

Schedule

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LABORATORY LOCATION/ CENTRAL OFFICE: 	SIRIM Calibration Sdn Bhd, Johor Bangunan SIRIM No. 3, Jalan Teknologi 5 Taman Teknologi Johor, 81400 Senai, Johor , 81400, JOHOR MALAYSIA
ACCREDITED SINCE :	28 NOVEMBER 2024
FIELD(S) OF CALIBRATION:	DIMENSIONAL ELECTRICAL FORCE MASS PRESSURE TEMPERATURE TORQUE

This laboratory has demonstrated its technical competence to operate in accordance with MS ISO/IEC 17025:2017 (ISO/IEC 17025:2017).

This laboratory's fulfillment 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 and calibrations. 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 (see Joint ISO-ILAC-IAF Communiqué dated April 2017).

*** The uncertainty covered by the CMC is expressed as the expanded uncertainty corresponding to a coverage probability of approximately 95 % and have a coverage factor of k=2 unless stated otherwise.**

CENTRAL LOCATION	SIRIM Calibration Sdn Bhd, Johor Bangunan SIRIM No. 3, Jalan Teknologi 5 Taman Teknologi Johor, 81400 Senai, Johor , 81400, Johor
FIELD(S) OF CALIBRATION :	DIMENSIONAL, ELECTRICAL, FORCE, MASS, PRESSURE, HEAT & TEMPERATURE, TORQUE

SCOPE OF CALIBRATION : DIMENSIONAL

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
1. Micrometer	Up to 25 mm travers 25m to 50 mm 50 mm to 75 mm 75 mm to 100 mm	1 μ m 1 μ m 2 μ m 2 μ m	Calibrated using Steel Gauge Block as a Standard with reference to ISO 3611: 2010
2. Caliper	Up to 200 mm 200 mm to 600 mm	6 μ m 11 μ m	Calibrate using Caliper Checker as a Standard with reference to JIS B 7507:1993
3. Caliper Checker	20 mm to 350 mm 350 mm to 450 mm 450 mm to 600 mm	3 μ m 5 μ m 6 μ m	Calibrate using Steel Gauge Block set as a Standard & Linear Height Gauge as a comparator
4. Standard Rod	20 mm to 100 mm 100 mm to 150 mm 150 mm to 300 mm 300 mm to 450 mm 450 mm to 800 mm	2 μ m 3 μ m 4 μ m 5 μ m 10 μ m	Calibrate using Steel Gauge Block set as a Standard & Linear Height Gauge as a comparator
5. Calibration Tester	0.001 mm to 25 mm	1.3 μ m	Calibrate using Steel Gauge Block set as a Standard & Sylvac as a Standard
6. Dial Thickness Gauge	0.001 mm to 50 mm 50 mm to 100 mm	1 μ m 2 μ m	Calibrate using Gauge Steel Block set as a Standard
7. Pin Gauge(diameter Only)	0.2 mm to 40 mm	2.2 μ m	Using Std. Pin Gauge set as a Standard & Laser Micrometer as a comparator
8. Feeler Gauge	0.005 mm to 2 mm	1.0 μ m	Calibrate using Steel Gauge Block set as a Standard & Sylvac Probe as a comparator with reference to JIS-B-7524: 2008 (clause 5:1)
9. Dial Test Indicator	0.01 mm to 1 mm	3 μ m	Calibrate using Calibration Tester as a Standard with reference to JIS-B7533:1990

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
10. Dial Gauge	0.01 mm to 100 mm	4 μ m	Calibrate using Calibration Tester as a Standard with reference to JIS-B 7503:1997
11. Depth Gauges / Micrometer	0.001 to 300 mm	7 μ m	Calibrate using Depth Microchecker as a Standard with reference to BS 6468:2008 or JIS-B 7518:1993
12. Digital Indicator (linear Displacement)	0.001 to 50 mm 50 to 100 mm	1 μ m 2 μ m	Calibrate using steel gauge block as standard

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SCOPE OF CALIBRATION : ELECTRICAL

