

R&S® TS6030 I-Level Special Test Equipment

Fast and easy on-site
maintenance of radios,
amplifiers and control
units



75 Years of
Driving
Innovation



ROHDE & SCHWARZ

R&S®TS6030 I-Level Special Test Equipment At a glance

The R&S®TS6030 test system is specifically designed for performing service and maintenance on radios and accessory equipment of the R&S®M3xR family and the R&S®Series 4200. In conjunction with the test routines built into the radio equipment, the R&S®TS6030 enables you to identify errors down to the module level (I-level).

You can connect the radio being tested to the R&S®TS6030 in next to no time. Testing itself is then performed fully automatically. The R&S®TS6030 is a highly reliable and accurate test system that can be operated without requiring extensive training.

Since the R&S®TS6030 test system is housed in rugged, splash-proof 19" boxes, it can be transported safely, set up quickly, and utilized at a variety of locations.

- Fast and automatic functional test
- Testing across the radio equipment's entire frequency range
- Precise error identification
- Verification after module replacement
- Easily adaptable to a variety of radio types
- Transportable and robust 19" aluminum racks



R&S®TS6030 I-Level Special Test Equipment

Benefits and key features

Reliable functional test of radio equipment

- Fast and automatic functional test
- Performance test across the radio equipment's entire frequency range
- User-selectable scope of testing
- Display of current system status
- Automatic generation of test reports

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Maximum flexibility, minimum training

- Do-it-yourself on-site repair
- Precise error identification
- Recommended replacement unit for defective modules
- Verification after module replacement

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Mobile and adaptable to customer requirements

- Easily adaptable to a variety of radio types
- Transportable and robust 19" aluminum racks
- Future-ready investment

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Typical ESD protected laboratory
environment with the R&S®TS6030

