

SINGAPORE STANDARD

Specification for QR code



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Contents

	Page
National Foreword _____	9
Foreword _____	12

CLAUSES

0	Introduction _____	13
1	Scope _____	14
2	Conformance _____	14
3	Normative references _____	14
4	Terms and definitions, mathematical and logical symbols, abbreviations and conventions	15
4.1	Terms and definitions _____	15
4.2	Mathematical and logical symbols _____	17
4.3	Abbreviations _____	17
4.4	Conventions _____	18
4.4.1	Module positions _____	18
4.4.2	Byte notation _____	18
4.4.3	Version references _____	18
5	Symbol description _____	18
5.1	Basic characteristics _____	18
5.2	Summary of additional features _____	20
5.3	Symbol structure _____	21
5.3.1	Symbol versions and sizes _____	22
5.3.2	Finder pattern _____	29
5.3.3	Separator _____	30
5.3.4	Timing pattern _____	30
5.3.5	Alignment patterns _____	30
5.3.6	Encoding region _____	30
5.3.7	Quiet zone _____	30
6	Requirements _____	31
6.1	Encode procedure overview _____	31
6.2	Data analysis _____	33
6.3	Modes _____	33
6.3.1	Extended Channel Interpretation (ECI) mode _____	33
6.3.2	Numeric mode _____	33
6.3.3	Alphanumeric mode _____	33
6.3.4	Byte mode _____	34
6.3.5	Kanji mode _____	34
6.3.6	Mixing modes _____	34

6.3.7	Structured Append mode_____	34
6.3.8	FNC1 mode_____	34
6.4	Data encoding_____	35
6.4.1	Sequence of data_____	35
6.4.2	Extended Channel Interpretation (ECI) mode_____	36
6.4.3	Numeric mode_____	38
6.4.4	Alphanumeric mode_____	39
6.4.5	Byte mode_____	40
6.4.6	Kanji mode_____	42
6.4.7	Mixing modes_____	43
6.4.8	FNC1 modes_____	43
6.4.9	Terminator_____	46
6.4.10	Bit stream to codeword conversion_____	46
6.5	Error correction_____	50
6.5.1	Error correction capacity_____	50
6.5.2	Generating the error correction codewords_____	58
6.6	Constructing the final message codeword sequence_____	59
6.7	Codeword placement in matrix_____	60
6.7.1	Symbol character representation_____	60
6.7.2	Function pattern placement_____	60
6.7.3	Symbol character placement_____	60
6.8	Data masking_____	64
6.8.1	Data mask patterns_____	64
6.8.2	Evaluation of data masking results_____	67
6.9	Format information_____	69
6.9.1	QR Code symbols_____	69
6.9.2	Micro QR Code symbols_____	70
6.10	Version information_____	71
7	Structured Append_____	73
7.1	Basic principles_____	73
7.2	Symbol Sequence Indicator_____	73
7.3	Parity data_____	74
8	Symbol printing and marking_____	74
8.1	Dimensions_____	74
8.2	Human-readable interpretation_____	74
8.3	Marking guidelines_____	75
9	Symbol quality_____	75
9.1	Methodology_____	75
9.2	Symbol quality parameters_____	75
9.2.1	Fixed pattern damage_____	75

9.2.2	Scan grade and overall symbol grade	75
9.2.3	Grid non-uniformity	75
9.3	Process control measurements	75
10	Decoding procedure overview	75
11	Reference decode algorithm for QR Code 2005	77
12	Autodiscrimination capability	83
13	Transmitted data	83
13.1	General principles	83
13.2	Symbology Identifier	83
13.3	Extended Channel Interpretations	83
13.4	FNC1	84

ANNEXES

A	(normative) Error detection and correction generator polynomials	85
B	(normative) Error correction decoding steps	89
C	(normative) Format information	91
C.1	Error correction bit calculation	91
C.2	Error correction decoding steps	91
D	(normative) Version information	94
D.1	Error correction bit calculation	94
D.2	Error correction decoding steps	94
E	(normative) Position of alignment patterns	96
F	(normative) Symbology Identifier	98
G	(normative) QR Code 2005 print quality – symbology-specific aspects	99
G.1	Fixed pattern damage	99
G.1.1	Features to be assessed	99
G.1.2	Fixed pattern damage grading	101
G.2	Grading of additional parameters	102
G.2.1	Grading of format information	102
G.2.2	Grading of version information (QR Code symbols)	103
G.3	Scan grade	104
H	(informative) JIS8 and Shift JIS character sets	105
I	(informative) Symbol encoding examples	107
I.1	General	107
I.2	Encoding a QR Code symbol	107
I.3	Encoding a Micro QR Code symbol	109
J	(informative) Optimisation of bit stream length	111
J.1	General	111
J.2	Optimisation for QR Code symbols	112
J.3	Optimisation for Micro QR Code symbols	113

