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Test & Measurement

- sales
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- calibration
- repair
- disposal

Complimentary Reference Material

This PDF has been made available as a complimentary service for you to assist in evaluating this model for your testing requirements.

TMG offers a wide range of test equipment solutions, from renting short to long term, buying refurbished and purchasing new. Financing options, such as Financial Rental, and Leasing are also available on application.

TMG will assist if you are unsure whether this model will suit your requirements.

Call TMG if you need to organise repair and/or calibrate your unit.

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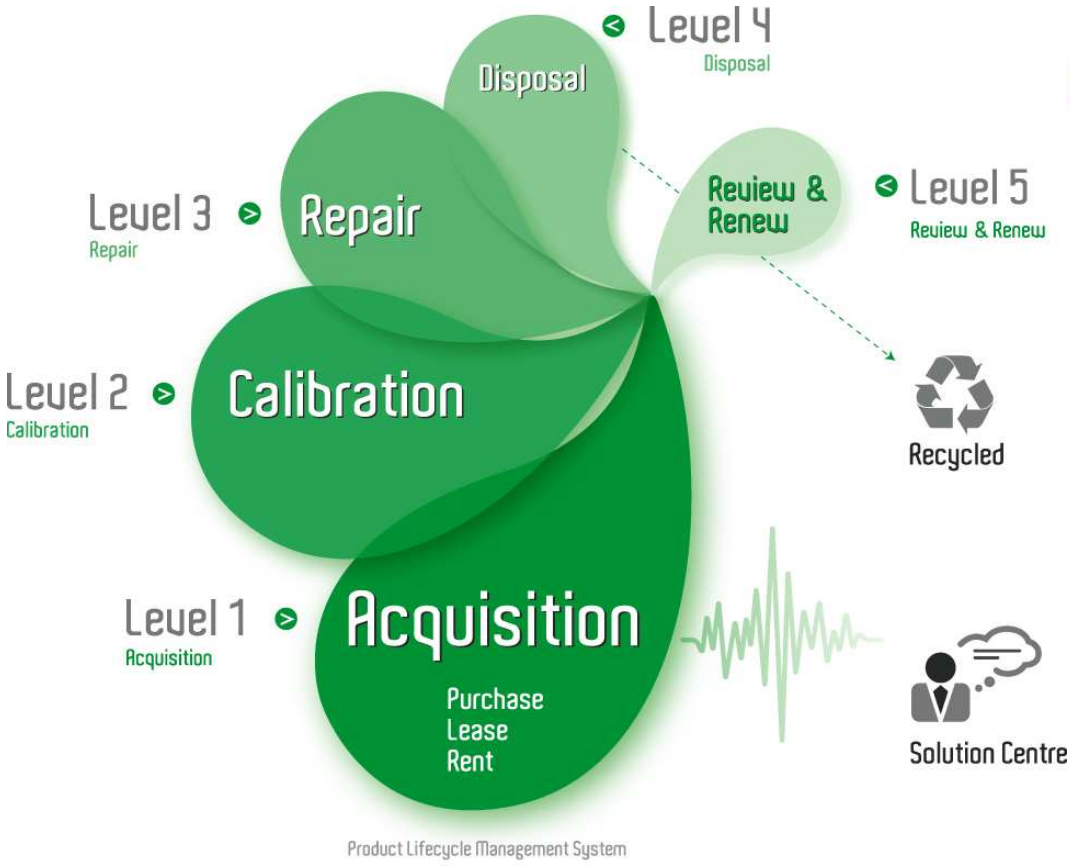


Version 02.00
February 2007

R&S®TSML-W Radio Network Analyzer

WCDMA PN scanner

- WCDMA PN scanning (bands I to IX) with BCH (SIB) demodulation
- Low power consumption
- Attractive pricing
- Handy, portable, and compact solution
- RF-shielded, solid case
- Fast data transfer via IEEE 1394 (FireWire) interface
- Indoor/outdoor solutions
- Controlled via R&S®ROMES drive test software
- Open user interface based on C++

ROHDE&SCHWARZ

The R&S®TSML radio network analyzer family

At a glance

The radio network analyzers of the R&S®TSML family are the ideal choice if you want to carry out quick, efficient, precise, and cost-effective measurements in order to optimize your mobile radio network.

