



中国合格评定国家认可委员会 实验室认可证书

(注册号: CNAS L5523)

兹证明:

上海思百吉仪器系统有限公司 HBK 校准实验室

(法人: 上海思百吉仪器系统有限公司)

广东省广州市天河区体育西路 189 号城建大厦 11HJ,

510620

符合 ISO/IEC 17025: 2017 《检测和校准实验室能力的通用要求》
(CNAS-CL01 《检测和校准实验室能力认可准则》) 的要求, 具备承担本
证书附件所列服务能力, 予以认可。

获认可的能力范围见标有相同认可注册号的证书附件, 证书附件是
本证书组成部分。

生效日期: 2024-03-20

截止日期: 2030-03-19



中国合格评定国家认可委员会授权人

张朝华

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本证书的有效性可登陆 www.cnas.org.cn 获认可的机构名录查询。



China National Accreditation Service for Conformity Assessment
LABORATORY ACCREDITATION CERTIFICATE
(Registration No. CNAS L5523)

Spectris Instrumentation & Systems Shanghai Co., Ltd.
HBK Calibration Laboratory

(Legal Entity: Spectris Instrumentation & Systems Shanghai Co., Ltd.)

11HJJ, Chengjian Plaza, No.189, Tiyu Xilu, Tianhe District, Guangzhou,
Guangdong, China

is accredited in accordance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence to undertake the service described in the schedule attached to this certificate.

The scope of accreditation is detailed in the attached schedule bearing the same registration number as above. The schedule forms an integral part of this certificate.

Effective Date: 2024-03-20

Expiry Date: 2030-03-19

Signed on behalf of China National Accreditation Service for Conformity Assessment

谷朝华

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is a signatory of the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement (ILAC MRA) and the Asia Pacific Accreditation Cooperation Mutual Recognition Arrangement (APAC MRA).

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名称：上海思百吉仪器系统有限公司 HBK 校准实验室

地址：广东省广州市天河区体育西路 189 号城建大厦 11H1J

注册号：CNAS L5523

认可依据：ISO/IEC 17025:2017 以及 CNAS 特定认可要求

生效日期：2024 年 04 月 02 日 截止日期：2030 年 03 月 19 日

附件 5 认可的校准和测量能力范围

注：“测量仪器名称”栏仪器名称前标注*的项目可开展现场校准。

序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 (k=2)	说明	生效日期
一. 声学							
1	*适调放大器	电荷	Bruel&Kjaer NEXUS 适调放大器校准程序 P_269x, Bruel&Kjaer 2635 型适调放大器校准程序 P_2635, Bruel&Kjaer 2647 型适调放大器校准程序 P_2647	0.01pC~10nC, 20Hz~50Hz	$U_{rel}=0.58\%$		2024-04-02
				0.01pC~10nC, 50Hz~10kHz	$U_{rel}=0.26\%$		2024-04-02
				0.01pC~10nC, 10kHz~100kHz	$U_{rel}=1.0\%$		2024-04-02
		交流电压		0.1mV~50mV, 10Hz~100kHz	$U_{rel}=0.08\%$		2024-04-02
				50mV~5V, 10Hz~100kHz	$U_{rel}=0.04\%$		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		直流电压		1V~200V	$U_{rel}=0.035\%$		2024-04-02
		直流电流		2mA~10mA	$U=0.02mA$		2024-04-02
2	*测量放大器	交流电压	测量放大器校准规范 JJF 1157	0.1mV~50mV, 10Hz~100kHz	$U_{rel}=0.08\%$		2024-04-02
		直流电压		50mV~5V, 10Hz~100kHz	$U_{rel}=0.04\%$		2024-04-02
		直流电压		1V~200V	$U_{rel}=0.035\%$		2024-04-02
3	*声校准器	声压级	电声： 声校准器 IEC60942，声校准器检定 规程 JJG176	94dB、104dB、114dB， 31.5Hz	$U=0.14dB$		2024-04-02
				94dB、104dB、114dB， 63Hz、125Hz、250Hz、 500Hz、1kHz、2kHz、 4kHz	$U=0.11dB$		2024-04-02
				94dB、104dB、114dB， 8kHz、12.5kHz	$U=0.13dB$		2024-04-02
				94dB、104dB、114dB， 16kHz	$U=0.14dB$		2024-04-02
				124dB, 250Hz	$U=0.10dB$		2024-04-02
				频率	31.5Hz~16kHz		$U_{rel}=0.0014\%$
		失真度		0.01%~30%	$U=0.2\%$		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
4	*工作标准传声器 (耦合腔比较法)	声压级	测量传声器第 5 部分: 工作标准传声器声压校准方法 (比较法) IEC 61094-5, 工作标准传声器 (耦合腔比较法) 检定规程 JJG 1019	40dB~120dB, 250Hz~1000Hz	$U=0.08\text{dB}$		2024-04-02
				40dB~120dB, 20Hz~40Hz	$U=0.19\text{dB}$		2024-04-02
				40dB~120dB, 40Hz~4kHz	$U=0.17\text{dB}$		2024-04-02
				40dB~120dB, 4kHz~16kHz	$U=0.19\text{dB}$		2024-04-02
				40dB~120dB, 16kHz~20kHz	$U=0.21\text{dB}$		2024-04-02
5	工作标准传声器 (静电激励法)	声压级	测量传声器第 6 部分用静电激励器法校准传声器的频率响应 IEC 61094-6, 工作标准传声器 (静电激励器法) 检定规程 JJG 175	40dB~120dB, 20Hz~5kHz	$U=0.10\text{dB}$		2024-04-02
				40dB~120dB, 5kHz~10kHz	$U=0.12\text{dB}$		2024-04-02
				40dB~120dB, 10kHz~40kHz	$U=0.20\text{dB}$		2024-04-02
				40dB~120dB, 40kHz~80kHz	$U=0.25\text{dB}$		2024-04-02
				40dB~120dB, 80kHz~100kHz	$U=0.30\text{dB}$		2024-04-02
6	声强传声器套组	相位	电声-声强测量设备-用压强传声器对测量 IEC61043-A.2	1/2 英寸传声器: (0~1.26)°, 20Hz~12.5kHz	$U=(0.010\sim0.31)^\circ$		2024-04-02
				1/4 英寸传声器: (0~2)°, 20Hz~20kHz	$U=(0.010\sim0.32)^\circ$		2024-04-02
			声级计-第三部分: 周期测试 IEC 61672-3, 声级	电信号: 76dB~140dB, 20Hz~20kHz	$U=0.12\text{dB}$		2024-04-02



