



**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT  
FACILITIES DEVELOPMENT DIVISION**

**APPLICATION FOR OSHPD SPECIAL SEISMIC  
CERTIFICATION PREAPPROVAL (OSP)**

OFFICE USE ONLY

APPLICATION #: OSP – 0640

**OSHPD Special Seismic Certification Preapproval (OSP)**

Type:  New  Renewal

**Manufacturer Information**

Manufacturer: Vertiv

Manufacturer's Technical Representative: Keith Goshia

Mailing Address: 975 Pittsburgh Drive, Delaware, OH 43015

Telephone: (740) 833-8557

Email: [keith.goshia@vertiv.com](mailto:keith.goshia@vertiv.com)

**Product Information**

Product Name: Liebert EXS UPS

Product Type: Uninterruptible Power Supply

Product Model Number: Varies (See attachment)

(List all unique product identification numbers and/or part numbers)

General Description: UPS cabinets, seismic modifications made to address anomalies observed during tests shall be incorporated into the production units.

Mounting Description: Base mounted-rigid

**Applicant Information**

Applicant Company Name: TRU Compliance, by Structural Integrity Associates, Inc.


Contact Person: Galen Reid

Mailing Address: 5215 Hellyer Ave., Suite 210, San Jose, CA 95138

Telephone: 844-878-0200

Email: [greid@structint.com](mailto:greid@structint.com)

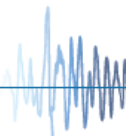
I hereby agree to reimburse the Office of Statewide Health Planning and Development review fees in accordance with the California Administrative Code, 2016.

Signature of Applicant: 

Date: 12/31/19

Title: Program Manager

Company Name: TRU Compliance, by Structural Integrity Associates, Inc.





**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT  
FACILITIES DEVELOPMENT DIVISION**

**California Licensed Structural Engineer Responsible for the Engineering and Test Report(s)**

Company Name: TRU Compliance, by Structural Integrity Associates, Inc.

Name: Andrew M. Coughlin California License Number: S6082

Mailing Address: 5215 Hellyer Ave., Suite 210, San Jose, CA 95138

Telephone: 844-878-0200 Email: [acoughlin@structint.com](mailto:acoughlin@structint.com)

**Supports and Attachments Preapproval**

- Supports and attachments are preapproved under OPM- \_\_\_\_\_  
(Separate application for OSHPD Preapproval of Manufacturer's Certification (OPM) of Supports and attachments is required)
- Supports and attachments are not preapproved

**Certification Method**

- Testing in accordance with:  ICC-ES AC156
- Other (Please Specify): \_\_\_\_\_

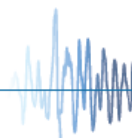
**Testing Laboratory**

Company Name: Environmental Testing Laboratory

Contact Name: Jeremy Lange

Mailing Address: 11034 Indian Trail, Dallas, TX 75229

Telephone: (972) 247-9657 Email: [jeremy@etldallas.com](mailto:jeremy@etldallas.com)





**OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT  
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**Seismic Parameters**

Design in accordance with ASCE 7-10 Chapter 13:  Yes  No

Design Basis of Equipment or Components ( $F_p/W_p$ ) = 1.12 ( $S_{DS} = 1.55, z/h = 1$ ); 1.01 ( $S_{DS} = 2.25, z/h = 0$ )

$S_{DS}$  (Design spectral response acceleration at short period, g) = 1.55 ( $z/h = 1$ ), 2.25 ( $z/h = 0$ )

$a_p$  (In-structure equipment or component amplification factor) = 1.0

$R_p$  (Equipment or component response modification factor) = 2.5

$\Omega_0$  (System overstrength factor) = 2.0

$I_p$  (Importance factor) = 1.5

$z/h$  (Height factor ratio) = 1 ( $S_{DS} = 1.55$ ), 0 ( $S_{DS} = 2.25$ )

Equipment or Component Natural Frequencies (Hz) = See Attachment

Overall dimensions and weight (or range thereof) = See Attachment

Equipment or Components @ grade designed in accordance with ASCE 7-10 Chapter 15:  Yes  No

Design Basis of Equipment or Components ( $V/W$ ) = \_\_\_\_\_

$S_{DS}$  (Design spectral response acceleration at short period, g) = \_\_\_\_\_

$S_{D1}$  (Design spectral response acceleration at 1 second period, g) = \_\_\_\_\_

