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## CALIBRATION OF:

Sound Level Meter 2238-4188-BZ7126 No: 2246375  
Microphone: 4188 No: 2231305  
Identification:  
Date of receipt: 05/03/2012  
Certificate No: 19/12

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## CLIENT:

fakulta, z  
xy, 093 00 z

Order No: 319264

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## CALIBRATION CONDITIONS:

Preconditioning: 12 hours at 23 °C  
Environment conditions  
Air temperature: 24 °C ± 3°C  
Air pressure: 99.8 kPa ± 3 kPa  
Relative Humidity: 40 %RH ± 20 %RH

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## SPECIFICATIONS:

The Sound Level Meter has been calibrated in accordance with the requirements as specified in IEC 651 and IEC 804 type 1234, and vendor specific procedures.

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## PROCEDURE:

The measurements have been performed with the assistance of:  
Brüel & Kjær Sound Level Meter Calibration System B&K 3630

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## RESULTS:

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.

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Date of Calibration: 5/3/2012

Certificate issued: 5/3/2012

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JAROMIR KUPCOK

Calibration Technician

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JAROMIR KUPCOK

Approved signatory

## Summary

Absolute Acoustical Sensitivity Level	<i>Passed</i>
Frequency Response Measured in Acoustic Coupler, FW A	<i>Passed</i>
Frequency Response Measured in Acoustic Coupler, FW C	<i>Passed</i>
Frequency Response Measured in Acoustic Coupler, FW Lin	<i>Passed</i>
Electrical Inherent Noise Level, FW A	<i>Passed</i>
Electrical Inherent Noise Level, FW C	<i>Passed</i>
Electrical Inherent Noise Level, FW Lin	<i>Passed</i>
Determining Electrical Level for LRef @1kHz	<i>Passed</i>
Frequency Response measured with Electrical Signal, FW A	<i>Passed</i>
Frequency Response measured with Electrical Signal, FW C	<i>Passed</i>
Frequency Response measured with Electrical Signal, FW Lin	<i>Passed</i>
Level Range Control, 1000 Hz	<i>Passed</i>
Linearity Range, IEC60651, 1000 Hz, SPL 1 dB steps	<i>Passed</i>
Linearity Range, IEC60651, 4000 Hz, SPL 10 dB steps	<i>Passed</i>
Linearity Range, IEC60804, Leq	<i>Passed</i>
Linearity Range, IEC60804, SEL	<i>Passed</i>
Time Weighting, Difference in Reference Level Indication	<i>Passed</i>
Time Weighting, Response to Single Burst, 200 ms, F	<i>Passed</i>
Time Weighting, Response to Single Burst, 500 ms, S	<i>Passed</i>
Time Weighting, Response to Single Burst, 20 ms, I	<i>Passed</i>

Time Weighting, Response to Single Burst, 5 ms, I	Passed
Time Weighting, Response to Single Burst, 2 ms, I	Passed
Time Weighting, Response to a Continuous Sequence of Bursts, 100 Hz	Passed
Time Weighting, Response to a Continuous Sequence of Bursts, 20 Hz	Passed
Time Weighting, Response to a Continuous Sequence of Bursts, 2 Hz	Passed
Time Weighting, Peak	Passed
RMS Detector, Sine Burst, CF3	Passed
RMS Detector, Sine Burst, CF5	Passed
RMS Detector, Sine Burst, CF10	Passed
Time Averaging, Leq- SEL	Passed
Pulse Range, Leq-SEL	Passed
Overload Indication, Sine Signals, Inverse A	Passed
Overload Indication, 4kHz Tone burst	Passed

The verdict “Passed/Failed” does not take the calibration uncertainty into consideration; therefore this certificate is not a conformance statement. “Passed” only means that the measured value is within the limits stated on the certificate (in most cases equal to the IEC tolerance).

## Instruments

<u>Category:</u>	<u>Type:</u>	<u>Manufacturer:</u>	<u>Serial No.:</u>	<u>Last Calibration date:</u>	<u>Traceable to:</u>
Generator	Pulse Generator	Brüel & Kjær	2273615	27/11/2010	PTB, DFM
Burst Generator	5918 Generator	Brüel & Kjær	1920181	27/11/2010	PTB, DFM
Voltmeter	DMM34970A	Agilent	?	16/11/2011	
Calibrator	4226	Brüel & Kjær	2272353	26/11/2010	DPLA & PTB
Amplifier/Divider	3111 Output Module	Brüel & Kjær		26/11/2010	
Adaptor	WA0302 A, 13 pF	Brüel & Kjær		21/5/2010	B&K

## Absolute Acoustical Sensitivity Level

The response of the sound level meter to a sinusoidal sound pressure signal at the calibration frequency and at the calibration level of the sound level meter is registered.

	Coupler Pressure Lc	Mic. Correction C4226	Body Influence Cbi	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB]	[dB]	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Ref. Conditions	93.97	0.20	0.00	93.77	93.8	-1.0	1.0	0.0	0.28

## Frequency Response Measured in Acoustic Coupler, FW A

The response of the sound level meter to sinusoidal sound pressure signals at the calibration level at 1 kHz and at other frequencies is registered. From this the free field frequency response of for the sound level meter is calculated. The frequency response is calculated for other frequencies than 1 kHz relative to the response at 1 kHz. Expected response is calculated as Sound Pressure Level in the Acoustic Calibrator minus Free-Field-Correction and minus Body-Influence-Correction. The results are compared to the nominal frequency weighting.

	Coupler Pressure Lc	Mic. Correction C4226	Body Influence Cbi	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB]	[dB]	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
1000Hz	93.97	0.20	0.00	93.77	93.8	-1.0	1.0	0.0	0.28
31.623Hz	93.35	0.00	0.00	53.98	55.2	-1.5	1.5	1.2	0.25
63.096Hz	93.84	0.00	0.00	67.67	68.0	-1.5	1.5	0.3	0.25
125.89Hz	93.90	0.00	0.10	77.73	77.9	-1.0	1.0	0.2	0.25
251.19Hz	93.95	0.00	0.20	85.18	85.3	-1.0	1.0	0.1	0.25
501.19Hz	93.97	0.00	0.20	90.60	90.6	-1.0	1.0	0.0	0.25
1995.3Hz	94.00	0.35	0.00	94.88	94.8	-1.0	1.0	-0.1	0.30
3981.1Hz	93.88	1.25	0.10	93.56	93.8	-1.0	1.0	0.2	0.33
7943.3Hz	93.57	4.00	0.00	88.50	88.9	-3.0	1.5	0.4	0.50
12589Hz	93.29	7.20	0.20	81.62	81.8	-6.0	3.0	0.2	0.60

## Frequency Response Measured in Acoustic Coupler, FW C

The response of the sound level meter to sinusoidal sound pressure signals at the calibration level at 1 kHz and at other frequencies is registered. From this the free field frequency response of for the sound level meter is calculated. The frequency response is calculated for other frequencies than 1 kHz relative to the response at 1 kHz. Expected response is calculated as Sound Pressure Level in the Acoustic Calibrator minus Free-Field-Correction and minus Body-Influence-Correction. The results are compared to the nominal frequency weighting.

	Coupler Pressure Lc	Mic. Correction C4226	Body Influence Cbi	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB]	[dB]	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]

1000Hz	93.97	0.20	0.00	93.77	93.8	-1.0	1.0	0.0	0.28
31.623Hz	93.35	0.00	0.00	90.38	91.4	-1.5	1.5	1.0	0.25
63.096Hz	93.84	0.00	0.00	93.07	93.4	-1.5	1.5	0.3	0.25
125.89Hz	93.90	0.00	0.10	93.63	93.9	-1.0	1.0	0.3	0.25
251.19Hz	93.95	0.00	0.20	93.78	94.0	-1.0	1.0	0.2	0.25
501.19Hz	93.97	0.00	0.20	93.80	93.9	-1.0	1.0	0.1	0.25
1995.3Hz	94.00	0.35	0.00	93.48	93.4	-1.0	1.0	-0.1	0.30
3981.1Hz	93.88	1.25	0.10	91.76	92.0	-1.0	1.0	0.2	0.33
7943.3Hz	93.57	4.00	0.00	86.60	87.0	-3.0	1.5	0.4	0.50
12589Hz	93.29	7.20	0.20	79.72	80.0	-6.0	3.0	0.3	0.60

### Frequency Response Measured in Acoustic Coupler, FW Lin

The response of the sound level meter to sinusoidal sound pressure signals at the calibration level at 1 kHz and at other frequencies is registered. From this the free field frequency response of for the sound level meter is calculated. The frequency response is calculated for other frequencies than 1 kHz relative to the response at 1 kHz. Expected response is calculated as Sound Pressure Level in the Acoustic Calibrator minus Free-Field-Correction and minus Body-Influence-Correction. The results are compared to the nominal frequency weighting.

