



Kalibrier-Zertifikat

Calibration Certificate

MUSTER

Gegenstand Object	Power Sensor
Hersteller Manufacturer	AGILENT DEUTSCHLAND GMBH
Typ Type description	E9300A
Serien Nr. Serial no.	12345
Inventar Nr. Inventory no.	---
Prüfmittel Nr. Test equipment no.	---
Equipment Nr. Equipment no.	12345678
Standort Location	---
Auftraggeber Customer	Mustermann GmbH
	DE-12345 Musterhausen
Kunden Nr. Customer ID no.	1234567
Auftrags Nr. Order no.	654321

Hiermit bestätigen wir, dass das durchführende Kalibrierlabor ein Managementsystem nach **ISO 9001:2008**, sowie **ISO/IEC 17025:2005** eingeführt hat. Die Urkunden finden Sie auf www.testotis.de. Die für die Kalibrierung verwendeten Messeinrichtungen werden regelmäßig kalibriert und sind rückführbar auf die nationalen Normale der Physikalisch Technischen Bundesanstalt (PTB) Deutschlands oder auf andere nationale Normale. Wo keine nationalen Normale existieren, entspricht das Messverfahren den derzeit gültigen technischen Regeln und Normen. Die für diesen Vorgang angefertigte Dokumentation kann eingesehen werden. Alle erforderlichen Messdaten sind in diesem Kalibrier-Zertifikat aufgelistet.

Hereby we confirm that the performing calibration laboratory is working with a management system according to **ISO 9001:2008** and **ISO/IEC 17025:2005**. Accreditation certificates can be found under www.testotis.de. The measuring installations used for calibration are regularly calibrated and traceable to the national standards of the German Federal Physical Technical Institute (PTB) or other national standards. Should no national standards exist, the measuring procedure corresponds with the technical regulations and norms valid at the time of the measurement. The documents established for this procedure are available for viewing. All the necessary measured data can be found on the following page(s) of this calibration certificate.

Datum der Kalibrierung Date of calibration	22.12.2017
Datum der empfohlenen Rekalibrierung Date of the recommended re-calibration	22.12.2018

Konformitätsaussage Conformity

- Messwert(e) innerhalb der zulässigen Abweichung¹⁾. Measured value(s) within the allowed deviation¹⁾.
- Messwert(e) außerhalb der zulässigen Abweichung¹⁾. Measured value(s) beyond the allowed deviation¹⁾.

¹⁾ Die Messunsicherheit wurde nach GUM mit dem Erweiterungsfaktor k=2 berechnet und enthält die Unsicherheit des Verfahrens sowie die Unsicherheit des Prüflings. Die Konformitätsaussage erfolgte nach DIN EN ISO 14253-1 gemäß der Kalibrieranweisung QSA - TIS 7.5-02.

¹⁾ The measurement uncertainty was calculated according to the regulations of GUM with the coverage factor k=2 and contains the uncertainty of the measuring procedure and the uncertainty of the measuring system. The statement of conformity was made according to DIN EN ISO 14253-1 according to calibration instruction QSA - TIS 7.5-02.

Dieser Kalibrierschein darf nur vollständig weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.

This calibration certificate may not be reproduced other than in full except with permission of the issuing laboratory. Calibration certificates without signature and seal are not valid.

V 4.52 / DE

Stempel Seal



Fachverantwortlicher Supervisor

Max Mustermann
Max Mustermann

Bearbeiter Technician

Martina Musterfrau
Martina Musterfrau



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Messeinrichtung Measuring equipment

Referenz Reference	Rückführung Traceability	Rekal. Next cal.	Zertifikat-Nr. Certificate-no.	EQ-Nr. EQ-no.
Frequency Standard Fluke 910R	GPS locked ---	---	Support Device	10640562
Dämpfungsglied schaltbar 110 dB HEWLETT PACKARD 8496H	15070-01-01 2017-04	2018-04	E46764	10916993
Network Analyzer AGILENT DEUTSCHLAND GMBH N5230C	15070-01-01 2017-02	2018-02	E44901	10954847
RF Power Meter Tegam 1830A	15070-01-01 2017-09	2018-09	E53043	10954853
RF XFER STD, 10KHz-18GHz F1130B Tegam F1130B	15070-01-01 2017-04	2018-04	E46314	10954855
Power Meter AGILENT DEUTSCHLAND GMBH E4417A	15070-01-01 2017-05	2018-05	E47067	10962174
Signal Generator Agilent E8257D	GPS locked ---	---	Support device	10971083
Type N Economy Calibration Kit AGILENT DEUTSCHLAND GMBH 85054D	15070-01-01 2017-03	2018-03	E45890	11373071

Referenzzertifikate sind auf www.primasonline.com abrufbar Reference certificates are available at www.primasonline.com

Umgebungsbedingungen Ambient conditions

Temperatur Temperature (23 ± 1) °C
Relative Luftfeuchte Relative Humidity (40 ± 20) %

Messverfahren Measuring procedure

Die Kalibrierung erfolgt nach Herstelleranweisung
The calibration is performed according to the manufacturer's procedure

