

# 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  
Issue Date Year Month Day

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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)  
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国家计量数据科学中心深圳分中心  
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### 联系方式 Contact Information

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### 校准用主要计量标准装置信息

#### Main Standard Devices Used

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

### 校准用主要标准器信息

#### Main Standards of Measurement Used

| 名称<br>Equipment Name | 测量范围<br>Measuring Range | 不确定度/准确度等级/<br>最大允许误差<br>Uncertainty/Accuracy Class/<br>Maximum Permissible Error | 设备编号<br>Equipment No | 有效期至<br>Due Date | 溯源单位/<br>证书号<br>Traceability to/<br>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<br>Channel | 传声器型号<br>Type | 传声器编号<br>No. | 灵敏度 (mV/Pa)<br>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<br>Frequency | 左耳频响<br>F.R.of Left | 右耳频响<br>F.R.of Right | 允许范围<br>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<br>Frequency | 左耳频响<br>F.R.of Left | 右耳频响<br>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<br>Frequency | 左耳频响<br>F.R.of Left | 右耳频响<br>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<br>Frequency | 左耳频响<br>F.R.of Left | 右耳频响<br>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<br>Frequency | 左耳频响<br>F.R.of Left | 右耳频响<br>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<br>Frequency | 声压级<br>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<br>Frequency | 失真<br>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<br>Frequency | 声压级<br>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:

## 校准结果

RESULTS OF CALIBRATION

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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.  
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 : 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

(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  
Issue Date Year Month Day

证书首页背面“重要声明”是证书的组成部分,任何未包含“重要声明”内容的复制均为不完整复制。

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National Nutrition Food Testing Center (Guangdong)  
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## 校准证书

CALIBRATION CERTIFICATE

证书编号: JL2501133071  
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<br>Equipment Name | 测量范围<br>Measuring Range | 不确定度/准确度等级/<br>最大允许误差<br>Uncertainty/Accuracy Class/<br>Maximum Permissible Error | 计量标准考核证书号<br>Certificate No | 有效期至<br>Due Date |
|----------------------|-------------------------|-----------------------------------------------------------------------------------|-----------------------------|------------------|
|                      |                         |                                                                                   |                             |                  |

### 校准用主要标准器信息

#### Main Standards of Measurement Used

| 名称<br>Equipment Name | 测量范围<br>Measuring Range | 不确定度/准确度等级/<br>最大允许误差<br>Uncertainty/Accuracy Class/<br>Maximum Permissible Error | 设备编号<br>Equipment No | 有效期至<br>Due Date | 溯源单位/<br>证书号<br>Traceability to/<br>Certificate No                                    |
|----------------------|-------------------------|-----------------------------------------------------------------------------------|----------------------|------------------|---------------------------------------------------------------------------------------|
| 动态信号分析仪              | DC~51.2kHz              | 电平±0.01dB                                                                         | SB11219              | 2025-06-02       |   |
| 数字万用表                | 1 MHz, 1 kV             | $U_{rel} = 0.01\%$ , $k = 2$                                                      | 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

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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<br>Frequency | 频率响应<br>Frequency Response |           | 最大允许范围<br>Limit |
|-----------------|----------------------------|-----------|-----------------|
| (Hz)            | (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            |

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3 总谐波失真: 见表2  
THD: See Table 2

表2 Table 2

| 频率标称值<br>Freq. Nominal Value | 总谐波失真<br>THD |       | 最大允许范围<br>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<br>Gain | 增益标称值<br>Gain Indi.Value | 增益实测值<br>Gain Meas. Value | 误差<br>Error | 最大允许误差<br>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<br>Gain | 增益标称值<br>Gain Indi.Value | 增益实测值<br>Gain Meas. Value | 误差<br>Error | 最大允许误差<br>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

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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*.

