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September 17, 2018

Dakota Ultrasonics
1500 Green Hills Road, #107
Scotts Valley, CA 95066

Dear Mr. William Holt,

Enclosed is the EMC test report for compliance testing of the Dakota Ultrasonics, ZX family, tested to the requirements of EN 61326-1: 2013.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.



Cheryl Anicete
Documentation Department

Reference: (\Dakota Ultrasonics\EMCS99693-EURO)

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Electromagnetic Compatibility
Test Report

for the

Dakota Ultrasonics
ZX family

Tested under

EN 61326-1: 2013

MET Report: EMCS99693-EURO
September 17, 2018

Prepared for:
Dakota Ultrasonics
1500 Green Hills Road, #107
Scotts Valley, CA 95066

ACCREDITED
TESTINGCERT #0591.02

Prepared by:
MET Laboratories, Inc.
3162 Belick St.
Santa Clara, CA 95054

Electromagnetic Compatibility
Test Report

For the

Dakota Ultrasonics
ZX family

Tested under

EN 61326-1: 2013

MET Report: EMCS99693-EURO

Marcus Meyer
Project Engineer, Electromagnetic Compatibility Lab

Cheryl Anicete
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the applicable limits. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements per Test Summary (Section 1.0).

John Mason
Director, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	September 17, 2018	Initial Issue.

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Table of Contents

1.0 Testing Summary **1**
2.0 Equipment Configuration **2**
2.1 Overview 2
2.1.1 Test Site 2
2.1.2 Measurement Uncertainty 2
2.2 Detailed EUT Description and Test Setup 3
2.2.1 Description of Test Sample 3
2.2.2 Photograph(s) of Test Sample 3
2.2.3 Block Diagram 4
2.2.4 Equipment Configuration 5
2.2.5 Support Equipment 5
2.2.6 Ports and Cabling Information 5
2.2.7 Mode of Operation & Method of Monitoring EUT Operation 6
2.2.8 Overall Immunity Performance Criteria 6
2.2.9 Modifications to EUT 7
2.2.10 Disposition of EUT 7
3.0 Electromagnetic Compatibility Emission Criteria **8**
3.1 Radiated Emission: Limits of Electromagnetic Radiation Disturbance 8
4.0 Electromagnetic Compatibility Immunity Criteria **13**
4.1 Electrostatic Discharge 13
4.2 Radio Frequency Electromagnetic Field 26
5.0 CE Conformity Marketing **31**
6.0 Test Plan **33**

List of Tables

Table 1: Executive Summary of EN 61326-1 Compliance Testing 1
Table 2: Uncertainty Calculations Summary 2
Table 3. Equipment Configuration 5
Table 4. Support Equipment 5
Table 5. Ports and Cabling Information 5
Table 6. Performance Criteria Summary 7
Table 7. Radiated Emission Limits for Class B Equipment from EN 61326-1 8
Table 8. RE - (30 MHz – 1 GHz) Test Results 10
Table 9. RE Test Equipment List 12
Table 10. ESD Test Results 14
Table 11. ESD Test Equipment List 25
Table 12. RI Test Results 27
Table 13. RI Test Equipment List 30

List of Figures

Figure 1. Block Diagram of Test Configuration 4

List of Photographs

Photograph 1. ZX family 3
Photograph 2. RE Test Setup 11
Photograph 3. ESD Test Points – Front of EUT 20
Photograph 4. ESD Test Points – Rear of EUT 21
Photograph 5. ESD Test Points – Right of EUT 21
Photograph 6. ESD Test Points – Left of EUT 21
Photograph 7. ESD Test Points – Top of EUT 22
Photograph 8. ESD Test Points – Bottom of EUT 23
Photograph 9. ESD Test Setup 24
Photograph 10. RI (80 MHz- 1 GHz) Test Setup 28
Photograph 11. RI (Above 1 GHz) Test Setup 29

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent	**FOKI**	**F**requency **o**f **K**ey **I**nterest
µ**F**	**microf**arad	**GRP**	**G**round **R**eference **P**lane
µ**H**	**microh**enry	**H**	Magnetic Field
µ**s**	**micros**econds	**HCP**	**H**orizontal **C**oupling **P**lane
ACF	**A**ntenna **C**orrection **F**actor	**Hz**	**H**er**z**
AV	**Av**erage	**IEC**	**I**nternational **E**lectrotechnical **C**ommission
Cal	**Cal**ibration	**kHz**	**k**ilo**h**er**z**
CE	**C**onducted **E**missions	**kPa**	**k**ilo**pa**scal
CI	**C**onducted **I**mmunity	**kV**	**k**ilo**v**olt
CISPR	**C**omite **I**nternational **S**pecial des **P**erturbations **R**adioelectriques (International Special Committee on Radio Interference)	**LISN**	**L**ine **I**mpedance **S**tabilization **N**etwork
d	**M**easurement **D**istance	**MHz**	**M**ega**h**ertz
dB	**D**eci**b**els	**MI**	**M**agnetic **I**mmunity
dBµA	**D**eci**b**els above one **micro**amp	**PRF**	**P**ulse **R**epetition **F**requency
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter	**QP**	**Q**uasi **P**eak
dBµV	**D**eci**b**els above one **micro**volt	**RE**	**R**adiated **E**missions
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter	**RF**	**R**adio **F**requency
DC	**D**irect **C**urrent	**RI**	**R**adiated **I**mmunity
E	**E**lectric Field	**RMS**	**R**oot-**M**ean-**S**quare
EFT/B	**E**lectrical **F**ast **T**ransient/**B**urst	**V/m**	**V**olts **per m**eter
ESD	**E**lectro**s**tatic **D**ischarge	**VCP**	**V**ertical **C**oupling **P**lane
EUT	**E**quipment **U**nder **T**est	**VDI**	**V**oltage **D**ips **I**nterruptions
f	**F**requency	**VF**	**V**oltage **F**luctuations

1.0 Testing Summary

The following tests specified by EN 61326-1 were performed with the following results:

Test Method	Test Description	Compliance
EN 55011: 2009 +A1: 2010	Conducted Emissions – Voltage	Not Applicable
EN 55011: 2009 +A1: 2010	Radiated Emissions - Class B	Compliant
EN 61000-3-2: 2006 +A2:2009	Harmonic Current Emissions	Not Applicable
EN 61000-3-3: 2008	Voltage Fluctuations/Flicker	Not Applicable
EN 61000-4-2: 2009	Electrostatic Discharge Immunity	Compliant
EN 61000-4-3: 2006 +A1:2008 +A2:2010	Radiated Electromagnetic Field Immunity	Compliant
EN 61000-4-4: 2012	Electrical Fast Transient/Burst Immunity	Not Applicable
EN 61000-4-5: 2006	Surge Immunity	Not Applicable
EN 61000-4-6: 2009	Conducted Radio-Frequency Immunity	Not Applicable
EN 61000-4-8: 2010	Magnetic Immunity	Not Applicable
EN 61000-4-11: 2004	Voltage Dips, Interruptions and Variations	Not Applicable

Table 1: Executive Summary of EN 61326-1 Compliance Testing

2.0 Equipment Configuration

2.1. Overview

MET Laboratories, Inc. was contracted by Dakota Ultrasonics to perform testing on the ZX family, under Dakota Ultrasonics quote number 1DAK1206R1.

This document describes the test setups, test methods, required test equipment, and the test limit used to perform compliance testing of the ZX family with the requirements of EN 61326-1: 2013, Electrical Equipment for Measurement, Control and Laboratory Use. .

The results obtained relate only to the item(s) tested.

Model(s) Tested:	ZX family
Model(s) Covered:	ZX family
Primary Power as Tested:	3 VDC
Equipment Emissions Class:	B
Evaluated by:	Dan Phan, Marcus Meyer
Report Date:	September 17, 2018

2.1.1. Test Site

All testing was performed at MET Laboratories, Inc., 3162 Belick St., Santa Clara, CA 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

MET Laboratories is a ISO/IEC 17025 accredited site by A2LA, California #0591.02.

