KEYSIGHT TECHNOLOGIES

5G Network Emulation Solutions Catalog

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End-to-End Test Coverage

Delivering high-quality 5G New Radio (NR) devices requires innovative network emulation solutions (NES) for the entire 5G ecosystem, including non-standalone (NSA) and standalone (SA) use cases, sub-6 GHz and millimeter-wave (mmWave) frequencies, and all test domains.

Achieving a first-to-market advantage requires advanced solutions to accelerate the 5G device workflow from development to deployment that span protocol, radio frequency (RF) / radio resource management (RRM), and functional and performance testing.

Keysight's portfolio of network emulation solutions streamlines the end-to-end 5G device workflow with platforms that share common measurement science. These solutions have a protocol stack that includes 5G NR, Long-Term Evolution (LTE), Wideband Code Division Multiple Access (WCDMA), cellular vehicle-to-everything (C-V2X), automation, and logging.

WIRELESS TEST PLATFORM FOR 5G DEVICE DEVELOPMENT AND ACCEPTANCE SOLUTIONS

The Keysight E7515B UXM 5G wireless test platform provides the foundation for Keysight's 5G network emulation solutions used during device development and acceptance testing. It is a highly integrated signaling test platform with multiformat stack support, rich processing power, and abundant RF resources. The E7515B UXM 5G wireless test platform supports the latest 3rd Generation Partnership Project (3GPP) releases.

- Initiate a 5G call with a device under test (DUT) in different 5G NR deployment modes (NSA and SA) and frequency bands (FR1 and FR2).
- Perform a signaling test for device RF characteristics, protocol compliance, and functional key performance indicators.
- Optimize your lab space and support extended test coverage in a single unit.
- Get high RF port density with scalable bandwidth — 8 Tx downlink (DL) and 4 Rx uplink (UL) RF ports at 800 MHz bandwidth, and 4 Tx (DL). Includes 2 Rx (UL) RF ports at 1600 MHz bandwidth.
- Improve your advanced performance testing with an integrated baseband I / Q (BBIQ) interface and baseband fading.

Keysight's E7770A common interface unit and the Keysight M1740A mmWave transceiver for 5G are key components in Keysight's 5G solutions, providing the capability to verify the performance of 5G chipsets, devices, and base stations.

Learn more about the E7515B UXM 5G wireless test platform, E7770A common interface unit, and M1740A mmWave transceiver for 5G.

E7515B UXM 5G wireless test platform

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WIRELESS TEST SET FOR 5G DEVICE MANUFACTURING SOLUTIONS

Keysight's E6640A EXM wireless test set provides an industry-proven platform for multidevice and multiformat, non-signaling manufacturing test in a single compact configuration.

VERIFIES RF PERFORMANCE OF MOBILE DEVICES

- Perform state-of-the-art integrated automation and efficient sequencing using 5G NR waveform and measurement software.
- Scalable architecture ensures you are up-to-date with the latest cellular and wireless local area network (WLAN) chipset standards.

REDUCES 5G DEVICE MANUFACTURING COST OF TEST

- Get 5G module performance testing over any 3GPP-defined mmWave band with a single remote radio head (RRH).
- Up to 4 devices tested simultaneously at mmWave frequencies.
- Streamline your calibration and integration activities.

E6640A EXM wireless test set

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5G Device Development

With Keysight's 5G device development solutions, you can verify the signaling protocols and RF performance of the latest 5G chipsets and devices and validate user experience features and device performance.

Solution components	Model number	S8701A	S8702A	S8703A	S8708A	S8709A	S8710A
	Product	Protocol R&D toolset	RF automation toolset	Functional KPI toolset	5G advanced performance test toolset	Virtual drive test toolset	Device benchmarking toolset
Software	Test application framework		X	X			X
	Protocol R&D toolset application	X					
	UXM 5G automation toolset		X	X			
	Test packages		X	X	X	X	X
	Device analytics						X
	Nemo Outdoor						X
	APT toolset application				X		
	VDT toolset application					X	
Hardware	FR1	UXM 5G network emulator, PROPSIM FS16 (S8708A and S8709A only), test system PC, 1 Gbps switch					
	FR2	2D or 3D MPAC (S87078A and S8709A only) chamber, common interface unit, mmWave transceivers					
Data throughput test equipment	Data server PC, 10 Gbps switch	X		X	X	X	X
SIM profile changes automation	SIM programmer switch	X					
Battery life testing	DC power analyzer			X			
		GET A QUOTE	GET A QUOTE	GET A QUOTE	GET A QUOTE	GET A QUOTE	GET A QUOTE

SIGNALING PROTOCOL AND RF PERFORMANCE TESTING

The Keysight S8701A protocol R&D toolset provides an easy-to-use environment to develop and execute tests that verify the 5G NR and LTE signaling protocols of the latest 5G chipsets and devices. The toolset addresses a wide range of test scenarios in sub-6 GHz and mmWave frequencies for both SA and NSA modes.

