

**The Government of the Hong Kong Special Administrative Region –
Standards and Calibration Laboratory**

香港特別行政區政府 – 標準及校正實驗所

ADDRESS : 36/F., Immigration Tower, 7 Gloucester Road, Wanchai, Hong Kong
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CLIENTELE : Public
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ACCREDITED TEST : Calibration Services 校正服務
CATEGORY Proficiency Testing Provider 能力驗證提供者
認可測試類別

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Calibration Services 校正服務		
ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Acoustic and vibration measurements		
- Acoustic measurements		
- 1 inch laboratory standard microphone (LS1P)	Calibration for pressure field open-circuit sensitivity in accordance with IEC 61094-2: 1992 over the following frequency ranges:	
	63 Hz to 4 kHz	0.04 dB
	Above 4 kHz to 6 kHz	0.05 dB
	Above 6 kHz to 8 kHz	0.06 dB
	Above 8 kHz to 10 kHz	0.08 dB
	Calibration for pressure field open-circuit sensitivity in accordance with IEC 61094-2: 2009 over the following frequency ranges:	
	20 Hz to 6.3 kHz	0.04 dB
	Above 6.3 kHz to 8 kHz	0.05 dB
	Above 8 kHz to 10 kHz	0.08 dB
- ½ inch laboratory standard microphone (LS2P)	Calibration for pressure field open-circuit sensitivity in accordance with IEC 61094-2: 1992 over the following frequency ranges:	
	63 Hz to 12 kHz	0.04 dB
	Above 12 kHz to 16 kHz	0.05 dB
	Above 16 kHz to 20 kHz	0.08 dB
	Above 20 kHz to 25 kHz	0.14 dB
	Calibration for pressure field open-circuit sensitivity in accordance with IEC 61094-2: 2009 over the following frequency ranges:	
	20 Hz	0.08 dB
	Above 20 Hz to 25.1 Hz	0.06 dB
	Above 25.1 Hz to 12.6 kHz	0.05 dB
	Above 12.6 kHz to 16 kHz	0.06 dB
	Above 16 kHz to 20 kHz	0.09 dB
	Above 20 kHz to 25 kHz	0.13 dB

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Acoustic and vibration measurements		
- Acoustic measurements		
- ½ inch working grade microphone	<p>Calibration for pressure field open-circuit sensitivity by comparison with the laboratory standard microphone in accordance with IEC 61094-5: 2001 over the following frequency ranges:</p> <p>63 Hz to 125 Hz Above 125 Hz to 10 kHz Above 10 kHz to 20 kHz</p> <p>Calibration for pressure field open-circuit sensitivity by comparison with the laboratory standard microphone in accordance with IEC 61094-5: 2016 over the following frequency ranges:</p> <p>20 Hz to 40 Hz Above 40 Hz to 125 Hz Above 125 Hz to 10 kHz Above 10 kHz to 20 kHz</p> <p>Calibration for pressure field open-circuit sensitivity using sound calibrator in accordance with in-house procedure TPA029 over the following frequency ranges:</p> <p>63 Hz to 8 kHz Above 8 kHz to 12.6 kHz Above 12.6 kHz to 16 kHz Above 16 kHz to 20 kHz</p> <p>Calibration for relative frequency response using electrostatic actuator in accordance with IEC 61094-6: 2004 over the following frequency ranges:</p> <p>63 Hz to 10 kHz Above 10 kHz to 20 kHz</p>	<p>0.10 dB 0.07 dB 0.20 dB</p> <p>0.15 dB 0.10 dB 0.07 dB 0.20 dB</p> <p>0.2 dB 1.0 dB 1.5 dB 2.5 dB</p> <p>0.1 dB 0.2 dB</p>

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Acoustic and vibration measurements		
- Acoustic measurements		
- ½ inch working grade microphone in combination with constant current line drive (CCLD) microphone preamplifier	Calibration for pressure field open-circuit sensitivity in accordance with IEC 61094-5: 2016 over the following frequency ranges: 63 Hz to 4 kHz Above 4 kHz to 8 kHz Above 8 kHz to 10 kHz Above 10 kHz to 12.5 kHz	0.07 dB 0.10 dB 0.43 dB 1.2 dB
- ½ inch working grade microphone in combination with microphone preamplifier	Calibration for pressure field open-circuit sensitivity by comparison with the laboratory standard microphone in accordance with in-house procedure TPA031 over the following frequency ranges: 63 Hz to 126 Hz Above 126 Hz to 10 kHz Above 10 kHz to 20 kHz Above 20 kHz to 25 kHz	0.10 dB 0.08 dB 0.20 dB 0.40 dB
- 1/4 inch working grade microphone (WS3P)	Calibration for pressure field open-circuit sensitivity in accordance with IEC 61094-5:2016 over the following frequency ranges: 63 Hz to 4 kHz Above 4 kHz to 10 kHz Above 10 kHz to 20 kHz	0.10 dB 0.15 dB 0.35 dB
- 1 inch working grade microphone	Calibration for pressure field open-circuit sensitivity by comparison with the laboratory standard microphone in accordance with in-house procedure TPA028 over the following frequency ranges: 63 Hz to 4 kHz Above 4 kHz to 8 kHz Above 8 kHz to 10 kHz	0.07 dB 0.12 dB 0.15 dB

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Acoustic and vibration measurements - Acoustic measurements - Audio network analyzer	Calibration for the following parameters in accordance with in-house procedure TPA023: - Amplitude accuracy over the following ranges: 20 Hz and 100 kHz 0.02 V to 10 V 3 mV to 20 mV - Amplitude linearity - Frequency accuracy over the following frequency ranges: 20 Hz to 20 kHz Above 20 kHz to 50 kHz Above 50 kHz to 100 kHz - Ratio between channels - Phase between channels over the following frequency ranges: 20 Hz to 1 kHz Above 1 kHz to 6.25 kHz Above 6.25 kHz to 50 kHz Above 50 kHz to 100 kHz	0.1 % to 0.3 % 0.2 % to 1 % 0.02 dB 1 Hz 2 Hz 3 Hz 0.002 0.007° 0.013° 0.032° 0.064°

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Acoustic and vibration measurements		
- Acoustic measurements		
- Audiometer	Calibration for the following parameters in accordance with IEC 60645-1: 2012:	
	- Level accuracy of earphone over the following frequency ranges: 125 Hz to 4 kHz	0.6 dB
	Above 4 kHz to 8 kHz	1.0 dB
	- Level accuracy of bone vibrator over the following frequency ranges: 250 Hz to 1.5 kHz	0.7 dB
	Above 1.5 kHz to 2 kHz	0.9 dB
	Above 2 kHz to 4 kHz	1.3 dB
	Above 4 kHz to 6 kHz	1.8 dB
	Above 6 kHz to 8 kHz	2.0 dB
	- Frequency of test signals	1 Hz
	- Levels of masking noise	1.0 dB
	- Attenuator steps accuracy	0.2 dB
	- Harmonic distortion of test signals	0.6 %
	- Rise and fall times of test signals	2 ms
	- Cross-talk between earphone channels	1.0 dB
	- Masking noise spectra	0.5 dB
	- Distortion of speech input systems	0.6 %

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Acoustic and vibration measurements		
- Acoustic measurements		
- Hearing aid analyzer	Calibration for sound pressure level in accordance with in-house procedure TPA037 over the following range: 200 Hz to 2 kHz 55 dB to 85 dB	1 dB
- Measuring amplifier	Calibration for the following parameters in accordance with IEC 60651: 2001 and IEC 60804: 2000: - Frequency weighting A test - Frequency weighting Linear test - Level linearity test - Time weighting F test - Time weighting S test	0.1 dB 0.1 dB 0.1 dB 0.1 dB 0.1 dB

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Acoustic and vibration measurements		
- Acoustic measurements		
- Microphone preamplifier	Calibration for the following parameters in accordance with in-house procedure TPA032:	
	- Gain	0.0003
	- Frequency response	0.01 dB
	- Input capacitance	0.05 pF
- Mouth simulator	On-site calibration for the following parameters using the laboratory standard microphone in accordance with in-house procedure TPA030:	
	- Sound pressure level over the following frequency ranges:	
	100 Hz to 1 kHz	1.5 dB
	Above 1 kHz to 8 kHz	2.0 dB
	- Distortion at 94 dB over the following frequency ranges:	
	100 Hz to 200 Hz	0.2 %
	Above 200 Hz to 8 kHz	0.1 %
- Octave filter	Calibration for the following parameters in accordance with in-house procedure TPA008:	
	- Pass-band attenuation	0.02 dB
	- Stop-band attenuation	1 dB

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Acoustic and vibration measurements		
- Acoustic measurements		
- Otoacoustic emissions (OAE) analyzer	Calibration for the following parameters in accordance with in-house procedure TPA038:	
	- Frequency of stimulus signal over the following range: 500 Hz to 8 kHz	0.5 Hz
	- Sound pressure level of stimulus signal over the following range: 65 dB to 75 dB	1 dB
	- Harmonic distortion of stimulus signal over the following frequency range: 500 Hz to 8 kHz	0.05 %
- Personal sound exposure meter, noise dose meter, noise dosimeter	Calibration for the following parameters in accordance with IEC 61252: 1993 + A1: 2000 + A2: 2017:	
	- Absolute acoustic sensitivity sound exposure	6.8 %
	- Electrical Tests	
	- Frequency weighting	0.5 %
	- Linearity of response to steady signals over the following frequencies:	
	63 Hz	2.0 %
	1 kHz	
	Below 80 dB	20 %
	80 dB to 100 dB	5.0 %
	Above 100 dB to 130 dB	1.0 %
	Above 130 dB to 140 dB	2.0 %
	8 kHz	1.0 %
	- Response to short-duration signals	1.1 %
	- Response to unipolar pulse	1.4 %
	- Latching overload indicator	0.2 dB

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Acoustic and vibration measurements		
- Acoustic measurements		
- Sound calibrator	<p>Calibration for the following parameters in accordance with IEC 60942: 2000:</p> <p>- Sound pressure level over the following ranges:</p> <p>63 Hz to 4 kHz 94 dB to 124 dB Above 4 kHz to 16 kHz 94 dB to 124 dB</p> <p>- Frequency accuracy over the following frequency range: 63 Hz to 16 kHz</p> <p>- Distortion over the following range: 63 Hz to 16 kHz 94 dB to 114 dB</p> <p>Calibration for the following parameters in accordance with IEC 60942: 2003:</p> <p>- Sound pressure level over the following ranges:</p> <p>63 Hz to 4 kHz 94 dB to 124 dB Above 4 kHz to 8 kHz 94 dB to 124 dB Above 8 kHz to 16 kHz 94 dB to 124 dB</p> <p>- Frequency accuracy over the following frequency range: 63 Hz to 16 kHz</p> <p>- Distortion over the following range: 63 Hz to 16 kHz 94 dB to 114 dB</p>	<p>0.06 dB</p> <p>0.09 dB</p> <p>1 x 10⁻⁵ of result</p> <p>0.5 %</p> <p>0.06 dB</p> <p>0.10 dB</p> <p>0.16 dB</p> <p>1 x 10⁻⁵ of result</p> <p>0.5 %</p>

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Acoustic and vibration measurements		
- Acoustic measurements		
- Sound calibrator	Calibration for the following parameters in accordance with IEC 60942: 2017:	
	- Sound pressure level over the following ranges:	
	63 Hz to 4 kHz	
	94 dB to 124 dB	0.06 dB
	Above 4 kHz to 8 kHz	
	94 dB to 124 dB	0.10 dB
	Above 8 kHz to 16 kHz	
	94 dB to 124 dB	0.16 dB
	- Frequency accuracy over the following frequency range:	
	63 Hz to 16 kHz	1 x 10 ⁻⁵ of result
	- Total distortion and noise over the following ranges:	
	63 Hz to 16 kHz:	
	94 dB to 114 dB	0.5 %
	250 Hz	
	124 dB	0.5 %

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Acoustic and vibration measurements		
- Acoustic measurements		
- Sound level meter	<p>Calibration for the following parameters in accordance with IEC 61672-3: 2006:</p> <ul style="list-style-type: none"> - Indication at the calibration check frequency 0.1 dB - Self-generated noise 0.1 dB - Acoustical signal tests of a frequency weighting over the following frequency ranges: <ul style="list-style-type: none"> 63 Hz to 4 kHz 0.1 dB Above 4 kHz to 8 kHz 0.2 dB - Electrical signal tests of frequency weighting 0.1 dB - Frequency and time weightings at 1 kHz 0.1 dB - Level linearity on the reference level range 0.1 dB - Level linearity including the level range control 0.1 dB - Toneburst response 0.1 dB - Peak C sound level 0.1 dB - Overload indication 0.1 dB <p>Calibration for the following parameters in accordance with IEC 61672-3: 2013:</p> <ul style="list-style-type: none"> - Indication at the calibration check frequency 0.2 dB - Self-generated noise 0.1 dB - Acoustical signal tests of a frequency weighting over the following frequency ranges: <ul style="list-style-type: none"> 63 Hz to 1 kHz 0.2 dB Above 1 kHz to 8 kHz 0.3 dB - Electrical signal tests of frequency weighting 0.1 dB - Frequency and time weightings at 1 kHz 0.1 dB - Long-term stability 0.1 dB - Level linearity on the reference level range 0.1 dB - Level linearity including the level range control 0.1 dB - Toneburst response 0.1 dB - C-weighted peak sound level 0.1 dB - Overload indication 0.1 dB - High-level stability 0.1 dB 	

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Acoustic and vibration measurements		
- Acoustic measurements		
- Tympanometer	Calibration for the following parameters in accordance with in-house procedure TPA035:	
	- Frequency of probe tone over the following range: 226 Hz to 1 kHz	0.6 Hz
	- Sound pressure level of probe tone at 85 dB	0.7 dB
	- Harmonic distortion of probe tone over the following frequency range: 226 Hz to 1 kHz	0.05 %
- Type 1 ear simulator	Calibration for the following parameters in accordance with IEC 60318-1: 2009:	
	- Relative sound pressure response over the following frequency ranges: 40 Hz to 63 Hz	2.0 dB
	Above 63 Hz to 80 Hz	1.0 dB
	Above 80 Hz to 4 kHz	0.7 dB
	Above 4 kHz to 8 kHz	1.0 dB
	- Relative transfer impedance over the following frequency ranges: 40 Hz to 63 Hz	2.0 dB
	Above 63 Hz to 80 Hz	1.0 dB
	Above 80 Hz to 4 kHz	0.7 dB
	Above 4 kHz to 8 kHz	1.0 dB

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Acoustic and vibration measurements		
- Acoustic measurements		
- Type 3.2 ear simulator	Calibration for the following parameters in accordance with ITU-T P.57: 2005:	
	- Relative frequency sensitivity response over the following frequency ranges:	
	40 Hz to 63 Hz	2.0 dB
	Above 63 Hz to 80 Hz	1.0 dB
	Above 80 Hz to 4 kHz	0.7 dB
	- Acoustic impedance over the following frequency ranges:	
	40 Hz to 63 Hz	2.0 dB
	Above 63 Hz to 80 Hz	1.0 dB
	Above 80 Hz to 4 kHz	0.7 dB
- Head and Torso Simulator (HATS)	Calibration for the following parameters in accordance with ITU-T P.58: 2013:	
	- Maximum deliverable sound pressure level of HATS mouth over the following frequency range:	
	100 Hz to 10 kHz	0.5 dB
	- Harmonic distortion of HATS mouth over the following frequency range:	
	100 Hz to 10 kHz	1.5 %
	- Sound pick-up free field frequency response of HATS over the following frequency ranges:	
	100 Hz to 8 kHz	1.5 dB
	Above 8 kHz to 20 kHz	2.9 dB

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Acoustic and vibration measurements		
- Acoustic measurements		
- Ultrasonic transducer	Calibration for the following parameters in accordance with IEC 61161: 2013: <ul style="list-style-type: none"> - Radiation conductance at the following values or over the following ranges: <ul style="list-style-type: none"> 1 MHz to 3 MHz <ul style="list-style-type: none"> 50 mW 8.0 % Above 50 mW to 10 W 6.0 % Above 3 MHz to 20 MHz <ul style="list-style-type: none"> 50 mW 8.0 % Above 50 mW to 1 W 5.0 % - Ultrasonic power at the following values or over the following ranges: <ul style="list-style-type: none"> 1 MHz to 3 MHz <ul style="list-style-type: none"> 50 mW 8.0 % Above 50 mW to 10 W 5.0 % Above 3 MHz to 20 MHz <ul style="list-style-type: none"> 50 mW 8.0 % Above 50 mW to 1 W 5.0 % 	

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ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Acoustic and vibration measurements		
- Acoustic measurements		
- PULSE analyser	Calibration for the following parameters in accordance with in-house procedure TPA057:	
	- Frequency generating function by direct measurement using laboratory frequency measurement standard over the following range:	
	20 Hz to 25 kHz	1.2×10^{-5} of result
	- AC voltage generating function by direct measurement using laboratory AC voltmeter at the following values or over the following ranges:	
	1 kHz	
	0.01 V to 0.2 V	4.4 μ V to 34 μ V
	Above 0.2 V to 1 V	49 μ V to 0.14 mV
	Above 1 V to 2 V	0.15 mV to 0.49 mV
	20 Hz to 25 kHz	
	1 V	0.19 mV to 0.40 mV
	- Frequency measuring function by using laboratory frequency standard over the following range:	
	20 Hz to 25 kHz	1 mHz to 1 Hz
	- AC voltage measuring function by comparison with laboratory AC voltmeter at the following values or over the following ranges:	
	1 kHz	
	0.1 mV to 10 mV	2.8 μ V to 4.4 μ V
	Above 0.01 V to 0.2 V	4.5 μ V to 34 μ V
	Above 0.2 V to 1 V	49 μ V to 0.13 mV
	Above 1 V to 2 V	0.14 mV to 0.49 mV
	20 Hz to 25 kHz	
	1 V	0.19 mV to 0.36 mV

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Acoustic and vibration measurements - Acoustic measurements - PULSE analyser - Mechanical coupler for the measurement of bone vibrators	Calibration for the following parameter in accordance with in-house procedure TPA057: - Phase measuring function by using laboratory phase standard over the following range: 1 kHz 0° to 360° Calibration for mechanical impedance in accordance with IEC 60318-6: 2007: over the following ranges: 125 Hz to 800 Hz Above 800 Hz to 4 kHz Above 4 kHz to 8 kHz Calibration for force sensitivity level in accordance with in-house procedure TPA056 over the following ranges: 125 Hz to 800 Hz Above 800 Hz to 4 kHz Above 4 kHz to 8 kHz	0.009° 0.5 dB 0.7 dB 1.0 dB 0.4 dB 0.5 dB 1.2 dB

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Acoustic and vibration measurements - Vibration measurements - Accelerometer	<p>Calibration for the following parameters using the laboratory standard laser vibrometer in accordance with in-house procedure TPV101:</p> <p>- Charge sensitivity (modulus) over the following range: 10 Hz to 10 kHz 1 m/s² to 350 m/s²</p> <p>- Charge sensitivity (phase shift) over the following range: 0° to 360°</p> <p>Calibration for the following parameters by comparison with the laboratory standard accelerometer in accordance with ISO 16063-21:2003:</p> <p>- Charge sensitivity (modulus) over the following range: 10 Hz to 10 kHz 1 m/s² to 350 m/s²</p> <p>- Charge sensitivity (phase shift) over the following range: 0° to 360°</p> <p>Calibration for the following parameter by comparison with the laboratory standard accelerometer in accordance with in-house procedure TPV002:</p> <p>- Charge sensitivity (modulus) over the following range: 40 Hz to 4 kHz 10 m/s² to 100 m/s²</p>	<p>1.1 %</p> <p>2°</p> <p>1.5 %</p> <p>3°</p> <p>1.5 %</p>

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Acoustic and vibration measurements		
- Vibration measurements		
- Acceleration measuring chain	<p>Calibration for the following parameters using the laboratory standard laser vibrometer in accordance with in-house procedure TPV101:</p> <ul style="list-style-type: none"> - Voltage sensitivity (modulus) over the following range: 10 Hz and 10 kHz 1 m/s² to 350 m/s² - Voltage sensitivity (phase shift) over the following range: 10 Hz and 10 kHz 0° to 360° <p>Calibration for the following parameters by comparison with the laboratory standard accelerometer in accordance with ISO 16063-21:2003:</p> <ul style="list-style-type: none"> - Voltage sensitivity (modulus) over the following range: 10 Hz and 10 kHz 1 m/s² to 350 m/s² - Voltage sensitivity (phase shift) over the following range: 10 Hz and 10 kHz 0° to 360° 	<p>1.1 %</p> <p>2°</p> <p>1.5 %</p> <p>3°</p>

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Acoustic and vibration measurements		
- Vibration measurements		
- Charge amplifier	Calibration for gain magnitude by comparison with standard air capacitor and AC voltmeter in accordance with in-house procedure TPV003 over the following range: 50 Hz and 10 kHz 1 mV/pC to 1 V/pC	0.4 %
- Vibration calibrator	Calibration for continuous sinusoidal vibration range by comparison with standard accelerometer in accordance with in-house procedure TPV104 over the following range: 10 Hz to 10 kHz 1 m/s ² to 350 m/s ²	1.5 %

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Acoustic and vibration measurements - Vibration measurements - Vibration meter	<p>Calibration for the following parameters of continuous sinusoidal vibration by using the laboratory standard laser vibrometer in accordance with in-house procedure TPV103:</p> <p>- Displacement over the following range: 10 Hz to 10 kHz 0.0001 mm to 79 mm</p> <p>- Acceleration over the following range: 10 Hz to 10 kHz 1 m/s² to 350 m/s²</p> <p>- Velocity over the following range: 10 Hz to 10 kHz 0.5 mm/s to 500 mm/s</p> <p>Calibration for the following parameters of continuous sinusoidal vibration by using the laboratory standard accelerometer in accordance with in-house procedure TPV103:</p> <p>- Displacement over the following range: 10 Hz to 10 kHz 0.0001 mm to 79 mm</p> <p>- Acceleration over the following range: 10 Hz to 10 kHz 1 m/s² to 350 m/s²</p> <p>- Velocity over the following range: 10 Hz to 10 kHz 0.5 mm/s to 500 mm/s</p>	<p>1.1 %</p> <p>1.1 %</p> <p>1.1 %</p> <p>1.5 %</p> <p>1.5 %</p> <p>1.5 %</p>

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Electrical measurements and magnetism - Direct Current (DC) and Low Frequency (LF) measurements - DC voltage source: standard cell, solid state voltage standard, multifunction calibrator	Calibration for DC voltage using the Josephson array voltage standard in accordance with in-house procedure TPD031 at the following values: 1 V 1.018 V 10 V Calibration for DC voltage using the programmable Josephson array voltage standard in accordance with in-house procedure TPD091 at the following values: 1 V 1.018 V 10 V Calibration for DC voltage using the electronic reference standards in accordance with in-house procedure TPD032 at the following values: 1 V 1.018 V 10 V	Q[60 nV, N] Q[60 nV, N] Q[120 nV, N] where $Q[a, b] = [a^2 + b^2]^{1/2}$, N is the source noise Q[60 nV, N] Q[60 nV, N] Q[120 nV, N] where $Q[a, b] = [a^2 + b^2]^{1/2}$, N is the source noise 0.44 μV 0.44 μV 2.4 μV

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Electrical measurements and magnetism - DC & LF measurements - DC voltage source: standard cell, solid state voltage standard, multifunction calibrator	<p>Calibration for DC voltage using potentiometer in accordance with in-house procedure TPD007 over the following ranges:</p> <p>1 µV to 20 mV Above 20 mV to 200 mV Above 200 mV to 2 V</p> <p>Calibration for DC voltage using voltage ratio box in accordance with in-house procedure TPD016 over the following ranges:</p> <p>2 V to 10 V Above 10 V to 1000 V</p> <p>Calibration for DC voltage using multi-function calibrator in accordance with in-house procedure TPD042 over the following ranges:</p> <p>0.1 V to 10 V Above 10 V to 1000 V</p> <p>Calibration for DC voltage in accordance with in-house procedure TPD037 over the following ranges:</p> <p>0.1 mV to 1 mV Above 1 mV to 10 mV Above 10 mV to 100 mV Above 100 mV to 1 V Above 1 V to 10 V Above 10 V to 100 V Above 100 V to 1000 V</p>	<p>0.12 µV 0.13 µV to 0.18 µV 0.26 µV to 1.3 µV</p> <p>1.5 µV to 8.5 µV 8.5 µV to 1.1 mV</p> <p>0.17 µV to 8.5 µV 8.5 µV to 1.1 mV</p> <p>0.30 µV 0.40 µV 1.2 µV 12 µV 0.12 mV 1.7 mV 17 mV</p>

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Electrical measurements and magnetism - DC & LF measurements - DC voltage source: standard cell, solid state voltage standard, multifunction calibrator - DC high voltage source: DC kilovolt source	Calibration for DC voltage in accordance with in-house procedure TPD095 at the following values: 100 mV to 1 V Above 1 V to 10 V Above 10 V to 100 V Above 100 V to 1000 V Calibration for DC voltage in accordance with in-house procedure TPD102 over the following ranges: 1 kV to 30 kV Above 30 kV to 100 kV Calibration for DC voltage in accordance with in-house procedure TPD112 over the following ranges: 1 kV to 10 kV Above 10 kV to 50 kV Above 50 kV to 100 kV	40 nV to 0.40 μ V 0.40 μ V to 4.0 μ V 4.0 μ V to 40 μ V 40 μ V to 0.44 mV 0.042 V to 1.3 V 1.3 V to 4.2 V 0.04 V to 0.40 V 0.28 V to 1.4 V 1.9 V to 3.7 V

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Electrical measurements and magnetism		
- DC & LF measurements		
- DC voltmeter: nanovoltmeter, microvoltmeter, DC voltmeter, multimeter, multifunction transfer standard	<p>Calibration for DC voltage in accordance with in-house procedure TPD007 over the following ranges:</p> <p>1 µV to 20 mV Above 20 mV to 200 mV Above 200 mV to 2 V</p> <p>Calibration for DC voltage in accordance with in-house procedure TPD016 over the following range:</p> <p>2 V to 1000 V</p> <p>Calibration for DC voltage in accordance with in-house procedure TPL038 over the following ranges:</p> <p>100 mV to 200 mV Above 200 mV to 2 V Above 2 V to 1000 V</p> <p>On-site calibration for DC voltage in accordance with in-house procedure TPL038 over the following ranges:</p> <p>100 mV to 200 mV Above 200 mV to 2 V Above 2 V to 1000 V</p>	<p>0.12 µV 0.24 µV 0.30 µV to 3.0 µV</p> <p>3.0 µV to 1.2 mV</p> <p>1.6 µV to 3.2 µV 2.4 µV to 24 µV 26 µV to 13 mV</p> <p>1.6 µV to 3.2 µV 2.4 µV to 24 µV 26 µV to 13 mV</p>

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Electrical measurements and magnetism - DC & LF measurements - DC high voltage meter: DC kilovoltmeter, dedicated setup for high voltage	Calibration for DC voltage in accordance with in-house procedure TPD102 over the following ranges: 1 kV to 30 kV Above 30 kV to 100 kV Calibration for DC voltage in accordance with in-house procedure TPD112 over the following ranges: 1 kV to 10 kV Above 10 kV to 50 kV Above 50 kV to 100 kV	0.042 V to 1.3 V 1.3 V to 4.2 V 0.04 V to 0.40 V 0.28 V to 1.4 V 1.9 V to 3.7 V

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Electrical measurements and magnetism(cont'd)		
- DC & LF measurements		
- DC voltage ratio device: resistive divider, ratio meter	Calibration for DC voltage ratio in accordance with in-house procedure TPD038 over the following ranges:	
	20 V: 10 V to 100 V: 10 V	0.25 x 10 ⁻⁶
	100 V: 10 V	0.40 x 10 ⁻⁶
	200 V: 10 V to 1000 V: 10 V	0.55 x 10 ⁻⁶
	800 V: 10 V	0.60 x 10 ⁻⁶
	900 V: 10 V	0.70 x 10 ⁻⁶
	1000 V: 10 V	0.80 x 10 ⁻⁶
	2 V: 1 V to 5 V: 1 V	0.30 x 10 ⁻⁶
	10 V: 1 V	0.45 x 10 ⁻⁶
	20 V: 1 V to 50 V: 1 V	0.50 x 10 ⁻⁶
	100 V: 1 V	0.55 x 10 ⁻⁶
	200 V: 1 V to 700 V: 1 V	0.65 x 10 ⁻⁶
	800 V: 1 V	0.70 x 10 ⁻⁶
	900 V: 1 V	0.80 x 10 ⁻⁶
	1000 V: 1 V	0.90 x 10 ⁻⁶
	Calibration for DC voltage ratio in accordance with in-house procedure TPD048 over the following ranges:	
	20 V: 10 V to 100 V: 10 V	0.20 x 10 ⁻⁶
	200 V: 10 V to 1000 V: 10 V	0.40 x 10 ⁻⁶
- DC voltage ratio device for input voltage from 1 V to 100 V: voltage ratio divider, voltage ratio box	Calibration for DC voltage ratio in accordance with in-house procedure TPD022 over the following ranges:	
	0.00001 to 0.0001	0.90 x 10 ⁻⁶
	Above 0.0001 to 0.001	0.90 x 10 ⁻⁶
	Above 0.001 to 0.01	0.95 x 10 ⁻⁶
	Above 0.01 to 0.1	0.82 x 10 ⁻⁶
	Above 0.1 to 1	0.87 x 10 ⁻⁶

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Electrical measurements and magnetism - DC & LF measurements - DC resistance standard and source: fixed resistor, resistance box, three-terminal resistor	Calibration for DC resistance by direct or indirect comparison with the Quantised Hall resistance standard in accordance with in-house procedure TPD217 at the following values: 1 Ω 10 Ω 25 Ω 100 Ω 1 k Ω 10 k Ω Calibration for DC resistance in accordance with in-house procedure TPD033 at the following values: 100 m Ω 1 Ω 10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω Calibration for DC resistance in accordance with in-house procedure TPD403 at the following values: 1 Ω to 10 Ω Above 10 Ω to 100 Ω Above 100 Ω to 1 k Ω Above 1 k Ω to 10 k Ω	0.025 $\mu\Omega$ 0.25 $\mu\Omega$ 0.63 $\mu\Omega$ 2.5 $\mu\Omega$ 25 $\mu\Omega$ 0.25 m Ω 94 n Ω 0.30 $\mu\Omega$ 3.0 $\mu\Omega$ 30 $\mu\Omega$ 0.30 m Ω 3.0 m Ω 50 m Ω 0.18 $\mu\Omega$ to 1.4 $\mu\Omega$ 1.4 $\mu\Omega$ to 12 $\mu\Omega$ 12 $\mu\Omega$ to 0.10 m Ω 0.10 m Ω to 1.2 m Ω

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Electrical measurements and magnetism		
- DC & LF measurements		
- DC resistance standard and source: fixed resistor, resistance box, three-terminal resistor	<p>Calibration for DC resistance in accordance with in-house procedure TPD040 over the following ranges:</p> <p>0.1 Ω to 1 Ω Above 1 Ω to 10 Ω Above 10 Ω to 100 Ω Above 100 Ω to 1 kΩ Above 1 kΩ to 100 kΩ</p> <p>Calibration for DC resistance in accordance with in-house procedure TPD405 at the following values:</p> <p>1 Ω to 10 Ω Above 10 Ω to 100 Ω Above 100 Ω to 1 k Ω Above 1 kΩ to 10 k Ω</p> <p>Calibration for DC resistance in accordance with in-house procedure TPD006 at the following values or over the following range:</p> <p>1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 kΩ to 100 kΩ</p>	<p>0.14 $\mu\Omega$ to 1.4 $\mu\Omega$ 0.46 $\mu\Omega$ to 4.6 $\mu\Omega$ 4.2 $\mu\Omega$ to 42 $\mu\Omega$ 46 $\mu\Omega$ to 0.46 mΩ 6.8 mΩ to 0.68 Ω</p> <p>0.23 $\mu\Omega$ to 2.3 $\mu\Omega$ 2.3 $\mu\Omega$ to 23 $\mu\Omega$ 23 $\mu\Omega$ to 0.23 mΩ 0.23 mΩ to 2.3 mΩ</p> <p>6.8 mΩ 68 mΩ 0.68 Ω 6.8 Ω 68 Ω 0.68 kΩ 6.8 mΩ to 0.68 Ω</p>

