



# **General Requirements to Assess Conformance of GS1 BarCodes Implementation Guide**

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## Document Summary

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Document Description	This document specifies minimum process and requirements to assess conformity and declared products identified with GS1 linear BarCodes in conformance to GS1 Standards. It shall be used for GS1 users (Suppliers and Buyers), Solution Providers, and MOs that intend perform conformity assessment services of GS1 BarCodes.

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## Log of Changes in Issue 2

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0.2	Jan-2007	Adriano Bronzatto Raman Chhima Ray Delnick	Wording corrections, sampling size changes, exclusion of GS1 Bar Code Conformance Assessment Request Form and GS1 BarCode Conformance Report Template, inclusion of GS1 BarCode Verification Report Template
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1	Jun-2007	Adriano Bronzatto	TDT recommendations and wording corrections
2	Aug-2007	Adriano Bronzatto	Moved the information in sections 4.5.1 & 4.5.2 to sections 3.2.9 & 3.2.10

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# 1. Introduction

Hundreds of thousands of companies around the world rely on GS1 standards to conduct business and meet consumers' expectations – and well beyond the world of consumer packaged goods and supermarkets GS1 solutions are widely used in a myriad of industries. That means that if a bar code cannot be properly decoded it's more than just time at the cash register or the warehouse that is lost.

Today, 100% reliable GS1 BarCodes are an absolutely vital part of the supply chain. As a result users around the world increasingly require assurance that products and services they purchase conforms to GS1 Standards simply because it helps to ensure better reading rates, accuracy and efficiency.

The GS1 BarCode Conformance Assessment and Certification Programme will ensure that GS1 Standards are being used in a systematic and consistent way worldwide, increasing confidence,, helping to establish credibility and inspiring assurance that products in conformance to GS1 specifications will perform as intended.

## 1.1. Purpose

This document was developed under the ISO/IEC Guide 67:2004 and specifies the **minimum process and requirements** to assess conformity and declare products identified with GS1 linear BarCodes in conformance to GS1 Standards.

The sole aim is to provide a common methodology and criteria for GS1 users (Suppliers and Buyers), Solution Providers and MOs (further denominated **CABs – Conformity Assessment Body**) to perform conformity assessment services of GS1 BarCodes in conformance to GS1 practices and requirements.

All requirements described on this document are generic and are intended to be applicable to all organizations, regardless of type, size and product provided.

## 1.2. Scope and Target Audience

The requirements, criteria and methodology described in this document should be applied to assess conformance and to certify GS1 linear BarCodes (EAN/UPC, ITF-14 and GS1-128).

Although the target audience is GS1 Member Organisation staff involved in GS1 BarCode Quality and Conformance Verification, it is hoped that the information contained will be of use as a basis for training and/or reference material for [expert] end-users involved in GS1 BarCode production, print quality control and conformance assessment.

## 1.3. Main Components

The General Requirements to Assess Conformance of GS1 BarCodes comprise:

- **Pre-requisites** (section [1.5](#)): list of pre-requisites of staff professional qualifications, minimum equipment and process that a CAB must to have in order to be able to perform the certification process.
- **Process Plan Overview** (section [2](#)): it is a high-level process overview that sets out the main inputs, process, outputs and recommended process performance indicators.
- **Process Workflow** (section [3.1](#)): shows the process workflow recommended when performing certification processes.
- **Process Description** (section [3.2](#)): describe the minimum process and requirements
- **Conformance Clauses for GS1 BarCodes** (section [4](#)): these are a compendium from GS1 and ISO specifications that states all technical criteria that must be satisfied to claim

conformance of a GS1 BarCode. They are described as pass criteria (thresholds) and contain references to the sections in the standards from which they are derived to trace back to the specification.

- **Sampling Criteria** (appendix [A.1](#)): this section explains the ideal number of samples necessary to submit a product to assess conformance.
- **Templates of Declaration of Conformance** (appendix [A.2](#)): templates to be used when a GS1 BarCode is declared in conformance to GS1 Standards

## 1.4. Implementation Considerations

The requirements, criteria and methodology described in this document should be used as the basis to develop and implement conformance assessment procedures and certification services of GS1 linear BarCodes (EAN/UPC, ITF-14 and GS1-128).

When implementing a GS1 compliant BarCode Certification Service it is necessary to gather equipment, reference documents, create procedures and train personnel. This document specifies the minimum requirements, criteria and methodologies needed to set up this service. Users must follow all recommendations described in this document in order to declare themselves in compliance with the GS1 Certification Methodology.

Users are responsible for any adjustments for implementation, but all requirements described in this document must be fulfilled in order to have a basis for results comparison and further mutual recognition.

The GS1 BarCode Verification Best Practice can be used as complementary reference on how to perform the bar code assessment and how to report its results and educational comments.

Please visit [www.gs1.org/certification](http://www.gs1.org/certification) for more information.

## 1.5. Pre-requisites

Before implementing the process described in this document, CABs must provide the following pre-requisites:

### 1.5.1. Staff

Staff shall have sufficient knowledge and experience on:

- Operating, calibrating, maintaining a bar code verifier and understanding the bar code verification results
- GS1 procedures and technical criteria to assess conformance
- GS1 Data Standard, Bar Codes structure and applications based on the GS1 General Specifications and GS1 implementation guidelines

GS1 LEARN modules 1 to 7, including the Bar Code Quality module, are recommended.

