



Version  
01.00

September  
2007

# R&S® TS8991 OTA Performance Test System

*Perfect characterization of wireless products over the air interface*

- ◆ Measurement of over-the-air (OTA) performance in line with CTIA, CWG, and PTCRB standards and test cases
- ◆ For all important wireless technologies
- ◆ Reliable and reproducible measurement results
- ◆ Time-optimized, configurable test sequences for qualification and development
- ◆ Efficient due to automatic test sequences and integrated evaluation and report
- ◆ Can be combined with radiated spurious emission and EMC test systems



**ROHDE & SCHWARZ**

# Measurement of OTA performance ...

## What is OTA performance?

The R&S®TS8991 OTA performance test system measures the spatial radiation and sensitivity characteristic of wireless equipment.

Network operators and also various standards prescribe these measurements as important quality parameters defining the behavior of a device in the wireless network.

The test system sets up a connection to the EUT over the air interface and then measures both the radiated power and the limit sensitivity in different channels and wireless services (by means of the bit, frame, or packet error ratio) in all spatial directions. This yields the relevant parameters such as total radiated power (TRP) and total isotropic sensitivity (TIS), while the 3D radiation diagrams directly show the spatial distributions.

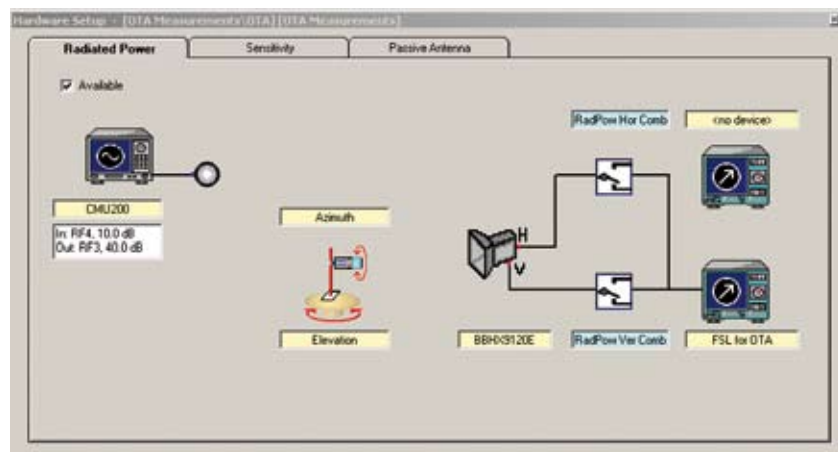
Parameters and diagrams together conclusively describe the RF characteristic of the wireless application.

## Why use the R&S®TS8991?

Owing to the many years of experience that Rohde & Schwarz has in OTA performance testing, the R&S®TS8991 offers outstanding performance. On the one hand, it provides excellent reproducibility and measurement accuracy (which is important for the acceptance of the measurement results), and on the other it enables efficient testing due to optimized measurement sequences. The time required for measurements in development or overview measurements is substantially reduced.