R (Response modification coefficient) = \_\_\_\_\_

$\Omega_0$  (System overstrength factor) = \_\_\_\_\_

$C_d$  (Deflection amplification factor) = \_\_\_\_\_

$I_p$  (Importance factor) = 1.5

Height to Center of Gravity above base = \_\_\_\_\_

Equipment or Component Natural Frequencies (Hz) = \_\_\_\_\_

Overall dimensions and weight (or range thereof) = \_\_\_\_\_

Tank(s) designed in accordance with ASME BPVC, 2015:  Yes  No

**List of Attachments Supporting Special Seismic Certification**

Test Report(s)  Drawings  Calculations  Manufacturer's Catalog

Other(s) (Please Specify): Product Matrices

**OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2025**

Signature: William Staehlin

Date: May 13, 2021

Print Name: William Staehlin

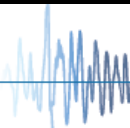
Title: Senior Structural Engineer

Special Seismic Certification Valid Up to:  $S_{DS}$  (g) = See Above

$z/h$  = See Above

Condition of Approval (if applicable): \_\_\_\_\_

\_\_\_\_\_



# SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

1900510-CR-001 R2



<b>Manufacturer:</b> Vertiv Corporation						<b>TABLE 1</b>	
<b>Model Line:</b> Liebert EXS UPS							
<b>Certified Product Construction Summary:</b> Carbon steel frame and skins							
<b>Certified Options Summary:</b> 10, 15, 20 and 30 kVA/kW, 208/220V, Three-Phase Tower							
<b>Mounting Configuration (Standalone):</b> Base mounted - rigid Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.							
<b>Building Code:</b> CBC 2019		<b>Seismic Certification Limits:</b>			$S_{DS} = 1.55 g \quad z/h=1.0$		
					$S_{DS} = 2.25 g \quad z/h=0.0$		
					$I_P = 1.5$		
Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
EXS Frame 1 10 kVA	53S10AC1AXXXXX	25.6	13.2	51.2	437	1 battery string	Extrap.
	...	...	...	...	...		Extrap.
	53S10EC2A0B0052	25.6	13.2	51.2	627.5	2 battery strings	1
EXS Frame 1S with Extended Battery 10 kVA	53S10AC3AXXXXX	25.6	22.7	51.2	893	3 battery strings	Interp.
	...	...	...	...	...		Interp.
	53S10FC4A0A0052	25.6	22.7	51.2	1128.5	4 battery strings	2
EXS Frame 2 15-20 kVA	53S15GC2B0XXXX	29.5	17.3	63	734	Identical to EXS 20kVa, software	Interp.
	53S15AG3AXXXXX	29.5	17.3	63	888		Interp.
	53S15GC4AXXXXX	29.5	17.3	63	1042		Interp.
	53S20GC6A0000CB	29.5	17.3	63	767.5	2 battery strings	3
	53S20GCXAXXXXXX	29.5	17.3	63	888		Interp.
	53S20GC8A0C00CO	29.5	17.3	63	1124.5	4 battery strings	4
EXS Fame 3 30 kVA	53S30HCERXXXXXX	23.6	33.5	63	1162	1 battery string	Interp.
	53S30HCFR000CST	23.6	33.5	63	1581	2 battery strings	5
EBC Frame 3	53BP30H11L1	23.6	33.5	63	870	1 battery string	7
	53BP30H12L1	23.6	33.5	63	1376	2 battery strings	6

# SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

1900510-CR-001 R2



<b>Manufacturer:</b> Vertiv Corporation	<b>TABLE 2</b>
<b>Model Line:</b> Liebert EXS UPS	

**Certified Product Construction Summary:**  
Carbon steel frame and skins

**Certified Options Summary:**  
30 kVA/kW, 208/220V, Three-Phase Tower

**Mounting Configuration (Ganged<sup>1</sup>):**  
Base mounted - rigid  
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

**Building Code:** CBC 2019     **Seismic Certification Limits:**      $S_{DS} = 1.55g$  z/h=1.0      $I_p = 1.5$   
 $S_{DS} = 2.25g$  z/h=0.0

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
EXS Frame 3 30 kVA	53S30HCGRBXXXX	47.2	67	63	1162	1 battery string	Extrap.
	53S30HCFR000CST	47.2	67	63	1581	2 battery strings	8
EBC Frame 3	53BP30R11X1XXXX	23.6	33.5	63	870	1 battery string	Extrap.
	53BP30H21L1	23.6	33.5	63	1376	2 battery strings, 1344.5 lbs <sup>2</sup>	8

Note:  
<sup>1</sup> UUT 5 was ganged to an EBC Frame 3 battery cabinet (2 string) to create UUT8  
<sup>2</sup> EBC Frame 3 ganged battery cabinet weighs less than identical standalone due to right panel being removed to attached the unit to a UPS.