### 1.5.2. Equipment

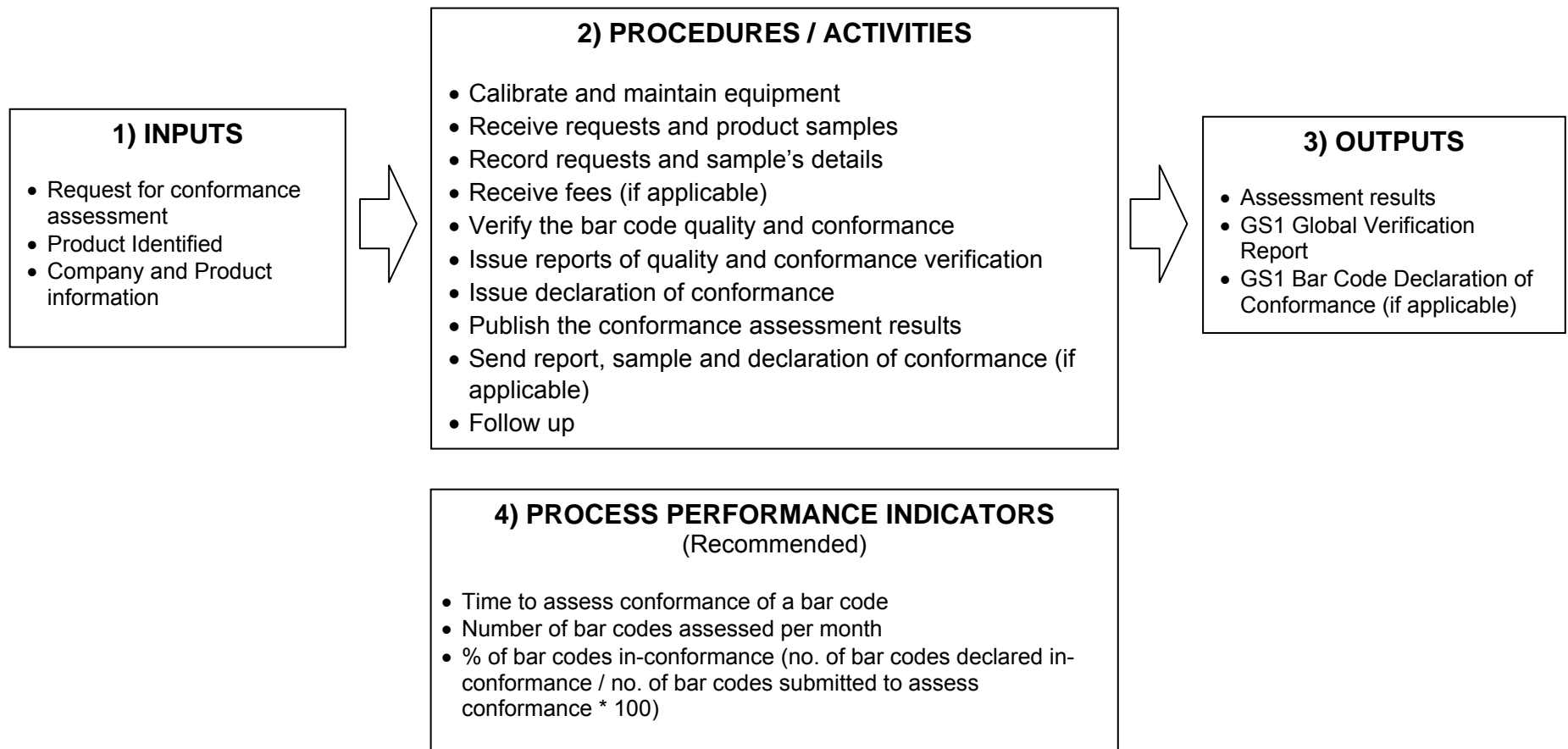
The minimum equipment necessary to implement this methodology are:

- Bar code quality verifier compliant with ISO 15416 and 15426-1.
- Ruler or calliper calibrated with at least 0.5mm of precision

### 1.5.3. Internal Procedures

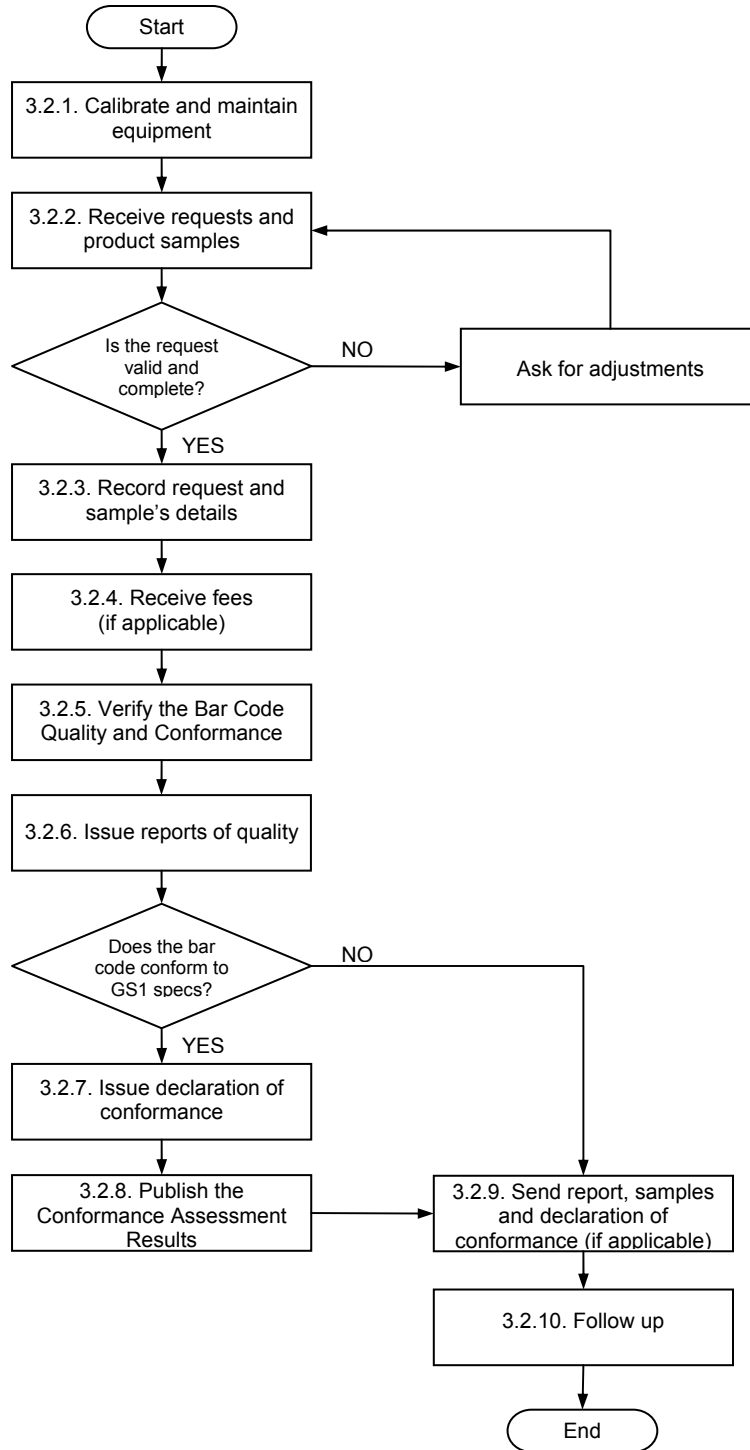
The user shall develop, document, implement and maintain an internal procedure and records that fulfil all requirements described on this document.

## 2. Process Plan Overview for Conformance Assessment Bodies



### 3. Process Description

#### 3.1. Process Workflow



## 3.2. Process Activities

### 3.2.1. Calibrate and Maintain Equipment

The CAB shall follow all recommendations provided from the equipment's manufacturers to install, use, maintain, operate and calibrate equipment, especially regarding the extent and frequency of maintenance and calibration.

Regular re-calibration, at least as frequently as recommended by the manufacturer, shall be done in order to provide reference values of color and contrast to the equipment. Typically re-calibration should occur at regular intervals in line with the manufacturer's recommendation, or after a substantial period of inactivity, or whenever there is an environmental change such as lighting conditions. The verifier must always be recalibrated if the scan head, the measuring aperture, or scan width is changed.

A calibration card, normally provided by the verifier's manufacturer, shall be used. It should be traceable and replaced periodically, following the manufacturer recommendation, or earlier if deterioration of the card is noticed.

At least once a month, the CAB shall use a traceable Conformance Test Card (e.g. Calibrated Conformance Standard Test Cards provided by GS1 US) to check if the verifier is working within the tolerances specified by the manufacturer. Using a Conformance Test Card the CAB will be able to compare the verifier's measures against the measures described on the card. These measures and tolerances shall be recorded and considered during the bar code analysis.

Results of tests, calibration and maintenance reports of equipments used on the assessment process must be identified and safeguarded for at least two years.

### 3.2.2. Receive Requests and Product's Samples

The CAB shall make clear the conditions and pre-requirements to perform the assessment process (eg. The claimant must be a GS1 Local Member).

