

Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-K-15047-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: 08.06.2022

Date of issue: 07.07.2022

Holder of certificate:

Gigahertz Optik GmbH
An der Kälberweide 12, 82299 Türkenfeld

Calibration in the fields:

Electrical quantities

DC and low frequency quantities

- DC current

High Frequency and Radiation Quantities

Optical Quantities

- Radiometry

Within the scope of accreditation marked with *), the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, to use standards or equivalent testing methods listed here with different issue dates.

The testing laboratory maintains a current list of all testing procedures within the flexible scope of accreditation.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories. Laboratories that conform to the requirements of this standard, operate generally in accordance with the principles of DIN EN ISO 9001.

The certificate together with the annex reflects the status as indicated by the date of issue.

The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de/en/accredited-bodies-search.html>.

Abbreviations used: see last page

Page 1 of 5

This document is a translation. The definitive version is the original German annex to the accreditation certificate.

Annex to the accreditation certificate D-K-15047-01-00

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded measurement of uncertainty	Remarks
Optical quantities Spectral responsivity photo diodes	1 μ A/W to 1 A/W	KA0041-spektrale Empfindlichkeit von Photodioden-v007		
		wave length in nm		
		250 to 300	3.0 %	terminal voltage at photo diode $\leq 50 \mu$ V $1 \text{ nW} \leq \Phi \leq 10 \mu$ W $18 \text{ }^\circ\text{C} \leq t \leq 28 \text{ }^\circ\text{C}$ $1 \text{ nm} \leq \Delta\lambda \leq 11 \text{ nm}$
		> 300 to 320	2.9 %	$100 \text{ nW} \leq \Phi \leq 100 \mu$ W $18 \text{ }^\circ\text{C} \leq t \leq 28 \text{ }^\circ\text{C}$ $1 \text{ nm} \leq \Delta\lambda \leq 11 \text{ nm}$ Φ = radiative power on active area t = ambient temperature of calibration item $\Delta\lambda$ = full width at half maximum
		> 320 to 340	2.6 %	
		> 340 to 360	2.3 %	
		> 360 to 400	2.0 %	
		> 400 to 880	1.7 %	
		> 880 to 920	2.0 %	
		> 920 to 960	2.4 %	
		> 960 to 1040	3.0 %	
		> 1040 to 1160	4.0 %	
Spectral irradiance lamps	10 μ W/(m ² ·nm) to 0.30 W/(m ² ·nm)	KA0042-spektrale Bestrahlungsstärke von Glühlampen-v005		
		wave length in nm		
		250 to 275	3.5 %	
		> 275 to 300	3.2 %	
		> 300 to 345	2.5 %	
		> 345 to 370	2.4 %	
		> 370 to 390	2.1 %	
		> 390 to 490	2.0 %	
		> 490 to 1000	1.9 %	
		> 1000 to 1150	2.3 %	
		> 1150 to 1250	2.5 %	
		> 1250 to 1400	2.7 %	
		> 1400 to 1450	2.8 %	
		> 1450 to 1550	3.6 %	
> 1550 to 1650	3.7 %			

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Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded measurement of uncertainty	Remarks
Spectral irradiance lamps	10 $\mu\text{W}/(\text{m}^2\cdot\text{nm})$ to 0.30 $\text{W}/(\text{m}^2\cdot\text{nm})$	> 1650 to 1700	3.8 %	
		> 1700 to 1750	3.9 %	
		> 1750 to 1800	4.6 %	
		> 1800 to 1900	4.7 %	
		> 1900 to 1950	4.8 %	
		> 1950 to 2000	5.2 %	
		> 2000 to 2050	5.5 %	
		> 2050 to 2100	5.7 %	
		> 2100 to 2150	6.1 %	
		> 2150 to 2200	6.3 %	
		> 2200 to 2250	6.5 %	
		> 2250 to 2300	7.0 %	
		> 2300 to 2350	7.3 %	
		> 2350 to 2400	7.7 %	
		> 2400 to 2450	8.0 %	
> 2450 to 2500	8.5 %			
Spectral irradiance deuterium lamps	1 $\mu\text{W}/(\text{m}^2\cdot\text{nm})$ to $1\cdot 10^5$ $\text{W}/(\text{m}^2\cdot\text{nm})$	KA0061-spektrale Bestrahlungsstärke von Deuteriumlampen-v002		In-house calibration method
		wave length in nm		
		200 to 205	7.6 %	
		210 to 220	6.6 %	
		225 to 230	5.8 %	
		235 to 245	4.8 %	
		250 to 285	4.1 %	
		290 to 310	4.9 %	
		315 to 340	5.7 %	
		345 to 355	6.6 %	
		360 to 365	7.5 %	
		370 to 370	8.4 %	
		375 to 385	9.5 %	
		385 to 390	10.4 %	
		395 to 400	11.4 %	

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Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded measurement of uncertainty	Remarks
Irradiance/ broadband radiometer *	200 nm to 349 nm	ASTM G130-12:2020		In-house calibration method : KA0057-integrale Bestrahlungsstärke-Empfindlichkeit ASTM G130-12
	1 $\mu\text{W}/\text{m}^2$ to $1 \cdot 10^5 \text{ W}/\text{m}^2$	wave length in nm		
		200 to 279	4.6 %	
	350 nm to 799 nm	280 to 315	2.9 %	
	0.22 $\mu\text{W}/\text{m}^2$ to $1 \cdot 10^5 \text{ W}/\text{m}^2$	316 to 550	2.8 %	
		551 to 1020	2.5 %	
	800 nm to 1050 nm	1021 to 1050	3.0 %	
	1 $\mu\text{W}/\text{m}^2$ to $1 \cdot 10^5 \text{ W}/\text{m}^2$			
Irradiance/ broadband radiometer * by means of a reference detector		CIE 220:2016		In-house calibration method : KA0058-integrale Bestrahlungsstärke-Empfindlichkeit CIE220-2016
		wave length in nm		
	200 nm to 1050 nm	200 to 279	4.9 %	
	1 fA/(W/m ²) to 1 A/(W/m ²)	280 to 315	3.2 %	
		316 to 550	3.1 %	
		551 to 1020	2.9 %	
		1021 to 1050	3.4 %	
DC and low frequency DC current Measuring device	1 pA to < 2 pA	KA0060- Stromkalibrierung von Anzeigegeräte-v002	9.3 %	In-house calibration method (based on VDI 2622)
	2 pA to < 20 pA		1.5 %	
	20 pA to < 200 pA		0.32 %	
	200 pA to < 2 nA		0.20 %	
	2 nA to < 20 nA		0.18 %	
	20 nA to < 200 nA		0.13 %	
	200 nA to < 2 μA		0.12 %	
	2 μA to < 20 μA		0.12 %	
	20 μA to < 200 μA		0.12 %	
	200 μA to < 2 mA		0.12 %	
	2 mA to < 20 mA		0.36 %	

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Abbreviations used:

ASTM	ASTM American Standard for Testing and Materials
CIE	International Commission on Illumination
CMC	Calibration and measurement capabilities
DIN	German Institute for Standardization e.V.
KA	In-house Calibration method of the Gigahertz Optik GmbH
VDE	Association for Electrical Engineering, Electronics and Information Technology e.V.
VDI	Association of German Engineers