

# R&S® CMW270 WiMAX Communication Tester

The all-in-one solution  
for IEEE 802.16e  
WiMAX mobile station  
testing



**75** Years of  
Driving  
Innovation



# R&S®CMW270 WiMAX Communication Tester At a glance

The R&S®CMW270 is an all-in-one solution for testing WiMAX equipment fast and accurately in accordance with the IEEE 802.16e standard.

With the R&S®CMW270, “all-in-one” truly means “all-in-one”: You can configure it to meet your specific requirements in production, quality assurance, and service – and you can do so with just one instrument.

The R&S®CMW270 allows you to select only the options you require – from the non-signaling mode for high-speed RF alignment in production up to the signaling mode with a base station emulator for testing mobile devices in simulated network conditions.

Moreover, you can keep your test costs to a minimum owing to the scalability, test speed, measurement repeatability, and accuracy of the R&S®CMW270.

- Continuous frequency range for all WiMAX band classes up to 6 GHz
- Realtime signaling to verify network entry and functional performance, plus a message logger
- Vector signal analyzer (VSA) for transmitter measurements and verification
- Vector signal generator (VSG) for receiver measurements with arbitrary waveform functionality
- R&S®Smart Alignment and R&S®Multi-Evaluation concept to reduce test times significantly
- Easy connection to WiMAX devices using the RF interface with integrated switching to eliminate external hardware



# R&S®CMW270 WiMAX Communication Tester

## Benefits and key features

### Maximum test reliability: mobile station test in full signaling mode

Verification and logging of not just RF parameters, but also protocol functions in the MAC layer

Test signal quality that far exceeds that of golden device solutions

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### Reduced test costs: RF alignment up to ten times faster

Simultaneous transmitter and receiver measurements for maximum parallel testing plus the R&S®Smart Alignment concept drastically reduce test time

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### High yield in production and simplified test setup

Minimum uncertainty and maximum repeatability

Wide RF input and output dynamic range as well as RF frontend with integrated switching eliminate external devices in test setup

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### Ready for future WiMAX requirements

Suitable for a second measurement channel for MIMO  
Continuous RF frequency range from 70 MHz to 6 GHz  
and 40/70 MHz IF bandwidth

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### Versatile features of the R&S®CMW270 base unit

RF generator and RF power meter for general-purpose CW test applications

Remote control via LAN, USB 2.0, or IEC/IEEE bus

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### From pre-sale to service. At your doorstep.

Worldwide network of local Rohde&Schwarz experts in over 70 countries

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### Reduced cost of ownership

- Wear-free electronic switches and step attenuators for longer component life
- Choice between 12- or 24-month calibration interval depending on accuracy requirements
- On-site retrofitting of signaling options without recalibrating the R&S®CMW270
- Internal selftest down to module level for minimum downtime of the production line

# Maximum test reliability: mobile station test in full signaling mode

Realtime signaling allows you to optionally test the full functionality of a mobile station like in mobile WiMAX network operation, e.g. synchronization, ranging, and registration.

The RF parameters of the WiMAX mobile station in the physical layer (PHY) and the protocol functions in the MAC layer are concurrently verified under realistic conditions. You can thus detect complex errors such as crosstalk between the transmit and receive paths.

## Test signal quality better than with golden device solutions

The R&S®CMW270 provides a much more reliable alternative to golden devices, which require complex calibration of the radio part in order to maintain signal quality. Requirements for traceability in line with international standards such as ISO 9001 can be easily met.

## Configuration of WiMAX signaling parameters at the protocol level

The most important parameters that the R&S®CMW270 can vary are as follows:

- MAC address
- Preamble code
- OFDMA frame settings
- Modulation type and coding rate

## Message logger for recording WiMAX traffic parameters

During the network entry process as well as during RF verification with signaling, complex data communications take place in the physical layer and in the MAC layer of a WiMAX mobile station.

The message logger records, monitors, and examines communications by means of the following data:

- Time stamp with 1 ms resolution
- Link direction (UL/DL)
- MAC management type (e.g. DL map, UL map, DCD, UCD)
- Connection identifier (CID)
- Status (success, continue)
- Number of bytes
- Offset frequency correction
- Power level correction

WiMAX signaling tests require these options:

R&S®CMW-KS700	WiMAX signaling software
R&S®CMW-B200A	Signaling unit hardware
R&S®CMW-B270A	WiMAX extension module

The message logger is part of the R&S®CMW-KS700 option.

Signaling options can be retrofitted on site without having to recalibrate the R&S®CMW270.