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
1. Measuring Instruments (a) Dc Voltage	0 mV to 330 mV 330 mV to 3.3 V 3.3V to 33 V 33 V to 330 V 330 V to 1020 V	1.6 μ V 3.2 μ V 20 μ V 180 μ V 1.7 mV	Generation using calibrator model Fluke 5522 A
1. Measuring Instruments (b) Resistance	0 Ω to 11 Ω 11 Ω to 33 Ω 33 Ω to 110 Ω 110 Ω to 330 Ω 330 Ω to 1.1 k Ω 1.1 k Ω to 3.3 k Ω 3.3 k Ω to 11 k Ω 11 k Ω to 33 k Ω 33 k Ω to 110 k Ω 110 k Ω to 330 k Ω 330 k Ω to 1.1 M Ω 1.1 M Ω to 3.3 M Ω 3.3 M Ω to 11 M Ω 11 M Ω to 33 M Ω 33 M Ω to 100 M Ω 100 M Ω to 330 M Ω 330 M Ω to 1100 M Ω	220 μ Ω 200 μ Ω 740 μ Ω 1.3 m Ω 4.3 m Ω 12 m Ω 54 m Ω 160 m Ω 450 m Ω 1.7 Ω 9 Ω 34 Ω 140 Ω 1.1 k Ω 2.7 k Ω 79 k Ω 560 k Ω	Generation using calibrator model Fluke 5522 A
	0 mV to 330 mV 330 mV to 3.3 V 3.3V to 33 V 33 V to 330 V 330 V to 1020 V	1.6 μ V 3.2 μ V 20 μ V 180 μ V 1.7 mV	Generation using calibrator model Fluke 5522 A
1. Measuring Instruments (c) Dc Current	0 μ A to 330 μ A 330 μ A to 3.3 mA 3.3 mA to 33 mA 33 mA to 330 mA 330 mA to 1.1 mA 1.1 A to 3 A 3 A to 10 A 10 A to 21 A	5.2 nA 34 nA 910 nA 8.7 μ A 42 μ A 100 μ A 1.4 mA 9 mA	Generation using calibrator mode Fluke 5522 A
1. Measuring Instruments (d) Ac Voltage (see Matrix A)	See Matrix A	See Matrix A	Generation using calibrator mode Fluke 5522 A
1. Measuring Instruments (e) Ac Current (see Matrix B)	See Matrix B	See Matrix B	Generation using calibrator mode Fluke 5522 A

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
1. Measuring Instruments (f) Frequency Measure (measuring Instrument)	DC 0 MHz to 60 MHz 60 MHz to 2 GHz	5 Hz 1 Hz	Generate using Function Generator HP 3325 B / Signal Generator Agilent E4433B
1. Measuring Instruments (g) Level	+ 7 dBm to -70 dBm	1.5 dBm	Generate using Function Generator HP 3325 B / Signal Generator Agilent E4433B
1. Measuring Instruments (h) Capacitance	1 μ F to 3.3 μ F 3.3 μ F to 11 μ F 11 μ F to 33 μ F 33 μ F to 110 μ F 110 μ F to 330 μ F 0.33 mF to 1.1 mF 1.1 mF to 3.3 mF 3.3 mF to 11 mF 11 mF to 33 mF 33 mF to 110 mF	9.3 nF 21 nF 85 nF 290 nF 920 nF 6.4 μ F 19 μ F 37 μ F 130 μ F 540 μ F	Generate using Fluke 5522A
2. Insulation Tester (max. Voltage 1000 V)	10 k Ω to 100 k Ω 100 k Ω to 10 M Ω 10 M Ω to 100 M Ω 100 M Ω to 1000 M Ω 1000 M Ω to 10 G Ω	0.58 Ω 580 Ω 6 k Ω 69 k Ω 600 k Ω	Generate using high resistance decade box IET HRRS
3. Sourcing/generating Instrument (a) Dc Voltage	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	0.9 μ V 8.8 μ V 58 μ V 0.6 mV 6.1 mV	Measure using System Multimeter HP 3458A
3. Sourcing/generating Instrument (b) Dc Current	0 μ A to 10 mA 10 mA to 100 mA 100 mA to 1 A	580 nA 7.8 μ A 590 μ A	Measure using System Multimeter HP 3458A
3. Sourcing/generating Instrument (c) Ac Voltage	100 mV to 10 V 40 Hz to 20 kHz 50 kHz to 1 MHz	590 μ V 604 μ V	Measure using System Multimeter HP 3458A
	10 V to 100 V 40 Hz to 1 kHz	6 mV	Measure using System Multimeter HP 3458A
	100 V to 700 V 40 Hz to 1 kHz	59 mV	Measure using System Multimeter HP 3458A

