AC156 Seismic Qualification Testing of

Supertorque 8ZR Genset Starting Systems

Qualification Level:
S_{DS} = 2.00g, z/h = 1.0
S_{DS} = 2.50g, z/h = 0.0

Report Prepared For: **SENS**

Testing Conducted at:
Dynamic Certification Labs, 1315 Greg Street, Suite 109
Sparks, NV 89431

Shake Table Test Date: 3/12/25
Report Date: 3/20/25
Tested Equipment Manufactured and Provided by: **SENS**

Prepared By:

3/20/25

Nastya Veyngerova **Date**
Seismic Test Engineer

Reviewed for Compliance with
AC156 and HCAI's PIN 55

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3/20/25

Rachel Wolfe **Date**
Seismic Test Engineer

Date:03/24/2025

IAS ACCREDITED Testing Laboratory

Disclaimer

Any opinions, findings, conclusions, or recommendations implied or expressed in this publication are those of the author and do not necessarily reflect the views of the sponsor or of the test laboratory. The test results are only applicable to the products received and tested. DCL has correlated the test materials with the product specifications.

Statement of Conformity

Tests and test reports are issued in compliance with the relevant test standard referenced herein. Dynamic Certification Laboratories, LLC (DCL) utilizes a simple decision rule and does not include measurement uncertainty in any statement of compliance unless requested by the customer. For testing and reporting under DCL's scope of accreditation, applicable instrumentation has been calibrated to the current ISO/IEC 17025 standard by an accredited calibration laboratory and found within tolerance.

Table of Contents

Report Revision Log

Revision	Description of Change	Author	Effective Date
00	Initial Release	Nastya Veyngerova	3/20/25

Key Information

Table 1: Key UUT, test, and contact information for seismic certification tests.

Unit Description	Supertorque 8ZR Genset Starting Systems
Unit Designation	UUT-01, UUT-02, UUT-03
Test Sponsor and Contact Information	Don Nohavec, Director, R&D Programs SENS, Longmont, Co Phone: 970-988-4005 Email: don.nohavec@sens-usa.com
Data Acquisition and Contact Information	Nastya Veyngerova, Seismic Test Engineer DCL, Sparks, Nevada Phone: 775-358-5085 Email: nastya.veyngerova@Shaketest.com
Test Laboratory and Contact Information	Josh Sailer, Lab Manager DCL, Sparks, Nevada Phone: 775-358-5085 Email: josh@Shaketest.com
Test Date	3/12/25
UUT Support	Rigid Base Mount
Test Level	S_{DS} = 2.00g at z/h = 1.0 S_{DS} = 2.50g at z/h = 0.0
Unit Installation	At grade to roof level installation
Compliance Status	UUT-01, UUT-02 and UUT-03 Comply with AC156

1 Introduction

The purpose of the testing was to verify attachment methods as well as unit performance and functionality of Supertorque 8ZR genset starting systems to the ICC-ES standard "AC156 Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems." AC156 criteria were followed which require the Unit Under Test (UUT) design to ensure that the anchored UUT* does not leave its mounting and cause damage to other building components or injury to occupants during the seismic event and that the structural integrity of the equipment attachment system is maintained. In addition, other functionality requirements were observed and recorded.

* This only applies for the anchors that were used to mount the units to the structure during testing. If other anchors are used, they are outside the scope of this test and must be independently qualified for the applicable loads.

1.1 UUT General Description

The UUTs are summarized in Tables 2 and 3. The test samples were provided by SENS. An overall pre-test photograph of each UUT is provided in Figures 1, 2 and 3. Drawings of each UUT are provided in Appendix A.

Table 2. *General description of UUTs.*

UUT	Component	Model	UUT Support	Outline Drawing
UUT-01	Genset Starting System	8R-A1-LA-331-00A-1	Rigid Base Mount	Appendix A Figure A.1
UUT-02		8R-A1-LA-4B2-C0A-1		Appendix A Figure A.2
UUT-02		8R-C1-0A-111-00A-1		Appendix A Figure A.3

1.2 UUT Dimensions and Weight

Table 3. *UUT dimensions and weights.**

UUT	Dimensions [in.]			Measured Weight [lb.]
	Length	Width	Height	
UUT-01	32.5	13.5	75.0	520
UUT-02	61.0	13.5	64.8	730
UUT-03	32.5	13.5	17.5	111

*Listed dimensions include hardware

Figure 1. *Photograph of UUT-01.*

Figure 2. *Photograph of UUT-02.*

Figure 3. *Photograph of UUT-03.*

2 UUT Subcomponents

For a custom product line, where subcomponents in each assembled product can potentially be different, all qualified subcomponents along with their dimensions and weights shall be listed. Since the test units are part of a custom product line, major subcomponents are listed in Appendix B.

3 Seismic Parameters and Derived Required Response Spectra

The seismic certification of the units was performed by means of an earthquake simulator (shake table) testing. A special three-component time history was generated to comply with ICC-ES AC156.

The seismic test parameters and derived Required Response Spectra (RRS) levels for each UUT are provided in Table 4.

Table 4. *Shake table test parameters.*

Building Code	Test Criteria	Sds (g)	z/h	Horizontal Acceleration (g)		Vertical Acceleration (g)	
				Aflx-H	Arig-H	Aflx-V	Arig-V
CBC 2022	ICC-ES AC156	2.00	1.0	3.20	2.40	N/A	N/A
		2.50	0.0	N/A	N/A	1.67	0.67

4 Seismic Certification Test Procedure

4.1 Pre-Test Inspection

An inspection was performed at the test laboratory upon receipt of each UUT. Each UUT was visually inspected for physical damage to verify that no damage had occurred during shipping and handling.

4.2 Pre-Test Functional Compliance Verification

Functionality requirements and tests were performed at the test laboratory by the designated SENS technical representative, as outlined in Figures 4, 5 and 6. It was determined that the listed components were working, power was being transmitted to the energized components, and the units were serving their intended function.

Functional Checklist DCL

Project Number:	08826-2401	Project Name:	SENS 8Z OSP
UUT:	UUT-01	Model:	8R-A1-LA-331-00A-1
Pre-Shake Date & Time:	8:22am 3/12/25	Post-Shake Date & Time:	2:02 pm 3/12/25

Checklist (generated in correspondence with the manufacturer)

ID	*Component*	*Method of Measure*	*Pass Criteria*	*Pre*	*Post*
1.1	UUT	Visual	Limited yielding per AC156	✓	✓
1.2	Battery	1. Measure voltage between positive and negative output terminals using DMM 2. Verify current flow with resistive load connected between positive and negative output terminals	Verify Flow	✓	✓

Witness Signatures

Position	*Printed Name*	*Signature*	*Date*
DCL Lab Witness	Nastya Veyngerova		3/12/25
Manufacturer Rep.	Jeremy J. Snow		03/12/25

Figure 4. *UUT-01 Functionality Check Description.*

Functional Checklist DCL

Project Number:	08826-2401	Project Name:	SENS 8Z OSP
UUT:	UUT-02	Model:	8R-A1-LA-4B2-C0A-1
Pre-Shake Date & Time:	8:27am 3/12/25	Post-Shake Date & Time:	11:03 am 3/12/25

Checklist (generated in correspondence with the manufacturer)

ID	*Component*	*Method of Measure*	*Pass Criteria*	*Pre*	*Post*
1.1	UUT	Visual	Limited yielding per AC156	✓	✓
1.2	Battery	1. Measure voltage between positive and negative output terminals using DMM 2. Verify current flow with resistive load connected between positive and negative output terminals	Verify Flow	✓	✓

Witness Signatures

Position	*Printed Name*	*Signature*	*Date*
DCL Lab Witness	Nastya Veyngerova		3/12/25
Manufacturer Rep.	Jeremy J. Snow		03/12/25

Figure 5. *UUT-02 Functionality Check Description.*

Functional Checklist					DCL
Project Number:	08826-2401		**Project Name:**	SENS 8Z OSP	
UUT:	UUT-03		**Model:**	8R-C1-0A-111-00A-1	
Pre-Shake Date & Time:	8:15am 3/12/25		**Post-Shake Date & Time:**	9:58 am 3/12/25	

Checklist (generated in correspondence with the manufacturer)					
ID	*Component*	*Method of Measure*	*Pass Criteria*	*Pre*	*Post*
1.1	UUT	Visual	Limited yielding per AC156	✓	✓
1.2	Battery	1. Measure voltage between positive and negative output terminals using DMM 2. Verify current flow with resistive load connected between positive and negative output terminals	Verify Flow	✓	✓

Witness Signatures			
Position	*Printed Name*	*Signature*	*Date*
DCL Lab Witness	Nastya Veyngerova		3/12/25
Manufacturer Rep.	Jeremy J. Snow		03/12/25

Figure 6. *UUT-03 Functionality Check Description.*

4.3 Seismic Simulation Test Setup

4.3.1 Triaxial Testing Requirements

A triaxial test was performed in one stage with the two principal horizontal axes and the vertical axis of each UUT simultaneously tested.

4.3.2 Weighing

Each UUT was weighed prior to performing the seismic simulation test.

4.3.3 Mounting

Each UUT was mounted on the shake table in a manner that simulated the intended service mounting in accordance with Section 4.5.2 of AC156.

4.3.4 Interface Connections

UUT-01 was rigidly mounted to the shake table interface plate using (4) ½'' Grade 8 bolts and flat washers. The bolts were spaced 10 5/8'' apart in x-direction measured on-center and 31 5/8'' apart in y-direction measured on-center.

UUT-02 was rigidly mounted to the shake table interface plate using (6) ½'' Grade 8 bolts and flat washers. The bolts were spaced 10 5/8'' apart in x-direction measured on-center and 31 5/8'' and 27 ½'' apart in y-direction measured on-center.

UUT-03 was rigidly mounted to the shake table interface plate using (4) ½'' Grade 8 bolts and flat washers. The bolts were spaced 10 5/8'' apart in x-direction measured on-center and 31 5/8'' apart in y-direction measured on-center.

The unit attachments are shown in Figures 7. Additional photographs are provided in Appendix C.

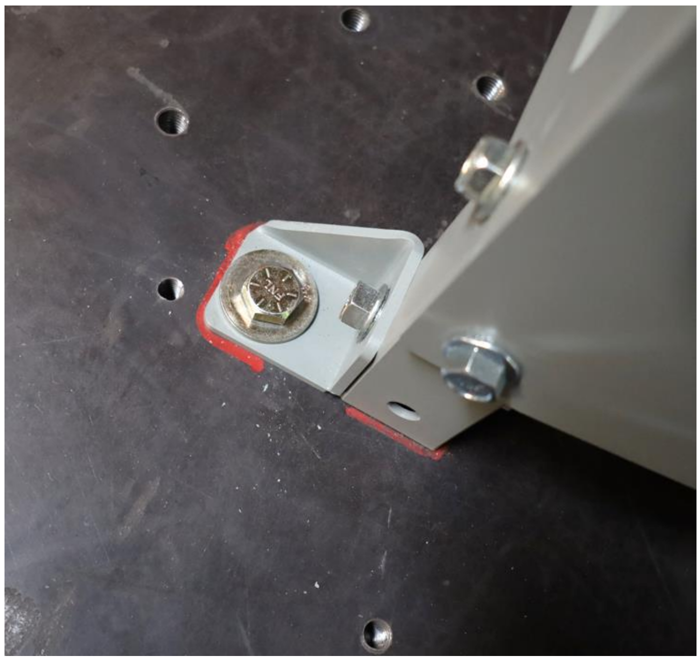

Figure 7. *UUT-01 attachment to shale table interface plate (UUT-02 and UUT-03 were attached in identical manner).*

4.3.5 Monitoring

Two reference control accelerometers were mounted on the shake table at locations near the base of each UUT setup. An accelerometer was mounted to the top of each unit to determine the response of each UUT associated with its structural fundamental frequencies.

4.4 Resonance Frequency Search

A low-level amplitude (approximately 0.1 g peak input) single-axis sinusoidal sweep from 1.3 to 33.3 Hz was performed in each orthogonal UUT axis to determine resonant frequencies of the system. The sweep rate was two octaves per minute.

4.5 Multi-frequency Seismic Simulation Tests

Each UUT was subjected to 30-second duration triaxial multi-frequency random motions which were amplitude-controlled in one-sixth octave bandwidths spaced over the frequency range of 1.3 to 33.3 Hz. Each unit was subjected to an AC156 level test at Sds 2.00 g with z/h=1.0 and Sds 2.50 g with z/h=0.0. The 5% damped AC156-specified RRS and Test Response Spectrum (TRS) were plotted from the recorded motions.

4.6 Post-Test Inspection

Each UUT was visually examined, and the results documented upon completion of the multi-frequency seismic simulation tests to determine whether the UUTs had adequate seismic capacity and whether the structural integrity of the component attachment and force-resisting systems were maintained.

4.7 Post-Test Functional Compliance Verification

Functionality requirements were performed on each UUT at the test laboratory by the SENS technical representative to verify that the UUTs satisfied the functional requirements with equivalent results to those of the pre-test functional compliance testing.

5 Testing Facility

5.1 Test Facility Location

The units were tested at Dynamic Certification Laboratories (DCL) in Sparks, Nevada and testing was supervised by trained DCL staff. DCL is accredited as complying with ISO/IEC Standard 17025 by the International Accreditation Service. The scope of DCL's accreditation includes ICC-ES AC156.

5.2 List of Observers Present for Functionality Testing

A listing of representatives and witnesses present for the pre- and post-test functionality checks is provided in Table 5.

Table 5. *List of witnesses with their affiliations during seismic qualification testing.*

Name	Affiliation	Position
Nastya Veyngerova	DCL	Seismic Test Engineer
Sam Chambers	SENS	Mechanical Engineering Manager
Jeremy Show	SENS	Manufacturer Representative

6 Testing Equipment Description

6.1 Shake Table

The seismic evaluation tests described in this report were conducted on DCL's triaxial shake table in Sparks, Nevada. Manufactured by MTS Systems of Minneapolis, Minnesota, the table is approximately 7 feet in diameter, with an approximate payload capacity of 10,000 pounds.

