WR #	GSCN Name	Effective Date
20-232	GS1 Digital Link URI syntax for consumer mobile devices applications	Oct 2020

Associated Work Request (WR) Number:

WR-20-000207 – Glossary of terms General Specifications

Background:

The initial GS1 Digital Link Standard was first published in August 2018. Since then, companies have been seeking to pilot and implement the standard. Currently, the use of the GS1 Digital Link URI syntax is not in the *GS1 General Specifications*, so may not be implemented by those who are able to use it.

This work request was submitted to allow the use of GS1 Digital Link where the data carrier will be scanned by a consumer mobile device to support their requirements. This means that GS1 Digital Link URI syntax must be encoded in data carriers that can be scanned or read by mobile devices.

GS1 General Specifications Change:

Disclaimer:

GS1 General Specification Change:

Insert the actual changes to the Gen Spec here.

2.1.13 Trade item extended packaging applications

The information obtained from a consumer trade item's packaging can be extended when consumers using mobile devices scan barcodes on the package, which leads them to more information or an application. This standard provides a standardised packaging solution, which will lead to brand owner authorised information.

Independent of whether a trade item is retail or non-retail, fixed or variable measure, if it is sold to the end consumer and utilises GTIN-based identification, then it is within the scope of this application.

This application standard has three approaches to enable extended packaging applications,

- GS1 Digital Link URI syntax (2.1.13.1)
  - For new extended packaging applications, the GS1 Digital Link URI syntax is encoded in QR Code or Data Matrix.
- GS1 element string (AI-based) syntax (2.1.13.2)
  - Prior to the GS1 Digital Link standard, GS1 approved two approaches to reach extended packaging applications that were available within the GS1 system of standards.
    - An indirect mode of look-up via GTIN
      - This relies upon mobile device applications (apps) to use the GTIN encoded in EAN/UPC, GS1 DataBar, GS1 DataMatrix, or GS1 QR Code. This approach remains valid, but its implementation is limited by the lack of support for attributes of GTIN and the need to conduct a look-up to find a Web-based resource (indirect mode).
    - A direct mode of look-up utilising GS1 element string (AI-based) syntax approach that relies upon AIs (01) and (8200) to produce a product URL
      - This uses the GTIN and an additional GS1 Application Identifier (8200) to produce a product URL. This approach can be used to reach brand owner authorised information or applications via direct mode, but implementation has been limited at the global level by the need for an app to construct the URL from the decoded data.

2.1.13.1 GS1 Digital Link URI syntax for extended packaging applications for trade items

The GS1 Digital Link standard (DL) provides a packaging solution that can lead to brand owner authorised information. It uses a Web URI syntax to encode GS1 data, (e.g., GTIN and attribute data) in QR Code or Data Matrix barcodes. Although the GS1 Digital Link standard offers a compressed form of the GS1 Digital Link URI syntax, this application SHALL use the uncompressed form. For example, GTIN 09506000134369 can be encoded in a QR Code or Data Matrix to form a GS1 DL URI *https://example.com/01/09506000134369*.

Note: The example.com domain name (reserved in RFC 2606 [*https://tools.ietf.org/html/rfc2606*]) is used in the example as a place holder for any domain name.

As the GS1 DL encodes GS1 data in barcodes using a Web URI syntax, it differs from previous 'direct' and 'indirect' approaches described in Section 2.1.13.2 because it explicitly encodes a resolvable Web URI. The GS1 Digital Link URI syntax also differs from the previous approaches in

that it supports all GTIN attributes and provides standardised concatenation of multiple element strings.

GS1 Digital Link: URI syntax is a ratified GS1 technical standard normatively referenced within the GS1 General Specifications. See https://www.gs1.org/standards/gs1-digital-link.

GS1 key

Required

The allowed key formats for this application are:

GTIN-8

GTIN-12

GTIN-13

Rules

See the GTIN rules described in section 4.

Attributes

Required

Not Applicable

Optional

See Section 3 for the overview of all GS1 Application Identifiers that may be used with trade items

Data carrier specification

Carrier choices

QR Code

Data Matrix

Symbol X-dimensions, minimum symbol height, and minimum symbol quality

See Figure 5.10.3.1-3, Symbol specification table 1 addendum 2 for GS1 Digital Link.

Symbol placement

For additional barcodes that carry GS1 DL URIs (i.e. QR Code and Data Matrix), see section 4.16.1

Unique application processing requirements

For a description of processing steps, see Section 7.0 and the GS1 *Digital Link standard* .

2.1.13.2 GS1 element string syntax for extended packaging applications for trade items

The GS1 element string syntax provides an extended packaging solution that can lead to brand owner authorised information. The GTIN is the primary GS1 key used to access GS1 B2C data standards and services and all GS1 application standards for consumer trade items require GTIN, therefore this standard makes normative reference to the sections in the *GS1 General Specifications* related to consumer trade items in figure *2.1.13-1*.

In addition to using GTIN and indirect mode to reach trusted data, the URL AI (8200) with GTIN can be used to reach brand owner authorised information or applications via direct mode. GTIN and AI (8200) are encoded as separate data elements in the barcode but once decoded they are processed in a standard fashion by concatenating the following three strings: the contents of AI (8200), followed by a slash (/) character, followed by the GTIN expressed as 14 numeric digits. For example, where a trade item's GTIN, when expressed as 14 digits is 01234567890128 and the URL for direct mode access to information is *http://example.com/01234567890128*.

When encoded in the symbol, the sequence for encoding is (01) 01234567890128 (8200) http://example.com, but when processed the URL, a slash, and the GTIN are combined to arrive at http://example.com/01234567890128.

The example provided is not intended to constrain the brand owner to the use of http URL schema, the .com top-level domain, or the specific structure of URL illustrated. Any URL may be used, and in processing the slash character and 14-digit GTIN are appended.

These values are also expressed in non-HRI text on the label (see section 4.15). If GTIN attributes beyond AI (8200) are encoded together with GTIN and PRODUCT URL they are processed and expressed in text on the label as *http://brandownerassignedURL.com/gtin/serialnumber* where serial number equals up to 20 alphanumeric digits.

Figure 2.1.13-1. Overview of related normative sections

Section	Title	General retail POS	Regulated healthcare: retail POS	Regulated healthcare: non-retail / POC
2.1.3	Fixed measure trade items scanned at retail POS	Yes		
2.1.3.6	Fixed measure fresh food trade items scanned at retail POS	Yes		
2.1.4	Fixed measure trade items scanned in general distribution and at retail POS	Yes		
2.1.5	Healthcare primary packaging (non-retail trade items)			Yes
2.1.6	Healthcare secondary packaging (regulated healthcare retail consumer trade items)		Yes	
2.1.7.1	Fixed measure trade items scanned in general distribution - identification of a trade item that is a single product			Yes
2.1.12.1	Variable measure fresh food trade items scanned at retail point-of-sale using GTIN	Yes		

GS1 key

Required

The allowed key formats for this application are:

- GTIN-8
- GTIN-12
- GTIN-13
- For regulated healthcare non-retail applications also: GTIN-14

Rules

All rules in the sections that appear in figure 2.1.13-1 apply as described in each section.

Attributes

Required

For the purpose of direct mode, AI (8200) must be used in combination with GTIN when brand owners provide extended packaging information or applications.

Optional

For the purpose of indirect mode, all attributes in the sections which appear in the figure in section 2.1.13 apply as described in each section.

Rules

All rules in the sections that appear in figure 2.1.13-1 apply as described in each section.

Data carrier specification

Carrier choices

For the purpose of supporting indirect mode, all carrier choices in the sections which appear in the figure 2.1.13-1 apply as described in each section.

