

校准证书

CALIBRATION CERTIFICATE



证书编号: JL2501133081

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客户名称 : 信恒检测技术(深圳)有限公司 BTF Testing Lab (Shenzhen) Co., Ltd.
Name of Customer
客户地址 : 广东省深圳市宝安区松岗街道潭头社区潭头工业城二区 1 栋厂房 101、201、301
Address of Customer F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community,
计量器具名称 : Head and Torso Simulator 头部躯干模拟器
Name of Instrument
型号/规格 : Type 4128C
Type/Specification
出厂编号 : 3107080
Serial No
资产编号 : BTF-EM-148
Asset No
制造单位 : B&K
Manufacture
校准依据 : JJF1520-2015 声学用头和躯干模拟器校准规范
Calibrated in Accordance to

(校准专用章)
Stamp

批准人 : 张瑞纹
Approved by

签名 : 张瑞纹
Signature

核验员 : 胡琴
Checked by

校准员 : 龙晓峰
Calibrated by

校准日期 : 2025 年 02 月 11 日
Operation Date Year Month Day

建议复校日期: --- 年 -- 月 -- 日
Suggested Recal.Date Year Month Day

签发日期 : 2025 年 02 月 11 日
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National Digital Electronic Product Testing Center (NETC)
国家营养食品质量检验检测中心(广东)
National Nutrition Food Testing Center (Guangdong)
国家体育用品质量检验检测中心(广东)
National Sports Product Testing Center (Guangdong)
国家环保产品质量检验检测中心(广东)
National Environmental Product Testing Center (Guangdong)
国家分布式光伏发电系统质量检验检测中心(广东)
National Distributed Photovoltaic Power Generation System Testing Center (Guangdong)
国家电动汽车电池及充电系统产业计量测试中心
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国家民用无人机产品质量检验检测中心(广东)
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National Metrology and Testing Center for Medical Device Industry
国家计量数据科学中心深圳分中心
National Metrology Data Science Center (Shenzhen)
国家城市能源计量中心(深圳)
National Urban Energy Measurement Center (Shenzhen)
中国轻工业联合会家具质量监督检测深圳站
Accredited Testing Station (Shenzhen) for Furniture by China National Light Industry Council (CNLIC)
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广东省质量监督学生用品检验站(深圳)
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Guangdong Quality Supervision and Inspection Institution for Safety Performance of Environmental Protection and Energy Saving Products (Shenzhen)
广东省质量监督眼镜检验站(深圳)
Guangdong Quality Supervision and Inspection Institution for Eyewear Products (Shenzhen)
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深圳市纤维纺织检验所
Shenzhen Quality Inspection Institution for Fiber and Textile
深圳市建材产品质量监督检验站
Shenzhen Quality Supervision and Inspection Institution for Building Materials
深圳市消防产品燃烧性能检测中心
Shenzhen Testing Center for Burning Behavior of Fire Protection Products

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校准用主要计量标准装置信息

Main Standard Devices Used

名称 Equipment Name	测量范围 Measuring Range	不确定度/准确度等级/ 最大允许误差 Uncertainty/Accuracy Class/ Maximum Permissible Error	计量标准考核证书号 Certificate No	有效期至 Due Date

校准用主要标准器信息

Main Standards of Measurement Used

名称 Equipment Name	测量范围 Measuring Range	不确定度/准确度等级/ 最大允许误差 Uncertainty/Accuracy Class/ Maximum Permissible Error	设备编号 Equipment No	有效期至 Due Date	溯源单位/ 证书号 Traceability to/ Certificate No
标准传声器	(20~20k)Hz	声压级 $U=0.2\text{dB}, k=2$	SB3979/01	2025-11-21	
声学振动测试前端 (含软件)	0.5Hz~50kHz	MPE: $\pm 0.01\%$	SB11219	2025-06-18	

附加说明

Appended Directions

委托日期:
Application Date

2025 年 02 月 06 日

环境条件:

Operation Environment

温度 22°C 相对湿度 53%

校准地点:
Operation Location

本院声学龙珠实验室

校准项目/参数说明:
Items Instructions

本次校准根据委托方要求实施, 校准项目/参数详见校准结果

符合性及限制使用说明:
Statement of Compliance and Limitation

参见校准结果使用(Use referring to the results of Calibration)

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1 外观检查: 符合要求。

Appearance Check: Pass.