6.2 Test Coordinate System

Reference Table 6 and Figure 8, 9 and 10 for the relationship between UUT orientation and assigned test coordinates.

Table 6. *UUT coordinate system.*

UUT Direction	Test Coordinate
Longitudinal	X
Transverse	Y
Vertical	Z

Figure 8. *UUT-01 coordinate system.*

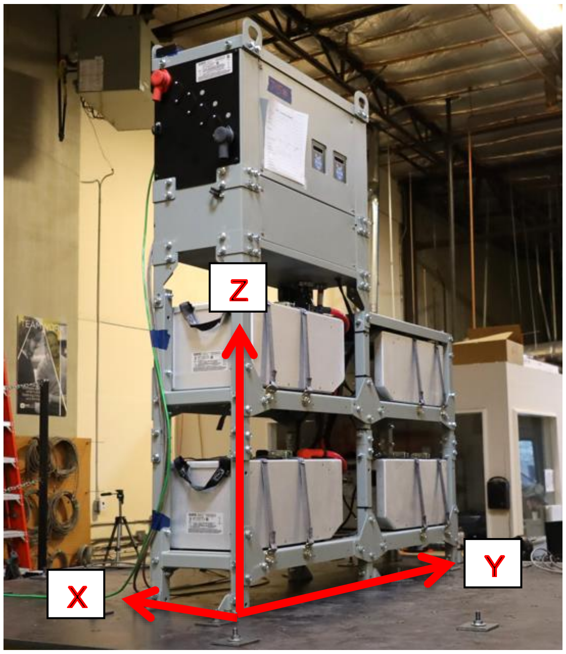

Figure 9. *UUT-02 coordinate system.*

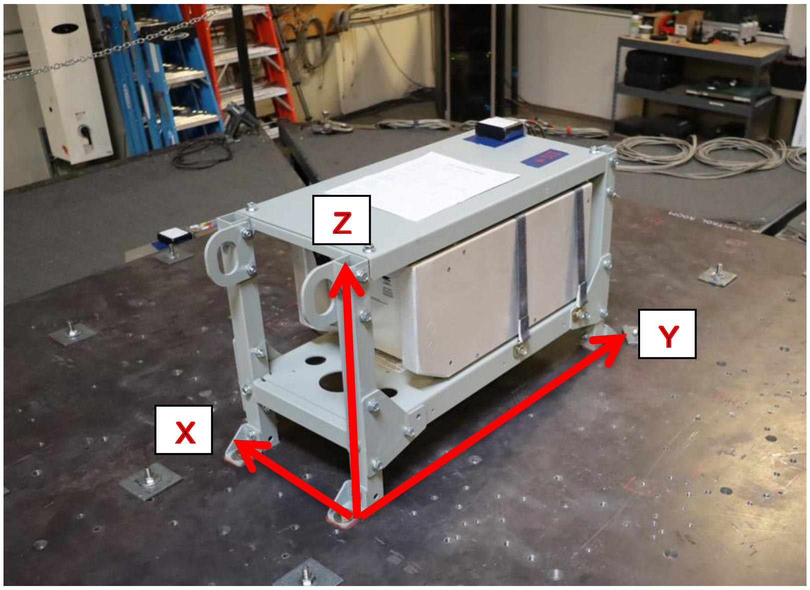

Figure 10. *UUT-03 coordinate system.*

6.3 Instrumentation

Data acquisition was performed at DCL using a NI SCXI-1520 8-Channel Universal Strain Gage Input module along with a NI SCXI-1314T Bridge Sensor Terminal Block. Triaxial accelerometers were placed on the UUTs, shake table and fixture to monitor the test response. Locations were decided in consultations between the manufacturer and the testing lab personnel. DCL instruments were calibrated in accordance with DCL's quality assurance program which complies with the requirements of ISO/IEC 17025. A summary of the instrumentation used for the tests is provided in Table 7.

Table 7. *Specimen instrumentation used in seismic evaluation.*

ID	Direction	Model	Serial Number	Location	Last Calibration	Calibration Due
ACC1	XYZ	ADXL-325	02	Shake Table	12/21/23	12/21/25
ACC2	XYZ	ADXL-325	04	Shake Table	12/21/23	12/21/25
ACC3	XYZ	ADXL-326	88	Top Corner of UUT-01/-02/-03	5/8/23	5/28/25

7 Results of Test Data

7.1 Results of Pre- and Post-Test Structural Integrity and Functionality Requirements

7.1.1 Pre-Test

DCL staff verified that each UUT was in good physical condition. Functionality requirements and tests were performed at the test laboratory by the designated manufacturer’s technical representative as outlined in Section 4.2. The units passed all pre-test checks.

7.1.2 Post-Test

Each UUT was visually inspected, and it was determined that the structural integrity of the component attachment system and force-resisting system was maintained.

Each unit was working, and it was verified that they satisfied the functional requirements with equivalent results to that of the pre-test functionality checks.

7.1.3 Design Changes

No design changes to the test units were implemented.

7.1.4 Resonance Search Results

Each test unit was subjected to the resonance search tests as described in Section 4.4. The transmissibility plots used to identify the fundamental frequencies of vibration of each test setup are shown in Appendix D. Table 8 shows a summary of the results.

Table 8. *Calculated natural frequencies.*

Unit	ACCX (vs ACC1)	Lowest Resonant Frequency (Hz)		
		X (Longitudinal)	Y (Lateral)	Z (Vertical)
UUT-01	ACC3	12.50	14.75	33.3<
UUT-02	ACC3	10.75	12.75	33.3<
UUT-03	ACC3	33.3<	33.3<	33.3<

8 Shake Table Output Signal for Seismic Certification

8.1 Obtained Signal Strength

Obtained TRS output signal intensities equaled or exceeded the target input RRS for the seismic certification spectra parameters previously outlined in Table 4. The spectral response plots and time histories for the UUTs in each of the three principal axes are shown in Appendix E.

8.2 Coherence of Input Motions

For the triaxial tests conducted, the table command acceleration in each of the three principal axes was phase incoherent, as shown the plots in Appendix F.

9 Test Results and Conclusions

The units included in this report were seismically tested with the following noted:

- In accordance with the functional performance criteria, the units were deemed functional before and after the seismic certification testing (reference Section 7.1)

- The input histories and shake table output met the ICC-ES AC-156 requirements for intensity, strong motion duration, and statistical independence of the components of motion

- The RRS targeted acceleration values were used to develop input signals for the X-, Y-, and Z- components for certification tests

- The certification testing of each UUT covers the following:
    - Roof level installation to installation at grade

- The TRS met or exceeded the target RRS for the frequency range of interest. The configurations in Table 9 were certified to the levels specified therein.

Table 9. *Compliance status of shake tested configurations.*

<table>
<tr><th>UUTs</th><th>Installation</th><th>S_{DS}, g</th><th>z/h</th><th>Compliance Status</th></tr>
<tr><td>UUT-01</td><td>Rigid Base Mounted</td><td rowspan="2">2.00</td><td rowspan="2">1.0</td><td rowspan="3">Complies with AC156</td></tr>
<tr><td>UUT-02</td><td>Rigid Base Mounted</td></tr>
<tr><td>UUT-03</td><td>Rigid Base Mounted</td><td>2.50</td><td>0.0</td></tr>
</table>

The supporting test documentation listed below follows this page in the indicated sequence:

Appendix A. Unit Drawings and Mounting Details
Appendix B. Listing of Subcomponents
Appendix C. Photographs of Units Under Test
Appendix D. Resonance Search Test Transmissibility Plots
Appendix E. Seismic Simulation Test Response Spectra and Time History Plots
Appendix F. Coherence Plots
Appendix G. Testing Laboratory Certificate of Accreditation

10 References

ASCE/SEI 7-16 (2016), *Minimum Design Loads for Buildings and Other Structures*, American Society of Civil Engineers, Reston, VA.

International Code Council Evaluation Service Inc. (ICC-ES), (2019): *AC156: Acceptance Criteria for Seismic certification by Shake-Table Testing of Nonstructural Components and Systems*, ICC-ES, Whittier, CA.