2.1.2. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty (dB)	K	Confidence Level
Radiated Emissions, (30 MHz – 1 GHz)	±3.24	2	95%

Table 2: Uncertainty Calculations Summary

2.2. Detailed EUT Description and Test Setup

2.2.1. Description of Test Sample

The ZX family, Equipment Under Test (EUT), consists of multiple versions of the same circuit board with various features enabled or disabled. ZX-1 and ZX-2 are the most basic versions. ZX-3 adds auto zero circuitry and firmware. ZX-5 adds beeper and alarm lights. ZX-5DL adds data logging and USB port. ZX-6 adds echo echo measurement mode (but has no data logger.) ZX-6DL adds back the data logger. PZX-7 uses delay line transducer and measures with higher precision. PZX-7DL adds data logger.

All these gauges are used to measure thickness by transit time of ultrasonic wave through the material to be tested. Thickness of piping, tanks, and bottles can be measured in various materials including steel, aluminum, glass, and some plastics.

2.2.2. Photograph(s) of Test Sample



Photograph 1. ZX family

2.2.3. Block Diagram

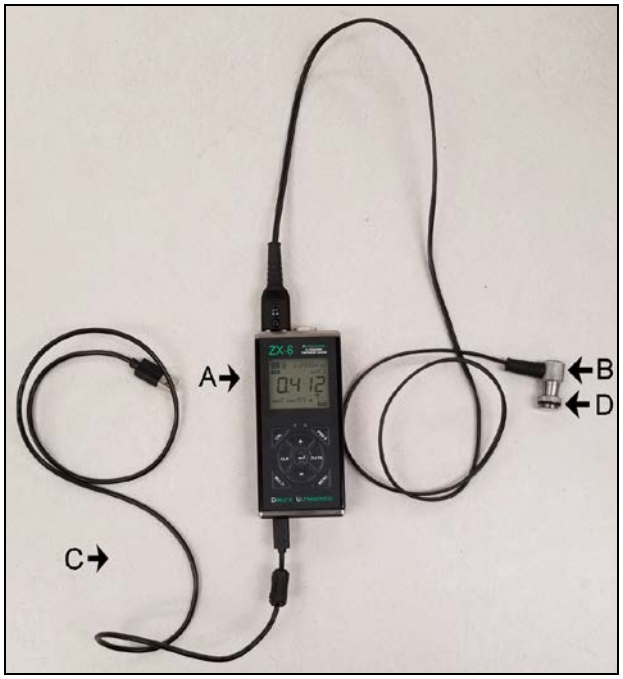


Figure 1. Block Diagram of Test Configuration

2.2.4. Equipment Configuration

The EUT was setup as outlined in Figure 1. All equipment incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Rev. #
A	Thickness gauge	ZX-6DL	--	50001	PCB #C
A	Thickness gauge	ZX-6DL	--	50003	PCB #C

Table 3. Equipment Configuration

2.2.5. Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number	*Customer Supplied Calibration Data
B	Transducer	Dakota Ultrasonics	--	NA
B	Transducer	Dakota Ultrasonics	--	NA
C	USB Cable	Dakota Ultrasonics	--	NA
C	USB Cable	Dakota Ultrasonics	--	NA
D	Zero Block	Dakota Ultrasonics	--	NA
D	Zero Block	Dakota Ultrasonics	--	NA

Table 4. Support Equipment

* All 'customer supplied' support equipment will include the equipments calibration data. This column will be marked as either not applicable, not available, or will contain the calibration date supplied by the customer.

2.2.6. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded (Y/N)	Termination Box ID & Port Name
1	Transducer	Support Equipment B	1	1	1	Yes	NA
2	USB C	Support Equipment C	1	1	1	Yes	NA

Table 5. Ports and Cabling Information

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2.2.7. Mode of Operation & Method of Monitoring EUT Operation

The EUT was operated in the following manner:
ZX-6DL gauge has all the features of the family and therefore represents worst case of the family. Gauge is to be tested in normal measure mode with the transducer clamped to a test block. Backlight should be set to ON and the alarm beeper activated.

Performance of the EUT was monitored in the following manner:
A thickness reading with stability display (in upper left corner of display similar to cell phone signal strength bars) of at least 4 bars indicates proper operation. Thickness display (once calibrated to material) may vary +/- 0.002 inch. Note that temperature change in the transducer may require recalibration.

2.2.8. Overall Immunity Performance Criteria

In accordance with EN 61326-1, the EUT was evaluated according to the following performance criteria where specified:

EN 61326-1 Sub-clause

6.4.1 General

The general principles (performance criteria) for the evaluation of the immunity test results are the following.

6.4.2 Performance Criterion 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.

6.4.3 Performance Criterion 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.

6.4.4 Performance Criterion C

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

Reference	Descriptive Name	EN 61326-1: 2013, Table 1 Performance Criteria Required	EN 61326-1: 2013, Table 1 Performance Criteria Achieved
EN 61000-4-2: 2009	Electrostatic Discharge Immunity	B	B
EN 61000-4-3: 2006 +A1:2008 +A2:2010	Radiated Electromagnetic Field Immunity	A	A

Table 6. Performance Criteria Summary

2.2.9. Modifications to EUT

No modifications were made to the EUT.

2.2.10. Disposition of EUT

The test sample including all support equipment (if any), submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Dakota Ultrasonics upon completion of testing.

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3.0 Electromagnetic Compatibility Emission Criteria

3.1. Radiated Emission: Limits of Electromagnetic Radiation Disturbance

3.1.1. Test Method, Test Requirements, and Test Procedures

3.1.1.1. Test Method

EN 55011: 2009 +A1: 2010
Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and Methods of Measurement

3.1.1.2. Test Requirements

In accordance with EN 61326-1, Section 7.2 Emission Limits, the EUT shall meet the Class B radiated emission limits shown in Table 7.

Frequency Band (MHz)	Class B Quasi-Peak limits 10 m measurement distance (dBµV/m)
30 to 230	30
230 to 1000	37

Table 7. Radiated Emission Limits for Class B Equipment from EN 61326-1

3.1.1.3. Test Procedure

The EUT was placed on a 80cm high acrylic table that was inside a semi-anechoic chamber. The method of testing, test conditions, and test procedures of CISPR 11: 2009 were used. An antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

Emissions measured at 3 m were normalized using an inverse proportionality factor of 20dB per decade for comparison to the 10 m limit. The physical size of the EUT was taken into account as to avoid near-field effects, which could occur near 30 MHz.

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3.1.2. Test Results, Test Data, and Test Setup

3.1.2.1. Test Result

The EUT was **compliant** with the Class B requirement(s) of this section. Measured emissions were below applicable limits.

Environmental Conditions for Radiated Emission	
Ambient Temperature:	26°C
Relative Humidity:	48%
Atmospheric Pressure:	100 kPa