序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		中国合格评定 认可	计-第三部分：周期测试 EN 61672-3, 声级计检定 规程 JJG 188	电信号: 42dB~140dB, 20Hz~12.5kHz	$U=0.13\text{dB}$		2024-04-02
				电信号: 20dB~42dB, 20Hz~12.5kHz	$U=0.24\text{dB}$		2024-04-02
				声信号: 94dB, 12.5kHz~16kHz	$U=0.9\text{dB}$		2024-04-02
				声信号: 94dB, 8kHz~ 12.5kHz	$U=0.7\text{dB}$		2024-04-02
				声信号: 94dB, 2kHz~ 8kHz	$U=0.5\text{dB}$		2024-04-02
				声信号: 94dB, 31.5Hz~ 2kHz	$U=0.3\text{dB}$		2024-04-02
8	倍频程滤波器和分数滤波器	相对衰减	电声学 倍频程和分数倍频程滤波器 第3部分: 周期试验 IEC 61260-3, 倍频程和分数倍频程滤波器检定规程 JJG 449	0dB~-50dB, 10Hz~ 100kHz	$U=0.06\text{dB}$		2024-04-02
				-50dB~-120dB, 10Hz~ 100kHz	$U=0.35\text{dB}$		2024-04-02
9	*人工嘴	声压级	电话传送质量 客观测量仪器 人工嘴 ITU-T P. 51, 仿真嘴校准规范 JJF 1580	60dB~130dB, 100Hz~ 10kHz	$U=0.3\text{dB}$		2024-04-02
10	*声频功率放大器	交流电压	声系统设备 第3部分: 放大器 IEC 60268-3, 声频功率放大器校准规范 JJF 1200	0.01 V~100V, 20Hz~ 20kHz	$U_{\text{rel}}=0.6\%$		2024-04-02
11	*传声器前置放大器	电压	传声器前置放大器校准规范 JJF 1137	144.0dB~ 94.0dB (以 1 μV 为参考), 10Hz~ 20kHz	$U=0.004\text{dB}$		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		中国	合格评定	94.0dB~ 54.0dB (以 1 μ V 为参考), 10Hz~20kHz	$U=0.007$ dB		2024-04-02
				54.0dB~ 34.0dB (以 1 μ V 为参考), 10Hz~20kHz	$U=0.008$ dB		2024-04-02
12	*声强校准器	声压级	电声-声强测量设备-用压强传声器对测量 IEC61043-A.3	正弦信号: 94dB	$U=0.16$ dB		2024-04-02
				噪声信号: 70dB~80dB, 20Hz~40Hz	$U=0.30$ dB		2024-04-02
				噪声信号: 70dB~80dB, 40Hz~3.15kHz	$U=0.20$ dB		2024-04-02
				通道差: -10dB~+10dB, 20Hz~3.15kHz	$U=0.03$ dB		2024-04-02
		频率		251.2Hz	$U_{rel}=0.0014\%$		2024-04-02
		失真度		0.01%~30%	$U=0.2\%$		2024-04-02
二. 振动							
1	振动声学分析仪	直流电压 (输出)	Bruel&Kjaer PULSE3560 型振动声学分析仪系统校准程序 P_3560, Bruel&Kjaer PULSE3660 型振动声学分析仪系统校准程序 P_3660	0.5V~5V	$U=(0.02V\sim0.05V)$		2024-04-02
		直流电压 (输入)		200V	$U=0.06V$		2024-04-02
				1V~10V	$U_{rel}=0.01\%$		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		交流电压 (输入)	合格评定 委员会 认可	144.0dB~ 94.0dB (以 1 μ V 为参考), 10Hz~ 20kHz	$U=0.004$ dB		2024-04-02
				94.0dB~ 54.0dB (以 1 μ V 为参考), 10Hz~ 20kHz	$U=0.007$ dB		2024-04-02
				54.0dB~ 34.0dB (以 1 μ V 为参考), 10Hz~ 20kHz	$U=0.008$ dB		2024-04-02
				144.0dB μ V~ 134.0dB μ V, 20kHz~204.8kHz	$U=0.012$ dB		2024-04-02
				134.0dB μ V~ 94.0dB μ V, 20kHz~204.8kHz	$U=0.008$ dB		2024-04-02
				94.0dB μ V~ 54.0dB μ V, 20kHz~204.8kHz	$U=0.010$ dB		2024-04-02
				54.0dB μ V~ 34.0dB μ V, 20kHz~204.8kHz	$U=0.045$ dB		2024-04-02
		交流电压 (输出)		137.0dB μ V~ 75.0dB μ V, 10Hz~20kHz	$U=0.004$ dB		2024-04-02
				75.0dB μ V~ 34.0dB μ V, 10Hz~20kHz	$U=0.006$ dB		2024-04-02
				137.0dB μ V~ 75.0dB μ V, 20kHz~204.8kHz	$U=0.008$ dB		2024-04-02
				75.0dB μ V~ 34.0dB μ V, 20kHz~204.8kHz	$U=0.046$ dB		2024-04-02
		直流电流		2mA~10mA	$U=0.02$ mA		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 (k=2)	说明	生效日期
		频率	中国合格评定 认可委员会	10Hz~204.8kHz	$U_{rel}=0.001\%$		2024-04-02
		电荷		0.01pC~10nC, 20Hz~50Hz	$U_{rel}=0.6\%$		2024-04-02
				0.01pC~10nC, 50Hz~10kHz	$U_{rel}=0.26\%$		2024-04-02
				0.01pC~10nC, 10kHz~200kHz	$U_{rel}=1.0\%$		2024-04-02
2	*压电加速度计	加速度	振动与冲击传感器校准方法-21 部分: 相对于参考传感器的振动比较法校准 ISO16063-21, 压电加速度计检定规程 JJG 233	0.1m/s ² ~200m/s ² , 80Hz、160Hz	$U_{rel}=0.7\%$		2024-04-02
				0.1m/s ² ~100m/s ² , 5Hz~2kHz	$U_{rel}=0.9\%$		2024-04-02
				0.1m/s ² ~100m/s ² , 2kHz~4kHz	$U_{rel}=1.3\%$		2024-04-02
				0.1m/s ² ~100m/s ² , 4kHz~10kHz	$U_{rel}=1.7\%$		2024-04-02
				0.1m/s ² ~200m/s ² , 80Hz、160Hz	$U_{rel}=0.8\%$		2024-04-02
3	*便携式振动校准器	加速度	振动和冲击传感器的校准方法 - 现场振动校准器的校准 ISO 16063-44, 便携式振动校准器检定规程 JJG 1062	3.16m/s ²	$U_{rel}=0.7\%$		2024-04-02
		10m/s ²		$U_{rel}=0.7\%$	2024-04-02		
		频率		159.15Hz	$U=0.01\text{Hz}$		2024-04-02
		失真		0.01%~10%	$U=0.2\%$		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
4	*测振仪	加速度	振动与冲击传感器校准方法-21 部分: 相对于参考传感器的振动比较法校准 ISO16063-21, 测振仪检定规程 JJG 676	1m/s ² ~700m/s ² , 5Hz~2kHz	$U_{rel}=0.9\%$		2024-04-02
				1m/s ² ~700m/s ² , 2kHz~4kHz	$U_{rel}=1.1\%$		2024-04-02
		速度		1mm/s~1400mm/s, 5Hz~2kHz	$U_{rel}=0.9\%$		2024-04-02
				1mm/s~1400mm/s, 2kHz~4kHz	$U_{rel}=1.1\%$		2024-04-02
		位移		0.01mm~6.4mm, 5Hz~2kHz	$U_{rel}=0.9\%$		2024-04-02
				0.01mm~6.4mm, 2kHz~4kHz	$U_{rel}=1.1\%$		2024-04-02
				频率	5Hz~4kHz		$U_{rel}=0.003\%$
5	*动态力传感器 (振动比较法)	动态力灵敏度	振动与冲击传感器校准方法-21 部分: 相对于参考传感器的振动比较法校准 ISO16063-21	0.01N~100N, 80Hz、160Hz	$U_{rel}=1.0\%$		2024-04-02
				0.01N~100N, 10Hz~1kHz	$U_{rel}=1.3\%$		2024-04-02
				0.01N~100N, 1kHz~2kHz	$U_{rel}=1.4\%$		2024-04-02
6	*标准振动台	加速度	标准振动台检定规程 JJG 298	0.1m/s ² ~700m/s ² , 5Hz~1kHz	$U_{rel}=1.3\%$		2024-04-02
				0.1m/s ² ~700m/s ² , 1kHz~5kHz	$U_{rel}=1.4\%$		2024-04-02
				0.1m/s ² ~700m/s ² , 5kHz~10kHz	$U_{rel}=2.3\%$		2024-04-02



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7	*电动振动试验系统	频率	电动振动试验系统检定规程 JJG 948	5Hz~3000Hz	$U_{rel}=0.0016\%$		2024-04-02
		加速度		1m/s ² ~1600m/s ² , 5Hz~3000Hz	$U_{rel}=5\%$		2024-04-02
		速度		0.5mm/s~3000mm/s, 5Hz~3000Hz	$U_{rel}=5\%$		2024-04-02
		位移		1mm~76mm, 5Hz~3000Hz	$U_{rel}=5\%$		2024-04-02



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Name: Spectris Instrumentation & Systems Shanghai Co., Ltd. HBK Calibration Laboratory

Address: 11H1J, Chengjian Plaza, No.189, Tiyu Xilu, Tianhe District, Guangzhou, Guangdong, China

Registration No. CNAS L5523

Accreditation Criteria: ISO/IEC 17025:2017 and relevant requirements of CNAS

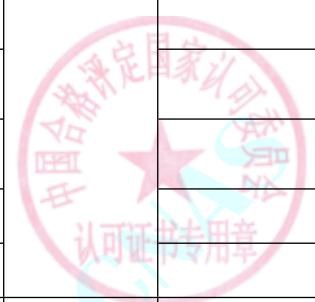
Effective Date: 2024-04-02 Expiry Date: 2030-03-19

CHINA NATIONAL ACCREDITATION SERVICE FOR CONFORMITY ASSESSMENT
SCHEDULE OF ACCREDITATION CERTIFICATE

SCHEDULE 5 ACCREDITED CALIBRATION AND MEASUREMENT CAPABILITY SCOPE

Note: The instruments with * represents onsite calibration can be performed.

No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
1. Acoustics							
1	*Conditioning Amplifier	Charge	Briel&Kjaer Calibration Procedure for Nexus Range of Conditioning Amplifiers P_269x, Calibration Procedure for Briel & Kjaer Conditioning Amplifier Type 2635 P_2635, Calibration Procedure for Briel & Kjaer Conditioner Type 2647 P_2647	01pC~10nC, 20Hz~50Hz	$U_{rel}=0.58\%$		
				01pC~10nC, 50Hz~10kHz	$U_{rel}=0.26\%$		
				01pC~10nC, >10kHz~100kHz	$U_{rel}=1.0\%$		
		AC Voltage		0.1mV~50mV, 10Hz~100kHz	$U_{rel}=0.08\%$		
				50mV~5V, 10Hz~100kHz	$U_{rel}=0.04\%$		
		DC Voltage		1V~200V	$U_{rel}=0.035\%$		
		DC Current		2mA~10mA	$U=0.02mA$		
2	*Measuring Amplifiers	AC Voltage	Calibration Specification for Measuring Amplifiers JJF	0.1mV~50mV, 10Hz~100kHz	$U_{rel}=0.08\%$		



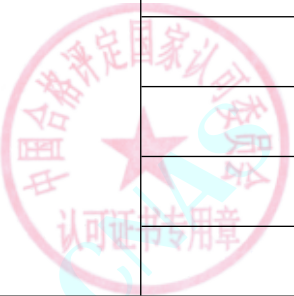
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The scope of the accreditation in Chinese remains the definitive version.

