S8710A Device Benchmarking Toolset

Features and Capabilities

Introduction

5G is moving fast. Accelerating 5G deployments globally are having a ripple effect throughout the mobile ecosystem. 5G also represents an exponential increase in technical complexity. Key challenges come from 5G new radio (NR), massive multiple input multiple output (MIMO), millimeter-wave (mmWave) frequencies, and over-the-air (OTA) test methods.

Device and chipset makers and operators must effectively overcome these challenges to reach commercialization faster than the competition. Understanding 5G device quality trends and position against competitors is vital. Many device manufacturers and operators do not have a reliable and consistent process to compare 5G devices and identify instances of software regression. This makes it difficult to evaluate how your device quality is developing against competitors and your previous builds. A standardized method to acquire and compare the benchmarking performance results may be missing, which makes it difficult to compare results reliably and to understand how quality is developing or how your product stands against competitors. Also, software regression testing is complicated without proper tools.

The S8710A Device Benchmarking Toolset is part of Keysight's 5G Network Emulation Solution portfolio that addresses the entire device development workflow – from early design, to acceptance and manufacturing. The S8710A Device Benchmarking Toolset will accelerate performance validation and allow you to reach first-to-market status with high-quality devices.

What is S8710A Device Benchmarking Toolset?

Keysight's S8710A Device Benchmarking Toolset is an end-to-end test solution that enables device makers and mobile operators to automate testing and reporting across different device builds and models. It delivers an integrated lab-based test solution that cost-effectively enables users to benchmark devices, troubleshoot, resolve issues and, ultimately, enhance product quality. Each device is tested separately, after which a benchmarking report including ranking and scoring of devices is created. The toolset offers pre-defined test cases and customizable test scripts to meet specific customer requirements.

With the S8710A Device Benchmarking Toolset, you will gain objective insight into comparable 5G product features and selected KPIs. The toolset comes with test automation capabilities that enable high-volume testing and repeatability – directly improving product quality, achieving consistency in testing, and minimizing the risk of human error.

This document describes the components and functionality of the S8710A Device Benchmarking Toolset.

Who benefits from using S8710A Device Benchmarking Toolset?
- MNOs to verify that devices comply with their device test requirements
- Device manufacturers to ensure their devices are accepted by the major mobile network operators before launch to the market
- Chipset manufacturers to ensure that their chipsets perform according to the major mobile network operators' specifications
- Test houses and test labs that run tests to independently verify that devices are compliant with the MNO performance requirements

S8710A Device Benchmarking Toolset Features

The S8710A Device Benchmarking Toolset enables standardized lab-based end-to-end automation of 5G device benchmarking with a predefined set of test cases, customizable scripts, and extensive reports. The toolset enables automated regression testing to benchmark daily software builds, hardware builds, and competitor devices, and test automation capabilities to reproduce test campaigns on a daily basis.

The solution offers:

- Fully automated end-to-end test environment for benchmarking devices produced by any manufacturer or devices built using modems from any chipset maker
- Automated benchmark report generation for the device under test
- User-definable ranking of individual KPIs to determine the device's overall score
- Comparison reports showing the rank, scores and KPIs from a range of devices
- Pre-defined test cases to obtain KPI measurements
- High-volume testing and repeatability

Software and Hardware Components

The full toolset includes Keysight's Nemo 5G Device Analytics SW for analysis and reporting, Nemo Outdoor SW for device control and diagnostics, and Keysight's UXM 5G Wireless Test Platform for 5G NR network emulation in a lab.
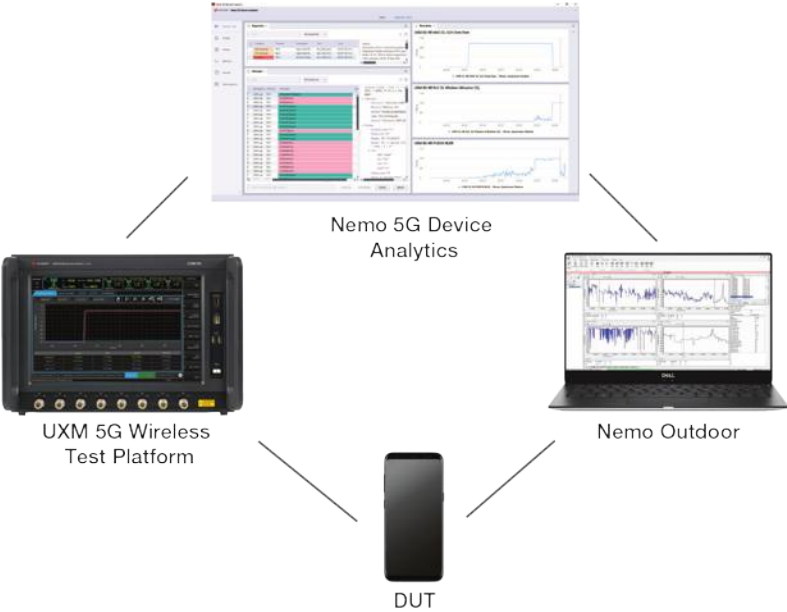

Figure 1. S8710A Device Benchmarking Toolset with UXM and Nemo Outdoor.

