

General Specifications Change Notification (GSCN)

WR #	GSCN Name	Effective Date
WR-22-309	GS1 Digital Link URI format for 2D in retail	Nov 2022

Associated Work Request (WR) Number:

WR-21-001, WR-22-031, WR-22-172

Background:

This 2D in Retail work request supports only the uncompressed structure of GS1 Digital Link URI and leverages both the ratified WR-22-172 section 8 optimisation and WR-22-031 2D in Retail MSWG agreements on the future state conformance requirements as the foundation.

The GS1 Digital Link URI syntax standard supports an uncompressed data string format and a compressed data string format. The compressed version introduces 2D in Retail complexity with negatable advantage for the retail sector and 2D barcode size.

For the eballot documentation, changes from the WR-22-309 are highlighted in the text below, but will not appear that way in the published *General Specifications*.

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Figure 5.12.3.1-2. GS1 symbol specification table 1 addendum 1 for AI (8200)

Symbol(s) specified		X-dimension mm (inches)		Minimum symbol height for given X mm (inches)			Quiet Zone	Minimum quality specification
	Minimum	Target	Maximum	For minimum X- dimension	For target X- dimension	For maximum X- dimension	Surrounding Symbol	
GS1 DataMatrix (ECC 200) (*)	0.396 (0.0150")	0.495 (0.0195")	0.743 (0.0293")	Height is determined by X-dimension and data that is encoded		1X on all four sides	1.5/12/660	
GS1 QR Code (*)	0.396 (0.0150")	0.495 (0.0195")	0.743 (0.0293")	Height is determined by X-dimension and data that is encoded			4X on all four sides	1.5/12/660

(*) 2D X-dimension - Optical effects in the image capture process require that the GS1 DataMatrix and GS1 QR Code symbols be printed at 1.5 times the equivalent X-dimension allowed for linear symbols.

Figure 5.12.3.1-3 provides the size and quality criteria for 2D barcodes used on retail consumer trade items scanned at POS. The use of these barcodes SHALL be in addition to a 1D barcode required for retail POS.



Note: Application Standard Profiles in section <u>8</u> provide information on conformance requirements for future use of 2D barcodes at retail POS without a mandatory 1D barcode.

Figure 5.12.3.1-3. Symbol specification table 1 addendum 2 for GS1 Digital Link2D barcodes

Symbol(s) specified	X-dimension mm (inches)			Minimum symbol height for given X mm (inches)	Quiet Zone	Minimum quality specification
	Minimum	Target	Maximum	for target maximum dimension	Surrounding Symbol	
GS1 DataMatrix (ECC 200) (*)	0.396 (0.0150")	0.495 (0.0195")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded	1X on all four sides	1.5/12/660
Data Matrix (GS1 Digital Link URI) (ECC 200) (*) (**)	0.396 (0.0150")	0.495 (0.0195")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded	1X on all four sides	1.5/12/660
QR Code (GS1 Digital Link URI) (*) (**)	0.396 (0.0150")	0.495 (0.0195")	0.990 (0.0390")	Height is determined by X-dimension and data that is encoded	4X on all four sides	1.5/12/660

(*) 2D X-dimension - Optical effects in the image capture process require that the Data Matrix and QR Code symbols be printed at 1.5 times the equivalent X-dimension allowed for linear symbols.
 (**) GS1 Digital Link URI syntax SHALL use the uncompressed form.



Note: The dimensional and quality specifications in figure 5.12.3.1-3 reflect the requirements within a read range typical of mobile device scanning of consumer trade item packaging.

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Figure 5.12.3.3-2. Symbol specification table 3 addendum 1 for 2D barcodes

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Symbol(s) specified	X-dimension mm (inches)					Quiet Zone	Minimum quality specification	
	Minimum	Target	Maximum	For minimum X- dimension	For target X- dimension	For maximum X- dimension	Surrounding Symbol	
GS1 DataMatrix (ECC 200) (*)	0.743 (0.0292)	0.990 (0.0390")	0.990 (0.0390")	(0.0390") and data that is encoded 0.990 (0.0390") Height is determined by X-dimension and data that is encoded 0.990 Height is determined by X-dimension		1X on all four sides	1.5/20/660	
Data Matrix (GS1 Digital Link URI) (ECC 200) (*)	0.743 (0.0292)	0.990 (0.0390")	0.990 (0.0390")			1X on all four sides	1.5/20/660	
QR Code (GS1 Digital Link URI) (*) (**)	0.743 (0.0292)	0.990 (0.0390")	0.990 (0.0390")			4X on all four sides	1.5/20/660	

(*)	2D X-dimension - Optical effects in the image capture process require that the Data Matrix and QR Code symbols be printed at 1.5 times the equivalent X-dimension allowed for linear symbols.
<u>(**)</u>]	GS1 Digital Link URI syntax SHALL use the uncompressed form.

