

# R&S® R-Line Compact Test Chamber

Precise measurements  
of radiated emissions of  
wireless terminals  
800 MHz to 18 GHz



**75** Years of  
Driving  
Innovation

  
**ROHDE & SCHWARZ**

# R&S®R-Line Compact Test Chamber At a glance

The R&S®R-Line compact test chamber is used to eliminate emission problems and optimize the overall RF performance of wireless terminals already in the initial phases of development. This helps to avoid costly and time-consuming modifications to a large number of prototypes at a later stage, thus optimizing time to market and return on investment.

The decisive advantage of the R&S®R-Line is that it offers measurement accuracy as high as that of an anechoic chamber ten times larger. The R&S®R-Line fits into any lab, which reduces investments for infrastructure and instrumentation.

Turnkey solutions combining the R&S®R-Line with a test system from Rohde & Schwarz ensure fast and smooth measurements in the lab and provide optimized capabilities for determining an EUT's RF performance and radiated emission characteristics in the microwave range.

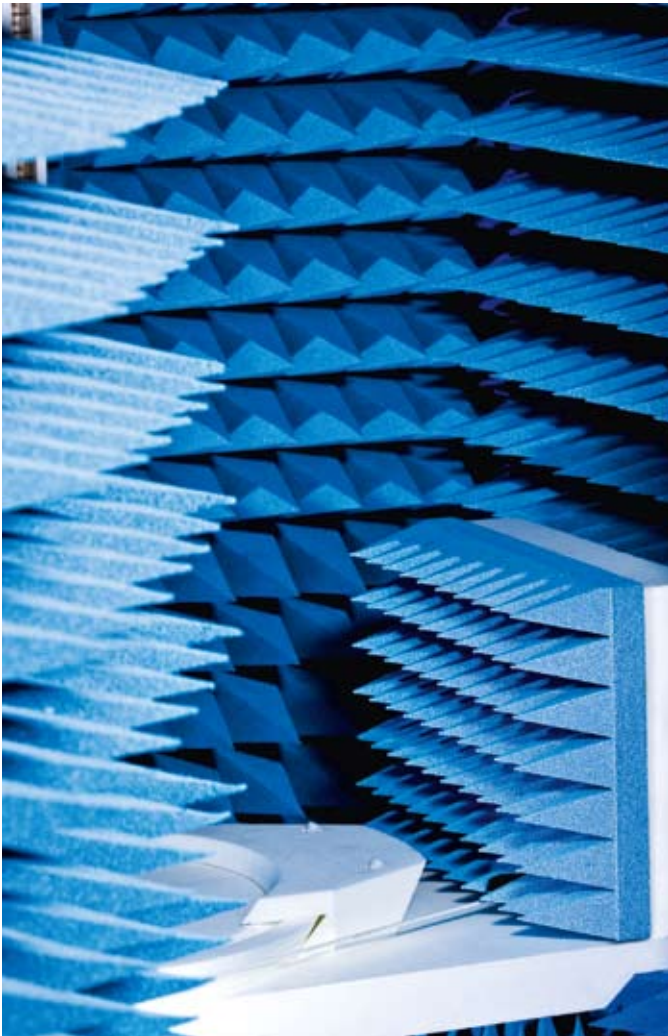
- Measurement of RF performance and radiated emissions at an early stage
- Measurement accuracy as high as of an anechoic chamber at significantly reduced investments in equipment and infrastructure
- Compact and versatile
- Efficient through automated measurements and the use of turnkey solutions



# R&S®R-Line Compact Test Chamber

## Benefits and key features

The compact R&S®R-Line offers extremely high measurement accuracy due to its elaborate design, with the turntable, absorbers and measurement geometry perfectly matched to one another.