Measurement functions of the R&S®CMW-KS700 option with base station emulation in the signaling mode

Signaling mode measurements
Receiver sensitivity (PER)
WiMAX signaling test
– Initial ranging
– Network registration
– Periodic ranging
– Data transfer (MAC)
Channel reporting
– CINR (carrier to interference and noise ratio)
– RSSI (receive signal strength indicator)

Typical applications for the R&S®CMW270 as a base station emulator:

- Design verification test in R&D
- Regression tests in R&D
- Incoming inspection for network operators
- Final test in production, service centers, and quality assurance
- Signaling unit for WiMAX test systems, e.g. radiated performance test (RPT)

The message logger provides a straightforward overview of a WiMAX communication in an easy-to-read format

No.	Timestamp	Message Type	Priority	MAC_HCR_CID	Bytes	Mac Mgmt Type	CFO	PWR	Mod	Ranging Params
14189	46144	Ranging Parameters Message	Indication	55			216.614292	126113 (-23.180941dB)	OPSK...	RNG_Type(2), Frame...
14221	46212	Ranging Parameters Message	Indication	55			122.021371	135887 (-23.187858dB)	OPSK...	RNG_Type(2), Frame...
14225	46212	Ranging Parameters Message	Indication	55			122.021371	135887 (-23.187858dB)	OPSK...	RNG_Type(2), Frame...
14436	46561	Ranging Parameters Message	Indication	55			-17.490610	272521 (-20.149730dB)	OPSK...	RNG_Type(2), Frame...
14438	46561	Ranging Parameters Message	Indication	55			-17.490610	272521 (-20.149730dB)	OPSK...	RNG_Type(2), Frame...
14535	46711	Ranging Parameters Message	Indication	55			15.169202	167952 (-22.287785dB)	OPSK...	RNG_Type(2), Frame...
14537	46711	Ranging Parameters Message	Indication	55			-10.486502	167952 (-22.287785dB)	OPSK...	RNG_Type(2), Frame...
14572	46761	MAC Management	Indication	58		Ranging Request			OPSK...	
14573	46763	MAC Management	Indication	58		Ranging Request			OPSK...	
14610	46851	Ranging Parameters Message	Indication	55			56.342458	169339 (-22.232070dB)	OPSK...	RNG_Type(2), Frame...
14612	46811	Ranging Parameters Message	Indication	55			-56.304250	169339 (-22.232070dB)	OPSK...	RNG_Type(2), Frame...
14626	46856	Ranging Parameters Message	Indication	55			23.467190	169146 (-22.237019dB)	OPSK...	RNG_Type(2), Frame...
14628	46836	Ranging Parameters Message	Indication	55			23.467190	169146 (-22.237019dB)	OPSK...	RNG_Type(2), Frame...
14644	46861	MAC Management	Indication	38		RR Aggregate			OPSK...	
14644	46861	MAC Management	Indication	38		RR Aggregate			OPSK...	
14659	46886	Ranging Parameters Message	Indication	55			-106.467767	174042 (-22.112096dB)	OPSK...	RNG_Type(2), Frame...
14660	46886	Ranging Parameters Message	Indication	55			-106.467767	174042 (-22.112096dB)	OPSK...	RNG_Type(2), Frame...
14662	46886	MAC Management	Indication	1	104	SS Basic Capability Request			OPSK...	
14663	46889	MAC Management	Indication	1	104	SS Basic Capability Request			OPSK...	
14666	46971	MAC Management	Request	1	66	SS Basic Capability Response			OPSK...	
14666	46971	MAC Management	Request	1	66	SS Basic Capability Response			OPSK...	
14684	46911	MAC Management	Indication	1	38	RR Aggregate			OPSK...	
14684	46911	MAC Management	Indication	1	38	RR Aggregate			OPSK...	
14698	46936	Ranging Parameters Message	Indication	55			-38.027462	168979 (-22.241309dB)	OPSK...	RNG_Type(2), Frame...
14700	46936	Ranging Parameters Message	Indication	55			-38.027462	168979 (-22.241309dB)	OPSK...	RNG_Type(2), Frame...
14716	47061	MAC Management	Indication	1001	38	RR Aggregate			OPSK...	
14716	47061	MAC Management	Indication	1001	38	RR Aggregate			OPSK...	
14762	47036	Ranging Parameters Message	Indication	55			-21.072452	169244 (-22.234504dB)	OPSK...	RNG_Type(2), Frame...
14764	47036	Ranging Parameters Message	Indication	55			-21.072452	169244 (-22.234504dB)	OPSK...	RNG_Type(2), Frame...
14780	47061	MAC Management	Indication	1001	38	RR Aggregate			OPSK...	
14780	47061	MAC Management	Indication	1001	38	RR Aggregate			OPSK...	
14796	47086	MAC Management	Indication	1001	102	Registration Request			OPSK...	
14797	47086	MAC Management	Indication	1001	102	Registration Request			OPSK...	
14799	47090	MAC Management	Request	1001	87	Registration Response			OPSK...	
14802	47092	MAC Management	Request	1001	446	Registration Response			OPSK...	
14802	47092	MAC Management	Request	1001	446	Registration Response			OPSK...	
17185	51050	MAC Management	Request	1001	94	Dynamic Service Addition Request			OPSK...	
17222	51281	Ranging Parameters Message	Indication	55			55.276303	169029 (-22.240025dB)	OPSK...	RNG_Type(2), Frame...
17227	51161	Ranging Parameters Message	Indication	55			-55.276303	169029 (-22.240025dB)	OPSK...	RNG_Type(2), Frame...
17243	51186	MAC Management	Indication	1001	38	RR Aggregate			OPSK...	
17243	51186	MAC Management	Indication	1001	38	RR Aggregate			OPSK...	
17273	51236	MAC Management	Indication	1001	46	Dynamic Service Addition Response			OPSK...	
17274	51239	MAC Management	Indication	1001	46	Dynamic Service Addition Response			OPSK...	
17277	51242	MAC Management	Request	1001	46	Dynamic Service Addition Ad			OPSK...	
17309	51286	MAC Management	Indication	38					OPSK...	

