R&S®RF PORTS ALIGNMENT SOFTWARE
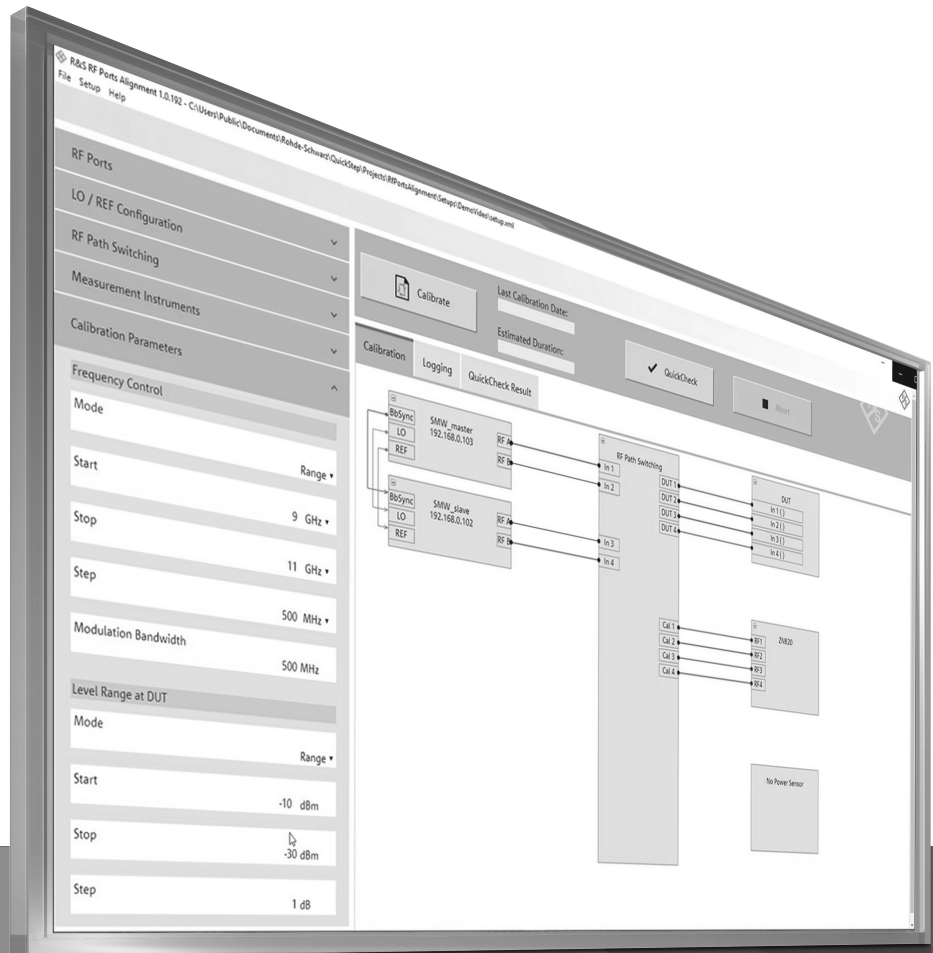
Specifications

Data Sheet
Version 02.00

ROHDE&SCHWARZ

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CONTENTS

Definitions

General

Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits

Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.
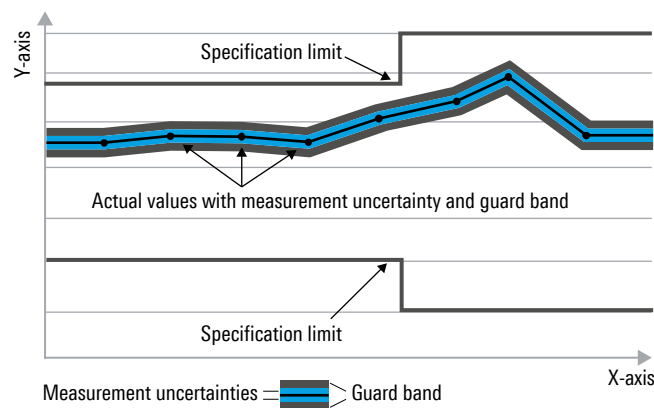
Non-traceable specifications with limits (n. trc.)

Represent product performance that is specified and tested as described under "Specifications with limits" above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

Specifications without limits

Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)

Characterizes product performance by means of representative information for the given parameter. When marked with <, > or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are designated with the format "parameter: value".