Worldwide chipset makers have adopted and used the S8701A protocol R&D toolset since it has the most mature 5G NR protocol stack. The S8701A protocol R&D toolset is the industry reference for 5G NR device makers.

- Supports and executes multiple phases of wireless device development — from pre-silicon protocol prototyping to system integration and verification.
- Implements tests with unique specifications as well as complex and simulated real network scenarios with additional features beyond industry requirements.

The Keysight S8702A RF automation toolset is a cost-effective benchtop solution that facilitates the inspection and verification of the RF performance of 5G NR devices during development for design optimization. The S8702A RF automation toolset supports in-band RF automated test cases and provides quick regression testing and test script customization.

- Quickly inspect RF parameters and analyze specific test conditions with the graphical user interface.
- Get real-time results and comprehensive test reports.

S8701A protocol R&D toolset

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S8702A RF automation toolset

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S8701A protocol R&D toolset

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FUNCTIONAL AND PERFORMANCE TESTING

Keysight's S8703A functional key performance indicator (KPI) toolset is a benchtop solution that enables you to detect and resolve issues with data throughput, battery life, audio / video quality, and mobility. It emulates and reproduces user issues observed in the field for in-depth troubleshooting.

S8703A functional KPI toolset

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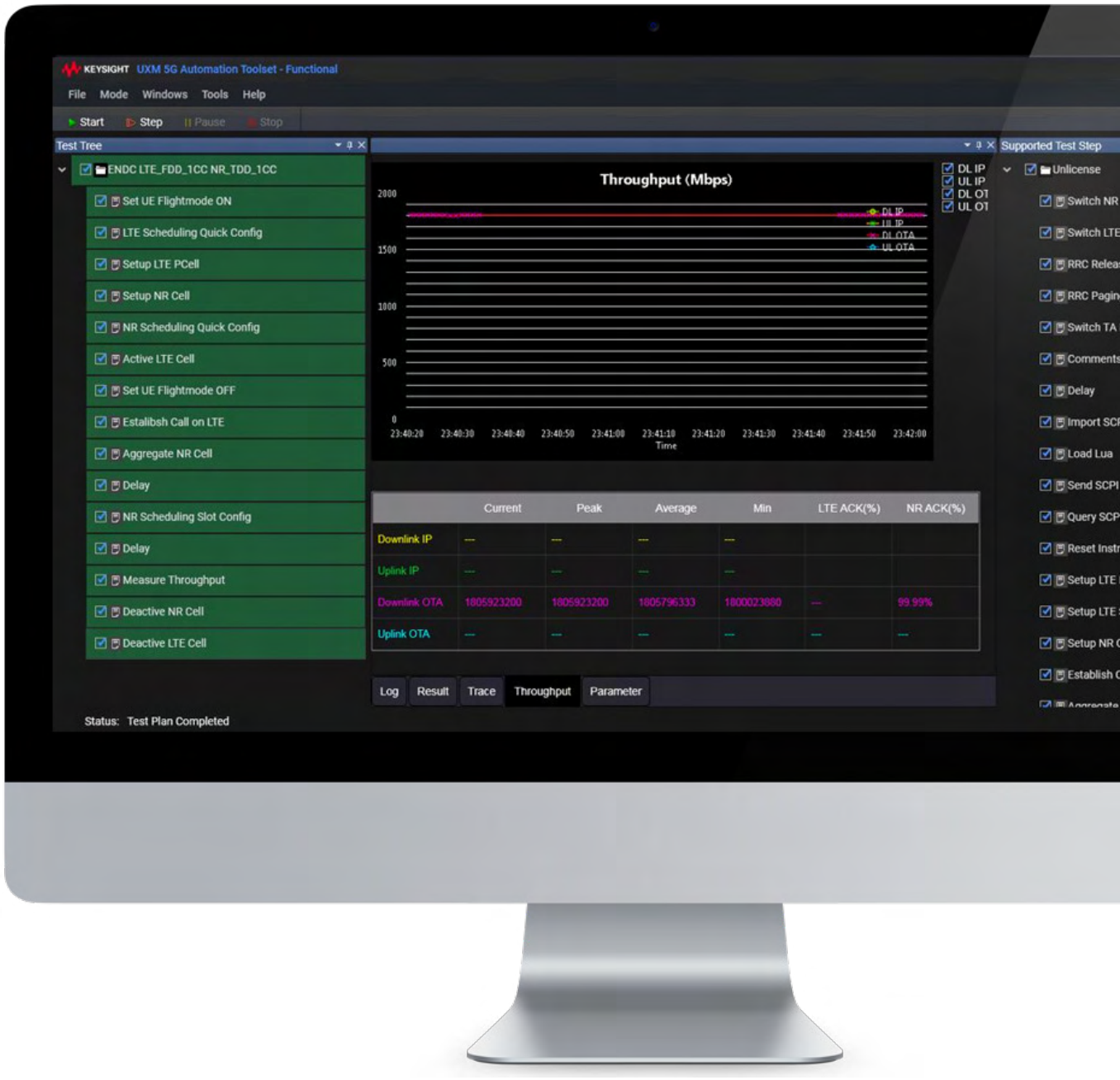

