

校准证书

CALIBRATION CERTIFICATE



证书编号: TSS0058017-20240625-1

Certificate No.

送校单位: 北京昂升科技有限公司

Customer

单位地址: 北京市昌平区科星西路106号院6号楼1410室

Address

被校样品: Multifunction Calibrator

DUT

仪器型号: 5730A

Model

制造厂商: FLUKE

Manufacturer

序列号: 3563503

Serial Number

软件/固件版本: v2.00.01

SW/FW Version

Tektronix证明校准所用的标准设备的量值可溯源至国家基准, 其计量单位采用国际单位制(SI)计量单位和国家选定的其他计量单位。本校准符合ISO/IEC 17025:2017(CNAS-CL01)要求。

Tektronix certifies the used calibration standards traceable to National Primary Standards of P.R.C. that are linked to the international system of units(SI) and other units adopted by the P.R.C. This calibration complies ISO/IEC 17025:2017 (CNAS-CL01) requirements.

本实验室通过了:

This laboratory is accredited by

- ISO9001:2015国际质量体系认证, 认证机构DEKRA, 证书编号: 112237.00.
- DEKRA for ISO9001:2015 Quality Management System, Certificate No. 112237.00.
- 中国合格评定国家认可委员会的认可, 认可证书号: 国家认可委 CNAS L3429.
- China National Accreditation Service for Conformity Assessment (CNAS), Certificate No. CNAS L3429.

接收情况: 在接受区间内

Received Condition

In Acceptance Interval

接收日期:

Received Date

2024/06/19

校准结果: 所校项目在接受区间内

Calibration Result

All Items Calibrated in Acceptance Interval

校准日期:

Calibration Date

2024/06/25

校准: 吕鸿岩

Calibrated By

吕鸿岩

签发机构(专用章):

Issued By

核验: 林磊

Checked By

林磊

签发日期: 2024/06/25

Issue Date

批准: 王公森

Approved By

王公森



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校准技术依据: JJF 1638-2017 多功能标准源校准规范
Reference Documents JJF 1152-2006 任意波发生器校准规范
JJF 1638-2017 C.S. for Multifunction Standard Sources
JJF 1152-2006 C.S. of Arbitrary Waveform Generator

注/Notes: C.S.-Calibration Specification; V.R.-Verification Regulation

校准环境条件及地点:
Calibration Environment Condition and Location

温度: 19.8 ° C
Temperature
相对湿度: 54.8 %
Relative Humidity
校准地点: 泰克北京校准实验室-304房间
CAL Location Tektronix Beijing Cal Lab: RM304
其他: /
Others
实验室地址: 北京市朝阳区酒仙桥路6号院7号楼1至19层101内3层303室
Calibration Lab Address: Room303, 3/F, Building #7, No.6 Jiuxianqiao Road, Chaoyang District, Beijing

本次校准所使用的主要标准测量器具

Measurement Standards Used In This Calibration

标准设备名称	型号 / 规格	出厂编号	有效期至	溯源至及证书编号
STD Names	Type	Serial Number	Due Date	Traceable to & Certificate Number
AC MEASUREMENT STAND	5790B	5319901	2024/10/31	BO1MT/DD23-2053
Kelvin-Varley Voltage Divider	720A	2820002	2024/07/14	BO1MT/DD23-1216
CURRENT SHUNT	A40B-10MA	212765413	2024/07/10	BO1MT/DC23-0672
CURRENT SHUNT	A40B-50MA	212765415	2024/07/10	BO1MT/DC23-0672
CURRENT SHUNT	A40B-500MA	212765418	2024/07/10	BO1MT/DC23-0672
CURRENT SHUNT	A40B-2A	212765420	2024/07/10	BO1MT/DC23-0672
Standard Resistance	742A-100	2141010	2024/07/10	BO1MT/DC23-0638
Standard Resistance	742A-10	2141011	2024/07/10	BO1MT/DC23-0638
Standard Resistance	742A-100K	2141012	2024/07/10	BO1MT/DC23-0638
Standard Resistance	742A-1M	2141013	2024/07/10	BO1MT/DC23-0632
Standard Resistance	742A-1K	2141014	2024/07/10	BO1MT/DC23-0638
Standard Resistance	742A-10M	2141015	2024/07/10	BO1MT/DC23-0632
High Value Standard Resistance	9334A-100M	70577	2024/08/02	BO1MT/DC23-0721
Reference Divider	752A	4365200	2024/07/14	BO1MT/DD23-1215
Counter	FCA3000	262626	2025/04/26	TEK (NIM) /TSS256206503-20240426-1
Standard Resistance	742A-1	4710013	2024/07/10	BO1MT/DC23-0638
Standard Resistance	742A-10K	4710047	2024/07/10	BO1MT/DC23-0638
Reference Multimeter	8508A	197464516	2024/09/21	TEK (BO1MT) /TSS256210575-20230921-1
CURRENT SHUNT	A40B-1MA	197464450	2024/07/10	BO1MT/DC23-0672
DC Reference STD	732A	4355000	2024/07/14	BO1MT/DB23-0015

标准测量器具的溯源说明

Traceability Explanation of Measurement Standards

NIM: 中国计量科学研究院
National Institute of Metrology
CIMM: 中国航空工业集团公司北京长城计量测试技术研究所
Beijing Changcheng Institute of Metrology & Measurement, AVIC
BIM: 北京市计量检测科学研究院
Beijing Institute of Metrology

BO1MT: 北京东方计量测试研究所
Beijing Orient Institute of Measurement & Test
TEK: 泰克科技(中国)有限公司北京分公司
Tektronix (China) Co., Ltd Beijing Branch
TEK(NIM): 表示TEK校准且外部溯源至NIM
TEK calibration and external traceable to NIM

