



No: CDK1399519



CERTIFICATE OF CALIBRATION

Page 1 of 44

CALIBRATION OF

Sound Level Meter:

Brüel & Kjær Type 2238

No: 2125128 Id: -No: 2057896

Microphone:

Brüel & Kjær Type 4188

**CUSTOMER** 

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin 17 Ireland

CALIBRATION CONDITIONS

Preconditioning:

4 hours at 23°C ± 3°C

Environment conditions:

Pressure: 101,3kPa ± 3kPa. Humidity: 25% - 70% RH. Temperature: 23°C ± 3°C.

#### **SPECIFICATIONS**

The Sound Level Meter Brüel & Kjær Type 2238 has been calibrated in accordance with the requirements as specified in IEC 60651 and 60804 type 1. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 5.0 - DB: 5.00) by using procedure 2238-4188-BZ7125.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2016-11-11

Date of issue: 2016-11-11

Mikail Önder

Calibration Technician







CERTIFICATE OF CALIBRATION

Page 1 of 44

CALIBRATION OF

Sound Level Meter:

Brüel & Kjær Type 2238

No: 2151874 Id: -

No: CDK1359513

Microphone:

Brüel & Kjær Type 4188

No: 2274039

#### CUSTOMER

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin 17 Ireland

#### CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: Pressure: 101,3kPa ± 3kPa. Humidity: 25% - 70% RH. Temperature: 23°C ± 3°C.

#### SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2238 has been calibrated in accordance with the requirements as specified in IEC 60651 and 60804 type 1. The accreditation assures the traceability to the international units system SI.

#### PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 5.0 - DB: 5.00) by using procedure 2238-4188-BZ7125.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2015-11-11

Date of issue: 2015-11-11

Mikail Önder

Calibration Technician

Approved Signatory

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CERTIFICATE OF CALIBRATION

Page 1 of 44

CALIBRATION OF

Sound Level Meter:

Brüel & Kjær Type 2238

No: 2343753 Id: -

No: CDK1399322

Microphone:

Brüel & Kjær Type 4188

No: 2555128

#### **CUSTOMER**

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin 17 Ireland

#### CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: Pressure: 101,3kPa ± 3kPa. Humidity: 25% - 70% RH. Temperature: 23°C ± 3°C.

#### **SPECIFICATIONS**

The Sound Level Meter Brüel & Kjær Type 2238 has been calibrated in accordance with the requirements as specified in IEC 60651 and 60804 type 1. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 5.0 - DB: 5.00) by using procedure 2238-4188-BZ7125.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2016-11-11 Date of issue: 2016-11-11

Mikail Önder

Calibration Technician

Erik Bruns

## CERTIFICATE OF CALIBRATION

Date of issue: 29 May 2015

Certificate Number: CDK1503969

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## Brüel & Kjær

The Calibration Laboratory Skodsborgvej 307. DK-2850 Nærum, Denmark Tel: +45 45 800 500 Fax: +45 45 801 405

Email: ukservice@bksv.com

Erik Bruus
Approved Signatory

#### **CALIBRATION OF:**

Sound Level Meter:

Brüel & Kjær Type 2238

No: 2562556 Id: -

Microphone:

Brüel & Kjær Type 4188

No: 2274039

Associated Calibrator:

Brüel & Kjær Type 4231

No: 2123002

Calibrator Level:

93.98 dB SPL

Calibrator Certificate: SLM Software Version:

BZ7226 Version 1.1.0

Date of calibration:

29 May 2015

CDK1503914

#### **CUSTOMER:**

Enfonic Ltd
Tecpro House
IDA Business & Technology Park
Clonshaugh
17 Dublin
Ireland

#### **CALIBRATION CONDITIONS:**

Preconditioning:

4 hours at  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ 

**Environment conditions:** 

Air Temperature: 23.0 °C, Air Pressure: 100.7 kPa, Relative Humidity: 41.0 %RH

#### **SPECIFICATIONS:**

The Sound Level Meter Brüel & Kjær Type 2238 has been calibrated in accordance with the requirements as specified in BS7580: Part 1: 1997.