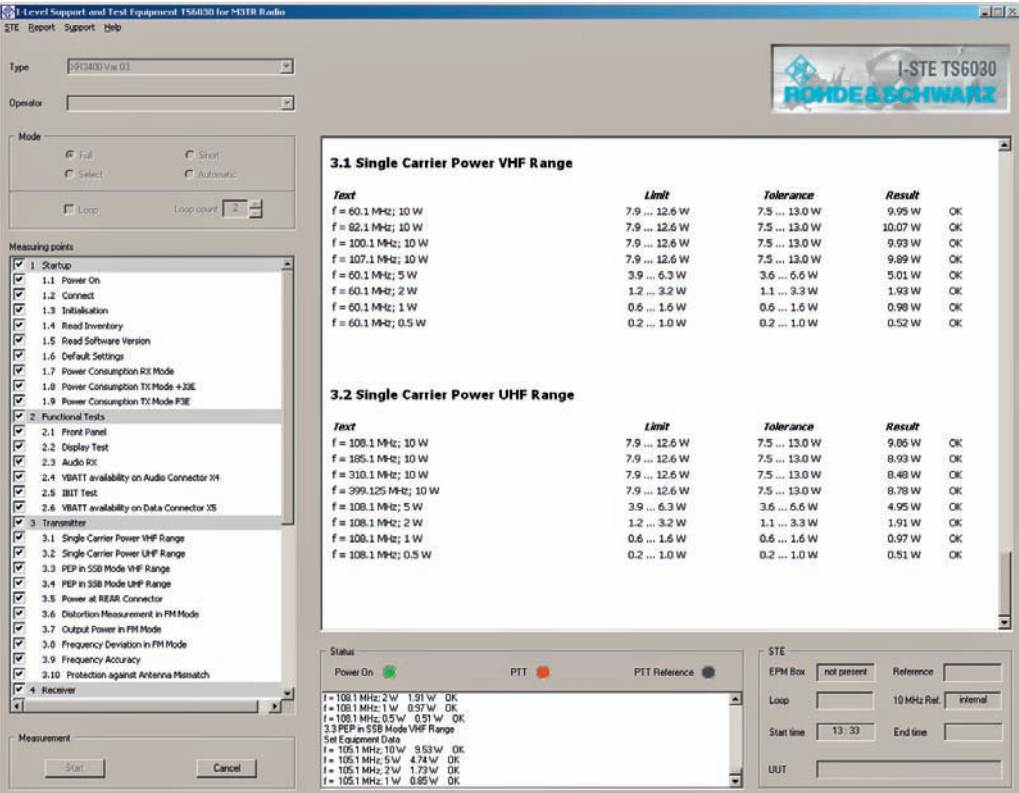


Reliable functional test of radio equipment

Fast and automatic functional test

You can now run automatic tests of radio equipment by means of the R&S®TS6030 software. The test system's software controls the entire test sequence and features a straightforward, interactive graphical user interface (GUI) based on Microsoft® Windows. In its default configuration, the software performs a full test of the unit under test (UUT). You do not need to switch any cable connections during the test, which makes system operation a lot easier.

Graphical user interface of the R&S®TS6030 software



Performance test covering radio equipment's entire frequency range

Plain mode

Plain mode (unencrypted) communications is a standard functionality in all R&S®M3xR radios.

To carry out a functional test in this mode, you only need the basic system (R&S®TS6030, see upper picture).

The system analyzes the following UUT functions and characteristics in this mode:

- RF parameters of the RX/TX antenna interface
- Audio and data transmission
- Level and performance of all interfaces
- Evaluation of results output by the UUT's internal test routines (via the remote interface)
- Initiated built-in test (IBIT)
- Continuous built-in test (CBIT)
- Analysis of the UUT's power consumption

EPM (ECCM) mode

R&S®M3xR radios may include electronic protective measures (EPM) capabilities such as R&S®SECOS, R&S®SECOM, HAVE QUICK and SATURN.

To test the EPM (ECCM) functionality of a UUT, you need a second radio that operates with the same keys of the same encryption standard as the UUT. The second radio is implemented as a reference radio, which is also often referred to as a golden device.

The EPM (ECCM) mode extension (R&S®TS6030-B100 option) consists of a second rack (see lower picture) and enables you to perform the following tests for encrypted communications:

- Key and data handling
- Time synchronization
- Voice/raw data transmission between UUT and reference radio
- Bit error ratio
- Test of data radio traffic with high losses on radio link

The radio link is simulated in the EPM (ECCM) mode by the R&S®RSG step attenuator. Any of the following radios may be used as a reference receiver as long as it offers the same encryption method as the UUT: R&S®M3AR, R&S®M3SR or R&S®M3TR. For example, it is possible to test an R&S®M3AR radio by means of an R&S®M3SR that is used as a golden device. This ensures maximum system flexibility.

Basic system



EPM (ECCM) mode extension



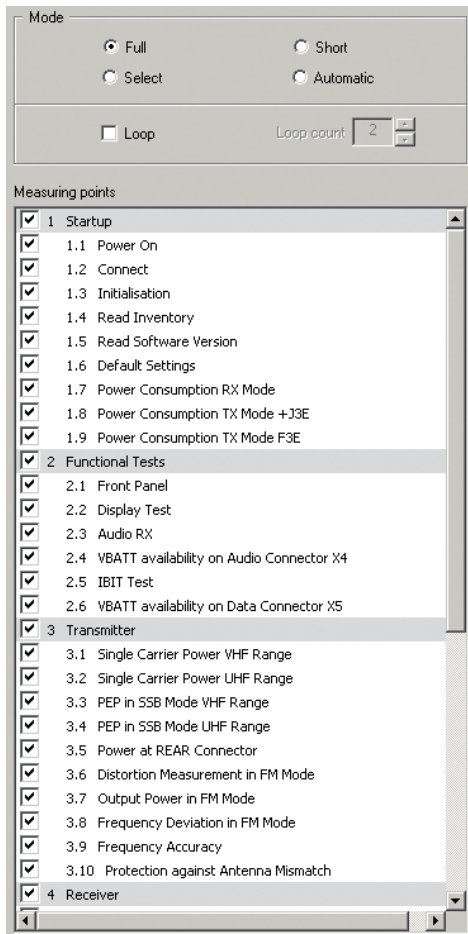
User-selectable scope of testing

The R&S®TS6030 allows you to select individual test groups to cover specific UUT functionalities. Each test group consists of a specific set of test steps for performing and evaluating the required measurements. If you need to detect sporadic errors, the R&S®TS6030 software can automatically repeat the test sequence you select (loop).