2 灵敏度 (参考频率: 1000 Hz): 见表1

Sensitivity of Ear Simulator(Ref. Freq:1000 Hz): See Table 1

表 1 Table 1

通道 Channel	传声器型号 Type	传声器编号 No.	灵敏度 (mV/Pa) Sensitivity
L通道	/	/	11.6
R通道	/	/	11.5

3 耳自由场频率响应(声源位于正前方1.0 m处):

Frequency Response of Ear Simulator (The distance is 1m) : See Table 2

表 2 Table 2

频率 Frequency	左耳频响 F.R.of Left	右耳频响 F.R.of Right	允许范围 M.P.E.
(Hz)	(dB)	(dB)	(dB)
100	-0.4	-0.1	+1.0 ~ -1.0
125	-0.4	0.6	+1.0 ~ -1.0
160	-0.8	0.2	+1.0 ~ -1.5
200	-0.9	-0.8	+1.0 ~ -1.5
250	-0.9	0.0	+1.5 ~ -1.0
315	-0.4	-0.1	+2.0 ~ -0.5
400	0.1	0.7	+2.5 ~ 0.0
500	1.0	2.1	+3.5 ~ +1.0
630	2.2	2.7	+4.0 ~ +1.5
800	2.5	3.2	+6.0 ~ +2.5
1000	3.8	4.1	+5.5 ~ +2.0
1250	1.9	2.2	+6.0 ~ +0.5

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1600	4.1	4.1	+7.0 ~ +2.0
2000	9.8	10.0	+13.5 ~ +9.0
2500	14.6	15.9	+19.5 ~ +14.5
3150	15.6	17.3	+20.5 ~ +13.5
4000	12.6	14.0	+18.0 ~ +12.0
5000	8.5	10.3	+15.5 ~ +8.5
6300	6.3	7.7	+9.0 ~ +2.5
8000	1.0	1.1	+11.0 ~ -1.0
10000	5.4	6.4	+10.0 ~ +0.5

4 耳指向性:
Ear directivity

4.1耳指向性0°:
Ear directivity of 0 ° : See Table 3

表 3 Table 3

频率 Frequency	左耳频响 F.R.of Left	右耳频响 F.R.of Right
(Hz)	(dB)	(dB)
100	61.3	61.6
125	63.4	64.4
160	59.4	60.5
200	57.5	57.7
250	56.0	56.9
315	56.7	57.0
400	55.7	56.4
500	58.2	59.3
630	59.0	59.4
800	62.5	63.2
1000	63.7	64.0
1250	61.6	61.9
1600	64.8	64.9
2000	71.8	72.1

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2500	76.8	78.2
3150	82.2	83.9
4000	75.1	76.6
5000	71.9	73.8
6300	75.3	76.6
8000	57.9	58.0
10000	58.8	59.7

4.2耳指向性90°:

Ear directivity of 90 ° : See Table 4

表 4 Table 4

频率 Frequency	左耳频响 F.R.of Left	右耳频响 F.R.of Right
(Hz)	(dB)	(dB)
100	61.7	60.2
125	64.0	63.0
160	62.0	59.6
200	60.2	58.0
250	59.1	57.4
315	59.6	55.1
400	59.6	53.8
500	63.1	58.7
630	63.1	58.2
800	67.3	62.2
1000	68.1	60.4
1250	66.4	61.7
1600	68.9	63.8
2000	73.7	67.9
2500	78.7	70.5
3150	82.9	74.3
4000	75.1	65.2
5000	80.8	57.0
6300	85.4	59.8

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8000	73.0	48.8
10000	66.9	49.0

4.3耳指向性180°:
Ear directivity of 180 ° : See Table 5

表 5 Table 5

频率 Frequency	左耳频响 F.R.of Left	右耳频响 F.R.of Right
(Hz)	(dB)	(dB)
100	61.2	62.3
125	63.8	64.0
160	60.4	60.5
200	57.7	58.8
250	56.8	57.1
315	55.5	56.6
400	54.9	55.5
500	58.8	59.1
630	58.4	59.4
800	62.6	62.9
1000	64.2	64.4
1250	63.3	63.6
1600	65.2	65.3
2000	70.3	70.3
2500	74.8	75.9
3150	79.1	81.6
4000	72.0	73.9
5000	68.7	68.9
6300	71.5	71.5
8000	58.2	58.0
10000	56.6	57.7

