The Global Language of Business

2D in Retail Advisory Group

Meeting 11

2DBarcodes

A new dimension in barcodes

GS1 AUS, GS1 Global, Jenny Keegan (Woolworths), Mark Dingley (Matthews)

14th March 2023

GS1 Australia Competition Law Caution

- GS1 operates under the GS1 Competition Law Caution. Strict compliance with competition laws is and always has been the policy of GS1.
- The best way to avoid problems is to remember that the purpose of the group is to enhance the ability of all industry members to compete more efficiently.
- This means:
  - **There shall be no discussion of prices, allocation of customers, or products, boycotts, refusals to deal, or market share**
  - If any participant believes the group is drifting toward impermissible discussion, the topic shall be tabled until the opinion of counsel can be obtained.

The full Australia caution is available via the link below, if you would like to read it in its entirety: http://www.gs1.org/gs1-competition-law-caution

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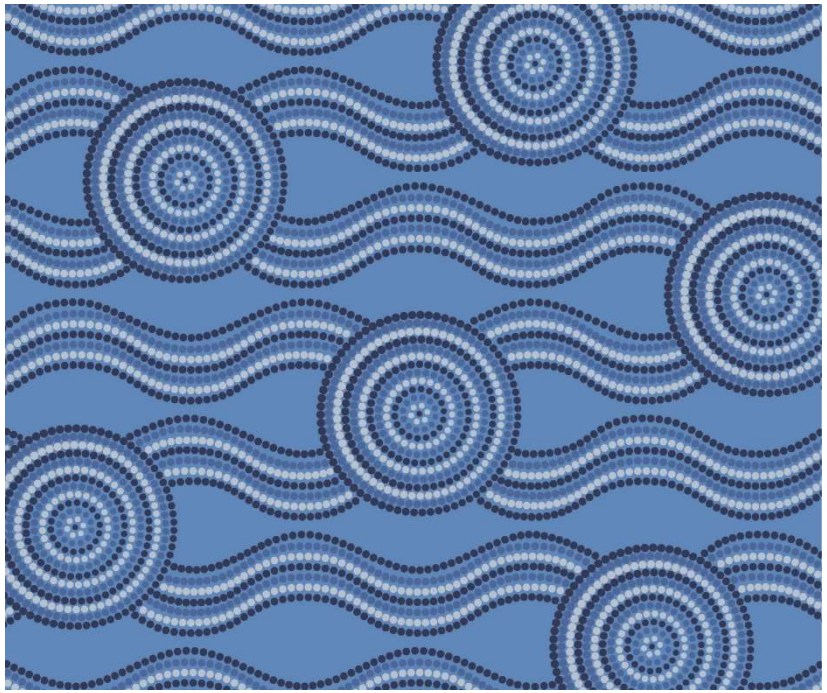
Welcome to country



We acknowledge the traditional custodians of the lands on which we meet today, and pay our respects to their Elders - past, present and emerging.

We extend that respect to Aboriginal and Torres Strait Islander peoples joining us today.

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Meeting etiquette

Introduce Yourself
When asking a question

Be considerate
Silence phones
Keep comments concise

Be collaborative
Ask questions
Be open to other views

Be professional
Speak on company's behalf

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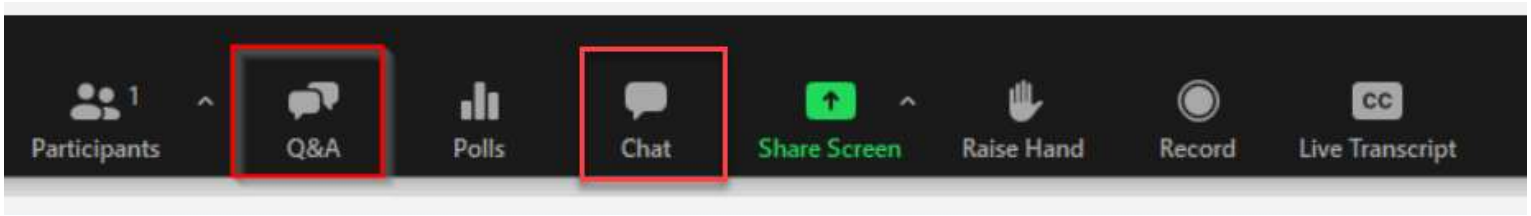
Use the Q&A or chat function to ask questions