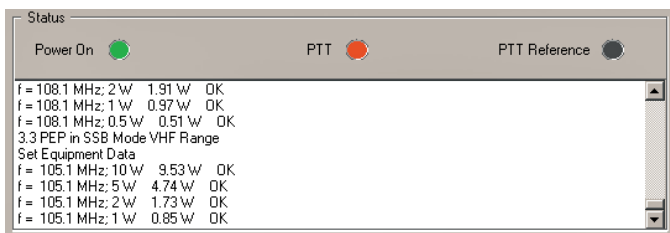
Display of the current system status

The system status as well as measurement and analysis results are displayed in the status panel even while the functional test is in progress.

Selection of test groups and the test steps they offer




System status display



Automatic generation of test reports

As each test step is completed, the R&S®TS6030 software generates a detailed test report that records the results of the test step. Test reports can be stored and printed. The test sum can be used to check the integrity of the stored test report.

Excerpt from a test report



I-STE TS6030
ROHDE & SCHWARZ

TEST REPORT

Equipment: XM6512D
Designation: Transceiver
Ident-No.: 6125.8004.6
Serial-No.: 100006 PIN:
I-STE Version: 1.37
EPM Box: present
Scope: complete
Summary: All Testcases

Name:
Date: 2008-04-01

Signature: _____

1 Startup

1.1 Power Consumption

Text	Limit	Tolerance	Result
Stand-By	<=0.0036 A	<=0.0136 A	0.00 A OK
On	<=1.1 A	<=1.1 A	0.80 A OK

1.2 Boot time

Text	Limit
Cold Start	<=20.0 s
Warm Start	<=20.0 s

1.3 Check Licenses

Text	Limit
TVHF present	OK
VHF present	OK
UHF present	OK
MAR present	OK
Ch Spacing 8.33 present	OK
SECOS 5/16 present	OK
DPP present	OK

1.4 Read Inventory data

Text	Limit
Reading	OK

Inventory Report

Type	Name	Identno. / Var	Serial no.
DEV	DEV	6125.8004.62	100006
HWMOD	HRC	6086.1515.13	100399/000
HWMOD	HCP	6086.0019.33	100006/000

2.2 MRX Sensitivity AM

Text	Limit	Tolerance	Result
f = 108.025 MHz	>=10.0 dB	>=9.3 dB	13.1 dB OK
f = 135.025 MHz	>=10.0 dB	>=9.3 dB	14.3 dB OK
f = 155.975 MHz	>=10.0 dB	>=9.3 dB	14.3 dB OK
f = 225.025 MHz	>=10.0 dB	>=9.3 dB	14.0 dB OK
f = 310.025 MHz	>=10.0 dB	>=9.3 dB	13.1 dB OK
f = 399.975 MHz	>=10.0 dB	>=9.3 dB	13.2 dB OK

2.3 MRX Sensitivity FM

Text	Limit	Tolerance	Result
f = 030.025 MHz	>=10.0 dB	>=9.2 dB	21.3 dB OK
f = 050.025 MHz	>=10.0 dB	>=9.2 dB	23.3 dB OK
f = 087.975 MHz	>=10.0 dB	>=9.2 dB	24.2 dB OK
f = 136.025 MHz	>=10.0 dB	>=9.2 dB	22.7 dB OK
f = 155.975 MHz	>=10.0 dB	>=9.2 dB	22.8 dB OK
f = 173.975 MHz	>=10.0 dB	>=9.2 dB	22.7 dB OK
f = 225.025 MHz	>=10.0 dB	>=9.2 dB	21.5 dB OK
f = 310.025 MHz	>=10.0 dB	>=9.2 dB	21.6 dB OK
f = 399.975 MHz	>=10.0 dB	>=9.2 dB	19.9 dB OK