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Electrical measurements and magnetism - DC & LF measurements - DC resistance standard and source: fixed resistor, resistance box, three-terminal resistor	Calibration for DC resistance in accordance with in-house procedure TPD005 at the following values: 1 MΩ 10 MΩ 100 MΩ Calibration for DC resistance in accordance with in-house procedure TPD025 over the following ranges: 100 MΩ to 10 GΩ Above 10 GΩ to 100 GΩ Above 100 GΩ to 1 TΩ Above 1 TΩ to 10 TΩ	1.0 Ω 10 Ω 0.50 kΩ 4.6 kΩ to 0.46 MΩ 0.78 MΩ to 7.8 MΩ 57 MΩ to 0.57 GΩ 1.4 GΩ to 14 GΩ

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Electrical measurements and magnetism		
- DC & LF measurements		
- DC resistance standard for high current: DC shunt	<p>Calibration for DC resistance in accordance with in-house procedure TPD015 at the following values or over the following ranges:</p> <p>1 mΩ 10 mΩ 100 mΩ 0.1 mΩ to 1 mΩ Above 1 mΩ to 10 mΩ Above 10 mΩ to 100 mΩ Above 0.1 Ω to 1 Ω</p> <p>Calibration for DC resistance in accordance with in-house procedure TPD035 at the following values or over the following ranges:</p> <p>1 mΩ 10 mΩ 100 mΩ 0.1 mΩ to 1 mΩ Above 1 mΩ to 10 mΩ Above 10 mΩ to 100 mΩ Above 0.1 Ω to 1 Ω</p> <p>Calibration for DC resistance in accordance with in-house procedure TPD407 at the following values:</p> <p>1 mΩ to 10 mΩ Above 10 mΩ to 100 mΩ</p>	<p>3.1 nΩ 19 nΩ 0.15 μΩ 0.39 nΩ to 3.9 nΩ 3.9 nΩ to 19 nΩ 19 nΩ to 0.15 μΩ 0.15 μΩ to 1.4 μΩ</p> <p>3.1 nΩ 19 nΩ 0.15 μΩ 0.39 nΩ to 3.9 nΩ 3.9 nΩ to 19 nΩ 19 nΩ to 0.15 μΩ 0.15 μΩ to 1.4 μΩ</p> <p>1.6 nΩ to 16 nΩ 16 nΩ to 0.17 μΩ</p>

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Electrical measurements and magnetism	Calibration for DC resistance in accordance with in-house procedure TPD037 at the following values or over the following ranges:	
- DC resistance standard and source: multifunction calibrator	1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ 1 GΩ 1 Ω to 10 Ω Above 10 Ω to 100 Ω Above 100 Ω to 1.0 kΩ Above 1.0 kΩ to 100 kΩ Above 100 kΩ to 1 MΩ Above 1 MΩ to 10 MΩ Above 10 MΩ to 100 MΩ Above 100 MΩ to 1 GΩ	30 μΩ 50 μΩ 0.50 mΩ 1.0 mΩ 30 mΩ 0.30 Ω 3.0 Ω 30 Ω 3.0 kΩ 80 kΩ 30 μΩ to 50 μΩ 50 μΩ to 0.50 mΩ 0.50 mΩ to 3.0 mΩ 3.0 mΩ to 0.40 Ω 0.40 Ω to 3.0 Ω 3.0 Ω to 30 Ω 30 Ω to 3.0 kΩ 3.0 kΩ to 0.1 MΩ

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Electrical measurements and magnetism		
- DC resistance standard and source: multifunction calibrator	Calibration for DC resistance in accordance with in-house procedure TPD046 at the following values or over the following ranges:	
	1 Ω	30 μΩ
	10 Ω	50 μΩ
	100 Ω	0.50 mΩ
	1 kΩ	1.0 mΩ
	10 kΩ	0.030 Ω
	100 kΩ	0.30 Ω
	1 MΩ	3.0 Ω
	10 MΩ	30 Ω
	100 MΩ	3.0 kΩ
	1 Ω to 10 Ω	30 μΩ to 50 μΩ
	Above 10 Ω to 100 Ω	50 μΩ to 0.50 mΩ
	Above 100 Ω to 1.9 kΩ	0.50 mΩ to 3.0 mΩ
	Above 1.9 kΩ to 190 kΩ	3.0 mΩ to 0.40 Ω
	Above 190 kΩ to 1 MΩ	0.40 Ω to 3.0 Ω
	Above 1 MΩ to 10 MΩ	3.0 Ω to 30 Ω
	Above 10 MΩ to 100 MΩ	30 Ω to 3.0 kΩ

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Electrical measurements and magnetism		
- DC & LF measurements		
- DC resistance meter: multimeter, multifunction transfer standard, resistance bridge, microohmmeter, ohmmeter, teraohmmeter	<p>Calibration for DC resistance in accordance with in-house procedure TPD004 over the following ranges:</p> <p>1 mΩ to 10 mΩ Above 10 mΩ to 100 mΩ Above 100 mΩ to 1 Ω Above 1 Ω to 10 Ω Above 10 Ω to 100 Ω Above 100 Ω to 1 kΩ</p> <p>Calibration for DC resistance in accordance with in-house procedure TPD040 over the following ranges:</p> <p>100 mΩ to 1 Ω Above 1 Ω to 10 Ω Above 10 Ω to 100 Ω Above 100 Ω to 1 kΩ Above 1 kΩ to 10 kΩ Above 10 kΩ to 100 kΩ</p> <p>Calibration for DC resistance in accordance with in-house procedure TPL038 at the following values:</p> <p>10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ 1 MΩ 10 MΩ 100 MΩ</p>	<p>1.2 μΩ 1.2 μΩ 1.2 μΩ to 1.5 μΩ 1.5 μΩ to 10 μΩ 10 μΩ to 0.10 mΩ 0.10 mΩ to 1.0 mΩ</p> <p>1.2 μΩ to 1.5 μΩ 1.5 μΩ to 10 μΩ 10 μΩ to 0.10 mΩ 0.10 mΩ to 1.0 mΩ 1.0 mΩ to 10 mΩ 10 mΩ to 0.10 Ω</p> <p>0.50 mΩ 2.0 mΩ 0.020 Ω 0.20 Ω 2.0 Ω 0.020 kΩ 0.50 kΩ 50 kΩ</p>

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Electrical measurements and magnetism - DC & LF measurements - DC resistance meter: multimeter, multifunction transfer standard, resistance bridge, microohmmeter, ohmmeter, teraohmmeter	On-site calibration for DC resistance in accordance with in-house procedure TPL038 at the following values: 10 Ω 100 Ω 1 k Ω 10 k Ω 100 k Ω 1 M Ω 10 M Ω 100 M Ω Calibration for DC resistance in accordance with in-house procedure TPD006 over the following range: 1 k Ω to 100 M Ω Calibration for DC resistance in accordance with in-house procedure TPD025 over the following ranges: Above 100 M Ω to 1000 M Ω Above 1 G Ω to 10 G Ω Above 10 G Ω to 100 G Ω Above 100 G Ω to 1 T Ω Above 1 T Ω to 10 T Ω	0.50 m Ω 2.0 m Ω 0.020 Ω 0.20 Ω 2.0 Ω 0.020 k Ω 0.50 k Ω 50 k Ω 6.8 m Ω to 0.68 k Ω 5.0 k Ω to 50 k Ω 50 k Ω to 6.0 M Ω 6.0 M Ω to 10 M Ω 90 M Ω to 0.90 G Ω 1.4 G Ω to 31 G Ω

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Electrical measurements and magnetism		
- DC & LF measurements		
- Loop impedance tester	Calibration for the following parameters in accordance with in-house procedure TPD078:	
	- Loop impedance	
	0.35 Ω to below 0.9 Ω	42 m Ω
	0.9 Ω to below 1.7 Ω	55 m Ω
	1.7 Ω to below 4.7 Ω	0.12 Ω
	4.7 Ω to below 17 Ω	0.23 Ω
	17 Ω to below 47 Ω	0.50 Ω
	47 Ω to below 90 Ω	0.70 Ω
	90 Ω to below 170 Ω	0.80 Ω
	170 Ω to below 470 Ω	1.2 Ω
	470 Ω to below 900 Ω	2.6 Ω
	900 Ω to below 1.7 k Ω	5.0 Ω
	1.7 k Ω	10 Ω
- Insulation resistance tester	Calibration for the following parameters in accordance with in-house procedure TPD036:	
	- insulation resistance over the following ranges:	
	0.1 M Ω to 1 M Ω	6.0 k Ω to 13 k Ω
	Above 1 M Ω to 10 M Ω	13 k Ω to 0.13 M Ω
	Above 10 M Ω to 100 M Ω	0.13 M Ω to 1.3 M Ω
	Above 100 M Ω to 1 G Ω	1.3 M Ω to 12 M Ω
	Above 1 G Ω to 10 G Ω	12 M Ω to 67 M Ω
	Above 10 G Ω to 100 G Ω	67 M Ω to 0.67 G Ω
	Above 100 G Ω to 600 G Ω	0.67 G Ω to 4.0 G Ω
	- DC output voltage over the following ranges:	
	100 V to 1 kV	12 mV to 59 mV
	Above 1 kV to 10 kV	53 V to 156 V

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Electrical measurements and magnetism - DC & LF measurements - DC current source: current generator, multifunction calibrator	Calibration for DC current in accordance with in-house procedure TPD058 at the following values or over the following ranges: 0.1 pA 1 pA 10 pA 100 pA 0.1 pA to 1 pA Above 1 pA to 10 pA Above 10 pA to 100 pA Calibration for DC current in accordance with in-house procedure TPD088 at the following values or over the following ranges: 1 pA to below 10 pA 10 pA to below 100 pA 100 pA Calibration for DC current in accordance with in-house procedure TPD076 over the following ranges: 0.1 nA to 1 nA Above 1 nA to 10 nA Above 10 nA to 100 nA	0.30 fA 1.0 fA 5.0 fA 20 fA 0.4 fA to 4.0 fA 1.0 fA to 10 fA 5.0 fA to 40 fA 0.8 fA 0.8 fA 2.0 fA 38 fA to 0.38 pA 0.15 pA to 1.5 pA 1.5 pA to 15 pA

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Electrical measurements and magnetism - DC & LF measurements - DC current source: current generator, multifunction calibrator	<p>Calibration for DC current by measuring voltage-drop with standard resistor and reference multimeter in accordance with in-house procedure TPD008 over the following ranges:</p> <p>0.1 µA to 1 µA Above 1 µA to 10 µA Above 10 µA to 100 µA Above 0.1 mA to 1 mA Above 1 mA to 10 mA Above 10 mA to 100 mA Above 0.1 A to 1 A Above 1 A to 10 A Above 10 A to 20 A Above 20 A to 30 A Above 30 A to 100 A</p> <p>Calibration for DC current by direct measurement using reference multimeter in accordance with in-house procedure TPD037 over the following ranges:</p> <p>0.1 mA to 1 mA Above 1 mA to 10 mA Above 10 mA to 100 mA Above 0.1 A to 1 A</p> <p>On-site calibration for DC current by direct measurement using reference multimeter in accordance with in-house procedure TPD037 over the following ranges:</p> <p>0.1 mA to 1 mA Above 1 mA to 10 mA Above 10 mA to 100 mA Above 0.1 A to 1 A</p>	<p>0.89 pA to 3.2 pA 2.2 pA to 9.8 pA 18 pA to 90 pA 0.18 nA to 0.90 nA 1.8 nA to 9.0 nA 18 nA to 0.20 µA 0.59 µA to 5.9 µA 2.9 µA to 26 µA 35 µA to 72 µA 72 µA to 0.13 mA 0.60 mA to 1.7 mA</p> <p>0.18 nA to 0.90 nA 1.8 nA to 9.0 nA 18 nA to 0.20 µA 0.59 µA to 5.9 µA</p> <p>18 nA to 0.18 µA 0.18 µA to 1.8 µA 1.8 µA to 18 µA 29 µA to 0.29 mA</p>

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Electrical measurements and magnetism - DC & LF measurements - DC current meter: multimeter, picoammeter, nanoammeter, multifunction transfer standard, current comparator, current transducer, dedicated equipment for heavy current measurement	Calibration for DC current in accordance with in-house procedure TPD056 at the following values or over the following ranges: 0.1 pA 1 pA 10 pA 100 pA 0.1 pA to 1 pA Above 1 pA to 10 pA Above 10 pA to 100 pA Calibration for DC current in accordance with in-house procedure TPD086 at the following value or over the following ranges: 1 pA to below 10 pA 10 pA to below 100 pA 100 pA Calibration for DC current in accordance with in-house procedure TPD076 over the following ranges: 0.1 nA to 1 nA Above 1 nA to 10 nA Above 10 nA to 100 nA	0.30 fA 1.0 fA 5.0 fA 11 fA 0.30 fA to 3.0 fA 1.0 fA to 5.0 fA 5.0 fA to 30 fA 0.3 fA 0.3 fA 0.9 fA 36 fA to 0.36 pA 0.14 pA to 1.4 pA 0.8 pA to 8 pA

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<p>Electrical measurements and magnetism</p> <p>- DC & LF measurements</p> <p>- DC current meter: multimeter, picoammeter, nanoammeter, multifunction transfer standard, current comparator, current transducer, dedicated equipment for heavy current measurement</p>	<p>Calibration for DC current by measuring voltage-drop with standard resistor and reference multimeter in accordance with in-house procedure TPD008 over the following ranges:</p> <p>0.1 μA to 1 μA Above 1 μA to 10 μA Above 10 μA to 100 μA Above 0.1 mA to 1 mA Above 1 mA to 10 mA Above 10 mA to 100 mA Above 0.1 A to 1 A Above 1 A to 10 A Above 10 A to 20 A Above 20 A to 30 A Above 30 A to 100 A</p>	<p>5 pA to 25 pA 25 pA to 30 pA 0.030 nA to 0.30 nA 0.30 nA to 3.0 nA 3.0 nA to 30 nA 30 nA to 0.30 μA 1.0 μA to 10 μA 10 μA to 0.10 mA 0.10 mA to 0.40 mA 0.40 mA to 0.90 mA 0.90 mA to 4.5 mA</p>

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Electrical measurements and magnetism - DC & LF measurements - DC current meter, clamp meter	Calibration for DC current in accordance with in-house procedure TPL146 over the following ranges: 100 A to 400 A Above 400 A to 600 A Above 600 A to 1300 A Above 1300 A to 1500 A Above 1500 A to 1700 A Above 1700 A to 1800 A Above 1800 A to 1900 A Above 1900 A to 2000 A	1.2 A 2.0 A 3.0 A 4.0 A 6.0 A 8.0 A 10 A 12 A

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Electrical measurements and magnetism		
- DC & LF measurements		
- DC power source	On-site calibration for DC power in accordance with in-house procedure TPD081 over the following range: Voltage: 1 V to 1 kV Current: 0.1 A to 100 A Power: 0.1 W to 20 kW	30 μ W/W
	Calibration for DC power in accordance with in-house procedure TPD081 over the following range: Voltage: 1 V to 1 kV Current: 0.1 A to 100 A Power: 0.1 W to 20 kW	30 μ W/W
- DC power meter	Calibration for DC power in accordance with in-house procedure TPD080 over the following ranges: Voltage: 1 V to 1 kV Current: 0.1 A to 100 A Power: 0.1 W to 1 W Above 1 W to 10 kW Above 10 kW to 20 kW	70 μ W 70 μ W to 0.70 W 0.70 W

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC high voltage source: AC high voltage generator	Calibration for AC voltage at 50 Hz in accordance with in-house procedure TPD103 over the following ranges: 1 kV to 11 kV	0.26 V to 2.9 V
	Calibration for AC voltage at 50 Hz in accordance with in-house procedure TPD105 over the following ranges: Above 11 kV to 30 kV Above 30 kV to 44 kV	5.1 V to 14 V 26 V to 38 V
- AC high voltage meter: AC high voltage meters, dedicated setup for high voltage measurement	Calibration for AC voltage at 50 Hz in accordance with in-house procedure TPD103 over the following ranges: 1 kV to 11 kV	0.26 V to 2.9 V
	Calibration for AC voltage at 50 Hz in accordance with in-house procedure TPD105 over the following ranges: Above 11 kV to 30 kV Above 30 kV to 44 kV	5.1 V to 14 V 27 V to 40 V

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ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Electrical measurements and magnetism - DC & LF measurements - AC voltage generator/source	Calibration for AC voltage in accordance with in-house procedure TPL017 at the following values: 40 Hz, 1 kHz, 10 kHz, 20 kHz 0.1 mV 0.2 mV 0.5 mV 1 mV 2 mV 5 mV 10 mV 20 mV 50 mV 100 mV 200 mV 50 kHz 0.1 mV 0.2 mV 0.5 mV 1 mV 2 mV 5 mV 10 mV 20 mV 50 mV 100 mV 200 mV	3000 µV/V 1000 µV/V 1000 µV/V 300 µV/V 200 µV/V 60 µV/V 40 µV/V 30 µV/V 20 µV/V 13 µV/V 13 µV/V 3000 µV/V 1000 µV/V 1000 µV/V 300 µV/V 200 µV/V 120 µV/V 40 µV/V 40 µV/V 30 µV/V 19 µV/V 19 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage in accordance with in-house procedure TPL017 at the following values or over the following ranges:	
	100 kHz	
	0.1 mV	4000 µV/V
	0.2 mV	4000 µV/V
	0.5 mV	4000 µV/V
	1 mV	400 µV/V
	2 mV	400 µV/V
	5 mV	340 µV/V
	10 mV	70 µV/V
	20 mV	70 µV/V
	50 mV	60 µV/V
	100 mV	48 µV/V
	200 mV	48 µV/V
	40 Hz to 20 kHz	
	0.1 mV to 1 mV	3000 µV/V
	Above 1 mV to 10 mV	300 µV/V
	Above 10 mV to 250 mV	70 µV/V
	20 kHz to 50 kHz	
	0.1 mV to 1 mV	3000 µV/V
	Above 1 mV to 10 mV	300 µV/V
	Above 10 mV to 250 mV	110 µV/V
	50 kHz to 100 kHz	
	0.1 mV to 1 mV	4000 µV/V
	Above 1 mV to 10 mV	500 µV/V
	Above 10 mV to 250 mV	220 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC voltage generator/source	Calibration for AC voltage by comparison with AC/DC thermal converter in accordance with in-house procedure TPL023 at the following values: 20 Hz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 40 Hz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 700 V 1000 V	14 µV/V 10 µV/V 12 µV/V 11 µV/V 10 µV/V 12 µV/V 14 µV/V 13 µV/V 12 µV/V 13 µV/V 13 µV/V 16 µV/V 18 µV/V 20 µV/V 20 µV/V 13 µV/V 10 µV/V 11 µV/V 12 µV/V 10 µV/V 13 µV/V 12 µV/V 13 µV/V 13 µV/V 16 µV/V 18 µV/V 20 µV/V 20 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by comparison with AC/DC thermal converter in accordance with in-house procedure TPL023 at the following values:	
	1 kHz	
	0.5 V	13 µV/V
	1 V	10 µV/V
	2 V	13 µV/V
	3 V	10 µV/V
	5 V	10 µV/V
	10 V	12 µV/V
	20 V	12 µV/V
	50 V	12 µV/V
	100 V	12 µV/V
	200 V	13 µV/V
	500 V	17 µV/V
	700 V	18 µV/V
	1000 V	13 µV/V
	10 kHz	
	0.5 V	12 µV/V
	1 V	10 µV/V
	2 V	10 µV/V
	3 V	10 µV/V
	5 V	10 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	12 µV/V
	100 V	12 µV/V
	200 V	13 µV/V
	500 V	16 µV/V
	700 V	19 µV/V
	1000 V	16 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by comparison with AC/DC thermal converter in accordance with in-house procedure TPL023 at the following values:	
	20 kHz	
	0.5 V	15 µV/V
	1 V	10 µV/V
	2 V	10 µV/V
	3 V	10 µV/V
	5 V	10 µV/V
	10 V	12 µV/V
	20 V	12 µV/V
	50 V	12 µV/V
	100 V	12 µV/V
	200 V	19 µV/V
	500 V	22 µV/V
	700 V	30 µV/V
	1000 V	28 µV/V
	30 kHz	
	100 V	12 µV/V
	200 V	19 µV/V
	500 V	30 µV/V
	700 V	36 µV/V
	1000 V	37 µV/V
	50 kHz	
	0.5 V	14 µV/V
	1 V	12 µV/V
	2 V	11 µV/V
	3 V	11 µV/V
	5 V	11 µV/V
	10 V	12 µV/V
	20 V	12 µV/V
	50 V	12 µV/V
	100 V	13 µV/V
	200 V	24 µV/V
	500 V	34 µV/V
	700 V	45 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by comparison with AC/DC thermal converter in accordance with in-house procedure TPL023 at the following values:	
	100 kHz	
	0.5 V	18 µV/V
	1 V	15 µV/V
	2 V	14 µV/V
	3 V	12 µV/V
	5 V	12 µV/V
	10 V	12 µV/V
	20 V	13 µV/V
	50 V	16 µV/V
	100 V	16 µV/V
	200 V	44 µV/V
	500 V	65 µV/V
	700 V	85 µV/V
	300 kHz	
	0.5 V	42 µV/V
	1 V	32 µV/V
	2 V	28 µV/V
	3 V	25 µV/V
	5 V	22 µV/V
	10 V	22 µV/V
	20 V	23 µV/V
	500 kHz	
	0.5 V	160 µV/V
	1 V	150 µV/V
	2 V	150 µV/V
	3 V	150 µV/V
	5 V	150 µV/V
	10 V	150 µV/V
	20 V	150 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by comparison with AC/DC thermal converter in accordance with in-house procedure TPL023 at the following values or over the following ranges:	
	1 MHz	
	0.5 V	500 µV/V
	1 V	500 µV/V
	2 V	500 µV/V
	3 V	500 µV/V
	5 V	500 µV/V
	10 V	500 µV/V
	20 V	500 µV/V
	40 Hz to 20 kHz	
	0.2 V to 1000 V	70 µV/V to 90 µV/V
	20 kHz to 50 kHz	
	0.2 V to 1000 V	90 µV/V to 130 µV/V
	50 kHz to 100 kHz	
	0.2 V to 700 V	170 µV/V to 400 µV/V
	100 kHz to 300 kHz	
	0.2 V to 0.6 V	900 µV/V
	Above 0.6 V to 20 V	230 µV/V
	300 kHz to 500 kHz	
	0.2 V to 0.6 V	1700 µV/V
	Above 0.6 V to 6 V	500 µV/V
	Above 6 V to 20 V	600 µV/V
	500 kHz to 1 MHz	
	0.2 V to 0.6 V	2900 µV/V
	Above 0.6 V to 20 V	1200 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 at the following values:	
	20 Hz	
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	15 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	20 µV/V
	100 V	18 µV/V
	200 V	20 µV/V
	500 V	18 µV/V
	40 Hz	
	1 mV	500 µV/V
	2 mV	300 µV/V
	5 mV	100 µV/V
	10 mV	50 µV/V
	20 mV	30 µV/V
	50 mV	35 µV/V
	100 mV	15 µV/V
	200 mV	15 µV/V
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	13 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	13 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	16 µV/V
	500 V	18 µV/V
	700 V	20 µV/V
	1000 V	20 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 at the following values:	
	1 kHz	
	1 mV	500 µV/V
	2 mV	300 µV/V
	5 mV	100 µV/V
	10 mV	50 µV/V
	20 mV	30 µV/V
	50 mV	30 µV/V
	100 mV	15 µV/V
	200 mV	15 µV/V
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	13 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	13 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	15 µV/V
	500 V	18 µV/V
	700 V	20 µV/V
	1000 V	20 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 at the following values:	
	10 kHz	
	1 mV	500 µV/V
	2 mV	300 µV/V
	5 mV	100 µV/V
	10 mV	50 µV/V
	20 mV	30 µV/V
	50 mV	30 µV/V
	100 mV	15 µV/V
	200 mV	15 µV/V
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	12 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	15 µV/V
	500 V	18 µV/V
	700 V	20 µV/V
	1000 V	20 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 at the following values:	
	20 kHz	
	1 mV	500 µV/V
	2 mV	300 µV/V
	5 mV	100 µV/V
	10 mV	50 µV/V
	20 mV	30 µV/V
	50 mV	30 µV/V
	100 mV	15 µV/V
	200 mV	15 µV/V
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	12 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	13 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	19 µV/V
	500 V	25 µV/V
	700 V	30 µV/V
	1000 V	30 µV/V
	30 kHz	
	100 V	16 µV/V
	200 V	19 µV/V
	500 V	30 µV/V
	700 V	40 µV/V
	1000 V	42 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 at the following values:	
	50 kHz	
	1 mV	500 µV/V
	2 mV	300 µV/V
	5 mV	200 µV/V
	10 mV	80 µV/V
	20 mV	50 µV/V
	50 mV	40 µV/V
	100 mV	25 µV/V
	200 mV	25 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	13 µV/V
	5 V	12 µV/V
	10 V	14 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	20 µV/V
	200 V	24 µV/V
	500 V	40 µV/V
	700 V	50 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 at the following values:	
	100 kHz	
	1 mV	600 µV/V
	2 mV	500 µV/V
	5 mV	300 µV/V
	10 mV	100 µV/V
	20 mV	100 µV/V
	50 mV	60 µV/V
	100 mV	60 µV/V
	200 mV	60 µV/V
	0.5 V	20 µV/V
	1 V	20 µV/V
	2 V	15 µV/V
	5 V	15 µV/V
	10 V	15 µV/V
	20 V	18 µV/V
	50 V	20 µV/V
	100 V	30 µV/V
	200 V	40 µV/V
	500 V	100 µV/V
	300 kHz	
	0.5 V	45 µV/V
	1 V	40 µV/V
	2 V	40 µV/V
	3 V	40 µV/V
	5 V	40 µV/V
	10 V	40 µV/V
	20 V	40 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 at the following values or over the following ranges:	
	500 kHz	
	0.5 V	160 µV/V
	1 V	150 µV/V
	2 V	150 µV/V
	3 V	150 µV/V
	5 V	150 µV/V
	10 V	150 µV/V
	20 V	150 µV/V
	1 MHz	
	0.5 V	500 µV/V
	1 V	500 µV/V
	2 V	500 µV/V
	3 V	500 µV/V
	5 V	500 µV/V
	10 V	500 µV/V
	20 V	500 µV/V
	40 Hz to 20 kHz	
	1 mV to 2 mV	2000 µV/V
	Above 2 mV to 6 mV	1000 µV/V
	Above 6 mV to 20 mV	380 µV/V
	Above 20 mV to 60 mV	160 µV/V
	Above 60 mV to 200 mV	70 µV/V
	Above 200 mV to 600 mV	50 µV/V
	Above 0.6 V to 200 V	40 µV/V
	Above 200 V to 1000 V	50 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 over the following ranges:	
	20 kHz to 50 kHz	
	1 mV to 2 mV	3200 µV/V
	Above 2 mV to 6 mV	1600 µV/V
	Above 6 mV to 20 mV	620 µV/V
	Above 20 mV to 60 mV	260 µV/V
	Above 60 mV to 200 mV	120 µV/V
	Above 200 mV to 200 V	90 µV/V
	Above 200 V to 700 V	150 µV/V
	20 kHz to 30 kHz	
	700 V to 1000 V	150 µV/V
	50 kHz to 100 kHz	
	1 mV to 2 mV	4200 µV/V
	Above 2 mV to 6 mV	2100 µV/V
	Above 6 mV to 20 mV	830 µV/V
	Above 20 mV to 60 mV	440 µV/V
	Above 60 mV to 200 mV	230 µV/V
	Above 200 mV to 200 V	170 µV/V
	Above 200 V to 600 V	580 µV/V
	100 kHz to 300 kHz	
	0.2 V to 20 V	230 µV/V
	300 kHz to 500 kHz	
	0.2 V to 20 V	500 µV/V
	500 kHz to 1 MHz	
	0.2 V to 2 V	1200 µV/V
	Above 2 V to 20 V	1400 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC voltage generator/source	On-site calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 at the following values and ranges: 40 Hz to 20 kHz 1 mV to 2 mV Above 2 mV to 6 mV Above 6 mV to 20 mV Above 20 mV to 60 mV Above 60 mV to 200 mV Above 200 mV to 600 mV Above 0.6 V to 200 V Above 200 V to 1000 V 20 kHz to 50 kHz 1 mV to 2 mV Above 2 mV to 6 mV Above 6 mV to 20 mV Above 20 mV to 60 mV Above 60 mV to 200 mV Above 200 mV to 200 V Above 200 V to 700 V 20 kHz to 30 kHz 700 V to 1000 V 50 kHz to 100 kHz 1 mV to 2 mV Above 2 mV to 6 mV Above 6 mV to 20 mV Above 20 mV to 60 mV Above 60 mV to 200 mV Above 200 mV to 200 V Above 200 V to 600 V	2000 µV/V 1000 µV/V 380 µV/V 160 µV/V 70 µV/V 50 µV/V 40 µV/V 50 µV/V 3200 µV/V 1600 µV/V 620 µV/V 260 µV/V 120 µV/V 90 µV/V 150 µV/V 150 µV/V 4200 µV/V 2100 µV/V 830 µV/V 440 µV/V 230 µV/V 170 µV/V 580 µV/V

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<p>Electrical measurements and magnetism</p> <p>- DC & LF measurements</p> <p>- AC voltage generator/source</p>	<p>On-site calibration for AC voltage by direct measurement in accordance with in-house procedure TPL030 over the following ranges:</p> <p>100 kHz to 300 kHz 0.2 V to 20 V</p> <p>300 kHz to 500 kHz 0.2 V to 20 V</p> <p>500 kHz to 1 MHz 0.2 V to 2 V Above 2 V to 20 V</p>	<p>230 μV/V</p> <p>500 μV/V</p> <p>1200 μV/V 1400 μV/V</p>

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 at the following values:	
	20 Hz	
	0.5 V	20 µV/V
	1 V	20 µV/V
	2 V	20 µV/V
	5 V	20 µV/V
	10 V	20 µV/V
	20 V	20 µV/V
	50 V	20 µV/V
	100 V	20 µV/V
	200 V	20 µV/V
	500 V	30 µV/V
	40 Hz	
	1 mV	500 µV/V
	2 mV	400 µV/V
	5 mV	200 µV/V
	10 mV	100 µV/V
	20 mV	60 µV/V
	50 mV	40 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	14 µV/V
	5 V	13 µV/V
	10 V	15 µV/V
	20 V	13 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	16 µV/V
	500 V	20 µV/V
	700 V	20 µV/V
	1000 V	21 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 at the following values:	
	1 kHz	
	1 mV	500 µV/V
	2 mV	400 µV/V
	5 mV	200 µV/V
	10 mV	100 µV/V
	20 mV	60 µV/V
	50 mV	40 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	13 µV/V
	5 V	13 µV/V
	10 V	14 µV/V
	20 V	13 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	15 µV/V
	500 V	20 µV/V
	700 V	20 µV/V
	1000 V	20 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 at the following values:	
	10 kHz	
	1 mV	500 µV/V
	2 mV	400 µV/V
	5 mV	200 µV/V
	10 mV	100 µV/V
	20 mV	60 µV/V
	50 mV	40 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	12 µV/V
	5 V	13 µV/V
	10 V	14 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	15 µV/V
	500 V	25 µV/V
	700 V	25 µV/V
	1000 V	25 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 at the following values :	
	20 kHz	
	1 mV	500 µV/V
	2 mV	400 µV/V
	5 mV	200 µV/V
	10 mV	100 µV/V
	20 mV	60 µV/V
	50 mV	40 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	12 µV/V
	5 V	13 µV/V
	10 V	14 µV/V
	20 V	13 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	19 µV/V
	500 V	30 µV/V
	700 V	35 µV/V
	1000 V	35 µV/V
	30 kHz	
	100 V	16 µV/V
	200 V	19 µV/V
	500 V	40 µV/V
	700 V	50 µV/V
	1000 V	45 µV/V

