APPLICATION FOR OSHPD SPECIAL SEISMIC CERTIFICATION PREAPPROVAL (OSP)

OFFICE USE ONLY	
APPLICATION #:	OSP – 0125-10

OSHPD Special Seismic Certification Preapproval (OSP)

Type: ☐ New ☒ Renewal

Manufacturer Information

Manufacturer: Carrier Corporation

Manufacturer's Technical Representative: Jeremy Babb

Mailing Address: 7310 West Morris St., Indianapolis, IN 46206

Telephone: 678.981.4995 Email: Jeremy.Babb@carrier.utc.com

Product Information

Product Name: Ductless Split Air Conditioning Systems

Product Type: Air Conditioning Units

Product Model Number: AHA/HHA/MK/RAV
(List all unique product identification numbers and/or part numbers)

General Description: Indoor/Outdoor Split Air Conditioning Units

Mounting Description: Floor, wall, and ceiling mounted - rigid

Applicant Information

Applicant Company Name: TRU Compliance, LLC

Contact Person: Matthew J. Tobolski, S.E.

Mailing Address: 960 SW Disk Dr., Suite 104, Bend, OR 97702

Telephone: 844.878.0200 Email: mtobolski@trucompliance.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: 10/26/2016

Title: President & CEO Company Name: TRU Compliance, LLC

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

Company Name: TRU Compliance, LLC

Name: Andrew M. Coughlin, S.E. California License Number: S6082

Mailing Address: 960 SW Disk Dr., Suite 104, Bend, OR 97702

Telephone: 844.878.0200 Email: acoughlin@trucompliance.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: Pacific Earthquake Engineering and Research Center (PEER)

Contact Name: Clement B. Barthes

Mailing Address: 1301 South 46th St., Bldg. 420, Richmond, CA 94804

Telephone: 510.642.3437 Email: peer_center@berkeley.edu

Seismic Parameters

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

Design Basis of Equipment or Components (F_p/W_p) = 1.5 (S_{DS} = 2.0); 1.13 (S_{DS} = 2.5)

S_{DS} (Design spectral response acceleration at short period, g) = 2.0 (z/h = 1.0); 2.5 (z/h = 0.0)

a_p (In-structure equipment or component amplification factor) = 2.5

R_p (Equipment or component response modification factor) = 6.0

Ω_0 (System overstrength factor) = 2.0

I_p (Importance factor) = 1.5

z/h (Height factor ratio) = 1.0 (S_{DS} = 2.0g); 0.0 (S_{DS} = 2.5g)

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

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

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): Attachment A

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

Signature: _____ Date: 11/29/2016

Print Name: M. R. Karim Title: SHFR

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

TRU PROJECT NO. 16043

TRU COMPLIANCE

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV

TABLE 1

Certified Product Construction Summary:
Carbon steel cabinet construction

Certified Options Summary:
Last digit of Model Number defines voltage: 3 = 208/230V single phase; 5 = 208/230V three phase; 6 = 460V three phase
Outdoor units listed in this table have indoor companion units listed in Tables 2 and 3.

Mounting Configuration:
Base mounted - rigid
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2016 ***Seismic Certification Limits:*** S_{DS} = 2.0 g z/h=1.0 S_{DS} = 2.5 g z/h=0.0 I_P = 1.5

