



The GS1 System uses the following bar code symbologies as the data carriers:

- The EAN/UPC Symbology family of bar codes (UPC-A, UPC-E, EAN-13, and EAN-8 Bar Codes 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. EAN-8 and UPC-E Bar Codes are only used on very small retail trade items to encode the GTIN-8 and zero-suppressed GTIN-12 respectively.



Figure 1 - EAN-13 Bar Code

- ITF-14 (Interleaved 2-of-5) Bar Codes 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.

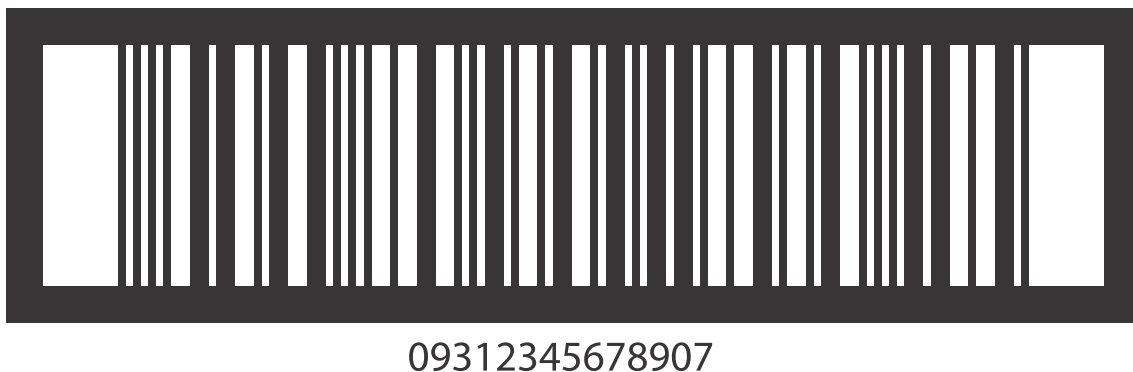


Figure 2 - ITF-14 Bar Code

- The GS1-128 Bar Code is a subset of the Code 128 Bar Code Symbology. Its use is exclusively licensed to GS1. This extremely flexible symbology encodes Element Strings using Application Identifiers.



(01)09312345678907

Figure 3 - GS1-128 Bar Code

- GS1 DataBar is a family of linear symbologies used within the GS1 System. This family of linear symbologies in most cases implicitly encodes Application Identifier (01) and in the case of GS1 DataBar Expanded explicitly encodes Element Strings using Application Identifiers. GS1 DataBar has been approved for bilateral use between trading partners from 2010. In 2014 GS1 DataBar becomes an open symbology and all scanning environments must be able to read these symbols. To date, symbol specifications have been developed for retail Point-of-Sale only.



(01)09312345678907

Figure 4 - GS1 DataBar Stacked Omnidirectional Bar Code

- Data Matrix ISO version ECC 200 is the only version that supports GS1 System data structures, including Function 1 Symbol Character. Implementation of GS1 DataMatrix shall be done per approved GS1 System application standards, such as those for Regulated Healthcare Retail Consumer Trade Items.



(01)09340941000006

Figure 5 - GS1 DataMatrix Bar Code



- GS1 QR Code, is a subset of ISO/IEC 18004 QR Code 2005. QR Code 2005 supports GS1 System data structures, including Function 1 Symbol Character. Implementation of GS1 QR Code shall be done per approved GS1 System application standards. QR Code is approved to obtain Extended Packaging information.



Figure 6 - GS1 QR Code Bar Code



1.1 Symbology Operational Bands

Consideration for selecting the correct bar code specification is based on where the symbol will actually be scanned, or the bar code operative scanning environment. The twelve operative scanning environments for GS1 Bar Codes are shown in Figure 7.

