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VPPAG Bar Code Implementation Technical Guideline

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Change Log

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2	August 2014	Ulrike Kreysa	Removed SSCC
3	October 2014	Chuck Biss	Integrated comments received, updated images in Figure 1-6
4	November 2014	Chuck Biss	Integrated additional comments received, restructured some sections, additional image updates in various sections
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7	03 April 2015	Chuck Biss	Final for release after comment resolution period close.
8	11 April 2015	Chuck Biss	Title Change, reformat

Contents

1. Introduction and Background

A growing number of new vaccines are, or will soon be, available for use in developing countries. These vaccines have a significant impact on the health of millions of people. At present there is no effective system for tracking and tracing vaccines from the port of entry in a country to the point of administration. The use of Automatic Identification and Data Capture (AIDC) data carriers (i.e. bar code symbols or "bar codes") to facilitate the capture of data at each step of the process provides an opportunity to improve safety and optimize stock management (streamline inventories).

The first step in taking advantage of the opportunity provided by bar codes is to agree on a system of standards to be followed and applied. Following this it is necessary to agree on the standard set of information contained in the bar codes allowing systems to be developed to read and use this information within the recipient countries at all levels of handling of the vaccines through to the point of administration. The third step is to set dates or a transition period by which the use of bar codes will be encouraged, following the WHO formal recommendation, and ultimately required for each level of packaging.

In order to define a way forward, WHO, UNICEF and Gavi, together with the Vaccine Presentation and Packaging Advisory Group (VPPAG), sought input from 15 vaccine manufacturers in developed and developing countries which supply to the UN and Gavi markets. Participants were current and/or likely future suppliers of Gavi funded vaccines which form a subset of suppliers with WHO prequalified vaccines and suppliers to UN agencies. Responses were received from all manufacturers surveyed (100% response rate).

Based on the analysis of the results received, VPPAG agreed on the usage of the GS1 System of standards on secondary and tertiary packaging levels for vaccines. This technical guideline shall assist manufacturers in implementation of identification and marking of vaccines on these levels with the agreed data content and data carriers.

1.1. Purpose of this Document

For the buying, selling and trading of products and services, organisations need to adhere to standards in their communications with each other. The GS1 System is a set of standards that, through its implementation, facilitates an efficient supply chain worldwide, due to uniquely identified products, logistic units and locations. These standards are global, neutral, and non-ambiguous. They facilitate product and data flow between supply chain partners such as suppliers, manufacturers, wholesalers, logistic providers, transporters, hospitals, etc. They help automatic data capture and data management, increase data flow, reduce cost and secure the supply chain.

The GS1 system uses identification numbers and supplementary data represented in a bar code data carrier to track and trace products in the supply chain. These numbers are also exchanged via electronic messages to be automatically integrated and stored in databases. They are the key to access a set of information within a database that may be used for traceability.

This document is intended to provide guidance for:

- use of a Global Trade Item Number (GTIN) in a healthcare environment, and

- creation of bar code symbols (1D/Linear or 2D/Matrix as applicable).

This implementation guide does not set or modify GS1 standards, but is intended to be used in conjunction with applicable GS1 standards, including but not limited to the following:

- GS1 General Specifications (available from your local GS1 Member Organisation or at http://www.gs1.org/genspecs)
- GS1 Healthcare GTIN Allocation Rules (www.gs1.org/1/gtinrules)
- GS1 Global Data Dictionary – GDD (gdd.gs1.org/gdd)

Note: The reader should always refer to the latest version of these standards.

1.2. Glossary of Terms

For the purpose of this document, the following terms and definitions will apply.

Term	Definition
2-Dimensional Symbology	Optically readable symbols that must be examined both vertically and horizontally to read the entire message. Two-dimensional symbols may be one of two types: matrix symbols and multi-row symbols. Two dimensional symbols have error detection and may include error correction features.
Alphanumeric (an)	Describes a character set that contains alphabetic characters (letters), numeric digits (numbers), and other characters, such as punctuation marks.
Attribute	An Element String that provides additional information about an entity identified with a GS1 Identification Key, such as Batch Number associated with a Global Trade Item Number (GTIN).
Automatic Identification and Data Capture	A technology used to automatically capture data. AIDC technologies include bar codes, smart cards, biometrics and RFID.
Bar code	A symbol that encodes data into a machine readable pattern of adjacent, varying width, parallel, rectangular dark bars and pale spaces.
Bar code verification	The assessment of the printed quality of a bar code based on ISO/IEC standards using ISO/IEC compliant bar code verifiers.
Batch / Lot	The batch or lot number associates an item with information the manufacturer considers relevant for traceability of the trade item. The data may refer to the trade item itself or to items contained in it.
Brand owner	The party that is responsible for allocating GS1 System Identification Keys. The administrator of a GS1 Company Prefix.
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.)

