

R&S® CMW270 Wireless Connectivity Tester Specifications



CONTENTS

General technical specifications	5
RF generator	5
<i>Modulation source: arbitrary waveform generator (ARB) (R&S®CMW-B110A option).....</i>	<i>7</i>
RF analyzer.....	7
<i>Power meter</i>	<i>8</i>
<i>Spectrum measurements</i>	<i>9</i>
RF path 2 with RF TRX (R&S®CMW-B570 option) and RF frontend (BASIC) (R&S®CMW-B590A option)	9
Timebase	10
<i>Timebase TCXO.....</i>	<i>10</i>
<i>Timebase basic OCXO (R&S®CMW-B690A option)</i>	<i>10</i>
<i>Timebase highly stable OCXO (R&S®CMW-B690B option).....</i>	<i>10</i>
<i>Reference frequency inputs/outputs.....</i>	<i>10</i>
Bluetooth® specifications.....	11
Bluetooth® RF generator (prerequisite: R&S®CMW-B110A option).....	11
<i>Bluetooth® WINIQSIM2™ (R&S®CMW-KW610 option)</i>	<i>11</i>
Bluetooth® RF analyzer (R&S®CMW-KM610 option).....	11
<i>Modulation analysis.....</i>	<i>12</i>
GPS specifications.....	13
GPS RF generator (prerequisite: R&S®CMW-B110A option)	13
<i>GPS WINIQSIM2™ (R&S®CMW-KW620 option).....</i>	<i>13</i>
DVB specifications.....	13
DVB RF generator (prerequisite: R&S®CMW-B110A option)	13
<i>DVB WINIQSIM2™ (R&S®CMW-KW630 option)</i>	<i>13</i>
FM STEREO RADIO specifications.....	13
FM STEREO RADIO generator (prerequisite: R&S®CMW-B110A option)	13
<i>FM STEREO RADIO waveforms (R&S®CMW-KV645 option)</i>	<i>13</i>
FM STEREO RADIO analyzer (R&S®CMW-KM645 option)	14
<i>Audio filter, weighting</i>	<i>14</i>
<i>RF carrier analysis</i>	<i>14</i>
<i>Modulation analysis.....</i>	<i>14</i>

WLAN specifications	15
WLAN RF generator (prerequisite: R&S®CMW-B110A option)	15
<i>WLAN ABG WINIQSIM2™ (R&S®CMW-KW650 option)</i>	<i>15</i>
<i>WLAN N WINIQSIM2™ (R&S®CMW-KW651 option)</i>	<i>15</i>
WLAN ABG RF analyzer (R&S®CMW-KM650 option).....	15
<i>Modulation analysis.....</i>	<i>16</i>
<i>Spectrum measurements</i>	<i>17</i>
WLAN N RF analyzer (R&S®CMW-KM651 option).....	17
<i>Modulation analysis.....</i>	<i>17</i>
<i>Spectrum measurements</i>	<i>18</i>
WiMAX™ specifications – mobile station and base station test	19
WiMAX™ RF generator (prerequisite: R&S®CMW-B110A option)	19
<i>WiMAX™ WINIQSIM2™ (R&S®CMW-KW700 option).....</i>	<i>19</i>
WiMAX™ RF analyzer (R&S®CMW-KM700, R&S®CMW-KM701 options).....	19
<i>Power measurement</i>	<i>20</i>
<i>Modulation analysis.....</i>	<i>20</i>
<i>Spectrum measurements</i>	<i>21</i>
WiMAX™ signaling base station emulator (prerequisite: R&S®CMW-KS700, R&S®CMW-KS701, R&S®CMW-KS702, R&S®CMW-B200A, R&S®CMW-B270A options)	21
<i>Physical layer</i>	<i>21</i>
<i>Measurements.....</i>	<i>22</i>
<i>Features</i>	<i>22</i>
WiMAX™ IP application enabler (prerequisite: R&S®CMW-KA700, R&S®CMW-B660, R&S®CMW-B661 options).....	23
Digital I/Q 1 to 4 (R&S®CMW-B510A option)	24
Digital I/Q interface	24
AUX interface.....	24
Included extras.....	24
General data	25
Ordering information	27
Recommended extras for manual operation.....	27
Recommended extras.....	27

Specifications apply under the following conditions:

Data valid for the R&S®CMW270 unless otherwise stated.

Data without tolerance limits is not binding. Based on a 24-month calibration interval unless otherwise stated. At least 15 minutes warm-up time at ambient temperature, specified environmental conditions met, calibration cycle adhered to, and all internal automatic adjustments performed. "Typical values" are designated with the abbreviation "typ.". These values are verified during the final test but are not assured by Rohde & Schwarz. "Nominal values" are design parameters that are not assured by Rohde & Schwarz. These values are verified during product development but are not specifically tested during production.

In line with the 3GPP/3GPP2 standard, chip rates are specified in Mcps (million chips per second), whereas bit rates and symbol rates are specified in Mbps (million bits per second), kbps (thousand bits per second) or ksp/s (thousand symbols per second), and sample rates are specified in Msample/s (million samples per second). Mcps, kbps, ksp/s and Msample/s are not SI units

During the production process, each instrument is calibrated in line with defined procedures. All measurement results, including measurement uncertainties of the calibration system, have to be within the published specification limits to release the individual instrument. The expanded measurement uncertainties of the calibration system used in the production process are determined with a coverage factor of $k = 2$ (normally approx. 95 % probability).

Parameters written in italics can be set directly on the tester.

"WiMAX Forum" is a registered trademark of the WiMAX Forum. "WiMAX," the WiMAX Forum logo, "WiMAX Forum Certified," and the WiMAX Forum Certified logo are trademarks of the WiMAX Forum.

The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by Rohde & Schwarz is under license.

Data without tolerance limits is not binding.

General technical specifications

RF generator

Frequency range		70 MHz to 3300 MHz up to 6000 MHz with the R&S®CMW-KB036 option
Frequency resolution		0.1 Hz
Frequency uncertainty		same as timebase + frequency resolution

Output level range		
RF1 COM, RF2 COM	70 MHz to 100 MHz	
	continuous wave (CW)	-130 dBm to -15 dBm
	peak envelope power (PEP)	up to -15 dBm
	overranging (PEP)	up to -10 dBm
	100 MHz to 3300 MHz	
	continuous wave (CW)	-130 dBm to -5 dBm
	peak envelope power (PEP)	up to -5 dBm
	overranging (PEP)	up to 0 dBm
	3300 MHz to 6000 MHz	
	continuous wave (CW)	-120 dBm to -15 dBm
	peak envelope power (PEP)	up to -15 dBm
	overranging (PEP)	up to -10 dBm
	maximum input DC level	0 V DC
RF1 OUT	70 MHz to 100 MHz	
	continuous wave (CW)	-120 dBm to -2 dBm
	peak envelope power (PEP)	up to -2 dBm
	overranging (PEP)	up to +3 dBm
	100 MHz to 3300 MHz	
	continuous wave (CW)	-120 dBm to +8 dBm
	peak envelope power (PEP)	up to +8 dBm
	overranging (PEP)	up to +13 dBm
	3300 MHz to 6000 MHz	
	continuous wave (CW)	-110 dBm to -2 dBm
	peak envelope power (PEP)	up to -2 dBm
	overranging (PEP)	up to +3 dBm
	maximum input DC level	0 V DC

