

Outer Dowsing Offshore Wind Preliminary Environmental Information Report Volume 2, Appendix 26.1: Sound Level Meter Calibration Certificates

Date: June 2023

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**OUTER DOWSING OFFSHORE WIND
PRELIMINARY ENVIRONMENTAL
INFORMATION REPORT**

**VOLUME 2, APPENDIX 26.1 SOUND
LEVEL METER CALIBRATION
CERTIFICATES**

SLR Ref: 410.V05356.00013
Version No: V1.0
June 2023

SLR 

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1.0 Sound Level Meter and Calibration Certificates

Presented below are the cover sheets for the calibration certificates for all the sound level meters and acoustic calibrators used throughout the project, all of which are traceable to national standards. Sound level meter calibration certificates are valid for 2 years. Acoustic calibrator certificates are valid for 1 year. Full certificates are available on request.

1.1 Cirrus CR:171B G079816 and CR:515 81268

CERTIFICATE OF CALIBRATION			
ISSUED BY	Cirrus Research plc		
DATE OF ISSUE	07/01/21	CERTIFICATE NUMBER 151030	

	Cirrus Research plc Acoustic House Bridlington Road Hunmanby North Yorkshire YO14 0PH United Kingdom	Page 1 of 15
		Approved signatory T. Goodrich Electronically signed: 

Sound level meter : IEC 61672-3:2013

Customer information

Name:	SLR Consulting Ltd	Address:	Aspect House Aspect Business Park Bennerley Road Nottingham	Postcode:	NG6 8WR	Country:	United Kingdom
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Instrument information

Manufacturer:	Cirrus Research plc	Notes:	
Model:	CR:171B		
Serial number:	G079816		
Class:	1		
Firmware version:	V3.2.3046		

Test summary

Date of receipt:	07/01/21	Date of calibration:	07/01/21
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Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. UKAS is one of the signatories to the Multilateral Agreement of the European co-operation for Accreditation (EA) for the mutual recognition of calibration certificates issued by accredited laboratories. The United Kingdom Accreditation Service (UKAS) is one of the signatories to the International Laboratory Accreditation Co-operation (ILAC) Arrangement for the mutual recognition of calibration certificates. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

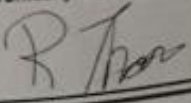
CERTIFICATE OF CALIBRATION	
ISSUED BY	Cirrus Research plc
DATE OF ISSUE	29 April 2022
CERTIFICATE NUMBER	173717



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
R. Thomas
Electronically signed:



Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer:	Cirrus Research plc	Notes:	
Model:	CR:515		
Serial number:	81268		
Class:	1		

Test summary

Date of calibration: 29 April 2022

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK-224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by Laboratoire National d'Essais (LNE), Physikalisch-Technische Bundesanstalt (PTB) and APPLUS (APPLUS).

Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

1.2 Cirrus CR:171B G400059 and CR:515 99960

CERTIFICATE OF CALIBRATION	
ISSUED BY	Cirrus Research plc
DATE OF ISSUE	18 October 2022
CERTIFICATE NUMBER	181627

	Cirrus Research plc Acoustic House Bridlington Road Hunmanby North Yorkshire YO14 0PH United Kingdom
---	---

Page 1 of 2
Approved signatory M.McDonald Electronically signed: 

Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:171B	
Serial number:	G400059	
Class:	1	
Firmware version:	5.7.3228	

Test summary

The calibration was performed respecting the requirements of ISO/IEC 17025:2017. Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**
DATE OF ISSUE **18 October 2022** CERTIFICATE NUMBER **181631**



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
M. Berezovskis
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc **Notes:**
Model: CR:515
Serial number: 99960
Class: 1

Test summary

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.

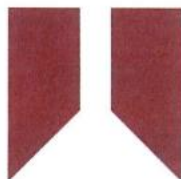
The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by Laboratoire National d'Essais (LNE), Physikalisch-Technische Bundesanstalt (PTB) and APPLUS (APPLUS).

