



Certificate of Calibration

Customer name

Customer address

Product name Sound level meter

Calibration item

Product name	Model	Class	Serial number	Manufacturer
Sound level meter	NL-52	Class 1		Rion Co., Ltd.
Microphone	UC-59	-		Rion Co., Ltd.
Preamplifier	NH-25	-		Rion Co., Ltd.

Software Version:

Calibration method Calibration conforming to IEC 61672-3:2013(JIC C 1509-3:2019)

Calibration item As shown on the following pages

Calibration location 2-22-2, Hyoe, Hachioji, Tokyo 192-0918, JAPAN
RION SERVICE CENTER CO., LTD. Calibration room

Calibration date (DD/MM/YYYY)

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

Issue Date (DD/MM/YYYY)

 Head of Office
 Quality Control Office
 Engineering Business Unit
 RION SERVICE CENTER CO., LTD.
 2-22-2, Hyoe, Hachioji, Tokyo 192-0918, JAPAN

- This certificate shows the results of calibration using the International System of Units (SI) or the national standard traceable standards.
- Only a portion of this Certificate may not be reproduced without the written approval of the Issuer.
- We comply with ISO/IEC 17025:2017.
- This certificate is the MRA (mutual recognition) of ILAC (International Laboratory Accreditation Cooperation Organization) and APAC (Asia Pacific Accreditation Cooperation Organization). It is issued by a calibration organization accredited by IAJapan which is a member of the Association. The calibration results are internationally acceptable through the ILAC/APAC MRA.

Information on the calibration results

The sound level meter submitted for testing successfully completed the periodic tests of the class 1 specifications of IEC 61672-3:2013 (JIS C 1509-3:2019), for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 (JIS C 1509-1:2017) because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 (JIS C 1509-1:2017) or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 (JIS C 1509-3:2019) cover only a limited subset of the specifications in IEC 61672-1:2013 (JIS C 1509-1:2017).

Pass / fail rules for conformance

Judgment of conformity to IEC 61672-3:2013 (JIS C 1509-3:2019) standard for sound level meters is based on the judgment that the measured deviations do not exceed the corresponding acceptance limits and the uncertainty of measurement does not exceed the corresponding maximum-permitted uncertainty of measurement for a coverage probability of 95 %.

Source of data used for correction

1. Instruction manual for the sound level meter
Instruction manual sound level meter: NL-52
Version: No.
Downloaded date: (DD/MM/YYYY)
2. Instruction manual for the sound calibrator
Instruction manual sound calibrator:
Version: No.
3. Comparison coupler

Information about the sound level meter

Calibration check frequency: 1 kHz
Reference sound pressure level: 94.0 dB
Reference level range:

Composition

Extension cable: Not Used
Windscreen: None

Information about the sound calibrator

Model:
Serial number:
Manufacturer: Rion Co., Ltd.
Certificate of calibration: No.

Uncertainty of measurement

The uncertainty of measurement is based on the standard uncertainty multiplied by a coverage factor $k=2$ providing a level of confidence of approximately 95 %.

Maximum-permitted uncertainties of measurement

Maximum-permitted uncertainties of measurement is prescribed as follows, for a coverage probability of 95 %, by IEC 61672-1:2013 (JIS C 1509-1:2017) Annex B.

▪ Frequency weighting	
10 Hz to 4 kHz:	0.60 dB
4 kHz to 10 kHz:	0.70 dB
10 kHz to 20 kHz:	1.00 dB
▪ Frequency weighting and time weighting at 1 kHz:	0.20 dB
▪ Stability during continuous operation:	0.10 dB
▪ Level linearity:	0.30 dB
▪ 1 dB to 10 dB change in level:	0.25 dB
▪ Tone burst response:	0.30 dB
▪ C-weighted peak sound level:	0.35 dB
▪ Overload indication:	0.25 dB
▪ High-level stability:	0.10 dB

Preliminary inspection

Prior to any measurements, the sound level meter and all accessories shall be visually inspected, paying particular attention to damage to, or accumulation of foreign material on, the protection grid or diaphragm of the microphone.

All relevant controls shall be operated to ensure that they are in working order.

Remarks

After receiving the calibrated product, calibration was performed without repair or adjustment, except for adjustments made by our sound calibrator.

Summary of calibration results

Calibration items	Results
1. Self-generated noise*	-
2. Acoustical signal tests of frequency weighting	Conformance
3. Electrical signal tests of frequency weighting	Conformance
4. Frequency and time weighting at 1 kHz	Conformance
5. Long-term stability	Conformance
6. Level linearity on the reference level range	Conformance
7. Level linearity including the level range control	Conformance
8. Toneburst response	Conformance
9. C-weighted peak sound level	Conformance
10. Overload indication	Conformance
11. High-level stability	Conformance

* Items outside the scope of ASNITE certification.