Operator interface of the R&S®CMW-KS700 option for WiMAX signaling tests

**WIMAX Signaling**

Path: Bandwidth

**General Settings**

- Frequency: 2.500000000 GHz
- Bandwidth: 10 MHz
- RF Input (Rx)
  - RF Routing: Path: RF-Rx 1 Connector: RF1 COM
  - Expected Peak Envelope Power: 0.00 dBm
- RF Output (Tx)
  - RF Routing: Path: RF-Tx 1 Connector: RF1 COM
  - Tx Power Data Carrier: -60.000

**Results**

- DUT Info
  - MAC Address Result: ----
  - MAC Version Result: 1
  - UL Transport CID: ----
  - DL Transport CID: ----
  - ARO Support: True
  - Time Adjustment Result: 0.000 Ps
  - Carrier Freq Error Result: 0.000 Hz
- PER
- MS Channel Report

Buttons: Message Logger, WIMAX Signaling (ON), Config...

# Reduced test costs: RF alignment up to ten times faster

The R&S®CMW270 measures all TX and RX parameters essential for producing WiMAX base stations and mobile stations cost-effectively while maintaining high quality. RF alignment is performed in the non-signaling mode, and the DUT is controlled directly via a test mode interface, e.g. for setting the RF paths and downloading calibration tables.

## Transmitter measurements with R&S®Multi-Evaluation

To reduce test time, the R&S®CMW-KM700 software option enables the simultaneous analysis of a wide range of TX measurements by using the R&S®Multi-Evaluation concept.

Different evaluations (power, modulation quality, spectrum, etc.) are based on an identical set of sampled data. This approach not only increases test speed as compared with data capturing and evaluation techniques that are exclusively sequential, but also ensures greater test depth. Since all measured parameters are correlated, the result is a more detailed overview of the transmitter functions.

## Receiver measurements

For receive path alignment in the non-signaling mode, the R&S®CMW-B110A arbitrary waveform (ARB) generator option outputs predefined OFDMA test signals. The packet error rate (PER) or bit error rate (BER) is evaluated in the mobile station itself, and the result is transferred via the test mode interface (single-ended test).

The R&S®CMW-KW700 option enables you to play WiMAX waveform files generated by means of the R&S®WinIQSIM2 signal generation software. These files can be transferred to the R&S®CMW270 via LAN or a USB memory stick.

WiMAX waveform files generated by the user, e.g. with the MATLAB® calculation program, can also be loaded to the ARB generator of the R&S®CMW270. This enables comparable testing in simulation, development, and production.

## R&S®Smart Alignment concept drastically reduces test time

The list mode with general-purpose RF generator and RF power meter reduces test time to a minimum when multiple power level steps and frequency segments of the DUT have to be aligned.

Preconfigured identical frequency/level hopping sequences in the DUT and the R&S®CMW270 minimize the volume of communications inside the test system, which is the bottleneck of conventional approaches. To reduce test time further, two independently controllable RX and TX synthesizers in the R&S®CMW270 enable the simultaneous alignment of the transmit and receive paths.