Do you need to cover only one specific application? Does your work focus on only one of the following: WCDMA, IS-95 and CDMA2000® 1X[1], GSM, or RF power measurements? Do you want to buy only what you truly need? Then the R&S®TSML radio network analyzers are the right choice for you.

Family concept

We offer five different radio network analyzers, allowing you to choose the instrument that optimally matches your specific requirements. The R&S®TSMU radio network analyzer from Rohde&Schwarz, which offers unparalleled functionality, is already firmly established on the market. It has now been joined by the R&S®TSML family of analyzers, which includes four different types. Each type has been designed to cover a specific application.

- R&S®TSML-W: WCDMA PN scanner
- R&S®TSML-C: IS-95 and CDMA2000® 1X PN scanner
- R&S®TSML-G: GSM network scanner
- R&S®TSML-CW: RF power measurements (CW application)

Benefits

- Wideband receivers (80 MHz to 6 GHz for the R&S®TSML-CW) → four different models covering all GSM, WCDMA, IS-95 and CDMA2000® 1X bands, and universal RF power → **universal usage of one technology reduces investment costs**
- Open user interface → allows customers to use the R&S®TSML-x in their own environment using dedicated or customized software as well as R&S®ROMES drive test software → **universal and customer-specific applications**
- Parallel operation of several R&S®TSML analyzers → for example, parallel WCDMA and GSM measurements for handover analysis → **reduces measurement time and costs**
- Light and compact design → ideal for drive test applications → **easy integration in vehicles and convenient use in a backpack**
- Software control via R&S®ROMES drive test software → flexible and powerful user interface → **reduces startup time and also offers powerful applications for post-processing**
- Easy system expansion by other data acquisition devices, e.g. test mobile phones, GPS, or other receivers, etc → **cost-effective upgrade to new applications**

Product	Technologies
R&S®TSMU	all[2]
R&S®TSML-W	WCDMA
R&S®TSML-C	IS-95 and CDMA2000® 1X
R&S®TSML-G	GSM
R&S®TSML-CW	CW

The various radio network analyzers and their areas of application

[1] CDMA2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA).

[2] Includes WCDMA, CDMA2000®, GSM, and CW.

R&S®TSML-W WCDMA PN scanner

The R&S®TSML-W WCDMA pseudo random noise (PN) scanner system measures the basic RF parameters of a WCDMA network. The system detects the PN codes, which carry the WCDMA signal information, and determines their power values, scrambling codes and quality parameters or their S/N ratios and timing. Data can be analyzed immediately or stored for subsequent processing. The system offers a wide variety of displays, which makes it easy to examine WCDMA parameters as well as network coverage and quality.

The standard test mode of the WCDMA PN scanner is the high speed mode:

- Measurement rate (one channel): 1/2/5/10 scans per second
- Parallel measurements on six channels (carriers)
- 10 measurements per second
- 512 dynamic (virtual) rake receivers
- Analysis of timing parameters – drift, deviation, delay spread, delta time, Doppler frequency shift
- Trace view of a selected scrambling code

Open user interface

Experienced C++ developers are able to quickly integrate the R&S®TSML as a measurement device into their own application. This offers a wide range of dedicated customer-specific applications and allows the R&S®TSML to be used in existing standard drive test tools.

The R&S®TSML comes with a detailed description of the open user interface for controlling the R&S®TSML and forwarding measurement data to the PC. The equipment supplied includes C++ libraries and also a ready-made demo application.

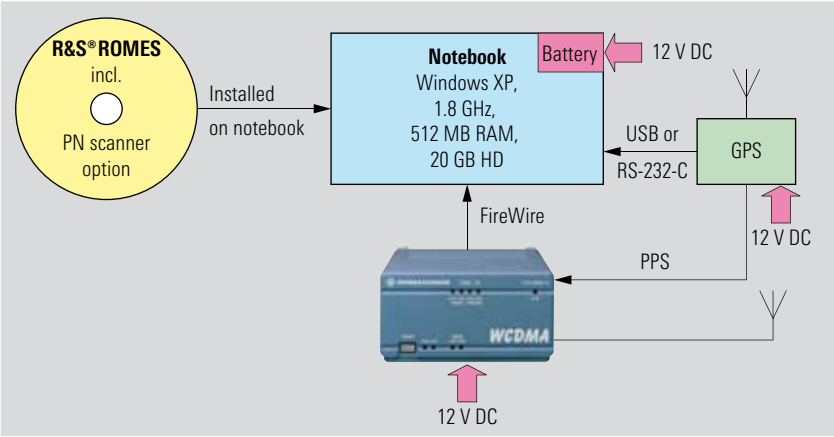
R&S®TSML-x and R&S®TSMU radio network analyzers

