LEADER IN CARRIER APPROVALS, REGULATORY CAPACITY AND 5G EXPERTISE

WI-FI 6E
EMC/RF
OTA
5G NR
SAR/RF
HAC
BATTERY SAFETY
WPT
IoT
CARRIER CONFORMANCE

SPEED
TECHNICAL EXPERTISE
MARKET ACCESS
ON TIME EVERY TIME
QUALITY
CAPACITY

A comprehensive offering only from Element: all major carrier approvals, extensive regulatory capacity and world-leading 5G expertise, all delivered by one company.

WHO WE ARE

Element is a leading global provider of Testing, Inspection, and Certification services for a diverse set of industries where failure in service is not an option. In the connected technology sector, we help innovators bring visionary technology to market faster, supporting our customers' regulatory and commercial goals. Together, Element and our acquired partners PCTEST and AIRCOM offer end-to-end expertise in connectivity, interoperability and regulatory compliance. We provide quality assurance at speed, ensuring your devices meet internationally recognized standards for safety, compliance and performance.
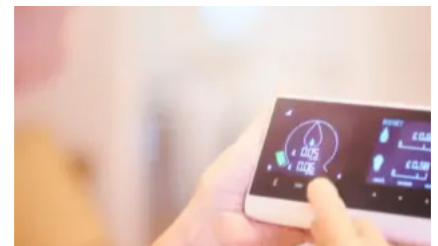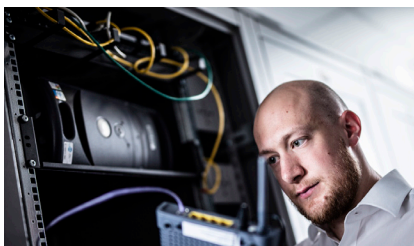
MARKETS WE SERVE

MOBILE & CELLULAR

CONSUMER ELECTRONICS

INTERNET OF THINGS (IoT)

TELECOMS

MEDICAL DEVICES

AUTOMOTIVE

ONE COMPLETE PACKAGE: TESTING AND CERTIFYING LEADING-EDGE CONNECTED TECHNOLOGY

EXTENSIVE CAPACITY
- Uniquely positioned to provide services around the globe with local presence and agility. Our network of state-of-the-art laboratories spans the US, Europe, and Asia, with an expanding footprint in Silicon Valley.

COMPREHENSIVE SUPPORT & EXPERTISE
- Full carrier coverage: we are authorized by all 3 major US operators plus European and Japanese operators.
- In-house expertise across the complete spectrum of wireless testing and certification services, including regulatory, industry and carrier certification.
- We are experts in emerging technology, including 5G and connected medical.
- We work closely with regulators, trade bodies & international committees on pre-approval guidance, standards development, and more.

OUR AGILE TEAM OF EXPERTS ARE PERFECTLY EQUIPPED TECHNICALLY, OPERATIONALLY AND GEOGRAPHICALLY TO DELIVER ON TIME, EVERY TIME.

SERVICES WE PROVIDE

- **Cellular conformance**
- **OTA (Over the Air)**
- **SAR/PD (Specific Absorption Rate/Power Density)**
- **HAC (Hearing Aid Compatibility)**
- **EMC (Electromagnetic Compatibility)**
- **Battery safety and life**
- **RF (Radio Frequency) Parameters**
- **Protocols**
- **Product Safety**
- **And more**

TECHNOLOGIES WE SUPPORT

- **Leader in full range of 5G technology testing and certification services (FR1 & FR2)**
- **3G, 4G - LTE**
- **Wi-Fi 5/6**
- **WPT (Wireless Power Transfer)**
- **UWB (Ultra Wide Band)**
- **NFC (Near Field Communications)**
- **Microwave fixed links**
- **Bluetooth®/ZigBee®**
- **Radar (Frequency-Modulated Continuous Wave)**
- **And more**

We support every stage of your project from product conception to market introduction, all in-house. We are committed to exceeding your expectations as a full-service testing and certification partner.

| ADVISORY SERVICES | TESTING | CERTIFICATION | CARRIER RECOGNITION | INDUSTRY APPROVAL |

MORE 5G TESTING CAPABILITY AND CAPACITY FOR FASTER MARKET ACCESS

Radio equipment requires a compliance test and technical assessment to ensure it is designed and configured for its intended purpose and will not cause any harm or disruption to people, the network or the environment in which it operates. Element's high capacity 5G NR test and certification services will help you expedite your product's journey to market.