### Transmitter measurements

Burst power in time domain
Crest factor
Modulation characteristics
– EVM measurement
– I/Q constellation
Center frequency error
Spectrum flatness
Adjacent channel power (ACP) <sup>1)</sup>
Spectrum emission mask (SEM) <sup>1)</sup>

### Receiver measurements

Receiver sensitivity (PER, BER)
Receiver maximum input signal
Receiver maximum tolerable signal

<sup>1)</sup> Subject to release.



WIMAX - Multi Evaluation

**General Settings**

Frequency: 2345000000.0 Hz FFT-Size: 1024 Modulation: QPSK

Bandwidth: 10 Link Mode: Uplink Zone Length: 18

**Result Summary**

	Current	Min	Max	Average
EVM All Carriers	-45.138	-45.138	-43.871	-44.451 dB
EVM Data Carriers	-43.961	-43.961	-42.832	-43.428 dB
EVM Pilot Carriers	-49.369	-49.369	-47.115	-47.623 dB
IQ Offset	-33.638	-33.699	-32.344	-33.638 dB
Gain Imbalance	-0.010	-0.010	-0.007	-0.009 dB
Quadrature Error	-0.020	-0.035	-0.012	-0.024 °
Center Frequency Error	0.657	-2.087	0.657	-0.542 Hz
Subframe Power	-11.540	-11.548	-11.538	-11.542 dBm
Crest Factor	9.931	9.434	9.932	9.675 dB
CINR	---	---	---	---
S. Flatness O. L.	-0.357	-0.365	-0.353	-0.358 dB
S. Flatness O. U.	0.206	0.277	0.296	0.288 dB
S. Flatness I. L.	-0.218	-0.238	-0.211	-0.221 dB
S. Flatness I. U.	0.201	0.195	0.211	0.205 dB
S. Flatness Neighbor	0.039	0.033	0.055	0.041 dB

Buttons: Multi Evaluation (RDY), RF Settings, Trigger, Statistic Count..., Repetition, Config. Menu...

All TX measurement results are displayed in a table for evaluation at a glance (displayed on an external monitor)

General Purpose RF Generator - Generator

Path: Baseband Mode

Routing: Path: RF-Tx 1 Connector: RF2 COM

Ext. Att. (Output): 0.00 dB

Frequency: 2500.000000 MHz

Level (RMS): -50.00 dBm Peak Envelope Power: -45.07 dBm

List Mode: Off

Baseband Mode: ARB

Baseband Configuration

- Dual Tone
- ARB
  - ARB File: D:\waveform\WiMAX\_D10\_4Q12\_p.wv
- List Configuration
  - List Mode: Off
  - List Section: Start Index: 0 Stop Index: 19 Result Count: 20
  - Current Index: 0
  - Mode: Auto
- List
 

Frequency	Level (RMS)	Digital Gain	Dwell Time
List [ 0 ]: 2500.000000 MHz	[-50.00 dBm]	[0.00 dB]	[5.00000 ms]
List [ 1 ]: 2525.000000 MHz	[-50.00 dBm]	[0.00 dB]	[5.00000 ms]
List [ 2 ]: 2550.000000 MHz	[-50.00 dBm]	[0.00 dB]	[5.00000 ms]
List [ 3 ]: 2575.000000 MHz	[-50.00 dBm]	[0.00 dB]	[5.00000 ms]
List [ 4 ]: 2600.000000 MHz	[-50.00 dBm]	[0.00 dB]	[5.00000 ms]

Buttons: GPRF Gen, Select ARB File..., List Config., GPRF Generator (ON), Frequency..., Level (RMS)..., Baseband Mode...

General purpose RF generator configuration menu

# High yield in production and simplified test setup

## Minimum uncertainty and maximum repeatability

The low level uncertainty of the R&S®CMW270 provides reliable data for maximizing yield in the mass production of mobile stations. The high dynamic range of the RF input and RF output levels means that all WiMAX measurements can be performed without any external passive and active RF components. The RF generator typically provides less than 0.3 dB level uncertainty and a repeatability of less than 0.05 dB for WiMAX band 1.

Internal temperature sensors automatically adapt the measurement accuracy to the ambient conditions.

No calibration is necessary when temperatures vary or when the instrument is switched on.

Wear-free electronic switches and step attenuators in the RF section ensure longer component life.

