**Vetscan QR Testing**

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# Overview

This document will contain a test plan and report involving the Vetscan’s camera. This will mainly focus on the Vetscan’s camera ability to read QR codes.

Each combination of label size, module size, and total characters will be tested. Each test will be recorded as pass or fail.

## Scope of this Document

This document will be used for engineering staff to plan and document testing.

## Test Equipment

-Vetscan unit.

-Ruler used to measure distance from the camera to a QR code, and the size of the QR code label.

-Printed QR Labels. Encoded according to ISO 18004:2006, using Level M error correction, and the max amount of data that can be contained in a QR Label.

-One carboard box - 2 inches tall and wider than 50 mm.

-One carboard box - 3 inches tall and wider than 50 mm.

## Documentation

|  |  |
| --- | --- |
| ISO 18004:2006 | QR code specification |
| <https://www.the-qrcode-generator.com/> | Web site used to generate a QR label with given data |
| <https://4qrcode.com/scan-qr-code.php> | Web app that can use a web cam to read a QR Label |

## QR Specification

### Content of QR code

**Format:** the content of the QR code must be a valid json structure.

**Name:** Mandatory information. Valid names are current FUSE VETXML Test codes.

See Name table below.

Maximum length 8 characters.

**Lot:** Mandatory information. A string consistent with the lot id from the manufacturer.

**Exp:** Mandatory information. Expiration date expressed according to ISO 8601 as yyyy-mm-dd.

**Data:** Optional. String of data to be sent verbatim to the analyzer.

Valid QR code according to specification (ISO 18004:2006)

Version: Minimum 1 (21 × 21 modules)  
 Maximum 40 (177 × 177 modules)

Size: Minimum size 10 mm × 10 mm.  
 Maximum size 50 mm × 50 mm.

Error correction: Level M.

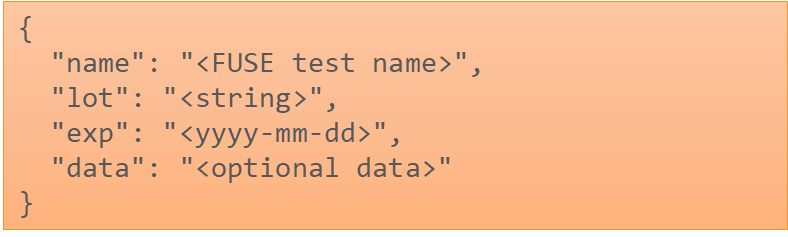
Max Alphanumeric characters:

21 x 21 modules: 20 TODO – THIS IS TO SMALL

177 x 177 modules: 3,391

Printed Labels: printed on a high-contrast background

Example JSON string that would be encoded into a QR label.



## FUSE VETXML Test names

|  |  |  |
| --- | --- | --- |
| **Analyzer** | **Name** | **Description** |
| Chemistry | AR | Avian/Reptilian Profile Plus |
| CDP | Comprehensive Diagnostic |
| CC | Critical Care Plus |
| EPP | Equine Profile Plus |
| KPP | Kidney Profile Plus |
| LA | Large Animal Profile |
| MLP | Mammalian Liver Profile |
| Prep | Prep Profile II |
| T4 | Thyroxine(T4)/Cholesterol Test |
| EP | Electrolyte Plus |
| PCP | Preventive Care Profile Plus |
| PP | Phenobarbital Profile |
| Hematology | HEM | Hematology |
| Chemistry2 | PT/aPTT | PT/aPTT Combination Test |
| Fib | Equine Fibrinogen Test |
| EFib | Equine Fibrinogen |
| CFib | Canine Fibrinogen |
| CBT | Canine Blood Typing |
| FBT | Feline Blood Typing |
| PTaPTT | PT/aPTT Combination |
| Phb | Phenobarbital (not released) |
| RapidTests | E | Ehrlichia Rapid Test |
| P | Parvo Rapid Test |
| A | Anaplasma Rapid Test |
| G | Giardia Rapid Test |
| L | Lyme Rapid Test |
| FF | FeLV\_Fiv Rapid Test |
| c | cPL Rapid Test |
| FLE | Flex4 Rapid Test |
| H | Heartworm Rapid Test |
| Fecalanalysis | FOVA | Fecal Ova/Oocysts |
| FGIA | Fecal Giardia |
| Urinalysis | SA | Urine Sediment |
| SA10 | Urine Sediment and UA10 |
| SA14 | Urine Sediment and UA14 |
| UA10 | UA10 |
| UA14 | UA14 |

