



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

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

OFFICE USE ONLY

APPLICATION #: **OSP – 0394 – 10**

OSHPD Special Seismic Certification Preapproval (OSP)

Type: New Renewal

Manufacturer Information

Manufacturer: **GE Healthcare**

Manufacturer's Technical Representative: Tom Farnow

Mailing Address: 3000 N. Grandview Blvd., Waukesha, WI 53188-1696

Telephone: 888-406-1101 Email: Tom.Farnow@gehcseismic.com

Product Information

Product Name: **Revolution CT System**

Product Type: Medical imaging equipment.

Product Model Number: See Attachment 1

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

General Description: System components of multiple-component Computed Tomography (CT) medical imaging system. Seismic enhancements made to the test units and modifications required to address the anomalies observed during the tests shall be incorporated into the production units.

Mounting Description: Rigid base mounted.

Applicant Information

Applicant Company Name: **EASE LLC**

Contact Person: Jonathan Roberson, S.E.

Mailing Address: 5877 Pine Ave. Suite 210, Chino Hills, CA 91709

Telephone: (406) 541-EASE (3273) Email: j.roberson@easeco.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: 6/13/2016

Title: Principal Engineer Company Name: EASE LLC

"Access to Safe, Quality Healthcare Environments that Meet California's Diverse and Dynamic Needs"





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

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

Company Name: EASE LLC
Name: Jonathan Roberson, S.E. California License Number: S4197
Mailing Address: 5877 Pine Ave. Suite 210, Chino Hills, CA 91709
Telephone: (909) 606-7622 Email: j.roberson@easeco.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, Inc.
Contact Name: Brady Richard
Mailing Address: 11034 Indian Trail, Dallas, TX 75229-3513
Telephone: (972) 247-9657 Email: brady@etldallas.com





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

Seismic Parameters

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

Design Basis of Equipment or Components (F_p/W_p) = See Attachment 1, Table 2

S_{DS} (Design spectral response acceleration at short period, g) = See Attachment 1, Table 2

a_p (In-structure equipment or component amplification factor) = See Attachment 1, Table 2

R_p (Equipment or component response modification factor) = See Attachment 1, Table 2

Ω_0 (System overstrength factor) = See Attachment 1, Table 2

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = See Attachment 1, Table 2

Equipment or Component Natural Frequencies (Hz) = See Attachment 2

Overall dimensions and weight (or range thereof) = See Attachment 1, Table 1

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) = _____

Ω_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) = _____

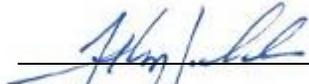
Tank(s) designed in accordance with ASME BPVC, 2015: Yes No

List of Attachments Supporting Special Seismic Certification

Test Report(s) Drawings Calculations Manufacturer's Catalog

Other(s) (Please Specify): Attachments 1 & 2

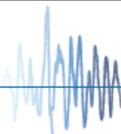
OSHPD Approval (For Office Use Only) – Approval Expires on December 31, 2022