OUR SERVICES

At Element, we understand the operation of the 5G NR test equipment and 3GPP specifications, just as we understood 4G (LTE), 3G, and 2G systems before them. We understand that every business's goal is to launch your product to market as efficiently as possible. At Element, we have the knowledge, capacity, test equipment and experience to help you achieve your goal from beginning to end. Our test labs are experienced and ready to assess 5G devices. When testing is complete, our experienced certification bodies are ready to approve your 5G devices for a global regulatory market.

- 3GPP TS 38.5xx RF, Supp RF, Conformance
- 5G NR FR1 & FR2 Operator Supp Test Plans (3rd Party Approved)
- Radio Transmitter and Receiver Communications
- Over the Air (OTA) Performance
- Electromagnetic Compatibility (EMC)
- Hearing Aid Compatibility (HAC)
- Safety Testing, Battery Testing
- Radio Frequency (RF) Exposure
- Radio Testing

- Cybersecurity
- Specific Absorption Rate (SAR)/ Power Density (PD)
- FCC, ISED, CE Marking, and MIC Testing and Certification
- Conformance Certification & Performance Testing
- Operator and Network Acceptance Services
- TCB/FCB and Notified Body
- PTCRB/GCF/CTIA Certification
- CRBS - OnGo Alliance
- Sunspec Alliance Certification

OUR ACCREDITATIONS AND CERTIFICATIONS

- FCC (Federal Communications Commission)
- ISED (Industry Canada)
- CE Marking (CE Mark)

- EU Notified Body for Radio Equipment Directive (RED)
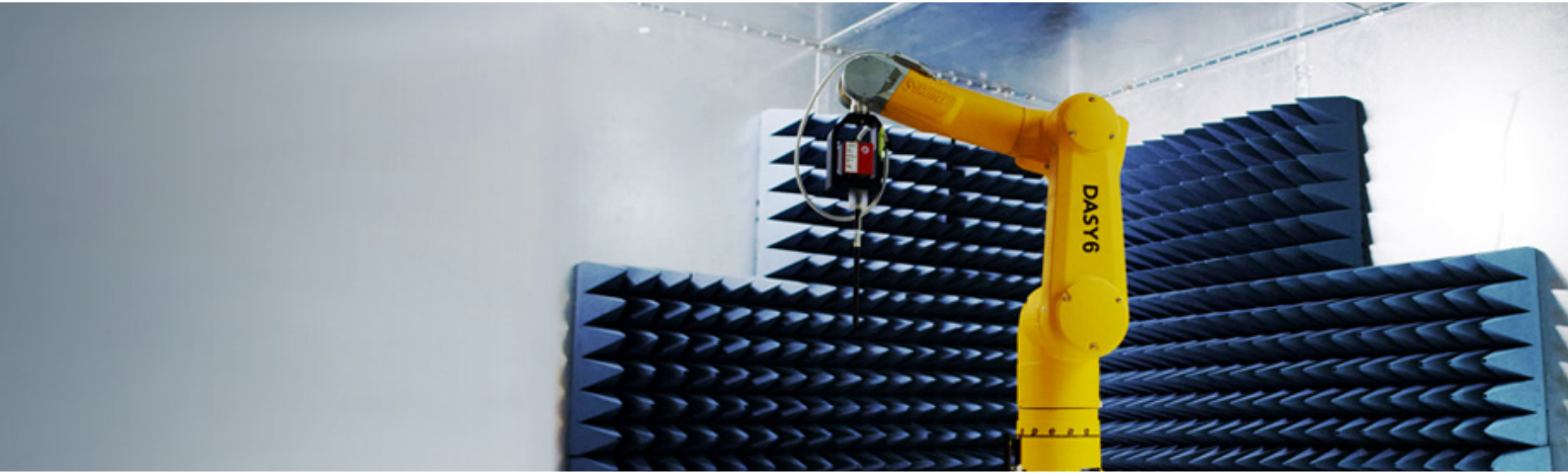- Ministry of Interal Affairs and Communications (MIC) for Japan

