CE TEST REPORT

EN 61326-1 CLASS A
TEST REPORT
For

PRESSURE TRANSDUCER
MODEL: P55

Prepared for

VALIDYNE ENGINEERING
8626 WILBUR AVE.
NORTHRIDGE, CA 91324

Prepared by: _____

JAMES C. BATTIE

Approved by: _____

RUBY A. HALL

COMPATIBLE ELECTRONICS INC.
1050 LAWRENCE DRIVE
NEWBURY PARK, CALIFORNIA 91320
(805) 480-4044

DATE: JUNE 16, 2017

	REPORT BODY	APPENDICES					TOTAL
		A	***B***	***C***	***D***	***E***	
PAGES	30	2	2	2	23	9	**68**

NVLAP® TESTING
NVLAP LAB CODE 200063-0

TABLE OF CONTENTS

LIST OF APPENDICES

APPENDIX	TITLE
A	Laboratory Accreditations
B	Modifications to the EUT
C	Additional Models Covered Under This Report
D	Diagrams, Charts and Photos • Test Setup Diagrams • Antenna and Amplifier Gain Factors • Radiated Emissions Photos • Immunity Photos
E	Data Sheets

LIST OF TABLES

TABLE	TITLE
1	Radiated Emissions Results

LIST OF FIGURES

GENERAL REPORT SUMMARY

This electromagnetic emission and immunity test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form except in full, without the written permission of Compatible Electronics.

This report must not be used by the client to claim product certification, approval or endorsement by NVLAP, NIST or any other agency of the U.S. Government.

Device Tested:	Pressure Transducer Model: P55 S/N: None
Product Description:	This is a pressure transducer used for pressure measurements. (Dimensions: 4" x 1.5" x 1.82").
Modifications:	The EUT was modified in order to comply with specifications. See the list of modifications in Appendix B.
Manufacturer:	Validyne Engineering 8626 Wilbur Ave. Northridge, CA 91324
Test Dates:	June 8, 9, 12 & 14, 2017

Test Specifications covered by accreditation:

NVLAP®
TESTING
NVLAP LAB CODE 200063-0

Emissions and Immunity requirements
International Standard EN 61326-1: 2013.

The specification EN 61326-1 is a product family EMC standard;
which references the following specifications:

IEC 61000-4-2: 2008
IEC 61000-4-3: 2006 +A1: 2007 + A2: 2010
IEC 61000-4-4: 2004 +A1: 2010
EN 61000-4-5: 2006
IEC 61000-4-6: 2008
IEC 61000-4-8: 2009
IEC61000-4-11:2004
EN 61000-3-2: 2006 +A1: 2009 +A2:2009
EN61000-3-3:2008
IEC61000-3-11:2000
IEC61000-3-12:2011
CISPR 11: 2009 +A1: 2010

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz – 30 MHz.	The EUT is DC powered, therefore this test was deemed unnecessary and thus was not performed
2	Radiated RF Emissions, 30 MHz – 1 GHz.	Complies with the **CLASS A** limits of CISPR 11 See section 6.4 for Measurement Uncertainty
3	Direct ESD, Air Discharge, ±2 kV, ±4 kV and ±8 kV (insulated surfaces).	The EUT had no air discharges therefore this test was deemed unnecessary and thus was not performed.
4	Direct ESD, Contact Discharge, ±2 kV and ±4 kV (conductive surfaces).	Complies with the requirements of EN 61326-1: 2013. The unit operates within its specifications. *See XX below for uncertainty notes.
5	Indirect ESD, ±2 kV and ±4 kV (HCP & VCP).	Complies with the relevant requirements of EN 61326-1: 2013. The unit operates within the specifications. *See XX below for uncertainty notes.
6	Radio-Frequency Electromagnetic Field, 80 MHz to 1000 MHz, 10 V/m with an amplitude modulated, 1 kHz sine wave at 80%. 1 GHz to 2 GHz @ 3V/m and 2 GHz to 2.7 GHz @ 1 V/m.	Complies with the requirements of EN 61326-1: 2013. The unit operates within its specifications. *See XX below for uncertainty notes. Variations of measured field strength due to reflections from the EUT are not included in the uncertainty calculations.
7	Fast Transients Common Mode, ±0.5 kV, ±1.0 kV & ±2.0 kV on DC Power lines and ±1.0 kV on data lines.	Complies with the requirements of EN 61326-1: 2013. The unit operates within its specifications. *See XX below for uncertainty notes.
8	Surge Immunity Test Differential Mode, ±0.5 kV & 1.0 kV and Common Mode, ±0.5 kV, ±1.0 kV & ±2.0 kV on DC power lines.	This test was not performed at the client's request.
9	Radio-Frequency Electromagnetic Conducted Field, .150 MHz to 80 MHz, 3Vrms with an amplitude modulated, 1 kHz sine wave at 80%.	Complies with the requirements of EN 61326-1: 2013. The unit operates within its specifications. *See XX below for uncertainty notes.
10	Power Frequency Magnetic Field Susceptibility, 30 A/m @ 50Hz & 60Hz, X, Y, & Z-axis.	Complies with the requirements of EN 61326-1: 2013. The unit operates within its specifications. *See XX below for uncertainty notes.
11	Voltage Dips and Voltage Variations, Short Interrupts, 100% @ 20ms, 60% @ 200ms, 30% @ 500ms and 100% @ 5000ms reduction of rated voltage.	The EUT is DC powered, therefore this test was deemed unnecessary and thus was not performed
12	Quasi-Stationary Current Harmonics Test 230V@50Hz, 39th Odd Harmonics and 40th Even harmonics.	The EUT is DC powered, therefore this test was deemed unnecessary and thus was not performed
13	Voltage Fluctuation and Flicker Test 230V@50Hz.	The EUT is DC powered, therefore this test was deemed unnecessary and thus was not performed
XX	Note that for all immunity tests above, it has been demonstrated that the generator and or the test configuration meets the specified requirements in the relevant technical standard. Uncertainty is based on a coverage factor of k=2 giving an approximate 95% confidence level. Calibration data is on file at the lab.	

Reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2

1. PURPOSE

This document is a qualification test report based on the emissions and immunity tests performed on the Pressure Transducer Model: P55. The emissions measurements were performed according to the measurement procedure described in CISPR 11. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **CLASS A** specification limits defined in EN 61326-1: 2013 (Electrical Equipment for measurement, control and laboratory use – EMC Requirements - Industrial Environments.

The immunity tests were performed according to the industrial immunity requirements described in EN 61326-1: 2013 (Electrical Equipment for measurement, control and laboratory use – EMC Requirements). These tests were performed in order to determine whether the EUT would accept any interference and still perform within the performance criteria described in section 4.2.1 of this report. The tests were performed by Compatible Electronics personnel; also the unit was operated and monitored for susceptibility by Compatible Electronics personnel.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The Emissions and Immunity tests described herein were performed at the test facility of Compatible Electronics at 1050 Lawrence Drive, Newbury Park, CA 91320.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST). For equipment used for immunity testing, refer to the applicable calibration certificates for tolerance and uncertainty information, which is on file at the location of the test.

2.3 Cognizant Personnel

Validyne Engineering

Manish Desai	Engineering Manager

Compatible Electronics Inc.

Reynald O. Ramirez	Sr. Test Engineer
James C. Battie	Test Technician
Ruby A. Hall	Lab Manager

2.4 Date Test Sample Was Received

The test sample was received on June 8, 2017.

2.5 Disposition of the Test Sample

The test sample was returned to Validyne Engineering

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

EFT	Electrical Fast Transients
RF	Radio Frequency
ESD	Electrostatic Discharge
EMI	Electromagnetic Interference
EMC	Electromagnetic Compatibility
VCP	Vertical Coupling Plane
HCP	Horizontal Coupling Plane
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this Test Report.

SPEC	TITLE
EN 61326-1: 2013	Electrical Equipment for measurement, control and laboratory use – EMC requirements.
CISPR 11 2009 +A1:2010	Industrial, scientific and medical (ISM) radio frequency equipment – Electromagnetic Disturbance characteristics – Limits and methods of measurement.
CISPR 16-1-4 2008	Specification for radio disturbance and immunity measuring apparatus and methods.
EN 61000-3-2 2006 +A1: 2009 & A2: 2009	Electromagnetic compatibility – Part 3: Limits – Section 2: Limits for harmonic current emissions (equipment input current <= 16 A per phase)
EN 61000-3-3 2008	Electromagnetic compatibility – Part 3: Limits – Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current <= 16 A and not subject to conditional connection
IEC 61000-4-2 2008	Electromagnetic compatibility – Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test
IEC 61000-4-3 2006 +A1: 2007 +A2: 2010	Electromagnetic compatibility – Part 4: Testing and measurement techniques – Section 3: Radiated, radio-frequency electromagnetic field test
IEC 61000-4-4 2004 +A1: 2010	Electromagnetic compatibility – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test
EN 61000-4-5 2006	Electromagnetic compatibility – Part 4: Testing and measurement techniques – Section 5: Surge immunity test
IEC 61000-4-6 2008	Electromagnetic compatibility – Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, Induced by radio-frequency fields
IEC 61000-4-8 2009	Electromagnetic compatibility – Part 4: Testing and measurement techniques – Section 8: Power frequency magnetic field immunity test
IEC 61000-4-11 2004	Electromagnetic Compatibility. Part 4: Testing and measurement techniques. Section 11: Voltage dips, short interruptions and voltage variations immunity tests

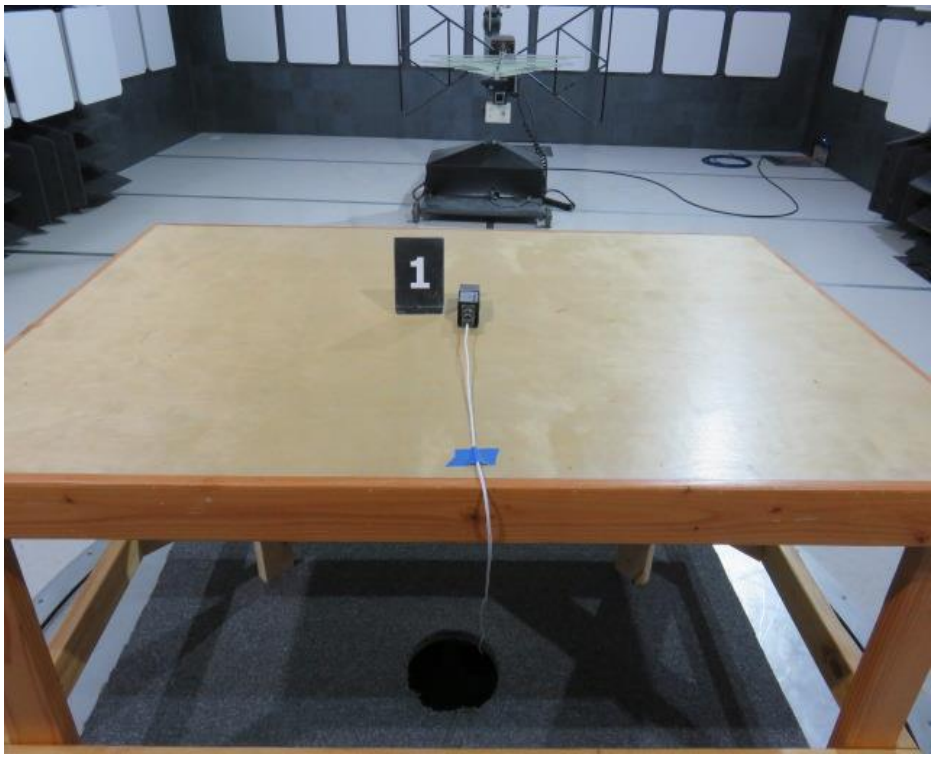
4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - Emissions

The EUT was tested in a tabletop configuration. The EUT was connected to the remotely located DC Power Supply. The EUT was powered on and 0 PSI was applied which output 0.000±0,010V.

The final radiated data was taken in the aforementioned mode of operation. All initial investigations were performed with the EMI Receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix D.

4.1.1 Photograph of Test Configuration – Emissions



4.1.2 Cable Construction and Termination

Cable 1

This is a 7 meter, foil shielded, round cable that connects the DC Power Supply to the EUT. The cable has a 6 Position Circular Connector at the EUT end and Banana plugs at the DC Power Supply end.

4.2 Description of the Test Configuration - Immunity

The EUT was operating as described in section 4.1 of this report.

