



San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

Technical Evaluation of Sensor Technology (TEST) Program

*Aeroqual Series 500 Sensor
2020 – 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 (Aeroqual 1) 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 (Aeroqual 2 and Aeroqual 3) 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

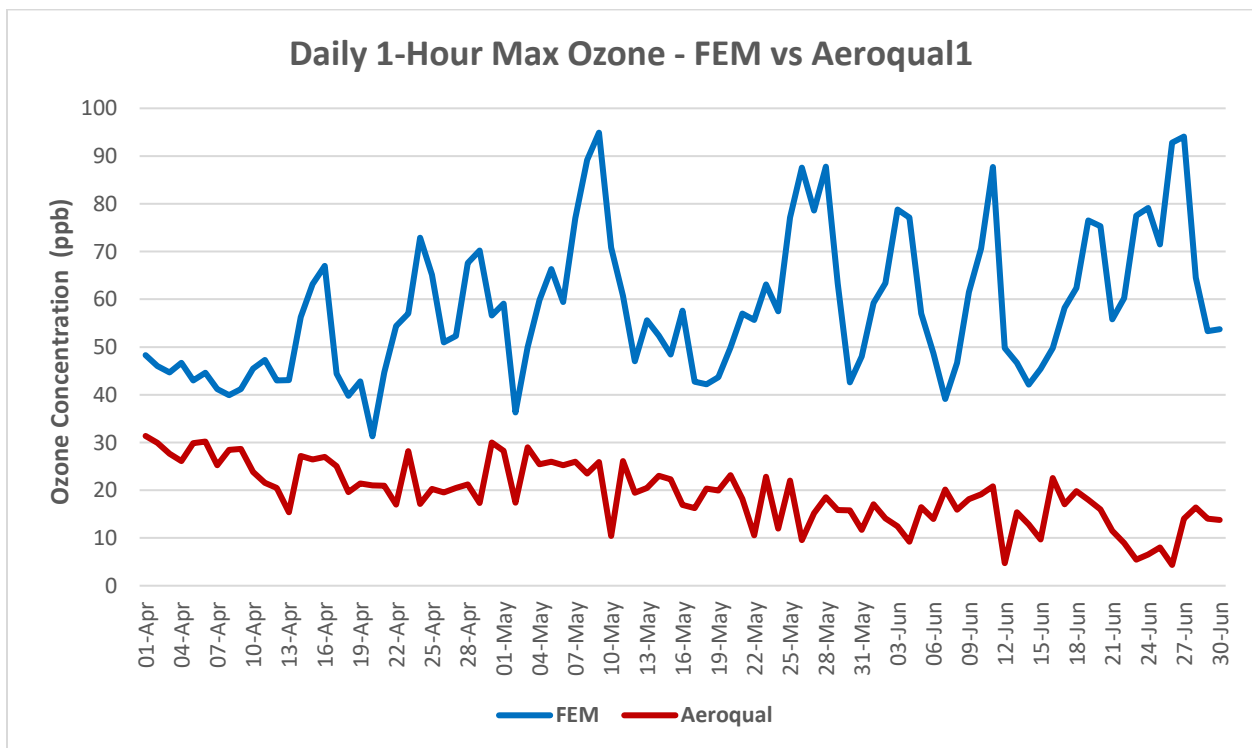
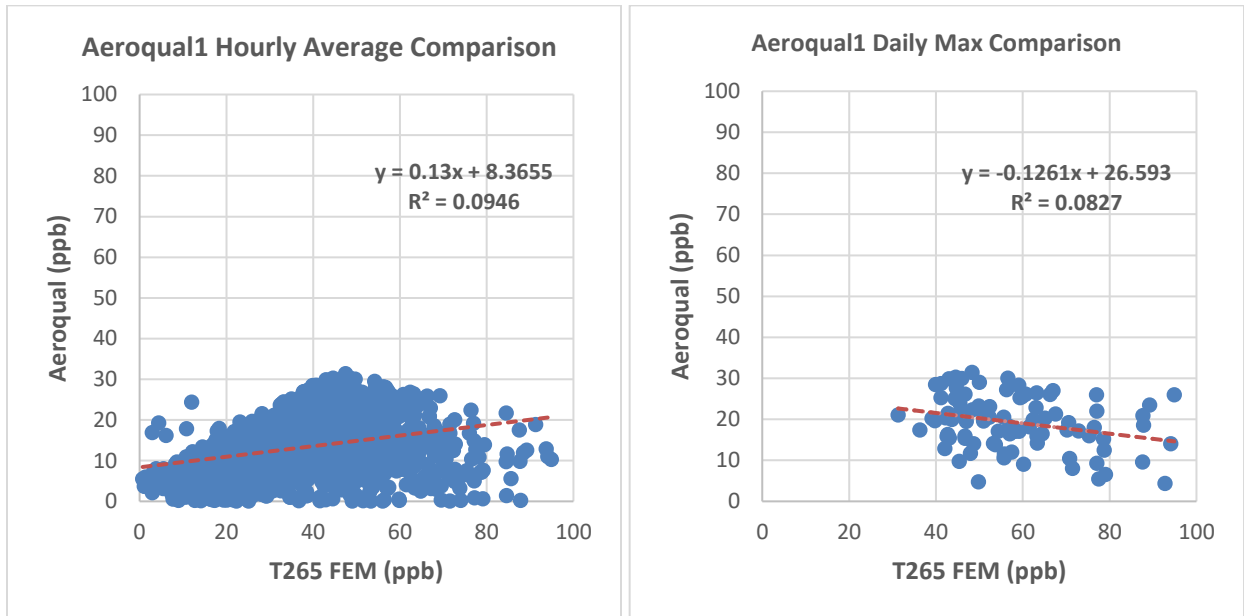
The analysis for this report covers the time period of April 2020 through June 2020 (2020 – 2nd quarter). During this this period, hourly data was removed from the calculation of bias when either the Aeroqual sensor or regulatory analyzer did not have a valid hourly sample. For the scatter plots and line graph, all available data are shown.

