

## Sibata LD-5R K-Factor Verification Test by Total Suspended Particulates HVS Test Report

### Information of Calibrated Equipment

Verification Test Date:	1-Mar-23	to	2-Mar-23	Next Verification Test Date:	1-Mar-24
Unit-under-Test- Model No.:	Sibata LD-5R				
Unit-under-Test Serial No.:	0Z4545				
Our Report Reference No.:	RPT-23-HVS-0002				
Calibration Location:	Emax				

### Standard Equipment Information

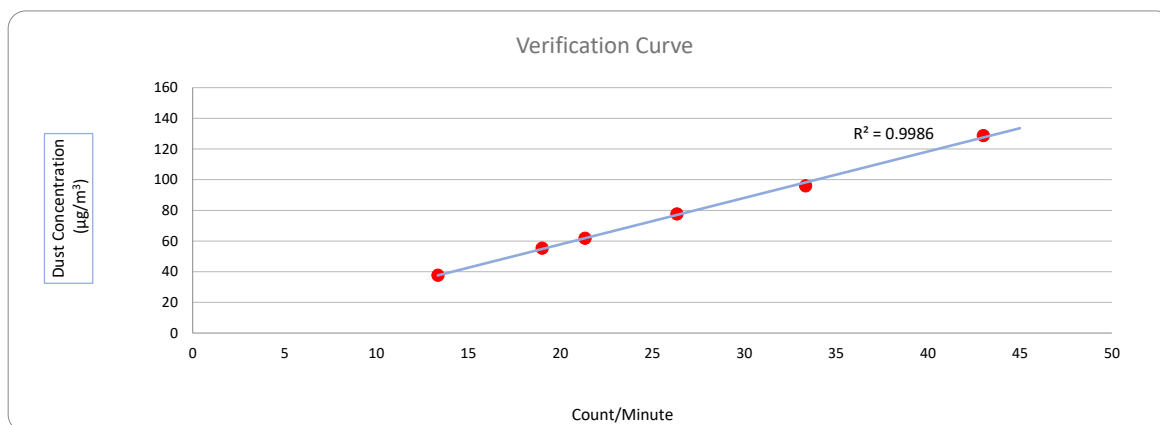
Verification Equipment Type:	Tisch TSP HVS	Tisch HVS Calibrator
Standard Equipment Model No.:	TE-5170X	TE-5025A
Equipment serial no.:	1086	3465
Last Calibration Date:	1-Mar-23	28-Jun-22
Next Calibration Date:	30-Apr-23	27-Jun-23

### Equipment Verification Result

Verification Test No.	Date	Duration			Results from Calibrated Equipment		Results from Standard Equipment
		Start-time	End-time	Elapsed Time (in min)	Total Counts	Counts/ Minute x-axis	Dust Concentration ( $\mu\text{g}/\text{m}^3$ ) y-axis
1	1/3/2023	5013.27	5016.34	184.20	4851	26	78
2	1/3/2023	5016.34	5019.34	180.00	6000	33	96
3	1/3/2023	5019.34	5022.34	180.00	7740	43	129
4	2/3/2023	5022.34	5025.34	180.00	3840	21	62
5	2/3/2023	5025.34	5028.34	180.00	2400	13	38
6	2/3/2023	5028.34	5031.34	180.00	3420	19	55

### Linear Regression of y on x

Slope, K factor:	<b>3.0313</b>	Intercept:	<b>-2.8495</b>	*Correlation Coefficient, R:	<b>0.9993</b>
Verification Test Result: <u>Strong Correlation, Results were accepted.</u>					* If the Correlation Coefficient, R is <0.5. Checking and Re-verification are required.



