

Keysight Requirements Verification Suite

Reduce design verification time & resources, and take control of your product's destiny

Introduction

As design complexity grows, so does your data and your job — but it doesn't have to delay your product launch. That's the power of Keysight's Requirements Verification Suite: it's the automated way to reduce the time and resources used during design verification across simulation and test. On its own or integrated with your in-house tools, KRVS helps you drive process transformation by weaving together simulation predictions, prototype measurements, analytics, and people.

Product complexity has been progressing rapidly over the last two decades. It is being driven by increased design requirements, miniaturization, standards, and regulations. Product complexity is growing exponentially and there is no end in sight. Over the next five years, the industry experts anticipate a tipping point will occur where traditional processes won't be able to keep up.

Any design team using electronic design automation to accelerate product development must consider how best to use digital twin simulation and hardware verification in their process. Most designers operate these domains in isolation. Keysight has found 2/3 of product development time is spent in design verification. The verification process is plagued with manual workflows and isolated homegrown tools which are not scalable and difficult to maintain. This represents a failure of EDA and test companies to address the problem. But the industry is at a tipping point and mainstream workflow automation solutions are required.

Benefits

- Up to 50% improvement in verification efficiency and cost
- Shrink time-to-market as much as 33%
- Minimize digital transformation investment
- Empower collaboration across teams
- Maximize team efficiency

Critical inefficiencies plague the design process

In October 2023, Keysight commissioned Dimensional Research to conduct a global survey with 301 electronic design professionals and leaders from diverse sectors such as semiconductors, aerospace, automotive, and telecommunications.

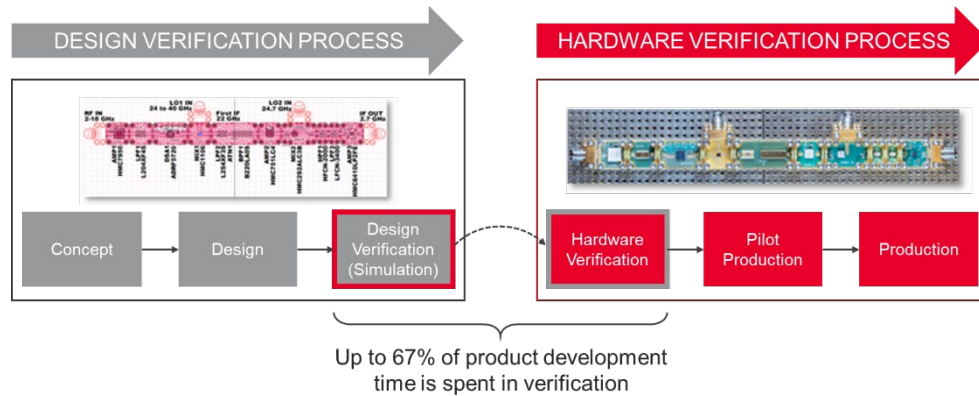


Figure 1. Typical stages of the product design lifecycle

- Design engineers are entrenched in workflow inefficiency, with an alarming average of 3 hours per day being consumed by manual tasks.
- 70% of companies risk losing their time-to-market advantage due to months' long design and test data correlation cycles.
- Disconnected, manual workflows cost an average 10-person design team over \$1.7 million per year.
- Addressing the semiconductor talent shortfall, the same-size team can recover the workload equivalent to 3.5 full-time employees by adopting automation and integrated workflows.
- 74% of organizations use spreadsheets to keep critical design data, which often lack the sophisticated security measures
- 72% still use paper notes or emails to share data

This is an area of importance for Keysight. Besides designing our own leading-edge systems and components, Keysight is uniquely positioned as the only leading vendor to supply EDA, CAE, and Test solutions to the market.

Where is your time spent ?

- Increased design complexity driven by miniaturization, rigid standards and regulations
- Growing requirements
- Exploding specifications & operating modes
- Manual, complicated verification methods and procedures
- Gigabytes of results data to analyze

Benefits of Optimized Requirements Verification

Beneath the surface of day-to-day operations lurks a formidable adversary: the productivity loss of disconnected workflows. Companies are paying huge sums only to achieve bad outcomes – leading to old and error-prone information that is raising design costs.

More active usage of integrated requirements verification tools can lead to significant productivity gains and faster time to market. This shift is critical; engineering teams are moving away from traditional and often manual, siloed workflows to streamlined, integrated, and automated processes.

