

A close-up photograph of a person's hands on a bicycle handlebar. The person is wearing a light-colored, patterned shirt. The handlebar has a digital display with four green LEDs. The bicycle frame is black, and the front wheel is visible in the lower part of the image. A red semi-transparent box is overlaid on the right side of the image, containing the main text.

Leading the way in micromobility safety

Our comprehensive testing and certification
solutions for micromobility products



Solutions

Safety. Science. Transformation.™



The micromobility transformation

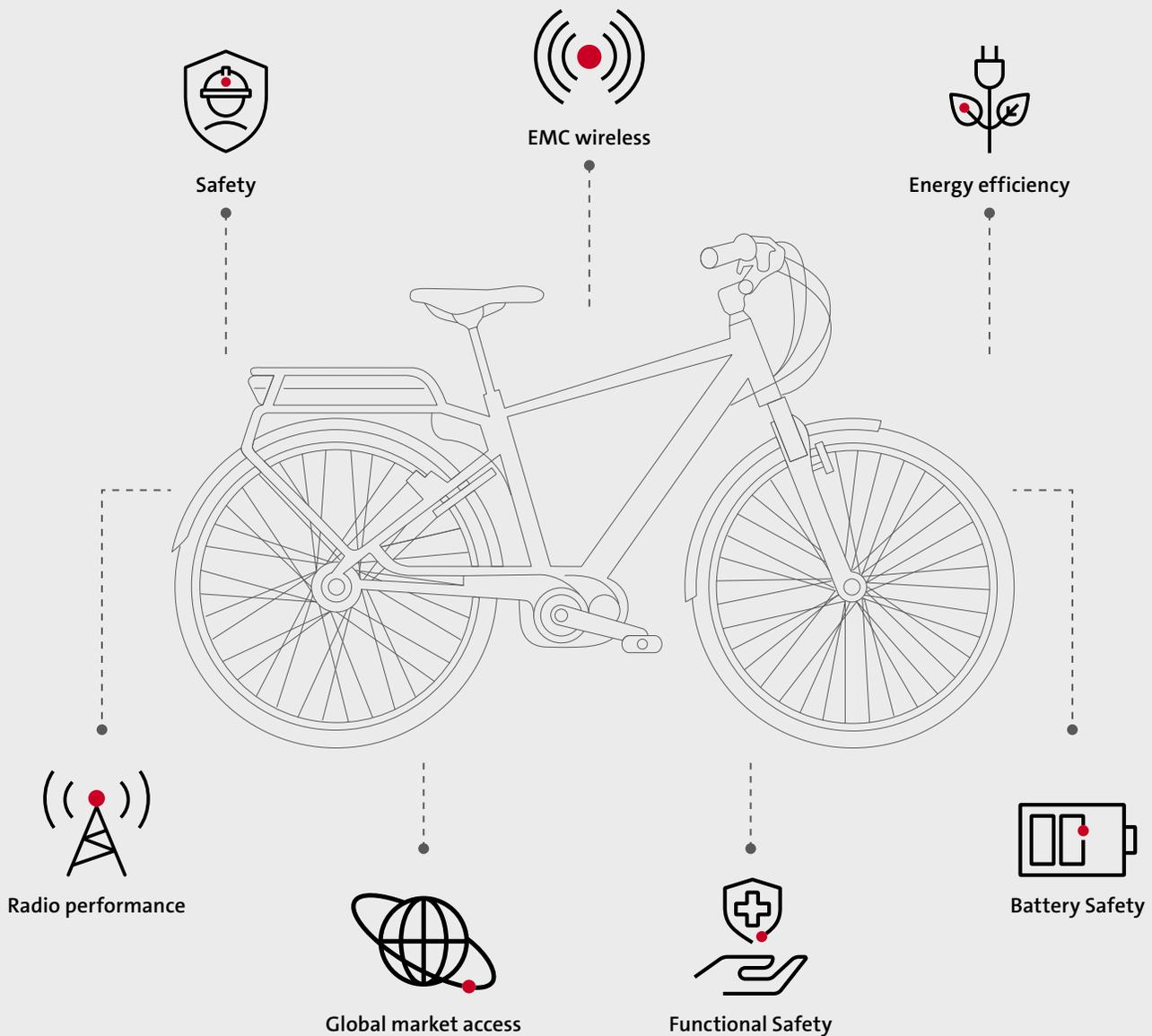
An incredible transformation of personal electrified transportation technology has taken place around the globe and shows no sign of slowing. More and more, light electric vehicles (LEVs) and personal transportation devices are populating worldwide markets.

