

Layout of Calibration Certificates And Measurement Reports

Application Note

Overview

When Agilent Technologies performs calibration service, we always provide a calibration certificate along with a report containing all measurement results. We measure the actual performance of your instrument for all warranted specifications, for all installed options. The measurement report is your physical proof of measurements/work performed, and is generally available online for up to 7 years to support audits or for any reason you wish to review previous calibration results.

Changes to Calibration Certificates

Beginning March 2014 you will notice changes on calibration certificates corresponding to:

- A new “Action Taken” field on calibration certificates
- An improved calibration certificates layout
- New pass/fail statements of conformance

Note: Agilent uses a number of systems and program environments for generating calibration certificates and measurement reports. It will take 12 to 18 months before all reports are produced in the new format described here.

New “Action Taken” Field on Calibration Certificates

To provide clarity regarding actions performed during a calibration, a new field, “Action Taken”, has been added to calibration certificates. The most common entries for this new field are:

- Cal factors were updated (i.e. for a power sensor)
- The equipment was adjusted
- The equipment firmware was updated (with customer approval)
- Service note recommendations performed

As Received Conditions

One or more measured values of the equipment were observed OUT OF SPECIFICATION at the points tested.

Action Taken

- The equipment was adjusted.

As Completed Conditions

The measured values of the equipment were observed IN SPECIFICATION at the points tested.

Figure 1. Example of new “Action Taken” field



Improved Calibration Certificates Layout

The presentation of information on Calibration Certificates has been rearranged for improved readability and clarity. An example follows.



Figure 2. Example of Improved Cal Certificate layout

“Agilent Cal + Uncertainties” Service

New Pass/Fail statements of conformance

Agilent Technologies offers several calibration services with measurement uncertainties reported. Measurement Uncertainty is simply the official metrology term that most engineers understand as “accuracy”, but is in conformance with ISO/IEC Guide 98-3:2008 ¹. The major requirements standard for calibration laboratories, ISO/IEC 17025:2005 ², only provides ambiguous guidance how to assess Pass or Fail conformance to a specification. Par. 5.10.4.2 simply states “When statements of compliance are made, the uncertainty of measurement shall be taken into account.” ILAC-G8:03/2009 ³ provides additional guidance. After a thorough review of key international calibration standards and consultations with multiple Accreditation Bodies, Agilent Technologies has adopted the conformance definitions in Figure 2.

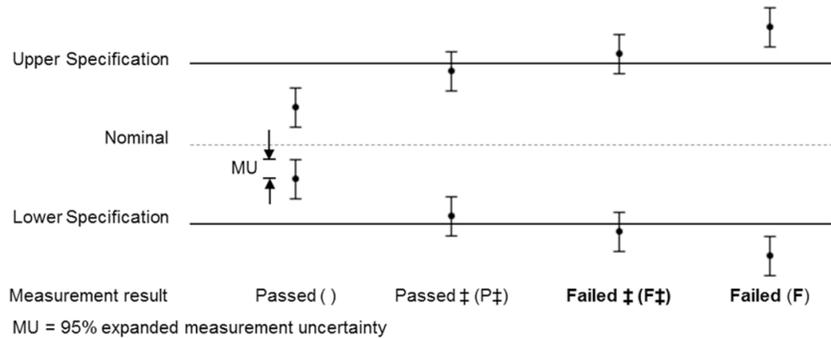


Figure 2. Conformance Reporting for “Agilent Calibration + Uncertainties” Service

1. ISO/IEC Guide 98-3:2008, Guide for Expression of Uncertainty of Measurements
2. ISO/IEC 17025: 2005, General Requirements for the Competence of Testing and Calibration Laboratories
3. ILAC-G8:03/2009, Guidelines on the Reporting of Compliance with Specification
 [https://www.ilac.org/documents/ILAC_G8_03_2009.pdf]

Measurement results are reported as:

