KEOLABS' end-to-end testing tool and service offer enables validation of smart objects and NFC systems used in identity, payment and other applications. KEOLABS accompanies customers through their complete design cycle from product conception to final conformance testing.

In the quest to improve product performance and reliability, having the right testing tools is essential to understanding and optimizing technology. KEOLABS’ Quest line of testing tools challenge technology and provide insights into performance in order to help users clearly understand and overcome problems with ease and efficiency.
**CONTACTLESS TESTER**

ProxiLAB provides fully configurable reader and card signal emulation for all 13.56 MHz protocols (NFC, ISO/IEC 14443, FeliCa, ISO/IEC 15693) for cards, and NFC devices. It supports VHBR at all bit rate (up to 6.8Mbps in ASK and up to 27Mbps in PSK). Natively it comes with a Vectorial Network Analyzer (0-60MHz). It offers total, precise control of analog and digital signal parameters, and the freedom to buy only the functionality users require.

Ideal tool for:
- Prototyping, characterization.
- Standard-specific validation.

**CONTACTLESS SPY**

ProxiSPY provides easy-to-use spy and analysis for analog, digital and application levels. It covers the full range of 13.56 MHz contactless protocols (NFC, ISO/IEC 14443, FeliCa, ISO/IEC 15693). Probes are optimized for reliable, robust capture and ease-of-use. It integrates with ContactLAB for full visibility of contact and contactless interfaces in NFC systems.

Ideal tool for:
- Exploring contactless technologies.
- Interoperability troubleshooting.

**AUTONOMOUS SPY & TESTER**

NomadLAB provides autonomous communication spy and signal emulator with tactile interface and power from battery or USB. It is equally adapted to application testing in a lab or field environment, providing communication spy and analysis for NFC, ISO/IEC 14443 A/B card signals, FeliCa, ISO/IEC 7816 and SWP (HCI/SDLC) and emulation of ISO/IEC 7816 and ISO/IEC 14443 card signals for active testing of card readers.

Ideal tool for:
- Interoperability troubleshooting in lab or field.
- Application-level validation of contact and contactless readers.

**CONTACT SPY & TESTER**

ContactLAB all-in-one platform provides fully configurable signal emulation, spy, and analysis covering protocols ISO/IEC 7816, ISO/IEC 14443 A/B, SPI and SWP (HCI/SHDLC) for validating contact smart cards, USIM and contactless front end and in mobile phones. It offers total, precise control of signal parameters, and the freedom to buy only the functionality users require. It integrates with ProxiSPY for full visibility of contactless and contact interfaces in NFC systems.

Ideal tool for:
- Prototyping, characterization.
- Standard-specific validation.
- Interoperability troubleshooting.
Validation solutions allow in-house verification of device compliance to functional and application-specific standards. KEOLABS participates in standardization organizations, contributing to evolutions in testing standards and to ensure solution compliance to changes in technologies and standards. Validation solutions are verified and used in KEOLABS’ Testing Laboratory where they must meet the constraints of standards conformance and reliability.

SCRIPTIS™ TEST ENVIRONMENT

This standard, open and flexible testing environment manages all KEOLABS’ standard-specific validation solutions. It provides test management, reporting, editing and debugging features, as well as precise visualization of card/reader signals associated with a specific test result. KEOLABS’ testing scripts are based on the open Python programming language. Users can easily copy and modify the scripts to create their own test cases.

- Single interface for test bench integration.
- Easy, push-button campaign management, results viewer.
- Full visibility of test results including DUT/test bench signals.
- Open environment for modifying test cases.
- Includes script debugger.
- Personalized report generation.
**NFC VALIDATION SOLUTIONS**
KEOLABS provides off-the-shelf solutions to verify conformity of NFC-enabled objects and systems to relevant standards, including NFC Forum, GCF, ISO/IEC 14443, and ISO/IEC 18092 for CLF and UICC interfaces. The testing environment meets strict conformance requirements to NFC Forum standards for verifying analog, digital, and application implementations in passive devices (cards, tags, mobiles, etc.) and active systems (readers, mobiles).

It is complemented by ETSI and Global Platform conform solutions for contact interfaces (HCI, SHDLC), enabling concurrent testing of contact and contactless interfaces for comprehensive validation of NFC mobile phones.

**PAYMENT VALIDATION SOLUTIONS**
For international payment cards, mobiles, and readers, KEOLABS provides off-the-shelf solutions to verify conformity to relevant EMVCo standard. KEOLABS’ turnkey EMVCo test bench is available where Level 1 verification is required.

**IDENTITY VALIDATION SOLUTIONS**
KEOLABS provides off-the-shelf solutions to verify conformity of international electronic passport (eMRTD) to relevant standards, including ICAO Doc 9303 and BSI TR-03710. KEOLABS also provides solutions for ID card and driving licence applications compliant respectively with eIDAS and ISO/IEC 18013.

**TRANSPORT VALIDATION SOLUTIONS**
For cards and readers used in fare collection applications, KEOLABS provides off-the-shelf solutions to verify conformity to relevant CIPURSE standard. KEOLABS’ CIPURSE application-level testing solution meets strict conformance to the OSPT Alliance standards and is the alliance’s official tool for conformance verification. KEOLABS also provides CEN/TS 16794 compliant test bench, also available for object testing at analog and digital levels.

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PICC: Proximity Integrated Circuit Card = contactless smart card.
PCC, Proximity Coupling Device = contactless reader.
CLF, Contactless Front End.
UICC, Universal Integrated Circuit Card.
KEOLABS’ Testing Laboratory accompanies customers through system validation with ISO/IEC 17025 accredited services. It provides both functional electrical and physical testing to fully assess a device’s operational reliability. Its testing capabilities include:
- Physical durability (climate, bending, abrasion, impact, x-ray, chemical, etc.).
- Analog, electrical and EMD characteristics & performance.
- Digital protocol implementation.
- Application level implementation.

The laboratory is a recognized testing center for smart cards and card readers, and maintains an accreditation from the Cofrac (French Accreditation Committee) under the standard ISO/IEC 17025 (Accreditation n°1-2468, a list of locations and scopes are available on www.cofrac.fr).

KEOLABS participates in all major certification processes for secure transaction, identity and transport sectors, contributing to the evolution of test standards, methods and tools.

Debug sessions allow customers to conduct testing before engaging in independent validation of conformity. Sessions are conducted in accordance with the customer’s needs and may be based on a full test standard (pre-certification), part of a standard or a proprietary test plan associated with a specific issue.

Conformance testing is conducted in strict adherence with a standard test specification. This independent conformity testing is conducted in a ‘single shot’ mode where samples are pre-identified and tests are performed once. The customer is not present during testing.