2.4 MRX Selectivity 25kHz

Text	Limit	Tolerance	Result
Receive at +11kHz; +6dB	>=16.0 dB	>=15.2 dB	20.9 dB OK
Receive at -11kHz; +6dB	>=16.0 dB	>=15.2 dB	20.8 dB OK
Receive at +25kHz; +60dB	<=3.0 dB	<=3.8 dB	0.6 dB OK
Receive at -25kHz; +60dB	<=3.0 dB	<=3.8 dB	0.3 dB OK

2.5 MRX Selectivity 8.33kHz

Text	Limit	Tolerance	Result
Receive at +3.5kHz; +6dB	>=16.0 dB	>=15.2 dB	20.0 dB OK
Receive at -3.5kHz; +6dB	>=16.0 dB	>=15.2 dB	19.5 dB OK
Receive at +5.5kHz; +60dB	<=3.0 dB	<=3.8 dB	0.0 dB OK
Receive at -5.5kHz; +60dB	<=3.0 dB	<=3.8 dB	0.0 dB OK

Maximum flexibility, minimum training

Do-it-yourself on-site repair

Sending radios to external service centers for testing not only takes a lot of time: It also takes a big bite out of your budget. The R&S®TS6030 lets you avoid this entire process.

Precise error identification

Based on the results of the individual test steps, the R&S®TS6030 assesses overall UUT functionality. Defects within a UUT can be precisely localized through the intelligent correlation of all results.

Recommended replacement unit for defective modules

After precisely identifying an error in the UUT, the R&S®TS6030 recommends the smallest replaceable unit (SRU). This minimizes costs and effort in the repair of defective radios.

Functionality verification after module replacement

The R&S®TS6030 can also be used to verify whether a repair (e.g. a module replacement) was successful. You merely need to subject the repaired radio to the test again. This type of the verification proves that the UUT functions properly and is an essential component of maintenance measures, for example in aviation electronics.

Mobile use of the R&S®TS6030



Mobile and adaptable to customer requirements

Easily adaptable to a variety of radio types

The R&S®M3AR, R&S®M3SR and R&S®M3TR radios have different interfaces and power supply requirements because they are intended for different applications. The R&S®TS6030 offers special-to-type interfaces for each type of radio. They can be used as required without any modification to the test system. The R&S®TS6030-B10/-B110, -B20/-B120 and -B30/-B130 options include as standard the plug-in cards required in each case. This plug-and-play functionality makes system upgrading an easy task.

You do not need to switch any cable connections during the test, which makes system operation a lot easier. Support for additional types of radios is available on request.

Testing of power amplifiers and antenna tuners also possible

If you want to test the R&S®VT3050C, R&S®VK3150 and R&S®VD480L power amplifiers, you can add test options specifically for this purpose. These options contain all required cables plus an extension for the test software. Moreover, the R&S®TS6030 also offers optional support for testing the R&S®FK3150HF antenna tuner.

System interface of the R&S®TS6030



Water-resistant rugged transit case (IP 65)



Transportable and robust 19" box

The R&S®TS6030 is housed in a rugged 19" box (12 HU). Its front and rear sides can be protected during transport by means of the covers supplied with the unit. The R&S®TS6030-B100 (EPM (ECCM) mode) option comes in a second box with identical characteristics and of identical size. The cable connections between the two boxes are dimensioned such that the boxes can be set up one on top of the other or next to each other.

The protective covers include convenient pouches for storing all cables during transport.

If you plan to use the equipment solely in a stationary lab setup, all components of the R&S®TS6030 including the EPM (ECCM) mode expansions can be installed in just one 19" rack (27 HU).