	Coupler Pressure Lc [dB SPL]	Mic. Correction C4226 [dB]	Body Influence Cbi [dB]	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz	93.97	0.20	0.00	93.77	93.9	-1.0	1.0	0.1	0.28
31.623Hz	93.35	0.00	0.00	93.48	94.5	-1.5	1.5	1.0	0.25
63.096Hz	93.84	0.00	0.00	93.97	94.4	-1.5	1.5	0.4	0.25
125.89Hz	93.90	0.00	0.10	93.93	94.3	-1.0	1.0	0.4	0.25
251.19Hz	93.95	0.00	0.20	93.88	94.1	-1.0	1.0	0.2	0.25
501.19Hz	93.97	0.00	0.20	93.90	94.1	-1.0	1.0	0.2	0.25
1995.3Hz	94.00	0.35	0.00	93.78	93.8	-1.0	1.0	0.0	0.30
3981.1Hz	93.88	1.25	0.10	92.66	93.1	-1.0	1.0	0.4	0.33
7943.3Hz	93.57	4.00	0.00	89.70	90.5	-3.0	1.5	0.8	0.50
12589Hz	93.29	7.20	0.20	86.02	87.0	-6.0	3.0	1.0	0.60

### Electrical Inherent Noise Level, FW A

The connection from the electrical input adaptor to the generator is substituted with a short-circuit and the reading of the sound level meter is registered. It is verified that the reading is sufficiently low so as to indicate that the inherent noise do not affect the linearity of the sound level meter.

	Max [dB SPL]	Measured [dB SPL]	Deviation [dB]	Uncertainty [dB]
Noise	18.0	0.0	-18.0	1.00

**Electrical Inherent Noise Level, FW C**

The connection from the electrical input adaptor to the generator is substituted with a short-circuit and the reading of the sound level meter is registered. It is verified that the reading is sufficiently low so as to indicate that the inherent noise do not affect the linearity of the sound level meter.

	Max [dB SPL]	Measured [dB SPL]	Deviation [dB]	Uncertainty [dB]
Noise	20.0	0.0	-20.0	1.00

**Electrical Inherent Noise Level, FW Lin**

The connection from the electrical input adaptor to the generator is substituted with a short-circuit and the reading of the sound level meter is registered. It is verified that the reading is sufficiently low so as to indicate that the inherent noise do not affect the linearity of the sound level meter.

	Max [dB SPL]	Measured [dB SPL]	Deviation [dB]	Uncertainty [dB]
Noise	25.0	21.6	-3.4	1.00

**Determining Electrical Level for LRef @1kHz**

The response to an electrical input signal level corresponding to the expected response at a sound pressure level of 94 dB is registered. All electrical signals are set relative to this response.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref.	94.0	94.1	-2.0	2.0	0.1	0.10

**Frequency Response measured with Electrical Signal, FW A**

The response of the sound level meter to sinusoidal voltage signals at 1 kHz and at other frequencies is registered. The frequency response is calculated for other frequencies than 1 kHz relative to the response at 1 kHz. The results are compared to the nominal frequency weighting.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz	125.0	124.9	-1.0	1.0	-0.1	0.12
10Hz	54.5	54.3	-100.0	3.0	-0.2	0.12
12.58Hz	61.5	61.5	-100.0	3.0	0.0	0.12
15.84Hz	68.2	68.1	-100.0	3.0	-0.1	0.12
19.95Hz	74.4	74.4	-3.0	3.0	0.0	0.12
25.19Hz	80.2	80.4	-2.0	2.0	0.2	0.12
31.623Hz	85.5	85.6	-1.5	1.5	0.1	0.12

39.811Hz	90.3	90.4	-1.5	1.5	0.1	0.12
50.119Hz	94.7	94.7	-1.5	1.5	0.0	0.12
63.096Hz	98.7	98.8	-1.5	1.5	0.1	0.12
79.433Hz	102.4	102.5	-1.5	1.5	0.1	0.12
100Hz	105.8	105.8	-1.0	1.0	0.0	0.12
125.89Hz	108.8	108.8	-1.0	1.0	0.0	0.12
158.49Hz	111.5	111.6	-1.0	1.0	0.1	0.12
199.53Hz	114.0	114.1	-1.0	1.0	0.1	0.12
251.19Hz	116.3	116.3	-1.0	1.0	0.0	0.12
316.23Hz	118.3	118.3	-1.0	1.0	0.0	0.12
398.11Hz	120.1	120.1	-1.0	1.0	0.0	0.12
501.19Hz	121.7	121.7	-1.0	1.0	0.0	0.12
630.96Hz	123.0	123.0	-1.0	1.0	0.0	0.12
794.33Hz	124.1	124.1	-1.0	1.0	0.0	0.12
1258.9Hz	125.5	125.5	-1.0	1.0	0.0	0.12
1584.9Hz	125.9	125.9	-1.0	1.0	0.0	0.12
1995.3Hz	126.1	126.1	-1.0	1.0	0.0	0.12
2511.9Hz	126.2	126.2	-1.0	1.0	0.0	0.12
3162.3Hz	126.1	126.1	-1.0	1.0	0.0	0.12
3981.1Hz	125.9	125.9	-1.0	1.0	0.0	0.12
5011.9Hz	125.4	125.4	-1.5	1.5	0.0	0.12
6309.6Hz	124.8	124.8	-2.0	1.5	0.0	0.12
7943.3Hz	123.8	123.8	-3.0	1.5	0.0	0.12
10000Hz	122.4	122.4	-4.0	2.0	0.0	0.12
12589Hz	120.6	120.6	-6.0	3.0	0.0	0.12
15849Hz	118.3	118.4	-100.0	3.0	0.1	0.12
19953Hz	115.6	115.7	-100.0	3.0	0.1	0.12

### Frequency Response measured with Electrical Signal, FW C

The response of the sound level meter to sinusoidal voltage signals at 1 kHz and at other frequencies is registered. The frequency response is calculated for other frequencies than 1 kHz relative to the response at 1 kHz. The results are compared to the nominal frequency weighting.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
1000Hz	125.0	124.9	-1.0	1.0	-0.1	0.12
10Hz	110.6	110.2	-100.0	3.0	-0.4	0.12
12.58Hz	113.7	113.6	-100.0	3.0	-0.1	0.12
15.84Hz	116.4	116.3	-100.0	3.0	-0.1	0.12
19.95Hz	118.7	118.7	-3.0	3.0	0.0	0.12
25.19Hz	120.5	120.7	-2.0	2.0	0.2	0.12
31.623Hz	121.9	122.0	-1.5	1.5	0.1	0.12
39.811Hz	122.9	123.0	-1.5	1.5	0.1	0.12
50.119Hz	123.6	123.7	-1.5	1.5	0.1	0.12
63.096Hz	124.1	124.1	-1.5	1.5	0.0	0.12
79.433Hz	124.4	124.5	-1.5	1.5	0.1	0.12
100Hz	124.6	124.6	-1.0	1.0	0.0	0.12
125.89Hz	124.7	124.7	-1.0	1.0	0.0	0.12
158.49Hz	124.8	124.8	-1.0	1.0	0.0	0.12