Appendix A Unit Drawings and Mounting Details

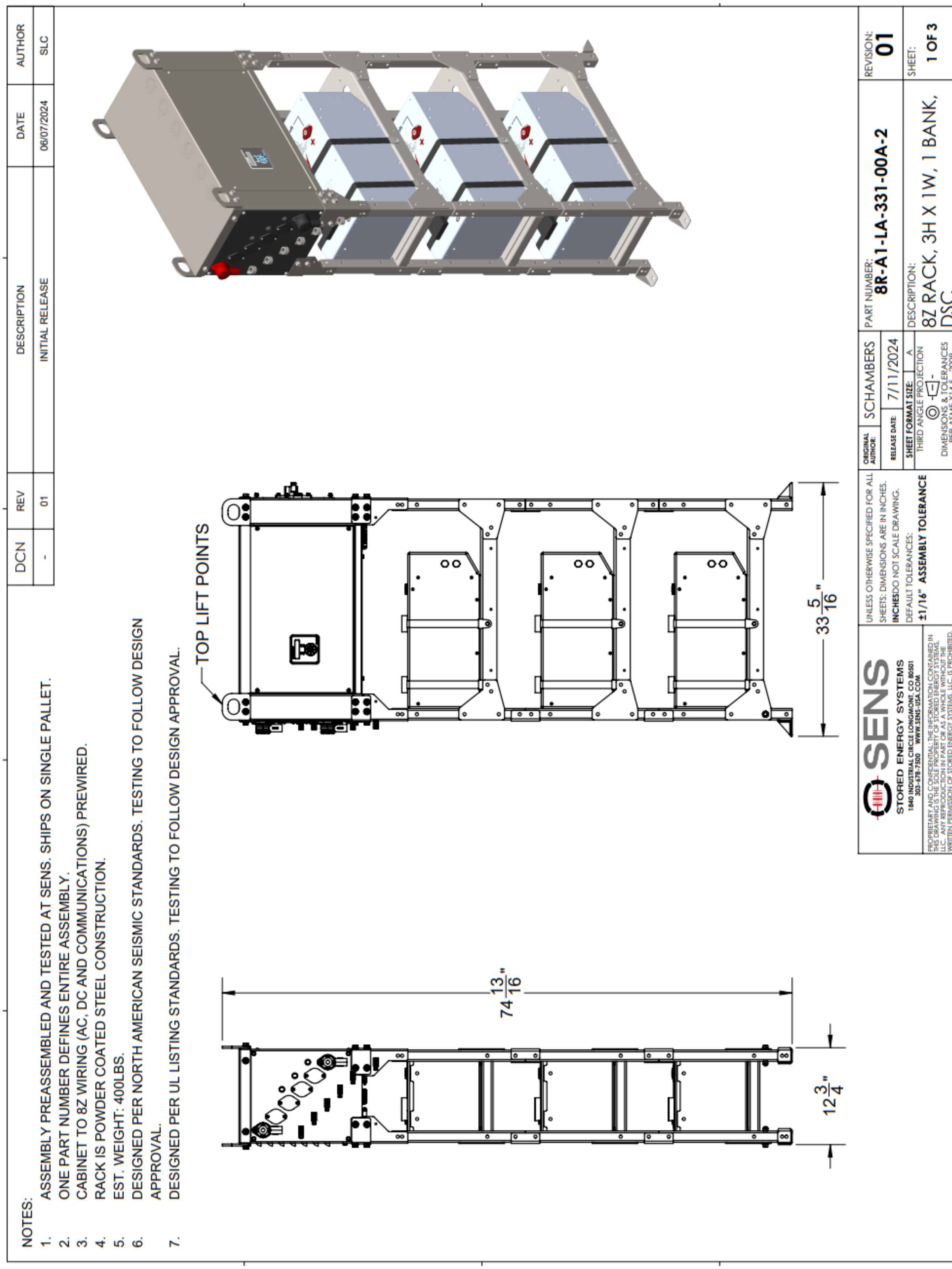

Figure A.1. *UUT-01 drawing.*

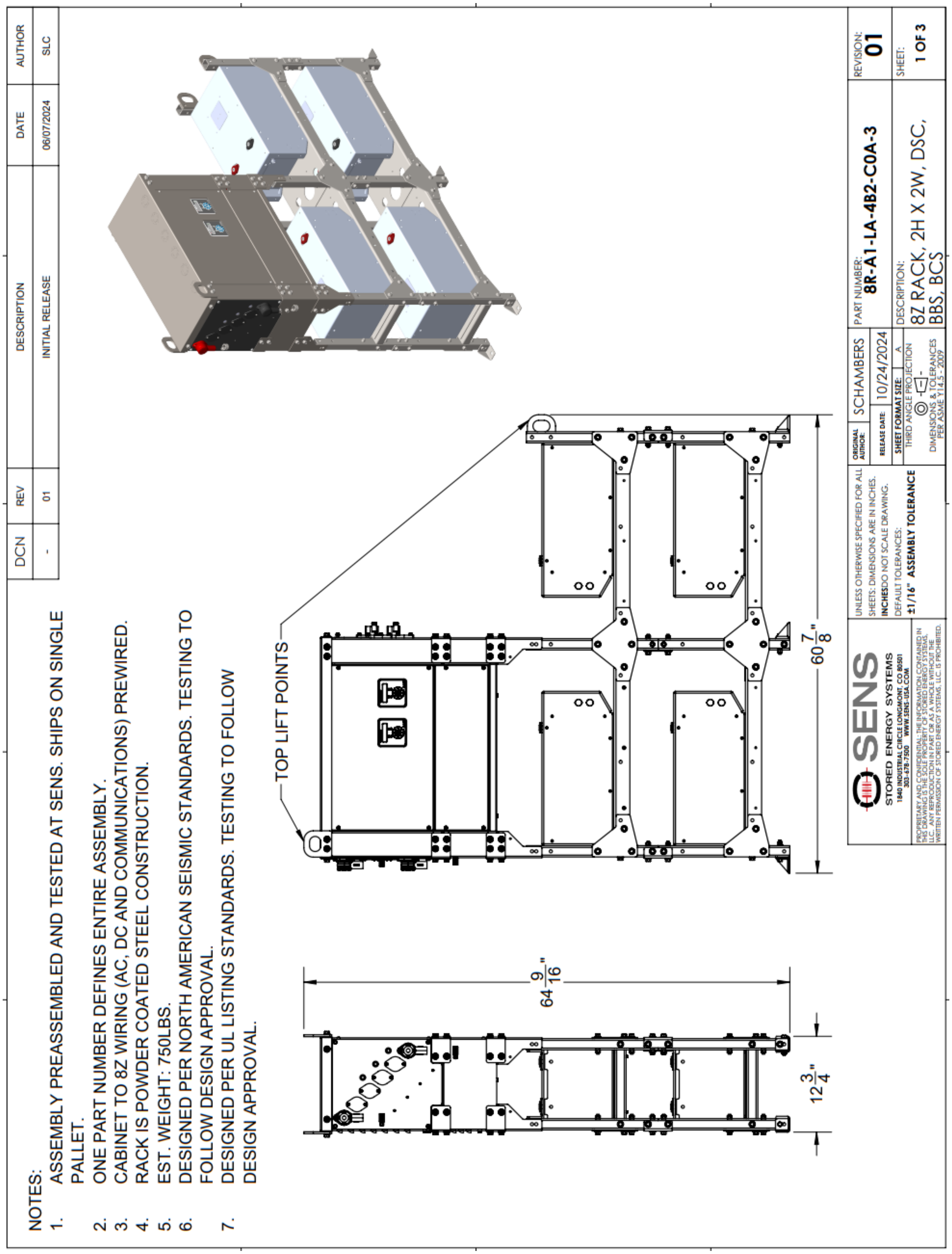

Figure A.2. *UUT-02 drawing.*

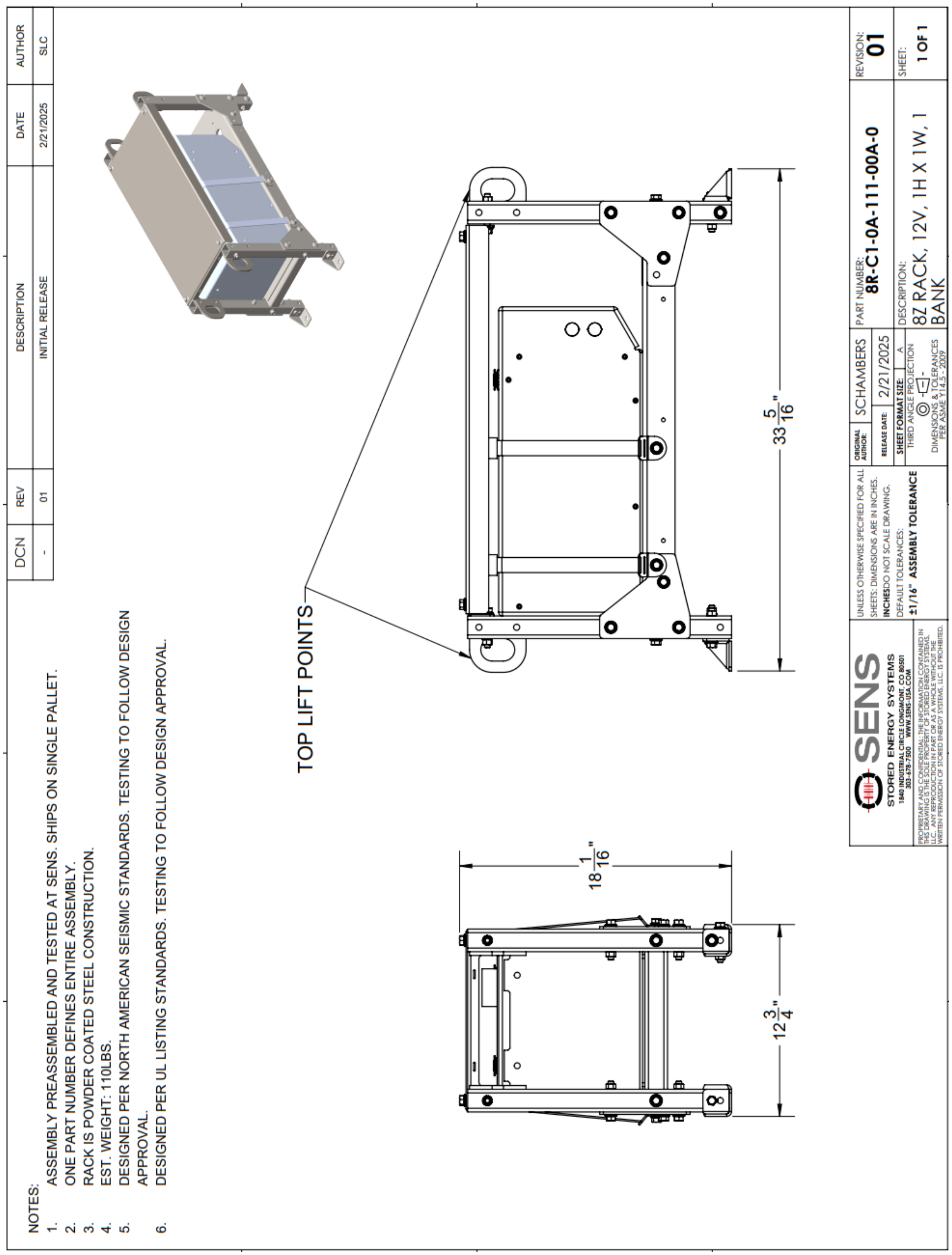

Figure A.3. *UUT-03 drawing.*

Appendix B Listing of Subcomponents

Table B.1. *Subcomponents list for UUT-01, UUT-02 and UUT-03.*

Model Number	Description	Manufacturer	Material	Weight [lb.]	Unit
Batteries					
8Z-12-B-15-A-1-1-OM	LER or Stationary Applications	Stored Energy Systems	Nickel, Zinc, Plastic, Carbon Steel	50	UUT-03
8Z-24-B-15-A-1-1-OM				89	UUT-01, UUT-02
Diodes					
209706	ASSEMBLY, BLOCKING DIODES, BBS-4800	Stored Energy Systems	Silicon, Aluminum	45	UUT-02
Circuit Boards					
2S7757	PCA, MG2, ACCY, CAN, DISP, 5 RLY, ETH, SYS, S/W	Stored Energy Systems	PCB, Copper	<1	UUT-01, UUT-02
207056	PCA, DIODE ISOLATOR, 80A/120A			1.0	UUT-02
2S5750	PCA, MG2, PWR/CTRL, 12V/24V, 15A, SC TRM, S/W			1.5	UUT-01, UUT-02
204288	PCA, 8Z LED BOARD			<1	UUT-01, UUT-02
Breakers					
702939	BRKR, 1 POLE, 10A,125VDC, HYDMAG	Carling Technologies	Plastic, Copper	<1	UUT-02
702940	BRKR, 1 POLE, 80A,125VDC, HYDMAG			<1	UUT-02

