



Kalibrierschein / Calibration certificate



Deutsche
Akkreditierungsstelle
D-K-15070-01-00

erstellt durch das Kalibrierlaboratorium
issued by the calibration laboratory

Testo Industrial Services GmbH
Gewerbestr. 3
79199 Kirchzarten

Kalibrierzeichen
Calibration mark

MUSTER

D-K-
15070-01-00

2024-07

Gegenstand <i>Object</i>	Signal Analyzer
Hersteller <i>Manufacturer</i>	Keysight Technologies Deutschl
Typ <i>Type</i>	N9040B
Fabrikat/Serien-Nr. <i>Serial no.</i>	12345
Equipment Nr. <i>Equipment no.</i>	12345678
Prüfmittel Nr. <i>Test equipment no.</i>	1234567
Auftraggeber <i>Customer</i>	Mustermann GmbH
	DE-12345 Musterhausen
Auftragsnummer <i>Order no.</i>	654321

Dieser Kalibrierschein dokumentiert die metrologische Rückführbarkeit auf das Internationale Einheitensystem (SI). Die DAkkS ist Unterzeichner der multilateralen Übereinkommen der European co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine. Die Messergebnisse beziehen sich nur auf den kalibrierten Gegenstand. Das Laboratorium gibt keine Empfehlung über das Kalibrierintervall. Für die Festlegung und Einhaltung von Fristen zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

This calibration certificate documents the metrological traceability to the International System of Units (SI). The DAkkS is signatory to the multilateral agreements of the European co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates. The measurement results refer only to the calibration object. The laboratory does not make any recommendation about the calibration interval. The user is obliged to have the object recalibrated at appropriate intervals.

Datum der Kalibrierung
Date of calibration 19.07.2024

Datum der Rekalibrierung
Date of re-calibration 07.2025

Konformitätsaussage
Conformity pass

Weitere Informationen auf Seite 13
Further information see page 13

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung des ausstellenden Kalibrierlaboratoriums.
This calibration certificate may not be reproduced other than in full except with the permission of the issuing laboratory.

V 8.03 / DE

Datum der Ausstellung
Date of issue

Leiter des Kalibrierlaboratoriums
Head of the calibration laboratory

Freigabe des Kalibrierscheins durch
Approval of the certificate of calibration by

21.03.2025

Max Mustermann

Max Mustermann

Kalibriergegenstand (KG)

Calibration object

Gegenstand Object

Signal Analyzer

Inventar Nr. Inventory no.

123456

Standort Location

Kalibrierverfahren

Calibration procedure

Die Kalibrierung erfolgte in Anlehnung an VDI/VDE/DGQ/DKD 2622 „Kalibrieren von Messmitteln für elektrische Größen“, Blatt 11 "Spektrumanalysatoren", November 2019.

The calibration was performed in accordance with VDI/VDE/DGQ/DKD 2622 "Calibration of measuring equipment for electrical quantities", Sheet 11 "Spectrum analyzers", November 2019.

Verwendete Kalibrierprozedur Used calibration procedure

E:Keysight:N9040B:TISSD:SPA / Rev.: 1.0

Umgebungsbedingungen

Ambient conditions

Temperatur Temperature

(23 ± 1) °C

Relative Luftfeuchte Relative humidity

(20...70) %

Messeinrichtungen

Measuring equipment

Referenz Reference	Rückführung Traceability	Rekal. Next cal.	Zertifikats Nr. Certificate-no.	Eq.-Nr. EQ-no.
Signalgenerator SMG	GPS locked	---	Support device	10588393
ATTENUATOR/SWITCH DRIVER 11713A	GPS locked	---	Support device	11105439
Frequenznormal 910R	GPS locked	---	Support device	11846061
Signal Generator SML03	15070-01-00	2029-11	Support device	12708595
Signal Generator 83650L	15070-01-00	2850-03	Support Device	12716717
Signal Analyzer FSW26	15070-01-00	2024-11	E266766	15469389
Netzworkanalyzer PNA 5222B N5222B	15070-01-00	2025-04	E285443	15728580