Test Engineer(s): Dan Phan

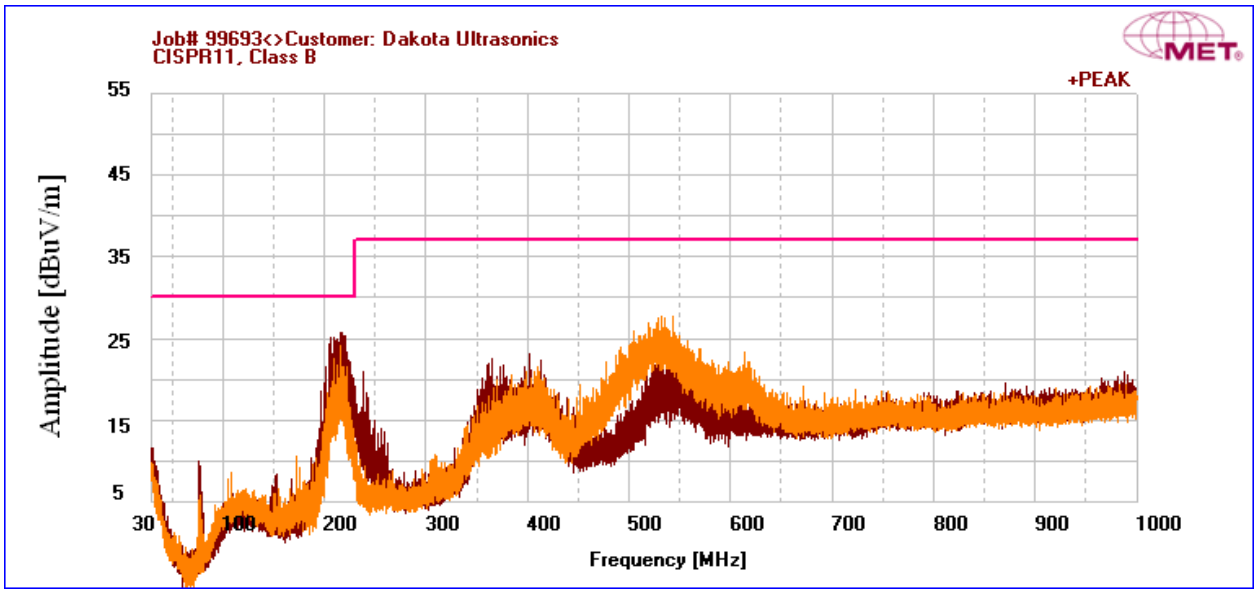
Test Date(s): 08/06/2018

3.1.2.2. Test Data

Frequency (MHz)	Antenna Polarity	EUT Azimuth (Degrees)	Antenna Height (cm)	Uncorrected Amplitude (dBuV)	ACF (dB/m)	Pre Amp Gain (dB)	CBL (dB)	DCF (dB)	Corrected Amplitude (dBuV)	Limit (dBuV)	Margin (dB)
215.4	H	273	152.76	21.3	10.224	0	2.095	-10.46	23.159	30	-6.841
215.96	V	211	115.82	16.9	10.438	0	2.098	-10.46	18.976	30	-11.024
396.52	V	34	132.94	10.9	16.022	0	2.599	-10.46	19.061	37	-17.939
360.08	H	134	100	10.5	15.702	0	2.51	-10.46	18.252	37	-18.748
522.52	H	274	205.47	7.6	18.001	0	2.927	-10.46	18.068	37	-18.932
518.44	V	244	100	12.7	17.869	0	2.92	-10.46	23.029	37	-13.971

Table 8. RE - (30 MHz – 1 GHz) Test Results

Note(s): The EUT was tested at 3 m. The data has been corrected for comparison with the 10 m limit using the formula: 20log (3 m/10 m) as expressed in the 'Distance Correction' column.

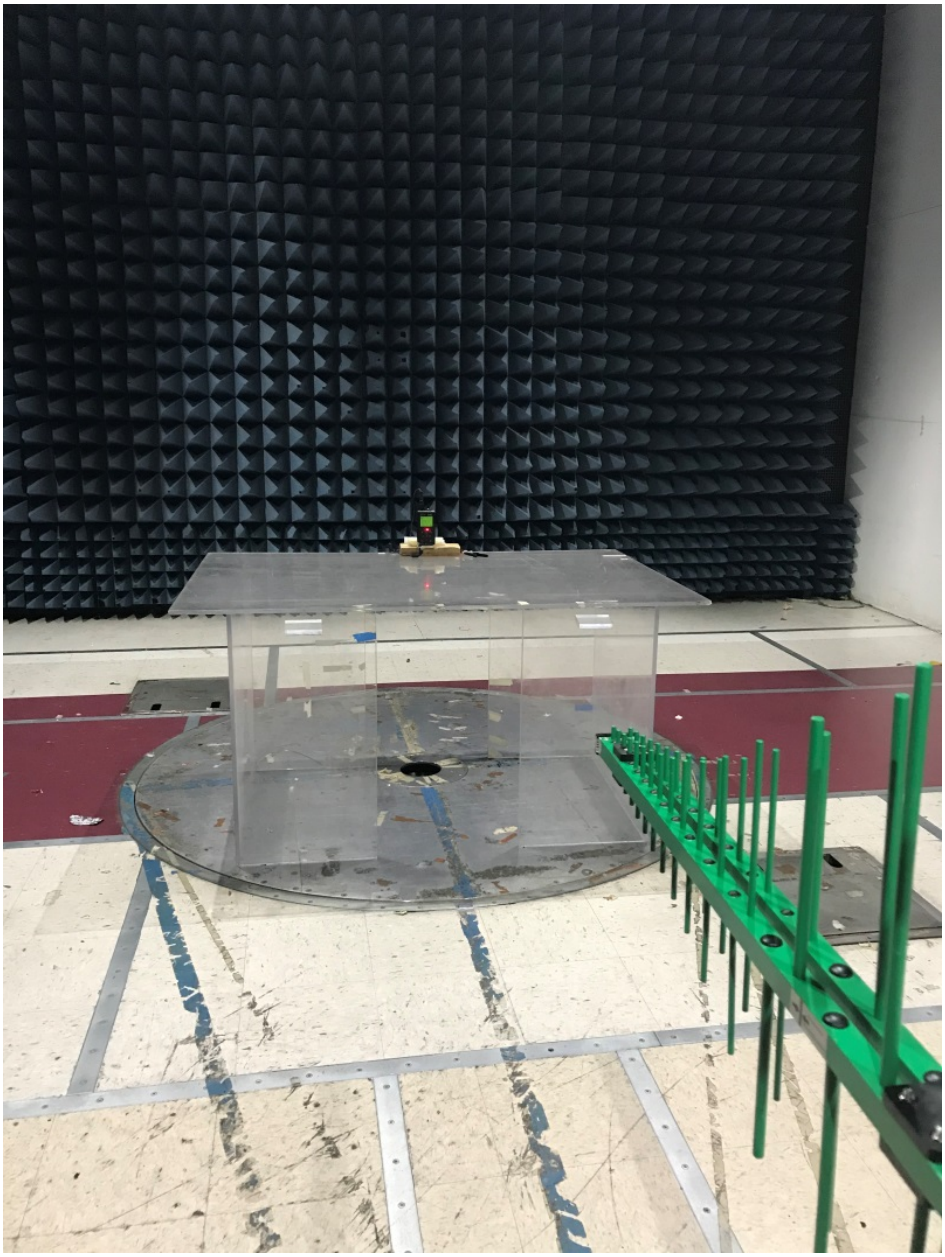


Plot 1. RE - (30 MHz – 1 GHz), Plot

= Vertical Polarization
= Horizontal Polarization

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3.1.2.3. Test Setup Photograph



Photograph 2. RE Test Setup

3.1.2.4. Test Setup Photograph

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

Test Name: Radiated Emissions Electric Field			**Test Date(s):** 08/06/2018		
MET Asset #	**Equipment**	**Manufacturer**	**Model**	**Last Cal Date**	**Cal Due Date**
1S2482	5 Meter Chamber (NSA)	Panashield	5 Meter Semi-Anechoic Chamber	See Note	See Note
1S2501	EMI Test Receiver 20 Hz-40 GHz	Rohde & Schwarz	ESU40	02/16/2018	02/16/2019
1S2399	Turntable Controller	SUNOL SCIENCE	SC99V	See Note	See Note
1S2600	Bilog Antenna	Teseq	CBL6112D	11/28/2016	11/28/2018
Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.					

Table 9. RE Test Equipment List

4.0 Electromagnetic Compatibility Immunity Criteria

4.1. Electrostatic Discharge

4.1.1. Test Method, Test Requirements, and Test Procedures

4.1.1.1. Test Method

EN 61000-4-2: 2009
Electromagnetic Discharge Immunity Test

4.1.1.2. Test Requirements

EN 61326-1, Section 6.2, Immunity Requirements
Per EN 61000-4-2, the EUT shall be tested with air discharges of up to ±8 kV applied to non-conductive surfaces, and to contact discharges of up to ±4 kV, applied to conductive surfaces of the EUT, HCP and the VCP.