J.3.1	Optimisation principles_____	113
J.3.2	Capacity of Micro QR Code symbols_____	113
K	(informative) User guidelines for printing and scanning of QR Code 2005 symbols_____	119
K.1	General_____	119
K.2	User selection of error correction level_____	119
L	(informative) Autodiscrimination_____	121
M	(informative) Process control techniques_____	122
M.1	Symbol contrast_____	122
M.2	Assessing axial nonuniformity_____	122
M.3	Visual inspection for symbol distortion and defects_____	122
M.4	Assessing print growth_____	123
N	(informative) Characteristics of Model 1 symbols_____	124
N.1	Model 1 QR Code symbols_____	124
N.1.1	Model 1 overall characteristics_____	124
N.1.2	Symbol versions and sizes_____	125
N.2	Detailed specifications_____	126
ZA	Micro QR Code_____	127
ZB	Utilising QR Code / Micro QR Code_____	131
ZC	Examples of QR Code applications_____	136
	Bibliography_____	148

National Foreword

This Singapore Standard was prepared by the Automatic Data Capture Technical Committee (ADCTC) under the purview of the Information Technology Standards Committee (ITSC), with GS1 Singapore* as the secretariat of ADCTC under ITSC.

This Singapore Standard is a modified adoption of ISO/IEC 18004 : 2006 – “Information technology – Automatic identification and data capture techniques – QR Code 2005 bar code symbology specification”.

Attention is drawn to the following:

1. Wherever the words “International Standard” appear referring to this standard, they should be read as “Singapore Standard”.
2. The comma has been used throughout as a decimal marker whereas in Singapore Standards it is a practice to use a full point on the baseline as the decimal marker.

ISO/IEC 18004 : 2006 was adopted to guide potential users of QR Code in Singapore on how to implement QR Code Standard in their businesses.

This Singapore Standard defines the requirements for the symbology known as QR Code 2005. It specifies the QR Code 2005 symbology characteristics, data character encoding methods, symbol formats, dimensional characteristics, error correction rules, reference decoding algorithm, production quality requirements, and user-selectable application parameters, and lists in an informative annex the features of QR Code Model 1 symbols which differ from QR Code 2005.

To guide potential users of QR Code in Singapore on the implementation of QR Code standard in their businesses, the following additional informative national annexes listed below on utilising QR Code and Micro QR Code and examples of applications have been included:

Annex ZA – Micro QR Code

Annex ZB – Utilising QR Code / Micro QR Code

Annex ZC – Examples of QR Code applications

Applications of the QR Code in the healthcare sector are included because this sector has adopted the QR Code in patient identification and medicine administration traceability using QR Code printed on patients' wrist bands. Applications of the QR Code using mobile phones are also featured in Annex ZC, due to the potential for such an application.

Acknowledgement is made to DENSO-Wave Inc. Japan, the creator and owner of QR Code, for providing the contents of Annexes ZA and ZB and GS1 Japan, QP Corporation and Association of Japan Medical Equipment (JAMEI) for providing the contents of Annex ZC.

This Singapore Standard is to be used in conjunction with SS 362 : Part 1 : 2004 and SS 362 : Part 2 : 2004, the specification for EAN Bar Coding System. The major benefit for the users of the EAN Bar Coding system is the availability of uniquely defined identification codes for use in their trading transactions. This is particularly useful in open environments.

* The administration of the numbering system by GS1, formerly known as EAN International in Brussels and GS1 Singapore ensures that the EAN Bar Coding System assigned to particular items is unique worldwide and items are defined in a consistent way.

The name of EAN International has been changed to GS1 in 2005 to fully reflect the global reach of the organization following its expansion in November 2002 when the Uniform Code Council (UCC) of USA and the Electronic Commerce Council of Canada (ECCC) joined EAN International as member organizations. Accordingly, the name of Singapore Article Number Council (SANC) has been changed to GS1 Singapore in 2005 to fully reflect its link to GS1 internationally. For enquires please contact GS1 Singapore at sanc1@gs1.org.sg.

This Singapore Standard serves two major purposes:

- Infrastructure for QR Code system management;
- Basis for QR Code applications.

During the past years, there were major global developments in the adoption of QR Codes including the following:

1. Micro QR Code has been proposed to ISO/IEC JTC1SC31 separately from QR Code. It had been approved during the deliberation stage for SC31 to be added to the QR Code standard (ISO/IEC 18004), and in 2006, ISO/IEC 18004 was revised to a standard containing that for Micro QR Code.
2. Widespread adoption of QR Code by the manufacturing and logistics sectors in China, Japan and Korea.
3. Adoption of QR Code for patient identification by hospitals in Japan, Korea, Hong Kong and two hospitals in Singapore, the National University Hospital and the Tan Tock Seng Hospital.
4. Use of QR Code for food product traceability in Japan and Korea.
5. The airlines' implementation of 2D Code by 2010 as mandated by the International Air Transport Association (IATA) which includes the use of QR Code on mobile phones for paperless passenger boarding passes.
6. Trends to use QR Codes / Micro QR Codes for various applications in other industries.