Environmental conditions

	Temperature (°C)	Relative Humidity (%)	Static pressure (kPa)
Ranges of environmental conditions	20~26	25~70	97~105
Before calibration			
After calibration			

Indicated value before and after adjustment

Indicated value before adjustment: dB

Indicated value after adjustment: dB

※ The indicated value considered the calibration value of the sound calibrator.

Certificate No.

Calibration using equipment

SAMPLE

Calibration result

1. Self-generated noise:

Level range:20 - 70 dB

Time-averaged sound level:30 s

Measurement conditions	Frequency weighting	Self-noise level (dB)
Microphone installed	A	21.9
Microphone replaced by the electrical input-signal device	A	12.3
	C	16.9
	Z	22.0

2. Acoustical signal tests of frequency weighting:

Frequency weighting:C

Level range:20 - 130 dB

Time weighting:F

Sound-incident angle:Reference angle

Calibration sound pressure level:94.0 dB

Frequency (Hz)	Deviation (dB)	Acceptance limit (dB)	Uncertainty of measurement (dB)
125	0.5	±1.0	0.44
1 000	0.0	±0.7	0.37
8 000	-0.1	+1.5,-2.5	0.43

3. Electrical signal tests of frequency weighting:

Frequency weighting:A

Level range:20 - 130 dB

Time weighting:F

Frequency (Hz)	Input signal level (dB)	Indicated value (dB)	Frequency response of the microphone (dB)	Effects of reflections from the case (dB)	Windscreen frequency weighting (dB)	Relative frequency weighting (dB)	Acceptance limit (dB)	Uncertainty of measurement (dB)
63	119.2	93.0	0.1	-0.1	-	0.0	±1.0	0.26
125	109.1	93.0	0.1	0.0	-	0.1	±1.0	0.26
250	101.6	93.0	0.1	0.0	-	0.1	±1.0	0.26
500	96.2	93.0	0.0	0.1	-	0.1	±1.0	0.26
1 000	93.0	93.0	0.0	0.0	-	0.0	±0.7	0.26
2 000	91.8	93.0	0.0	0.0	-	0.0	±1.0	0.26
4 000	92.0	93.0	0.1	-0.1	-	0.0	±1.0	0.26
8 000	94.1	93.1	0.0	0.0	-	0.1	+1.5,-2.5	0.26
16 000	99.6	91.8	-0.8	-0.2	-	-2.2	+2.5,-16.0	0.26

Frequency weighting:C

Level range:20 - 130 dB

Time weighting:F

Frequency (Hz)	Input signal level (dB)	Indicated value (dB)	Frequency response of the microphone (dB)	Effects of reflections from the case (dB)	Windscreen frequency weighting (dB)	Relative frequency weighting (dB)	Acceptance limit (dB)	Uncertainty of measurement (dB)
63	93.8	93.0	0.1	-0.1	-	0.0	±1.0	0.26
125	93.2	93.1	0.1	0.0	-	0.2	±1.0	0.26
250	93.0	93.0	0.1	0.0	-	0.1	±1.0	0.26
500	93.0	93.0	0.0	0.1	-	0.1	±1.0	0.26
1 000	93.0	93.0	0.0	0.0	-	0.0	±0.7	0.26
2 000	93.2	93.0	0.0	0.0	-	0.0	±1.0	0.26
4 000	93.8	93.0	0.1	-0.1	-	0.0	±1.0	0.26
8 000	96.0	93.1	0.0	0.0	-	0.1	+1.5,-2.5	0.26
16 000	101.5	91.8	-0.8	-0.2	-	-2.2	+2.5,-16.0	0.26

Frequency weighting:Z
 Level range:20 - 130 dB
 Time weighting:F

Frequency (Hz)	Input signal level (dB)	Indicated value (dB)	Frequency response of the microphone (dB)	Effects of reflections from the case (dB)	Windscreen frequency weighting (dB)	Relative frequency weighting (dB)	Acceptance limit (dB)	Uncertainty of measurement (dB)
63	93.0	93.0	0.1	-0.1	-	0.0	±1.0	0.26
125	93.0	93.0	0.1	0.0	-	0.1	±1.0	0.26
250	93.0	93.0	0.1	0.0	-	0.1	±1.0	0.26
500	93.0	93.0	0.0	0.1	-	0.1	±1.0	0.26
1 000	93.0	93.0	0.0	0.0	-	0.0	±0.7	0.26
2 000	93.0	93.0	0.0	0.0	-	0.0	±1.0	0.26
4 000	93.0	93.0	0.1	-0.1	-	0.0	±1.0	0.26
8 000	93.0	93.0	0.0	0.0	-	0.0	+1.5,-2.5	0.26
16 000	93.0	93.0	-0.8	-0.2	-	-1.0	+2.5,-16.0	0.26

