



Calibration Certificate

issued by an Accredited Laboratory

Certificate number
492770

Date of issue
2013-01-18

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Calibrated by
Ole F. Carlsen

Approved by
Ole F. Carlsen

Gert Schnipper

CUSTOMER: **SG AUDIO APS**
MARIENDALSVEJ 70, 2. TV.
2000 FREDERIKSBERG

DEVICE UNDER TEST: **ACOUSTIC MEASURING SYSTEM, SG AUDIO, 10EaZy Class 2**
Serial No.: 117091 - 580 ID No.: -
METECH No.: 330407
(MIO No.):

COMMISSION: Accredited Calibration

EXTENT OF CALIBRATION: IEC 61672-3 Electroacoustics - Sound level meters - Part 3: Periodic tests - 2007
Tolerances at. IEC 61672-1 Electroacoustics - Sound level meters - Part 1:
Specifications - 2003, Class 2 and vendor specifications

STATUS: No adjustment or repair has been made.

RESULT OF CALIBRATION: **All of the measurements are within the indicated tolerance with a coverage probability of 95%.**

DATE OF CALIBRATION: 2013-01-16
(yyyy-mm-dd)

DATE OF RECEIPT: 2013-01-16
(yyyy-mm-dd)

LOCATION OF CALIBRATION: Acoustics Laboratory, Lab. 227, 2630 Taastrup

AMBIENT CONDITIONS: Temperature: (23 ± 3) °C, Humidity: (50 ± 30) %rh

TRACEABILITY: The calibration is performed with equipment directly or indirectly traceable to the laboratory reference standards. The reference standards are traceable to national or international standards.

The measurement procedures and measurement equipment used have been selected to provide an uncertainty of measurement of less than a third of the specification and to ensure that the measurements are traceable to the International System of Units (SI), where possible. The uncertainty of measurement has been determined in accordance with EA Publication EA-4/02. In the assessment of compliance with specification the uncertainty of measurement has been taken into account. Any statement of compliance with specification is only valid at the tested points. The compliance with specification has been determined in accordance with ILAC publication ILAC-G8:03/2009. Laboratories are accredited by the Danish Accreditation and Metrology Fund – DANAK under the terms of Danish legislation. The accredited laboratory activities meet the requirements in ISO/IEC 17025. The Danish Accreditation and Metrology Fund – DANAK is one of the signatories to the Multilateral Agreements of the European co-operation for Accreditation (EA) and the International Laboratory Accreditation Cooperation (ILAC) for mutual recognition of calibration certificates and test reports. This calibration certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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Reference equipment

	ID No.	Cal. due
Multimeter, Hewlett Packard 3458A	D3228	2013-08-27
Signal Generator, Stanford Research Systems DS360	D3229	2013-08-22
Sound Calibrator, Brüel & Kjær 4231	D3208	2013-04-15

Uncertainty of measurement:

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/02.

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Compliance with specification:

If specification is indicated for a result (measurement), a note will appear.
The notes indicate how the results complies with the indicated specification.

The compliance evaluation applies for a coverage probability of approximately 95%.

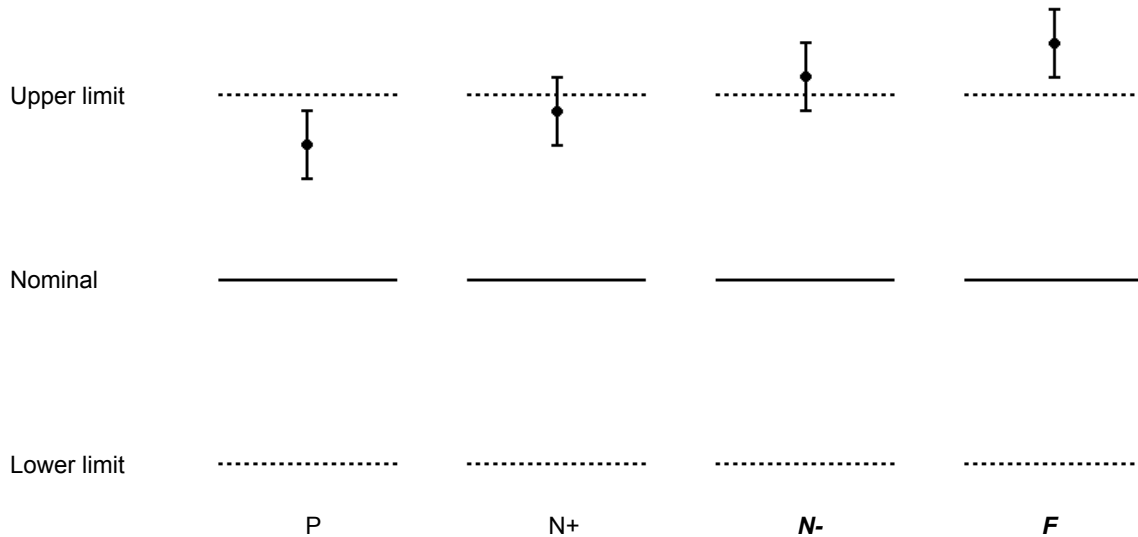
P Pass: The result extended with the expanded uncertainty is within the indicated specification.

