

R&S®CMQ SHIELDING CUBE

Making OTA testing reliable and efficient

R&S®CMQ200
R&S®CMQ500



Product Brochure
Version 01.00

ROHDE & SCHWARZ

Make ideas real



AT A GLANCE

The R&S®CMQ shielding cube is a compact shielding solution for RF parametric testing. The turnkey chambers for direct far field over-the-air (OTA) measurements are ideal for testing antennas, modules and devices throughout the entire lifecycle under comparable measurement conditions: from product design to the production line.

The wide frequency range of the R&S®CMQ offers great functionality and test coverage. The flexibility and broad range of extensions make the R&S®CMQ a solid and future-proof environment for all testing needs, from legacy technologies to 5G NR FR2 mmWave.

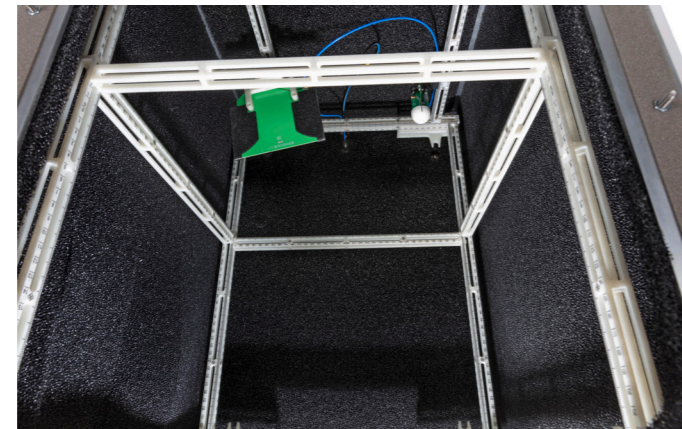
A drawer concept and modular design are suitable for both R&D and fully automated, reliable handling in mass production environments. The robust mechanical construction and rugged design ensures millions of test cycles with no noticeable impact on shielding performance.

Rohde&Schwarz has three R&S®CMQ models with different frequency ranges. Depending on the required frequency range, the R&S®CMQ can be equipped with specific absorbers to ensure anechoic conditions within the chamber.

- ▶ R&S®CMQ500 – the over-all solution, frequency range from 700 MHz to 77 GHz
- ▶ R&S®CMQ200 – the mmWave specialist, frequency range from 20 GHz to 77 GHz
- ▶ R&S®CMQ200 – the classic frequency solution, frequency range from 300 MHz to 14 GHz



The R&S®CMQ500 with open door. R&S®CMQ models are available with a manual or automatic opening/closing mechanism.



View from above into the R&S®CMQ with removed top cover

The top cover of the R&S®CMQ can be removed to ease installation, adapt or adjust the DUT or the measurement and link antennas.

Key facts

- ▶ Compact shielding solution for RF parametric testing
- ▶ Turnkey chambers for direct far field OTA measurements
- ▶ Reduced floor space: fits into 19" racks
- ▶ Robust mechanical design ensures millions of test cycles
- ▶ Manual or automatic opening/closing mechanism

BENEFITS AND KEY FEATURES

R&S®CMQ is an essential tool for R&D as well as design verification for module and device characterization from the sub 6 GHz frequency band up to mmWave frequency band.

OTA measurements

The lack of conventional external RF connectors on mmWave devices makes 5G device characterization challenging. FR2 devices use active array antennas and beamforming techniques to overcome path loss at high frequencies. The active components inside the antenna array (amplifiers and phase shifters) require high precision for proper beamforming and usually cannot have wired RF connections. The lack of RF connectors mean the device under test (DUT) needs to be validated in an OTA environment. The R&S®CMQ shielding cube enables such RF parametric testing.

More compact

The R&S®CMQ is compact enough to fit into 19" racks and enable over-the-air RF measurements under direct far field conditions. The resulting quiet zone is big enough to fit for medium-sized devices and enables white box measurements, where the location of antennas inside the DUT are known. If a larger quiet zone is needed, an optional height extension can increase the distance between measurement antenna and DUT for reliable RF measurements within the Fraunhofer distance.



Height extensions can double the distance between the DUT and the measurement antenna.



Rohde & Schwarz provides a wide variety of antenna types that serves different functionalities in OTA systems. Vivaldi antennas are particularly suitable for use in R&S®CMQ shielding cubes.

Link antenna for testing under signaling conditions

5G non-standalone (NSA) signaling setups require simultaneous transmission from an anchor cell with a legacy technology (LTE) and a 5G FR2 signal to a DUT. In the R&S®CMQ500, the FR2 signal radiates from the measurement antenna to the DUT while another optional antenna provides the anchor signal. This link antenna is mounted for the best possible link stability, even when a 4x4 MIMO anchor signal is required. To meet individual needs when connecting the DUT, various antennas with special mounts, device holders and feedthroughs are available for a wide range of applications.

Further expandability

Modern devices now offer many different wireless connections but often come with a USB3 wired interface. The R&S®CMQ can be equipped with a USB3 feedthrough and cable with an A/B type connector or with a more modern C type connector. If different kinds communications, power or control cables are required at the DUT, the R&S®CMQ can be equipped with a dozen additional feedthroughs to run cables in the shielded chamber without compromising the effectiveness of the shielding.