Signature:  Date: June 21, 2016

Print Name: Timothy J. Piland Title: SSE

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

Condition of Approval (if applicable): _____



ATTACHMENT 1: SEISMIC CERTIFIED COMPONENTS

ATTACHMENT PAGE | 1 OF 2

TABLE 1: SEISMIC CERTIFIED SYSTEMS & COMPONENTS

Manufacturer		GE HEALTHCARE						
System		REVOLUTION CT						
COMPONENT	MODEL NUMBER	APPROX. DIMENSIONS (IN.)			MAX. WT. (LB.)	MOUNT	BASIS ^[1]	
		W	D	H				
GANTRIES								
Revolution CT Gantry	5590000	93.1	56.2	78.9	6335	Floor	UUT1	
Revolution CT Gantry	5590000-2 5590000-3 5590000-4 5590000-5	93.1	56.2	78.9	6335	Floor	SAME	
Revolution CT Gantry	5590000-6	93.1	56.2	78.9	6335	Floor	UUTC1	
Revolution CT Gantry	5590000-7 5590000-8 5590000-9 5590000-10	93.1	56.2	78.9	6335	Floor	SAME	
PATIENT TABLES								
NG 2000 Table	5201910	24	114	30	1760 ^[2]	Floor	UUT2	
NG 2000 Table	5201910-2 5201910-3 5201910-4 5201910-5	24	114	30	1760	Floor	SAME	
NG 2000 Table	5201910-6	24	114	30	1760 ^[3]	Floor	UUTA2	
NG 2000 Table	5201910-7 5201910-8 5201910-9 5201910-10	24	114	30	1760	Floor	SAME	
CONSOLES								
Scanner Desktop Assembly	5480177	18.5	28.375	25.8	157	Floor	UUT3	
Scanner Desktop Assembly	5480177-2 5480177-3 5480177-4 5480177-5	18.5	29.1	25.8	157	Floor	SAME	
Scanner Desktop Assembly (HP Z420)	5641778	29.0	18.5	25.8	135	Floor	UUTB1	
Scanner Desktop Assembly (HP Z440)	5641778-2	29.0	18.5	25.8	135	Floor	UUTB2	
Open Console	5737200	14.57	21.85	22.75	105	Floor	UUTD1	
SYSTEM CABINETS								
Rev System Cabinet (Avnet Technologies Solutions)	6161000	25	48	59	701 ^[4]	Floor	UUT4	
Rev System Cabinet (Avnet Technologies Solutions)	6161000-2 6161000-3 6161000-4 6161000-5	25	48	59	701	Floor	SAME	
Revo System Cabinet	6162000	24	48.42	55.71	659	Floor	UUTA1	
Revo System Cabinet	6162000-2 6162000-3 6162000-4	24	48.42	55.71	659	Floor	SAME	
System Cabinet	6163000	24	48.42	55.71	706	Floor	UUTC2	
System Cabinet	6163000-2 6163000-3 6163000-4	24	48.42	55.71	706	Floor	SAME	

(Table continues next page)

ATTACHMENT 1: SEISMIC CERTIFIED COMPONENTS

POWER DISTRIBUTION							
Power Distribution Unit	2326492-61	27.6	21.7	41.8	818	Floor	UUT5
Mount	Floor (Rigid Base): free-standing, base-mounted condition with the component rigidly attached to a supporting structure and no lateral support above the base.						
Notes	1. BASIS: <ul style="list-style-type: none"> • UUT#: Indicates that a test specimen matching these characteristics was tested as part of this testing program. • SAME: Model is physically, mechanically & electrically the same as test specimen. Difference is limited to model number, color, software and/or GE manufacturing location. 2. Patient Table weight does not include the 500 lb. simulated patient load present during testing. 3. Patient Table weight does not include the 675 lb. simulated patient load present during testing 4. Weight of System Cabinet does not include 10lb. weight of brackets used to anchor the test specimen. 5. All components listed above are manufactured by GE Healthcare unless otherwise noted.						

TABLE 2: ASCE 7-10 DESIGN BASIS FOR EQUIPMENT

COMPONENT		F _P /W _P	S _{DS}	z/h	a _P	R _P	Ω ₀
Gantries	5590000 5590000-2 5590000-3 5590000-4 5590000-5 5590000-6	2.40	2.0	1.0	1	1 ½	1 ½
	5590000-7 5590000-8 5590000-9 5590000-10	1.13	2.5	0			
Patient Tables	5201910 5201910-2 5201910-3 5201910-4 5201910-5 5201910-6	2.40	2.0	1.0	1	1 ½	1 ½
	5201910-7 5201910-8 5201910-9 5201910-10	1.13	2.5	0			
Consoles	5480177 5480177-2 5480177-3 5480177-4 5480177-5	1.50	2.0	1.0	2 ½	6	2
	5641778 5641778-2 5737200	1.13	2.5	0			
System Cabinets	6161000 6161000-2 6161000-3 6161000-4 6161000-5 6162000 6162000-2	1.50	2.0	1.0	2 ½	6	2
	6162000-3 6162000-4 6163000 6163000-2 6163000-3 6163000-4	1.13	2.5	0			
Power Distribution Units	2326492-61	1.44	2.0	1.0	1	2 ½	2
		1.17	2.6	0			

ATTACHMENT 2: TEST SPECIMEN SUMMARY

UUT- 1		Revolution CT Gantry	
MANUFACTURER:		GE Healthcare	
IDENTIFICATION:		Model No.: 5590000	Serial No.: 1977CZ8
DESCRIPTION:		System Component of the Revolution CT System	
MOUNTING:		FLOOR MOUNTED (Rigid Base) using (8) – 5/8" dia. bolts	