4.2.1 Susceptibility Criteria

TEST	PERFORMANCE CRITERIA (Industrial Immunity Test Requirements)
Electrostatic Discharge	B
Radio-Frequency Electromagnetic Field	A
Fast Transients Common Mode	B
Surge Immunity Test	B
Conducted Disturbances Test	A
Power Frequency Magnetic Field Susceptibility	A
Voltage Dips	B
Voltage Interruptions	C

Performance criteria A: The equipment shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Performance criteria B: The equipment shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Performance criteria C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

#	EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER
1	PRESSURE TRANSDUCER (EUT)	VALIDYNE ENGINEERING	P55 P/N: P55-X-X-X-XX-X-X-X-9	S/N: NONE
	DC POWER SUPPLY	PROTEK	3015	S/N: 9401786
	AIR COMPRESSOR	MENSOR	CPC6000	ASSET NO.: 1178

5.2 Emissions Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
TDK Emissions Lab Software	TDK RF Solutions, Inc.	TDK Emissions Lab	Version: 10.78	N/A	N/A
EMI Receiver	Keysight Technologies	N9038A	MY51100115	Jan. 10, 2017	Jan. 10, 2018
Combi-Log Antenna	Com-Power	AC-220	061097	Mar. 14, 2017	Mar. 14, 2018
Turntable	EMCO	2088-2.03	None	NCR	NCR
Antenna Mast	EMCO	2075-2	None	NCR	NCR
Multi-Device Controller	ETS EMCO	2090	9511-1095	NCR	NCR
Temperature and Humidity Indicator	Abbeon	HTAB169B	3022	Dec. 02, 2016	Dec. 02, 2017
Barometer	Maximum	Predictor	3043	NCR	NCR

5.3 Immunity Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
GENERAL TEST EQUIPMENT USED FOR ALL IMMUNITY TESTS					
Barometer	Abbeon	BAR130B	Asset# 3043	NCR	N/A
Hydro-Temp Indicator	Abbeon	HTAB 169B	Asset# 3022	Dec. 02, 2016	Dec. 02, 2017
Computer System	Dell	Dimension 2400	8L4WF41	NCR	NCR
ELECTROSTATIC DISCHARGE TEST EQUPIMENT					
ESD Simulator	Teseq	NSG 437	657	Jan. 20, 2017	Jan. 20, 2018
RF RADIATED ELECTROMAGNETIC FIELD TEST EQUIPMENT					
RFI Test Software	Compatible Elec.	E-Field	Version 1.6	N/A	N/A
RFI Test Software (High Frequency)	Com-Power	SEGI	V1.0.0.1	NCR	NCR
RF Signal Generator	Com-Power	SIG-200	02174	NCR	N/A
RF Signal Generator	Hewlett Packard	8648C	3623A02821	Jan. 06, 2017	Jan. 06, 2019
RF Power Amplifier	Ophir	5066F	1022	NCR	NCR
RF Power Amplifier	Ophir	5293	1040/1620	NCR	NCR
Biconical Antenna	Com Power	AB-900	15317	NCR	N/A
Log Periodic Antenna	Com Power	AL-100	16280	NCR	N/A
High-Gain Horn Antenna	Com-Power	AH-8055	501953	NCR	NCR
Isotropic Field Probe	Amplifier Research	FP2000	15955	May 19, 2017	May 19, 2019
Isotropic Field Monitor	Amplifier Research	FM 2000	18324	NCR	N/A
EFT, SURGE, AND VOLTAGE DIPS TEST EQUIPMENT					
EMCpro Plus Software	Thermo Scientific	CEWare32	Version 4.00	NCR	NCR
EMC Test Generator	Thermo Scientific	EMCpro PLUS	1205237	Jan. 16, 2017	Jan. 16, 2018
Capacitive Clamp	KeyTek	CM-CCL	9609501	Jan. 16, 2017	Jan. 16, 2018
RF CONDUCTED SUSCEPTIBILITY TEST EQUIPMENT					
RF Power Amplifier	Com-Power	ACS-250-100W	711977	NCR	N/A
RF Signal Generator	Com-Power	SIG-200	02174	NCR	N/A
3 dB Atten. 100W	Com Power	ATTN-03-100W	511542	Oct. 06, 2016	Oct. 06, 2017
CDN - Coupling Decoupling Network	Com-Power	CDN M325E	521107	Apr. 25, 2017	Apr. 25, 2018
Current Probe	Com Power	CLCI-100	561431	Nov. 06, 2016	Nov. 06, 2017

5.3.1 Immunity Test Equipment (Continued)

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
RF CONDUCTED SUSCEPTIBILITY TEST EQUIPMENT					
Conducted Immunity Software	Compatible Electronics, Inc.	CSAT	V2.0.1.0	NCR	N/A
POWER FREQUENCY MAGNETIC FIELD TEST EQUIPMENT					
ELF Field Monitor	Walker Scientific	ELF-60D	K71571-37	Apr. 08, 2016	Apr. 08, 2018
Magnetic Field Gen. Loop Antenna	Compatible Electronics	100-1000 A/m	N/A	NCR	N/A

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

All immunity tests were performed in a shielded enclosure 18 feet wide, 20 feet long and 14 feet high. Please refer to section 2.1 of this report for test locations.

6.2 EUT Mounting, Bonding and Grounding

For all tests except for ESD, EFT and the Conducted Immunity tests, the EUT was set up on a 1.0 by 1.5 by 0.8 meter high non-conductive table, which was placed on the ground plane. For ESD testing, the unit was mounted 0.5 millimeters above the 0.8 meter by 1.6 meter horizontal coupling plane. For the Conducted Immunity and EFT tests, the EUT was mounted 10cm above the GRP.

The EUT was grounded through the DC Power cord.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature and barometric pressure.

6.4 Measurement Uncertainty

"Compatible Electronics' U_{lab} value is less than U_{cispr}, thus based on this – compliance is deemed to occur if no measured disturbance exceeds the disturbance limit

$$u_c(y) = \sqrt{\sum_i c_i^2 \; u^2(x_i)}$$

Measurement		U_{cispr}	$U_{lab} = 2\,uc\,(y)$
Conducted disturbance (mains port)	(9 kHz – 150 kHz) (150 kHz – 30 MHz)	4,0 dB 3,6 dB	2.88 dB 9 kHz – 30 MHz
Radiated disturbance (electric field strength on an open area test site or alternative test site)	(30 MHz – 1 000 MHz)	5,2 dB	3.07 dB

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 RF Emissions

7.1.1 Conducted Emissions Test

Test Results:

The EUT is DC powered therefore this test was deemed unnecessary and thus was not performed. Had this test been applicable it would have been performed as described below

The EMI Receiver was used as a measuring meter. The data was collected with the EMI Receiver in the peak detect mode with the "Max Hold" feature activated. The quasi-peak or average was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the EMI Receiver input stage, and the EMI Receiver offset was adjusted accordingly to read the actual data measured. The EMI Receiver read the LISN output. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in CISPR 16. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.15 MHz to 1.6 MHz, 1.6 MHz to 5 MHz and 5 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the EMI Receiver span adjusted to 1 MHz.

The final data was collected under program control by the computer in several overlapping sweeps by running the EMI Receiver at a minimum scan rate of 10 seconds per octave.

7.1.2 Radiated Emissions Test

The EMI Receiver was used as the measuring meter. A built-in, internal preamplifier was used to increase the sensitivity of the instrument. The EMI Receiver was initially used in the Analyzer mode feature activated. In this mode, the EMI receiver can then record the actual frequency to be measured. This final reading is then taken accurately in the EMI Receiver mode, which takes into account the cable loss, amplifier gain and antenna factors, so that a true reading is compared to the true limit. A quasi-peak reading was taken only for those readings, which are marked accordingly on the data sheets. The effective measurement bandwidth used for the radiated emissions test is listed in the table below.

A broadband Combilog antenna was used as a transducer during the measurement. The Combilog antenna was used from 30 MHz to 1000 MHz. Furthermore, the frequency span was reduced during the preliminary investigations as deemed necessary.

The EMI test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.4, EN 50147-2 and CISPR 11. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength).

The measurement bandwidth and transducer used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
30 MHz to 1 GHz	120 kHz	Combilog Antenna

The EUT was tested at a 3 meter test distance. The six highest emissions are listed in Table 1.0.

.

7.1.3 RF Emissions Test Results

Table 1.0 RADIATED EMISSION RESULTS
PRESSURE TRANSDUCER
MODEL: P55

Frequency MHz	Corrected Reading* dBuV	Specification Limit dBuV	Delta (Cor. Reading – Spec. Limit) dB
30.70	26.43#	50	-23.57
698.60	30.34#	57	-26.66
806.80	31.76#	57	-25.24
869.50	31.90#	57	-25.10
897.70	32.01#	57	-24.99
940.80	32.08#	57	-24.92

Notes:

* The complete emissions data is given in Appendix E of this report.

** The factors for the antennas and preamplifier gain are attached in Appendix D of this report.

\# Quasi-Peak Reading

A Average Reading

7.2 Electrostatic Discharge Tests

An ESD Generator was used for this test. The characteristics consist of an energy storage capacitor: 150 pF; discharge resistance: 330 Ohms; charging resistor: 100 Megaohms; tolerance of voltage indication: ±5%; polarity of output voltage: positive and negative. The waveshape conforms to IEC 61000-4-2. The test was performed as per IEC 61000-4-2.

7.2.1 Direct ESD - Air Discharge

Test Results:

The EUT had no air discharges therefore this test was deemed unnecessary and thus was not performed. Had this test been applicable it would have been performed as described below.

In the Air ESD test, the EUT was exposed to a direct air discharge at all user accessible surfaces. The ESD arc was drawn directly to any insulated point on the EUT. The test simulated a situation in which any person or object carrying an electrostatic charge discharges it to any point on the equipment. The ground strap of the ESD generator was connected to the earth ground (shield room ground reference plane) and was a minimum of 0.2 m away from the EUT.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in Appendix D of this report. Photographs of the test equipment, and EUT setup during the test are in Appendix D.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. The test point locations were selected based on an exploratory test of inducing 20 discharges per second onto all surfaces of the unit. The test point locations selected for the final test are listed in the data sheets attached in Appendix E.

The test voltages were increased from 2.0 kV to 8.0 kV at 2.0 kV increments, in order to eliminate errors related to the "window" effect associated with ESD testing. Also, testing in increments helps determine the voltage threshold without severely damaging the unit. The final test was performed with 10 single shot discharges on each selected point in each polarity. The rounded discharge probe was used for the test. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Direct ESD - Contact Discharge

In the contact ESD test, the EUT was exposed to a direct contact discharge at all conductive user accessible surfaces. The ESD arc was drawn directly to any conductive point on the equipment under test. The test provides a repeatable method to determine immunity of the EUT to electrostatic discharges. The ground strap of the ESD generator was connected to the earth ground (shield room ground reference plane) and was a minimum of 0.2 m away from the EUT.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are in Appendix D.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. The test point locations were selected based on the exploratory test of inducing 20 discharges per second onto all surfaces of the unit. The test point locations selected for the final test are listed in the data sheets attached in Appendix E.

The test voltages were ±2.0 kV and ±4.0 kV in order to eliminate errors related to the "window" effect associated with ESD testing. Also, testing in increments helps determine the threshold without severely damaging the unit. The final test was performed with single shot discharges on all the selected points.

The pointed discharge probe was touching the conductive surface of the unit before initiating the discharge. For painted surfaces, the sharp tip of the probe was used to penetrate the paint before providing discharge to the EUT. At least 10 discharges (in both polarities) were applied at each test point. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 61326-1: 2013. The unit operates within the specifications for contact discharge at ±2.0 kV and ±4.0 kV.

Indirect Electrostatic Discharge Test - Vertical Coupling Plane

For indirect electrostatic discharges, the vertical coupling plane (0.5 m x 0.5 m) was tied to the ground reference plane through braid and a series of two 470 kΩ resistors one at each end of the braid. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are in Appendix D.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. A distance of one meter was maintained between the EUT and the shield room walls or any other metallic structures. The ground strap of the ESD generator was connected to the earth ground (shield room ground reference plane) and was a minimum of 0.2 m away from the EUT. The coupling plane was placed 0.1 meters from each side of the EUT and at a height close to the center of the EUT. The discharges were applied to the edge of the VCP. Ten discharges were applied to the VCP at each test level in each polarity on each side of the unit. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 61326-1: 2013. The unit operates within the specifications for indirect discharges to the VCP at ±2.0 kV and ±4.0 kV.

Indirect Electrostatic Discharge Test - Horizontal Coupling Plane

For indirect electric discharges the horizontal coupling plane (1.0 m x 1.0 m) was tied to the ground reference plane through braid and a series of two 470 kΩ resistors at each end of the braid.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are in Appendix D.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. A distance of one meter was maintained between the EUT and the shield room walls or any other metallic structures. The ground strap of the ESD generator was connected to the earth ground (shield room ground reference plane) and was a minimum of 0.2 m away from the EUT. The discharges were applied to the center of the front edge of the HCP 10 cm in front of the EUT at each test level in each polarity. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 61326-1: 2013. The unit operates within the specifications for indirect discharges to the HCP at ±2.0 kV and ±4.0 kV.

7.3 Radio-Frequency Electromagnetic Field

The test was performed as per IEC 61000-4-3. For this test, broadband antennas were used to radiate the energy onto the EUT. The signal was 80% AM modulated with a 1 kHz sine wave, with a field strength of 10V/m peak, over the frequency range 80 MHz to 1 GHz, and 3V/m from 1.4 GHz to 2 GHz and 1V/m from 2 GHz to 2.7 GHz. The frequency range was covered with a step size of 1% and the dwell time was 3 seconds. The fields were established prior to injecting modulation per the requirements of IEC 61000-4-3.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The EUT was set up as shown in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are included in Appendix D.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. The RF energy was radiated using the Biconical Antenna from 80 MHz to 275 MHz and Log Periodic Antenna from 275 MHz to 1000 MHz. The field strength was set to the test level contained in IEC 1000-4-3 using the RFI test software, which was installed on the desktop computer. The field strength was monitored using a field strength probe placed near the EUT. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 61326-1: 2013. The unit operates within the specifications.