4.1.1.3. Test Procedure

The EUT and cables were isolated from the ground reference plane by an insulating support approximately **0.5 mm** thick. Air discharges of up to ±8 kV were applied to non-conductive surfaces. Contact discharges of up to ±4 kV were applied to conductive surfaces of the EUT and the HCP and VCP. Discharges were applied at least ten times to each selected discharge point at each polarity with a minimum time between discharges of 1s. The functionality of the EUT was determined during and after each discharge.

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4.1.2. Test Results, Test Data, and Test Setup

4.1.2.1. Test Results

The EUT was **compliant** with the requirement(s) of this section.

Environmental Conditions for Electrostatic Discharge	
Ambient Temperature:	21.1°C
Relative Humidity:	60%
Atmospheric Pressure:	101.3 kPa

Test Engineer(s): Marcus Meyer

Test Date(s): 08/09/2018

4.1.2.2. Test Data

Discharge Type	Test Voltage (±kV)	Results						Anomalies
		Front	Rear	Left	Right	Top	Bottom	
HCP	4	Pass	Pass	Pass	Pass	Pass	Pass	None
VCP	4	Pass	Pass	Pass	Pass	Pass	Pass	None
Contact Discharge	2	Pass	Pass	Pass	Pass	Pass	Pass	None
	4	Pass	Pass	Pass	Pass	Pass	Pass	None
Air Discharge	2	Pass	Pass	Pass	Pass	Pass	Pass	None
	4	Pass	Pass	Pass	Pass	Pass	Pass	None
	6	Pass	Pass	Pass	Pass	Pass	Pass	None
	8	Pass	Pass	Pass	Pass	Pass	Pass	None
Detailed List of Anomalies: No anomalies observed.								

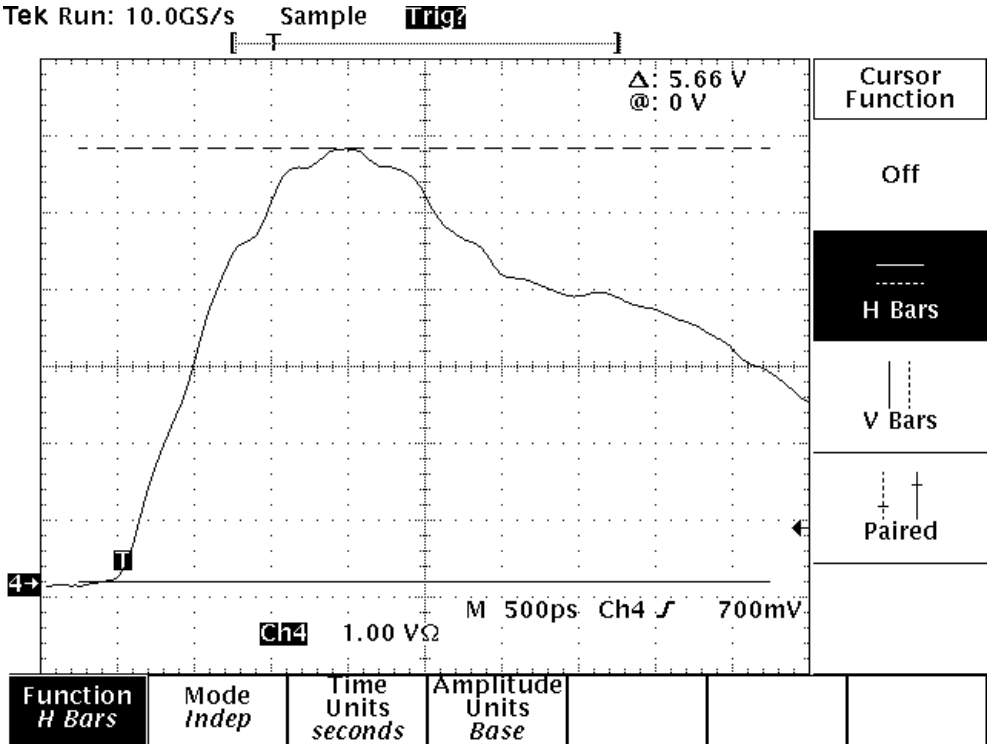
Table 10. ESD Test Results

Peak Current = Delta V / 2
Rise Time = Delta t
Current @ 30ns = V/2
Current @ 60ns = V/2

Test Level	Peak Current 30A +/-15% (25.5-34.5 A)	Rise Time 0.8nS +/-25% (0.6-1 ns)	Current @ 30ns 16A +/-30% (11.2-20.8 A)	Current @ 60ns 8A +/-30% (5.6-10.4 A)
+8 kV	28.3	0.92	17.3	7.0
-8 kV	27.9	0.91	17.4	6.9

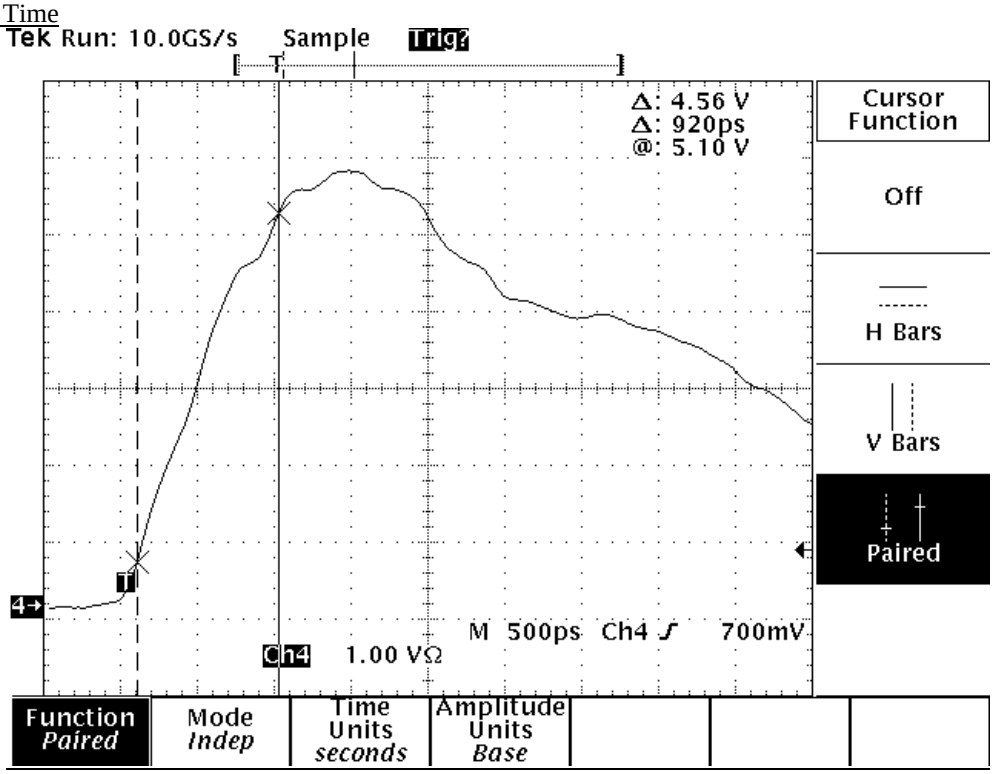
*Note: Measured value from oscilloscope is not compensated for 20dB attenuation. Multiply by 10 to obtain corrected value.

