

Automotive Solutions

CATALOG



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INTRODUCTION

Innovating for Next-Generation Automobiles

Innovations in current and next-generation automobiles are expanding capabilities and performance to serve three key areas: autonomous driving, connected cars, and electromobility.

Automotive electronics is the underlying platform for all operations and diagnostics, convenience and comfort, safety and security, and primary support for those three areas of innovation.

Keysight Technologies' leadership in high-speed digital, radio frequency (RF), and power electronics design and test solutions can help bring your next innovative automotive idea to reality faster.

Do you know that you can gain access to automotive solutions without using your CapEx budget? **KeysightAccess** offers subscriptions to Keysight's leading-edge test systems hardware, software, and expert support when you need them. Available in select geographies.

 [Learn more](#)



Automotive Radar

Low noise. Great accuracy and speed.

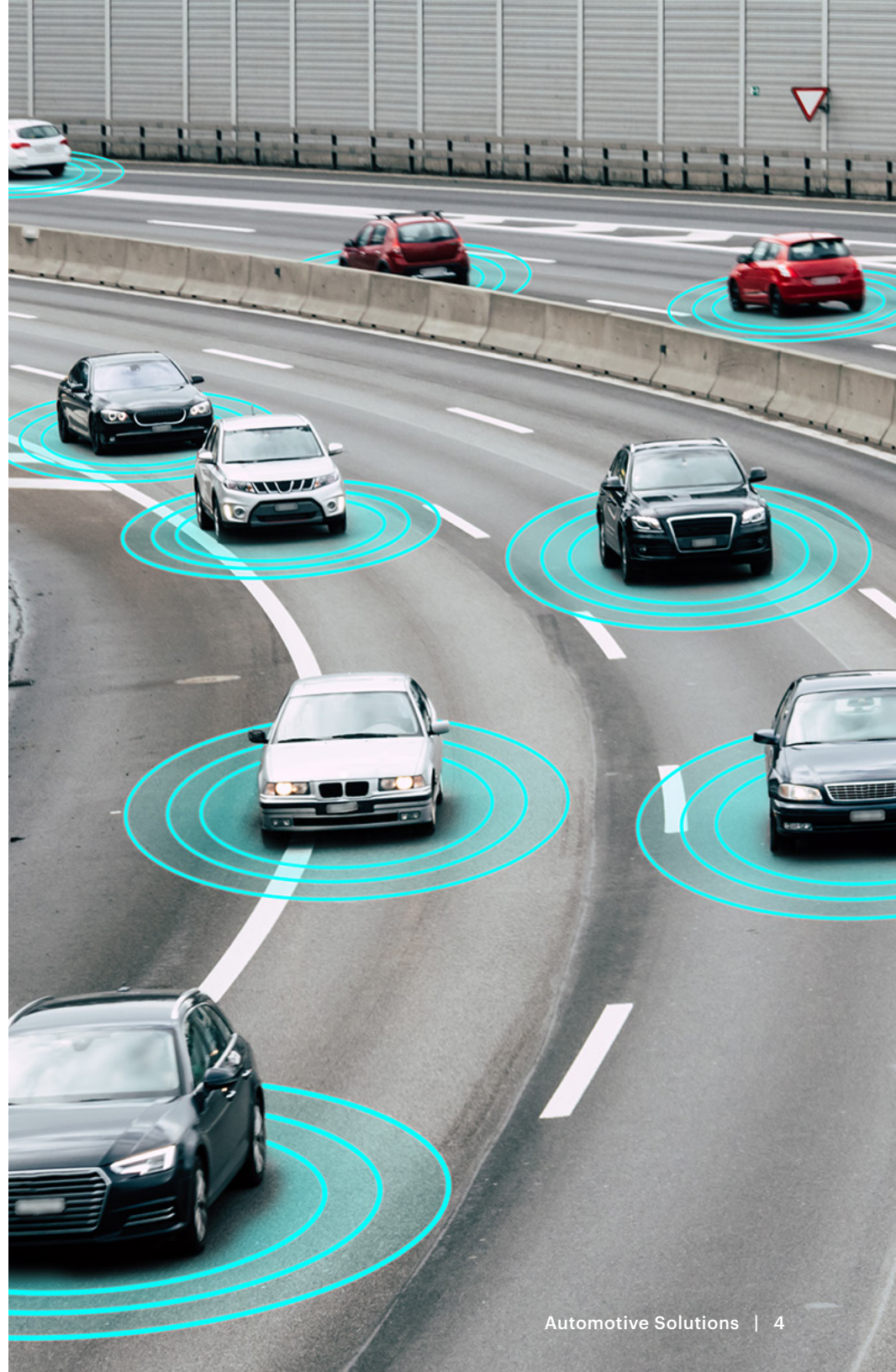
Testing is critical for adoption of the autonomous vehicle, which relies on a complex integration of advanced driver-assistance systems (ADAS) and communication systems. This complexity requires rigorous testing to ensure vehicle safety across all types of traffic, road, and weather conditions.

Millimeter-wave (mmWave) automotive radar is a key technology that enables many ADAS applications needed for autonomous driving. Keysight provides automotive radar design and test solutions to help you generate and characterize accurate wide bandwidth mmWave signals.

Our test instruments minimize propagation loss, phase noise, IQ / frequency response errors, and noise on evaluation modules. They enable you to focus on creating products with the best resolution and performance to ensure safe and smooth journeys on the road.

 [View Keysight's automotive radar design and test solutions](#)

- Radar target simulation for 76 – 81 GHz
- Radar conformance test for spurious emissions 0 – 330 GHz
- SystemVue automotive radar simulation library



AR8700 Series Automotive Radar Test Solutions

- Solutions generate interfering signals from 60 – 90 GHz.
- Solutions include a mmWave automotive power control loop.
- Solutions provide signal generation capabilities, including frequency modulated continuous wave (FMCW) up / down / tri, custom chirp signal, and multiple frequency-shift keying (MFSK).

