



TEST REPORT

Report no.:

300-KLAB-16-022

Product:

Type: Air to water heat pump
Panasonic WH-SQC16H9E8/WH-UQ16HE8

Customer:

Panasonic DE GmbH

Date:

Maj 2017

Consultants:

Kamalathan Arumugam & Birger Bech Jessen



DANISH
TECHNOLOGICAL
INSTITUTE

TEST REPORT

DK-8000 Aarhus C
Tel.: 72 20 20 00
Fax: 72 20 10 19

Date: 2017.05.19
Report no.: 300-KLAB-16-022
File no.: 702564

Page: 1 of 12
Init.: KAMA/JGW
Enclosures: 1

info@teknologisk.dk
www.teknologisk.dk

Customer: Contact person: Thomas Gross
Company: Panasonic DE GmbH
Address: Hagenauer Strasse 43
City: 65203 Wiesbaden
Tel.: +49 1724 141441

Component: Brand: Panasonic
Type: Air to water heat pump
Model: Indoor WH-SQC16H9E8 & outdoor WH-UQ16HE8
Series no.: 55176 & 56184
Production year: Indoor n.a., outdoor n.a.

Dates Component tested: April 2017

Procedure: Test procedure according to EN 12102:2013 and the method ISO 3743-1:2010 and EN 14511:2013 part 1, 2, 3, and 4.

Remarks: The unit was delivered by the customer. Installation and setting of the unit's control system were done according to the manufacturer's instructions.

Conditions: Accredited testing was carried out in compliance with the current guidelines laid down by DANAK (Danish Laboratory Accreditation Scheme), please see www.danak.dk, and in compliance with Danish Technological Institute's General Terms and Conditions regarding Commissioned Work Accepted by Danish Technological Institute, March 2015.

The test results apply to the tested products only.

This test report may be reproduced in extract only if the Laboratory has approved the extract in writing.

Division/Centre: Danish Technological Institute
Energy and Climate
Heat Pump Laboratory, Aarhus

Date: 2017.05.19

Signature:

Co-reader:

Kamalathasan Arumugam
B.Sc. Engineer

Birger Bech Jessen
Senior Consultant



DANISH
TECHNOLOGICAL
INSTITUTE

Page 3 of 13
300-KLAB-16-022

Objective

The objective of this report is to document the sound power level of the outdoor unit at the test conditions and heat pump settings stated in the table below.

The measurement of the sound power level is performed according to the standard EN 12102, using the Class A method. ISO 3743-1 is the basic method of carrying out sound power measurements. The method is briefly described in appendix 1. For a more detailed description, please view the accreditation papers DANAK-300 (in Danish only). The sound power level is measured for the outdoor unit only and not for the indoor unit as neither the compressor nor the fan is a part of this.



DANISH
TECHNOLOGICAL
INSTITUTE

Page 4 of 13
300-KLAB-16-022

Test conditions and heat pump settings for sound power measurements

N °	Test condition	Heat pump setting				
		Compressor speed [Hz]	Fan speed 1 [rpm]	Fan speed 2 [rpm]	Heating capacity [kW]	Water flow rate [l/h]
1 ¹	A7/W35	42-43	580	620	16.2	2695
2 ²	A7/W35	27-28	420	460	9.9	1710
3 ³	A7/W35	20	490	530	7.65	1335
4 ¹	A7/W55	47-48	490	530	16.1	1766
5 ²	A7/W55	30-31	490	530	10.4	1100
6 ³	A7/W55	20	490	530	6.1	800

1) Free mode, 2) Quiet mode level 3, 3) Test mode 4



DANISH
TECHNOLOGICAL
INSTITUTE

Page 5 of 13
300-KLAB-16-022

Test results of the sound power test

Test results of the sound power measurements N°	Sound power level LW(A) [dB re 1pW]	Uncertainty [dB] (weighted value)
1	62	0.1
2	55	0.1
3	58	0.1
4	62	0.1
5	58	0.1
6	58	0.1

The uncertainty value is a weighted value using the level and frequency dependant influence for each 1/1-octave level on the final A-weighted sound power level.

The A-weighted total sound power level is determined for the measured frequency range from 100 Hz to 10 kHz.



DANISH
TECHNOLOGICAL
INSTITUTE

Page 6 of 13
300-KLAB-16-022

Outdoor unit



Rating plate - outdoor unit

Panasonic			
AIR-TO-WATER HEATPUMP			
OUTDOOR UNIT			
Model No.	WH-UQ16HE		
RATED VOLTAGE	400 V		
PHASE	3N~		
FREQUENCY	50Hz		
MAXIMUM INPUT	10.27kW/15.5A		
REFRIGERANT	R410A	2.99kg	
CAPACITY	COOLING (A35W7)	HEATING (A7W3S)	HEATING (A2W3S)
	12.20kW	16.00kW	16.00kW
CURRENT	7.2A	5.7A	7.8A
POWER INPUT	4.76kW	3.76kW	5.16kW
EER/COP	2.57	4.28	3.10
(EN 14511)			
MWP	H.P. 4.15MPa	L.P. 2.00MPa	
SERIAL NO.	56184		
PRODUCTION DATE			
Panasonic Appliances			
Air-Conditioning Malaysia Sdn. Bhd.			
Shah Alam Malaysia			
Authorized representative in EU			
Panasonic Testing Centre			
Panasonic Marketing Europe GmbH			
Winsbergstr. 15, 22525 Hamburg, Germany			
THIS PRODUCT CONTAINS FLUORINATED GREENHOUSE GASES			
 			
