
**THREE OAKS RENEWABLE
ENERGY PARK
EXTENSION**

**Environmental
Statement Appendix 9.3:
Calibration Charts**

MAY 2026



Appendix 9.3 Calibration Charts

Rion SLM #420771



CERTIFICATE OF CALIBRATION

Date of Issue: 21 May 2024

Certificate Number: TCRT24/1380

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
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Page 1 of 2 Pages
Approved Signatory

K. Mistry



Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Customer
Ion Acoustics Ltd
Georges House
9-10 Bath Street
Bristol
BS1 6HL

Order No. ION240517
Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator
Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	00420771
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	20820
Rion	Microphone	UC-59	03580
Rion	Calibrator	NC-75	34334830
	Calibrator adaptor type if applicable		NC-75-022

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 20 May 2024

ANV Job No. TRAC24/05209

Date Calibrated 21 May 2024

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	Dated	Certificate No.	Laboratory
	18 May 2022	TCRT22/1310	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.

CERTIFICATE OF CALIBRATION



Certificate Number

TCRT24/1380

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Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	Sound Level Meter	NL-42 / NL-52
SLM instruction manual ref / issue		11-03
SLM instruction manual source	Manufacturer	
Internet download date if applicable	N/A	
Case corrections available	Yes	
Uncertainties of case corrections	Yes	
Source of case data	Manufacturer	
Wind screen corrections available	Yes	
Uncertainties of wind screen corrections	Yes	
Source of wind screen data	Manufacturer	
Mic pressure to free field corrections	Yes	
Uncertainties of Mic to F.F. corrections	Yes	
Source of Mic to F.F. corrections	Manufacturer	
Total expanded uncertainties within the requirements of IEC 61672-1:2002	Yes	
Specified or equivalent Calibrator	Specified	
Customer or Lab Calibrator	Lab Calibrator	
Calibrator adaptor type if applicable	NC-75-022	
Calibrator cal. date	30 April 2024	
Calibrator cert. number	UCRT24/1668	
Calibrator cal cert issued by	ANV Measurement Systems	
Calibrator SPL @ STP	94.01	dB Calibration reference sound pressure level
Calibrator frequency	1000.00	Hz Calibration check frequency
Reference level range	25 - 130	dB

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15

Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp.

Environmental conditions during tests	Start	End	
Temperature	22.34	22.62	± 0.30 °C
Humidity	52.9	55.5	± 3.00 %RH
Ambient Pressure	99.91	99.90	± 0.03 kPa

Response to associated Calibrator at the environmental conditions above.

Initial indicated level	94.3	dB	Adjusted indicated level	94.0	dB
The uncertainty of the associated calibrator supplied with the sound level meter ±			0.10		dB

Self Generated Noise This test is currently not performed by this Lab.

Microphone installed (if requested by customer) = Less Than	N/A	dB	A Weighting
Uncertainty of the microphone installed self generated noise ±	N/A	dB	

Microphone replaced with electrical input device - UR = Under Range Indicated

Weighting	A	C	Z
	13.5	17.5	22.7
	dB	dB	dB
	UR	UR	UR

Uncertainty of the electrical self generated noise ± 0.12 dB

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 the Guide to the Expression of Uncertainty in Measurement published by ISO.

For the test of the frequency weightings as per paragraph 12. of IEC 61672-3:2006 the actual microphone free field response was used.

The acoustical frequency tests of a frequency weighting as per paragraph 11 of IEC 61672-3:2006 were carried out using an electrostatic actuator.

END

Calibrated by: K. Zablocki

Additional Comments

None

R 1

Rion SLM #876021



CERTIFICATE OF CALIBRATION

Date of Issue: 29 August 2024

Certificate Number: TCRT24/1673

Issued by:

ANV Measurement Systems

Beaufort Court

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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

