

Position Paper

Migration to a single GS1 compliant 2D barcode for retailer private label and in-store labelled products

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Executive summary

The retail industry is undergoing a significant transformation, with a shared objective to migrate to supporting 2D barcodes at Retail point-of-sale (POS) by 2027, known as Ambition 2027. This transition is spearheaded by [industry-wide collaboration and commitment](#), supported by GS1 Member Organisations all around the world. There is a rapidly increasing demand for more information about the products we use and consume. To meet this demand, industry has set a goal that, by the end of 2027, all retail POS systems should be capable of reading and processing a [defined set of 2D barcodes compliant with GS1 standards, in addition to the existing linear barcodes for retail POS](#). As the transition to 2D barcode capability at retail POS unfolds across the globe, brand owners are already exploring and implementing the most appropriate 2D barcode solutions to address priority use cases and meet critical consumer and business needs.

Retailers have beneficial opportunities to accelerate 2D migration for private label¹ and in-store labelled goods within their store ecosystems, while simultaneously preparing to support the industry agreed co-located linear and 2D barcodes on branded products during the transition period. This position paper highlights these opportunities alongside the importance of leveraging global open standards throughout the transition. The paper also outlines the commitment needed to drive the widespread adoption of 2D barcodes across the entire retail sector, concluding with a summary of key actions for retailers.

As detailed in this paper, to fully leverage the benefits of 2D barcodes, retailers should:

- ✓ Upgrade POS scanners to support all GS1 compliant retail POS barcodes, including co-located linear and 2D barcodes
- ✓ Train employees on new business processes to benefit from the enhanced capabilities of 2D barcodes
- ✓ Unlock new capabilities, such as stopping sale of expired or recalled product, minimising food waste, automating price markdowns and more
- ✓ Develop consumer-facing digital experiences using QR Codes with GS1 Digital Link URIs, known broadly as QR Codes Powered by GS1.

Retailer opportunities for private label and in-store labelled trade items

As retailers prepare to support the three GS1 compliant retail POS 2D barcodes (GS1 DataMatrix, Data Matrix with GS1 Digital Link URI and QR Code with GS1 Digital Link URI), they can get started on the journey within their own ecosystem. Retailers can accelerate 2D barcode migration by leveraging their unique opportunity to implement single 2D barcodes on private-label and in-store labelled products, which are often produced, processed and labelled within an entirely closed environment. Examples include deli meats labelled in-store or bakery products labelled in a retailer production centre. Additional opportunities exist in semi-closed environments, such as labelling of instant coffee or cake mixes produced by contract manufacturers.

The opportunity is especially relevant for fresh foods and products with a short shelf life, as these products could carry additional data, such as best-before dates, expiry dates, batch/lot codes or serial numbers. Depending on suppliers' capabilities, leveraging this labelling opportunity may assist with meeting regulatory compliance or facilitate greater control over inventory and in-store operations. Private-label and in-store labelled products offer retailers a distinct advance opportunity to pilot and refine single 2D barcode implementation, without waiting for broader supplier adoption of 2D.

¹ Private label, also known as own brand or white label, depending on the region or market, is a broad term that describes products with branding or packaging controlled by a retailer, using either the retailer's brand name or a brand name that the retailer owns.

Mobilising to capture this opportunity can help to achieve:

- Improved food safety – stopping sale of expired product or product from a recalled batch/lot
- Improved inventory management – including minimising food waste and automating markdowns, which help retailers quickly realise savings and efficiency
- Capability testing of overall IT infrastructure across [store ecosystems](#) to implement and manage changes at scale, including understanding requirements and troubleshooting for host system, scanners and scales. This will help to handle all GS1 compliant retail POS barcodes, including co-located linear and 2D barcodes, as well as any additional data
- Early insights into evolving technologies to help shape new or improved business processes and unlock opportunities for [enhanced digital consumer experiences](#) by using GS1 Digital Link URIs to connect users to richer product information and retailer services
- [Employee training](#) to understand 2D barcode capabilities, the resulting benefits for business processes and the associated changes to processes

By leading this change, retailers can unlock new use cases and set best practices for broader industry adoption. However, this should not be mistaken as an alternative path that bypasses broader industry collaboration to enable 2D barcode migration for all retail products sold at a retail point of sale. While retailers will test and learn from implementing single 2D barcodes on their private label and in-store labelled products, they will simultaneously need to prepare their systems and processes to handle all GS1 compliant retail POS barcodes to align with the global industry goal stated above.