IP24			
Made in Malaysia			
R410A			

Indoor unit



Rating plate - indoor unit




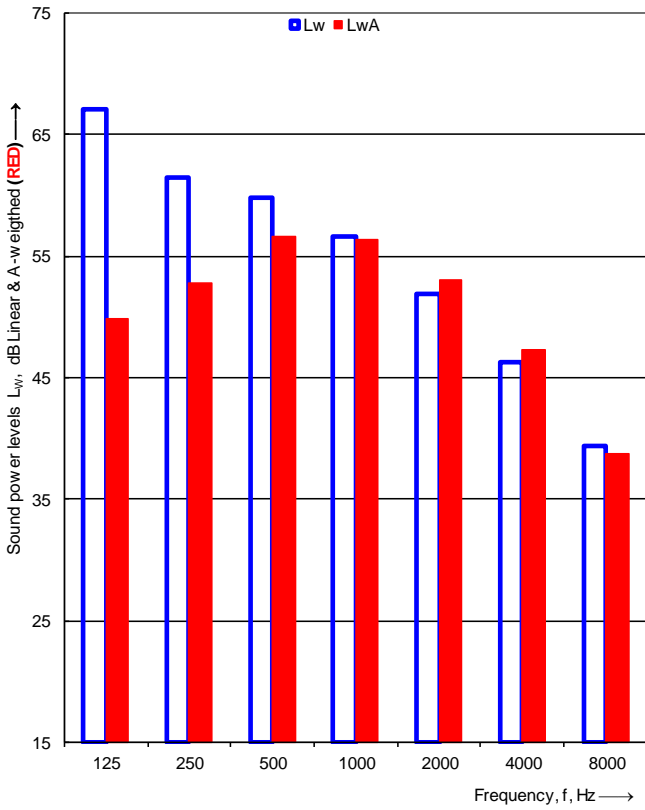
Panasonic	
AIR-TO-WATER HEATPUMP	
Model No.	WH-SQC16H9E8
OUTDOOR UNIT	WH-UQ16HE8
POWER SUPPLY 1	
RATED VOLTAGE	400V
PHASE	3N~
RATED FREQUENCY	50Hz
POWER SUPPLY 2	
RATED VOLTAGE	400V
PHASE	3N~
RATED FREQUENCY	50Hz
MAXIMUM POWER	9.00kW
MAXIMUM CURRENT	13.0A
MWP (WATER)	0.3MPa
HEATING WATER FLOW	2.8m³/h
COOLING WATER FLOW	2.1m³/h
SERIAL NO.	55176
PRODUCTION DATE	
Panasonic Appliances	
Air-Conditioning Malaysia Sdn. Bhd.	
Shah Alam Malaysia	
Made in Malaysia	
Authorized representative in EU	
Panasonic Testing Centre	
Panasonic Marketing Europe GmbH	
Winsbergstr. 15, 22525 Hamburg, Germany	
R410A	
CE	
ACXF09-01390	



