



Technical Evaluation of Sensor Technology (TEST) Program

*Aeroqual Series 500 Sensor
2020 – 4th 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

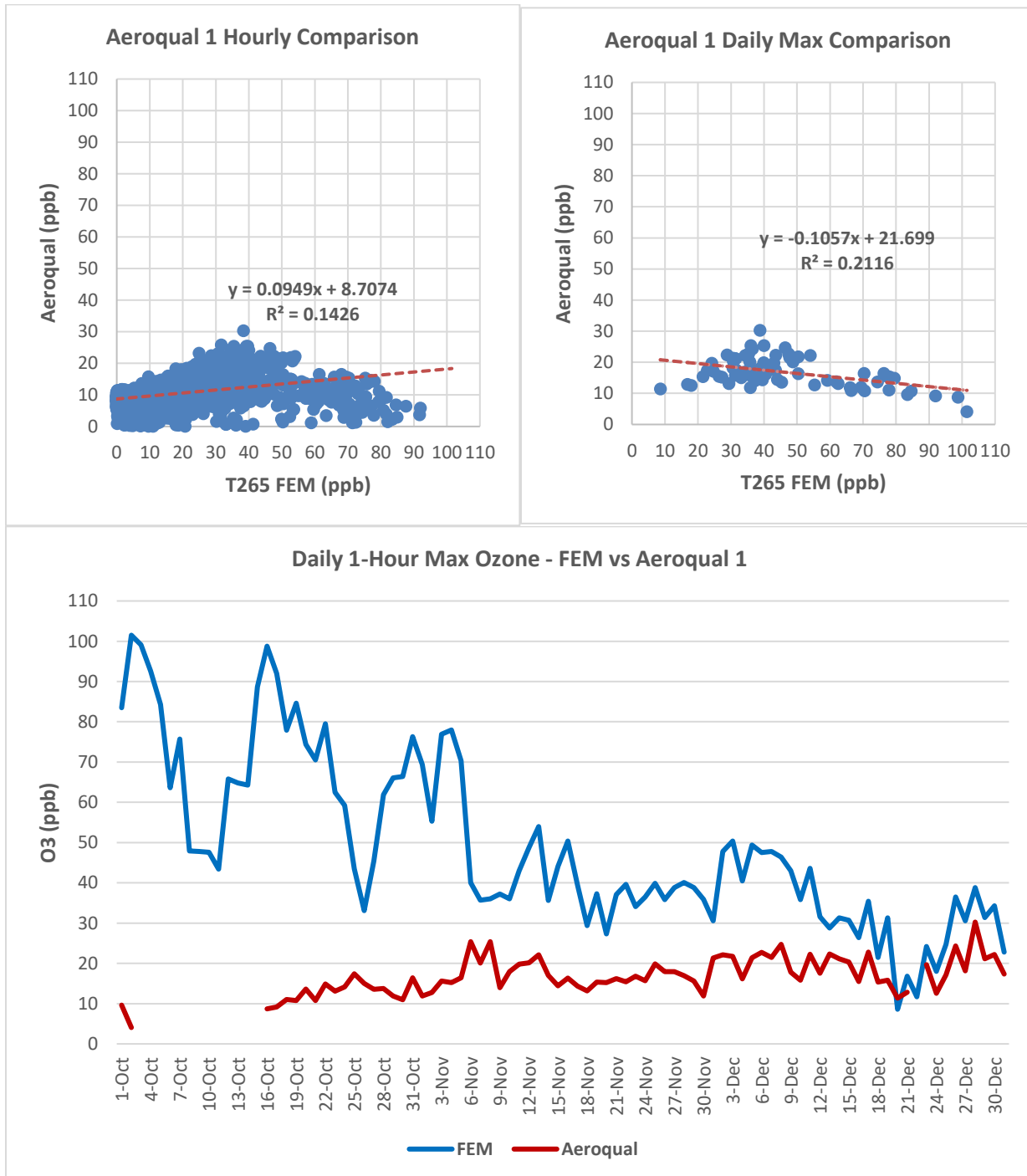
The analysis for this report covers the time period of October 2020 through December 2020 (2020 – 4th quarter). During this this period, hourly data was removed from the calculation of bias when either the Aeroqual sensor or regulatory analyzer did not have a valid hourly sample. For the scatter plots and line graph, all available data are shown.