Output level uncertainty	in temperature range +20 °C to +35 °C, no overranging	
RF1 COM, RF2 COM	output level > -120 dBm	
	70 MHz to 100 MHz	< 1.2 dB ¹
	100 MHz to 3300 MHz	< 0.6 dB ¹
	3300 MHz to 6000 MHz	< 1.2 dB ¹
RF1 OUT	output level > -110 dBm	
	70 MHz to 100 MHz	< 1.6 dB ¹
	100 MHz to 3300 MHz	< 0.8 dB ¹
	3300 MHz to 6000 MHz	< 1.6 dB ¹

Output level uncertainty	in temperature range +5 °C to +45 °C, no overranging	
RF1 COM, RF2 COM	output level > -120 dBm	
	70 MHz to 100 MHz	< 2.0 dB ¹
	100 MHz to 3300 MHz	< 1.0 dB ¹
	3300 MHz to 6000 MHz	< 2.0 dB ¹
RF1 OUT	output level > -110 dBm	
	70 MHz to 100 MHz	< 2.0 dB ¹
	100 MHz to 3300 MHz	< 1.0 dB ¹
	3300 MHz to 6000 MHz	< 2.0 dB ¹

¹ Valid for a 12-month calibration interval.

Output level linearity with fixed RF output attenuator setting	in temperature range +20 °C to +35 °C, GPRF generator list mode, level range 0 dB to -30 dB	
RF1 COM, RF2 COM	no overranging	< 0.2 dB, typ. < 0.1 dB

Output level resolution		0.01 dB
Output level repeatability	typical values after 1 h warm-up time, always returning to same level and frequency, no temperature change, insignificant time change	
	output level \geq -80 dBm	< 0.01 dB
	output level < -80 dBm	< 0.05 dB

VSWR		
RF1 COM, RF2 COM	70 MHz to 3300 MHz	< 1.2
	3300 MHz to 5000 MHz	< 1.5
	5000 MHz to 6000 MHz	< 1.6
RF1 OUT	70 MHz to 3300 MHz	< 1.5
	3300 MHz to 5000 MHz	< 1.5
	5000 MHz to 6000 MHz	< 1.6

Attenuation of 2nd harmonic		
RF1 COM, RF2 COM	70 MHz to 6000 MHz, P < -10 dBm	> 30 dB
RF1 OUT	70 MHz to 6000 MHz, P < 0 dBm	> 30 dB

Attenuation of 3rd harmonic		
RF1 COM, RF2 COM	70 MHz to 6000 MHz, P < -10 dBm	> 40 dB
RF1 OUT	70 MHz to 6000 MHz, P < 0 dBm	> 40 dB

Attenuation of nonharmonics	> 5 kHz offset from carrier, for output level > -40 dBm, for full scale CW signal	
	400 MHz to 3300 MHz, except $f_{\text{nonharmonic}} = 3900 \text{ MHz} - f_{\text{carrier}}$, except $f_{\text{nonharmonic}} = 3900 \text{ MHz}$ except $f_{\text{carrier}} = (899 \text{ to } 901) \text{ MHz} + n \times 800 \text{ MHz}$ with $n = 1, 2, 3$	> 60 dB
	3300 MHz to 3600 MHz	> 25 dB
	3600 MHz to 6000 MHz, except $f_{\text{nonharmonic}} = 2 \times f_{\text{carrier}} - 6400 \text{ MHz}$	> 40 dB

Phase noise	single sideband, 70 MHz to 3300 MHz	
Carrier offset	$\geq 1 \text{ MHz}$	< -120 dBc, 1 Hz

Phase noise	single sideband, 3300 MHz to 6000 MHz	
Carrier offset	$\geq 1 \text{ MHz}$	< -117 dBc, 1 Hz

Signal-to-noise ratio	70 MHz to 3300 MHz	
RF1 COM, RF2 COM	5 MHz offset from carrier, for output level > -30 dBm	> 95 dB, typ. > 101 dB, 1 kHz (> 125 dB, typ. > 131 dB, 1 Hz)

Signal-to-noise ratio	3300 MHz to 6000 MHz	
RF1 COM, RF2 COM	5 MHz offset from carrier, for output level > -30 dBm	> 92 dB, 1 kHz

Modulation source: arbitrary waveform generator (ARB) (R&S® CMW-B110A option)

Memory size		1.024 Gbyte
Word length	I	16 bit
	Q	16 bit
	marker	4 bit to 16 bit
Sample length	with 4-bit marker	up to 227.55 Msample
Sample rate	minimum	400 Hz
	maximum	100 MHz

Trigger		
Trigger sources		BASE: external TRIG A, BASE: external TRIG B

RF analyzer

VSWR		
RF1 COM, RF2 COM	70 MHz to 3300 MHz	< 1.2
	3300 MHz to 5000 MHz	< 1.5
	5000 MHz to 6000 MHz	< 1.6

Inherent spurious response	without input signal	
	70 MHz to 6000 MHz, except 4000 MHz, 4800 MHz, 5600 MHz, 6000 MHz	< -100 dBm

Spurious response	for full scale single tone input signal	
	70 MHz to 3300 MHz except $f_{in} = 1962.5$ MHz and 3925 MHz	< -55 dB
	3300 MHz to 3700 MHz, except $f_{in} = 6400$ MHz - $f_{selected}$, except $f_{in} = 6400$ MHz - $0.5 \times f_{selected}$	< -40 dB
	3700 MHz to 6000 MHz, except $f_{in} = 6400$ MHz - $0.5 \times f_{selected}$	< -40 dB

Harmonic response	2nd harmonic	
RF1 COM, RF2 COM	$f_{in} = 70$ MHz to 1650 MHz, $f_{selected} = 140$ MHz to 3300 MHz	< -30 dB
	$f_{in} = 1650$ MHz to 3000 MHz, $f_{selected} = 3300$ MHz to 6000 MHz	< -30 dB

Harmonic response	3rd harmonic	
RF1 COM, RF2 COM	$f_{in} = 70$ MHz to 1100 MHz, $f_{selected} = 210$ MHz to 3300 MHz	< -50 dB
	$f_{in} = 1100$ MHz to 2000 MHz, $f_{selected} = 3300$ MHz to 6000 MHz	< -50 dB

Phase noise	single sideband, 70 MHz to 3300 MHz	
Carrier offset	≥ 1 MHz	< -120 dBc, 1 Hz

Phase noise	single sideband, 3300 MHz to 6000 MHz	
Carrier offset	≥ 1 MHz	< -117 dBc, 1 Hz

Trigger		
Trigger sources		BASE: external TRIG A, BASE: external TRIG B, GPRF: free run, GPRF: IF power, BB generators, BB signaling