The CAB shall define and inform all claimants which information is necessary to claim for conformance and how to provide it.

At least the following information should be provided:

- Company Name
- Contact Details (Name, Position, Address, Telephone Number, e-mail)
- List of products to be assessed including product description, bar code number / GTIN, bar code application, quantity of package printed and quantity of samples submitted.
- Sampling criteria (percentage representation) utilized (see Appendix 1)
- Order Number (if applicable)

To be assessed, a product (samples) should be submitted full and complete in their final form, which allows extensive testing in terms of colour, contrast, location and quality.

The certification body must check if all the requested information about product and claimant was received.

### 3.2.3. Record Requests and Sample's Details

The CAB shall establish systems and procedures for the identification, collection, indexing, accessing, storage, maintenance and disposal of documents and samples provided by the claimant. The procedures shall define the controls needed to prevent the unintended use of obsolete documents.

The CAB shall guarantee the confidentiality of documents, samples or any information provided.

The maximum period to assess conformity of a product should be established and notified to the claimants.

### 3.2.4. Receive Fees (If Applicable)

The CAB shall make clear what fees will be charged to assess conformance and the procedures to provide it.

### 3.2.5. Verify the Bar Code Quality and Conformance

The CAB shall evaluate all samples using a Bar Code Quality Verifier, as described in ISO/IEC 15416 and others equipment when necessary.

The AIDC specialist must set on the Bar Code Quality Verifier the appropriate aperture/light source. The symbol shall be measured by 10 (ten) scans at different heights.

The results of the equipment evaluations and the AIDC specialist analysis (visual check) shall be compared with the applicable Conformance Clauses for GS1 Bar Codes to ensure that all mandatory requirements are fulfilled. All mandatory GS1 Conformance Clauses must be assessed.

### 3.2.6. Issue Reports of Quality and Conformance Verification

GS1 Bar code verification report as detailed in the GS1 General Specifications should be issued highlighting all relevant aspects of the analysis, including GS1 Conformance Clause fulfilment. (see *GS1 General Specifications — Section 5.4.A.2*).

The GS1 Bar Code Quality Verification Report must be identified and safeguarded for at least two years.


### 3.2.7. Issue Declaration of Conformance

The CAB must make sure that the following requirements were achieved before issuing a Declaration of Conformance:

- The claimant has provided all the information requested about the products and company.
- Has provided enough samples to represent all printed bar codes (see Appendix 1).
- Samples tested fulfil all mandatory GS1 Conformance Clauses applicable.
- The brand owner and GS1 Company Prefix are valid with the MO responsible for its licence.

The common GS1 BarCode Declaration of Conformance (Appendix 2 Declaration of Conformance Templates) shall be used.

### 3.2.8. Publish the Conformance Assessment Results

 **Note:** This step is applicable only when the CAB is a GS1 MO.

It is recommended to establish procedures to publish for the general public that the determined product was assessed and declared in conformance with GS1 Standards. If the conformance assessment was not renewed, its publication shall be cancelled just after its expiry date.

The Declaration of Conformance shall be valid for a minimum of six and maximum of twelve months, or when changes to the bar code, printing process, package process or material, were made.

The product's characteristics, brand owner name, conformance expiration date and terms and conditions of the GS1 Declaration of Conformance must be included in this publication.

### 3.2.9. Send Reports, Samples and Declaration of Conformance (If Applicable)

The CAB shall make clear the policy to return samples and documents.

Reports and Declarations of Conformance can be sent to anybody that requested the service. However is recommended to sent these documents exclusively to the GS1 Company Prefix owner. If the claimant is different from the GS1 Company Prefix owner, a notification could be sent to him to confirm that the result of the conformance assessment process was also sent to the GS1 Company Prefix owner.

### 3.2.10. Follow Up

A follow up procedure is recommended. Before the Declaration of Conformance expires, the CAB should contact the GS1 Company Prefix owner to ask for new samples for assessment.

## 4. Conformance Clauses

The Conformance Clauses for GS1 BarCodes are a compendium from GS1 and ISO specifications that states all technical criteria that must be satisfied to claim conformance. They are a high-level description of what is required of implementations to be considered in conformance with the GS1 specifications.

They are a technical reference (guide) when implementing barcodes certification services and they do not replace the GS1 General Specifications which remains the repository for all Technical Specifications related to GS1 BarCodes.

These clauses support the *GS1 General Specifications v. 7.1*.

### 4.1. Measures and Tolerances

Variations on measurements will never be totally eliminated because of equipment precision, operator interpretation and variances of the process. Even tolerances can be used when the results found are close to the "borderline" that determines overall acceptance or rejection of the symbol. It is highly recommended to take the time and effort to investigate the parameters that are the limiting factors in their scans and determine specifically which the deficient areas of the symbol are and finally how they can be improved.

With this effort the grades, regardless of which side of the "borderline" they start out on, will move away from that line to a higher, more secure level of quality thus eliminating the area of contention.

All measurement devices, such as Bar Code Quality Verifiers, rulers and callipers, shall be calibrated appropriately as recommended by the manufacturer. A tolerance of 0.5mm shall be considered in all measurements within this document.

When measuring the symbol contrast a tolerance of +/- 8% both for overall symbol grade and for individual parameter measurements shall be considered.

## 4.2. How to Use it?

The conformance clauses for GS1 BarCodes are described below as pass criteria, which represent the minimum requirements necessary to guarantee correct bar code scanning and excellent performance. They contain the references to the sections in the standards from which they are derived to trace back to the specification.

The clauses are classified as Mandatory (M) and Recommended (R). Mandatory clauses are described as the minimum requirements needed to be in conformance with the standard. Recommended clauses could be followed to improve performance, but are not mandatory. They can also be defined as best practices and market recommendations.

Conformance clauses are organized into five main groups as described below:

1. **ISO Parameters of Quality** – This group of clauses describes all ISO parameters of quality used to measure the technical bar code symbol based on ISO/IEC 15416:2000 standard.
2. **Symbol Structure** – This group of clauses describes the requirements about the symbol structure, such as X dimension, quiet zones, symbol height, etc.
3. **Data Content and Format** – The data content represented in a bar code symbol shall be tested, as well as the Application Identifier (AI) combination if applicable, to make sure that content, GS1 Identification Key and AI format and combination are correct and represented in an appropriate symbology.
4. **Bar code Applications** – This group of clauses is defined to ensure that the bar code symbol tested fulfils the GS1 Data Standard application rules.
5. **Symbol Placement** – Symbol placement is critical to successful scanning. This group of clauses defines mandatory and recommended symbol placement specifications.

Base on these conformance clauses, users can perform a bar code symbol quality verification process and identify if the minimum requirements are met to claim conformance.

To be considered “in conformance with GS1 Standards” the bar code symbol tested **shall fulfil all the Mandatory Conformance Clauses applicable**.

