



## 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  
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Date: 2017.05.19 Page: 1 of 12  
Report no.: 300-KLAB-16-022 Init.: KAMA/JGW  
File no.: 702564 Enclosures: 1

[info@teknologisk.dk](mailto:info@teknologisk.dk)  
[www.teknologisk.dk](http://www.teknologisk.dk)

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

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**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](http://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.

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

**Date:** 2017.05.19

**Signature:**

**Co-reader:**

Kamalathan Arumugam  
B.Sc. Engineer

Birger Bech Jessen  
Senior Consultant



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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.



## 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 <sup>1</sup>	A7/W35	42-43	580	620	16.2	2695
2 <sup>2</sup>	A7/W35	27-28	420	460	9.9	1710
3 <sup>3</sup>	A7/W35	20	490	530	7.65	1335
4 <sup>1</sup>	A7/W55	47-48	490	530	16.1	1766
5 <sup>2</sup>	A7/W55	30-31	490	530	10.4	1100
6 <sup>3</sup>	A7/W55	20	490	530	6.1	800

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



## 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.



### Outdoor unit



### Rating plate - outdoor unit



### Indoor unit



### Rating plate - indoor unit





## Detailed test results - sound power level - test 1

		<b>Sound power levels according to ISO 3743-1:2010</b>																																																																					
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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																																																																				
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## Detailed test results - sound power level - test 2

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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[rmm]																																																																						
Static pressure:	1013 kPa	<u>Reference box:</u>																																																																					
Air temperature:	7.0 °C	L1:	1.3 m																																																																				
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### Detailed test results - sound power level - test 3

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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[rmm], 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																																																																				
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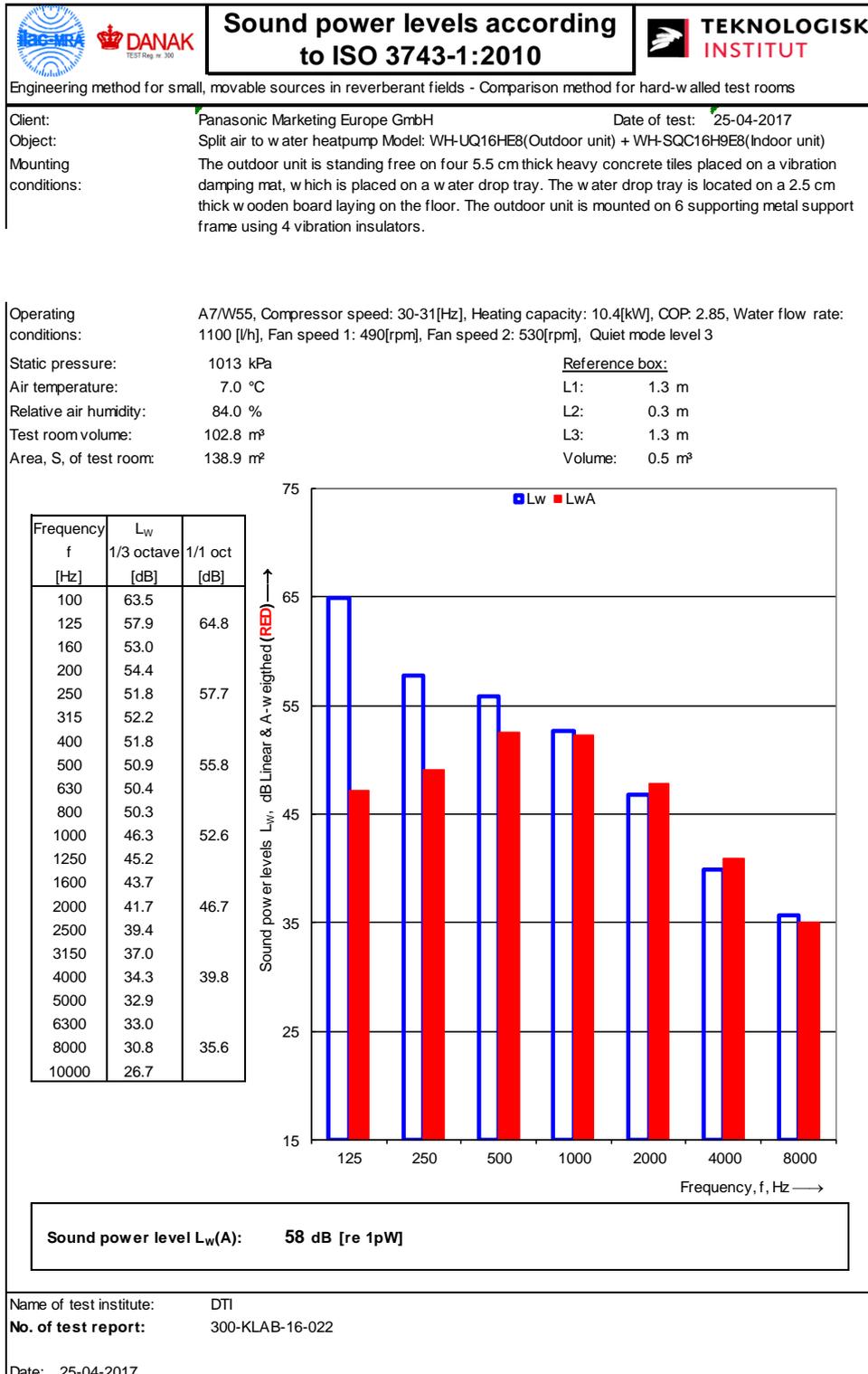