校准数据报告

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Step/Operation	STD Value/Nominal Value	Lower Limit	Measured Value	Upper Limit	U (k=2)	Result
PHYSICAL APPEARANCE CHECK						Pass
1 Year Specification Limits shown, except as noted						
99% Confidence Level						
DC Voltage Accuracy						
0.22V Range						
0.19000000 V	0.19000000 V	0.18999779 V	0.18999985 V	0.19000221 V	0.00000064 V	Pass
0.15000000 V	0.15000000 V	0.14999815 V	0.14999986 V	0.15000185 V	0.00000054 V	Pass
0.10000000 V	0.10000000 V	0.09999860 V	0.09999986 V	0.10000140 V	0.00000041 V	Pass
0.05000000 V	0.05000000 V	0.04999905 V	0.04999995 V	0.05000095 V	0.00000028 V	Pass
0.01000000 V	0.01000000 V	0.00999941 V	0.01000005 V	0.01000059 V	0.00000018 V	Pass
-0.19000000 V	-0.19000000 V	-0.19000221 V	-0.18999970 V	-0.18999779 V	0.00000064 V	Pass
-0.10000000 V	-0.10000000 V	-0.10000140 V	-0.09999984 V	-0.09999860 V	0.00000041 V	Pass
-0.01000000 V	-0.01000000 V	-0.01000059 V	-0.00999991 V	-0.00999941 V	0.00000018 V	Pass
2.2V Range						
1.9000000 V	1.9000000 V	1.8999878 V	1.8999950 V	1.9000122 V	0.0000048 V	Pass
1.5000000 V	1.5000000 V	1.4999902 V	1.4999955 V	1.5000098 V	0.0000038 V	Pass
1.0000000 V	1.0000000 V	0.9999932 V	0.9999967 V	1.0000068 V	0.0000025 V	Pass
0.6000000 V	0.6000000 V	0.5999956 V	0.5999979 V	0.6000044 V	0.0000015 V	Pass
0.3000000 V	0.3000000 V	0.2999974 V	0.2999988 V	0.3000026 V	0.0000008 V	Pass
-1.9000000 V	-1.9000000 V	-1.9000122 V	-1.8999958 V	-1.8999878 V	0.0000048 V	Pass
-1.0000000 V	-1.0000000 V	-1.0000068 V	-0.9999972 V	-0.9999932 V	0.0000025 V	Pass
-0.3000000 V	-0.3000000 V	-0.3000026 V	-0.2999991 V	-0.2999974 V	0.0000008 V	Pass
11V Range						
10.000000 V	10.000000 V	9.999957 V	9.999990 V	10.000043 V	0.000020 V	Pass
9.000000 V	9.000000 V	8.999961 V	8.999990 V	9.000039 V	0.000018 V	Pass
8.000000 V	8.000000 V	7.999965 V	7.999990 V	8.000035 V	0.000016 V	Pass
7.000000 V	7.000000 V	6.999969 V	6.999991 V	7.000031 V	0.000014 V	Pass
6.000000 V	6.000000 V	5.999973 V	5.999992 V	6.000027 V	0.000012 V	Pass
5.000000 V	5.000000 V	4.999977 V	4.999994 V	5.000023 V	0.000010 V	Pass
4.000000 V	4.000000 V	3.999981 V	3.999995 V	4.000019 V	0.000008 V	Pass
3.000000 V	3.000000 V	2.999985 V	2.999996 V	3.000015 V	0.000006 V	Pass
-10.000000 V	-10.000000 V	-10.000043 V	-9.999994 V	-9.999957 V	0.000020 V	Pass
-6.000000 V	-6.000000 V	-6.000027 V	-5.999995 V	-5.999973 V	0.000012 V	Pass
-3.000000 V	-3.000000 V	-3.000015 V	-2.999997 V	-2.999985 V	0.000006 V	Pass
22V Range						
19.000000 V	19.000000 V	18.999919 V	18.999990 V	19.000081 V	0.000038 V	Pass
18.000000 V	18.000000 V	17.999923 V	17.999990 V	18.000077 V	0.000036 V	Pass
16.000000 V	16.000000 V	15.999931 V	15.999991 V	16.000069 V	0.000032 V	Pass
14.000000 V	14.000000 V	13.999939 V	13.999992 V	14.000061 V	0.000028 V	Pass
12.000000 V	12.000000 V	11.999947 V	11.999992 V	12.000053 V	0.000024 V	Pass
-19.000000 V	-19.000000 V	-19.000081 V	-18.999996 V	-18.999919 V	0.000038 V	Pass
-16.000000 V	-16.000000 V	-16.000069 V	-15.999996 V	-15.999931 V	0.000032 V	Pass
-12.000000 V	-12.000000 V	-12.000053 V	-11.999996 V	-11.999947 V	0.000024 V	Pass
220V Range						
190.00000 V	190.00000 V	189.99881 V	190.00021 V	190.00119 V	0.00039 V	Pass
150.00000 V	150.00000 V	149.99905 V	150.00013 V	150.00095 V	0.00031 V	Pass
100.00000 V	100.00000 V	99.99935 V	100.00008 V	100.00065 V	0.00021 V	Pass

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Step/Operation	STD Value/Nominal Value	Lower Limit	Measured Value	Upper Limit	U (k=2)	Result
60.00000 V	60.00000 V	59.99959 V	60.00005 V	60.00041 V	0.00013 V	Pass
30.00000 V	30.00000 V	29.99977 V	30.00003 V	30.00023 V	0.00007 V	Pass
-190.00000 V	-190.00000 V	-190.00119 V	-190.00006 V	-189.99881 V	0.00039 V	Pass
-100.00000 V	-100.00000 V	-100.00065 V	-100.00002 V	-99.99935 V	0.00021 V	Pass
-30.00000 V	-30.00000 V	-30.00023 V	-30.00000 V	-29.99977 V	0.00007 V	Pass
1100V Range						
1000.0000 V	1000.0000 V	999.9915 V	1000.0024 V	1000.0085 V	0.0026 V	Pass
800.0000 V	800.0000 V	799.9931 V	800.0021 V	800.0069 V	0.0021 V	Pass
500.0000 V	500.0000 V	499.9955 V	500.0015 V	500.0045 V	0.0013 V	Pass
300.0000 V	300.0000 V	299.9971 V	300.0010 V	300.0029 V	0.0008 V	Pass
-1000.0000 V	-1000.0000 V	-1000.0085 V	-1000.0022 V	-999.9915 V	0.0026 V	Pass
-300.0000 V	-300.0000 V	-300.0029 V	-300.0009 V	-299.9971 V	0.0008 V	Pass