Comparison between the
R&S®TS6030 test system and the
built-in test equipment

R&S®TS6030	Built-in test equipment R&S®M3xR radio family and R&S®Series 4200
Test over the same interfaces via which the UUT is also connected	Measurements are performed at the main test points inside the UUT
Selectable test groups across the entire frequency range of the radios	No selection possible
Recommendation for the replacement of a defective module owing to the intelligent linking of all test results	You have to interpret the results of the built-in test yourself with the help of the manual
Loop function for detecting sporadic errors in the real operation environment	The measurements at the main test points are repeated
Test of encrypted communications	Testing not possible
Test of EPM (ECCM) modes with different types of radios	Testing not possible
Measurement of the operating temperature inside the UUT not possible	The temperature inside the UUT is measured
Generation of a complete test report in line with Rohde&Schwarz test instructions	Output on the UUT display
Verification after a module replacement under the same test conditions	

Ordering information

Designation	Type	Order No.
Basic system¹⁾		
I-Level Special Test Equipment, including system rack, measurement equipment, 19" industrial PC and laser printer	R&S®TS6030	5200.7050.02
Included measurement equipment		
Radiocommunication Service Monitor	R&S®CMS54	0840.0009.54
OCXO Reference Oscillator	R&S®CMS-B2	1001.6809.02
Centronics Interface and CCITT Filter	R&S®CMS-B55	1032.0790.02
10 MHz Reference Frequency IN/OUT	R&S®CMS-B22	1001.6750.02
19" Adapter, 4 HU 3/4 for KB90 cabinets	R&S®ZZA-99	0839.5775.00
Attenuator 30 dB 100 W	R&S®RBU100	1073.8495.30
Directional Power Sensor 25 MHz to 1 GHz	R&S®NRT-Z14	1120.5505.02
RS-232-C Interface Adapter for R&S®NRT-Z Sensors	R&S®NRT-Z3	1081.2705.02
System interface options (plain mode)¹⁾		
Including interface modules, cabling and plain mode test software suite		
System Interface for R&S®M3AR, radio types R&S®MR6000R, R&S®MR6000L	R&S®TS6030-B10	5200.7067.02
System Interface for R&S®M3AR, radio type R&S®MR6000A	R&S®TS6030-B15	5201.6229.02
System Interface for 611H	R&S®TS6030-B18	5201.6241.02
System Interface for R&S®M3SR Series 4400	R&S®TS6030-B20	5200.7073.02
System Interface for R&S®M3SR Series 4100	R&S®TS6030-B25	5201.6458.02
System Interface for R&S®Series 400U	R&S®TS6030-B28	5201.6258.02
System Interface for R&S®M3TR	R&S®TS6030-B30	5200.7080.02
System Interface for R&S®Series 4200	R&S®TS6030-B40	5201.6441.02
System Interface for R&S®Series ARRS	R&S®TS6030-B50	5201.6535.02
EPM (ECCM) mode extension options²⁾		
EPM (ECCM) Mode Extension, including system rack and measurement equipment	R&S®TS6030-B100	5200.7096.02
Included measurement equipment		
RF Step Attenuator, DC to 5.2 GHz	R&S®RSG	1009.4505.02
19" Adapter, 2 HU 1/1 for KB90 cabinets	R&S®ZZA 92	0396.4886.00
Attenuator 30 dB 100 W, 2 units	R&S®RBU100	1073.8495.30
System Interface for R&S®M3AR, radio types R&S®MR6000R, R&S®MR6000L (EPM (ECCM) mode extension), including interface modules, cabling and EPM (ECCM) mode test software suite	R&S®TS6030-B110	5200.7109.02
System Interface for R&S®M3AR, radio type R&S®MR6000A (EPM (ECCM) mode extension), including interface modules, cabling and EPM (ECCM) mode test software suite	R&S®TS6030-B115	5201.6235.02
System Interface for 611H (EPM (ECCM) mode extension), including interface modules, cabling and EPM (ECCM) mode test software suite	R&S®TS6030-B118	5201.6270.02
System Interface for R&S®M3SR Series 4400 (EPM (ECCM) mode extension), including interface modules, cabling and EPM (ECCM) mode test software suite	R&S®TS6030-B120	5200.7115.02
System Interface for R&S®M3SR Series 4100 (EPM (ECCM) mode extension), including interface modules, cabling and EPM (ECCM) mode test software suite	R&S®TS6030-B125	5201.6464.02
System Interface for R&S®Series 400U (EPM (ECCM) mode extension), including interface modules, cabling and EPM (ECCM) mode test software suite	R&S®TS6030-B128	5201.6264.02
System Interface for R&S®M3TR (EPM (ECCM) mode extension), including interface modules, cabling and EPM (ECCM) mode test software suite	R&S®TS6030-B130	5200.7121.02
Auxiliary device test options		
Control Unit Test for R&S®M3AR (R&S®GB6500), including cabling and control unit test software suite; requires R&S®TS6030-B10 option	R&S®TS6030-B11	5200.7138.02
Control Unit Test for R&S®M3SR Series 4400 (R&S®GB4000C), including cabling and control unit test software suite; requires R&S®TS6030-B20 option	R&S®TS6030-B21	5200.7144.02
Extension for R&S®MR3000P Plain Mode, including cabling for R&S®MR3000P and test software suite extension; requires R&S®TS6030-B30 option	R&S®TS6030-B31	5201.7931.02
Extension for R&S®MR3000P EPM (ECCM) Mode, including cabling for R&S®MR3000P and EPM (ECCM) test software suite extension; requires R&S®TS6030-B130 option	R&S®TS6030-B131	5201.7948.02
Control Unit Test for R&S®GB406S1, including cabling and control unit test software suite; requires R&S®TS6030-B20 option	R&S®TS6030-B22	5201.6529.02

