



Technical Evaluation of Sensor Technology (TEST) Program

*Aeroqual Series 500 Sensor
2021 – 2nd Quarter*



Introduction and Sensor Profile

Between June and July 2019, the District installed three Aeroqual Series 500 sensors at the Clovis-Villa air monitoring site for the purpose of testing the Aeroqual sensor in the San Joaquin Valley by comparing the performance of the collocated Aeroqual sensor to the Federal Equivalent Method (FEM) ozone analyzer. The data sets analyzed for this report compare ozone data collected from the Aeroqual sensors and the Teledyne T265 FEM analyzer collocated at the regulatory air monitoring site. The scatter plots and time series graph below show how the hourly datasets compare for this period.

Background and Approach of Evaluation Test

In June 2019, one Aeroqual Series 500 sensor (Aeroqual1) began operating at the San Joaquin Valley Air Pollution Control District (District) Clovis air monitoring site to compare the sensor performance to the regulatory gaseous analyzer at the site. At the end of July, two more Aeroqual sensors (Aeroqual2 and Aeroqual3) began operating at the Clovis site. The data sets analyzed for this report compare O₃ data collected from all three Aeroqual Series 500 sensors with the Teledyne T265 Federal Equivalent Method (FEM) monitor at the Clovis air monitoring site. The scatter plots and time series graphs below show how the datasets compare for hourly values.

Overview of Analysis Findings from Current Period

The analysis for this report covers the time period of April 2021 through June 2021 (2021 – 2nd). During this period, hourly data was removed from the calculation of bias when either the Aeroqual sensor or regulatory analyzer did not have a valid hourly sample. For the scatter plots and line graph, all available data are shown.

Weather systems can influence ozone levels by either trapping pollutants near the surface or dispersing them. California's weather pattern is characterized by high pressure systems and low pressure systems that move through the region every two to four days in alternating fashion in April. As the 2nd quarter progressed, temperatures grew warmer and the high pressure systems that built over the region rendered stronger stability, particularly during the end of May-beginning of June and mid-June time frames. Strong stability on June 19th resulted in a 1-hour ozone concentration of 111 ppb being measured on the FEM monitor.