Operated By: Andy Li  
Project Technician, Environmental

Date: 05-03-2023

Checked By: Tandy Tse  
Senior Consultant, Environmental

Date: 05-03-2023

**Sibata LD-5R K-Factor Verification Test by Total Suspended Particulates HVS Test Report**

**Information of Calibrated Equipment**

Verification Test Date:	1-Mar-23	to	2-Mar-23	Next Verification Test Date:	1-Mar-24
Unit-under-Test- Model No.:	Sibata LD-5R				
Unit-under-Test Serial No.:	882106				
Our Report Reference No.:	RPT-23-HVS-0008				
Calibration Location:	Emax				

**Standard Equipment Information**

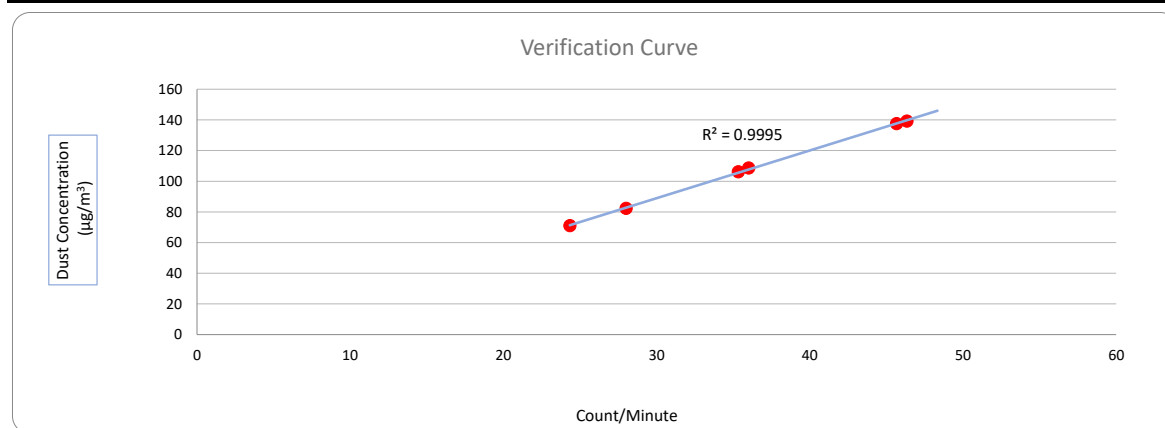
Verification Equipment Type:	Tisch TSP HVS	Tisch HVS Calibrator
Standard Equipment Model No.:	TE-5170X	TE-5025A
Equipment Serial no.:	1087	3465
Last Calibration Date:	1-Mar-23	28-Jun-22
Next Calibration Date:	30-Apr-23	27-Jun-23

**Equipment Verification Result**

Verification Test No.	Date	Duration			Results from Calibrated Equipment		Results from Standard Equipment
		Start-time	End-time	Elapsed Time (in min)	Total Counts	Counts/ Minute x-axis	Dust Concentration ( $\mu\text{g}/\text{m}^3$ ) y-axis
1	1/3/2023	5013.27	5016.34	184.20	8535	46	139
2	1/3/2023	5016.34	5019.34	180.00	6480	36	109
3	1/3/2023	5019.34	5022.34	180.00	8220	46	137
4	2/3/2023	5022.34	5025.34	180.00	5040	28	82
5	2/3/2023	5025.34	5028.34	180.00	4380	24	71
6	2/3/2023	5028.34	5031.34	180.00	6360	35	106

**Linear Regression of y on x**

Slope, K factor:	<b>3.1109</b>	Intercept:	<b>-4.3817</b>	*Correlation Coefficient, R:	<b>0.9998</b>
Verification Test Result: <u>Strong Correlation, Results were accepted.</u>					* If the Correlation Coefficient, R is <0.5. Checking and Re-verification are required.