## Wide dynamic range of RF input and RF output

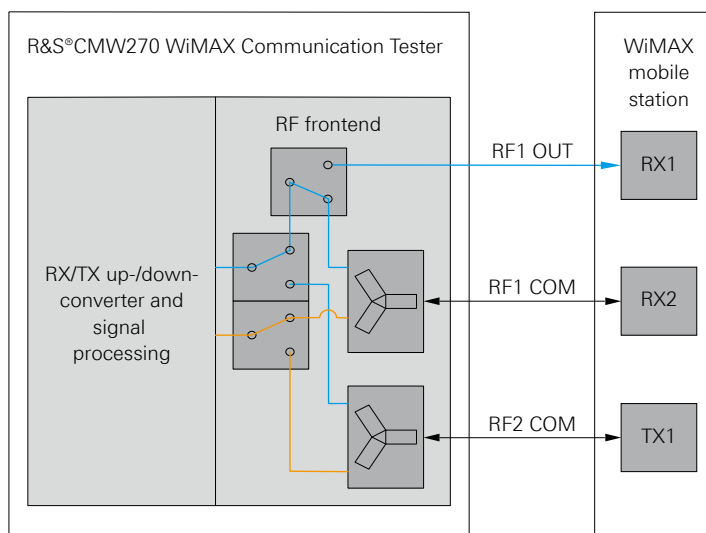
Maximum input power of  $-84$  dBm to  $+34$  dBm ( $+42$  dBm peak load): no need for external attenuator pads.

Wide power level range of RF output from max.  $-130$  dBm to  $+8$  dBm: no need for external RF amplifiers.

## RF frontend with integrated switching

The RF frontend of the R&S®CMW270 has three RF connectors. Two of them are bidirectional, and the third is a high-power RF output. You can directly connect a WiMAX mobile station with two receive antennas (RX diversity) and one transmit antenna. No external RF combiners or relays are required, thus reducing the costs of the test setup and increasing reliability and accuracy.

## Connection of WiMAX mobile station



A WiMAX mobile station with two receive paths and one transmit path can be directly connected to the RF inputs and outputs of the R&S®CMW270 without any external switches



# Ready for future WiMAX requirements

The RF frontend of the R&S®CMW270 with three RF connectors and an optional second measurement channel



Its continuous RF frequency range from 70 MHz to 6 GHz and its wide IF bandwidth enable the R&S®CMW270 WiMAX communication tester to keep pace with the evolution of the WiMAX standard.

## Supports a second measurement channel for MIMO

The R&S®CMW270 is already designed to accommodate a second measurement channel for testing MIMO applications.

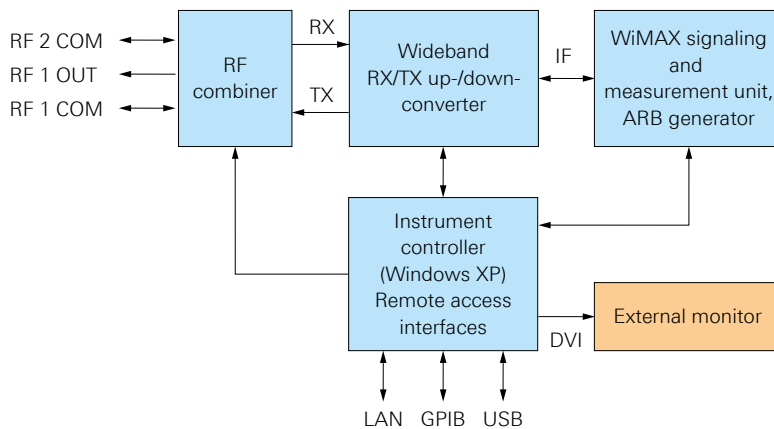
## Continuous RF frequency range

The R&S®CMW270 base unit is specified from 70 MHz to 6 GHz, which easily supports all current and anticipated RF profiles of the WiMAX Forum.

## 40/70 MHz IF bandwidth

The IEEE 802.16e WiMAX standard defines a variable signal bandwidth. Initial WiMAX products are specified only up to 10 MHz. With an IF bandwidth of 40 MHz for the analyzer and 70 MHz for the generator, the R&S®CMW270 provides a margin that is more than sufficient, e.g. for adjacent channel measurements.

## Modular device architecture



The R&S®CMW270 is based on a modular device architecture with distributed signal processing

# Versatile features of the R&S®CMW270 base unit

An external monitor (DVI), keyboard, and mouse enable you to manually carry out all device settings and measurements



## RF generator and RF power meter for general-purpose CW test applications

For highly varied measurement tasks, the R&S®CMW270 is equipped with a built-in general-purpose RF generator and frequency-selective RF power meter.

Cable losses originating from the external test setup can be measured without any additional measuring equipment, and data can be stored in correction tables.

The R&S®CMW270 is of modular design and can easily be expanded with additional hardware and software options. The state-of-the-art instrument architecture with its Windows®XP-based controller makes the instrument easy to use.

The R&S®CMW270 does not include an integrated display since the instrument is primarily used on production lines, where remote control is standard. For standalone operation, the instrument includes interfaces for a monitor, keyboard, and mouse.

