

# R&S®TS7121

## Shielded RF Test Boxes

Reliable RF tests on  
devices with a radio  
interface



# R&S®TS7121 Shielded RF Test Boxes At a glance

The use of shielded RF boxes is a prerequisite for reliably testing radio interfaces. This is the only way to ensure that DUTs are not affected by interference from other, external test systems, which would distort measurement results, and also to prevent other external instruments or test systems from being affected by the testing of the radio interface. To meet these requirements, a test box must offer high shielding effectiveness, a good antenna coupling factor, and a rugged mechanical design for reproducible results.

The R&S®TS7121 RF test box has been designed to meet the requirements of automatic production lines. These include long service life, rugged design, and automatic opening and closing of the RF box. Featuring high shielding effectiveness over a wide frequency range, the RF test boxes perform tests on modules and devices with a radio interface in accordance with a wide variety of standards such as ISM, GSM/CDMA2000®/WCDMA, WLAN, Bluetooth®, ZigBee®, WiMAX™, Wi-Fi and LTE.

## Key facts

- Wide frequency range from 300 MHz to 6 GHz
- Rugged design for long service life
- High shielding effectiveness
- Low reflection due to use of absorbent material
- Integrated RF connectors and filter feedthroughs
- Automatically and manually operated versions

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Rear view of automatic version of the R&S®TS7121 with exchangeable connector plate.

# R&S®TS7121 Shielded RF Test Boxes

## Benefits and key features

### Rugged mechanical design for long service life and reproducible RF characteristics

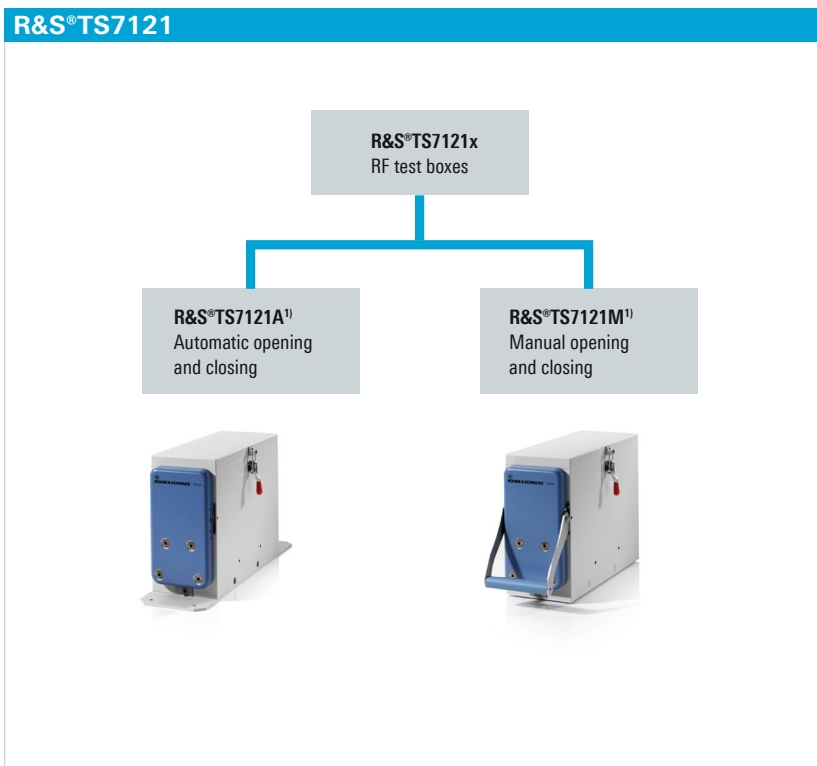
- Milled case ensures reproducible RF characteristics
- Optional absorbers mitigate reflection from RF test box inner walls
- Manual and automatic versions with identical RF characteristics
- Exchangeable connector plate for customized configurations

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### Diverse options for application-specific configurations

- Feedthrough filter for DUT control
- Antenna couplers for diverse technologies

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# Rugged mechanical design for long service life and reproducible RF characteristics

## Milled case ensures reproducible RF characteristics

The RF test boxes were designed with high shielding effectiveness and sturdy construction in mind. To meet these requirements without diminishing manufacturing efficiency, the three-dimensional structure of the RF test box is milled from an aluminum block.

## Optional absorbers mitigate reflection from RF test box inner walls

The interior of the RF test box can optionally be lined with absorbent material, which attenuates high-frequency electromagnetic waves and thus ensures reproducible and stable measurements.

## Manual and automatic versions with identical RF characteristics

The R&S®TS7121A and R&S®TS7121M automatic and manual versions of the RF test boxes have the same basic design, ensuring the same test functionality for both versions in development, production and service.

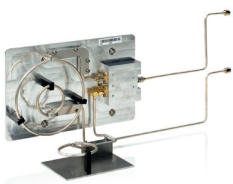
## Exchangeable connector plate for customized configurations

An important design feature is the exchangeable connector plate with two feedthrough filters on the rear of the RF test box. These D-Sub filter connectors make it possible to feed electrical signals to the DUT or to test and control circuitry that can be integrated into the test box. The exchangeable connector plate makes it easy to add application-specific feedthroughs without having to modify the RF test box.