### Reduced time to market through early verification of radiated emissions

- ▮ Measurement accuracy as high as of an anechoic chamber
- ▮ Site VSWR (SVSWR) in line with CISPR 16-1-4:2007
- ▮ Frequency range 800 MHz to 18 GHz

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### Efficient operation through measurements in the lab

- ▮ Compact and versatile
- ▮ Readily available verification tool
- ▮ Significantly lower investment than for an anechoic chamber

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### Optimum utilization of resources through comprehensive, automated test sequences

- ▮ Automated measurements using turnkey solutions that combine the R&S®R-Line with Rohde&Schwarz test systems
  - R&S®TS8991 over-the-air (OTA) performance test system
  - R&S®TS8996 radiated spurious emissions (RSE) test system

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# Reduced time to market through early verification of radiated emissions

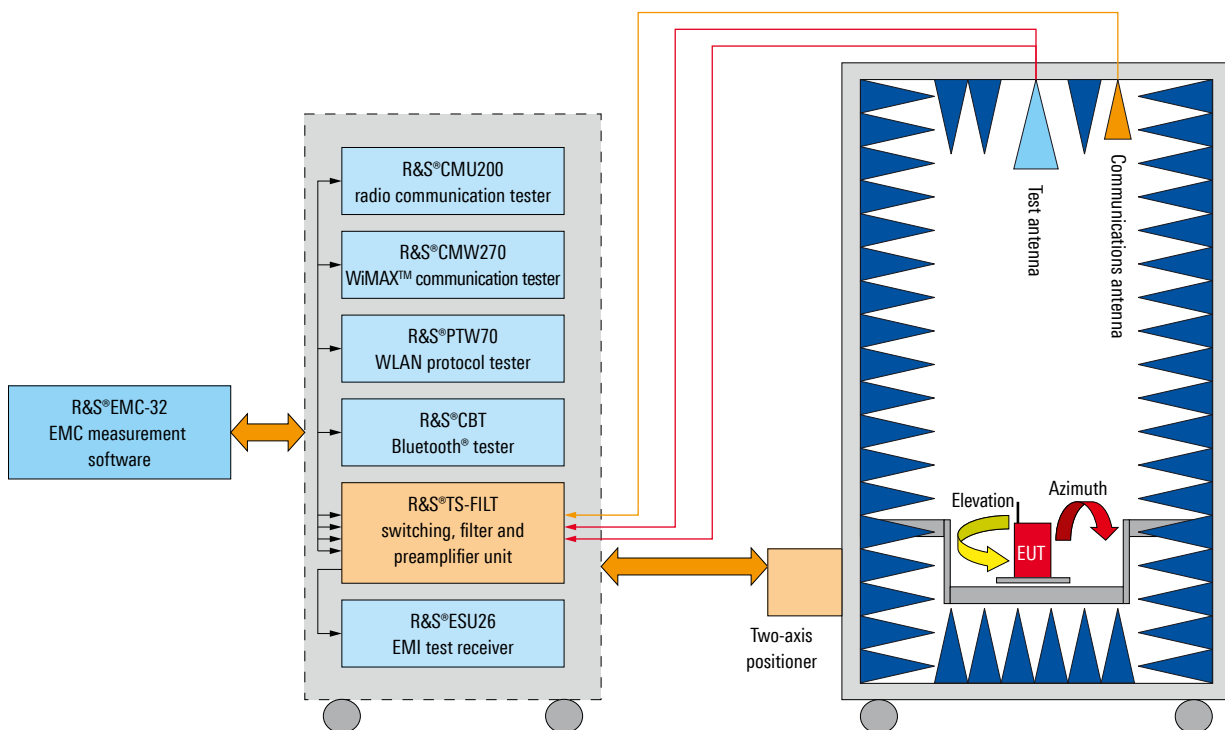
## Measurement accuracy as high as of an anechoic chamber

The compact system performs measurements in the critical frequency range from 800 MHz to 18 GHz with an accuracy as high as that of an anechoic chamber. The SVSWR validation requirements in line with CISPR 16-1-4:2007 are not only met but even considerably exceeded. The R&S®R-Line is a compact and economical solution for microwave measurements and is suitable for use in the R&D lab. The system identifies radiated harmonics and spurious emissions at an early stage – i.e. during development. This avoids complex and costly re-engineering during the final conformance tests. As a result, time to market and related costs are thus reduced. Optimizing radiated spurious emissions as well as the specific absorption rate (SAR) and over-the-air (OTA) performance poses a permanent challenge. To achieve optimum results, therefore, the measurement solution should fulfill the requirements of a conformance test system.

The high measurement accuracy is obtained through an optimized measurement geometry and absorber layout combined with a positioner made of low-permittivity material throughout.