Term	Definition
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 Function 1 Symbol Character. Data Matrix Symbols are read by two-dimensional imaging scanners or vision systems.
Electronic Commerce	The conduct of business communications and management through electronic methods, such as Electronic Data Interchange (EDI) and automated data collection systems.
Electronic Message	A composition of Element Strings from scanned data and transaction information assembled for data validation and unambiguous processing in a user application.
Extension digit	The first digit within the SSCC (Serial Shipping Container Code) which is allocated by the user and is designed to increase the capacity of the SSCC.
Fixed length	Term used to describe a data field in an Element String with an established number of characters.
Fixed Measure Trade Item	An item always produced in the same pre-defined version (e.g., type, size, weight, contents, design, etc.) that may be sold at any point in the supply chain.
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 application identifier.
GS1 Check Digit Calculation	An algorithm used by the GS1 System for the calculation of a Check Digit to verify accuracy of data. (e.g. Modulo 10 check digit, Price check digit, etc.).
GS1 Company Prefix	Part of the GS1 System identification number consisting of a GS1 Prefix and a Company Number. The Company Number is allocated by GS1 Member Organisations. See also U.P.C. Company Prefix. GS1 Member Organisations assign GS1 Company Prefixes to entities that administer the allocation of GS1 System identification numbers. These entities may be, for example, commercial companies, not for profit organisations, governmental agencies, and business units within organisations. Criteria to qualify for the assignment of a GS1 Company Prefix are set by the GS1 Member Organisations.
GS1 DataMatrix	GS1 implementation specification for use of Data Matrix

Term	Definition
GS1 Global Data Dictionary	A repository tool used to record GS1 member standards agreements on business terms and definitions used by all business units.
GS1	Based in Brussels, Belgium, and Princeton, USA, it is the organisation that manages the GS1 System. Its members are GS1 Member Organisations.
GS1 Identification Key	A numeric or alphanumeric data field defined by GS1 to ensure the global, unambiguous uniqueness of the identifier in the open demand or supply chain.
GS1 Identification Keys	A globally managed system of numbering used by all GS1 Business Units to identify trade items, logistic units, locations, legal entities, assets, service relationships, consignment, shipments and more. Any identification number that combines GS1 member company identifiers (GS1 Company Prefix) with standards based rules for allocating reference numbers is a key.
GS1 Member Organisation	A member of GS1 that is responsible for administering the GS1 System in its country (or assigned area). This task includes, but is not restricted to, ensuring brand owners make correct use of the GS1 System, have access to education, training, promotion and implementation support and have access to play an active role in GSMP.
GS1 Prefix	A number with two or more digits, administered by GS1 that is allocated to GS1 Member Organisations or for Restricted Circulation Numbers.
GS1 Symbologies using GS1 Application Identifiers	All GS1 endorsed bar code symbologies that can encode more than a GTIN namely GS1-128, GS1 DataMatrix, GS1 DataBar and Composite).
GS1 System	The specifications, standards, and guidelines administered by GS1.
GS1-128 Symbology	A subset of Code 128 that is utilised exclusively for GS1 System data structures.
GTIN Application Format	A format for a GTIN-8, GTIN-12, or GTIN-13 used when a GTIN application uses a fixed field length, for example, when a GTIN-13 is encoded in symbology using Application Identifier (01).
GTIN-8	The 8-digit GS1 Identification Key composed of a GS1-8 Prefix, Item Reference, and Check Digit used to identify trade items.
GTIN-12	The 12-digit GS1 Identification Key composed of a U.P.C. Company Prefix, Item Reference, and Check Digit used to identify trade items.
GTIN-13	The 13-digit GS1 Identification Key composed of a GS1 Company Prefix, Item Reference, and Check Digit used to identify trade items.
GTIN-14	The 14-digit GS1 Identification Key composed of an Indicator digit (1-9), GS1 Company Prefix, Item Reference, and Check Digit used to identify trade items.
Healthcare Primary Packaging	The first level of packaging for the product marked with an AIDC data carrier either on the packaging or on a label affixed to the packaging. For non-sterile