Designation	Type	Order No.
Power amplifier test options		
R&S®VT3050/VK3150 Power Amplifier Test, including cabling for R&S®VT3050, R&S®VK3150 and test software suite extension	R&S®TS6030-B35 ³⁾	5201.6206.02
R&S®FK3150 HF Antenna Tuning Unit Test, including antenna simulation unit, cabling and test software suite extension	R&S®TS6030-B36 ³⁾	5201.6212.02
R&S®VT3050C Power Amplifier Test, including cabling for R&S®VT3050C and test software suite extension	R&S®TS6030-B38 ³⁾	5201.7860.02
R&S®VD480L Power Amplifier Test, including cabling for R&S®VD480L and test software suite extension; requires R&S®TS6030-B20 option	R&S®TS6030-B39	5201.6512.02

For the EPM (ECCM) tests and power amplifier test option, a reference radio is required (not included in the items supplied).

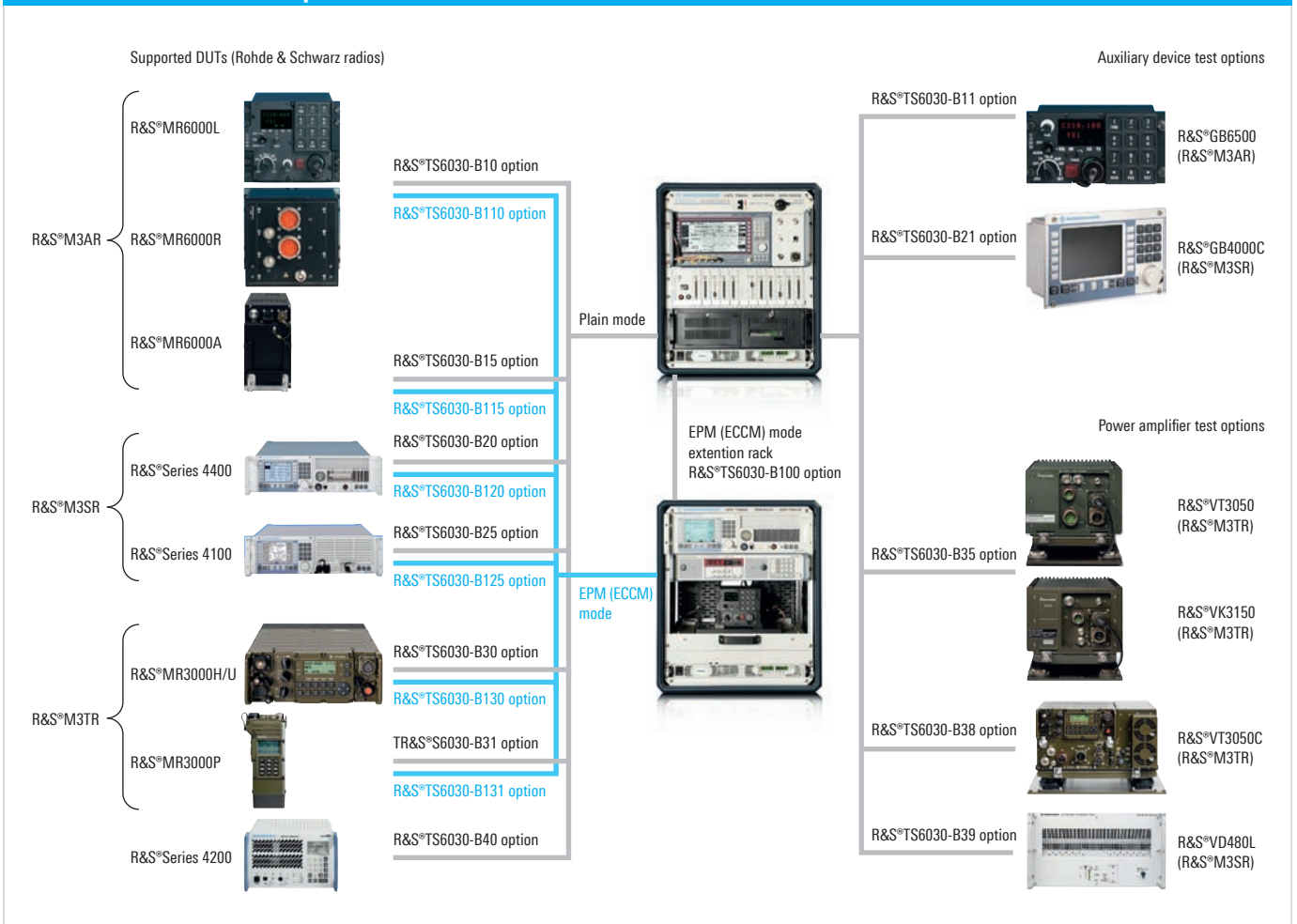
- ¹⁾ The basic system can only be ordered together with an R&S®TS6030-B10/-B15/-B18/-B20/-B25/-B28/-B30/-B40 or R&S®TS6030-B50 system interface option.
- ²⁾ The EPM (ECCM) mode extension can only be ordered together with an R&S®TS6030-B110/-B115/-B118/-B120/-B125/-B128 or R&S®TS6030-B130 system interface option. For the EPM (ECCM) tests, a reference radio is required (not included in the items supplied).
- ³⁾ Requires the R&S®TS6030-B30 option. A docking station is not included in the items supplied (docking station not required for the R&S®VT3050C).

Specifications

General data

Dimensions		
