

Schedule

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FIELD OF TESTING : Calibration and Measurement

MEASURED QUANTITIES/INSTRUMENTS/ RANGE TO BE CALIBRATED	METHOD / FREQUENCY	CALIBRATION AND MEASUREMENT CAPABILITY (CMC *)
<p>ELECTRICAL</p> <p>1. DC Voltage - Measure</p> <p>0 – 329.999 9 mV 0.33 V – 3.299 999 V 3.3 V – 32.999 99 V 33 V – 329.999 9 V 330 V – 1000.000 V</p> <p>2. DC Current - Measure</p> <p>0 – 329.999 μA 0.33 mA – 3.299 99 mA 3.3 mA – 32.9999 mA 33 mA – 329.999 mA 0.33 A – 1.099 99 A 1.1 A – 2.999 99 A 3 A – 10.999 9 A</p>	<p>SOP – MDCV – 01, Rev B (17/7/06)</p> <p>SOP – MDCC – 02, Rev B (17/7/06)</p>	<p>16 ppm + 1.1 μV 9 ppm + 6 μV 10 ppm + 60 μV 14 ppm + 600 μV 14 ppm + 1300 μV</p> <p>120 ppm + 0.02 μA 78 ppm + 0.07 μA 78 ppm + 0.3 μA 78 ppm + 3.0 μA 160 ppm + 35 μA 300 ppm + 35 μA 390 ppm + 700 μA</p>

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<p>3. Resistance – Measure</p> <p>0 – 10.999 9 Ω</p> <p>11 Ω – 32.999 9 Ω</p> <p>33 Ω – 109.999 9 Ω</p> <p>110 Ω – 329.999 9 Ω</p> <p>330 Ω – 1.099 999 kΩ</p> <p>1.1 kΩ – 3.299 999 kΩ</p> <p>3.3 kΩ – 10.999 99 kΩ</p> <p>11 kΩ – 32.999 99 kΩ</p> <p>33 kΩ – 109.999 9 kΩ</p> <p>110 kΩ – 329.999 9 kΩ</p> <p>0.33 MΩ – 1.099 999 MΩ</p> <p>1.1 MΩ – 3.299 999 MΩ</p> <p>3.3 MΩ – 10.999 99 MΩ</p> <p>11 MΩ – 32.999 99 MΩ</p> <p>33 MΩ – 109.999 9 MΩ</p> <p>100 kΩ – 1000 kΩ</p> <p>1 MΩ – 10 MΩ</p> <p>10 MΩ – 100 MΩ</p> <p>500 MΩ</p> <p>1 GΩ</p>	<p>SOP – MRES – 03, Rev B (17/7/06)</p> <p>SOP – IRT-21, Rev A (18/4/12)</p>	<p>32 ppm + 0.008 Ω</p> <p>24 ppm + 0.012 Ω</p> <p>22 ppm + 0.012 Ω</p> <p>22 ppm + 0.016 Ω</p> <p>22 ppm + 0.02 Ω</p> <p>22 ppm + 0.16 Ω</p> <p>22 ppm + 0.08 Ω</p> <p>22 ppm + 0.8 Ω</p> <p>22 ppm + 0.8 Ω</p> <p>25 ppm + 8 Ω</p> <p>25 ppm + 8 Ω</p> <p>47 ppm + 120 Ω</p> <p>110 ppm + 200 Ω</p> <p>200 ppm + 2000 Ω</p> <p>390 ppm + 2700 Ω</p> <p>0.06 % + 6 kΩ</p> <p>0.12 % + 6 kΩ</p> <p>0.24 % + 60 kΩ</p> <p>1.2 % + 600 kΩ</p> <p>1.2 % + 600 kΩ</p>
<p>4. Capacitance – Measure</p> <p>0.4 nF – 1.099 9 nF</p> <p>3.3 nF – 10.999 nF</p> <p>33 nF – 109.999 nF</p> <p>0.33 μF – 1.099 99 μF</p> <p>3.3 μF – 10.999 9 μF</p> <p>33 μF – 109.999 μF</p> <p>0.33 μF – 1.099 99 mF</p> <p>3.3 mF – 10.999 9 mF</p>	<p>SOP – MCAP – 14, Rev B (17/7/06)</p> <p>} 10 Hz - 1 kHz</p> <p>} 10 Hz - 120 Hz</p> <p>} 10 Hz - 80 Hz</p> <p>0 - 20 Hz</p> <p>0 - 2 Hz</p>	<p>0.40 % + 0.01 nF</p> <p>0.20 % + 0.01 nF</p> <p>0.20 % + 0.1 nF</p> <p>0.20 % + 1 nF</p> <p>0.20 % + 10 nF</p> <p>0.35 % + 100 nF</p> <p>0.35 % + 1000 nF</p> <p>0.35 % + 10 000 nF</p>

