

Version
01.00June
2005

Protocol Tester for Bluetooth® Technology R&S® PTW 70-BT

Protocol tester for qualification tests of Bluetooth® 1.1 and Bluetooth® 1.2 devices

Features

- ◆ Official TTCN test cases for Bluetooth® 1.1 and 1.2 for BB, LM, L2CAP, GAP, SDP, SPP and RFCOMM
- ◆ Rohde & Schwarz PC-based platform
- ◆ Convenient user interface (GUI)
- ◆ Manual or automatic test case execution
- ◆ ICS/IXIT editor
- ◆ Test case mapping in line with official testcase reference list (TCRL)
- ◆ Static qualification review
- ◆ Verdict handling
- ◆ Test log analysis
- ◆ Decoding, filtering and debugging
- ◆ EUT (equipment under test) database

- ◆ Automatic test report generator
- ◆ Upgradeable for WLAN IEEE 802.11a/b/g protocol test of access points and stations

Applications

- ◆ Certification test: The R&S® PTW70-BT will be validated for qualification tests in line with the requirements of the Bluetooth® SIG

**ROHDE & SCHWARZ**

Objective of the R&S®PTW70-BT

Rohde & Schwarz has played an active part in the development of Bluetooth® wireless technology since 1999. The R&S®PTW 70-BT as the successor to the R&S®PTW60 represents the latest step in a successful product history.

The Protocol Tester for Bluetooth® Wireless Technology R&S®PTW70-BT is designed to test Bluetooth® devices for qualification against the official requirements of the Bluetooth® SIG. These qualification tests are necessary to obtain the Bluetooth® qualification by a Bluetooth® qualification body and thus to get a product listed in the official list of Bluetooth® compatible devices.

The debug features of the R&S®PTW70 allow Bluetooth® device manufacturers to perform pre-qualification tests resulting in more successful, faster product development cycles and reduced external test efforts.

Target customers

- ◆ Test houses and Bluetooth® qualification bodies (BQBs)
- ◆ Bluetooth® device manufacturers
- ◆ Consulting companies and engineers

The Rohde & Schwarz Bluetooth® expert team helps customers with any questions relating to the R&S®PTW70-BT and Bluetooth® protocol analysis. Regular software updates ensure that the R&S®PTW70-BT keeps track of the evolution of the Bluetooth® test standards.

The Protocol Tester for Bluetooth® Wireless Technology R&S®PTW70-BT offers professional and comprehensive protocol test and analysis functions. It is ideal for qualification testing of Bluetooth® products.