DANISH
TECHNOLOGICAL
INSTITUTE

Page 7 of 13
300-KLAB-16-022

Detailed test results - sound power level - test 1




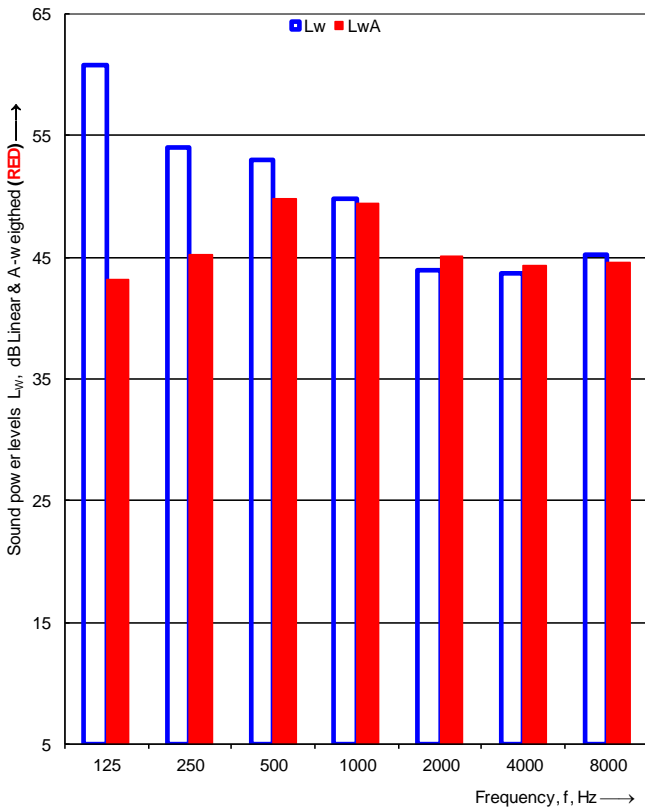
 		Sound power levels according to ISO 3743-1:2010	 TEKNOLOGISK INSTITUT																																																																		
Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms																																																																					
Client:	Panasonic Marketing Europe GmbH		Date of test: 26-04-2017																																																																		
Object:	Split air to water heatpump Model: WH-UQ16HE8(Outdoor unit) + WH-SQC16H9E8(Indoor unit)																																																																				
Mounting conditions:	The outdoor unit is standing free on four 5.5 cm thick heavy concrete tiles placed on a vibration damping mat, which is placed on a water drop tray. The water drop tray is located on a 2.5 cm thick wooden board laying on the floor. The outdoor unit is mounted on 6 supporting metal support frame using 6 vibration insulators.																																																																				
Operating conditions:	A7/W35, Compressor speed:42-43[Hz], Heating capacity: 16.2[kW], COP: 4.31, Water flow rate: 2695 [l/h], Fan speed 1:580[rpm], Fan speed 2:620[rmm]																																																																				
Static pressure:	1013 kPa	<u>Reference box:</u>																																																																			
Air temperature:	7.0 °C	L1: 1.3 m																																																																			
Relative air humidity:	84.0 %	L2: 0.3 m																																																																			
Test room volume:	102.8 m³	L3: 1.3 m																																																																			
Area, S, of test room:	138.9 m²	Volume: 0.5 m³																																																																			
<table border="1"><thead><tr><th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr></thead><tbody><tr><td>100</td><td>65.2</td><td></td></tr><tr><td>125</td><td>61.4</td><td>67.1</td></tr><tr><td>160</td><td>56.6</td><td></td></tr><tr><td>200</td><td>58.0</td><td></td></tr><tr><td>250</td><td>55.9</td><td>61.5</td></tr><tr><td>315</td><td>55.9</td><td></td></tr><tr><td>400</td><td>55.4</td><td></td></tr><tr><td>500</td><td>55.1</td><td>59.8</td></tr><tr><td>630</td><td>54.7</td><td></td></tr><tr><td>800</td><td>53.5</td><td></td></tr><tr><td>1000</td><td>51.1</td><td>56.6</td></tr><tr><td>1250</td><td>50.0</td><td></td></tr><tr><td>1600</td><td>48.5</td><td></td></tr><tr><td>2000</td><td>47.0</td><td>51.9</td></tr><tr><td>2500</td><td>45.2</td><td></td></tr><tr><td>3150</td><td>43.1</td><td></td></tr><tr><td>4000</td><td>40.9</td><td>46.2</td></tr><tr><td>5000</td><td>39.7</td><td></td></tr><tr><td>6300</td><td>36.9</td><td></td></tr><tr><td>8000</td><td>34.3</td><td>39.4</td></tr><tr><td>10000</td><td>30.2</td><td></td></tr></tbody></table>		Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]	100	65.2		125	61.4	67.1	160	56.6		200	58.0		250	55.9	61.5	315	55.9		400	55.4		500	55.1	59.8	630	54.7		800	53.5		1000	51.1	56.6	1250	50.0		1600	48.5		2000	47.0	51.9	2500	45.2		3150	43.1		4000	40.9	46.2	5000	39.7		6300	36.9		8000	34.3	39.4	10000	30.2			
Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]																																																																			
100	65.2																																																																				
125	61.4	67.1																																																																			
160	56.6																																																																				
200	58.0																																																																				
250	55.9	61.5																																																																			
315	55.9																																																																				
400	55.4																																																																				
500	55.1	59.8																																																																			
630	54.7																																																																				
800	53.5																																																																				
1000	51.1	56.6																																																																			
1250	50.0																																																																				
1600	48.5																																																																				
2000	47.0	51.9																																																																			
2500	45.2																																																																				
3150	43.1																																																																				
4000	40.9	46.2																																																																			
5000	39.7																																																																				
6300	36.9																																																																				
8000	34.3	39.4																																																																			
10000	30.2																																																																				
Sound power level L _w (A):		62 dB [re 1pW]																																																																			
Name of test institute:	DTI																																																																				
No. of test report:	300-KLAB-16-022																																																																				
Date: 26-04-2017																																																																					