The Keysight S8708A 5G advanced performance test toolset enables reliable performance testing of mobile devices in a lab. The S8708A 5G advanced performance test toolset integrates a high-capacity PROPSIM channel emulator and the UXM 5G with FR2 over-the-air (OTA) test chambers and mmWave access components. You can use this solution to validate beam management in real-world radio channel conditions and stress test devices to optimize performance.

S8708A advanced performance test toolset

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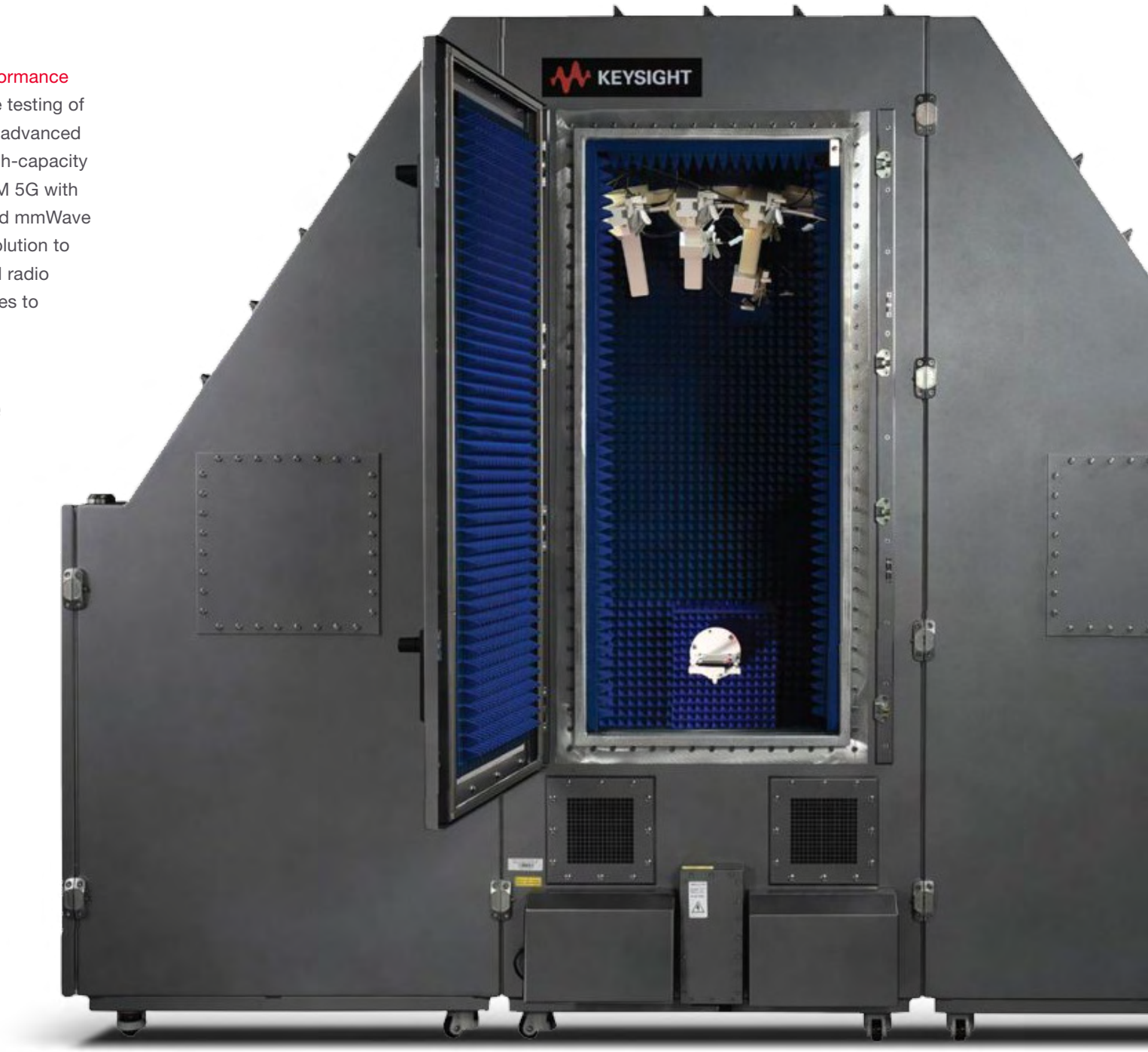