# SPECIAL SEISMIC CERTIFICATION CERTIFIED COMPONENT MATRIX

1900510-CR-001 R2



**Manufacturer:** Vertiv Corporation  
**Model Line:** Liebert EXS UPS

## TABLE 3

### EXS Nomenclature

1-2	3	4-5	6	7	8	9	10	11	12	13-15
Product Line	System Type	Nameplate Rating	Frame Type	Input & Output Voltage	Battery String Qty & No. of Jars/String	Battery Model Code	Factory installed Communication Cards <sup>1,2</sup>	Factory Installed Distribution Slot 1	Factory Installed Distribution Slot 2 <sup>3</sup>	Config Digits
53 = Liebert EXS	S = Single Module	10 = 10kVA/10kW 15 = 15kVA/15kW 20 = 20kVA/20kW 30 = 30kVA/30kW	A = Frame 1 335mm, 10kA B = Frame 1S 570mm, 10kA E = Frame 1 335mm, 30kA F = Frame 1S 570mm, 30kA G = Frame 2 440mm, 30kA H = Frame 3 600mm, 30kA	C = 208/120 in 208/120 out Y = 220/127 in 220/127 out	0 = None 1 = 1 String - 32 Jars 2 = 2 Strings - 32 Jars 3 = 3 Strings - 32 Jars 4 = 4 Strings - 32 Jars 6 = 2 Strings - 28 Jars 7 = 3 Strings - 28 Jars 8 = 4 Strings - 28 Jars E = 1 String - 20 Jars F = 2 Strings - 20 Jars G = 3 Strings - 20 Jars H = 4 Strings - 20 Jars	0 = No Battery A = CSB HRL1234WF2FR R = CSB HRL12150WFR	0 = IS-UNITY-LIFE / None 1 = IS-UNITY-SNMP / None 2 = IS-UNITY-DP / None 3 = IS-UNITY-LIFE / IS-RELAY 4 = IS-UNITY-LIFE / IS-485EXI 5 = IS-UNITY-SNMP / IS-RELAY 6 = IS-UNITY-SNMP / IS-485EXI 7 = IS-UNITY-DP / IS-RELAY 8 = IS-UNITY-DP / IS-485EXI A = IS-UNITY-DP / IS-UNITY-DP B = IS-UNITY-DP / IS-UNITY-SNMP C = IS-UNITY-SNMP / IS-UNITY-SNMP D = IS-485EXI / None E = IS-485EXI / IS-RELAY	These characters are shared for digits 11 & 12: 0 = None A - (2) L21-30R [PD3-001] B - (6) L6-30R [PD3-002] C - (6) L5-30R [PD3-003] D - (1) IEC60309 3W [PD3-004] E - (6) L5-20R [PD3-005] F - (6) L6-20R [PD3-006] G - (2) L15-30R [PD3-007] H - (1) CS8365C [PD3-008] J - (2) L21-20R [PD3-009] K - (2) L15-20R [PD3-010] L - (1) IEC60309 4W [PD3-011] 1 = (2) L6-30R, (8) 5-15/20R, [PD2-101] 2 = (4) L6-20R, (4) 5-15/20R, [PD2-102] 3 = (4) L6-30R, (4) 5-15/20R, [PD2-103] 4 = (2) L6-30R, (2) L6-20R, (4) 5-15/20R, [PD2-104] 5 = (2) L5-30R, (2) L5-20R, (4) 5-15/20R, [PD2-105] 6 = (4) L6-20R, (4) L5-20R, [PD2-106] 7 = (4) L5-20R, (4) 5-15/20R, [PD2-107] 8 = (2) L6-30R, (2) L6-20R, [PD2-108] 9 = (2) L14-30R, [PD2-109] W = (4) IEC320-C19, (4) IEC320-C13, [PD2-200] X = (2) IEC320-C19, (8) IEC320-C13, [PD2-201] Y = (12) IEC320-C13, [PD2-202] Z = (2) IEC320-32A, (4) IEC320-C13, [PD2-204]	Unique Number Automatic Assigned	

# SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX

1900510-CR-001 R2



<b>Manufacturer:</b> Vertiv Corporation <b>Model Line:</b> Liebert EXS UPS		<b>Table Description:</b> Subcomponents				<b>TABLE 4</b>		
<b>Building Code:</b> CBC 2019		<b>Seismic Certification Limits:</b>				$S_{DS} = 1.55 g \quad z/h = 1.0$ $S_{DS} = 2.25 g \quad z/h = 0.0$		
<b>Model Line (Manufacturer)</b>	<b>Model</b>	<b>Dimension (in)</b>			<b>Weight (lb)</b>	<b>Material</b>	<b>Notes</b>	<b>UUT</b>
		<b>Depth</b>	<b>Width</b>	<b>Height</b>				
Battery (CBS)	HRL123W-F2FR	2.6	6	3.7	6	Lead Acid		1,2,3,4,5
	HRL12150W-FR	7.7	5.12	6.8	26.5	Lead Acid		6,7,8
Battery (Data Safe)	12HX150	7.68	5.12	6.46	22.5	Lead Acid		8
Bypass /Maintenance Isolation Breaker (ABB)	S203-C40	2.1	2.7	3.5	0.8	Plastic		1,2,3
Maintenance Bypass Breaker (ABB)	S203-C50	2.1	2.7	3.5	0.8	Plastic		1,2,3
2925.5	S204-C40	2.8	2.7	3.5	1.1	Plastic		1,2,3
Breaker (NADER)	NDM1-125C80/3	2.8	2.7	3.5	1.2	Plastic		4,5
	NDM1-125C125/3	2.8	2.7	3.5	1.2	Plastic		8
Breaker (Siemens)	3VA5217-5EC31-0AA0	4.2	4.1	7.3	4.5	Plastic		6,7,8
Communication Cards (Liebert)	IS-UNITY-LIFE		3	1.5	0.44	Carbon steel and plastic		1,2
	IS-UNITY-SNMP		3	1.5	0.44			3
	IS-UNITY-DP		3	1.5	0.44			4
	IS-RELAY		3	1.5	0.44			5,6
	IS-485EXI		3	1.5	0.44			5,6

# SPECIAL SEISMIC CERTIFICATION CERTIFIED SUBCOMPONENT MATRIX



1900510-CR-001 R2

<b>Manufacturer:</b> Vertiv Corporation		<b>Table Description:</b> PODS			<b>TABLE 5</b>			
<b>Model Line:</b> Liebert EXS UPS								
<b>Building Code:</b> CBC 2019		<b>Seismic Certification Limits:</b>			$S_{DS} = 1.55 g \quad z/h = 1.0$		$I_P = 1.5$	
					$S_{DS} = 2.25 g \quad z/h = 0.0$			
Model Line (Manufacturer)	Model <sup>1</sup>	Dimension (in)			Weight (lb)	Material	Notes	UUT
		Depth	Width	Height				
Power Output Distribution (Vertiv Co.)	PD3-001		7.4	5.7	4.4	Carbon steel and plastic	(2) L21-30R	2
	PD3-002		7.4	5.7	6.6	Carbon steel and plastic	(6) L6-30R	1
	PD3-003		7.4	5.7	6.6	Carbon steel and plastic	(6) L5-30R	4
	PD3-004		7.4	5.7	4.4	Carbon steel and plastic	(1) IEC60309 - 60A (4W+G)	Interp.
	PD3-005		7.4	5.7	6.6	Carbon steel and plastic	(6) L5-20R	Interp.
	PD3-006		7.4	5.7	6.6	Carbon steel and plastic	(6) L6-20R	Interp.
	PD3-007		7.4	5.7	4.4	Carbon steel and plastic	(2) L15-30R	Interp.
	PD3-008		7.4	5.7	4.4	Carbon steel and plastic	(1) CS8364C- 60A	Interp.
	PD3-009		7.4	5.7	4.4	Carbon steel and plastic	(2) L21-20R	Interp.
	PD3-010		7.4	5.7	4.4	Carbon steel and plastic	(2) L15-20R	Interp.
	PD3-011		7.4	5.7	4.4	Carbon steel and plastic	(1) IEC60309 - 60A (3W+G)	Interp.

Notes:  
<sup>1</sup> All PODS are of similar construction, output receptacle vary.



