

Calibration Certificate

Kalibrierschein

Certificate Number 24-0110-100930-02

Zertifikatsnummer

Unit Data

Item Gegenstand	Harmonic Mixer, 75 GHz to 110 GHz		
Manufacturer Hersteller	ROHDE & SCHWARZ		
Type Typ	R&S® FS-Z110		
Material Number Materialnummer	1089.0947.05	Serial Number Seriennummer	100930
Asset Number Inventarnummer			

This calibration certificate documents, that the named item is tested and measured against defined specifications. Measurement results are located usually in the corresponding interval with a probability of approx. 95% (coverage factor $k = 2$). Calibration is performed with test equipment and standards directly or indirectly traceable by means of approved calibration techniques to the PTB/DKD or other national/international standards, which realize the physical units of measurement according to the International System of Units (SI). In all cases where no standards are available, measurements are referenced to standards of the R&S laboratories. Principles and methods of calibration correspond with EN ISO/IEC 17025. This calibration certificate may not be reproduced other than in full. Calibration certificates without signatures are not valid. The user is obliged to have the object recalibrated at appropriate intervals.

Order Data

Customer Auftraggeber	Continental Resources Inc Ledge St 175 03060-3014 Nashua USA
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Order Number Bestellnummer	88000000525
Date of Receipt Eingangsdatum	2018-01-26

Performance

Place and Date of Calibration Ort und Datum der Kalibrierung	Meckenheim, 2018-02-13
Scope of Calibration Umfang der Kalibrierung	Standard Calibration
Statement of Compliance (Incoming) Konformitätsaussage (Anlieferung)	All measured values are <u>within the data sheet specifications.</u>
Statement of Compliance (Outgoing) Konformitätsaussage (Auslieferung)	All measured values are <u>within the data sheet specifications.</u>
Extend of Calibration Documents Umfang des Kalibrierdokuments	2 pages Calibration Certificate 5 pages Outgoing Results 3 pages Incoming Results

Dieser Kalibrierschein dokumentiert, dass der genannte Gegenstand nach festgelegten Vorgaben geprüft und gemessen wurde. Die Messwerte lagen im Regelfall mit einer Wahrscheinlichkeit von annähernd 95% im zugeordneten Wertebereich (Erweiterte Messunsicherheit mit $k = 2$). Die Kalibrierung erfolgte mit Messmitteln und Normalen, die direkt oder indirekt durch Ableitung mittels anerkannter Kalibriermethoden rückgeführt sind auf Normale der PTB/DKD oder anderer national/internationaler Standards zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Wenn keine Normale existieren, erfolgt die Rückführung auf Bezugsnormale der R&S-Laboren. Grundsätze und Verfahren der Kalibrierung beziehen sich auf EN ISO/IEC 17025. Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Kalibrierscheine ohne Unterschriften sind ungültig. Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

Radiometer Physics GmbH; Meckenheim

Date of Issue
Ausstellungsdatum

2018-02-19

Head of Laboratory
Laborleitungen

Schulze



Person Responsible
Bearbeiter

Gottbehuet



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Vers2010-05-05/
RPG2014-02-28

Calibration Method
Kalibrieranweisung

RPG-PAQA-TN-2014-002

Relative Humidity 20 % - 80 %
Relative Luftfeuchte

Ambient Temperature
Umgebungstemperatur

(23 ⁺⁷) °C

Working standards used (having a significant effect on the accuracy)
Verwendete Gebrauchsnormale (mit signifikantem Einfluss auf die Genauigkeit)

Item Gegenstand	Type Typ	Serial Number Seriennummer	Calibration Certificate Number Kalibrierscheinnummer	Cal. Due Kalibr. bis
Vector Network Analyzer	R&S® ZVA67	101097	20-300432406	2020-07-21
Powersensor	R&S® NRP-Z55	140093	20-300426315	2018-05-17
Powersensor	R&S® NRP-Z58	101064	20-611527	2018-07-22
Calibration kit	WR10	W10001	RPG-PAQA-TN-2014-005	2019-02-01

UGB1 A compliance statement may be possible where a confidence level of less than 95 % is acceptable.
Die Bestätigung der Konformität ist möglich, sofern ein Grad des Vertrauens von weniger als 95 % akzeptabel ist.

UGB2 A non-compliance statement may be possible where a confidence level of less than 95 % is acceptable.
Die Bestätigung der Nicht-Konformität ist möglich, sofern ein Grad des Vertrauens von weniger als 95 % akzeptabel ist.

