

# D9030SATC SATA 6 Gb/s Compliance Test Software

The Keysight Technologies, Inc. SATA compliance test software for Infiniium oscilloscopes provides you with a fast and easy way to validate and debug your SATA 1.5-Gb/s (Gen1), 3.0 Gb/s (Gen2) and 6.0 Gb/s (Gen3) silicon, host bus adapters, port multipliers, high-density disk drives, solid-state disk drives and optical disk drives. The software provides automated compliance test support for the i (internal), m (eSATA) and u (mSATA, SATA USM, SATA microSSD and M.2 form factor) interface points and displays the results in a flexible report format. In addition to the measurement data, the report provides a margin analysis that shows how closely your device passed or failed each test.

To make measurements with the SATA compliance test software, you will also need a test fixture for signal access to make measurements. Wilder Technologies' SATA Gen3 test fixtures are recommended for compliance testing. The product information is available at <https://www.wilder-tech.com/en/products/sata>. The Luxshare-ICT test fixtures are also recommended for all host and device compliance testing. You can find more information on the required test fixtures at <http://en.luxshare-ict.com/product/index.html>.



# Features

The SATA software offers several features to simplify the validation of SATA designs:

- Supports Gen1, Gen2 and Gen3 SATA, eSATA, mSATA, SATA USM, SATA MicroSSD and M.2 Form Factor PHY, TSG and OOB Compliance Test
- Setup and measurement wizard with guided connection
- Support for BIST-T, A, S (transmit only) and BIST-L (far-end retimed loopback) test modes
- Intelligent test selection and margin analysis specific to interface selection
- Spread-spectrum clock modulation depth and frequency accuracy measurements
- Complete SATA-IO logo validation tests for PHY general, transmit signal and OOB requirements per Unified Test Document 1.5
- Automated out-of-band (OOB) burst and gap margin analysis and tests for detect/reject on COMRESET, COMINIT and COMWAKE bursts that are in/out of specified ranges