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
AHA	24AHA-418-A003	14.6	36.9	31.1	146	1.5 ton-cooling only	1
	24AHA-424-A003	14.6	36.9	31.1	148	2 ton-cooling only	Interp.
	24AHA-430-A003	17.1	44.5	37.1	183	2.5 ton-cooling only	Interp.
	24AHA-436-A003	17.1	44.5	37.1	184	3 ton-cooling only	Interp.
	24AHA-436-A005	17.1	44.5	37.1	184	3 ton-cooling only	Interp.
	24AHA-436-A006	17.1	44.5	37.1	184	3 ton-cooling only	Interp.
	24AHA-448-A003	17.1	44.5	37.1	213	4 ton-cooling only	Interp.
	24AHA-448-A005	17.1	44.5	37.1	213	4 ton-cooling only	Interp.
	24AHA-448-A006	17.1	44.5	37.1	213	4 ton-cooling only	Interp.
	24AHA-460-A003	17.1	44.5	37.1	245	5 ton-cooling only	Interp.
	24AHA-460-A005	17.1	44.5	37.1	245	5 ton-cooling only	Interp.
	24AHA-460-A006	17.1	44.5	37.1	245	5 ton-cooling only	Interp.
HHA	25HHA-418-A003	14.6	36.9	25.1	150	1.5 ton-heating/cooling	Interp.
	25HHA-425-A003	14.6	36.9	31.1	161	2 ton-heating/cooling	Interp.
	25HHA-430-A003	17.1	44.5	37.1	196	2.5 ton-heating/cooling	Interp.
	25HHA-436-A003	17.1	44.5	37.1	197	3 ton-heating/cooling	Interp.
	25HHA-436-A005	17.1	44.5	37.1	197	3 ton-heating/cooling	Interp.
	25HHA-436-A006	17.1	44.5	37.1	197	3 ton-heating/cooling	Interp.
	25HHA-448-A003	17.1	44.5	43.1	246	4 ton-heating/cooling	Interp.
	25HHA-448-A005	17.1	44.5	43.1	246	4 ton-heating/cooling	Interp.
	25HHA-448-A006	17.1	44.5	43.1	246	4 ton-heating/cooling	Interp.
	25HHA-460-A003	17.1	44.5	43.1	258	5 ton-heating/cooling	Interp.
	25HHA-460-A005	17.1	44.5	43.1	258	5 ton-heating/cooling	Interp.
	25HHA-460-A006	17.1	44.5	43.1	258	5 ton-heating/cooling	2

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16043

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV

TABLE 1

Certified Product Construction Summary:
Carbon steel cabinet construction

Certified Options Summary:
Last digit of Model Number defines voltage: 3 = 208/230V single phase; 5 = 208/230V three phase; 6 = 460V three phase
Outdoor units listed in this table have indoor companion units listed in Tables 2 and 3.

Mounting Configuration:
Base mounted - rigid
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2016 ***Seismic Certification Limits:*** S_{DS} = *2.0 g z/h=1.0* S_{DS} = *2.5 g z/h=0.0* I_P = *1.5*

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
RAV	RAV-SP180AT2-UL	11.4	30.7	21.7	98	1.5 ton-heating/cooling	9
	RAV-SP240AT2-UL	12.6	35.4	35	144.5	2 ton-heating/cooling	Interp.
	RAV-SP300AT2-UL	12.6	35.4	52.8	211.5	2.5 ton-heating/cooling	Interp.
	RAV-SP360AT2-UL	12.6	35.4	52.8	211.5	3 ton-heating/cooling	Interp.
	RAV-SP420AT2-UL	12.6	35.4	52.8	211.5	3.5 ton-heating/cooling	10

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16043

TRU COMPLIANCE

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV

TABLE 2

Certified Product Construction Summary:
Carbon steel frame with plastic cover

Certified Options Summary:
208/230V Single Phase

Mounting Configuration:
Wall Mounted - Rigid

Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2016 ***Seismic Certification Limits:*** S_{DS} = 2.0 g z/h=1.0; S_{DS} = 2.5 g z/h=0.0 I_P = 1.5

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
MK (High Wall)	40MKCB18B-3	10.2	46.7	13.4	37.5	1-1/2 Ton cooling only	3
	40MKCB22B-3	10.2	46.7	13.4	37.5	1-5/6 Ton cooling only	Interp.
	40MKCB28B-3	10.4	57.1	13.4	55.1	2-1/3 Ton cooling only	Interp.
	40MKCB32B-3	10.4	57.1	13.4	55.1	2-2/3 Ton cooling only	Interp.
	40MKQB24B-3	10.4	57.1	13.4	55.1	2 Ton heating/cooling	Interp.
	40MKQB28B-3	10.4	57.1	13.4	55.1	2-1/3 Ton heating/cooling	4
MK (Low Wall)	40MKCB18F-3	9.3	42	26.6	59.7	1.4 Ton cooling only	5
	40MKCB34F-3	9.3	65	26.6	91.9	2.8 Ton cooling only	Interp.
	40MKCB54F-3	9.3	65	26.6	98.8	3.8 Ton cooling only	Interp.
	40MKQB36F-3	9.3	65	26.6	98.8	2.9 Ton heating/cooling	Interp.
	40MKQB48F-3	9.3	65	26.6	98.8	3.9 Ton heating/cooling	6
RAV	RAV-SP180KRT-UL	9	41.3	12.6	36	1.5 Ton heating/cooling	15
	RAV-SP240KRT-UL	9	41.3	12.6	36	2 Ton heating/cooling	16

SPECIAL SEISMIC CERTIFICATION
CERTIFIED COMPONENT MATRIX

TRU PROJECT NO. 16043

TRU COMPLIANCE

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV

TABLE 3

Certified Product Construction Summary:
Carbon steel frame with plastic cover

Certified Options Summary:
208/230V Single Phase

Mounting Configuration:
Ceiling Suspended/Mounted - Rigid
Note: Installed mounting configuration must be of similar configuration and equivalent strength and stiffness to those tested.