For the purpose of direct mode, in addition to the symbol required for indirect mode, when AI (8200) is used, GS1 DataMatrix and GS1 QR Code are the only approved data carriers. In the case of regulated healthcare consumer trade items, only GS1 DataMatrix is approved. See also section 4.16.

Symbol X-dimensions, minimum symbol height, and minimum symbol quality

To determine the appropriate specifications for printing and quality control, see the GS1 symbol specification table(s) referred to in each application standard shown in figure 2.1.13-1. ~~See note below figure 5.10.3.1-2 GS1 symbol specification table 1 addendum for AI (8200) related to reverse and mirror image representation constraint.~~

Symbol placement

None defined.

Unique application processing requirements

For a description of processing requirements, see section 7.

2.1.14 European Regulation 2018/574, traceability of tobacco products

This application standard provides a normative GS1 response to a specific regulatory requirement. It covers identification and marking of various entities per the Commission *Implementing Regulation (EU) 2018/574 on technical standards for the establishment and operation of a traceability system for tobacco products.* https://ec.europa.eu/health/tobacco/tracking_tracing_system_en . If other regulatory authorities (outside the EU) adopt the EU approach, this application standard is intended to support their efforts and enable global interoperability.

The regulation specifies where ISO/IEC 15459 compliant GS1 identification keys can be used to identify:

1. Unit packs (retail trade item consumer units) for traceability purposes (retail point of sale specifications are defined within separate application standard 2.1.3)
2. Aggregates defined as "*any packaging containing more than one unit packet of tobacco products*" (trade item groupings), including:
    a. Trade item grouping (e.g., higher level aggregations of unit packs such as cartons and cases) defined within separate application standards 2.1.4 or 2.1.7.
    b. Logistic units (e.g., aggregation of unit packs as transport units) defined within separate application standard 2.2.1.
3. Economic operators defined by EU 2018/574 as "any natural or legal person who is involved in the trade of tobacco products, including for export, from the manufacturer to the last economic operator before the first retail outlet" and where "Economic operators and operators of first retail outlets shall apply for an economic operator identifier code from the ID issuer competent for each Member State in which they operate at least one facility."
4. Facilities defined by EU 2018/574 as "any location, building or vending machine where tobacco products are manufactured, stored or placed on the market"
5. Machines defined as "the equipment used for the manufacture of tobacco products which is integral to the manufacturing process"

The regulation also specifies ISO/IEC, AIM, and GS1 compliant barcodes for unit packs and aggregations as well as ISO/IEC 15415 and 15416 print quality minimums.

The regulation introduces an extension of ISO/IEC 15459 Issuing Agency Codes (IACs) to identify the Member State appointed ID Issuer called the Unique Identification Code (UIC). As EU 2018/574 extends the IAC function to identify ID Issuers, GS1 will assign ID Issuer Unique Identification Codes (UICs) from its Issuing Agency Code allocation. GS1 identification keys will be used as they

Application	See section	SST(s)	Carrier choices
Variable measure fresh food trade items scanned at retail point-of-sale using GTIN	2.1.12.1	1	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked GS1 DataMatrix, GS1 QR Code
Variable measure trade items scanned at retail point-of-sale using Restricted Circulation Numbers	2.1.12.2	1	EAN-13, UPC-A
GS1 Digital Link URI syntax for extended packaging applications for trade items	2.1.13.1	1 Addendum 2	Data Matrix, QR Code
GS1 element string syntax for extended packaging applications for trade items~~Trade item extended packaging applications~~	2.1.13.2~~2.1.13~~	1 Addendum 1	GS1 DataMatrix, GS1 QR Code
▪ Regulated healthcare trade items	2.1.13	6, 7, 8, or 10	GS1 DataMatrix only
Regulated trade item, at unit pack level, per EU 2018/574 for tobacco traceability (GTIN + Third-Party Controlled Serialised Extension of GTIN)	2.1.14	12	GS1 DataMatrix, GS1 QR Code, GS1 DotCode
Regulated trade item, at standard trade grouping level, per EU 2018/574 for tobacco traceability (SGTIN)	2.1.14	12	GS1 DataMatrix, GS1 QR Code, GS1-128
Regulated logistics unit per EU 2018/574 for tobacco traceability (SSCC)	2.1.14	12	GS1 DataMatrix, GS1 QR Code, GS1-128
Logistics units - individual logistic units	2.2.1	5	GS1-128 As additional symbol: GS1 DataMatrix, GS1 QR Code
Logistics units - multiple logistic units (GSIN, GINC)	2.2.2, 2.2.3	5	GS1-128, GS1 DataMatrix, GS1 QR Code
Assets – Global Returnable Asset Identifier (GRAI)	2.3.1	9	GS1-128, GS1 DataMatrix, GS1 QR Code
▪ Permanent marking of GRAI	2.3.1, 2.6.14	7	GS1 DataMatrix, GS1 QR Code
Assets – Global Individual Asset Identifier (GIAI)	2.3.2	9	GS1-128, GS1 DataMatrix, GS1 QR Code
▪ Permanent marking of GIAI	2.3.2 2.6.14	7	GS1 DataMatrix, GS1 QR Code
Locations and parties - Identification of a physical location	2.4.4	9	GS1-128, GS1 Data Matrix, GS1 QR Code, EPC/RFID
Service relationships	2.5	11	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked, GS1-128, GS1 DataMatrix, GS1 QR Code
Coupons identified using the Global Coupon Number	2.6.2	1	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked
Coupon identification for restricted geographic distribution (GS1 Prefix 99) GS1 common currency coupon identification (GS1 Prefixes 981 to 983)	2.6.3.3 2.6.3.4 2.6.3.5	1	EAN-13
Coupon code identification for use in North America (AI 8110, 8112)	2.6.3.6 2.6.3.7	(*)	GS1 DataBar Expanded, GS1 DataBar Expanded Stacked or digitally transmitted
Refund receipts	2.6.4	1	EAN-13
Electronic serial identifier for cellular mobile telephones (CMTI): AI(8002)	2.6.5	4	GS1-128
Payment slips	2.6.6	4	GS1-128
Customer specific articles	2.6.7	1	EAN-13, UPC-A, ITF-14, GS1-128
Custom trade item	2.6.8	4	GS1–128, GS1 DataBar, GS1 DataMatrix, GS1 QR Code

4.15 Human readable interpretation (HRI) rules

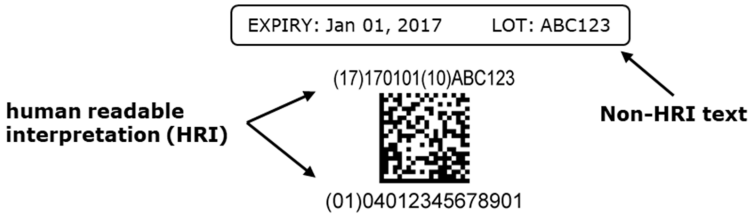
Human readable interpretation (HRI) rules are provided to standardise printing requirements and facilitate training of staff on how to deal with GS1 AIDC data carriers that fail to scan or read. There are two categories of rules:

- General rules that apply independent of sector, product category, or region.
- Sector specific rules which must be aligned with the general rules.

For the purposes of interpreting this standard, there are two types of text that appear on a label, package, or item; human readable interpretation (HRI) and non-HRI text.

- Human readable interpretation (HRI) is the information below, beside or above a barcode or tag which is encoded in the barcode or tag and represents the same characters as carried in the barcode or tag (See section 8 for full definition).
- Non-HRI text is all other text on package, label or item (See section 8 for full definition).