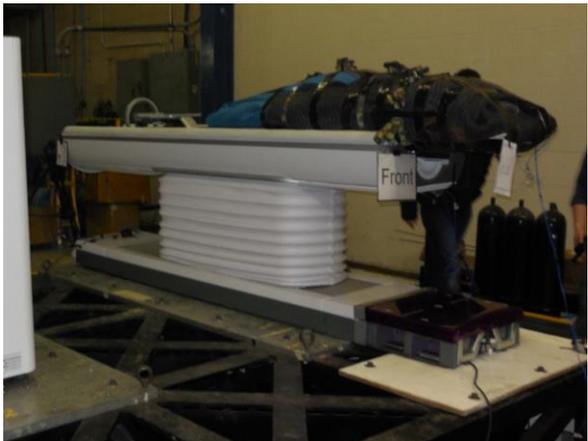


PROPERTIES:						
DIMENSIONS (in.)			Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)		
Width	Depth	Height		FRONT-AXIS	SIDE-AXIS	VERTICAL-AXIS
93.1	56.2	78.9	6335	7.4	11.3	8.4

SHAKE TABLE TEST PARAMETERS								
CODE	TEST CRITERIA	S _{Ds} (G)	z/h	I _p	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)
CBC 2016	ICC-ES AC156	2.0	1.0	1.5	3.2	2.4	1.34	0.54
		2.5	0.0		2.5	1.0	1.68	0.68

Unit maintained structural integrity and remained functional per manufacturer requirement

UUT-2		NG 2000 Table	
MANUFACTURER:		GE Healthcare	
IDENTIFICATION:		Model No.: 5201910	Serial No.: 436153CN1
DESCRIPTION:		System Component of the Revolution CT System	
MOUNTING:		FLOOR MOUNTED (Rigid Base) using (6) – 5/8" dia bolts	



PROPERTIES:						
DIMENSIONS (in.)			Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)		
Width	Depth	Height		SIDE-AXIS	FRONT-AXIS	VERTICAL-AXIS
23.5	116 min / 210 max	41	1760 + 500 Patient	3.0	16.8	4.5

SHAKE TABLE TEST PARAMETERS								
CODE	TEST CRITERIA	S _{Ds} (G)	z/h	I _p	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)
CBC 2016	ICC-ES AC156	2.0	1.0	1.5	3.2	2.4	1.34	0.54
		2.5	0.0		2.5	1.0	1.68	0.68

Unit maintained structural integrity and remained functional per manufacturer requirement

ATTACHMENT 2: TEST SPECIMEN SUMMARY

UUT- 3 Scanner Desktop Assembly									
MANUFACTURER:		GE Healthcare							
IDENTIFICATION:		Model No.: 5480177				Serial No.: 433776CN2			
DESCRIPTION:		System Component of the Revolution CT System							
MOUNTING:		FLOOR MOUNTED (Rigid Base) using (4) – 3/8" dia. bolts.							
									
PROPERTIES:									
DIMENSIONS (in.)					Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)			
Width	Depth	Height				SIDE-AXIS	FRONT-AXIS	VERTICAL-AXIS	
18.5	29.1	25.8			157	12.8	16.8	13.9	
SHAKE TABLE TEST PARAMETERS									
CODE	TEST CRITERIA	S _{DS} (G)	z/h	I _P	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)	
CBC 2016	ICC-ES AC156	2.0 2.5	1.0 0.0	1.5	3.2 2.5	2.4 1.0	1.34 1.68	0.54 0.68	
Unit maintained structural integrity and remained functional per manufacturer requirement									

UUT-4 Rev System Cabinet									
MANUFACTURER:		Avnet Technologies Solutions							
IDENTIFICATION:		Model No.: 6161000				Serial No.: 435438C7			
DESCRIPTION:		System Component of the Revolution CT System							
MOUNTING:		FLOOR MOUNTED (Rigid Base) using (4) – 1/2" dia. bolts							
									