Referenzzertifikate sind auf www.primasonline.com abrufbar

Reference certificates are available at www.primasonline.com

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Bezugswert Reference value	Messbedingung Measuring condition	Messwert KG Measured value UUT	Abweichung deviation	Zulässige Abweichung Allowed deviation	Ausnutzung der zul. Abw. in % Utilization of Allowed deviation %	Messunsicher- heit ($k=2$) Measuring uncertainty ($k=2$)
Device Identification						
Manufacturer:----->Keysight Technologies						
Model:----->N9040B						
Serial Number:----->MY61320162						
Softwarerevision:----->A.30.12						
Options: "508,B25,B2X,B40,CR3,DP2,DP4,EP0,EXM,FBP,FS1,FS2,FSA,LFE,LNP,MPB,NF2,NUL,P08,PFR,RTL,RT2,EDP,FT2,P SM,RCL,SSD,PC8,W10,MTU"						
Internal Calibration Routine						
Calibration was successfully completed.						
Self-test						
Self Test: Pass						
Function						
Rotary Knob						pass
Keyboard						pass
Display						pass
Clock-Reference						
Internal Frequency Accuracy						
:by Measuring on Ref. Out						
Noise Floor (LNP Off)						
Preamp Off						
normalized to 1 Hz RBW						
-200.000dBm/Hz	0.009 MHz	-148.00dBm/Hz	52.0dB	---/ +59dB	---	pass 4.5 dB
-200.000dBm/Hz	0.098 MHz	-156.80dBm/Hz	43.2dB	---/ +59dB	---	pass 4.5 dB
-200.000dBm/Hz	0.998 MHz	-158.60dBm/Hz	41.4dB	---/ +50dB	---	pass 4.5 dB
-200.000dBm/Hz	9.8 MHz	-158.80dBm/Hz	41.2dB	---/ +45dB	---	pass 4.5 dB
-200.000dBm/Hz	500 MHz	-156.90dBm/Hz	43.1dB	---/ +45dB	---	pass 4.5 dB
-200.000dBm/Hz	1000 MHz	-157.30dBm/Hz	42.7dB	---/ +45dB	---	pass 4.5 dB
-200.000dBm/Hz	1500 MHz	-158.20dBm/Hz	41.8dB	---/ +47dB	---	pass 4.5 dB

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-200.000 dBm/Hz	2000 MHz	-157.20 dBm/Hz	42.8 dB	---/ +47 dB	--- pass	4.5 dB
-200.000 dBm/Hz	2500 MHz	-155.00 dBm/Hz	45.0 dB	---/ +48 dB	--- pass	4.5 dB
-200.000 dBm/Hz	3000 MHz	-153.30 dBm/Hz	46.7 dB	---/ +49 dB	--- pass	4.5 dB
-200.000 dBm/Hz	3500 MHz	-155.80 dBm/Hz	44.2 dB	---/ +49 dB	--- pass	4.5 dB
-200.000 dBm/Hz	4000 MHz	-157.20 dBm/Hz	42.8 dB	---/ +51 dB	--- pass	4.5 dB
-200.000 dBm/Hz	4500 MHz	-157.20 dBm/Hz	42.8 dB	---/ +50 dB	--- pass	4.5 dB
-200.000 dBm/Hz	5000 MHz	-157.30 dBm/Hz	42.7 dB	---/ +50 dB	--- pass	4.5 dB
-200.000 dBm/Hz	5500 MHz	-157.70 dBm/Hz	42.3 dB	---/ +50 dB	--- pass	4.5 dB
-200.000 dBm/Hz	6000 MHz	-156.70 dBm/Hz	43.3 dB	---/ +50 dB	--- pass	4.5 dB
-200.000 dBm/Hz	6500 MHz	-156.40 dBm/Hz	43.6 dB	---/ +50 dB	--- pass	4.5 dB
-200.000 dBm/Hz	7000 MHz	-156.10 dBm/Hz	43.9 dB	---/ +50 dB	--- pass	4.5 dB
-200.000 dBm/Hz	7499 MHz	-157.10 dBm/Hz	42.9 dB	---/ +50 dB	--- pass	4.5 dB
-200.000 dBm/Hz	7501 MHz	-156.90 dBm/Hz	43.1 dB	---/ +50 dB	--- pass	4.5 dB
-200.000 dBm/Hz	8000 MHz	-156.50 dBm/Hz	43.5 dB	---/ +50 dB	--- pass	4.5 dB
-200.000 dBm/Hz	8400 MHz	-157.10 dBm/Hz	42.9 dB	---/ +51 dB	--- pass	4.5 dB
Noise Floor (LNP On)						
Preamp Off						
normalized to 1 Hz RBW						
-200.000 dBm/Hz	3500 MHz	-154.40 dBm/Hz	45.6 dB	---/ +46 dB	--- pass	4.5 dB
-200.000 dBm/Hz	4000 MHz	-158.30 dBm/Hz	41.7 dB	---/ +46 dB	--- pass	4.5 dB
-200.000 dBm/Hz	4500 MHz	-158.20 dBm/Hz	41.8 dB	---/ +45 dB	--- pass	4.5 dB
-200.000 dBm/Hz	5000 MHz	-158.40 dBm/Hz	41.6 dB	---/ +45 dB	--- pass	4.5 dB
-200.000 dBm/Hz	5500 MHz	-158.50 dBm/Hz	41.5 dB	---/ +45 dB	--- pass	4.5 dB
-200.000 dBm/Hz	6000 MHz	-158.90 dBm/Hz	41.1 dB	---/ +45 dB	--- pass	4.5 dB
-200.000 dBm/Hz	6500 MHz	-159.10 dBm/Hz	40.9 dB	---/ +45 dB	--- pass	4.5 dB
-200.000 dBm/Hz	7000 MHz	-159.30 dBm/Hz	40.7 dB	---/ +45 dB	--- pass	4.5 dB
-200.000 dBm/Hz	7499 MHz	-159.30 dBm/Hz	40.7 dB	---/ +45 dB	--- pass	4.5 dB
-200.000 dBm/Hz	7501 MHz	-159.90 dBm/Hz	40.1 dB	---/ +45 dB	--- pass	4.5 dB
-200.000 dBm/Hz	8000 MHz	-158.90 dBm/Hz	41.1 dB	---/ +45 dB	--- pass	4.5 dB
-200.000 dBm/Hz	8400 MHz	-158.70 dBm/Hz	41.3 dB	---/ +45 dB	--- pass	4.5 dB
Noise Floor						
Preamp On						
normalized to 1 Hz RBW						
-200.000 dBm/Hz	0.1 MHz	-159.70 dBm/Hz	40.3 dB	---/ +48 dB	--- pass	4.5 dB
* -200.000 dBm/Hz	0.998 MHz	-165.80 dBm/Hz	34.2 dB	---/ +41 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	9.8 MHz	-167.40 dBm/Hz	32.6 dB	---/ +39 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	500 MHz	-167.20 dBm/Hz	32.8 dB	---/ +35 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	1000 MHz	-167.10 dBm/Hz	32.9 dB	---/ +35 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	1500 MHz	-165.90 dBm/Hz	34.1 dB	---/ +35 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	2000 MHz	-166.70 dBm/Hz	33.3 dB	---/ +35 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	2500 MHz	-165.90 dBm/Hz	34.1 dB	---/ +37 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	3000 MHz	-165.30 dBm/Hz	34.7 dB	---/ +37 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	3500 MHz	-164.70 dBm/Hz	35.3 dB	---/ +36 dB	--- pass	4.5 dB
* -200.000 dBm/Hz	4000 MHz	-166.70 dBm/Hz	33.3 dB	---/ +36 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	4500 MHz	-165.20 dBm/Hz	34.8 dB	---/ +36 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	5000 MHz	-167.60 dBm/Hz	32.4 dB	---/ +36 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	5500 MHz	-166.60 dBm/Hz	33.4 dB	---/ +36 dB	--- pass	2.0 dB