Operated By: Andy Li  
Project Technician, Environmental

Date: 05-03-2023

Checked By: Tandy Tse  
Senior Consultant, Environmental

Date: 05-03-2023

## Sibata LD-5R K-Factor Verification Test by Total Suspended Particulates HVS Test Report

### Information of Calibrated Equipment

Verification Test Date:	1-Mar-23	to	2-Mar-23	Next Verification Test Date:	1-Mar-24
Unit-under-Test- Model No.:	Sibata LD-5R				
Unit-under-Test Serial No.:	942532				
Our Report Reference No.:	RPT-23-HVS-0005				
Calibration Location:	Emax				

### Standard Equipment Information

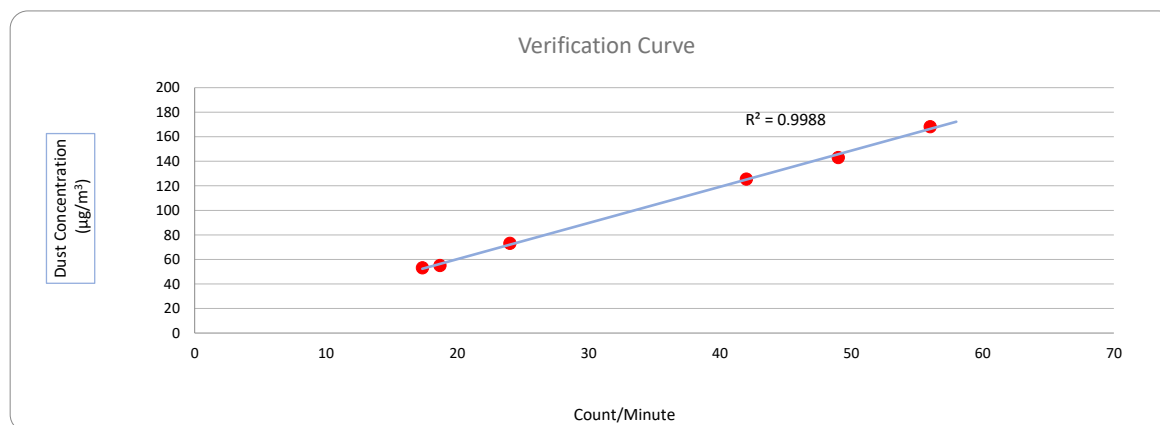
Verification Equipment Type:	Tisch TSP HVS	Tisch HVS Calibrator
Standard Equipment Model No.:	TE-5170X	TE-5025A
Equipment Serial no.:	1855	3465
Last Calibration Date:	1-Mar-23	28-Jun-22
Next Calibration Date:	30-Apr-23	27-Jun-23

### Equipment Verification Result

Verification Test No.	Date	Duration			Results from Calibrated Equipment		Results from Standard Equipment
		Start-time	End-time	Elapsed Time (in min)	Total Counts	Counts/ Minute x-axis	Dust Concentration ( $\mu\text{g}/\text{m}^3$ ) y-axis
1	1/3/2023	5013.27	5016.34	184.20	7736	42	125
2	1/3/2023	5016.34	5019.34	180.00	8820	49	143
3	1/3/2023	5019.34	5022.34	180.00	10080	56	168
4	2/3/2023	5022.34	5025.34	180.00	3120	17	53
5	2/3/2023	5025.34	5028.34	180.00	3360	19	55
6	2/3/2023	5028.34	5031.34	180.00	4320	24	73

### Linear Regression of y on x

Slope, K factor:	<b>2.9474</b>	Intercept:	<b>1.2739</b>	*Correlation Coefficient, R:	<b>0.9994</b>
Verification Test Result: <u>Strong Correlation, Results were accepted.</u>					* If the Correlation Coefficient, R is <0.5. Checking and Re-verification are required.



Operated By: Andy Li  
Project Technician, Environmental

Date: 05-03-2023

Checked By: Tandy Tse  
Senior Consultant, Environmental

Date: 05-03-2023



**JCSS**  
JCSS 0197

## CALIBRATION CERTIFICATE

Product : SOUND CALIBRATOR  
Type : NC-75  
Serial number : 35124530  
Manufacturer : RION CO., LTD.  
Calibration quantities : Sound pressure level (with reference standard microphone)  
Calibration method : Measured by specified secondary standard microphone  
according to JCSS calibration procedure specified by RION.  
Ambient conditions : Temperature 23.9 °C, Relative humidity 49 %,  
Static pressure 100.6 kPa  
Calibration date : 02/11/2022 (DD/MM/YYYY)  
Calibration location : 3-20-41 Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan  
RION CO., LTD. Calibration Room

We hereby certify that the results of this calibration were as follows.