## 4.3. Conformance Clauses for EAN/UPC Bar Code Symbols

### 1.1. ISO Parameters of Quality

	Conformance Clause	Class	Pass Criteria	Standard Reference
1.1.1	Overall ISO Grade	M	$\geq 1.5/06/670 \pm 10\text{nm}$	GS1 General Specifications section 5.4.2.8, 5.4.3.3.10.2 and ISO/IEC 15416 – item 6.2
1.1.2	Decode	M	= 4	ISO/IEC 15416 – item 6.1.1
1.1.3	Symbol Contrast	M	$\geq 40\%$	ISO/IEC 15416 – item 6.1.2
1.1.4	Minimum Reflectance	M	= 4	
1.1.5	Edge Contrast	M	$\geq 15\%$	
1.1.6	Modulation	M	$\geq 50\%$	
1.1.7	Defects	M	$\leq 25\%$	

	Conformance Clause	Class	Pass Criteria	Standard Reference
1.1.8	Decodability	M	≥ 37%	ISO/IEC 15416 – item 6.1.3

## 1.2. Symbol Structure

	Conformance Clause	Class	Pass Criteria	Standard Reference
1.2.1	X-dimension (exception for characters 1, 2, 7, and 8 with has tolerance of +/- 0.025mm)			
1.2.1.1	<b>scanned in Retail</b> Point-of-Sale and <b>not</b> scanned in General Distribution Environment	M	≥ 0.264mm (0.0104") and ≤ 0.66mm (0,026")	GS1 General Specifications Figures 5.4.2.7.1-2 and 5.4.2.8-2
1.2.1.2	scanned in Retail Point-of-Sale <b>and</b> in General Distribution Environment	M	≥ 0.495mm (0.0195") and ≤ 0.66mm (0,026")	GS1 General Specifications Figures 5.4.2.7.1-2 and 5.4.2.8-4
1.2.1.3	scanned in General Distribution Environment <b>only</b>	M	≥ 0.495mm (0.0195") and ≤ 0.66mm (0,026")	GS1 General Specifications Figures 5.4.2.7.1-2 and 5.4.2.8-3
1.2.1.3	<b>Very Small Healthcare Item</b> Identification scanned at Retail Point-of-Sale	M	≥ 0.264mm (0.0104") and ≤ 0.66mm (0,026")	GS1 General Specifications Figures 5.4.2.7.1-2 and 5.4.2.8-5
1.2.1.4	on-demand print processes scanned at Retail Point-of-Sale	M	≥ 0.2475mm (0.00975") and ≤ 0.66mm (0,026")	GS1 General Specifications Figures 5.4.2.7.1-2, 5.4.2.8-2 and Appendix 5.4.A.1
1.2.2	Bar code height (see also appendix 5.3)			
1.2.2.1	scanned at <b>Retail</b> Point-of-Sale and for <b>Very Small Healthcare Item</b> Identification	M	The bar code height shall be ≥ 20.73mm (0.82") and be compliant with appendix 5.3. (For EAN-8 the bar code height shall be ≥ 17.03mm (0.67") and also be compliant with appendix 5.3)	GS1 General Specifications sections 5.1.3, 5.1.A.7, Figures 5.4.2.7.1-2, 5.4.2.8-2 and 5.4.2.8-5
1.2.2.2	scanned in <b>General Distribution</b> Environment	M	The bar code height shall be ≥ 38.87mm (1.53") and be compliant with appendix 5.3.	GS1 General Specifications sections 5.1.3, 5.1.A.7, Figures 5.4.2.7.1-2, 5.4.2.8-3 and 5.4.2.8-4
1.2.2.3	Truncation (bar code with normal length, but reduced in height )	M	Only be applicable if there is absolutely no possibility of printing a full size bar code symbol	GS1 General Specifications section 2.1.2.1.3
1.2.3	Quiet Zone (left)			
1.2.3.1	EAN-13	M	≥ 11 X and ≥ 2.904mm	GS1 General Specifications 5.1.1.4.3
1.2.3.2	EAN-8	M	≥ 7 X and ≥ 1.848mm	
1.2.3.3	UPC-A	M	≥ 9 X and ≥ 2.376mm	GS1 General Specifications section 5.1.1.4.3
1.2.3.4	UPC-E	M	≥ 9 X and ≥ 2.376mm	
1.2.4	Quiet Zone (right)			
1.2.4.1	EAN-13	M	≥ 7 X and ≥ 1.848mm	GS1 General Specifications section 5.1.1.4.3
1.2.4.2	EAN-8	M	≥ 7 X and ≥ 1.848mm	
1.2.4.3	UPC-A	M	≥ 9 X and ≥ 2.376mm	
1.2.4.4	UPC-E	M	≥ 7 X and ≥ 1.848mm	
1.2.5	Position of Add-On code	M	At least at just the end of the right Quiet Zone and at maximum of 12 modules of the main symbol. Shall be horizontally aligned with main symbol	GS1 General Specifications section 5.1.1.4.6
1.2.6	Symbol Format – Design			

	Conformance Clause	Class	Pass Criteria	Standard Reference
1.2.6.1	EAN-13	M	Fulfill the design described on the GS1 General Specifications Figure 5.1.A.6-1	GS1 General Specifications Figure 5.1.A.6-1
1.2.6.2	UPC-A	M	Fulfill the design described on the GS1 General Specifications Figure 5.1.A.6-2 or 5.1.A.6-3	GS1 General Specifications Figure 5.1.A.6-2 or 5.1.A.6-3
1.2.6.3	EAN-8	M	Fulfill the design described on the GS1 General Specifications Figure 5.1.A.6-4	GS1 General Specifications Figure 5.1.A.6-4
1.2.6.4	UPC-E	M	Fulfill the design described on the GS1 General Specifications Figure 5.1.A.6-5	GS1 General Specifications Figure 5.1.A.6-5
1.2.6.5	EAN/UPC + Two-digit Add-On	M	Fulfill the design described on the GS1 General Specifications Figure 5.1.A.6-6	GS1 General Specifications Figure 5.1.A.6-6
1.2.6.6	EAN/UPC + Five-digit Add-On	M	Fulfill the design described on the GS1 General Specifications Figure 5.1.A.6-7	GS1 General Specifications Figure 5.1.A.6-7
1.2.7	Correspondence of the Human Readable Interpretation	M	The Human Readable shall correspond with the data encoded and must be showed in human readable interpretation form, clearly legible. Start, Stop, Shift, Function Characters and Symbol Check Character should not be shown in the human readable interpretation (OCR font format is recommended)	GS1 General Specifications section 5.1.3
1.2.8	Human Readable Interpretation location	M	Underneath the main symbol and above the Add-On Symbol (if applicable). Minimum space between the top of the digits and the bottom of the bars is 0.5 modules	GS1 General Specifications section 5.1.3
1.2.9	Human Readable Interpretation font size	R	The minimum height of the digits is 8.33 modules. For UPC-A and UPC-E, the size of the first and last digits should be reduced to a maximum width equivalent to 4 modules	GS1 General Specifications section 5.1.3