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* -200.000 dBm/Hz	6000 MHz	-167.90 dBm/Hz	32.1 dB	---/ +36 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	6500 MHz	-168.40 dBm/Hz	31.6 dB	---/ +36 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	7000 MHz	-168.30 dBm/Hz	31.7 dB	---/ +36 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	7499 MHz	-167.80 dBm/Hz	32.2 dB	---/ +36 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	7501 MHz	-167.80 dBm/Hz	32.2 dB	---/ +36 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	8000 MHz	-167.80 dBm/Hz	32.2 dB	---/ +36 dB	--- pass	2.0 dB
* -200.000 dBm/Hz	8400 MHz	-167.30 dBm/Hz	32.7 dB	---/ +37 dB	--- pass	2.0 dB
3rd order intercept point						
-18 dBm mixer level, two-tone 100 kHz separation						
Preamp off						
30.000 dBm	10 MHz	18.40 dBm	-11.6 dB	-16.5/--- dB	--- pass	1.5 dB
30.000 dBm	20 MHz	19.00 dBm	-11.0 dB	-16.5/--- dB	--- pass	1.5 dB
30.000 dBm	30 MHz	19.20 dBm	-10.8 dB	-16.5/--- dB	--- pass	1.5 dB
30.000 dBm	45 MHz	17.80 dBm	-12.2 dB	-16.5/--- dB	--- pass	1.5 dB
30.000 dBm	50 MHz	19.70 dBm	-10.3 dB	-16.5/--- dB	--- pass	1.5 dB
30.000 dBm	100 MHz	19.80 dBm	-10.2 dB	-16.5/--- dB	--- pass	1.5 dB
30.000 dBm	200 MHz	19.90 dBm	-10.1 dB	-16.5/--- dB	--- pass	1.5 dB
30.000 dBm	500 MHz	20.10 dBm	-9.9 dB	-12/--- dB	--- pass	1.5 dB
30.000 dBm	1000 MHz	21.30 dBm	-8.7 dB	-10/--- dB	--- pass	1.5 dB
30.000 dBm	1500 MHz	21.80 dBm	-8.2 dB	-9/--- dB	--- pass	1.5 dB
30.000 dBm	2000 MHz	22.40 dBm	-7.6 dB	-9/--- dB	--- pass	1.5 dB
30.000 dBm	2500 MHz	22.30 dBm	-7.7 dB	-9/--- dB	--- pass	1.5 dB
30.000 dBm	3000 MHz	22.90 dBm	-7.1 dB	-9/--- dB	--- pass	1.5 dB
30.000 dBm	3500 MHz	22.90 dBm	-7.1 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	4000 MHz	23.00 dBm	-7.0 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	4500 MHz	21.30 dBm	-8.7 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	5000 MHz	22.90 dBm	-7.1 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	5500 MHz	23.30 dBm	-6.7 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	6000 MHz	22.90 dBm	-7.1 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	6500 MHz	22.50 dBm	-7.5 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	7000 MHz	20.50 dBm	-9.5 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	7500 MHz	21.80 dBm	-8.2 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	8000 MHz	22.80 dBm	-7.2 dB	-11/--- dB	--- pass	1.5 dB
30.000 dBm	8400 MHz	21.60 dBm	-8.4 dB	-11/--- dB	--- pass	1.5 dB
IF Filters						
Bandwidth Switching Uncertainty						
3 dB Filters, relative to 30 kHz						
at Carrier Frequency 50 MHz						
Preamp off						
300 Hz Bandwidth, 3 kHz Span						
0.000 dB	50 MHz	-0.00 dB	0.000 dB	±0.03 dB	--- pass	0.012 dB
510 Hz Bandwidth, 5 kHz Span						
0.000 dB	50 MHz	0.00 dB	0.000 dB	±0.03 dB	--- pass	0.012 dB
1 kHz Bandwidth, 10 kHz Span						