Figure 4.15-1. Example of HRI and non-HRI text



Note: The following rules are intended for global use. Exceptions may occur only when local regulatory or legal requirements mandate otherwise.

Note: At present, HRI rules are applicable to barcodes as rules for EPC/RFID tags are under development.

Note: HRI rules for the EAN/UPC symbology and the add-on symbols are explained in section 5.2.5 *Human readable interpretation*.

Human readable interpretation rules

- **Rule 1.** Whether a GS1 AIDC data carrier encodes a GS1 identification key, GS1 key attributes, or a combination of both, the HRI SHOULD be placed below the barcode and grouped together wherever physically possible while maintaining the HRI legibility and minimum barcode height (as specified in the appropriate symbol specification table referenced by the GS1 AIDC application standard).
  a. In cases where the HRI must be printed above, to the left, or to the right of the symbol due to packaging or space constraints, HRI SHALL always be printed adjacent to (obviously associated with) the GS1 AIDC data carrier while protecting Quiet Zones.
  b. If the HRI for GS1 identification keys and GS1 key attributes is split (for example GS1 key HRI is below the barcode and GS1 key attributes HRI is above the barcode), the preference for GS1 key HRI placement is always below the barcode.
  c. When HRI is grouped together (for example, all HRI data is grouped below the barcode or all HRI data is grouped above the barcode), HRI SHALL always follow the encoding sequencing of the GS1 AIDC data carrier.
- **Rule 2.** A single data element SHALL NOT be broken into two lines of HRI, for example the data for a serial number would appear on one line of HRI.

- **Rule 3.** Parentheses SHALL surround AIs in HRI but are not encoded in the GS1 AIDC data carrier.
- **Rule 4.** A clearly legible font SHALL be used (e.g., OCR-B as defined in *ISO 1073-2*) and the character set as defined in section 7.11. Reasonable alternative type fonts and character sizes are acceptable provided the interpretation is clearly legible.
- **Rule 5.** On GS1 Logistic Labels HRI characters SHALL be no less than 3 mm (0.1181 inch) high
- **Rule 6.** HRI SHALL be limited to element strings and will not include GS1 AIDC data carrier overhead such as separator characters.
- **Rule 7.** If the required barcode and associated HRI is marked directly on the part, then both satisfy the requirements for healthcare primary package marking (see section 2.1.4) if the barcode can be scanned and the HRI is legible through a panel in the primary packaging.
- **Rule 8.** HRI SHALL appear except in rare circumstances for specific applications where there are extreme space constraints (e.g., direct part marking). If the GS1 AIDC data carrier cannot be read or scanned and the HRI does not appear on the label, package, or item, non-HRI text SHOULD be used as backup information.

  As a non-HRI text option, the data title (see section 3.2) may be associated with the data instead of using the AI numbers. See figure 4.15-1 which shows expiration date and lot number identified with non-HRI text and where in the same figure the same data is shown using the all-AI format. These presentations can be used with all GS1 AIDC data carriers using GS1 Application Identifiers, except GS1-128 symbology.
- **Rule 9**. For symbols (Composite symbol, GS1 DataMatrix, GS1 QR Code) encoding a large amount of data, it may not be practical to display all the data in human readable interpretation form or, even if there is space to show it in this form, it may not be practical to key enter that much data. In these instances, some of the data may be omitted from the human readable interpretation. However, primary identification data (GS1 identification keys) such as the Global Trade Item Number (GTIN) or Global Document Type Identifier (GDTI) must always be shown. Application specifications provide guidance on human readable interpretation.

Figure 4.15-2. HRI with some of the data omitted

(01)13112345678906

- **Rule 10.** HRI alongside a GS1 2D symbol on a logistic label is not required if this is already present with the GS1-128 symbol, or is present as data titles and data content elsewhere on the label.
- **Rule 11.** If the barcode is printed in ladder orientation on the product, the HRI SHOULD remain clearly associated with the barcode and may appear below, to the left, or to the right of the symbol respecting Quiet Zones. See figure below.

Figure 4.15-3. Locations of HRI for barcode in ladder orientation

Note: There may be local variants for non-HRI text on the label (e.g., dates, prices) which are formatted based on local practice rather than the way the data is encoded in GS1 AIDC data carriers. In this case, the HRI associated with AIDC SHALL still be expressed as it is encoded in the GS1 AIDC data carrier encodation (per GS1 Application Identifier definition).

- **Rule 12.** When AI (8200) appears on the label, the expression of the URL SHALL NOT appear in HRI. If it appears in non-HRI text, it SHALL be expressed as *http://brandownerassignedURL.com/GTIN* (where GTIN expressed as 14 digits).
- **Rule 13.** When a logistic label displays a 2D symbol encoding transport process information that is otherwise represented in human readable format(text or graphic) elsewhere on the label, additional HRI is not required.
- **Rule 14.** When the GS1 Digital Link URI syntax for trade item extended applications appears on the label, the contents of HRI text is at the discretion of the brand owner. If non-HRI text appears it SHALL express the GTIN as encoded.

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4.15.1 Healthcare human readable interpretation rules

The GS1 system requires printing both the GS1 AIDC data carrier and the HRI that represents all the information encoded within that GS1 AIDC data carrier.

If the GS1 AIDC data carrier cannot be read or scanned, the HRI should be used as back up information. The GS1 preferred format for HRI when applied on healthcare trade items SHALL be as noted in the general HRI rules found in section *4.15*.

When considering the practical implementation and application of HRI during the creation of the product packaging, many factors must be taken into account to determine if and how HRI is included with the symbol. These factors may include the type of product being labelled or marked, product use, available space for marking, alternate data availability, regulatory or legal requirements, technical constraints, etc.

However, printing both the GS1 AIDC data carrier and the associated HRI may not be possible due to many factors such as the intended use of the item, available space for marking, etc. Deviation from the HRI format should be minimised and consider impacts to downstream trading partners and users

Typical examples are shown the figure below.

Figure 4.15.1-1. Preferred HRI format examples

If a deviation from the preferred format is required that results in HRI not being printed, then a combination of HRI and non-HRI text may be used. When doing so, the following rules apply:

- If the data represented in the non-HRI text is exactly as in the HRI, then the appropriate AI SHALL be printed along with the data title. See figure *4.15.1-2*.

5 Data carriers

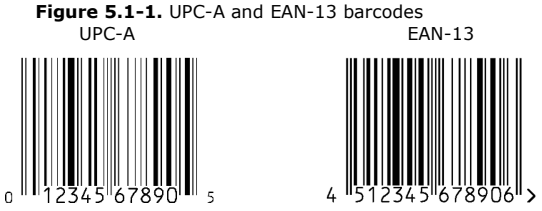
5.1 Introduction

A data carrier is a means of representing data in machine readable form. Data carriers that are endorsed by GS1 are described in sections 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.11~~5.9~~; barcode production and quality assessment are covered in section 5.12~~5.10~~.

The GS1 system specifies the data carrier used to represent any given element string. Section 2 covers rules indicating which data carrier should be used to represent which element strings in particular applications. The GS1 system uses the following data carriers:

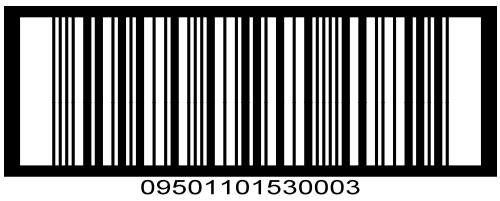
- The EAN/UPC symbology family of barcodes (UPC-A, UPC-E, EAN-13, and EAN-8 barcodes and the two- and five-digit add-on symbols) can be read omnidirectionally. These symbols must be used for all items that are scanned at the point-of-sale and may be used on other trade items.