This standard also enables solution providers to have a better understanding of the QR Code so that they can develop various innovative solutions such as those for the healthcare, logistics, manufacturing and telecommunications sectors.

In preparing this standard reference was also made to the following documents:

AIM International Symbology Specification 97-001, QR Code

GS1 General Specifications, GS1

Chinese National Standard

Japanese Industrial Standard

Japan Automobile Manufacturers Association (JAMA)

Korea National Standard

Vietnam National Standard

GB/T 18284 : 2000-12

JIS-X0510 : 1999-01

JAMA-EIE001 : 1999-09

KS-X ISO/IEC 18004 : 2002-12

TCVN7322 : 2003-12

Acknowledgement is also made for the use of information from the above publications.

Attention is drawn to the possibility that some of the elements of this Singapore Standard may be the subject of patent rights. SPRING Singapore shall not be held responsible for identifying any or all of such patent rights.

NOTE

1. *Singapore Standards are subject to periodic review to keep abreast of technological changes and new technical developments. The revisions of Singapore Standards are announced through the issue of either amendment slips or revised editions.*
2. *Compliance with a Singapore Standard does not exempt users from legal obligations.*

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 18004 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

This second edition cancels and replaces the first edition (ISO/IEC 18004:2000), which has been technically revised.

0 Introduction

It is necessary to distinguish four technically different, but closely related members of the QR Code family, which represent an evolutionary sequence.

- QR Code Model 1 was the original specification for QR Code and is described in AIM International Symbology Specification 97-001.
- QR Code Model 2 was an enhanced form of the symbology with additional features (primarily the addition of alignment patterns to assist navigation in larger symbols), and was the basis of the first edition of ISO/IEC 18004.
- QR Code 2005 (the basis of this second edition of ISO/IEC 18004) is closely similar to QR Code Model 2 and, in its QR Code format, differs only in the addition of the facility for symbols to appear in a mirror image orientation, for reflectance reversal (light symbols on dark backgrounds) and the option for specifying alternative character sets to the default.
- The Micro QR Code format (also specified in this International Standard), is a variant of QR Code 2005 with a reduced number of overhead modules and a restricted range of sizes, which enables small to moderate amounts of data to be represented in a small symbol, particularly suited to direct marking on parts and components, and to applications where the space available for the symbol is severely restricted.

QR Code 2005 is a matrix symbology. The symbols consist of an array of nominally square modules arranged in an overall square pattern, including a unique finder pattern located at three corners of the symbol (in Micro QR Code symbols, at a single corner) and intended to assist in easy location of its position, size and inclination. A wide range of sizes of symbol is provided for, together with four levels of error correction. Module dimensions are user-specified to enable symbol production by a wide variety of techniques.

QR Code Model 2 symbols are fully compatible with QR Code 2005 reading systems.

Model 1 QR Code symbols are recommended only to be used in closed system applications and it is not a requirement that equipment complying with this International Standard should support Model 1. Since QR Code 2005 is the recommended model for new, open systems application of QR Code, this International Standard describes QR Code 2005 fully, and lists the features in which Model 1 QR Code differs from QR Code 2005 in Annex N.

Specification for QR Code

(ISO title: Information technology – Automatic identification and data capture techniques – QR Code 2005 bar code symbology specification)

1 Scope

This International Standard defines the requirements for the symbology known as QR Code 2005. It specifies the QR Code 2005 symbology characteristics, data character encoding methods, symbol formats, dimensional characteristics, error correction rules, reference decoding algorithm, production quality requirements, and user-selectable application parameters, and lists in an informative annex the features of QR Code Model 1 symbols which differ from QR Code 2005.

2 Conformance

QR Code 2005 symbols (and equipment designed to produce or read QR Code 2005 symbols) shall be considered as conforming with this International Standard if they provide or support the features defined in this International Standard.

Symbols complying with the requirements for QR Code Model 1, as defined in ISO/IEC 18004:2000, may not be readable with equipment complying with this International Standard.

Symbols complying with the requirements for QR Code Model 2, as defined in ISO/IEC 18004:2000, are readable with equipment complying with this International Standard.

Reading equipment complying with ISO/IEC 18004:2000 will not be able to read all symbols complying with this International Standard. Symbols that make use of the additional features of QR Code 2005 will not be readable by such equipment.

Printing equipment complying with ISO/IEC 18004:2000 will not be able to print all symbols defined in this International Standard. Symbols that make use of the additional features of QR Code 2005 will not be printable by such equipment.

It should be noted, however, that QR Code 2005 is the form of the symbology recommended for new and open systems applications.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 8859-1:1998, *Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No. 1*

ISO/IEC 15415, *Information technology – Automatic identification and data capture techniques – Bar code print quality test specification – Two-dimensional symbols*

ISO/IEC 15424, *Information technology – Automatic identification and data capture techniques – Data carrier identifiers (including Symbology Identifiers)*

ISO/IEC 19762-1, *Information technology – Automatic identification and data capture (AIDC) techniques – Harmonized vocabulary – Part 1: General terms relating to AIDC*