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4.4耳指向性270°:

Ear directivity of 270 ° : See Table 6

表 6 Table 6

频率 Frequency	左耳频响 F.R.of Left	右耳频响 F.R.of Right
(Hz)	(dB)	(dB)
100	61.4	64.5
125	63.1	65.2
160	58.8	62.4
200	56.7	60.0
250	56.4	59.2
315	54.1	59.8
400	53.0	59.8
500	57.9	63.6
630	57.4	63.6
800	62.2	67.9
1000	60.1	68.0
1250	61.6	66.8
1600	64.3	68.9
2000	68.3	73.6
2500	69.9	79.7
3150	73.0	85.2
4000	64.7	77.2
5000	56.4	81.8
6300	60.5	86.2
8000	49.5	73.0
10000	48.7	68.4

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5 嘴参考点处的幅频特性:
Frequency Response of MPR: See Table 7

表 7 Table 7

频率 Frequency	声压级 SPL
(Hz)	(dB)
100	50.2
125	55.9
160	61.3
200	65.7
250	67.4
315	66.2
400	64.3
500	63.7
630	63.1
800	62.4
1000	63.3
1250	64.6
1600	67.7
2000	66.5
2500	60.8
3150	58.9
4000	58.9
5000	57.2
6300	60.7
8000	58.4
10000	57.3

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6 嘴参考点处的失真:
THD of MPR: See Table 8

表 8 Table 8

频率 Frequency	失真 THD
(Hz)	(%)
100	9.60
125	6.30
160	2.75
200	1.22
250	1.15
315	1.46
400	1.61
500	2.67
630	3.45
800	2.61
1000	2.01
1250	1.72
1600	1.12
2000	1.72
2500	2.13
3150	3.64
4000	1.42
5000	3.20
6300	1.30
8000	0.50
10000	0.60

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7 嘴自由场幅频特性（传声器位于嘴前0.5 m）：
Amplitude-frequency characteristics: See Table 9

表 9 Table 9

频率 Frequency	声压级 SPL
(Hz)	(dB)
100	41.0
125	45.2
160	51.7
200	55.9
250	58.4
315	56.6
400	54.8
500	56.6
630	54.5
800	50.7
1000	52.9
1250	54.9
1600	59.8
2000	59.6
2500	53.1
3150	51.5
4000	51.8
5000	52.2
6300	55.0
8000	54.2
10000	51.3

附注：
Notes:

1. 参考频率声压级测量结果扩展不确定度：
Related Expanded Uncertainty of Sound Pressure Level at Reference Frequency:

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$U=1.0\text{ dB}$, $k=2$ (20 Hz ~ 200 Hz) ;
 $U=0.8\text{ dB}$, $k=2$ (250 Hz ~ 400 Hz) ;
 $U=0.6\text{ dB}$, $k=2$ (500 Hz ~ 1.25 kHz) ;
 $U=1.0\text{ dB}$, $k=2$ (1.6 kHz ~ 10 kHz) 。
 $U=1.2\text{ dB}$, $k=2$ (12.5 kHz ~ 20 kHz) 。

2. 失真测量结果扩展不确定度:

Relative Expanded Uncertainty of Distortion:

$U_{\text{rel}}=0.5\%$, $k=2$ (0.05%~30%, 20 Hz ~ 20 kHz) 。

3. 本证书中给出的测量不确定度依据 JJF 1059.1-2012 《测量不确定度评与表示》评定

The uncertainty given in this certificate is evaluated according to JJF 1059.1-2012 *Evaluation and Expression of Uncertainty in Measurement*.