Power meter

Frequency range		70 MHz to 3300 MHz up to 6000 MHz with the R&S®CMW-KB036 option
Frequency resolution		0.1 Hz
Resolution bandwidths		Gaussian, 1 kHz to 10 MHz, in 1/3/5 steps, bandpass, 1 kHz to 30 MHz, in 1/3/5 steps, RRC, $\alpha = 0.1$, 3.84 MHz, RRC, $\alpha = 0.22$, WCDMA filter, 1.2288 MHz, CDMA filter
Expected nominal power setting range	for ADC full scale	
RF1 COM, RF2 COM	70 MHz to 100 MHz	-37 dBm to +42 dBm ²
	100 MHz to 3300 MHz	-47 dBm to +42 dBm ²
	3300 MHz to 6000 MHz	-37 dBm to +42 dBm ²

Level range		
RF1 COM, RF2 COM	70 MHz to 100 MHz	
	continuous power (CW)	-74 dBm ³ to +34 dBm
	peak envelope power (PEP)	up to +42 dBm ²
	100 MHz to 3300 MHz	
	continuous power (CW)	-84 dBm ³ to +34 dBm
	peak envelope power (PEP)	up to +42 dBm ²
	3300 MHz to 6000 MHz	
	continuous power (CW)	-74 dBm ³ to +34 dBm
	peak envelope power (PEP)	up to +42 dBm ²
	maximum input DC level	0 V DC

Level uncertainty	in temperature range +20 °C to +35 °C	
RF1 COM, RF2 COM	70 MHz to 100 MHz	< 1.0 dB ⁴
	100 MHz to 3300 MHz	< 0.5 dB ⁴
	3300 MHz to 6000 MHz	< 1.0 dB ⁴

Level uncertainty	in temperature range +5 °C to +45 °C	
RF1 COM, RF2 COM	70 MHz to 100 MHz	< 1.2 dB ⁴
	100 MHz to 3300 MHz	< 0.7 dB ⁴
	3300 MHz to 6000 MHz	< 1.2 dB ⁴

Level linearity with fixed expected nominal power setting	in temperature range +20 °C to +35 °C	
RF1 COM, RF2 COM	level range 0 dB to -40 dB	< 0.15 dB, typ. < 0.1 dB

Level resolution		0.01 dB
-------------------------	--	---------

Level repeatability	typical values after 1 h warm-up time, always returning to same level and frequency, no temperature change, insignificant time change	
	input level ≥ -40 dBm	< 0.01 dB
	input level < -40 dBm	< 0.03 dB

Dynamic range	70 MHz to 3300 MHz, <i>RBW</i> \rightarrow 1 kHz, with fixed expected nominal power setting	> 100 dB
Expected nominal power setting for full dynamic range		
RF1 COM, RF2 COM		-8 dBm to +42 dBm ²

Dynamic range	3300 MHz to 6000 MHz, <i>RBW</i> \rightarrow 1 kHz, with fixed expected nominal power setting	> 97 dB
Expected nominal power setting for full dynamic range		
RF1 COM, RF2 COM		+2 dBm to +42 dBm ²

² The maximum permissible continuous power is +34 dBm due to thermal limits.

³ *RBW* \rightarrow 1 kHz.

⁴ Valid for a 12-month calibration interval.

Spectrum measurements

FFT spectrum analyzer (R&S®CMW-KM010 option)		
Frequency range		70 MHz to 3300 MHz up to 6000 MHz with the R&S®CMW-KB036 option
Frequency span		1.25 MHz, 2.5 MHz, 5 MHz, 10 MHz, 20 MHz, 40 MHz
FFT length		1k, 2k, 4k, 8k, 16k
Detector		peak, RMS
Level range		see general technical specifications
Level uncertainty	for center frequency and <i>detector</i> → <i>peak</i>	see general technical specifications
Dynamic range	70 MHz to 3300 MHz, <i>for FFT length</i> → <i>16k</i> and <i>span</i> → <i>5 MHz</i> (equivalent to RBW → 781 Hz)	> 100 dB
Expected nominal power setting for full dynamic range		
RF1 COM, RF2 COM		-8 dBm to +42 dBm ⁵
Dynamic range	3300 MHz to 6000 MHz, <i>for FFT length</i> → <i>16k</i> and <i>span</i> → <i>5 MHz</i> (equivalent to RBW → 781 Hz)	> 97 dB
Expected nominal power setting for full dynamic range		
RF1 COM, RF2 COM		+2 dBm to +42 dBm ⁵
Inherent spurious response	without input signal	see general technical specifications

RF path 2 with RF TRX (R&S®CMW-B570 option) and RF frontend (BASIC) (R&S®CMW-B590A option)

The R&S®CMW-B570 and R&S®CMW-B590A options make the second RF path (RF path 2) available on the front of the instrument with three additional RF connectors, i.e. RF3 COM, RF4 COM and RF3 OUT.

RF3 COM	equivalent to RF1 COM	see general technical specifications
RF4 COM	equivalent to RF2 COM	see general technical specifications
RF3 OUT	equivalent to RF1 OUT	see general technical specifications

⁵ The maximum permissible continuous power is +34 dBm due to thermal limits.

Timebase

Timebase TCXO

Max. frequency drift	in temperature range +5 °C to +45 °C	$\pm 1 \times 10^{-6}$
Max. aging	at +25 °C, after 14 days of continuous operation	$\pm 1 \times 10^{-6}$ /year

Timebase basic OCXO (R&S® CMW-B690A option)

Max. frequency drift	in temperature range +5 °C to +45 °C	$\pm 5 \times 10^{-8}$
Retrace	at +25 °C, after 24 hours power ON / 2 hours power OFF / 1 hour power ON	$\pm 2 \times 10^{-8}$
Max. aging	at +25 °C, after 10 days of continuous operation	$\pm 1 \times 10^{-7}$ /year $\pm 1 \times 10^{-9}$ /day
Warm-up time	at +25 °C, the frequency is in the range that is 10 times the frequency drift ($\pm 5 \times 10^{-7}$)	approx. 10 min

Timebase highly stable OCXO (R&S® CMW-B690B option)

Max. frequency drift	in temperature range +5 °C to +45 °C, referenced to +25 °C with instrument orientation	$\pm 5 \times 10^{-9}$ $\pm 1 \times 10^{-9}$
Retrace	at +25 °C, after 24 hours power ON / 2 hours power OFF / 1 hour power ON	$\pm 5 \times 10^{-9}$
Max. aging	at +25 °C, after 10 days of continuous operation	$\pm 3 \times 10^{-8}$ /year $\pm 5 \times 10^{-10}$ /day
Warm-up time	at +25 °C, the frequency is in the range that is 10 times the frequency drift ($\pm 5 \times 10^{-8}$)	approx. 10 min

Reference frequency inputs/outputs

Synchronization input		BNC connector REF IN, rear panel
Frequency	sine wave square wave (TTL level)	10 MHz to 80 MHz, step: 1 Hz 1 MHz to 80 MHz, step: 1 Hz
Max. frequency variation		$\pm 10 \times 10^{-6}$
Input voltage range		0.5 V to 2 V, RMS
Impedance		50 Ω

Synchronization output 1		BNC connector REF OUT 1, rear panel
Frequency		10 MHz from internal reference or frequency at synchronization input
Output voltage		> 1.4 V, peak-to-peak
Impedance		50 Ω

Bluetooth® specifications

Standard	standard	Bluetooth® Core Specification Version 2.1 + EDR
	test standard	Radio Frequency Test Specification V1.2/V2.0/V2.0+EDR/V2.1/V2.1+EDR