The increasing demands put on e-transportation electrical systems and the associated safety challenges must be proactively addressed. In order to support this rapid market evolution, we have launched a platform of micromobility certification solutions.

A comprehensive solution

On top of our dedicated testing and certification solutions for micromobility devices, we also help manufacturers with a range of other tests, including:

- Safety
- EMC wireless
- Radio performance
- Battery safety
- Global market access
- Functional safety
- Energy efficiency



North America Requirements

	E-Bikes	E-Scooters and other micromobility devices
Safety	<p>UL 2849 Electrical Systems for eBikes</p> <p>The standard covers electric bicycles, both pedal assisted and non-pedal assisted. An eBike is defined as a two or three wheeled electrical/mechanical device provided with functional pedals that includes one or more electric motors to either assist the rider when pedaling (EPAC versions) or provide motive power to the wheels when the rider is not pedaling.</p> <ul style="list-style-type: none"> • UL 2849 is bi-national accredited consensus Standard for USA and Canada. • As a minimum, the electrical system consists of the drive unit [electric motor], battery, battery management system (BMS), interconnecting wiring, and power inlet. Any additional components or systems required to demonstrate compliance are included based on the overall system application and risk. 	<p>UL 2272 Electrical Systems of Personal E-Mobility Devices</p> <p>The Standard covers consumer mobility devices intended for a single rider with a rechargeable electric drive train that balances and propels the rider, and which may be provided with a handle for grasping while riding. This device may or may not be self-balancing. This Standard covers micromobility devices not intended for use on roadways, such as hoverboards, e-skateboards, e-scooters.</p> <ul style="list-style-type: none"> • UL 2272 is bi-national accredited consensus Standard for USA and Canada. • From 1 January, 2021 only UL 2272 certified electric scooters will be allowed in Singapore. <p>Hoverboards, e-Skateboards, e-Uniwheels and other forms for personal e-mobility are covered by this standard.</p>
Battery safety	<p>UL 2271 Batteries for Use in Light Electric Vehicle (LEV) Applications</p> <p>This standard covers requirements for electrical energy storage assemblies (EESAs) such as battery packs and combination battery pack-electrochemical capacitor assemblies and the subassembly/modules that make up these assemblies for use in light electric-powered vehicles (LEVs) as defined in this standard.</p> <p>UL 2271 is bi-national accredited consensus Standard for USA and Canada.</p>	
EMC	<ul style="list-style-type: none"> • US EMC requirements set by FCC. Typically FCC Part 15B unintentional radiators requirements • CANADA EMC requirements set by ISED Canada. Typically ICES-003 unintentional radiators requirements 	
Wireless	<p>US wireless requirements set by FCC. Typically FCC Part 15C, intentional radiators requirements.</p> <ul style="list-style-type: none"> • For 2.4GHz WIFI FCC part 15.247 • For Bluetooth FCC part 15.247 • For SRD typically FCC part 15.231/15.247 <p>CANADA wireless requirements set by ISED Canada. Typically RSS intentional radiators requirements</p> <ul style="list-style-type: none"> • For 2.4GHZ WIFI RSS-247 • For Bluetooth RSS-247 • For SRD typically RSS-210 	
Global Market Access	<p>Requirements for micromobility devices vary depending on target country. Please contact UL Solutions team for more information.</p>	
Energy Efficiency	<p>DoE and CEC (Department of Energy and California Energy Commission) US and NRCAN Canada mandatory requirements covering battery charging systems (micromobility end-product+battery+charger) and chargers. Testing at accredited lab required and additionally, for NRCAN only, certification required. Energy efficiency testing includes a range of specific tests and assessments intended to evaluate various design features and use considerations of a given product. Energy efficiency testing typically includes:</p> <ol style="list-style-type: none"> 1. Charge mode and battery maintenance mode test 2. Battery discharge energy test 3. Standby mode energy consumption test 4. Off mode energy consumption test 	

U.S. Consumer Product Safety Commission (CPSC) Micromobility Safety Guidance

On December 20, 2022, the U.S. Consumer Product Safety Commission's (CPSC) has called on manufacturers, retailers, importers, and distributors of micromobility devices to comply with established UL safety standards. This includes products covered by UL 2272 and UL 2849, which address electrical systems in personal e-mobility devices (such as hoverboards) and eBikes, respectively.