April 2020 had several low pressure systems enter the region with significant rainfall. By May, the low pressure systems brought several gusty wind events to the Valley. June was marked by high pressure systems that brought an increase in temperatures. As the days started to get longer this quarter, more sunlight was available and ozone increased through the later part of the quarter. Data from each of the Aeroqual sensors was intermittent during this time period due to sensor data loggers resetting automatically and other unknown factors. As the plots below show, Aeroqual data continues to be biased lower than the District's regulatory data during this period for O₃.

Sensor Specific Analysis of Aeroqual Sensor Performance

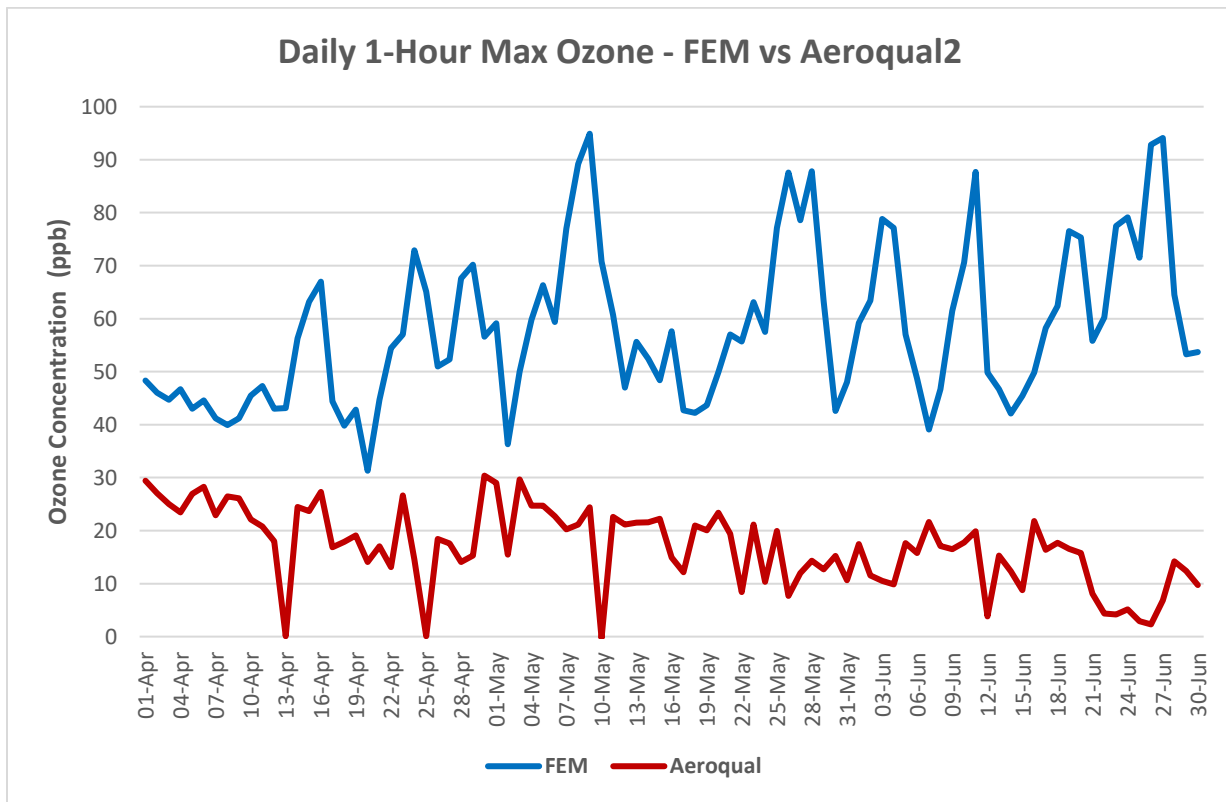
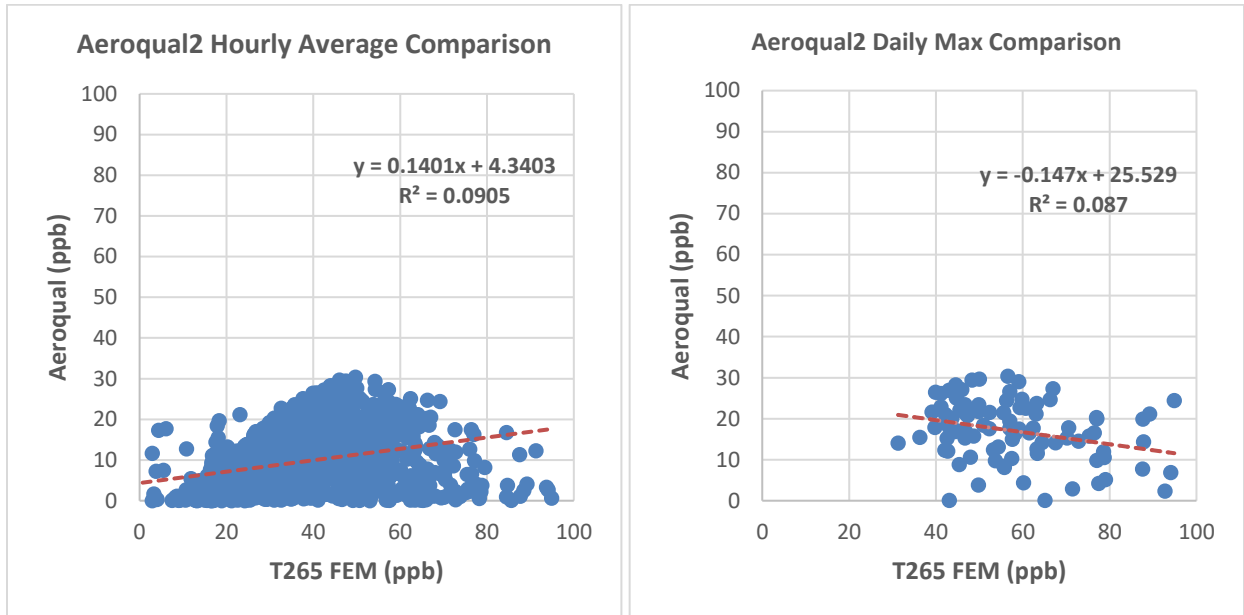
Aeroqual 1

For the hourly O3 max value, the Aeroqual 1 sensor had a 23 ppb low bias and the max daily ozone had a 38.9 ppb low bias during the 2nd quarter 2020 period.