Bluetooth® RF generator (prerequisite: R&S® CMW-B110A option)

Frequency range	Bluetooth®	2402 MHz to 2481 MHz
------------------------	------------	----------------------

Bluetooth® WINIQSIM2™ (R&S® CMW-KW610 option)

Arbitrary waveform file	basic rate	BLUETOOTH_11110000_DH5.WV LAP: 123456, (PAR = 0.00 dB)
	enhanced data rate (EDR)	BLUETOOTH_PRBS9_3-DH5.WV LAP: 123456, (PAR = 3.17 dB)

Output level range	depending on PAR	see general technical specifications
Output level uncertainty	waveform files used: BLUETOOTH_11110000_DH5.WV BLUETOOTH_PRBS_3-DH5.WV	see general technical specifications
Output level resolution		see general technical specifications

Signal quality		
Modulation index uncertainty	basic rate, frequency deviation Δf_1 max. = 160 kHz, waveform file used: BLUETOOTH_11110000_DH5.WV	< 1 %
Differential error vector magnitude (DEV M)	enhanced data rate, waveform file used: BLUETOOTH_PRBS9_3-DH5.WV	< 1.5 %, RMS

Bluetooth® RF analyzer (R&S® CMW-KM610 option)

Frequency range	Bluetooth®	2402 MHz to 2481 MHz
------------------------	------------	----------------------

Statistics		
Statistical count		1 to 1000
Values		current, average, maximum, minimum, standard deviation

Trigger		
Trigger sources		BT: IF power

Modulation analysis

Filter	filter bandwidth → wide	bandpass 2.0 MHz
	filter bandwidth → narrow	bandpass 1.3 MHz
Level range		-35 dBm to +42 dBm ⁶
Supported packet types	basic rate	DH1, DH3, DH5
	enhanced data rate (EDR)	2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3, 3-DH5
Measured parameters	basic rate, numeric results and standard deviation	Δf_2 99.9 %, frequency accuracy, frequency drift, maximum drift rate, frequency deviation Δf_1 average, frequency deviation Δf_1 minimum, frequency deviation Δf_1 maximum, frequency deviation Δf_2 average, frequency deviation Δf_2 minimum, frequency deviation Δf_2 maximum, nominal power
Measured parameters	enhanced data rate (EDR), numeric results and standard deviation	99 % DEVM, frequency stability ω_i , frequency stability $(\omega_o + \omega_i)_{max}$, frequency stability $\omega_{o,max}$, RMS DEVM, peak RMS, nominal power

Total measurement range for frequency accuracy, frequency deviation and frequency drift	basic rate	±250 kHz
--	------------	----------

Frequency accuracy	basic rate	
Measurement range	for nominal deviation of 160 kHz	±100 kHz
Uncertainty	for deviation ≤ 160 kHz	< 2 kHz

Frequency deviation average	basic rate	
Measurement range	without frequency offset	≤ 210 kHz
Uncertainty	for modulation index 0.22 to 0.42	< 1 %

Frequency drift	basic rate	
Measurement range		±50 kHz
Uncertainty	measured in burst related to frequency offset in preamble with 10101010 pattern	< 2 kHz

Frequency stability ω_i	enhanced data rate	
Measurement range		±100 kHz
Uncertainty	for ω_i ≤ 75 kHz, for deviation ≤ 160 kHz	< 2 kHz

Frequency stability $\omega_{o,max}$	enhanced data rate	
Measurement range		±15 kHz
Uncertainty	for ω_o ≤ 10 kHz	< 1 kHz

Differential error vector magnitude (DEVM)	enhanced data rate	
Inherent DEVM	for PRBS pattern	< 1.5 %, RMS < 3.0 %, peak

⁶ The maximum permissible continuous power is +34 dBm due to thermal limits.

GPS specifications

Standard		GPS
----------	--	-----

GPS RF generator (prerequisite: R&S®CMW-B110A option)

Frequency range	GPS band	
	L1	1575.42 MHz
	L2	1227.6 MHz

GPS WINIQSIM2™ (R&S®CMW-KW620 option)

Arbitrary waveform file		GPS_DEFAULT.WV (PAR = 3.66 dB)
Output level range	depending on PAR	see general technical specifications
Output level uncertainty	waveform file used: GPS_DEFAULT.WV	see general technical specifications
Output level resolution		see general technical specifications

DVB specifications

Standard		DVB-T
----------	--	-------

DVB RF generator (prerequisite: R&S®CMW-B110A option)

Frequency range	VHF band III	
	channels 5 to 12	174 MHz to 230 MHz
	UHF band IV	
	channels 21 to 34	470 MHz to 582 MHz
UHF band V		
	channels 35 to 69	582 MHz to 862 MHz

DVB WINIQSIM2™ (R&S®CMW-KW630 option)

Arbitrary waveform file		DVB-T_SCRAMBLED_16QAM_3SEC_TESTFILE.WV (PAR = 13.23 dB)
Output level range	depending on PAR	see general technical specifications
Output level uncertainty	waveform file used: DVB-T_SCRAMBLED_16QAM_3SEC_TESTFILE.WV	see general technical specifications
Output level resolution		see general technical specifications

FM STEREO RADIO specifications

Standard		FM STEREO RADIO
----------	--	-----------------

FM STEREO RADIO generator (prerequisite: R&S®CMW-B110A option)

Frequency range	FM	70 MHz to 110 MHz
-----------------	----	-------------------

FM STEREO RADIO waveforms (R&S®CMW-KV645 option)

Arbitrary waveform file		FM_M_M1K0_D75K0.WV (PAR = 0.00 dB)
Output level range	depending on PAR	see general technical specifications
Output level uncertainty	waveform file used: FM_M_M1K0_D75K0.WV	see general technical specifications
Output level resolution		see general technical specifications
Signal quality	RMS detector *SQRT(2)	
Deviation error	waveform file used: FM_M_M1K0_D75K0.WV	< 1 %

FM STEREO RADIO analyzer (R&S[®] CMW-KM645 option)

Frequency range	FM	70 MHz to 110 MHz
------------------------	----	-------------------

Statistics		
Statistical count		1 to 1000
Values		current, average, maximum, minimum, standard deviation

Audio filter, weighting

Lowpass		OFF, 3 kHz, 4 kHz, 15 kHz
Highpass		OFF, 6 Hz, 50 Hz, 300 Hz
Deemphasis		OFF, 50 μ s, 75 μ s, 750 μ s
Weighting filter		OFF, A-weighting

RF carrier analysis

Carrier frequency error		
Measurement range	for nominal deviation of 75 kHz	± 10 kHz
Uncertainty	for deviation ≤ 75 kHz	< 35 Hz + drift of timebase, see general technical specifications

Multiplex deviation		
Measurement range	without frequency offset	≤ 96 kHz
Uncertainty		< 1 %, peak

Modulation analysis

Filter	filter bandwidth	bandpass 500 kHz
Level range		-28 dBm to +42 dBm ⁷
Measured parameters	numeric results	carrier power, carrier frequency error, multiplex deviation, pilot deviation, audio left/right deviation, pilot frequency error, THD left/right, THD+N/SINAD left/right, SNR left/right

Pilot frequency error		
Measurement range	for nominal deviation of 6.75 kHz	± 10 Hz
Uncertainty	for deviation ≤ 67.5 kHz, drift of timebase according to pilot 19.0 kHz	< 0.1 Hz + drift of timebase, see general technical specifications

THD		
Measurement range		< 10 %
Inherent distortion		< 0.05 %
Uncertainty	for modulation frequency of 1 kHz and deviation of 67.5 kHz	< 1 % + inherent distortion

THD+N / (SINAD)		
Measurement range		< 10 %
Inherent distortion	with deemphasis filter (50 μ s) and A-weighted filter	< 0.20 %
Uncertainty	for modulation frequency of 1 kHz, deviation of 67.5 kHz and with deemphasis filter (50 μ s) and A-weighted filter	< 1 % + inherent distortion

SNR		
Inherent distortion	with deemphasis filter (50 μ s) and A-weighted filter	> 54 dB

⁷ The maximum permissible continuous power is +34 dBm due to thermal limits.