Ref.: ILAC-G8:03/2009 'Guidelines on the Reporting of Compliance with Specification'.

Notes
Anmerkungen

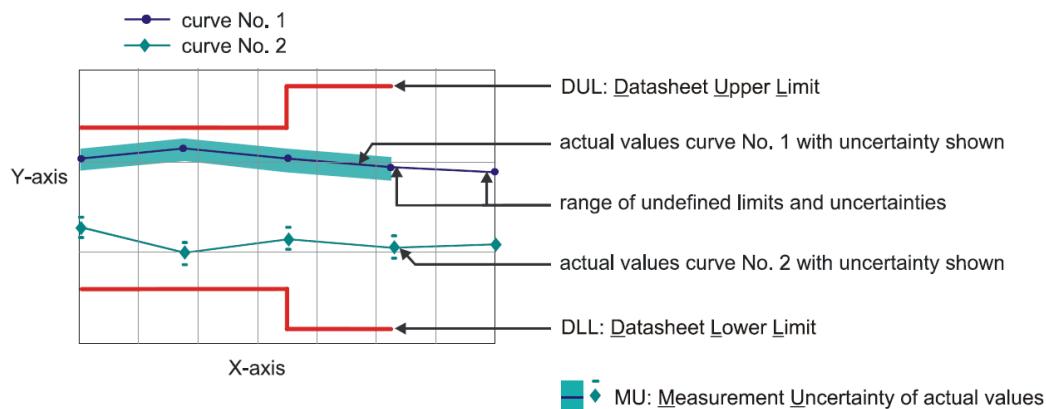
If the new product is stored under the climate conditions as specified in the data sheet upon delivery, the product's accuracy is not significantly affected within 12 month after its calibration in our factory. In this case, the recommended calibration interval starts on the date when the product is actually put into operation.

Outgoing Results

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.
- DL or DT Data Limit for symmetrical tolerance limits
 DLL Datasheet Lower Limit
 DUL Datasheet Upper Limit
 MU Measurement Uncertainty
 MLL or MLV Measurement Uncertainty Lower Value
 MUL or MUV Measurement Uncertainty Upper Value
 Nom. Nominal Value
 Dev. Deviation
 MErr. Measurement Error
 Act. Actual Value
 UGB Uncertainty Guard Band: Measuring uncertainty violates the data (spec.) limit.
 UGB1 Measurement results marked as UGB1 show conformity with a probability of >50 % and <95 %.
 UGB2 Measurement results marked as UGB2 show non-conformity with a probability of >50 % and <95 %.
 DU Datasheet Uncertainty

