### Evaluation Summary

- Overall, the three Aeroqual AQY sensors (Units 130, 131 and 132) showed low to moderate accuracy in the laboratory studies. They overestimated the FEM GRIMM PM$_{2.5}$ measurements for a concentration range between 0 to 400 µg/m$^3$.
- The three Aeroqual AQY sensors exhibited high precision for all T/RH combinations tested in the environmental chamber.
- The Aeroqual AQY sensors (units IDs: 130 and 132) showed low intra-model variability in the field deployment as well as in the laboratory testing (Units 130, 131 and 132).
- The Aeroqual AQY sensors had good data recovery (≥99% for 5-min average in the field, and 100% for 1-min average in the laboratory).
- For PM$_{2.5}$, the Aeroqual AQY sensors (Units 130 and 132) showed strong correlations with the reference instrument from the field ($R^2 > 0.84$) and very strong correlations with the reference instrument in the laboratory studies ($R^2 > 0.99$; Units 130, 131 and 132).

### Field Evaluation Highlights

- Deployment period 12/22/2017-03/27/2018: the Aeroqual AQY sensors (units IDs: 130 and 132) showed good correlations with PM$_{2.5}$ concentration change as monitored by FEM GRIMM and FEM BAM.
- The units showed >99% data recovery as well as low intra-model variability.

---

**Coefficient of Determination ($R^2$)** quantifies how the two sensors (Units 130 and 132) followed the PM$_{2.5}$ concentration change by FEM GRIMM. An $R^2$ approaching the value of 1 reflects a near perfect agreement, whereas a value of 0 indicates a complete lack of correlation.
Accuracy was evaluated by a concentration ramping experiment at 20 °C and 40%. The sensor’s readings at each ramping steady state are compared to the reference instrument.

A negative % means sensors’ overestimation by more than two fold. The higher the positive value (close to 100%), the higher the sensor’s accuracy.

Sensor’s ability of generating precise measurements of PM concentration at low, medium, and high pollutant levels were evaluated under 9 combinations of T and RH, including extreme weather conditions like cold and dry (5 °C and 15%), cold and humid (5 °C and 65%), hot and humid (35 °C and 65%), or hot and dry (35 °C and 15%).

The three Aeroqual AQY sensors showed excellent correlation with the corresponding FEM PM$_{2.5}$ data ($R^2 > 0.99$) at 20 °C and 40% RH.

**Climate Susceptibility**
From the laboratory studies, temperature and relative humidity had minimal effect on the Aeroqual AQY sensors’ precision. At the set-points of RH changes, Aeroqual AQY sensors reported spiked changes in concentrations.

**Observed Interferents**
N/A