## Remote control

The base unit of the R&S®CMW270 is equipped with a Gigabit LAN interface and a USB 2.0 interface for remote control via an external PC. The R&S®CMW-B612A option enables you to operate the instrument via the IEC/IEEE bus interface.

By using the Windows®XP Remote Desktop application, you can operate the R&S®CMW270 via remote control in a LAN network. You can directly configure, start, and monitor measurements. Plus, you can display result and log files and also transfer them to a server.

## Manual operation

By connecting an external monitor (DVI), keyboard, and mouse, you can also carry out all device settings and measurements manually via the easy-to-operate graphical user interface. Manual operation reduces the analysis time required in the case of product launches or troubleshooting.

## Minimum operating costs due to state-of-the-art selftest concept

- Extensive selftests at the system and module level ensure that the communications between internal modules of the instrument are not interrupted and that a specific hardware module works properly.
- Selftests are primarily intended for service purposes and are not needed during normal operation.
- Examples: voltage diagnostic test, memory test, address line test, download test, EEPROM test.

You can determine the status of the R&S®CMW270 without having to disassemble the test system. The capability to directly determine error locations in the event of increased DUT failure rates reduces the downtime of the production system.

## Precise reference measurements by connecting R&S®NRP-Zxx power sensors

Since the instrument enables you to perform highly accurate measurements of RF power at any point in the test setup, you can optimize test procedures in production. The R&S®NRP-Zxx power sensors are connected directly to the R&S®CMW270 SENSOR input, and the power measurements are automatically recorded.

# From pre-sale to service. At your doorstep.

The Rohde & Schwarz network in over 70 countries ensures optimum on-site support by highly qualified experts. The user risks are reduced to a minimum at all stages of the project:

- Solution finding/purchase
- Technical start-up/application development/integration
- Training
- Operation/calibration/repair



# Application

## Production test on WiMAX mobile stations

A required step in the production of WiMAX mobile and base stations is the alignment of the RF transceiver. This includes measuring and interpolating variations in the frequency and level characteristics – in both the transmit and receive paths – and storing the data in correction tables. In later operation, compliance with RF level accuracy as specified in the IEEE 802.16e standard is thus ensured.

### Board level test: RF alignment in non-signaling mode

After the WiMAX module has been assembled, the RF transceiver is aligned at the printed board level. Owing to the wide dynamic range and the high total bandwidth of the WiMAX useful bands, the RF alignment requires numerous single measurements with various frequency/level settings. Each DUT therefore requires a specific alignment algorithm. The R&S®Smart Alignment concept – based on the list mode of the RF generator and of the RF power meter – enables you to reduce the alignment time to a minimum.

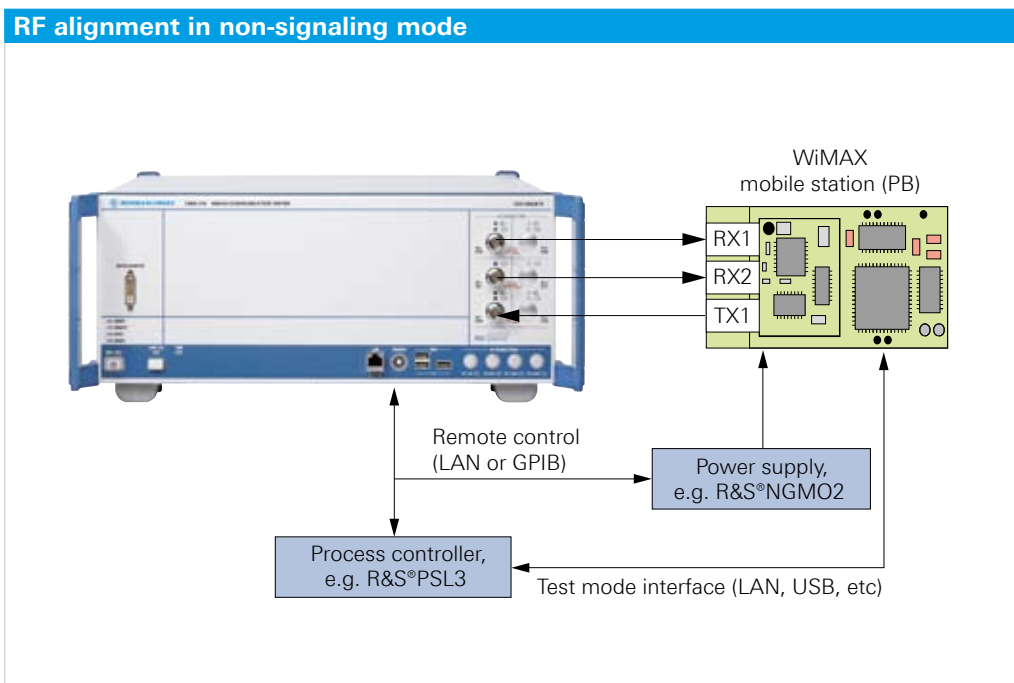
### Final test: verification of RF parameters and protocol functions in signaling mode