7.4 Fast Transient Common Mode Tests

The test was performed as per IEC 61000-4-4. The burst duration was 15 ms, with 300 ms burst period. The individual impulse had a 5ns rise time and a 50ns decay time and a 5 kHz frequency up to 2 kV, and a 2.5 kHz frequency above 2 kV. The EMC immunity test system was used for the test. Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT was operated and configured as described in section 4.2 of this report. The coupling device was placed 1 meter away from the EUT. The EUT was set up as shown in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are included in Appendix D.

Power Lines

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. The transient energy was injected onto the power line through the use of a coupling/decoupling network. Bursts of pulse trains were injected onto the power line, in both positive and negative polarities. The test level was ±2kV. The test was run for one minute on each lead and each lead combination. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 61326-1: 2013. The unit operates within the specifications.

Data Lines

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. The transient energy was coupled from the EMC immunity test system to the signal lines through the use of the capacitive coupling clamp. The clamp meets the requirements of IEC 61000-4-4. The clamp was placed on the ground plane, and the data lines were placed inside the clamp. Bursts of pulse trains were injected onto the signal lines, in both positive and negative polarities. The test level was ±1.0 kV. The test was run for two minutes on each cable. After completion of the test, a functional test was performed on the EUT to ensure proper operation.

Test Results:

The EUT complies with the relevant requirements of EN 61326-1: 2013. The unit operates within the specifications.

7.5 Surge Immunity Test

Power Lines

Test Results:

This test was not performed at the client's request. Had this test been requested it would have been performed as described below.

The EMC Test Immunity System was used to provide the "Combination Wave" as specified in EN 61000-4-5 Voltage waveform for high impedance - Rise time to crest voltage: 1.2 uS approx. and Decay: 50 uS to 50% of peak voltage value. Current waveform for low impedance - Rise time to crest voltage: 8.0 uS approx. and Decay: 20 uS to 50% of peak current value. The amplitude was increased incrementally at the stated test levels contained in IEC 61000-4-5 using the EMC Test Immunity System software, which was installed on the desktop computer. As per EN 61000-4-5, the selection of the voltage or current waveform depends on impedance offered by the EUT.

7.6 Conducted disturbances induced by RF Electromagnetic Field Test

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. This test was performed as per IEC 61000-4-6. For this test, a Coupling Decoupling Network was used to induce an RF-field current directly onto the DC lines and Current Probe was used on data lines. The signal was 80% AM modulated with a 1 kHz sine wave, with a field strength of 3Vrms, over the frequency range of 150 kHz to 80 MHz. The frequency range was covered with a 1% step size and the dwell time was 1 second. The EUT was placed 10 cm above the GRP with the Coupling Decoupling Network mounted and bonded to the GRP.

The EUT was operated as described in section 4.2 of this report. The EUT was set up as shown in Appendix D of this report. Photographs of the test equipment and EUT setup during the test are included in Appendix D.

Test Results:

The EUT complies with the relevant requirements of EN 61326-1: 2013. The unit operates within the specifications.

7.7 Power Frequency Magnetic Field Test

Test Results:

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. This test was performed to determine if the test sample was susceptible to Power Frequency Magnetic Fields which are generated by power frequency current in conductors and leaking transformers. The test was performed as per EN 61000-4-8. The magnetic field is applied by the immersion method to the EUT; in this method the EUT is placed in the center of an induction coil. The waveform is that of the typical power frequency either 50Hz or 60Hz. The Magnetic Field Strength is expressed in A/m; 1 A/m corresponds to free space induction of 1.26µTesla. A Square Induction coil in conjunction with a variable AC power source was used to induce the magnetic field. Prior to placing the EUT in the induction coil, the level of the field was verified through the use of an ELF meter. The test duration was 1 minute for each of the three Orthogonal Axes.

Test Results:

The EUT complies with the relevant requirements of EN 61326-1: 2013. The unit operates within the specifications.

7.8 Voltage Dips, Short Interruptions, and Voltage Variations

Test Results:

The EUT is DC powered therefore this test was deemed unnecessary and thus was not performed. Had this test been applicable it would have been performed as described below.

Prior to the start of the test, a functional test was performed on the EUT to ensure proper operation. The EUT was also monitored during the test for any degradation of performance. This test was performed as per IEC 61000-4-11. The purpose of this test was to determine the immunity of the EUT when subjected to voltage dips, short interruptions, and voltage variations. The voltages of the EUT were varied and disrupted at various levels of the supplied voltages for a given period of time. The voltage reduction level was 100% for 20ms, 60% for 200 ms, 30% for 500ms and 100% for 5 seconds. The test was performed 3 times. The voltage change-overs took place at zero degree crossings.

7.9 Quasi-Stationary Harmonics and Flicker Test

Test Results:

The EUT is DC powered therefore these tests were deemed unnecessary and thus were not performed. Had these tests been applicable they would have been performed as described below.

The Harmonic/Flicker Test System was used as a measuring meter along with a laptop computer. The data was collected using the Harmonic/Flicker Test System with software control activated. The voltage settings were 230V at 50Hz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was set up with the minimum distances from any conductive surfaces as specified in EN 55022: 2010/AC: 2011.

The final data was collected under program control by the software running the Harmonic Flicker Test System. The data and test report were collected under program control by the test system software.

8. DEVIATIONS FROM THE TEST PROCEDURES

The test procedure deviations included not testing the DC lines for Surge immunity at the request of the client.

.

9. CONCLUSIONS

The Pressure Transducer, Model: P55, as tested, meets emissions requirements and only the requirements of the tests that were performed to the immunity requirements of (Class A) and Industrial immunity requirements of the International Standard EN 61326-1: 2013 (Electrical Equipment for measurement, control and laboratory use – EMC Requirements as described in this report.

APPENDIX A

LABORATORY ACCREDITATIONS

LABORATORY ACCREDITATIONS AND RECOGNITIONS

For US, Canada, Australia/New Zealand, Japan, Taiwan, Korea, and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025.

NVLAP TESTING
NVLAP LAB CODE 200063-0

For the most up-to-date version of our scopes and certificates please visit

http://celectronics.com/quality/scope/

Quote from ISO-ILAC-IAF Communiqué on 17025:

"A laboratory's fulfilment of the requirements of ISO/IEC 17025:2005 means the laboratory meets both the technical competence requirements and management system requirements that are necessary for it to consistently deliver technically valid test results and calibrations. The management system requirements in ISO/IEC 17025:2005 (Section 4) are written in language relevant to laboratory operations and meet the principles of ISO 9001:2008 Quality Management Systems — Requirements."

See: https://www.ilac.org/documents/17025_joint_communique.pdf

ANSI listing
CETCB
https://www.ansica.org/wwwversion2/outside/ALLdirectoryDetails.asp?menuID=1&prgID=3&orgID=123&status=4

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).

Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA).

We are also certified/listed for IT products by the following country/agency:

VCCI Listing, from VCCI site
Enter "Compatible" in search form http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html

FCC Listing, from FCC OET site
FCC test lab search https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm

Industry Canada Industrie Canada

Compatible Electronics IC listing can be found at:
http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The following modifications were made at the time of testing with one aim; to show that the sample product referenced in this test report can satisfy the test requirements. See the individual test description in this report for further detail on the modification.

Sequence #	TEST	Modification(s) made / type	Result prior	Result after
1	Radiated Susceptibility Test	Isolation was added (Chomerics Soft Shield 4800) to the seam around metal enclosure.	Fail	Pass

The modification by the manufacturer for mass production may include other constraints not controlled by Compatible Electronics, Inc.: constraints of provisioning components, costs and optimizations of implementation in series production, simplified alternative modifications, electrical safety, etc.

This approach is in line with ECANB TGN 28 Feb 2012 V1.0

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST: PRESSURE TRANSDUCER
Model: P55
S/N: NONE