No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
			1157	50mV~5V, 10Hz~100kHz	$U_{rel}=0.04\%$		
		DC Voltage		1V~200V	$U_{rel}=0.035\%$		
3	*Sound Calibrator	Sound Pressure Level	Electroacoustics: Sound Calibrators IEC60942, Verification Regulation of Sound Calibrators JJG176	94dB、104dB、114dB, 31.5Hz	$U=0.14dB$		
				94dB、104dB、114dB, 63Hz、125Hz、250Hz、500Hz、1kHz、2kHz、4kHz	$U=0.11dB$		
				94dB、104dB、114dB, 8kHz、12.5kHz	$U=0.13dB$		
				94dB、104dB、114dB, 16kHz	$U=0.14dB$		
				124dB, 250Hz	$U=0.10dB$		
		Frequency		31.5Hz~16kHz	$U_{rel}=0.0014\%$		
Distortion	0.01%~30%	$U=0.2\%$					
4	*Working standard microphone (Coupler Comparison Method)	Sound pressure level	Methods for pressure calibration of working standard microphone by comparison IEC 61094-5, Verification Regulation of the working standard microphone (Coupler Comparison Method) JJG 1019	40dB~120dB, 250Hz、1000Hz	$U=0.08dB$		
				40dB~120dB, 20Hz~40Hz	$U=0.19dB$		
				40dB~120dB, 40Hz~4kHz	$U=0.17dB$		
				40dB~120dB, 4kHz~16kHz	$U=0.19dB$		
				40dB~120dB, 16kHz~20kHz	$U=0.21dB$		



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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
5	Working standard microphones(Electrostatic Actuator Method)	Sound pressure level	Measurement microphones- Part 6 Electrostatic actuators for determination of frequency response IEC 61094-6,Verification Regulation of the working standard microphones(Electrostatic Actuator Method) JIG 175	40dB~120dB, 220Hz~5kHz	U=0.10dB		
				40dB~120dB, 5kHz~10kHz	U=0.12dB		
				40dB~120dB, 10kHz~40kHz	U=0.20dB		
				40dB~120dB, 40kHz~80kHz	U=0.25dB		
				40dB~120dB, 80kHz~100kHz	U=0.30dB		
6	Sound Intensity Microphone Pair	Phase	Specification for Electroacoustics — Instruments for the measurement of sound intensity — Measurement with pairs of pressure sensing microphones IEC61043-A.2	1/2 inch microphone:(0~1.26)° , 20Hz~12.5kHz	U=(0.010~0.31)°		
				1/4 Inch Microphone: (0~2)° , 20Hz~20kHz	U=(0.010~0.32)°		
7	Sound Level Meter	Sound pressure level	Sound Level Meter- Part 3: Periodic tests IEC 61672-3, Sound Level Meter- Part 3: Periodic tests EN 61672-3, Verification Regulation of Sound Level Meters JIG 188	Electronic Signal: 76dB~140dB, 20Hz~20kHz	U=0.12dB		
				Electronic Signal: 42dB~140dB, 20Hz~12.5kHz	U=0.13dB		
				Electronic Signal: 20dB~42dB, 20Hz~12.5kHz	U=0.24dB		
				Sound signal: 94dB, 12.5kHz~16kHz	U=0.9dB		

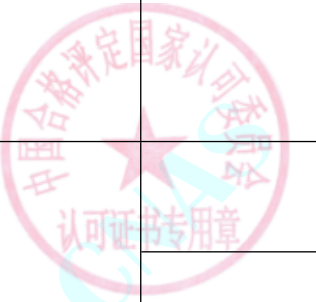


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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
				Sound signal: 94dB, 8kHz~12.5kHz	U=0.7dB		
				Sound signal: 94dB, 2kHz~8kHz	U=0.5dB		
				Sound signal: 94dB, 31.5Hz~2kHz	U=0.3dB		
8	Octave-Band and Fractional-Octave-Band Filters	Relative attenuation	Electroacoustics-Octave-band and fractional-octave-band filters-Part 3: Periodic tests IEC 61260-3, Verification Regulation of Octave-Band and Fractional-Octave-Band Filters JJG 449	0dB~-50dB, 10Hz~100kHz	U=0.06dB		
				-50dB~-120dB, 10Hz~100kHz	U=0.35dB		
9	*Artificial Mouth	Sound Pressure Level	TELEPHONE TRANSMISSION QUALITY Objective measuring apparatus Artificial Mouth ITU-T P.51, Calibration Specification for Artificial Mouths JJF 1580	60dB~130dB, 100Hz~10kHz	U=0.3dB		
10	*Audio-frequency Power Amplifiers	AC Voltage	Sound system equipment part 3: Amplifiers IEC 60268-3, Calibration Specification for Audio-frequency Power Amplifiers JJF 1200	0.01 V~100V, 20Hz~20kHz	U _{rel} =0.6%		
11	*Microphone Preamplifiers	Voltage	Calibration Specification for Microphone Preamplifiers JJF 1137	144.0dB~94.0dB (Refer to 1 μV), 10Hz~20kHz	U=0.004dB		
				94.0dB~54.0dB (Refer to 1 μV), 10Hz~20kHz	U=0.007dB		

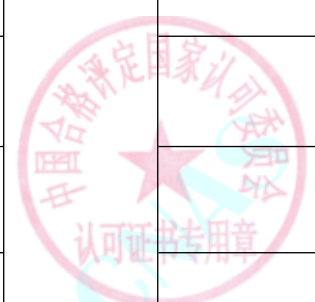


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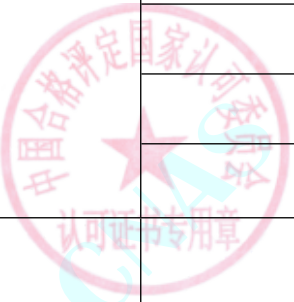
No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
				54.0dB~ 34.0dB (Refer to 1 μ V), 10Hz~20kHz	U=0.008dB		
12	*Sound Intensity Calibrator	Sound Pressure Level	Specification for Electroacoustics — Instruments for the measurement of sound intensity — Measurement with pairs of pressure sensing microphones IEC61043-A.3	sinusoidal signal:94dB	U=0.16dB		
				Noise signal: 70dB~80dB, 20Hz~40Hz	U=0.30dB		
				Noise signal: 70dB~80dB, 40Hz~3.15kHz	U=0.20dB		
				Chanel diffrence: -10dB~+10dB, 20Hz~3.15kHz	U=0.03dB		
		Frequency		251.2Hz	U _{rel} =0.0014%		
Distortion	0.01%~30%	U=0.2%					
2. Vibration							
1	Vibration and Sound Analyzer	Output DC Voltage	The calibration procedure for Bruel&Kjaer Vibration and Sound Analyzer Type 3560 P_3560, The calibration procedure for Bruel&Kjaer Vibration and Sound Analyzer Type 3660 P_3660	0.5V~5V	U=(0.02V~0.05V)		
				200V	U=0.06V		
		Input DC Voltage		1V~10V	U _{rel} =0.01%		
				144.0dB~ 94.0dB (Refer to 1 μ V), 10Hz~20kHz	U=0.004dB		
		Input AC Voltage		94.0dB~ 54.0dB (Refer to 1 μ V) , 10Hz~20kHz	U=0.007dB		
		54.0dB~ 34.0dB (Refer to 1 μ V), 10Hz~20kHz	U=0.008dB				



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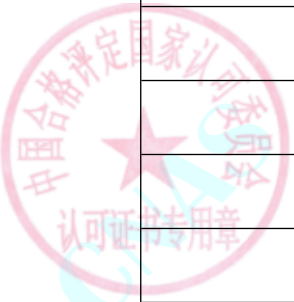
The scope of the accreditation in Chinese remains the definitive version.

