

Verification of Mixer

Identification

Object R&S FS-Z110
Rise number BX81427
Place C2M C609
Datum 2018-05-09
Performed by Martin Forsberg/ Tomas Lennhager

Equipment

Signal and spectrum analyser with external mixer	Rohde & Schwarz FSW 43	2Hz - 43 GHz	902073
Power meter	Agilent E4418B	-	C607
Power sensor	Agilent W8486A	75 – 110 GHz	Tool 728
Extender	VDI WR10+	67 – 115 GHz	Tool 852
Network Analyzer	Keysight PNA-X	10 MHz – 67 GHz	Tool 614

RISE Research Institutes of Sweden AB Elektronik - EMC

Performed by

Examined by

Tomas Lennhager

Monika Fuller

Resultat

Frequency	Pin	Pmeas	Corr Pm	Calc CL	Nom CL	Diff CL
GHz	dBm	dBm	dBm	dB	dB	dB
75	-15,05	-34,17	-33,87	19,12	19,51	-0,39
80	-14,02	-32,26	-31,96	18,24	19,99	-1,75
85	-14,51	-31,86	-31,56	17,35	18,20	-0,85
90	-15,03	-32,05	-31,75	17,02	18,65	-1,63
95	-16,06	-36,23	-35,93	20,17	20,74	-0,57
100	-15,08	-39,60	-39,30	24,52	25,35	-0,83
105	-16,30	-41,16	-40,86	24,86	27,07	-2,21
107	-17,84	-41,21	-40,91	23,37	25,37	-2,00

The measured Conversion Loss is within tolerance and the mixer complies with its specification.

Calibration Certificate

Kalibrierschein

Certificate Number **24-0110-101467-01**

Zertifikatsnummer

Unit Data

Item Harmonic Mixer, 75 GHz to 110 GHz
Gegenstand

Manufacturer ROHDE & SCHWARZ
Hersteller

Type R&S® FS-Z110
Typ

Material Number 1048.0471.02 **Serial Number** 101467
Materialnummer Seriennummer

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

Order Number
Bestellnummer

Date of Receipt
Eingangsdatum

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 Werteintervall (Erweiterte Messunsicherheit mit $k = 2$). Die Kalibrierung erfolgte mit Messmitteln und Normalen, die direkt oder indirekt durch Ableitung mittels anerkannter Kalibriertechniken rückgeführt sind auf Normale der PTB/DKD oder anderer nationaler/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-Laboratorien. 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.

Performance

Place and Date of Calibration
Ort und Datum der Kalibrierung

Meckenheim, 2017-01-12

Scope of Calibration
Umfang der Kalibrierung

Standard Calibration

Statement of Compliance (Incoming)
Konformitätsaussage (Anlieferung)

New device

Statement of Compliance (Outgoing)
Konformitätsaussage (Auslieferung)

All measured values are within the data sheet specifications.

Extend of Calibration Documents
Umfang des Kalibrierdokuments

**2 pages Calibration Certificate
5 pages Outgoing Results**

Radiometer Physics GmbH; Meckenheim

Date of Issue
Ausstellungsdatum

2017-01-13

Head of Laboratory
Laborleitung


Ceru

Person Responsible
Bearbeiter


Heinze

Page (Seite) 1/2
Vers2010-05-05/
RPG2014-02-28

Calibration Method
Kalibrieranweisung

RPG-PAQA-TN-2014-002

Relative Humidity **20 % - 80 %**
Relative Luftfeuchte

Ambient Temperature
Umgebungstemperatur

(23 ⁺⁷₋₃) °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	10-300319061	2017-08-06
Powersensor	R&S® NRP-Z55	140093	20-541556	2017-05-12
Powersensor	R&S® NRP-Z58	101064	20-611527	2017-07-22
Calibration kit	WR10	W10001	RPG-PAQA-TN-2014-005	2017-05-23

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'.