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS AND PHOTOS

FIGURE 1: CONDUCTED EMISSIONS TEST SETUP

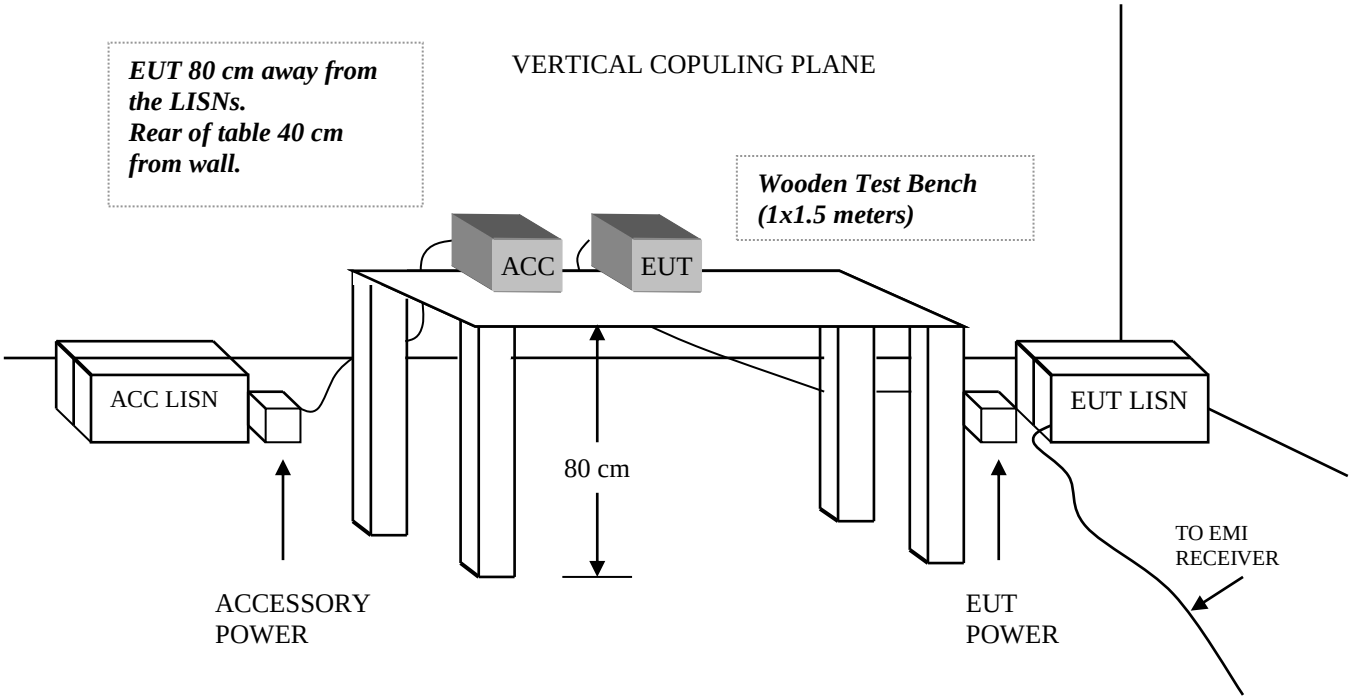


FIGURE 2: PLOT MAP AND LAYOUT OF RADIATED SITE

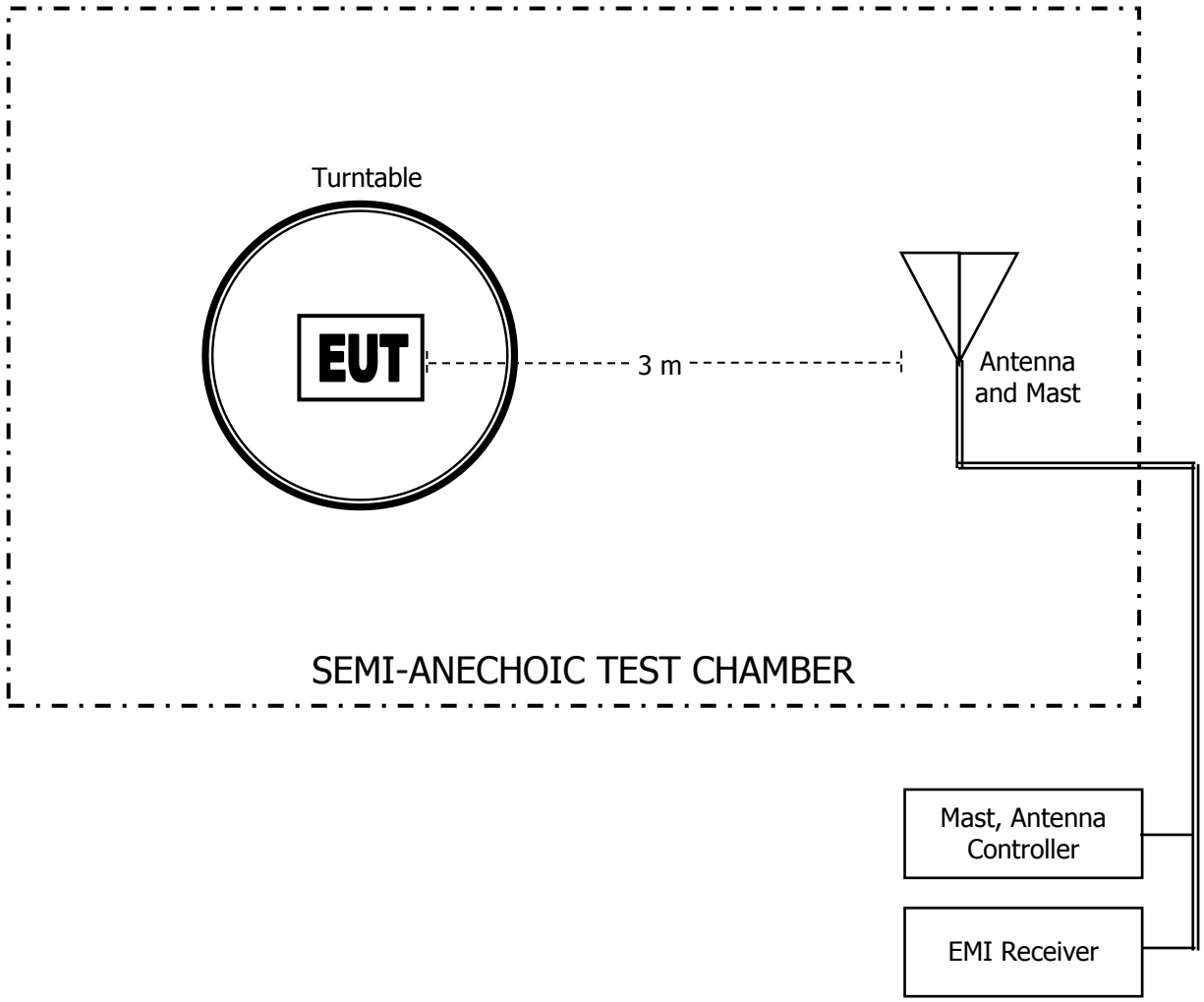


FIGURE 3: HIGH FREQUENCY TEST VOLUME

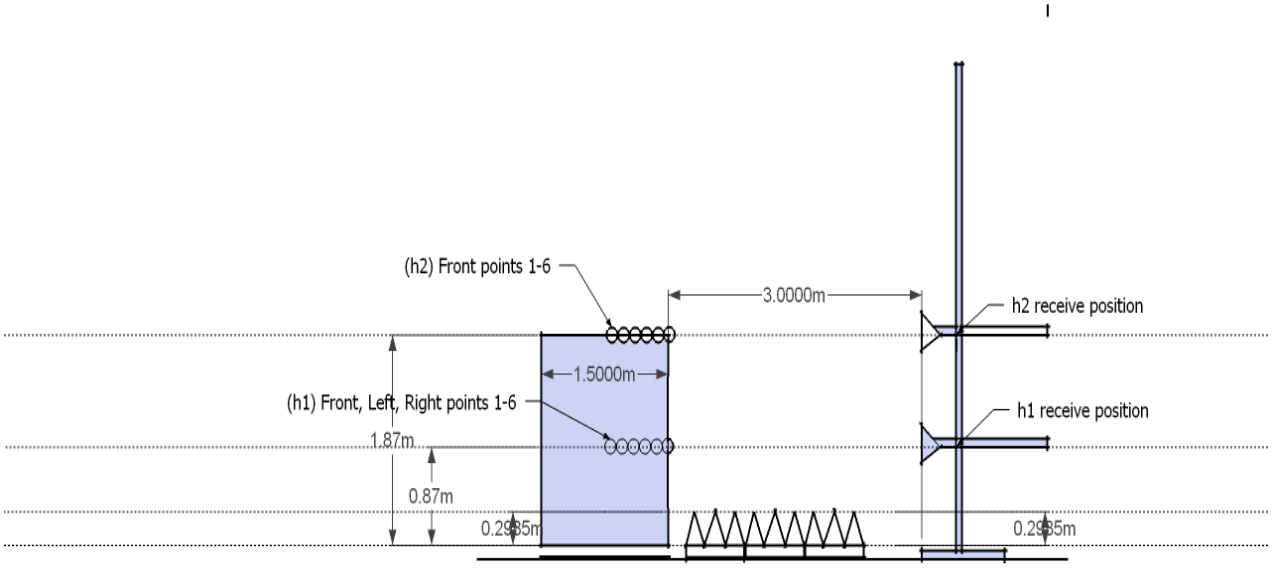


FIGURE 4: ELECTROSTATIC DISCHARGE

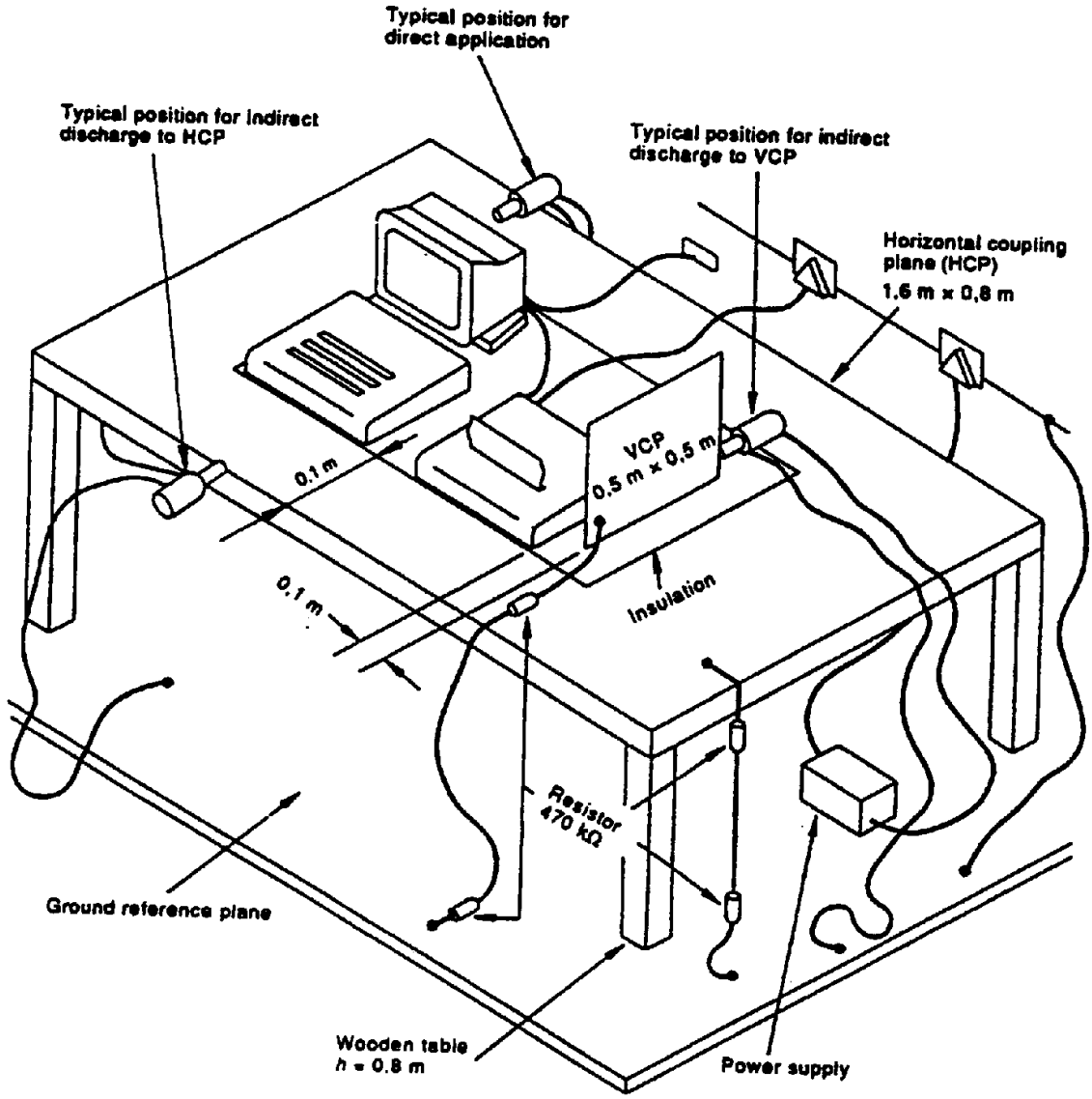


FIGURE 5: RADIATED SUSCEPTIBILITY SETUP

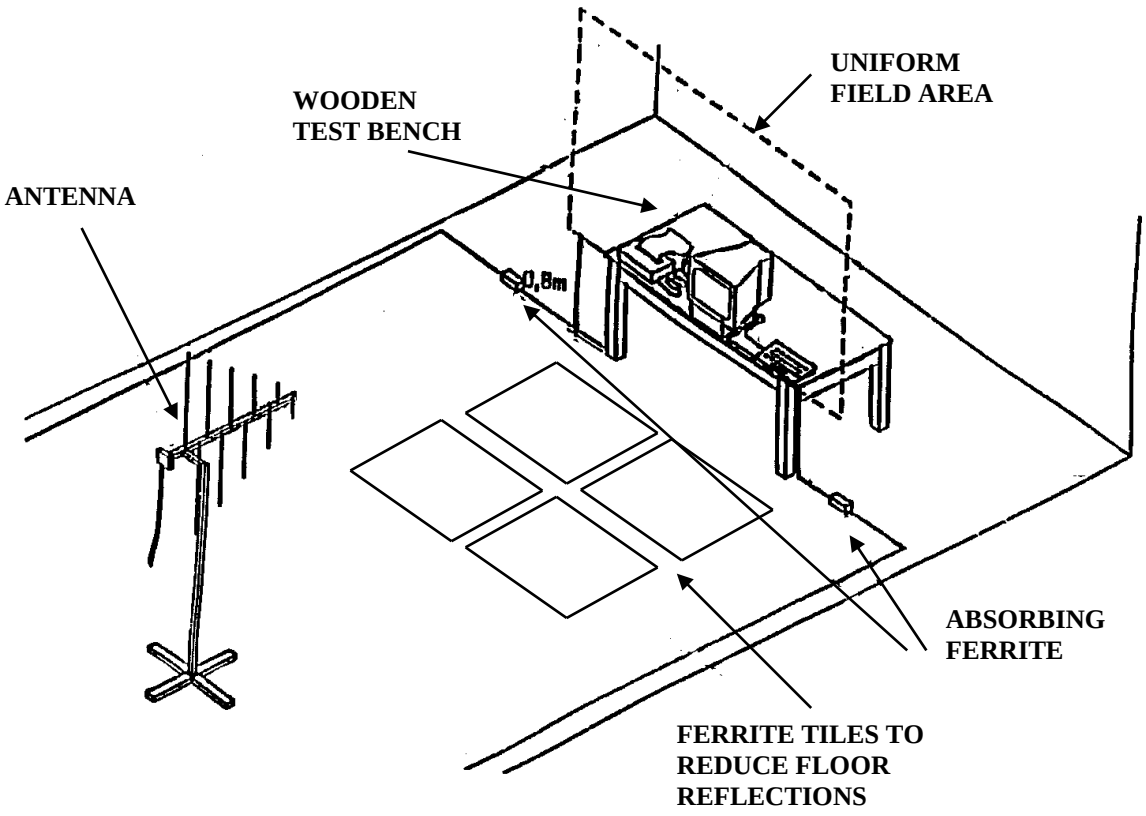


FIGURE 6: FAST TRANSIENTS COMMON MODE TEST SETUP

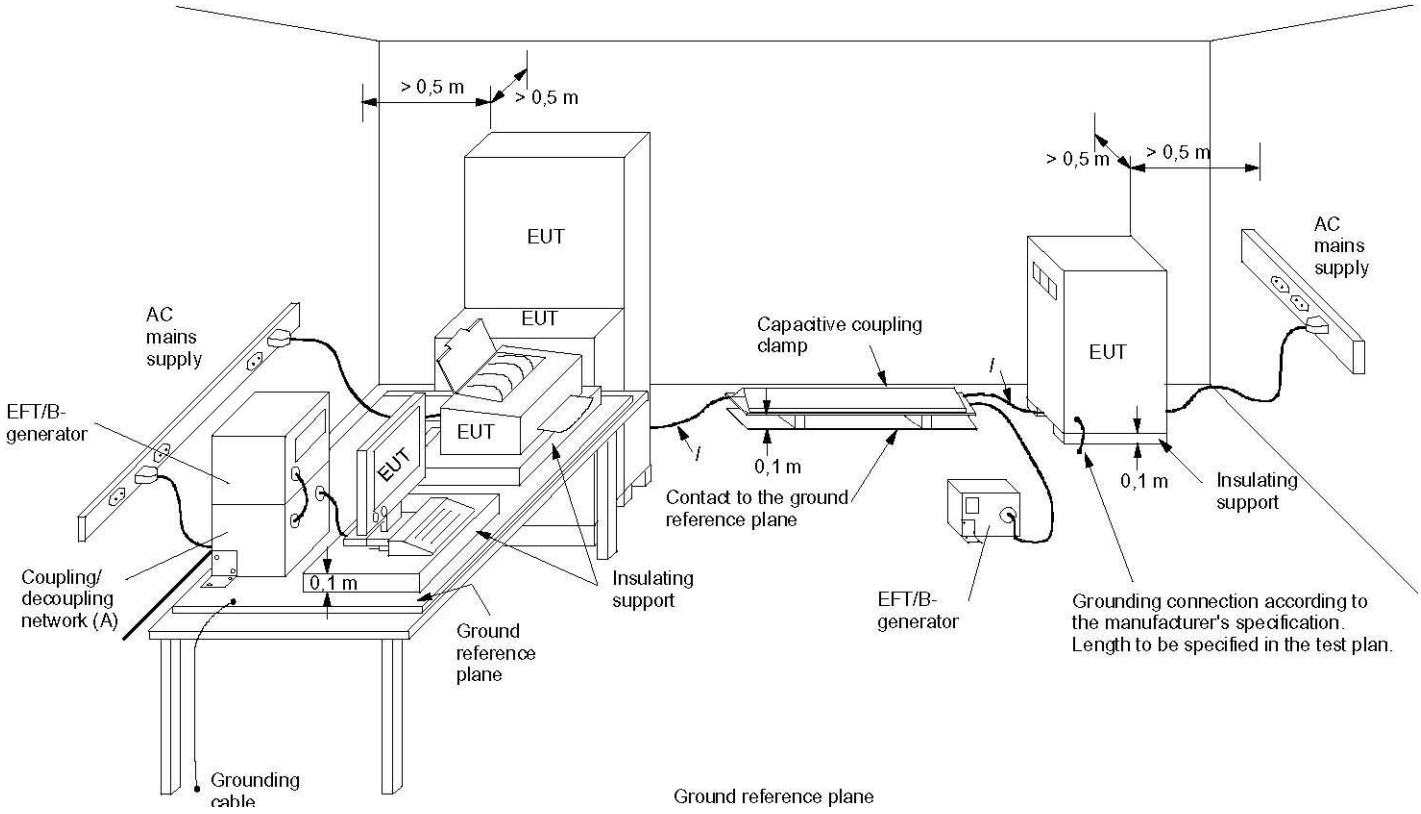


FIGURE 7: SURGE IMMUNITY TEST SETUP

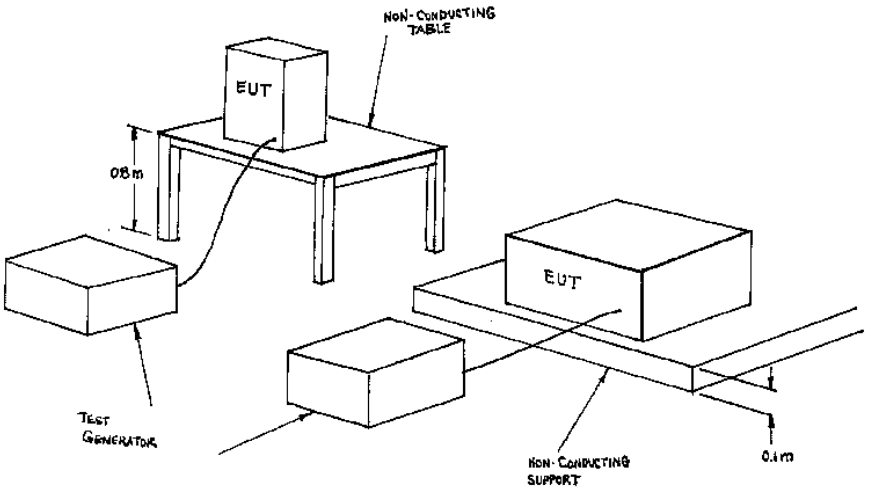


FIGURE 8: CONDUCTED DISTURBANCES INDUCED BY RF FIELDS TEST SETUP

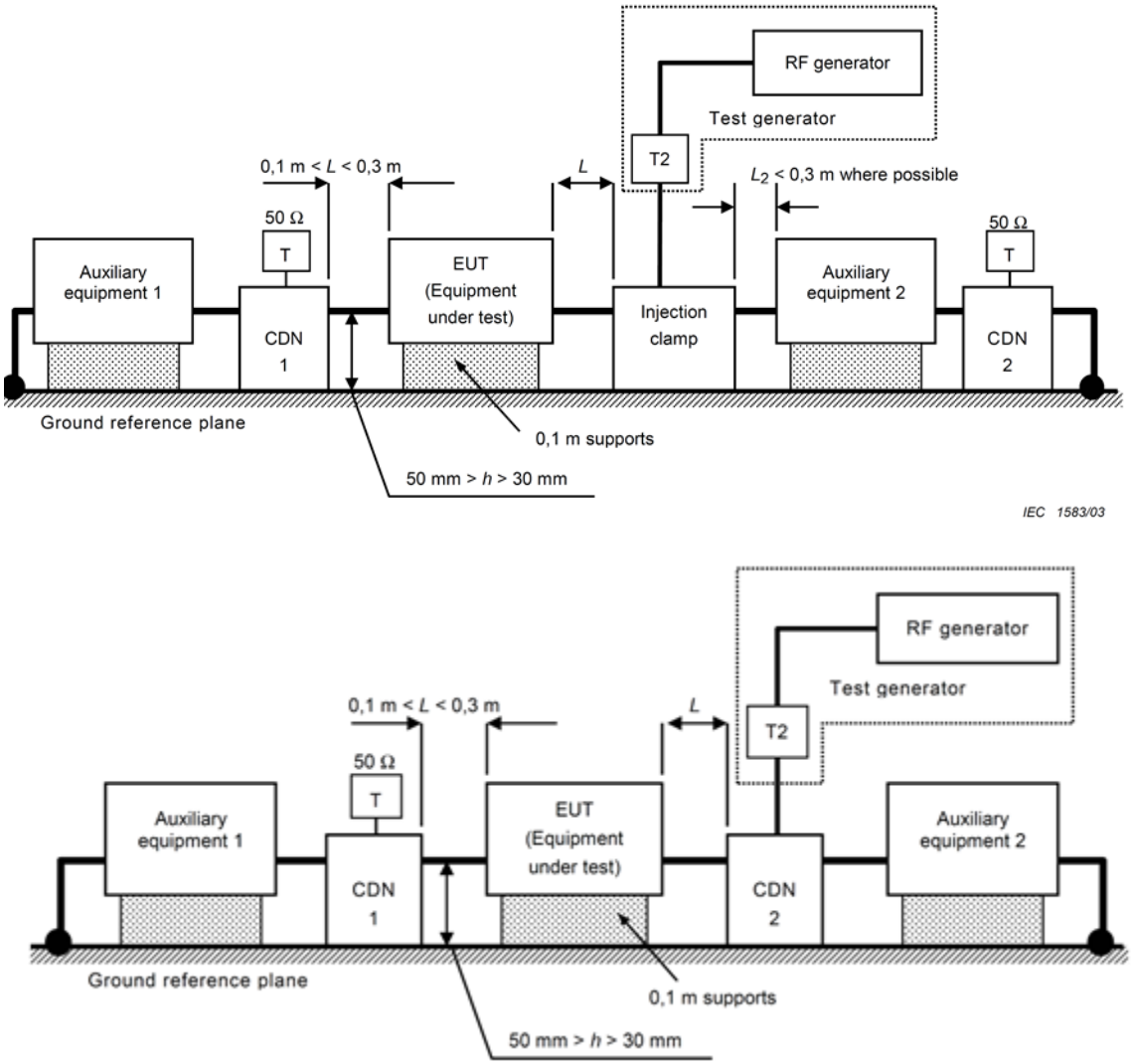


FIGURE 9: POWER FREQUENCY MAGNETIC FIELD TEST SETUP