PROPERTIES:									
DIMENSIONS (in.)					Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)			
Width	Depth	Height				SIDE-AXIS	FRONT-AXIS	VERTICAL-AXIS	
25	48	59			701 + 10 brackets	6.0	10.1	22.6	
SHAKE TABLE TEST PARAMETERS									
CODE	TEST CRITERIA	S _{DS} (G)	z/h	I _P	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)	
CBC 2016	ICC-ES AC156	2.0 2.5	1.0 0.0	1.5	3.2 2.5	2.4 1.0	1.34 1.68	0.54 0.68	
Unit maintained structural integrity and remained functional per manufacturer requirement									

UUT- 5 Power Distribution Unit								
<i>MANUFACTURER:</i>				GE Healthcare				
<i>IDENTIFICATION:</i>				Model No.: 2326492-61				
				Serial No.: : 322132HM2				
<i>DESCRIPTION:</i>				System component of the Optima CT580 System				
<i>MOUNTING:</i>				FLOOR MOUNTED (Rigid Base) w/ (4) – 3/8" dia. Bolts				
								
<i>PROPERTIES:</i>								
DIMENSIONS (in.)				Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)			
Width	Depth	Height	SIDE-AXIS		FRONT-AXIS	VERTICAL-AXIS		
27.6	21.7	41.8	796 + 22 brackets = 818	15.7	19.9	45		
<i>SHAKE TABLE TEST PARAMETERS</i>								
CODE	TEST CRITERIA	S _{DS} (G)	z/h	I _p	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)
CBC 2016	ICC-ES AC156	2.0 2.6	1.0 0.0	1.5	3.20 2.60	2.40 1.04	1.34 1.74	0.54 0.70
Unit maintained structural integrity and remained functional per manufacturer requirement								

ATTACHMENT 2: TEST SPECIMEN SUMMARY

UUT- A1 SYSTEM CABINET									
MANUFACTURER: GE Healthcare									
IDENTIFICATION: Model No.: 6162000									
DESCRIPTION: System component of the Revolution CT system									
MOUNTING: Floor mounted using (4) - 1/2" dia GR 8 bolts to plate mounted with GE provided seismic brackets									
PROPERTIES:									
DIMENSIONS (in.)				Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)				
Width	Depth	Height	FRONT-AXIS		SIDE-AXIS	VERTICAL-AXIS			
24	48.42	55.71	659		6.3	16.3	12.4		
SHAKE TABLE TEST PARAMETERS									
CODE	TEST CRITERIA	S _{DS} (G)	z/h	I _p	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)	
CBC 2016	ICC-ES AC156	2.0	1	1.5	3.2	2.4	1.34	0.54	
		2.5	0		2.5	1.0	1.68	0.68	
Unit maintained structural integrity and remained functional per manufacturer requirement									

UUT- A2 NG2000 TABLE									
MANUFACTURER: GE Healthcare									
IDENTIFICATION: Model No.: 5201910-6									
DESCRIPTION: System component of the Revolution CT system Patient table 675lb capacity									
MOUNTING: Floor mounted using (6) - 5/8" dia GR 8 bolts to plate									
PROPERTIES:									
DIMENSIONS (in.)				Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)				
Width	Depth	Height	FRONT-AXIS		SIDE-AXIS	VERTICAL-AXIS			
23.5	114 min / 210 max	23 min / 41 max	1760 + 675 LB Patient load		9.1	19.3	4.4		
SHAKE TABLE TEST PARAMETERS									
CODE	TEST CRITERIA	S _{DS} (G)	z/h	I _p	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)	
CBC 2016	ICC-ES AC156	2.0	1	1.5	3.2	2.4	1.34	0.54	
		2.5	0		2.5	1.0	1.68	0.68	
Unit maintained structural integrity and remained functional per manufacturer requirement									

ATTACHMENT 2: TEST SPECIMEN SUMMARY

UUT-B1 Scanner Desktop Assembly (HP Z420)									
MANUFACTURER: GE Healthcare									
IDENTIFICATION: Model No.: 5641778									
Serial No.: 440747CN4									
DESCRIPTION: Main component of CT Imaging									
MOUNTING: Floor mounted using (4) – 3/8" dia GR 8 Allen head bolts with washers									
PROPERTIES:									
DIMENSIONS (in.)				Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)				
Width	Depth	Height	FRONT-AXIS		SIDE-AXIS	VERTICAL-AXIS			
29.0	18.5	25.8	133.5		21	15.1	19.1		
SHAKE TABLE TEST PARAMETERS									
CODE	TEST CRITERIA	S _{DS} (G)	z/h	I _P	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)	
CBC 2016	ICC-ES AC156	2.0 2.5	1 0	1.5	3.2 2.5	2.4 1.0	1.34 1.68	0.54 0.68	
Unit maintained structural integrity and remained functional per manufacturer requirement									