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- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 at the following values:	
	50 kHz	
	1 mV	700 µV/V
	2 mV	500 µV/V
	5 mV	200 µV/V
	10 mV	150 µV/V
	20 mV	80 µV/V
	50 mV	50 µV/V
	100 mV	50 µV/V
	200 mV	50 µV/V
	0.5 V	15 µV/V
	1 V	15 µV/V
	2 V	15 µV/V
	5 V	15 µV/V
	10 V	14 µV/V
	20 V	15 µV/V
	50 V	20 µV/V
	100 V	20 µV/V
	200 V	24 µV/V
	500 V	80 µV/V
	700 V	100 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 at the following values:	
	100 kHz	
	1 mV	700 µV/V
	2 mV	500 µV/V
	5 mV	300 µV/V
	10 mV,	200 µV/V
	20 mV	100 µV/V
	50 mV	100 µV/V
	100 mV	100 µV/V
	200 mV	100 µV/V
	0.5 V	30 µV/V
	1 V	20 µV/V
	2 V	20 µV/V
	5 V	20 µV/V
	10 V	20 µV/V
	20 V	20 µV/V
	50 V	30 µV/V
	100 V	31 µV/V
	200 V	44 µV/V
	500 V	200 µV/V
	300 kHz	
	0.5 V	70 µV/V
	1 V	70 µV/V
	2 V	70 µV/V
	5 V	60 µV/V
	10 V	60 µV/V
	20 V	60 µV/V
	500 kHz	
	0.5 V	200 µV/V
	1 V	200 µV/V
	2 V	200 µV/V
	5 V	200 µV/V
	10 V	200 µV/V
	20 V	200 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 at the following values or over the following ranges:	
	1 MHz	
	0.5 V	500 µV/V
	1 V	500 µV/V
	2 V	500 µV/V
	5 V	500 µV/V
	10 V	500 µV/V
	20 V	500 µV/V
	40 Hz to 20 kHz	
	1 mV to 2 mV	2000 µV/V
	Above 2 mV to 6 mV	1000 µV/V
	Above 6 mV to 20 mV	380 µV/V
	Above 20 mV to 60 mV	160 µV/V
	Above 60 mV to 200 mV	70 µV/V
	Above 200 mV to 600 mV	50 µV/V
	Above 0.6 V to 200 V	40 µV/V
	Above 200 V to 1000 V	50 µV/V
	20 kHz to 50 kHz	
	1 mV to 2 mV	3200 µV/V
	Above 2 mV to 6 mV	1600 µV/V
	Above 6 mV to 20 mV	620 µV/V
	Above 20 mV to 60 mV	260 µV/V
	Above 60 mV to 200 mV	120 µV/V
	Above 200 mV to 200 V	90 µV/V
	Above 200 V to 700 V	150 µV/V
	20 kHz to 30 kHz	
	700 V to 1000 V	150 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	Calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 over the following ranges:	
	50 kHz to 100 kHz	
	1 mV to 2 mV	4200 µV/V
	Above 2 mV to 6 mV	2100 µV/V
	Above 6 mV to 20 mV	830 µV/V
	Above 20 mV to 60 mV	440 µV/V
	Above 60 mV to 200 mV	230 µV/V
	Above 200 mV to 200 V	170 µV/V
	Above 200 V to 600 V	570 µV/V
	100 kHz to 300 kHz	
	0.2 V to 20 V	230 µV/V
	300 kHz to 500 kHz	
	0.2 V to 20 V	500 µV/V
	500 kHz to 1 MHz	
	0.2 V to 2 V	1200 µV/V
	Above 2 V to 20 V	1400 µV/V
	On-site calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 over the following ranges:	
	40 Hz to 20 kHz	
	1 mV to 2 mV	2000 µV/V
	Above 2 mV to 6 mV	1000 µV/V
	Above 6 mV to 20 mV	380 µV/V
	Above 20 mV to 60 mV	160 µV/V
	Above 60 mV to 200 mV	70 µV/V
	Above 200 mV to 600 mV	50 µV/V
	Above 0.6 V to 200 V	40 µV/V
	Above 200 V to 1000 V	50 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltage generator/source	On-site calibration for AC voltage by direct measurement in accordance with in-house procedure TPL036 over the following ranges:	
	20 kHz to 50 kHz	
	1 mV to 2 mV	3200 µV/V
	Above 2 mV to 6 mV	1600 µV/V
	Above 6 mV to 20 mV	620 µV/V
	Above 20 mV to 60 mV	260 µV/V
	Above 60 mV to 200 mV	120 µV/V
	Above 200 mV to 200 V	90 µV/V
	Above 200 V to 700 V	150 µV/V
	20 kHz to 30 kHz	
	700 V to 1000 V	150 µV/V
	50 kHz to 100 kHz	
	1 mV to 2 mV	4200 µV/V
	Above 2 mV to 6 mV	2100 µV/V
	Above 6 mV to 20 mV	830 µV/V
	Above 20 mV to 60 mV	440 µV/V
	Above 60 mV to 200 mV	230 µV/V
	Above 200 mV to 200 V	170 µV/V
	Above 200 V to 600 V	570 µV/V
	100 kHz to 300 kHz	
	0.2 V to 20 V	230 µV/V
	300 kHz to 500 kHz	
	0.2 V to 20 V	500 µV/V
	500 kHz to 1 MHz	
	0.2 V to 2 V	1200 µV/V
	Above 2 V to 20 V	1400 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC voltmeter	Calibration for AC voltage by comparison with AC/DC thermal converter in accordance with in-house procedure TPL033 at the following values: 20 Hz 0.5 V 1 V 2 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 40 Hz 0.5 V 1 V 2 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 700 V 1000 V	15 µV/V 11 µV/V 13 µV/V 11 µV/V 13 µV/V 14 µV/V 13 µV/V 15 µV/V 16 µV/V 18 µV/V 15 µV/V 11 µV/V 13 µV/V 11 µV/V 13 µV/V 14 µV/V 13 µV/V 15 µV/V 16 µV/V 18 µV/V 20 µV/V 20 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC/DC thermal converter in accordance with in-house procedure TPL033 at the following values:	
	1 kHz	
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	13 µV/V
	5 V	11 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	13 µV/V
	100 V	15 µV/V
	200 V	16 µV/V
	500 V	18 µV/V
	700 V	20 µV/V
	1000 V	15 µV/V
	10 kHz	
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	13 µV/V
	5 V	11 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	13 µV/V
	100 V	15 µV/V
	200 V	16 µV/V
	500 V	18 µV/V
	700 V	20 µV/V
	1000 V	20 µV/V

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Calibration Services 校正服務		
ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC/DC thermal converter in accordance with in-house procedure TPL033 at the following values:	
	20 kHz	
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	13 µV/V
	5 V	11 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	13 µV/V
	100 V	15 µV/V
	200 V	20 µV/V
	500 V	25 µV/V
	700 V	30 µV/V
	1000 V	30 µV/V
	30 kHz	
	100 V	15 µV/V
	200 V	20 µV/V
	500 V	30 µV/V
	700 V	40 µV/V
	1000 V	40 µV/V
	50 kHz	
	0.5 V	15 µV/V
	1 V	12 µV/V
	2 V	13 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	13 µV/V
	100 V	20 µV/V
	200 V	25 µV/V
	500 V	40 µV/V
	700 V	50 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC/DC thermal converter in accordance with in-house procedure TPL033 at the following values:	
	100 kHz	
	0.5 V	20 µV/V
	1 V	15 µV/V
	2 V	15 µV/V
	5 V	15 µV/V
	10 V	15 µV/V
	20 V	15 µV/V
	50 V	20 µV/V
	100 V	30 µV/V
	200 V	45 µV/V
	500 V	100 µV/V
	300 kHz	
	0.5 V	45 µV/V
	1 V	40 µV/V
	2 V	40 µV/V
	5 V	40 µV/V
	10 V	40 µV/V
	20 V	40 µV/V
	500 kHz	
	0.5 V	65 µV/V
	1 V	50 µV/V
	2 V	50 µV/V
	5 V	50 µV/V
	10 V	50 µV/V
	20 V	50 µV/V
	1 MHz	
	0.5 V	200 µV/V
	1 V	200 µV/V
	2 V	200 µV/V
	5 V	200 µV/V
	10 V	200 µV/V
	20 V	200 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL034 at the following values:	
	20 Hz	
	0.5 V	18 µV/V
	1 V	14 µV/V
	2 V	16 µV/V
	5 V	14 µV/V
	10 V	16 µV/V
	20 V	17 µV/V
	50 V	16 µV/V
	100 V	18 µV/V
	200 V	18 µV/V
	500 V	20 µV/V
	40 Hz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	18 µV/V
	1 V	14 µV/V
	2 V	16 µV/V
	5 V	14 µV/V
	10 V	16 µV/V
	20 V	17 µV/V
	50 V	16 µV/V
	100 V	18 µV/V
	200 V	18 µV/V
	500 V	20 µV/V
	700 V	23 µV/V
	1000 V	22 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL034 at the following values:	
	1 kHz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	18 µV/V
	1 V	14 µV/V
	2 V	16 µV/V
	5 V	14 µV/V
	10 V	16 µV/V
	20 V	17 µV/V
	50 V	16 µV/V
	100 V	18 µV/V
	200 V	18 µV/V
	500 V	20 µV/V
	700 V	23 µV/V
	1000 V	18 µV/V
	10 kHz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	18 µV/V
	1 V	14 µV/V
	2 V	16 µV/V
	5 V	14 µV/V
	10 V	16 µV/V
	20 V	17 µV/V
	50 V	16 µV/V
	100 V	18 µV/V
	200 V	18 µV/V
	500 V	20 µV/V
	700 V	23 µV/V
	1000 V	22 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL034 at the following values:	
	20 kHz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	18 µV/V
	1 V	14 µV/V
	2 V	16 µV/V
	5 V	14 µV/V
	10 V	16 µV/V
	20 V	17 µV/V
	50 V	16 µV/V
	100 V	18 µV/V
	200 V	22 µV/V
	500 V	28 µV/V
	700 V	33 µV/V
	1000 V	32 µV/V
	30 kHz	
	100 V	18 µV/V
	200 V	22 µV/V
	500 V	32 µV/V
	700 V	43 µV/V
	1000 V	42 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL034 at the following values:	
	50 kHz	
	10 mV	150 µV/V
	100 mV	50 µV/V
	200 mV	50 µV/V
	0.5 V	18 µV/V
	1 V	15 µV/V
	2 V	16 µV/V
	5 V	16 µV/V
	10 V	16 µV/V
	20 V	17 µV/V
	50 V	16 µV/V
	100 V	22 µV/V
	200 V	27 µV/V
	500 V	42 µV/V
	700 V	52 µV/V
	100 kHz	
	10 mV	200 µV/V
	100 mV	100 µV/V
	200 mV	100 µV/V
	0.5 V	22 µV/V
	1 V	18 µV/V
	2 V	18 µV/V
	5 V	18 µV/V
	10 V	18 µV/V
	20 V	18 µV/V
	50 V	22 µV/V
	100 V	32 µV/V
	200 V	45 µV/V
	500 V	110 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL034 at the following values:	
	300 kHz	
	0.5 V	48 µV/V
	1 V	46 µV/V
	2 V	46 µV/V
	5 V	44 µV/V
	10 V	43 µV/V
	20 V	43 µV/V
	500 kHz	
	0.5 V	92 µV/V
	1 V	90 µV/V
	2 V	85 µV/V
	5 V	80 µV/V
	10 V	80 µV/V
	20 V	80 µV/V
	1 MHz	
	0.5 V	320 µV/V
	1 V	320 µV/V
	2 V	320 µV/V
	5 V	320 µV/V
	10 V	320 µV/V
	20 V	320 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL037 at the following values:	
	20 Hz	
	0.5 V	20 µV/V
	1 V	20 µV/V
	2 V	20 µV/V
	5 V	20 µV/V
	10 V	20 µV/V
	20 V	20 µV/V
	50 V	20 µV/V
	100 V	20 µV/V
	200 V	20 µV/V
	500 V	30 µV/V
	40 Hz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	14 µV/V
	5 V	13 µV/V
	10 V	15 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	16 µV/V
	500 V	20 µV/V
	700 V	20 µV/V
	1000 V	21 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL037 at the following values:	
	1 kHz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	13 µV/V
	5 V	13 µV/V
	10 V	14 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	16 µV/V
	500 V	20 µV/V
	700 V	20 µV/V
	1000 V	20 µV/V
	10 kHz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	13 µV/V
	5 V	13 µV/V
	10 V	14 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	16 µV/V
	500 V	25 µV/V
	700 V	25 µV/V
	1000 V	25 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL037 at the following values:	
	20 kHz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	13 µV/V
	5 V	13 µV/V
	10 V	14 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	20 µV/V
	500 V	30 µV/V
	700 V	35 µV/V
	1000 V	35 µV/V
	30 kHz	
	100 V	16 µV/V
	200 V	20 µV/V
	500 V	40 µV/V
	700 V	50 µV/V
	1000 V	45 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL037 at the following values:	
	50 kHz	
	10 mV	150 µV/V
	100 mV	50 µV/V
	200 mV	50 µV/V
	0.5 V	15 µV/V
	1 V	15 µV/V
	2 V	15 µV/V
	5 V	15 µV/V
	10 V	14 µV/V
	20 V	15 µV/V
	50 V	20 µV/V
	100 V	20 µV/V
	200 V	25 µV/V
	500 V	80 µV/V
	700 V	100 µV/V
	100 kHz	
	10 mV	200 µV/V
	100 mV	100 µV/V
	200 mV	100 µV/V
	0.5 V	30 µV/V
	1 V	20 µV/V
	2 V	20 µV/V
	5 V	20 µV/V
	10 V	20 µV/V
	20 V	20 µV/V
	50 V	30 µV/V
	100 V	31 µV/V
	200 V	45 µV/V
	500 V	200 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL037 at the following values:	
	300 kHz	
	0.5 V	70 µV/V
	1 V	70 µV/V
	2 V	70 µV/V
	5 V	60 µV/V
	10 V	60 µV/V
	20 V	60 µV/V
	500 kHz	
	0.5 V	200 µV/V
	1 V	200 µV/V
	2 V	200 µV/V
	5 V	200 µV/V
	10 V	200 µV/V
	20 V	200 µV/V
	1 MHz	
	0.5 V	400 µV/V
	1 V	400 µV/V
	2 V	400 µV/V
	5 V	400 µV/V
	10 V	400 µV/V
	20 V	400 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL037 at the following values:	
	40 Hz to 20 kHz	
	10 mV to 20 mV	380 µV/V
	Above 20 mV to 60 mV	170 µV/V
	Above 60 mV to 200 mV	80 µV/V
	Above 200 mV to 600 mV	50 µV/V
	Above 0.6 V to 200 V	40 µV/V
	Above 200 V to 1000 V	50 µV/V
	20 kHz to 50 kHz	
	10 mV to 20 mV	630 µV/V
	Above 20 mV to 60 mV	270 µV/V
	Above 60 mV to 200 mV	120 µV/V
	Above 200 mV to 1000 V	170 µV/V
	50 kHz to 100 kHz	
	10 mV to 20 mV	840 µV/V
	Above 20 mV to 60 mV	450 µV/V
	Above 60 mV to 200 mV	240 µV/V
	Above 200 mV to 200 V	170 µV/V
	Above 200 V to 600 V	570 µV/V
	100 kHz to 300 kHz	
	0.2 V to 20 V	230 µV/V
	300 kHz to 500 kHz	
	0.2 V to 20 V	500 µV/V
	500 kHz to 1 MHz	
	0.2 V to 0.6 V	1200 µV/V
	Above 0.6 V to 2 V	1100 µV/V
	Above 2 V to 20 V	1400 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	On-site calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL037 over the following ranges:	
	40 Hz to 20 kHz	
	10 mV to 20 mV	380 µV/V
	Above 20 mV to 60 mV	170 µV/V
	Above 60 mV to 200 mV	80 µV/V
	Above 200 mV to 600 mV	50 µV/V
	Above 0.6 V to 200 V	40 µV/V
	Above 200 V to 1000 V	50 µV/V
	20 kHz to 50 kHz	
	10 mV to 20 mV	630 µV/V
	Above 20 mV to 60 mV	270 µV/V
	Above 60 mV to 200 mV	120 µV/V
	Above 200 mV to 1000 V	170 µV/V
	50 kHz to 100 kHz	
	10 mV to 20 mV	840 µV/V
	Above 20 mV to 60 mV	450 µV/V
	Above 60 mV to 200 mV	240 µV/V
	Above 200 mV to 200 V	170 µV/V
	Above 200 V to 600 V	570 µV/V
	100 kHz to 300 kHz	
	0.2 V to 20 V	230 µV/V
	300 kHz to 500 kHz	
	0.2 V to 20 V	500 µV/V
	500 kHz to 1 MHz	
	0.2 V to 0.6 V	1200 µV/V
	Above 0.6 V to 2 V	1100 µV/V
	Above 2 V to 20 V	1400 µV/V

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ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by direct measurement using multi-function calibrator in accordance with in-house procedure TPL038 at the following values:	
	20 Hz	
	0.5 V	30 µV/V
	1 V	30 µV/V
	2 V	30 µV/V
	5 V	30 µV/V
	10 V	30 µV/V
	20 V	30 µV/V
	50 V	30 µV/V
	100 V	30 µV/V
	200 V	30 µV/V
	500 V	50 µV/V
	40 Hz, 1 kHz, 10 kHz	
	10 mV	300 µV/V
	100 mV	50 µV/V
	200 mV	50 µV/V
	0.5 V	30 µV/V
	1 V	30 µV/V
	2 V	30 µV/V
	5 V	30 µV/V
	10 V	30 µV/V
	20 V	30 µV/V
	50 V	30 µV/V
	100 V	30 µV/V
	200 V	30 µV/V
	500 V	50 µV/V
	700 V	50 µV/V
	1000 V	50 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by direct measurement using multi-function calibrator in accordance with in-house procedure TPL038 at the following values:	
	20 kHz	
	10 mV	300 µV/V
	100 mV	50 µV/V
	200 mV	50 µV/V
	0.5 V	30 µV/V
	1 V	30 µV/V
	2 V	30 µV/V
	5 V	30 µV/V
	10 V	30 µV/V
	20 V	30 µV/V
	50 V	30 µV/V
	100 V	30 µV/V
	200 V	30 µV/V
	500 V	50 µV/V
	700 V	50 µV/V
	1000 V	100 µV/V
	30 kHz	
	100 V	30 µV/V
	200 V	30 µV/V
	500 V	50 µV/V
	700 V	50 µV/V
	1000 V	100 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by direct measurement using multi-function calibrator in accordance with in-house procedure TPL038 at the following values:	
	50 kHz	
	10 mV	300 µV/V
	100 mV	50 µV/V
	200 mV	50 µV/V
	0.5 V	30 µV/V
	1 V	30 µV/V
	2 V	30 µV/V
	5 V	30 µV/V
	10 V	30 µV/V
	20 V	30 µV/V
	50 V	30 µV/V
	100 V	30 µV/V
	200 V	30 µV/V
	500 V	100 µV/V
	700 V	100 µV/V
	100 kHz	
	10 mV	300 µV/V
	100 mV	100 µV/V
	200 mV	100 µV/V
	0.5 V	30 µV/V
	1 V	30 µV/V
	2 V	30 µV/V
	5 V	30 µV/V
	10 V	30 µV/V
	20 V	30 µV/V
	50 V	30 µV/V
	100 V	50 µV/V
	200 V	50 µV/V
	500 V	200 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by direct measurement using multi-function calibrator in accordance with in-house procedure TPL038 at the following values:	
	300 kHz	
	0.5 V	100 µV/V
	1 V	100 µV/V
	2 V	100 µV/V
	5 V	100 µV/V
	10 V	100 µV/V
	20 V	100 µV/V
	500 kHz	
	0.5 V	200 µV/V
	1 V	200 µV/V
	2 V	200 µV/V
	5 V	200 µV/V
	10 V	200 µV/V
	20 V	200 µV/V
	1 MHz	
	0.5 V	1 mV/V
	1 V	1 mV/V
	2 V	1 mV/V
	5 V	1 mV/V
	10 V	1 mV/V
	20 V	1 mV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage in accordance with in-house procedure TPL038 over the following ranges:	
	40 Hz to 20 kHz	
	10 mV to 20 mV	1300 µV/V
	Above 20 mV to 60 mV	1100 µV/V
	Above 60 mV to 200 mV	600 µV/V
	Above 200 mV to 600 mV	210 µV/V
	Above 0.6 V to 2 V	140 µV/V
	Above 2 V to 6 V	210 µV/V
	Above 6 V to 20 V	140 µV/V
	Above 20 V to 60 V	230 µV/V
	Above 60 V to 200 V	150 µV/V
	Above 200 V to 600 V	380 µV/V
	Above 600 V to 1000 V	300 µV/V
	20 kHz to 50 kHz	
	10 mV to 20 mV	1800 µV/V
	Above 20 mV to 60 mV	1500 µV/V
	Above 60 mV to 200 mV	1100 µV/V
	Above 200 mV to 600 mV	270 µV/V
	Above 0.6 V to 2 V	200 µV/V
	Above 2 V to 6 V	260 µV/V
	Above 6 V to 20 V	180 µV/V
	Above 20 V to 60 V	400 µV/V
	Above 60 V to 200 V	290 µV/V
	Above 200 V to 600 V	190 µV/V
	Above 600 V to 700 V	180 µV/V
	20 kHz to 50 kHz	
	700 V to 1000 V	180 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC voltmeter	Calibration for AC voltage in accordance with in-house procedure TPL038 over the following ranges: 50 kHz to 100 kHz 10 mV to 20 mV Above 20 mV to 60 mV Above 60 mV to 200 mV Above 200 mV to 600 mV Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V Above 20 V to 60 V Above 60 V to 200 V Above 200 V to 600 V 100 kHz to 300 kHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V 300 kHz to 500 kHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V 500 kHz to 1 MHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V	1800 µV/V 1500 µV/V 1100 µV/V 270 µV/V 200 µV/V 260 µV/V 180 µV/V 400 µV/V 290 µV/V 190 µV/V 1.2 mV/V 0.81 mV/V 1.0 mV/V 0.62 mV/V 570 µV/V 500 µV/V 520 µV/V 500 µV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	On-site calibration for AC voltage in accordance with in-house procedure TPL038 over the following ranges:	
	40 Hz to 20 kHz	
	10 mV to 20 mV	1300 µV/V
	Above 20 mV to 60 mV	1100 µV/V
	Above 60 mV to 200 mV	600 µV/V
	Above 200 mV to 600 mV	210 µV/V
	Above 0.6 V to 2 V	140 µV/V
	Above 2 V to 6 V	210 µV/V
	Above 6 V to 20 V	140 µV/V
	Above 20 V to 60 V	230 µV/V
	Above 60 V to 200 V	150 µV/V
	Above 200 V to 600 V	380 µV/V
	Above 600 V to 1000 V	300 µV/V
	20 kHz to 50 kHz	
	10 mV to 20 mV	1800 µV/V
	Above 20 mV to 60 mV	1500 µV/V
	Above 60 mV to 200 mV	1100 µV/V
	Above 200 mV to 600 mV	270 µV/V
	Above 0.6 V to 2 V	200 µV/V
	Above 2 V to 6 V	260 µV/V
	Above 6 V to 20 V	180 µV/V
	Above 20 V to 60 V	400 µV/V
	Above 60 V to 200 V	290 µV/V
	Above 200 V to 600 V	190 µV/V
	Above 600 V to 700 V	180 µV/V
	20 kHz to 30 kHz	
	700 V to 1000 V	180 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC voltmeter	On-site calibration for AC voltage in accordance with in-house procedure TPL038 Over the following ranges: 50 kHz to 100 kHz 10 mV to 20 mV Above 20 mV to 60 mV Above 60 mV to 200 mV Above 200 mV to 600 mV Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V Above 20 V to 60 V Above 60 V to 200 V Above 200 V to 600 V 100 kHz to 300 kHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V 300 kHz to 500 kHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V 500 kHz to 1 MHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V 500 kHz to 1 MHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 20 V	1800 µV/V 1500 µV/V 1100 µV/V 270 µV/V 200 µV/V 260 µV/V 180 µV/V 400 µV/V 290 µV/V 190 µV/V 1.2 mV/V 0.81 mV/V 1.1 mV/V 0.62 mV/V 570 µV/V 500 µV/V 520 µV/V 500 µV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V 1.1 mV/V 1200 µV/V 1100 µV/V 1400 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL050 at the following values:	
	20 Hz	
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	15 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	18 µV/V
	100 V	18 µV/V
	200 V	18 µV/V
	500 V	18 µV/V
	40 Hz, 1 kHz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	13 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	16 µV/V
	500 V	18 µV/V
	700 V	20 µV/V
	1000 V	18 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL050 at the following values:	
	10 kHz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	13 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	16 µV/V
	500 V	18 µV/V
	700 V	20 µV/V
	1000 V	20 µV/V
	20 kHz	
	10 mV	100 µV/V
	100 mV	30 µV/V
	200 mV	30 µV/V
	0.5 V	15 µV/V
	1 V	11 µV/V
	2 V	13 µV/V
	5 V	12 µV/V
	10 V	13 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	16 µV/V
	200 V	20 µV/V
	500 V	25 µV/V
	700 V	30 µV/V
	1000 V	30 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL050 at the following values:	
	30 kHz	
	100 V	16 µV/V
	200 V	20 µV/V
	500 V	30 µV/V
	700 V	40 µV/V
	1000 V	42 µV/V
	50 kHz	
	10 mV	150 µV/V
	100 mV	50 µV/V
	200 mV	50 µV/V
	0.5 V	15 µV/V
	1 V	13 µV/V
	2 V	13 µV/V
	5 V	12 µV/V
	10 V	14 µV/V
	20 V	14 µV/V
	50 V	15 µV/V
	100 V	20 µV/V
	200 V	25 µV/V
	500 V	40 µV/V
	700 V	50 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL050 at the following values: 100 kHz 10 mV 100 mV 200 mV 0.5 V 1 V 2 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 300 kHz 0.5 V 1 V 2 V 5 V 10 V 20 V 500 kHz 0.5 V 1 V 2 V 5 V 10 V 20 V	200 μ V/V 100 μ V/V 100 μ V/V 20 μ V/V 20 μ V/V 15 μ V/V 15 μ V/V 15 μ V/V 18 μ V/V 20 μ V/V 30 μ V/V 45 μ V/V 100 μ V/V 45 μ V/V 40 μ V/V 40 μ V/V 40 μ V/V 40 μ V/V 40 μ V/V 65 μ V/V 50 μ V/V 50 μ V/V 50 μ V/V 50 μ V/V 50 μ V/V

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Electrical measurements and magnetism - DC & LF measurements - AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL050 at the following values or over the following ranges: 1 MHz 0.5 V 1 V 2 V 5 V 10 V 20 V 40 Hz to 20 kHz 10 mV to 20 mV Above 20 mV to 60 mV Above 60 mV to 200 mV Above 200 mV to 600 mV Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V Above 20 V to 60 V Above 60 V to 200 V Above 200 V to 600 V Above 600 V to 1000 V 20 kHz to 50 kHz 10 mV to 20 mV Above 20 mV to 60 mV Above 60 mV to 200 mV Above 200 mV to 600 mV Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V Above 20 V to 60 V Above 60 V to 200 V Above 200 V to 700 V	200 µV/V 200 µV/V 200 µV/V 320 µV/V 300 µV/V 320 µV/V 380 µV/V 170 µV/V 80 µV/V 50 µV/V 40 µV/V 40 µV/V 40 µV/V 40 µV/V 40 µV/V 50 µV/V 45 µV/V 630 µV/V 270 µV/V 120 µV/V 90 µV/V 90 µV/V 90 µV/V 90 µV/V 90 µV/V 90 µV/V 150 µV/V

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ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Electrical measurements and magnetism - DC & LF measurements - AC voltmeter	Calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL050 over the following ranges: 20 kHz to 30 kHz 700 V to 1000 V 50 kHz to 100 kHz 10 mV to 20 mV Above 20 mV to 60 mV Above 60 mV to 200 mV Above 200 mV to 600 mV Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V Above 20 V to 60 V Above 60 V to 200 V Above 200 V to 700 V 100 kHz to 300 kHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V 300 kHz to 500 kHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V 500 kHz to 1 MHz 0.2 V to 0.6 V Above 0.6 V to 2 V Above 2 V to 6 V Above 6 V to 20 V	150 μ V/V 840 μ V/V 450 μ V/V 240 μ V/V 170 μ V/V 170 μ V/V 170 μ V/V 170 μ V/V 170 μ V/V 170 μ V/V 580 μ V/V 230 μ V/V 230 μ V/V 230 μ V/V 230 μ V/V 500 μ V/V 500 μ V/V 500 μ V/V 500 μ V/V 1.2 mV/V 1.1 mV/V 1.4 mV/V 1.4 mV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	On-site calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL050 over the following ranges:	
	40 Hz to 20 kHz	
	10 mV to 20 mV	380 µV/V
	Above 20 mV to 60 mV	170 µV/V
	Above 60 mV to 200 mV	80 µV/V
	Above 200 mV to 600 mV	50 µV/V
	Above 0.6 V to 2 V	40 µV/V
	Above 2 V to 6 V	40 µV/V
	Above 6 V to 20 V	40 µV/V
	Above 20 V to 60 V	40 µV/V
	Above 60 V to 200 V	40 µV/V
	Above 200 V to 600 V	50 µV/V
	Above 600 V to 1000 V	45 µV/V
	20 kHz to 50 kHz	
	10 mV to 20 mV	630 µV/V
	Above 20 mV to 60 mV	270 µV/V
	Above 60 mV to 200 mV	120 µV/V
	Above 200 mV to 600 mV	90 µV/V
	Above 0.6 V to 2 V	90 µV/V
	Above 2 V to 6 V	90 µV/V
	Above 6 V to 20 V	90 µV/V
	Above 20 V to 60 V	90 µV/V
	Above 60 V to 200 V	90 µV/V
	Above 200 V to 700 V	150 µV/V
	20 kHz to 30 kHz	
	700 V to 1000 V	150 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC voltmeter	On-site calibration for AC voltage by comparison with AC Measurement Standard in accordance with in-house procedure TPL050 over the following ranges:	
	50 kHz to 100 kHz	
	10 mV to 20 mV	840 µV/V
	Above 20 mV to 60 mV	450 µV/V
	Above 60 mV to 200 mV	240 µV/V
	Above 200 mV to 600 mV	170 µV/V
	Above 0.6 V to 2 V	170 µV/V
	Above 2 V to 6 V	170 µV/V
	Above 6 V to 20 V	170 µV/V
	Above 20 V to 60 V	170 µV/V
	Above 60 V to 200 V	170 µV/V
	Above 200 V to 700 V	580 µV/V
	100 kHz to 300 kHz	
	0.2 V to 0.6 V	230 µV/V
	Above 0.6 V to 2 V	230 µV/V
	Above 2 V to 6 V	230 µV/V
	Above 6 V to 20 V	230 µV/V
	300 kHz to 500 kHz	
	0.2 V to 0.6 V	500 µV/V
	Above 0.6 V to 2 V	500 µV/V
	Above 2 V to 6 V	500 µV/V
	Above 6 V to 20 V	500 µV/V
	500 kHz to 1 MHz	
	0.2 V to 0.6 V	1.2 mV/V
	Above 0.6 V to 2 V	1.1 mV/V
	Above 2 V to 6 V	1.4 mV/V
	Above 6 V to 20 V	1.4 mV/V

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<p>Electrical measurements and magnetism</p> <p>- DC & LF measurements</p> <p>- AC three phase voltmeter</p>	<p>Calibration for AC voltage in accordance with in-house procedure TPL102 over the following range of parameters:</p> <p>45 Hz to 65 Hz 50 V to 500 V</p>	<p>60 μV/V</p>