#### PROCEDURE:

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 5.1 - DB: 4.60) by using procedure 2238-4188-BZ7126.

#### **RESULTS:**

Unless otherwise stated herein, the reported uncertainty is based upon 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 DANAK requirements. The uncertainties refer to the measured values only with no account being taken of the ability of the device under test to maintain its calibration.

Note: Calibration as received.

This certificate is issued in accordance with the laboratory accreditation requirements of DANAK. It 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

Page 1 of 44

CALIBRATION OF

Sound Level Meter:

Brüel & Kjær Type 2238

No: 2756962 Id: -

No: CDK1399341

Microphone:

Brüel & Kjær Type 4188

No: 2746328

#### **CUSTOMER**

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin 17 Ireland

#### CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: Pressure: 101,3kPa ± 3kPa. Humidity: 25% - 70% RH. Temperature: 23°C ± 3°C.

#### **SPECIFICATIONS**

The Sound Level Meter Brüel & Kjær Type 2238 has been calibrated in accordance with the requirements as specified in IEC 60651 and 60804 type 1. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 5.0 - DB: 5.00) by using procedure 2238-4188-BZ7125.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2016-11-13

Date of issue: 2016-11-13

Mikail Önder

Calibration Technician







CERTIFICATE OF CALIBRATION No: CDK1359690

Page 1 of 10

#### CALIBRATION OF

Sound Level Meter: Brüel & Kjær Type 2250 No: 2590440 Id: - 2590440

Microphone: Brüel & Kjær Type 4189 No: 2589639
Preamplifier: Brüel & Kjær Type ZC-0032 No: 16110
Supplied Calibrator: Brüel & Kjær Type 4231 No: 2626210

Software version: BZ7222 Version 2.1 Pattern Approval: PTB1.63-4046158

Instruction manual: BE1712-18

#### CUSTOMER

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin

#### CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: See actual values in Environmental conditions sections.

#### SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

#### PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.9 - DB: 4.90) by using procedure 2250-4189.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2015-12-12 Date of issue: 2015-12-12

Mikail Önder

Calibration Technician

Susanne Jørgensen







#### CERTIFICATE OF CALIBRATION

No: CDK1608402

Page 1 of 11

#### **CALIBRATION OF**

Sound Level Meter:

Brüel & Kjær Type 2250

No: 3010911 Id: -

Microphone:

Brüel & Kjær Type 4189

No: 3044415

Preamplifier:

Brüel & Kjær Type ZC-0032

No: 25273

Supplied Calibrator:

None

Software version:

BZ7222 Version 4.7.1

Pattern Approval:

**PENDING** 

Instruction manual:

BE1712-22

#### **CUSTOMER**

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Clonshaugh

D17 NX50 Dublin

Ireland

#### **CALIBRATION CONDITIONS**

Preconditioning:

4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

**Environment conditions:** 

See actual values in Environmental conditions sections.

#### **SPECIFICATIONS**

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2013 class 1. Procedures from IEC 61672-3:2013 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 6.0 - DB: 6.01) by using procedure B&K proc 2250, 4189 (IEC 61672:2013).

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2016-12-13

Date of issue: 2016-12-13

Lene Petersen

Calibration Technician

Mikail Onder

Approved Signatory

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CERTIFICATE OF CALIBRATION No: CDK1609406 Page 1 of 10

CALIBRATION OF

Sound Level Meter: Brüel & Kjær Type 2250 No: 2580156 Id: - 2580156

Microphone:Brüel & Kjær Type 4950No: 2698718Preamplifier:Brüel & Kjær Type ZC-0032No: 17445Supplied Calibrator:Brüel & Kjær Type 4231No: 2460008

Software version: BZ7222 Version 2.1 Pattern Approval: PTB1.63-4046158

Instruction manual: BE1712-18

**CUSTOMER** 

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin D17 NX50 Ireland

CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: See actual values in Environmental conditions sections.

