

14 April 2020

www.pta.asn.au

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Dear Mr Khan,

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RE: DIGITAL MULTIMETER PROFICIENCY TESTING PROGRAM ROUND 5

Code No: 4

To provide participants with early information concerning their performance in the above proficiency testing program, a summary report detailing your laboratory's performance is attached.

As laboratory contact this information is forwarded to you for review and distribution to relevant laboratory staff.

The final report will be available to download on the PTA website: www.pta.asn.au. I will contact you when this is available.

Please be advised that the test item used in this program is still available for troubleshooting or training purposes at the reduced rate of \$960 plus GST. Please contact me for further details.

If you have any queries at this stage, please contact me.

Yours sincerely



Dr Michael Li

**SENIOR SCIENTIFIC OFFICER
PROFICIENCY TESTING AUSTRALIA**

PROFICIENCY TESTING AUSTRALIA

REPORT No. 1180 LABORATORY SUMMARY SHEET

DIGITAL MULTIMETER (ROUND 5) INTERLABORATORY COMPARISON

Keysight 34465A Digital Multimeter (MY54502348)

Laboratory Name: **HK Calibration Technologies Pty Ltd**
Testing Officer: **Nilay Patel**

Lab Code: **4**
Report Date: **2-Oct-19**
Ambient Temp: **23.2 °C**

DC VOLTAGE

RANGE (V)	NOMINAL (V)	REFERENCE (μ V)		LAB (μ V)		LAB - REF (μ V)	E_n RATIO
		CORR.	U_{REF}	CORR.	U_{LAB}		
0.1	0	0.0	0.3	-0.2	7	-0.20	-0.03
0.1	0.1	0.9	0.9	2.51	7	1.66	0.24
0.1	-0.1	0.1	0.9	-2.19	7	-2.24	-0.32
1	1	3.5	41	13.5	43	10.00	0.17
1	-1	2.0	41	-8.1	43	-10.10	-0.17
10	5	25	20	61	230	36.00	0.16
10	10	60	30	135	430	75.00	0.17
10	-5	-20	20	-53	230	-33.00	-0.14
10	-10	-45	30	-103	430	-58.00	-0.13
100	100	-350	2800	390	4700	740.00	0.14
100	-100	550	2800	-190	4700	-740.00	-0.14
1000	100	0	3500	800	4700	800.00	0.14
1000	1000	1500	25500	13300	44000	11800.00	0.23
1000	-1000	500	25500	-7800	44000	-8300.00	-0.16

AC VOLTAGE

NOMINAL (V)	FREQ (kHz)	REFERENCE (mV)		LAB (mV)		LAB - REF (mV)	E_n RATIO
		CORR.	U_{REF}	CORR.	U_{LAB}		
0.01	1	0.0012	0.0039	0.00057	0.023	-0.001	-0.02
0.1	1	0.0110	0.0115	0.0098	0.039	-0.001	-0.03
1	0.057	0.030	0.075	0.0066	0.28	-0.02	-0.08
1	1	0.015	0.070	-0.0179	0.28	-0.03	-0.11
1	50	-0.520	0.175	-0.6595	0.82	-0.14	-0.17
10	0.057	0.00	0.75	-0.133	2.8	-0.13	-0.05
10	1	-0.20	0.75	0.255	2.8	0.46	0.16
10	50	-5.45	1.75	-5.4	8.2	0.05	0.01
100	0.057	4.0	8.0	3.45	41	-0.55	-0.01
100	1	3.0	8.0	10.18	41	7.18	0.17
100	50	-57.0	17.5	-61.57	100	-4.57	-0.05
750	0.057	-102	57	31.4	310	132.90	0.42
750	1	-125	57	-10.5	310	114.50	0.36

PROFICIENCY TESTING AUSTRALIA

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DC CURRENT

RANGE (A)	NOMINAL (A)	REFERENCE (µA)		LAB (µA)		LAB - REF (µA)	E _n RATIO
		CORR.	U _{REF}	CORR.	U _{LAB}		
0.01	0.01	-0.57	0.26	-0.25	0.97	0.32	0.31
0.1	0.1	-5.0	2.9	-3.21	9.7	1.79	0.18
3	1	-290	45	-239.8	330	50.20	0.15

AC CURRENT

RANGE (A)	NOMINAL (A)	REFERENCE (µA)		LAB (µA)		LAB - REF (µA)	E _n RATIO
		CORR.	U _{REF}	CORR.	U _{LAB}		
1	0.01 @ 57Hz	-2	10	-1.584	4.7	-0.08	-0.01
1	0.01 @ 1kHz	-2	10	-1.285	4.7	0.22	0.02
1	0.1 @ 400Hz	-30	37	-11.02	47	18.48	0.31
1	0.1 @ 1kHz	-24	37	-13.16	47	10.84	0.18
3	1 @ 57Hz	16	115	-90.6	470	-106.10	-0.22
3	1 @ 400Hz	-7	115	-63.5	470	-57.00	-0.12
3	1 @ 1kHz	0	115	-41.2	470	-41.20	-0.09

RESISTANCE

NOMINAL (Ω)	REFERENCE (Ω)		LAB (Ω)		LAB - REF (Ω)	E _n RATIO
	CORR.	U _{REF}	CORR.	U _{LAB}		
100	-0.0014	0.0017	0.00121	0.0081	0.003	0.32
100 000	-0.2	1.4	-0.31	8.7	-0.11	-0.01
10 000 000	-55	420	-41	4700	14.00	0.003

Notes: 1. Reference Laboratory: National Measurement Institute (NMI), Australia. Ref No: RN200025 & RN181086.

2. Uncertainties of measurement are at a 95% confidence level.

3.
$$E_n = \frac{\text{LAB} - \text{REF}}{\sqrt{(U_{\text{LAB}})^2 + (U_{\text{REF}})^2}}$$
 Values of |E_n| ≥ 1.0 require investigation.

4. E_n ratios are based on laboratory's reported uncertainties and calibration data from NMI.

5. Confidentiality: Refer to Guide to Proficiency Testing Australia (2019).

6. This summary sheet should be read in conjunction with the final report found at www.pta.asn.au. The above results are from one proficiency program and may not be fully representative of a laboratory's overall performance. Therefore, this summary sheet should not be used solely to evaluate laboratory competence.

Date of issue: 14 April 2020

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