2DBarcodes
A new dimension in barcodes

Click the bar at the bottom of your screen the chat window will open



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Agenda

ID #	Item	Details	Owner
1	10:00 – 10:15	**Welcome & Introductions** • GS1 Competition Law Caution & Welcome to Country • Approach for 2023 • Actions from previous meeting(s) • Participants profile	Co-Chairs
2	10.15 - 10.30	**Global Update** • GS1 Global Forum Update • Asia-Pacific region Update	Sue/Andrew
3	10.30 – 11.15	**Standards & Technical Update** • Co-located barcodes – Test results • Practical scanning demo • Standards Update	Steve/Aruna
4	11.15 – 11.40	**Local Update** • Woolworths Update • Dairy Industry Update	Roberto/Andrew
5	11.40 – 11.50	**Marketing Update**	Tracey /Andrew
6	11.50 - 12.00	**General Business and Q&A**	Co-chairs/Sue/Andrew

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Approach for 2023

2DBarcodes
A new dimension in barcodes

Advancing Practical 2D Implementations

Image sourced from Shutterstock

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Actions from previous meeting

Solution Provider Showcase Survey

Online Series 'Advancing real implementation of 2D at Retail'

- Discuss real life implementations – success, challenges and learnings
- Drill down to specific topics
- Series to be defined

We will define scope and release topics to Solution Providers and give fair opportunities to participate

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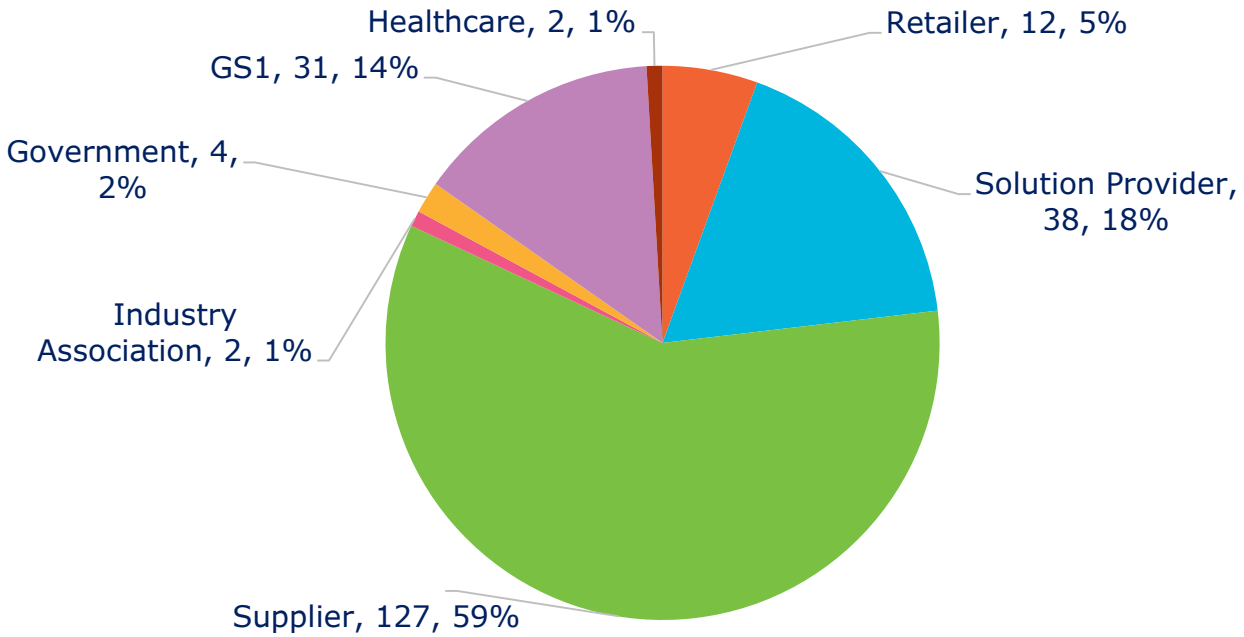
Participants profile



215 participants

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Global Update

- GS1 Global Forum Update - Andrew
- Asia-Pacific region Update - Sue

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Global Forum Update

Andrew Steele

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https://forum.gs1.org/

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Opening Plenary

2DBarcodes
A new dimension in barcodes

"2D helps us get information in the hands of our customer"

- Rodney McMullen
The Kroger Company

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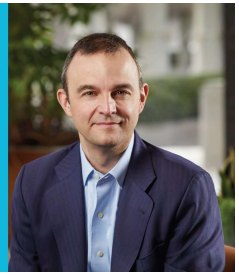
Retail Plenary