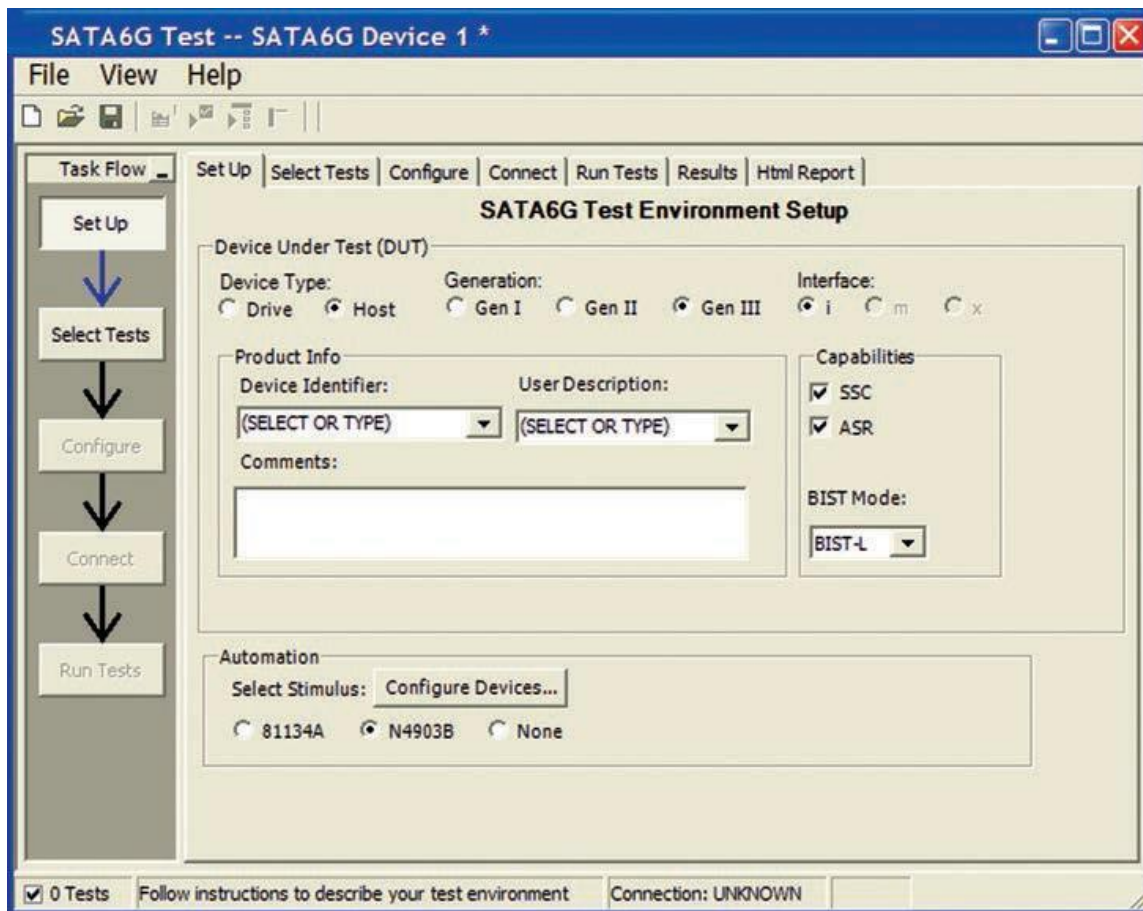
The SATA 6 Gb/s compliance software performs a wide range of tests required to meet the physical layer transmitter test requirements of the Serial ATA International Organization: Serial ATA Revision 3.3 specification. The Serial ATA Revision 3.3, or SATA 6Gb/s, specification requires that an oscilloscope with a minimum bandwidth of 12 GHz be used for validating the 6 Gb/s physical layer transmitter. The Keysight Technologies, Inc. Infiniium Series oscilloscopes, combined with the SATA software, provides the necessary bandwidth and analysis capability for validating SATA 6 Gb/s transmitters, as well as control of the 81134A pattern generator or N4903B J-BERT with Option 002 or M8020A J-BERT for performing automated out-of-band (OOB) signal parametric and timing tests. The 81134A pattern generator or M8020A J-BERT can be configured and used for SATA 6 Gb/s testing as well.

The SATA-IO sponsors an official certified logo program, which requires that SATA products be tested at official interoperability workshops or at a certified independent test lab, in order for that product to be included on the SATA-IO integrators' list and to use its certified logo. Keysight's SATA physical layer test solutions, which provide complete coverage for PHY, TSG and OOB test categories, are used for gold suite testing at SATA-IO interoperability workshops as well as in several independent SATA test labs.

# Saves You Time

The SATA software saves you time by setting the stage for automatic execution of SATA electrical tests. Part of the difficulty of performing electrical tests for SATA is connecting the oscilloscope to the target device, configuring the scope's measurement system for compliance testing, issuing the proper commands to perform the tests and then analyzing the measured results by comparing them to limits published in the specification. The SATA electrical test software does much of this work for you. In addition, if you discover a problem with your device, debug tools in the scope are available to aid in root-cause analysis.