AC Voltage Accuracy

22 mV Range						
20 mV @ 10 Hz	20.0000 mV	19.9890 mV	19.9960 mV	20.0110 mV	0.0077 mV	Pass
20 mV @ 20 Hz	20.0000 mV	19.9927 mV	19.9967 mV	20.0073 mV	0.0055 mV	Pass
20 mV @ 40 Hz	20.0000 mV	19.9930 mV	19.9965 mV	20.0070 mV	0.0037 mV	Pass
20 mV @ 1 kHz	20.0000 mV	19.9930 mV	19.9964 mV	20.0070 mV	0.0037 mV	Pass
20 mV @ 20 kHz	20.0000 mV	19.9930 mV	19.9972 mV	20.0070 mV	0.0037 mV	Pass
20 mV @ 50 kHz	20.0000 mV	19.9900 mV	19.9984 mV	20.0100 mV	0.0064 mV	Pass
20 mV @ 100 kHz	20.0000 mV	19.9820 mV	20.0006 mV	20.0180 mV	0.0090 mV	Pass
20 mV @ 300 kHz	20.0000 mV	19.962 mV	19.989 mV	20.038 mV	0.021 mV	Pass
20 mV @ 500 kHz	20.0000 mV	19.941 mV	19.961 mV	20.059 mV	0.027 mV	Pass
20 mV @ 1 MHz	20.0000 mV	19.907 mV	19.981 mV	20.093 mV	0.044 mV	Pass
15 mV @ 1 kHz	15.0000 mV	14.9935 mV	14.9973 mV	15.0065 mV	0.0031 mV	Pass
10 mV @ 10 Hz	10.0000 mV	9.9920 mV	9.9987 mV	10.0080 mV	0.0045 mV	Pass
10 mV @ 20 Hz	10.0000 mV	9.9938 mV	9.9986 mV	10.0062 mV	0.0034 mV	Pass
10 mV @ 40 Hz	10.0000 mV	9.9940 mV	9.9987 mV	10.0060 mV	0.0024 mV	Pass
10 mV @ 1 kHz	10.0000 mV	9.9940 mV	9.9986 mV	10.0060 mV	0.0024 mV	Pass
10 mV @ 20 kHz	10.0000 mV	9.9940 mV	9.9991 mV	10.0060 mV	0.0024 mV	Pass
10 mV @ 50 kHz	10.0000 mV	9.9925 mV	9.9998 mV	10.0075 mV	0.0042 mV	Pass
10 mV @ 100 kHz	10.0000 mV	9.9880 mV	10.0014 mV	10.0120 mV	0.0058 mV	Pass
10 mV @ 300 kHz	10.0000 mV	9.975 mV	9.997 mV	10.025 mV	0.012 mV	Pass
10 mV @ 500 kHz	10.0000 mV	9.958 mV	9.985 mV	10.042 mV	0.017 mV	Pass
10 mV @ 1 MHz	10.0000 mV	9.941 mV	10.000 mV	10.059 mV	0.027 mV	Pass

220 mV Range						
200 mV @ 10 Hz	200.000 mV	199.925 mV	199.999 mV	200.075 mV	0.043 mV	Pass
200 mV @ 20 Hz	200.000 mV	199.972 mV	200.001 mV	200.028 mV	0.020 mV	Pass
200 mV @ 40 Hz	200.000 mV	199.978 mV	199.994 mV	200.022 mV	0.010 mV	Pass
200 mV @ 1 kHz	200.000 mV	199.978 mV	199.992 mV	200.022 mV	0.010 mV	Pass
200 mV @ 20 kHz	200.000 mV	199.978 mV	199.994 mV	200.022 mV	0.010 mV	Pass
200 mV @ 50 kHz	200.000 mV	199.962 mV	199.996 mV	200.038 mV	0.016 mV	Pass
200 mV @ 100 kHz	200.000 mV	199.900 mV	200.001 mV	200.100 mV	0.036 mV	Pass
200 mV @ 300 kHz	200.000 mV	199.815 mV	200.038 mV	200.185 mV	0.056 mV	Pass
200 mV @ 500 kHz	200.000 mV	199.630 mV	200.086 mV	200.370 mV	0.091 mV	Pass
200 mV @ 1 MHz	200.00 mV	199.28 mV	200.31 mV	200.72 mV	0.21 mV	Pass
150 mV @ 1 kHz	150.0000 mV	149.9815 mV	149.9934 mV	150.0185 mV	0.0078 mV	Pass
100 mV @ 1 kHz	100.0000 mV	99.9850 mV	99.9956 mV	100.0150 mV	0.0056 mV	Pass
30 mV @ 10 Hz	30.0000 mV	29.976 mV	30.000 mV	30.024 mV	0.010 mV	Pass