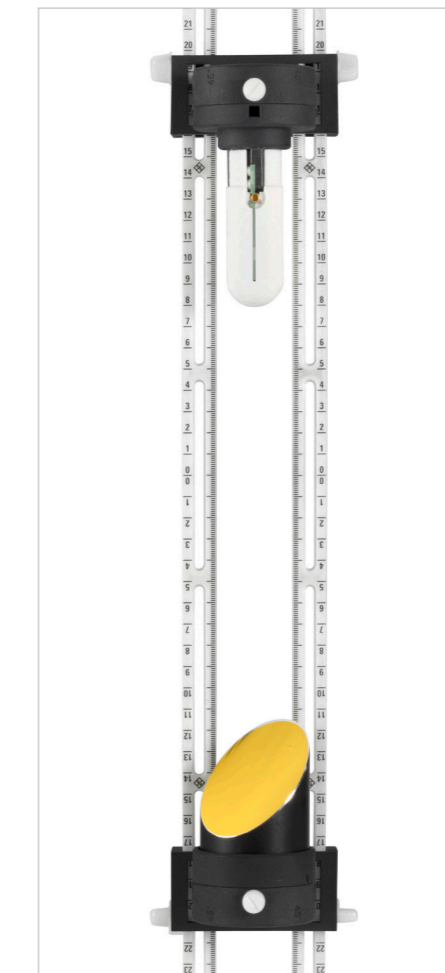
Multiple power, control, communications or coaxial RF feedthroughs are available.

One-stop solution

The R&S®CMQ offers a compact environment, which can be easily connected to any type of test equipment including network analyzers, signal generators, signal analyzers and radio communication testers. Rohde&Schwarz is a one-stop solution for optimal and stable system parameters for lab based device testing of the sub 6 GHz to the mmWave frequency range.

Smart loophole

Modern laptops or mobile phones have a number of communication antennas, which can be placed along the edges and surfaces of devices. In white box testing (where the antenna locations in the DUT are known) the measurement antenna and antenna under test have to be precisely aligned and a minimum distance maintained to create far field conditions. Depending on the size of the DUT, such alignments and distances can be challenging. The R&S®CMQ has small mirrors that reflect signals. The mirrors can easily direct the reflection of the measurement antenna radiation to different points along the edge of a device by simply rotating the reflector horizontally to ease adjustment of the measurement antenna when the DUT antennas are distributed along the edge of the DUT.



Mirror and FR2 Vivaldi antenna mounted in holders that can easily be rotated horizontally.

RF CAMBER OVERVIEW

Rohde & Schwarz has the well-established experience with innovative solutions and top-quality engineering needed to provide a wide variety of OTA chambers.



	R&S®DST200 RF diagnostic chamber	R&S®TS7124 RF shielded box	R&S®CMW-Z10 RF shield box
Application	R&D, production sample testing, diagnostics	R&D, production	R&D, service
Frequency range	0.4 GHz to 18 GHz	0.3 GHz to 18 GHz	0.4 GHz to 6 GHz
Type	near field	near field	coupling
Quiet zone	–	–	–
Positioner	3D great circle cut (optional)	–	–
Shielding effectiveness	100 dB	80 dB	> 60 dB
Dimensions (W × H × D)	0.77 m × 0.76 m × 0.7 m (30.3 in × 29.9 in × 27.5 in)	0.45 m × 0.4 m × 0.48 m (17.7 in × 15.7 in × 18.9 in)	0.32 m × 0.27 m × 0.53 m (12.6 in × 10.6 in × 20.9 in)



	R&S®CMQ200 shielding cube (opt. 1)	R&S®CMQ500 shielding cube	R&S®CMQ200 shielding cube (opt. 2)
	The classic frequency solution	The all-over-all solution	The mmWave specialist
Application	R&D, production, automotive device/components	R&D, production, 5G FR1 and 5G FR2 device/components LBS, NPT	R&D, production, automotive device/component
Frequency range	0.3 GHz to 14 GHz	0.7 GHz to 77 GHz	20 GHz to 77 GHz
Type	near field	direct far field (FR2)/near field (FR1)	white box direct far field/near field
Quiet zone	–	Ø 2 cm at 40 GHz	Ø 2 cm at 40 GHz
Positioner	–	–	–
Shielding effectiveness	> 80 dB	> 80 dB	> 60 dB
Dimensions (W × H × D)	0.45 m × 0.7 m × 0.72 m (17.7 in × 27.6 in × 28.3 in)	0.45 m × 0.7 m × 0.72 m (17.7 in × 27.6 in × 28.3 in)	0.45 m × 0.7 m × 0.72 m (17.7 in × 27.6 in × 28.3 in)

Service at Rohde & Schwarz You're in great hands

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

Rohde & Schwarz

The Rohde&Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test&measurement, technology systems and networks&cybersecurity. Founded more than 85 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

Sustainable product design

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management

ISO 9001

Certified Environmental Management

ISO 14001

Rohde & Schwarz training

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