FUNCTIONAL AND PERFORMANCE TESTING

The Keysight S8709A virtual drive test toolset enables you to test 5G devices under a wide range of real-world mobility and roaming scenarios.

- Control RF conditions and network cell parameters over multiple test runs.
- Choose from ready-made test case packages.

S8709A virtual drive test toolset

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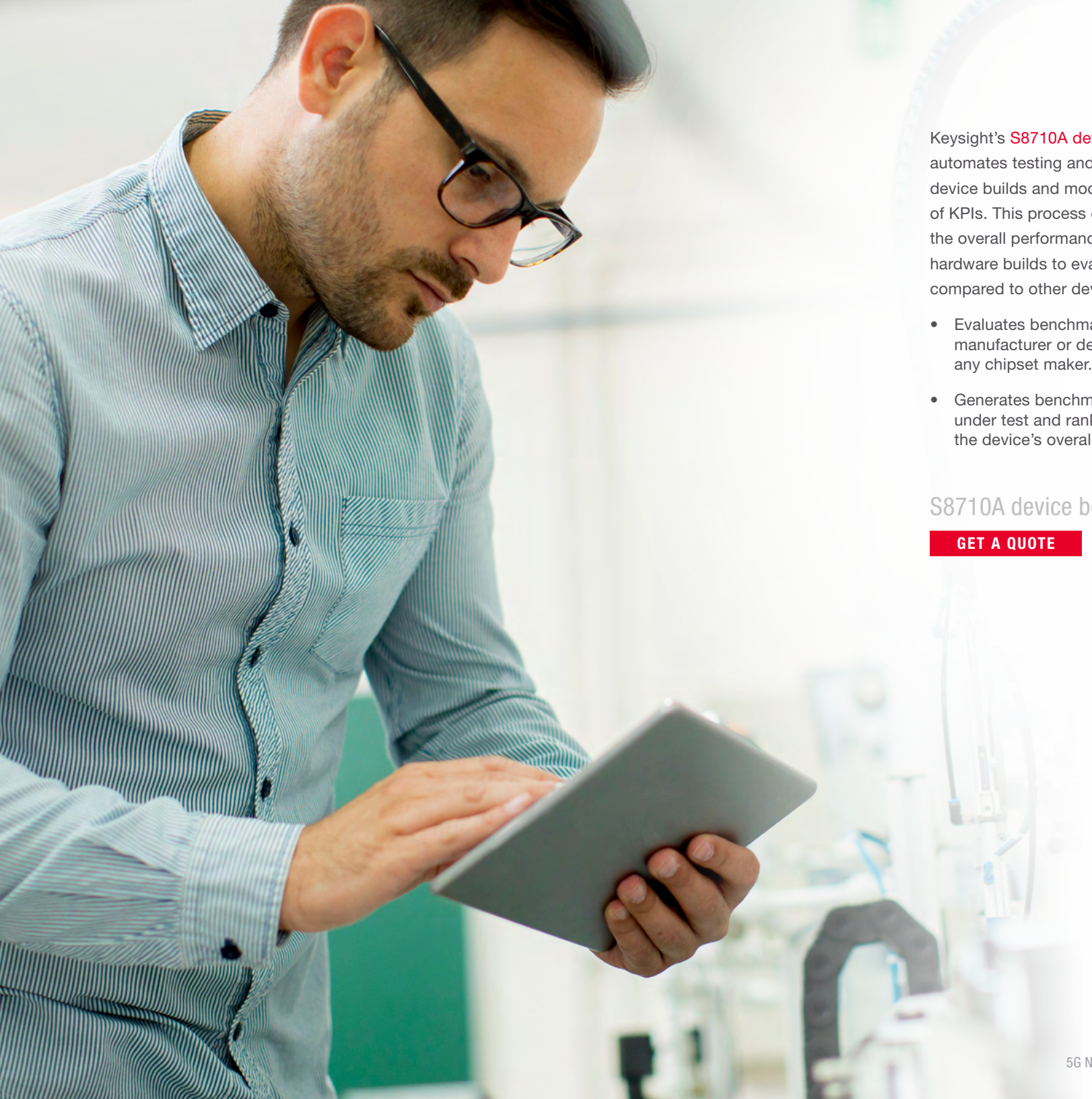