### 1.3. Data Content and Format

	Conformance Clause	Class	Pass Criteria	Standard Reference
1.3.1	GS1 Company Prefix	R	GS1 Company Prefix shall be valid	GS1 General Specifications section 1.2, 1.3.1 and GS1 Operational Manual section B 2
1.3.2	Data Standard			
1.3.2.1	Global Trade Item Number (GTIN)	M	Fulfill the format described on the GS1 General Specifications section 1.3.1, 2.1.2.1.5.2, 2.1.2.1.5.5, 3.2.1 and 3.3.1	GS1 General Specifications section 1.3.1 2.1.2.1.5.2, 2.1.2.1.5.5, 3.2.1 and 3.3.1
1.3.2.2	Restricted Circulation Number – GS1 Prefixes 02 and 20 to 29	M	Fulfill the format described on the GS1 General Specifications section 3.2.2 and 3.2.4	GS1 General Specifications section 3.2.2 and 3.2.4
1.3.2.3	Identification of a Trade Item Within a Company - Fixed Measure – GS1 Prefixes 00 and 04	M	Fulfill the format described on the GS1 General Specifications section 3.2.3 and 3.3.2	GS1 General Specifications section 3.2.3 and 3.3.2
1.3.2.4	Coupon Identification for Restricted Distribution – GS1 Prefixes 99 and 05	M	Fulfill the format described on the GS1 General Specifications section 3.2.5 and 3.2.6	GS1 General Specifications section 3.2.5 and 3.2.6

	Conformance Clause	Class	Pass Criteria	Standard Reference
1.3.2.5	Common Currency Coupon Code Identification for Restricted Distribution – GS1 Prefixes 981 and 982	M	Fulfill the format described on the GS1 General Specifications section 3.2.7	GS1 General Specifications section 3.2.7
1.3.2.6	Identification of Refund Receipts - Restricted Distribution – GS1 Prefix 980	M	Fulfill the format described on the GS1 General Specifications section 3.2.8	GS1 General Specifications section 3.2.8
1.3.2.7	Two and five digits Add-On Codes	M	Fulfill the format described on the GS1 General Specifications section 3.4	GS1 General Specifications section 3.4
1.3.3	Validity of Check-Digit (Modulo 10)	M	Fulfill the algorithm described on the GS1 General Specifications section 3.A.1.1	GS1 General Specifications section 3.A.1.1
1.3.4	UPC-E zero suppression	M	Fulfill the algorithm described on the GS1 General Specifications section 5.1.1.3.4.1	GS1 General Specifications section 5.1.1.3.4.1
1.3.5	Data Standard represented in the correspondent EAN/UPC Bar Code Symbol	M	Make correspondence with Data Standard format described on the GS1 General Specifications section 1.3.1 with the Bar Code Standard described on GS1 General Specifications section 5.1.1.3	GS1 General Specifications section 1.3.1 and 5.1.1.3

#### 1.4. Bar Code Applications

	Conformance Clause	Class	Pass Criteria	Standard Reference
1.4.1	Use of the correct GS1 Identification Key (Data Standard) for the application proposed	M	Shall follow the application rules described on GS1 General Specifications 2.1 and 2.6	GS1 General Specifications section 2.1 and 2.6
1.4.2	Use of the correct GS1 Prefix for the application proposed	M	Fulfill the rules and follow the tables described on GS1 General Specifications section 1.3.8	GS1 General Specifications section 1.3.8

#### 1.5. Symbol Placement

	Conformance Clause	Class	Pass Criteria	Standard Reference
1.5.1	Symbol Placement on trade Items with Curved Surfaces	M	Fulfill the rules described on GS1 General Specifications section 6.A.1	GS1 General Specifications section 6.2.3.2 and 6.A.1
1.5.2	Symbol Placement to avoid scanning obstacles	R	Fulfill the recommendation described on GS1 General Specifications section 6.2.3.3	GS1 General Specifications section 6.2.3.3
1.5.3	Number of Symbols	M	Minimum 1 symbol. Bar code symbols representing different Global Trade Item Numbers (GTINs) must never be visible on any one item. For General Distribution Environment is recommended to apply more than 1 symbol. It is permitted for random wraps intended for Point-of-Sale too.	GS1 General Specifications section 6.2.1
1.5.4	Multipacks and banded items	M	Only the main bar code symbol should be visible. The bar code symbols on the inner products should be obscured.	GS1 General Specifications section 6.3.1
1.5.5	Preferred Placement	R	On the lower right quadrant of the back respecting the proper Quiet Zone areas, the edge rule and considerations in Section 6.3.3.7	GS1 General Specifications section 6.3.3.1 and 6.3.3.7



	Conformance Clause	Class	Pass Criteria	Standard Reference
1.5.6	Edge Rule	R	Not closer than 8mm (0.3 in.) or farther than 100mm (4 in.) from the nearest edge of the package	GS1 General Specifications section 6.3.3.3
1.5.7	Placement recommendations for with type of package	R	Should follow the recommendations for placement in General Specifications section 6.4, 6.5, 6.6 and 6.7	GS1 General Specifications section 6.4, 6.5, 6.6 and 6.7

## 4.4. Conformance Clauses for ITF-14 Bar Code Symbols

### 2.1. ISO Parameters of Quality

Conformance Clause		Class	Pass Criteria	Standard Reference	
2.1.1	Overall ISO Grade	M	$X < 0.635\text{mm (0.025in.)}$	$\geq 1.5/10/670 \text{ +/- } 10\text{nm}$	GS1 General Specifications section 5.4.2.8, 5.4.3.3.10.4 and ISO/IEC 15416 – item 6.2
			$X \geq 0.635\text{mm (0.025in.)}$	$\geq 0.5/20/670 \text{ +/- } 10\text{nm}$	
2.1.2	Decode	M	= 4	ISO/IEC 15416 – item 6.1.1	
2.1.3	Symbol Contrast	M	$X < 0.635\text{mm (0.025in.)}$	$\geq 40\%$	ISO/IEC 15416 – item 6.1.2
			$X \geq 0.635\text{mm (0.025in.)}$	$\geq 20\%$	
2.1.4	Minimum Reflectance	M	= 4		
2.1.5	Edge Contrast	M	$\geq 15\%$		
2.1.6	Modulation	M	$X < 0.635\text{mm (0.025in.)}$	$\geq 50\%$	
			$X \geq 0.635\text{mm (0.025in.)}$	$\geq 40\%$	
2.1.7	Defects	M	$X < 0.635\text{mm (0.025in.)}$	$\leq 25\%$	
			$X \geq 0.635\text{mm (0.025in.)}$	$\leq 30\%$	
2.1.8	Decodability	M	$X < 0.635\text{mm (0.025in.)}$	$\geq 37\%$	ISO/IEC 15416 – item 6.1.3
			$X \geq 0.635\text{mm (0.025in.)}$	$\geq 25\%$	

### 2.2. Symbol Structure

Conformance Clause		Class	Pass Criteria	Standard Reference
2.2.1	X-dimension			
2.2.1.1	<b>scanned in General Distribution Environment</b>	M	$\geq 0.495\text{mm (0.0195")}$ and $\leq 1.016\text{mm (0.040")}$	GS1 General Specifications Figures 5.4.2.7.1-2 and 5.4.2.8-3
2.2.1.2	<b>scanned in all others Environments</b>	M	$\geq 0.250\text{mm (0.00984")}$ and $\leq 0.495\text{mm (0.0195")}$	GS1 General Specifications Figures 5.4.2.7.1-2 and 5.4.2.8-5
2.2.1.3	printed directly on corrugate with conventional (plate based) processes	M	$\geq 0.635\text{mm (0.025")}$ and $\leq 1.016\text{mm (0.040")}$	GS1 General Specifications Figures 5.4.2.7.1-2 and 5.4.2.8-5
2.2.2	Bar code height (not include Human Readable Interpretation text or Bearer Bars)			
2.2.2.1	<b>scanned in General Distribution Environment</b>	M	$\geq 32.00\text{mm (1.25")}$	GS1 General Specifications Figures 5.4.2.7.1-2, 5.4.2.8-3
2.2.2.2	<b>scanned in all others Environments</b>	M	$\geq 12.70\text{mm (0.50")}$ Note: If the package is physically too small to accommodate the minimum height (12.70mm), further truncation is permitted. In no case shall the bar height be less than 5.08 mm (0.20 in.)	GS1 General Specifications Figures 5.4.2.7.1-2, 5.4.2.8-5
2.2.3	Quiet Zones (left and right)	M	$\geq 10 X$ ( $\geq 10$ Modules )	GS1 General Specifications 5.2.1.3
2.2.4	Average bar width ratio	M	$\geq 2.25$ and/or $< 3.00$	GS1 General Specifications 5.2.A.4