10 benefits of Keysight Requirements Verification Suite

- Up to 50% improvement in verification efficiency and cost
- Shrink time-to-market as much as 33%
- Reduce data management time spent in verification up to 30%
- Traceability of processes and data
- Reduce duplicate and serial effort between design and test domains
- Reduce dependency on “tribal knowledge” with digitized processes
- Reduce development and maintenance of homegrown solutions
- Vendor agnostic across design and test
- Empower collaboration across teams
- Reduce project management efforts with real-time project status

Keysight Requirements Verification Suite

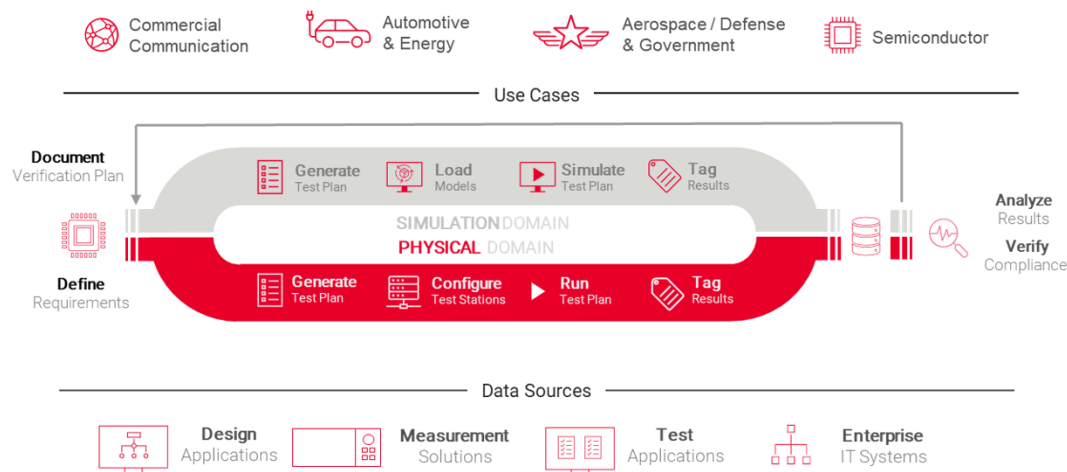


Figure 2. Ideal process for the product design lifecycle

Keysight’s solution to optimized requirements definition, verification, and results tracking has three tightly integrated components focused on efficiently gathering requirements and specifications, executing verification procedures for simulation and test results, and analyzing the results for compliance to the requirements. The solution also provides capabilities to perform analytics on the results that explain root cause through correlation analysis.

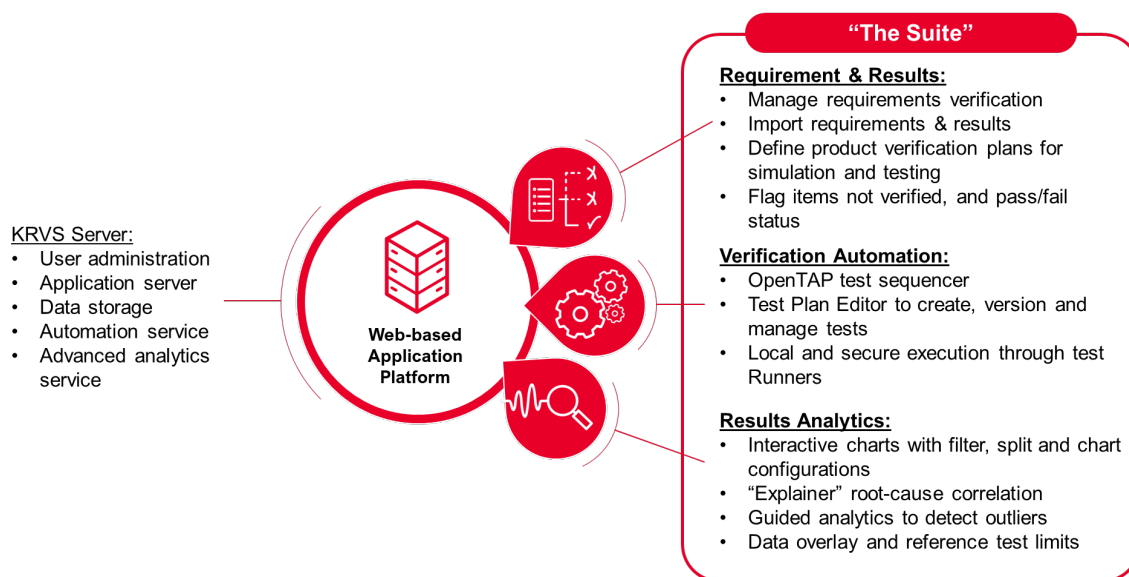


Figure 3. Keysight Requirements Verification Suite product structure

Requirements and results

KRVS requirements and results component provides a cockpit to manage requirements throughout the verification process from design to test. It imports requirements from CSV or other formats, drives product verification plans used by both simulation and test. The application automates the status of compliance checking, flags items not verified and stores pass/fail determinations along with the results data for future analysis. Data is meta-data tagged for traceability.