GS1 standards for global, open supply chains

GS1 develops global standards for voluntary adoption in open supply chains. For retail products scanned at POS, the global open standard that has been agreed by industry requires co-located linear and 2D barcodes until all retailers are prepared to scan only 2D barcodes. While some retailers may choose to transition directly to a single GS1 compliant retail POS 2D barcode for private label and in-store labelled products, GS1 conformance requirements ensures all GS1 compliant retail POS barcodes remain entirely interoperable, regardless of specific closed or semi-closed ecosystem implementations. This unified approach provides a forward-looking migration path for the widespread adoption of 2D barcodes across the entire retail sector.

Essential industry commitment to reach Ambition 2027 and modes of implementation

Achieving pervasive 2D barcode adoption by 2027 across the entire retail sector necessitates active collaboration across all retail stakeholders—not just within the retailers’ walls. It is critical that all stakeholders collaborate to prioritise POS scanner upgrade or reconfiguration to enable capability for all GS1 compliant retail POS 2D barcodes, along with co-located linear and 2D barcodes for the transition period. In support of this transition, the [2D Barcodes at Retail Point-of-Sale Implementation Guideline](#) details three scanning modes that can be implemented in POS scanners.

The industry should consider the following two scanning modes and partner with their scanner manufacturers/integrators to ensure that they are implemented correctly, tested and optimised:

- **Mode 1:** Transmits the GTIN from any GS1 compliant retail POS linear or 2D barcode. This mode is suited for retailers who are not yet ready to process additional data beyond the GTIN and is the minimum requirement for Ambition 2027.
- **Mode 2:** Prioritises the GS1 compliant retail POS 2D barcodes, but configured with a method that ensures it does not compromise or slow the POS processing speed, which means if the 2D barcode is not decoded within the allotted time, the system will transmit the linear barcode’s data. Retailers choosing this mode may opt to transition their products directly to GS1 compliant retail POS 2D barcodes without a co-located linear barcode, thereby optimising scanner decoding and unlocking use cases enabled by transmitting both the GTIN and additional data.

These modes support the existing 2D in Retail ambition and provide a flexible framework for retailers to select the implementation pathway that best meets their operational and consumer service and engagement objectives.

Risks and impact

If the industry fails to prioritise enabling POS capability to handle co-located linear and 2D barcodes using one of the scanning modes mentioned above, retailers and brands may experience inefficiencies at the checkout. These issues can include operational disruptions caused by double scanning of a trade item or the inability to process additional data on branded goods, resulting in potential consumer dissatisfaction from these POS experiences. Simply enabling POS systems for 2D scanning, without the upgrades or reconfigurations required



for the scanning modes, may lead to slower processing speeds and disruptions in consumer transactions. Such a fragmented approach would create risks impeding the overall transition to 2D and would undermine the global ambition of achieving seamless barcode interoperability by 2027.

Conclusion & call to action

Industry-wide collaboration is essential to successfully achieving the goal of marking trade items once and enabling them to be shipped anywhere, thereby realising the full potential of the 2D barcode revolution. GS1 reaffirms its position on the necessity of upgrading POS capabilities to handle all GS1 compliant retail POS barcodes, including co-located linear and 2D barcodes, through a standardised and collaborative approach. This position paper supports industry's 2027 ambition and emphasises the critical importance of prioritising scanner capabilities using the scanning modes outlined above and detailed in the [2D in Retail Implementation Guideline](#). By adhering to global standards and selecting the appropriate mode of implementation, stakeholders can ensure a forward-looking and efficient migration that benefits retailers, brands and consumers alike.

2D barcodes represent the future of retail by offering richer encoded data that unlocks new brand and retailer use cases and enhanced consumer engagement. For retailers producing, processing and labelling products for use within their own ecosystem, the transition from linear to 2D barcodes is not only feasible but is strategically advantageous in preparing their ecosystem's capability to support all GS1 compliant barcodes for retail POS. By embracing 2D barcode technology early, retailers can more quickly realise value on their private label products while also leading the way by having their systems and staff ready for industry-wide 2D migration.