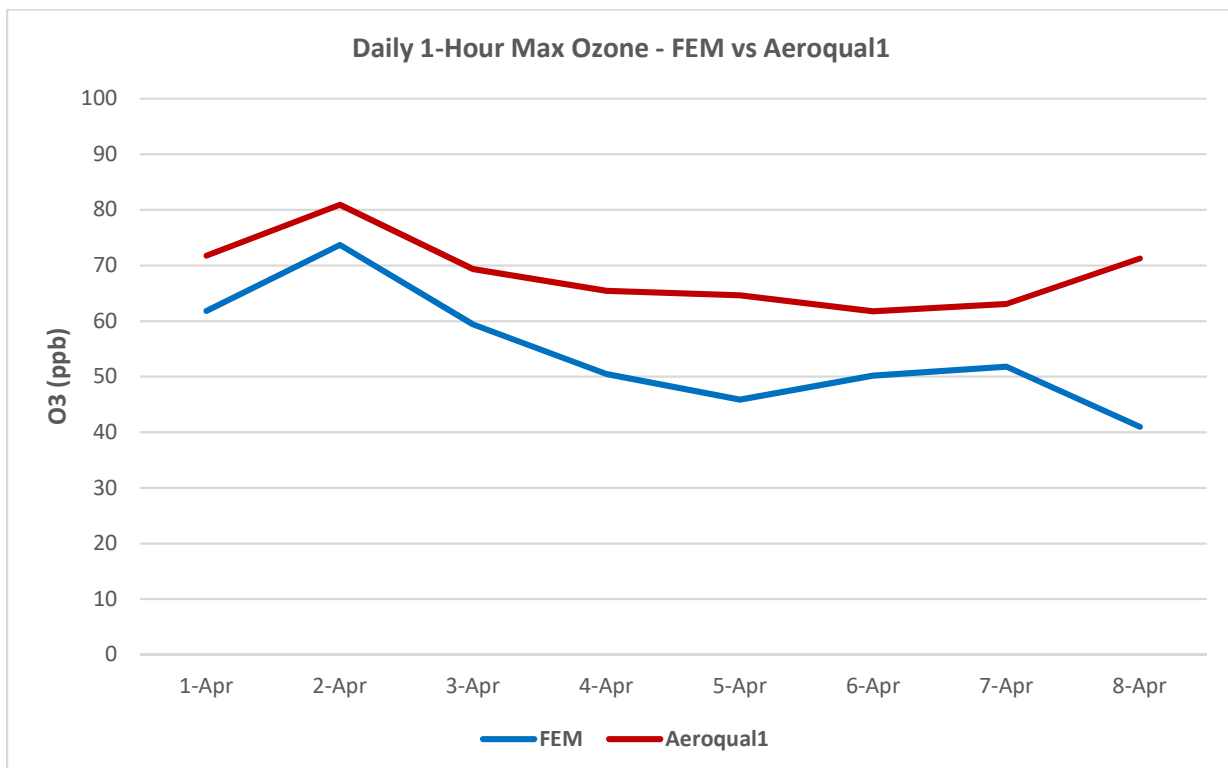
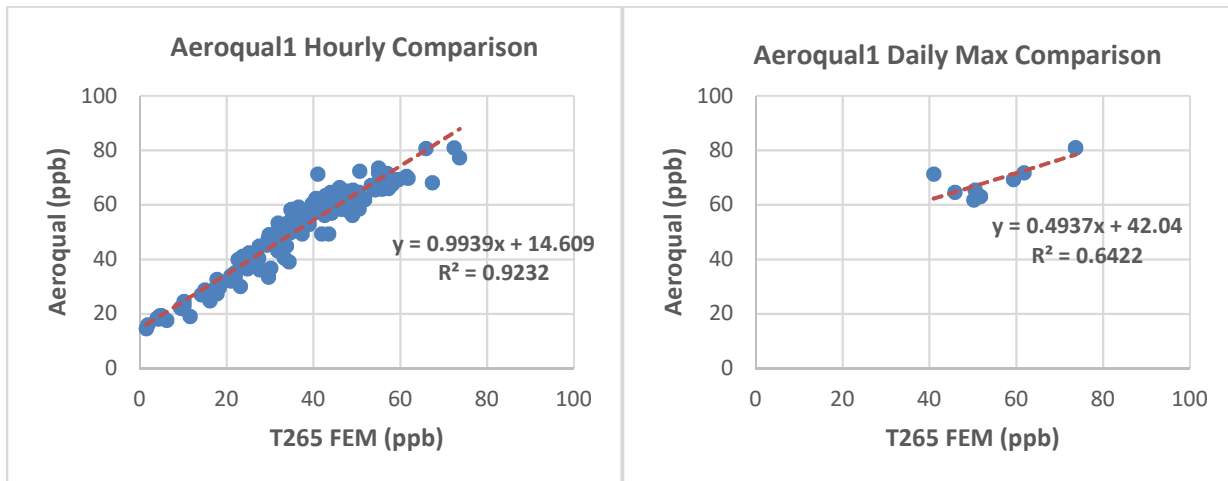
The Aeroqual2 experienced a device failure and was removed from the site on December 8, 2020. The Aeroqual1 experienced a device failure and was removed from the site on April 8, 2021.

Sensor Specific Analysis of Aeroqual Sensor Performance

Aeroqual1

For the hourly ozone value, the Aeroqual1 sensor had a 14.4 ppb high bias and the max daily ozone had a 14.2 ppb low bias during the 2nd quarter 2021 period. The Aeroqual1 sensor malfunctioned on April 8, 2021 and was removed.