Notes:


This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

1.3 Cirrus CR:171B G303390 CR:515 97661

CERTIFICATE OF CALIBRATION		
ISSUED BY	Cirrus Research plc	
DATE OF ISSUE	01 October 2021	CERTIFICATE NUMBER 163688



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2
Approved signatory M.McDonald Electronically signed: 

Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:171B	
Serial number:	G303390	
Class:	1	
Firmware version:	5.6.3177	

Test summary

Date of calibration: 21 September 2021

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

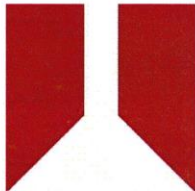
However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**
DATE OF ISSUE **17 November 2022** CERTIFICATE NUMBER **183408**



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
R.Thomas
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc
Model: CR:515
Serial number: 97661
Class: 1

Notes:

Test summary

Date of calibration: 17 November 2022

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.



The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by APPLUS, Physikalisch Technische Bundesanstalt (PTB) and Laboratoire National d'Essais (LNE).

Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

1.4 Cirrus CR:171B G301839 CR:515 93674

CERTIFICATE OF CALIBRATION		
ISSUED BY	Cirrus Research plc	
DATE OF ISSUE	18 November 2022	CERTIFICATE NUMBER 183449

	Cirrus Research plc Acoustic House Bridlington Road Hunmanby North Yorkshire YO14 0PH United Kingdom	Page 1 of 2 Approved signatory R.Thomas Electronically signed: 
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Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:171B	
Serial number:	G301839	
Class:	1	
Firmware version:	5.8.3251	

Test summary

Date of calibration: 18 November 2022

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**
DATE OF ISSUE **18 November 2022** CERTIFICATE NUMBER **183451**



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
R.Thomas
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc **Notes:**
Model: CR:515
Serial number: 93674
Class: 1

Test summary

Date of calibration: 18 November 2022

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.



The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by APPLUS, PhysikalischTechnische Bundesanstalt (PTB) and Laboratoire National d'Essais (LNE).


Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

1.5 Cirrus CR:171B G300561and CR:515 87922

CERTIFICATE OF CALIBRATION	
ISSUED BY	Cirrus Research plc
DATE OF ISSUE	11/06/21
CERTIFICATE NUMBER	158222

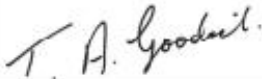




Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 15

Approved signatory
T. Goodrich
Electronically signed:



Sound level meter : IEC 61672-3:2013

Customer information

Name:	SLR Consulting Ltd	Address:	15 Middle Pavement Nottingham	Postcode:	NG1 7DX
		Country:	United Kingdom		

Instrument information

Manufacturer:	Cirrus Research plc	Notes:	
Model:	CR:171B		
Serial number:	G300561		
Class:	1		
Firmware version:	V5.6.3177		

Test summary

Date of receipt: 11/06/21 Date of calibration: 11/06/21

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.


The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. UKAS is one of the signatories to the Multilateral Agreement of the European co-operation for Accreditation (EA) for the mutual recognition of calibration certificates issued by accredited laboratories. The United Kingdom Accreditation Service (UKAS) is one of the signatories to the International Laboratory Accreditation Co-operation (ILAC) Arrangement for the mutual recognition of calibration certificates. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

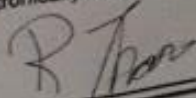
CERTIFICATE OF CALIBRATION	
ISSUED BY	Cirrus Research plc
DATE OF ISSUE	07 June 2022
CERTIFICATE NUMBER	175488



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
R. Thomas
Electronically signed:



Sound Calibrator : IEC 60942:2003

Instrument information	
Manufacturer:	Cirrus Research plc
Model:	CR.515
Serial number:	87922
Class:	1

Notes:

Test summary

Date of calibration: 07 June 2022

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK 224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.



The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by Laboratoire National d'Essais (LNE), Physikalisch Technische Bundesanstalt (PTB) and APPLUS (APPLUS).

Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

1.6 Cirrus CR:171B G303356 and CR:515 97641

CERTIFICATE OF CALIBRATION			
ISSUED BY	Cirrus Research plc		
DATE OF ISSUE	01 October 2021	CERTIFICATE NUMBER	163689

	Cirrus Research plc Acoustic House Bridlington Road Hunmanby North Yorkshire YO14 0PH United Kingdom	Page 1 of 2 Approved signatory M.Berezovskis Electronically signed: 
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Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:171B	
Serial number:	G303356	
Class:	1	
Firmware version:	5.6.3177	

Test summary

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

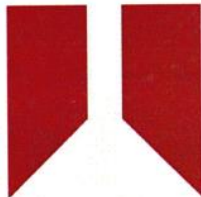
However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**
DATE OF ISSUE **17 November 2022** CERTIFICATE NUMBER **183409**



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
R.Thomas
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc
Model: CR:515
Serial number: 97641
Class: 1

Notes:

Test summary

Date of calibration: 17 November 2022

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.