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
3. Sourcing/generating Instrument (d) Ac Current At 1 KHz	0 to 10 mA 10 mA to 100 mA 100 mA to 1 A	71 μ A 23 μ A 780 μ A	Measure using System Multimeter HP 3458A
3. Sourcing/generating Instrument (e) Resistance	0 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω 1 k Ω to 10 k Ω 10 k Ω to 100 k Ω 100 k Ω to 1 M Ω 1 M Ω to 10 M Ω	665 $\mu\Omega$ 6 m Ω 16 m Ω 150 m Ω 1.7 Ω 24 Ω 730 Ω	Measure using System Multimeter HP 3458A
3. Sourcing/generating Instrument I) Dc Current:	1 A to 2 A 2 A to 10 A	210 μ A 3 mA	Measure using System Multimeter HP 3458 A & AC / DC Current Shunt Ballantine 1625 A
3. Sourcing/generating Instrument Ii) Ac Current To 1 KHz:	0 A to 2 A 2 A to 10 A	1 mA 21 mA	Measure using System Multimeter HP 3458 A & AC / DC Current Shunt Ballantine 1625 A
3. Sourcing/generating Instrument Iii) Ac Current 1 To 5 KHz:	0 A to 10 A	22 mA	Measure using System Multimeter HP 3458 A & AC / DC Current Shunt Ballantine 1625 A
3. Sourcing/generating Instrument V) Ac Current 5 To 10 KHz:	0 A to 2 A	1 mA	Measure using System Multimeter HP 3458 A & AC / DC Current Shunt Ballantine 1625 A
3. Sourcing/generating Instrument Dc Current (source)	10 A to 20 A 20 A to 100 A	3 mA 3 mA	Measure using System Multimeter HP 3458 A & AC / DC Current Shunt Ballantine 1625 A
3. Sourcing/generating Instrument Ac Current @ 50 Hz To 1 KHz (source)	0 A to 20 A 0 A to 100 A	21 mA 40 mA	Measure using System Multimeter HP 3458 A & AC / DC Current Shunt Ballantine 1625 A
3. Sourcing/generating Instrument (f) Frequency	3 GHz to 5 GHz 0 MHz to 3 GHz	210 nHz 175 nHz	Measuring using Universal Counter Agilent 53132A

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
4. High Voltage Meters/ Testers	DC V: 0 - 40 kV AC V: 0 - 28 kV (peak ac at 50 Hz)	31 V 120 V	Measure with probes using Digital Multimeter & High Voltage Probe Fluke 80K-40
	DC V: 0 - 2 kV DCV: 2 – 20 kV AC V: 0 - 2 kV at 50Hz AC V: 2 - 20 kV at 50 Hz	600 mV 1.0 V 700 mV 17 V	Measure direct using Precision High Voltage Meter Vitrek 4700
	DC V: 0 - 10 kV AC V: 0 - 10 kV at 50 Hz	1.0 V 17 V	Generate using Withstanding Voltage Tester Kikusui TOS 5101 & Precision High Voltage Meter Vitrek 4700
5. Clamp Meters	DC Current 0 A to $\pm$ 10 A (up to 1000 A via multiturn coil – 10 & 50 Turn Coil)	57 mA	Generate using Calibrator Wavetek 9100
	AC Current 0 A to $\pm$ 10 A 40 Hz to 440 Hz (up to 1000 A via multiturn coil – 10 & 50 Turn Coil)	61 mA	Generate using Calibrator Wavetek 9100
	AC Current 10 A to 20 A 40 Hz to 110 Hz	73 mA	Generate using Calibrator Wavetek 9100
6. Withstanding / Insulation Voltage Testers (a) Generate: (direct)	DC V: 0 kV to 20 kV AC V: 0 kV to 20 kV at 50 Hz	1.2 V 17 V	Measure using Precision High Voltage Meter Vitrek 4700
6. Withstanding / Insulation Voltage Testers (b) Resistance (measure)	10 k Ω to 100 k Ω 100 k Ω to 10 M Ω 10 M Ω to 100 M Ω 100 M Ω to 1000 M Ω 1000 M Ω to 10 G Ω	0.58 Ω 577 Ω 6 k Ω 69 k Ω 600 k Ω	Generate using high resistance decade box IET HRRS