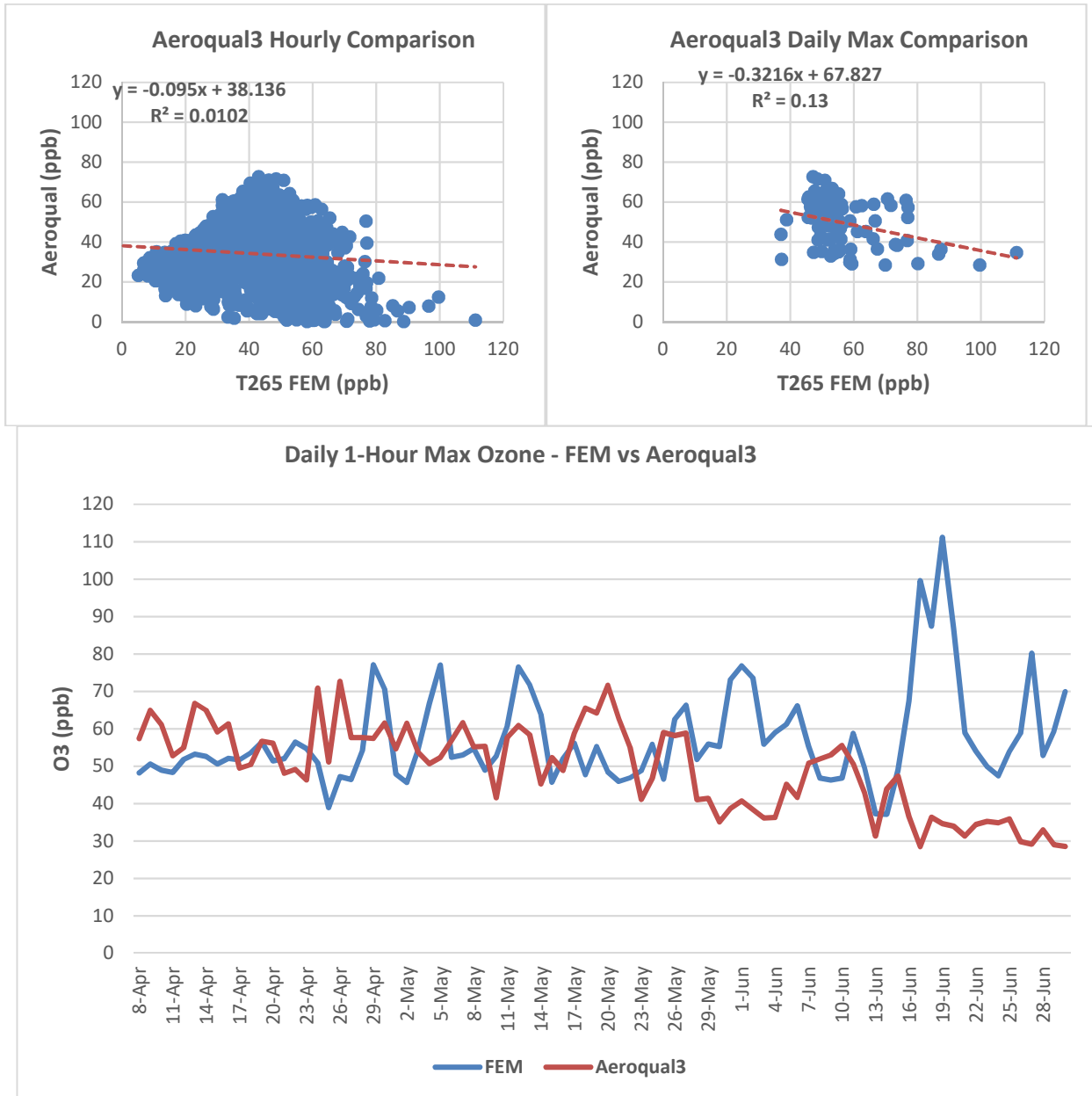
Note: Aeroqual1 data used in this analysis is from April 1 through April 8, 2021 when the instrument was functioning.



Aeroqual3

For the hourly ozone value, the Aeroqual sensor had a 5.1 ppb low bias and the max daily ozone had a 10.7 ppb low bias during the 2nd quarter 2021 period. The Aeroqual3 was malfunctioning prior to maintenance performed on April 8. Data used in this analysis is from April 8 through June 30, 2021.

Note: Aeroqual3 data used in this analysis is from April 8 through June 30, 2021.



Non-Reporting Analyzers

Aeroqual2

Data from this sensor was not available for the April 1, 2021, through June 30, 2021, period.

Statistical Summary

The following table provides a statistical summary of the ozone data collected during the analysis period of this report.

Clovis-Villa	Average 1-hr	Max 1-hr	1-hr R2	1-hr Slope	1-hr Intercept	Max R2	Max Slope	Max Intercept
Aeroqual1	50.2	96.6	0.9232	0.9939	14.609	0.6422	0.4937	42.04
Aeroqual3	34.4	72.7	0.0102	-0.095	67.827	0.13	-0.3216	67.827
FEM	39.4	111.2						