Term	Definition
	packaging, the first level of packaging can be the packaging in direct contact with the product. For sterile packaging, the first level of packaging can be any combination of the sterile packaging system, May consist of a single item or group of items for a single therapy such as a Kit. For packaging configurations that include a retail consumer trade item, primary packaging is a packaging level below the retail consumer trade item.
Healthcare Secondary Packaging	A level of packaging marked with an AIDC carrier that may contain one or more primary packages or a group of primary packages containing a single item.
Human Readable Interpretation(HRI)	Characters, such as letters and numbers, which can be read by persons and are encoded in GS1 AIDC data carriers confined to a GS1 standard structure and format. The Human Readable Interpretation is a one-to-one illustration of the encoded data. However Start, Stop, shift and function characters, as well as the Symbol Check Character, are not shown in the human readable interpretation.
Identification number	A numeric or alphanumeric field intended to enable the recognition of one entity versus another.
Linear Bar Code	Bar code symbology using bars and spaces in one dimension.
Logistic unit	An item of any composition established for transport and/or storage that needs to be managed through the supply chain. It is identified with an SSCC.
Non-HRI Text	Characters such as letters and numbers that can be read by persons and may or may not be encoded in GS1 AIDC data carriers and are not confined to a structure and format based on GS1 standards (e.g., a date code expressed in a national format that could be used to encode a date field in a GS1 AIDC data carrier, brand owner name, consumer declarations).
Responsible Entity	The party responsible for the safety and effectiveness of the medical product at a moment in time in its lifecycle, 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.)
Scanner	An electronic device to read bar code and convert them into electrical signals understandable by a computer device.
Serial Shipping Container Code	The GS1 Identification Key used to identify logistics units. The key comprises an Extension digit, GS1 Company Prefix, Serial Reference, and Check Digit.
Symbol	The combination of symbol characters and features required by a particular symbology, including Quiet Zone, Start and Stop Characters, data characters, and other auxiliary patterns, which together form a complete scannable entity; an instance of a symbology and a data structure.

Term	Definition
Symbology	A defined method of representing numeric or alphabetic characters in a bar code; a type of bar code.
Trade item	Any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced, or ordered, or invoiced at any point in any supply chain.

2. Healthcare Product Marking

2.1. Packaging Levels

Each product or "trade item" may have various package configurations or "packaging levels" within an overall packaging hierarchy for that product. Within the GS1 General Specification these packaging levels are specifically defined in order to best structure their unique identification and marking. Examples of each of those possible packaging levels follow.

2.1.1. Primary Package (Not in scope, for packaging level illustration only)

The primary package is the first level of packaging for the product marked with a data carrier either on the packaging or on a label affixed to the packaging.

Primary package configurations may consist of:

- sterile packaging
- non-sterile packaging
- single item
- group of items
- combination of items for a single therapy (kit)

Figure 1.1 Primary Package examples:

Note: Identification of Primary Packaging is out-of-scope for this WHO recommendation and shown for definition & illustration purposes only.

2.1.2. Secondary Package

Secondary packaging configurations consist of packages containing one or more items in their Primary Packaging.

Figure 1-3 Secondary Package examples:

2.1.3. Tertiary Package (Case / Shipper or Pallet)

Sometimes also referred to as “Tertiary Packaging”, these are packaging configurations that may be used as either trade items or logistic units (see 2.2 below). Cases / shippers may contain one or more items in their Secondary Packaging. Pallets may contain one or more cases / shippers.

Figure 1-4 Case / Shipper Example

Figure 1-5 Pallet Example

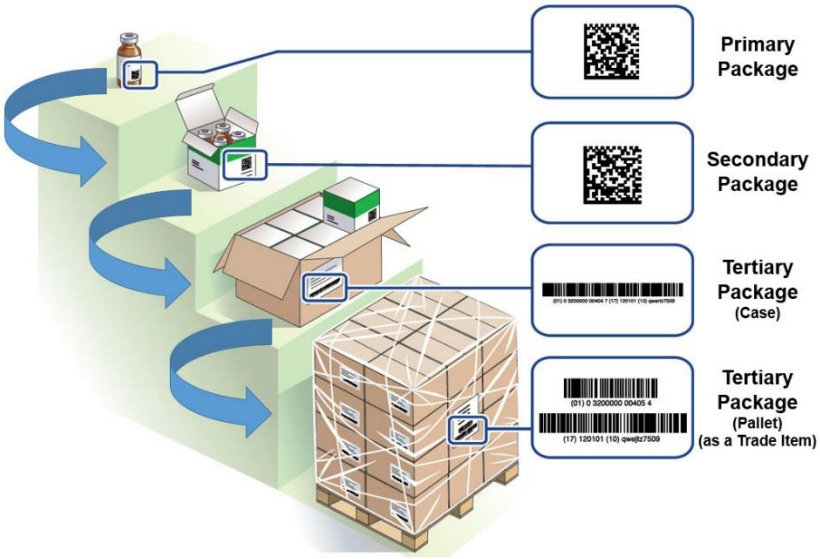
Note: Identification and marking of Logistic Units is out-of-scope for this WHO recommendation.