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30 mV @ 20 Hz	30.0000 mV	29.9916 mV	30.0007 mV	30.0084 mV	0.0054 mV	Pass
30 mV @ 40 Hz	30.0000 mV	29.9899 mV	30.0000 mV	30.0101 mV	0.0037 mV	Pass
30 mV @ 1 kHz	30.0000 mV	29.9899 mV	29.9997 mV	30.0101 mV	0.0037 mV	Pass
30 mV @ 20 kHz	30.0000 mV	29.9899 mV	30.0004 mV	30.0101 mV	0.0037 mV	Pass
30 mV @ 50 kHz	30.0000 mV	29.9875 mV	30.0006 mV	30.0125 mV	0.0059 mV	Pass
30 mV @ 100 kHz	30.0000 mV	29.968 mV	30.002 mV	30.032 mV	0.010 mV	Pass
30 mV @ 300 kHz	30.0000 mV	29.951 mV	30.009 mV	30.049 mV	0.020 mV	Pass
30 mV @ 500 kHz	30.0000 mV	29.919 mV	30.021 mV	30.081 mV	0.029 mV	Pass
30 mV @ 1 MHz	30.0000 mV	29.841 mV	30.076 mV	30.159 mV	0.042 mV	Pass
2.2 V Range						
2 V @ 10 Hz	2.00000 V	1.99935 V	1.99944 V	2.00065 V	0.00044 V	Pass
2 V @ 20 Hz	2.00000 V	1.99976 V	1.99985 V	2.00024 V	0.00014 V	Pass
2 V @ 40 Hz	2.000000 V	1.999894 V	1.999981 V	2.000106 V	0.000052 V	Pass
2 V @ 1 kHz	2.000000 V	1.999894 V	2.000003 V	2.000106 V	0.000052 V	Pass
2 V @ 20 kHz	2.000000 V	1.999894 V	1.999992 V	2.000106 V	0.000052 V	Pass
2 V @ 50 kHz	2.000000 V	1.999828 V	1.999966 V	2.000172 V	0.000095 V	Pass
2 V @ 100 kHz	2.00000 V	1.99976 V	1.99990 V	2.00024 V	0.00015 V	Pass
2 V @ 300 kHz	2.00000 V	1.99910 V	1.99972 V	2.00090 V	0.00032 V	Pass
2 V @ 500 kHz	2.00000 V	1.99735 V	1.99973 V	2.00265 V	0.00054 V	Pass
2 V @ 1 MHz	2.00000 V	1.99560 V	2.00009 V	2.00440 V	0.0018 V	Pass
1.5 V @ 1 kHz	1.500000 V	1.491895 V	1.500001 V	1.508105 V	0.000039 V	Pass
1 V @ 1 kHz	1.000000 V	0.991930 V	1.000002 V	1.008070 V	0.000026 V	Pass
0.3 V @ 10 Hz	0.300000 V	0.299860 V	0.300004 V	0.300140 V	0.000072 V	Pass
0.3 V @ 20 Hz	0.300000 V	0.299947 V	0.300004 V	0.300053 V	0.000028 V	Pass
0.3 V @ 40 Hz	0.300000 V	0.299976 V	0.300001 V	0.300024 V	0.000013 V	Pass
0.3 V @ 1 kHz	0.300000 V	0.299976 V	0.300000 V	0.300024 V	0.000013 V	Pass
0.3 V @ 20 kHz	0.300000 V	0.299976 V	0.300001 V	0.300024 V	0.000013 V	Pass
0.3 V @ 50 kHz	0.300000 V	0.299964 V	0.300004 V	0.300036 V	0.000018 V	Pass
0.3 V @ 100 kHz	0.300000 V	0.299930 V	0.300004 V	0.300070 V	0.000027 V	Pass
0.3 V @ 300 kHz	0.300000 V	0.299780 V	0.300006 V	0.300220 V	0.000060 V	Pass
0.3 V @ 500 kHz	0.300000 V	0.29939 V	0.30003 V	0.30061 V	0.00010 V	Pass
0.3 V @ 1 MHz	0.30000 V	0.29900 V	0.30020 V	0.30100 V	0.00033 V	Pass
22 V Range						
20 V @ 10 Hz	20.0000 V	19.9935 V	19.9945 V	20.0065 V	0.0046 V	Pass
20 V @ 20 Hz	20.0000 V	19.9976 V	19.9985 V	20.0024 V	0.0014 V	Pass
20 V @ 40 Hz	20.00000 V	19.99897 V	19.99965 V	20.00103 V	0.00061 V	Pass
20 V @ 1 kHz	20.00000 V	19.99897 V	20.00011 V	20.00103 V	0.00061 V	Pass
20 V @ 20 kHz	20.00000 V	19.99897 V	20.00019 V	20.00103 V	0.00061 V	Pass
20 V @ 50 kHz	20.0000 V	19.9983 V	20.0001 V	20.0017 V	0.0010 V	Pass
20 V @ 100 kHz	20.0000 V	19.9978 V	20.0000 V	20.0022 V	0.0017 V	Pass
20 V @ 300 kHz	20.0000 V	19.9932 V	20.0006 V	20.0068 V	0.0038 V	Pass
20 V @ 500 kHz	20.0000 V	19.9735 V	20.0006 V	20.0265 V	0.0082 V	Pass
20 V @ 1 MHz	20.000 V	19.960 V	20.015 V	20.040 V	0.024 V	Pass
15 V @ 1 kHz	15.00000 V	14.99921 V	14.99997 V	15.00079 V	0.00046 V	Pass
10 V @ 1 kHz	10.00000 V	9.99945 V	9.99999 V	10.00055 V	0.00031 V	Pass
3 V @ 10 Hz	3.00000 V	2.99860 V	2.99920 V	3.00140 V	0.00071 V	Pass
3 V @ 20 Hz	3.00000 V	2.99947 V	2.99985 V	3.00053 V	0.00022 V	Pass
3 V @ 40 Hz	3.000000 V	2.999786 V	2.999972 V	3.000214 V	0.000078 V	Pass
3 V @ 1 kHz	3.000000 V	2.999786 V	3.000007 V	3.000214 V	0.000078 V	Pass
3 V @ 20 kHz	3.000000 V	2.999786 V	3.000033 V	3.000214 V	0.000078 V	Pass
3 V @ 50 kHz	3.00000 V	2.99964 V	3.00004 V	3.00036 V	0.00015 V	Pass
3 V @ 100 kHz	3.00000 V	2.99945 V	3.00005 V	3.00055 V	0.00026 V	Pass

校准数据报告

CALIBRATION DATA REPORT



证书编号: TSS0058017-20240625-1

Certificate No.

