Enabling trustworthy automotive interoperability

A great user experience in connected cars requires seamless communication between devices and vehicles.
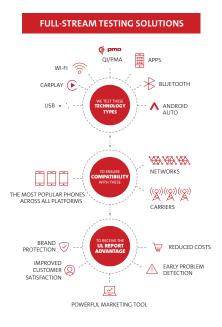
At UL Solutions, we've been testing mobile technology's connectivity, interoperability and user experience in automotive ecosystems since Bluetooth® was first introduced into vehicles in 2001. Since then, our services have advanced alongside mobile technology, and we know the importance of seamless and secure connections between you, your devices and your automobile.

As personal and automotive systems and devices grow ever more complex in the Internet of Things (IoT) ecosystem, it becomes increasingly difficult to avoid product connectivity problems post-launch. Due to budget and staffing constraints, it's unrealistic for anyone to identify every potential issue in-house — the number of possible connections and applications between devices is simply too large.

UL Solutions is here to help. Our long-standing relationships with major automakers, service providers and component and mobile phone manufacturers provide you access to our singular testing expertise from the planning stages through post-production and maintenance. Our engineers test factory-installed and aftermarket connected products to assess whether users get the promised experience.

At UL Solutions, our test scopes include:

- Cybersecurity
- Interoperability and compatibility verification
- Performance
- Real-time Bluetooth, Wi-Fi and projection connectivity
- Regulatory compliance

FULL-STREAM TESTING SOLUTIONS

WE TEST THESE TECHNOLOGY TYPES

QI/PMA · APPS · BLUETOOTH · ANDROID AUTO · USB · CARPLAY · WI-FI

TO ENSURE COMPATIBILITY WITH THESE

NETWORKS · CARRIERS · THE MOST POPULAR PHONES ACROSS ALL PLATFORMS

TO RECEIVE THE UL REPORT ADVANTAGE

BRAND PROTECTION · REDUCED COSTS · IMPROVED CUSTOMER SATISFACTION · EARLY PROBLEM DETECTION · POWERFUL MARKETING TOOL

UL Solutions is an approved testing laboratory for IoT and wireless standard bodies such as Bluetooth SIG, Thread Group, Connectivity Standards Alliance. We also actively engage with key players in 5G. For these protocols, UL can test the control systems and the connected devices and their accessories. We adapt our testing services to encompass the range of ever-advancing wireless accessories. We test interoperability in various industries, including consumer electronics and automobiles.

Providing you the widest breadth of testing services

We have a close working relationship with all mobile phone manufactures in the U.S. market. We also work closely with a variety of Bluetooth and Wi-Fi chipset vendors and infotainment system suppliers. We can validate your marketing claim that your mobile devices connect seamlessly in the vehicle and beyond.

These trusted relationships offer access to:

- 100% of U.S. mobile phone market
- Global facilities with large device libraries to support your global needs
- Extensive inventory of older phones to help extend the life of infotainment compatibly
- Pre-release device testing for future planning
- Pre-release and pre-update for major mobile operating systems
- Forward- and backward-compatibility testing
- Mobile app user experience and validation
- Infotainment system app user experience and validation

Protect your brand's reputation

We thoroughly review your product's features and technology specifications with real-world test scenarios that accurately replicate the consumer experience. This helps us identify problems prior to product launch before a poor user experience can potentially damage your brand with recalls and negative reviews.

We also test that the products and apps that connect to your device or automobile perform as expected so your reputation isn't damaged by poor interoperability of an auxiliary device or software. You can help protect your brand by using suppliers whose products have been UL tested for interoperability.

Customers trust third-party claims more than brand claims

58%
of adults need proof to believe marketing messages from brands

59%
of shoppers view reviews from strangers as trustworthy as from friends

42%
claimed to distrust brands

UP TO **40%** ★☆☆☆
of potential customers can be driven away by a negative review

69%
distrusted brands' advertising

UP TO **84%**
of millennials don't trust traditional advertising

MORE THAN
60%
of Fortune 500 and Global 500 companies work with UL Solutions

TENS *of* **BILLI⊕NS**
of products globally have the UL Mark

*Source: Trinity Mirror, ReportLinker, Label Insight report, Forbes

Testing helps build customer trust

No matter the manufacturing phase of your product, we offer a variety of testing approaches to help validate connectivity and interoperability performance. We can utilize your test plans, or you can take advantage of our vast library of industry-authenticated test plans. We can even combine both for a customized test solution specifically suited for your product.

Product design advisory services

Save time, money and resources with pre-production testing during the development stages of innovation. We offer a deep dive into interoperability testing to identify issues, validate performance and recommend solutions early to avoid costly trial-and-error prototyping. By testing early in your design process, you can spot and fix problems in the design before you get too far down the development pipeline. This can reduce the risk of expensive redesigns in production or post production.

Maintenance testing

The technologies to which your product connects can evolve rapidly, requiring additional testing to maintain a good user experience. We can help you confirm your product's user experience doesn't suffer when connecting with a recently upgraded operating system or a new mobile device introduced to the marketplace.

Our testing helps maintain user experience though your product's life cycle.

We also test against:
- User manuals
- Quick start guides
- Marketing claims
- Users' frequently asked questions

Our testing results are presented to you in a comprehensive format that offers a grading system based on pass/fail outcomes. For auto manufacturers, data sheets are available for easy upload to your website to promote approved devices.

Root cause analysis by connectivity experts

When there are failures in testing, we can help you understand why. We go beyond simple user experience testing by providing comprehensive root cause analysis. We have some of the most tenured connectivity industry experts working on site and have helped create and develop connectivity protocols, including Bluetooth.

Our experts can help:
- Diagnose interoperability issues
- Identify the sources of problems
- Collect protocol traces
- Define efficient resolution plans
- Recommend approaches to testing

Are you ready to build trustworthy automotive interoperability?
Learn more at UL.com/IOP or contact us today.

Solutions

Safety. Science. Transformation.™