluation process, accreditation is granted to this laboratory to perform the following automotive electromagnetic compatibility tests:

Test Technology	Test Method(s)
Electrostatic Discharge (ESD)	ISO 10605; SAE J1113-13, ES-XWTT-1A278-AB
Absorption Chamber	SAE J1113-21; ISO 11452-2, ES-XWTT-1A278-AB
Transverse Electromagnetic (TEM) Cell	ISO 11452-3; SAE J1113-24
Conducted Emissions	DaimlerChrysler LP-388C-41
Audio Frequency Conducted Immunity	SAE J1113-2