The S8710A Device Benchmarking Toolset is highly customizable to fit different use cases and needs. For example, device and chipset vendors can utilize the UXM 5G Wireless Test Platform for regression testing in a lab environment during device development. In this setup, as illustrated in Figure 1, DUT diagnostics are collected with Nemo Outdoor, and Nemo 5G Device Analytics is used to analyze the data and to rank and score the devices. Nemo 5G Device Analytics also offers advanced troubleshooting of issues between builds.

GUI Main Features

The versatile graphical user interface of the toolset makes device benchmarking intuitive and efficient. The flexible and user-friendly UI allows users with different levels of experience to have an easy and smooth access to the powerful benchmarking capabilities speeding up time-to-revenue of new 5G NR devices.

Test Manager

With the powerful Test Manager tool in Nemo 5G Device Analytics, you can design and execute end-to-end test campaigns that provide off-the-shelf functionality for many scenarios. With the Test Manager, you define the test cases, network settings, and the scoring methods. The test reports contain multiple functional KPIs measured over various challenging channel conditions to represent overall device performance and field readiness.
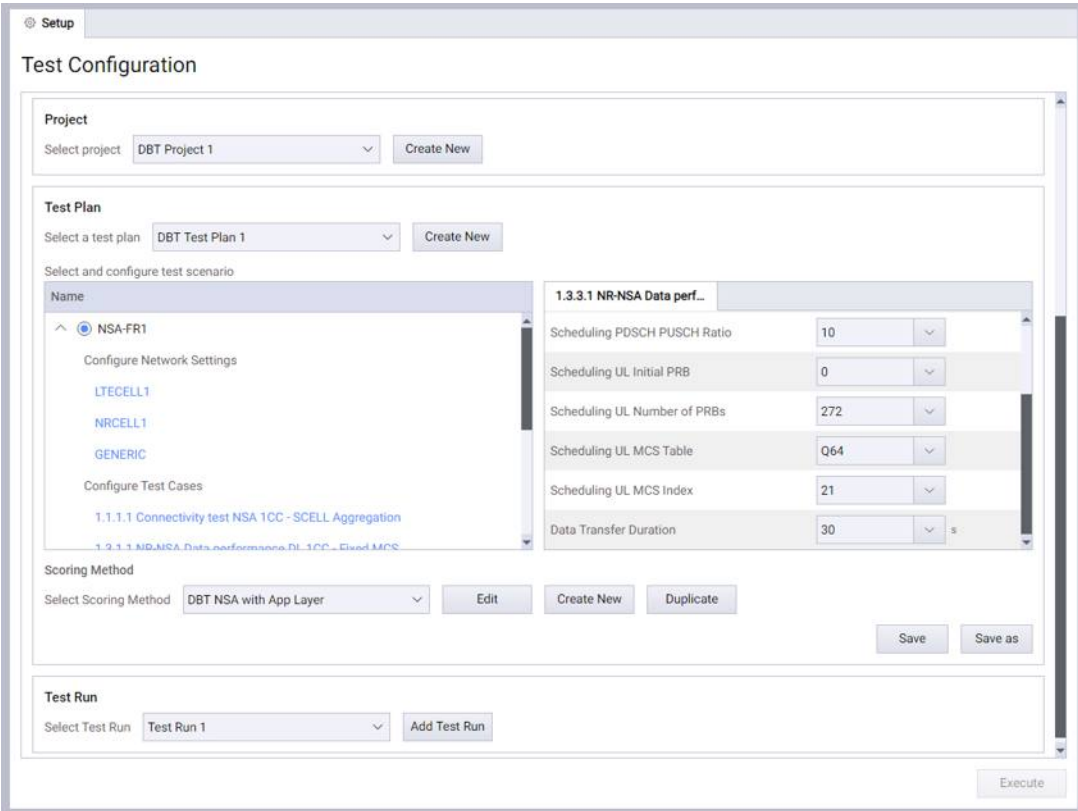
Figure 2. Test Manager for designing and executing end-to-end test campaigns.

Pre-defined and custom scoring methods

In addition to pre-defined test cases, the S8710A Device Benchmarking Toolset offers predefined scoring methods. The test cases and the corresponding scoring methods set an industry-first standard for device benchmarking. In addition to using the predefined scoring methods, you can create custom scoring and ranking methods to address specific test scenarios.

Figure 3. Defining scoring methods in Nemo 5G Device Analytics SW.