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
6. Withstanding / Insulation Voltage Testers (c) Cut Off Current (ac Current)	0 mA to 1.0 mA 1.0 mA to 2.0 mA 2.0 mA to 5.0 mA 5.0 mA to 10.0 mA	12 μ A 31 μ A 60 μ A 110 μ A	Measure using Cut Off Current Kikusui TLC 501 B
6. Withstanding / Insulation Voltage Testers (d) Timing	0 sec to 60 sec 1 min to 15 min 15 min to 25 min	62 msec 85 msec 800 msec	Measure using Time Calibrator SST-2
7. Oscilloscope (a) Amplitude	100 V 50 V 20 V 10 V 5 V 2 V 1 V 0.5 V 0.2 V 0.1 V 10 mV 1 mV	51 mV 51 mV 170 μ V 45 μ V 23 μ V 9.4 μ V 9.4 μ V 2.5 μ V 1.2 μ V 900 nV 900 nV 900 nV	Generate using Calibration Generator Tektronix PG 506A
7. Oscilloscope (b) Sweep	0.1 μ s 0.2 μ s 0.5 μ s 1 μ s 2 μ s 5 μ s 10 μ s to 0.1 ms 0.2 ms 0.5 ms 1 ms 2 ms 5 ms 10 ms 20 ms 50 ms 0.1 s 0.2 s 0.5 s 1 s to 2 s 5 s	570 ps 1.2 ns 2.8 ns 4 ns 9 ns 22 ns 460 ns 820 ns 2 μ s 4.5 μ s 8 μ s 20 μ s 45 μ s 80 μ s 200 μ s 460 μ s 930 μ s 2 ms 4.5 ms 23 ms	Generate using Time Mark Generator Tektronix TG 501A
7. Oscilloscope (c) Bandwidth	0.25 MHz to 250 MHz 250 MHz to 1 GHz	23 kHz 230 kHz	Generate using Levelled Sine Wave Generator Tegam SG 503 Generate using Signal Generator Agilent E4433B

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Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
8. Lcr Meters. Measuring Instruments. I) Inductance:	Frequency at 1 kHz 100 μ H to 1000 μ H 1 mH to 10 mH 10 mH to 100 mH 100 mH to 1000 mH 1 H to 10 H	110 nH 800 nH 12 μ H 82 μ H 790 μ H	Generate using Decade Inductor GR 1491G
9. Time	0 sec to 10 sec 0 sec to 100 sec	120 msec 120 msec	Measure using Time Calibrator SST-2
	0 sec to 1000 sec 0 sec to 10000 sec 0 min to 100 min 0 hr to 24 hr	130 msec 590 msec 590 msec 590 msec	Measure using Time Calibrator SST-2
11. Power Meters/ Indicating Instruments A) Dc Power	0.1 W to 1 kW 1 kW to 20 kW	0.26 + 0.46 mW 0.93 - 120 mW	Generate using Fluke 5522A
11. Power Meters/ Indicating Instruments B) Ac Power 45 Hz To 65 Hz, At Pf = 1	0.1 W to 1 W 1 W to 10 kW 10 kW to 20 kW	0.59 + 0.47 mW 1.1 + 430 mW 1.2 + 580 mW	Generate using Fluke 5522
10. Rpm Related Measuring Instruments (non Contact Type)	60 rpm to 5999 rpm 6000 rpm to 29999 rpm 30000 rpm to 59999 rpm 60000 rpm to 99999 rpm	0.07 rpm 7 rpm 36 rpm 120 rpm	In-House Method ESF/0303

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SCOPE OF CALIBRATION : FORCE

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
Digital Force Gauges / Push Pull Gauges / Tension Gauges	1 mgf to 10 kgf 10 kgf to 50 kgf 50 kgf to 100 kgf	0.6 gf 10 gf 61 g	Using Std. Weight as a Standard

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SCOPE OF CALIBRATION : MASS

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
Standard Weights	Up to 200 mg	0.018 mg	Comparison Method using ABBA weighing scheme Using E2 Standard Weights by ABBA comparison weighing scheme
	500 mg	0.020 mg	
	1 g	0.023 mg	
	2 g	0.026 mg	
	5 g	0.032 mg	
	10 g	0.038 mg	
	20 g	0.046 mg	
	50 g	0.06 mg	
	100 g	0.10 mg	
	200 g	0.22 mg	
	500 g	2.9 mg	
	1000 g	3.4 mg	
	2 kg	0.11 g	Using Standard Weights F1, F2 ABBA Method
	5 kg	0.14 g	
	10 kg	0.17 g	
	20 kg	0.34 g	
	25 kg	0.40 g	

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SCOPE OF CALIBRATION : PRESSURE