Building Code: CBC 2016 ***Seismic Certification Limits:*** S_{DS} = *2.0 g z/h=1.0* S_{DS} = *2.5 g z/h=0.0* I_P = *1.5*

Model Line	Model	Dimensions (in)			Weight (lb)	Notes	UUT
		Depth	Width	Height			
MK	40MKCB18F-3	9.3	42	26.6	59.7	1.4 Ton cooling only	7
	40MKCB34F-3	9.3	65	26.6	91.9	2.8 Ton cooling only	Interp.
	40MKCB54F-3	9.3	65	26.6	98.8	3.8 Ton cooling only	Interp.
	40MKQB36F-3	9.3	65	26.6	98.8	2.9 Ton heating/cooling	Interp.
	40MKQB48F-3	9.3	65	26.6	98.8	3.9 Ton heating/cooling	8
RAV (Underceiling)	RAV-SP180UT-UL	33.1	33.1	10.1	44	1.5 Ton heating/cooling	11
	RAV-SP240UT-UL	33.1	33.1	10.1	44	2 Ton heating/cooling	Interp.
	RAV-SP300UT-UL	33.1	33.1	12.6	53	2.5 Ton heating/cooling	Interp.
	RAV-SP360UT-UL	33.1	33.1	12.6	53	3 Ton heating/cooling	Interp.
	RAV-SP420UT-UL	33.1	33.1	12.6	53	3.5 Ton heating/cooling	12
RAV (Four Way Cassette)	RAV-SP180CT-UL	26.8	35.8	8.3	46	1.5 Ton heating/cooling	13
	RAV-SP240CT-UL	26.8	46.5	8.3	55	2 Ton heating/cooling	Interp.
	RAV-SP300CT-UL	26.8	62.8	8.3	73	2.5 Ton heating/cooling	Interp.
	RAV-SP360CT-UL	26.8	62.8	8.3	73	3 Ton heating/cooling	Interp.
	RAV-SP420CT-UL	26.8	62.8	8.3	73	3.5 Ton heating/cooling	14

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16043

UUT 1

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV
Model Number: 24AHA-418-A003 ***Serial Number:*** 3716X94714

Product Construction Summary:
Carbon steel housing

Options/Subcomponent Summary:
Cooling only, single phase 208/230V

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
146	14.6	36.9	31.1	11.2	23.6	>33.3

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was rigid floor mounted using six (6) 3/8" Grade 8 Bolts.
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

TRU PROJECT NO. 16043

UUT 2

Manufacturer:	Carrier Corporation		
Model Line:	AHA/HHA/MK/RAV		
Model Number:	25HHA-460-A006	***Serial Number:***	3616X90140

Product Construction Summary:

Carbon steel housing

Options/Subcomponent Summary:

Heating and cooling, 3 phase 460V

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
245	17.1	44.5	43.1	5.8	13.8	>33.3

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was rigid floor mounted using six (6) 3/8" Grade 8 Bolts.
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

TRU PROJECT NO. 16043

UUT 3

Manufacturer:	Carrier Corporation		
Model Line:	AHA/HHA/MK/RAV		
Model Number:	40MKCB18B-3	***Serial Number:***	2816V00518

Product Construction Summary:

Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
37.5	10.2	46.7	13.4	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was rigid wall mounted using nineteen (19) #12 sheet metal screws.
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

TRU PROJECT NO. 16043

UUT 4

Manufacturer:	Carrier Corporation		
Model Line:	AHA/HHA/MK/RAV		
Model Number:	40MKQB28B-3	***Serial Number:***	2515V00550

Product Construction Summary:

Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
55.1	10.4	57.1	13.4	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was rigid wall mounted using twenty two (22) #12 sheet metal screws.
Unit maintained structural integrity and remained functional per manufacturer requirement.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16043

UUT 5

Manufacturer:	Carrier Corporation		
Model Line:	AHA/HHA/MK/RAV		
Model Number:	40MKCB18F-3	***Serial Number:***	4515V00035