*R&S®TS8991 system rack*



*R&S®TS8991 device configuration*

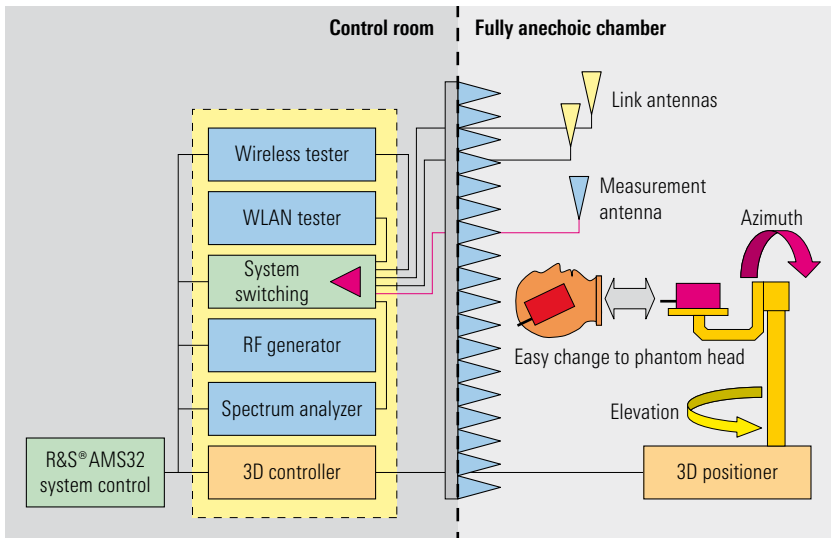
## ... efficient and future-proof

This is only possible because of the ideal matching of the R&S® AMS32 OTA software and the hardware of the test system, which ensures optimum performance in the test sequence. The R&S® TS8991 combines the expertise and know-how of Rohde & Schwarz in the fields of radiated RF measurements and wireless technologies.

The system can handle all common wireless standards. In addition, the company's close cooperation with leading mobile phone manufacturers and its participation in standardization bodies enable it to offer new test methods early on. For example, Rohde & Schwarz delivered the world's first OTA test systems certified for TIS measurements and for WiFi equipment.



*R&S® TS8991 positioner*



*Block diagram of the R&S® TS8991 – configuration example*

# For every standard ...

The R&S®TS8991 can perform OTA measurements in line with the CTIA, CWG, and PTCRB standards for all important wireless technologies:

Wireless standard	Measurements												R&S® AMS32	Remarks
	CTIA 2.2					CWG 1.0		TR25.914 <sup>1)</sup>						
	TRP	TIS	Intermediate sensitivity	Single-point offset	Multi-point offset	Desense	3D	MERG	MERP	MERS	ERP	EIRP		
Passive antennas							✓				✓	✓	✓	
GSM 850	✓	✓	✓			✓	✓				✓	✓	✓	
GSM 900	✓	✓	✓			✓	✓				✓	✓	✓	
GSM 1800	✓	✓	✓			✓	✓				✓	✓	✓	
GSM 1900	✓	✓	✓			✓	✓				✓	✓	✓	
GPRS	✓	✓	✓	✓	○		✓				✓	✓	✓	
EDGE	✓	✓	✓	✓	○		✓				✓	✓	✓	
cdmaOne	✓	✓					✓				✓	✓	✓	
CDMA2000®	✓	✓					✓				✓	✓	✓	
1xEV-DO	✓	✓					✓				✓	✓	✓	
WCDMA 3GPP/FDD	✓	✓					✓	✓	✓	✓	✓	✓	✓	Bands 1 to 9
WCDMA 3GPP/TDD	✓	✓					✓	✓	✓	✓	✓	✓	✓	
TD-SCDMA	○	○					○				✓	✓	○	Please inquire about availability
Bluetooth® 802.15.1	✓	✓					✓				✓	✓	✓	
Bluetooth® EDR	✓	✓					✓				✓	✓	✓	
IEEE 802.11a	✓	✓				✓	✓				✓	✓	✓	
IEEE 802.11b	✓	✓				✓	✓				✓	✓	✓	
IEEE 802.11g	✓	✓				✓	✓				✓	✓	✓	
IEEE 802.11n	○	○				○	○				○	○	○	Please inquire about availability
IEEE 802.16	○	○					○				✓	✓	○	Please inquire about availability
IEEE 802.16/e	○	○					○				✓	✓	○	Please inquire about availability

<sup>1)</sup> To simplify the measurements, TRP and TIS are measured in accordance with TR25.914.

CDMA 2000® is a registered trademark of the Telecommunications Industry Association (TIA - USA).

The Bluetooth wordmark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by Rhode & Schwarz is under license.

The scope of functionalities of the R&S®TS8991 test system from Rohde & Schwarz is continuously being expanded by new technologies, which ensures high future-proofness and safety of investment.