Issue date : 09/11/2022 (DD/MM/YYYY)

Junichi Kawamura  
Manager  
Quality Assurance Section,  
Quality Assurance Department,  
Environmental Instrument Division,  
RION CO., LTD.  
3-20-41 Higashimotomachi, Kokubunji,  
Tokyo 185-8533, Japan



This certificate is based on article 144 of the Measurement Law and indicates the result of calibration in accordance with measurement standards traceable to Primary Measurement Standards (National Standards) which realizes the physical units of measurement according to the International System of Units (SI).

The accreditation symbol is attestation of which the result of calibration is traceable to Primary Measurement Standards (National Standards).

The certificate shall not be reproduced except in full, without the written approval of the issuing laboratory.

The calibration laboratory who issued this calibration certificate conforms to ISO/IEC 17025:2017.

This calibration certificate was issued by the calibration laboratory accredited by IAJapan who is a signatory to the Mutual Recognition Arrangement (MRA) of International Laboratory Accreditation Cooperation (ILAC) and Asia Pacific Accreditation Cooperation (APAC). This (These) calibration result(s) may be accepted internationally through ILAC/APAC MRA.

## CALIBRATION RESULT

### 1. Sound pressure level (with reference standard microphone)

Measured value	Expanded uncertainty *1
93.99 dB	0.09 dB

Specified secondary standard microphone:

Type : 4160

Serial number : 2973341

Reference Sound pressure :  $2 \times 10^{-5}$  Pa

\*1 Defines an interval estimated to have a level of confidence of approximately 95 %.

Coverage factor  $k=2$

Calibration result is the calibration value in ambient conditions during calibration.

## BE OUT OF JCSS CALIBRATION

### 1. Frequency

Measured value	Measurement uncertainty ( $k=2$ )
1000.0 Hz	$2.7 \times 10^{-4}$ Hz

Working measurement standard universal counter:

Type : 53132A

Serial number : MY40005574

(JCSS Calibration Certificate No. 2208001889940)

### 2. Total distortion

Measured value
0.2 %

Working measurement standard distortion meter:

Type : VA-2230A

Serial number : 11076061

(A2LA Calibration Certificate No. 1502-03109)

- closing -



# *Certificate of Calibration*

*for*

*Description:*                      *Sound Level Calibrator*  
*Manufacturer:*                *RION*  
*Type No.:*                        *NC-75*  
*Serial No.:*                      *34724245*

***Submitted by:***

*Customer:*                      *Acuity Sustainability Consulting Limited*  
*Address:*                      *Unit E, 12/F, Ford Glory Plaza,*  
   *Nos. 37-39 Wing Hong Street,*  
   *Cheung Sha Wan, Kowloon,*  
   *Hong Kong*

**Upon receipt for calibration, the instrument was found to be:**

- ☒ **Within**  
☐ **Outside**

**the allowable tolerance.**

The test equipments used for calibration are traceable to National Standards via:

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory

**Date of receipt:** 27 July 2023

**Date of calibration:** 3 August 2023

**Date of NEXT calibration:** 2 August 2024

*Calibrated by:* \_\_\_\_\_  
   *Calibration Technician*

*Certified by:* \_\_\_\_\_  
   *Mr. Ng Yan Wa*  
   *Laboratory Manager*

**Date of issue:** 3 August 2023

*Certificate No.:* APJ23-049-CC003



Page 1 of 2

**1. Calibration Precautions:**

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.