199.53Hz	124.9	124.9	-1.0	1.0	0.0	0.12
251.19Hz	124.9	124.9	-1.0	1.0	0.0	0.12
316.23Hz	124.9	124.9	-1.0	1.0	0.0	0.12
398.11Hz	124.9	124.9	-1.0	1.0	0.0	0.12
501.19Hz	124.9	124.9	-1.0	1.0	0.0	0.12
630.96Hz	124.9	124.9	-1.0	1.0	0.0	0.12
794.33Hz	124.9	124.9	-1.0	1.0	0.0	0.12
1258.9Hz	124.9	124.9	-1.0	1.0	0.0	0.12
1584.9Hz	124.8	124.8	-1.0	1.0	0.0	0.12
1995.3Hz	124.7	124.7	-1.0	1.0	0.0	0.12
2511.9Hz	124.6	124.6	-1.0	1.0	0.0	0.12
3162.3Hz	124.4	124.4	-1.0	1.0	0.0	0.12
3981.1Hz	124.1	124.1	-1.0	1.0	0.0	0.12
5011.9Hz	123.6	123.6	-1.5	1.5	0.0	0.12
6309.6Hz	122.9	122.9	-2.0	1.5	0.0	0.12
7943.3Hz	121.9	121.9	-3.0	1.5	0.0	0.12
10000Hz	120.5	120.5	-4.0	2.0	0.0	0.12
12589Hz	118.7	118.7	-6.0	3.0	0.0	0.12
15849Hz	116.4	116.5	-100.0	3.0	0.1	0.12
19953Hz	113.7	113.8	-100.0	3.0	0.1	0.12

### Frequency Response measured with Electrical Signal, FW Lin

The response of the sound level meter to sinusoidal voltage signals at 1 kHz and at other frequencies is registered. The frequency response is calculated for other frequencies than 1 kHz relative to the response at 1 kHz. The results are compared to the nominal frequency weighting.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
1000Hz	125.0	124.9	-1.0	1.0	-0.1	0.12
10Hz	124.9	124.5	-100.0	3.0	-0.4	0.12
12.58Hz	124.9	124.8	-100.0	3.0	-0.1	0.12
15.84Hz	124.9	124.9	-100.0	3.0	0.0	0.12
19.95Hz	124.9	124.9	-3.0	3.0	0.0	0.12
25.19Hz	124.9	125.0	-2.0	2.0	0.1	0.12
31.623Hz	124.9	125.0	-1.5	1.5	0.1	0.12
39.811Hz	124.9	124.9	-1.5	1.5	0.0	0.12
50.119Hz	124.9	124.9	-1.5	1.5	0.0	0.12
63.096Hz	124.9	124.9	-1.5	1.5	0.0	0.12
79.433Hz	124.9	125.0	-1.5	1.5	0.1	0.12
100Hz	124.9	124.9	-1.0	1.0	0.0	0.12
125.89Hz	124.9	124.9	-1.0	1.0	0.0	0.12
158.49Hz	124.9	124.9	-1.0	1.0	0.0	0.12
199.53Hz	124.9	124.9	-1.0	1.0	0.0	0.12
251.19Hz	124.9	124.9	-1.0	1.0	0.0	0.12
316.23Hz	124.9	124.9	-1.0	1.0	0.0	0.12
398.11Hz	124.9	124.9	-1.0	1.0	0.0	0.12
501.19Hz	124.9	124.9	-1.0	1.0	0.0	0.12
630.96Hz	124.9	124.9	-1.0	1.0	0.0	0.12
794.33Hz	124.9	124.9	-1.0	1.0	0.0	0.12



1258.9Hz	124.9	124.9	-1.0	1.0	0.0	0.12
1584.9Hz	124.9	124.9	-1.0	1.0	0.0	0.12
1995.3Hz	124.9	124.9	-1.0	1.0	0.0	0.12
2511.9Hz	124.9	124.9	-1.0	1.0	0.0	0.12
3162.3Hz	124.9	124.9	-1.0	1.0	0.0	0.12
3981.1Hz	124.9	124.9	-1.0	1.0	0.0	0.12
5011.9Hz	124.9	125.0	-1.5	1.5	0.1	0.12
6309.6Hz	124.9	125.0	-2.0	1.5	0.1	0.12
7943.3Hz	124.9	125.1	-3.0	1.5	0.2	0.12
10000Hz	124.9	125.2	-4.0	2.0	0.3	0.12
12589Hz	124.9	125.2	-6.0	3.0	0.3	0.12
15849Hz	124.9	124.8	-100.0	3.0	-0.1	0.12
19953Hz	124.9	122.8	-100.0	3.0	-2.1	0.12

### Level Range Control, 1000 Hz

The response of the sound level meter to a sinusoidal voltage signal is registered in each of the level ranges of the sound level meter. The relative response to the response in the reference level range is calculated for each level range, and the relative response is compared to the anticipated relative response.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Ref.	94.0	94.0	-1.0	1.0	0.0	0.12
Meas. in range 140	104.0	104.0	-0.5	0.5	0.0	0.12
Meas. in range 120	84.0	84.0	-0.5	0.5	0.0	0.12
Meas. in range 110	74.0	74.0	-0.5	0.5	0.0	0.12
Meas. in range 100	64.0	64.0	-0.5	0.5	0.0	0.12

### Linearity Range, IEC60651, 1000 Hz, SPL 1 dB steps

The response of the sound level meter to sinusoidal voltage signals is registered for various levels covering the reference level range, including a level nominally corresponding to  $L_{ref}$  at the measurement frequency. From this the response at the other levels is calculated relative to the response at the level corresponding to  $L_{ref}$ . The relative response is compared to the anticipated relative response. For each level the difference between the responses at the level and at the previous level is also calculated in order to determine differential level linearity.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
94 dB	94.0	94.0	-1.0	1.0	0.0	0.12
52 dB. Rel. Ref.	52.0	52.2	-0.7	0.7	0.2	0.12
53 dB. Rel. Ref.	53.0	53.2	-0.7	0.7	0.2	0.12
53 dB. Diff.	53.2	53.2	-0.2	0.2	0.0	0.12
54 dB. Rel. Ref.	54.0	54.2	-0.7	0.7	0.2	0.12
54 dB. Diff.	54.2	54.2	-0.2	0.2	0.0	0.12
55 dB. Rel. Ref.	55.0	55.2	-0.7	0.7	0.2	0.12

## CERTIFICATE OF CALIBRATION

\*\*\*DRAFT\*\*\* Certificate No: 19/

Page 10 of  
23

55 dB. Diff.	55.2	55.2	-0.2	0.2	0.0	0.12
56 dB. Rel. Ref.	56.0	56.2	-0.7	0.7	0.2	0.12
56 dB. Diff.	56.2	56.2	-0.2	0.2	0.0	0.12
57 dB. Rel. Ref.	57.0	57.2	-0.7	0.7	0.2	0.12
57 dB. Diff.	57.2	57.2	-0.2	0.2	0.0	0.12
58 dB. Rel. Ref.	58.0	58.2	-0.7	0.7	0.2	0.12
58 dB. Diff.	58.2	58.2	-0.2	0.2	0.0	0.12
59 dB. Rel. Ref.	59.0	59.2	-0.7	0.7	0.2	0.12
59 dB. Diff.	59.2	59.2	-0.2	0.2	0.0	0.12
60 dB. Rel. Ref.	60.0	60.1	-0.7	0.7	0.1	0.12
60 dB. Diff.	60.2	60.1	-0.2	0.2	-0.1	0.12
61 dB. Rel. Ref.	61.0	61.1	-0.7	0.7	0.1	0.12
61 dB. Diff.	61.1	61.1	-0.2	0.2	0.0	0.12
62 dB. Rel. Ref.	62.0	62.1	-0.7	0.7	0.1	0.12
62 dB. Diff.	62.1	62.1	-0.2	0.2	0.0	0.12
63 dB. Rel. Ref.	63.0	63.1	-0.7	0.7	0.1	0.12
63 dB. Diff.	63.1	63.1	-0.2	0.2	0.0	0.12
64 dB. Rel. Ref.	64.0	64.1	-0.7	0.7	0.1	0.12
64 dB. Diff.	64.1	64.1	-0.2	0.2	0.0	0.12
65 dB. Rel. Ref.	65.0	65.1	-0.7	0.7	0.1	0.12
65 dB. Diff.	65.1	65.1	-0.2	0.2	0.0	0.12
66 dB. Rel. Ref.	66.0	66.1	-0.7	0.7	0.1	0.12
66 dB. Diff.	66.1	66.1	-0.2	0.2	0.0	0.12
67 dB. Rel. Ref.	67.0	67.1	-0.7	0.7	0.1	0.12
67 dB. Diff.	67.1	67.1	-0.2	0.2	0.0	0.12
68 dB. Rel. Ref.	68.0	68.1	-0.7	0.7	0.1	0.12
68 dB. Diff.	68.1	68.1	-0.2	0.2	0.0	0.12
69 dB. Rel. Ref.	69.0	69.1	-0.7	0.7	0.1	0.12
69 dB. Diff.	69.1	69.1	-0.2	0.2	0.0	0.12
70 dB. Rel. Ref.	70.0	70.1	-0.7	0.7	0.1	0.12
70 dB. Diff.	70.1	70.1	-0.2	0.2	0.0	0.12
71 dB. Rel. Ref.	71.0	71.1	-0.7	0.7	0.1	0.12
71 dB. Diff.	71.1	71.1	-0.2	0.2	0.0	0.12
72 dB. Rel. Ref.	72.0	72.1	-0.7	0.7	0.1	0.12
72 dB. Diff.	72.1	72.1	-0.2	0.2	0.0	0.12
73 dB. Rel. Ref.	73.0	73.1	-0.7	0.7	0.1	0.12
73 dB. Diff.	73.1	73.1	-0.2	0.2	0.0	0.12
74 dB. Rel. Ref.	74.0	74.1	-0.7	0.7	0.1	0.12
74 dB. Diff.	74.1	74.1	-0.2	0.2	0.0	0.12
75 dB. Rel. Ref.	75.0	75.1	-0.7	0.7	0.1	0.12
75 dB. Diff.	75.1	75.1	-0.2	0.2	0.0	0.12
76 dB. Rel. Ref.	76.0	76.1	-0.7	0.7	0.1	0.12
76 dB. Diff.	76.1	76.1	-0.2	0.2	0.0	0.12
77 dB. Rel. Ref.	77.0	77.1	-0.7	0.7	0.1	0.12
77 dB. Diff.	77.1	77.1	-0.2	0.2	0.0	0.12
78 dB. Rel. Ref.	78.0	78.1	-0.7	0.7	0.1	0.12
78 dB. Diff.	78.1	78.1	-0.2	0.2	0.0	0.12
79 dB. Rel. Ref.	79.0	79.1	-0.7	0.7	0.1	0.12
79 dB. Diff.	79.1	79.1	-0.2	0.2	0.0	0.12
80 dB. Rel. Ref.	80.0	80.1	-0.7	0.7	0.1	0.12
80 dB. Diff.	80.1	80.1	-0.2	0.2	0.0	0.12
81 dB. Rel. Ref.	81.0	81.1	-0.7	0.7	0.1	0.12
81 dB. Diff.	81.1	81.1	-0.2	0.2	0.0	0.12