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5. AC Voltage – Measure	SOP – MACV – 04, Rev B (17/7/06)	
1 mV – 32.999 mV	}	120 ppm + 5 μ V
33 mV – 329.999 mV	}	120 ppm + 7 μ V
0.33 V – 3.299 99 V	} 45 Hz - 1 kHz	120 ppm + 50 μ V
3.3 V – 32.9999 V	}	120 ppm + 500 μ V
33 V – 329.999 V	}	150 ppm + 1700 μ V
330 V – 1020.00 V	}	240 ppm + 8000 μ V
6. AC Current – Measure	SOP – MACC – 05, Rev B (17/7/06)	
29 μ A – 329.99 μ A	}	0.10 % + 0.08 μ A
0.33 mA – 3.299 9 mA	}	0.08 % + 0.13 μ A
3.3 mA – 32.999 mA	} 45 Hz - 1 kHz	0.04 % + 2 μ A
33 mA – 329.999 mA	}	0.04 % + 20 μ A
0.33 A – 1.099 99 A	}	0.04 % + 80 μ A
1.1 A – 2.999 99 A	}	0.05 % + 80 μ A
3 A – 10.999 9 A	45 Hz - 100 Hz	0.05 % + 2000 μ A
3 A – 10.999 9 A	100 Hz - 1 kHz	0.08 % + 2000 μ A
7. AC Power - Measure	SOP – MACW-22, Rev A (17/1/13)	
100 mW to 11.000 kW (3.3 mA to 11.000 0 A)	45 Hz to 65 Hz, PF=1	0.11 %
8. DC Power – Measure	SOP – MDCW-24, Rev A (17/1/14)	
10 mW – 6.000 kW (3.3 mA – 11.000 0 A)		0.08 %

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<p>9. DC Voltage - Source / Calibrator</p> <p>0 – 100.000 0 mV 0.1 V – 1.000 000 V 1 V – 10.000 00 V 10 V – 100.000 0 V 100 V – 350.000 V 0.5 kV – 10.000 kV</p> <p>10. Temperature Indicator without sensor - Measure Thermocouple Input Type K (-190 °C to 1300 °C) Type T (-150.0 °C to 390.0 °C)</p> <p>11. DC Current - Source / Calibrator</p> <p>0 – 10.000 00 mA 10 mA – 100.0000 mA 0.1 A – 1.000 000 A 1 A – 3.000 00 A 0 – 400.00 µA 0.4 mA – 4.000 0 mA 4 mA – 10.000 mA</p>	<p>} SOP – SDCV – 06, Rev B (17/7/06) } } } } SOP – HDCV – 15, Rev B, (18/10/10)</p> <p>SOP-MTEMP-25, Rev A (5/1/15)</p> <p>} SOP – SDCC – 07, Rev C (17/10/07) } } } SOP – HDCC – 16, Rev B (18/10/10) } }</p>	<p>0.0060 % + 5 µV 0.0050 % + 8 µV 0.0040 % + 64 µV 0.0052 % + 710 µV 0.0052 % + 600 000 µV 0.6 % + 0.007 µV</p> <p>0.5 °C 0.3 °C</p> <p>0.06 % + 2.5 µA 0.06 % + 6 µA 0.12 % + 120 µA 0.14 % + 700 µA 0.24 % + 0.1 µA 0.24 % + 0.002 mA 0.24 % + 0.02 mA</p>

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<p>12. Resistance - Source Instrument</p> <p>0 Ω – 100.000 0 Ω 0.1 kΩ – 1.000 000 kΩ 1 kΩ – 10.000 00 kΩ 10 kΩ – 100.000 0 kΩ 0.1 MΩ – 1.000 000 MΩ 1 MΩ – 10.000 00 MΩ 10 MΩ – 100.000 0 MΩ</p>	<p>SOP – SRES – 08, Rev C (17/10/07)</p>	<p>0.012 % + 0.005 Ω 0.012 % + 0.012 Ω 0.012 % + 0.120 Ω 0.012 % + 1.2 Ω 0.012 % + 12 Ω 0.050 % + 120 Ω 0.95 % + 13 000 Ω</p>
<p>13. AC Voltage – Source / Calibrator</p> <p>0.1 V – 1.000 000 V 1 V – 10.000 00 V 10 V – 100.000 0 V 100 V – 750.000 V</p> <p>0.5 kV – 10.000 kV</p>	<p>SOP – SACV – 09, Rev B (17/7/06)</p> <p>} 45 Hz to 500 Hz } } }</p> <p>SOP – HACV – 17, Rev B (18/10/10) 50 Hz</p>	<p>0.07 % + 0.51 mV 0.07 % + 5.1 mV 0.07 % + 51 mV 0.07 % + 380 mV</p> <p>1.2 % + 0.007 kV</p>
<p>14. AC Current – Source / Calibrator</p> <p>0.01 A – 1.000 000 A 1 A – 3.000 00 A</p> <p>29 μA – 400.00 μA 0.4 mA – 4.000 0 mA 4 mA – 40.000 mA 40 mA – 100.00 mA</p>	<p>SOP – SACC – 10, Rev B (17/7/06)</p> <p>} 45 Hz to 500 Hz }</p> <p>SOP – HACC -18, Rev B (18/10/10)</p> <p>} } 50 Hz } }</p>	<p>0.12 % + 0.5 mA 0.18 % + 2.1 mA</p> <p>0.7 % + 0.4 μA 0.7 % + 0.002 mA 0.7 % + 0.04 mA 0.7 % + 0.4 mA</p>

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15. Test Time – Source 0.5 s - 30 s 30 s - 60 s	SOP – TIMER – 19, Rev B (18/10/10)	0.1 s 0.2 s

* CMC is expressed as an expanded uncertainty estimated at a level of confidence of approximately 95 %.

Approved signatories :

Mr Tan Hock Han

Mr Felix Yeoh Boon Kuan

Mr Nelson Lim Te Chiang

Note :

This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. A laboratory's fulfilment of the requirements of ISO/IEC 17025 means the laboratory meets both the technical competence requirements and **management system requirements** that are necessary for it to consistently deliver technically valid test results. The **management system requirements** in ISO/IEC 17025 are written in language relevant to laboratory operations and operate generally in accordance with the principles of ISO 9001.