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Note: ASP 1 does not apply to products sold or dispensed in a controlled environment (e.g., pharmacy, hospital) nor does it apply to books and serial publications where additional identification, data carrier, specifications and/or rules apply.

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Figure 8.2.1 ASP 1 conformance requirements

	e 8.2.1 ASP 1 conformance requirements	
Conformance requirements	General retail products	
Basis of conformance requirements	Section 2.1.3.1 Fixed measure trade items scanned at retail POS using GTIN-12 or GTIN-13 Section 2.1.3.2 Fixed measure trade items scanned at retail POS using GTIN-12 carried by a UPC-E barcode Section 2.1.3.3 Fixed measure trade items scanned at retail POS using GTIN-8	Commented [DM29]: WR22-0
	Section 2.1.3.6 Fixed measure fresh food trade items scanned at retail POS	
Identifier choices	GTIN-8, GTIN-12, GTIN-13	
Mandatory attribute(s)	N/A	
Optional attribute(s)	See section 3.2 for the list of GS1 Application Identifiers that may be used with the identifier	
Mandatory choices for a data carrier	EAN-8, EAN-13, UPC-A, UPC-E, GS1 DataBar Omnidirectional, GS1 DataBar Stacked Omnidirectional, GS1 DataBar Expanded, GS1 DataBar Expanded Stacked	Commented [DM30]: WR22-03
Agreement on conformant data carriers in the future	Any one of the mandatory data carriers or any one of the data carriers below will be conformant in the future once POS system support for these three 2D data carriers below reached pervasive adoption and becomes part of the global application standards. In the migration period, one of the data carriers below may be used in addition to the mandatory data carrier selected.	
	GS1 DataMatrix	
	Data Matrix (GS1 Digital Link URI)	
	QR Code (GS1 Digital Link URI)	
Barcode size and quality specifications	Figure 5.12.3.1-1 Symbol specification table 1 contains barcode quality and size specifications for trade items scanned in general retail POS and not general distribution	
	Figure 5.12.3.1-3 Symbol specification table 1 addendum 2 for 2D barcodes	
Mandatory choices for GS1 syntax	Plain, GS1 element string	Commented [DM31]: WR22-03
Agreement on conformant syntax in the future	Any one of the mandatory GS1 syntaxes or the uncompressed form of GS1 Digital Link URI syntax will SHALL be conformant in the future once the POS system support for interoperability between all three GS1 syntaxes has reached pervasive adoption and becomes part of the global application standards. GS1 Digital Link URI	

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Note: A data carrier with GS1 Digital Link URI to support consumer mobile devices may be used in addition to the mandatory POS data carriers selected.

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Figure 8.3.1 ASP 2 conformance requirements					
Conformance requirements	Fixed Measure POS and General Distribution				
Basis of conformance requirements					
Identifier choices	GTIN-8, GTIN-12, GTIN-13				
Mandatory attribute(s)	N/A				
Optional attribute(s)	See section 3.2 for the list of GS1 Application Identifiers that may be used with the identifier				
Mandatory choices for a data carrier	EAN-8, EAN-13, UPC-A, UPC-E, GS1 DataBar Omnidirectional, GS1 DataBar Stacked Omnidirectional, GS1 DataBar Expanded, GS1 DataBar Expanded Stacked				
Agreement on conformant data carriers in the future	Any one of the mandatory data carriers or any one of the data carriers below will be conformant in the future once POS and general distribution system support for these three 2D data carriers below reaches pervasive adoption and becomes part of the global application standards. In the migration period, one of the data carriers below may be used in addition to the mandatory data carrier selected. GS1 DataMatrix Data Matrix (GS1 Digital Link URI) QR Code (GS1 Digital Link URI)				
Barcode size and quality specifications	Figure 5.12.3.3-1. Symbol specification table 3 Figure 5.12.3.3-2 Symbol specification table 3 addendum 1 for 2D barcodes				
Mandatory choices for GS1 syntax	Plain, GS1 element string				
Agreement on conformant syntax in the future	Any one of the mandatory GS1 syntaxes or the uncompressed form of GS1 Digital Link URI syntax will SHALL be conformant in the future once the POS system support for interoperability between all three GS1 syntaxes has reached pervasive adoption and becomes part of the global application standards. GS1 Digital Link URI				

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Note: A data carrier with GS1 Digital Link URI to support consumer mobile devices may be used in addition to the mandatory POS data carriers selected.