# CERTIFICATE OF CALIBRATION

\*\*\*DRAFT\*\*\* Certificate No: 19/

Page 11 of  
23

82 dB. Rel. Ref.	82.0	82.1	-0.7	0.7	0.1	0.12
82 dB. Diff.	82.1	82.1	-0.2	0.2	0.0	0.12
83 dB. Rel. Ref.	83.0	83.1	-0.7	0.7	0.1	0.12
83 dB. Diff.	83.1	83.1	-0.2	0.2	0.0	0.12
84 dB. Rel. Ref.	84.0	84.1	-0.7	0.7	0.1	0.12
84 dB. Diff.	84.1	84.1	-0.2	0.2	0.0	0.12
85 dB. Rel. Ref.	85.0	85.1	-0.7	0.7	0.1	0.12
85 dB. Diff.	85.1	85.1	-0.2	0.2	0.0	0.12
86 dB. Rel. Ref.	86.0	86.1	-0.7	0.7	0.1	0.12
86 dB. Diff.	86.1	86.1	-0.2	0.2	0.0	0.12
87 dB. Rel. Ref.	87.0	87.0	-0.7	0.7	0.0	0.12
87 dB. Diff.	87.1	87.0	-0.2	0.2	-0.1	0.12
88 dB. Rel. Ref.	88.0	88.0	-0.7	0.7	0.0	0.12
88 dB. Diff.	88.0	88.0	-0.2	0.2	0.0	0.12
89 dB. Rel. Ref.	89.0	89.0	-0.7	0.7	0.0	0.12
89 dB. Diff.	89.0	89.0	-0.2	0.2	0.0	0.12
90 dB. Rel. Ref.	90.0	90.1	-0.7	0.7	0.1	0.12
90 dB. Diff.	90.0	90.1	-0.2	0.2	0.1	0.12
91 dB. Rel. Ref.	91.0	91.0	-0.7	0.7	0.0	0.12
91 dB. Diff.	91.1	91.0	-0.2	0.2	-0.1	0.12
92 dB. Rel. Ref.	92.0	92.0	-0.7	0.7	0.0	0.12
92 dB. Diff.	92.0	92.0	-0.2	0.2	0.0	0.12
93 dB. Rel. Ref.	93.0	93.0	-0.7	0.7	0.0	0.12
93 dB. Diff.	93.0	93.0	-0.2	0.2	0.0	0.12
95 dB. Rel. Ref.	95.0	95.0	-0.7	0.7	0.0	0.12
95 dB. Diff.	95.0	95.0	-0.4	0.4	0.0	0.12
96 dB. Rel. Ref.	96.0	96.0	-0.7	0.7	0.0	0.12
96 dB. Diff.	96.0	96.0	-0.2	0.2	0.0	0.12
97 dB. Rel. Ref.	97.0	97.0	-0.7	0.7	0.0	0.12
97 dB. Diff.	97.0	97.0	-0.2	0.2	0.0	0.12
98 dB. Rel. Ref.	98.0	98.0	-0.7	0.7	0.0	0.12
98 dB. Diff.	98.0	98.0	-0.2	0.2	0.0	0.12
99 dB. Rel. Ref.	99.0	99.0	-0.7	0.7	0.0	0.12
99 dB. Diff.	99.0	99.0	-0.2	0.2	0.0	0.12
100 dB. Rel. Ref.	100.0	100.0	-0.7	0.7	0.0	0.12
100 dB. Diff.	100.0	100.0	-0.2	0.2	0.0	0.12
101 dB. Rel. Ref.	101.0	101.0	-0.7	0.7	0.0	0.12
101 dB. Diff.	101.0	101.0	-0.2	0.2	0.0	0.12
102 dB. Rel. Ref.	102.0	102.0	-0.7	0.7	0.0	0.12
102 dB. Diff.	102.0	102.0	-0.2	0.2	0.0	0.12
103 dB. Rel. Ref.	103.0	103.0	-0.7	0.7	0.0	0.12
103 dB. Diff.	103.0	103.0	-0.2	0.2	0.0	0.12
104 dB. Rel. Ref.	104.0	104.0	-0.7	0.7	0.0	0.12
104 dB. Diff.	104.0	104.0	-0.2	0.2	0.0	0.12
105 dB. Rel. Ref.	105.0	105.0	-0.7	0.7	0.0	0.12
105 dB. Diff.	105.0	105.0	-0.2	0.2	0.0	0.12
106 dB. Rel. Ref.	106.0	106.0	-0.7	0.7	0.0	0.12
106 dB. Diff.	106.0	106.0	-0.2	0.2	0.0	0.12
107 dB. Rel. Ref.	107.0	107.0	-0.7	0.7	0.0	0.12
107 dB. Diff.	107.0	107.0	-0.2	0.2	0.0	0.12
108 dB. Rel. Ref.	108.0	108.0	-0.7	0.7	0.0	0.12
108 dB. Diff.	108.0	108.0	-0.2	0.2	0.0	0.12
109 dB. Rel. Ref.	109.0	109.0	-0.7	0.7	0.0	0.12

