

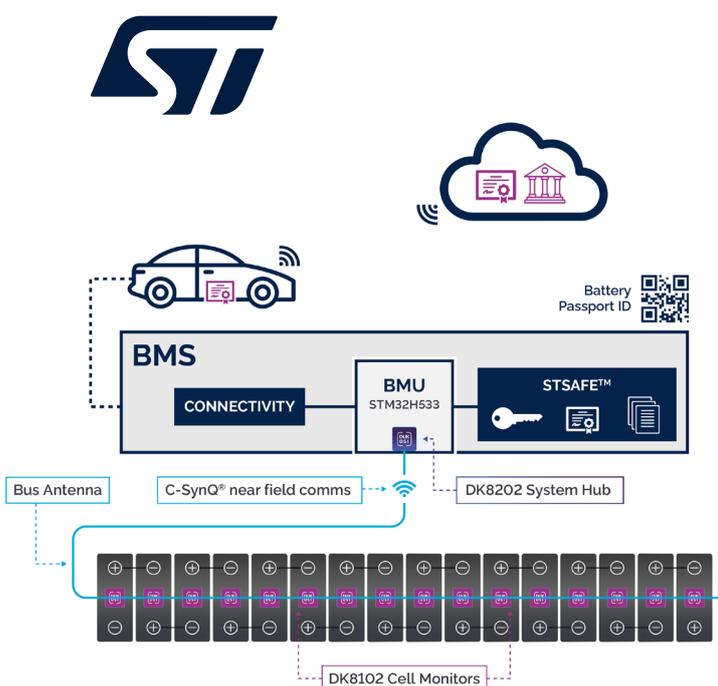
Solution Brief

Best-in-class Secure Solution for Cell-to-Cloud Battery Passport Protection



Key Advantages

- EU Battery Passport-ready - DIN DKE SPEC 99100 compliant.
- DKCMS-based battery architecture with STSAFE-A120 upgrades security, maintainability, and full traceability across the cell's lifetime (cell passport).
- A regulatory-ready, multi award-winning battery architecture that enhances the performance, safety, reliability and serviceability of next generation battery systems for wide-ranging electrified applications.
- Best-in-class turnkey Battery Management System (BMS) solution with integrated Cell-to-Cloud encryption, secure authentication and lifetime data protection.

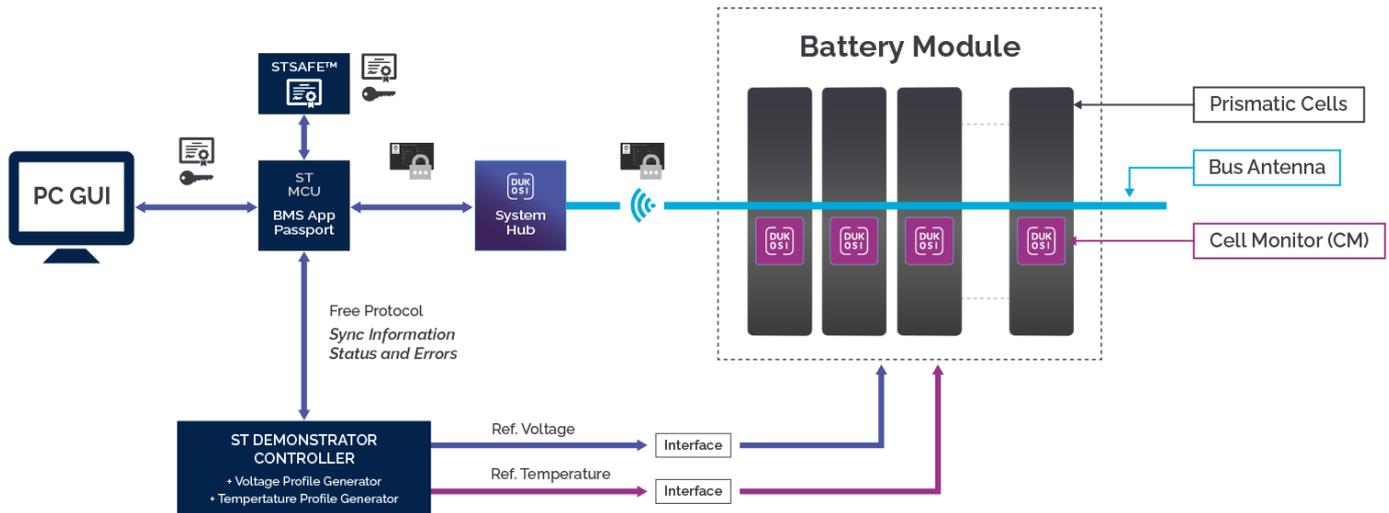


Battery Passport Demonstrator with DKCMS™ and STSAFE-A120

Dukosi partnered with STMicroelectronics to create a battery passport demonstrator based on the Dukosi Cell Monitoring System (DKCMS™) with C-SynQ®. The module contains 16 cells, each featuring a DK8102 Cell Monitor (CM). These monitors communicate synchronously with the DK8202 System Hub through a single bus antenna built into the lid of the module housing. In the Battery Management Unit (BMU), the System Hub is linked via SPI to the STM32H533 MCU, which is paired with the embedded secure element STSAFE-A120 for battery pack authentication, data encryption and secure connection, enabling secure storage of Battery Passport and cell-level identity and usage data.

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In this demonstration, one designated cell includes an internal heater that can be user controlled to generate variable temperature conditions. A variable voltage is generated for all cells to simulate charge and discharge cycles and overvoltage events. These events are part of the dynamic data in the battery passport and, together with some static data, are stored in the CMs' non-volatile memory. The unique ID of each Dukosi CM is stored in the STSAFE-A120 to ensure data encryption and validation. The graphical user interface (GUI) includes dedicated sections for battery passport management, data encryption, and secure validation processes.

When an individual cell is removed and replaced, the system detects a mismatch in the new cell's unique ID on the network. This flags a potential tampering anomaly and restricts access to data from other cells and system operations. An authorized maintenance procedure can be simulated through a dedicated GUI, where valid credentials allow registration and replacement of the replacement cell by authorized service personnel (PLI).

This demonstration highlights the ultimate flexibility, repairability, safety and security of the DKCMS and STSAFE's cell-to-cloud, Battery Passport ready, BMS solution.

Dukosi Cell Monitoring System (DKCMS™)

DKCMS™ dramatically improves the performance, safety, and efficiency of battery systems, and enables a more sustainable battery value chain. Dukosi's unique chip-on-cell technology and proprietary C-SynQ® communication protocol transform the way batteries are designed and monitored. Dukosi's novel contactless solution is designed for safety critical, next generation battery systems and overcomes the limitations of traditional wired and far field wireless systems. DKCMS has achieved ASPICE Level 2 and AEC-Q100 qualified, meeting the stringent requirements and lifetime expectations of xEVs and stationary battery energy storage systems (BESS). The DKCMS on-cell lifetime traceability enables customers' products to be compliance-ready for upcoming regulations like the EU Battery Passport. **Learn more:** <https://www.dukosi.com/dukosi-cell-monitoring-system-dkcms>

STMicroelectronics STSAFE-A120

The STSAFE-A120 is a secure element providing authentication, confidentiality, and platform integrity services to the BMS. It safeguards the battery passport ID against unauthorized duplication, while also ensuring that battery activity logs are securely stored and protected when exchanged with digital signature. The STSAFE-A120 securely stores additional BMS credentials, including certificates, ensuring integrity over the battery's lifetime and supports secure communication to cloud services. **Learn more:** <https://www.st.com/en/secure-mcus/stsafe-a120.html>

