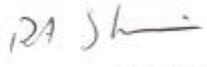


Appendix 10.3: Calibration certificates of noise instruments used

RECEIVED: 26/01/2023

	<p>MTS Calibration Ltd, The Grange Business Centre, Belasis Avenue, Billingham TS23 1LG, England Telephone: 01642 876 410</p>																																																																																						
CERTIFICATE OF CALIBRATION		Page 1 of 11 pages Approved Signatory:  Tony Sherris																																																																																					
Issued by: MTS Calibration Ltd Date of Issue: 04 February 2021 Certificate Number: 35457																																																																																							
Sound Level Meter																																																																																							
Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1																																																																																							
Client: Environmental Measurements Unit 12, Tallaght Business Centre Whitestown Business Park Co.Dublin 24, Ireland	Instrument Make: Larson Davis Instrument Model: LxT1L Serial Number: 0004647																																																																																						
9	<table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><i>Associated Equipment</i></td> <td style="text-align: center;"><i>Make</i></td> <td style="text-align: center;"><i>Model</i></td> <td style="text-align: center;"><i>Serial number</i></td> </tr> <tr> <td><i>Preamplifier</i></td> <td>Larson Davis</td> <td>PRMLxT1L</td> <td>042725</td> </tr> <tr> <td><i>Microphone</i></td> <td>PCB</td> <td>377B02</td> <td>171552</td> </tr> <tr> <td><i>Calibrator</i></td> <td>Brüel & Kjær</td> <td>4231</td> <td>2326247</td> </tr> <tr> <td><i>Calibrator supplied by</i></td> <td colspan="3">MTS for this calibration</td> </tr> </table>	<i>Associated Equipment</i>	<i>Make</i>	<i>Model</i>	<i>Serial number</i>	<i>Preamplifier</i>	Larson Davis	PRMLxT1L	042725	<i>Microphone</i>	PCB	377B02	171552	<i>Calibrator</i>	Brüel & Kjær	4231	2326247	<i>Calibrator supplied by</i>	MTS for this calibration																																																																				
<i>Associated Equipment</i>	<i>Make</i>	<i>Model</i>	<i>Serial number</i>																																																																																				
<i>Preamplifier</i>	Larson Davis	PRMLxT1L	042725																																																																																				
<i>Microphone</i>	PCB	377B02	171552																																																																																				
<i>Calibrator</i>	Brüel & Kjær	4231	2326247																																																																																				
<i>Calibrator supplied by</i>	MTS for this calibration																																																																																						
Test results summary, detailed results are shown on subsequent pages.																																																																																							
Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1																																																																																							
<table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Tests performed</th> <th style="text-align: left;">Section</th> <th style="text-align: left;">Results of test</th> <th style="text-align: left;">Page</th> <th style="text-align: left;">Comments</th> </tr> </thead> <tbody> <tr><td>Calibration Certificate</td><td>22</td><td></td><td>1</td><td></td></tr> <tr><td>Additional information</td><td></td><td></td><td>2</td><td></td></tr> <tr><td>Indication with Calibrator Supplied</td><td>10</td><td>No Limit</td><td>3</td><td></td></tr> <tr><td>Self-Generated Noise</td><td>11</td><td>No Limit</td><td>3</td><td></td></tr> <tr><td>Frequency and Time-weightings at 1kHz</td><td>14</td><td>Complies</td><td>3</td><td></td></tr> <tr><td> Long term stability</td><td>15</td><td>Complies</td><td>3</td><td></td></tr> <tr><td> High stability</td><td>21</td><td>Complies</td><td>3</td><td></td></tr> <tr><td>Acoustic Tests</td><td>12</td><td>Complies</td><td>4</td><td></td></tr> <tr><td> Frequency Weighting A</td><td>13</td><td>Complies</td><td>5</td><td></td></tr> <tr><td> Frequency Weighting C</td><td>13</td><td>Complies</td><td>6</td><td></td></tr> <tr><td> Frequency Weighting Z</td><td>13</td><td>Complies</td><td>7</td><td></td></tr> <tr><td> Level Linearity</td><td>16</td><td>Complies</td><td>8</td><td></td></tr> <tr><td>Level Linearity Range Control</td><td>17</td><td></td><td>n/a</td><td>SLM only has one