Figure 5.1-1. UPC-A and EAN-13 barcodes



- ITF-14 (Interleaved 2-of-5) barcodes carry ID numbers only on trade items that are not expected to pass through the point-of-sale. ITF-14 symbols are better suited for direct printing onto corrugated fibreboard.

Figure 5.1-2. ITF-14 barcode



- The GS1-128 barcode is a subset of the Code 128 barcode symbology. Its use is exclusively licenced to GS1. This extremely flexible symbology encodes element strings using GS1 Application Identifiers.

Figure 5.1-3. GS1-128 barcode

- GS1 DataBar is a family of linear symbologies used within the GS1 system. This family of linear symbologies in most cases implicitly encodes GS1 Application Identifier (01) and in the case of GS1 DataBar Expanded explicitly encodes element strings using GS1 Application Identifiers.

Figure 5.1-4. GS1 DataBar Omnidirectional barcode

- Composite Component symbols do not exist in isolation. The primary identification number is always encoded in the linear symbol and supplementary GS1 Application Identifier element strings are encoded in the two-dimensional (2D) component where they take up less space.

Figure 5.1-5. GS1 DataBar Stacked Omnidirectional barcode with a Composite Component

- GS1 DataMatrix implementing ECC 200 error correction ~~Data Matrix ISO version ECC 200~~ is a subset of *ISO/IEC 16022* and is the only version that supports GS1 system data structures encoded with GS1 element string syntax, including Function 1 Symbol Character (FNC1). ~~Implementation of~~ GS1 DataMatrix SHALL be implemented ~~done~~ per approved GS1 system application standards, such as those for regulated healthcare retail consumer trade items.

Figure 5.1-6. GS1 DataMatrix barcode

- GS1 QR Code, is a subset of *ISO/IEC 18004~~:2015~~*. QR Code supports GS1 system data structures encoding with GS1 element string syntax, including Function 1 Symbol Character (FNC1). ~~Implementation of~~ GS1 QR Code SHALL be implemented ~~done~~ per approved GS1 system application standards.

Figure 5.1-7. GS1 QR Code barcode

- GS1 DotCode, supporting GS1 system data structures is supported by the AIM DotCode Specification, Rev 3.0, August 2014. Per the specification, "*Message segments that begin with a pair of digits, without an FNC1 either before or immediately following those two digits are regarded as conveying GS1 formatted data by excluding Function 1 Symbol Character*." ~~Implementation of~~ GS1 DotCode SHALL be implemented ~~done~~ per approved GS1 system application standards.

Figure 5.1-8. GS1 DotCode barcode

Data Matrix implementing ECC 200 error correction is an International Standard *ISO/IEC 16022*. Data Matrix Code supports GS1 system data structures encoded with GS1 Digital Link URI syntax. Data Matrix SHALL be implemented per approved GS1 system application standards.

Figure 5.1-9. Data Matrix barcode

https://example.com/01/09506000134369

QR Code is an International Standard *ISO/IEC 18004*. QR Code supports GS1 system data structures encoded with GS1 Digital Link URI syntax. QR Code SHALL be implemented per approved GS1 system application standards.

Figure 5.1-10. QR Code barcode

https://example.com/01/09506000134369

5.1.1 International standards

A number of national and regional standardisation bodies have developed barcode technical standards. The International Organisation for Standardisation (ISO) has published standard barcode symbology specifications via a subcommittee of ISO/IEC JTC1 (International Organisation for Standardisation/International Electrotechnical Commission Joint Technical Committee 1).

GS1 is actively involved in developing these standards. The objective is for GS1 system standards to remain fully compatible with relevant published national, regional, and international symbology standards. The pertinent documents for section 5 include the latest published version of:

- **Section 5.1**: *ISO/IEC 15424: Information technology; automatic identification and data capture techniques; data carrier/symbology identifiers*.
- **Section 5.2**: *ISO/IEC 15420: Information technology; automatic identification and data capture techniques; bar code symbology specifications; EAN/UPC*.
- **Section 5.3**: *ISO/IEC 16390: Information technology; automatic identification and data capture techniques; bar code symbology specifications; ITF-14*.
- **Section 5.4**: *ISO/IEC 15417: Information technology; automatic identification and data capture techniques; bar code symbology specifications; GS1-128 Symbology specifications*.
- **Section 5.5**: *ISO/IEC 24724: Information technology; automatic identification and data capture techniques; GS1 DataBar bar code symbology specification.*
- **Section 5.6**: *ISO/IEC 16022: Information technology; automatic identification and data capture techniques; Data Matrix bar code symbology specification, as it pertains to GS1 DataMatrix.*
- **Section 5.7**: *ISO/IEC 18004:2015: Information technology; automatic identification and data capture techniques; QR Code bar code symbology specification, as it pertains to GS1 QR Code.*
- **Section 5.8:** *AIM Rev 3.0, August 2014: Information technology; automatic identification and data capture techniques; bar code symbology specification - DotCode.*
- **Section 5.9**: *ISO/IEC 16022: Information technology; automatic identification and data capture techniques; Data Matrix bar code symbology specification.*
- **Section 5.10**: *ISO/IEC 18004: Information technology; automatic identification and data capture techniques; QR Code bar code symbology specification*
- **Section 5.11~~9~~**: *ISO/IEC 24723: Information technology; automatic identification and data capture techniques; EAN.UCC Composite bar code symbology specification.*
- **Section 5.12~~0~~**: Bar Code Production and Quality Assessment:
  - *ISO/IEC 15415: Information technology; automatic identification and data capture techniques; bar code print quality test specification; two-dimensional symbols*.
  - *ISO/IEC 15416: Information technology; automatic identification and data capture techniques; bar code print quality test specification; linear symbols*.
  - *ISO/IEC 15419: Information technology; automatic identification and data capture techniques; bar code digital imaging and printing performance testing.*
  - *ISO/IEC 15421: Information technology; automatic identification and data capture techniques; bar code master test specifications.*
  - *ISO/IEC 15426-1: Information technology; automatic identification and data capture techniques; bar code verifier conformance specification - Part 1: Linear symbols.*
  - *ISO/IEC 15426-2: Information technology; automatic identification and data capture techniques; bar code verifier conformance specification - Part 2: Two-dimensional symbols.*
  - *ISO 1073-2: Alphanumeric character sets for optical recognition – Part 2: Character set OCR-B Shapes and dimensions of the printed image.*
  - *ISO/IEC TR 29158: Information technology; Automatic identification and data capture techniques; direct part marking (DPM) Quality Guideline.*
- **All sections**: *ISO/IEC 646: Information technology; ISO 7-bit coded character set for information interchange.*

5.1.2 Symbology identifiers

The symbology identifier is not encoded in the barcode but is generated by the decoder after decoding and is transmitted as a preamble to the data message.

All scanning equipment has the ability to recognise the symbology that has been scanned. Some scanners have the optional feature of being able to transmit a symbology identifier. The symbology identifier is a three-character data string comprising a flag character, code character, and a modifier character. The symbology identifiers used in the GS1 system are shown in figure *5.1.2-1*.

Figure 5.1.2-1. Structure of the symbology identifiers

Character	Description
]	The flag character (which has an ASCII value of 93). This denotes that the two characters following it are Symbol Identifier characters.
c	The code character. This denotes the type of symbology.
m	The modifier character. This indicates the mode in which the symbology is used.

Note: If used, the symbology identifier is transmitted as a prefix to the data message.