Appendix C Photographs of Units Under Test

Figure C.1. *UUT-01 overall view, pre-test.*

Figure C.2. *UUT-01 overall view, post-test.*

Figure C.3. *UUT-02 overall view, pre-test.*

Figure C.4. *UUT-02 overall view, post-test.*

Figure C.5. *UUT-03 overall view, pre-test.*

Figure C.6. *UUT-03 overall view, post-test.*

Figure C.7. *UUT-01 accelerometer ACC1, ACC2 and ACC3 locations.*

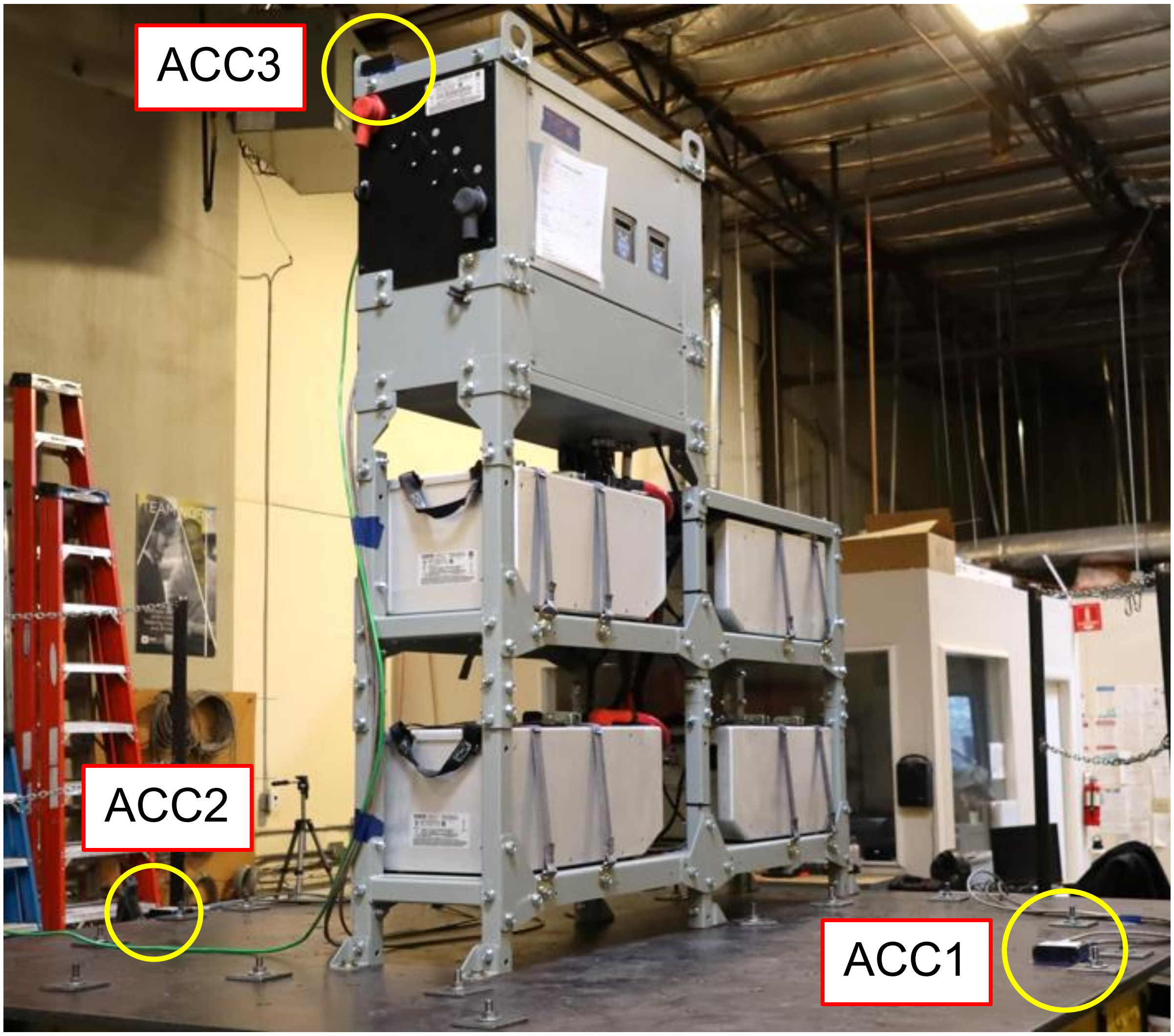

Figure C.8. *UUT-02 accelerometer ACC1, ACC2 and ACC3 locations.*

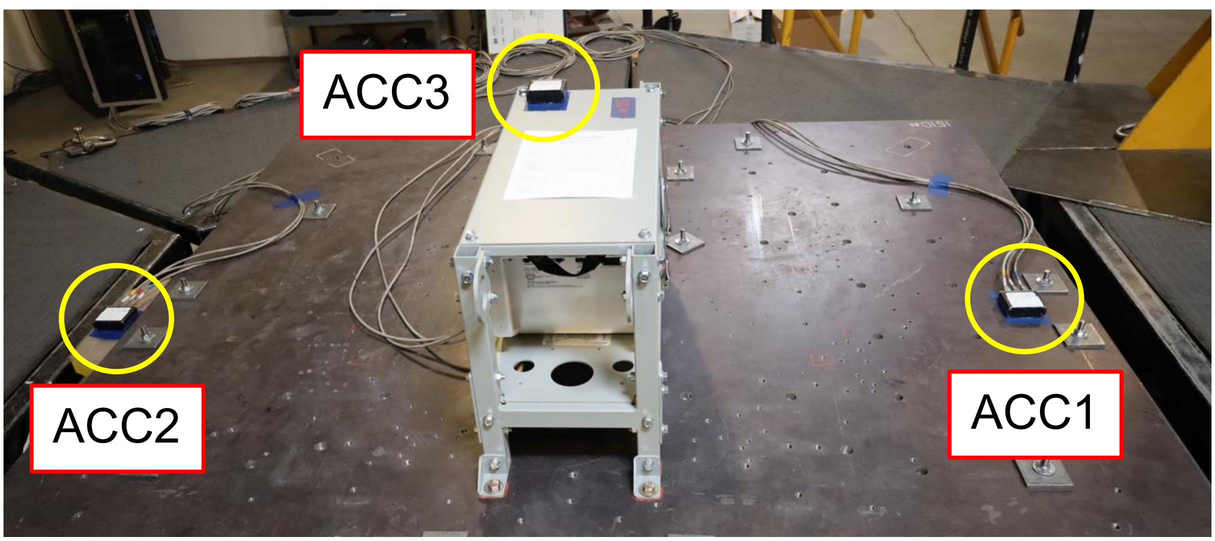

Figure C.9. *UUT-03 accelerometer ACC1, ACC2 and ACC3 locations.*

Appendix D Resonance Search Test Transmissibility Plots

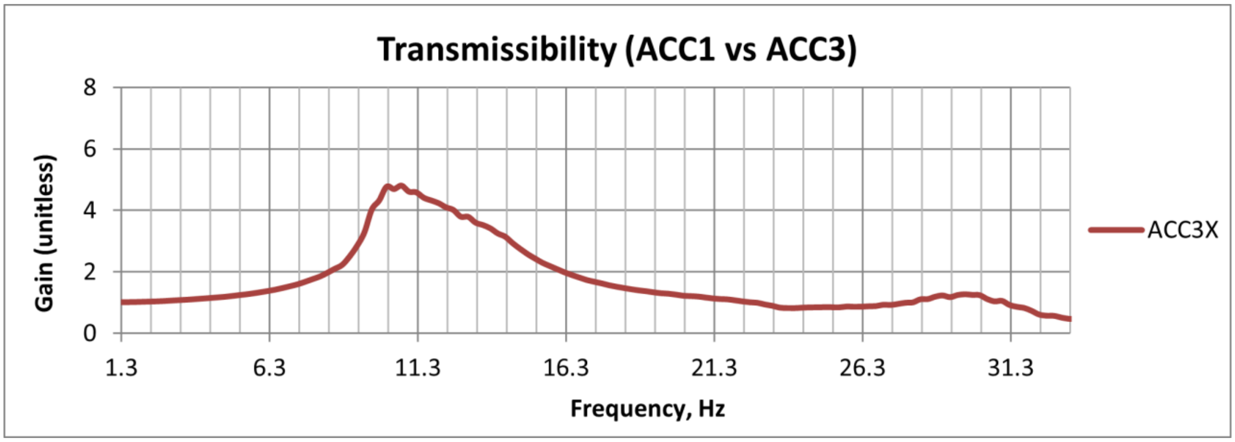

Figure D.1. *UUT-01 resonance frequency in the X-direction (ACC1 vs ACC3).*

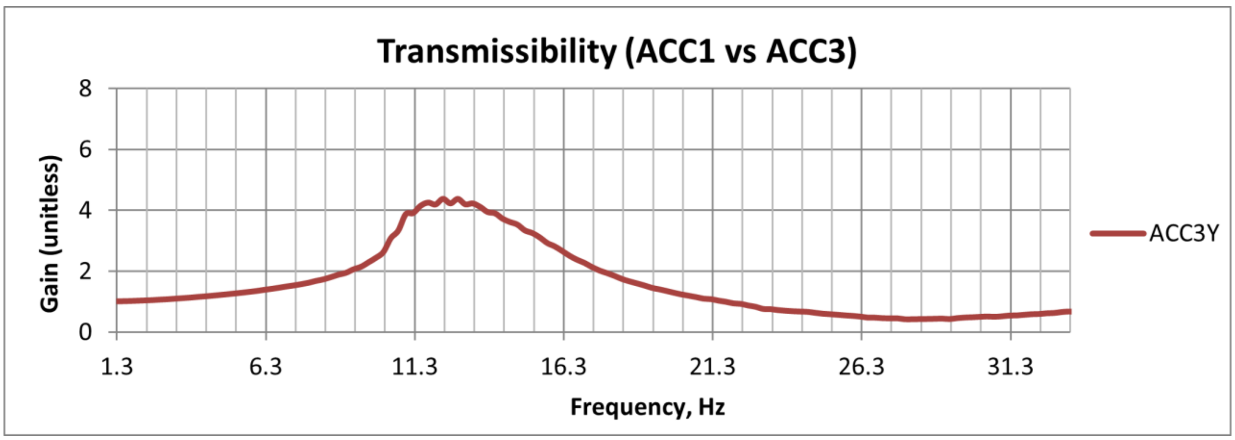

Figure D.2. *UUT-01 resonance frequency in the Y-direction (ACC1 vs ACC3).*

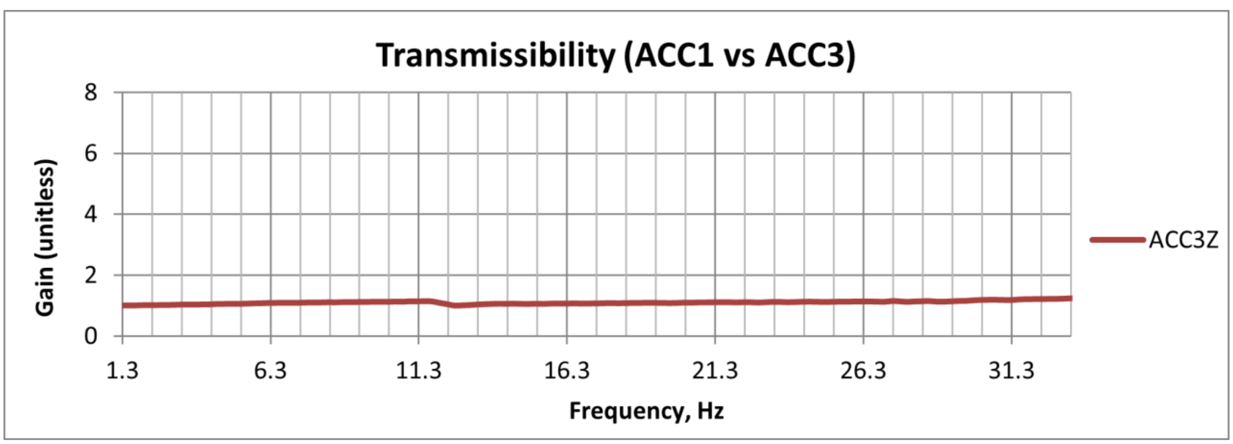

Figure D.3. *UUT-01 resonance frequency in the Z-direction (ACC1 vs ACC3).*

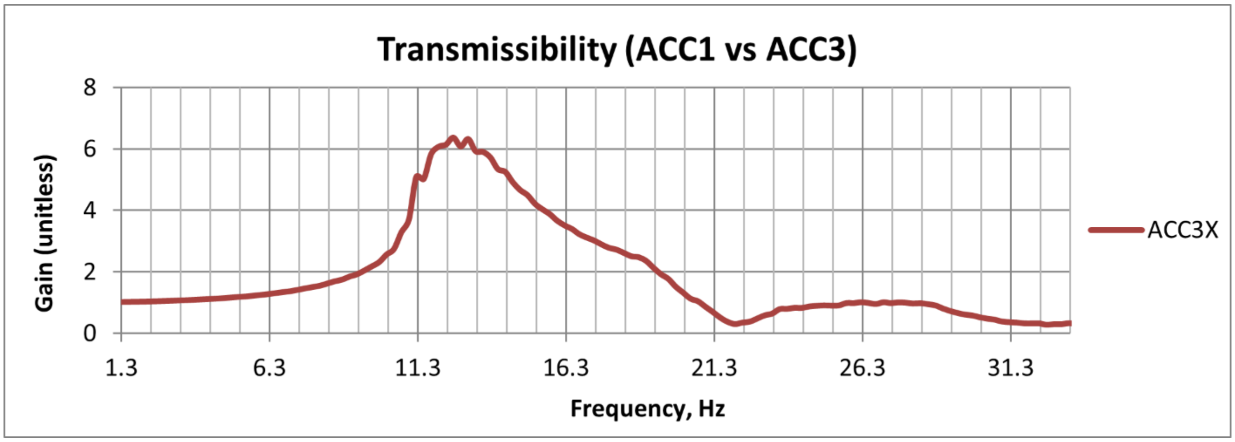

Figure D.4. *UUT-02 resonance frequency in the X-direction (ACC1 vs ACC3).*

