How to Read the ISO/IEC 15415 Verification Report

The Quadrus® Verifier produces detailed verification reports based on ISO/IEC 15415 requirements for Data Matrix symbols.

Reports can be saved in several different formats: PDF, HTML, RTF, and CSV. The example at right shows a report in HTML format.

This guide explains how to interpret the specific information listed in the ISO/IEC 15415 Verification Report.

Graded Parameters

Reference Decode is the Verifier's default image processing mode. A symbol cannot be evaluated without a successful application of the Reference Decode Algorithm. A "PASS" result for Reference Decode is equivalent to a grade of 4 (A).

Symbol Contrast is the maximum difference in reflectance between the light and dark regions of the symbol, including the 1x quiet zone.

The closer the light and dark regions are in value, the more difficult it is for a reader to locate the candidate symbol on the substrate.

A Symbol Contrast value of 71% receives a grade of 4 (A).

Parameters:	Results	Grade
Reference Decode	PASS	4 (A)
Symbol Contrast	71%	4 (A)
Fixed Pattern Damage	----	4 (A)
Axial Non-Uniformity	0.06	4 (A)
Grid Non-Uniformity	0.06	4 (A)
Modulation	----	4 (A)
Unused ECC	84%	4 (A)
	Final Grade:	4 (A)

Axial Non-Uniformity is the amount of deviation along the symbol's major axes.

A result of 0.09 indicates that the marking process is resulting in the X- or Y-dimensions of individual modules being greater than their counterparts. This inconsistency of X- and Y- dimensions typically indicates movement of the object as it is being marked.

Fixed Pattern Damage tests for missing elements or distortions in the symbol's quiet zone, finder pattern, and clock pattern.

Fixed patterns are used for locating, orienting, and mapping the symbol. Damage to these patterns can severely inhibit readability.

Grid Non-Uniformity refers to the cell deviation from the theoretical or "ideal" grid intersections to those that are determined by the reference decode algorithm.

Imagine an ideal grid overlaying the candidate symbol. Grid Non-Uniformity measures the maximum vector deviation from that ideal grid to the one mapped using the reference decode algorithm.

Modulation measures the ability to discriminate between light and dark elements.

Inconsistencies in the dark values of symbol elements can result in a reader's inability to properly determine whether a light element is light or a dark element is dark.

Unused Error Correction Capacity indicates the amount of error correcting capability remaining after applying the error correcting algorithms to reconstruct a damaged or poorly modulated symbol. 100% Unused Error Correction Capacity is ideal and would indicate that there is no damage to the symbol.

Important: Notice that the Fixed Pattern Damage and Modulation parameters on the report do not show numerical results. The resulting Modulation and Fixed Pattern Damage grades for a Data Matrix symbol do not have a corresponding decimal value. For Modulation, individual elements within the symbol have a decimal value, but the symbol's overall Modulation grade is formed by taking these individual values and grading them based on their effects on the error correcting data stream. Fixed Pattern Damage is also constructed in a similar fashion, where each segment of the fixed pattern is evaluated individually and the resulting grade is a formulation of the components. Please refer to the ISO/IEC 15415 specification for further details about grading these two parameters.

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Symbol Data and Non-Graded Parameters

Print Growth refers to a percentage of variation from the nominal dimension of the symbol where positive represents print growth and negative represents print loss. The measurements are taken from both the vertical and horizontal clock patterns. They are evaluated separately and averaged together to form a single result.
-0.10 represents a **10% Underprint.**

Symbol Data: 123

The Verifier decodes the symbol during verification. The decoded symbol data is shown here, located below the graded parameters.

Non-Graded Parameters:

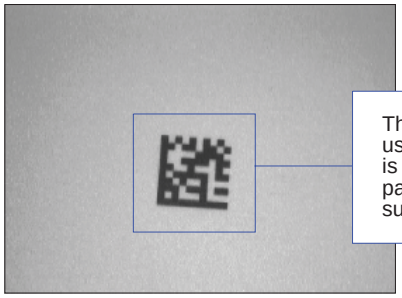
Print Growth	-0.10
Symbol Type	ECC200
Symbol Size	16x16
Pixels/Element	6.1

Symbol Type states the Reed-Solomon error correction level of the Data Matrix symbol being verified.

Symbol Size is measured in elements. 16 x 16 expresses a Symbol Size of 16 elements by 16 elements.

For consistent and reliable verification, a symbol must have a minimum of 10 **Pixels Per Element** (PPE). Pixels Per Element refers to the number of pixels in the **width** of each individual symbol element. The Verifier appends a Pixels Per Element value to ISO/IEC 15415 verification reports.
The result of **6.1** shown here is well below the ideal of **10** PPE.

Symbol Image



The image capture that is used in verifying the symbol is shown below the graded parameters and above the supplementary information.

Supplementary Information

The first items of supplementary information beneath the image capture are **Aperture**, **Wavelength**, and **Angle**. **Aperture** states the size of the synthetic aperture used in the verification process. **Wavelength** states the illumination LED output in nanometers. **Angle** states the angle of the illumination LEDs in the Verifier's lighting chamber.

Firmware Version identifies the version of firmware used by the Verifier at the time verification was performed.

```
Aperture: 0.000"    Wavelength: 660 nm    Angle: 45 degrees
Firmware Version 35-676201-E2
Verifier Serial Number
This report was created on Wednesday, February 01, 2006 at 14:57:02
          Software Version 3.2.1.0
Company: XYZ Corp.
Operator: J. Doe
```

Software Version states the version of ESP that was used to create the report.

The **date** and **time** of report creation are stated here.

The **Serial Number** of the Verifier hardware used for verification is stated here.

If they are entered in **Preferences** before verification, the names of the company performing verification and the individual operator will be shown here.