校准证书

CALIBRATION CERTIFICATE



证书编号: JL2501133071

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客户名称 : 信恒检测技术(深圳)有限公司 BTF Testing Lab (Shenzhen) Co., Ltd.
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客户地址 : 广东省深圳市宝安区松岗街道潭头社区潭头工业城二区 1 栋厂房 101、201、301
Address of Customer F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community,
计量器具名称 : Conditioning Amplifier 调节放大器
Name of Instrument
型号/规格 : Type-2690-030
Type/Specification
出厂编号 : 2673666
Serial No
资产编号 : BTF-EM-146
Asset No
制造单位 : Brule&Kjaer
Manufacture
校准依据 : JJF1157-2006 测量放大器校准规范
Calibrated in Accordance to

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Stamp

批准人 : 张瑞纹
Approved by

签名 : 张瑞纹
Signature

核验员 : 胡琴
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重 要 声 明

Important statement

1. 本院(站)是由深圳市人民政府依据《中华人民共和国计量法》设置并由国家市场监督管理总局、广东省市场监督管理局依法授权的法定计量检定机构。
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To ensure that the calibrated object is properly used under given conditions in compliance with technical specifications or regulations, recalibrate before the suggested date (Applicable to calibration report only).
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Shenzhen Testing Center for Burning Behavior of Fire Protection Products

联系方式 Contact Information

联系电话 Contact Tel.: 0755-26941696 26941546(龙珠) 27591789(宝安) 82426246(八卦岭) 28932280(龙岗) 0769-21684525(东莞)
传真电话 Fax No.: 0755-27591716(宝安) 82408176(八卦岭) 28932840(龙岗) 0769-21684527(东莞)
投诉及证书/报告真伪查询电话 Complaint Tel.: 400-900-8999 按5 Email: complaint@smq.com.cn

校准证书

CALIBRATION CERTIFICATE

证书编号: JL2501133071
Certificate No

第 2 页, 共 6 页
Page 2 of 6 Pages

校准用主要计量标准装置信息

Main Standard Devices Used

名称 Equipment Name	测量范围 Measuring Range	不确定度/准确度等级/ 最大允许误差 Uncertainty/Accuracy Class/ Maximum Permissible Error	计量标准考核证书号 Certificate No	有效期至 Due Date
_____	_____	_____	_____	_____

校准用主要标准器信息

Main Standards of Measurement Used

名称 Equipment Name	测量范围 Measuring Range	不确定度/准确度等级/ 最大允许误差 Uncertainty/Accuracy Class/ Maximum Permissible Error	设备编号 Equipment No	有效期至 Due Date	溯源单位/ 证书号 Traceability to/ Certificate No
动态信号分析仪	DC~51.2kHz	电平 $\pm 0.01\text{dB}$	SB11219	2025-06-02	
数字万用表	1 MHz, 1 kV	$U_{\text{rel}} = 0.01\%$, $k = 2$	SB0425	2025-06-03	
函数发生器	80 MHz	平坦度优于 0.1dB	SB5260	2025-08-29	

附加说明

Appended Directions

委托日期:
Application Date

2025 年 02 月 06 日

环境条件:

Operation Environment

温度 20.5°C 相对湿度 52%

校准地点:
Operation Location

本院声学龙珠实验室

校准项目/参数说明:
Items Instructions

本次校准根据委托方要求实施, 校准项目/参数详见校准结果

符合性及限制使用说明:
Statement of Compliance and Limitation

参见校准结果使用(Use referring to the results of Calibration)

校准结果

RESULTS OF CALIBRATION

证书编号: JL2501133071
Certificate No

第 3 页, 共 6 页
Page 3 of 6 Pages

1 外观检查: 符合要求
Appearance Check: Pass.

2 频率响应特性 (参考频率: 1000 Hz): 见表1
Frequency Response(Ref. 1000 Hz):See Table 1

表1 Table 1

频率 Frequency	频率响应 Frequency Response		最大允许范围 Limit
(Hz)	(dB)	(dB)	(dB)
	CH1	CH2	
20	-0.02	-0.03	±0.2
31.5	-0.01	-0.02	±0.2
63	0.00	-0.01	±0.2
125	0.00	0.00	±0.2
250	0.00	0.00	±0.2
500	0.00	0.00	±0.2
1000	0.0 (ref)	0.0 (ref)	±0.2
2000	0.00	0.00	±0.2
4000	0.00	0.00	±0.2
8000	0.00	-0.01	±0.2
12500	0.00	0.00	±0.2
16000	+0.01	0.01	±0.2
20000	+0.02	+0.02	±0.2

校准结果

RESULTS OF CALIBRATION

证书编号: JL2501133071
Certificate No.