Figure 5.1.2-2. ISO/IEC 15424 symbology identifiers used in the GS1 system

Symbology identifier (*)	Symbology format	Content
]E0	EAN-13, UPC-A, or UPC-E	13 digits
]E1	Two-digit add-on symbol	2 digits
]E2	Five-digit add-on symbol	5 digits
]E3	EAN-13, UPC-A, or UPC-E with add-on symbol (**)	15 or 18 digits
]E4	EAN-8	8 digits
]I1	ITF-14	14 digits
]C1	GS1-128	Standard AI element strings
]e0	GS1 DataBar	Standard AI element strings
]e1	GS1 Composite	Data packet containing the data following an encoded symbol separator character.
]e2	GS1 Composite	Data packet containing the data following an escape mechanism character.
]d2	GS1 DataMatrix	Standard AI element strings
]Q3	GS1 QR Code	Standard AI element strings
]J1	GS1 DotCode	Standard AI element strings
]d1	Data Matrix implementing ECC 200	GS1 Digital Link URI
]Q1	QR Code	GS1 Digital Link URI

(*)	Symbology identifiers are case sensitive.
(**)	Barcodes with add-on symbols may be considered either as two separate symbols, each of which is transmitted separately with its own symbology identifier, or as a single data packet. The system designer SHALL select one of these methods, but the method using symbology identifier **]E3** is preferable for data security.

5.9 Two dimensional barcodes - Data Matrix symbology

Data Matrix implementing ECC 200 error correction is an international Standard *ISO/IEC 16022*. Data Matrix is only used by the GS1 system to encode the GS1 Digital Link URI syntax. For full technical aspects of Data Matrix, see ISO/IEC 16022.

5.10 Two dimensional barcodes - QR Code symbology

QR Code is an international Standard *ISO/IEC 18004*. QR Code is only used by the GS1 system to encode the GS1 Digital Link URI syntax. For full technical aspects of QR Code, see ISO/IEC 18004.

~~5.10.3~~5.12.3 GS1 symbol specification tables

In order to find the correct barcode specification, you must:

- Find the appropriate GS1 system application area using figure *5.12.2.6~~5.10.2.6~~-1*.
- If the application area references two symbol specification tables, use the decision tree in figure *5.12.2.6~~5.10.2.6~~-2* to determine which one to use.

The figure below provides a quick reference list of the symbol quality parameters depending on their type and their application.

Figure 5.12.3-1. Quick reference on symbol quality

Symbology	Application or ID key	ISO (ANSI) symbol grade	Aperture	Wavelength
EAN/UPC	GTIN-8	1.5 (C)	See symbol specification tables 1, 2, 3, 4, 6, 8 and 10 for values	660 nm +/-10
EAN/UPC	GTIN-12	1.5 (C)	See symbol specification tables 1, 2, 3, 4, 6, 8 and 10 for values	660 nm +/-10
EAN/UPC	GTIN-13	1.5 (C)	See symbol specification tables 1, 2, 3, 4, 6, 8 and 10 for values	660 nm +/-10
GS1-128	GTIN-12, GTIN-13, GTIN-14	1.5 (C)	See symbol specification tables 2, 4, 5, 6, 8, 9 and 10 for values	660 nm +/-10
GS1-128	SSCC	1.5 (C)	10 mils	660 nm +/-10
ITF-14 (<0.635 mm (0.025 in.) X)	GTIN-12, GTIN-13, GTIN-14	1.5 (C)	See symbol specification tables 2, 4, 6, 8, and 10 for values	660 nm +/-10
ITF-14 (≥0.635 mm (0.025 in.) X)	GTIN-12, GTIN-13, GTIN-14	0.5 (D)	20 mils	660 nm +/-10
Composite	GTIN-8, GTIN-12, GTIN-13, GTIN-14 and other AIs	1.5 (C)	6 mils	660 nm +/-10
GS1 DataBar	GTIN-8, GTIN-12, GTIN-13, GTIN-14 and other AIs	1.5 (C)	See symbol specification tables 1, 2, 3, 4, 6, 8, 10 and 11	660 nm +/-10
GS1 DataMatrix	Direct part marking, regulated healthcare retail or non-retail consumer trade items, extended packaging, and logistic units	1.5 (C)	See symbol specification tables 5, 6, 7, 8, 9, 10 and 11 Table 1 Addendum 1 for AI (8200) for values.	660 nm +/-10
GS1 QR Code	Direct part marking, custom trade item, extended packaging, GDTI, logistic units and GSRN	1.5 (C)	See symbol specification tables 1 Addendum 1 for AI (8200), 5, 7, 9, and 11 for values.	660 nm +/-10
GS1-128, GS1 DataMatrix, GS1 QR Code, GS1 DotCode	Supporting European Regulation 2018/574 *on technical standards for the establishment and operation of a traceability system for tobacco products*	3.5 (A)	See symbol specification tables 12	660 nm +/- 10
Data Matrix	GS1 Digital Link Standard URI syntax for extended packaging applications	1.5 (C)	See symbol specification table 1 Addendum 2 for GS1 Digital Link for values	660 nm +/- 10

Symbology	Application or ID key	ISO (ANSI) symbol grade	Aperture	Wavelength
QR Code	GS1 Digital Link Standard URI syntax for extended packaging applications	1.5 (C)	See symbol specification table 1 Addendum 2 for GS1 Digital Link for values	660 nm +/- 10

~~5.10.3.1~~5.12.3.1 Symbol specification table 1 - Trade items scanned in general retail POS and not general distribution

Figure 5.12.3.1-1. GS1 symbol specification table 1

Primary 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	Left	Right	
EAN-13	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	11*X*	7*X*	1.5/06/660
EAN-8	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	14.58 (0.574")	18.23 (0.718")	36.46 (1.435")	7*X*	7*X*	1.5/06/660
UPC-A	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9*X*	9*X*	1.5/06/660
UPC-E	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9*X*	7*X*	1.5/06/660
GS1 DataBar Omni-directional (****)	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	12.14 (0.478")	15.19 (0.598")	30.36 (1.195")	None	None	1.5/06/660
GS1 DataBar Stacked Omni-directional (***) (****)	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	25.10 (0.988 ")	31.37 (1.235")	62.70 (2.469")	None	None	1.5/06/660
GS1 DataBar Expanded	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	8.99 (0.354")	11.23 (0.442")	22.44 (0.883")	None	None	1.5/06/660
GS1 DataBar Expanded Stacked (*****)	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.75 (0.738")	23.44 (0.923")	46.86 (1.845")	None	None	1.5/06/660
GS1 DataMatrix	0.375 (0.0148)	0.625 (0.0246)	0.990 (0.0390)	Height is determined by the X-dimension and data that is encoded			1X on all four sides		1.5/08/660
GS1 QR Code	0.375 (0.0148)	0.625 (0.0246)	0.990 (0.0390)	Height is determined by the X-dimension and data that is encoded			4X on all four sides		1.5/08/660

Primary Symbol(s) Specified Plus Add-on 2 or 5	X-dimension mm (inches)			(**) Minimum symbol height for given X mm (inches)			Quiet Zone	Min separation between symbols	Max separation between symbols	Quiet Zone	Min. Quality Spec.
	(*) Minimum	Target	Maximum	For min. X-dimension	For target X-dimension	For max. X-dimension	Left		Right		
EAN-13 + 2	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	11*X*	7*X*	12*X*	5*X*	1.5/06/ 660
EAN-13 + 5	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	11*X*	7*X*	12*X*	5*X*	1.5/06/ 660
UPC-A + 2	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9*X*	9*X*	12*X*	5*X*	1.5/06/ 660
UPC-A + 5	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9*X*	9*X*	12*X*	5*X*	1.5/06/ 660
UPC-E + 2	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9*X*	7*X*	12*X*	5*X*	1.5/06/ 660
UPC-E + 5	0.264 (0.0104")	0.330 (0.0130")	0.660 (0.0260")	18.28 (0.720")	22.85 (0.900")	45.70 (1.800")	9*X*	7*X*	12*X*	5*X*	1.5/06/ 660