2DBarcodes
A new dimension in barcodes

Our 2D future – One barcode, infinite possibility

Alfredo Colas
P&G
Senior Vice President – Information Technology

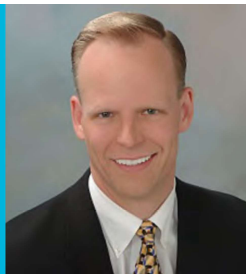


Garance Osternaud
Carrefour
Head of Merchandise and Supply Platforms @Global CTO

Marcel Sieira
GS1 Australia
Chief Customer Officer

Andrea Schlossarek
METRO
Vice President – Corporate Master Data Management

John Phillips
PEPSICO
Senior Vice President – Customer Supply Chain and Global Go-to-Market



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Printing & Scanning Session

2DBarcodes
A new dimension in barcodes

Global Forum 2023

Getting Ready for 2D

What's possible for 2D printing and scanning

Steven Keddie
14 Feb 2023

50 years of transforming tomorrow

DOMINO

Macsa id
a code you can trust

BELL-MARK
INLINE PRINTING AND CODING SPECIALISTS

markem-imaje
a DOVER company

WIPOTEC

ZEBRA

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Asia Pacific Region Update

Sue Schmid

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Asia Pacific 2D Member Organisation Training

- Module 1 — Prepare your Member Organisation for 2D
- Module 2 — A technical Introduction to 2D
- Module 3 — Customer Engagement Strategies
- Module 4 — A technical advanced look at 2D
- Module 5 — 2D your summary

Modules designed to address questions from region and develop knowledge

- Module 1 — Conversations about preparing your MO for 2D
- Module 2 — Conversations about getting technical with 2D
- Module 4 — Conversations about getting even more with 2D

Conversations to engage participants to think module content through and have a discussion about what they learnt, clarify and cement their learning

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MO’s who attended these sessions

- Australia
- China
- Hong Kong
- Indonesia
- Japan
- Korea
- Malaysia
- Myanmar
- Philippines
- New Zealand
- Singapore
- Chinese Taipei
- Thailand

550+ participants

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GS1 Asia-Pacific 2D priorities for 2023

Key Actions	Goals
Strengthen Training & Education for AP MOs	• Building capability of expertise in the region • Develop local mentoring hubs
Raise Awareness & understanding among all AP MOs	• Level set knowledge adjusted to MOs current capability
Maintain close collaboration with global programme	• Ensure strong presence by AP on Global Level by sharing of AP MO case studies and pilots to MO Zone; • Ensure regular and structured two-way information sharing with GO team

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First Japanese Retailer Scans 2D at POS

GS1 Datamatrix Symbology
(01) GTIN
(17) Use By Date
25 Fresh Bakery Products

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Automated Markdowns

https://www.youtube.com/watch?v=o6pwnh6Q3r0

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Standards and Technical Update

- Co-Located Barcodes – Tier 3.1 Test results - Steve
- Practical Demo - Steve
- Human Readable Intepretation Guidance - Aruna

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2D in Retail Lab Testing

Steven Keddie

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Memphis & GS1 AIDC Lab

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GS1 Bar Code Test Lab

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Test scenarios

Tier 1: Baseline controls

Establish a common baseline for barcodes with only GTIN

Tier 2: GTIN+

Understand how additional data affects scan performance and throughput

Tier 3: Multiple barcodes

Determine how the location of barcode combinations impact scanning

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Tier 1 GTIN only testing goals & results

Tier 1 testing was the groundwork for initial scanner improvements and answered the following questions:

- How quickly can different barcodes be scanned with accuracy?
  - **Can 2D barcodes** (e.g., QR code and Data Matrix) encoded with **GTIN be scanned at retail check speeds** (40 IPM)? **YES**
- Do the **number of barcode decode algorithms** that are switched on (barcode types turned on in a scan engine) impact relative scanning performance? **NO**
- Is **GS1 guidance for 2D barcode's quality and size appropriate** for imaged-based bi-optic POS scanners? See GS1 General Specification Section 5.12 Barcode production and quality assessment **YES**

Tier 1 final report

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Tier 2 GTIN + testing goals & results

Tier 2 testing answered the following questions:

- **Can 2D barcodes** (e.g., QR Code and Data Matrix) e**ncoded with GTIN and additional data be scanned at retail speeds** between 40 and 70 items per minute (IPM)? **YES**
- Are there **performance differences between barcode types and syntaxes encoded** with GTIN and additional data? **YES**
- Do the **number of barcode decode algorithms** that are switched on (barcode types turned on in a scan engine) impact relative scanning performance? **NO**
- Is **GS1 guidance for 2D barcode quality and size appropriate** for imaged-based bi-optic POS scanners? See GS1 General Specification Section 5.12 Barcode production and quality assessment **YES**

Tier 2 final report

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Tier 3 Multiple (co-located) barcodes testing goals

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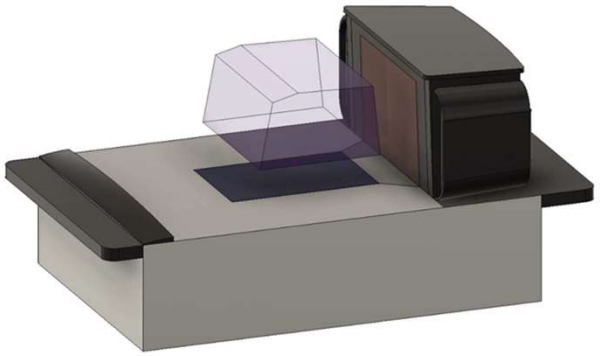
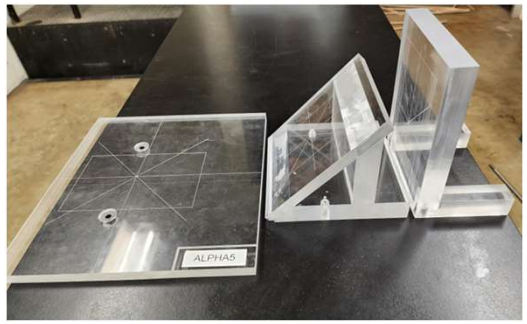
Tier 3 testing will help answer these questions:

- If there are **multiple barcodes on a pack** (such as an EAN/UPC and a QR Code), **how well do scanning systems find the needed information**?
- **How should barcodes be placed in relation to each other** for optimised scan results?
- Is the **decode time between multiple barcodes** on a single product delivered at an **acceptable delta for retailer host systems**?
- Fixture were created to validate robot (test card) paths





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Co-Located barcode test cards

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A new dimension in barcodes

Co-located Examples

Tier 3 co-located barcodes testing results

- Results
  - **Zebra, Honeywell and Datalogic create new software**.
  - All capable of delivering all barcodes carrying GS1 data
  - **Partial successes**
    - All could scan and deliver data for 2 barcodes
    - One could do at speed of retail
    - All could identify GS1 structures
      - One intermittently
    - One solution on presentation test
  - Scanner **solution providers refined software for Tier 3.1**

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Tier 3.1 Co-located barcode testing update

- How well **do the scanning systems handle multiple barcodes on a single trade item**?
  - The test results show that, in a controlled environment, scanning systems are capable of processing **multiple barcodes at the highest practical retail scanning speeds of 40 to 70 items per minute.**
  - Additionally, the solution developed and tested that can **determine that two barcodes came from the same package**, ensuring the system only "rang up" once, preventing double charges.

	Horizontal plane				Vertical plane			
Scanner	150 mm/s	300 mm/s	400 mm/s	1200 mm/s + pause	150 mm/s	300 mm/s	400 mm/s	1200 mm/s + pause
ALPHA2	63	100	117	144	47	80	95	145
ALPHA5	72	105	120	132	44	68	79	105
BETA3	41	65	78	88	44	65	76	73
DELTA0	42	66	76	90	35	58	70	89
DELTA1	48	83	102	143	41	75	86	146
Average	51	81	95	120	41	68	80	111

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Tier 3.1 Co-located barcode testing update

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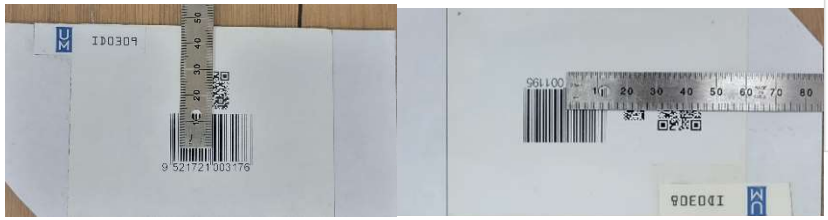
- How should the **barcodes be placed in relation to each other** for optimised scan results?
  - When minimum barcode quiet zones are maintained, testing shows that 2 barcodes with between **~15 mm and 50 mm separation provide the best overall performance** for speed and scan rates.