2.2. Package Hierarchy

Consideration should be given to the hierarchy of packaging. Each level of the package

hierarchy presents different marking challenges in labelling (e.g. space, substrate, production line speed, etc.). Each level also presents differing identification and data information requirements (e.g. GS1 Identification Key or GS1 Identification Key plus additional Attribute data, etc.). See *Figure 1-6* for a general example of a packaging hierarchy.

Figure 1-6 Package Hierarchy Illustration



Note: Shippers and Pallets may be marked with either GTIN (following GS1 Healthcare GTIN Allocation Rules) or Serial Shipping Container Code (SSCC) identifiers based upon whether they are considered "Trade Items" or "Logistic Units" per GS1 definition:

> Trade item - Any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced, or ordered, or invoiced at any point in any supply chain. Trade Items are identified with a GTIN.
>
> Logistic unit - An item of any composition established for transport and/or storage that needs to be managed through the supply chain. It is identified with an SSCC.

See the appropriate GS1 General Specifications sections for further detail or contact your local GS1 Member Organization for assistance.

Note: Identification and marking of Primary Packaging and Logistic Units is out-of-scope for this WHO recommendation.

3. GS1 Identification Keys and Application Identifiers (attribute or additional data) used in this document

When marking Healthcare products, GS1 Identification Keys are used to statically identify trade items and logistic units. Additional dynamic Attribute Data may be associated with the GS1 Identification Keys through the use of GS1 Application Identifiers (AI's). Following are the GS1 Identification Keys and Application Identifiers that have been agreed to for the identification of

vaccines by VPPAG (see the GS1 General Specifications for additional details on the structure and specifics for use of GS1 Identification Keys and Application Identifiers).

3.1. Global Trade Item Number (GTIN)

The GS1 Key for unique product identification is the Global Trade Item Number (GTIN) which is assigned AI (01). GTINs are used to identify “trade items” (i.e., products and services that may be priced, ordered or invoiced at any point in the supply chain). They are assigned by the responsible entity (e.g. brand owner) who is normally responsible for the allocation of the GTIN.

A company receives a GS1 company prefix by joining a GS1 Member Organization. This gives the company the ability to create their unique GTINs in compliance with the GS1 standards.

3.1.1. Tips for Implementation

Allocate GTINs according to the GS1 Healthcare GTIN Allocation Rules - to manage your GTIN’s accurately you should undertake the following:

- Allocate a unique Global Trade Item Number (GTIN) for each product and for each packaging level, referring to the GS1 General Specifications (www.gs1.org/genspecs) and GS1 Healthcare GTIN Allocation Rules (www.gs1.org/1/gtinrules).
- Register the GTINs in a database in your system linking the number to the product name, description, its hierarchy and other relevant product data.
- The GTIN shall never be duplicated or re-used even if the product becomes obsolete.
- Build in a quality process for GTIN allocation for new products to ensure that duplication does not occur.
- Build an automatic check digit calculator into your system (see the GS1 General Specifications for more detail).

3.2. Batch/Lot - AI (10)

If you require additional data to identify Batch and/or Lot Number, the GS1 Application Identifier (10) is assigned at the point of manufacture to identify the applicable Batch/Lot information. This additional data can be alphanumeric in structure with a variable length of up to 20 characters.

3.3. Expiration Date - AI (17)

If you require additional data to identify an Expiration Date (often referred to as expiry date, use by date or maximum durability date), then the GS1 Application Identifier (17) is used to identify this date information. This date indicates the limit of consumption or use of a product (e.g., for pharmaceutical products it can indicate the possibility of an indirect health risk resulting from the ineffectiveness of the product after the date). It is expressed when encoded in the bar code data carrier numerically as year, month and day in the form YYMMDD.