Requirement	Pass	Test Description	Start F...	Stop ...	RF Stimu...	Conditions	Specification	Unit	Verification	Results Ben
							Min	Typ	Max	
Gain at 2.8V	▲	Small signal gain	1500	5900	-10	Vcc 2.8 Temp 25	11	13	17	dB
Gain at 5V	▲	Small signal gain	1500	5900	-10	Vcc 5 Temp 25	15	17	18	dB
RL In as 5V	▲	Small signal input RL	1500	5900	-10	Vcc 5 Temp 25	-8.5	-7.5		dB
RL In at 2.8V	▲	Small signal input RL	1500	5900	-10	Vcc 2.8 Temp 25	-7.3	-6.3		dB
RL out at 2.8V	▲	Small signal output RL	1500	5900	-10	Vcc 2.8 Temp 25	-15.5	-14.5		dB
RL out at 5V	▲	Small signal output RL	1500	5900	-10	Vcc 5 Temp 25	-20	-18		dB

Figure 4. Requirements and Results application graphical user interface

- Establish direct traceability between requirements and results with consistent and normalized data acquisition and analysis
- Accelerate time to compliance with clear visualization of specifications achievement
- Enhance insights with integrated analysis and analytics
- Share simulation and measurement data more readily with your own on-premises or cloud deployment to provide access across organizations or regions

Verification automation

KRVS verification automation is built on Keysight's open-source test automation platform, openTAP. The application includes a test plan editor to create, version control, and manage tests used in simulation and prototype verification stages of the requirements verification process. It provides a package (library) repository to store standardized trusted libraries from Keysight as well as custom libraries developed by your design and test engineers. Tests are automated through local and secure execution using “test runners”, which can be deployed throughout the organization for scalability. The test sequencer has a public API for custom interfacing with test managers.