LOOKING INTO THE FUTURE

While your device completes 5G testing at Element and enters the market, we will continue to keep our eyes on the development of 3GPP standards and the next generation of wireless technology. We look forward to partnering with you again as we enter the next generation of cellular communication.

TRUST THE CERTAINTY OF element

With almost 200 years of experience and a global network of world-class laboratories, we make certain that the materials and products we test, inspect and certify for our customers are safe, quality, compliant and fit for purpose.

Send your inquiries to: contact.us@element.com

Ensure your wireless device is compliant with Radio Frequency (RF) safety limits for worldwide markets with RF Exposure assessments including Specific Absorption Rate (SAR), Power Density (PD) testing, and SPR-002 Nerve Stimulation Testing.

OUR SERVICES

Defined as the measure of Radio Frequency (RF) energy absorbed by the head or body, Specific Absorption Rate (SAR) is carefully regulated by government institutions. As a Vodafone-authorized SAR laboratory, Element can help you determine the SAR of a product and ensure that the rate is below accepted standards for safe exposure.

Element regularly carries out RF exposure assessments for a wide range of products including 2G/3G/4G/5G/WLAN/Bluetooth smartphones, tablets, laptops, wearables, and implantable devices. We also offer RF exposure and SAR testing services according to the latest standards and specifications around the world to support you with gaining approvals for CE marking for EU, FCC for U.S., ISED for Canada, MIC for Japan, RRA for Korea, and UKCA marking for the UK.

We have close and regular contact with the FCC, ISED, service providers/carriers, and manufacturers, and use this to establish test solutions for complex compliance situations. We have assisted in developing test solutions for regulatory requirements for products including:

- 5G NR and mmWave technology
- A4WP, WPC, PMA Wireless Power Transfer (WPT)/Charging
- Consumer and occupational handheld wireless devices
- Device-based Time-Averaged RF Exposure (TAS)
- EAS, metal detectors, RFID, TPMS, vehicle security systems
- Implants and body-worn devices
- IoT including Zigbee
- Tablets & smartphones including cellular technologies 2G/3G/4G/LTE/5G
- Wearables
- Consumer Premise Equipment (CPE)