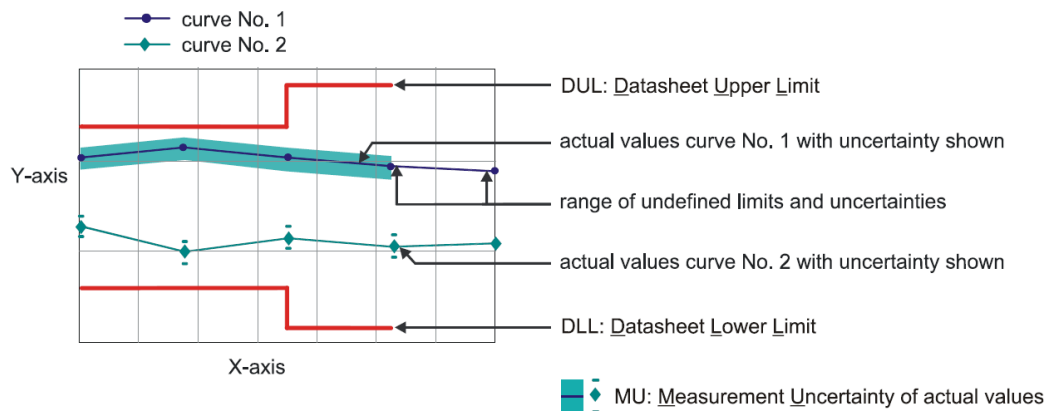
Notes
Anmerkungen

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

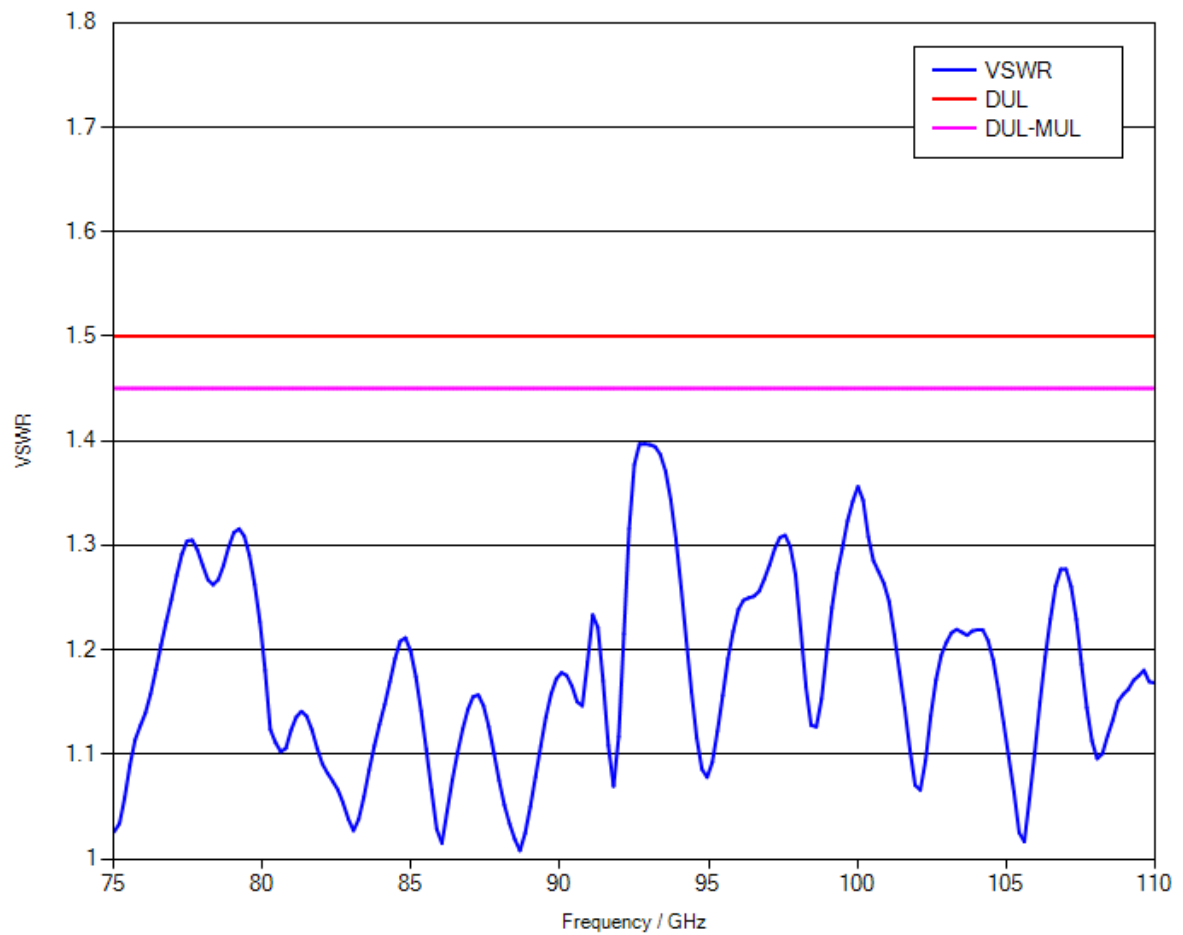
Explanation of charts



Software used for measurement**Item Type**Measurement Studio Professional Edition
MixerCertification**Version**2013
7_04**Remark**

