

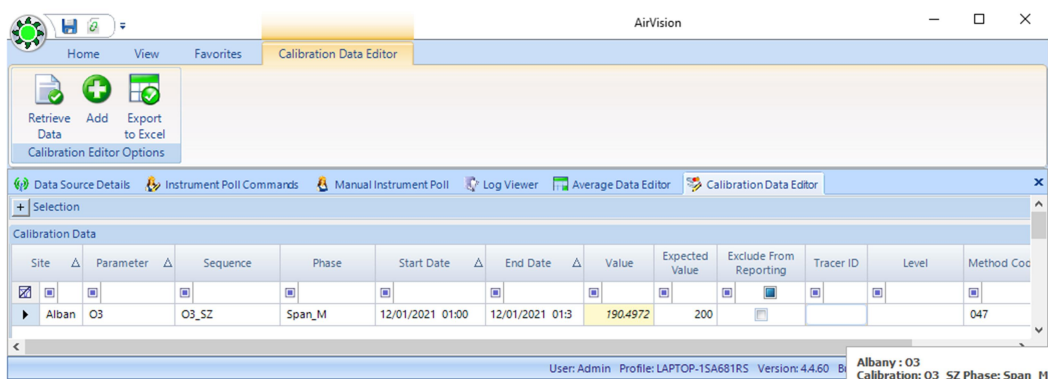
Application Note: Calibration Error Calculation in AirVision Calibration Results Report

The determination of % error (sometimes called % difference in EPA documents, although there is a somewhat pedantic difference) is generally familiar to all as:

$$\% \text{ Error} = \left| \frac{T - E}{T} \right| \cdot 100$$

Where T = the "test"/expected/reference value and E = the analyzer response

However, some questions come into play when displaying values in calibration reports, and when users try to compare hand calculations from the report value and can come up with a slightly different % error calculation. The reason for this can be traced to the fact that AirVision stores a full precision value in the calibration results database, both for the analyzer response and the expected value. Example:

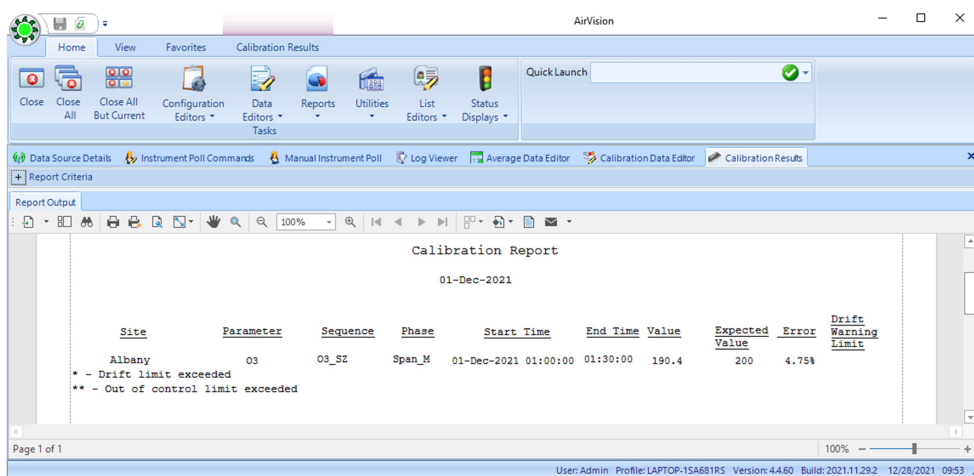


Site	Parameter	Sequence	Phase	Start Date	End Date	Value	Expected Value	Exclude From Reporting	Tracer ID	Level	Method Cod
Alban	O3	O3_SZ	Span_M	12/01/2021 01:00	12/01/2021 01:3	190.4972	200				047

If we use the pure floating point value, the % error is -4.75%, but if we apply EPA truncation to the values (using a value of '190' for the analyzer response), the value is -5.0%.

Which approach is correct? At this point, it seems to be an agency preference as it's not defined in the CFR, and probably embedded in varying SOPs. So, it is a configurable setting in AirVision.