109 dB. Diff.	109.0	109.0	-0.2	0.2	0.0	0.12
110 dB. Rel. Ref.	110.0	110.0	-0.7	0.7	0.0	0.12
110 dB. Diff.	110.0	110.0	-0.2	0.2	0.0	0.12
111 dB. Rel. Ref.	111.0	111.0	-0.7	0.7	0.0	0.12
111 dB. Diff.	111.0	111.0	-0.2	0.2	0.0	0.12
112 dB. Rel. Ref.	112.0	112.0	-0.7	0.7	0.0	0.12
112 dB. Diff.	112.0	112.0	-0.2	0.2	0.0	0.12
113 dB. Rel. Ref.	113.0	113.0	-0.7	0.7	0.0	0.12
113 dB. Diff.	113.0	113.0	-0.2	0.2	0.0	0.12
114 dB. Rel. Ref.	114.0	114.0	-0.7	0.7	0.0	0.12
114 dB. Diff.	114.0	114.0	-0.2	0.2	0.0	0.12
115 dB. Rel. Ref.	115.0	115.0	-0.7	0.7	0.0	0.12
115 dB. Diff.	115.0	115.0	-0.2	0.2	0.0	0.12
116 dB. Rel. Ref.	116.0	116.0	-0.7	0.7	0.0	0.12
116 dB. Diff.	116.0	116.0	-0.2	0.2	0.0	0.12
117 dB. Rel. Ref.	117.0	117.0	-0.7	0.7	0.0	0.12
117 dB. Diff.	117.0	117.0	-0.2	0.2	0.0	0.12
118 dB. Rel. Ref.	118.0	118.0	-0.7	0.7	0.0	0.12
118 dB. Diff.	118.0	118.0	-0.2	0.2	0.0	0.12
119 dB. Rel. Ref.	119.0	118.9	-0.7	0.7	-0.1	0.12
119 dB. Diff.	119.0	118.9	-0.2	0.2	-0.1	0.12
120 dB. Rel. Ref.	120.0	119.9	-0.7	0.7	-0.1	0.12
120 dB. Diff.	119.9	119.9	-0.2	0.2	0.0	0.12
121 dB. Rel. Ref.	121.0	120.9	-0.7	0.7	-0.1	0.12
121 dB. Diff.	120.9	120.9	-0.2	0.2	0.0	0.12
122 dB. Rel. Ref.	122.0	121.9	-0.7	0.7	-0.1	0.12
122 dB. Diff.	121.9	121.9	-0.2	0.2	0.0	0.12
123 dB. Rel. Ref.	123.0	122.9	-0.7	0.7	-0.1	0.12
123 dB. Diff.	122.9	122.9	-0.2	0.2	0.0	0.12
124 dB. Rel. Ref.	124.0	123.9	-0.7	0.7	-0.1	0.12
124 dB. Diff.	123.9	123.9	-0.2	0.2	0.0	0.12
125 dB. Rel. Ref.	125.0	124.9	-0.7	0.7	-0.1	0.12
125 dB. Diff.	124.9	124.9	-0.2	0.2	0.0	0.12
126 dB. Rel. Ref.	126.0	125.9	-0.7	0.7	-0.1	0.12
126 dB. Diff.	125.9	125.9	-0.2	0.2	0.0	0.12
127 dB. Rel. Ref.	127.0	126.9	-0.7	0.7	-0.1	0.12
127 dB. Diff.	126.9	126.9	-0.2	0.2	0.0	0.12
128 dB. Rel. Ref.	128.0	127.9	-0.7	0.7	-0.1	0.12
128 dB. Diff.	127.9	127.9	-0.2	0.2	0.0	0.12
129 dB. Rel. Ref.	129.0	128.8	-0.7	0.7	-0.2	0.12
129 dB. Diff.	128.9	128.8	-0.2	0.2	-0.1	0.12
130 dB. Rel. Ref.	130.0	129.8	-0.7	0.7	-0.2	0.12
130 dB. Diff.	129.8	129.8	-0.2	0.2	0.0	0.12

### Linearity Range, IEC60651, 4000 Hz, SPL 10 dB steps

The response of the sound level meter to sinusoidal voltage signals is registered for various levels covering the reference level range, including a level nominally corresponding to  $L_{ref}$  at the measurement frequency. From this the response at the other levels is calculated relative to the response at the level

corresponding to Lref. The relative response is compared to the anticipated relative response. For each level the difference between the responses at the level and at the previous level is also calculated in order to determine differential level linearity.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
94 dB	94.0	94.0	-1.0	1.0	0.0	0.12
52 dB. Rel. Ref.	52.0	52.2	-0.7	0.7	0.2	0.12
60 dB. Rel. Ref.	60.0	60.1	-0.7	0.7	0.1	0.12
60 dB. Diff.	60.2	60.1	-0.4	0.4	-0.1	0.12
70 dB. Rel. Ref.	70.0	70.1	-0.7	0.7	0.1	0.12
70 dB. Diff.	70.1	70.1	-0.4	0.4	0.0	0.12
80 dB. Rel. Ref.	80.0	80.0	-0.7	0.7	0.0	0.12
80 dB. Diff.	80.1	80.0	-0.4	0.4	-0.1	0.12
90 dB. Rel. Ref.	90.0	90.0	-0.7	0.7	0.0	0.12
90 dB. Diff.	90.0	90.0	-0.4	0.4	0.0	0.12
100 dB. Rel. Ref.	100.0	100.0	-0.7	0.7	0.0	0.12
100 dB. Diff.	100.0	100.0	-0.4	0.4	0.0	0.12
110 dB. Rel. Ref.	110.0	110.0	-0.7	0.7	0.0	0.12
110 dB. Diff.	110.0	110.0	-0.4	0.4	0.0	0.12
120 dB. Rel. Ref.	120.0	119.9	-0.7	0.7	-0.1	0.12
120 dB. Diff.	120.0	119.9	-0.4	0.4	-0.1	0.12
130 dB. Rel. Ref.	130.0	129.8	-0.7	0.7	-0.2	0.12
130 dB. Diff.	129.9	129.8	-0.4	0.4	-0.1	0.12

### Linearity Range, IEC60804, Leq

The response of the sound level meter to sinusoidal voltage signals is registered for various levels covering the reference level range, including a level nominally corresponding to Lref at the measurement frequency. From this the response at the other levels is calculated relative to the response at the level corresponding to Lref. The relative response is compared to the anticipated relative response. For each level the difference between the responses at the level and at the previous level is also calculated in order to determine differential level linearity.

	Expected [dB Leq]	Measured [dB Leq]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
94 dB	94.0	93.9	-1.0	1.0	-0.1	0.12
52 dB. Rel. Ref.	51.9	52.0	-0.7	0.7	0.1	0.12
60 dB. Rel. Ref.	59.9	60.0	-0.7	0.7	0.1	0.12
70 dB. Rel. Ref.	69.9	70.0	-0.7	0.7	0.1	0.12
80 dB. Rel. Ref.	79.9	80.0	-0.7	0.7	0.1	0.12
90 dB. Rel. Ref.	89.9	89.9	-0.7	0.7	0.0	0.12
100 dB. Rel. Ref.	99.9	99.9	-0.7	0.7	0.0	0.12
110 dB. Rel. Ref.	109.9	109.9	-0.7	0.7	0.0	0.12
120 dB. Rel. Ref.	119.9	119.8	-0.7	0.7	-0.1	0.12
130 dB. Rel. Ref.	129.9	129.7	-0.7	0.7	-0.2	0.12

## Linearity Range, IEC60804, SEL

The sound exposure level reading of the sound level meter when exposed to single 4 kHz tonebursts of 1 s duration is registered for various levels of the toneburst covering the reference level range and including a burst with a peak level of  $V_{ref} + 2$  dB corresponding to a sound exposure level of  $L_{ref}$ . From this the response at other sound exposure levels than  $L_{ref}$  is calculated relative to the response at  $L_{ref}$ . The relative response is compared to the anticipated relative response. The signal levels are defined relative to  $L_{min}$ . The measurements are carried out with A frequency weightings.

	Expected [dB Leq]	Measured [dB Leq]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
94 dB	94.0	93.9	-1.0	1.0	-0.1	0.15
54 dB. Rel. Ref.	53.9	54.1	-0.7	0.7	0.2	0.15
60 dB. Rel. Ref.	59.9	60.1	-0.7	0.7	0.2	0.15
70 dB. Rel. Ref.	69.9	70.0	-0.7	0.7	0.1	0.15
80 dB. Rel. Ref.	79.9	80.0	-0.7	0.7	0.1	0.15
90 dB. Rel. Ref.	89.9	89.9	-0.7	0.7	0.0	0.15
100 dB. Rel. Ref.	99.9	99.9	-0.7	0.7	0.0	0.15
110 dB. Rel. Ref.	109.9	109.9	-0.7	0.7	0.0	0.15
120 dB. Rel. Ref.	119.9	119.8	-0.7	0.7	-0.1	0.15
130 dB. Rel. Ref.	129.9	129.7	-0.7	0.7	-0.2	0.15

## Time Weighting, Difference in Reference Level Indication

The response of the sound level meter to a steady 1 kHz sinusoidal voltage signal at the reference level is registered for each timeweighting available in the sound level meter. The differences between the responses are calculated and compared to the maximum allowed differences.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref. Fast	94.0	94.0	-1.0	1.0	0.0	0.11
Meas. Slow	94.0	94.0	-0.1	0.1	0.0	0.11
Meas. Impulse	94.0	94.1	-0.1	0.1	0.1	0.11

