Scottish & Southern Electricity Networks

TRANSMISSION

# Environmental Impact Assessment (EIA) Report

## *LT383 Alyth to Tealing Overhead Line (OHL) 400kV Upgrade*

***November 2024***

# VOLUME 4: APPENDIX 13.2 – CALIBRATION CERTIFICATES


| | | |
|---|---|---|
| **1.** | **CALIBRATION CERTIFICATE NL52 00175536** | **1** |
| **2.** | **CALIBRATION CERTIFICATE NC74 34178103** | **3** |

# 1. CALIBRATION CERTIFICATE NL52 00175536

ANV MEASUREMENT SYSTEMS

## CERTIFICATE OF CALIBRATION

ilac-MRA UKAS CALIBRATION 0653

**Date of Issue: 25 May 2022** **Certificate Number: UCRT22/1695**

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

Page 1 of 2 Pages
Approved Signatory
K. Mistry

| | |
|---|---|
| Customer | Wood Group<br>St. Vincent Plaza (Floor 2)<br>319 St. Vincent Street<br>Glasgow<br>G2 5LP |
| Order No. | 26010406 |
| Description | Sound Level Meter / Pre-amp / Microphone / Associated Calibrator |

| Identification | *Manufacturer* | *Instrument* | *Type* | *Serial No. / Version* |
|---|---|---|---|---|
| | Rion | Sound Level Meter | NL-52 | 00175536 |
| | Rion | Firmware | | 2.0 |
| | Rion | Pre Amplifier | NH-25 | 65638 |
| | Rion | Microphone | UC-59 | 13128 |
| | Rion | Calibrator | NC-74 | 34178103 |
| | | Calibrator adaptor type if applicable | | NC-74-002 |

| | |
|---|---|
| Performance Class | 1 |
| Test Procedure | TP 10. SLM 61672-3:2013<br>*Procedures from IEC 61672-3:2013 were used to perform the periodic tests.* |
| Type Approved to IEC 61672-1:2013 | Yes<br>*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 | 23 May 2022 ANV Job No. UKAS22/05346 |
| Date Calibrated | 25 May 2022 |

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* |
|---|---|---|---|
| | 26 May 2020 | UCRT20/1449 | 0653 |

# CERTIFICATE OF CALIBRATION

| | |
|---|---|
| UKAS Accredited Calibration Laboratory No. 0653 | **Certificate Number** UCRT22/1695 |
| | Page 2 of 2 Pages |

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 | Customers Calibrator | | |
| Calibrator adaptor type if applicable | NC-74-002 | | |
| Calibrator cal. date | 24 May 2022 | | |
| Calibrator cert. number | UCRT22/1682 | | |
| Calibrator cal cert issued by Lab | 0653 | | |
| Calibrator SPL @ STP | 94.02 | dB | Calibration reference sound pressure level |
| Calibrator frequency | 1001.97 | Hz | Calibration check frequency |
| Reference level range | Single | dB | |

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - The Extension Cable was used between the SLM and the pre-amp for this calibration.

| Environmental conditions during tests | Start | End | |
|---|---|---|---|
| Temperature | 24.65 | 24.37 | ± 0.30 °C |
| Humidity | 48.5 | 48.7 | ± 3.00 %RH |
| Ambient Pressure | 100.05 | 100.05 | ± 0.03 kPa |

| Indication at the Calibration Check Frequency | | | | |
|---|---|---|---|---|
| Initial indicated level | 94.3 | 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 19.1 dB A Weighting

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

| Weighting | A | | | C | | | Z | | |
|---|---|---|---|---|---|---|---|---|---|
| | 13.1 | dB | UR | 16.9 | dB | UR | 23.1 | dB | 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 UKAS requirements.

Additional Comments — The results on this certificate only relate to the items calibrated as identified above.

None

END

Calibrated by: B. Bogdan

R 2

# 2. CALIBRATION CERTIFICATE NC74 34178103

ANV MEASUREMENT SYSTEMS

## CERTIFICATE OF CALIBRATION

ilac-MRA UKAS CALIBRATION 0653

**Date of Issue: 24 May 2022**

**Certificate Number: UCRT22/1682**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems



Approved Signatory

K. Mistry

| | | | | |
|---|---|---|---|---|
| Customer | Wood Group<br>St. Vincent Plaza (Floor 2)<br>319 St. Vincent Street<br>Glasgow<br>G2 5LP | | | |
| Order No. | 26010406 | | | |
| Test Procedure | Procedure TP 1 Calibration of Sound Calibrators | | | |
| Description | Acoustic Calibrator | | | |
| Identification | *Manufacturer*<br>Rion | *Instrument*<br>Calibrator | *Model*<br>NC-74 | *Serial No.*<br>34178103 |

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) 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.

| | | |
|---|---|---|
| ANV Job No. | UKAS22/05346 | |
| Date Received | 23 May 2022 | |
| Date Calibrated | 24 May 2022 | |
| Previous Certificate | *Dated*<br>*Certificate No.*<br>*Laboratory* | 22 May 2020<br>UCRT20/1440<br>0653 |

| CERTIFICATE OF CALIBRATION | Certificate Number UCRT22/1682 |
|---|---|
| UKAS Accredited Calibration Laboratory No. 0653 | Page 2 of 2 Pages |

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

| Test Microphone | *Manufacturer* | *Type* |
|---|---|---|
| | Brüel & Kjær | 4134 |

Results

The level of the calibrator output under the conditions outlined above was

94.02 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

| | | | |
|---|---|---|---|
| The frequency of the sound produced was | 1001.97 | ± | 0.12 Hz |
| The total distortion was | 1.61 | ± | 0.11 % Distortion |

During the measurements environmental conditions were

| | | | | |
|---|---|---|---|---|
| Temperature | 23 | to | 24 | °C |
| Relative Humidity | 44 | to | 51 | % |
| Barometric Pressure | 99.4 | to | 99.5 | 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 UKAS requirements.

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.

..... END .....

**Note:**

| | | |
|---|---|---|
| Calibrator adjusted prior to calibration? | NO | |
| Initial Level | N/A | dB |
| Initial Frequency | N/A | Hz |

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

Calibrated by: B. Bogdan R 2