STANDARDS

EUROPE
- EN 62369-1 (2009)
- EN 50360 (2017)
- EN 50566 (2017)
- EN 62209-1 (2016)
- IEC 62209-1 (2016)
- EN 62209-2 (2010/AMD1:2019)
- IEC 62209-2 (2010/AMD1:2019)
- EN 50364 (2018)
- EN 62479 (2010)
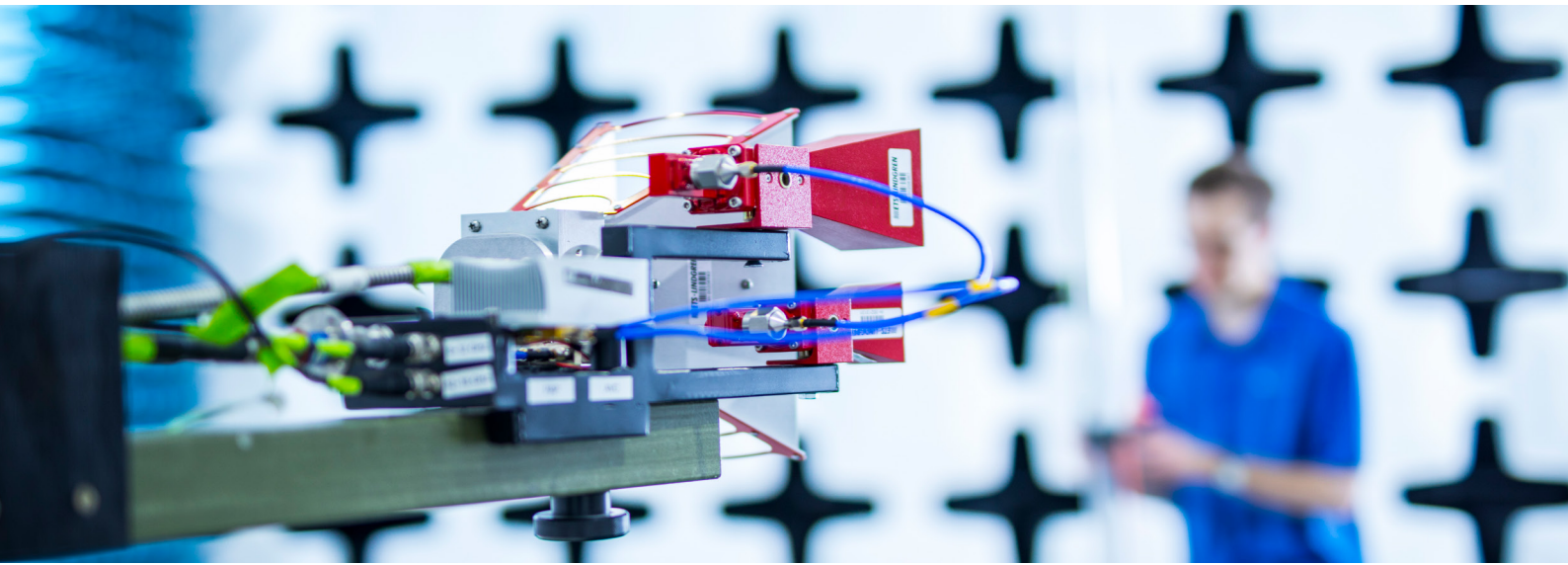- IEC/IEEE 62209-1528 (2020)
- IEC TR 63170: 2018

NORTH AMERICA
- FCC RF Exposure KDBs
- IEC/IEEE 62209-1528 (2020)
- IEEE Standard 1528 (2013)
- IEC 62209-2 (2010/AMD1:2019)
- IEC 62209-1 (2016)
- RSS-102, Issue 5
- Safety Code 6: Health Canada's Radiofrequency Exposure Guidelines
- RSS-102, SPR-002
- IEC TR 63170: 2018

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OVERVIEW

Element's EMC laboratories in the US and UK hold a range of accreditations and approvals including ISO/IEC 17025:2005 from NVLAP, A2LA or UKAS, approval to ISO 9001:2008, and are a Notified Body against the EMC Directive.

Within our labs, we test thousands of products every year. We have the largest capacity in the UK for electromagnetic testing commercial and industrial electronic devices to meet regulatory, as well as contractual requirements for a diverse range of products.

Our industry leading capacity and expertise help our customers get their products to international markets faster and allows them to confidently publish their European Declaration of Conformity that demonstrates compliance with the European EMC Directive which is necessary for CE Marking.

We are experts in helping companies satisfy the regulations of nearly 200 countries around the world; enabling our clients to export and sell their products globally, access new markets and drives growth.

OUR SERVICES

EXAMPLES

- Electromagnetic compatibility testing to meet FCC CFR47 part 15 requirements for North America and ISED requirements for Canada
- Conducted & radiated electromagnetic immunity/susceptibility testing
- Conducted & radiated electromagnetic emissions testing
- EMC testing for E-marking on sub-assemblies and whole vehicles
- On-site EMC surveys/testing

COMMON REGULATORY STANDARDS (INC NATIONAL VERSIONS / DERIVATIVES)

- IEC/61000-4-x series
- IEC/61000-6-x series
- IEC/61000-3-2&3
- IEC/61326-x series
- IEC/55022
- IEC/55032
- IEC/55024
- IEC/50121-x
- EN301 489-x series
- IEC/60601-1-2

For a comprehensive list of our services, accreditations & approvals, please visit element.com or call +1 888 786 7555