Product Construction Summary:

Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
59.7	42	9.3	26.6	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was rigid wall mounted using four (4) 3/8"A307 Thru bolts.
Unit maintained structural integrity and remained functional per manufacturer requirement.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16043

UUT 6

Manufacturer:	Carrier Corporation		
Model Line:	AHA/HHA/MK/RAV		
Model Number:	40MKQB48F-3	***Serial Number:***	3015V00793

Product Construction Summary:

Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
98.8	9.3	65	26.6	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was rigid wall mounted using four (4) 3/8"A307 Thru bolts.
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

TRU PROJECT NO. 16043

UUT 7

Manufacturer:	Carrier Corporation		
Model Line:	AHA/HHA/MK/RAV		
Model Number:	40MKCB18F-3	***Serial Number:***	4575V00034

Product Construction Summary:

Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

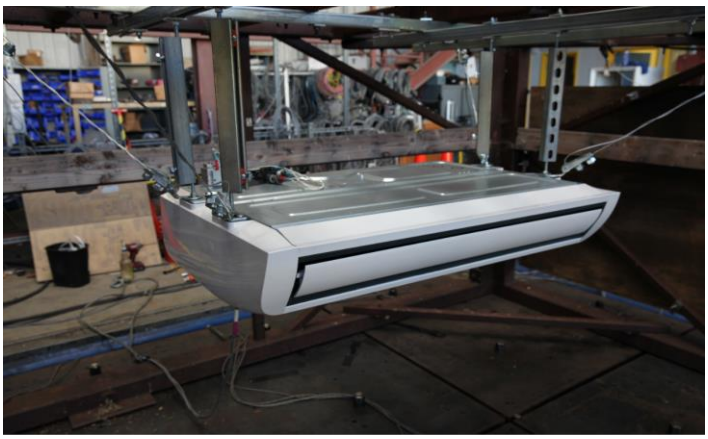
UUT Properties

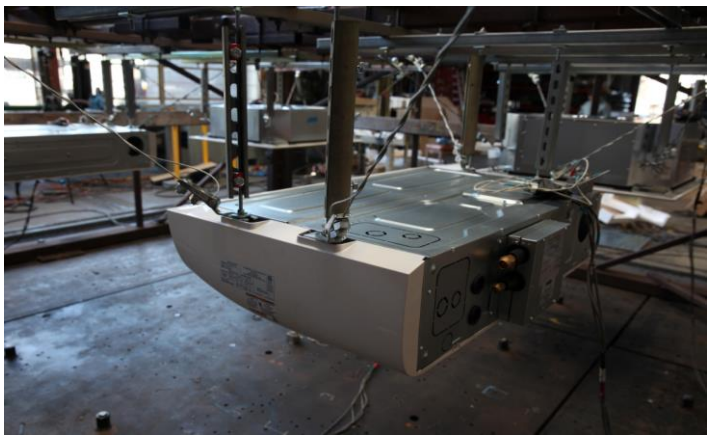
Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
59.7	42	26.6	9.3	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:





The UUT was ceiling suspended using four (4) 3/8" A36 hanger rods w/rod stiffeners & four (4) 1/8" cable braces w/Mason SCB-1/SCBH-1 clips at each end. The brackets were mounted to the unit using six (6) #10 self-tapping screws each.
Unit maintained structural integrity and remained functional per manufacturer requirement.
Contents were included in testing per operating conditions.

UNIT UNDER TEST (UUT) SUMMARY SHEET

TRU PROJECT NO. 16043

UUT 8

Manufacturer:	Carrier Corporation		
Model Line:	AHA/HHA/MK/RAV		
Model Number:	40MKQB48F-3	***Serial Number:***	3015V00793

Product Construction Summary:

Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

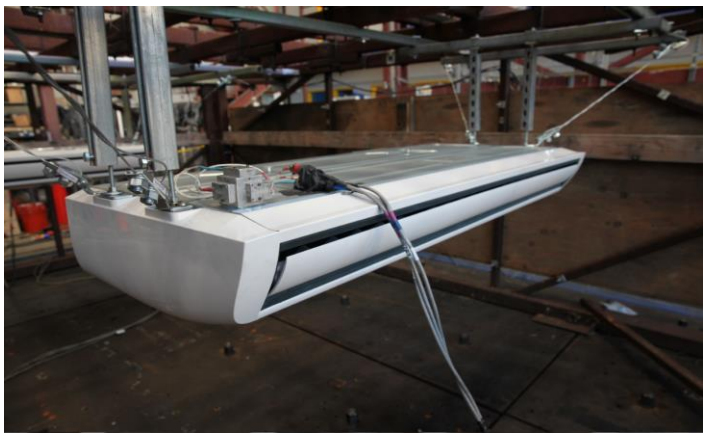
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
98.8	26.6	65	9.3	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:



