Newtons4th Ltd
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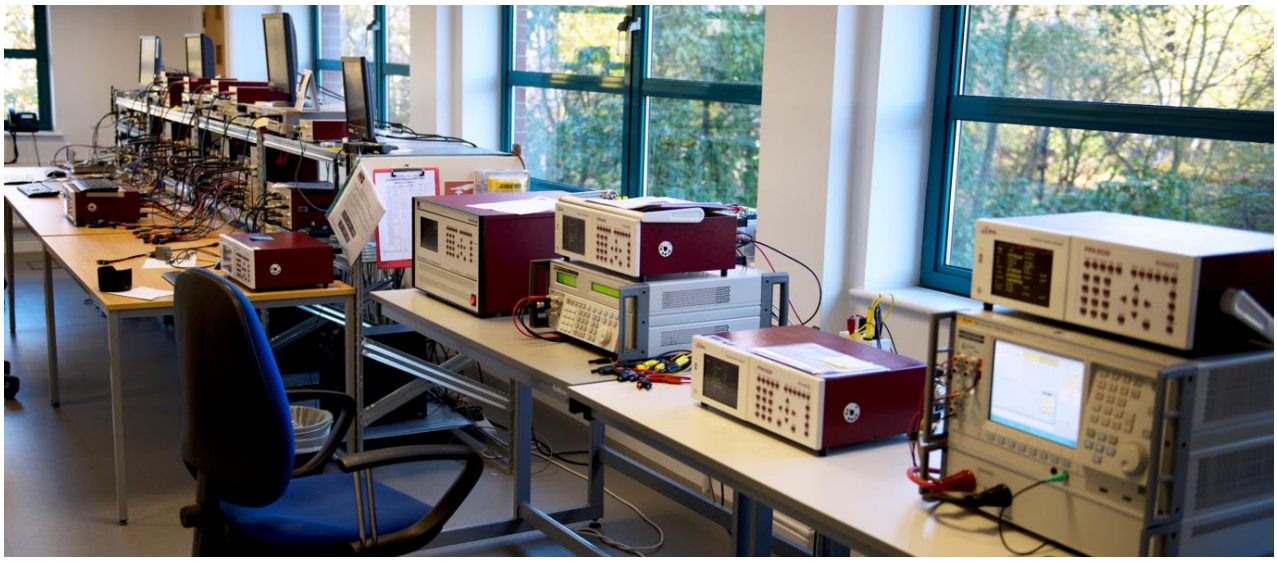
Power Measurement Calibration

What makes Newtons4th different?



Principles of calibration

The definition of calibration is a documented comparison of a measurement device relative to a traceable reference or standard.

Logically the reference is more accurate than the device to be calibrated.

Traceability requires the reference standard to have been calibrated using an even higher-level standard. The traceability should be an unbroken chain of calibrations, so that the highest-level calibration has been done in a national calibration centre, or equivalent. With accreditation, the laboratory needs to prove the traceability of their measurements to a national or international standard and to follow defined processes and procedures required of an accredited facility.

When you calibrate an instrument, you may find that there is some difference between the instrument being calibrated and the reference greater than the defined uncertainty. It would be logical to want to adjust the instrument being calibrated to correct this difference. The formal definition does not include adjustments, however at N4L we expand on this strict definition, therefore when an instrument is calibrated, we also apply adjustments to optimise the instrument to its “as new” specification rather than just certifying that it is still within our published specifications as would be the norm at most other calibration laboratories.

Two certificates?

In our ISO17025 accredited calibration laboratory, we offer both an ISO17025 traceable wideband calibration and UKAS (ISO17025) accredited calibration.

Each new PPA is supplied with both as standard, however when it is time to return your PPA to us, you have a choice between Standard Wideband Calibration only, or Standard plus UKAS (ISO17025).

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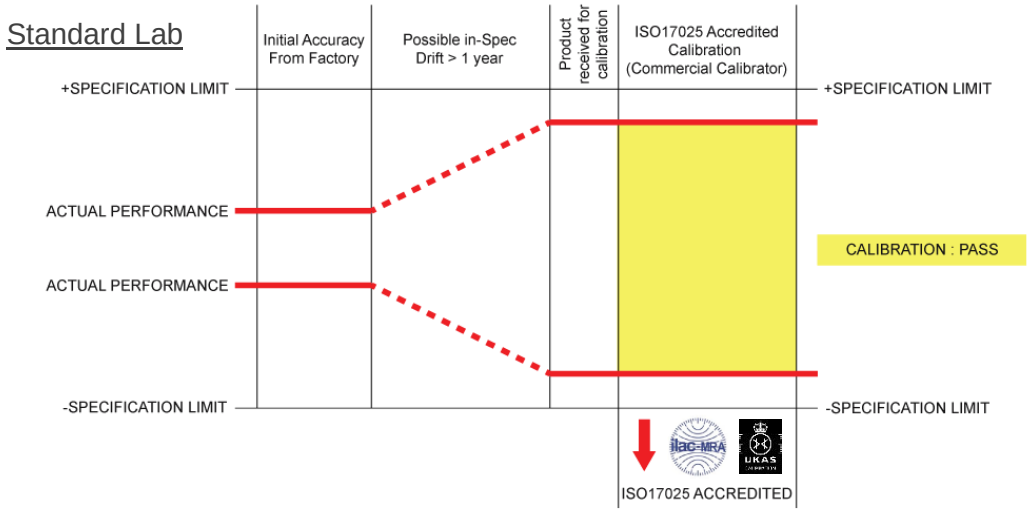
So, what is the difference?