Figure 8.3.2 ASP 2 cross-application rules

Cross-application rules	Description	GS1-General Specifications-sSection
GTIN rules	Rules for GTIN management of uniqueness and allocation, and responsibility for allocation.	4.3
	Rules that apply when a company changes legal status as a result of an acquisition, merger, partial purchase, split, or "spin-off."	1.6
Data relationships	Rules for allowed combinations of element strings on the same physical entity, irrespective of the data carrier(s) applied to the entity.	4.14

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Conformance	Variable measure fresh food using GTIN +	Variable measure fresh food using
requirements	count/weight	restricted circulation number (RCN)
Identifier choices	GTIN-12, GTIN-13	RCN-12, RCN-13
Mandatory attribute(s)	SHALL have at least one of the following GS1 Application Identifiers: AI(30)/AI(31nn)/AI(32nn)/AI(35nn)/AI(36n)	N/A
Optional attribute(s)	See section 3.2 for the list of GS1 Application Identifiers that may be used with the identifier	N/A
Mandatory choices for a data carrier	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked	EAN-13, UPC-A
Agreement on conformant data	Any one of the mandatory data carriers or any one of the data carriers below will be	N/A
carriers in the future	conformant in the future once POS system support for these three 2D data carriers below reaches pervasive adoption and becomes part	
	of the global application standards. In the migration period, one of the data	
	carriers below may be used in addition to the mandatory data carrier selected.	
	□ GS1 DataMatrix	
	 Data Matrix (GS1 Digital Link URI) QR Code (GS1 Digital Link URI) 	
Barcode size and	Figure 5.12.3.1-1 Symbol specification table 1	Figure 5.12.3.1-1 Symbol specification
quality specifications	contains barcode quality and size specifications for trade items scanned in general retail POS and not general distribution	table 1 contains barcode quality and size specifications for trade items scanned in general retail POS and not general
	Figure 5.12.3.1-3 Symbol specification table 1 addendum 2 for 2D barcodes	distribution
Mandatory choices for GS1 syntax	GS1 element string	Plain
Agreement on conformant syntax in the future	GS1 element string or the uncompressed form of GS1 Digital Link URI syntax SHALL will-be conformant in the future once the POS system support for interoperability between these syntaxes has reached pervasive adoption and becomes part of the global application standards.	N/A



Note: A data carrier with GS1 Digital Link URI to support consumer mobile devices may be used in addition to the mandatory POS data carriers selected.

Figure 8.4.2 ASP 3 cross-application rules

Cross-application rules	Description	GS1-General Specifications-sSection
GTIN rules	Rules for GTIN 4management of uniqueness and allocation, and responsibility for allocation. Allocating the numbers, GTIN 4management definitions	4.3

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All legacy implementations of these approaches remain conformant but new implementations SHALL use the GS1 Digital Link URI approach.

Figure 8.5.1 ASP 4 conformance requirements

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Conformance requirements	General retail products GS1 Digital Link URI
Basis of conformance requirements	Section 2.1.13.1 GS1 Digital Link URI syntax for extended packaging applications for trade items
Identifier choices	GTIN-8, GTIN-12, GTIN-13
Mandatory attribute(s)	N/A
Optional attribute(s)	See section 3.2 for the list of GS1 Application Identifiers that may be used with the identifier
Mandatory choices for a data carrier	QR Code (GS1 Digital Link URI), Data Matrix (GS1 Digital Link URI)
Barcode size and quality specifications	Figure 5.12.3.1-3 Symbol specification table 1 addendum 2 for 2D barcodes contains barcode quality and size specifications for 2D barcodes with GS1 Digital Link URI
Mandatory choices of GS1 syntax	This application SHALL use the uncompressed form of GS1 Digital Link URI, see GS1 Digital Link Standard: URI Syntax for more information