WLAN specifications

Standard		IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, IEEE 802.11n
-----------------	--	---

WLAN RF generator (prerequisite: R&S® CMW-B110A option)

Frequency range	WLAN IEEE 802.11b/g/n (2.4 GHz band)	2412 MHz to 2484 MHz
	WLAN IEEE 802.11a/n (5 GHz band) prerequisite: R&S®CMW-KB036 option	5000 MHz to 6000 MHz

WLAN ABG WINIQSIM2™ (R&S® CMW-KW650 option)

Arbitrary waveform files	in line with IEEE 802.11a/g OFDM 64QAM	WLAN_A_G_OFDM_64QAM.WV (PAR = 10.01 dB)
	in line with IEEE 802.11b CCK DQPSK	WLAN_B_CCK_DQPSK.WV (PAR = 1.48 dB)

Output level range	depending on PAR	see general technical specifications
Output level uncertainty	waveform files used: WLAN_A_G_OFDM_64QAM.WV WLAN_B_CCK_DQPSK.WV	see general technical specifications
Output level resolution		see general technical specifications

Signal quality		
Error vector magnitude (EVM)	IEEE 802.11a/g EVM all carriers waveform file used: WLAN_A_G_OFDM_64QAM.WV	< -40 dB, RMS
	IEEE 802.11b EVM waveform file used: WLAN_B_CCK_DQPSK.WV	< 4 %, peak

WLAN N WINIQSIM2™ (R&S® CMW-KW651 option)

Arbitrary waveform files	in line with IEEE 802.11n 64QAM code rate 5/6	WLAN_N_64QAM_5_6.WV (PAR = 10.01 dB)
---------------------------------	--	---

Output level range	depending on PAR	see general technical specifications
Output level uncertainty	waveform files used: WLAN_N_64QAM_5_6.WV	see general technical specifications
Output level resolution		see general technical specifications

Signal quality		
Error vector magnitude (EVM)	IEEE 802.11n EVM all carriers waveform file used: WLAN_N_64QAM_5_6.WV	< -40 dB, RMS

WLAN ABG RF analyzer (R&S® CMW-KM650 option)

Frequency range	WLAN IEEE 802.11b/g	2412 MHz to 2484 MHz
	WLAN IEEE 802.11a prerequisite: R&S®CMW-KB036 option	5000 MHz to 6000 MHz

Statistics		
Statistical count		1 to 1000
Values		current, average, maximum, standard deviation

Trigger		
Trigger sources		WLAN: free run WLAN: IF power

Modulation analysis

Filter		20 MHz
Level range		-28 dBm to +42 dBm ⁸
Payload length		≥ 16 symbol or ≥ 403 byte
Analysis modes	DSSS	1 Mbps DBPSK, 2 Mbps DQPSK, 5.5 Mbps CCK, 11 Mbps CCK
	OFDM	6 Mbps BPSK, 9 Mbps BPSK, 12 Mbps QPSK, 18 Mbps QPSK, 24 Mbps 16QAM, 36 Mbps 16QAM, 48 Mbps 64QAM, 54 Mbps 64QAM
Measured parameters	DSSS, numeric results and standard deviation	burst power, error vector magnitude (EVM) peak, error vector magnitude (EVM) RMS, center frequency error, chip clock error, I/Q offset, gain imbalance, quadrature error
	DSSS, graphical	EVM versus chip, I/Q constellation
	OFDM, numeric results and standard deviation	burst power, EVM all carriers, EVM data carriers, EVM pilot carriers, center frequency error, symbol clock error, I/Q offset, gain imbalance, quadrature error
	OFDM, graphical	EVM versus symbol, EVM versus carrier, I/Q constellation, spectrum flatness

Error vector magnitude (EVM)		
Inherent EVM	DSSS, IEEE 802.11b/g	< 5 %, peak < 2 %, RMS
	OFDM, IEEE 802.11g	< -40 dB, RMS
	OFDM, IEEE 802.11a	
	-18 dBm ≤ input level ≤ +42 dBm ⁸ , RMS	< -37 dB, RMS
Measurement length	DSSS	1000 samples
	OFDM	entire PPDU

Center frequency error		
Frequency measurement uncertainty	DSSS	< 35 Hz + drift of timebase, see general technical specifications
	OFDM, for ≥ 100 symbol (400 μs)	< 35 Hz + drift of timebase, see general technical specifications

Chip clock error		
Uncertainty	DSSS	< 1 ppm

Symbol clock error		
Uncertainty	OFDM	< 1 ppm

⁸ The maximum permissible continuous power is +34 dBm due to thermal limits.

I/Q offset		
Inherent I/Q offset	DSSS, for average ≥ 10 measurements	< -50 dB
	OFDM, for average ≥ 10 measurements	< -45 dB
Spectrum flatness		
Level uncertainty	OFDM, IEEE 802.11g (2.4 GHz band)	< 0.5 dB
	OFDM, IEEE 802.11a (5 GHz band)	< 0.8 dB

Spectrum measurements

Transmit spectrum mask		
Frequency span		80 MHz
Dynamic range	DSSS	in line with IEEE 802.11b
	OFDM	in line with IEEE 802.11a/g
Expected nominal power setting for full dynamic range	RF1 COM, RF2 COM	
	IEEE 802.11g (2.4 GHz band)	+2 dBm to +42 dBm ⁹
	IEEE 802.11a (5 GHz band)	+12 dBm to +42 dBm ⁹

WLAN N RF analyzer (R&S® CMW-KM651 option)

Frequency range	WLAN IEEE 802.11n (2.4 GHz band)	2412 MHz to 2484 MHz
	WLAN IEEE 802.11n (5 GHz band) prerequisite: R&S®CMW-KB036 option	5000 MHz to 6000 MHz

Statistics		
Statistical count		1 to 1000
Values		current, average, maximum, standard deviation

Trigger		
Trigger sources		WLAN: free run WLAN: IF power

High throughput (HT)		
PPDU format		legacy mode, mixed mode, greenfield mode

Modulation analysis

Bandwidth		20 MHz, 40 MHz
Level range		-28 dBm to +42 dBm ⁹
Payload length		≥ 16 symbol or ≥ 403 byte
Analysis modes		BPSK code rate 1/2 (MCS0), BPSK code rate 3/4, QPSK code rate 1/2 (MCS1), QPSK code rate 3/4 (MCS2), 16QAM code rate 1/2 (MCS3), 16QAM code rate 3/4 (MCS4), 64QAM code rate 1/2, 64QAM code rate 2/3 (MCS5), 64QAM code rate 3/4 (MCS6), 64QAM code rate 5/6 (MCS7)
	for optional 40 MHz MCS format	BPSK code rate 1/2 (MCS32)

⁹ The maximum permissible continuous power is +34 dBm due to thermal limits.