**2. Calibration Specifications:**

Calibration check

**3. Calibration Conditions:**

Air Temperature: 22.6 °C  
Air Pressure: 1006 hPa  
Relative Humidity: 52.9 %

**4. Calibration Equipment:**

Test Equipment	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	AV220061	HOKLAS
Sound Level Meter	RION NA-28	30721812	AV220120	HOKLAS

**5. Calibration Results****5.1 Sound Pressure Level**

Nominal value dB	Accept lower level dB	Accept upper level dB	Measured value dB
94.0	93.6	94.4	94.0

Note:

The values given in this certification only related to the values measured at the time of the calibration.

Certificate No.: APJ23-049-CC003



Page 2 of 2

# Manufacturer Calibration Certificate

---

The following instrument has been tested and calibrated to the manufacturer specifications.  
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **XL2 Audio and Acoustic Analyzer**
- Serial Number: **A2A-13663-F0**

- Certificate Issued: **15 February 2023**
- Certificate Number: **44972-A2A-13663-F0**
- Results: **PASSED**  
(for detailed report see next page)

---

Tested by:

M. Frick

Signature:

Stamp:



NTi Audio AG  
Im alten Riet 102  
LI - 9494 Schaan  
www.nti-audio.com



Calibration of: XL2 Audio and Acoustic Analyzer  
 Serial Number: A2A-13663-F0  
 Date: 15 February 2023

• Detailed Calibration Test Results:

	reference	actual	unit	actual error	XL2 tolerance	calibration uncertainty <sup>2</sup>
RMS Level @ 1kHz, XLR Input	0.1	<b>0.100</b>	V	≤0.1%	±0.5%	±0.10%
	1	<b>0.999</b>	V	-0.1%	±0.5%	±0.09%
	10	<b>9.982</b>	V	-0.2%	±0.5%	±0.09%
Flatness, XLR Input <sup>1</sup>	20 Hz	<b>0.995</b>	V	-0.5%	±1.1%	±0.09%
	20 kHz	<b>1.003</b>	V	0.3%	±1.1%	±0.09%
Frequency	1000	<b>1000.00</b>	Hz	≤0.003%	±0.003%	±0.01%
Residual Noise	XLR	<b>&lt; 2 uV</b>			<2 uV	±0.50%
THD+N @ 0 dBu, 1 kHz, XLR Input		<b>-100.5</b>	dB		typ. -100 dB	±0.50%

- Test Conditions: Temperature: **24.9** °C  
 Relative Humidity: **19.8** %

• Calibration Equipment Used:

- Agilent Multimeter, Typ 34401A, Serial No. MY 5300 4607  
 Last calibration: 15.09.2022, Next calibration: 15.09.2023  
 Calibrated by ELCAL to the national standards maintained at Swiss Federal Office of Metrology. SCS 0002
- FX100 Audio Analyzer, Serial No. 10408  
 Last Calibration: 11.10.2022, Next Calibration: 11.10.2023  
 Manufacturer calibration based on Agilent 34410, Serial No. MY47014254,  
 Last Calibration: 26.05.2022, Next Calibration: 26.05.2023  
 which is calibrated by ELCAL to national standards maintained at Swiss Federal Office of Metrology. SCS 002

<sup>1</sup> The specified tolerance +/-0.1 dB @ 1V = +/- 1.1%

<sup>2</sup> 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 regulations of the GUM.

# *Certificate of Calibration*

*for*

*Description:* *Sound Level Meter*  
*Manufacturer:* *NTi Audio*  
*Type No.:* *XL2 (Serial No.: A2A-09696-E0)*  
*Microphone:* *ACO 7052 (Serial No.:68914)*  
*Preamplifier:* *NTi Audio MA220 (Serial No.:10390)*

*Submitted by:*

*Customer:* *Acuity Sustainability Consulting Limited*  
*Address:* *Unit E, 12/F, Ford Glory Plaza,*  
*Nos. 37-39 Wing Hong Street,*  
*Cheung Sha Wan, Kowloon, Hong Kong*

Upon receipt for calibration, the instrument was found to be:

- ☒ Within (31.5Hz – 4kHz)  
☐ Outside

the allowable tolerance.