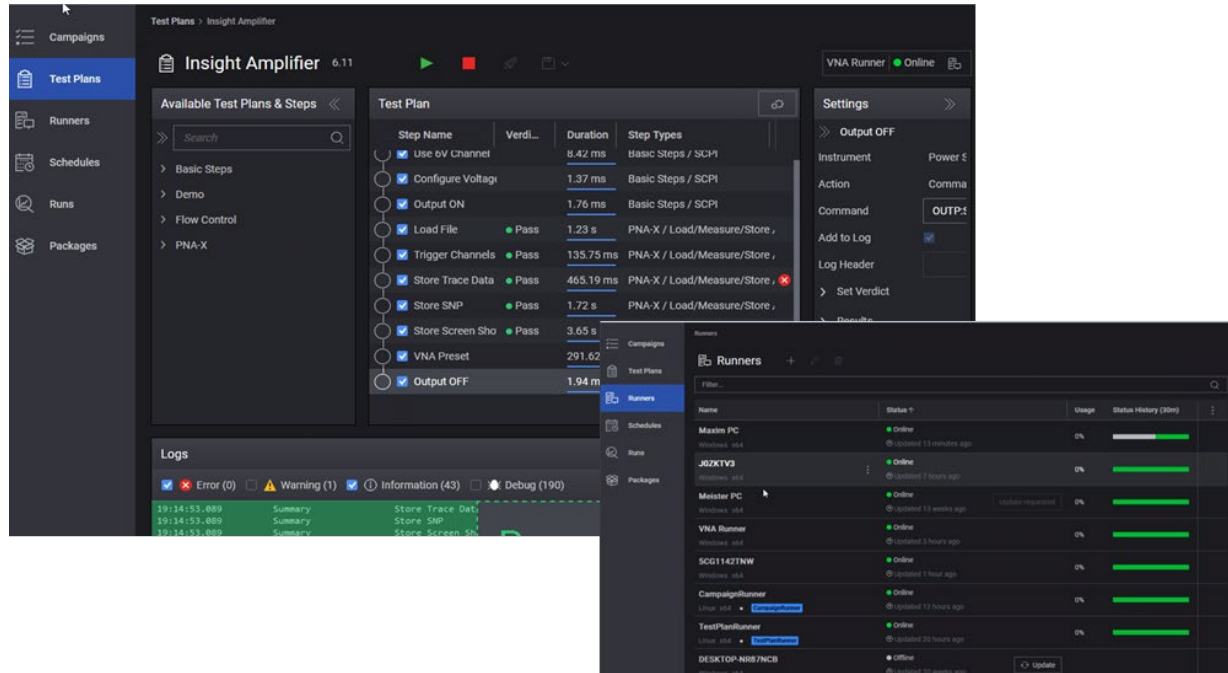


Figure 5. Keysight Test Automation application graphical user interface

- Compose test plans directly from requirements and easily evolve with changing goals
- Accelerate measurements from simulation and validation
- Collaborate across organizations using sharable resources
- Monitor the health, status and utilization of your test assets and processes
- Enable collaboration with your teams down the hall, across town or around the world

Results analysis & analytics

Keysight's Measurement Analytics application provides interactive charts of aggregated measurements collected through test automation or manually collected and imported from CSV files. It provides filters, data splitting and custom chart configurations. Measurement Analytics includes an “Explain” feature used to identify root cause with correlation back to test properties. The workflow is guided for ease of use to detect outliers quickly and accurately. Data overlay and reference test limits can be set for benchmarking against simulation results or golden unit test results.

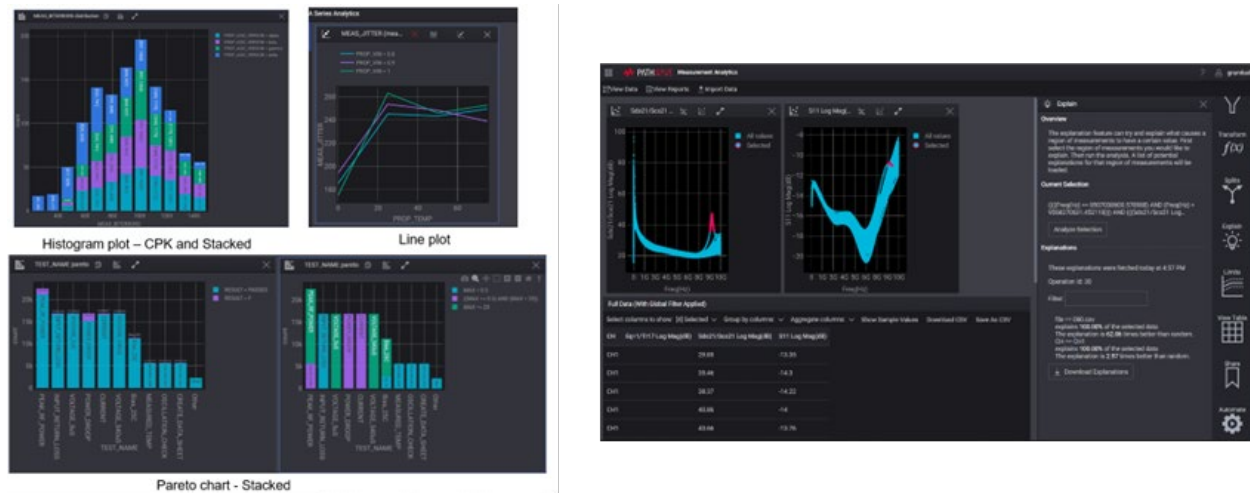


Figure 4. Keysight Measurement Analytics graphical user interface

- Accelerate analysis of aggregated measurement results tagged with test properties through easy and real-time web access to the dataset
- Unlock root cause quickly with visualization and statistics analysis capability tailored for T&M use cases
- Maximize cross functional team efficiency with integration of PathWave Test Automation and API support
- Collaborate across teams, organizations and regions using a shared dashboard view

Conclusion

Design complexity will undoubtedly continue to increase. How do we fix the chasm between design and test and enable shift-left? How can we improve design productivity with more actionable data insights?

Executives are increasingly recognizing the strategic linchpin of agility: a common software framework. 60% of industry leaders assert that such a framework is not just beneficial but vital for maintaining the competitive edge necessary in today's market. It's a fundamental component in the quest to accelerate time-to-market — a goal that 63% of executives identify as directly influenced by the integration of software across the design and testing lifecycle.

Keysight Requirements Verification Suite is the automated way to optimize your workflows across digital and physical design verification. On its own or integrated with your in-house tools, the Suite helps you drive process transformation by weaving together simulation predictions, prototype measurements, analytics, and people. Collaborate with Keysight and take control of your product destiny.

Learn more

For more information on Keysight Requirements Verification Suite or any of Keysight Technologies' products or services, please contact your local Keysight office. The complete list is available at:

www.keysight.com/find/contactus



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

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