Basic system rack/EPM (ECCM) mode extension	with cover (W x H x D)	434 mm x 618 mm x 610 mm (17.09 in x 24.33 in x 24.02 in)
	without cover (W x H x D)	434 mm x 618 mm x 480 mm (17.09 in x 24.33 in x 18.90 in)
Weight	basic system rack	103 kg (227.08 lb)
	EPM (ECCM) mode extension	70 kg (154.32 lb)
Temperature range	operating	+5°C to +40°C
	storage	-20°C to +60°C
	best test accuracy	+20°C to +23°C
	damp heat	+40°C at 95% relative humidity
Power supply		100 V AC to 240 V AC, 50/60 Hz
Fuse protection	115 V	16 A
	230 V	10 A
Time required		
Connecting a UUT		<5 min
Complete test	R&S®M3SR	<30 min (depending on type and equipment)
	R&S®M3TR	<30 min (depending on type and equipment)
	R&S®M3AR	approx. 40 min (depending on type and equipment)
Test system setup		<30 min
Test system dismantling		<30 min
Recommended calibration cycle	R&S®CMS54, R&S®NRT-Z14	1 year

Overview R&S®TS6030 options



Service you can rely on

- In 70 countries
- Person-to-person
- Customized and flexible
- Quality with a warranty
- No hidden terms

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.

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ISO 14001
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DQS REG. NO 1954 AS

Certified Quality System
AQAP-2110
Audit report GP T3.1-NO 05.03

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PD 5213.9428.32 | Version 01.00 | October 2008 | R&S®TS6030
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