## Test Labels

A QR code (abbreviated from Quick Response code) is a type of matrix barcode (or two-dimensional barcode[1]) invented in 1994 by the Japanese automotive company Denso Wave.[2] A barcode is a machine-readable optical label that contains information about the item to which it is attached. In practice, QR codes often contain data for a locator, identifier, or tracker that points to a website or application. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to store data efficiently; extensions may also be used.

The test labels will be printed on paper with matte and glossy finishes.

The test labels will be scanned on boxes that are 2 inches (50.8 mm) and 3 inches (76.2 mm) tall.

The test Label Sizes that will be used will be 10 mm x 10 mm and 50 x 50 mm.

The test Labels will contain a range of test character strings.

### Test Label Generation

The web site <https://www.the-qrcode-generator.com/> was used to generate the images for the different label data densities.

On the web page, “No margin” and 300px were selected.

Test text of known length was entered in the text field of the web page.

The images were saved to disk.

The disk images were then copied and pasted into tables in a WinWord document.

The images in the table were labeled with the image size and number of characters in the QR label.

The images were then resized to the desired size on the page.

The document was printed in black and white at high resolution on stock white paper.

The table of images were then cut apart.

# Test #1:

The purpose of this test is to determine what is the maximum amount of data that can be read with the camera at given distances, label sizes, and label densities.

## Test Setup

The web camera and QR labels will be tested using a web site that can activate the camera and record the QR label’s code. The web page will display the camera image and display the QR code.

The QR labels will be placed on the top of ether the 2 or 3-inch-tall box.

The box will be placed on the base of the Vetscan.

The display of the Vetscan will need to be tilted until it aligns to the label. TODO – how will the operator determine the correct alignment?

The web site will use the Vetscan’s camera to capture an image of the QR label and attempt to decode the embedded data in the QR label.

If the QR label is decoded, the data will be displayed on the web page. Each test case shall be recorded in the tables below. If the QR label is decoded, then the test case shall be marked as “Pass”, else it shall be marked as “Fail”.

See screen capture of web page below.



## Test Instructions

### Test setup instructions

1. Turn on the Vetscan’s unit that is under test.
2. Open the web site: <https://4qrcode.com/scan-qr-code.php>.
3. On the web page, click on the button labelled “Open camera”.
4. You should see an image from the unit’s camera displayed on the web page.

### Test case instructions

For each test case, select the proper box and QR label.

1. Place the test box under the Vetscan’s camera.
2. Place the QR label on the top of the box.
3. Using the web page’s camera image, center the QR tag’s image in the center of the image.
4. If the QR label can be decoded, the web page will display the QR label’s data on web page.
5. Once the image is centered, wait at most 30 seconds for the web site to decode the QR label.
6. If the QR label was decoded within 30 seconds, then the test case passed, else the test case failed.
7. Record the pass/fail status of each test case.

## Test Results at 2 inches

Record the results of testing labels at 2 inches (50.8 mm).