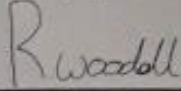
As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by APPLUS, PhysikalischTechnische Bundesanstalt (PTB) and Laboratoire National d'Essais (LNE).


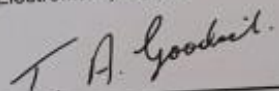
Notes:

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

1.7 Cirrus CR:171B G0302667 and CR:515 94806

CERTIFICATE OF CALIBRATION		
ISSUED BY	Cirrus Research plc	
DATE OF ISSUE	30 June 2022	CERTIFICATE NUMBER 176576
	Cirrus Research plc Acoustic House Bridlington Road Hunmanby North Yorkshire YO14 0PH United Kingdom	Page 1 of 2 Approved signatory R.Woodall Electronically signed 
Sound Level Meter : IEC 61672-3:2013		
Instrument information		
Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:171B	
Serial number:	G302667	
Class:	1	
Firmware version:	5.7.3228	
Test summary		
Date of calibration: 30 June 2022		
The calibration was performed respecting the requirements of ISO/IEC 17025:2017. Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.		
The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.		
However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.		
Notes		
This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.		

<h1>CERTIFICATE OF CALIBRATION</h1>			
ISSUED BY	Cirrus Research plc		
DATE OF ISSUE	04 April 2022	CERTIFICATE NUMBER	172456

	Cirrus Research plc Acoustic House Bridlington Road Hunmanby North Yorkshire YO14 0PH United Kingdom
	Page 1 of 2 Approved signatory T. Goodrich Electronically signed: 

Sound Calibrator : IEC 60942:2003

Instrument information	
Manufacturer: Cirrus Research plc	Notes:
Model: CR:515	
Serial number: 94806	
Class: 1	

Test summary

Date of calibration: 04 April 2022

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK.224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by Laboratoire National d'Essais (LNE), Physikalisch-Technische Bundesanstalt (PTB) and APPLUS (APPLUS).

Notes:

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1.8 Cirrus CR:171B G400055 and CR:515 99952

CERTIFICATE OF CALIBRATION	
ISSUED BY	Cirrus Research plc
DATE OF ISSUE	18 October 2022
CERTIFICATE NUMBER	181626

	Cirrus Research plc Acoustic House Bridlington Road Hunmanby North Yorkshire YO14 0PH United Kingdom
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Page 1 of 2
Approved signatory M.McDonald
Electronically signed: 

Sound Level Meter : IEC 61672-3:2013

Instrument information

Manufacturer:	Cirrus Research plc	Notes:
Model:	CR:171B	
Serial number:	G400055	
Class:	1	
Firmware version:	5.7.3228	

Test summary

The calibration was performed respecting the requirements of ISO/IEC 17025:2017.
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013.

The sound level meter submitted for testing successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 because (a) evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to determine that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

Notes

This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%.

CERTIFICATE OF CALIBRATION

ISSUED BY **Cirrus Research plc**
DATE OF ISSUE **18 October 2022** CERTIFICATE NUMBER **181630**



Cirrus Research plc
Acoustic House
Bridlington Road
Hunmanby
North Yorkshire
YO14 0PH
United Kingdom

Page 1 of 2

Approved signatory
M.Berezovskis
Electronically signed:

Sound Calibrator : IEC 60942:2003

Instrument information

Manufacturer: Cirrus Research plc **Notes:**
Model: CR:515
Serial number: 99952
Class: 1

Test summary

The sound calibrator detailed above has been calibrated to the published data as described in the operating manual and in the half-inch configuration. The procedures and techniques used are as described in IEC60942_2003 Annex B – Periodic Tests and three determinations of the sound pressure level, frequency and total distortion were made.

The sound pressure level was measured using a WS2F condenser microphone type MK:224 manufactured by Cirrus Research plc.

The results have been corrected to the reference pressure of 101.33 kPa using the manufacturer's data.

As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003.


The manufacturer's product information indicates that this model of sound calibrator has been formally pattern approved to IEC60942_2003 Annex A to Class 1. This has been confirmed by Laboratoire National d'Essais (LNE), Physikalisch-Technische Bundesanstalt (PTB) and APPLUS (APPLUS).