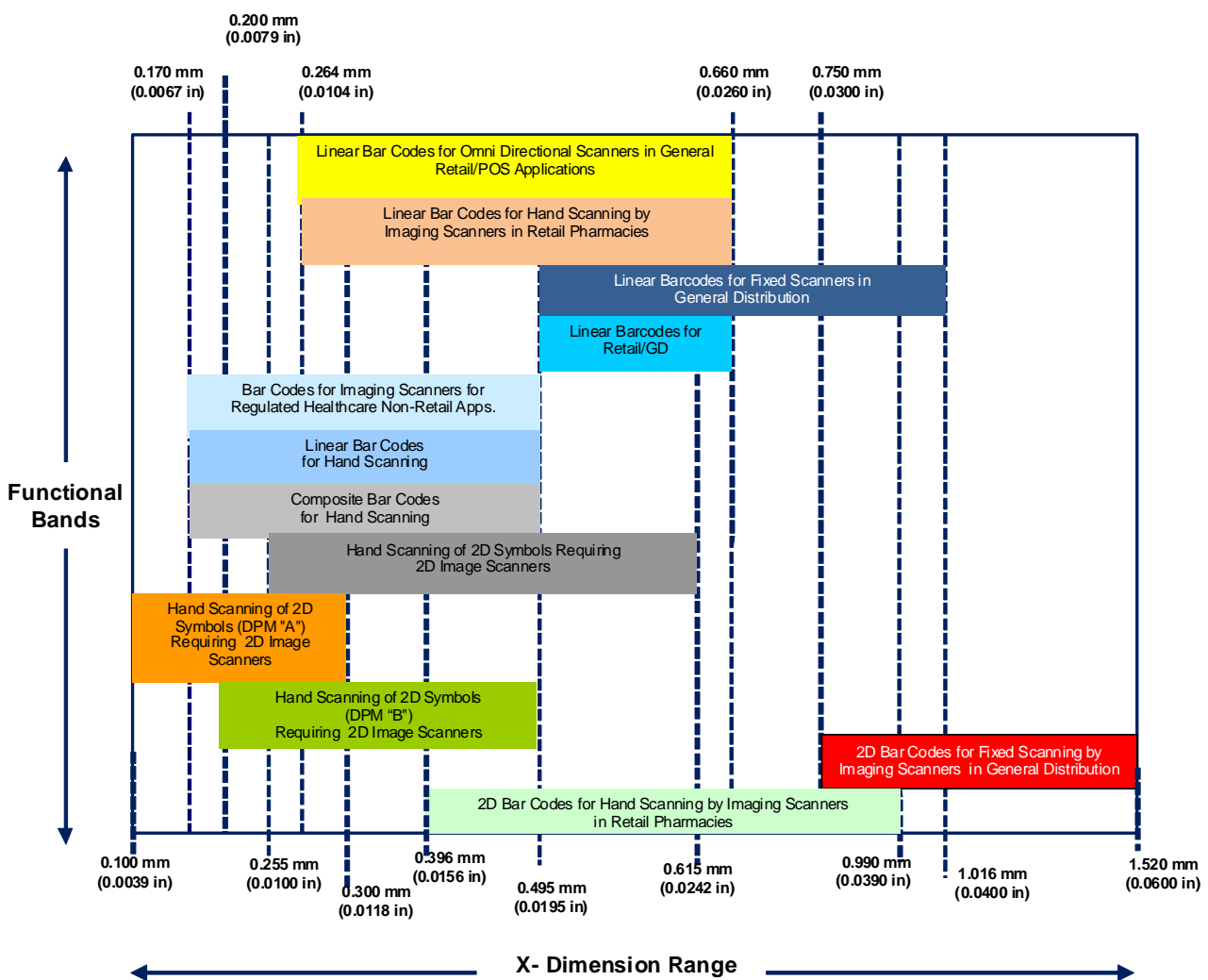


Figure 7 - Symbology Operational Bands

The Omnidirectional Scanners for General Retail\ POS band is primarily intended for General Retail Consumer Trade Items to provide orientation-free scanning in high-volume check-out lanes. Scanners are designed to read over-square symbols such as EAN/UPC and GS1 DataBar Retail POS Family. The approximate average distance between scanner and symbol is 100 millimetres



The fixed scanners in General Distribution band is primarily intended to facilitate automated scanning of trade items packaged for transport and logistic units using fixed mount scanners. In this environment it is essential to maintain symbol height and location to achieve acceptable scan rates.

The Linear Bar Codes for Imaging Scanners for Retail Pharmacies band is intended for regulated healthcare consumer trade items sold in a pharmacy or apothecary that is a separate retail store or a “controlled” area for distribution of healthcare trade items inside a larger retail operation. This band allows for the use of 2D symbols but this functional band shows the X-dimension ranges used for linear bar codes. Over the counter trade items that are sold in retail pharmacy but also general retail are marked according to general retail scanning specifications.