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
Pressure Indicating Instruments (hydraulic Medium)	0 - 16000 psi	0.01 % of Reading	Using Dead Weight Tester / Pressure Comparator as a Standard
Pressure Indicating Instruments (pneumatic)	-1 bar to 0 bar	0.002 bar	Generation Using Digital Pressure Calibrator
	0 bar to 120 bar	0.01 % of reading	Generating using Air Dead Weight Tester

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SCOPE OF CALIBRATION : TEMPERATURE

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
1. Liquid In Glass Thermometer (total Immersion)	-30 °C to 100 °C 100 °C to 250 °C	0.08 °C 0.09 °C	Comparison Method Using SPRT Module + PT100
2. Digital Thermometer with Probe	-40 °C to 250 °C 250 °C to 400 °C 400 °C to 600 °C	0.10 °C 0.15 °C 0.2 °C	Comparison Method Using SPRT Module + PT100
3. Mechanical thermometer	30 °C to 150 °C 150 °C to 250 °C	0.3 °C 0.6 °C	Comparison Method Using SPRT Module + PT100
4. Temperature indicating Instruments	Type-K -100 °C to 1300 °C Type-J -100 °C to 1200 °C Type-T -100 °C to 400 °C Type-E -100 °C to 1000 °C Type-R 0 °C to 1700 °C Type-S 0 °C to 1700 °C PT100 -100 °C to 800 °C	0.3 °C 0.3 °C 0.3 °C 0.3 °C 0.4 °C 0.4 °C 0.2 °C	Electrical Simulation Using Documenting Process Calibrator based on EA-10/11 and ITS 90 Table
5. Temperature Block calibrator	-40 °C to 0 °C 0 °C to 600 °C	0.1 °C 0.2 °C	Using SPRT Module with PT 100 and PRT Based on EA-10/13
6. Thermo-hygrometer /thermo-hygrograph	30 %rh to 90 %rh (@ 23 °C) 10 °C to 30 °C 30 °C to 50 °C	2.5 %rh 0.5 °C 0.6 °C	Comparison method using Std. Temperature and Humidity Meter based on BS 1339- 3:2004
7. Infrared Thermometer	35 °C to 100 °C 100 °C to 200 °C 200 °C to 400 °C	0.7 °C 1.5 °C 2.0 °C	Calibration by Comparison Method using; 1. Infrared Thermometer 2. Blackbody calibrator

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SCOPE OF CALIBRATION : TORQUE

Instrument Calibrated/Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty ($\pm$)*	Remarks
Torque Wrench	0 Nm to 100 Nm 0 Nm to 500 Nm 501 Nm to 800 Nm	0.12 Nm 0.58 Nm 1.5 Nm	Measuring using Torque Transducer

SITE LOCATION (HQ)	1. CATEGORY I
FIELD(S) OF CALIBRATION :	DIMENSIONAL,ELECTRICAL,FORCE,HEAT & TEMPERATURE,MASS,PRESSURE

SCOPE OF CALIBRATION : ELECTRICAL

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Measuring Instrument A) Dc Voltage	0 mV to 330 mV 330 mV to 3.3 V 3.3 V to 33 V 33 V to 330 V 330 V to 1020 V	1.4 μ V 15 μ V 160 μ V 880 μ V 8.6 mV	Generation using calibrator model Fluke 5522 A
Measuring Instrument B) Ac Voltage	See Matrix C See Matrix D	See Matrix C See Matrix D	Generation using calibrator model Fluke 5522 A & Wavetek 9100
Measuring Instrument C) Dc Current	0 to 330 mA 330 mA to 3.3 mA 3.3 mA to 33 mA 33 mA to 330 mA 330 mA to 1.1 A 1.1 A to 3 A 3 A to 11 A 11 A to 21 A	25 nA 170 nA 670 nA 6.7 μ A 280 μ A 530 μ A 2.4 mA 15 mA	Generation using calibrator model Fluke 5522 A
Measuring Instrument D) Ac Current	See Matrix E See Matrix F	See Matrix E See Matrix F	Generation using calibrator model Fluke 5522 A & Wavetek 9100