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Approved Signatory

K. Mistry

Customer
Ion Acoustics Ltd
Georges House
9-10 Bath Street
Bristol
BS1 6HL

Order No.	Warranty Repair																												
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator																												
Identification	<table border="0"> <tr> <th>Manufacturer</th> <th>Instrument</th> <th>Type</th> <th>Serial No. / Version</th> </tr> <tr> <td>Rion</td> <td>Sound Level Meter</td> <td>NL-52</td> <td>00876021</td> </tr> <tr> <td>Rion</td> <td>Firmware</td> <td></td> <td>2.1</td> </tr> <tr> <td>Rion</td> <td>Pre Amplifier</td> <td>NH-25</td> <td>76138</td> </tr> <tr> <td>Rion</td> <td>Microphone</td> <td>UC-59</td> <td>11551</td> </tr> <tr> <td>Rion</td> <td>Calibrator</td> <td>NC-75</td> <td>34334830</td> </tr> <tr> <td></td> <td>Calibrator adaptor type if applicable</td> <td></td> <td>NC-75-022</td> </tr> </table>	Manufacturer	Instrument	Type	Serial No. / Version	Rion	Sound Level Meter	NL-52	00876021	Rion	Firmware		2.1	Rion	Pre Amplifier	NH-25	76138	Rion	Microphone	UC-59	11551	Rion	Calibrator	NC-75	34334830		Calibrator adaptor type if applicable		NC-75-022
Manufacturer	Instrument	Type	Serial No. / Version																										
Rion	Sound Level Meter	NL-52	00876021																										
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Rion	Calibrator	NC-75	34334830																										
	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

22 August 2024

ANV Job No.

TRAC24/08374

Date Calibrated

29 August 2024

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
	03 January 2023	TCRT23/1001	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.

Appendix 9.3 – Calibration Charts

CERTIFICATE OF CALIBRATION



Certificate Number

TCRT24/1673

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Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	NL-52/NL-42 Description for IEC 61672-1		
SLM instruction manual ref / issue	No. 56034 21-03	Source	Rion
Date provided or internet download date	19 March 2021		
	Case Corrections	Wind Shield Corrections	Mic Pressure to Free Field Corrections
Uncertainties provided	Yes	Yes	Yes
Total expanded uncertainties within the requirements of IEC 61672-1:2013			YES
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	NC-75-022		
Calibrator cal. date	13 August 2024		
Calibrator cert. number	UCRT24/2101		
Calibrator cal cert issued by Lab	0653		
Calibrator SPL @ STP	94.00	dB	Calibration reference sound pressure level
Calibrator frequency	1000.00	Hz	Calibration check frequency
Reference level range	Single	dB	
Accessories used or corrected for during calibration - Extension Cable (No Wind Shield)			
Note - The Extension Cable was used between the SLM and the pre-amp for this calibration.			

Environmental conditions during tests	Start	End	
Temperature	23.61	23.48	± 0.30 °C
Humidity	52.1	52.9	± 3.00 %RH
Ambient Pressure	100.85	100.86	± 0.03 kPa

Indication at the Calibration Check Frequency			
Initial indicated level	94.0	dB	Adjusted indicated level 94.0 dB
Uncertainty of calibrator used for Indication at the Calibration Check Frequency ±			0.10 dB
Self Generated Noise			
Microphone installed -	Less Than	18.2	dB A Weighting
Microphone replaced with electrical input device - UR = Under Range indicated			
Weighting	A	C	Z
	13.8	18.7	23.5
	dB	dB	dB
	UR	UR	UR

Self Generated Noise reported for information only and not used to assess conformance to a requirement

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 the Guide to the Expression of Uncertainty in Measurement published by ISO.

Additional Comments

Prior to calibration the instrument's main PCB was replaced and the meter was realigned.

..... END

Calibrated by: C. Hirlav

R 3

Larson Davis SLM LD820 #A1721



CERTIFICATE OF CALIBRATION

Date of Issue: 13 June 2025

Certificate Number: TCRT25/1477

Issued by:

ANV Measurement Systems

Beaufort Court

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Milton Keynes MK5 8HL

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Approved Signatory

K. Mistry



CUSTOMER Ion Acoustics Ltd
Georges House
9-10 Bath Street
Bristol
BS1 6HL

ORDER No ION250609JC

Job No TRAC25/06267

DATE OF RECEIPT 10 June 2025

PROCEDURE Calibration Engineer's Handbook section 3

IDENTIFICATION Sound level meter Larson Davis type 820 serial No A1721 connected via a 5m extension lead and preamplifier type PRM828 serial No 1744 to a half-inch microphone type GRAS 40AE serial No 75163.

CALIBRATED ON 13 June 2025

PREVIOUS CALIBRATION Calibrated on 05 September 2022 Certificate No. TCRT22/1555 issued by this laboratory.