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## Application: R&S®TS8996 radiated spurious emissions (RSE) test system with R&S®R-Line



# Efficient operation through measurements in the lab

## Compact and versatile ...

### ... at the development engineer's workstation

Requiring a floor space of only 2.5 m<sup>2</sup>, the R&S®R-Line fits into any R&D lab. No long distances have to be covered, and there is no need for the complex infrastructure of an anechoic chamber. The test chamber can quickly and easily be set up wherever it is needed. This makes for highly flexible and efficient test procedures.

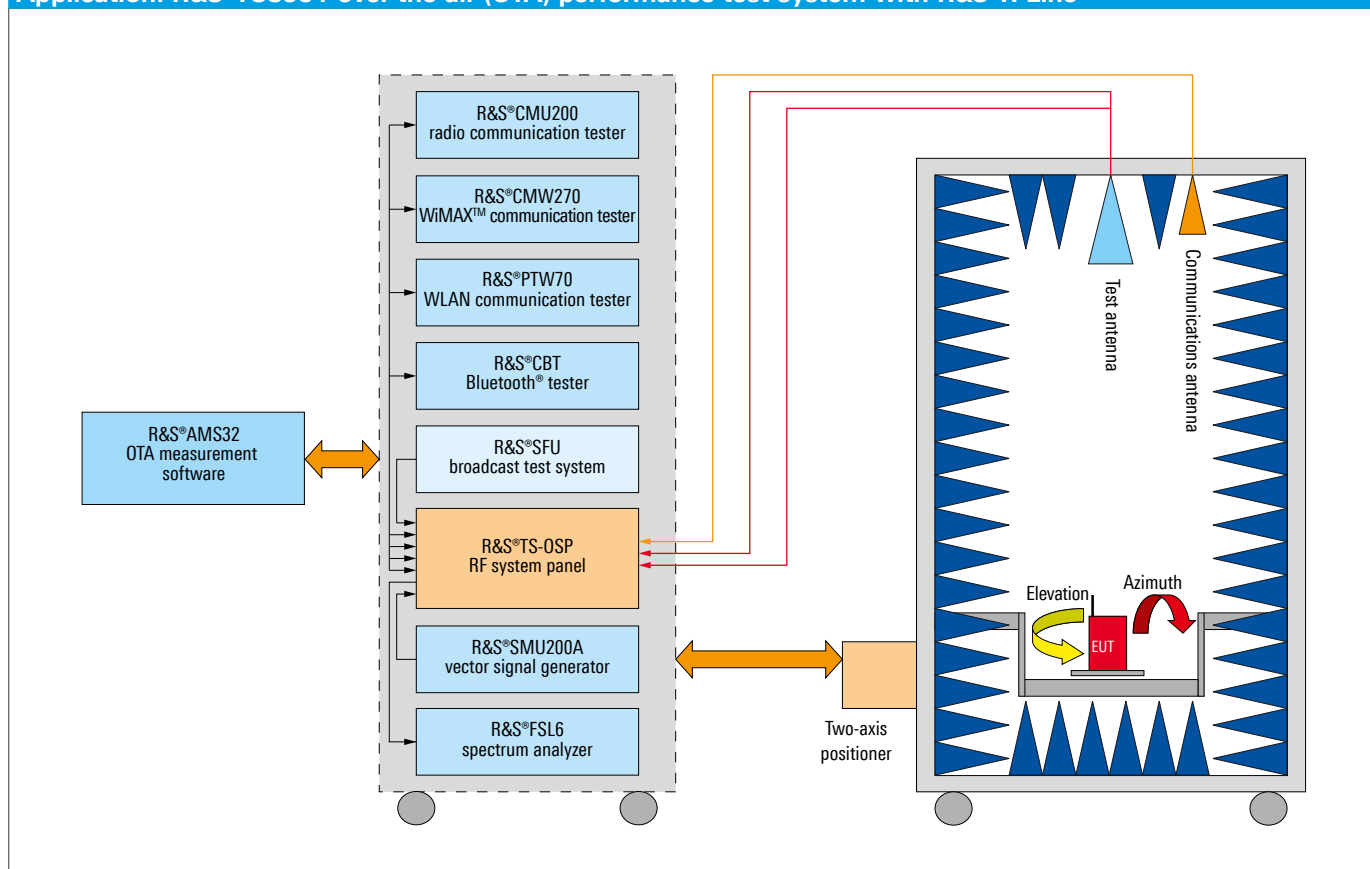
### ... with respect to the measurement task

The R&S®R-Line provides in-development support of radiated spurious emission measurements as well as in-band measurements covering the effective isotropical radiated power (EIRP) and the three-dimensional radiation and reception characteristics (free-space OTA performance). The corresponding test systems – R&S®TS8996 for RSE and R&S®TS8991 for OTA measurements – are adapted to the measurement task by adding the required modules to each system and/or combining the two systems.