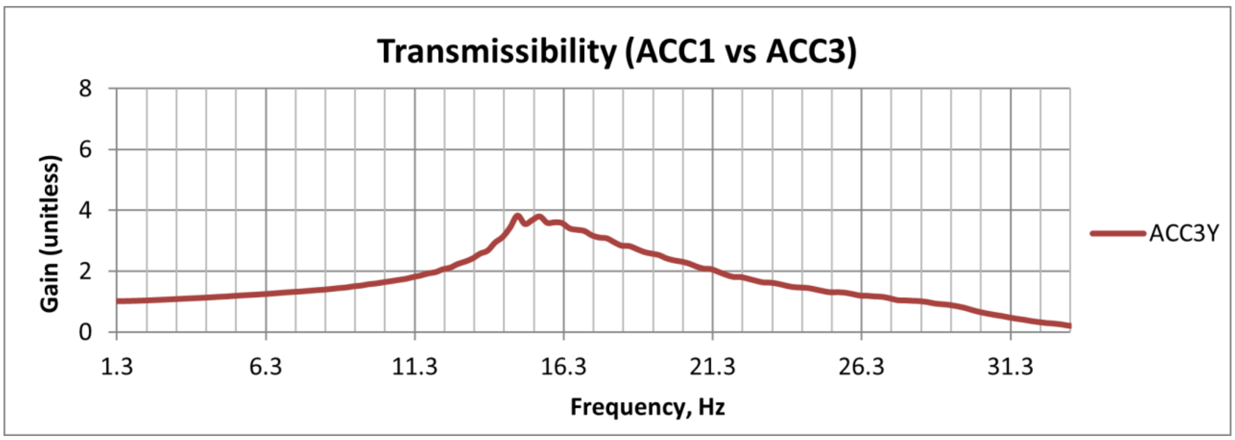

Figure D.5. *UUT-02 resonance frequency in the Y-direction (ACC1 vs ACC3).*

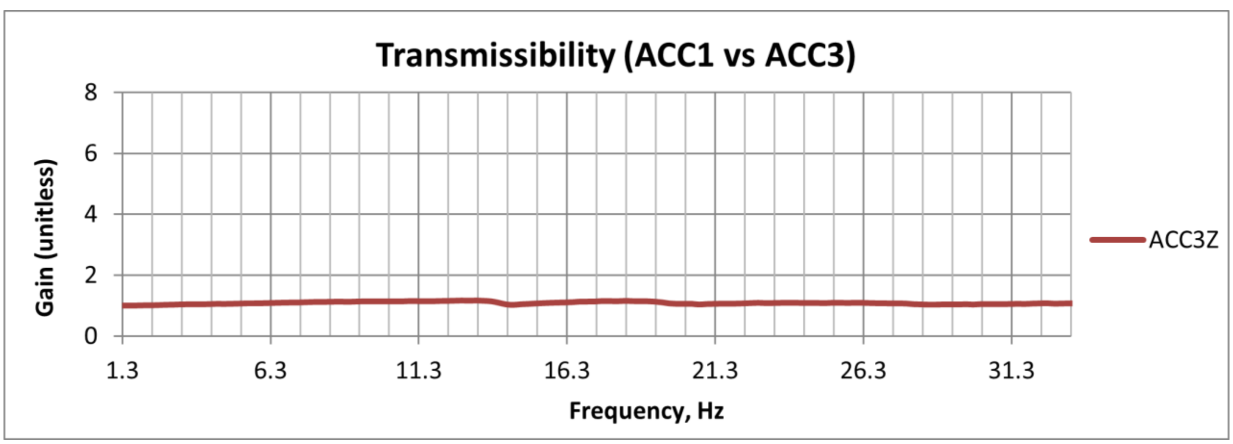

Figure D.6. *UUT-02 resonance frequency in the Z-direction (ACC1 vs ACC3).*

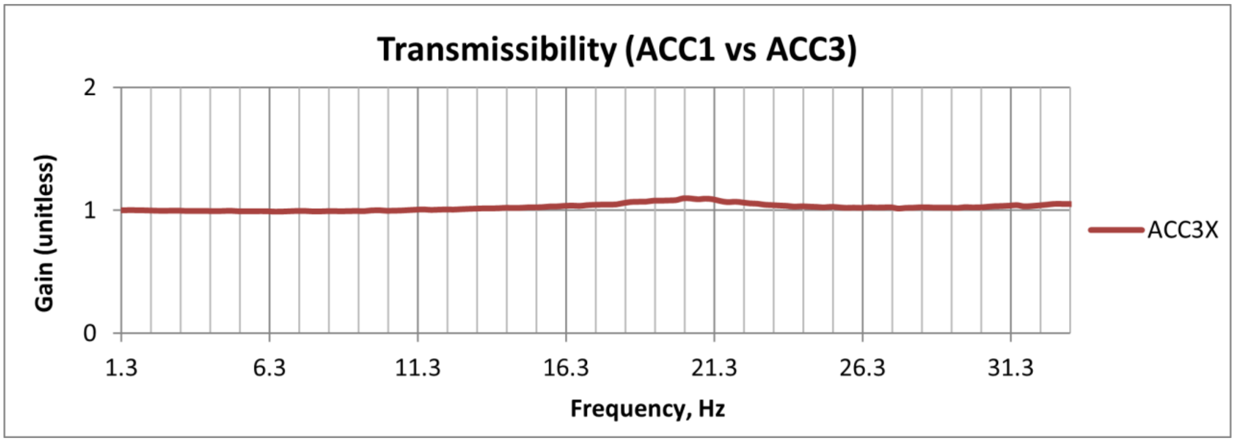

Figure D.7. *UUT-03 resonance frequency in the X-direction (ACC1 vs ACC3).*

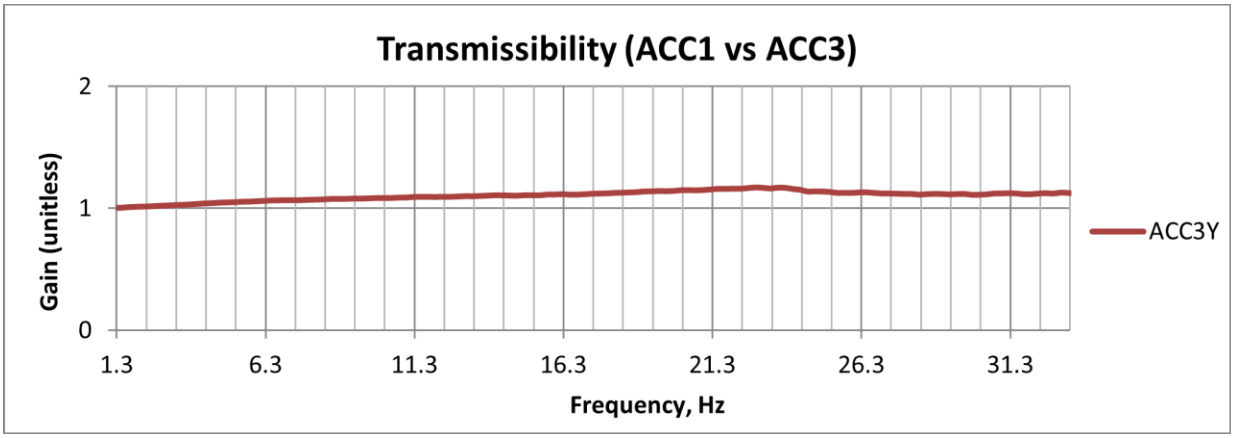

Figure D.8. *UUT-03 resonance frequency in the Y-direction (ACC1 vs ACC3).*

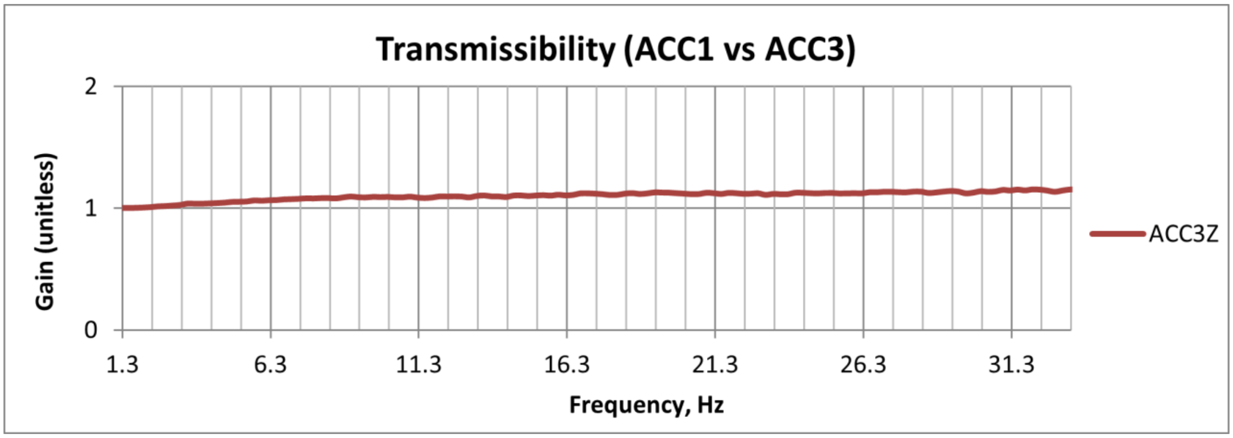

Figure D.9. *UUT-03 resonance frequency in the Z-direction (ACC1 vs ACC3).*

Appendix E Seismic Simulation Test Response Spectra and Time History Plots

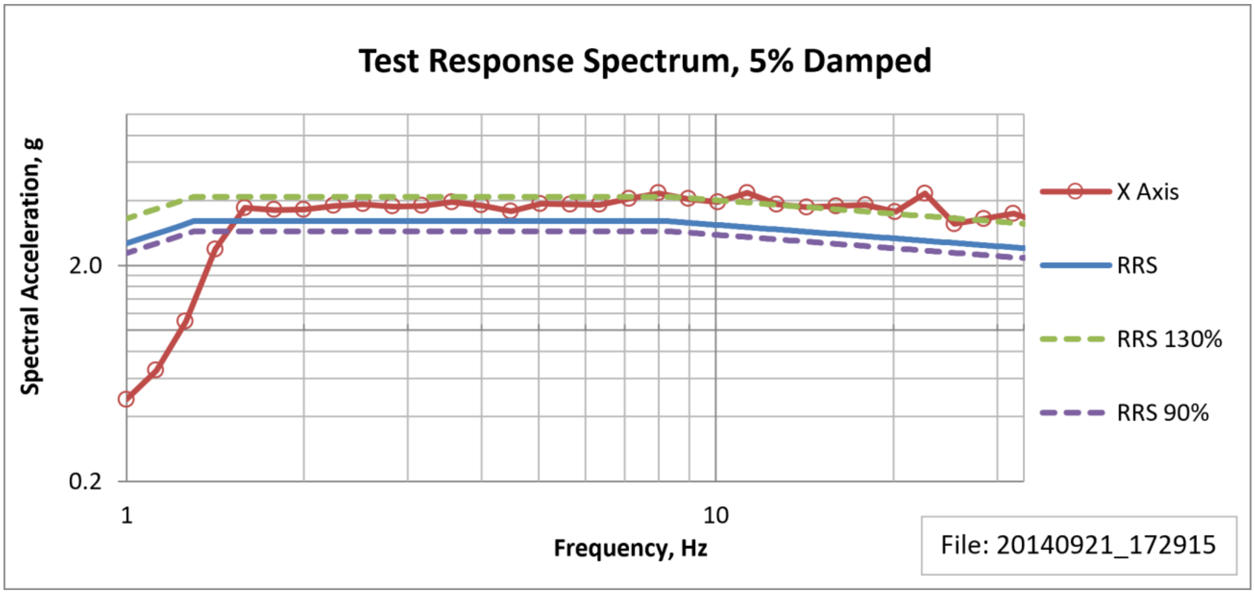

Figure E.1. *Response spectra for UUT-01; X-direction.*

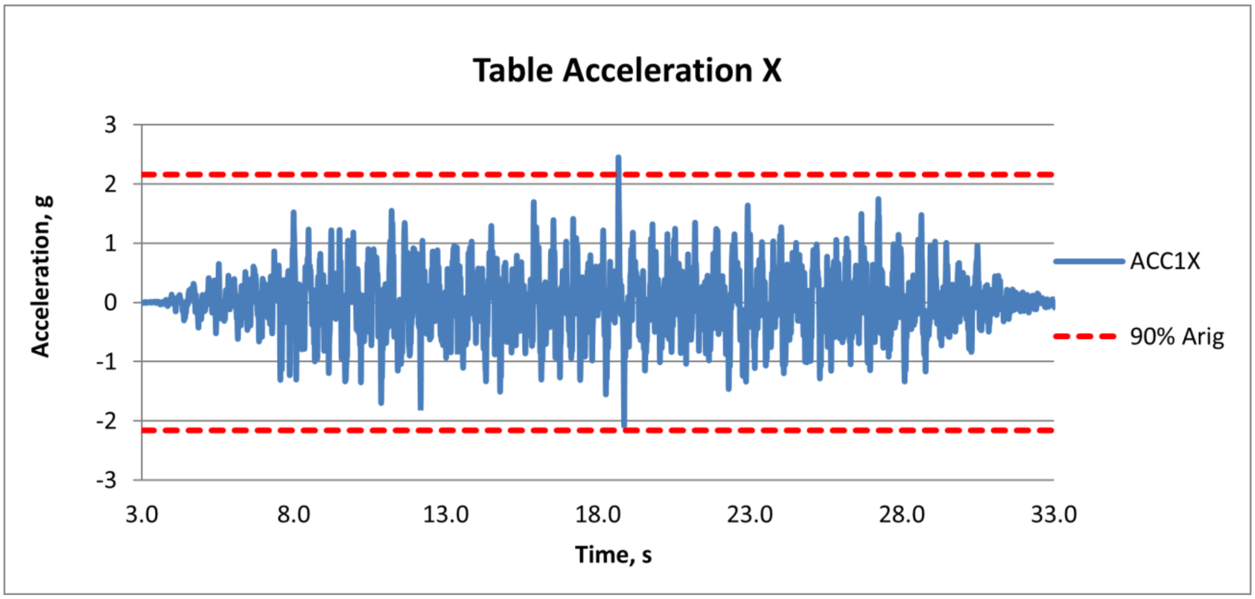

Figure E.2. *Shake table time history for UUT-01; X-direction.*

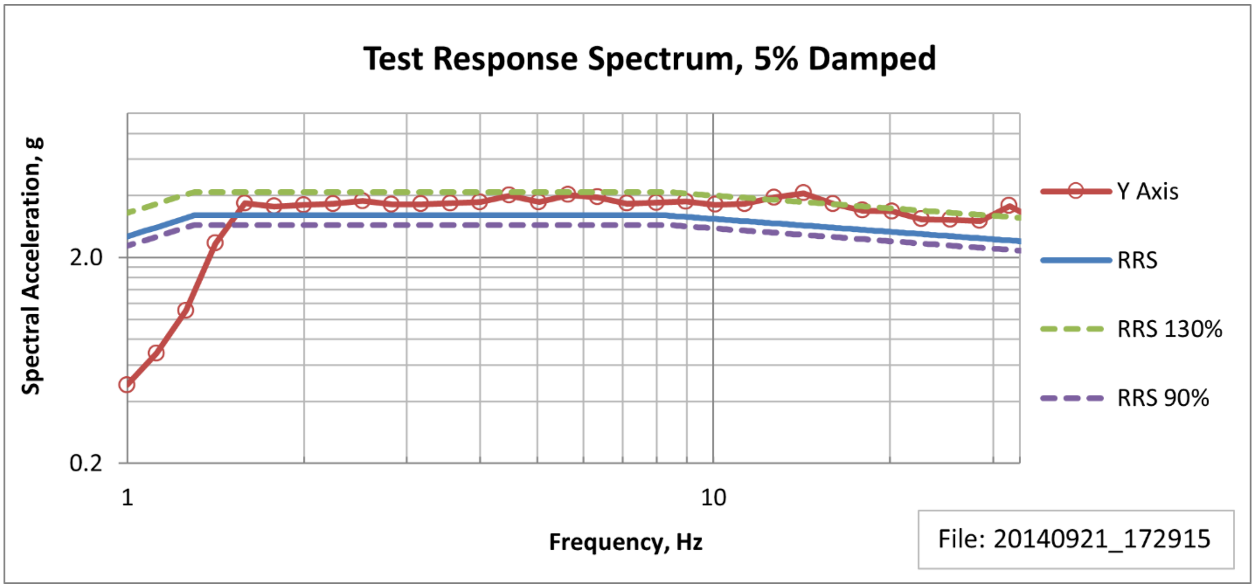

Figure E.3. *Response spectra for UUT-01; Y-direction.*

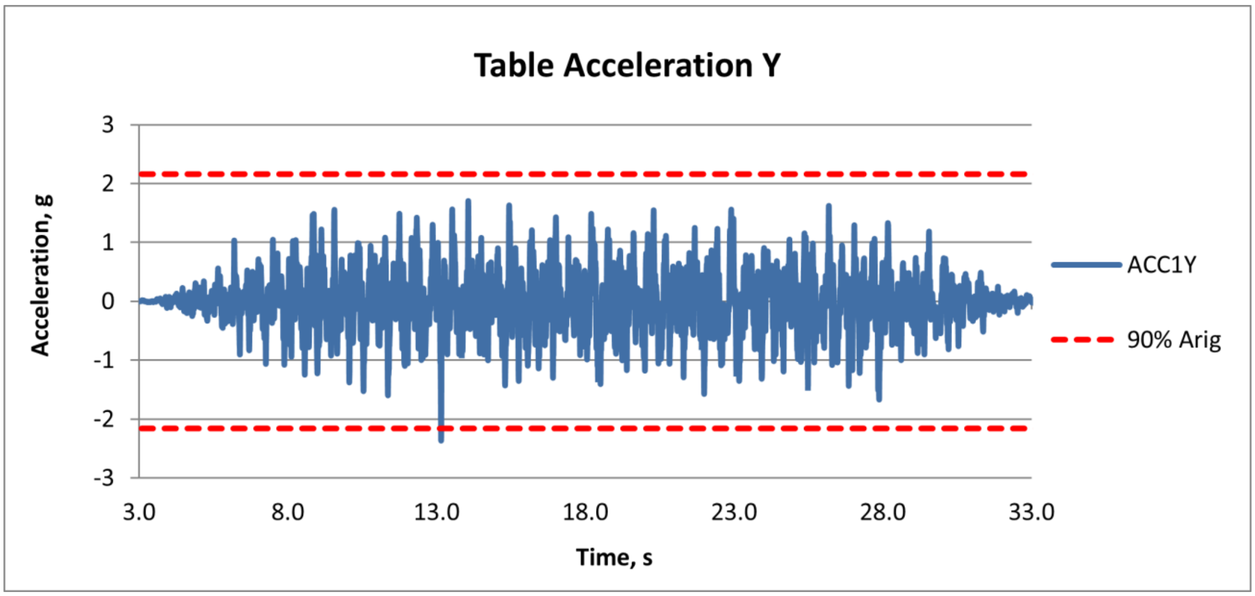

Figure E.4. *Shake table time history for UUT-01; Y-direction.*

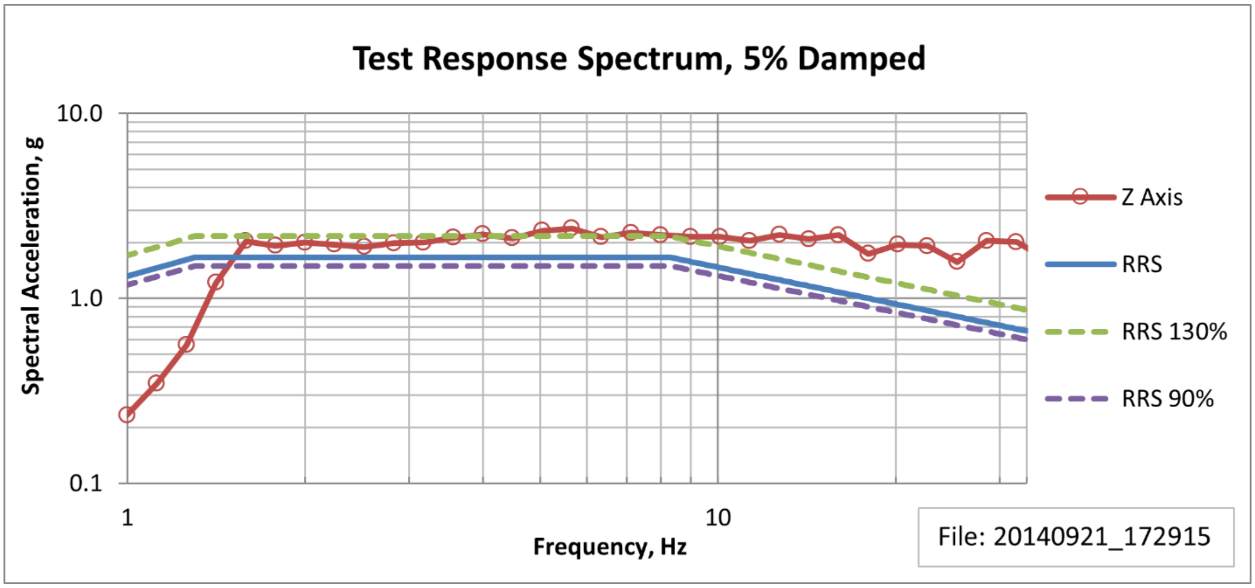