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Electrical measurements and magnetism - DC & LF measurements - AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL006 at the following values: 20 Hz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 40 Hz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 700 V 1000 V	12 μ V/V 10 μ V/V 10 μ V/V 10 μ V/V 11 μ V/V 11 μ V/V 12 μ V/V 11 μ V/V 11 μ V/V 11 μ V/V 13 μ V/V 17 μ V/V 11 μ V/V 9.0 μ V/V 11 μ V/V 10 μ V/V 10 μ V/V 11 μ V/V 10 μ V/V 11 μ V/V 12 μ V/V 16 μ V/V 16 μ V/V 18 μ V/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL006 at the following values:	
	1 kHz	
	0.5 V	11 µV/V
	1 V	9.0 µV/V
	2 V	9.0 µV/V
	3 V	9.0 µV/V
	5 V	10 µV/V
	10 V	9.0 µV/V
	20 V	9.0 µV/V
	50 V	11 µV/V
	100 V	10 µV/V
	200 V	11 µV/V
	500 V	15 µV/V
	700 V	15 µV/V
	1000 V	15 µV/V
	10 kHz	
	0.5 V	10 µV/V
	1 V	9.0 µV/V
	2 V	9.0 µV/V
	5 V	10 µV/V
	10 V	10 µV/V
	20 V	10 µV/V
	50 V	11 µV/V
	100 V	10 µV/V
	200 V	12 µV/V
	500 V	16 µV/V
	700 V	18 µV/V
	1000 V	18 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL006 at the following values:	
	20 kHz	
	0.5 V	13 µV/V
	1 V	10 µV/V
	2 V	9.0 µV/V
	3 V	9.0 µV/V
	5 V	10 µV/V
	10 V	9.0 µV/V
	20 V	10 µV/V
	50 V	11 µV/V
	100 V	11 µV/V
	200 V	15 µV/V
	500 V	23 µV/V
	700 V	30 µV/V
	1000 V	30 µV/V
	30 kHz	
	100 V	10 µV/V
	200 V	17 µV/V
	500 V	28 µV/V
	700 V	42 µV/V
	1000 V	42 µV/V
	50 kHz	
	0.5 V	12 µV/V
	1 V	11 µV/V
	2 V	9.0 µV/V
	3 V	9.0 µV/V
	5 V	10 µV/V
	10 V	9.0 µV/V
	20 V	10 µV/V
	50 V	11 µV/V
	100 V	10 µV/V
	200 V	20 µV/V
	500 V	45 µV/V
	700 V	61 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL006 at the following values: 100 kHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 700 V 200 kHz 100 V 300 kHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 500 kHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V	 27 µV/V 17 µV/V 14 µV/V 14 µV/V 14 µV/V 14 µV/V 14 µV/V 14 µV/V 16 µV/V 16 µV/V 16 µV/V 36 µV/V 73 µV/V 110 µV/V 27 µV/V 56 µV/V 39 µV/V 28 µV/V 25 µV/V 25 µV/V 24 µV/V 25 µV/V 69 µV/V 56 µV/V 34 µV/V 33 µV/V 29 µV/V 29 µV/V 29 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL006 at the following values: 1 MHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V Calibration for AC/DC voltage difference in accordance with in-house procedure TPL032 at the following values: 20 Hz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V	160 μ V/V 160 μ V/V 120 μ V/V 120 μ V/V 120 μ V/V 120 μ V/V 120 μ V/V 120 μ V/V 12 μ V/V 8.0 μ V/V 9.0 μ V/V 9.0 μ V/V 8.0 μ V/V 9.0 μ V/V 12 μ V/V 11 μ V/V 10 μ V/V 12 μ V/V 16 μ V/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL032 at the following values:	
	40 Hz	
	0.5 V	11 µV/V
	1 V	8.0 µV/V
	2 V	11 µV/V
	3 V	10 µV/V
	5 V	8.0 µV/V
	10 V	11 µV/V
	20 V	10 µV/V
	50 V	11 µV/V
	100 V	11 µV/V
	200 V	12 µV/V
	500 V	16 µV/V
	700 V	16 µV/V
	1000 V	18 µV/V
	1 kHz	
	0.5 V	11 µV/V
	1 V	8.0 µV/V
	2 V	8.0 µV/V
	3 V	8.0 µV/V
	5 V	8.0 µV/V
	10 V	9.0 µV/V
	20 V	9.0 µV/V
	50 V	10 µV/V
	100 V	10 µV/V
	200 V	11 µV/V
	500 V	12 µV/V
	700 V	12 µV/V
	1000 V	12 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL032 at the following values:	
	10 kHz	
	0.5 V	10 µV/V
	1 V	8.0 µV/V
	2 V	8.0 µV/V
	3 V	8.0 µV/V
	5 V	8.0 µV/V
	10 V	10 µV/V
	20 V	10 µV/V
	50 V	10 µV/V
	100 V	10 µV/V
	200 V	12 µV/V
	500 V	14 µV/V
	700 V	15 µV/V
	1000 V	15 µV/V
	20 kHz	
	0.5 V	13 µV/V
	1 V	8.0 µV/V
	2 V	8.0 µV/V
	3 V	8.0 µV/V
	5 V	8.0 µV/V
	10 V	9.0 µV/V
	20 V	10 µV/V
	50 V	10 µV/V
	100 V	10 µV/V
	200 V	15 µV/V
	500 V	20 µV/V
	700 V	27 µV/V
	1000 V	27 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL032 at the following values: 30 kHz 100 V 200 V 500 V 700 V 1000 V 50 kHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 700 V 100 kHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 700 V	10 µV/V 16 µV/V 28 µV/V 35 µV/V 37 µV/V 12 µV/V 9.0 µV/V 8.0 µV/V 9.0 µV/V 9.0 µV/V 9.0 µV/V 10 µV/V 10 µV/V 10 µV/V 10 µV/V 19 µV/V 34 µV/V 44 µV/V 16 µV/V 13 µV/V 12 µV/V 10 µV/V 10 µV/V 10 µV/V 11 µV/V 14 µV/V 14 µV/V 33 µV/V 62 µV/V 83 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL032 at the following values: 200 kHz 100 V 300 kHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 500 kHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 1 MHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V	16 $\mu\text{V/V}$ 40 $\mu\text{V/V}$ 29 $\mu\text{V/V}$ 25 $\mu\text{V/V}$ 21 $\mu\text{V/V}$ 18 $\mu\text{V/V}$ 18 $\mu\text{V/V}$ 19 $\mu\text{V/V}$ 60 $\mu\text{V/V}$ 42 $\mu\text{V/V}$ 34 $\mu\text{V/V}$ 33 $\mu\text{V/V}$ 29 $\mu\text{V/V}$ 29 $\mu\text{V/V}$ 29 $\mu\text{V/V}$ 120 $\mu\text{V/V}$ 92 $\mu\text{V/V}$ 78 $\mu\text{V/V}$ 78 $\mu\text{V/V}$ 68 $\mu\text{V/V}$ 68 $\mu\text{V/V}$ 70 $\mu\text{V/V}$

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Electrical measurements and magnetism - DC & LF measurements - AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL145 at the following values: 20 Hz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 40 Hz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 700 V 1000 V	12 µV/V 8.0 µV/V 9.0 µV/V 9.0 µV/V 8.0 µV/V 9.0 µV/V 12 µV/V 11 µV/V 10 µV/V 12 µV/V 16 µV/V 11 µV/V 8.0 µV/V 11 µV/V 10 µV/V 8.0 µV/V 11 µV/V 10 µV/V 11 µV/V 11 µV/V 12 µV/V 16 µV/V 16 µV/V 18 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL145 at the following values:	
	1 kHz	
	0.5 V	11 µV/V
	1 V	8.0 µV/V
	2 V	8.0 µV/V
	3 V	8.0 µV/V
	5 V	8.0 µV/V
	10 V	9.0 µV/V
	20 V	9.0 µV/V
	50 V	10 µV/V
	100 V	10 µV/V
	200 V	11 µV/V
	500 V	12 µV/V
	700 V	12 µV/V
	1000 V	12 µV/V
	10 kHz	
	0.5 V	10 µV/V
	1 V	8.0 µV/V
	2 V	8.0 µV/V
	3 V	8.0 µV/V
	5 V	8.0 µV/V
	10 V	10 µV/V
	20 V	10 µV/V
	50 V	10 µV/V
	100 V	10 µV/V
	200 V	12 µV/V
	500 V	14 µV/V
	700 V	15 µV/V
	1000 V	15 µV/V

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ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL145 at the following values:	
	20 kHz	
	0.5 V	13 µV/V
	1 V	8.0 µV/V
	2 V	8.0 µV/V
	3 V	8.0 µV/V
	5 V	8.0 µV/V
	10 V	9.0 µV/V
	20 V	10 µV/V
	50 V	10 µV/V
	100 V	10 µV/V
	200 V	15 µV/V
	500 V	20 µV/V
	700 V	27 µV/V
	1000 V	27 µV/V
	30 kHz	
	100 V	10 µV/V
	200 V	16 µV/V
	500 V	28 µV/V
	700 V	35 µV/V
	1000 V	37 µV/V
	50 kHz	
	0.5 V	12 µV/V
	1 V	9.0 µV/V
	2 V	8.0 µV/V
	3 V	9.0 µV/V
	5 V	9.0 µV/V
	10 V	9.0 µV/V
	20 V	10 µV/V
	50 V	10 µV/V
	100 V	10 µV/V
	200 V	19 µV/V
	500 V	34 µV/V
	700 V	44 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL145 at the following values:	
	100 kHz	
	0.5 V	16 µV/V
	1 V	13 µV/V
	2 V	12 µV/V
	3 V	10 µV/V
	5 V	10 µV/V
	10 V	10 µV/V
	20 V	11 µV/V
	50 V	14 µV/V
	100 V	14 µV/V
	200 V	33 µV/V
	500 V	62 µV/V
	700 V	83 µV/V
	200 kHz	
	100 V	16 µV/V
	300 kHz	
	0.5 V	40 µV/V
	1 V	29 µV/V
	2 V	25 µV/V
	3 V	21 µV/V
	5 V	18 µV/V
	10 V	18 µV/V
	20 V	19 µV/V
	500 kHz	
	0.5 V	60 µV/V
	1 V	42 µV/V
	2 V	34 µV/V
	3 V	33 µV/V
	5 V	29 µV/V
	10 V	29 µV/V
	20 V	29 µV/V

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Electrical measurements and magnetism - DC & LF measurements - AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL145 at the following values: 1 MHz 0.5 V 1 V 2 V 3 V 5 V 10 V 20 V Calibration for AC/DC voltage difference in accordance with in-house procedure TPL148 at the following values: 20 Hz 1 V 2 V 3 V 5 V 10 V 20 V 50 V 100 V 200 V 500 V 40 Hz 1 V 3 V 700 V 1000 V	120 µV/V 92 µV/V 78 µV/V 78 µV/V 68 µV/V 68 µV/V 70 µV/V 13 µV/V 9.0 µV/V 10 µV/V 12 µV/V 11 µV/V 15 µV/V 13 µV/V 12 µV/V 13 µV/V 17 µV/V 12 µV/V 10 µV/V 17 µV/V 18 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL148 at the following values:	
	1 kHz	
	1 V	11 µV/V
	2 V	8.0 µV/V
	3 V	13 µV/V
	5 V	13 µV/V
	10 V	11 µV/V
	20 V	11 µV/V
	50 V	11 µV/V
	100 V	11 µV/V
	200 V	12 µV/V
	500 V	13 µV/V
	700 V	12 µV/V
	1000 V	12 µV/V
	10 kHz	
	1 V	10 µV/V
	3 V	11 µV/V
	700 V	15 µV/V
	1000 V	17 µV/V
	30 kHz	
	700 V	35 µV/V
	1000 V	37 µV/V
	50 kHz	
	1 V	11 µV/V
	3 V	9.0 µV/V
	50 V	11 µV/V
	100 V	11 µV/V
	200 V	19 µV/V
	500 V	34 µV/V
	700 V	44 µV/V

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC voltage transfer instrument	Calibration for AC/DC voltage difference in accordance with in-house procedure TPL148 at the following values:	
	100 kHz	
	1 V	16 µV/V
	2 V	13 µV/V
	3 V	12 µV/V
	5 V	10 µV/V
	10 V	10 µV/V
	20 V	14 µV/V
	50 V	14 µV/V
	100 V	15 µV/V
	200 V	33 µV/V
	500 V	62 µV/V
	700 V	83 µV/V
	200 kHz	
	100 V	18 µV/V
	500 kHz	
	1 V	42 µV/V
	3 V	33 µV/V
	1 MHz	
	1 V	92 µV/V
	3 V	78 µV/V
	5 V	76 µV/V
	10 V	74 µV/V
	20 V	81 µV/V

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<p>Electrical measurements and magnetism</p> <p>- DC & LF measurements</p> <p>- Inductive voltage divider</p>	<p>Calibration for the following parameters in accordance with in-house procedure TPL018:</p> <p>- Magnitude of AC voltage ratio at 25 V and the following frequencies: 400 Hz 1 kHz 10 kHz</p> <p>- Quadrature error of AC voltage at 25 V and the following frequencies: 400 Hz 1 kHz 10 kHz</p> <p>Calibration for the magnitude of AC voltage ratio in accordance with in-house procedure TPL087 at the following frequencies: 400 Hz 1 kHz 10 kHz</p>	<p>2.6 x 10⁻⁷ of input 2.6 x 10⁻⁷ of input 2.2 x 10⁻⁶ of input</p> <p>27 x 10⁻⁸ of input 27 x 10⁻⁸ of input 300 x 10⁻⁸ of input</p> <p>5.0 x 10⁻⁷ of input 5.0 x 10⁻⁷ of input 2.2 x 10⁻⁶ of input</p>

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC current generator/source	On-site calibration for AC current in accordance with in-house procedure TPL044 over the following ranges:	
	40 Hz, 1 kHz	
	100 µA to 1 mA	65 µA/A
	Above 1 mA to 100 mA	40 µA/A
	Above 100 mA to 1 A	65 µA/A
	3 kHz, 5 kHz	
	100 µA to 1 mA	83 µA/A
	Above 1 mA to 100 mA	40 µA/A
	Above 100 mA to 1 A	81 µA/A
	10 kHz	
	100 µA to 1 mA	190 µA/A
	Above 1 mA to 100 mA	40 µA/A
	Above 100 mA to 1 A	200 µA/A
	Calibration for AC current in accordance with in-house procedure TPL044 over the following ranges:	
	40 Hz, 1 kHz	
	100 µA to 1 mA	65 µA/A
	Above 1 mA to 100 mA	40 µA/A
	Above 100 mA to 1 A	65 µA/A
	3 kHz, 5 kHz	
	100 µA to 1 mA	83 µA/A
	Above 1 mA to 100 mA	40 µA/A
	Above 100 mA to 1 A	81 µA/A
	10 kHz	
	100 µA to 1 mA	190 µA/A
	Above 1 mA to 100 mA	40 µA/A
	Above 100 mA to 1 A	200 µA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC current generator/source	On-site calibration for AC current in accordance with in-house procedure TPL046 at the following values or over the following ranges:	
	40 Hz	
	100 µA to 1 mA	65 µA/A
	Above 1 mA to 1 A	95 µA/A
	1 mA	65 µA/A
	10 mA	45 µA/A
	100 mA	90 µA/A
	1 A	75 µA/A
	2 A	90 µA/A
	5 A	120 µA/A
	10 A	120 µA/A
	15 A	120 µA/A
	20 A	120 µA/A
	1 kHz	
	100 µA to 1 mA	65 µA/A
	Above 1 mA to 1 A	95 µA/A
	1 mA	65 µA/A
	10 mA	45 µA/A
	100 mA	70 µA/A
	1 A	75 µA/A
	2 A	90 µA/A
	5 A	120 µA/A
	10 A	120 µA/A
	15 A	120 µA/A
	20 A	120 µA/A
	3 kHz	
	100 µA to 10 mA	83 µA/A
	Above 10 mA to 100 mA	100 µA/A
	Above 100 mA to 1 A	150 µA/A

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Electrical measurements and magnetism - DC & LF measurements - AC current generator/source	On-site calibration for AC current in accordance with in-house procedure TPL046 at the following values or over the following ranges: 5 kHz 100 µA to 10 mA Above 10 mA to 100 mA Above 100 mA to 1 A 1 mA 10 mA 100 mA 1 A 2 A 5 A 10 A 15 A 20 A 10 kHz 100 µA to 10 mA Above 10 mA to 100 mA Above 100 mA to 1 A 1 mA 10 mA 100 mA 1 A 2 A 5 A 10 A	83 µA/A 100 µA/A 150 µA/A 55 µA/A 55 µA/A 50 µA/A 85 µA/A 150 µA/A 300 µA/A 300 µA/A 300 µA/A 300 µA/A 190 µA/A 300 µA/A 500 µA/A 190 µA/A 75 µA/A 185 µA/A 230 µA/A 500 µA/A 500 µA/A 500 µA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC current generator/source	On-site calibration for AC current in accordance with in-house procedure TPL046 at the following values or over the following ranges:	
	40 Hz to 1 kHz	
	2.5 mA to 2 A	80 µA/A
	Above 2 A to 20 A	120 µA/A
	1 kHz to 5 kHz	
	2.5 mA to 100 mA	100 µA/A
	Above 100 mA to 1 A	150 µA/A
	Above 1 A to 20 A	300 µA/A
	5 kHz to 10 kHz	
	2.5 mA to 100 mA	300 µA/A
	Above 100 mA to 10 A	500 µA/A
	Calibration for AC current in accordance with in-house procedure TPL046 at the following values or over the following ranges:	
	40 Hz	
	100 µA to 1 mA	65 µA/A
	Above 1 mA to 1 A	95 µA/A
	1 mA	65 µA/A
	10 mA	45 µA/A
	100 mA	90 µA/A
	1 A	75 µA/A
	2 A	90 µA/A
	5 A	120 µA/A
	10 A	120 µA/A
	15 A	120 µA/A
	20 A	120 µA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC current generator/source	Calibration for AC current in accordance with in-house procedure TPL046 at the following values or over the following ranges:	
	1 kHz	
	100 µA to 1 mA	65 µA/A
	Above 1 mA to 1 A	95 µA/A
	1 mA	65 µA/A
	10 mA	45 µA/A
	100 mA	70 µA/A
	1 A	75 µA/A
	2 A	90 µA/A
	5 A	120 µA/A
	10 A	120 µA/A
	15 A	120 µA/A
	20 A	120 µA/A
	3 kHz	
	100 µA to 10 mA	83 µA/A
	Above 10 mA to 100 mA	100 µA/A
	Above 100 mA to 1 A	150 µA/A
	5 kHz	
	100 µA to 10 mA	83 µA/A
	Above 10 mA to 100 mA	100 µA/A
	Above 100 mA to 1 A	150 µA/A
	1 mA	55 µA/A
	10 mA	55 µA/A
	100 mA	50 µA/A
	1 A	85 µA/A
	2 A	150 µA/A
	5 A	300 µA/A
	10 A	300 µA/A
	15 A	300 µA/A
	20 A	300 µA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC current generator/source	Calibration for AC current in accordance with in-house procedure TPL046 at the following values or over the following ranges:	
	10 kHz	
	100 µA to 10 mA	190 µA/A
	Above 10 mA to 100 mA	300 µA/A
	Above 100 mA to 1 A	500 µA/A
	1 mA	190 µA/A
	10 mA	75 µA/A
	100 mA	185 µA/A
	1 A	230 µA/A
	2 A	500 µA/A
	5 A	500 µA/A
	10 A	500 µA/A
	40 Hz to 1 kHz	
	2.5 mA to 2 A	80 µA/A
	Above 2 A to 20 A	120 µA/A
	1 kHz to 5 kHz	
	2.5 mA to 100 mA	100 µA/A
	Above 100 mA to 1 A	150 µA/A
	Above 1 A to 20 A	300 µA/A
	5 kHz to 10 kHz	
	2.5 mA to 100 mA	300 µA/A
	Above 100 mA to 10 A	500 µA/A

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Electrical measurements and magnetism - DC & LF measurements - AC current generator/source	Calibration for AC current in accordance with in-house procedure TPL025 at the following values: 40 Hz, 1 kHz 5 mA 10 mA 20 mA 30 mA 50 mA 100 mA 200 mA 300 mA 500 mA 1 A 2 A 3 A 5 A 10 A 15 A 20 A 5 kHz 5 mA 10 mA 20 mA 30 mA 50 mA 100 mA 200 mA 300 mA 500 mA 1 A 2 A 3 A 5 A 10 A 15 A 20 A	30 µA/A 30 µA/A 30 µA/A 30 µA/A 30 µA/A 30 µA/A 30 µA/A 30 µA/A 40 µA/A 40 µA/A 40 µA/A 40 µA/A 50 µA/A 50 µA/A 50 µA/A 60 µA/A 60 µA/A 50 µA/A 50 µA/A 50 µA/A 50 µA/A 50 µA/A 50 µA/A 50 µA/A 100 µA/A 100 µA/A 100 µA/A 100 µA/A 150 µA/A 150 µA/A 150 µA/A 250 µA/A 250 µA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC current generator/source	Calibration for AC current by comparison with AC/DC transfer standard in accordance with in-house procedure TPL040 at the following values:	
	40 Hz, 1 kHz	
	5 mA	30 µA/A
	10 mA	30 µA/A
	20 mA	30 µA/A
	30 mA	30 µA/A
	50 mA	30 µA/A
	100 mA	30 µA/A
	200 mA	30 µA/A
	300 mA	30 µA/A
	500 mA	35 µA/A
	1 A	35 µA/A
	2 A	35 µA/A
	3 A	40 µA/A
	5 A	40 µA/A
	10 A	40 µA/A
	15 A	40 µA/A
	20 A	40 µA/A
	5 kHz	
	5 mA	30 µA/A
	10 mA	30 µA/A
	20 mA	30 µA/A
	30 mA	30 µA/A
	50 mA	30 µA/A
	100 mA	30 µA/A
	200 mA	30 µA/A
	300 mA	30 µA/A
	500 mA	35 µA/A
	1 A	35 µA/A
	2 A	56 µA/A
	3 A	56 µA/A
	5 A	56 µA/A
	10 A	56 µA/A
	15 A	56 µA/A
	20 A	56 µA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC current generator/source	Calibration for AC current by comparison with AC/DC transfer standard in accordance with in-house procedure TPL040 at the following values or over the following ranges:	
	10 kHz	
	5 mA	30 μA/A
	10 mA	30 μA/A
	20 mA	30 μA/A
	30 mA	30 μA/A
	50 mA	30 μA/A
	100 mA	30 μA/A
	200 mA	30 μA/A
	300 mA	30 μA/A
	500 mA	35 μA/A
	1 A	35 μA/A
	2 A	56 μA/A
	3 A	56 μA/A
	5 A	60 μA/A
	10 A	60 μA/A
	15 A	60 μA/A
	40 Hz to 10 kHz	
	2.5 mA to 5 mA	100 μA/A
	Above 5 mA to 5 A	220 μA/A
	Above 5 A to 10 A	320 μA/A
	40 Hz to 5 kHz	
	10 A to 20 A	320 μA/A

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Electrical measurements and magnetism - DC & LF measurements - AC current generator/source	<p>Calibration for AC current by measuring voltage-drop with current transformer in accordance with in-house procedure TPL016 over the following range:</p> <p>45 Hz to 60 Hz 1 A to 100 A</p> <p>On-site calibration for AC current by measuring voltage-drop with current transformer in accordance with in-house procedure TPL134 over the following ranges:</p> <p>45 Hz to 65 Hz 1 A to 50 A Above 50 A to 100 A Above 100 A to 200 A</p> <p>Calibration for AC current by measuring voltage-drop with current transformer in accordance with in-house procedure TPL134 over the following ranges:</p> <p>45 Hz to 65 Hz 1 A to 50 A Above 50 A to 100 A Above 100 A to 200 A</p>	<p>80 µA/A</p> <p>70 µA/A 80 µA/A 90 µA/A</p> <p>70 µA/A 80 µA/A 90 µA/A</p>

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC ammeter	On-site calibration for AC current by direct measurement using multi-function calibrator in accordance with in-house procedure TPL038 at the following values or over the following ranges:	
	40 Hz, 1 kHz	
	100 µA	120 µA/A
	1 mA	120 µA/A
	10 mA	120 µA/A
	100 mA	120 µA/A
	1 A	240 µA/A
	5 kHz	
	100 µA	210 µA/A
	1 mA	160 µA/A
	10 mA	120 µA/A
	100 mA	120 µA/A
	1 A	360 µA/A
	10 kHz	
	100 µA	510 µA/A
	1 mA	510 µA/A
	10 mA	310 µA/A
	100 mA	310 µA/A
	1 A	1600 µA/A
	40 Hz to 1 kHz	
	100 µA to 200 µA	300 µA/A
	Above 200 µA to 200 mA	400 µA/A
	Above 200 mA to 2 A	600 µA/A
	1 kHz to 5 kHz	
	100 µA to 200 µA	600 µA/A
	Above 200 µA to 2 mA	1000 µA/A
	Above 2 mA to 20 mA	700 µA/A
	Above 20 mA to 200 mA	500 µA/A
	Above 200 mA to 2A	1200 µA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC ammeter	<p>On-site calibration for AC current by direct measurement using multi-function calibrator in accordance with in-house procedure TPL038 over the following ranges:</p> <p>5 kHz to 10 kHz 100 µA to 200 µA Above 200 µA to 2 mA Above 2 mA to 20 mA Above 20 mA to 200 mA Above 200 mA to 2A</p> <p>Calibration for AC current by direct measurement using multi-function calibrator in accordance with in-house procedure TPL038 at the following values:</p> <p>40 Hz, 1 kHz 100 µA 1 mA 10 mA 100 mA 1 A</p> <p>5 kHz 100 µA 1 mA 10 mA 100 mA 1 A</p>	<p>2.4 mA/A 6.0 mA/A 5.0 mA/A 2.2 mA/A 11 mA/A</p> <p>120 µA/A 120 µA/A 120 µA/A 120 µA/A 240 µA/A</p> <p>210 µA/A 160 µA/A 120 µA/A 120 µA/A 360 µA/A</p>

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC ammeter	Calibration for AC current by direct measurement using multi-function calibrator in accordance with in-house procedure TPL038 at the following values or over the following ranges:	
	10 kHz	
	100 µA	510 µA/A
	1 mA	510 µA/A
	10 mA	310 µA/A
	100 mA	310 µA/A
	1 A	1600 µA/A
	40 Hz to 1 kHz	
	100 µA to 200 µA	300 µA/A
	Above 200 µA to 200 mA	400 µA/A
	Above 200 mA to 2 A	600 µA/A
	1 kHz to 5 kHz	
	100 µA to 200 µA	600 µA/A
	Above 200 µA to 2 mA	1000 µA/A
	Above 2 mA to 20 mA	700 µA/A
	Above 20 mA to 200 mA	500 µA/A
	Above 200 mA to 2A	1200 µA/A
	5 kHz to 10 kHz	
	100 µA to 200 µA	2.4 mA/A
	Above 200 µA to 2 mA	6.0 mA/A
	Above 2 mA to 20 mA	5.0 mA/A
	Above 20 mA to 200 mA	2.2 mA/A
	Above 200 mA to 2A	11 mA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC ammeter	On-site calibration for AC current by comparison with reference ammeter in accordance with in-house procedure TPL051 at the following values or over the following ranges:	
	40 Hz, 1 kHz, 5 kHz	
	100 µA	120 µA/A
	1 mA	120 µA/A
	10 mA	120 µA/A
	100 mA	120 µA/A
	1 A	240 µA/A
	10 kHz	
	100 µA	200 µA/A
	1 mA	200 µA/A
	10 mA	200 µA/A
	100 mA	200 µA/A
	1 A	400 µA/A
	40 Hz to 5 kHz	
	100 µA to 100 mA	120 µA/A
	Above 100 mA to 1 A	240 µA/A
	5 kHz to 10 kHz	
	100 µA to 200 mA	200 µA/A
	Above 200 mA to 1 A	400 µA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC ammeter	Calibration for AC current by comparison with reference ammeter in accordance with in-house procedure TPL051 at the following values or over the following ranges:	
	40 Hz, 1 kHz, 5 kHz	
	100 µA	120 µA/A
	1 mA	120 µA/A
	10 mA	120 µA/A
	100 mA	120 µA/A
	1 A	240 µA/A
	10 kHz	
	100 µA	200 µA/A
	1 mA	200 µA/A
	10 mA	200 µA/A
	100 mA	200 µA/A
	1 A	400 µA/A
	40 Hz to 5 kHz	
	100 µA to 100 mA	120 µA/A
	Above 100 mA to 1 A	240 µA/A
	5 kHz to 10 kHz	
	100 µA to 200 mA	200 µA/A
	Above 200 mA to 1 A	400 µA/A

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Electrical measurements and magnetism - DC & LF measurements - AC ammeter	<p>Calibration for AC current by measuring voltage-drop with standard resistor and reference multimeter in accordance with in-house procedure TPL047 at the following values or over the following ranges:</p> <p>40 Hz, 1 kHz, 5 kHz</p> <p>100 µA 1 mA 10 mA 100 mA 1 A</p> <p>10 kHz</p> <p>100 µA 1 mA 10 mA 100 mA 1 A</p> <p>40 Hz to 5 kHz</p> <p>100 µA to 100 mA Above 100 mA to 1 A</p> <p>5 kHz to 10 kHz</p> <p>100 µA to 200 mA Above 200 mA to 1 A</p>	<p>120 µA/A 120 µA/A 120 µA/A 120 µA/A 240 µA/A</p> <p>200 µA/A 200 µA/A 200 µA/A 200 µA/A 400 µA/A</p> <p>120 µA/A 240 µA/A</p> <p>200 µA/A 400 µA/A</p>

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Electrical measurements and magnetism - DC & LF measurements - AC ammeter	On-site calibration for AC current in accordance with in-house procedure TPL049 over the following ranges: 40 Hz to 1 kHz 1 A to 20 A 1 kHz to 5 kHz 1 A to 20 A 5 kHz to 10 kHz 1 A to 10 A Calibration for AC current in accordance with in-house procedure TPL049 over the following ranges: 40 Hz to 1 kHz 1 A to 20 A 1 kHz to 5 kHz 1 A to 20 A 5 kHz to 10 kHz 1 A to 10 A	240 µA/A 360 µA/A 400 µA/A 240 µA/A 360 µA/A 400 µA/A

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Electrical measurements and magnetism - DC & LF measurements - AC ammeter (clamp-on type)	<p>On-site calibration for AC current in accordance with in-house procedure TPL135 over the following ranges:</p> <p>45 Hz to 65 Hz 1 A to 150 A Above 150 A to 200 A</p> <p>Calibration for AC current in accordance with in-house procedure TPL135 over the following ranges:</p> <p>45 Hz to 65 Hz 1 A to 150 A Above 150 A to 200 A</p> <p>Calibration for AC current in accordance with in-house procedure TPL146 over the following range:</p> <p>50 Hz 200 A to 300 A Above 300 A to 400 A Above 400 A to 1300 A Above 1300 A to 1500 A Above 1500 A to 1700 A Above 1700 A to 1800 A Above 1800 A to 1900 A Above 1900 A to 2000 A</p>	<p>2000 µA/A 5500 µA/A</p> <p>2000 µA/A 5500 µA/A</p> <p>1.2 A 2.0 A 3.0 A 4.0 A 6.0 A 8.0 A 10 A 12 A</p>

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<p>Electrical measurements and magnetism</p> <p>- DC & LF measurements</p> <p>- AC three phase ammeter</p>	<p>Calibration for AC current in accordance with in-house procedure TPL102 over the following ranges of parameters:</p> <p>45 Hz to 65 Hz 0.1 A to 150 A</p>	<p>50 μA/A</p>

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Electrical measurements and magnetism - DC & LF measurements - AC/DC current transfer instrument	Calibration for AC/DC current difference in accordance with in-house procedure TPL043 at the following values: 40 Hz 5 mA 10 mA 20 mA 30 mA 50 mA 100 mA 200 mA 300 mA 500 mA 1 A 2 A 3 A 5 A 10 A 15 A 20 A 1 kHz 5 mA 10 mA 20 mA 30 mA 50 mA 100 mA 200 mA 300 mA 500 mA 1 A 2 A 3 A, 5 A 10 A 15 A 20 A	 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 27 µA/A 29 µA/A 30 µA/A 31 µA/A 36 µA/A 36 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 26 µA/A 27 µA/A 30 µA/A 31 µA/A 34 µA/A 33 µA/A

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC/DC current transfer instrument	Calibration for AC/DC current difference in accordance with in-house procedure TPL043 at the following values:	
	5 kHz	
	5 mA	26 µA/A
	10 mA	26 µA/A
	20 mA	26 µA/A
	30 mA	26 µA/A
	50 mA	26 µA/A
	100 mA	26 µA/A
	200 mA	26 µA/A
	300 mA	26 µA/A
	500 mA	26 µA/A
	1 A	26 µA/A
	2 A	56 µA/A
	3 A, 5 A	30 µA/A
	10 A	31 µA/A
	15 A	34 µA/A
	20 A	38 µA/A
	10 kHz	
	5 mA	26 µA/A
	10 mA	26 µA/A
	20 mA	26 µA/A
	30 mA	26 µA/A
	50 mA	26 µA/A
	100 mA	26 µA/A
	200 mA	26 µA/A
	300 mA	26 µA/A
	500 mA	30 µA/A
	1 A	30 µA/A
	2 A	56 µA/A
	3 A	30 µA/A
	5 A	30 µA/A
	10 A	31 µA/A
	15 A	34 µA/A

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Electrical measurements and magnetism - DC & LF measurements - AC single phase power source	<p>Calibration for the following parameters in accordance with in-house procedure TPL130:</p> <ul style="list-style-type: none"> - Active power over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 1 A to 160 A - Reactive power over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 1 A to 160 A - Apparent power over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 1 A to 160 A 	<p>130 μW/VA</p> <p>130 μvar/VA</p> <p>130 μVA/VA</p>

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Electrical measurements and magnetism - DC & LF measurements - AC three phase power source	<p>Calibration for the following parameters in accordance with in-house procedure TPL130:</p> <ul style="list-style-type: none"> - Active power over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 1 A to 160 A - Reactive power over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 1 A to 160 A - Apparent power over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 1 A to 160 A 	<p>130 μW/VA</p> <p>130 μvar/VA</p> <p>130 μVA/VA</p>