4. GS1 Data Carriers

4.1. GS1-128

A subset of the ISO/IEC Code 128 Bar Code Symbology, its use is exclusively assigned to

GS1 by definition within ISO/IEC standards. This extremely flexible 1D/linear symbology encodes GS1 element strings using Application Identifiers. Implementation of GS1-128 should be done as per the GS1 General Specifications.

Figure 1-7 GS1-128 Bar Code Symbol Example

(01)09504000059118 (17)141120 (10)NYFUL01

4.2. GS1 DataMatrix

A subset of the ISO/IEC Data Matrix Bar Code Symbology, similar to GS1-128 its use is exclusively assigned to GS1 by definition within ISO/IEC standards. It is a two-dimensional (2D / Matrix) bar code symbology that supports GS1 System data structures. This extremely flexible and space efficient symbology also encodes GS1 element strings using Application Identifiers. Implementation of GS1 DataMatrix should be done as per the approved GS1 General Specifications.

Figure 1-8 GS1 DataMatrix Bar Code Symbol Example

(01)09504000059101
(17)141120
(10)1234567p

Note: The GS1 DataMatrix illustrated above as Figure 1-8 is shown at an enlarged size for clarity. If printed at an element / module size equivalent to that used for the GS1-128 example in Figure 1-7, the GS1 DataMatrix would be approximately 25% smaller than shown.

Note: All pack/item bar code symbols, the GS1 Data Carriers, will be accompanied by human readable text (known as HRI for Human Readable Interpretation) as detailed in the GS1 General Specifications. This HRI denotes the GTIN, Batch/Lot Number and Expiry Date as they are encoded within the symbol (with the exception of the parenthesis shown). If space prohibits use of both the bar code symbol and HRI, recommendations within the GS1 General Specifications should be followed (see the General Specification Section on Healthcare Human Readable Interpretation Rules). In all cases the HRI should be in a font and size that are in accordance with GS1 recommendations.

Note: GS1 Standards only cover HRI (Human Readable Interpretation) which

represents the data encoded in the bar code symbol. They do not affect the other text or printed information (known in GS1 terms as “Non-HRI Text”) found on a label / package which may be a duplication of that information in other formats determined by the manufacturer or a regulator. See the GS1 General Specification for more detail.

5. Tips for Implementation

5.1. GTIN Allocation, Application Identifiers and Data Carrier Selection

The GS1 System provides a series of “allocation rules” for application of the GS1 Identification Key (e.g. GTIN – Global Trade Item Number), GS1 Application Identifiers (attribute data) and a variety of AIDC Data Carriers (i.e. bar code symbols) that will meet the combination of printing and data needs at various packaging levels across the supply chain. *Figure 1-7 below* offers illustrations and examples (see the GS1 General Specifications and the GS1 Healthcare GTIN Allocation Rules for complete and specific rules and details of application).

Figure 1-9
Packaging Level Data and
Data Carrier Examples

	Healthcare Product	GS1 Key *	Additional data	Encoded information and GS1 Data Carriers
Primary packaging (one vial) NOTE: Not in scope for the identification of vaccines by VPPAG, shown for illustration purposes only.		GTIN “1”	Lot ABC Expiry date 31-Dec-2010	(01)00857674002133(17)101231(10)ABC Suggested GS1 Data Carrier: GS1 DataMatrix or (01)00857674002133 Suggested GS1 Data Carrier: GS1 DataMatrix
Secondary packaging (multi-pack - 1 box of 4 vials each) This is an example of another possible packaging level		GTIN “2”	Lot ABC Expiry date 31-Dec-2010	(01)00857674002140(17)101231(10)ABC or (01)10857674002130 (17)101231(10)ABC Suggested GS1 Data Carriers: GS1 DataMatrix, GS1-128
Tertiary packaging - Case (6 multi-packs of 4 vials each)		GTIN “3”	Lot ABC Expiry date 31-Dec-2010	(01)00857674002157(17)101231(10)ABC or (01)30857674002134(17)101231(10)ABC Suggested GS1 Data Carriers: GS1-128, GS1 DataMatrix
Tertiary packaging – Pallet – as a Trade Item (24 cases)		GTIN “4”	Lot ABC Expiry date 31-Dec-2010	(01)00857674002164(17)101231(10)AB or (01)50857674002138(17)101231(10)ABC Suggested GS1 Data Carriers: GS1-128, GS1 DataMatrix (**Note:** When marking a Pallet as a Trade Item ensure a match between scanner/imager capabilities and bar code symbol sizes.)