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OUR SERVICES

Element's IoT testing services cover a wide range of wireless devices including Cellular (including 5G FR1 & FR2, 4G LTE Cat M1, Narrow-Band IoT), Wi-Fi, RFID, ZigBee, Bluetooth and BLE devices, with customers from the Healthcare & Life Sciences, Consumer and Home, Energy, Buildings Transportation, Industrials and IT & Networks industries.
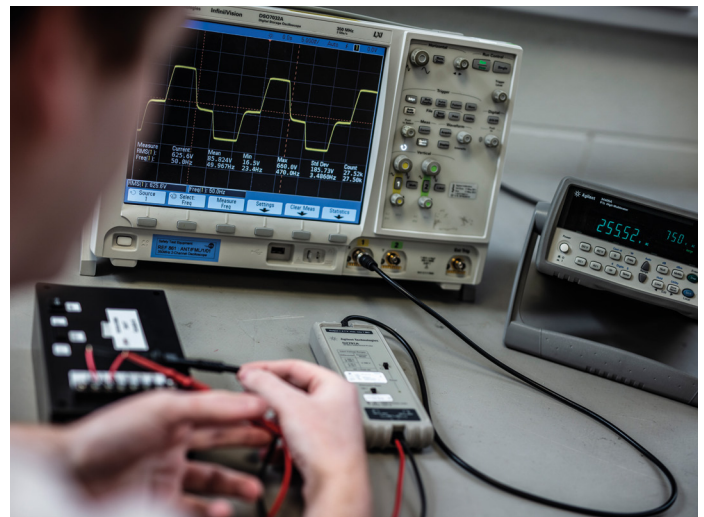
PRODUCT COMPLIANCE TESTING

- Wireless (Radio)
- EMC
- Safety
- RF Exposure (SAR testing)
- Hearing Aid Compatibility (HAC)
- OTA Testing (inc mmW)

ADDITIONAL SERVICES

- Advisory services (Compliance GAP analysis, test plans)
- ECO system testing
- Protocol Testing
- Reliability And Scalability Testing
- Pre-Deployment Testing

GLOBAL MARKET ACCESS

Between new technology and the growing list of certification regulations, access to the global marketplace is becoming more of a challenge for manufacturers. Entering new markets is more important than ever to achieving growth and staying competitive – but with unique requirements in individual countries, it can be difficult to know if your products are compliant. Our team of international certification experts provide the testing and certification assistance needed to bring your products to a global market audience.

ELEMENT MATERIALS TECHNOLOGY

WHY CHOOSE ELEMENT?

UNIQUELY QUALIFIED

Elements global certification team streamlines testing programs, providing customers with a cost-effective certification timeline to maximize return on investment for product development.

CUSTOMER CARE

Element focuses on creating an excellent customer experience for our clients in all of their interactions with Element. We put our customers at the heart of everything we do so that we can be a truly customer-centric organization.

ENGAGED EXPERTS

We provide an extensive network of highly technical engineers across diverse services providing support as you develop products and launch across the world.

WIRELESS (RADIO) TESTING

- PTCRB/GCF Testing
- Regulatory Compliance Testing
- Exploratory Testing
- Compatibility Testing
- SAR Testing
- Over The Air (OTA) Measurements
- Hearing Aid Compatibility (HAC)

EMC TESTING

- Pre-Deployment Testing
- Compliance Testing
- Functional Testing
- Wireless Coexistence

ADVISORY SERVICES

- Assistance with Test Plans
- Compliance GAP Analysis
- CE and FCC Requirement Training
- Risk Assessment Reviews

SAFETY TESTING

- Basic Safety Assessments
- Performance Testing
- Usability Testing
- Risk Assessments

CERTIFICATION SERVICES

- CB Scheme
- Zigbee Certification: Smart Energy, Home Automation (Zigbee 3.0)
- Telecommunications Certification Bodies (TCB)
- Foreign Certification Body (FCB) for Innovation, Science and Economic Development (ISED)
- Notified Body (NB) for the Radio Equipment Directive (RED) and Electromagnetic Compatibility Directive (EMCD)
- CTIA Authorized Test Lab
- PTCRB/GCF Certified Test Laboratory

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contact.us@element.com   element.com

ELEMENT MATERIALS TECHNOLOGY

North America: +1 888 786 7555   .   Europe: +44 808 234 1667   .   German Language Support: +49 800 000 5137

OVERVIEW

From our European and North American facilities, we work with Chipset Vendors though to those integrating radio modules to enable them to deliver their wireless and radio products to market.