New York City Council's law on micromobility devices and batteries

In a move to strengthen fire safety of e-bikes, e-scooters, and the lithium-ion batteries that power such devices, on March 2, 2023, the New York City Council passed Initiative 663-A, mandating e-bikes, e-scooters, e-mobility devices, and light electric vehicle (EV) battery packs to be third-party certified. On March 20, 2023, New York City Mayor Eric Adams signed this into law. With this new law, any company selling, leasing or distributing micromobility devices, such as e-bikes or e-scooters, has until September 16, 2023, to obtain certification from an accredited testing laboratory to:

- UL 2849, the Standard for Electrical Systems for e-Bikes, for the electrical system of any powered bicycle sold, distributed, leased, or rented in New York City.
- UL 2272, the Standard for Electrical Systems for Personal E-Mobility Devices, for all powered mobility devices, including e-scooters, sold, distributed, leased, or rented in New York City.
- UL 2271, the Standard for Batteries for Use in Light Electric Vehicle Applications, of any storage battery for a powered bicycle or mobility device sold, distributed, leased or rented in New York City.



European Union Requirements

From a safety perspective, Machinery Directive 2006/42/EC is applicable and should be followed.

	E-Bikes	E-Scooters and other micromobility devices
Safety	EN 15194 for e-bikes is the only specific standard that has been published. At this time EN 15194 does not cover the necessary safety of electrical systems utilizing battery packs in the same manner of how UL 2849 covers this subject.	EN 60335-1 is a generic standard commonly used for hoverboards. This standard does not cover the necessary safety of electrical systems utilizing battery packs in the same manner as UL 2272 covers this subject. Hoverboards, e-Skateboards, e-Uniwheels and other forms for personal e-mobility are covered by this standard.
Battery safety	EN15194:2017 standard for eBikes specifically refers to IEC EN62133 and EN 50604-1 standards for battery safety. IEC/EN62133:2017 covers safety for secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Safety Requirements for Portable Sealed Secondary Cells, and for Batteries Made from them, for Use in Portable Applications EN 50604-1- this standard covers secondary lithium batteries for light electric vehicle (LEV) applications	
EMC	EN 15194 - ANNEX C Contains the EMC emission and immunity requirements for EPAC and ESA devices	EMC Directive (2014/30/EU) Most common applicable standards: <ul style="list-style-type: none"> • EN 55014-1 or EN61000-6-3 • EN 55014-2 or EN61000-6-1 • EN 61000-3-3 • EN 61000-3-2
Wireless	RE-Directive 2014/53/EU (RED) Depending on the wireless technology, different standards can be used: <ul style="list-style-type: none"> • For WIFI EN 301 489-1/17 + EN 300 328 • For BLUETOOTH EN 301 489-1/17 + EN 300 328 • For SRD EN 301 489-1/3 + EN 300 220-2 	
Global Market Access	Requirements for micromobility devices vary depending on target country. Please contact UL Solutions team for more information.	
Energy Efficiency	ErP Directive mandatory requirements, covering battery charging systems (eBike+battery+charger) and chargers. Example standard EN 50563.	ErP Directive mandatory requirements, covering battery charging systems (micromobility end-product+battery+charger) and chargers. Example standard EN 50563.

The EU Commission Coordinated Activities on the Safety of Products (CASP) 2019 study has referenced additional standards for product safety of Personal Transporters, but UL Solutions provides the most commonly utilized standards for electrical safety.





Panasonic

Giving riders peace of mind: Panasonic and the first e-bike certified to UL 2849

Panasonic, a global manufacturer of batteries for automotive and e-bicycles, became the first organization to certify to UL 2849, the Standard for Electrical Systems for eBikes.