The DUT is placed on the slide-in unit and slid into the RF test box by pneumatic or manual control. The front supporting plate is mounted inside on the slide-in unit's front panel; see figure on page 6. On this plate, you can attach the application-specific DUT mount or a mechanical mount for an exchangeable DUT mount or DUT holder.

When the slide-in unit is closed, the front supporting plate is guided by means of two centering pins, which ensures reproducible positioning of the DUT.

## Technology-specific antenna couplers



R&S®TS-F21AGB  
GSM, CDMA2000®, WCDMA, Bluetooth®



R&S®TS-F2x-G  
GSM, CDMA2000®, WCDMA



R&S®TS-F2x-G  
Bluetooth®, WLAN (b, g)



R&S®TS-F2x-I4  
ISM

# Diverse options for application-specific configurations

## **Feedthrough filter for DUT control**

By using the R&S®TS-F21FU2 option, you can feed USB 1.1 and USB 2.0 signals to the RF test box for controlling the DUT and the test equipment in the RF test box.

## **Antenna couplers for diverse technologies**

Antenna couplers for all important mobile radio standards as well as for WLAN b/g, ISM and Bluetooth® are available. The couplers can be attached to the side panels or rear supporting plate of the RF chamber. Customer-specific antenna couplers can also be integrated.

When several RF test boxes are used, each test box should be calibrated to correct even the smallest production tolerances in the measurements – be it for the antenna couplers, the RF cables, or the absorbent material.

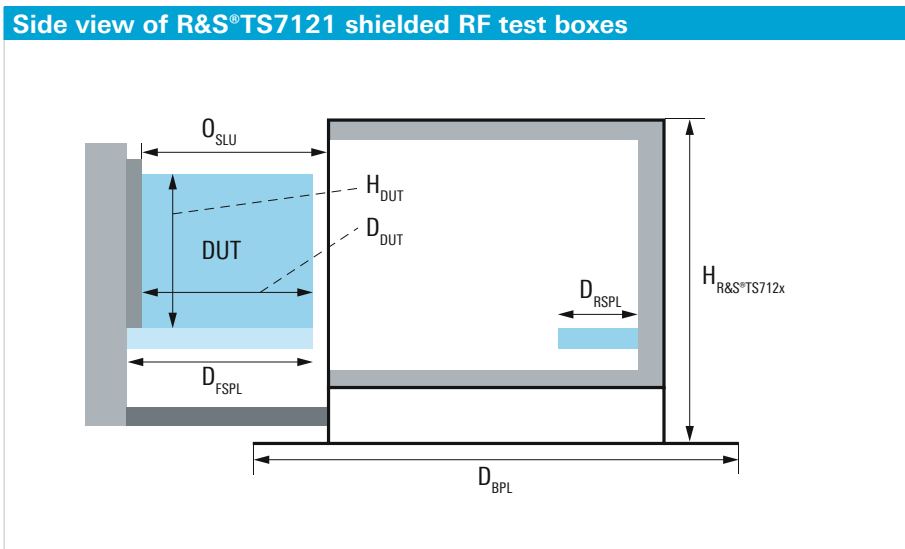
# Specifications

Specifications	
<b>RF shielding effectiveness <sup>1)</sup></b>	
300 MHz to 3 GHz	> 70 dB (typ.)
1 GHz to 2.5 GHz	> 75 dB (typ.)
2.5 GHz to 4 GHz	> 60 dB (typ.)
<b>Interfaces</b>	
Compressed air (grease-free)	4 bar to 8 bar (automatic version only)
Control of pneumatic system	25-contact, D-Sub (m), 24 V
Exchangeable connector plate with feedthrough filter	80 mm × 90 mm (3.15 in × 3.54 in)
1 × 25, 1 × 9-contact feedthrough filter	D-Sub female (on outside of case), D-Sub male (on inside of case) 3 MHz (3 dB) cut-off frequency, 100 V (1 A) DC voltage, 100 V (0.3 A) AC voltage
RF feedthroughs	4 × N female (on outside of case) to SMA female (on inside of case), 0 MHz to 12.4 GHz
<b>Temperature ranges</b>	
Operating temperature range	+10 °C to +40 °C
Storage temperature range	−20 °C to +60 °C
Relative humidity	
Operation	90 % relative humidity, noncondensating at +10 °C to +30 °C or 75 % relative humidity, noncondensating at +10 °C to +40 °C
Storage	90% relative humidity, noncondensating up to +60 °C
<b>Dimensions (W × H × D)</b>	
Outer dimensions (slide-in unit closed) <sup>2)</sup>	
Automatic version (with base plate)	155 mm × 305 mm × 428 (600) mm (6.10 in × 12.00 in × 16.85 (23.62) in)
Manual version (with handle)	155 mm × 305 mm × 498 mm (6.10 in × 12.00 in × 19.61 in)
Additional depth with slide-in unit fully extended	+210 mm (+8.27 in)
Inner dimensions (with absorber)	87 mm × 130 mm × 354 mm (3.43 in × 5.12 in × 13.94 in)
Max. DUT dimensions (with absorber)	80 mm × 130 mm × 193 mm (3.15 in × 5.12 in × 7.60 in)
Base plate of automatic version (W × D) <sub>BPL</sub> <sup>3)</sup>	155 mm × 600 mm (6.10 in × 23.62 in)
Front supporting plate (with absorber) (W × D) <sub>FSPL</sub> <sup>3)</sup>	80 mm × 200 (193) mm (3.15 in × 7.87 (7.60) in)
Rear supporting plate (with absorber) (W × D) <sub>RSPL</sub> <sup>3)</sup>	80 mm × 175 (149) mm (3.15 in × 6.89 (5.87) in)
Max. opening of slide-in unit (with absorber) O <sub>SLU</sub> <sup>3)</sup>	209 (195) mm (8.23 (7.68) in)
Weight (with absorber, without antenna)	approx. 25 kg (55.12 lb)
Shipping weight	approx. 32 kg (70.55 lb)

