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Information technology — Automatic identification and data capture techniques — QR code bar code symbology specification

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This British Standard is the UK implementation of ISO/IEC 18004:2024. It supersedes BS ISO/IEC 18004:2015, which is withdrawn.

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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

This fourth edition cancels and replaces the third edition (ISO/IEC 18004:2015), which has been technically revised.

The main changes are as follows:

— continuous grading according to ISO/IEC 15415 has been adopted for grade fixed pattern damage;

— the reference decoding algorithm has been clarified.

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There are four technically different, but closely related members of the QR code family, which represent an evolutionary sequence.

— QR code model 1 is the original specification for QR code and is described in AIM ITS 97-001[21].

— QR code model 2 is an enhanced form of the symbology with additional features (primarily, the addition of alignment patterns to assist navigation in larger symbols) and is the basis of the first edition of this document (i.e. ISO/IEC 18004:2000).

— QR code [the basis of the second edition of this document (i.e. ISO/IEC 18004:2006)] is very similar to QR code model 2; 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 is set to the default.

— The micro QR code format [also specified in the second edition of this document (i.e. ISO/IEC 18004:2006)], is a variant of QR code with a reduced number of overhead modules and a restricted range of sizes, which enables small to moderate amount 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 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-specific to enable symbol production by a wide variety of techniques.

QR code model 2 symbols are fully compatible with QR code reading systems.

QR code model 1 symbols are recommended only to be used in closed system applications. Equipment complying with this document are not required to support QR code model 1 symbols. Since QR code is the recommended model for new, open system application of QR code, this document describes QR code fully. This document also lists the features in which QR code model 1 differs from QR code in Annex N.

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Information technology — Automatic identification and data capture techniques — QR code bar code symbology specification

1 Scope

This document specifies requirements for the symbology known as "QR code". It specifies the QR code symbology characteristics, data character encoding methods, symbol formats, dimensional characteristics, error correction rules, reference decoding algorithm, production quality requirements and user-selectable application parameters.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 15415, *Information technology — Automatic identification and data capture techniques — Bar code symbol print quality test specification — Two-dimensional symbols*

ISO/IEC 15424:—[1)], *Information technology — Automatic identification and data capture techniques — Data Carrier Identifiers (including Symbology Identifiers)*

ISO/IEC 19762, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19762 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
character count indicator
bit sequence which defines the data string length in a *mode* (3.10)

3.2
data masking
process of XORing the bit pattern in the *encoding region* (3.4) with a data mask pattern to provide a symbol with more evenly balanced numbers of dark and light modules, and reduced occurrence of patterns which would interfere with fast processing of the image

3.3
data mask pattern reference
3-bit identifier of the *data masking* (3.2) patterns applied to the symbol

1) Under preparation. Stage at the time of publication: ISO/IEC DIS 15424:2024.

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