Innovations in sustainable transportation in the form of e-mobility, or micromobility, have grown rapidly in the past decade. To keep pace with this evolving technology, UL Solutions has launched a new voluntary safety certification program to the American National Standards Institute (ANSI) and Standards Council of Canada (SCC) accredited electric bicycle system safety binational standard, ANSI/CAN/UL 2849.

Panasonic, a global manufacturer of batteries for automotive and e-bicycles, became the first organization to certify to UL 2849 on Jan. 3, 2020, for their GXO and GXL models, BEP-NUA251F and BEP-NUA252F series.

Panasonic has worked with UL Solutions engineers and laboratory technicians globally on the product safety evaluation and testing, ultimately achieving UL 2849 certification of its e-bicycles.

Riders can have peace of mind that the products and components they rely on meet and exceed the strictest industry standards,' said Tom Juliano, director of Regulatory Affairs and Compliance at Panasonic Corporation of North America.

UL Solutions evaluated the Panasonic e-bike's product design and tested per the test requirements of ANSI/CAN/UL 2849, which addresses the battery system, charging system, electric motors and other electrical parts. Evaluation, testing and certification to UL 2849 by UL Solutions aims to minimize risks from e-bike system fires or explosions, such as lithium battery thermal runaway, as well as electric shock hazards.

The UL 2849 certification program includes:

- Product design review requires robust evaluations of the battery system, charger system, battery protective circuitry, system protective circuitry, electrical drive train system and variations in the system combinations per the consensus requirements of UL 2849.
- Electrical, environmental, functional and mechanical safety testing per the test clauses of UL 2849 in order to minimize the risk of fire and electric shock of the e-bike product.
- The UL 2849 certification program does not evaluate for the operator's ability to maintain control while riding and remains focused on system safety for fire, explosions and electric shock.

As interest in new types of micromobility devices has grown, so has interest by consumers, city planners, manufacturers and retailers in finding ways to incorporate them safely into daily life.

"UL Solutions has been involved with the trend of micromobility in recent years, creating electrical safety certification programs as new products come on the market," said Ghislain Devouge, UL Solutions' senior vice president and general manager for the Consumer Testing, Inspection and Certification business. "UL Solutions is excited to be part of the growth of e-bikes because it enables a fun alternative to traditional transportation, and it helps city planners reduce congestion creating sustainable, smart cities."

UL 2849 complements the previous UL Solutions standard that addresses micromobility, UL 2272, the Standard for Electrical Systems for Personal E-Mobility Devices. UL 2272 was previously developed as the national standard of the U.S. and Canada for electronic personal mobility devices. These include hoverboards, e-skateboards, e-scooters and e-transporters. UL Solutions issues test reports and certifications to both Standards. In addition, UL Solutions leads initiatives globally for micromobility to help manufacturers and commercial sharing service companies achieve international market access.

How we can help



We deliver comprehensive solutions for micromobility.



We test safety, functional safety and radio/EMC aspects.



We provide technical advisory and continuous updates on the latest global regulatory landscape.



We provide combined evaluations of batteries and end products.



We help you navigate complex global market access.

Why UL Solutions



Expertise

We have been working to mitigate the potential risks from products using lithium-ion batteries for 40 years by applying our safety science expertise and rigorous end-to-end testing methodologies to give users peace of mind.



Knowledge

We support manufacturers and regulators with webinars and dedicated training sessions on regulations worldwide.



Unparalleled experience

We draw on more than 50 years of research and development more appropriate for consumer technology.



Trusted leadership

We are highly regarded experts on micromobility worldwide and stay on top of the latest developments.