DANISH
TECHNOLOGICAL
INSTITUTE

Page 8 of 13
300-KLAB-16-022

Detailed test results - sound power level - test 2




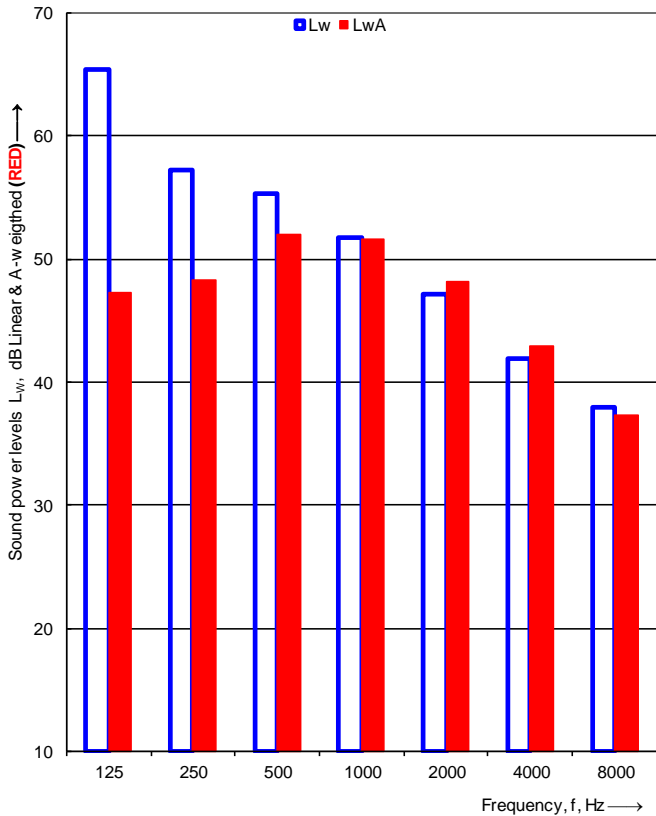
 		Sound power levels according to ISO 3743-1:2010	 TEKNOLOGISK INSTITUT																																																																		
Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms																																																																					
Client:	Panasonic Marketing Europe GmbH		Date of test: 26-04-2017																																																																		
Object:	Split air to water heatpump Model: WH-UQ16HE8(Outdoor unit) + WH-SQC16H9E8(Indoor unit)																																																																				
Mounting conditions:	The outdoor unit is standing free on four 5.5 cm thick heavy concrete tiles placed on a vibration damping mat, which is placed on a water drop tray. The water drop tray is located on a 2.5 cm thick wooden board laying on the floor. The outdoor unit is mounted on 6 supporting metal support frame using 6 vibration insulators.																																																																				
Operating conditions:	A7/W35, Compressor speed: 27-28[Hz], Heating capacity: 9.9[kW], COP: 4.55, Water flow rate: 1710[l/h], Fan speed 1: 420[rpm], Fan speed 2: 460[rpm]																																																																				
Static pressure:	1013 kPa	<u>Reference box:</u>																																																																			
Air temperature:	7.0 °C	L1: 1.3 m																																																																			
Relative air humidity:	84.0 %	L2: 0.3 m																																																																			
Test room volume:	102.8 m³	L3: 1.3 m																																																																			
Area, S, of test room:	138.9 m²	Volume: 0.5 m³																																																																			
<table border="1"><thead><tr><th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr></thead><tbody><tr><td>100</td><td>59.3</td><td></td></tr><tr><td>125</td><td>53.5</td><td>60.7</td></tr><tr><td>160</td><td>50.2</td><td></td></tr><tr><td>200</td><td>50.6</td><td></td></tr><tr><td>250</td><td>48.0</td><td>54.0</td></tr><tr><td>315</td><td>48.5</td><td></td></tr><tr><td>400</td><td>48.7</td><td></td></tr><tr><td>500</td><td>47.9</td><td>53.0</td></tr><tr><td>630</td><td>48.0</td><td></td></tr><tr><td>800</td><td>47.9</td><td></td></tr><tr><td>1000</td><td>42.6</td><td>49.8</td></tr><tr><td>1250</td><td>41.7</td><td></td></tr><tr><td>1600</td><td>40.8</td><td></td></tr><tr><td>2000</td><td>38.7</td><td>43.9</td></tr><tr><td>2500</td><td>37.1</td><td></td></tr><tr><td>3150</td><td>36.4</td><td></td></tr><tr><td>4000</td><td>34.2</td><td>43.7</td></tr><tr><td>5000</td><td>42.1</td><td></td></tr><tr><td>6300</td><td>42.9</td><td></td></tr><tr><td>8000</td><td>40.2</td><td>45.2</td></tr><tr><td>10000</td><td>34.5</td><td></td></tr></tbody></table>		Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]	100	59.3		125	53.5	60.7	160	50.2		200	50.6		250	48.0	54.0	315	48.5		400	48.7		500	47.9	53.0	630	48.0		800	47.9		1000	42.6	49.8	1250	41.7		1600	40.8		2000	38.7	43.9	2500	37.1		3150	36.4		4000	34.2	43.7	5000	42.1		6300	42.9		8000	40.2	45.2	10000	34.5			
Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]																																																																			
100	59.3																																																																				
125	53.5	60.7																																																																			
160	50.2																																																																				
200	50.6																																																																				
250	48.0	54.0																																																																			
315	48.5																																																																				
400	48.7																																																																				
500	47.9	53.0																																																																			
630	48.0																																																																				
800	47.9																																																																				
1000	42.6	49.8																																																																			
1250	41.7																																																																				
1600	40.8																																																																				
2000	38.7	43.9																																																																			
2500	37.1																																																																				
3150	36.4																																																																				
4000	34.2	43.7																																																																			
5000	42.1																																																																				
6300	42.9																																																																				
8000	40.2	45.2																																																																			
10000	34.5																																																																				
Sound power level L _w (A):		55 dB [re 1pW]																																																																			
Name of test institute:	DTI																																																																				
No. of test report:	300-KLAB-16-022																																																																				
Date: 26-04-2017																																																																					