1.1 RF Input – VSWR

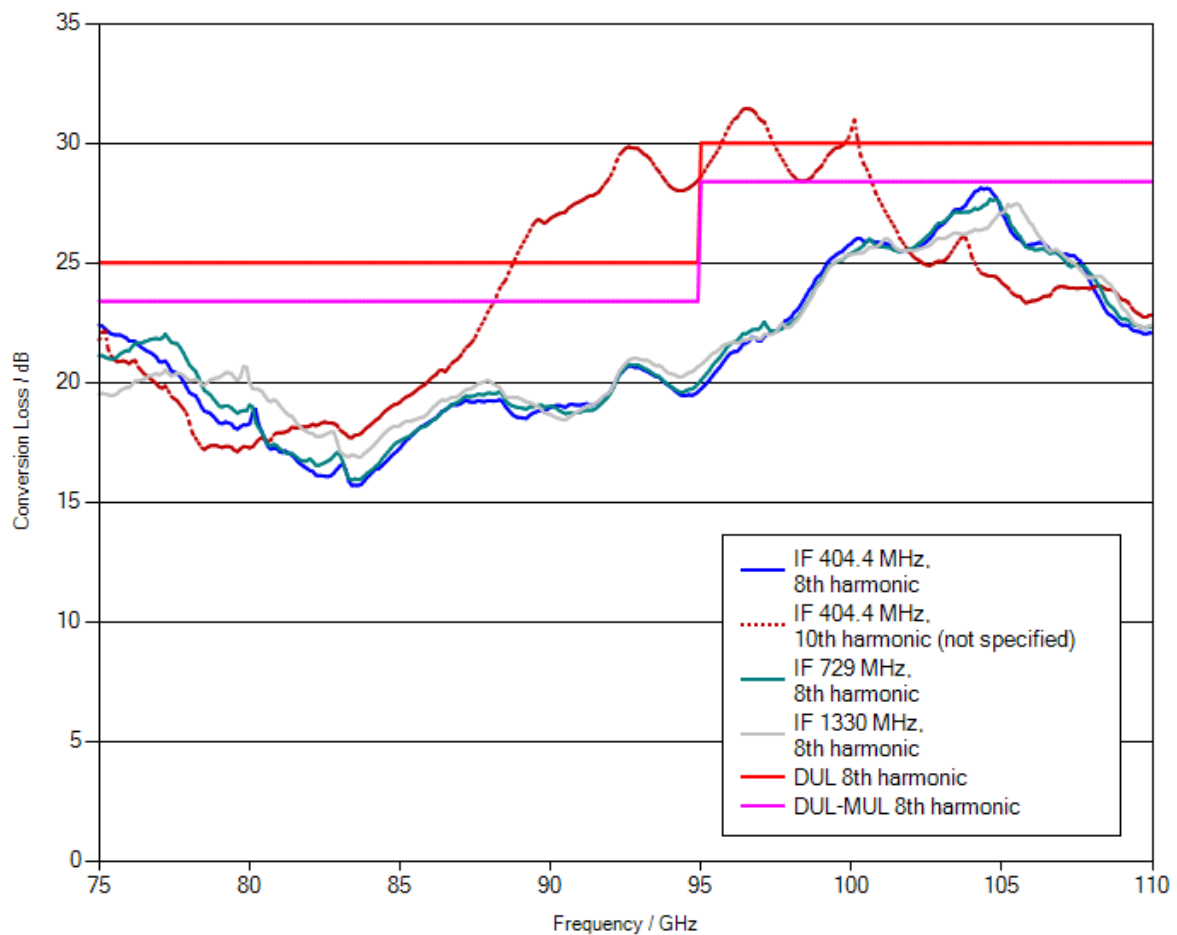
Measurement uncertainty: 0.05 (VSWR)



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	2.26 dB	PASS
IF = 404.4 MHz, 10th harmonic	not specified	3.78 dB	not specified
IF = 729 MHz, 8th harmonic	6 dB	2.06 dB	PASS
IF = 1330 MHz, 8th harmonic	6 dB	2.08 dB	PASS