Configuration

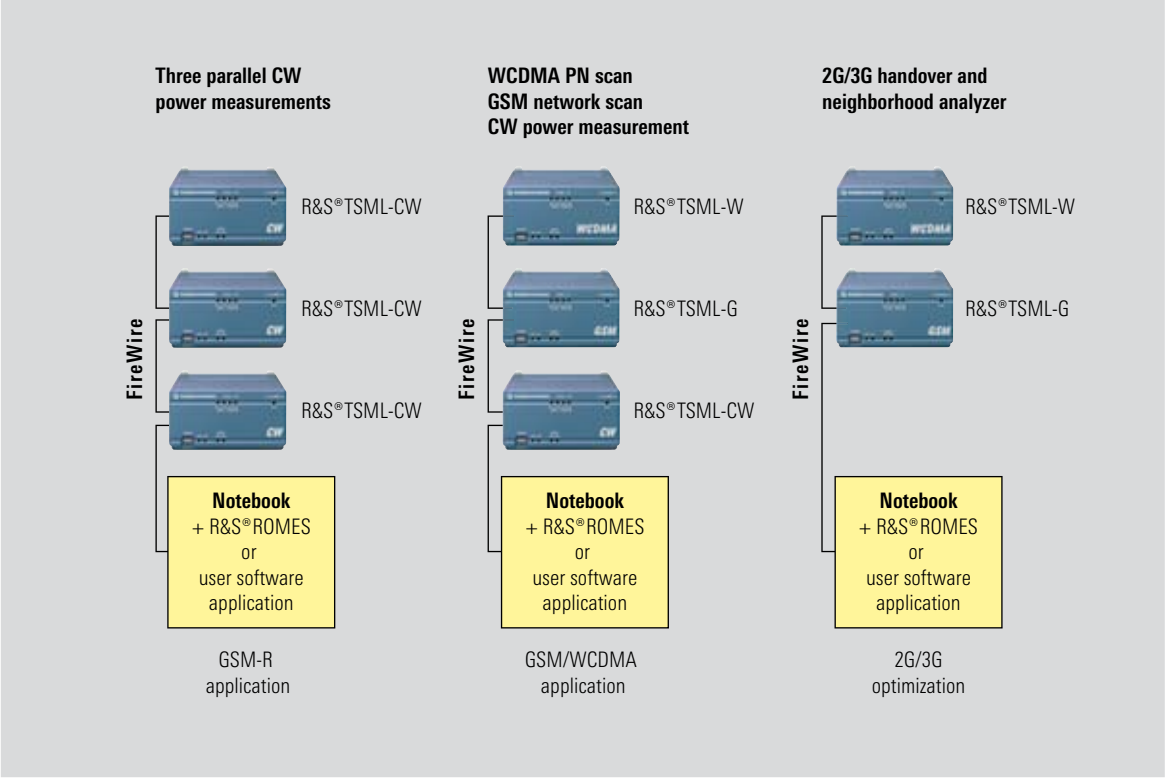
The R&S®TSML-W is the high-performance hardware platform for WCDMA scanning. In addition, application software is needed, e.g. R&S®ROMES drive test software and an optional GPS system. The R&S®ROMES application software runs on a standard Windows PC or notebook.

BCH (SIB) demodulator application and R&S®ROMES

The BCH demodulator can be activated separately for each carrier frequency. Either specific system information blocks (SIBs) or all (SIB1 to SIB18) can be selected. The demodulated SIB3 (CI, MCC, MNC) and SIB11 (neighbor cell) information is used in the R&S®ROMES neighborhood analysis.