## Time Weighting, Response to Single Burst, 200 ms, F

The maximum reading of the sound level meter when exposed to single tonebursts is registered for various burst durations. The toneburst response of the sound level meter is calculated as the maximum reading relative to the response of the sound level meter to a steady sinusoidal signal with the same frequency and peak voltage as the tonebursts. The response of the Sound Level Meter to a single burst is tested and compared to the anticipated response.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref. 126 dB	126.0	125.9	-1.0	1.0	-0.1	0.20
Burst Meas. 126 dB	124.9	124.9	-1.0	1.0	0.0	0.20

Ref. 116 dB	116.0	116.0	-1.0	1.0	0.0	0.20
Burst Meas. 116 dB	115.0	114.9	-1.0	1.0	-0.1	0.20
Ref. 106 dB	106.0	106.0	-1.0	1.0	0.0	0.20
Burst Meas. 106 dB	105.0	105.0	-1.0	1.0	0.0	0.20
Ref. 96 dB	96.0	96.0	-1.0	1.0	0.0	0.20
Burst Meas. 96 dB	95.0	95.0	-1.0	1.0	0.0	0.20
Ref. 86 dB	86.0	86.0	-1.0	1.0	0.0	0.20
Burst Meas. 86 dB	85.0	85.0	-1.0	1.0	0.0	0.20
Ref. 76 dB	76.0	76.1	-1.0	1.0	0.1	0.20
Burst Meas. 76 dB	75.1	75.0	-1.0	1.0	-0.1	0.20
Ref. 66 dB	66.0	66.1	-1.0	1.0	0.1	0.20
Burst Meas. 66 dB	65.1	65.1	-1.0	1.0	0.0	0.20
Ref. 56 dB	56.0	56.2	-1.0	1.0	0.2	0.20
Burst Meas. 56 dB	55.2	55.2	-1.0	1.0	0.0	0.20

### Time Weighting, Response to Single Burst, 500 ms, S

The maximum reading of the sound level meter when exposed to single tonebursts is registered for various burst durations. The toneburst response of the sound level meter is calculated as the maximum reading relative to the response of the sound level meter to a steady sinusoidal signal with the same frequency and peak voltage as the tonebursts. The response of the Sound Level Meter to a single burst is tested and compared to the anticipated response.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref. 126 dB	126.0	125.9	-1.0	1.0	-0.1	0.25
Burst Meas. 126 dB	121.8	121.7	-1.0	1.0	-0.1	0.25
Ref. 116 dB	116.0	116.0	-1.0	1.0	0.0	0.25
Burst Meas. 116 dB	111.9	111.9	-1.0	1.0	0.0	0.25
Ref. 106 dB	106.0	106.0	-1.0	1.0	0.0	0.25
Burst Meas. 106 dB	101.9	101.9	-1.0	1.0	0.0	0.25
Ref. 96 dB	96.0	96.0	-1.0	1.0	0.0	0.25
Burst Meas. 96 dB	91.9	91.8	-1.0	1.0	-0.1	0.25
Ref. 86 dB	86.0	86.0	-1.0	1.0	0.0	0.25
Burst Meas. 86 dB	81.9	82.0	-1.0	1.0	0.1	0.25
Ref. 76 dB	76.0	76.1	-1.0	1.0	0.1	0.25
Burst Meas. 76 dB	72.0	72.0	-1.0	1.0	0.0	0.25
Ref. 66 dB	66.0	66.1	-1.0	1.0	0.1	0.25
Burst Meas. 66 dB	62.0	62.0	-1.0	1.0	0.0	0.25
Ref. 56 dB	56.0	56.2	-1.0	1.0	0.2	0.25
Burst Meas. 56 dB	52.1	52.2	-1.0	1.0	0.1	0.25

### Time Weighting, Response to Single Burst, 20 ms, I

The maximum reading of the sound level meter when exposed to single tonebursts is registered for various burst durations. The toneburst response of the sound level meter is calculated as the maximum

reading relative to the response of the sound level meter to a steady sinusoidal signal with the same frequency and peak voltage as the tonebursts. The response of the Sound Level Meter to a single burst is tested and compared to the anticipated response.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref. 130 dB	130.0	129.8	-1.0	1.0	-0.2	0.35
Burst Meas. 130 dB	126.2	125.9	-1.5	1.5	-0.3	0.35
Ref. 120 dB	120.0	120.0	-1.0	1.0	0.0	0.35
Burst Meas. 120 dB	116.4	116.5	-1.5	1.5	0.1	0.35
Ref. 110 dB	110.0	110.0	-1.0	1.0	0.0	0.35
Burst Meas. 110 dB	106.4	106.4	-1.5	1.5	0.0	0.35
Ref. 100 dB	100.0	100.1	-1.0	1.0	0.1	0.35
Burst Meas. 100 dB	96.5	96.4	-1.5	1.5	-0.1	0.35
Ref. 90 dB	90.0	90.1	-1.0	1.0	0.1	0.35
Burst Meas. 90 dB	86.5	86.3	-1.5	1.5	-0.2	0.35
Ref. 80 dB	80.0	80.1	-1.0	1.0	0.1	0.35
Burst Meas. 80 dB	76.5	76.6	-1.5	1.5	0.1	0.35
Ref. 70 dB	70.0	70.1	-1.0	1.0	0.1	0.35
Burst Meas. 70 dB	66.5	66.6	-1.5	1.5	0.1	0.35
Ref. 60 dB	60.0	60.2	-1.0	1.0	0.2	0.35
Burst Meas. 60 dB	56.6	56.5	-1.5	1.5	-0.1	0.35

### Time Weighting, Response to Single Burst, 5 ms, I

The maximum reading of the sound level meter when exposed to single tonebursts is registered for various burst durations. The toneburst response of the sound level meter is calculated as the maximum reading relative to the response of the sound level meter to a steady sinusoidal signal with the same frequency and peak voltage as the tonebursts. The response of the Sound Level Meter to a single burst is tested and compared to the anticipated response.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref. 130 dB	130.0	129.9	-1.0	1.0	-0.1	0.60
Burst Meas. 130 dB	121.1	120.5	-2.0	2.0	-0.6	0.60
Ref. 120 dB	120.0	120.0	-1.0	1.0	0.0	0.60
Burst Meas. 120 dB	111.2	110.8	-2.0	2.0	-0.4	0.60
Ref. 110 dB	110.0	110.1	-1.0	1.0	0.1	0.60
Burst Meas. 110 dB	101.3	101.5	-2.0	2.0	0.2	0.60
Ref. 100 dB	100.0	100.1	-1.0	1.0	0.1	0.60
Burst Meas. 100 dB	91.3	91.5	-2.0	2.0	0.2	0.60
Ref. 90 dB	90.0	90.1	-1.0	1.0	0.1	0.60
Burst Meas. 90 dB	81.3	81.0	-2.0	2.0	-0.3	0.60
Ref. 80 dB	80.0	80.1	-1.0	1.0	0.1	0.60
Burst Meas. 80 dB	71.3	71.4	-2.0	2.0	0.1	0.60
Ref. 70 dB	70.0	70.1	-1.0	1.0	0.1	0.60
Burst Meas. 70 dB	61.3	60.9	-2.0	2.0	-0.4	0.60
Ref. 60 dB	60.0	60.2	-1.0	1.0	0.2	0.60
Burst Meas. 60 dB	51.4	51.5	-2.0	2.0	0.1	0.60