[Get a quote](#)



Solutions

Description

AR8700I Automotive Radar Interference Immunity Test Solution	Generate interference signals to robustly test automotive radar modules.	Get a quote >
AR8700R Automotive Radar Receiver Test Solution	Generate a wide range of signals to thoroughly test automotive radar receivers.	Get a quote >
AR8700T Automotive Radar Transmitter and Conformance Test Solution	Analyze automotive radar transmitter design signals, as well as in-band and out-of-band spurious emissions.	Get a quote >

Software

Feature

KS83200A	Run standards-compliant test and validation for transmitters and receivers.	Request free trial >
KS83RX0A	Run receiver and interference test cases.	Request free trial >
KS83ST0A	Run signal analysis and signal generation test cases for ETSI standards.	Request free trial >



KS83xxxA Application Software as well as individual instruments in the solution (MXG X-Series Microwave Analog Signal Generator and Arbitrary Waveform Generator) include KeysightCare. As a KeysightCare subscriber, you get unlimited access to Keysight's technical experts with predictable response times on your measurement questions.

[Learn more](#)

AR8700C Automotive Radar OTA Test Solution

Characterize your automotive radar module's RF performance, functionality, and antenna design in a controlled and traceable environment.

The solution provides:

- Compact antenna test range (CATR)
- Shielded anechoic chamber with a rolled-edge reflector
- Roll-over-azimuth positioner
- Controller for feed and device under test (DUT) positioners with triggered data acquisition capability
- Probe feed options for in-band and spurious test frequency ranges

[> Get a quote](#)



AD1012A Radar Scene Emulator

Validate radar autonomous driving functions in the lab with full-scene emulation.

- Achieve full-scene emulation in the lab.
- Emulate objects with up to 512-pixel resolution, and at distances as close as 1.5 meters.
- Sharpen ADAS radar vision.

[Get a quote](#)

Learn more:

[How to Test Autonomous Driving NCAP Scenarios](#)



E8717A Lidar Target Simulator

Simulate targets with both distance and reflectivity in a compact bench setup, with advance features and analytical software to gain insights into lidar sensor performance.

- Simulate and automatically sweep in distance and reflectivity.
- Implement both solid-state and mechanical rotating lidar sensors.
- Perform 3D / real-world object simulation.
- Improve quality and yield with insights from innovative visualization and analytical software.
- Obtain distance simulation / sweep from 3 m to 300 m in 1m step.
- Achieve surface reflectivity of 10% to 94%.



[View Keysight's Lidar Target Simulator](#)

Learn more:

[How to Verify Lidar Sensors](#)

Vehicle-to-Everything (V2X)

With vehicle-to-everything (V2X), connected cars can communicate with devices, other vehicles, and nearby infrastructure nodes. They share information on road and traffic conditions to enable all connected vehicles to take appropriate action.

Ensure your V2X technology works the way it should and helps you deliver on your connected car vision. Keysight's powerful cellular, and Wi-Fi® emulation and test solutions allow you to verify all wireless technologies used in a connected car, including LTE, LTE-Advanced, 5G, DSRC (802.11p), Wi-Fi, Bluetooth®, and near-field communication (NFC).

- > **V2X Test and Emulation**
- > **V2X Hardware-in-the-Loop (HiL) Test System**
- > **V2X Test Solution with 802.11p, DSRC and ITS-G5**
- > **C-V2X Test Solution**
- > **eCall / ERA-GLONASS Conformance Test Solution**



WaveBee V2X Test and Emulation

Design for V2X requirements of the automotive industry and infrastructure manufacturers. The series includes development platforms, onboard units, roadside units (intelligent transport system (ITS) stations), simulation, visualization, and analysis. Explore complete testing equipment that proves grounds for V2X field tests in highly scalable expansion stages.

Model number	Features	
AV1021A	WaveBee Touch – Mobile V2X Analysis and Validation System	Get a quote >
AV1022A	WaveBee Plus – V2X Development and Streaming Platform	Get a quote >
AV1023A	WaveBee Road – V2X Roadside Unit	Get a quote >
AV1024A	WaveBee Togo – Mobile V2X Simulator	Get a quote >
AV1025A	WaveBee Creator – V2X Test Scenario Editor	Get a quote >
AV1026A	WaveBee Carkit – HMI Framework and SDK for V2X Applications	Get a quote >



Learn more:
[WaveBee V2X Test and Emulation](#)

AV1000A & AV1001A WaveBee Hive – V2X HiL Test System

The AV1000A WaveBee Hive is a compact DSRC / IEEE 802.11p and C-V2X HiL V2X test system and multi-stack environment for automotive simulations. With its Extended AV1001A version, WaveBee Hive will help you meet the automotive industry's requirements for sophisticated, reproducible test environments.

Model number	Features	
AV1000A	WaveBee Hive – V2X HiL Test System 3-port Static AIR Emulator, 5 Simulated V2X Stations	Get a quote >
AV1001A	WaveBee Hive Extended – V2X HiL Test System 5-port Dynamic AIR Emulator, 60 Simulated V2X Stations	Get a quote >

Learn more:

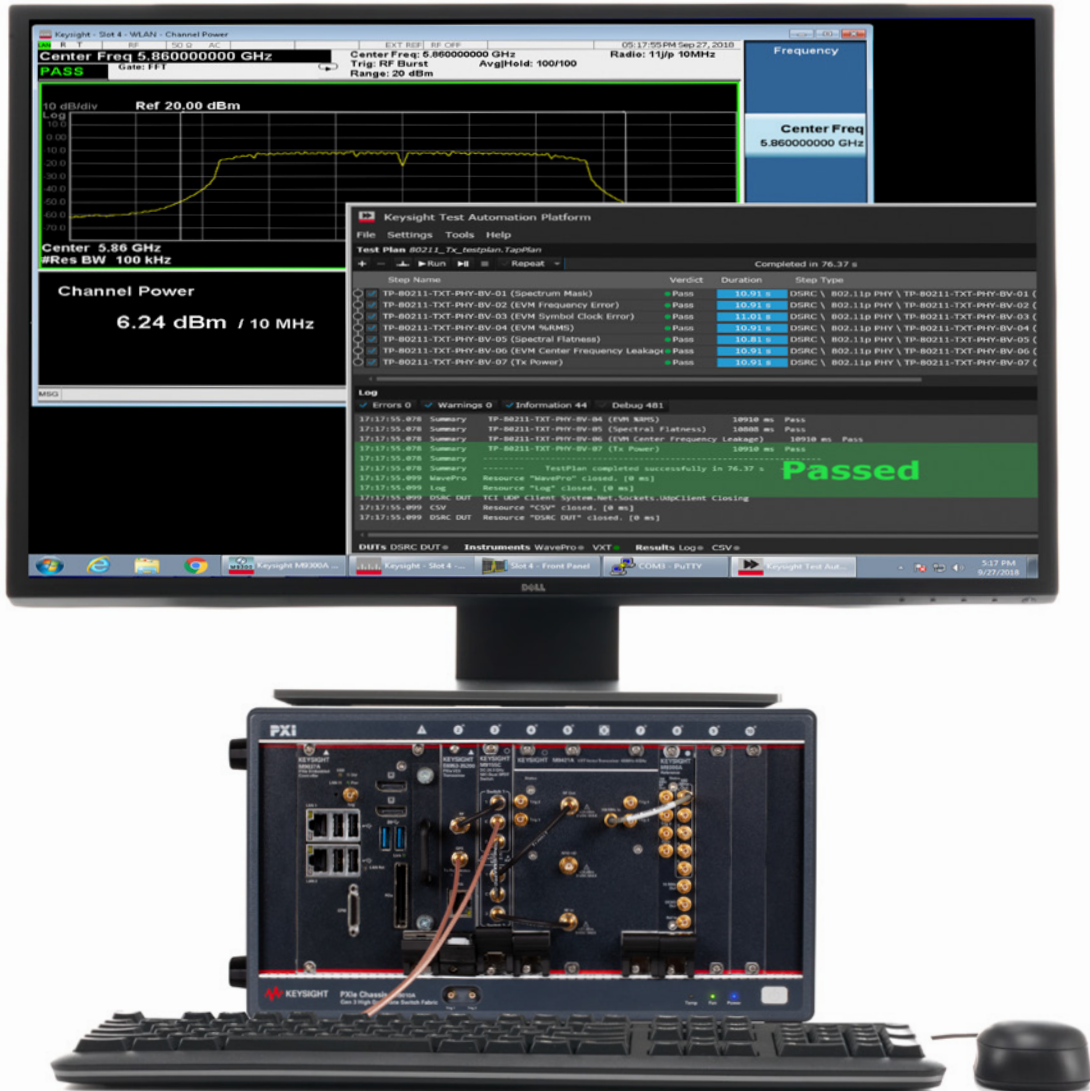
[> How to Conduct V2X Hardware-in-the-Loop Testing](#)



E6953A V2X Test Solution with 802.11p, DSRC and ITS-G5

Compact single PXIe solution for the Dedicated Short-Range Communications (DSRC) **OmniAir Consortium** certification test, providing full coverage of DSRC RF measurements and protocol testing.

- Performs dedicated short-range communications (DSRC).
- Covers all OmniAir certification test cases in a single, integrated PXI frame.
- Offers an expandable platform for future V2X test needs.
- Provides compact PXI hardware in a smaller footprint and increases test density.



[Get a quote](#)

SA8700A C-V2X Test Solution

The Keysight SA8700A C-V2X test solution is a comprehensive test solution enabling functional, protocol, and RF measurements on R14 C-V2X devices.

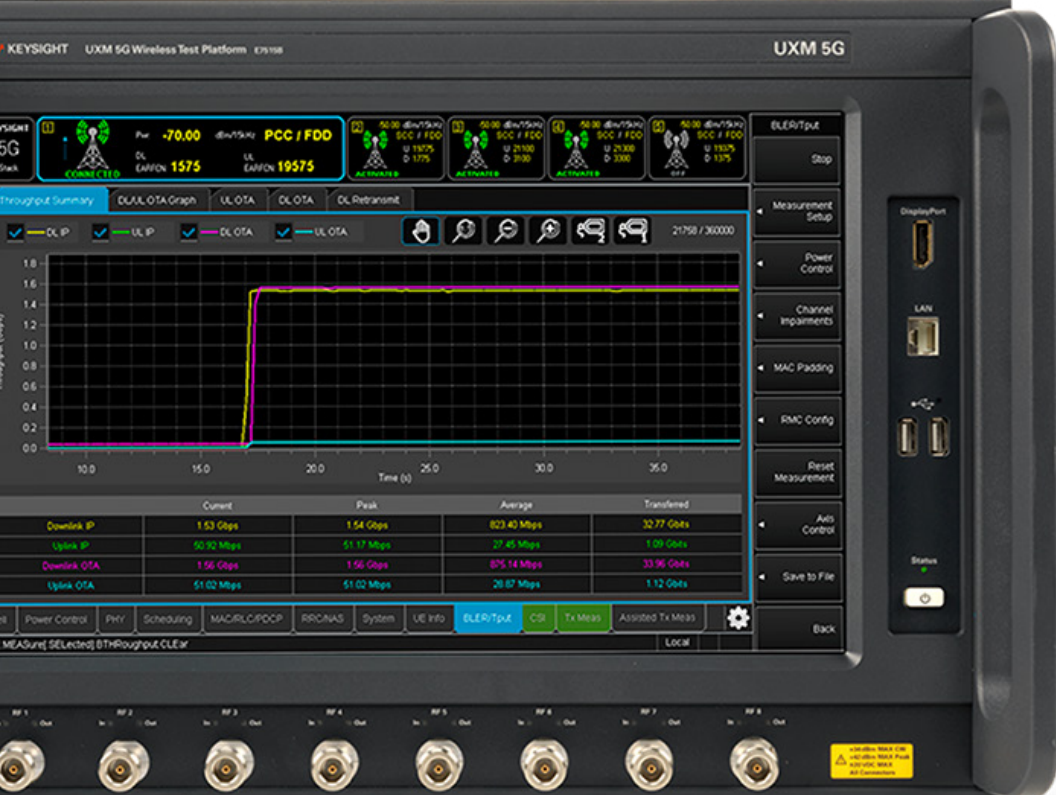
- Simplify C-V2X protocol.
- Emulate global navigation satellite system (GNSS) signals.
- Future-proof for 5G New Radio V2X.
- Get fully certified OmniAir Qualified Test Equipment status.