The AirVision default for most systems is to use the full precision value, but to report values based on the rounding and truncation rules in the parameter (in this case, 1 digit):

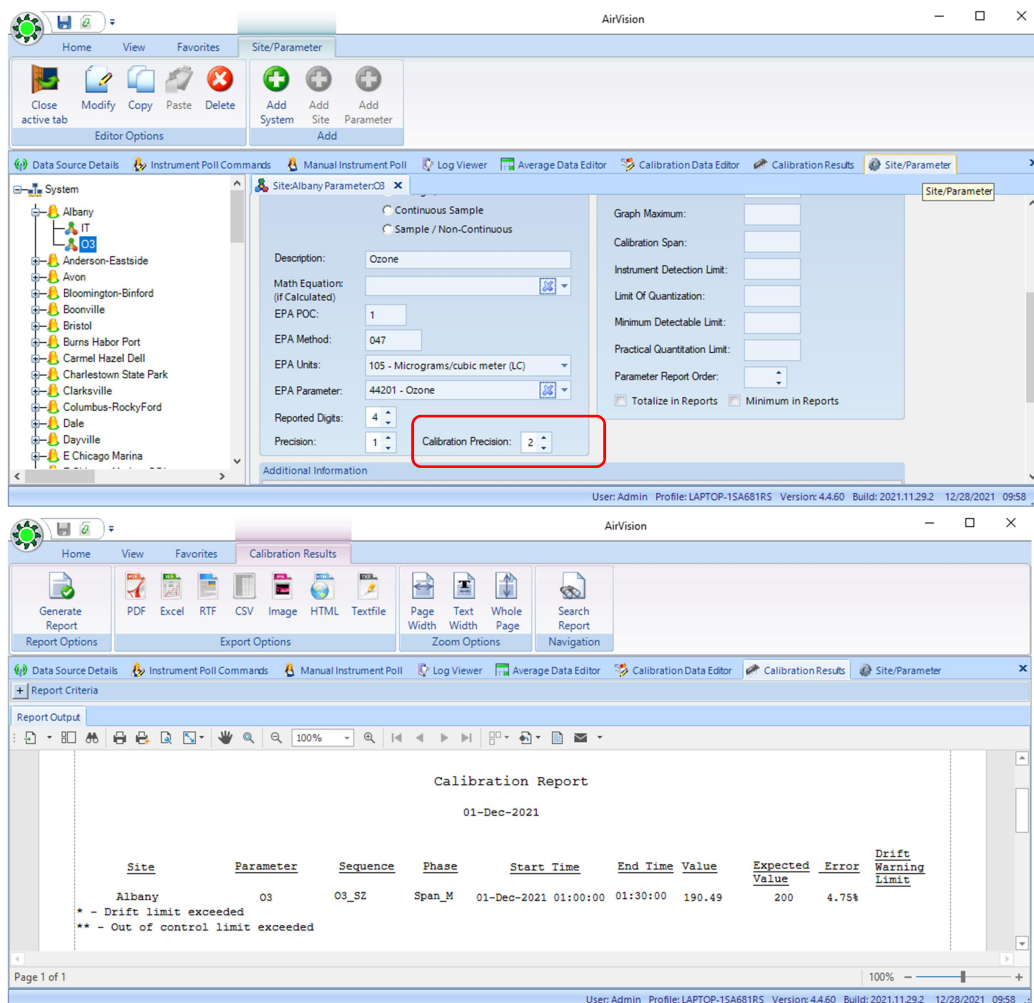


Site	Parameter	Sequence	Phase	Start Time	End Time	Value	Expected Value	Error	Drift Warning Limit
Albany	O3	O3_SZ	Span_M	01-Dec-2021 01:00:00	01:30:00	190.4	200	4.75%	

* - Drift limit exceeded
** - Out of control limit exceeded

A hand calculation here would still show 4.6%, and cause some consternation. The user has a few options:

1. Understand and agree with the “full precision” method and know that a hand calculation purely from the Calibration Results report won’t agree (and to use the Calibration Data Editor to see or export full precision for auditing).
2. Increase the “Cal Precision” setting in the parameter editor to get closer (e.g., an alternate report precision just for cal reports):



3. Finally, an internal database preference settings can be toggled to just use the rounded / truncated value:
UPDATE UtilitySetting set SettingValue = TRUE where SettingKey = 'EDASCalErrorMethod'
UPDATE UtilitySetting set SettingValue = TRUE where SettingKey = 'UsePrecForCalExpectedFormat'

As you can see from the name, the preference setting will match the calculation method from the old E-DAS Ambient application, if that is the agency preference / SOP.