The Global Language of Business

2D Barcodes in Retail Test Kit

Capability test

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Table of Contents

1 Introduction

This 2D barcode test kit is provides GS1 compliant sample 2D barcodes for industry to accurately determine their current scanning capability and determine how systems interact with 2D barcodes approved for use in the GS1 standards. This test kit is intended to be used to assess system readiness and determine updates that need to take place to achieve Ambition 2027.

A test tracking template is included as part of the 2D barcode test kit, to support industry with returning test results to GS1 New Zealand for further analysis and assessment of capability.

2 How to use the 2D barcode test kit

The 2D Barcodes in Retail test kit is intended to be used with and test the 2D capabilities of any system expected to interact with 2D barcodes approved for use within the GS1 General Specifications retail application standards that containing a GTIN.

2.1 Determine which systems to test

When determining which systems will be tested, consider all scan environments where barcodes containing GTIN are or may be used. While some organisations will only have a single system to test, others may need to conduct the tests multiple times using different combinations of hardware and software.

Note: It is not uncommon for scanning system components used in the same environment to have different capabilities.

For example:

- A linear LASER handheld scanner and 2D imager bi-optic scanner are used together at retail point-of-sale.
- A presentation scanner and a bi-optic scanner used together at retail point of sale either at self-check out or fixed check out.

Important: These tests are best conducted after systems are confirmed to have all appropriate barcode and syntaxes enabled correctly.

2.2 Add test GTINs to host systems

To determine how data is being processed, the GTINs encoded in the test barcodes must be added to systems (e.g., Host POS system, ERP, …). If the test GTINs are not added, systems will fail to find a match and most commonly, return an error stating that the product cannot be found.

The following GTIN need to be added:

- **09521101530018**: GTIN-13

Note: Systems may display or label GTINs differently than what is shown above. GTINs provided are displayed in the recommended 14-digit format. Systems that do not use a 14-digit format may require the GTINs above to be modified for use. What modifications are required will be dependent on specific system nuances.

2.3 Print 2D Barcodes in Retail Test Cards

The tests cards provided are a minimum requirement to achieve Ambition 2027 of scanning and processing only GTIN at Retail POS.

Please Note: If minimum requirement test cases pass, additional advance test cards can be provided for 2D barcodes with additional attributes, reverse reflectance test, etc.

2.4 Test Execution and Tracking

Once the set-up process is completed, the testing process can begin. Test results can be tracked by using the 2D Barcodes in Retail Test Tracking Template provided.

The spreadsheet captures what system was being tested and if the GTIN look-up function worked as intended.

The 2D Barcode Test Case Template includes a Test Case Summary tab and a Test Tracking tab.

2.4.1 Test Case Summary

The Test Case Summary tab provides the details of each of the test cases corresponding to the 2D Barcode Test Cards.

The tests cases provided are a **minimum requirement** to achieve Ambition 2027 of scanning and processing only GTIN at Retail POS. 2D barcodes with additional attributes that need to be scanned and processed at Retail POS will require more testing with advanced test cases.

Each of the test executions must be repeated for each different combination of hardware and software.

2.4.2 Test Tracking

The Test Tracking tab provides a template to track each of the test cases and systems being tested.

- Yellow highlighted cells require information to be entered.
- Grey cells automatically populate

Note: Please use one line per scanner type.

1. Identify the applicable test number from the Test Case Summary tab and enter in the '**Test No**' column to populate the details of the test case.
2. Identify the test system and environment being tested and enter in the '**Test System Description**' column.
3. Identify hardware/scanner being tested and enter in the '**Scanner make/model number'** column
4. Identify the mode of the scanner being tested and enter in the '**Mode'** column. **Note:** The minimum requirement for the Ambition 2027 is software Mode 1 Refer to Section 3.3 Explanation of Scanning Modes for further information.
5. Scan the printed barcode corresponding to the relevant test no. with the test system identified in the test tracking
6. If the GTIN processes as expected in the system, enter "Yes" in the '**Did GTIN lookup work?'** column.
    - An example of this might be having a GTIN added to a point-of-sale transaction, appear correctly on a pick-list, or successfully populate a master data file.
    - In addition to seeing if GTIN is getting processed, review how the data is being captured and/or stored. For example, all types of GTIN should be stored in a 14-digit format.
7. If the GTIN does not process as expected in the system, enter 'No" in the '**Did GTIN lookup work?'** column.
    - Some examples of test notes if unsuccessful can be:
        - Barcodes are scanned but data not processed
        - An imaging scanner is used but 2D tests were unsuccessful

- In a co-located barcode scanning scenario, GTIN is being captured from more than one barcode - it looks like two separate products when scanned

8. Repeat the above steps for each test case and different combination of hardware and software. Add more rows as required.