(*)	These barcodes may only be printed using an X-dimension below 0.264 millimetre (0.0104 inch) under the following conditions: ▪ The allowance for X-dimensions between 0.249 millimetre (0.0098 inch) and 0.264 millimetre (0.0104 inch) is only applicable to on demand (e.g., thermal, laser) print processes. For all other printing processes, an X-dimension of 0.264 millimetre (0.0104 inch) is attainable and is the minimum allowable size. ▪ When printing a minimum symbol with any method of printing, the area provided for printing the symbol and the required Quiet Zone SHOULD never be less than the area required for an X-dimension of 0.264 millimetre (0.0104 inch).
(**)	▪ The minimum symbol height dimensions listed for all symbologies including EAN/UPC symbols do not include the human readable interpretation. ▪ When printing a minimum symbol with any method of printing, the bar height SHALL never be truncated below the minimum as listed in the table above. ▪ Because of the operative scanning environment for EAN/UPC symbols, there is a direct relationship between the symbol's height and width. This means the minimum symbol height listed is tied to the minimum, target, and maximum X-dimension listed. There is no maximum for the height, but if the maximum X-dimension is used, the symbol height must be equal to or greater than those listed in the Minimum Symbol Height column. ▪ The minimum heights of EAN/UPC symbols do not include the extended bars: see section 5.2.3.2 for dimensions of the extended bars. ▪ For GS1 DataBar Expanded Stacked symbols, the table reflects the minimum symbol height for symbols that are two rows in height.
(***)	In addition to the factors above related to digital printing, one other exception is permitted; For loose produce being weighed at the point-of-sale (POS) using GS1 DataBar Stacked Omnidirectional minimum X-dimension of 0.203 millimetre (0.0080 inch) is permitted but may produce scanning performance reduction. However, for POS, this performance drop off is not noticeable when the product must be weighed at the point-of-sale. Even with a slower scanning performance to conduct the transaction, the weighing process takes longer than the scanning process. For that reason, a lower minimum X-dimension should never be used on products crossing point-of-sale which are not weighed as loose produce during the scan event.
(****)	The current symbol specification for GS1 DataBar Omnidirectional (minimum height 33X) and GS1 DataBar Stacked Omnidirectional (minimum height 69X) indicate a square aspect ratio for the symbol segments. To enhance scanning performance, in an omnidirectional scanning environment, an over square aspect ratio SHALL be used following the example of the EAN/UPC symbology specification and rigorous field test of the GS1 DataBar symbology (46X or 95X).
(*****)	For North American coupon codes using GS1 DataBar Expanded Stacked in 2 row and 3 row configurations the X-dimension may be as low as 0.0080" (0.203mm) as long as a minimum overall bar height of 1.020" (25.91mm) is maintained. X-dimensions less than 0.0100" (.254mm) might not always be feasible for all GS1 DataBar coupon barcodes due to variables, such as printing process, symbol orientation, and material. Due to the time sensitive nature of the coupon printing process, these variables should be considered during the design and barcode origination processes. Barcode verification should always be done from printing press proofs.

Note: See section 2.7 to ensure the correct symbol specification table is used.

The table above is used to determine the appropriate specifications for printing and quality control of the barcode used in the retail point-of-sale for products. In addition to the symbol used at general retail POS, an additional 2D symbol may be used to carry AI (8200). As AI (8200) has a mandatory association with GTIN, the GTIN within the symbol ensures compatibility with direct or indirect mode. GS1 DataMatrix is approved for all applications including regulated healthcare trade items covered by SSTs 6, 7, 8, 10 and 11, but for general retail consumer trade items, either GS1 QR Code or GS1 DataMatrix are GS1 approved options. When using 2D symbols to carry AI (8200) on general retail trade items, the following specifications are required. For additional barcodes that carry GS1 Digital Link URIs (i.e. QR Code and Data Matrix), see the below figure 5.10.3.1-3 GS1 symbol specification table 2 addendum for GS1 Digital Link.

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.
~~(**)~~	~~Where a linear symbol appears on the package, reverse and mirror-image representation of GS1 2D symbols SHALL NOT be permitted.~~

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

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	
Data Matrix (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
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 Data Matrix and QR Code symbols be printed at 1.5 times the equivalent X-dimension allowed for linear symbols.

Note: The dimensional and quality specifications in Figure 5.10.3.1-3 reflect the requirements within a read range typical of mobile device scanning of consumer trade item packaging.

7.1 Introduction

The purpose of entering data transmitted from a reading device into a system is to record a transaction. In the GS1 system, a transaction is an Electronic Message to be processed according to the meaning and content of the data fields contained in the message. This should be possible without requiring any human intervention to determine the data's meaning and content.

First, an item must be physically present in order to produce a barcode or RFID reader message about the item. Only the data present in the data carrier on the item, and therefore relevant to it, can be recorded.

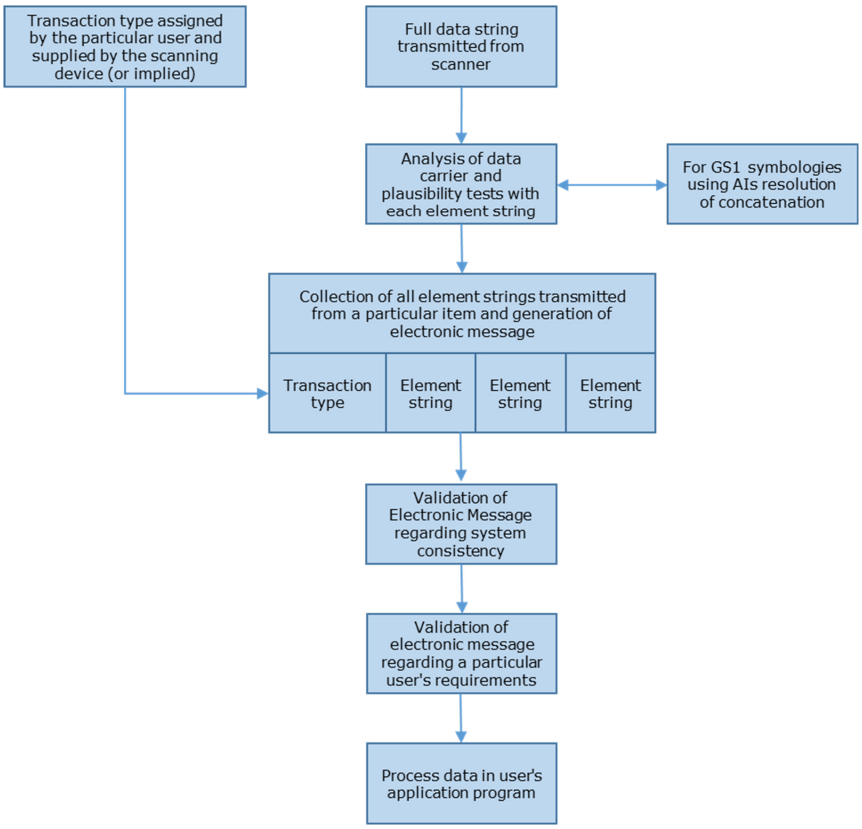
The standardised element strings of the GS1 system are the basis for the identification of items of every kind. They identify a particular item in an unambiguous manner and supply relevant attribute information.