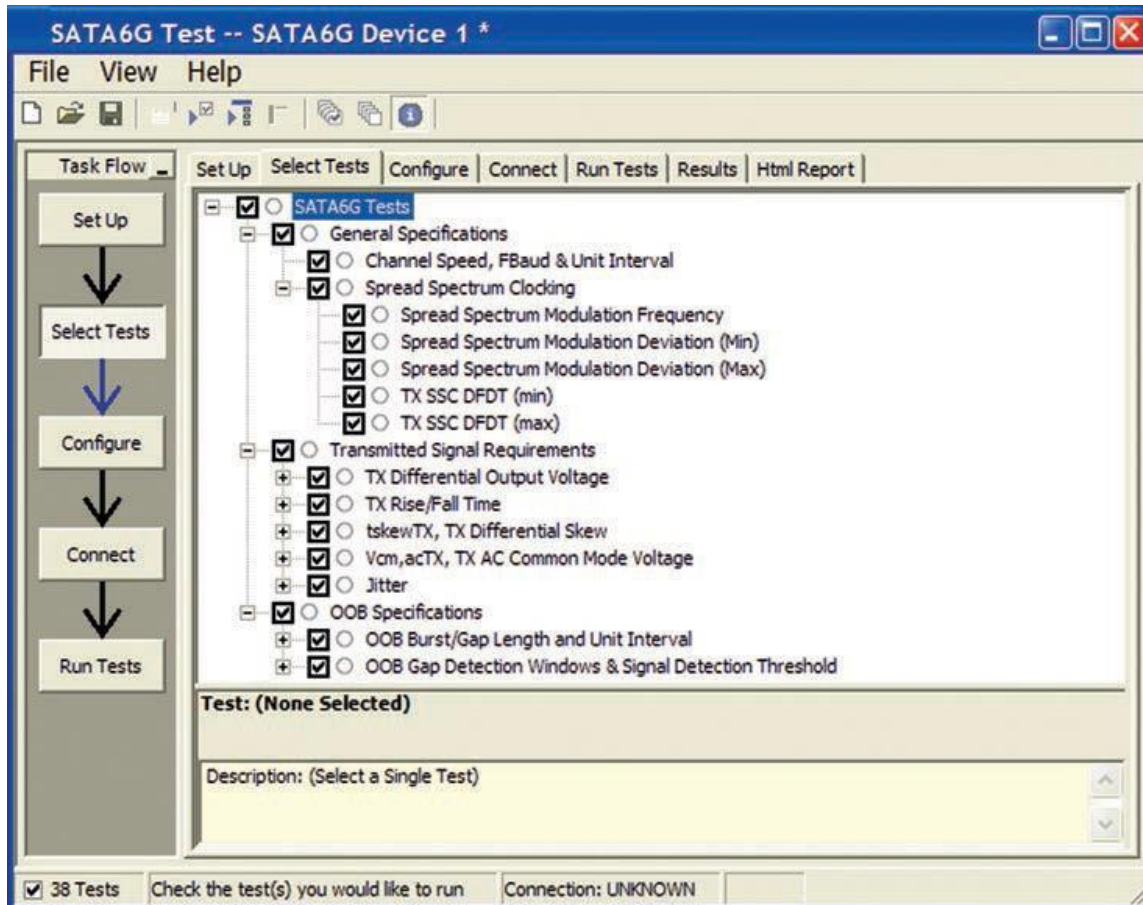
The SATA electrical test software offers the required tests to verify compliance with the physical layer requirements tables, Serial ATA Revision 3.3 specification. The software automatically configures the oscilloscope for each test and provides an informative results report that includes margin analysis relative to the specified conformance limits. See Table 2 for a complete list of the measurements made by the SATA electrical test software.



**Figure 1.** The Keysight SATA software setup tab allows you to choose the interface type of your product and the relevant test speed, then automatically configures the measurements and limits appropriately for your specific product per the specification requirements.

# Comprehensive Tests

The SATA software extends the ease-of-use advantages of Keysight's Infiniium Series oscilloscopes to testing SATA designs. The Keysight automated test engine walks you quickly through the steps required to select and perform required tests for the interface you have selected (Gen3i Host, for example). You can select a category of tests or specify individual tests. The user interface is oriented to minimize unnecessary reconnections, which saves time and minimizes potential for measurement error. You can save tests and configurations as project files and recall them later for additional testing and review of previous test results. Straightforward menus let you perform tests with a minimum of mouse clicks.



**Figure 2.** The Keysight automated test engine guides you quickly through selecting and configuring tests, setting up the connection, running the tests, and viewing the results. You can easily select individual tests or groups of tests with a mouse-click and customize your output report based on the test results you want to see.