Keysight's S8710A device benchmarking toolset automates testing and reporting across different device builds and models with standardized scoring of KPIs. This process enables you to compare the overall performance of different software and hardware builds to evaluate a device's performance compared to other devices.

- Evaluates benchmark devices produced by any manufacturer or devices based on modems from any chipset maker.
- Generates benchmark reports for the device under test and ranks individual KPIs to determine the device's overall score.

S8710A device benchmarking toolset

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5G Device Acceptance

Accelerating device certification and acceptance requires early and continuous access to the latest 3GPP conformance and mobile network operator (MNO) acceptance tests.

Keysight's 5G device acceptance solutions span the entire workflow — pre-conformance, conformance, regulatory, and carrier acceptance — and cover the protocol and RF / RRM domains. Keysight solutions provide the most validated test cases by the Global Certification Forum (GCF) and PCS Type Certification Review Board (PTCRB) certification bodies, regulators, and MNOs.

Solution components	Model number	S8704A	S8706A	S8705A	S8707A
	Product	Protocol conformance toolset	Protocol carrier acceptance toolset	RF / RRM DVT & conformance toolset	RF / RRM carrier acceptance toolset
Software	PCT application	X			
	TTCN-3 compiler run-time	X			
	PCAT application		X		
	RCT application			X	
	RCAT application				X
	Test case packages	X	X	X	X
Hardware	FR1	UXM 5G network emulator, test system PC, 1 Gbps switch, DUT automation PC (optional)		UXM 5G network emulator, PC and monitor, FR1 switch / filter unit, power supply unit, rack and accessories	
	FR2	2D MPAC chamber, common interface unit, mmWave transceivers		Compact Antenna Test Range (CATR) chamber, common interface unit, mmWave transceivers, FR2 switch / filter unit	
C-V2X testing	MXG vector signal generator	X		X	X
SIM profile changes automation	SIM programmer switch	X	X		
Data throughput testing	Data server PC, 10 Gbps switch		X		
Battery life testing	DC power analyzer		X		
Out-of-band blocking	PSG analog signal generator			X	X
Spurious emissions testing	UXA signal analyzer			X	X
		GET A QUOTE	GET A QUOTE	GET A QUOTE	GET A QUOTE

SIGNALING, PERFORMANCE, AND APPLICATION TESTING

The Keysight S8704A protocol conformance toolset for 3GPP certification testing provides up-to-date and comprehensive access to 5G test cases, including USIM / USAT, LTE, and C-V2X protocol conformance to ensure mobile devices perform as expected on a live mobile network. The test cases are from the latest TTCN-3 test specification from 3GPP RAN5. These test cases are necessary for device certification and support GCF and PTCRB frequency bands in both sub-6 GHz and mmWave frequencies.

- Sophisticated tools for campaign management, debug, and analysis.
- Automatic SIM profile changes.