Prüfprozedur Procedure Agilent:E9300A:KIZ:DAkKS:IEEE/LAN / Rev.:1.00

Messergebnisse Measuring results

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Besondere Bemerkungen Special remarks



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Input Reflections						
	0.00000 Rho	10 MHz	0.0332 Rho	-0/ +0.07 Rho	47% pass	0.0050 Rho
	0.00000 Rho	30 MHz	0.0281 Rho	-0/ +0.07 Rho	40% pass	0.0050 Rho
	0.00000 Rho	50 MHz	0.0231 Rho	-0/ +0.07 Rho	33% pass	0.0070 Rho
	0.00000 Rho	100 MHz	0.0105 Rho	-0/ +0.07 Rho	15% pass	0.0070 Rho
	0.00000 Rho	300 MHz	0.0110 Rho	-0/ +0.07 Rho	16% pass	0.0070 Rho
	0.00000 Rho	500 MHz	0.0109 Rho	-0/ +0.07 Rho	16% pass	0.0070 Rho
	0.00000 Rho	1000 MHz	0.0099 Rho	-0/ +0.07 Rho	14% pass	0.0070 Rho
	0.00000 Rho	1500 MHz	0.0099 Rho	-0/ +0.07 Rho	14% pass	0.0070 Rho
	0.00000 Rho	2000 MHz	0.0115 Rho	-0/ +0.07 Rho	16% pass	0.0070 Rho
	0.00000 Rho	2500 MHz	0.0131 Rho	-0/ +0.07 Rho	19% pass	0.010 Rho
	0.00000 Rho	3000 MHz	0.0132 Rho	-0/ +0.07 Rho	19% pass	0.010 Rho
	0.00000 Rho	3500 MHz	0.0122 Rho	-0/ +0.07 Rho	17% pass	0.010 Rho
	0.00000 Rho	4000 MHz	0.0102 Rho	-0/ +0.07 Rho	15% pass	0.010 Rho
	0.00000 Rho	4600 MHz	0.0095 Rho	-0/ +0.07 Rho	14% pass	0.010 Rho
	0.00000 Rho	5000 MHz	0.0088 Rho	-0/ +0.07 Rho	13% pass	0.010 Rho
	0.00000 Rho	5600 MHz	0.0081 Rho	-0/ +0.07 Rho	12% pass	0.010 Rho
	0.00000 Rho	6000 MHz	0.0094 Rho	-0/ +0.07 Rho	13% pass	0.010 Rho
	0.00000 Rho	7000 MHz	0.0208 Rho	-0/ +0.07 Rho	30% pass	0.010 Rho
	0.00000 Rho	8000 MHz	0.0222 Rho	-0/ +0.07 Rho	32% pass	0.010 Rho
	0.00000 Rho	9000 MHz	0.0105 Rho	-0/ +0.078 Rho	14% pass	0.010 Rho
	0.00000 Rho	10000 MHz	0.0210 Rho	-0/ +0.078 Rho	27% pass	0.010 Rho
	0.00000 Rho	11000 MHz	0.0319 Rho	-0/ +0.078 Rho	41% pass	0.010 Rho
	0.00000 Rho	12000 MHz	0.0331 Rho	-0/ +0.078 Rho	42% pass	0.010 Rho
	0.00000 Rho	13000 MHz	0.0343 Rho	-0/ +0.078 Rho	44% pass	0.010 Rho
	0.00000 Rho	14000 MHz	0.0299 Rho	-0/ +0.078 Rho	38% pass	0.010 Rho
	0.00000 Rho	15000 MHz	0.0263 Rho	-0/ +0.078 Rho	34% pass	0.010 Rho
	0.00000 Rho	16000 MHz	0.0304 Rho	-0/ +0.078 Rho	39% pass	0.010 Rho
	0.00000 Rho	17000 MHz	0.0314 Rho	-0/ +0.078 Rho	40% pass	0.010 Rho
	0.00000 Rho	18000 MHz	0.0505 Rho	-0/ +0.078 Rho	65% pass	0.010 Rho
Power Accuracy						
Power meter settings:						
Sensor Frequency Correction Table: On						
Filter/Range Automatic						
Laboratory estimated tolerance						
Frequency = 10 MHz, Rho = 0.0332, Phi = -68.98°						
	1.0007 mW		0.999 mW	±0.04 mW	4% pass	10 µW
Frequency = 30 MHz, Rho = 0.0281, Phi = -58.1°						