Learn more:

[!\[\]\(b3131996c2d47980618867ba93d92313_img.jpg\) **How to Validate C-V2X Device Performance**](#)

[!\[\]\(0678d1887db22e3f6b52fe38cd7e7b5b_img.jpg\) **Get a quote**](#)





E6950A eCall / ERA-GLONASS Conformance Test Solution

The Keysight E6950A eCall Conformance Test Solution performs end-to-end functional and standard-compliant conformance testing of eCall modules, with optional audio performance analysis.

[Get a quote](#)

Learn more:

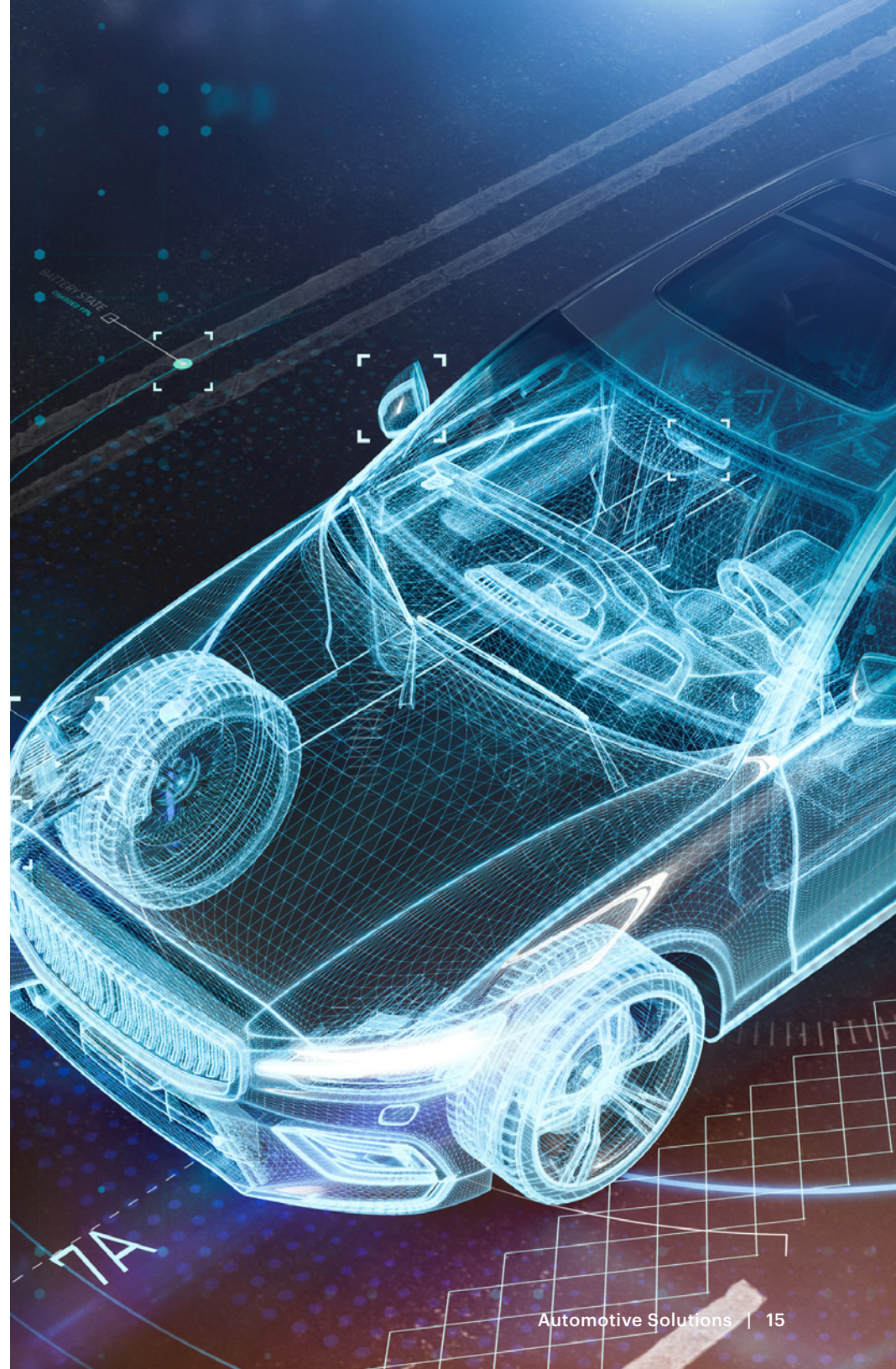
[How to Test eCall / ERA-GLONASS Conformance](#)

In-Vehicle Networking

In today's rapidly evolving automotive landscape, In-Vehicle Networking (IVN) stands as a pivotal technological paradigm, seamlessly connecting various vehicle components to ensure optimal functionality and efficiency. At the forefront of this revolution are cutting-edge technologies such as Automotive Ethernet, Serializer / Deserializer (SerDes), and Controller Area Network (CAN), facilitating high-speed data transmission, real-time communication, and advanced vehicle control systems. IVN not only revolutionizes the driving experience but also lays the foundation for autonomous driving and smart vehicle ecosystems.