During the final test, both the physical layer (PHY) and the protocol layer (MAC) of the mobile station are verified as in normal operation in a WiMAX network. This test is performed by using the realtime signaling function of the R&S®CMW270, which emulates a WiMAX base station.

Typical measurements include the following:

- Network entry
- Receiver sensitivity (PER)
- MS channel report
- TX burst power and error vector magnitude (EVM)

Part to be aligned	Test method
Receiver	R&S®CMW270: RF generator in ARB mode outputs OFDMA signal DUT: internal RSSI level measurement (operated in test mode)
Transmitter	R&S®CMW270: TX power measurement DUT: generates downlink or uplink OFDMA frames at different power levels (operated in test mode)



# Specifications in brief

Frequency		
Frequency range	R&S®CMW270	70 MHz to 6 GHz
Max. frequency drift	R&S®CMW270 base unit	$\pm 1 \times 10^{-6}$
	with R&S®CMW-B690A option (OCXO extension)	$\pm 5 \times 10^{-8}$
	with R&S®CMW-B690B option (highly stable OCXO extension)	$\pm 5 \times 10^{-9}$

RF generator		
RF output level range	continuous wave (CW) RF1 OUT, WiMAX band 1	-130 dBm to +8 dBm
Output level uncertainty	in temperature range +20°C to +35°C no overranging output level >-120 dBm	<0.6 dB (calibration interval 1 year) <0.8 dB (calibration interval 2 years)
IF bandwidth		70 MHz

RF analyzer		
RF input level range, RF1 COM, RF2 COM	continuous power (CW)	-84 dBm to +34 dBm
Level uncertainty, RF1 COM, RF2 COM	in temperature range +20°C to +35°C	<0.5 dB (calibration interval 1 year) <0.7 dB (calibration interval 2 years)
IF bandwidth		40 MHz

Arbitrary waveform generator (with R&S®CMW-B110A option)		
Arbitrary waveform files	maximum sample length	256 Msamples
Sample rate	maximum	100 MHz
Memory size		1 Gbyte

WiMAX parameters		
Digital standard		IEEE 802.16e
Physical layer mode		OFDMA, TDD
Bandwidth		3.5 MHz, 5 MHz, 7 MHz, 8.75 MHz, 10 MHz,
Frame duration		5 ms
FFT size		512, 1024
Modulation and coding rates		BPSK, QPSK 1/2, QPSK 3/4, 16QAM 1/2, 16QAM 3/4, 64QAM 1/2, 64QAM 2/3, 64QAM 3/4
MAC support		IEEE 802.16e, mobile station

General data		
Dimensions	W x H x D	465.1 mm x 197.3 mm x 517.0 mm 18.31 in x 7.77 in x 20.35 in (19" 1/1, 4 HU, 450)
Weight	with typical options	approx. 18 kg approx. 39.68 lb
Interfaces		LAN 1 x 100 Mbit/s 1 x 1000 Mbit/s
	with R&S®CMW-B612A option	IEEE 488.2 4 x USB 2.0 1 x USB 1.1
	for external monitor	DVI-D

For data sheet, see PD 5213.8880.22 and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: CMW270)

