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Member of the **Deutschen Kalibrierdienst**



Calibration Certificate No. 081002-03

Outgoing Test

Object	Digital multimeter esz Testmodell (AB)
Serial No.	123456
Customer	esz Marketing Max-Planck-Str. 16 82223 Eichenau Germany
esz ID	081002
Test Equipment No.	Testmodell (AB)
Inventory No.	n.a.
Customer Ref. No.	
Order No.	Layouttest 2020-03 DKD OS
Traceability	This calibration certificate documents the metrological traceability to the International System of Units (SI, <i>Système international d'unités</i>). Quality management system, principles and calibration procedures according to DIN EN ISO/IEC 17025 are accredited by the DAkkS. 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.
Date of Calibration	2020-03-30 to 2020-03-31
Next Calibration	2021-03 The definition and compliance to intervals for recalibrations lie within the user's responsibility.
Approved by	Andreas Böck on 2020-03-31
Laboratory Manager	Person in Charge



Philip M. Fleischmann



Andreas Böck

1. Device Under Test

Manufacturer:	esz
Model:	Testmodell (AB)
Model type:	Digital multimeter
Option(s):	no specifications
Application(s):	AC DC
Connector(s):	4-mm socket
Type:	Handheld device
Inspection equipment No.:	Testmodell (AB)
Inventory No.:	n.a.

All stated measurement and test results relate only to the item mentioned above.

2. Calibration Procedure

- Direct measurement procedure using fixed standards or a variable AC/DC-source according to QMH III.1

Calibration procedure revision 3.0, approved 2020-03-31 by Andreas Böck

Calibration equipment and standards:

Standards	Manufacturer Model	Device	Traceable to	Cal. no.	Last cal.	Next cal.
001407	Hewlett Packard 11683A	Calibrator	D-K-15019-01-00	001407-05	2018-05	2020-05

Auxiliary equipment and devices:

Aux. devices	Manufacturer Model	Device	Traceable to	Cal. no.	Last cal.	Next cal.
000645	Maury Microwave A007A	dial indicator	D-K-15019-01-00	000645-03	2019-09	2022-09
078911	Rohde & Schwarz FMAV	Modulation analyzer	0323,416398,422508,422510,422511,424015,438591,458431,459176,462127,462980,464465,466974,484815,663987	078911-04	2019-02	2021-02

Traceability to national/international Standards:

Standards	Manufacturer Model	Device	Traceable to	Cal. no.
0323	Rohde & Schwarz RSP	Precision Step Attenuator	D-K-15195-01-00	0323
416398	Rohde & Schwarz NRV	Dual Channel Power Meter	D-K-15195-01-00	416398
422508	Rohde & Schwarz NRP-Z91	Power Sensor	D-K-15195-01-00	422508
422510	Rohde & Schwarz NRP-Z91	Power Sensor	D-K-15195-01-00	422510
422511	Rohde & Schwarz NRP-Z91	Power Sensor	D-K-15195-01-00	422511
424015	Rohde & Schwarz FMAB	Mod. Analyzer	D-K-15012-01-00	424015
438591	Rohde & Schwarz FSL6	Spectrum Analyzer	D-K-15195-01-00	438591
458431	Agilent 3458A	Digital multimeter	D-K-15012-01-00	458431
459176	Rohde & Schwarz URV5-Z2	10V Insertion Unit	D-K-15195-01-01	459176
462127	Rohde & Schwarz URE3	RMS Peak-Voltmeter	D-K-15012-01-00	462127
462980	Anritsu 87A50-1	VSWR Bridge	D-K-15195-01-01	462980
464465	Agilent 8482A	Power Sensor	D-K-15012-01-00	464465
466974	Rohde & Schwarz UPV	Audio Analyzer	D-K-15012-01-00	466974
484815	Rohde & Schwarz ZRB2	SWR Bridge	D-K-15195-01-01	484815
663987	Microsemi System2000	Standard frequency unit 1X1	D-K-15195-01-00	663987

3. Ambient Conditions

Temperature [22,2 to 22,3] °C ± 1 K
 Relative Humidity [33 to 34] % ± 3 %
 Barometric Pressure [961 to 962] mbar ± 5 mbar

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4. Test Conditions

Acquisition method: Manually
Resolution: 4,5 Digit

Appropriate storage time at ambient conditions and warm up time have been observed.

5. Place of Calibration

Max-Planck-Straße 16
82223 Eichenau
Germany

6. Measurement Uncertainties (MU)

The given measurement uncertainties are calculated in accordance to EA-4/02 M: 2022 and contain the uncertainties of the calibration method, the calibration equipment and of the DUT during calibration. Any long term instability is not considered. The uncertainty as stated is the expanded uncertainty obtained by multiplying the standard uncertainty by coverage factor $k = 2$. The value of the measurands lies within the assigned range of values with a probability of 95 %. Relative uncertainties are based on the nominal test point (calibration of measurement devices), otherwise on the measured value (calibration of sources or standards).

7. Additional Maintenance

☒ Adjustment ☐ Repair ☐ Function Test ☐ Cleaning

8. Remarks

keine Spezifikationen, ILAC PASS; Prozent des Spezifikationsbereichs; Kal.-Intervall 12 Monate; Zeilendiagramm;

9. Detailed Results: Outgoing Test

The definition of test points has been done considering the laboratory's measurement capabilities and technical infrastructure according to the following source(s):
calibration expert: Testdokument Spezifikationen und Auswahl der Messpunkte.pdf

The comma is used as decimal separator.

DC Voltage

(no specifications)

Range	Nominal Value	Measured Value	Deviation	MU	Rem.
15 V	10,000 V	10,001 V	0,010 %	0,22 %	
15 V	10,000 V	10,101 V	1,01 %	0,22 %	
15 V	10,000 V	10,111 V	1,11 %	0,22 %	
15 V	10,000 V	10,131 V	1,31 %	0,22 %	
15 V	10,000 V	10,155 V	1,55 %	0,22 %	

DC Voltage

(no specifications)

Range	Nominal Value	Measured Value	Deviation	MU	Rem.
15 V	Ø 10,000 V (n=5)	Ø 10,100 V (n=5)	1,00 %	0,57 %	

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DC Voltage

(no specifications)

Range	Nominal Value	Measured Value	Deviation	MU	Rem.
15 V	10,000 V	10,001 V	$100 \cdot 10^{-6}$	0,22 %	
15 V	10,000 V	10,101 V	1,01 %	0,22 %	
15 V	10,000 V	10,111 V	1,11 %	0,22 %	
15 V	10,000 V	10,131 V	1,31 %	0,22 %	
15 V	10,000 V	10,155 V	1,55 %	0,22 %	
15 V	Ø 10,000 V (n=5)	Ø 10,100 V (n=5)	1,00 %	0,57 %	

Function test

Test	Condition	Result
Connector has been cleaned (free of dust and residue)?	isopropanol	PASS
Pin depth without protrusion?		PASS

End of calibration certificate