Vertical scan rate by barcode separation

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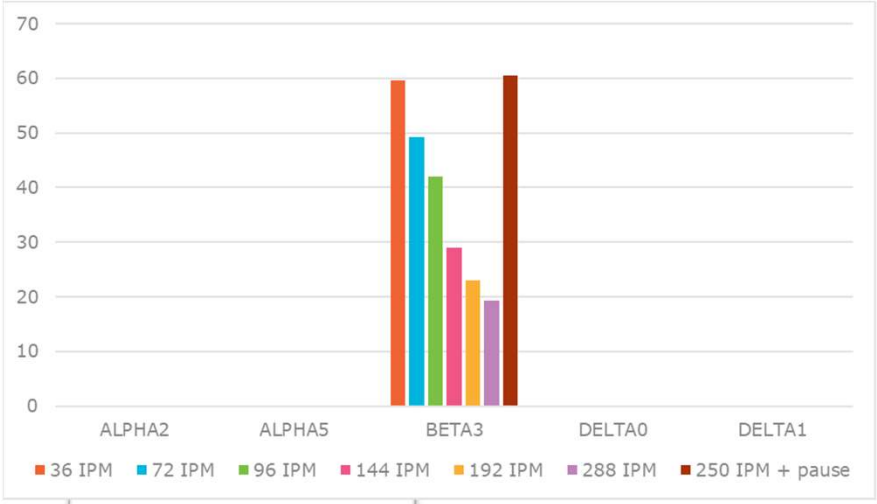
Tier 3.1 Co-located barcode testing update

- Can **POS scanners identify linear and 2D barcodes encoded with GS1 data structures** and differentiate non-GS1 encodings?
  - **Scanning systems are capable of distinguishing between GS1 data structures and non-GS1 encodings** in 2D barcodes, allowing the **retailer to have confidence that the right barcode can be identified** for the right purpose.
  - **Beta3 had no software updates**



Non-GS1 syntax second barcode decoded Scan Rate

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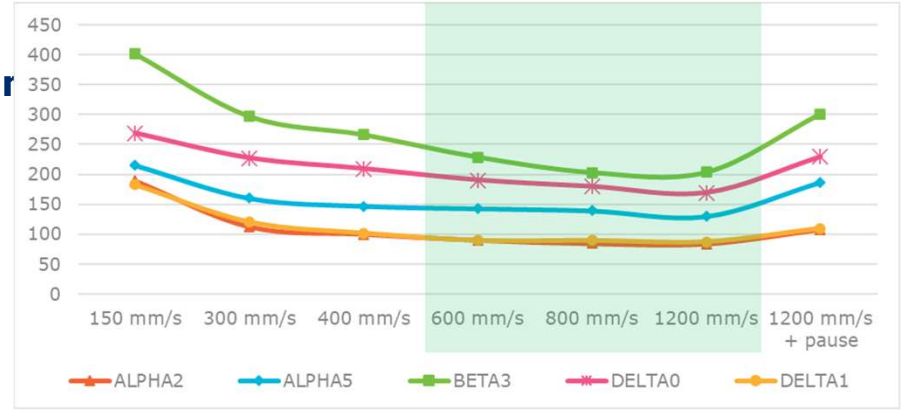
Tier 3.1 Co-located barcode testing update

- **Is the decode time of multiple barcodes on a single product acceptable to retailer host systems**?
  - **Yes**, scanning rates for **multiple barcodes that are placed within 50mm of each other are fast enough** that retailer host systems should be able to make timely, informed decisions. The test results also show that the retail scan rates of 40 to 70 items per minute (IPM) are achievable when barcodes are co-located within 50mm of each other.
  - **Second barcode is delivered in less than 200 milliseconds**.