2.4.2.1 Tracking spreadsheet example

Example Test No.	Test Description/ Barcode tested	Test System Description	Scanner make/ model number	Did GTIN lookup work?	Test notes (if unsuccessful)
1	GS1 DataMatrix	Store 5, Self Checkout No. 3	Zebra MP7000	Yes	N/A

2.5 Analysis of Test Results

After testing is complete, review and analysis are needed to understand baseline capabilities and plan next steps.

The completed Test Tracking spreadsheet can be returned to your GS1 New Zealand Account Manager for further review.

3 Appendix

3.1 Ambition 2027

The retail industry is undergoing a global transition to 2D Barcodes, transforming the way we do business and offering new opportunities for all stakeholders.

Industry has defined the date of 2027 when all retailers will aim to scan 2D Barcodes at retail point-of-sale, worldwide.

3.2 Explanation of the barcodes and scenarios used

The ability to scan and process the GTIN from all the below 3 2D barcodes is a required capability for Ambition 2027.

Important: Data Matrix with GS1 Digital Link is not the same as the GS1 DataMatrix used in regulated healthcare. If seeking to test systems scanning regulated healthcare items, GS1 DataMatrix tests should be used in addition to AI tests in other barcode types.

3.2.1 GS1 DataMatrix

Best for those that need more data for business use cases but are not enabling a consumer experience. No imaging scanner software updated required and requires specialised mobile device app to scan with smartphone.

3.2.2 QR Code with GS1 Digital Link

Best for those that need more data for business use cases but are not enabling a consumer experience. Imaging scanner software update is required and scannable with mobile device's default camera app.

3.2.3 Data Matrix with GS1 Digital Link

Best for those that are enabling business use cases and a consumer experience but cannot fit a QR Code on-pack. Imaging scanner software update is required and requires specialised mobile device app to scan with smartphone.

3.2.4 Co-Located barcode scenarios

It is common for a single object to have multiple barcodes on it that systems must be able to process. When a linear barcode and a 2D barcode are both being used for retail POS applications, the scanning system may not identify that both barcodes are related to the same trade item.

3.3 Explanation of Scanning Modes

Industry has agreed on three primary software modes that should be implemented in scanners:

3.3.1 Mode 1

All POS systems can process GTIN from EAN/UPC family of barcodes (plain syntax). Many POS systems can process the GTIN and some additional data (e.g., lot/batch, expiration date) from GS1 DataBar retail family and GS1 DataMatrix that use GS1 element string syntax. Updated POS systems can process the GTIN from Data Matrix with GS1 Digital Link URI syntax and QR Code with GS1 Digital URI syntax.

Once the first GTIN is identified in a linear or 2D barcode, irrespective of the presence of multiple GS1-compliant retail barcodes on-pack, the scanner promptly process and

transmits the GTIN with a single audible (e.g., beep) or visual signal, and awaits subsequent product.

Note: This minimum requirement for the Ambition 2027 is software Mode 1

3.3.2 Mode 2

Prioritise GS1 compliant general retail 2D barcodes, decode, "beep" once and transmits GTIN and any additional data (e.g., lot/batch number, expiration date) in the common format of GS1 element string syntax and, if one cannot be found, transmit data from the linear barcode. Any data that the system is not able to store or use can be dropped.

3.3.3 Mode 3

Identify, decode, and transmit all GS1 compliant general retail barcodes (linear or 2D) on a product, while generating an **8-digit label identification** to associate multiple barcodes with the same trade item. Upon capturing the first GTIN from either a linear or 2D barcode, the scanner promptly provides a single audible (e.g., beep) or visual signal. The scanner will generate an **8-digit label identification** in a common format header of the barcode's Plain & GS1 element string syntax.

3.4 Resources

3.4.1 2D Barcodes at Retail Point-of-Sale Implementation Guideline

3.4.2 GS1 General Specifications

3.4.3 GS1 Digital Link URI Syntax standard