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Electrical measurements and magnetism - DC & LF measurements - AC single phase wattmeter	<p>Calibration for active power in accordance with in-house procedure TPL105 over the following ranges of parameters:</p> <p>Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 110 V to 120 V / 220 V to 240 V Current: 1 A, 5 A, 10 A 50 A 100 A 160 A</p> <p>Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 0.1 A to 10 A Above 10 A to 50 A Above 50 A to 100 A Above 100 A to 160 A</p> <p>Calibration for active power in accordance with in-house procedure TPL012 over the following ranges of parameters:</p> <p>Frequency: 400 Hz Voltage: 75 V to 300 V Current: 0.5 A to 20 A Power factor: 0.5 lead/lag Power factor: 0.5 lead/lag to unity Power factor: unity</p>	<p>30 μW/VA 35 μW/VA 40 μW/VA 50 μW/VA</p> <p>50 μW/VA 60 μW/VA 70 μW/VA 80 μW/VA</p> <p>0.037 % 0.050 % 0.020 %</p>

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC single phase varmeter	Calibration for reactive power in accordance with in-house procedure TPL105 over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 110 V to 120 V / 220 V to 240 V Current: 1 A, 5 A, 10 A 50 A 100 A 160 A Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 0.1 A to 10 A Above 10 A to 50 A Above 50 A to 100 A Above 100 A to 160 A	30 μ var/VA 35 μ var/VA 40 μ var/VA 50 μ var/VA 50 μ var/VA 60 μ var/VA 70 μ var/VA 80 μ var/VA
- AC single phase VA meter	Calibration for apparent power in accordance with in-house procedure TPL105 over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 110 V to 120 V / 220 V to 240 V Current: 1 A, 5 A, 10 A 50 A 100 A 160 A Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 0.1 A to 10 A Above 10 A to 50 A Above 50 A to 100 A Above 100 A to 160 A	30 μ VA/VA 35 μ VA/VA 40 μ VA/VA 50 μ VA/VA 50 μ VA/VA 60 μ VA/VA 70 μ VA/VA 80 μ VA/VA

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC three phase wattmeter	<p>Calibration for active power in accordance with in-house procedure TPL102 over the following ranges of parameters:</p> <p>Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 110 V to 120 V / 220 V to 240 V Current: 1 A, 5 A, 10 A 50 A 100 A 160 A</p> <p>Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 0.1 A to 10 A Above 10 A to 50 A Above 50 A to 100 A Above 100 A to 160 A</p>	<p>50 μW/VA 60 μW/VA 70 μW/VA 80 μW/VA</p> <p>70 μW/VA 80 μW/VA 90 μW/VA 100 μW/VA</p>
- AC three phase varmeter	<p>Calibration for reactive power in accordance with in-house procedure TPL102 over the following ranges of parameters:</p> <p>Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 110 V to 120 V / 220 V to 240 V Current: 1 A, 5 A, 10 A 50 A 100 A 160 A</p> <p>Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 0.1 A to 10 A Above 10 A to 50 A Above 50 A to 100 A Above 100 A to 160 A</p>	<p>50 μvar/VA 60 μvar/VA 70 μvar/VA 80 μvar/VA</p> <p>70 μvar/VA 80 μvar/VA 90 μvar/VA 100 μvar/VA</p>

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Electrical measurements and magnetism - DC & LF measurements - AC three phase VA meter	Calibration for apparent power in accordance with in-house procedure TPL102 over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 110 V to 120 V / 220 V to 240 V Current: 1 A, 5 A, 10 A 50 A 100 A 160 A Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Voltage: 24 V to 480 V Current: 0.1 A to 10 A Above 10 A to 50 A Above 50 A to 100 A Above 100 A to 160 A	50 μ VA/VA 60 μ VA/VA 70 μ VA/VA 80 μ VA/VA 70 μ VA/VA 80 μ VA/VA 90 μ VA/VA 100 μ VA/VA

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC single phase watt-hour meter	Calibration for AC energy in accordance with in-house procedure TPL125 over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Measuring time: 1 s to 1 h Voltage: 24 V to 480 V Current: 1 A to 55 A Above 55 A to 160 A	2.0 mWh/VAh 6.0 mWh/VAh
- AC single phase var-hour meter	Calibration for AC energy in accordance with in-house procedure TPL125 over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Measuring time: 1 s to 1 h Voltage: 24 V to 480 V Current: 1 A to 55 A Above 55 A to 160 A	2.0 mvarh/VAh 6.0 mvarh/VAh
- AC single phase VA-hour meter	Calibration for AC energy in accordance with in-house procedure TPL125 over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Measuring time: 1 s to 1 h Voltage: 24 V to 480 V Current: 1 A to 55 A Above 55 A to 160 A	2.0 mVAh/VAh 6.0 mVAh/VAh

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Electrical measurements and magnetism		
- DC & LF measurements		
- AC three phase watt-hour meter	Calibration for AC energy in accordance with in-house procedure TPL101 over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Measuring time: 1 s to 1 h Voltage: 24 V to 480 V Current: 1 A to 55 A Above 55 A to 160 A	2.0 mWh/VAh 6.0 mWh/VAh
- AC three phase var-hour meter	Calibration for AC energy in accordance with in-house procedure TPL101 over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Measuring time: 1 s to 1 h Voltage: 24 V to 480 V Current: 1 A to 55 A Above 55 A to 160 A	2.0 mvarh/VAh 6.0 mvarh/VAh
- AC three phase VA-hour meter	Calibration for AC energy in accordance with in-house procedure TPL101 over the following ranges of parameters: Frequency: 45 Hz to 65 Hz Power factor: 0 lead/lag to unity Measuring time: 1 s to 1 h Voltage: 24 V to 480 V Current: 1 A to 55 A Above 55 A to 160 A	2.0 mVAh/VAh 6.0 mVAh/VAh

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SPECIFIC TEST OR PROPERTY MEASURED[@]	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)*				
Electrical measurements and magnetism - DC & LF measurements - Capacitor	Calibration for capacitance in accordance with in-house procedure TPL069 at the following values or over the following ranges: 50 Hz to 100 Hz 1 pF to 10 pF 100 Hz to 10 kHz 1 pF to 10 pF 400 Hz to 10 kHz Above 10 pF to 1 nF	400 μF/F	200 μF/F	20 μF/F	

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Electrical measurements and magnetism - DC & LF measurements - Capacitor	Calibration for capacitance in accordance with in-house procedure TPL005 at the following values: 400 Hz 10 pF 100 pF 1 nF 10 nF 100 nF 1 µF 1 kHz 10 pF 100 pF 1 nF 10 nF 100 nF 1 µF 10 kHz 10 pF 100 pF 1 nF 10 nF 100 nF 1 µF Calibration for capacitance in accordance with in-house procedure TPL061 at the following values: 1 kHz 10 pF 100 pF 1 nF 10 nF 100 nF 1 µF	 5.0 µF/F 5.0 µF/F 5.0 µF/F 77 µF/F 77 µF/F 99 µF/F 5.0 µF/F 5.0 µF/F 5.0 µF/F 66 µF/F 66 µF/F 84 µF/F 8.0 µF/F 5.3 µF/F 5.3 µF/F 230 µF/F 230 µF/F 350 µF/F 5.0 µF/F 5.0 µF/F 5.0 µF/F 66 µF/F 66 µF/F 84 µF/F

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Electrical measurements and magnetism - DC & LF measurements - Capacitor	Calibration for capacitance in accordance with in-house procedure TPL065 at the following values and ranges: 100 Hz 10 μ F 400 Hz 10 pF 100 pF 1 nF 10 nF 100 nF 1 μ F 1 kHz 10 pF 100 pF 1 nF 10 nF 100 nF 1 μ F 10 μ F 10 kHz 10 pF 100 pF 1 nF 10 nF 100 nF 1 μ F	700 μ F/F 500 μ F/F 200 μ F/F 200 μ F/F 200 μ F/F 200 μ F/F 200 μ F/F 300 μ F/F 200 μ F/F 200 μ F/F 200 μ F/F 200 μ F/F 200 μ F/F 700 μ F/F 200 μ F/F 200 μ F/F 200 μ F/F 230 μ F/F 230 μ F/F 400 μ F/F

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Electrical measurements and magnetism - DC & LF measurements - Capacitor	<p>Calibration for capacitance in accordance with in-house procedure TPL065 at the following values or over the following ranges:</p> <p>100 Hz to 1 kHz 10 μF</p> <p>400 Hz to 1 kHz 10 pF to 1 μF</p> <p>1 kHz to 10 kHz 10 pF to 0.05 μF Above 0.05 μF to 1 μF</p> <p>Calibration for capacitance in accordance with in-house procedure TPL004 over the following ranges:</p> <p>50 Hz to 100 Hz 10 pF to 100 pF Above 100 pF to 1.11 μF</p> <p>100 Hz to 1 kHz 10 pF to 1.11 μF</p> <p>1 kHz to 10 kHz 10 pF to 100 pF Above 100 pF to 0.05 μF Above 0.05 μF to 1.11 μF</p> <p>Calibration for capacitance in accordance with in-house procedure TPL060 over the following ranges:</p> <p>1 kHz 10 pF to 1 nF Above 1 nF to 1 μF</p>	<p>700 μF/F</p> <p>700 μF/F</p> <p>700 μF/F 2000 μF/F</p> <p>1000 μF/F 100 μF/F</p> <p>100 μF/F</p> <p>200 μF/F 250 μF/F 2000 μF/F</p> <p>15 μF/F 100 μF/F</p>

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Electrical measurements and magnetism - DC & LF measurements - Inductor	Calibration for inductance in accordance with in-house procedure TPL063 at the following values or over the following ranges: 400 Hz 100 µH 1 mH 10 mH, 100 mH, 1 H 100 µH to 1 H 1 kHz 100 µH 1 mH 10 mH, 100 mH, 1 H 100 µH to 1 H 10 kHz 100 µH, 1 mH, 10 mH 100 mH 100 µH to 100 mH	180 µH/H 200 µH/H 140 µH/H 500 µH/H 140 µH/H 180 µH/H 140 µH/H 500 µH/H 270 µH/H 350 µH/H 500 µH/H
- Phase generator	Calibration for phase accuracy in accordance with in-house procedure TPL071 over the following ratios: 40 Hz to 100 kHz voltage ratio 1:1 voltage ratio 1:10	0.0020° 0.0025°

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Electrical measurements and magnetism		
- DC & LF measurements		
- Phasemeter	<p>Calibration for phase over the voltage of 0.1 V to 100 V with equal input levels in accordance with in-house procedure TPL028 over the following ranges:</p> <p>40 Hz to 1 kHz 0° to 360°</p> <p>1 kHz to 6.25 kHz 0° to 360°</p> <p>6.25 kHz to 50 kHz 0° to 360°</p> <p>50 kHz to 100 kHz 0° to 360°</p> <p>Calibration for phase over the voltage of 0.1 V to 100 V with equal input levels in accordance with in-house procedure TPL072 over the following ranges:</p> <p>40 Hz to 1 kHz 0° to 360°</p> <p>1 kHz to 6.25 kHz 0° to 360°</p> <p>6.25 kHz to 50 kHz 0° to 360°</p> <p>50 kHz to 100 kHz 0° to 360°</p>	<p>0.020°</p> <p>0.040°</p> <p>0.060°</p> <p>0.10°</p> <p>0.020°</p> <p>0.040°</p> <p>0.060°</p> <p>0.10°</p>

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Electrical measurements and magnetism		
- DC & LF measurements		
- Distortion meter	Calibration for distortion in accordance with in-house procedure TPL086 over the following ranges:	
	40 Hz to 50 kHz -10 dB to -60 dB	0.20 dB
	50 kHz to 100 kHz -10 dB to -50 dB -50 dB to -60 dB	0.20 dB 0.50 dB
	40 Hz to 20 kHz -60 dB to -70 dB	0.60 dB
- Power factor meter	Calibration for power factor in accordance with in-house procedure TPL070 over the following ranges of parameters:	
	Voltage: 25 V to 250 V	
	Current: 50 mA to 100 A	
	Frequency: 50 Hz and 60 Hz	
	Power factor: 0.0 lead/lag to 0.5 lead/lag	0.0040
	Above 0.5 lead/lag to 0.9 lead/lag	0.0030
	Above 0.9 lead/lag to unity	0.0020

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Electrical measurements and magnetism		
- DC & LF measurements		
- Withstanding voltage tester	Calibration for the following parameters in accordance with in-house procedure TPL081:	
	- DC output voltage:	
	1 kV to 5 kV	6.0 V
	Above 5 kV to 11 kV	7.0 V
	- AC output voltage:	
	1 kV to 2 kV	6.0 V
	Above 2 kV to 5 kV	7.0 V
	Above 5 kV to 7 kV	8.0 V
	Above 7 kV to 9 kV	9.0 V
	Above 9 kV to 11 kV	10 V
	- DC leak current:	
	0.5 mA to 100 mA	0.040 %
	- AC leak current:	
	0.5 mA to 100 mA	0.080 %
- LCR meter	Calibration for the following parameters in accordance with in-house procedure TPL064:	
	- Resistance:	
	1 kHz	
	1 Ω to 10 k Ω	20 $\mu\Omega/\Omega$
	- Capacitance:	
	1 kHz	
	10 pF to 1 nF	15 $\mu\text{F}/\text{F}$
	Above 1 nF to 1 μF	100 $\mu\text{F}/\text{F}$
	- Inductance:	
	1 kHz	
	100 μH to 1 H	100 $\mu\text{H}/\text{H}$

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Electrical measurements and magnetism - DC & LF measurements - Electrostatic meter	<p>Calibration for DC voltage at distance not exceeding 100 mm from the calibration plane in accordance with in-house procedure TPD057 over the following range:</p> <p>10 V to 50 kV</p> <p>Calibration for DC voltage at distance not exceeding 30 mm from the calibration plane in accordance with in-house procedure TPD049 over the following range:</p> <p>1 kV to 30 kV</p>	<p>1.2×10^{-2}</p> <p>0.023 kV to 0.69 kV</p>

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<p>Electrical measurements and magnetism</p> <p>- DC & LF measurements</p> <p>- Electrometer</p>	<p>Calibration for the following parameters in accordance with in-house procedure TPD059:</p> <p>- DC voltage: 1 V to 1 kV</p> <p>- DC current: 1 pA to 20 pA Above 20 pA to 200 pA Above 200 pA to 2 nA Above 2 nA to 20 nA Above 20 nA to 20 µA Above 20 µA to 20 mA</p> <p>- Charge: 0.1 nC to 2 nC Above 2 nC to 20 nC Above 20 nC to 200 nC Above 200 nC to 2 µC</p> <p>- Resistance: 1 MΩ to 20 MΩ Above 20 MΩ to 100 MΩ Above 100 MΩ to 100 GΩ Above 100 GΩ to 1 TΩ Above 1 TΩ to 10 TΩ</p> <p>- DC output voltage (voltage source): 0.1 mV to 1 kV</p>	<p>20 µV to 20 mV</p> <p>0.025 pA to 0.20 pA 0.20 pA 0.20 pA to 2.0 pA 2.0 pA to 0.010 nA 0.010 nA to 0.010 µA 0.010 µA to 2.0 µA</p> <p>0.1 pC to 2.5 pC 2.5 pC to 6.0 pC 6.0 pC to 60 pC 60 pC to 0.60 nC</p> <p>1.0 kΩ to 20 kΩ 20 kΩ to 50 kΩ 50 kΩ to 0.10 GΩ 0.10 GΩ to 3.0 GΩ 3.0 GΩ to 35 GΩ</p> <p>0.15 µV to 20 mV</p>

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<p>Electrical measurements and magnetism</p> <p>- DC & LF measurements</p> <p>- Residual-current device (RCD) tester</p>	<p>Calibration for the following parameters in accordance with in-house procedure TPD077:</p> <p>- AC residual current:</p> <p>5 mA to 1 A</p> <p>Above 1 A to 2.5 A</p> <p>Above 2.5 A to 5 A</p> <p>- Residual pulsating DC current:</p> <p>20 mA to 1.406 A</p> <p>- Ramping AC residual current:</p> <p>2 mA to 4 mA</p> <p>Above 4 mA to 40 mA</p> <p>Above 40 mA to 550 mA</p> <p>- Tripping time:</p> <p>10 ms to 40 ms</p> <p>Above 40 ms to 160 ms</p> <p>Above 160 ms to 430 ms</p> <p>Above 430 ms to 1000 ms</p>	<p>0.50 %</p> <p>2.2 %</p> <p>3.5 %</p> <p>1.2 %</p> <p>2.2 %</p> <p>1.3 %</p> <p>1.0 %</p> <p>0.70 ms</p> <p>0.80 ms</p> <p>1.0 ms</p> <p>2.2 ms</p>

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Electrical measurements and magnetism - DC & LF measurements - Harmonics source	<p>Calibration for harmonic voltage in accordance with in-house procedure TPL116 over the following ranges of parameters:</p> <p>Frequency: 50 Hz / 60 Hz Harmonic order: 2nd to 100th Phase: $\pm(0 \text{ to } 180)^\circ$</p> <p>Harmonic voltage: 10 V to 12 V 20 V to 24 V</p> <p>Calibration for harmonic voltage in accordance with in-house procedure TPL128 over the following ranges of parameters:</p> <p>Frequency: 50 Hz / 60 Hz Harmonic order: 2nd to 100th Phase: $\pm(0 \text{ to } 180)^\circ$</p> <p>Harmonic voltage: 10 V to 12 V 20 V to 24 V</p>	<p>0.030 % 0.030 %</p> <p>0.030 % 0.030 %</p>

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Electrical measurements and magnetism - DC & LF measurements - Harmonics source	<p>Calibration for harmonic current in accordance with in-house procedure TPL117 over the following ranges of parameters:</p> <p>Frequency: 50 Hz / 60 Hz Harmonic order: 2nd to 100th Phase: $\pm(0 \text{ to } 180)^\circ$</p> <p>Harmonic current: 10 mA to 20 mA Above 20 mA to 0.2 A Above 0.2 A to 6 A</p> <p>Calibration for harmonic current in accordance with in-house procedure TPL129 over the following ranges of parameters:</p> <p>Frequency: 50 Hz / 60 Hz Harmonic order: 2nd to 100th Phase: $\pm(0 \text{ to } 180)^\circ$</p> <p>Harmonic current: 10 mA to 20 mA Above 20 mA to 0.2 A Above 0.2 A to 6 A</p>	<p>0.24 % 0.18 % 0.24 %</p> <p>0.24 % 0.18 % 0.24 %</p>

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Electrical measurements and magnetism - DC & LF measurements - Harmonics analyzer	<p>Calibration for harmonic voltage in accordance with in-house procedure TPL114 over the following ranges of parameters:</p> <p>Frequency: 50 Hz / 60 Hz Harmonic order: 2nd to 45th Phase: $\pm(0 \text{ to } 180)^\circ$</p> <p>Harmonic voltage: 10 V to 12 V 20 V to 24 V</p> <p>Calibration for harmonic current in accordance with in-house procedure TPL110 over the following values of parameters:</p> <p>Frequency: 50 Hz / 60 Hz Harmonic order: 2nd to 45th Phase: $\pm(0 \text{ to } 180)^\circ$</p> <p>Harmonic current: 4 A</p> <p>Calibration for harmonic current in accordance with in-house procedure TPL115 over the following ranges of parameters:</p> <p>Frequency: 50 Hz / 60 Hz Harmonic order: 2nd to 45th Phase: $\pm(0 \text{ to } 180)^\circ$</p> <p>Harmonic current: 3 mA to 75 mA Above 75 mA to 3 A Above 3 A to 6 A</p>	<p>0.30 % 0.30 %</p> <p>0.80 %</p> <p>3.0 % 0.50 % 0.80 %</p>

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Electrical measurements and magnetism		
- DC & LF measurements		
- Flicker source	<p>Calibration for modulation depth in accordance with in-house procedure TPL126: over the following ranges of parameters:</p> <p>Modulation waveform: Sinusoidal Voltage: 120 V / 240 V Frequency: 50 Hz / 60 Hz Phase: 0° Modulating frequency: 5 Hz to 25 Hz</p> <p>Modulation depth: 0.25 % to 1 %</p>	0.010 % to 0.060 %
	<p>Calibration for modulation depth in accordance with in-house procedure TPL136: over the following ranges of parameters:</p> <p>Modulation waveform: Rectangular Voltage: 120 V / 230 V Frequency: 50 Hz / 60 Hz Phase: 0° Modulating frequency: 1 Hz to 25 Hz</p> <p>Modulation depth: 0.25 % to 1 %</p>	0.035 %
- Flicker meter	<p>Calibration for short-term flicker severity (Pst) and long-term flicker severity (Plt) in accordance with in-house procedure TPL112 over the following ranges of parameters:</p> <p>Modulation waveform: Rectangular Voltage: 230 V Frequency: 50 Hz Depth: 0.001 % to 60 % Duty cycle: 0.01 % to 99.99 %</p> <p>Short-term flicker severity (Pst) Long-term flicker severity (Plt)</p>	0.0030 0.0030

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Electrical measurements and magnetism - DC & LF measurements - Electrocardiograph (ECG) analyser	<p>Calibration for voltage level in accordance with in-house procedure TPL143 over the following ranges of parameters:</p> <p>Waveform: Sinusoidal Frequency: 10 Hz to 200 Hz</p> <p>Voltage level: 1 mV to 5 mV</p> <p>Calibration for deviation voltage in accordance with in-house procedure TPD143 over the following range:</p> <p>0.05 mV to 0.8 mV</p> <p>Calibration for interval timing in accordance with in-house procedure TPD143 over the following ranges:</p> <p>QRS interval 40 ms to 120 ms RR interval 0.5 s to 5 s</p>	<p>0.30 %</p> <p>2.0 µV to 32 µV</p> <p>0.5 ms</p> <p>0.5 ms</p>

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Electrical measurements and magnetism - DC & LF measurements - Non-invasive pacer	Calibration for pulse amplitude in accordance with in-house procedure TPD143 over the following ranges: 0.1 V to 10 V 1 mA to 100 mA Calibration for pulse timing in accordance with in-house procedure TPD143 over the following ranges: Pulse width 1 ms to 20 ms Pulse interval 0.5 s to 5 s Pulse rate 30 bpm to 300 bpm	0.05 mV to 5 mV 0.5 µA to 50 µA 50 µs 50 µs 0.003 bpm

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Electrical measurements and magnetism		
- DC & LF measurements		
- Electrical safety analyzer	Calibration for the following parameters in accordance with in-house procedure TPL141:	
	- Accessible voltage: 50 Hz 1 V to 300 V	0.10 V
	- Mains voltage: 50 Hz 1 mV to 0.1 V 220 V 230 V 240 V	0.10 V 0.20 V 0.20 V 0.20 V
	- Protective earth resistance: 0.5 Ω to 2 Ω	0.0030 Ω
	- Insulation resistance: 1 MΩ to 23 MΩ Above 23 MΩ to 100 MΩ	0.10 MΩ 0.20 MΩ
	- Leakage current: 50 Hz 10 μA to 199.9 μA 200 μA to 1999 μA 2 mA to 10 mA	0.10 μA 1.0 μA 10 μA
	- Equipment current: 50 Hz 1 A to 6.5 A	0.10 A

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Electrical measurements and magnetism		
- DC & LF measurements		
- Electrical safety analyzer	Calibration for the following parameters in accordance with in-house procedure TPL141:	
	- Point to point voltage 50 Hz 1 V to 300 V	0.10 V
	- Point to point current: 50 Hz 10 µA to 199.9 µA 200 µA to 1999 µA 2 mA to 10 mA	0.10 µA 1.0 µA 10 µA
	- Point to point resistance: 0.5 Ω to 2 Ω	0.0030 Ω
- Defibrillator analyzer	Calibration for biphasic energy in accordance with in-house procedure TPL142 over the following ranges:	
	150 J to 200 J	1.0 J
	Above 200 J to 300 J	1.5 J
	Above 300 J to 360 J	2.0 J
- Programmable filter	Calibration for passband attenuation and stopband attenuation in accordance with in-house procedure TPL127 over the following ranges of parameters:	
	Voltage: 3.2 V	
	Frequency: 20 Hz to 25 kHz	
	Passband attenuation: 0 dB to -10 dB	0.010 dB
	Stopband attenuation : 0 dB to -80 dB	0.20 dB

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Electrical measurements and magnetism		
- DC & LF measurements		
- SINAD meter	<p>Calibration for signal-to-noise and distortion ratio (SINAD) in accordance with in-house procedure TPL132 over the following ranges of parameters:</p> <p>Voltage level: 1 V to 6.4 V Frequency: 40 Hz, 1 kHz, 10 kHz</p> <p>Signal-to-noise and distortion ratio (SINAD): 10 dB to 70 dB</p> <p>Voltage level: 1 V to 6.4 V Frequency: 20 kHz, 40 kHz</p> <p>Signal-to-noise and distortion ratio (SINAD): 10 dB to 60 dB Above 60 dB to 70 dB</p>	<p>0.30 dB</p> <p>0.30 dB</p> <p>0.80 dB</p>
- Strain gauge meter	<p>Calibration for voltage ratio in accordance with in-house procedure TPL133 at the following voltage levels:</p> <p>Test frequency: 40 Hz to 1 kHz Voltage level: 2.5 V, 5 V, 10 V</p> <p>0.1 mV/V to 10 mV/V</p>	<p>1.0 µV/V</p>

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Electrical measurements and magnetism		
- Time and frequency measurements		
- Laboratory reference time scale UTC(SCL)	Calibration for the difference in Coordinated Universal Time (UTC – UTC(SCL)) in accordance with in-house procedure TPR001:	0.1 μ s
- Time scale difference	Calibration for time interval difference from laboratory reference time scale UTC(SCL) in accordance with in-house procedure TPR001 over the following range: 1 ns to 1 s	1 ns

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Electrical measurements and magnetism - Time and frequency measurements - Frequency standard	<p>Calibration for the following parameters in accordance with in-house procedure TPR002:</p> <ul style="list-style-type: none"> - Frequency at the following values: 100 kHz 1 MHz 5 MHz 10 MHz - Drift rate per day at the following frequencies: 100 kHz 1 MHz 5 MHz 10 MHz <p>Calibration for the following parameters in accordance with in-house procedure TPR049:</p> <ul style="list-style-type: none"> - Frequency at the following values: 1 MHz 5 MHz 10 MHz - Drift rate per day at the following frequencies: 1 MHz 5 MHz 10 MHz 	<p>2.0 x 10⁻¹³ of result 8.2 x 10⁻¹⁴ of result 8.0 x 10⁻¹⁴ of result 8.0 x 10⁻¹⁴ of result for τ ≥ 5 days, where τ is the averaging time</p> <p>2 x 10⁻¹³ of result 2 x 10⁻¹³ of result 2 x 10⁻¹³ of result 2 x 10⁻¹³ of result for τ = 1 day, where τ is the averaging time</p> <p>8.2 x 10⁻¹⁴ of result 8.0 x 10⁻¹⁴ of result 8.0 x 10⁻¹⁴ of result for τ ≥ 5 days, where τ is the averaging time</p> <p>2 x 10⁻¹³ of result 2 x 10⁻¹³ of result 2 x 10⁻¹³ of result for τ = 1 day, where τ is the averaging time</p>

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Electrical measurements and magnetism		
- Time and frequency measurements		
- Frequency source	Calibration for frequency in accordance with in-house procedure TPR004 over the following ranges: 1 Hz to 1 kHz Above 1 kHz to 1 MHz Above 1 MHz to 1.3 GHz Above 1.3 GHz to 10 GHz Above 10 GHz to 26.5 GHz	4×10^{-6} to 3×10^{-9} of result 3×10^{-9} to 5×10^{-11} of result 5×10^{-11} of result 6×10^{-10} to 2×10^{-10} of result 2×10^{-10} to 1×10^{-10} of result
	Calibration for frequency in accordance with in-house procedure TPR073 over the following range: 12.4 GHz to 40 GHz	1×10^{-10} of result
- Frequency counter	Calibration for frequency in accordance with in-house procedure TPR003 over the following ranges: 1 Hz to 1 kHz Above 1 kHz to 1 MHz Above 1 MHz to 1.3 GHz Above 1.3 GHz to 10 GHz Above 10 GHz to 26.5 GHz	4×10^{-6} to 3×10^{-9} of result 3×10^{-9} to 6.1×10^{-11} of result 6.1×10^{-11} of result 6.1×10^{-10} to 2×10^{-10} of result 2×10^{-10} to 1×10^{-10} of result
	Calibration for frequency in accordance with in-house procedure TPR081 over the following range: 18 GHz to 40 GHz	1×10^{-10} of result

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Electrical measurements and magnetism		
- Time and frequency measurements		
- Flashing light source	Calibration for the following parameters in accordance with in-house procedure TPR084	
	- Frequency over the following range: 1 Hz to 1 kHz	4×10^{-6} to 3×10^{-9} of result
	- Period over the following range: 1 ms to 1 s	3×10^{-9} to 4×10^{-6} of result
- Two flashing light source	Calibration for time interval in accordance with in-house procedure TPR085 over the following range: Above 0.05 μ s to 999 s	3.0 ns

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Electrical measurements and magnetism - Time and frequency measurements - Period source	Calibration for period in accordance with in-house procedure TPR073 over the following range: 25 ps to 81 ps Calibration for period in accordance with in-house procedure TPR004 over the following ranges: Above 38 ps to 100 ps Above 100 ps to 769 ps Above 769 ps to 1 µs Above 1 µs to 1 ms Above 1 ms to 1 s	1 x 10 ⁻¹⁰ of result 1 x 10 ⁻¹⁰ to 2 x 10 ⁻¹⁰ of result 2 x 10 ⁻¹⁰ to 6 x 10 ⁻¹⁰ of result 5 x 10 ⁻¹¹ of result 5 x 10 ⁻¹¹ to 3 x 10 ⁻⁹ of result 3 x 10 ⁻⁹ to 4 x 10 ⁻⁶ of result
- Period meter	Calibration for period in accordance with in-house procedure TPR081 over the following range: 25 ps to 56 ps Calibration for period in accordance with in-house procedure TPR003 over the following ranges: 38 ps to 100 ps Above 100 ps to 769 ps Above 769 ps to 1 µs Above 1 µs to 1 ms Above 1 ms to 1 s	1 x 10 ⁻¹⁰ of result 1 x 10 ⁻¹⁰ to 2 x 10 ⁻¹⁰ of result 2 x 10 ⁻¹⁰ to 6.1 x 10 ⁻¹⁰ of result 6.1 x 10 ⁻¹¹ of result 6.1 x 10 ⁻¹¹ to 3 x 10 ⁻⁹ of result 3 x 10 ⁻⁹ to 4 x 10 ⁻⁶ of result

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Electrical measurements and magnetism		
- Time and frequency measurements		
- Time difference source	Calibration for time interval in accordance with in-house procedure TPR005 over the following ranges: 1 ns to 1 s Above 1 s to 999 s	1 ns 1 ns to 3 ns
- Time difference meter	Calibration for time interval in accordance with in-house procedure TPR005 over the following ranges: 1 ns to 1 s Above 1 s to 999 s	1 ns 1 ns to 15 ns

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Electrical measurements and magnetism		
- Time and frequency measurements		
- Timing device	Calibration for the following parameters in accordance with in-house procedure TPR056	
	- Relative accuracy:	
	10 ms to below 100 ms	2×10^{-1}
	100 ms to below 1 s	2×10^{-2}
	1 s to below 10 s	2×10^{-3}
	10 s to below 100 s	2×10^{-4}
	100 s to below 1,000 s	2×10^{-5}
	1,000 s to below 10,000 s	2×10^{-6}
	10,000 s to below 9,999,999.999 s	2×10^{-7}
- Electronic stop watch (with resolution ≥ 0.001 s) (maximum measuring time interval of 9,999,999.999 s (~115 days))	Calibration for relative accuracy in accordance with in-house procedure TPR056 for a calibration period of 7 hours	2×10^{-7}
- Quartz watch tester	Calibration for the following parameters in accordance with in-house procedure TPR066:	
	- Relative time accuracy over the following range: +8 sec per day to -8 sec per day	0.01 sec per day
	- Relative frequency accuracy over the following range of frequencies: 32765 Hz to 32771 Hz	3×10^{-7}

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Electrical measurements and magnetism		
- Time and frequency measurements		
- Mechanical watch tester	Calibration for the following parameters in accordance with in-house procedure TPR067:	
	- Relative time accuracy over the following range: +8 sec per day to -8 sec per day	0.05 sec per day
	- Relative frequency accuracy in beats per hour (BPH) over the following range: 14400 BPH to 36000 BPH	1.5×10^{-6}
- Metronome	Calibration for frequency in beats per minute (BPM) in accordance with in-house procedure TPR069 at the following values:	
	60 BPM	2×10^{-4} BPM
	120 BPM	2×10^{-4} BPM
	150 BPM	2×10^{-4} BPM
	180 BPM	2×10^{-4} BPM
	200 BPM	2×10^{-4} BPM
	240 BPM	2×10^{-4} BPM