When these element strings are printed on items, the scanned and transmitted data refers to that item and identifies its physical presence at a given location. When the message read from the scanned data carrier is coupled with an internally assigned designation of the type of item movement (e.g., warehouse entry, stock taking, sales), it is possible to automatically record data related to each movement of items. This provides security in two ways. First, an item must be physically present in order to produce a barcode reader message about the item, and, second, only the data in the barcode on the item and, therefore, relevant to it, can be recorded. False notification of movements is thereby largely eliminated.

When element strings are used in administrative areas (e.g., in order entry) they also can be used for automatic, error-free data capture. Because of the considerable length of many GS1 system ID numbers, automatic reading has great significance. By using a check digit, a digit that ensures the data has been correctly composed, the accuracy of the reading is verified.

7.2 Synopsis of message processing

Figure 7.2-1. Synopsis of element string message processing

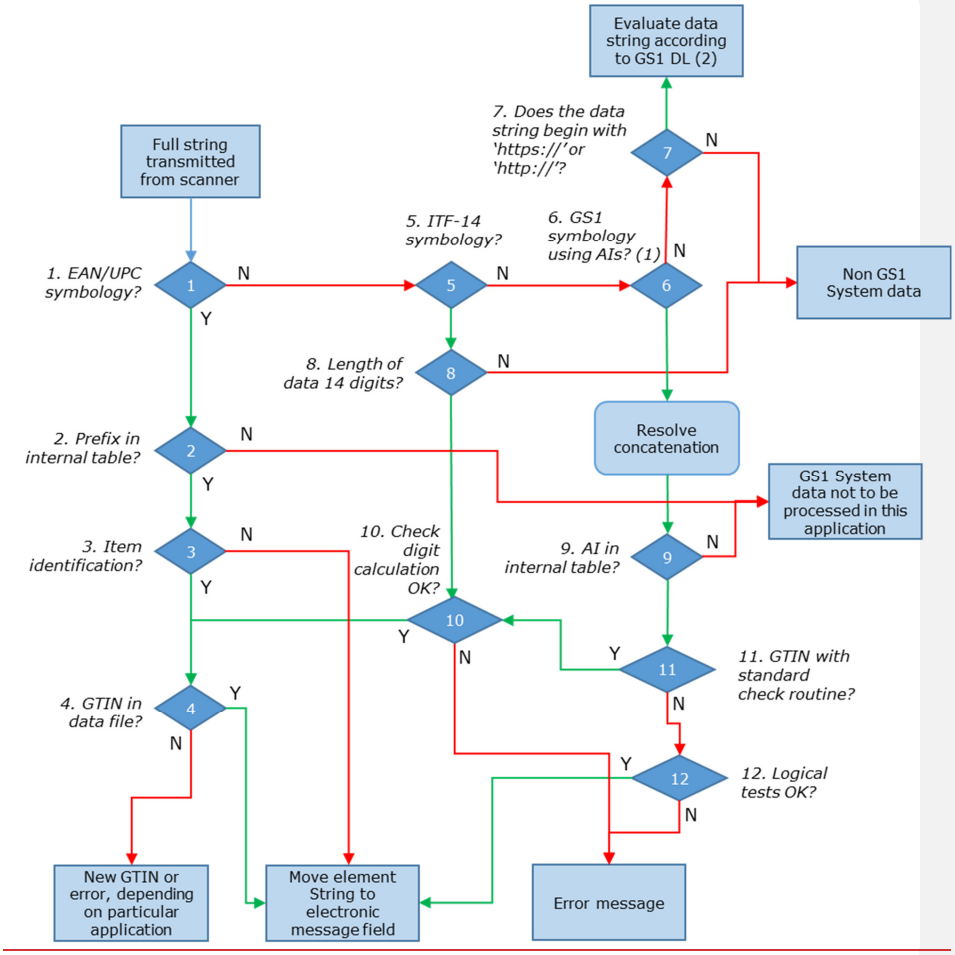


For details on any of the actions in figure 7.2-1, see the following subsections.

Note: For message processing using the GS1 Digital Link URI syntax see the GS1 Digital Link standard (https://www.gs1.org/standards/gs1-digital-link) for detailed information

7.2.1 Analysis of the data carrier and plausibility test for element strings

Figure 7.2.1-1. Test procedure



Term	Definition
Character Set 82	The set of characters found in *ISO 646*: Unique Graphic Character Allocations which includes numeric, alphabetic upper-case and lower-case, plus twenty special characters but excluding "space".
check character pair	A final character pair calculated from the other characters of some GS1 identification keys. These characters are used to check that the data has been correctly composed.
check digit	A final digit calculated from the other digits of some GS1 identification keys. This digit is used to check that the data has been correctly composed. (See GS1 check digit calculation.)
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	This term is used to refer to the 2D symbol component within a composite symbol.
Composite symbology	A GS1 system composite symbol consists of a linear component (encoding the item's primary identification) associated with an adjacent Composite Component (encoding attribute data, such as a batch number or expiration date). The composite symbol always includes a linear component so that the primary identification is readable by all scanning technologies, and so that imager scanners can use the linear component as a finder pattern for the adjacent 2D Composite Component. The composite symbol always includes one of three multi-row 2D Composite Component versions (e.g., CC-A, CC-B, CC-C) for compatibility with linear- and area-CCD scanners and with linear and rastering laser scanners.
concatenation	The representation of several element strings in one barcode.
configuration level	Assignment or grouping of trade items that includes one or more of the same trade item.
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 *ISO 3166-1*. 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 Extended barcode	A supplemental barcode, used only in North America, that can be printed on a coupon to provide additional information, such as offer codes, expiration dates, and household identification numbers.
coupon instance ID	The identification of a unique instance of a digital coupon.
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 letter, digit, or other symbol represented in the data field(s) of an element string.
data field	A field that contains a GS1 identification key, an RCN, or attribute information
Data Matrix	A standalone, two-dimensional matrix symbology that is made up of square modules arranged within a perimeter finder pattern. Data Matrix ISO version ECC 200 is the only version that supports GS1 system identification numbers, 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.
default front	The side of a retail consumer trade item that is used as the starting point to capture dimensional attributes for the purpose of data alignment.
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 discount 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).