+8 kV Peak Current

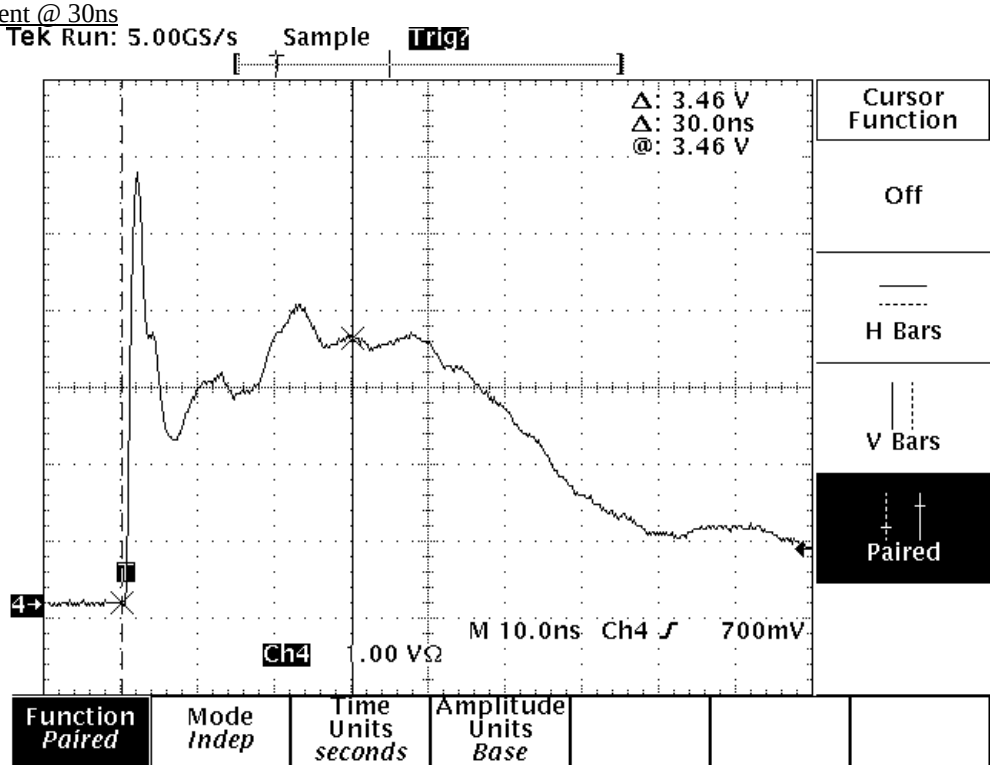


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+8 kV Rise Time

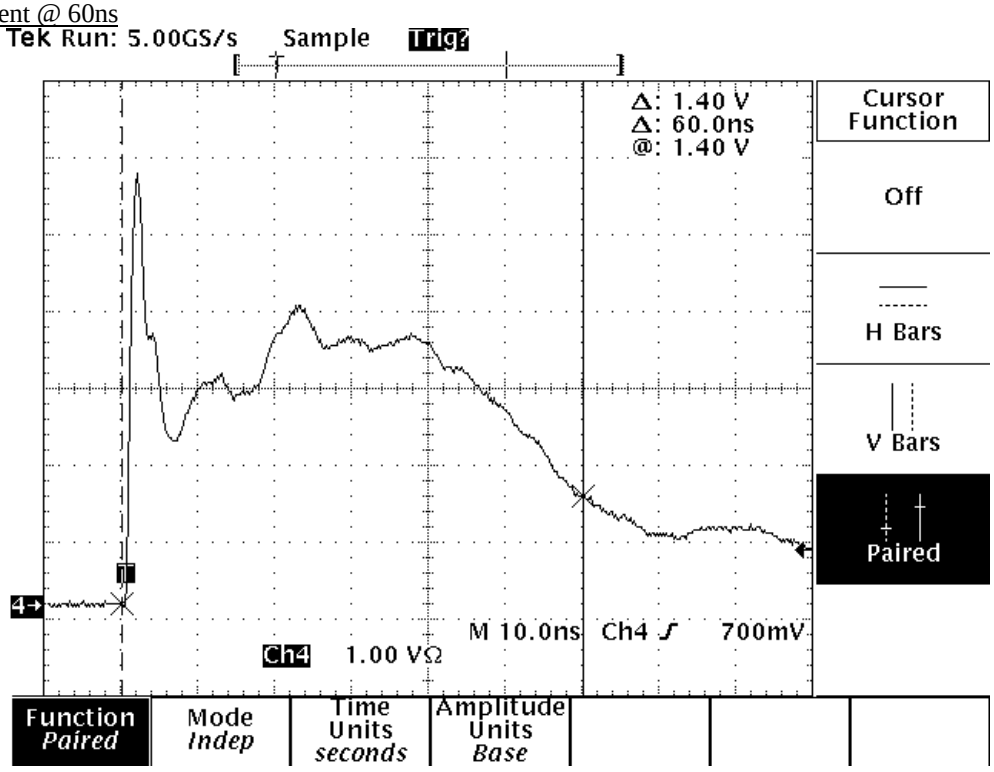


+8 kV Current @ 30ns

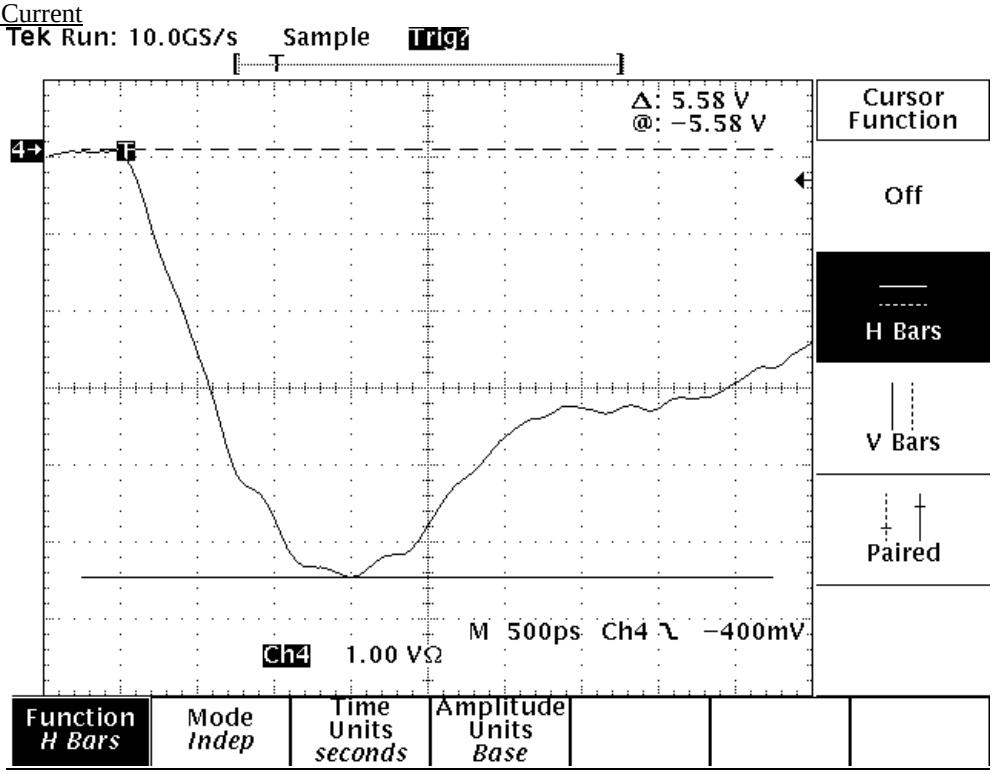


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+8 kV Current @ 60ns

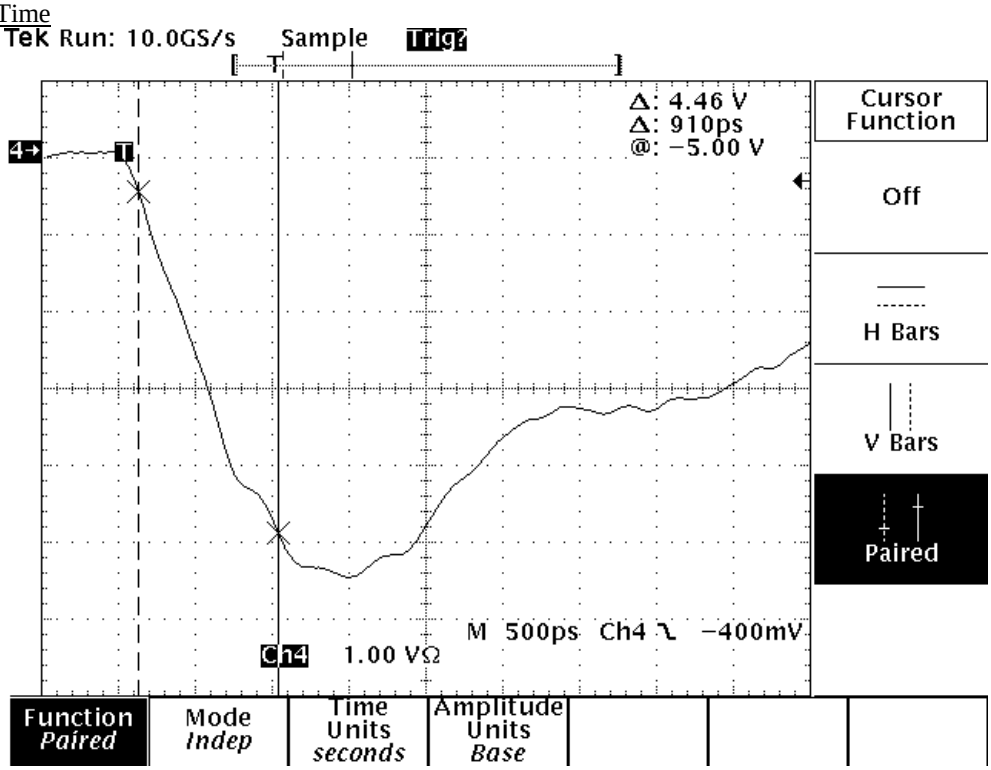


-8 kV Peak Current

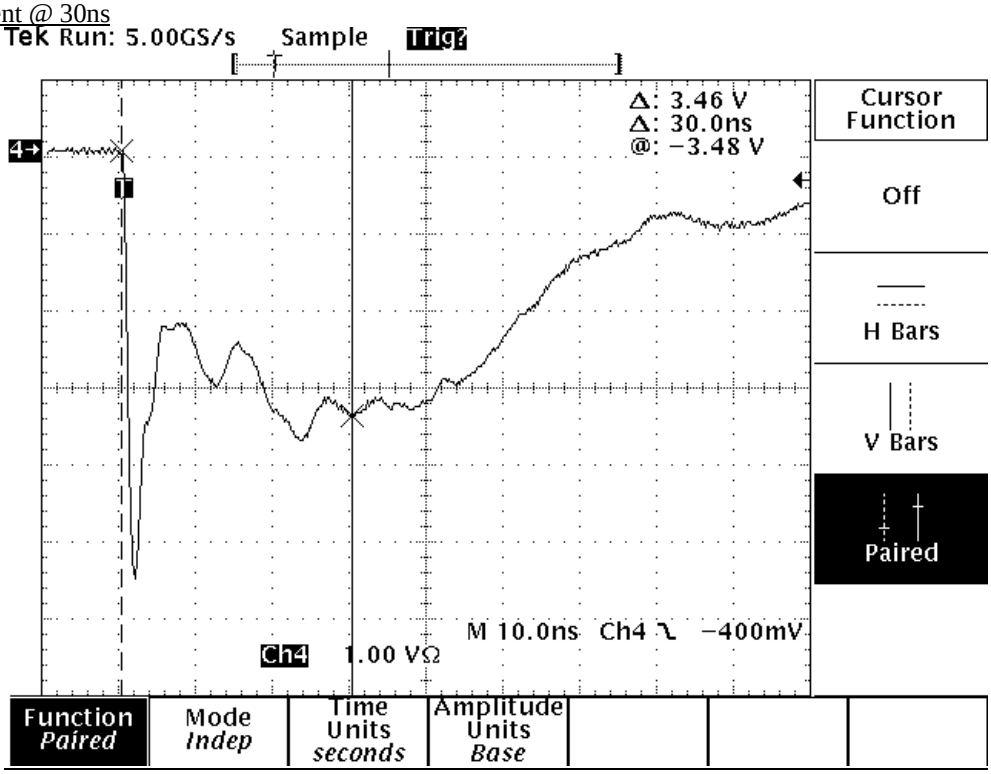


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-8 kV Rise Time

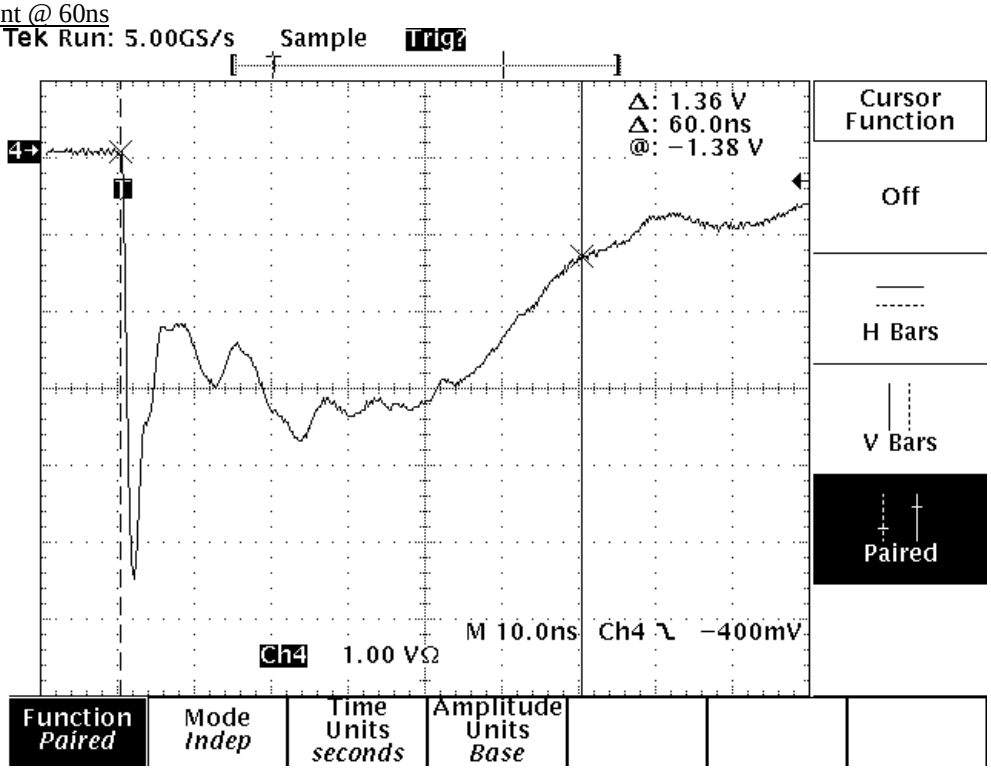


-8 kV Current @ 30ns



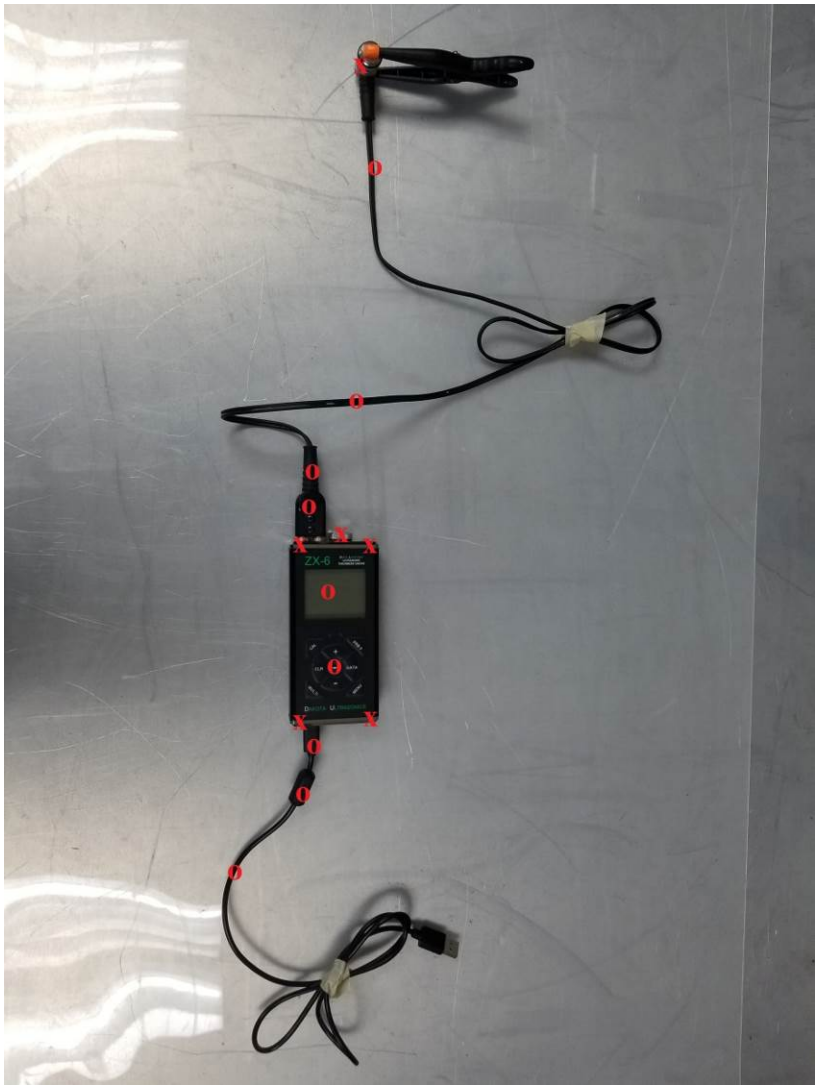
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-8 kV Current @ 60ns



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4.1.2.3. ESD Test Point Photographs



Photograph 3. ESD Test Points – Front of EUT

X = Contact Discharge Test Points
O = Air Discharge Test Points

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Photograph 4. ESD Test Points – Rear of EUT



Photograph 5. ESD Test Points – Right of EUT



Photograph 6. ESD Test Points – Left of EUT

X = Contact Discharge Test Points
O = Air Discharge Test Points



Photograph 7. ESD Test Points – Top of EUT

X = Contact Discharge Test Points
O = Air Discharge Test Points



Photograph 8. ESD Test Points – Bottom of EUT