[Tier 3 final report]

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Tier 3.1.1 Co-located barcode testing update

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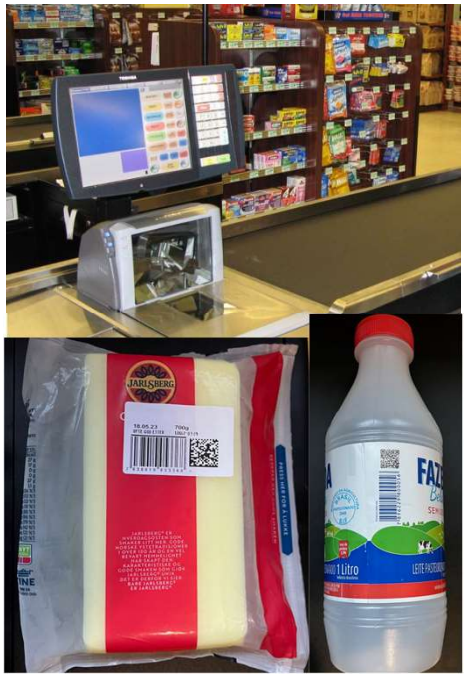
- **Does the position of the barcode make a difference**?
  - **Whether the leading barcode is always decoded first could guide symbol placement** recommendations that would help brands and retailers design packaging based on which barcode they deem should be scanned first.
    - **Yes the first barcode entering the scanners field of view is decoded first**
    - Based on scanner orientation the results suggest the 2D could be to the right or above to optimise scanning results…



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Tier 3.2 & Presentation scanner testing

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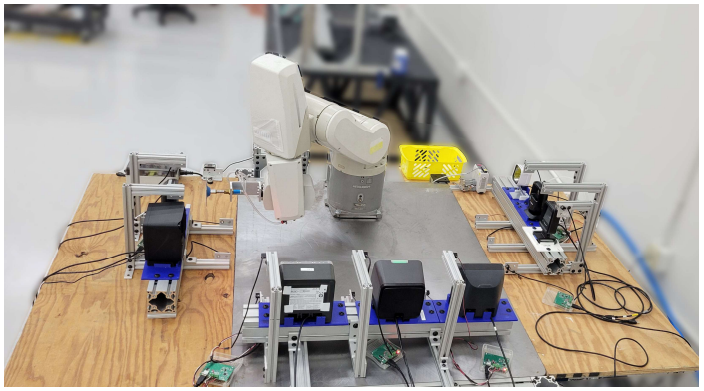
Tier 3.2

Presentation scanner testing

- **Are presentation and hand scanner ready for 2D in Retail?**
  - Tests will follow the same process
    - Tier 1 (GTIN only)
    - Tier 2 (GTIN + attributes)
    - Tier 3 (Co-located barcodes)
- **Presentation testing is underway**



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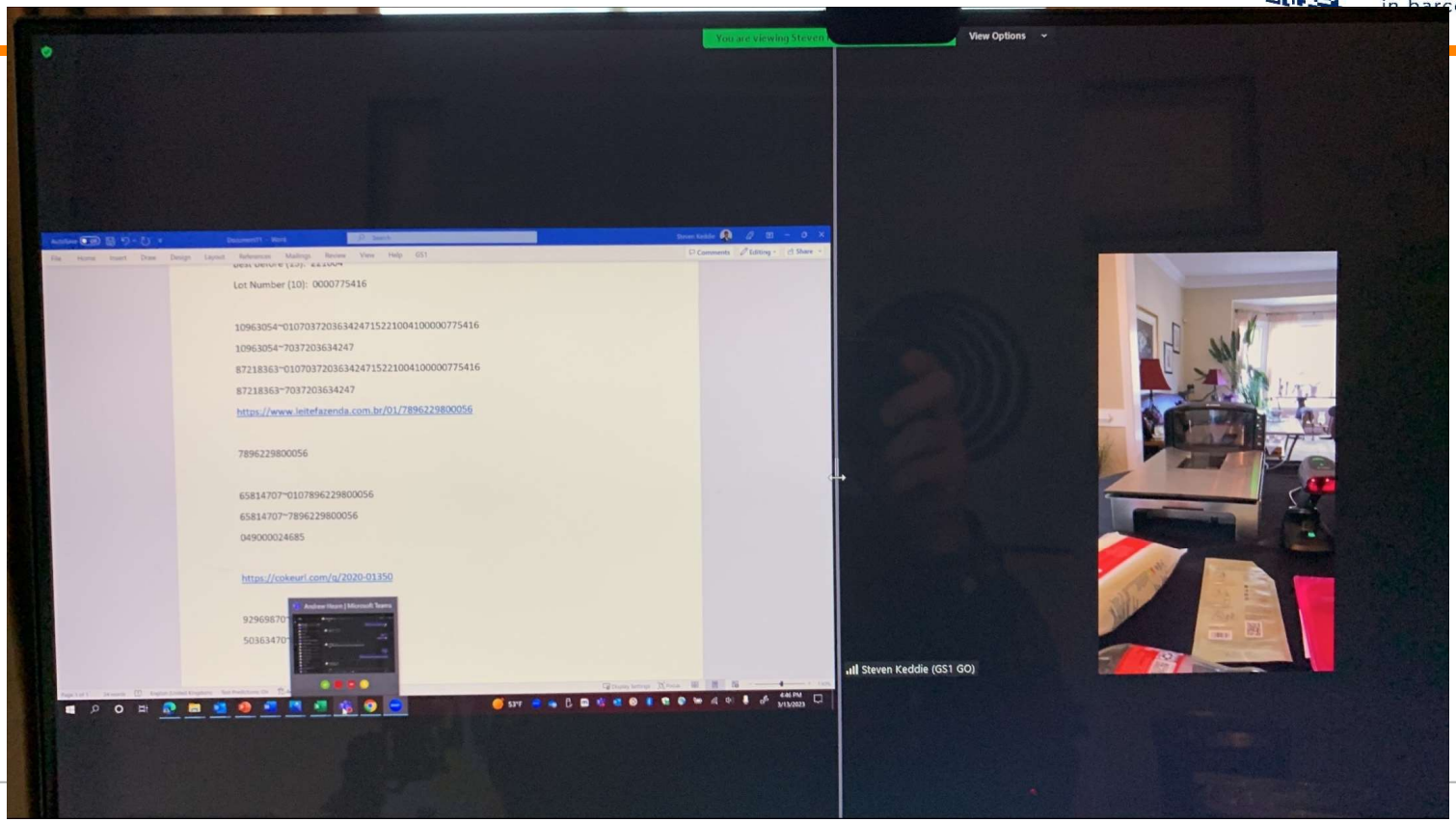
Scanner Demo