**SPECIFICATIONS** 

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

**PROCEDURE** 

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.9 - DB: 4.90) by using procedure 2250-4189.

RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2017-02-13 Date of issue: 2017-02-13

Mikail Önder

Calibration Technician

Susanne Jørgensen





No: CDK14010525



CERTIFICATE OF CALIBRATION

Page 1 of 10

CALIBRATION OF

Sound Level Meter: Brüel & Kjær Type 2250 No: 2580156 Id: -

Microphone: Brüel & Kjær Type 4950 No: 2698718

Preamplifier: Brüel & Kjær Type ZC-0032 No: 17445 Supplied Calibrator: Brüel & Kjær Type 4231 No: 2343370

Software version: BZ7222 Version 2.1 Pattern Approval: PTB1.63-4046158

Instruction manual: BE1712-18

CUSTOMER

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin

#### CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: See actual values in Environmental conditions sections.

#### **SPECIFICATIONS**

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.9 - DB: 4.90) by using procedure 2250-4189.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2015-07-21 Date of issue: 2015-07-21

Mikail Önder

Calibration Technician

Susanne Jørgensen

Approved Signatory

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CERTIFICATE OF CALIBRATION No: CDK1609408 Page 1 of 10

CALIBRATION OF

Sound Level Meter: Brüel & Kjær Type 2250 No: 2654662 Id: - 2654662

Microphone:Brüel & Kjær Type 4950No: 2737145Preamplifier:Brüel & Kjær Type ZC-0032No: 6822Supplied Calibrator:Brüel & Kjær Type 4231No: 2460008

Software version: BZ7222 Version 2.1 Pattern Approval: PTB1.63-4046158

Instruction manual: BE1712-18

**CUSTOMER** 

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin D17 NX50 Ireland

#### CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: See actual values in Environmental conditions sections.

#### **SPECIFICATIONS**

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.9 - DB: 4.90) by using procedure 2250-4189.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2017-02-13 Date of issue: 2017-02-13

Mikail Önder

Calibration Technician

Susanne Jørgensen







CERTIFICATE OF CALIBRATION No: CDK1410515 Page 1 of 10

CALIBRATION OF

Sound Level Meter: Brüel & Kjær Type 2250 No: 2654662 Id: - 2654662

Microphone:Brüel & Kjær Type 4950No: 2737145Preamplifier:Brüel & Kjær Type ZC-0032No: 6822Supplied Calibrator:Brüel & Kjær Type 4231No: 2123002

Software version: BZ7222 Version 2.1 Pattern Approval: PTB1.63-4046158

Instruction manual: BE1712-18

CUSTOMER

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin

CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: See actual values in Environmental conditions sections.

#### **SPECIFICATIONS**

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.9 - DB: 4.90) by using procedure 2250-4189.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2015-07-21 Date of issue: 2015-07-21

Mikail Önder

Calibration Technician

Susanne Jørgensen







CERTIFICATE OF CALIBRATION No: CDK1359391 Page 1 of 10

CALIBRATION OF

Sound Level Meter: Brüel & Kjær Type 2250 No: 3000855 Id: - 2626210

Microphone:Brüel & Kjær Type 4950No: 2778445Preamplifier:Brüel & Kjær Type ZC-0032No: 16743Supplied Calibrator:Brüel & Kjær Type 4231No: 2626210

Software version: BZ7222 Version 2.1 Pattern Approval: PTB1.63-4046158

Instruction manual: BE1712-18

CUSTOMER

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin

CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: See actual values in Environmental conditions sections.

#### SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.9 - DB: 4.90) by using procedure 2250-4189.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2015-11-21 Date of issue: 2015-11-21

Mikail Önder

Calibration Technician

Susanne Jørgensen







CERTIFICATE OF CALIBRATION No: CDK1609404 Page 1 of 10

CALIBRATION OF

Sound Level Meter: Brüel & Kjær Type 2250 No: 3002367 Id: - 3002367

Microphone: Brüel & Kjær Type 4950 No: 2778447
Preamplifier: Brüel & Kjær Type ZC-0032 No: 17907
Supplied Calibrator: Brüel & Kjær Type 4231 No: 2460008

Software version: BZ7222 Version 2.1 Pattern Approval: PTB1.63-4046158

Instruction manual: BE1712-18

**CUSTOMER** 

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin D17 NX50 Ireland

CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: See actual values in Environmental conditions sections.

**SPECIFICATIONS** 

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

**PROCEDURE** 

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.9 - DB: 4.90) by using procedure 2250-4189.

RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2017-02-13 Date of issue: 2017-02-13

Mikail Önder

Calibration Technician

Susanne Jørgensen







CERTIFICATE OF CALIBRATION

No: CDK1404221

Page 1 of 10

CALIBRATION OF

Sound Level Meter:

Brüel & Kjær Type 2250 Light

No: 3002367 Id: -

Microphone:

Brüel & Kjær Type 4950

No: 2778447

Preamplifier:

Brüel & Kjær Type ZC-0032 Brüel & Kjær Type 4231 No: 17907 No: 2460008

Supplied Calibrator:

BZ7133 Version 4.3.2

Pattern Approval:

PTB

Software version: Instruction manual:

BE1853-11

CUSTOMER

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Clonshaugh 17 Dublin Ireland

#### CALIBRATION CONDITIONS

Preconditioning:

4 hours at 23°C ± 3°C

Environment conditions:

See actual values in Environmental conditions sections.

#### SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 Light has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 5.1 - DB: 5.10) by using procedure B&K proc 2250-L-4950 (IEC61672).

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2015-06-09

Date of issue: 2015-06-09

Jonas Johannessen

Calibration Technician

Morten Høngård Hansen Approved Signatory

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CERTIFICATE OF CALIBRATION No: CDK1360941 Page 1 of 10

CALIBRATION OF

Sound Level Meter: Brüel & Kjær Type 2250 No: 3006895 Id: - 3006895

Microphone:Brüel & Kjær Type 4952No: 2550918Preamplifier:Brüel & Kjær Type ZC-0032No: 16530Supplied Calibrator:Brüel & Kjær Type 4231No: 2460008

Software version: BZ7222 Version 2.1 Pattern Approval: PTB1.63-4046158

Instruction manual: BE1712-18

CUSTOMER

Enfonic Ltd Tecpro House

IDA Business & Technology Park

Dublin

CALIBRATION CONDITIONS

Preconditioning: 4 hours at  $23^{\circ}C \pm 3^{\circ}C$ 

Environment conditions: See actual values in Environmental conditions sections.

#### SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2250 has been calibrated in accordance with the requirements as specified in IEC61672-1:2002 class 1. Procedures from IEC 61672-3:2006 were used to perform the periodic tests. The accreditation assures the traceability to the international units system SI.

#### **PROCEDURE**

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 4.9 - DB: 4.90) by using procedure 2250-4189.

#### RESULTS

Calibration Mode: Calibration as received.