No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
				144.0dB μ V ~ 134.0dB μ V, 20kHz~204.8kHz	$U=0.012$ dB		
				134.0dB μ V ~ 94.0dB μ V, 20kHz~204.8kHz	$U=0.008$ dB		
				94.0dB μ V ~ 54.0dB μ V, 20kHz~204.8kHz	$U=0.010$ dB		
				54.0dB μ V ~ 34.0dB μ V, 20kHz~204.8kHz	$U=0.045$ dB		
		Output AC Voltage		137.0dB μ V ~ 75.0dB μ V, 10Hz~20kHz	$U=0.004$ dB		
				75.0dB μ V ~ 34.0dB μ V, 10Hz~20kHz	$U=0.006$ dB		
				137.0dB μ V ~ 75.0dB μ V, 20kHz~204.8kHz	$U=0.008$ dB		
				75.0dB μ V ~ 34.0dB μ V, 20kHz~204.8kHz	$U=0.046$ dB		
		DC Current		2mA ~ 10mA	$U=0.02$ mA		
		Frequency		10Hz ~ 204.8kHz	$U_{rel}=0.001\%$		
		Charge		0.01pC ~ 10nC, 20Hz ~ 50Hz	$U_{rel}=0.6\%$		
				0.01pC ~ 10nC, 50Hz ~ 10kHz	$U_{rel}=0.26\%$		
				0.01pC ~ 10nC, 10kHz ~ 200kHz	$U_{rel}=1.0\%$		
			Methods for the calibration of vibration and shock transducers - Part 21: Vibration calibration by	0.1m/s ² ~ 200m/s ² , 80Hz、160Hz	$U_{rel}=0.7\%$		



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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
			comparison to a reference transducer ISO16063-21, Verification Regulation of Piezoelectric Accelerometer JJG 233	0.1m/s ² ~100m/s ² , 5Hz~2kHz	U _{rel} =0.9%		
				0.1m/s ² ~100m/s ² , 2kHz~4kHz	U _{rel} =1.3%		
				0.1m/s ² ~100m/s ² , 4kHz~10kHz	U _{rel} =1.7%		
				0.1m/s ² ~200m/s ² , 80Hz、160Hz	U _{rel} =0.8%		
3	*Portable Vibration Calibrator	Acceleration	Methods for the calibration of vibration and shock transducers - Calibration of field vibration calibrators ISO 16063-44, Verification Regulation of Portable Vibration Calibrator JJG 1062	3.16m/s ²	U _{rel} =0.7%		
		Frequency		10m/s ²	U _{rel} =0.7%		
		Distortion		159.15Hz	U=0.01Hz		
				0.01%~10%	U=0.2%		
4	*Vibration Meter	Acceleration	Methods for the calibration of vibration and shock transducers - Part 21: Vibration calibration by comparison to a reference transducer ISO16063-21, Verification Regulation of Measuring Vibration Instruments JJG 676	1m/s ² ~700m/s ² , 5Hz~2kHz	U _{rel} =0.9%		
				1m/s ² ~700m/s ² , 2kHz~4kHz	U _{rel} =1.1%		
		Velocity		1mm/s~1400mm/s, 5Hz~2kHz	U _{rel} =0.9%		
				1mm/s~1400mm/s, 2kHz~4kHz	U _{rel} =1.1%		
		Displacement		0.01mm~6.4mm, 5Hz~2kHz	U _{rel} =0.9%		
				0.01mm~6.4mm, 2kHz~4kHz	U _{rel} =1.1%		
Frequency	5Hz~4kHz	U _{rel} =0.003%					



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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
5	*Dynamic Force Transducer (Vibration calibration by comparison)	Dynamic force sensitivity	Methods for the calibration of vibration and shock transducers - Part 21: Vibration calibration by comparison to a reference transducer ISO16063-21	0.01N~100N, 80Hz、160Hz	$U_{rel}=1.0\%$		
				0.01N~100N, 10Hz~1kHz	$U_{rel}=1.3\%$		
				0.01N~100N, 1kHz~2kHz	$U_{rel}=1.4\%$		
6	*Standard Vibrators	Acceleration	Verification Regulation of Standard Vibrators JJG 298	0.1m/s ² ~700m/s ² , 5Hz~1kHz	$U_{rel}=1.3\%$		
				0.1m/s ² ~700m/s ² , 1kHz~5kHz	$U_{rel}=1.4\%$		
				0.1m/s ² ~700m/s ² , 5kHz~10kHz	$U_{rel}=2.3\%$		
7	*Electrodynamic Vibration Testing Systems	Frequency	V. R. of Electrodynamic Vibration Testing Systems JJG 948	5Hz~3000Hz	$U_{rel}=0.0016\%$		
		Acceleration		1m/s ² ~1600m/s ² , 5Hz~3000Hz	$U_{rel}=5\%$		
		Velocity		0.5mm/s~3000mm/s, 5Hz~3000Hz	$U_{rel}=5\%$		
		Displacement		1mm~76mm, 5Hz~3000Hz	$U_{rel}=5\%$		



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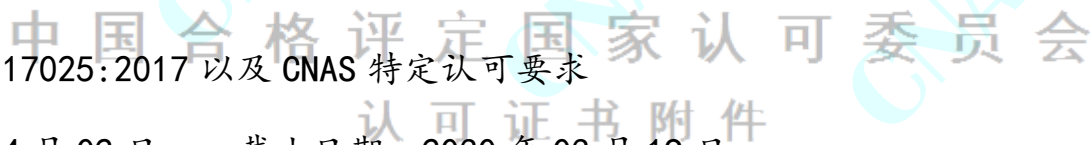
名称：上海思百吉仪器系统有限公司 HBK 校准实验室

地址：江苏省苏州市虎丘区横山路 106 号 208 房、209 房

注册号：CNAS L5523

认可依据：ISO/IEC 17025:2017 以及 CNAS 特定认可要求

生效日期：2024 年 04 月 02 日 截止日期：2030 年 03 月 19 日



附件 5 认可的校准和测量能力范围

注：“测量仪器名称”栏仪器名称前标注*的项目可开展现场校准。

序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 (k=2)	说明	生效日期
一. 声学							
1	*声校准器	声压级	电声：声校准器 IEC60942，声校准器检定 规程 JJG176	94dB, 104dB, 114dB (31.5Hz)	$U=0.14\text{dB}$		2024-04-02
				94dB, 104dB, 114dB (63Hz, 125Hz, 250Hz, 500 Hz, 1kHz, 2kHz, 4kHz)	$U=0.11\text{dB}$		2024-04-02
				94dB, 104dB, 114dB (8kHz, 12.5kHz)	$U=0.13\text{dB}$		2024-04-02
				94dB, 104dB, 114dB (16kHz)	$U=0.14\text{dB}$		2024-04-02
				124dB (250Hz)	$U=0.10\text{dB}$		2024-04-02

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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		频率		31.5Hz~16kHz	$U_{rel}=0.0014\%$		2024-04-02
		失真度		0.01%~30%	$U=0.2\%$		2024-04-02
2	*传声器	声灵敏度级(声校准器法)	测量传声器第6部分用静电激励器法校准传声器的频率响应 IEC 61094-6, 工作标准传声器(静电激励器法) 检定规程 JJG 175	-60dB~0dB(250Hz, 参考1V/Pa)	$U=0.14\text{dB}$		2024-04-02
		压力场声压频率响应(静电激励器法)		40dB~130dB, 20Hz~5kHz	$U=0.10\text{dB}$		2024-04-02
				40dB~130dB, 5kHz~10kHz	$U=0.12\text{dB}$		2024-04-02
				40dB~130dB, 10kHz~40kHz	$U=0.20\text{dB}$		2024-04-02
				40dB~130dB, 40kHz~80kHz	$U=0.25\text{dB}$		2024-04-02
				40dB~130dB, 80kHz~100kHz	$U=0.30\text{dB}$		2024-04-02
				40dB~130dB, 20Hz~5kHz	$U=0.20\text{dB}$		2024-04-02
				40dB~130dB, 5kHz~10kHz	$U=0.24\text{dB}$		2024-04-02
				40dB~130dB, 10kHz~40kHz	$U=0.40\text{dB}$		2024-04-02
		自由场和混响场声压频率响应(静电激励器法)		40dB~130dB, 40kHz~80kHz	$U=0.50\text{dB}$		2024-04-02
40dB~130dB, 80kHz~100kHz	$U=0.60\text{dB}$			2024-04-02			



序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 (k=2)	说明	生效日期
二、数据采集/测量仪 (系统)							
1	多功能数据采集和测量仪	直流电压 (Burst 4462 型标准源法)	中国合格评定国家认可委员会 多功能数据采集和测量仪 校准实施细则 HBKCL-SOP-0015	0.01V~0.045V	$U=30 \times 10^{-6} U_x + 4\mu V$		2024-04-02
				0.045V~0.3V	$U=30 \times 10^{-6} U_x + 13\mu V$		2024-04-02
				0.3V~0.45V	$U=30 \times 10^{-6} U_x + 23\mu V$		2024-04-02
				0.45V~3V	$U=30 \times 10^{-6} U_x + 0.13mV$		2024-04-02
				3V~4.5V	$U=30 \times 10^{-6} U_x + 0.23mV$		2024-04-02
		4.5V~30V		$U=30 \times 10^{-6} U_x + 1.4mV$	2024-04-02		
		直流电压 (Keithley 2750 型标准表法)		0.01V~0.1V	$U=37 \times 10^{-6} U_x + 7\mu V$		2024-04-02
				0.1V~1V	$U=36 \times 10^{-6} U_x + 14\mu V$		2024-04-02
				1V~10V	$U=36 \times 10^{-6} U_x + 0.06mV$		2024-04-02
		直流电流 (Burster 4462 型标准源法)		10V~100V	$U=53 \times 10^{-6} U_x + 1mV$		2024-04-02
0.002A~0.0075A	$U=70 \times 10^{-6} I_x + 0.9\mu A$		2024-04-02				
		0.0075A~0.052A	$U=70 \times 10^{-6} I_x + 4\mu A$	2024-04-02			