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Standards Update

Aruna Ravikumar

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Standards group - 2D in Retail MSWG

- Divided into three phase
- Phase 1 completed – Development of "Future conformances" in Application Standard Profiles
- Phase 2 – Divided in 3 parts
  - Part 1 – Human Readable Interpretation - Completed
  - Part 2 – Multiple Barcode Management – Completed
  - Part 3 – Barcode Placement guidance – To start
- Phase 3 – Develop Implementation guideline

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HRI (Adjacent barcodes)

When a linear EAN-8, EAN-13 or UPC-A barcode and 2D barcode are adjacent on a general retail consumer trade item, HRI for the GTIN is only required for the linear barcode

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HRI (Non-adjacent barcodes)

If the linear EAN-8,EAN-13, UPC-A or UPC-E barcode and 2D barcode are unable to be adjacent, then the GTIN SHOULD accompany both.

(01)09524810000346

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HRI (Consumer Interaction symbol)

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HRI for any additional consumer engagement (extended packaging) barcode encoding GS1 Digital Link URI SHALL be left to the discretion of the brand owner

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HRI (for 2D barcodes)

GS1 DataMatrix, Data M l Link URI) and QR Code (GS1 Digital Link URI) SHALL display (01) followed by the encoded GTIN in a 14-digit format.

(01)09524810000339

(01)09524810000339

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Multiple Barcode guidance

Migration guidance

- A GS1 DataMatrix, QR Code /Data Matrix (GS1 Digital Link URI), **SHALL be used in addition** to the EAN/UPC, or a GS1 DataBar retail POS family of barcodes, to ensure stakeholders that are not yet able to consistently scan 2D barcodes are not negatively impacted

Same GTIN

- All GS1 barcodes on a single trade item **SHALL encode the same GTIN**

Placement guidance

- When a 2D barcode will be scanned in multiple applications (e.g., point-of-sale, inventory management and consumer engagement), **placement for POS** takes precedence

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Local Update

- Woolworths Update – Roberto
- Dairy Industry Update - Andrew

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Woolworths Update

Roberto Olivares

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2D Barcode Summary

+9m

2D Barcodes scanned per week

730

Articles on 2D Barcodes

Background

- To date, +9M 2D barcodes are scanned in stores and online per week nationally.
- 2D Barcodes were introduced in **2020** for the purpose of adding additional valuable information in the articles barcodes such as **Expiry Dates** (Food Safety, Out of Code Management and Online), **Weight** (Meat), **Date & Time of Production** (In Store Production) and **Batch / Serial ID's** (traceability).
- 2D Barcodes were chosen due to their higher data capacity, compact size symbology and error correction capabilities.