Detailed benchmarking

With the S8710A Device Benchmarking Toolset, you can objectively benchmark and compare data from devices under test with one tool. The toolset offers a comprehensive benchmarking view with KPI drilldown capabilities to compare devices and software builds.
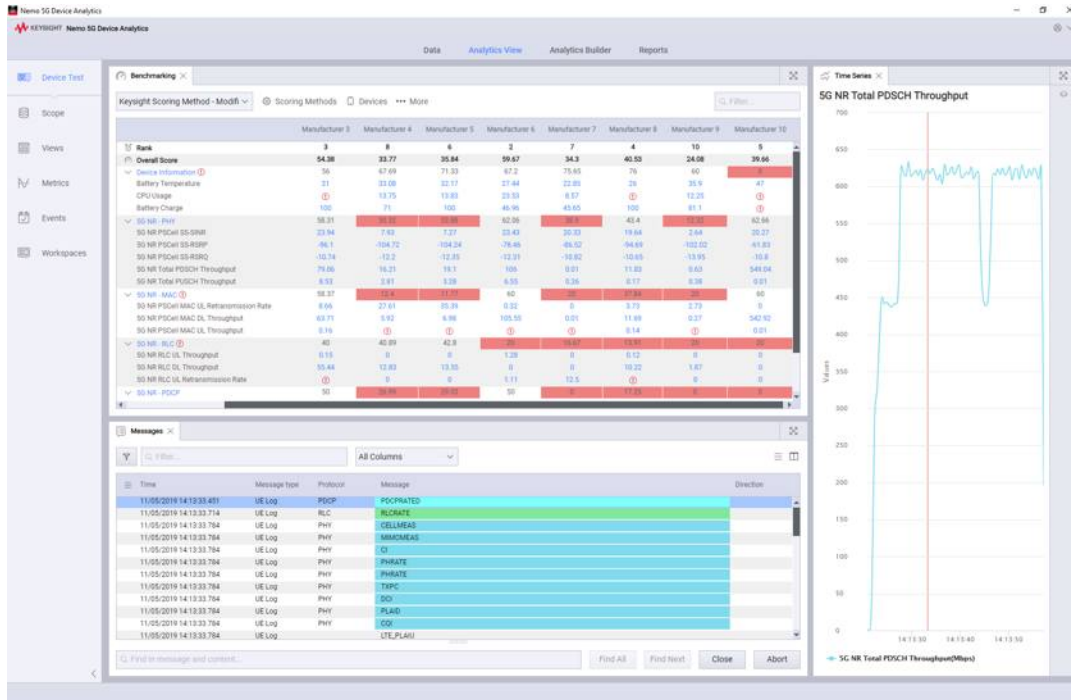

Figure 4. Benchmarking view from Nemo 5G Device Analytics SW.

The toolset compares data from the DUTs and UXM, after which a benchmarking report including ranking and scoring of devices is created.
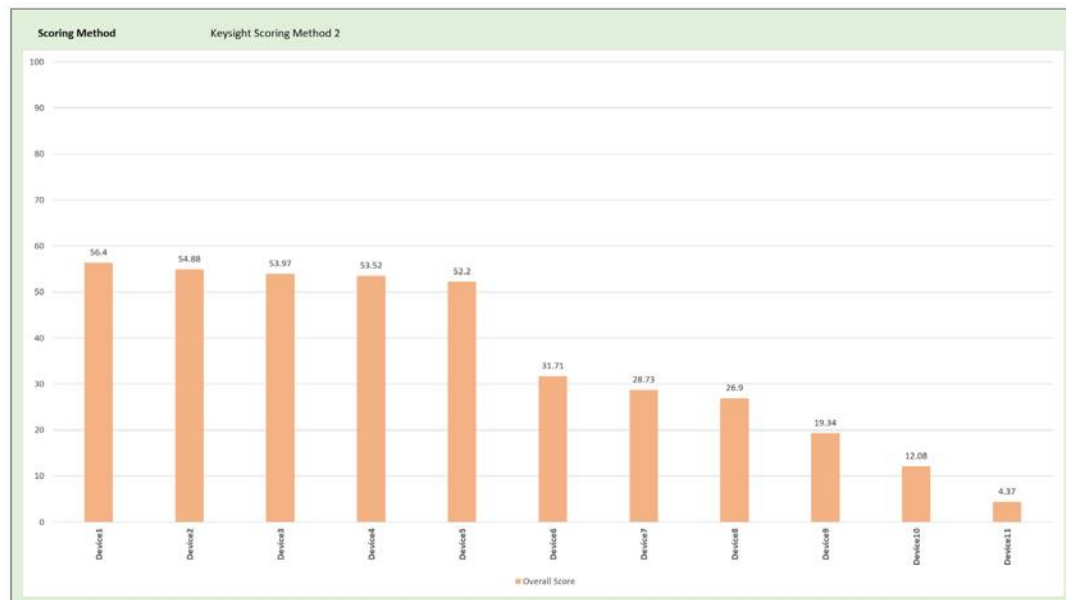

Figure 5. Benchmarking report from Nemo 5G Device Analytics SW.

Test cases

The S8710A Device Benchmarking Toolset offers pre-defined test cases for benchmarking any 3GPP compliant device. The KPIs are collected from Keysight's UXM 5G Wireless Test Platform log files and the available test cases are:

- 5G NR maximum DL throughput
- LTE maximum DL throughput
- LTE-5G NR data share
- Maximum throughput mobility
- Cell edge performance
- Cell register performance
- Application layer throughput

When the toolset includes the Nemo Outdoor drive test SW, some supplementary KPIs can be collected.

The test cases automate the benchmarking process, improve quality, and speed up testing.

Learn more at: www.keysight.com

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