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Electrical measurements and magnetism		
- Radio Frequency (RF) measurements		
- Voltage source	Calibration for voltage in accordance with in-house procedure TPR039: over the following ranges:	
	DC and up to 2.5 GHz AC 50 Ω 4 mV to 5 V	1.2 %
	DC and up to 2.5 GHz AC 1 MΩ 0.8 V to 40 V	1.2 %
- Power source fitted with 50 Ω type N connector	Calibration for power in accordance with in-house procedure TPR010 over the following ranges:	
	10 kHz to 30 MHz 10 nW to 10 μW Above 10 μW to 100 mW	1.3 % to 4.5 % 1.3 % to 4.0 %
	30 MHz to 3 GHz 10 nW to 10 μW Above 10 μW to 100 mW	1.0 % to 3.8 % 1.0 % to 3.1 %
	3 GHz to 18 GHz 10 nW to 10 μW Above 10 μW to 100 mW	2.3 % to 7.7 % 2.3 % to 7.4 %
	Calibration for power in accordance with in-house procedure TPR025 over the following ranges:	
	100 Hz to 3 GHz -100 dBm to +20 dBm	1.2 dB
	3 GHz to 18 GHz -100 dBm to +20 dBm	2.0 dB

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Electrical measurements and magnetism		
- RF measurements		
- Power meter fitted with 50 Ω type N connector	Calibration for power in accordance with in-house procedure TPR009 over the following ranges: 10 kHz to 30 MHz 10 nW to 10 μ W Above 10 μ W to 100 mW 30 MHz to 3 GHz 10 nW to 10 μ W Above 10 μ W to 100 mW 3 GHz to 18 GHz 10 nW to 10 μ W Above 10 μ W to 100 mW Calibration for power in accordance with in-house procedure TPR025 over the following ranges: 100 Hz to 3 GHz -100 dBm to +20 dBm 3 GHz to 18 GHz -100 dBm to +20 dBm	1.4 % to 4.5 % 1.4 % to 4.0 % 1.0 % to 3.8 % 1.0 % to 3.1 % 1.9 % to 7.4 % 1.9 % to 7.0 % 1.2 dB 2.0 dB
- High level RF power meter fitted with 50 Ω type N connector	Calibration for power in accordance with in-house procedure TPR035 over the following ranges: 1 MHz to 1 GHz 23 dBm to 44 dBm 1 GHz to 4.2 GHz 23 dBm to 37 dBm 4.2 GHz to 18 GHz 23 dBm to 40 dBm	0.60 dB 0.60 dB 0.60 dB

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Electrical measurements and magnetism		
- RF measurements		
- Power meter fitted with 50 Ω 3.5 mm connector	Calibration for power in accordance with in-house procedure TPR045 over the following range: 50 MHz to 26.5 GHz 10 nW to 1 mW	5.7 % to 7.0 %
- Power source fitted with 50 Ω 3.5 mm connector	Calibration for power in accordance with in-house procedure TPR046 over the following range: 50 MHz to 26.5 GHz 10 nW to 1 mW	1.3 % to 4.5 %
- Power meter fitted with 50 Ω 2.4 mm connector	Calibration for power in accordance with in-house procedure TPR082 over the following range: 50 MHz to 100 MHz 10 μ W to 1 mW 100 MHz to 10 GHz 10 μ W to 1 mW 10 GHz to 26.5 GHz 10 μ W to 1 mW 26.5 GHz to 40 GHz 10 μ W to 1 mW	3.1 % to 3.4 % 4.0 % to 4.9 % 5.3 % to 7.0 % 9.0 % to 9.7 %
- Power source fitted with 50 Ω 2.4 mm connector	Calibration for power in accordance with in-house procedure TPR078 over the following range: 50 MHz to 40 GHz 10 μ W to 100 mW	1.1 % to 8.2 %

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Electrical measurements and magnetism		
- RF measurements		
- Power amplifier with input and output ports fitted with 50 Ω type N / 3.5 mm / 2.4 mm connectors	Calibration for power gain in accordance with in-house procedure TPR402 over the following ranges:	
	10 kHz to below 1 MHz -100 dBm to 20 dBm	0.10 dB to 2.6 dB
	1 MHz to 50 MHz -100 dBm to 44.8 dBm	0.07 dB to 2.6 dB
	Above 50 MHz to 1 GHz -100 dBm to 44.8 dBm	0.09 dB to 2.6 dB
	Above 1 GHz to 3 GHz -100 dBm to 44.8 dBm	0.12 dB to 2.6 dB
	Above 3 GHz to 4.2 GHz -100 dBm to 37 dBm	0.12 dB to 7.7 dB
	Above 4.2 GHz to 18 GHz -100 dBm to 40 dBm	0.19 dB to 7.7 dB
	Above 18 GHz to 26.5 GHz -50 dBm to 20 dBm	0.21 dB to 0.44 dB
	Above 26.5 GHz to 40 GHz -50 dBm to 20 dBm	0.23 dB to 0.59 dB

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Electrical measurements and magnetism		
- RF measurements		
- Thermistor mount power sensor fitted with 50 Ω type N connector	Calibration for effective efficiency and calibration factor by using micro-calorimeter in accordance with in-house procedure TPR401 over the following range:	
	10 MHz to below 30 MHz 0.7 to 1.2	0.003
	30 MHz to below 1 GHz 0.7 to 1.2	0.004
	1 GHz to below 2 GHz 0.7 to 1.2	0.006
	2 GHz to below 15 GHz 0.7 to 1.2	0.005
	15 GHz to 18 GHz 0.7 to 1.2	0.006

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Electrical measurements and magnetism		
- RF measurements		
- Thermistor mount power sensor fitted with 50 Ω type N connector	Calibration for effective efficiency at 10 mW and calibration factor by using direct method in accordance with in-house procedure TPR055 over the following range:	
	10 MHz to below 30 MHz 0.7 to 1.2	0.0059
	30 MHz to 100 MHz 0.7 to 1.2	0.0040
	above 100 MHz to 300 MHz 0.7 to 1.2	0.0045
	above 300 MHz to 1 GHz 0.7 to 1.2	0.0051
	above 1 GHz to 3 GHz 0.7 to 1.2	0.0061
	above 3 GHz to 4 GHz 0.7 to 1.2	0.0076
	above 4 GHz to 12 GHz 0.7 to 1.2	0.016
	above 12 GHz to 18 GHz 0.7 to 1.2	0.019

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Electrical measurements and magnetism		
- RF measurements		
- Thermal power sensor fitted with 50 Ω 2.4 mm coaxial connector	Calibration for effective efficiency and calibration factor by using micro-calorimeter in accordance with in-house procedure TPR403 over the following ranges:	
	10 MHz to below 500 MHz 0.7 to 1.2	0.014
	500 MHz to 15 GHz 0.7 to 1.2	0.012
	above 15 GHz to 21 GHz 0.7 to 1.2	0.016
	above 21 GHz to 35 GHz 0.7 to 1.2	0.020
	above 35 GHz to 50 GHz 0.7 to 1.2	0.025

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Electrical measurements and magnetism - RF measurements - Coaxial power sensor fitted with 50 Ω type N connector - Coaxial power sensor fitted with 50 Ω 2.4 mm connector	Calibration for power in accordance with in-house procedure TPR008 at the following values: 10 kHz to 30 MHz 10 μ W 10 mW 30 MHz to 3 GHz 10 μ W 10 mW 3 GHz to 18 GHz 10 μ W 10 mW Calibration for calibration factor at 1 mW in accordance with in-house procedure TPR074 over the following ranges: 50 MHz to 2 GHz 0.8 to 1.2 Above 2 GHz to 40 GHz 0.8 to 1.2	 1.0 % to 3.2 % 1.0 % to 3.2 % 1.0 % to 1.8 % 0.8 % to 1.2 % 1.8 % to 3.9 % 1.2 % to 3.3 % 2.3 % 3.7 %

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Electrical measurements and magnetism - RF measurements - Coaxial system fitted with 50 Ω type N connector	<p>Calibration for the following parameters in accordance with in-house procedure TPR030:</p> <p>- Voltage reflection coefficient phase over the following ranges: 300 kHz to 45 MHz -180° to +180° 45 MHz to 2 GHz -180° to +180° 2 GHz to 8 GHz -180° to +180° 8 GHz to 18 GHz -180° to +180°</p> <p>- Voltage reflection coefficient magnitude over the following ranges: 300 kHz to 45 MHz 0.000 to 1.000 45 MHz to 2 GHz 0.000 to 1.000 2 GHz to 8 GHz 0.000 to 1.000 8 GHz to 18 GHz 0.000 to 1.000</p> <p>- Voltage reflection coefficient (real and imaginary components) over the following ranges: 300 kHz to 45 MHz -1.000 to 1.000 45 MHz to 2 GHz -1.000 to 1.000 2 GHz to 8 GHz -1.000 to 1.000 8 GHz to 18 GHz -1.000 to 1.000</p> <p>- Voltage Standing Wave Ratio (VSWR) $VSWR = (1+ \Gamma)/(1- \Gamma)$ $\Gamma = \text{voltage reflection coefficient magnitude}$ </p>	<p>1.5° to 180°</p> <p>0.7° to 180°</p> <p>1.3° to 180°</p> <p>2.5° to 180°</p> <p>0.0080 to 0.029</p> <p>0.0066 to 0.010</p> <p>0.011 to 0.022</p> <p>0.020 to 0.036</p> <p>0.0080 to 0.029</p> <p>0.0066 to 0.010</p> <p>0.011 to 0.022</p> <p>0.020 to 0.036</p> <p> $2U_{ \Gamma }/(1- \Gamma)^2$ where $U_{ \Gamma }$ is the CMC of Γ </p>

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Electrical measurements and magnetism		
- RF measurements		
- Coaxial system fitted with 50 Ω PC7 connector	Calibration for the following parameters in accordance with in-house procedure TPR030:	
	- Voltage reflection coefficient phase over the following ranges:	
	45 MHz to 2 GHz	0.5° to 180°
	-180° to +180°	
	2 GHz to 8 GHz	0.7° to 180°
	-180° to +180°	
	8 GHz to 18 GHz	2.1° to 180°
	-180° to +180°	
	- Voltage reflection coefficient magnitude over the following ranges:	
	45 MHz to 2 GHz	
	0.000 to 1.000	0.004 to 0.008
	2 GHz to 8 GHz	
	0.000 to 1.000	0.004 to 0.005
	8 GHz to 18 GHz	
	0.000 to 1.000	0.008 to 0.009
	- Voltage reflection coefficient (real and imaginary components) over the following ranges:	
	45 MHz to 2 GHz	
	-1.000 to 1.000	0.004 to 0.008
	2 GHz to 8 GHz	
	-1.000 to 1.000	0.004 to 0.005
	8 GHz to 18 GHz	
	-1.000 to 1.000	0.008 to 0.009

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ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
<p>Electrical measurements and magnetism</p> <p>- RF measurements</p> <p>- Coaxial system fitted with 50 Ω 2.4 mm connector</p>	<p>Calibration for the following parameters in accordance with in-house procedure TPR071:</p> <p>- Voltage reflection coefficient phase over the following ranges: 10 MHz to 700 MHz -180° to +180° 700 MHz to 24 GHz -180° to +180° 24 GHz to 40 GHz -180° to +180°</p> <p>- Voltage reflection coefficient magnitude over the following ranges: 10 MHz to 700 MHz 0.000 to 1.000 700 MHz to 24 GHz 0.000 to 1.000 24 GHz to 40 GHz 0.000 to 1.000</p> <p>- Voltage reflection coefficient (real and imaginary components) over the following ranges: 10 MHz to 700 MHz -1.000 to 1.000 700 MHz to 24 GHz -1.000 to 1.000 24 GHz to 40 GHz -1.000 to 1.000</p> <p>- Voltage Standing Wave Ratio (VSWR) $VSWR = (1+ \Gamma)/(1- \Gamma)$ Γ = voltage reflection coefficient magnitude</p>	<p>2.6° to 180°</p> <p>1.4° to 180°</p> <p>4.0° to 180°</p> <p>0.023 to 0.046</p> <p>0.013 to 0.024</p> <p>0.023 to 0.046</p> <p>0.023 to 0.046</p> <p>0.013 to 0.024</p> <p>0.023 to 0.046</p> <p>$2U_{ \Gamma }/(1- \Gamma)^2$ where $U_{ \Gamma }$ is the CMC of Γ</p>

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Electrical measurements and magnetism		
- RF measurements		
- Coaxial system fitted with 50 Ω 2.4 mm connector	Calibration for transmission coefficient phase in accordance with in-house procedure TPR072 over the following ranges:	
	10 MHz to 700 MHz	
	0 dB to 40 dB	
	-180° to +180°	1.5°
	50 dB	
	-180° to +180°	1.8°
	60 dB	
	-180° to +180°	3.6°
	70 dB	
	-180° to +180°	11°
	80 dB	
	-180° to +180°	33°
	700 MHz to 24 GHz	
	0 dB to 30 dB	
	-180° to +180°	0.8° to 2.8°
	40 dB to 60 dB	
	-180° to +180°	1.1° to 3.4°
	70 dB	
	-180° to +180°	2.1° to 4.0°
	80 dB	
	-180° to +180°	5.9° to 6.9°
	24 GHz to 40 GHz	
	0 dB to 30 dB	
	-180° to +180°	3.1° to 4.5°
	40 dB to 50 dB	
	-180° to +180°	3.4° to 5.1°
	60 dB	
	-180° to +180°	3.7° to 5.5°
	70 dB	
	-180° to +180°	5.0° to 6.5°
	80 dB	
	-180° to +180°	11° to 12°

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Electrical measurements and magnetism		
- RF measurements		
- Network analyzer fitted with 50 Ω 2.4 mm connector	Calibration for the following parameters in accordance with in-house procedure TPR075:	
	- Voltage reflection coefficient magnitude over the following ranges:	
	10 MHz to 700 MHz	0.038
	0.000 to 1.000	
	700 MHz to 24 GHz	0.023
	0.000 to 1.000	
	24 GHz to 40 GHz	0.043
	0.000 to 1.000	
	- Voltage reflection coefficient phase over the following ranges:	
	10 MHz to 700 MHz	
	-180° to +180°	5.6°
	700 MHz to 24 GHz	
	-180° to +180°	4.5° to 5.8°
	24 GHz to 40 GHz	
	-180° to +180°	9.0° to 11°
	- Transmission coefficient magnitude over the following ranges:	
	10 MHz to 700 MHz	
	0 dB to 80 dB	0.24 dB
	700 MHz to 24 GHz	
	0 dB to 80 dB	0.12 dB
	24 GHz to 40 GHz	
	0 dB to 80 dB	0.22 dB
	- Transmission coefficient phase over the following ranges:	
	10 MHz to 700 MHz	
	-180° to +180°	1.4°
	700 MHz to 24 GHz	
	-180° to +180°	1.4° to 2.6°
	24 GHz to 40 GHz	
	-180° to +180°	3.3° to 4.7°

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Electrical measurements and magnetism - RF measurements - Oscilloscope	<p>Calibration for the following parameters in accordance with in-house procedure TPR016:</p> <ul style="list-style-type: none"> - Peak to Peak voltage of 1 kHz square waveform over the following range: 40 μV to 40 V - Period of triangular waveform over the following range: 0.5 ns to 5 s - Bandwidth over the following range: 1 MHz to 2 GHz <p>Calibration for rise time in accordance with in-house procedure TPR024: over the following range: 0.5 ns to 900 μs</p> <p>Calibration for the following parameters in accordance with in-house procedure TPC101:</p> <ul style="list-style-type: none"> - Peak to Peak voltage of 1 kHz square waveform over the following range: 40 μV to 200 V - Period of triangular waveform over the following range: 0.2 ns to 50 s - Bandwidth over the following range: 0.1 MHz to 6.4 GHz - Rise time over the following range: 300 ps to 1 ms 	<p>0.0032v + 3 μV where v is nominal test voltage in V</p> <p>0.060 %</p> <p>4.3 % of applied voltage level and it will be expressed in term of frequency for the UUT</p> <p>0.03 ns to 23 μs</p> <p>0.0032v + 3 μV where v is nominal test voltage in V</p> <p>0.060 %</p> <p>4.3 % of applied voltage level and it will be expressed in term of frequency for the UUT</p> <p>8.0 ps to 20 μs</p>

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Electrical measurements and magnetism		
- RF measurements		
- Oscilloscope	Calibration for the following parameters in accordance with in-house procedure TPC105: - Bandwidth: 6 GHz to 20 GHz - Rise time: 20 ps to 300 ps	0.25 % 0.25 ps
- Oscilloscope calibrator	Calibration for square wave output amplitude in accordance with in-house procedure TPC102 over the following ranges: 50 Hz to 1 kHz 50 Ω 0.4 mV to 4 V 1 MΩ 0.4 mV to 200 V	0.90 % to 0.002 % 0.90 % to 0.002 %
- Amplitude modulation generator and meter	Calibration for modulation index in accordance with in-house procedure TPR013 over the following range of parameters: Carrier frequency: 150 kHz to 1.3 GHz Modulating frequency: 100 Hz to 200 kHz Modulation index: 0.01 to 0.99	3.4 % to 4.3 %
- Frequency modulation generator and meter	Calibration for frequency deviation in accordance with in-house procedure TPR014 over the following range of parameters: Carrier frequency: 150 kHz to 1.3 GHz Modulating frequency: 100 Hz to 400 kHz Frequency deviation at: 100 Hz to 400 kHz	0.80 %

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Electrical measurements and magnetism - RF measurements - RF attenuator fitted with 50 Ω connector	Calibration for attenuation by using WBCO system in accordance with in-house procedure TPR012 over the following range: 30 MHz 0 dB to 50 dB Above 30 MHz to 16 GHz 0 dB to 50 dB Calibration for attenuation by using automatic network analyser in accordance with in-house procedure TPR031 over the following ranges: 300 kHz to 18 GHz 0 dB to 20 dB Above 20 dB to 40 dB Above 40 dB to 60 dB Above 60 dB to 80 dB	0.009 dB to 0.039 dB 0.050 dB 0.036 dB to 0.14 dB 0.036 dB to 0.15 dB 0.075 dB to 0.49 dB 0.56 dB to 5.8 dB

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Electrical measurements and magnetism - RF measurements - RF voltage generator of 50 Ω load	Calibration for voltage in accordance with in-house procedure TPR011 over the following range: 10 kHz to 1 GHz 0.71 mV to 2.2 V Calibration for voltage in accordance with in-house procedure TPR025 over the following ranges: 100 Hz to 3 GHz 7 dB μ V to 127 dB μ V 3 GHz to 18 GHz 7 dB μ V to 127 dB μ V	0.80 % to 2.3 % 1.2 dB 2.0 dB
- RF voltage generator of 75 Ω load	Calibration for voltage in accordance with in-house procedure TPR050 over the following range: 300 kHz to 1 GHz 65 dB μ V to 134 dB μ V	0.30 dB

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Electrical measurements and magnetism		
- RF measurements		
- RF voltmeter of 50 Ω load	Calibration for voltage in accordance with in-house procedure TPR011 over the following range: 10 kHz to 1 GHz 0.71 mV to 2.2 V	1.5 % to 3.6 %
	Calibration for voltage in accordance with in-house procedure TPR025 over the following ranges: 100 Hz to 3 GHz 7 dBμV to 127 dBμV	1.2 dB
	3 GHz to 13 GHz 7 dBμV to 127 dBμV	2.5 dB
	13 GHz to 18 GHz 7 dBμV to 127 dBμV	3.2 dB
- RF voltmeter of 75 Ω load	Calibration for voltage in accordance with in-house procedure TPR051 over the following range: 300 kHz to 1 GHz 10 dBμV to 120 dBμV	0.50 dB

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<p>Electrical measurements and magnetism</p> <p>- RF measurements</p> <p>- Power splitter fitted with 50 Ω 2.4 mm connector</p>	<p>Calibration for the following parameters in accordance with in-house procedure TPR077:</p> <p>- Equivalent output VRC magnitude (linear) over the following ranges:</p> <p>10 MHz to 700 MHz 0.000 to 1.000</p> <p>700 MHz to 24 GHz 0.000 to 1.000</p> <p>24 GHz to 40 GHz 0.000 to 1.000</p> <p>- Tracking (dB) over the following range:</p> <p>10 MHz to 700 MHz -80 dB to 80 dB</p> <p>700 MHz to 24 GHz -80 dB to 80 dB</p> <p>24 GHz to 40 GHz -80 dB to 80 dB</p>	<p>0.020</p> <p>0.020</p> <p>0.040</p> <p>0.30 dB</p> <p>0.20 dB</p> <p>0.30 dB</p>

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Electrical measurements and magnetism		
- RF measurements		
- Loop antenna		
	Calibration for antenna factor in accordance with CISPR 16-1-6: 2014 + A1: 2017 at the following frequency ranges:	
- Active loop antenna	1 kHz to 30 MHz -40 dB (S/m) to 10 dB (S/m)	1.2 dB
- Passive loop antenna	1 kHz to 1 MHz 10 dB (pT/μV) to 110 dB (pT/μV)	1.2 dB
	Calibration for antenna factor in accordance with in-house procedure TPR201 at the following frequency ranges:	
- Active loop antenna	1 kHz to 30 MHz -40 dB (S/m) to 10 dB (S/m)	1.9 dB
- Passive loop antenna	1 kHz to 1 MHz 10 dB (pT/μV) to 110 dB (pT/μV)	1.9 dB

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Electrical measurements and magnetism		
- RF measurements		
- Electrical fast transient/ burst (EFT/B) generator	Calibration for the following parameters in accordance with IEC 61000-4-4: 2004 Cl.6.1.2:	
	- Peak voltage V_p into 50 Ω load over the following range: 0.125 kV to 2.4 kV	3.7 %
	- Peak voltage V_p into 1 k Ω load over the following range: 0.24 kV to 4.6 kV	3.7 %
	- Repetition rate over the following range: 5 kHz and 100 kHz	0.60 %
	- Burst duration over the following ranges: 15 ms at 5 kHz 0.75 ms at 100 kHz	0.60 % 0.60 %
	- Burst period at 300 ms	0.60 %
	- Rise time t_r at 5 ns	1.3 %
	- Duration of pulse (to 50% of peak voltage) at 50 ns	1.1 %

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Electrical measurements and magnetism		
- RF measurements		
- Electrical fast transient/ burst (EFT/B) generator	Calibration for the following parameters in accordance with IEC 61000-4-4: 2012 Cl.6.2.3:	
	- Peak voltage V_p into 50 Ω load over the following range: 0.125 kV to 2.4 kV	3.7 %
	- Peak voltage V_p into 1 k Ω load over the following range: 0.24 kV to 4.6 kV	3.7 %
	- Repetition rate over the following range: 5 kHz and 100 kHz	0.60 %
	- Burst duration at the following values: 15 ms at 5 kHz 0.75 ms at 100 kHz	0.60 % 0.60 %
	- Burst period at 300 ms	0.60 %
	- Rise time t_r at 5 ns	1.3 %
	- Duration of pulse (to 50% of peak voltage) at 50 ns	1.1 %
- Electrostatic discharge (ESD) generator	Calibration for the following parameters in accordance with IEC 61000-4-2: 2008 Cl.6.2:	
	- First peak current of discharge over the following range: 7.5 A to 112.5 A	3.0 %
	- Rise time t_r over the following range: 0.6 to 1 ns	0.05 ns
	- Current at 30 ns over the following range: 4 A to 60 A	4.0 %
	- Current at 60 ns over the following range: 2 A to 120 A	6.0 %

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Electrical measurements and magnetism		
- RF measurements		
- EMI quasi-peak (QPK) measuring receiver	<p>Calibration for the following parameters in accordance with CISPR 16-1-1: 2006 + A1: 2006 Cl.4.4.1, 4.4.2:</p> <p>- Amplitude relationship: over the following range: 9 kHz to 1000 MHz -10 dB to 10 dB</p> <p>- Variation with repetition frequency: over the following range: 9 kHz to 1000 MHz -20 dB to 45 dB</p> <p>Calibration for the following parameters in accordance with CISPR 16-1-1: 2015 Cl.4.4.1, 4.4.2:</p> <p>- Amplitude relationship: over the following range: 9 kHz to 1000 MHz -10 dB to 10 dB</p> <p>- Variation with repetition frequency: over the following range: 9 kHz to 1000 MHz -20 dB to 45 dB</p>	<p>0.45 dB</p> <p>0.50 dB</p> <p>0.45 dB</p> <p>0.50 dB</p>

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Electrical measurements and magnetism		
- RF measurements		
- EMI quasi-peak (QPK) measuring receiver	Calibration of the following parameters in accordance with CISPR 16-1-1: 2019-05 Cl.5.2.1, 5.2.2:	
	- Amplitude relationship: over the following range: 9 kHz to 1000 MHz -10 dB to 10 dB	0.45 dB
	- Variation with repetition frequency: over the following range: 9 kHz to 1000 MHz -20 dB to 45 dB	0.50 dB

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Electrical measurements and magnetism		
- RF measurements		
- 1.2/50 µs voltage surge generator	Calibration for the following parameters in accordance with IEC 61000-4-5: 2005:	
	- Front time at 1.2 µs	5.0 %
	- Time to half-value at 0 µs	5.0 %
	- Voltage surge peak over the following range: 0.5 kV to 7.4 kV	2.0 %
	Calibration for the following parameters in accordance with IEC 61000-4-5: 2014:	
	- Front time at 1.2 µs	5.0 %
	- Duration at 50 µs	2.0 %
	- Voltage surge peak over the following range: 0.5 kV to 4 kV	3.0 %
- 10/700 µs voltage surge generator	Calibration for the following parameters in accordance with IEC 61000-4-5: 2005:	
	- Front time at 10 µs	5.0 %
	- Time to half-value at 700 µs	5.0 %
	- Voltage surge peak over the following range: 0.5 kV to 7.4 kV	2.0 %
	Calibration for the following parameters in accordance with IEC 61000-4-5: 2014:	
	- Front time at 10 µs	5.0 %
	- Duration at 700 µs	2.0 %
	- Voltage surge peak over the following range: 0.5 kV to 4 kV	3.0 %

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Electrical measurements and magnetism		
- RF measurements		
- 8/20 μ s current surge generator	Calibration for the following parameters in accordance with IEC 61000-4-5: 2005:	
	- Front time at 8 μ s	5.0 %
	- Time to half-value at 20 μ s	5.0 %
	- Current surge peak over the following range: 0.25 kA to 3.7 kA	2.8 %
	Calibration for the following parameters in accordance with IEC 61000-4-5: 2014:	
	- Front time at 8 μ s	5.0 %
	- Duration at 20 μ s	5.0 %
	- Current surge peak over the following range: 0.25 kA to 2.0 kA	2.8 %
- 5/320 μ s current surge generator	Calibration for the following parameters in accordance with IEC 61000-4-5: 2005:	
	- Front time at 5 μ s	5.0 %
	- Time to half-value at 320 μ s	5.0 %
	- Current surge peak over the following range: 12.5 A to 185 A	2.8 %
	Calibration for the following parameters in accordance with IEC 61000-4-5: 2014:	
	- Front time at 5 μ s	5.0 %
	- Duration at 20 μ s	5.0 %
	- Current surge peak over the following range: 12.5 A to 100 A	2.8 %

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<p>Electrical measurements and magnetism</p> <p>- RF measurements</p> <p>- 50 Ω/50 μH + 5 Ω V- network type artificial mains network (AMN) / line impedance stabilisation network (LISN)</p>	<p>Calibration for the following parameters in accordance with CISPR 16-1-2: 2003 + A1: 2004 + A2: 2006: at the following frequencies or over the following frequency ranges:</p> <p>- Magnitude of impedance:</p> <p>9 kHz 0.3 MHz to 7 MHz 10 MHz to 20 MHz 30MHz</p> <p>- Phase of impedance:</p> <p>9 kHz 0.3 MHz to 3 MHz 4 MHz to 5 MHz 7 MHz 10 MHz 15 MHz 20 MHz 30 MHz</p> <p>- Voltage division factor (dB):</p> <p>9 kHz to 100 kHz Above 100 kHz to 300 kHz Above 0.3 MHz to 30 MHz</p> <p>- Isolation:</p> <p>9 kHz to 100 kHz Above 100 kHz to 300 kHz Above 0.3 MHz to 30 MHz</p>	<p>1.7 Ω 1.7 Ω 1.8 Ω 1.9 Ω</p> <p>0.05° 1.0° 1.1° 1.2° 1.5° 1.9° 2.5° 3.5°</p> <p>0.10 dB 0.40 dB 0.30 dB</p> <p>0.10 dB 0.60 dB 0.30 dB</p>

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<p>Electrical measurements and magnetism</p> <p>- RF measurements</p> <p>- 50 Ω/50 μH + 5 Ω V- network type artificial mains network (AMN) / artificial network (AN) / line impedance stabilisation network (LISN)</p>	<p>Calibration for the following parameters in accordance with CISPR 16-1-2: 2014 + A1: 2017: at the following frequencies or over the following frequency ranges:</p> <p>- Magnitude of impedance:</p> <p>9 kHz 0.3 MHz to 7 MHz 10 MHz to 20 MHz 30MHz</p> <p>- Phase of impedance:</p> <p>9 kHz 0.3 MHz to 3 MHz 4 MHz to 5 MHz 7 MHz 10 MHz 15 MHz 20 MHz 30 MHz</p> <p>- Voltage division factor (dB):</p> <p>9 kHz to 100 kHz Above 100 kHz to 300 kHz Above 0.3 MHz to 30 MHz</p> <p>- Isolation:</p> <p>9 kHz to 100 kHz Above 100 kHz to 300 kHz Above 0.3 MHz to 30 MHz</p>	<p>1.7 Ω 1.7 Ω 1.8 Ω 1.9 Ω</p> <p>0.05° 1.0° 1.1° 1.2° 1.5° 1.9° 2.5° 3.5°</p> <p>0.10 dB 0.40 dB 0.30 dB</p> <p>0.10 dB 0.60 dB 0.30 dB</p>

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<p>Electrical measurements and magnetism</p> <p>- RF measurements</p> <p>- Ultrasonic examination equipment</p>	<p>Calibration for the following parameters in accordance with BS EN ISO 22232-1: 2020:</p> <p>- Cl. 9.3 - Transmitter pulse parameters</p> <p>- Pulse voltage over the following range: 50 V to 450 V</p> <p>- Rise time over the following range: 2 ns to 50 ns</p> <p>- Duration over the following ranges: 4 ns to 50 ns Above 50 ns to 2 µs</p> <p>- Cl. 9.4 - Receiver</p> <p>- Frequency response</p> <p>- Centre frequency</p> <p>- 3 dB bandwidth</p> <p>- Noise level (Method B) over the following range: 10 nV/√Hz to 100 nV/√Hz</p> <p>- Gain linearity over the following range: 0 dB to 110 dB</p> <p>- Vertical display linearity</p>	<p>3 %</p> <p>3 %</p> <p>3 %</p> <p>1 %</p> <p>2 %</p> <p>3 %</p> <p>3 %</p> <p>0.3 dB</p> <p>1 %</p>

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Electrical measurements and magnetism - RF measurements - Electric field probe	<p>Calibration for the following parameter in accordance with in-house procedure TPR204 over the following ranges:</p> <p>Electric field strength 0.1 MHz to 80 MHz (1 to 35) V/m above 80 MHz to 90 MHz (1 to 35) V/m</p> <p>Calibration for the following parameter in accordance with in-house procedure TPR205 over the following ranges:</p> <p>Electric field strength 0.1 MHz (1 to 35) V/m above 0.1 MHz to 1 MHz (1 to 35) V/m above 1 MHz to 10 MHz (1 to 35) V/m above 10 MHz to 100 MHz (1 to 35) V/m above 100 MHz to 500 MHz (1 to 35) V/m above 500 MHz to 1 GHz (1 to 35) V/m above 1 GHz to 2 GHz (1 to 35) V/m above 2 GHz to 3 GHz (1 to 35) V/m above 3 GHz to 4 GHz (1 to 35) V/m above 4 GHz to 5 GHz (1 to 35) V/m above 5 GHz to 6 GHz (1 to 35) V/m</p>	<p>1.2 dB</p> <p>1.7 dB</p> <p>1.4 dB</p> <p>1.5 dB</p> <p>1.7 dB</p> <p>2.1 dB</p> <p>2.0 dB</p> <p>1.5 dB</p> <p>1.9 dB</p> <p>3.5 dB</p> <p>2.2 dB</p> <p>3.5 dB</p> <p>2.6 dB</p>

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<p>Electrical measurements and magnetism</p> <p>- RF measurements</p> <p>- Magnetic field probe</p>	<p>Calibration for the following parameter in accordance with in-house procedure TPR206 over the following range:</p> <p>Magnetic field strength 0.3 MHz to 30 MHz (0.01 to 0.1) A/m</p>	<p>1.3 dB</p>