Suppliers

- The transition to 2D Barcodes requires suppliers to have **on demand printing** capabilities and **changes to article packaging artwork** to accommodate the 2D Barcode and expiry dates.
- While all Fresh and Perishable articles should have an expiration date, not all printing technologies are suitable to print 2D Barcodes with the desired quality for POS. Hence the uptake among suppliers is slow while they acquire the technology to print and verify 2D barcodes in their processing lines.
- To date, **10 Suppliers** have adopted 2D Barcodes in Meat, Poultry and F&V
- Next is to trial 2D barcode on **Woolies Milk**

Salad Bag 2D Barcodes

Implementation

- In F22, 2D Barcodes on Salad Bags were trialed using **on demand printing** capabilities and embedding expiry date information.
- On Demand Printing 2D Barcode on Salad Bags /films was a **first globally**.
- Identified **packaging artwork** changes and moved the Expiry Date from the bottom of the packaging to the top right, which provides **better visibility** for Customers, Team and allows Supplier to use the same printhead to print on demand information in the same area of the 2D barcode.
- Allowance for a future GS1 Digital Link QR code
- Identified significant opportunities in the printing of expiry dates, as there is inconsistency in quality, size and location, which makes it difficult for Customers and Store team members.
- For the transition of suppliers to 2D Barcodes , the traditional EAN barcode was left at the back of the pack. This allows the supplier to embed the printing and QA verification processes in their plants. If something goes wrong, the EAN barcode is the backup.

Dairy Industry Update

Andrew Steele

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Australian Dairy Farmers

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Information & Awareness session to ADF members on 2D Barcodes on 10th February

- Discussed two use cases
  - Point of Sale
  - GS1 Digital Link

Dairy is seen as a logical and important early adopter product category for 2D barcodes

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Marketing Update

Tracey / Andrew

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New Resources

Tracey Kelly-Jenkins

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Resources section on webpage

2DBarcodes Advisory Group

Join a group of key stakeholders and have your say on the implementation of 2DBarcodes in Australia.

Learn more

Register for the webinar '2D Barcodes | Powering the Future of Retail' | 14 March

2DBarcodes Latest News

Don't get left behind by 2D barcodes

Time to rethink legacy point of sale

2DBarcodes Resources

2D FAQs

2D Toolkit

2D Checklist *(coming soon)*

New resources section

2D barcodes - GS1 Australia

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Conference: Australian Institue of Packaging

Packaging that Saves Food

Marcel Sieira, Chief Engagement Officer
GS1 Australia

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GS1 Digital Link

Andrew Steele

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QR Code(with GS1 Digital Link) – Best practices

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- Use brand's internet domain
- Use a sub-domain
- Use redirection
- Keep it short
- Include data to support business processes

https://www.gs1au.org/what-we-do/standards/digital-link

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Citrus Australia

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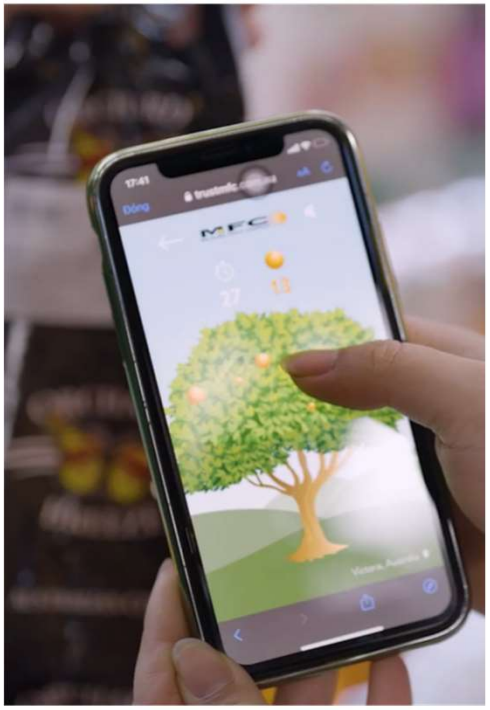

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Australian
Table Grape
Association Inc.

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WORLDSTAR
WINNER
2023

WORLDSTAR FOR PACKAGING

WPO
WORLD
PACKAGING
ORGANISATION

RESULT
GROUP OF COMPANIES

ATGA
Australian
Table Grape
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Perfection

GS1

AGRICULTURE VICTORIA

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General Business/Q&A

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Thank You!

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