4. Frequency and time weighting at 1 kHz:

Level range:20 - 130 dB

Electrical input signal:1 kHz

At the sound level display setting	Deviation from indicated value at frequency weighting A (dB)		Uncertainty of measurement (dB)
	Frequency weighting:C	Frequency weighting:Z	
Time weighting:F	0.0	0.0	0.10

At the sound level display setting	Deviation from indicated value at time weighting F (dB)		Uncertainty of measurement (dB)
	Time weighting:S	Time average sound level	
Frequency weighting:A	0.0	0.0	0.10

5. Long-term stability:

Frequency weighting:A

Level range:20 - 130 dB

Electrical input signal:1 kHz

Time weighting:F

Continuous operation time:25 minutes

Difference between indicated values at start and end (dB)	Uncertainty of measurement (dB)
0.0	0.10

6. Level linearity on the reference level range:

Frequency weighting:A

Level range:20 - 130 dB

Electrical input signal:8 kHz

Time weighting:F

Input signal level (dB)	Deviation (dB)	Uncertainty of measurement (dB)
94.0	-	-
99.0	0.0	0.23
104.0	0.0	0.23
109.0	0.0	0.23
114.0	0.0	0.23
119.0	0.0	0.23
124.0	0.0	0.23
129.0	0.0	0.23
131.0	0.0	0.23
132.0	0.0	0.23
133.0	0.0	0.23
134.0	0.0	0.23
135.0	0.0	0.23
136.0	0.0	0.23
137.0	0.0	0.23

Input signal level (dB)	Deviation (dB)	Uncertainty of measurement (dB)
94.0	-	-
89.0	0.0	0.23
84.0	-0.1	0.23
79.0	-0.1	0.23
74.0	-0.1	0.23
69.0	-0.1	0.23
64.0	-0.1	0.23
59.0	-0.1	0.23
54.0	-0.1	0.23
49.0	-0.1	0.23
44.0	-0.1	0.23
39.0	-0.1	0.23
34.0	-0.1	0.23
30.0	-0.1	0.23
29.0	-0.1	0.23
28.0	-0.1	0.23
27.0	0.0	0.23
26.0	0.0	0.23
25.0	-0.1	0.23

7. Level linearity including the level range control:

Frequency weighting:A

Electrical input signal:1 kHz

Time weighting:F

Electrical input signal level:

Reference sound pressure level (Constant input signal level) (dB)

Level range (dB)	Deviation (dB)	Uncertainty of measurement (dB)
20 - 130	0.0	0.23

Signal level 5 dB higher than the signal level that initially displays the under-range indication (dB)

Level range (dB)	Deviation (dB)	Uncertainty of measurement (dB)
20 - 130	-0.1	0.23

8. Toneburst response:

Frequency weighting:A

Level range:20 - 130 dB

Electrical input signal:4 kHz

Maximum F-time weighting sound levels

Toneburst duration (ms)	For the reference toneburst response deviation of the measurement of the toneburst response (dB)	Uncertainty of measurement (dB)
200	-0.1	0.15
2	0.0	0.15
0.25	0.0	0.15

Maximum S-time weighting sound levels

Toneburst duration (ms)	For the reference toneburst response deviation of the measurement of the toneburst response (dB)	Uncertainty of measurement (dB)
200	0.0	0.15
2	0.0	0.15

Sound exposure level

Toneburst duration (ms)	For the reference toneburst response deviation of the measurement of the toneburst response (dB)	Uncertainty of measurement (dB)
200	-0.1	0.15
2	0.0	0.15
0.25	0.0	0.15

9. C-weighted peak sound level:

Frequency weighting:C

Level range:20 - 130 dB

Input signal	For the electrical input signal frequency (Hz)	Deviation (dB)	Uncertainty of measurement (dB)	Presence or absence of overload instructions
One cycle	8 000	0.0	0.17	Absent
Positive half-cycle	500	-0.2	0.17	Absent
Negative half-cycle	500	-0.2	0.17	Absent

10. Overload indication:

Frequency weighting:A

Level range:20 - 130 dB

Electrical input signal:4 kHz

As a positive semi-periodic signal difference from the negative semi-periodic signal (dB)	Uncertainty of measurement (dB)	The overload indication was confirmed to be retained as specified in IEC 61672-1.
0.0	0.23	

11. High-level stability:

Frequency weighting:A

Level range:20 - 130 dB

Electrical input signal:1 kHz

Time weighting:F

At the A-weighted sound level difference between the start and end values (dB)	Uncertainty of measurement (dB)
0.0	0.10

End of certificate.