N+ The result is within the indicated specification, but the result extended with the expanded uncertainty may exceed the indicated specification.

N- The result exceeds the indicated specification, but the result extended with the expanded uncertainty may be within the indicated specification.

F Fail: The result extended with the expanded uncertainty exceeds the indicated specification.

NE Test uncertainty ratio (TUR) is not sufficient to evaluate compliance with specification (Not Evaluated).



Words/abbreviations that may be used in the certificate/report:

NA:	<u>N</u> ot <u>A</u> vailable	ppm:	<u>p</u> arts <u>p</u> er <u>m</u> illion
UUT:	<u>U</u> nit <u>U</u> nder <u>T</u> est	TUR:	<u>T</u> est <u>U</u> ncertainty <u>R</u> atio
DUT:	<u>D</u> evice <u>U</u> nder <u>T</u> est	NCR:	<u>N</u> o <u>C</u> alibration <u>R</u> equired

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Measuring Conditions:

During the tests, signals are supplied the microphone input via a 18 pF input adaptor B&K type WA 0304.

Measurements of the frequency weightings include the frequency response of the microphone.

The system connected to 230V supply via a power adaptor.

If nothing else is stated the results are read on the sound level meters display.

Microphone: Cirrus type: MK 216 Serial no.: 117091
Premamplifier 10EaZy MV 220A Serial no.: 580
USB soundcard: 10EaZy Serial no.: 580
Software: 10EaZy Version 2.3.1 Build 10.01.13

Results:

0,1 Acoustical test at 1 kHz

Sensitivity adjustment	Nominal	Measured	Deviation	Uncertainty	± IEC-Tolerances
Before adjustment (as received)	93,9 dB	93,6 dB	-0,3	± 0,1 dB	0,7 dB P
After adjustment	93,9 dB	94,0 dB	0,1	± 0,1 dB	0,7 dB P

0,2 External Reference

	Nominal	Measured	Deviation	Uncertainty
After sensitivity adjustment	-26,0 dBV	-25,8 dBV	0,2	± 0,1 dBV

1 Frequency and time weighting at 1 kHz

Frequency W Time W	Nominal	Indication	Deviation	Uncertainty	± IEC-Tolerances
A Fast	94,0 dB	94,0 dB	Ref.		Ref.
A Slow	94,0 dB	94,0 dB	0,0	± 0,1 dB	0,3 dB P
A Leq1min	94,0 dB	94,0 dB	0,0	± 0,1 dB	0,3 dB P
C Fast	94,0 dB	94,0 dB	0,0	± 0,1 dB	0,4 dB P

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2 Level Linearity

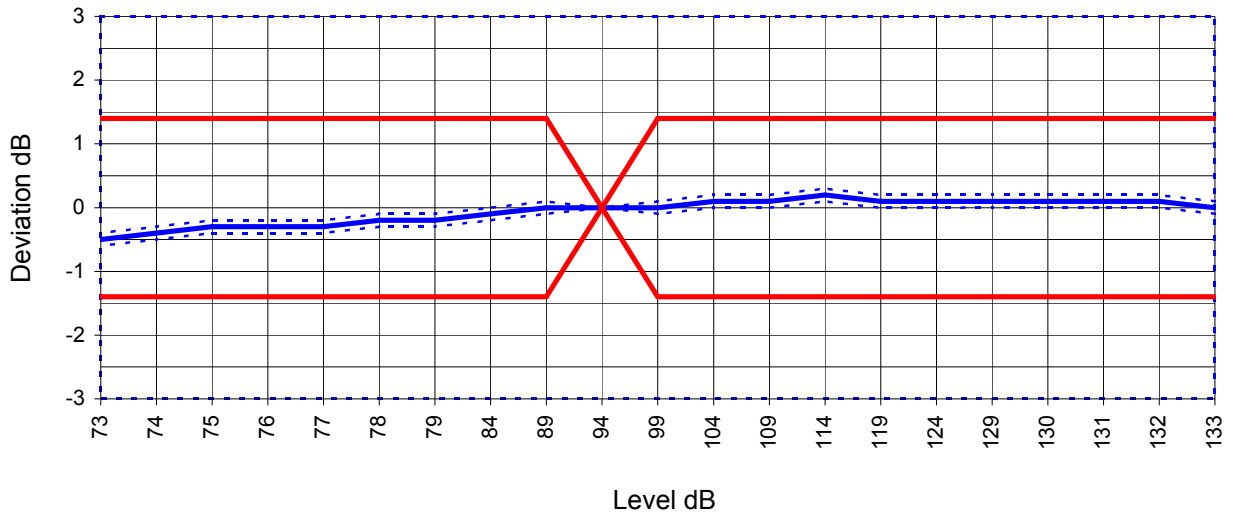
Conditions:

Method: Reading of display / dial

Measuring range: 133 dB FSD

Weighting filter: A

Time weighting: F



Frequency	Nominal	Indication	Deviation	Uncertainty	± IEC-Tolerances
8k Hz	133,0 dB	132,7 dB	0,0	± 0,1 dB	1,4 dB P
8k Hz	132,0 dB	131,8 dB	0,1	± 0,1 dB	1,4 dB P
8k Hz	131,0 dB	130,8 dB	0,1	± 0,1 dB	1,4 dB P
8k Hz	130,0 dB	129,8 dB	0,1	± 0,1 dB	1,4 dB P
8k Hz	129,0 dB	128,8 dB	0,1	± 0,1 dB	1,4 dB P
8k Hz	124,0 dB	123,8 dB	0,1	± 0,1 dB	1,4 dB P
8k Hz	119,0 dB	118,8 dB	0,1	± 0,1 dB	1,4 dB P
8k Hz	114,0 dB	113,9 dB	0,2	± 0,1 dB	1,4 dB P
8k Hz	109,0 dB	108,8 dB	0,1	± 0,1 dB	1,4 dB P
8k Hz	104,0 dB	103,8 dB	0,1	± 0,1 dB	1,4 dB P
8k Hz	99,0 dB	98,7 dB	0,0	± 0,1 dB	1,4 dB P
8k Hz	94,0 dB	93,7 dB	Ref.		
8k Hz	89,0 dB	88,7 dB	0,0	± 0,1 dB	1,4 dB P
8k Hz	84,0 dB	83,6 dB	-0,1	± 0,1 dB	1,4 dB P
8k Hz	79,0 dB	78,5 dB	-0,2	± 0,1 dB	1,4 dB P
8k Hz	78,0 dB	77,5 dB	-0,2	± 0,1 dB	1,4 dB P
8k Hz	77,0 dB	76,4 dB	-0,3	± 0,1 dB	1,4 dB P
8k Hz	76,0 dB	75,4 dB	-0,3	± 0,1 dB	1,4 dB P
8k Hz	75,0 dB	74,4 dB	-0,3	± 0,1 dB	1,4 dB P
8k Hz	74,0 dB	73,3 dB	-0,4	± 0,1 dB	1,4 dB P
8k Hz	73,0 dB	72,2 dB	-0,5	± 0,1 dB	1,4 dB P