# Configurability and Guided Connection

The SATA software provides flexibility in your test setup. The SATA test software provides you with user-defined controls for critical test parameters, such as test pattern source selection and number of unit intervals (UI) desired for the test group.

After configuring the tests according to your needs, the test software guides you to make connection changes with diagrams. This includes the oscilloscope channels used for the test and the routing of any necessary SMA cabling, power dividers, DC blocking capacitors and test fixtures needed to perform the tests.

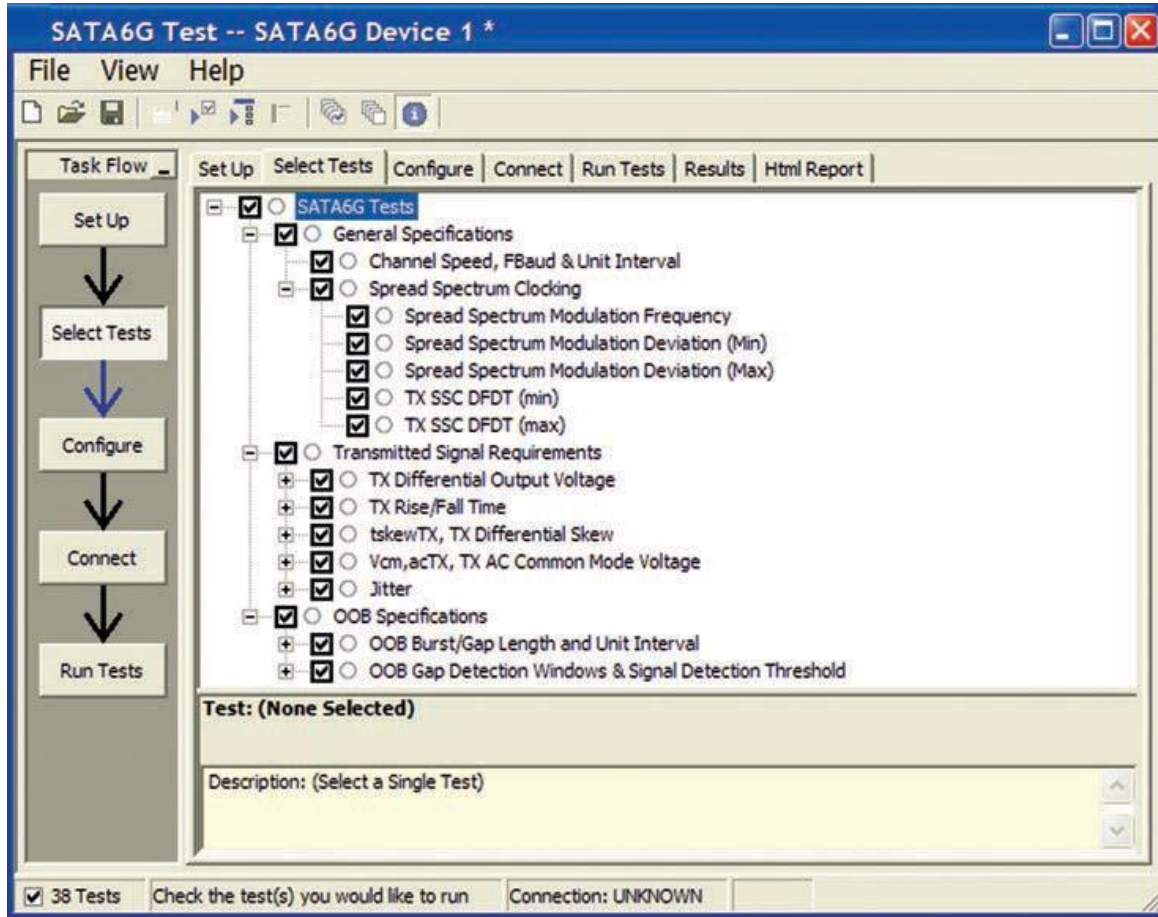
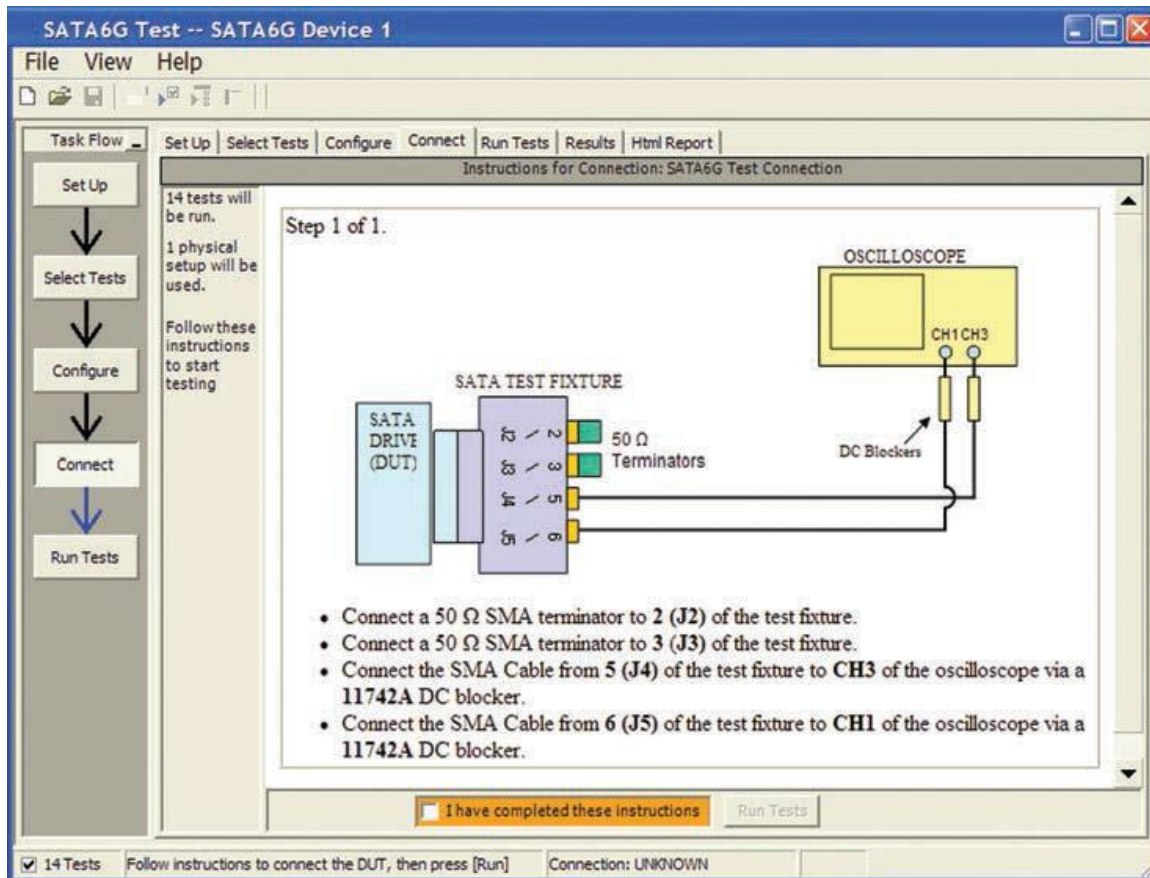