The Fixed Scanners in General Distribution band is primarily intended to facilitate automated scanning of trade items packaged for transport and logistic units using fixed mount scanners. In this environment it is essential to maintain symbol height and location to achieve acceptable scan rates.

Linear bar codes for both Retail and General Distribution band covers trade items in specific packaging suitable for transport purposes in General Distribution Scanning, but that are also scanned as General Retail Consumer Trade Items. See the overlap area between EAN/UPC Retail and General Distribution (Retail/GD) in Figure 7

The Imaging Scanners for Non-Retail Regulated Healthcare trade items band is intended for non-retail regulated healthcare consumer trade items sold outside of the retail channel. For example these X-dimension bands should be used for products destined for hospitals or nursing homes that will never be scanned in a retail pharmacy.

The Linear bar codes for hand scanning band is intended for non-retail trade items using a linear bar code.

The Composite Component bar codes for hand scanning band is intended for non-retail trade items using Composite Component bar codes which are, in effect, a multi-row 2D linear bar code. In general, the rule is that Composite Components shall be printed at the same X-dimension as their linear host. GS1 DataMatrix Symbols shall be printed at X-dimensions that are 50 percent greater than corresponding linear symbols with Composite Components. Therefore, the bands for linear symbols and Composite Components are very similar in X-dimension and if the same scanner types are chosen, as in the case of Composite Symbols, the bands become one.

The 2D Bar Codes for Automated Scanning by Imaging Scanners in General Distribution band has been added to show the X-dimension band used by those who support general distribution of regulated healthcare consumer trade items which may be marked with GS1 DataMatrix.

2D Bar Codes for Imaging Scanners for Retail Pharmacy band is intended for regulated healthcare consumer trade items sold in a pharmacy or apothecary that is a separate retail store or a “controlled” area for distribution of healthcare trade items inside a larger retail operation. This band allows for the use of linear symbols but this functional band shows the X-dimension ranges used for 2D bar codes. Over the counter trade items that are sold in retail pharmacy but also general retail are marked according to general retail scanning specifications.

Note: Today, there is no functional band for mobile devices as the variables of symbol selection, data, operative scanning environment, and allowable symbol specifications for size would require a detailed table solely for mobile devices. At this time, the assumption for mobile devices is that they will support all currently approved symbols, symbol data scenarios, and symbol size specifications however where testing and/or practical experience shows a constraint, this will be addressed in GS1 standards.



1.2 Symbology Identifiers

All scanning equipment has the ability to recognise the symbology of the bar code 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 of format **Jcm** comprising a flag character, code character and a modifier character.

Character	Description
J	The flag character (which has an ASCII value of 93) denotes that the two characters following are symbol identifier characters.
c	The code character denotes the type of symbology.
m	The modifier character denotes the mode in which the symbology is used.

TABLE 1. Symbology identifier definitions

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

The symbology identifiers used in the GS1 System are as follows:

Symbology identifier*	Symbology format	Content
]E 0	EAN-13, UPC-A or UPC-E	13 digits
]E 1	Two-digit EAN/UPC Add-on	2 digits
]E 2	Five-digit EAN/UPC Add-on	5 digits
]E 3	EAN-13, UPC-A or UPC-E with Add-on**	15 or 18 digits
]E 4	EAN-8	8 digits
]I 1	ITF-14	14 digits
]C 1	GS1-128	Standard AI Element Strings
]e 0	GS1 DataBar***	Standard AI Element Strings
]e 1	GS1 Composite	Data packet containing the data following an encoded symbol separator character.
]e 2	GS1 Composite	Data packet containing the data following an escape mechanism character.
]d 2	GS1 DataMatrix	Standard AI Element Strings
JQ3	GS1 QR code	Use for Extended Packaging Direct Mode

* Symbology identifiers are case sensitive.

** EAN/UPC Bar Codes with Add-Ons may be considered either as two separate bar codes, 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.

*** The same symbology identifier is used for all versions of GS1 DataBar

TABLE 2. Symbology Identifiers



1.3 Disclaimer

Every possible effort has been made to ensure that the information and specifications in this manual are correct, however GS1 Australia expressly disclaim liability for any errors. In addition, no warranty or representation is made that this manual will not require modification due to developments in technology or changes or additions to the GS1 System.

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