DANISH
TECHNOLOGICAL
INSTITUTE

Page 9 of 13
300-KLAB-16-022

Detailed test results - sound power level - test 3




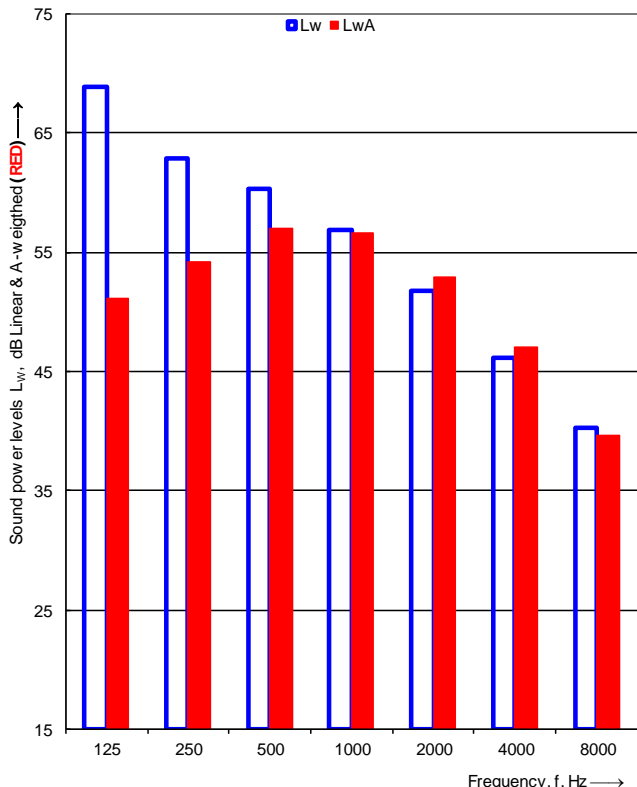
 		Sound power levels according to ISO 3743-1:2010	 TEKNOLOGISK INSTITUT																																																																		
Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms																																																																					
Client:	Panasonic Marketing Europe GmbH		Date of test: 27-04-2017																																																																		
Object:	Split air to water heatpump Model: WH-UQ16HE8(Outdoor unit) + WH-SQC16H9E8(Indoor unit)																																																																				
Mounting conditions:	The outdoor unit is standing free on four 5.5 cm thick heavy concrete tiles placed on a vibration damping mat, which is placed on a water drop tray. The water drop tray is located on a 2.5 cm thick wooden board laying on the floor. The outdoor unit is mounted on 6 supporting metal support frame using 6 vibration insulators.																																																																				
<hr/>																																																																					
Operating conditions:	A7/W35, Compressor speed: 20[Hz], Heating capacity: 7.65[kW], COP: 4.55, Water flow rate: 1335[l/h], Fan speed 1: 490[rpm], Fan speed 2: 530[rpm], Test mode 4																																																																				
Static pressure:	1013 kPa	<u>Reference box:</u>																																																																			
Air temperature:	7.0 °C	L1: 1.3 m																																																																			
Relative air humidity:	84.0 %	L2: 0.3 m																																																																			
Test room volume:	102.8 m³	L3: 1.3 m																																																																			
Area, S, of test room:	138.9 m²	Volume: 0.5 m³																																																																			
<hr/>																																																																					
<table border="1"><thead><tr><th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr></thead><tbody><tr><td>100</td><td>64.5</td><td></td></tr><tr><td>125</td><td>56.3</td><td>65.3</td></tr><tr><td>160</td><td>52.4</td><td></td></tr><tr><td>200</td><td>54.3</td><td></td></tr><tr><td>250</td><td>51.0</td><td>57.2</td></tr><tr><td>315</td><td>51.1</td><td></td></tr><tr><td>400</td><td>51.1</td><td></td></tr><tr><td>500</td><td>50.6</td><td>55.2</td></tr><tr><td>630</td><td>49.6</td><td></td></tr><tr><td>800</td><td>48.9</td><td></td></tr><tr><td>1000</td><td>46.0</td><td>51.8</td></tr><tr><td>1250</td><td>45.2</td><td></td></tr><tr><td>1600</td><td>43.9</td><td></td></tr><tr><td>2000</td><td>42.3</td><td>47.1</td></tr><tr><td>2500</td><td>39.8</td><td></td></tr><tr><td>3150</td><td>37.9</td><td></td></tr><tr><td>4000</td><td>37.0</td><td>41.9</td></tr><tr><td>5000</td><td>36.4</td><td></td></tr><tr><td>6300</td><td>35.2</td><td></td></tr><tr><td>8000</td><td>32.8</td><td>38.0</td></tr><tr><td>10000</td><td>30.1</td><td></td></tr></tbody></table>	Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]	100	64.5		125	56.3	65.3	160	52.4		200	54.3		250	51.0	57.2	315	51.1		400	51.1		500	50.6	55.2	630	49.6		800	48.9		1000	46.0	51.8	1250	45.2		1600	43.9		2000	42.3	47.1	2500	39.8		3150	37.9		4000	37.0	41.9	5000	36.4		6300	35.2		8000	32.8	38.0	10000	30.1				
Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]																																																																			
100	64.5																																																																				
125	56.3	65.3																																																																			
160	52.4																																																																				
200	54.3																																																																				
250	51.0	57.2																																																																			
315	51.1																																																																				
400	51.1																																																																				
500	50.6	55.2																																																																			
630	49.6																																																																				
800	48.9																																																																				
1000	46.0	51.8																																																																			
1250	45.2																																																																				
1600	43.9																																																																				
2000	42.3	47.1																																																																			
2500	39.8																																																																				
3150	37.9																																																																				
4000	37.0	41.9																																																																			
5000	36.4																																																																				
6300	35.2																																																																				
8000	32.8	38.0																																																																			
10000	30.1																																																																				
<hr/>																																																																					
Sound power level L _w (A):		58 dB [re 1pW]																																																																			
<hr/>																																																																					
Name of test institute:	DTI																																																																				
No. of test report:	300-KLAB-16-022																																																																				
Date:	27-04-2017																																																																				