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		直流电阻	合格评定国家认可委员会 认可证书附件	16 Ω ~400 Ω	$U=36 \times 10^{-6} R_x + 3\text{m}\Omega$		2024-04-02
				400 Ω ~2000 Ω	$U=54 \times 10^{-6} R_x + 0.24\text{m}\Omega$		2024-04-02
				2000 Ω ~10000 Ω	$U=1.6 \times 10^{-4} R_x + 2.6\text{m}\Omega$		2024-04-02
	温度 (电阻温度计指示器 PT100)	-100 $^{\circ}\text{C}$ ~200 $^{\circ}\text{C}$		$U=0.02^{\circ}\text{C}$		2024-04-02	
		200 $^{\circ}\text{C}$ ~500 $^{\circ}\text{C}$		$U=0.03^{\circ}\text{C}$		2024-04-02	
		500 $^{\circ}\text{C}$ ~800 $^{\circ}\text{C}$		$U=0.04^{\circ}\text{C}$		2024-04-02	
	温度 (电阻温度计指示器 PT1000)	-100 $^{\circ}\text{C}$ ~200 $^{\circ}\text{C}$		$U=0.02^{\circ}\text{C}$		2024-04-02	
		200 $^{\circ}\text{C}$ ~500 $^{\circ}\text{C}$		$U=0.08^{\circ}\text{C}$		2024-04-02	
		500 $^{\circ}\text{C}$ ~800 $^{\circ}\text{C}$		$U=0.12^{\circ}\text{C}$		2024-04-02	
	温度 (K型热电偶指示器)	-100 $^{\circ}\text{C}$ ~800 $^{\circ}\text{C}$		$U=0.12^{\circ}\text{C}$		2024-04-02	
		800 $^{\circ}\text{C}$ ~1300 $^{\circ}\text{C}$	$U=0.3^{\circ}\text{C}$		2024-04-02		
	温度 (T型热电偶指示器)	-200 $^{\circ}\text{C}$ ~400 $^{\circ}\text{C}$	$U=0.12^{\circ}\text{C}$		2024-04-02		
	频率	2kHz~2000kHz	$U_{\text{rel}}=0.0012\%$		2024-04-02		



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		应变全桥 直流电压 比	合格评定 委员会 认可	2mV/V 量程(0%~100%) (直流桥路电压: 5V)	$U=0.3\mu\text{V}/\text{V}$		2024-04-02
				5mV/V 量程(0%~100%) (直流桥路电压: 5V)	$U=0.6\mu\text{V}/\text{V}$		2024-04-02
				10mV/V 量程(0%~100%) (直流桥路电压: 5V)	$U=1.2\mu\text{V}/\text{V}$		2024-04-02
				20mV/V 量程(0%~50%) (直流桥路电压: 5V)	$U=2.2\mu\text{V}/\text{V}$		2024-04-02
		应变全桥 交流电压 比		2mV/V 量程(0%~100%) (桥路电压: 5V, 频率 4.8kHz)	$U=0.4\mu\text{V}/\text{V}$		2024-04-02
				5mV/V 量程(0%~100%) (桥路电压: 2.5V, 频率 4.8kHz)	$U=2\mu\text{V}/\text{V}$		2024-04-02
				10mV/V 量程(0%~100%) (桥路电压: 2.5V, 频率 4.8kHz)	$U=2\mu\text{V}/\text{V}$		2024-04-02
				20mV/V 量程(0%~100%) (桥路电压: 2.5V, 频率 4.8kHz)	$U=10\mu\text{V}/\text{V}$		2024-04-02
		电感全桥 交流电压 比		100mV/V 量程(0%~100%) (桥路电压: 2.5V, 频率 4.8kHz)	$U=12\mu\text{V}/\text{V}$		2024-04-02
				1000mV/V 量程(0%~ 100%) (桥路电压: 1V, 频率 4.8kHz)	$U=0.12\text{mV}/\text{V}$		2024-04-02



序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		中国合格评定 认可 压阻全桥 直流电压 比	JJG-1004-2015 《直流电压 比较仪 检定规程》	1mV/V~45mV/V(直流桥路 电压: 1V)	$U=0.006\text{mV/V}$		2024-04-02
				45mV/V~300mV/V(直流桥 路电压: 1V)	$U=0.03\text{mV/V}$		2024-04-02
				300mV/V~450mV/V(直流 桥路电压: 1V)	$U=0.05\text{mV/V}$		2024-04-02
				450mV/V~1000mV/V(直流 桥路电压: 1V)	$U=0.17\text{mV/V}$		2024-04-02
				0.4mV/V~18mV/V(直流桥 路电压: 2.5V)	$U=0.003\text{mV/V}$		2024-04-02
				18mV/V~120mV/V(直流桥 路电压: 2.5V)	$U=0.012\text{mV/V}$		2024-04-02
				120mV/V~180mV/V(直流 桥路电压: 2.5V)	$U=0.02\text{mV/V}$		2024-04-02
				180mV/V~1000mV/V(直流 桥路电压: 2.5V)	$U=0.11\text{mV/V}$		2024-04-02
		应变半桥 直流电压 比		1mV/V~10mV/V(直流桥路 电压: 1V)	$U=0.004\text{mV/V}$		2024-04-02
				10mV/V~20mV/V(直流桥 路电压: 1V)	$U=0.005\text{mV/V}$		2024-04-02
				20mV/V~100mV/V(直流桥 路电压: 1V)	$U=0.02\text{mV/V}$		2024-04-02
				0.4mV/V~2mV/V(直流桥 路电压: 2.5V)	$U=0.002\text{mV/V}$		2024-04-02
				2mV/V~5mV/V(直流桥路 电压: 2.5V)	$U=0.002\text{mV/V}$		2024-04-02



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		中国	合格评定 认可	5mV/V~10mV/V(直流桥路电压: 2.5V)	$U=0.002\text{mV/V}$		2024-04-02
				10mV/V~20mV/V(直流桥路电压: 2.5V)	$U=0.002\text{mV/V}$		2024-04-02
				20mV/V~100mV/V(直流桥路电压: 2.5V)	$U=0.010\text{mV/V}$		2024-04-02
				0.2mV/V~2mV/V(直流桥路电压: 5V)	$U=0.002\text{mV/V}$		2024-04-02
				2mV/V~5mV/V(直流桥路电压: 5V)	$U=0.002\text{mV/V}$		2024-04-02
				5mV/V~10mV/V(直流桥路电压: 5V)	$U=0.004\text{mV/V}$		2024-04-02
		1/4 桥微应变	2000 $\mu\text{m/m}$ ~ 20000 $\mu\text{m/m}$ (直流桥路电压: 1V)	$U=8\mu\text{m/m}$	2024-04-02		
			20000 $\mu\text{m/m}$ ~ 40000 $\mu\text{m/m}$ (直流桥路电压: 1V)	$U=10\mu\text{m/m}$	2024-04-02		
			40000 $\mu\text{m/m}$ ~ 200000 $\mu\text{m/m}$ (直流桥路电压: 1V)	$U=40\mu\text{m/m}$	2024-04-02		
			800 $\mu\text{m/m}$ ~ 4000 $\mu\text{m/m}$ (直流桥路电压: 2.5V)	$U=4\mu\text{m/m}$	2024-04-02		
			4000 $\mu\text{m/m}$ ~ 10000 $\mu\text{m/m}$ (直流桥路电压: 2.5V)	$U=4\mu\text{m/m}$	2024-04-02		