数据类型: Found-Left

Data Type

校准项目 Step/Operation	标准值/标称值 STD Value/Nominal Value	容许下限 Lower Limit	测量值 Measured Value	容许上限 Upper Limit	扩展不确定度 U (k=2)	结果 Result
3 V @ 300 kHz	3.00000 V	2.99830 V	3.00030 V	3.00170 V	0.00057 V	Pass
3 V @ 500 kHz	3.0000 V	2.9939 V	3.0005 V	3.0061 V	0.0013 V	Pass
3 V @ 1 MHz	3.0000 V	2.9906 V	3.0038 V	3.0094 V	0.0034 V	Pass
220 V Range						
200 V @ 10 Hz	200.000 V	199.935 V	199.940 V	200.065 V	0.044 V	Pass
200 V @ 20 Hz	200.000 V	199.976 V	199.988 V	200.024 V	0.015 V	Pass
200 V @ 40 Hz	200.0000 V	199.9863 V	199.9957 V	200.0137 V	0.0069 V	Pass
200 V @ 1 kHz	200.0000 V	199.9863 V	199.9988 V	200.0137 V	0.0069 V	Pass
200 V @ 20 kHz	200.0000 V	199.9863 V	200.0024 V	200.0137 V	0.0069 V	Pass
200 V @ 50 kHz	200.000 V	199.979 V	200.008 V	200.021 V	0.014 V	Pass
200 V @ 100 kHz	200.000 V	199.961 V	200.010 V	200.039 V	0.020 V	Pass
150 V @ 1 kHz	150.0000 V	149.9896 V	149.9986 V	150.0104 V	0.0052 V	Pass
100 V @ 1 kHz	100.0000 V	99.9928 V	99.9992 V	100.0072 V	0.0035 V	Pass
30 V @ 10 Hz	30.0000 V	29.9860 V	29.9921 V	30.0140 V	0.0072 V	Pass
30 V @ 20 Hz	30.0000 V	29.9947 V	29.9983 V	30.0053 V	0.0023 V	Pass
30 V @ 40 Hz	30.0000 V	29.9974 V	29.9996 V	30.0026 V	0.0011 V	Pass
30 V @ 1 kHz	30.0000 V	29.9974 V	29.9999 V	30.0026 V	0.0011 V	Pass
30 V @ 20 kHz	30.0000 V	29.9974 V	30.0006 V	30.0026 V	0.0011 V	Pass
30 V @ 50 kHz	30.0000 V	29.9958 V	30.0022 V	30.0042 V	0.0018 V	Pass
30 V @ 100 kHz	30.0000 V	29.9916 V	30.0051 V	30.0084 V	0.0030 V	Pass
1100 V Range(BOOST OFF)						
1000 V @ 50 Hz	1000.000 V	999.911 V	1000.005 V	1000.089 V	0.041 V	Pass
1000 V @ 1 kHz	1000.000 V	999.911 V	1000.022 V	1000.089 V	0.041 V	Pass
800 V @ 1 kHz	800.000 V	799.928 V	800.019 V	800.072 V	0.034 V	Pass
500 V @ 1 kHz	500.000 V	499.954 V	500.009 V	500.046 V	0.023 V	Pass
300 V @ 50 Hz	300.000 V	299.970 V	300.001 V	300.030 V	0.014 V	Pass
300 V @ 1 kHz	300.000 V	299.970 V	300.008 V	300.030 V	0.014 V	Pass
Resistance Accuracy						
0.99988350 Ω	0.9998835 Ω	0.9997735 Ω	0.9998869 Ω	0.9999935 Ω	0.0000064 Ω	Pass
10.0001430 Ω	10.000143 Ω	9.999873 Ω	10.000005 Ω	10.000413 Ω	0.000083 Ω	Pass
100.002130 Ω	100.00213 Ω	100.00093 Ω	100.00139 Ω	100.00333 Ω	0.00061 Ω	Pass
1.00001480 kΩ	1.0000148 kΩ	1.0000068 kΩ	1.0000115 kΩ	1.0000228 kΩ	0.0000063 kΩ	Pass
10.0001030 kΩ	10.000103 kΩ	10.000023 kΩ	10.000080 kΩ	10.000183 kΩ	0.000041 kΩ	Pass
100.001580 kΩ	100.00158 kΩ	100.00058 kΩ	100.00184 kΩ	100.00258 kΩ	0.00063 kΩ	Pass
0.99993890 MΩ	0.9999389 MΩ	0.9999239 MΩ	0.9999423 MΩ	0.9999539 MΩ	0.0000086 MΩ	Pass
10.000278 MΩ	10.000278 MΩ	9.99982 MΩ	10.00030 MΩ	10.00074 MΩ	0.00010 MΩ	Pass
99.99752 MΩ	99.99752 MΩ	99.9855 MΩ	99.9948 MΩ	100.0095 MΩ	0.0015 MΩ	Pass
DC Current Accuracy						
0.22 mA Range						
0.1900000 mA	0.1900000 mA	0.1899835 mA	0.1899995 mA	0.1900165 mA	0.0000018 mA	Pass
0.1500000 mA	0.1500000 mA	0.1499855 mA	0.1499994 mA	0.1500145 mA	0.0000015 mA	Pass
0.1000000 mA	0.1000000 mA	0.0999880 mA	0.0999994 mA	0.1000120 mA	0.0000011 mA	Pass
0.0500000 mA	0.0500000 mA	0.0499905 mA	0.0499995 mA	0.0500095 mA	0.0000008 mA	Pass
0.0100000 mA	0.0100000 mA	0.0099925 mA	0.0099995 mA	0.0100075 mA	0.0000005 mA	Pass
-0.1900000 mA	-0.1900000 mA	-0.1900165 mA	-0.1900006 mA	-0.1899835 mA	0.0000018 mA	Pass
-0.1000000 mA	-0.1000000 mA	-0.1000120 mA	-0.1000005 mA	-0.0999880 mA	0.0000011 mA	Pass
-0.0100000 mA	-0.0100000 mA	-0.0100075 mA	-0.0100005 mA	-0.0099925 mA	0.0000005 mA	Pass

校准数据报告

CALIBRATION DATA REPORT



证书编号: TSS0058017-20240625-1

Certificate No.

