How to Read the Quadrus® Verifier's Certificate of Calibration

The Quadrus Verifier is a device that requires a rigorous calibration process to function reliably in an industrial environment. The Certificate of Calibration provides detailed evidence of the testing and calibration process by listing all instrument accuracy tests that have been performed on the Verifier, along with the results of those tests. All test results are provided in a table that also includes standard tolerances for each parameter.

This guide explains the details of the Certificate, including test environment information and instrument accuracy test parameters. The guide is presented in three major sections, concerning the information at the top of the Certificate, information in the middle, and information at the bottom.


MICROSCAN

CERTIFICATE OF

CALIBRATION

Microscan Systems Inc. hereby certifies that this instrument meets all requirements called out in ISO/IEC 15426-2 Bar Code Verifier Conformance Specifications

Model Information and Testing Conditions

The physical environment in which the Quadrus Verifier is tested and calibrated is extremely important, because even slight variations in factors such as the angle of LED illumination in the Verifier's lighting chamber, the air temperature, or the amount of ambient light near the Verifier, can affect testing and calibration results. The tables directly below the model information show all relevant environmental conditions at the time of testing and calibration.

Model: Identifies the name of the product.

Part Number: Identifies the Microscan part number that corresponds with the specific attributes of the Verifier.

Date Calibrated: Specifies the date on which all tests listed in the **Instrument Accuracy Table** (see reverse) were performed.

Serial Number: Identifies the unique product number for tracking and maintenance purposes.

Condition: States the product's condition at the time of shipping.

Next Cal. Date: Specifies the due date for Verifier calibration (the Verifier must be calibrated once a year to maintain conformance to ISO/IEC 15426-2 requirements.)

Model:	Quadrus Verifier
Part Number:	FIS-xxxx-xxxx
Date Calibrated:	25-Jan-06

Serial Number:	0000000
Condition:	New
Next Cal. Date:	25-Jan-07

Test Symbols & Light Configuration

Reference Test Symbols	11-000125
Symbology Tested	Data Matrix ECC 200
Illumination	660nM
Angle of Illumination	45°

Test Environment

Power Supply	97-100004-15
Temperature	72 ±5 Degrees F
Relative Humidity	45% ±10
Ambient Light Conditions	500-900 Lux, 60Hz, Fluorescent Overhead Lighting

Symbology Tested: Identifies that the Verifier has been tested using Data Matrix symbols with the Reed-Solomon Error Correction type ECC 200.

Reference Test Symbols: Shows the Microscan part number for the symbols used for testing.

Temperature: States the fahrenheit temperature of the testing environment at the time of calibration.

Relative Humidity: Expresses the relative humidity of the testing environment at the time of calibration.

Angle of Illumination: States that the LEDs in the Verifier's lighting chamber were angled at 45 degrees at the time of testing.

Illumination: Shows the wavelength of light emitted by the LEDs in the Verifier's lighting chamber.

Ambient Light Conditions: Explains the characteristics of the lighting in the testing environment at the time that testing and calibration were performed.

Power Supply: Shows the Microscan part number for the Verifier's power supply, used at the time of testing.

contact: info@microscan.com
ph: 425 226 5700 | 1 800 251 7711

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Instrument Accuracy Results

The Instrument Accuracy Table is located at the center of the Certificate. It is important for the user to understand that the Verifier must pass a separate test *for each test parameter.* In other words, there is a separate test for Modulation, Symbol Contrast, Unused Error Correction, Axial Non-Uniformity, Grid Non-Uniformity, and Fixed Pattern Damage. The individual test results are reflected in the Overall Results.

Test Parameters: Each parameter is tested separately and the results are combined to form the Overall Results.

Test Standard: The Verifier is tested against pre-determined test standard values for each primary reference symbol.

Allowed Tolerance: The allowable deviation of the Verifier's results from the values of the primary reference symbols (test standards).

Quadrus Verifier Results: The actual test results, as compared to the test standards.

Actual Deviation: The difference between test standards and test results.

Instrument Accuracy Table

Test Parameters	Test Standard	Quadrus Verifier Results	Allowed Tolerance	Actual Deviation	Results *
Overall Grade	Grade 4.0	Grade 4.0	±0.0	0.0	Pass
Modulation	21.55%	21%	±8%	-0.55%	Pass
Black Reflectance	6%	6%	±3% reflectance	0.00%	Pass
White Reflectance	82.9%	84%	±5% reflectance	1.10%	Pass
Symbol Contrast	29.6% (Grade 1)	32%	±5% reflectance	2.40%	Pass
UEC	43	43	±0.0	0	Pass
Axial Non-uniformity	0.10	0.11	**	0.01	Pass
Grid Non-uniformity	0.68	0.70	±0.06	0.02	Pass
Fixed Pattern Damage	Grade 1	Grade 1	**	0	Pass
Overall Results					PASS

* To pass, each tested parameter requires that all other parameters report the calibrated grade of 4.
** Tolerance within calibrated boundaries of grade 1.

For each independent test, the Verifier must measure and output a value with the allowable tolerance for that parameter. All other parameters will then need to pass at **Grade 4** values. For example, the **Symbol Contrast** test should report a value that falls within a **Grade 1** score, while all other tested parameters report a **Grade 4**.

Results: Shows the final result of each instrument accuracy test. Pass or Fail.

Signature and Test Accuracy Ratio Information

Near the bottom of the Certificate is the signature and printed name of the technician who performed the testing and calibration process. Directly beneath the signature line is a brief explanation of the specific standards to which the Verifier is calibrated.

Signature and printed name of test technician.

Certified By _____ _____
(Sign/Date) (Print)

The instrument listed on this certification has been calibrated against standards traceable to the National Institute of Standards and Technology (NIST).

The calibration test accuracy ratio (TAR) of 10:1 was maintained, unless otherwise stated. A TAR of 10:1 defines that the test instrument(s) and standard(s) are ten times the accuracy of the calibrated instrument(s).

All results contained within this certification relate only to the item calibrated. 04-000356-01 Rev A

Microscan Corporate | 1201 SW 7th Street | Renton, Washington 98055 | Tel: 425.226.5700 | Fax: 425.226.8250
Microscan Europe | Lemelerberg 17 | NL-2402 ZN Alphen aan den Rijn | The Netherlands | Tel: 31.172.423360 | Fax: 31.172.423366
Microscan Asia Pacific R.O. | 31 Kaki Bukit Road 3 #06-02 | TechLink, Singapore 417818 | Tel: 65.846.1214 | Fax: 65.846.4641

The section beneath the test technician's signature explains the standards to which the Verifier is calibrated. The calibration test accuracy ratio of 10:1 is a standard ratio used for verifier calibration.

Microscan contact information.