Figure E.5. *Response spectra for UUT-01; Z-direction.*

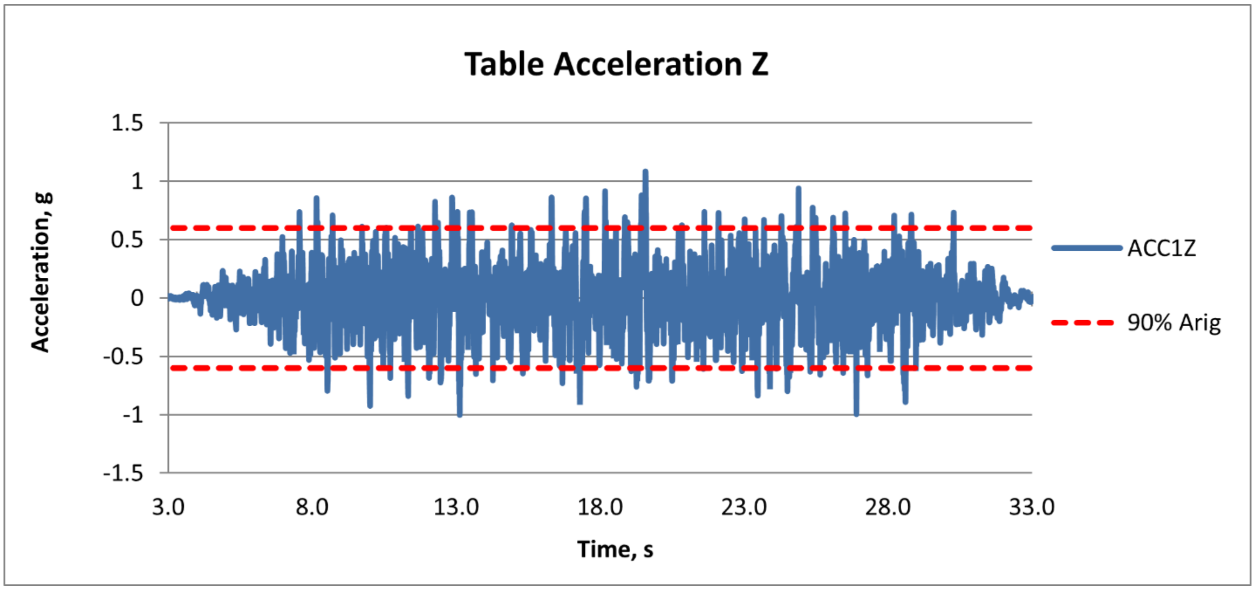

Figure E.6. *Shake table time history for UUT-01; Z-direction.*

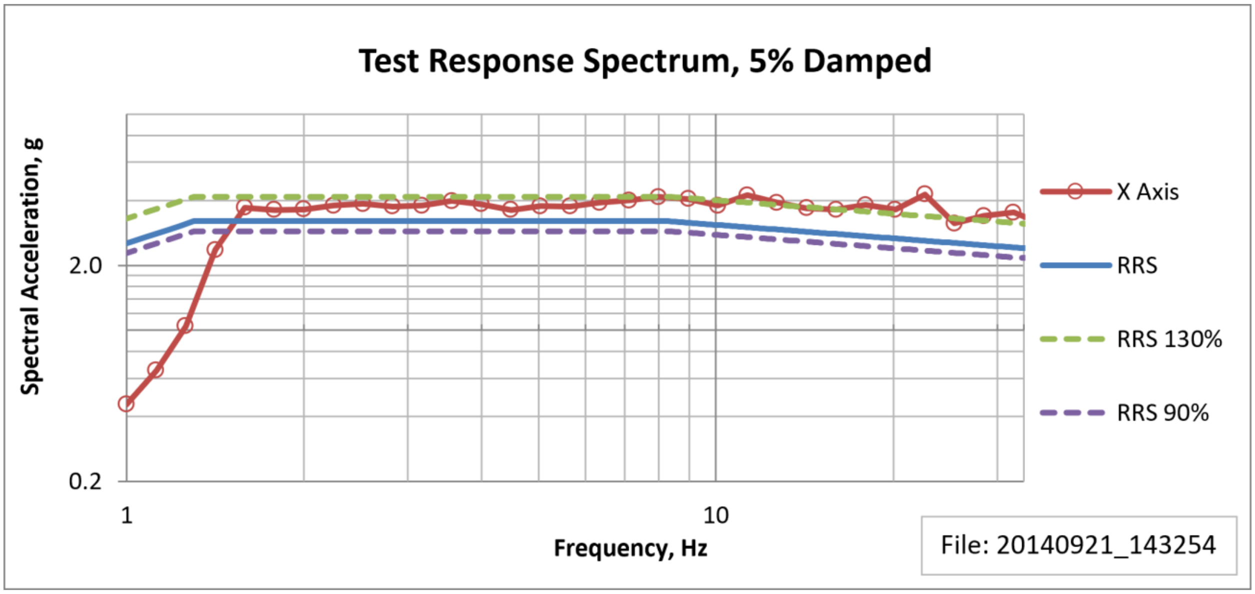

Figure E.7. *Response spectra for UUT-02; X-direction.*

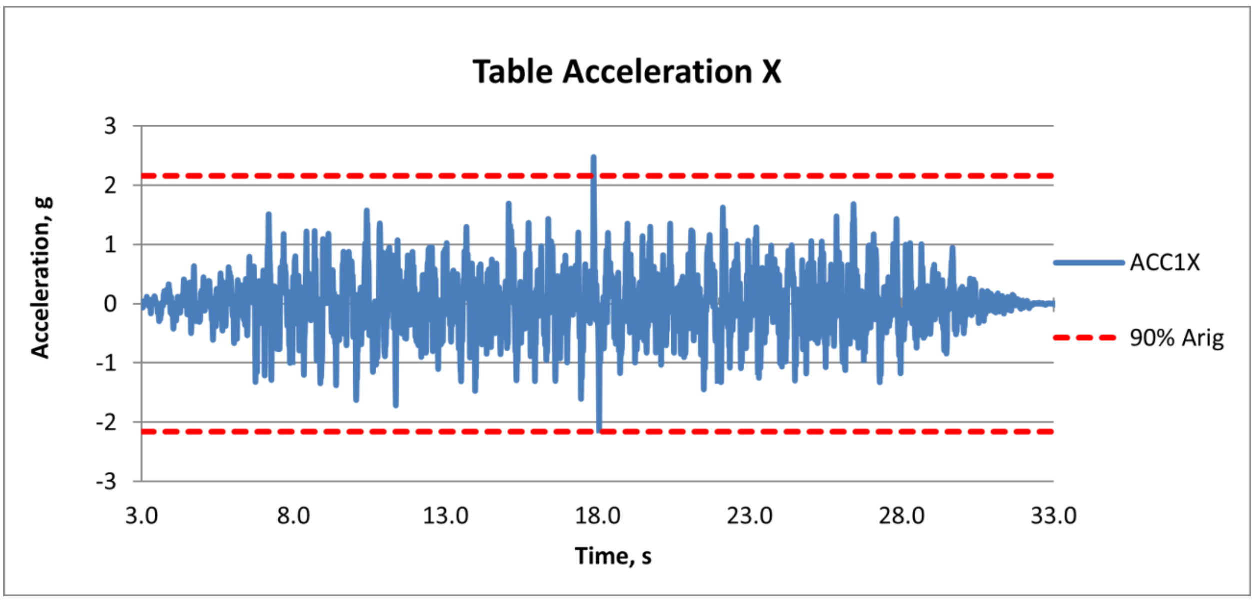

Figure E.8. *Shake table time history for UUT-02; X-direction.*

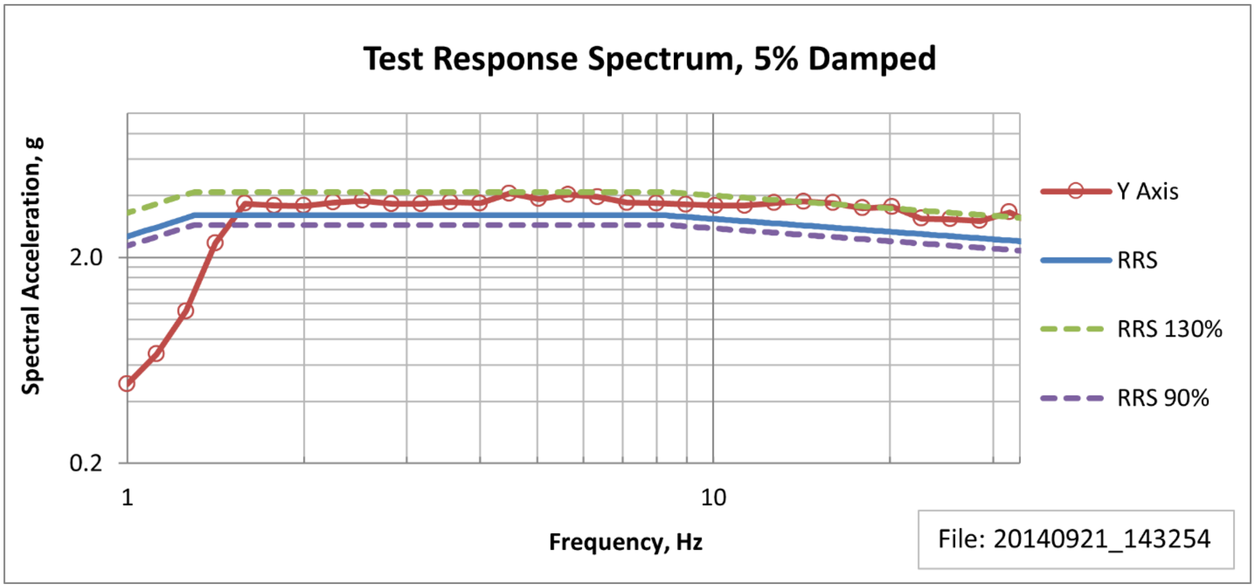

Figure E.9. *Response spectra for UUT-02; Y-direction.*

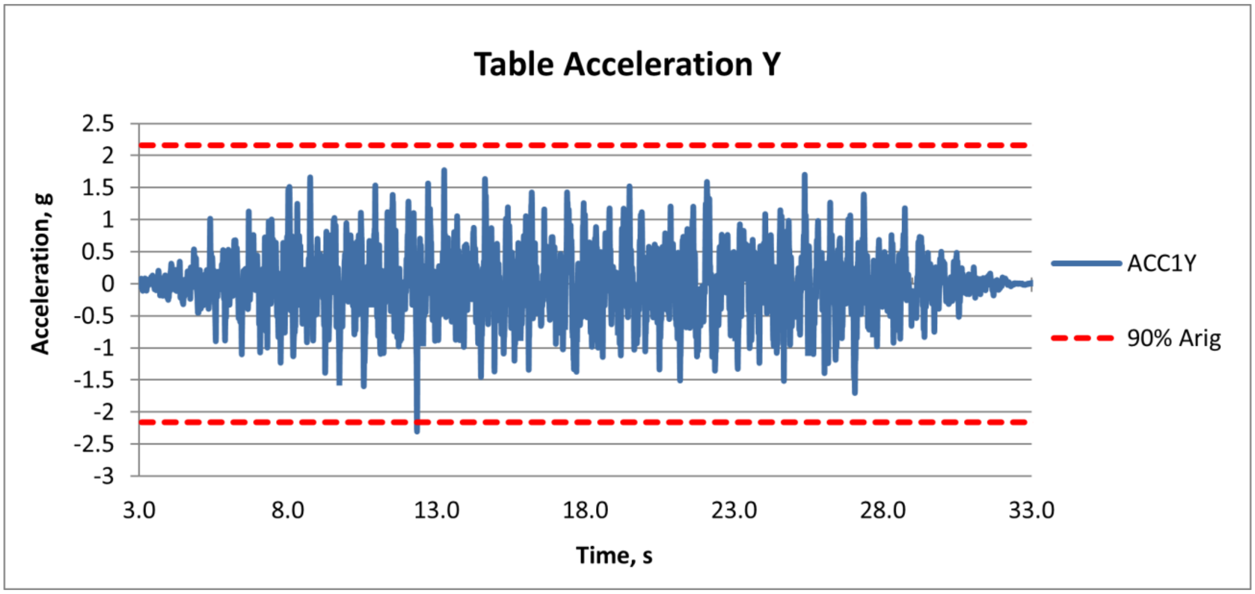

Figure E.10. *Shake table time history for UUT-02; Y-direction.*

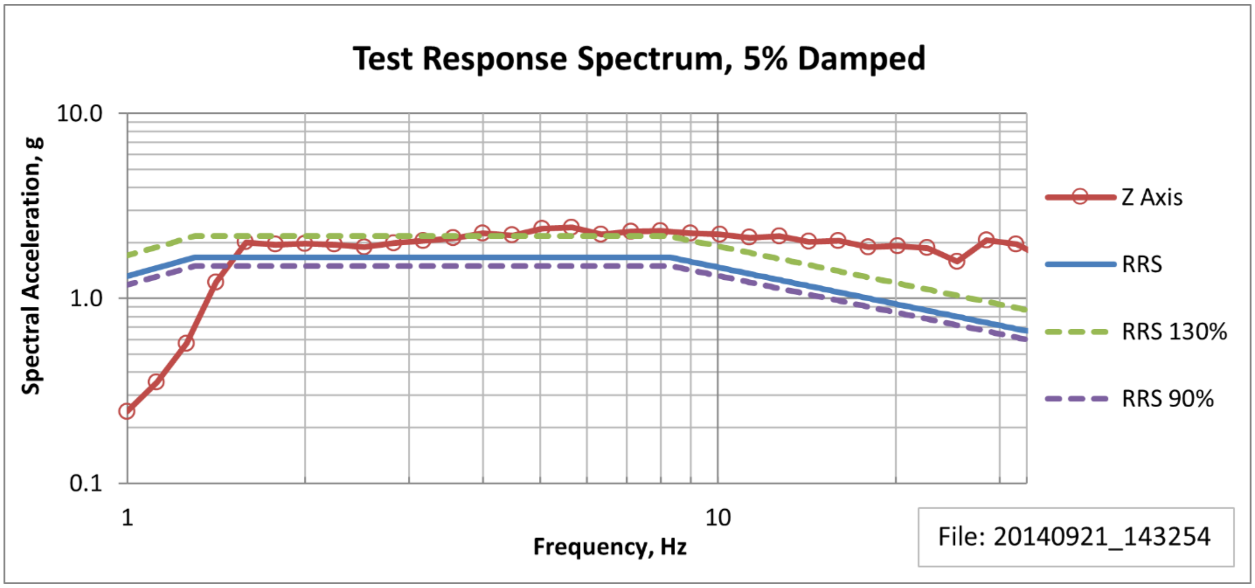

Figure E.11. *Response spectra for UUT-02; Z-direction.*

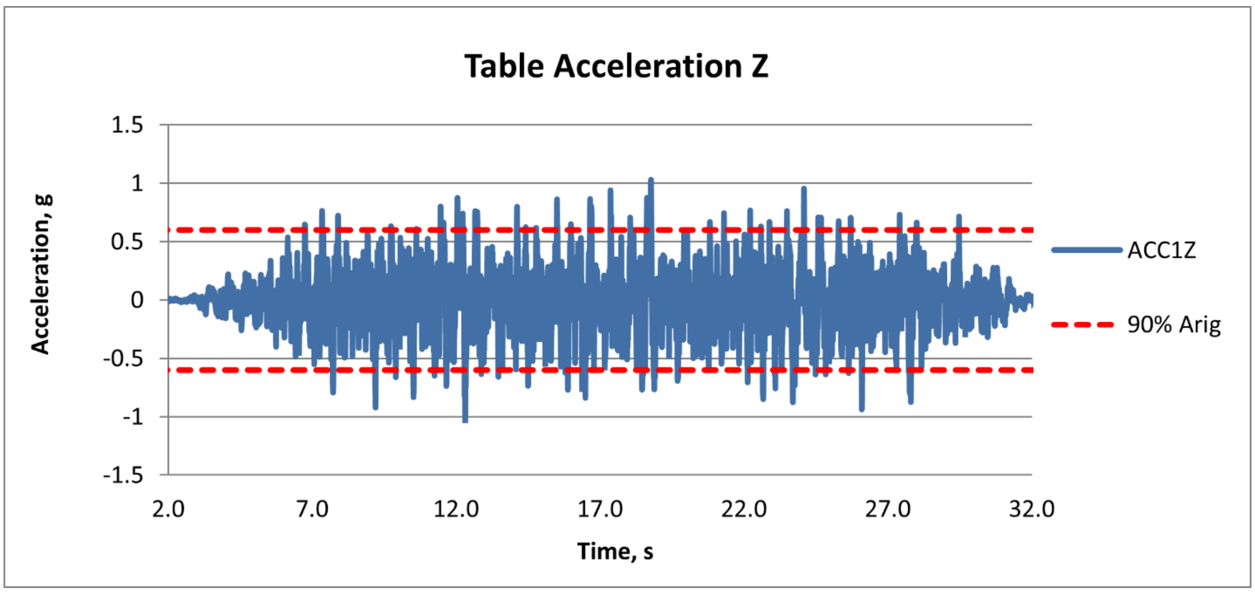

Figure E.12. *Shake table time history for UUT-02; Z-direction.*

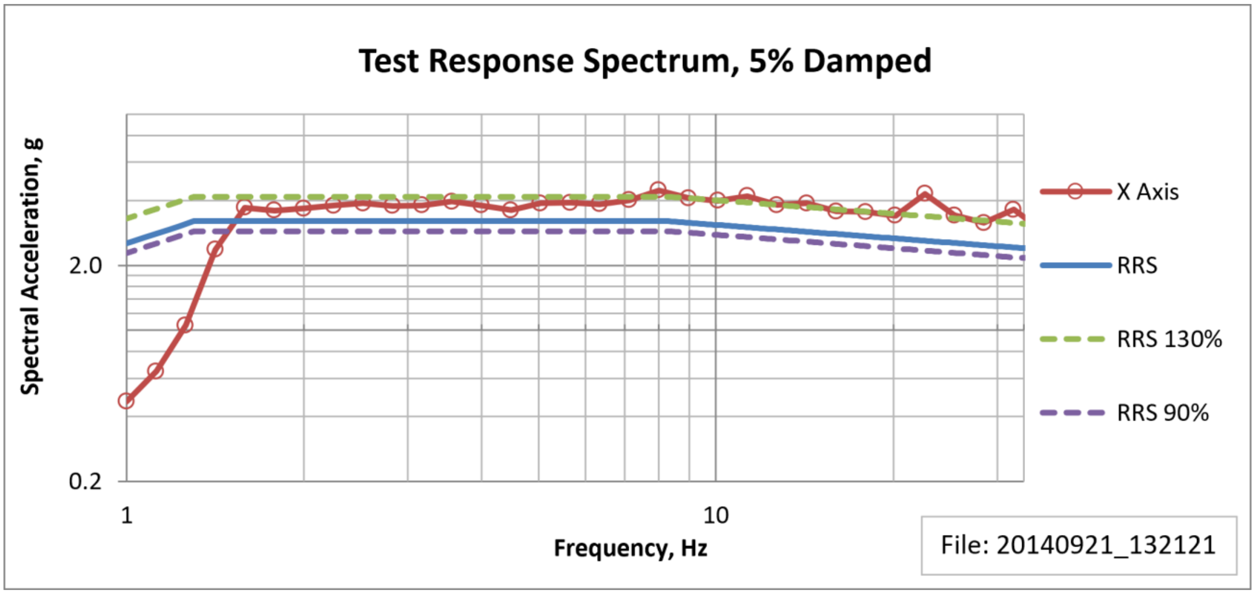

Figure E.13. *Response spectra for UUT-03; X-direction.*

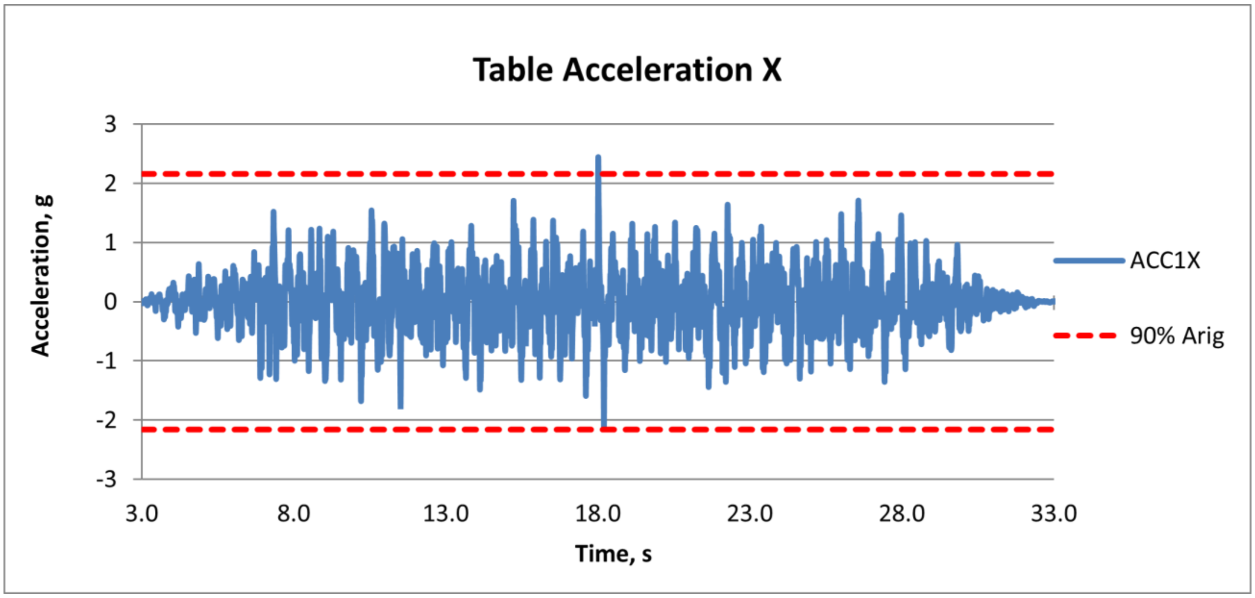

Figure E.14. *Shake table time history for UUT-03; X-direction.*

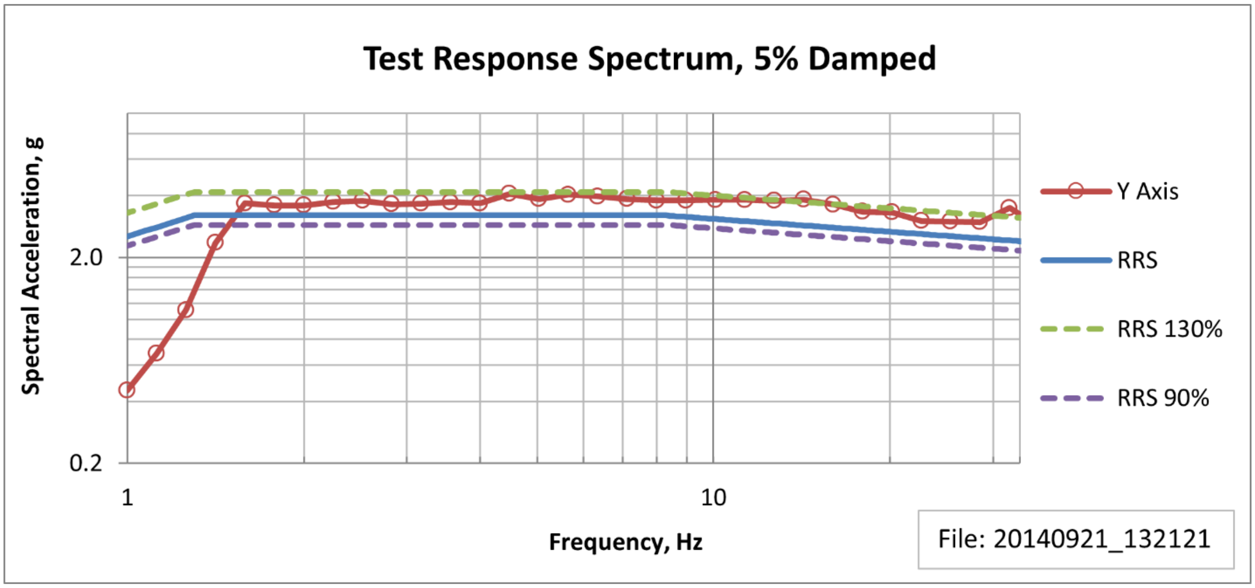

Figure E.15. *Response spectra for UUT-03; Y-direction.*

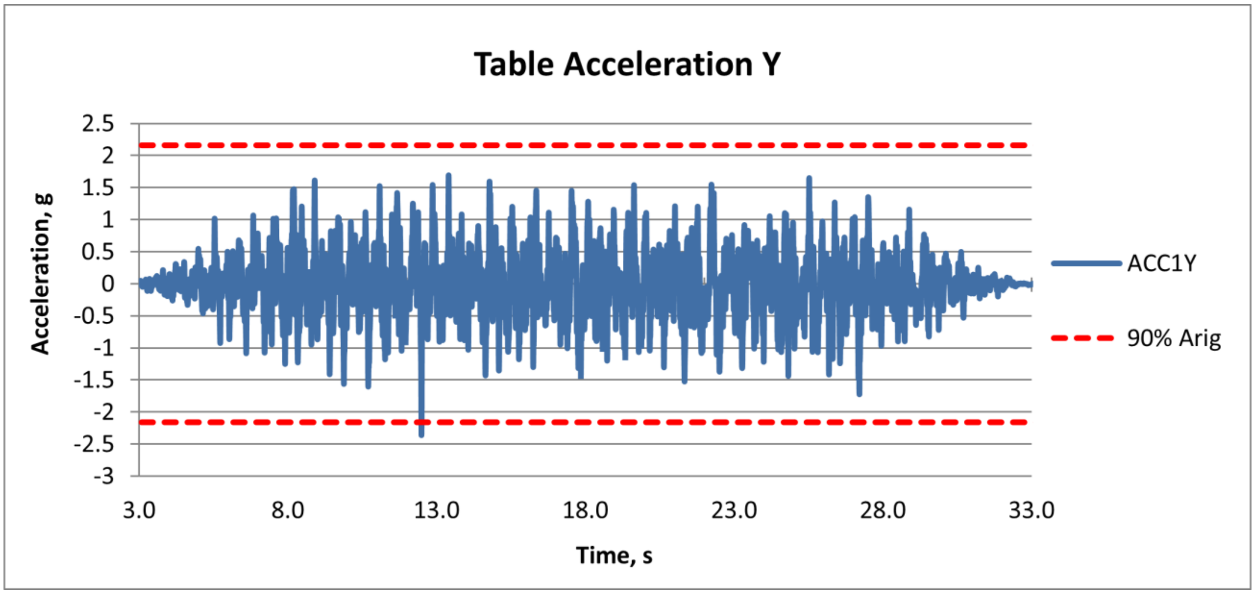