数据类型: Found-Left

Data Type

校准项目 Step/Operation	标准值/标称值 STD Value/Nominal Value	容许下限 Lower Limit	测量值 Measured Value	容许上限 Upper Limit	扩展不确定度 U (k=2)	结果 Result
2.2 mA Range						
1.900000 mA	1.900000 mA	1.899916 mA	1.899995 mA	1.900084 mA	0.000017 mA	Pass
1.500000 mA	1.500000 mA	1.499932 mA	1.499995 mA	1.500068 mA	0.000014 mA	Pass
1.000000 mA	1.000000 mA	0.999952 mA	0.999996 mA	1.000048 mA	0.000010 mA	Pass
0.600000 mA	0.600000 mA	0.599968 mA	0.599997 mA	0.600032 mA	0.000007 mA	Pass
0.300000 mA	0.300000 mA	0.299980 mA	0.299998 mA	0.300020 mA	0.000004 mA	Pass
-1.900000 mA	-1.900000 mA	-1.900084 mA	-1.900002 mA	-1.899916 mA	0.000017 mA	Pass
-1.000000 mA	-1.000000 mA	-1.000048 mA	-1.000001 mA	-0.999952 mA	0.000010 mA	Pass
-0.300000 mA	-0.300000 mA	-0.300020 mA	-0.300001 mA	-0.299980 mA	0.000004 mA	Pass
22 mA Range						
19.00000 mA	19.00000 mA	18.99919 mA	18.99988 mA	19.00081 mA	0.00017 mA	Pass
18.00000 mA	18.00000 mA	17.99923 mA	17.99989 mA	18.00077 mA	0.00016 mA	Pass
16.00000 mA	16.00000 mA	15.99931 mA	15.99989 mA	16.00069 mA	0.00015 mA	Pass
14.00000 mA	14.00000 mA	13.99939 mA	13.99990 mA	14.00061 mA	0.00013 mA	Pass
12.00000 mA	12.00000 mA	11.99947 mA	11.99991 mA	12.00053 mA	0.00012 mA	Pass
10.00000 mA	10.00000 mA	9.99955 mA	9.99992 mA	10.00045 mA	0.00010 mA	Pass
8.00000 mA	8.00000 mA	7.99963 mA	7.99993 mA	8.00037 mA	0.00008 mA	Pass
6.00000 mA	6.00000 mA	5.99971 mA	5.99994 mA	6.00029 mA	0.00007 mA	Pass
3.00000 mA	3.00000 mA	2.99983 mA	2.99995 mA	3.00017 mA	0.00004 mA	Pass
-19.00000 mA	-19.00000 mA	-19.00081 mA	-19.00009 mA	-18.99919 mA	0.00017 mA	Pass
-10.00000 mA	-10.00000 mA	-10.00045 mA	-10.00005 mA	-9.99955 mA	0.00010 mA	Pass
-3.00000 mA	-3.00000 mA	-3.00017 mA	-3.00004 mA	-2.99983 mA	0.00004 mA	Pass
220 mA Range						
190.0000 mA	190.0000 mA	189.9883 mA	190.0010 mA	190.0117 mA	0.0023 mA	Pass
150.0000 mA	150.0000 mA	149.9910 mA	150.0008 mA	150.0090 mA	0.0013 mA	Pass
100.0000 mA	100.0000 mA	99.9942 mA	100.0005 mA	100.0058 mA	0.0013 mA	Pass
60.0000 mA	60.0000 mA	59.9962 mA	60.0003 mA	60.0038 mA	0.0008 mA	Pass
30.0000 mA	30.0000 mA	29.9977 mA	30.0001 mA	30.0023 mA	0.0005 mA	Pass
-190.0000 mA	-190.0000 mA	-190.0117 mA	-190.0024 mA	-189.9883 mA	0.0023 mA	Pass
-100.0000 mA	-100.0000 mA	-100.0058 mA	-100.0010 mA	-99.9942 mA	0.0013 mA	Pass
-30.0000 mA	-30.0000 mA	-30.0023 mA	-30.0002 mA	-29.9977 mA	0.0005 mA	Pass
2.2 A Range						
2.000000 A	2.000000 A	1.999725 A	2.000020 A	2.000275 A	0.000055 A	Pass
1.500000 A	1.500000 A	1.499816 A	1.500008 A	1.500184 A	0.000042 A	Pass
1.000000 A	1.000000 A	0.999895 A	1.000001 A	1.000105 A	0.000028 A	Pass
0.600000 A	0.600000 A	0.599931 A	0.599999 A	0.600069 A	0.000017 A	Pass
0.300000 A	0.300000 A	0.299958 A	0.299999 A	0.300042 A	0.000009 A	Pass
-2.000000 A	-2.000000 A	-2.000275 A	-2.000046 A	-1.999725 A	0.000055 A	Pass
-1.000000 A	-1.000000 A	-1.000105 A	-1.000012 A	-0.999895 A	0.000028 A	Pass
-0.300000 A	-0.300000 A	-0.300042 A	-0.300001 A	-0.299958 A	0.000009 A	Pass

AC Current Accuracy

0.22 mA Range						
0.2 mA @ 10 Hz	0.200000 mA	0.199920 mA	0.200003 mA	0.200080 mA	0.000074 mA	Pass
0.2 mA @ 20 Hz	0.200000 mA	0.199948 mA	0.200004 mA	0.200052 mA	0.000032 mA	Pass
0.2 mA @ 40 Hz	0.200000 mA	0.199966 mA	0.199997 mA	0.200034 mA	0.000019 mA	Pass
0.2 mA @ 1 kHz	0.200000 mA	0.199966 mA	0.199997 mA	0.200034 mA	0.000019 mA	Pass
0.2 mA @ 5 kHz	0.200000 mA	0.199915 mA	0.200004 mA	0.200085 mA	0.000019 mA	Pass

校准数据报告

CALIBRATION DATA REPORT



证书编号: TSS0058017-20240625-1

Certificate No.