<sup>1)</sup> With integrated absorber, when maintenance intervals are adhered to.

<sup>2)</sup> Without connectors on rear panel (> 20 mm (> 0.79 in)), without lateral clamping levers (2 mm (0.08 in) × 30 mm (1.81 in)).

<sup>3)</sup> For location in test box, see figure "Side view of R&S®TS7121x RF shielded test boxes".



Specifications	
<b>Options<sup>4)</sup></b>	
Antenna couplers	coupling coefficient typ. 10 dB to 20 dB <sup>5)</sup>
GSM/CDMA2000®/WCDMA (R&S®TS-F2x-G, included in R&S®TS-F21AGB)	770 MHz to 1000 MHz, 1700 MHz to 2200 MHz
Bluetooth®/WLAN (b, g) (R&S®TS-F2x-B2, included in R&S®TS-F21AGB)	2.4 GHz
ISM (R&S®TS-F2x-I4)	315 MHz, 433 MHz to 434 MHz, 850 MHz to 950 MHz
<b>Absorber</b>	
Thickness	26 mm (1.02 in)
Return loss	up to 1 GHz: <2 dB; 1 GHz to 2 GHz: 10 dB to 20 dB, from 2 GHz >20 dB
Proportion of shielding effectiveness	up to 1 GHz: approx. 5 dB; 0.8 GHz to 2 GHz: approx. 10 dB; from 2 GHz: approx. 15 dB
Feedthrough filter for USB up to 2.0	yes
Outer dimensions (with side handle)	155 (188) mm × 185 mm × 400 mm (6.10 (7.40) in × 7.28 in × 15.75 in)
Inner dimensions (without absorber)	128 mm × 170 mm × 373 mm (5.04 in × 6.69 in × 14.69 in)
Inner dimensions (with absorber)	76 mm × 144 mm × 321 mm (2.99 in × 5.67 in × 12.64 in)
Effective additional inner height (with absorber)	179 (153) mm (7.05 (6.02) in)

<sup>4)</sup> Feedthrough filter for fiber-optic link and compressed air on request.

<sup>5)</sup> Depending on DUT.

# Ordering information

Designation	Type	Order No.
<b>Shielded RF Test Box, narrow version (without absorber)</b>		
Automatic version <sup>1)</sup>	R&S®TS7121A	1152.5700.04
Manual version with handle	R&S®TS7121M	1152.5800.02
<b>Options – antenna couplers</b>		
GSM, CDMA2000®, WCDMA- + Bluetooth® Antenna Coupler with absorber for R&S®TS7121	R&S®TS-F21AGB	1506.9000.02
GSM, CDMA2000®, WCDMA Antenna Coupler <sup>2)</sup>	R&S®TS-F2x-G	1506.9017.04
Bluetooth® Antenna Coupler with bracket <sup>2)</sup>	R&S®TS-F2x-B2	1506.9046.02
ISM Wideband Antenna Coupler (315 MHz, 434 MHz, 850 bis 950 MHz) <sup>2)</sup>	R&S®TS-F2x-I4	1506.9030.02
<b>Other options</b>		
Absorber Kit for R&S®TS7121	R&S®TS-F21ABS	1506.9100.02
USB 2.0 Feedthrough Filter with exchangeable connector	R&S®TS-F21FU2	1506.9181.02

<sup>1)</sup> Use only in protected environment, risk of bodily injury through automatic opening and closing of RF box (see safety sheet included with R&S®TS712x documentation).

<sup>2)</sup> Supplied without absorber; absorber required.

## Service that adds value

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

## Rohde & Schwarz

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## Sustainable product design

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

Certified Quality Management

**ISO 9001**

Certified Environmental Management

**ISO 14001**

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