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP/3GPP2 standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bits per second (Gbps), million bits per second (Mbps), thousand bits per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

Introduction

The R&S®RF Ports Alignment Software automates the generation of alignment data of multiple RF signals. This data is used by the R&S®SMW-K545 RF port alignment option to align the RF signals of at least two RF ports of an R&S®SMW200A vector signal generator with respect to:

- Amplitude
- Phase
- Time delay
- Frequency response over modulation bandwidth

The RF signals are generated by one or several R&S®SMW200A vector signal generators. By controlling a vector network analyzer, the R&S®RF Ports Alignment Software measures the deviation between two RF ports. In a setup containing more than two RF ports, the deviations are measured relative to a single reference port.

In combination with a Rohde & Schwarz power sensor, the R&S®RF Ports Alignment Software can also provide absolute power deviations.

Notations and abbreviations

The R&S®RF Ports Alignment Software is abbreviated as RFPAL.

Minimum configuration

To use the RFPAL with R&S®SMW200A vector signal generators, the following minimum configuration is required:

- R&S®SMW-B9 [1] wideband baseband generator with ARB
- R&S®SMW-B13XT wideband signal routing and baseband main module, two I/Q paths to RF
- R&S®SMW-B90 phase coherence
- R&S®SMW-K61 [1] multicarrier CW signal generation
- R&S®SMW-K544 [1] user-defined frequency response correction
- R&S®SMW-K545 [2] RF port alignment

If only standard baseband signals are required, the R&S®SMW-B9 and R&S®SMW-B13XT options can be replaced by the R&S®SMW-B10 and R&S®SMW-B13 options.

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[1] Option required for each RF port.

[2] Option required for each device.

Calibration setup

The RFPAL controls via LAN a calibration setup which contains at least two RF ports and a vector network analyzer. For setups with more than one R&S®SMW200A vector signal generator, one signal generator must be designated as primary.

Supported measurement instruments

The RFPAL controls a vector network analyzer to measure the deviation between two RF ports. Optionally, a power sensor can be controlled to measure the absolute power level. The following devices are supported.

Vector network analyzers

- R&S®ZNA
- R&S®ZNB
- R&S®ZVA (direct receiver access can be used if the R&S®ZVA-B16 option is available)

Power sensors

- R&S®NRP18S(N)
- R&S®NRP-Z81

RF path switching

The RFPAL supports switch and control units to automatically connect the signal generator RF outputs to the measurement instrument during calibration. In manual mode, the user has to connect the cables on demand.

Parameter type		
RF path switching		manual, automatic

The following switch and control unit is supported by the RFPAL:

- R&S®OSP120 open switch and control platform

LO/REF configuration

The RFPAL allows the user to specify the source of the LO signal and its distribution. It also allows the source of the REF signal of the primary signal generator to be specified.

Parameter type		
LO distribution		star, daisy chain
LO source		internal, external
REF source of primary signal generator	secondary devices always use an external reference	internal, external

Supported external LO sources

- R&S®SMA100B RF and microwave signal generator

Calibration parameters

The RFPAL allows the user to specify a range of carrier frequencies for which alignment data is obtained. Similarly, a range of RF power levels can be specified. The alignment data is valid for the points of the matrix defined by the two ranges. Furthermore, the modulation bandwidth can be specified. Actual limits are determined by the hardware capabilities of the used source and measurement instruments.

Frequency control

Parameter type		
Input mode		range, list
Range		
Start, stop		250 kHz to 65 GHz
Step		100 kHz to 10 GHz
List		file with comma separated values in GHz
Modulation bandwidth		80 MHz to 2 GHz

Level control

Parameter type		
Input mode		range, list
Range		
Start, stop		–145 dBm to +30 dBm
Step		0.01 dB to 30 dB
List		file with comma separated values in dBm

Ordering information

Designation	Type	Order No.
RF Ports Alignment Software for R&S®SMW-K545	R&S®RF Ports Alignment Software	available for download from the Rohde & Schwarz website www.rohde-schwarz.com

Rohde & Schwarz

The Rohde & Schwarz technology group is among the trail-blazers when it comes to paving the way for a safer and connected world with its leading solutions in test & measurement, technology systems and networks & cybersecurity. Founded more than 85 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

Sustainable product design

► Environmental compatibility and eco-footprint
► Energy efficiency and low emissions
► Longevity and optimized total cost of ownership

Certified Quality Management	Certified Environmental Management
ISO 9001	ISO 14001

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