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0.000dB	50 MHz	0.00dB	0.000dB	±0.03dB	--- pass	0.012 dB
3 kHz Bandwidth, 10 kHz Span						
0.000dB	50 MHz	-0.00dB	0.000dB	±0.03dB	--- pass	0.012 dB
10 kHz Bandwidth, 30 kHz Span						
0.000dB	50 MHz	0.00dB	0.000dB	±0.03dB	--- pass	0.012 dB
30 kHz Bandwidth, 100 kHz Span						
0.000dB	50 MHz	0.01dB	0.010dB	±0.03dB	--- pass	0.012 dB
100 kHz Bandwidth, 300 kHz Span						
0.000dB	50 MHz	0.00dB	0.000dB	±0.03dB	--- pass	0.012 dB
300 kHz Bandwidth, 1 MHz Span						
0.000dB	50 MHz	0.01dB	0.010dB	±0.03dB	--- pass	0.012 dB
1 MHz Bandwidth, 3 MHz Span						
0.000dB	50 MHz	0.00dB	0.000dB	±0.03dB	--- pass	0.012 dB
1.5 MHz Bandwidth, 5 MHz Span						
0.000dB	50 MHz	0.01dB	0.010dB	±0.03dB	--- pass	0.012 dB
2 MHz Bandwidth, 10 MHz Span						
0.000dB	50 MHz	0.00dB	0.000dB	±0.05dB	--- pass	0.012 dB
3 MHz Bandwidth, 10 MHz Span						
0.000dB	50 MHz	0.00dB	0.000dB	±0.1dB	--- pass	0.012 dB
4 MHz Bandwidth, 20 MHz Span						
0.000dB	50 MHz	0.01dB	0.010dB	±1dB	--- pass	0.012 dB
5 MHz Bandwidth, 25 MHz Span						
0.000dB	50 MHz	-0.00dB	0.000dB	±1dB	--- pass	0.012 dB
6 MHz Bandwidth, 30 MHz Span						
0.000dB	50 MHz	0.01dB	0.010dB	±1dB	--- pass	0.012 dB
8 MHz Bandwidth, 40 MHz Span						
0.000dB	50 MHz	-0.00dB	0.000dB	±1dB	--- pass	0.012 dB
IF Filter Bandwidth Accuracy						
Filters: -3.01 dB Filters						
at Carrier Frequency 50 MHz						
Preamp off						
— only nominal						
8.000000000MHz	8 MHz	7.75900000MHz	-0.241MHz	±1.2MHz	20% pass	80 kHz
6.0000MHz	6 MHz	5.891MHz	-0.109MHz	±0.9MHz	12% pass	60 kHz
3.0000 MHz	3 MHz	2.978MHz	-0.022MHz	±0.21 MHz	11% pass	30 kHz
1.0000 MHz	1 MHz	0.998MHz	-0.002MHz	±0.02 MHz	10% pass	10 kHz
300.00 kHz	300 kHz	300.7 kHz	0.7 kHz	±6 kHz	12% pass	3.0 kHz
100.00 kHz	100 kHz	100.2 kHz	0.2 kHz	±2 kHz	10% pass	1.0 kHz
30.000 kHz	30 kHz	30.01 kHz	0.01 kHz	±0.6 kHz	2% pass	300 Hz
10.000 kHz	10 kHz	10.00 kHz	0.00 kHz	±0.2 kHz	2% pass	100 Hz
3.0000 kHz	3 kHz	3.001 kHz	0.001 kHz	±0.06 kHz	2% pass	30 Hz
1.0000 kHz	1 kHz	1.000 kHz	0.000 kHz	±0.02 kHz	0% pass	10 Hz
300.00 Hz	300 Hz	300.1 Hz	0.1 Hz	±6 Hz	2% pass	3.0 Hz