Much of October was characterized by elevated Ozone due to the combination of extended periods of strong stability and wildfire smoke impacts. Wildfire activity finally subsided in November 2020 and long duration high pressure systems were absent as well so ozone levels were able to decrease through the end of the year. Due to shorter days, less sunlight was available and ozone remained low through the later part of the quarter. Data from each of the Aeroqual sensors was intermittent during this time period due to sensor performance. As the plots below show, Aeroqual data was biased lower than the District's regulatory data during this period.

Sensor Specific Analysis of Aeroqual Sensor Performance

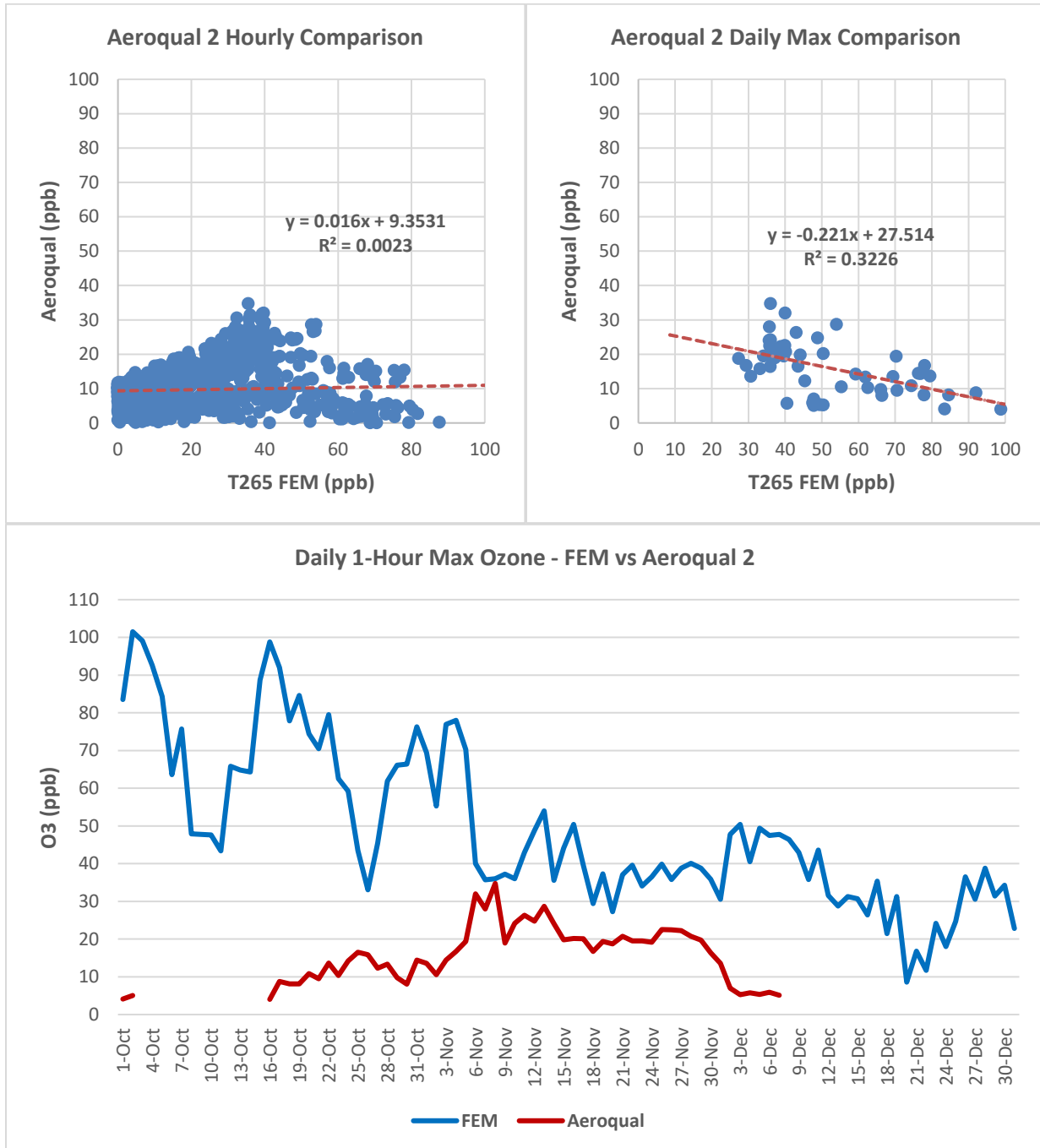
Aeroqual 1

For the hourly ozone value, the Aeroqual 1 sensor had an 8.6 ppb low bias and the max daily ozone had a 29.4 ppb low bias during the 4th quarter 2020 period.