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 (k=2)	说明	生效日期
		中国合格评定认可委员会	合格评定认可委员会附件	10000μm/m ~ 20000μm/m (直流桥路电压: 2.5V)	$U=4\mu\text{m}/\text{m}$		2024-04-02
				20000μm/m ~ 40000μm/m (直流桥路电压: 2.5V)	$U=12\mu\text{m}/\text{m}$		2024-04-02
				40000μm/m ~ 200000μm/m (直流桥路电压: 2.5V)	$U=22\mu\text{m}/\text{m}$		2024-04-02
				400μm/m ~ 4000μm/m (直流桥路电压: 5V)	$U=4\mu\text{m}/\text{m}$		2024-04-02
				4000μm/m ~ 10000μm/m (直流桥路电压: 5V)	$U=4\mu\text{m}/\text{m}$		2024-04-02
				10000μm/m ~ 20000μm/m (直流桥路电压: 5V)	$U=8\mu\text{m}/\text{m}$		2024-04-02
2	高速数据采集和测量系统	直流电压	高速数据采集和测量系统校准实施细则 HBKCL-SOP-0016	10mV~120mV	$U=6.4 \times 10^{-6} U_x + 1.1\mu\text{V}$		2024-04-02
				0.12V~1.2V	$U=5.7 \times 10^{-6} U_x + 6\mu\text{V}$		2024-04-02
				1.2V~12V	$U=4.7 \times 10^{-6} U_x + 0.06\text{mV}$		2024-04-02
				12V~120V	$U=6.5 \times 10^{-6} U_x + 0.6\text{mV}$		2024-04-02
				120V~1000V	$U=7.2 \times 10^{-6} U_x + 6\text{mV}$		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		直流电流	合格评定国家认可委员会 认可证书附件	0.036mA~0.22mA	$U=64 \times 10^{-6} I_x + 0.06 \mu A$		2024-04-02
				0.22mA~2.2mA	$U=64 \times 10^{-6} I_x + 0.18 \mu A$		2024-04-02
				2.2mA~22mA	$U=64 \times 10^{-6} I_x + 0.24 \mu A$		2024-04-02
				22mA~220mA	$U=66 \times 10^{-6} I_x + 1.3 \mu A$		2024-04-02
		直流电阻		10 Ω	$U=0.40 m \Omega$		2024-04-02
				100 Ω	$U=2.0 m \Omega$		2024-04-02
				1000 Ω	$U=16 m \Omega$		2024-04-02
				10000 Ω	$U=0.15 \Omega$		2024-04-02
		交流电压		10mV~22mV (40Hz~20kHz)	$U=0.015\% U_x + 11 \mu V$		2024-04-02
				22mV~220mV (40Hz~20kHz)	$U=0.015\% U_x + 18 \mu V$		2024-04-02
				0.22V~2.2V (40Hz~20kHz)	$U=0.011\% U_x + 15 \mu V$		2024-04-02
				2.2V~22V (40Hz~20kHz)	$U=0.011\% U_x + 0.15 mV$		2024-04-02
				22V~220V (40Hz~20kHz)	$U=0.012\% U_x + 1.9 mV$		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		中国合格评定 认可委员会	JJG-1001-2015 直流电压源校准规范	220V~1000V (50Hz~1kHz)	$U=0.042\%U_x + 10\text{mV}$		2024-04-02
				10mV~22mV (20kHz~50kHz)	$U=0.042\%U_x + 6\mu\text{V}$		2024-04-02
				22mV~220mV (20kHz~50kHz)	$U=0.036\%U_x + 18\mu\text{V}$		2024-04-02
				0.22V~2.2V (20kHz~50kHz)	$U=0.02\%U_x + 0.04\text{mV}$		2024-04-02
				2.2V~22V (20kHz~50kHz)	$U=0.02\%U_x + 0.4\text{mV}$		2024-04-02
				22V~200V (20kHz~50kHz)	$U=0.028\%U_x + 8\text{mV}$		2024-04-02
				10mV~22mV (50kHz~100kHz)	$U=0.096\%U_x + 16\mu\text{V}$		2024-04-02
				22mV~220mV (50kHz~100kHz)	$U=0.096\%U_x + 0.06\text{mV}$		2024-04-02
				0.22V~2.2V (50kHz~100kHz)	$U=0.042\%U_x + 0.16\text{mV}$		2024-04-02
				2.2V~22V (50kHz~100kHz)	$U=0.042\%U_x + 0.8\text{mV}$		2024-04-02
				22V~200V (50kHz~100kHz)	$U=0.060\%U_x + 18\text{mV}$		2024-04-02
				10mV~22mV (100kHz~300kHz)	$U=0.14\%U_x + 26\mu\text{V}$		2024-04-02
				22mV~220mV (100kHz~300kHz)	$U=0.14\%U_x + 0.06\text{mV}$		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		中国合格评定 认可委员会	JJG 1005-2005 交流电压表	0.22V~2.2V (100kHz~300kHz)	$U=0.08\%U_x+0.29\text{mV}$		2024-04-02
				2.2V~20V (100kHz~300kHz)	$U=0.094\%U_x+4\text{mV}$		2024-04-02
				10mV~22mV (300kHz~500kHz)	$U=0.24\%U_x+0.06\text{mV}$		2024-04-02
				22mV~220mV (300kHz~500kHz)	$U=0.24\%U_x+0.08\text{mV}$		2024-04-02
				0.22V~2.2V (300kHz~500kHz)	$U=0.2\%U_x+0.8\text{mV}$		2024-04-02
				2.2V~20V (300kHz~500kHz)	$U=0.24\%U_x+10\text{mV}$		2024-04-02
				10mV~22mV (500kHz~1MHz)	$U=0.68\%U_x+0.06\text{mV}$		2024-04-02
				22mV~220mV (500kHz~1MHz)	$U=0.68\%U_x+0.18\text{mV}$		2024-04-02
				0.22V~2.2V (500kHz~1MHz)	$U=0.4\%U_x+1.9\text{mV}$		2024-04-02
				2.2V~20V (500kHz~1MHz)	$U=0.52\%U_x+19\text{mV}$		2024-04-02
		5mV~10mV (50kHz~100MHz)	$U=3.6\%U_x+0.3\text{mV}$	2024-04-02			
		10mV~100mV (50kHz~100MHz)	$U=3.6\%U_x+0.4\text{mV}$	2024-04-02			
		0.1V~1V (50kHz~100MHz)	$U=3.6\%U_x+1.1\text{mV}$	2024-04-02			
		交流电压 (高频)					



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
		中国	合格评定 认可委员会	1V~5V (50kHz~100MHz)	$U=3.6U_x+2.4mV$		2024-04-02
				5mV~10mV (100MHz~300MHz)	$U=4.2U_x+0.3mV$		2024-04-02
				10mV~100mV (100MHz~300MHz)	$U=4.2U_x+0.4mV$		2024-04-02
				0.1V~1V (100MHz~300MHz)	$U=4.2U_x+1.2mV$		2024-04-02
				1V~5V (100MHz~300MHz)	$U=4.2U_x+2.4mV$		2024-04-02
		交流电流		2.2mA~22mA (40Hz~1kHz)	$U=0.024\%I_x+0.8\mu A$		2024-04-02
				2.2mA~22mA (1kHz~5kHz)	$U=0.062\%I_x+9\mu A$		2024-04-02
				2.2mA~22mA (>5kHz~10kHz)	$U=0.29\%I_x+18\mu A$		2024-04-02
				22mA~220mA (40Hz~1kHz)	$U=0.024\%I_x+8\mu A$		2024-04-02
				22mA~220mA (1kHz~5kHz)	$U=0.062\%I_x+0.09mA$		2024-04-02
				22mA~220mA (5kHz~10kHz)	$U=0.29\%I_x+0.18mA$		2024-04-02
				0.22A~2.0A (40Hz~1kHz)	$U=0.12\%I_x+0.08mA$		2024-04-02
				0.22A~2.0A (1kHz~5kHz)	$U=0.14\%I_x+0.18mA$		2024-04-02



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序号	测量仪器名称	被测量	校准规范	测量范围	扩展不确定度 ($k=2$)	说明	生效日期
			JJG 1036-2005 合格评定国家认可委员会 认可证书附件	0.22A~2.0A (5kHz~10kHz)	$U=1.5\% I_x+0.4\text{mA}$		2024-04-02
		频带宽度		100kHz~100MHz	$U_{rel}=2.0\%$		2024-04-02
		IEPE 恒流激励电压		23V~30V	$U=0.14\text{V}$		2024-04-02
		IEPE 恒流激励电流		2mA	$U_{rel}=0.25\%$		2024-04-02
				4mA	$U_{rel}=0.23\%$		2024-04-02
				6mA	$U_{rel}=0.22\%$		2024-04-02
				8mA	$U_{rel}=0.22\%$		2024-04-02



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Name: Spectris Instrumentation & Systems Shanghai Co., Ltd. HBK Calibration Laboratory

Address: Room 208 and 209, No.106, Hengshan Road, Huqiu District, Suzhou, Jiangsu, China

Registration No. CNAS L5523

Accreditation Criteria: ISO/IEC 17025:2017 and relevant requirements of CNAS

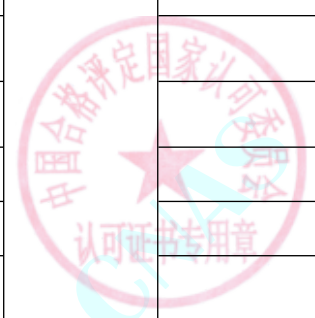
Effective Date: 2024-04-02 Expiry Date: 2030-03-19

CHINA NATIONAL ACCREDITATION SERVICE FOR CONFORMITY ASSESSMENT
SCHEDULE OF ACCREDITATION CERTIFICATE

SCHEDULE 5 ACCREDITED CALIBRATION AND MEASUREMENT CAPABILITY SCOPE

Note: The instruments with * represents onsite calibration can be performed.