Explanation of charts



Software used for measurement**Item Type**

Measurement Studio Professional Edition
MixerCertification

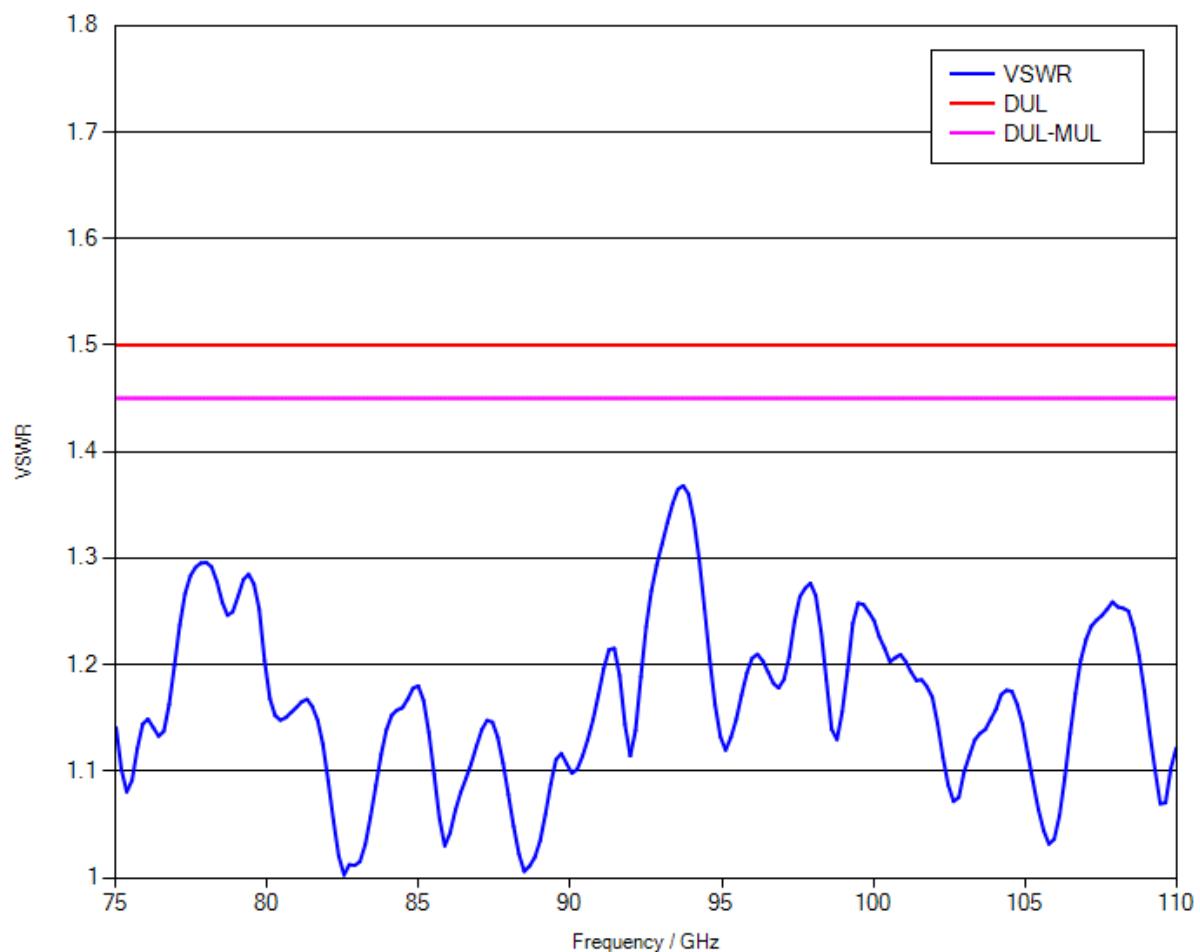
Version

2013
7_08

Remark

1.1 RF Input – VSWR

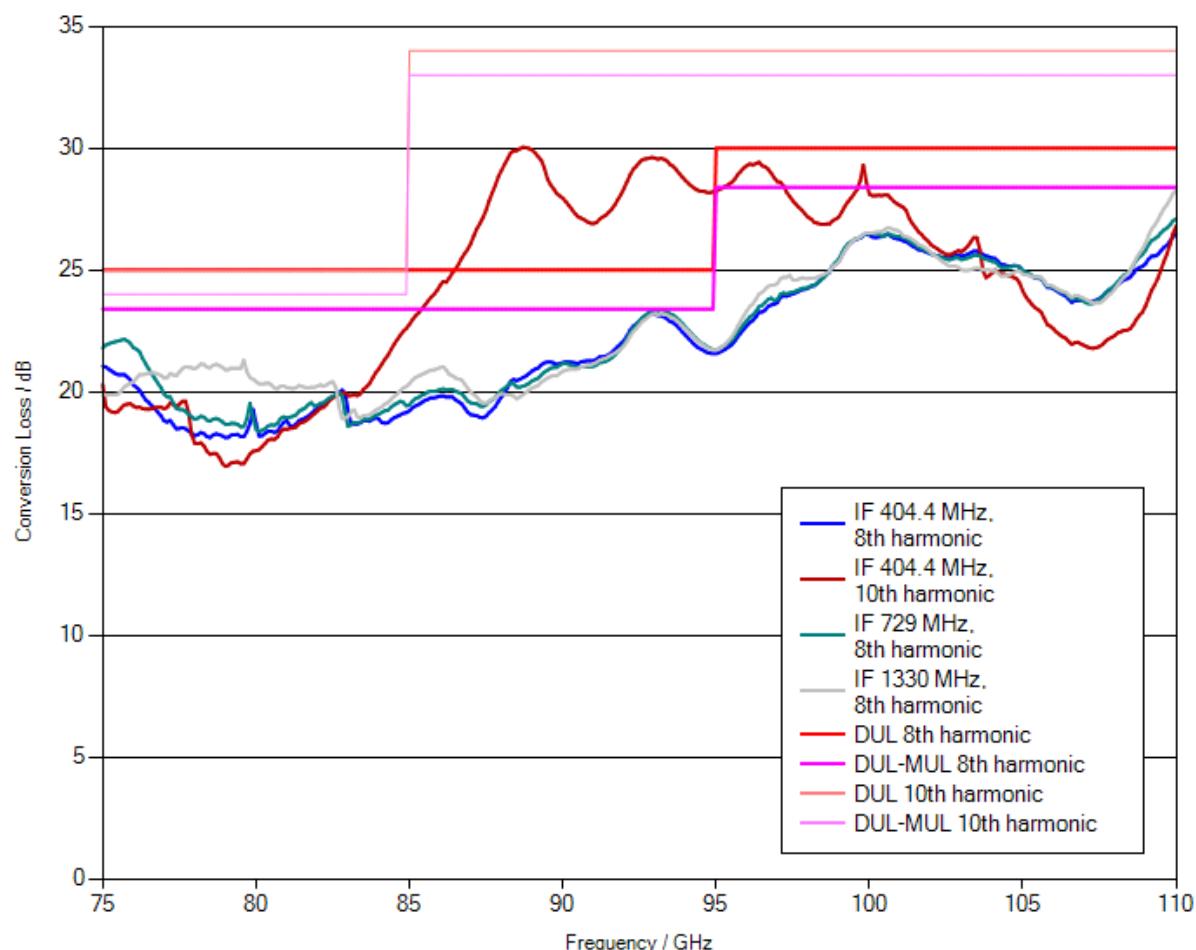
Measurement uncertainty: 0.05 (VSWR)



