


ITU/WHO Workshop on Digital COVID-19 Certificates

QR Code standards overview



Henri Barthel

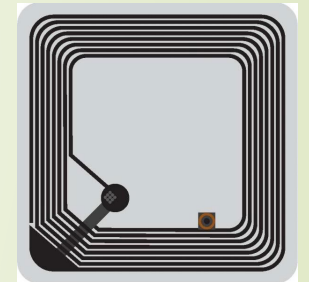
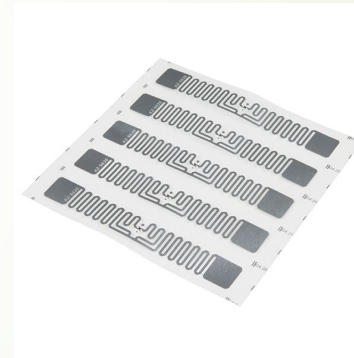
Chair ISO/IEC JTC 1/SC 31

26 November 2021

ISO/IEC JTC 1/SC 31

Standardization of data structures and technologies for the process of automatic identification and data capture

- Launched in 1996
- 130 standards published
- 50 countries involved

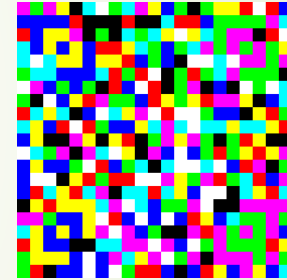


Recent developments in SC 31 (1/2)

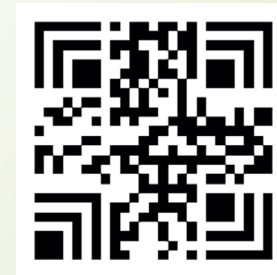
- ▶ Rectangular DataMatrix and QR Code



- ▶ New 2D colour barcode: JAB code



- ▶ New 2D barcode: Han Xin Code





QR Code

- ▶ The QR code system was invented in 1994 by Masahiro Hara from the Japanese company Denso Wave. Its initial purpose was to track vehicles and components at high-speed
- ▶ SC 31 agreed a New Work Item Proposal to standardise QR Code in 1998. Original SC 31 document:

COMMITTEE: 31

DOCUMENT #: 0235

DATE ASSIGNED: 1997-12-01

TITLE: International Symbology Specification - QR Code

NO. OF PAGES: 121

DISKETTE #: 11

SOURCE: Maria T. Schneider, Secretariat, ISO/IEC JTC 1/SC31

ACTION ID: For consideration at the next Plenary Meeting of ISO/IEC JTC 1/SC 31 scheduled for 27-29 January 1998, Rio de Janeiro, Brazil, for simultaneous processing as an NP and a CD



QR Code standards

- ▶ ISO/IEC 18004 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.
 - ▶ First version of ISO/IEC 18004 was published in 2000, latest version is from 2015
- ▶ Rectangular Micro QR Code (rMQR) (ISO/IEC DIS 23941) is under development.



QR Code characteristics

- Capacity

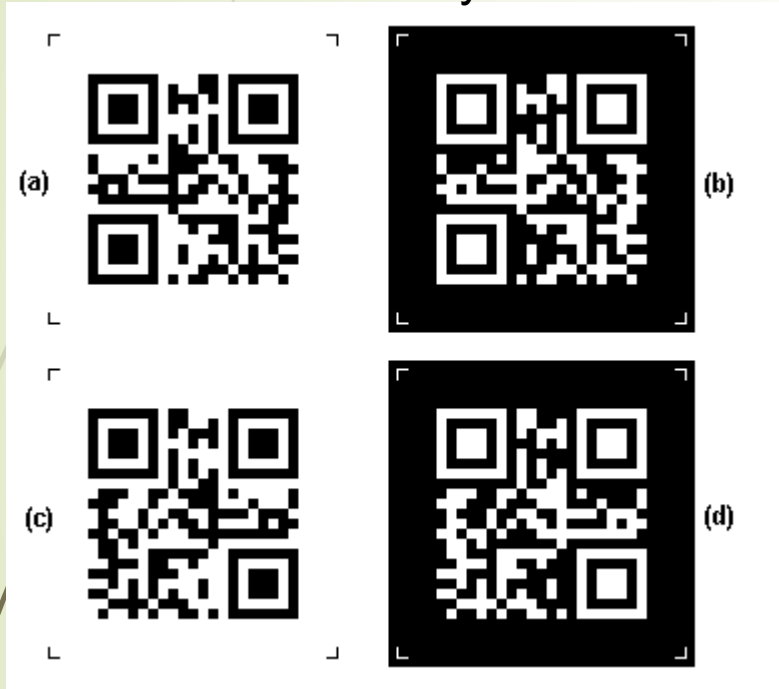
- Numeric data 7 089
- Alphanumeric data 4 296
- Byte data 2 953
- Kanji data 1 817