Measured parameters	numeric results and standard deviation	burst power, EVM all carriers, EVM data carriers, EVM pilot carriers, center frequency error, symbol clock error, I/Q offset, gain imbalance, quadrature error
	graphical	EVM versus symbol, EVM versus carrier, spectrum flatness

Error vector magnitude (EVM)		
Inherent EVM	IEEE 802.11n (2.4 GHz band)	
	-28 dBm ≤ input level ≤ +42 dBm ¹⁰ , RMS	< -37 dB, RMS
	IEEE 802.11n (5 GHz band)	
	-18 dBm ≤ input level ≤ +42 dBm ¹⁰ , RMS	< -35 dB, RMS
Measurement length		entire PPDU

Center frequency error		
Frequency measurement uncertainty	for ≥ 100 symbol (400 μs)	< 35 Hz + drift of timebase, see general technical specifications

Symbol clock error		
Uncertainty		< 1 ppm

I/Q offset		
Inherent I/Q offset	for average ≥ 10 measurements	< -45 dB

Spectrum flatness		
Level uncertainty	IEEE 802.11n (2.4 GHz band)	
	bandwidth 20 MHz	< 0.5 dB
	bandwidth 40 MHz	< 0.8 dB
	IEEE 802.11n (5 GHz band)	
	bandwidth 20 MHz	< 0.8 dB
	bandwidth 40 MHz	< 1.0 dB

Spectrum measurements

Transmit spectrum mask		
Frequency span		80 MHz
Dynamic range		in line with IEEE 802.11n
Expected nominal power setting for full dynamic range	RF1 COM, RF2 COM	
	IEEE 802.11n (2.4 GHz band)	+2 dBm to +42 dBm ¹⁰
	IEEE 802.11n (5 GHz band)	+12 dBm to +42 dBm ¹⁰

¹⁰ The maximum permissible continuous power is +34 dBm due to thermal limits.

WiMAX™ specifications – mobile station and base station test

Standard	IEEE 802.16e-2005, OFDMA
----------	--------------------------

WiMAX™ RF generator (prerequisite: R&S®CMW-B110A option)

Frequency range	WiMAX™ band 1	2300 MHz to 2800 MHz
	WiMAX™ band 2, prerequisite: R&S®CMW-KB036 option	3300 MHz to 3800 MHz
	WiMAX™ band 3, prerequisite: R&S®CMW-KB036 option	5100 MHz to 5850 MHz

WiMAX™ WINIQSIM2™ (R&S®CMW-KW700 option)

Arbitrary waveform file	in line with IEEE 802.16e-2005, OFDMA average power	WIMAX_DL_3-BURST_46_5MS.WV (PAR = 11.11 dB)
-------------------------	--	--

Output level range	depending on PAR	see general technical specifications
Output level uncertainty	waveform file used: WIMAX_DL_3-BURST_46_5MS.WV	see general technical specifications
Output level resolution		see general technical specifications

Signal quality		
Error vector magnitude (EVM)	ID_Cell = 0, permbase = 0, prbs_id = 0, cp = 1/8, BW = 10 MHz, bursts: FCH, DL-MAP, data PN15, modulation type and coding rate QPSK 1/2; waveform file used: WIMAX_DL_3BURST_46_5MS.WV	< -40 dB, RMS

WiMAX™ RF analyzer (R&S®CMW-KM700, R&S®CMW-KM701 options)

FFT size		512, 1024
Bandwidth		3.5 MHz, 5 MHz, 7 MHz, 8.75 MHz, 10 MHz
Link direction		uplink, downlink
Subcarrier allocation		DL PUSC, UL PUSC uplink collaborative MIMO

Frequency range	WiMAX™ band 1	2300 MHz to 2800 MHz
	WiMAX™ band 2, prerequisite: R&S®CMW-KB036 option	3300 MHz to 3800 MHz
	WiMAX™ band 3, prerequisite: R&S®CMW-KB036 option	5100 MHz to 5580 MHz and 5620 MHz to 5850 MHz
Level setting		manual mode
Level range	RF1 COM, RF2 COM	-40 dBm to +27 dBm, RMS

Statistics		
Statistical count		1 to 1000
Values		current, average, minimum, maximum

Trigger		
Trigger source		BASE: external TRIG A, BASE: external TRIG B, GPRF: BB generator, WiMAX™: IF power, WiMAX™ signaling: frame triggers

Measured parameters	numeric results	RMS power (subframe, burst, preamble), subcarrier power, crest factor, error vector magnitude (all carriers, pilot carriers, data carriers), unmodulated EVM, frequency error, sample clock error, I/Q DC offset, I/Q imbalance gain, I/Q imbalance quadrature, RSSI, CINR, spectrum flatness, spectrum flatness, neighbor, occupied bandwidth, spectrum emission mask, adjacent channel power
	graphical with the R&S®CMW-KM700 option	power versus time, constellation diagram
	graphical with the R&S®CMW-KM700 and R&S®CMW-KM701 options	FFT, spectral flatness, spectral flatness, neighbor, spectrum emission mask, adjacent channel power, CCDF, EVM versus carrier, EVM versus symbol

Power measurement

Power	RMS detector	
Level uncertainty		see general technical specifications ¹¹

Modulation analysis

Error vector magnitude		
Measurement range		from inherent EVM up to -12 dB
Inherent EVM ¹¹	WiMAX™ band 1 UL	
	-15 dBm ≤ input level ≤ +27 dBm	< -40 dB, RMS
	-40 dBm ≤ input level < -15 dBm	< -36 dB, RMS
	WiMAX™ band 2 UL	
	-15 dBm ≤ input level ≤ +27 dBm	< -38 dB, RMS
	-35 dBm ≤ input level < -15 dBm	< -35 dB, RMS
	WiMAX™ band 3 UL	
	-15 dBm ≤ input level ≤ +27 dBm	< -38 dB, RMS
	-35 dBm ≤ input level < -15 dBm	< -35 dB, RMS
	WiMAX™ band 1 DL	
	-15 dBm ≤ input level ≤ +27 dBm	< -38 dB, RMS
	WiMAX™ band 2 DL	
	-15 dBm ≤ input level ≤ +27 dBm	< -36 dB, RMS
	WiMAX™ band 3 DL	
	-15 dBm ≤ input level ≤ +27 dBm	< -36 dB, RMS

Frequency error		
Measurement range	FFT size 512, BW = 3.5 MHz	-27.34 kHz to +27.34 kHz
	FFT size 512, BW = 5 MHz	-38.28 kHz to +38.28 kHz
	FFT size 1024, BW = 7 MHz	-27.34 kHz to +27.34 kHz
	FFT size 1024, BW = 8.75 MHz	-34.18 kHz to +34.18 kHz
	FFT size 1024, BW = 10 MHz	-38.28 kHz to +38.28 kHz
Frequency measurement uncertainty		< 10 Hz + drift of timebase, see general technical specifications ¹¹

¹¹ Averaging across 100 bursts, UL: BW = 10 MHz, zone length = 18 symbols / 210 slots; DL: BW = 10 MHz, zone length = 34 symbols / 30 subchannels.

