

The background of the header section is a photograph of a large warehouse or distribution center. High industrial shelving units are filled with numerous cardboard boxes. A blue semi-transparent rectangular overlay covers the lower portion of this image, serving as a background for the title text.

Boost Transparency and Trust: Unlock Item-Level Tracking with Digital Product Passport



Introduction

The demand for transparency, compliance, and efficiency in retail has never been greater. Item-level tracking helps meet these demands by enabling accurate inventory, seamless checkout, fraud prevention, and product authenticity. AIDC technologies—including RFID, barcodes, and enterprise mobile computers—provide real-time visibility, strengthening trust between retailers and consumers.

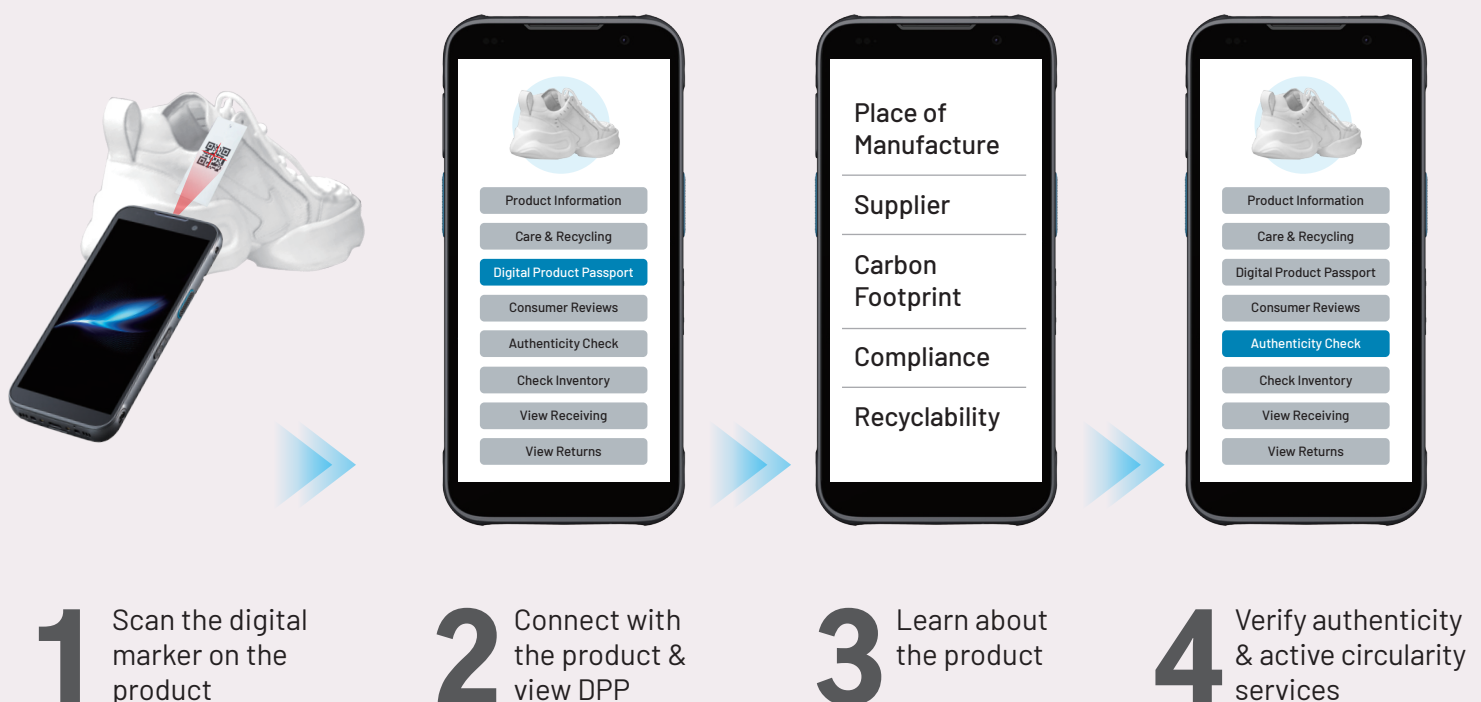
The Digital Product Passport (DPP) is a key enabler of sustainability innovation and circular economy practices. It empowers retailers and consumers to move beyond compliance and unlock new value through product lifecycle management. By assigning each product a digital identity, DPP revolutionizes item-level tracking—allowing visibility from production to purchase and beyond. Powered by RFID and barcodes, DPPs enhance authentication, ensure regulatory compliance, and support seamless integration across retail ecosystems—driving the shift toward unified commerce.

Item-Level Tracking with AIDC Technologies

Retailers can achieve precise item-level tracking using the right combination of AIDC technologies:

- **RFID for Automated Tracking** – RFID tags allow fast, contactless scanning of multiple items simultaneously. Ideal for inventory management, loss prevention, and warehouse logistics.
- **2D Barcodes for Universal Access** – Unlike RFID, 2D barcodes (e.g., QR codes, DataMatrix) can be easily scanned using smartphones or POS systems, making them accessible to both retailers and consumers.
- **Enterprise Mobile Computers (EMC) for Real-Time Insights** – EMCs enable staff to scan, verify, and update product data on the go, improving operational efficiency and responsiveness.

By integrating these technologies, retailers can streamline inventory control, prevent shrinkage, and improve supply chain transparency.



Graphic 1. How DPP and Digital Link Streamline Retailer Operations

What is a Digital Product Passport?