Term	Definition
fresh foods	Trade items in the following product categories: fruits, vegetables, meats, seafood, bakery and ready to serve food such as cheeses, cold cooked or cured meats, and salad, etc. Fresh foods are defined as food that is not preserved by canning, dehydration, freezing or smoking.
full string	The data transmitted by the barcode reader from reading a data carrier, including the symbology identifier as well as the encoded data.
Function 1 Symbol Character (FNC1)	A symbology character used in some GS1 data carriers for specific purposes.
general distribution scanning	Scanning environments that include barcoded trade items packaged for transport, logistic units, assets, and location tags.
general retail consumer trade item	A retail consumer trade item identified with a GTIN-13, GTIN-12 or GTIN-8 utilising omnidirectional linear barcodes that can be scanned by high-volume, omnidirectional scanners.
GINC	See Global Identification Number for Consignment.
GLN extension component	The GLN extension component is used to identify internal physical locations within a location which is identified with a GLN (stores, factories, buildings, etc.).
Global Coupon Number (GCN)	A GS1 identification key that provides a globally unique identification for a coupon, with an optional serial number
Global Document Type Identifier (GDTI)	The GS1 identification key used to identify a document type. The key comprises a GS1 Company Prefix, document type, check digit, and optional serial number.
Global Electronic Party Information Registry (GEPIR®)	A web-browser interface and a machine to machine set of protocols for GS1 Member Organisation (MO) membership databases to communicate company information for selected GS1 keys including information about the allocation of the GS1 Company Prefixes used to create GS1 keys and/or individually assigned GS1 keys. Created in 1997 as a tool for MO staff, GEPIR's initial scope was to provide a search engine for member addresses and phone numbers using MO GS1 Company Prefix (GCP) databases as the source of information. In more recent versions, GEPIR also provides a very limited set of information on parties (GLNs) and trade items (GTINs).
Global Identification Number for Consignment (GINC)	The GS1 identification key used to identify a logical grouping of logistic or transport units that are assembled to be transported under one transport document (e.g., waybill). The key comprises a GS1 Company Prefix and the freight forwarder's or carrier's transport reference.
Global Individual Asset Identifier (GIAI)	The GS1 identification key used to identify an individual asset. The key comprises a GS1 Company Prefix and individual asset reference.
Global Location Number (GLN)	The GS1 identification key used to identify physical locations or parties. The key comprises a GS1 Company Prefix, location reference, and check digit.
Global Model Number (GMN)	The GS1 identification key used to identify a product model or product family. The key comprises a GS1 Company Prefix~~, and~~ model reference and a check character pair.
Global Returnable Asset Identifier (GRAI)	The GS1 identification key used to identify returnable assets. The key comprises a GS1 Company Prefix, asset type, check digit, and optional serial number.
Global Service Relation Number (GSRN)	The Global Service Relation Number is the GS1 identification key used to identify the relationship between an organisation offering services and the recipient or provider of services. The key comprises a GS1 Company Prefix, service reference and check digit.
Global Shipment Identification Number (GSIN)	The GS1 identification key used to identify a logical grouping of logistic or transport units that are assembled by the consignor (seller) for a transport shipment from that consignor to one consignee (buyer) referencing a despatch advice and/or BOL. The key comprises a GS1 Company Prefix, shipper reference and check digit.
Global Trade Item Number® (GTIN®)	The GS1 identification key used to identify trade items. The key comprises a GS1 Company Prefix, an item reference and check digit.
GS1 AIDC data carrier	A means to represent data in a machine readable form; used to enable automatic reading of the element strings as specified for use by GS1.
GS1 Application Identifier	The field of two or more digits at the beginning of an element string that uniquely defines its format and meaning.
GS1 Application Identifier data field	The data used in a business application defined by one GS1 Application Identifier.
GS1 B2C Trusted Source of Data (TSD)	A GS1 managed network concept that leverages GTIN (product identification) and GDSN (product information) and would support the communication of authentic product data provided by brand owners to retailers, internet application providers, government, and consumers and shoppers using internet and mobile devices (phones, laptops, etc.).

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Term	Definition
Unique Device Identifier (UDI)	A series of numeric or alphanumeric characters that is created through a globally accepted device identification and coding standard. It allows the unambiguous identification of a specific medical device on the market. The UDI is comprised of the UDI-DI and the UDI-PI. The word 'Unique' does not imply serialisation of individual production units.
Unique Device Identifier – Device Identifier (UDI-DI)	A unique identifier specific to a medical device trade item represented by a Global Trade Item Number (GTIN).
Unique Device Identifier – Production Identifier (UDI-PI)	A numeric or alphanumeric code that identifies the unit of device production. The different types of UDI-PIs include serial number, lot number, software identification and manufacturing or expiry date or both types of date.
Unit of Use UDI-DI (UoU UDI-DI)	The Unit of Use UDI-DI serves to associate the use of a device with a patient in instances in which a UDI is not labelled on the individual device at the level of its actual use on a patient. For example, three clips (which do not carry a physical UDI marking themselves) are contained in a cartridge which is packaged inside a container, which does carry a labelled UDI.
U.P.C. Company Prefix	A GS1 Company Prefix starting with a zero ('0') becomes a U.P.C. Company Prefix by removing the leading zero. A U.P.C. Company Prefix is used to issue GTIN-12.
U.P.C. Prefix	A GS1 Prefix starting with a zero ('0') becomes a U.P.C. Prefix by removing the leading zero. A U.P.C. Prefix is used to issue U.P.C. Company Prefixes or allocated to other specific areas.
Unique Identification Code (UIC) (per EU 2018/574)	Identifier of an EU 2018/574 ID Issuer that begins with an ISO 15459 Issuing Agency Code.
unit of use	Refers to an individual unit package that is used to make up the patient-specific prescription that is prescribed for administering to a patient.
unrestricted distribution	Signifies that such system data may be applied on goods to be processed anywhere in the world without restraint as to such things as country, company, and industry.
UPC-A barcode	A barcode of the EAN/UPC symbology that encodes GTIN-12 and RCN-12.
UPC-E barcode	A barcode of the EAN/UPC symbology representing a GTIN-12 in six explicitly encoded digits using zero-suppression techniques.
variable measure trade item	A trade item which may be traded without a predefined measure, such as its weight or length.
wide-to-narrow ratio	The ratio between the wide elements and the narrow elements in a barcode symbology such as ITF-14 that has two different element widths.
X-dimension	The specified width of the narrowest element of a barcode.

8.2 GS1 abbreviations

Abbreviation	Term
ADC	Automatic Data Capture
AI	GS1 Application Identifier
AIDC	Automatic Identification and Data Capture
aUI	aggregate Unique Identifier (per EU 2018/574)
BUDI-DI	Basic UDI - Device Identifier
DPM	Direct Part Marking
EAN	EAN International, now called GS1
EDI	Electronic Data Interchange
EOID	Economic Operator Identifier (per EU 2018/574)
EPC	Electronic Product Code
EU	European Union
FID	Facility Identifier (per EU 2018/574)
FNC1	Function 1 Symbol Character
GCN	Global Coupon Number
GCP	GS1 Company Prefix

Abbreviation	Term
GDSN	Global Data Synchronisation Network
GDTI	Global Document Type Identifier
GEPIR	Global Electronic Party Information Registry
GIAI	Global Individual Asset Identifier
GINC	Global Identification Number for Consignment
GLN	Global Location Number
GMN	Global Model Number
GPC	Global Product Classification
GRAI	Global Returnable Asset Identifier
GRCTI	General Retail Consumer Trade Item
GS1 DL URI	GS1 Digital Link Uniform Resource Identifier
GS1 key	GS1 identification key
GSIN	Global Shipment Identification Number
GSMP	Global Standards Management Process
GSRN	Global Service Relation Number
GS1 UIC EXT	GS1 UIC Extension
GTIN	Global Trade Item Number
HRI	Human Readable Interpretation
ISBN	International Standard Book Number
ISO	International Organization for Standardization
ISSN	International Standard Serial Number
ITIP	Identification of Trade Item Pieces
LAC	Local Assigned Code
NHRN	National Healthcare Reimbursement Number
NTIN	National Trade Item Number
RCN	Restricted Circulation Number
RFID	Radio Frequency Identification
RHTI	Regulated healthcare trade item
RSS	Reduced Space Symbology
RZSC	Retailer Zero-Suppression Code.
SKU	Stock Keeping Unit
SRIN	Service Relation Instance Number
SSCC	Serial Shipping Container Code
TPX	Third Party Controlled, Serialised Extension of GTIN (restricted to EU 2018/574 regulatory use)
UIC	Unique Identification Code (per EU 2018/574)
upUI	unit pack Unique Identifier (per EU 2018/574)
UDI	Unique Device Identifier
UDI-DI	Unique Device Identifier – Device Identifier
UDI-PI	Unique Device Identifier – Production Identifier
UoM	Unit of Measure
UoU	Unit of Use

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8.3 Legacy (retired) terms

When terms are replaced or retired by GS1, they are maintained within this section for a minimum of five years. The legacy terms are supplied to point GS1 stakeholders to new terminology. The