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No. of test report:	300-KLAB-16-022																																																																					
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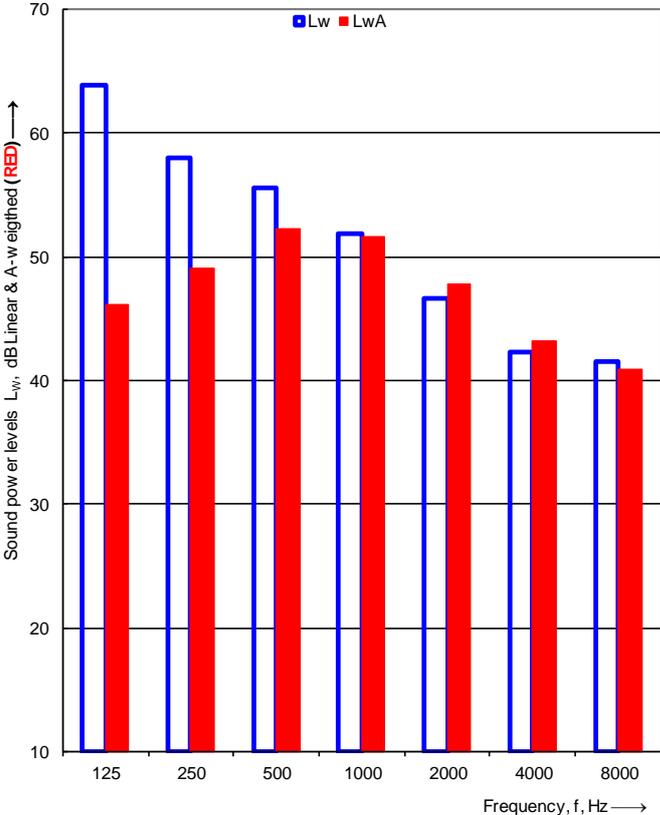
## Detailed test results - sound power level - test 5



Name of test institute: DTI  
 No. of test report: 300-KLAB-16-022  
 Date: 25-04-2017



## Detailed test results - sound power level - test 6

 		<b>Sound power levels according to ISO 3743-1:2010</b>	 <b>TEKNOLOGISK INSTITUT</b>																																																																
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 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<sub>w</sub> 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 <sub>w</sub> 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		
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## 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.