The RSE and OTA measurement software can be configured in a variety of ways. For example, a network message can be sent at the end of the test, or critical frequencies can automatically be identified and retested, or interactive test sequences can be provided.

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## Application: R&S®TS8991 over-the-air (OTA) performance test system with R&S®R-Line



# Optimum utilization of resources through fully automatic measurements of radiated emissions

## Automated measurements ...

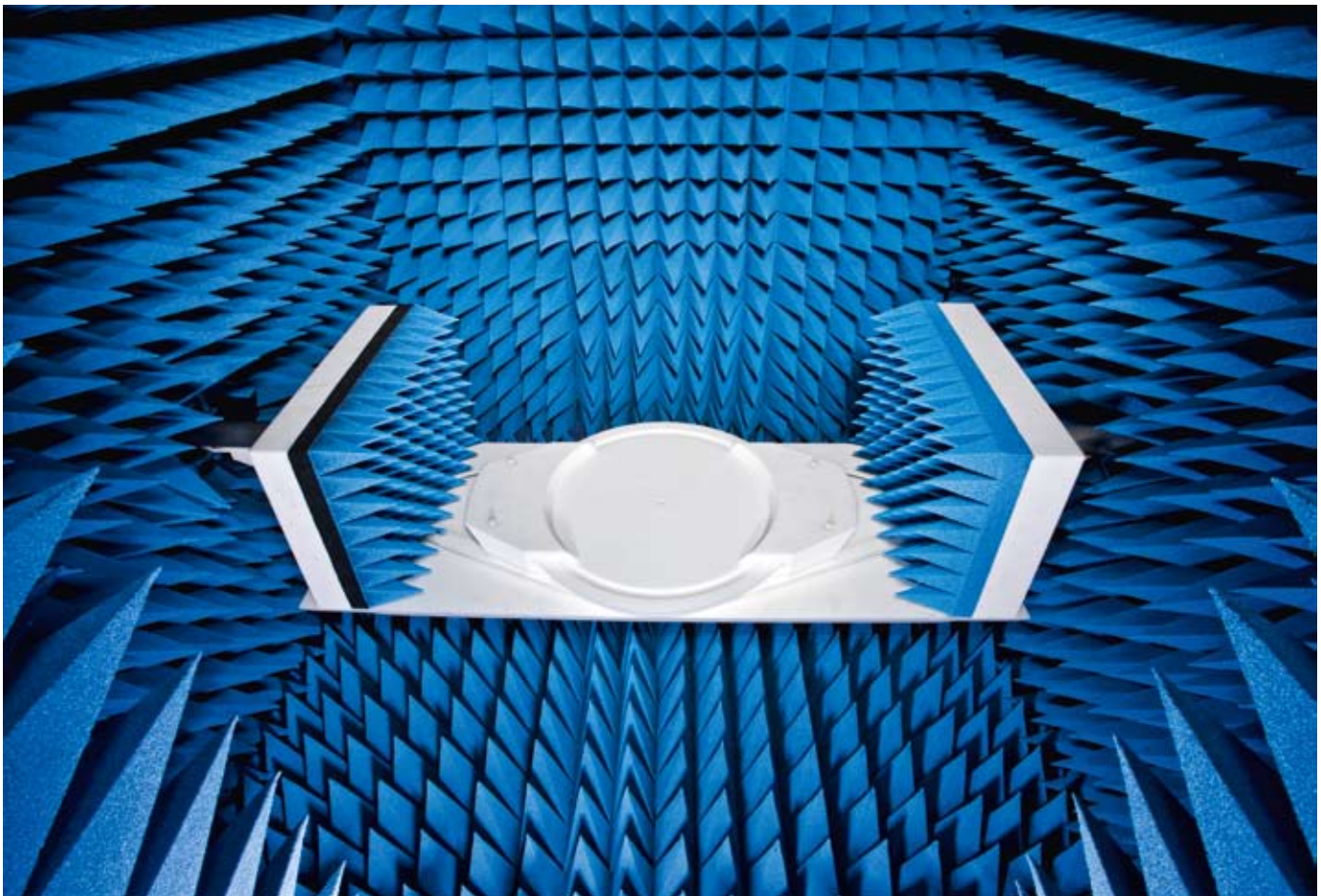
### ... through the use of an RF-transparent two-axis positioner

