5G NR ONE-BOX SOLUTIONS FROM ROHDE & SCHWARZ

The challenges associated with 5G NR require high flexibility, end-to-end data testing solutions and reliable measurement methods. As a long-term partner of the mobile radio communications industry, Rohde & Schwarz offers a comprehensive portfolio of innovative 5G NR test solutions.

Rohde & Schwarz radio communication tester portfolio

	LTE Advanced (plus legacy)	5G NR sub6	5G NR mmWave (plus IF)	
Non-signaling (RF analyzer and generator)	Lte Advanced Pro	5G	R&S®CMPQ	
	R&S®CMW100		R&S®CMQ200 / R&S®CMP200 / R&S®CMPHEAD30	
Signaling (network emulation)	Lte Advanced Pro R&S®CMWflexx	R&S®CMX500	R&S®CMXHEAD30	

Videos   Product site

For most mobile network operators, fifth generation (5G) of mobile communications will initially be an additional data service for transmission rates up to 20 Gbit/s. To allow developers to test their mobile devices in 5G NR non-standalone and standalone mode in line with 3GPP specifications, the test solution must work seamlessly in both LTE and 5G NR networks.

5G signaling solutions
The R&S®CMX500 radio communication tester adds 5G NR signaling to existing LTE test and measurement solutions. Users who already have an R&S®CMW500 or R&S®CMWflexx test system for LTE measurements can continue using it and simply add an R&S®CMX500 as an extension box to perform 5G NR signaling tests. This allows them to test 5G NR use cases in non-standalone (NSA) and standalone (SA) mode in FR1 and FR2 in accordance with 3GPP Option 3x and Option 2. For pure 5G NR test environments in FR2, all that is needed is an R&S®CMX500 radio communication tester (plus remote radio head and a shielded environment).

5G non-signaling solutions
For 5G NR FR2 testing (mmWave), Rohde & Schwarz offers the R&S®CMPQ. The R&S®CMPQ is a compact solution based on the R&S®CMP200 radio communication tester in combination with the R&S®CMPHEAD30 remote radio head (RRH) and the R&S®CMQ200 shielding cube. The instruments are matched to each other. Together they form an easy-to-use, cutting-edge test solution with a wide variety of combination options. The FR1 sub6 solution consists of the well-known R&S®CMW100 communications manufacturing test set and corresponding measurement software (see R&S®CMPQ product brochure)

One-platform strategy
Just like the R&S®CMW platform for LTE, Rohde & Schwarz is sticking to the proven one-platform strategy for 5G NR. Both the R&S®CMP200 and R&S®CMX500 are based on this strategy. The principle of the one-platform strategy is to use the same technology, comparable hardware and the same software in all test solutions and test stages. This makes the test results comparable. The different test configurations (signaling/non-signaling) must deliver reproducibility and validated test results. Rohde & Schwarz fulfills this requirement.

The test results must provide conclusive information about the characteristics of the DUTs without – figuratively speaking – also testing the test solution. Rohde & Schwarz systems deliver accurate and consistently reproducible test results.

With the Rohde & Schwarz one-platform strategy users ensure, that they when they finally bring their mature product to production state using R&S®CMP200 non-signaling test setup, they can expect same results as during R&D stages when R&S®CMX500 signaling tester was the test equipment.
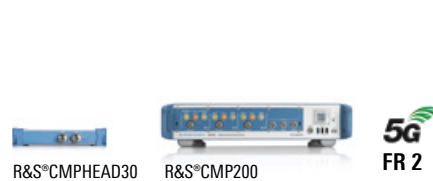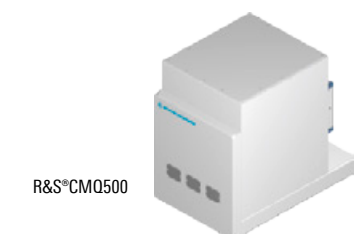
One-platform strategy

Signaling: sub6 + IF + mmWave

Non-signaling: IF + mmWave

R&S®CMXHEAD30 R&S®CMX500 5G FR 1/2
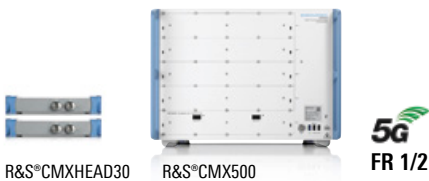
Technology reuse
► Same test concept
► Result traceability
► Synergy effects

R&S®CMPHEAD30 R&S®CMP200 5G FR 2

Identical measurements

Identical OTA environment

R&S®CMQ500

R&S®CMQ200

R&S®CMX500 RADIO COMMUNICATION TESTER

New

5G NR extension box to R&S®CMWflexx systems for NSA and SA modes

The R&S®CMX500 hardware and software is designed to address all signaling use cases that are encountered during the lifecycle of a 5G NR mobile communications device – from the early R&D design stage to final integration, verification/performance testing, final product validation in a test house, quality assurance and repair.

The modular hardware architecture allows configurations ranging from basic use cases such as RF parametric measurements to measurements under fading conditions and performance measurements with maximum data rates. The user always has access to all signaling events and logs.

The R&S®CMX500 has eliminated the traditional separation between RF tester, application tester and protocol tester. It is a signaling tester that allows seamless transition between all use cases required to bring a mobile cellular device from the basic layout/design stage to the production stage. In previous tester generations, dedicated instruments were needed to address all this.

The R&S®CMX500 hardware modules are designed for versatile tasks. Users enjoy great flexibility when it comes to addressing different measurement tasks with the same test station because there are no dedicated boards for dedicated measurement tasks. With just a basic configuration, users are all set for signaling, fading and data E2E applications.

Its 7 HU design provides plenty of space for future extension modules – a true one-box tester.

R&S®CMsquares – the powerful control center for 5G NR tests

With R&S®CMsquares, users can access each measurement task in a separate measurement square. In R&S®CMsquares, the DUT is always in focus. This DUT centric approach makes it very easy to keep track of even complex test scenarios, test environments and measurement tasks. The next change is just one mouse click away.

R&S®CMsquares includes as many squares as you need: for measurements, graphical outputs and statistical views, network layout and configuration, RF connection, message analyzer, test sequencer, scripting – you name it. The R&S®CMsquares layout can always be configured to your personal preferences.

Basic/Medium/Xpert – the new signaling concept

With its Basic, Medium and Xpert signaling concept, R&S®CMX500 breaks with the traditional separation between use cases for protocol testing, RF testing and data/performance testing. Unlike in the past where the signaling environments of e.g. RF testing and protocol testing were separated from each other and could not be accessed by the other, Basic, Medium and Xpert sit on top of each other and can be upgraded cost efficiently.

The GUI dynamically adjusts parameter access based on the signaling option – many more parameters can be accessed with Xpert signaling than with Medium or Basic.

The Basic/Medium/Xpert signaling options build on top of each other – Xpert needs Medium, Medium needs Basic.

The name of the option for an application indicates the signaling type required to operate it. For example, the "X" in the R&S®CMX-KC601X protocol conformance test package indicates that it requires the Xpert signaling functionality. Similar applications are available for "B" (Basic) and "M" (Medium) signaling.

Use cases

The R&S®CMX500 is designed to cover all test requirements that may come up during the entire product lifecycle of a mobile communications device. The many components of a mobile communications device need to be independently tested on various interfaces step by step – in development, during integration when components need to work together, and in the final device. The R&S®CMX500 gives users the flexibility and versatility they need for test solutions throughout the entire product lifecycle.