The reported expanded uncertainty is based on the 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 EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2016-02-14 Date of issue: 2016-02-14

Mikail Onder

Calibration Technician

Susanne Jørgensen



## CERTIFICATE OF CALIBRATION



0653

Date of Issue: 03 March 2017

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: UCRT17/1089

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Approved S	Signatory					
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		-	11/	//		
		N	en	-		
K. Mistry						

Customer **ANV Measurement Systems** 

> **Beaufort Court** 17 Roebuck Way Milton Keynes MK5 8HL

Order No. **ANVMS Hire** 

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

Serial No. / Version Identification Manufacturer Instrument Type

> Rion Sound Level Meter NL-52 00610195 1.8 Rion Firmware NH-25 Pre Amplifier 10189 Rion UC-59 Rion Microphone 02537 NC-74 34536109 Rion Calibrator

> > Calibrator adaptor type if applicable NC-74-002

Performance Class

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

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

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

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 02 March 2017 ANV Job No. UKAS17/03066

03 March 2017 **Date Calibrated** 

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 Certificate No. Dated Laboratory 7623 17 October 2016 UCRT16/1312

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## **CERTIFICATE OF CALIBRATION**

**Certificate Number** UCRT17/1089

Page Pages

UKAS Accredited Calibration Laboratory No. 0653

Sound Level Meter Instruction manual ar	nd data used to	adjust the	e sound	leve	Is ind	icated.			
SLM instruction manual title Sound Leve		/ NL-52	200	25,00225 01					
SLM instruction manual ref / issue	11-0	3							
SLM instruction manual source	Manufac	turer							
Internet download date if applicable	N/A	LIMM	. 4.656						
Case corrections available	Yes								
Uncertainties of case corrections	Yes								
Source of case data	Manufac	turer							
Wind screen corrections available	Yes								
Uncertainties of wind screen corrections	Yes								
Source of wind screen data	Manufac								
Mic pressure to free field corrections	Yes								
Uncertainties of Mic to F.F. corrections	Yes								
Source of Mic to F.F. corrections	Manufac	The second secon							
Total expanded uncertainties within the require	MACHINE TO THE PARTY OF THE PAR		02	Yes					
Specified or equivalent Calibrator	Specifi								
Customer or Lab Calibrator	Lab Calib								
Calibrator adaptor type if applicable	NC-74-								
Calibrator cal. date	02 Februar	y 2017							
Calibrator cert. number	UCRT17/1050								
Calibrator cal cert issued by	7623								
Calibrator SPL @ STP	93.99	dB	Calibra	tion re	eferen	ce soun	d press	sure le	vel
Calibrator frequency	1001.94	Hz	Calibra	tion cl	heck f	requenc	у		
Reference level range	25 - 130	dB							
Accessories used or corrected for during calif	oration - E	xtension C	able & V	Vind S	Shield	WS-15			
Note - if a pre-amp extension cable is listed the		between th	e SLM a	nd the	e pre-a	amp.			
Environmental conditions during tests	Start		End						
Temperature	21.32		22.27		±	0.20	°C		
Humidity	38.6		36.7		±	3.00	%RH		
Ambient Pressure	98.98		98.85		±	0.03	kPa		
Response to associated Calibrator at the env	ironmental cond	itions abov	e.						
Initial indicated level 94.0		Adjusted in		level	1000 - 10 Miles	94.0		dB	
The uncertainty of the associated calibrator s						0.10		dB	
Self Generated Noise This test is current									ē.
Microphone installed (if requested by custome			N/A		dB ,	A Weigl	oting		ř
Uncertainty of the microphone installed self g			N/A		dB /	T	iting		6
		<u>-</u>	13//3			<u> </u>  -			
INJUCTORNONA TANISCAN WITH AIACTTICSI INDI IT NAVI		D - 11-4-	D:						
Microphone replaced with electrical input dev	ice - U	R = Under	Range i						
Weighting A	ice - U			2	7	IIID			
Weighting A 13.9 dB UR	ice - U C 18.1 dl		23.	2	Z dB	UR			
Weighting A 13.9 dB UR Uncertainty of the electrical self generated no	ice - U C 18.1 dl ise ±	B UR	23. 0.12	9	dB dB			172	Į.
Weighting A 13.9 dB UR Uncertainty of the electrical self generated no The reported expanded uncertainty is based of	ice - U C 18.1 dl ise ± on a standard ur	B UR	23. 0.12 nultiplied	9 I by a	dB dB cover	age fact			
Weighting A 13.9 dB UR Uncertainty of the electrical self generated no	ice - U C 18.1 dl ise ± on a standard ur	B UR	23. 0.12 nultiplied	9 I by a	dB dB cover	age fact			

response was used.