# UNIT UNDER TEST (UUT) SUMMARY SHEET

1900510-CR-001 R2



**Manufacturer:** Vertiv Corporation  
**Model Line:** Liebert EXS UPS

UUT	Unit Description	Report Number	Testing Laboratory	S <sub>DS</sub>	z/h	I <sub>p</sub>
1	EXS Frame 1 10 kVA Standalone	15392 Rev.3 and Addendum "15392 Rev.3 Addendum 1"	ETL- Dallas	1.55 2.25	1 0	1.5
2	EXS Frame 1S 10 kVA Standalone	15392 Rev.3 and Addendum "15392 Rev.3 Addendum 1"	ETL-Dallas	1.55 2.25	1 0	1.5
3	EXS Frame 2 20 kVA Standalone 2 String	15392 Rev.3 and Addendum "15392 Rev.3 Addendum 1"	ETL-Dallas	1.55 2.25	1 0	1.5
4	EXS Frame 2 20 kVA Standalone 4 String	15392 Rev.3 and Addendum "15392 Rev.3 Addendum 1"	ETL-Dallas	1.55 2.25	1 0	1.5
5	EXS Frame 3 30 kVA Standalone 2 String	15392 Rev.3 and Addendum "15392 Rev.3 Addendum 1"	ETL-Dallas	1.55 2.25	1 0	1.5
6	EBC Frame 3 Standalone 4 String	15392 Rev.3 and Addendum "15392 Rev.3 Addendum 1"	ETL-Dallas	1.55 2.25	1 0	1.5
7	EBC Frame 3 Standalone 2 String	15392 Rev.3 and Addendum "15392 Rev.3 Addendum 1"	ETL-Dallas	1.55 2.25	1 0	1.5
8	EBC Frame 3 - EXS Frame 3 Ganged 4 String	15392 Rev.3 and Addendum "15392 Rev.3 Addendum 1"	ETL-Dallas	1.55 2.25	1 0	1.5

**Notes:**

# UNIT UNDER TEST (UUT) SUMMARY SHEET



**1900510-CR-001 R2**

<b>Manufacturer:</b> Vertiv Corporation	<b>UUT 1</b>
<b>Model Line:</b> Liebert EXS UPS	
<b>Model Number:</b> 53S10EC2A0B0052	
<b>Serial Number:</b> M19GBE0002	

**Product Construction Summary:**  
Carbon steel frame and skin

**Options/Subcomponent Summary:**  
Battery - CBS (PN: HRL123W-F2Fr, Bypass/Maintenance Isolator Breaker - ABB: S203-C40, Maintenance Bypass Breaker - ABB: S203-C50, Rectifier Input Breaker-ABB: S204-C40, Communication Card-Vertiv: IS-UNITY-LIFE, Power Output Distribution-Vertiv: PD3-002

### UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
627.5	25.6	13.2	51.2	13.84	10.59	22.50

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2019	ICC-ES AC156 (2018)	1.55	1.0	1.5	2.48	1.86	1.50	0.60
		2.25	0.0					

**Test Mounting Details:**



UUT base mounted rigid to shake table with mounting brackets at the front and rear base of unit. Each mounting bracket (Vertiv PN: 660267P1) was attached to the unit with (4) 3/8" Grade 5 bolts and to the shake table with (3) 3/8" Grade 5 bolts. All bolts used lock washers and flat washers.  
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.  
Contents were included in testing per operating conditions.

# UNIT UNDER TEST (UUT) SUMMARY SHEET



1900510-CR-001 R2

<b>Manufacturer:</b> Vertiv Corporation	<b>UUT 2</b>
<b>Model Line:</b> Liebert EXS UPS	
<b>Model Number:</b> 53S10FC4A0A0052	
<b>Serial Number:</b> M19GBE0003	

**Product Construction Summary:**  
Carbon steel frame and skin, sidecar battery

**Options/Subcomponent Summary:**  
Battery - CBS (PN: HRL123W-F2Fr, Bypass/Maintenance Isolator Breaker - ABB: S203-C40, Maintenance Bypass Breaker - ABB: S203-C50, Rectifier Input Breaker-ABB: S204-C40, Communication Card-Vertiv: IS-UNITY-LIFE, Power Output Distribution-Vertiv: PD3-001

### UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1128.5	25.6	22.7	51.2	8.62	11.01	28.40

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2019	ICC-ES AC156 (2018)	1.55	1.0	1.5	2.48	1.86	1.50	0.60
		2.25	0.0					

**Test Mounting Details:**



UUT base mounted rigid to shake table with mounting brackets at the front and rear base of unit. Each mounting bracket (Vertiv PN: 660130P1 & 660130P2) attached to the shake table with (4) 3/8" Grade 5 bolts and to the unit with (4) 3/8" Grade 5 bolts. All bolts used lock washers and flat washers.  
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.  
Contents were included in testing per operating conditions.