Passed	The measured values of the equipment were observed in specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values were in specification.
Passed ‡ (P‡)	The measured values of the equipment were observed in specification at the points tested. However, a portion of the expanded measurement uncertainty intervals about one or more measured values exceeded specification. Consequently, compliance with specification cannot be declared based on the stated coverage probability.
Failed ‡ (F‡)	One or more measured values of the equipment were observed out of specification at the points tested. However, a portion of the expanded measurement uncertainty intervals about one or more measured values were in specification. Consequently, non-compliance with specification cannot be declared based on the stated coverage probability.
Failed (F)	One or more measured values of the equipment were observed out of specification at the points tested. Additionally, the expanded measurement uncertainty intervals about one or more measured values were entirely outside the specification.

How to interpret the new conformance statements:

Passed	A clean “Pass”.
Passed ‡	As measured the instrument complies with the specification. However, if you are counting on this specification as part of a production accuracy analysis, you may want to investigate further as your yield may be eroding.
Failed ‡	As received the instrument was observed out-of-specification. Adjustments were performed. Although not as urgent as the “Failed” condition, you should probably perform an impact analysis to determine if this failure resulted in end product being shipped that could be out-of-specification.
Failed	As received, the instrument was observed out-of-specification by an amount larger than 2 standard deviations of measurement uncertainty. Although the instrument was adjusted, you should perform an immediate impact analysis to determine if this failure resulted in end product being shipped that could be out-of-specification.

Adjustment Limits for “Agilent Cal + Uncertainties”

Note:

For “Agilent cal + Uncertainties” service, the instrument is adjusted whenever the measured result is observed out-of-specification. The instrument is not adjusted for the As Received condition “Passed ‡”. If you need a tighter acceptance limit for triggering adjustments, please order the “Agilent Cal + Uncertainties + Guardbanding” service.

“Agilent Cal + Uncertainties + Guardbanding” Service

The new certificate layout and “Action Taken” field are the same on this service. While there are no changes to conformance reporting to “Agilent Cal + Uncertainties + Guardbanding”, sometimes there are comparison questions regarding “Agilent Cal + Uncertainties”. Please find below the conformance reporting summary for “Agilent Cal + Uncertainties + Guardbanding”.

Acceptance limit

The “Agilent Cal + Uncertainties + Guardbanding” service employs a guardband in the amount of the 95% expanded measurement uncertainty (MU). The resulting acceptance limit applied for Pass or Fail decisions, and for performing adjustments, is the difference of the specification and the guardband.

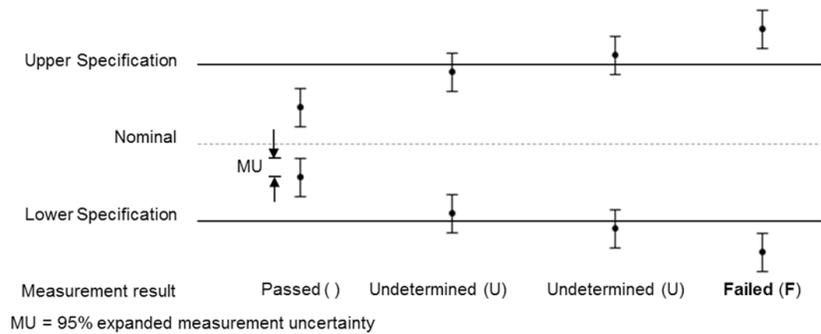


Figure 3. Conformance Reporting for “Agilent Calibration + Uncertainties + Guardbanding” Service

Measurement results are reported as:

Passed ()	The measured values of the equipment were observed in specification at the points tested. Additionally, the expanded measurement uncertainty intervals about the measured values were in specification.
Undetermined (U)	The expanded measurement uncertainty intervals about one or more measured values were in as well as out of specification. Consequently, neither compliance nor non-compliance with specification can be declared based on the stated coverage probability.
Failed (F)	One or more measured values of the equipment were observed out of specification at the points tested. Additionally, the expanded measurement uncertainty intervals about one or more measured values were entirely outside the specification.



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