Figure 8.5.2 ASP 4 cross-application rules

Cross-application rules	Description	Section
GTIN rules	Rules for GTIN management of uniqueness and allocation, and responsibility for allocation.	4.3
	Rules that apply when a company changes legal status as a result of an acquisition, merger, partial purchase, split, or "spin-off."	1.6
Data relationships	Rules for allowed combinations of element strings on the same physical entity, irrespective of the data carrier(s) applied to the entity.	4.14
Human readable interpretation	Human readable interpretation (HRI) rules are provided to standardise printing requirements and facilitate training of staff on how to deal with GS1 AIDC data carriers that fail to scan or read.	4.15
Multiple barcode management	Rules for implementing multiple barcodes on the same trade item.	4.16

Figure 8.5.3 ASP 4 related technical specifications

Related technical specifications	Description	GS1-General Specifications sSection
GS1 Application Identifiers in numerical order	This section describes the meaning, structure and function of the GS1 system element strings so they can be correctly processed in users' application programmes. An element string is the combination of a GS1 Application Identifier and a GS1 Application Identifier data field. Also see GS1 Application Identifiers browser	3.2

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Term	Definition
check digit	Numeric character calculated from data and appended as part of the data string to ensure that the data is correctly composed and transmitted.
codeword	A symbol character value. An intermediate level of coding between source data and the graphical encodation in the symbol.
component/part	An item that is intended to undergo at least one further transformation process to create finished goods for the purpose of downstream consumption
Component/Part Identifier (CPID)	The unique identifier for a component/part, comprising a GS1 Company Prefix and a component/part reference
Composite Component	The 2D symbol component of a GS1 composite symbol.
concatenation	The representation of several element strings in one barcode.
Conformant	The state in which a system meets a specified standard.
consignment	A grouping of logistic or transport units assembled by a freight forwarder or carrier to be transported under one transport document (e.g., waybill).
consumer product variant (CPV)	An alphanumeric attribute of a GTIN assigned to a retail consumer trade item variant for its lifetime.
country subdivision	Principle administrative divisions, or similar areas, of a country included in <i>ISO 3166-1</i> . Examples are a state in the US, a region in France, a canton in Swiss.
coupon	A voucher that can be redeemed at the point-of-sale for a cash value or free item.
coupon issuer	Party issuing the coupons, bearing the commercial and financial responsibility for the coupons.
customer	The party that receives, buys, or consumes an item or service.
data character	A single numeric digit, alphabetic character or punctuation mark, or control character, which represents meaningful information.
data field	A field that contains a GS1 identification key, an RCN, or attribute information
Data Matrix (GS1 Digital Link URI)	Data Matrix encoding data using the uncompressed form of GS1 Digital Link URI syntax.
Data Matrix symbology	A standalone, two-dimensional matrix symbology that is made up of square modules arranged within a perimeter finder pattern. Data Matrix using ECC 200 error correction is the only version that supports GS1 system identification keys, including the Function 1 Symbol Character (FNC1). Data Matrix symbols are read by two-dimensional imaging scanners or vision systems.
data titles	Data titles are the abbreviated descriptions of element strings which are used to support manual interpretation of barcodes.
digital coupon	A digital coupon is an electronic presentation, that is distributed and presented without manifesting as "paper" or in other hard-copy form, and that can be exchanged for a financial saving or for loyalty points when making a purchase.
direct mode	Mobile device information retrieval function when the barcode contains either the address (URL) of the content or service, or the content itself, in-line.
direct part marking (DPM)	Direct part marking refers to the process of marking a symbol on an item using an intrusive or non-intrusive method.
direct print	A process in which the printing apparatus prints the symbol by making physical contact with a substrate (e.g., flexography, ink jet, dot peening).
document type	A component of a Global Document Type Identifier (GDTI) assigned by the document issuer to create a unique GDTI.
dynamic assortment	A trade item that comprises a variable composition of a fixed total count of two or more different trade items, each identified with a GTIN.with a fixed total count, where the count of each trade item contained may change.W
EAN/UPC symbology	A family of barcodes including EAN-8, EAN-13, UPC-A and UPC-E barcodes as well as the 2-and 5-digit add-ons. See also EAN-8 barcode, EAN-13 barcode, UPC-A barcode and UPC-E barcode.
EAN-13 barcode	A barcode of the EAN/UPC symbology that encodes GTIN-13 or RCN-13.
EAN-8 barcode	A barcode of the EAN/UPC symbology that encodes GTIN-8 or RCN-8.
economic operator (per EU 2018/574)	An economic operator is a business or other organisation which supplies goods, works or services within the context of market operations. Related to requirement for EOID for each country in which a party operates a facility.