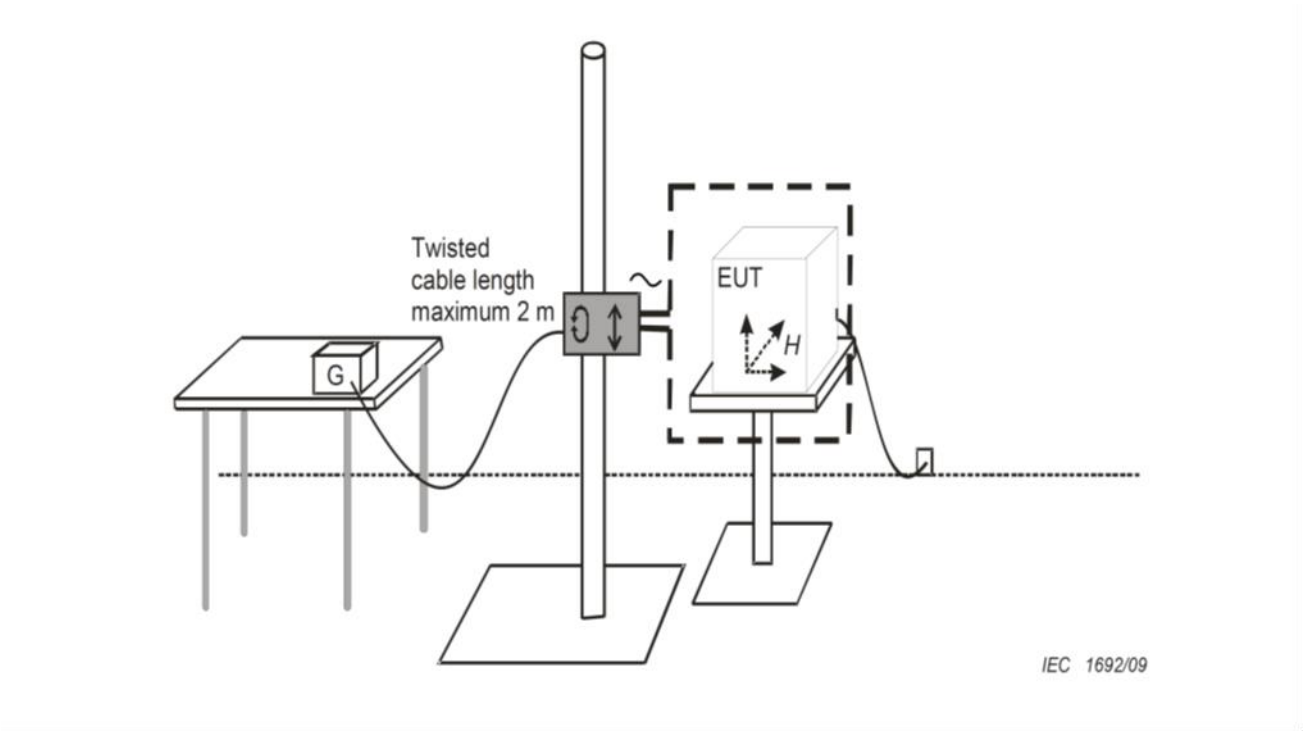
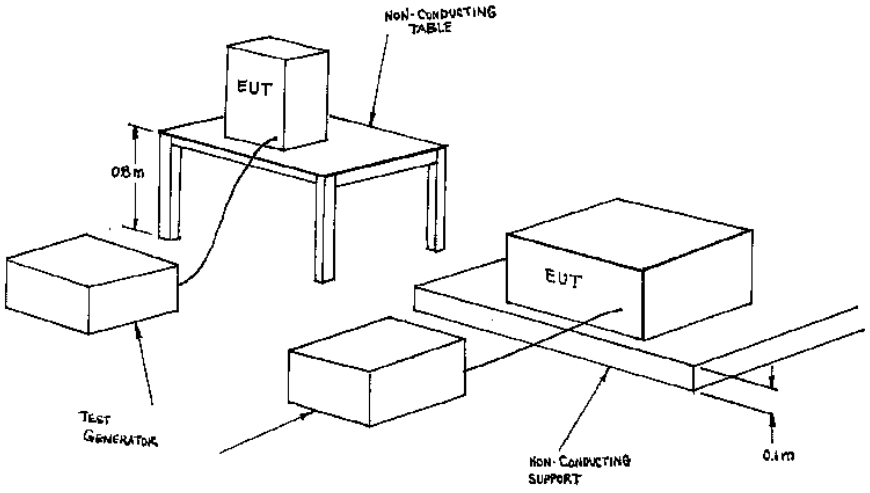


FIGURE 10: VOLTAGE DIPS & VOLTAGE VARIATIONS & SHORT INTERRUPTIONS



COM-POWER AC-220

COMBI-LOG ANTENNA

S/N: 061097

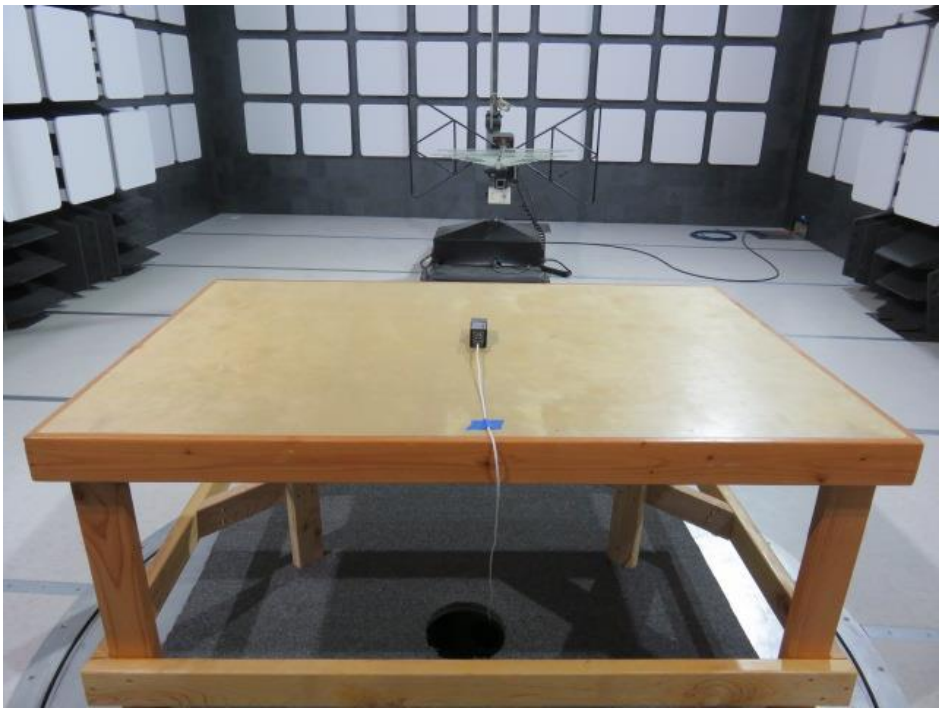
CALIBRATION DATE: MARCH 14, 2017

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	
25	22.32	450	21.73
30	24.26	500	22.23
35	23.20	550	22.83
40	20.21	600	23.97
45	17.40	650	24.32
50	15.73	700	24.50
60	12.02	750	25.55
70	9.29	800	26.33
80	11.33	850	26.68
90	14.19	900	27.02
100	14.98	950	27.29
120	16.10	1000	27.32
140	14.83	1100	28.40
160	13.69	1200	29.17
180	14.56	1300	29.61
200	14.61	1400	29.44
225	15.73	1500	30.87
250	16.78	1600	30.68
275	18.12	1700	31.29
300	18.75	1800	32.45
350	19.42	1900	32.53
400	20.58	2000	33.98