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Measuring Instrument E) Resistance	0 to 11 Ω 11 Ω to 33 Ω 33 Ω to 110 Ω 110 Ω to 330 Ω 330 Ω to 1.1 k Ω 1.1 k Ω to 3.3 k Ω 3.3 k Ω to 11 k Ω 11 k Ω to 33 k Ω 33 k Ω to 110 k Ω 110 k Ω to 330 k Ω 330 k Ω to 1.1M Ω 1.1 M Ω to 3.3 M Ω 3.3 M Ω to 11 M Ω 11 M Ω to 33 M Ω 33 M Ω to 110 M Ω 110 M Ω to 330 M Ω 330 M Ω to 1100 M Ω	1.2 m Ω 2.1 m Ω 2.7 m Ω 5.9 m Ω 35 m Ω 62 m Ω 130 m Ω 620 m Ω 1.3 Ω 6.4 Ω 39 Ω 120 Ω 570 Ω 6.4 k Ω 23 k Ω 500 k Ω 6.3 M Ω	Generation using calibrator model Fluke 5522 A
Measuring Instrument Resistance Up To 1000 Vmax	100 Ω to 1 k Ω 1 k Ω to 10 k Ω 10 k Ω to 100 k Ω 100 k Ω to 1000 k Ω 1000 k Ω to 10 M Ω 10 M Ω to 100 M Ω 100 M Ω to 1000 M Ω 1000 M Ω to 10 G Ω 0 Ω to 1 Ω 1 Ω to 100 Ω	140 m Ω 57 Ω 58 Ω 130 Ω 1.5 k Ω 24 k Ω 270 k Ω 130 M Ω 6 $\mu\Omega$ 1 m Ω	Generate using High Resistance Decade Substitute IET HRRS & Yokogawa 2793 ESD/0360 Rev 5.0 Generating using Standard Resistor & Decade Resistance Box model Yokogawa 2792 & 2793 respectively
Measuring Instrument (f) Frequency	0.01 Hz to 120 Hz 120 Hz to 1200 Hz 1.2 kHz to 12 kHz 12 kHz to 120 kHz 120 kHz to 1200 kHz 1.2 MHz to 3.2 MHz 3.2 MHz to 10 MHz	9.0 μ Hz 9.0 mHz 29 mHz 290 mHz 820 mHz 110 Hz 350 kHz	Generation using calibrator model Fluke 5522 A

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Measuring Instrument (g) Capacitance	220 pF to 400 pF 0.4 nF to 1.1 nF 1.1 nF to 3.3 nF 3.3 nF to 11 nF 11 nF to 33 nF 33 nF to 110 nF 110 nF to 330 nF 0.33 µF to 1.1 µF 1.1 µF to 3.3 µF 3.3 µF to 11 µF 11 µF to 33 µF 33 µF to 110 µF 110 µF to 330 µF 0.33 mF to 1.1 mF 1.1 mF to 3.3 mF 3.3 mF to 11 mF 11 mF to 33 mF 33 mF to 110 mF	13 pF 17 pF 23 pF 40 pF 98 pF 300 pF 900 pF 4.1 nF 9.3 nF 21 nF 85 nF 290 nF 920 nF 6.4 µF 19 µF 38 µF 130 µF 540 µF	Generation using calibrator model Fluke 5522 A
Measuring Instrument (a) Frequency	60 MHz to 4 GHz	1 Hz	Generate using Signal Generator Agilent E4433B
Measuring Instrument (b) Amplitude / Level	+ 20 dBm to -136 dBm	0.9 dBm	Generate using Signal Generator Agilent E4433B
Capacitance Frequency At 1 Khz	1 pF to 100 pF 100 pF to 10000 pF 10 nF to 100 nF 100 nF to 1000 nF	0.67 pF 1 pF 12 pF 570 pF	ESD/0360 Rev 5.0 Generation using Decade Capacitor model GR 1413
Capacitance Inductance	100 µH to 1000 µH 1 mH to 10 mH 10 mH to 100 mH 100 mH to 1000 mH 1 H to 10 H	0.16 µH 0.28 mH 0.34 mH 0.95 mH 0.3 H	ESD/0360 Rev 5.0 Generating using Decade Inductor model GR 1491-G
Sourcing/generating Instrument (a) Dc Voltage	0 mV to 100 mV 100 mV to 1 V 1 V to 10 V 230 µV 10 V to 100 V 1.5 mV 100 V to 1000 V	2.2 µV 14 µV 230 µV 1.5 mV 15 mV	Measured using Multimeter HP 3458A
Sourcing/generating Instrument (b) Dc Current	0 mA to 10 mA 10 mA to 100 mA 100 mA to 1000 mA 1 A to 3 A 3 A to 20 A 20 A to 100 A	9.1 µA 72 µA 1.6 mA 5.7 mA 6.0 mA 20 mA	Measured using Multimeter HP 3458A & Active Shunt Ballantine 1625A