Measurements in all spatial directions can be performed fully automatically without any interaction on the part of the operator. Such measurements are necessary for determining the radiation characteristics as well as radiated spurious emissions.

### ... by using a Rohde & Schwarz test system

The Rohde & Schwarz test systems support fully automatic measurements even across several bands and channels of a radio service. Automatic control covers the R&S®R-Line and the complete measurement sequence, as well as continuous and reliable communications with the EUT. Test configurations and results can be reused later during conformance measurements by means of the R&S®TS8991 and R&S®TS8996 test systems and an anechoic chamber. This yields an efficient and consistent test procedure.

Two-axis positioner made of RF-transparent material throughout.



# Specifications

General data		
<b>Environmental conditions</b>		
Operating temperature range		0°C to +35°C
Storage temperature range		-10°C to +45°C
Relative humidity	without condensation	90% at +40°C, non-condensing
Power supply	208 V to 230 V/50 Hz to 60 Hz	max. 350 VA
<b>Environmental test</b>		
Electromagnetic compatibility	EU – EMC Directive 2004/108/EC	in line with EN 61326-1, EN 55011 (class B), EN 61000-3-2, EN 61000-3-3
Electrical safety	EU – Low Voltage Directive 2006/95/EC	in line with EN 61010-1
<b>Mechanical data</b>		
Dimensions (W × H × D)	including four movable and lockable castors	1700 mm × 2250 mm × 1640 mm (66.93 in × 88.58 in × 64.57 in)
Weight		562 kg (1239 lb)
Door size (W × H)		500 mm × 1000 mm 19.68 in × 39.37 in
Size of EUT (∅ × H)		max. 330 mm × 240 mm max. 12.99 in × 9.45 in
Weight of EUT		max. 1 kg (max. 2.2 lb)
Positioning speed of turntable		azimuth: 0.5 rpm to 10 rpm elevation: 0.2 rpm to 10 rpm
Distance between tip of test antenna and center of EUT		1.03 m (40.55 in)
<b>Interfaces</b>		
IEC/IEEE bus, RS-232-C alternatively	for control of positioner	in line with IEC 625-2 (IEEE 488.2)
Test antenna		2 × SMA (female)
Communications antenna		1 × N (female)
RF feedthroughs	for calibration or connecting the EUT	2 × N (female) 2 × SMA (female)

RF specifications		
<b>Measurement range</b>		
Frequency range		800 MHz to 18 GHz
Polarization		horizontal and vertical, through R&S®HL024A1 cross-polarized antenna
RF power		max. 3 W
Communications antenna		800 MHz to 6 GHz, circularly polarized
Field uniformity	site VSWR, typ. 2 dB	in line with CISPR 16-1-4:2007
Shielding effectiveness	> 95 dB > 70 dB	800 MHz to 6 GHz 6 GHz to 18 GHz

## System requirements

For the positioner, a PC with Windows XP or Vista operating system and an IEC/IEEE bus interface is required. Ideally, the R&S®EMC32 or the R&S®AMS32 measurement software is used for controlling the positioner.

# Ordering information

Designation	Type	Order No.
<b>Compact Test Chamber</b> Spurious and RF measurements	R&S®R-Line	1511.0508.02
<b>System components</b>		
RSE Test System	R&S®TS8996	1119.4544.02
OTA Performance Test System	R&S®TS8991	1119.4309.02

## Service you can rely on

- | Worldwide
- | Local and personalized
- | Customized and flexible
- | Uncompromising quality
- | Long-term dependability

## About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

## Environmental commitment

- | Energy-efficient products
- | Continuous improvement in environmental sustainability
- | ISO 14001-certified environmental management system

Certified Quality System  
**ISO 9001**

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PD 5214.0253.32 | Version 02.00 | November 2009 | R&S®R-Line  
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