5G Protocol R&D Toolset
The Fastest Path to 5G

5G is rapidly approaching. Mobile operators are fast-tracking their 5G deployment plans, leading to the need for chipset and device manufacturers to accelerate their development activities. 5G brings new and powerful capabilities to support use cases that require much faster data rates, ultra-reliable low-latency as well as that enable massive machine-type communications. Delivering these use cases with the desired communications system performance requires technologies that operate at mm-Wave frequencies using wider bandwidths, as well as beamforming techniques. In other words, 5G produces significant challenges that the device ecosystem needs to address quickly and accurately when prototyping new designs.

The protocol stack is a core element of wireless technologies and 5G is no exception. The behavior of the protocol stack in a 5G device is fundamental given the complexity hosted on the network side. Ensuring that prototyping tests are easily performed against a well-proven reference is essential to deliver new functionality in a timely manner. Having early access to 5G R&D protocol test tools that provide ultimate control and flexibility is the key to accelerate the transformation from prototypes to 5G products.

Develop, Integrate and Comprehensively Validate your Device in Minimum Time

Wireless protocols are extraordinarily complex. The earlier in the development process that you can verify and make changes in your design, the more quickly you can launch a successful product. Design errors need to be caught early in the development cycle as the further downstream you find them, the harder and more costly it is to resolve them. At the same time, being able to easily develop comprehensive test cases for different network scenarios is important to improve quality and accelerate time to market.

The 5G Protocol R&D Toolset is a comprehensive solution to address diverse global spectrum requirements and efficiently prototype advanced 5G protocol features, including beamforming at mm-Wave frequencies and non-standalone as well as stand-alone use cases. The toolset, based on the UXM 5G, enables you to:

- Support multiple phases of wireless device development, from pre-silicon protocol prototyping to systems integration and verification;
- Accelerate test case creation and analysis, with the highest level of flexibility and control, to achieve first-to-market functionality with impeccable quality;
- Fully test 5G technologies faster, to guarantee that 5G features are fully utilized to achieve maximum performance and compliance.

Develop, Optimize, and Analyze

Verify device features at the start of the development cycle to eliminate risks

Make use of reference tests to accelerate test programs involving leading features

Discover and resolve defects early to ensure a faster, more cost-effective development

Optimized GUI
Real-time L1/L2
5G NR
Reference test case library
Filter
Bookmark
Export
Easiest test case creation

The 5G Protocol R&D Toolset includes a Graphical User Interface highly optimized for early test creation and analysis while 5G specifications continue to evolve and the industry starts to embrace them. This tool minimizes risk during development programs, as device features are verified to work correctly at the very start of the development cycle.

Key elements of the test case creation tool include:

- A built-in protocol state machine enabling debugging activities with reduced test case complexity;
- Access to L1/L2 parameters with the ability to make changes in real-time, without the need to program;
- Feature breadth and depth to go beyond mandatory industry requirements, allowing tests to be carried out to your specific needs and unique specifications;
- Support for the widest portfolio of reference tests with leading features from network operator test plans to de-risk carrier acceptance and time to market early in the prototyping phase.

Figure 1. L1/L2 parameters are easily accessible and can be read and edited in real time.
Most collaborative results analysis

The 5G Protocol R&D Toolset enables defects to be discovered and resolved early, ensuring a faster and more cost-effective development process.

Log Viewer is a collaborative results analysis tool that provides:

- Bookmarks to highlight key areas of interest when sharing logs with other teams;
- Customizable filters that allow different teams to investigate issues efficiently;
- Export options for other file formats and plug-ins that allow third party tools to be used for additional analysis.

Figure 2. Customizable filters in Log Viewer.
Earliest availability of advanced features

Achieved through early collaboration with key industry leaders, the 5G Protocol R&D Toolset brings the earliest availability of advanced 5G features to test your implementations in complex and simulated real network scenarios.

– Protocol stack feature tests
– Integrated stack tests
– Functional tests
– Regression tests

Figure 3. Key Performance Indicators (KPI) statistics.
5G Network Emulation Solutions for Fastest Market Access

5G-related features such as beamforming at mm-Wave and spectrum sharing increase test complexity considerably. To succeed in the fast-moving 5G industry, you must be able to emulate all the 5G system elements flexibly, make accurate measurements and make informed decisions during the prototyping phase.

From the industry leader in protocol and mm-Wave test, the 5G Protocol R&D Toolset is part of a series of Keysight network emulation solutions to help you streamline your current, and future, 5G device workflow.

Performing comprehensive tests quickly and managing program risk are critical success factors. Keysight can help you find the fastest path to 5G.

Learn more at: www.keysight.com

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