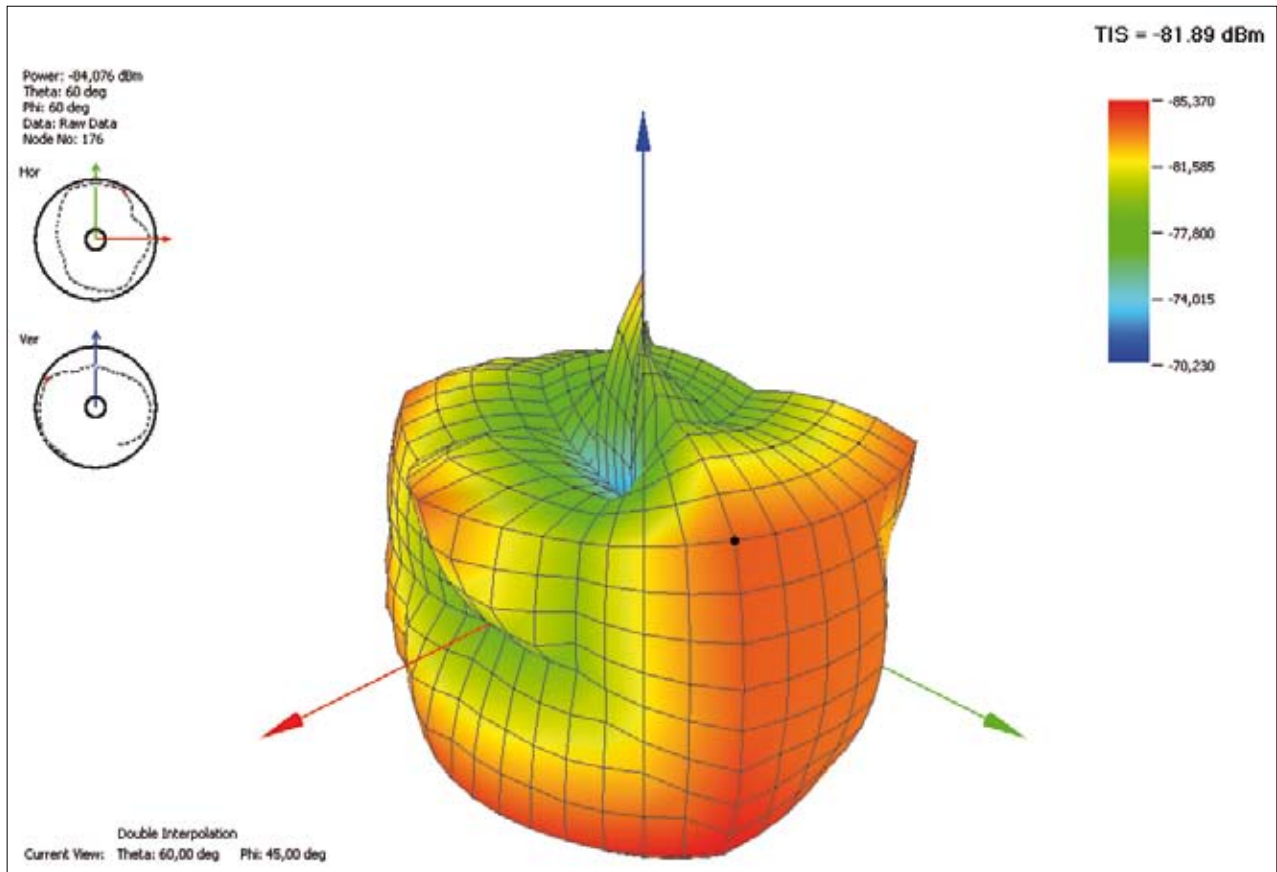
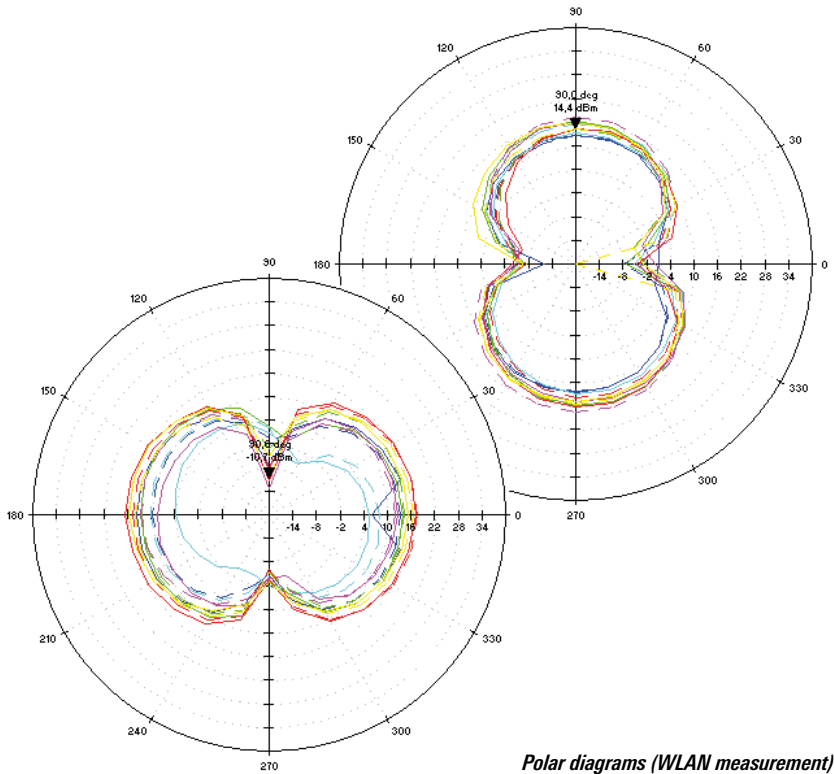
The R&S®TS8991 test system can either be combined with anechoic chambers from various manufacturers or comes as a turnkey solution. It can thus be ideally adapted to the customer's infrastructure.