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3 Frequency Weighting

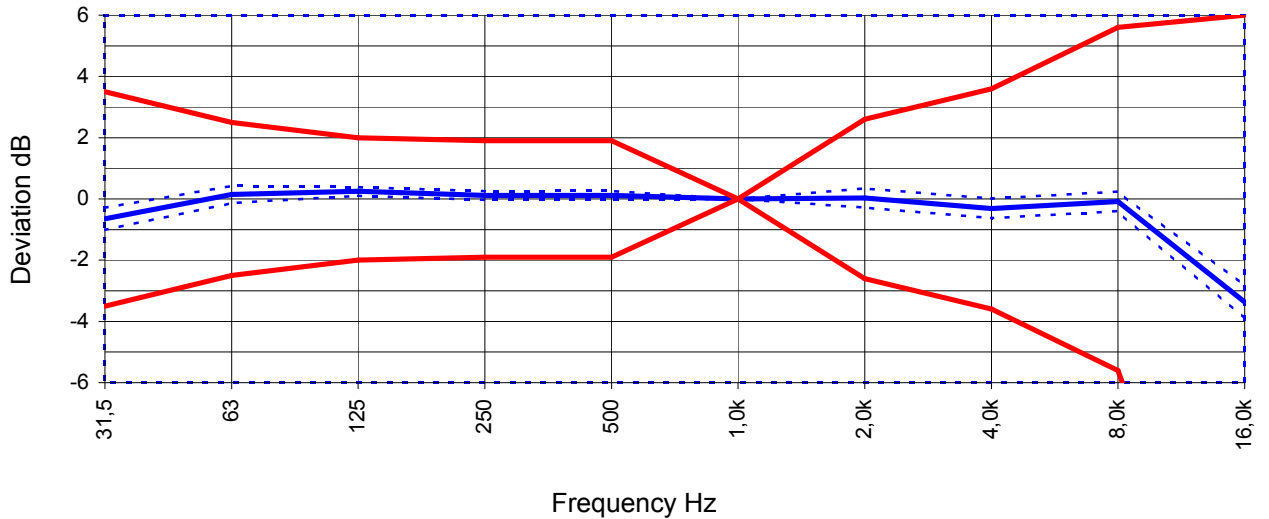
Conditions:

Method: Reading of Display / Dial

Measuring range: 133 dB FSD

Weighting filter: A

Time weighting: F



Frequency	Nominal	Measured	Deviation	Uncertainty	IEC-Tolerances
31,5 Hz	94,0 dB	93,2 dB	-0,6	± 0,4 dB	3,5 / 3,5 dB P
63 Hz	94,0 dB	94,0 dB	0,2	± 0,3 dB	2,5 / 2,5 dB P
125 Hz	94,0 dB	94,1 dB	0,3	± 0,1 dB	2,0 / 2,0 dB P
250 Hz	94,0 dB	94,0 dB	0,1	± 0,1 dB	1,9 / 1,9 dB P
500 Hz	94,0 dB	94,0 dB	0,1	± 0,1 dB	1,9 / 1,9 dB P
1,0k Hz	94,0 dB	93,9 dB	Ref.		Ref.
2,0k Hz	94,0 dB	93,9 dB	0,0	± 0,3 dB	2,6 / 2,6 dB P
4,0k Hz	94,0 dB	93,6 dB	-0,3	± 0,3 dB	3,6 / 3,6 dB P
8,0k Hz	94,0 dB	93,8 dB	-0,1	± 0,3 dB	5,6 / 5,6 dB P
16,0k Hz	94,0 dB	90,5 dB	-3,4	± 0,5 dB	~ / 6,0 dB P

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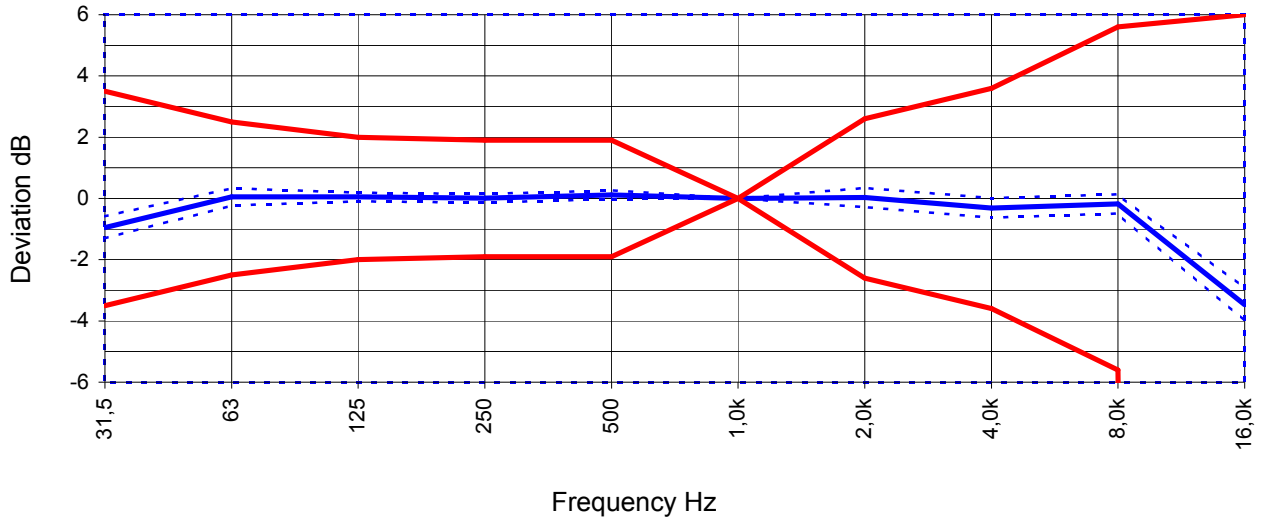
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Conditions:
 Method: Reading of Display / Dial
 Measuring range: 133 dB FSD
 Weighting filter: C
 Time weighting: Leq,1min