S8704A protocol conformance toolset

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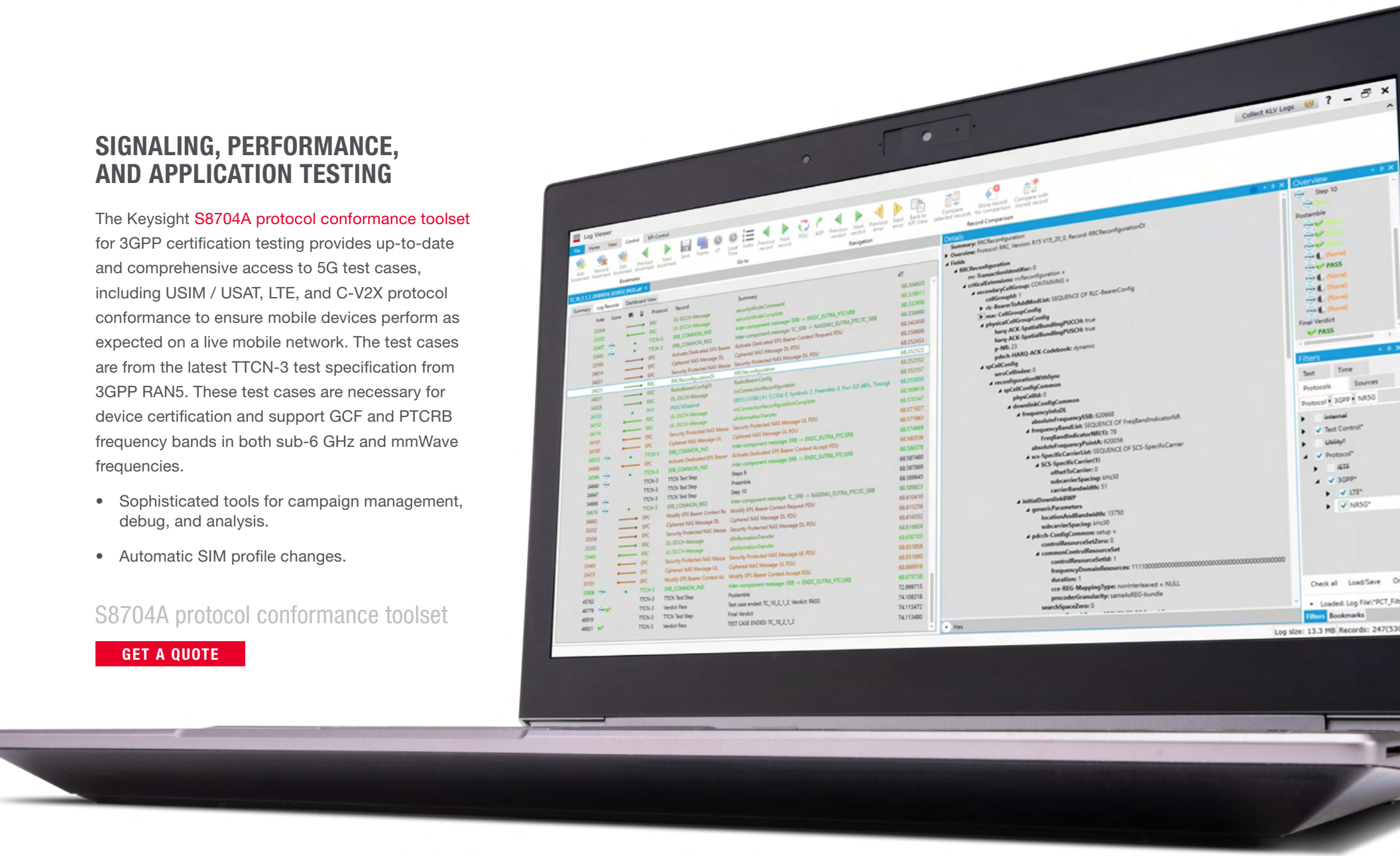

Keysight's S8706A protocol carrier acceptance toolset for MNO acceptance testing provides complete access to the protocol carrier acceptance test plans mandated by major 5G mobile network operators. The toolset addresses signaling, performance, and application testing in sub-6 GHz and mmWave frequencies for both SA and NSA modes.