X = Contact Discharge Test Points
O = Air Discharge Test Points

4.1.2.4. Test Setup Photograph



Photograph 9. ESD Test Setup

4.1.2.5. Test Equipment List

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

Test Name: Electrostatic Discharge			**Test Date(s):** 08/09/2018		
MET Asset #	**Equipment**	**Manufacturer**	**Model**	**Last Cal Date**	**Cal Due Date**
1S2470	Electrostatic Discharge Gun & Simulator	NoiseKen	TC-815R & ESS-2000	11/07/2017	11/07/2018
1S2491	Ground Plane 3	MET LABS	N/A	See Note	See Note
1S2458	ESD Target	ESD PARTNER	ESD TARGET -1	See Note	See Note
1S2664	Oscilloscope	Techmaster	TDS694C	07/05/2017	01/05/2019
1S2470	Electrostatic Discharge Gun & Simulator	NoiseKen	TC-815R & ESS-2000	11/07/2017	11/07/2018
Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.					

Table 11. ESD Test Equipment List

4.2. Radio Frequency Electromagnetic Field

4.2.1. Test Method, Test Requirements, and Test Procedures

4.2.1.1. Test Method

EN 61000-4-3: 2006 +A1:2008 +A2:2010
Radiated, Radio-Frequency, Electromagnetic Field Immunity Test

4.2.1.2. Test Requirements

EN 61326-1, Section 6.2, Immunity Requirements
The EUT must not be susceptible to a radiated electromagnetic field of 3 V/m, 3 V/m, and 1 V/m, 80% amplitude modulated 1 kHz, in the frequency range 80 MHz to 1 GHz, 1.4 GHz to 2 GHz, and 2.0 GHz to 2.7 GHz.

4.2.1.3. Test Procedure

Testing was performed in a semi-anechoic chamber as recommended by IEC 61000-4-3. The radiating antenna was placed 2 m in front of the EUT Support equipment for the EUT was located outside of the test room. The amplitude, frequency, and dwell time of the radiated interference was controlled by an automated, computer-controlled system.

The signal source was stepped through the applicable frequency range at a rate no faster than 1% of the fundamental. The signal was amplitude modulated 80% over the frequency range 80 MHz to 2.7 GHz at a level of 3 V/m, 3 V/m, and 1 V/m. The dwell time was set at 1 s. Field presence was monitored during testing via a field probe placed in close proximity to the EUT. Throughout testing, the EUT was closely monitored for signs of susceptibility. The test was performed with the antennae oriented in both a horizontal and vertical polarization.

4.2.2. Test Results, Test Data, and Test Setup

4.2.2.1. Test Result

The EUT was **compliant** with the requirement(s) of this section.

Environmental Conditions for Radio Frequency Electromagnetic Field	
Ambient Temperature:	23.3°C
Relative Humidity:	62%
Atmospheric Pressure:	101.4 kPa