Block diagram of WCDMA scanner application



Block diagram of WCDMA scanner application

Specifications

General RF data	
RF frequency range	80 MHz to 3 GHz
Noise figure	typ. 10 dB (f ≤ 2.2 GHz, preamplifier ON)
Maximum input power	–10 dBm
IP3	
Preamplifier ON	typ. –9 dBm
Preamplifier OFF	typ. +3 dBm
1 dB compression point	–15 dBm

Reference frequency aging	1 ppm/year
Reference frequency temperature drift	2 ppm (0 °C to +30 °C) additionally 2 ppm/10 °C (+30 °C to +40 °C)
Reference frequency accuracy	±0.01 ppm (GPS PPS synchronized)

Specifications cont.

WCDMA	
Time base for synchronization	internal GPS pulse per second (PPS)/GSM WCDMA network
Bands	WCDMA bands I to IX and user-defined bands (200 kHz resolution)
Pilot scan	up to 512 pilot channels
Multifrequency scan	max. 6 carriers
IF bandwidth	4.12 MHz
Measurement rate	variable, 1 Hz to 10 Hz (max. 10 Hz on single channel)
Power measurement dynamic range	–114 dBm to –20 dBm
Power measurement accuracy	typ. <1.5 dB (E_c/I_o) with E_c/I_o > –12 dB typ. <1 dB (RSCP)
Synchronization acquisition time, 5 pilots	typ. 10 ms
Synchronization level E_c/I_o	<–14.5 dB
BCH demodulation E_c/I_o	≥–10 dB
Dynamic range E_c/I_o	20 dB
Number of rake fingers	512 (virtual)
Ghost code rate	$<10^{-9}$ (ghost code suppression)
Adjacent channel rejection	typ. >70 dB
Rear-panel interfaces	
FIREWIRE I + II	IEEE 1394 female, 6-pin, high-speed data connection to PC, 400 Mbit/s
RF IN	N female, input impedance 50 Ω, VSWR typ. 2.0
RS-232-C	D-Sub male, 9-pin, serial interface for servicing and diagnostics
DC IN	snap and lock jack, 3-pin, power supply input, 9 V to 18 V DC
PULSE IN	BNC female, 3 V to 5 V, TTL input for GPS pulse per second (PPS) pulse (falling edge with high precision)
PULSE IN/OUT	BNC female, multifunctional (e.g. distance trigger input), valid input range 3 V to 15 V
SMARTCARD	compact flash card, 512 Mbyte
Front-panel interfaces	
POWER	button, main switch
RESET	button, reboot of R&S®TSML
8 monitoring LEDs	for displaying analyzer status information
General data	
Operating temperature range	0 °C to +45 °C
Storage temperature range	–20 °C to +70 °C
Humidity	95 % relative humidity at +40 °C
Vibration	
Sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz
Random	10 Hz to 500 Hz
Shock	40 g shock spectrum
EMC	EN 61326-1: 1997 + A1: 1998 + A2: 2001 E1 95/54/EC E1 ECE-R10
Electrical safety	EN 61010-1: 1993 + A2: 1005
Quality standard	developed and manufactured in line with ISO 9000
Power supply	9 V DC to 18 V DC
Power consumption	650 mA at 12 V DC
Dimensions (W × H × D)	150 mm × 80 mm × 170 mm (5.9 in × 3.1 in × 6.7 in)
Weight	1.5 kg (3.3 lb)

Ordering information

Designation	Type	Order No.
Radio Network Analyzer, WCDMA PN scanner	R&S®TSML-W	1153.6000.11
Accessories supplied: CD including manual, R&S®TSML software and IEEE 1394 driver; Getting Started documentation; power supply cable with cigarette lighter connector 2 m; 2 × IEEE 1394 FireWire cables 1.5 m (1 × 4/6, 1 × 6/6)		
Recommended options and accessories		
Power Supply 230 V AC/12 V DC/6 A for R&S®TSML	R&S®TSMU-Z1	1166.3786.02
19" Rack Adapter for R&S®TSML; max. 2 × R&S®TSML	R&S®TSMU-Z2	1153.6700.02
Accessories: indoor backpack system; 2 × rechargeable battery, 3000 mAh; battery charger; universal fixture for two test mobile phones without external antenna connection; USB hub; interface cables	R&S®TSMU-Z3	1153.6900.02
Documentation of Calibration Values	R&S®DCV	0240.2193.15
Drive Test Software	R&S®ROMES	1143.7991.30
Replay Software	R&S®ROMES-R	1143.7991.03

More information at
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(search term: TSML)

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