- Four levels of Reed-Solomon error correction

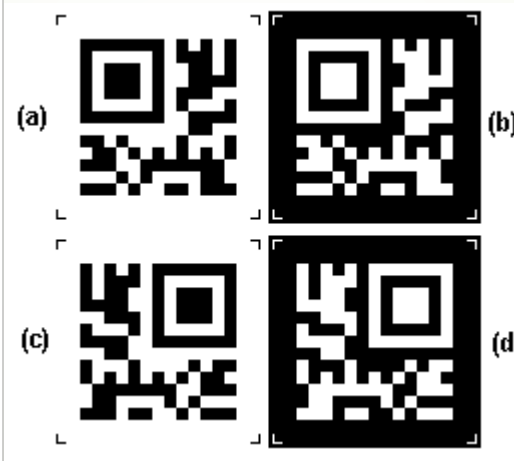
- L 7%
- M 15%
- Q 25%
- H 30%

Examples

QR Code symbol encoding the text "QR Code Symbol"



Micro QR Code symbol encoding the text "01234567"



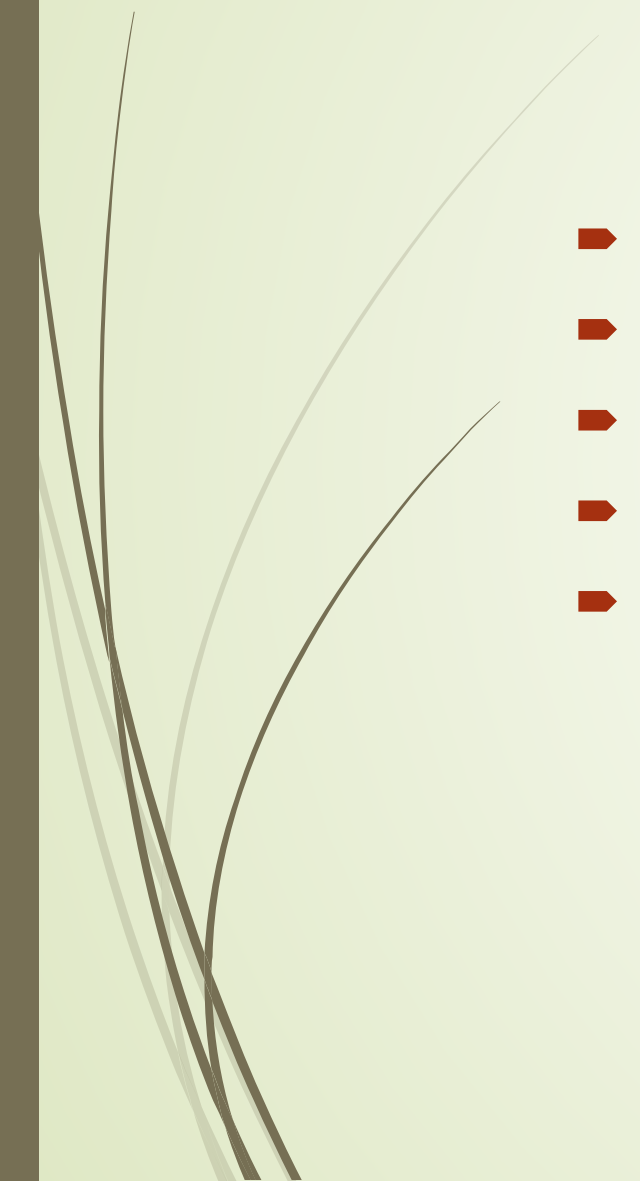
rMQR symbol encoding 0123456



- (a) normal orientation and normal reflectance arrangement
- (b) normal orientation and reversed reflectance
- (c) mirror image orientation and normal reflectance arrangement
- (d) mirror image orientation and reversed reflectance



Advantages / Disadvantages

- ▶ No license needed to create or use QR codes
 - ▶ QR Code has become ubiquitous, recognised by people
 - ▶ Decoding software is available by default on numerous devices
 - ▶ Requires a phone with a camera
 - ▶ Malicious QR codes combined with a permissive reader can put a computer's contents and user's privacy at risk
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Contact

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