Sample clock error ¹²		
Measurement range		-5 ppm to +5 ppm
Sample clock measurement uncertainty		< 0.1 ppm

I/Q imbalance ¹²		
Inherent I/Q gain imbalance		< 0.1 dB
Inherent I/Q quadrature imbalance		< 0.1°

Spectrum flatness, neighbor ¹²		
Level uncertainty	inner carriers / outer carriers	< 0.5 dB
	neighbor subcarriers	< 0.1 dB

Spectrum measurements

Adjacent channel power		
Filter	RMS detector	rectangle 5 MHz, 10 MHz 3.84 MHz or 7.68 MHz, RRC, $\alpha = 0.22$, WCDMA
Dynamic range	adjacent channels	> 45 dB
Expected nominal power setting for full dynamic range	RF1 COM, RF2 COM	> -3 dBm

Spectrum emission mask (SEM)		
Frequency span	RMS detector	60 MHz
Supported masks		IEEE, WiMAX Forum [®] , TTA, user-defined
Dynamic range	relative limit of IEEE mask	> 50 dB
Expected nominal power setting for full dynamic range	RF1 COM, RF2 COM	> -3 dBm

WiMAX™ signaling base station emulator (prerequisite: R&S[®] CMW-KS700, R&S[®] CMW-KS701, R&S[®] CMW-KS702, R&S[®] CMW-B200A, R&S[®] CMW-B270A options)

Standard		IEEE 802.16e
Physical layer mode		OFDMA

Frequency range		
WiMAX™ band 1, WiMAX™ band 2, WiMAX™ band 3	DL UL	see WiMAX™ RF generator specifications see WiMAX™ RF analyzer specifications

Output level range		
RF1 COM, RF2 COM, RF1 OUT	peak envelope power (PEP) preamble power single data subcarrier power	see general technical specifications up to -17.7 dBm ¹³ offset to peak envelope power up to -51.2 dBm ¹³ offset to peak envelope power
Output level uncertainty		see general technical specifications
Output level resolution		see general technical specifications
Output level setting		manual mode
Output level reference	DL	single data subcarrier power

Physical layer

FFT size		512, 1024
Bandwidth		3.5 MHz, 5 MHz, 7 MHz, 8.75 MHz, 10 MHz
Duplexing		TDD mode
Frame duration		5 ms
Cyclic prefix		1/8

¹² Averaging across 100 bursts, UL: BW = 10 MHz, zone length = 18 symbols / 210 slots; DL: BW = 10 MHz, zone length = 34 symbols / 30 subchannels.

¹³ BW = 10 MHz, all subchannels used.

Number of OFDMA symbols		26 to 35
Link mode		SISO MIMO – Matrix A MIMO – Matrix B MIMO – collaborative pattern A MIMO – collaborative pattern B
Zone	DL	first zone, second zone
	UL	first zone, second zone
Segmentation	DL	first zone
Subcarrier allocation		first zone: PUSC second DL zone: PUSC, FUSC, AMC 2x3 second UL zone: PUSC, AMC 2x3
Modulation	FEC code type: DL	QPSK 1/2, QPSK 3/4, 16QAM 1/2, 16QAM 3/4, 64QAM 1/2, 64QAM 2/3, 64QAM 3/4, 64QAM 5/6
	FEC code type: UL	QPSK 1/2, QPSK 3/4, 16QAM 1/2, 16QAM 3/4, 64QAM 5/6
Channel coding		convolutional (CC), turbo (CTC)

Measurements

PER		
Measurement range	graphically displayed, stop on limit fail	0 % to 100 %
Payload mode	auto mode and user-defined mode	region, data interval, payload size
Acknowledge type		ARQ, HARQ, ping
Data	DL	All 0, All 1, bit pattern: 0101, bit pattern: 1010, pseudo random, PN9 to PN23
Estimated BER		ARQ, HARQ, ping
Physical parameters	graphically displayed	power, frequency offset, timing offset
Mobile capabilities		MAC address, DL service flows, UL service flows, time adjustment, carrier frequency error
Measurement reports	reported from DUT	RSSI, CINR (mean and SD), TX power
CQICH		physical and effective CINR

Features

Connection status	status indication	signal ON, network entry completed, waiting for CDMA RNG-RSP, waiting for initial RNG-RSP, waiting for SBC-RSP, waiting for REG-RSP, deregistered, MS disconnected
Ranging control		initial ranging, periodic ranging
Power control		open loop, closed loop
Power boosting		preamble, pilots, FCH, DL map, UL map, data and management bursts
Burst allocation mode	data burst region	optimized, normal
Dummy burst generator	unused symbols filled with	pilots, dummy burst
Sample frequency offset		-1000 Hz to +1000 Hz
AWGN	CN ratio	-6 dB to +40 dB, two channels
Trigger output	WiMAX™ signaling: frame trigger	adjustable offset, adjustable pulse width, slope

WiMAX™ IP application enabler (prerequisite: R&S® CMW-KA700, R&S® CMW-B660, R&S® CMW-B661 options)

Key features		throughput measurement and end-to-end application testing
Interface	rear panel	1 GBaseT
Convergence sublayer	IP version	V4
IP settings		DHCP, static IP
Interface to IP-based server/client applications		e.g. IPERF (throughput test), e.g. web browsing, e.g. FTP file transfer, e.g. video streaming, e.g. VoIP
Data throughput	end-to-end IP connection	
	DL: UDP, SISO	up to 17.2 Mbps
	DL: UDP, MIMO	up to 36.5 Mbps
	UL: UDP, SISO	up to 9.7 Mbps

Digital I/Q 1 to 4 (R&S®CMW-B510A option)

The R&S®CMW-B510A option makes the digital I/Q interface and AUX interface available on the rear of the instrument.

Digital I/Q interface

The digital I/Q interface can be used for connecting the R&S®CMW to the digital I/Q interface of other Rohde & Schwarz instruments (e.g. R&S®AMU200A, R&S®EX-IQ-BOX).

DIG I/Q IN/OUT 1/3	input and output, bidirectional, half-duplex	26-pin MDR connector
Level		LVDS
Clock rate in		100 MHz
Clock rate out		100 MHz

DIG I/Q OUT 2/4	output	26-pin MDR connector
Level		LVDS
Clock rate		100 MHz

Control signals	general-purpose control, for future use	
	6 signals	100 MHz

I/Q data		
Resolution	for clock rate up to 100 MHz	16 bit for I and 16 bit for Q

I/Q sample rate		
Source		internal, digital input, digital output, AUX interface
Range		1.92 Msample/s to 100 Msample/s
Predefined values ¹⁴	standard-independent	100 Msample/s
	WCDMA, LTE	1.92 Msample/s, 3.84 Msample/s, 7.68 Msample/s, 15.36 Msample/s, 30.72 Msample/s

I/Q enable/request rate		
Digital input	I/Q mode 1	75 MHz, 100 MHz
	I/Q mode 2	0 MHz to 100 MHz
Digital output	I/Q mode 1	75 MHz, 100 MHz
	I/Q mode 2	0 MHz to 100 MHz
	I/Q mode 4	75 MHz

AUX interface

The AUX interface can be used for connecting the R&S®CMW to other instruments, e.g. to trigger, clock and enable signals.