Figure E.16. *Shake table time history for UUT-03; Y-direction.*

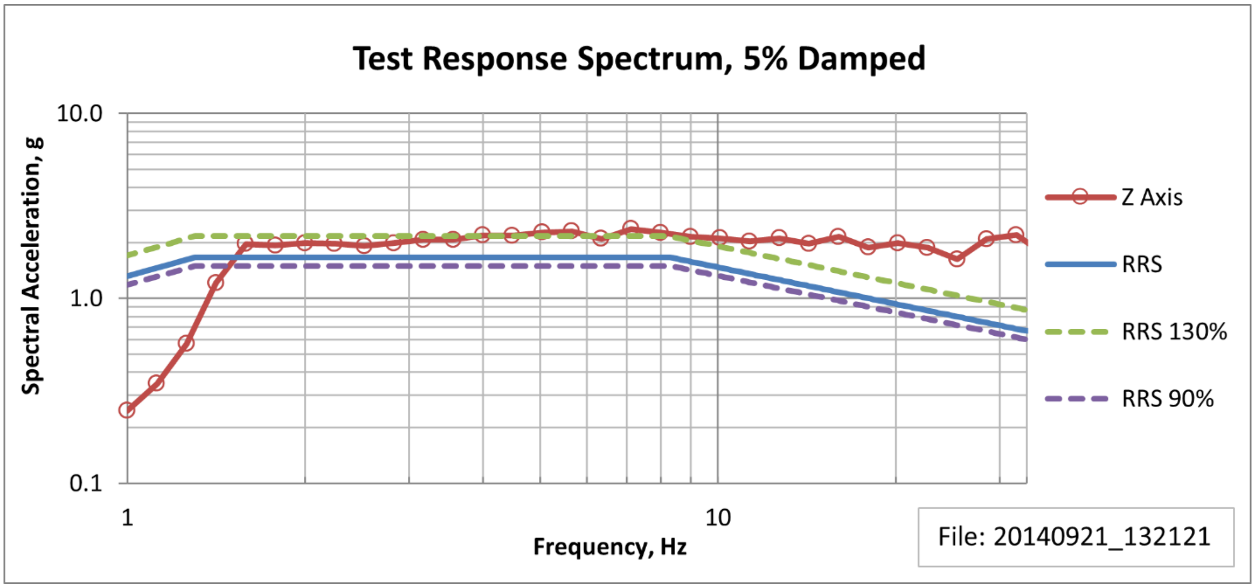

Figure E.17. *Response spectra for UUT-03; Z-direction.*

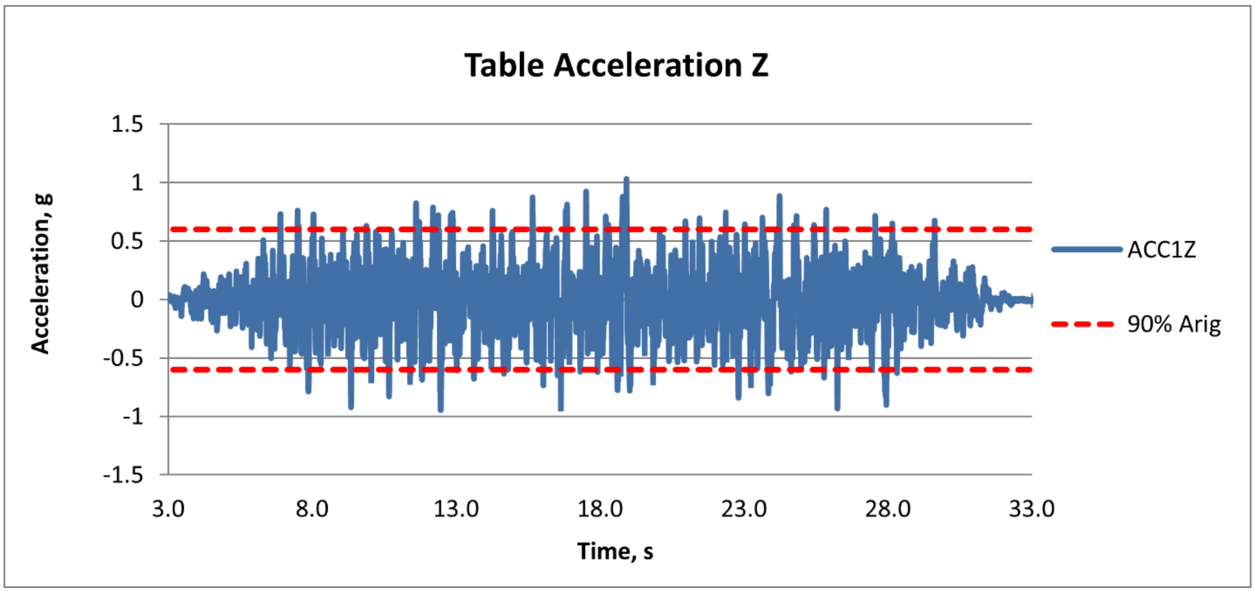

Figure E.18. *Shake table time history for UUT-03; Z-direction.*

Appendix F Coherence Plots

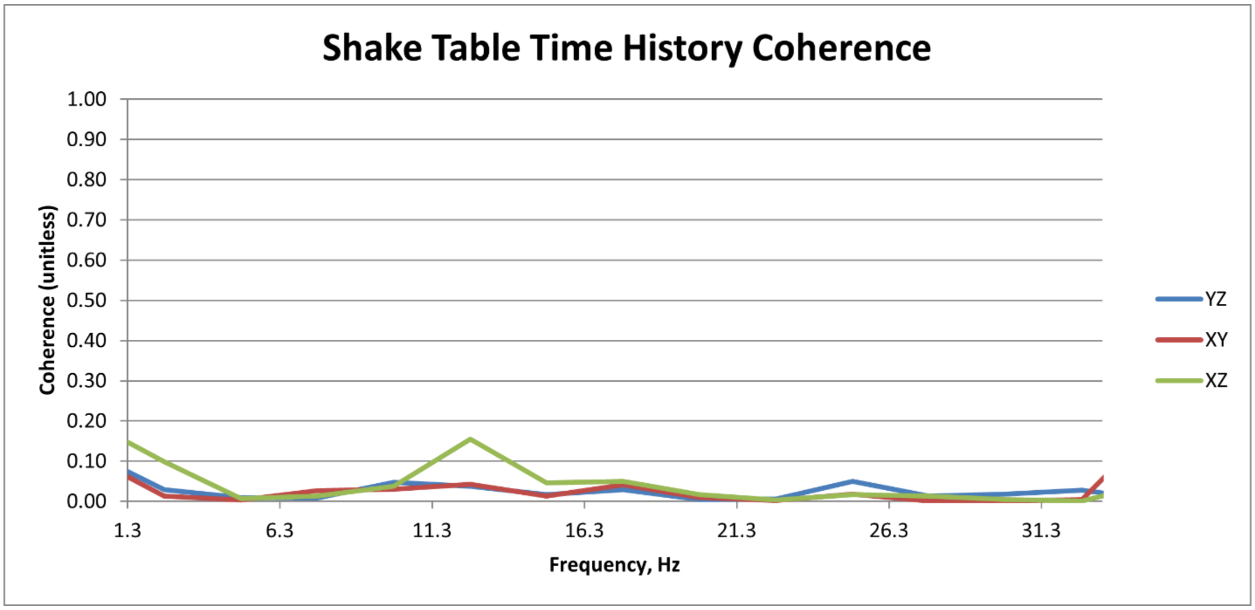

Figure F.1. *Shake table time history coherence for UUT-01 shake.*

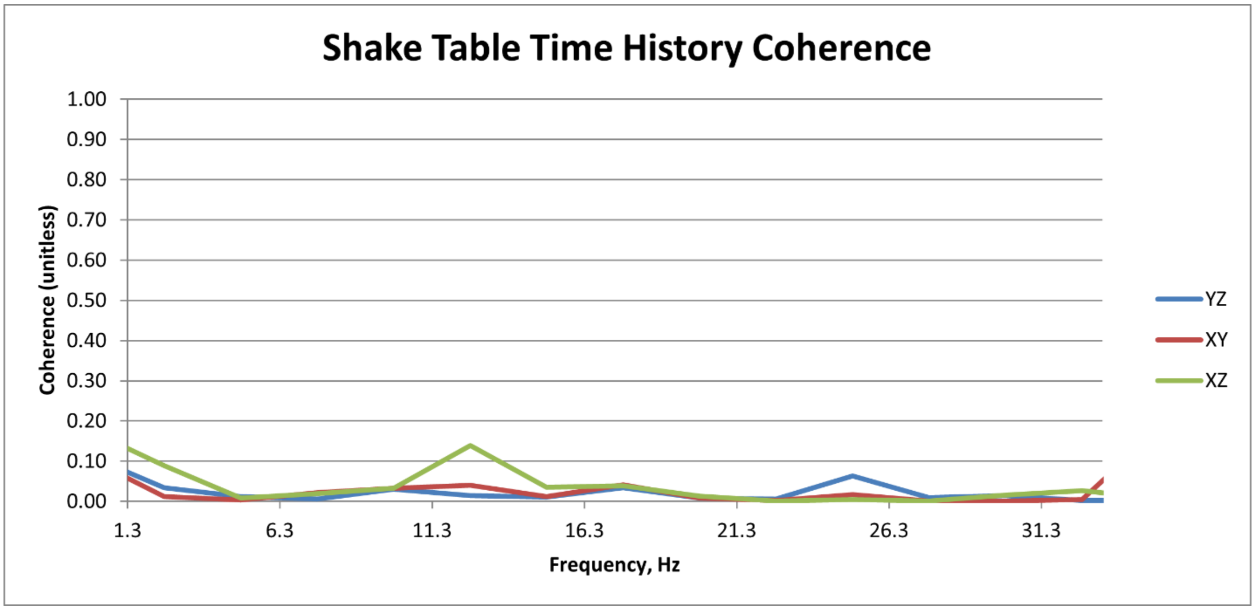

Figure F.2. *Shake table time history coherence for UUT-02 shake.*

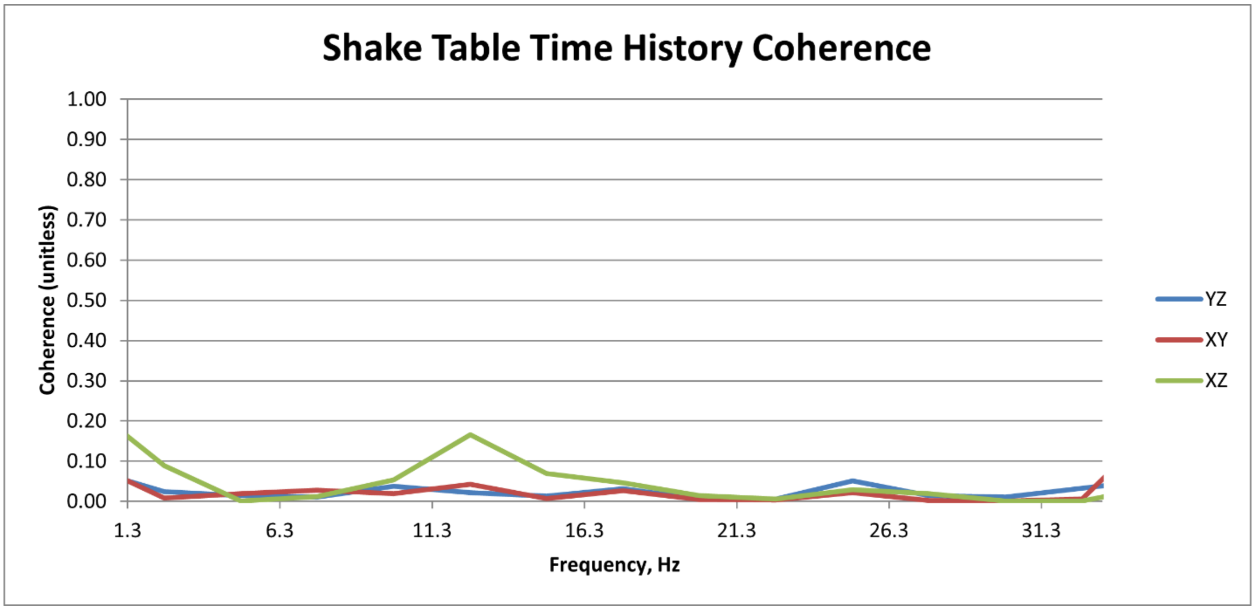

Figure F.3. *Shake table time history coherence for UUT-03 shake.*

Appendix G Testing Laboratory Certificate of Accreditation

INTERNATIONAL ACCREDITATION SERVICE®

CERTIFICATE OF ACCREDITATION

This is to attest that

DCL LABS, LLC
1315 GREG STREET, SUITE 109
SPARKS, NEVADA, 89431, U.S.A.

Testing Laboratory TL-461

has met the requirements of AC89, *IAS Accreditation Criteria for Testing Laboratories*, and has demonstrated compliance with ISO/IEC Standard 17025:2017, *General requirements for the competence of testing and calibration laboratories.* This organization is accredited to provide the services specified in the scope of accreditation.

Effective Date July 23, 2020

IAS ACCREDITED

President

Visit www.iasonline.org for current accreditation information.

SCOPE OF ACCREDITATION

International Accreditation Service, Inc.

3060 Saturn Street, Suite 100, Brea, California 92821, U.S.A. | www.iasonline.org

DCL LABS, LLC

www.shaketest.com

Contact Name Kelly Laplace **Contact Phone** +1 775 358-5085

Accredited to ISO/IEC 17025:2017 *Effective Date July 23, 2020*

Structural	
ANSI/FM Approvals 1950	American National Standard for Seismic Sway Braces For Pipe, Tubing and Conduit
ANSI/ASHRAE Standard 171	Method of Testing for Rating Seismic and Wind Restraints
ICC-ES AC156	Seismic certification by shake-table testing of nonstructural components (section 6.0 - seismic certification test procedure)
TELCORDIA GR-63-CORE	NEBS requirements. Physical protection: - Section 5.4.1 - earthquake test methods (excluding Section 5.4.1.4 static test procedure) - Section 5.4.2 - office vibration test procedure (excluding Alternative Test Procedure for Electronic Subassemblies Only)

End of Report