Test Engineer(s): Marcus Meyer

Test Date(s): 08/10/2018

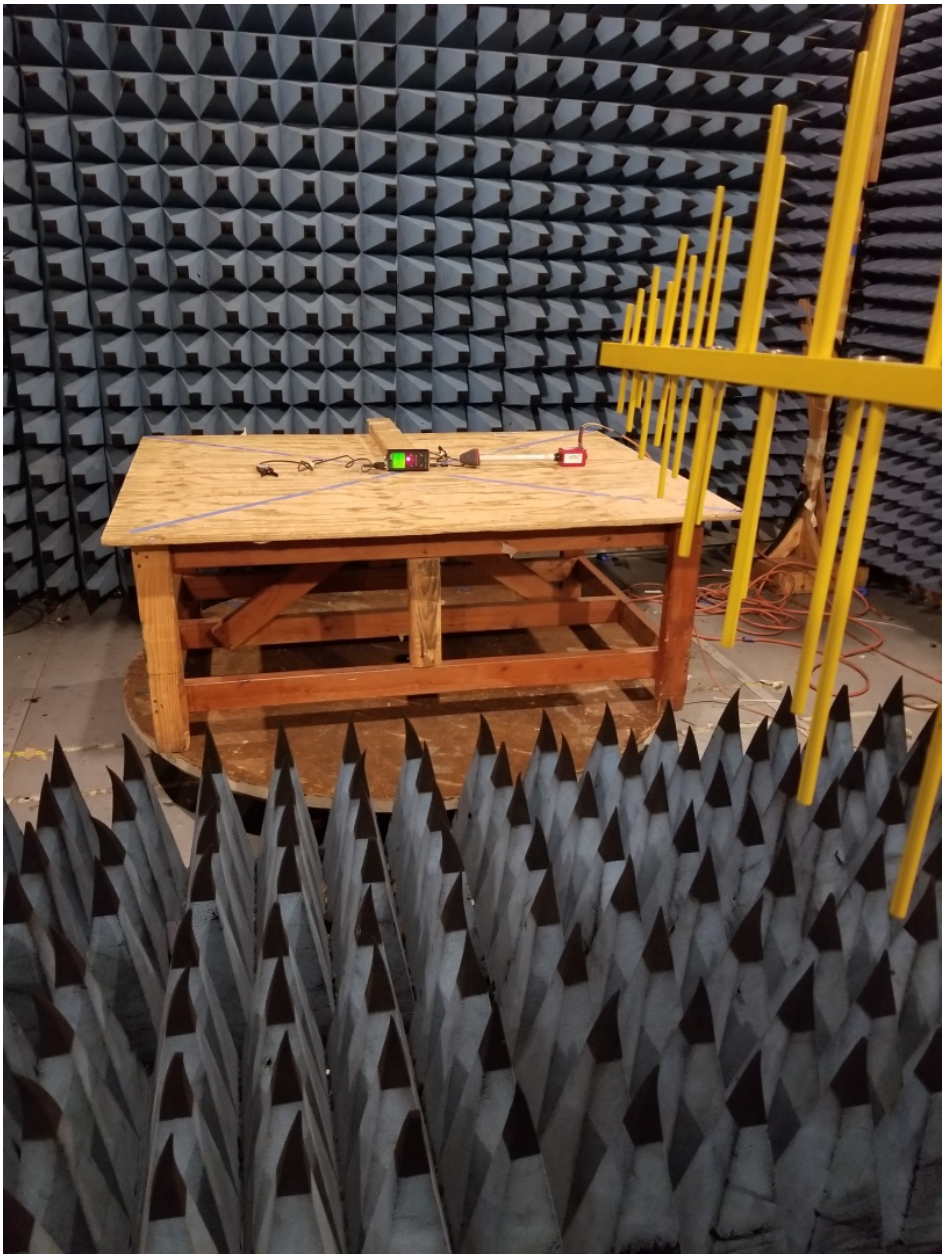
4.2.2.2. Test Data

Start Frequency (MHz)	Stop Frequency (MHz)	Severity (V/m)	Polarity (H/V)	Modulation (Freq & Type)	Results			
					Front	Back	Left	Right
80	1000	3	V	1 kHz, 80%AM	Pass	Pass	Pass	Pass
80	1000	3	H	1 kHz, 80%AM	Pass	Pass	Pass	Pass
1400	2000	3	V	1 kHz, 80%AM	Pass	Pass	Pass	Pass
1400	2000	3	H	1 kHz, 80%AM	Pass	Pass	Pass	Pass
2000	2700	1	V	1 kHz, 80%AM	Pass	Pass	Pass	Pass
2000	2700	1	H	1 kHz, 80%AM	Pass	Pass	Pass	Pass

Table 12. RI Test Results

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4.2.2.3. Test Setup Photograph



Photograph 10. RI (80 MHz- 1 GHz) Test Setup

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Photograph 11. RI (Above 1 GHz) Test Setup

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4.2.2.4. Test Equipment List

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

Test Name: Radio Frequency Electromagnetic Field			**Test Date(s):** 08/10/2018		
MET Asset #	**Equipment**	**Manufacturer**	**Model**	**Last Cal Date**	**Cal Due Date**
1S2264	Radiated Immunity Chamber	LINDGREN	N/A	See Note	See Note
1S2401	Bilog Antenna	Schaffner	CBL6140A	See Note	See Note
1S2198	Horn Antenna	EMCO	3115	See Note	See Note
1S3872	Amplifier	Amplifier Research	80/20S1G8	See Note	See Note
1S2702	Isotropic Electric Field Probe	ETS-Lindgren	HI-6053	05/02/2018	05/02/2019
1S2576	Amplifier (80-1000 MHz)	Amplifier Research	500W1000A	See Note	See Note
1U0208	Signal Generator	Rohde & Schwarz	SMR20	05/23/2018	05/23/2019
Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.					

Table 13. RI Test Equipment List

5.0 CE Conformity Marketing

In order to place the CE marking on your product, it must meet all the requirements of all applicable directives.

The CE conformity marking shall consist of the initial "CE" taking the following form:



If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected. The various components of the CE marking must have substantially the same vertical dimension, which may not be less than 5 mm.

Declaration of Conformity -

The Declaration must identify the manufacturer or its authorized representative established within the 15 nation European Union (EU). The Declaration must be signed by the party empowered to enter into commitments on behalf of the manufacturer or its authorized representative established within the EU.

User's Manual -

The User's Manual which accompanies the equipment must indicate the Directive(s) to which the CE Mark indicates compliance.

Disposition of Documents -

The technical documentation package and the Declaration of Conformity must be kept within the EU at the disposal of relevant national authorities for inspection. The information must be maintained for a period ending at least 10 years after the last product has been manufactured.

Internal Production Control -

The manufacturer shall take all measures necessary in order that the manufacturing process shall ensure compliance of the manufactured products with the technical documentation and with the requirements of the Directives that apply to them.

Example of a DoC:

DECLARATION OF CONFORMITY

Application of Council Directive(s)**: EU/EMC Directive 2014/30/EU**

Standards to which Conformity is Declared: **EN 61326-1: 2013**

Class B

Declarer's Name: **Dakota Ultrasonics**

Declarer's Address: **1500 Green Hills Road, #107, Scotts Valley, CA 95066**

Type of Equipment: **ZX family**

I the undersigned, hereby declare under my sole responsibility that the equipment specified above conforms to the above Directive(s) and Standard(s).

(Signature) (Date)

(Printed name) (Title)

To be completed by Dakota Ultrasonics personnel.

6.0 Test Plan

EMC Test Plan for the Dakota Ultrasonics, ZX family

(Please refer to the following section numbers of EN 61326-1 for more detailed information)

EN 61326
Subclause:
5.2.2 COMPOSITION OF EUT

Manufacturer:	Dakota Ultrasonics
Model:	ZX family
Serial Number:	50001, 50003
Size (inches):	Height – 5.5
	Width – 2.5
	Length – 1.25
Electrical Ratings:	3 VDC
Installation:	Table top
Description:	The ZX family, Equipment Under Test (EUT), consists of multiple versions of the same circuit board with various features enabled or disabled. ZX-1 and ZX-2 are the most basic versions. ZX-3 adds auto zero circuitry and firmware. ZX-5 adds beeper and alarm lights. ZX-5DL adds data logging and USB port. ZX-6 adds echo echo measurement mode (but has no data logger.) ZX-6DL adds back the data logger. PZX-7 uses delay line transducer and measures with higher precision. PZX-7DL adds data logger. All these gauges are used to measure thickness by transit time of ultrasonic wave through the material to be tested. Thickness of piping, tanks, and bottles can be measured in various materials including steel, aluminum, glass, and some plastics.

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5.2.3 ASSEMBLY of EUT

Ref. ID	Name / Description	Model Number	Part Number	Serial Number	Rev. #
A	Thickness gauge	ZX-6DL	--	50001	PCB #C
A	Thickness gauge	ZX-6DL	--	50003	PCB #C

5.2.4 I/O PORTS

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded (Y/N)	Termination Box ID & Port Name
1	Transducer	Support Equipment B	1	1	1	Yes	NA
2	USB C	Support Equipment C	1	1	1	Yes	NA

5.2.5 AUXILLARY EQUIPMENT

Ref. ID	Name / Description	Manufacturer	Model Number	*Customer Supplied Calibration Data
B	Transducer	Dakota Ultrasonics	--	NA
B	Transducer	Dakota Ultrasonics	--	NA
C	USB Cable	Dakota Ultrasonics	--	NA
C	USB Cable	Dakota Ultrasonics	--	NA
D	Zero Block	Dakota Ultrasonics	--	NA
D	Zero Block	Dakota Ultrasonics	--	NA

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5.2.6 CABLING AND EARTHING

The unit is DC powered through an internal battery. No exterior ground connections were made during testing.

5.3.1 OPERATION MODES

ZX-6DL gauge has all the features of the family and therefore represents worst case of the family. Gauge is to be tested in normal measure mode with the transducer clamped to a test block. Backlight should be set to ON and the alarm beeper activated.

5.3.2 ENVIRONMENTAL CONDITIONS

Temperature Range: -20 to 50C
Humidity Range: not specified
Atmospheric pressure: not specified

5.3.3 EUT SOFTWARE DURING TEST

r0.25

5.4 TEST DESCRIPTION

Tests shall be performed as per EN 61326-1, Table 1

Is the product Class A or Class B in nature (Commercial or Residential)? Class B

Is the product used in Industrial locations? No

Is the product used in Controlled Electromagnetic environments (i.e. MRI areas)? No

Is the product battery operated Portable T&M equipment? Yes

Emissions tests shall be performed as per: Class B (residential equipment)

Immunity tests shall be performed as per: EN 61326-1: 2013, Table 1 – Basic immunity test requirements

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