Bluetooth® test requirements covered by the R&S®PTW70-BT

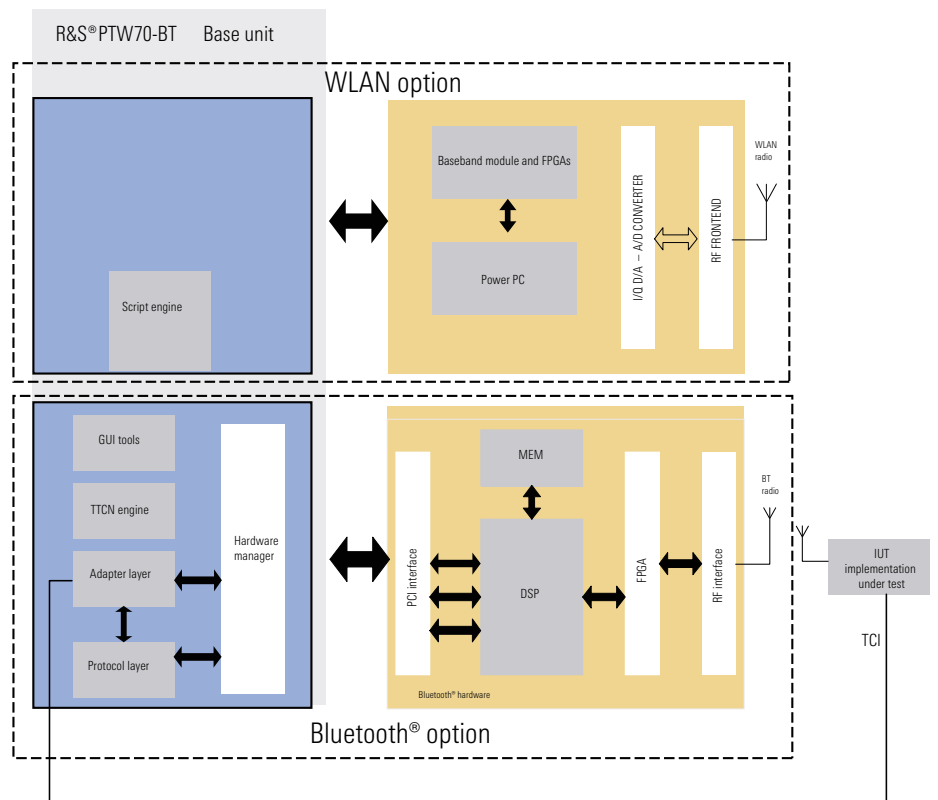
- ◆ BT 1.1 Test Specification, Part B: Test Suite Structure (TSS) and Test Purposes (TP) for BB
- ◆ BT 1.1 Test Specification, Part C: Test Suite Structure (TSS) and Test Purposes (TP) for LM
- ◆ BT 1.1 Test Specification, Part D: Test Suite Structure (TSS) and Test Purposes (TP) for L2CAP
- ◆ BT 1.1 Test Specification, Part E: Test Suite Structure (TSS) and Test Purposes (TP) for SDP
- ◆ BT 1.1 Test Specification, Part K:1: Test Suite Structure (TSS) and Test Purposes (TP) for GAP
- ◆ BT 1.1 Test Specification, Part K:5: Test Suite Structure (TSS) and Test Purposes (TP) for SPP
- ◆ BT 1.1 Test Specification, Part F:1 Test Suite Structure (TSS) and Test Purposes (TP) for RFCOMM
- ◆ BT 1.2 Test Specification, 5 November 2003

Modular design

The R&S®PTW70-BT is a modular protocol test platform. It can currently be equipped for Bluetooth® and WLAN (IEEE 802.11a/b/g) measurements. The standard-specific hardware features PCI plug-in modules with DSPs or FPGAs for time-critical signal processing and the standard-specific RF frontends.

The Protocol Tester for Bluetooth® Wireless Technology R&S®PTW 70-BT consists of the R&S®PTW70 base unit and a hardware and software option for Bluetooth®. The R&S®PTW70 base unit with the Windows 2000 operating system runs the user interface including TTCN tools, the higher layers of the protocol stack and the hardware control engine.

The Bluetooth® measurement unit holds the RF frontend, signal processing and the LC part of the baseband processing.



Block diagram of the R&S®PTW70

The R&S®PTW70-BT can be equipped with an optional WLAN 802.11.a/b/g hardware and software extension to allow protocol tests of WLAN access points and stations.

Software concept

The main user interface for the R&S®PTW70-BT is the test manager. It guides the operator through the definition of a complete test project.