DANISH
TECHNOLOGICAL
INSTITUTE

Page 10 of 13
300-KLAB-16-022

Detailed test results - sound power level - test 4




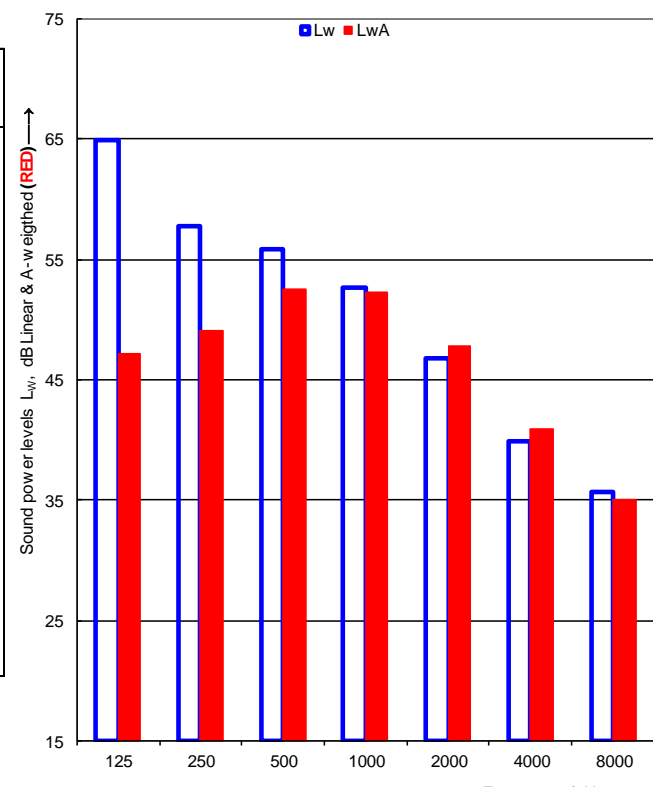
 		Sound power levels according to ISO 3743-1:2010	 TEKNOLOGISK INSTITUT																																																																		
Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms																																																																					
Client:	Panasonic Marketing Europe GmbH		Date of test: 25-04-2017																																																																		
Object:	Split air to water heatpump Model: WH-UQ16HE8(Outdoor unit) + WH-SQC16H9E8(Indoor unit)																																																																				
Mounting conditions:	The outdoor unit is standing free on four 5.5 cm thick heavy concrete tiles placed on a vibration damping mat, which is placed on a water drop tray. The water drop tray is located on a 2.5 cm thick wooden board laying on the floor. The outdoor unit is mounted on 6 supporting metal support frame using 4 vibration insulators.																																																																				
Operating conditions:	A7/W55, Compressor speed: 47-48[Hz], Heating capacity: 16.1[kW], COP: 2.8, Water flow rate: 1766 [l/h], Fan speed 1: 490[rpm], Fan speed 2: 530[rpm]																																																																				
Static pressure:	1013 kPa	Reference box:																																																																			
Air temperature:	7.0 °C	L1: 1.3 m																																																																			
Relative air humidity:	84.0 %	L2: 0.3 m																																																																			
Test room volume:	102.8 m³	L3: 1.3 m																																																																			
Area, S, of test room:	138.9 m²	Volume: 0.5 m³																																																																			
<table border="1"><thead><tr><th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr></thead><tbody><tr><td>100</td><td>67.8</td><td></td></tr><tr><td>125</td><td>60.9</td><td>68.9</td></tr><tr><td>160</td><td>57.1</td><td></td></tr><tr><td>200</td><td>59.7</td><td></td></tr><tr><td>250</td><td>56.3</td><td>62.9</td></tr><tr><td>315</td><td>57.7</td><td></td></tr><tr><td>400</td><td>56.3</td><td></td></tr><tr><td>500</td><td>55.2</td><td>60.3</td></tr><tr><td>630</td><td>54.9</td><td></td></tr><tr><td>800</td><td>54.2</td><td></td></tr><tr><td>1000</td><td>51.1</td><td>56.9</td></tr><tr><td>1250</td><td>49.9</td><td></td></tr><tr><td>1600</td><td>48.4</td><td></td></tr><tr><td>2000</td><td>46.9</td><td>51.8</td></tr><tr><td>2500</td><td>45.1</td><td></td></tr><tr><td>3150</td><td>43.0</td><td></td></tr><tr><td>4000</td><td>40.8</td><td>46.1</td></tr><tr><td>5000</td><td>39.3</td><td></td></tr><tr><td>6300</td><td>37.8</td><td></td></tr><tr><td>8000</td><td>35.0</td><td>40.2</td></tr><tr><td>10000</td><td>31.3</td><td></td></tr></tbody></table>		Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]	100	67.8		125	60.9	68.9	160	57.1		200	59.7		250	56.3	62.9	315	57.7		400	56.3		500	55.2	60.3	630	54.9		800	54.2		1000	51.1	56.9	1250	49.9		1600	48.4		2000	46.9	51.8	2500	45.1		3150	43.0		4000	40.8	46.1	5000	39.3		6300	37.8		8000	35.0	40.2	10000	31.3			
Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]																																																																			
100	67.8																																																																				
125	60.9	68.9																																																																			
160	57.1																																																																				
200	59.7																																																																				
250	56.3	62.9																																																																			
315	57.7																																																																				
400	56.3																																																																				
500	55.2	60.3																																																																			
630	54.9																																																																				
800	54.2																																																																				
1000	51.1	56.9																																																																			
1250	49.9																																																																				
1600	48.4																																																																				
2000	46.9	51.8																																																																			
2500	45.1																																																																				
3150	43.0																																																																				
4000	40.8	46.1																																																																			
5000	39.3																																																																				
6300	37.8																																																																				
8000	35.0	40.2																																																																			
10000	31.3																																																																				
<div>Sound power level L_w(A): 62 dB [re 1pW]</div>																																																																					
Name of test institute:	DTI																																																																				
No. of test report:	300-KLAB-16-022																																																																				
Date: 25-04-2017																																																																					