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Sourcing/generating Instrument (c) Ac Voltage	0 mV to 10 mV (40 Hz to 1 kHz) 100 mV to 10 V (40 Hz to 1 kHz) 10 V to 100 V (40 Hz to 1 kHz) 100 V to 1000 V (40 Hz to 1 kHz)	5.4 μ V 1.2 mV 29 mV 550 mV	Measured using Multimeter HP 3458A
Sourcing/generating Instrument (d) Ac Current	0 A to 1 A (10 Hz to 5 kHz) 1 A to 3 A (10 Hz to 5 kHz) 3 A to 20 A (10 Hz to 1 kHz) 20 A to 100 A (10 Hz to 1 kHz)	2.3 mA 8.1 mA 26 mA 130 mA	Measured using Multimeter HP 3458A & Active Shunt Ballantine 1625A
Sourcing/generating Instrument (a) Frequency	0 Hz to 5 GHz 5 GHz to 13 GHz	215 nHz 0.1 μ Hz	Measure using Universal Counter Agilent 53132A Measure using Spectrum Analyzer Agilent E4445A
Sourcing/generating Instrument (b) Amplitude / Level	-150 dB to +30 dB (3 Hz to 13 GHz)	1 dBm	Measure using Spectrum Analyzer Agilent E4445A
3. High Voltage Measurement - High Voltage Testers / Puncture Testers / Spark Testers Dc Voltage	0 kV to 2 kV 2 kV to 5 kV 5 kV to 10 kV 10 kV to 15 kV 15 kV to 20 kV	1.3 V 7.9 V 11 V 13 V 16 V	Measured using High Voltage Meter Vitrek 4700A
3. High Voltage Measurement - High Voltage Testers / Puncture Testers / Spark Testers Ac Voltage 20 Hz To 100 Hz	0 kV to 2 kV 2 kV to 5 kV 5 kV to 10 kV 10 kV to 15 kV 15 kV to 20 kV	4 V 30 V 34 V 45 V 57 V	Measured using High Voltage Meter Vitrek 4700A
3. High Voltage Measurement - High Voltage Testers / Puncture Testers / Spark Testers Cut Off Current Ac Current 40 Hz To 1 Khz	0 mA to 0.5 mA 0.5 mA to 1 mA 1 mA to 2 mA 2 mA to 5 mA 5 mA to 10 mA	0.03 mA 0.05 mA 0.06 mA 0.12 mA 0.20 mA	Measured using cut- off current meter TLC-501

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Schedule

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
4. Timer	0 sec to 10 sec 0 sec to 100 sec 0 sec to 1000 sec 0 sec to 10000 sec 0 min to 100 min 0 hr to 24 h	120 msec 120 msec 130 msec 570 msec 570 msec 570 msec	Measure using Time Calibrator SST-2
5. Source Instruments Resistance	0 to 10 ? 10 ? to 100 ? 100 ? to 1 k? 1 k? to 10 k? 10 k? to 100 k? 100 k? to 1 M? 1 M? to 10 M? 10 M? to 100 M? 100 M? to 1 G ?	240 μ? 2 m? 2.9 m? 130 m? 180 m? 20 ? 690 ? 59 k? 590 k?	Measure using Multimeter HP 3458 A
6. Oscilloscope (a) Vertical Deflection (square Wave Signal)	100 V 50 V 20 V 10 V 5 V 2 V 1 V 0.5 V 0.2 V 0.1 V 10 mV 1 mV	51 mV 51 mV 170 μV 45 μV 23 μV 9.4 μV 4.8 μV 2.5 μV 1.2 μV 900 nV 900 nV 5.2 μV	Generate using Calibration Generator Tektronix PG 506A
6. Oscilloscope (b) Vertical Deflection (dc Signal)	0mV to 330 mV 330 mV to 3.3 V 3.3 V to 33 V 33 V to 330 V 330 V to 1020 V	1.6 μV 23 μV 24 μV 290 μV 3.3 mV	Generation using Calibrator model Fluke 5522 A
6. Oscilloscope (c) Sweep	0.1 μs 0.2 μs 0.5 μs 1 μs 2 μs 5 μs 10 μs to 0.1 ms 0.2 ms 0.5 ms 1 ms 2 ms 5 ms 10 ms 20 ms 50 ms 0.1 s 0.2 s 0.5 s 1 s to 2 s 5 s	570 ps 1.2 ns 2.8 ns 4 ns 9 ns 22 ns 460 ns 820 ns 2 μs 4.6 μs 8 μs 20 μs 45 μs 80 μs 200 μs 460 μs 930 μs 2 ms 4.6 ms 23 ms	Generate using Time Mark Generator Tektronix TG 501A
6. Oscilloscope (d) Bandwidth	0.25 MHz to 250 MHz 250 MHz to 4 GHz	23 kHz 230 kHz	Generate using Levelled Sine Wave Generator Tegam SG 503 & Signal Generator Agilent E4433B
9. Power Meters/ Indicating Instruments A) Dc Power	0.1 W to 1 kW 1 kW to 20 kW	0.26 mW/W + 0.46 mW 0.93 mW/W - 120 mW	Generate using Fluke 5522A
9. Power Meters/ Indicating Instruments B) Ac Power 45 Hz To 65 Hz At Pf = 1	0.1 W to 1 W 1 W to 10 kW 10 kW to 20 kW	0.59 mW/W + 0.47 mW 1.10 mW/W + 430 mW 1.20 mW/W + 580 mW	Generate using Fluke 5522A