In this dynamic environment, Keysight emerges as a trailblazer, offering unparalleled expertise and innovative solutions to navigate the complexities of IVN. With our state-of-the-art testing and measurement tools, we empower automotive manufacturers and developers to accelerate their innovations, ensuring robust and reliable in-vehicle networks. Our comprehensive approach, combining deep industry knowledge and advanced testing capabilities, helps our partners stay ahead in the competitive automotive landscape, driving the future of mobility.

- **[View Keysight's suite of physical-layer automotive Ethernet conformance test solutions](#)**
- **[View Keysight's test solutions for automotive SerDes](#)**
- **[View Keysight's test solutions for layers 2-7 of automotive Ethernet applications](#)**



Automotive Ethernet Solutions

Autonomous vehicles promise to change the nature of commercial and passenger transportation. Data speed and bandwidth requirements are increasing in new vehicles. With the development of automotive Ethernet, faster data communications are now possible and the increasing demands of today’s vehicles and future connected vehicles can be met. Unlike the slower speed backplanes of Controller Area Network (CAN) and Local Interconnect Network (LIN), automotive Ethernet requires rigorous compliance testing. Keysight’s full suite of automotive Ethernet solutions automates testing, validation, and characterization across Tx, Rx, and channel testing from 10 Mb/s to 10Gb/s automotive Ethernet, providing increased test accuracy and saving time.

Solutions	Description	
AE6000T Automotive Ethernet Tx Compliance Solution	Transceiver conformance test (10M-10GBASE-T1)	Get a quote >
AE6000R Automotive Ethernet Rx Compliance Solution	Automotive Ethernet receiver validation and conformance test for 100BASE-T1 & 1000BASE-T1	Get a quote >
AE6000L Automotive Ethernet Channel Testing Solution	Channel testing per OPEN Alliance (1000BASE-T1) - TC9 UTP	Get a quote >

Learn more:

- [➤ How to Verify Automotive Ethernet Transmitter Compliance](#)
- [➤ How to Verify Automotive Ethernet Receiver Compliance](#)
- [➤ How to Test Automotive Ethernet Channel Compliance](#)

Set up your Keysight Infiniium oscilloscope to show automotive protocol decode in less than 30 seconds:

100 and 1000 BASE-T1

[➤ Find out how](#)



Automotive SerDes Solutions

The automotive industry is adding more complexity with more ADAS sensors and systems and at the same time, trying to simplify the networks that carry the data within the vehicle. Higher bandwidth and lower latency networking will play a critical role in addressing time-sensitive and complex automotive technologies to come like Automotive Ethernet and standardized Automotive Serial / Deserializer (SerDes). Emerging SerDes standards like mobile industry processor interface (MIPI) A-PHY® and Automotive SerDes Alliance (ASA) are top of mind for multiple silicon vendors. As an active member of the standards bodies, Keysight automotive SerDes solution experts are ready to help you address interoperability, data integrity, and network integrity testing needs.

Solutions	Description	
AE2000T Automotive SerDes Transmit Compliance Test Solution	MIPI A-PHY and ASA Transmit Compliance Test	Get a quote >
AE2000R Automotive SerDes Receiver Solution	MIPI A-PHY Automotive SerDes Receiver Compliance Solution	Get a quote >
AE2000L Automotive SerDes Cable and Channel Validation Test Solution	MIPI A-PHY Cable and Channel Validation	Get a quote >

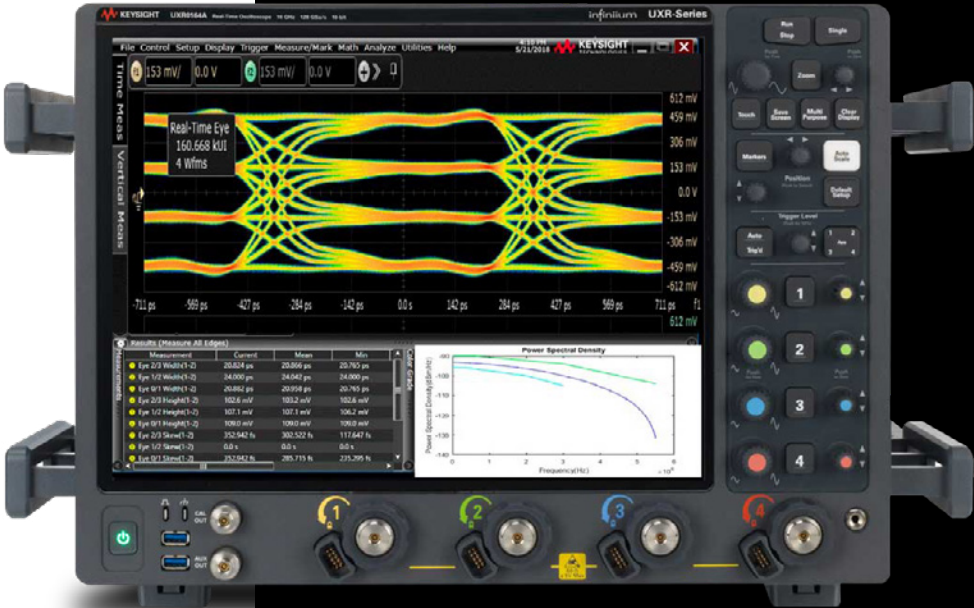
Learn more:

- [How to Test Automotive SerDes Transmit Conformance](#)
- [How to Test Automotive SerDes Receiver Conformance](#)
- [How to Test Automotive SerDes Channel Conformance](#)

Set up your Keysight Infiniium oscilloscope to show automotive protocol decode in less than 30 seconds:

CAN, CAN FD, CAN XL, LIN, FlexRay, and SENT

[Find out how](#)



Automotive Cybersecurity

As the connected car adds more ADAS, infotainment, and convenience applications, it is essential to protect data at all levels to ensure information security, as well as driver and passenger safety.