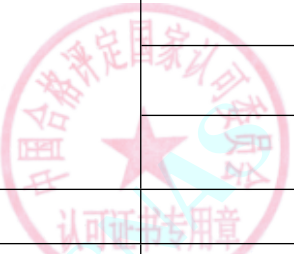
No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
1. Acoustics							
1	*Sound Calibrator	Sound Pressure Level	Electroacoustics: Sound Calibrators IEC60942, Verification Regulation of Sound Calibrators JJG176	94dB,104dB,114dB (31.5Hz)	U=0.14dB		
				94dB,104dB,114dB (63Hz,125Hz,250Hz,500Hz,1kHz,2kHz,4kHz)	U=0.11dB		
				94dB,104dB,114dB (8kHz,12.5kHz)	U=0.13dB		
				94dB,104dB,114dB (16kHz)	U=0.14dB		
				124dB (250Hz)	U=0.10dB		
		Frequency		31.5Hz~16kHz	U _{rel} =0.0014%		
		Total Distortion		0.01%~30%	U=0.2%		



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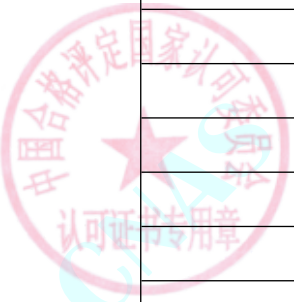
The scope of the accreditation in Chinese remains the definitive version.

No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date	
2	*Microphone	Sound Sensitivity Level (Sound Calibrator Method)	Measurement microphones- Part 6 Electrostatic actuators for determination of frequency response IEC 61094-6, Verification Regulation of the working standard microphones(Electrostatic Actuator Method) JJG 175	-60dB~0dB(250Hz,Ref 1V/Pa)	U=0.14dB			
		Pressure Field Frequency Response (Electrostatic Actuator Method)		40dB~130dB, 20Hz~5kHz	U=0.10dB			
				40dB~130dB, 5kHz~10kHz	U=0.12dB			
				40dB~130dB, 10kHz~40kHz	U=0.20dB			
				40dB~130dB, 40kHz~80kHz	U=0.25dB			
				40dB~130dB, 80kHz~100kHz	U=0.30dB			
				Free Field and Diffuse Field Frequency Response (Electrostatic Actuator Method)	40dB~130dB, 20Hz~5kHz	U=0.20dB		
					40dB~130dB, 5kHz~10kHz	U=0.24dB		
					40dB~130dB, 10kHz~40kHz	U=0.40dB		
		40dB~130dB, 40kHz~80kHz			U=0.50dB			
			40dB~130dB, 80kHz~100kHz	U=0.60dB				
2. Data acquisition/measurement instrument (system)								
1	Multifunctional data acquisition and measurement	DC Voltage	Calibration Procedure for Multifunctional data acquisition and measurement	0.01V~0.045V	U=30×10 ⁻⁶ U _x +4μV			
				0.045V~0.3V	U=30×10 ⁻⁶ U _x +13μV			



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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
	instrument		instrument HBKCL-SOP-0015	0.3V~0.45V	$U=30 \times 10^{-6} U_x + 23\mu V$		
				0.45V~3V	$U=30 \times 10^{-6} U_x + 0.13mV$		
				3V~4.5V	$U=30 \times 10^{-6} U_x + 0.23mV$		
				4.5V~30V	$U=30 \times 10^{-6} U_x + 1.4mV$		
		DC Voltage		0.01V~0.1V	$U=37 \times 10^{-6} U_x + 7\mu V$		
				0.1V~1V	$U=36 \times 10^{-6} U_x + 14\mu V$		
				1V~10V	$U=36 \times 10^{-6} U_x + 0.06mV$		
				10V~100V	$U=53 \times 10^{-6} U_x + 1mV$		
		DC Current		0.002A~0.0075A	$U=70 \times 10^{-6} I_x + 0.9\mu A$		
				0.0075A~0.052A	$U=70 \times 10^{-6} I_x + 4\mu A$		
		DC Resistance		16Ω~400Ω	$U=36 \times 10^{-6} R_x + 3m\Omega$		
				400Ω~2000Ω	$U=54 \times 10^{-6} R_x + 0.24m\Omega$		
				2000Ω~10000Ω	$U=1.6 \times 10^{-4} R_x + 2.6m\Omega$		
		Temperature(Indicators for resistance thermometers PT100)		-100℃~200℃	$U=0.02^\circ C$		
				200℃~500℃	$U=0.03^\circ C$		
				500℃~800℃	$U=0.04^\circ C$		
		Temperature(Indicators for resistance thermometers PT1000)		-100℃~200℃	$U=0.02^\circ C$		
				200℃~500℃	$U=0.08^\circ C$		
				500℃~800℃	$U=0.12^\circ C$		

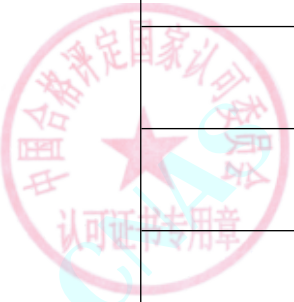


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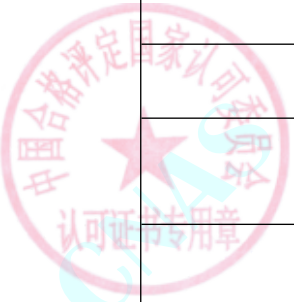
No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
		Temperature(Indicators for thermocouples Type K)		-100℃ ~ 800℃	U=0.12℃		
		Temperature(Indicators for thermocouples Type T)		800℃ ~ 1300℃	U=0.3℃		
		Frequency		2kHz~2000kHz	U _{rel} =0.0012%		
		Strain Gauge Full Bridge DC Voltage Ratio		2mV/V Range(0%~100%) (DC Bridge Voltage: 5V)	U=0.3μV/V		
				5mV/V Range(0%~100%) (DC Bridge Voltage: 5V)	U=0.6μV/V		
				10mV/V Range(0%~100%) (DC Bridge Voltage: 5V)	U=1.2μV/V		
				20mV/V Range(0%~50%) (DC Bridge Voltage: 5V)	U=2.2μV/V		
		Strain Gauge Full Bridge AC Voltage Ratio		2mV/V Range(0%~100%) (Bridge Voltage: 5V, Frequency:4.8kHz)	U=0.4μV/V		
				5mV/V Range(0%~100%) (Bridge Voltage: 2.5V, Frequency:4.8kHz)	U=2μV/V		
				10mV/V Range(0%~100%) (Bridge Voltage: 2.5V, Frequency:4.8kHz)	U=2μV/V		



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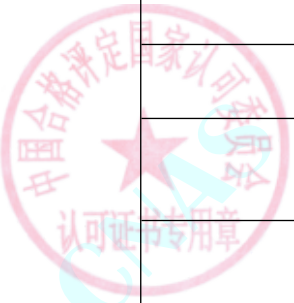
The scope of the accreditation in Chinese remains the definitive version.

No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
		Inductive Full Bridge AC Voltage Ratio		20mV/V Range(0%~100%) (Bridge Voltage: 2.5V, Frequency:4.8kHz)	U=10μV/V		
				100mV/V Range(0%~100%) (Bridge Voltage: 2.5V, Frequency:4.8kHz)	U=12μV/V		
		Piezoresistive Full Bridge DC Voltage Ratio		1000mV/V Range(0%~100%) (Bridge Voltage: 1V, Frequency:4.8kHz)	U=0.12mV/V		
				1mV/V~45mV/V(DC Bridge Voltage: 1V)	U=0.006mV/V		
				45mV/V~300mV/V(DC Bridge Voltage: 1V)	U=0.03mV/V		
				300mV/V~450mV/V(DC Bridge Voltage: 1V)	U=0.05mV/V		
				450mV/V~1000mV/V(DC Bridge Voltage: 1V)	U=0.17mV/V		
				0.4mV/V~18mV/V(DC Bridge Voltage: 2.5V)	U=0.003mV/V		
				18mV/V~120mV/V(DC Bridge Voltage: 2.5V)	U=0.012mV/V		
				120mV/V~180mV/V(DC Bridge Voltage: 2.5V)	U=0.02mV/V		
				180mV/V~1000mV/V(DC Bridge Voltage: 2.5V)	U=0.11mV/V		



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		Strain Gauge Half Bridge DC Voltage Ratio		1mV/V~10mV/V(DC Bridge Voltage: 1V)	U=0.004mV/V		
				10mV/V~20mV/V(DC Bridge Voltage: 1V)	U=0.005mV/V		
				20mV/V~100mV/V(DC Bridge Voltage: 1V)	U=0.02mV/V		
				0.4mV/V~2mV/V(DC Bridge Voltage: 2.5V)	U=0.002mV/V		
				2mV/V~5mV/V(DC Bridge Voltage: 2.5V)	U=0.002mV/V		
				5mV/V~10mV/V(DC Bridge Voltage: 2.5V)	U=0.002mV/V		
				10mV/V~20mV/V(DC Bridge Voltage: 2.5V)	U=0.002mV/V		
				20mV/V~100mV/V(DC Bridge Voltage: 2.5V)	U=0.010mV/V		
				0.2mV/V~2mV/V(DC Bridge Voltage: 5V)	U=0.002mV/V		
				2mV/V~5mV/V(DC Bridge Voltage: 5V)	U=0.002mV/V		
				5mV/V~10mV/V(DC Bridge Voltage: 5V)	U=0.004mV/V		
		Strain Gauge Quarter Bridge Microstrain		2000μm/m ~ 20000μm/m(DC Bridge Voltage:1V)	U=8μm/m		
				20000μm/m ~ 40000μm/m(DC Bridge Voltage:1V)	U=10μm/m		