Figure 3. In configuring the tests, you define the test mode and define which pattern will be used for each test.



**Figure 4.** When you make multiple tests where the connections must be changed, the software prompts you with connection diagrams.

## Comprehensive Result Analysis

In addition to providing you with measurement results, the SATA software provides a report format that shows you not only where your product passes or fails, but also reports how close you are to the limits specified for a test parameter. You can specify the level at which warnings are issued to alert you to the electrical tests where your product is operating close to the official test limit defined by the specification or your own requirements for a given test parameter.

The SATA compliance and validation software generates thorough HTML reports that clearly identify passing and failing conformance tests in a summary table along with relevant screen images and interim data values for complex measurements. The HTML report provides you with a complete report of your testing summary, references to the specification and requirements tables where each measurement is defined for traceability to the official test requirements for your SATA interface.

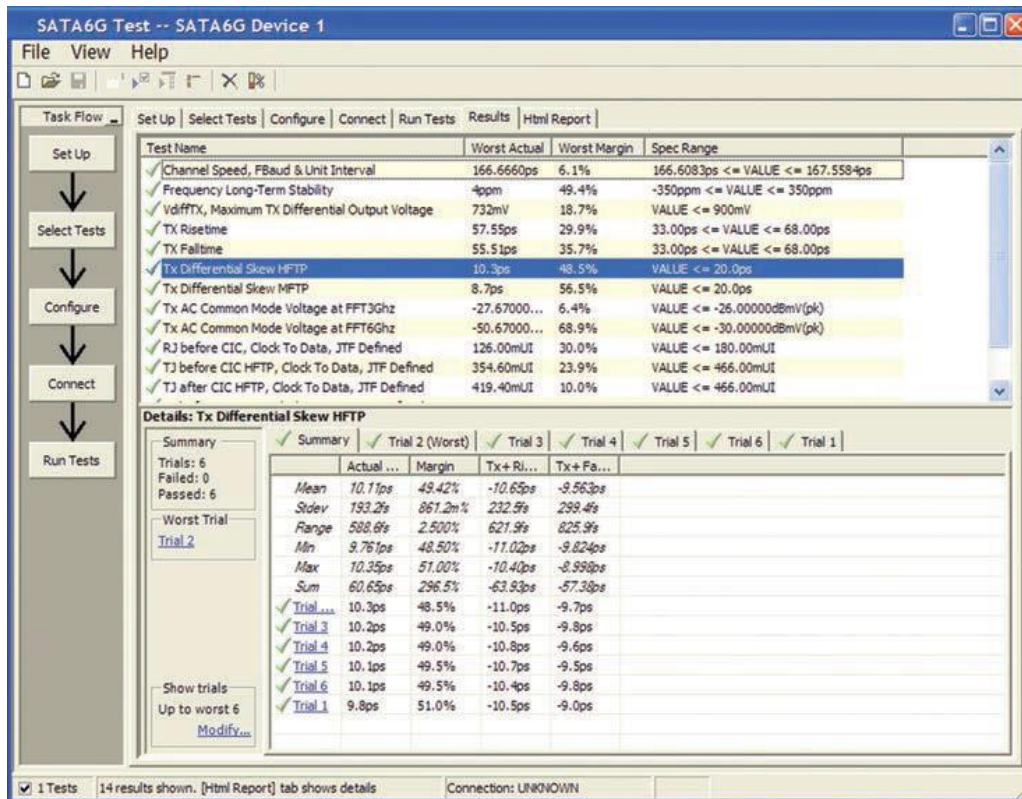


Figure 5. The Keysight SATA report can be customized with user-selectable repetitive run data and filtered to show only the relevant data and statistics desired in the final report.

## Measurement Requirements

To use the software you will need a Keysight Infiniium Series oscilloscope with at least 12 GHz of analog, real-time bandwidth. In order to use the software with BIST-T, A, S test mode, your SATA product will need to be able to source the required compliance test patterns as defined in the Serial ATA Revision 3.3 specification (HFTP, MFTP, LBP and LFTP). If you are using far-end re-timed loopback mode, then the Keysight 81134A 3.35 Gbps pulse/pattern generator M8020A J-BERT can be automatically programmed by the SATA software to provide the necessary test stimulus signals to be retimed by your chipset for 1.5 Gb/s, 3.0 Gb/s and 6.0 Gb/s signaling. The 81134A or M8020A are also used for OOB signal testing.