UUT-B2 Scanner Desktop Assembly (HP Z440)									
MANUFACTURER: GE Healthcare									
IDENTIFICATION: Model No.: 5641778-2									
Serial No.: 440749CN0									
DESCRIPTION: Main component of CT Imaging									
MOUNTING: Floor mounted using (4) – 3/8" dia GR 8 Allen head bolts with washers									
PROPERTIES:									
DIMENSIONS (in.)				Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)				
Width	Depth	Height	FRONT-AXIS		SIDE-AXIS	VERTICAL-AXIS			
29.0	18.5	25.8	133		19.4	14.5	25		
SHAKE TABLE TEST PARAMETERS									
CODE	TEST CRITERIA	S _{DS} (G)	z/h	I _P	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)	
CBC 2016	ICC-ES AC156	2.0 2.5	1 0	1.5	3.2 2.5	2.4 1.0	1.34 1.68	0.54 0.68	
Unit maintained structural integrity and remained functional per manufacturer requirement									

UUT-C1 Revolution CT Gantry								
MANUFACTURER: GE Healthcare								
IDENTIFICATION: Model No.: 5590000-6								
Serial No.: 442608CN6								
DESCRIPTION: Main component of CT Imaging								
MOUNTING: Floor mounted using (8) – 5/8" dia GR 8 bolts with washers								
PROPERTIES:								
DIMENSIONS (in.)				Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)			
Width	Depth	Height	FRONT-AXIS		SIDE-AXIS	VERTICAL-AXIS		
93.1	56.5	78.9	6335		11.1	7.5	23	
SHAKE TABLE TEST PARAMETERS								
CODE	TEST CRITERIA	S _{DS} (G)	z/h	I _P	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)
CBC 2016	ICC-ES AC156	2.0 2.5	1 0	1.5	3.2 2.5	2.4 1.0	1.34 1.68	0.54 0.68
Unit maintained structural integrity and remained functional per manufacturer requirement								

UUT-C2 System Cabinet								
MANUFACTURER: GE Healthcare								
IDENTIFICATION: Model No.: 6163000								
Serial No.: 442508CN8								
DESCRIPTION: Main component of CT Imaging								
MOUNTING: Floor mounted using (4) - 1/2" diam. GR 8 bolts to plate mounted with GE provided seismic brackets								
PROPERTIES:								
DIMENSIONS (in.)				Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)			
Width	Depth	Height	FRONT-AXIS		SIDE-AXIS	VERTICAL-AXIS		
24	48.42	55.71	706		18.9	5.9	24.7	
SHAKE TABLE TEST PARAMETERS								
CODE	TEST CRITERIA	S _{DS} (G)	z/h	I _P	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)
CBC 2016	ICC-ES AC156	2.0 2.5	1 0	1.5	3.2 2.5	2.4 1.0	1.34 1.68	0.54 0.68
Unit maintained structural integrity and remained functional per manufacturer requirement								

UUT-D1 Open Console								
MANUFACTURER: GE Healthcare								
IDENTIFICATION: Model No.: 5737200								
Serial No.: 445262CN9								
DESCRIPTION: System component of the Revolution CT System								
MOUNTING: Floor mounted using (3) – 3/8" dia GR 8 bolts through GE - provided mounting brackets.								
PROPERTIES:								
DIMENSIONS (in.)				Weight (lb.)	LOWEST RESONANT FREQUENCY (Hz.)			
Width	Depth	Height	FRONT-AXIS		SIDE-AXIS	VERTICAL-AXIS		
14.57	21.85	22.75	105	32.3	18.2	>50		
SHAKE TABLE TEST PARAMETERS								
CODE	TEST CRITERIA	S _{Ds} (G)	z/h	I _p	A _{FLX-H} (G)	A _{RIG-H} (G)	A _{FLX-V} (G)	A _{RIG-V} (G)
CBC 2016	ICC-ES AC156	2.0	1	1.5	3.2	2.4	1.34	0.54
		2.5	0		2.5	1.0	1.68	0.68
Unit maintained structural integrity and remained functional per manufacturer requirement								