The acoustical frequency	tests of a frequency	weighting as per	paragraph 11	of IEC 61672-3:20	06 were carried out
using an electrostatic actu	uator.				

**END** A Patel Calibrated by: **Additional Comments** 

None



# CERTIFICATE OF CALIBRATION



0653

Date of Issue: 03 March 2017

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: UCRT17/1093

Page 1 of 2 Pages
Approved Signatory

K. Mistry

Customer ANV Measurement Systems

Beaufort Court 17 Roebuck Way Milton Keynes MK5 8HL

Order No. ANVMS Hire

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

Identification Manufacturer Instrument Type Serial No. / Version

00620802 Sound Level Meter NL-52 Rion **Firmware** 1.8 Rion NH-25 20862 Rion Pre Amplifier Microphone UC-59 03628 Rion Calibrator NC-74 34536109 Rion

Calibrator adaptor type if applicable NC-74-002

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 02 March 2017 ANV Job No. UKAS17/03066

Date Calibrated 03 March 2017

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
13 January 2016 UCRT16/1030 7623

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#### CERTIFICATE OF CALIBRATION

Certificate Number UCRT17/1093

Page 2 of 2 Pages

UKAS Accredited Calibration Laboratory No. 0653

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated. NL-42 / NL-52 SLM instruction manual title Sound Level Meter SLM instruction manual ref / issue SLM instruction manual source Manufacturer Internet download date if applicable N/A Case corrections available Yes Uncertainties of case corrections Yes Manufacturer Source of case data 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 NC-74-002 Calibrator adaptor type if applicable 02 February 2017 Calibrator cal. date Calibrator cert. number UCRT17/1050 7623 Calibrator cal cert issued by 93.99 dB Calibration reference sound pressure level Calibrator SPL @ STP Calibrator frequency 1001.94 Hz Calibration check frequency 25 - 130 dB Reference level range Extension Cable & Wind Shield WS-15 Accessories used or corrected for during calibration -Note - if a pre-amp extension cable is listed then it was used between the SLM and the pre-amp. Environmental conditions during tests End Start 22.67 Temperature 22.60 ± 0.20 °C 3.00 %RH 32.9 Humidity 34.2 ± 98.50 98.30 ± 0.03 kPa **Ambient Pressure** Response to associated Calibrator at the environmental conditions above. 93.9 Adjusted indicated level 94.0 dB Initial indicated level dB The uncertainty of the associated calibrator supplied with the sound level meter ± 0.10 dB

The differentiality of the associated edibrator supplied with the countries a									0110	
Self Generated Noi	se This	test is	currentl	y not perfor	med by	this La	b.			10000
Microphone installe	d (if request	ed by c	ustome	er) = Less 7	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 indi	cated		
Weighting	#1000 TV 1000 SHITE	A C								
	12.1	dB	UR	16.3	dB	dB	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 UKAS requirements.

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:	A Patel		R1

Additional Comments

None



# CERTIFICATE OF CALIBRATION



0653

Date of Issue: 03 March 2017

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 S	Signatory				
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		~/	1/00	24	
				6	
K. Mistry					

Certificate Number: UCRT17/1092

Customer ANV Measurement Systems

Beaufort Court 17 Roebuck Way Milton Keynes MK5 8HL

Order No.	ANVMS Hire

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

Identification Manufacturer Instrument Type Serial No. / Version

Sound Level Meter NL-52 00732094 Rion Rion **Firmware** 1.8 Pre Amplifier NH-25 32122 Rion Microphone UC-59 05633 Rion NC-74 34536109 Rion Calibrator

Calibrator adaptor type if applicable NC-74-002

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 02 March 2017 ANV Job No. UKAS17/03066