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Input Attenuator Switching Uncertainty						
Input Attenuator = 10 dB (REF), Ref Level = -55 dBm						
@Frequency 50 MHz						
Input Attenuator = 5 dB, Ref Level = -60 dBm						
0.021dB		-0.00dB	-0.021dB	±0.18 dB	--- pass	0.070 dB
Input Attenuator = 15 dB, Ref Level = -50 dBm						
0.011dB		0.03dB	0.019dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 20 dB, Ref Level = -45 dBm						
0.052dB		0.05dB	-0.002dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 25 dB, Ref Level = -40 dBm						
0.063dB		0.12dB	0.057dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 30 dB, Ref Level = -35 dBm						
0.135dB		0.14dB	0.005dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 35 dB, Ref Level = -30 dBm						
0.146dB		0.16dB	0.014dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 40 dB, Ref Level = -25 dBm						
0.184dB		0.18dB	-0.004dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 45 dB, Ref Level = -20 dBm						
0.195dB		0.21dB	0.015dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 50 dB, Ref Level = -15 dBm						
0.186dB		0.19dB	0.004dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 55 dB, Ref Level = -10 dBm						
0.197dB		0.22dB	0.023dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 60 dB, Ref Level = -5 dBm						
0.197dB		0.23dB	0.033dB	±0.14 dB	--- pass	0.070 dB
Input Attenuator = 65 dB, Ref Level = 0 dBm						
0.208dB		0.28dB	0.072dB	±0.14 dB	--- pass	0.070 dB
Reference Level Accuracy						

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Log Scale, 10 dB Steps						
by laboratory estimated tolerance						
Ref Level = -15 dBm -0.022dB		-0.01dB	0.012dB	±0.2dB	--- pass	0.070 dB
Ref Level = -5 dBm -0.011dB		0.04dB	0.051dB	±0.2dB	--- pass	0.070 dB
Ref Level = -35 dBm -0.073dB		-0.04dB	0.033dB	±0.2dB	--- pass	0.070 dB
Ref Level = -45 dBm -0.156dB		-0.12dB	0.036dB	±0.2dB	--- pass	0.070 dB
Ref Level = -55 dBm -0.208dB		-0.16dB	0.048dB	±0.2dB	--- pass	0.070 dB
Ref Level = -65 dBm -0.198dB		-0.14dB	0.06dB	±0.2dB	--- pass	0.13 dB
Ref Level = -75 dBm -0.190dB		-0.26dB	-0.07dB	±0.2dB	--- pass	0.13 dB
Display linearity						
Log. scaling @ 50 MHz, -25 dBm Ref Level						
20.013dB		20.02dB	0.007dB	±0.1dB	--- pass	0.070 dB
10.002dB		9.97dB	-0.032dB	±0.07 dB	--- pass	0.070 dB
-10.049dB		-10.07dB	-0.021dB	±0.07 dB	--- pass	0.070 dB
-20.132dB		-20.14dB	-0.008dB	±0.07 dB	--- pass	0.070 dB
-30.184dB		-30.18dB	0.004dB	±0.07 dB	--- pass	0.070 dB
-40.174dB		-40.18dB	-0.006dB	±0.07 dB	--- pass	0.070 dB
-50.166dB		-50.11dB	0.06dB	±0.07 dB	--- pass	0.13 dB
Frequency Response, at 20 to 30 Degrees C						
Preamp Off, DC coupled , Input Attenuator 10 dB						
at Inputlevel -10 dBm						