AUX A/B	bidirectional, half-duplex	two BNC connectors
Level		3.3 V TTL
Clock rate		0 MHz to 100 MHz

Included extras

Digital I/Q cable (two sets)	same cable as included in R&S®SMU-Z6	26-pin MDR connector
-------------------------------------	--------------------------------------	----------------------

¹⁴ Further values in the range from 400 sample/s to 100 Msample/s can be provided on demand.

General data

RF connectors (front panel)		Snap-N female, 50 Ω, compatible with N female connectors
RF1 COM, RF2 COM		combined RF input and RF output
RF1 OUT		RF output

Remote control interfaces (front panel)		
LAN		Ethernet RJ-45 connector, 100 Mbps

Remote control interfaces (rear panel)		
IEEE 488	R&S®CMW-B612A IEEE bus (single) interface option or R&S®CMW-B612B IEEE bus (dual) interface option	IEC 60625-2 (IEEE 488.2), 24-pin Amphenol connector 2 × IEC 60625-2 (IEEE 488.2), 24-pin Amphenol connector
LAN REMOTE		Ethernet RJ-45 connector, 1000 Mbps
USB REMOTE		USB 2.0 type B connector

Further interfaces (front panel)		
USB	for keyboard, mouse, USB stick	3 × USB 2.0 type A connector
SENSOR		for R&S®NRP-Zxx power sensors
DIGITAL MONITOR	for external monitor, only included in R&S®CMW-S600C	DVI-D connector

Further interfaces (rear panel)		
USB	for keyboard, mouse, USB stick	1 × USB 2.0 type A connector 1 × USB 1.1 type A connector
DVI	for external monitor, R&S®CMW-B620A DVI interface option	DVI-D connector
TRIG A, TRIG B	trigger input/output output trigger sources	2 × BNC connector standard-specific internal trigger sources

Environmental conditions		
Temperature	operating temperature range	+5 °C to +45 °C
	storage temperature range	-25 °C to +60 °C
Relative humidity	+40 °C, non-condensing	80 %

Product conformity		
Electromagnetic compatibility	EU: EMC Directive 2004/108/EC	in line with EN 61326-1 (industrial environment) EN 61326-2-1 EN 55011 (class A) EN 61000-3-2 EN 61000-3-3
Electrical safety	EU: Low Voltage Directive 2006/95/EC	in line with EN 61010-1
	USA/Canada	in line with UL 61010-1 (second edition) CAN C22.2 No. 61010.1-04

Mechanical resistance	non-operating mode	
Vibration	sinusoidal	in line with EN 60068-2-6, 5 Hz to 150 Hz, 0.15 mm amplitude const., 55 Hz to 150 Hz, 0.5 g const.
Vibration	random	in line with EN 60068-2-64, 10 Hz to 300 Hz, acceleration 1.2 g RMS
Shock		in line with MIL-STD-810F 40 g shock spectrum

Power supply		power factor correction, in line with EN 61000-3-2
Input		100 V to 240 V \pm 10 % (AC), max. 850 VA, 50 Hz to 60 Hz \pm 5 %
Power consumption	R&S®CMW270 single tester, non-signaling	approx. 200 W

Display		selected with R&S®CMW-S600D (front panel with display and keypad)
Size		21 cm TFT color display (8.4")
Resolution		800 \times 600 pixels (SVGA resolution)
Pixel failure rate		$< 1.1 \times 10^{-5}$

Dimensions of the R&S®CMW270	W \times H \times D, overall	465.1 mm \times 197.3 mm \times 517.0 mm (18.31 in \times 7.77 in \times 20.35 in)
	for rackmounting	19" 1/1, 4 HU, 450
Weight of the R&S®CMW270	single tester, non-signaling	approx. 14 kg (approx. 31 lb)
	with typical options	approx. 18 kg (approx. 40 lb)

Calibration interval	12 months	recommended for highest accuracy, see specified RF generator and RF analyzer level uncertainty
	24 months	add 0.2 dB to specified RF generator and RF analyzer level uncertainty

Ordering information

Designation	Type	Order No.
Wireless Connectivity Tester Base unit with following accessories: power cord, operating manual (quick start guide), comprehensive documentation on CD-ROM	R&S®CMW270	1201.0002K75

For more ordering information about available options, please see our product brochure (PD 5213.8880.12) or ask your local Rohde & Schwarz expert to find the solution that is optimally suited to your needs.

Recommended extras for manual operation

For R&S®CMW-S600D configuration (front panel with display and keypad):

Designation	Type	Order No.
Mouse with USB Interface, optical	R&S®PSL-Z10	1157.7060.04

For R&S®CMW-S600C configuration (front panel without display or keypad):

Designation	Type	Order No.
Mouse with USB Interface, optical	R&S®PSL-Z10	1157.7060.04
Keyboard with USB Interface (US assignment)	R&S®PSL-Z2	1157.6870.04
17" TFT Monitor	R&S®PMC3	1082.6004.12

Important information:

We recommend using only the above-mentioned original PC components from Rohde & Schwarz in connection with the R&S®CMW270. The interaction of all components is continuously tested.

Insufficiently shielded PC components may lead to EMC problems which may disturb RF measurements results.

Recommended extras

Designation	Type	Order No.
19" Rack Adapter	R&S®ZZA-411	1096.3283.00
Digital Signal Interface Module	R&S®EX-IQ-BOX	1409.5505K04
Cable TVR 290, 26-pin MDR connector; additional cable for R&S®CMW-B510A used with e.g. R&S®AMU200A, R&S®EX-IQ-BOX	R&S®SMU-Z6	1415.0201.02

For product brochure, see PD 5213.8880.12 and www.rohde-schwarz.com

Service you can rely on

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

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 more than 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Environmental commitment

- | Energy-efficient products
- | Continuous improvement in environmental sustainability
- | ISO 14001-certified environmental management system

Certified Quality System
ISO 9001

Rohde & Schwarz GmbH & Co. KG

www.rohde-schwarz.com

Regional contact

- | Europe, Africa, Middle East
+49 89 4129 137 74
customersupport@rohde-schwarz.com
- | North America
1 888 TEST RSA (1 888 837 87 72)
customer.support@rsa.rohde-schwarz.com
- | Latin America
+1 410 910 79 88
customersupport.la@rohde-schwarz.com
- | Asia/Pacific
+65 65 13 04 88
customersupport.asia@rohde-schwarz.com

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG
Trade names are trademarks of the owners | Printed in Germany (ch)
PD 5213.8880.22 | Version 06.00 | April 2010 | R&S®CMW270
Subject to change

© 2007 - 2010 Rohde & Schwarz GmbH & Co. KG | 81671 München, Germany