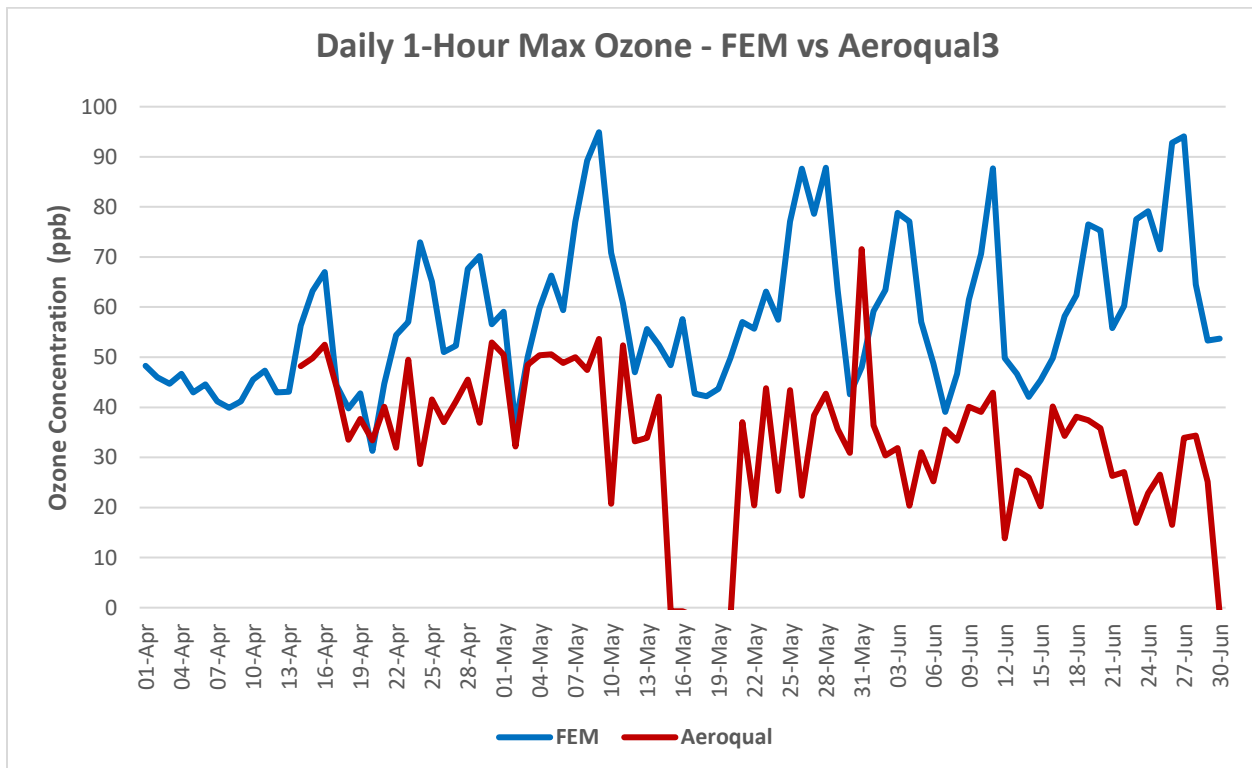
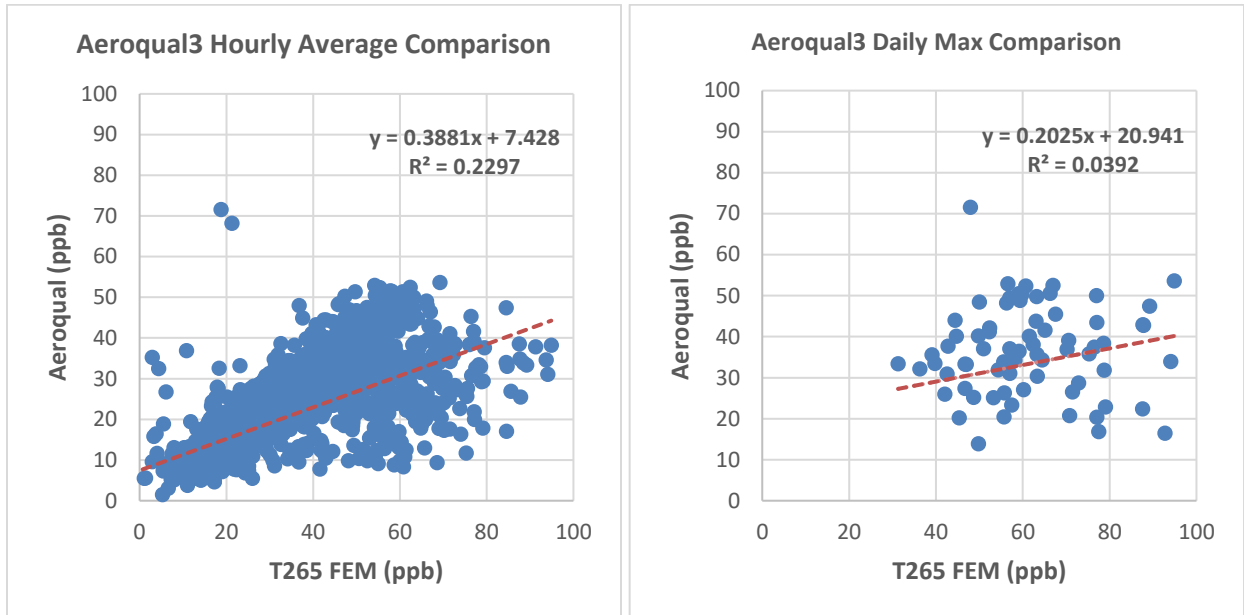
Aeroqual 2

For the hourly O3 max value, the Aeroqual 2 sensor had a 26.7 ppb low bias and the max daily ozone had a 41.2 ppb low bias during the 2nd quarter 2020 period.



Aeroqual 3

For the hourly O3 max value, the Aeroqual sensor had a 15.4 ppb low bias and the max daily ozone had a 29.7 ppb low bias during the 1st quarter 2020 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	13.2	31.4	0.0946	0.1300	8.3655	0.0827	-0.1261	26.593
Aeroqual2	9.4	30.4	0.0905	0.1401	4.3403	0.0870	-0.1470	25.529
Aeroqual3	21.9	71.6	0.2297	0.3881	7.4280	0.0392	0.2025	20.941
FEM	37.3	94.9						