# UNIT UNDER TEST (UUT) SUMMARY SHEET



1900510-CR-001 R2

<b>Manufacturer:</b> Vertiv Corporation	<b>UUT 3</b>
<b>Model Line:</b> Liebert EXS UPS	
<b>Model Number:</b> 53S20GC6A0000CB	
<b>Serial Number:</b> M19GB00002	

**Product Construction Summary:**  
Carbon steel frame and skins, 2 battery string

**Options/Subcomponent Summary:**  
Battery - CBS (PN: HRL123W-F2Fr, Bypass/Maintenance Isolator Breaker - ABB: S203-C40, Maintenance Bypass Breaker - ABB: S203-C50, Rectifier Input Breaker-ABB: S204-C40, Communication Card-Vertiv: IS-UNITY-SNMP

**UUT Properties**

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
767.5	29.5	17.3	63	11.52	5.92	>33.3

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2019	ICC-ES AC156 (2018)	1.55	1.0	1.5	2.48	1.86	1.50	0.60
		2.25	0.0					

**Test Mounting Details:**



UUT base mounted rigid to shake table with mounting brackets at the front and rear base of unit. Each mounting bracket (Vertiv PN: 660224P1) was attached to the unit with (4) 3/8" Grade 5 bolts and to the shake table with (4) 3/8" Grade 5 bolts. All bolts used lock washers and flat washers.  
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.  
Contents were included in testing per operating conditions.

# UNIT UNDER TEST (UUT) SUMMARY SHEET



1900510-CR-001 R2

<b>Manufacturer:</b> Vertiv Corporation	<b>UUT 4</b>
<b>Model Line:</b> Liebert EXS UPS	
<b>Model Number:</b> 53S20GC8A0C00CO	
<b>Serial Number:</b> M19GB00003	

**Product Construction Summary:**  
Carbon steel and skin - 4 battery string

**Options/Subcomponent Summary:**  
Battery - CBS (PN: HRL123W-F2Fr, Breaker-Nader: NDM1-125C80/3 Communication Card-Vertiv: IS-UNITY-DP, Power Output Distribution-Vertiv: PD3-003

### UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1124.5	29.5	17.3	63	9.06	3.79	19.96

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2019	ICC-ES AC156 (2018)	1.55	1.0	1.5	2.48	1.86	1.50	0.60
		2.25	0.0					

### Test Mounting Details:



UUT base mounted rigid to shake table with mounting brackets at the front and rear base of unit. Each mounting bracket (Vertiv PN: 660224P1) was attached to the unit with (4) 3/8" Grade 5 bolts and to the shake table with (4) 3/8" Grade 5 bolts. All bolts used lock washers and flat washers.  
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.  
Contents were included in testing per operating conditions.

# UNIT UNDER TEST (UUT) SUMMARY SHEET



1900510-CR-001 R2

<b>Manufacturer:</b> Vertiv Corporation	<b>UUT 5</b>
<b>Model Line:</b> Liebert EXS UPS	
<b>Model Number:</b> 53S30HCFR000CST <b>Serial Number:</b> M19GBE008	

**Product Construction Summary:**  
Carbon steel frame and skin

**Options/Subcomponent Summary:**  
Battery - CBS (PN: HRL123W-F2Fr, Breaker-Nader: NDM1-125C80/3, Communication Card-Vertiv: IS-Relay, Communication Card-Vertiv: IS-485EXI, Output Distribution-Vertiv: PD2-102

### UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1581	23.6	33.5	63	12.01	5.51	17.24

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2019	ICC-ES AC156 (2018)	1.55	1.0	1.5	2.48	1.86	1.50	0.60
		2.25	0.0					

**Test Mounting Details:**



UUT base mounted rigid to shake table with mounting brackets at the front and rear base of unit. Each mounting bracket (Vertiv PN: 660224P1) was attached to the unit with (4) 3/8" Grade 5 bolts and to the shake table with (4) 3/8" Grade 5 bolts. All bolts used lock washers and flat washers.  
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.  
Contents were included in testing per operating conditions.