The **Keysight SA8710A Automotive Cybersecurity Test Platform** adds consistency and value to help you meet best practices for cybersecurity test and prepare for industry-wide standards. It combines hardware security validation, with software to stress-test the potential attack interfaces against a dynamic application and threat intelligence library.

Find out if there is a security risk before your new car model gets attacked or operates under dangerous conditions.

Protocol-specific connectivity gateways

- USB-based connectivity hub: Wi-Fi®, Bluetooth®, CAN
- Wireless test set: 2G, 3G, and 4G LTE cellular connectivity
- Requirements tracking: ISO/SAE 21434, UN R155, vehicle-specific requirements

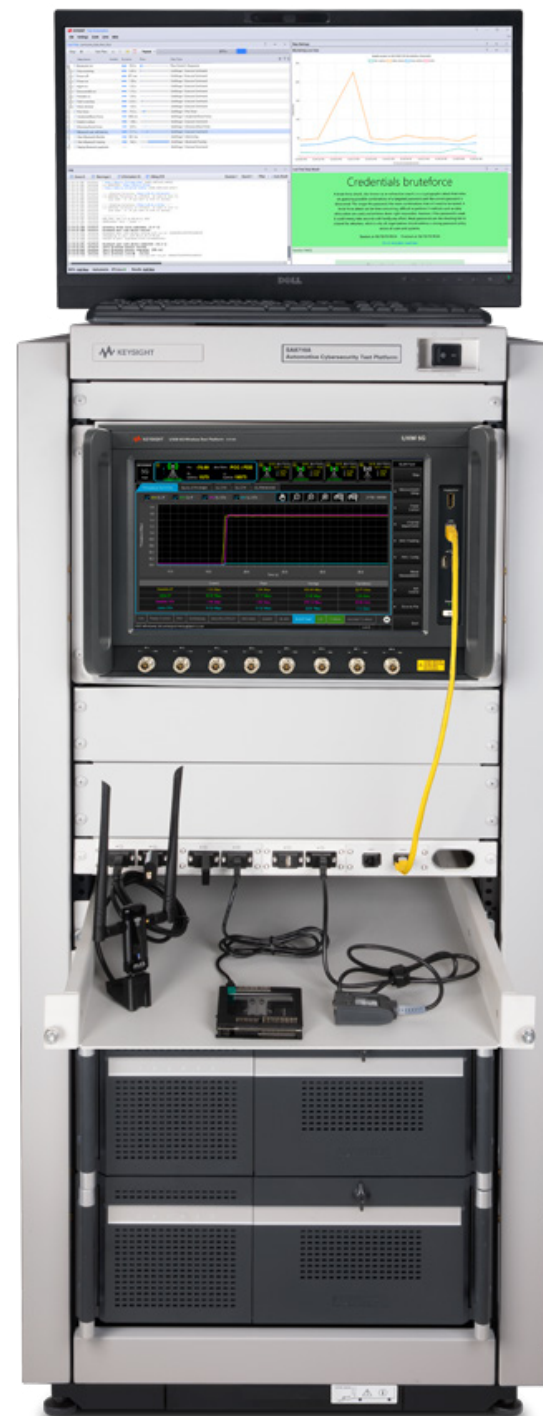
Management servers

- Windows management server: Penetration test platform
- Linux-based reconnaissance and fuzzing server: Exploitation and service attacks
- Auditing and reporting: Documentation / results tracking for CSMS integration, UN compliance
- Test and results management: Test planning, automation

[!\[\]\(0b0636dbae614f97346d733ac650473d_img.jpg\) More on Keysight's SA8710A Test Platform](#)

Learn more:

[!\[\]\(c19358fd94e0cf6da112c93f72051a9c_img.jpg\) How to Validate Automotive Cybersecurity](#)



E-Mobility

Scienlab Charging Solutions

Keysight offers test solutions to ensure your electric vehicle (EV) and electric vehicle supply equipment (EVSE) conform to global conformance and interoperability requirements.

With the **Keysight Scienlab Charging Discovery System (CDS) Series**, testing your electric vehicle (EV), and EV supply equipment (EVSE), and charging technology products for the global market is simple.

- Offers automated functional, conformance, interoperability, and quality testing for R&D, end-of-line (EOL), and electromagnetic compatibility (EMC) applications.
- Supports AC charging and DC fast charging standards from IEC, SAE, GB/T, DIN, and CHAdeMO
- Use intuitive software for test analysis and system operation.
- Supports an extensive test case library for automated compliance testing of CCS, CHAdeMO, and GB/T standards.

Learn more:

- > [How to Test EV Charging Conformance](#)
- > [How to Verify EVSE Charging Conformance](#)



The Keysight **EV-ESE Charging Communication Interface Tester** (Com Tester) enables component-level tests of electric vehicle communication controllers (EVCC) and supply equipment communication controllers (SECC). It supports Combined Charging System (CCS) communication. The COM Tester supports the following use cases:

- Good use case emulation for development testing of EVCC and SECC.
- Conformance test for type approval testing of EVCC and SECC.
- Scenario-driven tests for manufacturing testing of EVCC and SECC.
- Hardware-in-the-loop (HiL) integration tests on component levels.



The Keysight **CCS Charging Protocol Tracer** (CCS Tracer) enables seamless observation of the CCS communication channel between a charging station and an electric vehicle. In combination with the **CCS Charging Protocol Trace Viewer** (CPT), you can analyze the over-the-wire communication traffic.