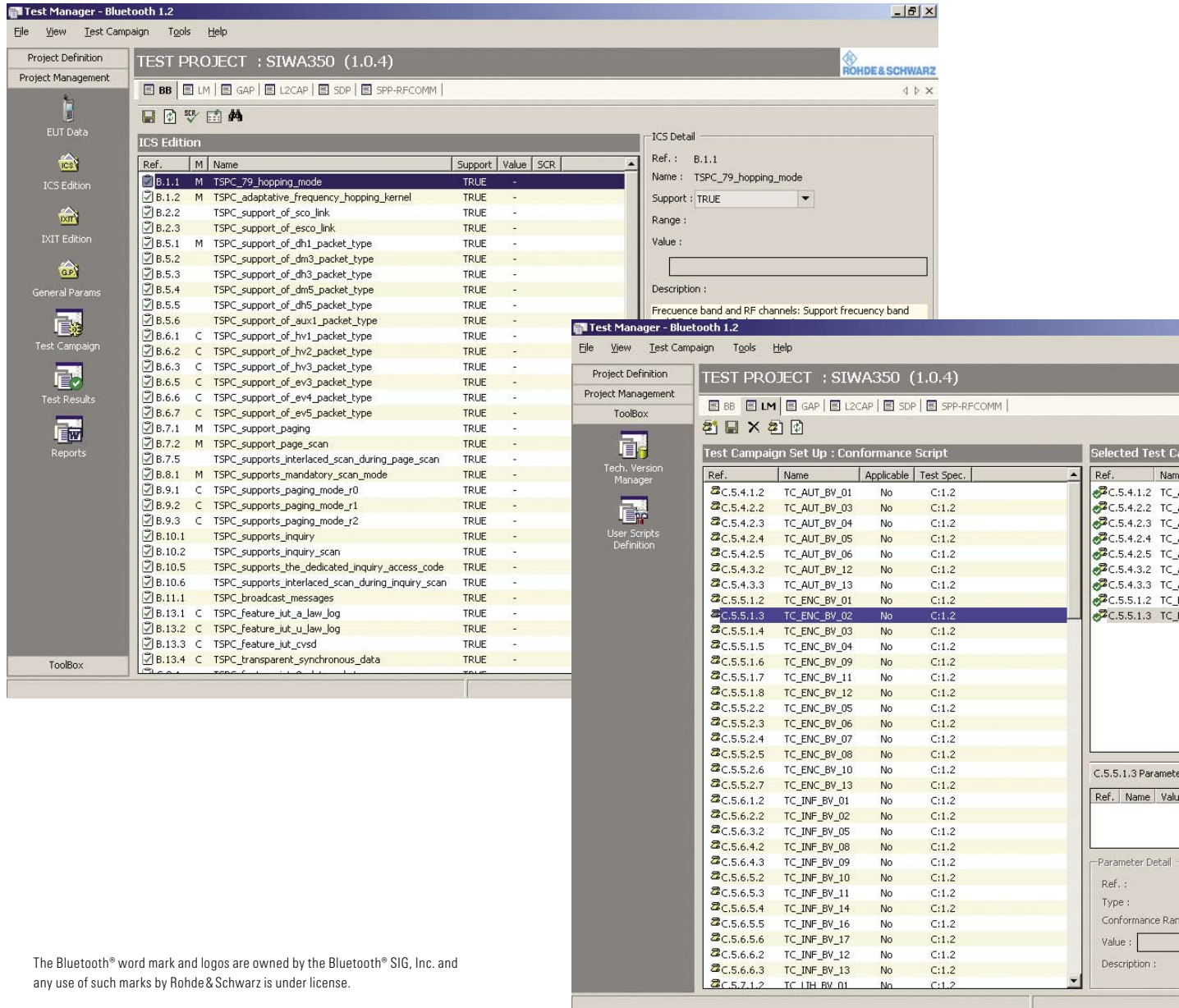
Based on the ICS and IXIT values that identify the capabilities of the device under test, the static conformance review function identifies the applicable test cases and indicates missing features that may be required for certain test cases.

The test suites are directly linked to the official layer specifications and the test specifications.

Individual test cases or groups of test cases may be put together in test scripts and executed.

Abbreviations

DFS	Dynamic frequency selection
DUT	Device under test
IEEE	Institute of Electrical and Electronics Engineers
ISM band	Industrial, scientific, medical band
ICS	
LAN	Local area network
MAC layer	Medium access control layer
PHY layer	Physical layer
QoS	Quality of service
RF	Radio frequency
SAP	Service access point
STA	Station
TPC	Transmit power control
U-NII band	Unlicensed National Information Infrastructure band
WLAN	Wireless LAN



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BITE Protocol Tester - Trace Browser [FULL] - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: C:\Program Files\RohdeSchwarz\RohdeSchwarz Test Manager\Bluetooth 1.2\Projects Databases\SIWA350\LM\C.5.4.1.2\Session 2004-08-02 14.59.35\Trace