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Term	Definition	
point-of-care (POC)	Location where dispensing or use of a non-retail, regulated healthcare pharmaceutical or medical device to or for a patient occurs.	
point-of-sale (POS)	Refers to the retail checkout where omnidirectional linear barcodes must be used to support high-volume laser-based scanning or low volume checkout where linear barcodes (or for regulated healthcare trade items, GS1 DataMatrix) are used with image-based scanners.	
predefined assortments	A trade item that comprises a fixed composition of two or more different trade items, eached identified with a GTIN with a fixed total count, where the count of each trade item contained does not change.	
price verifier digit	A digit calculated from the price element in a Restricted Circulation Number (RCN) that is used to check that the data has been correctly composed.	
product model	A base product design or specification from which a trade item is derived.	
QR Code (GS1 Digital Link URI)	QR Code encoding data using the uncompressed form of GS1 Digital Link URI syntax	
QR Code symbology	A two-dimensional matrix symbology consisting of square modules arranged in a square pattern. The symbology is characterised by a unique finder pattern located at three corners of the symbol. QR Code symbols are read by two-dimensional imaging scanners or vision systems.	
Quiet Zone	A clear space which precedes the start character and follows the stop character of a linear barcode or surrounds a 2D symbol.	
Quiet Zone Indicator	A greater than (>) or less than (<) character, printed in the human readable field of the barcode, with the tip aligned with the outer edge of the Quiet Zone.	
radio frequency	Any frequency within the electromagnetic spectrum associated with radio wave propagation. When radio frequency power is supplied to an antenna, an electromagnetic field is created that then is able to propagate through space. A radio frequency signal that can be processed by a radio frequency receiver. Many wireless technologies are based on radio frequency field propagation.	
radio frequency identification (RFID)	A technology that uses radio frequency electromagnetic fields or waves to automatically identify and track tags attached to objects. An RFID system consists of RFID tags and readers. When triggered by a radio frequency electromagnetic interrogation signal from a nearby RFID reader, the RFID tag transmits digital data, usually a unique identifier like an EPC, back to the reader.	
random assortment	A trade item that comprises two or more products that are not identified by a GTIN and are not intended for individual sale.	
RCN-12	A 12-digit Restricted Circulation Number (see Restricted Circulation Number).	
RCN-13	A 13-digit Restricted Circulation Number (see Restricted Circulation Number).	
RCN-8	An 8-digit Restricted Circulation Number (see Restricted Circulation Number)	
refund receipt	A voucher produced by equipment handling empty containers (i.e., bottles and crates).	
regular expression	A sequence of characters that specifies a search pattern that is usually used by string- searching algorithms for search / find-and-replace operations on strings or for validation of string input. A sequence of characters that specifies a search pattern. Usually, such patterns are used by string-searching algorithms for "find" or "find and replace" operations on strings, or for input validation.	
regulated healthcare non-retail consumer trade item	A regulated healthcare trade item not intended for scanning at POS and identified with a GTIN-14, GTIN-13, GTIN-12 or GTIN-8 utilising linear or 2D matrix barcodes that can be scanned by image-based scanners.	
regulated healthcare retail consumer trade item	A regulated healthcare trade item to be sold to the end consumer at a regulated healthcare retail point-of-sale (pharmacy). They are identified with a GTIN-13, GTIN-12 or GTIN-8 utilising linear or 2D matrix barcodes that can be scanned by image-based scanners.	
regulated healthcare trade item	Pharmaceuticals or medical devices that are sold or dispensed in a controlled environment (e.g., retail pharmacy, hospital pharmacy).	
responsible entity	The party responsible for the safety and effectiveness of the medical product at a moment in time in its life cycle, according to the approved regulatory file (including labelling) and regulatory/legal/professional obligations associated with the medical product. (e.g., brand owner, repackager, hospital pharmacy, etc.)	
Restricted Circulation Number (RCN)	Signifies an identification number used for special applications in restricted environments, either defined by local GS1 Member Organisations (for regional applications such as variable measure product identification and, couponing) or by a company (for internal applications).	

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