ROHDE&SCHWARZ

CALIBRATION CERTIFICATE

Kalibrierschein

Certificate Number
Zertifikatsnummer

0001A300623436

DAkkS Deutsche Akkreditierungsstelle D-K-15195-01-00

General Data

Item Gegenstand	FS-Z90 HARMONIC MIXER 60-90GHZ		
Manufacturer Hersteller	ROHDE & SCHWARZ		
Type Typ	FS-Z90		
Material Number Materialnummer	1048.0371.02	**Serial Number** Seriennummer	101811
Order Number Bestellnummer	8800012961 10, 516816.0	**Asset Number** Inventarnummer	
Customer Auftraggeber	Sporton International Inc. 6F., Sec. 1, Hsin Tai Wu Rd., No. 106 221 New Taipei City TW		

Performance

Place and Date of Calibration Ort und Datum der Kalibrierung	87700 Memmingen, Rohde-und-Schwarz-Str. 1 2021-11-16
Statement of Compliance (Incoming) Konformitätsaussage (Anlieferung)	All measured values are within the data sheet specifications.
Statement of Compliance (Outgoing) Konformitätsaussage (Auslieferung)	All measured values are within the data sheet specifications.
Customers due Interval Kalibrierintervall des Kunden	
Extent of Calibration Document Umfang des Kalibrierdokuments	3 Certificate 6 Outgoing Results 6 Incoming Results

Date of Issue Ausstellungsdatum	**Approval of the certificate by** Freigabe des Kalibrierscheins durch	
2021-11-16	Dr. Gerhard Rösel	Johannes Negele
	Laboratory management Labormanagement	**Person responsible** Bearbeiter

Calibration Mark
Kalibrierzeichen

300623436
D-K-15195-01-00
2021-11

Member of Deutscher Kalibrierdienst
Mitglied im Deutschen Kalibrierdienst

DKD

This calibration certificate documents the metrological traceability to national standards, which realize the units of measurement according 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 user is obliged to have the object recalibrated at appropriate intervals. This calibration certificate may not be reproduced other than in full except with the permission of the issuing laboratory. Calibration certificates with the full name of the approval responsible person are valid without signature.

Dieser Kalibrierschein dokumentiert die metrologische Rückführbarkeit auf nationale Normale zur Darstellung der Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Die DAkkS ist Unterzeichner der multilateralen Übereinkommen der European cooperation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine. Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich. Dieser Kalibrierschein darf nur vollständig weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine sind bei Nennung des für die Freigabe Verantwortlichen in Klarschrift auch ohne Unterschrift gültig.

Calibration Procedure
The measuring object is an RF harmonic mixer, which converts an RF signal at one frequency into a signal at another frequency (here: IF). The conversion loss was measured using a vector network analyzer. The RF output power as well as the IF input power of the corresponding ports of the VNA were traced back to a power sensor. The conversion loss is defined as the ratio of the power at the IF frequency to the power at the RF frequency with a given LO power. (IF: Intermediate frequency; LO: Local Oscillator) The traceability is represented in the table Working Standards used.

Working Standards used

Item	Type	Serial Number	Calibration Certificate Number	Cal. Due
Therm.Power Sensor DC-44GHz	NRP-Z55	140170	0023 D-K-15195-01-00 2020-12	2022-02-28
Thermal Waveguide Power Sensor	NRP90TWG	910001	0001A300621305	2022-10-31
Vector Network Analyzer 4 Port	ZVA67	101175	0023 D-K-15195-01-00 2021-03	2022-03-31

Remarks

Environmental Conditions			
Ambient Temperature	(23 ± 1) °C	**Relative Humidity**	20%-60%

Comments on Measurement Results

The measurement results in the test report stated below have been tested for compliance with the given specifications and marked if necessary. The associated uncertainty of measurement has been taken into account, if not otherwise stated.
Measurement results that are not covered by the DAkkS accreditation are marked with ¹.
Ref.: ILAC G8:09/2019 'Guidelines on Decision Rules and Statements of Conformity'.

The expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor k = 2.
It was determined in accordance with EA-4/02 M:2013. The true value is located in the corresponding interval with a probability of 95 %.

In addition to the calibration results, the calibration certificate includes functional measurements that might have an influence on the measurement uncertainty of the calibration results. The functional measurement results are marked and are not intended to be used to support the further dissemination of metrological traceability. They are intended to verify the requirements on the measurement object according to manufacturer specifications and technical standards.

Outgoing Results

Designation:	**HARMONIC MIXER**
Type:	**FS-Z90**
Material No.:	**1048.0371.02**
Serial No.:	**101811**
Certificate No.:	**0001A300623436**
Referring to Test Documentation:	**5038.8323.01-PB-02.00**

Test Department:	**3MM-P**
Name:	**Johannes Negele**
Date:	**2021-11-16**

The following abbreviations may be used in this document

{a}	No measurement uncertainty stated because the errors always add together. So it is sure that a measurement result evaluated as "PASS" is pass.
{b}	The measurement uncertainty depends on the measurement result. The stated measurement uncertainty is valid for the close area around the specification. Measurement results outside the close area have a higher measurement uncertainty but are within the specification.
{c}	Functional test, therefore no measurement uncertainty is stated.
{d}	Typical value, refer to performance test.
{e}	The measurement uncertainty is taken into account when setting the measuring system.
{f}	Verification of specified requirements. Technical operation that consist of the determination of one or more characteristics to a specified procedure.
DL or DT	Data Limit for symmetrical tolerance limits
DLL	Datasheet Lower Limit
DUL	Datasheet Upper Limit
MU	Symmetrical Measurement Uncertainty
MLL or MLV	Measurement Uncertainty Lower Value
MUL or MUV	Measurement Uncertainty Upper Value
Nom.	Nominal Value
Dev.	Deviation
Act.	Actual Value
UGB	Uncertainty Guard Band: Measuring uncertainty violates the data (spec.) limit.
UGB1	A compliance statement may be possible where a confidence level of less than 95 % is acceptable.
UGB2	A non-compliance statement may be possible where a confidence level of less than 95 % is acceptable.
DU	Datasheet Uncertainty

Explanation of charts