5503	Send:	[23] TCV_flag_paging := GcTRUE P_LM:LT_p_lm[23]PR_bb_lm_iut_is_slave_p_lm[6]LTS_connection_req_tester[28] [28] LC ? LM_LC_DATA_REQ = PDU: { link_number: '01'0, lt_addr: '001'B, packet_type: '0011'B, lmp_pdu_length: OMIT, lmp_pdu: PDU: { llid: '11'B, flow: '1'B, length: '00001'B, transaction_id: '0'B, lm_opcode: LMP_host_connection_req } }
5514	Recv:	P_LM:LT_p_lm[23]PR_bb_lm_iut_is_slave_p_lm[6]LTS_connection_req_tester[29] [29] LC ? LM_LC_DATA_CFM = PDU: { link_number: '01'0, confirm_ind: '0000'0 }
6234	Assign:	P_LM:LT_p_lm[23]PR_bb_lm_iut_is_slave_p_lm[6]LTS_connection_req_tester[30] [30] TCV_flag_connecting := GcTRUE
6234	Recv:	P_LM:LT_p_lm[23]PR_bb_lm_iut_is_slave_p_lm[6]LTS_connection_req_tester[30] [30] LC ? LM_LC_DATA_IND = PDU: { link_number: '01'0, lt_addr: '001'B, packet_type: '0011'B, lmp_pdu_length: '0003'0, lmp_pdu: PDU: { llid: '11'B, flow: '1'B, length: '0001'0, transaction_id: '0'B, lm_opcode: LMP_accepted, lm_return_opcode: LM_P_host_connection_req, fill_bit: '0'B } }
6250	Send:	P_LM:LT_p_lm[23]PR_bb_lm_iut_is_slave_p_lm[8] [8] CP_LM ! CM_CONTINUE = PDU: { val: "Cm_preamble_p_lm_finished" }
6602	Recv:	P_LM:LT_p_lm[23]PR_bb_lm_iut_is_slave_p_lm[10] [10] CP_LM ? CM_CONTINUE = PDU: { val: "Cm_start_test" }
6605	Assign:	P_LM:LT_p_lm[24]LTS_tc_start_p_lm:DF_testbody_p_lm[169] [169] TCV_received_lt_addr := '001'B
6607	Assign:	P_LM:LT_p_lm[24]LTS_tc_start_p_lm:DF_testbody_p_lm[169] [169] TCV_lm_pdu_lmp_features_req := PDU: { llid: '11'B, flow: '1'B, length: '0100'1'B, transaction_id: '1'B, lm_opcode: LMP_features_req, features: { three_slot_packets: '1'B, five_slot_packets: '1'B, encryption: '1'B, slot_offset: '1'B, timing_accuracy: '1'B, switch: '1'B, hold_mode: '1'B, sniff_mode: '1'B, park_state: '1'B, power_control_requests: '1'B, channel_quality_driven_data_rate: '1'B, sco_link: '1'B, hv2_packets: '1'B, hv3_packets: '1'B, u_law_log: '1'B, a_law_log: '1'B, c_vsd: '1'B, paging_parameter_negotiation: '0'B, power_control: '1'B, transparent_synchronous_data: '0'B, flow_control_lag_bit0: '0'B, flow_control_lag_bit1: '0'B, flow_control_lag_bit2: '0'B, broadcast_encryption: '1'B, reserved_1: '0'B, reserved_2: '0'B, reserved_3: '0'B, enhanced_inquiry_scan: '1'B, interlaced_inquiry_scan: '1'B, interlaced_page_scan: '1'B, RSSI_with_inquiry_results: '1'B, extended_SCO_link_EV3_packets: '1'B, EV4_packets: '1'B, EV5_packets: '1'B, reserved_4: '0'B, AFH_capable_slave: '1'B, AFH_classification_slave: '1'B, reserved_5: '0'B, reserved_6: '0'B, byte4_bit7: '0'B, byte5_bit0: '0'B, byte5_bit1: '0'B, byte5_bit2: '0'B, AFH_capable_master: '1'B, AFH_classification_master: '1'B, byte5_bit5: '0'B, byte5_bit6: '0'B, byte5_bit7: '0'B, byte6_bit3: '0'B, byte6_bit4: '0'B, byte7_bit0: '0'B, byte7_bit1: '0'B, byte7_bit2: '0'B, byte7_bit3: '0'B, byte7_bit4: '0'B, byte7_bit5: '0'B } }
		P_LM:LT_p_lm[24]LTS_tc_start_p_lm

The test results are managed in HTML format.