数据类型: Found-Left

Data Type

校准项目 Step/Operation	标准值/标称值 STD Value/Nominal Value	容许下限 Lower Limit	测量值 Measured Value	容许上限 Upper Limit	扩展不确定度 U (k=2)	结果 Result
0.2 mA @ 10 kHz	0.200000 mA	0.199660 mA	0.200003 mA	0.200340 mA	0.000019 mA	Pass
0.15 mA @ 1 kHz	0.150000 mA	0.149972 mA	0.149996 mA	0.150028 mA	0.000016 mA	Pass
0.02 mA @ 10 Hz	0.020000 mA	0.019974 mA	0.020001 mA	0.020026 mA	0.000013 mA	Pass
0.02 mA @ 20 Hz	0.020000 mA	0.019984 mA	0.020001 mA	0.020016 mA	0.000010 mA	Pass
0.02 mA @ 40 Hz	0.020000 mA	0.019988 mA	0.020001 mA	0.020012 mA	0.000006 mA	Pass
0.02 mA @ 1 kHz	0.020000 mA	0.019988 mA	0.020001 mA	0.020012 mA	0.000006 mA	Pass
0.02 mA @ 5 kHz	0.020000 mA	0.019978 mA	0.020004 mA	0.020022 mA	0.000006 mA	Pass
0.02 mA @ 10 kHz	0.020000 mA	0.019894 mA	0.020005 mA	0.020106 mA	0.000006 mA	Pass
2.2 mA Range						
2 mA @ 10 Hz	2.00000 mA	1.99935 mA	1.99997 mA	2.00065 mA	#0.00067 mA	Pass
2 mA @ 20 Hz	2.00000 mA	1.99956 mA	1.99999 mA	2.00044 mA	0.00033 mA	Pass
2 mA @ 40 Hz	2.00000 mA	1.99972 mA	1.99995 mA	2.00028 mA	0.00010 mA	Pass
2 mA @ 1 kHz	2.00000 mA	1.99972 mA	1.99998 mA	2.00028 mA	0.00010 mA	Pass
2 mA @ 5 kHz	2.00000 mA	1.99939 mA	1.99992 mA	2.00061 mA	0.00010 mA	Pass
2 mA @ 10 kHz	2.00000 mA	1.99660 mA	1.99966 mA	2.00340 mA	0.00010 mA	Pass
1.5 mA @ 1 kHz	1.50000 mA	1.49978 mA	1.49996 mA	1.50022 mA	0.00007 mA	Pass
1 mA @ 1 kHz	1.00000 mA	0.99984 mA	1.00000 mA	1.00016 mA	0.00006 mA	Pass
0.3 mA @ 10 Hz	0.30000 mA	0.29986 mA	0.30001 mA	0.30014 mA	0.00011 mA	Pass
0.3 mA @ 20 Hz	0.30000 mA	0.29990 mA	0.30001 mA	0.30010 mA	0.00004 mA	Pass
0.3 mA @ 40 Hz	0.30000 mA	0.29992 mA	0.30000 mA	0.30008 mA	0.00003 mA	Pass
0.3 mA @ 1 kHz	0.30000 mA	0.29992 mA	0.30000 mA	0.30008 mA	0.00003 mA	Pass
0.3 mA @ 5 kHz	0.30000 mA	0.29980 mA	0.30002 mA	0.30020 mA	0.00003 mA	Pass
0.3 mA @ 10 kHz	0.30000 mA	0.29881 mA	0.29999 mA	0.30119 mA	0.00003 mA	Pass
22 mA Range						
20 mA @ 10 Hz	20.0000 mA	19.9935 mA	19.9953 mA	20.0065 mA	#0.0068 mA	Pass
20 mA @ 20 Hz	20.0000 mA	19.9956 mA	19.9992 mA	20.0044 mA	0.0023 mA	Pass
20 mA @ 40 Hz	20.0000 mA	19.9972 mA	20.0002 mA	20.0028 mA	0.0012 mA	Pass
20 mA @ 1 kHz	20.0000 mA	19.9972 mA	20.0001 mA	20.0028 mA	0.0012 mA	Pass
20 mA @ 5 kHz	20.0000 mA	19.9945 mA	19.9991 mA	20.0055 mA	0.0012 mA	Pass
20 mA @ 10 kHz	20.0000 mA	19.9680 mA	19.9975 mA	20.0320 mA	0.0012 mA	Pass
15 mA @ 1 kHz	15.0000 mA	14.9978 mA	14.9999 mA	15.0022 mA	0.0010 mA	Pass
10 mA @ 1 kHz	10.0000 mA	9.9984 mA	9.9998 mA	10.0016 mA	0.0004 mA	Pass
3 mA @ 10 Hz	3.0000 mA	2.9986 mA	3.0000 mA	3.0014 mA	0.0010 mA	Pass
3 mA @ 20 Hz	3.00000 mA	2.99900 mA	3.00000 mA	3.00100 mA	0.00043 mA	Pass
3 mA @ 40 Hz	3.00000 mA	2.99924 mA	2.99994 mA	3.00076 mA	0.00014 mA	Pass
3 mA @ 1 kHz	3.00000 mA	2.99924 mA	2.99987 mA	3.00076 mA	0.00014 mA	Pass
3 mA @ 5 kHz	3.00000 mA	2.99858 mA	3.00012 mA	3.00142 mA	0.00014 mA	Pass
3 mA @ 10 kHz	3.00000 mA	2.99010 mA	3.00033 mA	3.00990 mA	0.00014 mA	Pass
220 mA Range						
200 mA @ 10 Hz	200.000 mA	199.935 mA	199.958 mA	200.065 mA	#0.068 mA	Pass
200 mA @ 20 Hz	200.000 mA	199.956 mA	199.998 mA	200.044 mA	0.023 mA	Pass
200 mA @ 40 Hz	200.000 mA	199.973 mA	200.006 mA	200.027 mA	0.011 mA	Pass
200 mA @ 1 kHz	200.000 mA	199.973 mA	200.009 mA	200.027 mA	0.011 mA	Pass
200 mA @ 5 kHz	200.000 mA	199.948 mA	199.999 mA	200.052 mA	0.011 mA	Pass
200 mA @ 10 kHz	200.000 mA	199.728 mA	199.982 mA	200.272 mA	0.011 mA	Pass
150 mA @ 1 kHz	150.000 mA	149.979 mA	150.005 mA	150.021 mA	0.009 mA	Pass
100 mA @ 1 kHz	100.0000 mA	99.9850 mA	100.0024 mA	100.0150 mA	0.0057 mA	Pass
50 mA @ 1 kHz	50.0000 mA	49.9910 mA	49.9995 mA	50.0090 mA	0.0027 mA	Pass
30 mA @ 10 Hz	30.0000 mA	29.9860 mA	30.0003 mA	30.0140 mA	0.0097 mA	Pass
30 mA @ 20 Hz	30.0000 mA	29.9900 mA	30.0007 mA	30.0100 mA	0.0047 mA	Pass
30 mA @ 40 Hz	30.0000 mA	29.9934 mA	29.9998 mA	30.0066 mA	0.0019 mA	Pass

校准数据报告

CALIBRATION DATA REPORT



证书编号: TSS0058017-20240625-1

Certificate No.