Additionally, the M8020A together with the SATA software can be used to send the appropriate sequence and program the SATA product into BIST-L test mode.

# Recommended Oscilloscopes

The SATA compliance software is compatible with Keysight Infiniium Series oscilloscopes with operating software revision 4.20 or higher. For oscilloscopes with earlier revisions, free upgrade software is available here: [www.keysight.com/find/scope-apps-sw](http://www.keysight.com/find/scope-apps-sw).

Data rate	Minimum bandwidth	Minimum channels	Description
1.5 Gb/s	8 GHz	4	Infiniium 90000A, V-series, Z-series, UXR-B
1.5, 3.0 and 6.0 Gb/s	12 GHz	4	Infiniium 90000A, V-series, Z-series, UXR-B

## Ordering Information

### Software

Model number	Description	Note
D9030SATC	SATA Gen 3 Compliance Test Software	Required
D9020JITA	Timing jitter, vertical noise and phase noise analysis	Required
D9020ASIA	Advanced signal integrity software (EQ, InfiniiSim Advanced)	Required
D9020SCNA	InfiniiScan Measurement and Zone Triggering Software	Required

### Hardware

Model number	Description	Quantity
SATA Gen 3 receptacle adapter	Wilder Technologies ( <a href="https://www.wilder-tech.com/en/products/sata">https://www.wilder-tech.com/en/products/sata</a> ) Luxshare-ICT ( <a href="http://en.luxshare-ict.com/product/index.html">http://en.luxshare-ict.com/product/index.html</a> )	1
11742A	DC blocking capacitor, 0.045 to 26.5 GHz, 3.5-mm (m-f) connectors	2
15443A	Matched cable pair, 2 90 cm SMA (m-m) cables, propagation delay with 25 ps or equivalent.	1 - PHY and TSG tests with BIRST-T, A, S support or 3 – PHY, TSG and OOB tests with BIST-L support and automation
M8020A or 81134A	3.35 Gbps pulse generator	1
11636B	Power divider, DC to 26.5 GHz, 3.5-mm (f) connectors	2
5062-6681	Cable assembly 6-in SMA (m-m) cables or equivalent	4
8493C	Coaxial fixed attenuator 8493C-010 or 8493C-020 for 81134 pattern generator	2



# Flexible Software Licensing and KeysightCare Software Support Subscriptions

Keysight offers a variety of flexible licensing options to fit your needs and budget. Choose your license term, license type, and KeysightCare software support subscription.

## License terms

- **Perpetual** – Perpetual licenses can be used indefinitely.
- **Subscription** – Subscription licenses can be used through the term of the license only (6, 12, 24, or 36 months).

## License types

- **Node-locked** – License can be used on one specified instrument/computer.
- **Transportable** – License can be used on one instrument/computer at a time but may be transferred to another using Keysight Software Manager (internet connection required).
- **USB Portable** – License can be used on one instrument/computer at a time but may be transferred to another using a certified USB dongle (available for additional purchase with Keysight part number E8900-D10).
- **Floating (single site)** – Networked instruments/computers can access a license from a server one at a time. Multiple licenses can be purchased for concurrent usage.

## KeysightCare Software Support Subscription provides peace of mind amid evolving technologies.

- Ensure your software is always current with the latest enhancements and measurement standards.
- Gain additional insight into your problems with live access to our team of technical experts.
- Stay on schedule with fast turnaround times and priority escalations when you need support.

## KeysightCare software support subscriptions

Perpetual licenses are sold with a 12 (default), 24, 36, or 60-month software support subscription. Support subscriptions can be renewed for a fee after that.

Subscription licenses include a software support subscription through the term of the license.

### Selecting your license

**Step 1.** Choose your software product (e.g. S1234567A).

**Step 2.** Choose your license term: perpetual or subscription.

**Step 3.** Choose your license type: node-locked, transportable, USB portable, or floating.

**Step 4.** Depending on the license term, choose your support subscription duration.