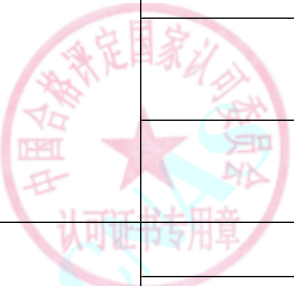


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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
				40000μm/m ~ 200000μm/m(DC Bridge Voltage:1V)	U=40μm/m		
				800μm/m ~ 4000μm/m(DC Bridge Voltage:2.5V)	U=4μm/m		
				4000μm/m ~ 10000μm/m(DC Bridge Voltage:2.5V)	U=4μm/m		
				10000μm/m ~ 20000μm/m(DC Bridge Voltage:2.5V)	U=4μm/m		
				20000μm/m ~ 40000μm/m(DC Bridge Voltage:2.5V)	U=12μm/m		
				40000μm/m ~ 200000μm/m(DC Bridge Voltage:2.5V)	U=22μm/m		
				400μm/m ~ 4000μm/m(DC Bridge Voltage:5V)	U=4μm/m		
				4000μm/m ~ 10000μm/m(DC Bridge Voltage:5V)	U=4μm/m		
				10000μm/m ~ 20000μm/m(DC Bridge Voltage:5V)	U=8μm/m		
				10mV~120mV	U=6.4×10 ⁻⁶ U _x +1.1μV		
				0.12V~1.2V	U=5.7×10 ⁻⁶ U _x +6μV		

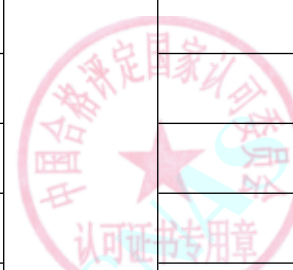


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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date	
	system		HBKCL-SOP-0016	1.2V~12V	$U=4.7 \times 10^{-6} U_x + 0.06\text{mV}$			
				12V~120V	$U=6.5 \times 10^{-6} U_x + 0.6\text{mV}$			
				120V~1000V	$U=7.2 \times 10^{-6} U_x + 6\text{mV}$			
		DC Current		0.036mA~0.22mA	$U=64 \times 10^{-6} I_x + 0.06\mu\text{A}$			
				0.22mA~2.2mA	$U=64 \times 10^{-6} I_x + 0.18\mu\text{A}$			
				2.2mA~22mA	$U=64 \times 10^{-6} I_x + 0.24\mu\text{A}$			
				22mA~220mA	$U=66 \times 10^{-6} I_x + 1.3\mu\text{A}$			
				DC Resistance	10 Ω			$U=0.40\text{m}\Omega$
					100 Ω			$U=2.0\text{m}\Omega$
		1000 Ω			$U=16\text{m}\Omega$			
		10000 Ω			$U=0.15\Omega$			
		AC Voltage		10mV~22mV(40Hz~20kHz)	$U=0.015\% U_x + 11\mu\text{V}$			
				22mV~220mV(40Hz~20kHz)	$U=0.015\% U_x + 18\mu\text{V}$			
				0.22V~2.2V(40Hz~20kHz)	$U=0.011\% U_x + 15\mu\text{V}$			
				2.2V~22V(40Hz~20kHz)	$U=0.011\% U_x + 0.15\text{mV}$			
				22V~220V(40Hz~20kHz)	$U=0.012\% U_x + 1.9\text{mV}$			
		220V~1000V(50Hz~1kHz)		$U=0.042\% U_x + 10\text{mV}$				

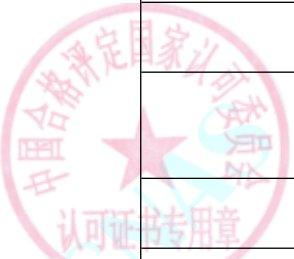


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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
				10mV~22mV(20kHz~50kHz)	$U=0.042\%U_x+6\mu V$		
				22mV~220mV(20kHz~50kHz)	$U=0.036\%U_x+18\mu V$		
				0.22V~2.2V(20kHz~50kHz)	$U=0.02\%U_x+0.04mV$		
				2.2V~22V(20kHz~50kHz)	$U=0.02\%U_x+0.4mV$		
				22V~200V(20kHz~50kHz)	$U=0.028\%U_x+8mV$		
				10mV~22mV(50kHz~100kHz)	$U=0.096\%U_x+16\mu V$		
				22mV~220mV(50kHz~100kHz)	$U=0.096\%U_x+0.06mV$		
				0.22V~2.2V(50kHz~100kHz)	$U=0.042\%U_x+0.16mV$		
				2.2V~22V(50kHz~100kHz)	$U=0.042\%U_x+0.8mV$		
				22V~200V(50kHz~100kHz)	$U=0.060\%U_x+18mV$		
				10mV~22mV(100kHz~300kHz)	$U=0.14\%U_x+26\mu V$		
				22mV~220mV(100kHz~300kHz)	$U=0.14\%U_x+0.06mV$		
				0.22V~2.2V(100kHz~300kHz)	$U=0.08\%U_x+0.29mV$		
				2.2V~20V(100kHz~300kHz)	$U=0.094\%U_x+4mV$		

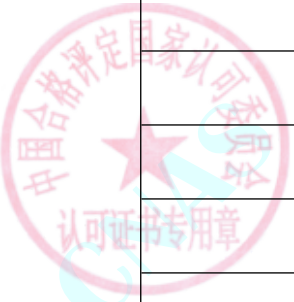


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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
		AC Voltage(High Frequency)	ilac-M	10mV~22mV(300kHz~500kHz)	$U=0.24\%U_x+0.06mV$		
				22mV~220mV(300kHz~500kHz)	$U=0.24\%U_x+0.08mV$		
				0.22V~2.2V(300kHz~500kHz)	$U=0.2\%U_x+0.8mV$		
				2.2V~20V(300kHz~500kHz)	$U=0.24\%U_x+10mV$		
				10mV~22mV(500kHz~1MHz)	$U=0.68\%U_x+0.06mV$		
				22mV~220mV(500kHz~1MHz)	$U=0.68\%U_x+0.18mV$		
				0.22V~2.2V(500kHz~1MHz)	$U=0.4\%U_x+1.9mV$		
				2.2V~20V(500kHz~1MHz)	$U=0.52\%U_x+19mV$		
				5mV~10mV (50kHz~100MHz)	$U=3.6\%U_x+0.3mV$		
				10mV~100mV (50kHz~100MHz)	$U=3.6\%U_x+0.4mV$		
				0.1V~1V (50kHz~100MHz)	$U=3.6\%U_x+1.1mV$		
				1V~5V (50kHz~100MHz)	$U=3.6\%U_x+2.4mV$		
				5mV~10mV (100MHz~300MHz)	$U=4.2\%U_x+0.3mV$		
				10mV~100mV (100MHz~300MHz)	$U=4.2\%U_x+0.4mV$		

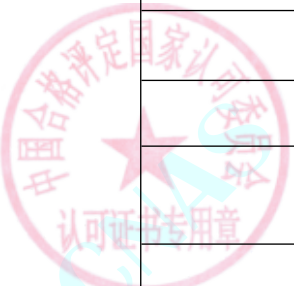


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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
				0.1V~1V (100MHz~300MHz)	$U=4.2\%U_x+1.2mV$		
				1V~5V (100MHz~300MHz)	$U=4.2\%U_x+2.4mV$		
		AC Current		2.2mA~22mA(40Hz~1kHz)	$U=0.024\%I_x+0.8\mu A$		
				2.2mA~22mA(1kHz~5kHz)	$U=0.062\%I_x+9\mu A$		
				2.2mA~22mA(>5kHz~10kHz)	$U=0.29\%I_x+18\mu A$		
				22mA~220mA(40Hz~1kHz)	$U=0.024\%I_x+8\mu A$		
				22mA~220mA(1kHz~5kHz)	$U=0.062\%I_x+0.09mA$		
				22mA~220mA(5kHz~10kHz)	$U=0.29\%I_x+0.18mA$		
				0.22A~2.0A(40Hz~1kHz)	$U=0.12\%I_x+0.08mA$		
				0.22A~2.0A(1kHz~5kHz)	$U=0.14\%I_x+0.18mA$		
				0.22A~2.0A(5kHz~10kHz)	$U=1.5\%I_x+0.4mA$		
			Frequency Bandwidth		100kHz~100MHz	$U_{rel}=2.0\%$	
		IEPE Compliance Voltage		23V~30V	$U=0.14V$		
		IEPE Excitation Current		2mA	$U_{rel}=0.25\%$		
				4mA	$U_{rel}=0.23\%$		



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No	Instrument	Measurand	Calibration Method	Range	Expanded Uncertainty (k=2)	Note	Effective Date
				6mA	$U_{rel}=0.22\%$		
				8mA	$U_{rel}=0.22\%$		

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