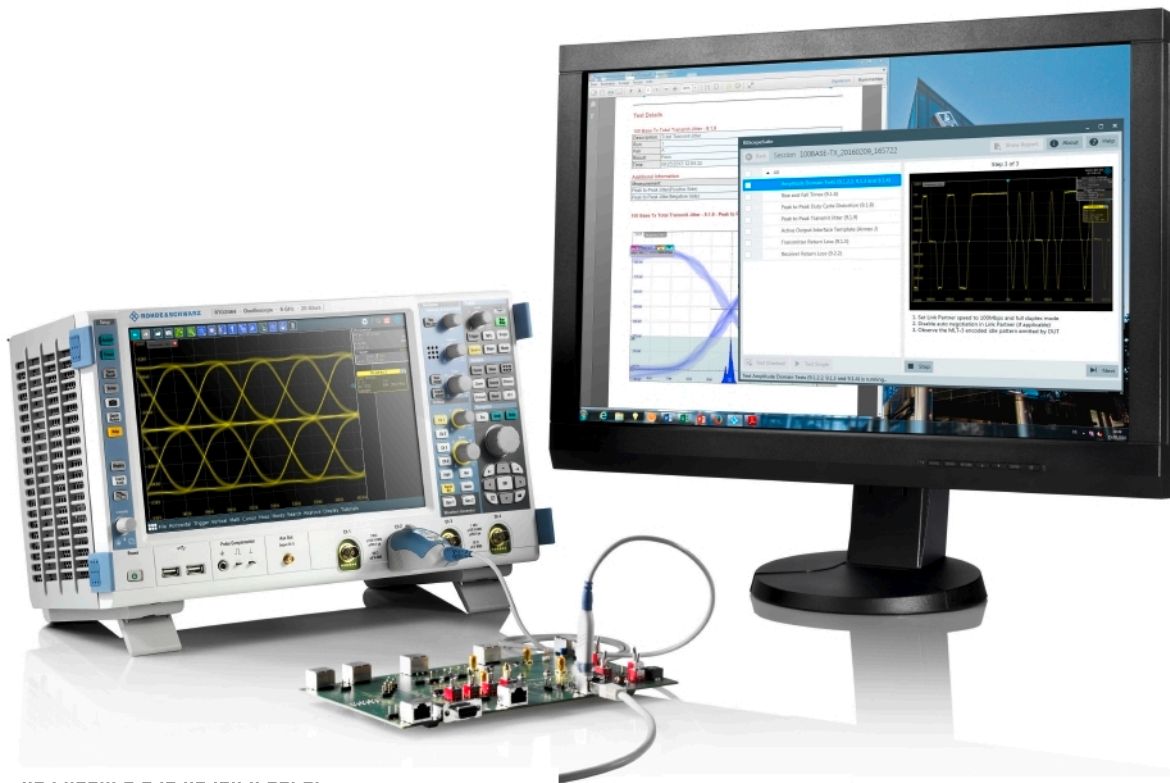


# R&S<sup>®</sup>RT-ZF2

## Ethernet Compliance

### Test Fixture Set

# Manual



1317555102

This manual describes the R&S RT-ZF2 Ethernet Compliance Test Fixture Set (1317.5522.02).

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Throughout this manual, products from Rohde & Schwarz are indicated without the ® symbol , e.g. R&S®RT-ZF2 is indicated as R&S RT-ZF2.

# 1 Safety Information

The product documentation helps you to use the product safely and efficiently. Keep the product documentation nearby and offer it to other users.

Safety information warns you about the potential dangers and gives instructions how to prevent personal injuries or damage caused by dangerous situations. Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

## Intended use

The equipment under test (EUT) is a signal quality test and development board, indented to be used at laboratory or test and measurement areas. These areas are used for analysis, testing and servicing and where equipment is operated by trained personnel.

## Operating site

Only use the product indoors, and keep it dry. The product has no casing and is sensitive to moisture and humidity.

The product is suitable for pollution degree 2 environments where nonconductive contamination can occur. For more information on environmental conditions such as ambient temperature, see the specifications.

## Installation

Connect only Ethernet devices with RJ-45 interface that are designed according to 100BASE-T1 IEEE Std 802.3bw™-2015 (Amendment to IEEE Std 802.3™-2015), 1000BASE-T1 (IEEE Std 802.3bp™-2016).