ACCREDITED TESTING FOR

- Europe
- United States
- Canada
- Japan
- Korea
- Australia / New Zealand

WIDE RANGE OF TECHNOLOGIES

- Digital Transmitters: Bluetooth / WLAN (2.4 & 5 GHz) / ZigBee
- Non-specific Short Range Devices (SRD)
- RFID
- DECT
- Satellite
- RADAR
- Land mobile radio
- Point to point microwave links

OUR SERVICES

USA AND CANADA

Element provides the related filing services that enable the Federal Communications Commission (FCC) and Innovation, Science and Economic Development Canada (ISED-Canada) to certify radio products. Element is accredited to ISO/IEC 17025:2005 and an appointed FCC Technical Certification Body (TCB) and ISED-C Foreign Certification Body (FCB).

EUROPE

Element is UKAS accredited to ISO/IEC 17025:2005. We can assist OEM integrators and manufacturers with their radio solutions by providing formal testing to European Harmonised Standards, as well as being a Radio Notified Body.

JAPAN

Element provides the related filing services that enable the Japanese Ministry of Internal Affairs and Communications to certify radio products.

We assist radio manufacturers with a number of regulations for Japanese radio compliance that fall under the Ordinance concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment and are designated as a CAB by MIC.

COMPLIMENTARY SERVICES

Element works with radio solution manufacturers throughout the design and compliance process. From the product's conception we can provide guidance on regulatory requirements that will be faced, through our Early Stage Qualification (ESQ®) program as well as pre-compliance testing, formal application for standards, and certification. We can then assist with taking the radio product to the global marketplace through our approvals services.

SPECIFIC ABSORPTION RATE (SAR) TESTING

Our SAR testing lab is located in a semi-anechoic chamber to maintain strict temperature control and eliminate influences from other nearby transmitters. We've selected the premier supplier of SAR evaluation systems and government-preferred vendor, SPEAG of Zurich Switzerland, to provide their latest offering – the DASY5. Equipped with probes, tissue simulants, and phantoms, the DASY5 can evaluate wireless devices operating from 400 MHz – 6 GHz. In addition, we use a variety of call boxes to support all cellular operating modes up through LTE.

ANTENNA PATTERN MEASUREMENTS AND OVER THE AIR MEASUREMENTS

Element provides Antenna Pattern Measurement (APM) and Over the Air (OTA) services. Our test chamber is designed for fully compliant radiated wireless antenna measurements over the frequency range of 400 MHz to 6 GHz.

Element's Antenna Pattern Measurement test chamber was designed and built by ETS Lindgren. The model AMS-8923-195 Lab includes a multiantenna array which is a ring that houses twenty-three (23) dual-polarized measurement antennas spaced every 15º. The turntable/positioner for the device under test (DUT) provides continuous rotation along the phi axis with minimized reflections through the use of low dielectric materials throughout this fully anechoic room (FAR.) The room is also equipped with a goniometer to improve that 3D resolution from 15º down to 1º as needed. An integrated laser alignment system assists with DUT positioning, and with an integrated high-speed switch controller, the system provides fast switching between antennas for accelerated testing.