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SCOPE OF CALIBRATION : DIMENSIONAL

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Profile Projector / Tool Maker Microscope / Smart Scope (measuring Accuracies Of Respective X And Y Axis Only)	up to 80 mm 81 mm to 300 mm	3 µm 5 µm	Calibrate using Glass Scale as a Standard according to JIS B 7153:1995, Performance No. 9

SCOPE OF CALIBRATION : HEAT & TEMPERATURE

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
1. Temperature Indicating Instruments	Type-K -100 °C to 1300 °C Type-J -100 °C to 1200 °C Type-T -100 °C to 400 °C Type-E -100 °C to 1000 °C Type-R 0 °C to 1700 °C Type-S 0 °C to 1700 °C PT100 -100 °C to 800 °C	0.4 °C 0.4 °C 0.4 °C 0.4 °C 0.5 °C 0.5 °C 0.3 °C	Electrical Simulation Using Documenting Process Calibrator based on EA-10/11 and ITS 90 Tables
2. Temperature Controlled Enclosure	-40 °C to 250 °C	0.7 °C	Using Temperature Recorder and Thermocouple Wires based on TLAS G-20
3. Temperature Sensor With Indicator	-40 °C to 250 °C 250 °C to 600 °C	0.3 °C 0.4 °C	Calibration by comparison method using: 1. PRT 2. Dry Block Calibrator

SCOPE OF CALIBRATION : MASS

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Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
1. Analytical Balance	Up to 200 g	0.2 mg	Using Std. Weight E2 as a Standard with reference to OIML R 76-I Edition 2006(E)
2. Electronic Balance	Up to 500 g Up to 1 kg Up to 2 kg Up to 5 kg Up to 15 kg Up to 30 kg Up to 60 kg Up to 100 kg Up to 200 kg Up to 500 kg Up to 1000 kg Up to 2000 kg	1.8 mg 3 mg 6 mg 18 mg 70 mg 2 g 5 g 12 g 19 g 104 g 180 g 204 g	Using Standard Weight E2, F1, F2, M2 as a Standard with reference to OIML R 76-I Edition 2006(E)

SCOPE OF CALIBRATION : FORCE

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Universal Testing Machine (compression Mode)	150 kgf to 1000 kgf 1001 kgf to 5000 kgf 5001 kgf to 10000 kgf	0.2 kgf 3.2 kgf 2.6 kgf	Using Std. Load Cell * Calibration Loop as a Standard with reference to ISO 7500- 1:2004

SCOPE OF CALIBRATION : PRESSURE

Material / Product Tested	Type Of Test / Properties Measured / Range Of Measurement	Standard Test Methods / Equipment / Techniques	Remarks
Pressure Indicating Instruments (hydraulic Medium)	0 psi to 300 psi 301 psi to 16000 psi	0.02 % of Reading 0.04 % of Reading	Using Pressure Comparator as a Standard
Pressure Indicating Instruments (pneumatic)	-1 bar to 0 bar 0 bar to 0.07 bar 0.08 bar to 20 bar	0.002 bar 0.9% of Reading 0.01% of Reading	Generation Using Digital Pressure Calibrator