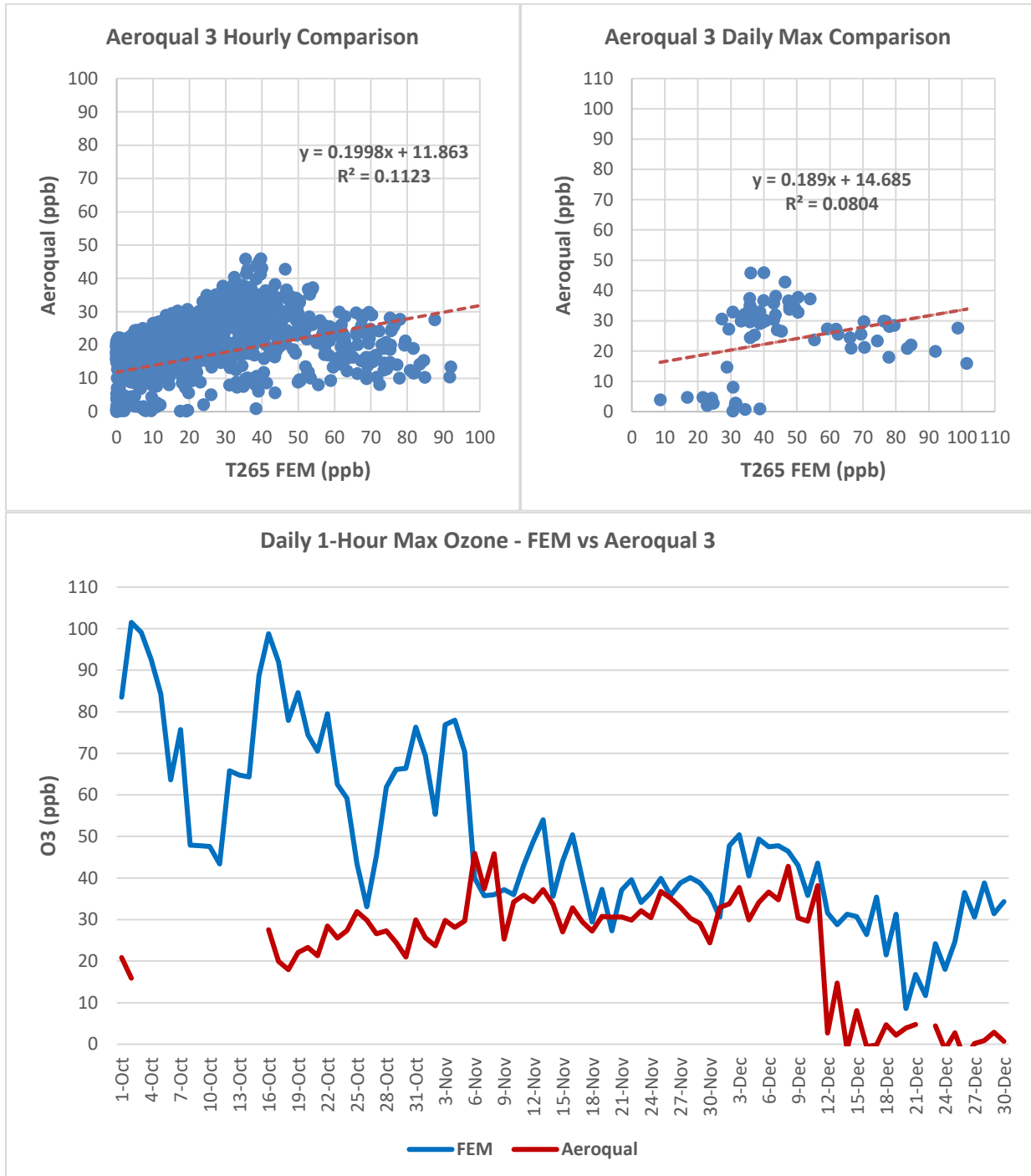
Aeroqual 2

For the hourly ozone value, the Aeroqual 2 sensor had a 12.7 ppb low bias and the max daily ozone had a 37.1 ppb low bias during the 4th quarter 2020 period.



Aeroqual 3

For the hourly ozone value, the Aeroqual sensor had a 3.6 ppb low bias and the max daily ozone had a 22.8 ppb low bias during the 4th 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
Aeroqual 1	10.6	30.3	0.1426	0.0949	8.7074	0.2116	-0.1057	21.699
Aeroqual 2	9.6	34.8	0.0023	0.016	9.3531	0.3226	-0.221	27.514
Aeroqual 3	15.7	45.9	0.1123	0.1998	11.863	0.0804	0.189	14.685
FEM	21.5	101.5						