Notes:


This certificate provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory. The results within this certificate relate only to the items calibrated. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%.

1.9 Rion NL-52 00710362

RW4



CERTIFICATE OF CALIBRATION




0653

Date of Issue: 05 October 2021
 Calibrated at & Certificate issued by:
 ANV Measurement Systems
 Beaufort Court
 17 Roebuck Way
 Milton Keynes MK5 8HL
 Telephone 01908 642846 Fax 01908 642814
 E-Mail: info@noise-and-vibration.co.uk
 Web: www.noise-and-vibration.co.uk
Acoustick Noise and Vibration Ltd trading as ANV Measurement Systems

Certificate Number: UCRT21/2220

Page 1 of 2 Pages

Approved Signatory



B. Giles

Customer SLR Consulting Limited
 2nd and 3rd Floors
 15 Middle Pavement
 Nottingham
 NG1 7DX

Order No. 422-17278

Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	00710362
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	10904
Rion	Microphone	UC-59	19636
Rion	Calibrator	NC-75	34713324
	Calibrator adaptor type if applicable		NC-75-022

Performance Class 1

Test Procedure TP 10. SLM 61672-3:2013
Procedures from IEC 61672-3:2013 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2013 Yes
If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013

Date Received 05 October 2021 **ANV Job No.** UKAS21/10653
Date Calibrated 05 October 2021

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate	Dated	Certificate No.	Laboratory
	Initial Calibration		

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

1.10 Rion NL-52 00976174




CERTIFICATE OF CALIBRATION

Date of Issue: 01 November 2021

Certificate Number: TCRT21/1764

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory

K. Mistry

Customer SLR Consulting Limited
15 Middle Pavement
Nottingham
NG1 7DX

Order No. 403-12727
Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator
Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	00976174
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	76291
Rion	Microphone	UC-59	12067
Rion	Calibrator	NC-74	34478298
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1
Test Procedure TP 10. SLM 61672-3:2013
Procedures from IEC 61672-3:2013 were used to perform the periodic tests.
Type Approved to IEC 61672-1:2013 Yes
If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013
Date Received 29 October 2021 ANV Job No. TRAC21/10451
Date Calibrated 01 November 2021


The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate	Dated	Certificate No.	Laboratory
	31 October 2019	UCRT19/2215	ANV Measurement Systems


This certificate provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

1.11 Rion NL-52 00710359

RW2



CERTIFICATE OF CALIBRATION




0653

Date of Issue: 05 October 2021

Calibrated at & Certificate issued by:
 ANV Measurement Systems
 Beaufort Court
 17 Roebuck Way
 Milton Keynes MK5 8HL
 Telephone 01908 642846 Fax 01908 642814
 E-Mail: info@noise-and-vibration.co.uk
 Web: www.noise-and-vibration.co.uk
 Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Certificate Number: UCRT21/2223

Page 1 of 2 Pages
Approved Signatory
 B. Giles


Customer	SLR Consulting Limited 2nd and 3rd Floors 15 Middle Pavement Nottingham NG1 7DX																												
Order No.	422-17278																												
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator																												
Identification	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Manufacturer</th> <th style="text-align: left;">Instrument</th> <th style="text-align: left;">Type</th> <th style="text-align: left;">Serial No. / Version</th> </tr> </thead> <tbody> <tr> <td>Rion</td> <td>Sound Level Meter</td> <td>NL-52</td> <td>00710359</td> </tr> <tr> <td>Rion</td> <td>Firmware</td> <td></td> <td>2.0</td> </tr> <tr> <td>Rion</td> <td>Pre Amplifier</td> <td>NH-25</td> <td>10901</td> </tr> <tr> <td>Rion</td> <td>Microphone</td> <td>UC-59</td> <td>19633</td> </tr> <tr> <td>Rion</td> <td>Calibrator</td> <td>NC-75</td> <td>34713324</td> </tr> <tr> <td></td> <td>Calibrator adaptor type if applicable</td> <td></td> <td>NC-75-022</td> </tr> </tbody> </table>	Manufacturer	Instrument	Type	Serial No. / Version	Rion	Sound Level Meter	NL-52	00710359	Rion	Firmware		2.0	Rion	Pre Amplifier	NH-25	10901	Rion	Microphone	UC-59	19633	Rion	Calibrator	NC-75	34713324		Calibrator adaptor type if applicable		NC-75-022
Manufacturer	Instrument	Type	Serial No. / Version																										
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Performance Class	1																												
Test Procedure	TP 10. SLM 61672-3:2013 <i>Procedures from IEC 61672-3:2013 were used to perform the periodic tests.</i>																												
Type Approved to IEC 61672-1:2013	Yes <i>If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013</i>																												
Date Received	05 October 2021																												
Date Calibrated	05 October 2021																												
	ANV Job No. UKAS21/10653																												