Trace Filter Options - Visualization

TTCN Tags | BB Filter | **LM Filter** | GAP Filter | L2CAP Filter | SDP Filter | RFCOMM-SPP Filter

Option Name

- Separate Traces By PTC
- Show MTC component
- Show PLC component
- Show PLM component
- Show PTCI component
- Show PL ASP Parameters
- Show LM PDU Parameters
- Show ID Packets
- Show POLL Packets

Ok Cancel

Filter functions allow the log information to be focused on specific areas of interest. A test report generator provides convenient compilation of test results into a Microsoft Word document.

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4 > X

ases in Script : None

e
AUT_BV_01
AUT_BV_03
AUT_BV_04
AUT_BV_05
AUT_BV_06
AUT_BV_12
AUT_BV_13
ENC_BV_01
ENC_BV_02

ers

e. Unit

Name :

Range :

age :

Specifications

	Additional information	TX Value	RX Value
Frequency ranges		2402 MHz to 2480 MHz	2402 MHz to 2480 MHz
Frequency resolution		1 MHz	1 MHz
Frequency accuracy		±1 ppm	±1 ppm
Impedance		50 Ω	50 Ω
Modulation		GFSK with BT = 0.5	GFSK with BT = 0.5
Bit rate		1 Mbps	1 Mbps
Spectral purity			
SSB phase noise	at carrier offset 10 kHz 100 kHz 1 MHz 10 MHz	-62 dBc/Hz -84 dBc/Hz -97 dBc/Hz -109 dBc/Hz	-62 dBc/Hz -84 dBc/Hz -97 dBc/Hz -109 dBc/Hz
Spurious	10 kHz to 200 MHz offset >200 MHz offset	-45 dBc -59 dBc	-45 dBc -59 dBc
Harmonics	2nd order 3rd order	-80 dBc -59 dBc	-80 dBc -59 dBc
Output level			
Maximum		-5 dBm	
Range		-5 dBm to -55 dBm	
Resolution		1 dB	
Input level			
Maximum			-20 dBm
Range			-20 dBm to -70 dBm
Resolution			1 dB
Output level accuracy			
Frequency response		±3 dB	
Linearity		N/A	
Drift	+20 °C to +30 °C	±0.5 dB	
Repeatability	3	±0.09 dB	
Output VSWR		<2:1	<2:1
Settling			
Synthesizer settling time	phase error <5°	240 s	240 s
Level settling time	level error <0.1 dB from residual value	30 s	30 s
RF interfaces			
Split RF connectors for antenna diversity with N connectors at front panel, external reference inputs/outputs with BNC connectors at rear panel, digital interfaces LAN 100BT, VGA connector for external monitor for LAN setup			
Environmental requirements			
Operating temperature range		+10 °C to +35 °C in line with DIN EN 60068-2-30: 2000-02	
Storage temperature range		-25 °C to +60 °C in line with DIN EN 60068-2-30: 2000-02	
Relative humidity		+40 °C 95 % noncondensing in line with DIN EN 60068-2-30: 2000-02	
Mechanical resistance			
Vibration	sinusoidal	5 Hz to 150 Hz in line with DIN EN 60068-2-6: 1996-05	
	random	5 Hz to 300 Hz in line with DIN EN 60068-2-64: 1995-08	
Shock		40 g shock spectrum in line with DIN EN 60068-2-27: 1995-03	

General data		
Power supply	input range	100 V to 240 V AC
	input power	max. 310 VA
	frequency range	50 Hz to 60 Hz
Regulatory requirements		
Electromagnetic compatibility		in line with EMC directive of EU
EMC standards		DIN EN 61000-6-3 and DIN EN 61000-6-4
Safety standards		EN 60950 (1992 + A1 2993 + A2 1993 + A3 1995)
Mechanical data		
Dimensions (W × H × D)		310 mm × 140 mm × 430 mm
Weight		10 kg

For detailed ordering information, please contact your local Rohde & Schwarz representative.



More information at
www.rohde-schwarz.com
 (search term: PTW70)



www.rohde-schwarz.com

Europe: Tel. +49 1805 12 4242, e-mail: customersupport@rohde-schwarz.com
 North America: Tel. 888 837 87 72, option 2 (from within the USA and Canada), +1 410-910-7800, option 2 (from other countries), e-mail: customer.support@rsa.rohde-schwarz.com
 Asia: Tel. +65 68463710, e-mail: customersupport.asia@rohde-schwarz.com