A Digital Product Passport (DPP) is an item identifier that either inherently contains the mandated product attribute data or links to this data. Mandated product attributes to record include, but are not limited to:

- Origin and manufacturing data
- Sustainability and compliance information
- Repairability and warranty status
- Ownership and lifecycle tracking

Mandated under the European Union's Ecodesign for Sustainable Products Regulation (ESPR), DPPs enable retailers to manage and share product data efficiently. DPPs can be encoded using both RFID and 2D barcodes, including GS1-compliant data structures, ensuring seamless integration across online and offline channels.

Interoperability: How RFID and Barcodes Work Together in DPPs

DPP regulations are currently flexible, allowing retailers to choose between RFID and barcode-based identification:

RFID-Based DPP

- Enables fast, bulk scanning of tagged products.
- Ideal for automated logistics and high-volume inventory tracking.
- Provides contactless authentication for secure transactions.

Barcode-Based DPP

- Accessible via smartphones and POS systems.
- Cost-effective and widely supported across industries.
- Ensures universal compatibility with consumer-facing applications.

By combining RFID and barcodes, DPPs enable retailers to balance speed, cost, and accessibility, ensuring seamless product traceability across supply chains and regulatory frameworks.

How Digital Product Passports Work

GS1 Digital Product Passports serve as a digital twin of each product, linking 2D barcodes or RFID tags to a structured database of essential product details.

When scanned, a DPP provides tailored information based on who is accessing it:

- Consumers can verify product authenticity, sustainability data, and usage tips.
- Retailers gain insights into stock levels, returns, and product performance.
- Regulators access compliance information for inspections and sustainability tracking.

When GS1 standards are used in connection with DPP, retailers can ensure interoperability across supply chains, marketplaces, and regulatory bodies.

Essential AIDC Capabilities for Digital Product Passports Implementation

To fully integrate Digital Product Passports and boost authentication, transparency, and trust, it is essential for retailers to ensure their AIDC infrastructure supports barcode and RFID interoperability:

Table 1: Key Technology Requirements

AIDC Technology	Essential Capabilities
Thermal Printers	Print high-quality 2D barcodes and accurately encode RFID labels, ensuring long-term durability.
Mobile Computers	Instantly scan DPP-enabled barcodes and RFID tags for real-time product data access across the supply chain.
RFID Systems	Enable fast, automated product tracking across supply chains.

Next Steps for Retailers

To adopt Digital Product Passports and enhance item-level tracking, retailers should:

Assess Current Barcode and Labeling Systems

Identify gaps and prepare for 2D barcode and RFID-based identification.

Upgrade AIDC Infrastructure

Invest in high-quality thermal printers and enterprise mobile computers that support DPP integration.

Train In-Store and Supply Chain Teams

Train employees to scan, access, and apply DPP data for customer service, inventory management, and compliance.

Collaborate with GS1 Partners

Work with GS1 and industry leaders like TSC Auto ID to ensure seamless implementation and compliance with emerging regulations.

For a complete guide on implementation, refer to [GS1's official GS1 Digital Product Passports resource](#).

Why TSC Auto ID Group?

TSC Auto ID Group offers a comprehensive AIDC solution tailored for retailers looking to adopt Digital Product Passports. Our industry-leading expertise in thermal printing, mobile computing, and RFID technology ensures a smooth transition to this new standard.

- **Durable Labeling Solutions:** Our thermal printers, ribbons, and media produce long-lasting, GS1-compliant 2D barcode labels and RFID tags.
- **Advanced Barcode Scanning and RFID Reading:** Our enterprise mobile computers provide fast, reliable data capture in retail and warehouse environments.
- **Seamless System Integration:** Our solutions work with various retail and supply chain management systems, enabling easy DPP label printing, scanning, and data uploads via SDKs.
- **Expert Support and Future-Proof Solutions:** As a leader in AIDC innovation, we help retailers stay ahead of the curve in barcode, RFID, and compliance technologies.

By adopting Digital Product Passports, retailers can strengthen customer trust, streamline operations, and future-proof their business. TSC Auto ID can provide the devices required to facilitate DPP adoption—with the right labeling, scanning, and encoding solutions. Contact us today to get started.

CORPORATE HEADQUARTERS

TSC Auto ID Technology Co., Ltd.
Tel: +886 2 2218 6789
E-mail: apac_sales@tscprinters.com

LI ZE PLANT

TSC Auto ID Technology Co., Ltd.
Tel: +886 3 990 6677
E-mail: apac_sales@tscprinters.com

CHINA

Tianjin TSC Auto ID Technology Co., Ltd.
Tel: +86 22 5981 6661
E-mail: apac_sales@tscprinters.com

EMEA

TSC Auto ID Technology EMEA GmbH
Tel: +49 (0) 8106 37979 000
E-mail: emea_sales@tscprinters.com

AMERICAS

TSC Auto ID Technology America Inc.
Tel: +1 657 258 0808
E-mail: americas_sales@tscprinters.com

ASIA PACIFIC

TSC Auto ID Technology Co., Ltd.
Tel: +886 2 2218 6789
E-mail: apac_sales@tscprinters.com

RUSSIA

TSC Auto ID Technology EMEA GmbH
Tel: +7 495 646 3538
E-mail: emea_sales@tscprinters.com

MEXICO

TSC Mexico Representative Office
Tel: +1 52 (33) 3673 1406
E-mail: americas_sales@tscprinters.com

KOREA

TSC Korea Representative Office
Tel: +82 2 852 3322
E-mail: apac_sales@tscprinters.com

MIDDLE EAST

TSC Auto ID Technology ME Ltd, FZE
Tel: +971 4 2533 069
E-mail: emea_sales@tscprinters.com

BRAZIL

TSC Brazil Representative Office
Tel: +55 (11) 3554 7225
E-mail: americas_sales@tscprinters.com

INDIA

TSC India Representative Office
Tel: +91 2249 679 315
E-mail: apac_sales@tscprinters.com