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50 MHz Reference Frequency						
0.009 MHz						
0.000dB		0.20dB	0.200dB	±0.46dB	--- pass	0.075 dB
0.01 MHz						
0.000dB		0.18dB	0.180dB	±0.46dB	--- pass	0.075 dB
0.02 MHz						
0.000dB		0.13dB	0.130dB	±0.46dB	--- pass	0.075 dB
0.05 MHz						
0.000dB		-0.01dB	-0.010dB	±0.46dB	--- pass	0.075 dB
0.1 MHz						
0.000dB		-0.05dB	-0.050dB	±0.46dB	--- pass	0.075 dB
0.2 MHz						
0.000dB		0.00dB	0.000dB	±0.46dB	--- pass	0.027 dB
0.5 MHz						
0.000dB		-0.03dB	-0.030dB	±0.46dB	--- pass	0.027 dB
1 MHz						
0.000dB		-0.04dB	-0.040dB	±0.46dB	--- pass	0.027 dB
2 MHz						
0.000dB		-0.03dB	-0.030dB	±0.46dB	--- pass	0.027 dB
5 MHz						
0.000dB		-0.01dB	-0.010dB	±0.46dB	--- pass	0.027 dB
10 MHz						
0.000dB		-0.00dB	0.000dB	±0.35dB	--- pass	0.027 dB
20 MHz						
0.000dB		-0.02dB	-0.020dB	±0.35dB	--- pass	0.027 dB
50 MHz						
0.000dB		0.00dB	0.000dB	±0.35dB	--- pass	0.027 dB
100 MHz						
0.000dB		0.00dB	0.000dB	±0.35dB	--- pass	0.053 dB
200 MHz						
0.000dB		-0.01dB	-0.010dB	±0.35dB	--- pass	0.053 dB
500 MHz						
0.000dB		-0.02dB	-0.020dB	±0.35dB	--- pass	0.053 dB
1000 MHz						
0.000dB		-0.03dB	-0.030dB	±0.35dB	--- pass	0.053 dB
2000 MHz						
0.000dB		-0.06dB	-0.060dB	±0.35dB	--- pass	0.053 dB
3000 MHz						
0.000dB		-0.04dB	-0.040dB	±0.35dB	--- pass	0.053 dB
4000 MHz						
0.000dB		-0.58dB	-0.580dB	±1.5dB	--- pass	0.053 dB
5000 MHz						
0.000dB		-0.49dB	-0.490dB	±1.5dB	--- pass	0.053 dB
6000 MHz						
0.000dB		-0.59dB	-0.590dB	±1.5dB	--- pass	0.053 dB
7000 MHz						

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MUSTER

D-K-
15070-01-00

2024-07

Bezugswert Reference value	Messbedingung Measuring condition	Messwert KG Measured value UUT	Abweichung deviation	Zulässige Abweichung Allowed deviation	Ausnutzung der zul. Abw. in % Utilization of Allowed deviation %	Messunsicher- heit ($k=2$) Measuring uncertainty ($k=2$)
0.000 dB		-0.60 dB	-0.600 dB	±1.5 dB	--- pass	0.088 dB
8000 MHz						
0.000 dB		-0.69 dB	-0.690 dB	±1.5 dB	--- pass	0.088 dB
8400 MHz						
0.000 dB		-0.68 dB	-0.680 dB	±2 dB	--- pass	0.088 dB
Frequency Response, at 20 to 30 Degrees C						
Preamp On, DC coupled , Input Attenuator 0 dB						
at Inputlevel -60 dBm (Ref Level -55 dBm)						
50 MHz Reference Frequency						
0.1 MHz						
0.000 dB		-0.05 dB	-0.05 dB	--- dB	---	0.17 dB
0.2 MHz						
0.000 dB		-0.05 dB	-0.05 dB	--- dB	---	0.17 dB
0.5 MHz						
0.000 dB		-0.06 dB	-0.06 dB	--- dB	---	0.17 dB
1 MHz						
0.000 dB		-0.08 dB	-0.08 dB	±0.68 dB	--- pass	0.17 dB
2 MHz						
0.000 dB		-0.04 dB	-0.04 dB	±0.68 dB	--- pass	0.17 dB
5 MHz						
0.000 dB		0.13 dB	0.13 dB	±0.68 dB	--- pass	0.17 dB
10 MHz						
0.000 dB		0.22 dB	0.22 dB	±0.68 dB	--- pass	0.17 dB
20 MHz						
0.000 dB		0.10 dB	0.10 dB	±0.68 dB	--- pass	0.17 dB
50 MHz						
0.000 dB		0.02 dB	0.02 dB	±0.55 dB	--- pass	0.17 dB
100 MHz						
0.000 dB		0.10 dB	0.10 dB	±0.55 dB	--- pass	0.17 dB
200 MHz						
0.000 dB		0.06 dB	0.06 dB	±0.55 dB	--- pass	0.17 dB
500 MHz						
0.000 dB		0.08 dB	0.08 dB	±0.55 dB	--- pass	0.17 dB
1000 MHz						
0.000 dB		0.10 dB	0.10 dB	±0.55 dB	--- pass	0.17 dB
2000 MHz						
0.000 dB		0.06 dB	0.06 dB	±0.55 dB	--- pass	0.17 dB
3000 MHz						
0.000 dB		0.11 dB	0.11 dB	±0.55 dB	--- pass	0.31 dB
4000 MHz						
0.000 dB		-0.60 dB	-0.60 dB	±2 dB	--- pass	0.31 dB
5000 MHz						
0.000 dB		-0.75 dB	-0.75 dB	±2 dB	--- pass	0.31 dB

