DAkkS
Deutsche
Akkreditierungsstelle

Accreditation

The Deutsche Akkreditierungsstelle attests with this **Accreditation Certificate** that the calibration laboratory

Rosenberger Hochfrequenztechnik GmbH & Co. KG
Hauptstraße 1, 83413 Fridolfing

meets the requirements according to DIN EN ISO/IEC 17025:2018 for the conformity assessment activities listed in the annex to this certificate. This includes additional existing legal and normative requirements for the calibration laboratory, including those in relevant sectoral schemes, provided they are explicitly confirmed in the annex to this certificate.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories and they conform to the principles of DIN EN ISO 9001.

This accreditation was issued in accordance with Art. 5 Para. 1 Sentence 2 of Regulation (EC) 765/2008, after an accreditation procedure was carried out in compliance with the minimum requirements of DIN EN ISO/IEC 17011 and on the basis of a review and decision of the appointed accreditation committees.

This accreditation certificate only applies in connection with the notices of 22.01.2025 with accreditation number D-K-17805-01.
It consists of this cover sheet, the reverse side of the cover sheet and the following annex with a total of 3 pages.

Registration number of the accreditation certificate: **D-K-17805-01-00**

Berlin, 22.01.2025 — Dr. Florian Witt, Head of Technical Unit

Translation issued: 22.01.2025 — Dr. Florian Witt, Head of Technical Unit

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 (www.dakks.de).

See notes overleaf

Deutsche Akkreditierungsstelle GmbH

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The Deutsche Akkreditierungsstelle GmbH (DAkkS) is the entrusted national accreditation body of the Federal Republic of Germany according to § 8 section 1 AkkStelleG in conjunction with § 1 section 1 AkkStelleGBV. DAkkS is designated as the national accreditation authority by Germany according to Art. 4 Para. 4 of Regulation (EC) 765/2008 and clause 4.7 of DIN EN ISO/IEC 17000.

Pursuant to Art. 11 section 2 of Regulation (EC) 765/2008, the accreditation certificate shall be recognised as equivalent by the national authorities within the scope of this Regulation as well as by the WTO member states that have committed themselves in bilateral or multilateral mutual agreements to recognise the certificates of accreditation bodies that are members of ILAC or IAF as equivalent.

DAkkS is a signatory to the multilateral agreements for mutual recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Co-operation (ILAC).

The up-to-date state of membership can be retrieved from the following websites:
EA: www.european-accreditation.org
ILAC: www.ilac.org
IAF: www.iaf.nu

Deutsche Akkreditierungsstelle

Annex to the Accreditation Certificate D-K-17805-01-00 according to DIN EN ISO/IEC 17025:2018

Valid from: **22.01.2025**

Date of issue: 22.01.2025

Holder of accreditation certificate:

Rosenberger Hochfrequenztechnik GmbH & Co. KG
Hauptstraße 1, 83413 Fridolfing

with the location

Rosenberger Hochfrequenztechnik GmbH & Co. KG
HF-Kalibrierlabor
Hauptstraße 1, 83413 Fridolfing

The calibration laboratory meets the requirements of DIN EN ISO/IEC 17025:2018 to carry out the conformity assessment activities listed in this annex. The calibration laboratory meets additional legal and normative requirements, if applicable, including those in relevant sectoral schemes, provided that these are explicitly confirmed below.

The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of calibration laboratories and they conform to the principles of DIN EN ISO 9001.

Calibration in the fields:

Electrical quantities
High frequency quantities
- **HF impedance (reflection factor)**
- **HF attenuation**

This certificate annex is only valid together with the written accreditation certificate and 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.