## 2 Product Description

The R&S RT-ZF2 Ethernet compliance test fixture set is a product for automated compliance testing of various Ethernet standards.

It is used in combination with:

- R&S RTO/R&S RTP oscilloscope
- 10BASE-T, 100BASE-TX, 1000BASE-T tests: R&S RTO-K22 (1329.7460.02), R&S RTP-K22 (1337.8691.02)
- 10GBASE-T: R&S RTO-K23 (1320.6261.02), R&S RTP-K23 (1337.8704.02)
- 100BASE-T1: R&S RTO-K24 (1329.7483.02), R&S RTP-K24 (1800.6531.02)
- 2.5/5GBASE-T: R&S RTO-K25 (1333.0496.02), R&S RTP-K25 (1337.8710.02)
- 1000BASE-T1: R&S RTO-K87 (1337.8591.02), R&S RTP-K87 (1800.6554.02)
- R&S ScopeSuite software

For data, see the "R&S RT-ZFxx Oscilloscope Test Fixtures - Specifications" at [www.rohde-schwarz.com/brochure-datasheet/rto](http://www.rohde-schwarz.com/brochure-datasheet/rto).

### 2.1 Deliveries

The R&S RT-ZF2 delivery package contains the following items:

- R&S RT-ZF2 test boards:
  - Ethernet test board (1317.5539.02)
  - Calibration board (1317.5539.02)
- Accessories, see [Table 2-1](#)
- Manual

**Table 2-1: Supplied accessories**

Item	Quantity	Order number
Ethernet cable CAT6	1	3033.9264.00
SMA terminations	3	0249.7823.00
Carrying case	1	
Manual	1	

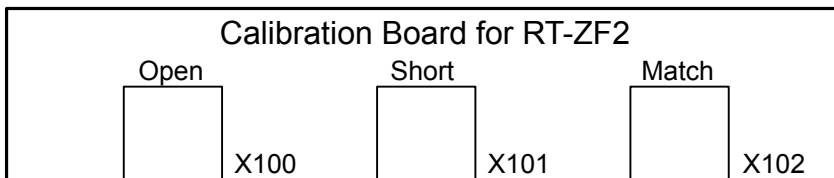
The following optional accessories are available:

**Table 2-2: Optional accessories**

Item	Type	Order number
Gigabit Ethernet Jitter Cable for 1000BASE-T jitter slave mode test 103 m cable with specific sections of different impedance that cause signal distortions	R&S RT-ZF2C	1317.5639.02

## 2.2 Calibration Board

The calibration board is required in return loss measurements. It is used to calibrate the vector network analyzer for the measurement.



**Figure 2-1: Ethernet calibration board**

## 2.3 Ethernet Test Board

The Ethernet test board has several labeled sections designed for specific test cases. You can cut the board at the section limits and use each section as a separate board.