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T R U S T   T H E   C E R T A I N T Y   O F   element

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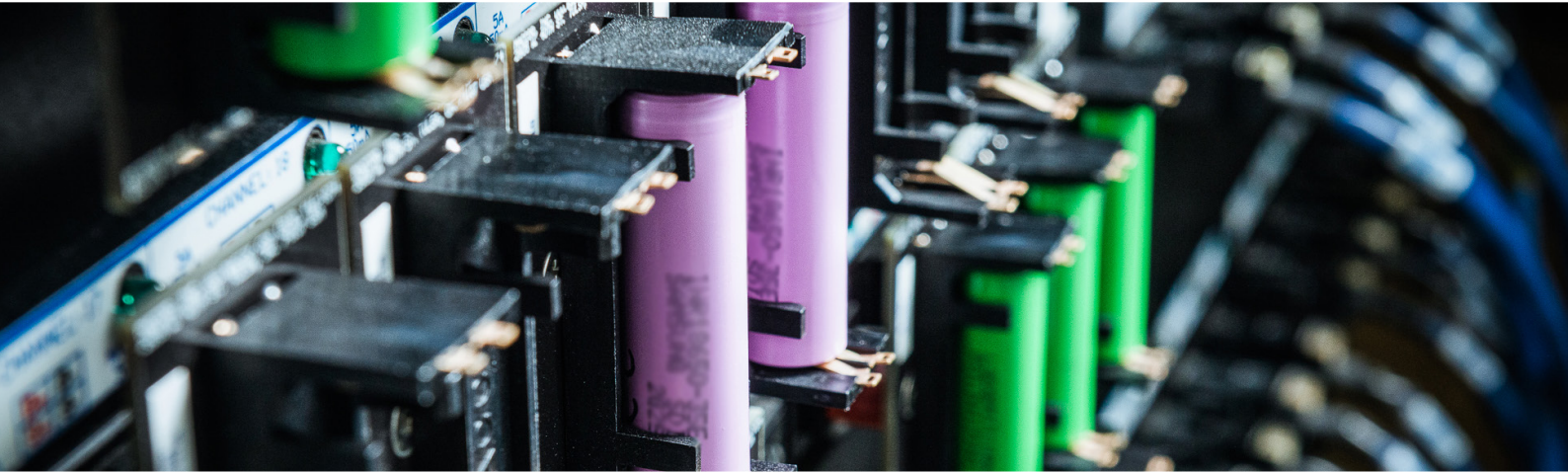
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ELEMENT MATERIALS TECHNOLOGY

Element's PCTEST is dedicated to providing a variety of industries with a single hub for certified battery testing services, to ensure your batteries are safe, compliant and fit for purpose.

OUR SERVICES

Element's PCTEST offers safety testing for the IEEE 1625 and IEEE 1725 standards for Rechargeable Batteries, as well as certification services for lithium-ion cell, packs, hosts and adapters, Battery Life Measurement Certification and Device Hardware Reliability Certification.

In addition to testing for the IEEE Standards, we offer testing solutions that satisfy the safety standards of the U.N. Transportation of Dangerous Goods (UNDOT), where we perform safety testing for the transportation of lithium-based cells and packs. Element provides customized safety, failure analysis, and R&D testing of lithium batteries for a variety of industries, from power tools to medical devices. We work in partnership with leading companies in the industry, ensuring that the lithium batteries in their products are safe and fit for purpose. Customized testing includes but is not limited to:

- Battery Life Cycle Testing
- Abuse Testing
- Mechanical Testing
- Thermal Cycle Testing
- Failure Analysis
- Destructive Physical Analysis
- Electrochemical Impedance Spectroscopy

- R&D Testing
- Cell Surveillance Testing
- Battery Life Cycle Testing
- Battery Thermal Cycle Testing
- Battery Safety and Abuse Testing
- Destructive Physical Analysis (DPA) and Failure Analysis

CERTIFICATION

Element's PCTEST is certified by the Cellular Telecommunications and Internet Association (CTIA) to perform safety testing for the IEEE 1625 and IEEE 1725 standards for Rechargeable Batteries. PCTEST is also an approved testing laboratory for CTIA's Battery Life Measurement Certification as well as Device Hardware Reliability Certification. Certifications include:

- CTIA IEEE 1725 Certification
- CTIA IEEE 1625 Certification
- CTIA Battery Life Measurement Certification

- CTIA Hardware Reliability Certification
- UN38.3 Testing and Certification

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