## ... quick and clear analysis

The integrated 3D representation allows the fast analysis of the diagrams, which is further facilitated by the intuitive operation with the mouse.

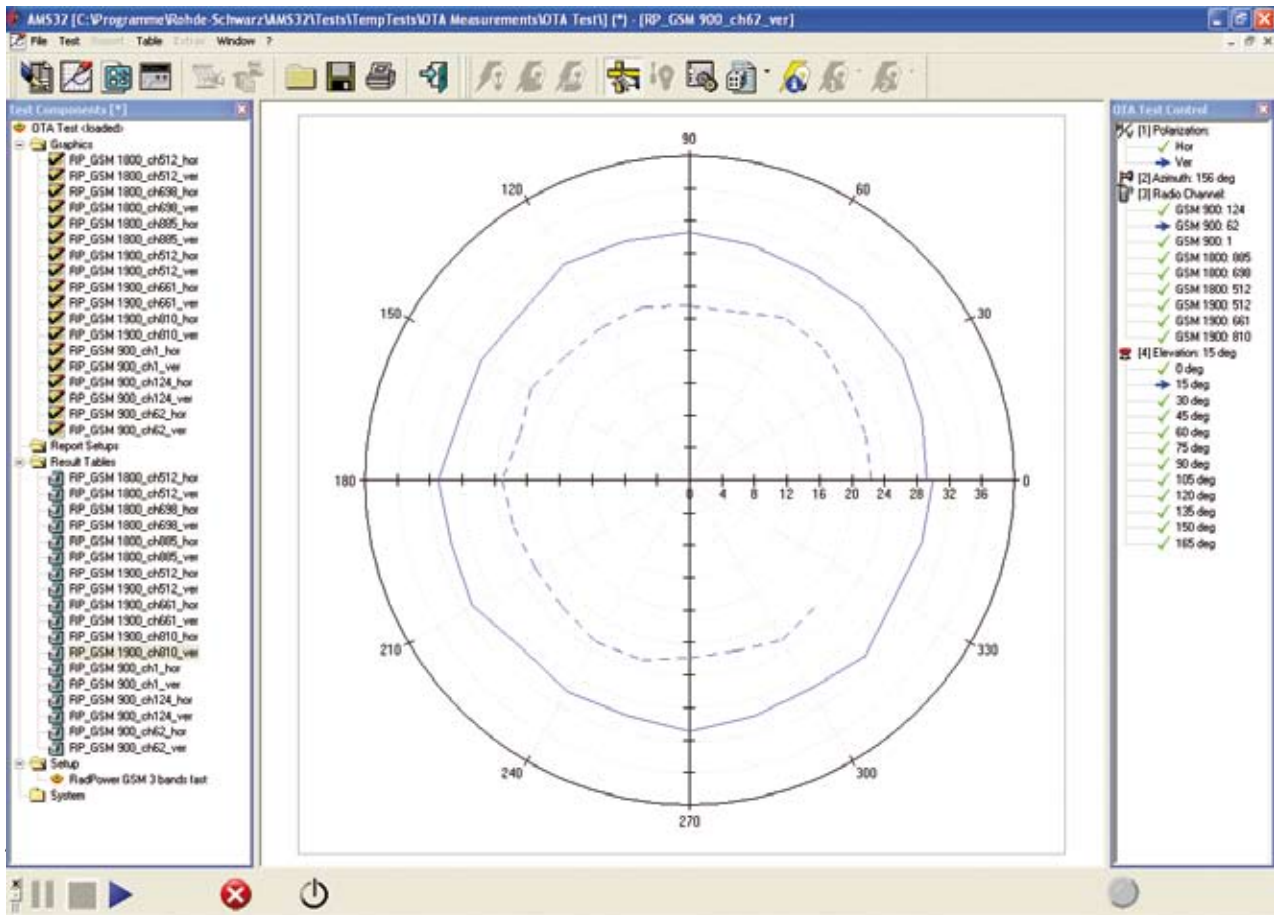
In addition, all relevant OTA and antenna parameters plus the 3D diagrams from the six main directions are automatically compiled in a report.