The UUT was ceiling suspended using four (4) 3/8" A36 hanger rods w/rod stiffeners & four (4) 1/8" cable braces w/Mason SCB-1/SCBH-1 clips at each end. The brackets were mounted to the unit using six (6) #10 self-tapping screws each.
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

TRU PROJECT NO. 16043

UUT 9

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV
Model Number: RAV-SP180AT2-UL ***Serial Number:*** 60620057

Product Construction Summary:
Carbon steel housing

Options/Subcomponent Summary:

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
98	11.4	30.7	21.7	17.2	21.1	>33.3

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was rigid floor mounted using four (4) 3/8" Grade 8 Bolts.
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

TRU PROJECT NO. 16043

UUT 10

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV
Model Number: RAV-SP420AT2-UL ***Serial Number:*** 606B001

Product Construction Summary:
Carbon steel housing

Options/Subcomponent Summary:

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
211.5	12.6	35.4	52.8	3.1	6.8	>33.3

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was rigid floor mounted using four (4) 1/2" Grade 8 Bolts.
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

TRU PROJECT NO. 16043

UUT 11

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV
Model Number: RAV-SP180UT-UL ***Serial Number:*** 60370013

Product Construction Summary:
Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

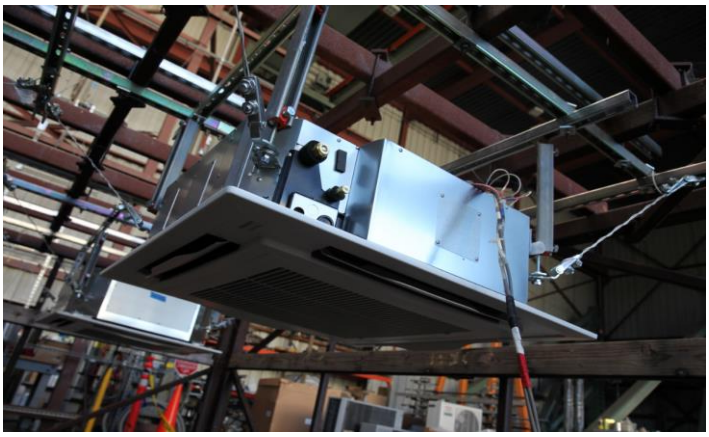
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
44	33.1	33.1	10.1	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:



The UUT was ceiling suspended using four (4) 3/8" A36 hanger rods w/rod stiffeners & four (4) 1/8" cable braces w/Mason SCB-1/SCBH-1 clips at each end.
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

TRU PROJECT NO. 16043

UUT 12

Manufacturer:	Carrier Corporation		
Model Line:	AHA/HHA/MK/RAV		
Model Number:	RAV-SP420UT-UL	***Serial Number:***	60670004

Product Construction Summary:

Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
53	33.1	33.1	12.6	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was ceiling suspended using four (4) 3/8" A36 hanger rods w/rod stiffeners & four (4) 1/8" cable braces w/Mason SCB-1/SCBH-1 clips at each end.
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

TRU PROJECT NO. 16043

UUT 13

Manufacturer:	Carrier Corporation		
Model Line:	AHA/HHA/MK/RAV		
Model Number:	RAV-SP180CT-UL	***Serial Number:***	50820030

Product Construction Summary:

Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

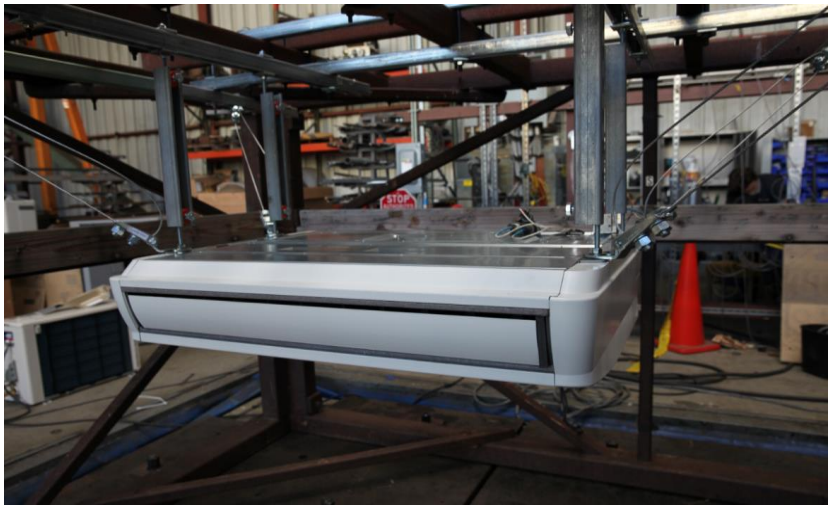
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
46	26.8	35.8	8.3	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:



The UUT was ceiling hung using four (4) A36 hanger rods w/rod stiffeners and four (4) 1/8" cable braces w/ Mason SCB-1/SCBH-1 clips at each end.

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

TRU PROJECT NO. 16043

UUT 14

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV
Model Number: RAV-SP420CT-UL ***Serial Number:*** 60420008

Product Construction Summary:
Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
73	26.8	62.8	8.3	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:

The UUT was ceiling hung using four (4) A36 hanger rods w/rod stiffeners and four (4) 1/8" cable braces w/ Mason SCB-1/SCBH-1 clips at each end.
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

TRU PROJECT NO. 16043

UUT 15

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV
Model Number: RAV-SP180KRT-UL ***Serial Number:*** 62600060

Product Construction Summary:
Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

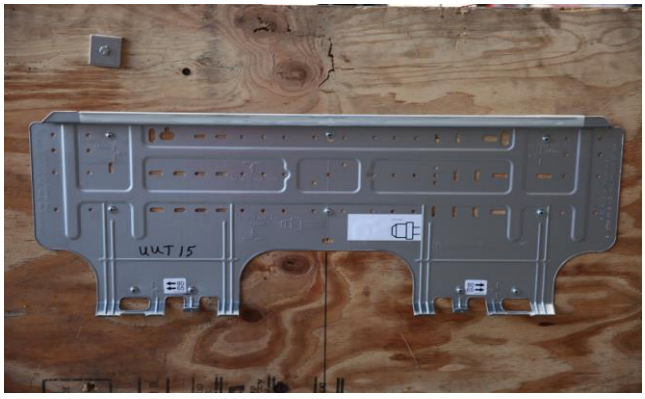
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
31	9	41.3	12.6	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:



The UUT was rigid wall mounted using ten (10) #10 sheet metal screws.
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

TRU PROJECT NO. 16043

UUT 16

Manufacturer: Carrier Corporation
Model Line: AHA/HHA/MK/RAV
Model Number: RAV-SP240KRT-UL ***Serial Number:*** 62400016

Product Construction Summary:
Carbon steel internal frame; plastic outer cover

Options/Subcomponent Summary:

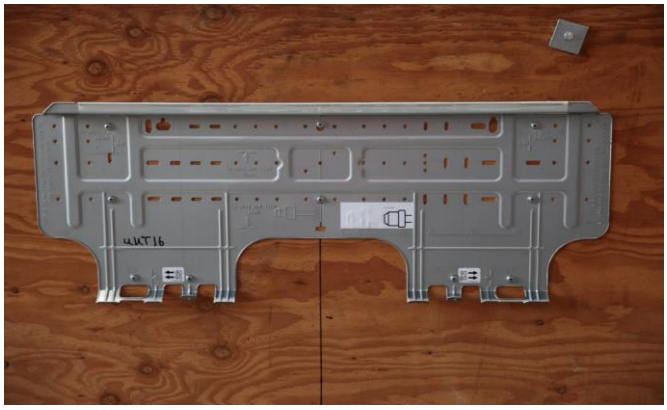
UUT Properties

Weight (lb)	Dimension (in)			Lowest Natural Frequency (Hz)		
	Depth	Width	Height	Front-Back	Side-Side	Vertical
31	9	41.3	12.6	N/A	N/A	N/A

UUT Highest Passed Seismic Run Information

Building 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	1.67	0.67
		2.5	0.0	1.5				

Test Mounting Details:



The UUT was rigid wall mounted using ten (10) #10 sheet metal screws.
Unit maintained structural integrity and remained functional per manufacturer requirement after shake table test.
Contents were included in testing per operating conditions.