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate	Dated	Certificate No.	Laboratory
	Initial Calibration		

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1.12 Norsonic Nor140 1403012 and 1251 Acoustic Calibrator 31872

Laboratory Location				
Campbell Associates Ltd				
5b Chelmsford Road Industrial Estate GREAT DUNMOW, Essex, GB-CM6 1HD				
Phone 01371 871030				
Certificate of Calibration and Conformance				
Certificate number:	42047			
Test Object:	Sound Level Meter, BS EN IEC 61672-1:2003 Class 1 Associated Frequency Analyser to BS EN IEC 61260:1996 Class 1			
Producer:	Norsonic AS.			
Type:	140			
Serial number:	1403012			
Customer:	SLR Consulting Ltd			
Address:	15 Middle Pavement, Nottingham. NG1 7DX.			
Contact Person:	James Burchell			
Order No:	000366-403			
Introduction:				
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the Test Object listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.				
Tested:	<i>Producer</i>	<i>Type</i>	<i>Serial No</i>	<i>Certificate No</i>
Microphone	Norsonic	1225	335397	42046
Calibrator*	Norsonic	1251	31872	42045
Preamplifier	Norsonic	1209	12366	Included
* The calibrator was complete with any required coupler for the microphone specified.				
Additional items that have also been submitted for verification:				
Wind shield	Norsonic	Nor1434 (ø 90mm)		
Attenuator	N/A			
Extension cable	Norsonic	Nor1408A/10M		
These items have been taken into account wherever appropriate.				
Instruction Manual: Im140_1Ed8R0En Firmware Version: v2.1.670 The test object is a single channel instrument.				
Conditions	<i>Pressure kPa</i>	<i>Temperature °C</i>	<i>Humidity %RH</i>	
Reference conditions	101.325	23	50	
Measurement conditions	99.93 ±0.09	22.43 ±0.8	45.00 ±0.75	
Calibration Dates:				
Received date:	20/09/2022	Reviewed date:	03/10/2022	
Calibration date:	30/09/2022	Issued date:	03/10/2022	
Technicians: (Electronic certificate)				
Calibrated by:	<i>Palanivel Marappan B.Eng (Hons), M.Sc</i>			
Reviewed by:	<i>Jenny Crawford</i>			
This certificate is issued in accordance with the CA Quality Management system. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.				
Page 1 of 2				

Laboratory Location

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030



Certificate of Calibration and Conformance

Certificate number: 42045
Test Object: Sound Calibrator
Producer: Norsonic AS.
Type: 1251
Serial number: 31872
Customer: SLR Consulting Ltd
Address: 15 Middle Pavement,
Nottingham. NG1 7DX.
Contact Person: James Burchell
Order No: 000366-403

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	114.13	0.05	1001.08	0.35
Measurement 2	114.12	0.04	1001.08	0.35
Measurement 3	114.13	0.03	1001.08	0.35
Result (Average):	114.13	0.04	1001.08	0.35
Expanded Uncertainty:	0.1	0.02	1	0.25
Degree of Freedom:	>100	32	>100	>100
Coverage Factor:	2	2.13	2	2

The stated level is relative to 20 μ Pa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement

Pres:0.0005 dB/kPa Temp:0.003 dB/°C Humi:0 dB/%RH Load volume: 0.0003 dB/mm³

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	100.108 \pm 0.042	22.7 \pm 0.2	46.4 \pm 1.3

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 Cal\Cal\2022\NOR1251_31872_M1.nmf

Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method

Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date: 20/09/2022 Reviewed date: 03/10/2022
Calibration date: 30/09/2022 Issued date: 03/10/2022

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng(Hons), M.Sc*
Reviewed by: *Jenny Crawford*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Calb-Cert-Master-V3-05

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