The user can select how the diagrams and reports are to be formatted. During the measurement, the current test step and the remaining measurement time are displayed, and all results are shown as polar diagrams.



### 3D evaluation

# Performance-optimized system design ...



Graphical user interface of the R&S® AMS32 OTA software

## Standard-conforming measurement of OTA performance

- ◆ Allows OTA measurements in line with CTIA, CWG, and PTCRB
- ◆ For all common wireless standards
- ◆ Swift implementation of new requirements due to collaboration with leading wireless equipment manufacturers and test houses as well as active participation in standardization bodies
- ◆ Certified as a reference system in many test houses

## High acceptance of results through reliable and reproducible measurements

- ◆ Exact positioning
- ◆ Use of optimized internal test routines
- ◆ System optimization through wear-free semiconductor switches at critical points
- ◆ Top measurement accuracy due to individual calibration with power sensor

## Efficient test sequences increase EUT throughput

Minimum measurement times owing to optimal matching of hardware and software, e.g. in fast, pinpoint positioning

- ◆ Optimized algorithms for TIS measurements
- ◆ Fast Pass/Fail detection
  - Adaptive step widths for bit error ratio measurements
- ◆ Time-optimized methods for measurements in development
  - Spiral scan with continuous revolution around both spatial axes for fast data acquisition
  - Alternative faster BER test method for TIS measurements
- ◆ Easy switchover between measurements with and without phantom head (changing of mast not required)
- ◆ Stable wireless links by means of diversity via two communications antennas and active level control

## ... for development and certification

### Structured operating concept enables result-oriented work

- ◆ Combined, automatic test sequences, e.g. of multichannel, multiband, intermediate channel (GSM), one point offset (GPRS, EDGE), or TRP and TIS in a single step
- ◆ Intuitive user interface and analysis including 3D representation
- ◆ Integrated, flexible report function for documentation
- ◆ Report output in CTIA-conforming format
- ◆ Open data formats for customized postprocessing

### Modular system design ensures adaptation to specific requirements

- ◆ Configurations for various OTA applications
- ◆ Combination with radiated spurious emission or EMC tests in one test system
- ◆ Available for integration into existing anechoic chambers or as a turnkey solution



*R&S® TS8991 with positioner*

## Ordering information

Product designation	Type	Order No.
OTA Performance Test System	R&S®TS8991	1119.4309.02

Our product managers support you in selecting options and exactly configuring the system.



For data sheet, see PD 5213.8796.12  
and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: TS8991)



**ROHDE & SCHWARZ**

[www.rohde-schwarz.com](http://www.rohde-schwarz.com)

Europe: +49 1805 12 4242, [customersupport@rohde-schwarz.com](mailto:customersupport@rohde-schwarz.com)  
Americas: +1-888-837-8772, [customer.support@rsa.rohde-schwarz.com](mailto:customer.support@rsa.rohde-schwarz.com)  
Asia: +65 65 130 488, [customersupport.asia@rohde-schwarz.com](mailto:customersupport.asia@rohde-schwarz.com)