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Electrical measurements and magnetism		
- Magnetism		
- Gaussmeter, Teslameter	Calibration for DC magnetic flux density and applied magnetic field strength in axial and transverse directions in accordance with in-house procedure TPD301 over the following ranges: 0.3 mT to 0.5 mT Above 0.5 mT to 50 mT Calibration for DC magnetic flux density and applied magnetic field strength in transverse direction in accordance with in-house procedure TPD302 over the following range: 50 mT to 1.5 T Calibration for DC magnetic flux density and applied magnetic field strength in axial direction in accordance with in-house procedure TPD303 over the following range: 50 mT to 1.0 T	2.0 % 1.0 % 0.1 % 0.1 %
- Reference magnet	Calibration for magnetic flux density in axial and transverse directions in accordance with in-house procedure TPD307 over the following ranges: 0.3 mT to 0.5 mT Above 0.5 mT to 50 mT Above 50 mT to 1.5 T	2.0 % 1.0 % 0.1 %

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Length and related quantities		
- Length		
- Stabilised laser of the <i>mise en pratique</i> (wavelength at 633 nm)	Calibration for optical frequency at 474 THz by using an acousto-optic modulator in accordance with in-house procedure TPM706	25 kHz
- Red He-Ne laser (wavelength at 633 nm)	Calibration for optical frequency at 474 THz in accordance with in-house procedure TPM702	2 MHz
- Comparator	Calibration for length in accordance: with in-house procedure TPM111 over the following range: 0.3 µm to 60 mm	0.13 µm

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Length and related quantities		
- Length		
- Gauge block	Calibration for length by comparison with a reference gauge block (grade 0, 1 or 2) in accordance with in-house procedure TPM101 over the following range: 0.5 mm to 100 mm	$Q[60 \text{ nm}, 1.3e-6l]$ where $Q[a, b] = [a^2 + b^2]^{1/2}$, l is the length
- Long gauge block and length bar	Calibration for length using comparator in accordance with in-house procedure TPM153 over the following range: Above 100 mm to 600 mm	$Q[400 \text{ nm}, 4e-6l]$ where $Q[a, b] = [a^2 + b^2]^{1/2}$, l is the length
- Long gauge block, step gauge, fixture, work piece and component	Calibration for length using coordinate measuring machine by non-substitution method in accordance with ISO 15530-3: 2011 over the following ranges: 20 mm to 100 mm Above 100 mm to 300 mm Above 300 mm to 420 mm	0.5 μm 0.9 μm 1.1 μm

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Length and related quantities - Length - Calliper checker	Calibration for distance between a measuring face and the datum face (bottom) in accordance with in-house procedure TPM172 over the following ranges: 10 mm to 300 mm Above 300 mm to 600 mm Calibration for distance between any measuring face and the datum face for internal measurement in accordance with in-house procedure TPM172 over the following ranges: 10 mm to 300 mm Above 300 mm to 600 mm	$Q[0.5 \mu\text{m}, 3.4\text{e-}6/l]$ $Q[1.2 \mu\text{m}, 3.1\text{e-}6/l]$ where $Q[a, b] = [a^2 + b^2]^{1/2}$, l is the distance between a measuring face and the datum face (bottom)
- Micrometer setting rod	Calibration for central length in accordance with in-house procedure TPM153 over the following ranges: 25 mm to 100 mm Above 100 mm to 500 mm	1.6 μm 3.4 μm $Q[260 \text{ nm}, 4\text{e-}6/l]$ $Q[400 \text{ nm}, 4\text{e-}6/l]$ where $Q[a, b] = [a^2 + b^2]^{1/2}$, l is the length

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Length and related quantities		
- Length		
- Length gauge (flat ended) and micrometer extension rod	Calibration for length in accordance with in-house procedure TPM153 over the following range: 1 mm to 1000 mm	$0.3 \mu\text{m} + 4\text{e-}6l$ where l is the length
- Length gauge (spherical ended)	Calibration for length in accordance with in-house procedure TPM153 over the following range: 1 mm to 600 mm	$0.3 \mu\text{m} + 4\text{e-}6l$ where l is the length
- Internal micrometer	Calibration for length in accordance with in-house procedure TPM114 over the following range: 5 mm to 1 m	$Q[2.4 \mu\text{m}, 9\text{e-}6l]$ where $Q[a, b] = [a^2 + b^2]^{1/2}$, l is the length
- Three-point micrometer	Calibration for diameter in accordance with in-house procedure TPE801 over the following range: 12 mm to 20 mm	$3.2 \mu\text{m}$

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Length and related quantities - Length - Coordinate measuring machine (CMM)	<p>Verification for the following parameter of CMM stylus contacting probing system in accordance with ISO 10360-5: 2010:</p> <ul style="list-style-type: none"> - single probe probing error - multiple probes probing error <p>Verification for the following parameters of CMM stylus contacting probing system in accordance with ISO 10360-5: 2020:</p> <ul style="list-style-type: none"> - single probe probing error - scanning mode size error - scanning mode form error <p>Verification for test length of CMM stylus contacting probing system in accordance with ISO 10360-2: 2009</p> <ul style="list-style-type: none"> - by comparison with a length artefact 1 mm to 1540 mm - by comparison with a laser interferometer 1 mm to 4000 mm <p>On-site calibration for travel distance in accordance with in-house procedure TPM133 over the following range:</p> <p>1 mm to 600 mm</p>	<p>0.03 µm</p> <p>0.04 µm</p> <p>0.03 µm</p> <p>0.8 µm</p> <p>1.6 µm</p> <p>Q[0.25 µm, 0.7e-6/l] where $Q[a, b] = [a^2 + b^2]^{1/2}$, l is the length</p> <p>Q[0.25 µm, 1.3e-6/l] where $Q[a, b] = [a^2 + b^2]^{1/2}$, l is the length</p> <p>0.3 µm + 4e-6/l where l is the travel distance</p>
- Coordinate table		

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Length and related quantities - Length - Measuring microscope and profile projector	On-site calibration for travel distance in accordance with in-house procedure TPM145 over the following range: 0.1 mm to 600 mm On-site calibration for magnification factor in accordance with in-house procedure TPM145 over the following range: 1 to 100	0.3 μm + 4e-6/ where l is the travel distance 0.07 % of magnification factor
- Gauge, jig, fixture, work piece and component (with dimensions of 1 mm x 1 mm x 1 mm to 250 mm x 250 mm x 200 mm)	Calibration for dimensions by optical method in accordance with in-house procedure TPM132 Calibration for dimensions by mechanical comparison or by direct measurement in accordance with in-house procedure TPM153	0.3 μm + 4e-6/ where l is the length 0.3 μm + 4e-6/ where l is the length

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Length and related quantities		
- Length		
- Plain plug gauge, cylindrical setting standard, gear measuring cylinder, pin gauge and roller	Calibration for diameter in accordance with in-house procedure TPM139 over the following range: 0.05 mm to 150 mm	$Q[0.4 \mu\text{m}, 9e-6d]$ where $Q[a, b] = [a^2 + b^2]^{1/2}$, d is the diameter
- Plain ring gauge	Calibration for diameter in accordance with in-house procedure TPM151 over the following range: 1 mm to 250 mm	$Q[0.5 \mu\text{m}, 10e-6d]$ where $Q[a, b] = [a^2 + b^2]^{1/2}$, d is the diameter
- Precision ball	Calibration for diameter in accordance with in-house procedure TPM159 over the following range: 1 mm to 25 mm	0.5 μm
- Radius gauge	Calibration for radius in accordance with in-house procedure TPE802 over the following range: 0.25 mm to 25 mm	7 μm
- Ring size measuring stick	Calibration for diameter in accordance with in-house procedure TPM188 over the following range: 10 mm to 25 mm	0.03 mm

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Length and related quantities		
- Length		
- Plastic film thickness gauge	Calibration for thickness in accordance with in-house procedure TPM152 over the following range: 0.01 mm to 0.05 mm	2 µm
- Ultrasonic thickness measuring system	Calibration for thickness in accordance with in-house procedure TPM170 over the following ranges: 0.3 mm to 25 mm Above 25 mm to 100 mm	0.03 mm 0.2 mm

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Length and related quantities - Length - Extensometer calibrator	Calibration for travel in accordance with standard method ISO 9513: 2012 over the following range: 0.01 mm to 0.333 mm Above 0.333 mm to 50 mm Calibration for travel in accordance with in-house procedure TPE103 over the following range: 0.01 mm to 0.333 mm Above 0.333 mm to 50 mm	0.23 μm + 0.5e-3l 0.49 μm + 4e-6l where l is the length 0.23 μm + 0.5e-3l 0.49 μm + 4e-6l where l is the length
- Laser distance meter (LDM/EDM)	Calibration for travel distance in accordance with in-house procedure TPE102 over the following range: 0.3 m to 20 m	1.0 mm
- Precision line scale	Calibration for interval length in accordance with in-house procedure TPE301 over the following range: 0.01 mm to 600 mm	Q[0.15 μm, 0.5e-6l] where Q[a, b] = [a² + b²]¹/², l is the length

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Length and related quantities - Length - Laser interferometry length measuring system - Universal length measuring system	Calibration for travel distance in accordance with in-house procedure TPE105 over the following range: 0.01 mm to 20 m On-site calibration for travel distance in accordance with in-house procedure TPE106 over the following range: 0.01 mm to 20 m	2.7 x 10 ⁻⁷ of result Q[0.41 μm, 3.3e-6/ <i>l</i>] where Q[a, b] = [a ² + b ²] ^{1/2} , <i>l</i> is the travel distance

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Length and related quantities		
- Angle		
- Precision index table	Calibration for angle in accordance with in-house procedure TPE502 over the following range: 0° to 360°	0.16 second of arc
- Rotary table	Calibration for angle in accordance with in-house procedure TPM126 over the following range: 0° to 360°	1 second of arc
- Rotary axis, spindle of machine table and head	On-site calibration for angle in accordance with in-house procedure TPE503 over the following range: 0° to 360°	1 second of arc

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Length and related quantities		
- Angle		
- Angle gauge	Calibration for angle in accordance with in-house procedure TPM134 over the following range: 0° to 90°	0.6 second of arc
- Bevel protractor	Calibration for angle in accordance with in-house procedure TPM121 over the following range: 5 minute of arc to 360°	2 minute of arc
- Protractor	Calibration for angle in accordance with in-house procedure TPM198 over the following range: 0° to 180°	0.1°
- Electronic level	Calibration for angle in accordance with in-house procedure TPM131 over the following range: 0 second of arc to 200 second of arc Above 200 second of arc to 1200 second of arc	0.3 second of arc 0.8 second of arc
- Laser level	Calibration for the following parameters in accordance with in-house procedure TPE501: - Horizontal line (0°) - Vertical line (90°)	41 second of arc 38 second of arc

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Length and related quantities		
- Angle		
- Polygons up to 36 sides	Calibration for angle in accordance with in-house procedure TPM128 by direct comparison with a precision index table over the following range: 0° to 360°	0.6 second of arc
	Calibration for angle in accordance with in-house procedure TPE504 by circle closure method over the following range: 0° to 360°	0.16 second of arc
- Sine bar	Calibration for distance between the roller axes in accordance with in-house procedure TPM183 over the following range: 10 mm to 254 mm	2.1 µm
- Square		
- cylindrical type square	Calibration for squareness in accordance with in-house procedure TPM157 over the following range: 5 mm to 300 mm	0.6 µm
- Squareness tester	Calibration for squareness for travel distance in accordance with in-house procedure TPM118 over the following range: 5 mm to 300 mm	1 µm + 8e-6/ where <i>l</i> is the travel distance

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Length and related quantities		
- Form		
- Optical flat and optical parallel (10 mm to 200 mm diameter)	Calibration for flatness in accordance with in-house procedure TPM186 over the following range of diameter: 10 mm to 150 mm Above 150 mm to 200 mm Calibration for parallelism in accordance with in-house procedure TPM113 over the following range of diameter: 10 mm to 200 mm Calibration for thickness in accordance with in-house procedure TPM186 over the following range of diameter: 10 mm to 200 mm	0.04 µm 0.11 µm 0.15 µm 0.25 µm
- Surface plate (made of granite and cast iron, with dimensions of 160 mm x 100 mm to 2500 mm x 1600 mm)	Calibration for the following parameters in accordance with in-house procedure TPM130: - Local flatness - Overall flatness On-site calibration for the following parameters in accordance with in-house procedure TPM130: - Local flatness - Overall flatness	0.6 µm 0.4 µm + 0.5e-6/ where l is the diagonal length 0.6 µm 0.4 µm + 0.5e-6/ where l is the diagonal length
- Toolmaker's flat (60 mm to 150 mm diameter)	Calibration for the following parameters in accordance with in-house procedure TPM112 - Flatness - Parallelism	0.04 µm 0.3 µm

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Length and related quantities		
- Form		
- Parallel (with dimensions of 5 mm x 10 mm x 100 mm to 50 mm x 100 mm x 400 mm)	Calibration for parallelism in accordance with in-house procedure TPM124	2 µm
- Roundness sample (with internal diameter from 3 mm to 200 mm and external diameter from 1 mm to 200 mm)	Calibration for roundness in accordance with in-house procedure TPM160 over the following range: 0 to 2000 µm	0.09 µm
- Hemisphere (with external diameter from 1 mm to 200 mm)	Calibration for roundness in accordance with in-house procedure TPM171 over the following range: 0 to 2000 µm	0.1 µm
- Sphere (with external diameter from 1 mm to 200 mm)	Calibration for roundness in accordance with in-house procedure TPM171 over the following range: 0 to 2000 µm	0.2 µm
	Calibration for diameter in accordance with in-house procedure TPM159 over the following range: 1 mm to 200 mm	0.5 µm

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Length and related quantities		
- Form		
- Straight edge made of cast iron, steel and granite (with length from 0.03 mm to 2 m)	Calibration for straightness in accordance with in-house procedure TPM117	$0.5 \mu\text{m} + 0.1e-6l$ where l is the length
- Toolmaker's straight edge (with length from 50 mm to 500 mm)	Calibration for straightness in accordance with in-house procedure TPM116	$0.4 \mu\text{m}$
- Surface texture sample	Calibration for the following parameters in accordance with in-house procedure TPE702:	
	- Depth, d from $0.26 \mu\text{m}$ to $12.00 \mu\text{m}$	$Q[0.026 \mu\text{m}, 0.01d]$
	- Roughness Pt from $0.26 \mu\text{m}$ to $12.00 \mu\text{m}$	$Q[0.026 \mu\text{m}, 0.01Pt]$
	- Roughness Ra from $0.10 \mu\text{m}$ to $6.30 \mu\text{m}$	$Q[0.011 \mu\text{m}, 0.03Ra]$
	- Roughness Rq from $0.10 \mu\text{m}$ to $6.30 \mu\text{m}$	$Q[0.011 \mu\text{m}, 0.03Rq]$
	- Roughness Rt from $1.10 \mu\text{m}$ to $23.00 \mu\text{m}$	$Q[0.03 \mu\text{m}, 0.27Rt]$
	- Roughness Rz from $0.40 \mu\text{m}$ to $20.10 \mu\text{m}$	$Q[0.03 \mu\text{m}, 0.27Rz]$
	- Roughness RSm from $80.0 \mu\text{m}$ to $140.0 \mu\text{m}$	$Q[0.036 \mu\text{m}, 0.12RSm]$ where $Q[a, b] = [a^2 + b^2]^{1/2}$,
- Ultrasonic calibration block No. 2	Calibration for the following parameters in accordance with standard method ISO7963: 2006	
	- Length	$0.95 \mu\text{m}$
	- Angle	0.0076°
	- Roughness	$Ra: 0.046 \mu\text{m}$

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Length and related quantities		
- Rotational speed		
- Rotational speed standard		
- Variable speed drive	Calibration for rotational speed in accordance with in-house procedure TPM805 over the following ranges: 2 r/min to 8000 r/min Above 8000 r/min to 40000 r/min	0.1 r/min 0.3 r/min to 0.4 r/min
- Rotational speed measuring device		
- Frequency meter	Calibration for rotational speed in accordance with in-house procedure TPM802 over the following range: 1 r/min to 120000 r/min	0.01 r/min to 0.4 r/min
- Stroboscope	Calibration for rotational speed in accordance with in-house procedure TPM804 over the following ranges: 40 r/min to 4000 r/min Above 4000 r/min to 35000 r/min	0.2 r/min 1 r/min

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Length and related quantities		
- Tachometer	Calibration for rotational speed by comparison with a standard rotational speed setup in accordance with in-house procedure TPM801 over the following ranges: 6 r/min to 18,000 r/min	1.0 r/min
	Calibration for rotational speed by using function generator and laser diode in accordance with in-house procedure TPM803 over the following ranges: 6 r/min to 100,000 r/min	1.0 r/min
- Rotational equipment	On-site calibration for rotational speed in accordance with in-house procedure TPM806 over the following ranges: - using frequency meter 1 r/min to 120000 r/min - using stroboscope 40 r/min to 4000 r/min Above 4000 r/min to 35000 r/min - using tachometer 6 r/min to 10000 r/min Above 10000 r/min to 100000 r/min	0.01 r/min to 0.4 r/min 0.2 r/min 1 r/min 1 r/min 4 r/min

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Mass and related quantities - Mass - Weight (standard value)	<p>Calibration for mass in accordance with in-house procedure TPM017 over the following ranges:</p> <p>1 mg to 5 mg 10 mg to 100 mg 0.2 g to 1 g 2 g to 10 g 20 g to 100 g 200 g to 500 g 1 kg</p> <p>Calibration for mass in accordance with in-house procedure TPM018 over the following ranges:</p> <p>2 kg to 10 kg</p> <p>Calibration for mass in accordance with in-house procedure TPM020 over the following ranges:</p> <p>20 kg to 50 kg</p>	<p>0.7 µg to 0.8 µg 0.7 µg to 0.8 µg 0.8 µg to 1.7 µg 2.2 µg to 8 µg 9 µg to 14 µg 17 µg to 32 µg 57 µg</p> <p>0.6 mg to 2.1 mg</p> <p>20 mg to 53 mg</p>

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Mass and related quantities - Mass - Weight (non-standard value)	Calibration for mass in accordance with in-house procedure TPM017 over the following ranges: 1 mg to 2 g Above 2 g to 20 g Above 20 g to 200 g Above 200 g to 1 kg Calibration for mass in accordance with in-house procedure TPM018 over the following range: Above 1 kg to 10 kg Calibration for mass in accordance with in-house procedure TPM020 over the following ranges: Above 10 kg to 20 kg Above 20 kg to 50 kg - Magnetic susceptibility of standard weight Calibration for magnetic susceptibility by using the BIPM-type susceptometer in accordance with in-house procedure TPM021 over the following range: 0 to 1	4 µg 10 µg 52 µg 1.5 mg 30 mg 30 mg 53 mg 12 %

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<p>Mass and related quantities</p> <p>- Mass</p> <p>- Electronic balance</p>	<p>Calibration for mass using OIML Class E2 weights from 1 mg to 50 kg in accordance with in-house procedure TPM007 over the following range:</p> <p>1 mg to 5 g Above 5 g up to 50 g Above 50 g up to 500 g Above 500 g up to 1.2 kg Above 1.2 kg up to 100 kg</p> <p>On-site calibration for mass using OIML Class E2 weights from 1 mg to 20 kg in accordance with in-house procedure TPM007 over the following range:</p> <p>1 mg to 5 g Above 5 g up to 50 g Above 50 g up to 500 g Above 500 g up to 1.2 kg Above 1.2 kg up to 20 kg</p>	<p>6 µg 6 µg to 50 µg 50 µg to 0.5 mg 0.5 mg to 1.2 mg 1.2 mg to 2 g</p> <p>6 µg 6 µg to 50 µg 50 µg to 0.5 mg 0.5 mg to 1.2 mg 1.2 mg to 0.4 g</p>

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<p>Mass and related quantities</p> <p>- Density</p> <p>- Density of solid (stainless steel)</p>	<p>Calibration for density in the range of 7700 kg/m³ to 8400 kg/m³ in accordance with in-house procedure TPM503 for the following ranges of mass:</p> <p>20 g Above 20 g up to 50 g Above 50 g up to 100 g Above 100 g up to 1000 g</p>	<p>5 kg/m³ 2 kg/m³ 1 kg/m³ 0.5 kg/m³</p>

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Mass and related quantities		
- Flow speed		
- Anemometer		
- All types	Calibration for air velocity by comparison with pitot tube in accordance with in-house procedure TPM412 over the following ranges:	
	0.2 m/s to 0.5 m/s	9 %
	Above 0.5 m/s to 35 m/s	3 %
- Thermal type	Calibration for air velocity by comparison with laser Doppler anemometer (LDA) in accordance with in-house procedure TPM407 over the following ranges:	
	0.2 m/s to 1 m/s	5 %
	Above 1 m/s to 35 m/s	2 %
- Vane type	Calibration for air velocity by comparison with laser Doppler anemometer (LDA) in accordance with in-house procedure TPM409 over the following ranges:	
	0.2 m/s to 1 m/s	5 %
	Above 1 m/s to 35 m/s	2 %
- Pitot-static type	Calibration for air velocity by comparison with laser Doppler anemometer (LDA) in accordance with in-house procedure TPM411 over the following ranges:	
	3 m/s to 35 m/s	2 %
- Fume hood	On-site calibration for air velocity using anemometers in accordance with in-house procedure TPM410 over the following ranges:	
	0.2 m/s to 1 m/s	6 %
	Above 1 m/s to 35 m/s	3 %

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Mass and related quantities		
- Volume gas flow rate		
- Gas flow meter	Calibration for volume flow rate using air as working medium in accordance with in-house procedure TPM414 over the following ranges: 0.1 L/min to 10 L/min Above 10 L/min to 30 L/min Calibration for volume flow rate using air as working medium in accordance with in-house procedure TPM415 over the following ranges: 30 L/min to 100 L/min	1 % 0.5 % 0.5 %

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<p>Mass and related quantities</p> <p>- Volume</p> <p>- Single channel piston-operated pipette</p>	<p>Calibration for the contained or delivered volume in accordance with standard method ISO 8655-6: 2002 over the following ranges:</p> <p>1 µL to 5 µL Above 5 µL to 10 µL Above 10 µL to 50 µL Above 50 µL to 100 µL Above 100 µL to 500 µL Above 500 µL to 1 mL Above 1 mL to 5 mL</p> <p>Calibration for the contained or delivered volume in accordance with in-house procedure TPM405 over the following ranges:</p> <p>1 µL to 5 µL Above 5 µL to 10 µL Above 10 µL to 50 µL Above 50 µL to 100 µL Above 100 µL to 500 µL Above 500 µL to 1 mL Above 1 mL to 5 mL</p>	<p>0.05 µL 0.1 µL 0.5 µL 1 µL 4 µL 6 µL 25 µL</p> <p>0.05 µL 0.1 µL 0.5 µL 1 µL 4 µL 6 µL 25 µL</p>

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Mass and related quantities - Volume - Multiple channel piston-operated pipette	<p>Calibration for the contained or delivered volume in accordance with standard method ISO 8655-6: 2002 over the following ranges:</p> <p>10 µL to 50 µL Above 50 µL to 100 µL Above 100 µL to 300 µL Above 300 µL to 500 µL Above 500 µL to 1000 µL</p> <p>Calibration for the contained or delivered volume in accordance with in-house procedure TPM405 over the following ranges:</p> <p>10 µL to 50 µL Above 50 µL to 100 µL Above 100 µL to 300 µL Above 300 µL to 500 µL Above 500 µL to 1000 µL</p>	<p>0.7 µL 2 µL 3 µL 5 µL 8 µL</p> <p>0.7 µL 2 µL 3 µL 5 µL 8 µL</p>

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Mass and related quantities		
- Volume		
- Volumetric glassware and containers	Calibration for volume in accordance with in-house procedure TPM401 over the following ranges: 0.1 mL to 5 mL Above 5 mL to 200 mL Above 200 mL to 1000 mL Above 1 L to 5 L Above 5 L to 20 L Above 20 L to 50 L	5 µL 5 µL 50 µL to 130 µL 0.13 mL to 0.5 mL 1.5 mL 5 mL
- Proving tank	Calibration for volume in accordance with in-house procedure TPM404 over the following ranges: 20 L to 50 L	5 mL
- Syringe	Calibration for volume in accordance with in-house procedure TPM413 over the following ranges: 1 µL to 10 µL Above 10 µL to 100 µL Above 100 µL to 1000 µL	0.05 µL 0.4 µL 4 µL

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Mass and related quantities		
- Pressure		
- Electronic barometer	Calibration for absolute pressure in accordance with in-house procedure TPM207 over the following range: 800 hPa to 1100 hPa	0.11 hPa
- Differential pressure meter, manometer and differential pressure gauge (gas medium)	Calibration for differential pressure in accordance with in-house procedure TPM214 over the following ranges: 4 Pa to 400 Pa Above 400 Pa to 6000 Pa On-site calibration for differential pressure in accordance with in-house procedure TPM215 over the following range: 5 Pa to 100 Pa	(0.2 + 2 x 10 ⁻⁴ P) Pa (0.3 + 5 x 10 ⁻⁴ P) Pa where P is the pressure in Pa 6 Pa

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Mass and related quantities		
- Pressure		
- Gas pressure balance, pressure gauge, transducer and transmitter	Calibration for the following parameters in accordance with in-house procedure TPM205: - Gauge pressure over the following range: 5 kPa to 7000 kPa - Absolute pressure over the following range: 5 kPa to 7000 kPa	0.0035 % 0.0035 %
	Calibration for effective area of piston-cylinder assembly in accordance with in-house procedure TPM208 over the following range: 3 mm ² to 3500 mm ²	0.0035 %
	Calibration for distortion coefficient in accordance with in-house procedure TPM208 over the following range: 0.5 x 10 ⁻⁹ /kPa to 1 x 10 ⁻⁷ /kPa	20 %

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Mass and related quantities		
- Pressure		
- Hydraulic pressure balance	Calibration for the following parameters in accordance with in-house procedure TPM201	
	- Hydraulic pressure over the following range: 2 MPa to 100 MPa	0.004 %
	- Area of piston-cylinder assembly over the following range: 3 mm ² to 3500 mm ²	0.004 %
	- Distortion coefficient over the following range: 0.5 x 10 ⁻⁹ /kPa to 1 x 10 ⁻⁷ /kPa	20 %
- Pressure gauge, transducer and transmitter	Calibration for hydraulic pressure in accordance with in-house procedure TPM202 over the following range: 2 MPa to 100 MPa	0.004 %
- Sphygmomanometer	Calibration for gauge pressure in accordance with in-house procedure TPM210 over the following range : 50 hPa to 400 hPa	0.5 hPa

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Mass and related quantities		
- Force		
- Push-pull type force gauge (spring tester)	Calibration for force by using deadweight in accordance with in-house procedure TPM605 over the following range: 0.5 N to 500 N	0.1 %
- Torque		
- Torque meter and transducer	Calibration for torque in accordance with in-house procedure TPM603 over the following range: 0.1 N·m to 1000 N·m	0.1 %
- Torque wrench and screwdriver	Calibration for torque in accordance with in-house procedure TPM601 over the following range: 0.1 N·m to 1000 N·m	1 %

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Mass and related quantities		
- Hardness		
- Hardness testing machine	Indirect calibration for Rockwell hardness HRB and HRC scales in accordance with in-house procedure TPM303 over the following ranges: 20 HRB to 100 HRB 20 HRC to 70 HRC Indirect calibration for Rockwell superficial hardness N and T scales in accordance with in-house procedure TPM304 over the following ranges: 42 HR30N to 86 HR30N 29 HR30T to 82 HR30T Indirect calibration for Vickers hardness scales in accordance with in-house procedure TPM306 over the following ranges: 20 HV 10 to 2000 HV 10 60 HV 30 to 2000 HV 30	1.0 HRB 0.5 HRC 0.5 HR30N 1.0 HR30T 2 % 2 %

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Mass and related quantities		
- Hardness		
- Hardness testing machine (cont'd)	<p>On-site indirect calibration for Rockwell hardness HRB and HRC scales in accordance with in-house procedure TPM303 over the following ranges:</p> <p>20 HRB to 100 HRB 20 HRC to 70 HRC</p> <p>On-site indirect calibration for Rockwell superficial hardness N and T scales in accordance with in-house procedure TPM304 over the following ranges:</p> <p>42 HR30N to 86 HR30N 29 HR30T to 82 HR30T</p> <p>On-site indirect calibration for Vickers hardness scales in accordance with in-house procedure TPM306 over the following ranges:</p> <p>20 HV 10 to 2000 HV 10 60 HV 30 to 2000 HV 30</p>	<p>1.0 HRB 0.5 HRC</p> <p>0.5 HR30N 1.0 HR30T</p> <p>2 % 2 %</p>

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Mass and related quantities		
- Hardness		
- Hardness block	Calibration for hardness in accordance with in-house procedure TPM301 over the following ranges:	
	- Rockwell B scale 20 HRB to 100 HRB	1.5 HRB
	- Rockwell C scale 20 HRC to 70 HRC	1.0 HRC
	Calibration for hardness in accordance with in-house procedure TPM302 over the following ranges:	
	- Rockwell superficial 42 HR30N to 86 HR30N 29 HR30T to 82 HR30T	1.0 HR30N 1.5 HR30T
	Calibration for hardness in accordance with in-house procedure TPM305 over the following ranges:	
	- Vickers scale 20 HV 10 to 2000 HV 10	2.5 %
	60 HV 30 to 2000 HV 30	2.5 %

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Mass and related quantities		
- Hardness		
- Metallic materials	Calibration for hardness in accordance with in-house procedure TPM301 over the following ranges:	
	- Rockwell B scale 20 HRB to 100 HRB	1.5 HRB
	- Rockwell C scale 20 HRC to 70 HRC	1.0 HRC
	Calibration for hardness in accordance with in-house procedure TPM302 over the following ranges:	
	- Rockwell superficial 42 HR30N to 86 HR30N	1.0 HR30N
	29 HR30T to 82 HR30T	1.5 HR30T
	Calibration for hardness in accordance with in-house procedure TPM305 over the following ranges:	
	- Vickers scale 20 HV 10 to 2000 HV 10	2.5 %
	60 HV 30 to 2000 HV 30	2.5 %

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Photometry and radiometry		
- Photometry		
- Tungsten standard lamp (AC, constant current)	Calibration for luminous flux in accordance with in-house procedure TPP601 over the following range: 20 lm to 10000 lm	2.6 %
- Tungsten standard lamp (DC, constant current)	Calibration for luminous flux in accordance with in-house procedure TPP601 over the following range: 20 lm to 10000 lm	1.0 %
- Tungsten standard lamp (DC, constant current)	Calibration for luminous intensity at colour temperature of 2856 K in accordance with in-house procedure TPP201 over the following range: 35 cd to 3500 cd	1.5 %
- White LED standard lamp (AC, constant voltage)	Calibration for luminous flux in accordance with in-house procedure TPP601 over the following range: 20 lm to 10000 lm	2.2 %

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Photometry and radiometry		
- Photometry		
- Illuminance meter / lux meter	Calibration for illuminance at colour temperature of 2856 K in accordance with standard method BS667:2005 Annex B Calibration B.2.2 over the following range: 1 lx to 3000 lx	1.5 %
- Luminance meter	Calibration for luminance at colour temperature of 2856 K in accordance with in-house procedure TPP401 over the following range: 10 cd/m ² to 4000 cd/m ² Calibration for luminance at colour temperature of 2856 K in accordance with in-house procedure TPP402 over the following range: 10 cd/m ² to 23000 cd/m ²	1.5 % 1.4 %

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Photometry and radiometry		
- Properties of detectors		
- Unfiltered broadband detector and photodetector	Calibration for spectral power responsivity in accordance with in-house procedure TPP501 at wavelength over the following ranges:	
	Power level below 20 µW:	
	200 nm to 204 nm	3.6 %
	Above 204 nm to 240 nm	2.6 %
	Above 240 nm to 380 nm	1.1 %
	Power level below 1 µW:	
	380 nm to 410 nm	0.70 %
	Above 410 nm to 920 nm	0.40 %
	Above 920 nm to 950 nm	0.70 %
	Above 950 nm to 1200 nm	1.5 %
	Above 1200 nm to 1800 nm	2.0 %
- Wavelength meter and spectrometer	Calibration for optical wavelength in accordance with in-house procedure TPP701 over the following range:	
	250 nm to 600 nm	1.5 nm

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Photometry and radiometry		
- Spectral emission properties of sources		
- Irradiance light source	Calibration for spectral irradiance below $250 \text{ mWm}^{-2}\text{nm}^{-1}$ in accordance with in-house procedure TPP505 at wavelength at the following value or over the following ranges:	
	300 nm	3.3 %
	310 nm to 330 nm	3.0 %
	340 nm to 430 nm	3.0 %
	440 nm to 690 nm	2.1 %
	700 nm to 850 nm	2.1 %
- Tungsten standard lamp	Calibration for spectral irradiance below $300 \text{ mWm}^{-2}\text{nm}^{-1}$ in accordance with in-house procedure TPP502 at wavelength over the following ranges:	
	250 nm to 290 nm	3.0 %
	Above 290 nm to 410 nm	2.5 %
	Above 410 nm to 950 nm	1.5 %
	Above 950 nm to 1800 nm	2.0 %
- Tungsten standard lamp	Calibration for spectral radiance below $150 \text{ mWm}^{-2} \text{sr}^{-1}\text{nm}^{-1}$ in accordance with in-house procedure TPP503 at wavelength over the following ranges:	
	300 nm to 400 nm	3.4 %
	Above 400 nm to 999 nm	2.4 %
	Above 999 nm to 1800 nm	2.8 %