DANISH
TECHNOLOGICAL
INSTITUTE

Page 11 of 13
300-KLAB-16-022

Detailed test results - sound power level - test 5




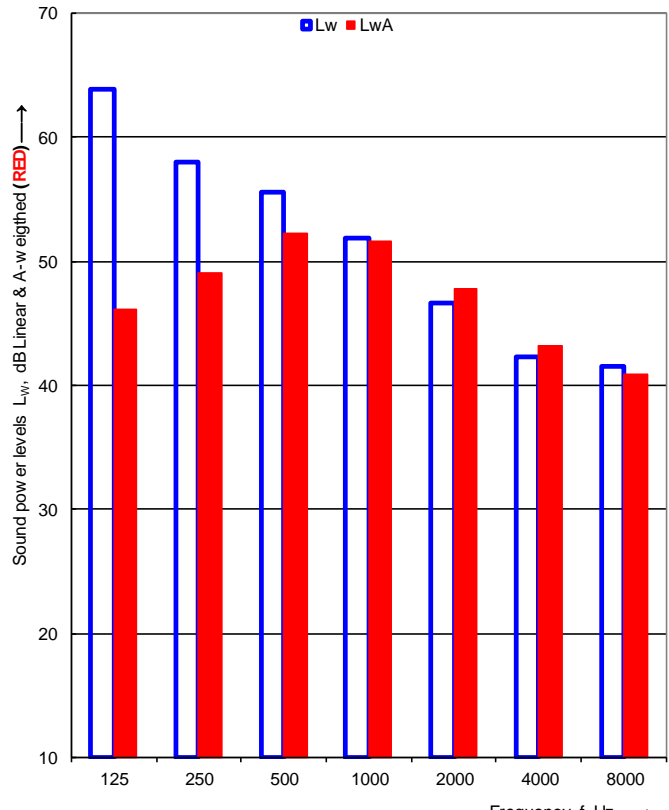
 		Sound power levels according to ISO 3743-1:2010	 TEKNOLOGISK INSTITUT																																																																		
Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms																																																																					
Client:	Panasonic Marketing Europe GmbH		Date of test: 25-04-2017																																																																		
Object:	Split air to water heatpump Model: WH-UQ16HE8 (Outdoor unit) + WH-SQC16H9E8 (Indoor unit)																																																																				
Mounting conditions:	The outdoor unit is standing free on four 5.5 cm thick heavy concrete tiles placed on a vibration damping mat, which is placed on a water drop tray. The water drop tray is located on a 2.5 cm thick wooden board laying on the floor. The outdoor unit is mounted on 6 supporting metal support frame using 4 vibration insulators.																																																																				
Operating conditions:	A7/W55, Compressor speed: 30-31[Hz], Heating capacity: 10.4[kW], COP: 2.85, Water flow rate: 1100 [l/h], Fan speed 1: 490[rpm], Fan speed 2: 530[rpm], Quiet mode level 3																																																																				
Static pressure:	1013 kPa	<u>Reference box:</u>																																																																			
Air temperature:	7.0 °C	L1: 1.3 m																																																																			
Relative air humidity:	84.0 %	L2: 0.3 m																																																																			
Test room volume:	102.8 m³	L3: 1.3 m																																																																			
Area, S, of test room:	138.9 m²	Volume: 0.5 m³																																																																			
<table border="1"><thead><tr><th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr></thead><tbody><tr><td>100</td><td>63.5</td><td></td></tr><tr><td>125</td><td>57.9</td><td>64.8</td></tr><tr><td>160</td><td>53.0</td><td></td></tr><tr><td>200</td><td>54.4</td><td></td></tr><tr><td>250</td><td>51.8</td><td>57.7</td></tr><tr><td>315</td><td>52.2</td><td></td></tr><tr><td>400</td><td>51.8</td><td></td></tr><tr><td>500</td><td>50.9</td><td>55.8</td></tr><tr><td>630</td><td>50.4</td><td></td></tr><tr><td>800</td><td>50.3</td><td></td></tr><tr><td>1000</td><td>46.3</td><td>52.6</td></tr><tr><td>1250</td><td>45.2</td><td></td></tr><tr><td>1600</td><td>43.7</td><td></td></tr><tr><td>2000</td><td>41.7</td><td>46.7</td></tr><tr><td>2500</td><td>39.4</td><td></td></tr><tr><td>3150</td><td>37.0</td><td></td></tr><tr><td>4000</td><td>34.3</td><td>39.8</td></tr><tr><td>5000</td><td>32.9</td><td></td></tr><tr><td>6300</td><td>33.0</td><td></td></tr><tr><td>8000</td><td>30.8</td><td>35.6</td></tr><tr><td>10000</td><td>26.7</td><td></td></tr></tbody></table>		Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]	100	63.5		125	57.9	64.8	160	53.0		200	54.4		250	51.8	57.7	315	52.2		400	51.8		500	50.9	55.8	630	50.4		800	50.3		1000	46.3	52.6	1250	45.2		1600	43.7		2000	41.7	46.7	2500	39.4		3150	37.0		4000	34.3	39.8	5000	32.9		6300	33.0		8000	30.8	35.6	10000	26.7			
Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]																																																																			
100	63.5																																																																				
125	57.9	64.8																																																																			
160	53.0																																																																				
200	54.4																																																																				
250	51.8	57.7																																																																			
315	52.2																																																																				
400	51.8																																																																				
500	50.9	55.8																																																																			
630	50.4																																																																				
800	50.3																																																																				
1000	46.3	52.6																																																																			
1250	45.2																																																																				
1600	43.7																																																																				
2000	41.7	46.7																																																																			
2500	39.4																																																																				
3150	37.0																																																																				
4000	34.3	39.8																																																																			
5000	32.9																																																																				
6300	33.0																																																																				
8000	30.8	35.6																																																																			
10000	26.7																																																																				
<div>Sound power level L_w(A): 58 dB [re 1pW]</div>																																																																					
Name of test institute:	DTI																																																																				
No. of test report:	300-KLAB-16-022																																																																				
Date: 25-04-2017																																																																					