FRONT VIEW

VALIDYNE ENGINEERING
PRESSURE TRANSDUCER
MODEL: P55
EN 61326-1 CLASS A - RADIATED EMISSIONS – 06-08-17

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS



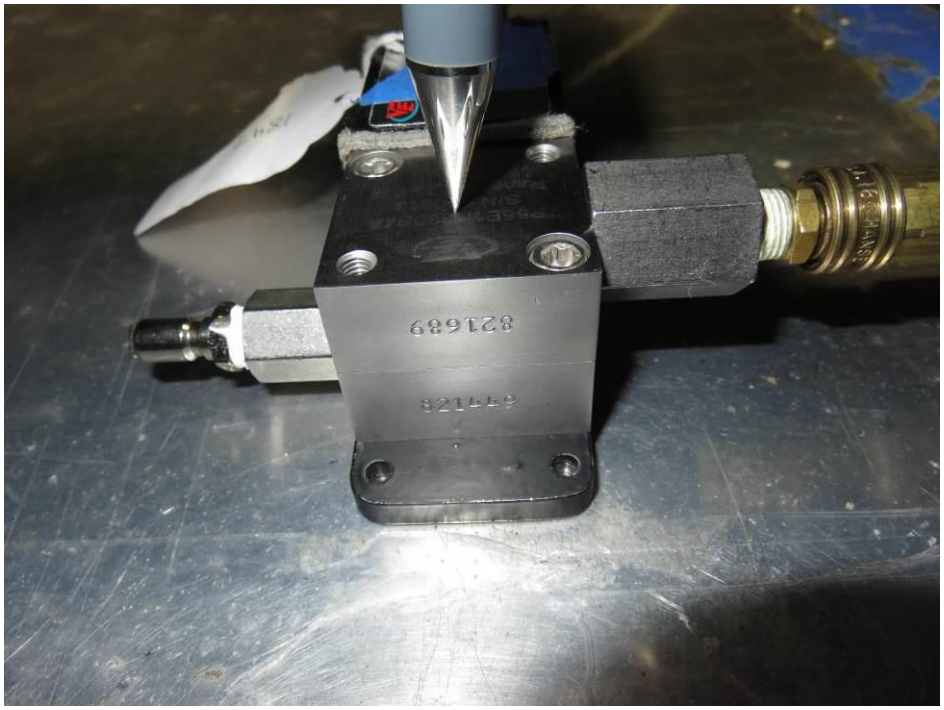
REAR VIEW

VALIDYNE ENGINEERING
PRESSURE TRANSDUCER
MODEL: P55
EN 61326-1 CLASS A - RADIATED EMISSIONS – 06-08-17

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

ELECTROSTATIC DISCHARGE

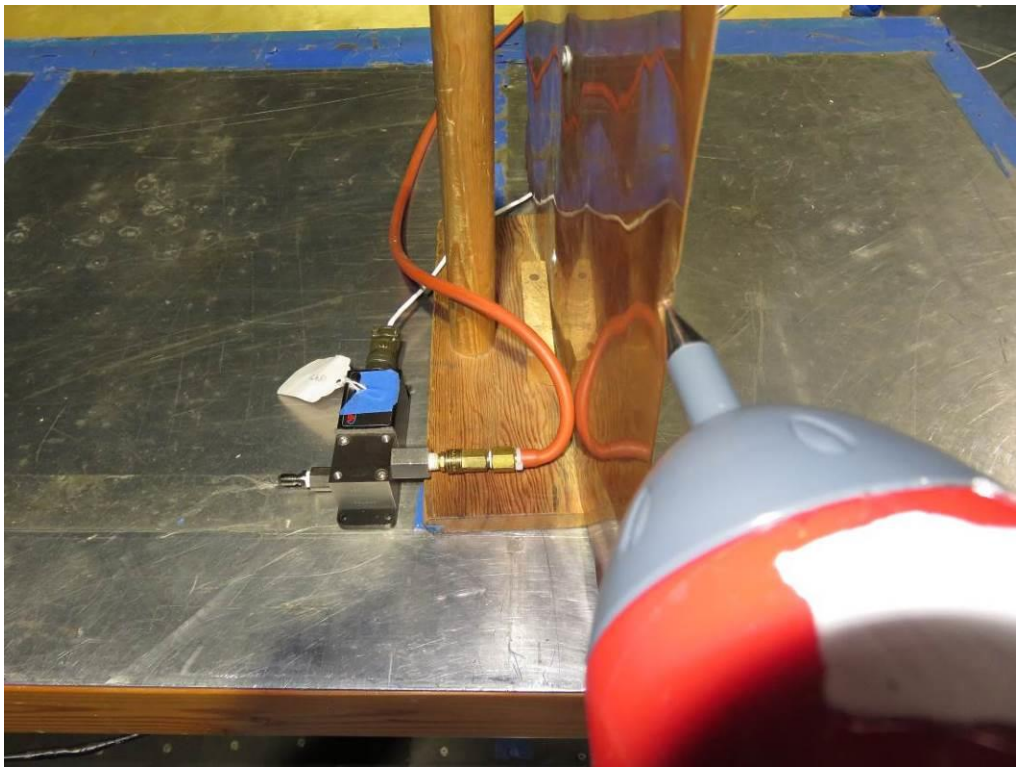
COMPANY:	Validyne Engineering	**DATE:**	6-14-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE



PHOTOGRAPH OF THE TEST SETUP FOR
DIRECT ELECTROSTATIC DISCHARGE TEST
(CONTACT DISCHARGE)

ELECTROSTATIC DISCHARGE

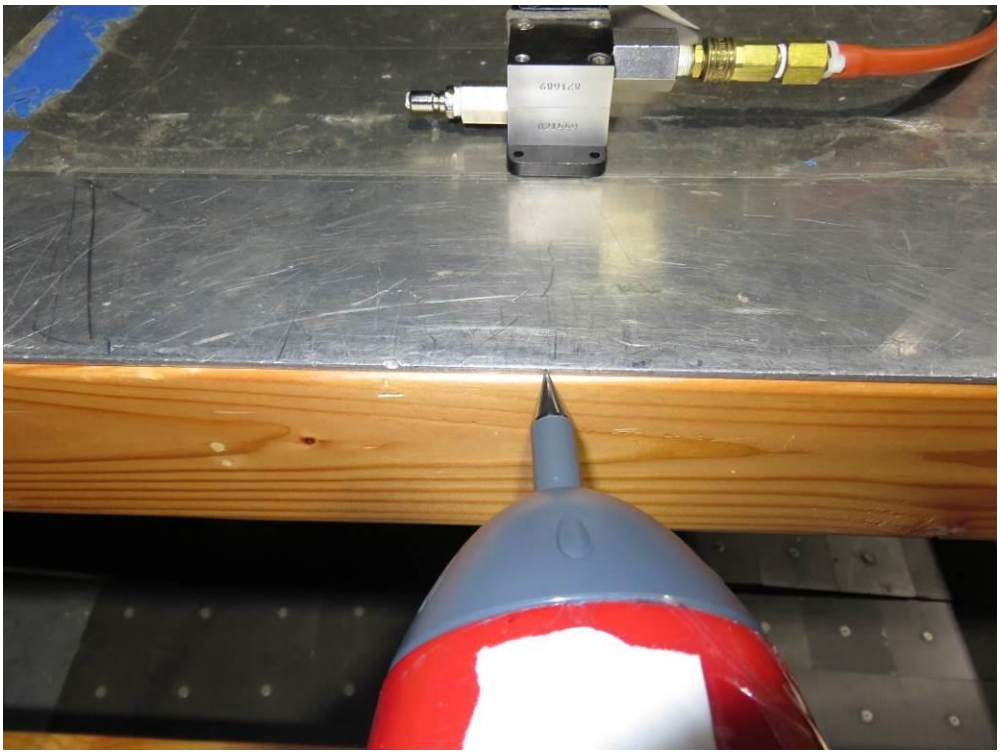
COMPANY:	Validyne Engineering	**DATE:**	6-14-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE



PHOTOGRAPH OF THE TEST SETUP FOR
INDIRECT ELECTROSTATIC DISCHARGE TEST
(VERTICAL COUPLING PLANE)

ELECTROSTATIC DISCHARGE

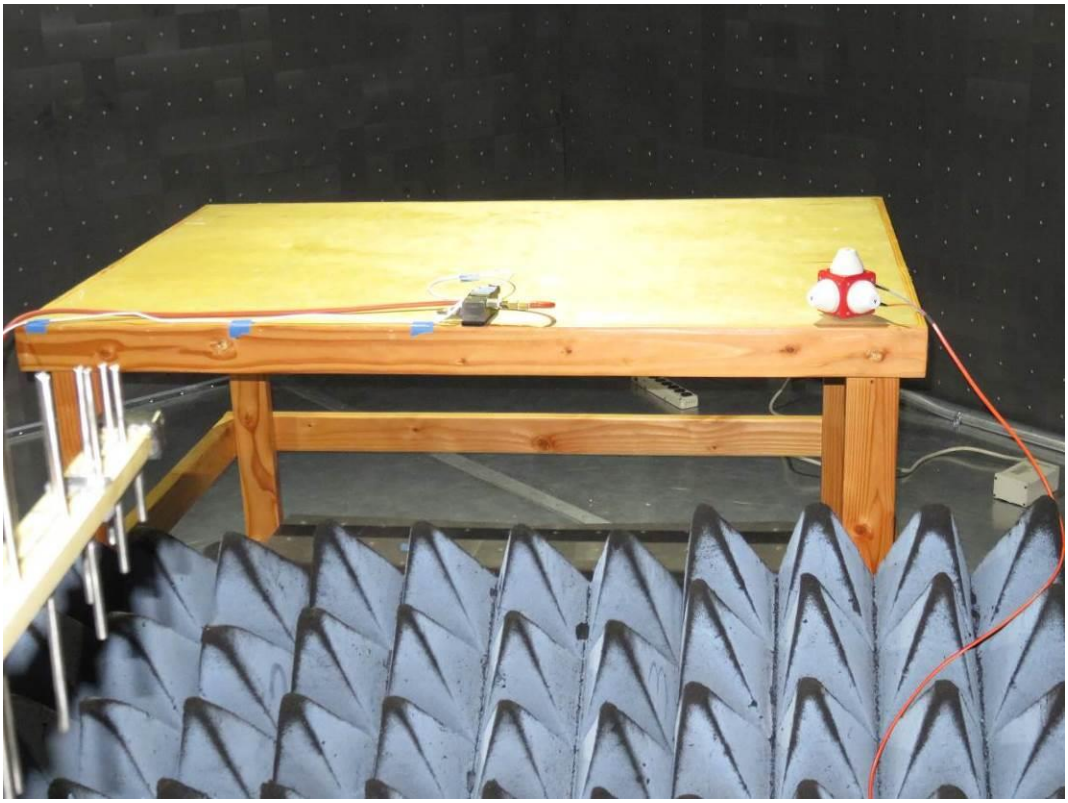
COMPANY:	Validyne Engineering	**DATE:**	6-14-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE



PHOTOGRAPH OF THE TEST SETUP FOR
INDIRECT ELECTROSTATIC DISCHARGE TEST
(HORIZONTAL COUPLING PLANE)