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Page 4 of 6 Pages

3 总谐波失真: 见表2
THD: See Table 2

表2 Table 2

频率标称值 Freq. Nominal Value	总谐波失真 THD		最大允许范围 M.P.R.
(Hz)	(%)		(%)
	CH1	CH2	
63	0.054	0.065	≤0.3
125	0.056	0.058	≤0.3
250	0.069	0.053	≤0.3
500	0.052	0.053	≤0.3
1000	0.054	0.054	≤0.1
2000	0.053	0.055	≤0.3
4000	0.054	0.057	≤0.3
8000	0.054	0.055	≤0.3
12500	0.055	0.054	≤0.3
16000	0.054	0.057	≤0.3
20000	0.057	0.054	≤0.3

校准结果

RESULTS OF CALIBRATION

4 增益控制偏差 (1 kHz): 见表3、表4
Gain Indication Error: See Table 3 and Table 4

CH1 表3 Table 3

增益档 Gain	增益标称值 Gain Indi.Value	增益实测值 Gain Meas. Value	误差 Error	最大允许误差 M.P.E.
(mV/Pa)	dB	dB	dB	dB
10	-20	-19.99	0.01	±0.1
31.6	-10	-10.00	0.00	±0.1
100	0	0.00	0.00	±0.1
316	10	10.00	0.00	±0.1
(V/Pa)	dB	dB	dB	dB
1	20	20.00	0.00	±0.1
3.16	30	30.00	0.00	±0.1
10	40	40.00	0.00	±0.1
31.6	50	50.01	0.01	±0.1

CH2 表4 Table 4

增益档 Gain	增益标称值 Gain Indi.Value	增益实测值 Gain Meas. Value	误差 Error	最大允许误差 M.P.E.
(mV/Pa)	dB	dB	dB	dB
10	-20	-19.99	0.01	±0.1
31.6	-10	-10.00	0.00	±0.1
100	0	0.00	0.00	±0.1
316	10	10.00	0.00	±0.1
(V/Pa)	dB	dB	dB	dB
1	20	20.00	0.00	±0.1
3.16	30	30.00	0.00	±0.1
10	40	40.00	0.00	±0.1
31.6	50	50.01	0.01	±0.1

校准结果

RESULTS OF CALIBRATION

证书编号: JL2501133071

Certificate No

第 6 页, 共 6 页

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附注:

Notes:

1. 电压测量结果扩展不确定度: $U_{\text{rel}} = 0.1\%, k = 2$

Relative Expanded Uncertainty of Voltage: $U_{\text{rel}} = 0.1\%, k = 2$

2. 失真测量结果扩展不确定度: $U_{\text{rel}} = 1.8\%, k = 2$

Relative Expanded Uncertainty of Distortion: $U_{\text{rel}} = 1.8\%, k = 2$

3. 本证书中给出的测量不确定度依据 JJF 1059.1-2012 《测量不确定度评与表示》评定

The uncertainty given in this certificate is evaluated according to JJF 1059.1-2012 *Evaluation and Expression of Uncertainty in Measurement*.

校准证书

CALIBRATION CERTIFICATE



证书编号: JL2501133061

第 1 页, 共 4 页

Page 1 of 4 Pages

客户名称 : 信恒检测技术(深圳)有限公司 BTF Testing Lab (Shenzhen) Co., Ltd.
Name of Customer
客户地址 : 广东省深圳市宝安区松岗街道潭头社区潭头工业城二区 1 栋厂房 101、201、301
Address of Customer F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community,
计量器具名称 : Sound Calibrator 声音校准器
Name of Instrument
型号/规格 : 4231
Type/Specification
出厂编号 : 3010778
Serial No
资产编号 : BTF-EM-149
Asset No
制造单位 : 丹麦 BK 公司
Manufacture
校准依据 : JJG 176-2022 声校准器
Calibrated in Accordance to

(校准专用章)
Stamp

批准人 : 张瑞纹
Approved by

签名 : 张瑞纹
Signature

核验员 : 龙晓峰
Checked by

校准员 : 胡琴
Calibrated by

校准日期 : 2025 年 02 月 08 日
Operation Date Year Month Day

建议复校日期: --- 年 -- 月 -- 日
Suggested Recal.Date Year Month Day

签发日期 : 2025 年 02 月 11 日
Issue Date Year Month Day

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重 要 声 明

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深圳市纤维纺织检验所
Shenzhen Quality Inspection Institution for Fiber and Textile
深圳市建材产品质量监督检验站
Shenzhen Quality Supervision and Inspection Institution for Building Materials
深圳市消防产品燃烧性能检测中心
Shenzhen Testing Center for Burning Behavior of Fire Protection Products