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Bezugswert Reference value	Messbedingung Measuring condition	Messwert KG Measured value UUT	Abweichung deviation	Zulässige Abweichung Allowed deviation	Ausnutzung der zul. Abw. in % Utilization of Allowed deviation %	Messunsicher- heit ($k=2$) Measuring uncertainty ($k=2$)
6000 MHz						
0.000 dB		-0.84 dB	-0.84 dB	±2 dB	--- pass	0.31 dB
7000 MHz						
0.000 dB		-0.87 dB	-0.87 dB	±2 dB	--- pass	0.31 dB
8000 MHz						
0.000 dB		-0.71 dB	-0.71 dB	±2 dB	--- pass	0.31 dB
8400 MHz						
0.000 dB		-0.88 dB	-0.88 dB	±2.3 dB	--- pass	0.31 dB
Absolute Level Accuracy 50 MHz, at 20 to 30 Degrees C						
Preamp Off, DC coupled , Input Attenuator 10 dB						
-4.000 dBm	2 MHz	-3.97 dBm	0.030 dB	±0.24 dB	--- pass	0.027 dB
-9.000 dBm	1 MHz	-8.97 dBm	0.030 dB	±0.24 dB	--- pass	0.027 dB
-14.000 dBm	500 kHz	-13.97 dBm	0.03 dB	±0.24 dB	--- pass	0.17 dB
Preamp Off, DC coupled , Input Attenuator 20 dB						
-4.000 dBm	100 kHz	-3.94 dBm	0.060 dB	±0.38 dB	--- pass	0.027 dB
-14.000 dBm	100 kHz	-13.96 dBm	0.04 dB	±0.38 dB	--- pass	0.17 dB
Preamp Off, DC coupled , Input Attenuator 30 dB						
-4.000 dBm	100 kHz	-3.96 dBm	0.040 dB	±0.38 dB	--- pass	0.027 dB
-14.000 dBm	100 kHz	-13.95 dBm	0.05 dB	±0.38 dB	--- pass	0.17 dB
Preamp On, DC coupled , Input Attenuator 10 dB (1 kHz RBW)						
-43.022 dBm	106 kHz	-42.97 dBm	0.05 dB	±0.36 dB	--- pass	0.17 dB
Phase Noise with Carrier 1 GHz						
Referred to 1 Hz RBW						
Best-case Optimization, Internal Reference						
100 Hz offset						
* -107.000 dBc/Hz	1 GHz	-111.23 dBc/Hz	-4.2 dB	-100/ +0 dB	--- pass	1.0 dB
10 kHz offset						
* -134.000 dBc/Hz	1 GHz	-135.19 dBc/Hz	-1.2 dB	-100/ +0 dB	--- pass	1.0 dB
100 kHz offset						
* -139.000 dBc/Hz	1 GHz	-141.87 dBc/Hz	-2.9 dB	-100/ +0 dB	--- pass	1.0 dB
1 MHz offset						

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Bezugswert Reference value	Messbedingung Measuring condition	Messwert KG Measured value UUT	Abweichung deviation	Zulässige Abweichung Allowed deviation	Ausnutzung der zul. Abw. in % Utilization of Allowed deviation %	Messunsicher- heit ($k=2$) Measuring uncertainty ($k=2$)
* -145.000 dBc/Hz	1 GHz	-147.78 dBc/Hz	-2.8 dB	-100/ +0 dB	--- pass	1.0 dB
Input VSWR						
Input Attenuator 10 dB, DC coupled						
Unit is VSWR						
1.0570	10.000 MHz	1.000	-0.0570	-0.101/---	56% pass	0.0098
1.0683	20.000 MHz	1.000	-0.0683	-0.101/---	68% pass	0.0099
1.0763	30.000 MHz	1.000	-0.076	-0.101/---	76% pass	0.010
1.0750	45.000 MHz	1.000	-0.075	-0.101/---	74% pass	0.010
1.0681	50.000 MHz	1.000	-0.0681	-0.101/---	68% pass	0.0099
1.0677	100.000 MHz	1.000	-0.0677	-0.101/---	67% pass	0.0099
1.0560	200.000 MHz	1.000	-0.0560	-0.101/---	55% pass	0.0098
1.0791	500.000 MHz	1.000	-0.079	-0.101/---	78% pass	0.010
1.0813	1000.000 MHz	1.000	-0.081	-0.101/---	81% pass	0.010
1.0632	1500.000 MHz	1.000	-0.0632	-0.101/---	63% pass	0.0099
1.0292	2000.000 MHz	1.000	-0.0292	-0.101/---	29% pass	0.0094
1.0316	2500.000 MHz	1.000	-0.0316	-0.101/---	31% pass	0.0095
1.1459	3000.000 MHz	1.000	-0.146	---	---	0.011
1.1044	3500.000 MHz	1.000	-0.104	---	---	0.010
1.0150	4000.000 MHz	1.000	-0.0150	-0.278/---	5% pass	0.0093
1.0541	4500.000 MHz	1.000	-0.0541	-0.278/---	20% pass	0.0098
1.2371	5000.000 MHz	1.000	-0.237	-0.278/---	85% pass	0.012
1.3671	5500.000 MHz	1.000	-0.367	---	---	0.014
1.2202	6000.000 MHz	1.000	-0.220	-0.278/---	79% pass	0.012
1.0802	6500.000 MHz	1.000	-0.080	-0.278/---	29% pass	0.010
1.1278	7000.000 MHz	1.000	-0.128	-0.278/---	46% pass	0.011
1.0883	7500.000 MHz	1.000	-0.088	-0.278/---	32% pass	0.010
1.0770	8000.000 MHz	1.000	-0.077	-0.278/---	28% pass	0.010
1.0423	8400.000 MHz	1.000	-0.0423	-0.341/---	12% pass	0.0096
Clock-Reference						
Internal Frequency Accuracy						
:by Measuring on Ref. Out						
Deviation of 10 MHz (Option PFR), Drift not tested						
9.999999810 MHz		10.00000000 MHz	0.00000019 MHz	±0.000001 MHz	19% pass	0.10 Hz