RADIO-FREQUENCY ELECTROMAGNETIC FIELD

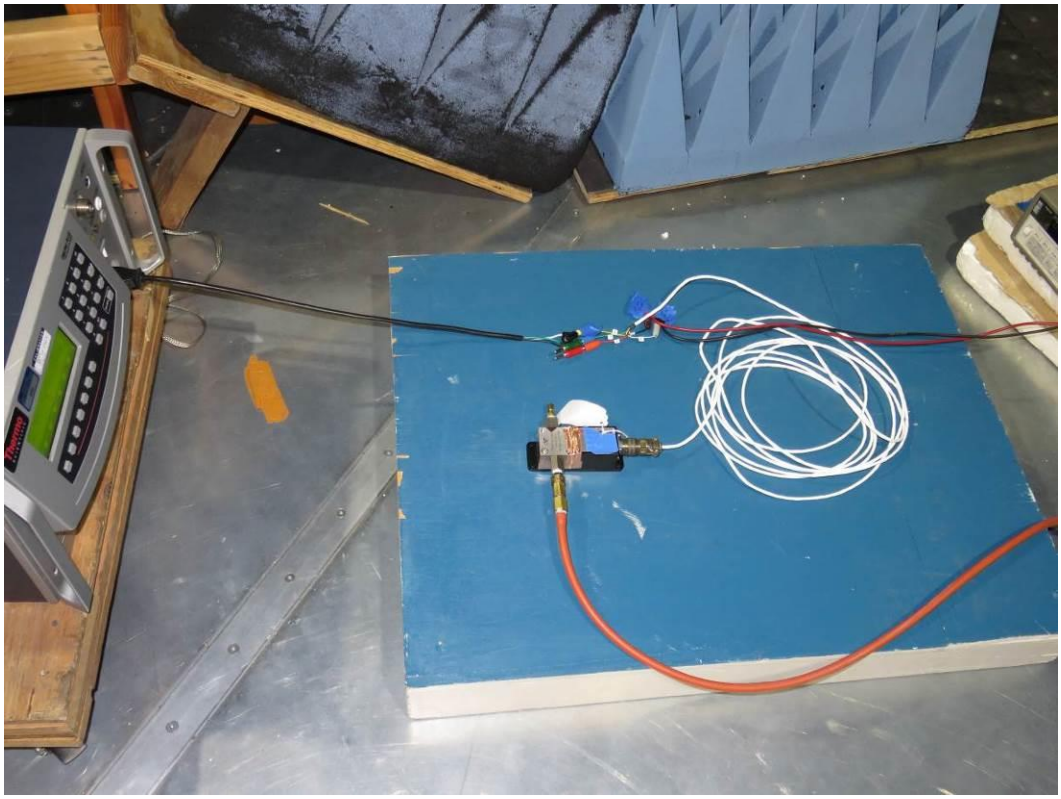
COMPANY:	Validyne Engineering	**DATE:**	6-14-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE



PHOTOGRAPH OF THE TEST SETUP FOR
RADIO-FREQUENCY ELECTROMAGNETIC FIELDS TEST

FAST TRANSIENTS COMMON MODE

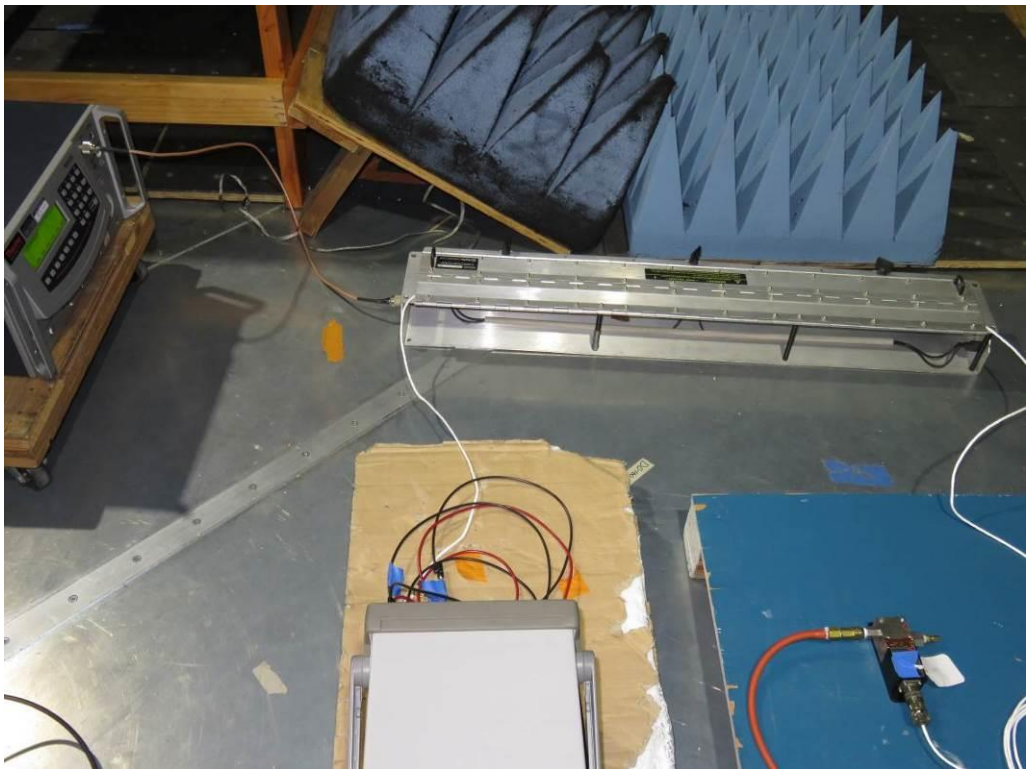
COMPANY:	Validyne Engineering	**DATE:**	6-12-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE



PHOTOGRAPH OF THE TEST SETUP FOR
FAST TRANSIENT COMMON MODE TEST
(DC MAINS)

FAST TRANSIENTS COMMON MODE

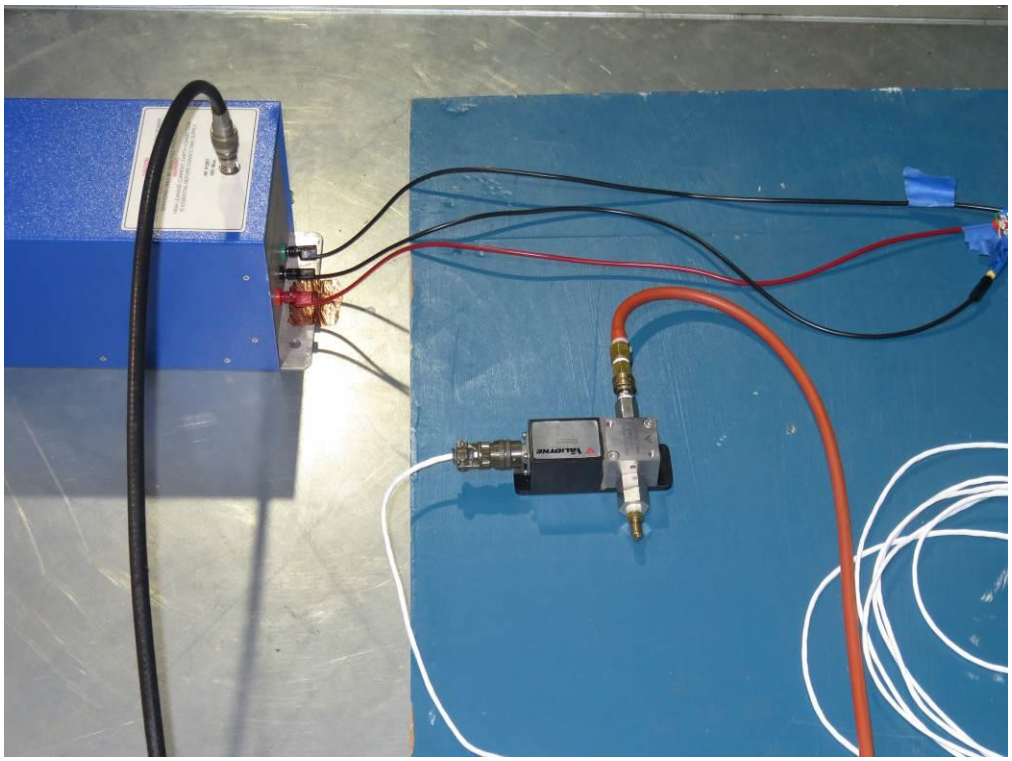
COMPANY:	Validyne Engineering	**DATE:**	6-12-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE



PHOTOGRAPH OF THE TEST SETUP FOR
FAST TRANSIENT COMMON MODE TEST
(DATA LINES)

CONDUCTED DISTURBANCES INDUCED BY RF FIELDS TEST

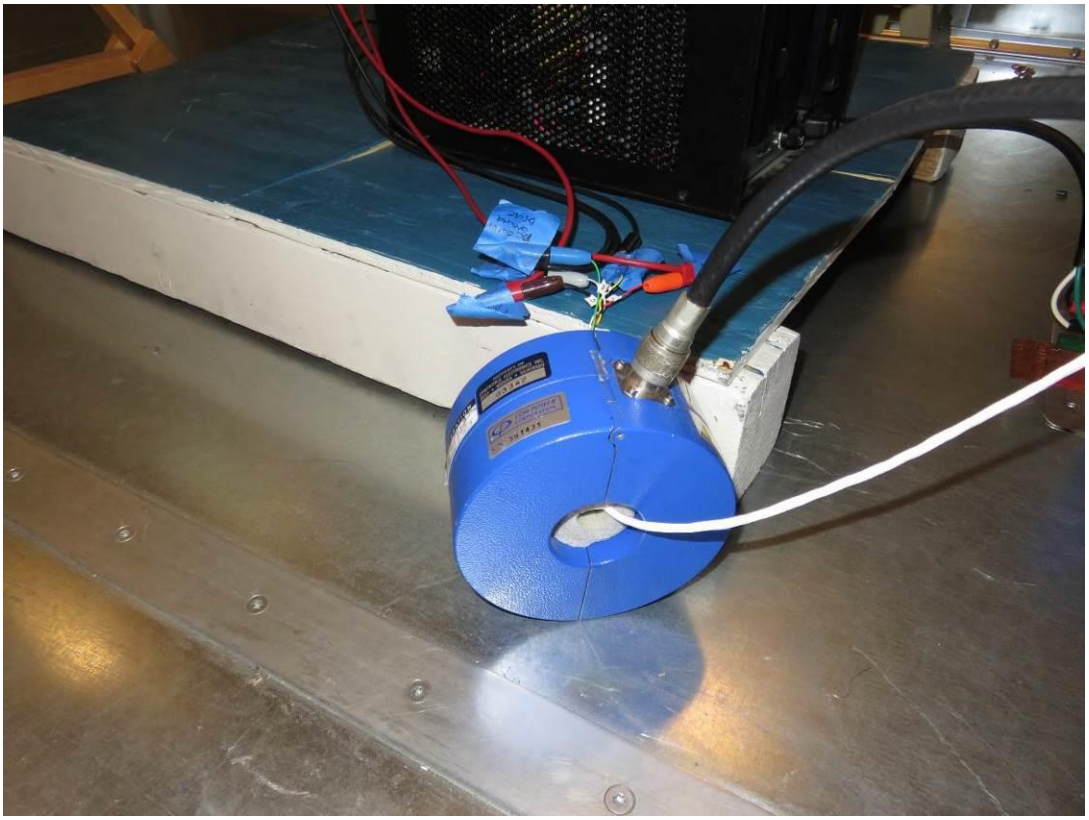
COMPANY:	Validyne Engineering	**DATE:**	6-9-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE



PHOTOGRAPH OF THE TEST SETUP FOR
CONDUCTED DISTURBANCES INDUCED BY RF FIELDS
(DC LINES)

CONDUCTED DISTURBANCES INDUCED BY RF FIELDS TEST

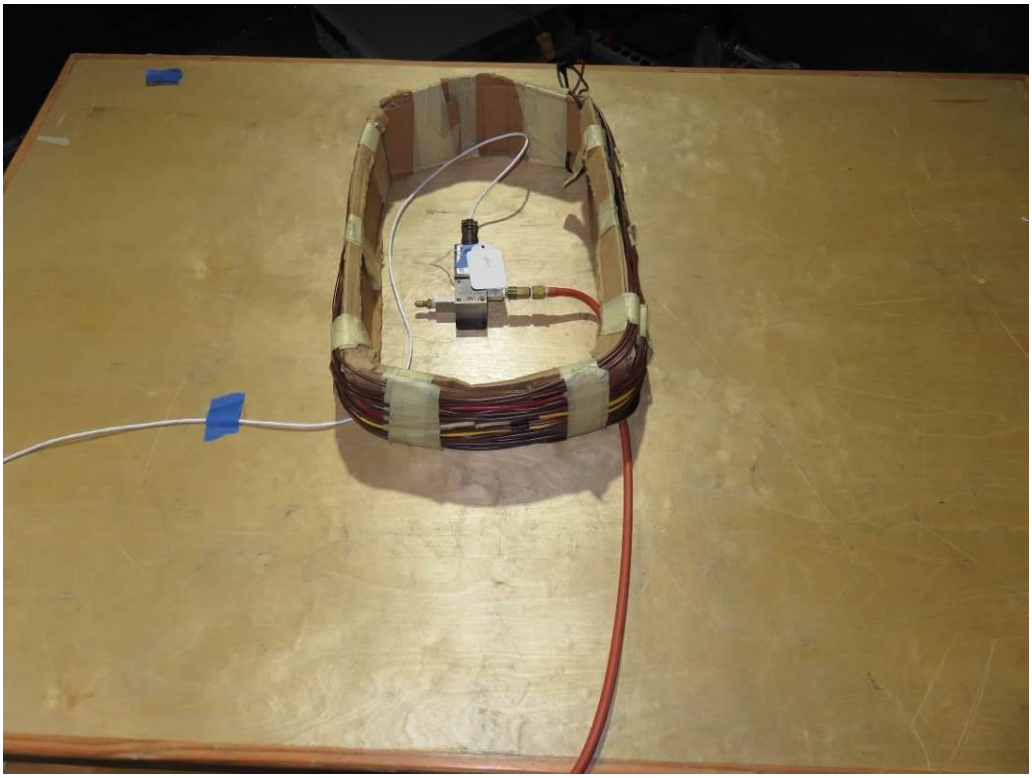
COMPANY:	Validyne Engineering	**DATE:**	6-9-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE



PHOTOGRAPH OF THE TEST SETUP FOR
CONDUCTED DISTURBANCES INDUCED BY RF FIELDS
(DATA LINES)

POWER FREQUENCY MAGNETIC FIELD SUSCEPTIBILITY

COMPANY:	Validyne Engineering	**DATE:**	6-9-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE



PHOTOGRAPH OF THE TEST SETUP FOR
POWER FREQUENCY MAGNETIC FIELD SUSCEPTIBILITY

APPENDIX E

DATA SHEETS

ELECTROSTATIC DISCHARGE

COMPANY:	Validyne Engineering	**DATE:**	6-14-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	None
SPEC.: **TEST PROC.:**	EN 61326-1: 2013 IEC 61000-4-2: 2008	**AIR TEMPERATURE:**	22° C
LEVEL:	±2.0 , ±4.0 , ±6.0 & ±8.0 kV Air Discharge and ±2.0 & ±4.0 kV Direct and Indirect Contact	**BAROMETRIC PRESSURE:**	102.9kPa
PERFORMANCE CRITERIA:	B	**RELATIVE HUMIDITY:**	46 %

TEST POINT	**TEST POINT DESCRIPTION** AIR	**TEST POINT**	**TEST POINT DESCRIPTION CONTACT**
		1	Top of Chassis
		2	Right Side
		3	Left Side
		4	Front of Chassis
		5	Back of Chassis

TEST POINTS	**LEVEL (kV)**	**DISCHARGES PER POLARITY**	**NO. OF FAILURES**	**COMMENTS**
1-5	±2.0	10	0	No susceptibility observed
1-5	±4.0	10	0	"
Vertical	±2.0	10	0	No susceptibility observed
Coupling Plane	±4.0	10	0	"
Horizontal	±2.0	10	0	No susceptibility observed
Coupling Plane	±4.0	10	0	"

RADIO-FREQUENCY ELECTROMAGNETIC FIELD

COMPANY:	Validyne Engineering	**DATE:**	6-14-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	None
SPEC.: **TEST PROC.:**	EN 61326-1: 2013 IEC 61000-4-3: 2006 +A1: 2007 +A2: 2010	**AIR TEMPERATURE:**	22° C
LEVEL:	10V/m, 3V/m & 1V/m, 1 kHz AM sine wave at 80%	**BAROMETRIC PRESSURE:**	102.9kPa
PERFORMANCE CRITERIA:	A	**RELATIVE HUMIDITY:**	46 %

ALL SIDES OF THE EUT WERE EXPOSED TO THE FIELDS.

FREQ. RANGE (MHz)	POLAR-. IZATION	RESULT	THRESHOLD (V/m)	COMMENTS
80 - 1000	Horizontal	Passed	> 10.0 V/m	No susceptibility observed
80 - 1000	Vertical	Passed	> 10.0 V/m	No susceptibility observed
1400 - 2000	Horizontal	Passed	> 3.0 V/m	No susceptibility observed
1400 - 2000	Vertical	Passed	> 3.0 V/m	No susceptibility observed
2000 – 2700	Horizontal	Passed	> 1.0 V/m	No susceptibility observed
2000 – 2700	Vertical	Passed	> 1.0 V/m	No susceptibility observed

FAST TRANSIENTS COMMON MODE

COMPANY:	Validyne Engineering	**DATE:**	6-12-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	None
SPEC.: **TEST PROC.:**	EN 61326-1: 2013 IEC 61000-4-4: 2004+A1: 2010	**AIR TEMPERATURE:**	22° C
LEVEL:	±0.5 kV, ±1.0 kV & ±2.0 kV on DC Mains	**BAROMETRIC PRESSURE:**	103.3 kPa
PERFORMANCE CRITERIA:	B	**RELATIVE HUMIDITY:**	43%

TEST LEVEL (kV)	START VOLTAGE (kV)	STEP VOLTAGE (kV)	TEST DURATION (minutes)	TIME BETWEEN TESTS (seconds)
2.0	0.5	0.5	1.0	10.0

AC ENTRY DESIGNATION	LEVEL (kV)	RESULT	COMMENTS
L1	±0.5	Passed	No susceptibility observed
"	±1.0	"	"
"	±2.0	"	"
L2	±0.5	Passed	No susceptibility observed
"	±1.0	"	"
"	±2.0	"	"
L1-L2	±0.5	Passed	No susceptibility observed
"	±1.0	"	"
"	±2.0	"	"
L1-PE	± 0.5	Passed	No susceptibility observed
"	± 1.0	"	"
"	±2.0	"	"
L2-PE	± 0.5	Passed	No susceptibility observed
"	± 1.0	"	"
"	±2.0	"	"
L1-L2-PE	± 0.5	Passed	No susceptibility observed
"	± 1.0	"	"
"	±2.0	"	"

FAST TRANSIENTS COMMON MODE

COMPANY:	Validyne Engineering	**DATE:**	6-12-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	None
SPEC.: **TEST PROC.:**	EN 61326-1: 2013 IEC 61000-4-4: 2004+A1: 2010	**AIR TEMPERATURE:**	22° C
LEVEL:	±0.5 & ± 1.0kV Data Lines	**BAROMETRIC PRESSURE:**	103.3 kPa
PERFORMANCE CRITERIA:	B	**RELATIVE HUMIDITY:**	43%

TEST LEVEL (kV)	TEST DURATION (minutes)	TIME BETWEEN TESTS (seconds)
1.0	1.0	10.0

DATA ENTRY DESIGNATION	LEVEL (kV)	RESULT	COMMENTS
Signal Cable	±0.5	Passed	No susceptibility observed
"	±1.0	"	"

CONDUCTIVE DISTURBANCES INDUCED BY RF ELECTROMAGNETIC FIELDS TEST

COMPANY:	Validyne Engineering	**DATE:**	6-9-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE
SPEC.: **TEST PROC.:**	EN 61326-1: 2013 IEC 61000-4-6: 2008	**AIR TEMPERATURE:**	23° C
LEVEL:	3Vrms, 1 kHz sine wave, AM Modulation at 80%	**BAROMETRIC PRESSURE:**	102.9kPa
PERFORMANCE CRITERIA:	A	**RELATIVE HUMIDITY:**	40 %

PORT ENTRY	FREQ. RANGE (MHz)	RESULT	THRESHOLD (V)	COMMENTS
DC Mains	.150 – 80	Passed	3.0	No susceptibility observed
Signal Cable	.150 – 80	Passed	3.0	“

POWER-FREQUENCY MAGNETIC FIELD SUSCEPTIBILITY

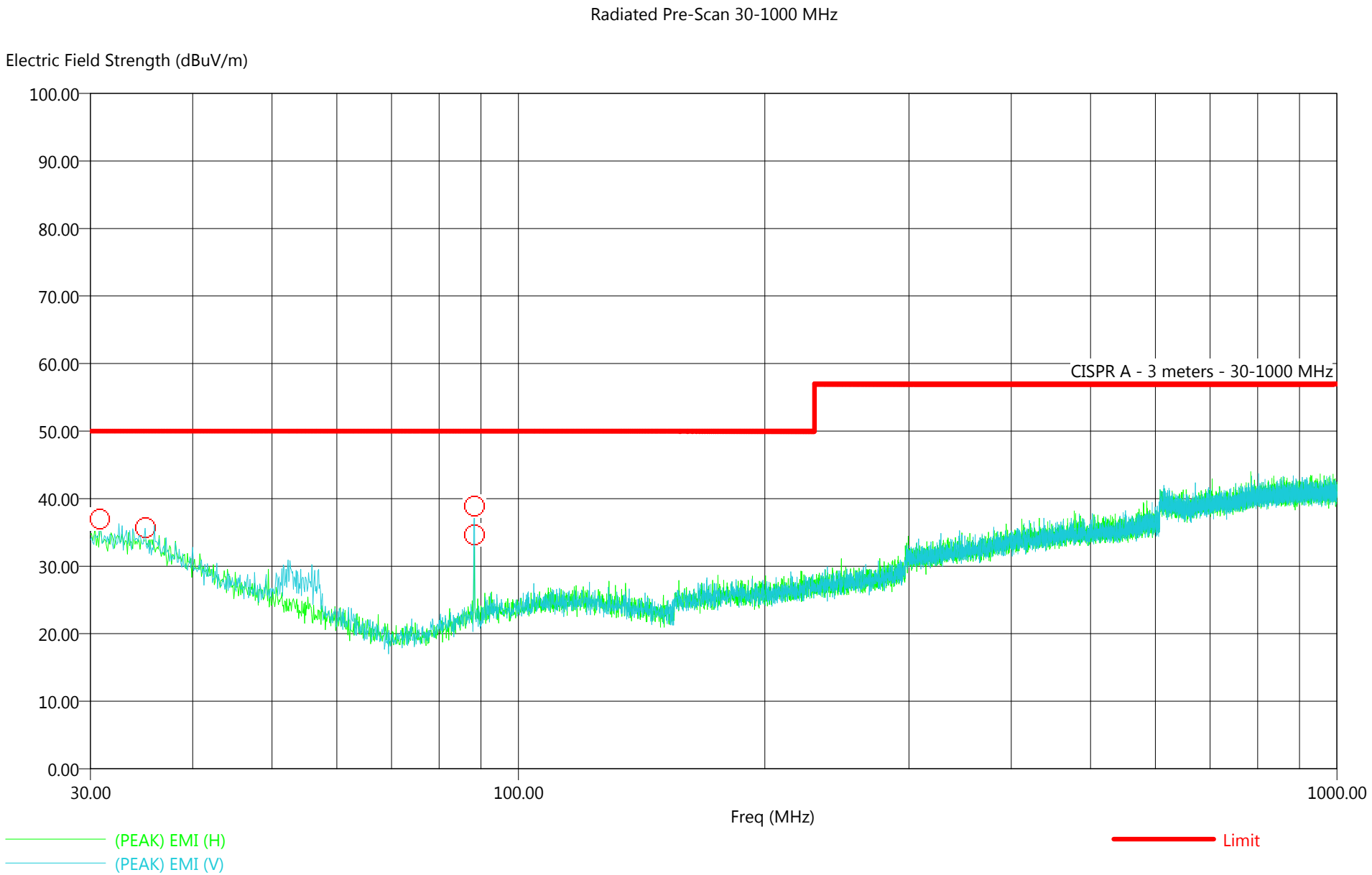
COMPANY:	Validyne Engineering	**DATE:**	6-9-17
EUT:	Pressure Transducer	**ENGINEER:**	J. Battie
MODEL:	P55	**S/N:**	NONE
SPEC.: **TEST PROC.:**	EN 61326-1: 2013 IEC 61000-4-8: 2009	**AIR TEMPERATURE:**	19° C
LEVEL:	30 A/m, 50 Hz & 60 Hz	**BAROMETRIC PRESSURE:**	103.6 kPa
PERFORMANCE CRITERIA:	A	**RELATIVE HUMIDITY:**	53 %

ALL THREE ORTHOGONAL AXES WERE TESTED

ORTHOGONAL AXIS	LEVEL A/m	RESULT	COMMENTS
X	30	Passed	No susceptibility observed
Y	30	Passed	No susceptibility observed
Z	30	Passed	No susceptibility observed

Title: Radiated Pre-Scan 30-1000 MHz
File: Radiated Pre-Scan 30-1000 MHz Final 1
Operator: R. Ramirez
EUT Type: Pressure Transducer
EUT Condition:
Comments:
Clock Oscillators: 2 MHz
Company: Validyne Engineering Corp.
Model: P55
Temperature:70 F Humidity: 64 % Pressure: 30 inHg
Tested to: 1 GHz

6/8/2017 11:29:55 AM
Sequence: Preliminary Scan



Title: Radiated Final 30-1000 MHz
File: Radiated Final 30-1000 MHz Final
Operator: R. Ramirez
EUT Type: Pressure Transducer
EUT Condition:
Comments: Clock Oscillators: 2 MHz
Company: Validyne Engineering Corp.
Model: P55
Temperature:70 F Humidity: 64 % Pressure: 30 inHg
Tested to: 1 GHz

6/8/2017 1:08:28 PM
Sequence: Final Measurements

Data

Freq (MHz)	Pol	(PEAK) EMI (dBuV/m)	(QP) EMI (dBuV/m)	Limit (dBuV/m)	(PEAK) Margin (dB)	(QP) Margin (dB)	Twr Ht (cm)	Ttbl Agl (deg)
30.20	H	28.79	26.34	50.00	-21.21	-23.66	242.00	178.10
30.70	V	30.48	26.43	50.00	-19.52	-23.57	363.40	167.10
73.30	H	15.57	11.61	50.00	-34.43	-38.39	113.40	208.70
119.30	V	19.85	16.50	50.00	-30.15	-33.50	236.70	16.40
129.40	H	19.29	16.03	50.00	-30.71	-33.97	202.10	296.60
183.90	H	21.28	17.28	50.00	-28.72	-32.72	291.30	108.10
305.70	V	26.08	22.89	57.00	-30.92	-34.11	147.80	289.30
439.90	V	29.99	25.38	57.00	-27.01	-31.62	339.00	354.20
610.50	V	34.00	30.34	57.00	-23.00	-26.66	131.80	338.30
669.60	V	34.80	29.97	57.00	-22.20	-27.03	303.20	357.00
698.60	V	33.88	30.34	57.00	-23.12	-26.66	305.70	91.10
806.80	V	34.66	31.76	57.00	-22.34	-25.24	281.20	340.00
869.50	V	35.59	31.90	57.00	-21.41	-25.10	146.50	289.30
897.70	H	35.20	32.01	57.00	-21.80	-24.99	235.80	183.10
940.80	H	35.42	32.08	57.00	-21.58	-24.92	149.70	160.80