Conformance Clause		Class	Pass Criteria	Standard Reference
2.2.5	Symbol Format – Design	M	Fulfill the design described on the GS1 General Specifications Figure 5.2.A.4-1	GS1 General Specifications Figure 5.2.A.4-1
2.2.6	Correspondence of the Human Readable Interpretation with the GTIN encoded	M	The Human Readable Interpretation shall correspond with the data encoded and must be shown in Human Readable Interpretation form, clearly and legibly. Start and Stop should not be shown in the human readable interpretation	GS1 General Specifications section 5.2.1.6
2.2.7	Human Readable Interpretation location	M	Underneath the Bearer Bar of the main symbol	GS1 General Specifications section 5.2.1.6
2.2.8	Human Readable Interpretation font size	R	Proportional to the size of the symbol	
2.2.9	Bearer Bar (It is mandatory unless it is not technically feasible to apply it).	M	methods requiring printing plates	GS1 General Specifications section 5.2.1.5.1
			methods that do not require printing plates	

**2.3. Data Content and Format**

Conformance Clause		Class	Pass Criteria	Standard Reference
2.3.1	GS1 Company Prefix	R	GS1 Company Prefix shall be valid	GS1 General Specifications section 1.2, 1.3.1 and GS1 Operational Manual section B 2
2.3.2	Data Standard - Global Trade Item Number (GTIN)	M	Fulfill the format described on the GS1 General Specifications section 1.3.1	GS1 General Specifications section 1.3.1
2.3.3	Validity of Check Digit (Modulo 10)	M	Fulfill the algorithm described on the GS1 General Specifications section 3.A.1.1	GS1 General Specifications section 3.A.1.1
2.3.5	Data Standard represented in the correspondent Data Carrier	M	Make correspondence with Data Standard format described on the GS1 General Specifications section 1.3.1 with the Bar Code Standard described on GS1 General Specifications section 5.2	GS1 General Specifications sections 1.3.1 and 5.2

**2.4. Bar Code Applications**

Conformance Clause		Class	Pass Criteria	Standard Reference
2.4.1	Use of the correct GS1 Identification Key (Data Standard) for the application proposes	M	Shall follow the application rules described on GS1 General Specifications 2.1	GS1 General Specifications section 2.1

**2.5. Symbol Placement - The following clauses may not apply to unusual packaging types (e.g., low height items, display cases, bags).**

Conformance Clause		Class	Pass Criteria	Standard Reference
2.5.1	Symbol Placement on trade Items with Curved Surfaces	M	Fulfill the rules described on GS1 General Specifications section 6.A.1	GS1 General Specifications sections 6.2.3.2 and 6.A.1
2.5.2	Symbol Placement to avoid scanning obstacles	R	Follow the recommendation described on GS1 General Specifications section 6.2.3.3	GS1 General Specifications section 6.2.3.3
2.5.3	Number of Symbols	M	Bar code symbols representing different Global Trade Item Numbers (GTINs) must never be visible on any one item.	GS1 General Specifications sections 6.2.1, 6.7.1 and 6.7.2

	Conformance Clause	Class	Pass Criteria	Standard Reference
		R	For General Distribution Environment is recommended to apply 2 or more identical bar codes symbols in different sides of the Logistic Unit	
2.5.4	Preferred Placement	R	Target placement for the bottom of the bar code symbol is 32mm (1.25 in.) from the natural base of the item and be at least 19mm (0.75 in.) from any vertical edge. Special recommendations for pallets and shallow trays on GS1 General Specifications sections 6.7.1.1 and 6.7.1.3	GS1 General Specifications sections 6.7.1.1, 6.7.1.2 and 6.7.1.3

## 4.5. Conformance Clauses for GS1-128 Bar Code Symbols

### 3.1. ISO Parameters of Quality

	Conformance Clause	Class	Pass Criteria	Standard Reference
3.1.1	Overall ISO Grade	M	$\geq 1.5/10/670 \pm 10\text{nm}$ (the GS1 US Coupon Code requires an aperture of 6 mils and a minimum grade of 1.5/06/670)	GS1 General Specifications section 5.4.2.8, 5.4.3.3.10.3 and ISO/IEC 15416 – item 6.2
3.1.2	Decode	M	= 4	ISO/IEC 15416 – item 6.1.1
3.1.3	Symbol Contrast	M	$\geq 40\%$	ISO/IEC 15416 – item 6.1.2
3.1.4	Minimum Reflectance	M	= 4	
3.1.5	Edge Contrast	M	$\geq 15\%$	
3.1.6	Modulation	M	$\geq 50\%$	
3.1.7	Defects	M	$\leq 25\%$	
3.1.8	Decodability	M	$\geq 37\%$	ISO/IEC 15416 – item 6.1.3

### 3.2. Symbol Structure

	Conformance Clause	Class	Pass Criteria	Standard Reference
3.2.1	X-dimension			
3.2.1.1	applied on <b>logistic unit</b> to be scanned in <b>General Distribution Environment (includes the Serial Shipping Container Code (SSCC))</b>	M	$\geq 0.495\text{mm}$ (0.095") and $\leq 0.940\text{mm}$ (0.037") Note: If the information required cannot be accommodated in the space available, a lower X-dimension may be used. In any case, the minimum X-dimension is 0.250 mm (0.00984 in.)	GS1 General Specifications Figures 5.4.2.7.1-2, 5.4.2.8-6, and Section 2.2.4.4.1.2
3.2.1.2	applied on non-logistic units to be scanned in <b>General Distribution Environment</b>	M	$\geq 0.495\text{mm}$ (0.095") and $\leq 1.016\text{mm}$ (0.040")	GS1 General Specifications Figures 5.4.2.7.1-2, 5.4.2.8-3 and Section 2.2.4.4.1.2
3.2.1.3	<b>scanned in all others Environments</b>	M	$\geq 0.250\text{mm}$ (0.00984") and $\leq 0.495\text{mm}$ (0.095")	GS1 General Specifications Figures 5.4.2.7.1-2 and 5.4.2.8-5
3.2.2	Bar code height (not include Human Readable Interpretation text)			