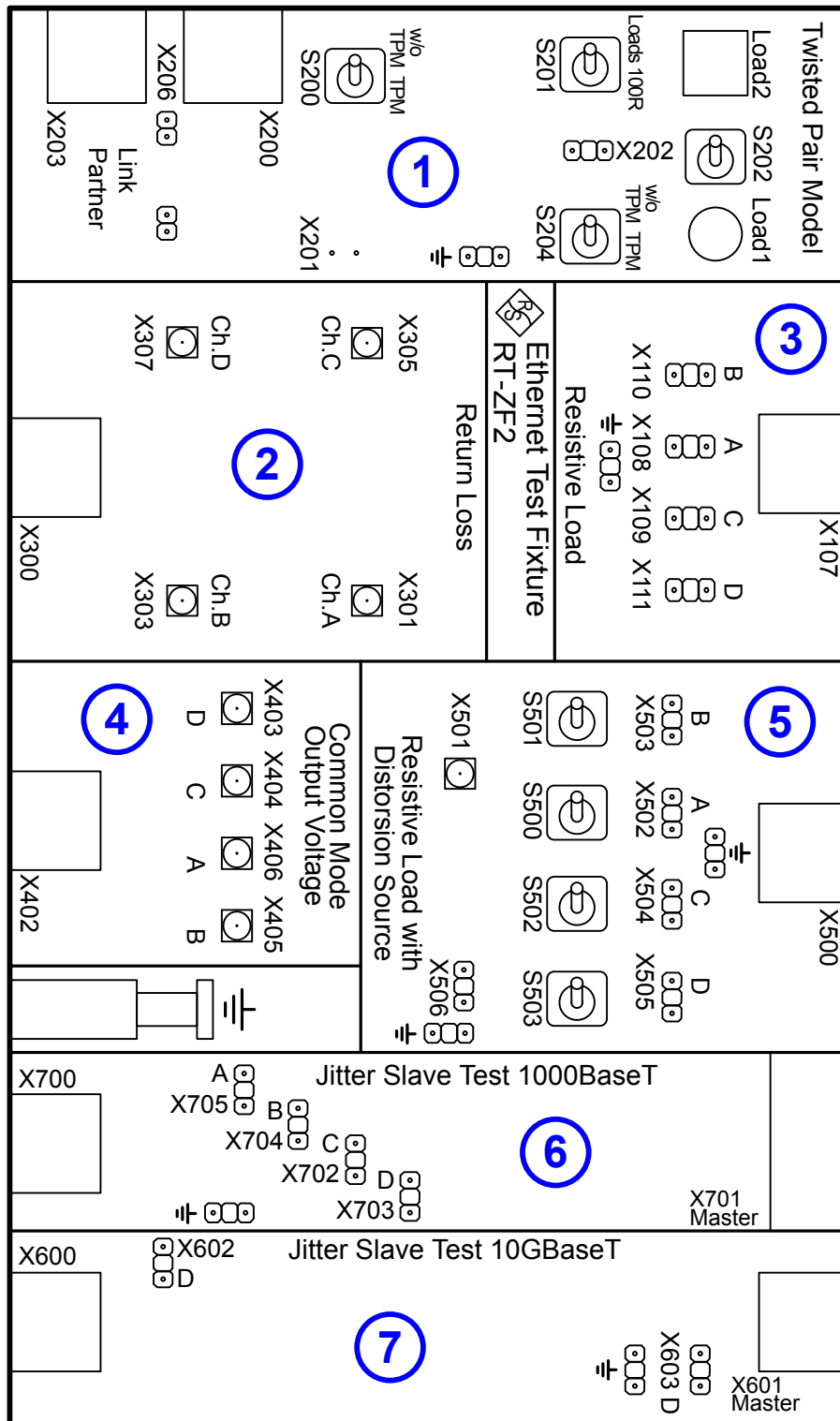


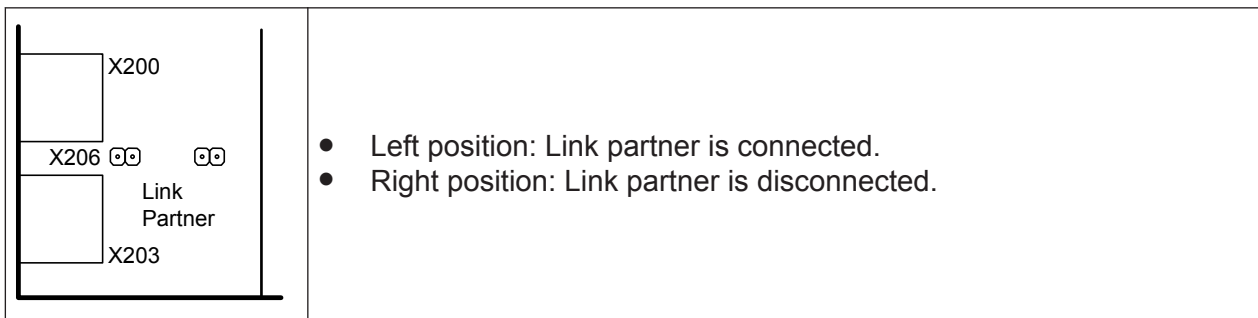
Figure 2-2: Ethernet test board

- 1 = Twisted Pair Model
- 2 = Return Loss
- 3 = Resistive Load

- 4 = Common Mode Output Voltage
- 5 = Resistive Load with Distortion Source
- 6 = Jitter Slave Test 1000BASE-T
- 7 = Jitter Slave Test 10GBASE-T

### X206 jumper

The X206 jumper switches the link partner on or off. It is used in 10BASE-T test cases.