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Photometry and radiometry - Spectral emission properties of sources - Tungsten standard lamp (DC, constant current)	Calibration for spectral radiant flux in the range of 10 μ W/nm to 200 mW/nm using spectrometer with measurement bandwidth from 2 nm to 5 nm in accordance with in-house procedure TPP602 at wavelength at the following value or over the following ranges: 365 nm 370 nm to 380 nm 385 nm to 390 nm 395 nm to 405 nm 410 nm to 450 nm 455 nm to 730 nm 735 nm to 790 nm 795 nm to 835 nm 840 nm to 850 nm	3.7 % 3.6 % 3.1 % 3.0 % 2.6 % 2.2 % 2.5 % 3.0 % 3.3 %
- Tungsten standard lamp (AC, constant current)	Calibration for spectral radiant flux in the range of 10 μ W/nm to 200 mW/nm using spectrometer with measurement bandwidth from 2 nm to 5 nm in accordance with in-house procedure TPP602 at wavelength at the following value or over the following ranges: 365 nm 370 nm to 380 nm 385 nm to 405 nm 410 nm to 450 nm 455 nm to 730 nm 735 nm to 790 nm 795 nm to 835 nm 840 nm to 850 nm	5.1 % 5.0 % 4.6 % 4.3 % 4.1 % 3.1 % 3.5 % 3.7 %

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Photometry and radiometry - Spectral emission properties of sources - White LED standard lamp (AC, constant voltage)	Calibration for spectral radiant flux in the range of 10 μ W/nm to 200 mW/nm using spectrometer with measurement bandwidth from 2 nm to 5 nm in accordance with in-house procedure TPP602 at wavelength at the following value or over the following ranges: 365 nm 370 nm to 380 nm 385 nm to 405 nm 410 nm to 440 nm 445 nm to 460 nm 465 nm to 730 nm 735 nm to 790 nm 795 nm to 835 nm 840 nm to 850 nm	3.9 % 3.8 % 3.3 % 2.7 % 3.4 % 2.3 % 2.6 % 3.5 % 3.7 %
- Wavelength source	Calibration for optical wavelength in accordance with in-house procedure TPP701 over the following range: 250 nm to 600 nm	1.5 nm

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Photometry and radiometry - Spectrally-integrated measurements for sources and detectors - Colorimeter for tungsten light source	Calibration for correlated colour temperature in accordance with in-house procedure TPP301 over the following ranges: 2750 K to 2856 K Above 2856 K to 3200 K	20 K 21 K
- Tungsten standard lamp	Calibration for correlated colour temperature in accordance with in-house procedure TPP603 over the following ranges: 2700 K to 2856 K Above 2856 K to 3100 K	26 K 30 K

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Photometry and radiometry - Spectral properties of materials - Optical filter and spectrally neutral material	Calibration for regular spectral transmittance in accordance with in-house procedure TPP504 at wavelength of 400 nm to 1000 nm over the following ranges: 1.00 to 0.10 below 0.10 to 0.05 below 0.05 to 0.01	0.50 % 0.55 % 1.8 %
- Spectrally-selective transmitting material	Calibration for wavelength in accordance with in-house procedure TPP506 over the following ranges: 260 nm to 536 nm above 536 nm to 650 nm	0.15 nm 0.20 nm

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Photometry and radiometry		
- Fibre optics		
- Optical time domain reflectometers (OTDRs) for single mode fibre <45 km)	<p>Calibration for the following parameters in accordance with standard method IEC 61746-1: 2009:</p> <p>Source with wavelength 1310 nm</p> <ul style="list-style-type: none"> - distance scale deviation - zero location offset - location deviation - loss deviation - loss scale deviation - reflectance deviation at the following values: <ul style="list-style-type: none"> -10 dB -30 dB -50 dB <p>Source with wavelength 1550 nm</p> <ul style="list-style-type: none"> - distance scale deviation - zero location offset - location deviation - loss deviation - loss scale deviation - reflectance deviation at the following values: <ul style="list-style-type: none"> -10 dB -30 dB -50 dB 	<ul style="list-style-type: none"> 0.050 m/km 1.3 m 1.8 m 0.060 dB 0.090 dB/dB 1.7 dB 1.7 dB 1.7 dB 0.050 m/km 1.3 m 2.0 m 0.040 dB 0.060 dB/dB 1.7 dB 1.7 dB 1.7 dB

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Photometry and radiometry		
- Fibre optics		
- Optical time domain reflectometers (OTDRs) for single mode fibre <45 km)	Calibration for the following parameters in accordance with standard method BS EN 61746-1: 2011:	
	Source with wavelength 1310 nm	
	- distance scale deviation	0.050 m/km
	- zero location offset	1.3 m
	- location deviation	1.8 m
	- loss deviation	0.060 dB
	- loss scale deviation	0.090 dB/dB
	- reflectance deviation at the following values:	
	-10 dB	1.7 dB
	-30 dB	1.7 dB
	-50 dB	1.7 dB
	Source with wavelength 1550 nm	
	- distance scale deviation	0.050 m/km
	- zero location offset	1.3 m
	- location deviation	2.0 m
	- loss deviation	0.040 dB
	- loss scale deviation	0.060 dB/dB
	- reflectance deviation at the following values:	
	-10 dB	1.7 dB
	-30 dB	1.7 dB
	-50 dB	1.7 dB

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Photometry and radiometry		
- Fibre optics		
- Optical fibre power meter	Calibration for the following parameters in accordance with standard method IEC 61315: 2005:	
	Source with wavelength 1310 nm	
	- calibration factor at 1 mW	0.90 %
	- linearity at attenuation over the following range: -50 dBm to below -45 dBm	0.90 %
	- linearity at attenuation over the following range: -45 dBm to 0 dBm	0.70 %
	Source with wavelength 1550 nm	
	- calibration factor at 1 mW	0.90 %
	- linearity at attenuation over the following range: -50 dBm to below -45 dBm	0.90 %
	- linearity at attenuation over the following range: -45 dBm to 0 dBm	0.70 %
- Optical fibre laser source	Calibration for power output stability at 1 mW in accordance with standard method ISO 11554 at the following wavelengths:	
	1310 nm	0.011 dB
	1550 nm	0.015 dB
	Calibration for the following parameters in accordance with in-house procedure TPR101	
	Source with wavelength 1310 nm	
	- wavelength accuracy	2.0 pm
	- absolute power output level	10 %
	Source with wavelength 1550 nm	
	- wavelength accuracy	3.0 pm
	- absolute power output level	10 %

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Photometry and radiometry		
- Fibre optics		
- Optical fibre attenuator	<p>Calibration for the following parameters in accordance with in-house procedure TPR102:</p> <p>Source with wavelength 1310 nm</p> <ul style="list-style-type: none"> - absolute attenuation over the following range: 0 dB to 25 dB - step attenuation over the following ranges: 0 dB to 10 dB Above 10 dB to 25 dB <p>Source with wavelength 1550 nm</p> <ul style="list-style-type: none"> - absolute attenuation over the following range: 0 dB to 25 dB - step attenuation over the following ranges: 0 dB to 10 dB Above 10 dB to 25 dB 	<p>7.1 %</p> <p>0.24 %</p> <p>1.0 %</p> <p>7.1 %</p> <p>0.24 %</p> <p>1.0 %</p>
- Optical fibre wavelength meter	<p>Calibration for wavelength accuracy in accordance with in-house procedure TPR103 at the following wavelengths:</p> <p>1310 nm</p> <p>1550 nm</p>	<p>1.0 pm</p> <p>1.2 pm</p>

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Temperature and humidity measurements - Temperature measurements - Items used for defining ITS-90 - Primary fixed-point cell	Calibration for temperature in accordance with in-house procedure TPT014 at the following values: Triple-point of argon (-189.3442 °C) Triple-point of mercury (-38.8344 °C) Triple-point of water (0.01 °C) Melting-point of gallium (29.7646 °C) Freezing-point of indium (156.5985 °C) Freezing-point of tin (231.928 °C) Freezing-point of zinc (419.527 °C) Freezing-point of aluminium (660.323 °C) Freezing-point of silver (961.78 °C)	0.3 mK 0.6 mK 0.2 mK 0.5 mK 2.0 mK 2.0 mK 2.0 mK 6.0 mK 10 mK
- Complete apparatus realising fixed point	Calibration for temperature in accordance with in-house procedure TPT014 at the following values: Triple-point of argon with bath (-189.3442 °C) Triple-point of mercury with bath (-38.8344 °C) Triple-point of water with bath (0.01 °C) Melting-point of gallium with furnace (29.7646 °C) Freezing-point of indium with furnace (156.5985 °C) Freezing-point of tin with furnace (231.928 °C) Freezing-point of zinc with furnace (419.527 °C) Freezing-point of aluminium with furnace (660.323 °C) Freezing-point of silver with furnace (961.78 °C)	0.3 mK 0.6 mK 0.2 mK 0.5 mK 2.0 mK 2.0 mK 2.0 mK 6.0 mK 10 mK

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Temperature and humidity measurements - Temperature measurements - Items used for defining ITS-90 - Standard platinum resistance thermometer (SPRT)	Calibration for temperature in accordance with in-house procedure TPT040 at the following values: Triple-point of argon: (-189.3442 °C) Triple-point of mercury: (-38.8344 °C) Triple-point of water: (0.01 °C) Melting-point of gallium: (29.7646 °C) Freezing-point of indium: (156.5985 °C) Freezing-point of tin: (231.928 °C) Freezing-point of zinc: (419.527 °C) Freezing-point of aluminium: (660.323 °C) Freezing-point of silver: (961.78 °C)	0.3 mK 0.6 mK 0.2 mK 0.5 mK 2.0 mK 2.0 mK 2.0 mK 6.0 mK 10 mK
- Platinum resistance thermometer	Calibration for temperature in accordance with in-house procedure TPT002 over the following ranges: -80 °C to 230 °C 230 °C to 550 °C	6 mK 10 mK

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Temperature and humidity measurements - Temperature measurements - Items used for defining ITS-90 - Liquid in glass thermometer	Calibration for temperature in accordance with in-house procedure TPT009 at the following point or over the following ranges: -80 °C to below -50 °C -50 °C to -30 °C Above -30 °C to below 0 °C Ice-point (0 °C) Above 0 °C to 100 °C Above 100 °C to 250 °C Above 250 °C to 300 °C Above 300 °C to 450 °C Above 450 °C to 550 °C	500 mK 200 mK 30 mK 7.0 mK 20 mK 30 mK 50 mK 200 mK 300 mK
- Thermistor	Calibration for temperature in accordance with in-house procedure TPT037 over the following range: -50 °C to 90 °C	6 mK

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Temperature and humidity measurements - Temperature measurements - Items used for disseminating ITS-90 - Thermocouple	<p>Calibration for temperature in accordance with in-house procedure TPT008 over the following ranges:</p> <p>-80 °C to -30 °C Above -30 °C to 550 °C</p> <p>Calibration for temperature in accordance with in-house procedure TPT012 over the following ranges:</p> <p>500 °C to 1100 °C Above 1100 °C to 1200 °C</p> <p>Calibration for temperature in accordance with in-house procedure TPT017 over the following range:</p> <p>550 °C to 950 °C</p>	<p>0.25 K 0.15 K</p> <p>1.0 K 2.0 K</p> <p>0.30 K</p>

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Temperature and humidity measurements		
- Temperature measurements		
- Radiation thermometry		
- Radiation thermometer / infrared thermometer (working wavelength from 8 μm to 13 μm)	Calibration for radiance temperature in accordance with in-house procedure TPT025 over the following range: -40 °C to 0 °C	0.45 K
	Calibration for radiance temperature in accordance with in-house procedure TPT022 over the following range: 0 °C to 50 °C	(0.33 + 0.003t) K where t is measured radiance temperature in °C
	Calibration for radiance temperature in accordance with in-house procedure TPT020 over the following range: 50 °C to 200 °C	(0.33 + 0.003t) K where t is measured radiance temperature in °C
	Calibration for radiance temperature in accordance with in-house procedure TPT023 over the following range: 200 °C to 1000 °C	(1.5 + 0.002t) K where t is measured radiance temperature in °C
- Black body radiation source (working wavelength from 8 μm to 13 μm)	Calibration for radiance temperature in accordance with in-house procedure TPT024 over the following ranges: -40 °C to 0 °C Above 0 °C to 200 °C	(0.28 + 0.003 t) K (0.31 + 0.0025t) K where t is measured radiance temperature in °C

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Temperature and humidity measurements		
- Temperature measurements		
- Radiation thermometry		
- Infrared ear thermometer	Calibration for temperature by using a black body radiator which is designed to EN 12470-5 in accordance with in-house procedure TPT018 over the following range: 34 °C to 43 °C	0.2 K
- Infrared ear thermometer calibrator	Calibration for temperature in accordance with in-house procedure TPT019 over the following range: 34 °C to 43 °C	0.15 K

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Temperature and humidity measurements - Temperature measurements - Digital thermometer or temperature indicator	Calibration for temperature in accordance with in-house procedure TPT028 at the following value: -196 °C Calibration for temperature in accordance with in-house procedure TPT010 over the following ranges: -80 °C to 230 °C Above 230 °C to 550 °C Calibration for temperature in accordance with in-house procedure TPT013 over the following ranges: 500 °C to 1100 °C Calibration for temperature in accordance with in-house procedure TPT021 over the following range: 500 °C to 1200 °C	20 mK 6.0 mK 10 mK 1.0 K 2.0 K

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Temperature and humidity measurements		
- Temperature measurements		
- Digital thermometer or temperature Indicator	<p>Calibration for temperature in accordance with in-house procedure TPT030 over the following range:</p> <p>-30 °C to 75 °C</p>	0.10 K
	<p>On-site calibration for temperature in accordance with in-house procedure TPT030 over the following range:</p> <p>-30 °C to 75 °C</p>	0.10 K
	<p>Calibration for temperature in accordance with in-house procedure TPT027 over the following range:</p> <p>50 °C to 650 °C</p>	0.45 K
	<p>On-site calibration for temperature in accordance with in-house procedure TPT027 over the following range:</p> <p>50 °C to 650 °C</p>	0.45 K
- Thermometer with analogue display	<p>Calibration for temperature in accordance with in-house procedure TPT010 over the following ranges:</p> <p>-80 °C to 230 °C Above 230 °C to 550 °C</p>	<p>0.5 K 1 K</p>

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Temperature and humidity measurements - Temperature measurements - Thermocouple simulator	Calibration for temperature by converting measured thermal EMF to equivalent temperature in accordance with in-house procedure TPT029	0.15 K
- Resistance Temperature Detector (RTD) simulator	Calibration for temperature by converting measured resistance to equivalent temperature in accordance with in-house procedure TPT034	0.10 K

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Temperature and humidity measurements - Temperature measurements - Constant temperature bath	<p>Calibration for the following parameters in accordance with in-house procedure TPT038:</p> <ul style="list-style-type: none"> - Temperature stability over the following temperature ranges: -80 °C to -25 °C Above -25 °C to 25 °C Above 25 °C to 70 °C Above 70 °C to 230 °C - Temperature gradient over the following temperature ranges: -80 °C to -25 °C Above -25 °C to 25 °C Above 25 °C to 70 °C Above 70 °C to 230 °C <p>On-site calibration for the following parameters in accordance with in-house procedure TPT038:</p> <ul style="list-style-type: none"> - Temperature stability over the following temperature ranges: -80 °C to -25 °C Above -25 °C to 25 °C Above 25 °C to 70 °C Above 70 °C to 230 °C - Temperature gradient over the following temperature ranges: -80 °C to -25 °C Above -25 °C to 25 °C Above 25 °C to 70 °C Above 70 °C to 230 °C 	<div>1.2 mK</div> <div>1.2 mK</div> <div>1.5 mK</div> <div>2.5 mK</div> <div>2.5 mK</div> <div>1 mK</div> <div>2 mK</div> <div>2 mK</div> <div>1.2 mK</div> <div>1.2 mK</div> <div>1.5 mK</div> <div>2.5 mK</div> <div>2.5 mK</div> <div>1 mK</div> <div>2 mK</div> <div>2 mK</div>

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Temperature and humidity measurements		
- Temperature measurements		
- Temperature chamber of volume not greater than 2000 litre	On-site calibration for the following parameters in accordance with IEC 60068-3-5: 2018	
	- Temperature fluctuation over the following temperature range: -80 °C to 250 °C	0.01 K
	- Temperature gradient over the following temperature range: -80 °C to 250 °C	0.08 K
	- Temperature variation in space over the following temperature range: -80 °C to 250 °C	0.08 K
	- Temperature rate of change over the following temperature range: -80 °C to 250 °C	0.01 K/min
	- Achieved temperature over the following range: -80 °C to 250 °C	0.06 K
	On-site calibration for overall mean temperature in accordance with in-house procedure TPT039 over the following ranges:	
	-80 °C to below -40 °C	0.50 K
	-40 °C to 5 °C	0.40 K
	Above 5°C to 40 °C	0.10 K
	Above 40 °C to 70 °C	0.15 K
	Above 70 °C to 180 °C	0.60 K
	Above 180 °C to 250 °C	0.90 K

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Calibration Services 校正服務		
ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
Temperature and humidity measurements		
- Temperature measurements		
- Temperature chamber of volume not greater than 2000 litre	Calibration for the following parameters in accordance with IEC 60068-3-5: 2018	
	- Temperature fluctuation over the following temperature range: -80 °C to 250 °C	0.01 K
	- Temperature gradient over the following temperature range: -80 °C to 250 °C	0.08 K
	- Temperature variation in space over the following temperature range: -80 °C to 250 °C	0.08 K
	- Temperature rate of change over the following temperature range: -80 °C to 250 °C	0.01 K/min
	- Achieved temperature over the following range: -80 °C to 250 °C	0.06 K
	Calibration for overall mean temperature in accordance with in-house procedure TPT039 over the following ranges:	
	-80 °C to below -40 °C	0.50 K
	-40 °C to 5 °C	0.40 K
	Above 5°C to 40 °C	0.10 K
	Above 40 °C to 70 °C	0.15 K
	Above 70 °C to 180 °C	0.60 K
	Above 180 °C to 250 °C	0.90 K

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Temperature and humidity measurements - Temperature measurements - Psychrometer, relative humidity sensor and other relative humidity measurement instrument (excluding thermohygrograph) - Thermohygrograph / Temperature and humidity chart recorder	Calibration for air temperature in accordance with in-house procedure TPH102 over the following ranges: for relative humidity from 8 %rh to 95 %rh 5 °C to 40 °C Above 40 °C to 70 °C Calibration for air temperature in accordance with in-house procedure TPH103 over the following ranges: for relative humidity from 8 %rh to 95 %rh 5 °C to 40 °C Above 40 °C to 70 °C	(0.068 + 0.0008 x (t-5)) °C (0.096 + 0.002 x (t-40)) °C where t is measured air temperature in °C (0.068 + 0.0008 x (t-5)) °C (0.096 + 0.002 x (t-40)) °C where t is measured air temperature in °C

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Temperature and humidity measurements - Humidity measurements - Dew-point generator	Calibration for dew-point temperature in accordance with in-house procedure TPH101 over the following ranges: -60 °C to below -40 °C -40 °C to below 30 °C 30 °C to 65 °C	0.20 °C 0.15 °C 0.13 °C
- Dew point hygrometer	Calibration for dew-point temperature in accordance with in-house procedure TPH101 over the following ranges: -60 °C to below -40 °C -40 °C to below 30 °C 30 °C to 65 °C	0.20 °C 0.15 °C 0.13 °C
- Relative humidity generator, chamber and calibrator	On-site calibration for relative humidity in accordance with in-house procedure TPH104 over the following range: for air temperature from 5 °C to 85 °C 5 %rh to 95 %rh Calibration for relative humidity in accordance with in-house procedure TPH104 over the following range: for air temperature from 5 °C to 85 °C 5 %rh to 95 %rh	(0.18 + 0.0075 x H) %rh where H is the relative humidity test point (0.18 + 0.0075 x H) %rh where H is the relative humidity test point

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Temperature and humidity measurements - Humidity measurements - Psychrometer, relative humidity sensor and other relative humidity measurement instrument (excluding thermohygrograph)	Calibration for relative humidity in accordance with in-house procedure TPH102 over the following ranges: for air temperature from 5 °C to 40 °C 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 80 %rh Above 80 %rh to 95 %rh for air temperature from above 40 °C to 70 °C 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 80 %rh Above 80 %rh to 95 %rh	0.50 %rh 0.60 %rh 0.70 %rh 1.1 %rh 1.3 %rh 0.50 %rh 0.90 %rh 1.3 %rh 1.8 %rh 1.8 %rh
- Thermohygrograph / Temperature and humidity chart recorder	Calibration for relative humidity in accordance with in-house procedure TPH103 over the following ranges: for air temperature from 5 °C to 40 °C 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 80 %rh Above 80 %rh to 95 %rh for air temperature from above 40 °C to 70 °C 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 80 %rh Above 80 %rh to 95 %rh	0.50 %rh 0.60 %rh 0.70 %rh 1.1 %rh 1.3 %rh 0.50 %rh 0.90 %rh 1.3 %rh 1.8 %rh 1.8 %rh

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Temperature and humidity measurements - Humidity measurements - Relative humidity chamber	On-site calibration for the following parameters in accordance with in-house procedure TPH105 - Humidity gradient over the following ranges: for air temperature from 5 °C to 40 °C: 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 80 %rh Above 80 %rh to 95 %rh for air temperature from above 40 °C to 70 °C: 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 95 %rh - Humidity variation in space over the following ranges: for air temperature from 5 °C to 40 °C: 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 80 %rh Above 80 %rh to 95 %rh for air temperature from above 40 °C to 70 °C: 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 95 %rh	0.80 %rh 0.90 %rh 1.0 %rh 1.6 %rh 1.9 %rh 0.80 %rh 1.3 %rh 1.9 %rh 2.6 %rh 0.80 %rh 0.90 %rh 1.0 %rh 1.6 %rh 1.9 %rh 0.80 %rh 1.3 %rh 1.9 %rh 2.6 %rh

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Temperature and humidity measurements - Humidity measurements - Relative humidity chamber	<p>Calibration for the following parameters in accordance with in-house procedure TPH105</p> <p>- Mean humidity (excluding humidity fluctuation and gradient) over the following ranges:</p> <p>for air temperature from 5 °C to 40 °C: 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 80 %rh Above 80 %rh to 95 %rh</p> <p>for air temperature from above 40 °C to 70 °C: 8 %rh to 20 %rh Above 20 %rh to 40 %rh Above 40 %rh to 60 %rh Above 60 %rh to 95 %rh</p> <p>- Humidity fluctuation over the following ranges:</p> <p>for air temperature from 5 °C to 40 °C: 8 %rh to 95 %rh</p> <p>for air temperature from above 40 °C to 70 °C: 8 %rh to 95 %rh</p>	<p>0.60 %rh 0.70 %rh 0.80 %rh 1.2 %rh 1.4 %rh</p> <p>0.60 %rh 1.0 %rh 1.4 %rh 1.9 %rh</p> <p>0.30 %rh 0.30 %rh</p>

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Temperature and humidity measurements		
- Humidity measurements		
- Relative humidity chamber	<p>Calibration for the following parameters in accordance with in-house procedure TPH105</p> <p>- Humidity gradient over the following ranges:</p> <p style="margin-left: 40px;">for air temperature from 5 °C to 40 °C:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">8 %rh to 20 %rh</div> <div>0.80 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 20 %rh to 40 %rh</div> <div>0.90 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 40 %rh to 60 %rh</div> <div>1.0 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 60 %rh to 80 %rh</div> <div>1.6 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 80 %rh to 95 %rh</div> <div>1.9 %rh</div> </div> <p style="margin-left: 40px;">for air temperature from above 40 °C to 70 °C:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">8 %rh to 20 %rh</div> <div>0.80 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 20 %rh to 40 %rh</div> <div>1.3 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 40 %rh to 60 %rh</div> <div>1.9 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 60 %rh to 95 %rh</div> <div>2.6 %rh</div> </div> <p>- Humidity variation in space over the following ranges:</p> <p style="margin-left: 40px;">for air temperature from 5 °C to 40 °C:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">8 %rh to 20 %rh</div> <div>0.80 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 20 %rh to 40 %rh</div> <div>0.90 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 40 %rh to 60 %rh</div> <div>1.0 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 60 %rh to 80 %rh</div> <div>1.6 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 80 %rh to 95 %rh</div> <div>1.9 %rh</div> </div> <p style="margin-left: 40px;">for air temperature from above 40 °C to 70 °C:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">8 %rh to 20 %rh</div> <div>0.80 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 20 %rh to 40 %rh</div> <div>1.3 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 40 %rh to 60 %rh</div> <div>1.9 %rh</div> </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;">Above 60 %rh to 95 %rh</div> <div>2.6 %rh</div> </div>	

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Scope of Accreditation
Registration No. HOKLAS 051
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Temperature and humidity measurements - Humidity measurements - Relative humidity generator, chamber and calibrator	On-site calibration for the following parameter in accordance with in-house procedure TPH107 over the following ranges: for air temperature from 5 °C to 85 °C and relative humidity from 5 %rh to 95 %rh - Overall Mean Relative Humidity Calibration for the following parameter in accordance with in-house procedure TPH107 over the following ranges: for air temperature from 5 °C to 85 °C and relative humidity from 5 %rh to 95 %rh - Overall Mean Relative Humidity	(0.18 + 0.0075 x H) %rh where H is the relative humidity test point (0.18 + 0.0075 x H) %rh where H is the relative humidity test point

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Calibration Services		
Acoustic Measurements		
- Sound calibrator	Calibration for the following parameters: - Sound pressure level over the following range: 94 dB and 114 dB - Frequency at the following value 1000 Hz - Total distortion and noise over the following range: 0 to 3.0 %	PTA001: PT Plan for sound calibrator
- Sound level meter	Calibration for relative frequency weighting C normalised to the response at 1 kHz over the following range: 125 Hz, 1 kHz, 4kHz and 8 kHz -3.0 dB to 0 dB	PTA002: PT Plan for sound level meter
- Audiometer	Calibration for the following parameters: - Sound pressure level over the following range: 125 Hz to 8 kHz 77 dB to 115 dB - Force level over the following range: 250 Hz to 8 kHz 71 dB to 107 dB (re 1µN) - Attenuator steps at the following value: 5 dB	PTA003: PT Plan for audiometer

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<p>Calibration Services</p> <p>Electricity</p> <p>- Digital multimeter</p>	<p>Calibration for the following parameters:</p> <p>- DC voltage over the following range: 0.1 mV to 1000V</p> <p>- DC current over the following range: 10 μA to 100 A</p> <p>- DC resistance over the following range: 1 mΩ to 1 GΩ</p> <p>- AC voltage over the following range: 40 Hz to 10 kHz 10 mV to 1000 V 10 kHz to 100 kHz 10 mV to 300 V 100 kHz to 500 kHz 0.2 V to 3 V</p> <p>- AC current over the following range: 40 Hz to 10 kHz 100 μA to 1 A 45 Hz to 65 Hz 1 A to 200 A</p>	<p>PTL001: PT plan for digital multimeter</p>

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Calibration Services		
Electricity		
- Multifunction calibrator	Calibration for the following parameters: - DC voltage over the following range: 0.1 mV to 1000V - DC current over the following range: 10 μ A to 100 A - DC resistance over the following range: 1 m Ω to 1 G Ω - AC voltage over the following range: 40 Hz to 10 kHz 10 mV to 1000 V 10 kHz to 100 kHz 10 mV to 300 V 100 kHz to 500 kHz 0.2 V to 3 V - AC current over the following range: 40 Hz to 10 kHz 100 μ A to 1 A 45 Hz to 65 Hz 1 A to 200 A	PTL002: PT plan for multifunction calibrator
- Power meter	Calibration for single or three phase active/reactive/apparent power over the following range of parameters: Voltage: 24 V to 300 V Current: 0.1 A to 10 A Power factor: 0 lead/lag to unity Frequency: 45 Hz to 65 Hz	PTL031: PT plan for power meter

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Calibration Services		
Electricity		
- Oscilloscope	Calibration for the following parameters: - Peak to peak voltage of 1 kHz square waveform over the following range: 40 μ V to 40 V - Bandwidth over the following range: 1 MHz to 300 MHz - Period of triangular waveform over the following range: 0.5 ns to 5 s	PTR006: PT plan for oscilloscope
Time and frequency		
- Stopwatch	Calibration for relative correction of time interval	PTR005: PT plan for stopwatch

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Calibration Services		
Length and related quantities		
- Calliper	Calibration for length over the following range: 0.5 mm to 1 m	PTM008: PT scheme for calliper
- Engineer's steel rule	Calibration for length over the following range: 0.5 mm to 1 m	PTM006: PT scheme for engineer's steel rule
- Square	Calibration for squareness for travel over the following range: 5 mm to 500 mm	PTM004: PT scheme for square
Mass and related quantities		
- Standard weight	Calibration for mass over the following range: 1 mg to 50 kg	PTM001: PT scheme for standard weights
- Electronic balance	Calibration for mass over the following range: 1 mg to 50 kg	PTM002: PT scheme for electronic balances
- Piston-operated pipette	Calibration for contained or delivered volume over the following range: 1 µl to 5 ml	PTM003: PT scheme for piston-operated pipettes
Photometry and radiometry		
- Illuminance meter	Calibration for illuminance at colour temperature of 2856 K over the following range: 1 lx to 3000 lx	PTP001: PT plan for illuminance meter

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Provision of Proficiency Testing Schemes 提供能力驗證		
PROFICIENCY TESTING SCHEME AND ITEM 能力驗證計劃及項目	MEASURAND OR CHARACTERISTIC MEASURED 測試參數或特質	PROFICIENCY TESTING SCHEME PROCEDURE 能力驗證計劃程序
Calibration Services		
Humidity measurements		
- Digital thermohygrometer	Calibration for humidity over the following range: for air temperature 5 °C to 70 °C: 8 %rh to 95 %rh	PTH001: PT plan for relative humidity measurement instrument
Temperature measurements		
- Platinum resistance thermometer	Calibration for temperature at the following value or over the following range: Triple-point of water: (0.01 °C) -80 °C to 550 °C	PTT001: PT plan for platinum resistance thermometer
- Thermocouple	Calibration for temperature over the following range: -80 °C to 550 °C	PTT002: PT plan for thermocouple
- Liquid-in-glass thermometer	Calibration for temperature over the following range: -80 °C to 550 °C	PTT003: PT plan for liquid-in-glass thermometer
- Digital thermometer	Calibration for temperature over the following range: -80 °C to 550 °C	PTT004: PT plan for digital thermometer

**The Government of the Hong Kong Special Administrative Region –
Standards and Calibration Laboratory**

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Calibration Services 校正服務		
ITEM TESTED OR MEASURED 測試或量度項目	SPECIFIC TEST OR PROPERTY MEASURED® 特定測試或量度的特性®	CALIBRATION AND MEASUREMENT CAPABILITY (CMC)* 校準和測量能力*
<p>Mass and related quantities</p> <p>- Force</p> <p>- Force proving instruments, load cells, proving rings, load columns and other force measuring devices in tension and compression modes</p> <p>- Universal testing machines in tension and compression modes</p>	<p>Calibration for force using a deadweight or hydraulic force standard machine in accordance with standard methods BS EN ISO 376: 2011, EN ISO 376: 2011 or ISO 376: 2011 over the following ranges :-</p> <p>50 N to 60 kN Above 60 kN to 600 kN</p> <p>On-site calibration for force using indicated or true force method in accordance with standard methods BS EN ISO 7500-1: 2018, EN ISO 7500-1: 2018 or ISO 7500-1: 2018, over the following ranges :-</p> <p>50 N to 60 kN Above 60 kN to 600 kN Above 600 kN to 3000 kN</p>	<p>0.01 % 0.05 %</p> <p>(Class 00 load cell with a maximum uncertainty of 0.08 %) (Class 0.5 load cell with a maximum uncertainty of 0.16 %) (Class 1 load cell with a maximum uncertainty of 0.32 %)</p>

® Unless otherwise specified, accredited activities are conducted at the laboratory.

* The calibration uncertainty of a device under test, which is usually reported at 95% confidence level, depends on both the CMC of the laboratory and the performance of the device during calibration.