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Messunsicherheit Measuring uncertainty

Angegeben ist die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor $k = 2$ ergibt. Sie wurde gemäß EA-4/02 M: 2022 ermittelt. Der Wert der Messgröße liegt mit einer Wahrscheinlichkeit von etwa 95 % im zugeordneten Werteintervall. Ein Anteil für die Langzeit-Instabilität ist nicht enthalten. Die dimensionslosen Anteile der Messunsicherheit sind als relative Messunsicherheiten bezogen auf den Messwert zu verstehen.

The expanded uncertainty of measurement corresponding to the measurement results is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$. This was determined in accordance with EA-4/02 M: 2022. Usually the true value is located in the corresponding interval with a probability of approximately 95%. The non-dimensional fractions of the measuring uncertainty are relative values in relation to the indicated value.

Bemerkungen Special remarks

Die mit * gekennzeichneten Messwerte sind rückführbar auf Normale eines nationalen metrologischen Instituts (NMI), sind aber außerhalb des akkreditierten Bereiches des ausstellenden Labors

The measurements marked with * are traceable to standards at the national metrological institute (NMI), but are not within the accredited scope of the issuing laboratory

Bewertung der Konformität Determination of conformity

Gesamtkonformität: Overall conformity:

Alle Messergebnisse liegen innerhalb der zulässigen Abweichung

All measurement results are within the allowed deviation

1) Die Konformitätsaussage erfolgt gemäß der Entscheidungsregel 'Vertrauensniveau 50' mit einer Konformitätswahrscheinlichkeit größer 50%. Zulässige Abweichung gemäß Herstellerangabe.

1) The statement of conformity is made according to the decision rule 'confidence level 50' with a probability of conformity greater than 50%. Allowed deviation in accordance with manufacturer.

Zeichenerklärung zum Diagramm:
 ◆ blau = Normal (4Eck; μ N normiert)
 ● grün = Kalibriergesamt. (Kreis; μ (KG) normiert)
 — rot = $\pm$ Zulässige Abweichung (normiert auf $\pm 100\%$)
 H schwarz = erw. Messunsicherheit für $k=2$ (normiert)

Die Einhaltung der Spezifikation wird im Kalibrierzertifikat wie folgt angezeigt:

The compliance to specification is represented on the calibration certificate as follows:

Messwert und Messunsicherheit innerhalb der zulässigen Abweichung Measured value and measurement uncertainty within specification	pass	
Messwert innerhalb und Messunsicherheit außerhalb der zulässigen Abweichung. Measured value within and measurement uncertainty outside the specification.	pass	
Messwert außerhalb und Messunsicherheit teilweise innerhalb der zulässigen Abweichung Measured value outside and measurement uncertainty partly within the specification.	fail	
Messwert und Messunsicherheit außerhalb der zulässigen Abweichung Measured value and measurement uncertainty outside specification.	fail	

Ausnutzung der zulässigen Abweichung in % = $| \text{Abweichung} | / \text{Zulässige Abweichung}$

Utilization of allowed deviation % = $| \text{deviation} | / \text{allowed deviation}$

Die Angabe der Toleranzausnutzung in % ist bei logarithmischen Einheiten nicht sinnvoll und wird mit "---" entwertet.

The indication of the tolerance utilization in % is not applicable for logarithmic units and is invalidated with "---".

The German original text is valid in case of doubt.

- Ende des Kalibrierscheins -
 - End of the calibration certificate. -