- Easy analysis of CCS charging communication
- Small size for optimum use directly on the EV or EVSE



Products	Hardware	Software	
SL1040A	CDS Portable Series Thanks to a modular and innovative design, you can configure the CDS to customers' specific needs to ensure an optimal price-performance ratio.	—	Get a quote >
SL1040A	CDS EMC Series This version of the series is designed to use inside an anechoic chamber for immunity and emission tests (conducted or radiated) of electric vehicles and charging infrastructure.	—	Get a quote >
SL1047A	CDS High-Power Series This solution, featuring the Scienlab Cooling Unit with interchangeable liquid-cooled charging adapters, enables you to test charging interfaces of EVs and EVSE during high-power charging up to 1,500 V DC and ± 600 A DC.	—	Get a quote >
SL1047A	EV – EVSE Charging Communication Interface Tester This solution is designed for component-level tests of EVCCs and SECCs. It supports CCS communication (IEC 61851-1, DIN SPEC 70121, and ISO 15118).	—	Get a quote >
SL11556A	CCS Charging Protocol Tracer This solution enables seamless observation of the CCS communication channel between a charging station (EVSE) and an electric vehicle (EV).	—	Get a quote >
SL1093A	—	Charging Discover Test The software enables you to operate the system, visualize measured values, record test sequences, and generate reports.	Get a quote >
SL1470A	—	EV – EVSE Smart Charging Emulation Software Provides emulation of EVs / EVCCs or EVSEs / SECCs according to the standards addressed by the CCS specification.	Get a quote >
SL1471A	—	Charging Communication Test Automation Software Provides test case packages for conformance and interoperability testing based on the test implementation language TTCN-3 (Testing and Test Control Notation).	Get a quote >
SL1487A	—	CCS Charging Protocol Trace Viewer Enables decoding of CCS communication protocols used for charging.	Get a quote >



Scienlab Battery Testers

Keysight helps EV battery developers build better batteries faster with solutions at the cell, module, and pack levels.

Learn more:

- > [How to Validate EV Battery Modules](#)
- > [How to Test High-Power EV Battery Packs](#)
- > [How to Test EV Battery Cells](#)



Keysight's Scienlab battery testers include KeysightCare for Solutions. As a KeysightCare subscriber, you get unlimited access to Keysight's technical experts with predictable response times and onsite support for repair and calibration.

Products	Hardware	Software	
SL100XA	EV Battery Cell Tester Test battery cells with an output power up to ± 3.6 kW and voltage range up to 6 V.	—	Get a quote >
SL1001A	EV Battery Module Tester Test battery modules with an output power up to ± 68 kW and voltage range up to 300 V.	—	Get a quote >
SL1740A	EV Battery Pack Tester Test battery packs with output power up to 270 kW and voltage range up to 1500 V.	—	Get a quote >
SL1091A	—	Energy Storage Discover Achieve time-synchronous control of all battery test systems for cells, modules, and packs. Validate all energy storage types with different environmental components.	Get a quote >
EP1150A	—	PathWave Lab Operations for Battery Test Manage your resources and DUTs with an integrated, web-based lab management platform. Modernize your test workflows and increase data integrity and traceability.	Get a quote >

Learn more:

- > [KeysightCare for Scienlab Solutions](#)

Emulators

AC Emulator

The **Scienlab Regenerative 3-Phase AC Emulator** is designed to handle all your 3-phase AC test needs up to 1200 VAC, from 30 to 630 kVA, without the need for a transformer.

Two voltage ranges are available — 600 VAC and 1,200 VAC. The 600 VAC models are ideal for low-voltage inverter tests as well as EV and EVSE charging test applications. The 1,200 VAC models allow for high-voltage ride-through (HVRT) testing at the IEC low-voltage AC (LVAC) limit without needing a large, complex test setup.

- Covers AC test — up to 1,200 VL-L, up to 130 A, and up to 630 kVA.
- Achieves 1,200 VL-L at full specifications without extra equipment, such as a transformer.
- Saves energy with 100% regenerative (bidirectional) power solution with > 85% efficiency.



DC Emulators

Keysight regenerative DC Emulators enables the energy normally consumed to be returned to the power grid cleanly, saving energy consumption and cooling costs. Also both emulators can be fully integrated with [Scienlab Charging Discovery System](#) and [SL1093A Scienlab Charging Discover Software](#).

The [Scienlab Regenerative DC Emulator](#) - High-Power Series enables users to emulate the large batteries in electric vehicles. The bidirectional power flow allows emulation of both power sourcing applications, such as traction inverter test, as well as power-absorbing (sinking) applications, such as EV charging. The solution can support high-power DC charging test up to 270 kW in a small footprint, parallel for up to 1.5 MW.

The [Scienlab Dynamic DC Emulator Mid-Power Series](#) from Keysight provides up to five power stages, called Regenerative Power Systems (RP7900 Series). It is a family of bidirectional, regenerative DC power supplies.

- Provides up to 950 V DC, ± 100 A, and 50 kW (for a fully equipped rack with a total of five RPS units)
- Create a total power or loading of up to 150 kW (± 300 A DC) through easy paralleled connections of three fully equipped racks



Supporting the E-mobility Ecosystem

Better battery performance, improved electric drivetrains, the availability of efficient charging stations, and better power conversion across the e-mobility ecosystem have increased the range of hybrid and electric vehicles.

Keysight helps you design, test, and manufacture innovative electronics for renewable energy integration, advancement in battery technology, the rapid development of electric and hybrid electric vehicles, and charging systems compatibility.