Note: The AI(01) GTIN as shown above encoded within a GS1-128 or GS1 DataMatrix bar code symbol data carrier may be any of the four basic GTINs (GTIN-8, GTIN-12, GTIN-13 or GTIN-14). In each case, for proper encodation within the GS1 Data Carriers noted, it must be in a 14-digit format (as shown) prior to encoding.

Note: See the appropriate GS1 General Specifications sections for further detail or contact your local GS1 Member Organization for assistance.

Note: Identification and marking of a pallet when a Logistic Unit is out-of-scope for this WHO recommendation.

5.2. Evaluate printing software and marking quality

When choosing or using existing printer software, check your ability to produce your selected GS1 Data Carrier(s) in accordance with the GS1 General Specifications.

The position and quality of the bar code symbol on the packaging will need to be checked to see that it meets the requirements of the GS1 General Specifications. Any final labelling or wrapping should also be examined to ensure that the bar code symbols remain visible and able to be scanned efficiently.

5.2.1. Evaluate your symbol quality

As per the GS1 General Specifications it is globally accepted good practice to assign the role of Symbol Quality Manager within your organization and create an internal bar code verification process. To ensure your bar code symbols consistently meet the specified minimum quality levels that process should include the equipment and techniques to test in accordance with:

ISO/IEC 15415 - Information technology -- Automatic identification and data capture techniques -- Bar code symbol 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

GS1 General Specifications

As an alternative in the initial implementation stages, your bar code symbols may be able to be checked by your local GS1 Member Organisation and then also later within your internal process, with a bar code verifier, which is used to check the optical and data quality of printed symbols. In the case of in-line printing, a continuous quality control process is recommended.

5.3. Scanner considerations

When selecting or specifying the bar code scanner/imager to use, it is important that its features and capabilities are matched to your use case application or “scanning environment” (see the GS1 General Specification for details on “scanning environment”).

This will include that the scanners can be configured to read and decode GS1 Data Carrier(s) in accordance with the rules found in the GS1 General Specifications. Additionally it is important for a successful implementation that their optical capabilities and operating ranges (e.g. resolution, reading range, scanning orientation, etc.) match the physical aspects of the

symbols being produced in accordance with the recommendations found in the GS1 General Specification “Symbol Specification Tables”, for the given scanning environment and use case.

Proper matching of the scanner’s capabilities and configuration to the bar code symbols produced is key to an efficient scanning set up. In addition to reference to the GS1 General Specification, your local GS1 Member Organization (MO) can assist in this area.

Appendix A. Relevant references

The following ISO and ISO/IEC standards are either directly referenced within the GS1 General Specifications and/or are also important references to note when using the GS1 System:

ISO/IEC 646 Information technology -- ISO 7-bit coded character set for information interchange

ISO/IEC 15459-4 Information technology -- Unique identifiers -- Part 4: Individual items

ISO/IEC 15459-6 Information technology -- Unique identifiers -- Part 6: Unique identifier for product groupings

ISO 1073-2 Alphanumeric character sets for optical recognition -- Part 2: Character set OCR-B -- Shapes and dimensions of the printed image

ISO/IEC 15415 Information technology -- Automatic identification and data capture techniques -- Bar code symbol 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 15417 Information technology -- Automatic identification and data capture techniques -- Code 128 bar code symbology specification

ISO/IEC 15424 Information technology -- Automatic identification and data capture techniques -- Data Carrier Identifiers (including Symbology Identifiers)

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/IEC 16022 Information technology -- Automatic identification and data capture techniques -- Data Matrix bar code symbology specification

ISO/IEC 15418 Information technology -- Automatic identification and data capture techniques -- GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance

ISO/IEC 15423 Information technology -- Automatic identification and data capture techniques -- Bar code scanner and decoder performance testing

ISO/IEC 15459-1 Information technology -- Unique identifiers -- Part 1: Unique identifiers for transport units

ISO/IEC 15459-3 Information technology -- Unique identifiers -- Part 3: Common rules for unique identifiers

ISO/IEC 15459-8 Information technology -- Unique identifiers -- Part 8: Grouping of transport units

ISO/TS 16791 Health informatics -- Requirements for international machine-readable coding of medicinal product package identifiers

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