Frequency	Nominal	Measured	Deviation	Uncertainty	IEC-Tolerances
31,5 Hz	94,0 dB	93,1 dB	-1,0	± 0,4 dB	3,5 / 3,5 dB P
63 Hz	94,0 dB	94,1 dB	0,1	± 0,3 dB	2,5 / 2,5 dB P
125 Hz	94,0 dB	94,1 dB	0,1	± 0,1 dB	2,0 / 2,0 dB P
250 Hz	94,0 dB	94,0 dB	0,0	± 0,1 dB	1,9 / 1,9 dB P
500 Hz	94,0 dB	94,1 dB	0,1	± 0,1 dB	1,9 / 1,9 dB P
1,0k Hz	94,0 dB	94,0 dB	Ref.		Ref.
2,0k Hz	94,0 dB	94,0 dB	0,0	± 0,3 dB	2,6 / 2,6 dB P
4,0k Hz	94,0 dB	93,7 dB	-0,3	± 0,3 dB	3,6 / 3,6 dB P
8,0k Hz	94,0 dB	93,8 dB	-0,2	± 0,3 dB	5,6 / 5,6 dB P
16,0k Hz	94,0 dB	90,5 dB	-3,5	± 0,5 dB	~ / 6,0 dB P

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4 Time Weighting

Indicaton	Burst duration ms	Nominal	Measured	Deviation	Uncertainty	± IEC-Tolerances
Fast = F	200	129,0 dB	129,0 dB	0,0	± 0,1 dB	-1,3 / 1,3 dB P
Fast = F	2	112,0 dB	112,0 dB	0,0	± 0,1 dB	-2,8 / 1,3 dB P
Fast = F	0,25	103,0 dB	102,9 dB	-0,1	± 0,1 dB	-5,3 / 1,8 dB P
Slow = S	200	122,6 dB	122,6 dB	0,0	± 0,1 dB	-1,3 / 1,3 dB P
Slow = S	2	103,0 dB	103,0 dB	0,0	± 0,1 dB	-5,3 / 1,3 dB P

Indicaton	Burst duration ms	Nominal	Measured	Deviation	Uncertainty	± IEC-Tolerances
$L_E (L_{eq1min+17,8}dB)$	200	123,0 dB	123,0 dB	0,0	± 0,1 dB	-1,3 / 1,3 dB P
$L_E (L_{eq1min+17,8}dB)$	2	103,0 dB	103,0 dB	0,0	± 0,1 dB	-2,8 / 1,3 dB P
$L_E (L_{eq1min+17,8}dB)$	0,25	94,0 dB	93,9 dB	-0,1	± 0,1 dB	-5,3 / 1,8 dB P

5 Peak Indikation

Frequency (Hz)	Burst periodes	Nominal	Measured	Deviation	Uncertainty	± IEC-Tolerances
8000	1	131,4 dB	131,5 dB	0,1	± 0,1 dB	3,4 dB P
500	0.5 positive	130,4 dB	129,8 dB	-0,6	± 0,1 dB	3,4 dB P
500	0.5 negative	130,4 dB	129,7 dB	-0,7	± 0,1 dB	3,4 dB P

6 Overload Indication

	Nominal	Measured	Difference	Uncertainty	± IEC-Tolerances
Positive overload indication	135,0 dB*	135,4 dB*		± 0,1 dB	
Negative overload indication	135,0 dB*	135,2 dB*		± 0,1 dB	
Difference between positive and negative overload indication			0,2	± 0,2 dB	3,0 dB P

dB*=dB re 1µV

7 Residual Noise

Indicaton	Measured	Uncertainty	Tolerances
A-weighted noise with microphone	60,7 dB	± 0,5 dB	~/ 63,0 dB P
A-weighted electrical noise	60,6 dB	± 0,5 dB	~/ 63,0 dB P
C-weighted electrical noise	59,9 dB	± 0,5 dB	~/ 63,0 dB P

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