The test equipment used for calibration are traceable to National Standards via:

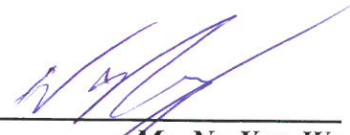
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory

Date of receipt: 30 March 2023

Date of calibration: 04 April 2023

Date of NEXT calibration: 03 April 2024

Calibrated by:   
Calibration Technician

Certified by:   
Mr. Ng Yan Wa  
Laboratory Manager

Date of issue: 04 April 2023

Certificate No.: APJ22-164-CC002



Page 1 of 4

**1. Calibration Precaution:**

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.

**2. Calibration Conditions:**

Air Temperature: 21.5 °C  
Air Pressure: 1005 hPa  
Relative Humidity: 71.4 %

**3. Calibration Equipment:**

	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	AV220061	HOKLAS

**4. Calibration Results**

Sound Pressure Level

Reference Sound Pressure Level

Setting of Unit-under-test (UUT)				Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting		Level, dB	Frequency, Hz	dB	Specification, dB
30-130	dBA SPL	Fast		94	1000	94.1	±0.4

Linearity

Setting of Unit-under-test (UUT)				Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting		Level, dB	Frequency, Hz	dB	Specification, dB
30-130	dBA SPL	Fast		94	1000	94.1	Ref
				104		104.1	±0.3
				114		114.1	±0.3

Time Weighting

Setting of Unit-under-test (UUT)				Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting		Level, dB	Frequency, Hz	dB	Specification, dB
30-130	dBA SPL	Fast		94	1000	94.1	Ref
		Slow				94.1	±0.3

Certificate No.: APJ22-164-CC002



Page 2 of 4



## Frequency Response

## Linear Response

Setting of Unit-under-test (UUT)			Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz	dB	Specification, dB
30-130	dB	SPL	94	31.5	94.3	$\pm 2.0$
				63	94.3	$\pm 1.5$
				125	94.3	$\pm 1.5$
				250	94.2	$\pm 1.4$
				500	94.2	$\pm 1.4$
				1000	94.1	Ref
				2000	93.8	$\pm 1.6$
				4000	93.1	$\pm 1.6$

## A-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz	dB	Specification, dB
30-130	dBA	SPL	94	31.5	55.0	$-39.4 \pm 2.0$
				63	68.2	$-26.2 \pm 1.5$
				125	78.2	$-16.1 \pm 1.5$
				250	85.6	$-8.6 \pm 1.4$
				500	91.0	$-3.2 \pm 1.4$
				1000	94.1	Ref
				2000	95.0	$+1.2 \pm 1.6$
				4000	94.1	$+1.0 \pm 1.6$

## C-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz	dB	Specification, dB
30-130	dBC	SPL	94	31.5	91.3	$-3.0 \pm 2.0$
				63	93.5	$-0.8 \pm 1.5$
				125	94.1	$-0.2 \pm 1.5$
				250	94.2	$-0.0 \pm 1.4$
				500	94.2	$-0.0 \pm 1.4$
				1000	94.1	Ref
				2000	93.6	$-0.2 \pm 1.6$
				4000	92.3	$-0.8 \pm 1.6$



## 5. Calibration Results Applied

The results apply to the particular unit-under-test only. All calibration points are within manufacture's specification as IEC 61672 Class 1.

Uncertainties of Applied Value:

94 dB	31.5 Hz	± 0.15
	63 Hz	± 0.10
	125 Hz	± 0.05
	250 Hz	± 0.05
	500 Hz	± 0.05
	1000 Hz	± 0.05
	2000 Hz	± 0.05
	4000 Hz	± 0.05
104 dB	1000 Hz	± 0.05
114 dB	1000 Hz	± 0.05

The uncertainties are evaluated for a 95% confidence level.

### Note:

The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allow for the equipment long-term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the calibration. (A+A)\*L shall not be liable for any loss or damage resulting from the use of the equipment.

Certificate No.: APJ22-164-CC002



Page 4 of 4