## 3 Connecting the Board

The appropriate DUT and probe connection depends on the test case. The R&S ScopeSuite software provides a step-by-step guide that shows the required setup for each test case.

The test preparation and measurements of the test cases are described in the "R&S®RTO, R&S®RTP Ethernet Compliance Tests, Test Procedures Manual".

## 4 Test Equipment

For Ethernet compliance tests, the following test equipment is needed:

- **10/100/1000BASE-T Ethernet compliance tests:**
  - R&S RTO/R&S RTP oscilloscope with at least 600 MHz bandwidth
  - Differential probe with at least 1 GHz bandwidth
  - R&S RTO/R&S RTP-K22 10/100/1000BASE-T Ethernet compliance test option (required option, installed on the oscilloscope)
  - R&S RT-ZF2 Ethernet test fixture set
  - For energy-efficient Ethernet tests, in addition:
    - R&S RTO/R&S RTP-K86 EEE test option
    - R&S RT-ZF5 Ethernet test fixture set for 100/1000BASE-T EEE tests
    - R&S RT-ZF4 test fixture for 10BASE-Te tests
- **2.5GBASE-T Ethernet compliance tests:**
  - R&S RTO/R&S RTP oscilloscope with at least 600 MHz bandwidth  
For precise power spectral density and power level measurements up to 1 GHz, it is recommended to use an oscilloscope and a differential probe with 1 GHz bandwidth each.
  - Differential probe with at least 1GHz bandwidth
  - R&S RTO/R&S RTP-K25 2.5/5GBASE-T Ethernet compliance test option (required option, installed on the R&S RTO/R&S RTP)
  - R&S RT-ZF2 Ethernet test fixture set
- **5GBASE-T Ethernet compliance tests:**
  - R&S RTO/R&S RTP oscilloscope with at least 1 GHz bandwidth  
For precise power spectral density and power level measurements up to 1.5 GHz, it is recommended to use an oscilloscope and a differential probe with 1.5 GHz bandwidth each.
  - Differential probe with at least 1.5 GHz bandwidth
  - R&S RTO/R&S RTP-K25 2.5/5GBASE-T Ethernet compliance test option (required option, installed on the R&S RTO/R&S RTP)
  - R&S RT-ZF2 Ethernet test fixture set
- **10GBASE-T Ethernet compliance tests:**
  - R&S RTO/R&S RTP oscilloscope with at least 2 GHz bandwidth



For precise power spectral density and power level measurements up to 3 GHz, it is recommended to use an oscilloscope and a differential probe with 3 GHz bandwidth each.

- Differential probe with at least 3 GHz bandwidth
- R&S RTO/R&S RTP-K23 10GBASE-T Ethernet compliance test option (required option, installed on the R&S RTO/R&S RTP)
- R&S RT-ZF2 Ethernet test fixture set
- **100BASE-T1 compliance tests:**
  - R&S RTO/R&S RTP oscilloscope with at least 600 MHz bandwidth
  - Differential probe with 1 GHz bandwidth
  - R&S RTO/R&S RTP-K24 100BASE-T1 compliance test option (required option, installed on the R&S RTO/R&S RTP)
  - R&S RT-ZF2 Ethernet test fixture set
  - R&S RT-ZF3 frequency converter for transmitter distortion tests
- **1000BASE-T1 compliance tests:**
  - R&S RTO/R&S RTP oscilloscope with at least 2 GHz bandwidth
  - Differential probe with 2 GHz bandwidth
  - R&S RTO/R&S RTP-K87 1000BASE-T1 compliance test option (required option, installed on the R&S RTO/R&S RTP)
  - R&S RT-ZF2 Ethernet test fixture set
  - R&S RT-ZF6 frequency converter for transmitter distortion tests
- The free-of-charge R&S ScopeSuite software, which can be installed on a computer or directly on the oscilloscope.
- R&S RTO-B6/R&S RTP-B6/Tabor WX2182B/Tabor WX2182C arbitrary waveform generator for automatic disturber tests. For 100BASE-T1 disturber tests, also HMF2550 can be used.
- R&S ZVL/ZNB/ZNC/ZND vector network analyzer for automatic return loss measurements.  
For manual measurements, also other AWGs and VNAs can be used.