|  |  |  |  |
| --- | --- | --- | --- |
| **Label Size** | **Modules** | **Total Characters** | **Results (Pass/Fail)** |
| 10 mm x 10 mm | 21 x 21 | 100 |  |
| 10 mm x 10 mm | 21 x 21 | 200 |  |
| 10 mm x 10 mm | 21 x 21 | 400 |  |
| 10 mm x 10 mm | 21 x 21 | 600 |  |
| 10 mm x 10 mm | 21 x 21 | 800 |  |
| 10 mm x 10 mm | 21 x 21 | 1,035 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Label Size** | **Modules** | **Total Characters** | **Results (Pass/Fail)** |
| 10 mm x 10 mm | 177 x 177 | 100 |  |
| 10 mm x 10 mm | 177 x 177 | 200 |  |
| 10 mm x 10 mm | 177 x 177 | 400 |  |
| 10 mm x 10 mm | 177 x 177 | 800 |  |
| 10 mm x 10 mm | 177 x 177 | 1,600 |  |
| 10 mm x 10 mm | 177 x 177 | 2,000 |  |
| 10 mm x 10 mm | 177 x 177 | 2,500 |  |
| 10 mm x 10 mm | 177 x 177 | 3,391 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Label Size** | **Modules** | **Total Characters** | **Results (Pass/Fail)** |
| 50 mm x 50 mm | 21 x 21 | 100 |  |
| 50 mm x 50 mm | 21 x 21 | 200 |  |
| 50 mm x 50 mm | 21 x 21 | 400 |  |
| 50 mm x 50 mm | 21 x 21 | 600 |  |
| 50 mm x 50 mm | 21 x 21 | 800 |  |
| 50 mm x 50 mm | 21 x 21 | 1,035 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Label Size** | **Modules** | **Total Characters** | **Results (Pass/Fail)** |
| 50 mm x 50 mm | 177 x 177 | 100 |  |
| 50 mm x 50 mm | 177 x 177 | 200 |  |
| 50 mm x 50 mm | 177 x 177 | 400 |  |
| 50 mm x 50 mm | 177 x 177 | 800 |  |
| 50 mm x 50 mm | 177 x 177 | 1,600 |  |
| 50 mm x 50 mm | 177 x 177 | 2,000 |  |
| 50 mm x 50 mm | 177 x 177 | 2,500 |  |
| 50 mm x 50 mm | 177 x 177 | 3,391 |  |

## Test Results at 3 inches

Record the results of testing labels at 3 inches (76.2 mm).

|  |  |  |  |
| --- | --- | --- | --- |
| **Label Size** | **Modules** | **Total Characters** | **Results (Pass/Fail)** |
| 10 mm x 10 mm | 21 x 21 | 100 |  |
| 10 mm x 10 mm | 21 x 21 | 200 |  |
| 10 mm x 10 mm | 21 x 21 | 400 |  |
| 10 mm x 10 mm | 21 x 21 | 600 |  |
| 10 mm x 10 mm | 21 x 21 | 800 |  |
| 10 mm x 10 mm | 21 x 21 | 1,035 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Label Size** | **Modules** | **Total Characters** | **Results (Pass/Fail)** |
| 10 mm x 10 mm | 177 x 177 | 100 |  |
| 10 mm x 10 mm | 177 x 177 | 200 |  |
| 10 mm x 10 mm | 177 x 177 | 400 |  |
| 10 mm x 10 mm | 177 x 177 | 800 |  |
| 10 mm x 10 mm | 177 x 177 | 1,600 |  |
| 10 mm x 10 mm | 177 x 177 | 2,000 |  |
| 10 mm x 10 mm | 177 x 177 | 2,500 |  |
| 10 mm x 10 mm | 177 x 177 | 3,391 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Label Size** | **Modules** | **Total Characters** | **Results (Pass/Fail)** |
| 50 mm x 50 mm | 21 x 21 | 100 |  |
| 50 mm x 50 mm | 21 x 21 | 200 |  |
| 50 mm x 50 mm | 21 x 21 | 400 |  |
| 50 mm x 50 mm | 21 x 21 | 600 |  |
| 50 mm x 50 mm | 21 x 21 | 800 |  |
| 50 mm x 50 mm | 21 x 21 | 1,035 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Label Size** | **Modules** | **Total Characters** | **Results (Pass/Fail)** |
| 50 mm x 50 mm | 177 x 177 | 100 |  |
| 50 mm x 50 mm | 177 x 177 | 200 |  |
| 50 mm x 50 mm | 177 x 177 | 400 |  |
| 50 mm x 50 mm | 177 x 177 | 800 |  |
| 50 mm x 50 mm | 177 x 177 | 1,600 |  |
| 50 mm x 50 mm | 177 x 177 | 2,000 |  |
| 50 mm x 50 mm | 177 x 177 | 2,500 |  |
| 50 mm x 50 mm | 177 x 177 | 3,391 |  |

## Revision History

Record the results of testing labels at 3 inches (76.2 mm).

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Date** | **Author** | **Comments** |
| A beta | 15 JUL 2021 | Bruce Graham | Initial work. The use of the 10 mm x 10 mm QR labels is to be resolved with initial testing. |
|  |  |  |  |