DANISH
TECHNOLOGICAL
INSTITUTE

Page 12 of 13
300-KLAB-16-022

Detailed test results - sound power level - test 6

 		Sound power levels according to ISO 3743-1:2010		 TEKNOLOGISK INSTITUT																																																																			
Engineering method for small, movable sources in reverberant fields - Comparison method for hard-walled test rooms																																																																							
Client:		Panasonic Marketing Europe GmbH		Date of test: 26-04-2017																																																																			
Object:		Split air to water heatpump Model: WH-UQ16HEB (Outdoor unit) + WH-SQC16H9E8 (Indoor unit)																																																																					
Mounting conditions:		The outdoor unit is standing free on four 5.5 cm thick heavy concrete tiles placed on a vibration damping mat, which is placed on a water drop tray. The water drop tray is located on a 2.5 cm thick wooden board laying on the floor. The outdoor unit is mounted on 6 supporting metal support frame using 4 vibration insulators.																																																																					
Operating conditions:		A7/W55, Compressor speed: 20[Hz], Heating capacity: 6.1[kW], COP: 2.2, Water flow rate: 800 [l/h], Fan speed 1: 490[rpm], Fan speed 2: 530[rpm], Test mode 4																																																																					
Static pressure:		1013 kPa		<u>Reference box:</u>																																																																			
Air temperature:		7.0 °C		L1: 1.3 m																																																																			
Relative air humidity:		84.0 %		L2: 0.3 m																																																																			
Test room volume:		102.8 m³		L3: 1.3 m																																																																			
Area, S, of test room:		138.9 m²		Volume: 0.5 m³																																																																			
<table border="1"><thead><tr><th>Frequency f [Hz]</th><th>L_w 1/3 octave [dB]</th><th>1/1 oct [dB]</th></tr></thead><tbody><tr><td>100</td><td>62.7</td><td></td></tr><tr><td>125</td><td>56.3</td><td>63.9</td></tr><tr><td>160</td><td>52.3</td><td></td></tr><tr><td>200</td><td>55.2</td><td></td></tr><tr><td>250</td><td>51.7</td><td>58.0</td></tr><tr><td>315</td><td>51.8</td><td></td></tr><tr><td>400</td><td>51.4</td><td></td></tr><tr><td>500</td><td>50.5</td><td>55.5</td></tr><tr><td>630</td><td>50.3</td><td></td></tr><tr><td>800</td><td>49.2</td><td></td></tr><tr><td>1000</td><td>45.8</td><td>51.8</td></tr><tr><td>1250</td><td>44.9</td><td></td></tr><tr><td>1600</td><td>43.5</td><td></td></tr><tr><td>2000</td><td>41.7</td><td>46.6</td></tr><tr><td>2500</td><td>39.5</td><td></td></tr><tr><td>3150</td><td>38.6</td><td></td></tr><tr><td>4000</td><td>35.5</td><td>42.2</td></tr><tr><td>5000</td><td>37.7</td><td></td></tr><tr><td>6300</td><td>39.0</td><td></td></tr><tr><td>8000</td><td>36.0</td><td>41.5</td></tr><tr><td>10000</td><td>33.6</td><td></td></tr></tbody></table>		Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]	100	62.7		125	56.3	63.9	160	52.3		200	55.2		250	51.7	58.0	315	51.8		400	51.4		500	50.5	55.5	630	50.3		800	49.2		1000	45.8	51.8	1250	44.9		1600	43.5		2000	41.7	46.6	2500	39.5		3150	38.6		4000	35.5	42.2	5000	37.7		6300	39.0		8000	36.0	41.5	10000	33.6					
Frequency f [Hz]	L _w 1/3 octave [dB]	1/1 oct [dB]																																																																					
100	62.7																																																																						
125	56.3	63.9																																																																					
160	52.3																																																																						
200	55.2																																																																						
250	51.7	58.0																																																																					
315	51.8																																																																						
400	51.4																																																																						
500	50.5	55.5																																																																					
630	50.3																																																																						
800	49.2																																																																						
1000	45.8	51.8																																																																					
1250	44.9																																																																						
1600	43.5																																																																						
2000	41.7	46.6																																																																					
2500	39.5																																																																						
3150	38.6																																																																						
4000	35.5	42.2																																																																					
5000	37.7																																																																						
6300	39.0																																																																						
8000	36.0	41.5																																																																					
10000	33.6																																																																						
Sound power level L_w(A): 58 dB [re 1pW]																																																																							
Name of test institute:		DTI																																																																					
No. of test report:		300-KLAB-16-022																																																																					
Date:		26-04-2017																																																																					



Appendix 1: Test Procedure

The measurements of the emitted sound power level from the heat pump are carried out according to the following:

- DS/EN 14511:2013
- EN 12102
- DS/EN 3743/1

The basic acoustic measurement standard DS/EN 3743-1 is a comparison method using a calibrated reference sound source. Two series of sound pressure measurements are made under exactly the same acoustic conditions, e.g. the same microphone positions, temperature and air humidity. The calibrated sound power levels are known for the reference sound source at each frequency band, and they are used in the estimation of the acoustical correction factor for the calculation of the sound power emitted from the tested heat pump. The background noise levels are measured and used for relevant corrections.

The final total A-weighted sound power level is based on measurements and calculations in 1/3-octave levels, which then are summed into 1/1-octave levels. The uncertainty is estimated on the weighted standard deviations in 1/1-octave levels.

The actual microphone positions and correction values are saved in data files linked to the complete project documentation according to the DANAK-accreditation.

The complete measurement system is documented and regularly calibrated according to DANAK.

The detailed description of the measurement method is given in Danish in the quality database system "QA Web" at Danish Technological Institute, which is accessible by DANAK.