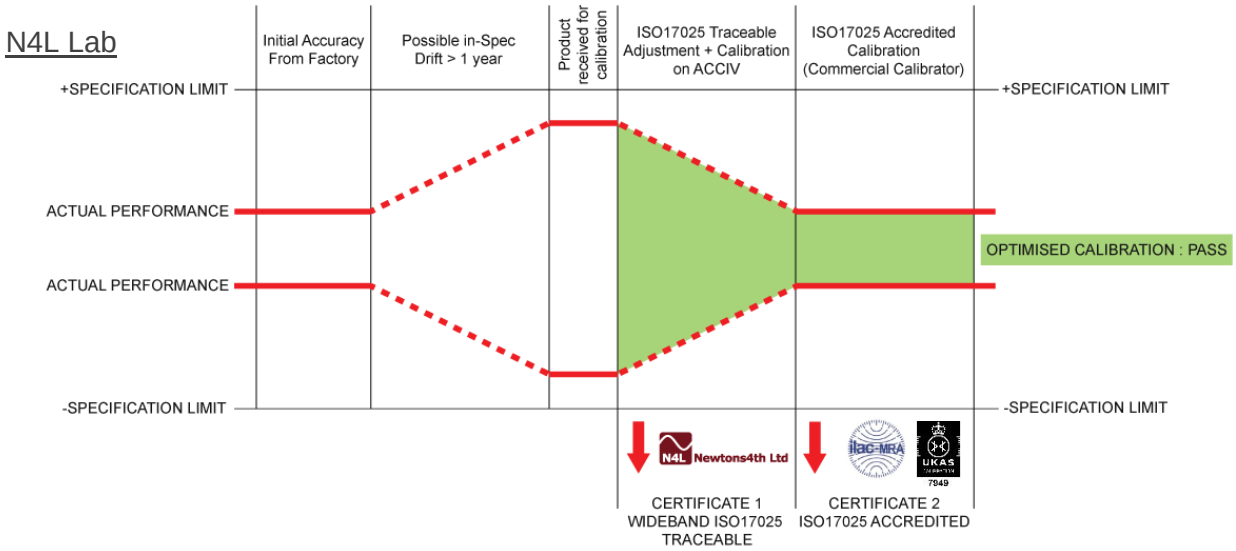
With the Standard wideband calibration offered by N4L, we calibrate the PPA series of power analyzers with a proprietary high frequency multi-channel signal generator and measurement switching system named the ACC-IV (Automatic Calibration Controller 4). The ACC-IV is used in conjunction with an ISO17025 traceable reference voltmeter and an N4L developed ISO17025 traceable reference load.
The ACC-IV, combined with custom designed amplifiers, provides low through to high frequency voltage and current sources at higher signal levels than commercially available calibrators.

The ACC-IV generator specification: -

+/-250uVpk to +/-400Vpk dc to 100kHz, linearly reducing to +/-10Vpk 100kHz to 2MHz (dc to 2MHz)
+/-1mApk to +/-5Apk dc to 100kHz linearly reducing to +/-300mApk to 100kHz to 2MHz (dc to 2MHz)

This exceptional range provides N4L with the means to calibrate our power analyzers over a wider frequency range than any other company. The ACC-IV has NIST/UKAS traceability. As an integral part of this calibration, optimisation is performed to best align instruments to their “as new” specification.





Certificate 1 gives optimized wideband calibration traceable to ISO17025. If selected, Certificate 2 has dual purpose:

First, it validates the integrity of the ACCIV system. [Not required for traceability but good practice]

Second, it provides accredited ISO17025 certification for customers with this documentary requirement.

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Period of validity

A common request associated with calibration certificates is for a defined period of validity and it is often surprising for the recipient of a calibration certificate to learn, that such a period is not and should never be claimed or stated on an accredited calibration.

The reason for this is that any accredited calibration certificate provides traceable evidence of measurement accuracy at one moment in time. It cannot account for the many uncertainties of a products use or ageing characteristics after calibration, since these are a function of product design and environment.

It is for this reason that ISO/IEC 17025:2017 section 7.8.4.3 states " A calibration certificate (or calibration label) **shall not contain any recommendation on the calibration interval** except where this has been agreed with the customer."

A period over which operation within a defined specification can be expected may be recommended by a manufacturer based upon proven performance over time and any user can directly justify calibration periods by virtue of pre-adjustment calibration evidence over time within ISO procedures.

While N4L follow common convention within the field of instrumentation by recommending annual calibration, we can confirm that under normal use, our instruments typically remain within specification for up to three years. It is on this basis that we can safely justify annual calibration before a customer may use pre-adjustment validation to justify longer periods between calibration.