1.2 Conversion loss

LO level +15.5 dBm nominal
Bias 0 A

Measurement uncertainty: 1.6 dB



Note: Numeric calibration data can be found attached to the PDF file of the calibration certificate.
Click the “paper clip” symbol to display the file.

The file has been renamed for safety reasons.

When downloading the file onto your PC, please delete the “.file” extension and unzip the data.

1.3 Frequency response within 1 GHz

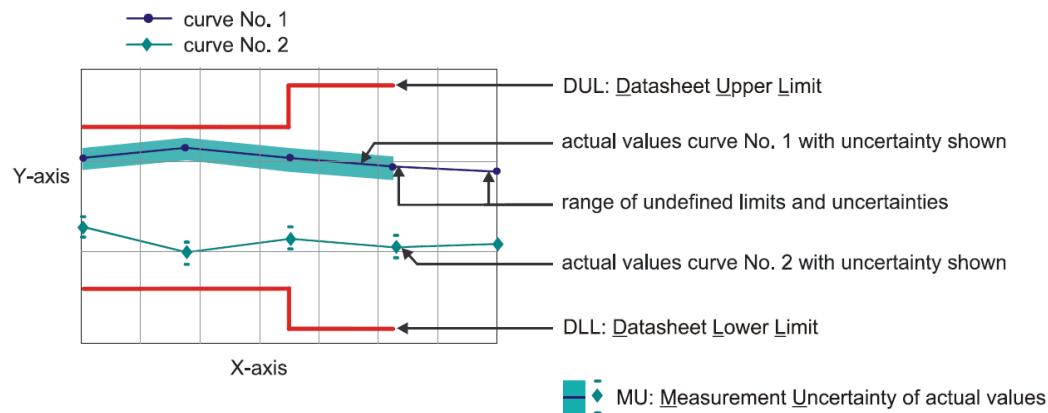
	DUL	Actual (worst case)	Evaluation
IF = 404.4 MHz, 8th harmonic	6 dB	1.57 dB	PASS
IF = 404.4 MHz, 10th harmonic	6 dB	3.29 dB	PASS
IF = 729 MHz, 8th harmonic	6 dB	1.96 dB	PASS
IF = 1330 MHz, 8th harmonic	6 dB	2.31 dB	PASS

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DL or DT	Data Limit for symmetrical tolerance limits
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MErr.	Measurement Error
Act.	Actual Value
UGB	Uncertainty Guard Band: Measuring uncertainty violates the data (spec.) limit.
UGB1	Measurement results marked as UGB1 show conformity with a probability of >50 % and <95 %.
UGB2	Measurement results marked as UGB2 show non-conformity with a probability of >50 % and <95 %.
DU	Datasheet Uncertainty

Explanation of charts



Software used for measurement

Item Type	Version	Remark
Measurement Studio Professional Edition	2013	
MixerCertification	7_08	

Incoming Report

1.1 Deviation between actual and previous conversion loss