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	1.0012 mW		0.998 mW	±0.04 mW	8%	pass	10 µW
Frequency = 50 MHz, Rho = 0.0231, Phi = -47.23°	1.0006 mW		0.998 mW	±0.03 mW	9%	pass	10 µW
Frequency = 100 MHz, Rho = 0.0105, Phi = -20.07°	0.9991 mW		0.995 mW	±0.0299 mW	14%	pass	15 µW
Frequency = 300 MHz, Rho = 0.011, Phi = -33.2°	1.0007 mW		0.997 mW	±0.03 mW	14%	pass	15 µW
Frequency = 500 MHz, Rho = 0.0109, Phi = -52.65°	0.9998 mW		0.991 mW	±0.0299 mW	29%	pass	15 µW
Frequency = 1000 MHz, Rho = 0.0099, Phi = -109.03°	0.9994 mW		0.991 mW	±0.0399 mW	20%	pass	15 µW
Frequency = 1500 MHz, Rho = 0.0099, Phi = -176.81°	1.0006 mW		0.990 mW	±0.03 mW	34%	pass	15 µW
Frequency = 2000 MHz, Rho = 0.0115, Phi = 118.21°	0.9995 mW		0.992 mW	±0.0299 mW	27%	pass	15 µW
Frequency = 2500 MHz, Rho = 0.0131, Phi = 68.94°	1.0000 mW		0.993 mW	±0.03 mW	23%	pass	15 µW
Frequency = 3000 MHz, Rho = 0.0132, Phi = 31.46°	0.9998 mW		0.996 mW	±0.0299 mW	12%	pass	15 µW
Frequency = 4000 MHz, Rho = 0.0102, Phi = -26.79°	1.0006 mW		0.993 mW	±0.03 mW	25%	pass	15 µW
Frequency = 5000 MHz, Rho = 0.0088, Phi = -81.35°	1.0002 mW		0.979 mW	±0.03 mW	72%	pass	15 µW
Frequency = 6000 MHz, Rho = 0.0094, Phi = 156.39°	1.0009 mW		0.977 mW	±0.03 mW	80%	pass	15 µW
Frequency = 7000 MHz, Rho = 0.0208, Phi = 49.95°	0.9987 mW		0.987 mW	±0.0399 mW	30%	pass	20 µW
Frequency = 8000 MHz, Rho = 0.0222, Phi = -25.14°							



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	0.9988 mW		1.002 mW	±0.0399 mW	7%	pass	20 µW
Frequency = 9000 MHz, Rho = 0.0105, Phi = -60.61°	1.0012 mW		0.999 mW	±0.04 mW	6%	pass	20 µW
Frequency = 10000 MHz, Rho = 0.021, Phi = -56.68°	1.0002 mW		0.998 mW	±0.04 mW	5%	pass	20 µW
Frequency = 11000 MHz, Rho = 0.0319, Phi = -135.68°	1.0013 mW		1.003 mW	±0.04 mW	5%	pass	20 µW
Frequency = 12000 MHz, Rho = 0.0331, Phi = 124.82°	1.0001 mW		1.004 mW	±0.04 mW	9%	pass	20 µW
Frequency = 13000 MHz, Rho = 0.0343, Phi = 23.86°	1.0008 mW		1.023 mW	±0.04 mW	57%	pass	20 µW
Frequency = 14000 MHz, Rho = 0.0299, Phi = -49.79°	0.9993 mW		1.018 mW	±0.0399 mW	46%	pass	20 µW
Frequency = 15000 MHz, Rho = 0.0263, Phi = -90.82°	1.0006 mW		1.032 mW	±0.04 mW	79%	pass	20 µW
Frequency = 16000 MHz, Rho = 0.0304, Phi = -152.07°	1.0005 mW		1.034 mW	±0.04 mW	84%	pass	20 µW
Frequency = 17000 MHz, Rho = 0.0314, Phi = 100.17°	1.0002 mW		1.039 mW	±0.04 mW	96%	pass	20 µW
Frequency = 18000 MHz, Rho = 0.0505, Phi = -10.25°	1.0002 mW		1.036 mW	±0.04 mW	89%	pass	20 µW
Linearity at 50 MHz							
Laboratory Estimated Tolerance							
	-5.01 dBm	50 MHz	-5.0 dBm	±0.3 dBm		pass	0.21 dB
	-10.01 dBm	50 MHz	-10.0 dBm	±0.3 dBm		pass	0.21 dB
	-15.01 dBm	50 MHz	-15.0 dBm	±0.3 dBm		pass	0.21 dB
	-19.87 dBm	50 MHz	-19.8 dBm	±0.3 dBm		pass	0.21 dB
	-24.88 dBm	50 MHz	-24.9 dBm	±0.3 dBm		pass	0.21 dB



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	-29.87 dBm	50 MHz	-29.8 dBm	±0.3 dBm	pass	0.21 dB
	-34.88 dBm	50 MHz	-34.9 dBm	±0.3 dBm	pass	0.21 dB
	-39.80 dBm	50 MHz	-39.7 dBm	±0.3 dBm	pass	0.21 dB
	-49.790 dBm	50 MHz	-49.84 dBm	±2 dBm	pass	0.20 dB
	-59.560 dBm	50 MHz	-60.42 dBm	±8 dBm	pass	0.20 dB

zulässige Abweichung gemäß Herstellerangabe
allowed deviation in accordance with manufacturer

Die dimensionslosen Anteile der Messunsicherheit U sind als relative Messunsicherheiten e bezogen auf den Messwert zu verstehen ($U = e \cdot MW$).

The non-dimensional fractions of the measuring uncertainty U are relative values e in relation to the indicated value ($U = e \cdot i.v.$).