# UNIT UNDER TEST (UUT) SUMMARY SHEET



1900510-CR-001 R2

<b>Manufacturer:</b> Vertiv Corporation	<b>UUT 6</b>
<b>Model Line:</b> Liebert EXS UPS	
<b>Model Number:</b> 53BP30H12L1 <b>Serial Number:</b> N/A	

**Product Construction Summary:**  
Carbon steel frame and skin, 2 Battery Strings

**Options/Subcomponent Summary:**  
Battery - CBS: HRL12150W-FR, Battery-Data Safe: 12HX150, Breaker - Siemens: 3VA5217-5EC31-0AA0

**UUT Properties**

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
1376	23.6	33.5	63	11.21	6.44	22.20

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2019	ICC-ES AC156 (2018)	1.55	1.0	1.5	2.48	1.86	1.50	0.60
		2.25	0.0					

**Test Mounting Details:**



UUT base mounted rigid to shake table with mounting brackets at the front and rear base of unit. Each mounting bracket (Vertiv PN: 660224P1) was attached to the unit with (4) 3/8" Grade 5 bolts and to the shake table with (4) 3/8" Grade 5 bolts. All bolts used lock washers and flat washers.  
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.  
Contents were included in testing per operating conditions.

# UNIT UNDER TEST (UUT) SUMMARY SHEET



1900510-CR-001 R2

<b>Manufacturer:</b> Vertiv Corporation	<b>UUT 7</b>
<b>Model Line:</b> Liebert EXS UPS	
<b>Model Number:</b> 53BP30H11L1 <b>Serial Number:</b> N/A	

**Product Construction Summary:**  
Carbon steel frame and skin, 1 Battery String

**Options/Subcomponent Summary:**  
Battery - CBS: HRL12150W-FR, Breaker - Siemens: 3VA5217-5EC31-0AA0

### UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
870	23.6	33.5	63	15.61	7.27	22.33

### UUT Highest Passed Seismic Run Information

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2019	ICC-ES AC156 (2018)	1.55	1.0	1.5	2.48	1.86	1.50	0.60
		2.25	0.0					

### Test Mounting Details:



UUT base mounted rigid to shake table with mounting brackets at the front and rear base of unit. Each mounting bracket (Vertiv PN: 660224P1) was attached to the unit with (4) 3/8" Grade 5 bolts and to the shake table with (4) 3/8" Grade 5 bolts. All bolts used lock washers and flat washers.  
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.  
Contents were included in testing per operating conditions.



# UNIT UNDER TEST (UUT) SUMMARY SHEET



1900510-CR-001 R2

<b>Manufacturer:</b> Vertiv Corporation	<b>UUT 8</b>
<b>Model Line:</b> Liebert EXS UPS	
<b>Model Number:</b> 53BP30H21L1 & 53S30HCER000CST	
<b>Serial Number:</b> M19GBE0007 & M19GBE0008	

**Product Construction Summary:**  
Carbon steel frame and skin. Units ganged together and 4 Battery Strings.

**Options/Subcomponent Summary:**  
Battery - CBS: HRL12150W-FR, Battery-Data Safe: 12HX150, Breaker - Siemens: 3VA5217-5EC31-0AA0, Breaker-Nader: NDM1-125C80/3, Communication Card-Vertiv: IS-Relay, Communication Card-Vertiv: IS-485EXI, Output Distribution-Vertiv: PD2-102

**UUT Properties**

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
2925.5	23.6	67	63	7.56	4.13	17.48

**UUT Highest Passed Seismic Run Information**

Building Code	Test Criteria	S <sub>DS</sub> (g)	z/h	I <sub>P</sub>	A <sub>FLX-H</sub> (g)	A <sub>RIG-H</sub> (g)	A <sub>FLX-V</sub> (g)	A <sub>RIG-V</sub> (g)
CBC 2019	ICC-ES AC156 (2018)	1.55	1.0	1.5	2.48	1.86	1.50	0.60
		2.25	0.0					

**Test Mounting Details:**



UUT ganged together with two M10 bolts at the front and back junction of the cabinets. UUT base mounted - rigid to table with four (4) brackets provided by manufacturer (Vertiv PN: 660224P1). Each mounting bracket was attached to the unit with (4) 3/8" Grade 5 bolts and to the shake table with (4) 3/8" Grade 5 bolts. All bolts used lock washers and flat washers. Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test. Contents were included in testing per operating conditions.