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
HF-impedance (reflection factor) Magnitude	0 to 1	9 kHz to < 50 MHz	$0.0060 + 0.0090 \cdot \lvert\Gamma\rvert^2$	N-Connector 50 Ω Γ: reflection factor
		50 MHz to 2 GHz	$0.0060 + 0.0060 \cdot \lvert\Gamma\rvert^2$	
		> 2 GHz to 8 GHz	$0.0060 + 0.0075 \cdot \lvert\Gamma\rvert^2$	
		> 8 GHz to 12 GHz	$0.0075 + 0.0095 \cdot \lvert\Gamma\rvert^2$	
		> 12 GHz to 18 GHz	$0.0075 + 0.0105 \cdot \lvert\Gamma\rvert^2$	
HF-impedance (reflection factor) Magnitude	0 to 1	10 MHz to < 50 MHz	$0.0070 + 0.0190 \cdot \lvert\Gamma\rvert^2$	PC3.5-Connector Γ: reflection factor
		50 MHz to 8 GHz	$0.0060 + 0.0080 \cdot \lvert\Gamma\rvert^2$	
		> 8 GHz to 18 GHz	$0.0065 + 0.0090 \cdot \lvert\Gamma\rvert^2$	
		> 18 GHz to 20 GHz	$0.0070 + 0.010 \cdot \lvert\Gamma\rvert^2$	
		> 20 GHz to 26.5 GHz	$0.0100 + 0.011 \cdot \lvert\Gamma\rvert^2$	
HF-impedance (reflection factor) Magnitude	0 to 1	10 MHz to < 50 MHz	$0.0080 + 0.0210 \cdot \lvert\Gamma\rvert^2$	PC 2.92-Connector Γ: reflection factor
		50 MHz to 4 GHz	$0.0070 + 0.012 \cdot \lvert\Gamma\rvert^2$	
		> 4 GHz to < 10 GHz	$0.0100 + 0.010 \cdot \lvert\Gamma\rvert^2$	
		10 GHz to 16 GHz	$0.0100 + 0.012 \cdot \lvert\Gamma\rvert^2$	
		> 16 GHz to 20 GHz	$0.0110 + 0.012 \cdot \lvert\Gamma\rvert^2$	
		> 20 GHz to 40 GHz	$0.0120 + 0.016 \cdot \lvert\Gamma\rvert^2$	
HF-impedance (reflection factor) Magnitude	0 to 1	10 MHz to < 50 MHz	$0.0070 + 0.0065 \cdot \lvert\Gamma\rvert^2$	N-Connector 75 Ω Γ: reflection factor
		50 MHz to 2 GHz	$0.0060 + 0.0065 \cdot \lvert\Gamma\rvert^2$	
		> 2 GHz to 4 GHz	$0.0060 + 0.0075 \cdot \lvert\Gamma\rvert^2$	
		> 4 GHz to 8 GHz	$0.0100 + 0.0095 \cdot \lvert\Gamma\rvert^2$	
		> 8 GHz to 12 GHz	$0.0100 + 0.013 \cdot \lvert\Gamma\rvert^2$	

Permanent Laboratory

Calibration and Measurement Capabilities (CMC)

Measurement quantity / Calibration item	Range	Measurement conditions / procedure	Expanded uncertainty of measurement	Remarks
HF-impedance (reflection factor) Magnitude	0 to 1	10 MHz to < 50 MHz	$0.0080 + 0.0070 \cdot \lvert\Gamma\rvert^2$	7/16-Connector Γ: reflection factor
		50 MHz to 4 GHz	$0.0070 + 0.0070 \cdot \lvert\Gamma\rvert^2$	
		> 4 GHz to 8 GHz	$0.0085 + 0.0095 \cdot \lvert\Gamma\rvert^2$	
HF-impedance (reflection factor) Phase angle φ	-180° to +180°	9 kHz to 40 GHz	$U(\varphi) = \arcsin\left(\frac{U(\lvert\Gamma\rvert)}{\lvert\Gamma\rvert}\right) \cdot \frac{180°}{\pi}$	All connector systems
HF-attenuation Magnitude	0 dB to 12 dB	9 kHz to < 1 MHz	0.045 dB	N-Connector 50 Ω
		1 MHz to 8,5 GHz	0.030 dB	
		> 8,5 GHz to 18 GHz	0.050 dB	
	> 12 dB to 22 dB	9 kHz to < 1 MHz	0.045 dB	
		1 MHz to 8,5 GHz	0.035 dB	
		> 8,5 GHz to 18 GHz	0.050 dB	
	> 22 dB to < 42 dB	9 kHz to < 1 MHz	0.045 dB	
		1 MHz to 8,5 GHz	0.040 dB	
		> 8,5 GHz to 18 GHz	0.065 dB	
	42 dB to 52 dB	9 kHz to < 1 MHz	0.065 dB	
		1 MHz to 8,5 GHz	0.055 dB	
		> 8,5 GHz to 18 GHz	0.070 dB	
	> 52 dB to 62 dB	9 kHz to < 1 MHz	0.11 dB	
		1 MHz to 8,5 GHz	0.060 dB	
		> 8,5 GHz to 18 GHz	0.12 dB	
Phase angle φ	-180° to +180°	9 kHz to < 1 MHz	0.50°	
		1 MHz to 8.5 GHz	0.45°	
		> 8,5 GHz to 18 GHz	1.0°	

Abbreviations used:

CMC Calibration and measurement capabilities
DIN Deutsches Institut für Normung e.V. – German institute for standardization
EN Europäische Norm – European Standard
IEC International Electrotechnical Commission
ISO International Organization for Standardisation