	Conformance Clause	Class	Pass Criteria	Standard Reference
3.2.2.1	scanned in General Distribution Environment	M	≥ 32.00mm (1.25")	GS1 General Specifications Figures 5.4.2.7.1-2, 5.4.2.8-6 and 5.4.2.8-3
3.2.2.2	scanned in all others Environments	M	≥ 12.70mm (0.50") Note: If the package is physically too small to accommodate the minimum height (12.70mm), further truncation is permitted. In no case shall the bar height be less than 5.08 mm (0.20 in.)	GS1 General Specifications Figures 5.4.2.7.1-2, 5.4.2.8-5
3.2.3	Quiet Zones (left and right)	M	≥ 10 X ( ≥ 10 Modules )	GS1 General Specifications sections 5.3.4.2 and 5.3.6.3
3.2.4	Symbol Length	M	No more than 48 data characters encoded (including Function Code 1 (FNC1) when used as a field separator), and ≤ 165mm (6.5in.), including Quiet Zones	GS1 General Specifications sections 5.3.4.3 and 5.3.8.2
3.2.5	Start Pattern	M	Must be consisted of Start (A, B, or C) + FNC1	GS1 General Specifications section 5.3.3.7
3.2.6	Separator Character - FNC1 (if used)	M	Shall be 11 modules represented <b>only</b> after variable length Also (see Figure 5.3.8.2.1 – 1 including AI 23n) as showed at GS1 General Specifications figure 5.3.3.2-1	GS1 General Specifications Figures 5.3.3.2 – 1, 5.3.8.2.1-1) and section 5.3.8.4
3.2.7	Shift Characters (if used)	M	Shall be 11 modules represented as showed at GS1 General Specifications figure 5.3.3.2-1	GS1 General Specifications section 5.3.3.4.1 and figure 5.3.3.2-1
3.2.8	Symbol Check Digit (Modulo 103)	M	Fulfill the algorithm described on the GS1 General Specifications section 5.3.A.1.1	GS1 General Specifications section 5.3.3.6 and 5.3.A.1.1
3.2.9	Stop character	M	Shall be 13 modules represented in the end of the code as showed at GS1 General Specifications figure 5.3.3.1-3	GS1 General Specifications figure 5.3.3.1-3 and section 5.3.3.5
3.2.10	Correspondence of the Human Readable Interpretation with the data encoded	M	The Human Readable shall correspond with the data encoded and must be Showed in Human Readable Interpretation form, clearly legible. Start, Stop, Shift, Function Characters and Symbol Check Character should not be shown in the Human Readable Interpretation	GS1 General Specifications sections 1.1, 2.2.4.4.1.6 and 5.3.7.4
3.2.11	Human Readable Interpretation location	M	Below the symbol	GS1 General Specifications sections 5.3.7.4 and 2.2.4.4.1.6
3.2.12	Human Readable Interpretation font size	R	Proportional to the size of the symbol	
3.2.13	Application Identifiers (AI) represented Human Readable Interpretation form	M	Shown between brackets (parentheses) in the Human Readable Interpretation form	

### 3.3. Data Content and Format

	Conformance Clause	Class	Pass Criteria	Standard Reference
3.3.1	GS1 Company Prefix	R	GS1 Company Prefix shall be valid	GS1 General Specifications section 1.2, 1.3.1 and GS1 Operational Manual section B 2
3.3.2	Data Standards - (GTIN, SSCC, GLN, GRAI, GIAI, GSRN and GDTI)	M	Fulfil the format described on the GS1 General Specifications section 1.3	GS1 General Specifications section 1.3

3.3.3	Validity of Check Digit (modulo 10)	M	Fulfil the algorithm described on the GS1 General Specifications section 3.A.1.1	GS1 General Specifications section 3.A.1.1
3.3.4	Data Standards represented in the correspondent Data Carrier	M	Make correspondence with Data Standards formats described on the GS1 General Specifications section 1.3 with the AI described on section 3.0 and data carrier described on section 5.3	GS1 General Specifications sections 1.3, 3.0 and 5.3
3.3.5	Application Identifier (AI) Format	M	Follows the AI Format described on the GS1 General Specifications section 3.6 and annex 3.A.4.1	GS1 General Specifications sections 3.6 and annex 3.A.4.1
3.3.6	Invalid Pairs of Element Strings	M	Shall follow the GS1 General Specifications figure 4.3-1 that defines the pairs of Element Strings that cannot appear on the same physical entity	GS1 General Specifications section 4.3
3.3.7	Mandatory Association of Element Strings	M	Shall follow the GS1 General Specifications figure 4.4-1 that defines the Element Strings that mandate the appearance of another Element String on the same physical entity	GS1 General Specifications section 4.4
3.3.8	Data Integrity (e.g., month < 13 and > 00)	M	Follows the AI Format and applications described on the GS1 General Specifications section 3.6	GS1 General Specifications section 3.6

### 3.4. Bar Code Applications

	Conformance Clause	Class	Pass Criteria	Standard Reference
3.4.1	Use of the correct GS1 Identification Key (Data Standard) for the application proposed	M	Shall follow the application rules described on GS1 General Specifications sections 2.1 until 2.6	GS1 General Specifications sections 2.1 until 2.6
3.4.2	GS1 Logistic Labels			
3.4.2.1	SSCC applied	M	Must to have a SSCC applied	GS1 General Specifications section 2.2.4.2.4
3.4.2.2	GS1 Logistic Labels Design	R	Could have Supplier, Customer, Carrier Sections	GS1 General Specifications section 2.2.4.3.1
3.4.2.3	Bar Code Symbol and Human Readable Interpretation Layout	R	Is recommended to represent the barcode at the lower part of each section	GS1 General Specifications section 2.2.4.3.2
3.4.2.4	Human readable interpretation	M	At least the data encoded in the barcodes must appear in human readable. Font size should be 7 mm. Data titles are the standard abbreviated descriptions of data fields used to denote the Human Readable Interpretation of encoded data. If there is no language agreed between trading partners, data titles must be printed in English.	GS1 General Specifications section 2.2.4.4.2.2
3.4.2.5	Plain text on GS1 Logistic Labels (Text that has no bar code symbol equivalent)	M	Font size should be no less than 3mm	GS1 General Specifications section 2.2.4.4.2.1

### 3.5. Symbol Placement - The following clauses may not apply to unusual packaging types (e.g., low height items, display cases, bags).

	Conformance Clause	Class	Pass Criteria	Standard Reference
3.5.1	Symbol Placement on trade Items with Curved Surfaces	M	Fulfill the rules described on GS1 General Specifications section 6.A.1	GS1 General Specifications sections 6.2.3.2 and 6.A.1

	Conformance Clause	Class	Pass Criteria	Standard Reference
3.5.2	Symbol Placement to avoid scanning obstacles	R	Follow the recommendation described on GS1 General Specifications section 6.2.3.3	GS1 General Specifications section 6.2.3.3
3.5.3	Number of Symbols	M	Bar code symbols representing different Global Trade Item Numbers (GTINs) must never be visible on any one item.	GS1 General Specifications sections 6.2.1, 6.7.1 and 6.7.2
		R	For General Distribution Environment is recommended to apply 2 or more identical bar codes in different sides of the Logistic Unit	
3.5.4	Preferred Placement for products not intended for point of sale (POS) scanning, for example cartons.	R	Target placement for the bottom of the bar code symbol is 32mm (1.25 in.) from the natural base of the item and be at least 19mm (0.75 in.) from any vertical edge. Special recommendations for pallets and shallow trays on GS1 General Specifications sections 6.7.1.1 and 6.7.1.3	GS1 General Specifications sections 6.7.1.1, 6.7.1.2 and 6.7.1.3

# A. Appendix


## A.1 Sampling criteria

The table below describes the ideal number of product samples necessary to assess conformance regarding the number of package that have bar codes printed on the same quality print level. The selection of the samples **shall be random**, in a way that represents the entire population. A computer program such as Minitab or Microsoft Excel (formula =RANDBETWEEN(bottom,top)) can be used to establish which samples should be selected.