Date Calibrated 03 March 2017

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 01 August 2016 UCRT16/1244 7623

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## **CERTIFICATE OF CALIBRATION**

Certificate Number UCRT17/1092

UKAS Accredited Calibration Laboratory No. 0653

None

Page 2 of 2 Pages

Sound Level Meter Instr	uction manual an	d data used to	adjust th	e soun	d leve	ls ind	licated.		
SLM instruction manual titl	e Sound Level	Meter NL-42 /	NL-52		William (1997)			5.00	3176
SLM instruction manual re	f / issue	11-03							
SLM instruction manual so	urce	Manufactu	ırer						9
Internet download date if a	pplicable	N/A							
Case corrections available		Yes							
Uncertainties of case corre	ections	Yes							
Source of case data		Manufacto	ırer						
Wind screen corrections a	vailable	Yes			***				
Uncertainties of wind scree	en corrections	Yes							
Source of wind screen data		Manufacti	urer						
Mic pressure to free field of		Yes							
Uncertainties of Mic to F.F		Yes							
Source of Mic to F.F. corre		Manufacti	A STATE OF THE PARTY OF THE PAR						
Total expanded uncertaint				002	Yes				
Specified or equivalent Ca		Specifie							
Customer or Lab Calibrato		Lab Calibr							
Calibrator adaptor type if a	pplicable	NC-74-0							
Calibrator cal. date		02 February	2017						
Calibrator cert. number		UCRT17/1050							
Calibrator cal cert issued by	у	7623							
Calibrator SPL @ STP		93.99	dB	Calibra	ation re	eferen	ce sound p	oressur	e level
Calibrator frequency		1001.94	Hz	Calibra	ation c	heck f	requency		
Reference level range		25 - 130	dB						
Accessories used or corre	cted for during calib	ration - Ex	tension C	able &	Wind S	Shield	WS-15		
Note - if a pre-amp extens			etween th	ne SLM	and the	e pre-	amp.		
Environmental conditions	durina tests	Start		End					
Elivironimontal contaitions	Temperature	22.36	_	22.60		±	0.20 °C		
	Humidity	36.8		34.4		±	3.00 %		
	Ambient Pressure	98.77		98.63		+	0.03 kP	_	
		ronmontal condit	ions abou	10					
Response to associated C	10.00.00				احددا	_	04.0	40	
Initial indicated level	94.0		Adjusted i				94.0 0.10	dB dB	
The uncertainty of the ass					I		0.10	ub	
Self Generated Noise			by this La						
Microphone installed (if re-				N/A			A Weightir	ng	
Uncertainty of the microph	one installed self ge	enerated noise ±		N/A		dB	╛		
Microphone replaced with	electrical input devi		R = Under	Range			<u></u>		
Weighting	Α	C				<u>Z</u>			
14		18.9 dB	UR		1.6	dB	UR		
Uncertainty of the electrica				0.12		dB			
The reported expanded ur									
a coverage probability of a	pproximately 95%.	The uncertainty	evaluatio	n has b	een ca	rried o	out in acco	rdance	with
UKAS requirements.									
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1									
For the test of the frequen	cy weightings as pe	r paragraph 12. d	of IEC 61	672-3:2	006 th	e actu	al microph	one fre	e field
	cy weightings as pe	r paragraph 12. d	of IEC 61	672-3:2	006 th	e actu	al microph	one fre	e field
For the test of the frequen									
For the test of the frequen response was used.	ests of a frequency								
For the test of the frequent response was used. The acoustical frequency to using an electrostatic actument.	ests of a frequency ator.	weighting as per		ph 11 of	EC 6	1672-		re carri	ed out
For the test of the frequent response was used. The acoustical frequency to using an electrostatic actument.	ests of a frequency ator.	weighting as per		ph 11 of	EC 6	1672-	3:2006 we	re carri	ed out