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.

CERTIFICATE OF CALIBRATION

Certificate Number

TCRT25/1477

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The sound level meter was set to frequency weighting A and adjusted to read correctly in response to a laboratory sound calibrator. This reading took into account manufacturers' information on the free-field response of the sound level meter.

The sound level meter was then tested, and its overall sensitivity adjusted as required.

An acoustic calibration at 1kHz was performed by application of a standard sound calibrator, whilst the tests at 125Hz and 8kHz were performed by the electrostatic actuator method.

RESULTS

The sound level meter was found to conform to the Type 1 requirements of BS EN 60651:1994* and BS EN 60804:1994* for those tests carried out.

The self-generated noise recorded was:

17.9 dB (A)

18.8 dB (C)

The expanded level uncertainty of the Laboratory's 1 kHz sound calibrator used during this verification is ± 0.10 dB.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the *Guide to the Expression of Uncertainty in Measurement* published by the International Organisation for Standards (ISO).

All measurement data are held at ANV Measurement Systems for a period of at least six years.

The manufacturer has not published case reflection factors for this instrument, and therefore the verification had to be carried out using an extension cable.

The linearity range and primary indicator range have been obtained from the manufacturer, and are stated to cover the entire measurement range of the instrument as given in the handbook (dated 9/30/97). The maximum level for signals of crest factor 3 has been interpreted from the handbook as 125 dB(A).

It is assumed that the Larson Davis 820 sound level meter was designed in accordance with the requirements of BS EN 60651* and BS EN 60804* for a Type 1 instrument.

No component of uncertainty for manufacturer-specified corrections has been included in the uncertainty budget and, in accordance with amendments to the standards, the measured values obtained during the verification have not been extended by any measurement uncertainty when assessing conformance to each standard.

Rion Calibrator NC-75



CERTIFICATE OF CALIBRATION

Date of Issue: 10 September 2025

Certificate Number: TCRT25/1682

Issued by:

ANV Measurement Systems

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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages
Approved Signatory

K. Mistry

Customer Ion Acoustics Ltd
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Bristol
BS1 6HL

Order No. ION250903

Test Procedure Procedure TP 14 Calibration of Sound Calibrators (60942:2017)

Description Acoustic Calibrator

Identification	Manufacturer	Instrument	Model	Serial No.
	Rion	Calibrator	NC-75	34745901
Public evidence of Type Approval	Yes	Approved by	PTB	

The calibrator has been tested as specified in Annex B of IEC 60942:2017. 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 60942:2017, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2017.

ANV Job No. TRAC25/09396

Date Received 04 September 2025

Date Calibrated 10 September 2025

Previous Certificate Dated Initial Calibration
Certificate No.
Laboratory

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.

Appendix 9.3 – Calibration Charts

CERTIFICATE OF CALIBRATION



Certificate Number

TCRT25/1682

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Measurements

The sound pressure level generated by the calibrator (averaged over a 20 to 25 second period) in its WS2 configuration was measured five times (rotating the calibrator on the microphone each time) by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below.

The frequency of the sound from the calibrator was measured five times over a 20 to 25 second period and the average frequency calculated.

The total distortion + noise of the sound from the calibrator was measured, using a rejection filter distortion factor meter, five times over a 20 to 25 second period and the average distortion + noise calculated.

Test Microphone	Manufacturer	Type
	Brüel & Kjær	4134

<u>Nominal</u> <u>Setting dB / Hz</u>	<u>Mean Level</u> <u>dB rel 20 μPa</u>	<u>Frequency</u>	<u>Distortion + Noise</u>
94 / 1000	93.99 $\pm$ 0.10	1000.00 $\pm$ 0.12Hz	(0.17 $\pm$ 0.05) %

<u>Environmental conditions during tests</u>	<u>Start</u>	<u>End</u>		
Temperature	23.54	23.50	$\pm$	0.30 °C
Humidity	57.5	52.3	$\pm$	3.0 %RH
Ambient Pressure	98.892	98.883	$\pm$	0.030 kPa

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 the Guide to the Expression of Uncertainty in Measurement published by the International Organisation for Standards (ISO).

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

Note: Calibrator adjusted prior to calibration? NO

Additional Comments The results on this certificate only relate to the items calibrated as identified above.
None

Calibrated by: TK

R 1

END