S8706A protocol carrier acceptance toolset

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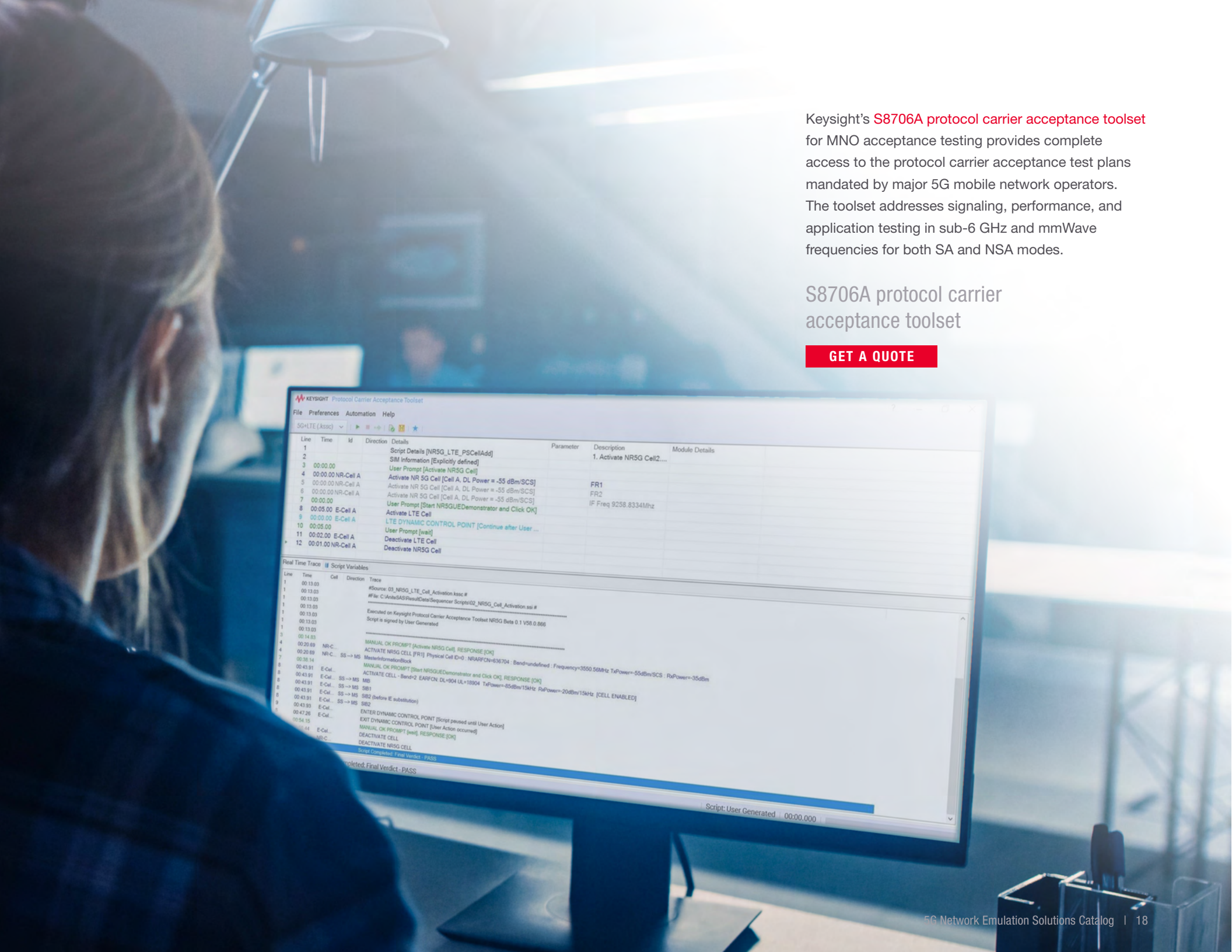

TRANSMITTER, RECEIVER, AND RADIO RESOURCE MANAGEMENT (RRM) TESTING

The Keysight S8705A RF / RRM DVT and conformance toolset for device verification and certification testing provides current and comprehensive access to 5G NR, C-V2X, RF, and RRM conformance test cases to ensure mobile devices perform as expected on a live mobile network.

The S8705A RF / RRM DVT and conformance toolset is an approved test platform for device certification at GCF and PTCRB that supports both time-division duplex (TDD) and frequency-division duplex (FDD) including the relevant bands in both sub-6 GHz and mmWave frequencies.

- Create customized test cases by adding new test points, modifying channel bandwidth, test frequencies, and other parameters.
- Go beyond the industry requirements defined by 3GPP.
- Apply advanced logging features to enable the rapid debugging of test case failures.

The S8705A RF / RRM DVT and conformance toolset easily scales with the Keysight S8707A 5G RF / RRM carrier acceptance toolset, delivering complimentary coverage for supplementary test plans defined by mobile network operators.