### Time Weighting, Response to Single Burst, 2 ms, I

The maximum reading of the sound level meter when exposed to single tonebursts is registered for various burst durations. The toneburst response of the sound level meter is calculated as the maximum reading relative to the response of the sound level meter to a steady sinusoidal signal with the same frequency and peak voltage as the tonebursts. The response of the Sound Level Meter to a single burst is tested and compared to the anticipated response.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref. 130 dB	130.0	129.8	-1.0	1.0	-0.2	0.60
Burst Meas. 130 dB	117.2	118.9	-2.0	2.0	1.7	0.60
Ref. 120 dB	120.0	120.0	-1.0	1.0	0.0	0.60
Burst Meas. 120 dB	107.4	109.0	-2.0	2.0	1.6	0.60
Ref. 110 dB	110.0	110.0	-1.0	1.0	0.0	0.60
Burst Meas. 110 dB	97.4	97.5	-2.0	2.0	0.1	0.60
Ref. 100 dB	100.0	100.1	-1.0	1.0	0.1	0.60
Burst Meas. 100 dB	87.5	87.5	-2.0	2.0	0.0	0.60
Ref. 90 dB	90.0	90.1	-1.0	1.0	0.1	0.60
Burst Meas. 90 dB	77.5	77.3	-2.0	2.0	-0.2	0.60
Ref. 80 dB	80.0	80.1	-1.0	1.0	0.1	0.60
Burst Meas. 80 dB	67.5	67.7	-2.0	2.0	0.2	0.60
Ref. 70 dB	70.0	70.1	-1.0	1.0	0.1	0.60
Burst Meas. 70 dB	57.5	57.8	-2.0	2.0	0.3	0.60

### Time Weighting, Response to a Continuous Sequence of Bursts, 100 Hz

The response of the sound level meter to sequences of repeated tonebursts when measuring time-weighted sound level is registered for various toneburst repetition frequencies. The peak level of the tonebursts is held constant for all the signals, and the toneburst response of the sound level meter is calculated as the maximum reading relative to the response of the sound level meter to a steady sinusoidal signal with the same peak voltage as the tonebursts. The responses are compared to the anticipated responses.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref. 130 dB	130.0	129.8	-1.0	1.0	-0.2	0.25
Burst Meas. 130 dB	127.1	127.1	-1.0	1.0	0.0	0.25
Ref. 120 dB	120.0	120.0	-1.0	1.0	0.0	0.25
Burst Meas. 120 dB	117.3	117.3	-1.0	1.0	0.0	0.25
Ref. 110 dB	110.0	110.1	-1.0	1.0	0.1	0.25
Burst Meas. 110 dB	107.4	107.3	-1.0	1.0	-0.1	0.25
Ref. 100 dB	100.0	100.1	-1.0	1.0	0.1	0.25
Burst Meas. 100 dB	97.4	97.3	-1.0	1.0	-0.1	0.25
Ref. 90 dB	90.0	90.1	-1.0	1.0	0.1	0.25

Burst Meas. 90 dB	87.4	87.4	-1.0	1.0	0.0	0.25
Ref. 80 dB	80.0	80.1	-1.0	1.0	0.1	0.25
Burst Meas. 80 dB	77.4	77.3	-1.0	1.0	-0.1	0.25
Ref. 70 dB	70.0	70.1	-1.0	1.0	0.1	0.25
Burst Meas. 70 dB	67.4	67.4	-1.0	1.0	0.0	0.25
Ref. 60 dB	60.0	60.2	-1.0	1.0	0.2	0.25
Burst Meas. 60 dB	57.5	57.5	-1.0	1.0	0.0	0.25

### Time Weighting, Response to a Continuous Sequence of Bursts, 20 Hz

The response of the sound level meter to sequences of repeated tonebursts when measuring time-weighted sound level is registered for various toneburst repetition frequencies. The peak level of the tonebursts is held constant for all the signals, and the toneburst response of the sound level meter is calculated as the maximum reading relative to the response of the sound level meter to a steady sinusoidal signal with the same peak voltage as the tonebursts. The responses are compared to the anticipated responses.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref. 130 dB	130.0	129.9	-1.0	1.0	-0.1	0.45
Burst Meas. 130 dB	122.3	122.2	-2.0	2.0	-0.1	0.45
Ref. 120 dB	120.0	120.0	-1.0	1.0	0.0	0.45
Burst Meas. 120 dB	112.4	112.2	-2.0	2.0	-0.2	0.45
Ref. 110 dB	110.0	110.0	-1.0	1.0	0.0	0.45
Burst Meas. 110 dB	102.4	102.2	-2.0	2.0	-0.2	0.45
Ref. 100 dB	100.0	100.1	-1.0	1.0	0.1	0.45
Burst Meas. 100 dB	92.5	92.5	-2.0	2.0	0.0	0.45
Ref. 90 dB	90.0	90.1	-1.0	1.0	0.1	0.45
Burst Meas. 90 dB	82.5	82.5	-2.0	2.0	0.0	0.45
Ref. 80 dB	80.0	80.1	-1.0	1.0	0.1	0.45
Burst Meas. 80 dB	72.5	72.6	-2.0	2.0	0.1	0.45
Ref. 70 dB	70.0	70.1	-1.0	1.0	0.1	0.45
Burst Meas. 70 dB	62.5	62.7	-2.0	2.0	0.2	0.45
Ref. 60 dB	60.0	60.2	-1.0	1.0	0.2	0.45
Burst Meas. 60 dB	52.6	52.4	-2.0	2.0	-0.2	0.45

### Time Weighting, Response to a Continuous Sequence of Bursts, 2 Hz

The response of the sound level meter to sequences of repeated tonebursts when measuring time-weighted sound level is registered for various toneburst repetition frequencies. The peak level of the tonebursts is held constant for all the signals, and the toneburst response of the sound level meter is calculated as the maximum reading relative to the response of the sound level meter to a steady sinusoidal signal with the same peak voltage as the tonebursts. The responses are compared to the anticipated responses.

Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
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	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Ref. 130 dB	130.0	129.8	-1.0	1.0	-0.2	0.45
Burst Meas. 130 dB	121.0	121.2	-2.0	2.0	0.2	0.45
Ref. 120 dB	120.0	120.0	-1.0	1.0	0.0	0.45
Burst Meas. 120 dB	111.2	111.0	-2.0	2.0	-0.2	0.45
Ref. 110 dB	110.0	110.0	-1.0	1.0	0.0	0.45
Burst Meas. 110 dB	101.2	100.9	-2.0	2.0	-0.3	0.45
Ref. 100 dB	100.0	100.1	-1.0	1.0	0.1	0.45
Burst Meas. 100 dB	91.3	91.3	-2.0	2.0	0.0	0.45
Ref. 90 dB	90.0	90.1	-1.0	1.0	0.1	0.45
Burst Meas. 90 dB	81.3	81.0	-2.0	2.0	-0.3	0.45
Ref. 80 dB	80.0	80.1	-1.0	1.0	0.1	0.45
Burst Meas. 80 dB	71.3	71.2	-2.0	2.0	-0.1	0.45
Ref. 70 dB	70.0	70.1	-1.0	1.0	0.1	0.45
Burst Meas. 70 dB	61.3	61.4	-2.0	2.0	0.1	0.45
Ref. 60 dB	60.0	60.2	-1.0	1.0	0.2	0.45
Burst Meas. 60 dB	51.4	51.7	-2.0	2.0	0.3	0.45

### Time Weighting, Peak

The peak level indication of the sound level meter when exposed to rectangular pulses of different duration is registered. The peak level indicated for a rectangular pulse of short duration is compared to the peak level indicated for a rectangular pulse of duration 10 ms. The measurements are carried out with both positive and negative going pulses. The peak level of the signal is 1 dB below the upper limit of the reference range.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Ref. POS	129.0	129.7	-2.0	2.0	0.7	0.09
Meas. POS	129.7	129.7	-2.0	2.0	0.0	0.09
Ref. NEG	129.0	129.7	-2.0	2.0	0.7	0.09
Meas. NEG	129.7	129.7	-2.0	2.0	0.0	0.09

### RMS Detector, Sine Burst, CF3

The response of the sound level meter to sequences of repeated tonebursts when measuring time-weighted sound level is registered for various toneburst durations of the individual tonebursts. The peak level is held constant for all the signals and the repetition frequency is 40 Hz i.e. different crest factors. The responses are compared to the anticipated responses.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Ref. 128 dB	128.0	127.8	-1.0	1.0	-0.2	0.25
Burst Meas. 128 dB	121.3	121.3	-0.5	0.5	0.0	0.25
Ref. 118 dB	118.0	118.0	-1.0	1.0	0.0	0.25
Burst Meas. 118 dB	111.5	111.5	-0.5	0.5	0.0	0.25