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Data Type

校准项目 Step/Operation	标准值/标称值 STD Value/Nominal Value	容许下限 Lower Limit	测量值 Measured Value	容许上限 Upper Limit	扩展不确定度 U (k=2)	结果 Result
30 mA @ 1 kHz	30.0000 mA	29.9934 mA	29.9999 mA	30.0066 mA	0.0019 mA	Pass
30 mA @ 5 kHz	30.0000 mA	29.9888 mA	30.0040 mA	30.0112 mA	0.0019 mA	Pass
30 mA @ 10 kHz	30.0000 mA	29.9490 mA	30.0059 mA	30.0510 mA	0.0019 mA	Pass
2.2 A Range						
2 A @ 20 Hz	2.00000 A	1.99936 A	1.99999 A	2.00064 A	0.00023 A	Pass
2 A @ 40 Hz	2.00000 A	1.99936 A	2.00006 A	2.00064 A	0.00010 A	Pass
2 A @ 1 kHz	2.00000 A	1.99936 A	2.00008 A	2.00064 A	0.00010 A	Pass
2 A @ 5 kHz	2.00000 A	1.99890 A	1.99993 A	2.00110 A	0.00010 A	Pass
2 A @ 10 kHz	2.00000 A	1.98380 A	2.00001 A	2.01620 A	0.00010 A	Pass
1.5 A @ 1 kHz	1.500000 A	1.499510 A	1.500013 A	1.500490 A	0.000077 A	Pass
1 A @ 1 kHz	1.000000 A	0.999660 A	1.000026 A	1.000340 A	0.000040 A	Pass
0.5 A @ 1 kHz	0.500000 A	0.499810 A	0.499997 A	0.500190 A	0.000028 A	Pass
0.3 A @ 20 Hz	0.300000 A	0.299870 A	0.300003 A	0.300130 A	0.000038 A	Pass
0.3 A @ 40 Hz	0.300000 A	0.299870 A	0.299996 A	0.300130 A	0.000019 A	Pass
0.3 A @ 1 kHz	0.300000 A	0.299870 A	0.300002 A	0.300130 A	0.000019 A	Pass
0.3 A @ 5 kHz	0.300000 A	0.299750 A	0.300026 A	0.300250 A	0.000019 A	Pass
0.3 A @ 10 kHz	0.300000 A	0.297400 A	0.300020 A	0.302600 A	0.000019 A	Pass
FREQUENCY ACCURACY						
2V @ 1.0MHz	1.0000000 MHz	0.99997500 MHz	0.99998915 MHz	1.00002500 MHz	0.0000005 MHz	Pass
2V @ 100kHz	100.00000 kHz	99.997500 kHz	99.998930 kHz	100.002500 kHz	0.00005 kHz	Pass
2V @ 10kHz	10.000000 kHz	9.9997500 kHz	9.9998891 kHz	10.0002500 kHz	0.000003 kHz	Pass
2V @ 1kHz	1.0000000 kHz	0.99997500 kHz	0.99998890 kHz	1.00002500 kHz	0.0000005 kHz	Pass
2V @ 100Hz	100.00000 Hz	99.997500 Hz	99.998871 Hz	100.002500 Hz	0.00005 Hz	Pass
2V @ 10Hz	10.000000 Hz	9.9997500 Hz	9.9998810 Hz	10.0002500 Hz	0.000005 Hz	Pass

符合性声明: 规则 1

The statement of conformity: Decision Rule 1

校准数据报告说明

Explanation of Calibration Data Report

证书编号: TSS0058017-20240625-1

Certificate No.

本报告中测量扩展不确定度符合《ISO测量不确定度表示指南(GUM)》，其置信因子(k)为2，置信概率约为95%。

The measurement expanded uncertainties provided in the report comply with The ISO Guide to the Expression of Uncertainty in Measurement (GUM).

The coverage factor (k) is 2, with coverage probability of approximately 95%.

除特殊说明外，容许下限/容许上限是根据被校样品厂家说明书计算获得。

Except special explanation, Lower Limit/Upper Limit are calculated according to UUT's manufacturer specification manual.

数据类型:

The data types:

As Found: 调整和/或维修前的校准数据报告。

As Found: Calibration data collected before the unit is adjusted and/or repaired.

As Left: 调整和/或维修后的校准数据报告。

As Left: Calibration data collected after the unit has been adjusted and /or repaired.

Found-Left: 没有实施调整和/或维修的校准数据报告。

Found-Left: Calibration data collected without any adjustment and/or repair performed.

被校样品的“接收情况”与“校准结果”和“数据类型”有关。

The device-under-test overall "Received Conditions" is determined on "Calibration Result" and "Data Type".

判定规则和符合性声明:

The decision rules and statements of conformity:

规则0(DR0): 校准数据报告中无符合性判断，但包含测量值和对应测量结果的扩展不确定度。

Decision Rule 0(DR0): The Calibration Data Report doesn't provide the statement of conformity, but it includes Measured Value with the Expanded Measurement Uncertainty.

规则1(DR1): 简单的二元接受，校准数据报告中有符合性判断，且包含测量结果的扩展不确定度。接受限等同于容许限，如 CNAS-GL015:2022 附录B示例1所示。测试不确定度比(TUR)应尽可能大于4:1，且不小于1:1。

Decision Rule 1(DR1): Binary simple acceptance rule. The Calibration Data Report provide the statement of conformity, also includes Measured Value with the Expanded Measurement Uncertainty. Acceptance limit is equal to tolerance limit, as showed in CNAS-GL015:2022 APPENDIX B, Example 1. The test uncertainty ratio (TUR) shall be greater than 4:1 whenever attainable, although never less than 1:1.

规则2(DR2): 基于保护带的二元接受，校准数据报告中有符合性判断，且包含测量结果的扩展不确定度。接受限(AL)由公式 $AL = \sqrt{(TL^2 - U^2)}$ (均方根) 计算获得, TL 是校准点的容许限, U 是测量结果的扩展不确定度，如CNAS-GL015:2022 附录B示例3所示。测试不确定度比(TUR)应尽可能大于4:1，且不小于1:1。

Decision Rule 2(DR2): Binary acceptance rule based on guard band. The Calibration Data Report provide the statement of conformity, also include Measured Value with the Expanded Measurement Uncertainty. Acceptance limit is given by $AL = \sqrt{(TL^2 - U^2)}$ (Root-Difference-Square). TL is tolerance limit of calibration point and U is the expanded measurement uncertainty, as showed in CNAS-GL015:2022 APPENDIX B, Example 3. The test uncertainty ratio (TUR) shall be greater than 4:1 whenever attainable, although never less than 1:1.

规则3(DR3): 基于保护带 $w=U$ 的非二元接受，校准数据报告中有符合性判断，且包含测量结果的扩展不确定度。接受区间是容许区间的一部分，接受限等于容许限减去保护带，保护带等于测量结果的扩展不确定度，如CNAS-GL015:2022 附录B示例2所示。测试不确定度比(TUR)应尽可能大于4:1，且不小于1:1。

Decision Rule 3(DR3): Non-binary acceptance rule based on guard band $w=U$. The Calibration Data Report provide the statement of conformity, also includes Measured Value with the Expanded Measurement Uncertainty. Acceptance Interval is part of tolerance Interval, the upper acceptance limit is upper tolerance limit minus guard band, the lower acceptance limit is lower tolerance limit minus guard band, as showed in CNAS-GL015:2022 APPENDIX B, Example 2. The test uncertainty ratio (TUR) shall be greater than 4:1 whenever attainable, although never less than 1:1.

校准数据报告可能包含超出认可能力范围或测试不确定度比(TUR)小于1:1的校准。如果有，这些校准被“#”标注。

The Calibration Data Report may contain measurements that are not covered by the Scope of Accreditation or test uncertainty ratio less than 1:1. These measurements are indicated by a pound sign(#).

校准数据报告结束

Calibration Data Report Complete