Learn more:

 [How to Measure EV Battery Cell Self-Discharge](#)

Learn more about design and test solutions for the e-mobility ecosystem:

- [Scienlab test solutions for electric and hybrid vehicles and the power grid](#)
- [Keysight PD1550A double pulse tester for wide-bandgap discrete devices and power modules](#)
- [Keysight T2200 lithium-ion cell-formation solution](#)
- [Keysight BT2152B lithium-ion cell self-discharge measurement solutions](#)
- [PV8900 Series photovoltaic array simulator, up to 2,000 V and 30 A with a single supply](#)



Remove the Barriers to Your Success with KeysightCare

Support portal

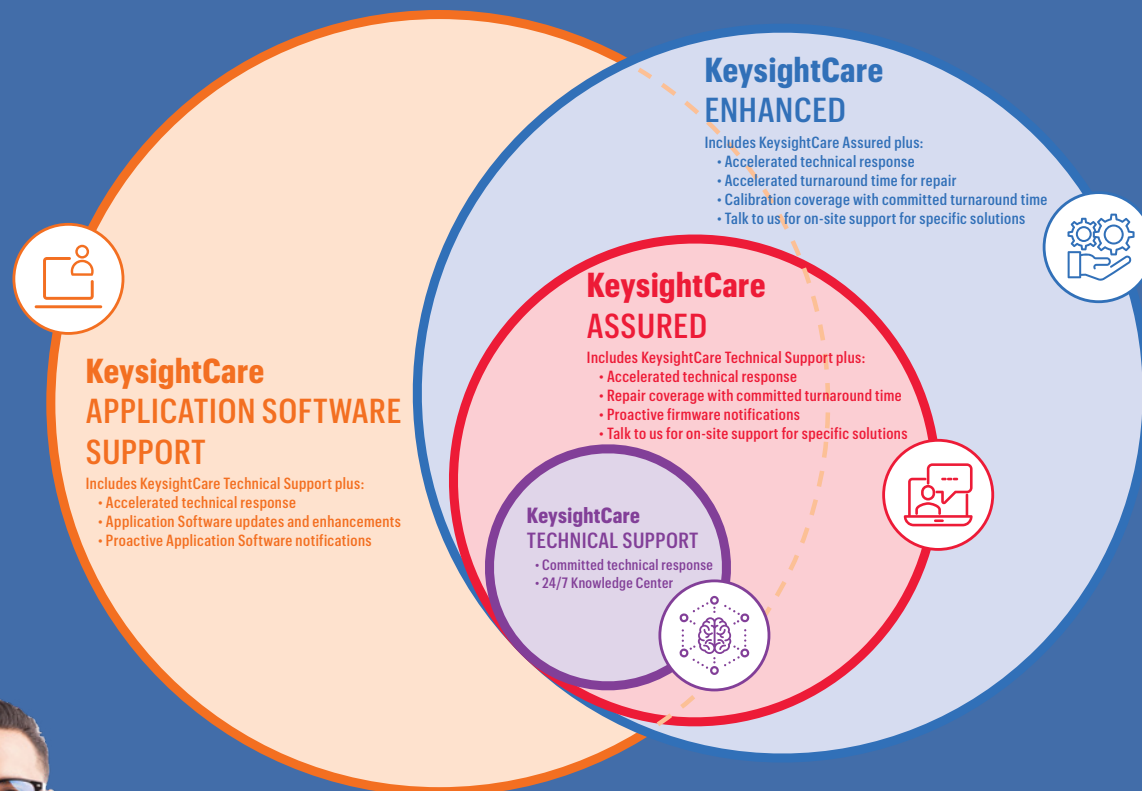
Receive personalized, proactive, and priority support. Find answers in the knowledge center, manage service requests, and interact with Keysight experts. Start [here](#).

Access to experts

With KeysightCare you get unlimited access to Keysight's technical experts on any instrument, application, or measurement question in addition to a worry-free warranty.

Lock in price and peak performance

Extend your peace of mind and eliminate budgetary surprises for up to 5 years with **KeysightCare Enhanced**. Trust your test results with calibrated in tolerance instruments and accurate measurements.



Accelerate the Wins with Help from Keysight Services

Prevent delays caused by technical questions or system downtimes due to instrument maintenance and repairs. The Keysight Services team is here to support you with expert technical support, instrument repair and calibration, software support, training, and more.

One year of KeysightCare Assured and Application Software Support is included with most eligible instruments and software. Maximize your test system up-time by securing technical support, repair, and calibration services with committed response and turnaround times. **Extend your coverage for up to 5 years and lock in peak performance with KeysightCare Enhanced.**

KeysightCare Enhanced * (includes tech support, warranty, and calibration)

Instruments	R-55B-001-1	KeysightCare Enhanced - Upgrade 1 year
	R-55B-001-2	KeysightCare Enhanced - Extend to 2 years
	R-55B-001-3	KeysightCare Enhanced - Extend to 3 years
	R-55B-001-5	KeysightCare Enhanced - Extend to 5 years
Solutions	R-55V-006-1	KeysightCare for Solutions Enhanced with Onsite Upgrade – 1 year
	R-55V-006-2	KeysightCare for Solutions Enhanced with Onsite Upgrade – 2 year
	R-55V-006-3	KeysightCare for Solutions Enhanced with Onsite Upgrade – 3 year
	R-55V-006-5	KeysightCare for Solutions Enhanced with Onsite Upgrade – 5 year

* available in select countries. For details, please check the service level in [KeysightCare Service Definition Tool](#).
R-55B-001-2/3/5 must be ordered with R-55B-001-1.



**Get service prices for
your instrument model**



Automotive Innovations Never Stop

Get up to speed with all the latest industry trends and solutions to help bring your next automotive innovation to life faster.

- > <https://learn.keysight.com/autonomous-vehicles>
- > <https://learn.keysight.com/electric-vehicles>
- > <https://www.keysight.com/us/en/industries/automotive-energy.html>
- > <https://www.keysight.com/us/en/industries/automotive.html>





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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