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校准证书

CALIBRATION CERTIFICATE

证书编号: JL2501133061
Certificate No

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校准用主要计量标准装置信息

Main Standard Devices Used

名称 Equipment Name	测量范围 Measuring Range	不确定度/准确度等级/ 最大允许误差 Uncertainty/Accuracy Class/ Maximum Permissible Error	计量标准考核证书号 Certificate No	有效期至 Due Date
_____	_____	_____	_____	_____

校准用主要标准器信息

Main Standards of Measurement Used

名称 Equipment Name	测量范围 Measuring Range	不确定度/准确度等级/ 最大允许误差 Uncertainty/Accuracy Class/ Maximum Permissible Error	设备编号 Equipment No	有效期至 Due Date	溯源单位/ 证书号 Traceability to/ Certificate No
多通道声分析仪	10Hz~20kHz	声压级 $U=(0.3\sim1.0)$ dB, $k=2$	SB3979	2025-05-13	
活塞发声器	250Hz, 124dB	LS 级	SB5198	2025-12-23	
实验室标准传声器	10Hz~25 kHz	$U=(0.05\sim0.20)$ dB, $k=2$	SB5199	2026-01-06	

附加说明

Appended Directions

委托日期:
Application Date

2025 年 02 月 06 日

环境条件:

Operation Environment

温度 20.7°C 相对湿度 51.7%

校准地点:

Operation Location

本院声学龙珠实验室

校准项目/参数说明:

Items Instructions

本次校准根据委托方要求实施, 校准项目/参数详见校准结果

符合性及限制使用说明:

Statement of Compliance and Limitation

所校准项目(或量值)合格(Passed at Calibration Items)

备注:

Remark

计量器具经本次校准的量值符合客户提供的技术指标/校准规范/检定规程/计量器具技术说明书提供的判断依据(准确度等级、最大允许误差限等)要求。

校准结果

RESULTS OF CALIBRATION

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1 外观检查: 正常
Appearance Inspection : Pass.

2 声压级: 见表1
Sound Pressure Level: See Table 1

表1 Table 1

频率标称值 Nominal Freq	声压级标称值 Nominal SPL	声压级实测值 Measured SPL	误差 Error	最大允许误差 MPE
(Hz)	(dB)	(dB)	(dB)	(dB)
1000.00	94.00	93.97	-0.03	±0.25 (1级)
1000.00	114.00	113.97	-0.03	±0.25 (1级)

3 频率: 见表2
Frequency: see Table 2

表2 Table 2

频率标称值 Nominal Freq.	频率实测值 Measured Freq.	误差 Error	最大允许误差 MPE
(Hz)	(Hz)	(%)	(%)
1000.0	1000.0	0.0	±0.7 (1级)

4 总失真+噪声: 见表3
THD+N: See Table 3

表3 Table 3

标称频率 Nominal Freq.	标称声压级 Nominal SPL	总失真+噪声 THD+N	允许范围 Limit
(Hz)	(dB)	(%)	(%)
1000.0	94.0	2.0	≤2.5 (1级)
1000.0	114.0	0.5	≤2.5 (1级)

校准结果

RESULTS OF CALIBRATION

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附注:

Notes:

1. 声压级测量结果扩展不确定度: 160 Hz ~ 1250 Hz, $U = 0.25$ dB, $k = 2$;

Expanded Uncertainty of sound pressure level Measurement Results:

160 Hz ~ 1250 Hz, $U = 0.25$ dB, $k = 2$;

2. 频率测量结果扩展不确定度: $U = 0.1\%$, $k = 2$;

Expanded Uncertainty of frequency Measurement Results: $U = 0.1\%$, $k = 2$;

3. 本证书中给出的测量不确定度依据 JJF 1059.1-2012《测量不确定度评定与表示》评定。

The uncertainty given in this certificate is evaluated according to JJF 1059.1-2012
Evaluation and Expression of Uncertainty in Measurement.
