

# R&S®TSML-CW

## Radio Network Analyzer

### Powerful scanner for CW applications



# R&S®TSML-CW Radio Network Analyzer At a glance

The R&S®TSML-CW is the ideal choice for RF power measurements (CW application). RF power measurements can be performed either on a single frequency, a frequency band (or parts of it) or a random list of frequencies, all in the range from 80 MHz to 6 GHz. Its compact size and low power consumption makes it ideal for mobile applications.

When combined with the R&S®ROMES4 drive test software, the scanner provides its full-range functionality and maximum performance.

## Key facts

- No band limiting – support of all frequencies from 80 MHz to 6 GHz
- Small weight and low power consumption
- Suitable for CW/RF power measurements and spectrum scan
- High measurement speed in all technologies



# R&S®TSML-CW Radio Network Analyzer

## Benefits and key features

### **CW/RF power measurements and spectrum scan with no band limiting**

- Worldwide deployment possible
  - Flexible and cost-efficient if new frequencies are released
  - Only one set of hardware required – no logistics problems
  - CW/RF power measurements according the Lee criterion
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### **Spectrum scan across the entire frequency range and CW/RF power measurements**

Overview of the entire spectrum

Uplink and interference measurements

Very fast measurements for high measurement density

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# CW/RF power measurements and spectrum scan with no band limiting

Owing to its unique wideband frontend, the R&S®TSML-CW Radio Network analyzer can be used in all frequency bands between 80 MHz and 6 GHz. They can handle RF power measurements on a single frequency, a frequency band (or parts of it) or a random frequency list with any combination of frequency or band and technology. Entering the channel number or the frequency and channel bandwidth is usually all that is required.

This feature provides high flexibility for the user and reduces costs. New scanner hardware is not required if new bands become available.

Measurements can be triggered either internally (at intervals of 1 ms to 1 s, settable in steps of 1/2/5; 1.6 ms free run, 2 ms distance trigger) or externally (via the distance pulse input). The RF power measurement driver automatically calculates the number of distance pulses required to yield the correct trigger rate (depending on the drive speed) for the set distance. With the R&S® TSML-CW the measurements can be performed according to the Lee criterion (with regard to the fast fading effect) with an external distance pulse trigger.

Radio network analyzer R&S® TSML-CW	Measurement Mode CW / RF power measurement	Measurement Mode Spectrum Scan
80 MHz – 6 GHz	CW: <ul style="list-style-type: none"> <li>• Single Frequency</li> <li>• (parts of) a frequency band</li> <li>• random list of frequencies</li> </ul>	RF Power Scan: 80 MHz to 6 GHz

# Spectrum scan across the entire frequency range an CW/RF power measurments

The TSML-CW provides an integrated spectrum scan. This feature allows signal analysis as well as analysis of the air interface independent of the technology used. The spectrum scan makes it possible to perform measurements throughout the entire frequency range from 80 MHz to 6 GHz. As a result, mobile radio bands as well as the uplink ranges can be measured, and detecting interference on the uplink frequencies becomes very easy.

Using the R&S®ROMES4 drive test software, the measurements are presented in a straightforward manner by means of both the classic spectrum display and the waterfall diagram. The measurement speed is especially important for drive tests in order to achieve a good measurement result density without having to reduce the drive speed.

When combined with the R&S®ROMES4 drive test software, the scanner provides its full-range functionality and maximum performance. The software is used for collecting the measurement data as well as for analyzing and evaluating this data.

# Specifications in brief

## Specifications in power measurement and measurement speed

Frequency range and measurement mode		
	R&S®TSML-CW	80 MHz to 6 GHz Single frequency Frequency band Frequency list
Bandwidth (3 dB)	Single frequency mode	12.5 kHz to 4000 kHz
	Multichannel mode	200 kHz to 4000 kHz
Noise figure	$f \leq 2.2$ GHz, preamplifier on (10 dB auto/manual)	typ. 10 dB
Frequency accuracy / time base	GPS/PPS synchronization	$\pm 0.01$ ppm
Max. Input power		-10 dBm
Frequency aging		1 ppm/year
Reference Frequency temperature drift	0°C to +30°C	2 ppm
	+30°C to +40°C	additional 2 ppm/10 °C (+30°C to +40°C)
Reference frequency accuracy	(GPS PPS synchronized)	$\pm 0.01$ ppm
IP3	preamplifier on	typ. - 9 dBm
	preamplifier off	typ. + 3 dBm
1 dB compression		-15 dBm
Sensitivity	GSM	-112 dBm
	WCDMA	-114 dBm
	CDMA2000® 1xEV-DO	-131 dBm
	Spectrum scan	-115 dBm
Channel power measurement dynamic range	GSM	-110 dBm to -20 dBm
	WCDMA	-95 dBm to -20 dBm
Adjacent channel rejection	GSM	30 dB
	WCDMA	60 dB
IF attenuation		0 / 10 / 15 dB
<b>R&amp;S®TSML-CW</b>		
Measurement speed		625 measurements/s Typical measurement rate in multichannel mode: <ul style="list-style-type: none"> <li>▪ 1.6 ms for 19 GSM-R channels</li> <li>▪ 76 ms for 124 GSM900 channels</li> <li>▪ 208 ms for 373 GSM1800 channels</li> </ul>
Measurement time		0.1 ms to 1000 ms
Detectors		Peak, average, RMS
Trigger modes	Time triggered	Internal timebase
	Distance triggered	External trigger event
<b>General data</b>		
Operating temperature range		0°C to +45°C
Storage temperature range		-20°C to +70°C
Relative humidity	at +40°C	95 %
RF input	SNAP-N connector	50 Ohms
Data interface		FireWire IEEE 1394 female
Voltage supply		9 V to 18 V DC
Current drain		650 mA at 12 V DC
Dimensions	W x H x D	150 mm x 80 mm x 170 mm (5.90 in x 3.15 in x 6.69 in)
Weight		1.5 kg (3.3 lb)
System requirements	R&S®ROMES4 drive test software, laptop/PC (multicore processor 2 GHz, 2 Gbyte RAM, FireWire, USB)	

Important remark: The R&S®TSML-CW has no CE marking (due to the latest guidelines).

# Ordering information

Designation	Type	Order No.
Scanner for CW	R&S®TSML-CW	1153.6000.15
<b>Accessories</b>		
Power Supply (2.5 A)	R&S®TSML-Z1	1503.4320.02
Rack Adapter	R&S®TSMU-Z2	1153.6700.02
<b>Software options</b>		
Drive Test Software	R&S®ROMES4	1117.6885.04
R&S®TSMx Driver	R&S®ROMES4T1Q	1117.6885.40

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