Ref. 108 dB	108.0	108.0	-1.0	1.0	0.0	0.25
Burst Meas. 108 dB	101.5	101.5	-0.5	0.5	0.0	0.25
Ref. 98 dB	98.0	98.1	-1.0	1.0	0.1	0.25
Burst Meas. 98 dB	91.6	91.5	-0.5	0.5	-0.1	0.25
Ref. 88 dB	88.0	88.1	-1.0	1.0	0.1	0.25
Burst Meas. 88 dB	81.6	81.5	-0.5	0.5	-0.1	0.25
Ref. 78 dB	78.0	78.1	-1.0	1.0	0.1	0.25
Burst Meas. 78 dB	71.6	71.6	-0.5	0.5	0.0	0.25
Ref. 68 dB	68.0	68.1	-1.0	1.0	0.1	0.25
Burst Meas. 68 dB	61.6	61.6	-0.5	0.5	0.0	0.25

### RMS Detector, Sine Burst, CF5

The response of the sound level meter to sequences of repeated tonebursts when measuring time-weighted sound level is registered for various toneburst durations of the individual tonebursts. The peak level is held constant for all the signals and the repetition frequency is 40 Hz i.e. different crest factors. The responses are compared to the anticipated responses.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Ref. 128 dB	128.0	127.8	-1.0	1.0	-0.2	0.25
Burst Meas. 128 dB	116.9	116.8	-1.0	1.0	-0.1	0.25
Ref. 118 dB	118.0	117.9	-1.0	1.0	-0.1	0.25
Burst Meas. 118 dB	107.0	106.9	-1.0	1.0	-0.1	0.25
Ref. 108 dB	108.0	108.0	-1.0	1.0	0.0	0.25
Burst Meas. 108 dB	97.1	97.3	-1.0	1.0	0.2	0.25
Ref. 98 dB	98.0	98.0	-1.0	1.0	0.0	0.25
Burst Meas. 98 dB	87.1	87.2	-1.0	1.0	0.1	0.25
Ref. 88 dB	88.0	88.0	-1.0	1.0	0.0	0.25
Burst Meas. 88 dB	77.1	77.4	-1.0	1.0	0.3	0.25
Ref. 78 dB	78.0	78.1	-1.0	1.0	0.1	0.25
Burst Meas. 78 dB	67.2	67.3	-1.0	1.0	0.1	0.25
Ref. 68 dB	68.0	68.1	-1.0	1.0	0.1	0.25
Burst Meas. 68 dB	57.2	57.2	-1.0	1.0	0.0	0.25

### RMS Detector, Sine Burst, CF10

The response of the sound level meter to sequences of repeated tonebursts when measuring time-weighted sound level is registered for various toneburst durations of the individual tonebursts. The peak level is held constant for all the signals and the repetition frequency is 40 Hz i.e. different crest factors. The responses are compared to the anticipated responses.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB SPL]	[dB SPL]	[dB]	[dB]	[dB]	[dB]
Ref. 128 dB	128.0	127.8	-1.0	1.0	-0.2	0.25
Burst Meas. 128 dB	110.9	110.9	-1.5	1.5	0.0	0.25

Ref. 118 dB	118.0	117.9	-1.0	1.0	-0.1	0.25
Burst Meas. 118 dB	101.0	101.1	-1.5	1.5	0.1	0.25
Ref. 108 dB	108.0	108.0	-1.0	1.0	0.0	0.25
Burst Meas. 108 dB	91.1	91.4	-1.5	1.5	0.3	0.25
Ref. 98 dB	98.0	98.0	-1.0	1.0	0.0	0.25
Burst Meas. 98 dB	81.1	81.4	-1.5	1.5	0.3	0.25
Ref. 88 dB	88.0	88.0	-1.0	1.0	0.0	0.25
Burst Meas. 88 dB	71.1	71.2	-1.5	1.5	0.1	0.25
Ref. 78 dB	78.0	78.1	-1.0	1.0	0.1	0.25
Burst Meas. 78 dB	61.2	61.0	-1.5	1.5	-0.2	0.25

### Time Averaging, Leq-SEL

The response of the sound level meter to sequences of repeated 4 kHz tonebursts when measuring time-average sound level or sound exposure level is registered for various toneburst repetition frequencies and durations of the individual tonebursts. The peak level of the tonebursts is adjusted so that the time-average level is constant for all the signals. The responses are compared to the anticipated responses.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB Leq]	[dB Leq]	[dB]	[dB]	[dB]	[dB]
Ref. Cont.	70.0	70.0	-1.0	1.0	0.0	0.20
Leq 1/10	70.0	69.9	-0.5	0.5	-0.1	0.20
SEL 1/10	87.8	87.7	-0.5	0.5	-0.1	0.20
Leq 1/100	70.0	70.2	-0.5	0.5	0.2	0.20
SEL 1/100	87.8	87.9	-0.5	0.5	0.1	0.20
Leq 1/1000	70.0	69.6	-1.0	1.0	-0.4	0.20
SEL 1/1000	87.8	87.3	-1.0	1.0	-0.5	0.20
Leq 1/10000	70.0	69.8	-1.0	1.0	-0.2	0.20
SEL 1/10000	94.8	94.6	-1.0	1.0	-0.2	0.20

### Pulse Range, Leq-SEL

The sound exposure level or time-average sound level reading of the sound level meter when exposed to single 4 kHz tonebursts superimposed on a low level steady 4 kHz signal is registered for various toneburst durations. The level of the low level signal is the minimum level of the reference range of the sound level meter, and the tonebursts are in phase with the low level signal. The toneburst responses are compared to their theoretical values calculated with the integration time used.

	Expected	Measured	Accept - Limit	Accept + Limit	Deviation	Uncertainty
	[dB Leq]	[dB Leq]	[dB]	[dB]	[dB]	[dB]
Ref. Cont.	110.0	109.9	-1.0	1.0	-0.1	0.25
Leq 1mS	62.4	62.4	-2.2	2.2	0.0	0.25
SEL 1mS	80.2	80.3	-2.2	2.2	0.1	0.25
Leq 10mS	72.1	72.1	-1.7	1.7	0.0	0.25
SEL 10mS	89.9	89.8	-1.7	1.7	-0.1	0.25
Leq 100mS	82.1	82.1	-1.7	1.7	0.0	0.25

SEL 100mS	99.9	99.9	-1.7	1.7	0.0	0.25
Leq 1S	92.1	92.1	-1.7	1.7	0.0	0.25
SEL 1S	109.9	109.9	-1.7	1.7	0.0	0.25

### Overload Indication, Sine Signals, Inverse A

The function of the overload detector of the sound level meter is verified with different voltage signals at levels around the limit of overload indication. A signal at a level corresponding to 5 dB below the maximum level of the sound level meter is applied starting at 1 kHz. The frequency of the signal is then lowered in 1/3-octave steps, and at the same time the level of the signal is increased so as to keep the same A-frequency-weighted level, until an overload is detected or the acceptance limits of the routine are exceeded.

	Expected [dB SPL]	Measured [dB SPL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
1000Hz	135.0	134.9	-1.0	1.0	-0.1	0.31
794.33Hz	134.9	134.9	-1.0	1.0	0.0	0.31
630.96Hz	134.9	134.9	-1.0	1.0	0.0	0.31
501.19Hz	134.9	134.8	-1.0	1.0	-0.1	0.31
398.11Hz	134.9	134.9	-1.0	1.0	0.0	0.31
316.23Hz	134.9	134.9	-1.0	1.0	0.0	0.31

### Overload Indication, 4kHz Tone burst

The function of the overload detector of the sound level meter is verified with different voltage signals at levels around the limit of overload indication. The applied signal is a 4-period 4 kHz tonebursts starting 5 dB below Lmax, the signal level is increased until an overload is detected or the acceptance limits of the routine are exceeded.

	Expected [dB SEL]	Measured [dB SEL]	Accept - Limit [dB]	Accept + Limit [dB]	Deviation [dB]	Uncertainty [dB]
Ref. 135 dB	105.0	105.4	-1.0	1.0	0.4	0.31
136dB.	106.4	106.7	-1.0	1.0	0.3	0.31
137dB.	107.4	107.8	-1.0	1.0	0.4	0.31
138dB.	108.4	108.1	-1.0	1.0	-0.3	0.31
139dB.	109.4	109.3	-1.0	1.0	-0.1	0.31
140dB.	110.4	110.8	-1.0	1.0	0.4	0.31
141dB.	111.4	111.7	-1.0	1.0	0.3	0.31

# CERTIFICATE OF CALIBRATION

\*\*\*DRAFT\*\*\* Certificate No: 19/

Page 23 of  
23

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