range</td></tr> <tr><td>Tone-burst Response</td><td>18</td><td>Complies</td><td>9</td><td></td></tr> <tr><td>Peak C sound level</td><td>19</td><td>Complies</td><td>10</td><td></td></tr> <tr><td>Overload indication</td><td>20</td><td>Complies</td><td>11</td><td></td></tr> </tbody> </table>	Tests performed	Section	Results of test	Page	Comments	Calibration Certificate	22		1		Additional information			2		Indication with Calibrator Supplied	10	No Limit	3		Self-Generated Noise	11	No Limit	3		Frequency and Time-weightings at 1kHz	14	Complies	3		Long term stability	15	Complies	3		High stability	21	Complies	3		Acoustic Tests	12	Complies	4		Frequency Weighting A	13	Complies	5		Frequency Weighting C	13	Complies	6		Frequency Weighting Z	13	Complies	7		Level Linearity	16	Complies	8		Level Linearity Range Control	17		n/a	SLM only has one range	Tone-burst Response	18	Complies	9		Peak C sound level	19	Complies	10		Overload indication	20	Complies	11			
Tests performed	Section	Results of test	Page	Comments																																																																																			
Calibration Certificate	22		1																																																																																				
Additional information			2																																																																																				
Indication with Calibrator Supplied	10	No Limit	3																																																																																				
Self-Generated Noise	11	No Limit	3																																																																																				
Frequency and Time-weightings at 1kHz	14	Complies	3																																																																																				
Long term stability	15	Complies	3																																																																																				
High stability	21	Complies	3																																																																																				
Acoustic Tests	12	Complies	4																																																																																				
Frequency Weighting A	13	Complies	5																																																																																				
Frequency Weighting C	13	Complies	6																																																																																				
Frequency Weighting Z	13	Complies	7																																																																																				
Level Linearity	16	Complies	8																																																																																				
Level Linearity Range Control	17		n/a	SLM only has one range																																																																																			
Tone-burst Response	18	Complies	9																																																																																				
Peak C sound level	19	Complies	10																																																																																				
Overload indication	20	Complies	11																																																																																				
The instrument required repair in order to meet the above specifications.																																																																																							
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																																																																																							
<table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Additional tests performed</th> <th style="text-align: left;">Reference</th> <th></th> </tr> </thead> <tbody> <tr> <td>Microphone full frequency response</td> <td>35459</td> <td>See additional certificate</td> </tr> <tr> <td>Filter calibration, third octave or octave</td> <td>35457F</td> <td>See additional certificate</td> </tr> </tbody> </table>	Additional tests performed	Reference		Microphone full frequency response	35459	See additional certificate	Filter calibration, third octave or octave	35457F	See additional certificate																																																																														
Additional tests performed	Reference																																																																																						
Microphone full frequency response	35459	See additional certificate																																																																																					
Filter calibration, third octave or octave	35457F	See additional certificate																																																																																					
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.																																																																																							



MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

RECEIVED: 26/01/2023

CERTIFICATE OF CALIBRATION

Page 1 of 11 pages

Issued by: **MTS Calibration Ltd**

Approved Signatory:

RA Sherris

Date of Issue: 02 February 2021 Certificate Number: 35442

Tony Sherris

Sound Level Meter

Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1

Client: Environmental Measurements
Unit 12, Tallaght Business Centre
Whitestown Business Park
Co.Dublin 24, Ireland

Instrument Make: Larson Davis
Instrument Model: LxT1L
Serial Number: 0005660

Associated Equipment	Make	Model	Serial number
Preamplifier	Larson Davis	PRMLxT1L	055806
Microphone	PCB	377B02	316352
Calibrator	Brüel & Kjær	4231	3014620
Calibrator supplied by	MTS for this calibration		

Test results summary, detailed results are shown on subsequent pages.

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1

Tests performed	Section	Results of test	Page	Comments
Calibration Certificate	22		1	
Additional Information			2	
Indication with Calibrator Supplied	10	No Limit	3	
Self-Generated Noise	11	No Limit	3	
Frequency and Time-weightings at 1kHz	14	Complies	3	
Long term stability	15	Complies	3	
High stability	21	Complies	3	
Acoustic Tests	12	Complies	4	
Frequency Weighting A	13	Complies	5	
Frequency Weighting C	13	Complies	6	
Frequency Weighting Z	13	Complies	7	
Level Linearity	16	Complies	8	
Level Linearity Range Control	17		n/a	SLM only has one range
Tone-burst Response	18	Complies	9	
Peak C sound level	19	Complies	10	
Overload indication	20	Complies	11	

The instrument was within the above specification as received - no modifications were made

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

Additional tests performed

Additional tests performed	Reference	
Microphone full frequency response	35444	See additional certificate
Filter calibration, third octave or octave	35442F	See additional certificate

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.



MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

RECEIVED: 26/10/2023

CERTIFICATE OF CALIBRATION

Page 1 of 11 pages

Issued by: **MTS Calibration Ltd**

Approved Signatory:

RA Sherris

Date of Issue: 21 January 2020 Certificate Number: 34094

Tony Sherris

Sound Level Meter

Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1

Client: Environmental Measurements
Unit 12, Tallaght Business Centre
Whitestown Business Park
Co.Dublin 24, Ireland

Instrument Make: Larson Davis
Instrument Model: LxT1L
Serial Number: 0004667

Associated Equipment	Make	Model	Serial number
Preamplifier	PCB	PRMLxT1L	069931
Microphone	PCB	377B02	316126
Calibrator	Larson Davis	CAL200	9175
Calibrator supplied by	MTS for this calibration		

Test results summary, detailed results are shown on subsequent pages.

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1

Tests performed	Section	Results of test	Page	Comments
Calibration Certificate	22		1	
Additional information			2	
Indication with Calibrator Supplied	10	No Limit	3	
Self-Generated Noise	11	No Limit	3	
Frequency and Time-weightings at 1kHz	14	Complies	3	
Long term stability	15	Complies	3	
High stability	21	Complies	3	
Acoustic Tests	12	Complies	4	
Frequency Weighting A	13	Complies	5	
Frequency Weighting C	13	Complies	6	
Frequency Weighting Z	13	Complies	7	
Level Linearity	16	Complies	8	
Level Linearity Range Control	17	n/a	n/a	SLM only has one range
Tone-burst Response	18	Complies	9	
Peak C sound level	19	Complies	10	
Overload indication	20	Complies	11	

The instrument was within the above specification as received - no modifications were made

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

Additional tests performed	Reference	
Microphone full frequency response	34270	See additional certificate
Filter calibration, third octave or octave	34094F	See additional certificate

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.

Calibration Certificate

Certificate Number 202009385

Customer:
Environmental Measurement
Unit 12 Tallaght Business Centre
Whitestown Business Park
Dublin, 24, Ireland

Model Number CAL200
Serial Number 18140
Test Results Pass

Initial Condition As Manufactured

Description Larson Davis CAL200 Acoustic Calibrator

Procedure Number D0001.8386
Technician Scott Montgomery
Calibration Date 26 Aug 2020

Calibration Due
Temperature 23 °C ± 0.3 °C
Humidity 35 %RH ± 3 %RH
Static Pressure 101.2 kPa ± 1 kPa

RECEIVED: 26/01/2023

Evaluation Method The data is acquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2017.

Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

This report may not be reproduced, except in full, unless permission for the publication of an approved abstract is obtained in writing from the organization issuing this report.

Standards Used			
Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	08/04/2020	08/04/2021	001021
Larson Davis Model 2900 Real Time Analyzer	04/02/2020	04/02/2021	001051
Microphone Calibration System	03/03/2020	03/03/2021	005446
1/2" Preamplifier	09/17/2019	09/17/2020	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	08/06/2020	08/06/2021	006507
1/2 inch Microphone - RI - 200V	12/06/2019	12/06/2020	006511
Pressure Transducer	10/18/2019	10/18/2020	007204

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001



LARSON DAVIS
A PCB PIEZOTRONICS DIV.

9/9/2020 4:27:27PM

Page 1 of 3

D0001.8410 Rev C