Not all certifications are equal. Here's why UL Solutions is trusted:



OSHA Nationally Recognized Test Laboratory and ANAB and SCC accredited for product certification, with more than 55 locations globally for local delivery



All applicable requirements, including testing, must be met to earn the holographic UL Mark



Conducts regular factory visits as part of ongoing surveillance to confirm continued product compliance



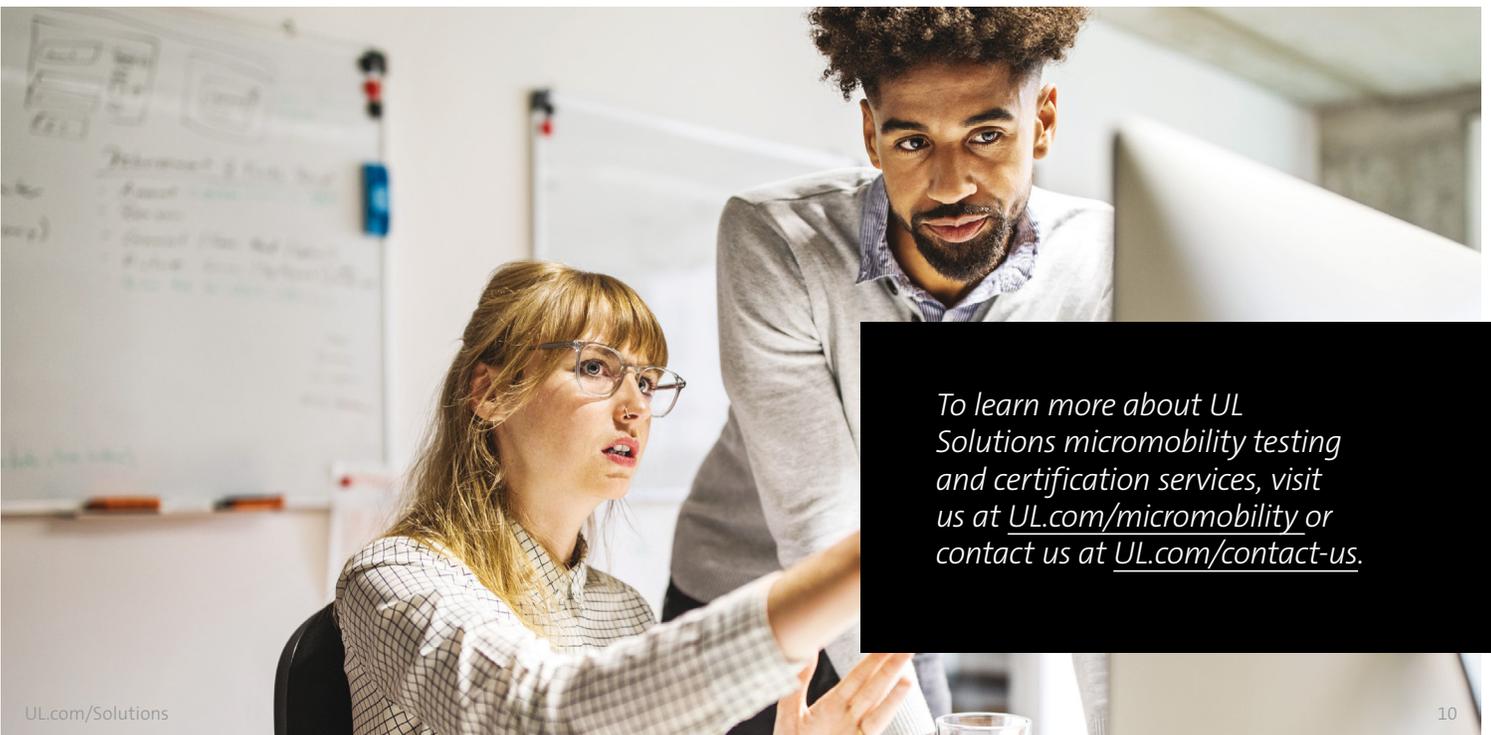
Evaluates, tests and certifies to a full spectrum of U.S./Canadian micromobility safety standards including UL 2849, UL 2272, UL 2271 and more



Trains U.S. Customs and Border Protection and Department of Homeland Security to identify counterfeit UL Marks



UL certification is a valuable marketing tool that tells your customers that your product, process, service or company has successfully met stringent requirements.



To learn more about UL Solutions micromobility testing and certification services, visit us at [UL.com/micromobility](https://www.ul.com/micromobility) or contact us at [UL.com/contact-us](https://www.ul.com/contact-us).



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