S8705A RF/RRM DVT and conformance toolset

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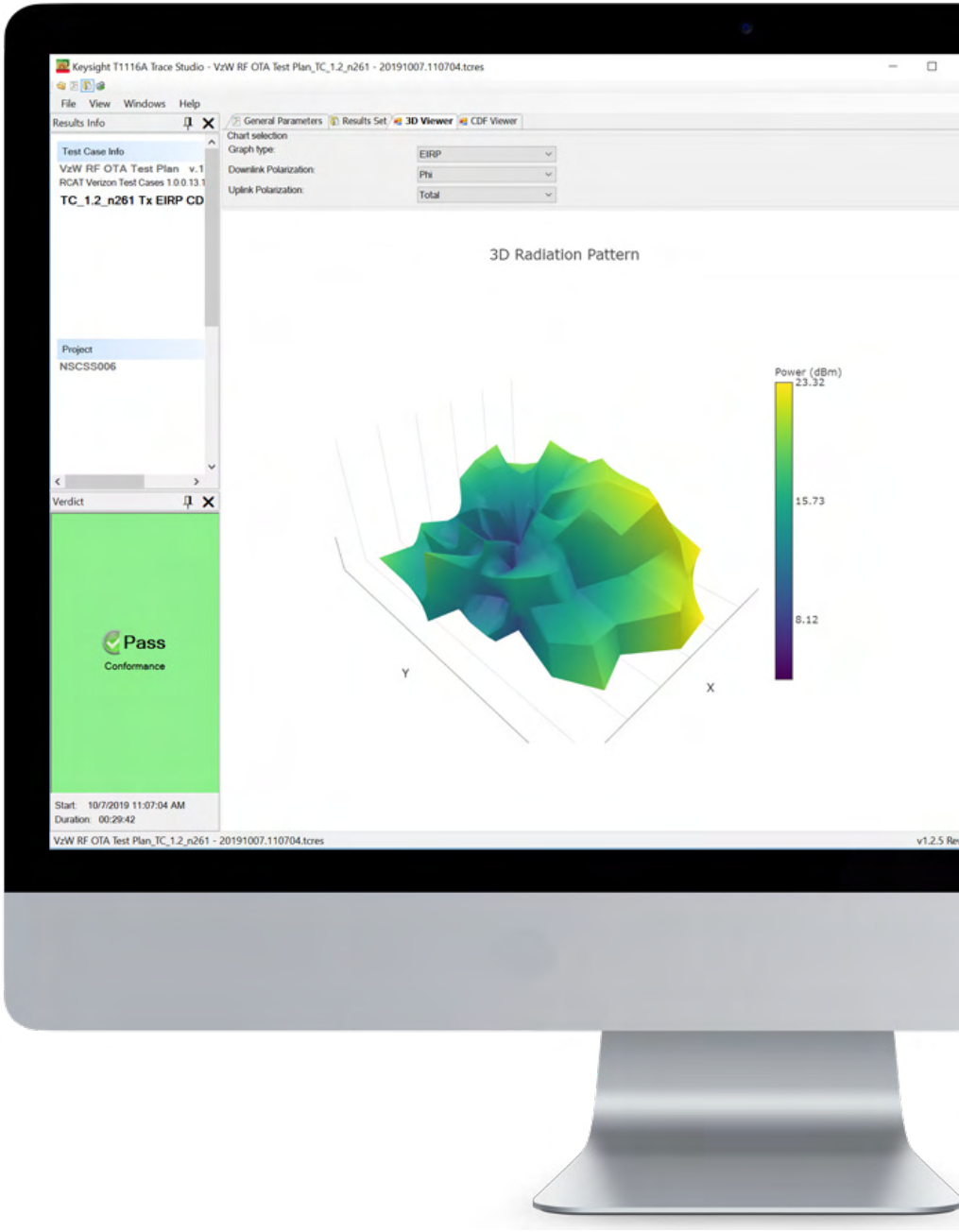

Keysight's S8707A RF / RRM carrier acceptance toolset for MNO acceptance testing provides complete access to RF / RRM carrier acceptance test plans mandated by major 5G mobile network operators. The toolset supports transmitter, receiver, and RRM test cases in sub-6 GHz and mmWave frequencies for both SA and NSA modes.

The S8707A RF / RRM carrier acceptance toolset for MNO easily scales with the S8705A RF / RRM DVT and conformance toolset solution. You can facilitate mobile device verification across the RF workflow — from early modem development to device certification and carrier acceptance on a common hardware and software platform.

S8707A carrier acceptance toolset

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5G Device Manufacturing

Testing 5G mmWave devices requires high-performance test equipment and a shift from standard conducted test methods to new OTA testing. These requirements impact test speed and cost.

Keysight's device manufacturing test solutions address test development and pilot testing, as well as high-volume production for both RF testing and non-signaling calibration and verification. You can quickly deploy new production lines and ramp-up to increase production capacity and reduce your cost of test by testing four 5G devices in FR2 simultaneously.

EXM NON-SIGNALING MANUFACTURING TEST SOLUTION FOR 5G MANUFACTURING IN FR1 AND FR2

The Keysight E6640A EXM 5G non-signaling manufacturing test solution reduces the cost of 5G UE manufacturing.

- Choose an industry-proven platform for testing multiple devices in multiple formats.
- Accelerate and optimize test by using streamlined automation and sequencing.

E6640A wireless test set

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LEARN MORE ABOUT:

- 5G Solutions
- 5G Network Emulation Solutions

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