# Ordering information

Designation	Type	Order No.
WiMAX Communication Tester Frequency range: 70 MHz to 6.0 GHz	R&S®CMW270	1201.0002K75
Configuration		
Hardware options		
Arbitrary Waveform Generator	R&S®CMW-B110A	1202.5508.02
Signaling Unit Universal	R&S®CMW-B200A	1202.6104.02
WiMAX Extension Module for R&S®CMW-B200A Option	R&S®CMW-B270A	1202.6504.02
OCXO Module	R&S®CMW-B690A	1202.5908.02
OCXO Module (highly stable)	R&S®CMW-B690B	1202.6004.02
IEEE Bus Interface Module (single connector)	R&S®CMW-B612A	1202.5608.02
Software options		
TX Measurement, Mobile WiMAX (IEEE802.16e)	R&S®CMW-KM700	1202.6604.02
Signaling (base station emulation) Mobile WiMAX (IEEE802.16e)	R&S®CMW-KS700	1202.6704.02
Enable R&S®WinIQSIM2 Waveforms, WiMAX (IEEE802.16)	R&S®CMW-KW700	1203.1358.02
R&S®Win/QSIM2 Signal Generation Software	R&S®WinIQSIM2™	1405.7032.08
Recommended extras for manual operation		
LCD TFT Monitor, 17", 1280 × 1024, DVI-D and analog interface	R&S®PMC3	1082.6004.12
Keyboard with USB Interface (US character set)	R&S®PSL-Z2	1157.6870.04
Mouse with USB Interface (optical, with wheel)	R&S®PSL-Z10	1157.7060.04
Recommended extras		
19" Adapter, 4 HU, 1/1 for BW2000 cabinets	R&S®ZZA-411	1096.3283.00
Average Power Sensor for universal use 10 MHz to 18 GHz, 200 pW to 200 mW	R&S®NRP-Z21	1137.6000.02
Power Sensor Module DC to 18 GHz	R&S®NRP-Z27	1169.4102.02
Level Control Sensor 10 MHz to 18 GHz for signal generators	R&S®NRP-Z28	1170.8008.02

Your local Rohde & Schwarz expert will help you determine the optimum solution for your requirements and will be glad to provide you with a customized quotation.

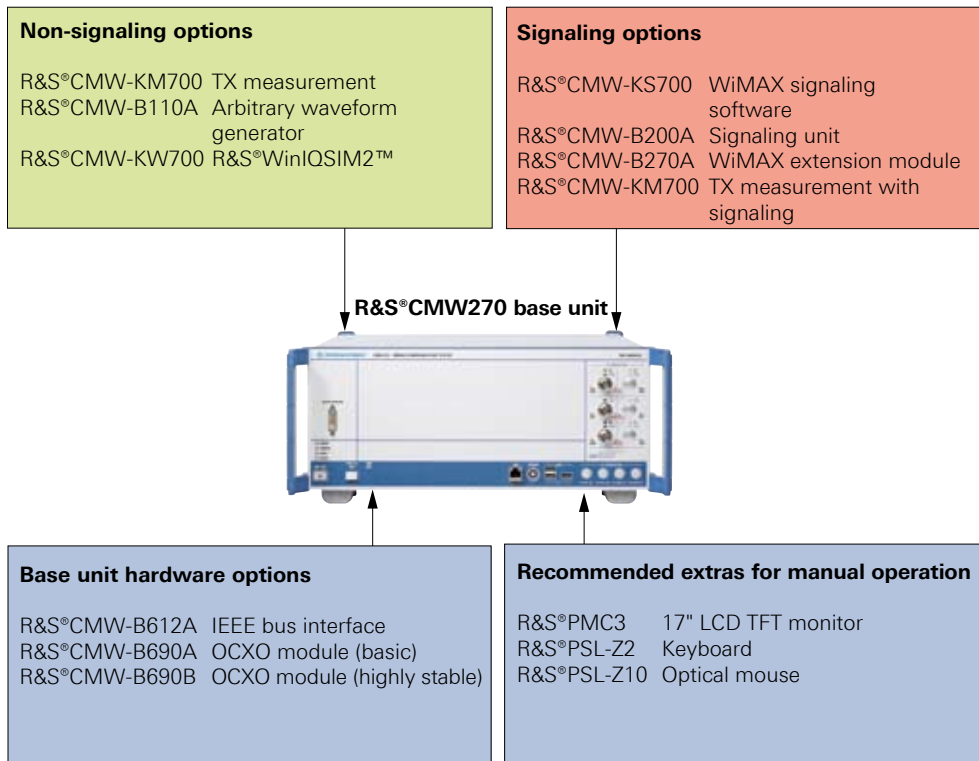
To find your nearest Rohde & Schwarz representative, visit [www.sales.rohde-schwarz.com](http://www.sales.rohde-schwarz.com)



# Glossary

Term	Explanation
ACP	Adjacent channel power
ARB	Arbitrary waveform generator functionality
BER	Bit error rate
CID	Connection identifier
CINR	Carrier to interference noise ratio
DCD	Downlink channel descriptor
DL map	Downlink map
DUT	Device under test
DVI	Digital video interface
EVM	Error vector magnitude
MAC	Medium access control
MIMO	Multiple input multiple output
OCXO	Oven-controlled crystal oscillator
OFDMA	Orthogonal frequency division multiple access

## Overview of R&S®CMW270 options and configurations



## 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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DQS REG. NO 1954 UM

For data sheet, see  
PD 5213.8880.22  
and [www.rohde-schwarz.com](http://www.rohde-schwarz.com)  
(search term: CMW270)

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