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# 校准证书

CALIBRATION CERTIFICATE



证书编号: JL2501133061

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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 : 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  
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4. 如果要满足被校准仪器的技术指标,或者技术法规要求,在规定范围内适用,请在建议复校日期前校准(适用于校准报告)。  
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).
5. 本证书/报告提供的结果仅对本次被检的计量器具有效。  
The results provided by the certificate/report are only valid for the measuring object under test this time.
6. 证书/报告无检定员/校准员、核验员、批准人签字,或涂改,或未盖本院证书/报告专用章及骑缝章无效。  
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7. 证书/报告更改后,发出的电子版证书/报告、证书/报告的扫描件及传真件将不被追回,委托方有义务将更改后的证书/报告提供给使用原证书/报告的相关方。  
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The QR code has the function of browsing and downloading complete report. Setting this function or not is chosen by the customer. The QR code and its copy enable anyone to scan and obtain the complete electronic version of the test report. Thus, if the owner of this report needs to restrict others from obtaining the content of the test report through the QR code, he shall cover or remove the QR code attached to the test report and its copies by himself. SMQ assumes no responsibility for the information leakage caused by the customer's selection of the QR code function of the test report ( This clause applies to certificates with QR code attached ) ..

### 获得的国家、省、市专业站 Establishment of Following Institutions

国家数字电子产品质量检验检测中心  
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  
National Metrology Center for Electric Vehicle Battery and Charging System Industry  
国家民用无人机产品质量检验检测中心(广东)  
National Civil Unmanned Aerial Vehicle Product Testing Center (Guangdong)  
国家高新技术计量站  
National Hi-tech Metrology Station  
国家医疗器械产业计量测试中心  
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)  
广东省质量监督食品检验站(深圳)  
Guangdong Quality Supervision and Inspection Institution for Food (Shenzhen)  
广东省质量监督生态纺织服装产品检验站(深圳)  
Guangdong Quality Supervision and Inspection Institution for Ecological Textile and Garment Products (Shenzhen)  
广东省质量监督皮革制品检验站  
Guangdong Quality Supervision and Inspection Institution for Leather Products  
广东省质量监督家具检验站(深圳)  
Guangdong Quality Supervision and Inspection Institution for Furniture Products (Shenzhen)  
广东省质量监督学生用品检验站(深圳)  
Guangdong Quality Supervision and Inspection Institution for Student's Articles (Shenzhen)  
广东省质量监督自行车检验站  
Guangdong Quality Supervision and Inspection Institution for Bicycle Quality  
广东省质量监督钟表检验站(深圳)  
Guangdong Quality Supervision and Inspection Institution for Horological Products (Shenzhen)  
广东省质量监督节能环保产品(安全性能)检验站(深圳)  
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)  
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Guangdong Quality Supervision and Inspection Institution for Generic Cabling System  
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

### 联系方式 Contact Information

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

### 校准用主要标准器信息

#### Main Standards of Measurement Used

| 名称<br>Equipment Name | 测量范围<br>Measuring Range | 不确定度/准确度等级/<br>最大允许误差<br>Uncertainty/Accuracy Class/<br>Maximum Permissible Error | 设备编号<br>Equipment No | 有效期至<br>Due Date | 溯源单位/<br>证书号<br>Traceability to/<br>Certificate No                                    |
|----------------------|-------------------------|-----------------------------------------------------------------------------------|----------------------|------------------|---------------------------------------------------------------------------------------|
| 多通道声分析仪              | 10Hz~20kHz              | 声压级 $U= (0.3\sim1.0)$<br>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

证书编号: JL2501133061  
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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<br>Nominal Freq | 声压级标称值<br>Nominal SPL | 声压级实测值<br>Measured SPL | 误差<br>Error | 最大允许误差<br>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<br>Nominal Freq. | 频率实测值<br>Measured Freq. | 误差<br>Error | 最大允许误差<br>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<br>Nominal Freq. | 标称声压级<br>Nominal SPL | 总失真+噪声<br>THD+N | 允许范围<br>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*.

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