If one of the samples tested fail, another test should be done using the same sampling criteria.

These ranges were developed considering a **confidence level of 95%** and a **margin of error of 15%**.

POPULATION SIZE Number of package that have bar codes printed at the same quality level	SAMPLE SIZE NEEDED Number of samples that shall be assessed
≤ 10	08
>10 and ≤ 20	14
> 20 and ≤ 30	18
> 30 and ≤ 40	21
> 40 and ≤ 50	23
> 50 and ≤100	30
>100 and ≤ 200	35
> 200 and ≤ 500	39
> 500 and ≤ 1000	41
>1000 and ≤ 9600	42
> 9600	43

 **Note: Sample Size** - Despite the sample criteria described above as the ideal method to guarantee the quantitative and qualitative evidence related to the product that was assessed, it may not be applicable to all Certification Programmes, because of logistics, operational, timing or economic constraints. In these cases is recommended to assess 3 (three) samples of each product. The assessment of one single product is acceptable only when logistics, operational, timing or economic constrains do not allow for use of the recommended sample criteria.

If more than one product has been tested, the selection of these samples should be completed at the start, end, and middle of each printing job.

## A.2 Declaration of Conformance Templates

### Declaration of Conformance Template to GS1 MO Performing as a CAB

 Country	The global language of business
<b>GS1 BARCODE DECLARATION OF CONFORMANCE</b>	
GS1 <i>country</i> , official representative of the GS1 Bar Code Conformance Assessment and Certification Programme hereby declare that the product	
<b>PRODUCT DESCRIPTION:</b> <b>NONONONON NONONO NONON NONON NONO</b> BAR CODE TYPE: xxxxxxxx BAR CODE NUMBER/GTIN: XXXXXXXXXX <b>PRINT RUN BATCH OR LOTE NUMBER: XXXXXX</b>  BRAND OWNER: NONONONO NONONO	
exceeds the minimum quality level defined at the GS1 General Specifications for Bar Code Applications and fulfils all the technical and business specifications, assuring the correct bar code interpretation and the best scanning performance.	
City – Country Responsible: xxxxxxxx xxxx xxxxxxxx Issued on: 00/00/0000 Valid until: 00/00/0000 GS1 Bar Code Verification Report number: xxxxxx	
<i>Insert a GS1 conformance and certification official stamp</i>	
<b>Restrictions – Attention</b> This declaration is valid only for the products tested in our laboratory until the valid time specified. Because of some quality variations on the printing process is not possible to guaranty, with this declaration, that all products manufactured will attend the same quality level of the product assessed. Is responsibility of the product brand owner guaranty the printing process quality control. Whilst every effort has been made to ensure that the tests results are correct, GS1 <i>country</i> hereby state that this declaration is provided without warranty, either expressed or implied, of accuracy or fitness for purpose, and hereby disclaim any liability, direct or indirect, for damages or loss relating to the use of this declaration.	
<i>GS1 MO Address, Telephone Number Web site - e-mail</i>	

## Declaration of Conformance Template to Generic Issuers

Issuer Logo

# BAR CODE DECLARATION OF CONFORMANCE

Issuer Name, following the GS1 Methodology to Conformance Assessment of Bar Codes declare that the product

PRODUCT DESCRIPTION:  
**NONONONON NONONO NONON NONON NONO**

BAR CODE TYPE: xxxxxxxx  
BAR CODE NUMBER/GTIN: XXXXXXXXXX  
**PRINT RUN BATCH OR LOTE NUMBER: XXXXXX**

BRAND OWNER: NONONONO NONONO

exceeds the minimum quality level defined at the GS1 General Specifications for Bar Code Applications and fulfils all the technical and business specifications, assuring the correct bar code interpretation and the best scanning performance.

City – Country

Responsible: XXXXXXXXXXX XXXX XXXXXXXXXXX

Issued on: 00/00/0000

Valid until: 00/00/0000

Bar Code Verification Report number: xxxxxx

### Restrictions – Attention

This declaration is valid only for the products tested in our laboratory until the valid time specified. Because of some quality variations on the printing process is not possible to guaranty, with this declaration, that all products manufactured will attend the same quality level of the product assessed. Is responsibility of the product brand owner guaranty the printing process quality control.

Whilst every effort has been made to ensure that the tests results are correct, *Issuer Name* hereby state that this declaration is provided without warranty, either expressed or implied, of accuracy or fitness for purpose, and hereby disclaim any liability, direct or indirect, for damages or loss relating to the use of this declaration.

*Issuer Address, Telephone Number  
Web site - e-mail*

### A.3 Symbol Heights at Different Magnifications

Magnification Factor	Ideal Module Width [mm]	EAN-13/UPC-A Dimensions [mm]		EAN-8 Dimensions [mm]	
		Symbol Height (including human readable)	Shortest symbol bar height (excluding human readable)	Symbol Height (including human readable)	Shortest symbol bar height (excluding human readable)
0.75	0.247	20.7	18.3	17.1	14.7
0.80	0.264	20.7	18.3	17.1	14.7
0.85	0.281	22.0	19.5	18.1	15.6
0.90	0.297	23.3	20.6	19.2	16.5
0.95	0.313	24.6	21.8	20.2	17.4
1.00	0.330	25.9	22.9	21.3	18.3
1.05	0.346	27.2	24.0	22.4	19.2
1.10	0.363	28.5	25.2	23.4	20.1
1.15	0.379	29.8	26.3	24.5	21.0
1.20	0.396	31.1	27.5	25.6	22.0
1.25	0.412	32.4	28.6	26.6	22.9
1.30	0.429	33.7	29.8	27.7	23.8
1.35	0.445	35.0	30.9	28.8	24.7
1.40	0.462	36.3	32.1	29.8	25.6
1.45	0.478	37.6	33.2	30.9	26.5
1.50	0.495	38.9	34.4	32.0	27.5
1.55	0.511	40.2	35.5	33.0	28.4
1.60	0.528	41.5	36.7	34.1	29.3
1.65	0.544	42.8	37.8	35.2	30.2
1.70	0.561	44.1	39.0	36.2	31.1
1.75	0.577	45.3	40.1	37.3	32.0
1.80	0.594	46.6	41.3	38.4	33.0
1.85	0.610	47.9	42.4	39.4	33.9
1.90	0.627	49.2	43.6	40.5	34.8
1.95	0.643	50.5	44.7	41.6	35.7
2.00	0.660	51.8	45.9	42.6	36.6

The bar code height (including human readable) for EAN-13 and UCP-A shall be  $\geq 78.5$  times the x-dimension. The shortest symbol bar height (excluding human readable) shall be  $\geq 69.5$  times the x-dimension.

For EAN-8 the bar code height (including human readable) shall be  $\geq 64.5$  times the x-dimension. The shortest symbol bar height (excluding human readable) shall be  $\geq 55.5$  times the x-dimension.

